

Service Manual: 2.4L ENGINE - SERVICE INFORMATION

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 mechanical (e.g., a strange noise), or performance (e.g., engine idles rough and stalls).

For Engine Mechanical diagnosis, refer to ENGINE MECHANICAL DIAGNOSTIC TABLE .

For Engine Performance diagnosis, refer to ENGINE PERFORMANCE DIAGNOSTIC TABLE .

For Fuel Delivery system diagnosis, refer to FUEL DELIVERY, DIAGNOSIS AND TESTING .

For Cooling System diagnosis, refer to DIAGNOSIS AND TESTING .

For Engine Lubrication System diagnosis, refer to ENGINE LUBRICATION DIAGNOSTIC TABLE .

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

- Cylinder Compression Pressure Test: Refer to CYLINDER COMPRESSION TEST .
- Cylinder Combustion Pressure Leakage Test: Refer to CYLINDER LEAKAGE TEST .
- Cylinder Head Gasket Leakage Diagnosis: Refer to CYLINDER HEAD GASKET .
- Mechanical Valve Tappet Noise Diagnosis: Refer to DIAGNOSIS AND TESTING - LASH ADJUSTER (TAPPET) NOISE .
- Exhaust System leak testing: Refer to CHECKING THE EXHAUST SYSTEM FOR LEAKS .

DIAGNOSIS AND TESTING > ENGINE PERFORMANCE DIAGNOSTIC TABLE

CONDITION	POSSIBLE CAUSE	CORRECTION
ENGINE WILL NOT START	1. Weak battery.	1. Test the battery. Charge or replace as necessary. Refer to BATTERY, DIAGNOSIS AND TESTING .
	2. Corroded or loose battery connections.	2. Clean and tighten the battery connections. Apply a coat of light mineral grease to the terminals.
	3. Faulty engine starting system.	3. Test the starting system. Refer to DIAGNOSIS AND TESTING .
	4. Faulty coil(s) or control unit.	4. Test and replace as needed. Refer to DIAGNOSIS AND

		TESTING .
	5. Incorrect spark plug gap.	5. Set the spark plug gap. Refer to SPECIFICATIONS .
	6. Contamination in fuel system.	6. Clean the fuel system and replace the fuel filter.
	7. Incorrect engine oil level and oil quality.	The engine starting should not be effected if the oil level shows anywhere on the dipstick. If the oil level is off the dipstick, the oil level could be contributing to the startability issue. If the oil quality is questionable, change the oil and filter.
	8. Long Stand Still Parking - longer than 35 days.	Perform a long start procedure - Crank engine for 10 seconds, let sit for 5 seconds, crank for 10 seconds. May be necessary to continue sequence after a 30 second break.
	9. Faulty fuel pump.	7. Test the fuel pump and replace as needed. Refer to DIAGNOSIS AND TESTING .
	8. Incorrect cam timing.	8. Verify cam timing. Refer to STANDARD PROCEDURE .
	10. Faulty Camshaft Position (CMP) sensor.	Replace the Camshaft Position (CMP) sensor. Refer to SENSOR, CAMSHAFT POSITION, REMOVAL AND INSTALLATION .
	11. Faulty Crankshaft Position (CKP) sensor.	Replace the Crankshaft Position (CKP) sensor. Refer to SENSOR, CRANKSHAFT POSITION, REMOVAL AND INSTALLATION .
ENGINE STALLS OR IDLES ROUGH	1. Idle speed too low.	1. Check for Diagnostic Trouble Codes (DTC). Refer to appropriate Engine Electrical Diagnostics article.
	2. Incorrect fuel mixture.	2. Check for Diagnostic Trouble Codes (DTC). Refer to appropriate Engine Electrical Diagnostics article.
	3. Vacuum leak.	3. Inspect intake manifold, manifold gasket, and vacuum hoses.
	4. Faulty ignition coil(s).	4. Test and replace the ignition coil. Refer to COIL, IGNITION, REMOVAL AND INSTALLATION .

	5. Faulty Crankshaft Position (CKP) sensor.	5. Replace the Crankshaft Position (CKP) sensor. Refer to SENSOR, CRANKSHAFT POSITION, REMOVAL AND INSTALLATION .
	6. Incorrect cam timing.	6. Verify cam timing. Refer to STANDARD PROCEDURE .
ENGINE LOSS OF POWER	1. Dirty or incorrectly gapped spark plugs.	1. Correct as necessary. Refer to SPARK PLUG, REMOVAL AND INSTALLATION .
	2. Contamination in fuel system.	2. Clean the fuel system and replace the fuel filter.
	3. Faulty fuel pump.	3. Test and replace the fuel pump. Refer to MODULE, FUEL PUMP, REMOVAL AND INSTALLATION .
	4. Leaking cylinder head gasket.	4. Replace the cylinder head gasket. Refer to CYLINDER HEAD, REMOVAL AND INSTALLATION .
	5. Low compression.	5. Determine the cause and repair as necessary. Refer to CYLINDER COMPRESSION TEST .
	6. Burned, warped, or pitted valves.	6. Replace valves as necessary. Refer to CYLINDER HEAD .
	7. Plugged or restricted exhaust system.	7. Perform the exhaust restriction test. Install new parts as necessary. Refer to DIAGNOSIS AND TESTING .
	8. Faulty ignition coil(s).	8. Test and replace the ignition coil. Refer to COIL, IGNITION, REMOVAL AND INSTALLATION .
	9. Incorrect valve timing.	9. Verify cam timing. Refer to STANDARD PROCEDURE .
ENGINE MISSES ON ACCELERATION	1. Dirty or incorrectly gapped spark plugs.	1. Correct as necessary. Refer to SPARK PLUG, REMOVAL AND INSTALLATION .
	2. Contamination in fuel system.	2. Clean fuel system and replace the fuel filter.
	3. Burned, warped, or pitted valves.	3. Replace valves as necessary. Refer to CYLINDER HEAD .
	4. Faulty ignition coil(s).	4. Test and replace the ignition coil. Refer to COIL, IGNITION, REMOVAL AND INSTALLATION .
ENGINE MISSES AT HIGH SPEED	1. Dirty or incorrect spark plug gap.	1. Correct as necessary. Refer to SPARK PLUG, REMOVAL AND

		INSTALLATION .
	2. Faulty ignition coil(s).	2. Test and replace the ignition coil. Refer to COIL, IGNITION, REMOVAL AND INSTALLATION .
	3. Contamination in fuel system.	3. Clean the fuel system and replace the fuel filter.
	4. Dirty fuel injector(s).	4. Test and replace as necessary. Refer to DIAGNOSIS AND TESTING .

DIAGNOSIS AND TESTING > NOISY OPERATION

1. You will hear a noise of high and constant intensity, coming from the engine area and detectable only within a certain range of RPM.

PRELIMINARY CHECKS	EVERYTHING OK	PROBLEMS ENCOUNTERED	RESOLUTION
Check the integrity and tightness of the circuit intake air	Continue to Step 2	Circuit components damaged.	Repair or replace components as necessary.

2. Check engine mounts.

CHECK ENGINE MOUNTS	EVERYTHING OK	PROBLEMS ENCOUNTERED	RESOLUTION
Check the correct mounting and the integrity of: - engine Supports - flexible blocks - guy reaction	Continue to Step 3	1. Fixing incorrect media engine 2. Support the engine gearbox side defective 3. Support engine timing side defective 4. Support rear motor defective 5. Anchor elastic support front defective 6. Anchor elastic back support defective 7. Anchor elastic support gearbox side defective 8. Fixing incorrect tie rod reaction.	1. Restore the correct fitting. 2. Replace the motor mount on the gearbox side. 3. Replace the motor mount side distribution. 4. Replace the rear motor mount. 5. Replace the elastic block front support. 6. Replace the elastic block back support. 7. Replace the elastic block support gearbox side.

			8. Restore the correct fixing.
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3. Check engine exhaust supports.

CHECK ENGINE SUPPORTS EXHAUST	EVERYTHING OK	PROBLEMS ENCOUNTERED	RESOLUTION
Check the correct support fixing sewage pipes.	Continue to Step 4	1. Supports loose. 2. Support damaged.	1. Restore the correct fixing of the supports. 2. Replace the damaged media.

4. Check engine exhaust.

CHECK ENGINE EXHAUST	EVERYTHING OK	PROBLEMS ENCOUNTERED	RESOLUTION
Check the exhaust system of the engine and in particular: - collector - conduit - Exhaust silencer - Seal front of the catalytic converter.	End diagnosis	1. Full damaged pipe. 2. Silencer damaged. 3. Seal Front worn or damaged.	1. Replace the pipe complete 2. Replace the rear silencer 3. Replace the front seal

DIAGNOSIS AND TESTING > ENGINE MECHANICAL DIAGNOSTIC TABLE

CONDITION	POSSIBLE CAUSES	CORRECTIONS
NOISY VALVES	1. High or low oil level in crankcase.	1. Adjust the engine oil level. Refer to FILTER, ENGINE OIL, REMOVAL AND INSTALLATION .
	2. Thin or diluted oil.	2. Change the engine oil and filter. Refer to FILTER, ENGINE OIL, REMOVAL AND INSTALLATION .
	3. Low oil pressure.	3. Check the oil pump, if OK, check the rod and main bearings for excessive wear. Refer to STANDARD PROCEDURE .
	4. Dirt in valve lash adjusters.	4. Replace as necessary. Refer to LIFTER(S), HYDRAULIC, REMOVAL AND INSTALLATION .
	5. Worn rocker arms.	5. Replace as necessary. Refer to CYLINDER HEAD .

	6. Worn valve lash adjusters	6. Replace as necessary. Refer to LIFTER(S), HYDRAULIC, REMOVAL AND INSTALLATION .
	7. Worn valve guides.	7. Inspect the valve guides for wear, cracks or looseness. If either condition exists, replace the cylinder head. Refer to CYLINDER HEAD, REMOVAL AND INSTALLATION .
	8. Excessive runout of valve seats or valve faces.	8. Replace as necessary. Refer to CYLINDER HEAD .
CONNECTING ROD NOISE	1. Insufficient oil supply.	1. Check and adjust the engine oil level. Refer to FILTER, ENGINE OIL, REMOVAL AND INSTALLATION .
	2. Low oil pressure.	2. Check the engine oil pump, if OK, check the rod and main bearings for excessive wear. Refer to STANDARD PROCEDURE .
	3. Thin or diluted oil.	3. Change the engine oil and filter. Refer to FILTER, ENGINE OIL, REMOVAL AND INSTALLATION .
	4. Excessive bearing clearance.	4. Replace as necessary. Refer to ENGINE BLOCK .
	5. Connecting rod journal out-of-round, rough surface or debris. Obstructed oil feed hole.	5. Service or replace the crankshaft. Check the crankshaft for plugged oil feed hole. Refer to ENGINE BLOCK .
	6. Misaligned connecting rods.	6. Replace the bent connecting rods. Refer to ROD, PISTON AND CONNECTING, REMOVAL AND INSTALLATION .
MAIN BEARING NOISE	1. Insufficient oil supply.	1. Check and adjust the engine oil level. Refer to FILTER, ENGINE OIL, REMOVAL AND INSTALLATION .
	2. Low oil pressure.	2. Check the engine oil pump, if OK, check the rod and main bearings for excessive wear. Refer to STANDARD PROCEDURE .
	3. Thin or diluted oil.	3. Change the engine oil and filter. Refer to FILTER, ENGINE OIL, REMOVAL AND INSTALLATION .
	4. Excessive bearing clearance.	4. Replace as necessary. Refer to ENGINE BLOCK .
	5. Excessive end play.	5. Check the thrust washers for wear. Refer to ENGINE BLOCK .

	6. Crankshaft journal out-of round, rough or debris. Obstructed oil feed hole.	6. Service or replace the crankshaft. Check the engine block for plugged oil feed hole. Refer to ENGINE BLOCK .
	7. Loose flywheel, flexplate or torque converter.	7. Tighten to the proper specification. Refer to TORQUE SPECIFICATIONS .

DIAGNOSIS AND TESTING > CYLINDER COMPRESSION TEST



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, 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 LEAKAGE TEST .

DIAGNOSIS AND TESTING > CYLINDER LEAKAGE TEST

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

Cylinder leakage testing will detect:

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

1. Check the coolant level and fill as required. DO NOT install the radiator cap.
2. Start and operate the engine until it attains normal operating temperature, then turn the engine OFF.
3. Remove the spark plugs.
4. Remove the oil filler cap.
5. Remove the air cleaner hose.
6. **Calibrate the tester according to the manufacturer's instructions.** The shop air source for testing should maintain a regulated air pressure at 552 kPa (80 psi).
7. Perform the test procedures on each cylinder according to the tester manufacturer's instructions. Set piston of cylinder to be tested at TDC compression.

8. While testing, listen for pressurized air escaping through the throttle body, tailpipe and oil filler cap opening. Check for bubbles in the radiator coolant.

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

If leakage is greater than 25%, refer to CYLINDER COMBUSTION PRESSURE LEAKAGE DIAGNOSIS CHART below.

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

DIAGNOSIS AND TESTING > 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.**

DIAGNOSIS AND TESTING > OIL CONSUMPTION TEST AND DIAGNOSIS > OIL CONSUMPTION TEST

1. Check the oil level at least 15 minutes after a hot shutdown with the vehicle on a level surface.
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 with a black light marking device (pen) or air conditioning dye applied with a small brush.



NOTE:

The use of a black light marking device is recommended so the marks can only be seen with a ultraviolet light.

4. Record the vehicle mileage. Note that the oil level at 'full' mark 15 minutes after hot shut-down and date.
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 on a level surface. If the oil level is half way between the "FULL" and "ADD" mark or below, continue with the next step.
7. Using a black light, check for any external engine oil leaks, repair as necessary, if no external engine oil leaks are present, continue with oil consumption diagnosis.

DIAGNOSIS AND TESTING > OIL CONSUMPTION TEST AND DIAGNOSIS > OIL CONSUMPTION DIAGNOSIS

1. Check the Positive Crankcase Ventilation (PCV) system. Make sure the system is not restricted, (one way by blowing air through it) and the PCV valve is the correct part based on the part number. Check the hoses and connectors for damage or leaks. It must have correct vacuum source at intake manifold through the hose- vent assembly. Normal vacuum is considered to be 18-20 in. Hg at idle, below 3000 ft. above sea level.
2. Perform a cylinder compression test and cylinder leakage test using the standard cylinder leakage tester and following manufacturers suggested best practices.



NOTE:

Blow the spark plug sockets/bores out with compressed air to remove fluid or debris before removing the spark plugs.

Verify the spark plugs are not oil saturated.

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

DIAGNOSIS AND TESTING > OIL CONSUMPTION TEST AND DIAGNOSIS > TOP 18 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.

If equipped with an engine driven vacuum pump, high oil consumption can be caused by unchecked airflow into the pump. This can be caused by anything that opens the vacuum pump intake port up to the atmosphere such as a faulty vacuum pump, hose fitting, hose and brake booster. If there is not a restriction (normally caused by the pump pulling vacuum on the brake booster), then the vacuum pump will pump a high volume of air. This high volume of air will pressurize the crankcase and cause excessive oil burning and oil flow through the PCV system.

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:

1. Excess fuel can enter and mix with the oil via a leaking fuel injector
2. Gasoline contaminated with diesel fuel

3. Restricted air intake

4. 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.

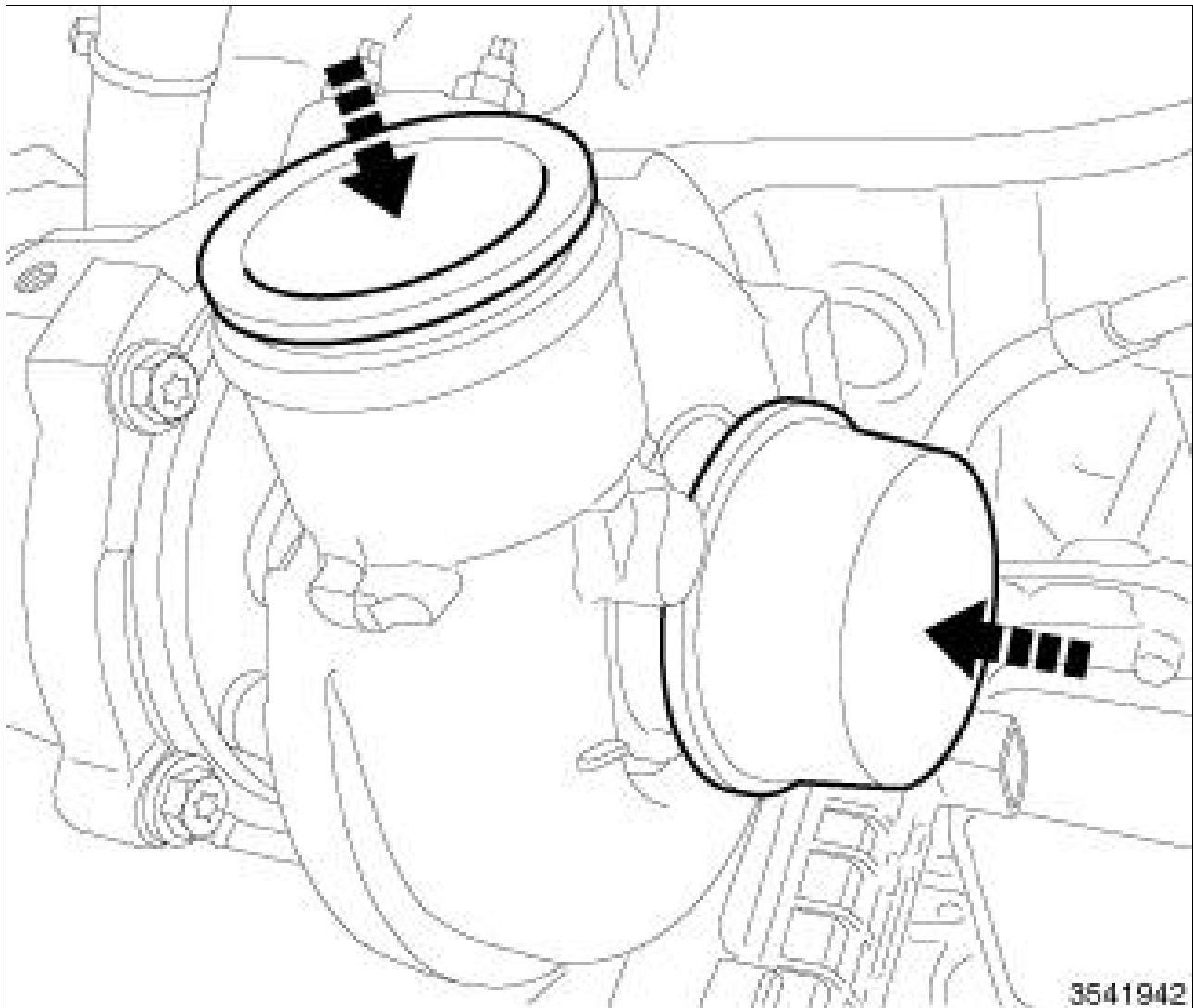
DIAGNOSIS AND TESTING > ENGINE LUBRICATION DIAGNOSTIC TABLE

CONDITION	POSSIBLE CAUSES	CORRECTION
OIL LEAKS	1. Misaligned or damaged gaskets and O-rings.	1. Replace as necessary.
	2. Loose fasteners, broken or porous metal parts.	2. Repair or replace metal parts. Tighten fasteners to the proper specification. Refer to TORQUE SPECIFICATIONS .
	3. Crankshaft rear oil seal.	3. Replace the rear crankshaft oil seal. Refer to SEAL, CRANKSHAFT OIL, REAR, REMOVAL AND INSTALLATION .
	4. Crankshaft rear oil seal surface scratched, nicked or grooved.	4. Polish or replace the crankshaft. Refer to ENGINE BLOCK .
	5. Oil pan flange cracked.	5. Replace the oil pan. Refer to PAN, OIL, REMOVAL AND INSTALLATION .
	6. Damaged or misaligned crankshaft front oil seal.	6. Replace the front crankshaft oil seal. Refer to SEAL, CRANKSHAFT OIL, FRONT, REMOVAL AND INSTALLATION .
	7. Scratched or damaged vibration damper hub front oil seal surface.	7. Polish or replace the vibration damper. Refer to DAMPER, VIBRATION, REMOVAL AND INSTALLATION .
OIL PRESSURE DROP	1. Low oil level.	1. Check and correct the engine oil level. Refer to LUBRICATION .
	2. Faulty oil pressure sensor.	2. Replace the oil pressure sensor.
	3. Low oil pressure.	3. Check the main crankshaft bearing clearance. Refer to ENGINE BLOCK . 3. Check the rod bearing clearance. Refer to ENGINE BLOCK .

	4. Clogged oil filter.	4. Replace the engine oil filter. Refer to FILTER, ENGINE OIL, REMOVAL AND INSTALLATION .
	5. Worn oil pump.	5. Replace the engine oil pump. Refer to PUMP, ENGINE OIL, REMOVAL AND INSTALLATION .
	6. Thin or diluted oil.	6. Change the engine oil and filter. Refer to LUBRICATION .
	7. Excessive bearing clearance.	7. Replace the crankshaft bearings. Refer to ENGINE BLOCK . 7. Replace the rod bearings. Refer to ENGINE BLOCK .
	8. Oil pump relief valve stuck.	8. Replace the engine oil pump. Refer to PUMP, ENGINE OIL, REMOVAL AND INSTALLATION .
OIL PUMPING AT RINGS; SPARK PLUGS FOULING	1. Worn or damaged rings.	1. Hone the cylinder bores and replace the piston rings. Refer to ENGINE BLOCK . Refer to RING(S), PISTON, REMOVAL AND INSTALLATION .
	2. Carbon in oil ring slots.	2. Replace the piston rings. Refer to RING(S), PISTON, REMOVAL AND INSTALLATION .
	3. Worn valve guides.	3. Replace the cylinder head. Refer to CYLINDER HEAD, REMOVAL AND INSTALLATION .
	4. Leaking valve guide seals.	4. Replace the valve guide seals. Refer to CYLINDER HEAD .
ENGINE OIL FILTER SWOLLEN OR BURST	1. Obstructed or incorrect oil filter.	1. Install new oil filter and test engine oil pressure. Refer to LUBRICATION .
	2. Engine oil viscosity incorrect.	2. Change engine oil and test engine oil pressure. Refer to LUBRICATION .
	3. Excessive engine oil pressure.	3. Replace engine oil pump. Refer to PUMP, ENGINE OIL, REMOVAL AND INSTALLATION .

STANDARD PROCEDURE > DUST COVERS AND CAPS

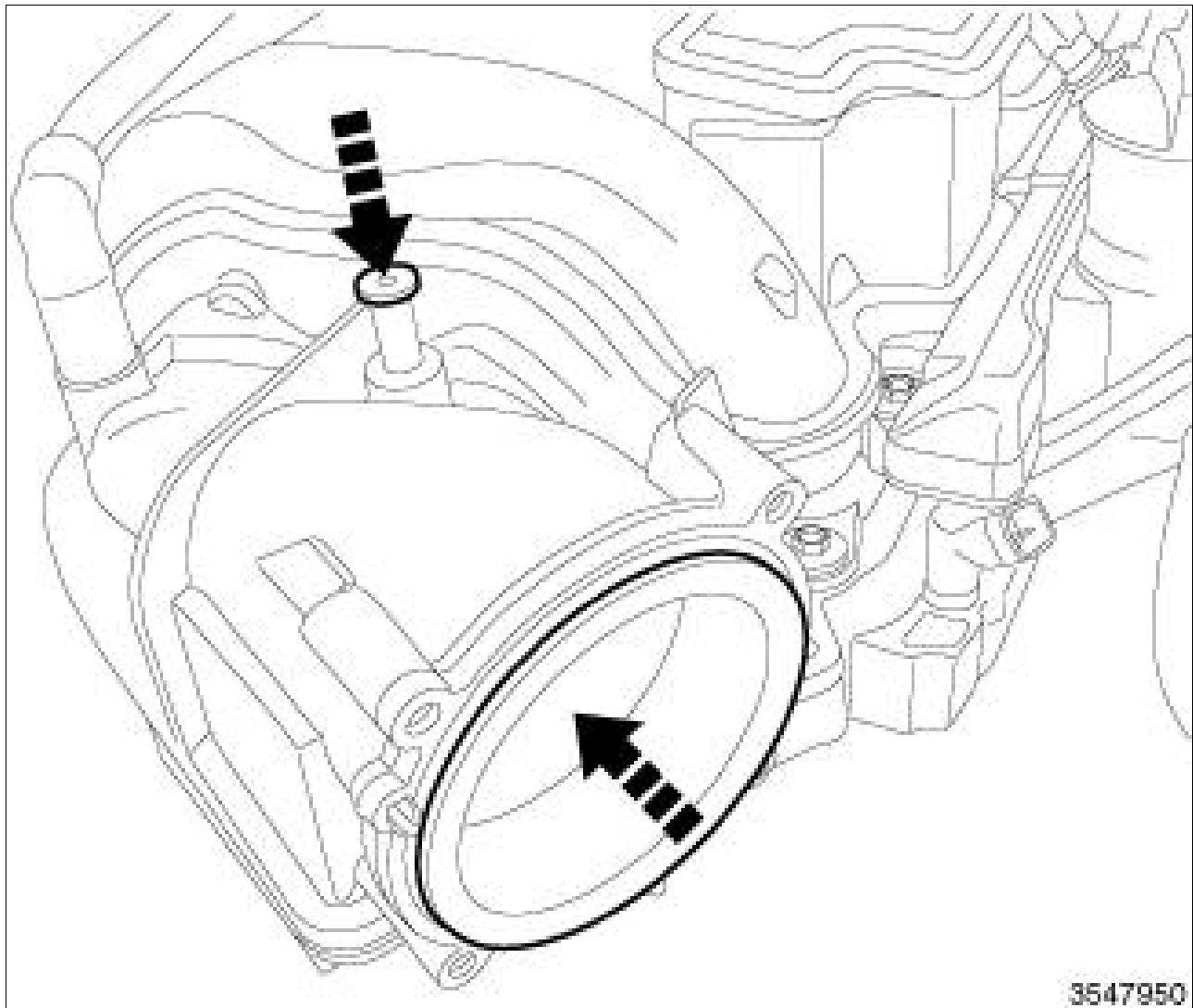
Fig 1: Covers/Caps



Courtesy of CHRYSLER GROUP, LLC

To avoid the possibility of dust, dirt, moisture and other foreign debris being introduced to the engine during service, cover or cap all openings when hoses and tubes are removed.

Fig 2: Opening Cover

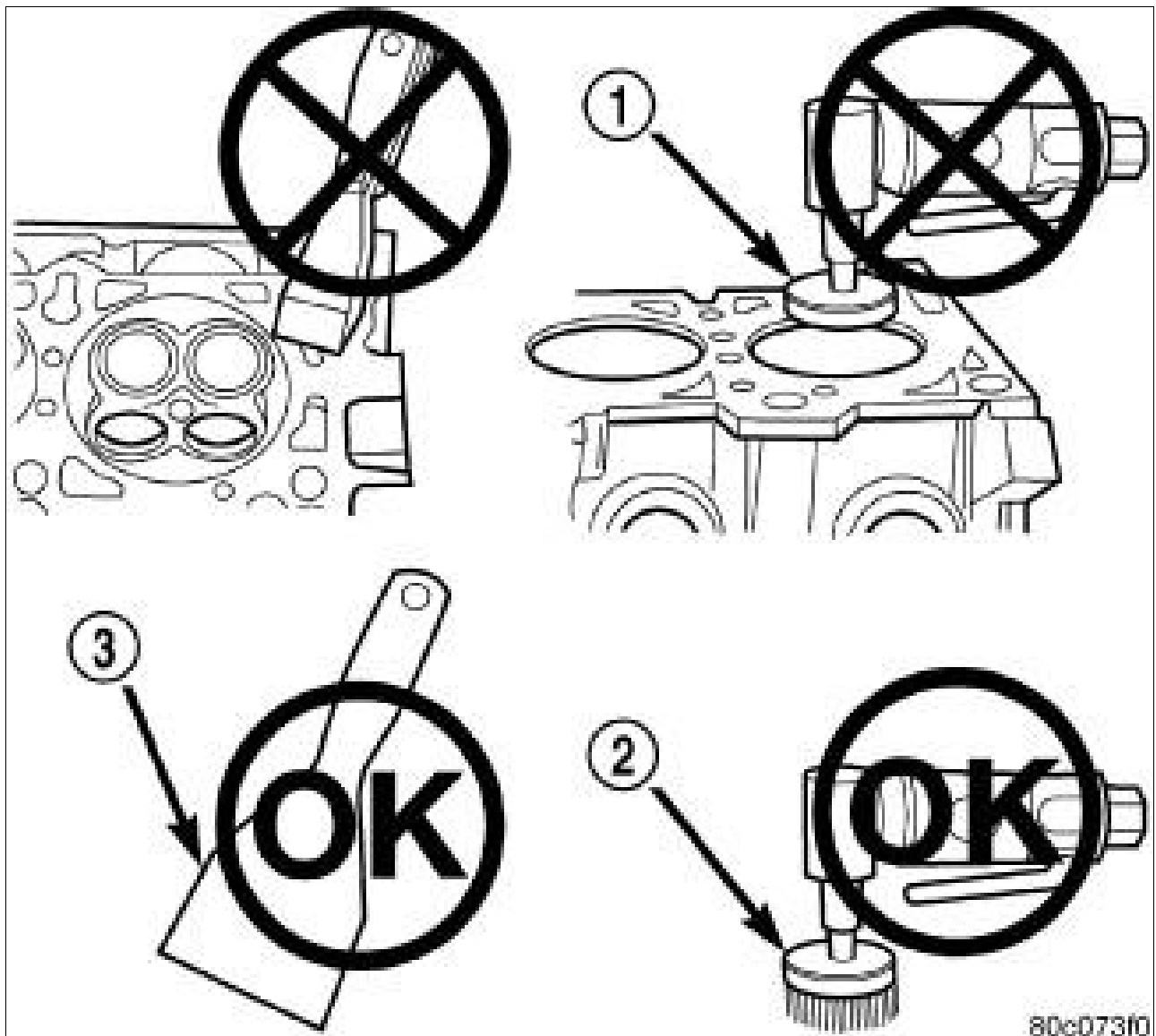


Courtesy of CHRYSLER GROUP, LLC

Covers installed over openings will reduce the possibility of foreign materials to entering the engine systems. Using miller tool Universal Protective Cap Set (special tool #10368, Set, Universal Protective Cap), select the appropriate cover needed for the procedure.

STANDARD PROCEDURE > ENGINE GASKET SURFACE PREPARATION

Fig 1: Proper Tool Usage For Surface Preparation



Courtesy of CHRYSLER GROUP, LLC

1 - ABRASIVE PAD

2 - 3M ROLOC™ BRISTLE DISC

3 - PLASTIC/WOOD SCRAPER

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

Never use the following to clean gasket surfaces:

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



NOTE:

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

Only use the following for cleaning gasket surfaces:

- Solvent or a commercially available gasket remover
- Plastic or wood scraper (3).
- Drill motor with 3M Roloc™ Bristle Disc (white or yellow) (2).



CAUTION:

Excessive pressure or high RPM (beyond the recommended speed), can damage the sealing surfaces. The mild (white, 120 grit) bristle disc is recommended. If necessary, the medium (yellow, 80 grit) bristle disc may be used on cast iron surfaces with care.

STANDARD PROCEDURE > FORM-IN-PLACE GASKETS AND SEALERS



NOTE:

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

There are numerous places where form-in-place gaskets are used on the engine. Care must be taken when applying form-in-place gaskets to assure obtaining the desired results. **Do not use form-in-place gasket material unless specified.** Bead size, continuity, and location are of great importance. Too thin 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. Surfaces should be cleaned with Mopar® brake parts cleaner prior to sealer application. After the sealer is applied, the parts should be assembled within 10 minutes.

There are numerous types of form-in-place gasket materials that are used in the engine area. Each has different properties and can not be used in place of the other.

SEALANT TYPES

- **MOPAR® ENGINE 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® ATF-RTV** is a specifically 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® BED PLATE SEALANT** is a unique (green-in-color) anaerobic type gasket material that is specially made to seal the area between the bed plate and cylinder block without disturbing the bearing clearance or alignment of these components. The material cures slowly in the absence of air when torqued between two metallic surfaces, and will rapidly cure when heat is applied.
- **MOPAR® THREEBOND™ ENGINE RTV** is formulated as a high performance temperature vulcanized silicone with good elasticity, temperature and chemical resistance when cured. It is resistant to engine oil, transmission fluid and gear lube but not recommended for sealing engine coolant.

SEALANT APPLICATION

- Mopar® Gasket Maker material should be applied sparingly 1 mm (0.040 in.) diameter or less of sealant to one gasket surface. Be certain the material surrounds each mounting hole. Excess material can easily be wiped off. Components should be torqued in place within 15 minutes. The use of a locating dowel is recommended during assembly to prevent smearing material off the location.
- Mopar® Engine Sealant RTV or ATF-RTV gasket material should be applied in a continuous bead approximately 3 mm (0.120 in.) in diameter. All mounting holes must be circled. For corner sealing and "T" joint locations, a 3.17 or 6.35 mm (1/8 or 1/4 in.) drop is placed in the center of the gasket contact area. Uncured sealant may be removed with a shop towel. Components should be torqued in place while the sealant is still wet to the touch (within 10 minutes). The usage of a locating dowel is recommended during assembly to prevent smearing material off the location.
- Mopar® Threebond™ Engine RTV Sealant gasket material should be applied in a continuous bead approximately 3 mm (0.120 in.) in diameter. The gasket surfaces should be cleaned with isopropyl alcohol wipes in preparation for sealant application. All mounting holes must be circled. For corner sealing and "T" joint locations, a 3.17 or 6.35 mm (1/8 or 1/4 in.) drop is placed in the center of the gasket contact area. Uncured sealant may be removed with a shop towel. Components should be assembled within 20 minutes and torqued in place within 45 minutes. The usage of a locating dowel is recommended during assembly to prevent smearing material off the location.

STANDARD PROCEDURE > HYDROSTATIC LOCKED ENGINE

When an engine is suspected to be hydrostatically locked, regardless of what caused the problem, the following steps should be used.

 CAUTION:

DO NOT use starter motor to rotate the engine, severe damage may occur.

1. Inspect air cleaner, induction system and intake manifold to insure system is dry and clear of foreign material.
2. Disconnect and isolate the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), disconnect the IBS connector first before disconnecting the negative battery cable.
3. Place a shop towel around the spark plugs when removing them from the engine. This will catch any fluid that may possibly be in the cylinder under pressure.
4. With all spark plugs removed, rotate engine crankshaft using a breaker bar and socket.
5. Identify the fluid in the cylinder(s) (i.e., coolant, fuel, oil or other).
6. Make sure all fluid has been removed from the cylinders. Inspect engine for damage (i.e., connecting rods, pistons, valves, etc.)
7. Repair engine or components as necessary to prevent this problem from reoccurring.

 CAUTION:

Squirt approximately one teaspoon of oil into the cylinders, rotate engine to lubricate the cylinder walls to prevent damage on restart.

8. Install new spark plugs.
9. Drain engine oil and remove oil filter.
10. Install a new oil filter.
11. Fill engine with specified amount of approved oil.
12. Connect the negative battery cable. If equipped with an Intelligent Battery Sensor (IBS), connect the IBS connector to the negative battery cable.
13. Start engine and check for any leaks.

STANDARD PROCEDURE > REPAIR DAMAGED OR WORN THREADS

 CAUTION:

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

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

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

SPECIFICATIONS > ENGINE SPECIFICATIONS

ENGINE TYPE

-	2.4 MultiAir2
Position in vehicle	Front
Orientation	Transverse
Number of cylinders	4
Cylinder position	In line
Fuel	Gas
Camshaft configuration	1 Cam in head (exhaust side) + MultiAir actuator module (intake side)

ENGINE DATA

-	2.4 MultiAir2
Bore (mm)	88.0
Stroke (mm)	97.0
Total displacement (cm3)	2360
Maximum power (kW EEC)	132
Maximum power (CV EEC)	175
Max. power (RPM)	6400
Maximum torque (Nm EEC)	224
Maximum torque (kgm EEC)	22.8
Maximum torque (RPM)	3900

SPECIFICATIONS > TORQUE SPECIFICATIONS

ENGINE MOUNTS

Component	Anchorage	Ø	Value (N.m)	Validity
Rigid Support of the powertrain side distribution	Screw	M8	25	1.4L MultiAir Turbo
Rigid Support of the powertrain side distribution	Screw	M10	50	1.6L Turbo Diesel 2.0L Turbo Diesel
Rigid Support of the powertrain transmission side	Screw	M12	40 + 45°	1.4L MultiAir Turbo
Elastic Dowel of the powertrain support distribution side	Screw	M10	60 + 45°	1.4L MultiAir Turbo
Elastic Dowel of the powertrain support distribution side - bodywork side	Screw	M10	60 + 45°	1.6L Turbo Diesel 2.0L Turbo Diesel
Elastic Dowel of the powertrain support distribution side - rigid support side	Screw	M12	90 + 45°	1.6L Turbo Diesel 2.0L Turbo Diesel
Elastic Dowel of the powertrain support transmission side - rigid support side	Screw	M12	40 + 45°	1.4L MultiAir Turbo 1.6L Turbo Diesel 2.0L Turbo Diesel
Elastic Dowel of the powertrain support transmission side - bodywork side	Screw	M12	120	-
Reaction of the lower bolt gearshift-side bracket	Screw	M14	90 + 45°	-
Reaction of the lower bolt gearshift-side suspension cross member	Screw	M14	90 + 45°	-
Bracket for lower tie rod of reaction	Screw	M12	40 + 45°	1.4L MultiAir Turbo 1.6L Turbo Diesel 2.0L Turbo Diesel 120/140CV
Bracket for lower tie rod of reaction	Screw	M14	90 + 45°	2.0L Turbo Diesel 170 hp
Elastic Dowel of the rigid support	Screw	-	68	2.4L MultiAir

powertrain group timing to the bodywork side				
Elastic Dowel of the rigid support powertrain group timing to the rigid support side	Screw	-	75	2.4L MultiAir

ENGINE CRANKCASE

Component	Anchorage	Ø	Value (N.m)	Validity
Crankcase	Central Screw	M10	20 + 80°	1.4L MultiAir Turbo
Crankcase	Lateral Screw	M8	30	1.4L MultiAir Turbo

CYLINDER HEAD

Component	Anchorage	Ø	Value (N.m)	Validity
Cover tappets	Screw	M6	9	1.4L MultiAir Turbo
Cover tappets	Screw	-	10	2.4L MultiAir
Upper head engine	Central Screw (to replace)	M8	25	1.4L MultiAir Turbo
Upper head engine	Lateral Screw	M8	25	1.4L MultiAir Turbo
Upper head engine	Screw	M8	25	1.6L Turbo Diesel 2.0L Turbo Diesel
Engine cylinder head	Screw	M9	30 + 90°	1.4L MultiAir Turbo
Engine cylinder head	Screw	-	30 + 73 + 73 + 90°	2.4L MultiAir
Engine cylinder head	Screw	M12	65 + 90° + 90° + 90°	1.6L Turbo Diesel 2.0L Turbo Diesel
Upper engine cylinder head caps	Cap	M16	14	1.6L Turbo Diesel 2.0L Turbo Diesel

ENGINE COVERS

Component	Anchorage	Ø	Value (N.m)	Validity
Engine oil drain plug	Cap	M14	20	1.4L MultiAir Turbo 1.6L Turbo Diesel 2.0L Turbo Diesel
Crankcase engine	Screw	M6	9	1.4L MultiAir Turbo

Crankcase engine	Nut	M6	9	1.4L MultiAir Turbo
Engine oil gearbox	Screw	M10	40	1.4L MultiAir Turbo
Crankcase	Screws timing side and transmission side	M6	9	1.6L Turbo Diesel 2.0L Turbo Diesel
Crankcase	Lateral screws	M8	25	1.6L Turbo Diesel 2.0L Turbo Diesel
Front cover oil seal crankshaft	Screw	M6	9	1.4L MultiAir Turbo 2.0L Turbo Diesel
Front cover oil seal crankshaft	Screw (to replace)	M6	9	1.6L Turbo Diesel 2.0L Turbo Diesel
Crankcase	Screw	-	12	2.4L MultiAir
Engine oil - conditioning compressor side	Screw	-	22	2.4L MultiAir
Timing cover	Screw	M6	9	2.4L MultiAir
Timing cover	Screw	M8	26	2.4L MultiAir
Rear oil seal retainer	Screw (to replace)	M6	9	1.6L Turbo Diesel 2.0L Turbo Diesel
Rear oil seal retainer	Screw	M6	9	1.4L MultiAir Turbo

CRANKSHAFT AND FLYWHEEL

Component	Anchorage	Ø	Value (N.m)	Validity
Flywheel engine	Screw (to replace)	M9	20 + 50°	1.4L MultiAir Turbo
Flywheel engine	Screw	-	29	2.4L MultiAir
Flywheel engine	Screw (to replace)	M12	160	1.6L Turbo Diesel 2.0L Turbo Diesel
Bearing caps	Screw	M12	20 + 100°	1.6L Turbo Diesel
Bearing caps	Screw	M12	24 + 100°	2.0L Turbo Diesel

PISTONS AND CONNECTING RODS

Component	Anchorage	Ø	Value (N.m)	Validity
Rod cap	Screw	M8	20 + 40°	1.4L MultiAir Turbo
Rod cap	Screw	M9	25 + 60°	1.6L Turbo Diesel
Rod cap	Screw	M9	24 + 60°	2.0L Turbo Diesel

TIMING CONTROL

Component	Anchorage	Ø	Value (N.m)	Validity
Mobile tensioner	Nut	M8	22 - 27	1.4L MultiAir Turbo
Mobile tensioner	Screw	-	12	2.4L MultiAir
Mobile tensioner	Screw (to replace)	M8	25	1.6L Turbo Diesel 2.0L Turbo Diesel
Fixed tensioner	Screw	M8	25	1.6L Turbo Diesel 2.0L Turbo Diesel
Crankshaft pulley	Screw	M12	120	1.4L MultiAir Turbo
Crankshaft pulley	Screw	M12	30 + 40°	1.6L Turbo Diesel 2.0L Turbo Diesel
Camshaft pulley	Screw	M12	20 + 110°	1.4L MultiAir Turbo
Camshaft pulley	Screw (clockwise)	M16	340	1.6L Turbo Diesel 2.0L Turbo Diesel
Protection cover of timing control	Screw (to replace)	M6	9	1.6L Turbo Diesel 2.0L Turbo Diesel
Driving gears camshafts	Screw	M12	28 + 40°	1.6L Turbo Diesel
Driving gears camshafts	Screw	M12	30 + 40°	2.0L Turbo Diesel
Tensioners support of timing belt	Screw	M10	50	1.6L Turbo Diesel
Tensioners support of timing belt	Screw	M10	25	2.0L Turbo Diesel

CAMSHAFT

Component	Anchorage	Ø	Value (N.m)	Validity
Timing shaft cap	Screw	M7	10	1.4L MultiAir Turbo
MultiAir module	Screw	M8	23	1.4L MultiAir Turbo
Oil temperature sensor	-	-	11	1.4L MultiAir Turbo 2.4L MultiAir

ENGINE TURBOCHARGER SYSTEM

Component	Anchorage	Ø	Value (N.m)	Validity
Turbocharger	Nut (to replace)	M8	25	1.4L MultiAir Turbo 1.6L Turbo Diesel 2.0L Turbo Diesel

Bracket turbocharger support	Screw	M8	25	1.4L MultiAir Turbo
Bracket turbocharger support	Nut (to replace)	M8	25	1.4L MultiAir Turbo
Engine oil pressure pipe to the Turbo-turbocharger side	Fitting	M10	26	2.0L Turbo Diesel
Engine oil pressure pipe to the turbocharged	Fitting	M12	25	2.0L Turbo Diesel
Duct engine oil return from the turbocharger - base side	Screw	M10	50	2.0L Turbo Diesel
Oil return tube turbocharger engine - turbocharger side	Screw	M6	9	2.0L Turbo Diesel

INTAKE AND EXHAUST MANIFOLDS

Component	Anchorage	Ø	Value (N.m)	Validity
Exhaust manifold	Nut (to replace)	M8	15 + 30°	1.4L MultiAir Turbo
Exhaust manifold	Screw	-	34	2.4L MultiAir
Exhaust manifold	Nut	-	34	2.4L MultiAir
Intake manifold	Screw (to replace)	M7	15	1.4L MultiAir Turbo
Intake manifold	Nut	M8	25	1.6L Turbo Diesel 2.0L Turbo Diesel
Exhaust manifold	Nut (to replace)	M8	24	1.6L Turbo Diesel
Exhaust manifold	Nut (to replace)	M8	20	2.0L Turbo Diesel
Heat shield of the exhaust manifold	Nut (to replace)	M6	9	1.4L MultiAir Turbo

LUBRICATION SYSTEM

Component	Anchorage	Ø	Value (N.m)	Validity
Engine oil filter cover	-	-	25	1.4L MultiAir Turbo 1.6L Turbo Diesel 2.0L Turbo Diesel
Oil filter support and heat exchanger - oil pump side	Screw	M20	45	1.4L MultiAir Turbo

Oil filter support and heat exchanger - base side	Screw	M10	50	1.4L MultiAir Turbo
Output pipe from turbo engine oil	Screw	M6	9	1.4L MultiAir Turbo
Output pipe from turbo engine oil	Screw	M10	50	1.6L Turbo Diesel
Engine oil return pipe from the turbo-blower-side heat exchanger	Fitting	M14	33	1.4L MultiAir Turbo
Engine oil pressure pipe to the Turbo-turbocharger side	Junction with filter	M12	25	1.4L MultiAir Turbo
Engine oil pressure pipe to the turbo-blower-side heat exchanger	Fitting	M12	25	1.4L MultiAir Turbo
Engine oil pressure pipe to the Turbo-turbocharger side	Fitting	M10	15	1.6L Turbo Diesel 2.0L Turbo Diesel
Engine oil pressure pipe to the Turbo-cylinder head upper side	Fitting	M12	25	1.6L Turbo Diesel 2.0L Turbo Diesel
Switch for engine oil pressure warning light	-	M14	32	1.4L MultiAir Turbo
Switch for engine oil pressure warning light	-	-	18	2.4L MultiAir
Switch for engine oil pressure warning light	-	M14	25	1.6L Turbo Diesel 2.0L Turbo Diesel
Engine oil pump assembly - balance module	Screw	-	15 + 29 + 90°	2.4L MultiAir
Engine oil pressure switch	-	M10	20	1.6L Turbo Diesel 2.0L Turbo Diesel
Introducing engine oil nozzle	Screw	M6	9	1.6L Turbo Diesel 2.0L Turbo Diesel
Displacement control valve oil pump motor	Screw	-	7	1.6L Turbo Diesel 2.0L Turbo Diesel
Engine oil pump	Screw	M6	10	1.4L MultiAir Turbo

MISCELLANEOUS ENGINE PARTS

Component	Anchorage	Ø	Value (N.m)	Validity
Pulley on crankshaft	Screw	M8	25	1.4L MultiAir Turbo 1.6L Turbo Diesel 2.0L Turbo Diesel
Pulley on crankshaft	Screw	-	210	2.4L MultiAir
Pulley on crankshaft	Screw	M8	30	2.0L Turbo Diesel
Automatic tensioner	Screw	-	24	2.4L MultiAir
Fixed tensioner	Screw	-	48	2.4L MultiAir
Fixed tensioner	Screw	M10	50	1.6L Turbo Diesel 2.0L Turbo Diesel
Mobile tensioner	Screw	M10	50	1.6L Turbo Diesel 2.0L Turbo Diesel

SPECIAL TOOLS > SPECIAL TOOLS

ENGINE DIAGNOSIS AND TESTING

Tool (EMEA)	Tool (NAFTA)	Name	Function
1806338000	*	Transducers Examiner Kit 2	Test compression cylinders
1860969000	*	Fitting	Check the engine lubrication system pressure
1870811001	*	Fitting	Cylinder compression
1870897400	*	Incorrect injector	Check cylinder compression
2000015600	*	Connection tube manometer	Check the engine lubrication system pressure
2000018801	*	Tee	Check the engine lubrication system pressure
2000024300	*	Fitting	Check the engine lubrication system pressure
* Tool not available for NAFTA. Use a commercially available tool or contact Mopar Essential Tools to order the custom EMEA tool.			

ENGINE PROCEDURES

Tool (EMEA)	Tool (NAFTA)	Name	Function
1823015000	C-4829A	Pry retainer	-
1860313000	*	Introducing engine oil sprayers	1.4L MultiAir Turbo
1860395000	*	Removing engine oil sprayers	1.4L MultiAir Turbo
1860470000	*	Cylinder head overhaul	-
1860644000	*	Valve disassembly/reassembly	1.4L MultiAir Turbo
1860741000	*	Flywheel retainer	2.4L MultiAir
1860786000	*	Valve check	1.4L MultiAir Turbo
1860815000	*	Rotating crankshaft	-
1860846000	*	Flywheel retainer	-
1860898000	*	Flywheel retainer	-
1860987000	*	Timing belt tension distribution command	1.4L MultiAir Turbo
1860990000	10273	Crankshaft oil seal installation	1.4L MultiAir Turbo
1860993000	*	Introduction oil seal ring valve guides	1.4L MultiAir Turbo
1860994000	*	Extraction/introduction of valve guides	1.4L MultiAir Turbo
1870718000	*	Cut sealing	-
1870890000	*	Valve removal	1.4L MultiAir Turbo
1870894000	*	Oil seal removal	1.4L MultiAir Turbo
1871000000	*	Engine placement on tripod for review	-
1871001700	*	Removing/installing the power plant	-
2019500031	*	Removing rear drive shaft	4x4
2000024700	*	Extracting/Introduction tappets	1.4L MultiAir Turbo
2000034400	10277	Distribution shaft timing	1.4L MultiAir Turbo
2000034500	*	Compression plates UNIAIR	1.4L MultiAir Turbo
2020000090	10259B	Compression plates UNIAIR	2.4L MultiAir
2000034600	10278	Camshaft oil seal assembly	1.4L MultiAir Turbo
2000034800	*	Disassembly/reassembly of oil temperature sensor module UNIAIR	1.4L MultiAir Turbo
			2.4L MultiAir
2000039800	*	Capless fuel inlet pipe fastening	1.4L MultiAir Turbo

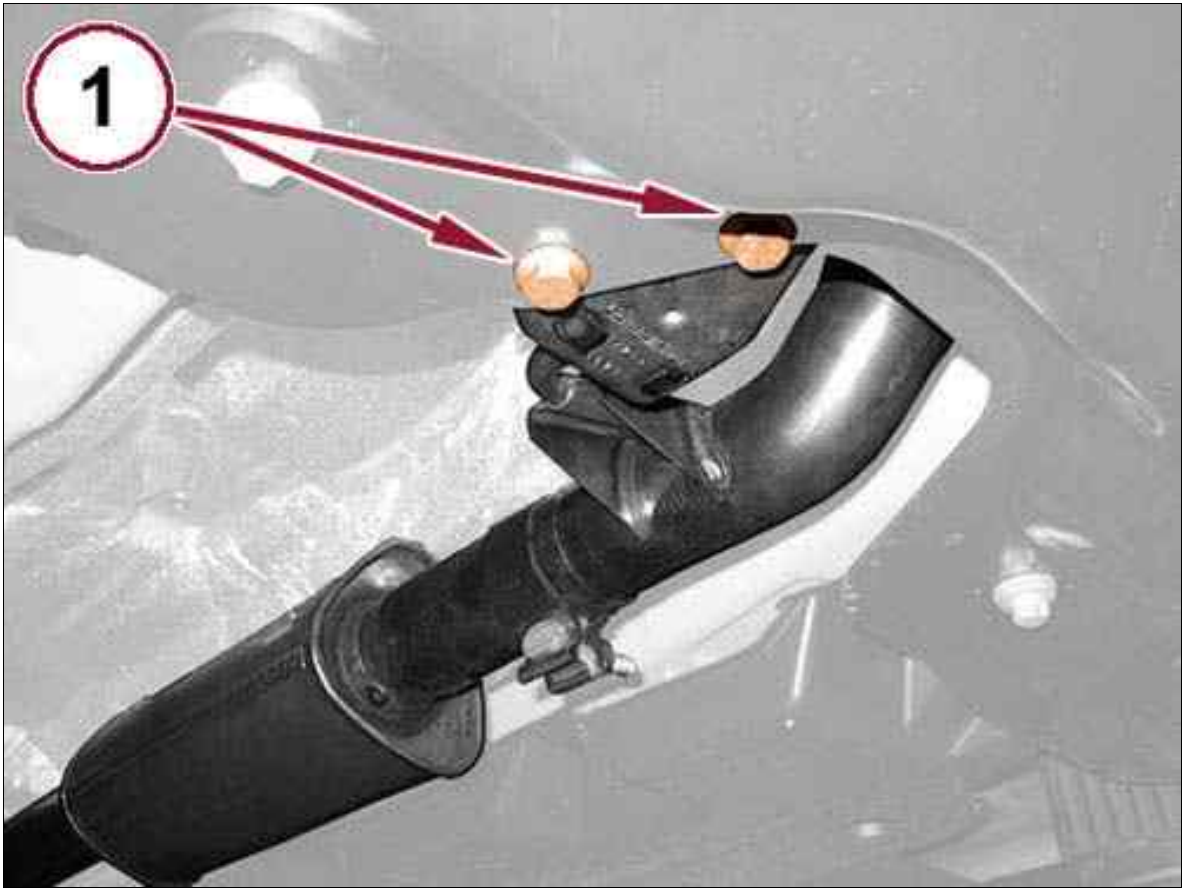
			-
			1.6L Turbo Diesel
			-
			2.0L Turbo Diesel
2000040245	9506	Mounting front cover oil seal crankshaft	2.4L MultiAir
2000040246	9509	Flywheel side mounting seal	2.4L MultiAir
2000040298	9706	Flywheel side mounting seal	2.4L MultiAir
2000040299	9707	Loosen/tighten pulley bolt on crankshaft services	2.4L MultiAir
2000040436	8534B	Shaft supporting powerplant	-
2000040586	C-4171	Flywheel side mounting seal	2.4L MultiAir
2000042900	*	Capless fuel inlet pipe fastening	1.4L MultiAir Turbo
			-
2000043000	*	Front suspension cross positioning	-
2000043300	*	Front suspension cross positioning	-
2000043500	*	Front suspension cross positioning	-
2000043600	*	Front suspension cross positioning	-
2000001400	*	Brake/clutch system depression	-
2000004500	10276	Crankshaft timing	1.4L MultiAir Turbo
* Tool not available for NAFTA. Use a commercially available tool or contact Mopar Essential Tools to order the custom EMEA tool.			

REMOVAL AND INSTALLATION > 2.4L WITH AUTOMATIC TRANSMISSION > REMOVAL

1. Raise and support the vehicle. Refer to HOISTING, STANDARD PROCEDURE .
2. Place the gear selector lever in "N" (neutral).
3. Remove fuse F21 from the Power Distribution Center (PDC).
4. Start and run the engine until it stalls from fuel starvation.
5. Return fuse F21 to the PDC.
6. Remove the front wheels. Refer to REMOVAL AND INSTALLATION .
7. Remove the front belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .

8. Remove the right front wheel splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
9. Remove the hood. Refer to HOOD, REMOVAL AND INSTALLATION .
10. Remove the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
11. Remove the battery. Refer to BATTERY, REMOVAL AND INSTALLATION .
12. Remove the battery tray. Refer to TRAY, BATTERY, REMOVAL AND INSTALLATION .
13. Drain the cooling system.
Refer to STANDARD PROCEDURE .
14. Recover the refrigerant from the refrigerant system.
Refer to PLUMBING, STANDARD PROCEDURE .
15. Remove the left and right half shafts. Refer to REMOVAL AND INSTALLATION .
16. Remove the front fascia. Refer to FASCIA, FRONT, REMOVAL AND INSTALLATION .
17. Remove the left front head lamp. Refer to UNIT, FRONT LAMP, REMOVAL AND INSTALLATION .
18. Remove the right front head lamp. Refer to UNIT, FRONT LAMP, REMOVAL AND INSTALLATION .
19. Remove the headlamp mounting crossmember. Refer to CROSSMEMBER, HEADLAMP MOUNTING, REMOVAL AND INSTALLATION .
20. Remove the air cleaner body. Refer to BODY, AIR CLEANER, REMOVAL AND INSTALLATION .

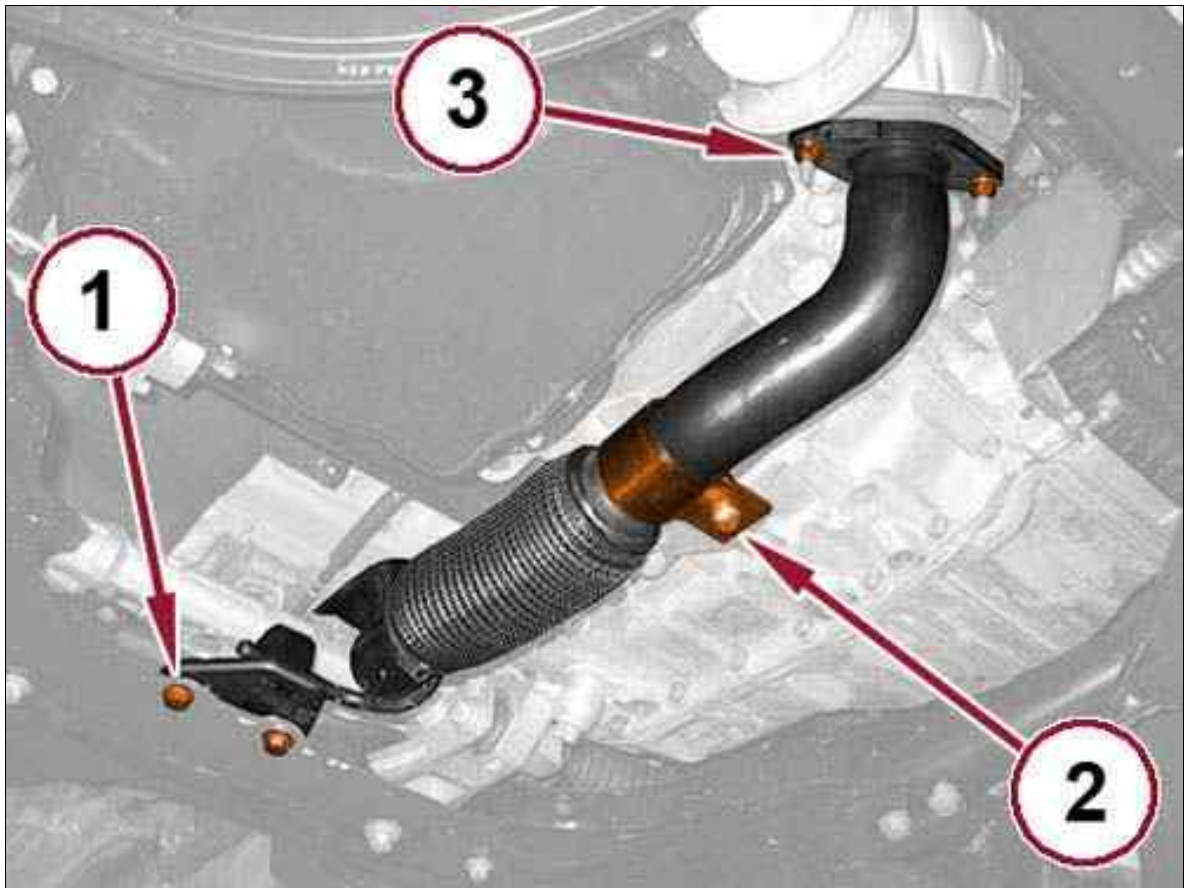
Fig 1: Exhaust Pipe Hanger Bolts



Courtesy of CHRYSLER GROUP, LLC

21. Remove the exhaust pipe hanger bolts (1).

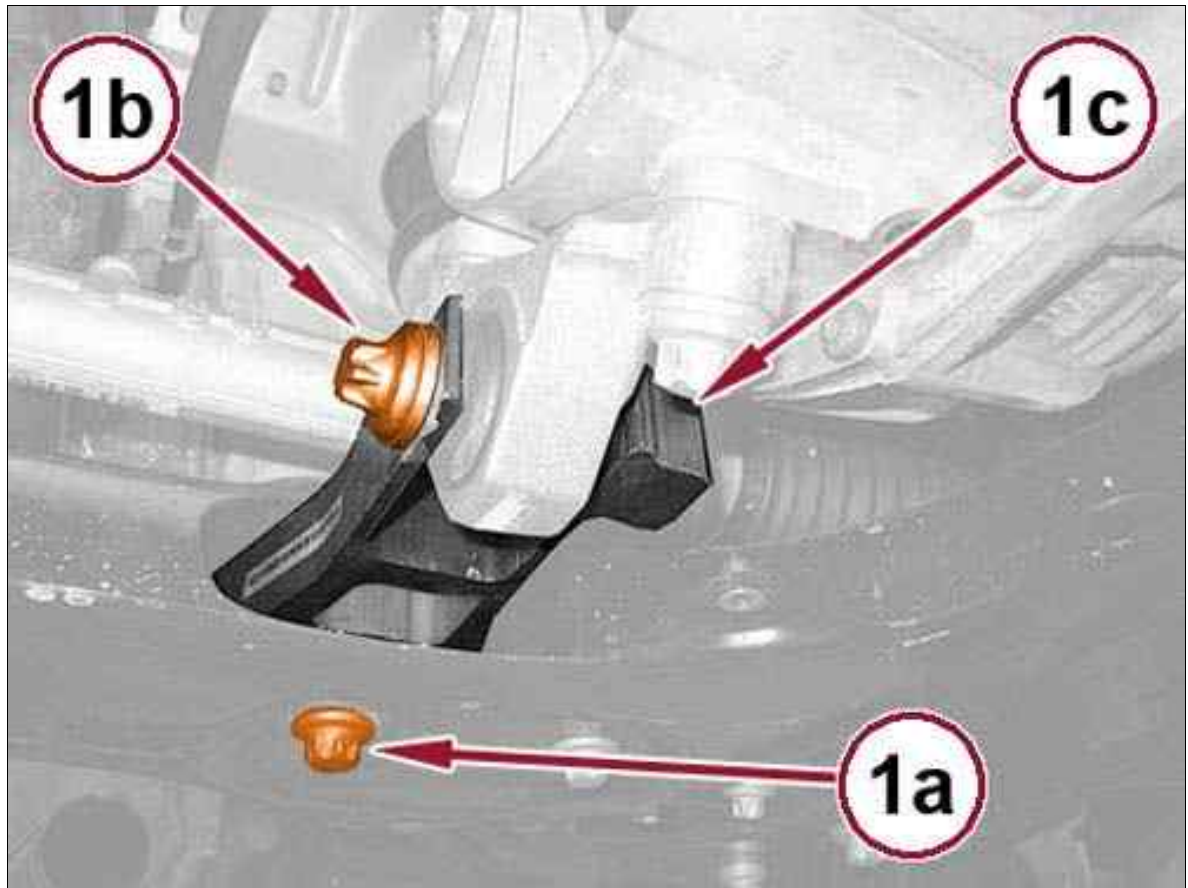
Fig 2: Exhaust Pipe Hanger Bolts, Exhaust Pipe Support Bracket Bolt & Exhaust Flange Nuts



Courtesy of CHRYSLER GROUP, LLC

22. Remove the exhaust pipe hanger bolts (1).
23. Remove the exhaust pipe support bracket bolt (2).
24. Remove the exhaust flange nuts (3), disconnect the exhaust pipe from the catalytic converter and remove the flange gasket.

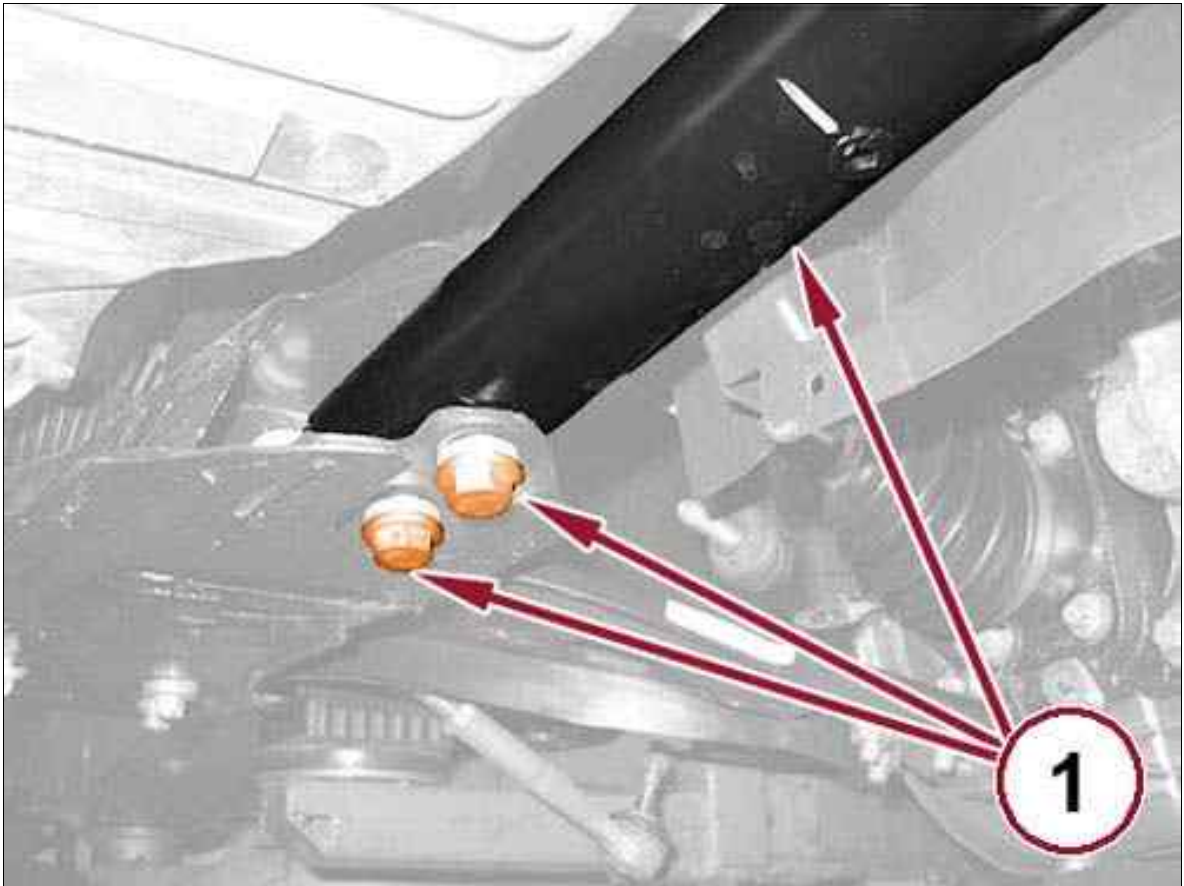
Fig 3: Rear Engine Mount Isolator & Bolts



Courtesy of CHRYSLER GROUP, LLC

25. Remove the bolts (1a) and (1b) and remove the rear engine mount isolator (1c).

Fig 4: Left & Right Side Lower Load Beam & Bolts

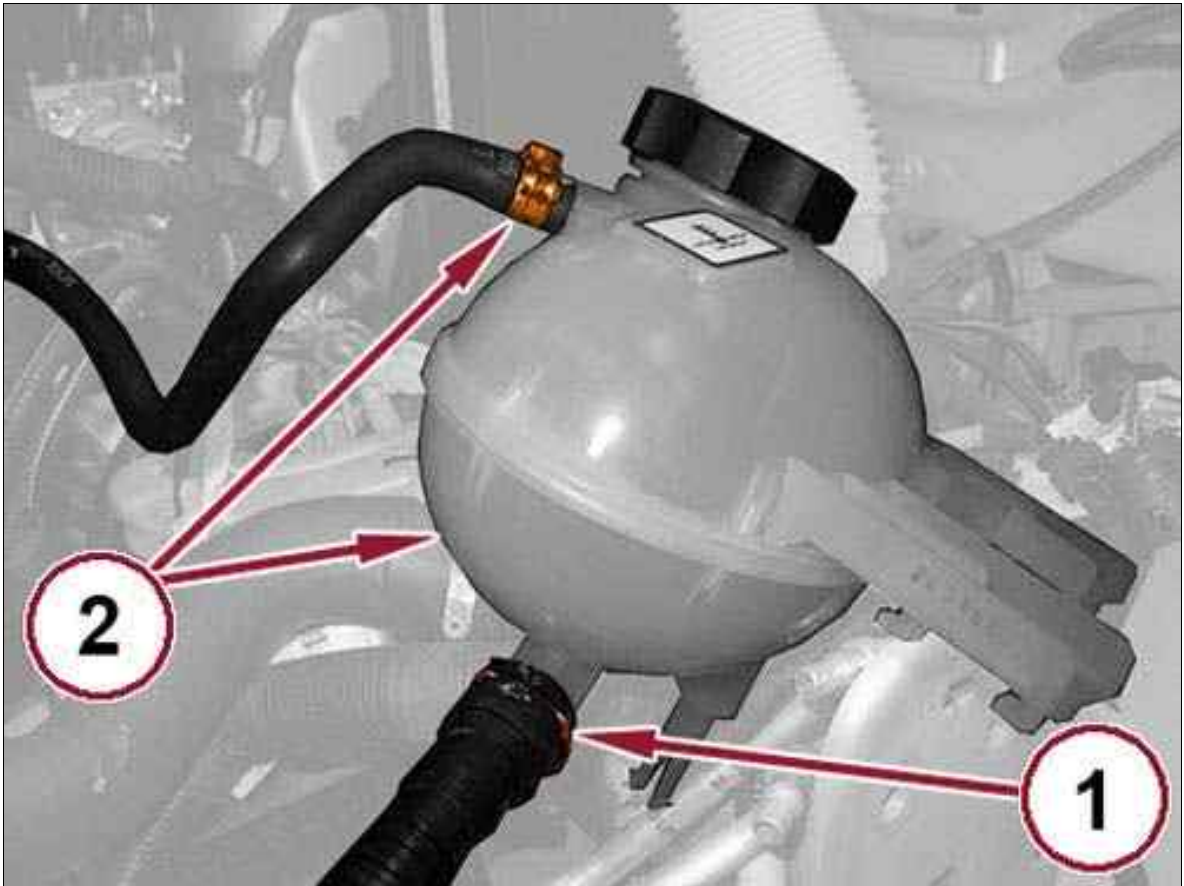


Courtesy of CHRYSLER GROUP, LLC

26. Remove the bolts (1) and the left side lower load beam.

27. Remove the bolts and the right side lower load beam.

Fig 5: Quick Coupling, Pressurized Coolant Bottle & Degas Hose Clamp



Courtesy of CHRYSLER GROUP, LLC

28. Disconnect the quick coupling (1) and remove the coolant hose from the pressurized coolant bottle.
29. Loosen the clamp (2) and remove the degas hose, disengage the retaining clips and remove the pressurized coolant bottle.

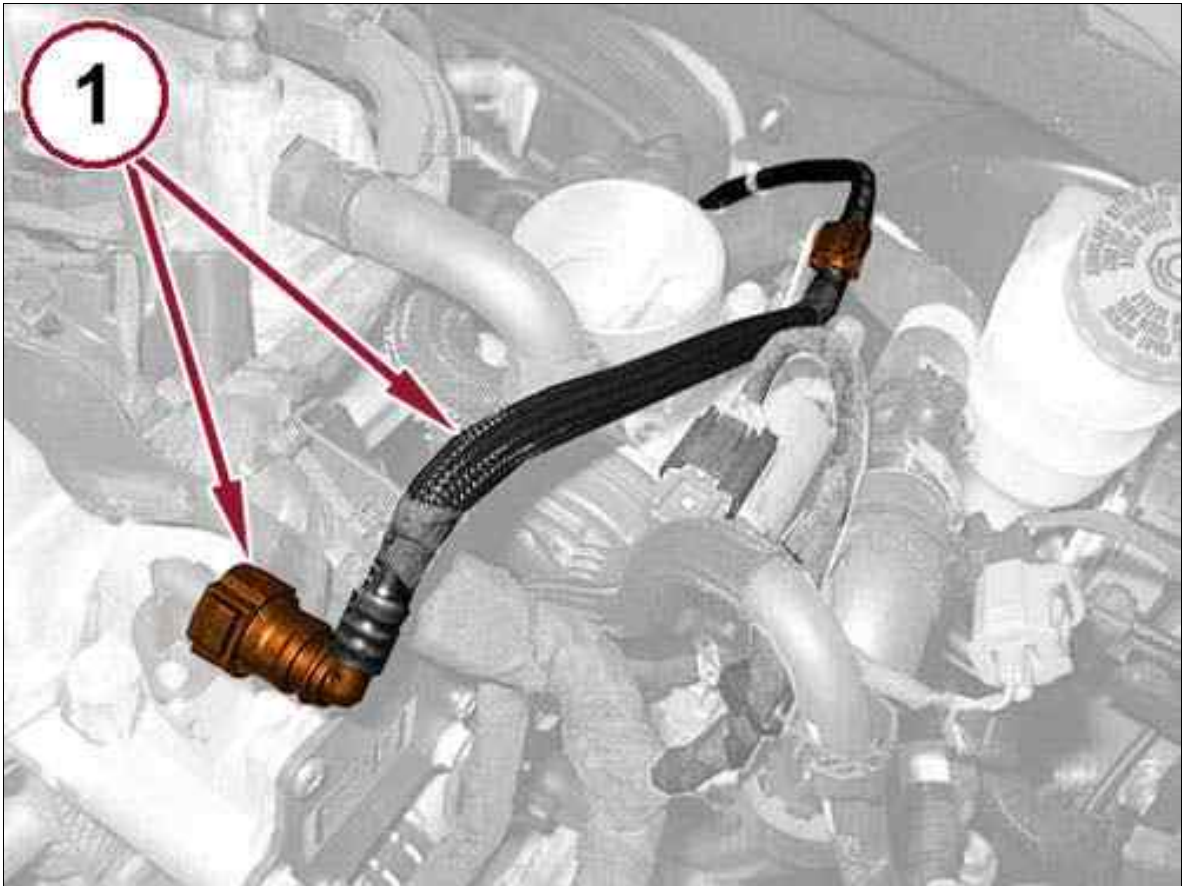
Fig 6: A/C Evaporator Quick Coupling



Courtesy of CHRYSLER GROUP, LLC

30. Disconnect the A/C evaporator quick coupling (1).

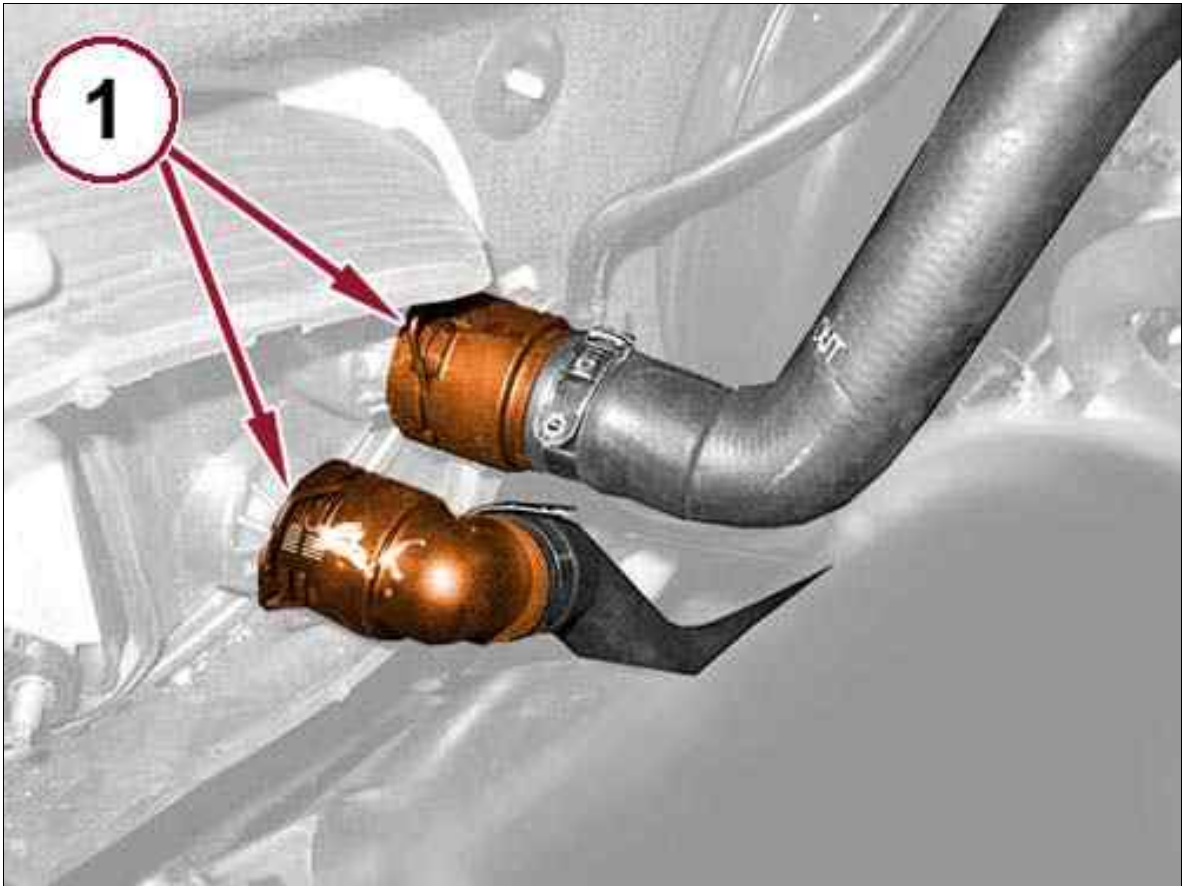
Fig 7: Vacuum Hose & Quick Coupling



Courtesy of CHRYSLER GROUP, LLC

31. Disconnect the quick coupling (1) and remove the vacuum hose from the vacuum pump.

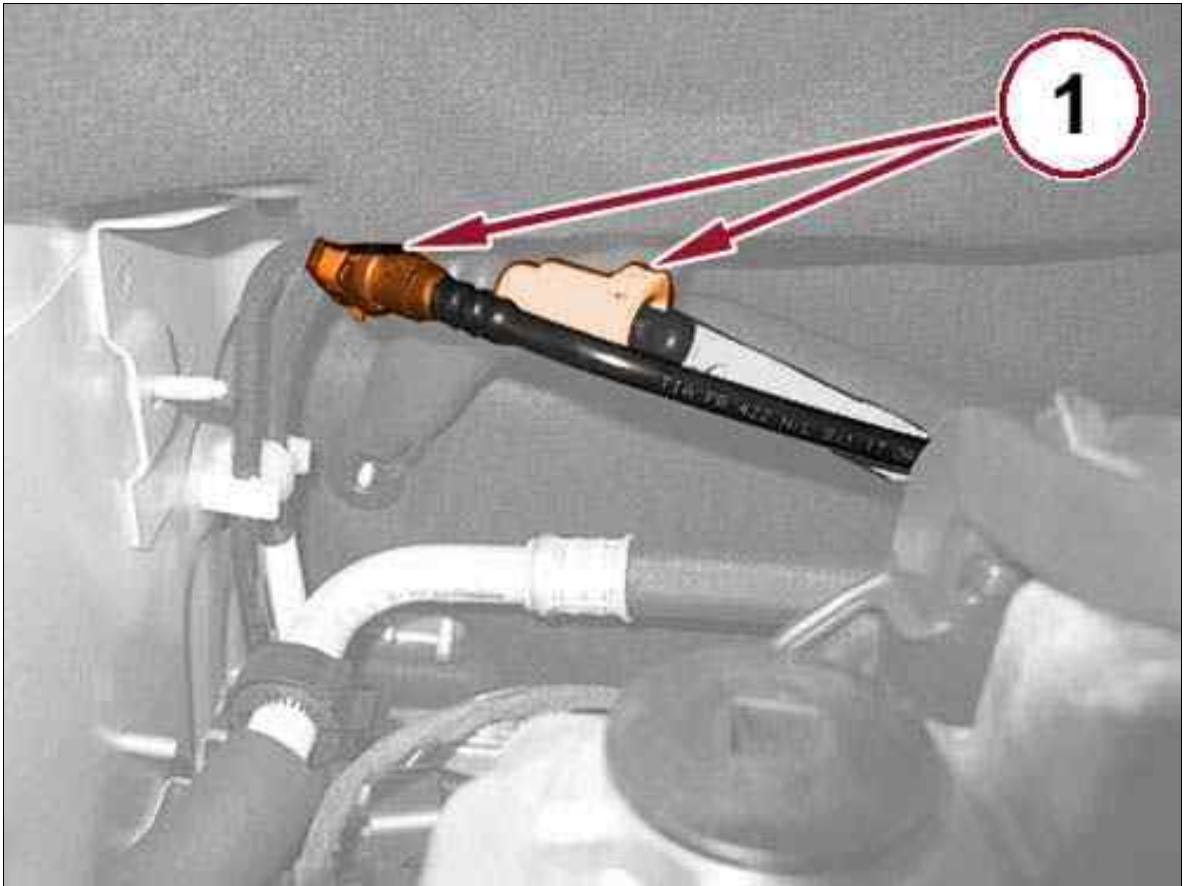
Fig 8: Heater Core Hose Quick Couplings



Courtesy of CHRYSLER GROUP, LLC

32. Disconnect the heater core hose quick couplings (1).

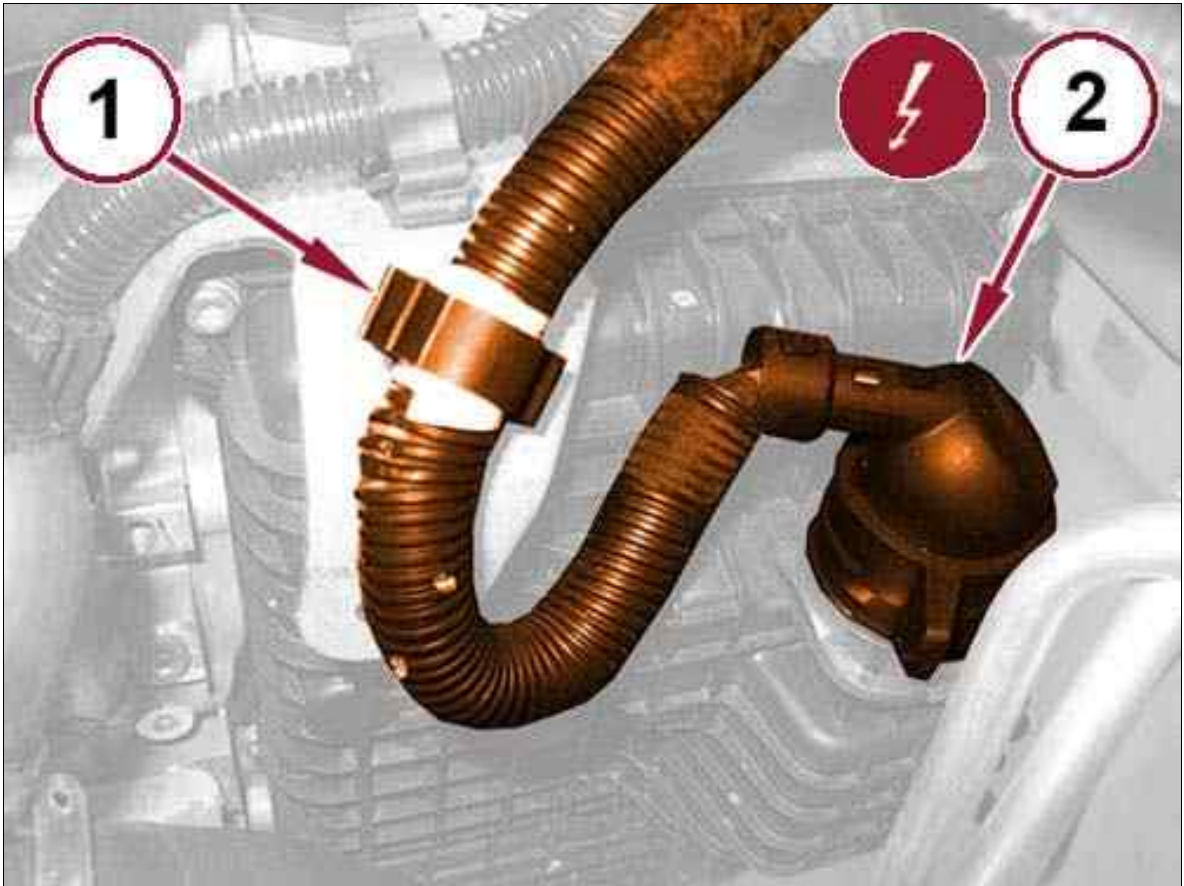
Fig 9: Fuel Supply Hose & Vapor Purge Hose Quick Couplings



Courtesy of CHRYSLER GROUP, LLC

33. Disconnect the fuel supply hose and vapor purge hose quick couplings (1).

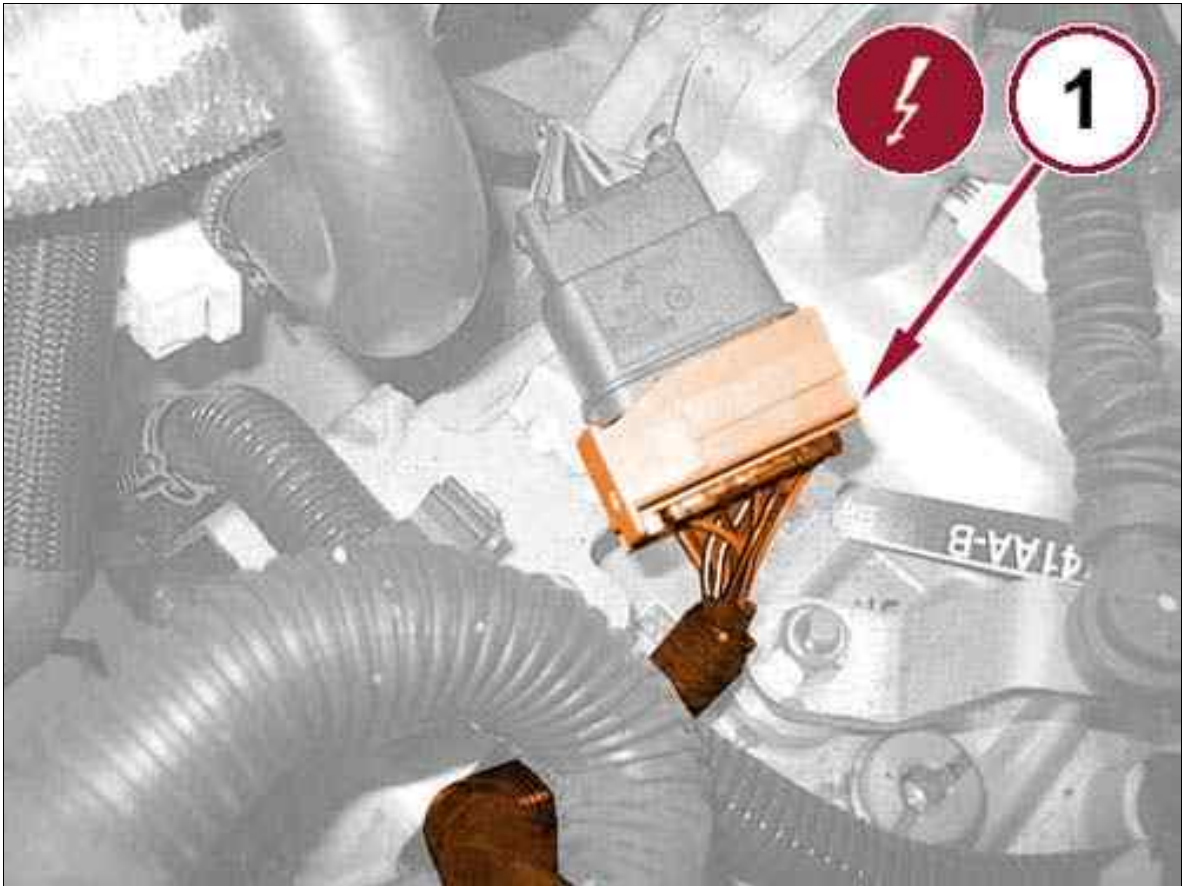
Fig 10: Wire Harness Retaining Clip & Transmission Wire Harness Connector



Courtesy of CHRYSLER GROUP, LLC

34. Open the wire harness retaining clip (1).
35. Rotate the connector lock nut and disconnect the transmission wire harness connector (2).

Fig 11: Engine Wire Harness Connector



Courtesy of CHRYSLER GROUP, LLC

36. Disconnect the engine wire harness connector (1).

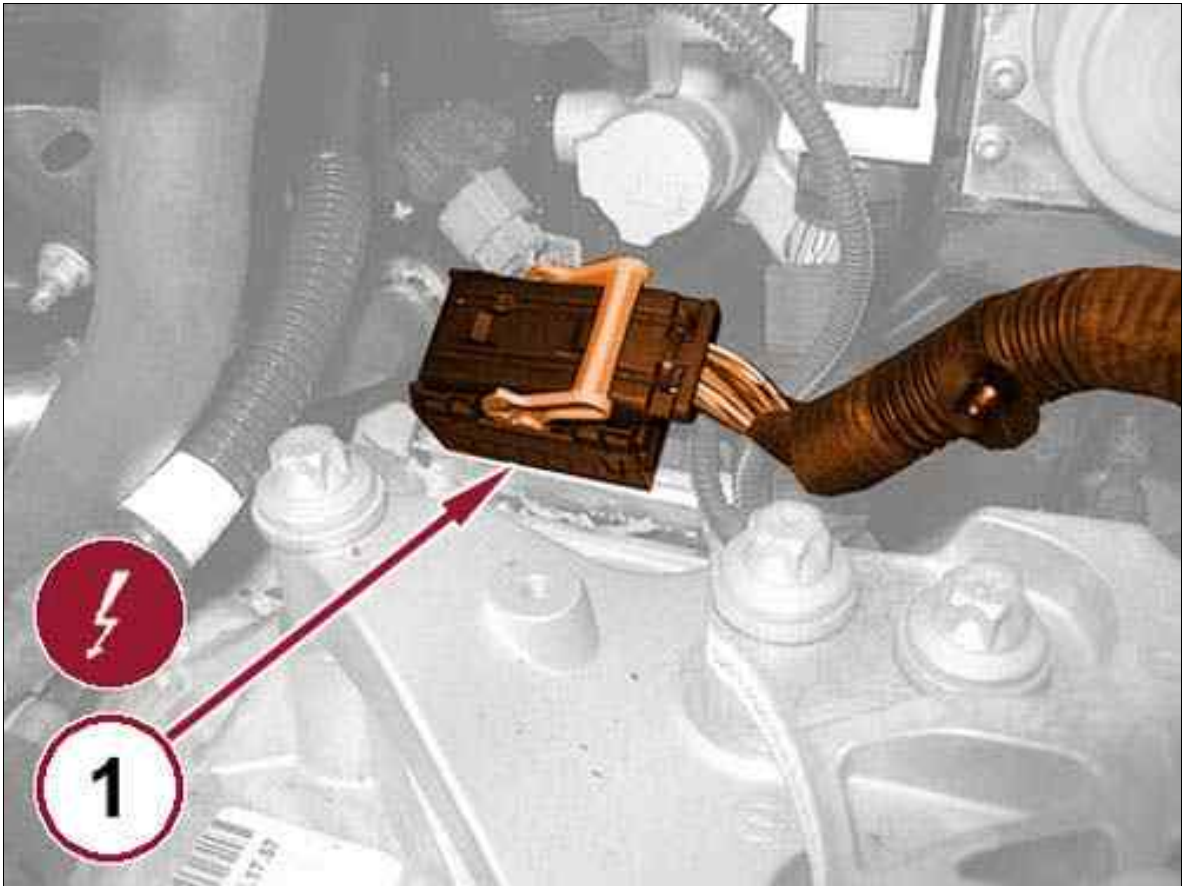
Fig 12: Gear Selector Cable At Gear Change Lever & Lock Slider



Courtesy of CHRYSLER GROUP, LLC

37. Disconnect the gear selector cable from the gear change lever (1).
38. Pull back the lock slider (2) and disengage the gear selector cable from the bracket.

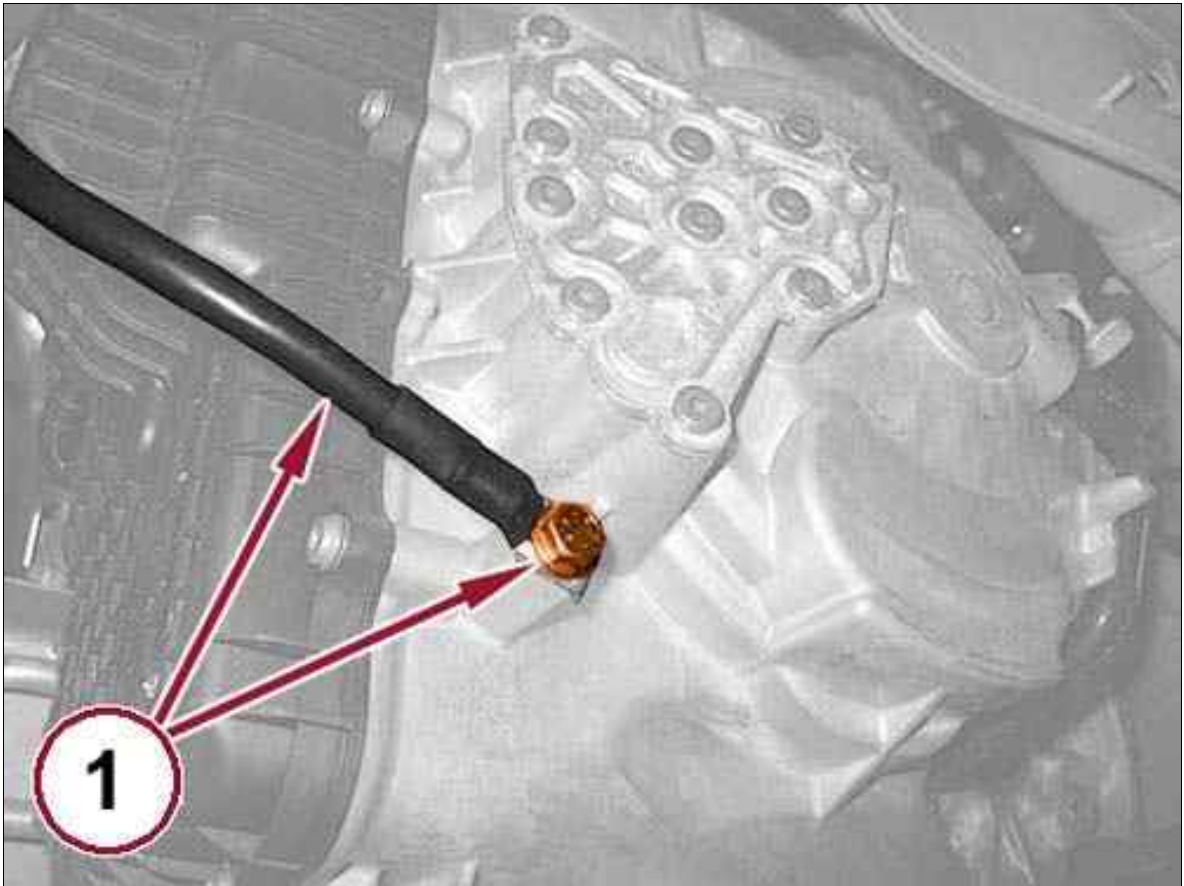
Fig 13: Transmission Control Module (TCM) Wire Harness Connector



Courtesy of CHRYSLER GROUP, LLC

39. Open the retaining clip and disconnect the Transmission Control Module (TCM) wire harness connector (1).

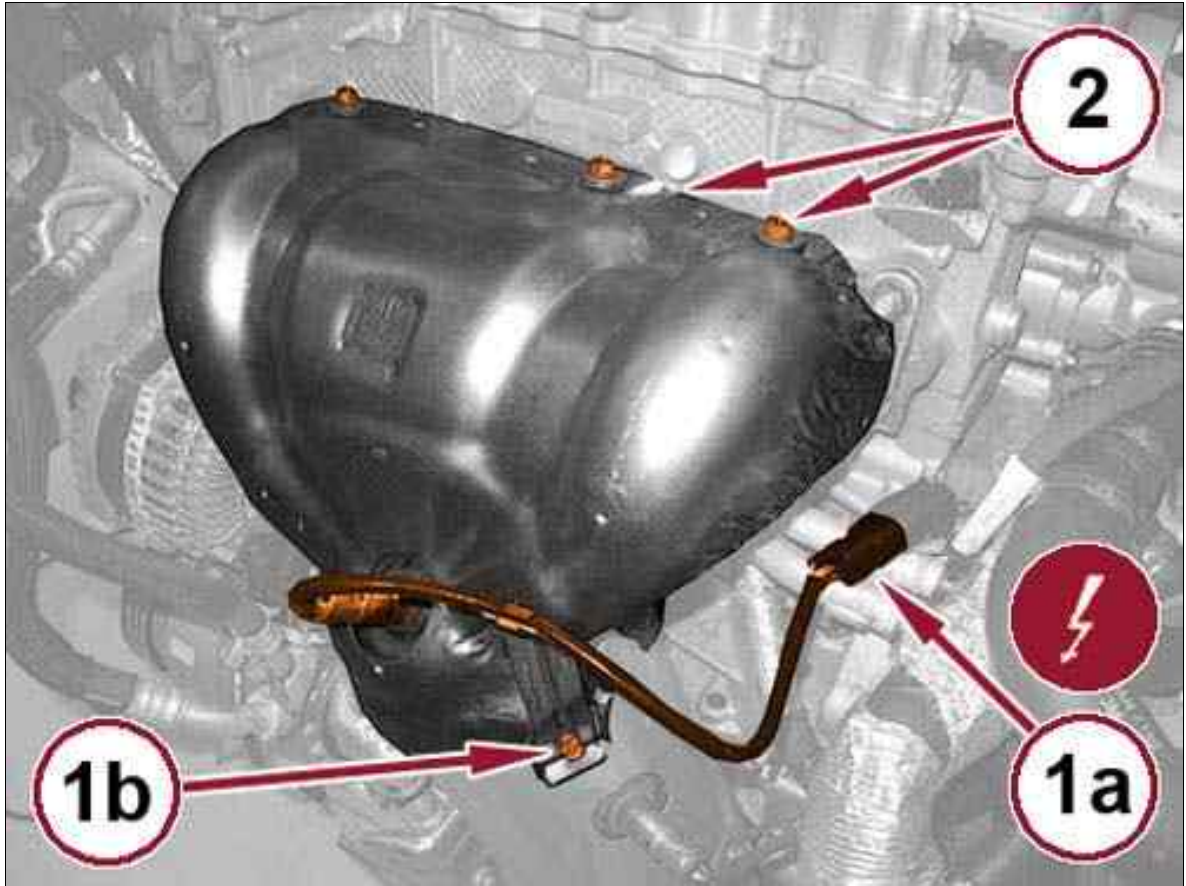
Fig 14: Battery Ground Cable & Bolt



Courtesy of CHRYSLER GROUP, LLC

40. Remove the bolt (1) and reposition the battery ground cable.

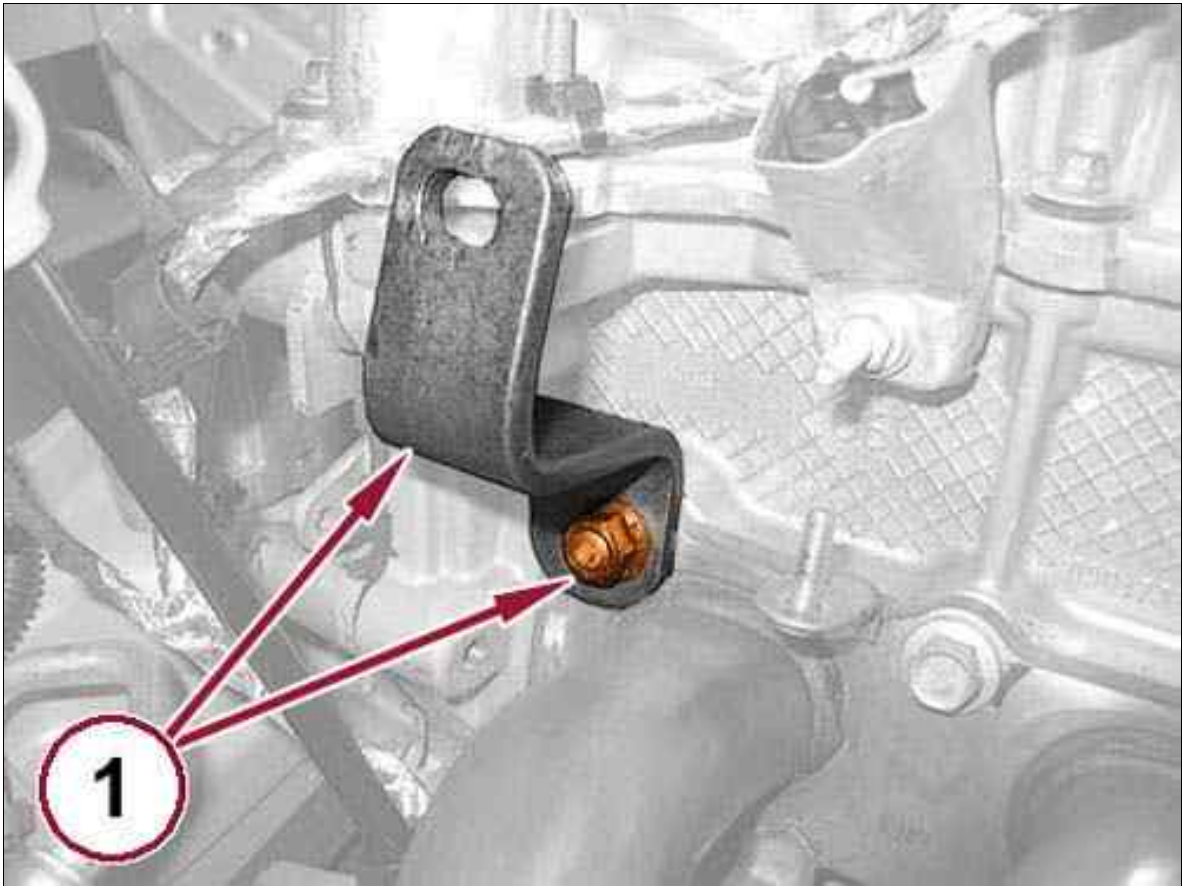
Fig 15: Upstream Oxygen Sensor Wire Harness Connector, Exhaust Manifold Heat Shield, Wire Harness Bracket & Bolts



Courtesy of CHRYSLER GROUP, LLC

41. Disconnect the upstream oxygen sensor wire harness connector (1a) and remove the bolt (1b) and wire harness bracket.
42. Remove the bolts (2) and the exhaust manifold heat shield.

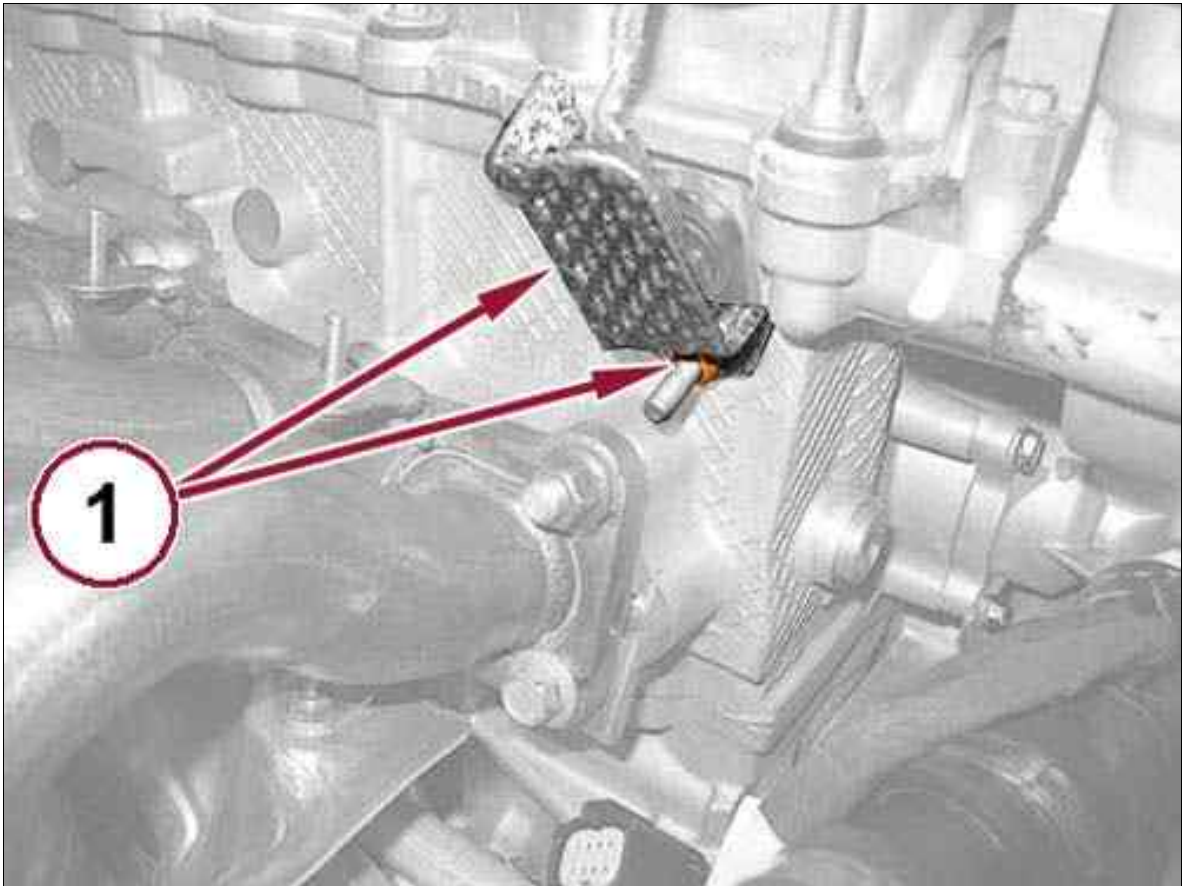
Fig 16: Engine Lifting Bracket & Exhaust Manifold Nut



Courtesy of CHRYSLER GROUP, LLC

43. Install a suitable engine lifting bracket (1) under the exhaust manifold nut.

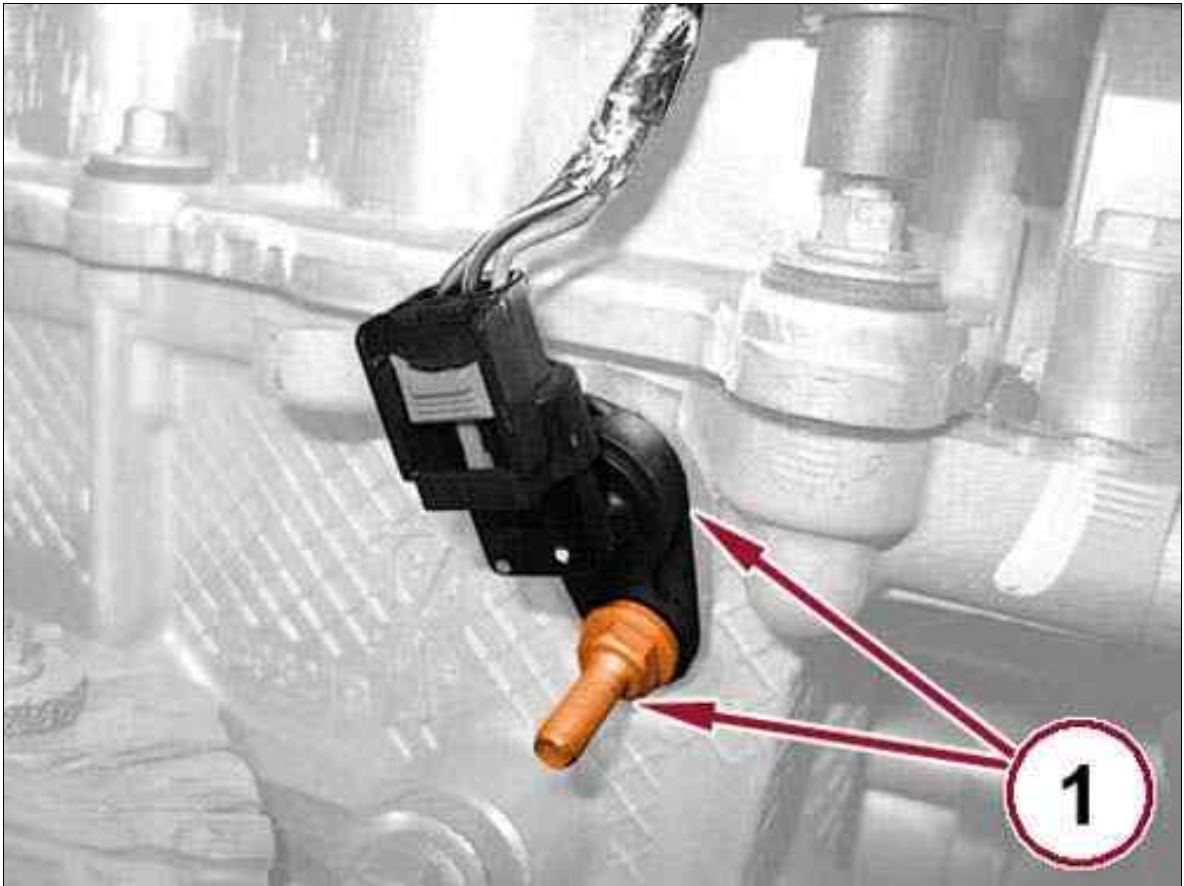
Fig 17: Camshaft Position Sensor Heat Shield & Nut



Courtesy of CHRYSLER GROUP, LLC

44. Remove the nut and the Camshaft Position sensor heat shield (1).

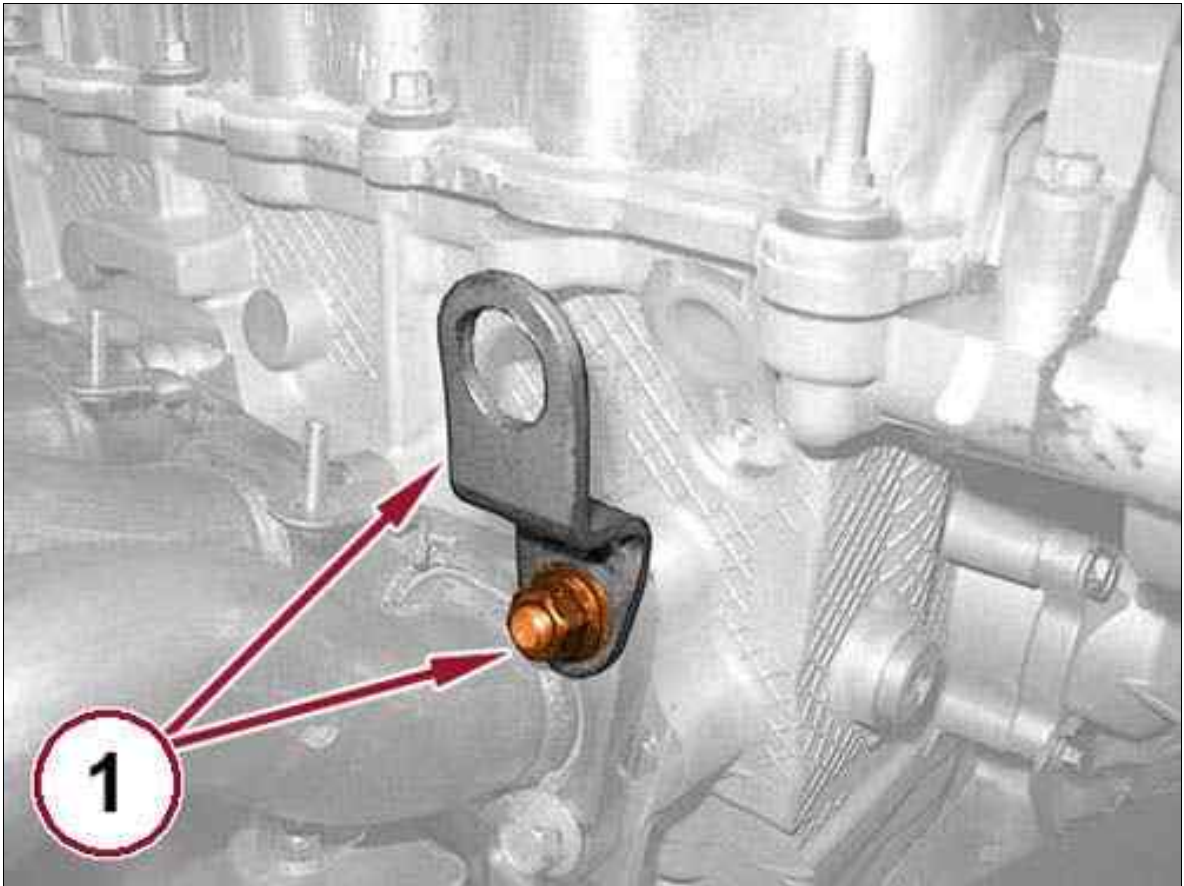
Fig 18: Camshaft Position Sensor & Studbolt



Courtesy of CHRYSLER GROUP, LLC

45. Remove the studbolt and the Camshaft Position sensor (1).

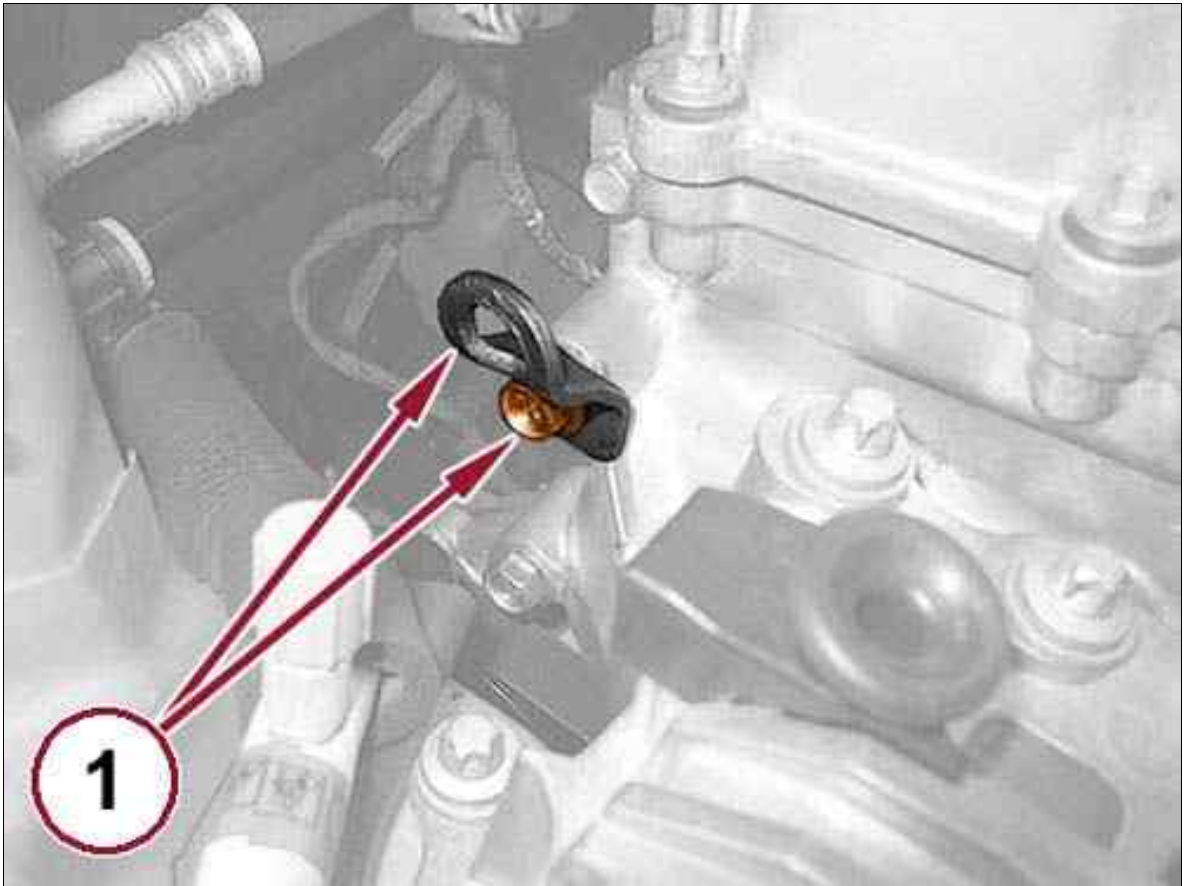
Fig 19: Engine Lifting Bracket & Exhaust Manifold Nut



Courtesy of CHRYSLER GROUP, LLC

46. Install a suitable engine lifting bracket (1) under the exhaust manifold nut.

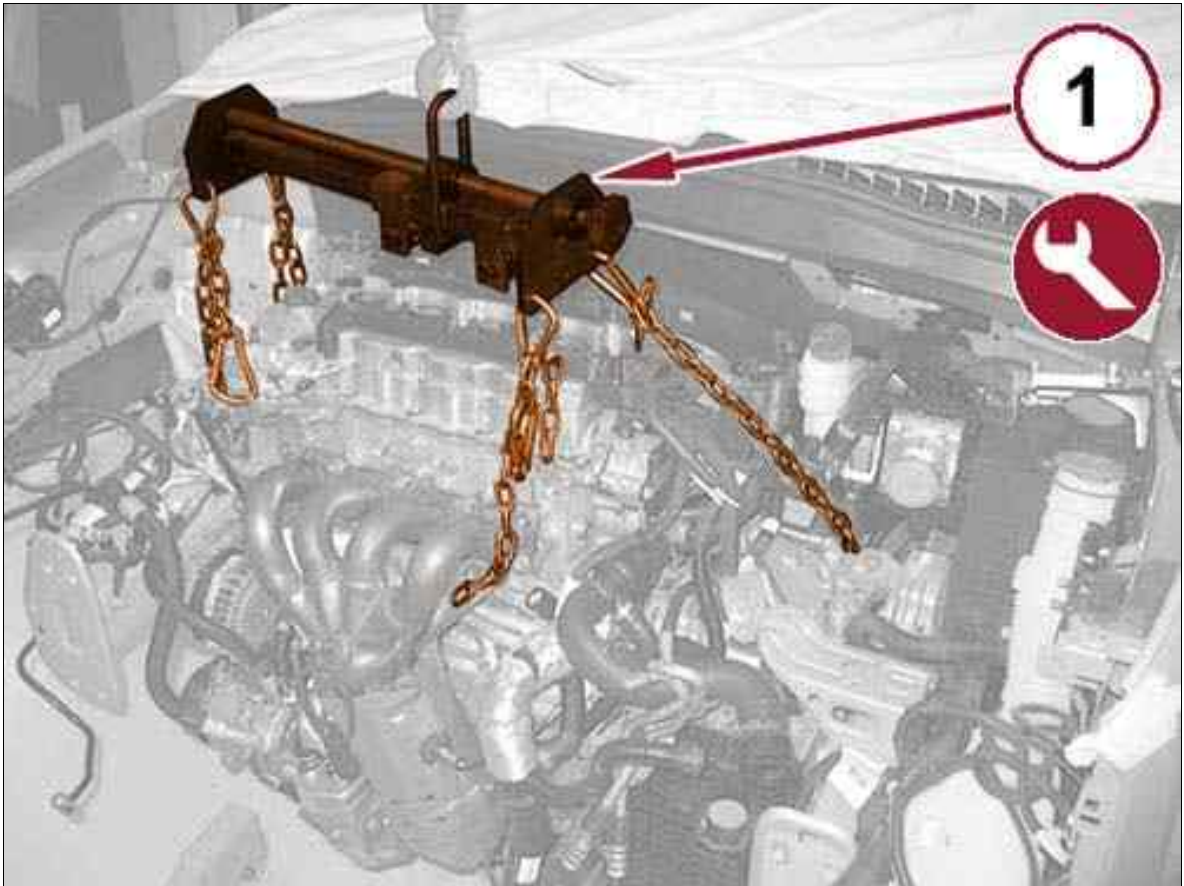
Fig 20: Engine Lifting Bracket & Engine Timing Cover Bolt



Courtesy of CHRYSLER GROUP, LLC

47. Install a suitable engine lifting bracket (1) under the engine timing cover bolt.

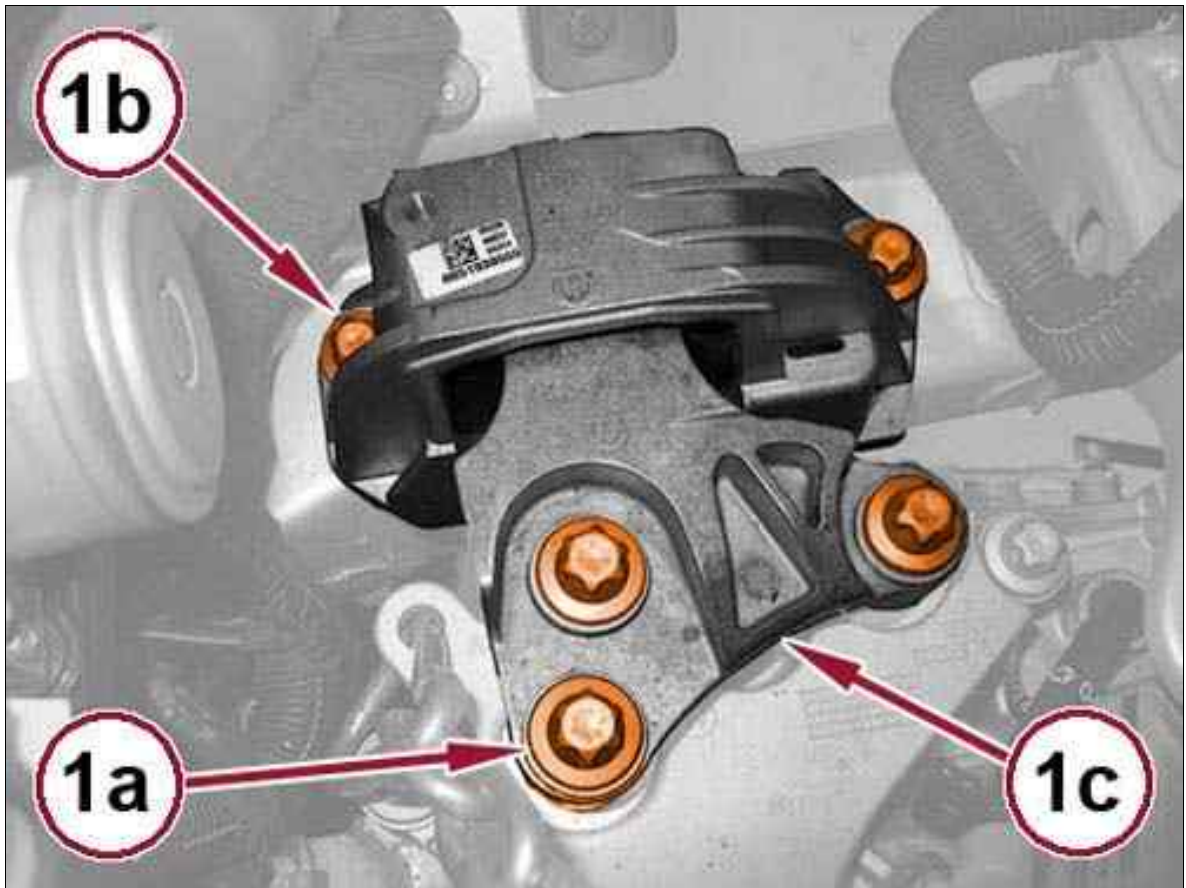
Fig 21: Hydraulic Crane & Sling



Courtesy of CHRYSLER GROUP, LLC

48. Connect a hydraulic crane and 1871001700 Sling (1) to the lifting brackets.

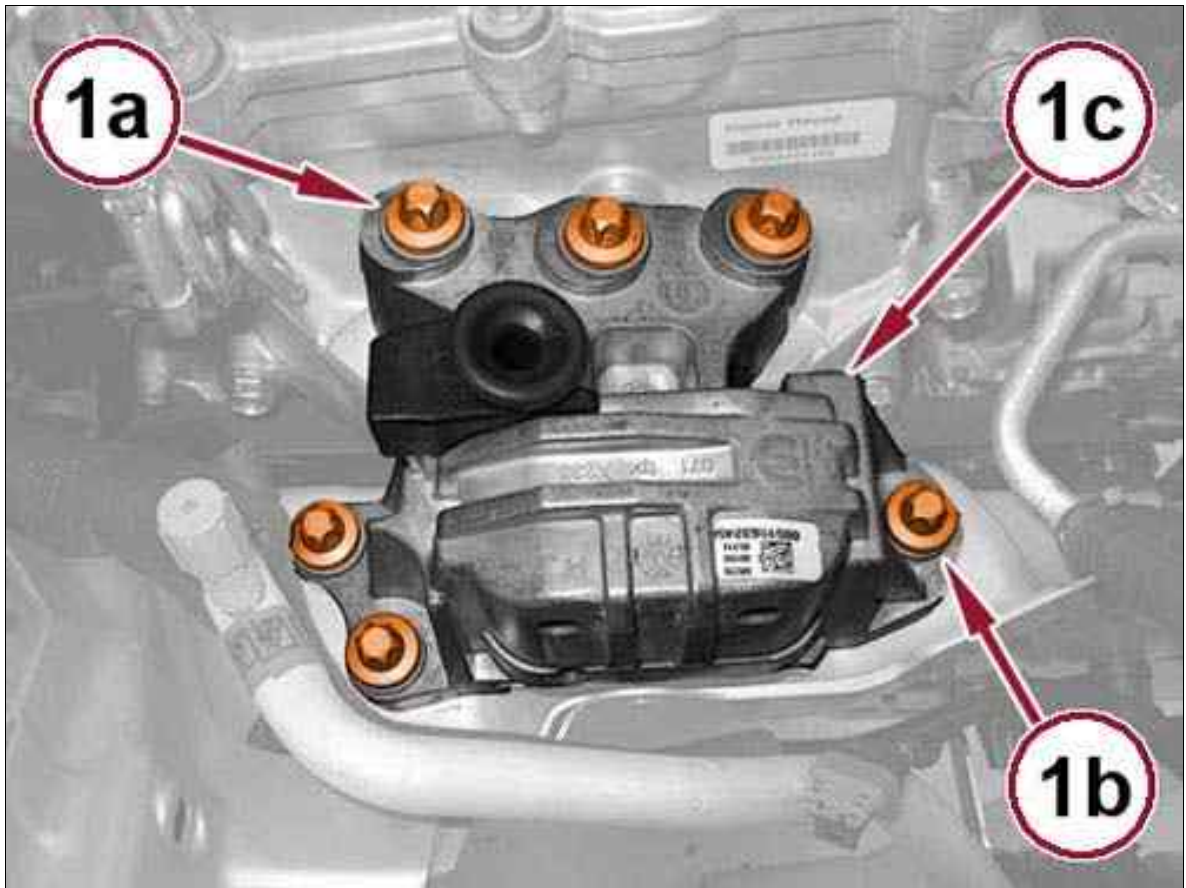
Fig 22: Left Engine Mount Isolator & Bolts



Courtesy of CHRYSLER GROUP, LLC

49. Remove the bolts (1a) and (1b) and remove the left engine mount isolator (1c).

Fig 23: Right Engine Mount Isolator & Bolts



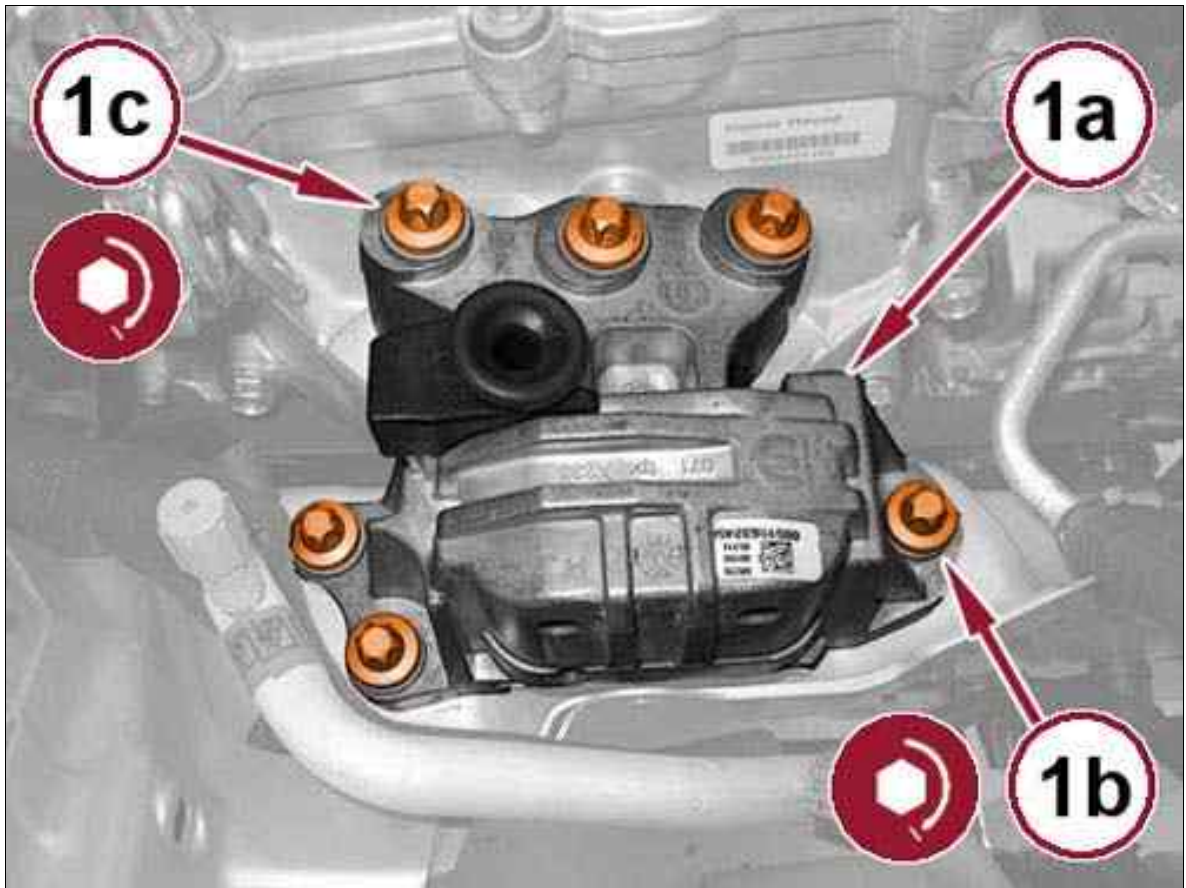
Courtesy of CHRYSLER GROUP, LLC

50. Remove the bolts (1a) and (1b) and remove the right engine mount isolator (1c).
51. Remove the powertrain from the engine compartment and place it on a suitable platform.
52. Remove the hydraulic crane and sling from the lifting brackets.

REMOVAL AND INSTALLATION > 2.4L WITH AUTOMATIC TRANSMISSION > INSTALLATION

1. Install the powertrain in the engine compartment using a hydraulic crane and 1871001700 Sling connected to the lifting brackets.

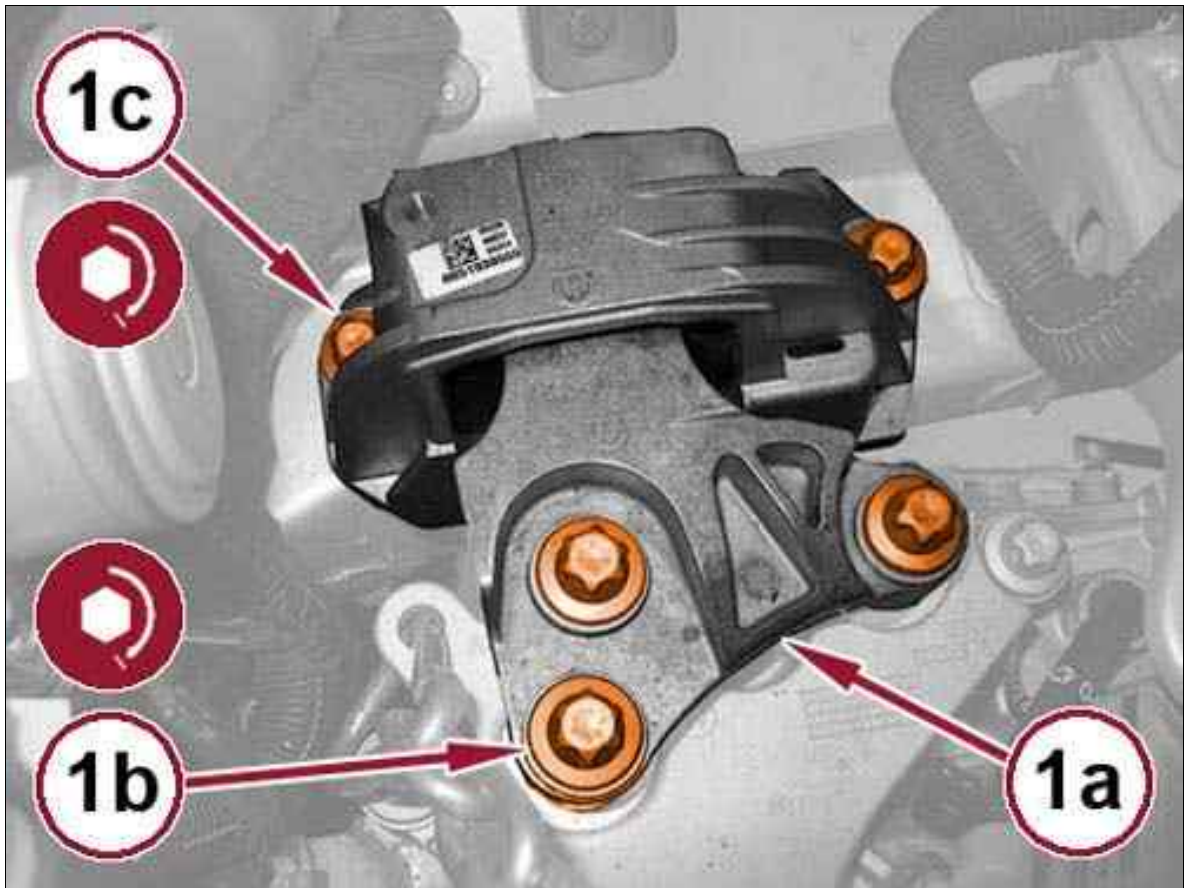
Fig 1: Right Engine Mount Isolator & Bolts



Courtesy of CHRYSLER GROUP, LLC

2. Install the right engine mount isolator (1a) and tighten the bolts (1b) and (1c) to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

Fig 2: Left Engine Mount Isolator & Bolts

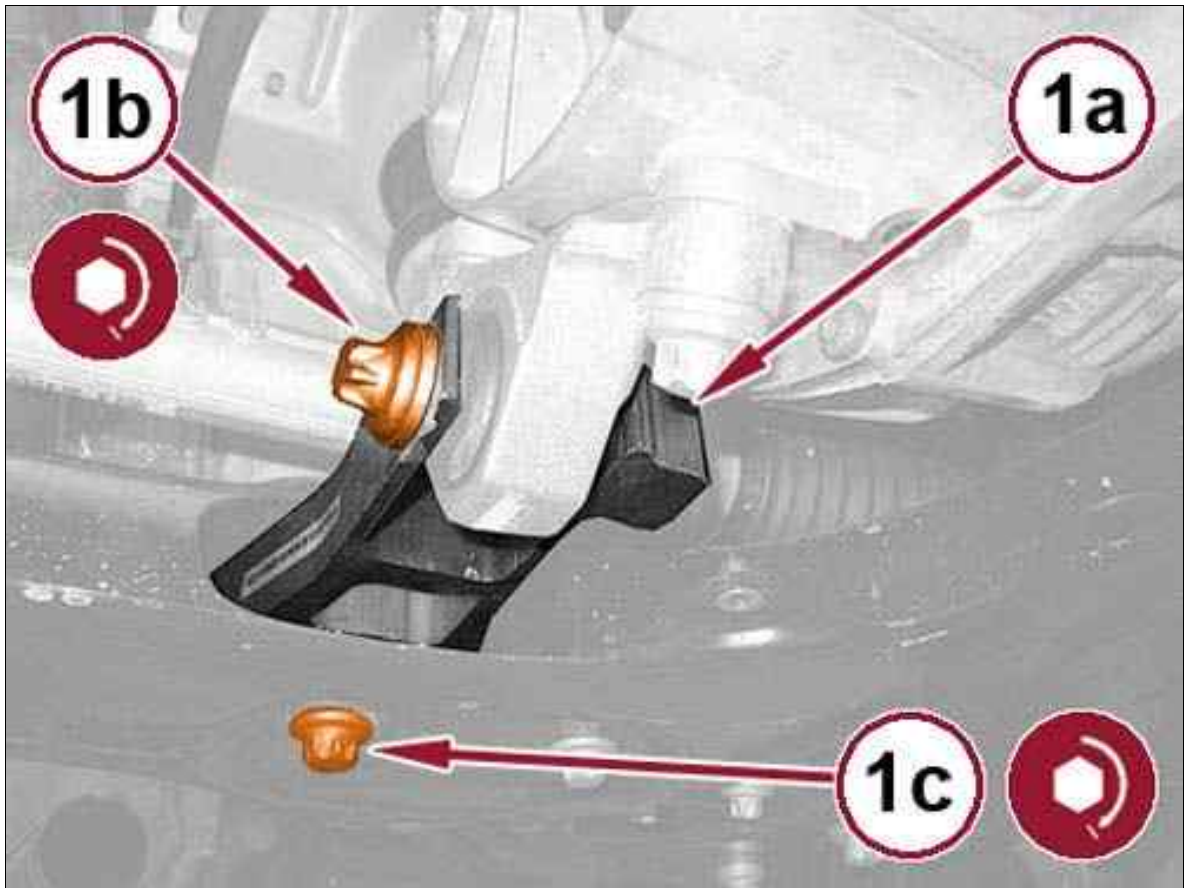


Courtesy of CHRYSLER GROUP, LLC

3. Install the left engine mount isolator (1a) and tighten the bolts (1b) and (1c) to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
4. Remove the hydraulic crane and sling connected to the powertrain lifting brackets.
5. Remove the powertrain lifting brackets from the engine and tighten the exhaust manifold nuts to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
6. Install the Camshaft Position sensor to the cylinder head and tighten the studbolt to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
7. Install the Camshaft Position sensor heat shield with the nut tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
8. Install the exhaust manifold heat shield with the bolts tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
9. Install the wire harness bracket to the exhaust manifold heat shield with the bolt tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
10. Connect the upstream oxygen sensor wire harness connector.
11. Install the battery ground cable with the bolt tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

12. Connect the Transmission Control Module (TCM) wire harness connector and close the wire harness retaining clip.
13. Pull back the lock slider and engage the gear selector cable to the bracket.
14. Engage the gear selector cable to the lever arm and check its function.
15. Connect the engine wire harness connector.
16. Connect the transmission wire harness connector by rotating the connector lock nut.
17. Close the wire harness retaining clip near the transmission wire harness connector.
18. Connect the fuel supply hose quick coupling and vapor purge hose quick coupling.
19. Connect the heater core hose quick couplings.
20. Install the vacuum hose to the vacuum pump and connect the quick coupling.
21. Connect the A/C evaporator quick coupling.
22. Install the pressurized coolant bottle and connect the quick coupling.
23. Install the degas hose to the pressurized coolant bottle and tighten the clamp to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
24. Install the left side load beam with the bolts tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
25. Install the right side load beam with the bolts tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

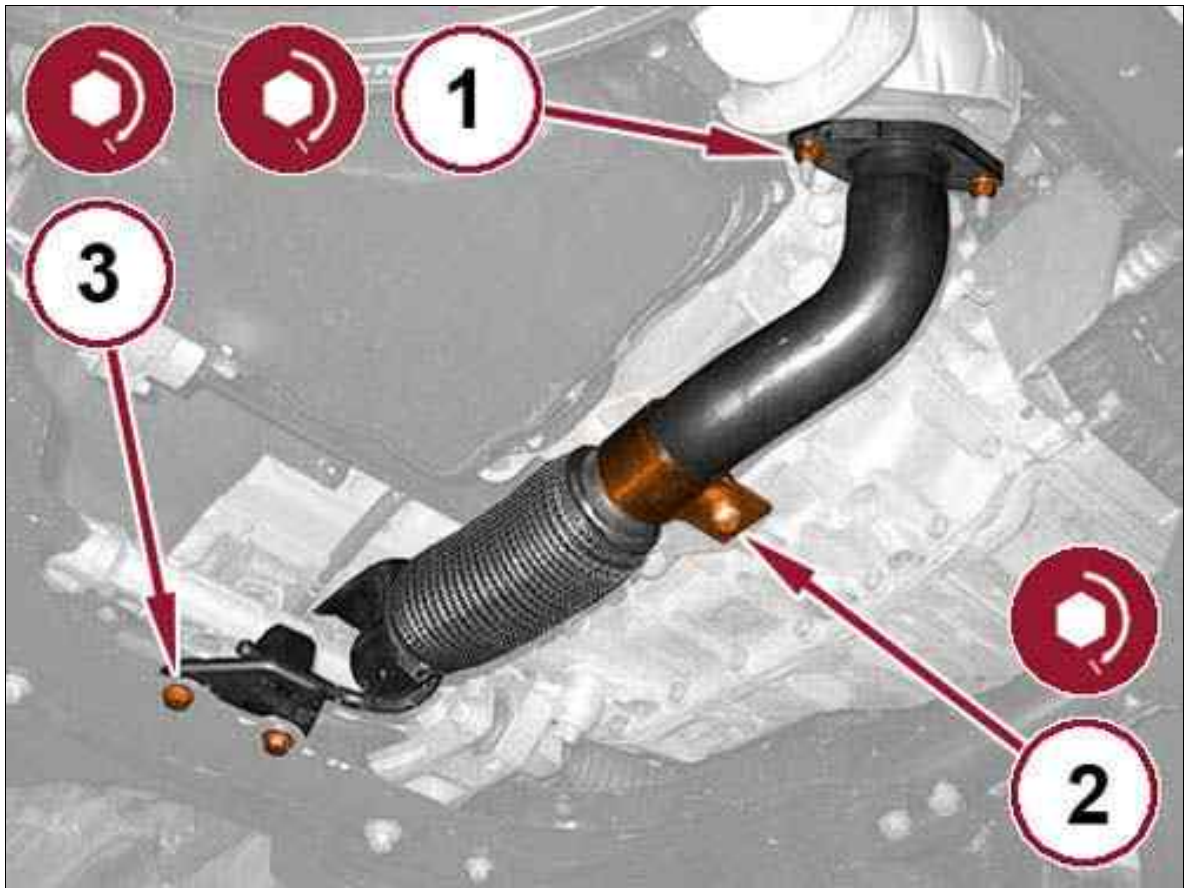
Fig 3: Rear Engine Mount Isolator & Bolts



Courtesy of CHRYSLER GROUP, LLC

26. Install the rear engine mount isolator (1a) with the bolts (1b) and (1c) tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

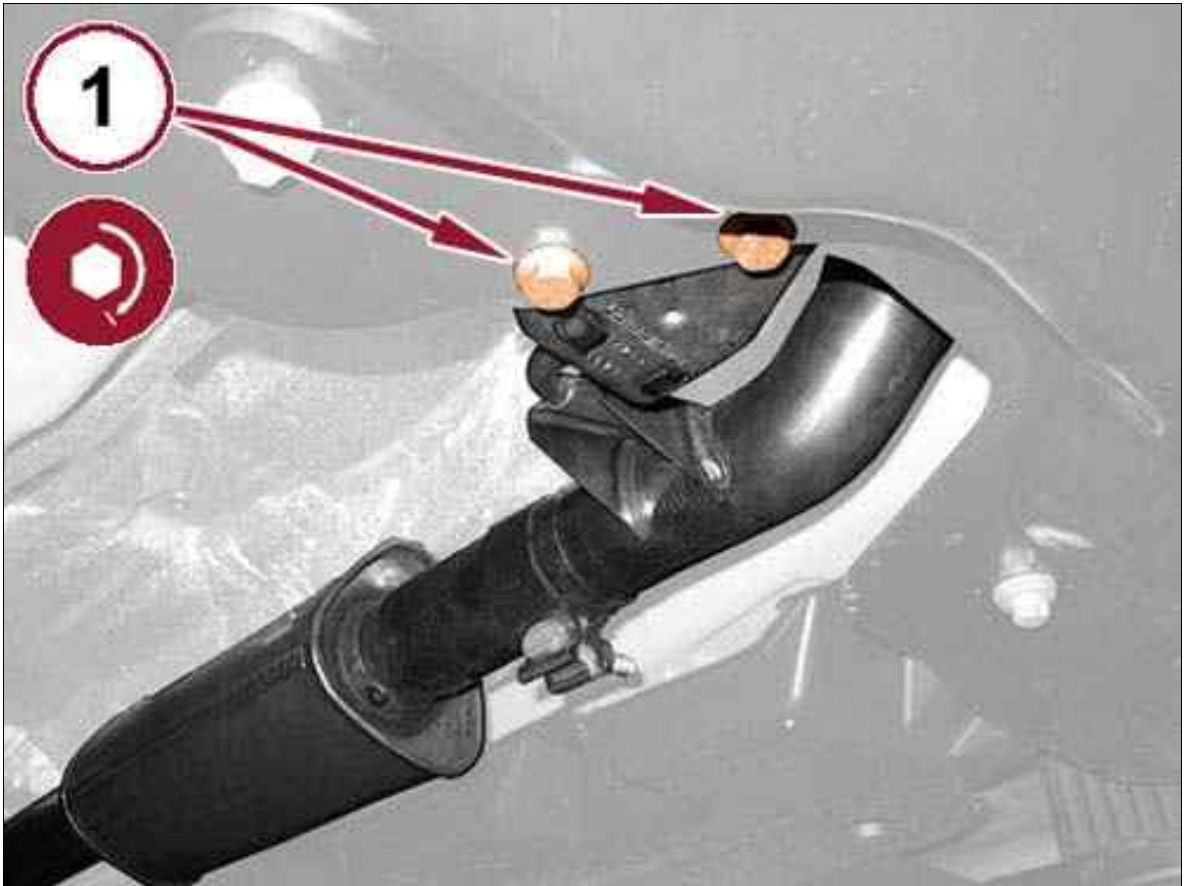
Fig 4: Exhaust Pipe Hanger Bolts, Exhaust Pipe Support Bracket Bolt & Exhaust Flange Nuts



Courtesy of CHRYSLER GROUP, LLC

27. Install a new flange gasket and connect the exhaust pipe to the catalytic converter with new nuts (1) tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
28. Install the exhaust pipe support bracket bolt (2) and tighten to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
29. Install the exhaust pipe hanger bolts (3) and tighten to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

Fig 5: Exhaust Pipe Hanger Bolts



Courtesy of CHRYSLER GROUP, LLC

30. Install the exhaust pipe hanger bolts (1) and tighten to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
31. Install the air cleaner body. Refer to BODY, AIR CLEANER, REMOVAL AND INSTALLATION .
32. Install the headlamp mounting crossmember. Refer to CROSSMEMBER, HEADLAMP MOUNTING, REMOVAL AND INSTALLATION .
33. Install the right front head lamp. Refer to UNIT, FRONT LAMP, REMOVAL AND INSTALLATION .
34. Install the left front head lamp. Refer to UNIT, FRONT LAMP, REMOVAL AND INSTALLATION .
35. Install the front fascia. Refer to FASCIA, FRONT, REMOVAL AND INSTALLATION .
36. Install the left and right half shafts. Refer to REMOVAL AND INSTALLATION .
37. Evacuate and charge the refrigerant system. Refer to PLUMBING, STANDARD PROCEDURE .
38. Fill the cooling system. Refer to STANDARD PROCEDURE .
39. Install the battery tray. Refer to TRAY, BATTERY, REMOVAL AND INSTALLATION .
40. Install the battery. Refer to BATTERY, REMOVAL AND INSTALLATION .
41. Install the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .

42. Install the hood. Refer to HOOD, REMOVAL AND INSTALLATION .
43. Install the right front wheel splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
44. Install the front belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
45. Install the front wheels. Refer to REMOVAL AND INSTALLATION .
46. Remove the vehicle from the lift.

REMOVAL AND INSTALLATION > 2.4L WITH AUTOMATIC TRANSMISSION - 4X4 > REMOVAL

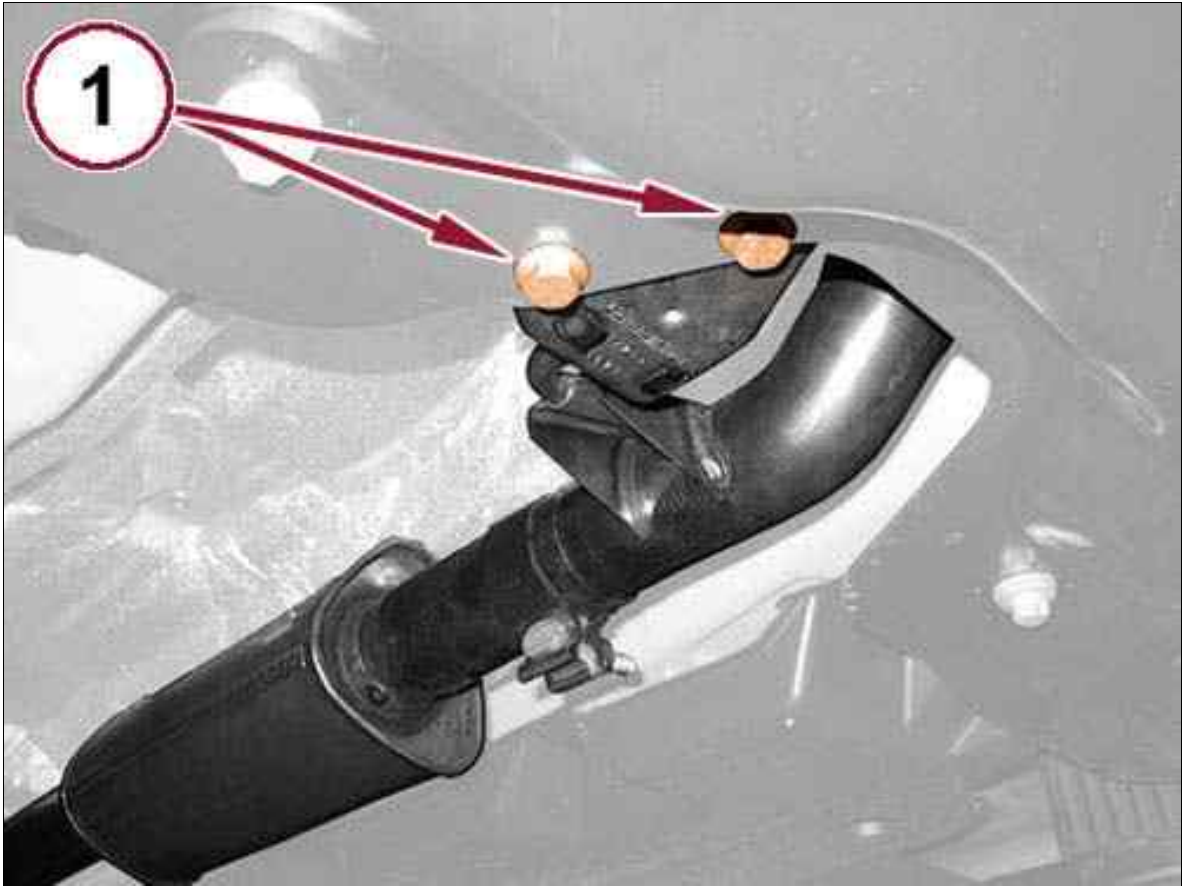
1. Raise and support the vehicle. Refer to HOISTING, STANDARD PROCEDURE .
2. Place the gear selector lever in "N" (neutral).
3. Remove the fuel pump fuse F21 (15A) from the Power Distribution Center (PDC).
4. Start and run the engine until it stalls from fuel starvation.
5. Return fuse F21 to the PDC.
6. Remove the front wheels. Refer to REMOVAL AND INSTALLATION .
7. Remove the front belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
8. Remove the right front wheel splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
9. Remove the hood. Refer to HOOD, REMOVAL AND INSTALLATION .
10. Remove the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
11. Remove the battery. Refer to BATTERY, REMOVAL AND INSTALLATION .
12. Remove the battery tray. Refer to TRAY, BATTERY, REMOVAL AND INSTALLATION .
13. Drain the cooling system.

Refer to STANDARD PROCEDURE .
14. Recover the refrigerant from the refrigerant system.

Refer to PLUMBING, STANDARD PROCEDURE .
15. Remove the left and right half shafts. Refer to REMOVAL AND INSTALLATION .
16. Remove the front fascia. Refer to FASCIA, FRONT, REMOVAL AND INSTALLATION .
17. Remove the left front head lamp. Refer to UNIT, FRONT LAMP, REMOVAL AND INSTALLATION .

18. Remove the right front head lamp. Refer to UNIT, FRONT LAMP, REMOVAL AND INSTALLATION .
19. Remove the headlamp mounting crossmember. Refer to CROSSMEMBER, HEADLAMP MOUNTING, REMOVAL AND INSTALLATION .
20. Remove the air cleaner body. Refer to BODY, AIR CLEANER, REMOVAL AND INSTALLATION .

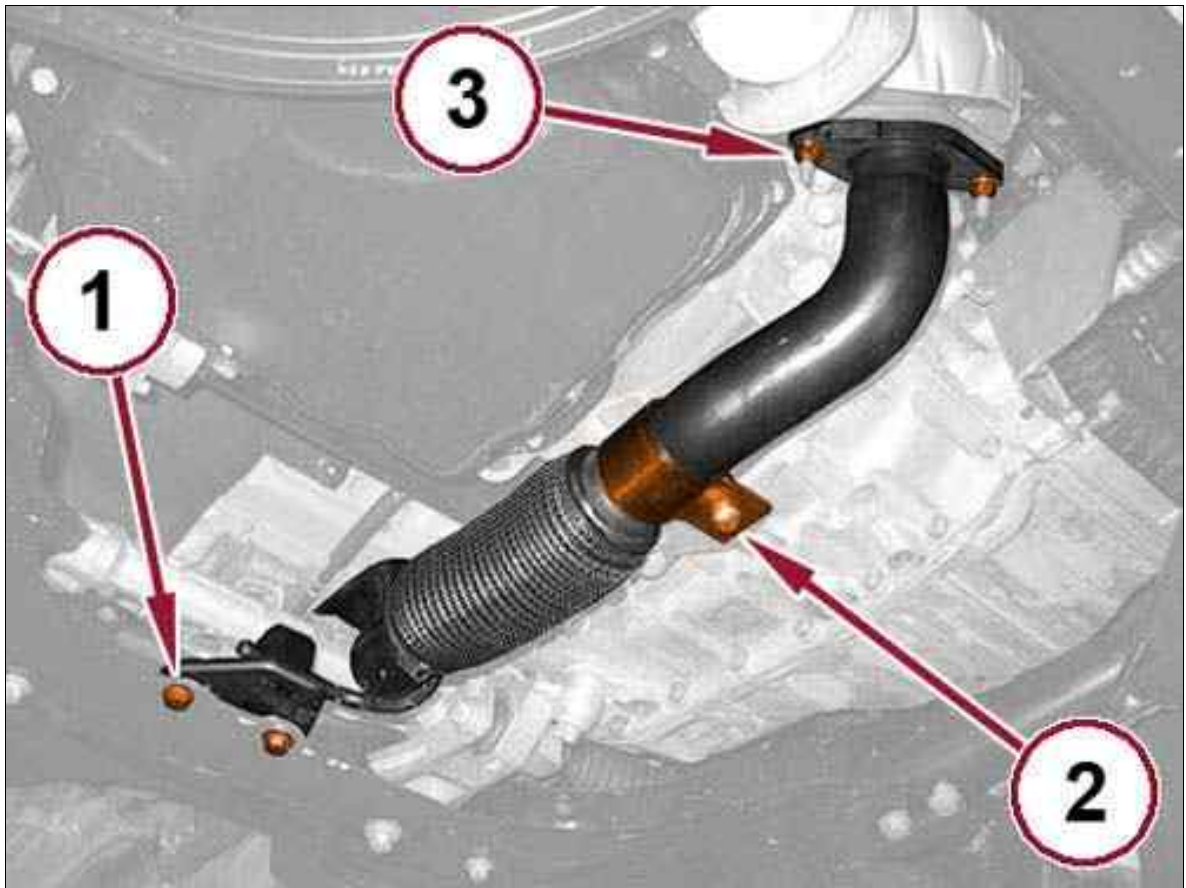
Fig 1: Exhaust Pipe Hanger Bolts



Courtesy of CHRYSLER GROUP, LLC

21. Remove the exhaust pipe hanger bolts (1).

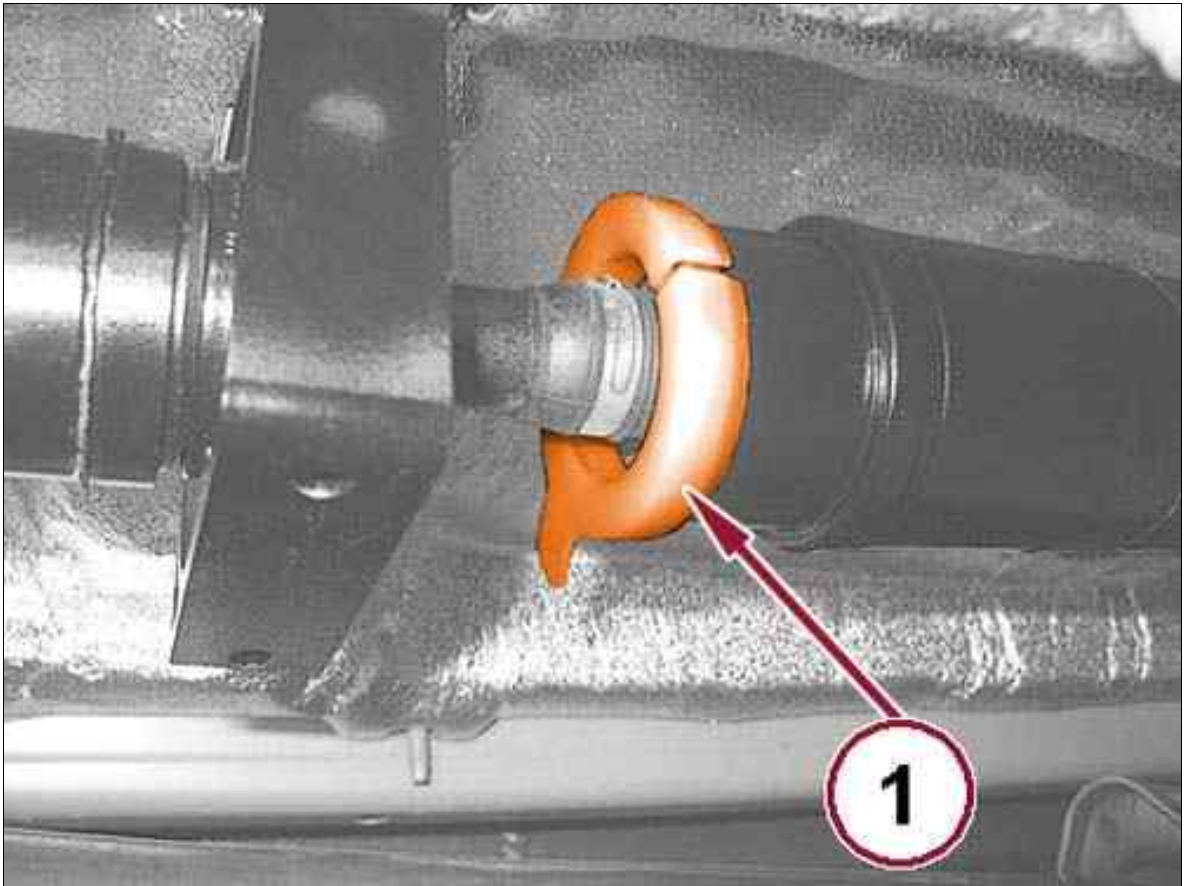
Fig 2: Exhaust Pipe Hanger Bolts, Exhaust Pipe Support Bracket Bolt & Exhaust Flange Nuts



Courtesy of CHRYSLER GROUP, LLC

22. Remove the exhaust pipe hanger bolts (1).
23. Remove the exhaust pipe support bracket bolt (2).
24. Remove the exhaust flange nuts (3), disconnect the exhaust pipe from the catalytic converter and remove the flange gasket.

Fig 3: Protective Sleeve At Joint



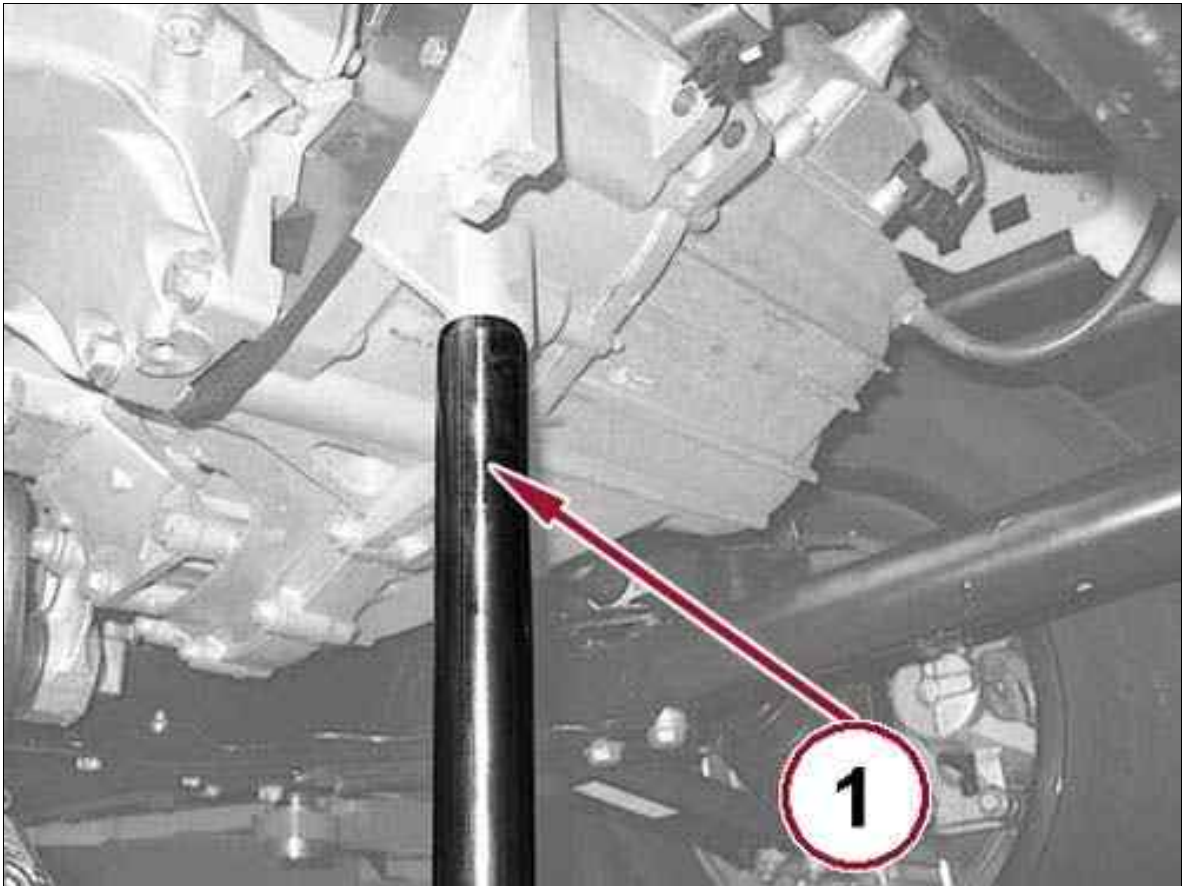
Courtesy of CHRYSLER GROUP, LLC

 NOTE:

The protective sleeve is included in the service parts package which also includes new dust covers and snap rings.

25. Mount the protective sleeve (1) as shown in illustration to protect the joint from excessive bending.

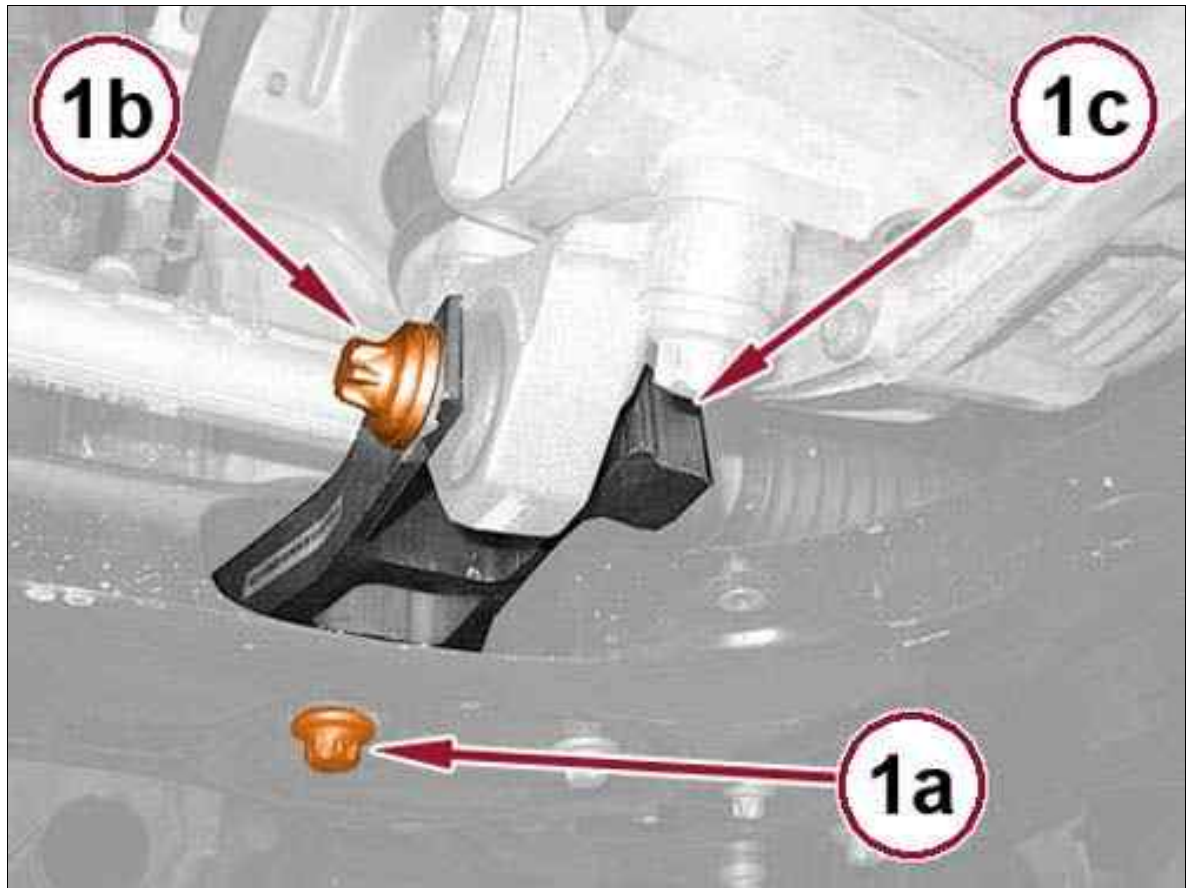
Fig 4: Locating Hydraulic Lift Under Powertrain



Courtesy of CHRYSLER GROUP, LLC

26. Position a suitable hydraulic lift under the powertrain (1).

Fig 5: Rear Engine Mount Isolator & Bolts



Courtesy of CHRYSLER GROUP, LLC

27. Remove the bolts (1a) and (1b) and remove the rear engine mount isolator (1c).

Fig 6: Dust Cover



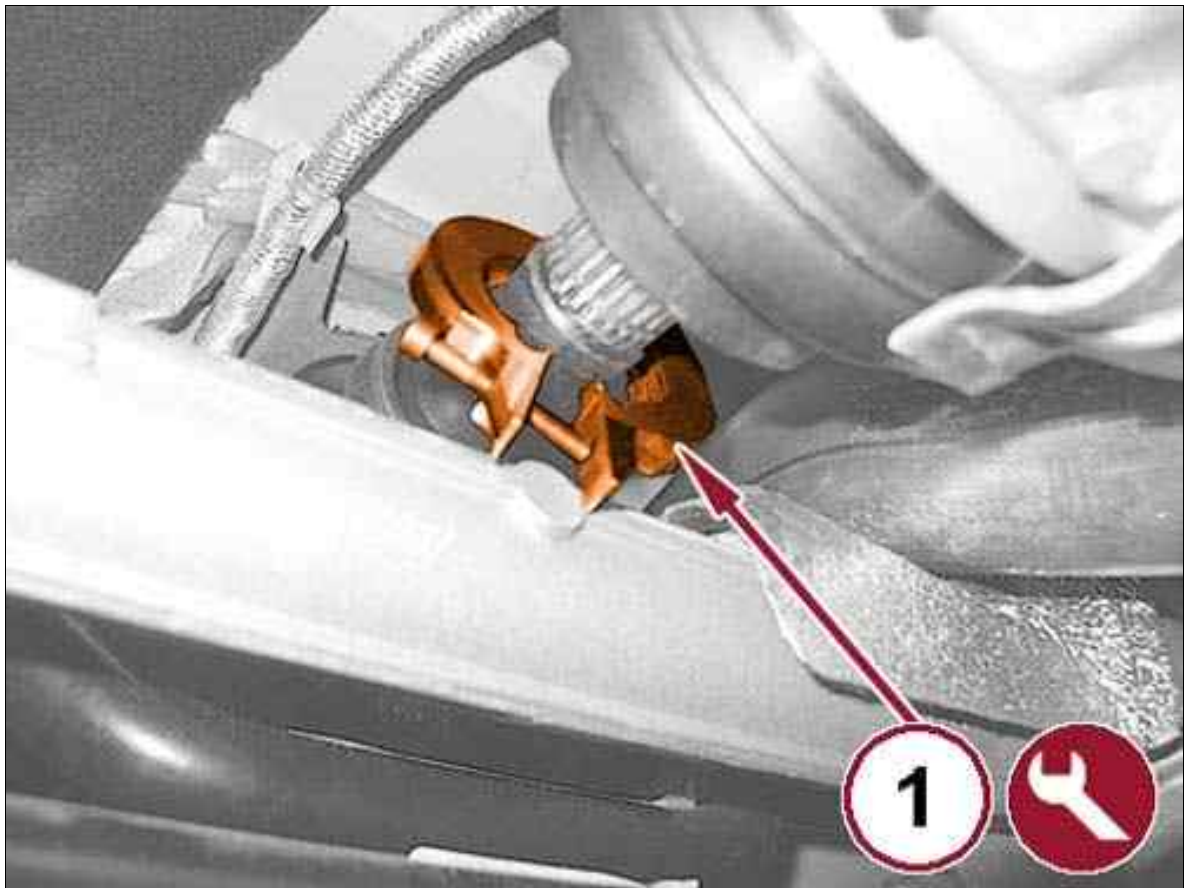
Courtesy of CHRYSLER GROUP, LLC

 NOTE:

The dust cover must be replaced whenever the drive shaft is disconnected.

28. Using the hydraulic lift, move the powertrain up and forward as much as permitted by the right and left engine mounts.
29. Pull back the dust cover (1).

Fig 7: Using Retractor Tool To Open Snap Ring



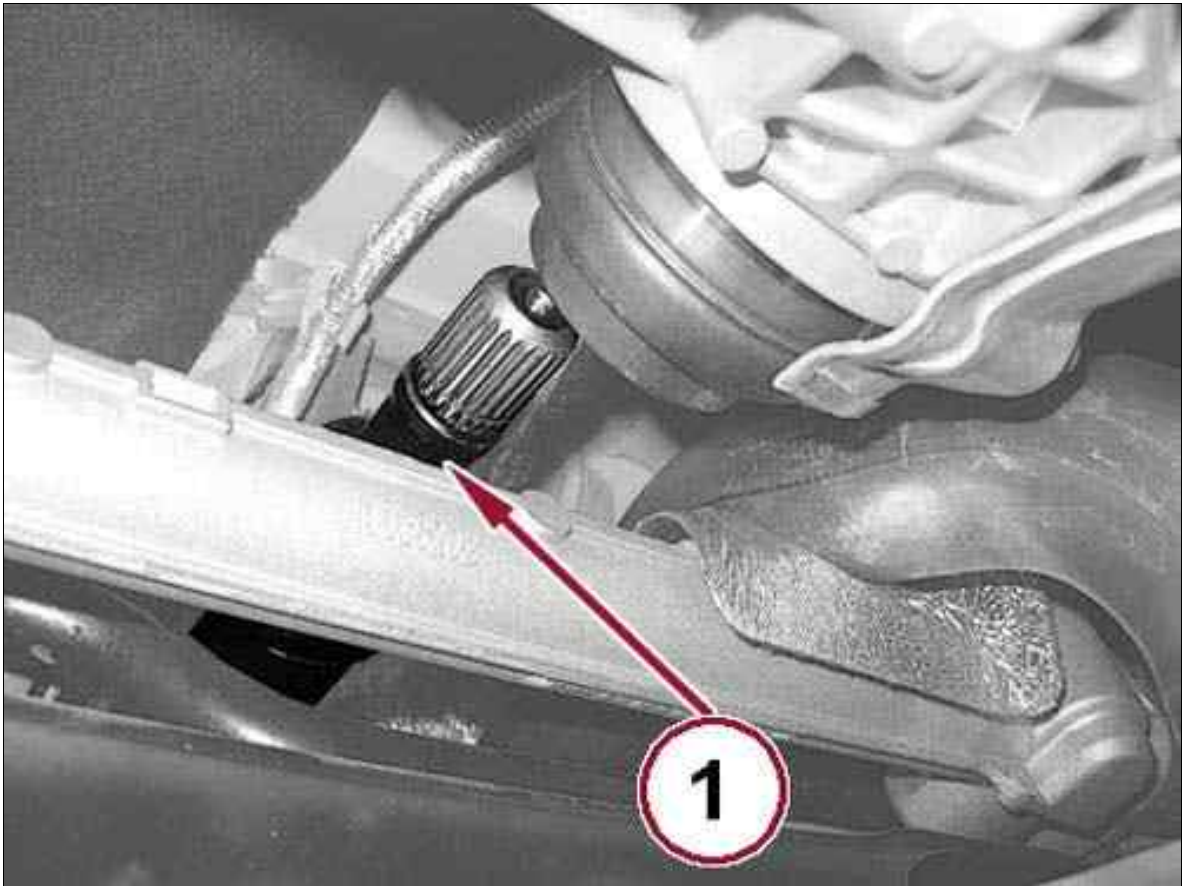
Courtesy of CHRYSLER GROUP, LLC

 NOTE:

The snap ring must be replaced whenever the drive shaft is disconnected.

30. Using tool 2019500030 Retractor (1), open the snap ring.

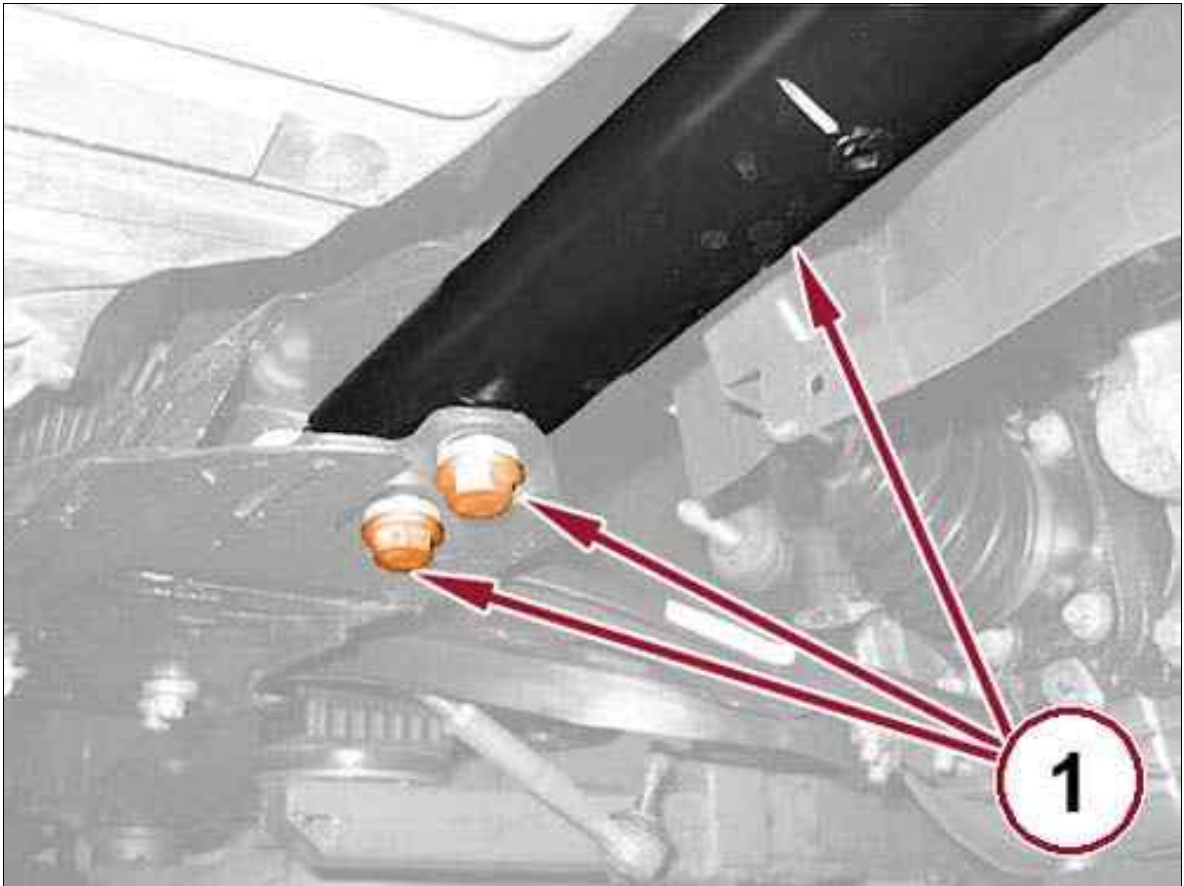
Fig 8: Positioning Drive Shaft At PTU



Courtesy of CHRYSLER GROUP, LLC

31. Pull back the drive shaft to disengage it from the PTU and reposition the shaft on the crossmember.
32. Remove the hydraulic lift.

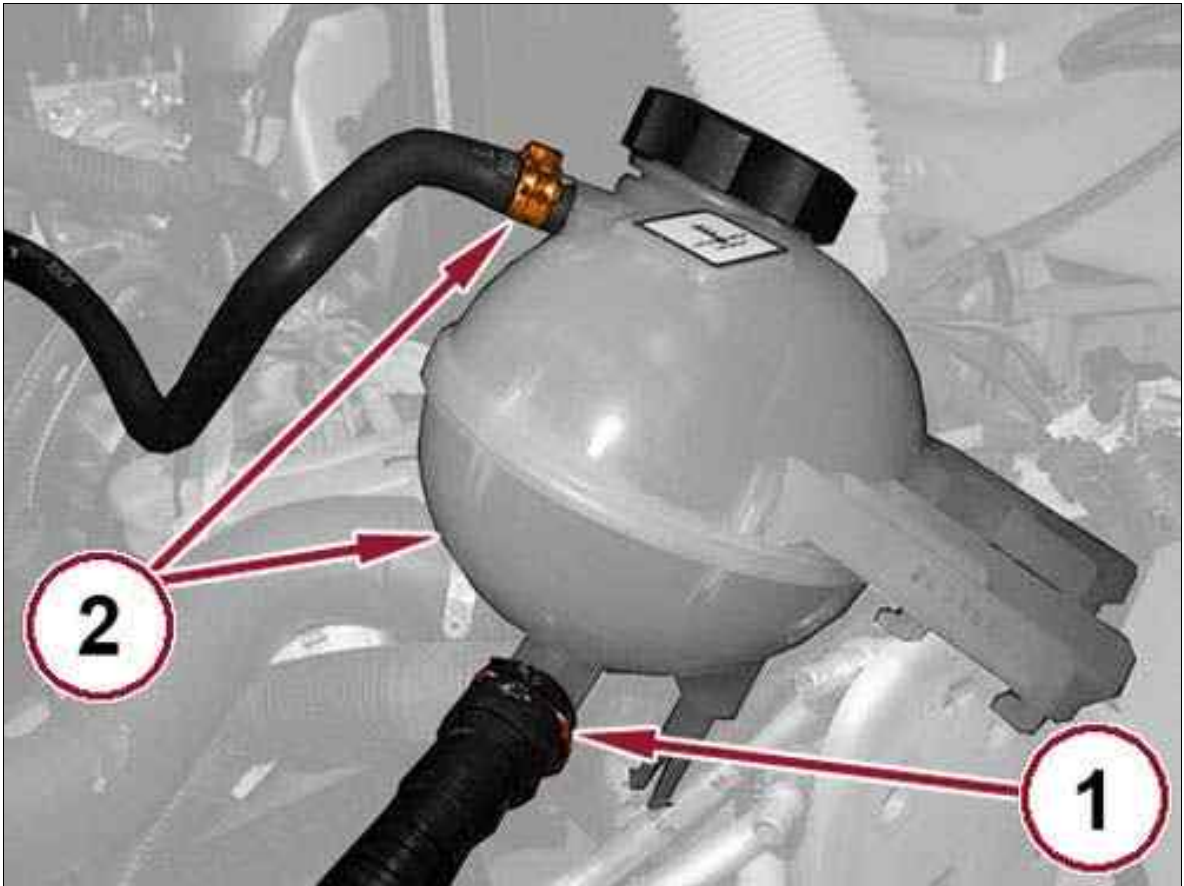
Fig 9: Left & Right Side Lower Load Beam & Bolts



Courtesy of CHRYSLER GROUP, LLC

33. Remove the bolts (1) and the left side lower load beam.
34. Remove the bolts and the right side lower load beam.

Fig 10: Quick Coupling, Pressurized Coolant Bottle & Degas Hose Clamp



Courtesy of CHRYSLER GROUP, LLC

35. Disconnect the quick coupling (1) and remove the coolant hose from the pressurized coolant bottle.
36. Loosen the clamp (2) and remove the degas hose, disengage the retaining clips and remove the pressurized coolant bottle.

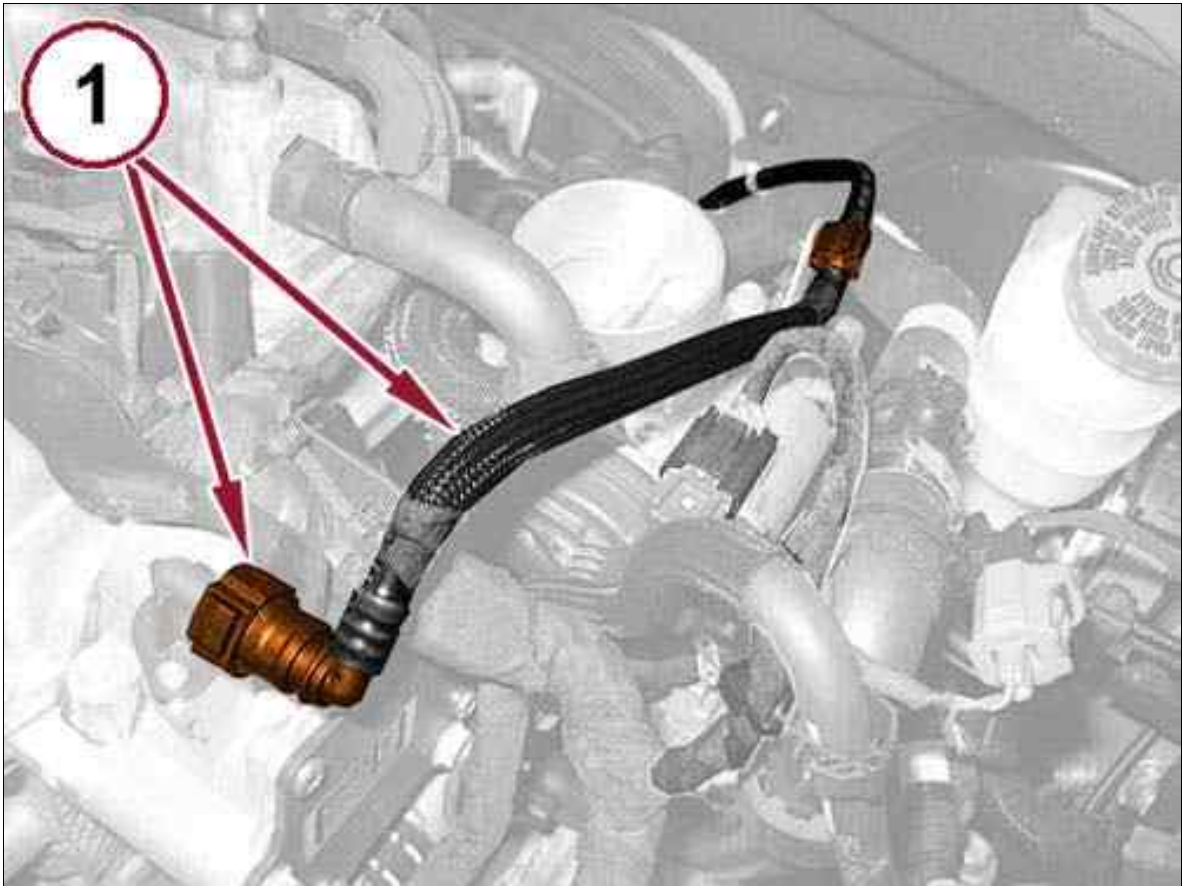
Fig 11: A/C Evaporator Quick Coupling



Courtesy of CHRYSLER GROUP, LLC

37. Disconnect the A/C evaporator quick coupling (1).

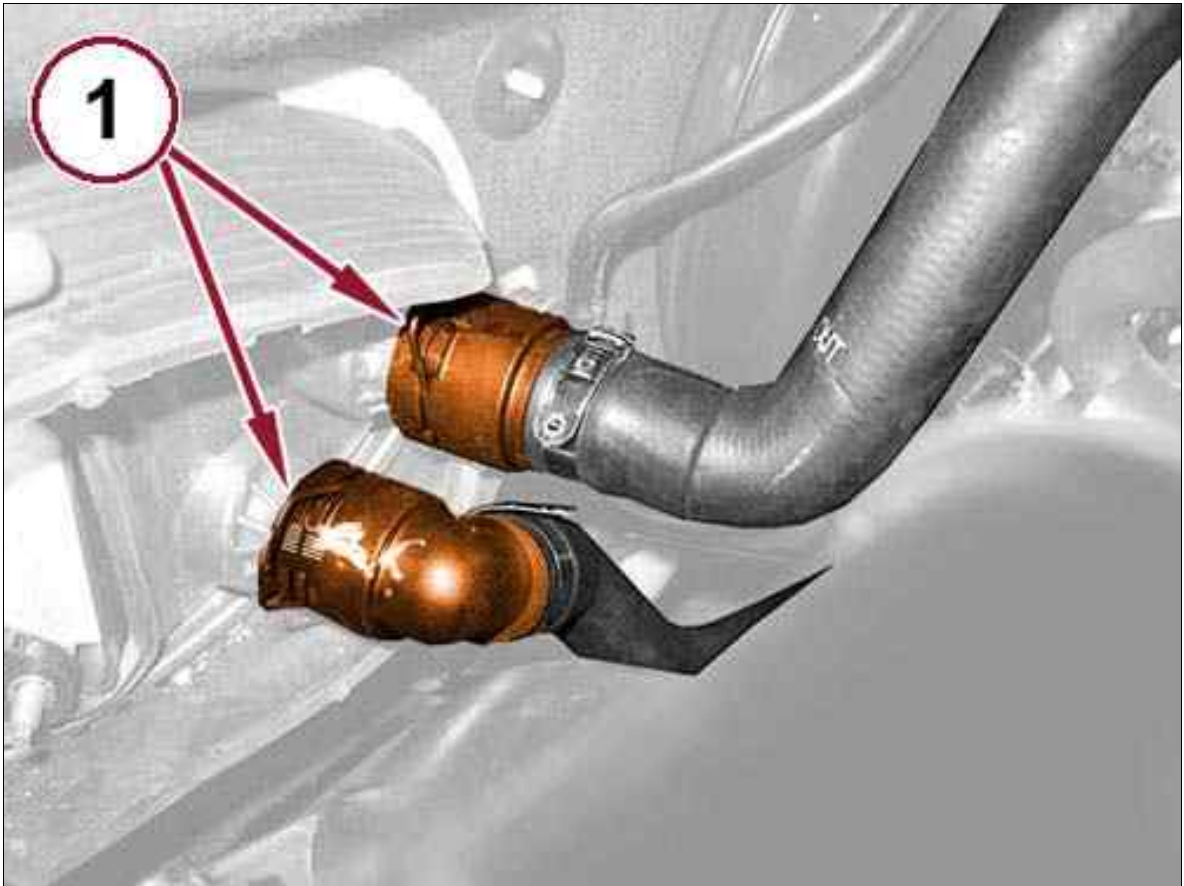
Fig 12: Vacuum Hose & Quick Coupling



Courtesy of CHRYSLER GROUP, LLC

38. Disconnect the quick coupling (1) and remove the vacuum hose from the vacuum pump.

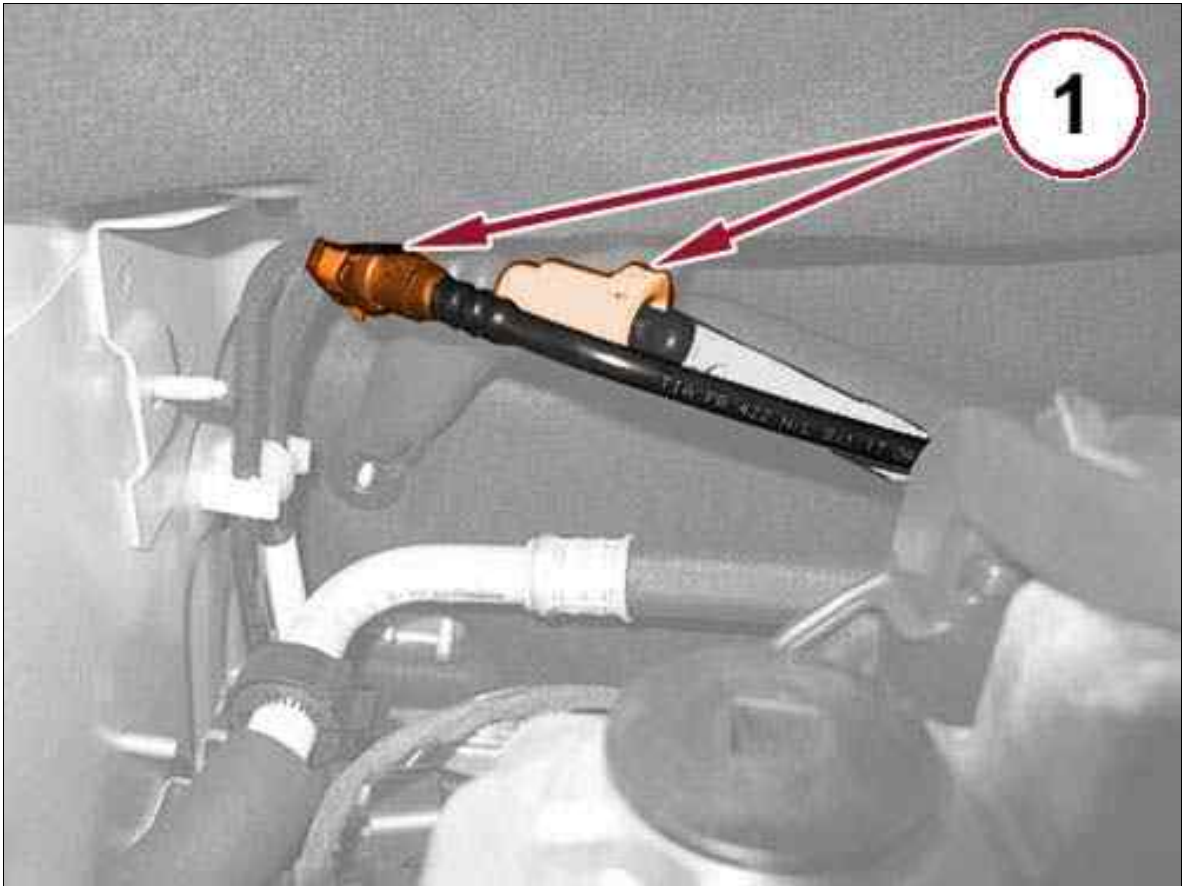
Fig 13: Heater Core Hose Quick Couplings



Courtesy of CHRYSLER GROUP, LLC

39. Disconnect the heater core hose quick couplings (1).

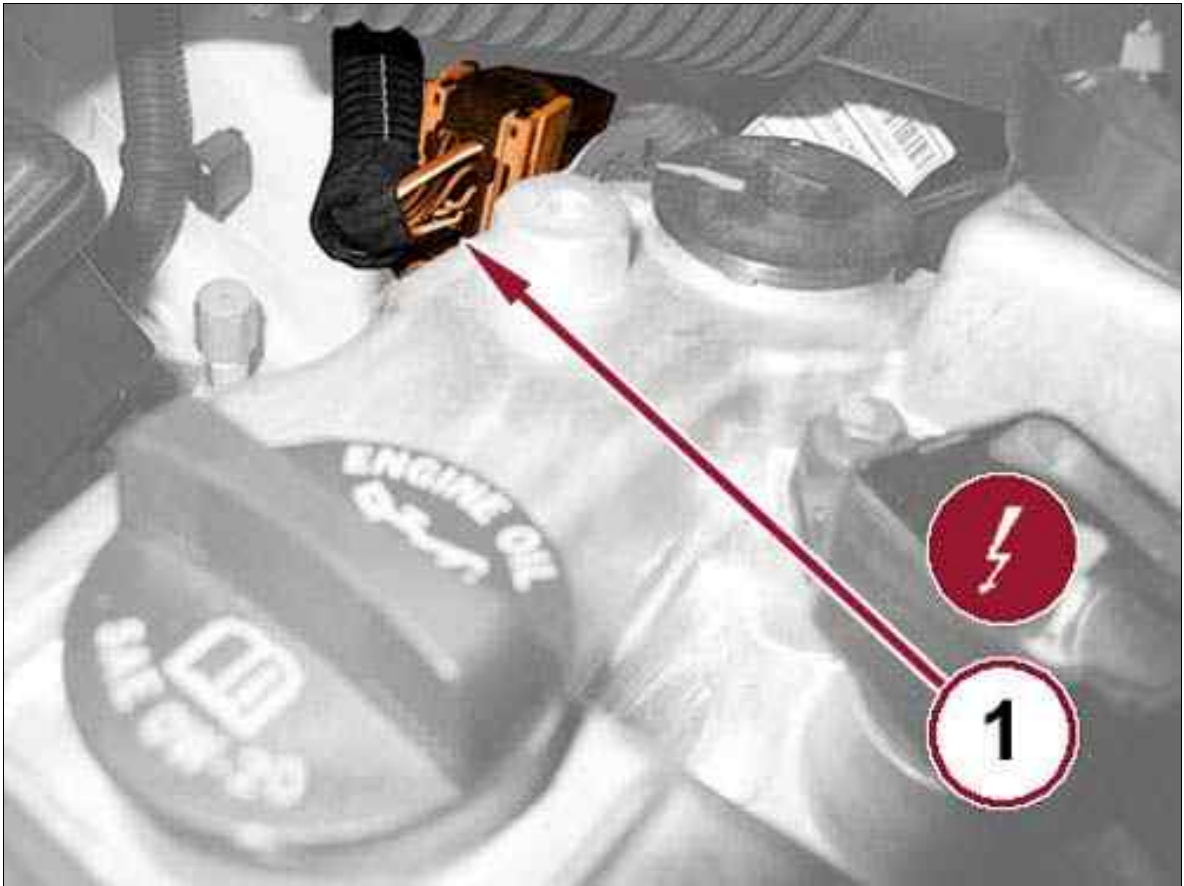
Fig 14: Fuel Supply Hose & Vapor Purge Hose Quick Couplings



Courtesy of CHRYSLER GROUP, LLC

40. Disconnect the fuel supply hose and vapor purge hose quick couplings (1).

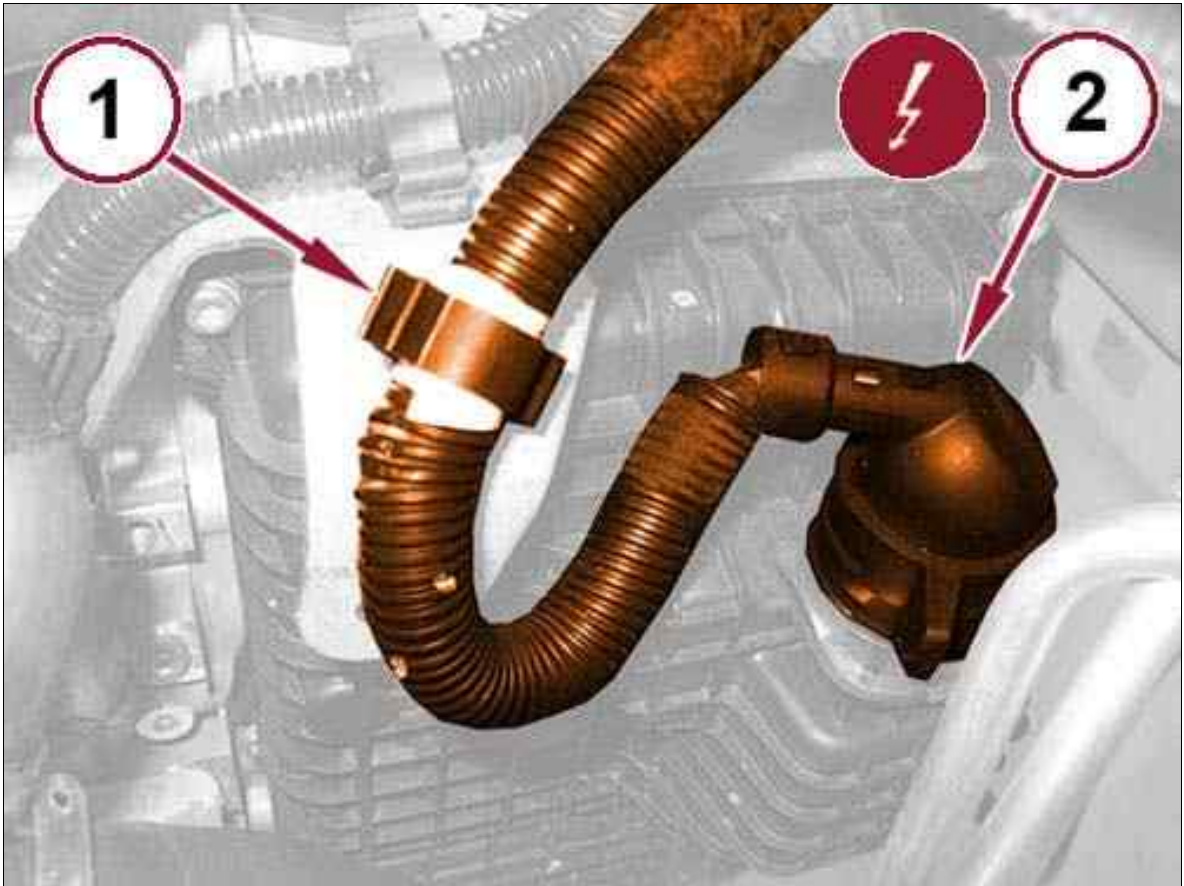
Fig 15: Power Transfer Unit Actuator Wire Harness Connector



Courtesy of CHRYSLER GROUP, LLC

41. Disconnect the power transfer unit actuator wire harness connector (1).

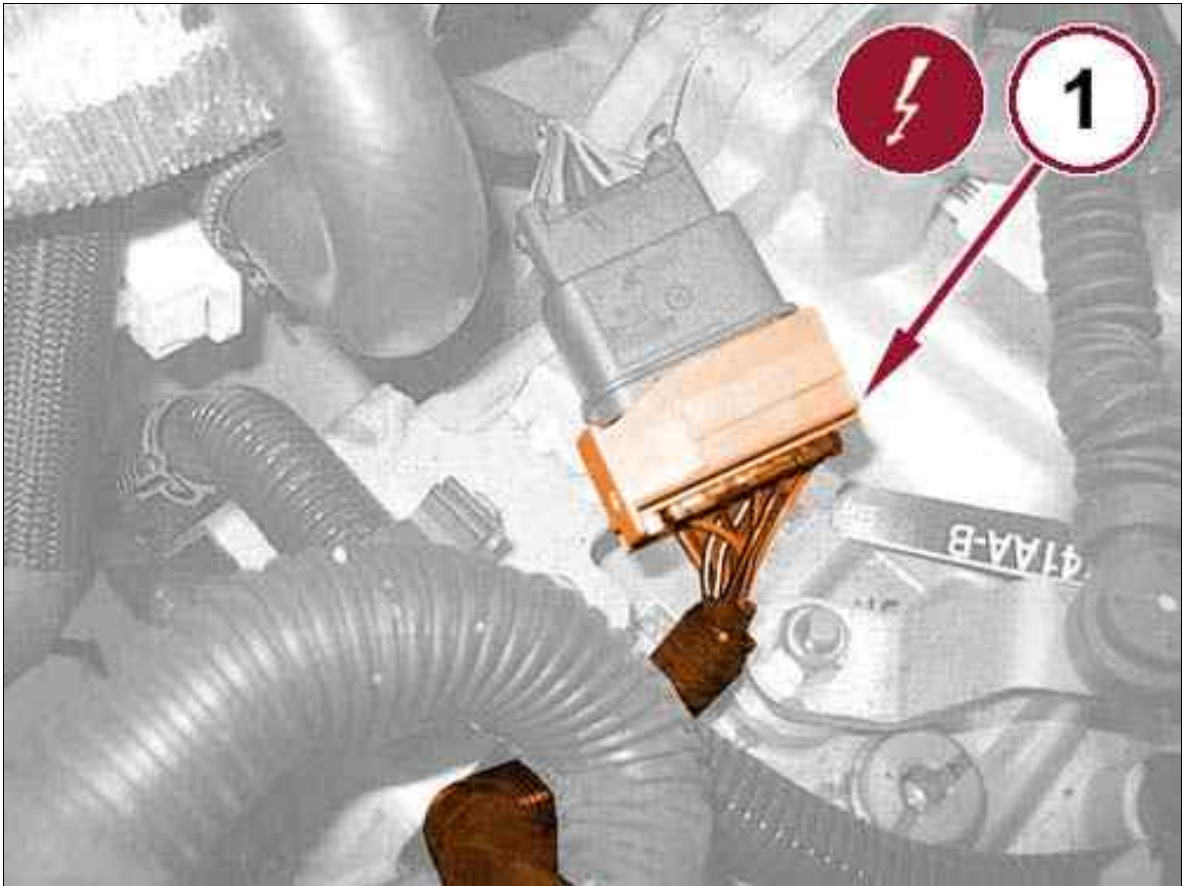
Fig 16: Wire Harness Retaining Clip & Transmission Wire Harness Connector



Courtesy of CHRYSLER GROUP, LLC

42. Open the wire harness retaining clip (1).
43. Rotate the connector lock nut and disconnect the transmission wire harness connector (2).

Fig 17: Engine Wire Harness Connector



Courtesy of CHRYSLER GROUP, LLC

44. Disconnect the engine wire harness connector (1).

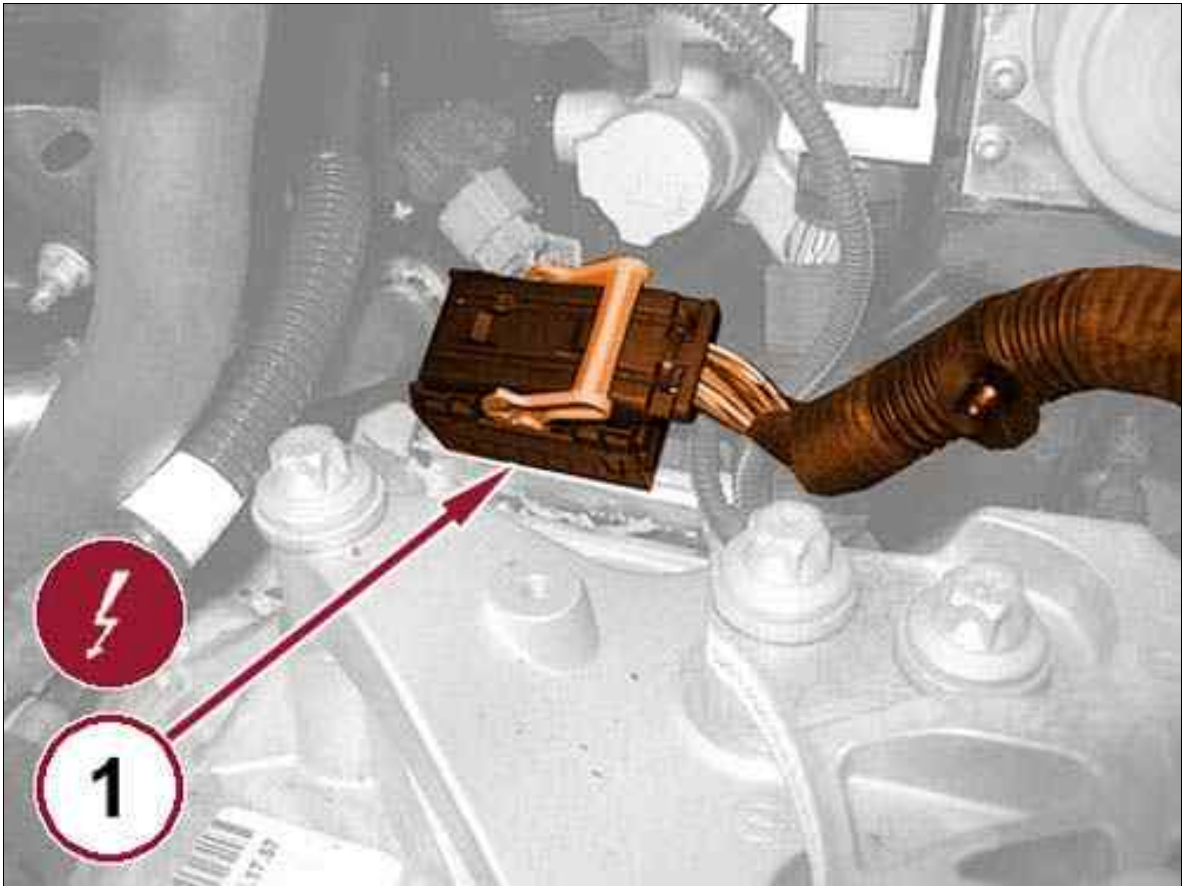
Fig 18: Gear Selector Cable At Gear Change Lever & Lock Slider



Courtesy of CHRYSLER GROUP, LLC

45. Disconnect the gear selector cable from the gear change lever (1).
46. Pull back the lock slider (2) and disengage the gear selector cable from the bracket.

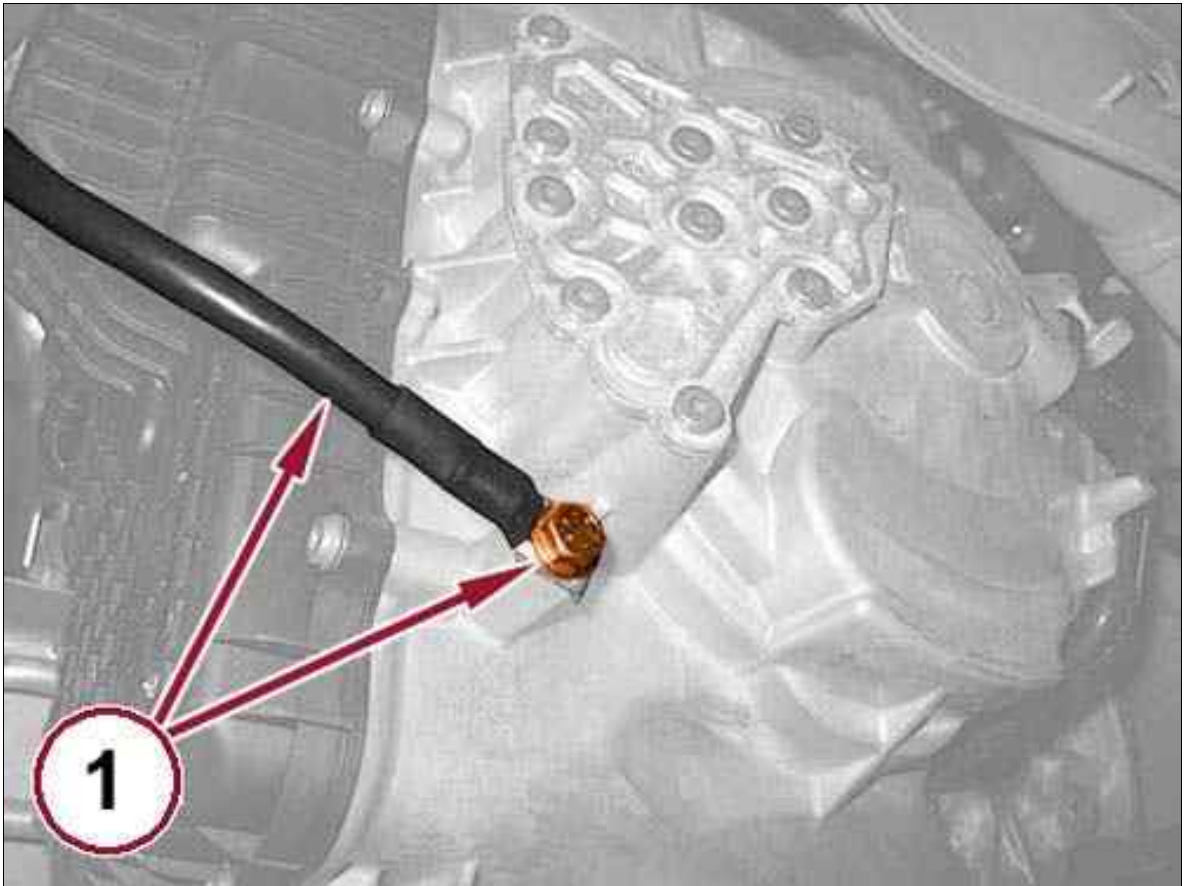
Fig 19: Transmission Control Module (TCM) Wire Harness Connector



Courtesy of CHRYSLER GROUP, LLC

47. Open the retaining clip and disconnect the Transmission Control Module (TCM) wire harness connector (1).

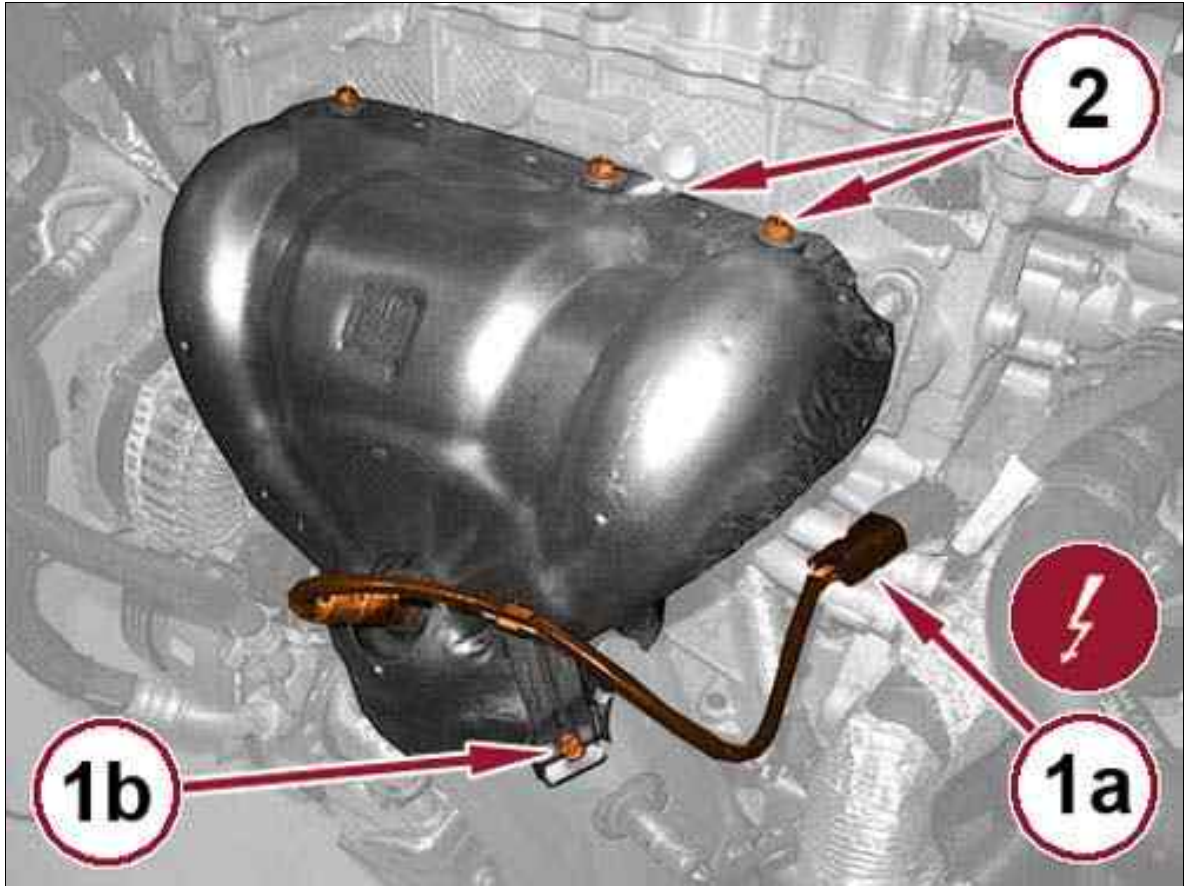
Fig 20: Battery Ground Cable & Bolt



Courtesy of CHRYSLER GROUP, LLC

48. Remove the bolt (1) and reposition the battery ground cable.

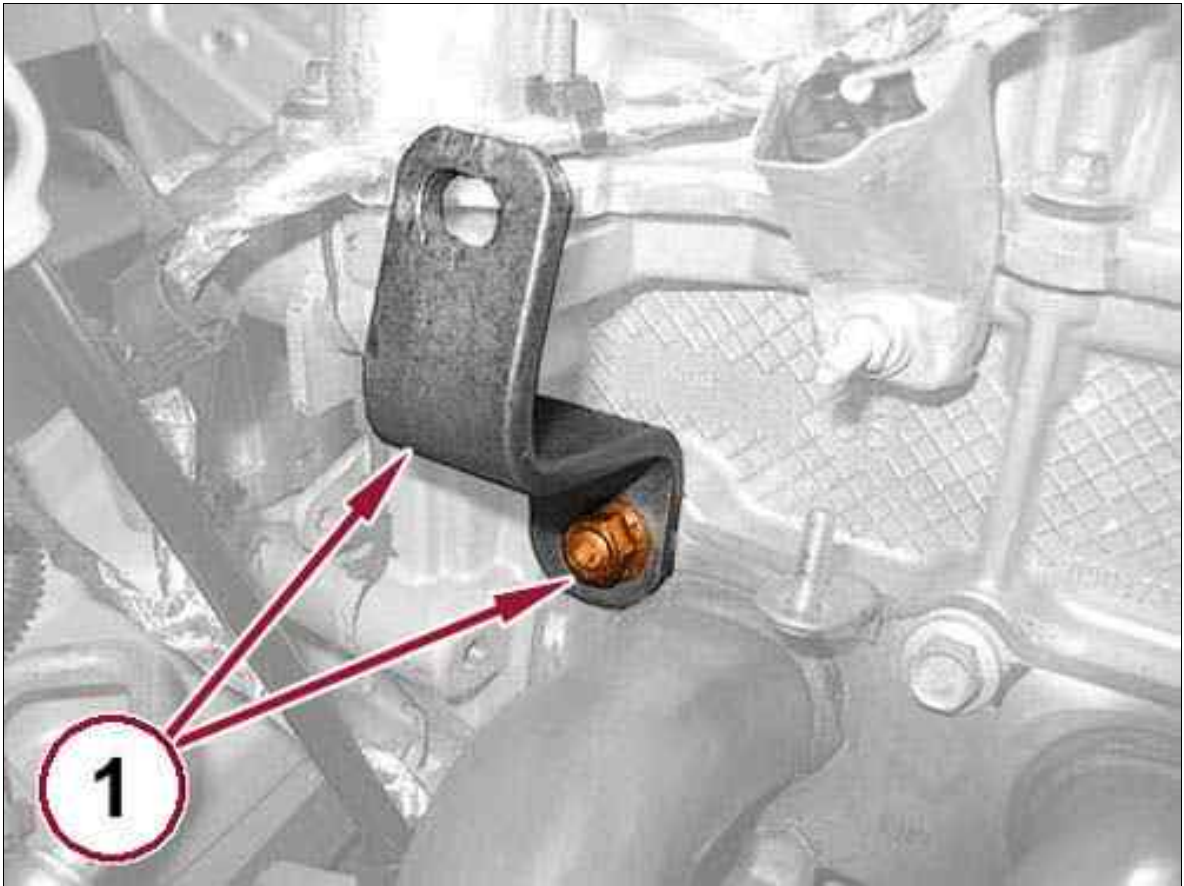
Fig 21: Upstream Oxygen Sensor Wire Harness Connector, Exhaust Manifold Heat Shield, Wire Harness Bracket & Bolts



Courtesy of CHRYSLER GROUP, LLC

49. Disconnect the upstream oxygen sensor wire harness connector (1a) and remove the bolt (1b) and wire harness bracket.
50. Remove the bolts (2) and the exhaust manifold heat shield.

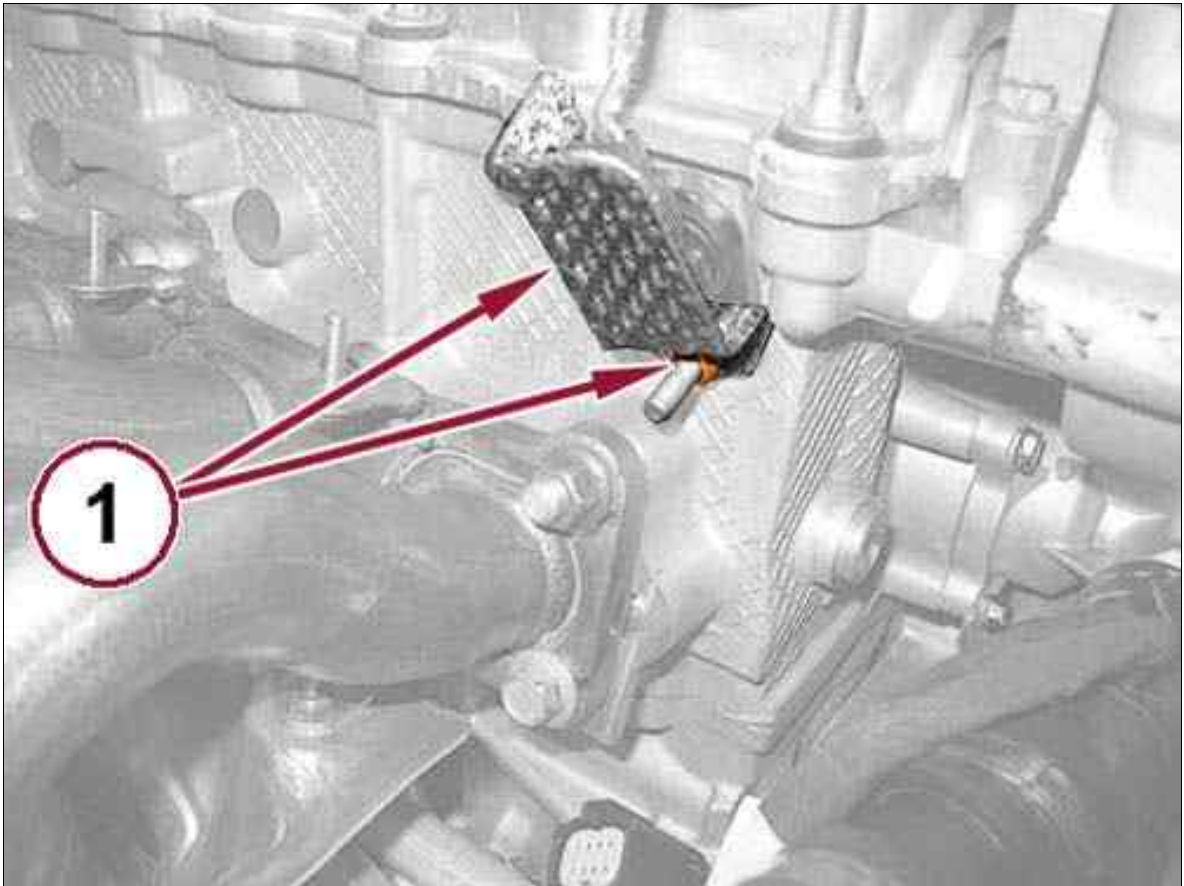
Fig 22: Engine Lifting Bracket & Exhaust Manifold Nut



Courtesy of CHRYSLER GROUP, LLC

51. Install a suitable engine lifting bracket (1) under the exhaust manifold nut.

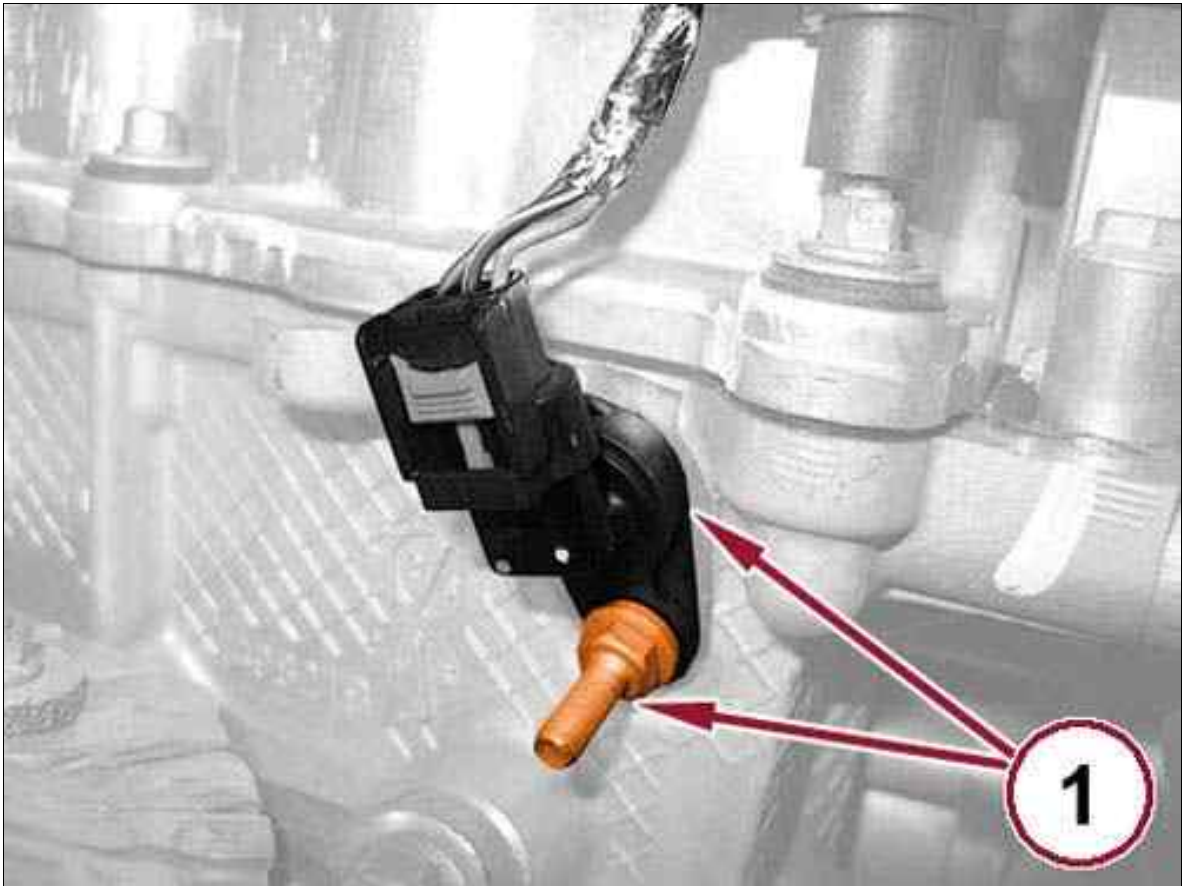
Fig 23: Camshaft Position Sensor Heat Shield & Nut



Courtesy of CHRYSLER GROUP, LLC

52. Remove the nut and the Camshaft Position sensor heat shield (1).

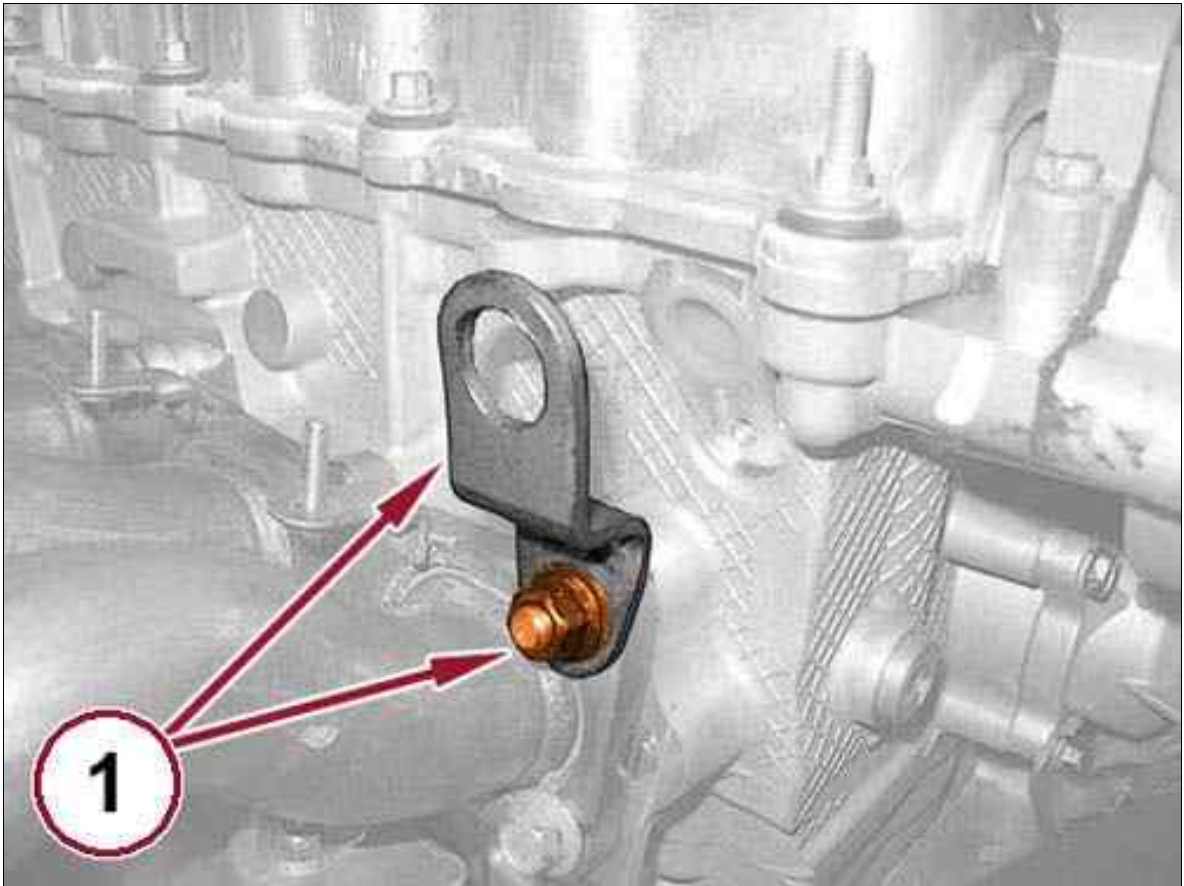
Fig 24: Camshaft Position Sensor & Studbolt



Courtesy of CHRYSLER GROUP, LLC

53. Remove the studbolt and the Camshaft Position sensor (1).

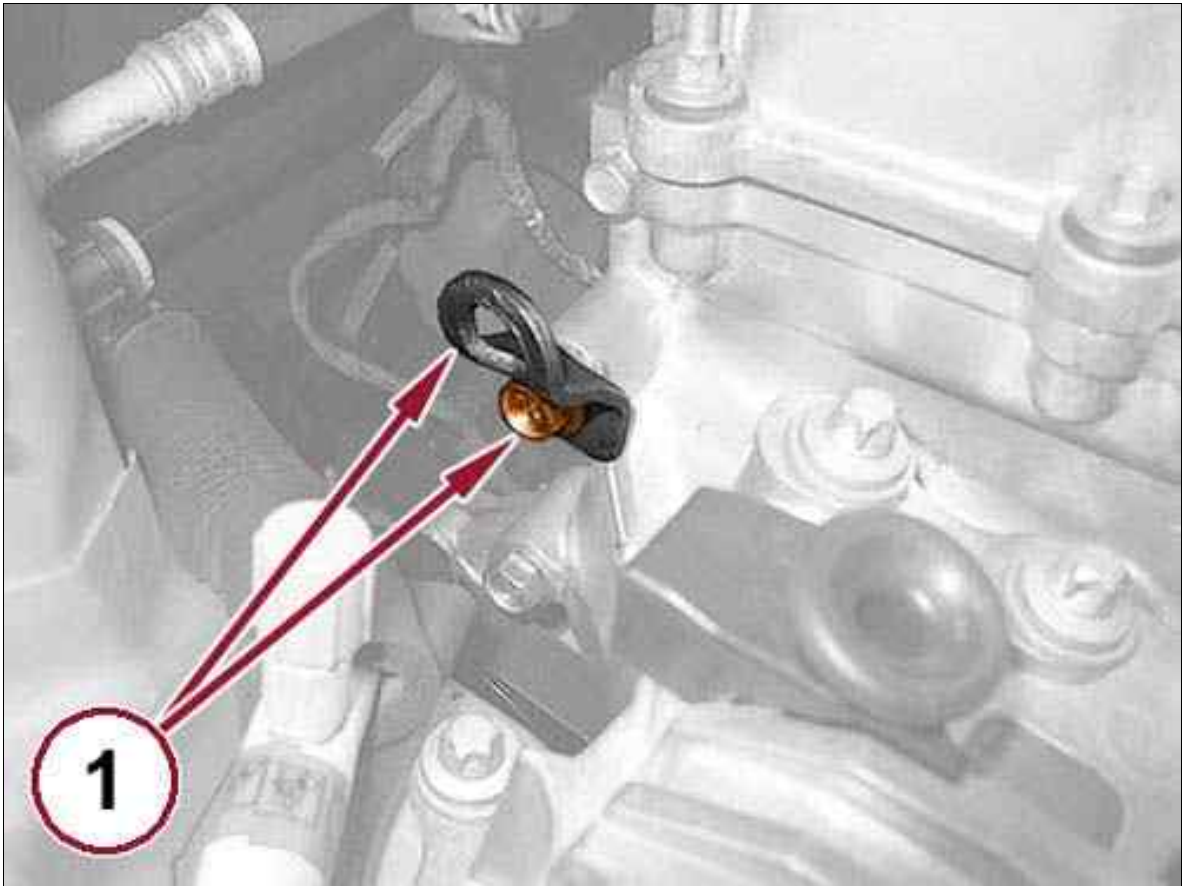
Fig 25: Engine Lifting Bracket & Exhaust Manifold Nut



Courtesy of CHRYSLER GROUP, LLC

54. Install a suitable engine lifting bracket (1) under the exhaust manifold nut.

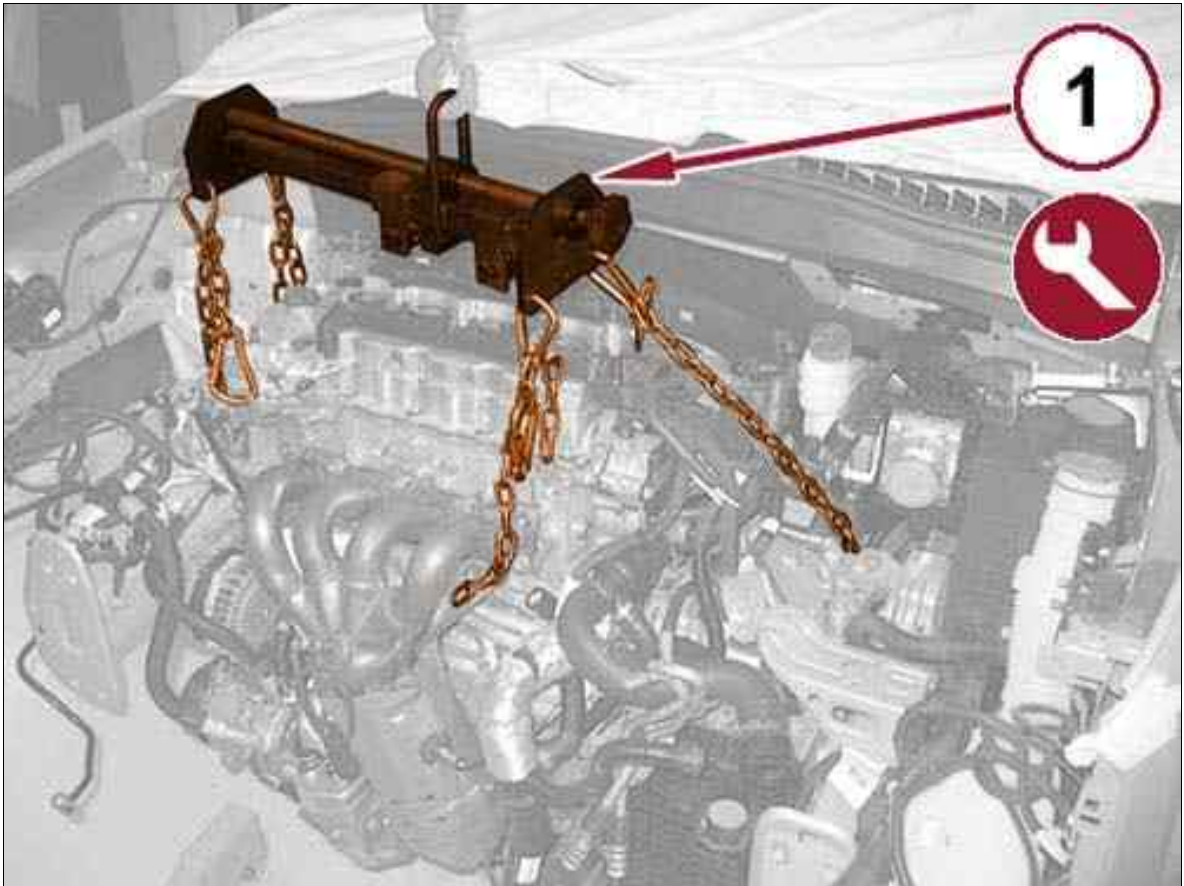
Fig 26: Engine Lifting Bracket & Engine Timing Cover Bolt



Courtesy of CHRYSLER GROUP, LLC

55. Install a suitable engine lifting bracket (1) under the engine timing cover bolt.

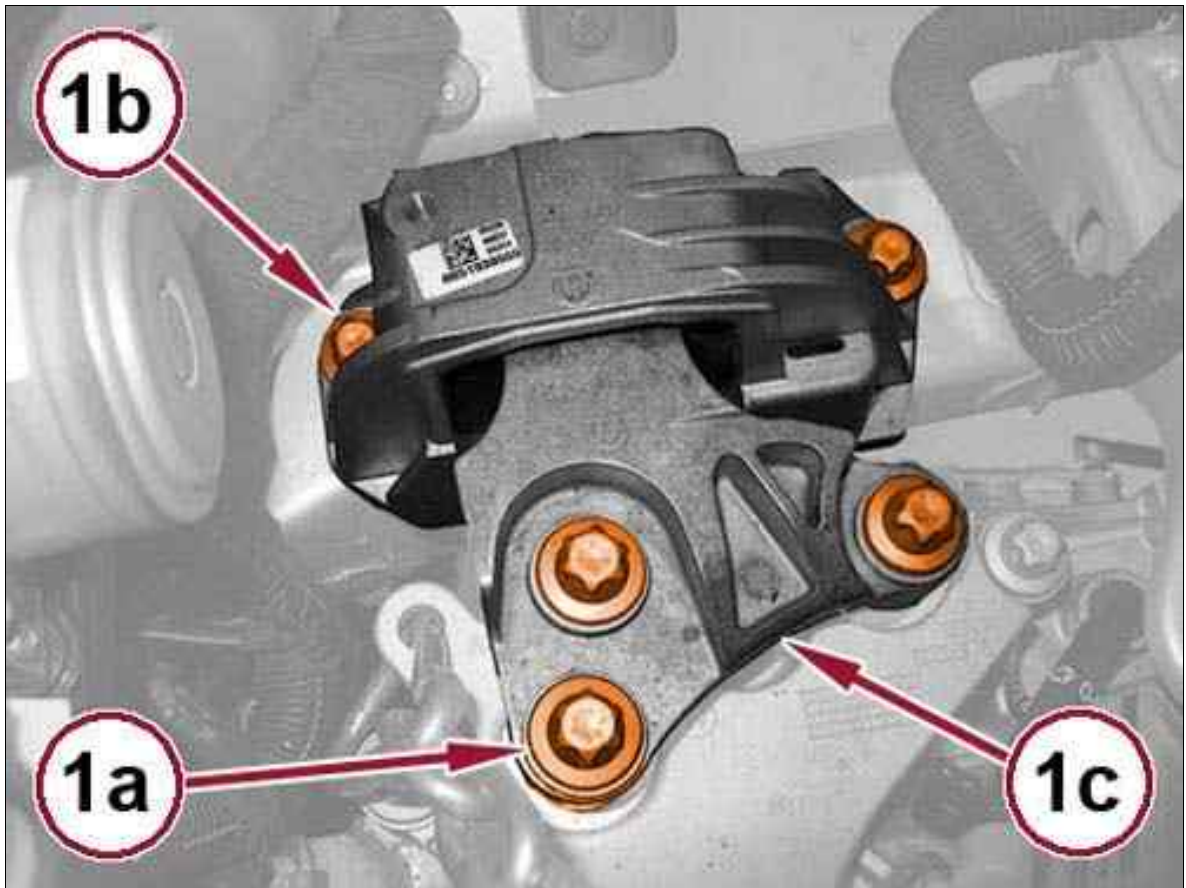
Fig 27: Hydraulic Crane & Sling



Courtesy of CHRYSLER GROUP, LLC

56. Connect a hydraulic crane and 1871001700 Sling (1) to the lifting brackets.

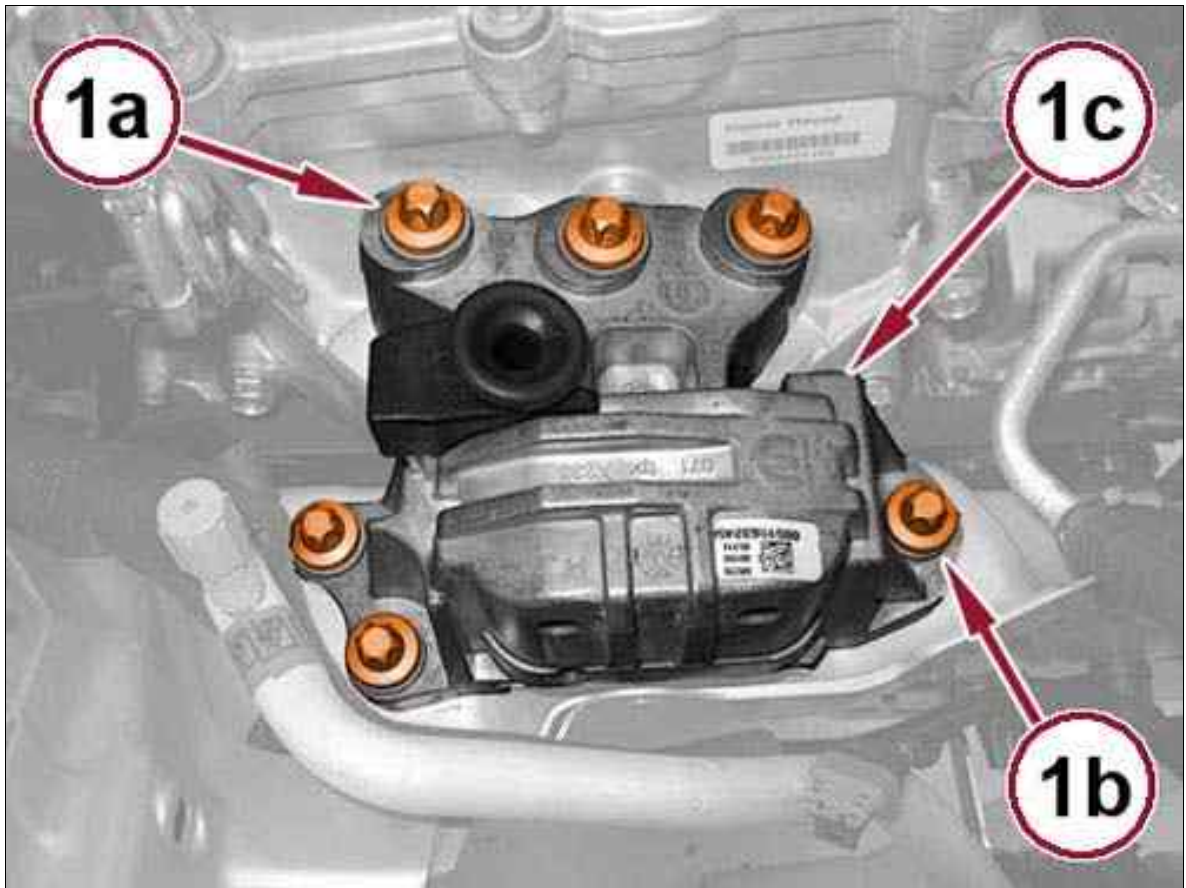
Fig 28: Left Engine Mount Isolator & Bolts



Courtesy of CHRYSLER GROUP, LLC

57. Remove the bolts (1a) and (1b) and remove the left engine mount isolator (1c).

Fig 29: Right Engine Mount Isolator & Bolts



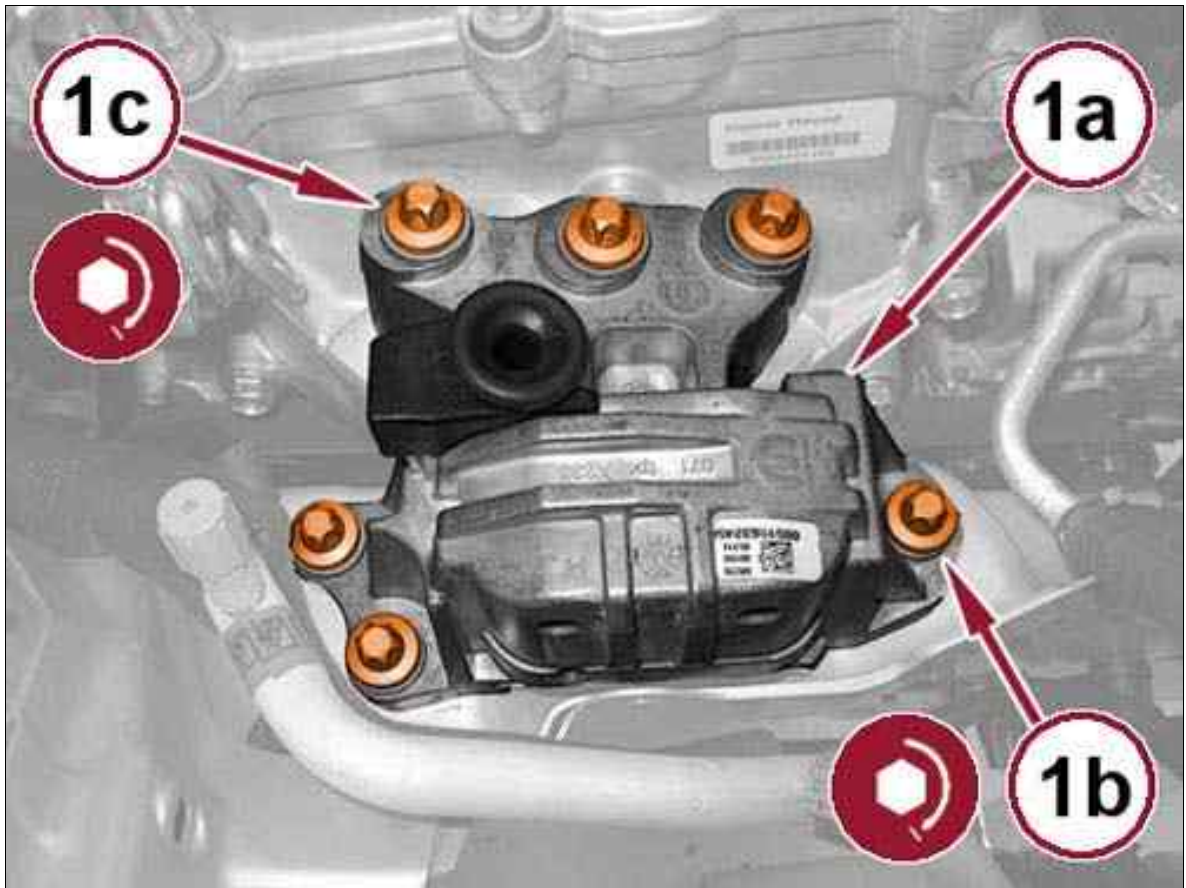
Courtesy of CHRYSLER GROUP, LLC

58. Remove the bolts (1a) and (1b) and remove the right engine mount isolator (1c).
59. Remove the power train from the engine compartment and place it on a suitable platform.
60. Remove the hydraulic crane and sling from the lifting brackets.

REMOVAL AND INSTALLATION > 2.4L WITH AUTOMATIC TRANSMISSION - 4X4 > INSTALLATION

1. Install the powertrain in the engine compartment using a hydraulic crane and 1871001700 Sling connected to the lifting brackets.

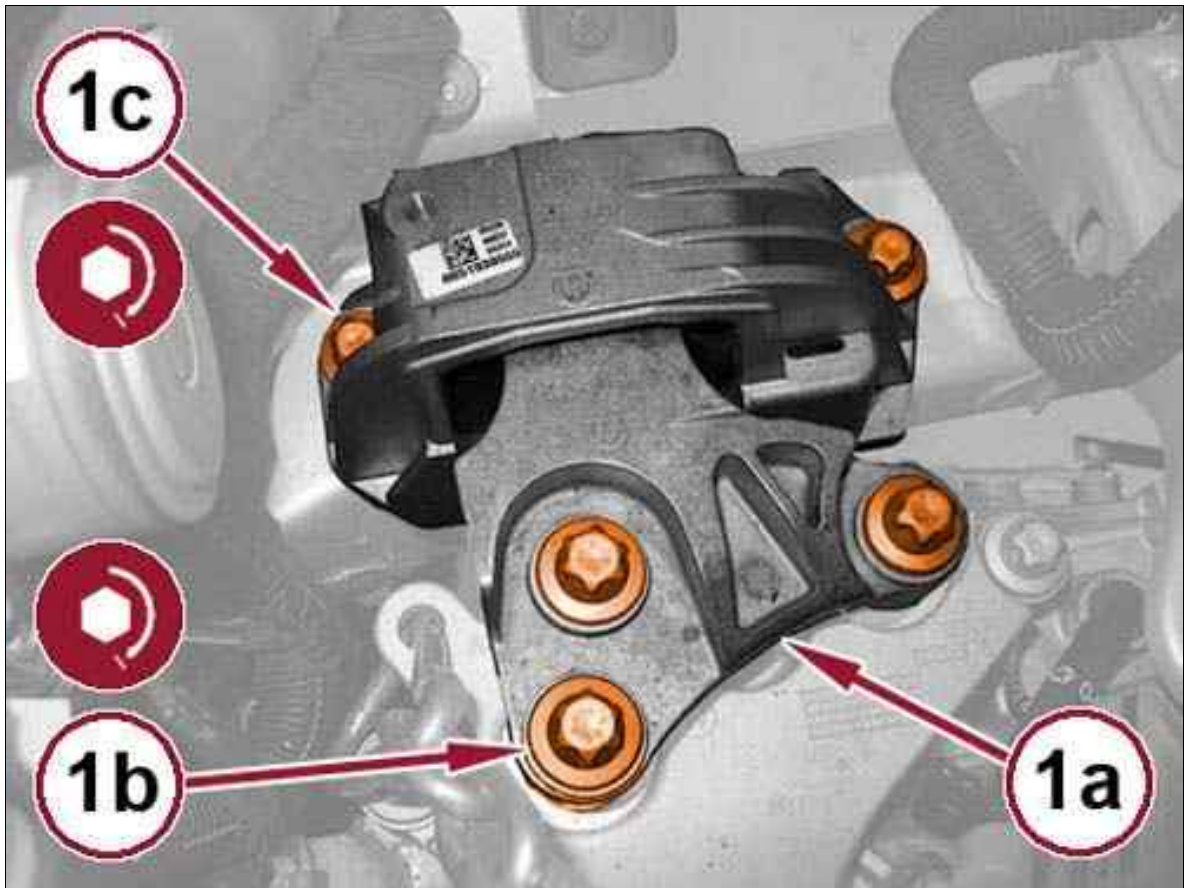
Fig 1: Right Engine Mount Isolator & Bolts



Courtesy of CHRYSLER GROUP, LLC

2. Install the right engine mount isolator (1a) and tighten the bolts (1b) and (1c) to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

Fig 2: Left Engine Mount Isolator & Bolts

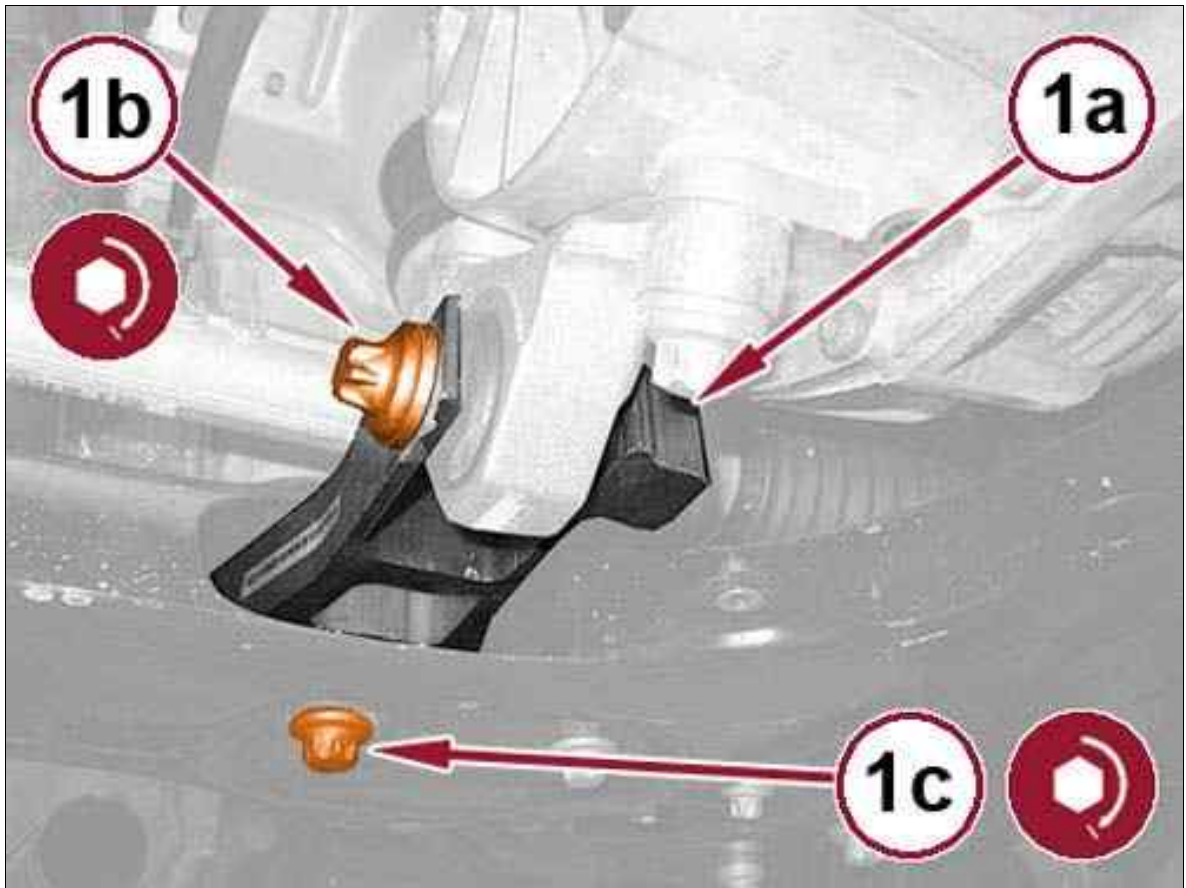


Courtesy of CHRYSLER GROUP, LLC

3. Install the left engine mount isolator (1a) and tighten the bolts (1b) and (1c) to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
4. Remove the hydraulic crane and sling connected to the powertrain lifting brackets.
5. Remove the powertrain lifting brackets from the engine and tighten the exhaust manifold nuts to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
6. Install the Camshaft Position sensor to the cylinder head and tighten the studbolt to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
7. Install the Camshaft Position sensor heat shield with the nut tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
8. Install the exhaust manifold heat shield with the bolts tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
9. Install the wire harness bracket to the exhaust manifold heat shield with the bolt tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
10. Connect the upstream oxygen sensor wire harness connector.
11. Install the battery ground cable with the bolt tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

12. Connect the Transmission Control Module (TCM) wire harness connector and close the wire harness retaining clip.
13. Pull back the lock slider and engage the gear selector cable to the bracket.
14. Engage the gear selector cable to the lever arm and check its function.
15. Connect the engine wire harness connector.
16. Connect the transmission wire harness connector by rotating the connector lock nut.
17. Close the wire harness retaining clip near the transmission wire harness connector.
18. Connect the power transfer unit actuator wire harness connector.
19. Connect the fuel supply hose quick coupling and vapor purge hose quick coupling.
20. Connect the heater core hose quick couplings.
21. Install the vacuum hose to the vacuum pump and connect the quick coupling.
22. Connect the A/C evaporator quick coupling.
23. Install the pressurized coolant bottle and connect the quick coupling.
24. Install the degas hose to the pressurized coolant bottle and tighten the clamp to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
25. Install the left side lower load beam with the bolts tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
26. Install the right side lower load beam with the bolts tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

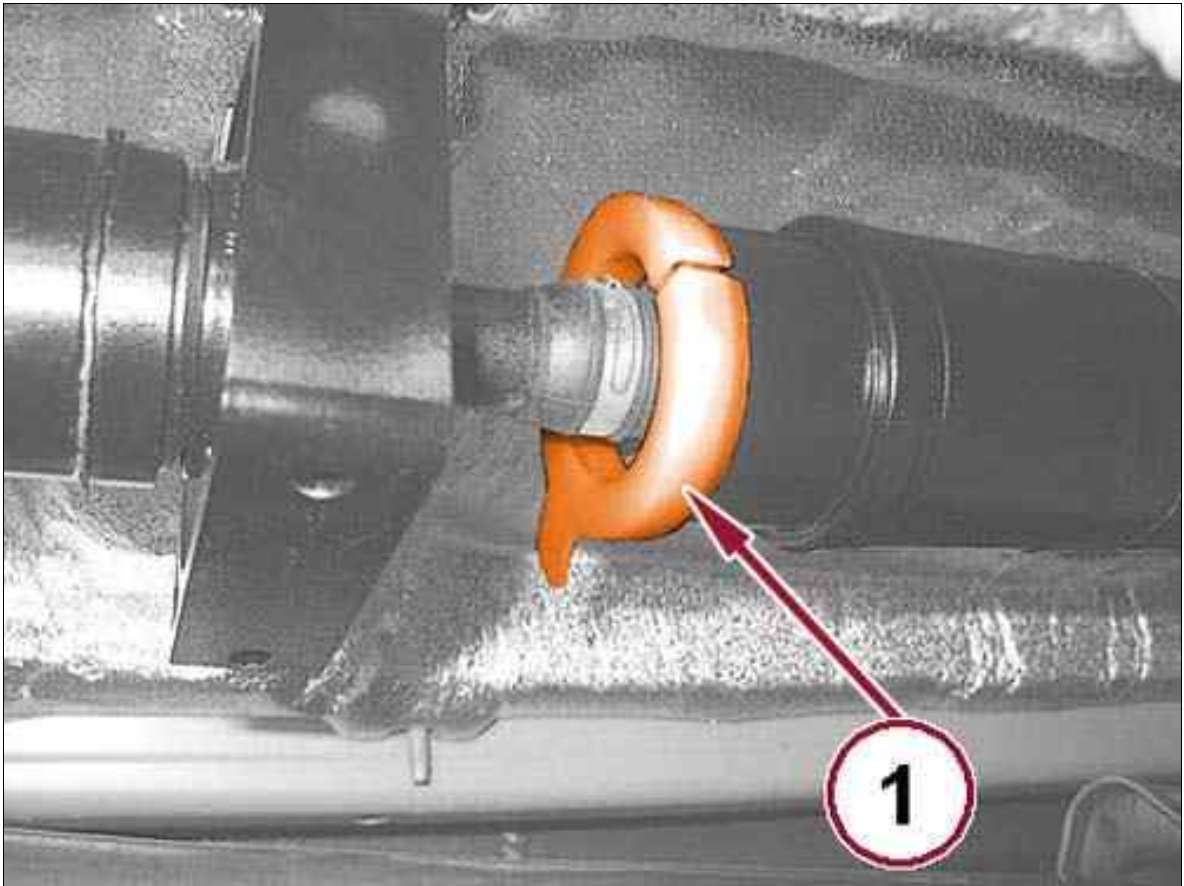
Fig 3: Rear Engine Mount Isolator & Bolts



Courtesy of CHRYSLER GROUP, LLC

27. Install the rear engine mount isolator (1a) with the bolts (1b) and (1c) tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

Fig 4: Protective Sleeve At Joint



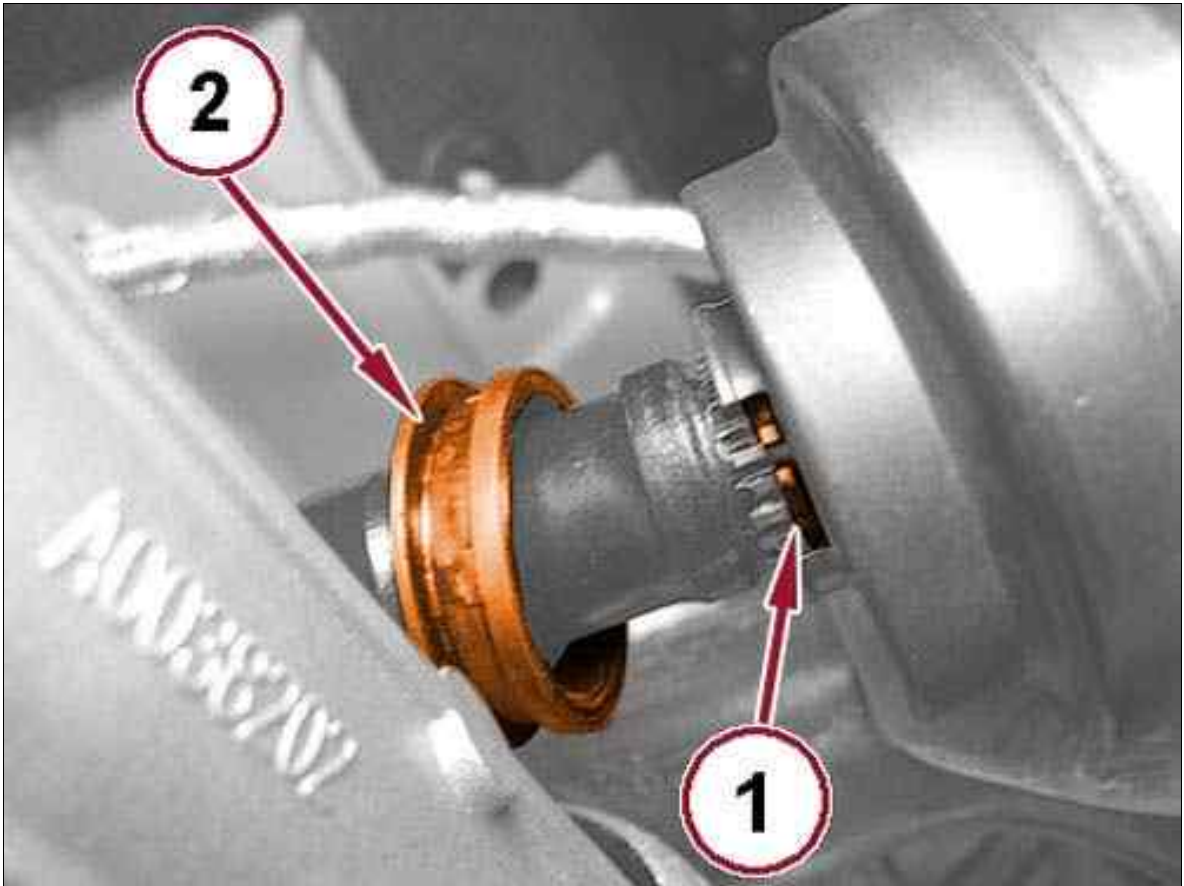
Courtesy of CHRYSLER GROUP, LLC

 NOTE:

The protective sleeve is included in the service parts package which also includes new dust covers and snap rings.

28. Mount the protective sleeve (1) as shown in illustration to protect the joint from excessive bending.

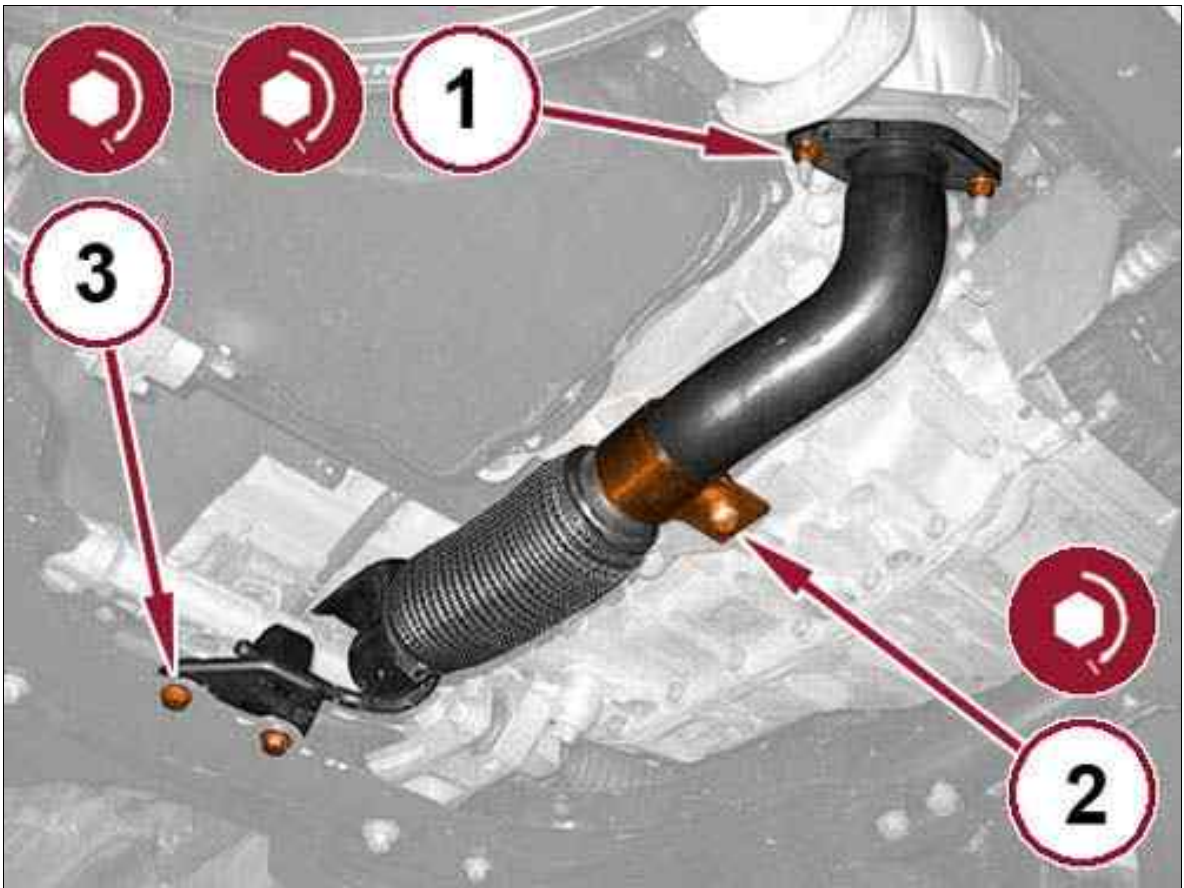
Fig 5: Drive Shaft Snap Ring & Dust Cover



Courtesy of CHRYSLER GROUP, LLC

29. Install a new drive shaft snap ring (1).
30. Install a new drive shaft dust cover (2).
31. Install the drive shaft into the power transfer unit and engage the snap ring.
32. Install the drive shaft dust cover.
33. Remove the drive shaft protective sleeve.

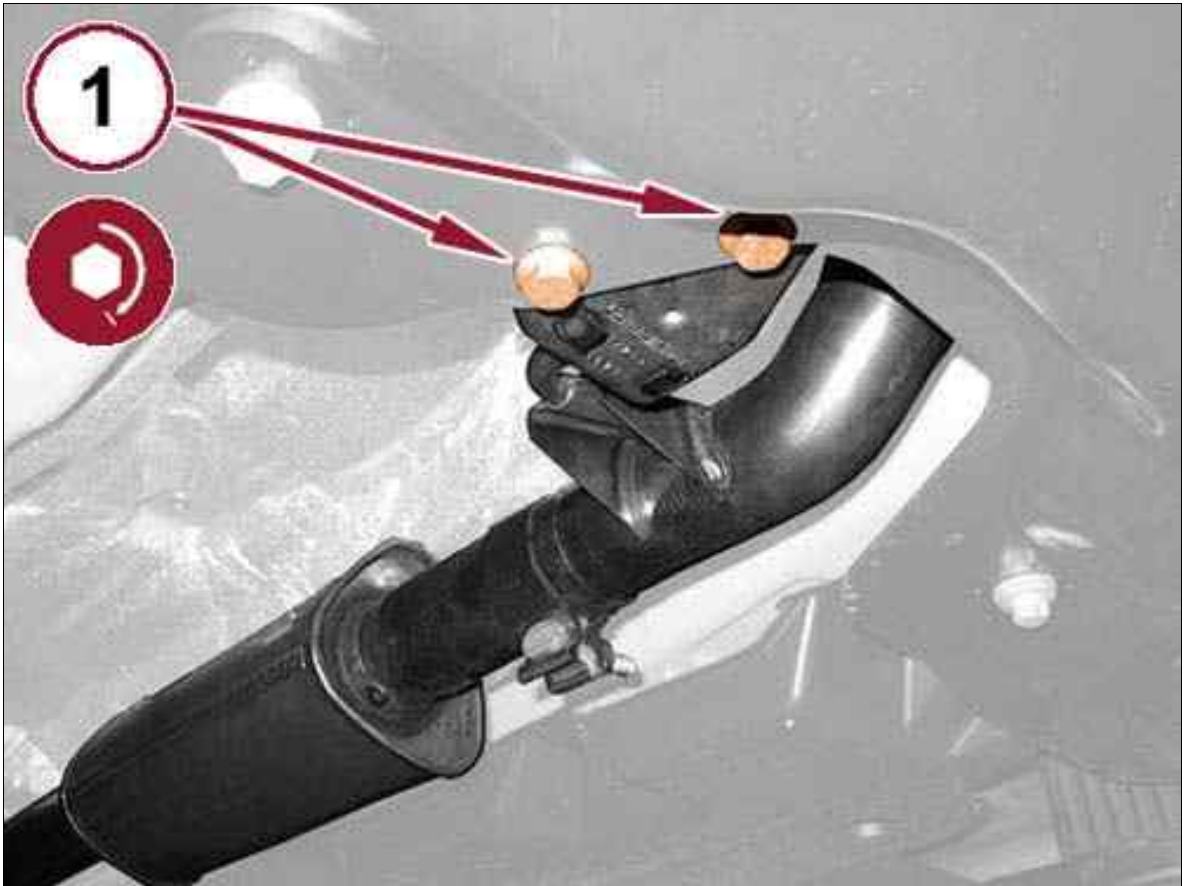
Fig 6: Exhaust Pipe Hanger Bolts, Exhaust Pipe Support Bracket Bolt & Exhaust Flange Nuts



Courtesy of CHRYSLER GROUP, LLC

34. Install a new flange gasket and connect the exhaust pipe to the catalytic converter with new nuts (1) tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
35. Install the exhaust pipe support bracket bolt (2) and tighten to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
36. Install the exhaust pipe hanger bolts (3) and tighten to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

Fig 7: Exhaust Pipe Hanger Bolts



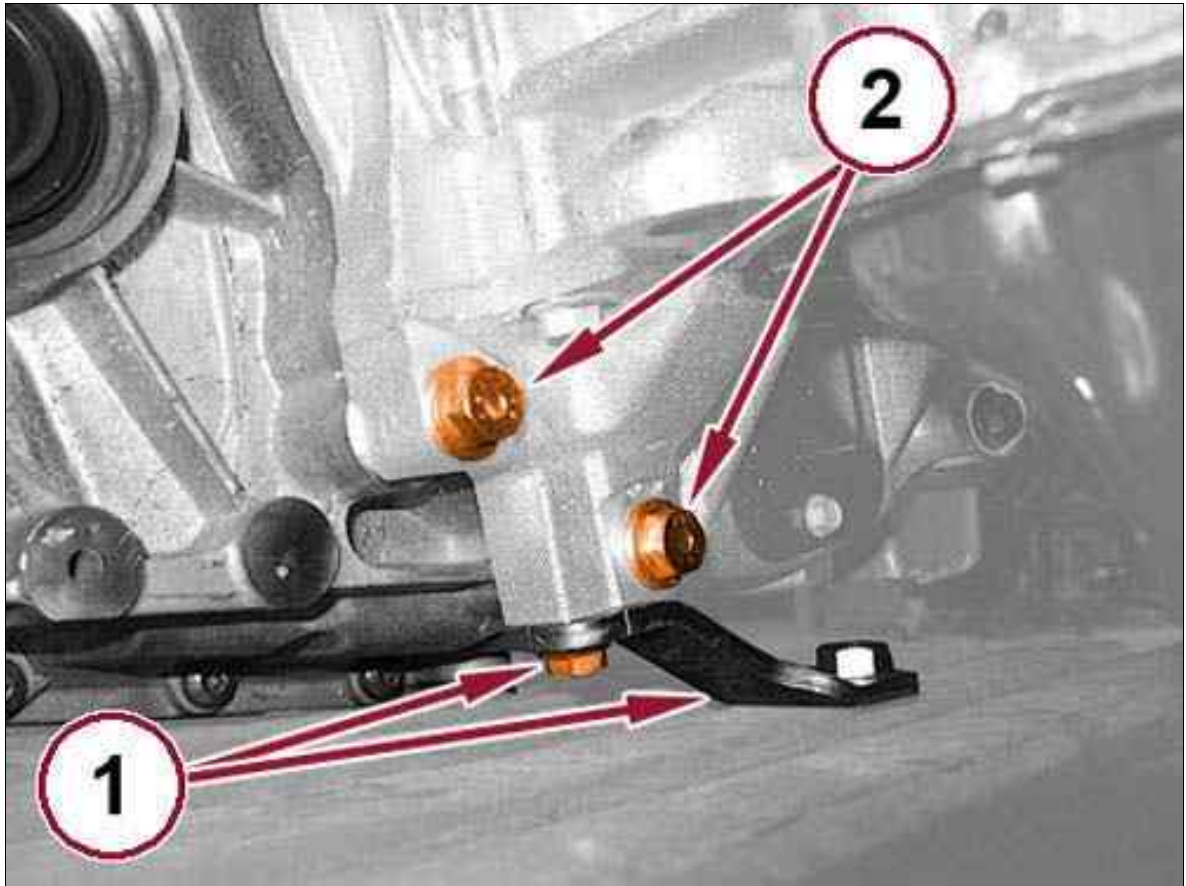
Courtesy of CHRYSLER GROUP, LLC

37. Install the exhaust pipe hanger bolts (1) and tighten to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
38. Install the air cleaner body. Refer to BODY, AIR CLEANER, REMOVAL AND INSTALLATION .
39. Install the headlamp mounting crossmember. Refer to CROSSMEMBER, HEADLAMP MOUNTING, REMOVAL AND INSTALLATION .
40. Install the right front head lamp. Refer to UNIT, FRONT LAMP, REMOVAL AND INSTALLATION .
41. Install the left front head lamp. Refer to UNIT, FRONT LAMP, REMOVAL AND INSTALLATION .
42. Install the front fascia. Refer to FASCIA, FRONT, REMOVAL AND INSTALLATION .
43. Install the left and right half shafts. Refer to REMOVAL AND INSTALLATION .
44. Evacuate and charge the refrigerant system. Refer to PLUMBING, STANDARD PROCEDURE .
45. Fill the cooling system. Refer to STANDARD PROCEDURE .
46. Install the battery tray. Refer to TRAY, BATTERY, REMOVAL AND INSTALLATION .
47. Install the battery. Refer to BATTERY, REMOVAL AND INSTALLATION .
48. Install the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .

49. Install the hood. Refer to HOOD, REMOVAL AND INSTALLATION .
50. Install the right front wheel splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
51. Install the front belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
52. Install the front wheels. Refer to REMOVAL AND INSTALLATION .
53. Remove the vehicle from the lift.

REMOVAL AND INSTALLATION > ENGINE (AUTOMATIC TRANSMISSION) SEPARATION AND REASSEMBLY - 2.4L MULTIAIR > REMOVAL

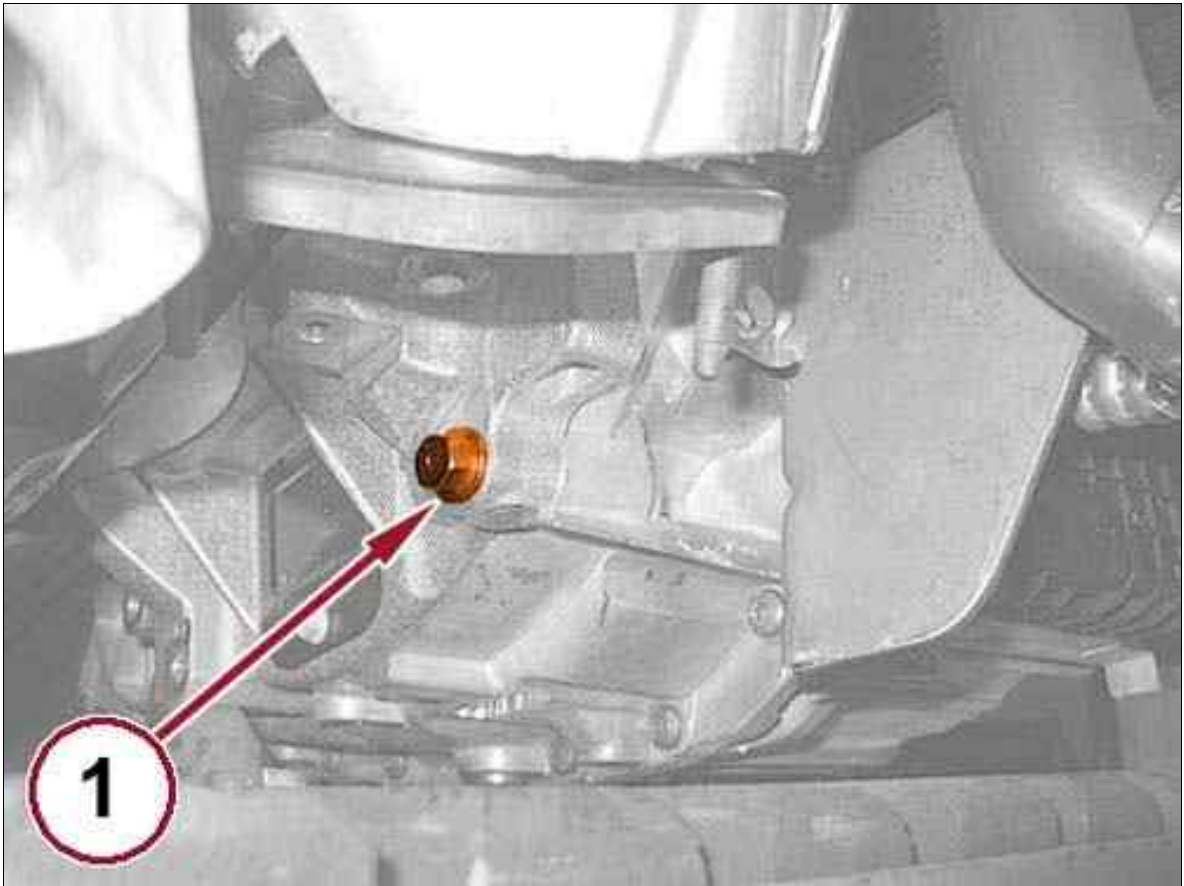
Fig 1: Exhaust Pipe Support Bracket Bolt & Intake Side Oil Pan To Transmission Bolts



Courtesy of CHRYSLER GROUP, LLC

1. Remove the bolt (1) and remove the exhaust pipe support bracket.
2. Remove the two intake side oil pan to transmission bolts (2).

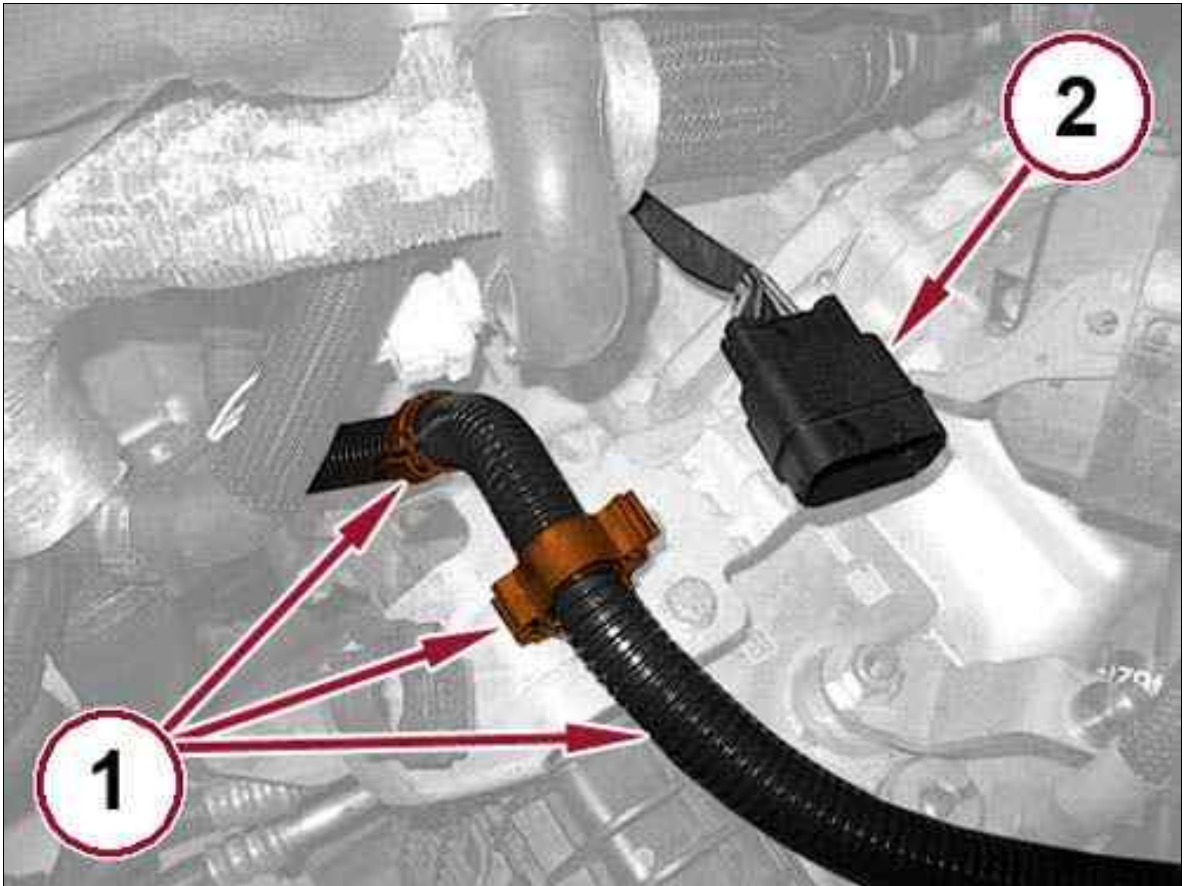
Fig 2: Exhaust Side Oil Pan To Transmission Bolt



Courtesy of CHRYSLER GROUP, LLC

3. Remove the exhaust side oil pan to transmission bolt (1).

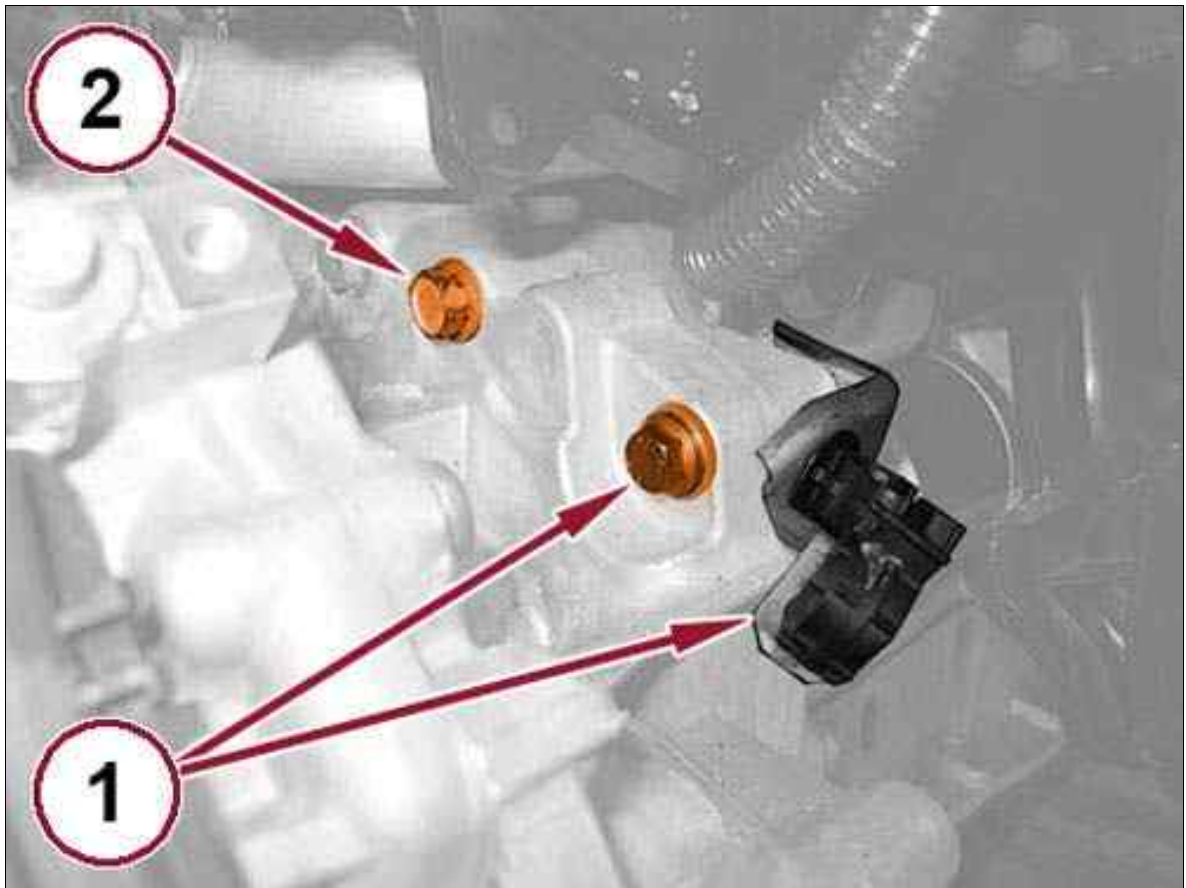
Fig 3: Alternator Wiring Harness Retaining Clips & Engine Wire Harness Connector



Courtesy of CHRYSLER GROUP, LLC

4. Open the retaining clips (1) and reposition the alternator wiring harness.
5. Disengage the engine wire harness connector (2) from the bracket.

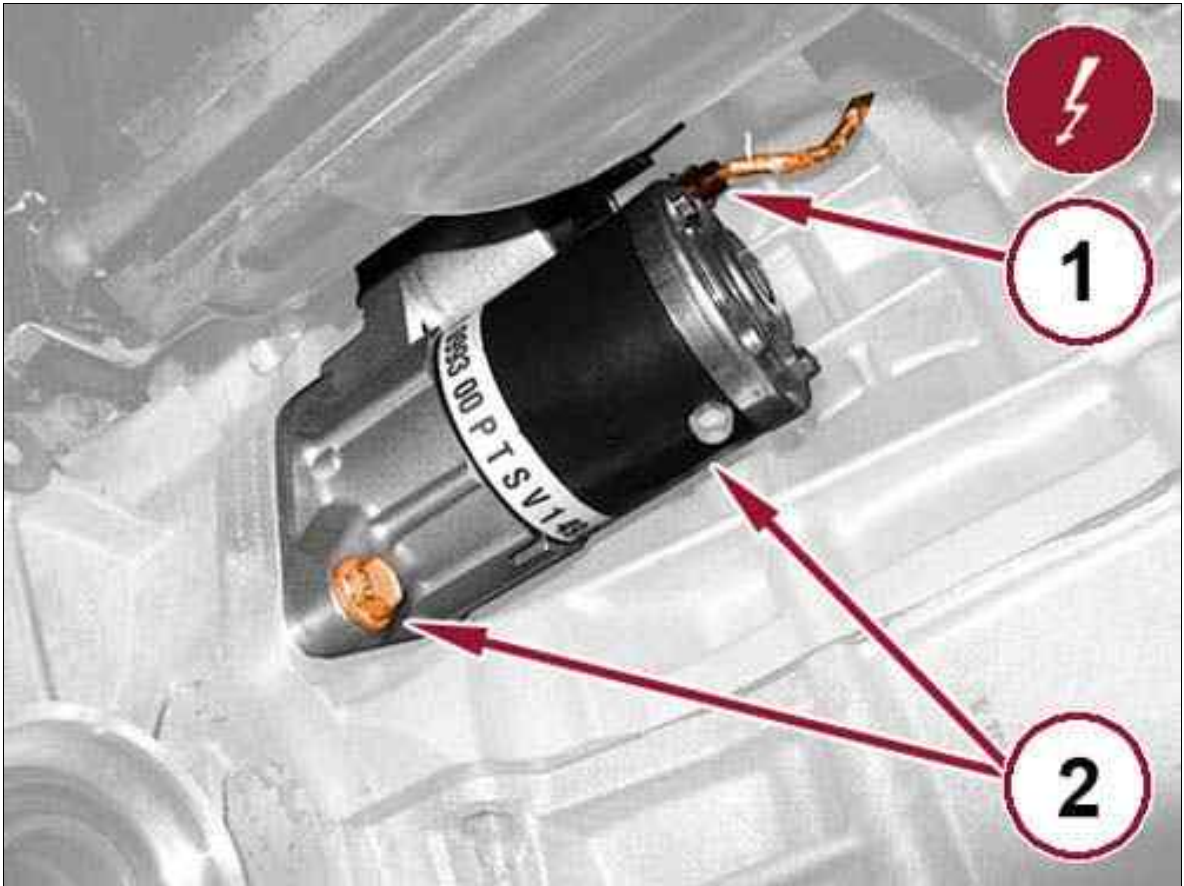
Fig 4: Bracket, Bolt & Upper Starter Bolt



Courtesy of CHRYSLER GROUP, LLC

6. Remove the bolt (1) and the bracket.
7. Remove the upper starter bolt (2).

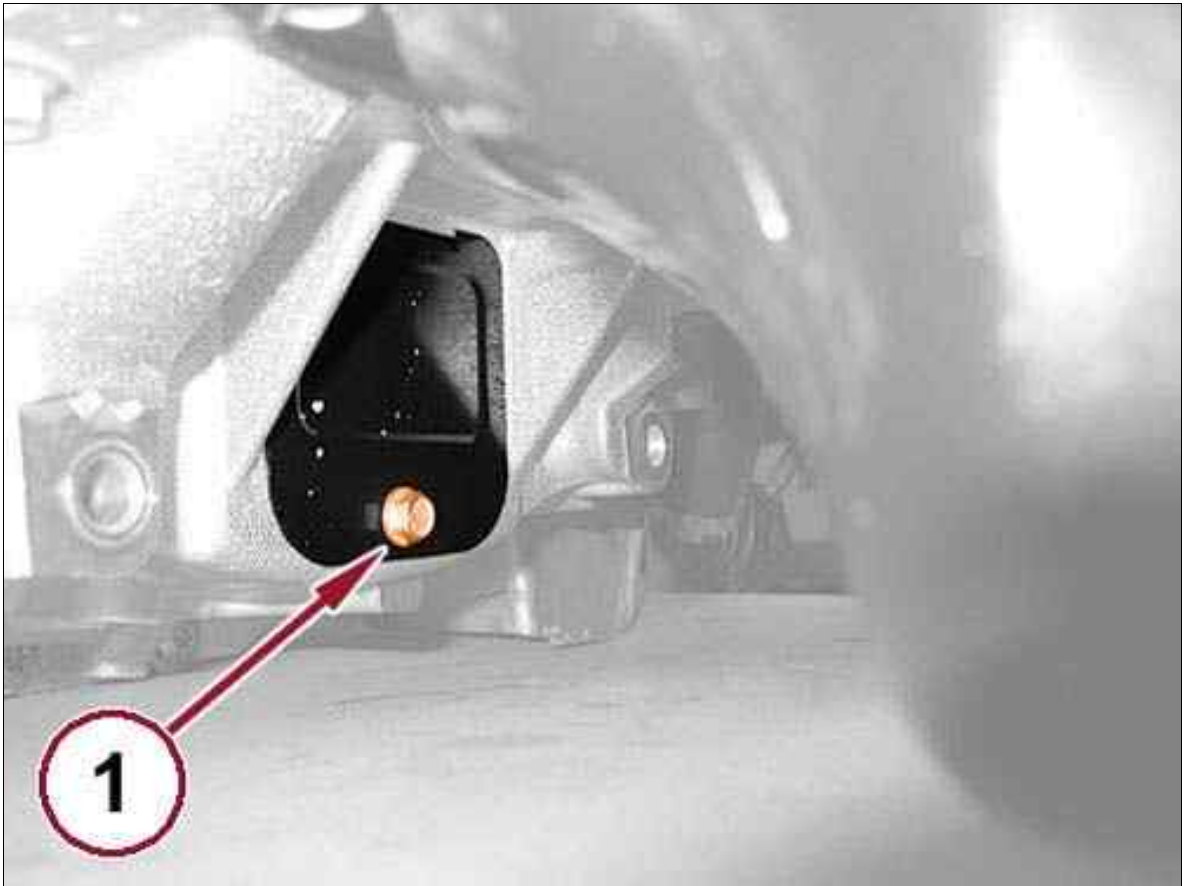
Fig 5: Starter Motor Wire Harness Connector & Lower Starter Bolt



Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the starter motor wire harness connector (1).
9. Remove the lower starter motor bolt (2) and remove the starter motor with the battery positive cable attached.

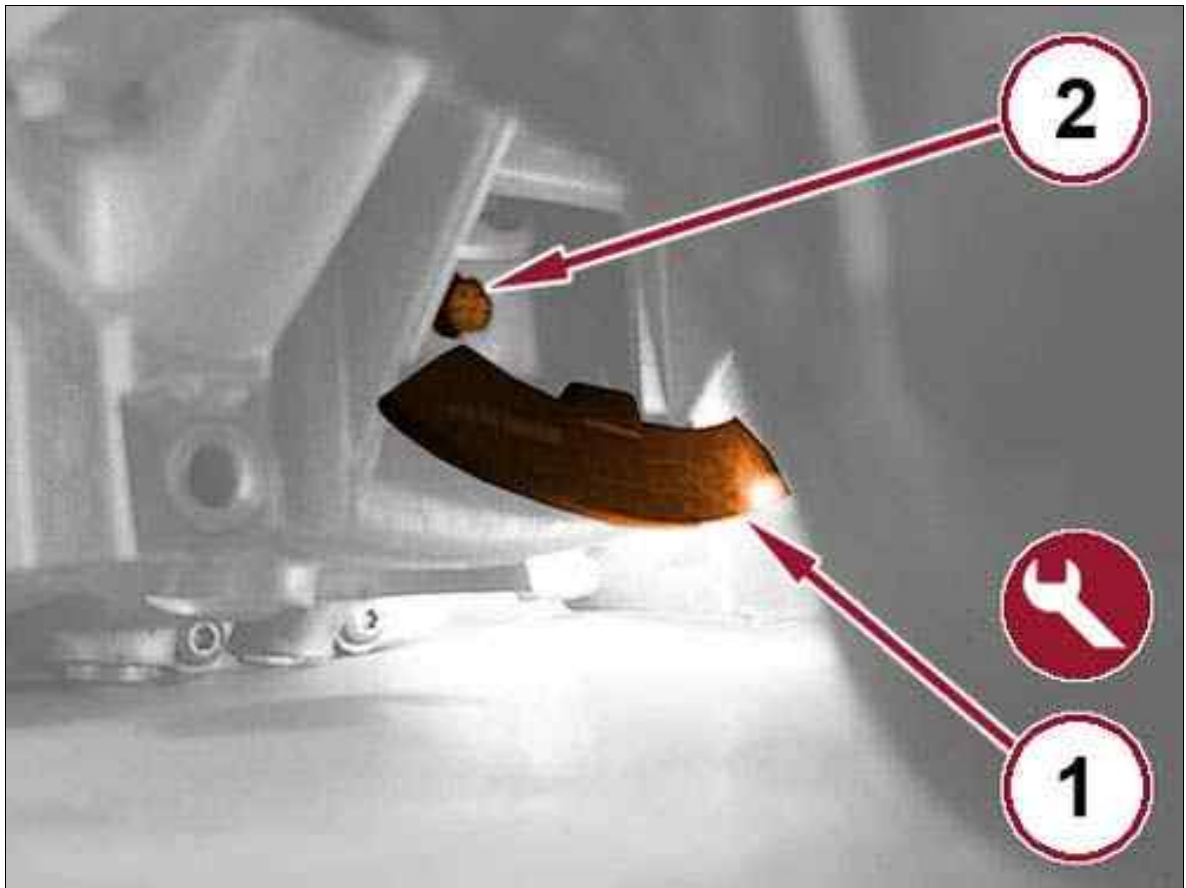
Fig 6: Inspection Cover Bolt



Courtesy of CHRYSLER GROUP, LLC

10. Remove the bolt (1) and remove the inspection cover.

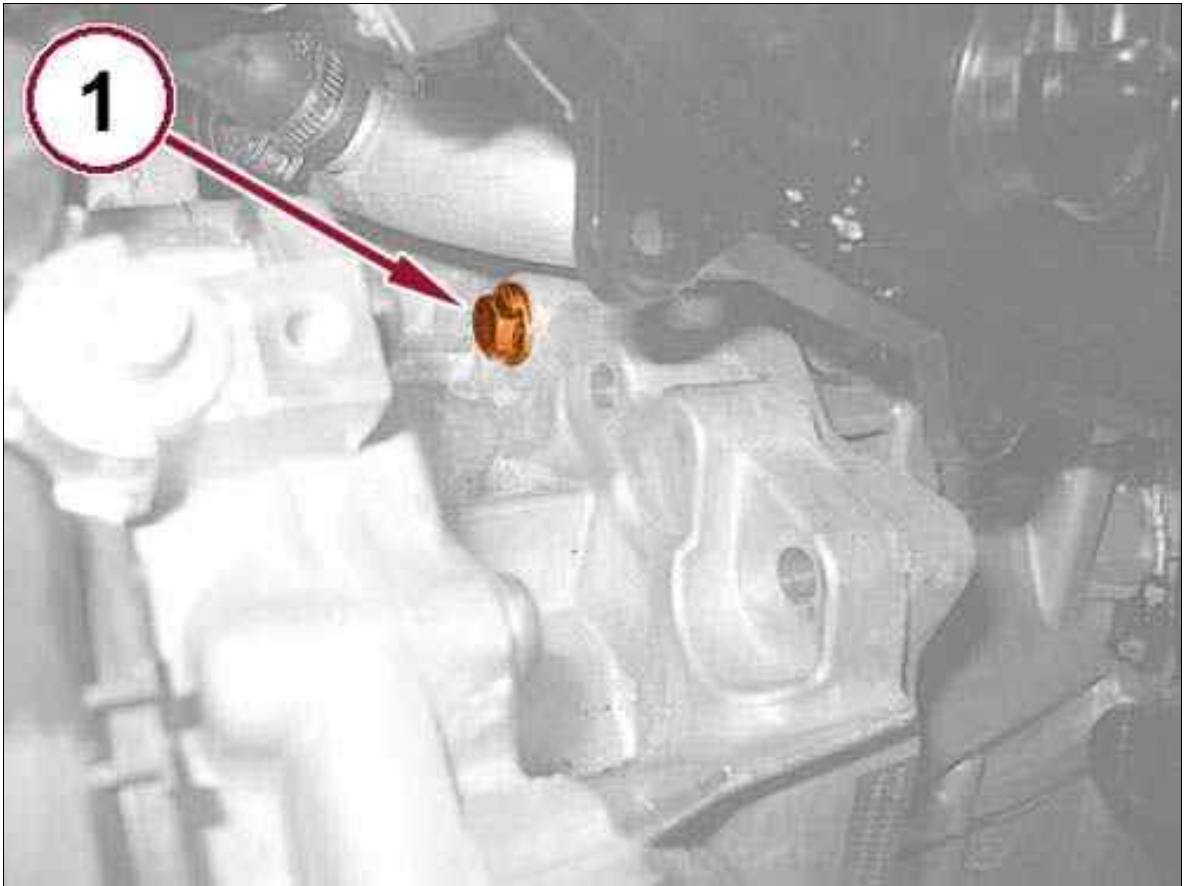
Fig 7: Special Tool & Torque Converter Bolt



Courtesy of CHRYSLER GROUP, LLC

11. Install the 1860898000 tool (1).
12. Remove the torque converter bolts (2).

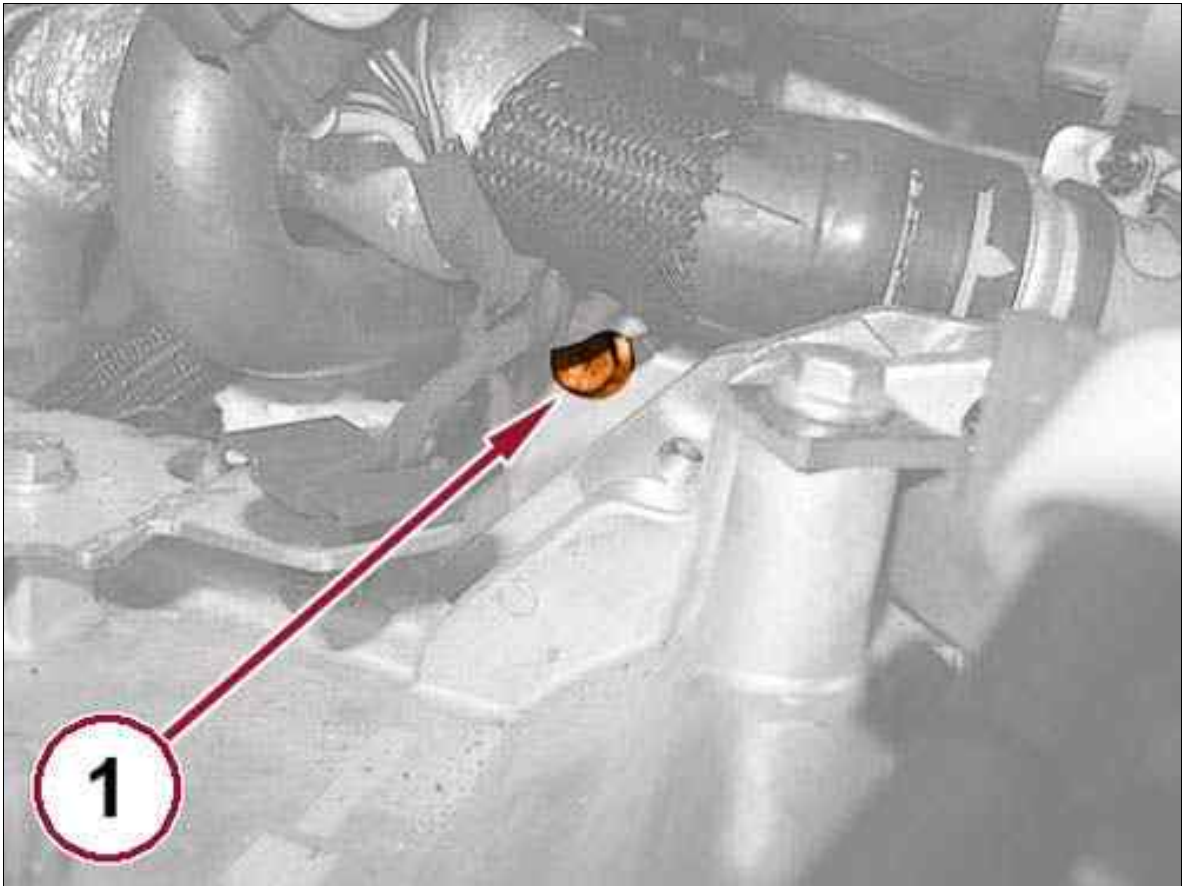
Fig 8: Intake Side Upper Transmission To Engine Block Bolt



Courtesy of CHRYSLER GROUP, LLC

13. Remove the intake side upper transmission to engine block bolt (1).

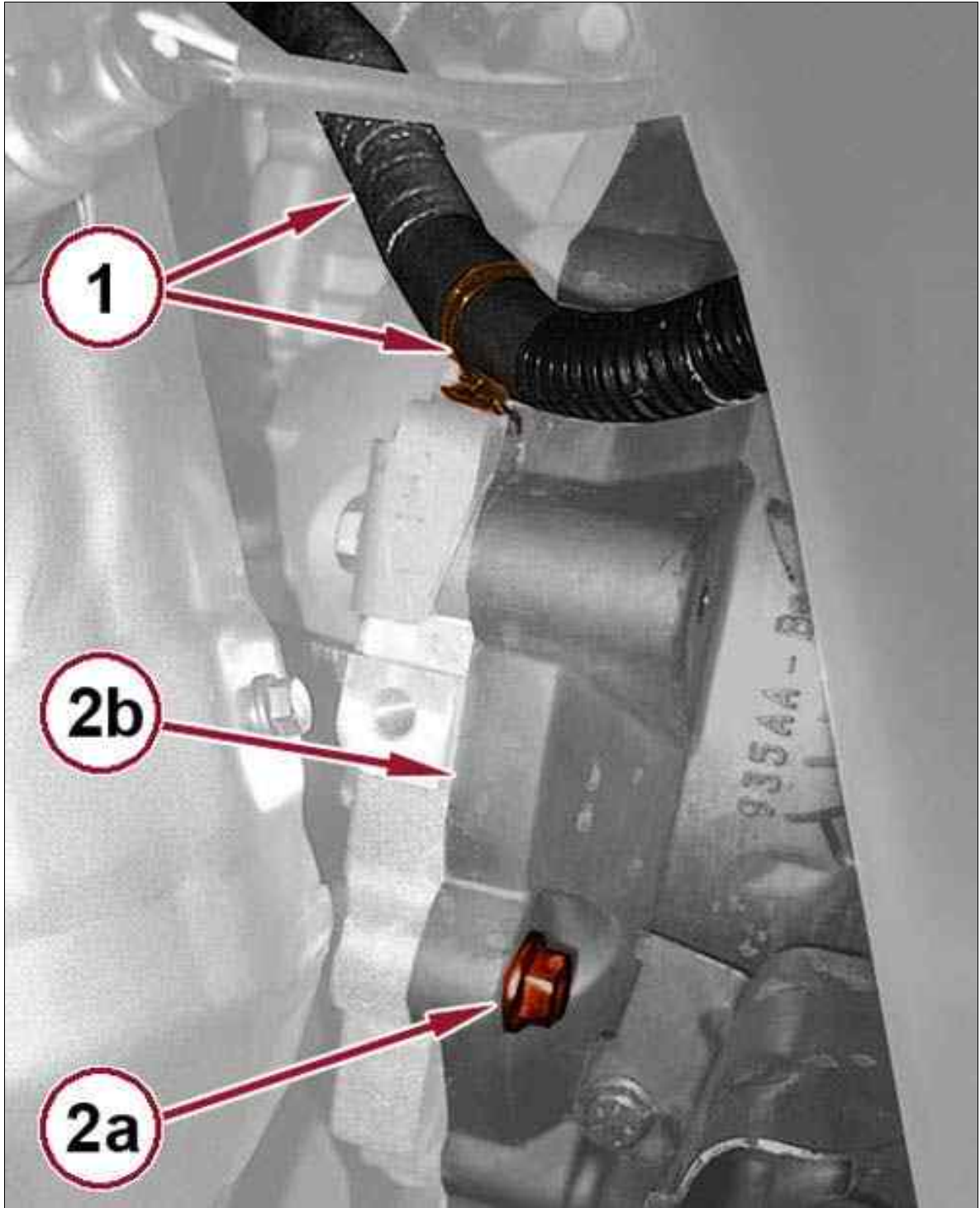
Fig 9: Exhaust Side Upper Transmission To Engine Block Bolt



Courtesy of CHRYSLER GROUP, LLC

14. Remove the exhaust side upper transmission to engine block bolt (1).

Fig 10: Wire Harness At Transmission, Side Transmission To Engine Block Bolt & Transmission

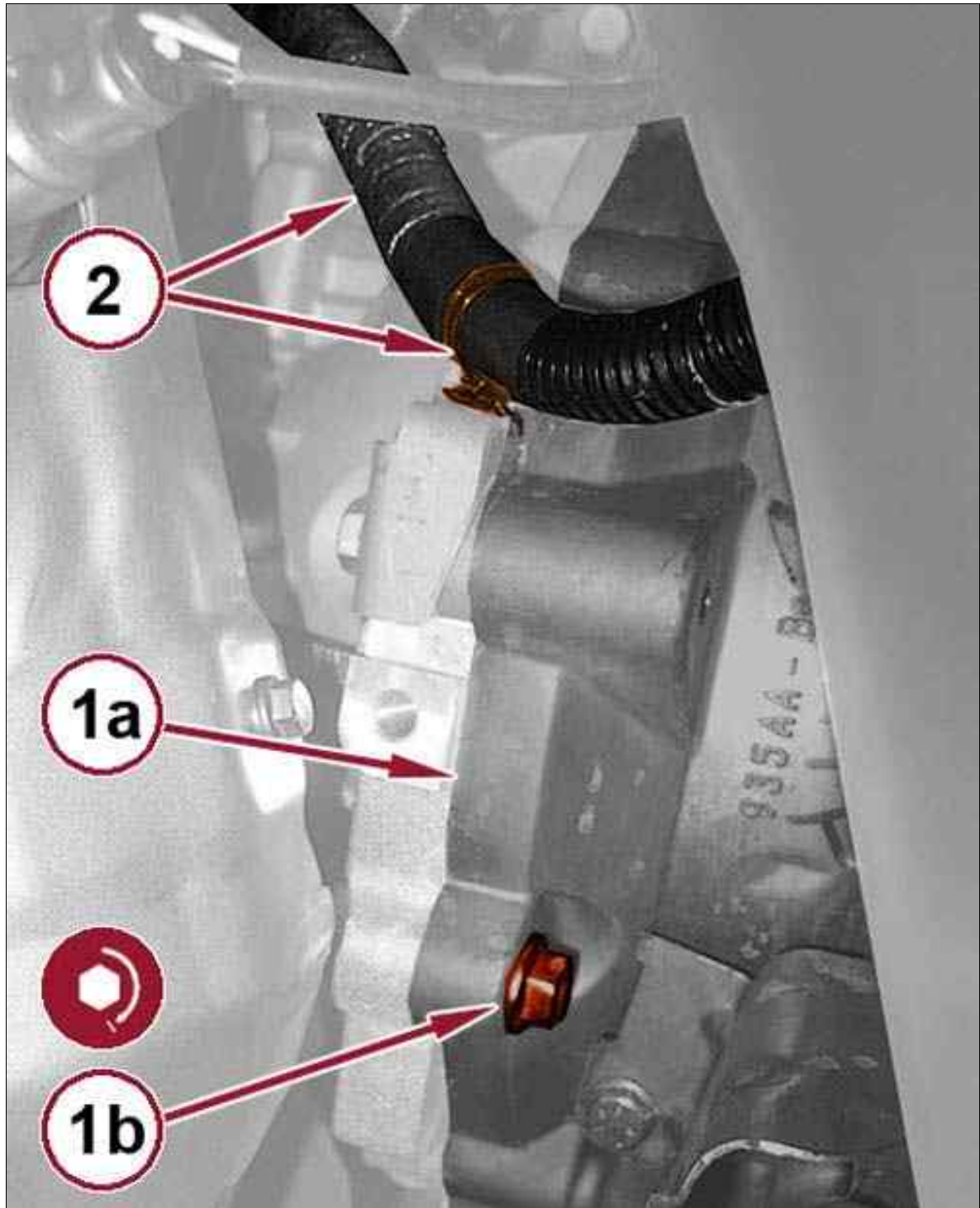


Courtesy of CHRYSLER GROUP, LLC

15. Disengage the wire harness from the transmission (1).
16. Remove the side transmission to engine block bolt (2a) and remove the transmission (2b) from the engine.

REMOVAL AND INSTALLATION > ENGINE (AUTOMATIC TRANSMISSION) SEPARATION AND REASSEMBLY - 2.4L MULTIAIR > INSTALLATION

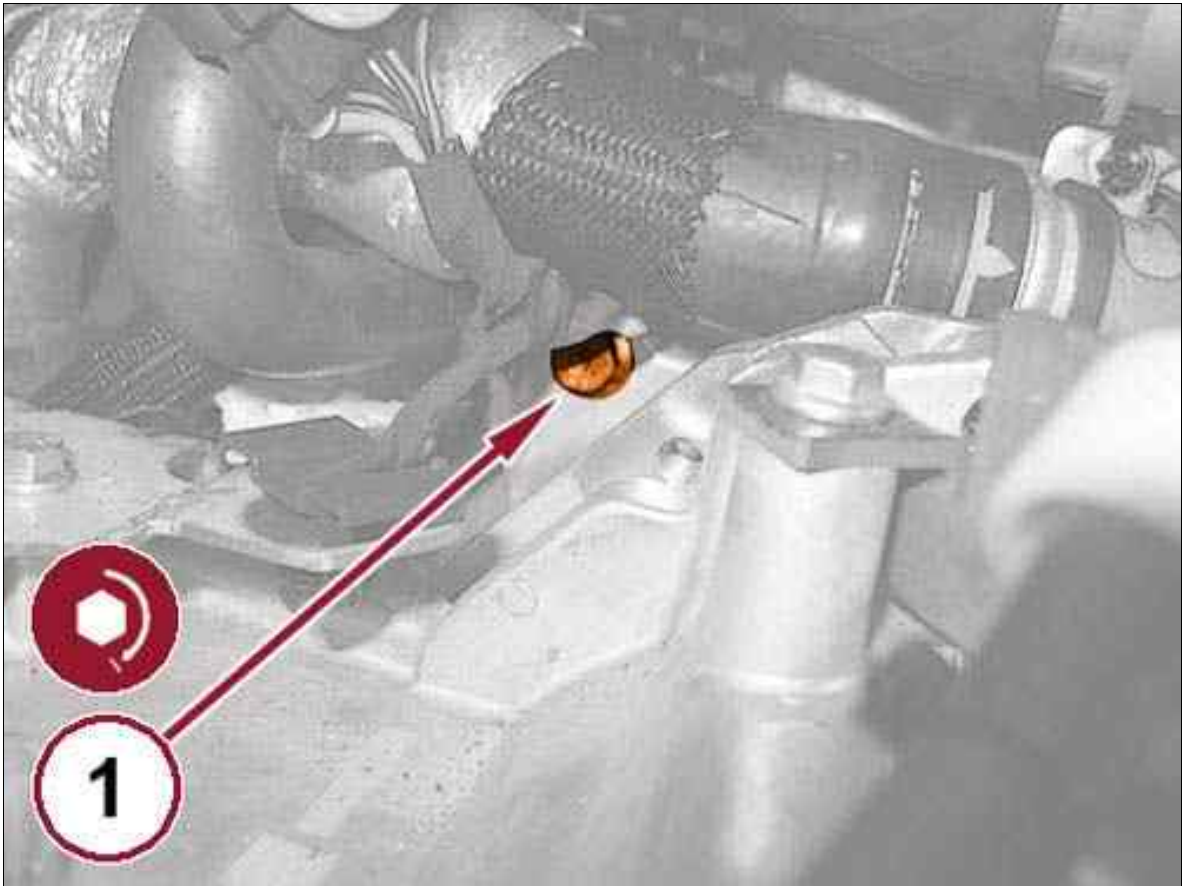
Fig 1: Wire Harness At Transmission, Side Transmission To Engine Block Bolt & Transmission



Courtesy of CHRYSLER GROUP, LLC

1. Install the transmission (1a) to the engine with the side transmission to engine bolt (1b) tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
2. Engage the wire harness to the transmission (2).

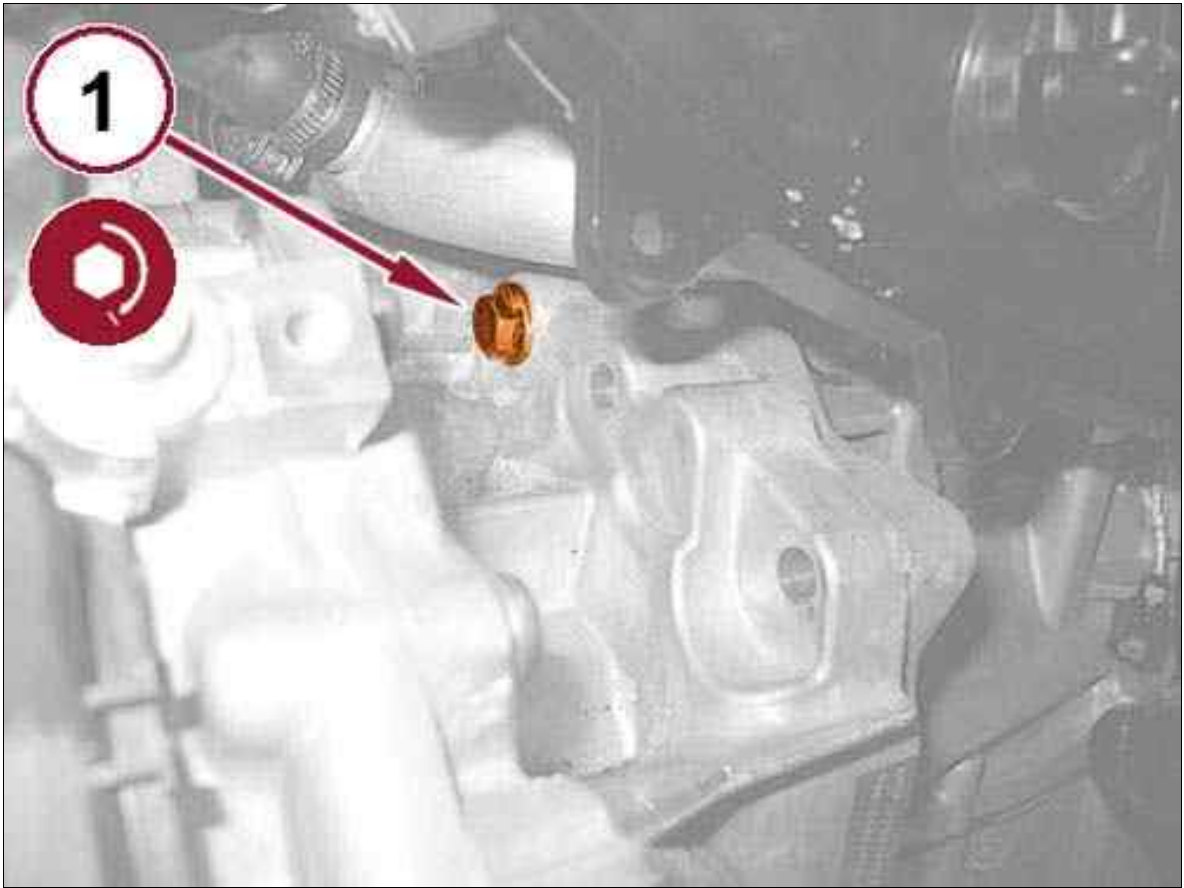
Fig 2: Exhaust Side Upper Transmission To Engine Block Bolt



Courtesy of CHRYSLER GROUP, LLC

3. Install the exhaust side upper transmission to engine block bolt (1) and tighten to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

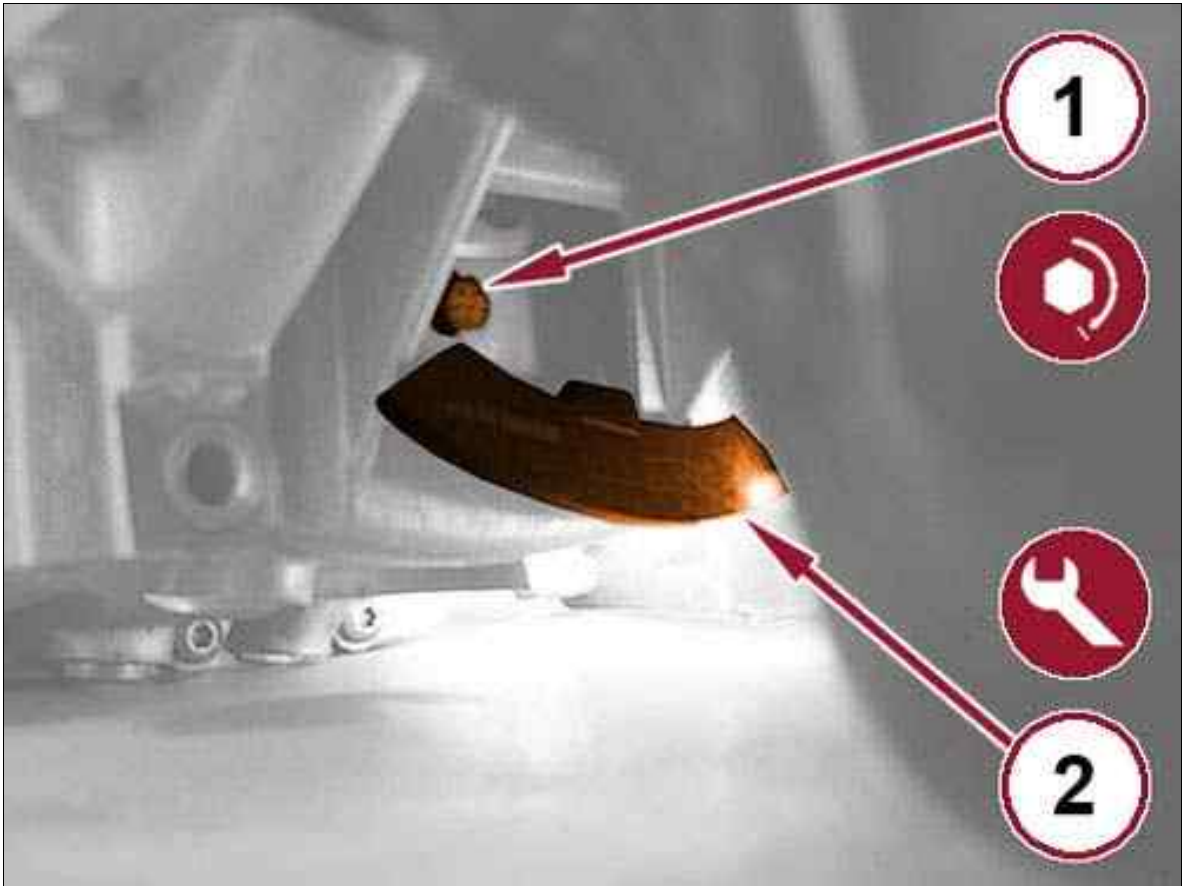
Fig 3: Intake Side Upper Transmission To Engine Block Bolt



Courtesy of CHRYSLER GROUP, LLC

4. Install the intake side upper transmission to engine block bolt (1) and tighten to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

Fig 4: Special Tool & Torque Converter Bolt



Courtesy of CHRYSLER GROUP, LLC

5. Install the torque converter bolts (1) and tighten to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
6. Remove the 1860898000 tool (2).
7. Install the inspection cover and tighten the bolt to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

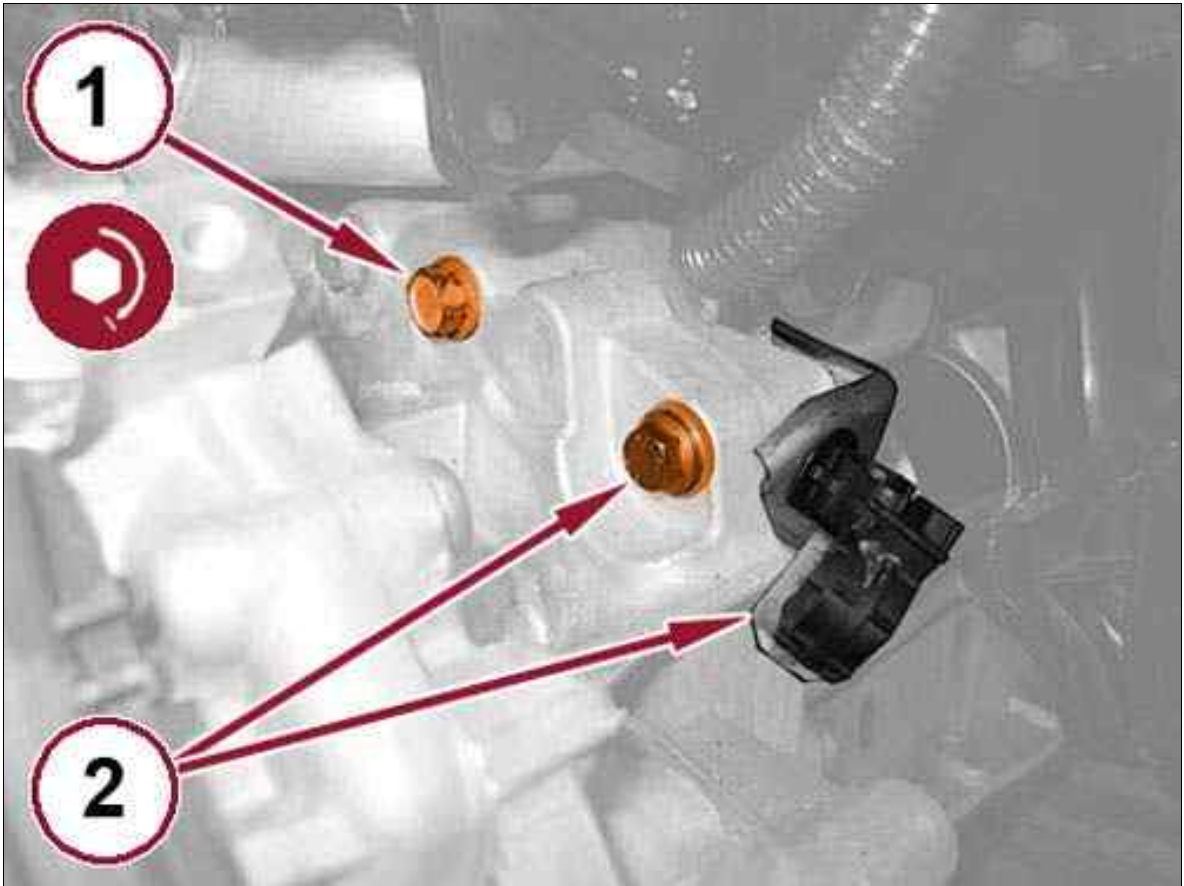
Fig 5: Starter Motor Wire Harness Connector & Lower Starter Bolt



Courtesy of CHRYSLER GROUP, LLC

8. Install the starter motor (1) with the battery positive cable attached and tighten the lower starter motor bolt to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
9. Connect the starter motor wire harness connector (2).

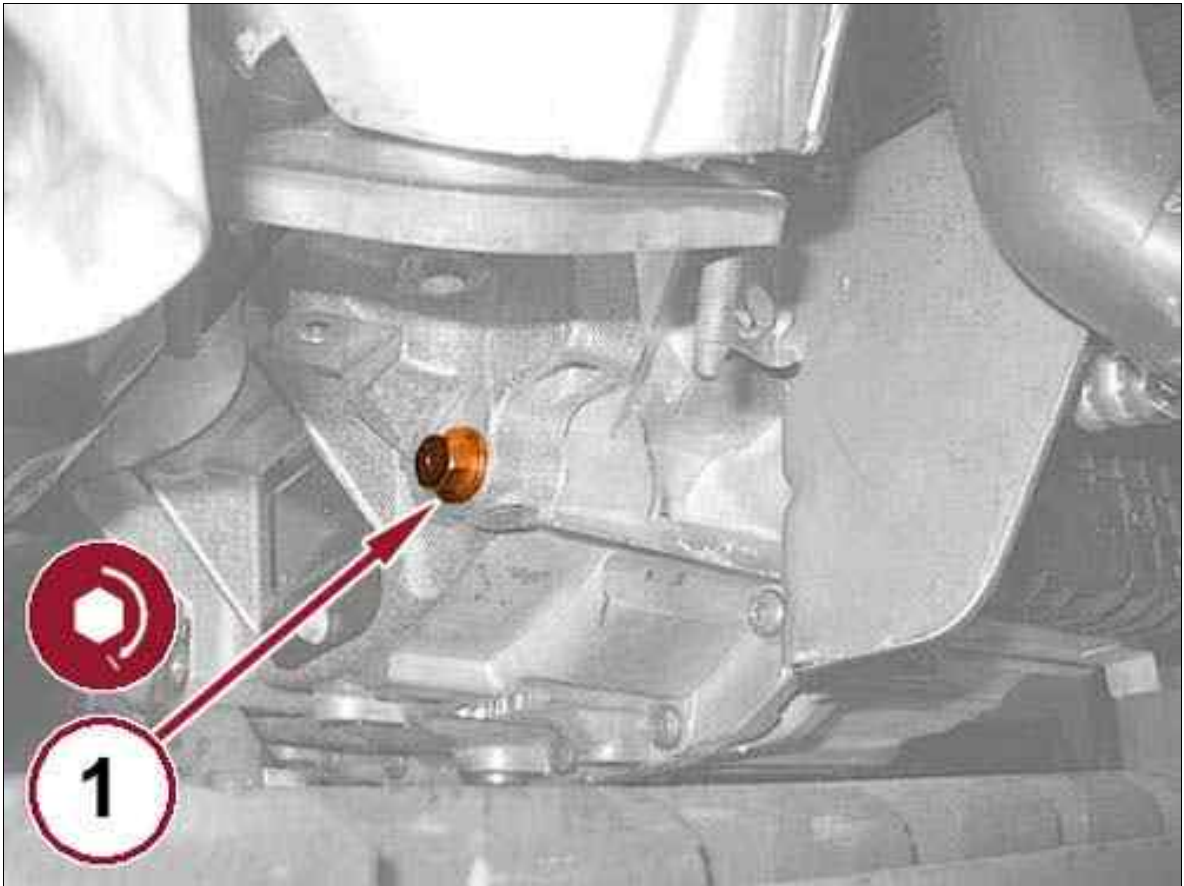
Fig 6: Bracket, Bolt & Upper Starter Bolt



Courtesy of CHRYSLER GROUP, LLC

10. Install the upper starter bolt (1) and tighten to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
11. Install the bracket (2) with the bolt tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
12. Engage the engine wire harness connector to the bracket.
13. Position the alternator wiring harness and close the retaining clips.

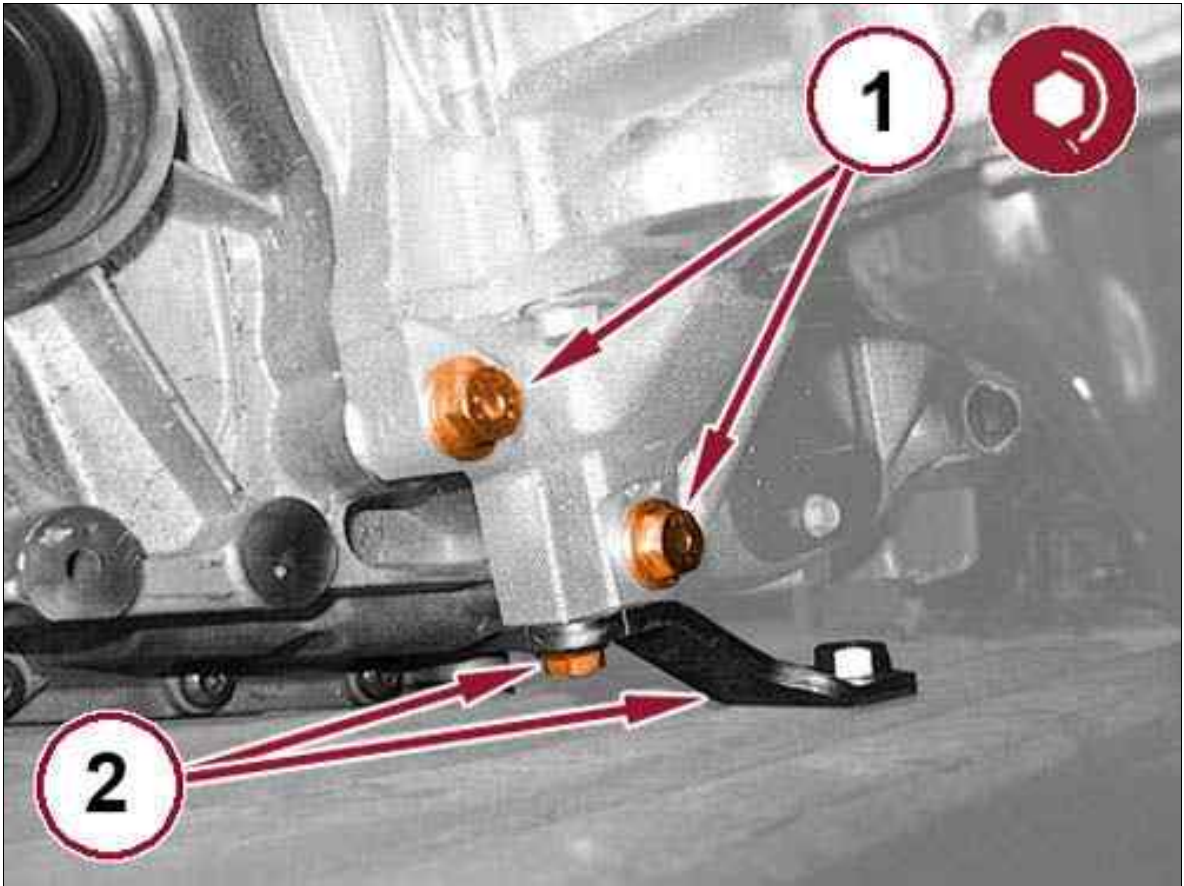
Fig 7: Exhaust Side Oil Pan To Transmission Bolt



Courtesy of CHRYSLER GROUP, LLC

14. Install the exhaust side oil pan to transmission bolt (1) and tighten to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

Fig 8: Exhaust Pipe Support Bracket Bolt & Intake Side Oil Pan To Transmission Bolts

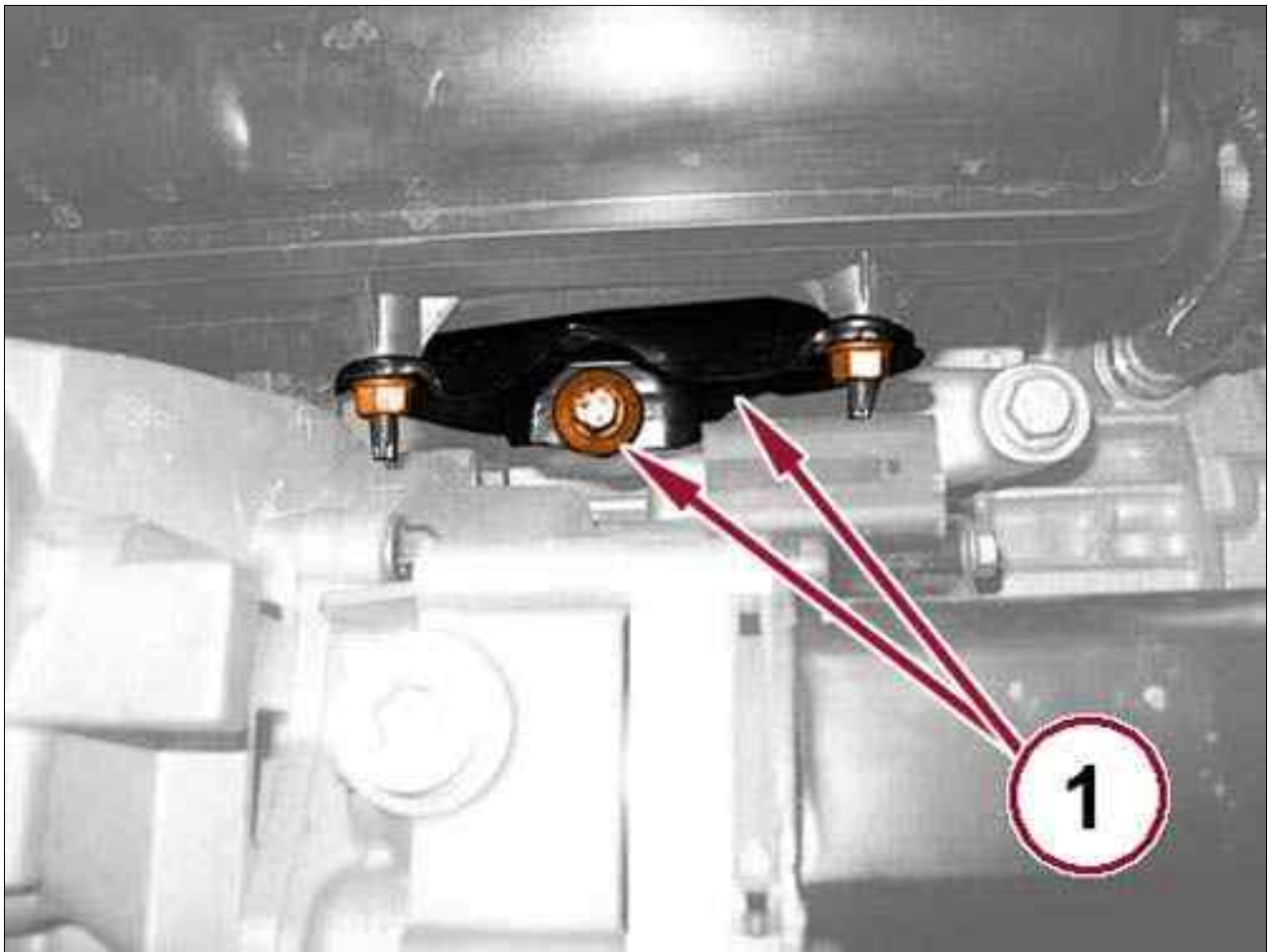


Courtesy of CHRYSLER GROUP, LLC

15. Install the two intake side oil pan to transmission bolts (1) and tighten to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
16. Install the exhaust pipe support bracket (2) and tighten the bolt to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

**REMOVAL AND INSTALLATION > ENGINE (AUTOMATIC TRANSMISSION)
SEPARATION AND REASSEMBLY - 2.4L MULTIAIR 4X4**

Fig 1: Lower Intake Manifold Support Bracket & Fasteners

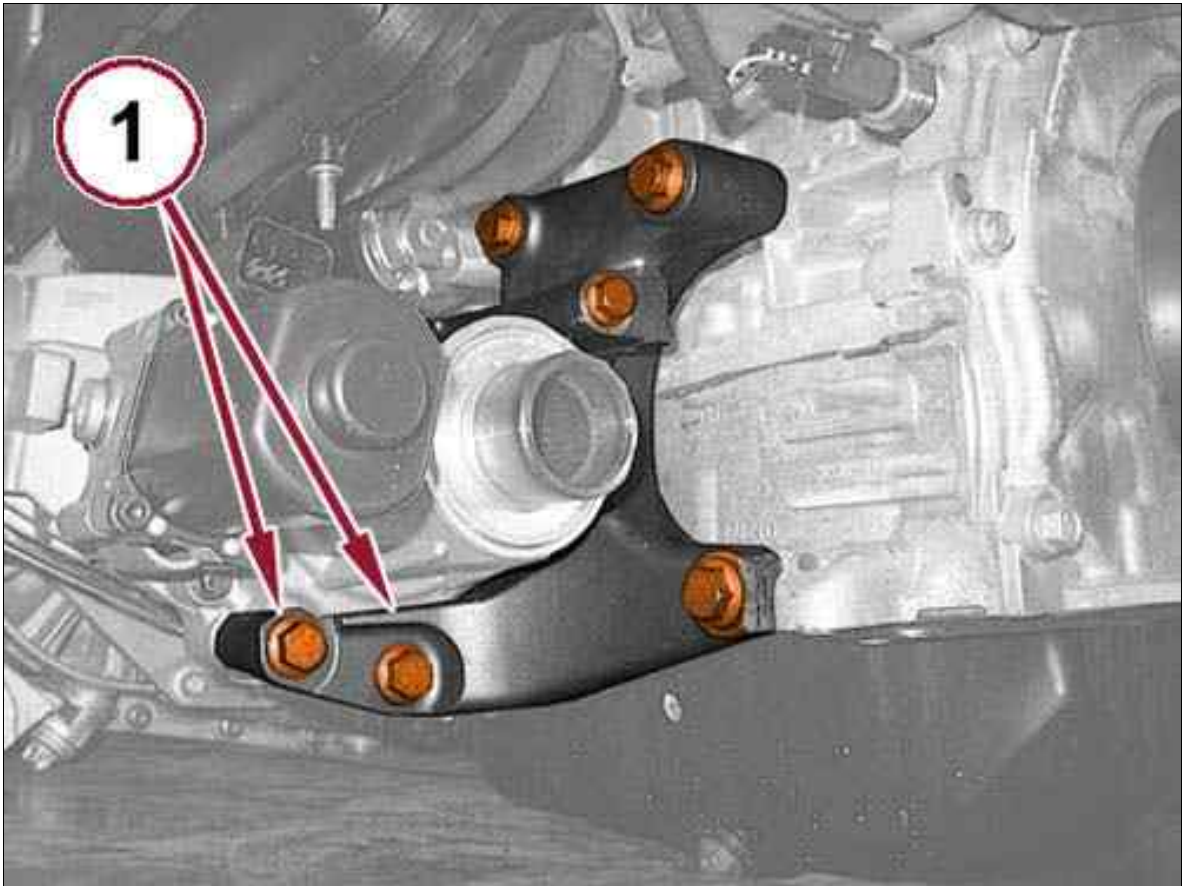


Courtesy of CHRYSLER GROUP, LLC

**REMOVAL AND INSTALLATION > ENGINE (AUTOMATIC TRANSMISSION)
SEPARATION AND REASSEMBLY - 2.4L MULTIAIR 4X4 > REMOVAL**

1. Remove the fasteners (1) and the lower intake manifold support bracket.

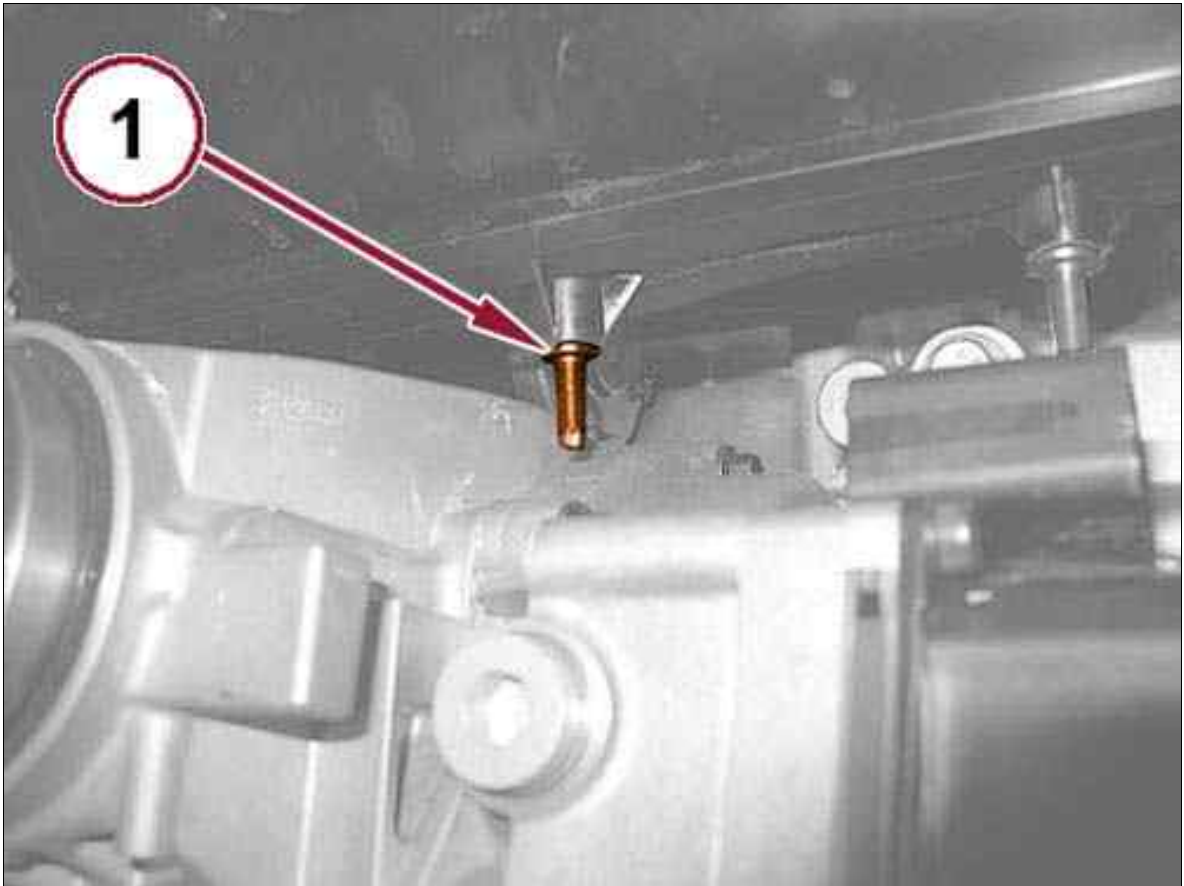
Fig 1: PTU Support Bracket & Bolts



Courtesy of CHRYSLER GROUP, LLC

2. Remove the bolts (1) and remove the PTU support bracket.

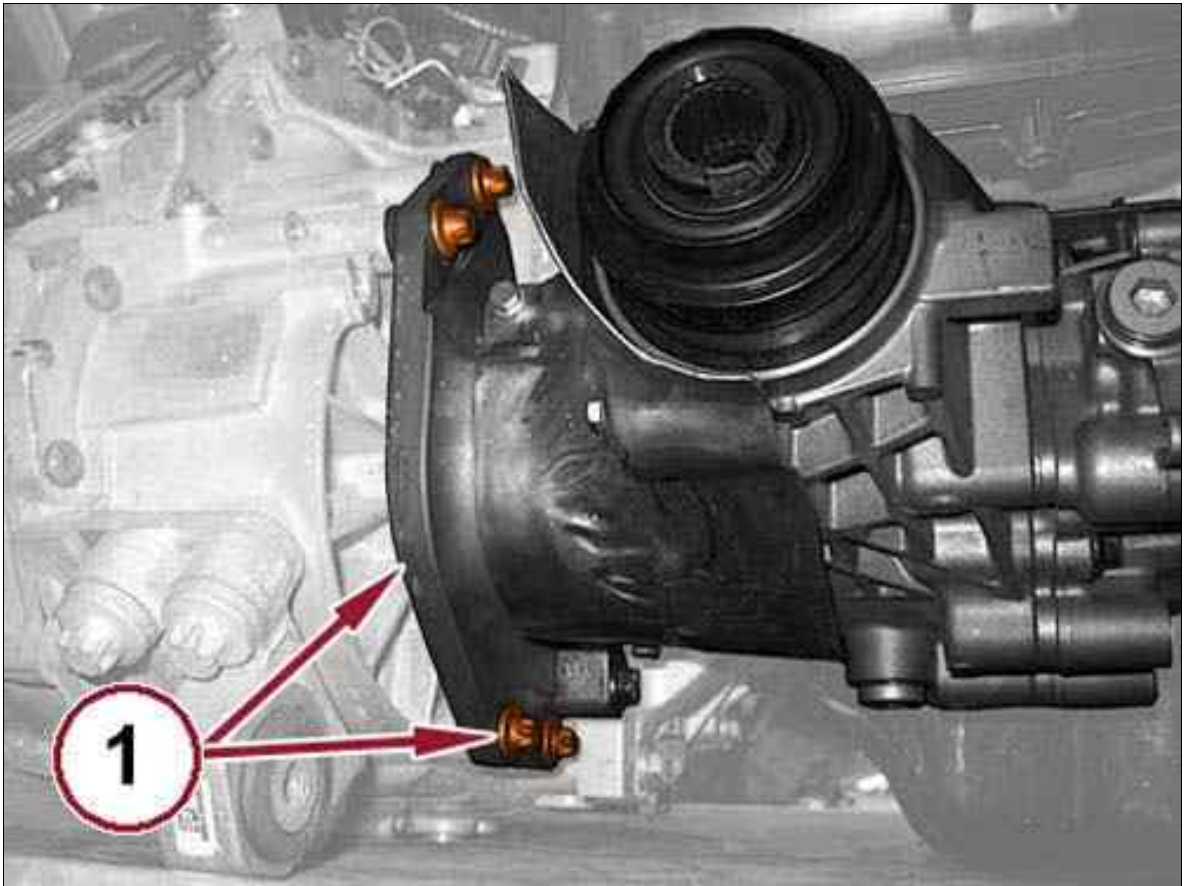
Fig 2: Locating Stud



Courtesy of CHRYSLER GROUP, LLC

3. Remove the stud (1).

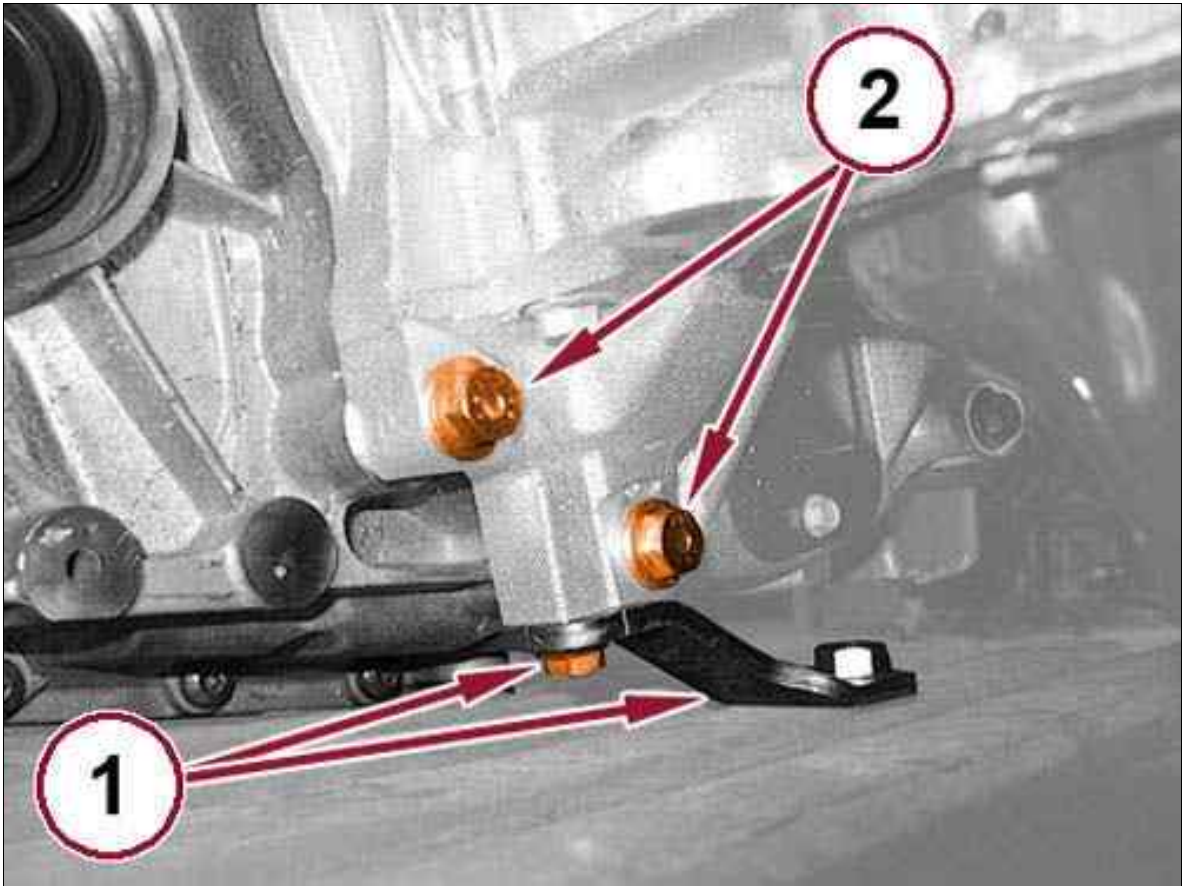
Fig 3: PTU, Transmission & Bolts



Courtesy of CHRYSLER GROUP, LLC

4. Remove the bolts (1) and remove the PTU from the transmission.

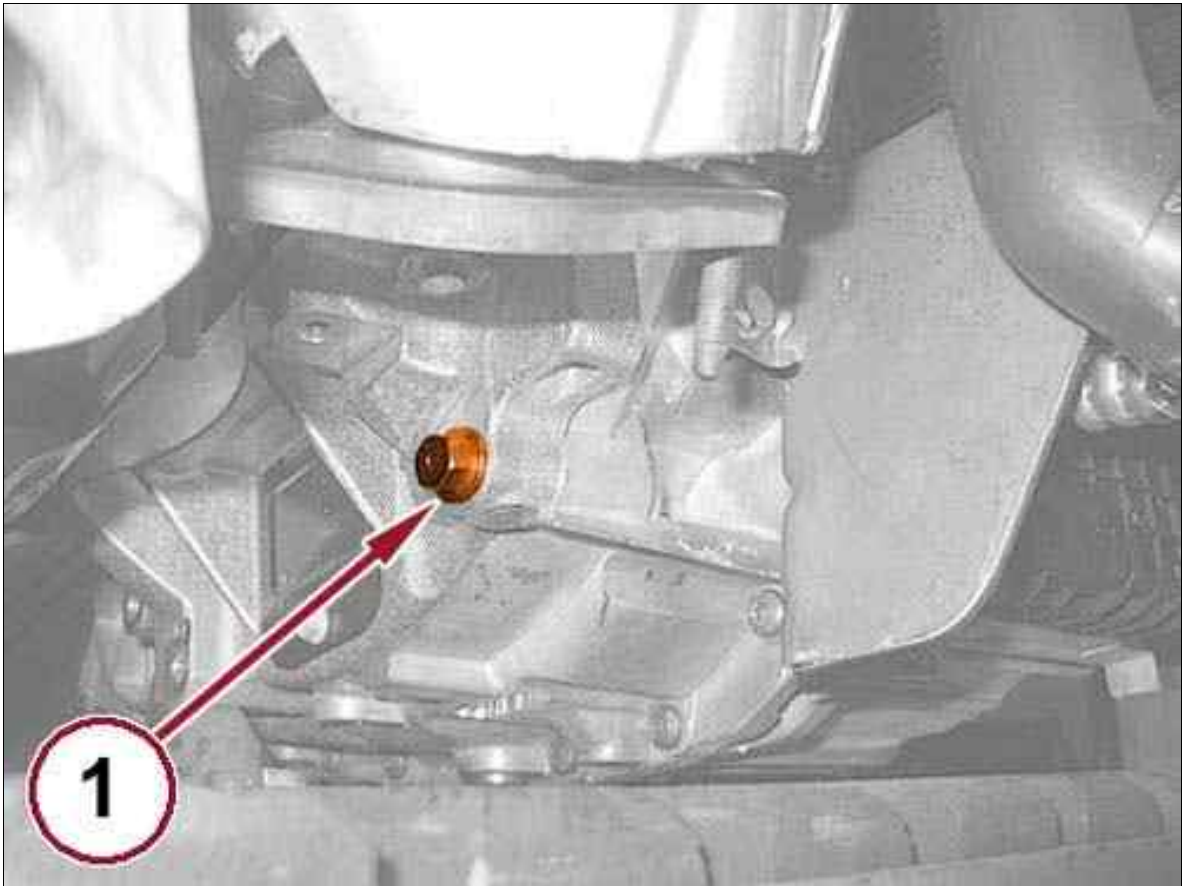
Fig 4: Exhaust Pipe Support Bracket Bolt & Intake Side Oil Pan To Transmission Bolts



Courtesy of CHRYSLER GROUP, LLC

5. Remove the bolt (1) and remove the exhaust pipe support bracket.
6. Remove the two intake side oil pan to transmission bolts (2).

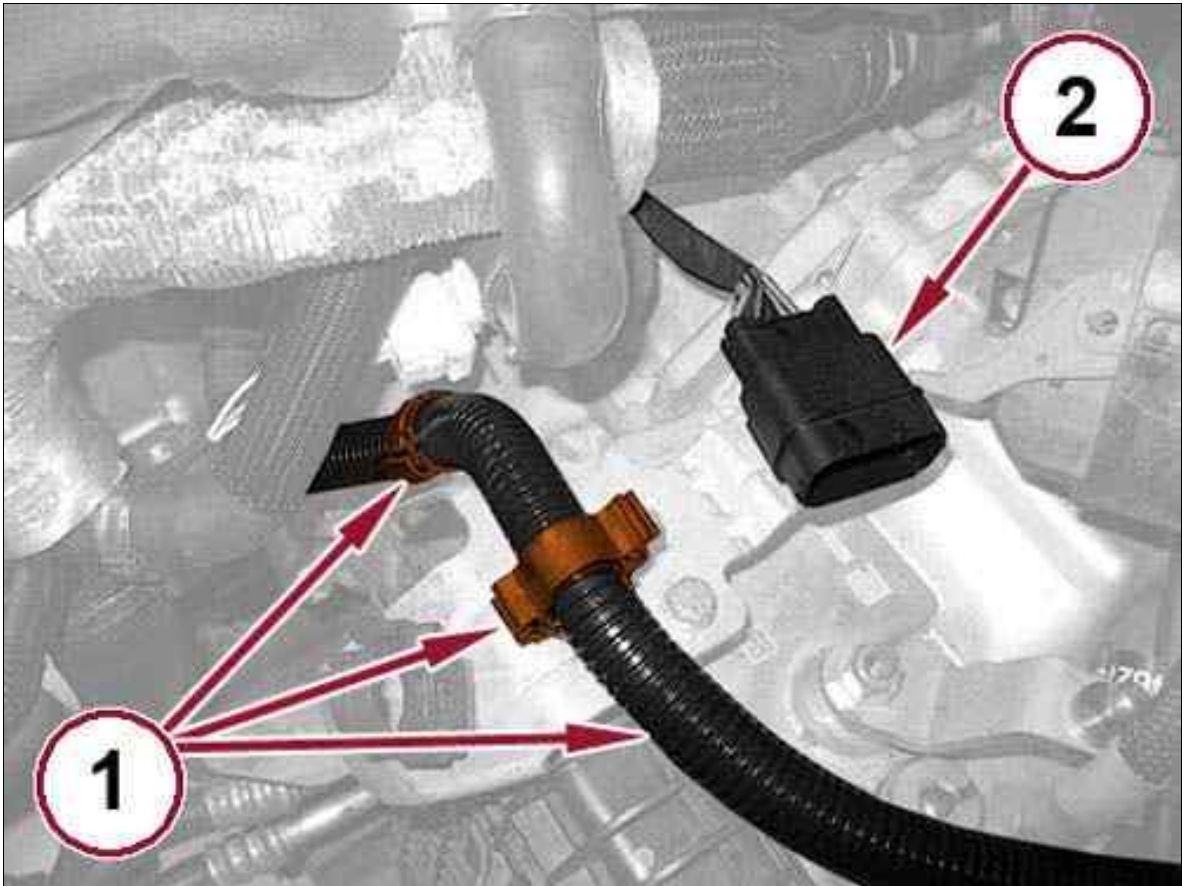
Fig 5: Exhaust Side Oil Pan To Transmission Bolt



Courtesy of CHRYSLER GROUP, LLC

7. Remove the exhaust side oil pan to transmission bolt (1).

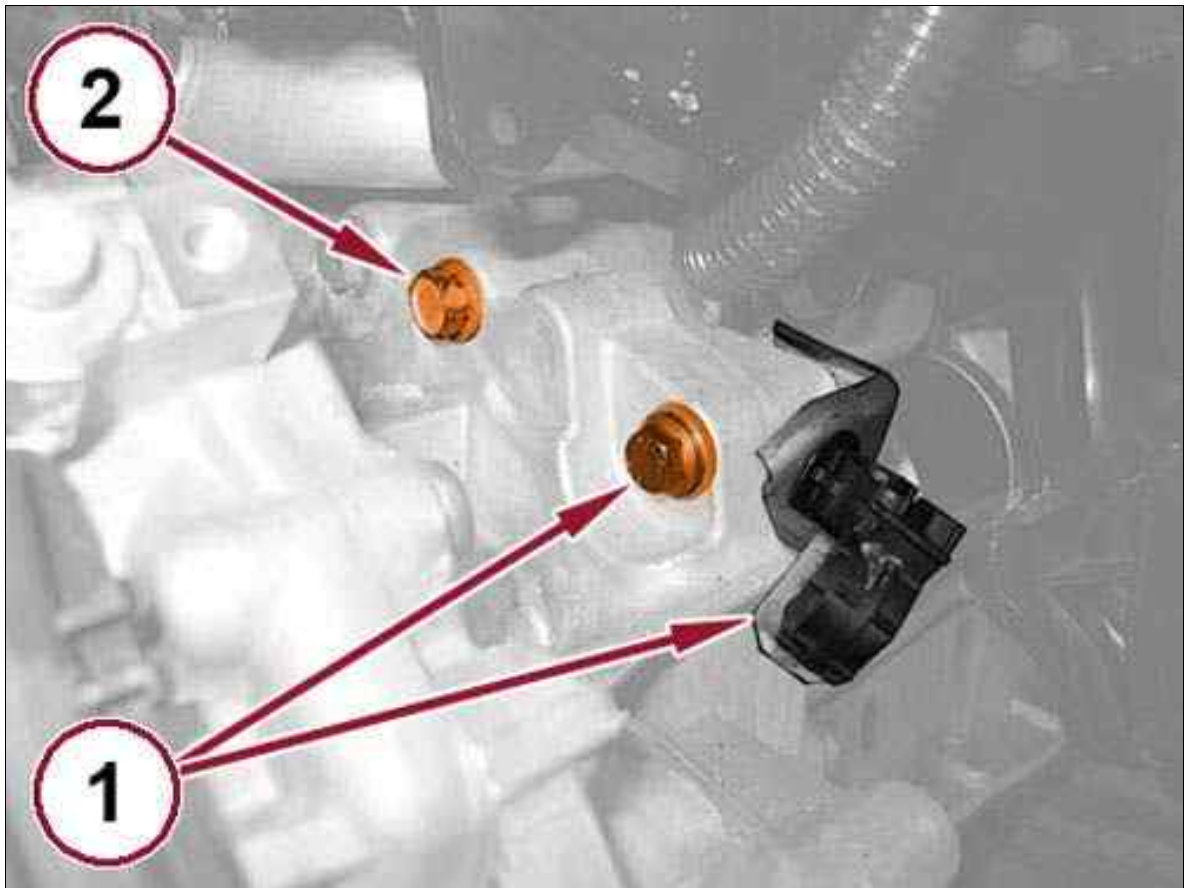
Fig 6: Alternator Wiring Harness Retaining Clips & Engine Wire Harness Connector



Courtesy of CHRYSLER GROUP, LLC

8. Open the retaining clips (1) and reposition the alternator wiring harness.
9. Disengage the engine wire harness connector (2) from the bracket.

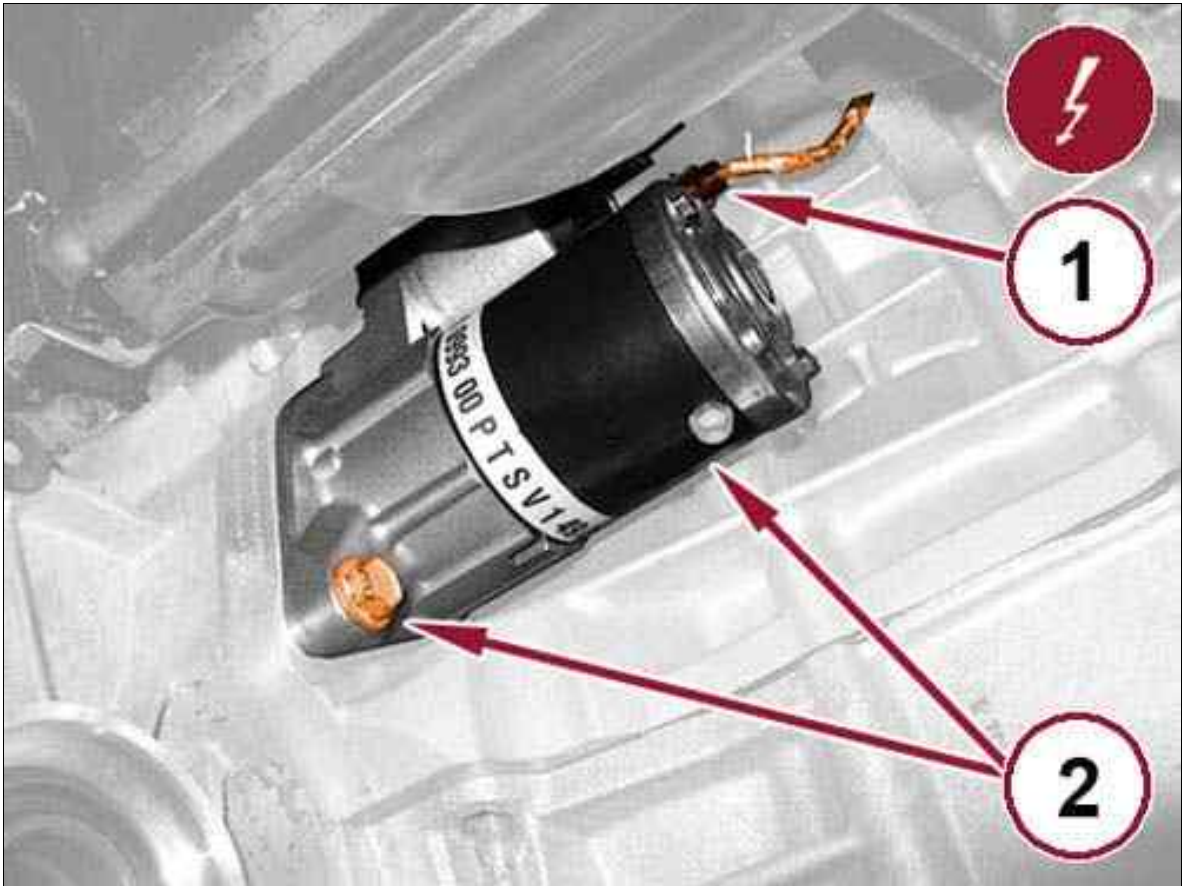
Fig 7: Bracket, Bolt & Upper Starter Bolt



Courtesy of CHRYSLER GROUP, LLC

10. Remove the bolt (1) and the bracket.
11. Remove the upper starter motor bolt (2).

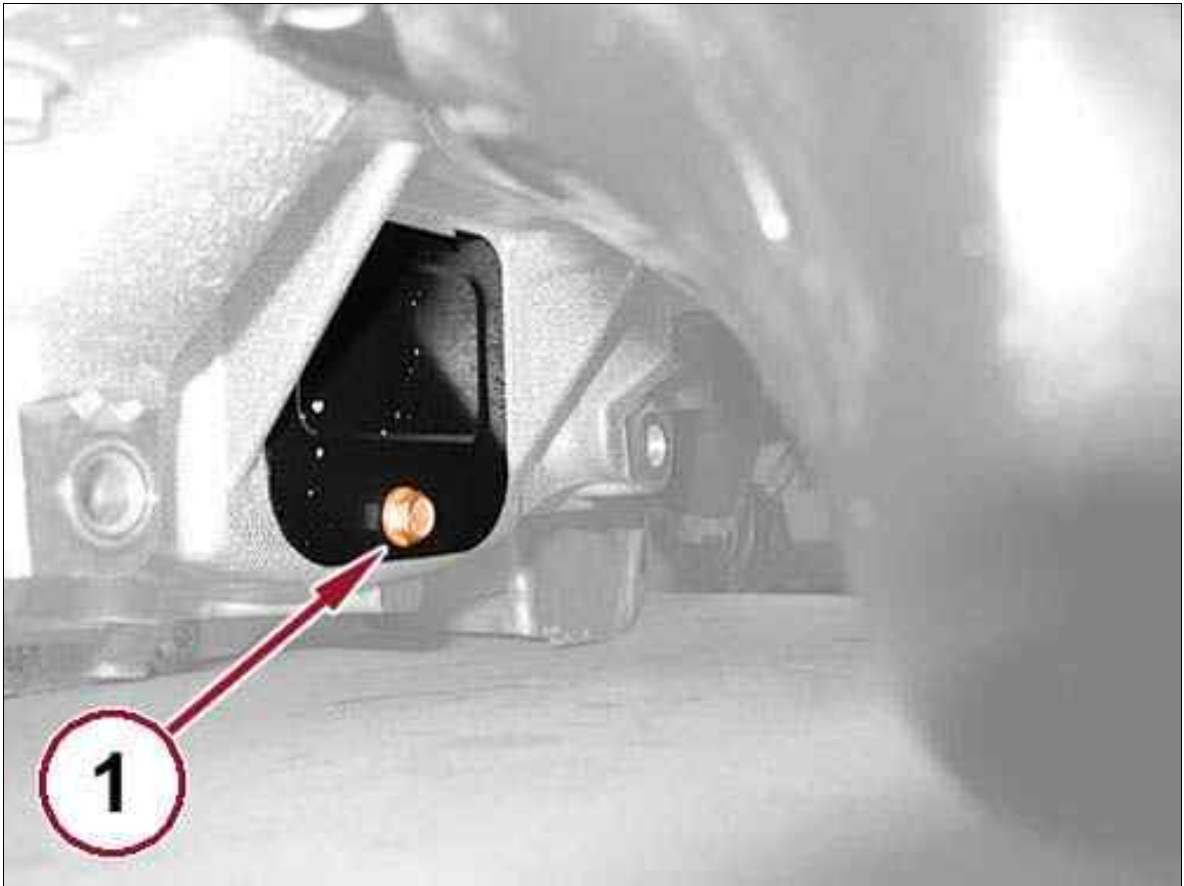
Fig 8: Starter Motor Wire Harness Connector & Lower Starter Bolt



Courtesy of CHRYSLER GROUP, LLC

12. Disconnect the starter motor wire harness connector (1).
13. Remove the lower starter motor bolt (2) and remove the starter motor with the battery positive cable attached.

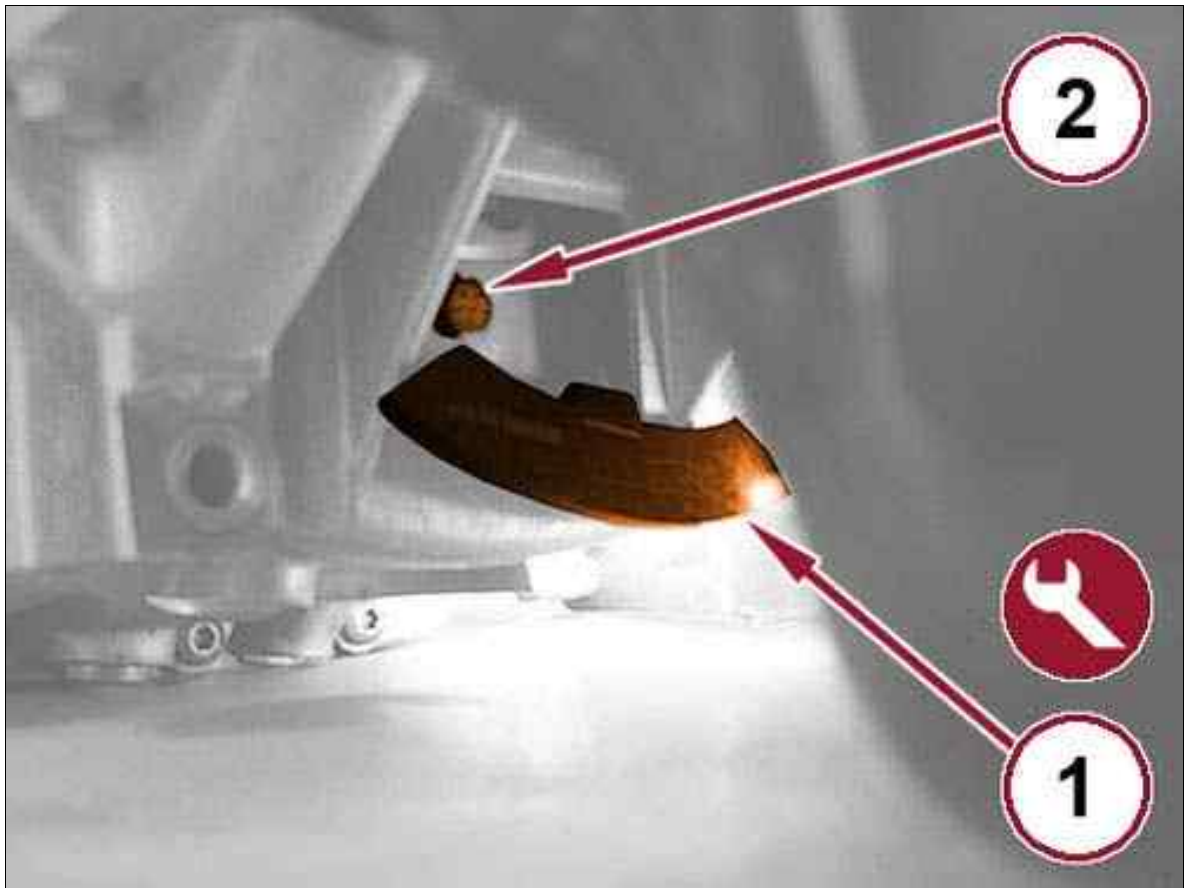
Fig 9: Inspection Cover Bolt



Courtesy of CHRYSLER GROUP, LLC

14. Remove the bolt (1) and remove the inspection cover.

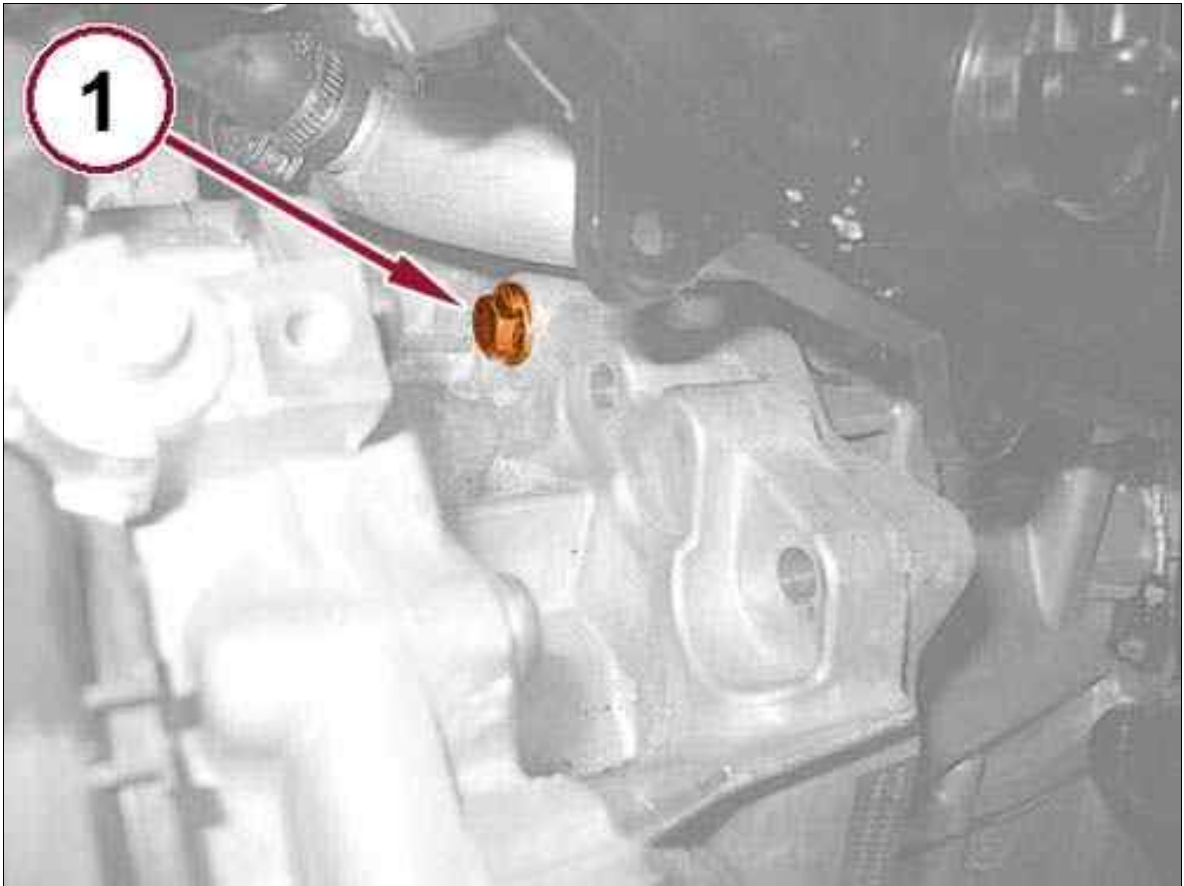
Fig 10: Special Tool & Torque Converter Bolt



Courtesy of CHRYSLER GROUP, LLC

15. Install the 1860898000 tool (1).
16. Remove the torque converter bolts (2).

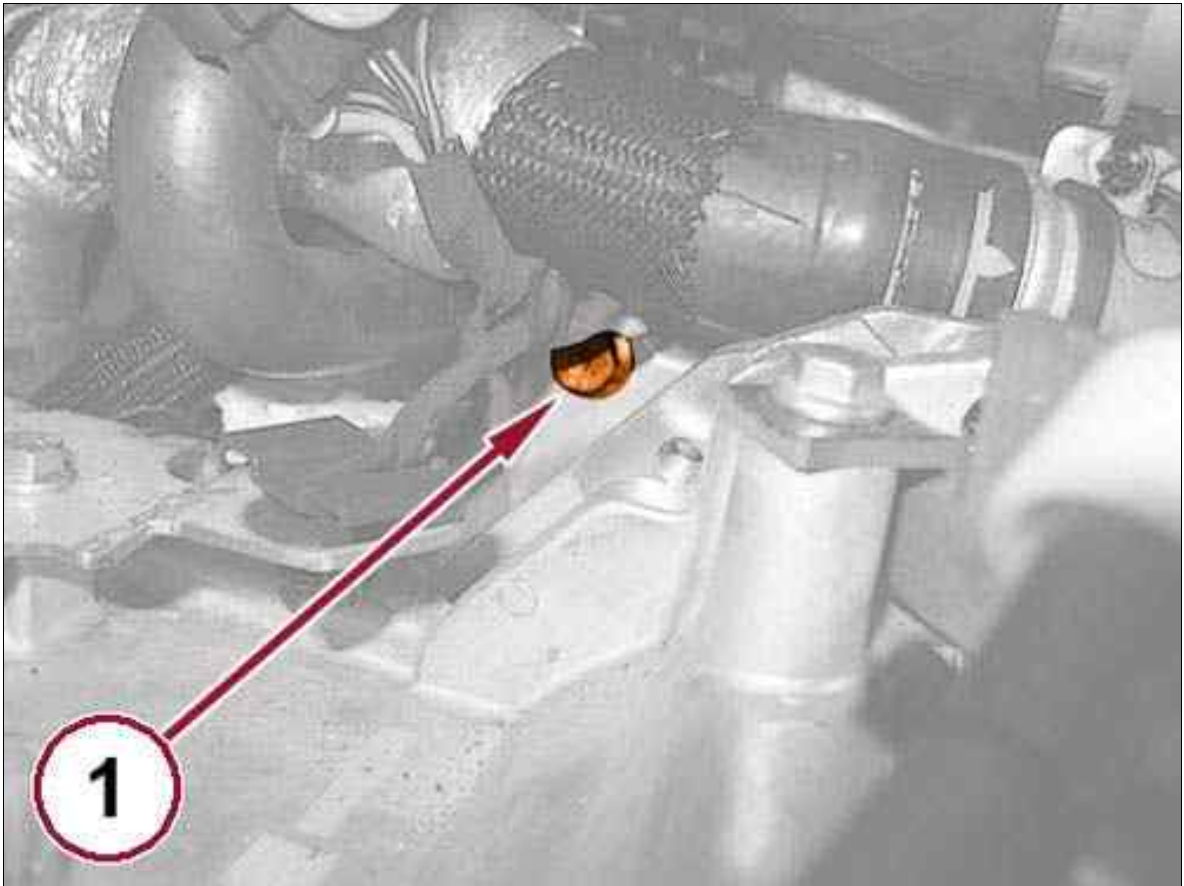
Fig 11: Intake Side Upper Transmission To Engine Block Bolt



Courtesy of CHRYSLER GROUP, LLC

17. Remove the intake side upper transmission to engine block bolt (1).

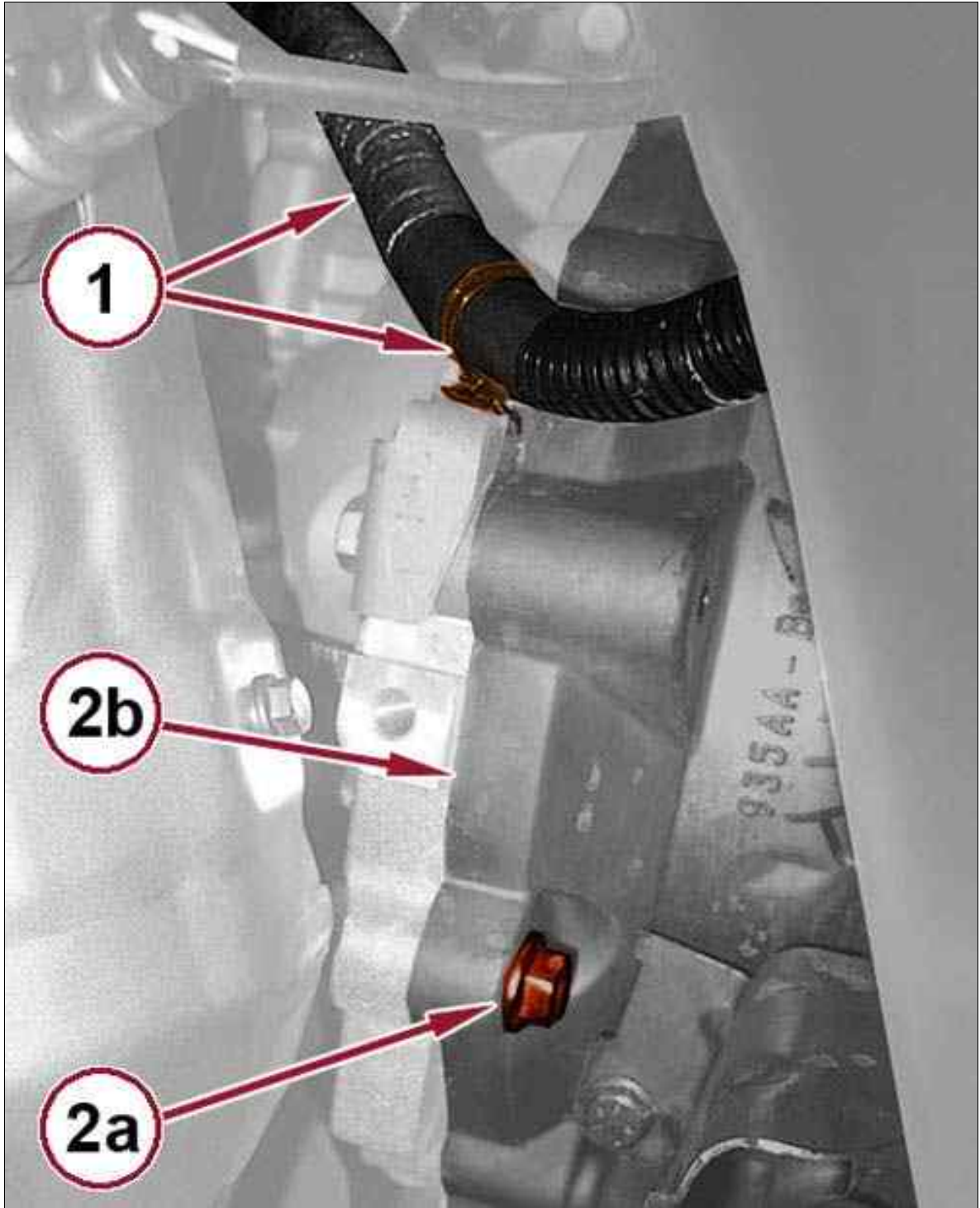
Fig 12: Exhaust Side Upper Transmission To Engine Block Bolt



Courtesy of CHRYSLER GROUP, LLC

18. Remove the exhaust side upper transmission to engine block bolt (1).

Fig 13: Wire Harness At Transmission, Side Transmission To Engine Block Bolt & Transmission

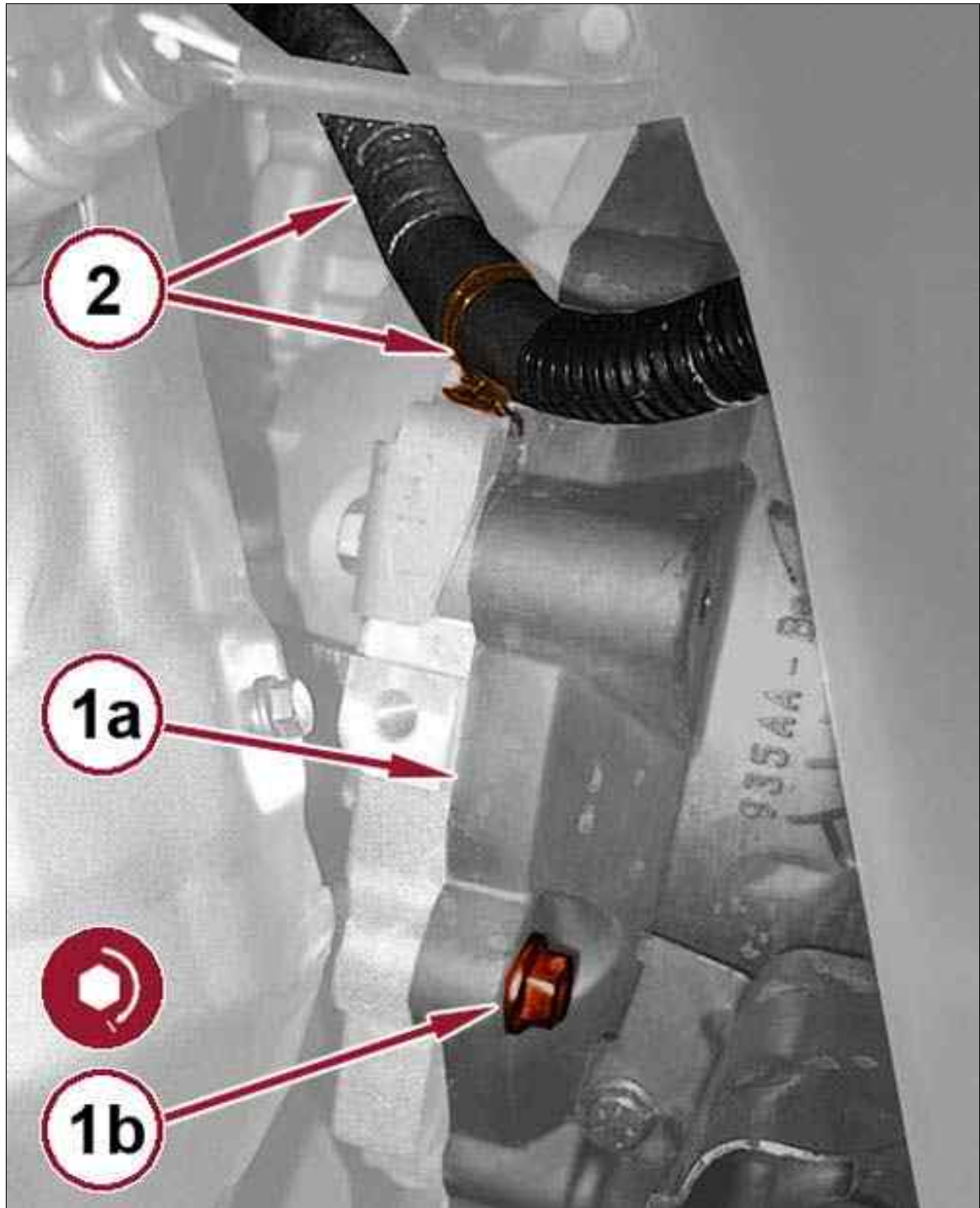


Courtesy of CHRYSLER GROUP, LLC

19. Disengage the wire harness from the transmission (1).
20. Remove the side transmission to engine block bolt (2a) and remove the transmission (2b) from the engine.

REMOVAL AND INSTALLATION > ENGINE (AUTOMATIC TRANSMISSION) SEPARATION AND REASSEMBLY - 2.4L MULTIAIR 4X4 > INSTALLATION

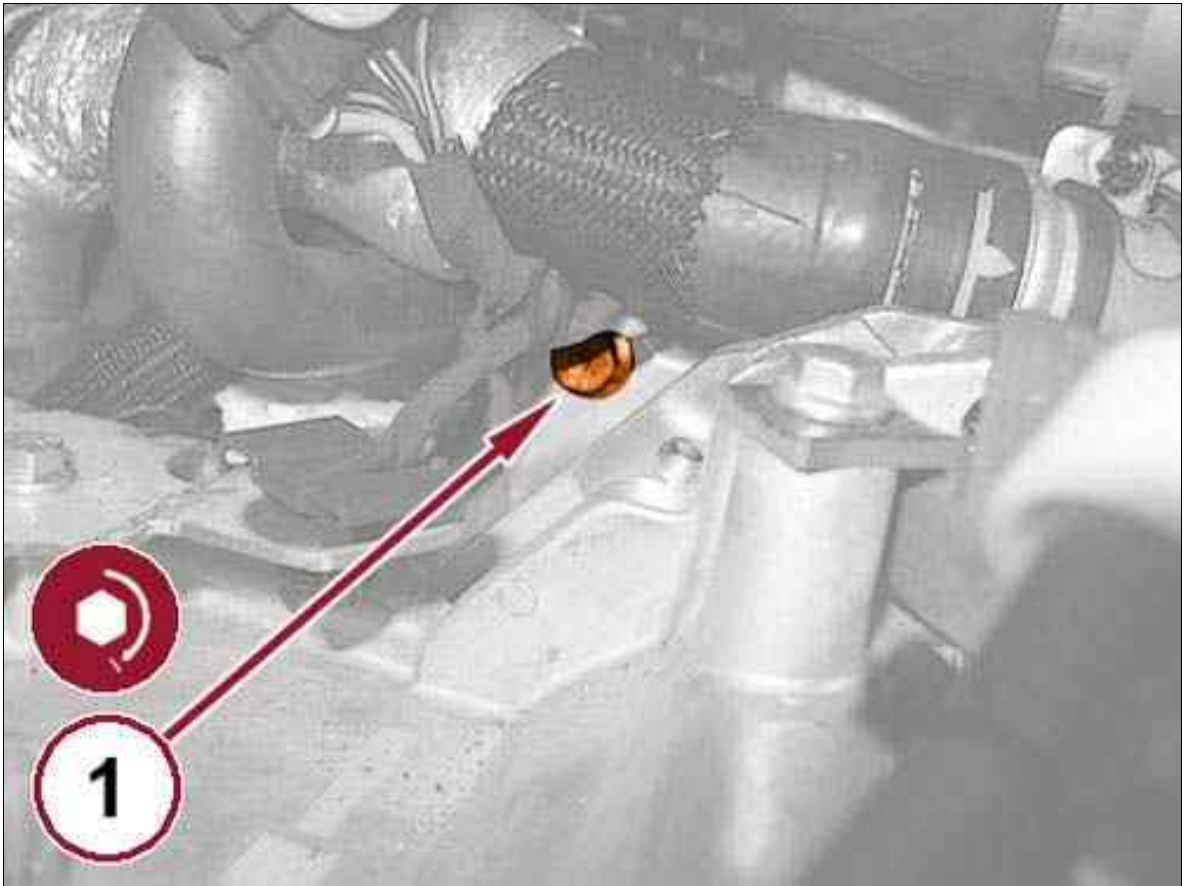
Fig 1: Wire Harness At Transmission, Side Transmission To Engine Block Bolt & Transmission



Courtesy of CHRYSLER GROUP, LLC

1. Install the transmission (1a) to the engine with the side transmission to engine bolt (1b) tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
2. Engage the wire harness to the transmission (2).

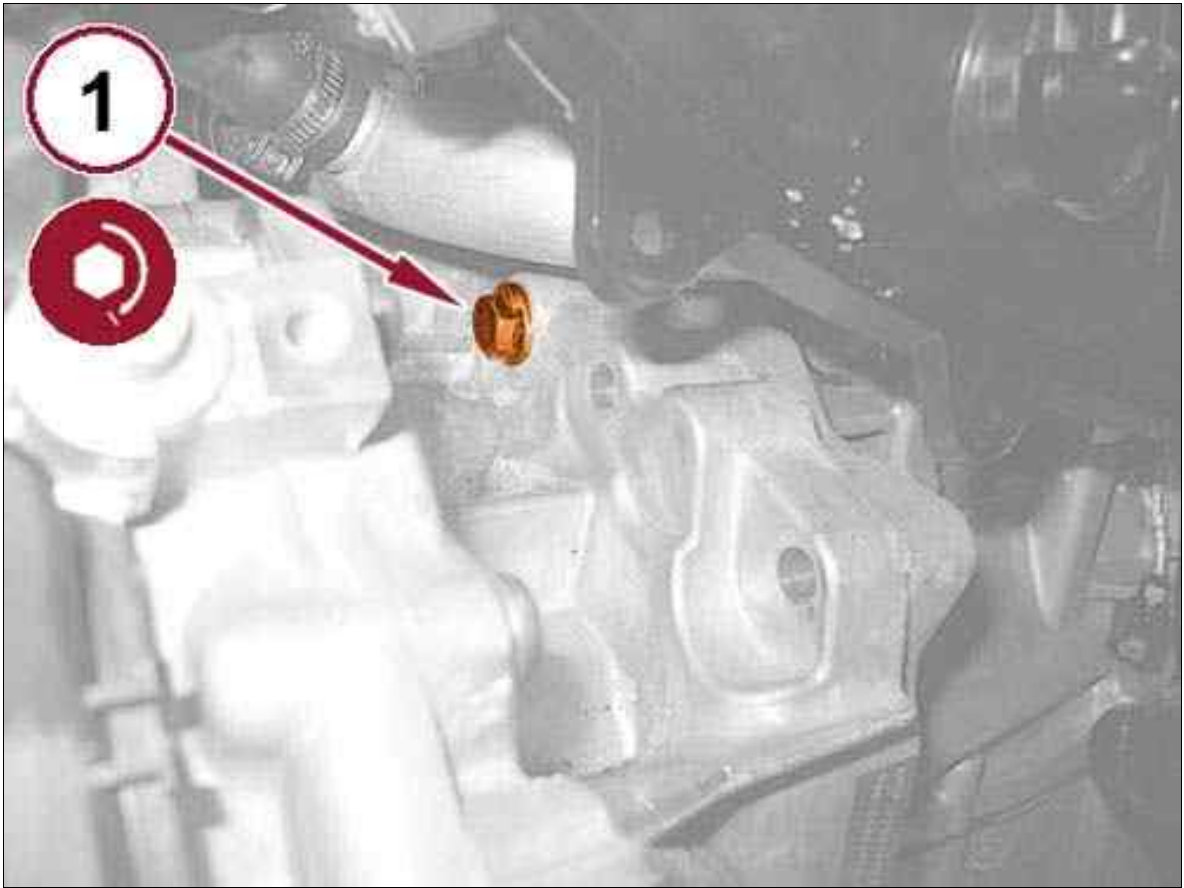
Fig 2: Exhaust Side Upper Transmission To Engine Block Bolt



Courtesy of CHRYSLER GROUP, LLC

3. Install the exhaust side upper transmission to engine block bolt (1) and tighten to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

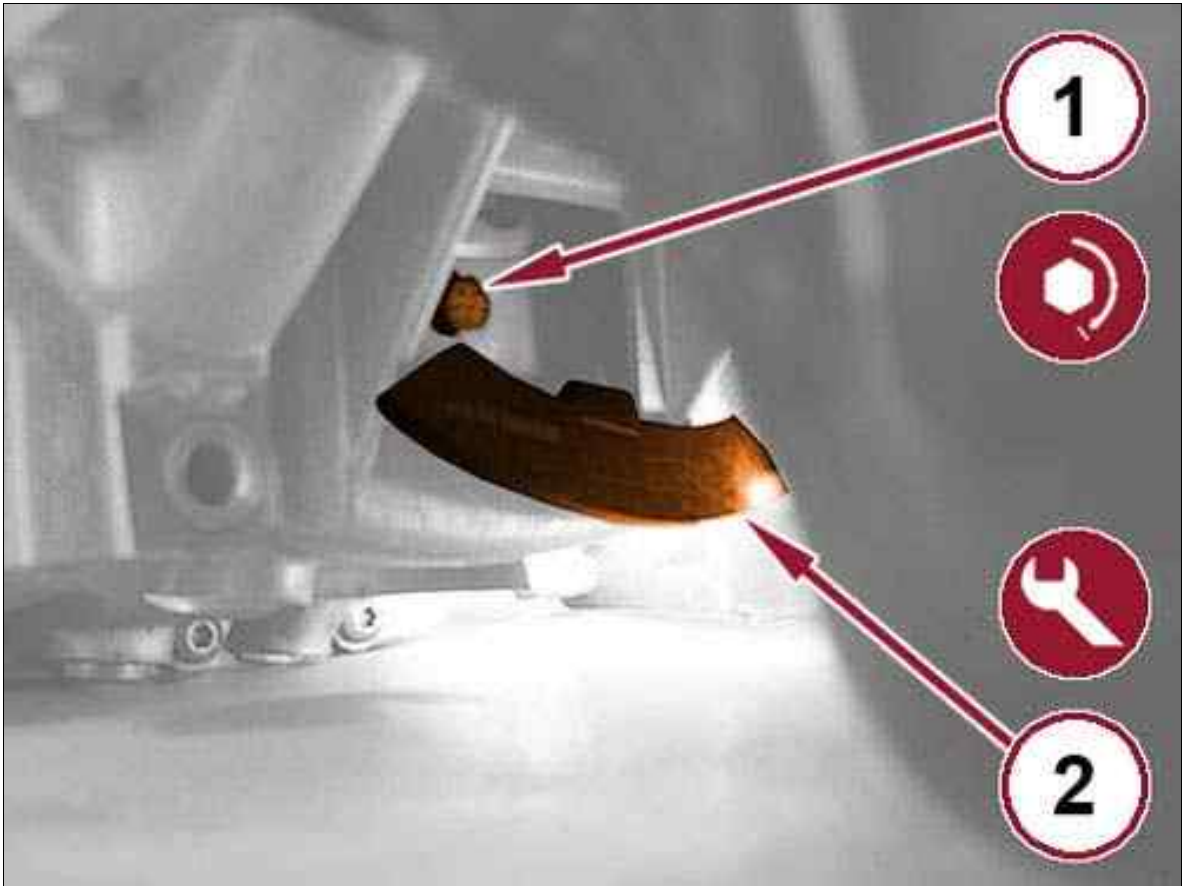
Fig 3: Intake Side Upper Transmission To Engine Block Bolt



Courtesy of CHRYSLER GROUP, LLC

4. Install the intake side upper transmission to engine block bolt (1) and tighten to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

Fig 4: Special Tool & Torque Converter Bolt



Courtesy of CHRYSLER GROUP, LLC

5. Install the torque converter bolts (1) and tighten to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
6. Remove the 1860898000 tool (2).
7. Install the inspection cover and tighten the bolt to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

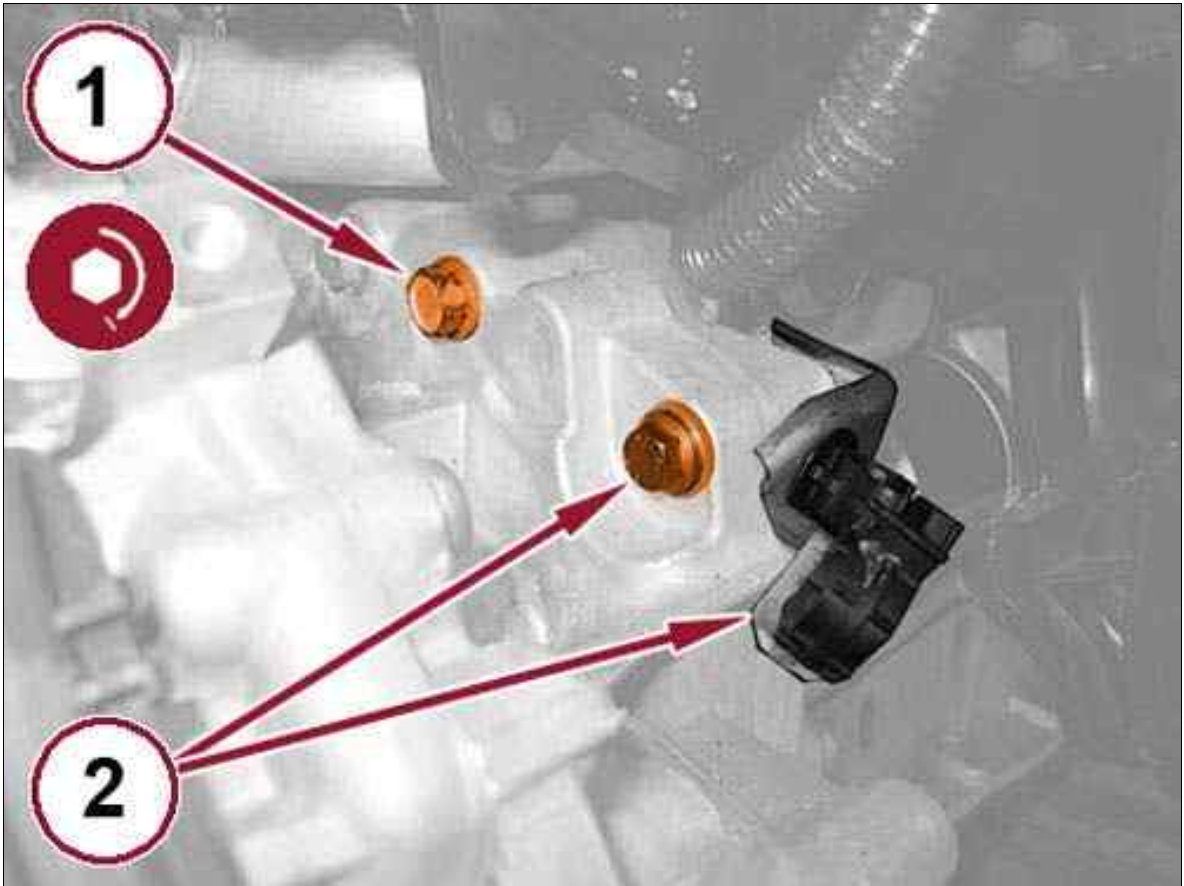
Fig 5: Starter Motor Wire Harness Connector & Lower Starter Bolt



Courtesy of CHRYSLER GROUP, LLC

8. Install the starter motor (1) with the battery positive cable attached and tighten the lower starter bolt to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
9. Connect the starter motor wire harness connector (2).

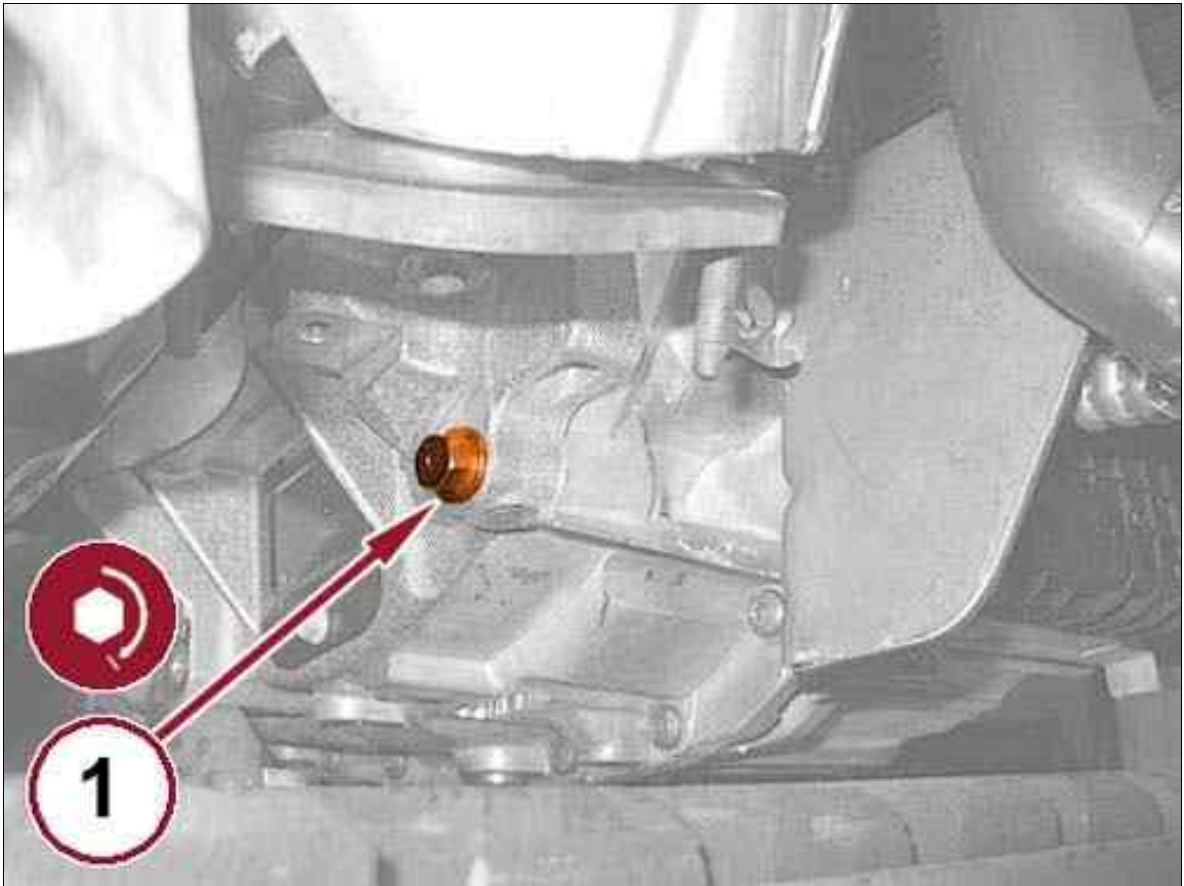
Fig 6: Bracket, Bolt & Upper Starter Bolt



Courtesy of CHRYSLER GROUP, LLC

10. Install the upper starter bolt (1) and tighten to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
11. Install the bracket (2) with the bolt tightened to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
12. Engage the engine wire harness connector to the bracket.
13. Position the alternator wiring harness and close the retaining clips.

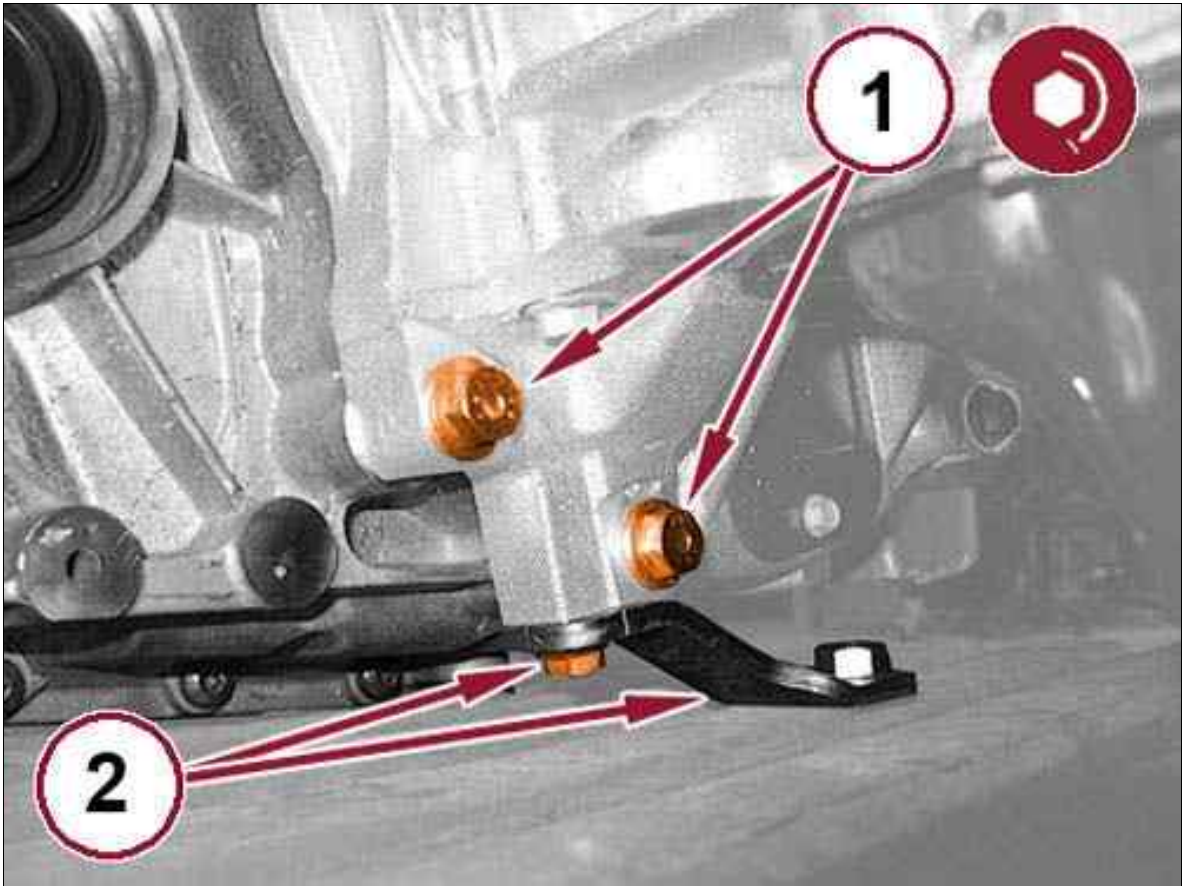
Fig 7: Exhaust Side Oil Pan To Transmission Bolt



Courtesy of CHRYSLER GROUP, LLC

14. Install the exhaust side oil pan to transmission bolt (1) and tighten to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

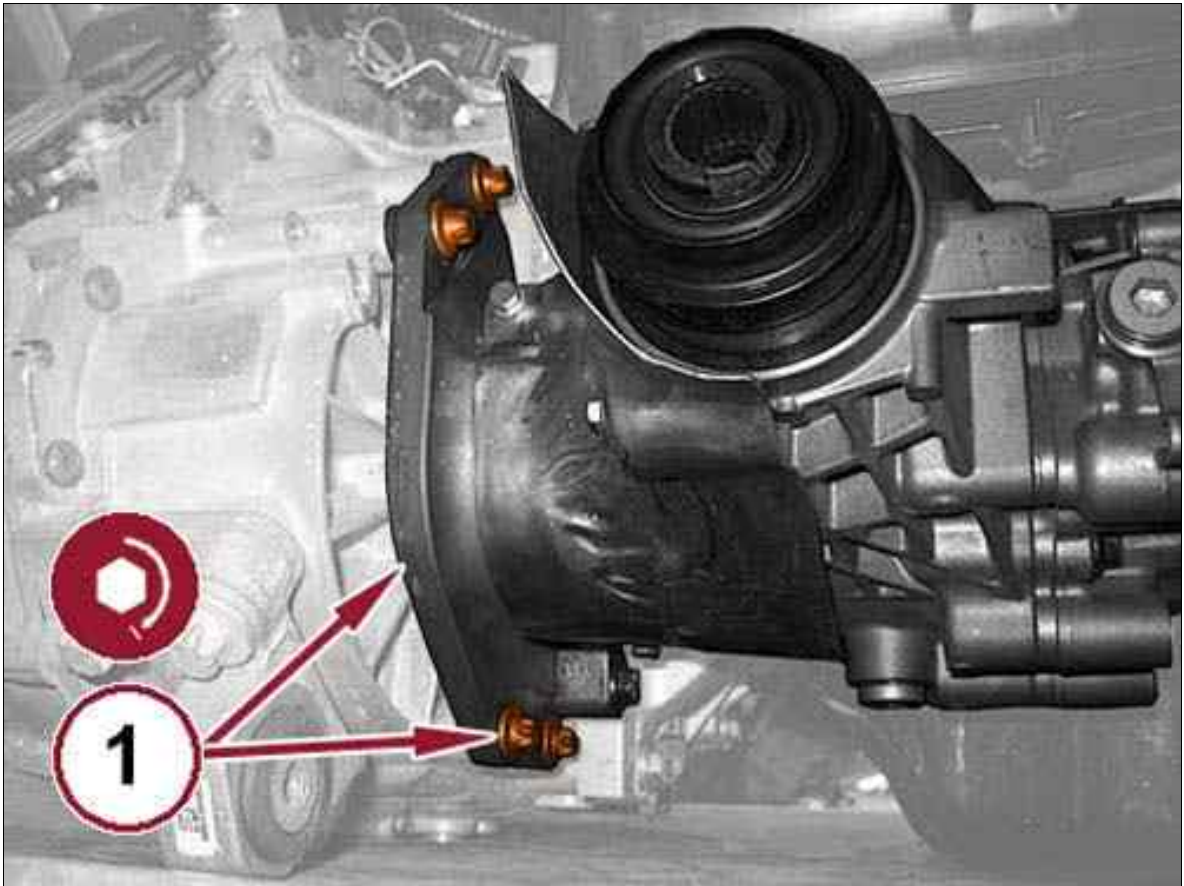
Fig 8: Exhaust Pipe Support Bracket Bolt & Intake Side Oil Pan To Transmission Bolts



Courtesy of CHRYSLER GROUP, LLC

15. Install the two intake side oil pan to transmission bolts (1) and tighten to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
16. Install the exhaust pipe support bracket (2) and tighten the bolt to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

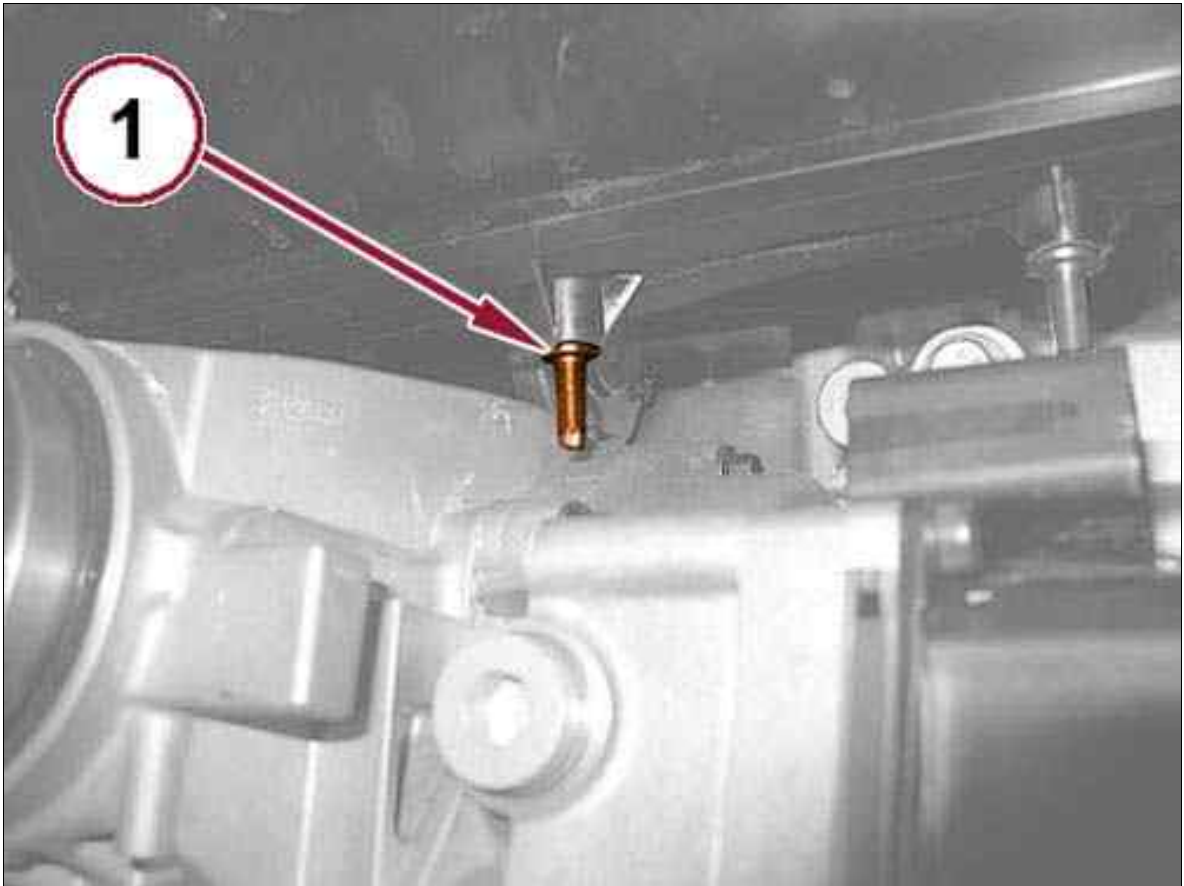
Fig 9: PTU, Transmission & Bolts



Courtesy of CHRYSLER GROUP, LLC

17. Install a new O-ring seal to the PTU.
18. Install the PTU (1) to the transmission and tighten the bolts to the proper torque specification.
Refer to TORQUE SPECIFICATIONS .

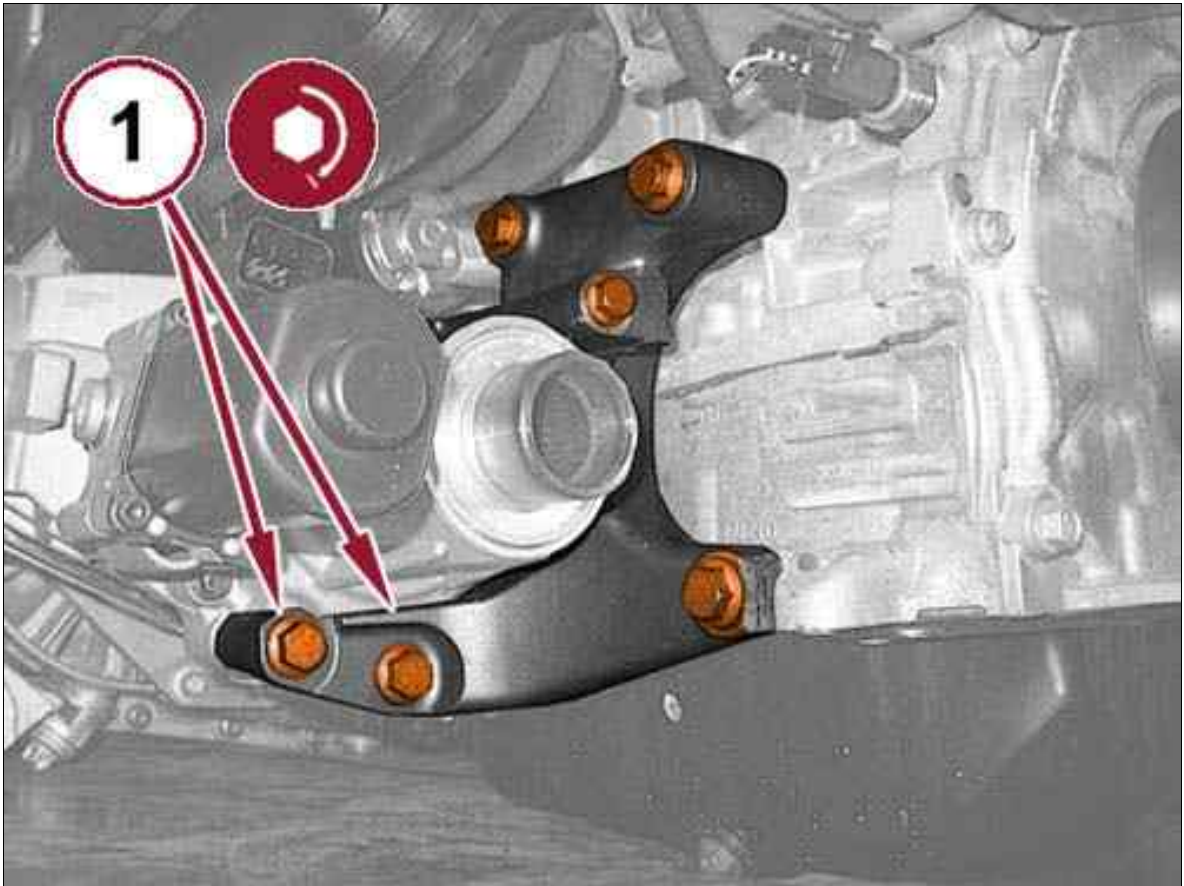
Fig 10: Locating Stud



Courtesy of CHRYSLER GROUP, LLC

19. Install the stud (1) to the intake manifold and tighten to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

Fig 11: PTU Support Bracket & Bolts

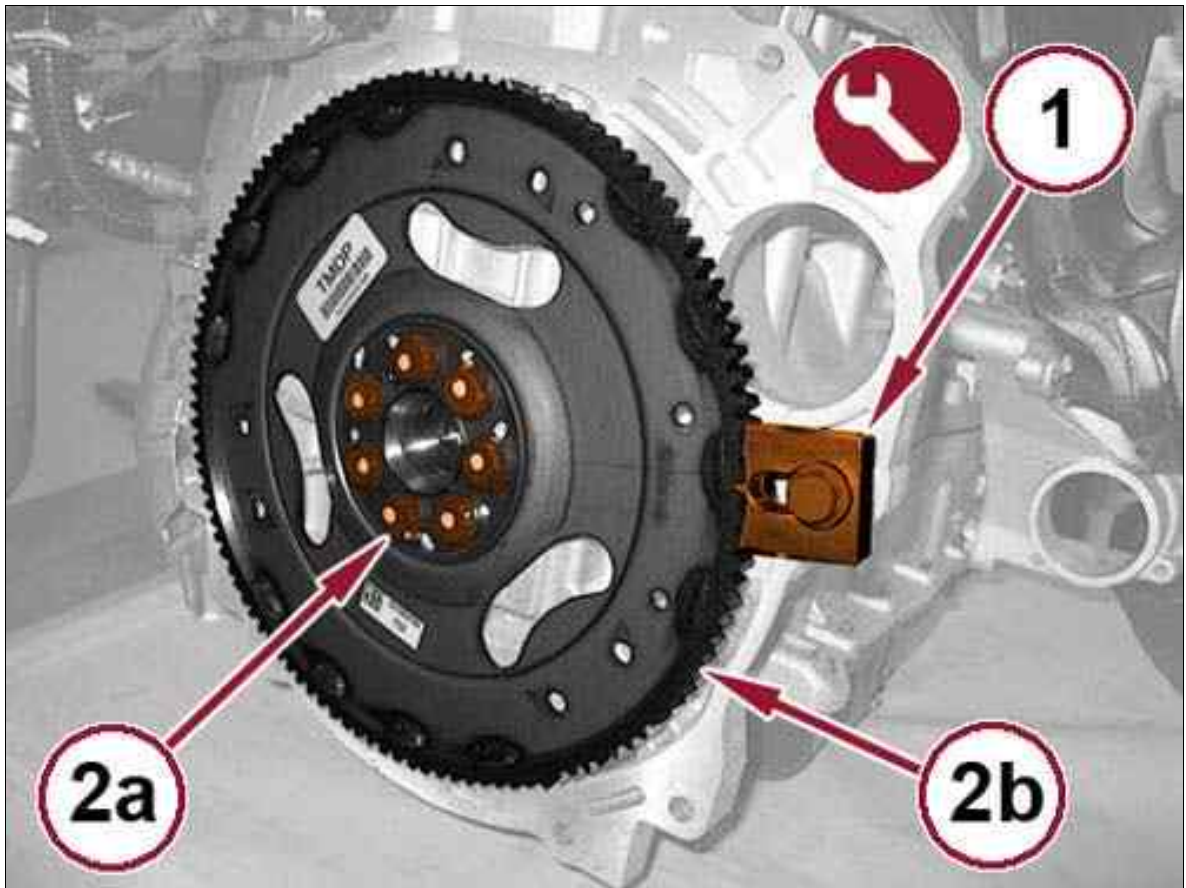


Courtesy of CHRYSLER GROUP, LLC

20. Install the PTU support bracket (1) and tighten the bolts to the proper torque specification. Refer to TORQUE SPECIFICATIONS .
21. Install the lower intake manifold support bracket and tighten the fasteners to the proper torque specification. Refer to TORQUE SPECIFICATIONS .

REMOVAL AND INSTALLATION > ENGINE - POSITION ON STAND AND REMOVE - 2.4L > REMOVAL

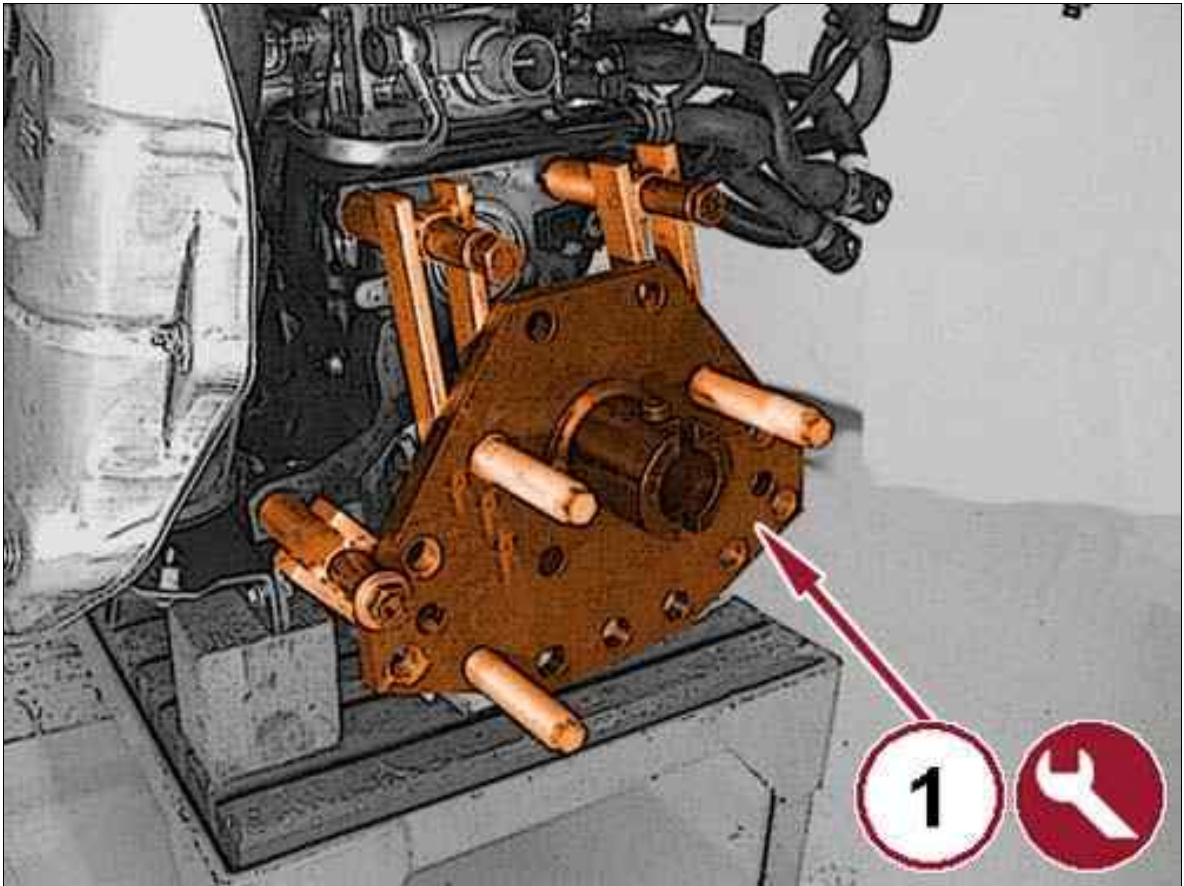
Fig 1: Flywheel Stop Tool, Flexplate & Bolts



Courtesy of CHRYSLER GROUP, LLC

1. Fit the 1860741000 (EMEA) flywheel stop tool (1).
2. Remove the bolts (2a) and remove the flexplate (2b) with spacer.
3. Remove the 1860741000 (EMEA) flywheel stop tool.

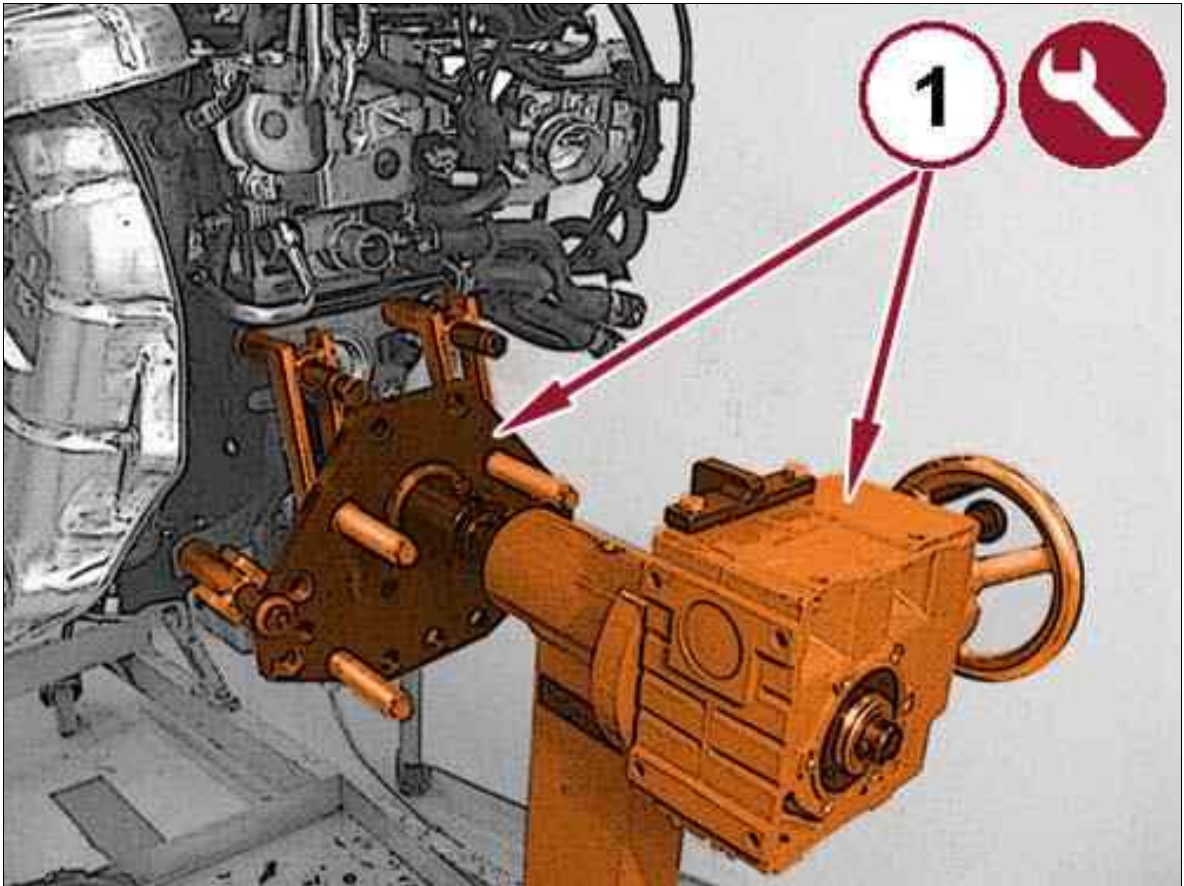
Fig 2: Installing Mounting Bracket On Engine Block



Courtesy of CHRYSLER GROUP, LLC

4. Install the 1871000000 mounting bracket on the engine block (1).

Fig 3: Installing Engine Block & Mounting Bracket To Maintenance Stand



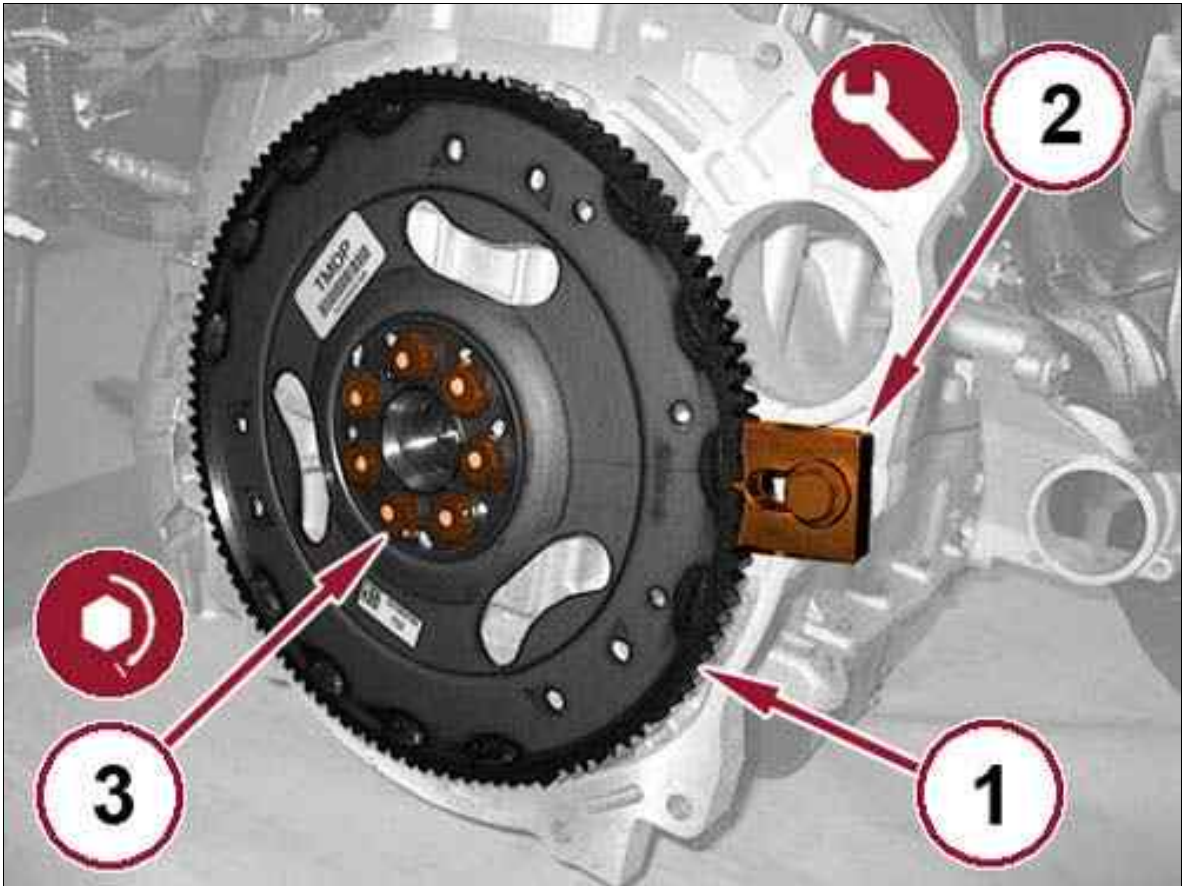
Courtesy of CHRYSLER GROUP, LLC

5. With the aid of a hydraulic lift, install the engine block and mounting bracket to the 1871000000 maintenance stand (1).

REMOVAL AND INSTALLATION > ENGINE - POSITION ON STAND AND REMOVE - 2.4L > INSTALLATION

1. With the aid of a hydraulic lift, remove the engine from the 1871000000 maintenance stand.
2. Place the engine on a suitable platform.

Fig 1: Flywheel Stop Tool, Flexplate & Bolts

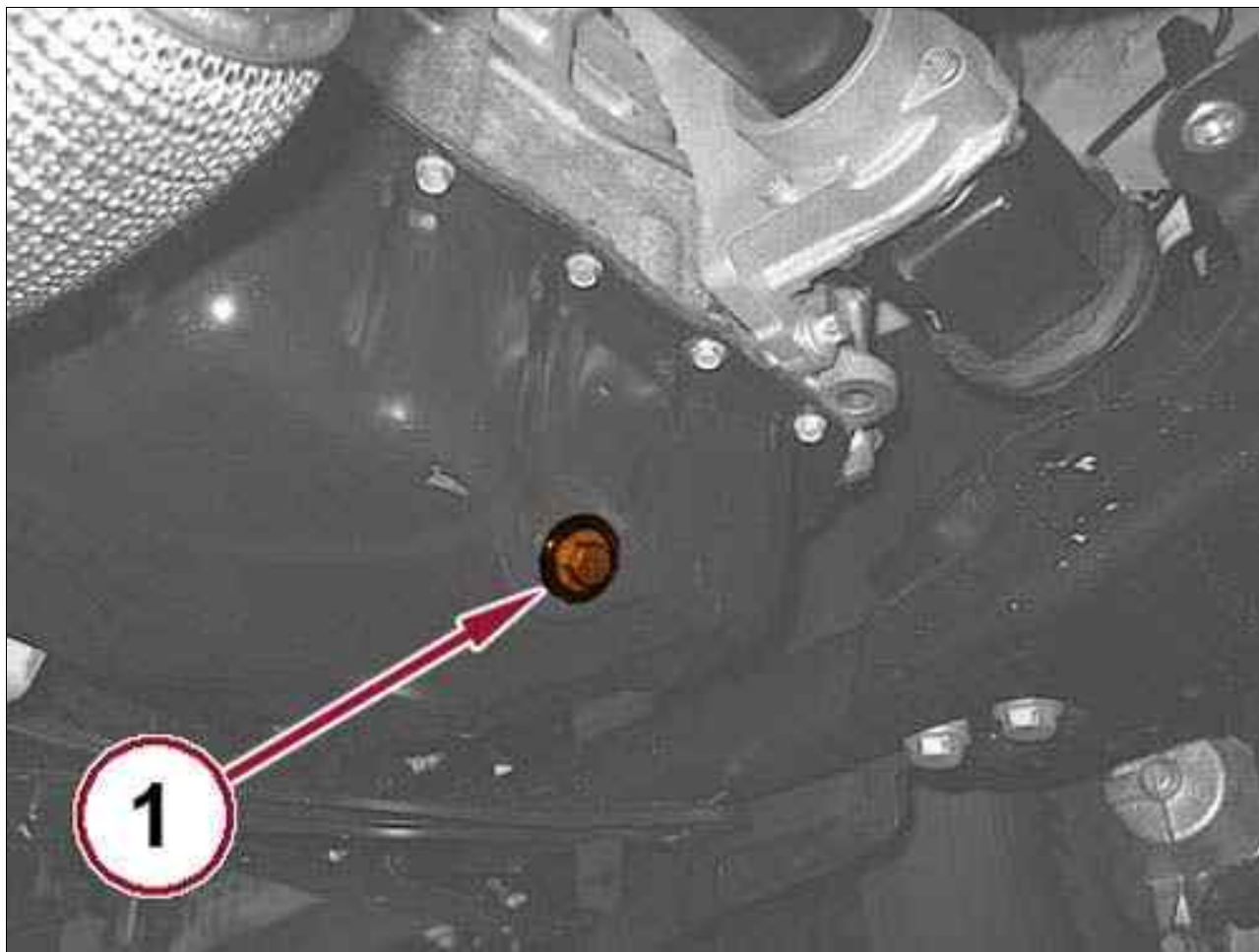


Courtesy of CHRYSLER GROUP, LLC

3. Install the engine flexplate with spacer (1) and partially tighten the bolts (3).
4. Fit the 1860741000 (EMEA) flywheel stop tool (2).
5. Tighten the flywheel mounting bolts (3) to the proper specification. Refer to TORQUE SPECIFICATIONS .
6. Remove the 1860741000 (EMEA) flywheel stop tool.

DISASSEMBLY AND ASSEMBLY > REMOVE CYLINDER HEAD AND OIL PAN FOR INSPECTION - 2.4L

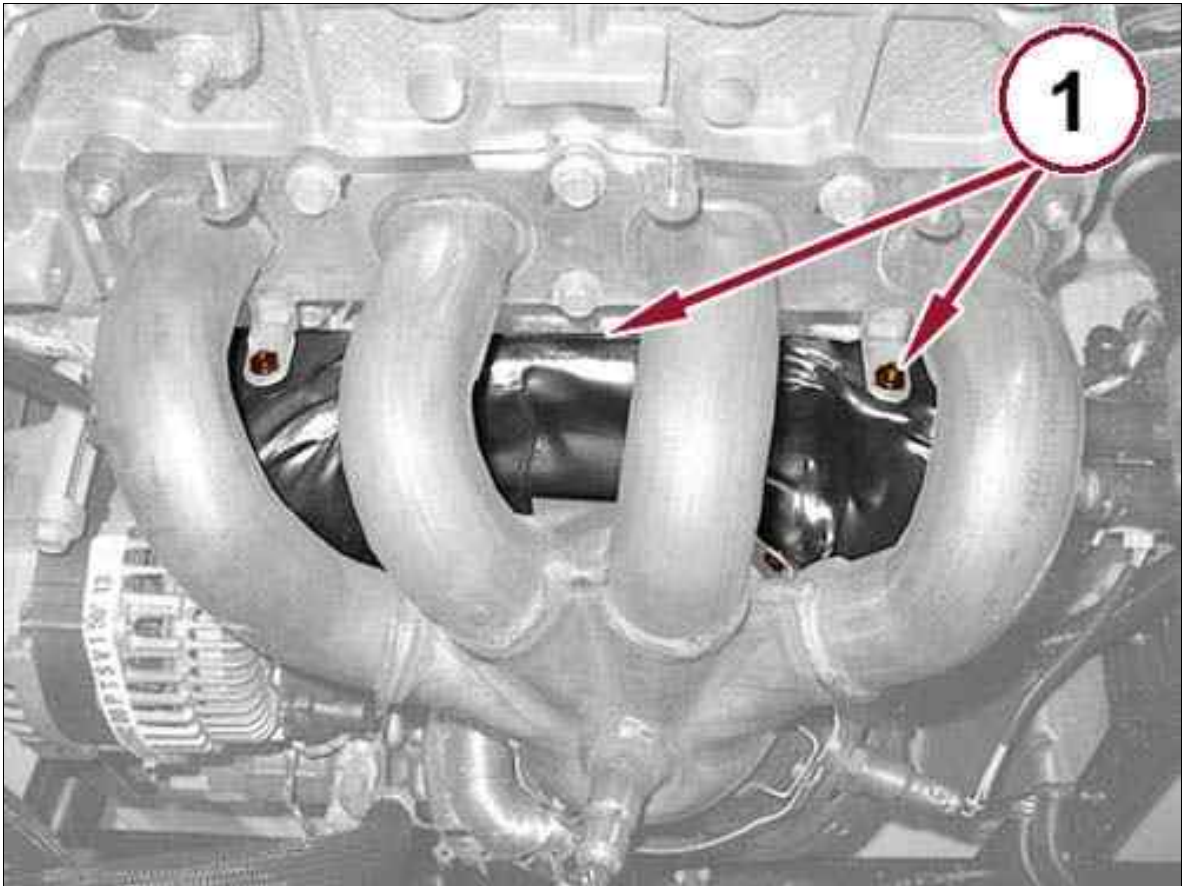
Fig 1: Oil Pan Drain Plug



Courtesy of CHRYSLER GROUP, LLC

1. Unscrew the plug (1) and drain the engine oil.

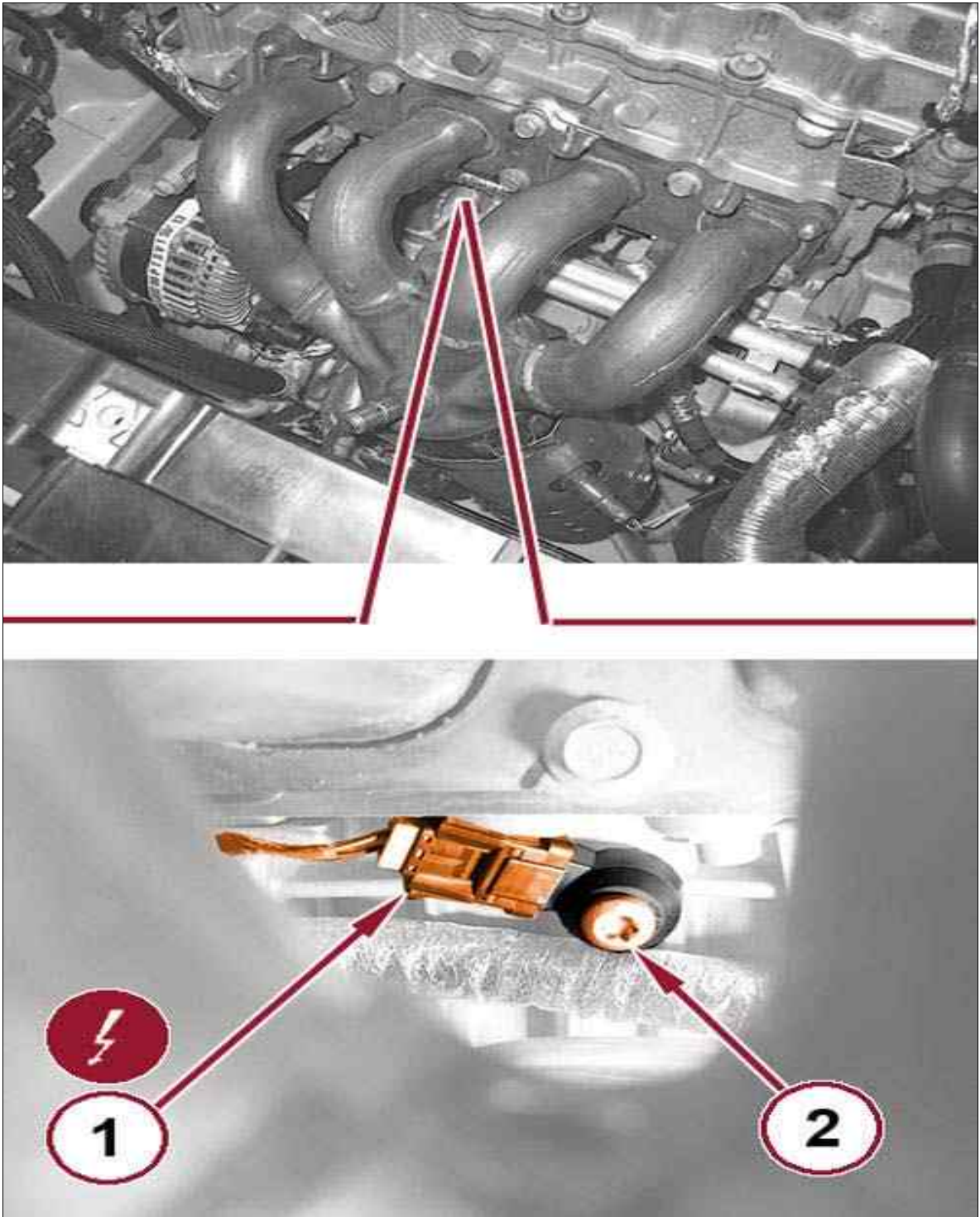
Fig 2: Lower Exhaust Manifold Heat Shield & Screws



Courtesy of CHRYSLER GROUP, LLC

2. Remove the screws (1) and remove the heat shield (1) below the exhaust manifold.

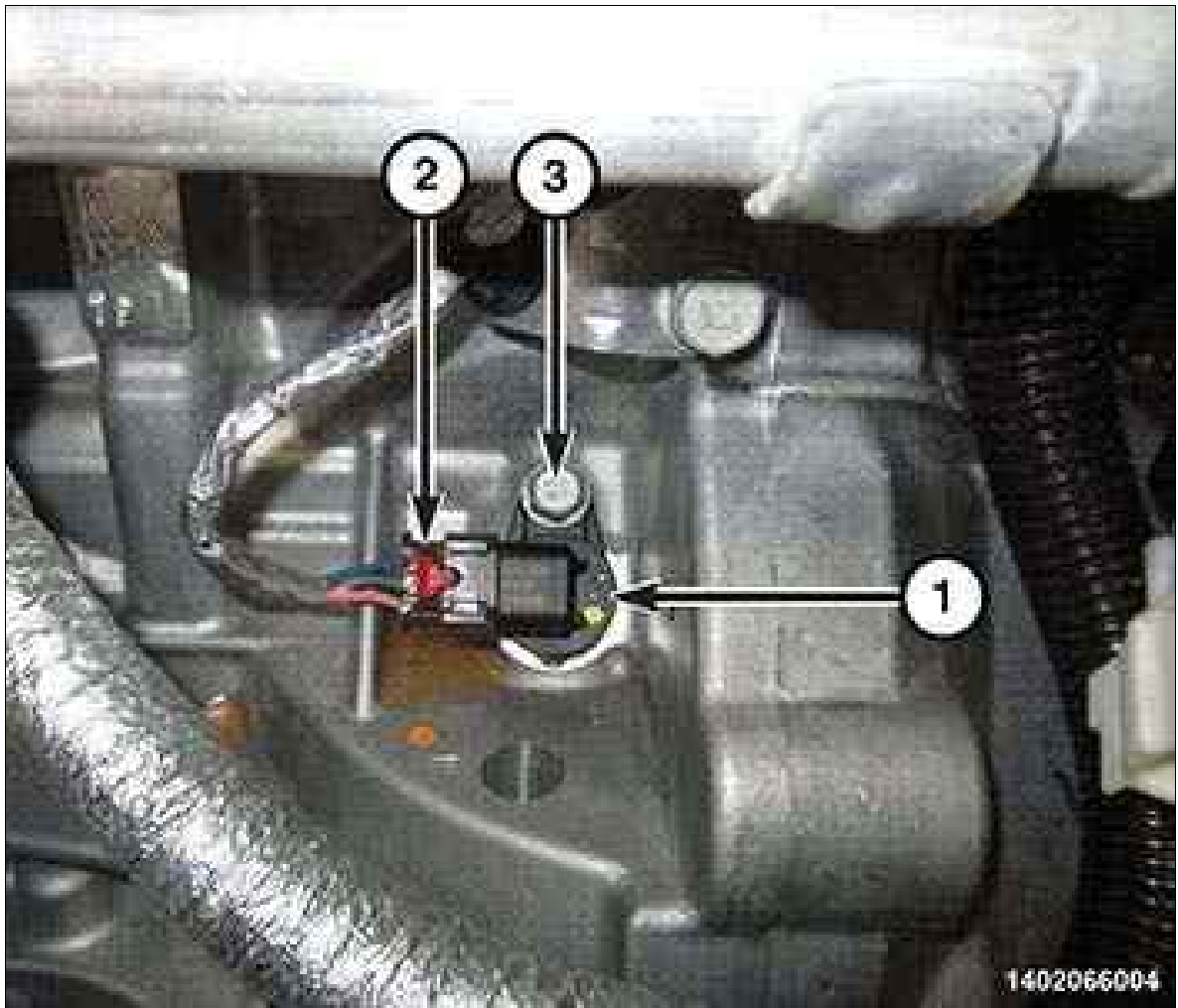
Fig 3: Knock Sensor & Electrical Connector



Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the knock sensor electrical connector (1).

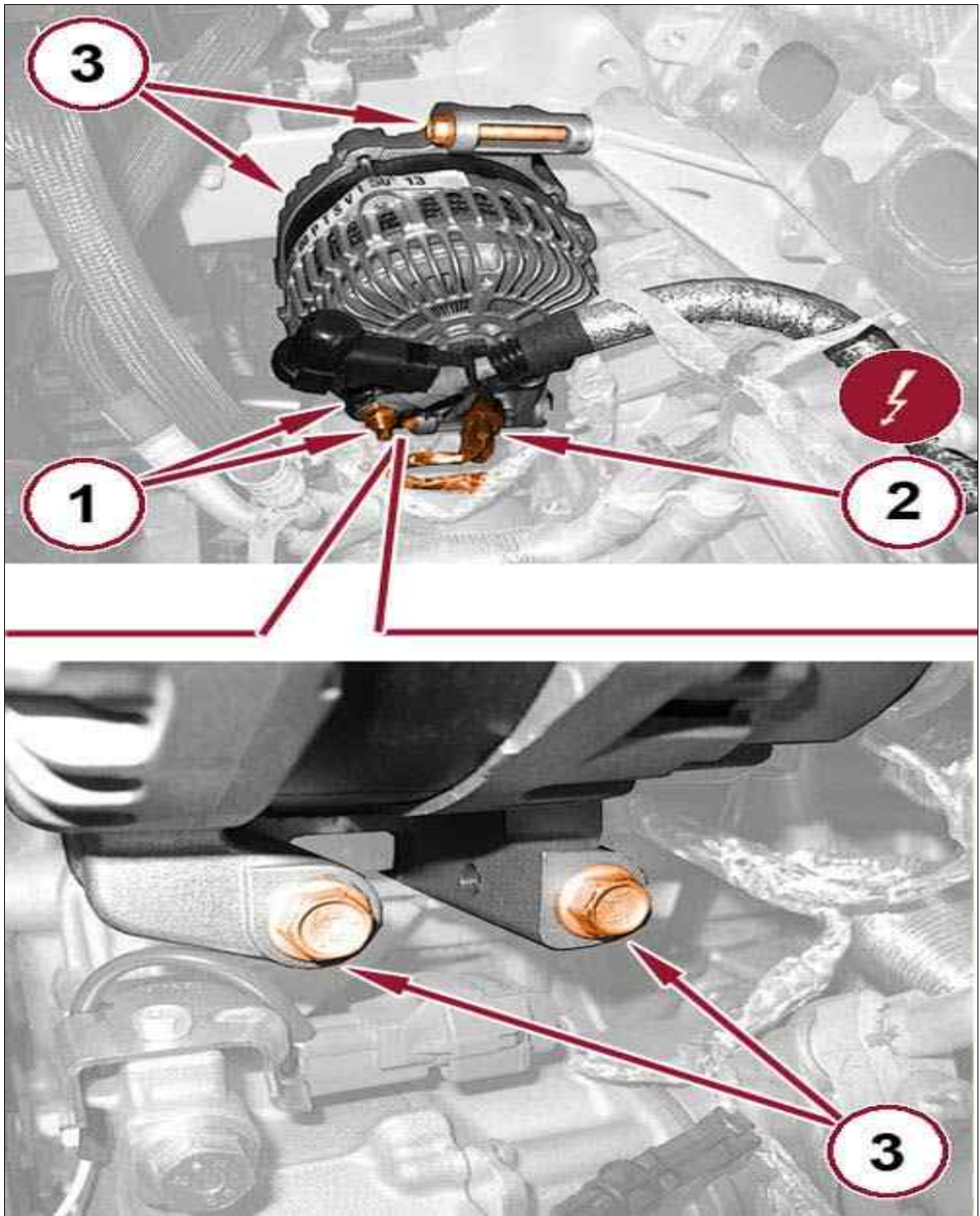
Fig 4: Crankshaft Position (CKP) Sensor, Wire Harness Connector & Bolt



Courtesy of CHRYSLER GROUP, LLC

4. Unlock and disconnect the Crankshaft Position (CKP) sensor wire harness connector (2).

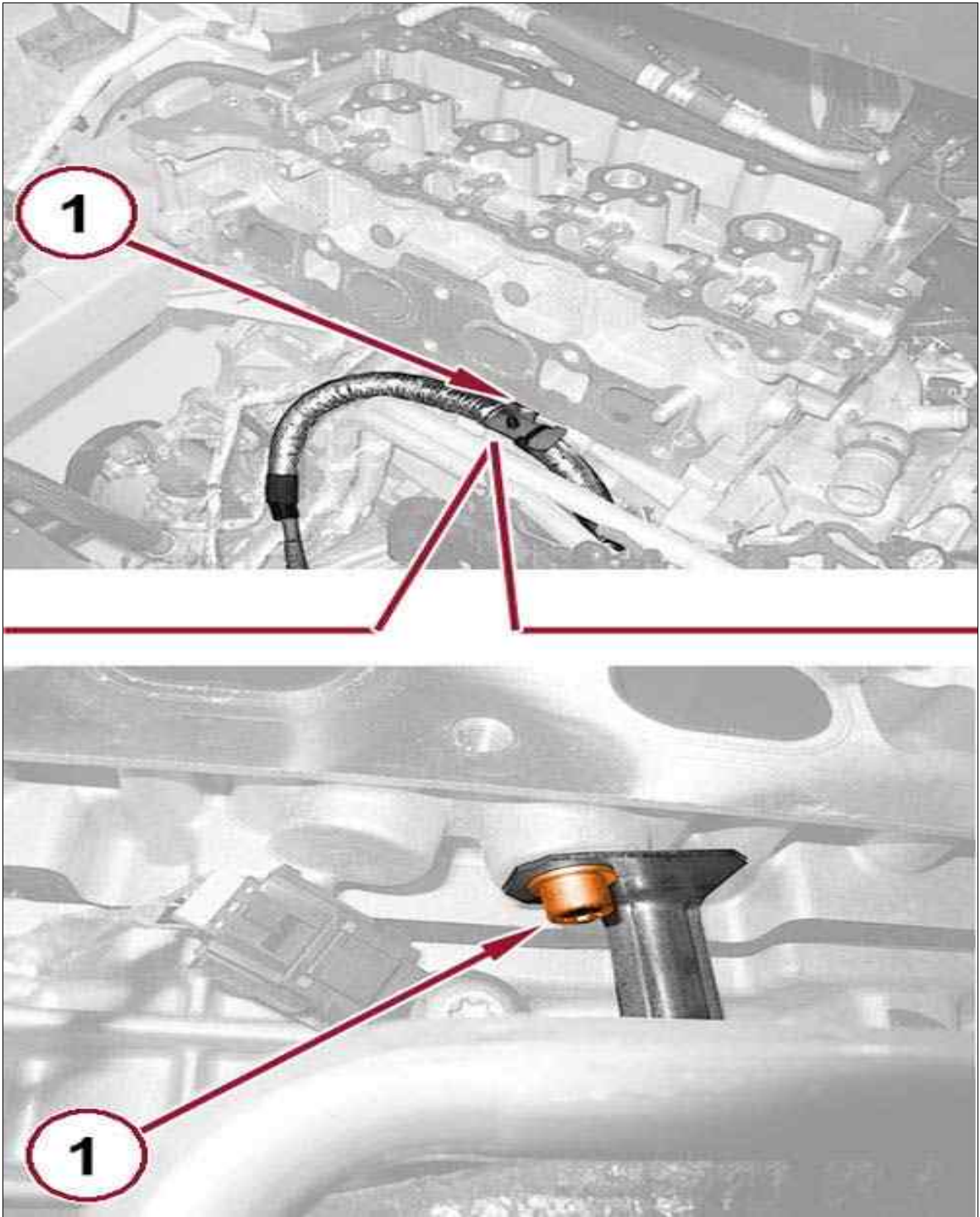
Fig 5: Alternator Wire Harness Connector, Bolts, Cap & Nut



Courtesy of CHRYSLER GROUP, LLC

5. Disengage cap (1), unscrew the nut (1) and disconnect the alternator wiring.
6. Disconnect the wire harness connector (2) from the alternator.

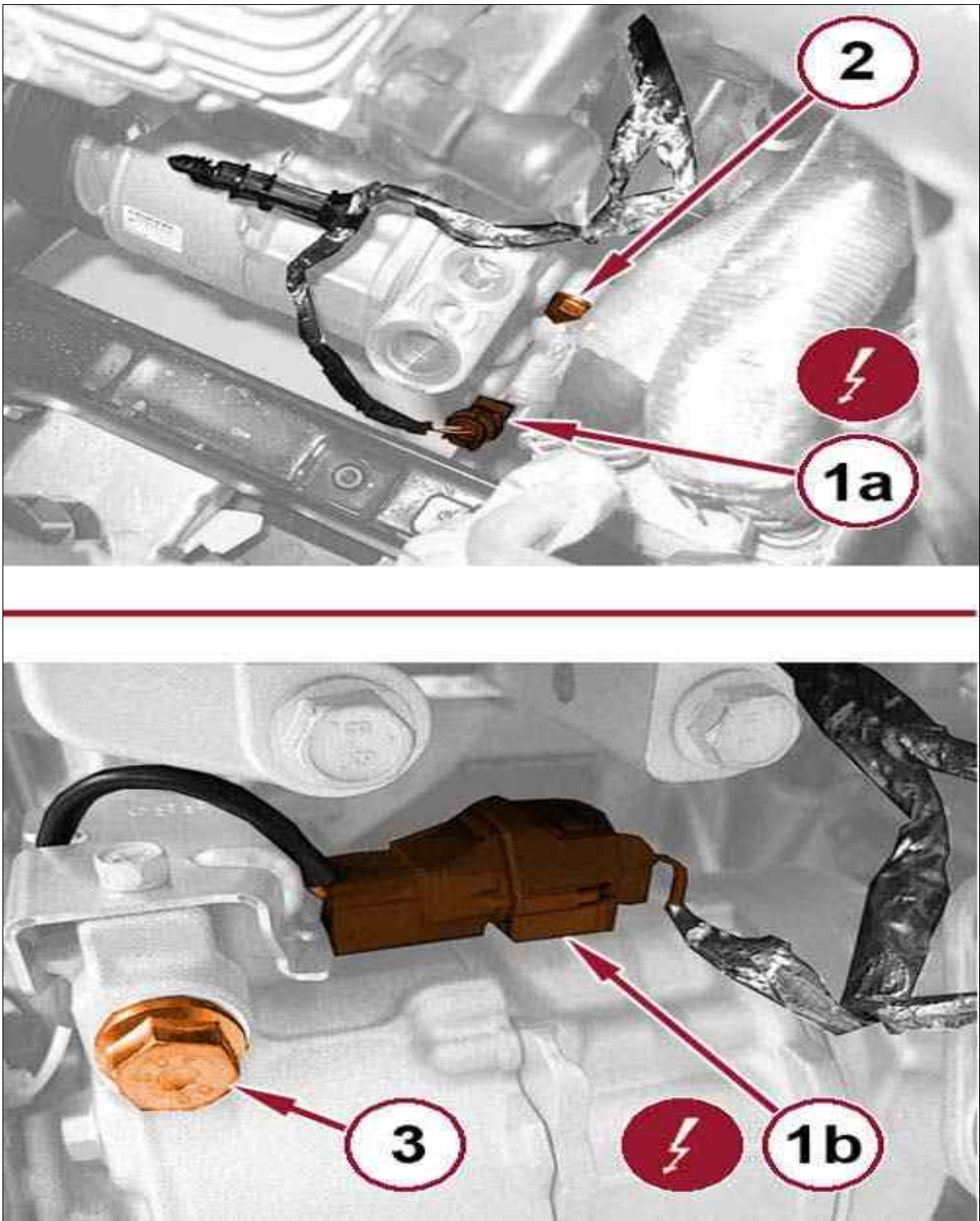
Fig 6: Wiring Retaining Bracket To Cylinder Head & Bolt



Courtesy of CHRYSLER GROUP, LLC

7. Remove the screw (1) from the wiring retaining bracket to the cylinder head.

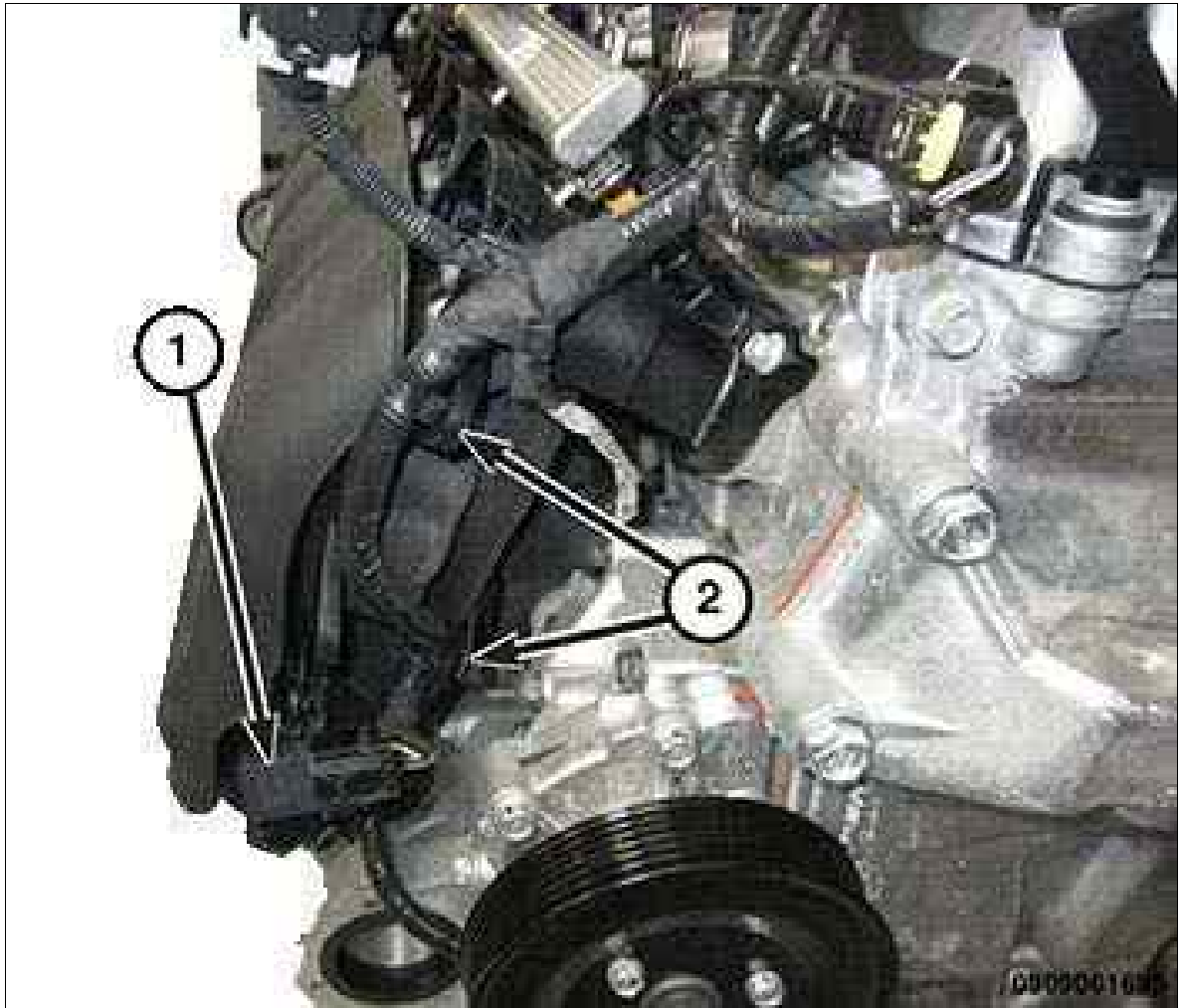
Fig 7: A/C Compressor Wire Harness Connectors



Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the wire harness connectors (1a and 1b) from the A/C compressor.

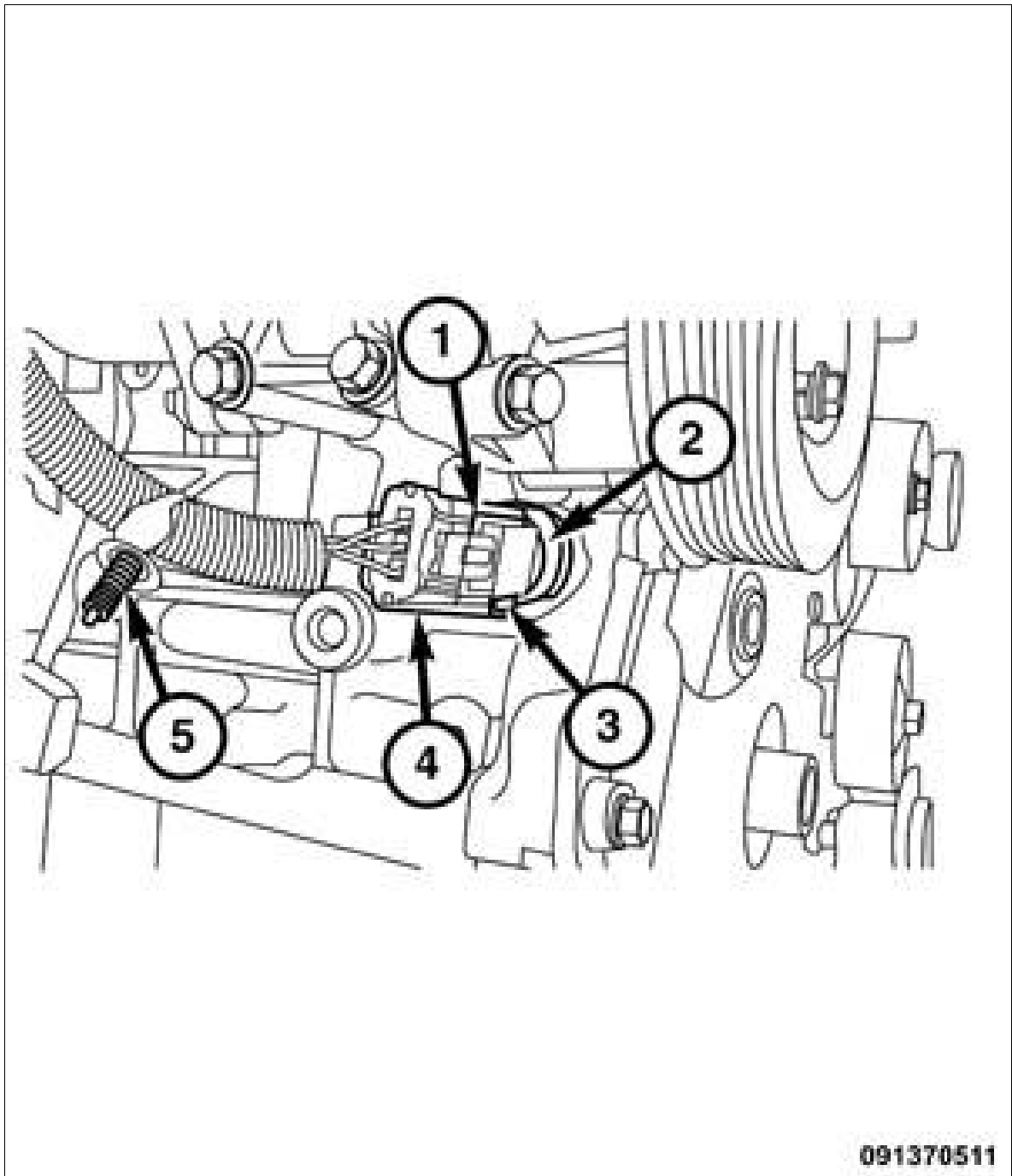
Fig 8: Manifold Air Pressure (MAP) Sensor



Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the manifold air pressure sensor electrical connection (1) and disengage the retaining clips (2).

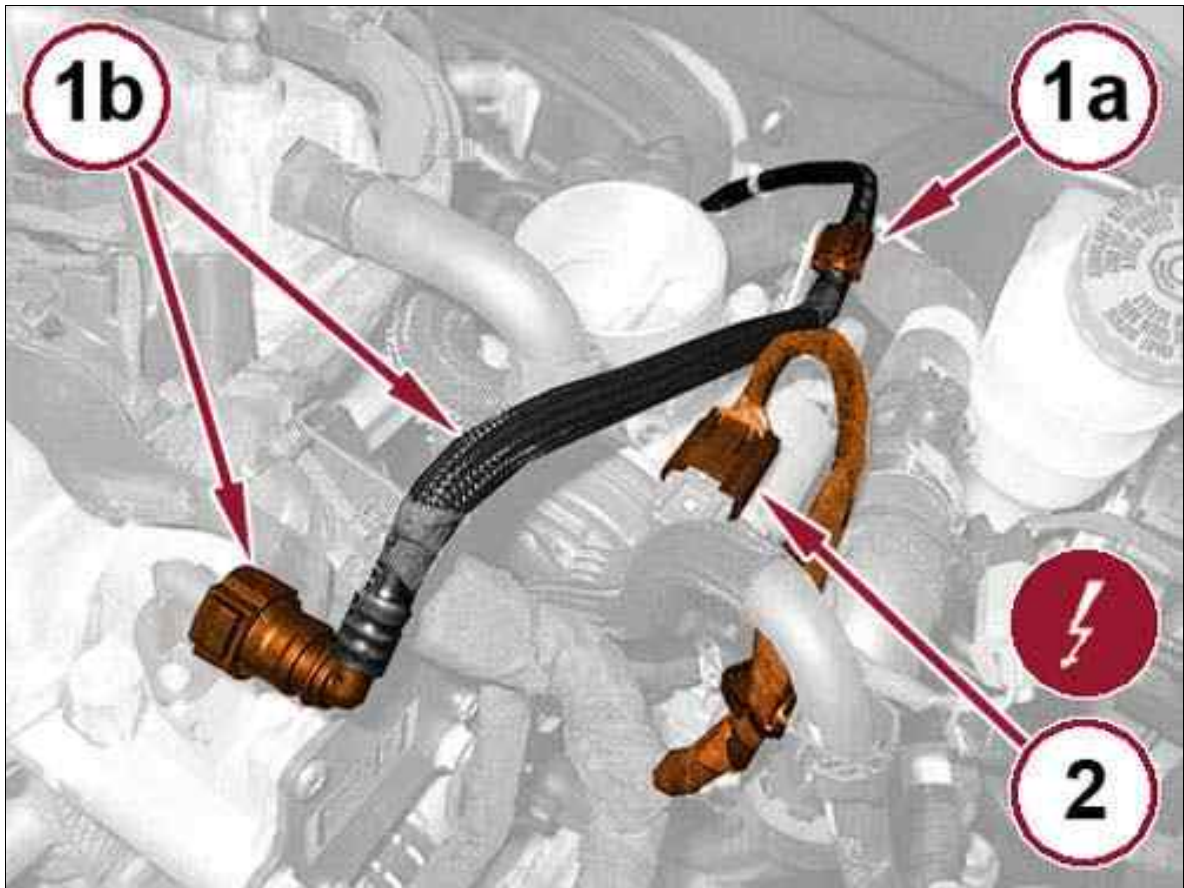
Fig 9: Oil Temperature Sensor & Connector



Courtesy of CHRYSLER GROUP, LLC

10. Unlock and disconnect the engine oil pressure sensor wire harness connector (4).

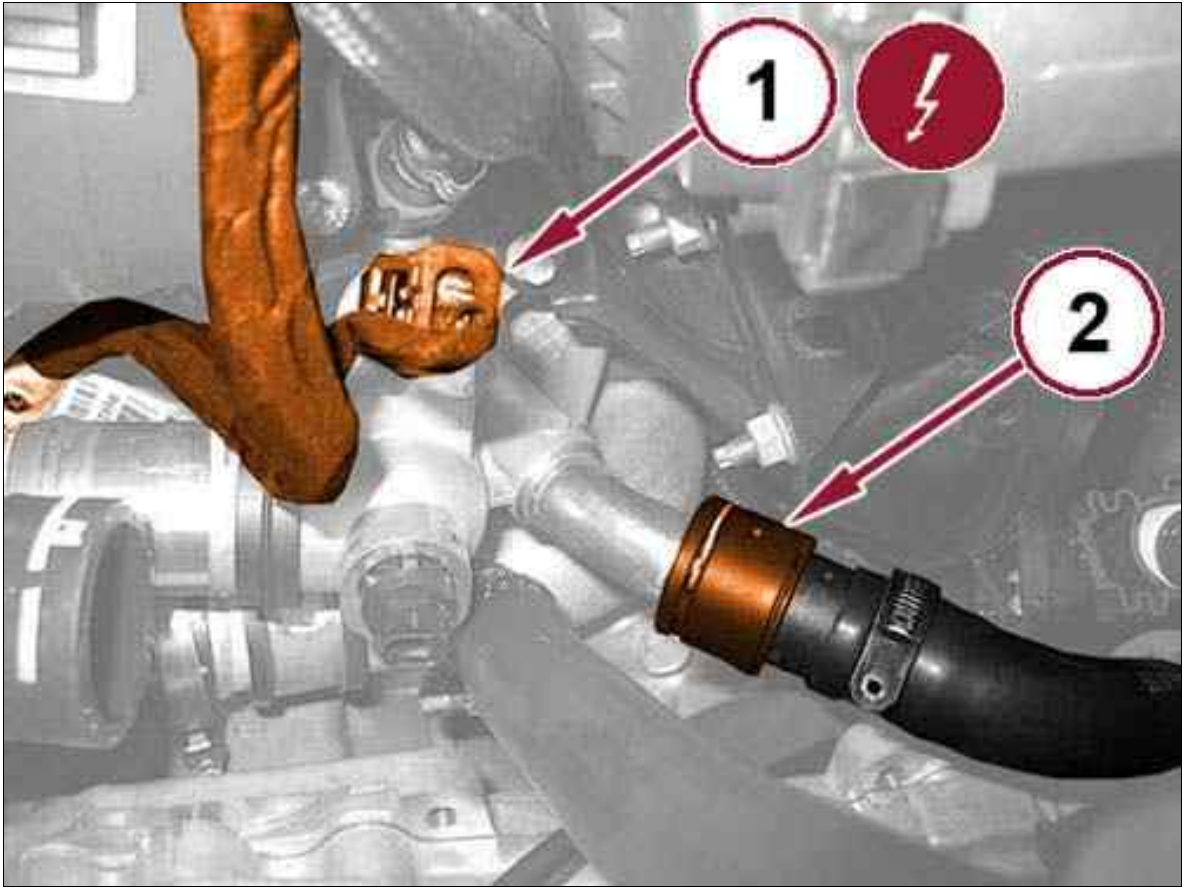
Fig 10: Throttle Body Electrical Connection



Courtesy of CHRYSLER GROUP, LLC

11. Disconnect the electrical connection of the throttle body (2).

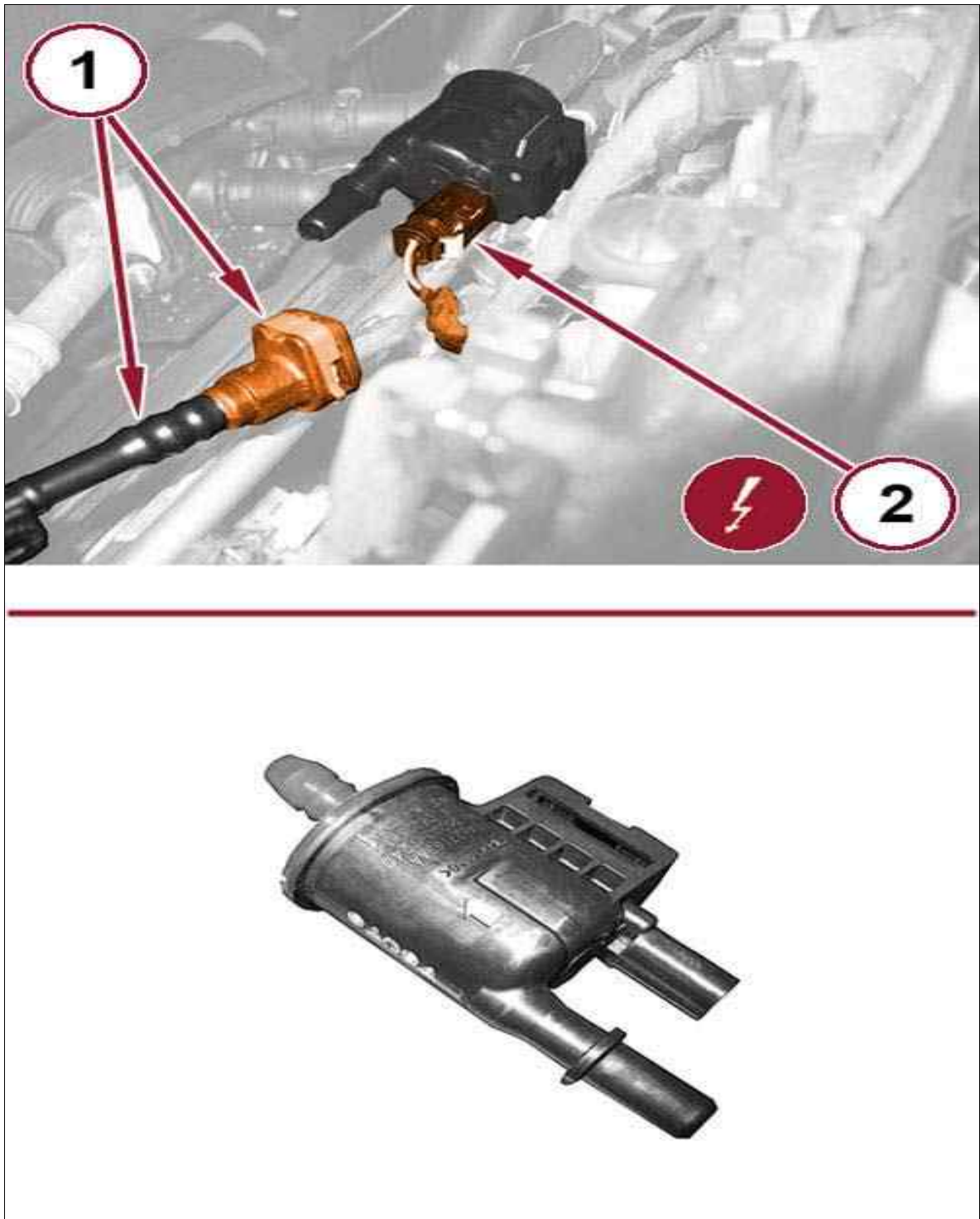
Fig 11: Engine Coolant Temperature (ECT) Sensor Wire Harness Connector & Coolant Hose Quick-Connect Coupling



Courtesy of CHRYSLER GROUP, LLC

12. Disconnect the Engine Coolant Temperature (ECT) sensor wire harness connector (1).

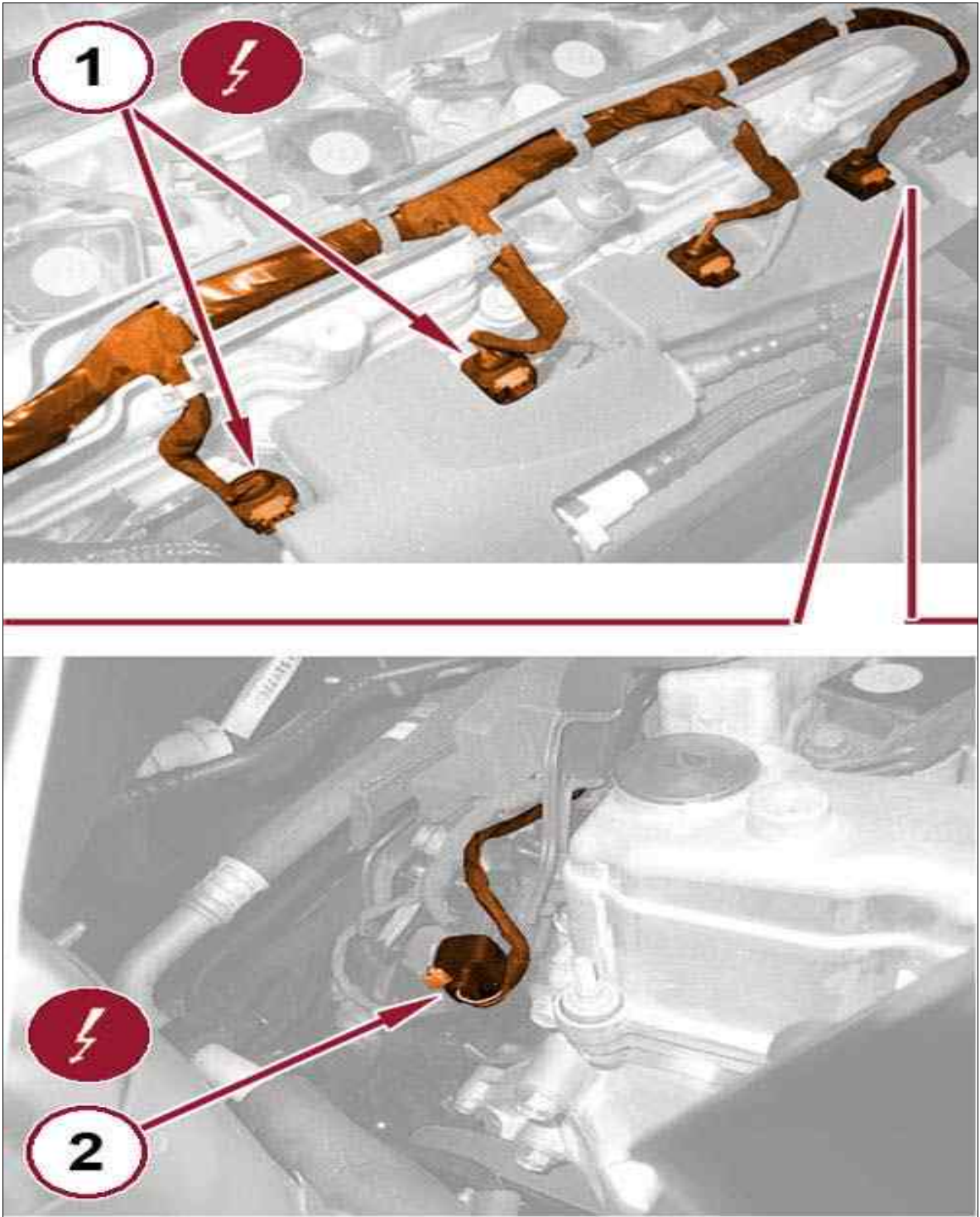
Fig 12: Fuel Vapors Solenoid Wire Harness Connector & Fuel Vapors Solenoid



Courtesy of CHRYSLER GROUP, LLC

13. Disconnect the fuel vapors solenoid wire harness connector (2) and remove fuel vapors solenoid.

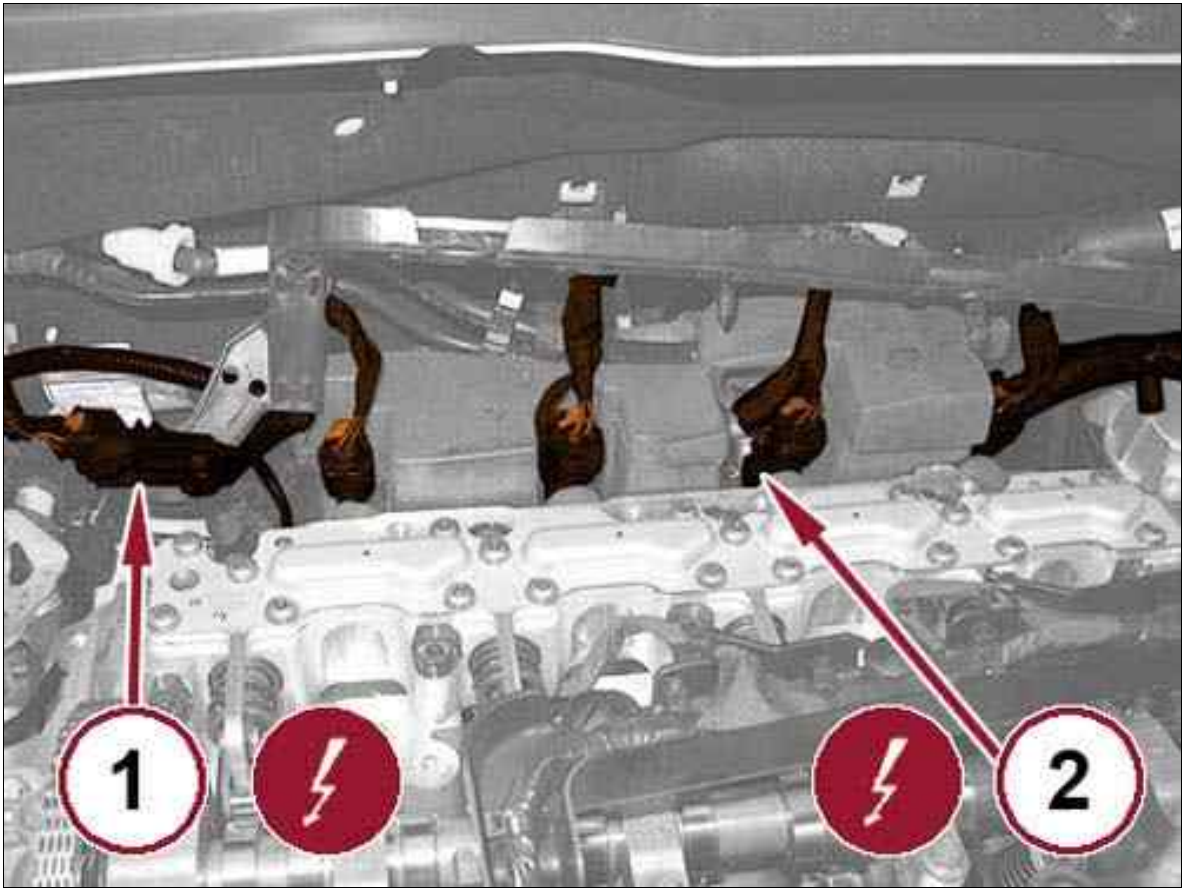
Fig 13: Fuel Injectors & Wire Harness Connectors



Courtesy of CHRYSLER GROUP, LLC

14. Disconnect the wire harness connectors (1) of the fuel injectors (2).

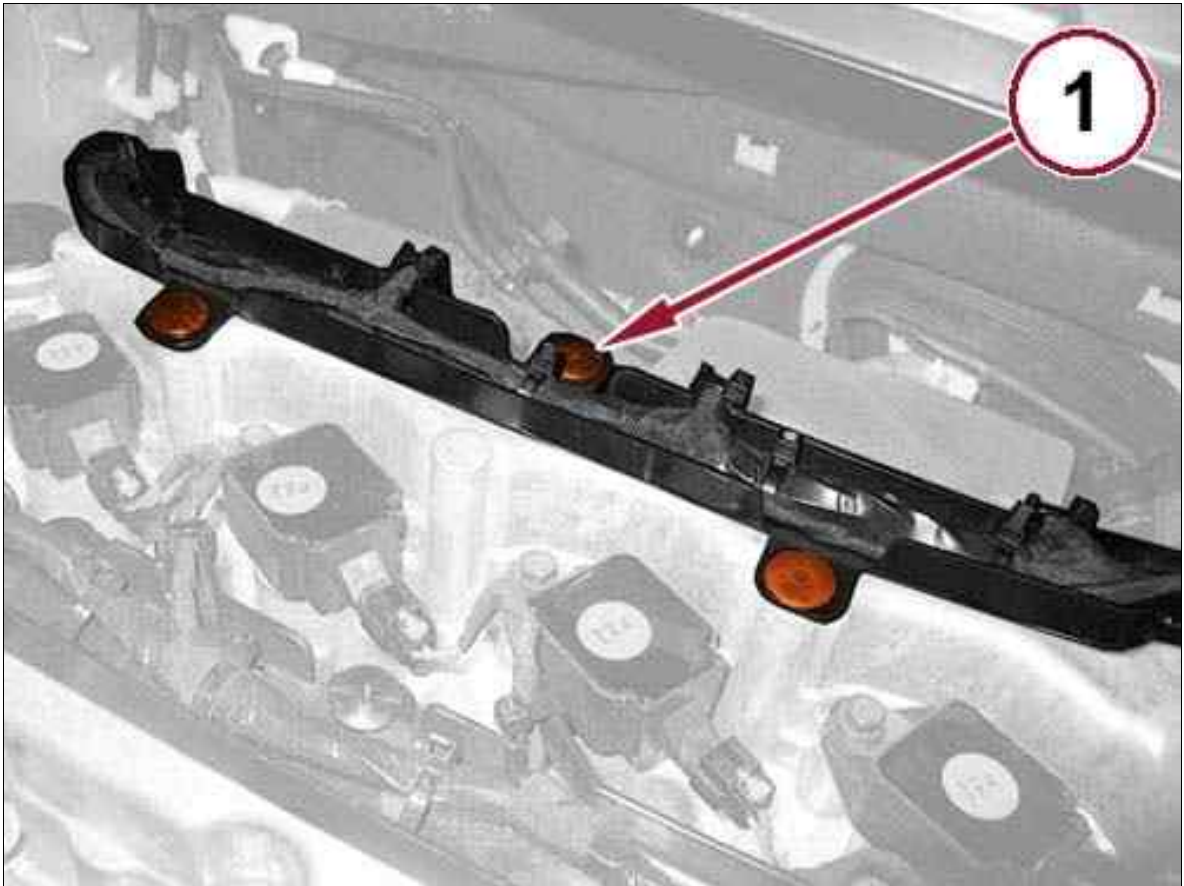
Fig 14: Oil Temperature Electrical Connector & MULTIAIR Actuator Electrical Connectors



Courtesy of CHRYSLER GROUP, LLC

15. Disconnect the oil temperature electrical connector (1) at the MULTIAIR actuator.
16. Disconnect the MULTIAIR actuator electrical connectors (2).

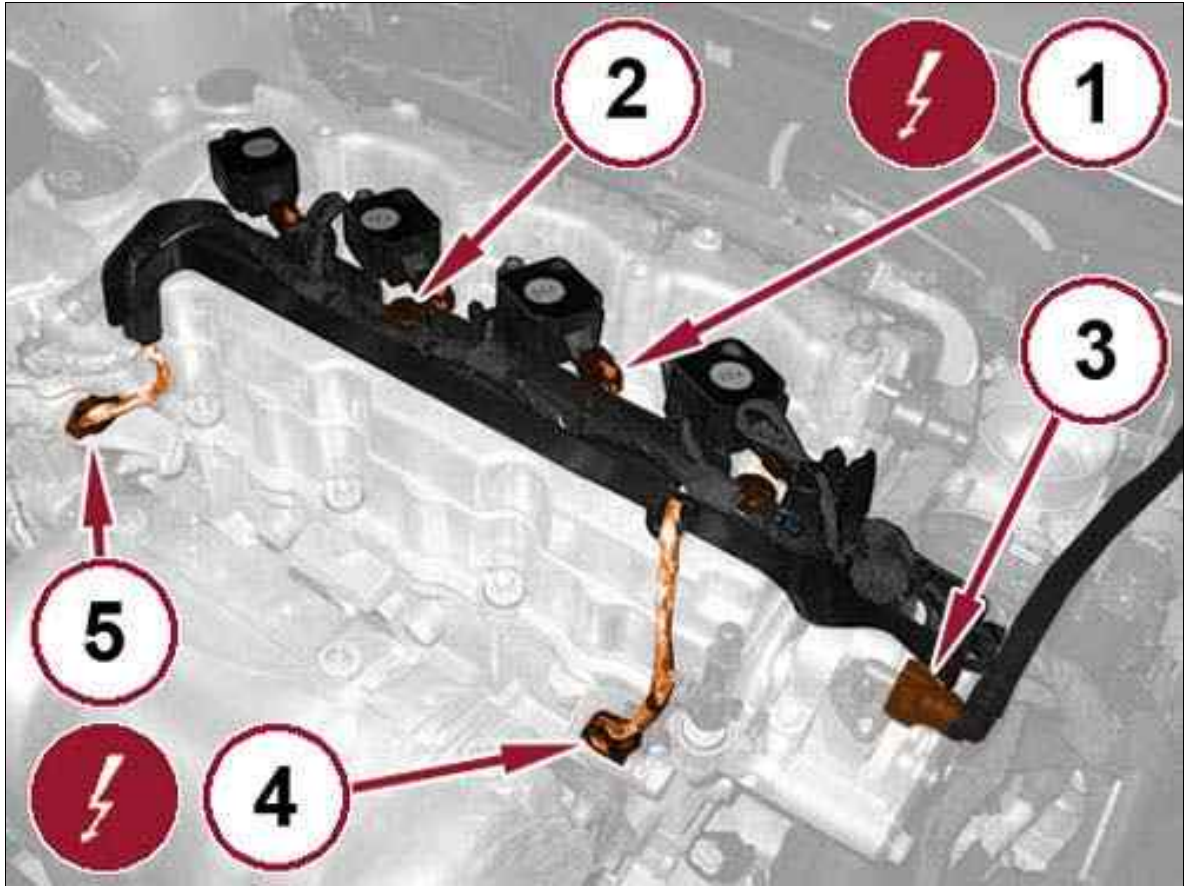
Fig 15: Wiring Duct On Intake Side & Bolts



Courtesy of CHRYSLER GROUP, LLC

17. Remove the screws (1) securing the wiring duct on the intake side.

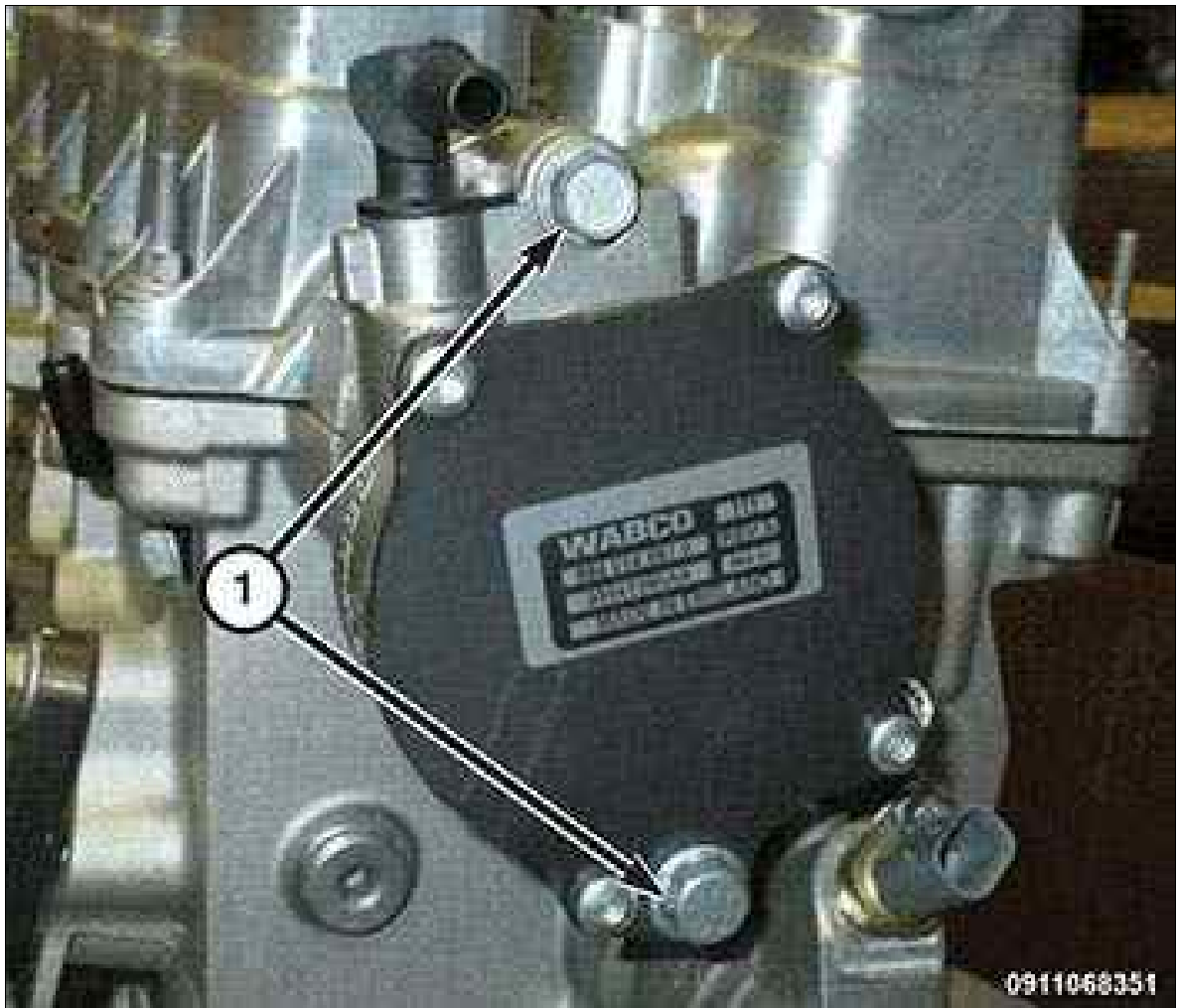
Fig 16: Ignition Coils Wire Harness Connectors, Wiring Duct On Exhaust Side Bolts & Ground Terminal



Courtesy of CHRYSLER GROUP, LLC

18. Disconnect the wire harness connectors (1) from the ignition coils.
19. Remove the screws (2) securing the wiring duct on the exhaust side.
20. Disconnect the ground terminal (5).
21. Remove the wire harness from the engine.

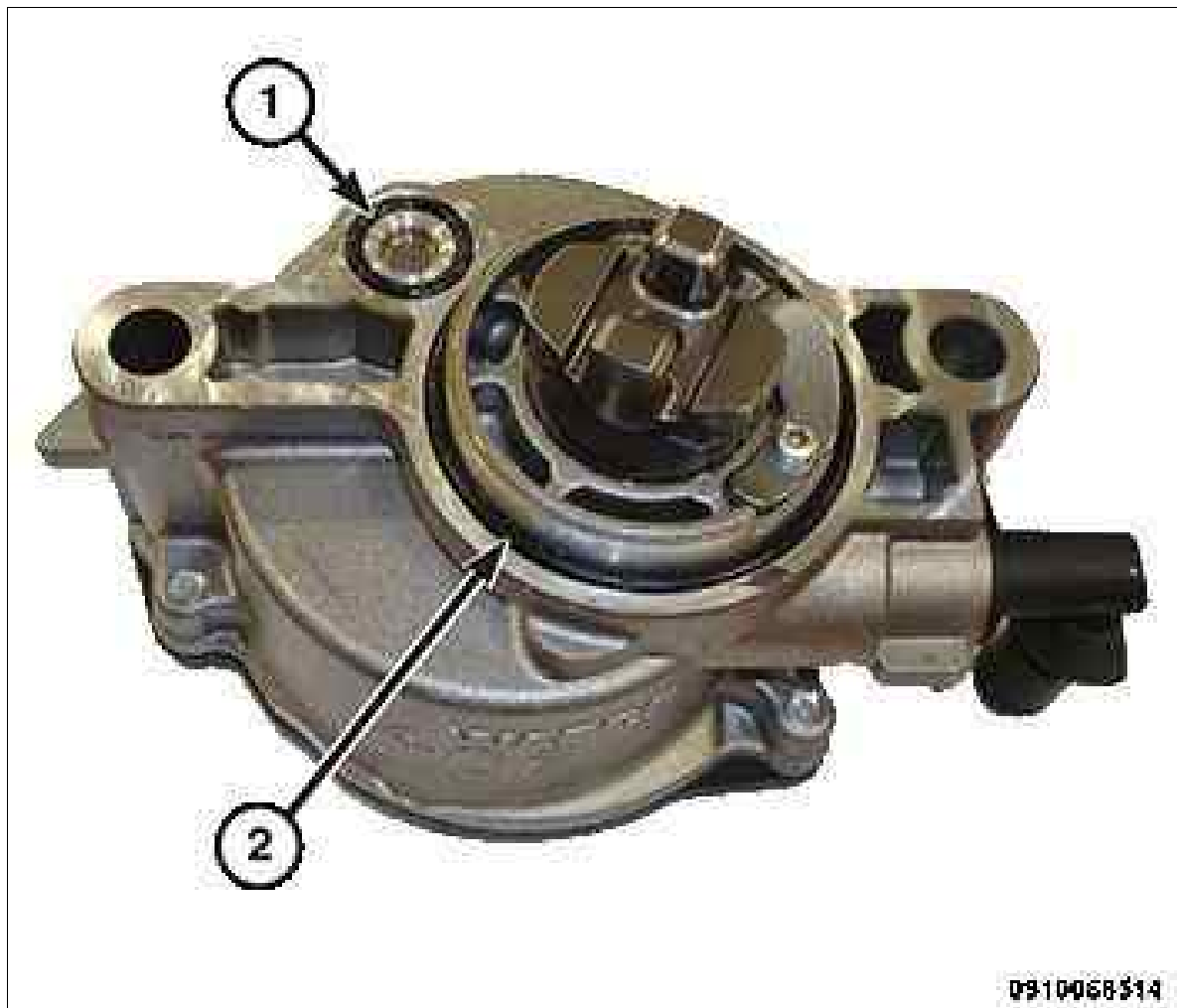
Fig 17: Vacuum Pump Mounting Bolts



Courtesy of CHRYSLER GROUP, LLC

22. Remove the vacuum pump mounting bolts (1) and the vacuum pump.

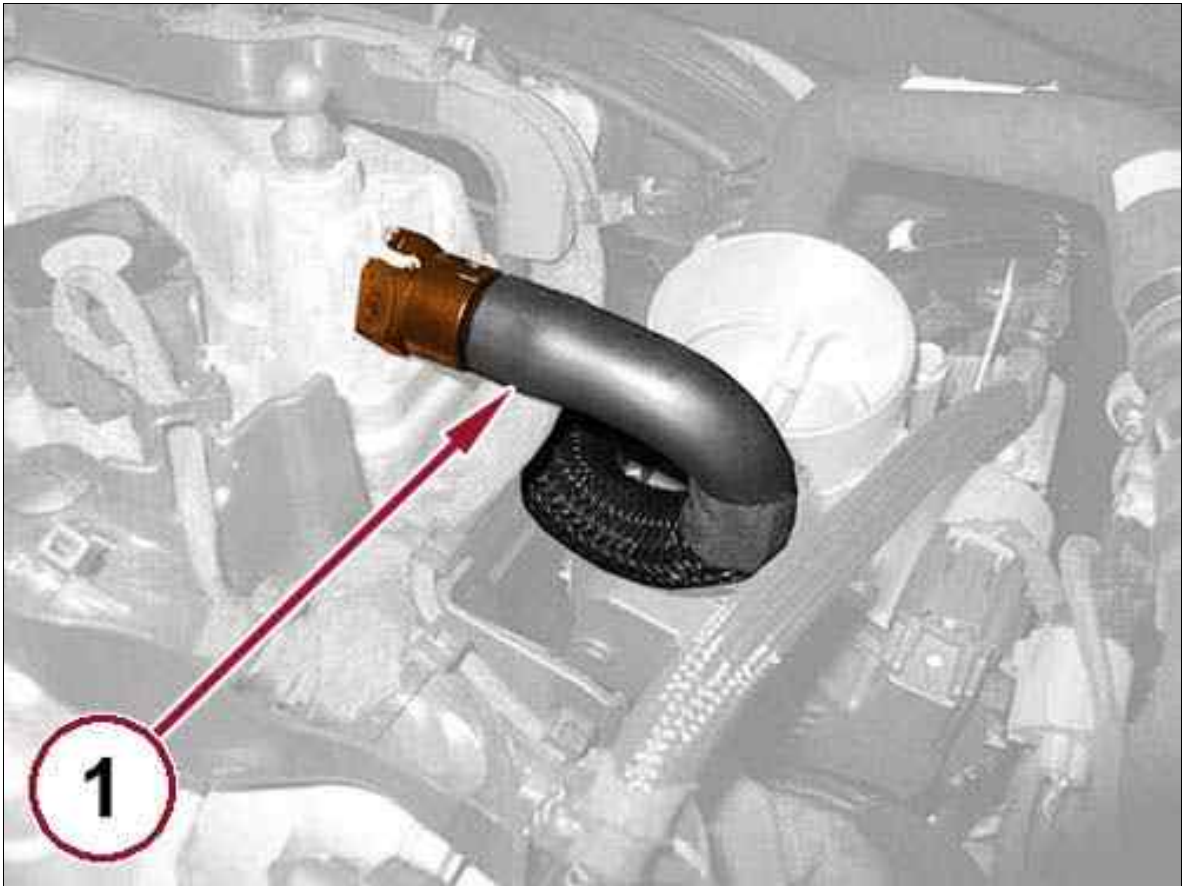
Fig 18: Vacuum Pump O-Ring Seals



Courtesy of CHRYSLER GROUP, LLC

23. Remove and discard the vacuum pump O-ring seals (1, 2).

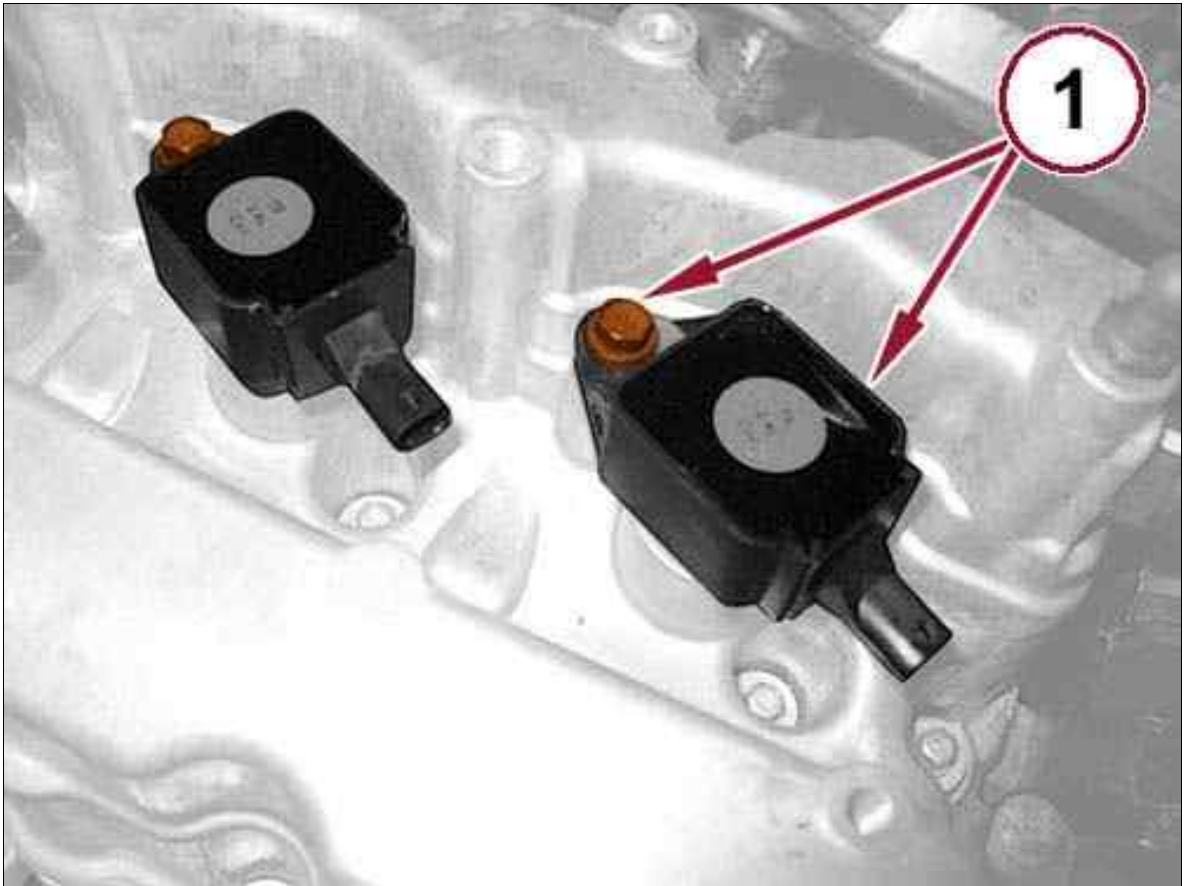
Fig 19: Oil Vapor To Air Capacity Airbox Pipe



Courtesy of CHRYSLER GROUP, LLC

24. Disconnect the pipe (1) that delivers oil vapor to the air capacity airbox.

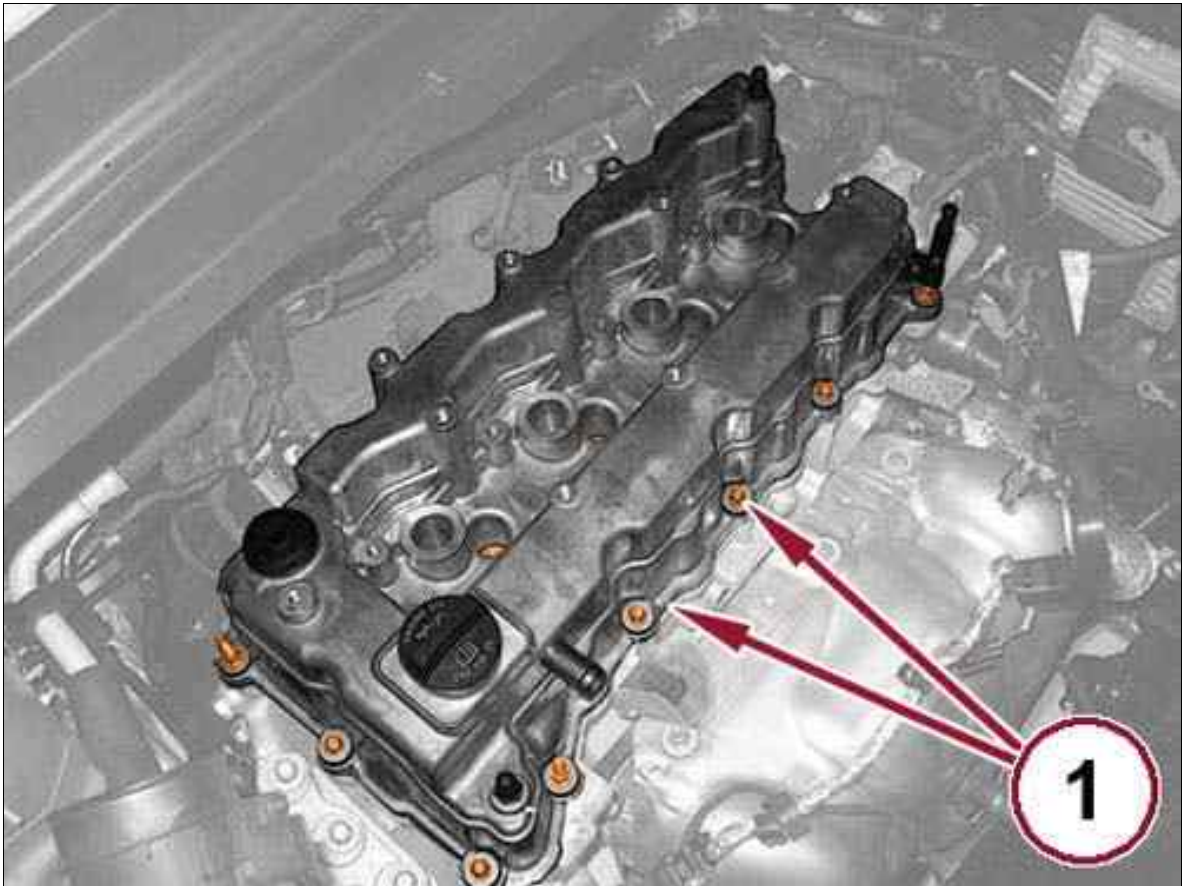
Fig 20: Ignition Coils & Bolts



Courtesy of CHRYSLER GROUP, LLC

25. Remove the screws (1) and remove the ignition coils.

Fig 21: Valve Cover Bolts



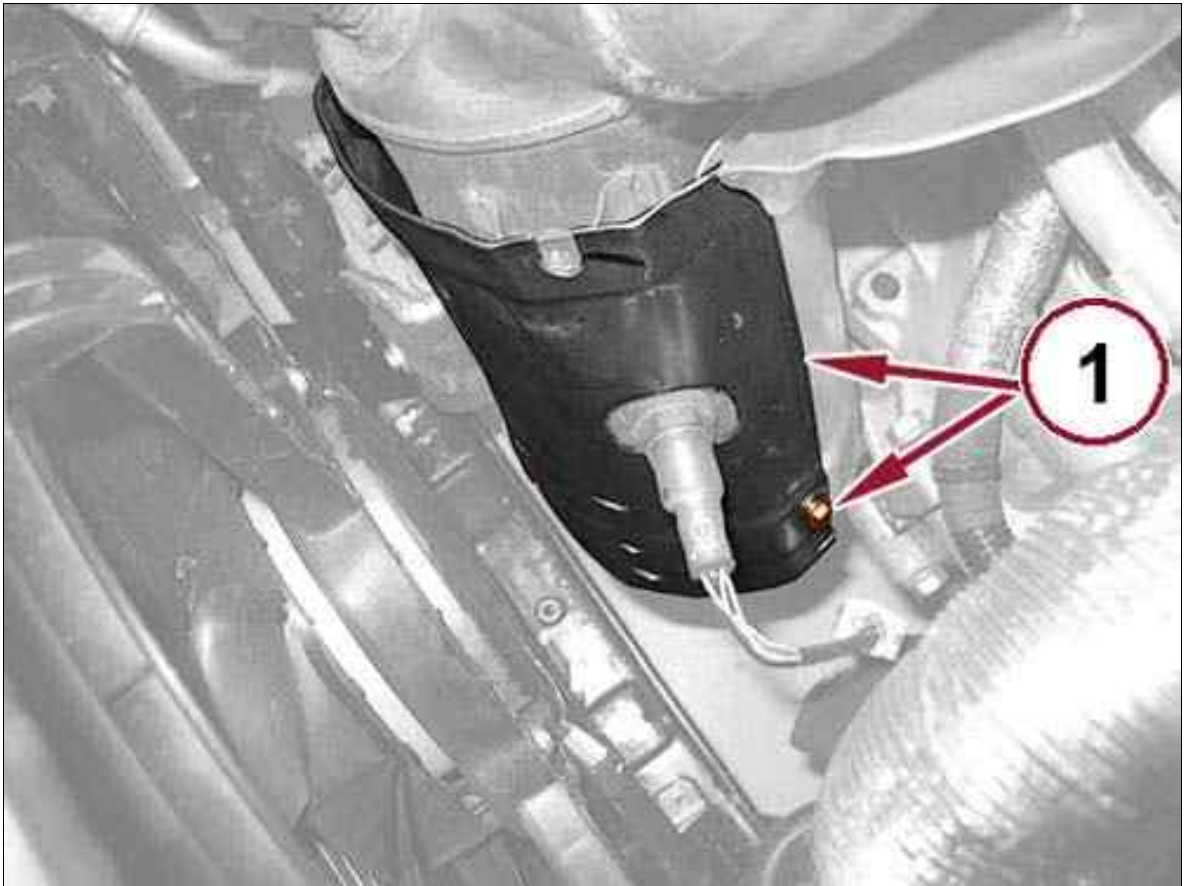
Courtesy of CHRYSLER GROUP, LLC

26. Remove the screws (1) and remove the valve cover and discard the valve cover gasket.

 NOTE:

Before removing the valve cover, mark the position of the studded screws for ease of installation.

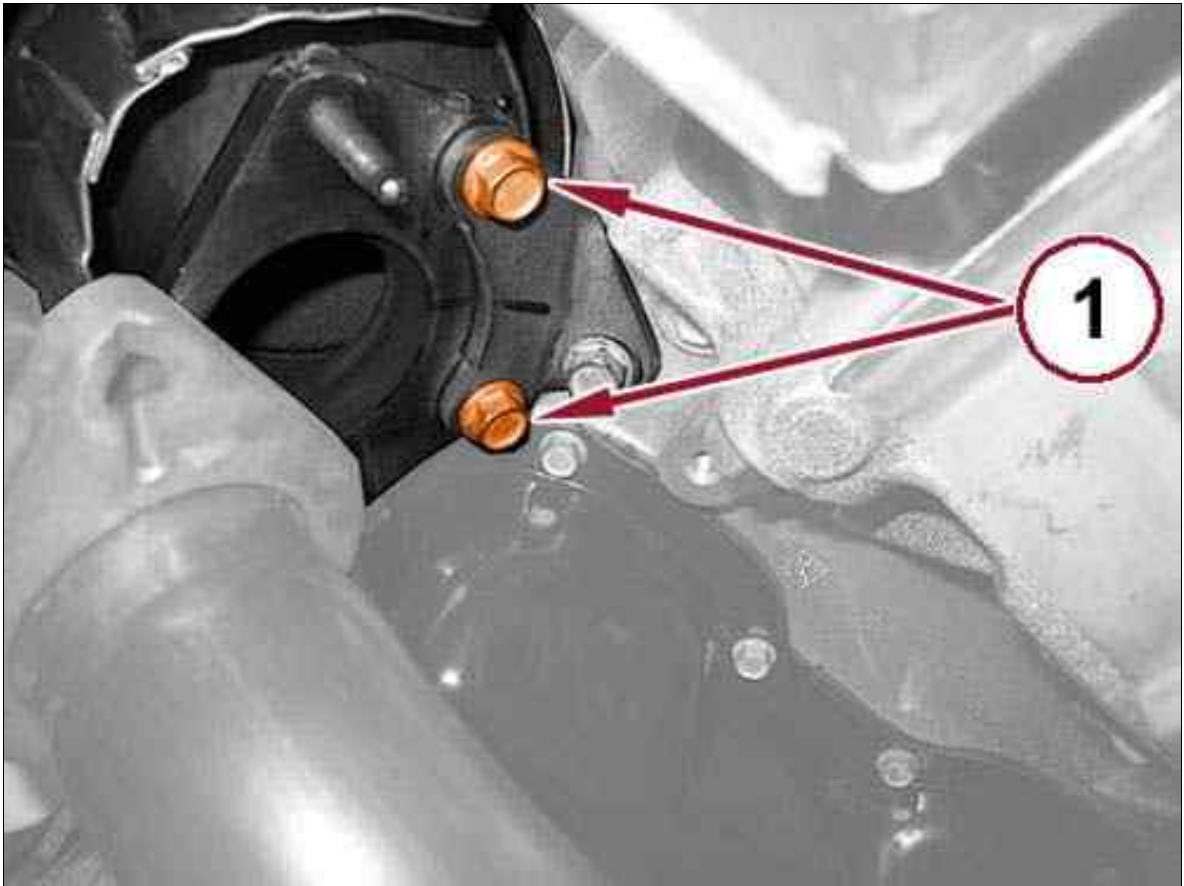
Fig 22: Lower Heat Shield & Bolts



Courtesy of CHRYSLER GROUP, LLC

27. Remove the bolts (1) and the lower heat shield.

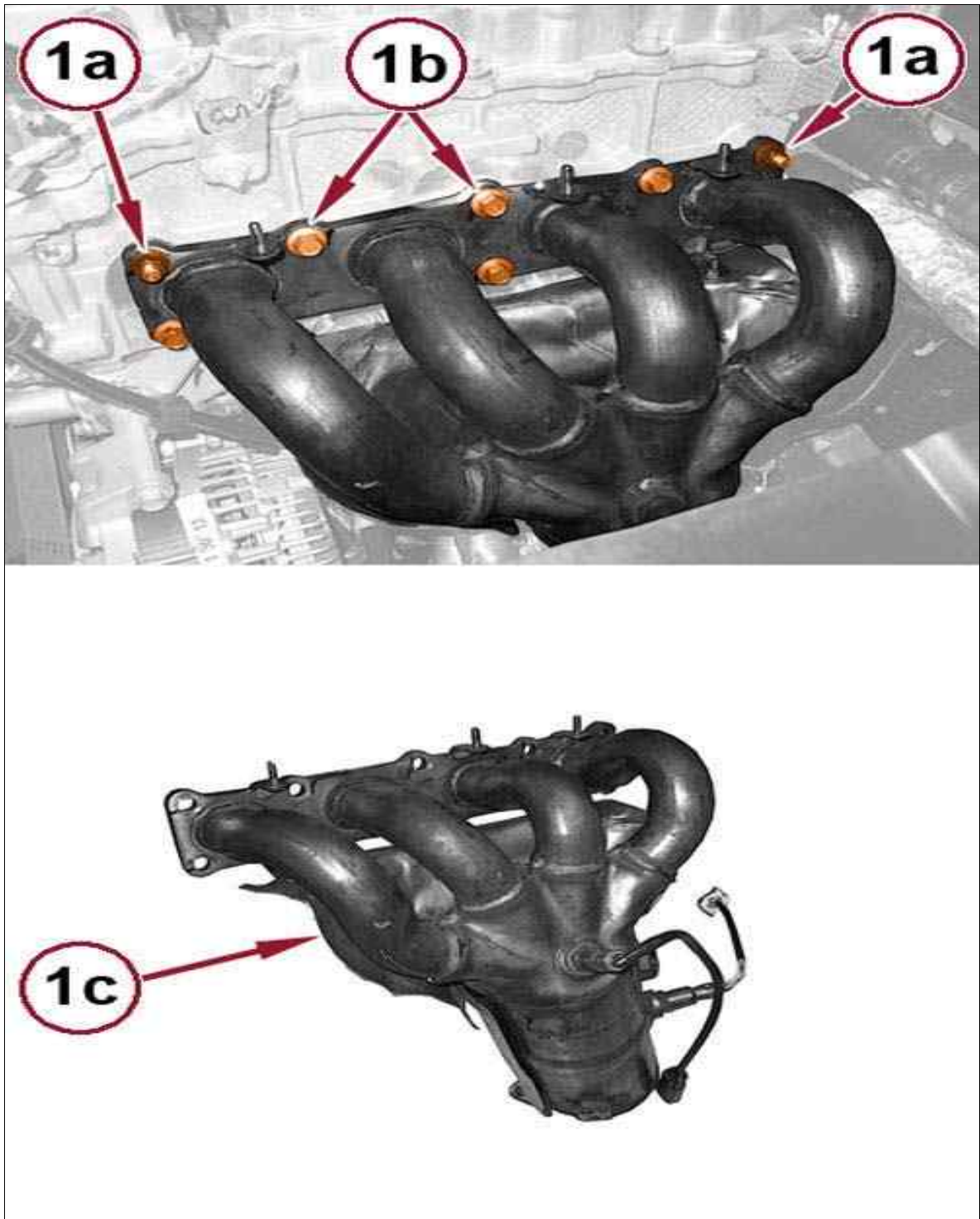
Fig 23: Catalytic Converter Support Bracket Bolts



Courtesy of CHRYSLER GROUP, LLC

28. Remove the bolts (1) and the catalytic converter support bracket.

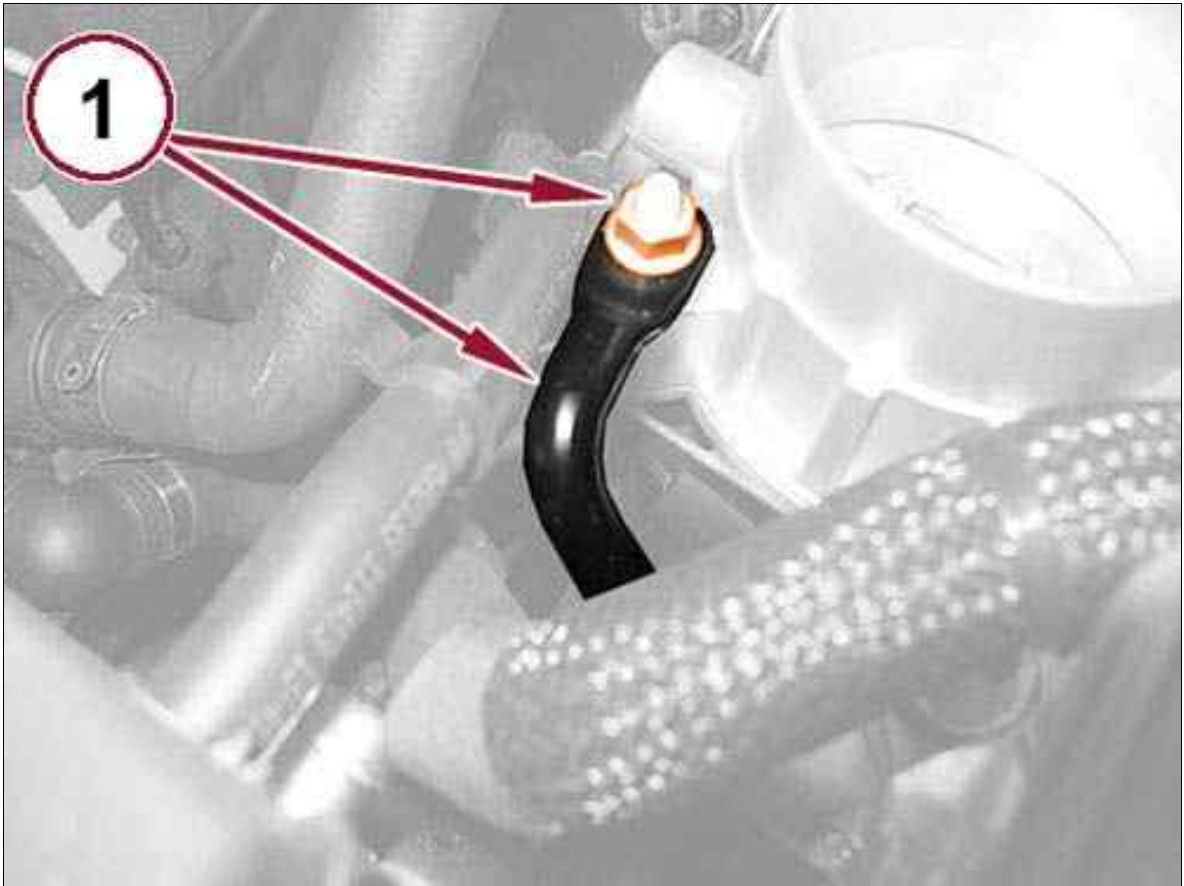
Fig 24: Exhaust Manifold Catalyst, Nuts & Bolts



Courtesy of CHRYSLER GROUP, LLC

29. Remove the nuts (1a) and the bolts (1b) and the exhaust manifold catalyst (1c).
30. Remove and discard the manifold gasket.

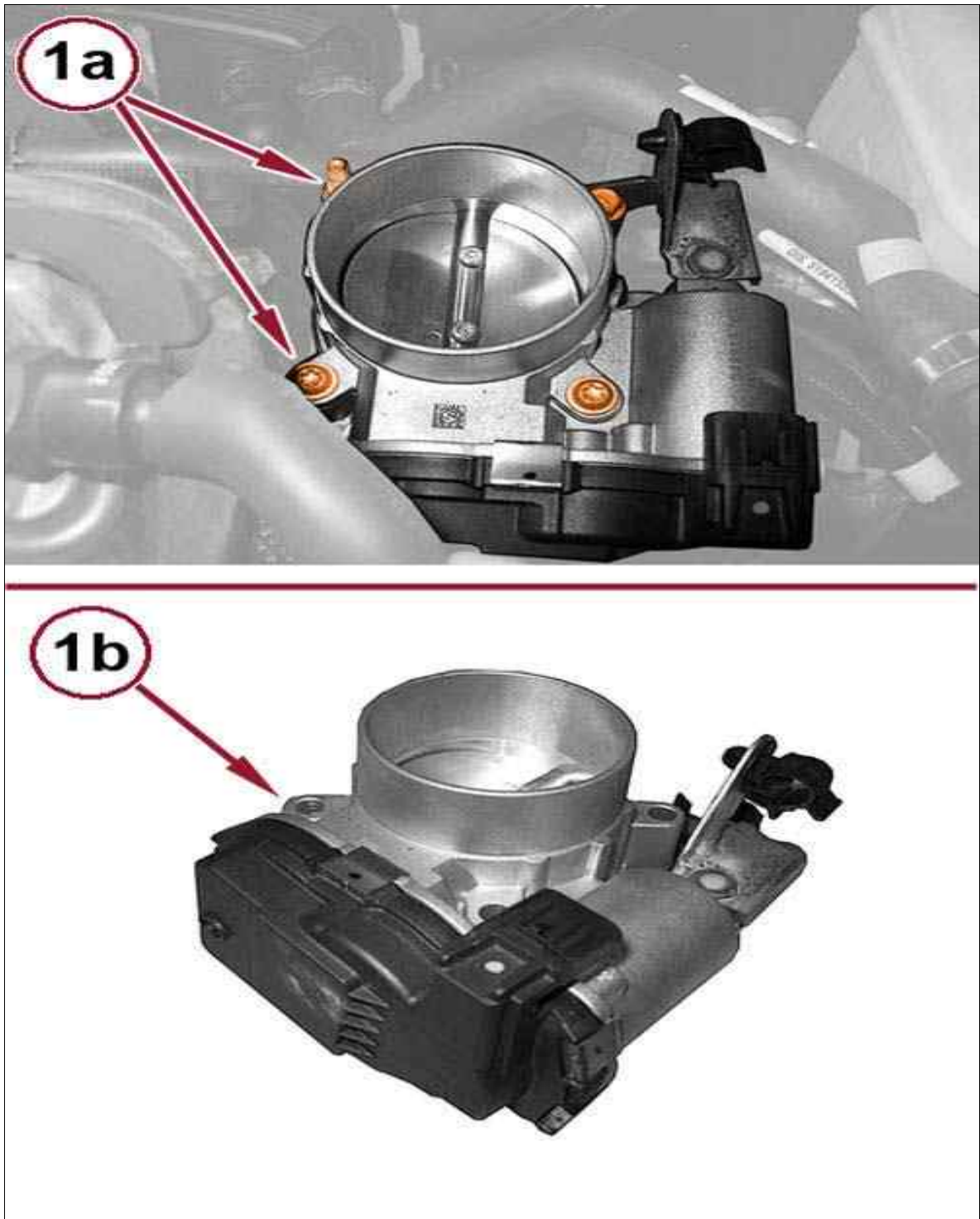
Fig 25: Reinforcement Bracket At Throttle Body & Fastener



Courtesy of CHRYSLER GROUP, LLC

31. Remove the fastener and the reinforcement bracket from the throttle body (1).

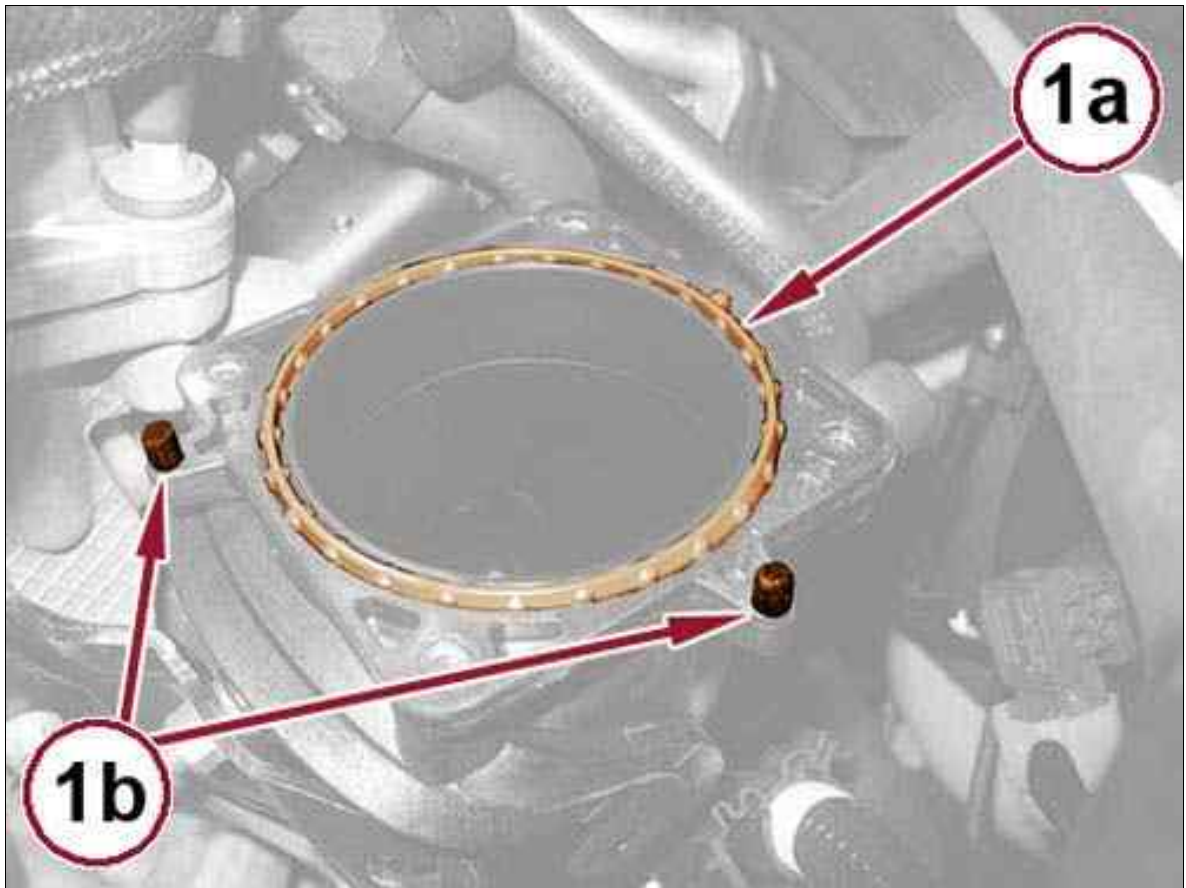
Fig 26: Throttle Body & Fasteners



Courtesy of CHRYSLER GROUP, LLC

32. Remove the fasteners (1a) and remove the throttle body (1b).

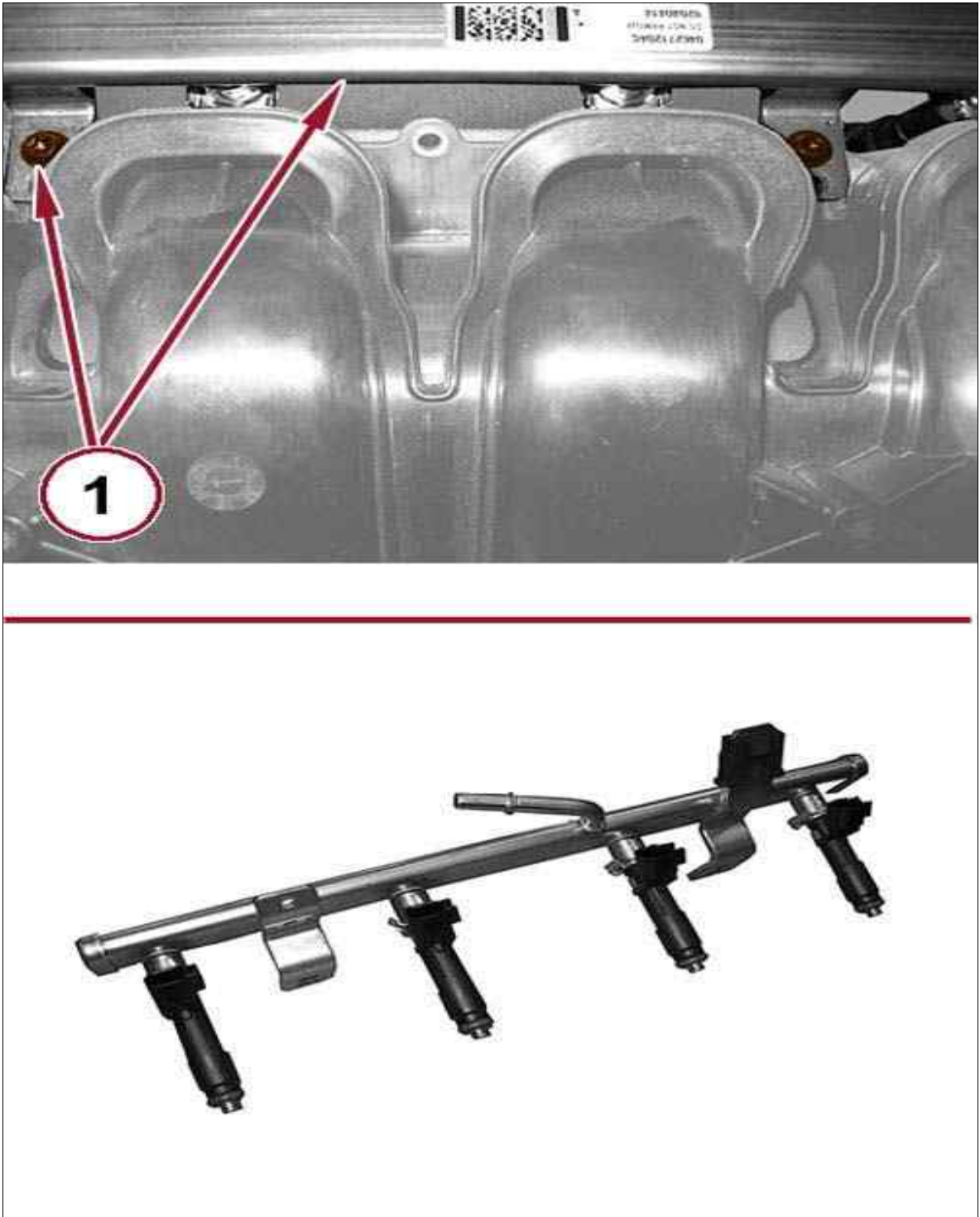
Fig 27: Centering Pins & Gasket



Courtesy of CHRYSLER GROUP, LLC

33. Remove the gasket (1a) and verify the integrity of the centering pins (1b).

Fig 28: Fuel Injectors & Fuel Rail



Courtesy of CHRYSLER GROUP, LLC

34. Remove the fuel rail (1) and fuel injectors. Refer to INJECTOR(S), FUEL, REMOVAL AND INSTALLATION .

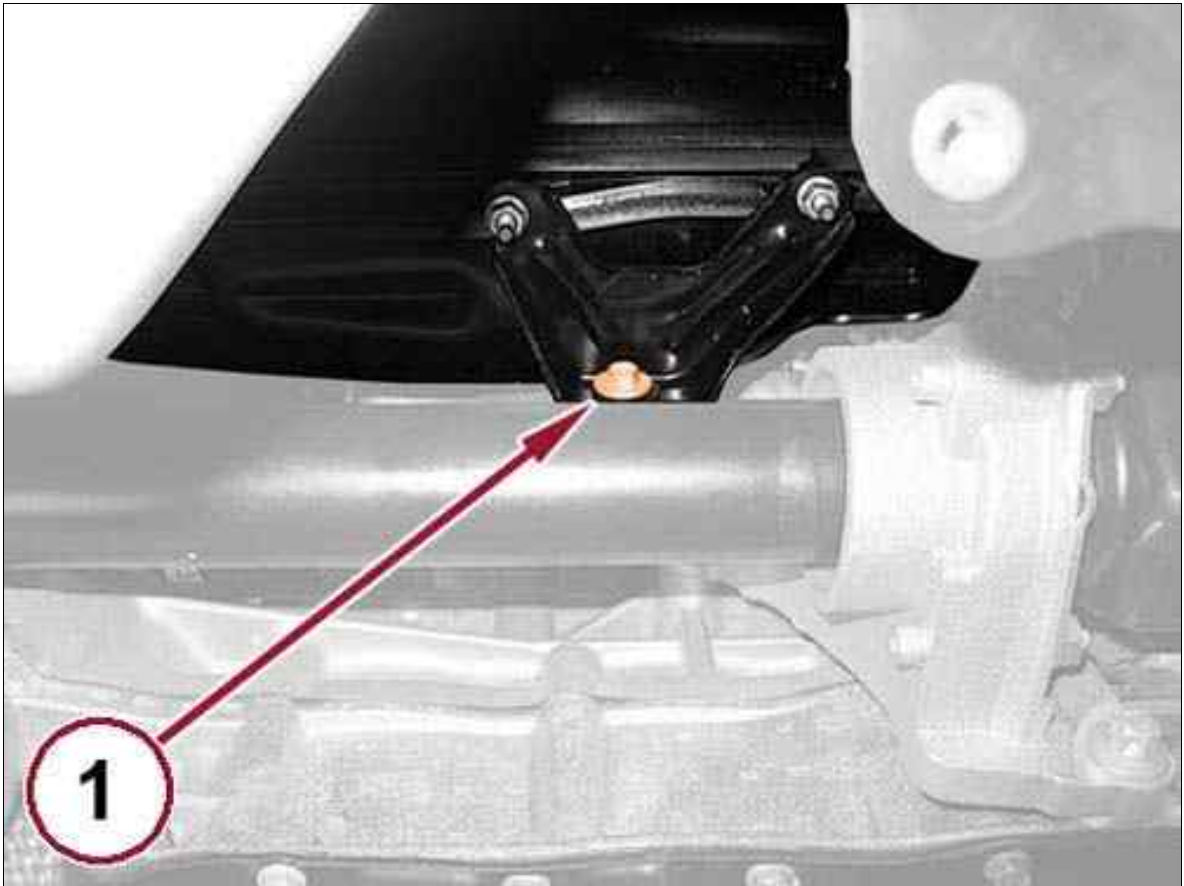
Fig 29: Intake Manifold Silencer Cover



Courtesy of CHRYSLER GROUP, LLC

35. Remove the four screws (1) and the intake manifold silencer cover.

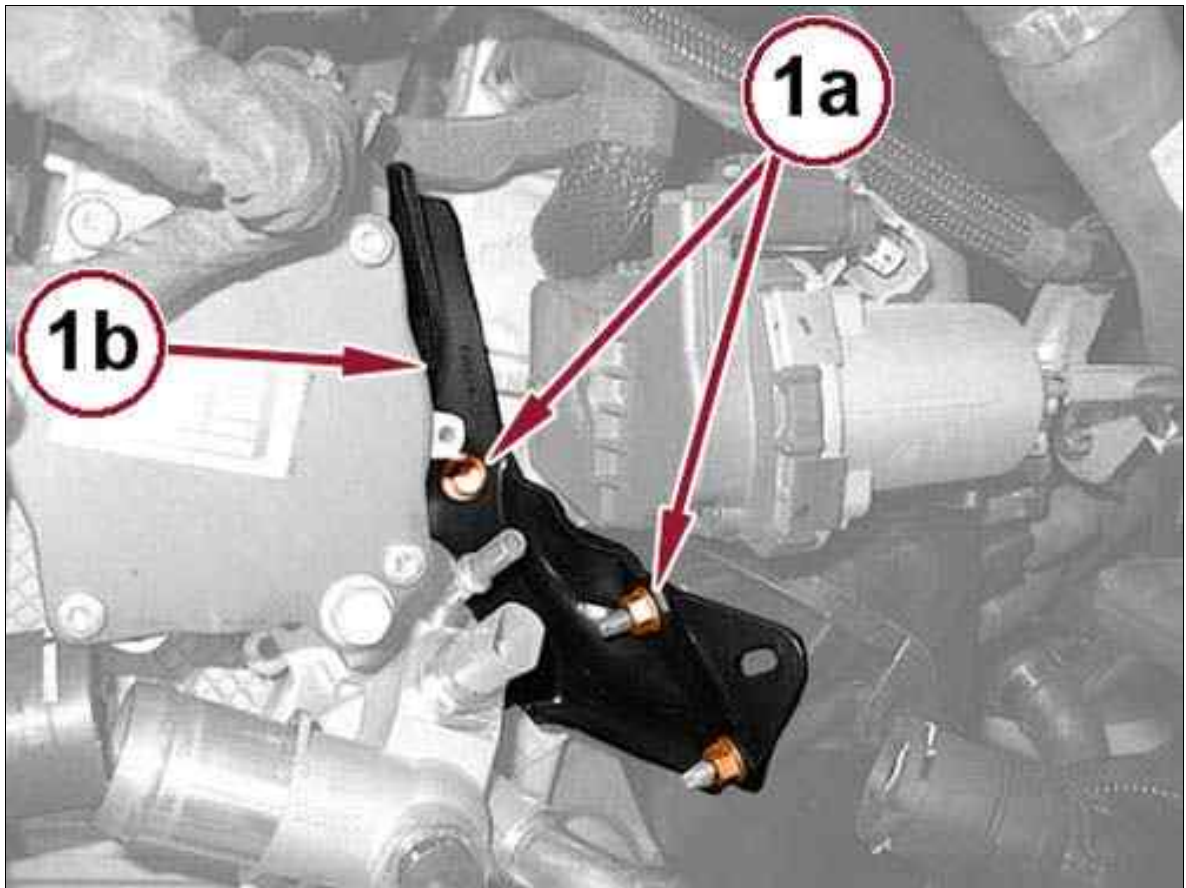
Fig 30: Intake Manifold Support Bracket & Bolt



Courtesy of CHRYSLER GROUP, LLC

36. Remove the bolt (1) securing the intake manifold support bracket.

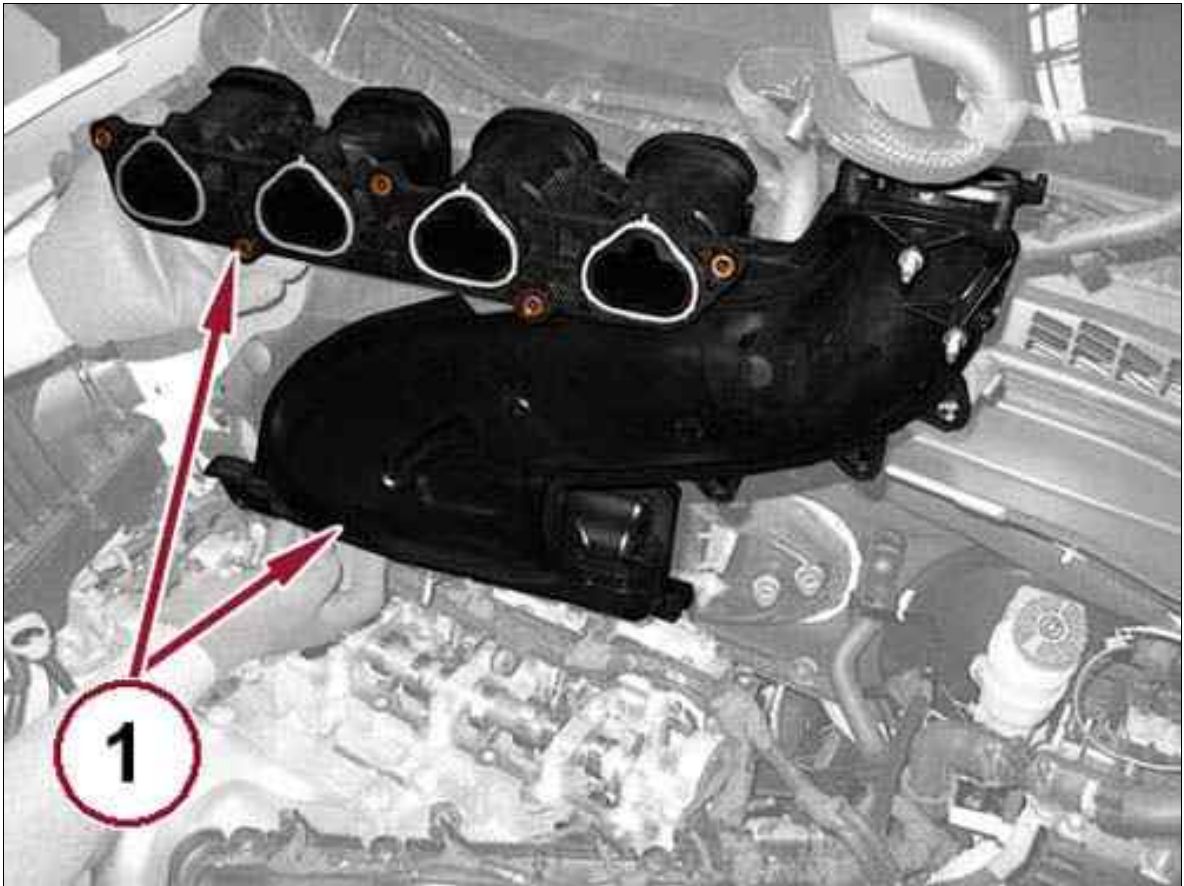
Fig 31: Vacuum Pump Support Bracket & Fasteners



Courtesy of CHRYSLER GROUP, LLC

37. Remove the fasteners (1a) and the vacuum pump support bracket (1b).

Fig 32: Intake Manifold & Fasteners

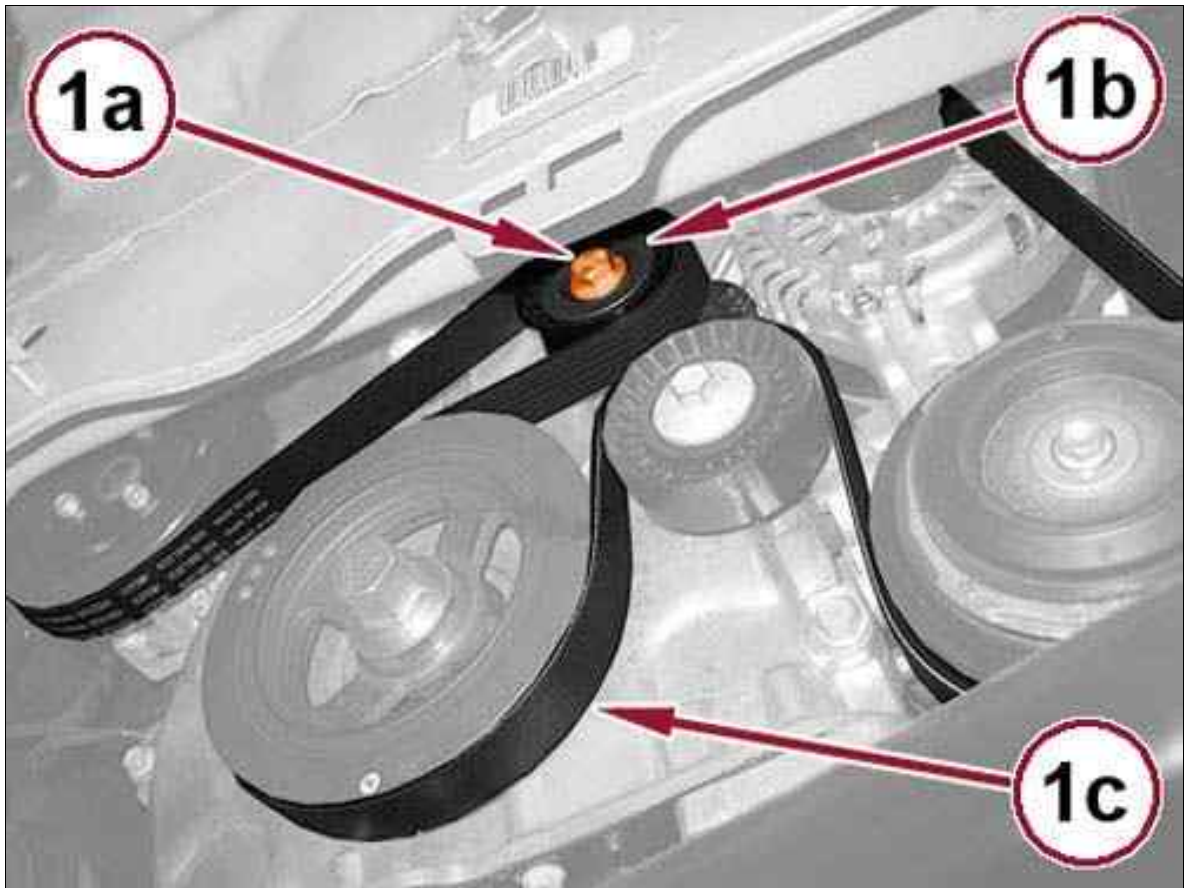


Courtesy of CHRYSLER GROUP, LLC

38. Remove the fasteners (1) and the intake manifold.

39. Remove and discard the gasket seals

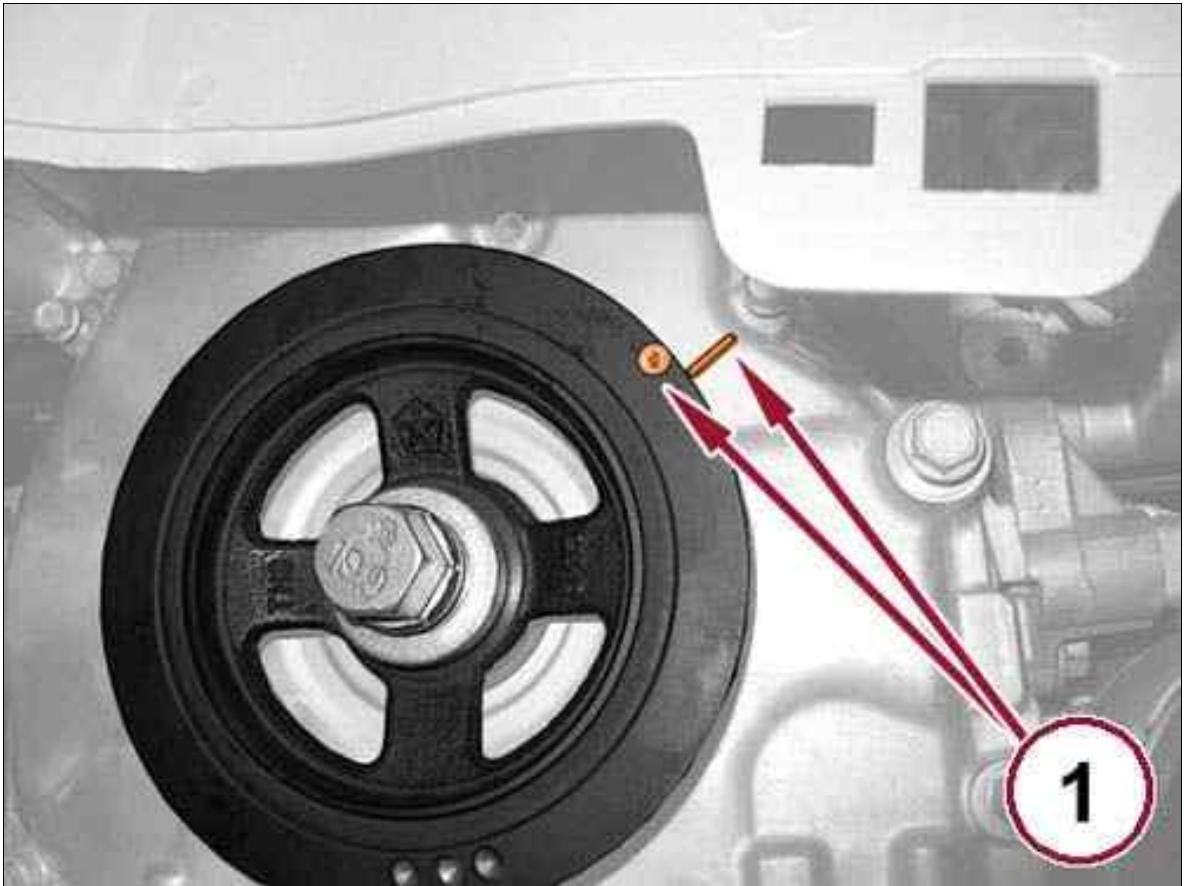
Fig 33: Belt Tensioner, Bolt & Serpentine Belt



Courtesy of CHRYSLER GROUP, LLC

40. Using a suitable removal tool, rotate belt tensioner (1b) to release the tension and remove the serpentine belt (1c).

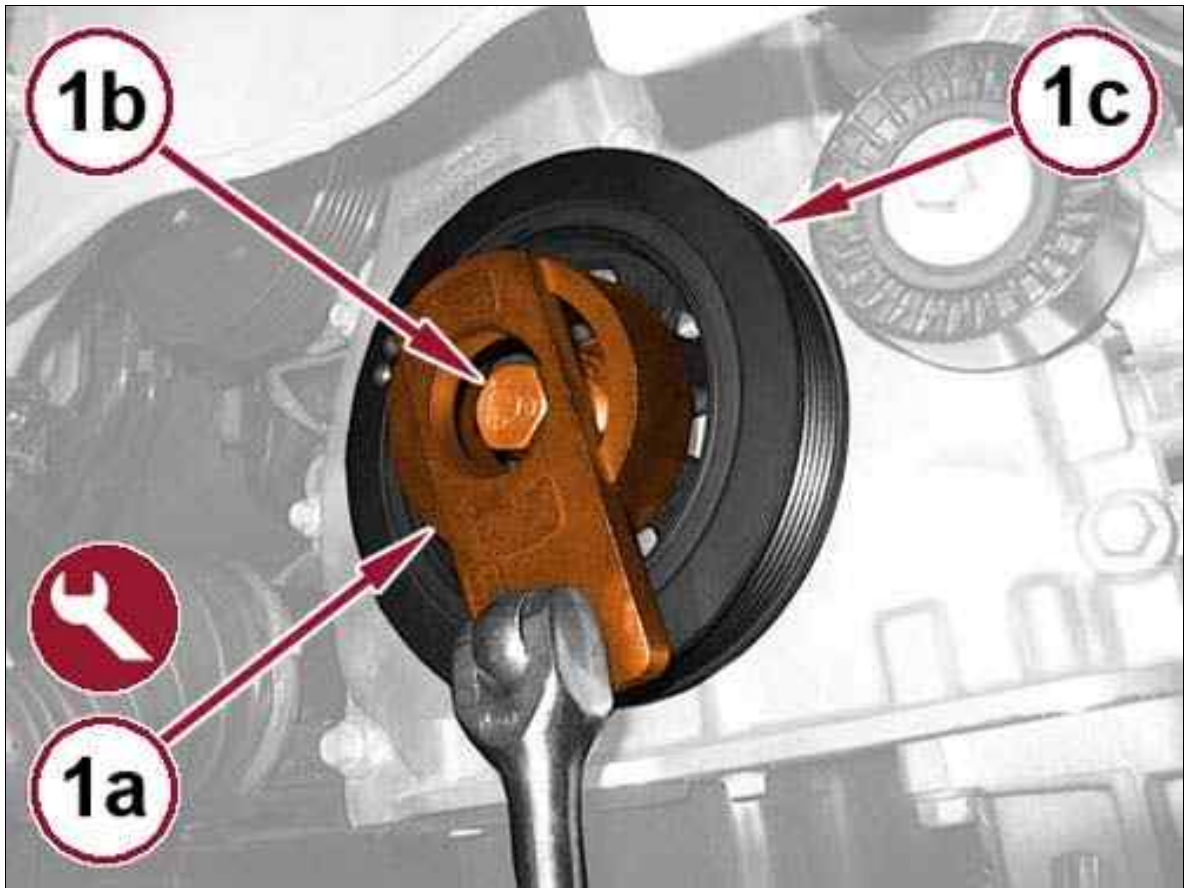
Fig 34: Vibration Damper & Aligning Timing Marks



Courtesy of CHRYSLER GROUP, LLC

41. Turn the vibration damper to align the timing marks (1).

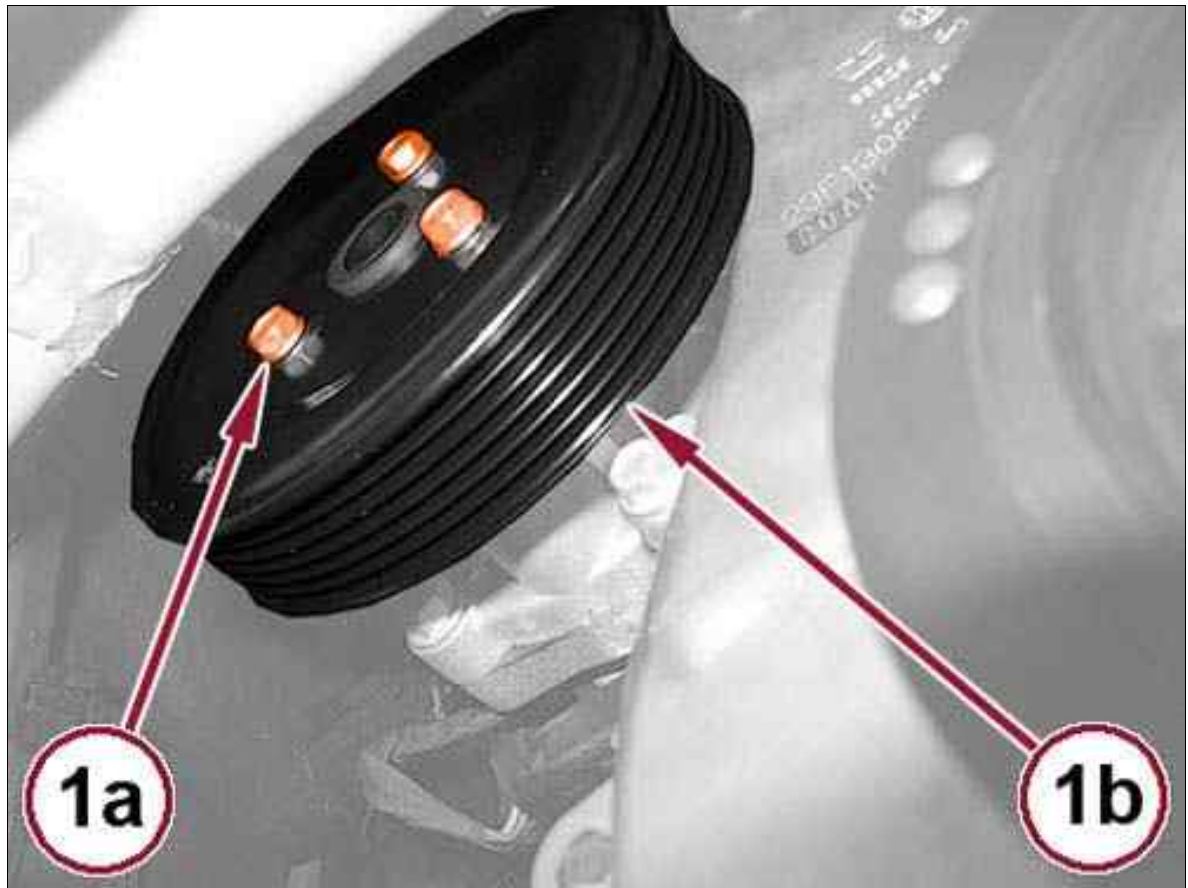
Fig 35: Special Tool, Bolt & Vibration Damper



Courtesy of CHRYSLER GROUP, LLC

42. Using the 2000040299 (EMEA) or (special tool #9707, Holder, Vibration Damper) (NAFTA) tool (1a), remove the bolt (1b) and the vibration damper (1c).

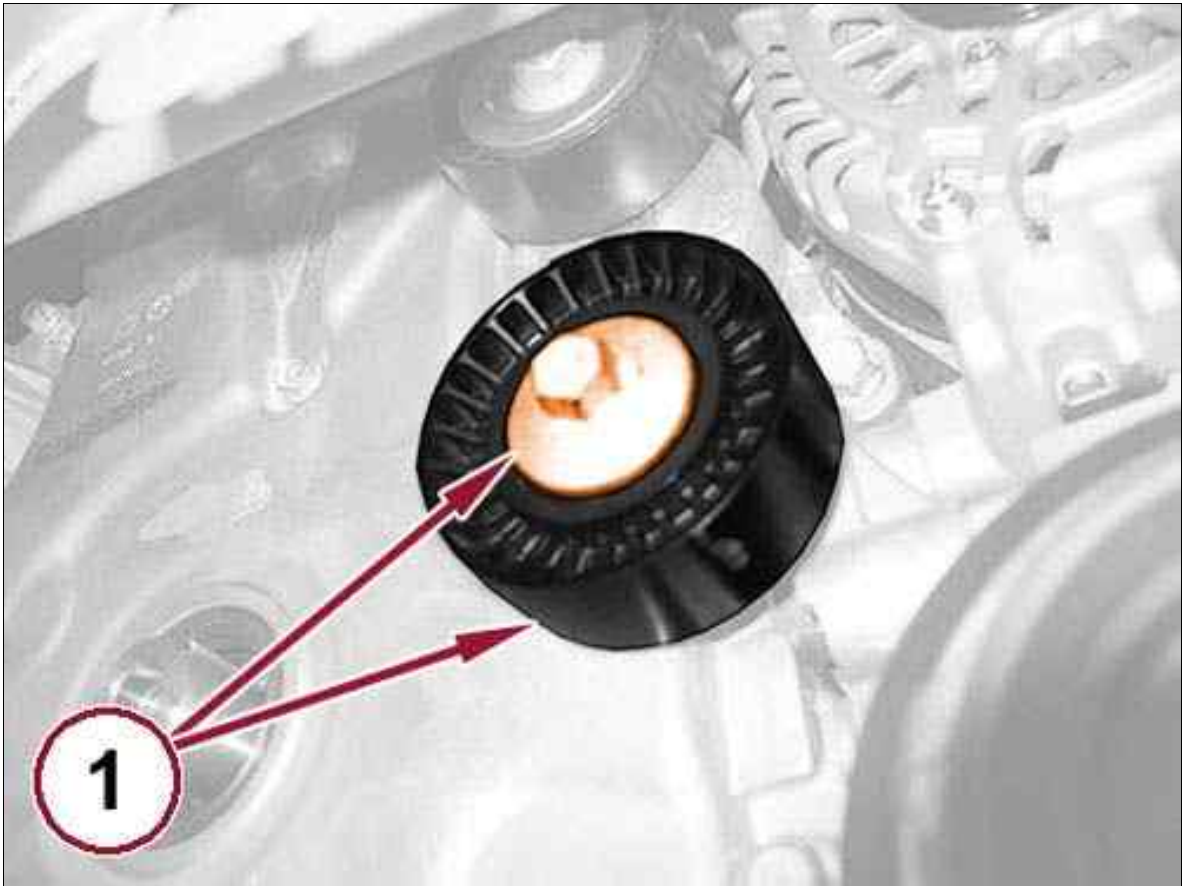
Fig 36: Water Pump Pulley & Bolts



Courtesy of CHRYSLER GROUP, LLC

43. Remove the bolts (1a) and the water pump pulley (1b).

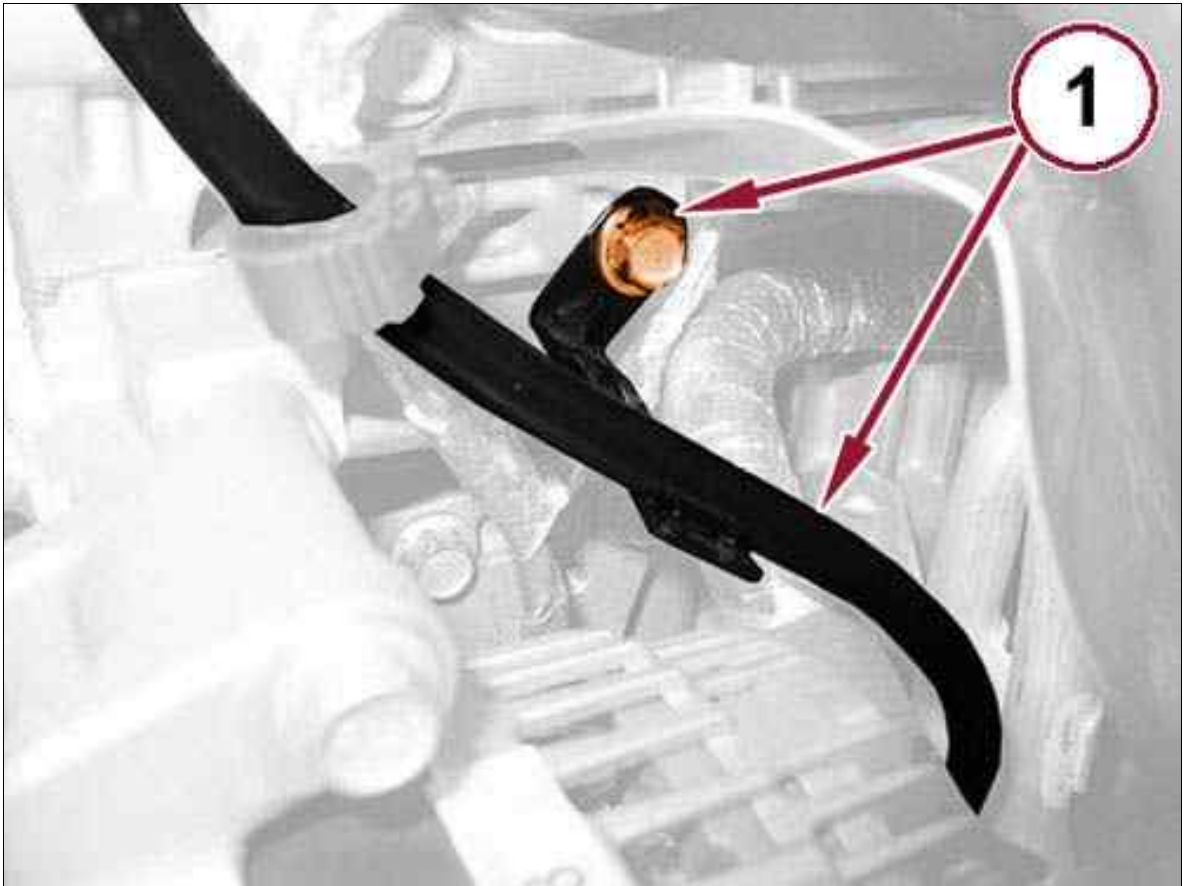
Fig 37: Accessory Drive Belt Idler Pulley & Bolt



Courtesy of CHRYSLER GROUP, LLC

44. Remove the bolt (1) and remove the accessory drive belt idler pulley.

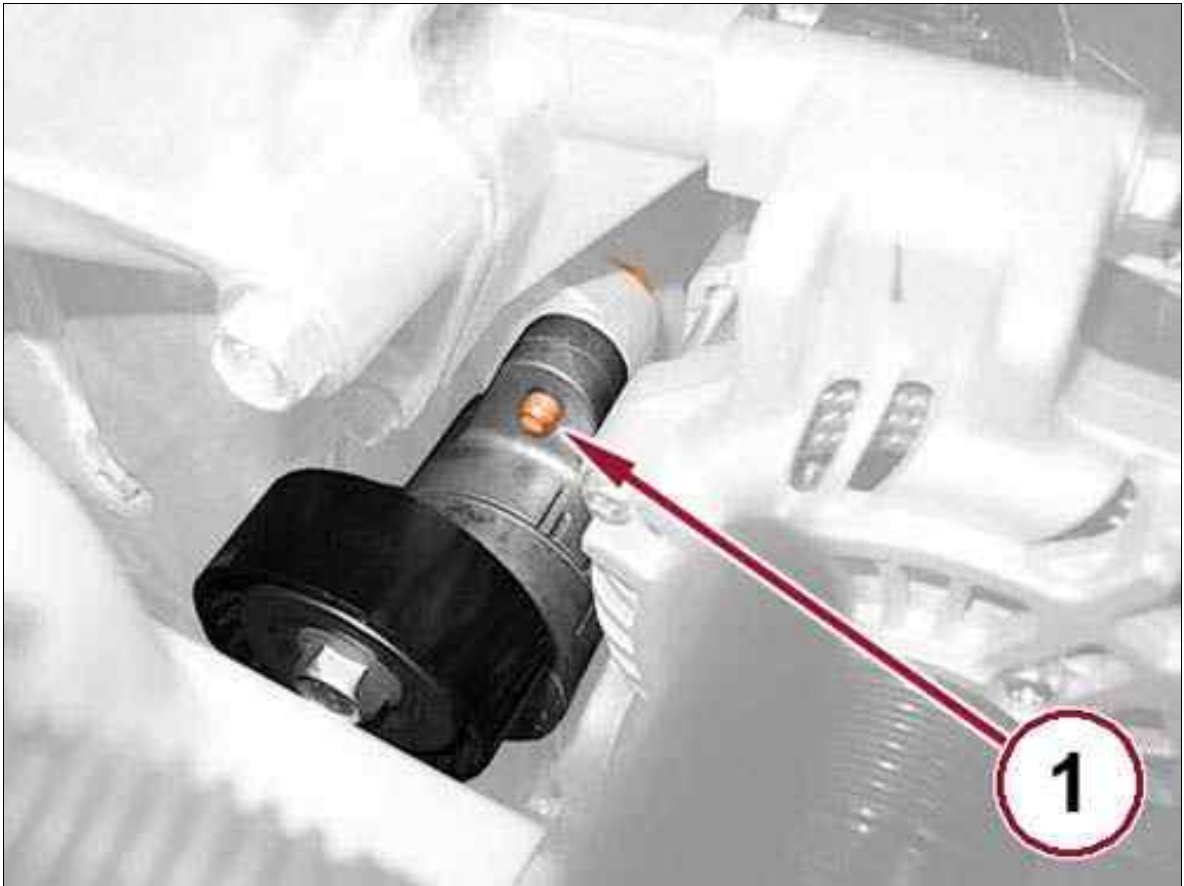
Fig 38: Engine Oil Dipstick Tube & Bolt



Courtesy of CHRYSLER GROUP, LLC

45. Remove the bolt (1) and remove the engine oil dipstick tube.

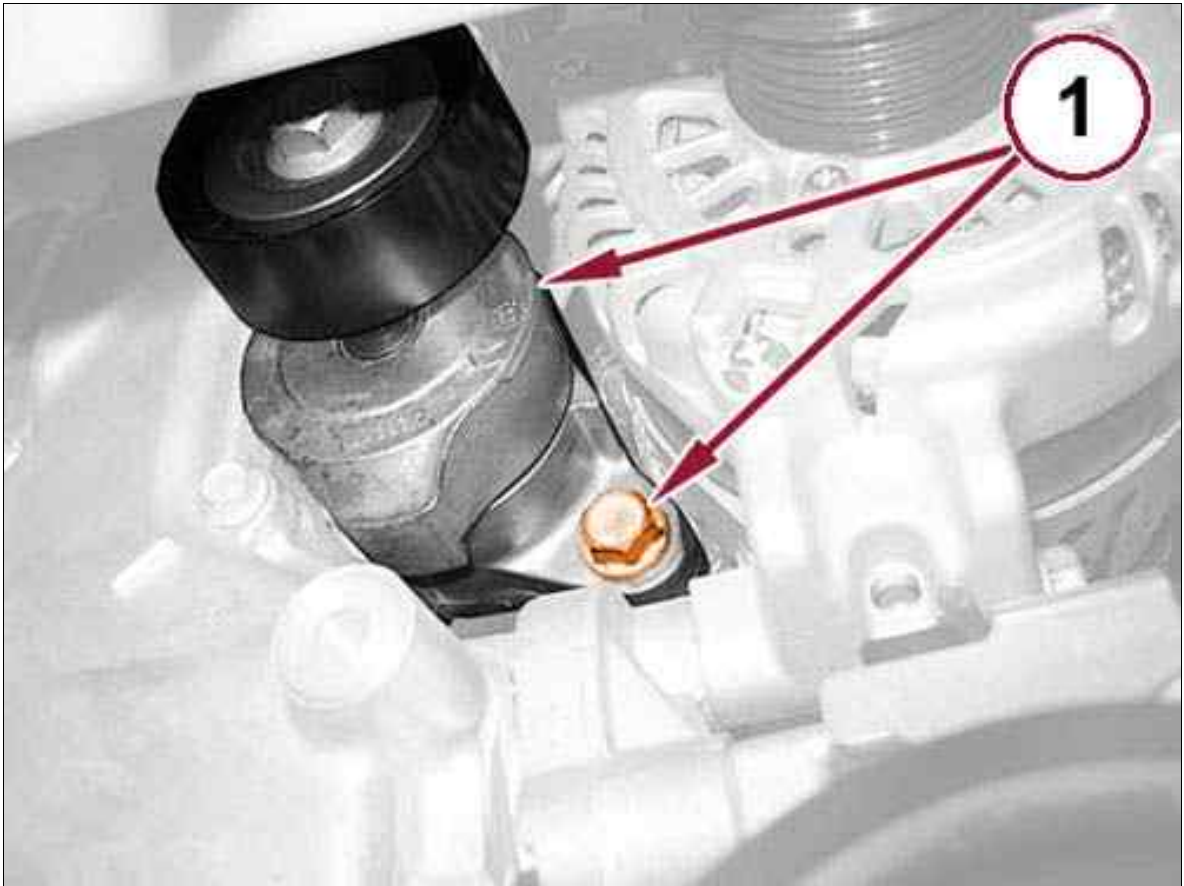
Fig 39: Accessory Drive Belt Tensioner Top Bolt



Courtesy of CHRYSLER GROUP, LLC

46. Remove the top bolt (1) from the accessory drive belt tensioner.

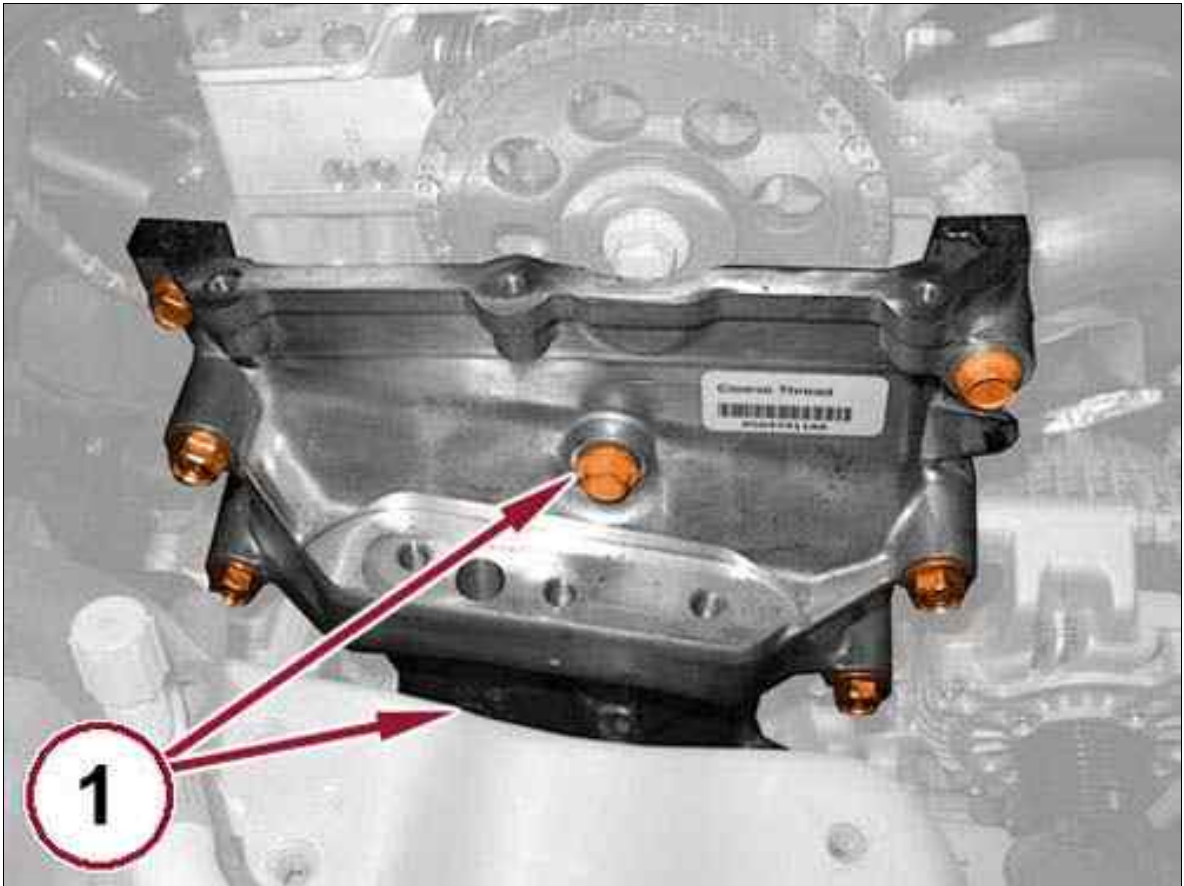
Fig 40: Accessory Drive Belt Tensioner & Bolt



Courtesy of CHRYSLER GROUP, LLC

47. Remove the bolt (1) and remove the accessory drive belt tensioner.

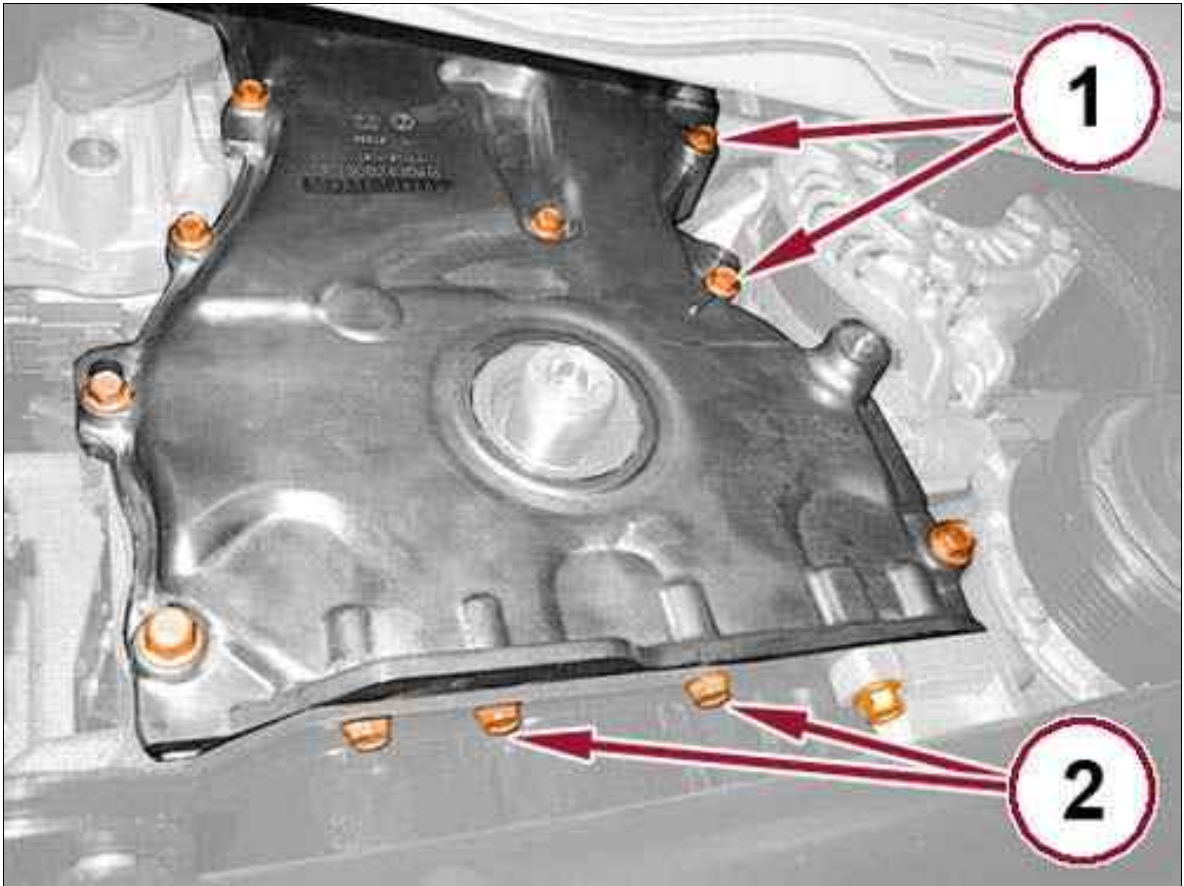
Fig 41: Engine Timing Cover To Cylinder Head Upper Bolts



Courtesy of CHRYSLER GROUP, LLC

48. Remove the upper bolts (1) securing the engine timing cover to the cylinder head.

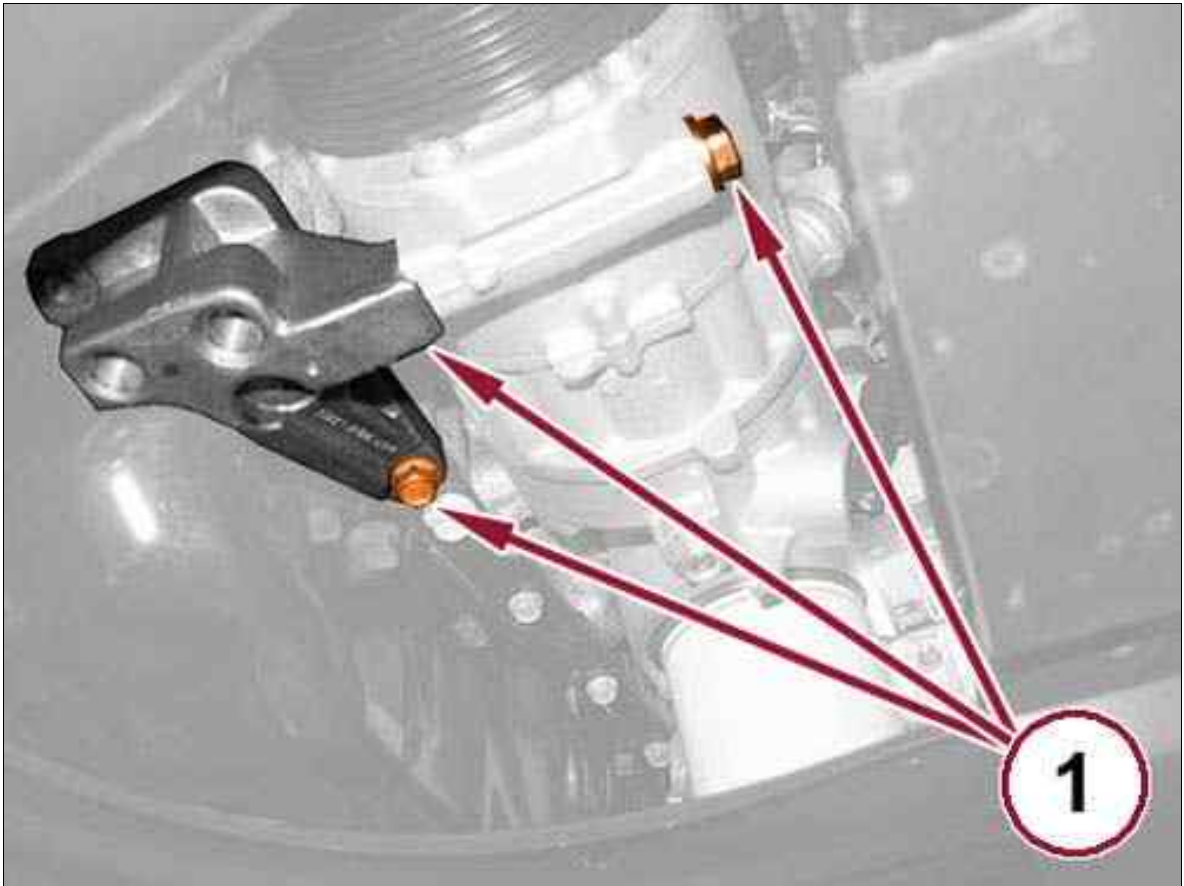
Fig 42: Engine Timing Cover To Engine Block & Engine Oil Pan Bolts



Courtesy of CHRYSLER GROUP, LLC

49. Remove the bolts (1) securing the engine timing cover to the engine block.
50. Remove the bolts (2) securing the engine timing cover to the engine oil pan.

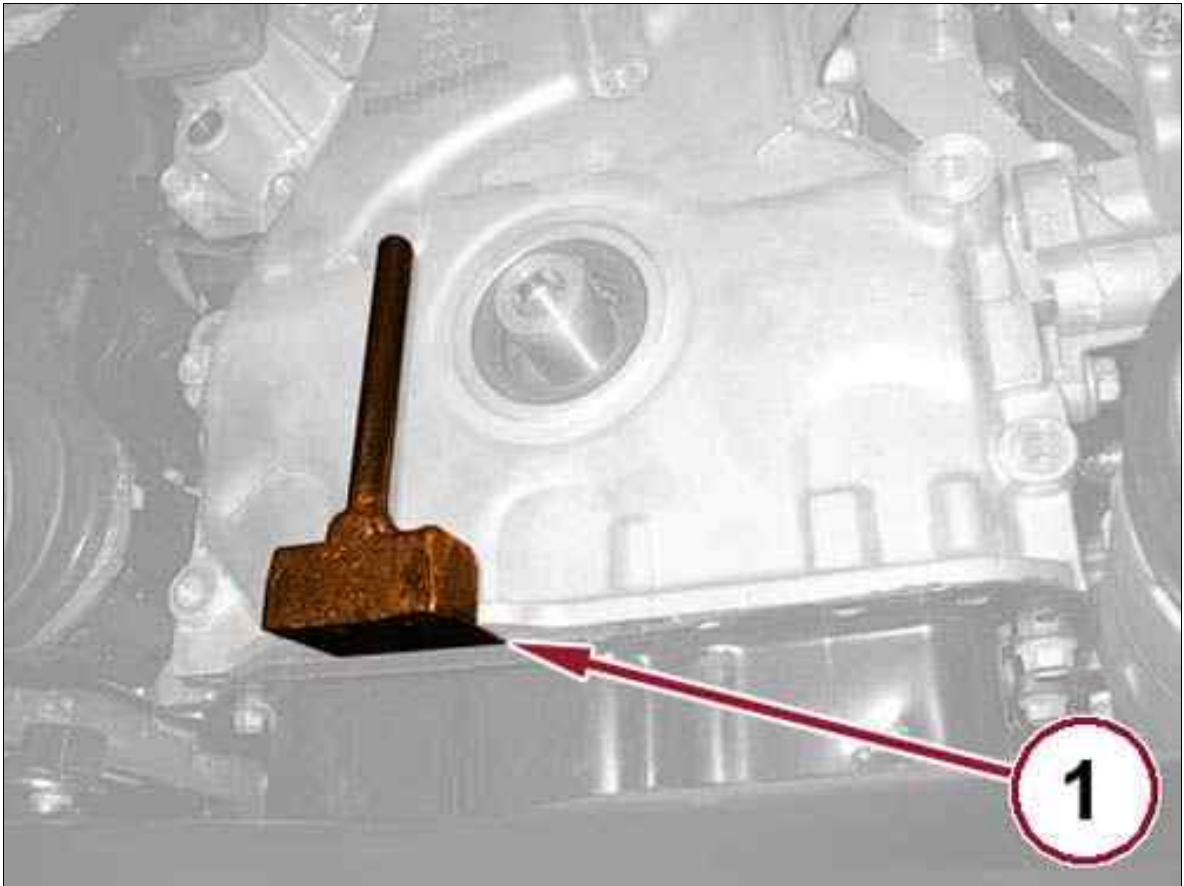
Fig 43: A/C Compressor And Support Bracket Bolts



Courtesy of CHRYSLER GROUP, LLC

51. Remove the bolts (1) and remove the A/C compressor and support bracket.

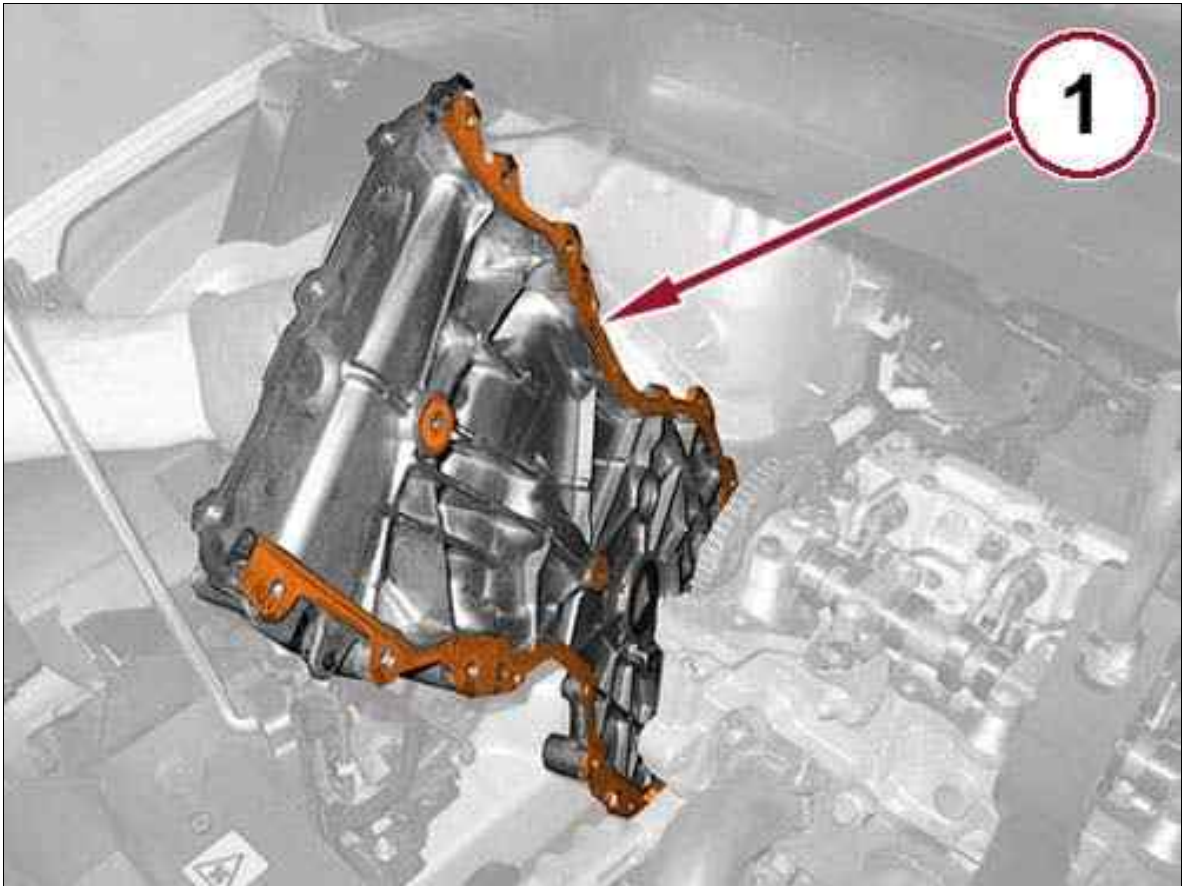
Fig 44: Cutting Sealant Between Engine Timing Cover & Engine Oil Pan Using Special Tool



Courtesy of CHRYSLER GROUP, LLC

52. With the 1870718000 tool (1) cut the sealant from between the engine timing cover and the engine oil pan.

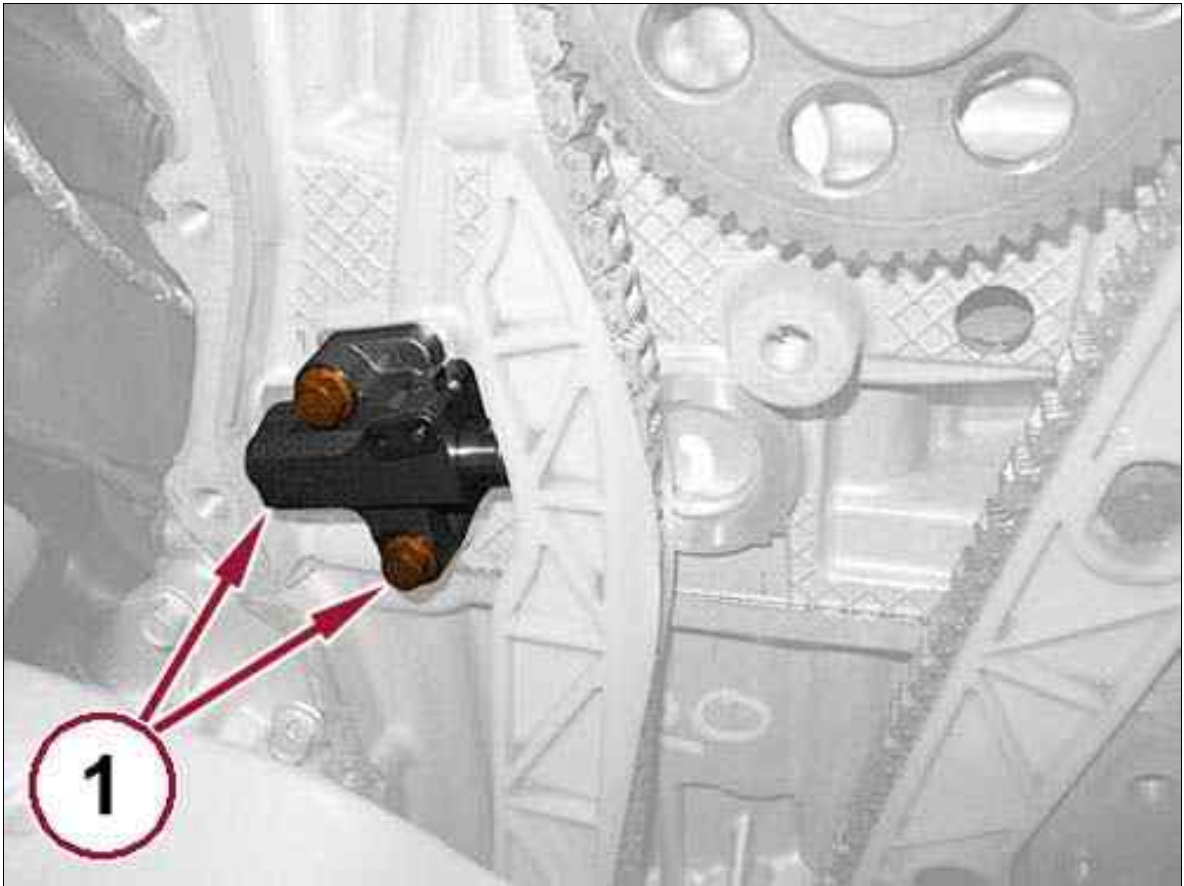
Fig 45: Engine Timing Cover



Courtesy of CHRYSLER GROUP, LLC

53. Remove the engine timing cover (1).
54. Remove the residual silicone gasket material from the cover and check the integrity of the centering bushings.
55. Pry off and remove the front crankshaft oil seal from the timing cover.

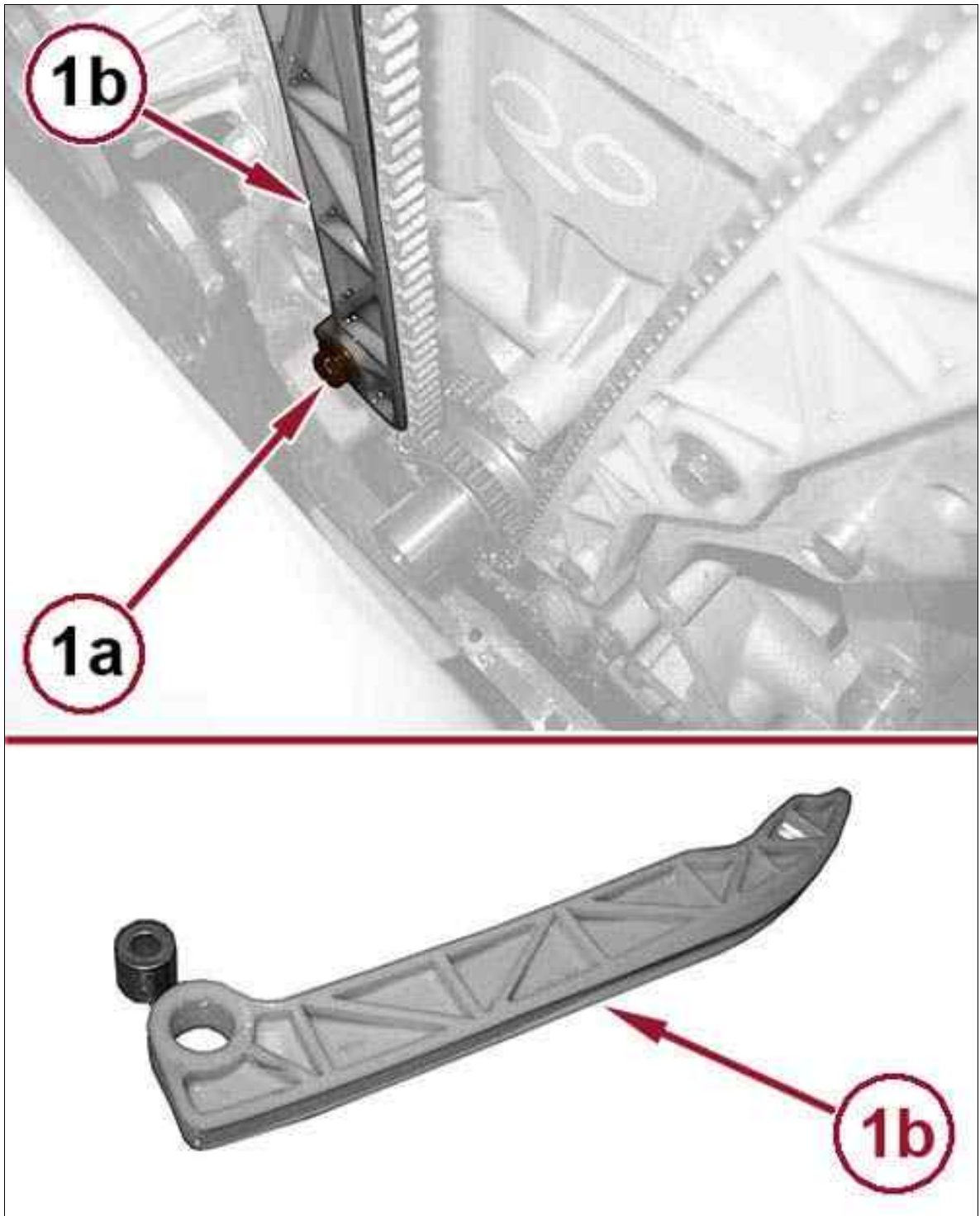
Fig 46: Tensioner & Bolts



Courtesy of CHRYSLER GROUP, LLC

56. Remove the screws (1) and remove the tensioner.

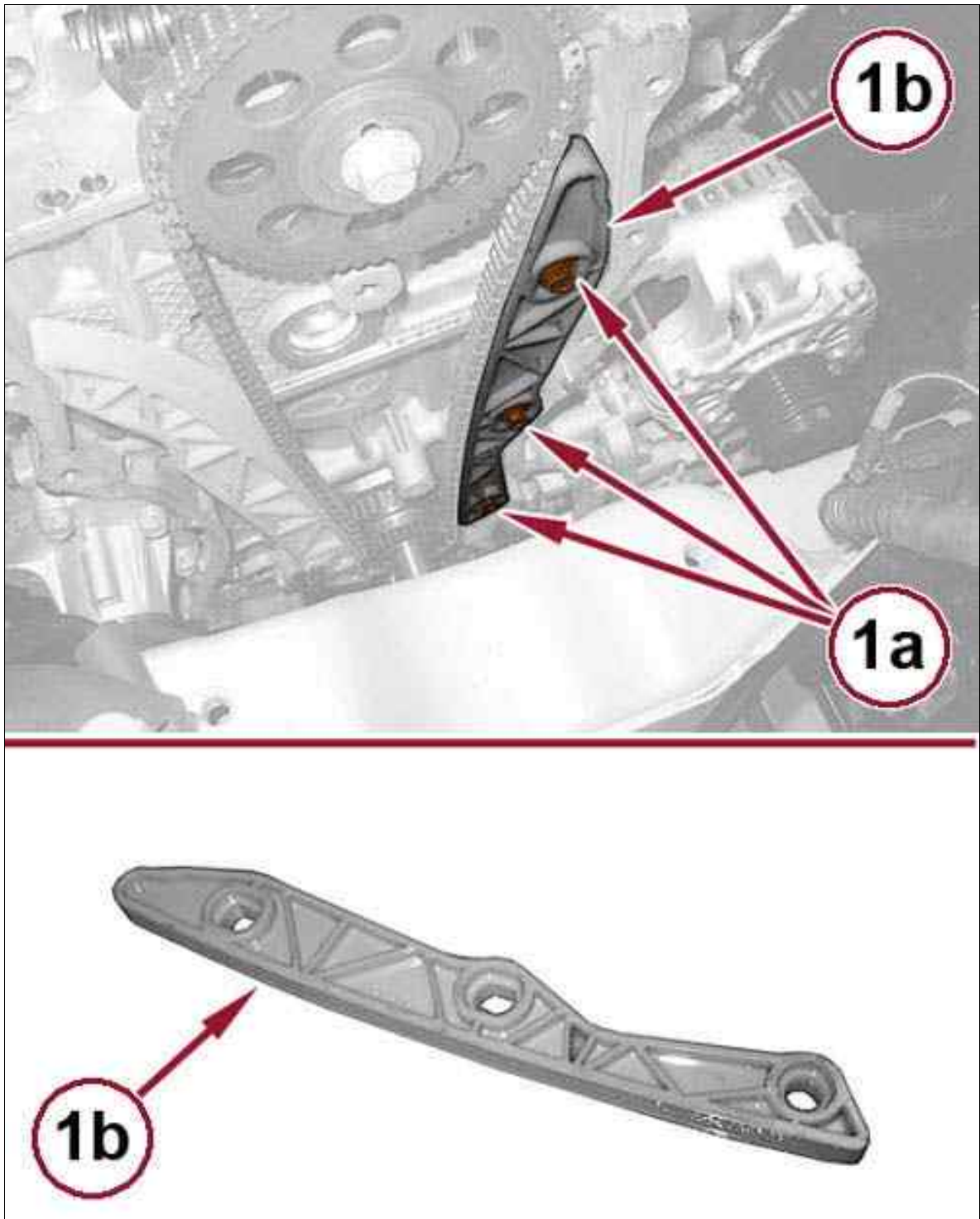
Fig 47: Timing Chain Tensioner Guide & Bolt



Courtesy of CHRYSLER GROUP, LLC

57. Remove the screw (1a) and remove the timing chain tensioner guide (1b) complete with bushing.

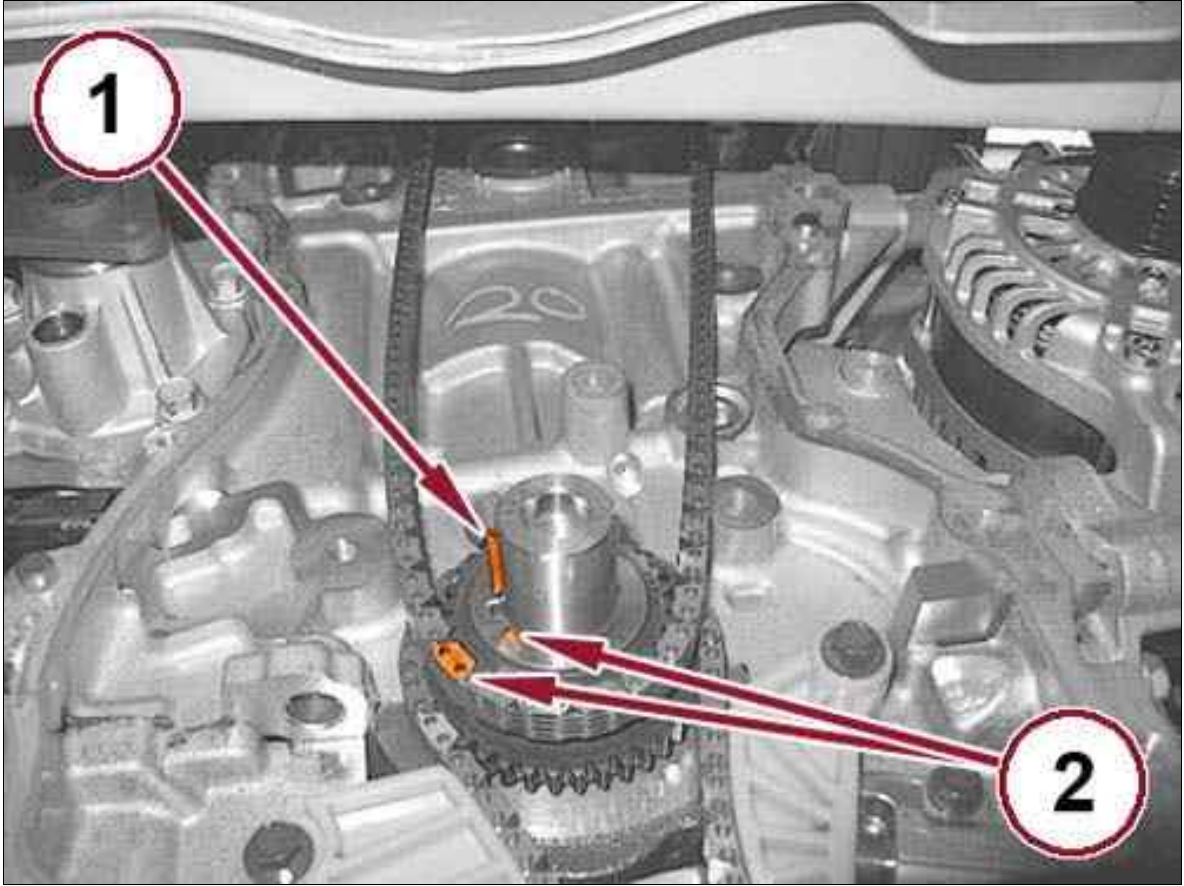
Fig 48: Timing Chain Tensioner Guide & Bolt



Courtesy of CHRYSLER GROUP, LLC

58. Remove the screw (1a) and remove the timing chain tensioner guide (1b).

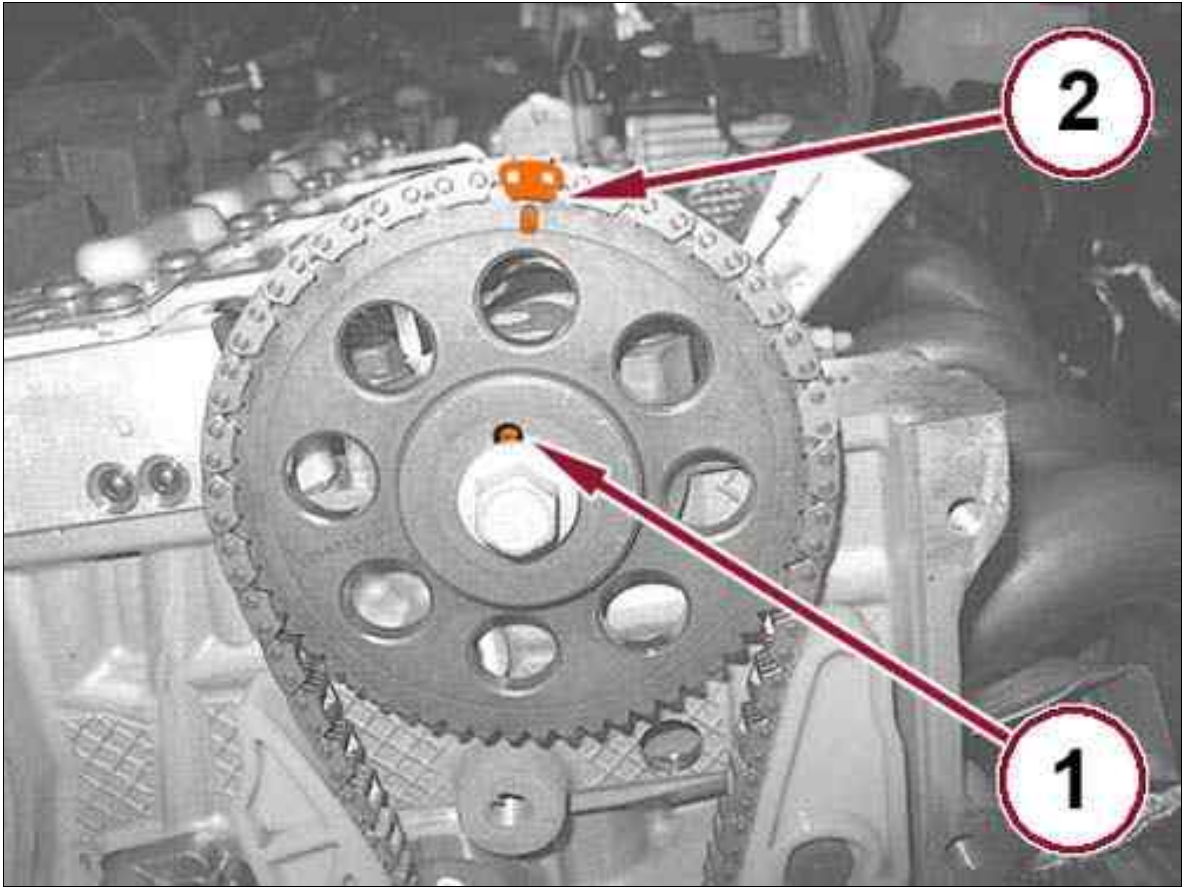
Fig 49: Positioning Crankshaft Key At "9" O-Clock Position & Marking Chain Link At Point Marked On Crankshaft Gear



Courtesy of CHRYSLER GROUP, LLC

59. Check that the crankshaft key is in the "9 o'clock" position (1).
60. Using the same chain, mark the link of the chain that is at the point marked (2) on the drive gear.

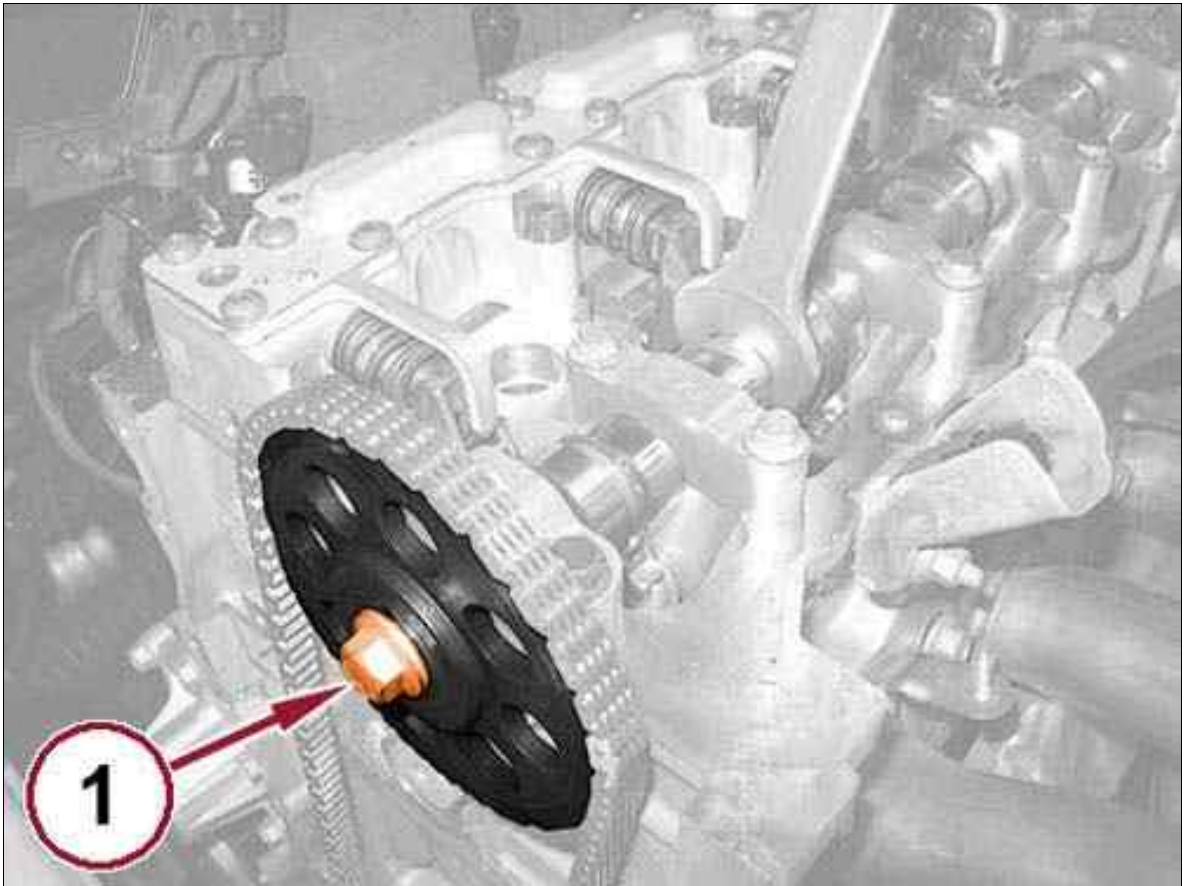
Fig 50: Positioning Camshaft Centering Pin At "12" O-Clock Position & Marking Chain Link At Point Marked On Camshaft Sprocket



Courtesy of CHRYSLER GROUP, LLC

61. Check that the camshaft centering pin (1) is in the "12 o'clock" position".
62. Using the same chain, mark the link of the chain (2) that corresponds with the notch on the camshaft sprocket.

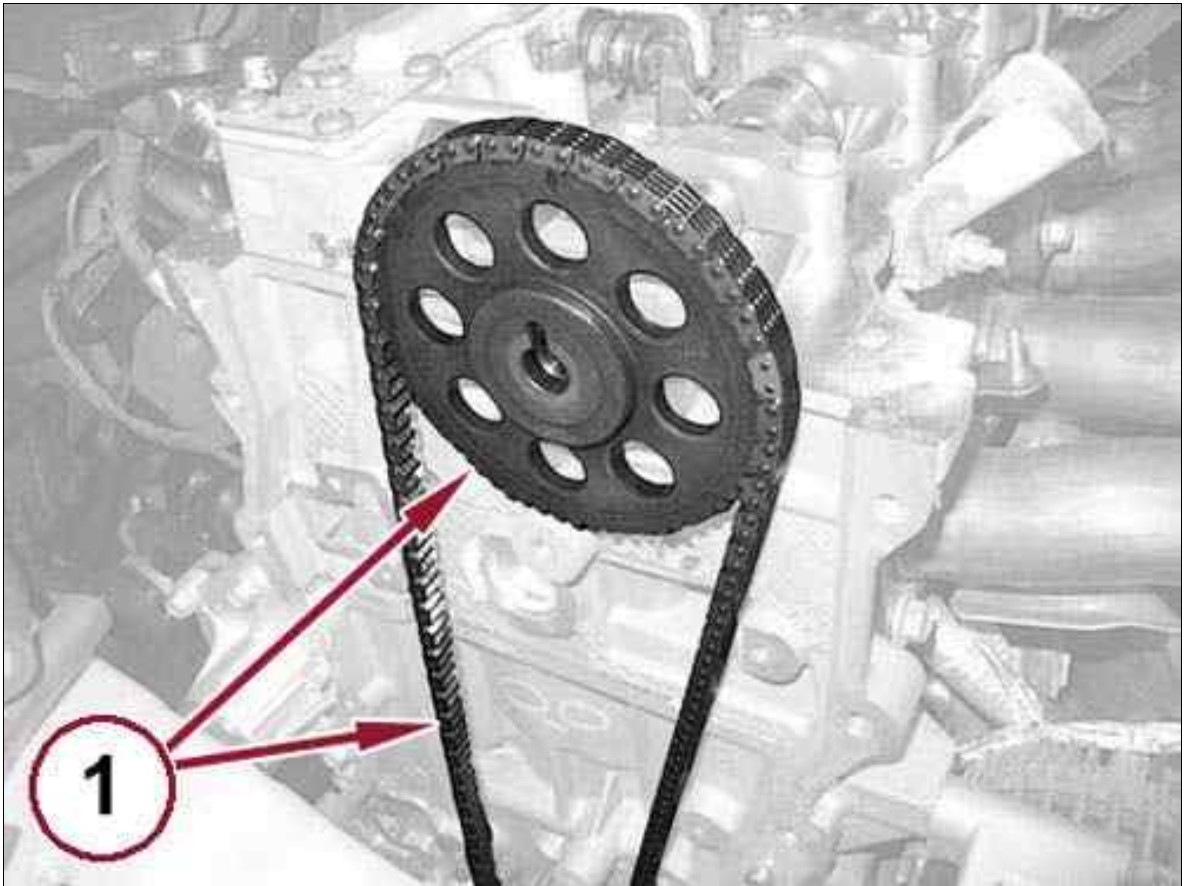
Fig 51: Camshaft Sprocket & Bolt



Courtesy of CHRYSLER GROUP, LLC

63. Remove the camshaft sprocket screw (1).

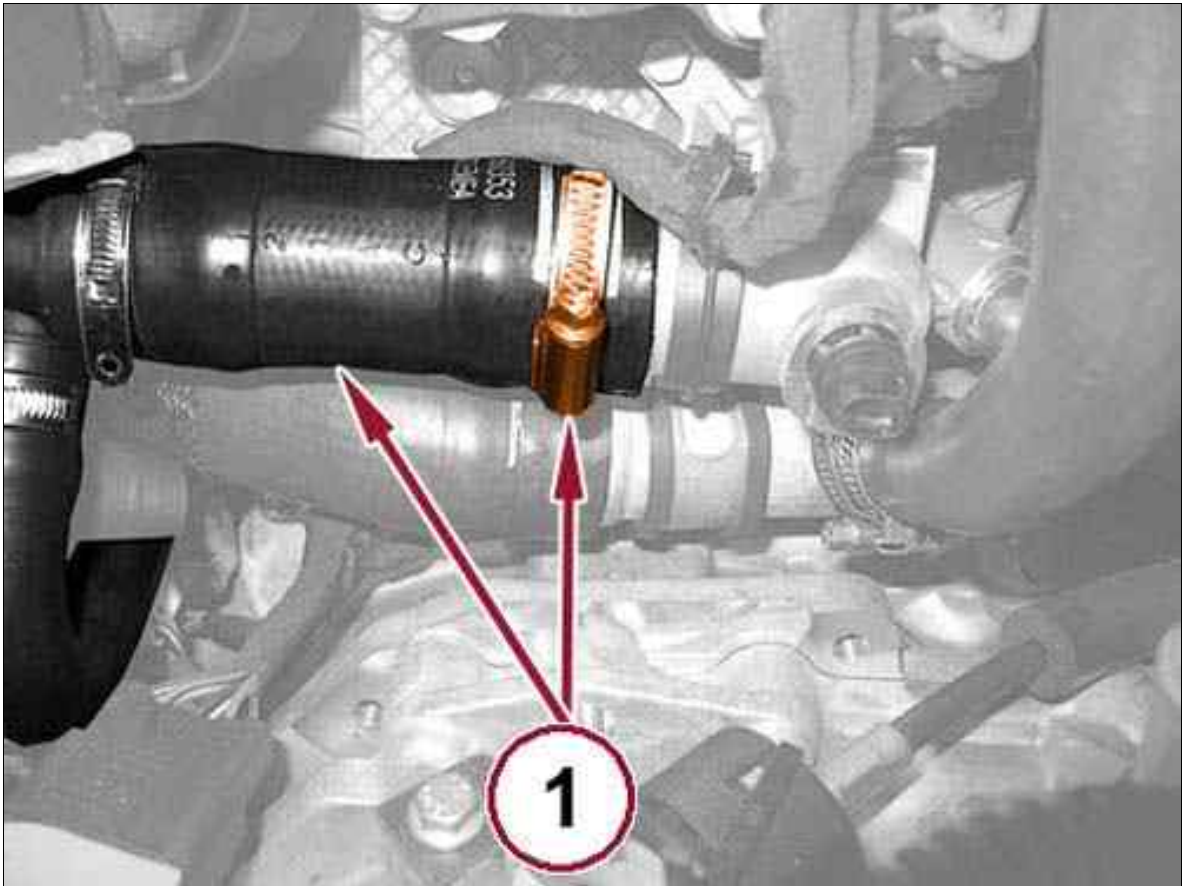
Fig 52: Camshaft Sprocket & Chain



Courtesy of CHRYSLER GROUP, LLC

64. Disengage the camshaft sprocket (1) from the shaft and remove it along with the chain.

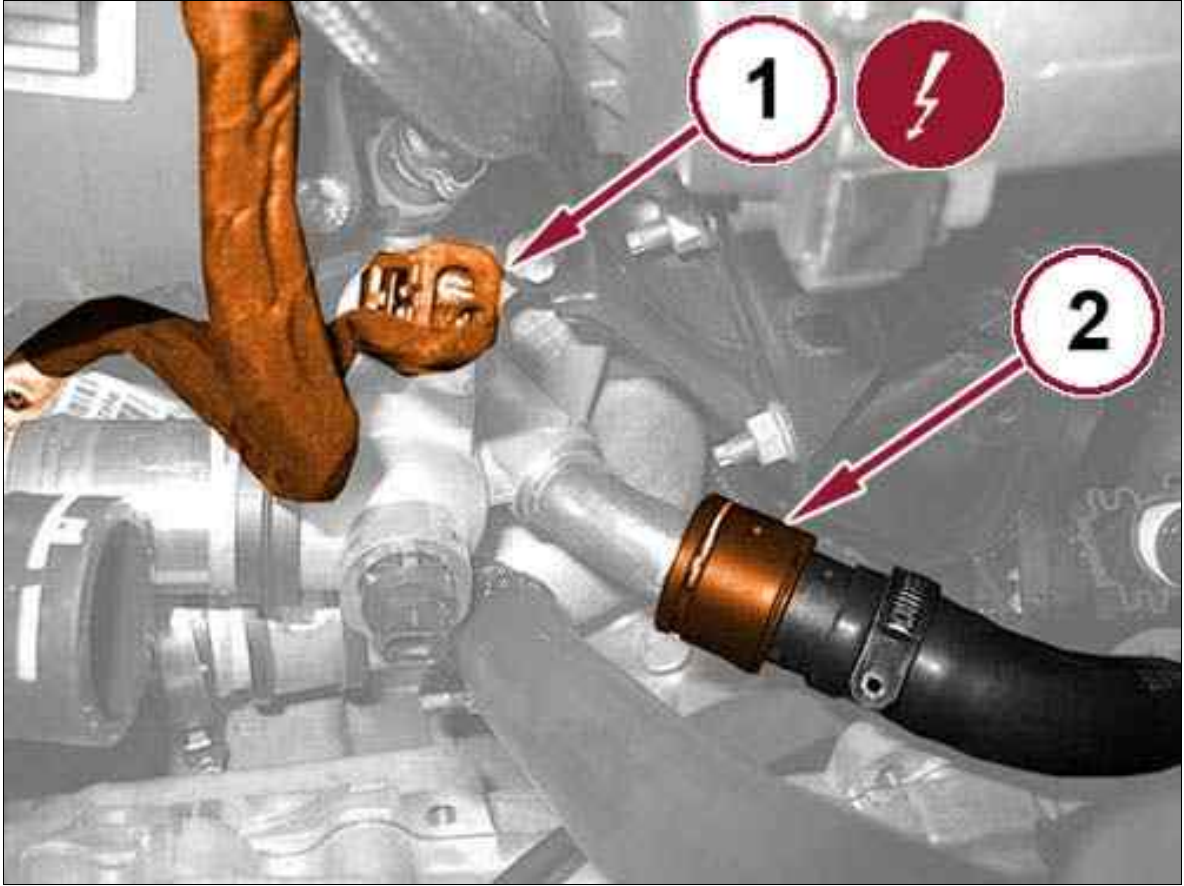
Fig 53: Radiator Hose & Clamp



Courtesy of CHRYSLER GROUP, LLC

65. Loosen the clamp and remove the radiator hose (1) from the thermostat housing.

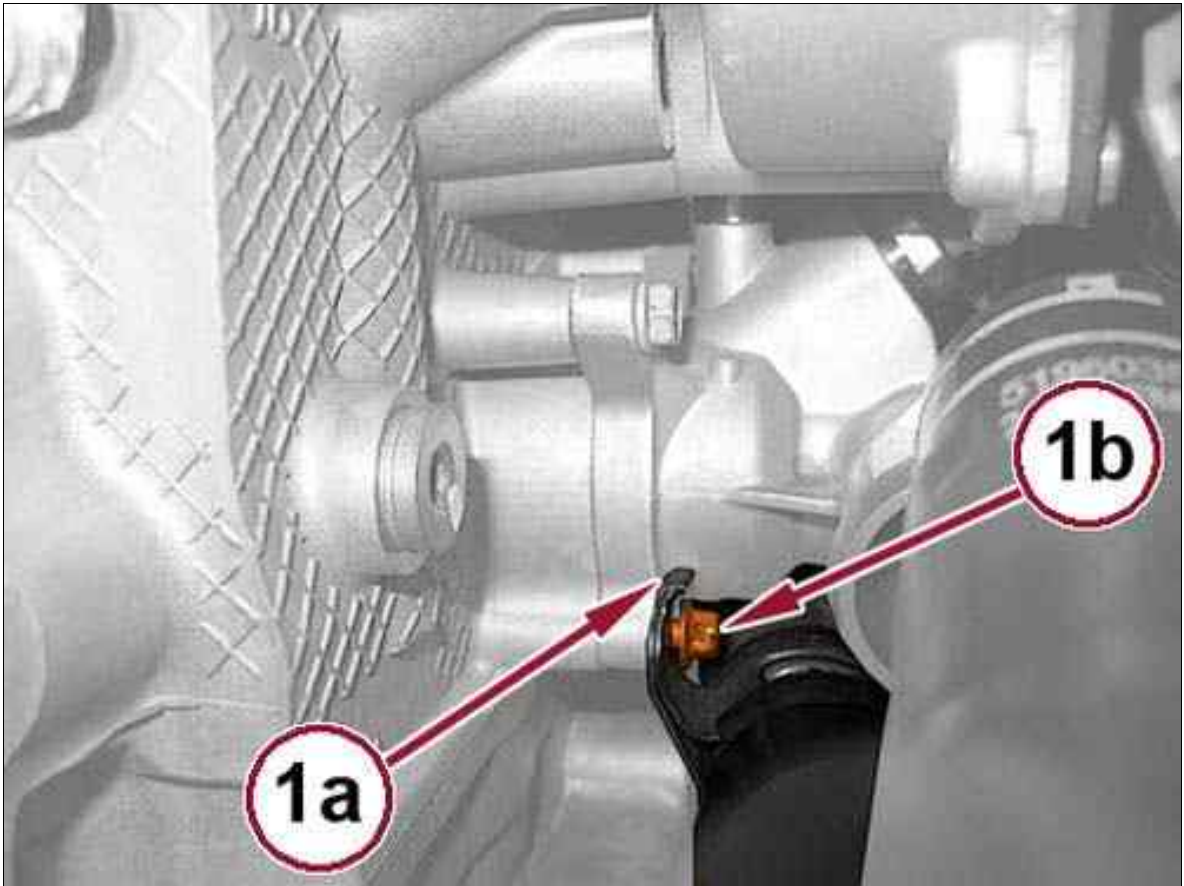
Fig 54: Engine Coolant Temperature (ECT) Sensor Wire Harness Connector & Coolant Hose Quick-Connect Coupling



Courtesy of CHRYSLER GROUP, LLC

66. Disconnect the quick-connect coupling and remove the coolant hose (2) from the thermostat housing

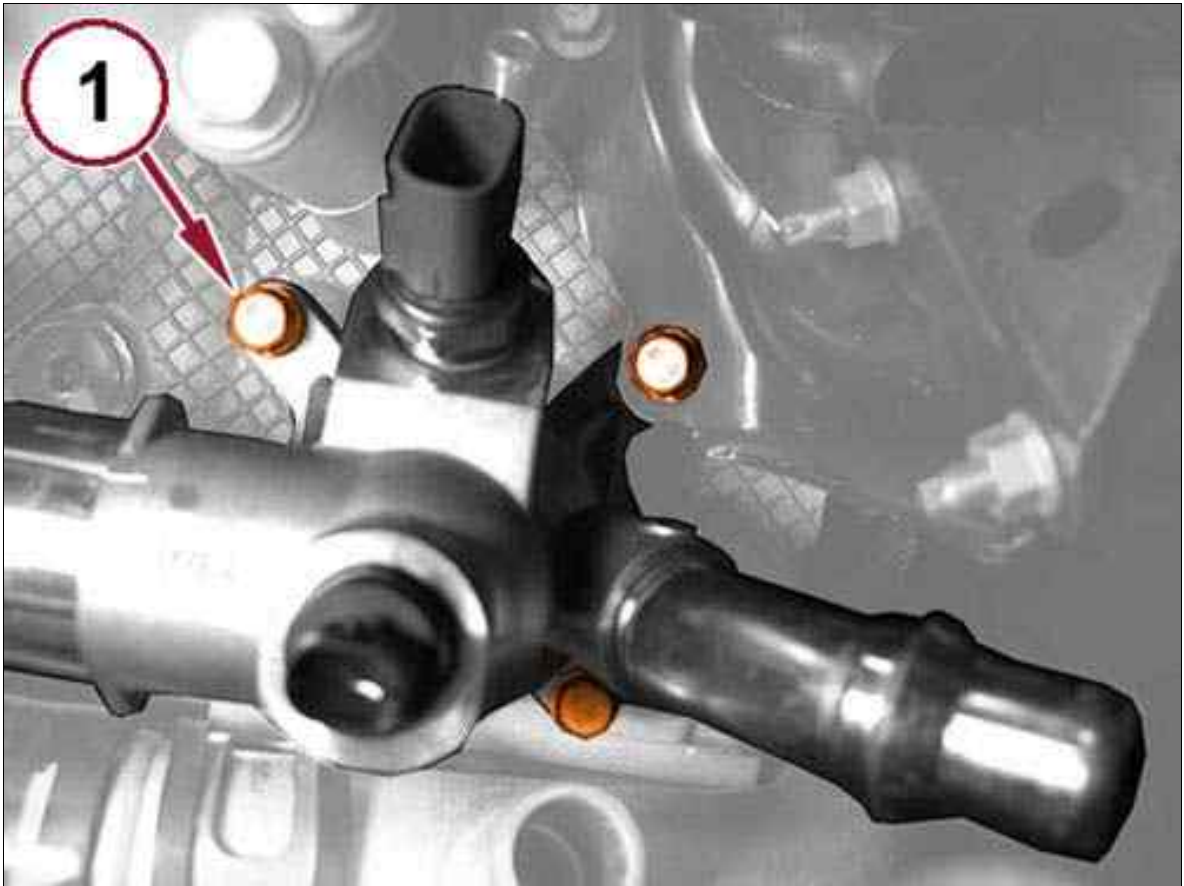
Fig 55: Coolant Tube To Thermostat Housing Lock Tab & Bolt



Courtesy of CHRYSLER GROUP, LLC

67. Release the lock tab (1a) and remove the bolt (1b) securing the coolant tube to the thermostat housing.

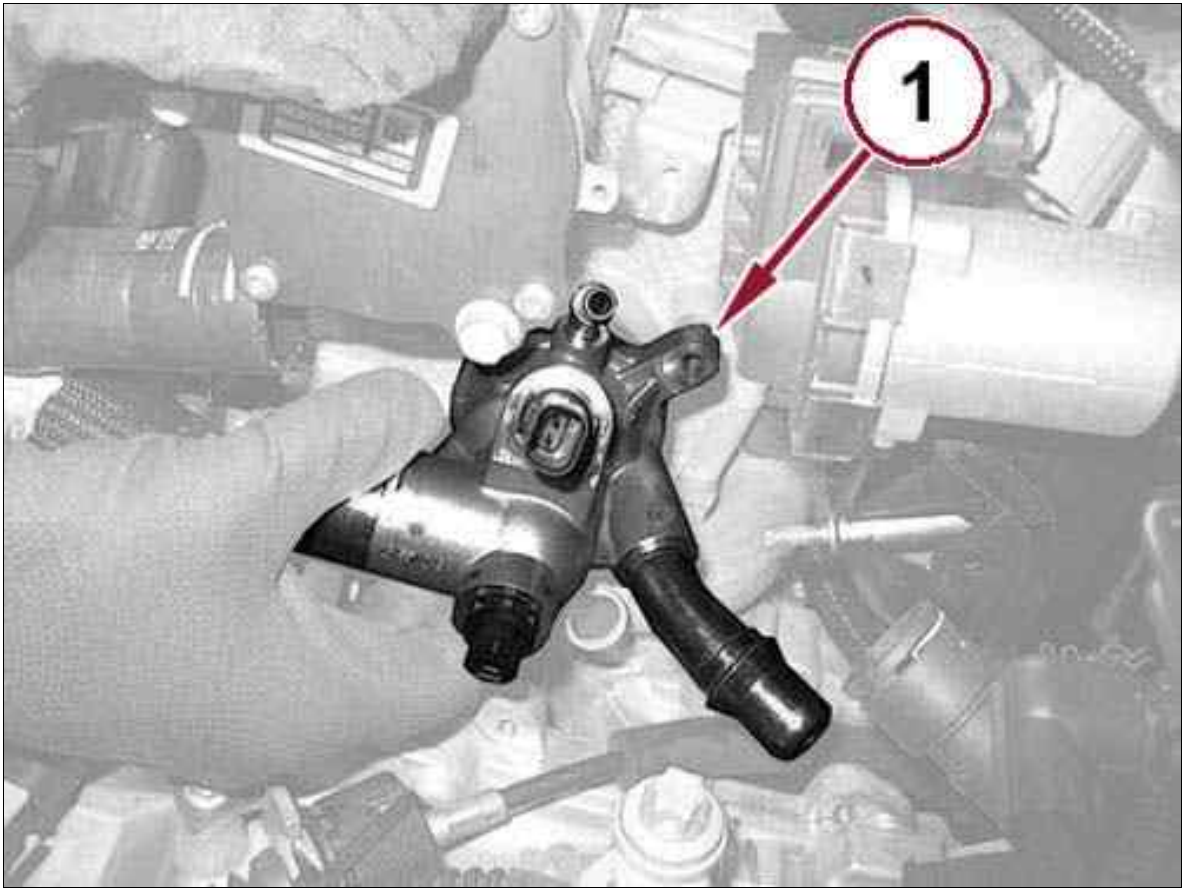
Fig 56: Thermostat Housing & Bolt



Courtesy of CHRYSLER GROUP, LLC

68. Remove the bolts (1) securing the thermostat housing.

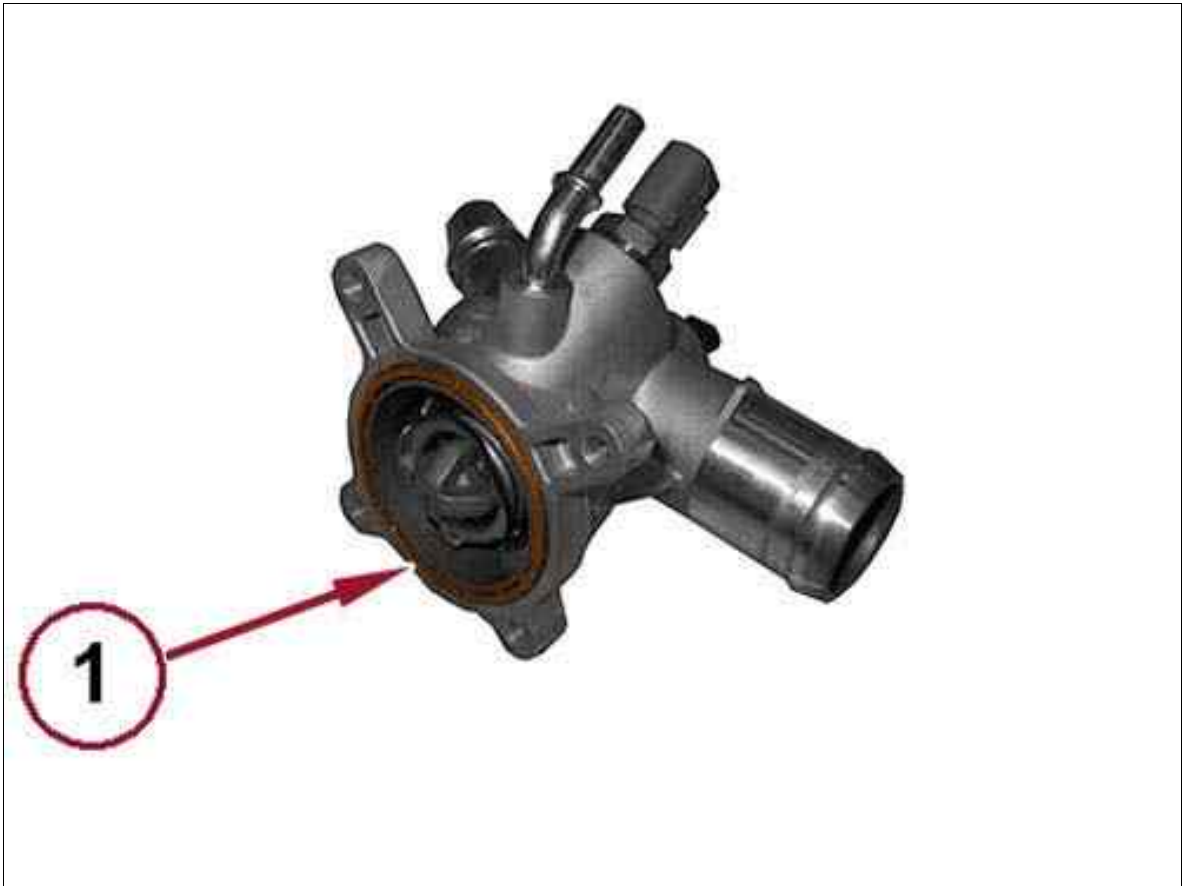
Fig 57: Thermostat Housing



Courtesy of CHRYSLER GROUP, LLC

69. Remove the thermostat housing (1).

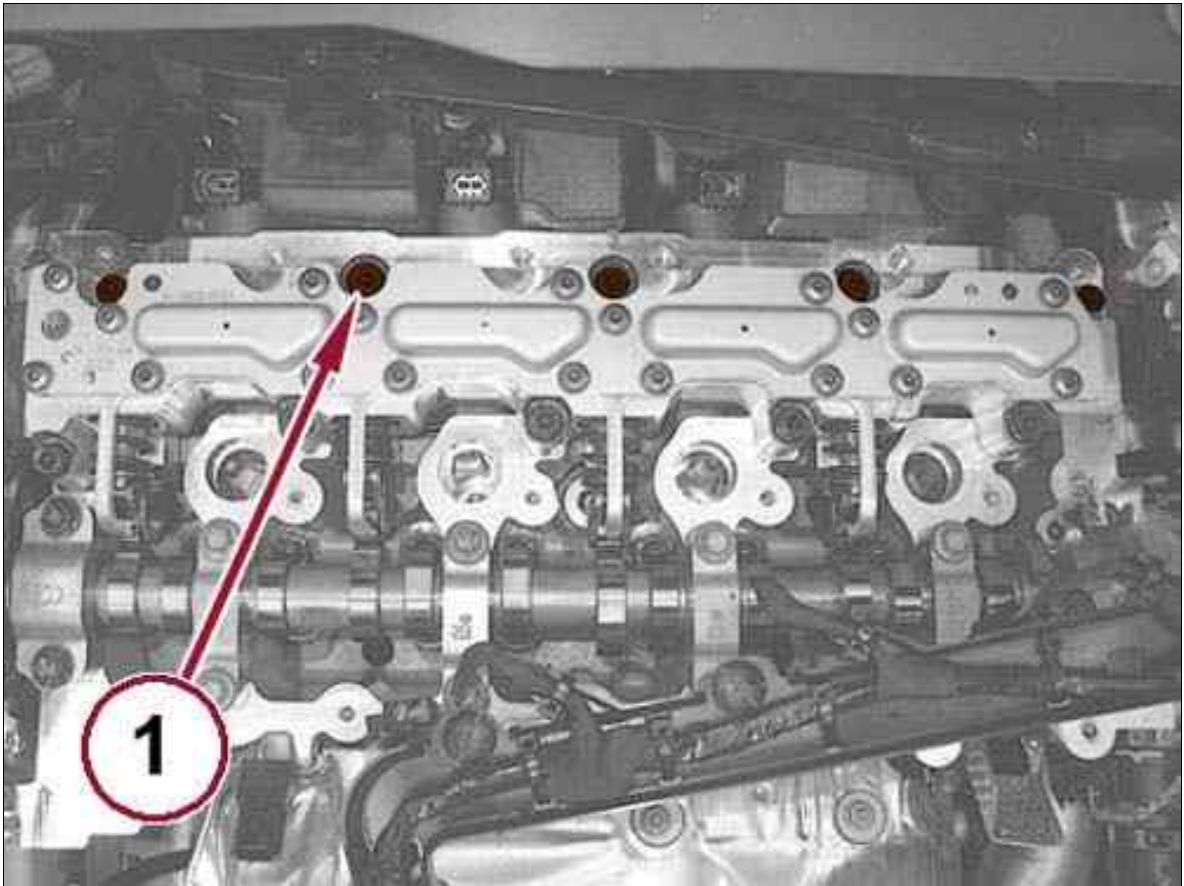
Fig 58: Thermostat Housing Gasket



Courtesy of CHRYSLER GROUP, LLC

70. Remove and discard the thermostat housing gasket (1).

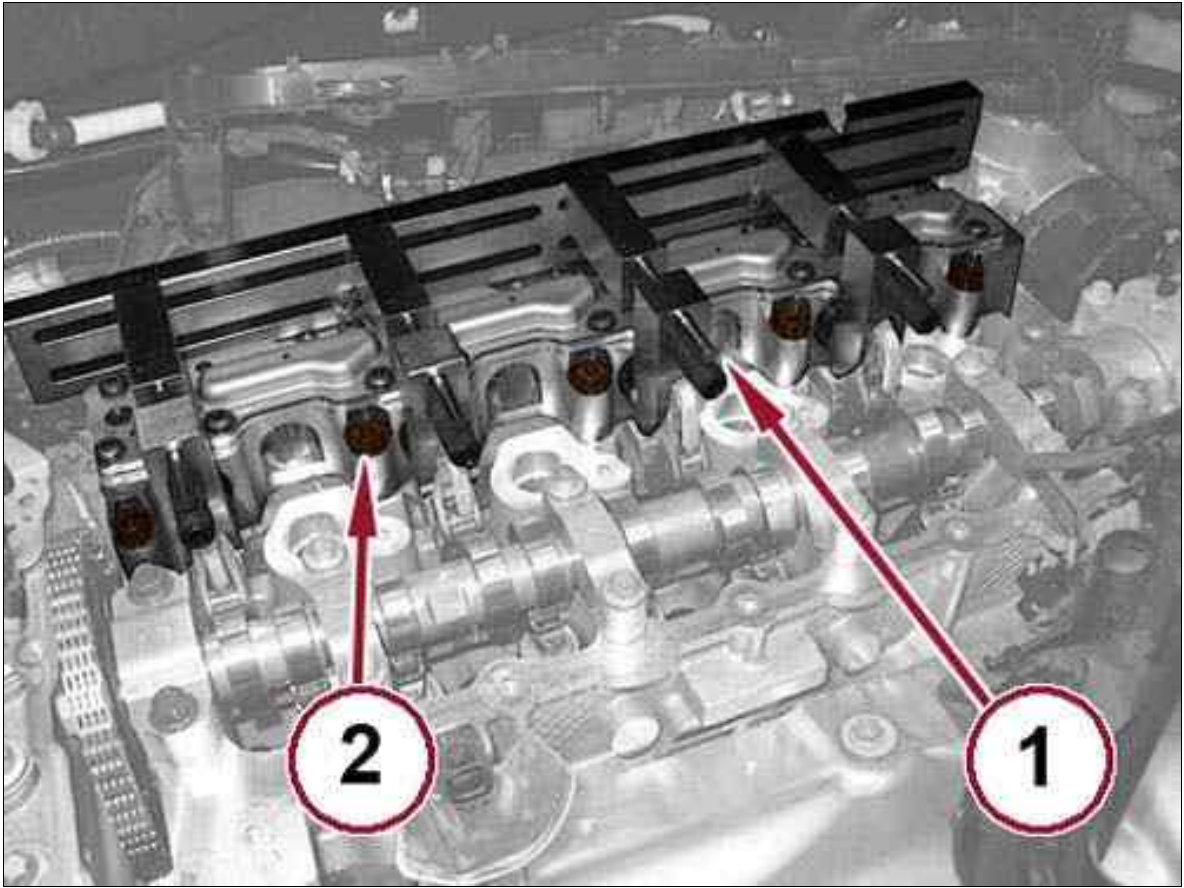
Fig 59: Rear MULTIAIR Actuator To Cylinder Head Bolt



Courtesy of CHRYSLER GROUP, LLC

71. Remove the rear MULTIAIR actuator to cylinder head bolts (1).

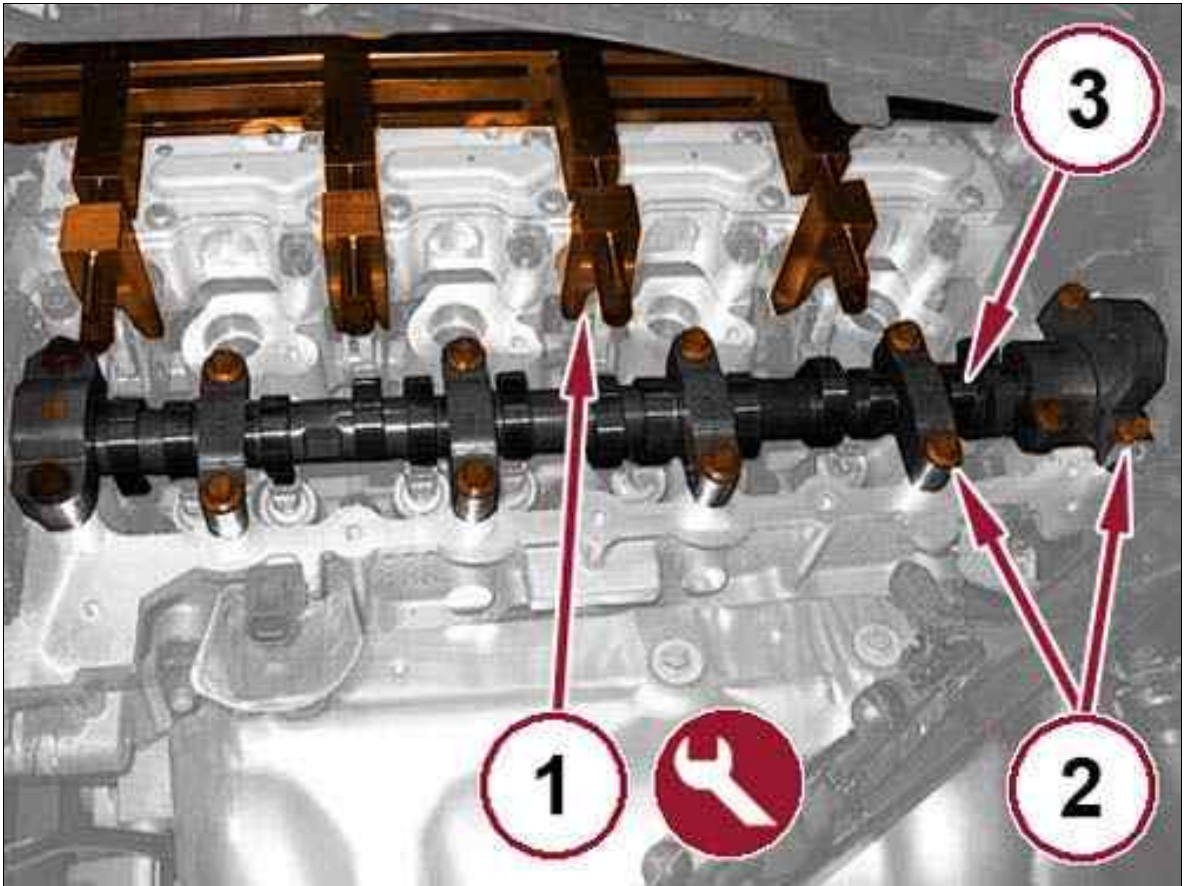
Fig 60: Compressing MULTIAIR Actuator Spring Using Special Tool & Locating Front MULTIAIR Actuator To Cylinder Head Bolt



Courtesy of CHRYSLER GROUP, LLC

72. Install the 2020000090 (EMEA) or (special tool #10259B, Compressor, MultiAir® Spring) (NAFTA) tool (1) on the MULTIAIR actuator and compress the springs.
73. Remove the front MULTIAIR actuator to cylinder head bolts (2), and remove the complete module from the cylinder head.
74. Remove the metal seal and the centering bushings.

Fig 61: MULTIAIR Actuator, Camshaft & Camshaft Caps



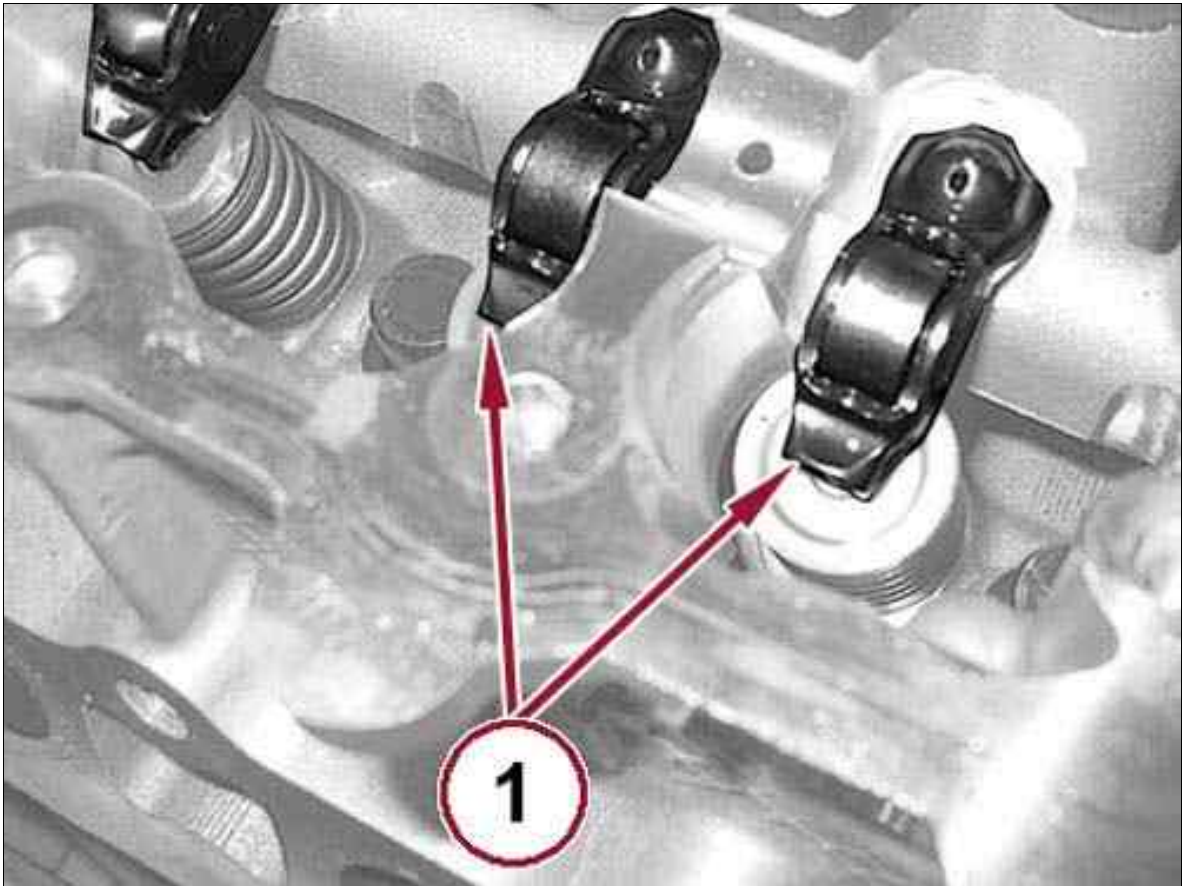
Courtesy of CHRYSLER GROUP, LLC

 NOTE:

For engine specifications, refer to DISASSEMBLY AND ASSEMBLY . Also refer to ENGINE SPECIFICATIONS .

75. Using a dial gauge and a suitable magnetic base, check that the camshaft end play is within the specified values.
76. Remove the camshaft cap to cylinder head bolts (2), and remove the camshaft caps.
77. Remove the camshaft (3) and oil seal.

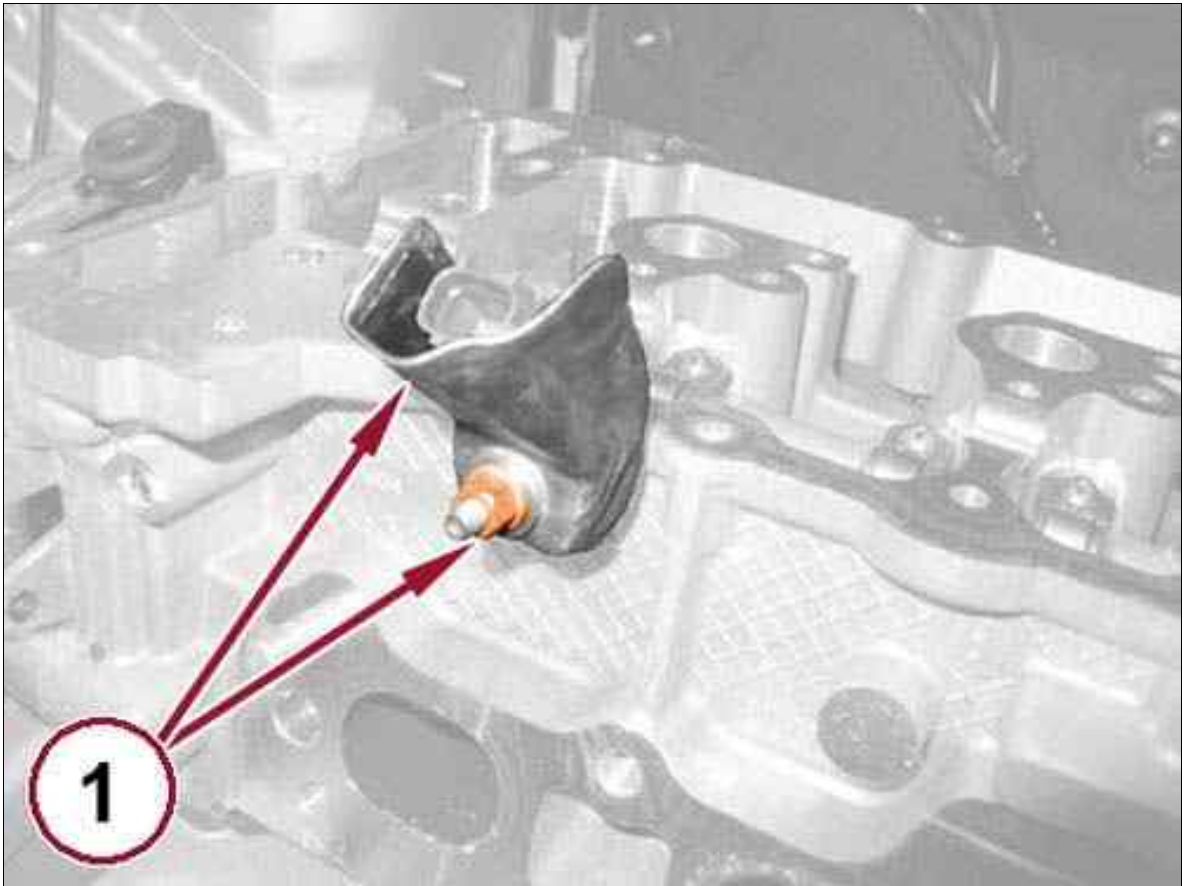
Fig 62: Hydraulic Tappets



Courtesy of CHRYSLER GROUP, LLC

78. Remove the hydraulic tappets (1).

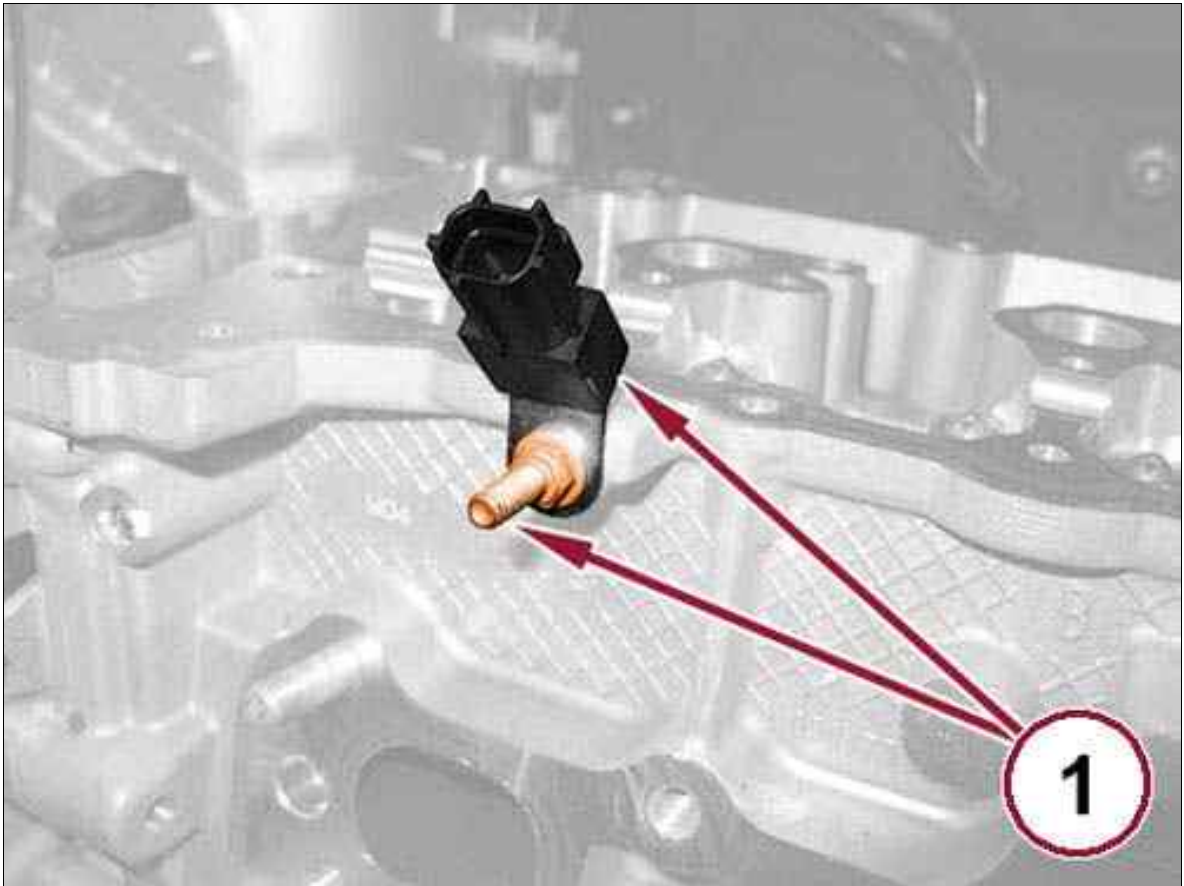
Fig 63: Heat Shield & Nut



Courtesy of CHRYSLER GROUP, LLC

79. Remove the nut (1) and remove the heat shield (1) of the ground terminal.

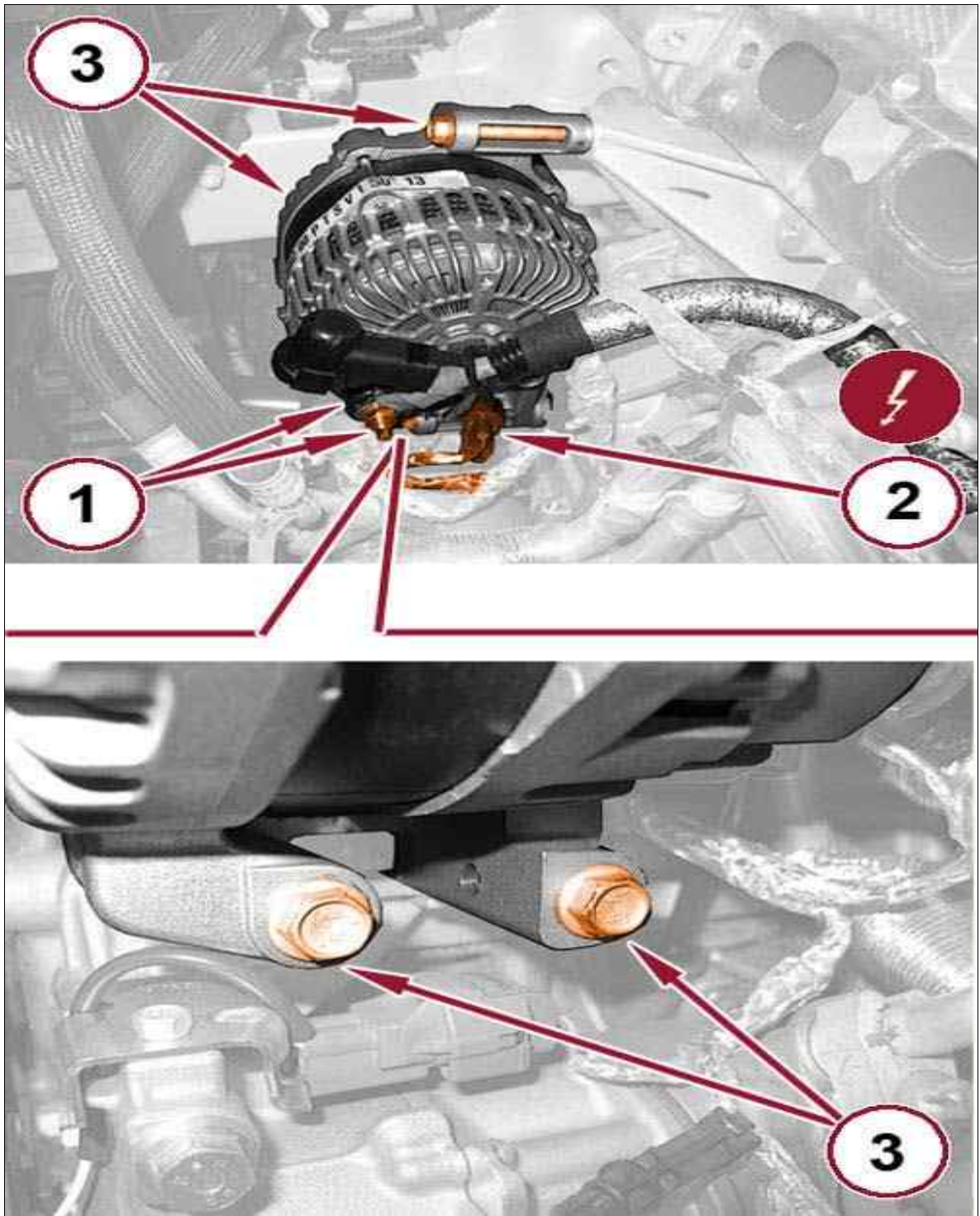
Fig 64: Ground Terminal & Stud



Courtesy of CHRYSLER GROUP, LLC

80. Remove the screw (1) and remove the ground terminal (1).

Fig 65: Alternator Wire Harness Connector, Bolts, Cap & Nut



Courtesy of CHRYSLER GROUP, LLC

81. Remove the alternator bolts (3).

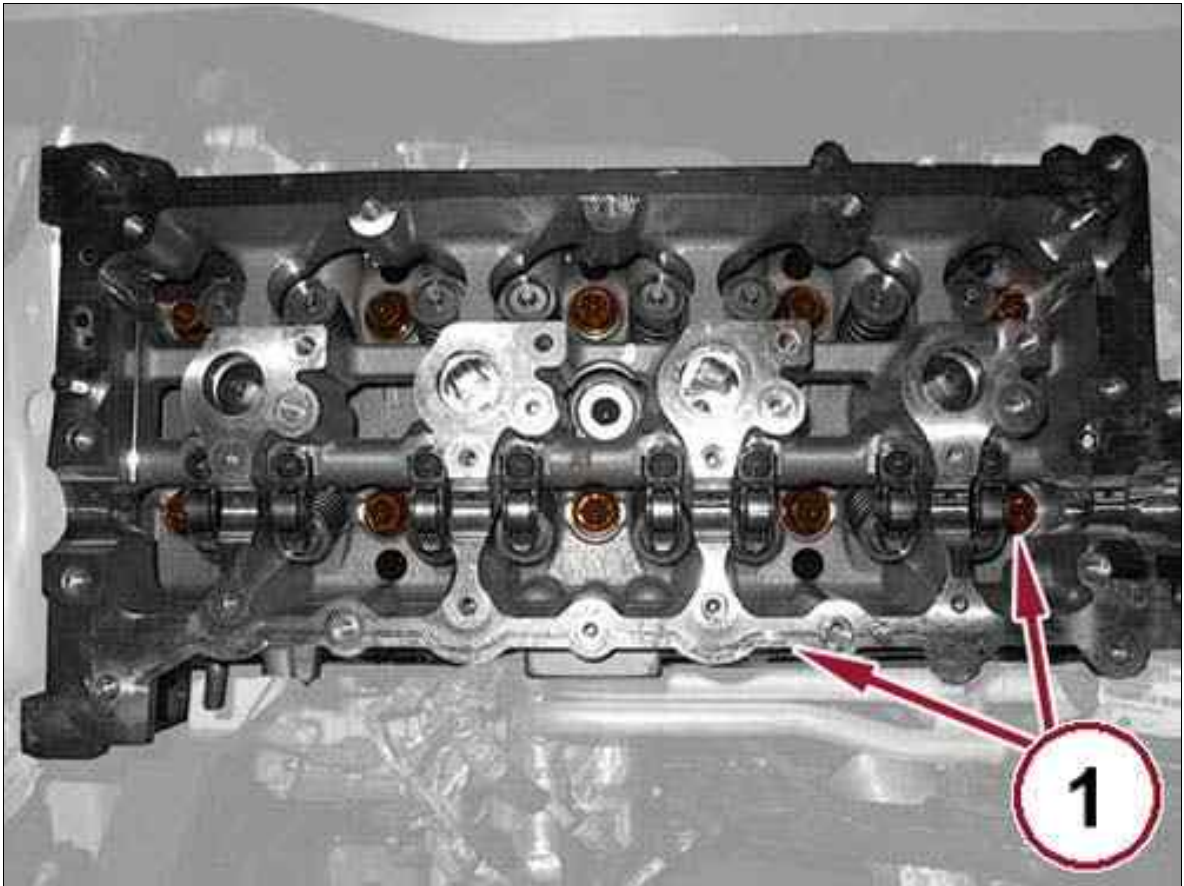
Fig 66: Alternator



Courtesy of CHRYSLER GROUP, LLC

82. Remove the alternator (1) with centering sleeve.

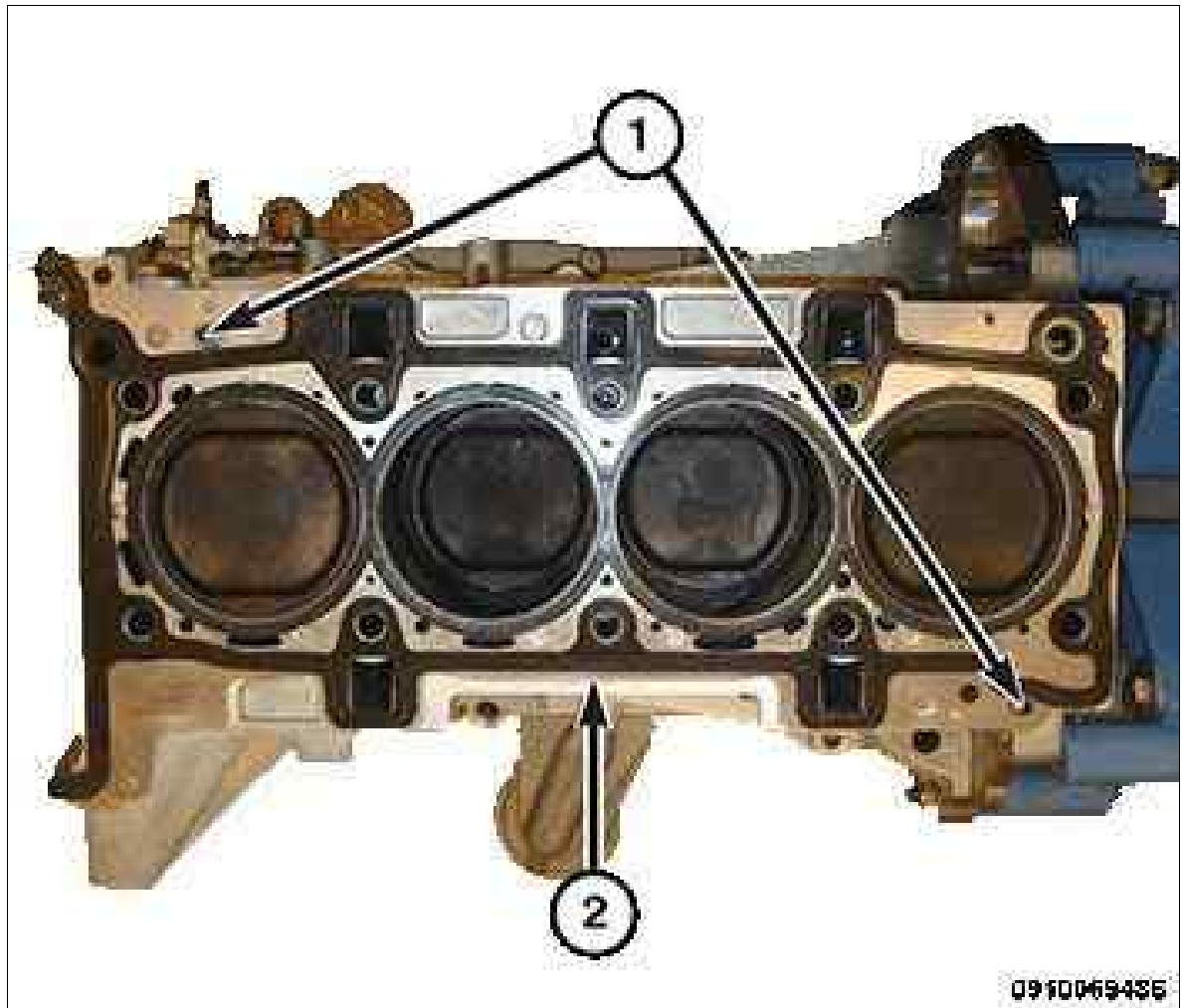
Fig 67: Cylinder Head & Bolts



Courtesy of CHRYSLER GROUP, LLC

83. Remove the bolts (1) and remove the cylinder head.

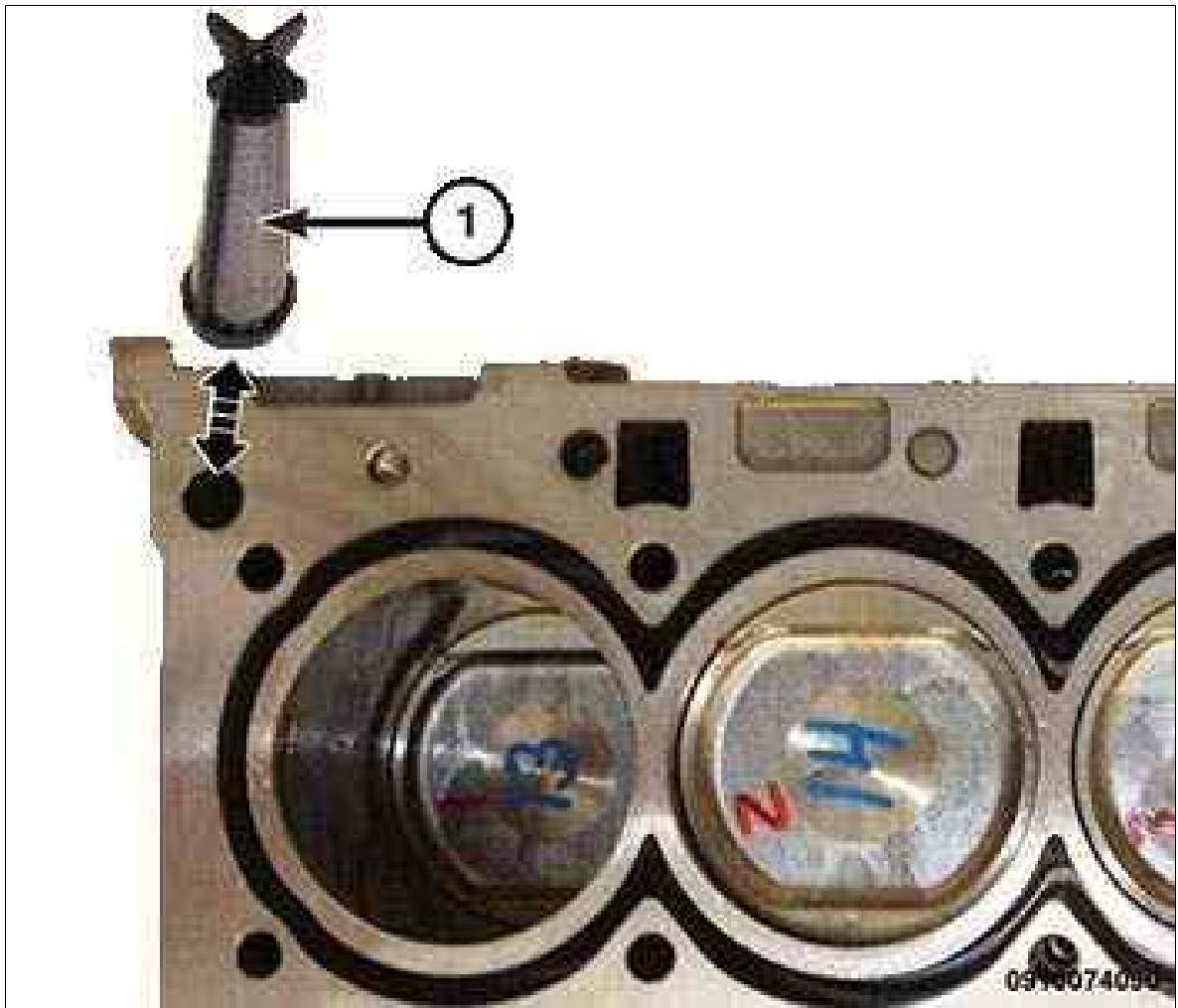
Fig 68: Cylinder Head Gasket & Locating Dowels



Courtesy of CHRYSLER GROUP, LLC

84. Remove the gasket (2) and the centering bushings (1).

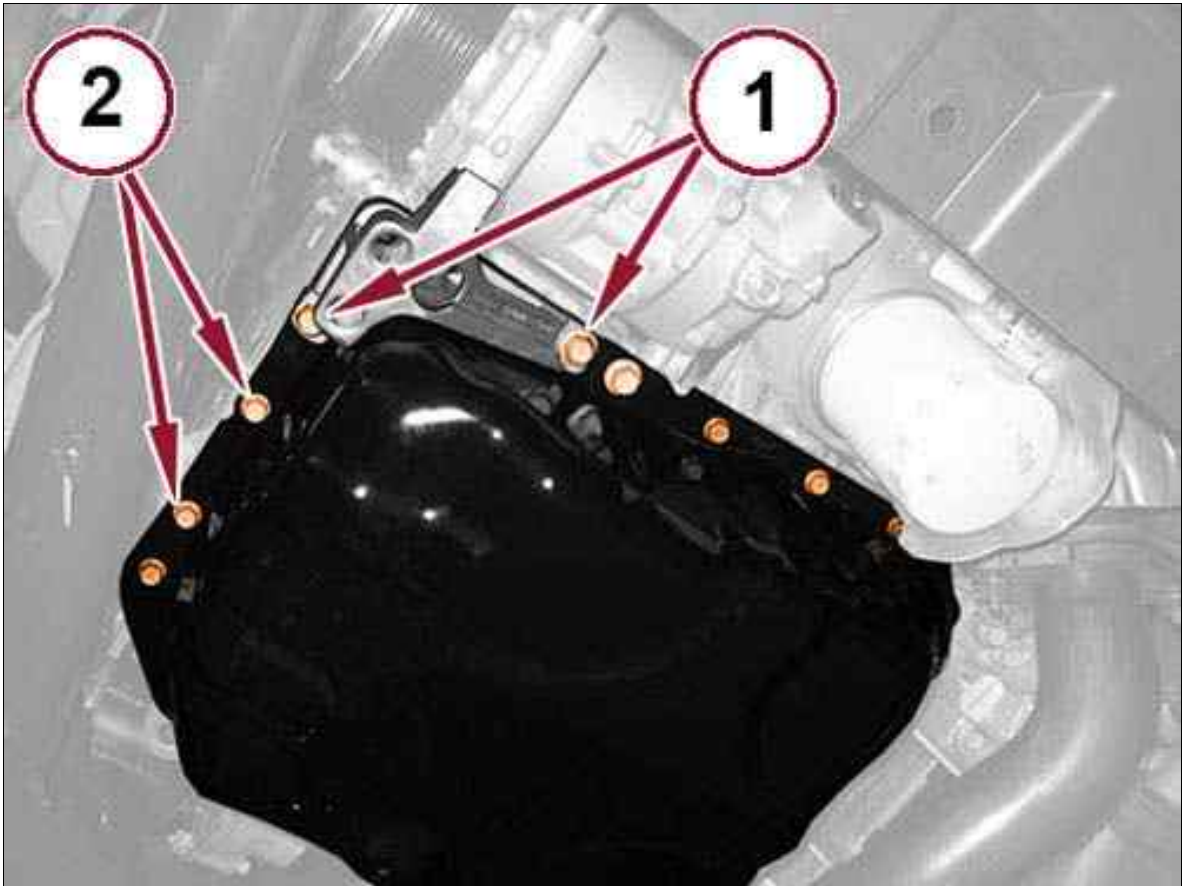
Fig 69: Locating Variable Valve Actuation Assembly (VVAA) Oil Supply Filter



Courtesy of CHRYSLER GROUP, LLC

85. Remove the Variable Valve Actuation Assembly (VVAA) oil supply filter (1) from the engine block.

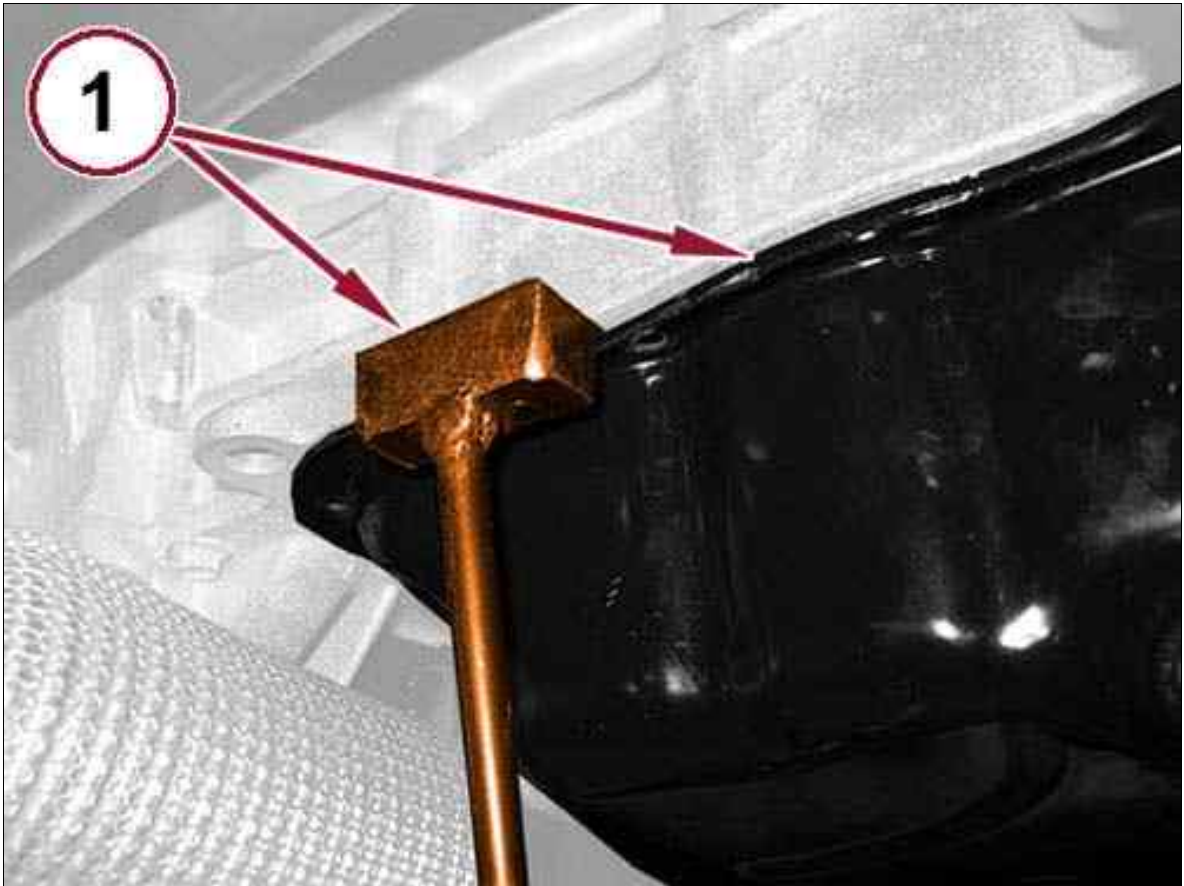
Fig 70: Engine Oil Pan & Bolts



Courtesy of CHRYSLER GROUP, LLC

86. Remove the bolts (2) securing oil pan.

Fig 71: Cutting Sealant Around Perimeter Of Engine Oil Pan Using Special Tool



Courtesy of CHRYSLER GROUP, LLC

87. Use the 1870718000 tool (1) to cut the silicone sealant around the entire perimeter of the engine oil pan.
88. Remove the engine oil pan.
89. Carefully clean the contact surfaces between the crankcase and oil pan.

DISASSEMBLY AND ASSEMBLY > DISASSEMBLY AND REASSEMBLY FOLLOWING INSPECTION - 2.4L



NOTE:

If the timing chain plated links (1) can no longer be seen, the timing chain links corresponding to the timing marks (2) must be marked prior to removal if the chain is to be reused.

DISASSEMBLY AND ASSEMBLY > DISASSEMBLY AND REASSEMBLY FOLLOWING

INSPECTION - 2.4L > DISASSEMBLY

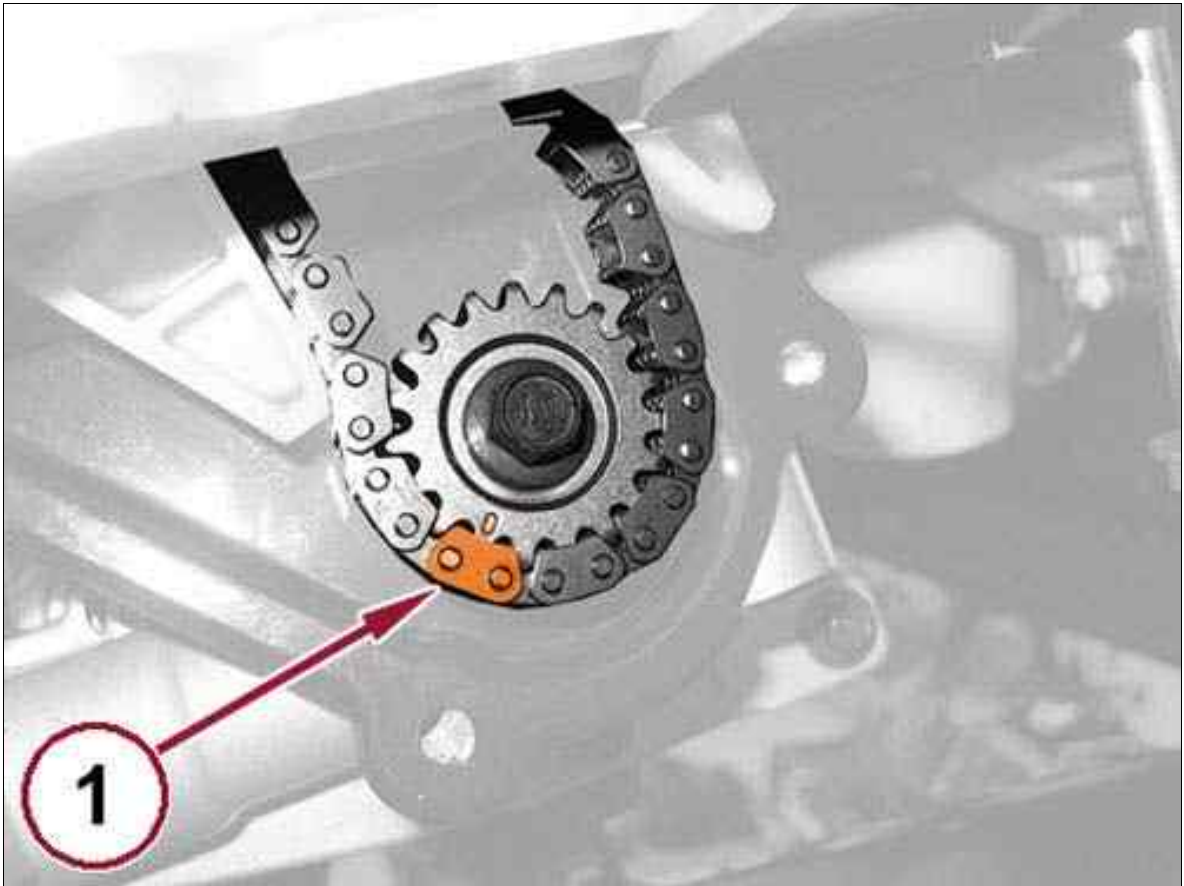
Fig 1: Marking Chain Link Corresponding To Crankshaft Sprocket Timing Mark



Courtesy of CHRYSLER GROUP, LLC

1. Mark chain link (1) corresponding to crankshaft sprocket timing mark (2).

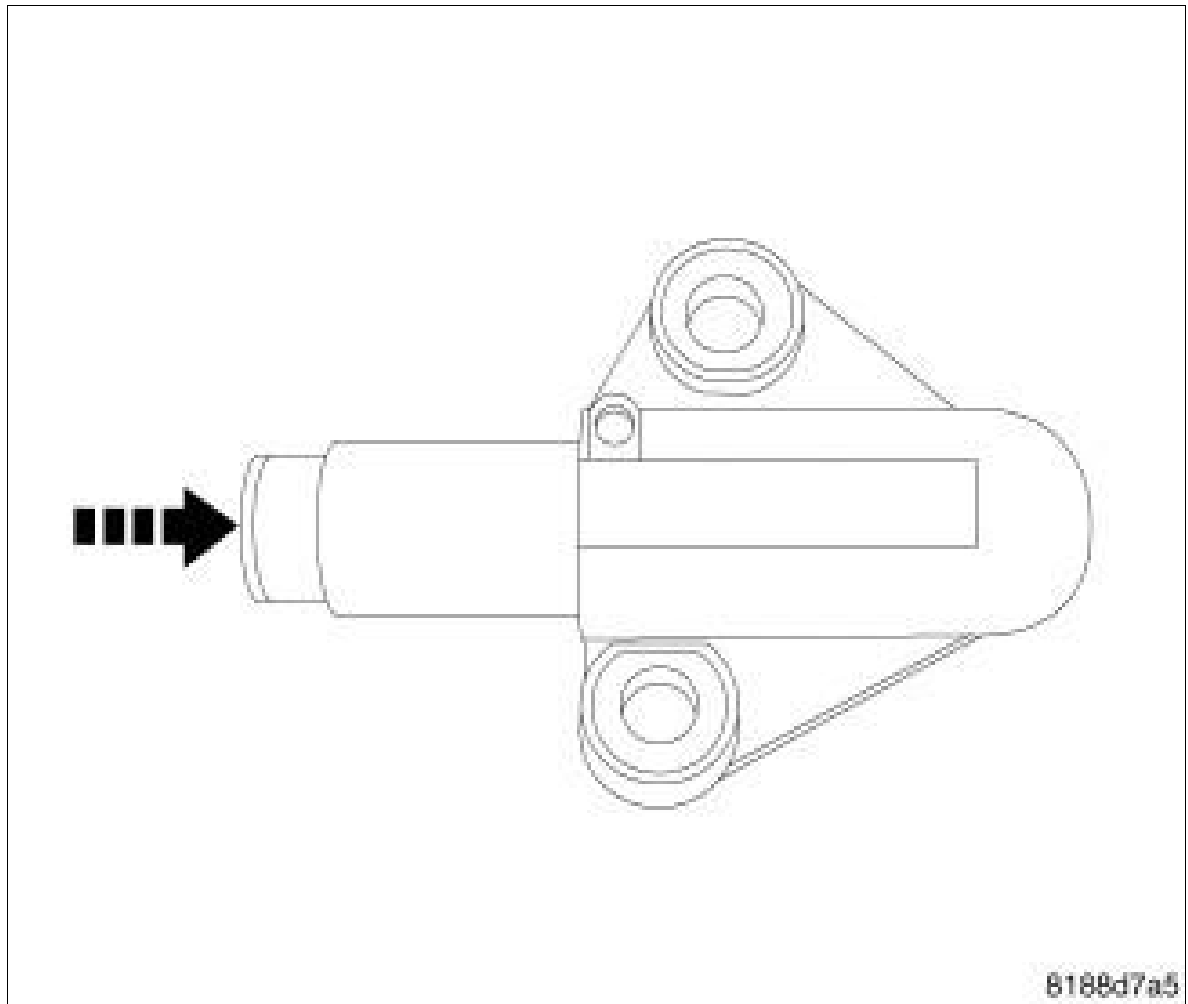
Fig 2: Marking Chain Link Corresponding To Balance Shaft/Oil Pump Sprocket Timing Mark



Courtesy of CHRYSLER GROUP, LLC

2. Mark the chain link (1) corresponding to balance shaft/oil pump sprocket timing mark.

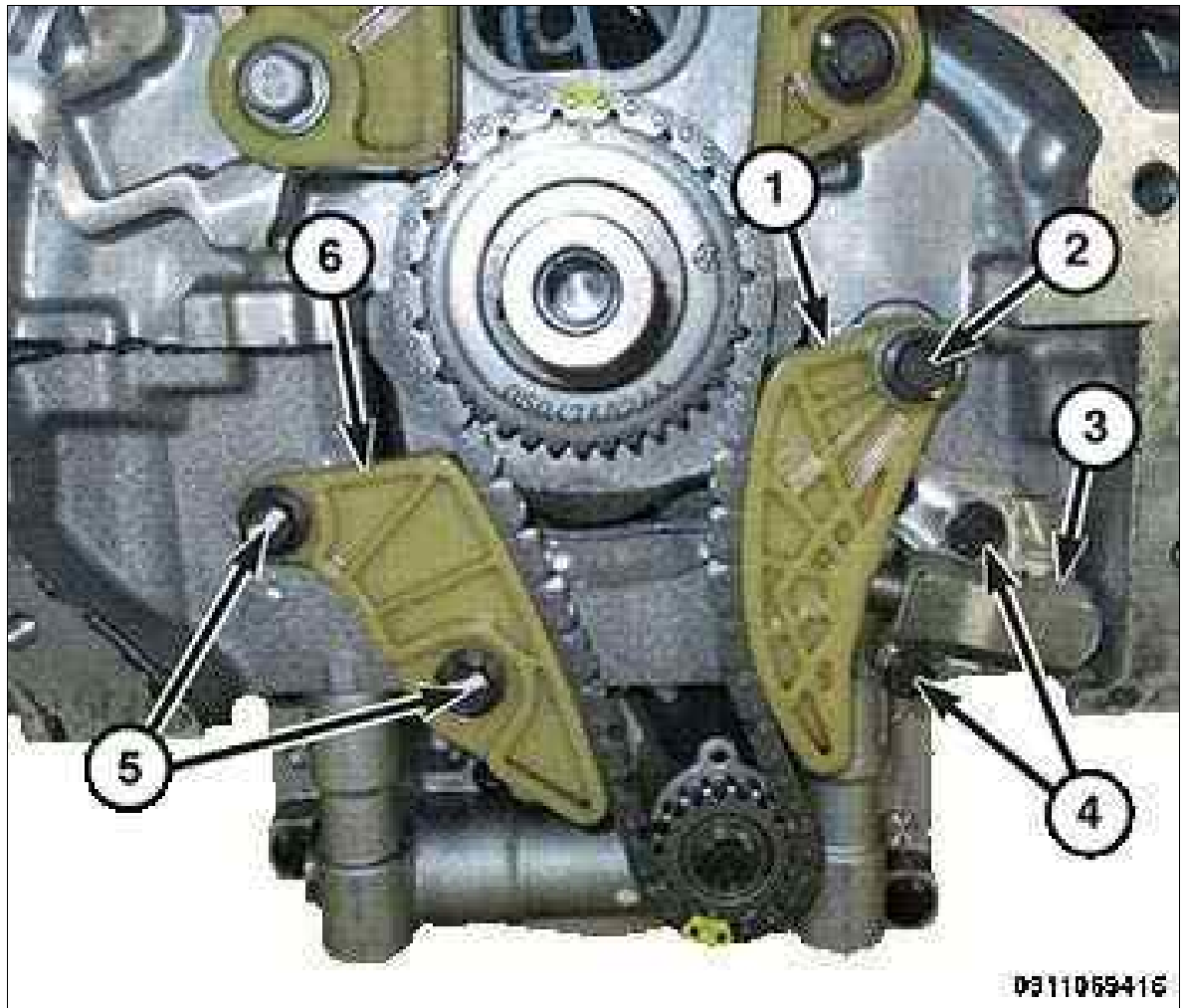
Fig 3: Oil Pump Tensioner Reset



Courtesy of CHRYSLER GROUP, LLC

3. Reset the balance shaft/oil pump chain tensioner by pushing the plunger inward and installing a pin to hold the plunger in the retracted position.

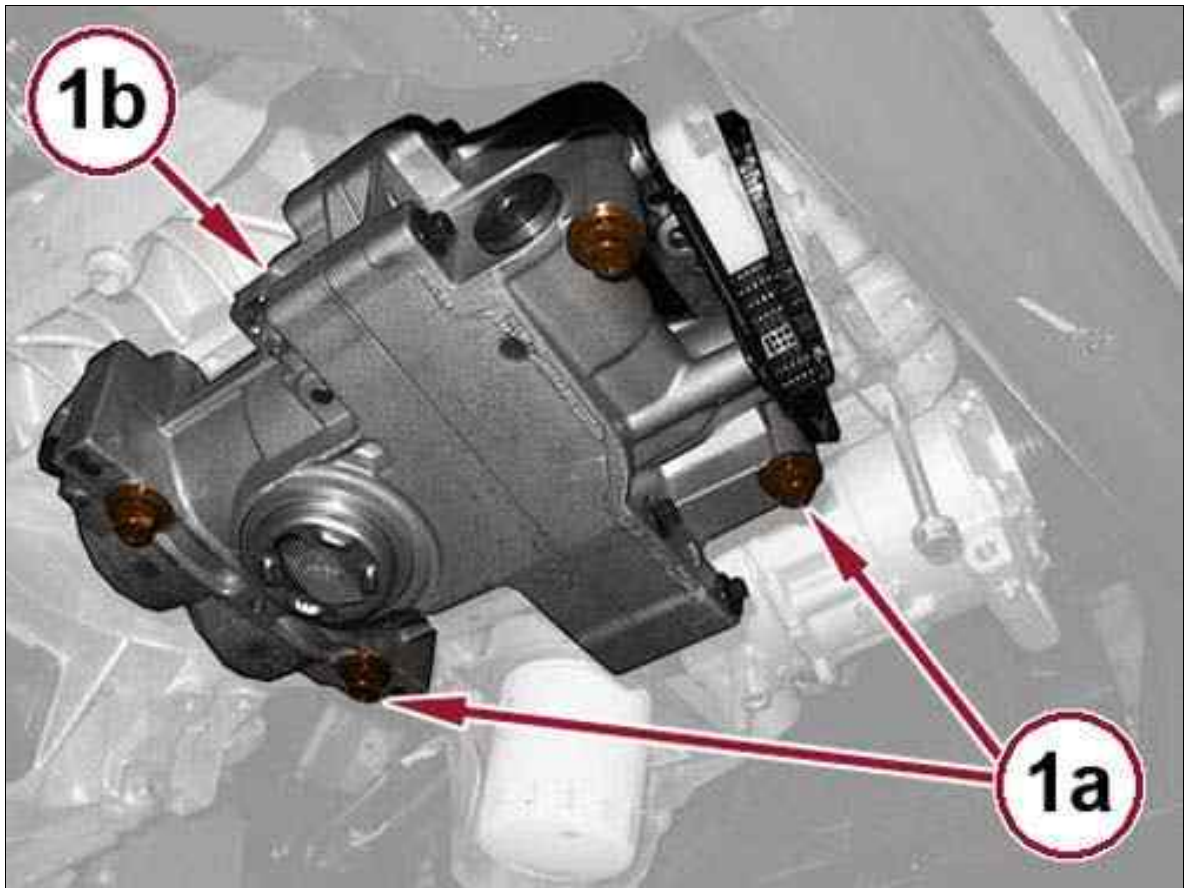
Fig 4: Tensioner, Tension Arm, Chain Guide & Bolts



Courtesy of CHRYSLER GROUP, LLC

4. Remove the two bolts (4) and the tensioner (3).
5. Remove the tensioner arm bolt (2) and the tensioner arm (1).
6. Remove the fixed chain guide bolts (5) and the chain guide (6).

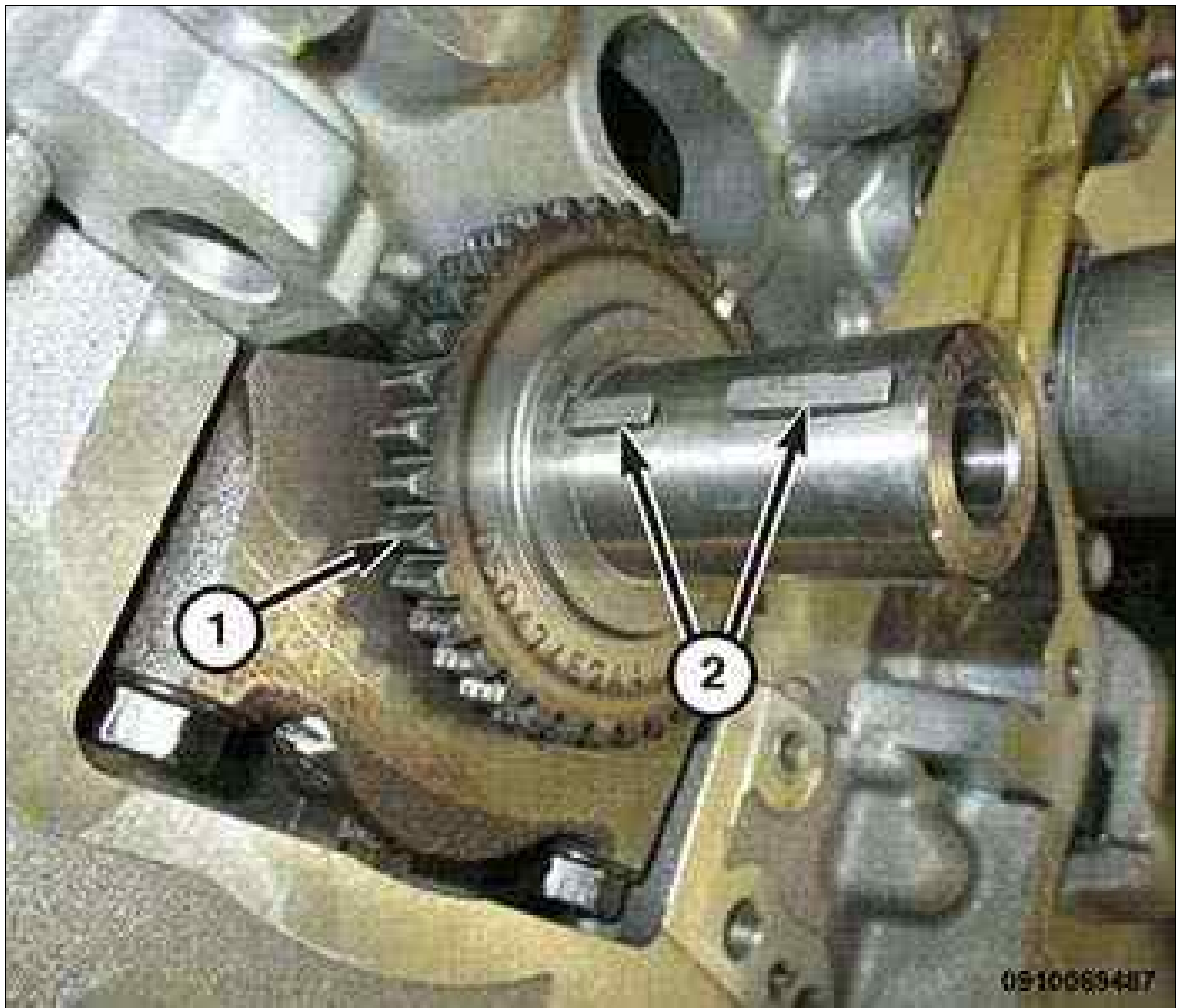
Fig 5: Oil Pump Assembly - Balancing Assembly & Bolts



Courtesy of CHRYSLER GROUP, LLC

7. Remove the screws (1a), disengage the chain from the engine oil pump control and remove the oil pump assembly - balancing assembly (1b).

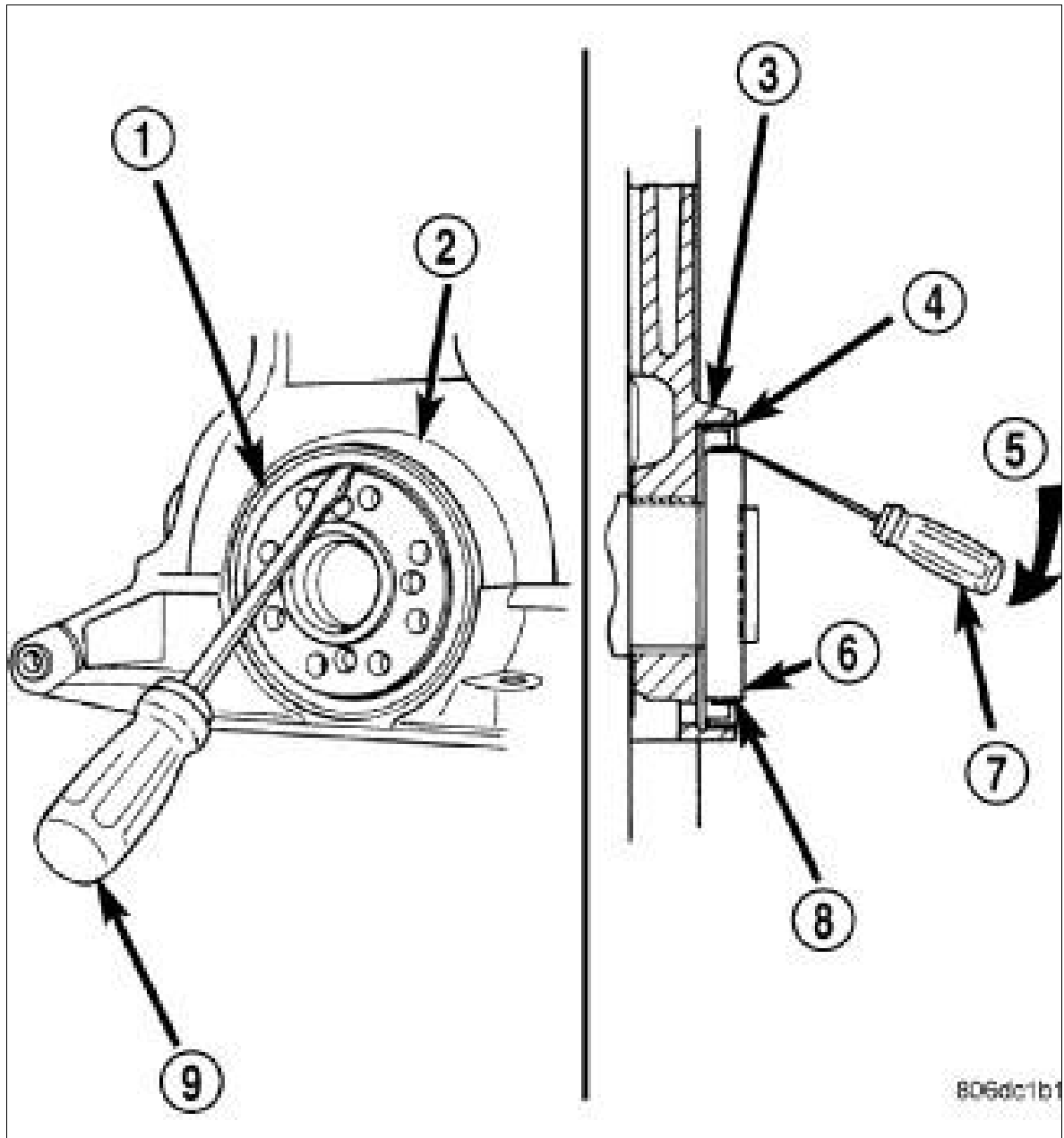
Fig 6: Crankshaft Sprocket & Keys



Courtesy of CHRYSLER GROUP, LLC

8. Remove the crankshaft sprocket (1).

Fig 7: Rear Crankshaft Oil Seal - Removal



Courtesy of CHRYSLER GROUP, LLC

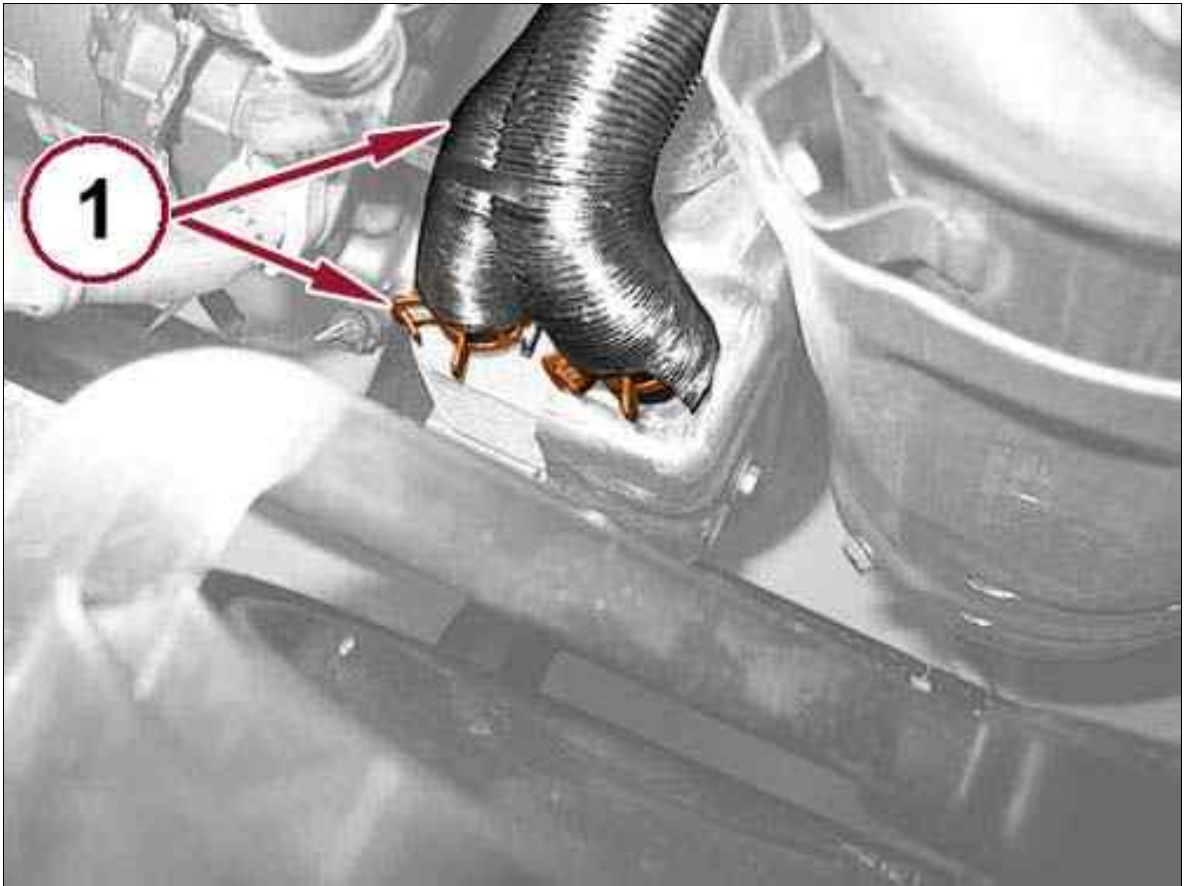
9. Insert a flat bladed screwdriver (7) between the dust lip (8) and the metal case (4) of the crankshaft seal (1). Angle the screwdriver through the dust lip against the metal case of the seal. Pry out the seal.

⚠ CAUTION:

Do not permit the screwdriver blade to contact crankshaft seal surface. Contact of the screwdriver blade against crankshaft edge (chamfer) is permitted.

10. Check to make sure the seals garter spring is also removed and is not on the crankshaft.

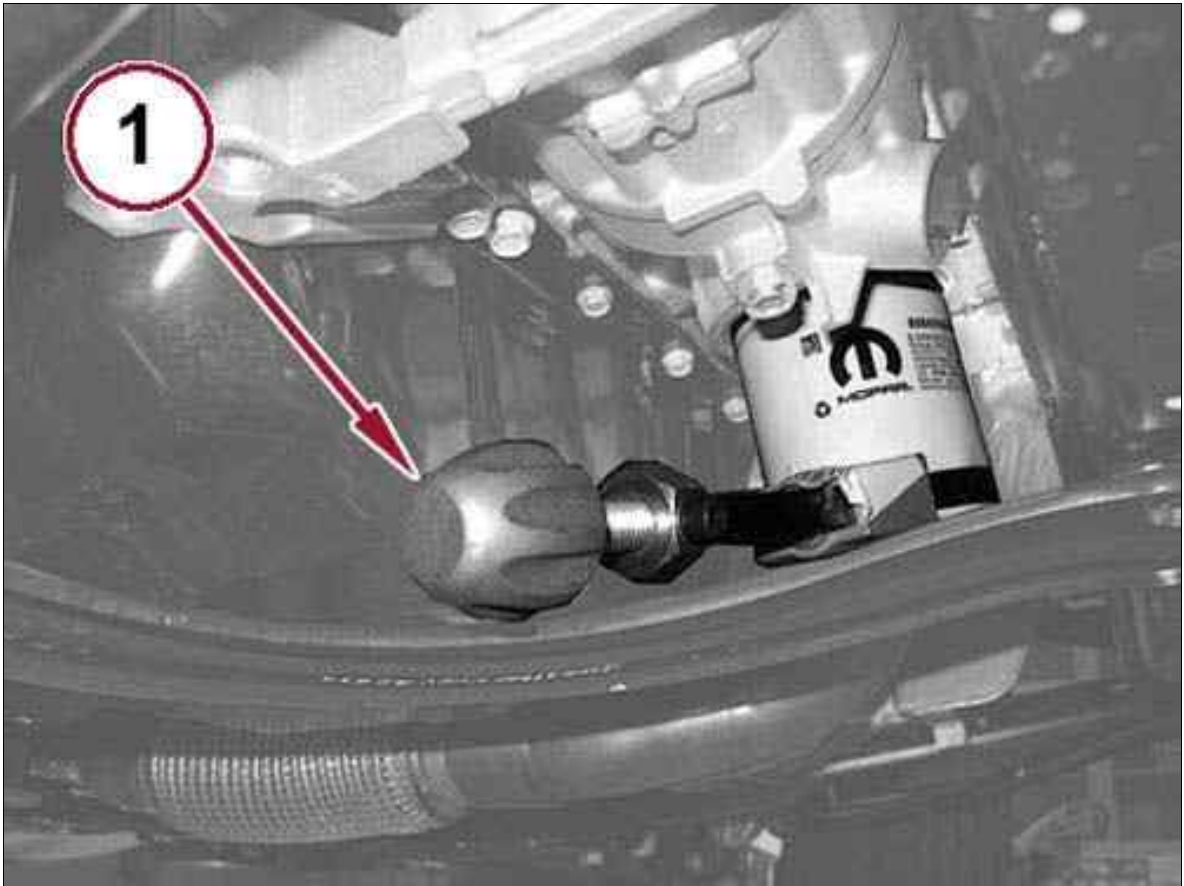
Fig 8: Water Supply And Return Hoses & Clamps



Courtesy of CHRYSLER GROUP, LLC

11. Loosen the clamps and disconnect the water supply and return hoses (1) to the engine oil cooler.

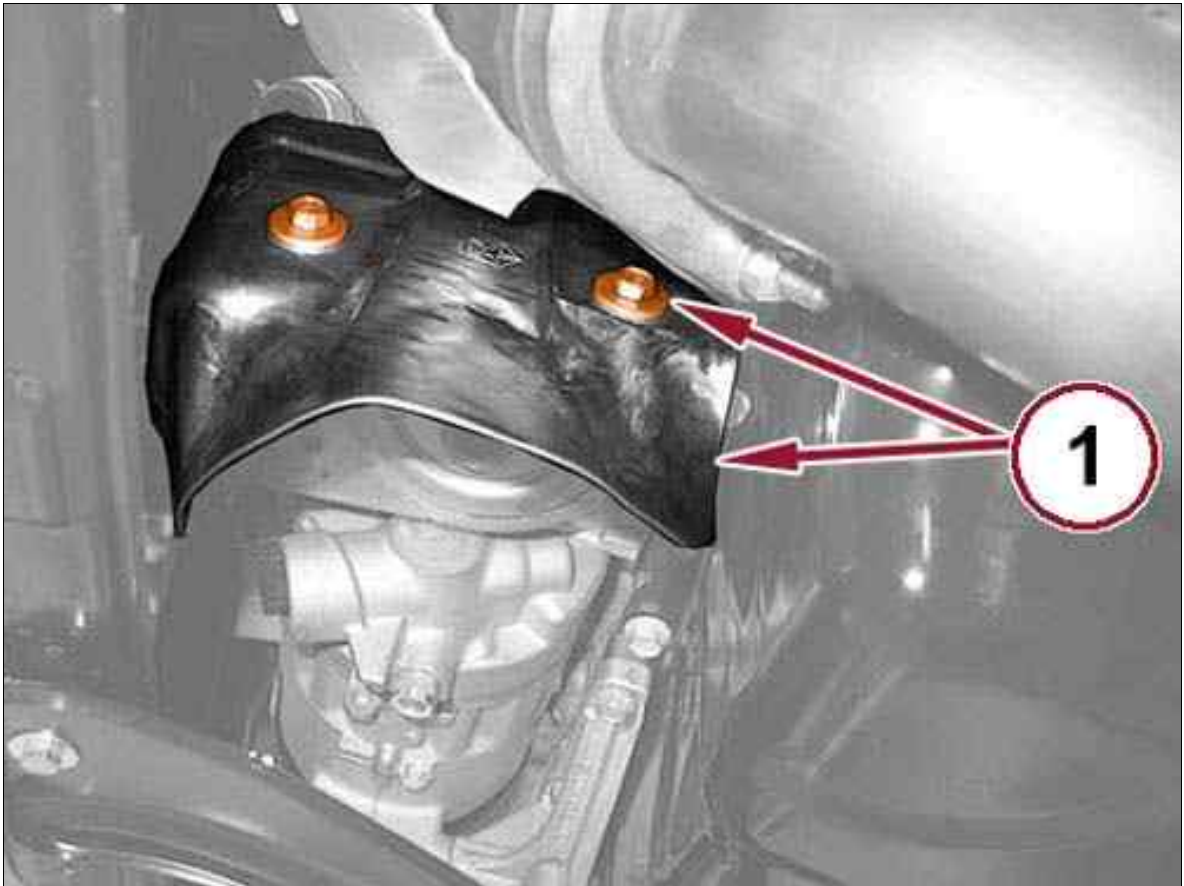
Fig 9: Removing Oil Filter Using Oil Filter Wrench



Courtesy of CHRYSLER GROUP, LLC

12. Unlock the engine oil filter and remove it using an appropriate oil filter wrench (1).

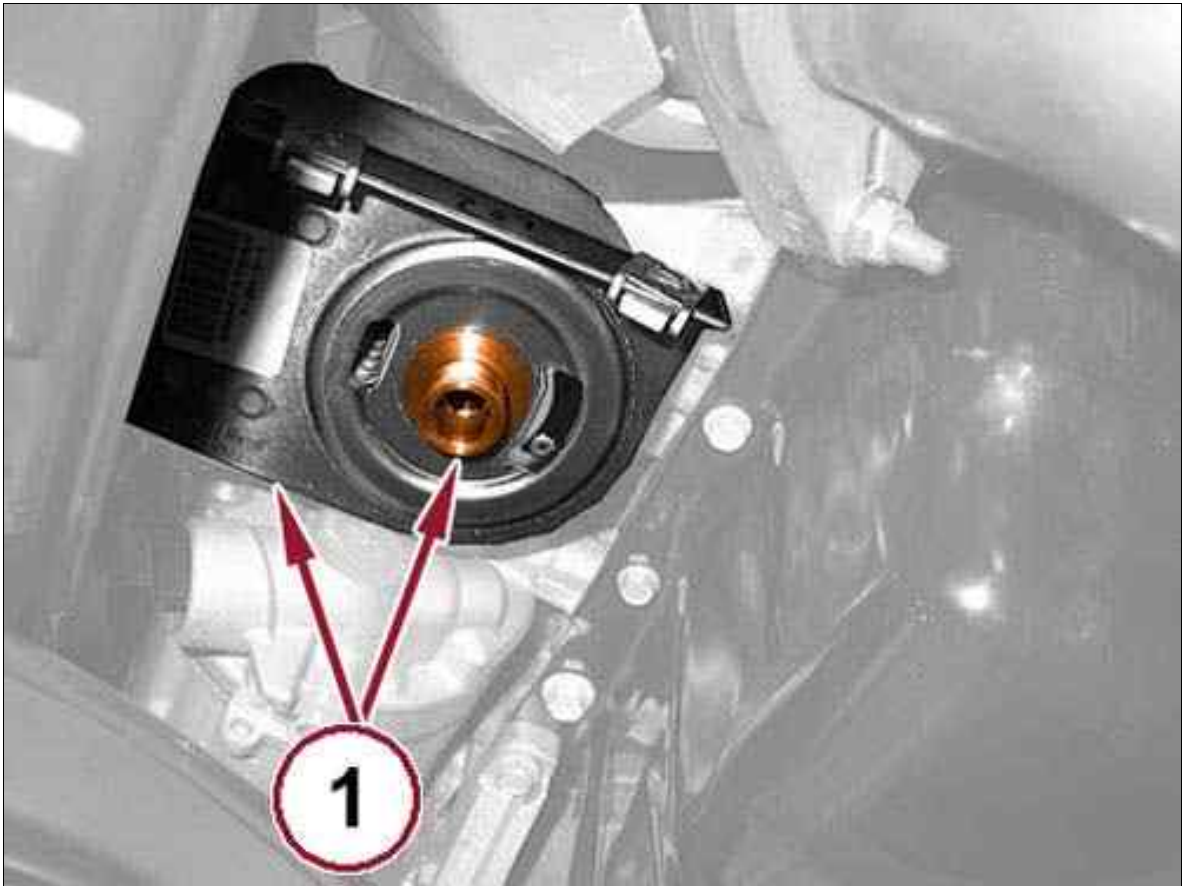
Fig 10: Heat Shield & Bolts



Courtesy of CHRYSLER GROUP, LLC

13. Remove the screws and remove the heat shield (1).

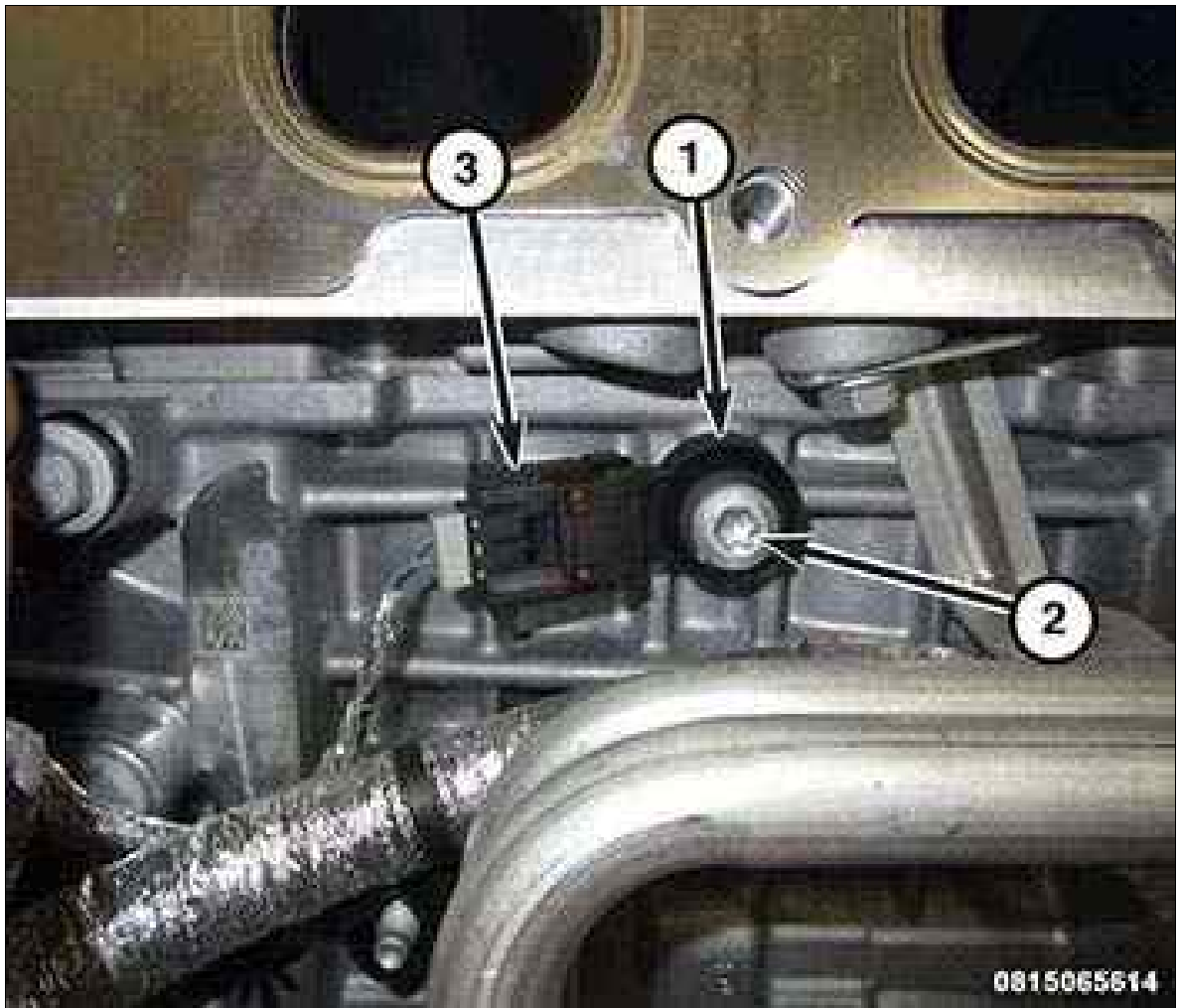
Fig 11: Filter Housing & Motor Oil Cooler



Courtesy of CHRYSLER GROUP, LLC

14. Unscrew the filter (1) and remove the motor oil cooler.

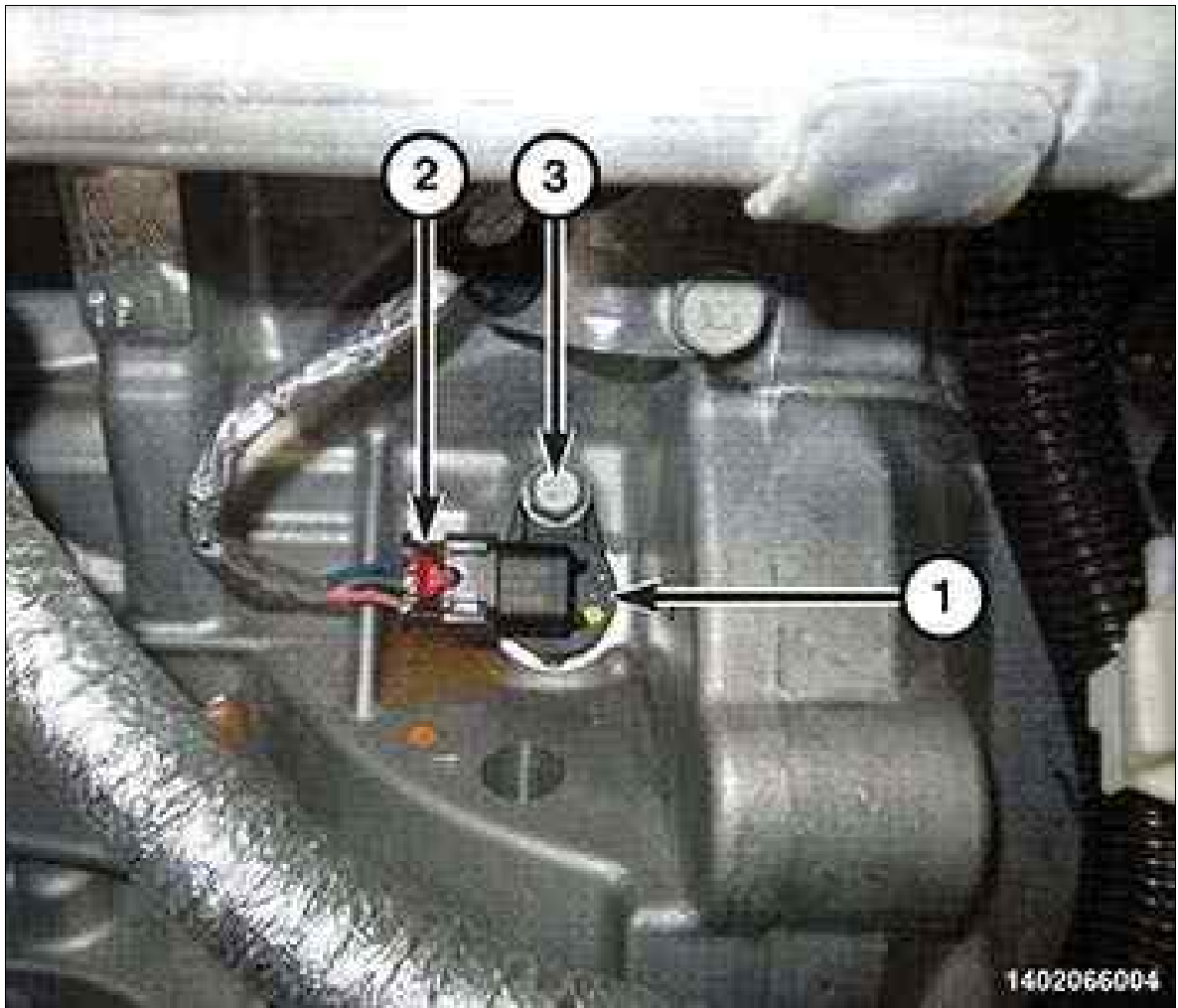
Fig 12: Knock Sensor & Mounting Bolt



Courtesy of CHRYSLER GROUP, LLC

15. Remove the mounting bolt (2) and remove the knock sensor (1).

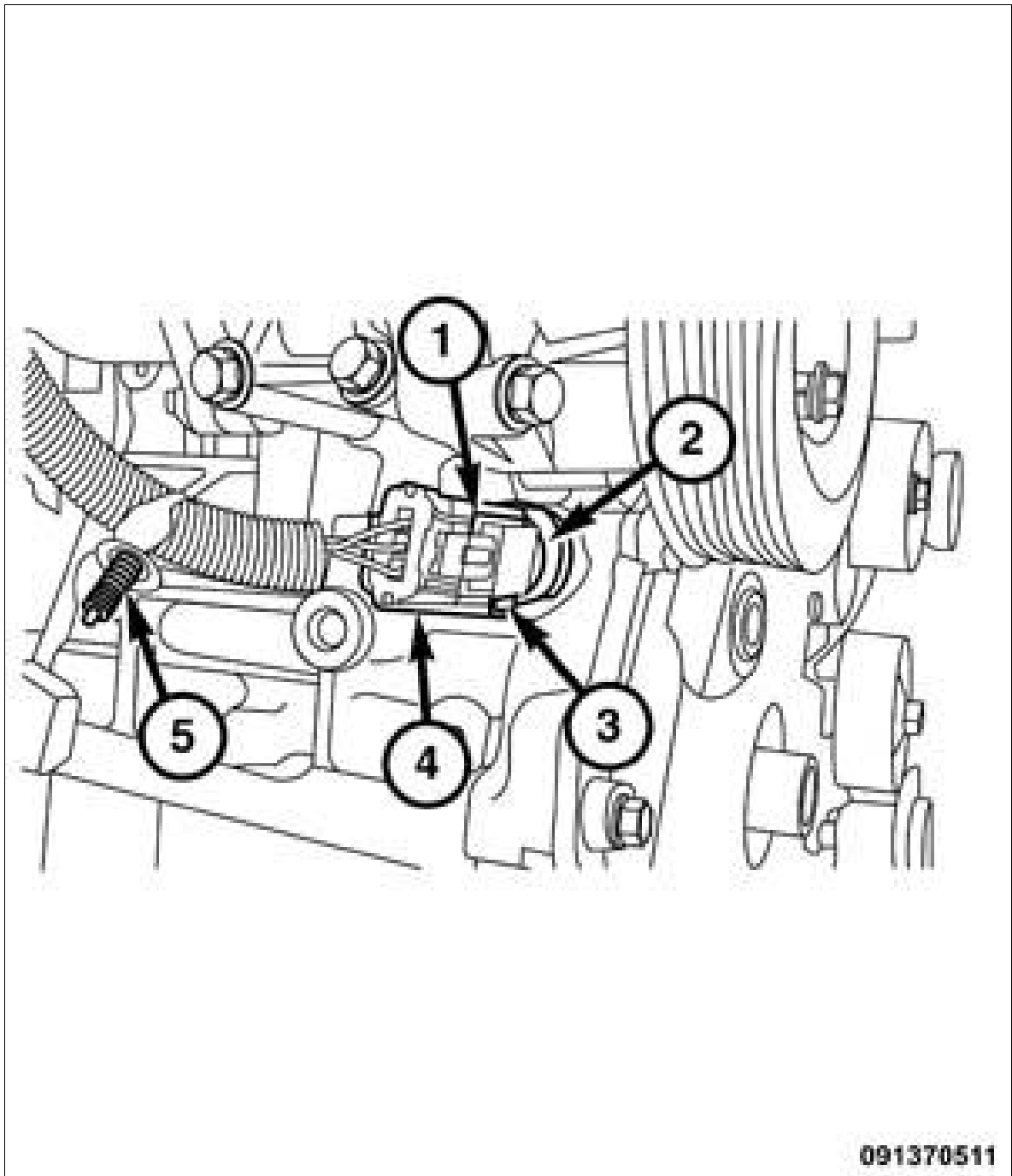
Fig 13: Crankshaft Position (CKP) Sensor, Wire Harness Connector & Bolt



Courtesy of CHRYSLER GROUP, LLC

16. Remove the mounting bolt (3) and remove the Crankshaft Position (CKP) sensor (1).

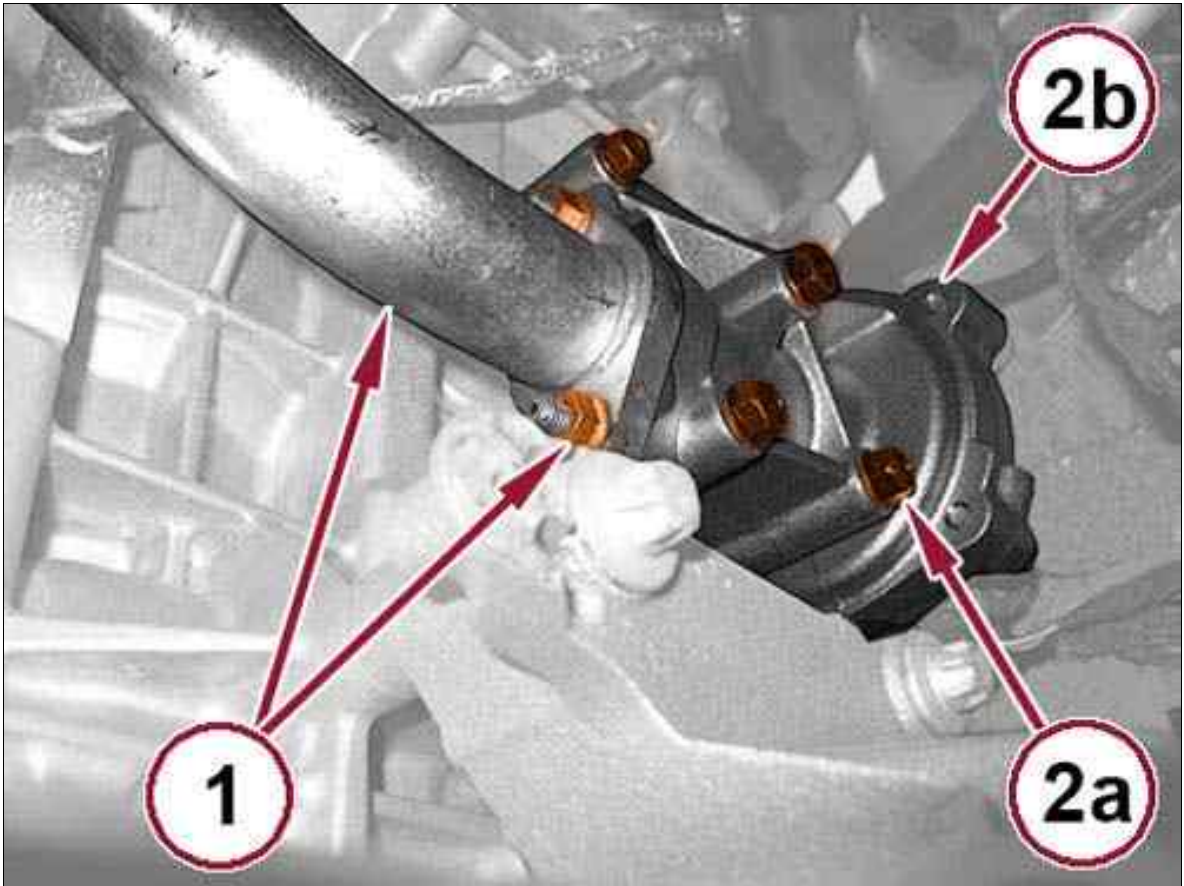
Fig 14: Oil Temperature Sensor & Connector



Courtesy of CHRYSLER GROUP, LLC

17. Remove the oil pressure sensor (2).

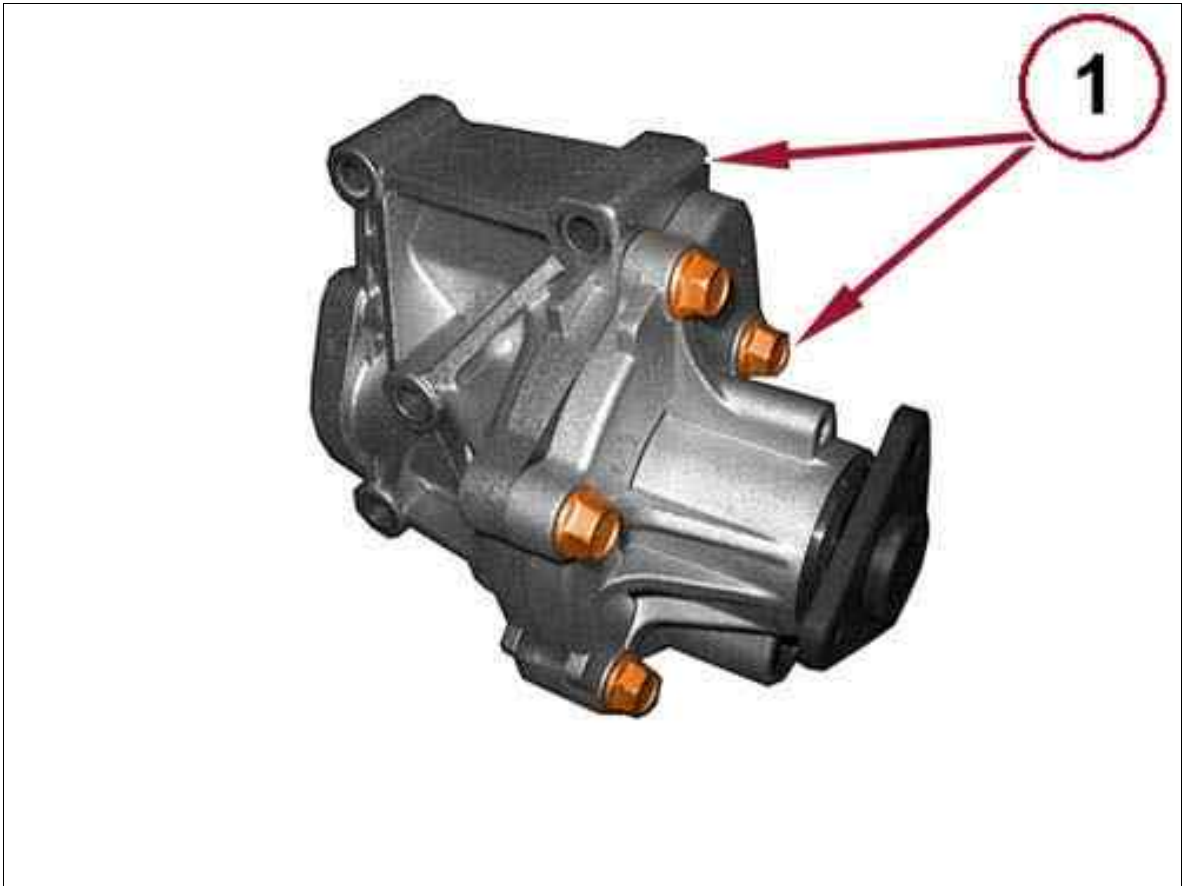
Fig 15: Coolant Tube, Water Pump Body, Nuts & Bolts



Courtesy of CHRYSLER GROUP, LLC

18. Remove the nuts (1) securing the coolant tube to the water pump body (2b).
19. Remove the bolts (2a) and the water pump body (2b).
20. Remove and discard the gasket.

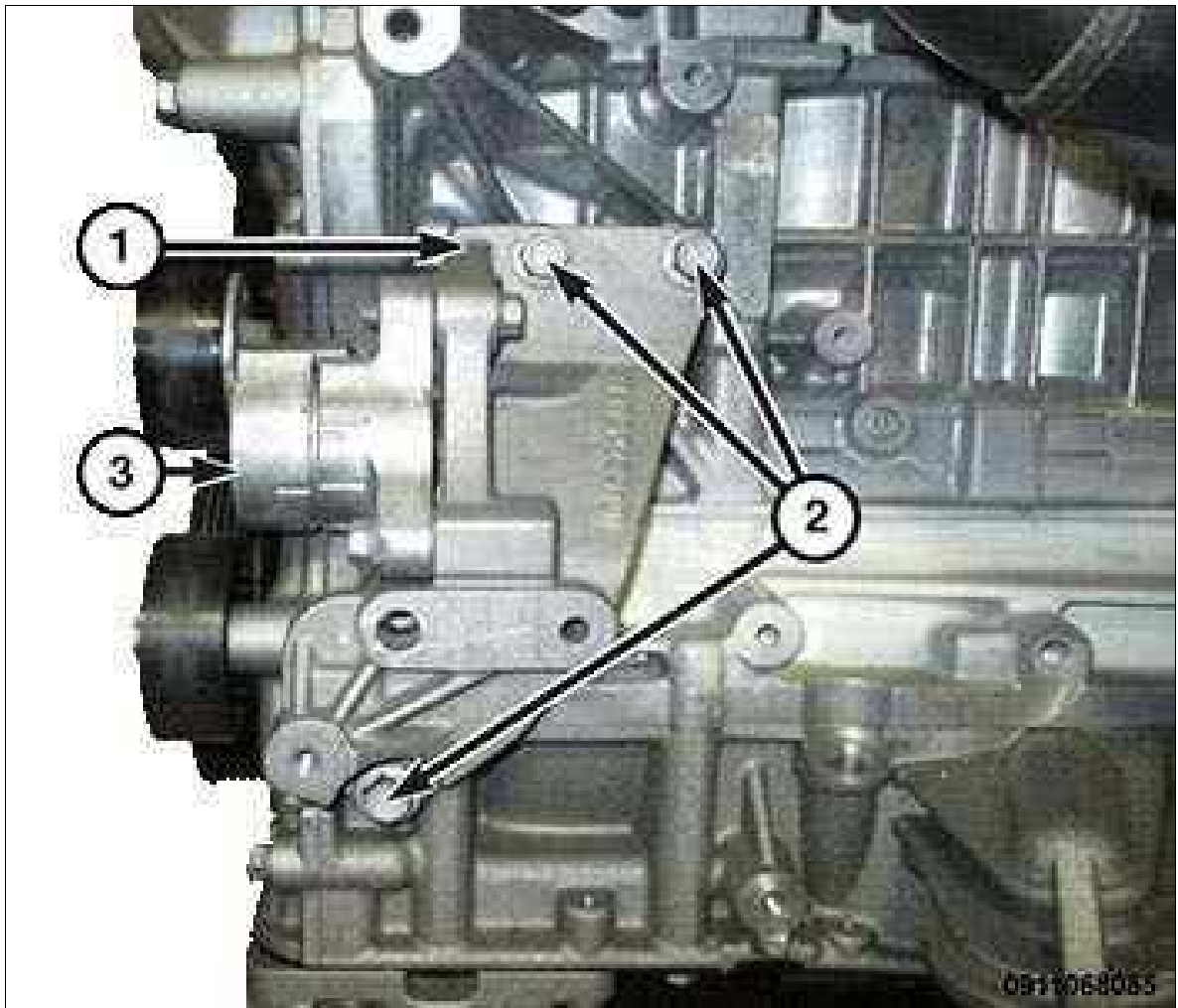
Fig 16: Water Pump & Bolts



Courtesy of CHRYSLER GROUP, LLC

21. If necessary, remove the bolts (1) and the water pump.

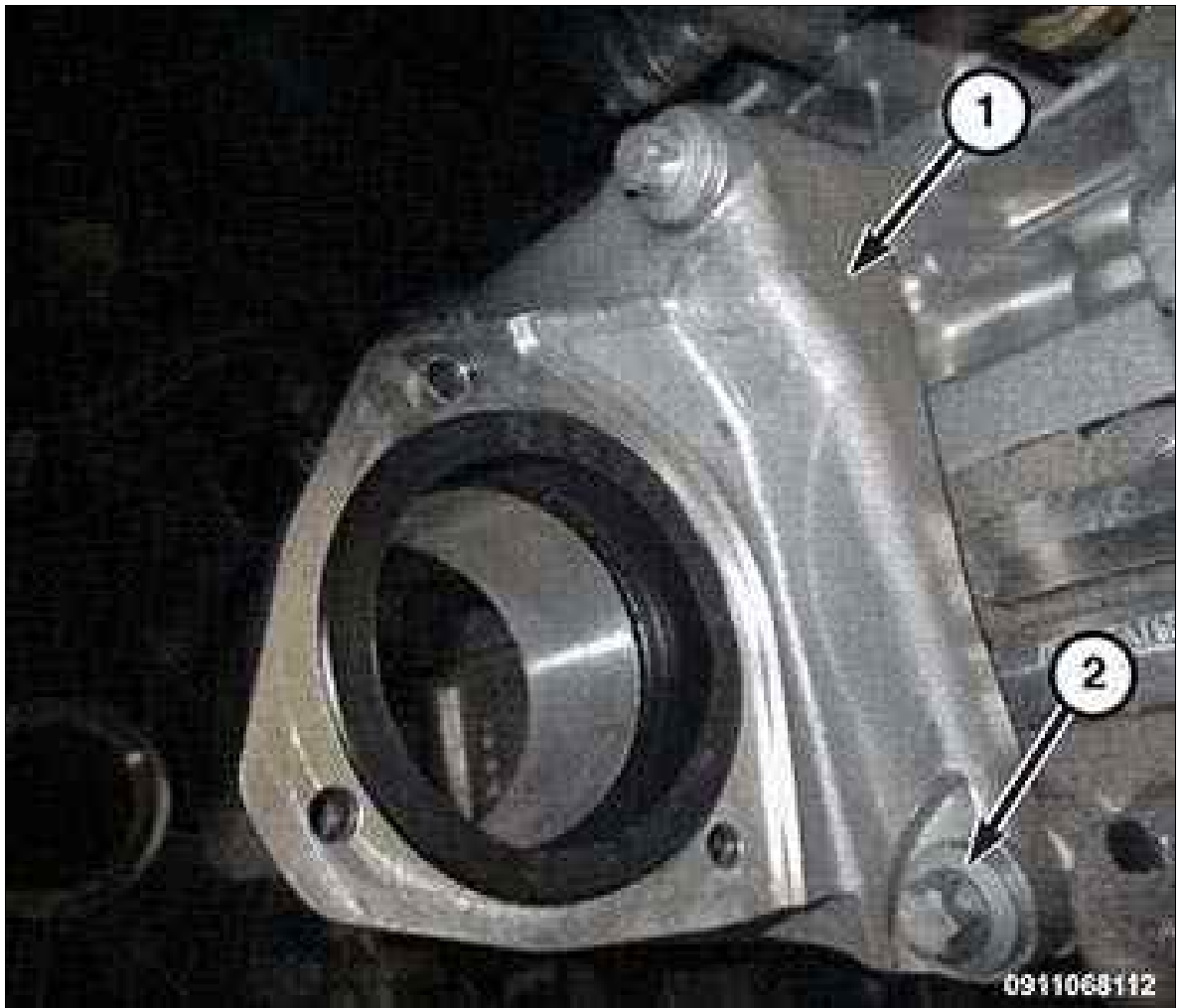
Fig 17: Generator Mounting Bracket, Accessory Belt Tensioner & Bolts



Courtesy of CHRYSLER GROUP, LLC

22. Remove the three bolts (2) and the generator mounting bracket (1) from the engine.

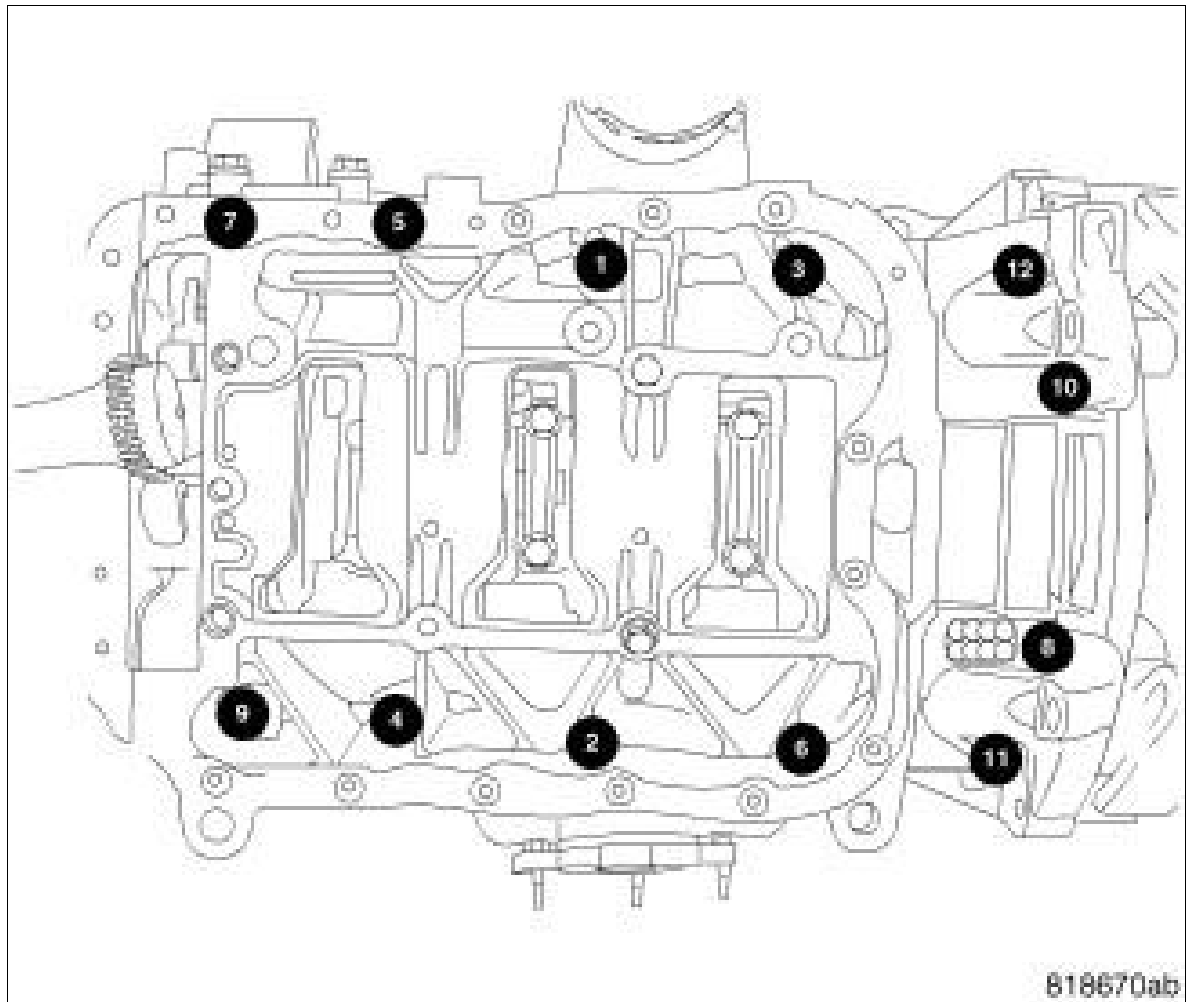
Fig 18: Intermediate Shaft Bearing Housing & Bolts



Courtesy of CHRYSLER GROUP, LLC

23. Remove the three bolts (2) and the intermediate shaft bearing support (1) from the engine, if equipped.

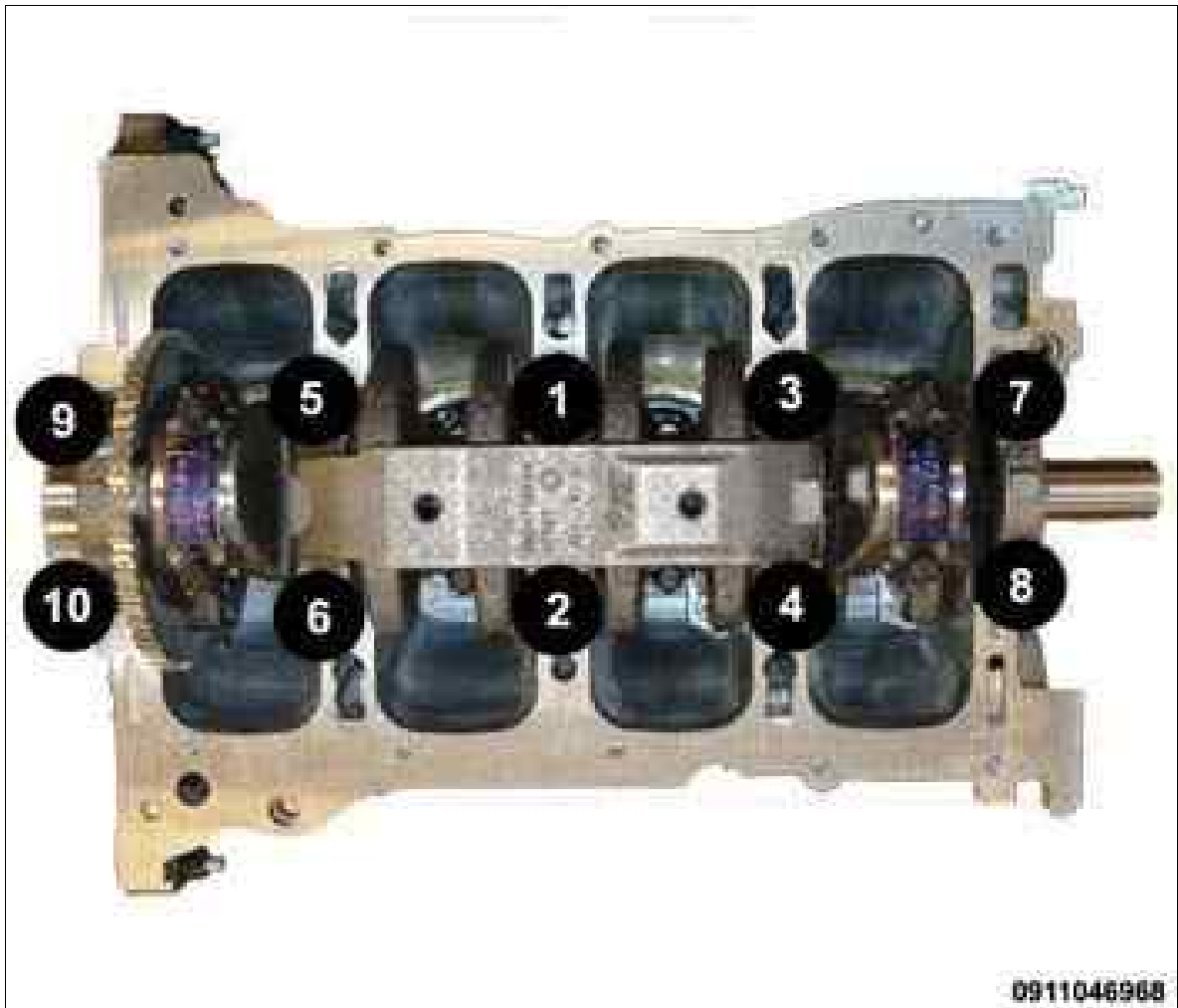
Fig 19: Ladder Frame Bolts Tightening Sequence



Courtesy of CHRYSLER GROUP, LLC

24. Remove the ladder frame bolts and separate the ladder frame from the engine block.

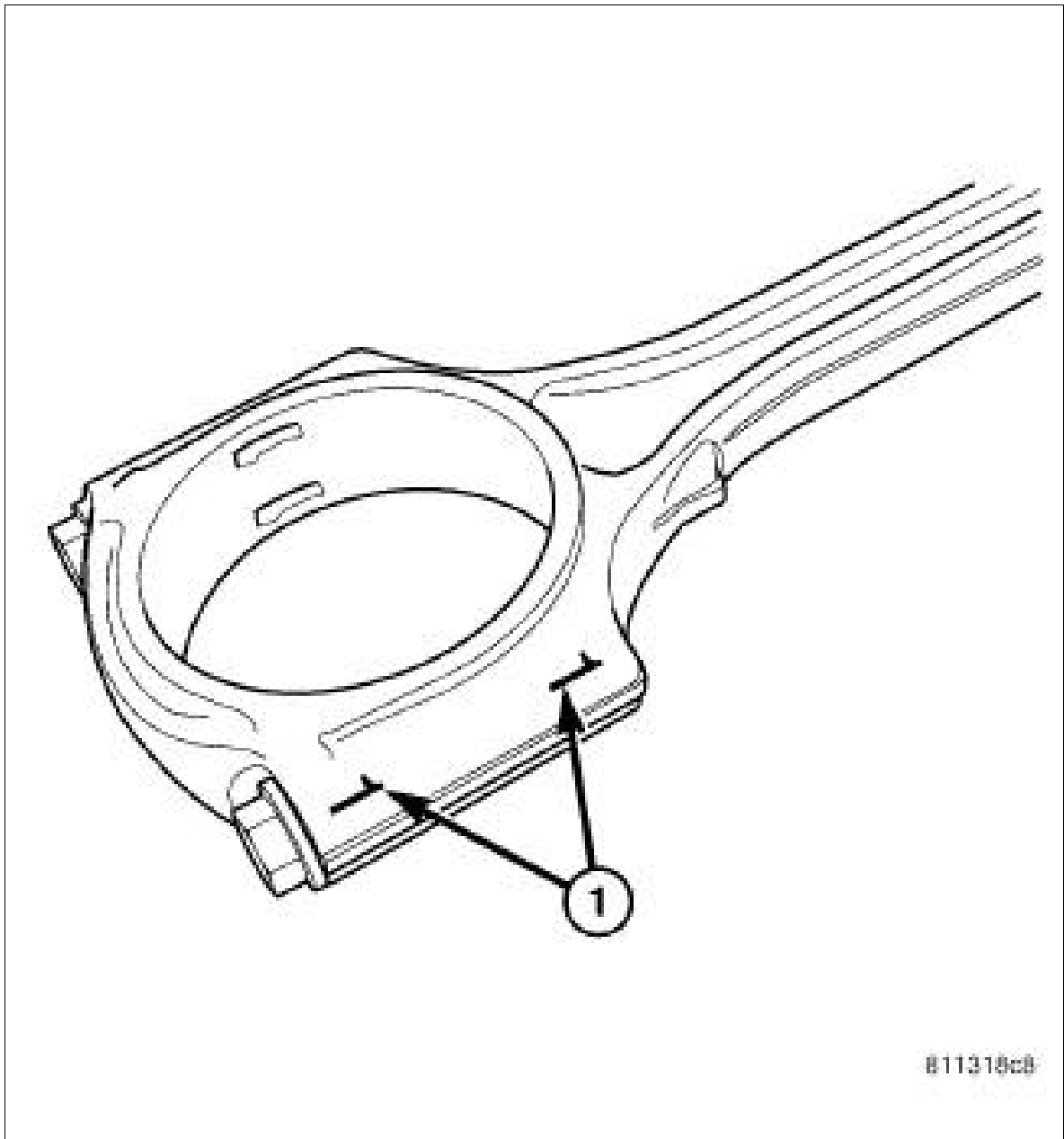
Fig 20: Main Bearing Cap Bolts Removal & Tightening Sequence



Courtesy of CHRYSLER GROUP, LLC

25. Loosen the ten main bearing cap bolts.
26. Remove the bearing beam bolts (1 - 6) and remove the bearing beam. Temporarily install main bearing cap bolts (M10 x 1.25 x 76.5) into the unsupported No. 2, 3 and 5 main bearing caps hand tight.

Fig 21: Connecting Rod To Cylinder Identification



811319c8

Courtesy of CHRYSLER GROUP, LLC

 NOTE:

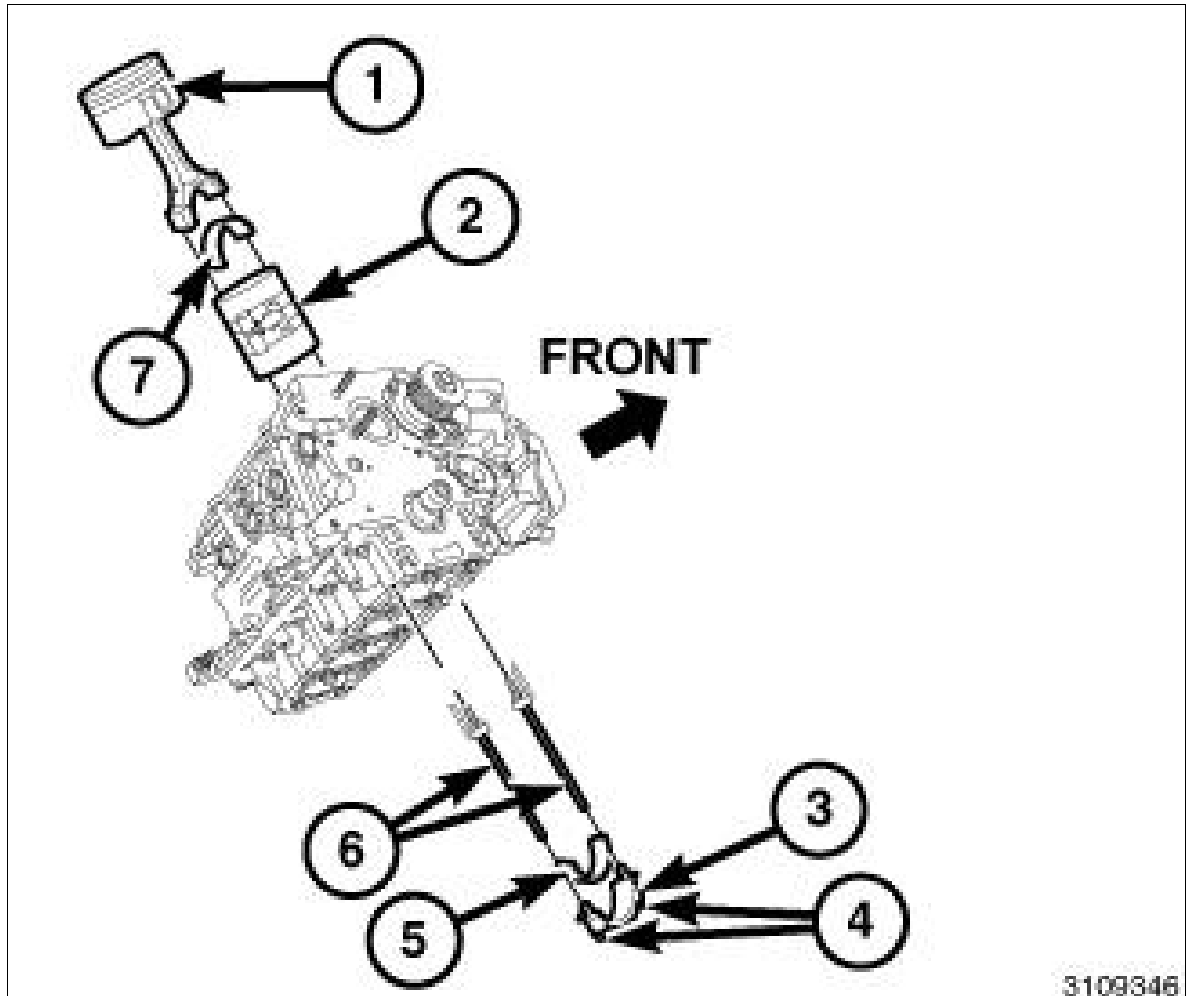
Connecting rods and bearing caps are not interchangeable and should be marked before removing to ensure correct reassembly.

 CAUTION:

DO NOT use a number stamp or a punch to mark connecting rods or caps, as damage to connecting rods could occur

27. Mark connecting rod and bearing cap positions (1) using a permanent ink marker or scribe tool.

Fig 22: Piston, Connecting Rod Cap, Bolts, Plastic Guide Plates & Guide Pins



Courtesy of CHRYSLER GROUP, LLC

 NOTE:

Typical I4 engine configuration shown in illustration.

28. If necessary, remove the top ridge of the cylinder bores with a reliable ridge reamer before removing the pistons from the engine block. **Be sure to keep the tops of pistons covered during this operation.** Pistons and connecting rods must be removed from the top of the engine block. When removing piston and connecting rod assemblies from the engine, rotate the crankshaft CW so that each connecting rod is centered in the cylinder bore.

29. Remove the connecting rod cap bolts (4) and the connecting rod cap (3). Discard the cap bolts (4).



CAUTION:

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

30. Install the (special tool #10281, Pins, Connecting Rod Guide) (6) on the connecting rod being removed.

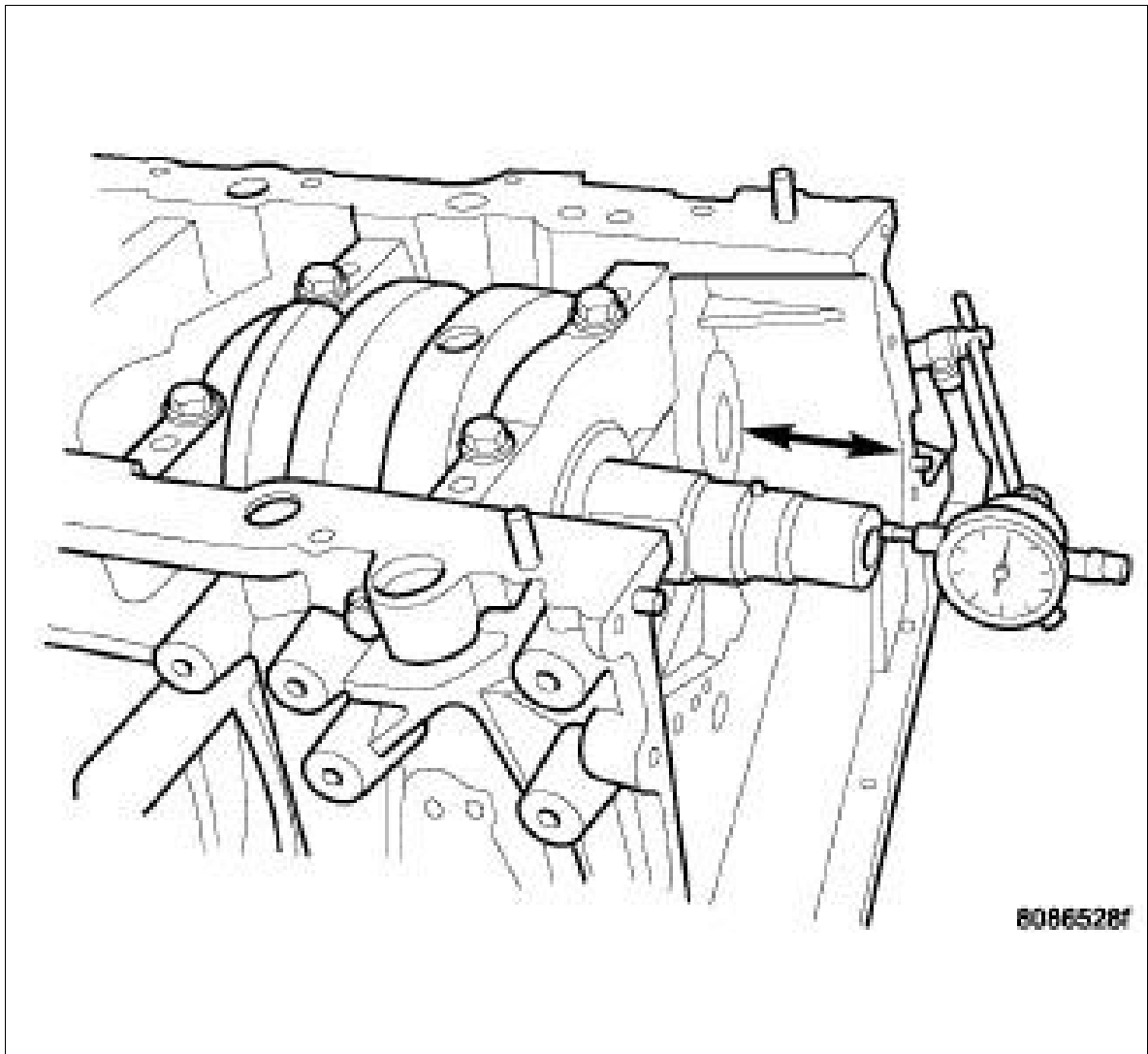


CAUTION:

Avoid contact with the piston oil cooler jet(s). Positioning of the oil cooler jet(s) is critical for proper engine operation.

31. Remove the connecting rod and piston assembly (1) complete with upper bearing shell (7) from the cylinder bore.
32. Repeat the previous steps for each piston being removed.
33. Immediately after piston and connecting rod removal, reinstall the bearing cap (3) on the mating connecting rod to prevent damage to the fractured cap and rod surfaces.
34. If required, remove the piston rings. Refer to RING(S), PISTON, REMOVAL AND INSTALLATION .

Fig 23: Checking Crankshaft End Play



Courtesy of CHRYSLER GROUP, LLC

35. Measure the crankshaft end play and compare it to the specification. Refer to ENGINE SPECIFICATIONS .



NOTE:

Crankshaft thrust bearings are not selectable and are only available in a single thickness.



CAUTION:

DO NOT use a number stamp or a punch to mark main bearing caps, as damage to main bearings could occur.

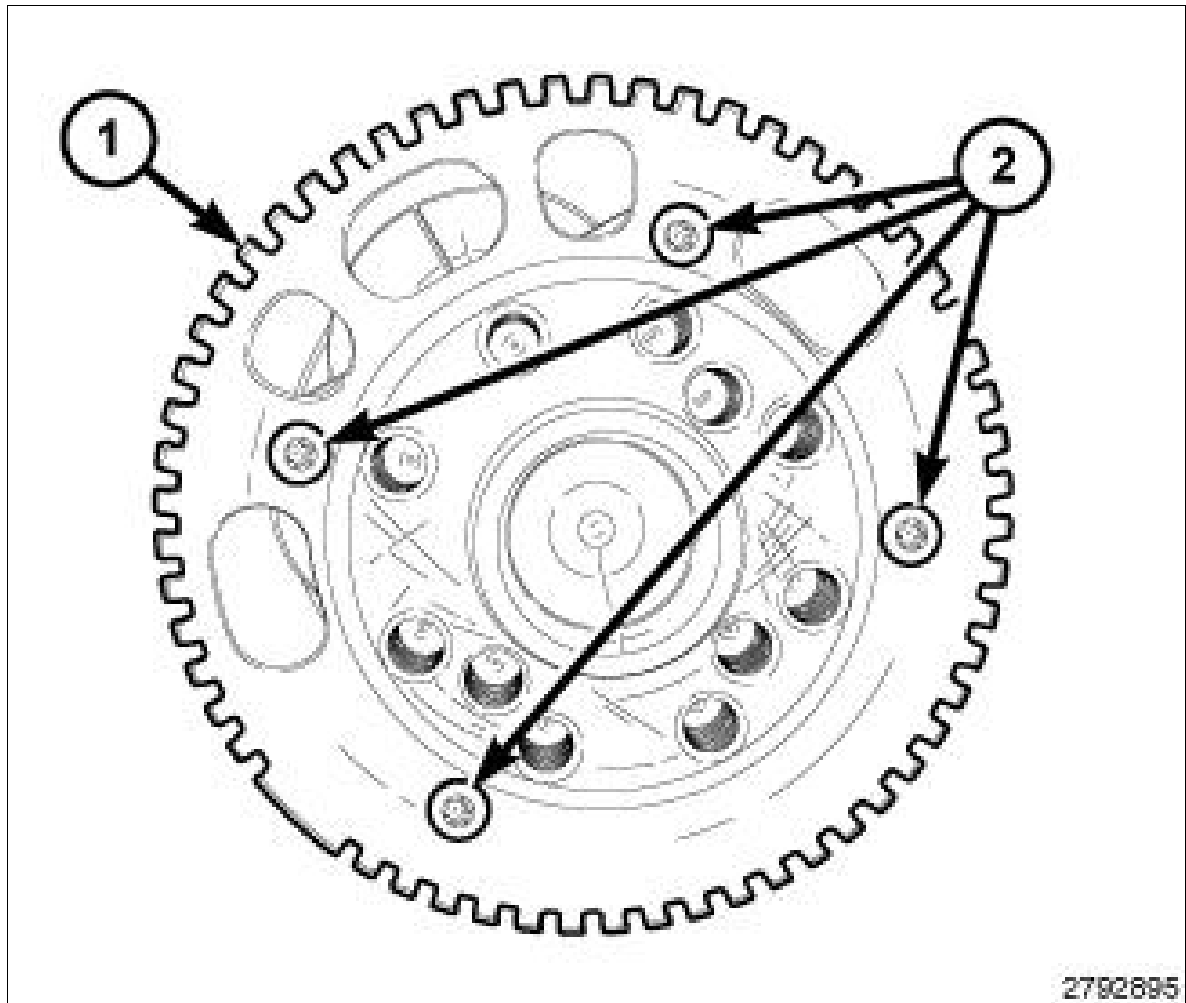
36. Mark the main bearing cap positions using a permanent ink marker or a scribe tool.

 **NOTE:**

Main bearing caps are not interchangeable and are marked to insure correct assembly.

37. Remove the main bearing cap bolts and remove the main bearing caps.

Fig 24: Target Wheel & Bolts



Courtesy of CHRYSLER GROUP, LLC

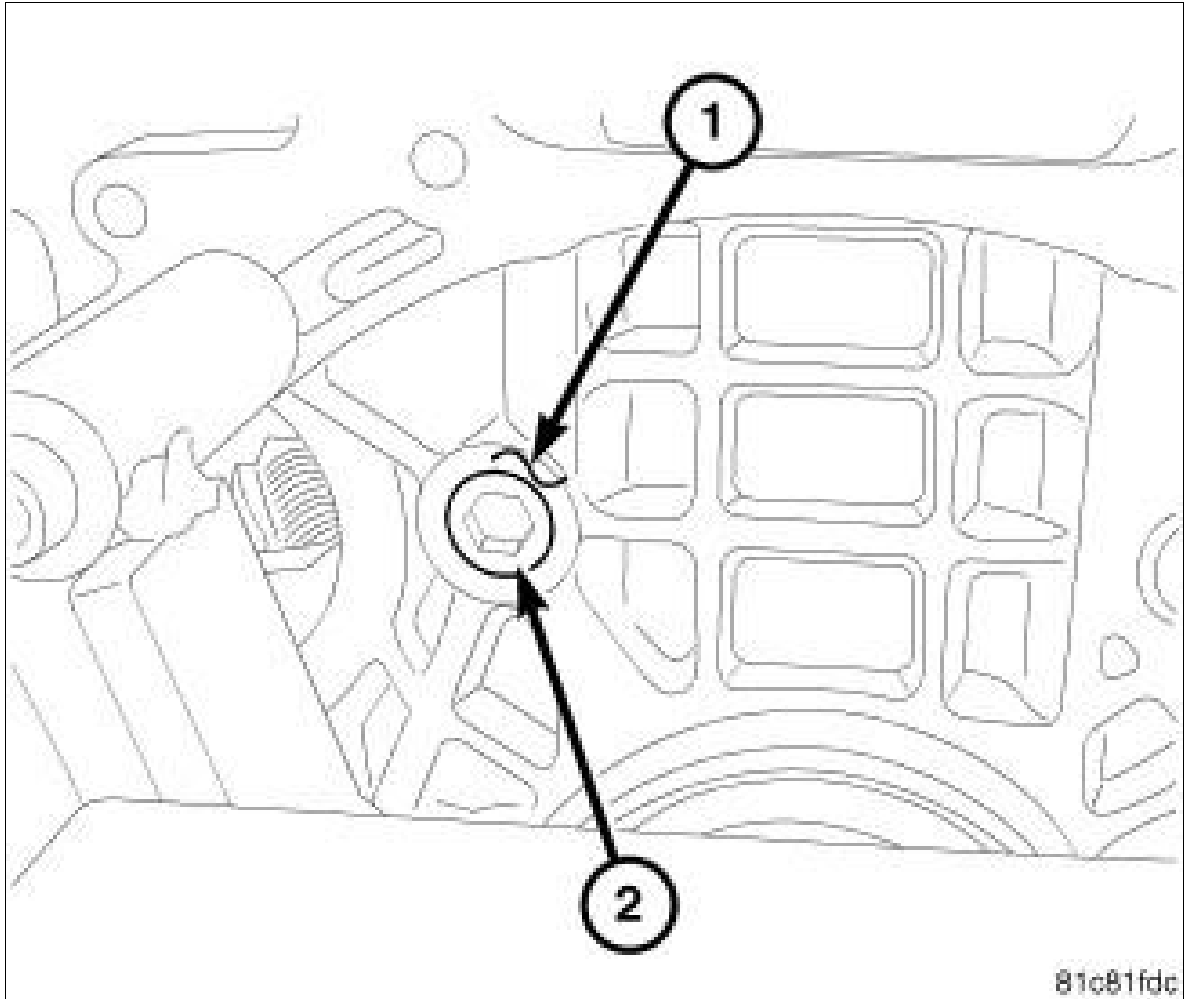
 **CAUTION:**

Do not rest the crankshaft on the target wheel (1). Damaged or bent target wheel teeth will destroy the target wheels ability to correctly relay crankshaft position to the crankshaft position sensor.

38. Lift the crankshaft from the cylinder block. Do not damage the main bearings or journals when removing the crankshaft.

39. If required, remove the four screws (2) and the target wheel (1) from the crankshaft.
40. Remove the lower main bearing shells from the main bearing caps.
41. Remove the upper main bearing shells from the engine block.
42. Remove the crankshaft thrust bearings.

Fig 25: Gallery Plug



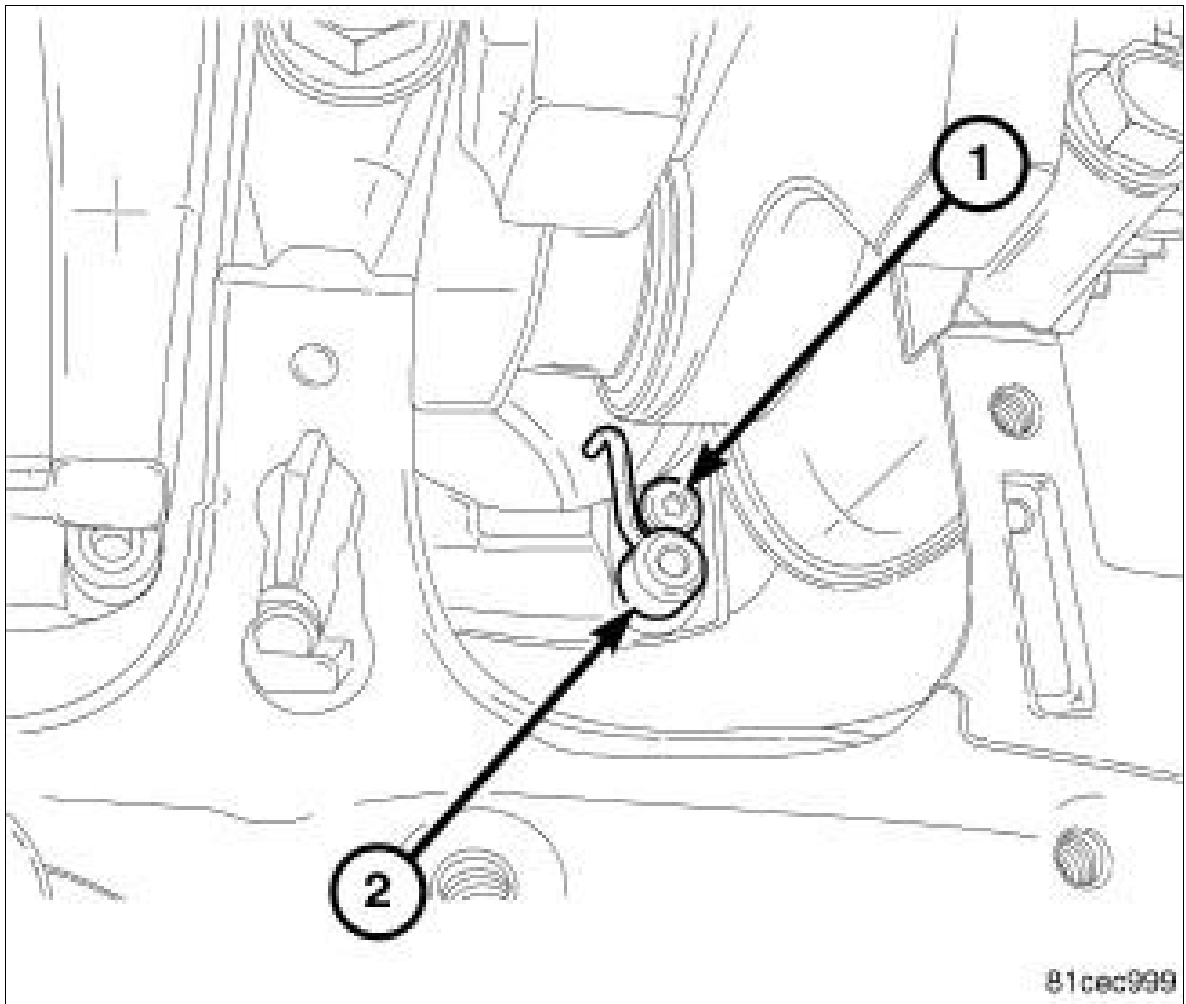
Courtesy of CHRYSLER GROUP, LLC

 NOTE:

Rear plug shown in illustration, other plugs are similar.

43. Remove the water galley and oil galley plugs (2).

Fig 26: Oil Jet Fastener & Oil Jet



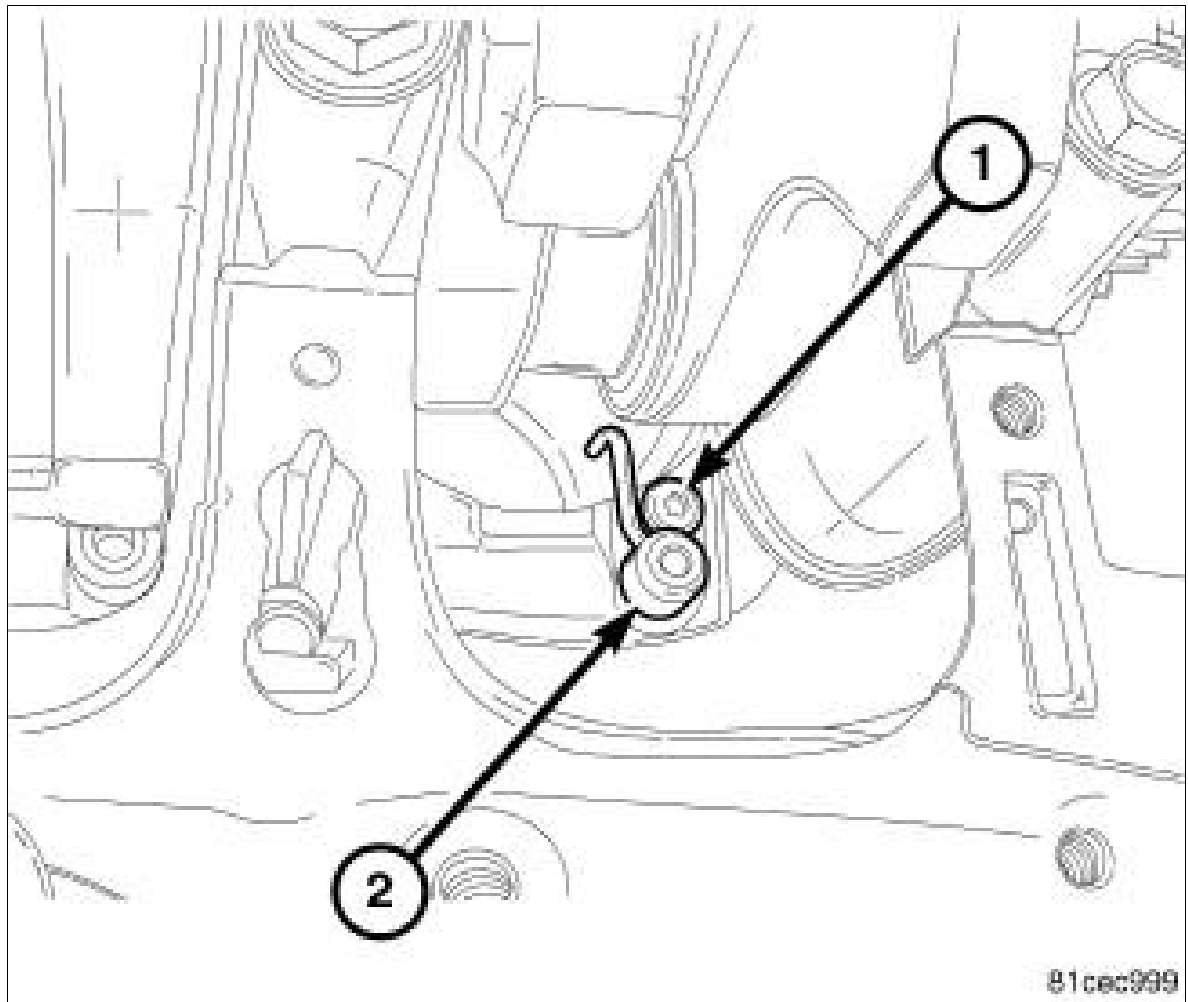
Courtesy of CHRYSLER GROUP, LLC

44. Remove the bolt (1) and the piston oil cooler jets (2).

DISASSEMBLY AND ASSEMBLY > DISASSEMBLY AND REASSEMBLY FOLLOWING INSPECTION - 2.4L > REASSEMBLY

1. Wash and inspect the disassembled components.
2. Install the engine block on the 1871000000 (EMEA) maintenance stand.
3. Install the water and oil galley plugs to the engine block, using appropriate tools.
4. Lubricate all internal engine components with clean engine oil.

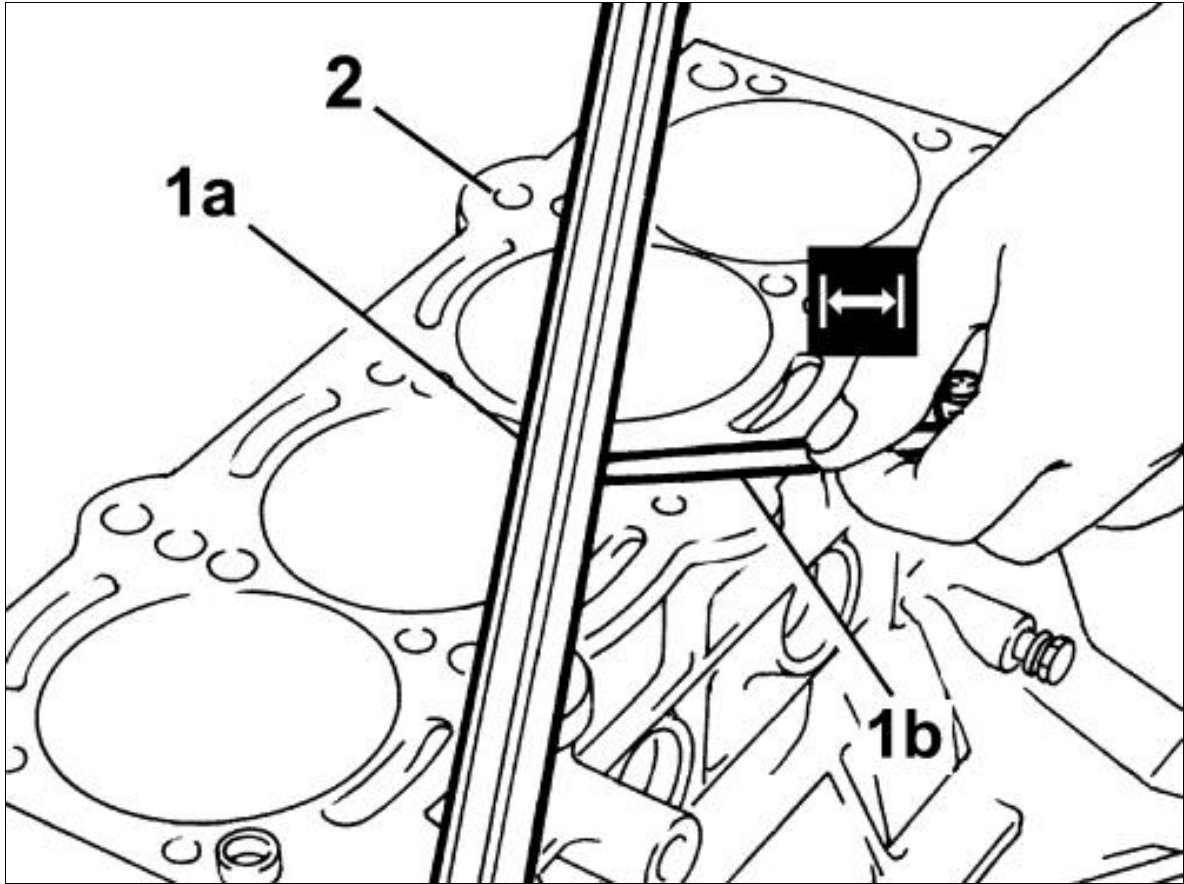
Fig 1: Oil Jet Fastener & Oil Jet



Courtesy of CHRYSLER GROUP, LLC

5. Install the piston oil cooler jets (2) with the bolt (1) tightened to the proper specification. Refer to TORQUE SPECIFICATIONS .

Fig 2: Measuring Flatness Of Cylinder Head Mounting Surface On Engine Block Using A Straight Edge & Feeler Gauge



Courtesy of CHRYSLER GROUP, LLC

6. Measure the flatness of the cylinder head mounting surface of the engine block using a straight edge (1a) and a feeler gauge (1b) and compare it to the specification. Refer to ENGINE SPECIFICATIONS .

 NOTE:

If the flatness is not within specification, resurface the cylinder head mounting surface.

7. Measure the diameter of the cylinder bores and compare it to the specification. Refer to ENGINE SPECIFICATIONS .

 NOTE:

If the diameters are not within specification, bore the cylinders to the appropriate oversize.

 **NOTE:**

In the case of refinishing, all cylinders bores must undergo the same increase.

8. Measure the roundness of the cylinder bores and compare it to the specification. Refer to ENGINE SPECIFICATIONS .

 **NOTE:**

If the roundness is not within specification, bore the cylinders to the appropriate oversize.

 **NOTE:**

In the case of refinishing, all cylinders bores must undergo the same increase.

9. Measure the taper of the cylinder bores and compare it to the specification. Refer to ENGINE SPECIFICATIONS .

 **NOTE:**

If the taper is not within specification, bore the cylinders to the appropriate oversize.

 **NOTE:**

In the case of refinishing, all cylinders bores must undergo the same increase.

10. Measure the crankshaft main bearing journal diameters and verify that they are within specification. Refer to ENGINE SPECIFICATIONS .
11. If the crankshaft main bearing journal diameters do not fall within the specifications, correct by refinishing the diameter of the journal to the appropriate undersize.

 **NOTE:**

The crankshaft has a nitride treatment; Therefore, after refinishing the crankshaft should again be nitrided and subjected to a subsequent dimensional inspection.

12. Measure the crankshaft rod bearing journal diameters and verify that they are within specification. Refer to ENGINE SPECIFICATIONS .

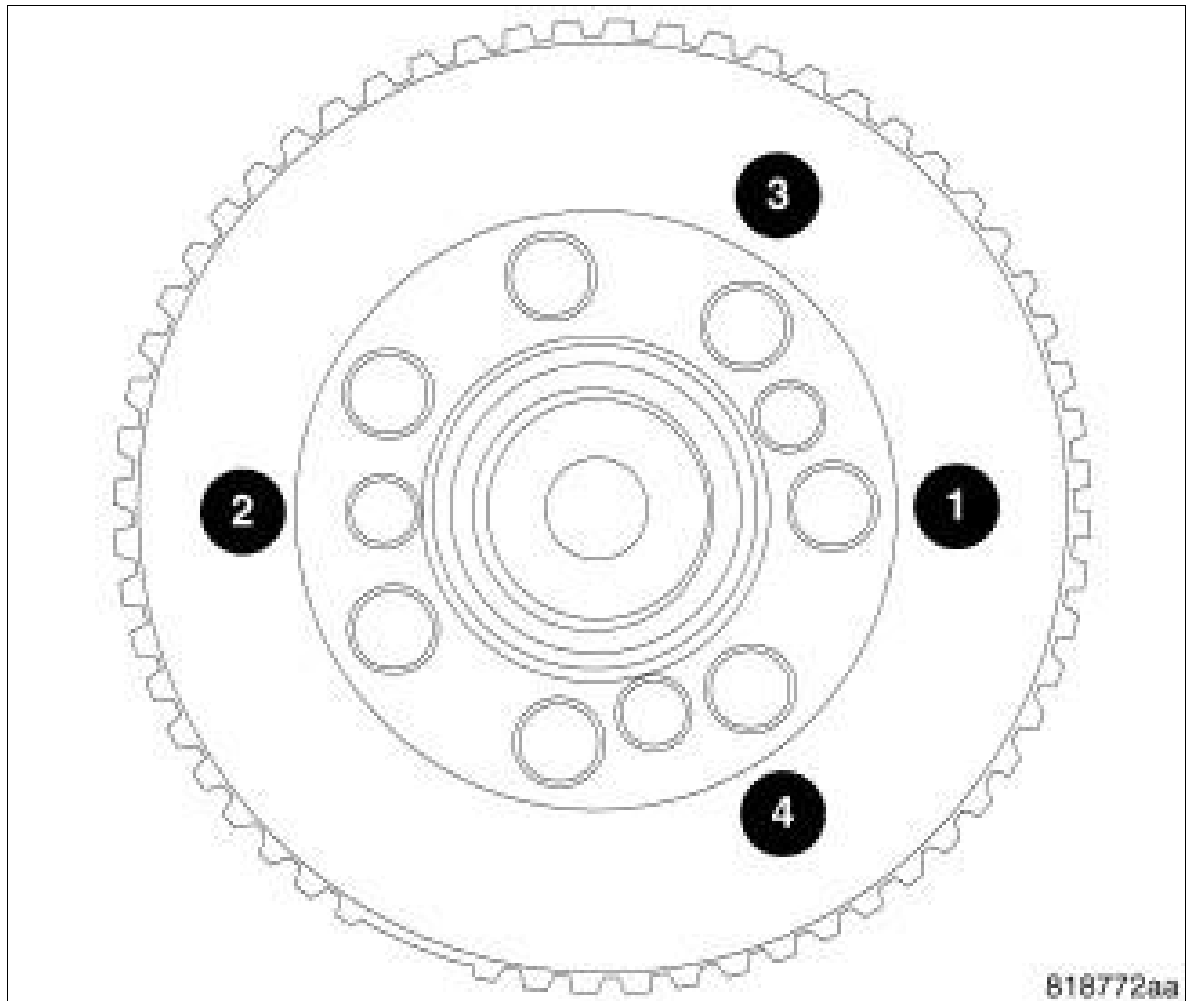
13. If the crankshaft rod bearing journal diameters do not fall within the specifications, correct by refinishing the diameter of the journal to the appropriate undersize.

 NOTE:

The crankshaft has a nitride treatment; Therefore, after refinishing the crankshaft should again be nitrided and subjected to a subsequent dimensional inspection.

14. Select main bearings to achieve the proper bearing clearance. Do not attempt perform any adaptation to the bearing shells. If you encounter any scratches or traces of engagement, replace the bearing shells.

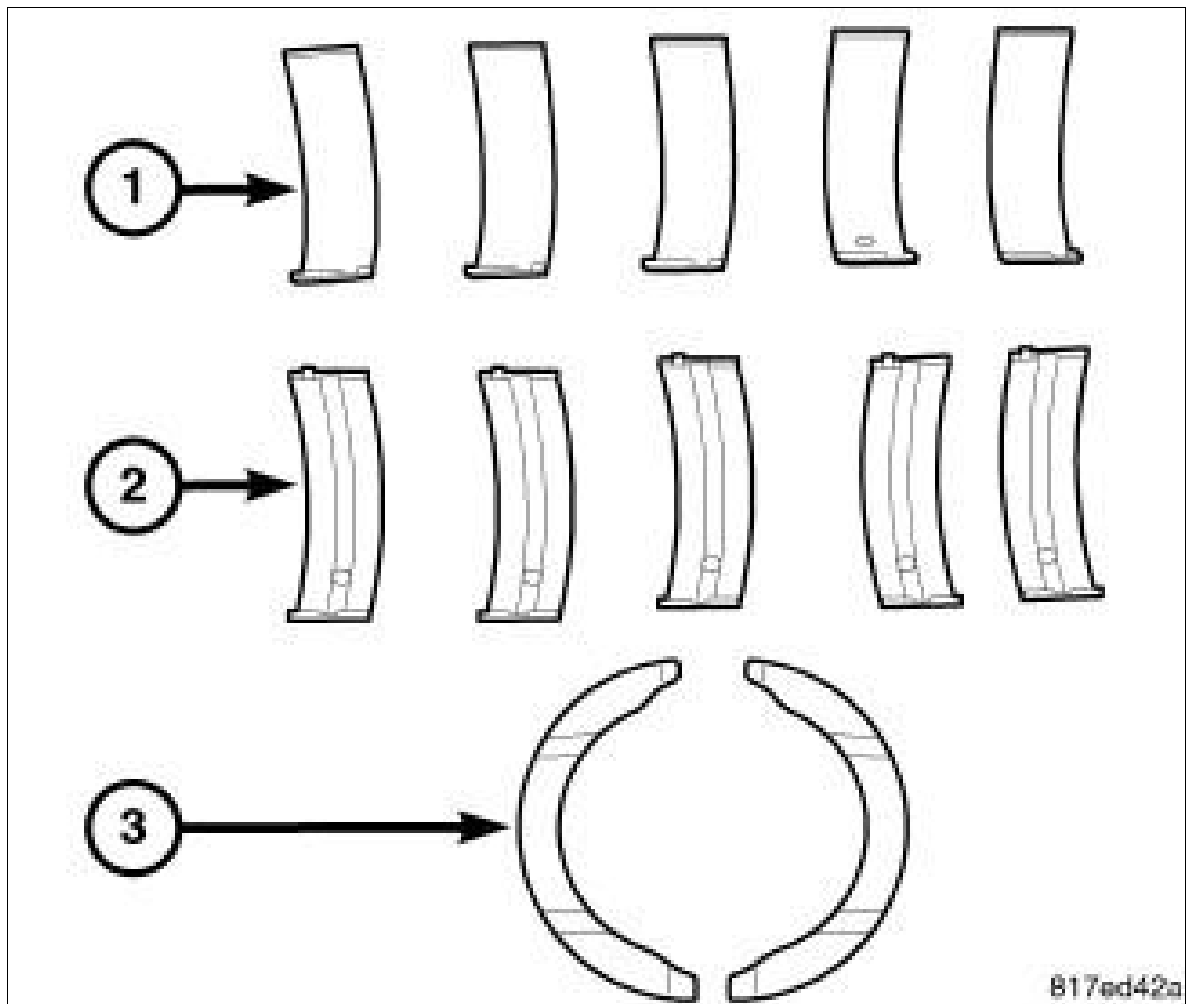
Fig 3: Target Wheel



Courtesy of CHRYSLER GROUP, LLC

15. If removed, install the target wheel to the crankshaft with four new screws. Ensure the threaded holes in the crankshaft are free of residual thread lock adhesive. Tighten the screws in the sequence shown in illustration to the proper specification. Refer to TORQUE SPECIFICATIONS .

Fig 4: Bearing Identification



Courtesy of CHRYSLER GROUP, LLC

 NOTE:

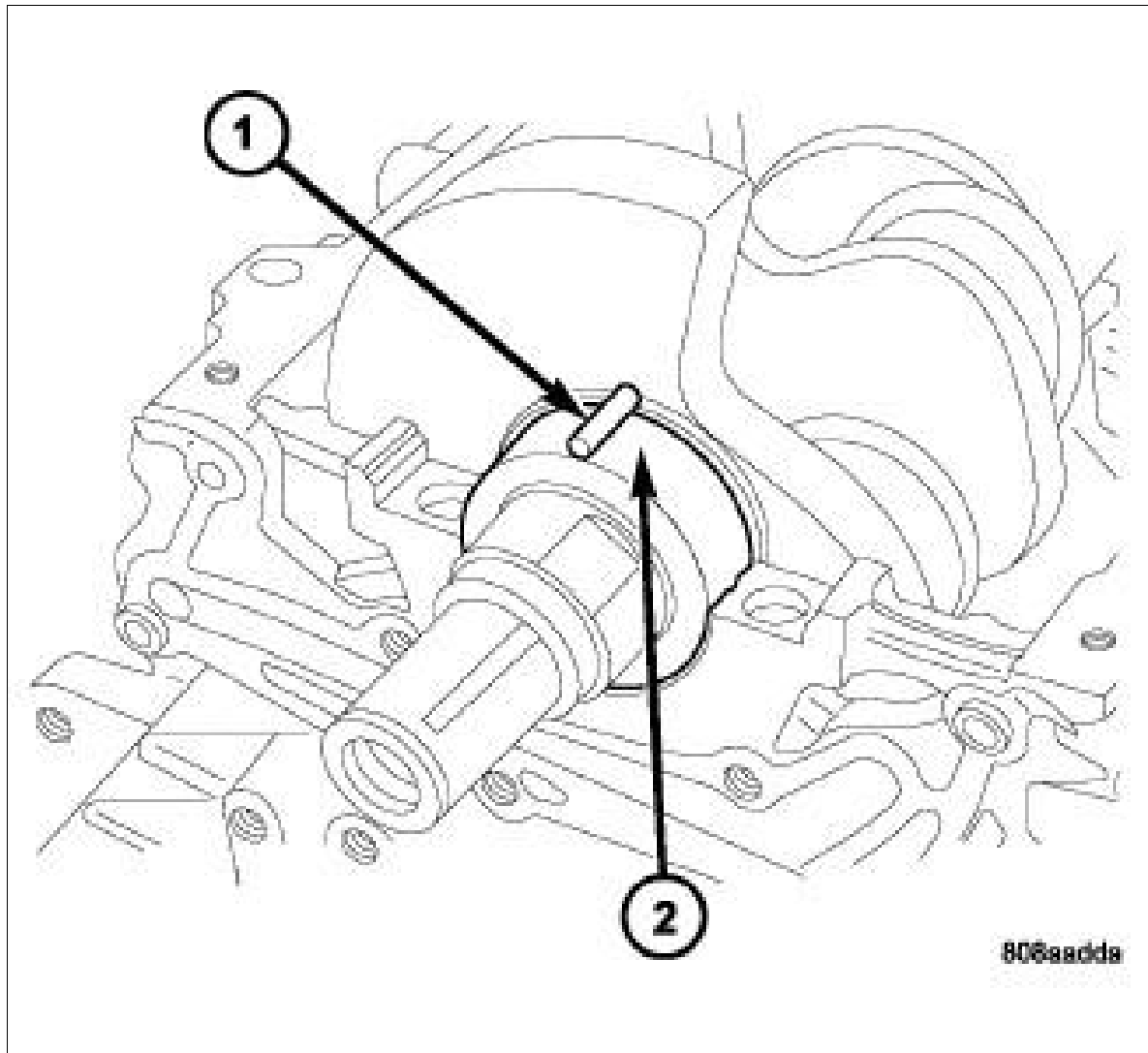
The upper main bearing shells (2) have oil lubrication holes, the lower main bearing shells (1) do not. Crankshaft thrust washers (3) are located on the second main bearing journal.

16. Lubricate the upper main bearing shells with clean engine oil and install the upper main bearing shells and crankshaft into the engine block.

 NOTE:

The thrust bearings must be installed with the notches facing the crankshaft.

Fig 5: Plastigage Placed In Lower Shell-Typical



Courtesy of CHRYSLER GROUP, LLC

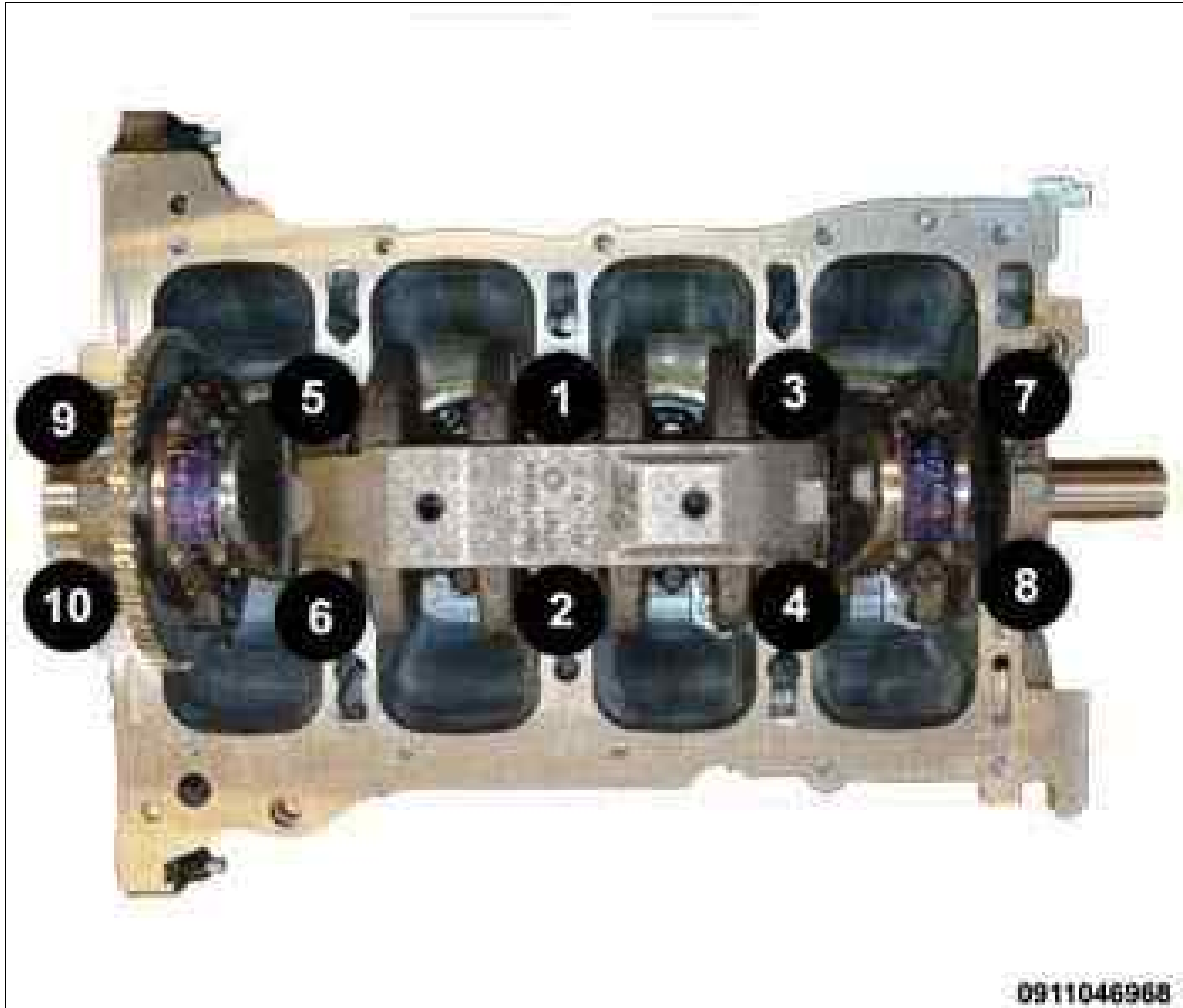
17. When installing thrust bearings at the second main bearing location, use the following procedure:
 1. Move the crankshaft forward to the limit of travel. Lubricate and install the front thrust bearing by rolling the bearing onto the machined shelf between the second upper main bulk head and crankshaft thrust surface.
 2. Move the crankshaft rearward to the limit of travel. Lubricate and install the rear thrust bearing by rolling the bearing onto the machined shelf between the second upper main bulk head and crankshaft thrust surface.
18. Remove oil film from the surface to be checked by the use of Plastigage or equivalent. Plastigage is soluble in oil.
19. Place a piece of Plastigage (1) across the entire width of the bearing journal (2). In addition, suspected areas can be checked by placing the Plastigage in the suspected area. Plastigage must not crumble in use. If brittle, obtain fresh stock.

 **NOTE:**

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

20. Install the lower main bearing shells into the main bearing caps.
21. Install the main bearing caps with the main bearing cap bolts. Use the temporarily installed main bearing cap bolts (M10 x 1.25 x 76.5) at the No. 2, 3 and 5 main bearing caps in place of the bearing beam for this dimensional check.

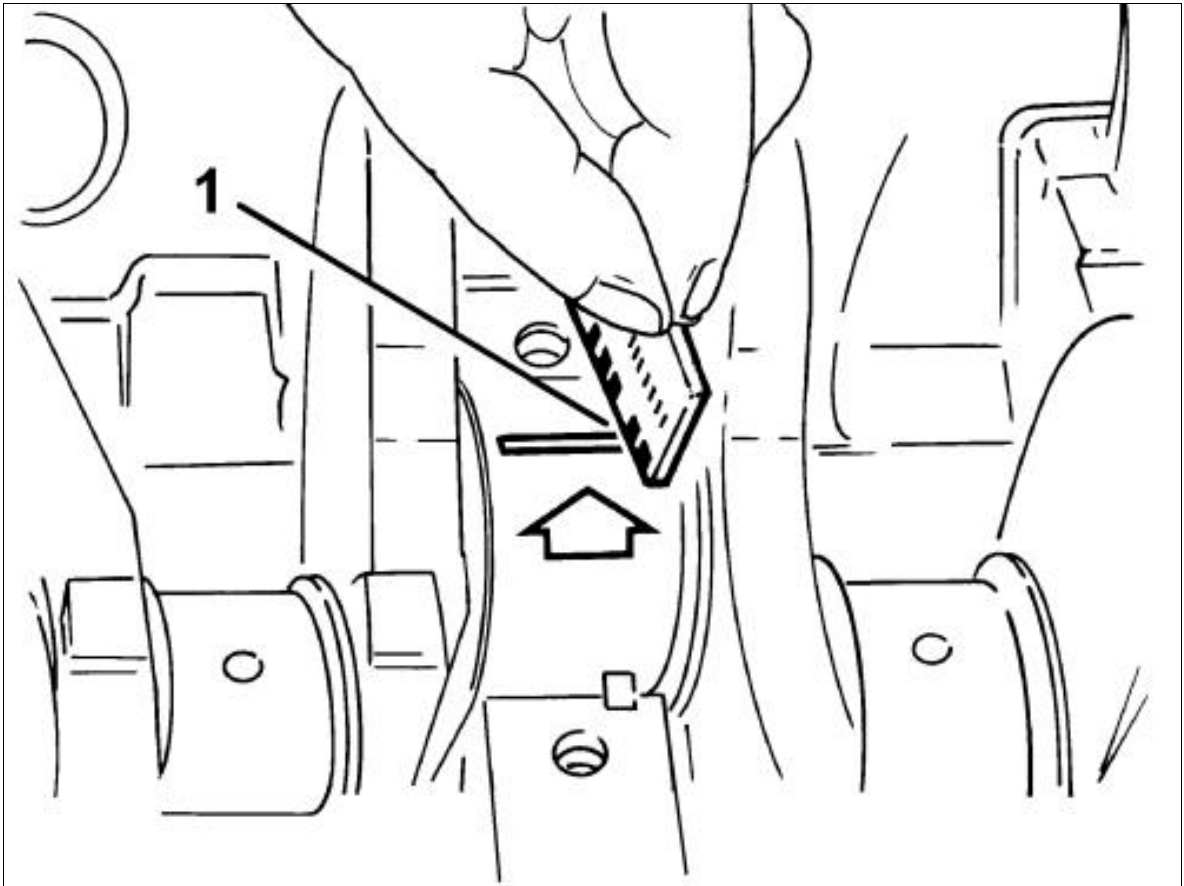
Fig 6: Main Bearing Cap Bolts Removal & Tightening Sequence



Courtesy of CHRYSLER GROUP, LLC

22. Tighten the ten main bearing cap bolts in the sequence shown in illustration, following this 3 step torque plus angle method. Tighten according to the following torque values:
 1. Step 1: All to 15 N.m (11 ft. lbs.)
 2. Step 2: All to 45 N.m (33 ft. lbs.)
 3. Step 3: All an additional 45° Turn **Do not use a torque wrench for this step.**

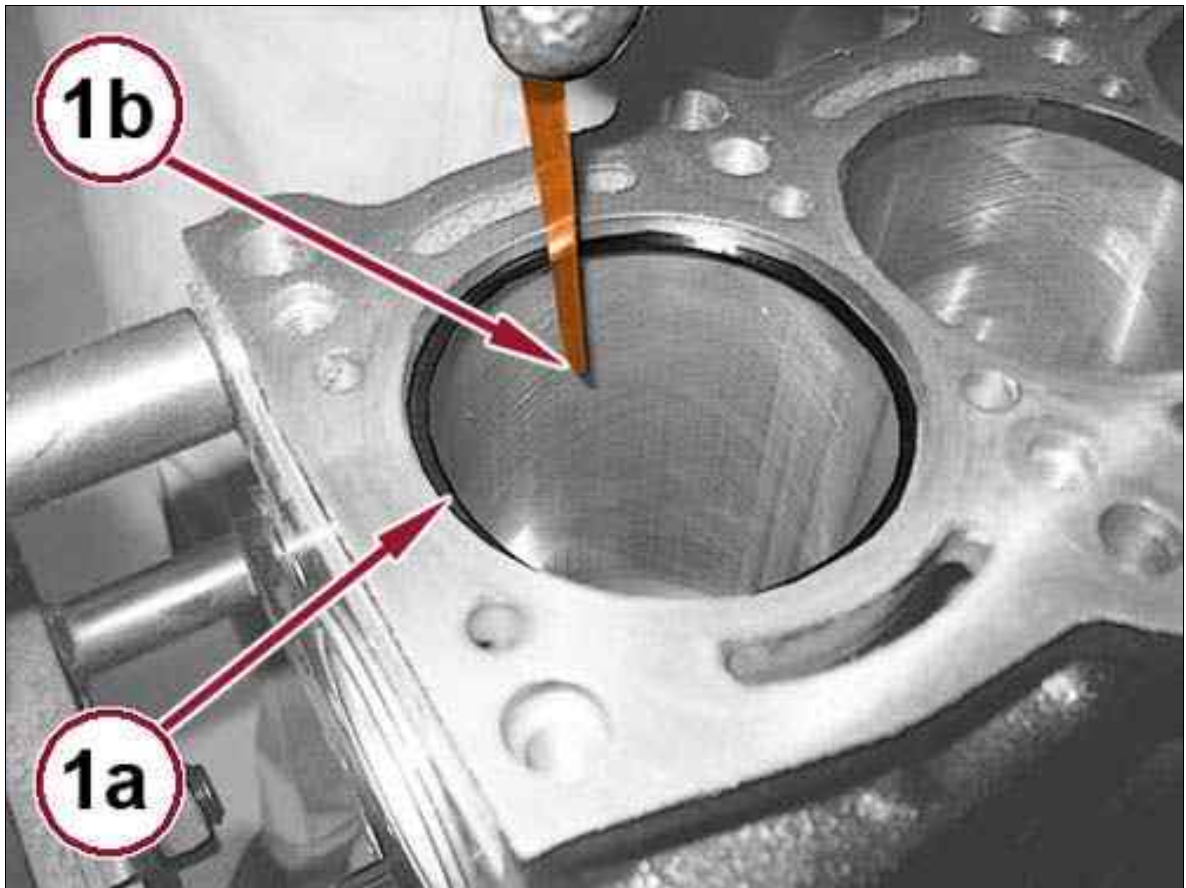
Fig 7: Using A Graduated Measuring Guide To Determine Bearing Clearance



Courtesy of CHRYSLER GROUP, LLC

23. Remove the main bearing caps and using a graduated measuring guide (1) determine the bearing clearance indicated by the Plastigage.
24. Perform the measurement on the remaining journals taking care not to rotate the crankshaft.
25. After verifying all main bearing clearances are within specification, lubricate and reinstall the main bearing caps with the main bearing cap bolts only hand tight at this time.

Fig 8: Measuring Piston Ring End Gap In Cylinder Bore Using A Feeler Gauge



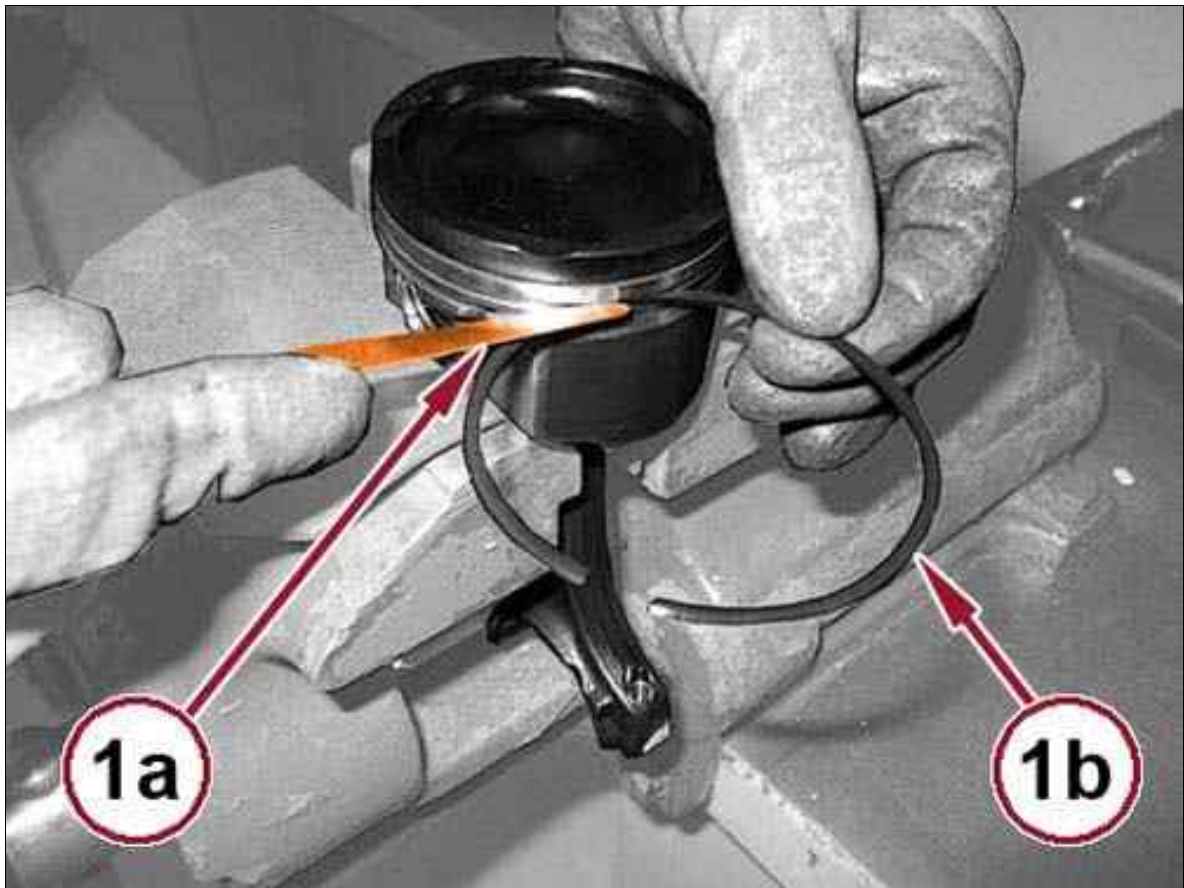
Courtesy of CHRYSLER GROUP, LLC

26. Check that the thickness of the piston rings are within specification. Refer to ENGINE SPECIFICATIONS .
27. Insert the piston rings (1a) in the cylinder bore and using a feeler gauge (1b), check that the end gaps are within specification. Refer to ENGINE SPECIFICATIONS .

 **NOTE:**

Piston rings not within specification should be replaced.

Fig 9: Using A Feeler Gauge To Check Axial Clearance Between Rings & Ring Grooves



Courtesy of CHRYSLER GROUP, LLC

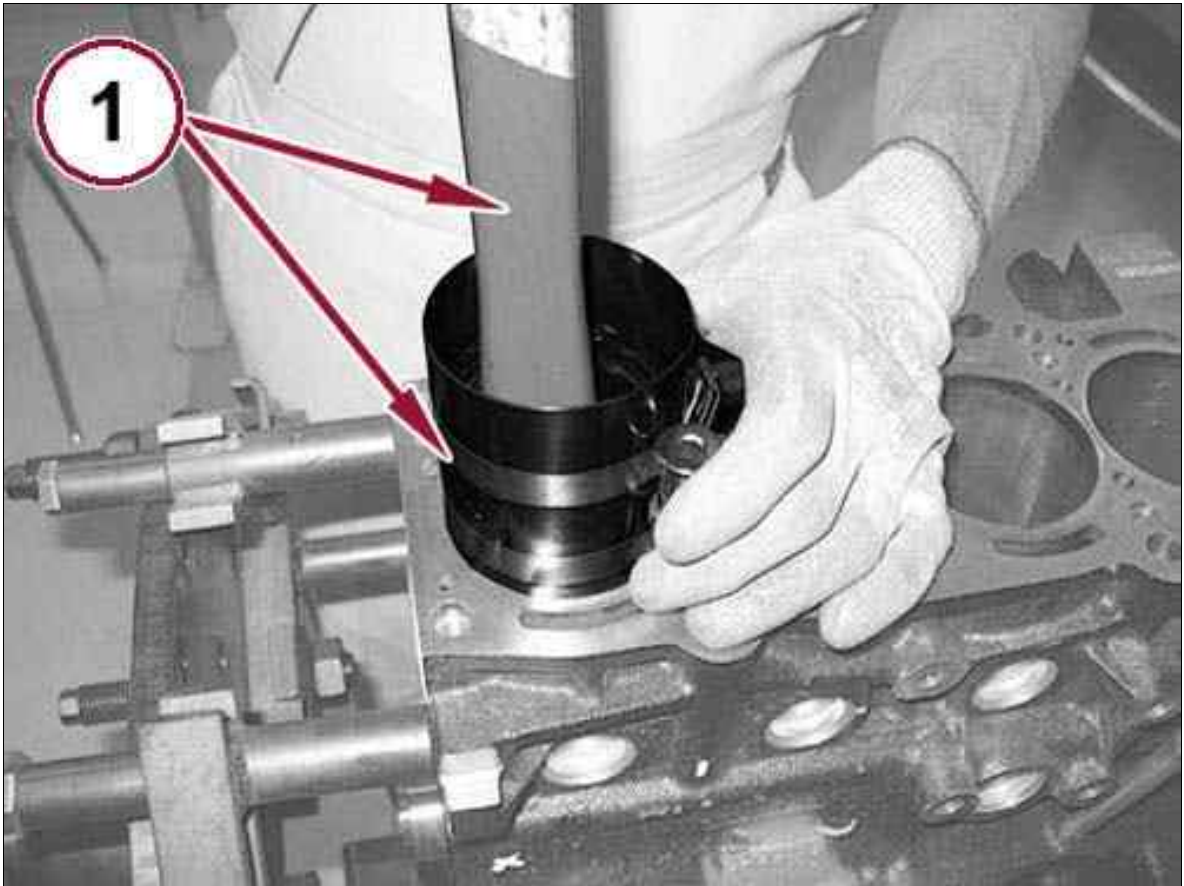
28. Using a feeler gauge (1a), check that the axial clearance between the rings (1b) and ring grooves on the piston are within specification. Refer to ENGINE SPECIFICATIONS .

 NOTE:

Measure 9 mm up from the bottom edge of the piston skirt, perpendicular to the piston pin bore.

29. Using a feeler gauge, check that the piston to cylinder bore clearances are within specification. Refer to ENGINE SPECIFICATIONS .
30. Verify that the diameter of the connecting rod big end is within specification. Refer to ENGINE SPECIFICATIONS .
31. Install the piston rings on the pistons. Refer to RING(S), PISTON, REMOVAL AND INSTALLATION .

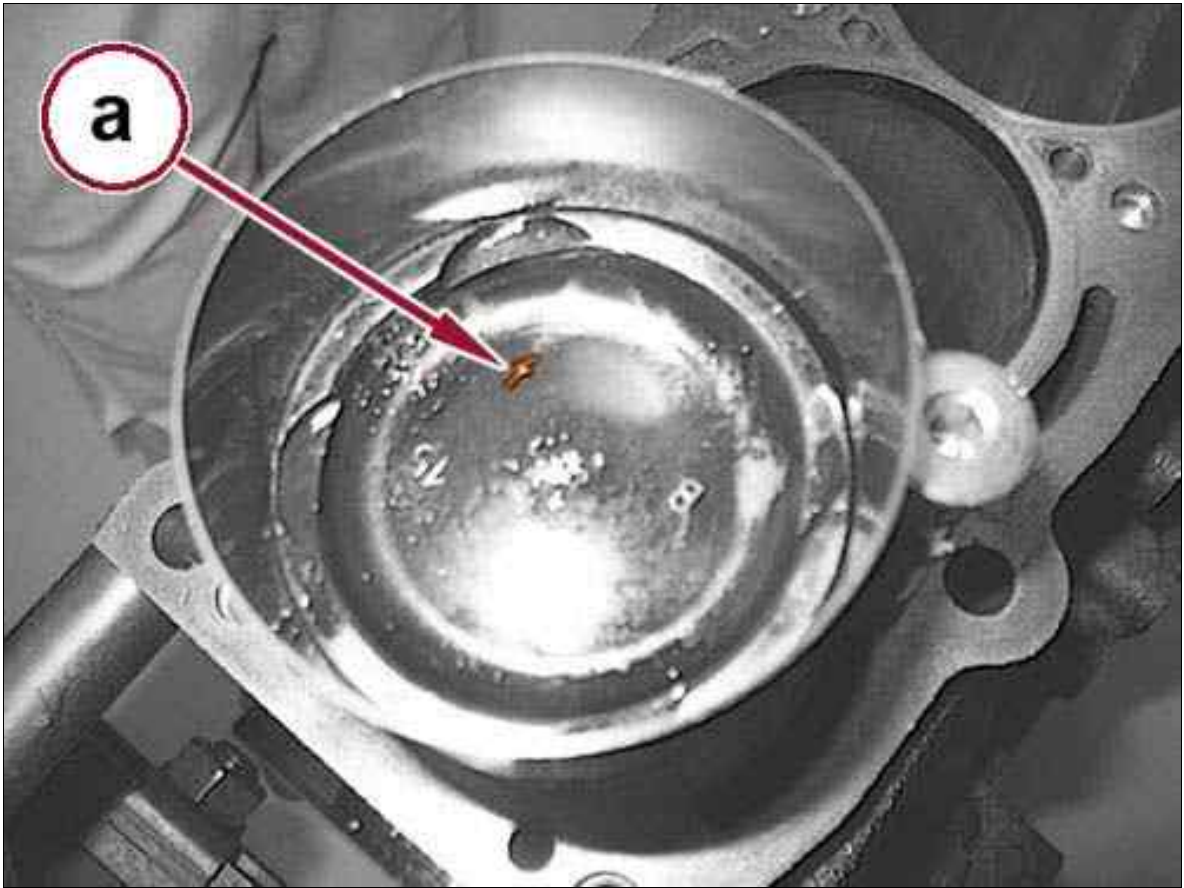
Fig 10: Using A Ring Compressor To Install Rod & Piston With Bearing Shell



Courtesy of CHRYSLER GROUP, LLC

32. Install the rod and piston complete with bearing shell using a ring compressor (1).

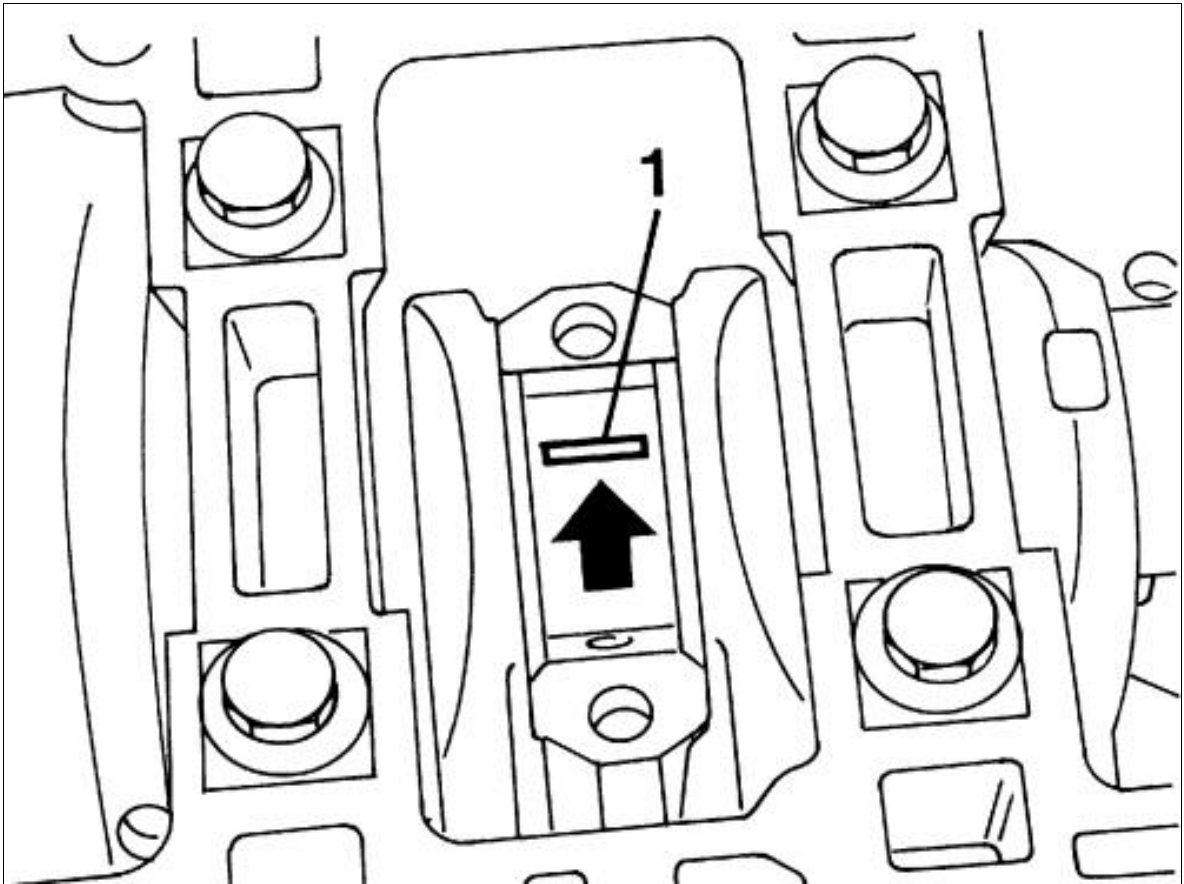
Fig 11: Locating Arrow On Piston Crown For Piston Installation Direction



Courtesy of CHRYSLER GROUP, LLC

33. The pistons crowns are stamped with an arrow (1). The piston and connecting rod assemblies must be installed so the arrow points toward the front of the engine.

Fig 12: Placing Plastigage Across Surface Of Bearing Journal



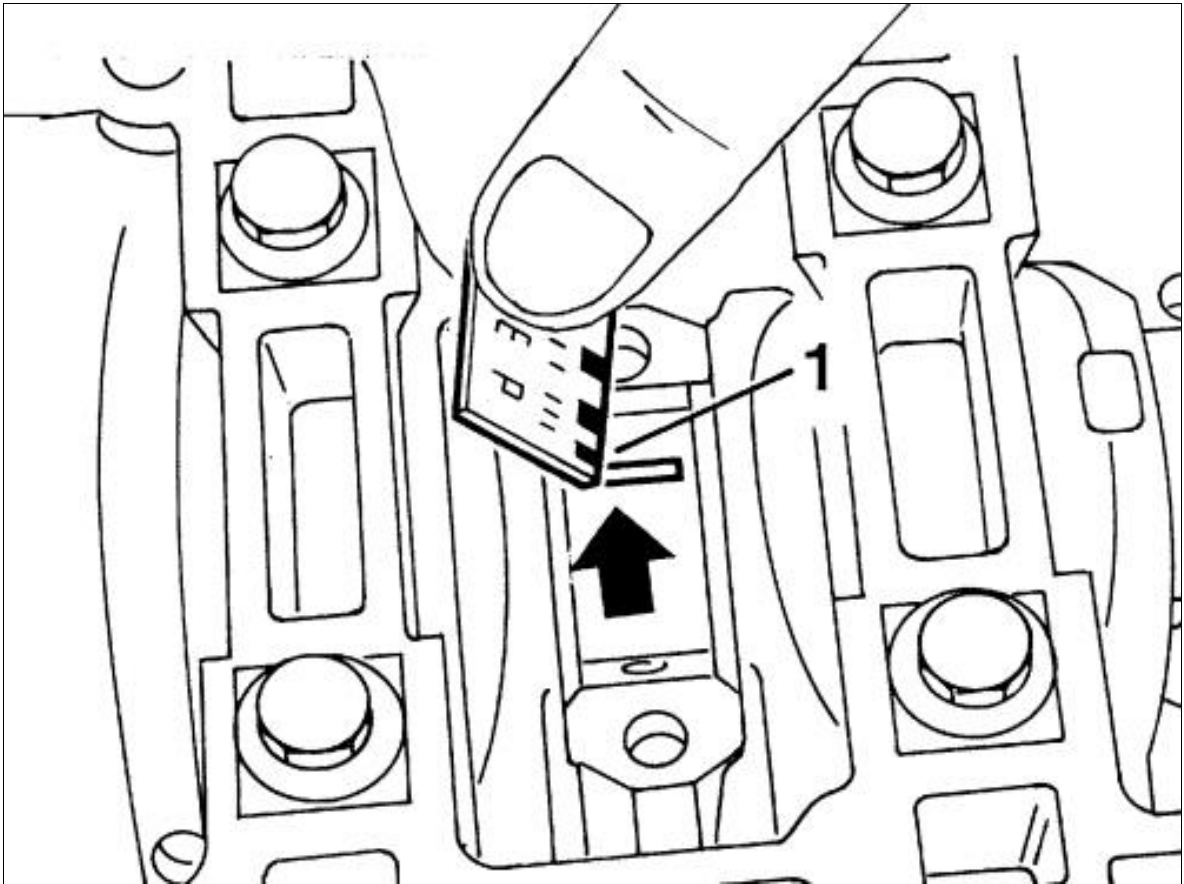
Courtesy of CHRYSLER GROUP, LLC

34. Check that the components are free of burrs, stamps, scratches or any other surface defects. Thoroughly clean and dry the pieces before assembly.
35. Apply the Plastigage across the surface of the rod bearing journals (1).

 NOTE:

The connecting rod caps must be assembled so that the number stamped on them is facing the same side as the one stamped on the big end.

Fig 13: Using Graduated Measuring Guide To Determine Bearing Clearance



Courtesy of CHRYSLER GROUP, LLC

36. Fit the bearing caps complete with bearing shells and tighten the bearing cap bolts to the proper specification. Refer to TORQUE SPECIFICATIONS .
37. Remove the bearing caps previously installed and using the graduated measuring guide (1) determine the bearing clearance indicated by the Plastigage.
38. Perform the measurement on the remaining journals taking care not to rotate the crankshaft.

 NOTE:

If the measured value is not within specification, replace the bearing shells with the proper dimension.

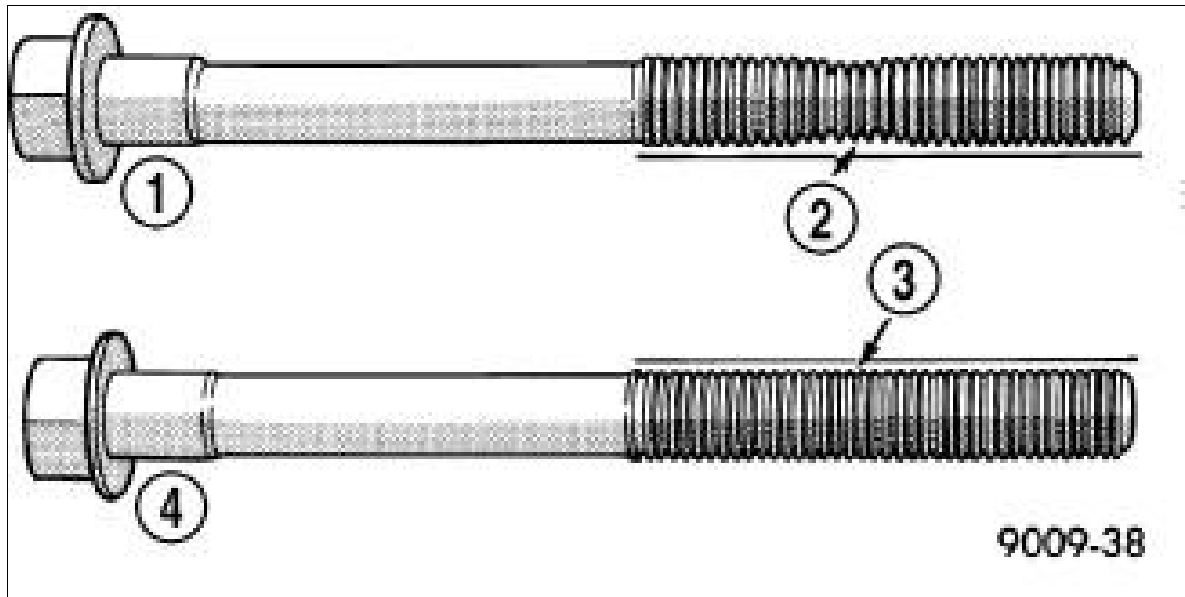
 CAUTION:

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

39. Lubricate the rod bearing surface with clean engine oil. Fit all bearing caps complete with

bearing shells and tighten all bearing cap bolts to the proper specification. Refer to TORQUE SPECIFICATIONS .

Fig 14: Checking Cylinder Head Bolts For Stretching (Necking)



Courtesy of CHRYSLER GROUP, LLC

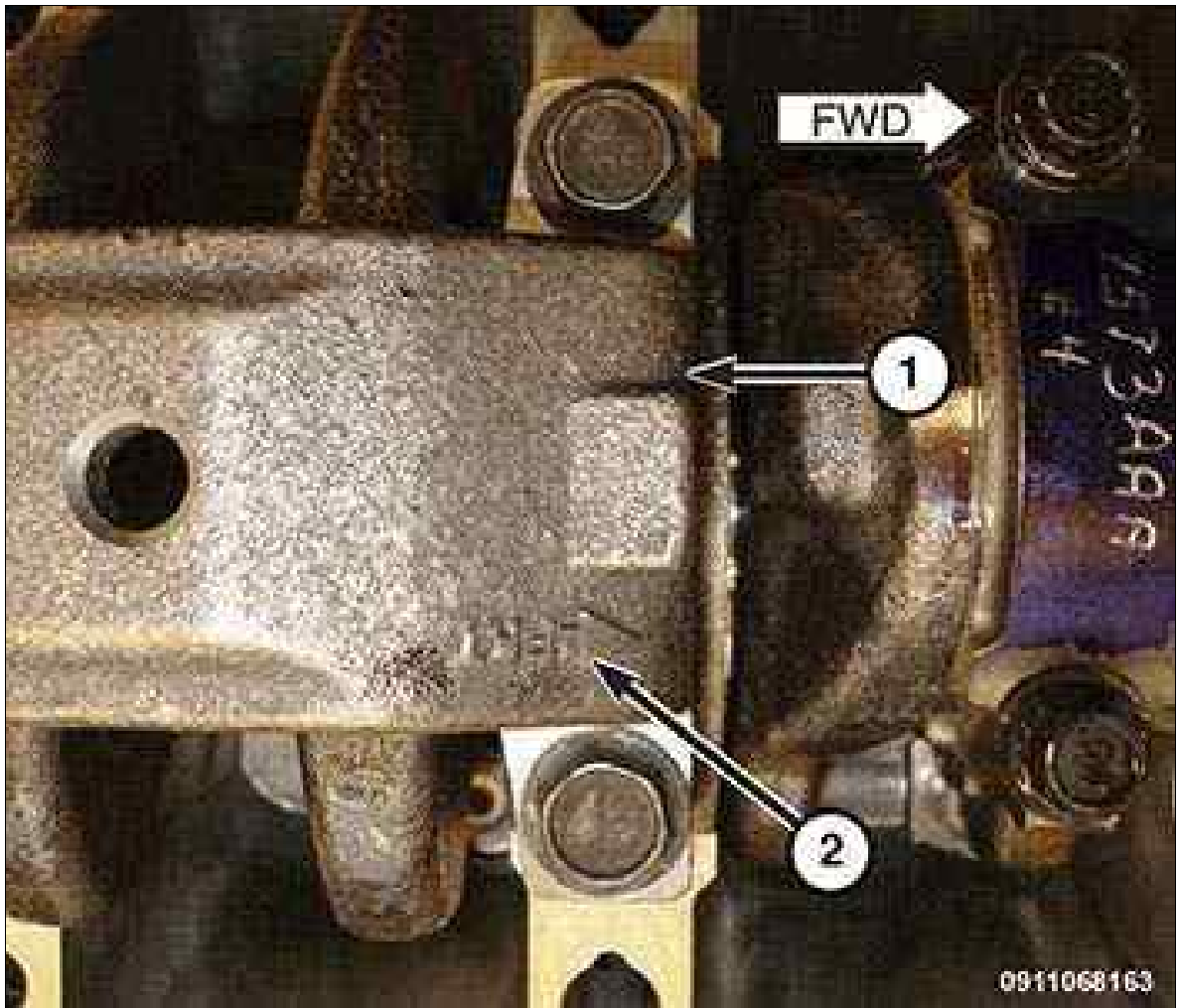


CAUTION:

The main bearing cap bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts must be replaced.

40. After verifying all main and rod bearing clearances are within specification, check the main bearing cap bolts for necking by holding a scale or straight edge against the threads. If all the threads do not contact the scale (2) the bolt must be replaced.

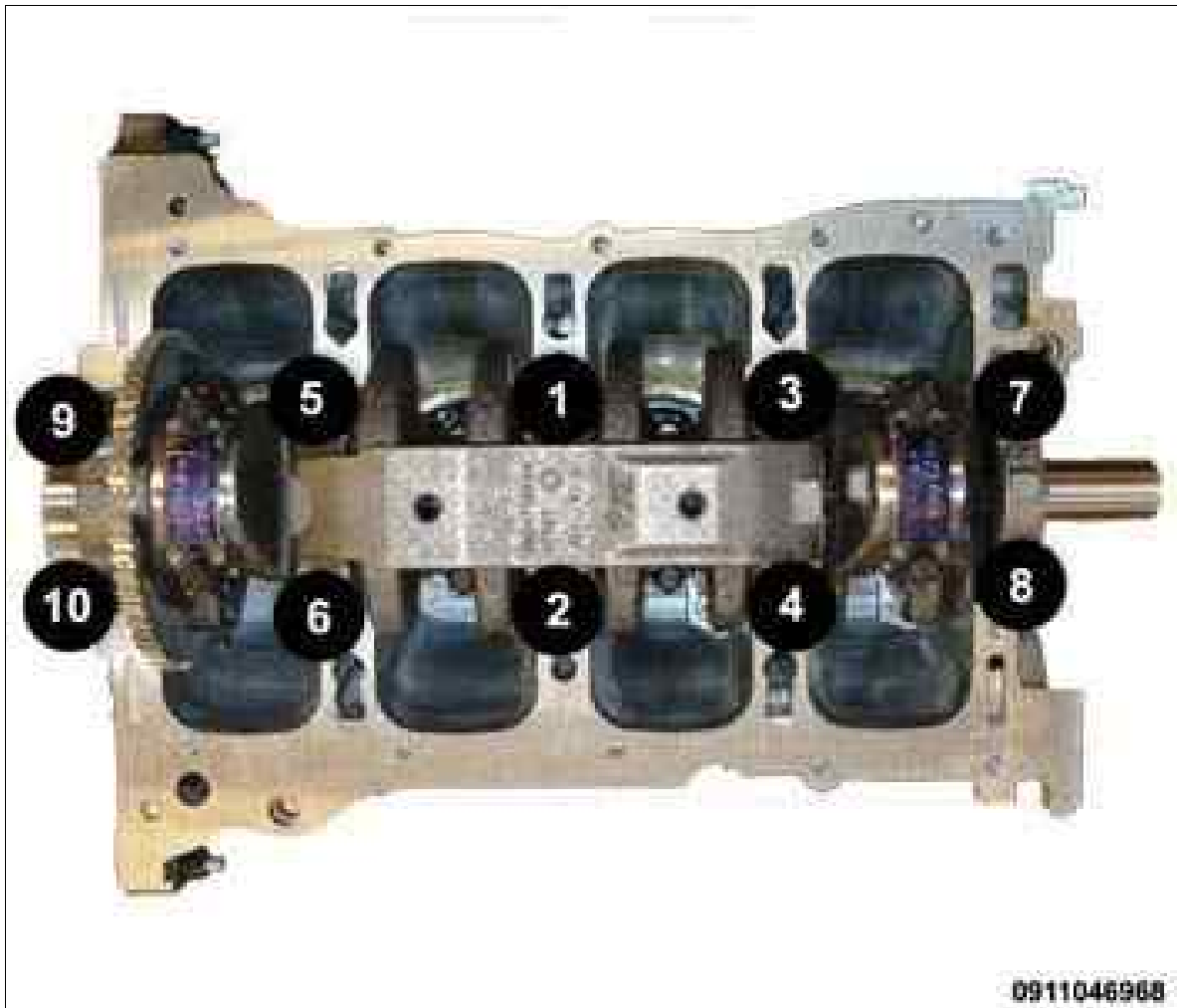
Fig 15: Bearing Beam Installed With Indication Pointing To Front Of Engine



Courtesy of CHRYSLER GROUP, LLC

41. Remove the temporarily installed main bearing cap bolts from main bearing caps 2, 3 and 5. Install the bearing beam (1) with its longer bolts so that the <FRT indication (2) is pointing to the front of the engine.

Fig 16: Main Bearing Cap Bolts Removal & Tightening Sequence

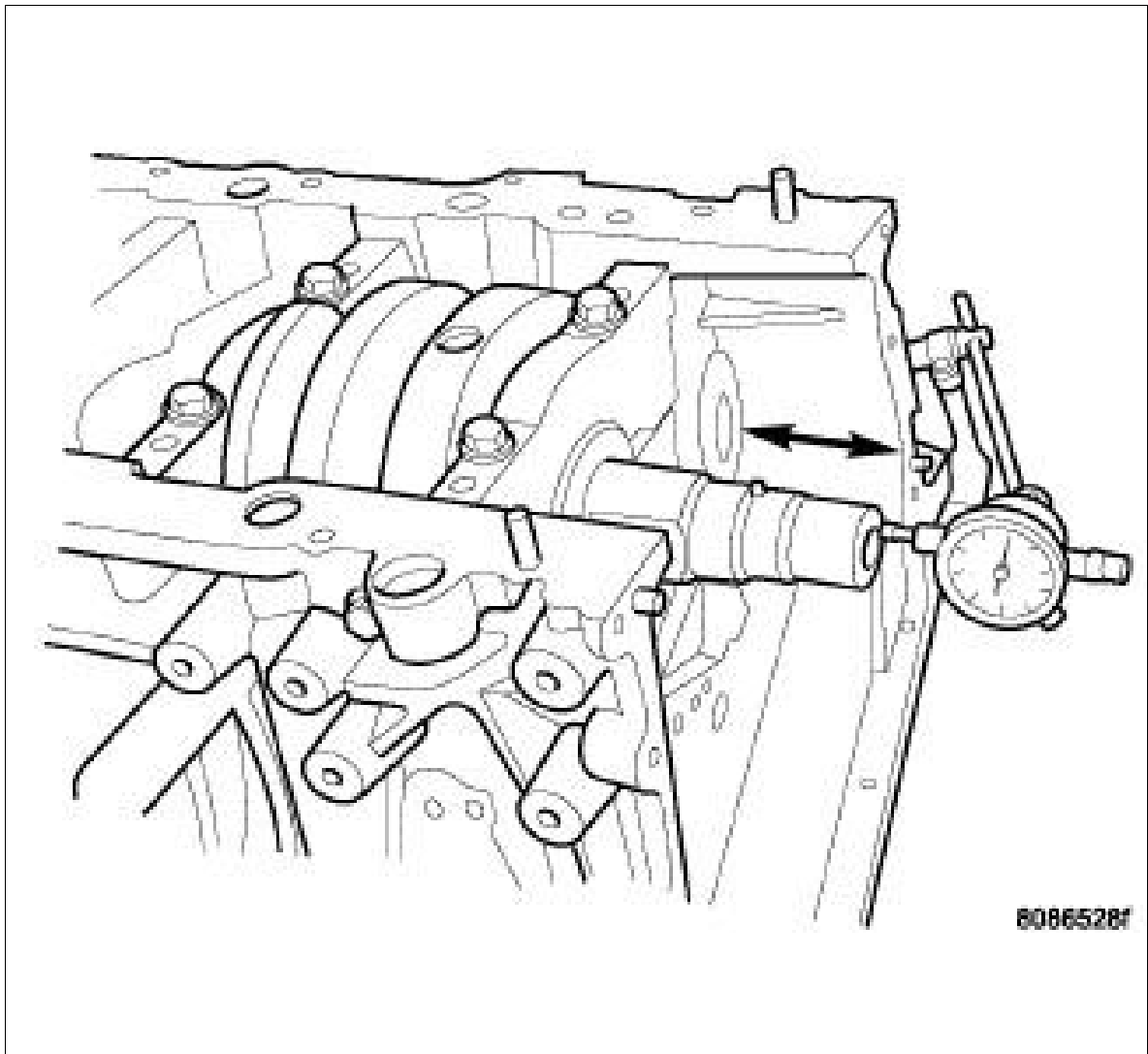


Courtesy of CHRYSLER GROUP, LLC

42. Tighten the ten main bearing cap bolts in the sequence shown in illustration, following this 3 step torque plus angle method. Tighten according to the following torque values:

1. Step 1: All to 15 N.m (11 ft. lbs.)
2. Step 2: All to 45 N.m (33 ft. lbs.)
3. Step 3: All an additional 45° Turn **Do not use a torque wrench for this step.**

Fig 17: Checking Crankshaft End Play



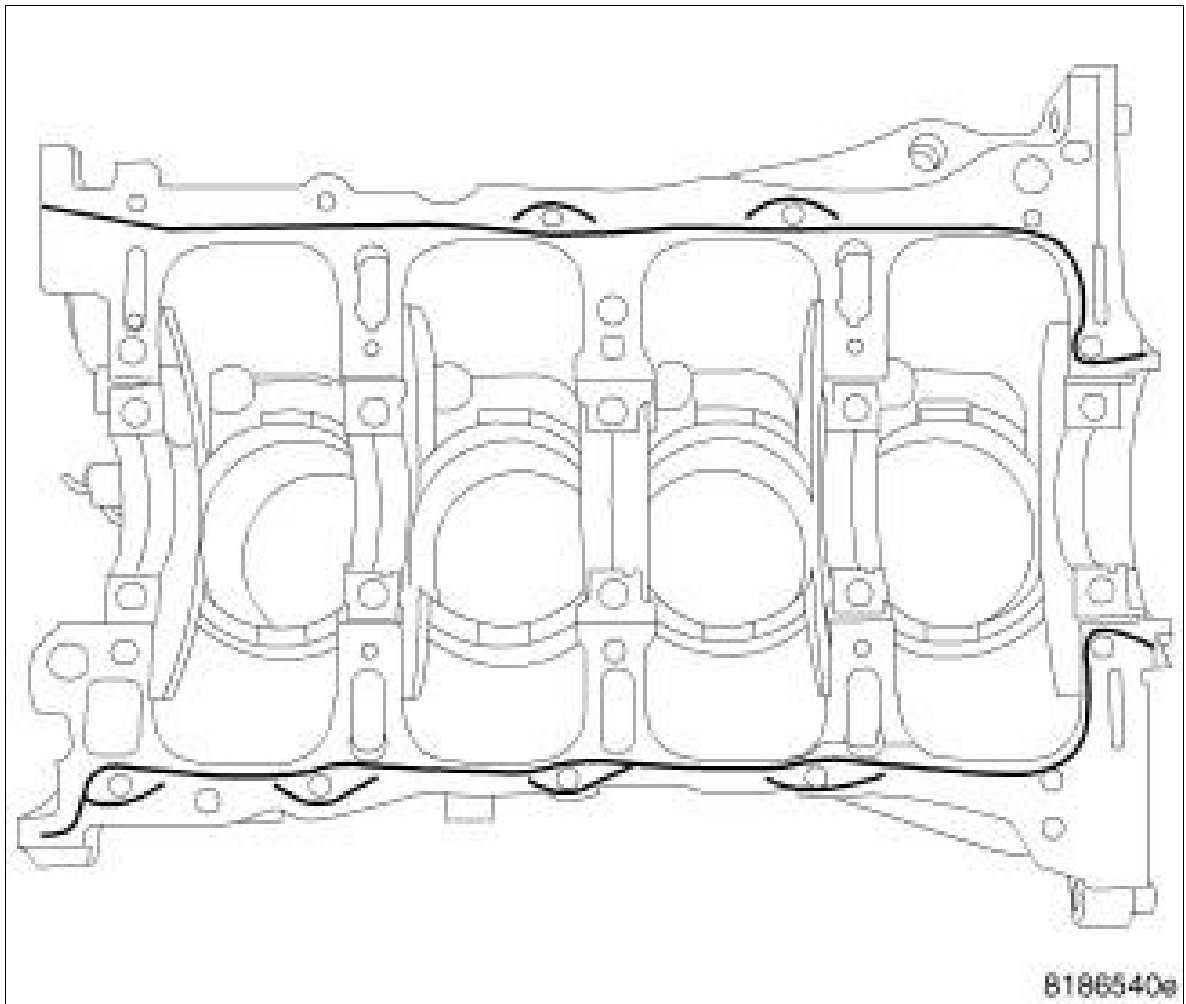
Courtesy of CHRYSLER GROUP, LLC

43. Measure the crankshaft end play and compare it to the specification. Refer to ENGINE SPECIFICATIONS .

 NOTE:

Crankshaft thrust bearings are not selectable and are only available in a single thickness.

Fig 18: Sealing Ladder Frame



Courtesy of CHRYSLER GROUP, LLC

44. Clean the ladder frame sealing surfaces with isopropyl alcohol in preparation for sealant application.

 CAUTION:

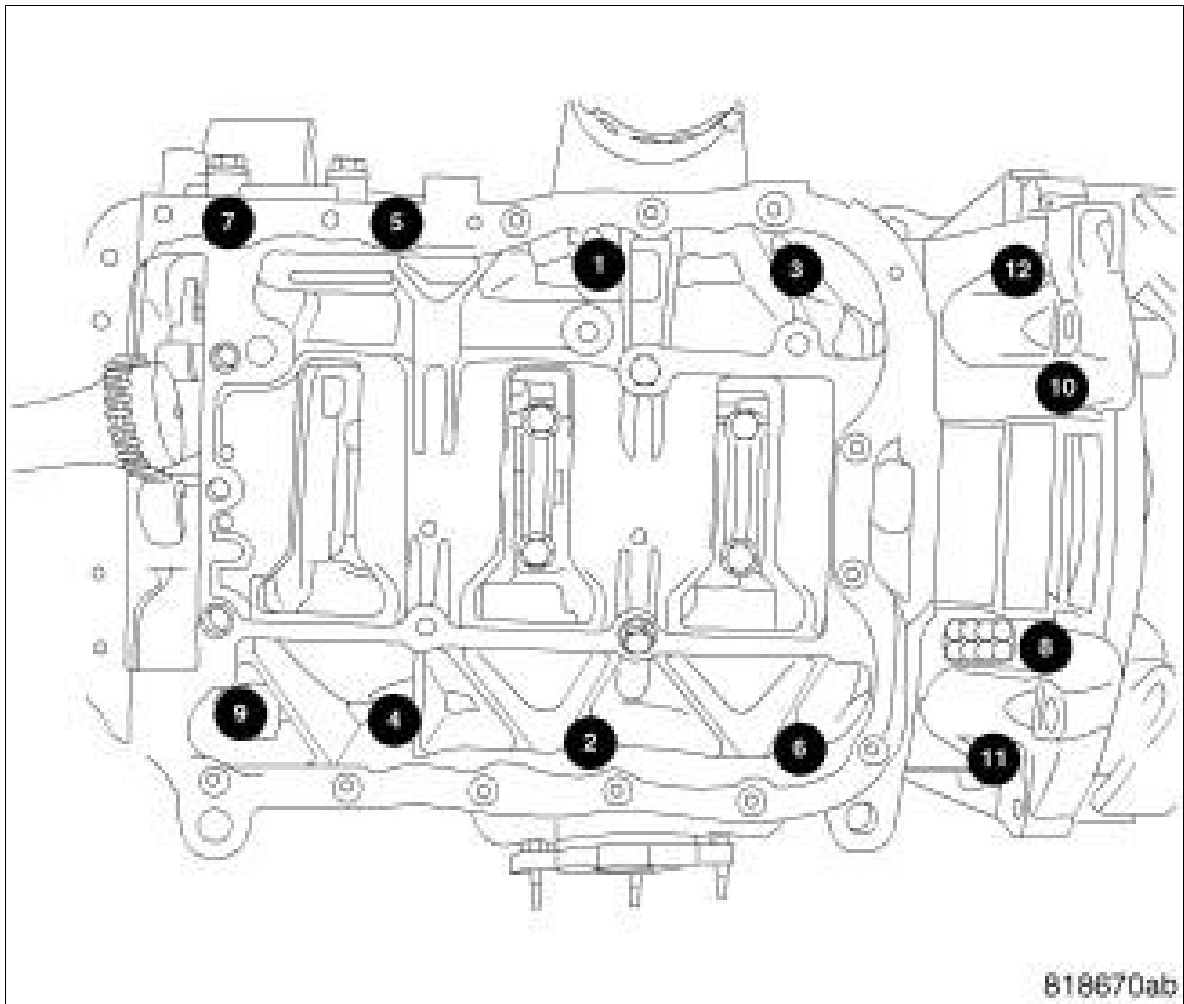
Engine assembly requires the use of a unique sealant that is compatible with engine oil. Using a sealant other than Mopar® Engine Sealant RTV Silicone Rubber Adhesive may result in engine fluid leakage.

 CAUTION:

Following the application of Mopar® Engine Sealant RTV Silicone Rubber Adhesive to the gasket surfaces, the components must be assembled within 10 minutes and the attaching fasteners must be tightened to specification within the next 10 minutes. Prolonged exposure to the air prior to assembly may result in engine fluid leakage.

45. Apply a 2 mm bead of Mopar® Engine Sealant RTV Silicone Rubber Adhesive as shown in illustration.

Fig 19: Ladder Frame Bolts Tightening Sequence

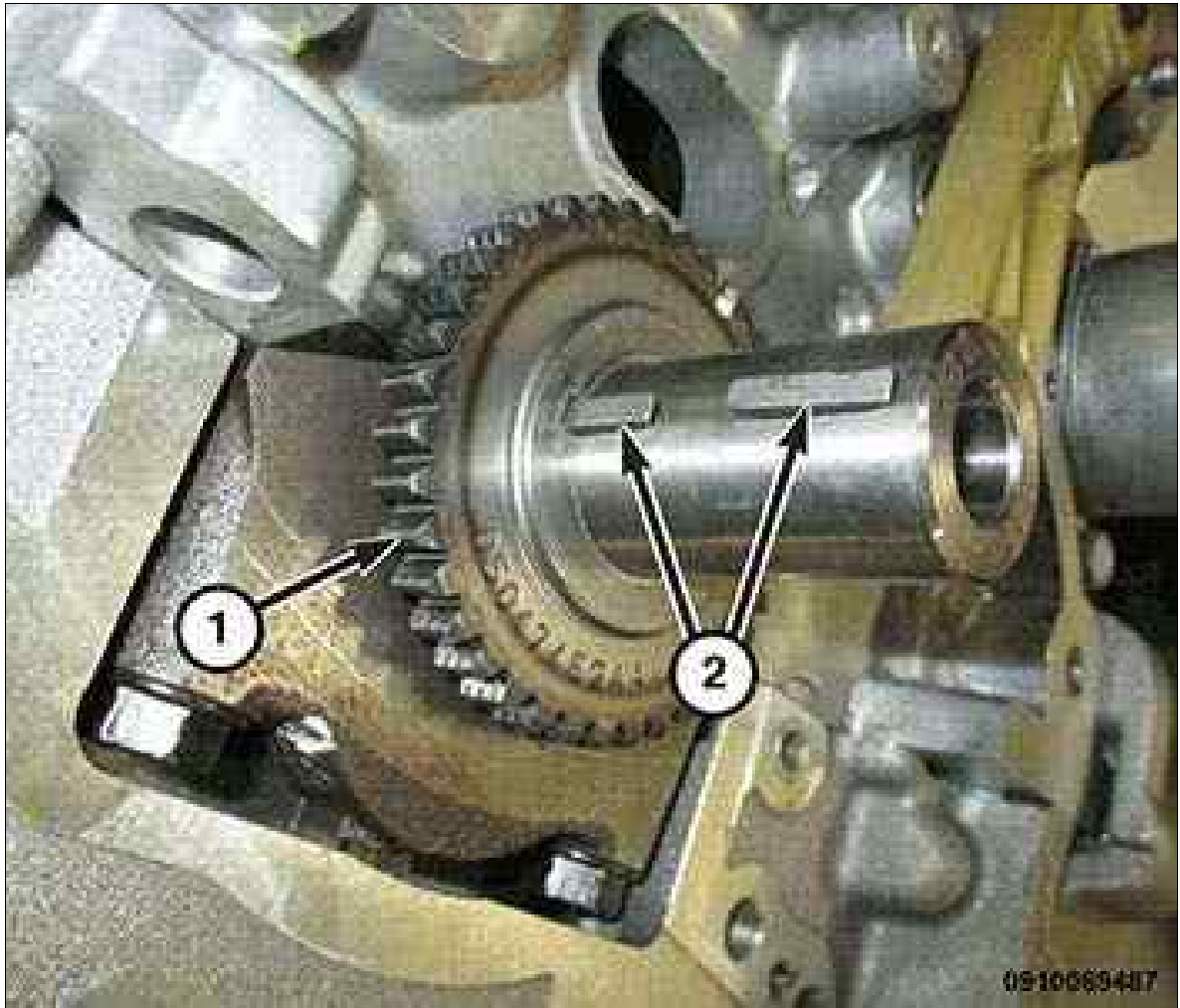


Courtesy of CHRYSLER GROUP, LLC

46. Install the ladder frame and tighten the twelve bolts in the sequence shown in illustration, following this 2 step method. Tighten according to the following torque values:

1. Step 1: All to 10 N.m (89 in. lbs.).
2. Step 2: All to 26 N.m (19 ft. lbs.).

Fig 20: Crankshaft Sprocket & Keys



Courtesy of CHRYSLER GROUP, LLC

- 47. If removed, install the crankshaft sprocket key (2) in the crankshaft.
- 48. Install the crankshaft sprocket (1).

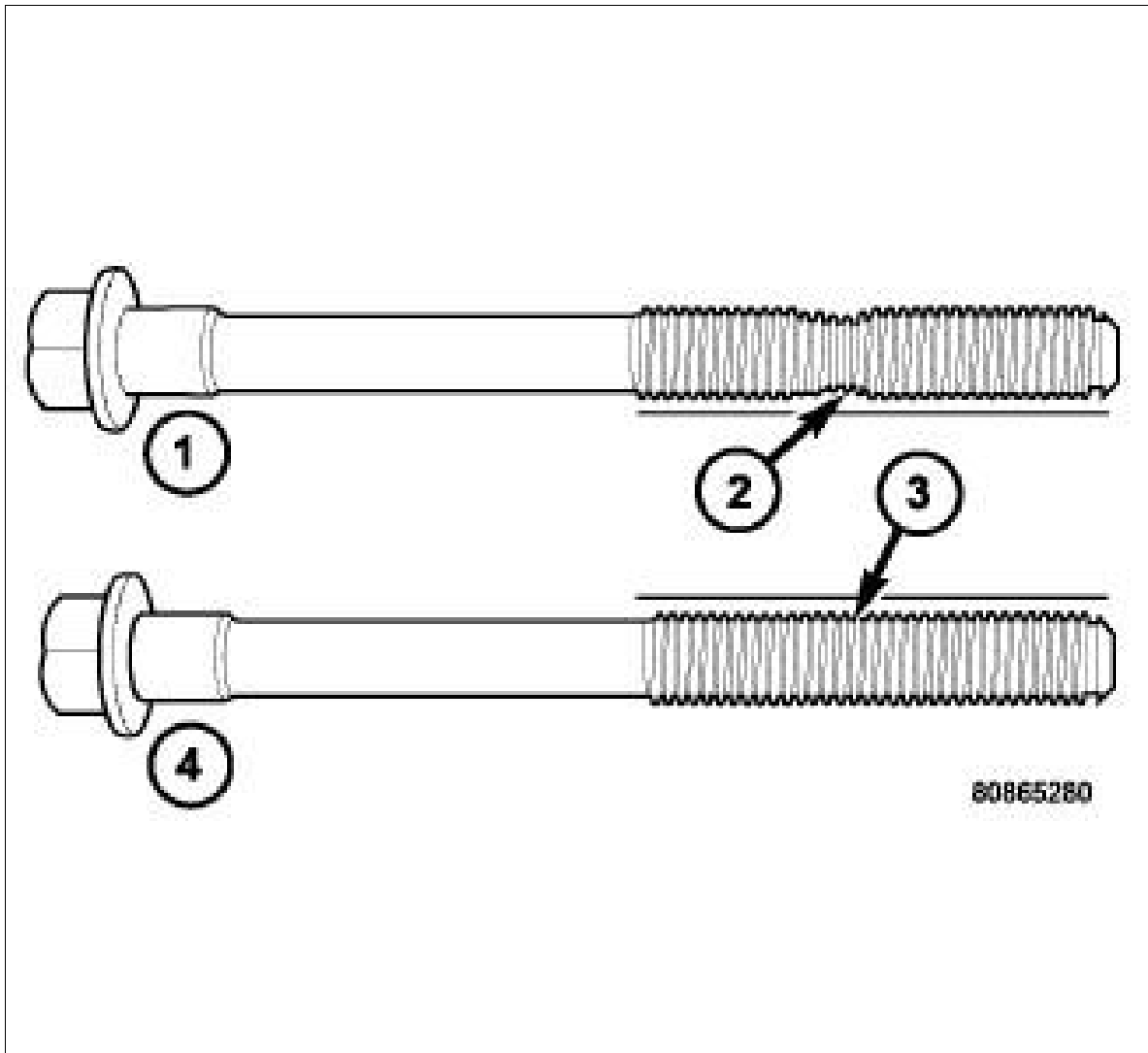
Fig 21: Marking Chain Link Corresponding To Crankshaft Sprocket Timing Mark



Courtesy of CHRYSLER GROUP, LLC

49. Align the timing chain onto the crank sprocket mark (2) using the painted link (1) as a guide.

Fig 22: Checking Cylinder Head Bolts For Stretching (Necking)



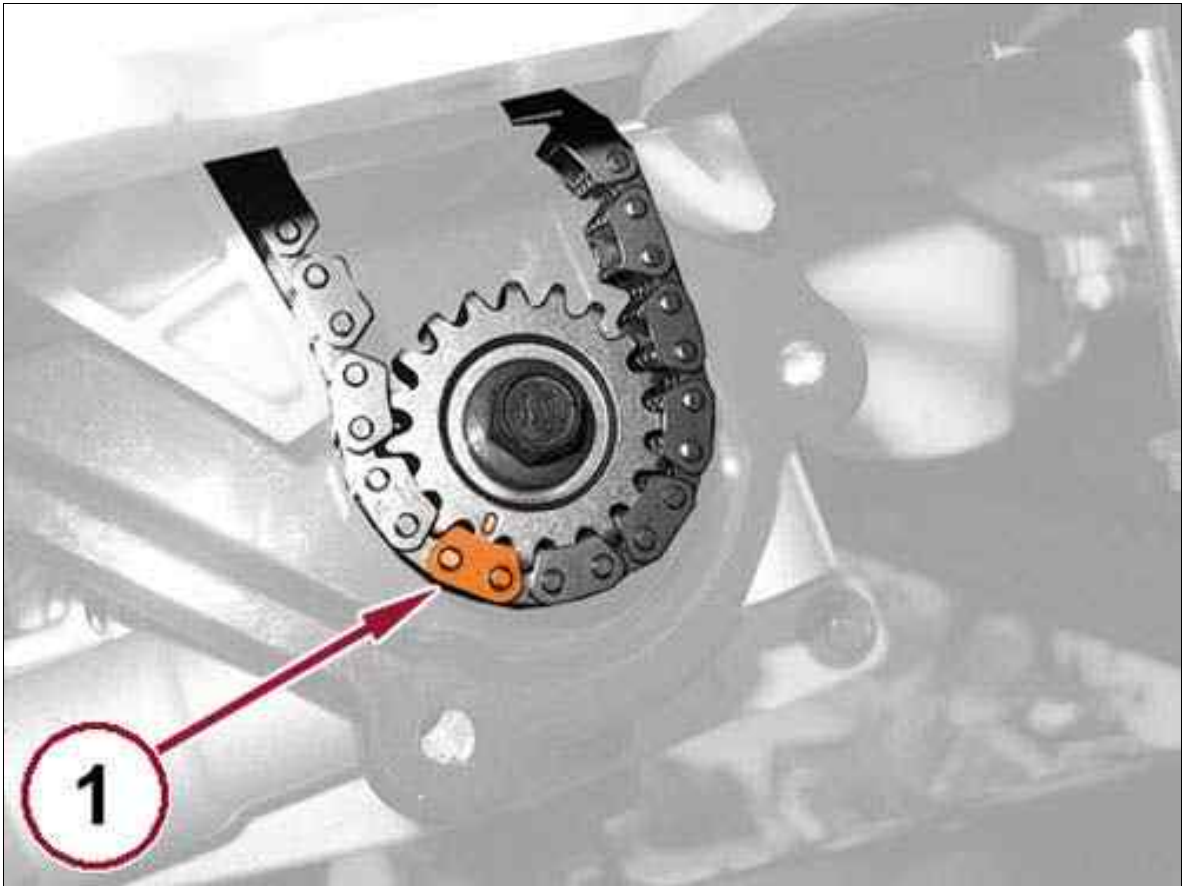
Courtesy of CHRYSLER GROUP, LLC

⚠ CAUTION:

The balance shaft/oil pump assembly bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts must be replaced.

50. Check the balance shaft/oil pump bolts for necking by holding a scale or straight edge against the threads. If all the threads do not contact the scale (2) the bolt must be replaced.

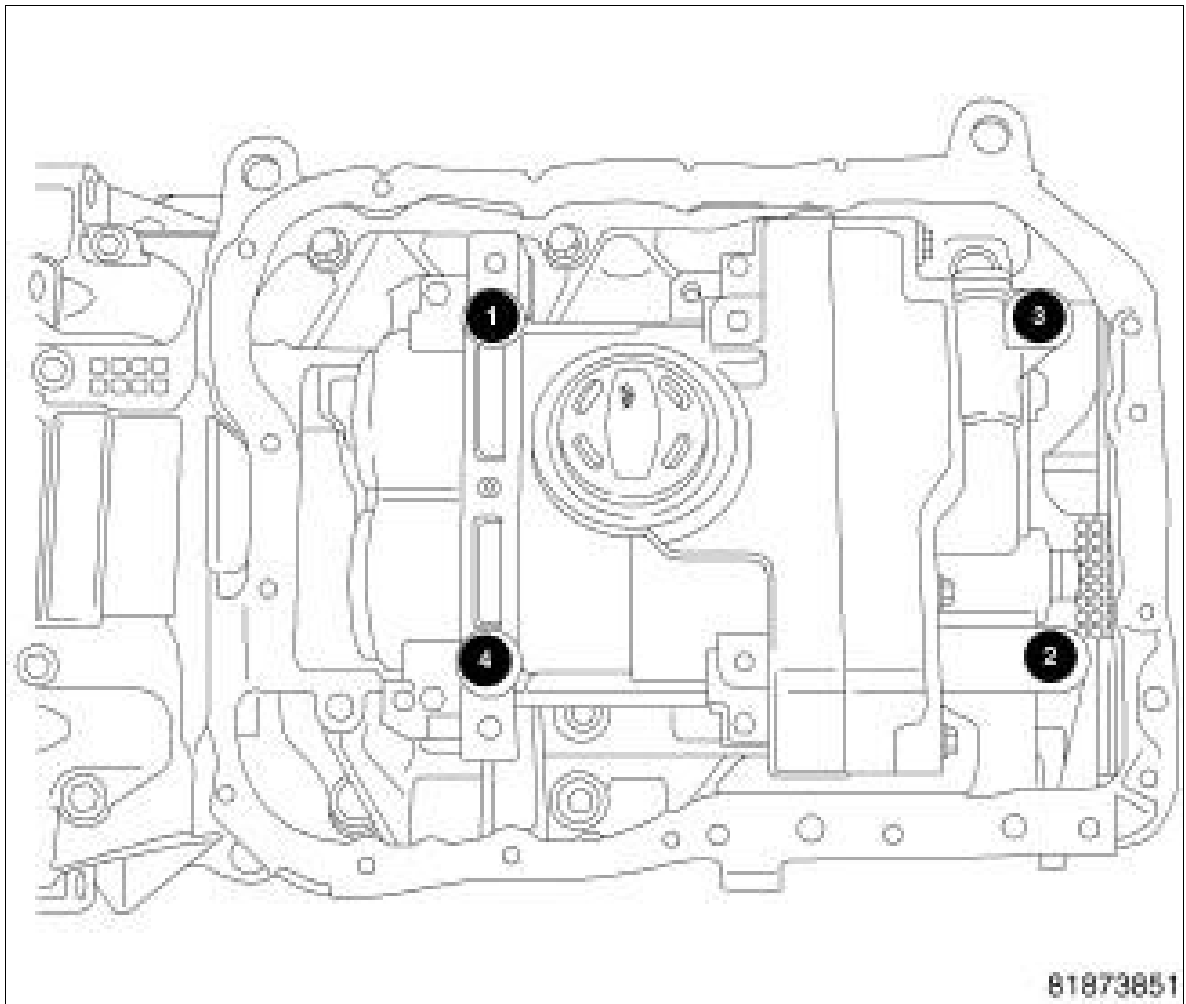
Fig 23: Marking Chain Link Corresponding To Balance Shaft/Oil Pump Sprocket Timing Mark



Courtesy of CHRYSLER GROUP, LLC

51. Align the timing chain onto the balance shaft/oil pump sprocket mark using the painted link (1) as a guide.
52. With the rear of the balance shaft/oil pump assembly on a slight angle, position the gear into the chain links and install the balance shaft/oil pump assembly on the ladder frame. Make sure the paint marks are aligned.

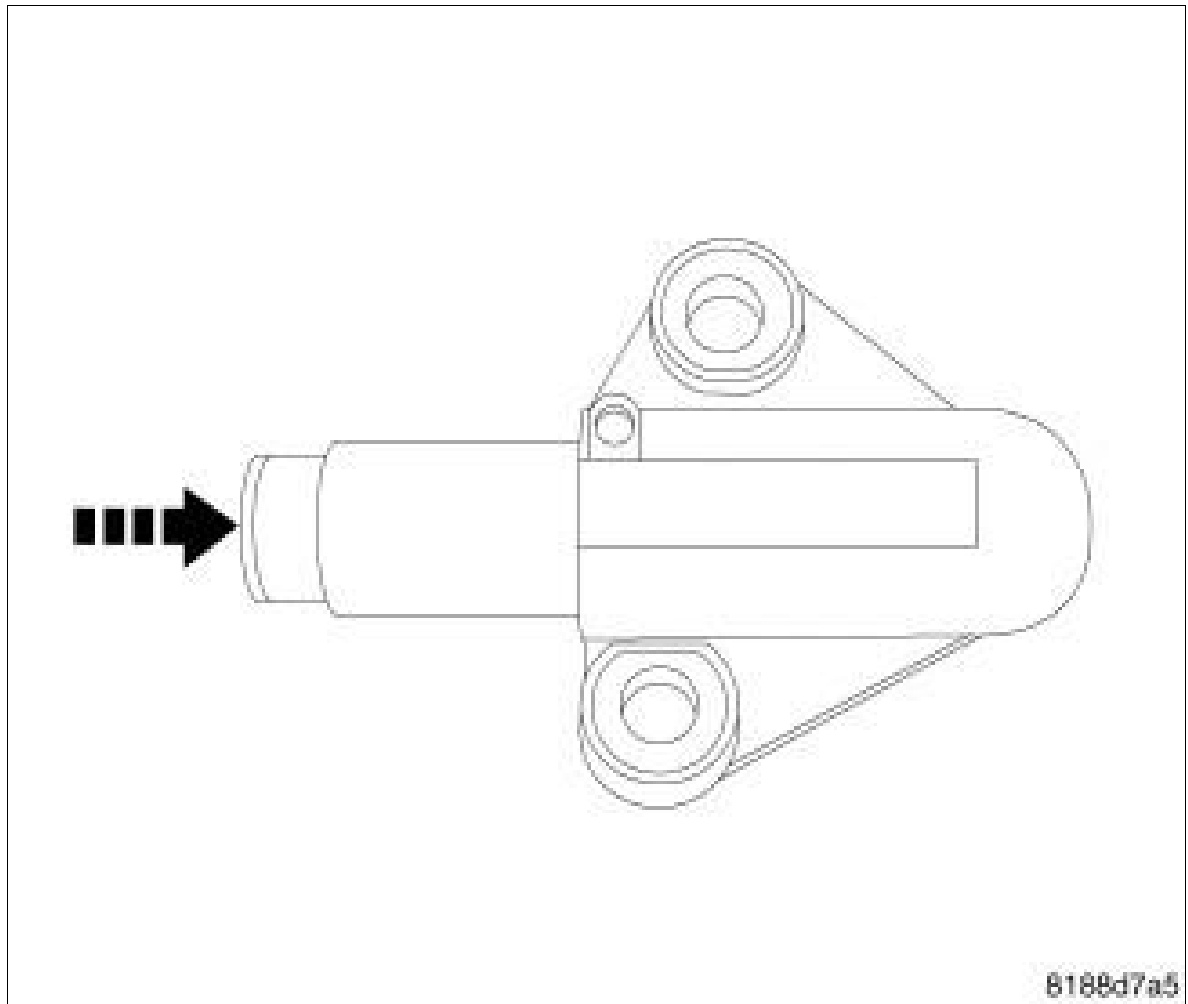
Fig 24: BSM Mounting Bolts Tightening Sequence



Courtesy of CHRYSLER GROUP, LLC

53. Install the four balance shaft/oil pump bolts finger tight.
54. Tighten the balance shaft/oil pump bolts in the sequence shown in illustration, following the 3 step torque plus an ending torque angle method. Tighten according to the following torque values:
 1. Step 1: All to 15 N.m (11 ft. lbs.)
 2. Step 2: All to 29 N.m (22 ft. lbs.)
 3. Step 3: All an additional 90° **Do not use a torque wrench for this step.**

Fig 25: Oil Pump Tensioner Reset



Courtesy of CHRYSLER GROUP, LLC

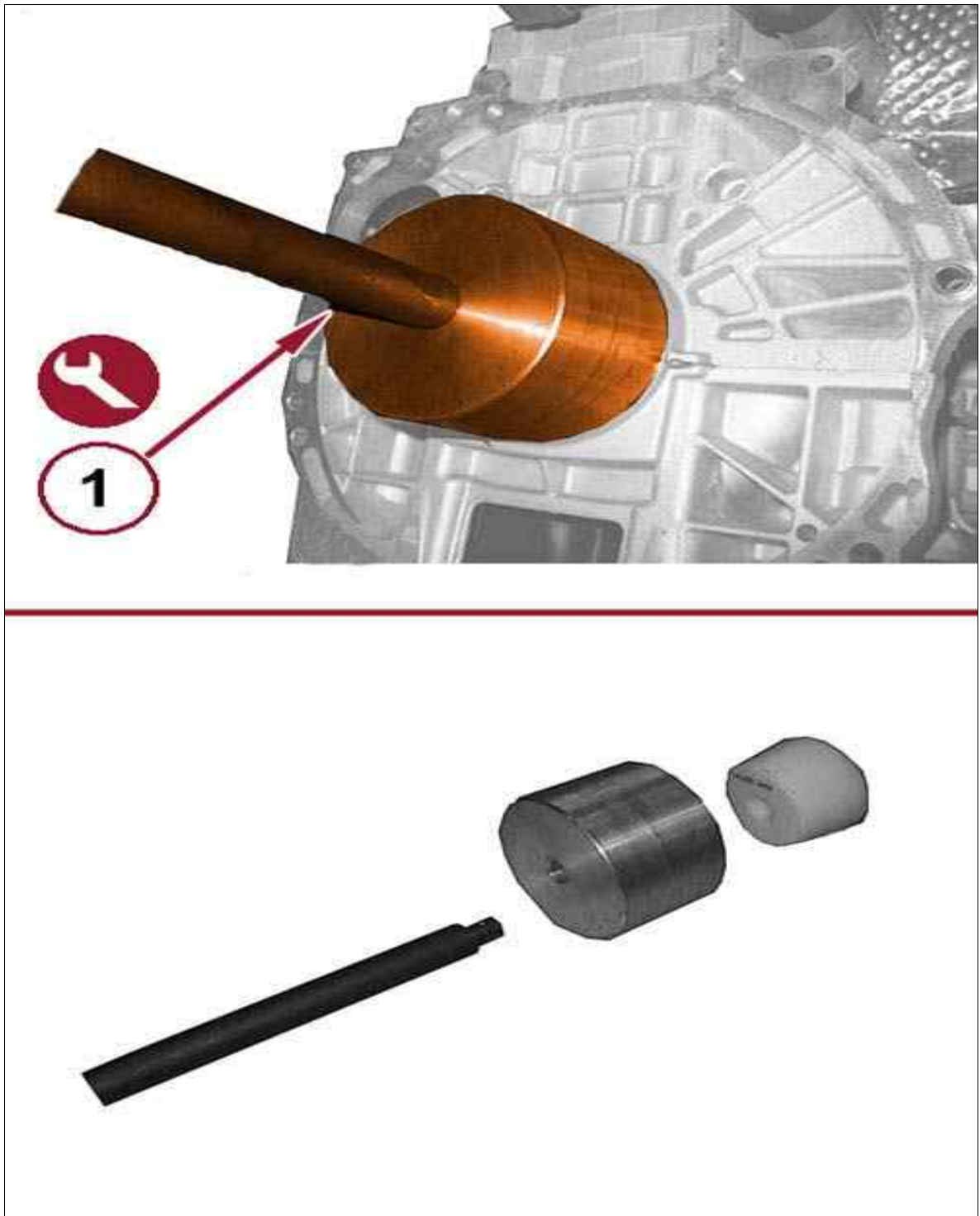
55. Reset the balance shaft/oil pump chain tensioner by pushing the plunger inward and installing a pin to hold the plunger in the retracted position.

Diagram illustrating the front cover assembly with numbered callouts:

- 1: Front cover (yellow plastic)
- 2: Bolt
- 3: Bolt
- 4: Bolt
- 5: Bolt
- 6: Bolt
- 7: Bolt

56. Install the fixed chain guide (7) with two bolts (6) tightened to the proper specification. Refer to TORQUE SPECIFICATIONS .
57. Install the tensioner arm (1) with the bolt (2) tightened to the proper specification. Refer to TORQUE SPECIFICATIONS .
58. Install the tensioner (4) with the two bolts (5) tightened to the proper specification. Refer to TORQUE SPECIFICATIONS .
59. Remove the tensioner pin (3) from the tensioner (4).

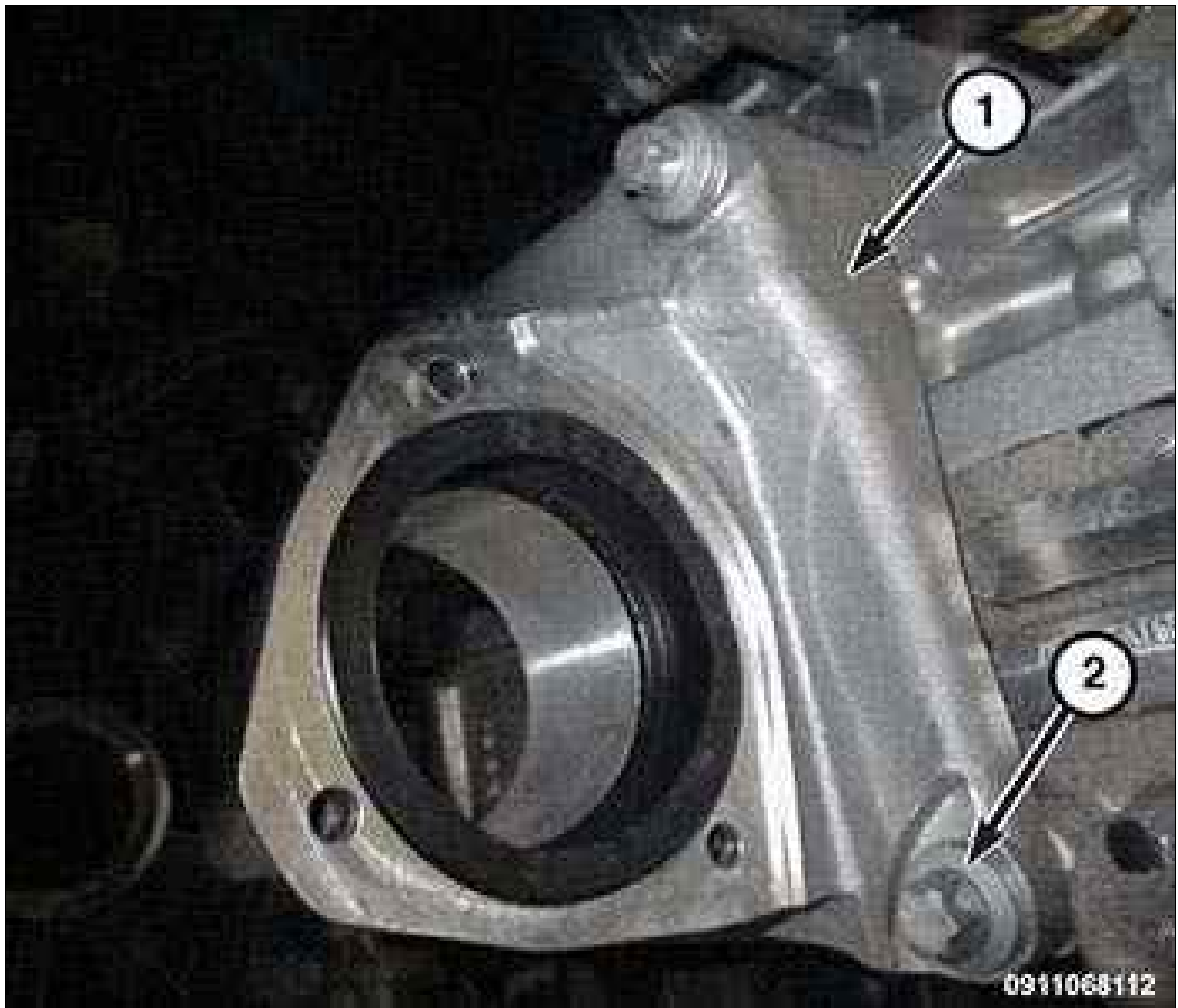
Fig 27: Installing Crankshaft Oil Seal Flywheel Side Using Special Tool



Courtesy of CHRYSLER GROUP, LLC

60. Using the 2000040586 (EMEA) or C-4171 (NAFTA), 2000040298 (EMEA) or (special tool #9706, Installer, Crankshaft Rear Oil Seal) (NAFTA) and 2000040246 (EMEA) or (special tool #9509, Installer, Oil Seal) (NAFTA) tools (1), install a new crankshaft oil seal, flywheel side.

Fig 28: Intermediate Shaft Bearing Housing & Bolts



Courtesy of CHRYSLER GROUP, LLC

61. If equipped, install the intermediate shaft bearing housing (1) with three bolts (2) tightened to the proper specification. Refer to SPECIFICATIONS .

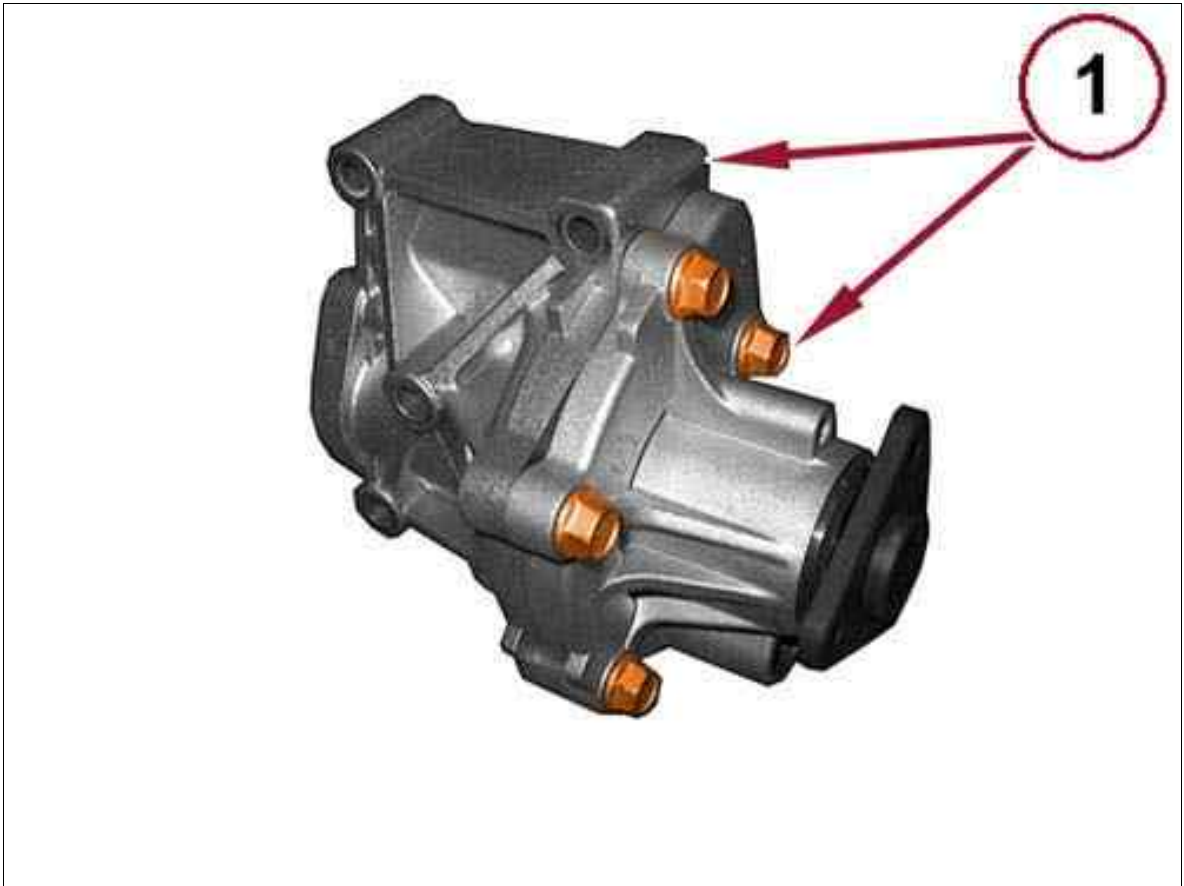
Fig 29: Water Pump Gasket



Courtesy of CHRYSLER GROUP, LLC

62. If removed, install a **NEW** gasket (1) onto the water pump.

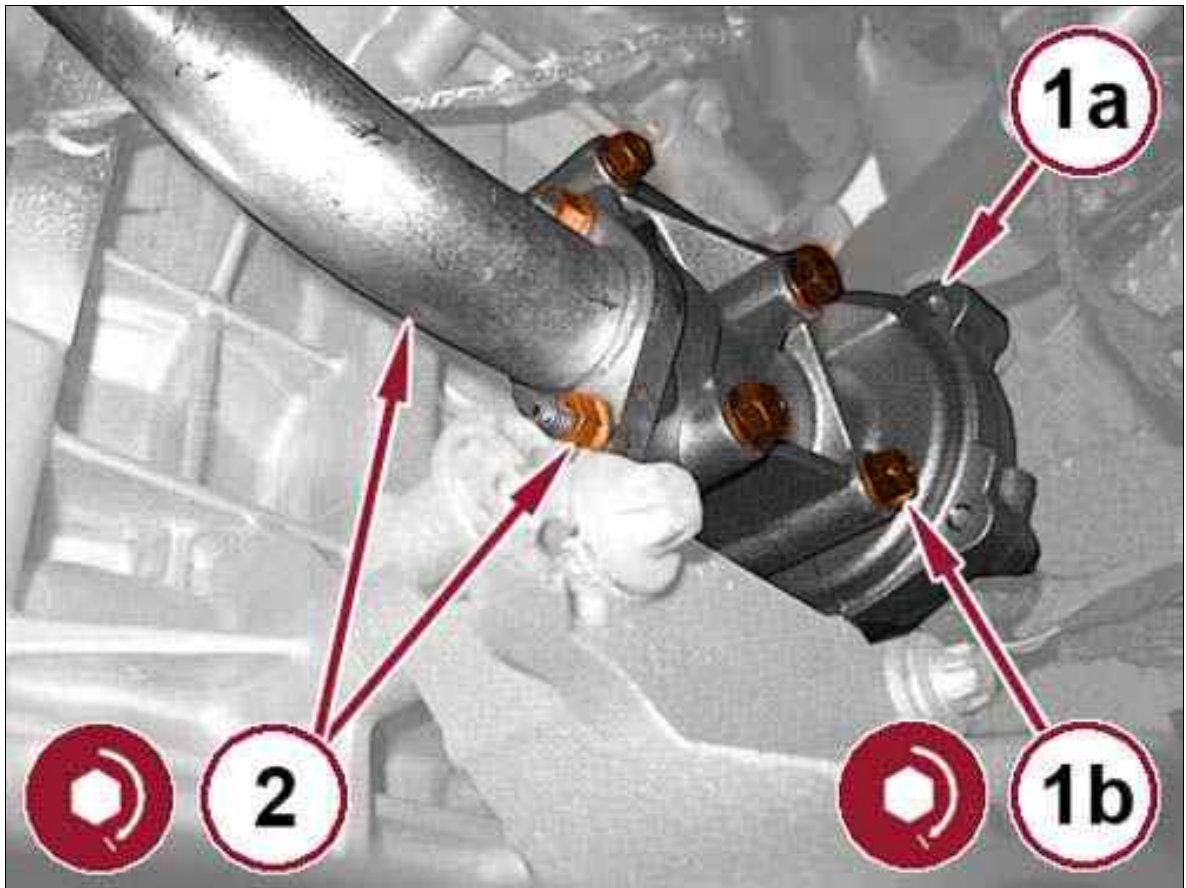
Fig 30: Water Pump & Bolts



Courtesy of CHRYSLER GROUP, LLC

63. If removed, install the water pump. Tightened the five bolts (1) in a crisscross pattern to the proper specification. Refer to SPECIFICATIONS .

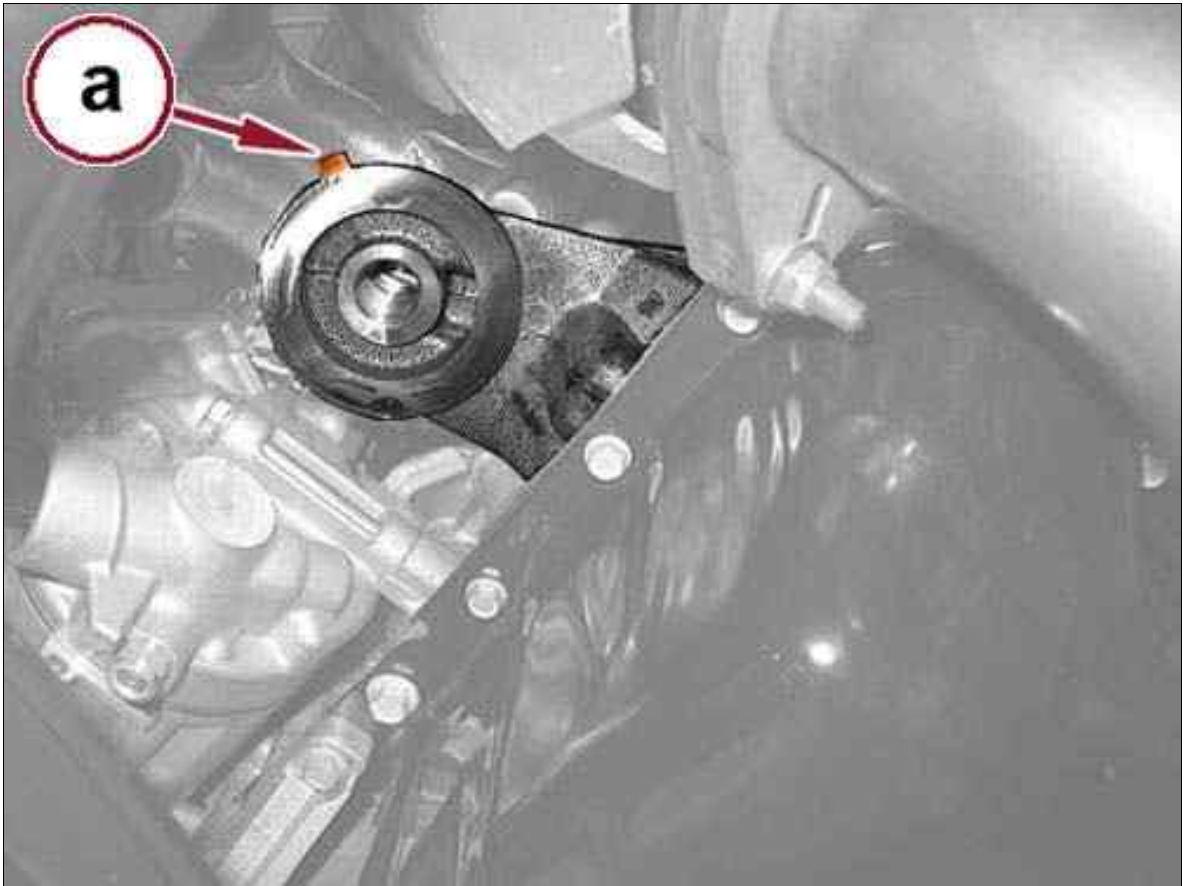
Fig 31: Coolant Tube, Water Pump Body, Nuts & Bolts



Courtesy of CHRYSLER GROUP, LLC

64. Using a **NEW** gasket, install the water pump body (1a). Tighten the bolts (1b) to the proper specification. Refer to SPECIFICATIONS .
65. Install the nuts (2) securing the coolant tube to the water pump body (1b) and tighten to the proper specification. Refer to SPECIFICATIONS .
66. Install the oil pressure sensor and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS .
67. Install the crankshaft position (CKP) sensor and tighten the mounting bolt to the proper specification. Refer to TORQUE SPECIFICATIONS .
68. Install the knock sensor with a new mounting bolt tightened to the proper specification. Refer to TORQUE SPECIFICATIONS .

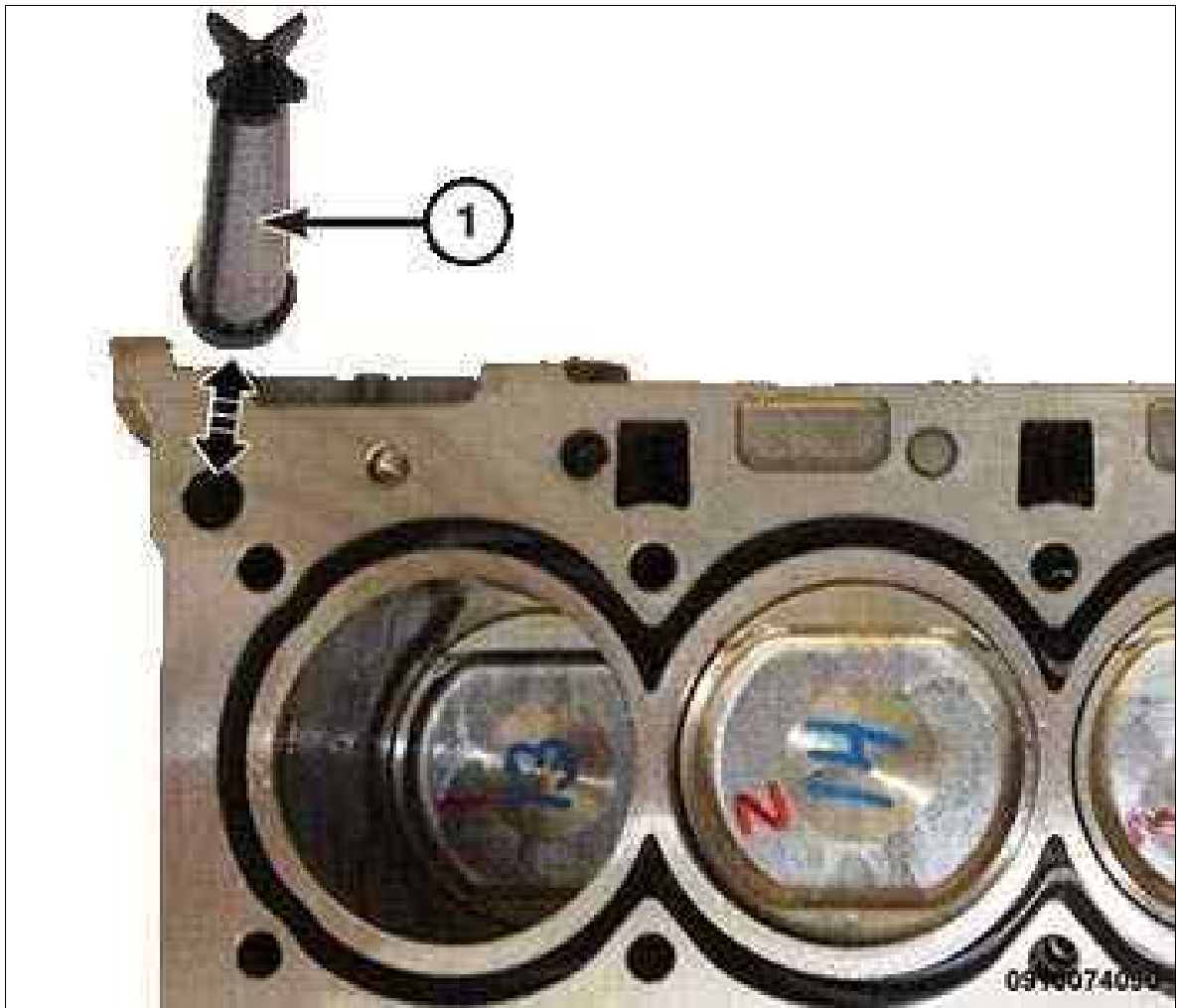
Fig 32: Installing Motor Oil Cooler By Engaging Reference Centering With Tab



Courtesy of CHRYSLER GROUP, LLC

69. Install the motor oil cooler, engaging the reference centering with the tab (a) shown in the figure and tighten the union.
70. Install the heat shield and tighten the screws.
71. Lubricate the seal with engine oil and mount the engine oil filter tightening it completely by hand.
72. Connect the water flow and return pipes to the engine oil cooler and tighten the clamps.

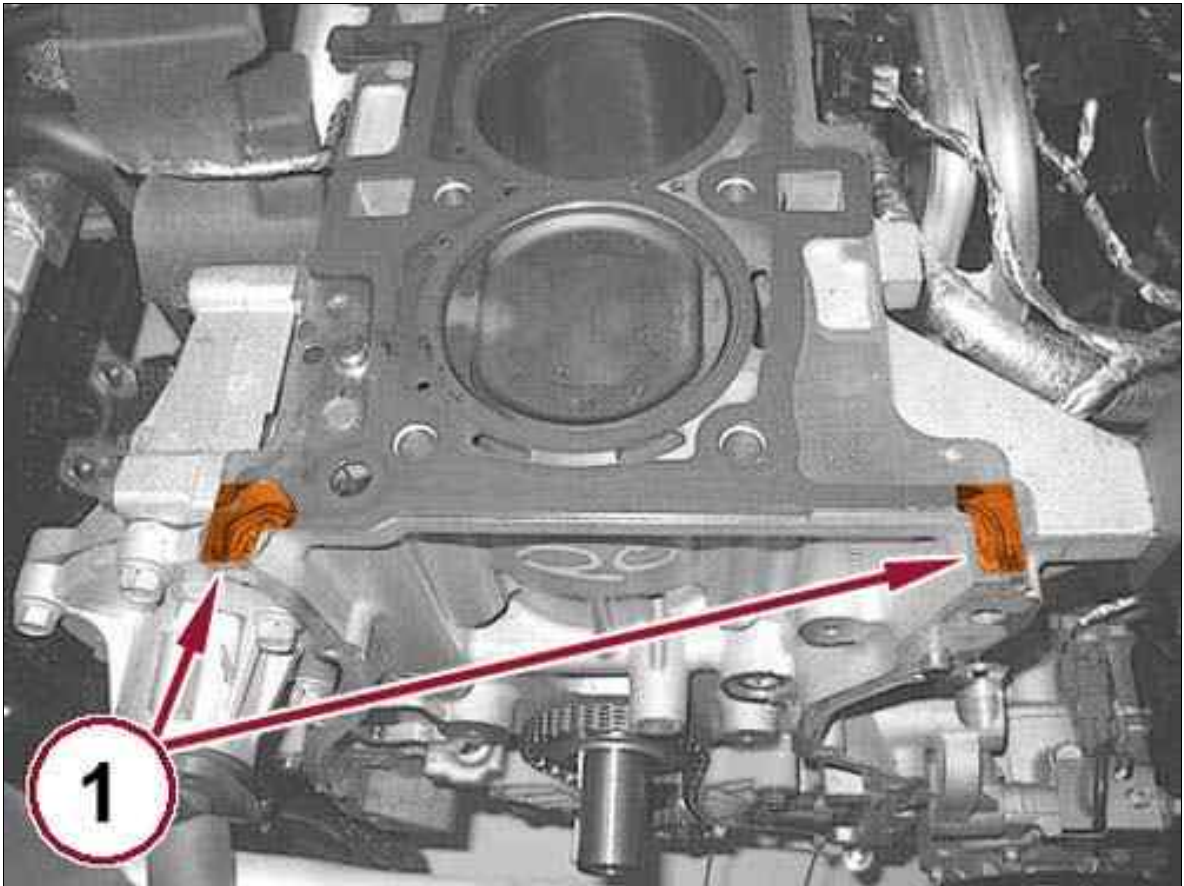
Fig 33: Locating Variable Valve Actuation Assembly (VVAA) Oil Supply Filter



Courtesy of CHRYSLER GROUP, LLC

73. Install the Variable Valve Actuation Assembly (VVAA) oil supply filter (1) in the engine block.

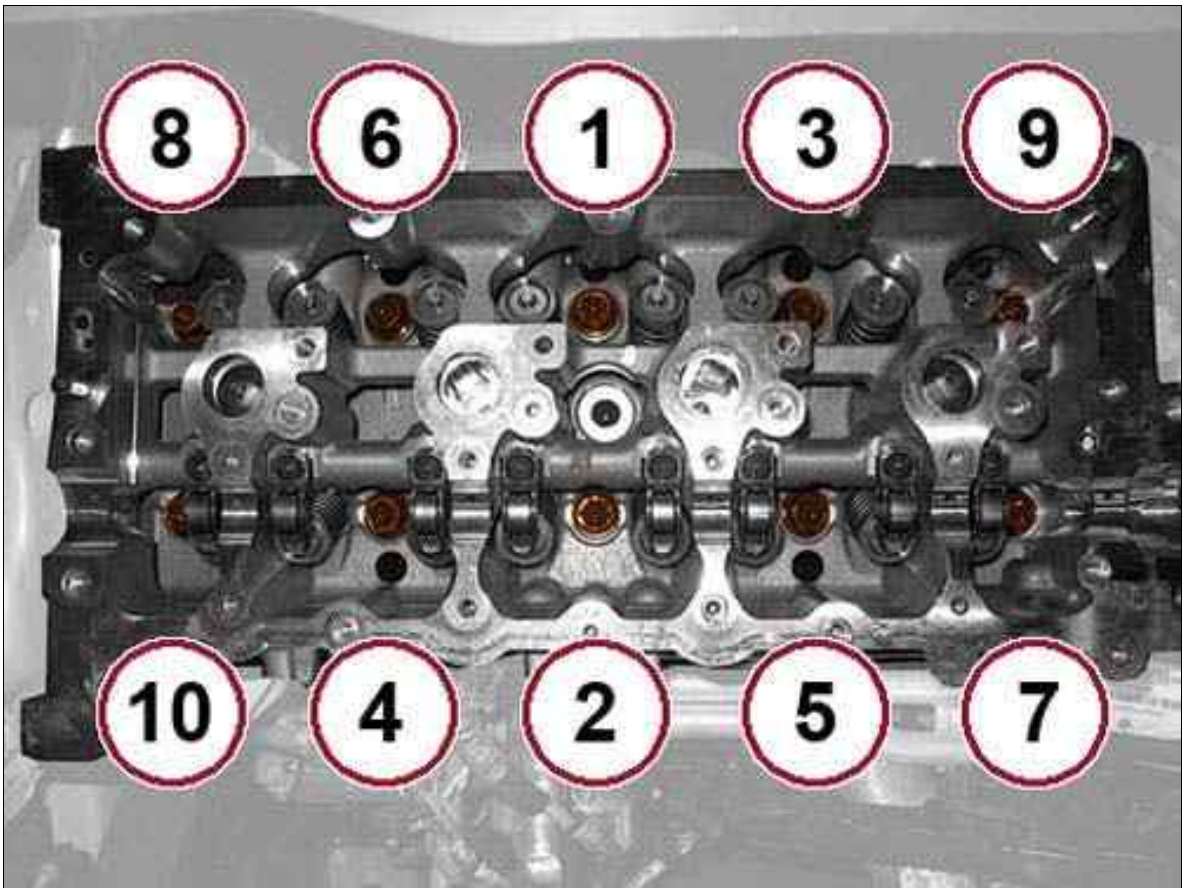
Fig 34: Placing Sealant On Cylinder Head Gasket At Specified Locations



Courtesy of CHRYSLER GROUP, LLC

74. Position the cylinder head gasket engaging the centering bushings.
75. Place sealant on the cylinder head gasket at the points indicated (1) in the figure.

Fig 35: Cylinder Head Bolts Tightening Sequence



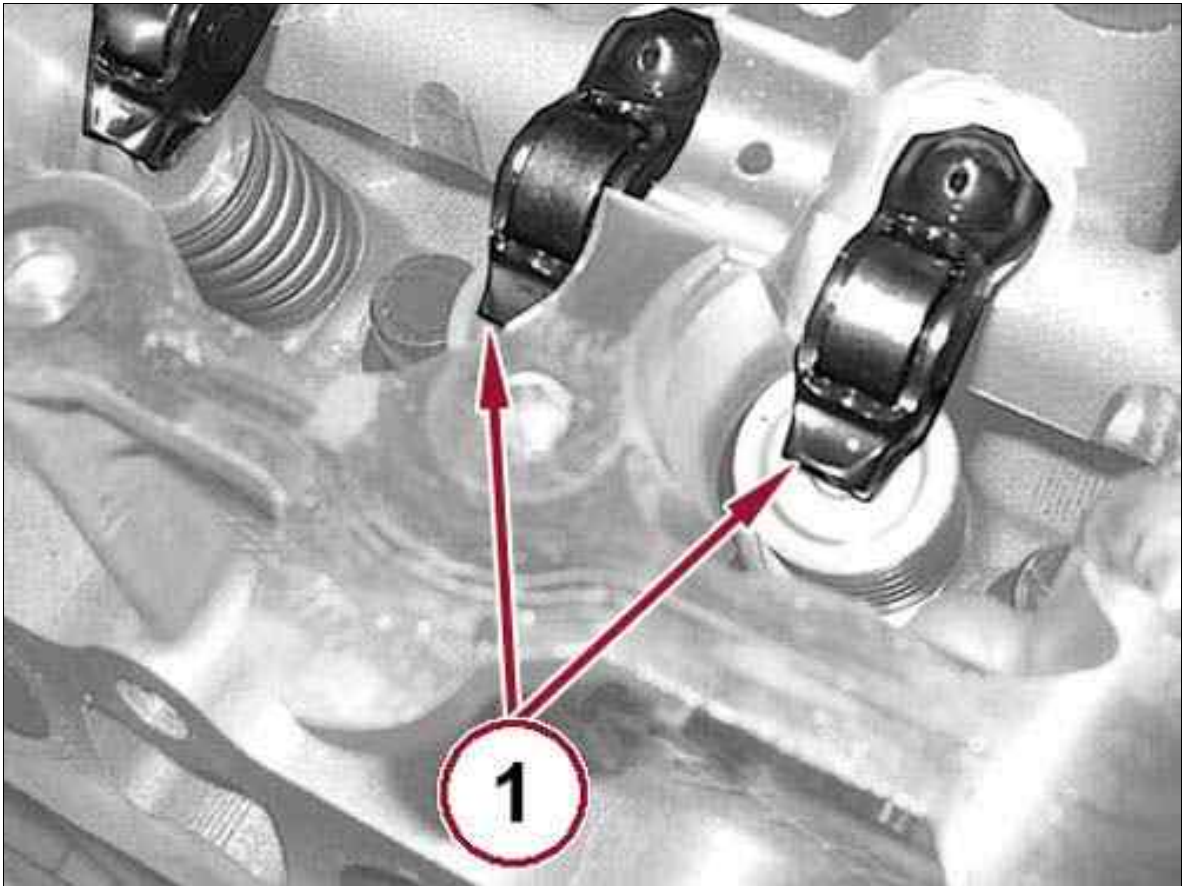
Courtesy of CHRYSLER GROUP, LLC

 **NOTE:**

For each tightening sequence, follow the order shown in illustration.

76. Install the cylinder head and bolts securing the cylinder head. Torque all bolts to the proper specification. Refer to TORQUE SPECIFICATIONS .

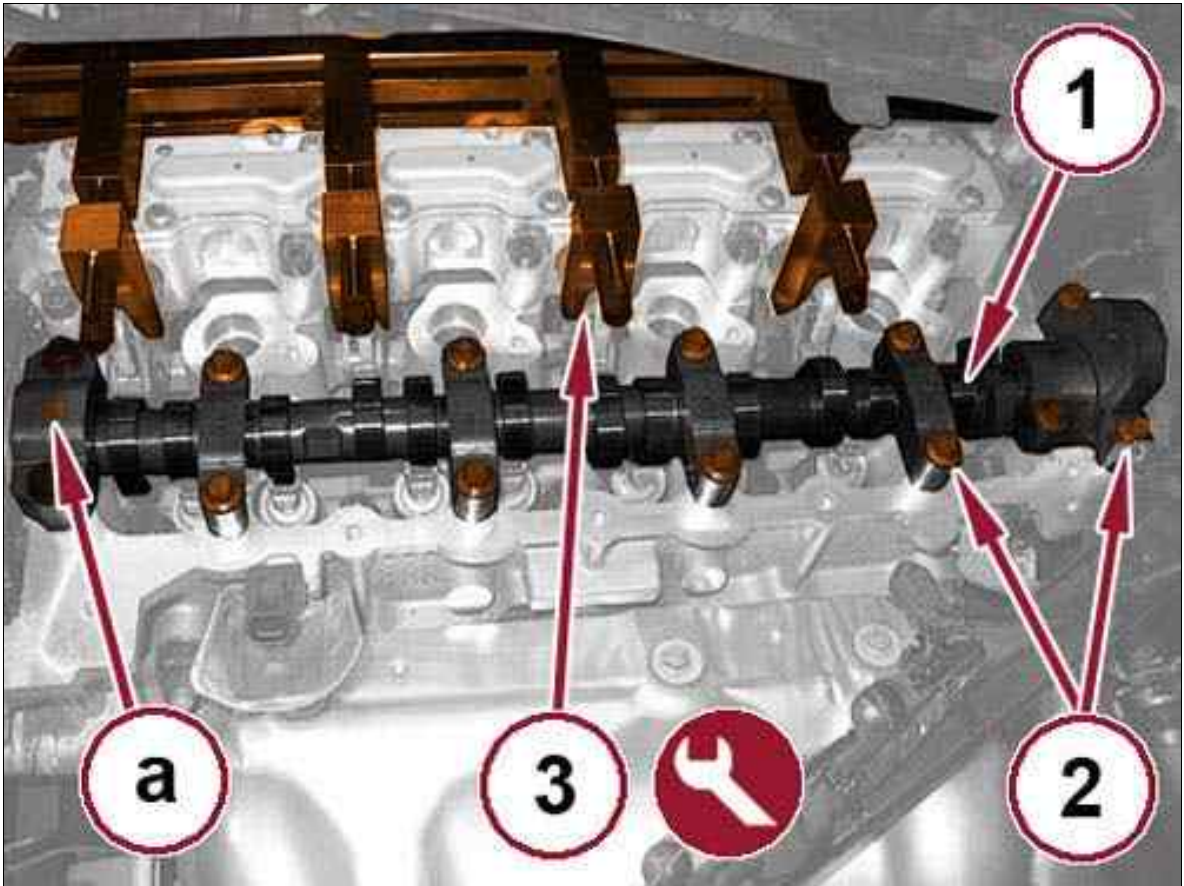
Fig 36: Hydraulic Tappets



Courtesy of CHRYSLER GROUP, LLC

77. Install the hydraulic tappets (1).

Fig 37: MULTIAIR Actuator, Camshaft & Camshaft Caps



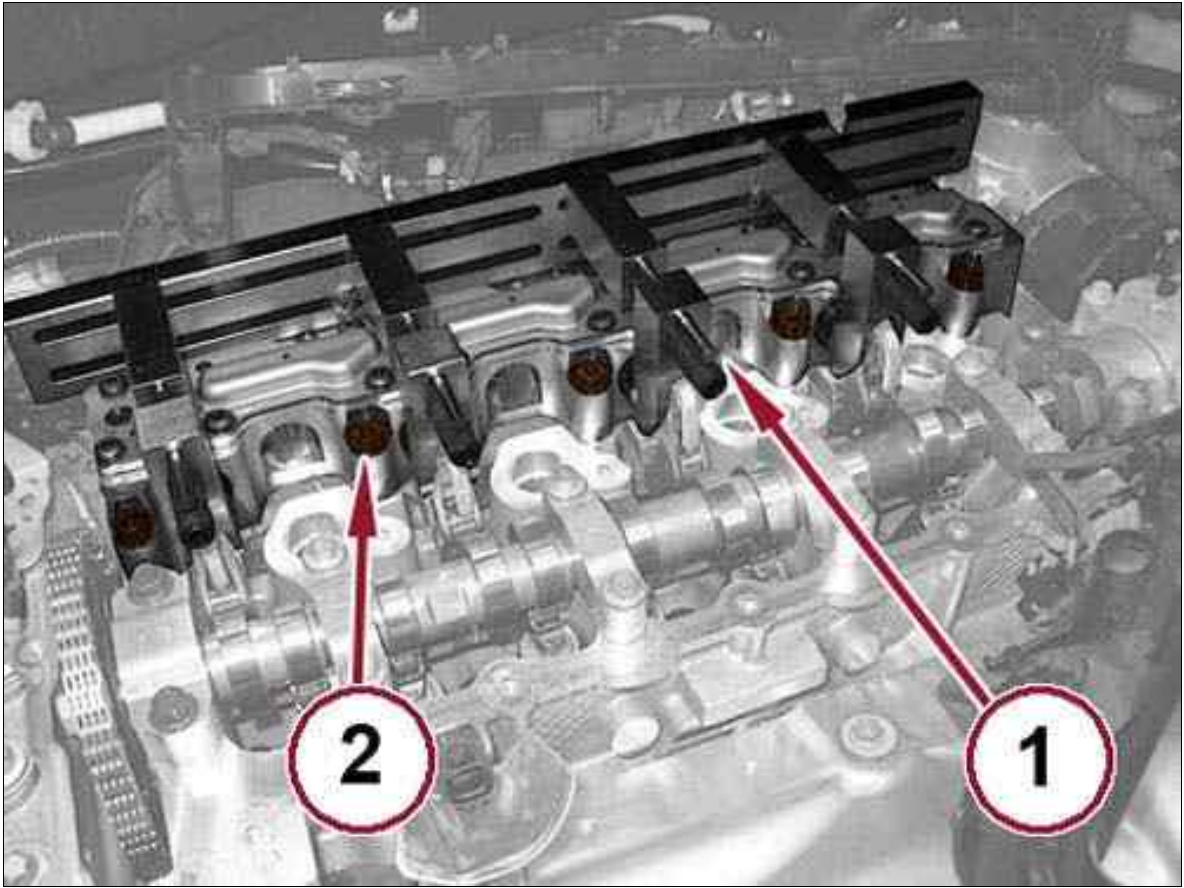
Courtesy of CHRYSLER GROUP, LLC

78. Install the camshaft (1) into the cylinder head.
79. Install the bearing caps (2), respecting the numbering of the cylinders stamped at the top of each cap, and tighten the camshaft cap to cylinder head bolts to the proper specification. Refer to TORQUE SPECIFICATIONS .

 NOTE:

The arrow on the bearing cap "a" must point to the timing side.

Fig 38: Compressing MULTIAIR Actuator Spring Using Special Tool & Locating Front MULTIAIR Actuator To Cylinder Head Bolt



Courtesy of CHRYSLER GROUP, LLC

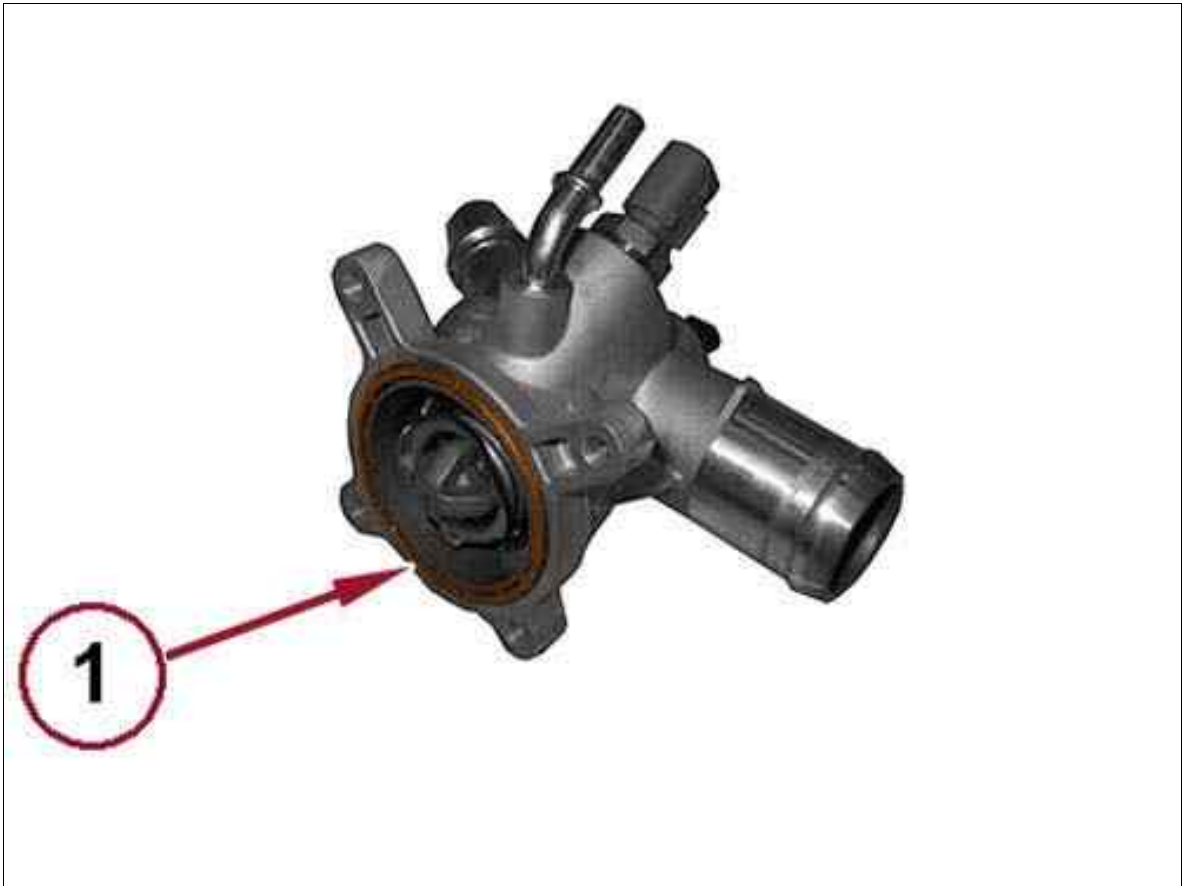


NOTE:

During all the handling operations, the MUTIAIR actuator should not be overturned with hydraulic tappets above.

80. Install a **NEW** metal gasket on the cylinder head top.
81. Position the MULTIAIR actuator into the vehicle, and tighten the front MULTIAIR actuator to cylinder head bolts to the proper specification. Refer to TORQUE SPECIFICATIONS .
82. Remove the 2020000090 (EMEA) or (special tool #10259B, Compressor, MultiAir® Spring) (NAFTA) tool from the MULTIAIR actuator.
83. Install and tighten the rear MULTIAIR actuator to cylinder head bolts to the proper specification. Refer to TORQUE SPECIFICATIONS .

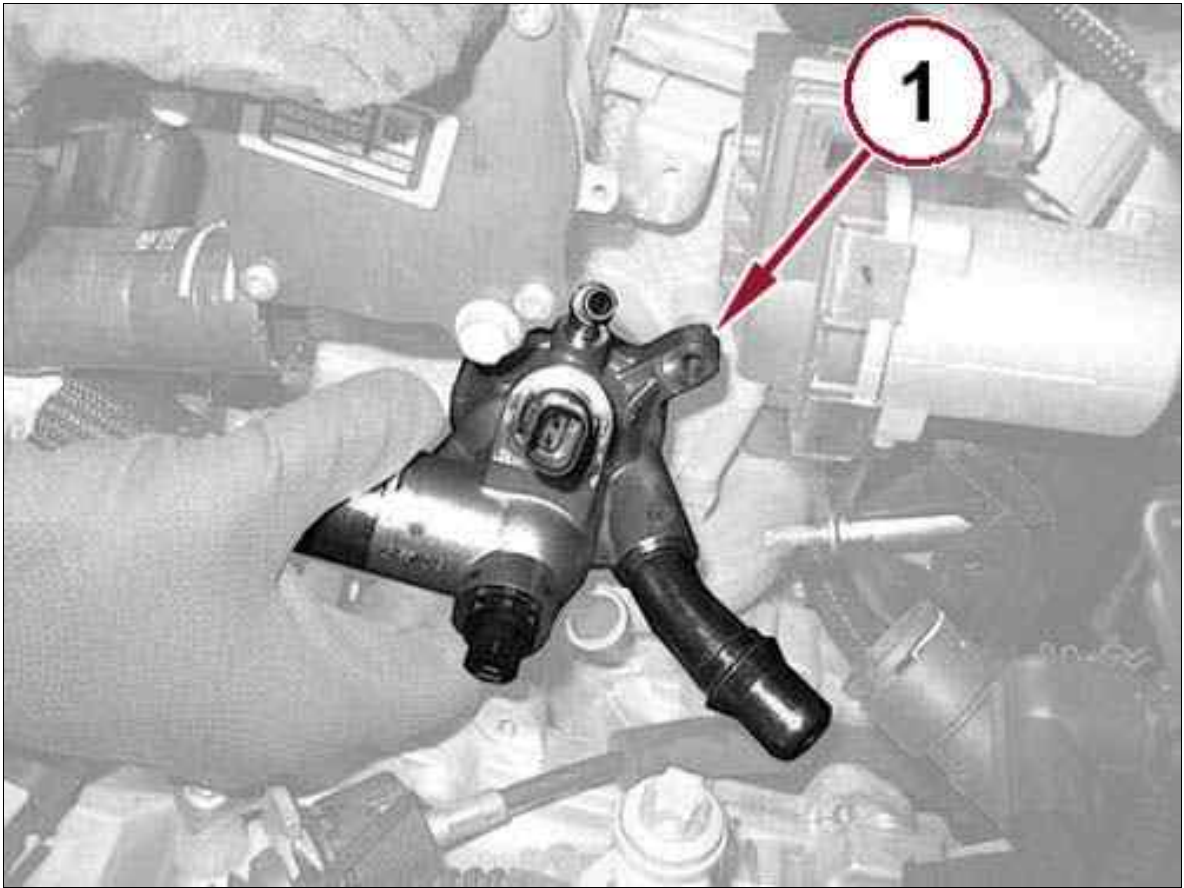
Fig 39: Thermostat Housing Gasket



Courtesy of CHRYSLER GROUP, LLC

84. Clean the gasket mating surfaces.
85. Install a **NEW** thermostat housing gasket (1).

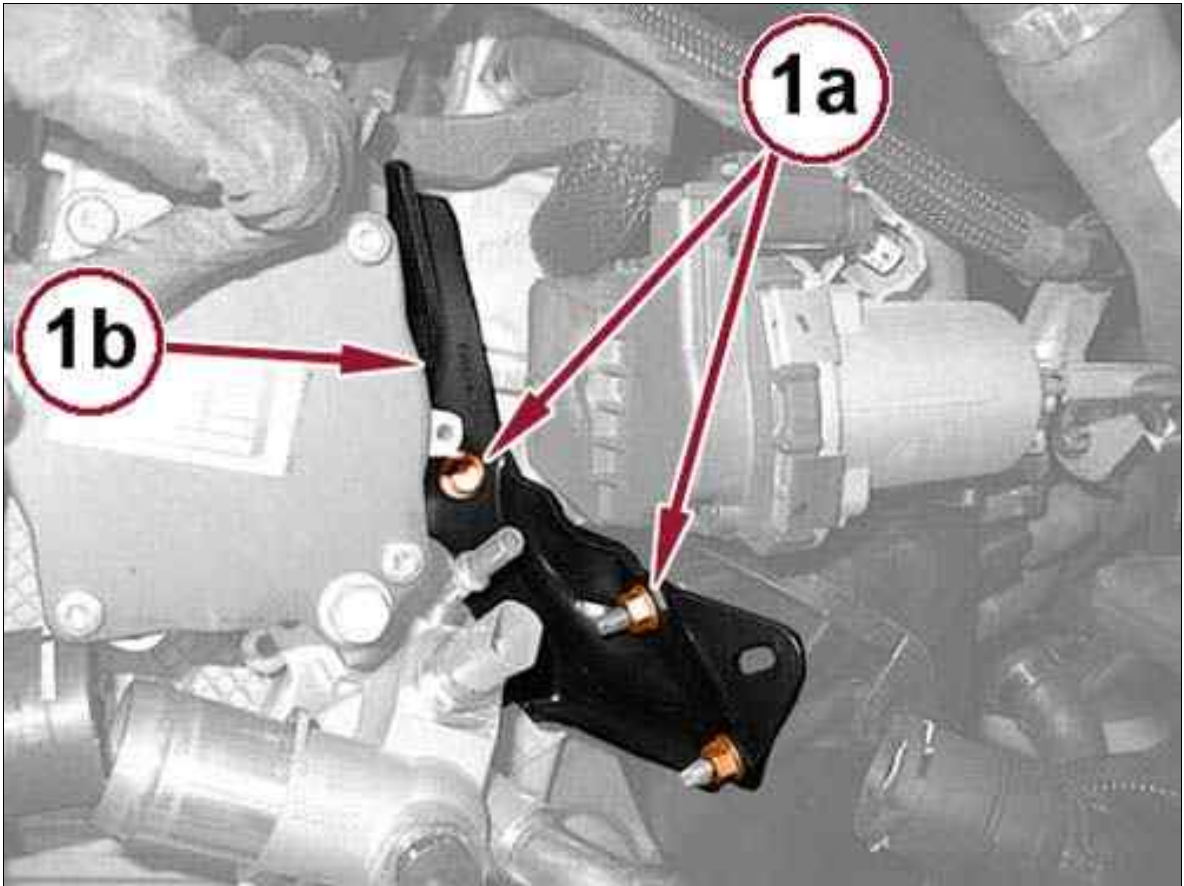
Fig 40: Thermostat Housing



Courtesy of CHRYSLER GROUP, LLC

86. Install the thermostat housing (1) and tighten bolt finger tight.

Fig 41: Vacuum Pump Support Bracket & Fasteners



Courtesy of CHRYSLER GROUP, LLC

87. Install the vacuum pump support bracket (1b) and securely tighten fasteners (1a).

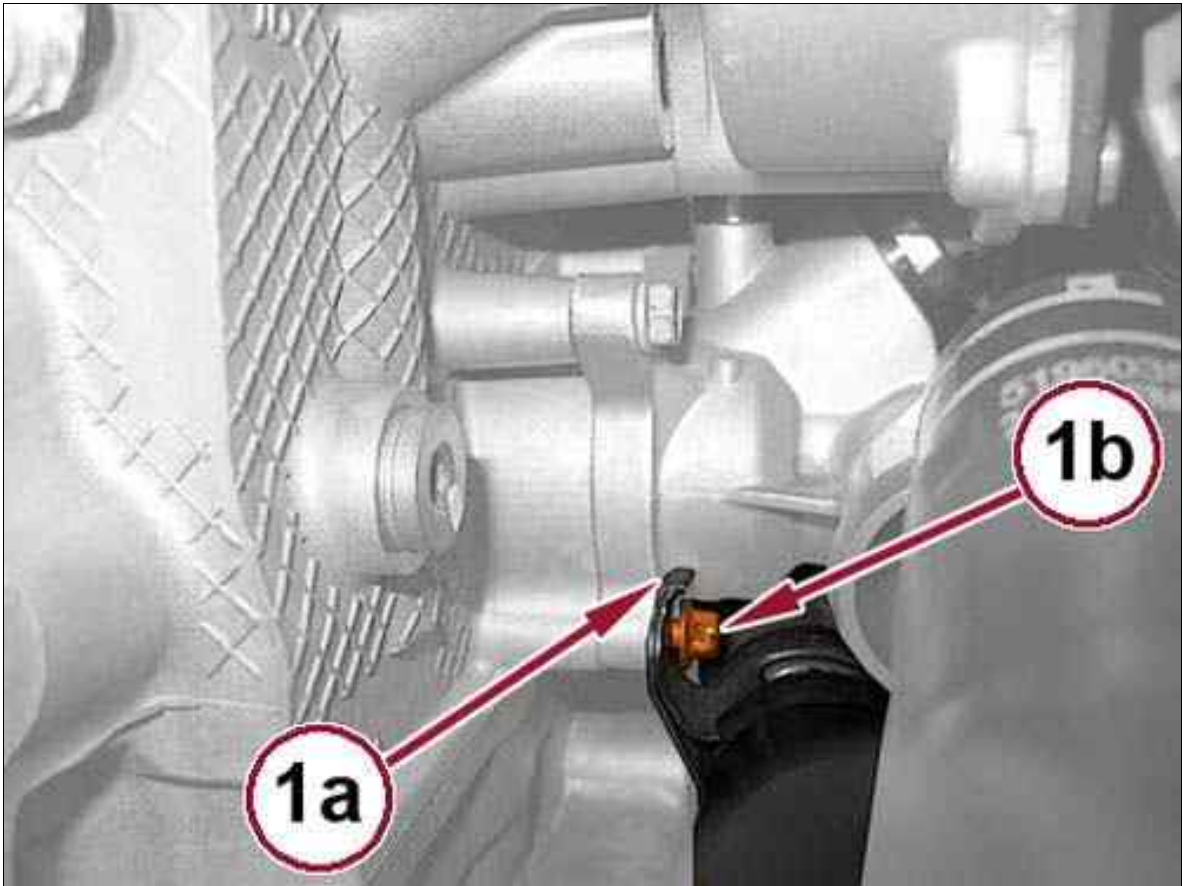
Fig 42: Thermostat Housing Bolts



Courtesy of CHRYSLER GROUP, LLC

88. Tighten the thermostat housing bolts (1) in a crisscross pattern to the proper specification. Refer to SPECIFICATIONS .

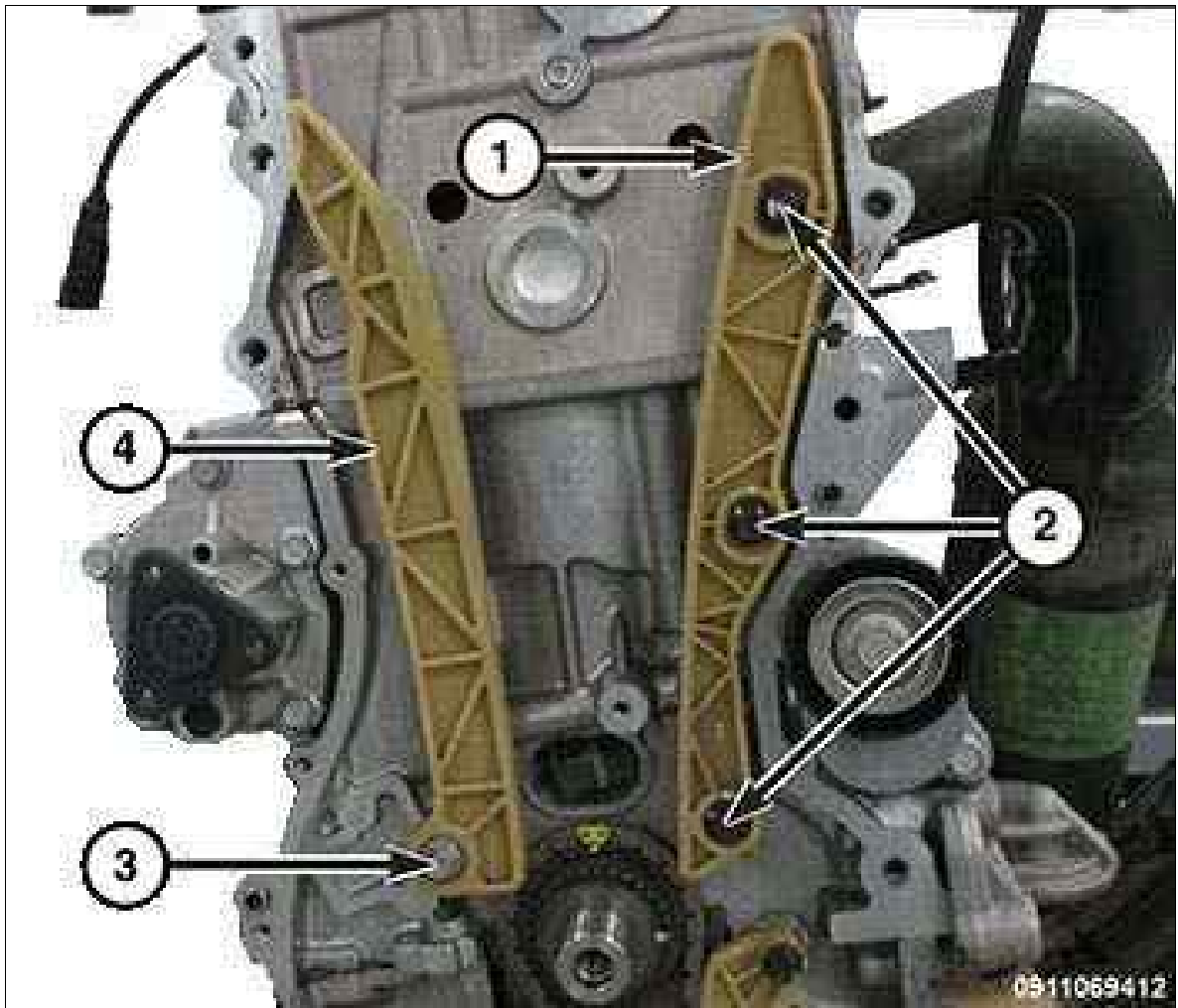
Fig 43: Coolant Tube To Thermostat Housing Lock Tab & Bolt



Courtesy of CHRYSLER GROUP, LLC

89. Install the bolt (1b) securing the coolant tube to the thermostat housing and tighten to the proper specification then bend lock tab to secure bolt (1a). Refer to SPECIFICATIONS .

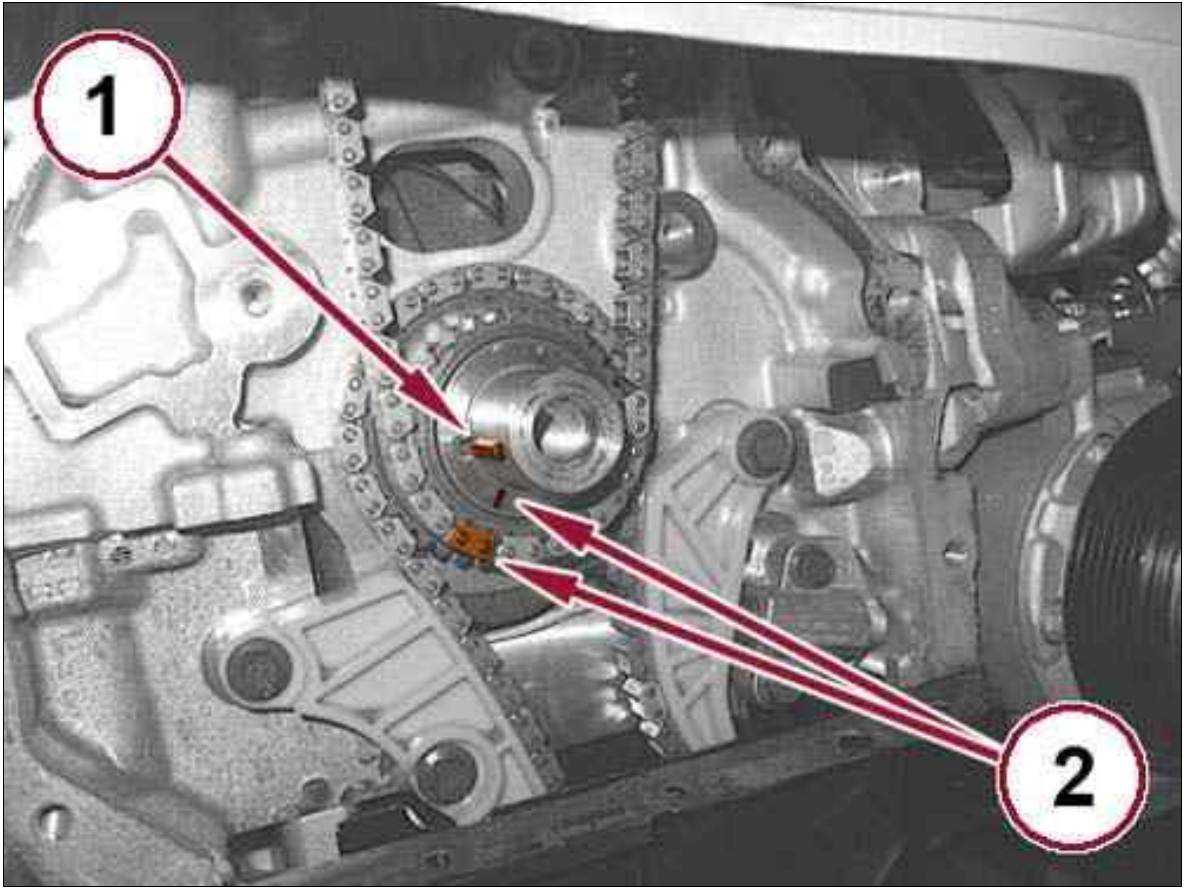
Fig 44: Timing Chain Guide, Guide Bolts, Tensioner Arm & Bolt



Courtesy of CHRYSLER GROUP, LLC

90. Install the timing chain guide (1) with three bolts (2) tightened to the proper specification. Refer to TORQUE SPECIFICATIONS .
91. Install the tensioner arm (4) with the bushing and bolt (3) tightened to the proper specification. Refer to TORQUE SPECIFICATIONS .

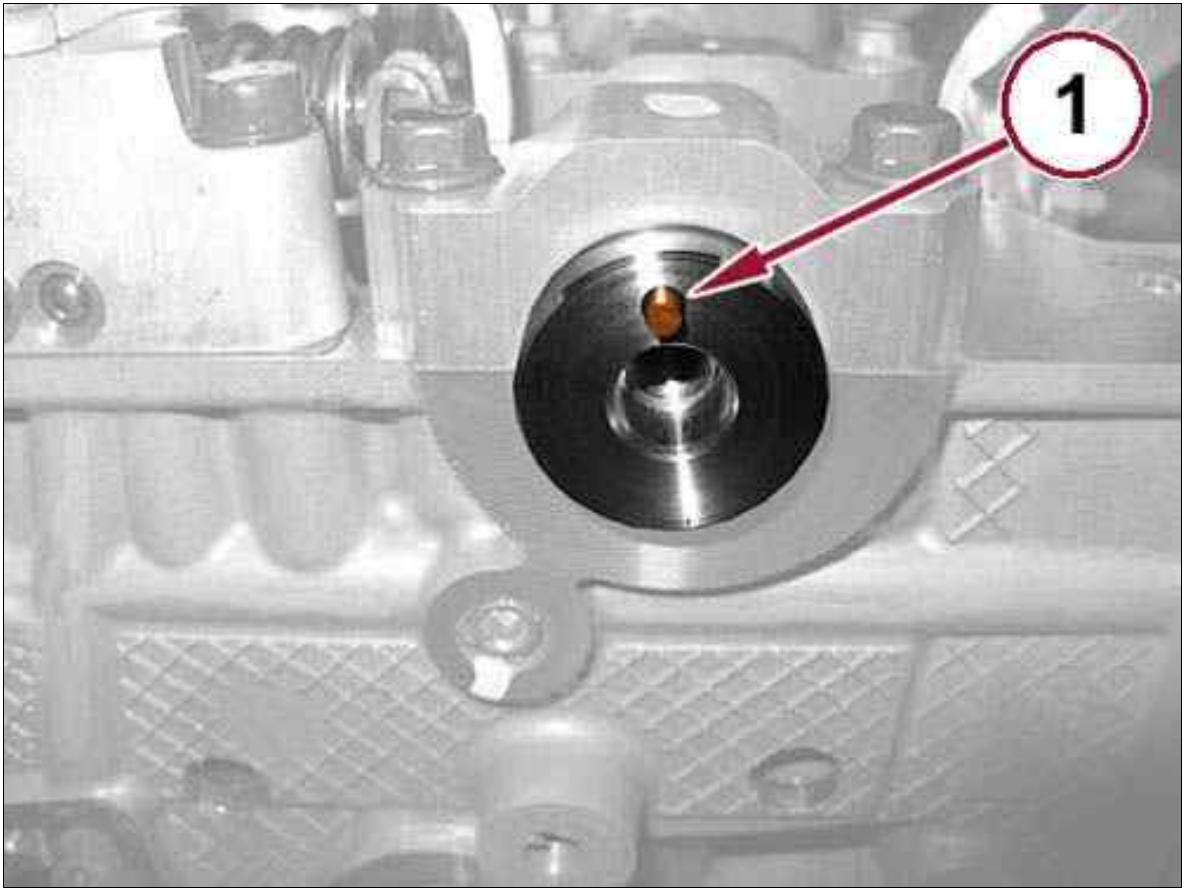
Fig 45: Positioning Crankshaft Key At "9" O-Clock Position & Marking Chain Link At Point Marked On Crankshaft Gear



Courtesy of CHRYSLER GROUP, LLC

92. Verify that the crankshaft key is in the "9 o'clock" in correspondence with the surfaces of contact between the lower and upper crankcase.
93. Install the chain, align the drive gear with the painted link. If you mount a new chain, the alignment reference is yellow.

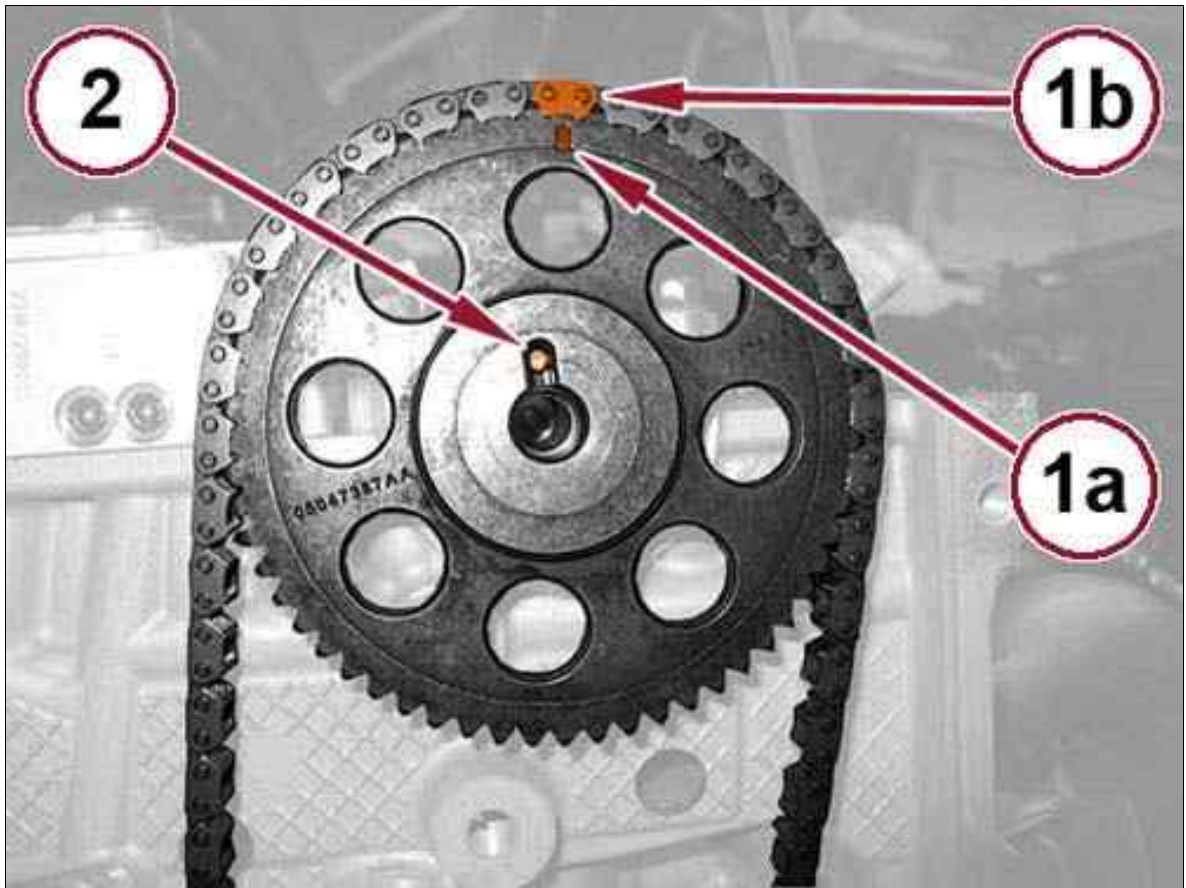
Fig 46: Placing Alignment Mark In "12" O-Clock Position



Courtesy of CHRYSLER GROUP, LLC

94. Check that the alignment mark (1) is in the "12 o'clock" position.

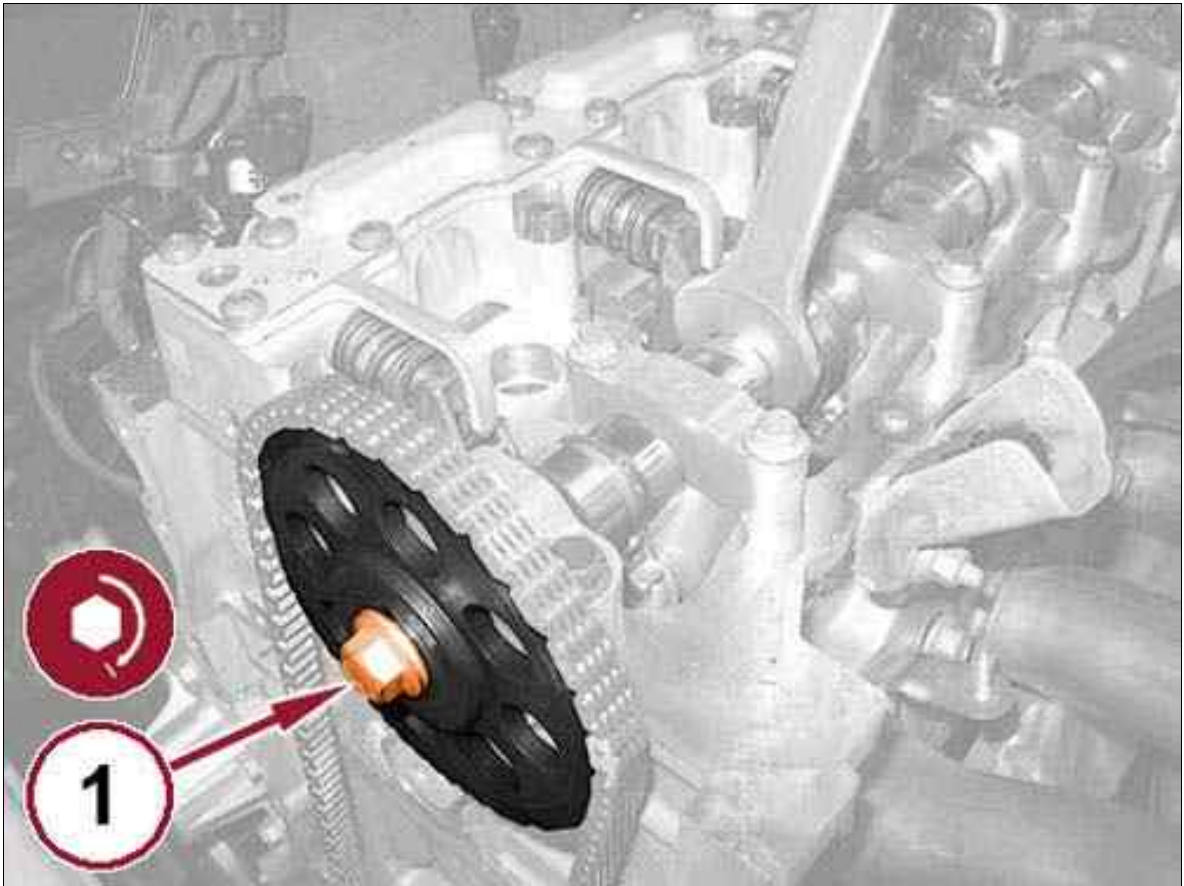
Fig 47: Matching Camshaft Sprocket Gear Notch To Marked Link



Courtesy of CHRYSLER GROUP, LLC

95. Fit the chain on the camshaft sprocket by matching the gear notch (1a) with the marked link (1b). If you mount a new chain, the alignment reference is yellow.
96. Align the pin (2) and install the camshaft sprocket.

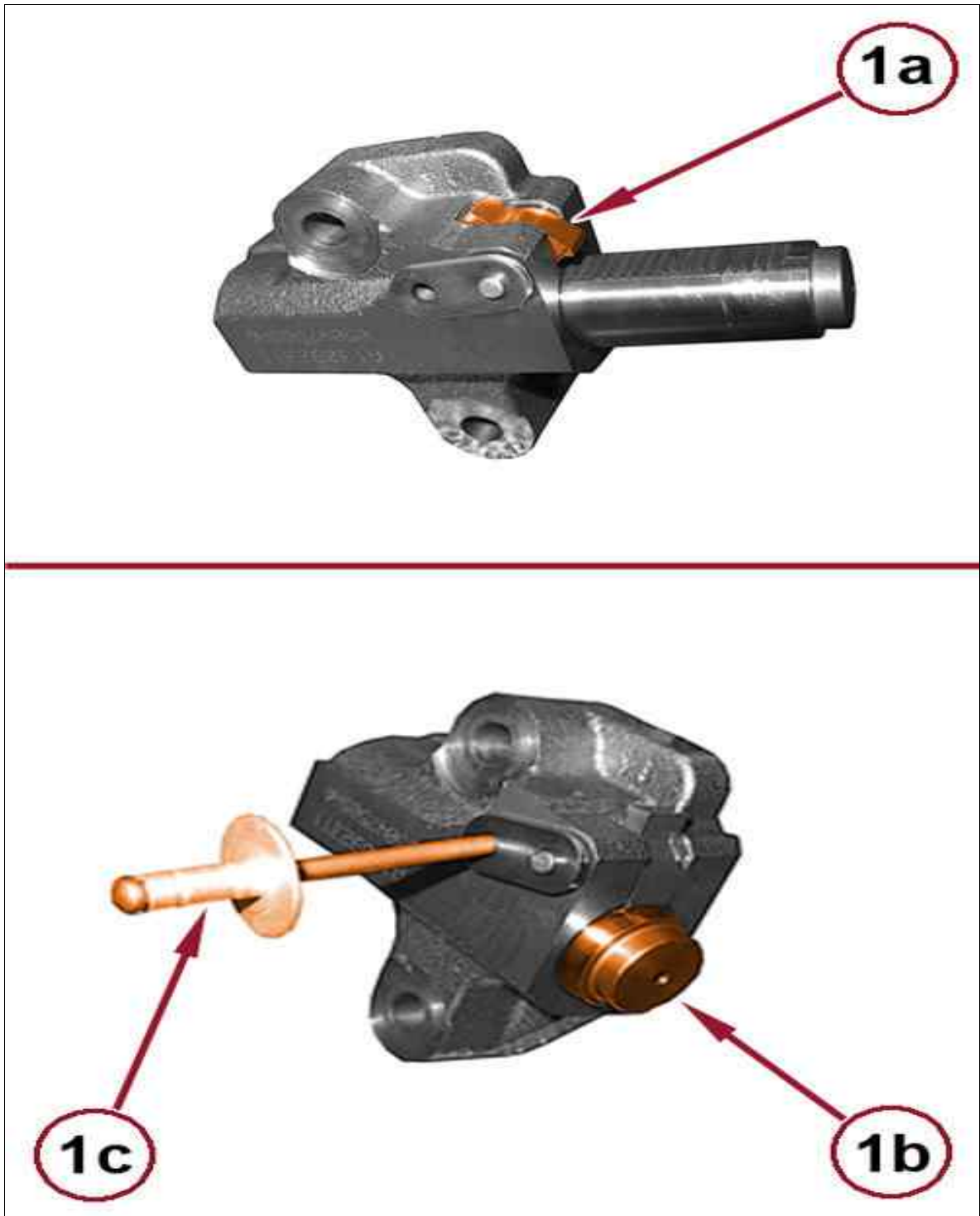
Fig 48: Camshaft Sprocket Bolt



Courtesy of CHRYSLER GROUP, LLC

97. Tighten the camshaft sprocket bolt (1) to the proper specification. Refer to SPECIFICATIONS .

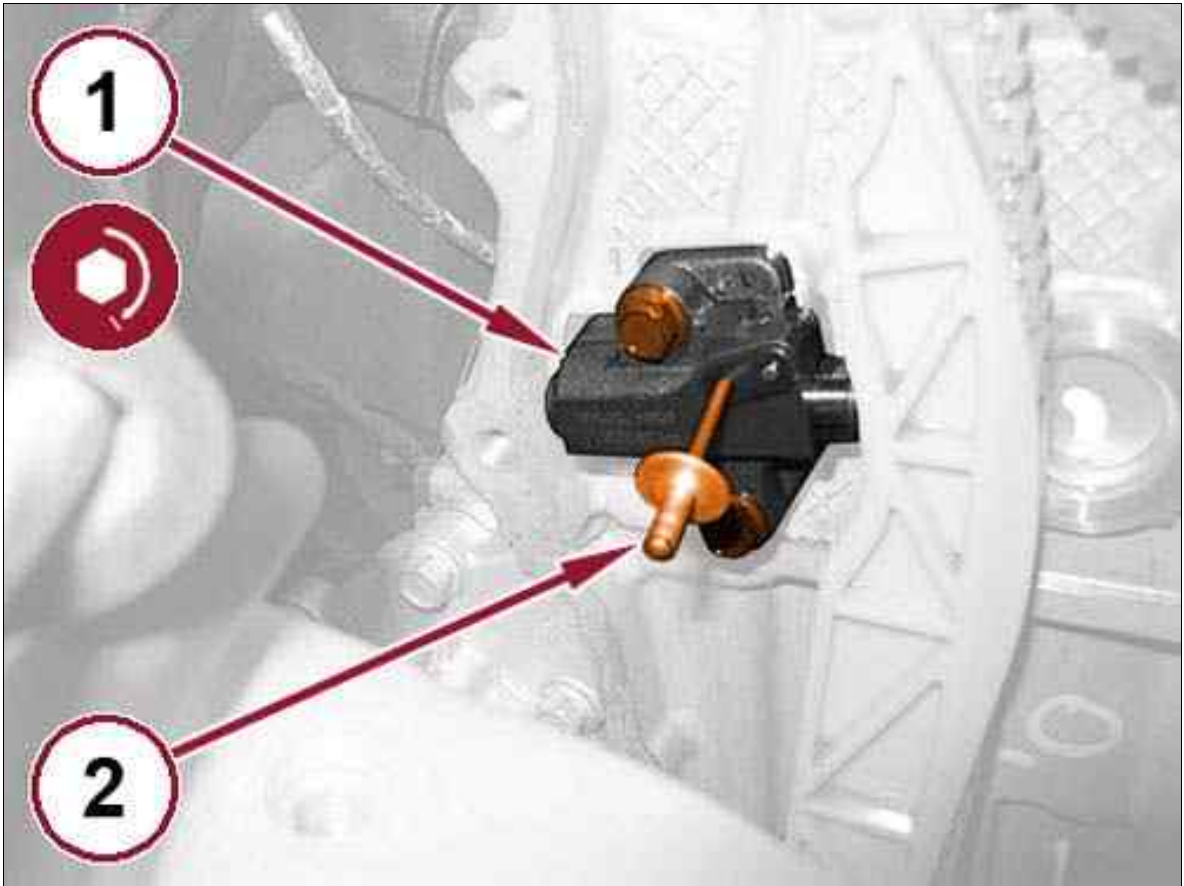
Fig 49: Pawl & Piston & Pin Lock



Courtesy of CHRYSLER GROUP, LLC

98. Disengage the pawl (1a) from the rack, compress the piston (1b) and insert the pin lock (1c).

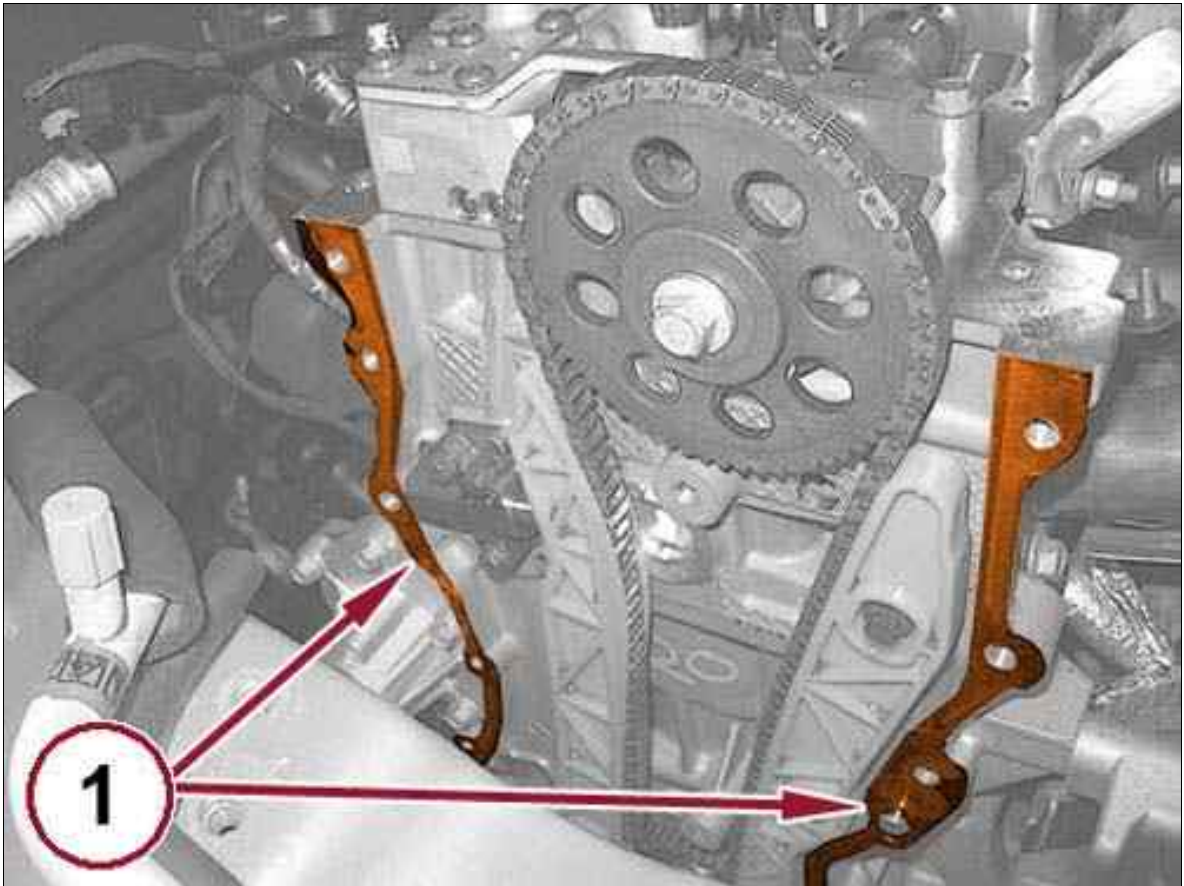
Fig 50: Tensioner & Locking Plunger Pin



Courtesy of CHRYSLER GROUP, LLC

99. Install the tensioner (1) and tighten the screws to the proper specification. Refer to TORQUE SPECIFICATIONS .
100. Remove the locking plunger pin (2).

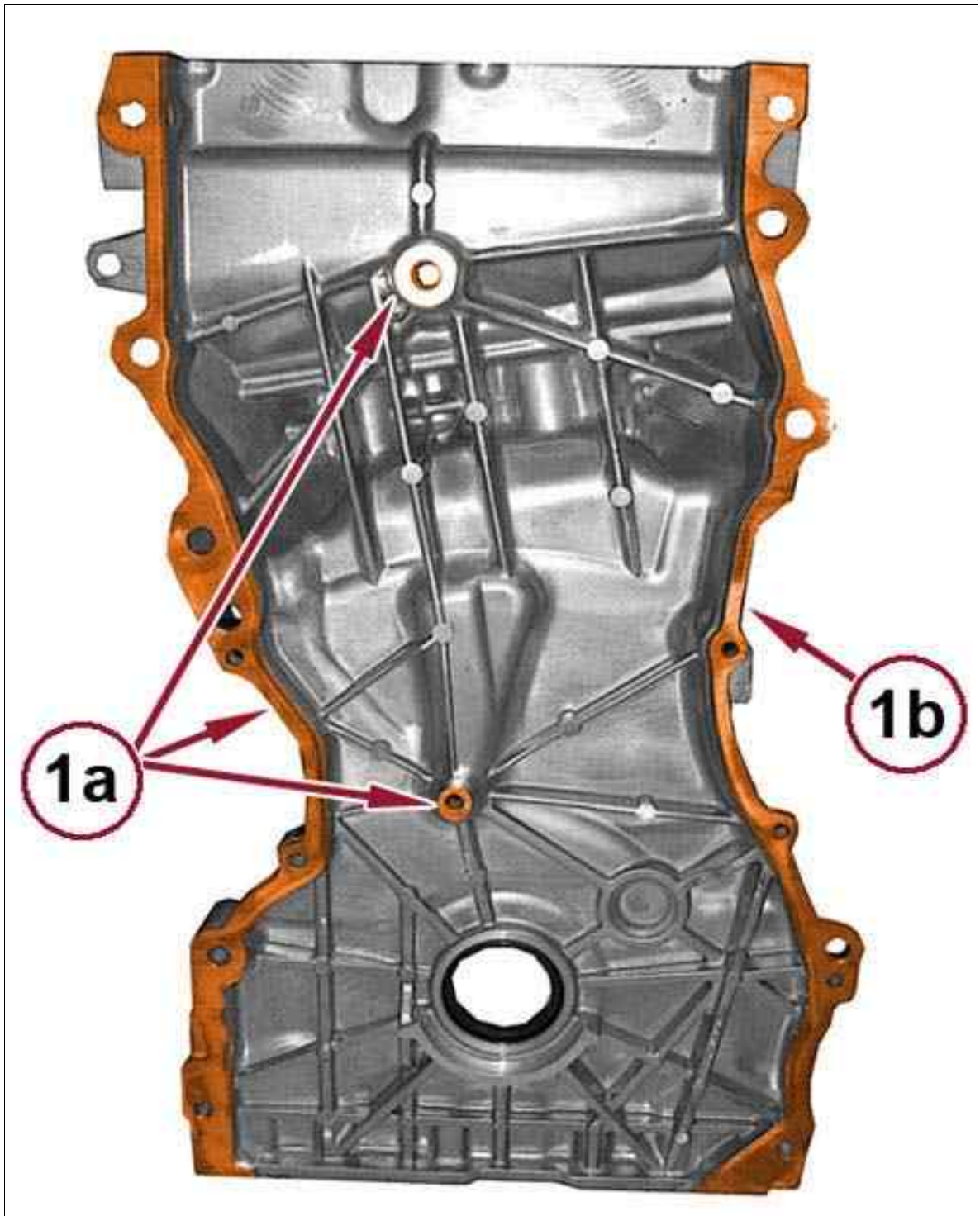
Fig 51: Applying Sealant To Engine Timing Cover To Engine Block Gasket Surface



Courtesy of CHRYSLER GROUP, LLC

101. Apply a suitable silicone sealant to the engine timing cover to engine block gasket surface (1) as shown in the figure.

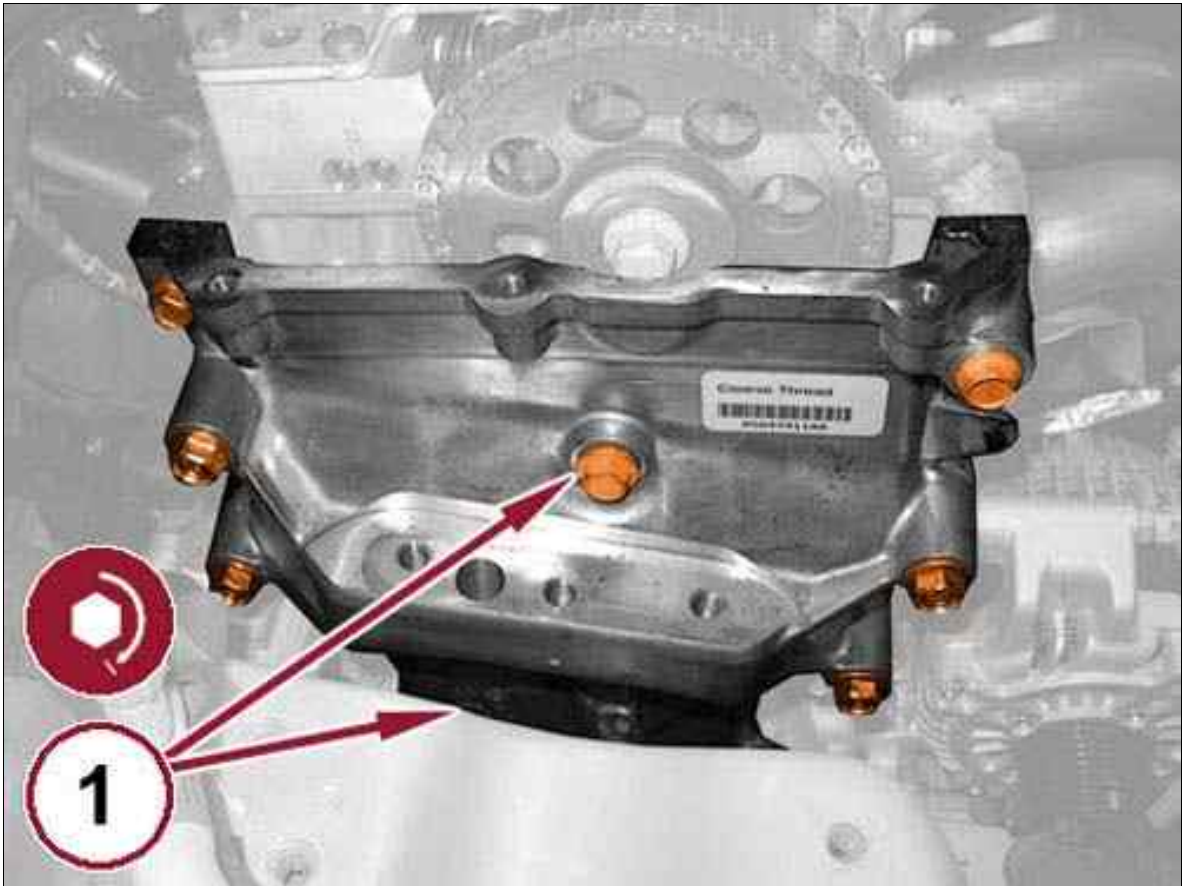
Fig 52: Applying Sealant To Indicated Surfaces



Courtesy of CHRYSLER GROUP, LLC

102. Apply a bead (2 mm) of a suitable silicone sealant (1a) and (1b) to the surfaces indicated in the figure.

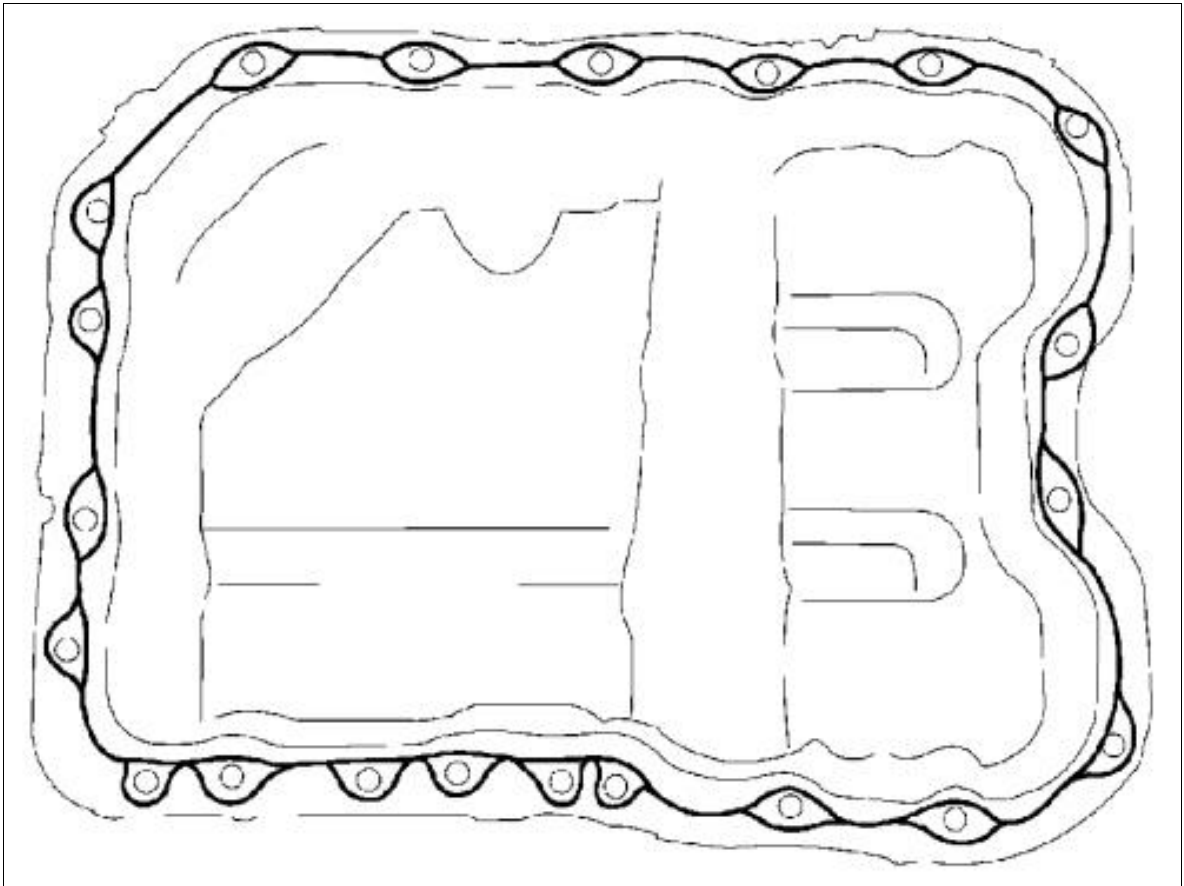
Fig 53: Engine Timing Cover & Mounting Bolts



Courtesy of CHRYSLER GROUP, LLC

103. Install the engine timing cover and tighten the mounting bolts (1) to the proper specification. Refer to TORQUE SPECIFICATIONS .

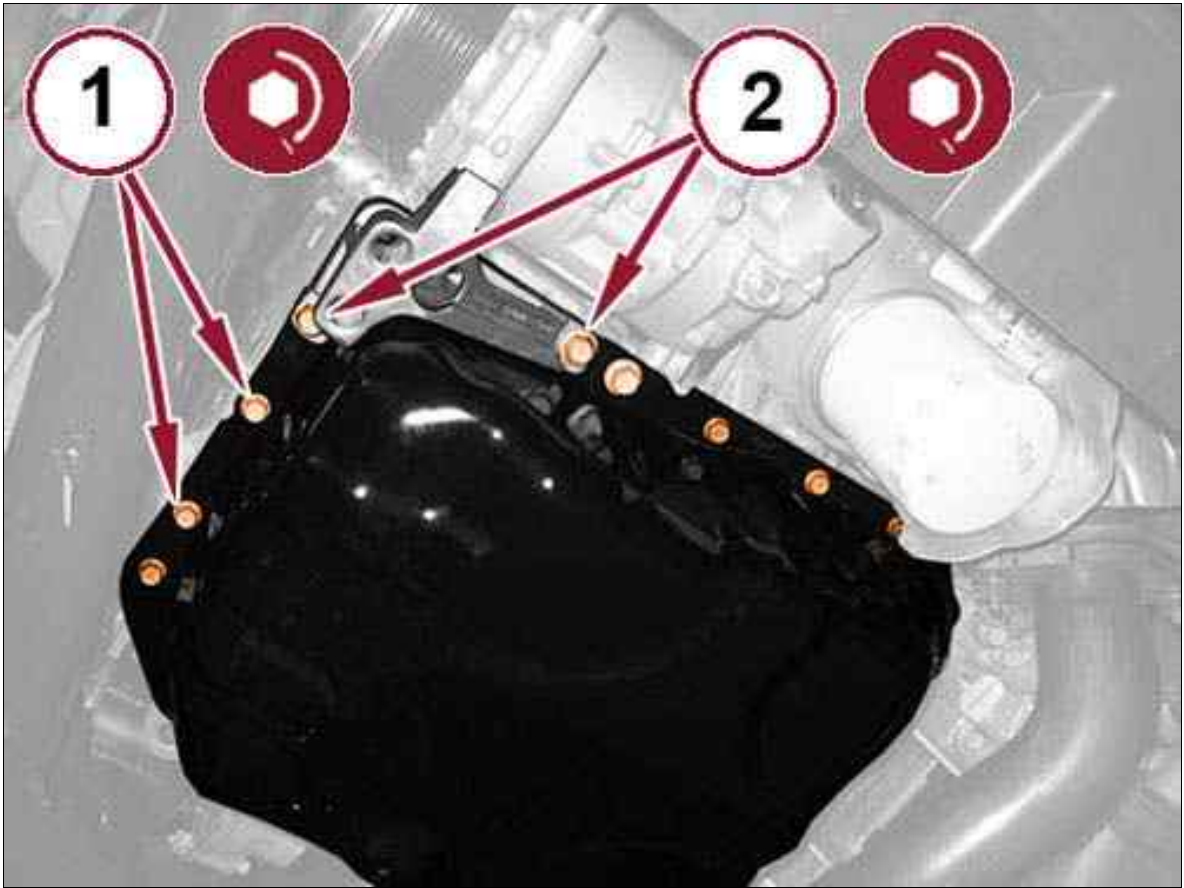
Fig 54: Applying Sealant To Oil Pan



Courtesy of CHRYSLER GROUP, LLC

104. Apply a 2 mm bead of Mopar® Engine Sealant RTV Silicone Rubber Adhesive around the oil pan as shown in illustration.

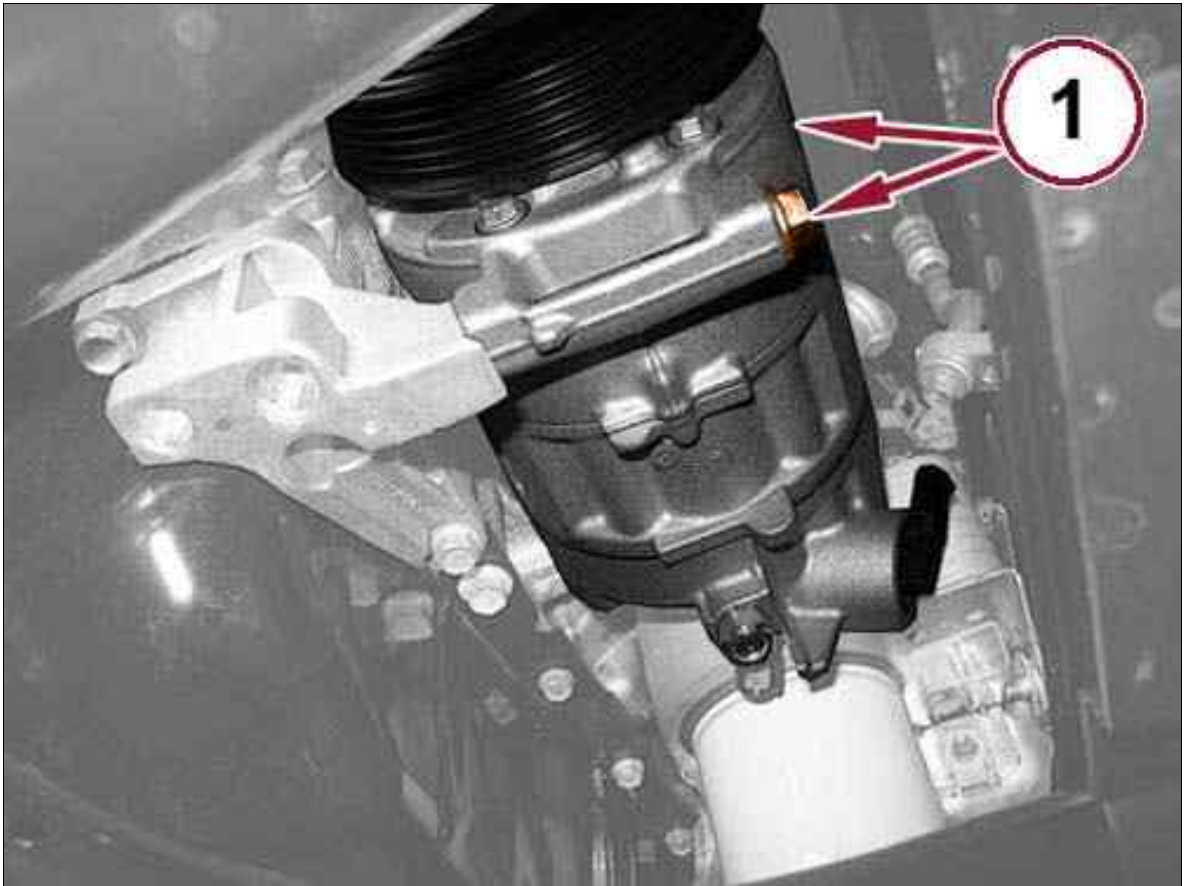
Fig 55: Engine Oil Pan & Bolts



Courtesy of CHRYSLER GROUP, LLC

105. Install the oil pan and tighten the bolts (1) to the proper specification. Refer to TORQUE SPECIFICATIONS .
106. Install the A/C compressor mounting bracket and tighten the bolts (2) to the proper specification. Refer to SPECIFICATIONS .

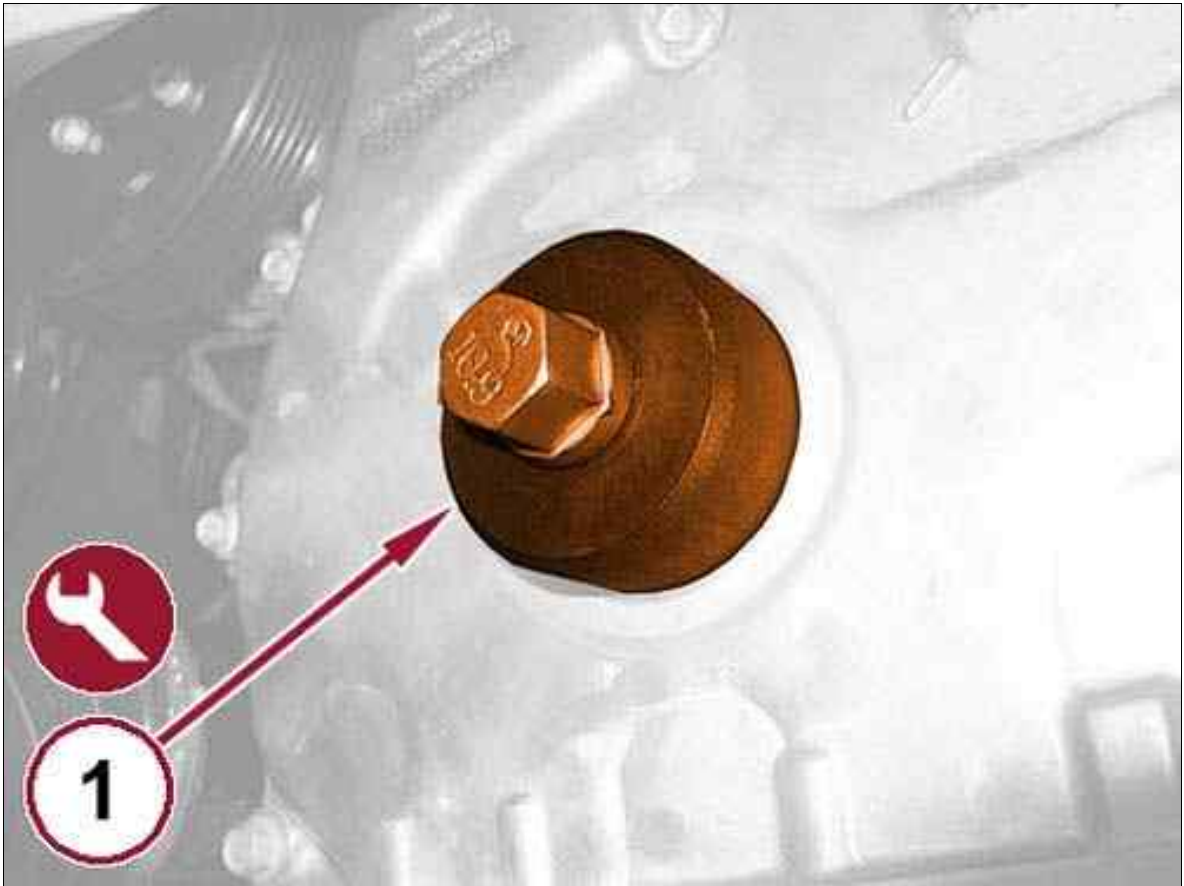
Fig 56: A/C Compressor & Bolts



Courtesy of CHRYSLER GROUP, LLC

107. Install the A/C compressor with three bolts (1) and tighten the bolts to the proper specification. Refer to SPECIFICATIONS .

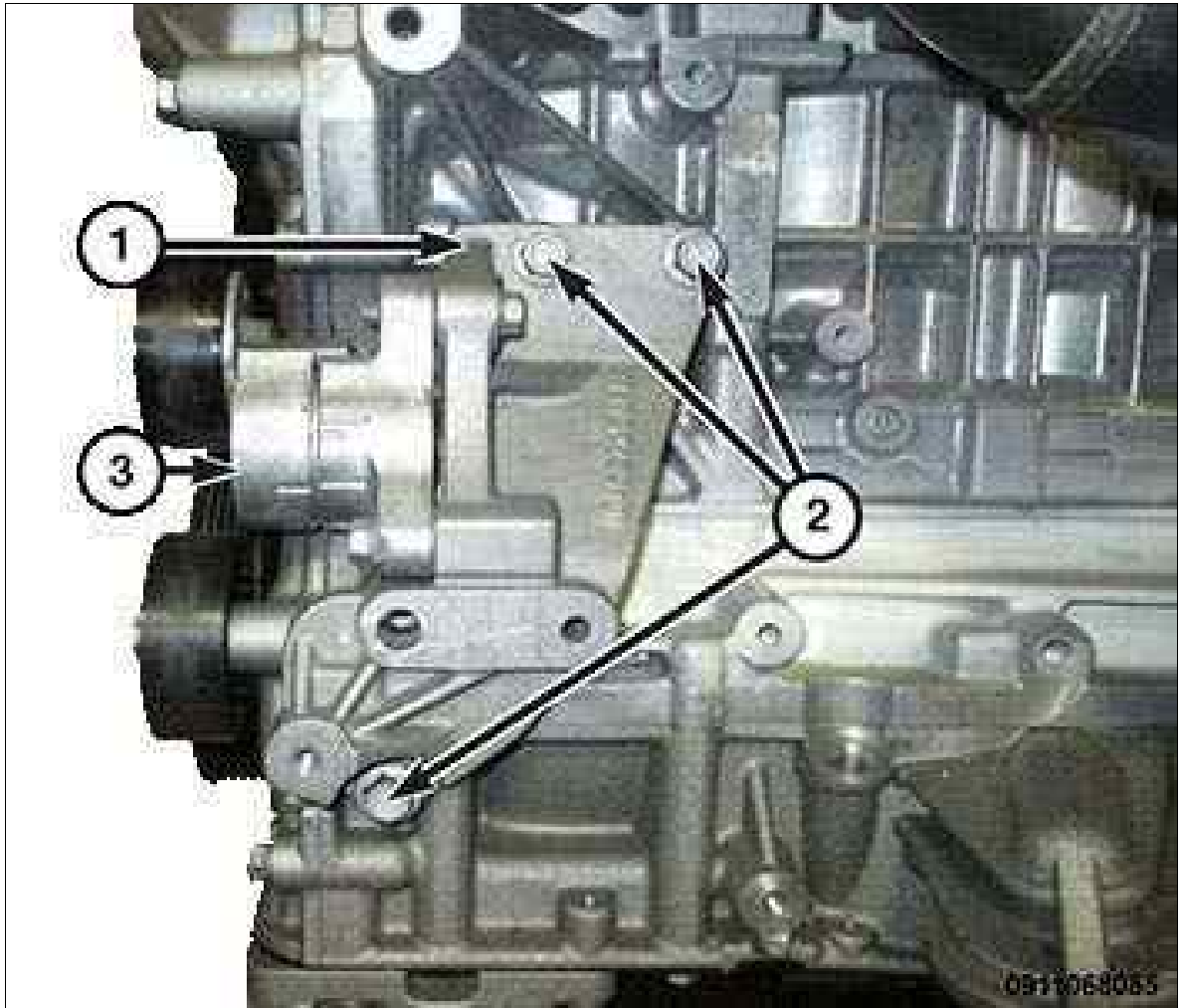
Fig 57: Installing Front Crankshaft Oil Seal Using Special Tool



Courtesy of CHRYSLER GROUP, LLC

108. Install a new front crankshaft oil seal with the 2000040245 (EMEA) or (special tool #9506, Installer, Oil Seal) (NAFTA) tool (1).

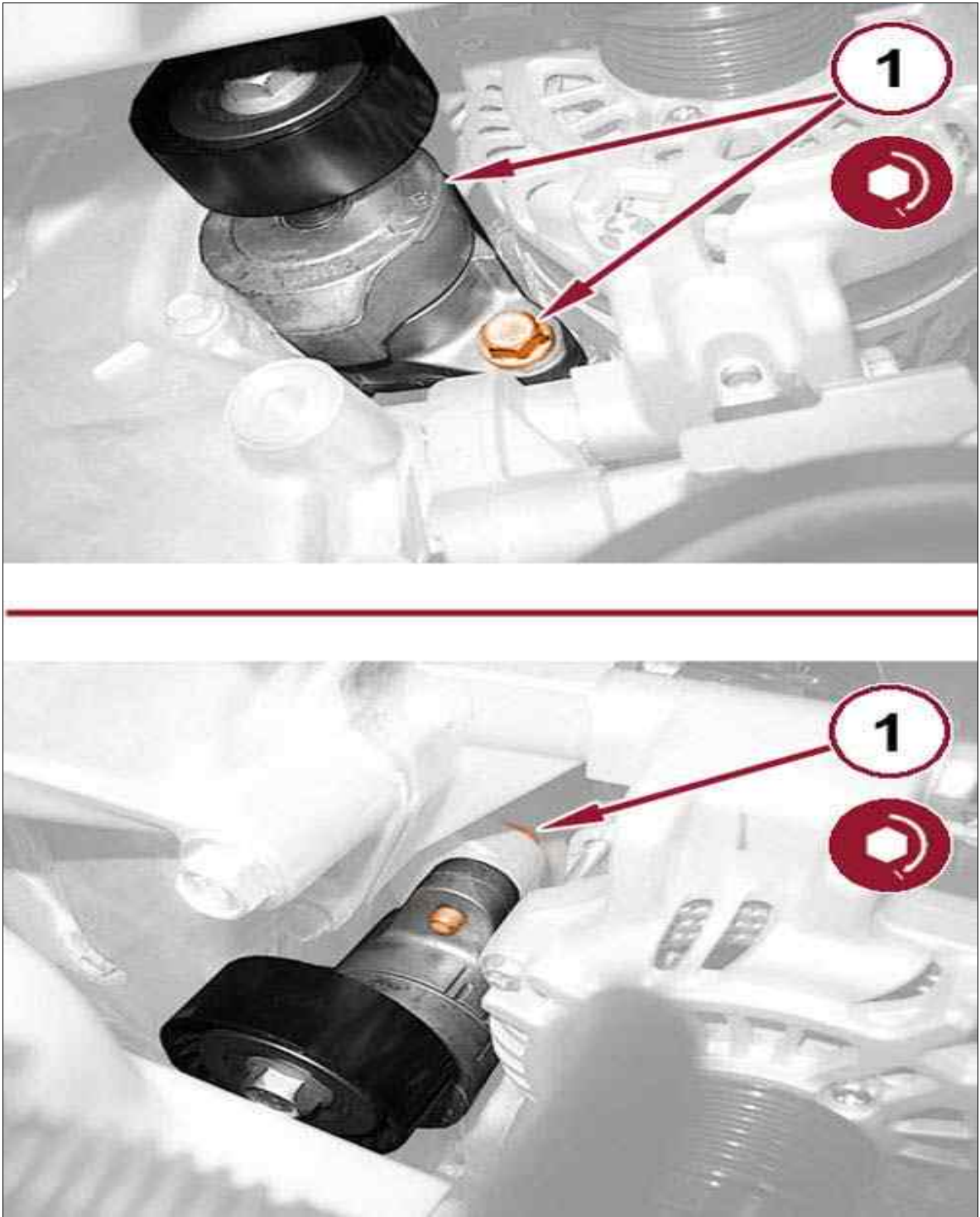
Fig 58: Generator Mounting Bracket, Accessory Belt Tensioner & Bolts



Courtesy of CHRYSLER GROUP, LLC

109. Install the generator mounting bracket (1) with three bolts (2) tightened to the proper specification. Refer to TORQUE SPECIFICATIONS .

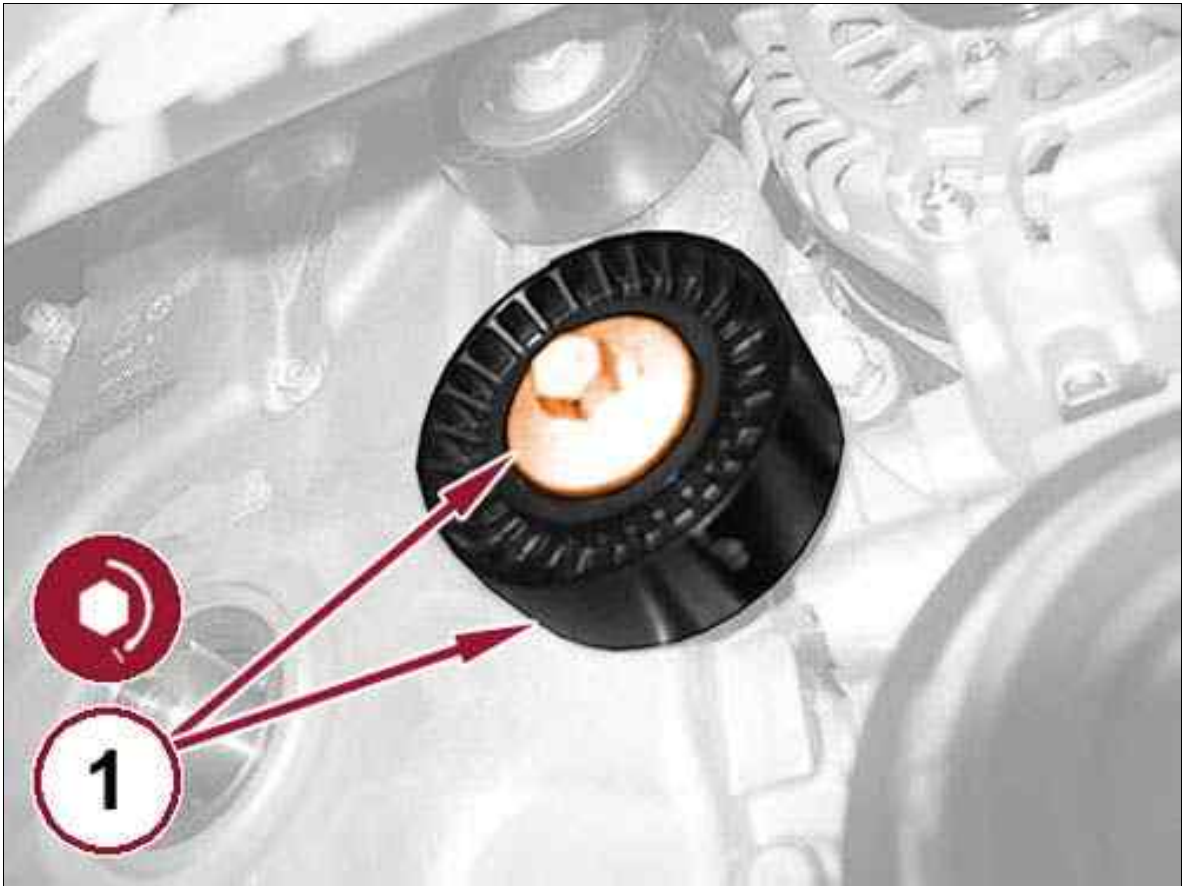
Fig 59: Accessory Drive Belt Tensioner & Bolts



Courtesy of CHRYSLER GROUP, LLC

110. If removed, install the accessory drive belt tensioner (1) and tighten the bolts to the proper specification. Refer to TORQUE SPECIFICATIONS .

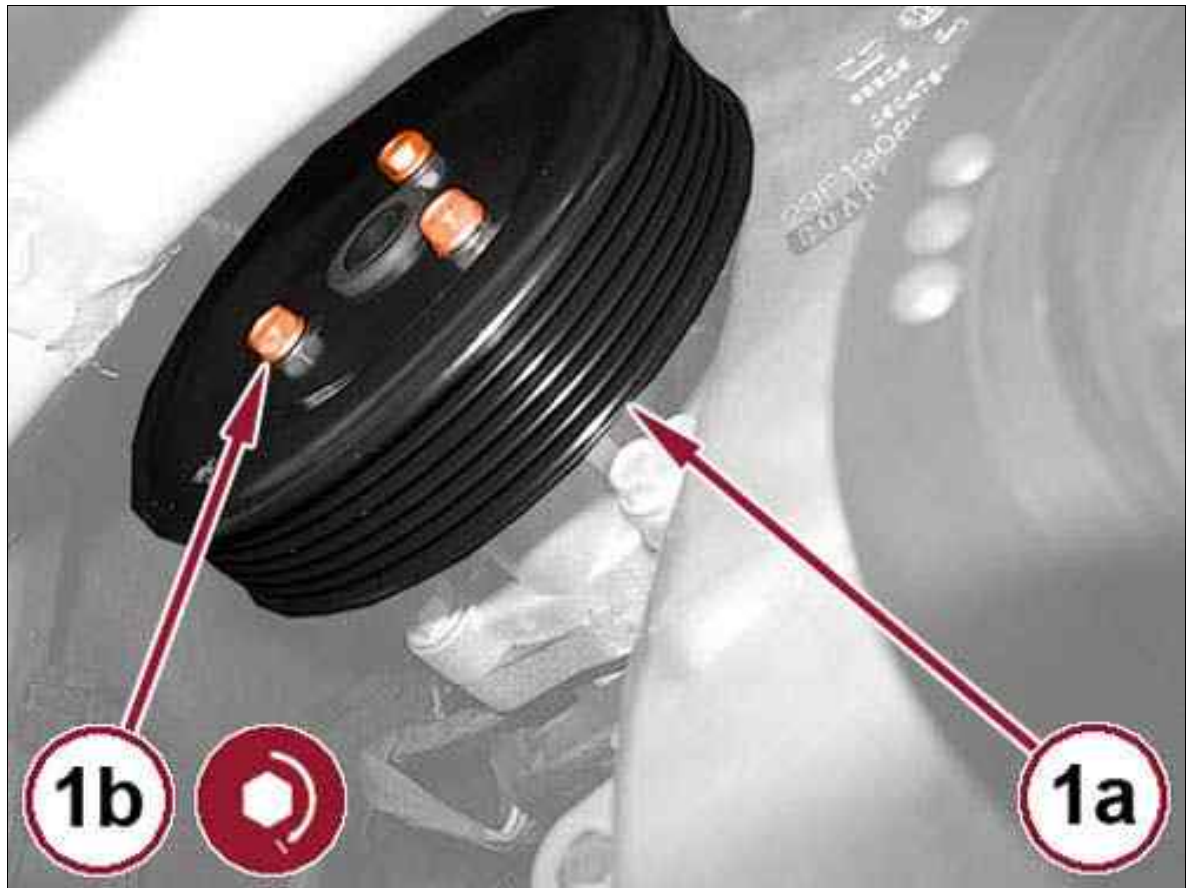
Fig 60: Accessory Drive Belt Idler Pulley & Bolt



Courtesy of CHRYSLER GROUP, LLC

111. Install the accessory drive belt idler pulley (1) and tighten the bolt to the proper specification. Refer to TORQUE SPECIFICATIONS .

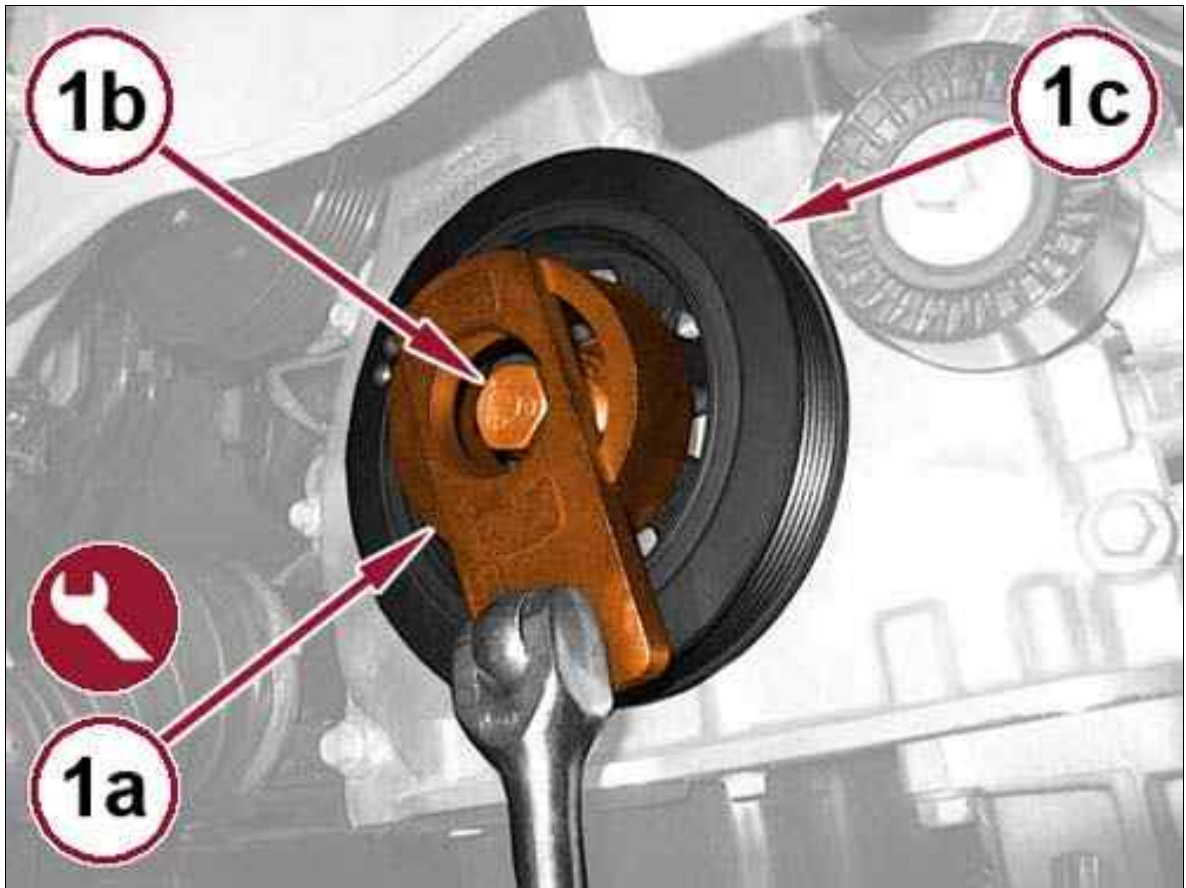
Fig 61: Water Pump Pulley & Bolts



Courtesy of CHRYSLER GROUP, LLC

112. Install the water pump pulley (1a). Tighten the three bolts (1b) to the proper specification. Refer to SPECIFICATIONS .

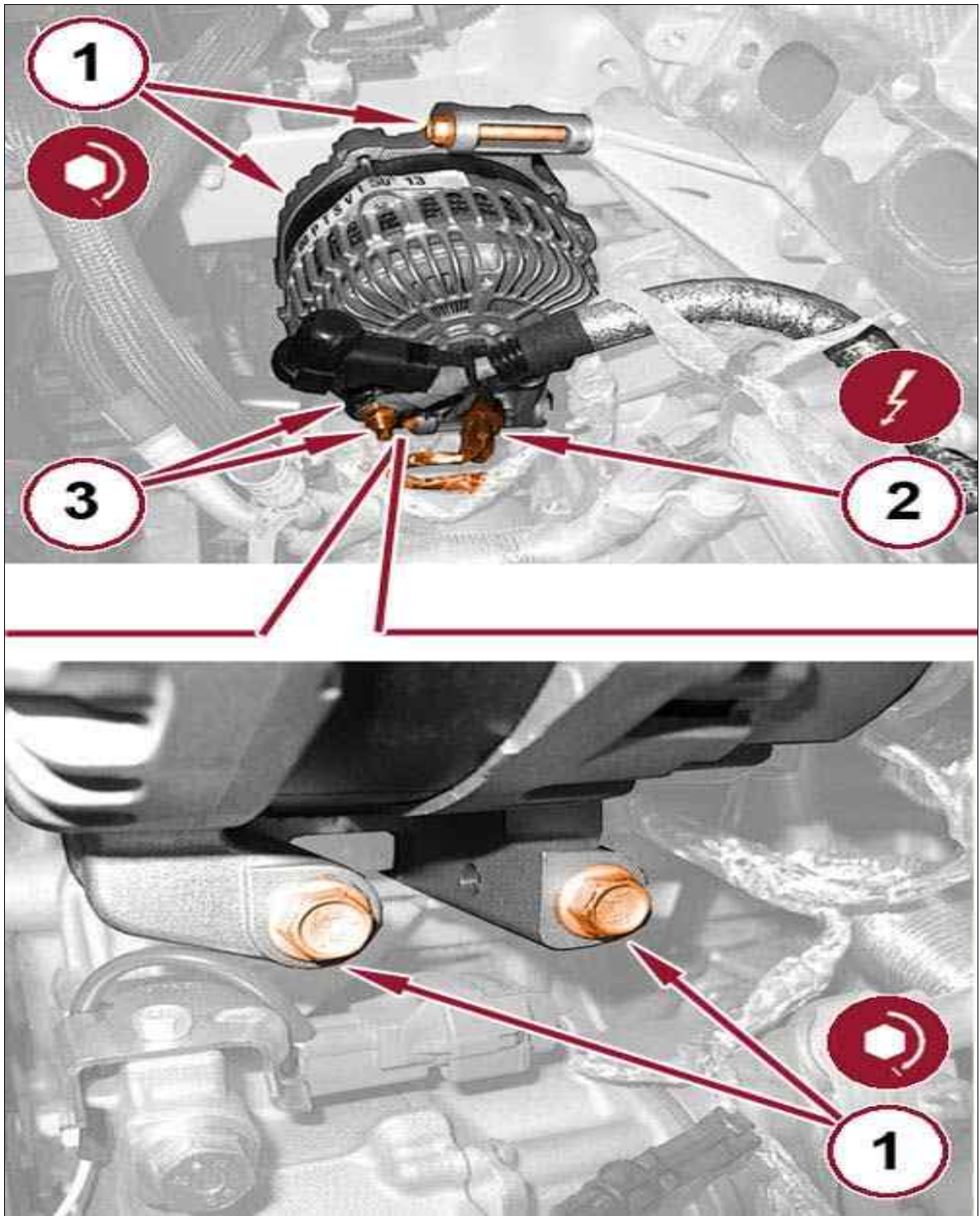
Fig 62: Special Tool, Bolt & Vibration Damper



Courtesy of CHRYSLER GROUP, LLC

113. Install the vibration damper onto the crankshaft (1c).
114. Using the 2000040299 (EMEA) or (special tool #9707, Holder, Vibration Damper) (NAFTA) tool (1a), Install the vibration damper bolt (1b) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS .

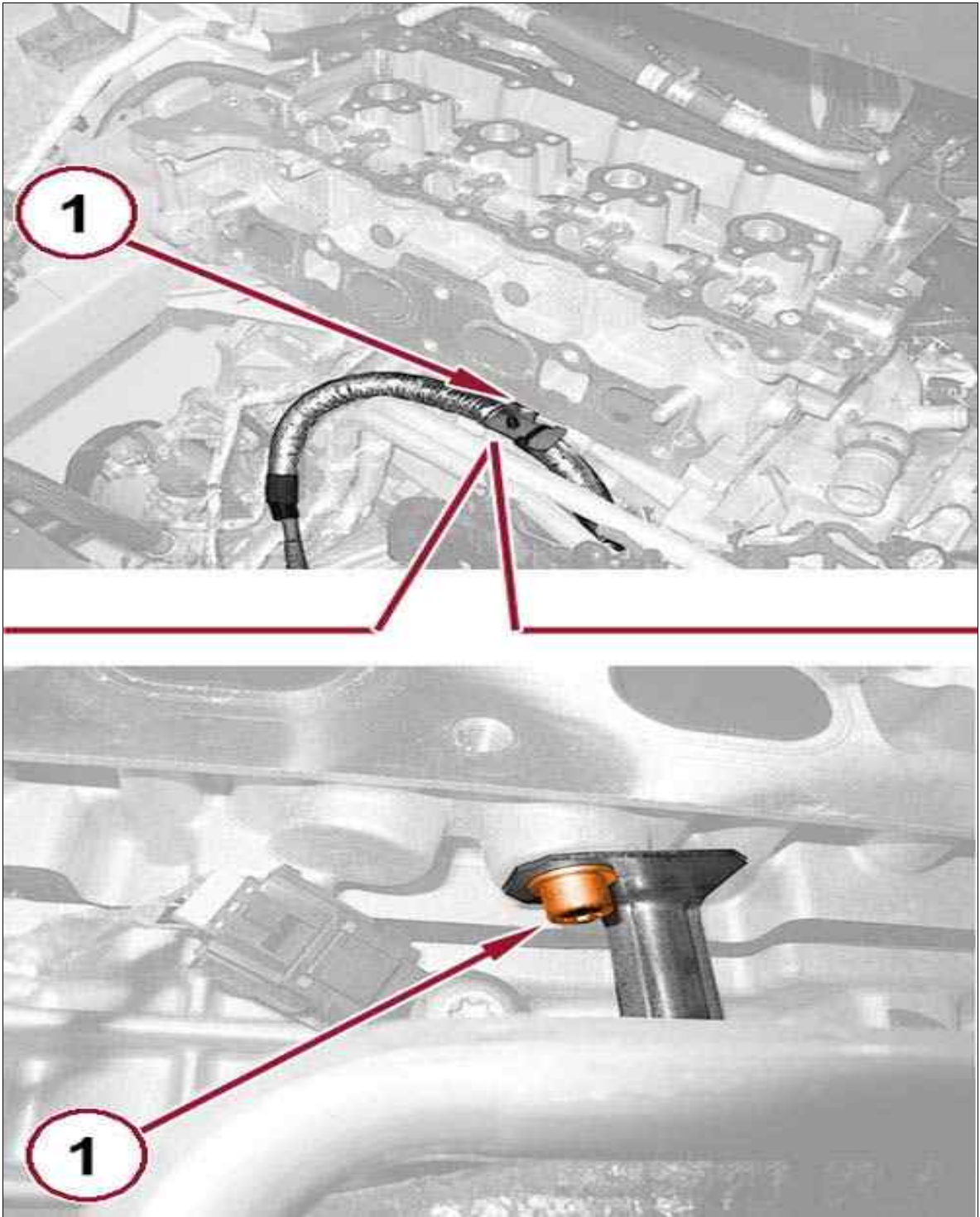
Fig 63: Alternator Wire Harness Connector, Bolts, Cap & Nut



Courtesy of CHRYSLER GROUP, LLC

115. Install the alternator, engaging the centering bushing and tighten the bolts (1) to the proper specification. Refer to SPECIFICATIONS .
116. Connect the alternator wiring with the nut (3) and engage the cap (3).
117. Connect the wire harness connector (2) to the alternator.

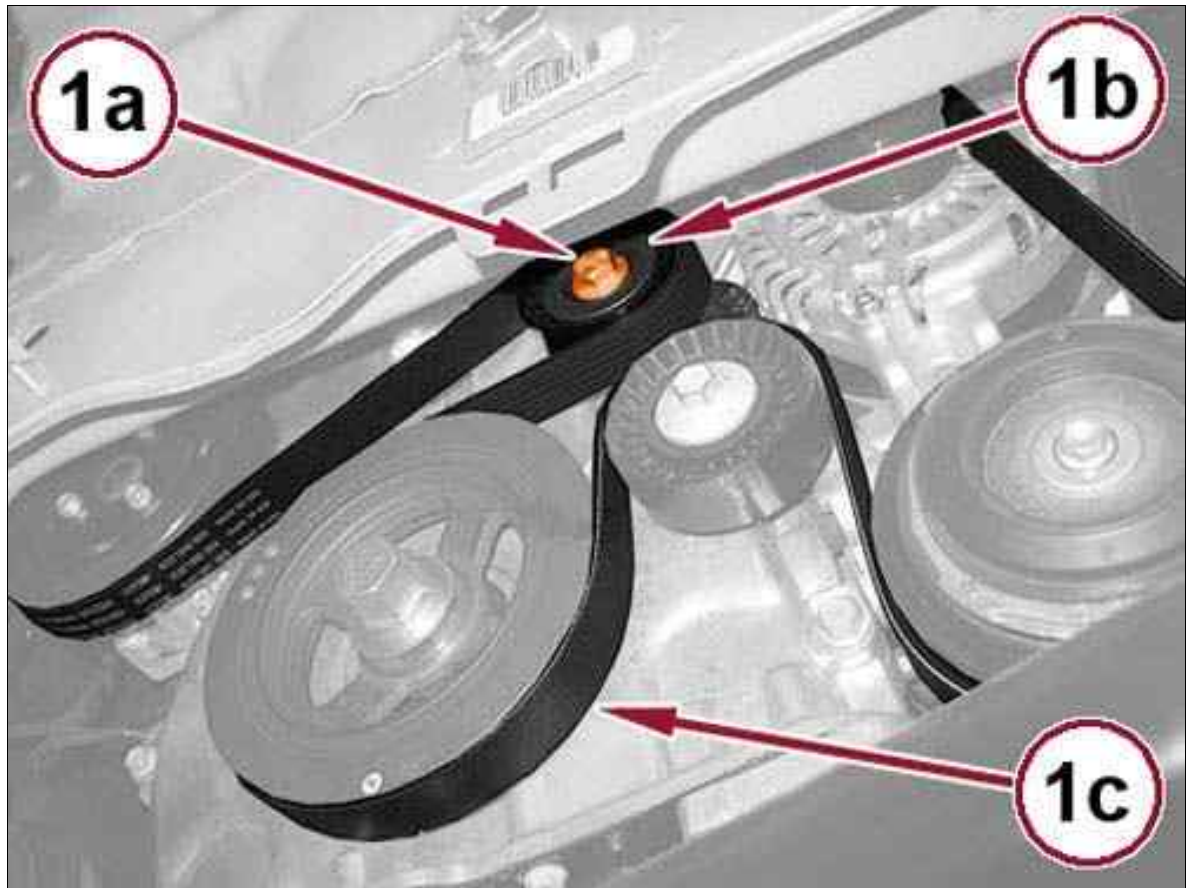
Fig 64: Wiring Retaining Bracket To Cylinder Head & Bolt



Courtesy of CHRYSLER GROUP, LLC

118. Install the wiring retaining bracket to the cylinder head with the screw (1) tighten to the proper specification. Refer to TORQUE SPECIFICATIONS .

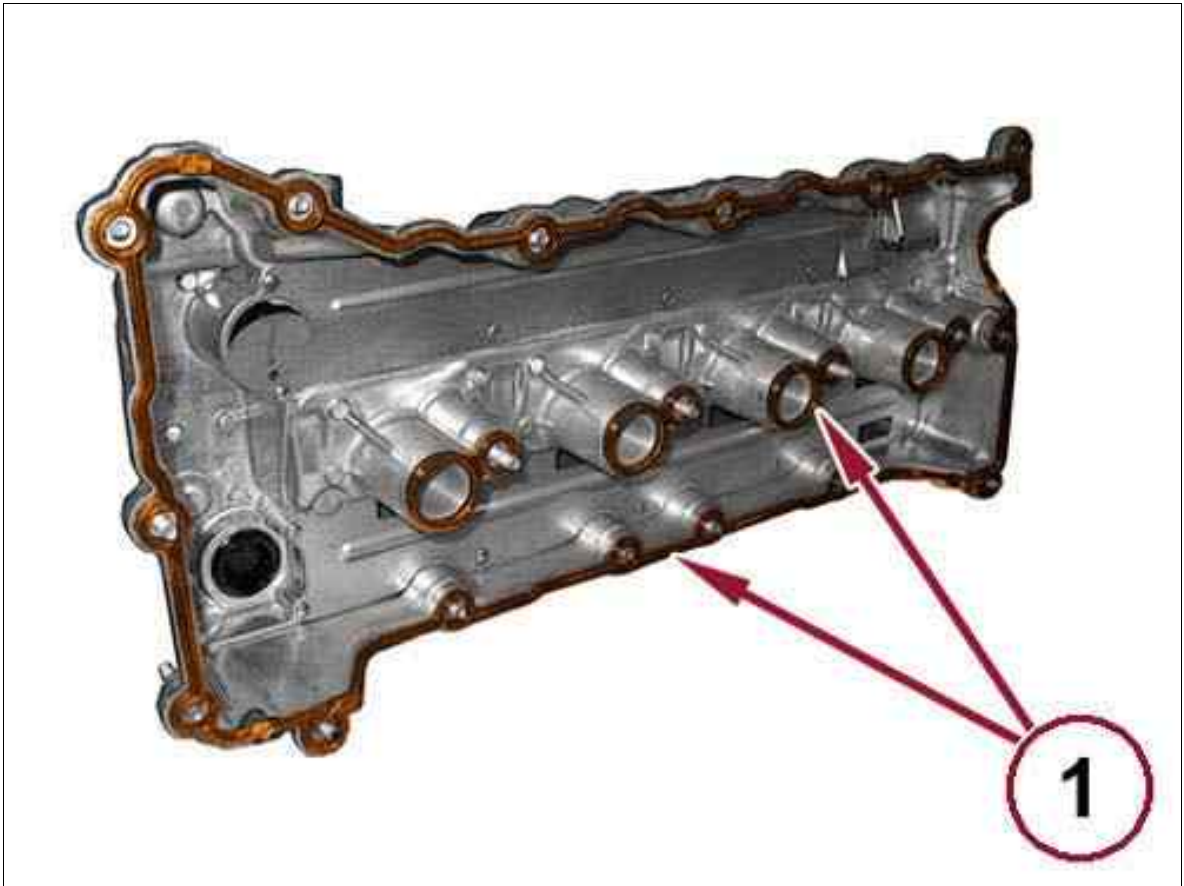
Fig 65: Belt Tensioner, Bolt & Serpentine Belt



Courtesy of CHRYSLER GROUP, LLC

119. Rotate the belt tensioner (1b) and install the serpentine belt (1c).

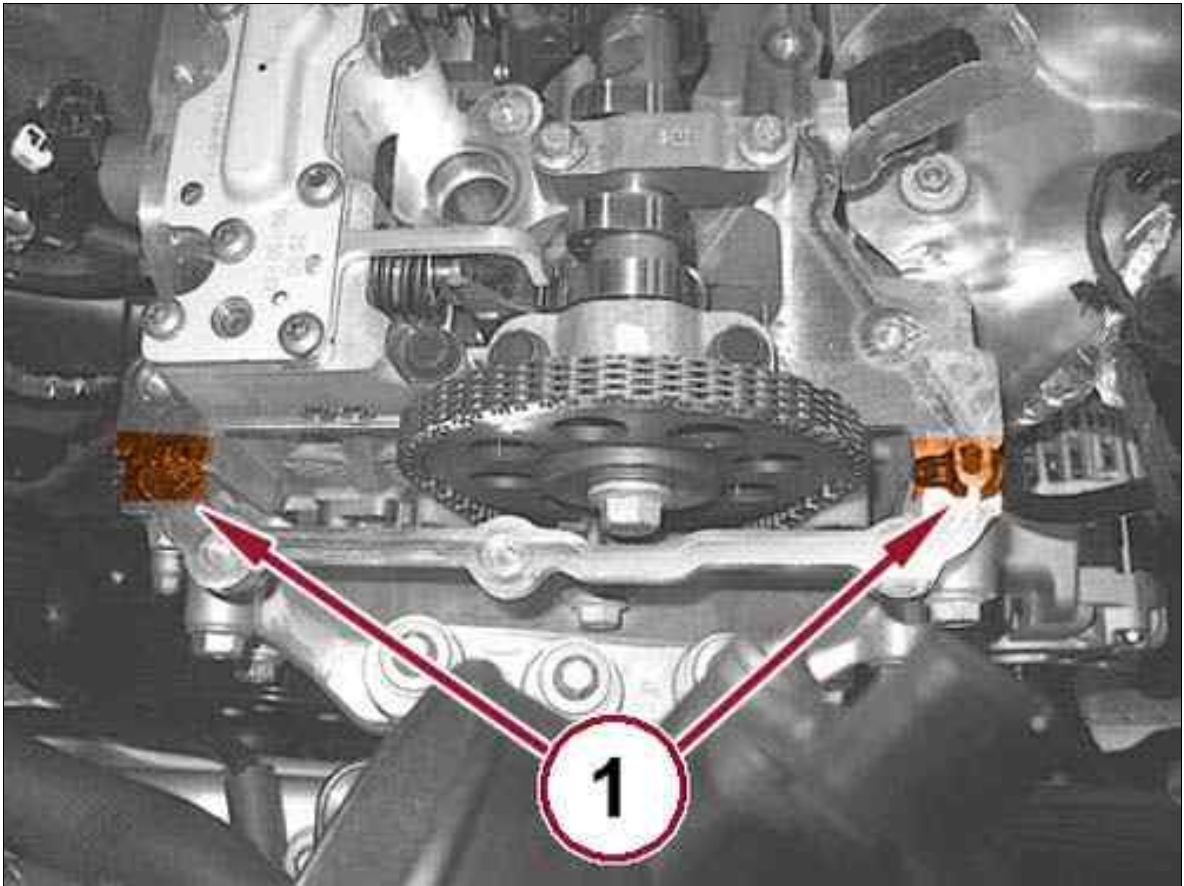
Fig 66: Valve Cover Seals



Courtesy of CHRYSLER GROUP, LLC

120. Install new seals (1) on the valve cover.

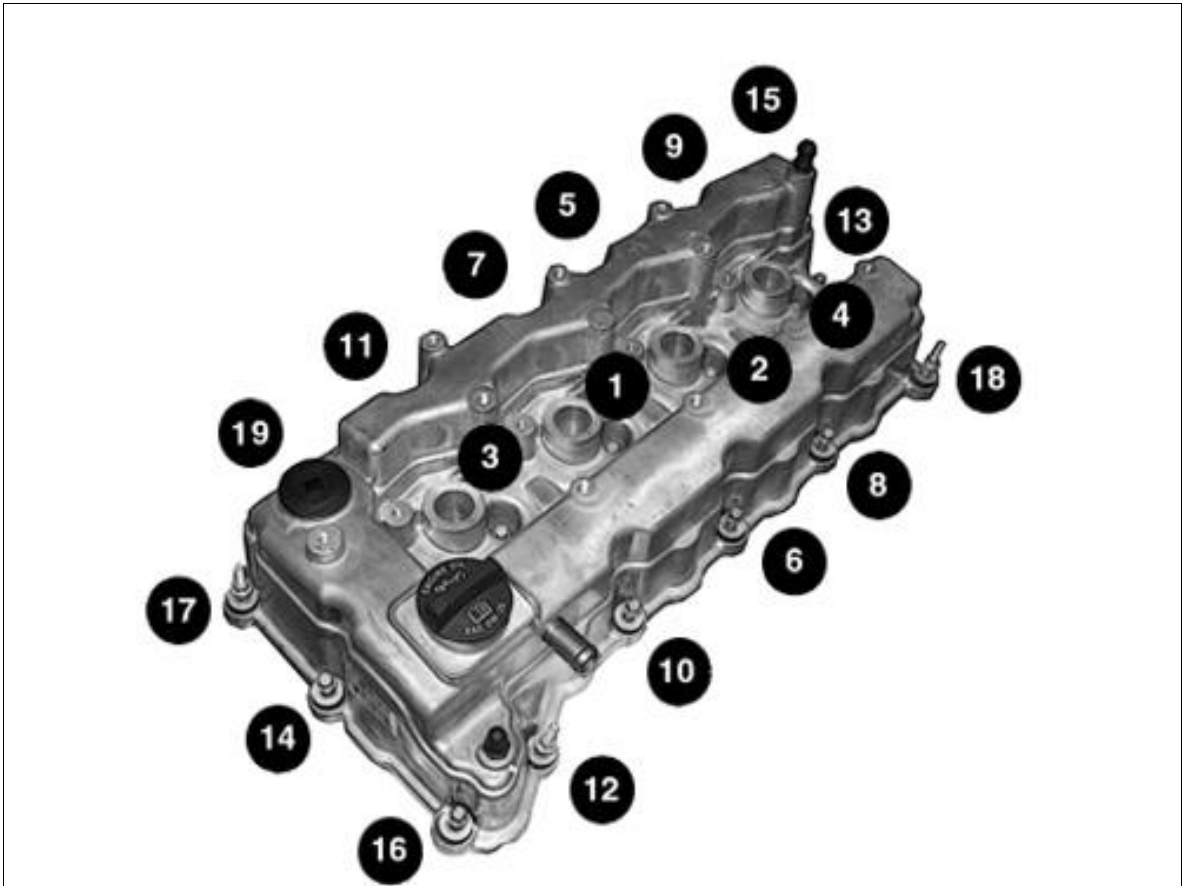
Fig 67: Placing Sealant On Cylinder Head At Specified Locations



Courtesy of CHRYSLER GROUP, LLC

121. Apply sealant in the points shown in illustration (1).

Fig 68: Valve Cover Bolts Tightening Sequence



Courtesy of CHRYSLER GROUP, LLC

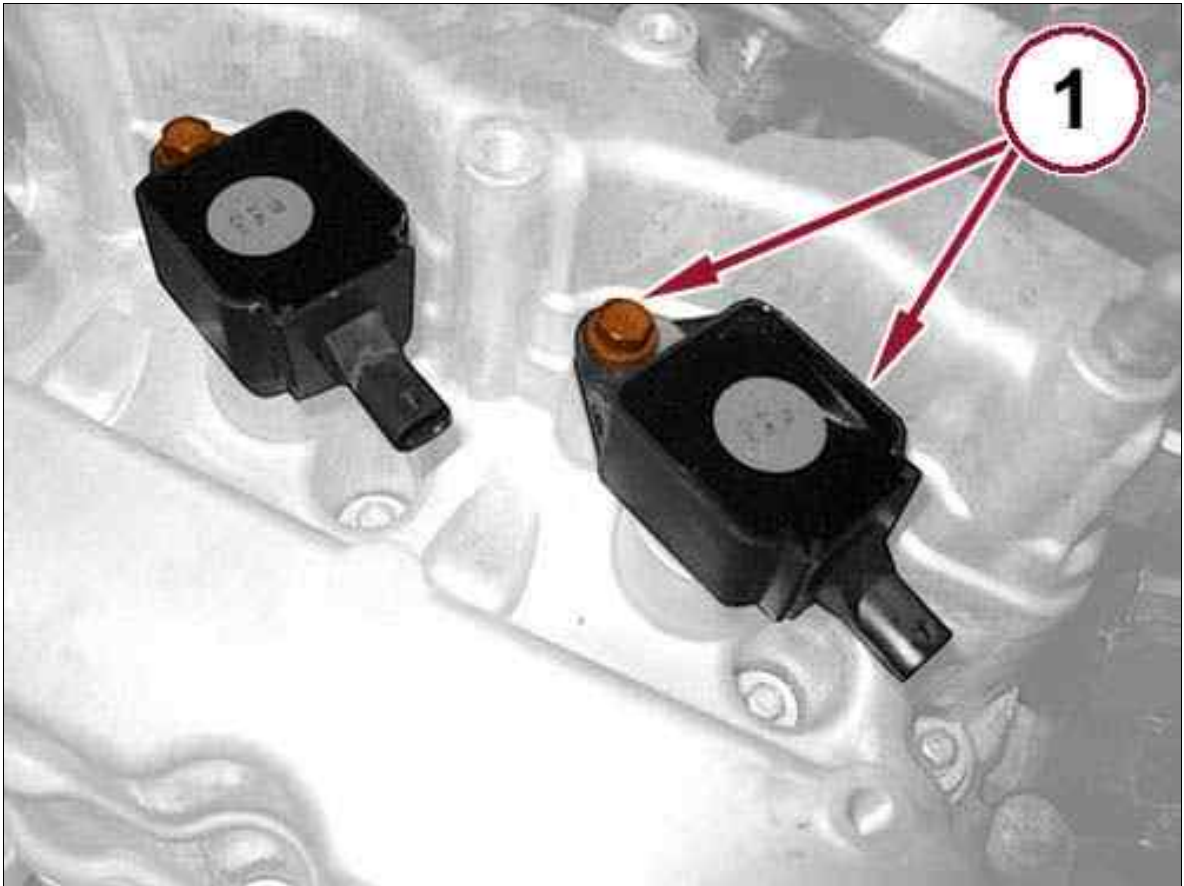


NOTE:

Place the studded screws in the positions previously marked for installation.

122. Put into place the valve cover and tighten the screws in the order shown in illustration. Tighten the screws to the proper specification. Refer to TORQUE SPECIFICATIONS .

Fig 69: Ignition Coils & Bolts

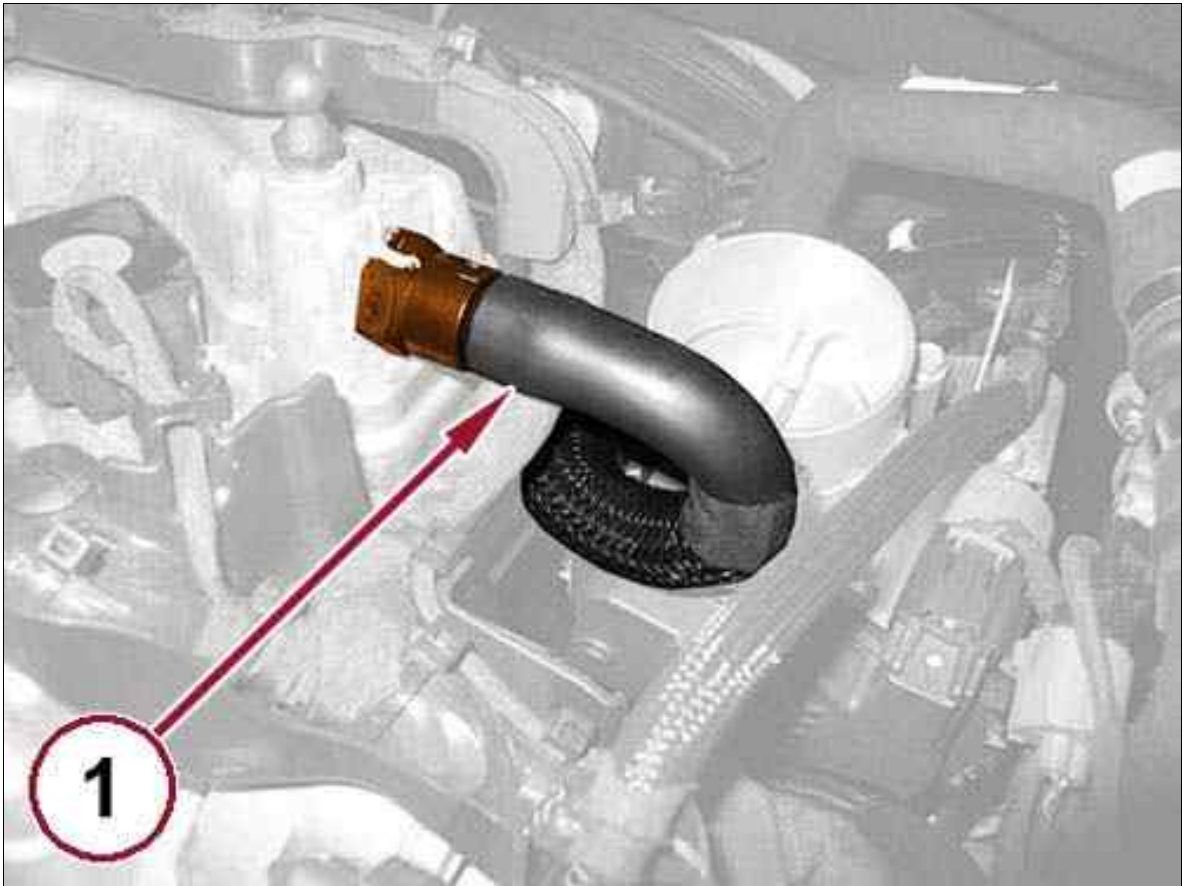


Courtesy of CHRYSLER GROUP, LLC

123. Install the ignition coils (1) and tighten the screws (1) to the proper specification. Refer to TORQUE SPECIFICATIONS .
124. Using **NEW** gaskets, install the intake manifold and tighten the fasteners to the proper specification. Refer to TORQUE SPECIFICATIONS .
125. Install the intake manifold support bracket nuts and securely tighten.
126. Install the intake manifold lower support bracket bolt and securely tighten.
127. Install the intake manifold silencer cover and securely tighten the four screws.
128. Install the fuel rail with injectors and securely tighten the retaining screws.
129. Install the fuel vapor solenoid.
130. Connect the fuel vapor delivery pipe to the air box.
131. Install the sound absorber.
132. Install a new gasket on the inlet plenum.
133. Install the throttle body, positioning it correctly on the centering pin.
134. Install the throttle body fasteners and tighten to the proper specification. Refer to FUEL INJECTION, SPECIFICATIONS .

135. Install the throttle body reinforcement bracket and tighten the fastener to the proper specification. Refer to FUEL INJECTION, SPECIFICATIONS .

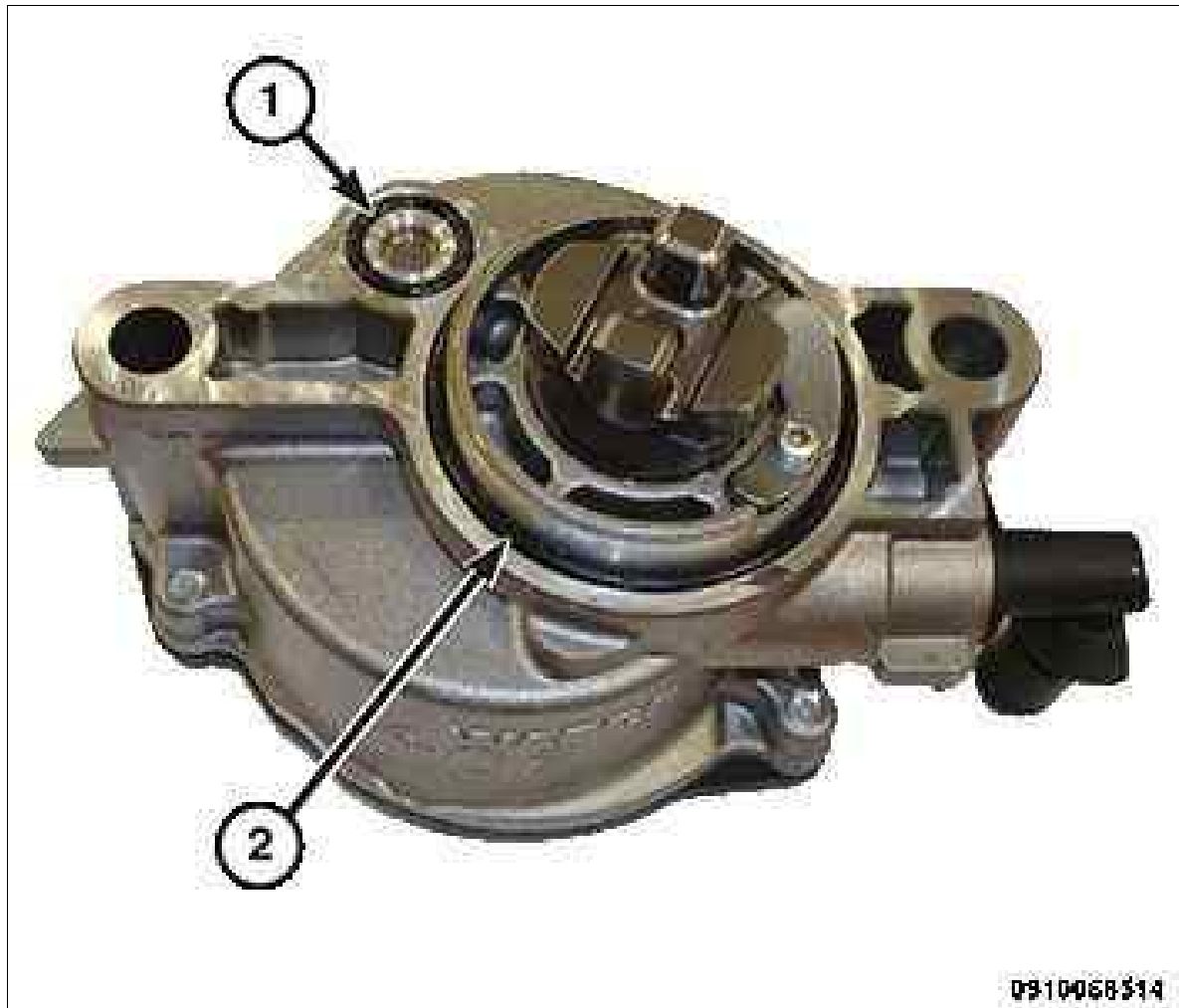
Fig 70: Oil Vapor To Air Capacity Airbox Pipe



Courtesy of CHRYSLER GROUP, LLC

136. Connect the pipe (1) that delivers oil vapor to the air capacity airbox.

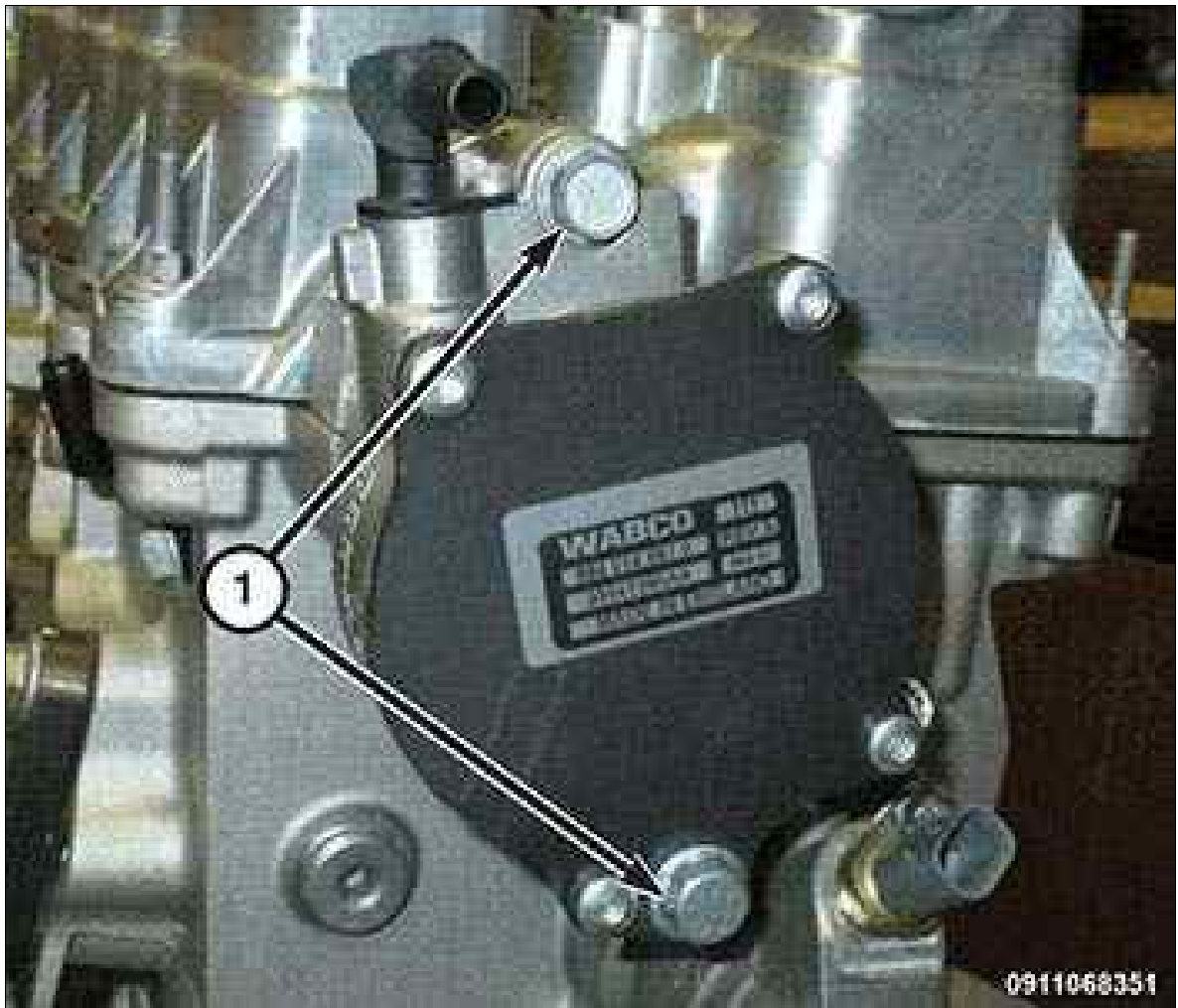
Fig 71: Vacuum Pump O-Ring Seals



Courtesy of CHRYSLER GROUP, LLC

137. Install new vacuum pump O-ring seals (1, 2).

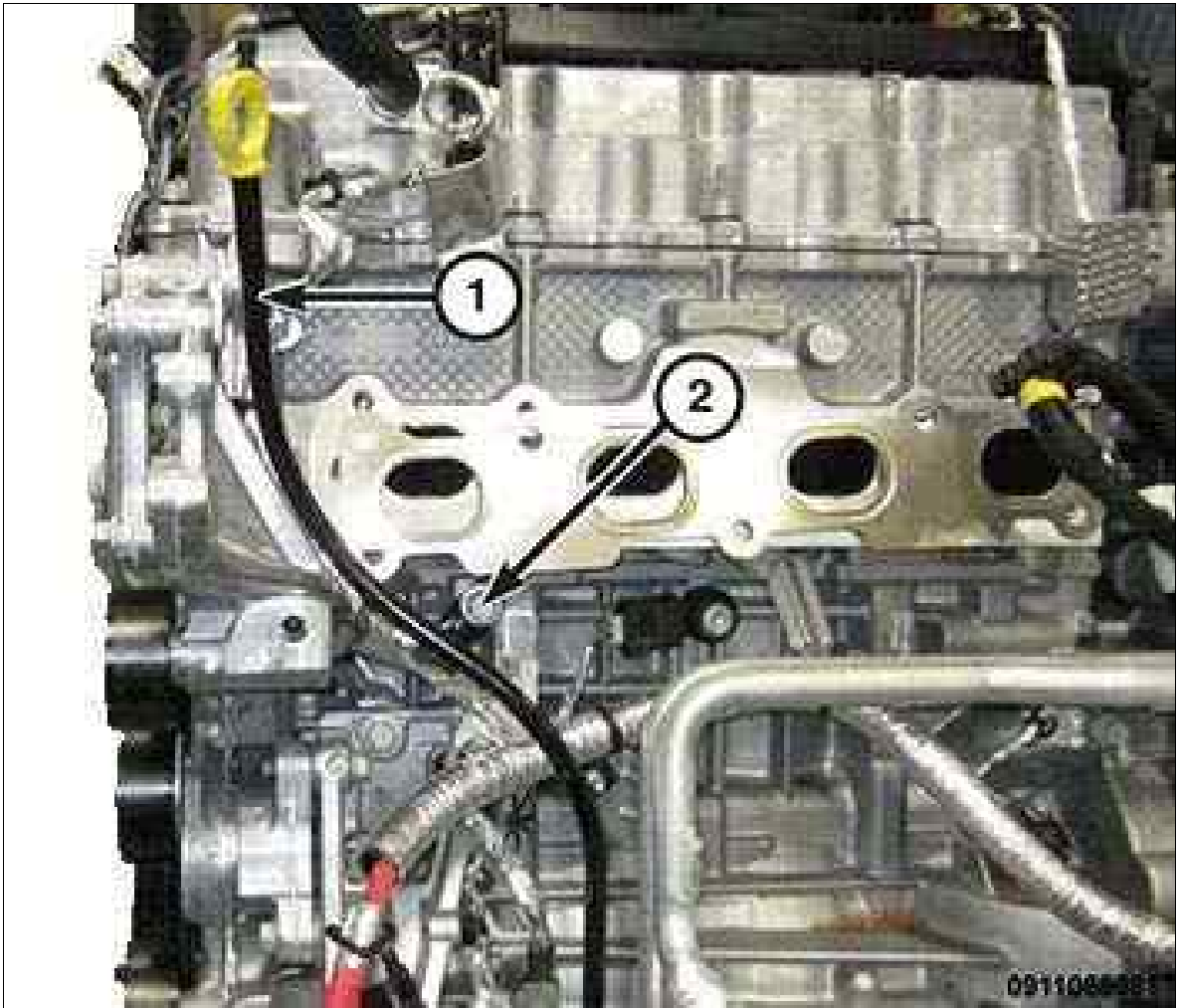
Fig 72: Vacuum Pump Mounting Bolts



Courtesy of CHRYSLER GROUP, LLC

138. Install the vacuum pump into the cylinder head opening with two bolts (1) tightened to the proper specification. Refer to TORQUE SPECIFICATIONS .

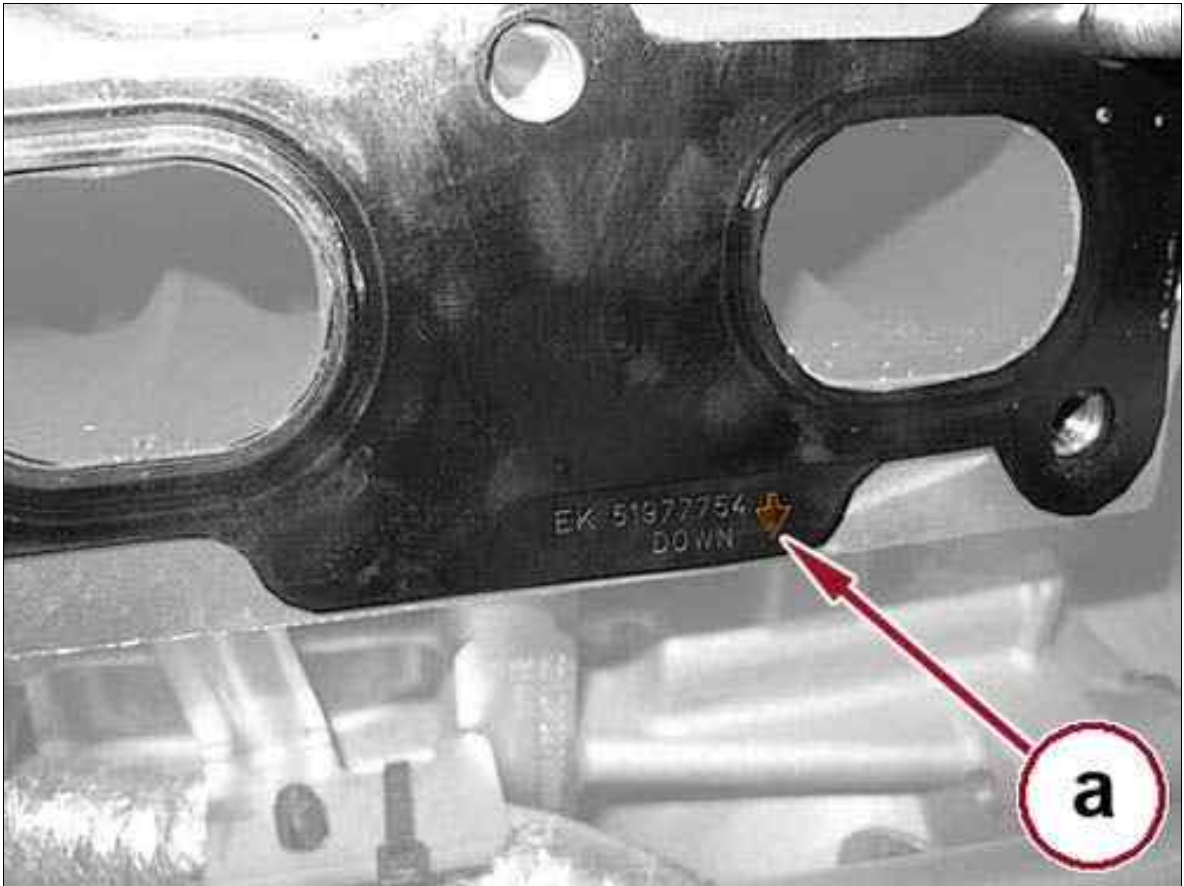
Fig 73: Dipstick Tube & Bolt



Courtesy of CHRYSLER GROUP, LLC

139. Install the oil dipstick tube (1) to the engine with the bolt (2) tightened to the proper specification. Refer to TORQUE SPECIFICATIONS .

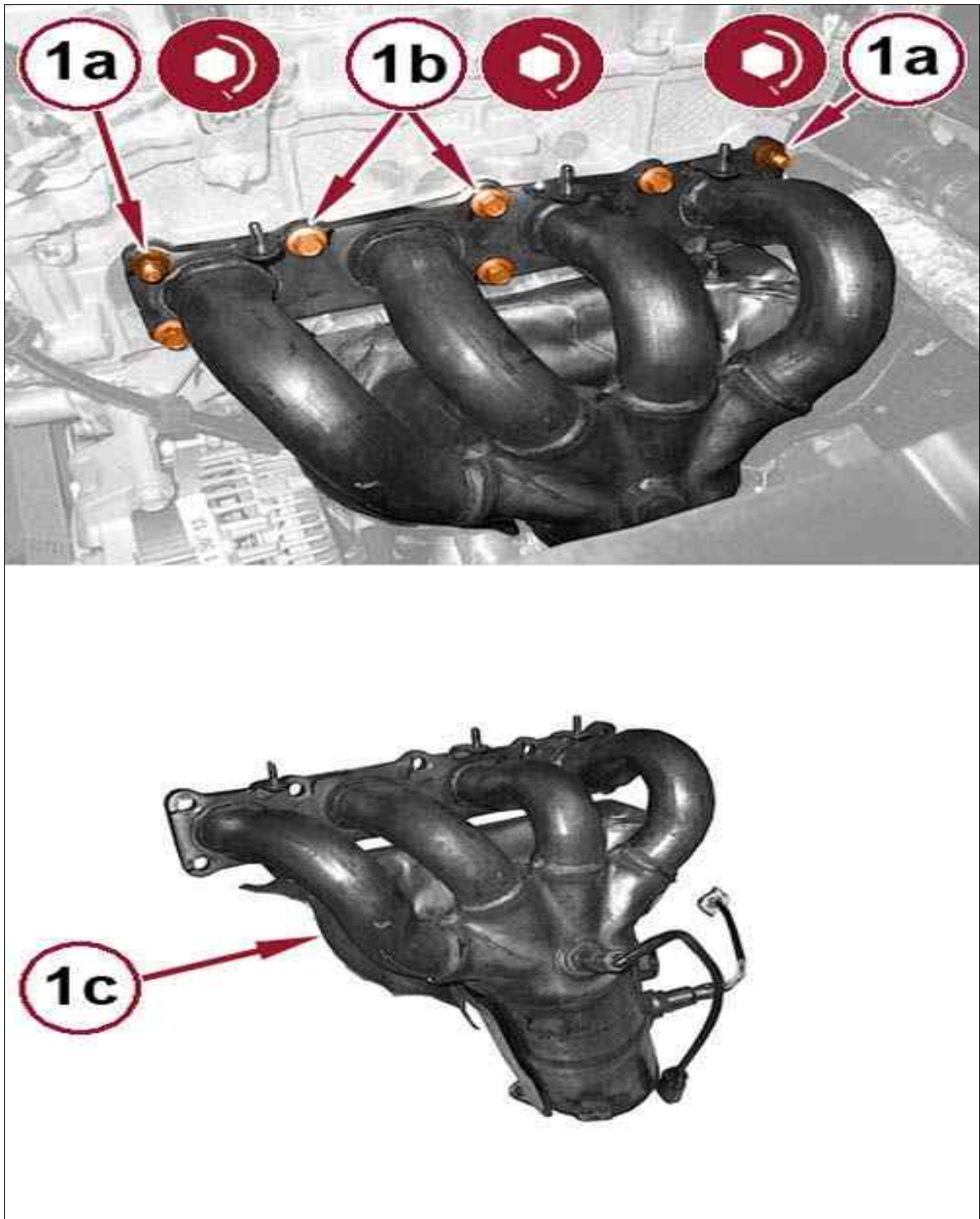
Fig 74: Ensure Arrow On Exhaust Manifold Gasket Is Pointing Downward



Courtesy of CHRYSLER GROUP, LLC

140. Install a new exhaust manifold gasket onto the cylinder head, taking care that the arrow (a) shown in the figure is pointing downwards.

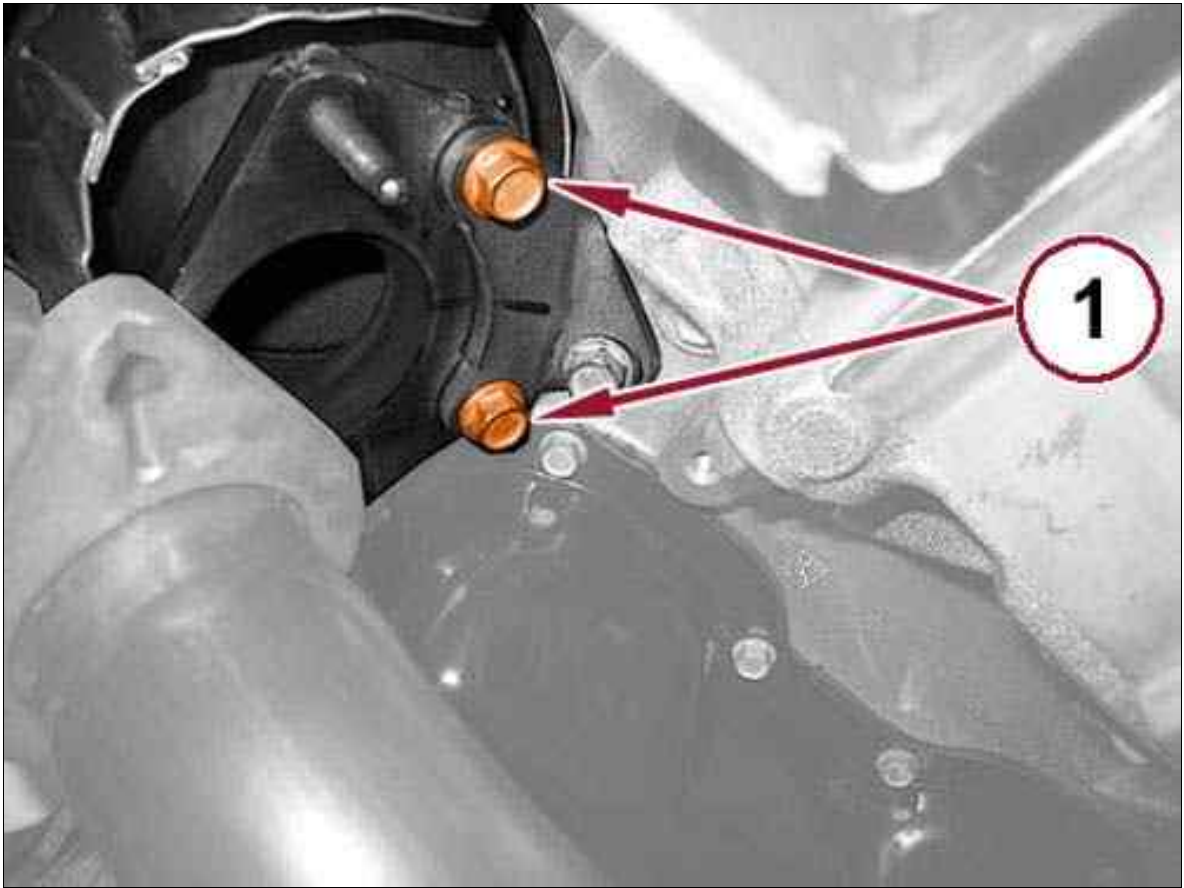
Fig 75: Exhaust Manifold Catalyst, Nuts & Bolts



Courtesy of CHRYSLER GROUP, LLC

141. Install the manifold catalyst (1c). Tighten the bolts (1b) and the nuts (1a) to the proper specification. Refer to TORQUE SPECIFICATIONS .

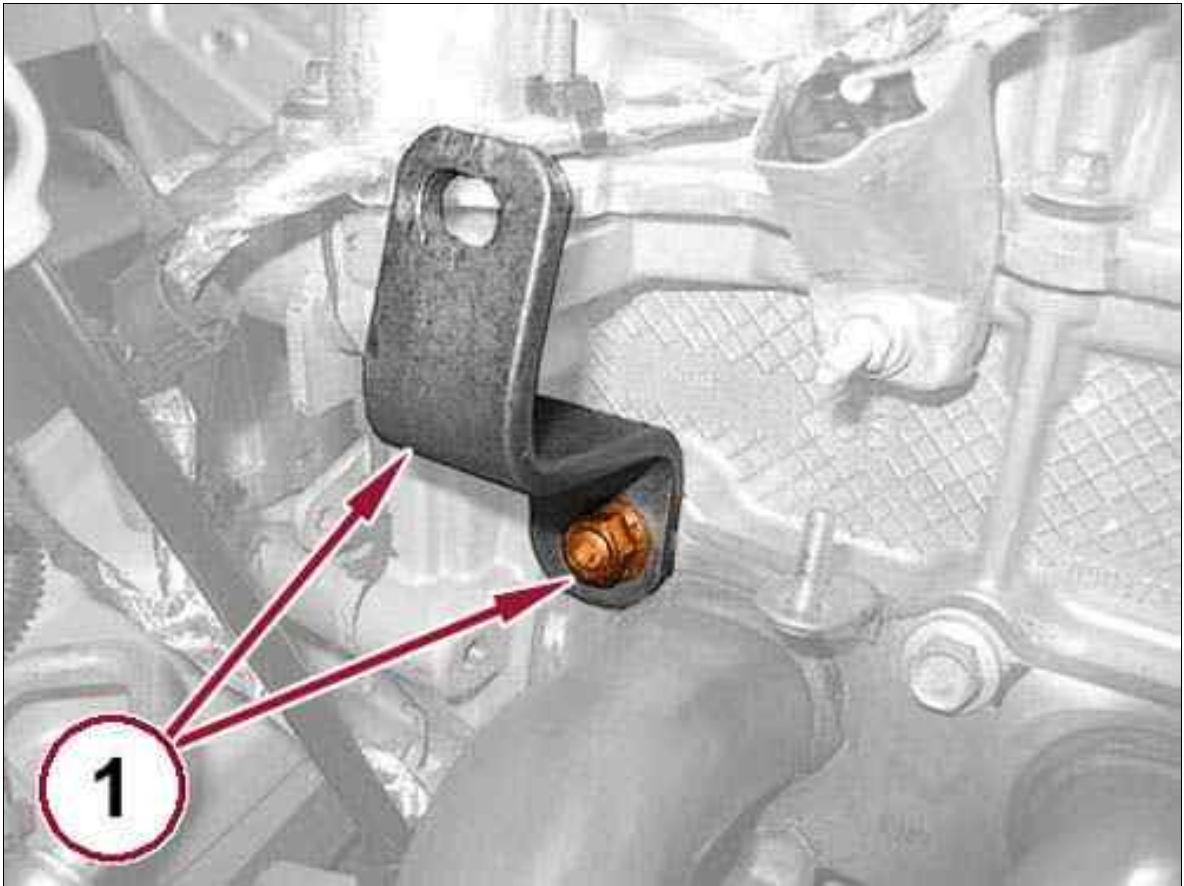
Fig 76: Catalytic Converter Support Bracket Bolts



Courtesy of CHRYSLER GROUP, LLC

142. Install the catalytic converter support bracket and tighten the bolts (1) to the proper specification. Refer to TORQUE SPECIFICATIONS .

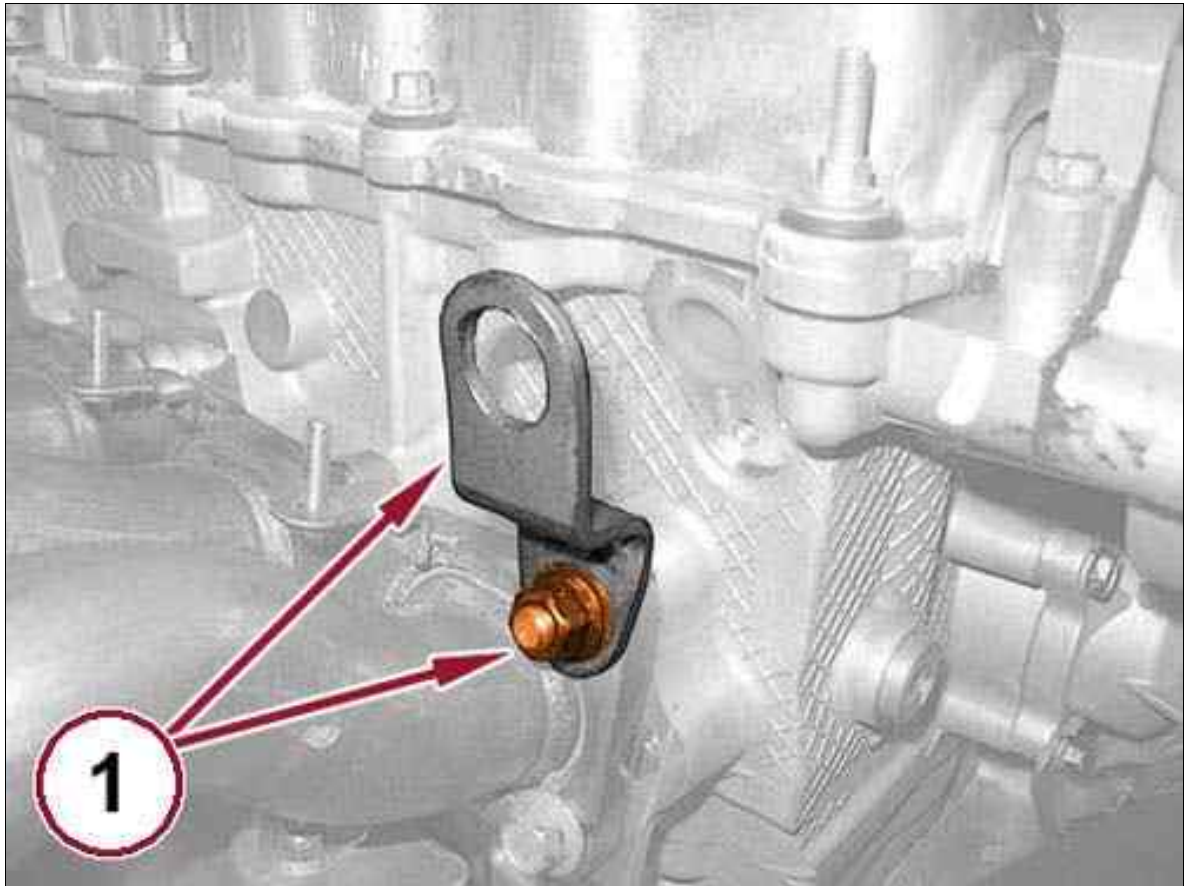
Fig 77: Engine Lifting Bracket & Exhaust Manifold Nut



Courtesy of CHRYSLER GROUP, LLC

143. Install a suitable engine lifting bracket (1) under the exhaust manifold nut.

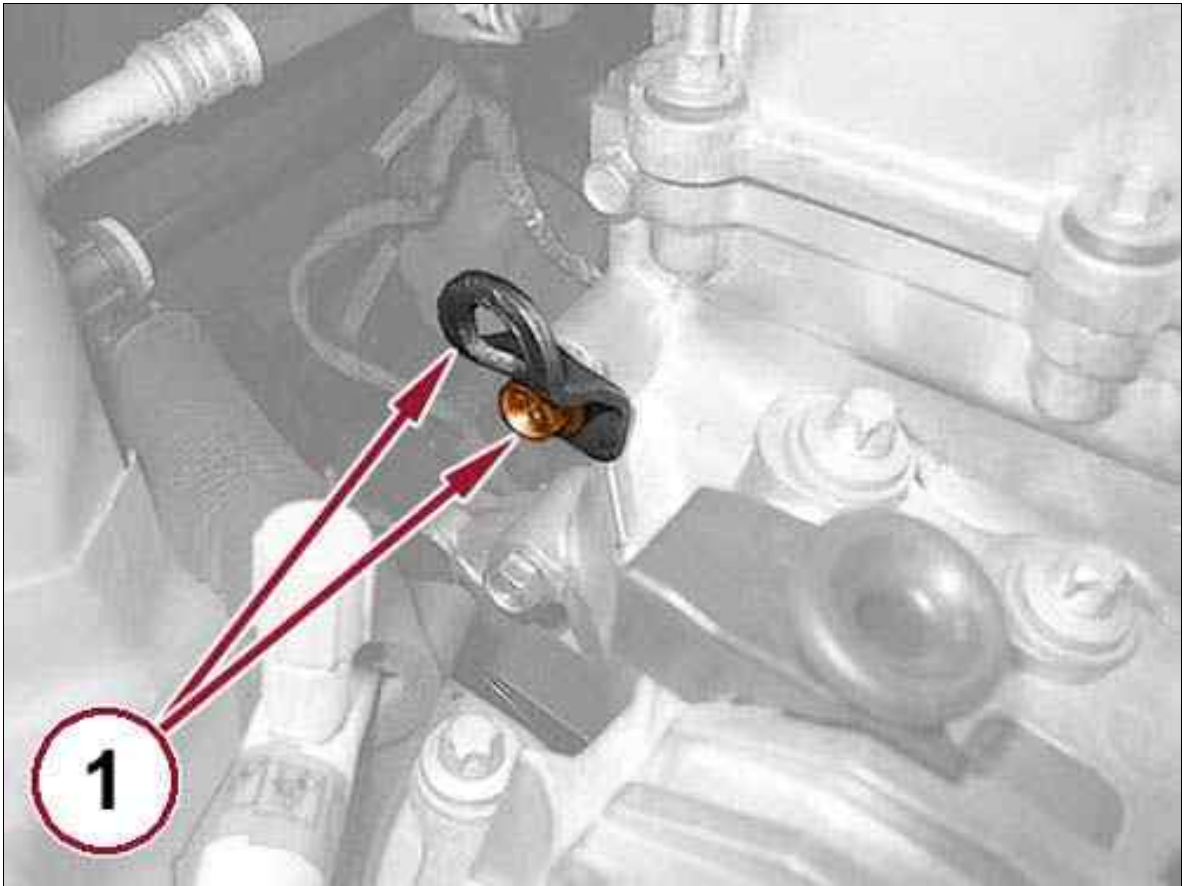
Fig 78: Engine Lifting Bracket & Exhaust Manifold Nut



Courtesy of CHRYSLER GROUP, LLC

144. Install a suitable engine lifting bracket (1) under the exhaust manifold nut.

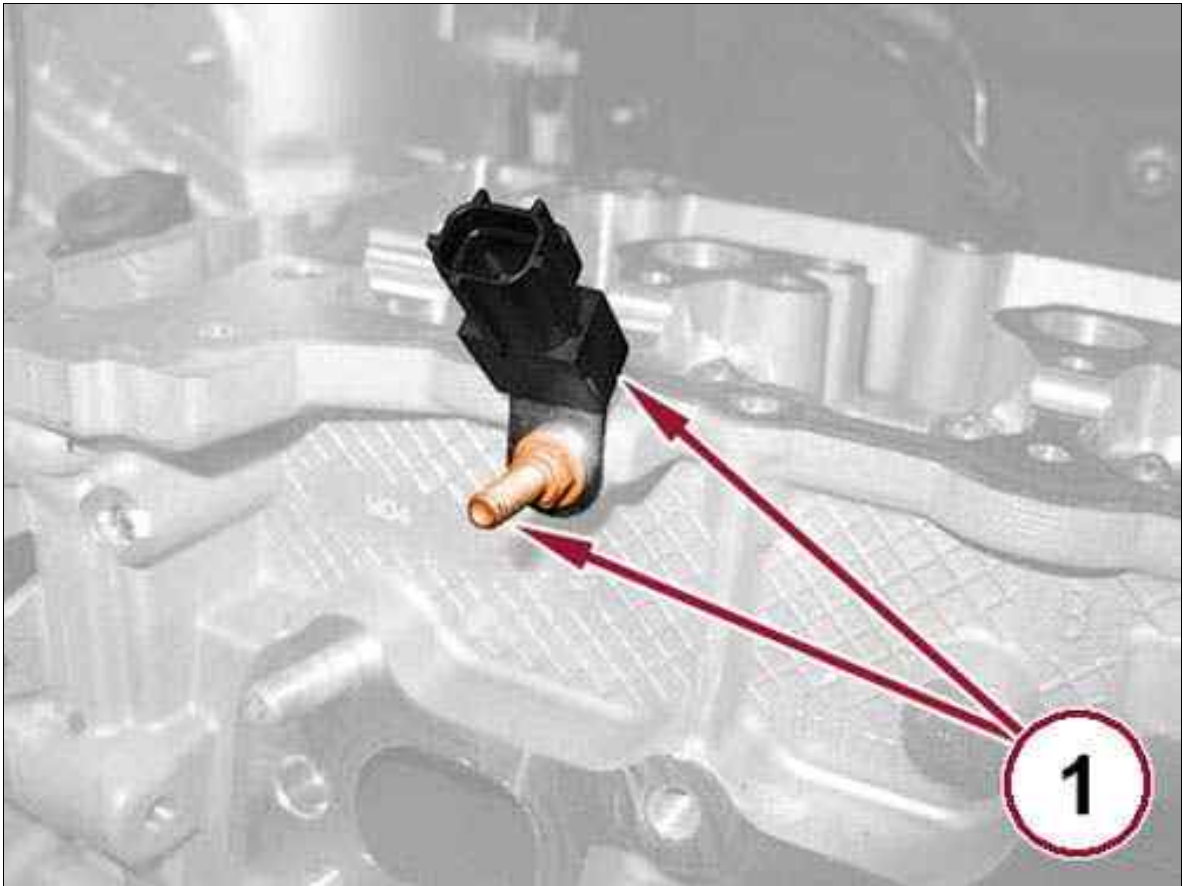
Fig 79: Engine Lifting Bracket & Engine Timing Cover Bolt



Courtesy of CHRYSLER GROUP, LLC

145. Install a suitable engine lifting bracket (1) under the engine timing cover bolt.

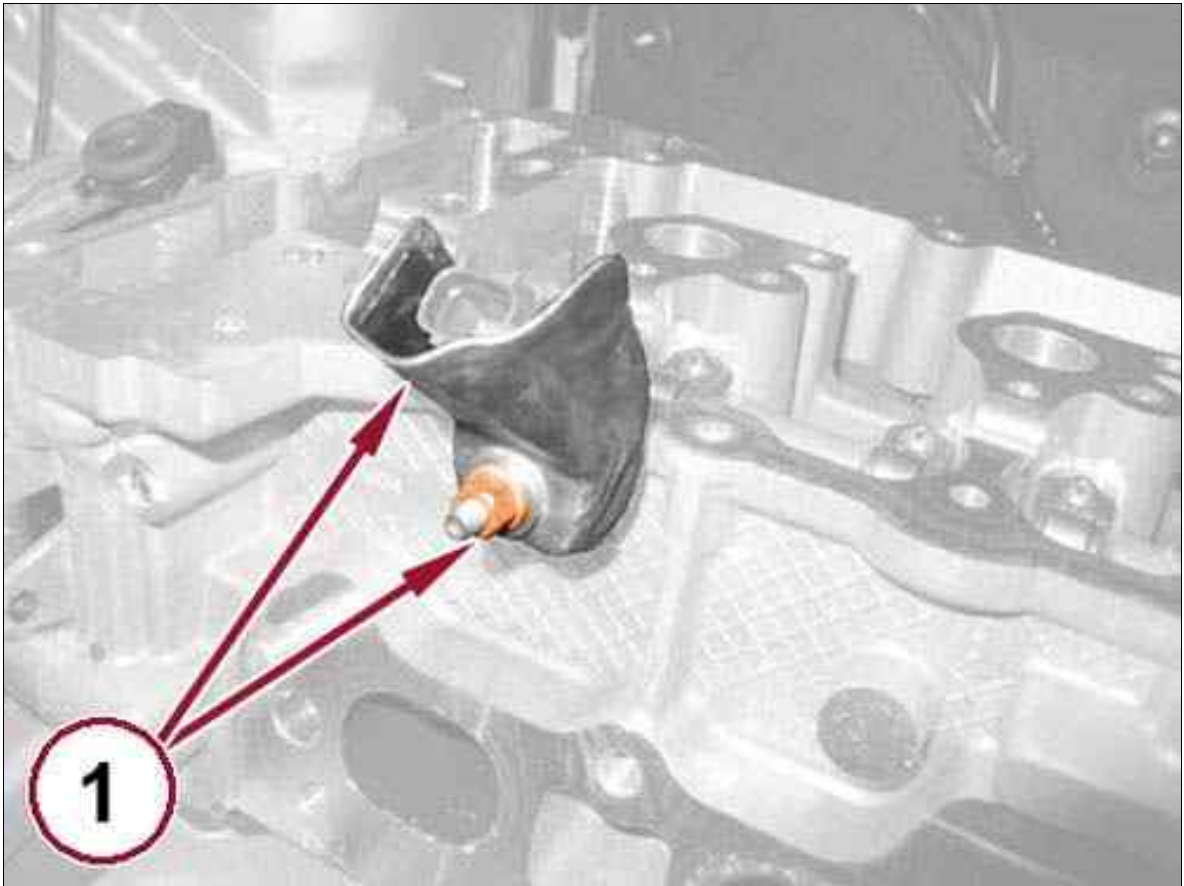
Fig 80: Ground Terminal & Stud



Courtesy of CHRYSLER GROUP, LLC

146. Install the ground terminal (1) and tighten the bolt securely.

Fig 81: Heat Shield & Nut



Courtesy of CHRYSLER GROUP, LLC

147. Install the heat shield of the ground terminal (1) and tighten the nut securely.

148. Position the wire harness on the engine and make the following connections:

1. Install the screws securing the wiring duct on the intake side.
2. Install the screws securing the wiring duct on the exhaust side.
3. Connect the knock sensor wire harness connector
4. Connect the crankshaft position sensor wire harness connector
5. Connect the A/C compressor wire harness connector
6. Connect the manifold pressure and temperature sensor wire harness connector and engage the retaining clips
7. Connect the engine oil pressure sensor wire harness connector
8. Connect the throttle body wire harness connector
9. Connect the coolant temperature sensor wire harness connector
10. Connect the purge solenoid wire harness connector
11. Connect the fuel injector wire harness connectors

12. Connect the engine oil temperature sensor wire harness connector
13. Connect the variable valve actuator wire harness connectors
14. Connect the ignition coil wire harness connectors
15. Connect the ground terminal wire harness connector
149. Install the lower heat shield onto the exhaust manifold and securely tighten the bolts.
150. Install the upper heat shield and securely tighten the nuts.
151. Install the upstream oxygen sensor support bracket and securely tighten the bolts then engage the wire harness retainer.
152. Connect the upstream oxygen sensor wire harness connector.
153. Connect the downstream oxygen sensor wire harness connector.
154. Install a new oil drain plug and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS .
155. Service the engine with the proper quality and quantity of engine oil. Refer to CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS .

COVER, ENGINE > REMOVAL AND INSTALLATION > REMOVAL AND INSTALLATION > REMOVAL - 2.4L MULTIAIR

1. Unlock and remove the engine cover from the mounting pins.

Fig 1: Engine Cover



Courtesy of CHRYSLER GROUP, LLC

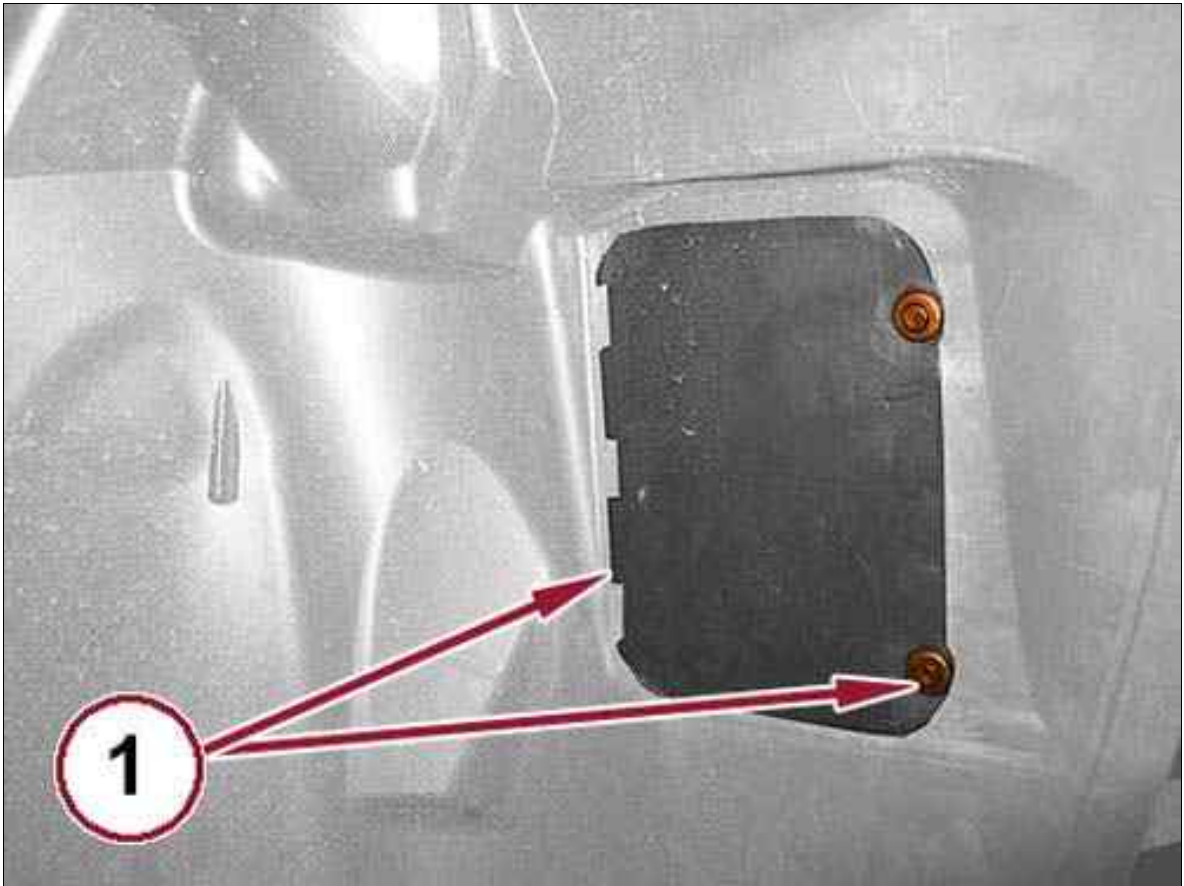
COVER, ENGINE > REMOVAL AND INSTALLATION > REMOVAL AND INSTALLATION > INSTALLATION - 2.4L MULTIAIR

1. Install the engine cover by engaging the mounting pins.

AIR INTAKE SYSTEM > BODY, AIR CLEANER > REMOVAL AND INSTALLATION > REMOVAL - 2.4L MULTI AIR

1. Disconnect and isolate the negative battery cable.
2. Remove the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
3. Raise and support the vehicle. Refer to HOISTING, STANDARD PROCEDURE .
4. Remove the right front tire and wheel assembly. Refer to REMOVAL AND INSTALLATION .

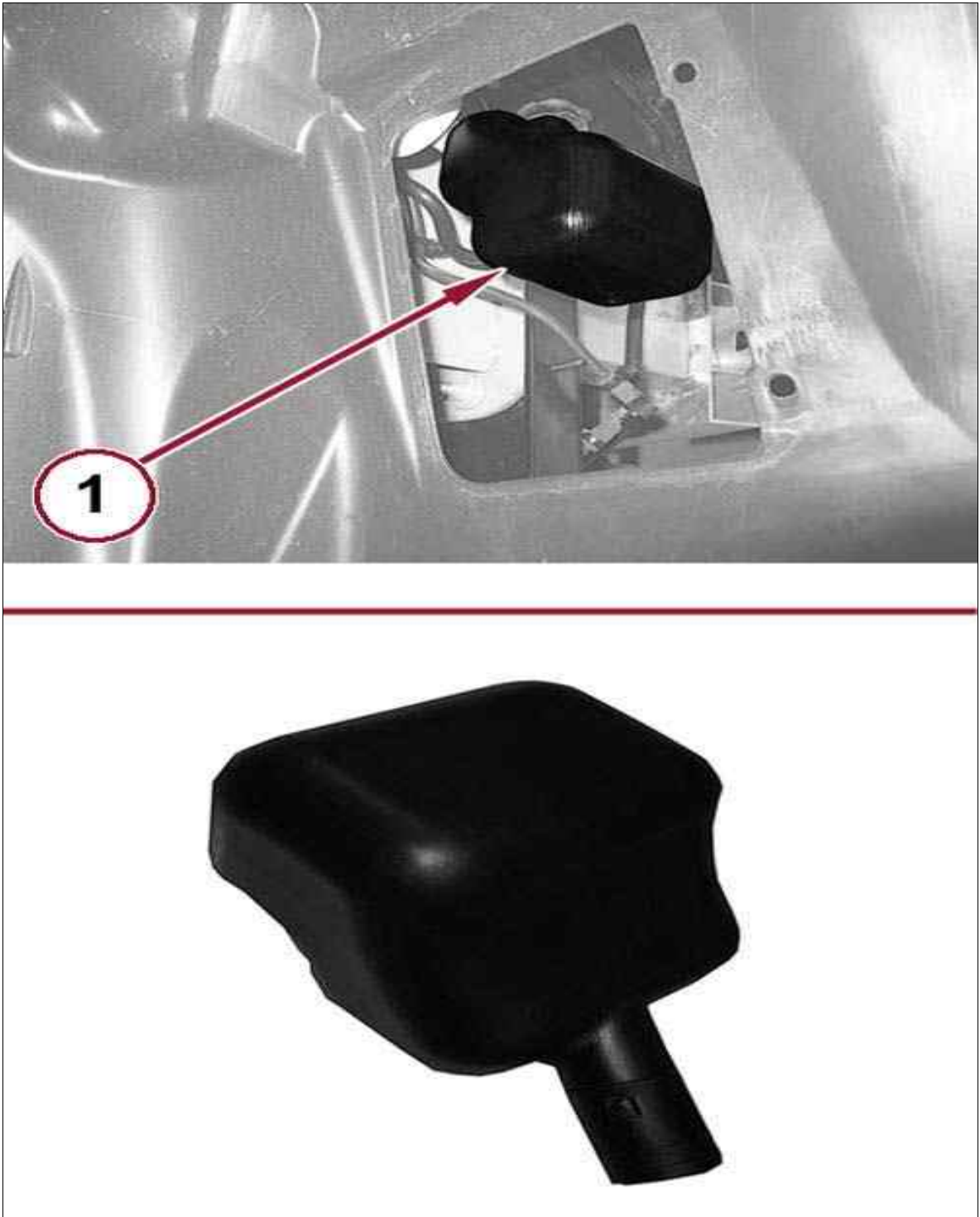
Fig 1: Access Panel Retainers



Courtesy of CHRYSLER GROUP, LLC

5. Remove the retainers (1) and the access panel.

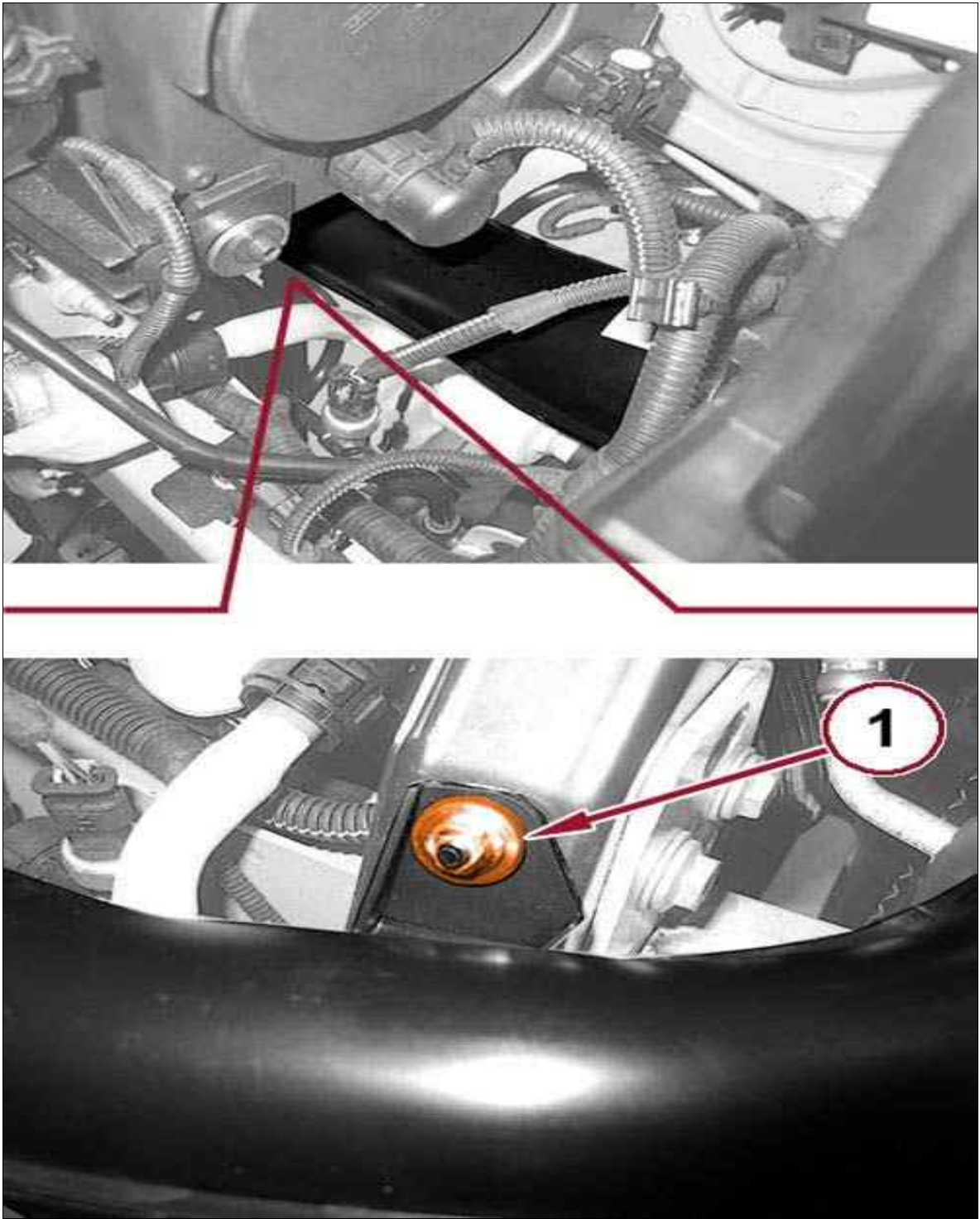
Fig 2: Resonator



Courtesy of CHRYSLER GROUP, LLC

6. Unscrew and remove the resonator (1).

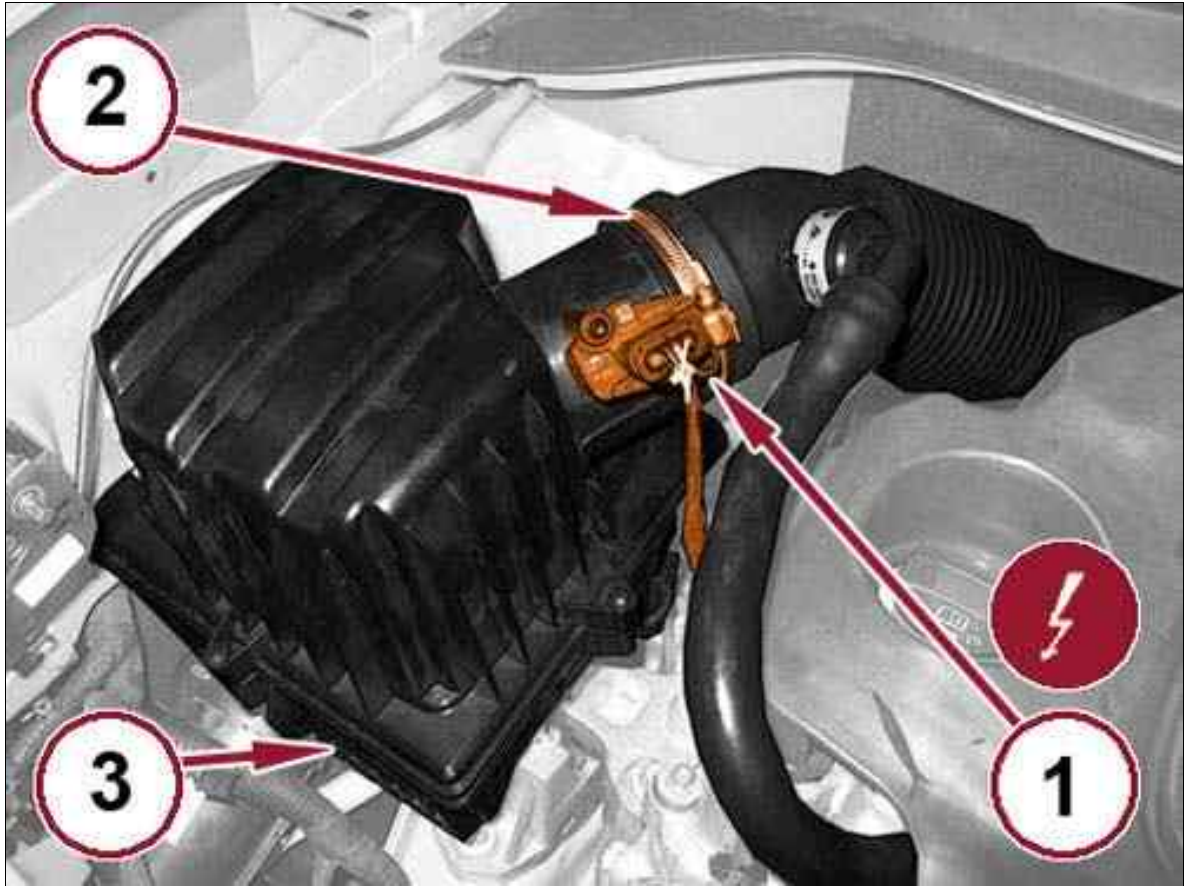
Fig 3: Air Tube & Nut



Courtesy of CHRYSLER GROUP, LLC

7. Remove the nut (1) securing the air tube.

Fig 4: Mass Air Flow (MAF) Sensor Wire Harness Connector, Air Tube Clamp & Air Cleaner Body



Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the Mass Air Flow (MAF) sensor wire harness connector (1).
9. Loosen the clamp (2) and disconnect the air tube from the air cleaner body.
10. Disengage the ball stud mounts, then lift up and remove the air cleaner body (3).
11. Release the tabs (1) and remove the intake air tube from the air cleaner body.

AIR INTAKE SYSTEM > BODY, AIR CLEANER > REMOVAL AND INSTALLATION > INSTALLATION

1. Install the air cleaner body and press down to engage the ball stud mount.
2. Install the air tube onto the air cleaner body and securely tighten the clamps.
3. Connect the Mass Air Flow (MAF) sensor wire harness connector.
4. Install the nut securing the air tube and securely tighten.
5. Install and attach the resonator.
6. Install the access panel and the retainers.

7. Install the right front tire and wheel assembly. Refer to REMOVAL AND INSTALLATION .
8. Remove support and lower the vehicle.
9. Install the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
10. Connect the negative battery cable.

CYLINDER HEAD > DIAGNOSIS AND TESTING > CYLINDER HEAD GASKET

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 HEAD > DIAGNOSIS AND TESTING > HYDRAULIC LASH ADJUSTER

A tappet-like noise may be produced from several sources. Check the following items:

- Engine oil level too high or too low. This may cause oil aeration. Aerated oil entering the adjusters may cause them to be spongy.
- Insufficient running time after rebuilding the cylinder head. Low speed running up to one hour may be required. Turn the engine off and let set for a few minutes before restarting. Repeat this several times after the engine has reached normal operating temperature.
- Low oil pressure.
- The oil screen in cylinder head or the oil passage to the cylinder head is plugged with debris.
- Air ingested into oil due to broken or cracked oil pump pick-up.
- Worn valve guides.
- Rocker arm ears contacting valve spring retainer.
- Rocker arm loose, adjuster stuck or at maximum extension and still leaves lash in the system.

- Oil leak or excessive cam bearing wear in the cylinder head.
- Faulty lash adjuster. Check lash adjusters for "sponginess" while installed in the cylinder head and cam lobe at base circle. Depress part of rocker arm over the adjuster. Normal adjusters should feel firm when pressed quickly. When pressed very slowly, lash adjusters should collapse. Remove suspected lash adjusters, and replace. Before installation, make sure adjusters are full of oil. This can be verified by little plunger travel when lash adjuster is depressed quickly.

CYLINDER HEAD > CLEANING > CLEANING



CAUTION:

When cleaning cylinder head and cylinder block surfaces, DO NOT use a metal scraper because the surfaces could be cut or ground. Use ONLY a wooden or plastic scraper.

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



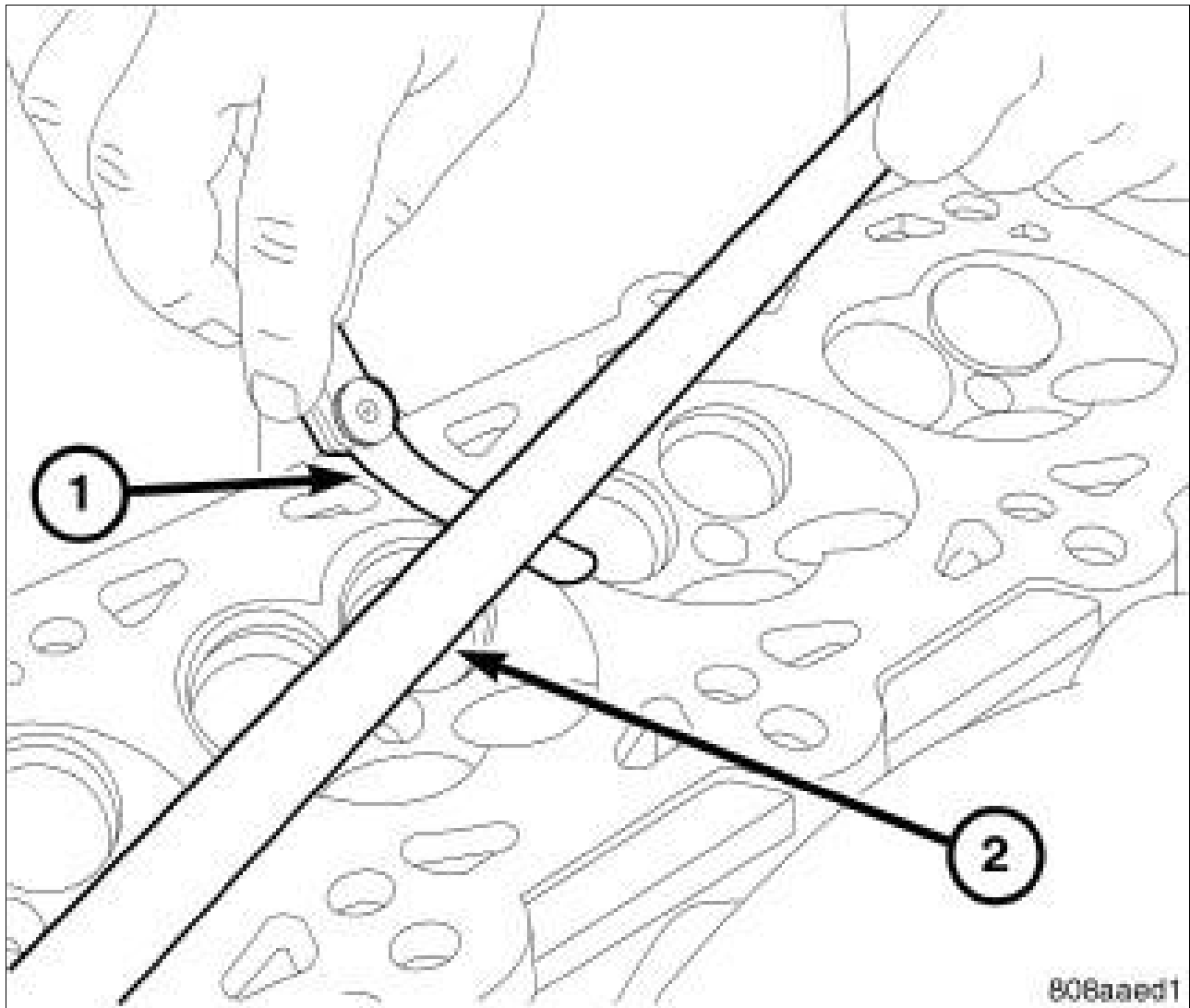
NOTE:

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

1. Remove all gasket material from cylinder head and block. Refer to ENGINE GASKET SURFACE PREPARATION . Do not damage the aluminum head sealing surface.
2. Clean all the engine oil passages.
3. Clean out the cylinder head bolt holes in the engine block.

CYLINDER HEAD > INSPECTION > INSPECTION

Fig 1: Checking Cylinder Head Flatness



Courtesy of CHRYSLER GROUP, LLC



NOTE:

Typical Cylinder Head shown in illustration.

1. Check the cylinder head for warping with a straight edge (2) and a feeler gauge (1).
2. The cylinder head must be flat within specification. Refer to ENGINE SPECIFICATIONS .
3. Remove any carbon or varnish deposits from inside of valve guides with a reliable guide cleaner.
4. Inspect the following components and verify that they are within specification.

Refer to ENGINE SPECIFICATIONS .

1. Valve Springs

2. Valve Seats
3. Valve Guides
4. Valves

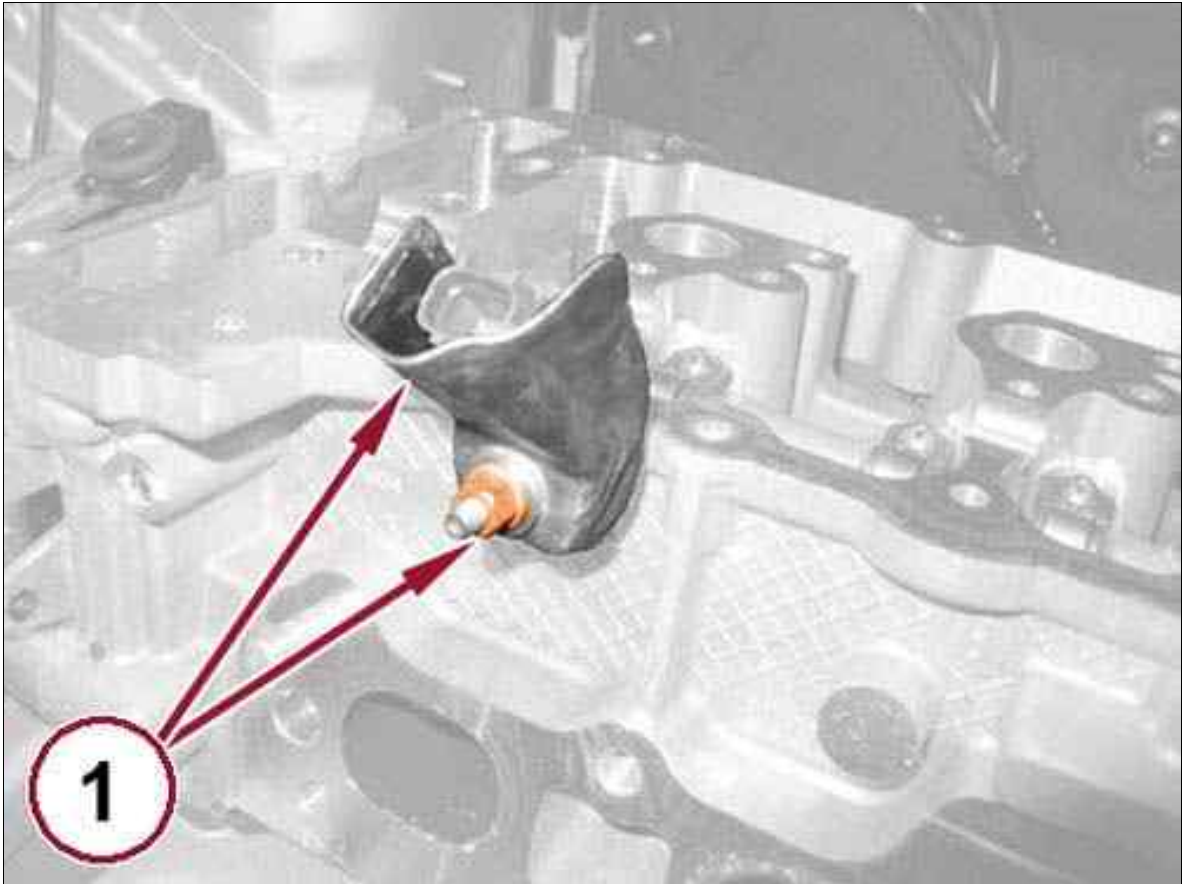
CYLINDER HEAD > REMOVAL AND INSTALLATION > REMOVAL AND INSTALLATION > REMOVAL - 2.4L MULTIAIR2

1. Raise and support the vehicle.
2. Remove the right front wheel. Refer to REMOVAL AND INSTALLATION .
3. Remove the right front wheelhouse splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
4. Remove the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
5. Remove the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
6. Drain the engine coolant. Refer to STANDARD PROCEDURE .
7. Remove the battery. Refer to BATTERY, REMOVAL AND INSTALLATION .
8. Remove the battery tray. Refer to TRAY, BATTERY, REMOVAL AND INSTALLATION .
9. Remove the valve cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL AND INSTALLATION .
10. Remove the exhaust manifold and catalytic converter. Refer to MANIFOLD, EXHAUST, REMOVAL AND INSTALLATION .
11. Remove the throttle body. Refer to THROTTLE BODY, REMOVAL AND INSTALLATION .
12. Remove the air capacity airbox. Refer to MANIFOLD, INTAKE, REMOVAL AND INSTALLATION .
13. Remove the air cleaner. Refer to BODY, AIR CLEANER .
14. Remove the accessory drive belt. Refer to BELT, SERPENTINE, REMOVAL AND INSTALLATION .
15. Remove the engine vibration damper. Refer to DAMPER, VIBRATION, REMOVAL AND INSTALLATION .
16. Remove the water pump pulley. Refer to PUMP, WATER, REMOVAL AND INSTALLATION .
17. Remove the timing chain cover. Refer to COVER(S), ENGINE TIMING, REMOVAL AND INSTALLATION .
18. Remove the timing chain tensioner. Refer to TENSIONER, ENGINE TIMING, REMOVAL AND INSTALLATION .
19. Remove the timing chain guides. Refer to GUIDES, TIMING CHAIN, REMOVAL AND

INSTALLATION .

20. Remove the timing chain and sprockets. Refer to CHAIN AND SPROCKETS, TIMING, REMOVAL AND INSTALLATION .
21. Remove the thermostat. Refer to THERMOSTAT, REMOVAL AND INSTALLATION .
22. Remove the variable valve actuation assembly. Refer to ASSEMBLY, VARIABLE VALVE ACTUATION, REMOVAL AND INSTALLATION .
23. Remove the camshaft. Refer to CAMSHAFT, ENGINE, REMOVAL AND INSTALLATION .

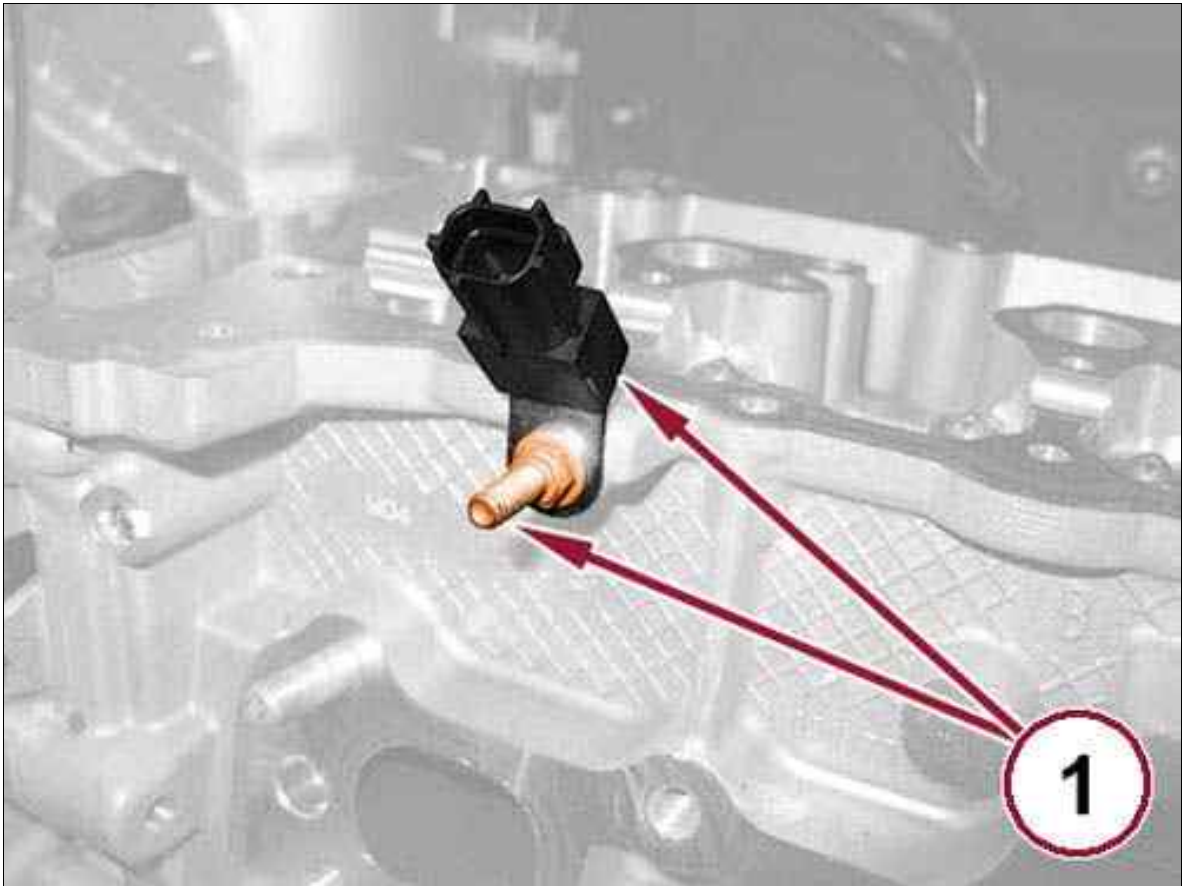
Fig 1: Heat Shield & Nut



Courtesy of CHRYSLER GROUP, LLC

24. Remove the nut (1) and remove the heat shield (1) of the ground terminal.

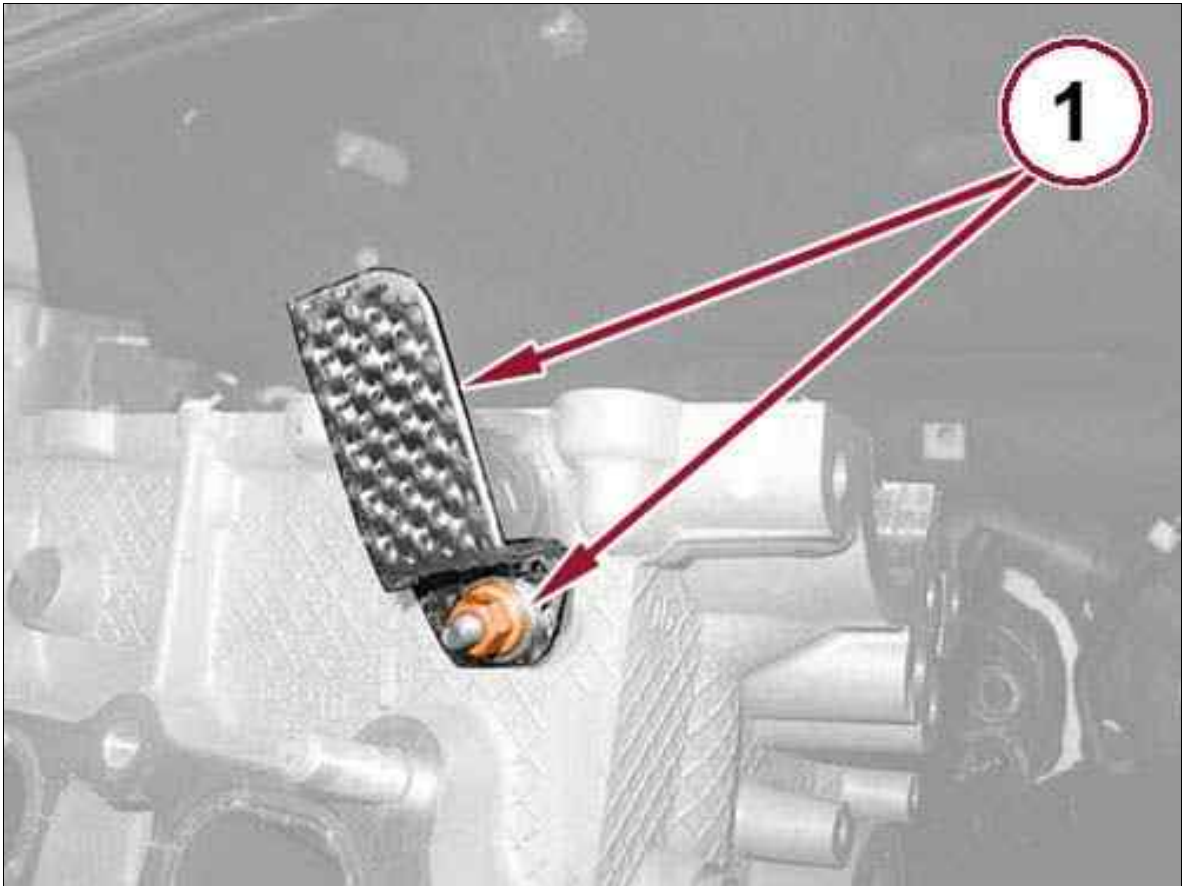
Fig 2: Ground Terminal & Stud



Courtesy of CHRYSLER GROUP, LLC

25. Remove the screw (1) and remove the ground terminal (1).

Fig 3: Cam Angle Sensor Heat Shield & Nut



Courtesy of CHRYSLER GROUP, LLC

26. Remove the nut (1) and remove the heat shield (1) of the cam angle sensor.

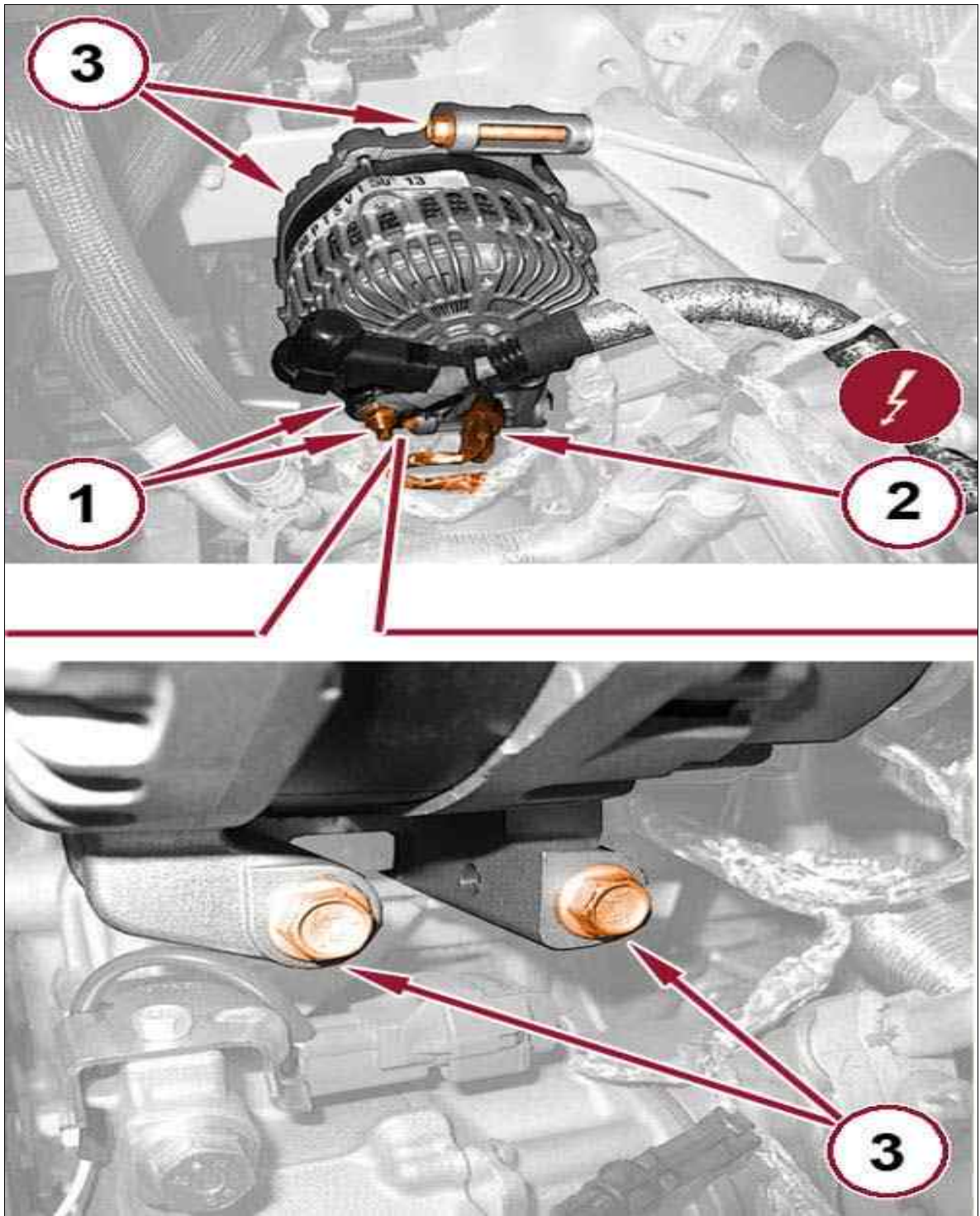
Fig 4: Cam Angle Sensor & Bolt



Courtesy of CHRYSLER GROUP, LLC

27. Remove the screw (1) and remove the cam angle sensor (1).

Fig 5: Alternator Wire Harness Connector, Bolts, Cap & Nut



Courtesy of CHRYSLER GROUP, LLC

- 28. Disengage cap (1), unscrew the nut (1) and disconnect the wiring.
- 29. Disconnect the wire harness connector (2) from the alternator.
- 30. Remove the alternator bolts (3).

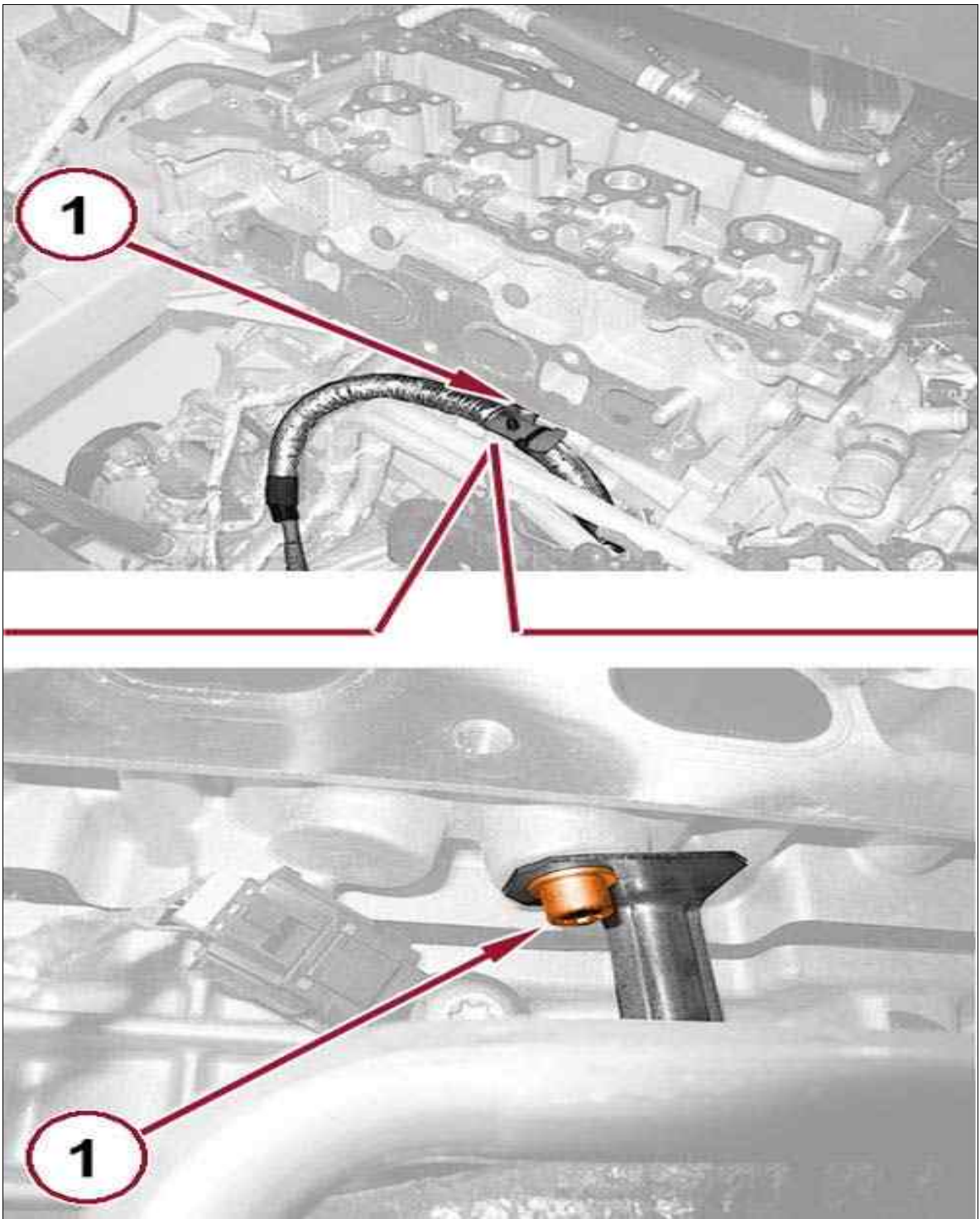
Fig 6: Alternator



Courtesy of CHRYSLER GROUP, LLC

31. Remove the alternator (1) with centering sleeve.

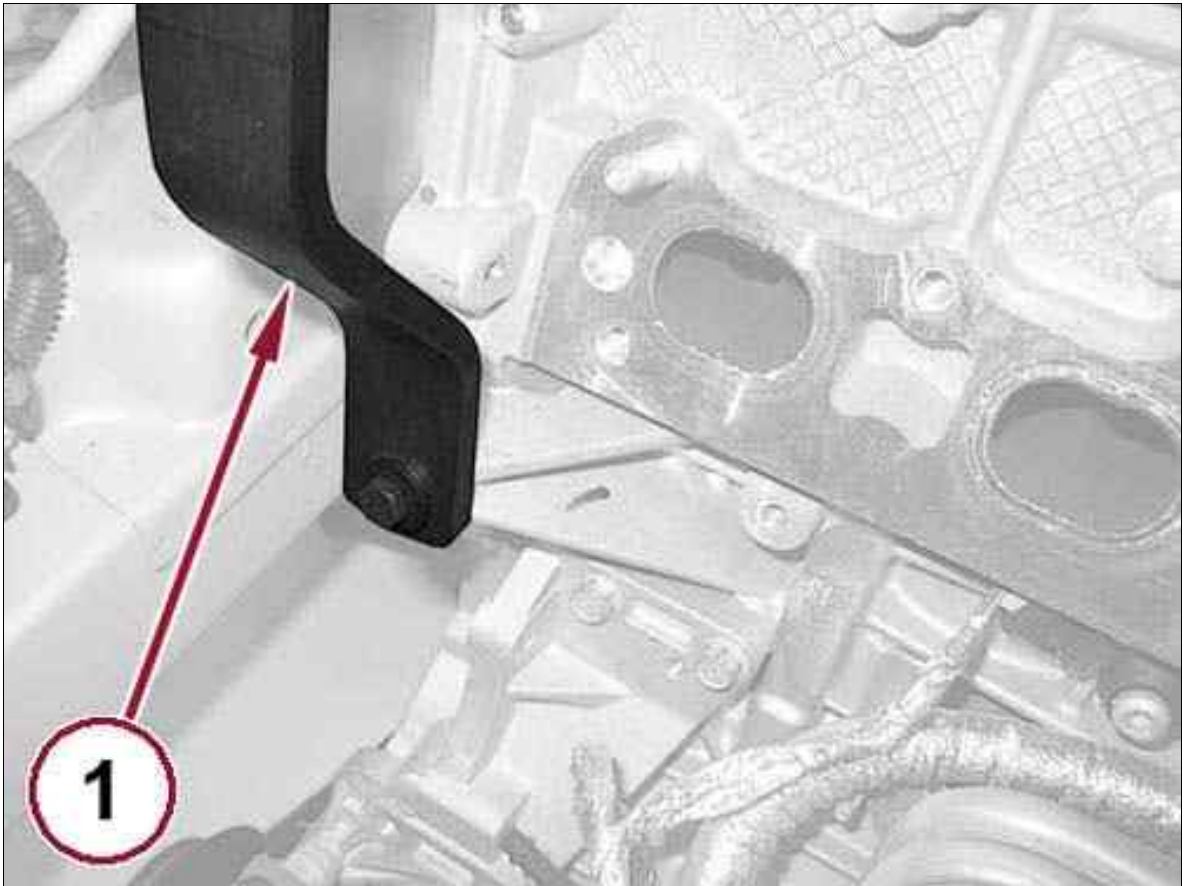
Fig 7: Wiring Retaining Bracket To Cylinder Head & Bolt



Courtesy of CHRYSLER GROUP, LLC

32. Remove the screw (1) from the wiring retaining bracket to the cylinder head.

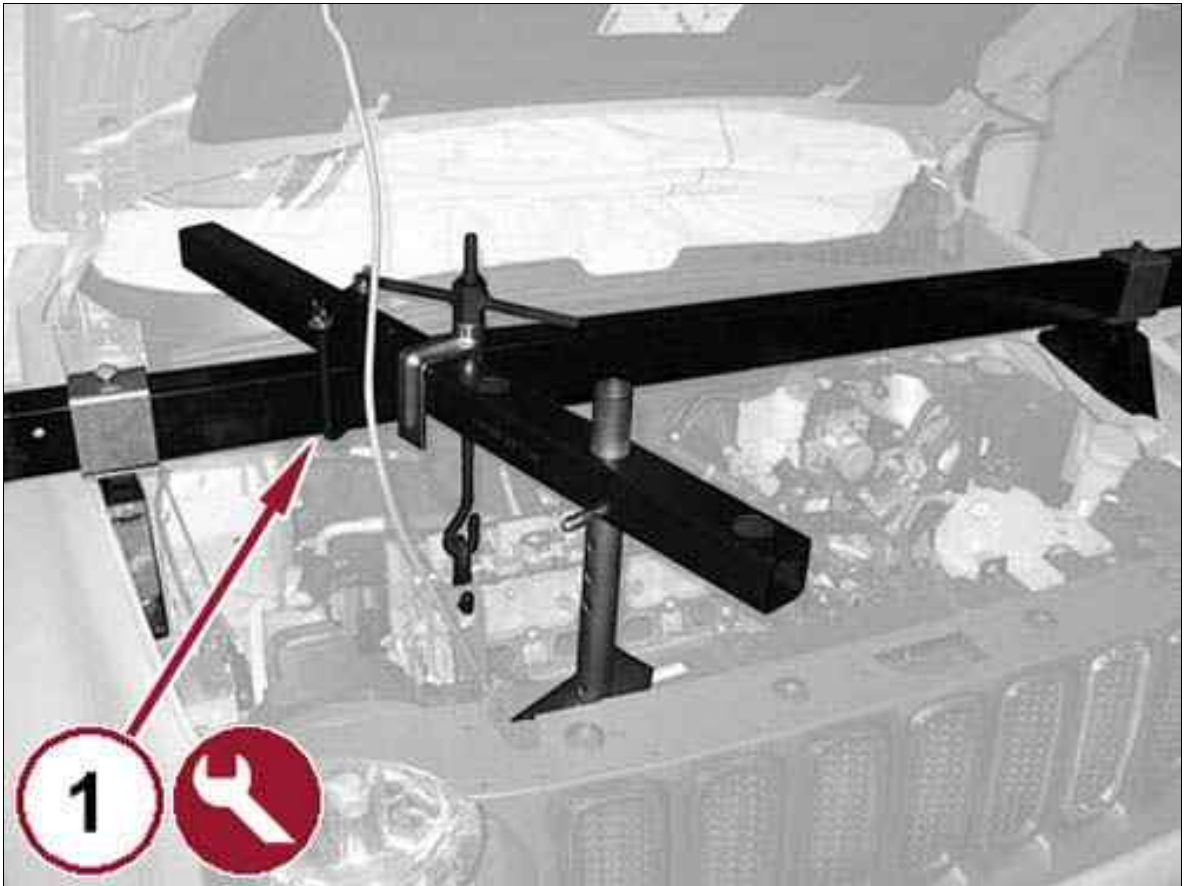
Fig 8: Engine Support Tool Bracket At Upper Alternator Mounting Hole



Courtesy of CHRYSLER GROUP, LLC

33. Mount the engine support tool bracket (1) to the upper alternator mounting hole.

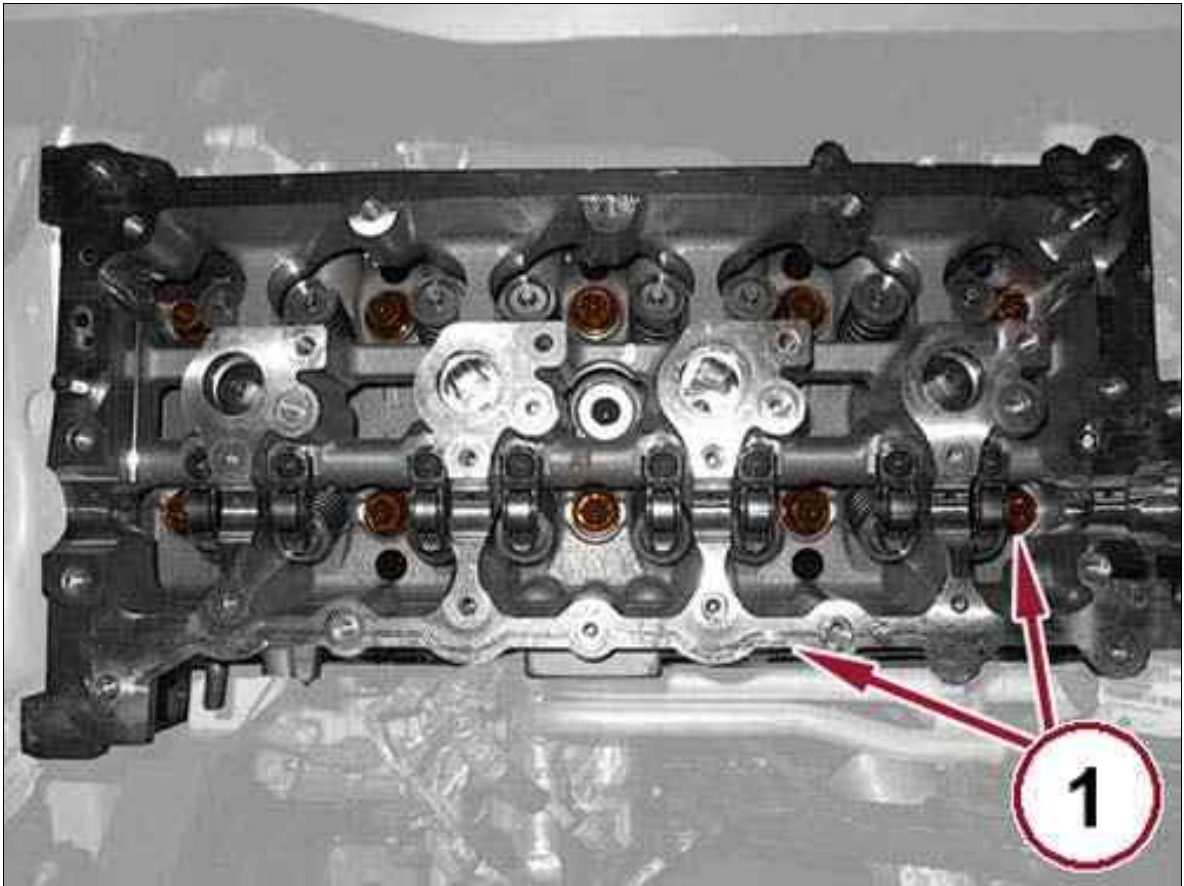
Fig 9: Positioning Engine Support Special Tool



Courtesy of CHRYSLER GROUP, LLC

34. Supporting the engine with the 2000040436 tool (1) positioned as shown in illustration.

Fig 10: Cylinder Head & Bolts



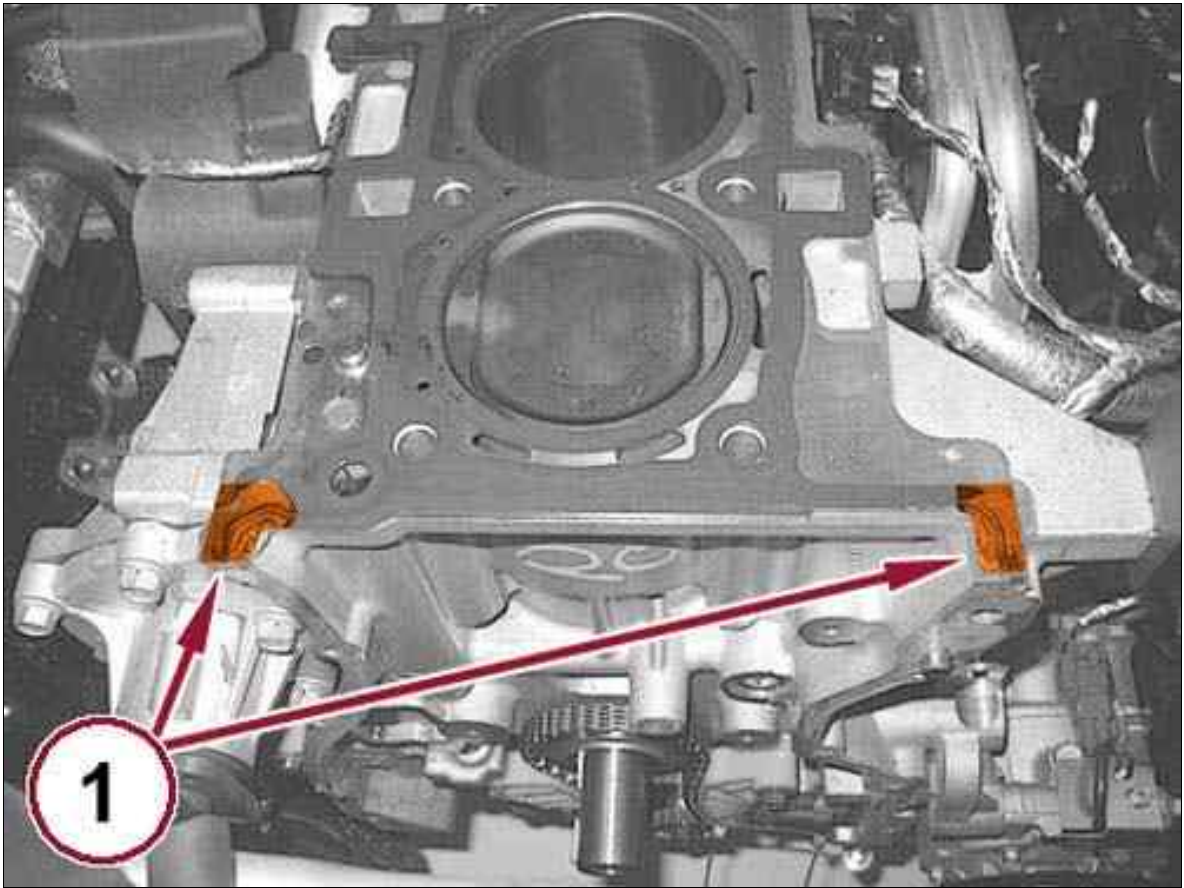
Courtesy of CHRYSLER GROUP, LLC

35. Remove the bolts (1) and remove the cylinder head (1).
36. Remove the seal and verify integrity of centering sleeves.
37. Remove any residual sealant.

CYLINDER HEAD > REMOVAL AND INSTALLATION > REMOVAL AND INSTALLATION > INSTALLATION - 2.4L MULTIAIR2

1. Position the cylinder head gasket engaging the centering bushings.

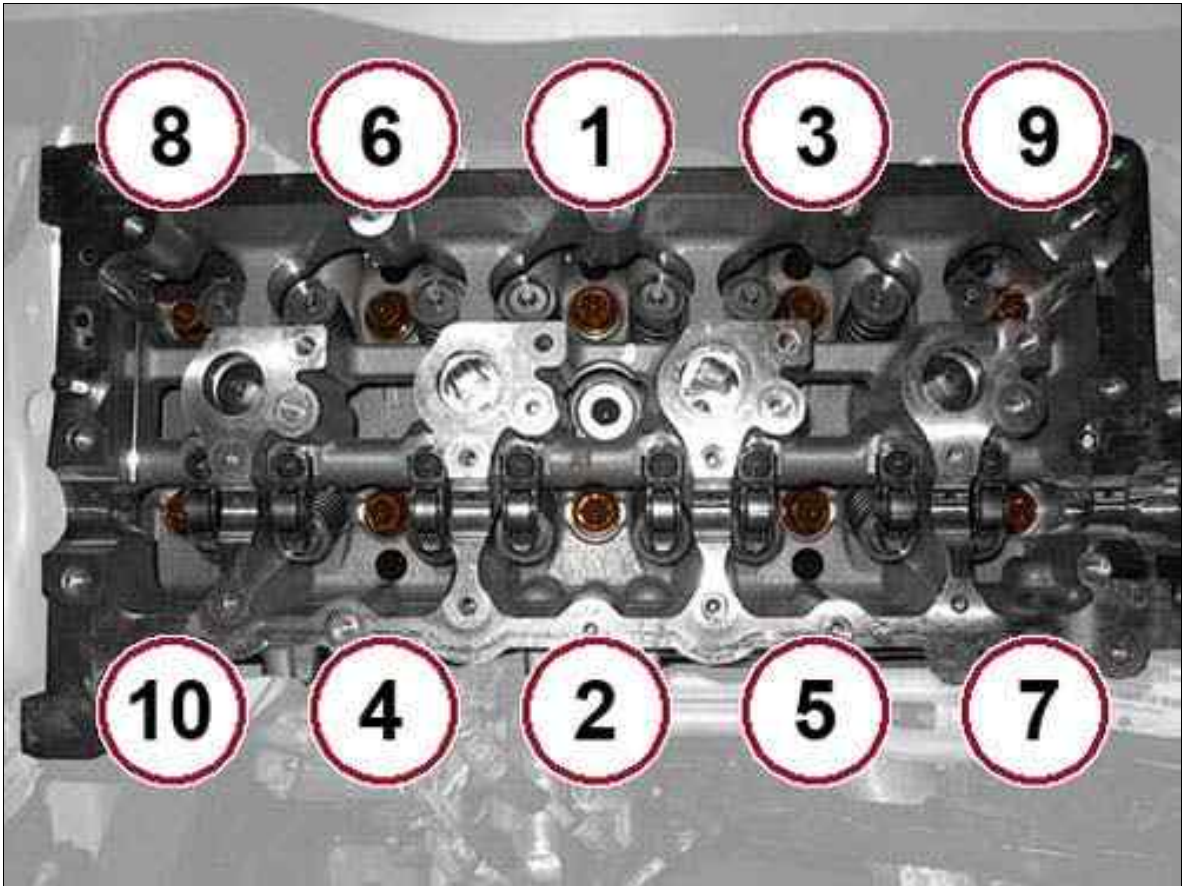
Fig 1: Placing Sealant On Cylinder Head Gasket At Specified Locations



Courtesy of CHRYSLER GROUP, LLC

2. Place sealant on the cylinder head gasket at the points indicated (1) in the figure.

Fig 2: Cylinder Head Bolts Tightening Sequence



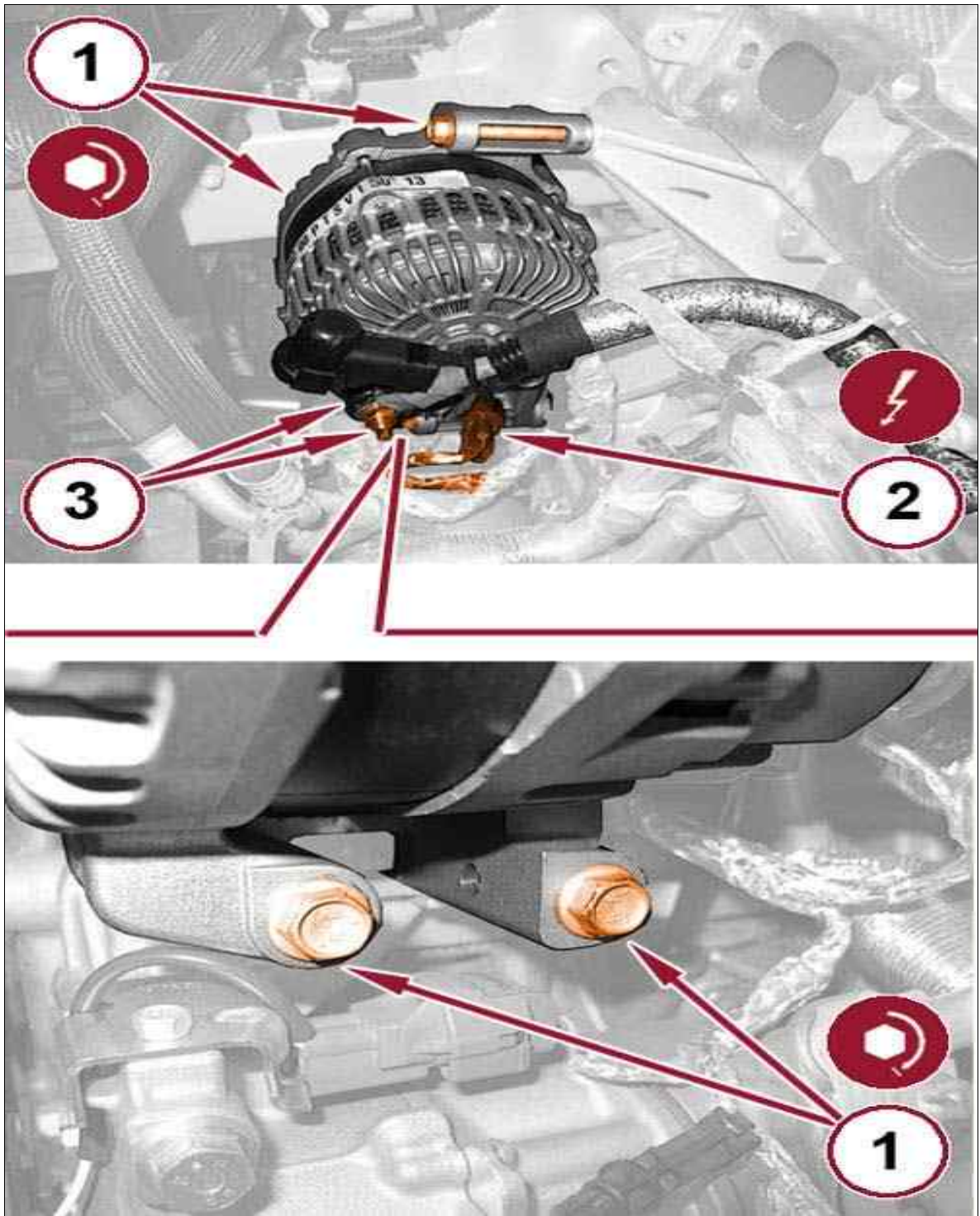
Courtesy of CHRYSLER GROUP, LLC

 **NOTE:**

For each tightening sequence, follow the order shown in illustration.

3. Install the cylinder head and bolts securing the cylinder head. Torque all bolts to the proper specification. Refer to TORQUE SPECIFICATIONS .
4. Remove the engine support tool.
5. Install the screw for the wiring retaining bracket to the cylinder head.

Fig 3: Alternator Wire Harness Connector, Bolts, Cap & Nut



Courtesy of CHRYSLER GROUP, LLC

6. Install the alternator, engaging the centering bushing and tighten the bolts (1) to the proper specification. Refer to SPECIFICATIONS .
7. Connect the wire harness connector (2) to the alternator.
8. Connect the alternator wire (3), tighten the nut securely and engage the cap.
9. Install the cam angle sensor and tighten the screw securely.

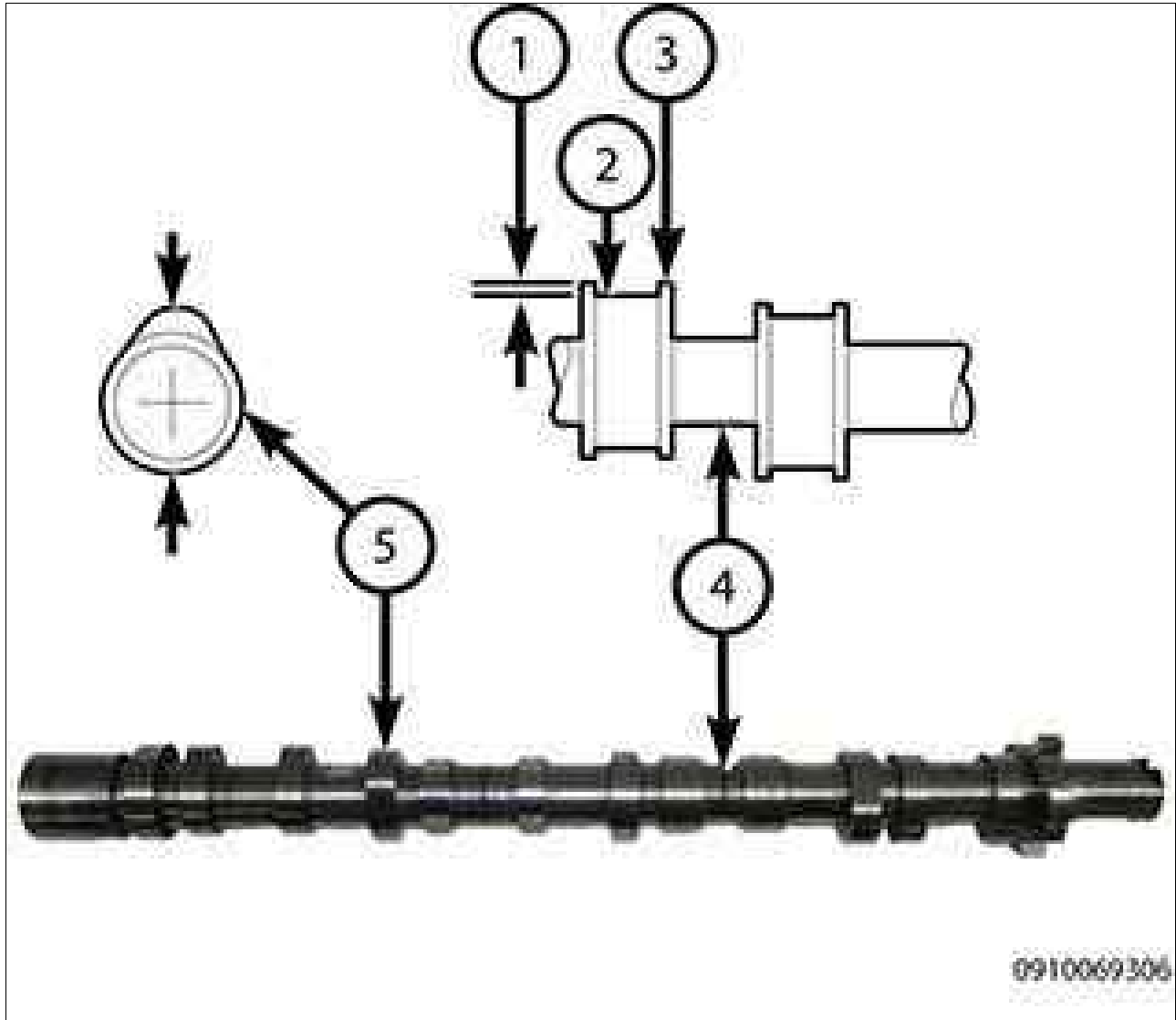
10. Install the heat shield of the cam angle sensor and tighten the nut securely.
11. Install the ground terminal and tighten the bolt securely.
12. Install the heat shield of the ground terminal and tighten the nut securely.
13. Install the camshaft. Refer to CAMSHAFT, ENGINE, REMOVAL AND INSTALLATION .
14. Install the variable valve actuation assembly. Refer to ASSEMBLY, VARIABLE VALVE ACTUATION, REMOVAL AND INSTALLATION .
15. Install the thermostat. Refer to THERMOSTAT, REMOVAL AND INSTALLATION .
16. Install the timing chain and sprockets. Refer to CHAIN AND SPROCKETS, TIMING, REMOVAL AND INSTALLATION .
17. Install the timing chain guides. Refer to GUIDES, TIMING CHAIN, REMOVAL AND INSTALLATION .
18. Install the timing chain tensioner. Refer to TENSIONER, ENGINE TIMING, REMOVAL AND INSTALLATION .
19. Install the timing chain cover. Refer to COVER(S), ENGINE TIMING, REMOVAL AND INSTALLATION .
20. Install the water pump pulley. Refer to PUMP, WATER, REMOVAL AND INSTALLATION .
21. Install the engine vibration damper. Refer to DAMPER, VIBRATION, REMOVAL AND INSTALLATION .
22. Install the accessory drive belt. Refer to BELT, SERPENTINE, REMOVAL AND INSTALLATION .
23. Install the air cleaner. Refer to BODY, AIR CLEANER .
24. Install the air capacity airbox. Refer to MANIFOLD, INTAKE, REMOVAL AND INSTALLATION .
25. Install the throttle body. Refer to THROTTLE BODY, REMOVAL AND INSTALLATION .
26. Install the exhaust manifold and catalytic converter. Refer to MANIFOLD, EXHAUST, REMOVAL AND INSTALLATION .
27. Install the valve cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL AND INSTALLATION .
28. Install the battery tray. Refer to TRAY, BATTERY, REMOVAL AND INSTALLATION .
29. Install the battery. Refer to BATTERY, REMOVAL AND INSTALLATION .
30. Fill the engine coolant. Refer to STANDARD PROCEDURE .
31. Remove the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
32. Install the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
33. Install the right front wheelhouse splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .

34. Install the right front wheel. Refer to REMOVAL AND INSTALLATION .

35. Remove the support and lower the vehicle.

CYLINDER HEAD > CAMSHAFT, ENGINE > INSPECTION > INSPECTION

Fig 1: Inspecting Camshaft Bearing Journals, Checking Surface Of Cam Lobes For Abnormal Wear & For Worn Or Unworn Areas Of Camshaft



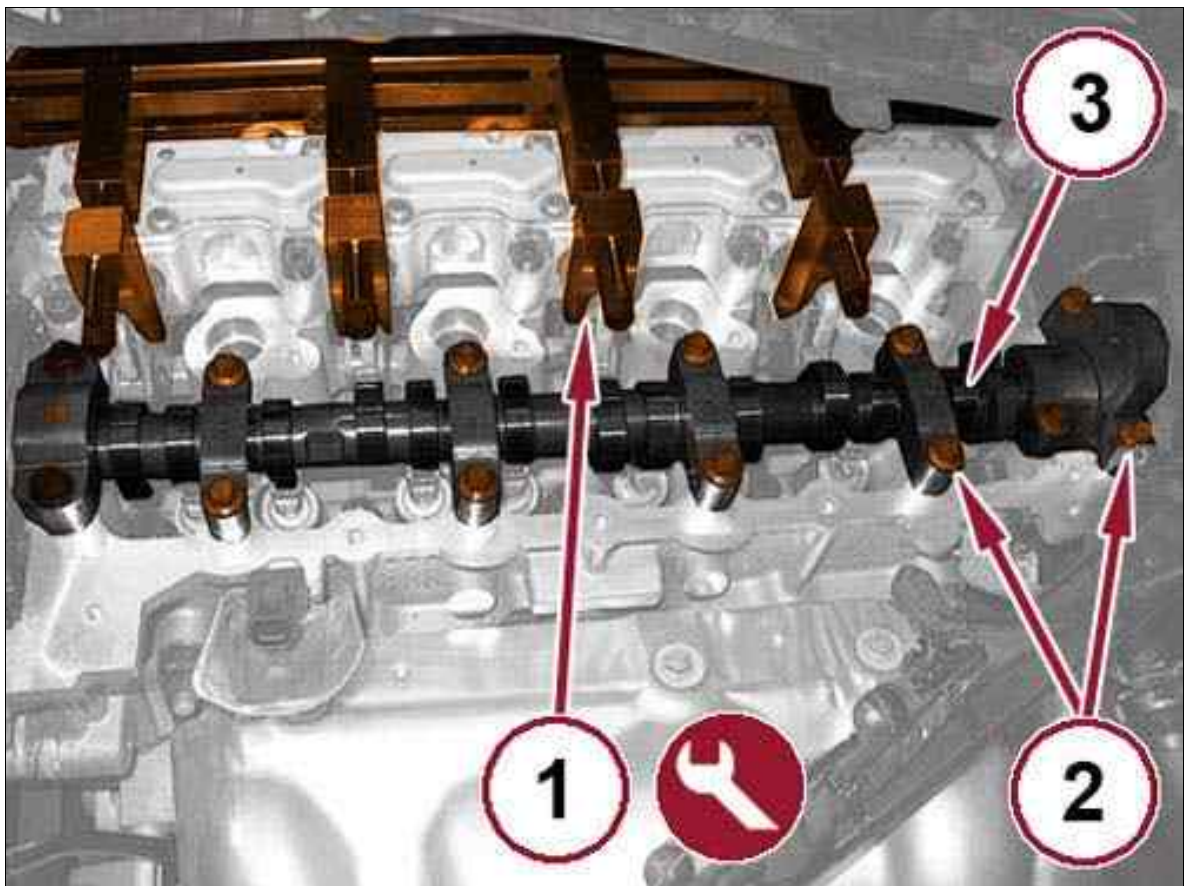
Courtesy of CHRYSLER GROUP, LLC

1. Inspect the camshaft bearing journals (4) for damage and binding. If the journals are binding, check the cylinder head for damage. Also check the oil supply ports for obstructions.
2. Check the surface of the cam lobes (5) for abnormal wear (1). Measure and compare the unworn area (3) to the worn area (2). Replace the camshaft if it is not within specification. Refer to ENGINE SPECIFICATIONS .

CYLINDER HEAD > CAMSHAFT, ENGINE > REMOVAL AND INSTALLATION > REMOVAL - 2.4L

1. Disconnect the negative battery cable.
2. Remove the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
3. Remove the air cleaner assembly. Refer to BODY, AIR CLEANER, REMOVAL AND INSTALLATION .
4. Remove the Powertrain Control Module (PCM). Refer to MODULE, POWERTRAIN CONTROL, REMOVAL AND INSTALLATION .
5. Remove the vacuum pump. Refer to PUMP, ELECTRIC VACUUM, REMOVAL AND INSTALLATION .
6. Remove the cylinder head cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL AND INSTALLATION .
7. Remove the timing belt. Refer to CHAIN AND SPROCKETS, TIMING .

Fig 1: MULTIAIR Actuator, Camshaft & Camshaft Caps



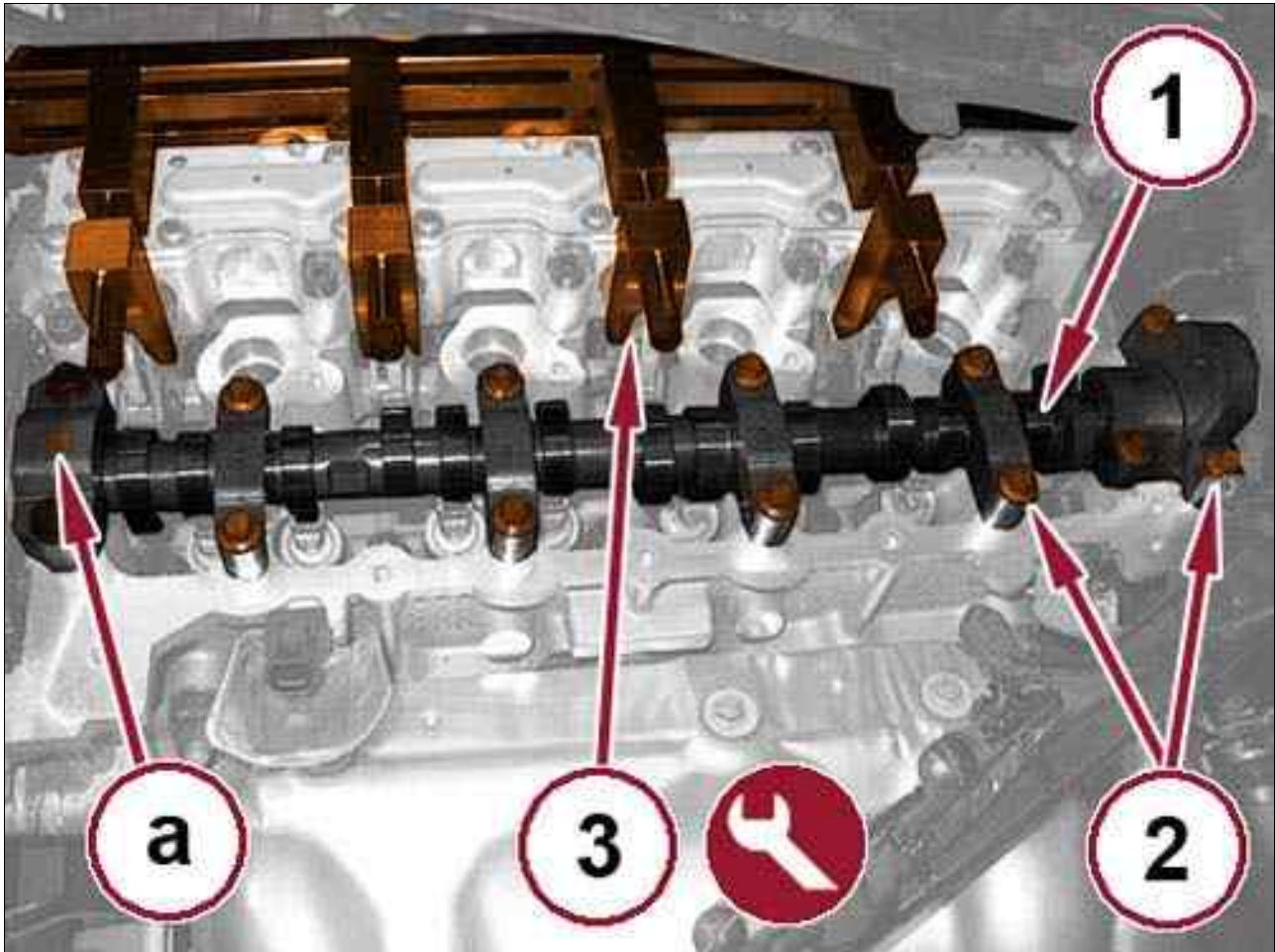
Courtesy of CHRYSLER GROUP, LLC

8. Install the 2020000090 (EMEA) or (special tool #10259B, Compressor, MultiAir® Spring) (NAFTA) tool on the MULTIAIR actuator (1).
9. Remove the camshaft cap to cylinder head bolts (2), and remove the camshaft caps.

10. Remove the camshaft (3) and oil seal.

CYLINDER HEAD > CAMSHAFT, ENGINE > REMOVAL AND INSTALLATION > INSTALLATION - 2.4L

Fig 1: MULTIAIR Actuator, Camshaft & Camshaft Caps



Courtesy of CHRYSLER GROUP, LLC

1. Install the camshaft (1) into the cylinder head.
2. Install the bearing caps (2), respecting the numbering of the cylinders stamped at the top of each cap, and tighten the camshaft cap to cylinder head bolts to the proper specification. Refer to TORQUE SPECIFICATIONS .

NOTE:

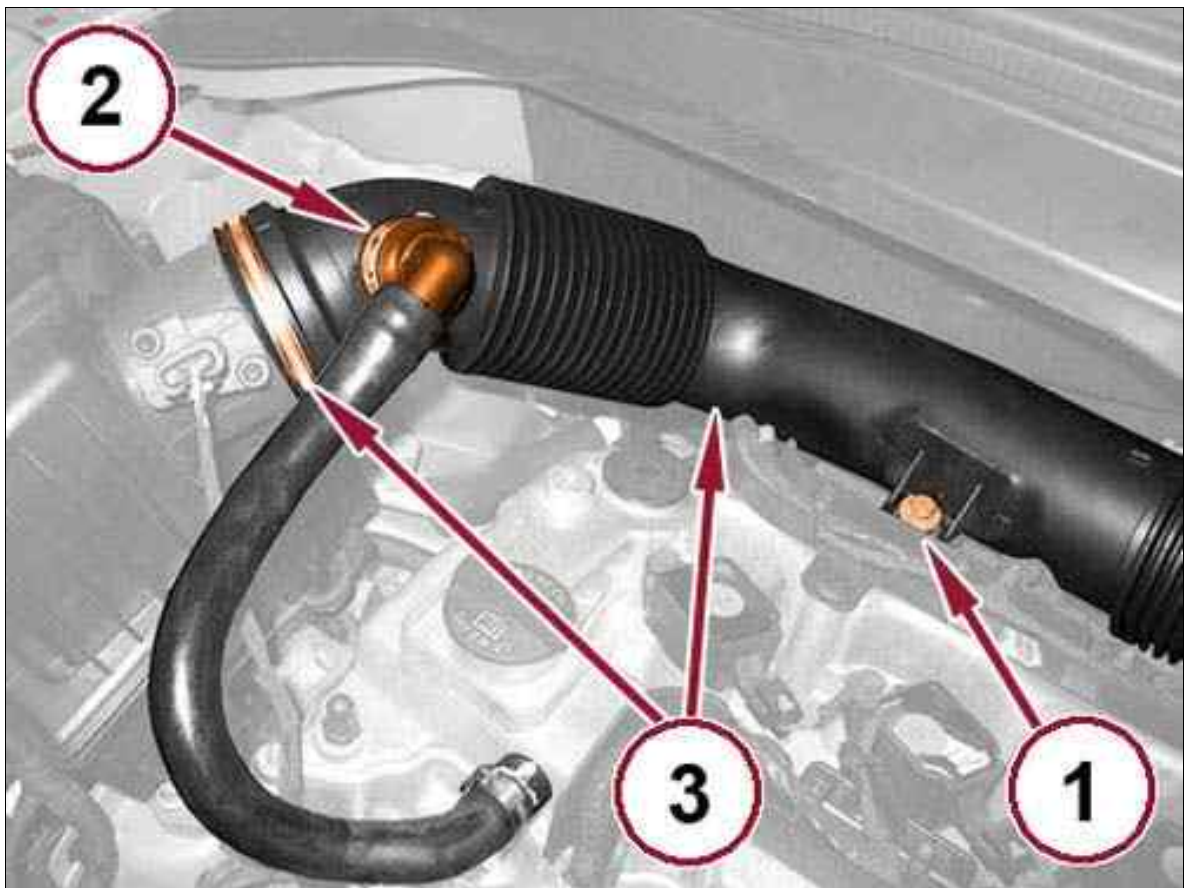
The arrow on the bearing cap "a" must point to the timing side.

3. Remove the 2020000090 (EMEA) or (special tool #10259B, Compressor, MultiAir® Spring) (NAFTA) tool (3) from the MULTIAIR actuator.

4. Install the timing belt. Refer to CHAIN AND SPROCKETS, TIMING .
5. Install the cylinder head cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL AND INSTALLATION .
6. Install the vacuum pump. Refer to PUMP, ELECTRIC VACUUM, REMOVAL AND INSTALLATION .
7. Install the Powertrain Control Module (PCM). Refer to MODULE, POWERTRAIN CONTROL, REMOVAL AND INSTALLATION .
8. Install the air cleaner assembly. Refer to BODY, AIR CLEANER, REMOVAL AND INSTALLATION .
9. Install the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
10. Connect the negative battery cable.

CYLINDER HEAD > COVER(S), CYLINDER HEAD > REMOVAL AND INSTALLATION > REMOVAL - 2.4L MULTIAIR2

Fig 1: Clean Air Hose Bolt, Clamp & Engine Oil Vapor Hose Quick Coupling

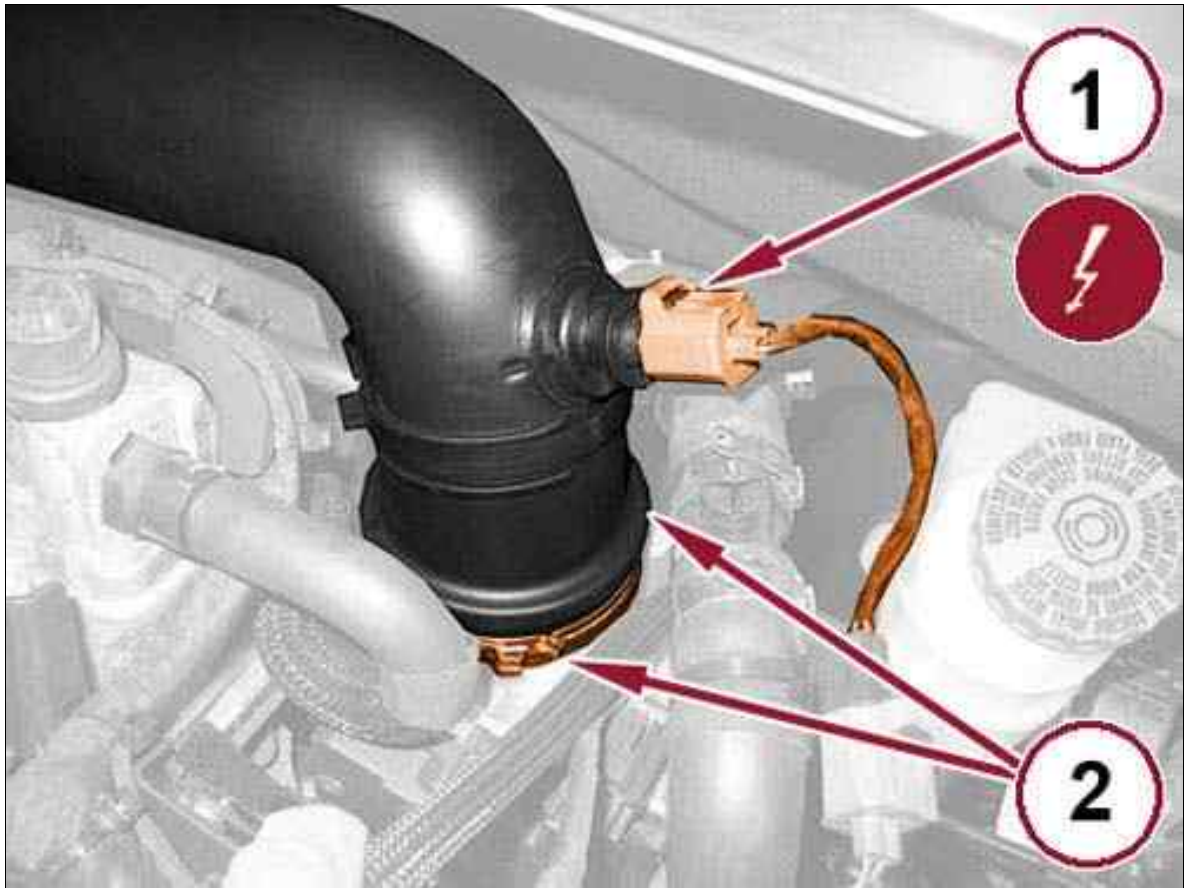


Courtesy of CHRYSLER GROUP, LLC

1. Remove the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .

2. Remove the retaining screw (1) for the clean air hose.
3. Disconnect the engine oil vapor hose quick coupling (2).
4. Loosen the clamp (3) and disconnect the clean air hose (3) from the air filter housing.

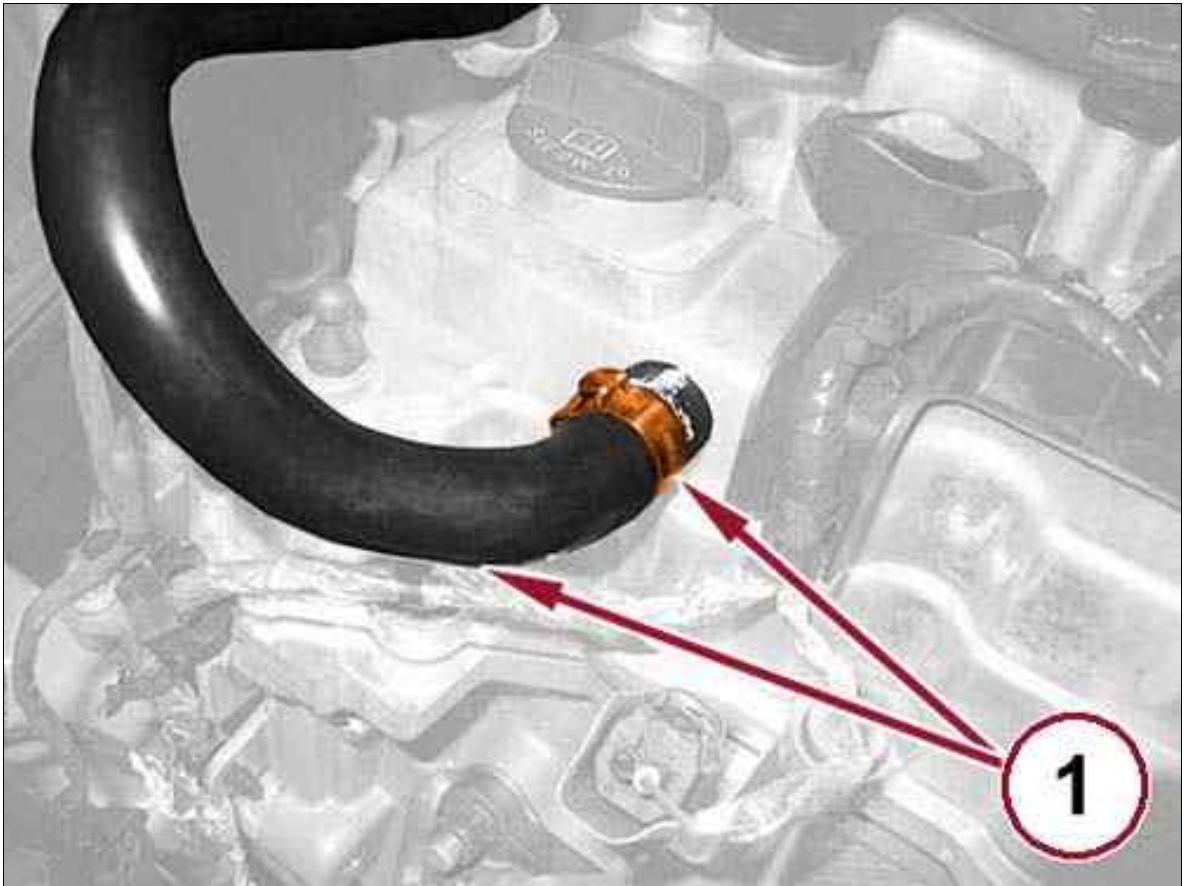
Fig 2: Intake Air Temperature Sensor Wire Harness Connector, Clean Air Hose & Clamp



Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the wire harness connector (1) from the intake air temperature sensor.
6. Loosen the clamp (2) and remove the clean air hose from the engine compartment.

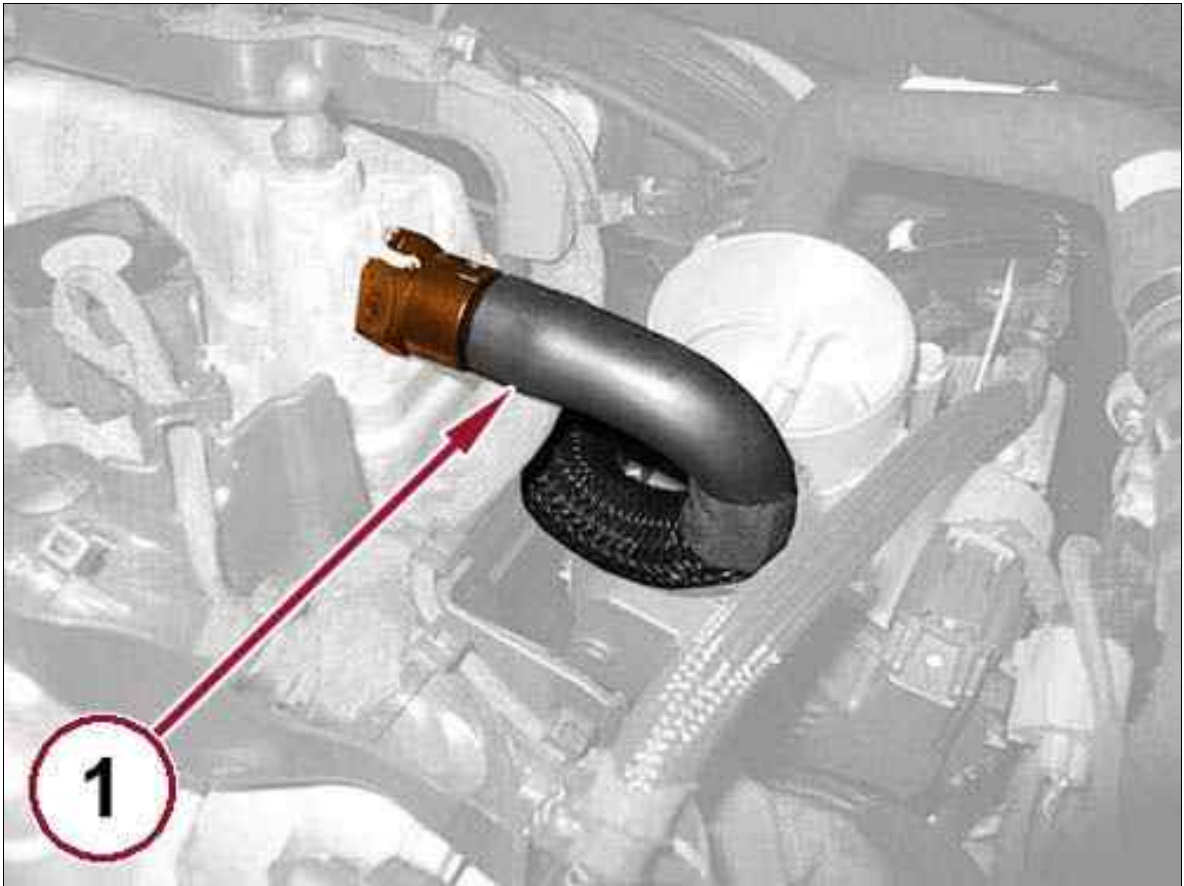
Fig 3: Air Filter To Valve Cover Hose & Clamp



Courtesy of CHRYSLER GROUP, LLC

7. Loosen the clamp (1) and remove the hose that delivers clean air from the air filter to the valve cover.

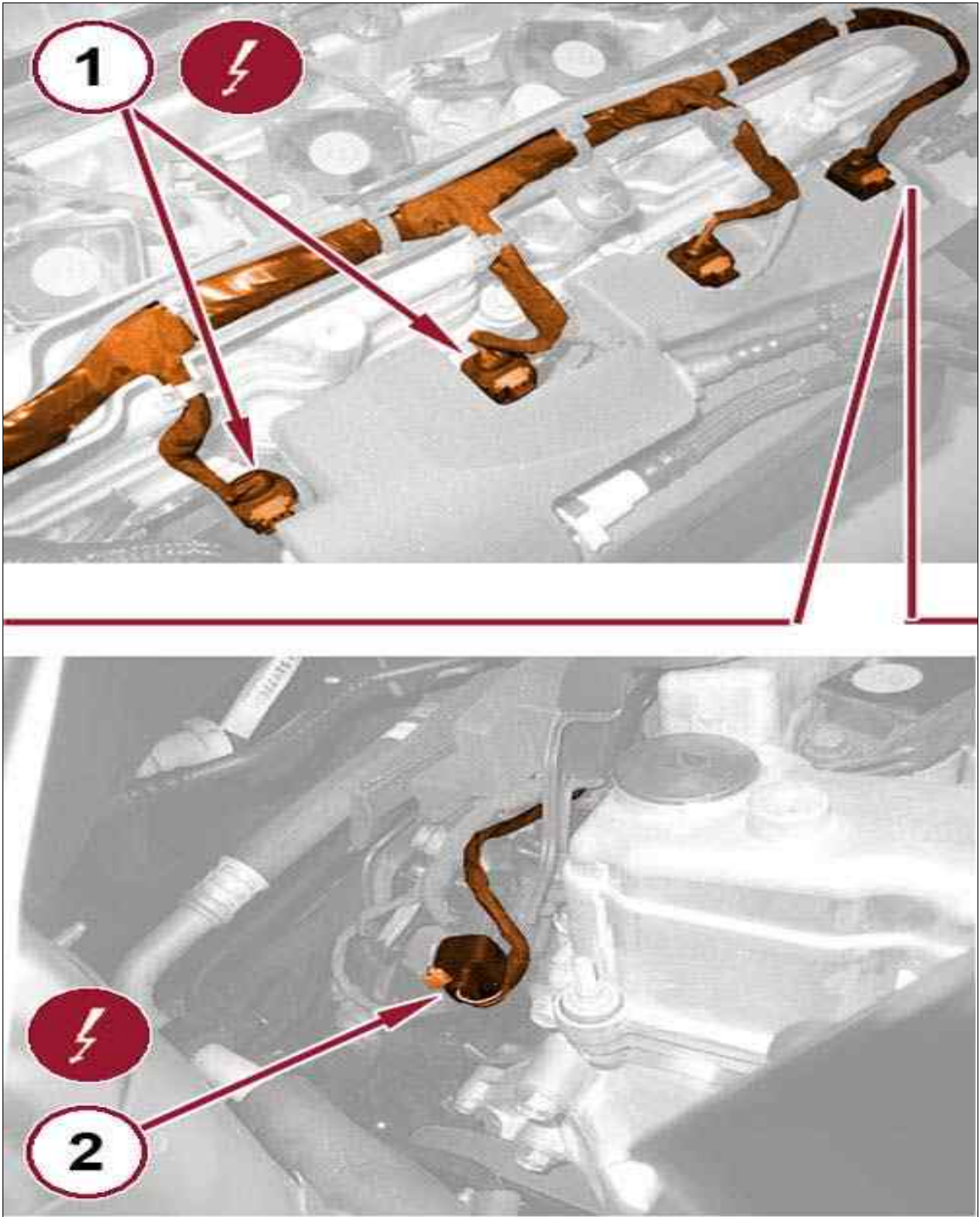
Fig 4: Oil Vapor To Air Capacity Airbox Pipe



Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the pipe (1) that delivers oil vapor to the air capacity airbox.

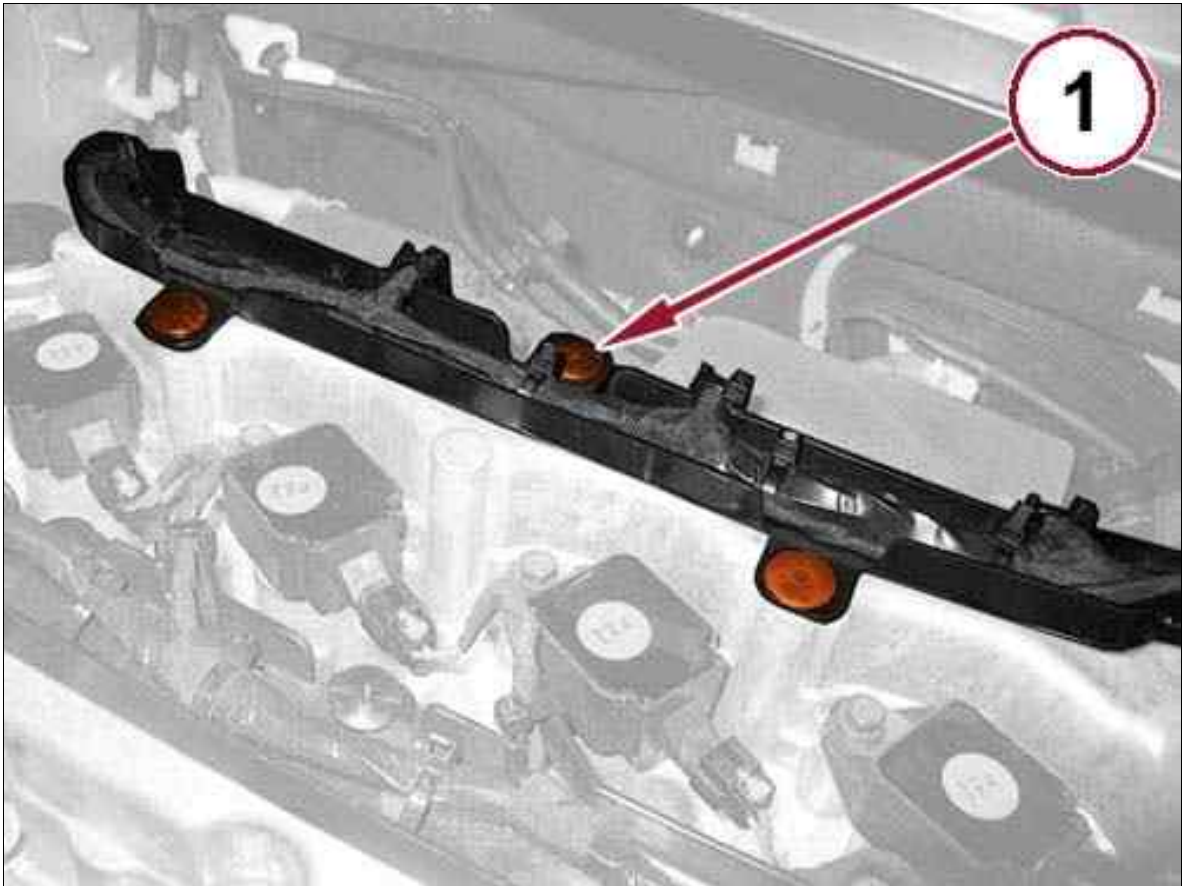
Fig 5: Fuel Injectors & Wire Harness Connectors



Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the wire harness connectors (1) of the fuel injectors.
10. Disconnect the wire harness connector (2) of the module UniAir.

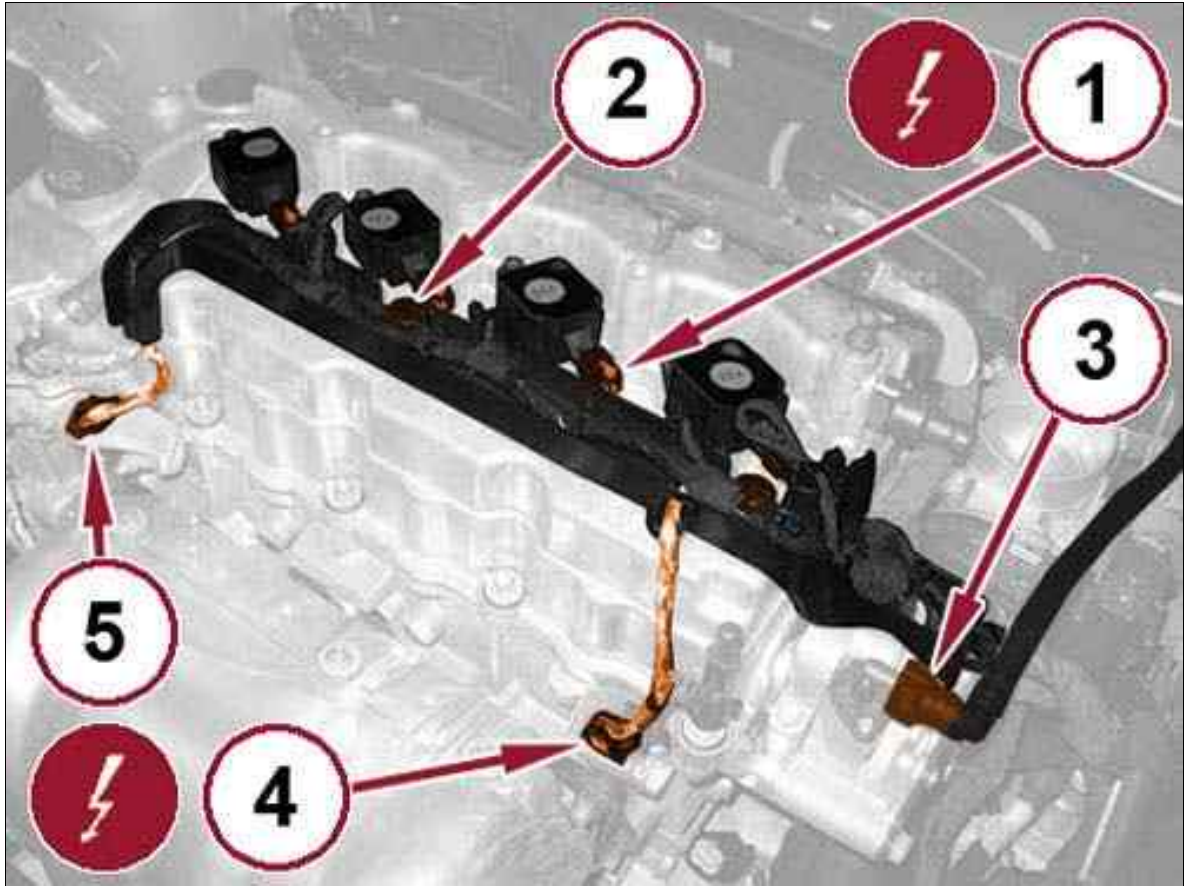
Fig 6: Wiring Duct On Intake Side & Bolts



Courtesy of CHRYSLER GROUP, LLC

11. Remove the screws (1) securing the wiring duct on the intake side.

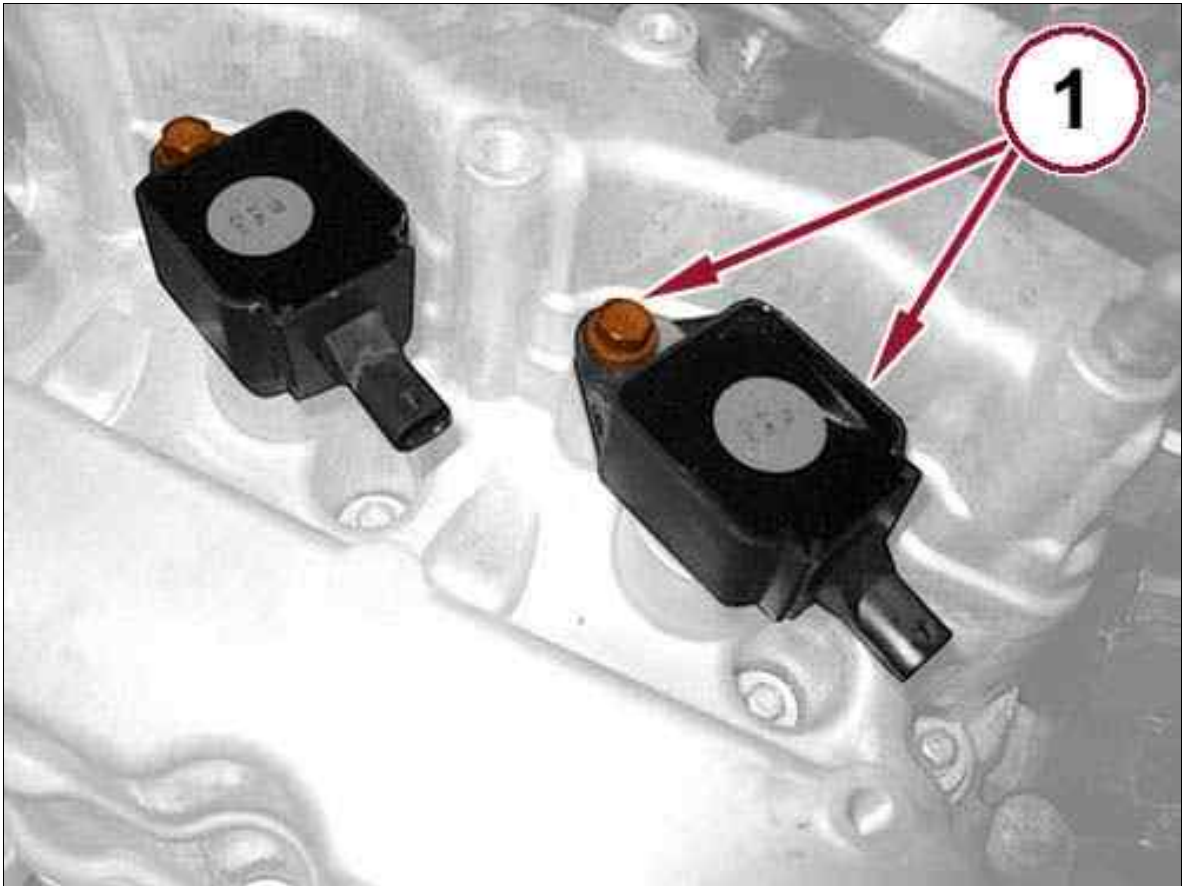
Fig 7: Ignition Coils Wire Harness Connectors, Wiring Duct On Exhaust Side Bolts & Ground Terminal



Courtesy of CHRYSLER GROUP, LLC

12. Disconnect the wire harness connectors (1) from the ignition coils.
13. Remove the screws (2) securing the wiring duct on the exhaust side.
14. Disconnect the brake booster vacuum pipe quick coupling (3) from the vacuum pump.
15. Disconnect the wire harness connector (4) from the phase sensor.
16. Disconnect the ground terminal (5) and position the wire harness aside.

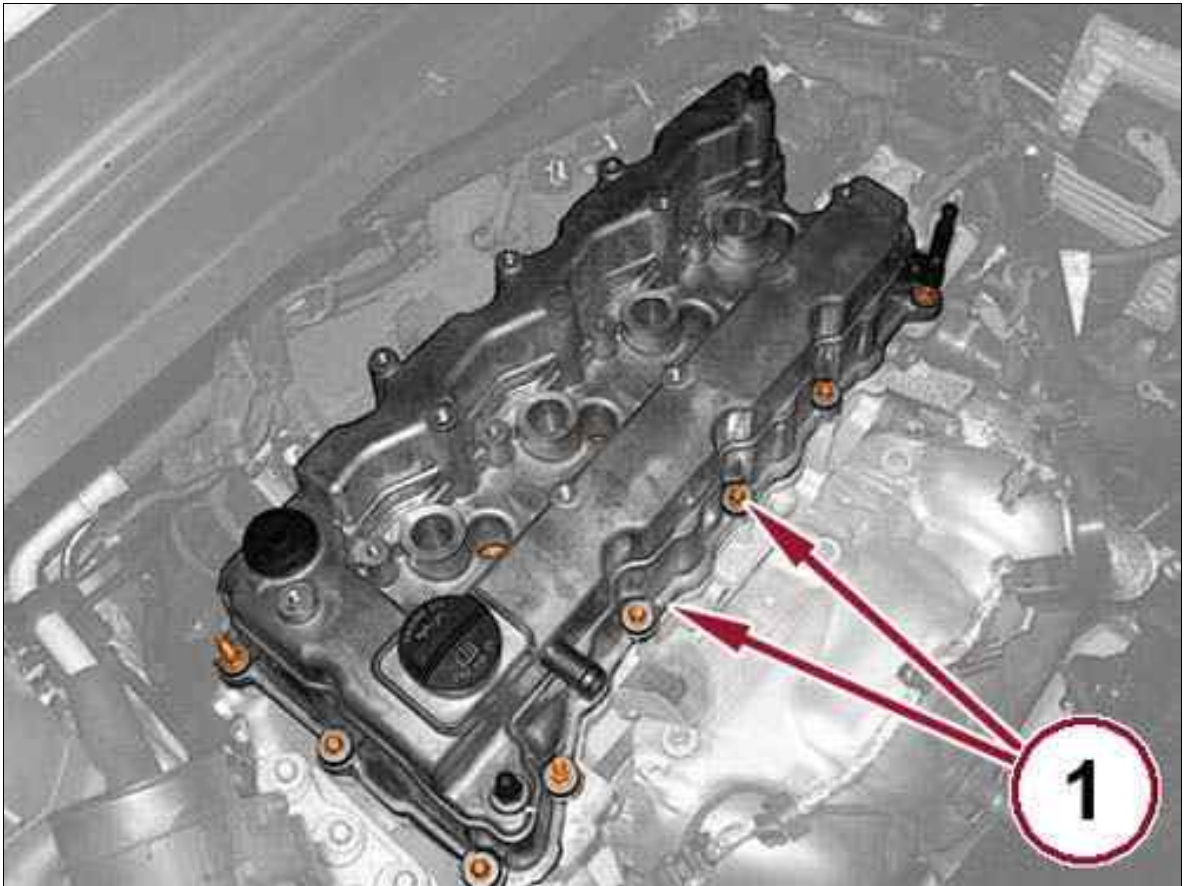
Fig 8: Ignition Coils & Bolts



Courtesy of CHRYSLER GROUP, LLC

17. Remove the screws (1) and remove the ignition coils.

Fig 9: Valve Cover Bolts



Courtesy of CHRYSLER GROUP, LLC

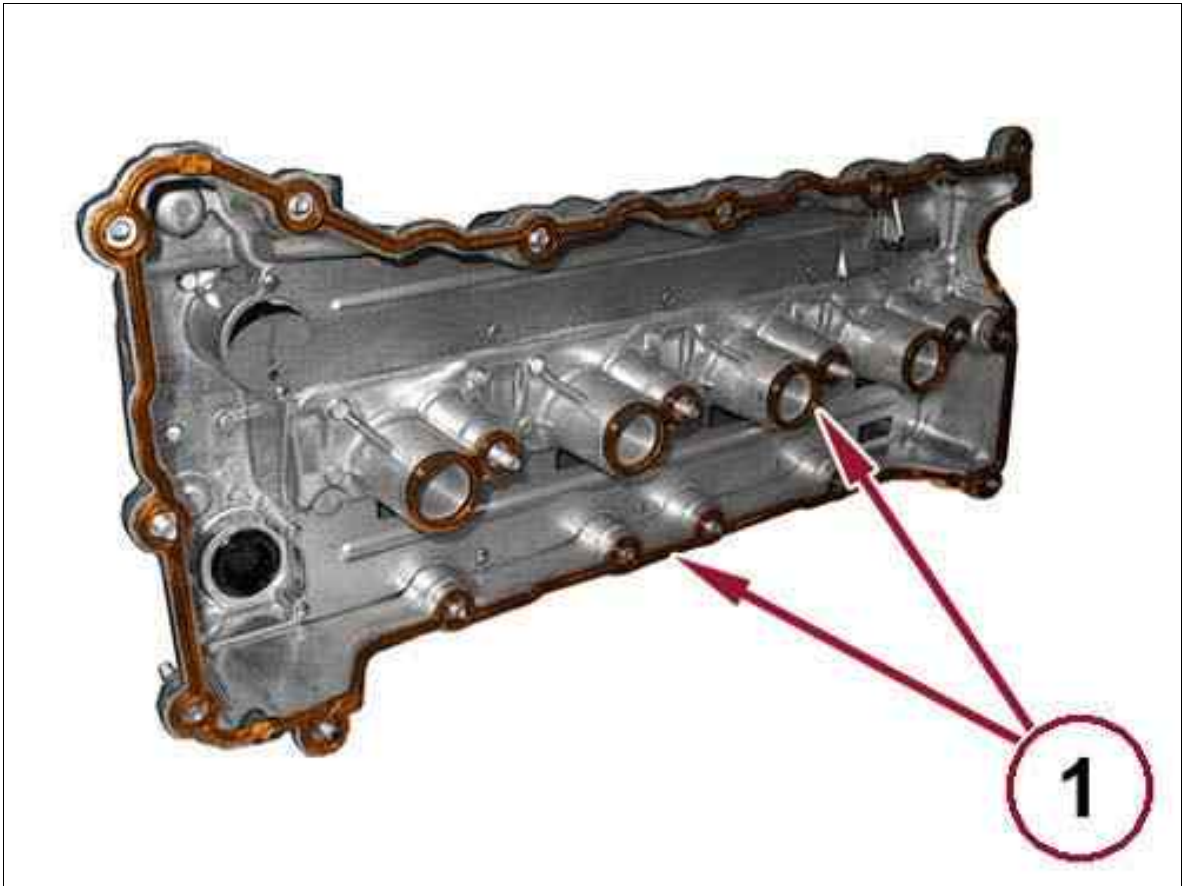
18. Remove the screws (1) and remove the valve cover and discard the valve cover gasket.

 NOTE:

Before removing the valve cover, mark the position of the studed screws for ease of installation.

CYLINDER HEAD > COVER(S), CYLINDER HEAD > REMOVAL AND INSTALLATION > INSTALLATION - 2.4L MULTIAIR2

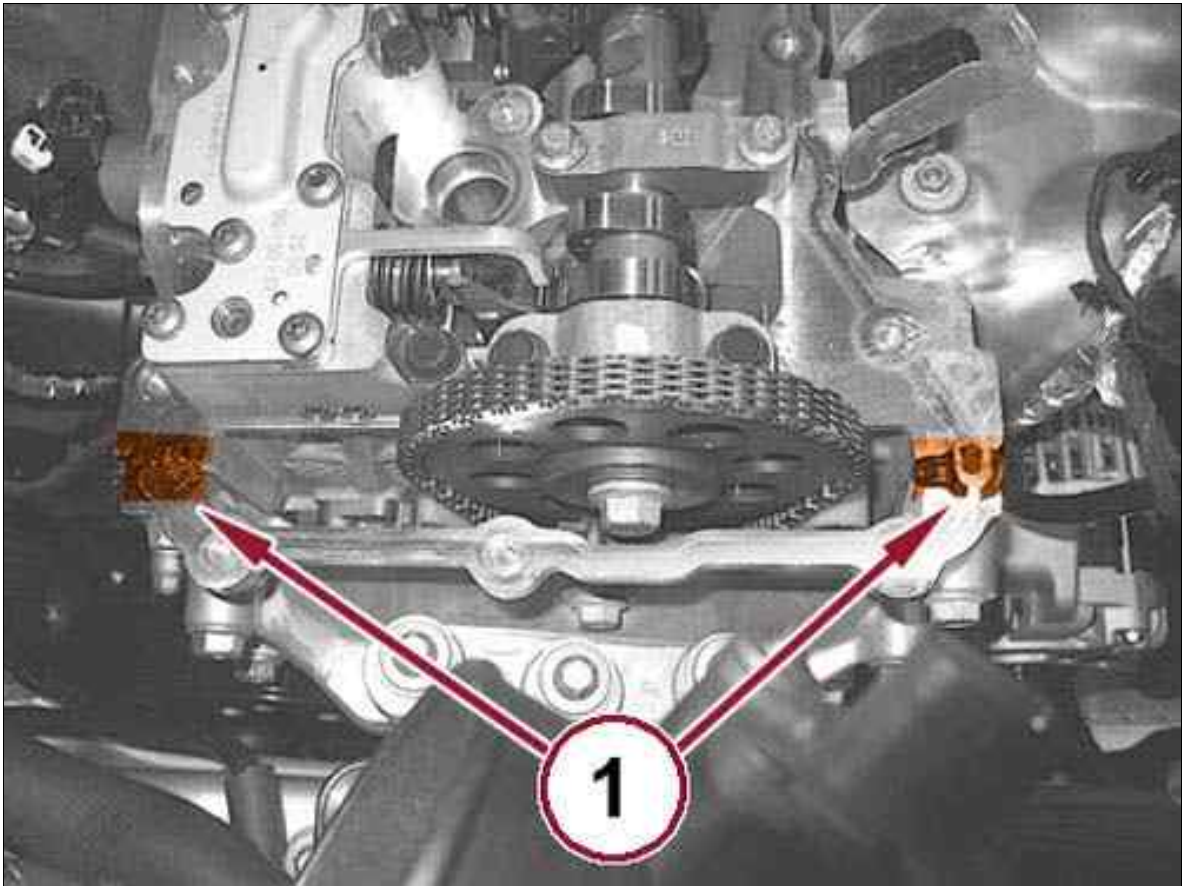
Fig 1: Valve Cover Seals



Courtesy of CHRYSLER GROUP, LLC

1. Install new seals on the valve cover.

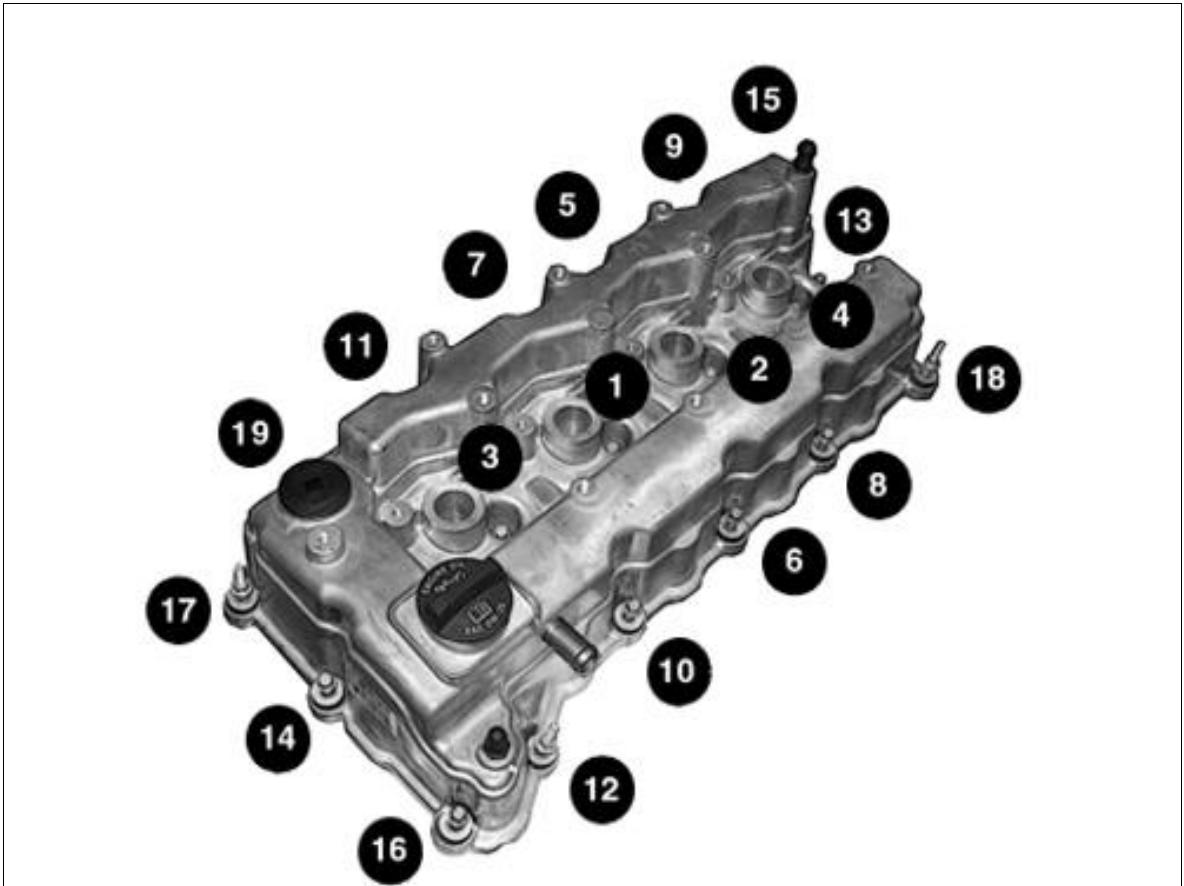
Fig 2: Placing Sealant On Cylinder Head At Specified Locations



Courtesy of CHRYSLER GROUP, LLC

2. Apply sealant in the points shown in illustration (1).

Fig 3: Valve Cover Bolts Tightening Sequence



Courtesy of CHRYSLER GROUP, LLC

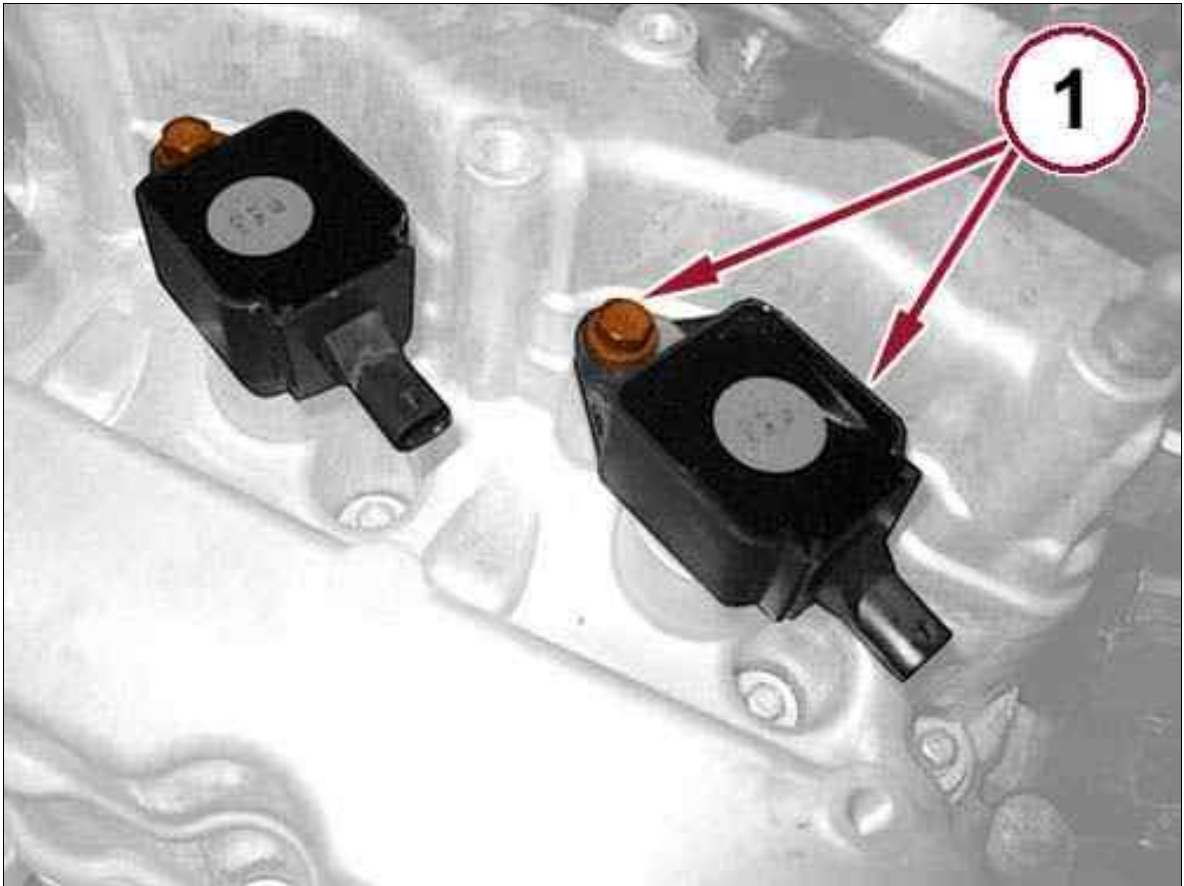


NOTE:

Place the studded screws in the positions previously marked for installation.

3. Put into place the valve cover and tighten the screws in the order shown in illustration. Tighten the screws to the proper specification. Refer to TORQUE SPECIFICATIONS .

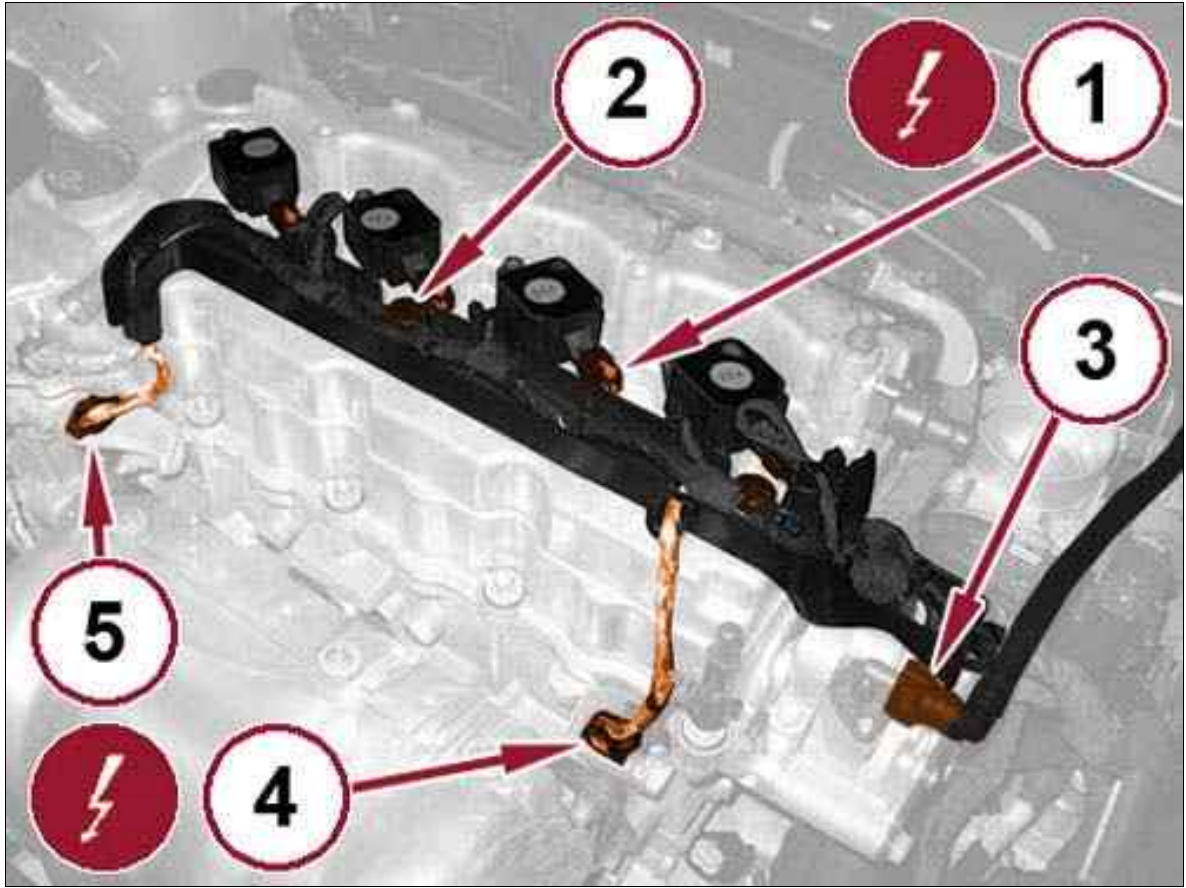
Fig 4: Ignition Coils & Bolts



Courtesy of CHRYSLER GROUP, LLC

4. Install the ignition coils (1) and tighten the screws (1) to the proper specification. Refer to TORQUE SPECIFICATIONS .

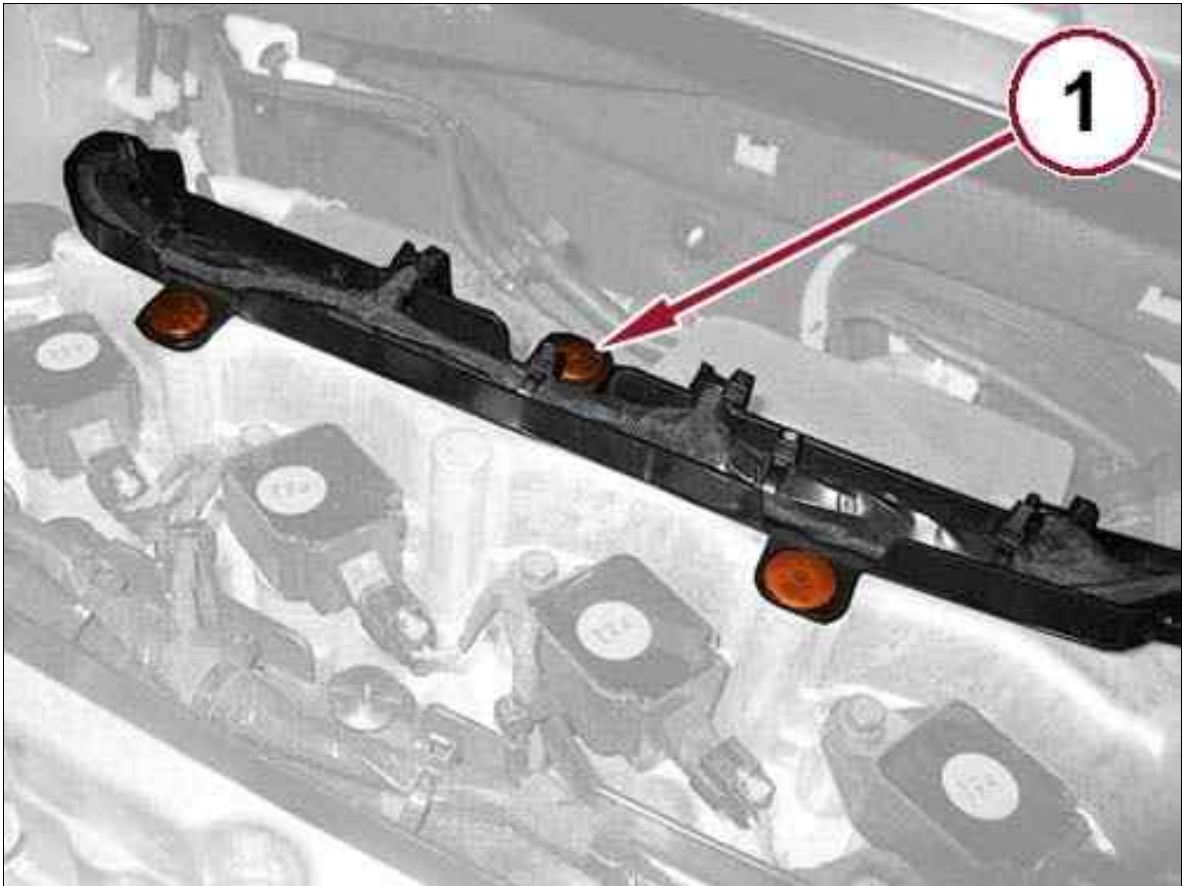
Fig 5: Ignition Coils Wire Harness Connectors, Wiring Duct On Exhaust Side Bolts & Ground Terminal



Courtesy of CHRYSLER GROUP, LLC

5. Put the engine wiring harness in place and connect the wire harness connectors for the ground terminal (5) and the phase sensor (4).
6. Connect the brake booster vacuum pipe quick coupling (3) to the vacuum pump.
7. Install the screws (2) securing the wiring duct on the exhaust side.
8. Connect the wire harness connectors (1) to the ignition coils.

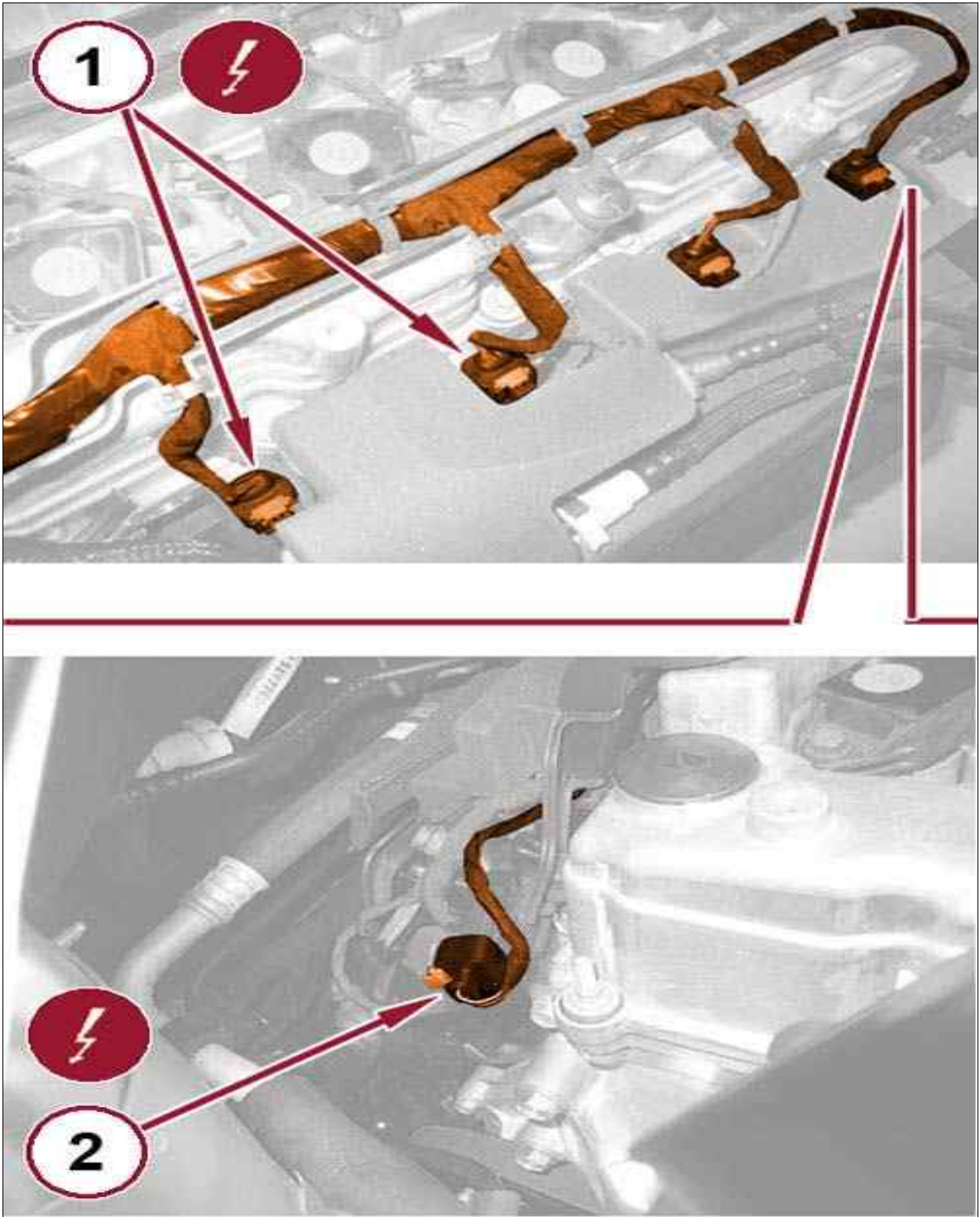
Fig 6: Wiring Duct On Intake Side & Bolts



Courtesy of CHRYSLER GROUP, LLC

9. Install the screws (1) securing the wiring duct on the intake side.

Fig 7: Fuel Injectors & Wire Harness Connectors

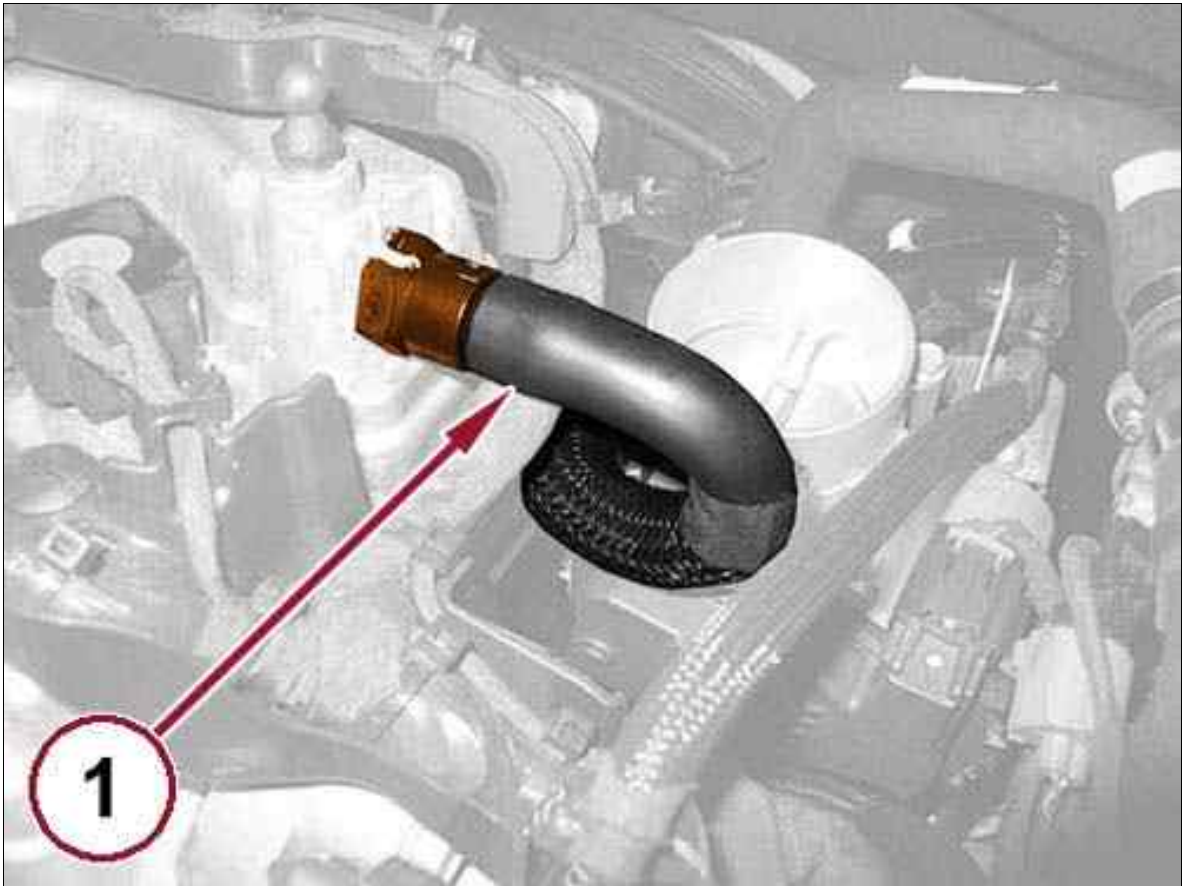


Courtesy of CHRYSLER GROUP, LLC

10. Connect the wire harness connector (2) to the module UniAir.

11. Connect the wire harness connectors (1) to the fuel injectors.

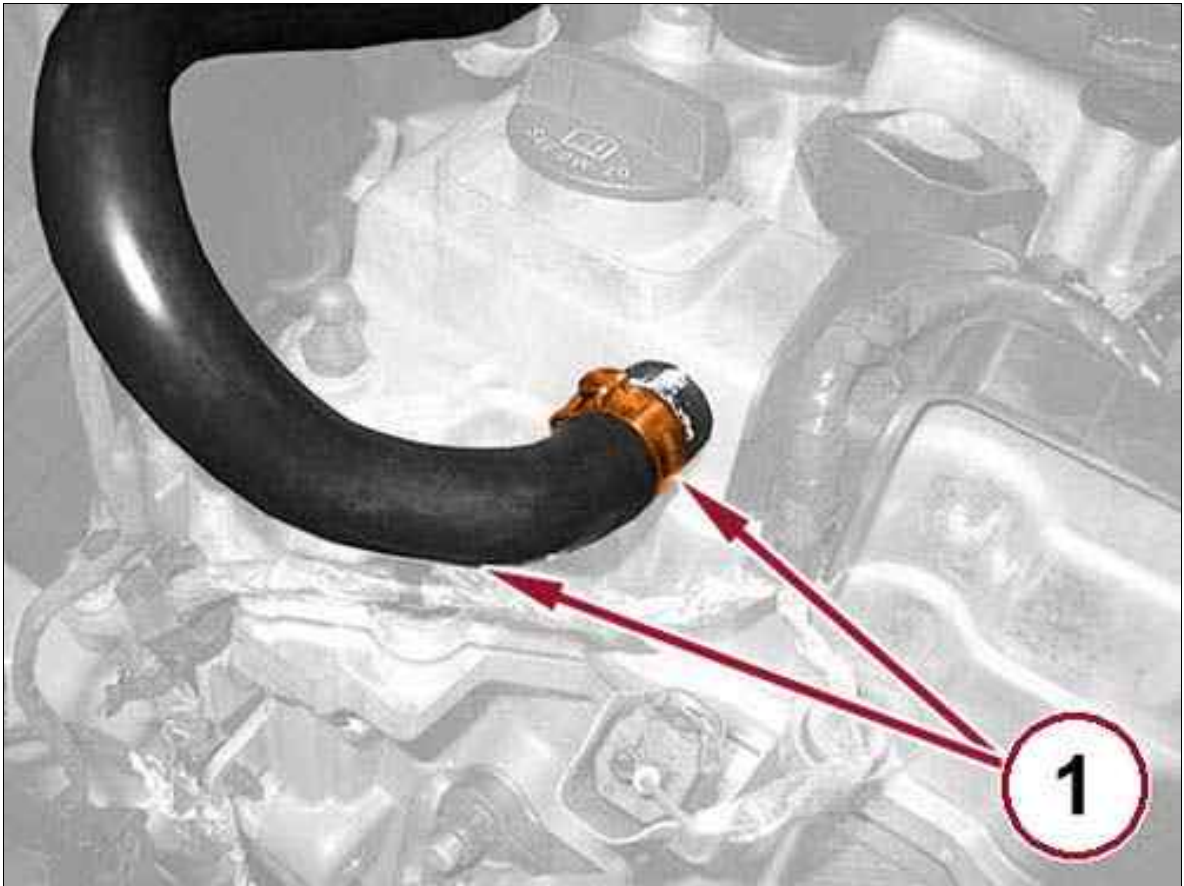
Fig 8: Oil Vapor To Air Capacity Airbox Pipe



Courtesy of CHRYSLER GROUP, LLC

12. Connect the pipe (1) that delivers oil vapor to the air capacity airbox.

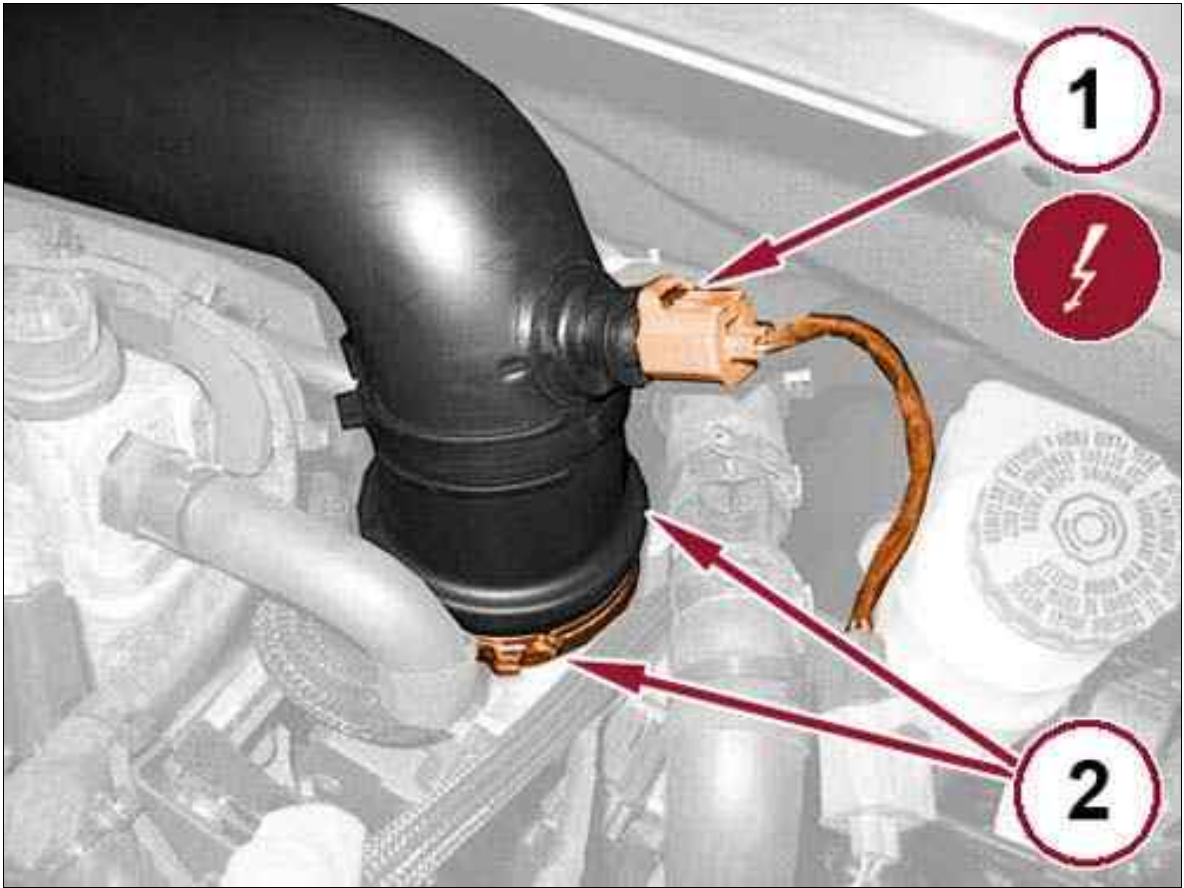
Fig 9: Air Filter To Valve Cover Hose & Clamp



Courtesy of CHRYSLER GROUP, LLC

13. Connect the hose that delivers clean air from the air filter to the valve cover and tighten the clamp (1) securely.

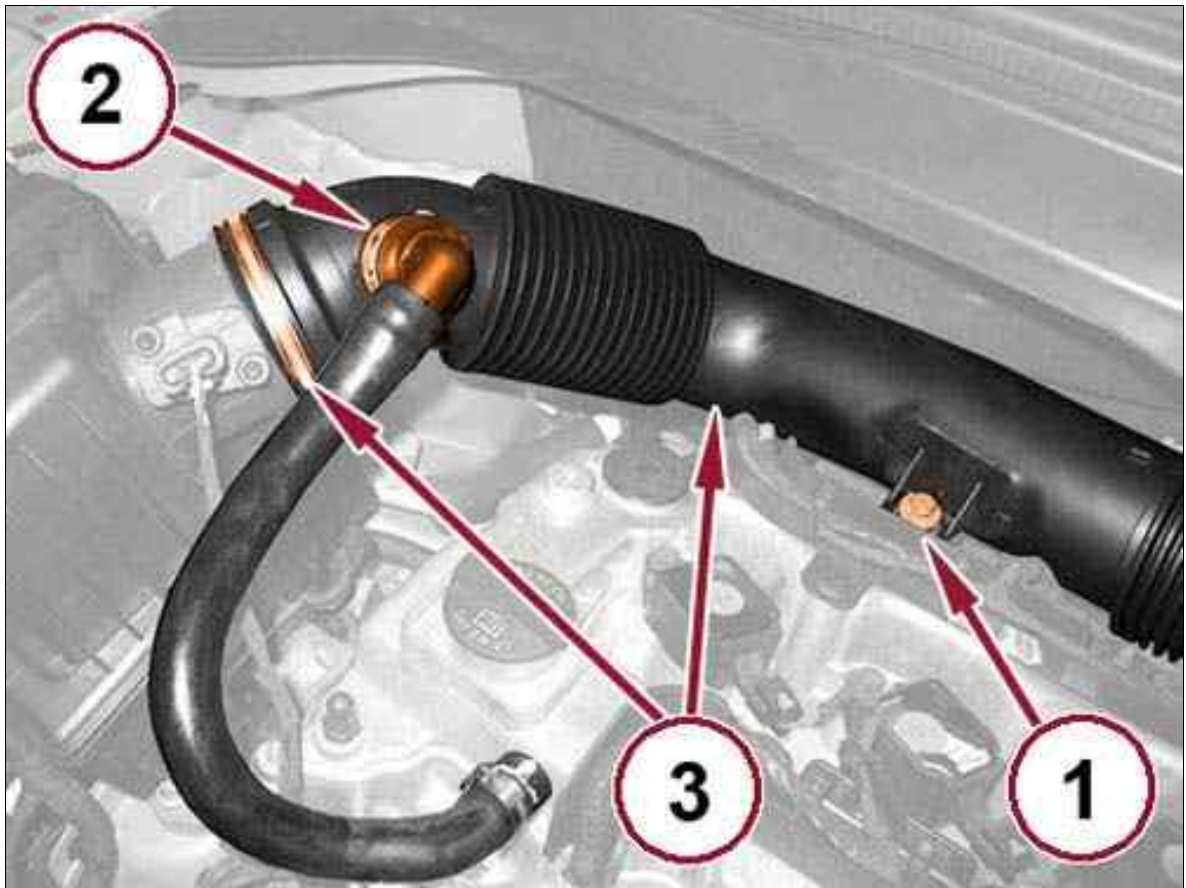
Fig 10: Intake Air Temperature Sensor Wire Harness Connector, Clean Air Hose & Clamp



Courtesy of CHRYSLER GROUP, LLC

14. Connect the clean air hose from the engine compartment and tighten the clamp (2) securely.
15. Connect the wire harness connector (1) to the intake air temperature sensor.

Fig 11: Clean Air Hose Bolt, Clamp & Engine Oil Vapor Hose Quick Coupling



Courtesy of CHRYSLER GROUP, LLC

16. Connect the clean air hose (3) to the air filter housing and tighten the clamp (3) securely.
17. Connect the engine oil vapor hose quick coupling (2).
18. Install the retaining screw (1) for the clean air hose.
19. Install the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .

CYLINDER HEAD > LIFTER(S), HYDRAULIC > DIAGNOSIS AND TESTING > DIAGNOSIS AND TESTING - LASH ADJUSTER (TAPPET) NOISE

Proper noise diagnosis is essential in locating the source of an NVH complaint. Locating a hydraulic lash adjuster (tappet) type noise can sometimes be difficult. As a result, an initial misdiagnosis may occur.

Refer to the following chart for possible causes and correction of a lash adjuster (tappet) type noise.

LASH ADJUSTER (TAPPET) NOISE CHART

POSSIBLE CAUSES	CORRECTION
1. Engine oil level-too high or too low. This may	1. Check and correct the engine oil level.

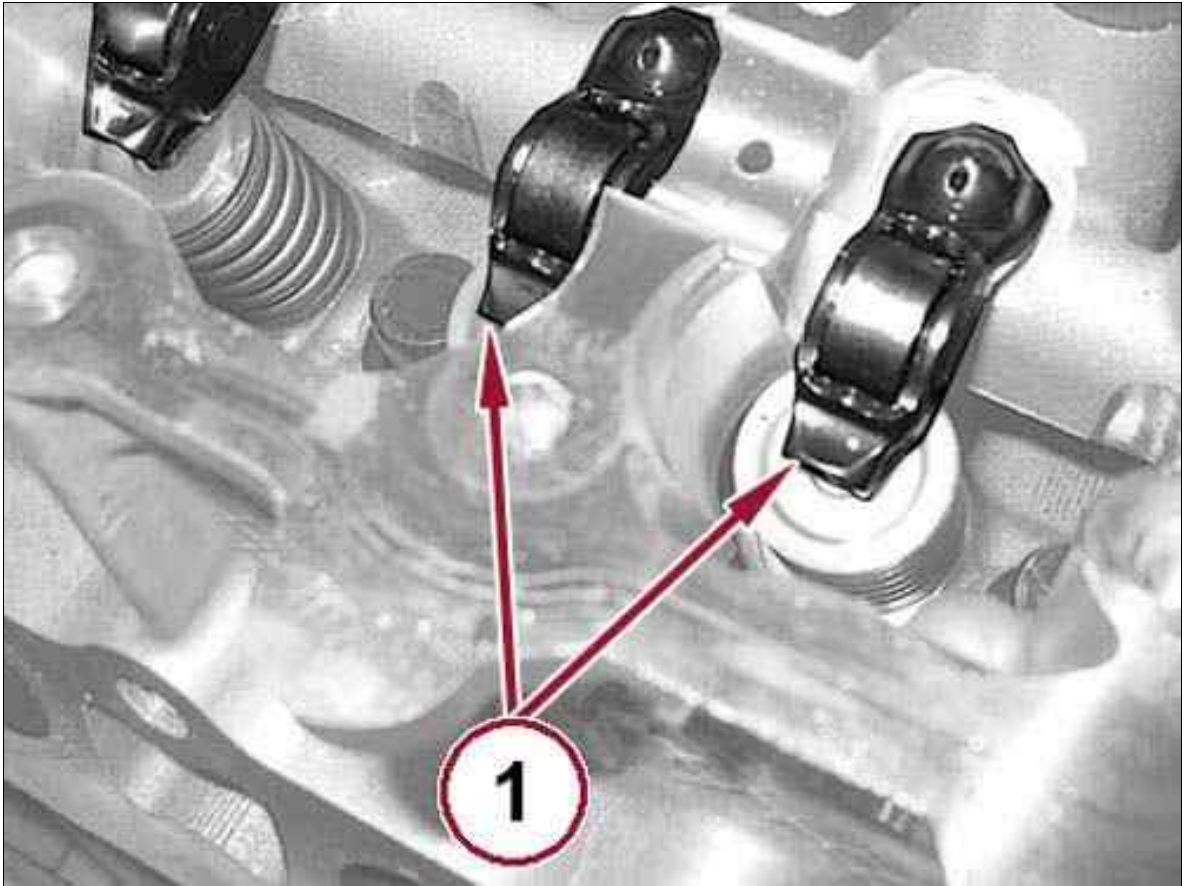
allow aerated oil to enter the adjusters and cause them to be spongy.	
2. Insufficient running time after rebuilding a cylinder head.	2. Low speed running of up to 1 hour may be required to fully evacuate trapped air from the valve train system. During this time, turn engine off and let set for a few minutes before restarting. Repeat this several times after engine has reached normal operating temperature.
3. Air trapped in the lash adjuster (after 1 hour of run time) or possible faulty lash adjuster.	3. See below: (a) Check lash adjusters for sponginess while installed in the cylinder head. Depress the lash adjuster. Normal adjusters should feel very firm. Very spongy adjusters can be bottomed out easily. (b) If the lash adjuster(s) are still spongy, replace the lash adjuster(s). Refer to LIFTER(S), HYDRAULIC, REMOVAL AND INSTALLATION .
4. Low oil pressure.	4. See below: (a) Check and correct the engine oil level. (b) Check the engine oil pressure. Refer to LUBRICATION . (c) Check for excessive main bearing clearance and correct. Refer to ENGINE BLOCK . (d) Check for a worn oil pump.
5. Oil screen in the cylinder head or oil passage to the cylinder head(s) plugged with debris.	5. Check cylinder head oil passages for blockage. Clean or replace as necessary.
6. Worn valve guide(s).	6. Measure valve stem-to-guide clearance. Refer to CYLINDER HEAD .
7. Rocker arm ears contacting valve spring retainer.	7. Visually inspect the alignment of the Variable Valve Actuation (VVA) plungers. Refer to ASSEMBLY, VARIABLE VALVE ACTUATION, REMOVAL AND INSTALLATION .
8. Rocker arm loose, adjuster stuck or at maximum extension and still leaves lash in the system.	8. Check for bent valve stem or sticking valve guide. Refer to CYLINDER HEAD .
9. Oil leak or excessive cam bearing wear in the cylinder head.	9. Check camshaft lobe and bearing journal diameters. Refer to INSPECTION .
10. Collapsed lash adjuster due to debris ingestion.	• Check lash adjuster while in the cylinder head. A normal lash adjuster will feel very firm. A lash adjuster with debris will be collapsed and will be very spongy. • If the lash adjusters are easily collapsed, clean debris from the engine and replace the lash

adjusters. Refer to LIFTER(S), HYDRAULIC, REMOVAL AND INSTALLATION .

CYLINDER HEAD > LIFTER(S), HYDRAULIC > REMOVAL AND INSTALLATION > 2.4L > REMOVAL

1. Remove the camshaft. Refer to CAMSHAFT, ENGINE, REMOVAL AND INSTALLATION .

Fig 1: Hydraulic Tappets



Courtesy of CHRYSLER GROUP, LLC

2. Remove the hydraulic tappets (1).

CYLINDER HEAD > LIFTER(S), HYDRAULIC > REMOVAL AND INSTALLATION > 2.4L > INSTALLATION

1. Install the hydraulic tappets.
2. Install the camshaft. Refer to CAMSHAFT, ENGINE, REMOVAL AND INSTALLATION .

CYLINDER HEAD > ASSEMBLY, VARIABLE VALVE ACTUATION > INSPECTION > INSPECTION

Because variable valve actuation is so closely monitored, the diagnostics of the system are strongly Diagnostic Trouble Code (DTC) driven. If the system does not perform according to design, many DTC's may be produced from a condition in the variable valve actuation system.

The variable valve actuation module includes very few serviceable components. The module has no internal components that are serviceable. The following components are serviceable:

- Valve rocker arms.
- Oil temperature sensor.
- Assembly gasket.
- Locating dowels.

CYLINDER HEAD > ASSEMBLY, VARIABLE VALVE ACTUATION > REMOVAL AND INSTALLATION > 2.4L > REMOVAL

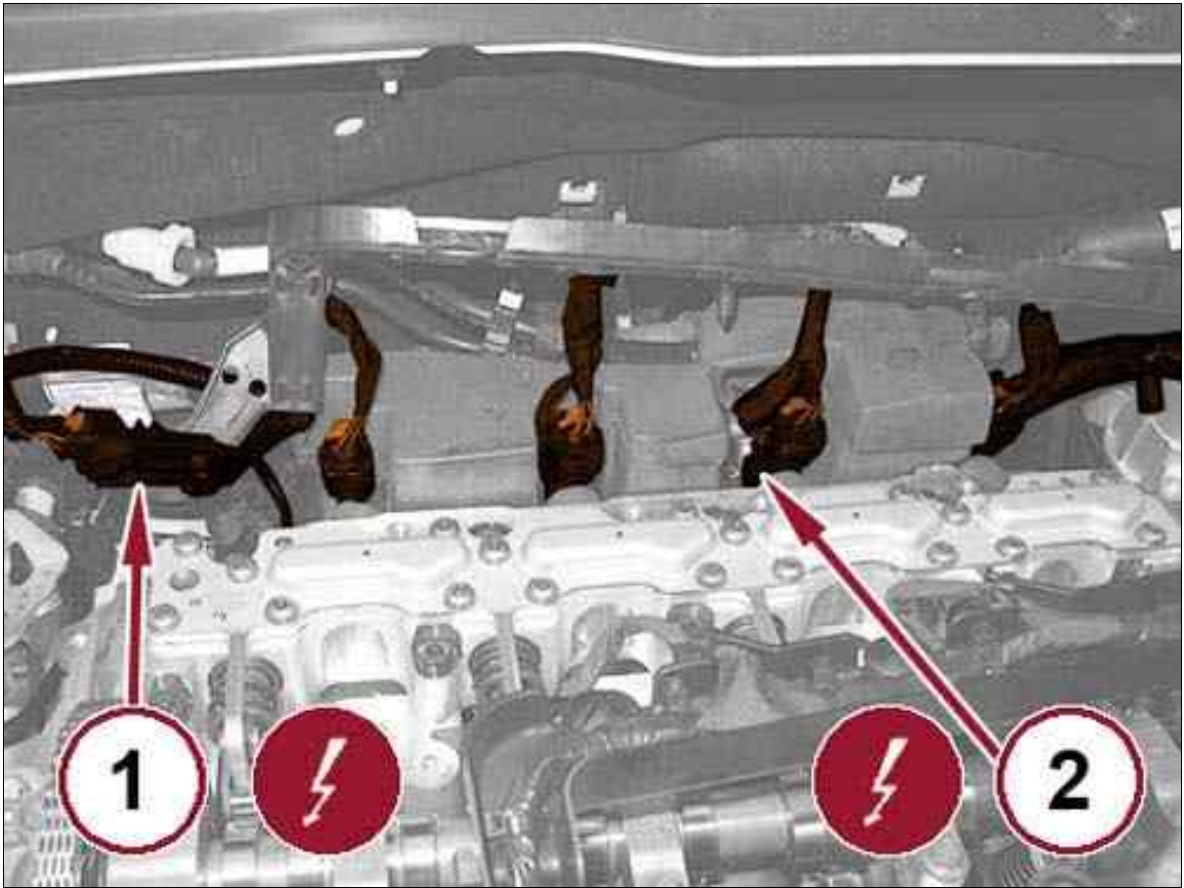


NOTE:

During all the handling operations, the MUTIAIR actuator should not be overturned with hydraulic tappets above.

1. Remove the cylinder head cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL AND INSTALLATION .

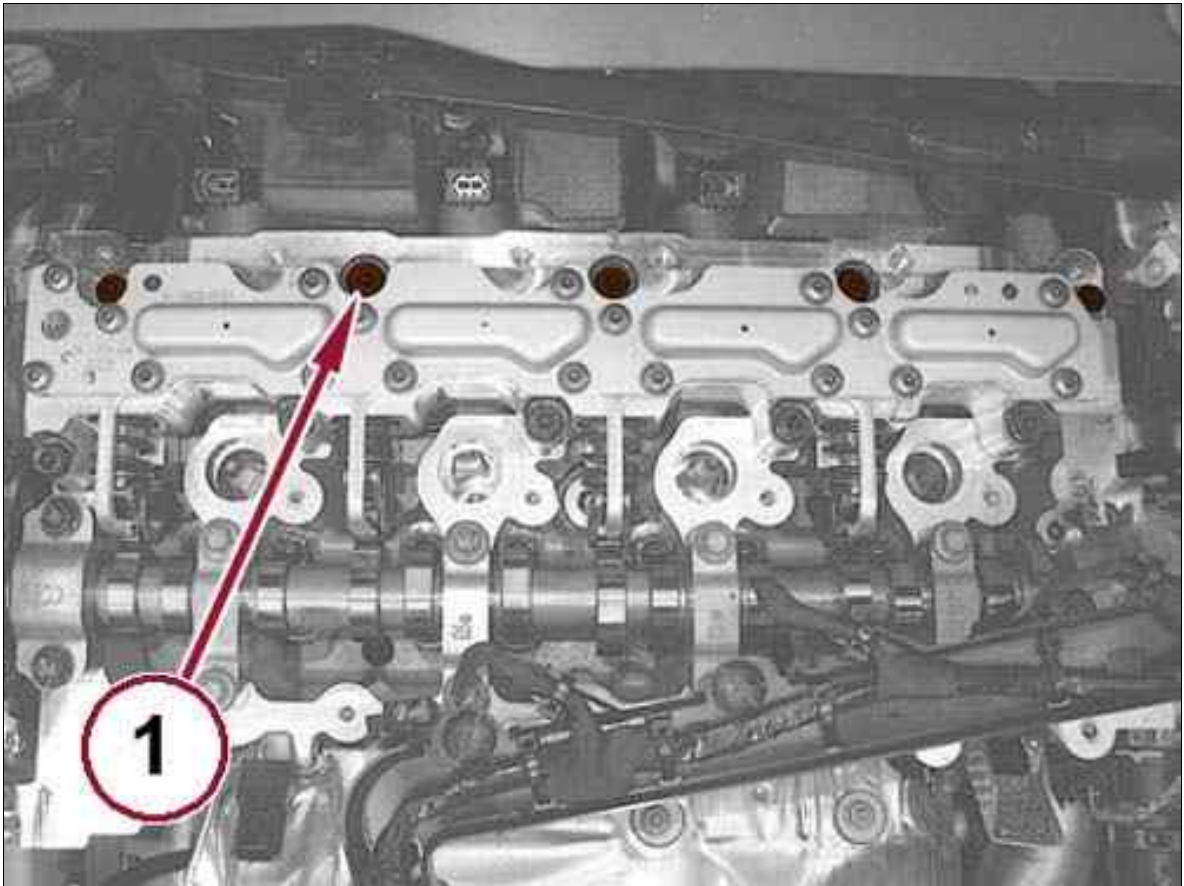
Fig 1: Oil Temperature Electrical Connector & MULTIAIR Actuator Electrical Connectors



Courtesy of CHRYSLER GROUP, LLC

2. Disconnect the oil temperature electrical connector (1) at the MULTIAIR actuator.
3. Disconnect the MULTIAIR actuator electrical connectors (2).

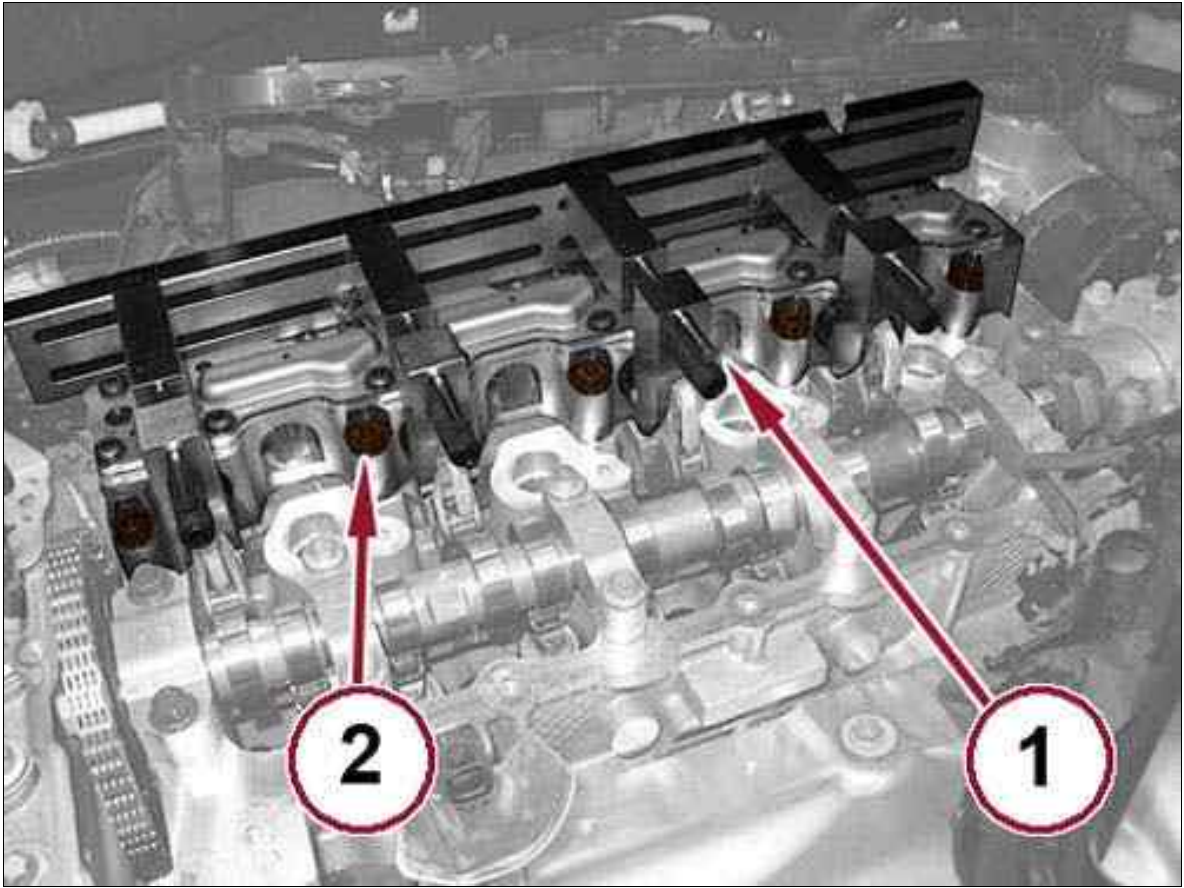
Fig 2: Rear MULTIAIR Actuator To Cylinder Head Bolt



Courtesy of CHRYSLER GROUP, LLC

4. Remove the rear MULTIAIR actuator to cylinder head bolts (1).

Fig 3: Compressing MULTIAIR Actuator Spring Using Special Tool & Locating Front MULTIAIR Actuator To Cylinder Head Bolt



Courtesy of CHRYSLER GROUP, LLC

5. Install the 2020000090 (EMEA) or (special tool #10259B, Compressor, MultiAir® Spring) (NAFTA) tool (1) on the MULTIAIR actuator and compress the springs.
6. Remove the front MULTIAIR actuator to cylinder head bolts (2), and remove the complete module from the cylinder head.
7. Remove the metal seal.

CYLINDER HEAD > ASSEMBLY, VARIABLE VALVE ACTUATION > REMOVAL AND INSTALLATION > 2.4L > INSTALLATION



NOTE:

During all the handling operations, the MUTIAIR actuator should not be overturned with hydraulic tappets above.

1. Install a **NEW** metal gasket on the cylinder head top.

2. Position the MULTIAIR actuator into the vehicle, and tighten the front MULTIAIR actuator to cylinder head bolts to the proper specification. Refer to TORQUE SPECIFICATIONS .
3. Remove the 2020000090 (EMEA) or (special tool #10259B, Compressor, MultiAir® Spring) (NAFTA) tool from the MULTIAIR actuator.
4. Install and tighten the rear MULTIAIR actuator to cylinder head bolts to the proper specification. Refer to TORQUE SPECIFICATIONS .
5. Connect the MULTIAIR actuator electrical connectors.
6. Connect the oil temperature electrical connector.
7. Install the cylinder head cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL AND INSTALLATION .

ENGINE BLOCK > STANDARD PROCEDURE > CYLINDER BORE DEGLAZING

Before deglazing, mask the crankcase area to keep abrasive materials from entering the engine lower end. Tape off any openings to prevent abrasive material from entering the coolant and oil circuits.



CAUTION:

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

1. Select an appropriate size flexible ball hone.

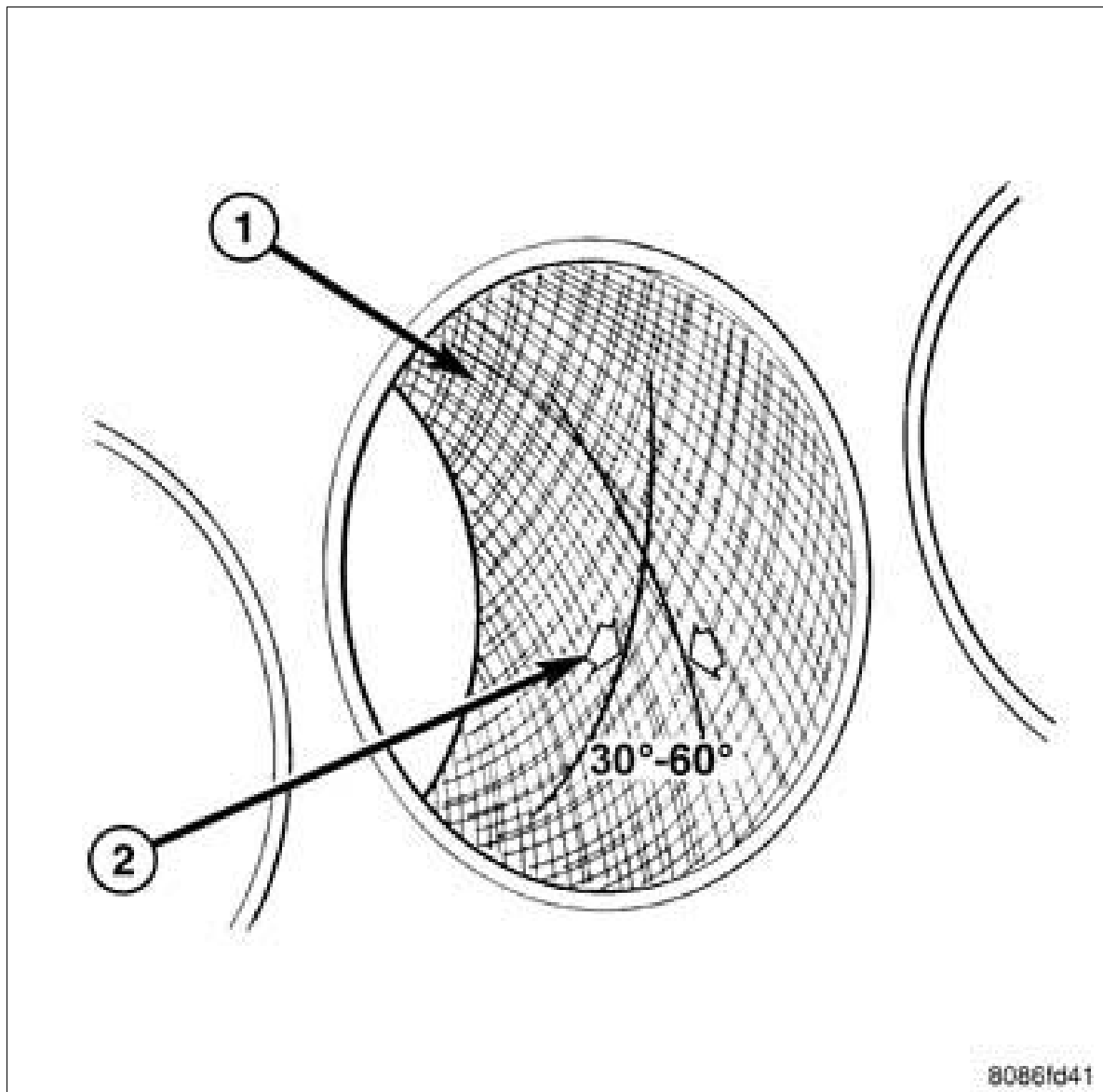


CAUTION:

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

2. Deglazing of the cylinder walls may be done if the cylinder bore is straight and round. About 20-60 strokes, depending on the condition of the cylinder bore, will be sufficient to provide a satisfactory surface. Use a light **honing** oil, available from major oil distributors.

Fig 1: Identifying Cylinder Bore Crosshatch Pattern



Courtesy of CHRYSLER GROUP, LLC

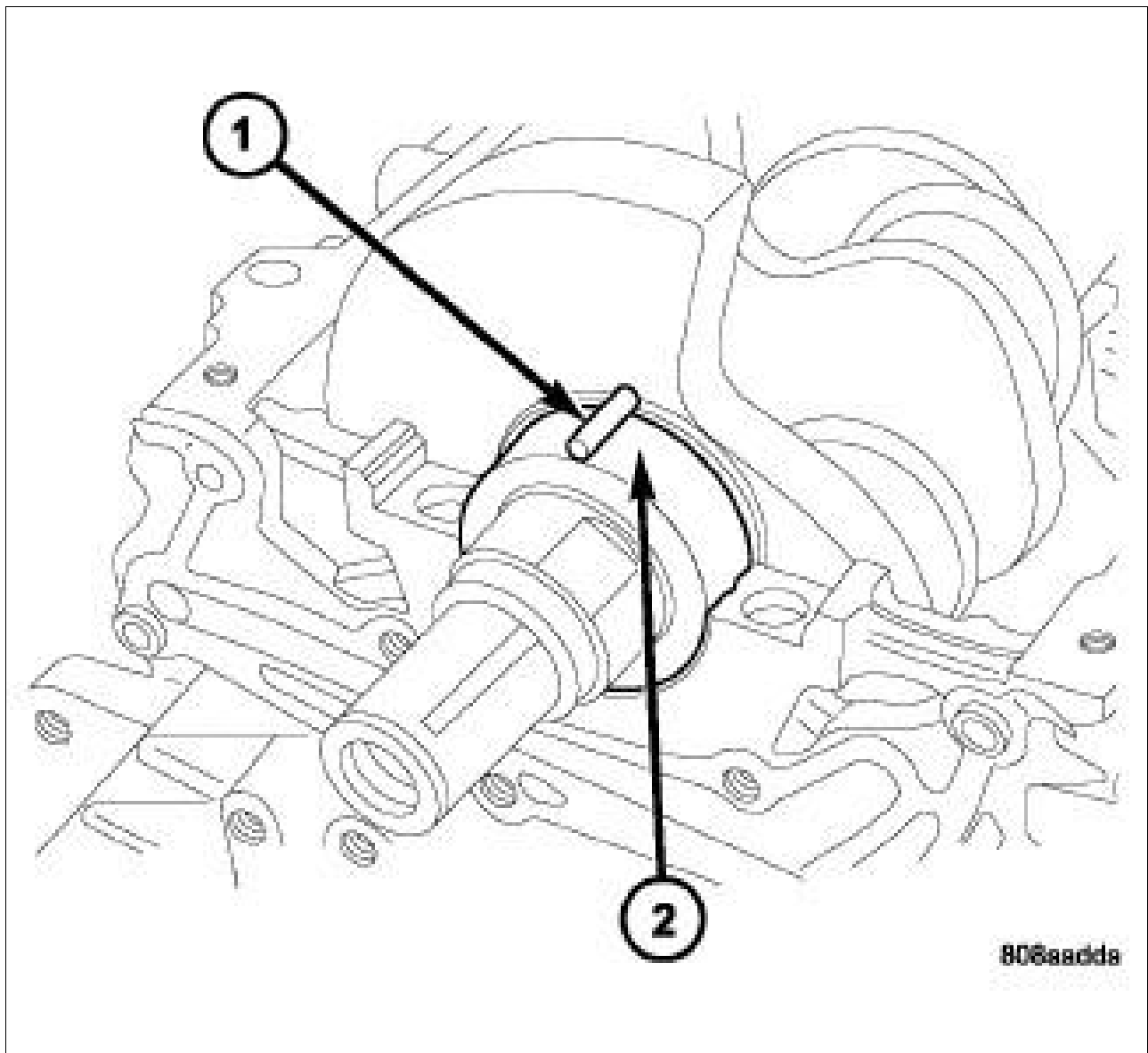
3. Deglazing should be done by moving the hone up and down fast enough to get a crosshatch pattern. The hone marks should intersect at 30° to 60° inclusive angle for proper seating of rings.
4. A controlled hone motor speed between 200 and 300 RPM is necessary to obtain the proper crosshatch angle (1). The number of up and down strokes per minute can be regulated to get the desired 30° to 60° inclusive angle (2). Faster up and down strokes increase the crosshatch angle.
5. After deglazing, it is necessary that the block be cleaned to remove all traces of abrasive. Use a brush to wash parts with a solution of hot water and detergent. Dry parts thoroughly. Use a clean, white, lint-free cloth to check that the bore is clean. Oil the bores after cleaning to prevent rusting. Upon completion, perform a visual inspection of the cylinder block passages to inspect for abrasive debris. If any debris is found, repeat the cleaning process.

 NOTE:

Cylinder bore diameter should not increase more than 20 microns during deglazing process from original nominal bore diameter, if the maximum of 20 microns is exceeded, the cylinder block must be replaced. If deglazing the cylinder bore cannot remove the light scratches and scuffs the cylinder block should be replaced.

ENGINE BLOCK > STANDARD PROCEDURE > MEASURING BEARING CLEARANCE USING PLASTIGAGE

Fig 1: Plastigage Placed In Lower Shell-Typical





NOTE:

Typical crankshaft journal shown in illustration.

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

1. Remove the oil film from surface to be checked. Plastigage is soluble in oil.
2. Place a piece of Plastigage (1) across the entire width of the journal (In addition, suspected areas can be checked by placing the Plastigage in the suspected area). Plastigage must not crumble in use. If brittle, obtain fresh stock.

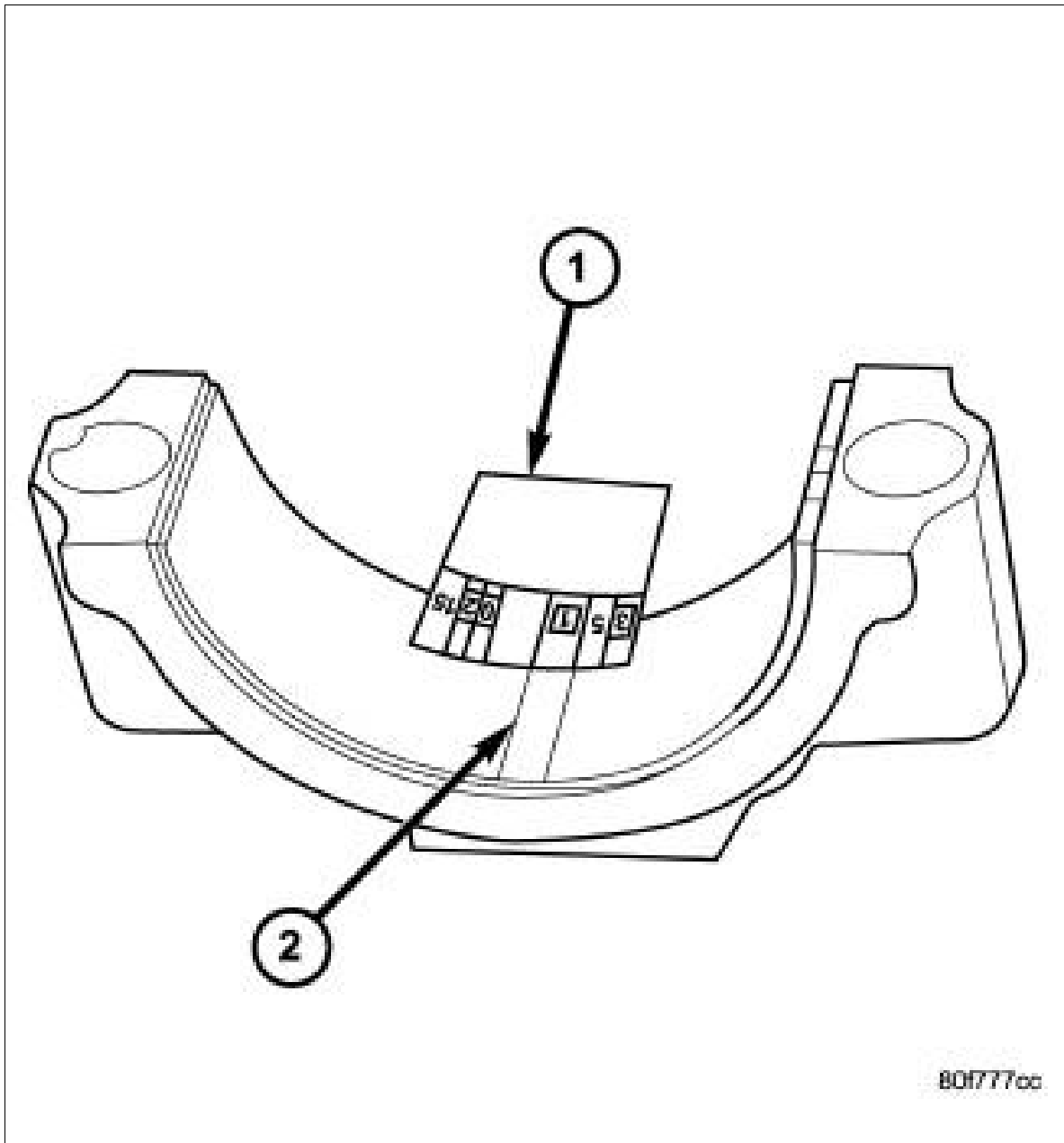


NOTE:

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

3. Torque the bearing cap bolts of the bearing being checked to the proper specification. Refer to TORQUE SPECIFICATIONS .

Fig 2: Measuring Bearing Clearance With Plastigage



Courtesy of CHRYSLER GROUP, LLC

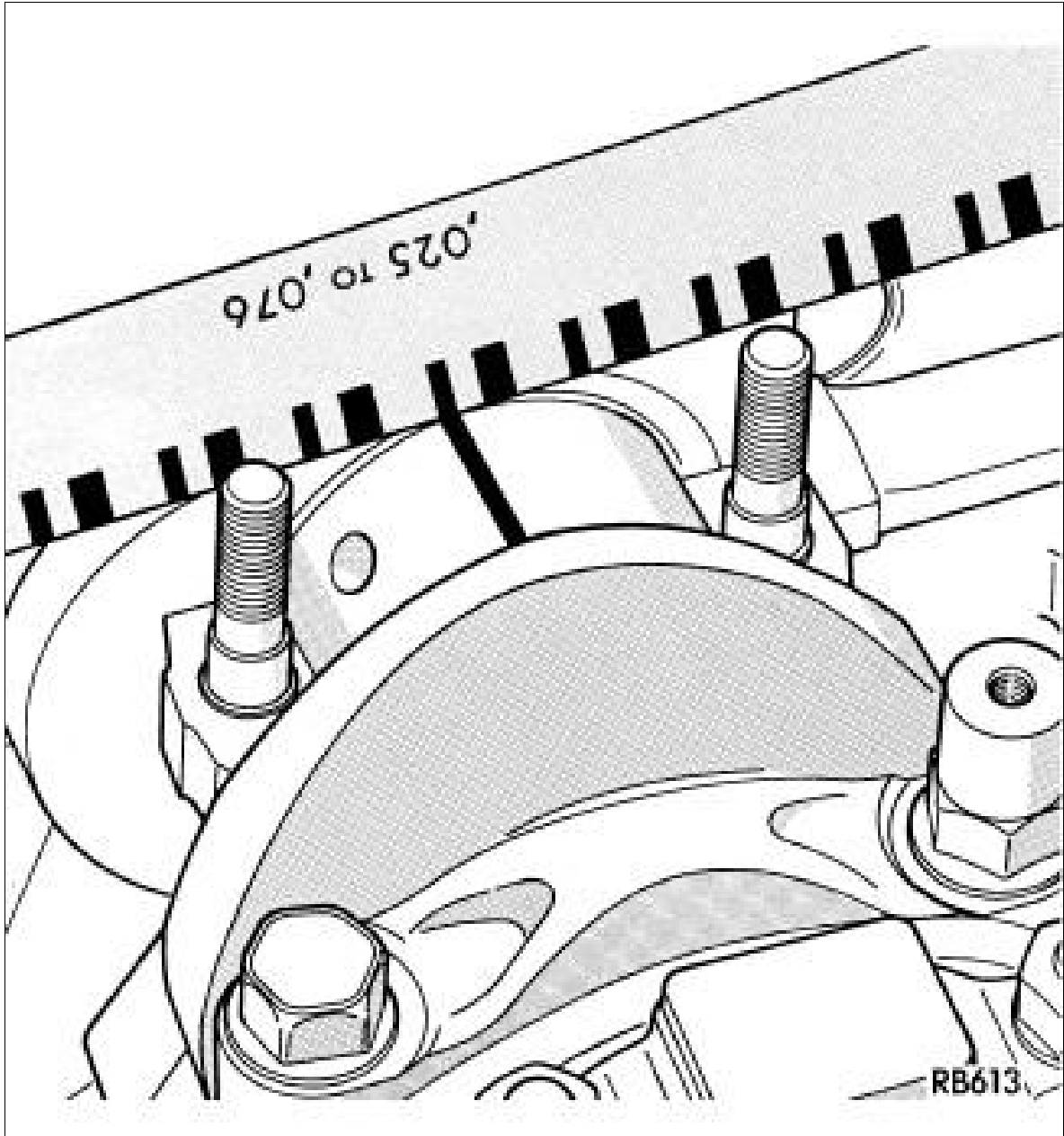
 NOTE:

Typical connecting rod cap shown in illustration.

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

ENGINE SPECIFICATIONS .

Fig 3: Checking Connecting Rod Bearing Clearance-Typical



Courtesy of CHRYSLER GROUP, LLC

 NOTE:

Typical connecting rod journal shown in illustration.

 NOTE:

*Plastigage is available in a variety of clearance ranges. Use the most appropriate range for the specifications you are checking. **Plastigage generally is***

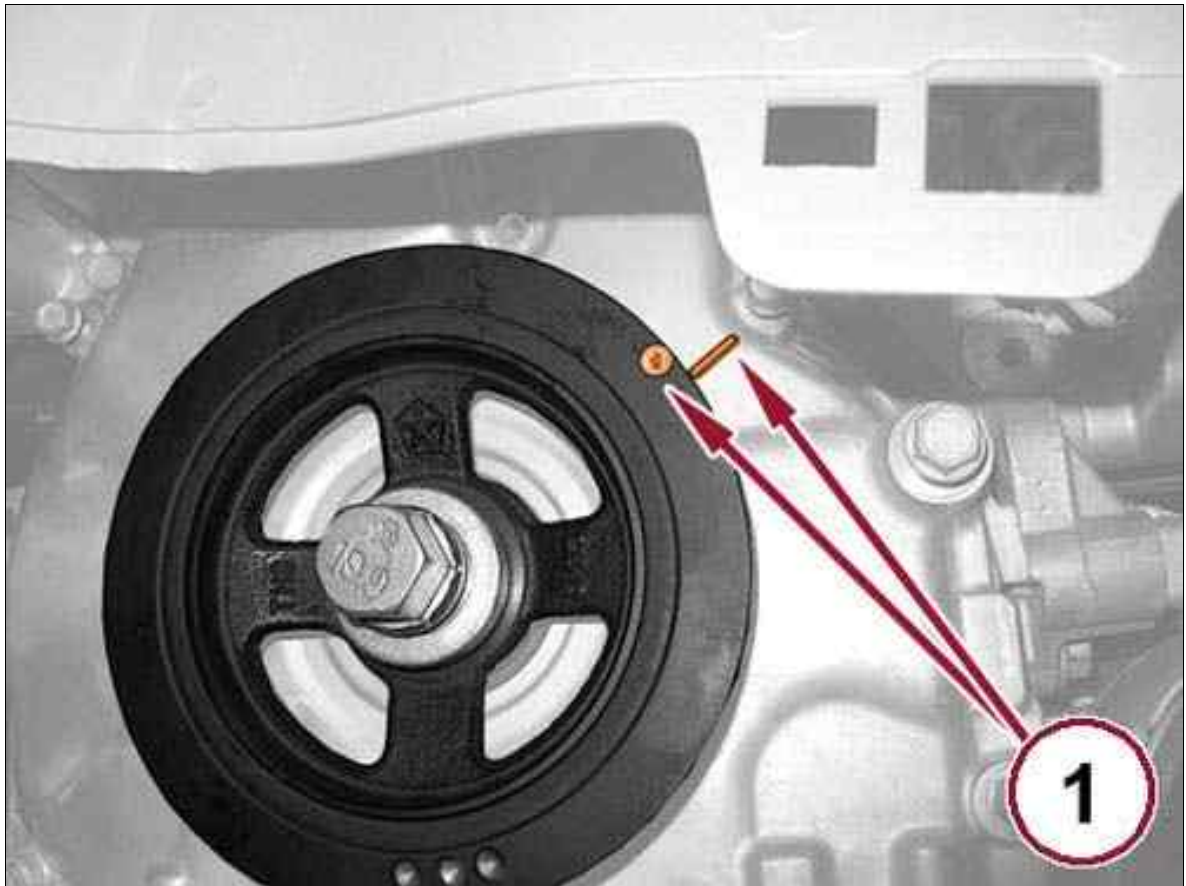
accompanied by two scales. One scale is in inches, the other is a metric scale.

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

ENGINE BLOCK > DAMPER, VIBRATION > REMOVAL AND INSTALLATION > REMOVAL - 2.4L MULTI AIR

1. Raise and support the vehicle. Refer to HOISTING, STANDARD PROCEDURE .
2. Remove the right front tire and wheel assembly. Refer to REMOVAL AND INSTALLATION .
3. Remove the right front wheelhouse splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
4. Remove the serpentine belt. Refer to BELT, SERPENTINE, REMOVAL AND INSTALLATION .

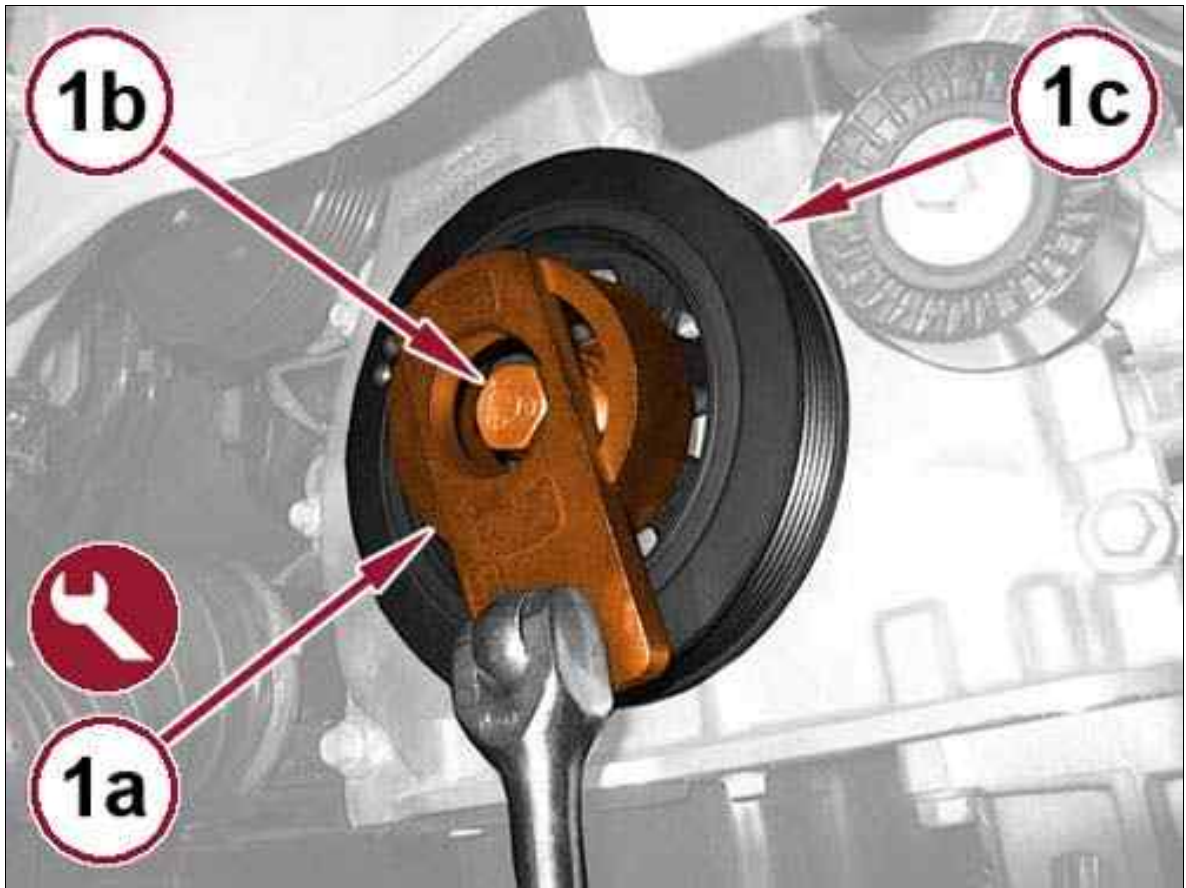
Fig 1: Vibration Damper & Aligning Timing Marks



Courtesy of CHRYSLER GROUP, LLC

5. Turn the vibration damper to align the timing marks (1).

Fig 2: Special Tool, Bolt & Vibration Damper

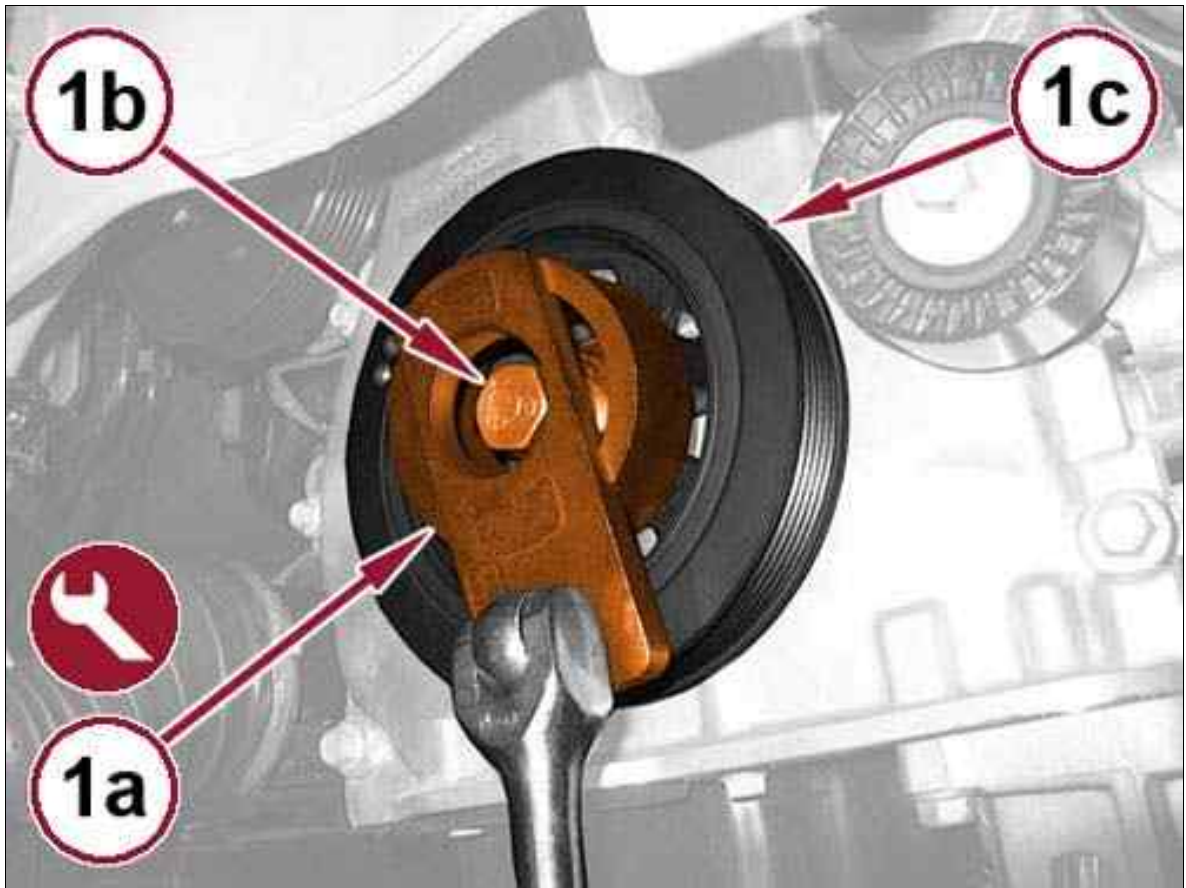


Courtesy of CHRYSLER GROUP, LLC

6. Using the 2000040299 (EMEA) or (special tool #9707, Holder, Vibration Damper) (NAFTA) tool (1a), remove the bolt (1b) and the vibration damper (1c).

**ENGINE BLOCK > DAMPER, VIBRATION > REMOVAL AND INSTALLATION >
INSTALLATION - 2.4L MULTI AIR**

Fig 1: Special Tool, Bolt & Vibration Damper

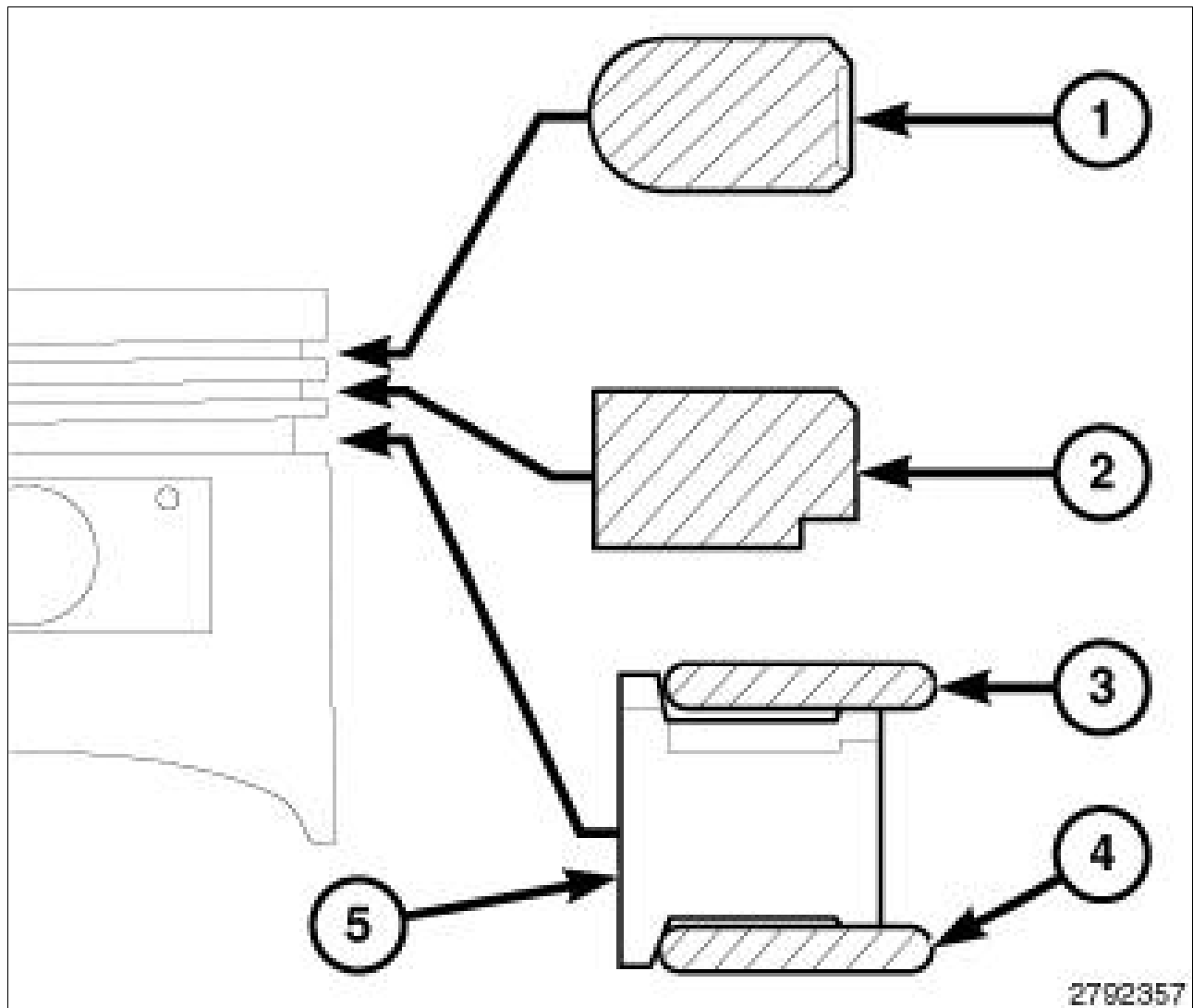


Courtesy of CHRYSLER GROUP, LLC

1. Install the vibration damper onto the crankshaft (1c).
2. Using the 2000040299 (EMEA) or (special tool #9707, Holder, Vibration Damper) (NAFTA) tool (1a), Install the vibration damper bolt (1b) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS .
3. Install the serpentine belt. Refer to BELT, SERPENTINE, REMOVAL AND INSTALLATION .
4. Install the right front wheelhouse splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
5. Install the right front tire and wheel assembly Refer to REMOVAL AND INSTALLATION .
6. Remove the support and lower the vehicle.

ENGINE BLOCK > RING(S), PISTON > REMOVAL AND INSTALLATION > REMOVAL - 2.4L MULTIAIR

Fig 1: Piston Ring Removal/Installation Sequence



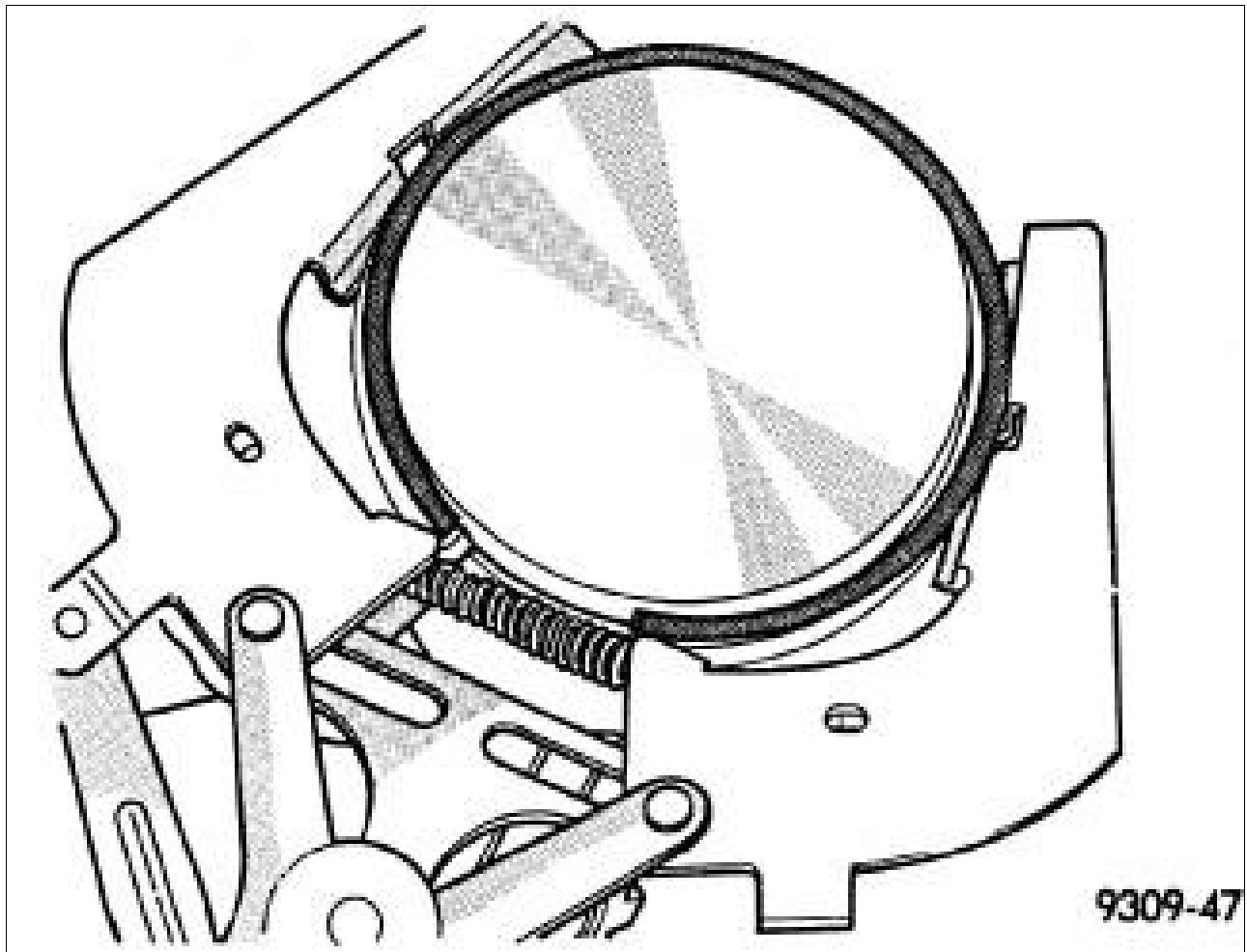
Courtesy of CHRYSLER GROUP, LLC

 CAUTION:

To avoid damage to the piston rings, they must be removed in the following order:

- *No. 1 (upper) piston ring (1)*
- *No. 2 (intermediate) piston ring (2)*
- *Oil ring upper side rail (3)*
- *Oil ring lower side rail (4)*
- *Oil ring expander (5)*

Fig 2: Installing Intermediate Piston Ring



Courtesy of CHRYSLER GROUP, LLC

1. Remove the No. 1 (upper) piston ring using a ring expander tool.
2. Remove the No. 2 (intermediate) piston ring using a ring expander tool.

Fig 3: Installing Piston Ring Side Rail



Courtesy of CHRYSLER GROUP, LLC

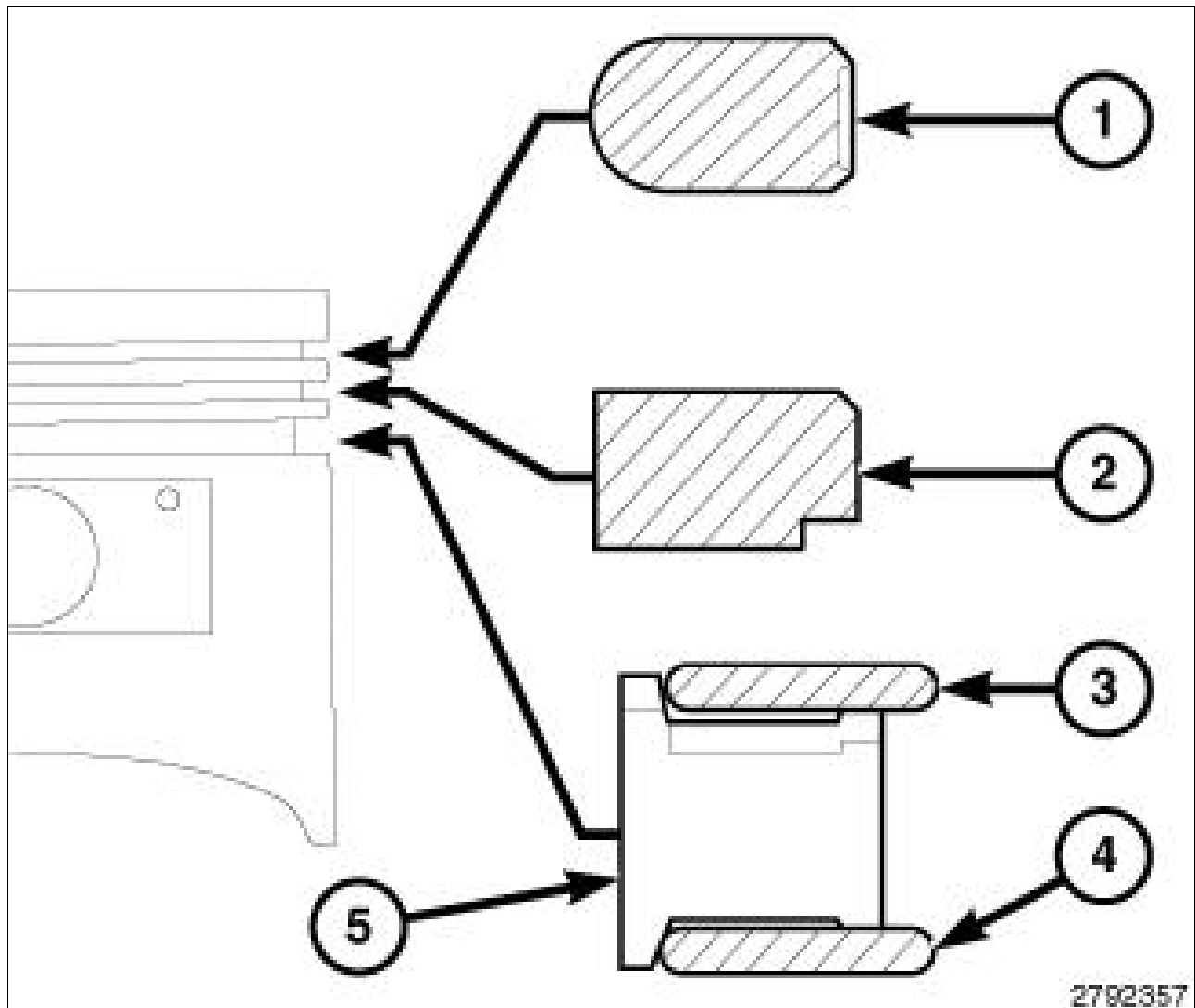
 NOTE:

Do not use a piston ring expander to remove the oil ring side rails.

3. Remove the oil ring upper side rail.
4. Remove the oil ring lower side rail.
5. Remove the oil ring expander (1).

**ENGINE BLOCK > RING(S), PISTON > REMOVAL AND INSTALLATION >
INSTALLATION - 2.4L MULTIAIR**

Fig 1: Piston Ring Removal/Installation Sequence



Courtesy of CHRYSLER GROUP, LLC



NOTE:

The No. 1 (upper) piston ring (1) and No. 2 (intermediate) piston ring (2) can be identified by their configuration. The No. 2 (intermediate) piston ring (2) is a micro Napier design (hook edge) while the No. 1 (upper) piston ring (1) has a square edge.



CAUTION:

To avoid damage to the piston rings, they must be installed in the following order:

- Oil ring expander (5)
- Oil ring lower side rail (4)
- Oil ring upper side rail (3)

- No. 2 (intermediate) piston ring (2)
- No. 1 (upper) piston ring (1)

Fig 2: Installing Piston Ring Side Rail



Courtesy of CHRYSLER GROUP, LLC

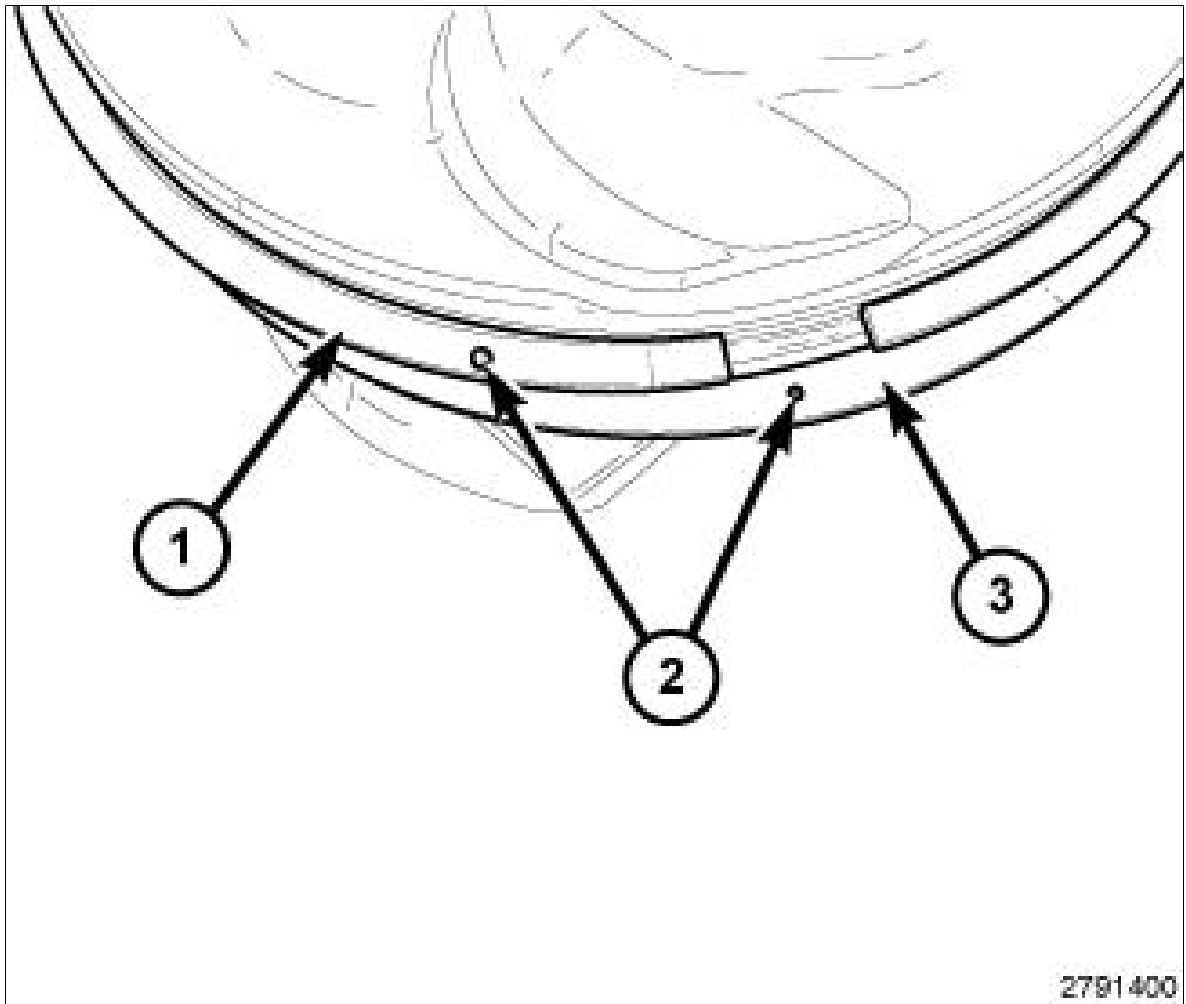


NOTE:

Do not use a piston ring expander to install the oil ring side rails.

1. Install the oil ring expander (1).
2. Install the oil ring lower side rail by placing one end between the piston ring groove and the oil ring expander. Hold this end firmly and press down the portion to be installed until the side rail is in position.
3. Install the oil ring upper side rail in the same manner as the lower side rail.

Fig 3: Identifying Dot Marks On Piston Rings

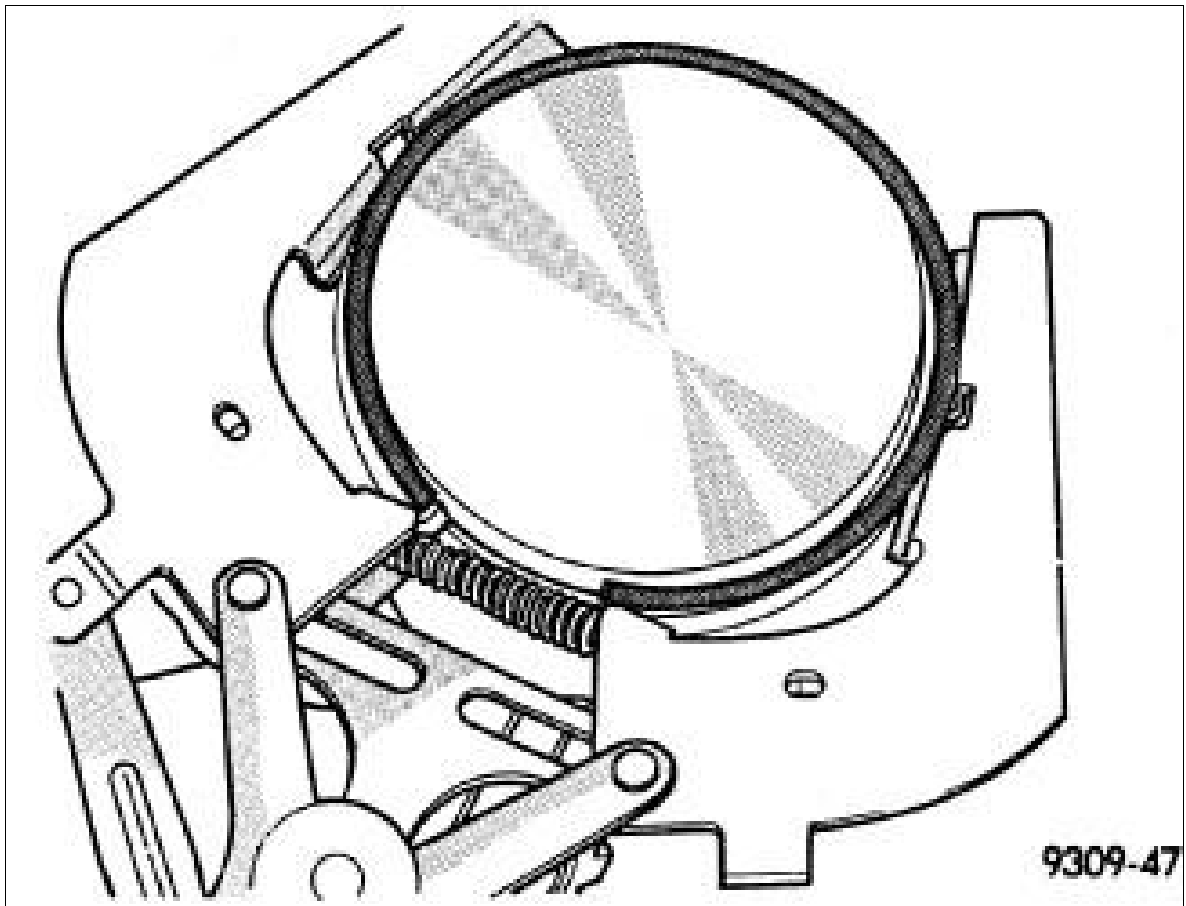


Courtesy of CHRYSLER GROUP, LLC

 NOTE:

Install the rings with manufacturers I.D. mark (2) facing up, towards the top of the piston. The No. 2 (intermediate) piston ring (3) is a micro Napier design (hook edge) while the No. 1 (upper) piston ring (1) has a square edge.

Fig 4: Installing Intermediate Piston Ring

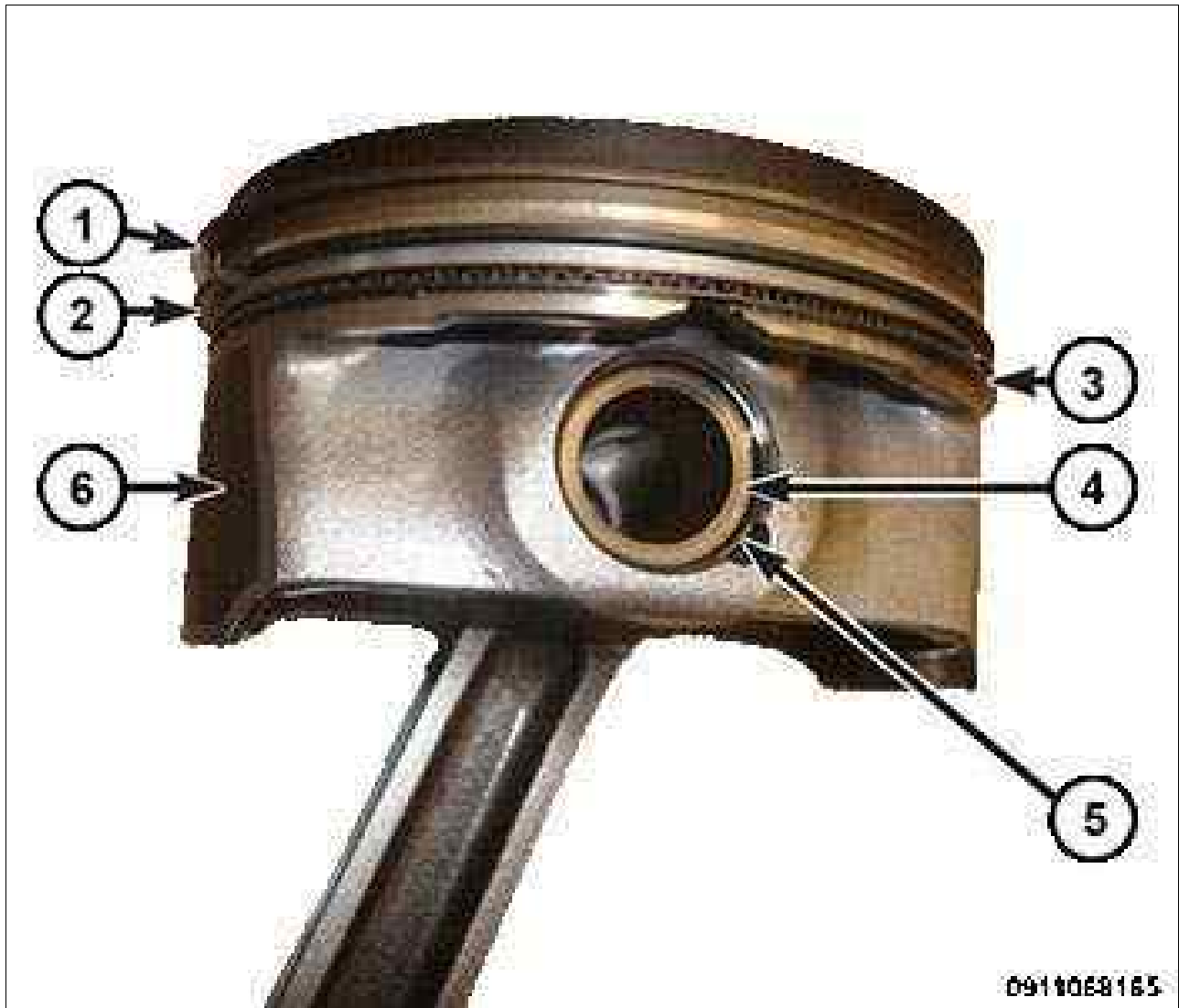


Courtesy of CHRYSLER GROUP, LLC

4. Install the No. 2 (intermediate) piston ring using a ring expander tool.
5. Install the No. 1 (upper) piston ring using a ring expander tool.
6. Rotate the rings around the piston, the rings must rotate in the grooves with out binding.

**ENGINE BLOCK > ROD, PISTON AND CONNECTING > DESCRIPTION AND
OPERATION > DESCRIPTION AND OPERATION**

Fig 1: Piston Components



Courtesy of CHRYSLER GROUP, LLC

 CAUTION:

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

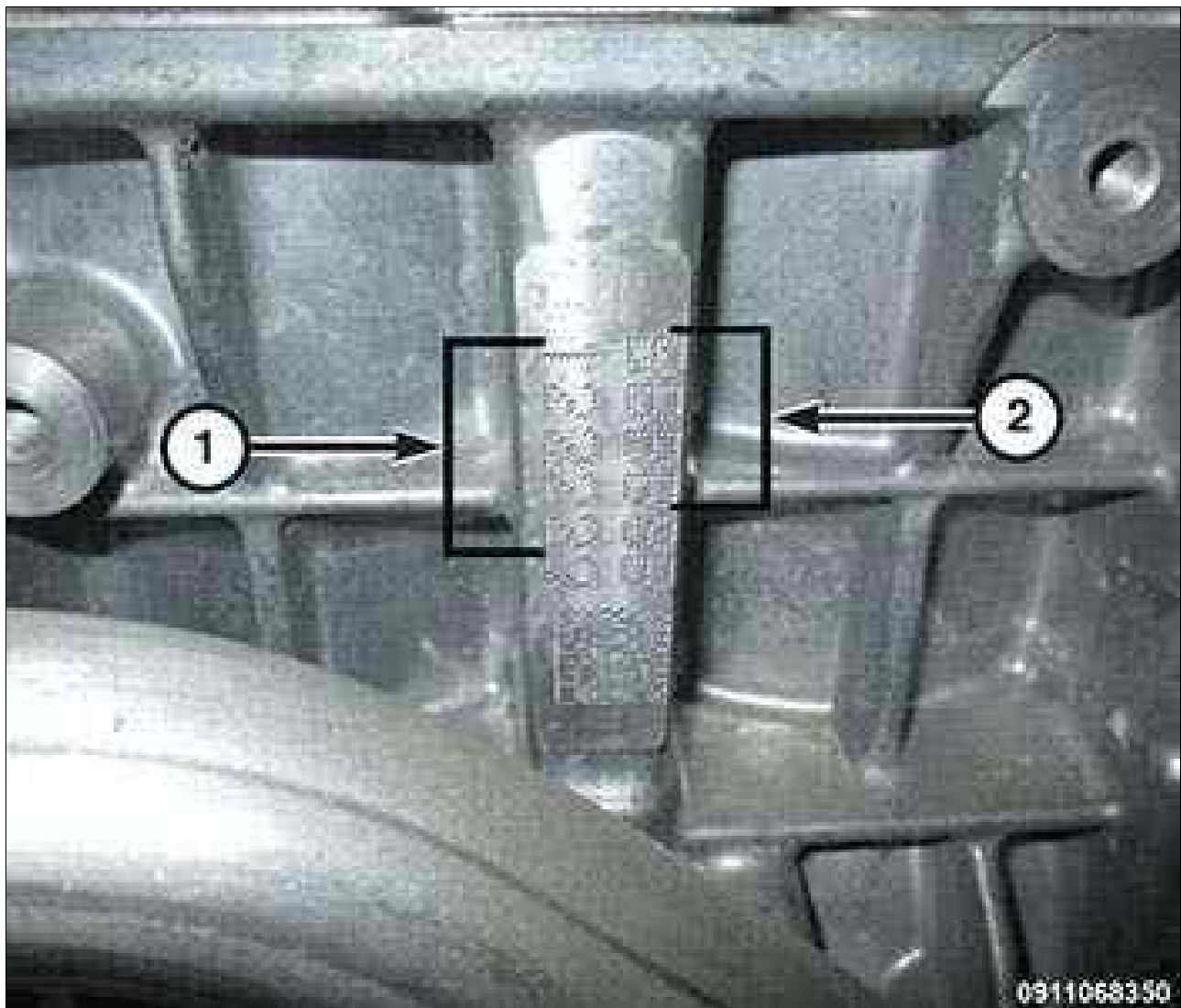
The pistons are a lightweight design with ultra low tension piston rings for improved fuel economy:

- The pistons are made of a high strength aluminum alloy and the piston skirt (6) has a MolyT® coating.
- The top piston ring land has an anodized coating for improved wear performance.
- The piston is connected to the rod using a full floating pin (5) with a locking clip (4) on both sides.
- The connecting rod is powder-forged steel with a bolted cracked cap design. The connecting rod bolts are not reusable.

- Pistons are available in three diameters (A, B and C) with grade markings for each bore indicated on the side of the cylinder block.
- The upper compression ring (1) is a 1.2 mm steel ring with Physical Vapor Deposition (PVD) coating.
- The intermediate compression ring (2) is 1.2 mm micro Napier design and has a greater radial wall thickness than the upper compression ring.
- Both compression rings have a dot or a mark on the piston ring. The marked side of the ring must face the top of the piston.
- The 2 mm three piece oil control ring (3) is very thin. Both the rail segments and the expander are nitride steel.

ENGINE BLOCK > ROD, PISTON AND CONNECTING > STANDARD PROCEDURE > PISTON FITTING

Fig 1: Upper Main Bearing Journal Diameter Grade Markings & Cylinder Bore Diameter Grade Markings



The pistons are "select fit" to achieve proper oil clearance. Engine block cylinder bore diameter grade markings (2) are stamped into the right side of the engine block. These marks are read from right to left (top to bottom), corresponding with cylinder number 1, 2, 3, 4.

Engine block cylinder bore diameter grade markings correspond to specific cylinder bore diameters. The chart below identifies the three engine block grade markings and their associated cylinder bore diameters.

Engine Block Marking	Cylinder Bore Size mm (in.)	
	Metric	Standard
A	88.000 - 88.010 mm	3.4645 - 3.4649 in.
B	88.010 - 88.020 mm	3.4649 - 3.4653 in.
C	88.020 - 88.030 mm	3.4653 - 3.4657 in.

Fig 2: Piston Size Marked On Piston Crown

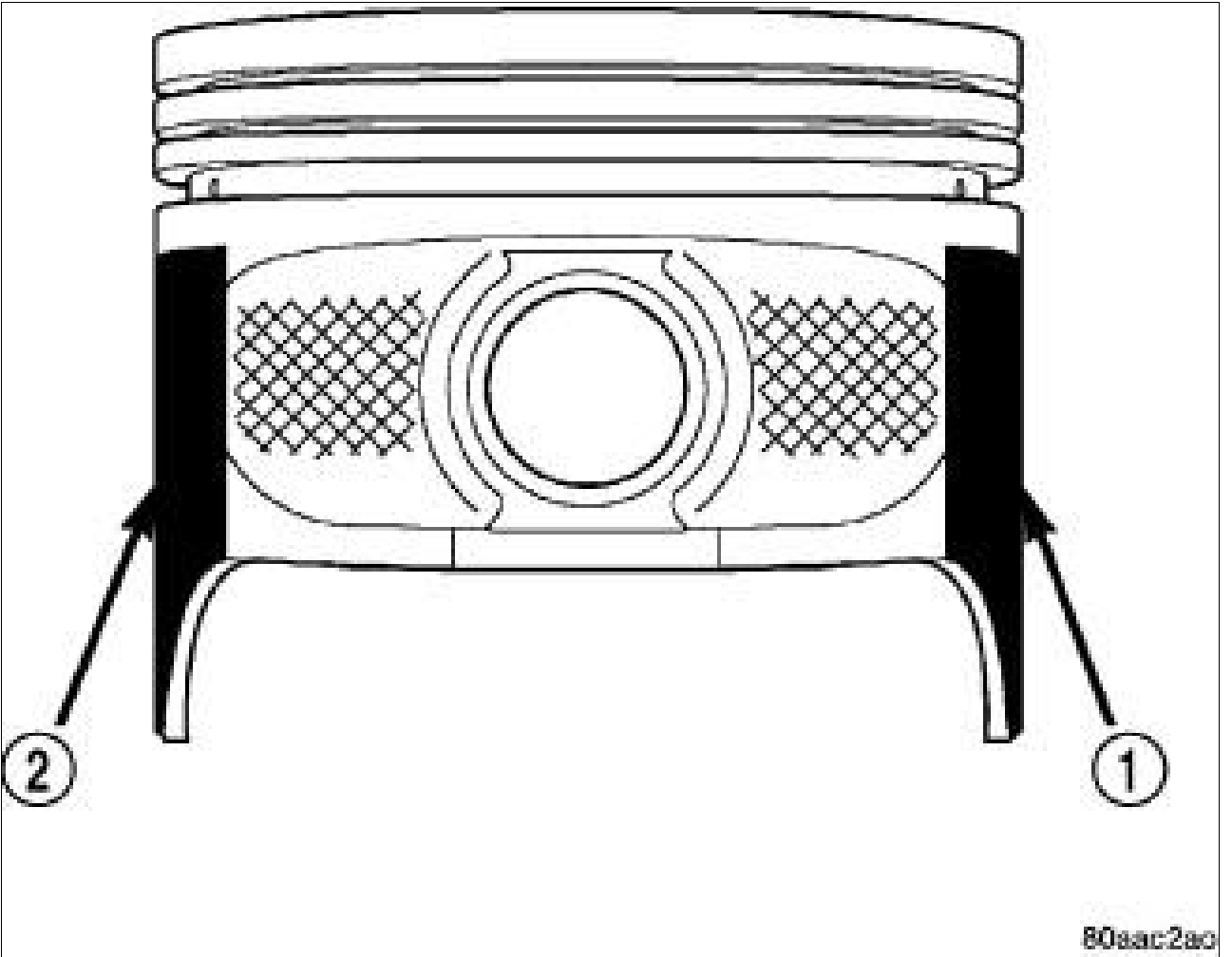


The piston is marked with the piston size (1) on the piston crown. The pistons are available in three different sizes in order to achieve the desired oil clearance. Select the piston size that corresponds to the engine block cylinder bore diameter grade markings for each cylinder.

Pistons are available in three sizes. The chart below identifies the three piston sizes.

Piston Marking	Piston Size mm (in.)	
	Metric	Standard
A	87.975 - 87.985 mm	3.4636 - 3.4640 in.
B	87.985 - 87.995 mm	3.4640 - 3.4644 in.
C	87.995 - 88.005 mm	3.4644 - 3.4648 in.

Fig 3: Identifying Coating Material On Piston





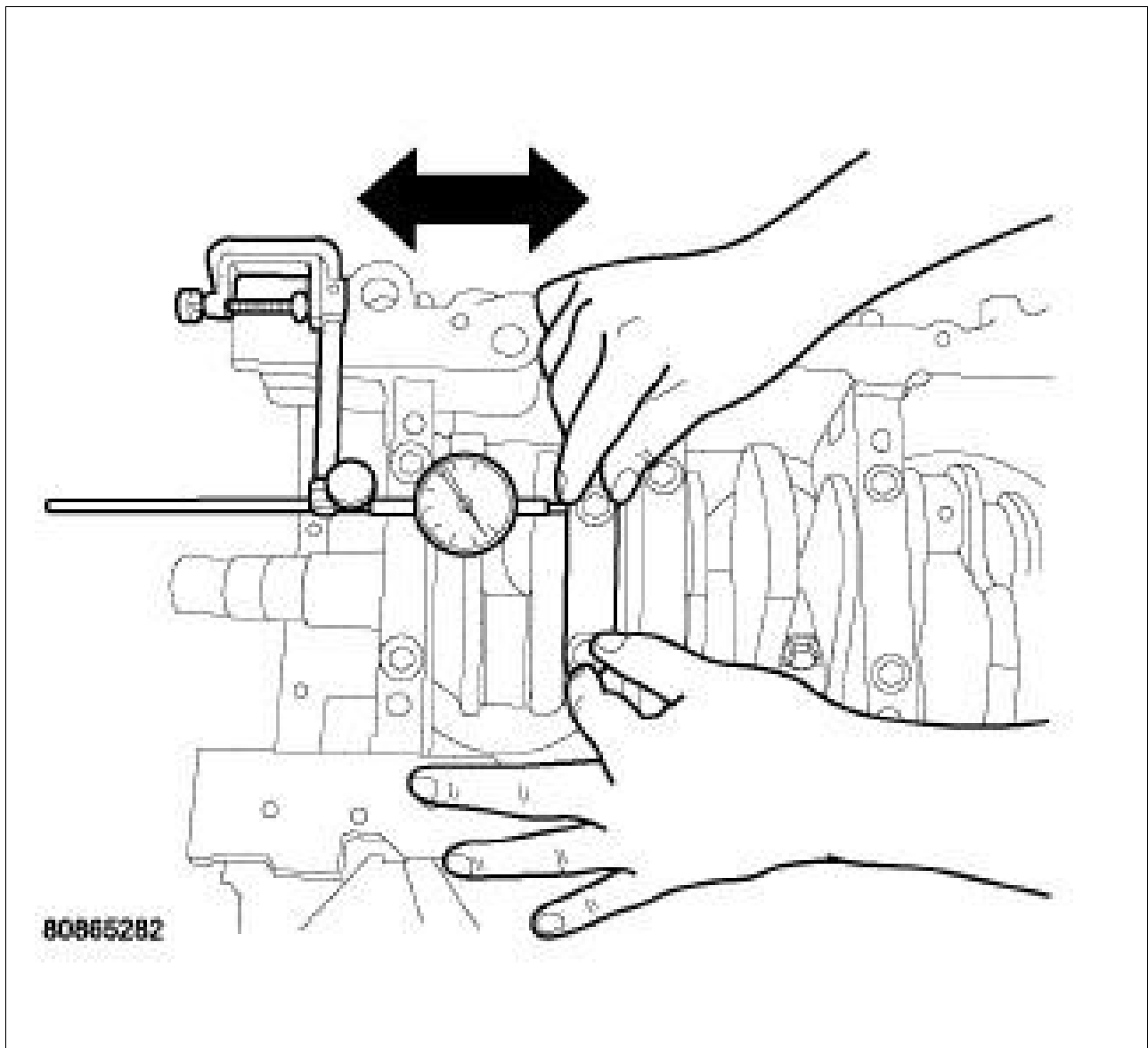
NOTE:

Typical coated piston shown in illustration.

The coated pistons are serviced with the piston pin and connecting rod pre-assembled. The coating material (1 and 2) is applied to the piston after the final piston machining process. Piston installation into the cylinder bore requires slightly more pressure than that required for non-coated pistons. The bonded coating on the piston will give the appearance of a line-to-line fit with the cylinder bore.

ENGINE BLOCK > ROD, PISTON AND CONNECTING > STANDARD PROCEDURE > CONNECTING ROD SIDE CLEARANCE > DIAL INDICATOR

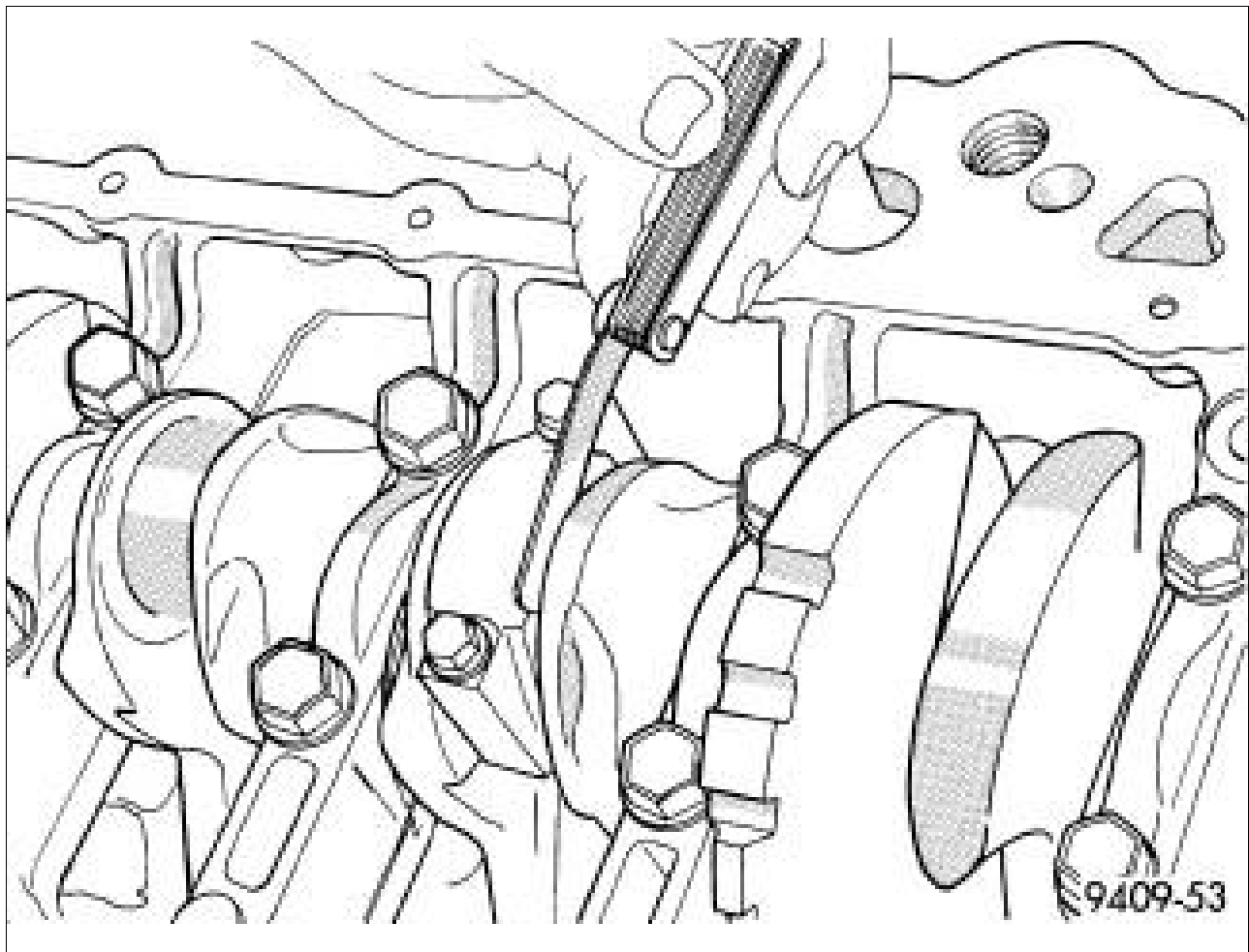
Fig 1: Measuring Connecting Rod Side Clearance



1. Mount the Dial Indicator Set (special tool #C-3339A, Set, Dial Indicator) to a stationary point on the engine. Locate the probe perpendicular to and resting against the connecting rod cap being checked.
2. Move the connecting rod all the way to the rear of its travel.
3. Zero the dial indicator.
4. Move the connecting rod forward to the limit of travel and read the dial indicator. Compare the measured side clearance to the specification. Refer to ENGINE SPECIFICATIONS .
5. Repeat this procedure for each connecting rod. Rotate the crankshaft for connecting rod accessibility.

ENGINE BLOCK > ROD, PISTON AND CONNECTING > STANDARD PROCEDURE > CONNECTING ROD SIDE CLEARANCE > FEELER GAUGE

Fig 1: Connecting Rod Side Clearance



Courtesy of CHRYSLER GROUP, LLC



NOTE:

Typical four cylinder engine shown in illustration.

1. Slide a snug-fitting feeler gauge between the connecting rod and crankshaft journal flange. Compare the measured side clearance to the specification. Refer to ENGINE SPECIFICATIONS .
2. Repeat this procedure for each connecting rod. Rotate the crankshaft for connecting rod accessibility.

ENGINE BLOCK > ROD, PISTON AND CONNECTING > CLEANING > CLEANING

CAUTION:

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

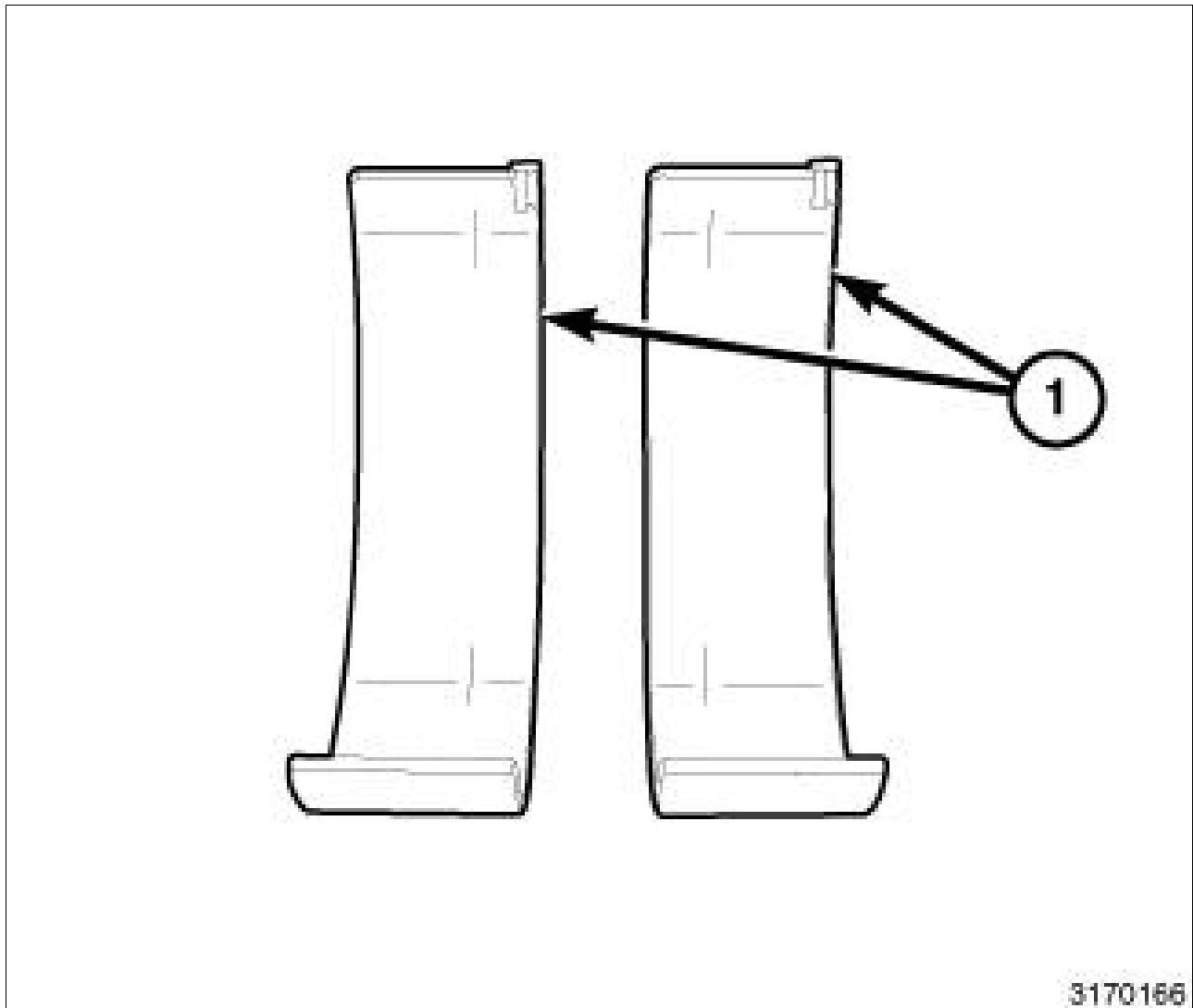
CAUTION:

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

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

ENGINE BLOCK > ROD, PISTON AND CONNECTING > INSPECTION > INSPECTION

Fig 1: Inserts

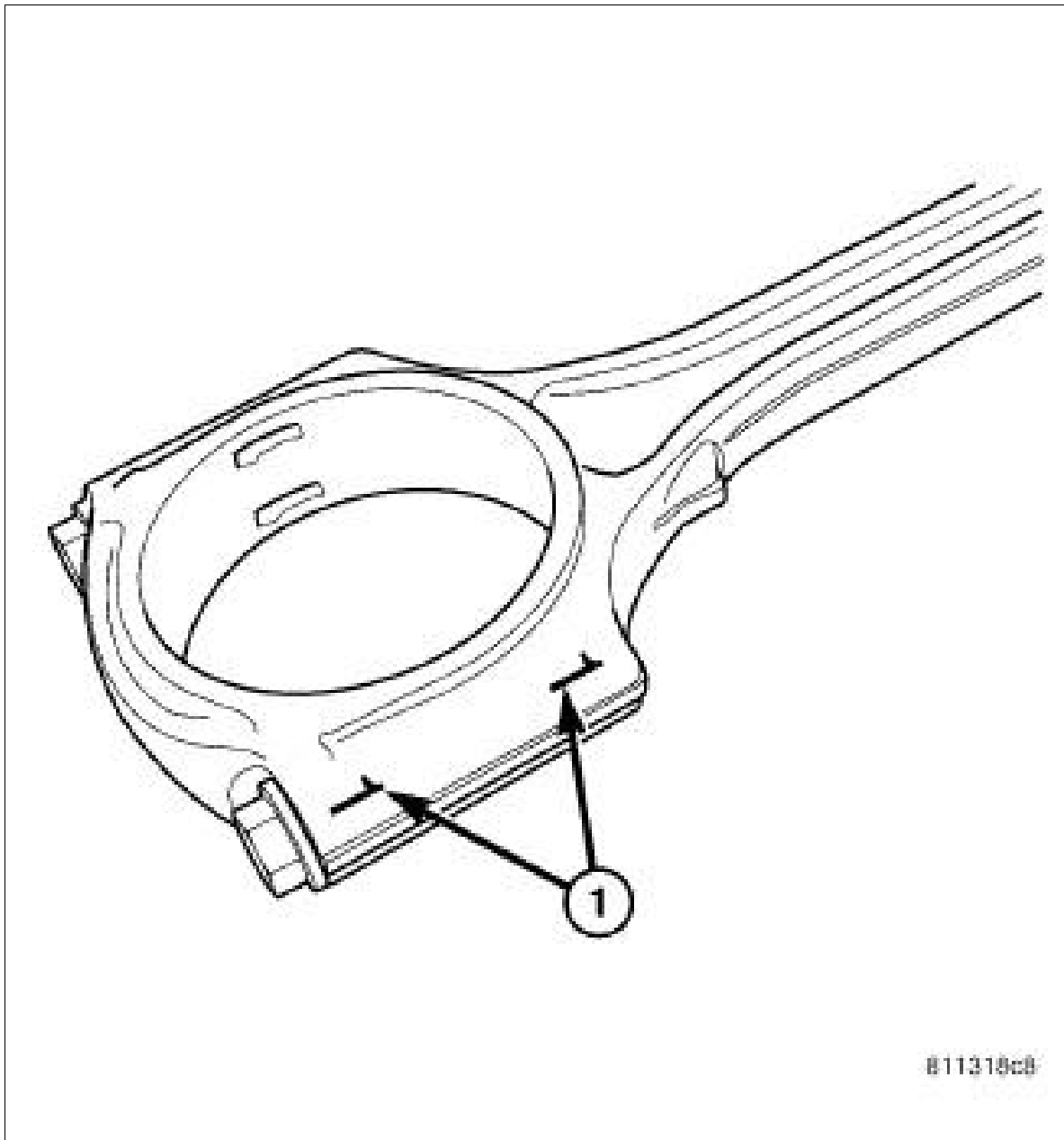


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Courtesy of CHRYSLER GROUP, LLC

1. Wipe the inserts (1) 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. Replace any bearing that shows abnormal wear.

Fig 2: Connecting Rod To Cylinder Identification



Courtesy of CHRYSLER GROUP, LLC

6. Inspect the connecting rod bearing bores for signs of scoring, nicks and burrs.

 NOTE:

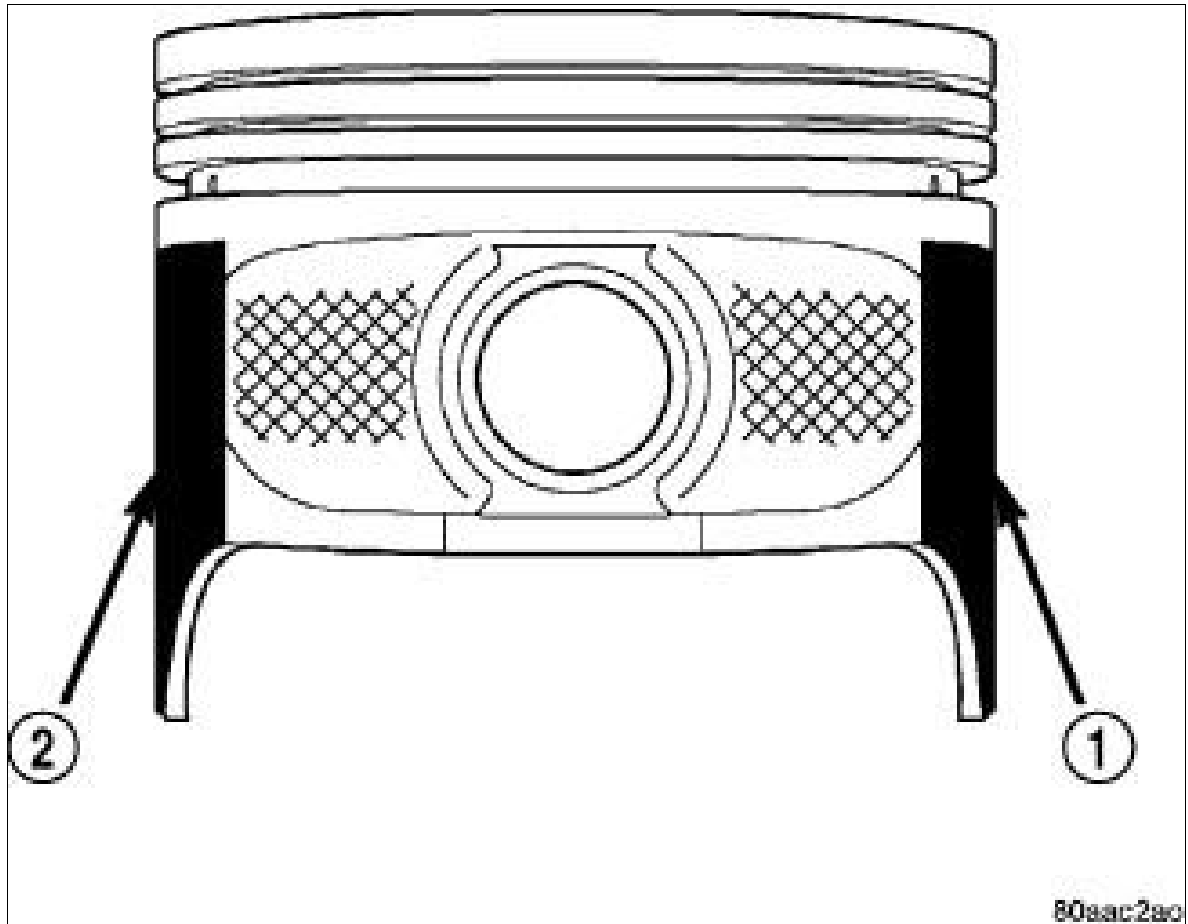
Misaligned or bent connecting rods can cause abnormal wear on pistons, piston rings, cylinder walls, connecting rod bearings and crankshaft connecting rod journals. If wear patterns or damage to any of these components indicate the probability of a misaligned connecting rod, inspect it for correct rod alignment.

7. Replace any misaligned, bent or twisted connecting rods.

 NOTE:

Connecting rods are serviced with the piston pre-assembled. The pistons are "select fit" to achieve proper oil clearance. Refer to ROD, PISTON AND CONNECTING, STANDARD PROCEDURE .

Fig 3: Identifying Coating Material On Piston



Courtesy of CHRYSLER GROUP, LLC

 NOTE:

Typical coated piston shown in illustration.

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

 NOTE:

The coating material (1 and 2) is applied to the piston after the final piston machining process. This coating may affect the outside diameter measurement of a

coated piston may not provide accurate results.

9. Check the piston for taper and out of round shape.



NOTE:

Piston installation into the cylinder bore may require slightly more pressure than that required for non-coated pistons. The bonded coating on the piston will give the appearance of a line-to-line fit with the cylinder bore.



NOTE:

The coated pistons will be serviced with the piston pin and connecting rod pre-assembled.

ENGINE BLOCK > ROD, PISTON AND CONNECTING > REMOVAL AND INSTALLATION > REMOVAL AND INSTALLATION > REMOVAL

1. Remove the engine from the vehicle and separate the transmission and flexplate from the engine. Refer to REMOVAL AND INSTALLATION .
2. Remove the cylinder head and oil pan for inspection. Refer to DISASSEMBLY AND ASSEMBLY .

Fig 1: Marking Chain Link Corresponding To Crankshaft Sprocket Timing Mark



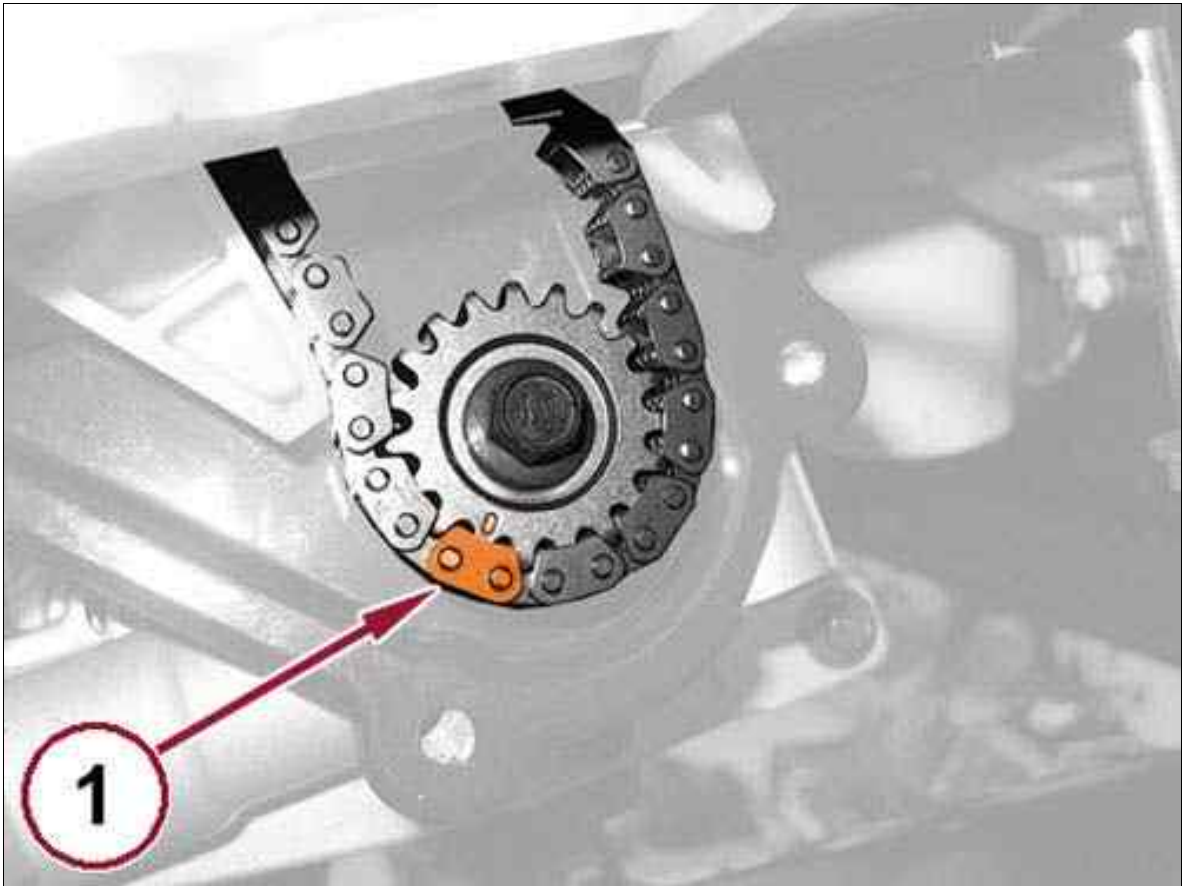
Courtesy of CHRYSLER GROUP, LLC

 NOTE:

If the timing chain plated links (1) can no longer be seen, the timing chain links corresponding to the timing marks (2) must be marked prior to removal if the chain is to be reused.

3. Mark chain link (1) corresponding to crankshaft sprocket timing mark (2).

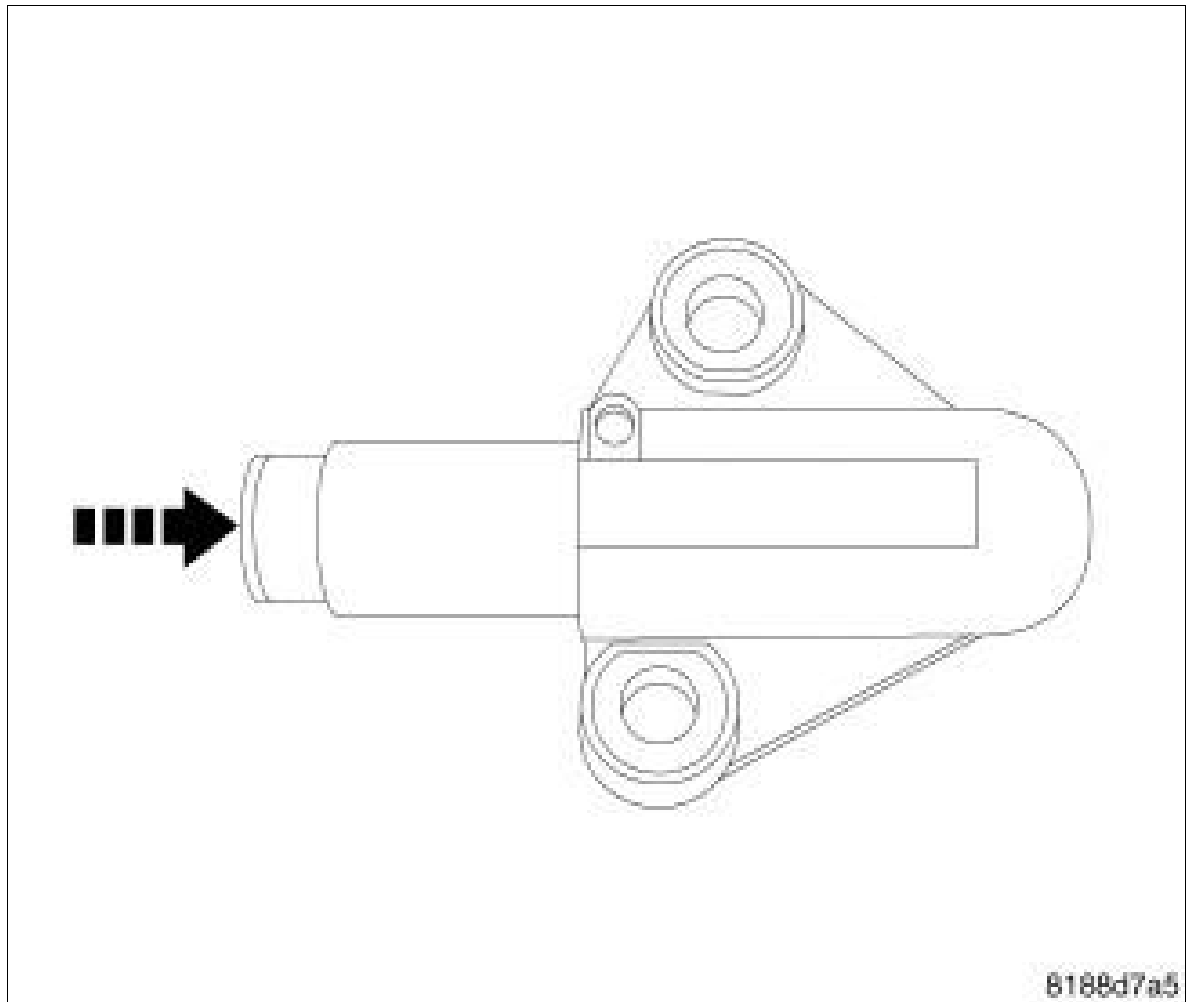
Fig 2: Marking Chain Link Corresponding To Balance Shaft/Oil Pump Sprocket Timing Mark



Courtesy of CHRYSLER GROUP, LLC

4. Mark the chain link (1) corresponding to balance shaft/oil pump sprocket timing mark.

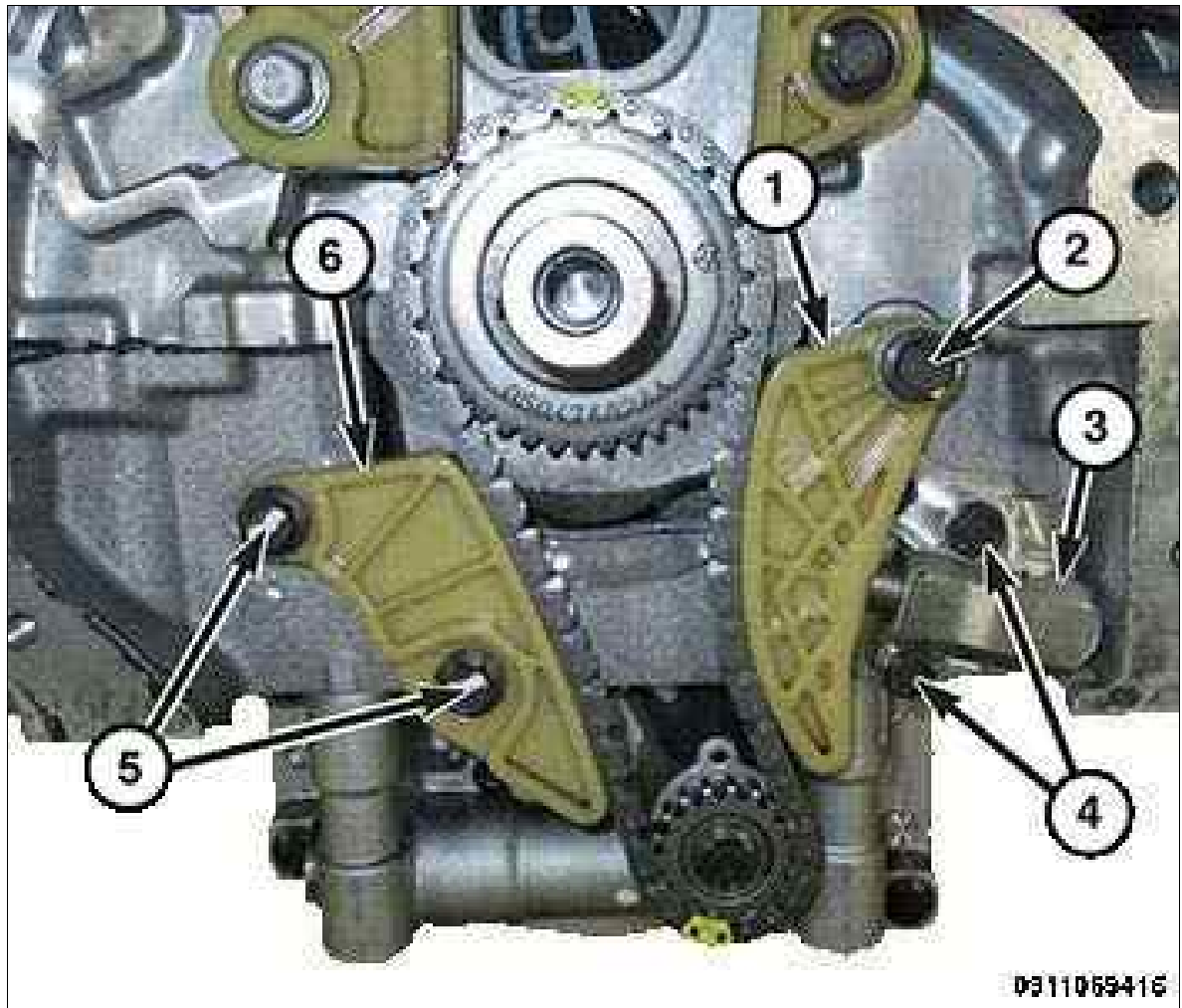
Fig 3: Oil Pump Tensioner Reset



Courtesy of CHRYSLER GROUP, LLC

5. Reset the balance shaft/oil pump chain tensioner by pushing the plunger inward and installing a pin to hold the plunger in the retracted position.

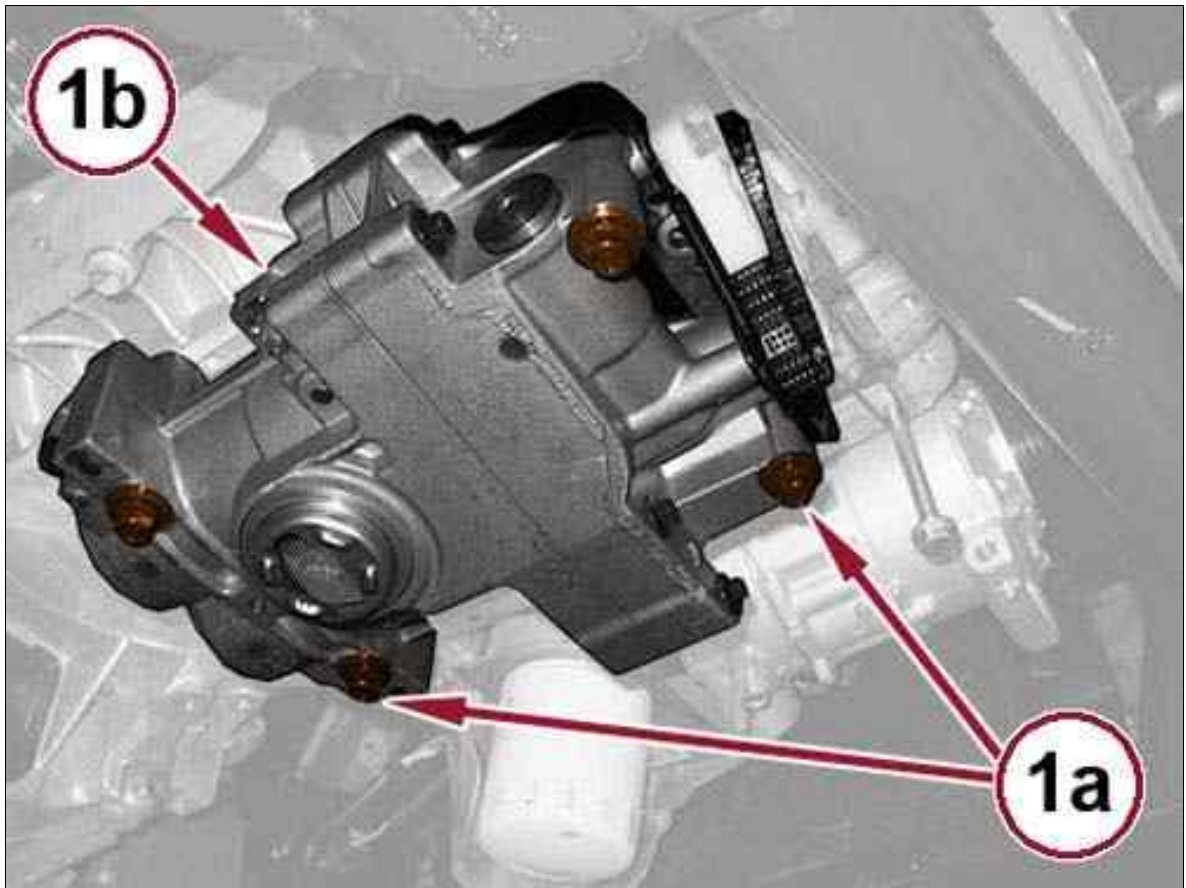
Fig 4: Tensioner, Tension Arm, Chain Guide & Bolts



Courtesy of CHRYSLER GROUP, LLC

6. Remove the two bolts (4) and the tensioner (3).
7. Remove the tensioner arm bolt (2) and the tensioner arm (1).
8. Remove the fixed chain guide bolts (5) and the chain guide (6).

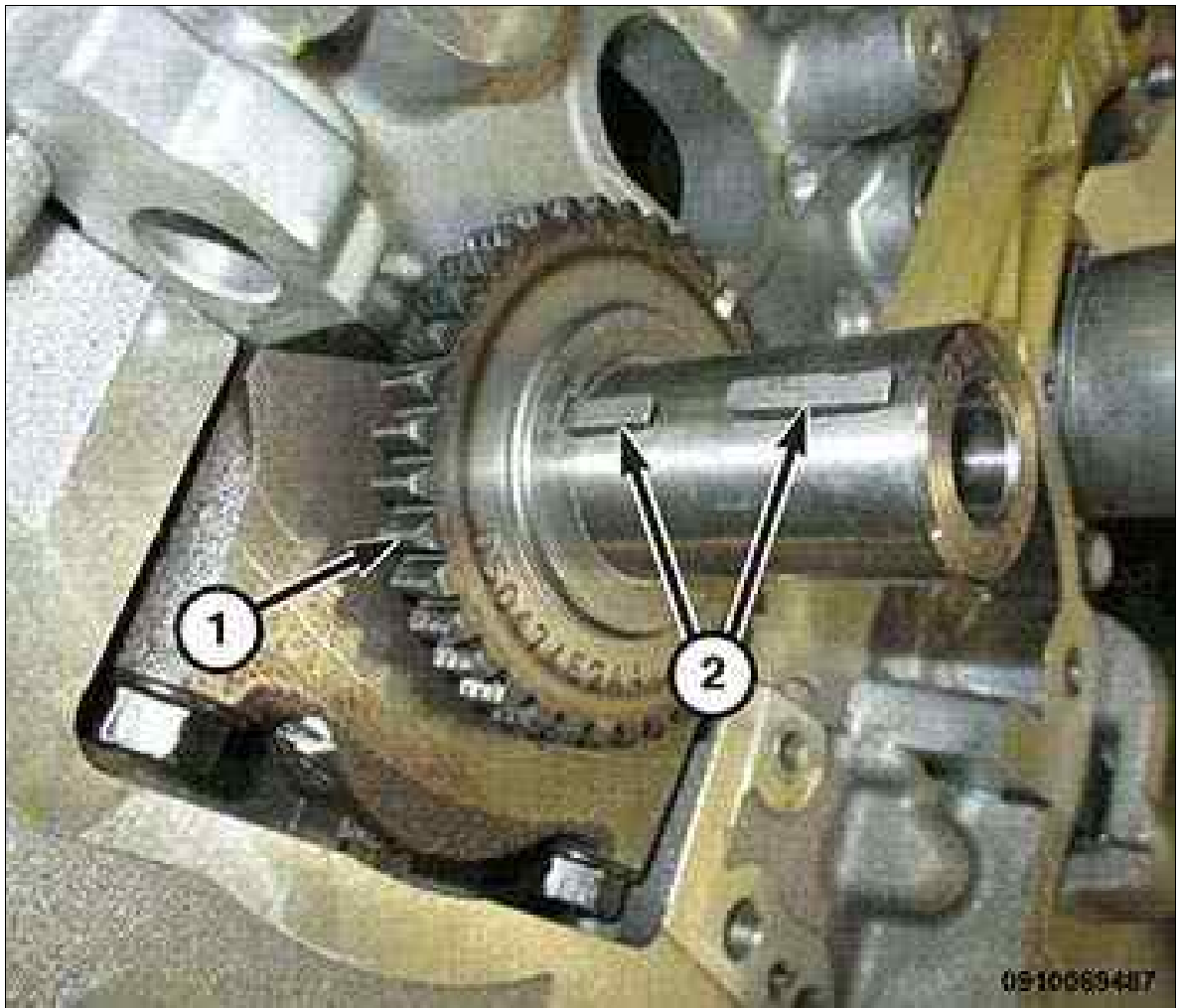
Fig 5: Oil Pump Assembly - Balancing Assembly & Bolts



Courtesy of CHRYSLER GROUP, LLC

9. Remove the screws (1a), disengage the chain from the engine oil pump control and remove the oil pump assembly - balancing assembly (1b).

Fig 6: Crankshaft Sprocket & Keys



Courtesy of CHRYSLER GROUP, LLC

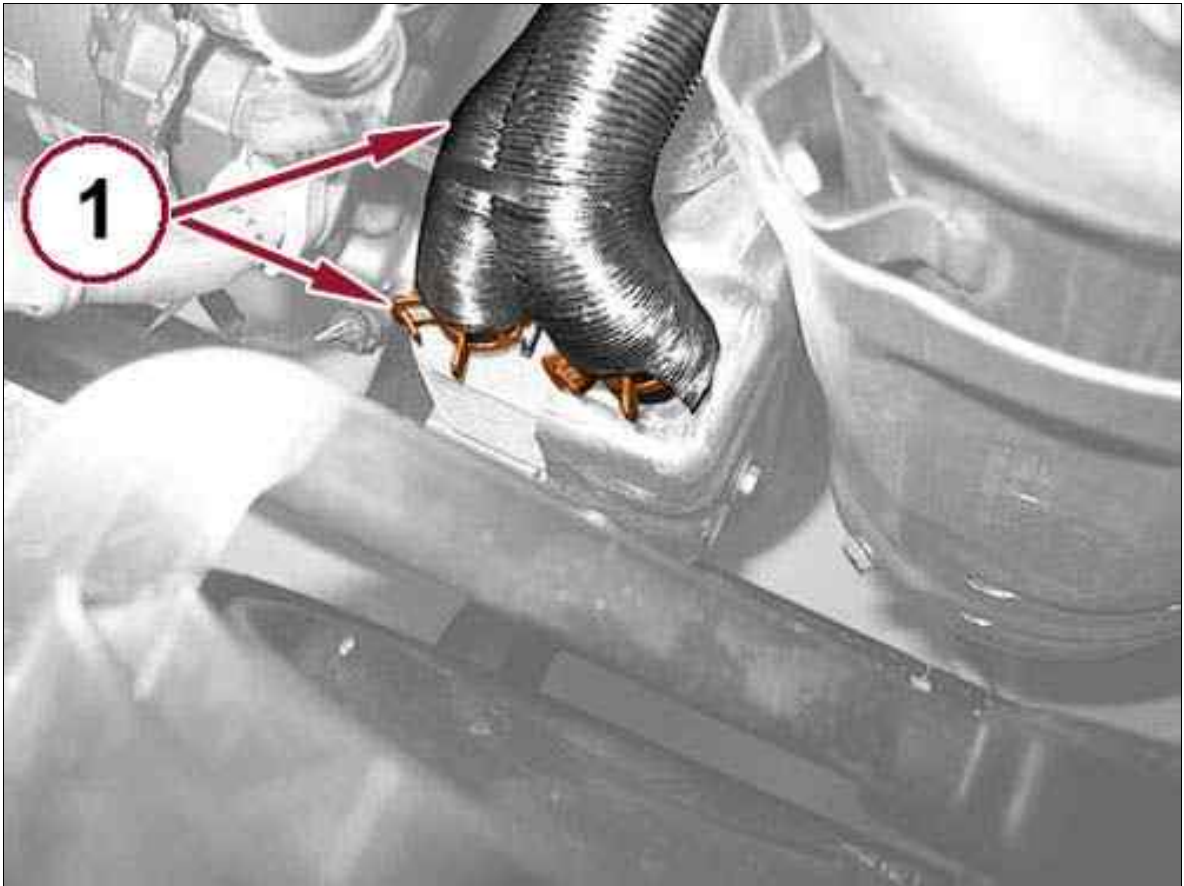
10. Remove the crankshaft sprocket (1).

11. Insert a flat bladed screwdriver (7) between the dust lip (8) and the metal case (4) of the crankshaft seal (1). Angle the screwdriver through the dust lip against the metal case of the seal. Pry out the seal.

Do not permit the screwdriver blade to contact crankshaft seal surface. Contact of the screwdriver blade against crankshaft edge (chamfer) is permitted.

12. Check to make sure the seals garter spring is also removed and is not on the crankshaft.

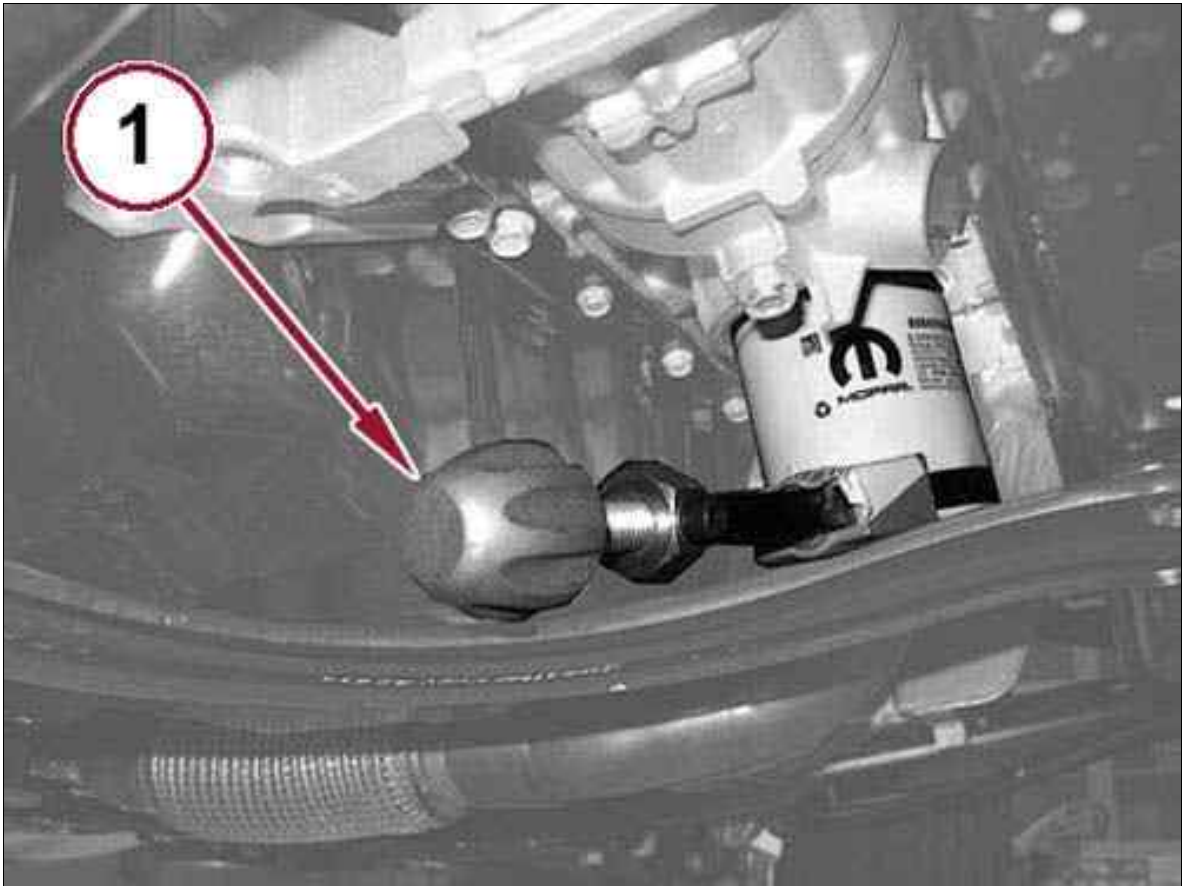
Fig 8: Water Supply And Return Hoses & Clamps



Courtesy of CHRYSLER GROUP, LLC

13. Loosen the clamps and disconnect the water supply and return hoses (1) to the engine oil cooler.

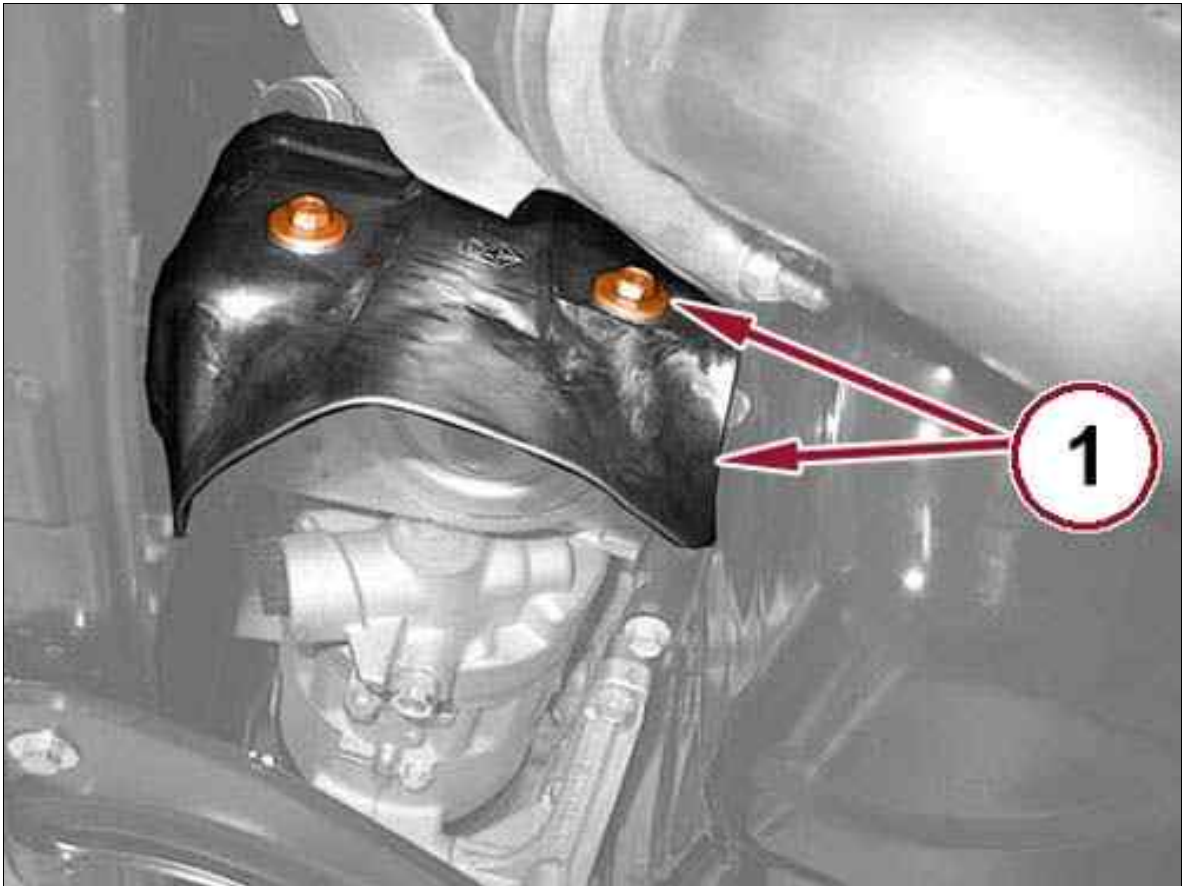
Fig 9: Removing Oil Filter Using Oil Filter Wrench



Courtesy of CHRYSLER GROUP, LLC

14. Unlock the engine oil filter and remove it using an appropriate oil filter wrench (1).

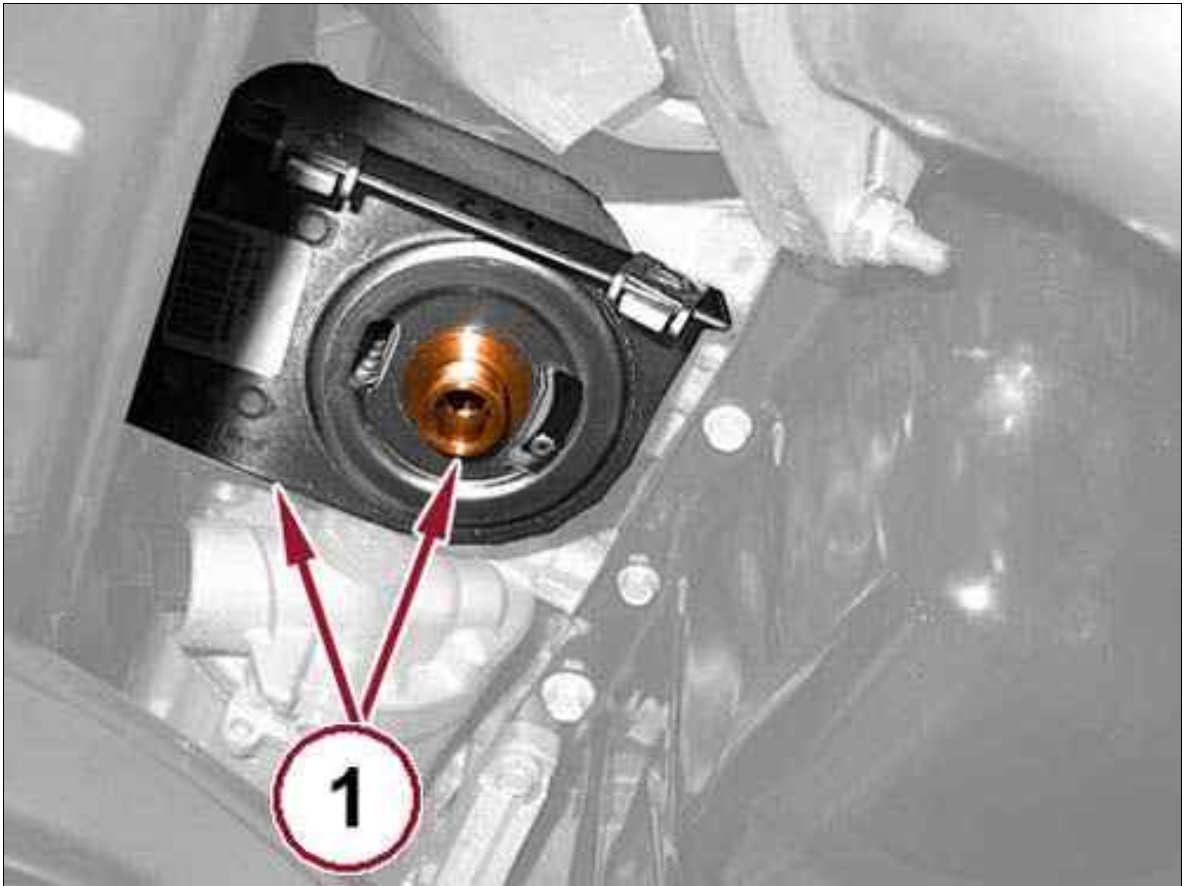
Fig 10: Heat Shield & Bolts



Courtesy of CHRYSLER GROUP, LLC

15. Remove the screws and remove the heat shield (1).

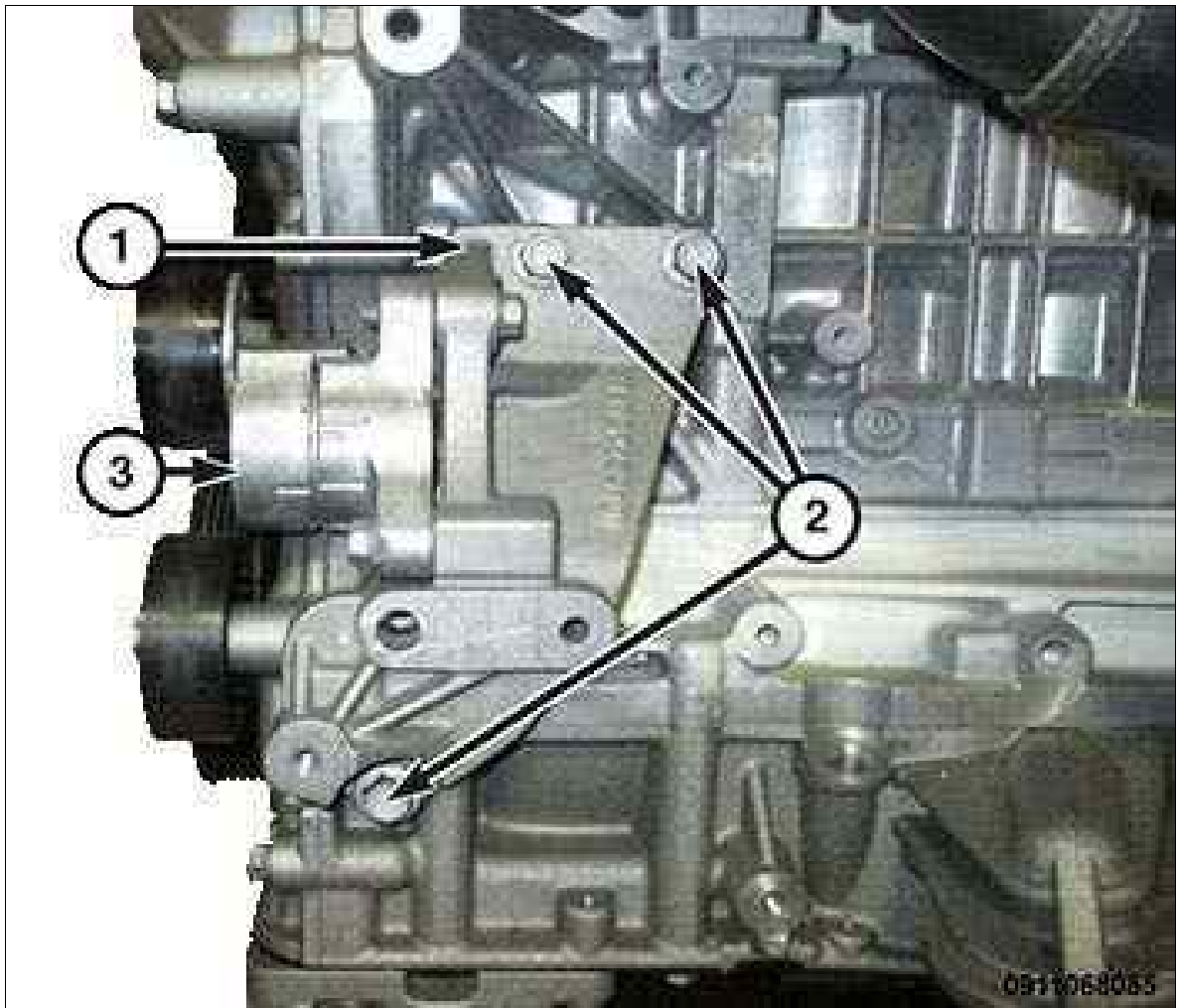
Fig 11: Filter Housing & Motor Oil Cooler



Courtesy of CHRYSLER GROUP, LLC

16. Unscrew the filter (1) and remove the motor oil cooler.

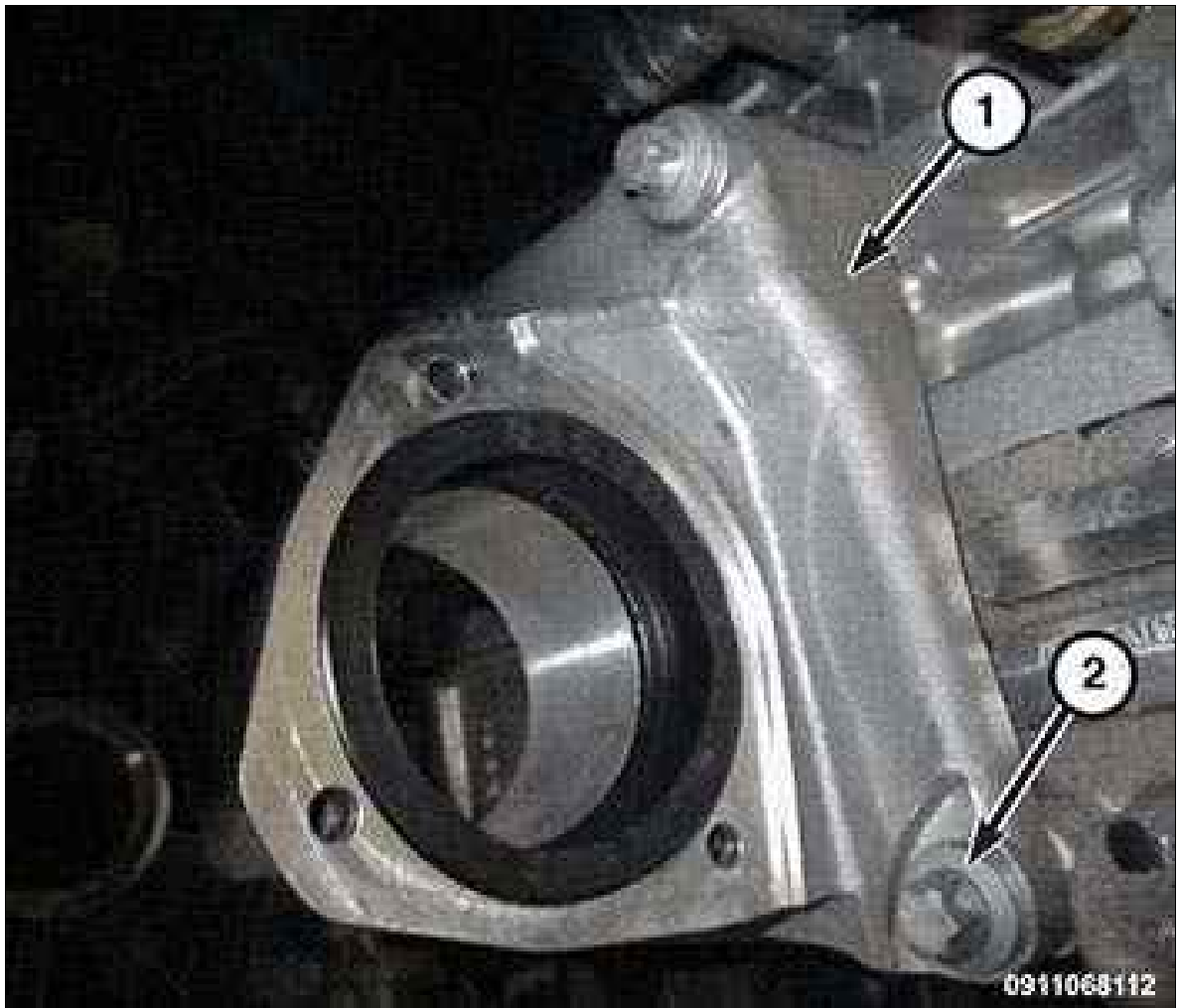
Fig 12: Generator Mounting Bracket, Accessory Belt Tensioner & Bolts



Courtesy of CHRYSLER GROUP, LLC

17. Remove the three bolts (2) and the generator mounting bracket (1) from the engine.

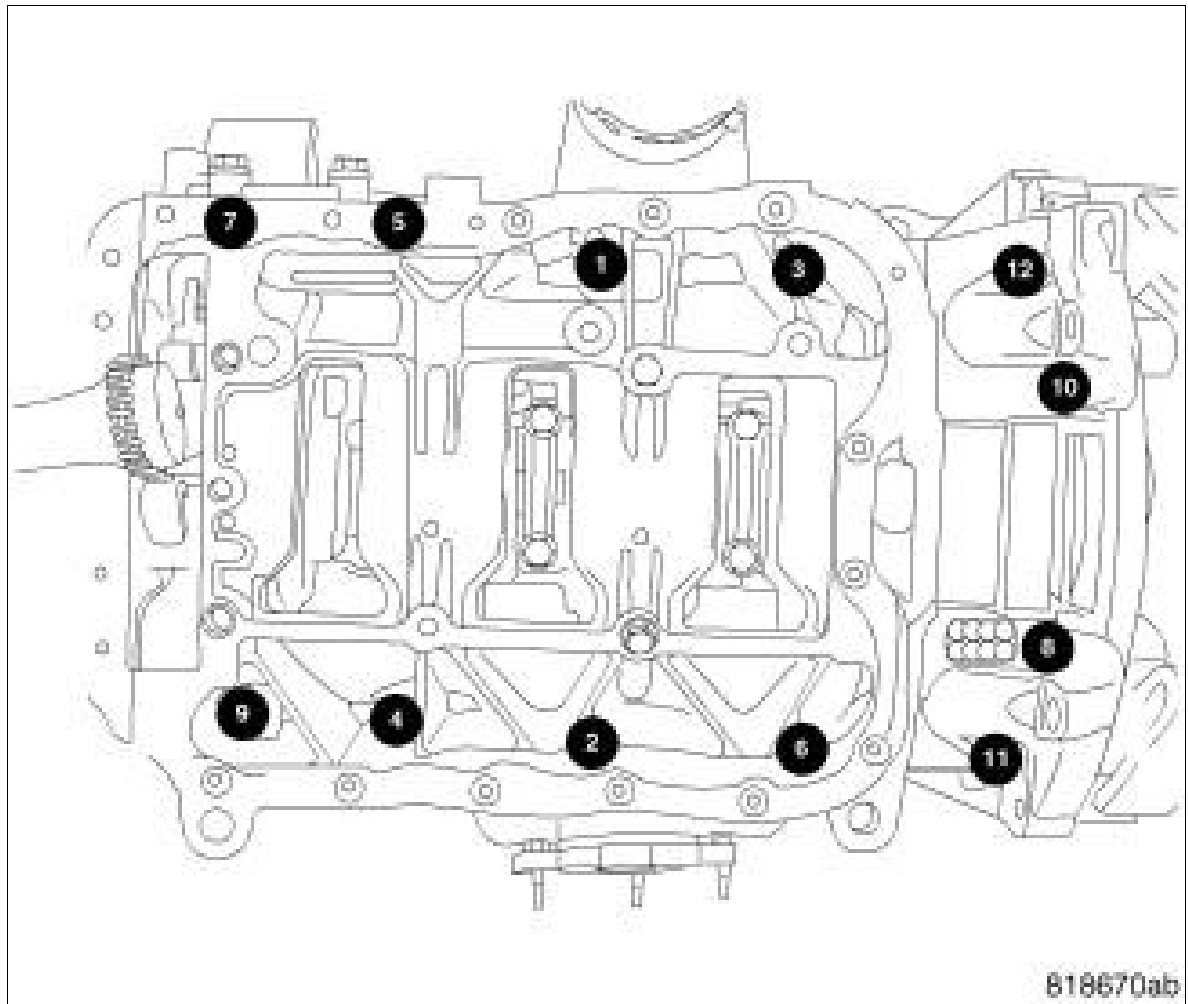
Fig 13: Intermediate Shaft Bearing Housing & Bolts



Courtesy of CHRYSLER GROUP, LLC

18. Remove the three bolts (2) and the intermediate shaft bearing support (1) from the engine, if equipped.

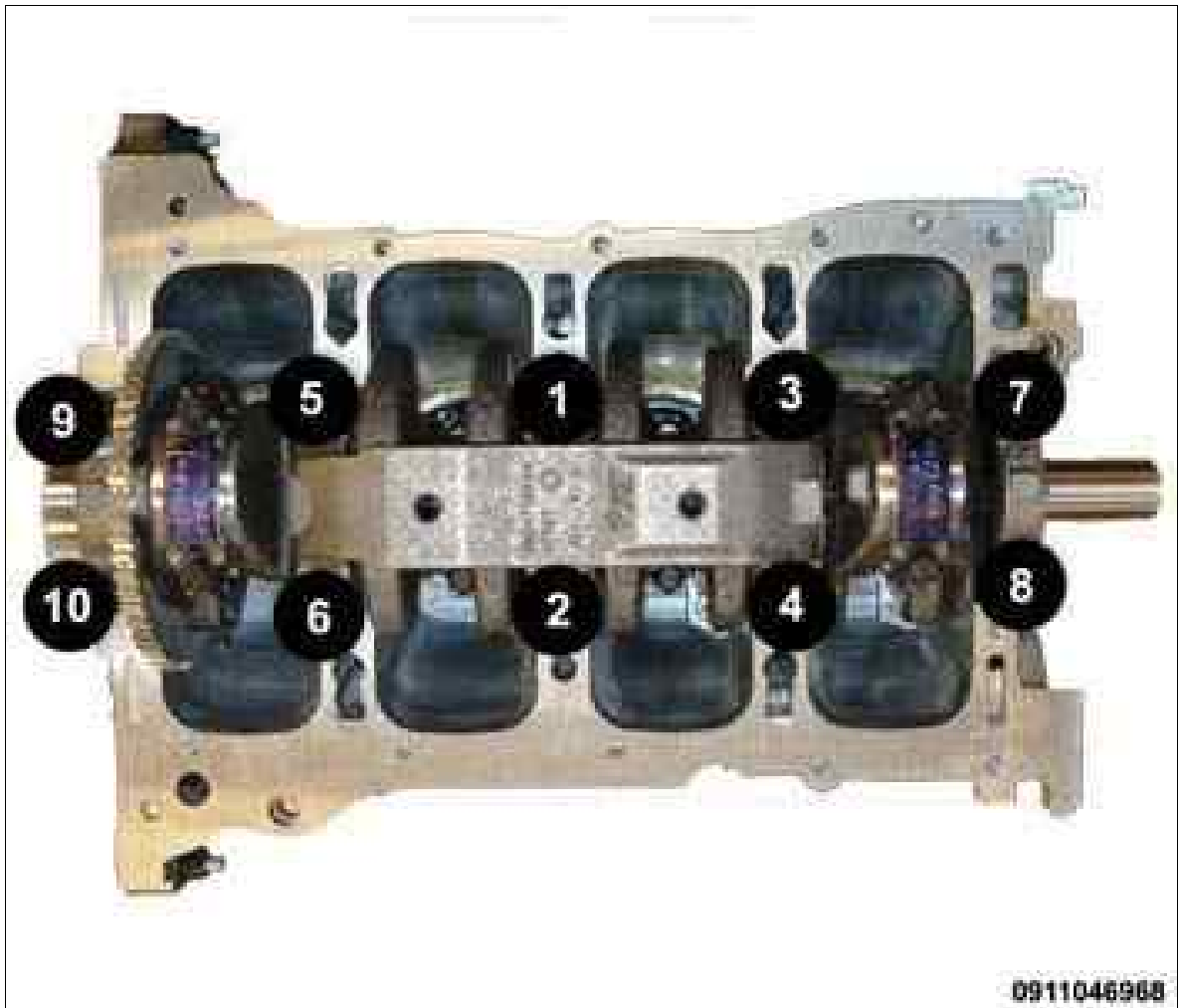
Fig 14: Ladder Frame Bolts Tightening Sequence



Courtesy of CHRYSLER GROUP, LLC

19. Remove the ladder frame bolts and separate the ladder frame from the engine block.

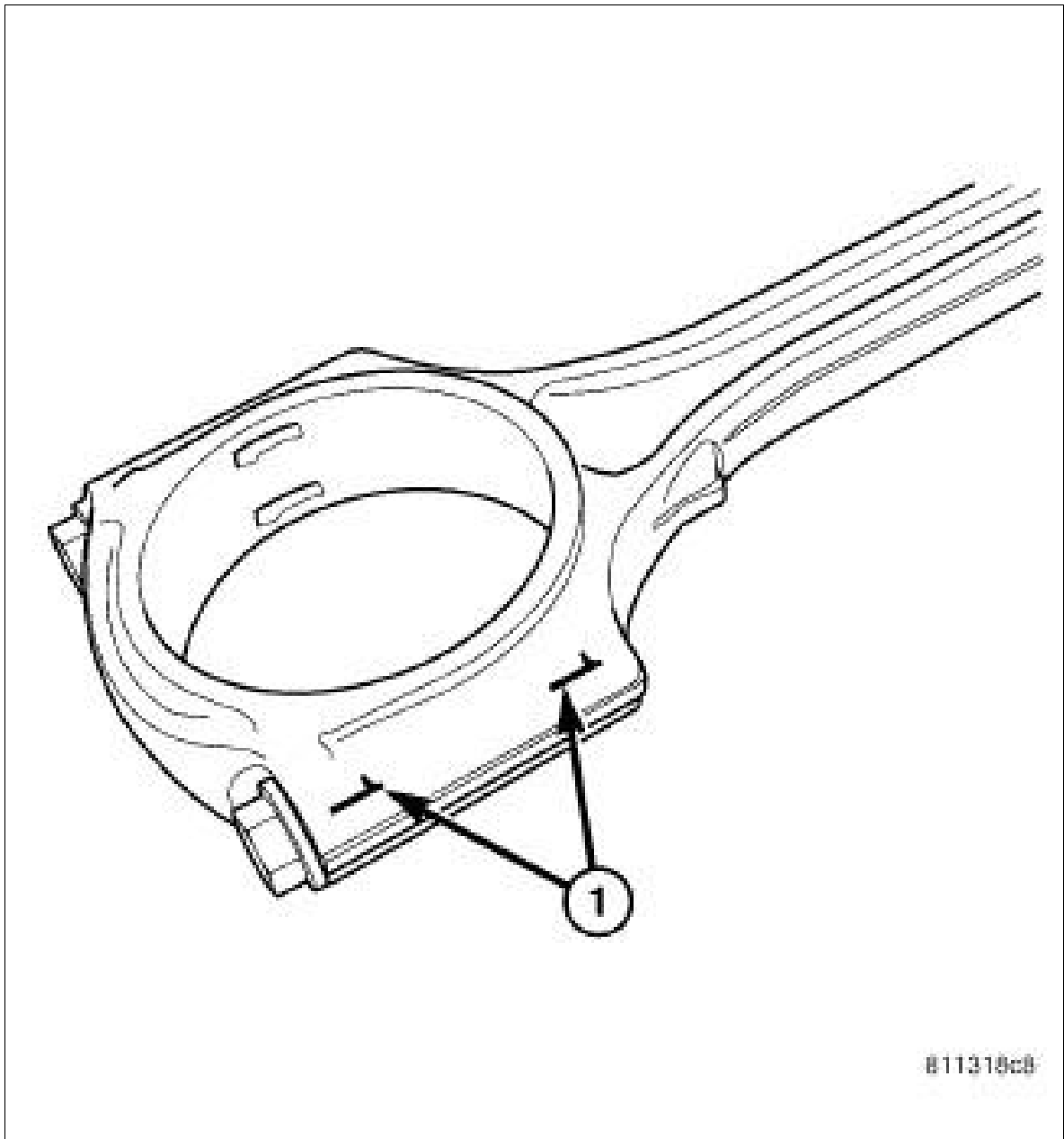
Fig 15: Main Bearing Cap Bolts Removal & Tightening Sequence



Courtesy of CHRYSLER GROUP, LLC

20. Loosen the ten main bearing cap bolts.
21. Remove the bearing beam bolts (1 - 6) and remove the bearing beam. Temporarily install main bearing cap bolts (M10 x 1.25 x 76.5) into the unsupported No. 2, 3 and 5 main bearing caps hand tight.

Fig 16: Connecting Rod To Cylinder Identification



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Courtesy of CHRYSLER GROUP, LLC

 NOTE:

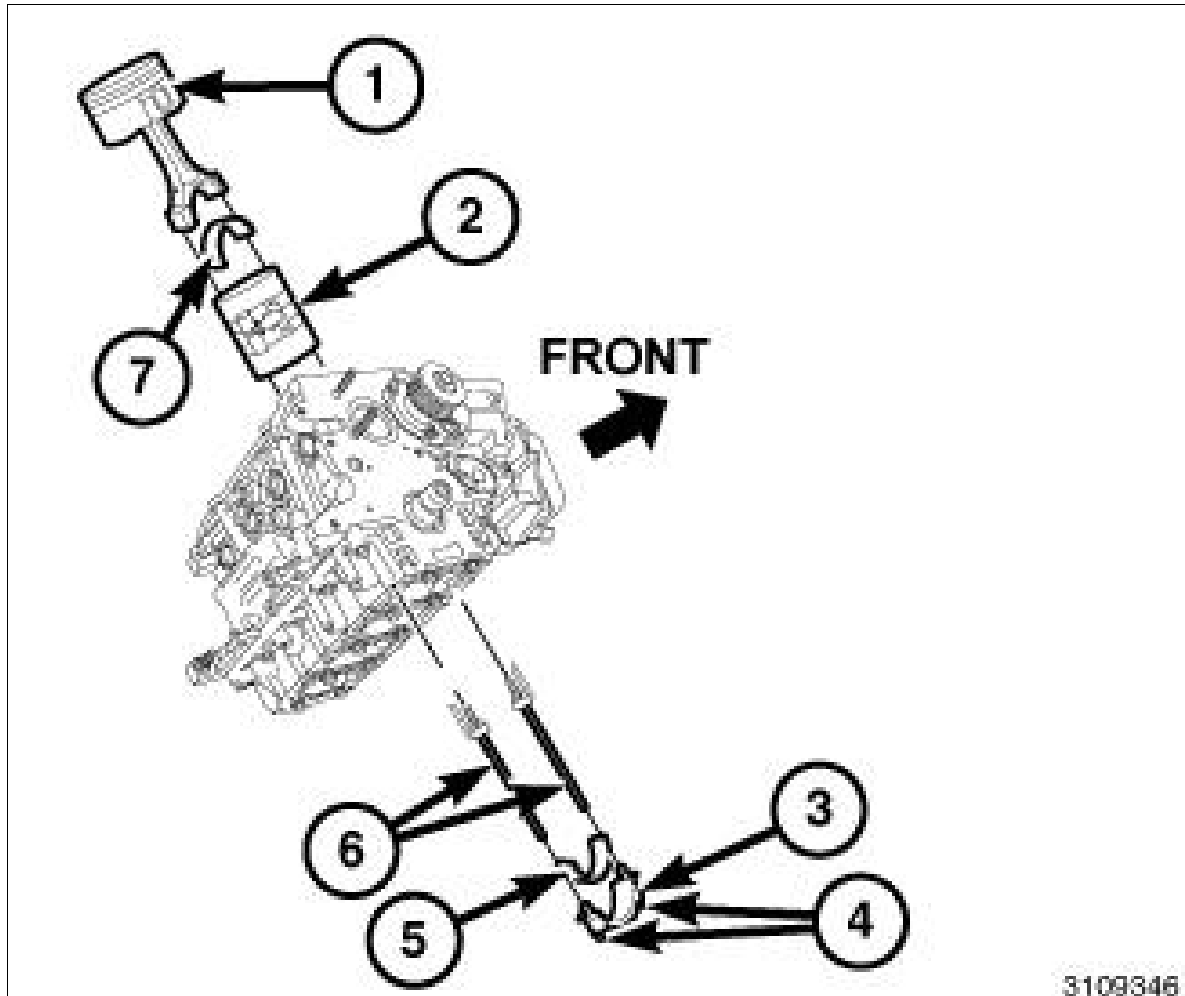
Connecting rods and bearing caps are not interchangeable and should be marked before removing to ensure correct reassembly.

 CAUTION:

DO NOT use a number stamp or a punch to mark connecting rods or caps, as damage to connecting rods could occur

22. Mark connecting rod and bearing cap positions (1) using a permanent ink marker or scribe tool.

Fig 17: Piston, Connecting Rod Cap, Bolts, Plastic Guide Plates & Guide Pins



Courtesy of CHRYSLER GROUP, LLC

 NOTE:

Typical I4 engine configuration shown in illustration.

23. If necessary, remove the top ridge of the cylinder bores with a reliable ridge reamer before removing the pistons from the engine block. **Be sure to keep the tops of pistons covered during this operation.** Pistons and connecting rods must be removed from the top of the engine block. When removing piston and connecting rod assemblies from the engine, rotate the crankshaft CW so that each connecting rod is centered in the cylinder bore.

24. Remove the connecting rod cap bolts (4) and the connecting rod cap (3). Discard the cap bolts (4).



CAUTION:

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

25. Install the (special tool #10281, Pins, Connecting Rod Guide) (6) on the connecting rod being removed.



CAUTION:

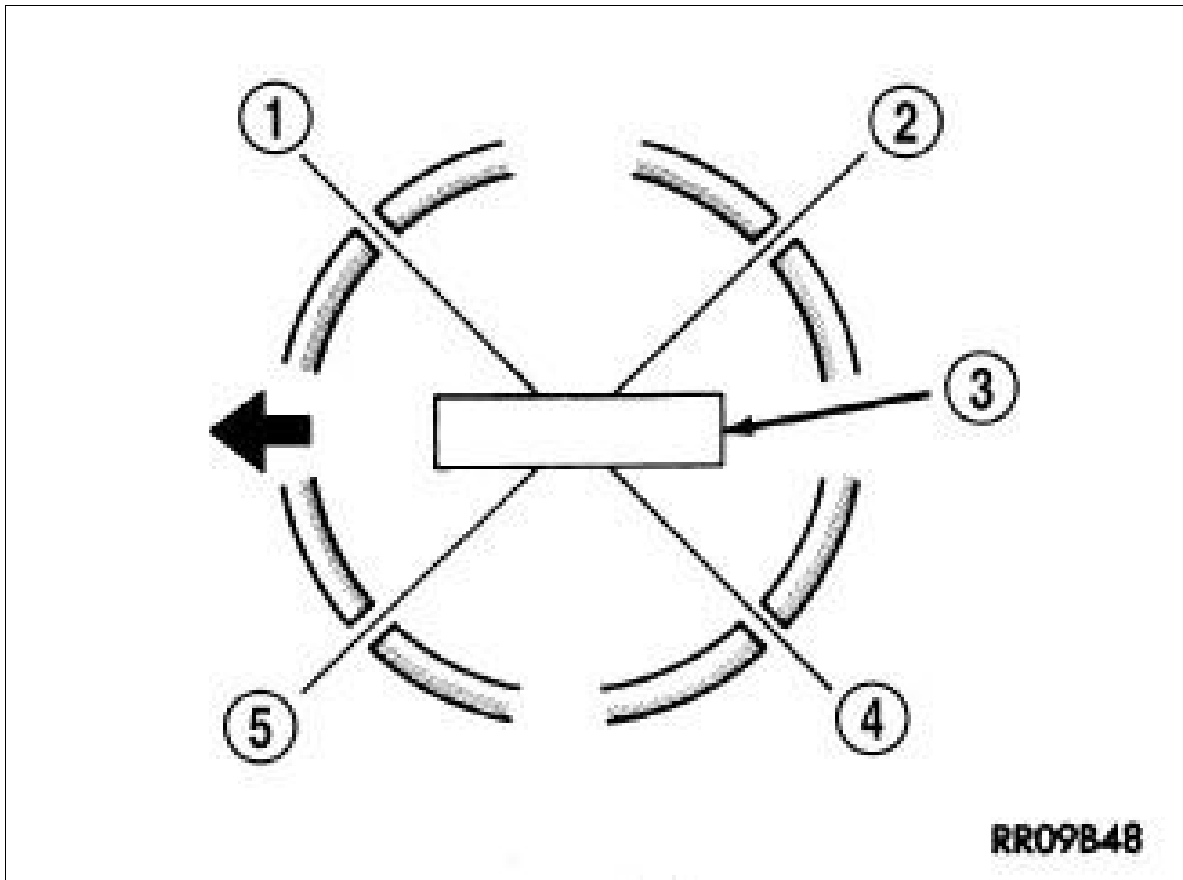
Avoid contact with the piston oil cooler jet(s). Positioning of the oil cooler jet(s) is critical for proper engine operation.

26. Remove the connecting rod and piston assembly (1) complete with upper bearing shell (7) from the cylinder bore.
27. Repeat the previous steps for each piston being removed.
28. Immediately after piston and connecting rod removal, reinstall the bearing cap (3) on the mating connecting rod to prevent damage to the fractured cap and rod surfaces.
29. If required, remove the piston rings. Refer to RING(S), PISTON, REMOVAL AND INSTALLATION .

ENGINE BLOCK > ROD, PISTON AND CONNECTING > REMOVAL AND INSTALLATION > REMOVAL AND INSTALLATION > INSTALLATION

1. If required, select and fit new piston and connecting rod assemblies to the engine block. Refer to ROD, PISTON AND CONNECTING, STANDARD PROCEDURE .
2. If required, hone the cylinder bores. Refer to STANDARD PROCEDURE .
3. If removed, install the piston rings. Refer to RING(S), PISTON, REMOVAL AND INSTALLATION .

Fig 1: Piston Ring End Gap Position

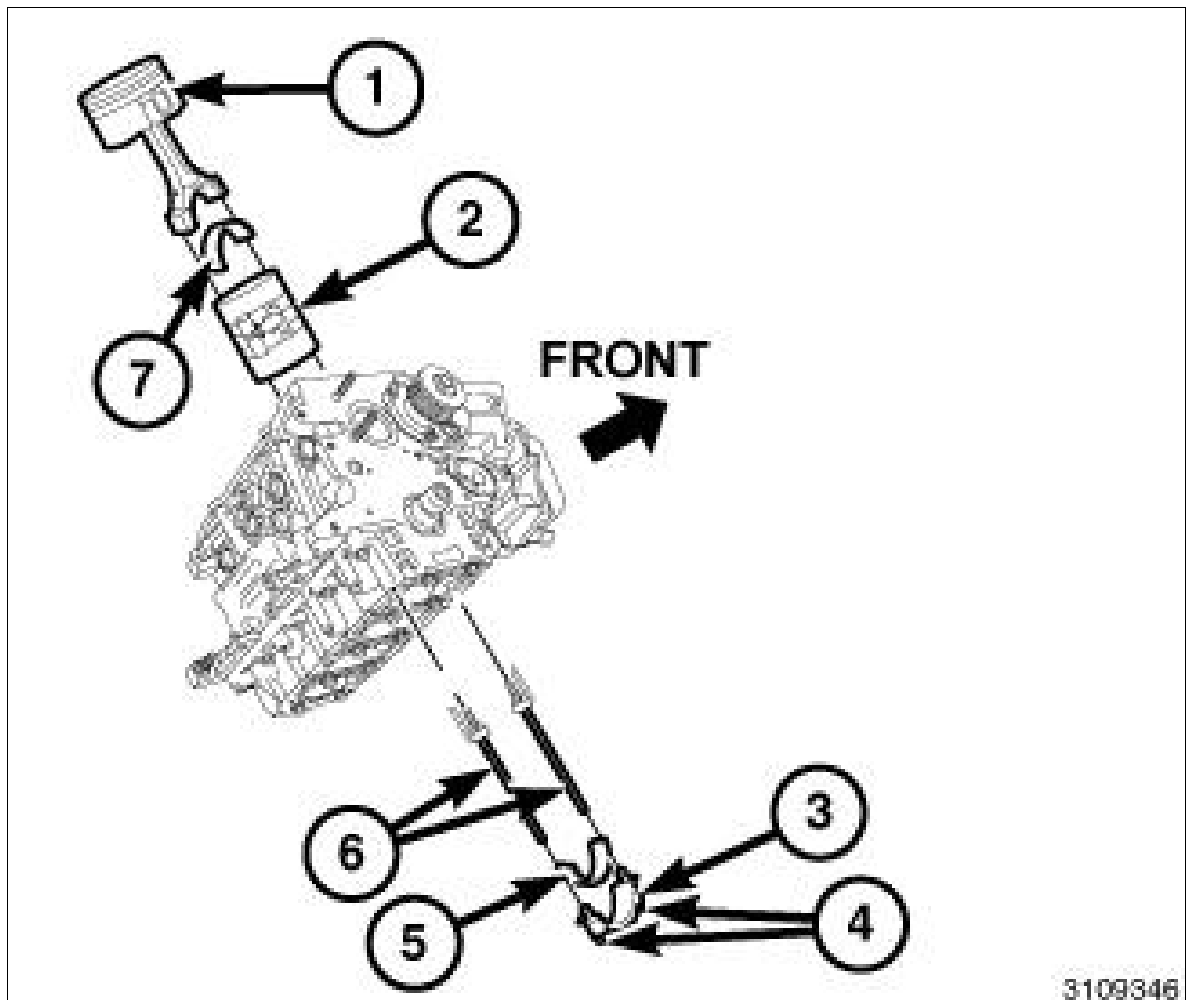


Courtesy of CHRYSLER GROUP, LLC

4. Position the piston ring end gaps as follows:

1. Oil ring expander gap (5)
2. Oil ring lower side rail end gap (4)
3. Oil ring upper side rail end gap (1)
4. No. 2 (intermediate) ring end gap (5)
5. No. 1 (upper) ring end gap (2)

Fig 2: Piston, Connecting Rod Cap, Bolts, Plastic Guide Plates & Guide Pins



Courtesy of CHRYSLER GROUP, LLC

 NOTE:

Typical I4 engine configuration shown in illustration.

 NOTE:

Ensure the position of the ring end gaps does not change when installing the ring compressor (2).

5. Lubricate the piston rings with clean engine oil. Position the (special tool #C-385, Compressor, Piston) (2) over the piston and rings. Tighten the compressor (2).

 NOTE:

Install the rod bearings in pairs. Do not mix sizes or use a new bearing half with an

old bearing half.

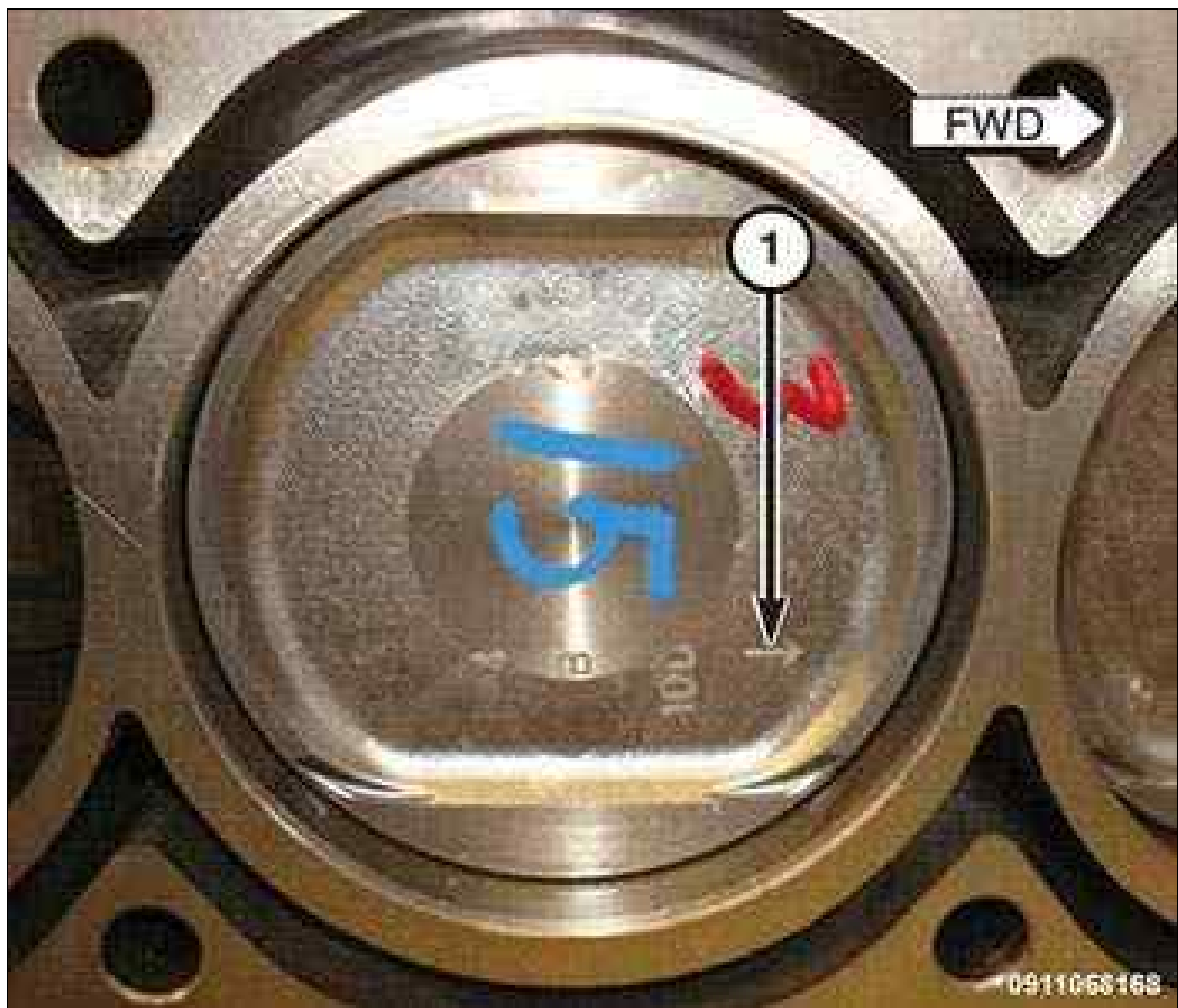
6. Install the bearing shell (7) on the connecting rod with the tang inserted into the machined groove in the rod. Lubricate the bearing surface with clean engine oil.
7. Install the (special tool #10281, Pins, Connecting Rod Guide) (6) on the connecting rod.



CAUTION:

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

Fig 3: Locating Arrow Stamped On Piston Crown



Courtesy of CHRYSLER GROUP, LLC

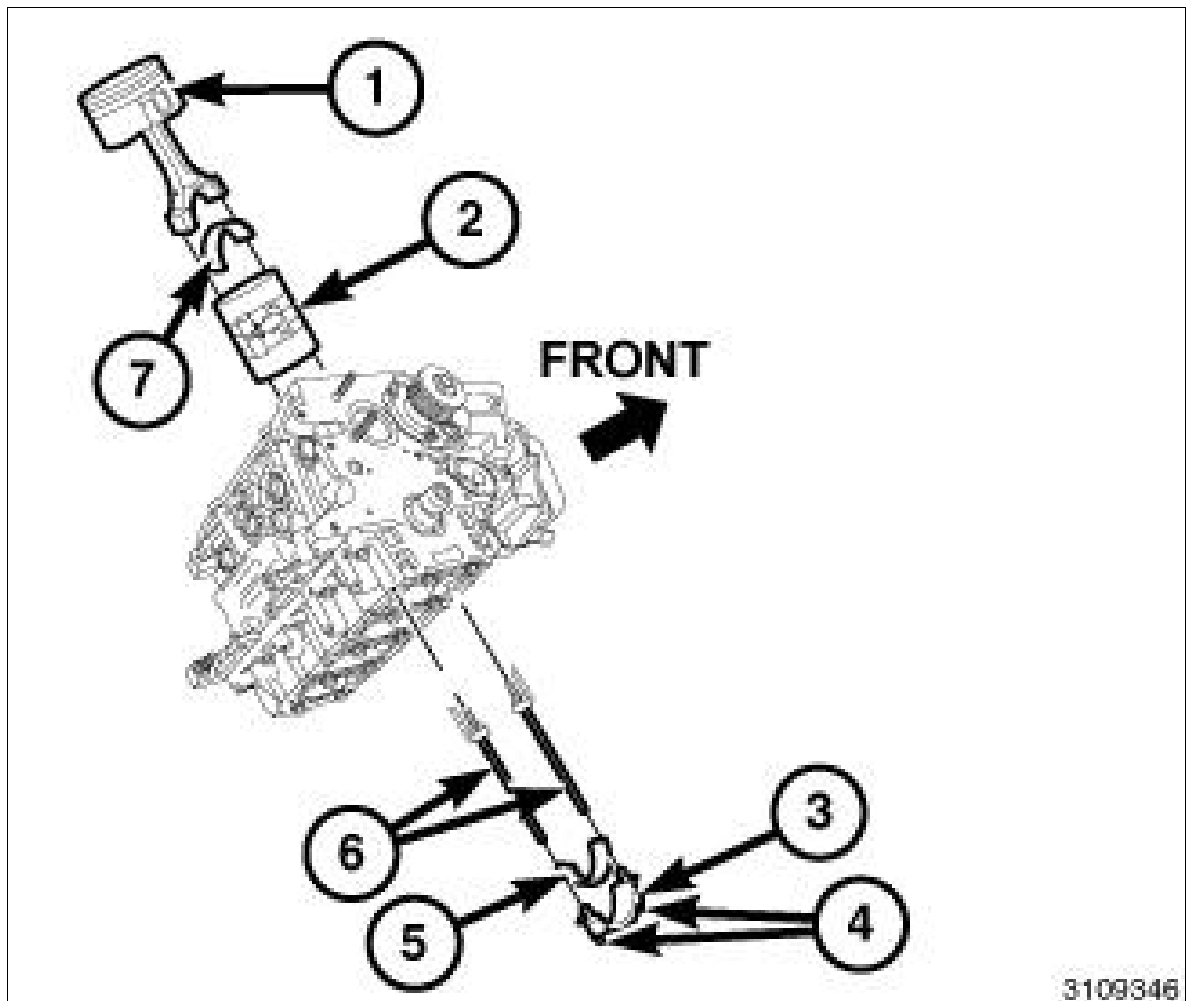
8. The pistons crowns are stamped with an arrow (1). The piston and connecting rod assemblies must be installed so the arrow points toward the front of the engine.
9. Wipe the cylinder bore clean and lubricate with clean engine oil.
10. Rotate the crankshaft until the connecting rod journal is on the center of cylinder bore.

 CAUTION:

Avoid contact with the piston oil cooler jet(s). Positioning of the oil cooler jet(s) is critical for proper engine operation.

11. Insert the piston and connecting rod into the cylinder bore and carefully position the guide pins over the crankshaft journal.
12. Tap the piston down in the cylinder bore using a hammer handle while guiding the connecting rod into position over the rod journal.

Fig 4: Piston, Connecting Rod Cap, Bolts, Plastic Guide Plates & Guide Pins



Courtesy of CHRYSLER GROUP, LLC

 NOTE:

Typical I4 engine configuration shown in illustration.

 CAUTION:

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

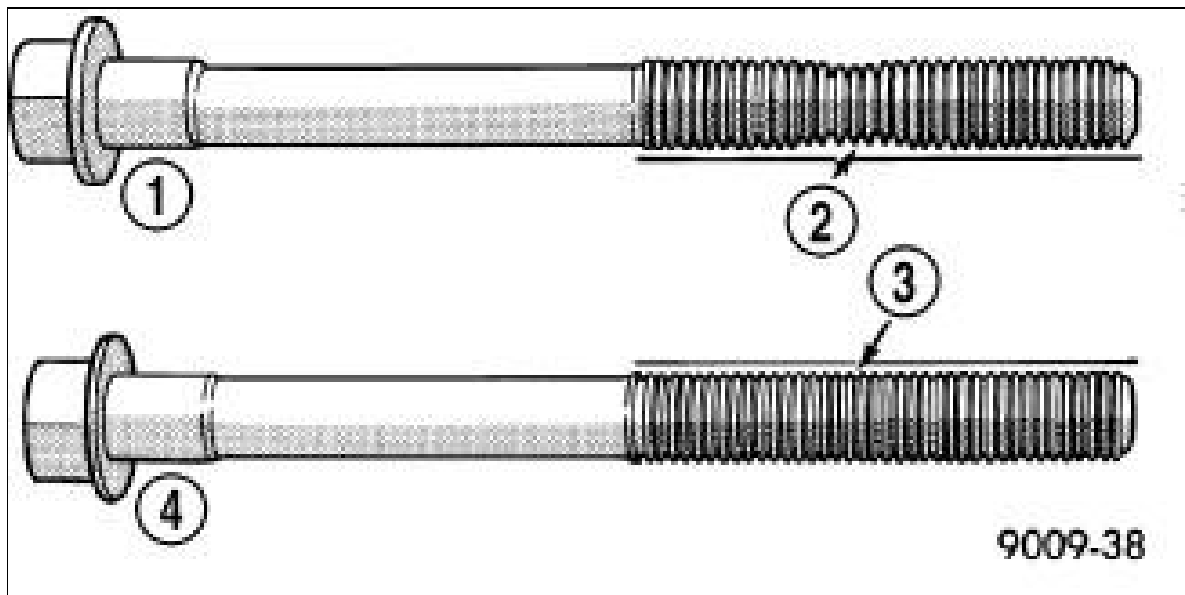
13. Install the bearing shell (5) on the connecting rod cap (3) with the tang inserted into the machined groove in the cap. Lubricate the bearing surface with clean engine oil.

 NOTE:

Do not lubricate the threads of the connecting rod cap bolts (4).

14. Install the connecting rod cap and bearing with the tang on the same side as the rod. Tighten the **NEW** connecting rod cap bolts (4) to the proper specification. Refer to TORQUE SPECIFICATIONS .
15. If required, check the connecting rod side clearance. Refer to ROD, PISTON AND CONNECTING, STANDARD PROCEDURE .
16. Repeat the previous steps for each piston being installed.

Fig 5: Checking Cylinder Head Bolts For Stretching (Necking)



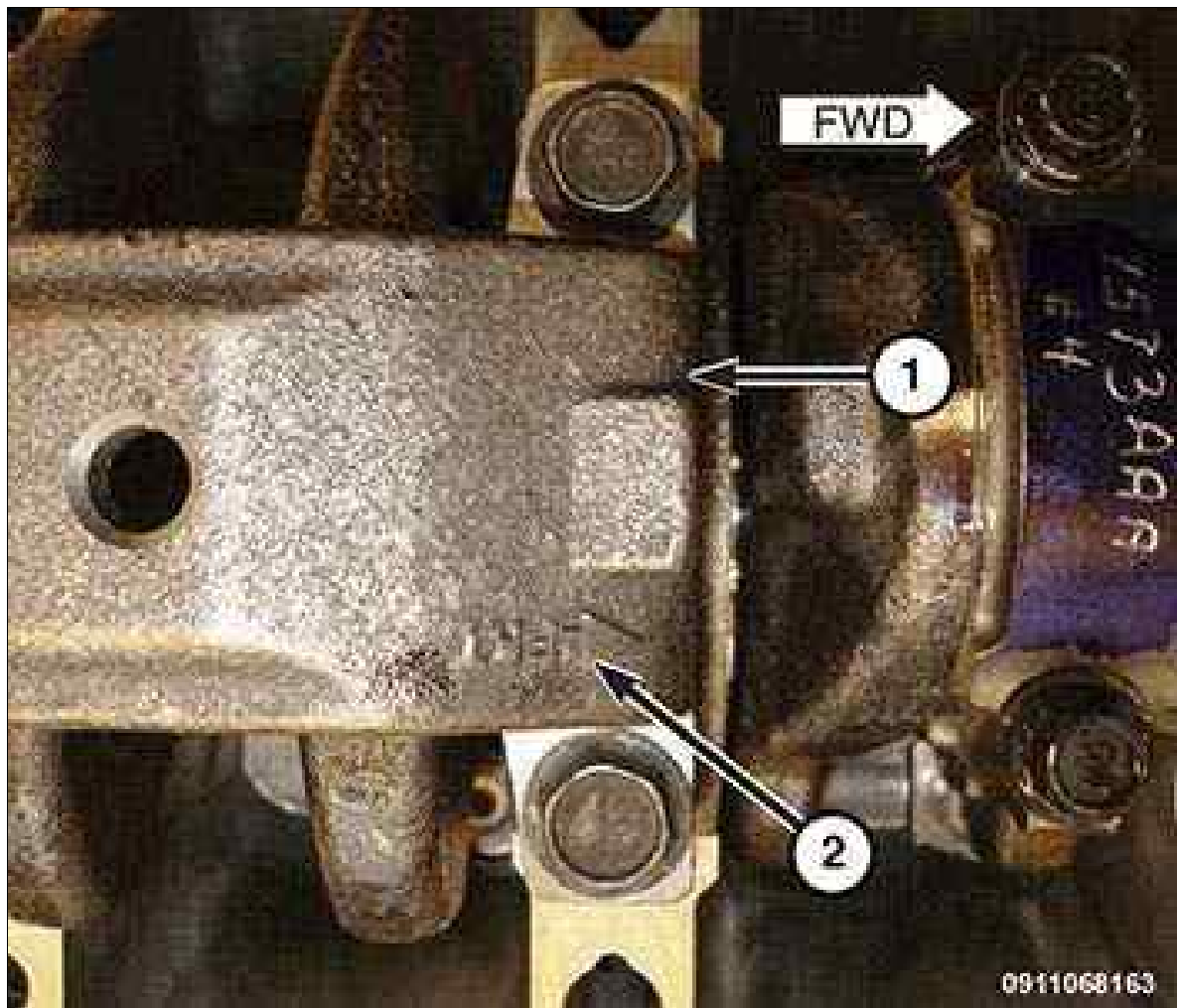
Courtesy of CHRYSLER GROUP, LLC

 CAUTION:

*The main bearing cap bolts are tightened using a torque plus angle procedure. The bolts must be examined **BEFORE** reuse. If the threads are necked down the bolts must be replaced.*

17. Check the main bearing cap bolts for necking by holding a scale or straight edge against the threads. If all the threads do not contact the scale (2) the bolt must be replaced.

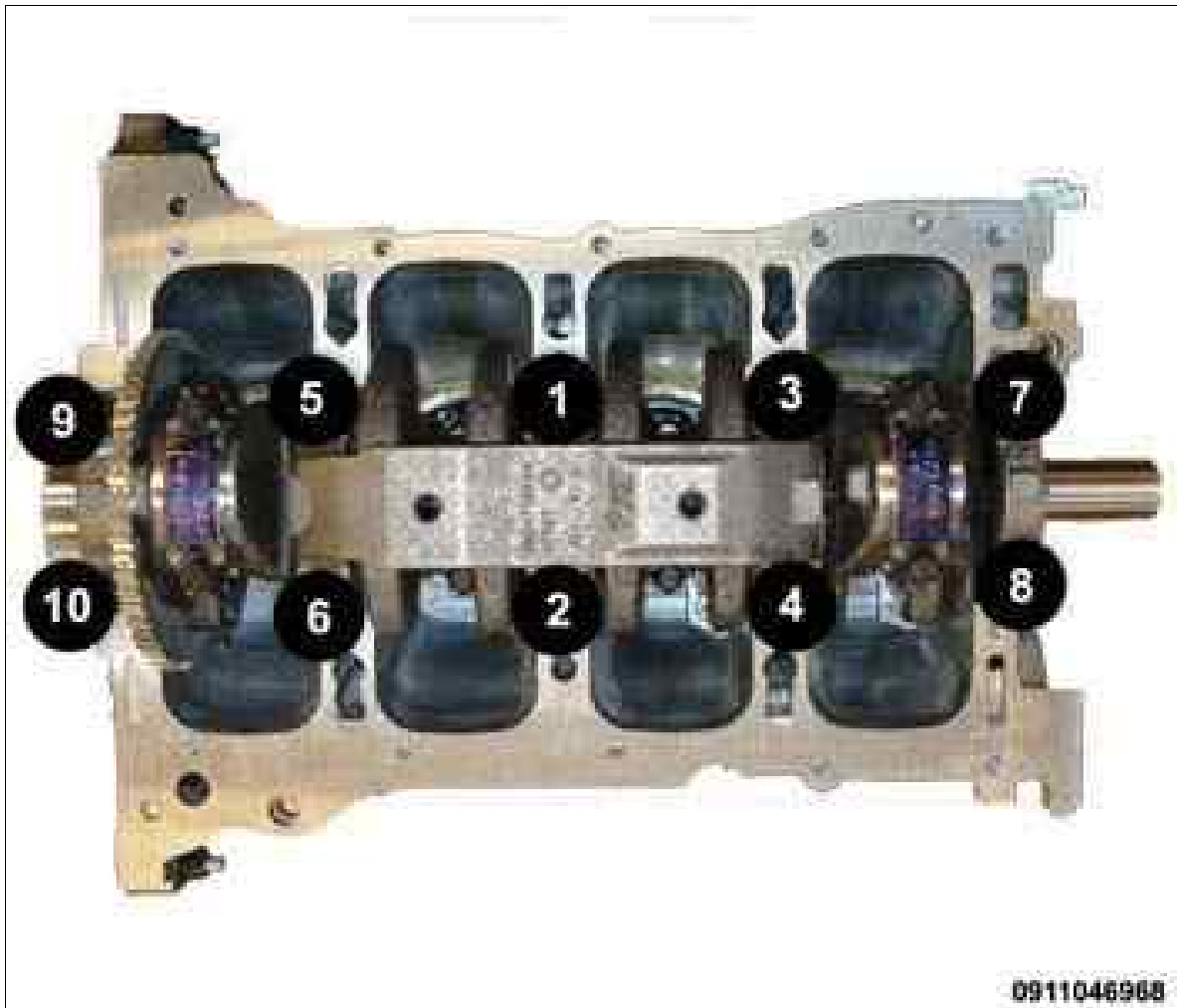
Fig 6: Bearing Beam Installed With Indication Pointing To Front Of Engine



Courtesy of CHRYSLER GROUP, LLC

18. Remove the temporarily installed cap bolts from main bearing caps 2, 3 and 5. Install the bearing beam (1) with its longer bolts so that the <FRT indication (2) is pointing to the front of the engine.

Fig 7: Main Bearing Cap Bolts Removal & Tightening Sequence

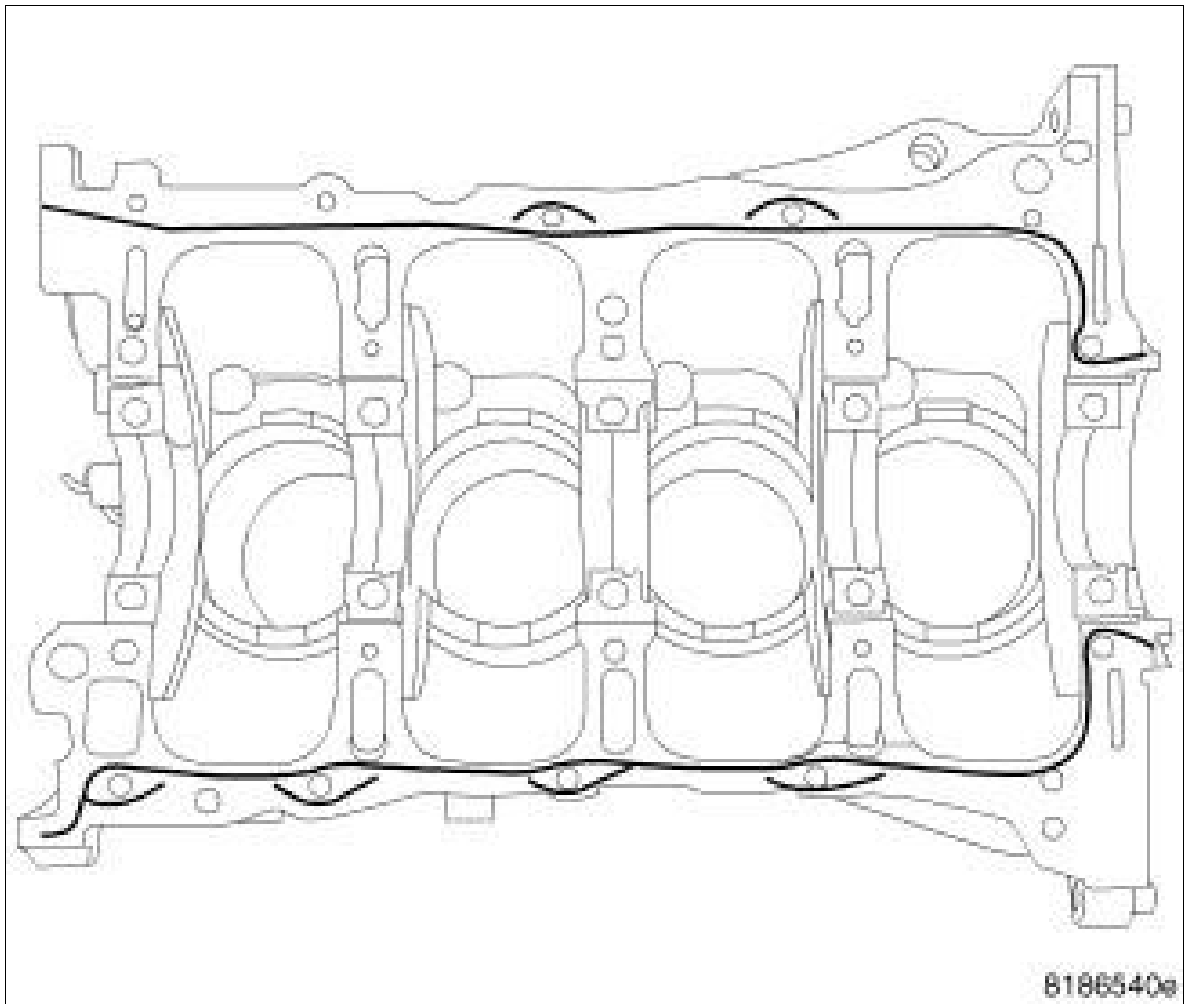


Courtesy of CHRYSLER GROUP, LLC

19. Tighten the ten main bearing cap bolts in the sequence shown in illustration, following this 3 step torque plus angle method. Tighten according to the following torque values:

1. Step 1: All to 15 N.m (11 ft. lbs.)
2. Step 2: All to 45 N.m (33 ft. lbs.)
3. Step 3: All an additional 45° Turn **Do not use a torque wrench for this step.**

Fig 8: Sealing Ladder Frame



Courtesy of CHRYSLER GROUP, LLC

20. Clean the ladder frame sealing surfaces with isopropyl alcohol in preparation for sealant application.

 CAUTION:

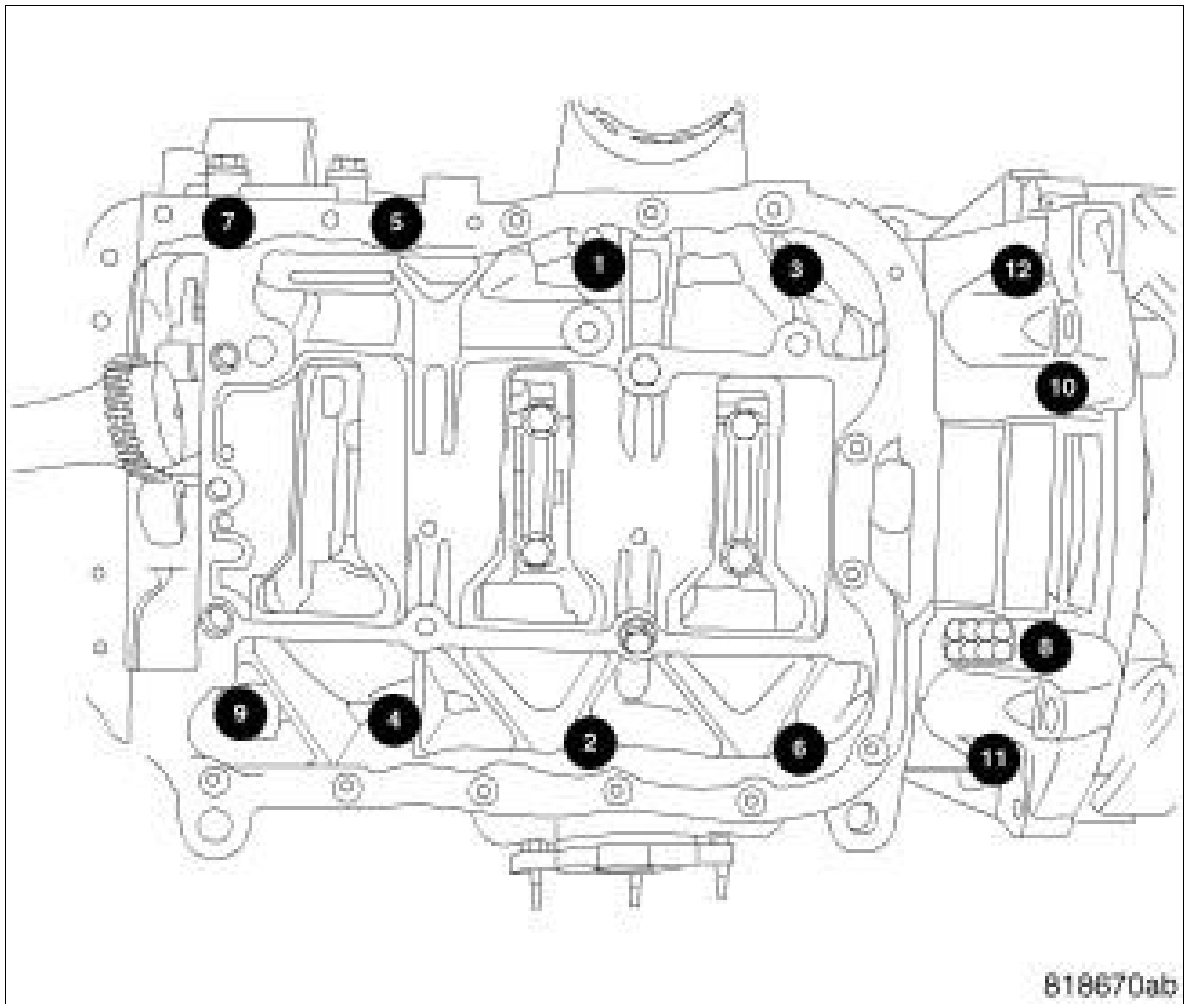
Engine assembly requires the use of a unique sealant that is compatible with engine oil. Using a sealant other than Mopar® Engine Sealant RTV Silicone Rubber Adhesive may result in engine fluid leakage.

 CAUTION:

Following the application of Mopar® Engine Sealant RTV Silicone Rubber Adhesive to the gasket surfaces, the components must be assembled within 10 minutes and the attaching fasteners must be tightened to specification within the next 10 minutes. Prolonged exposure to the air prior to assembly may result in engine fluid leakage.

21. Apply a 2 mm bead of Mopar® Engine Sealant RTV Silicone Rubber Adhesive as shown in illustration.

Fig 9: Ladder Frame Bolts Tightening Sequence

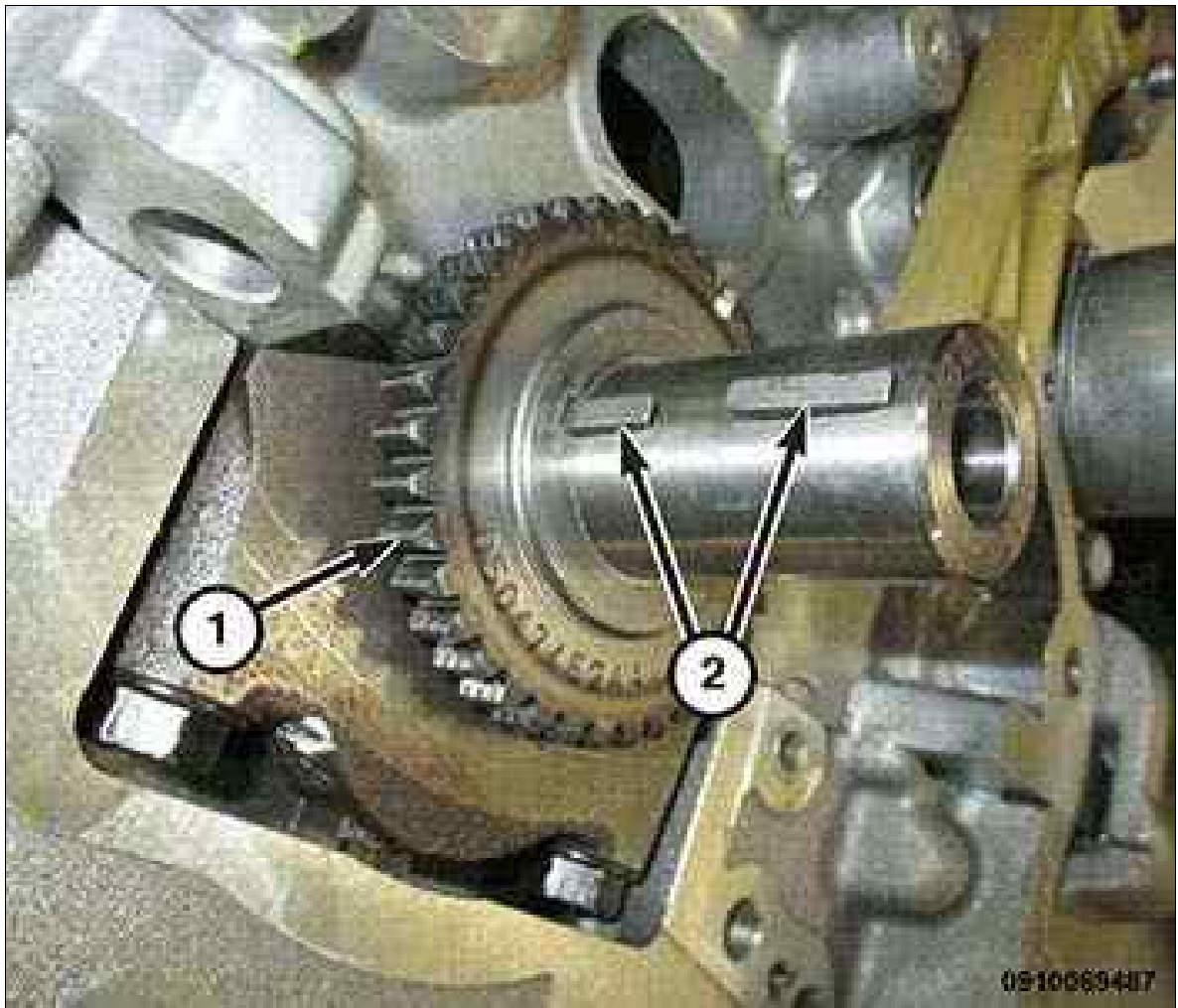


Courtesy of CHRYSLER GROUP, LLC

22. Install the ladder frame and tighten the twelve bolts in the sequence shown in illustration, following this 2 step method. Tighten according to the following torque values:

1. Step 1: All to 10 N.m (89 in. lbs.).
2. Step 2: All to 26 N.m (19 ft. lbs.).

Fig 10: Crankshaft Sprocket & Keys



Courtesy of CHRYSLER GROUP, LLC

23. If removed, install the crankshaft sprocket key (2) in the crankshaft.
24. Install the crankshaft sprocket (1).

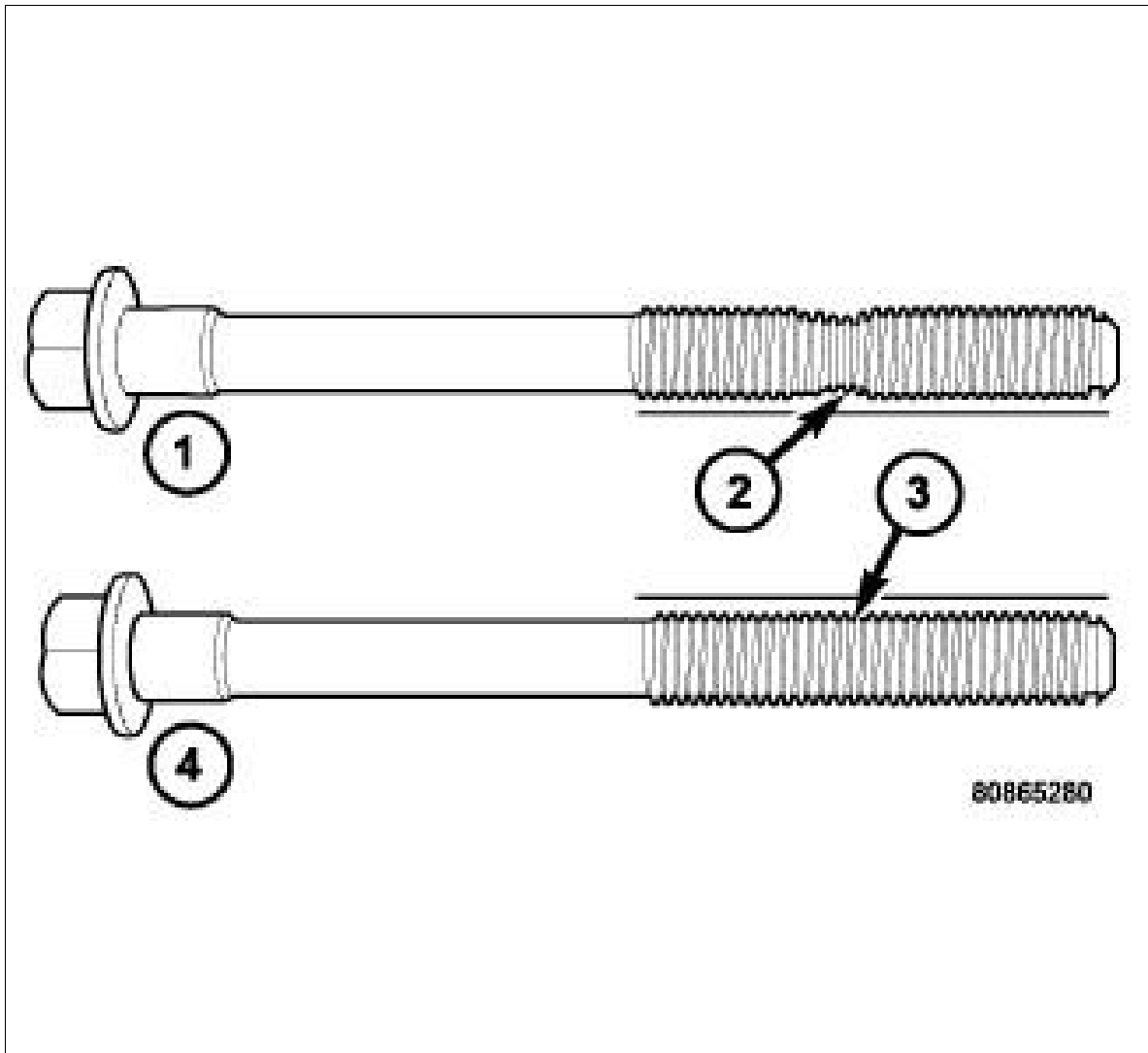
Fig 11: Marking Chain Link Corresponding To Crankshaft Sprocket Timing Mark



Courtesy of CHRYSLER GROUP, LLC

25. Align the timing chain onto the crank sprocket mark (2) using the painted link (1) as a guide.

Fig 12: Checking Cylinder Head Bolts For Stretching (Necking)



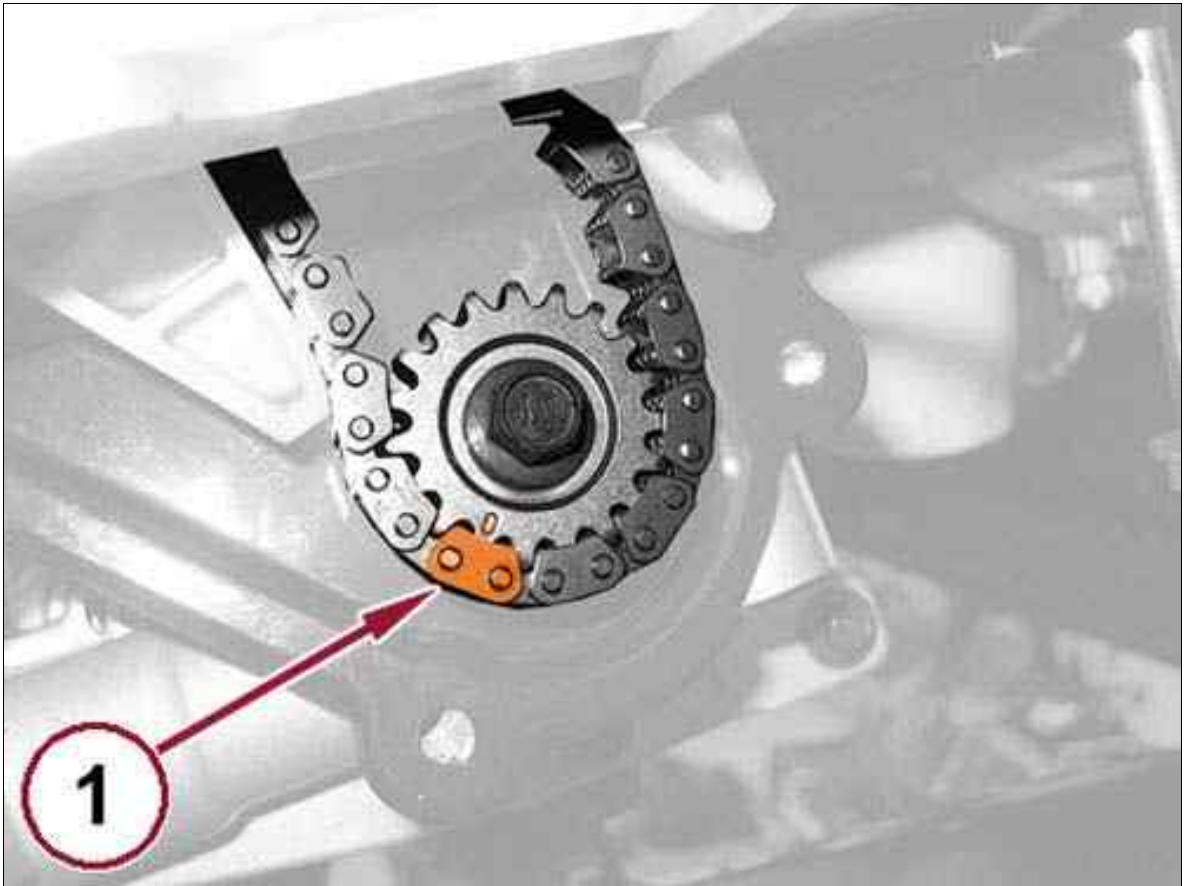
Courtesy of CHRYSLER GROUP, LLC

 CAUTION:

The balance shaft/oil pump assembly bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts must be replaced.

26. Check the balance shaft/oil pump bolts for necking by holding a scale or straight edge against the threads. If all the threads do not contact the scale (2) the bolt must be replaced.

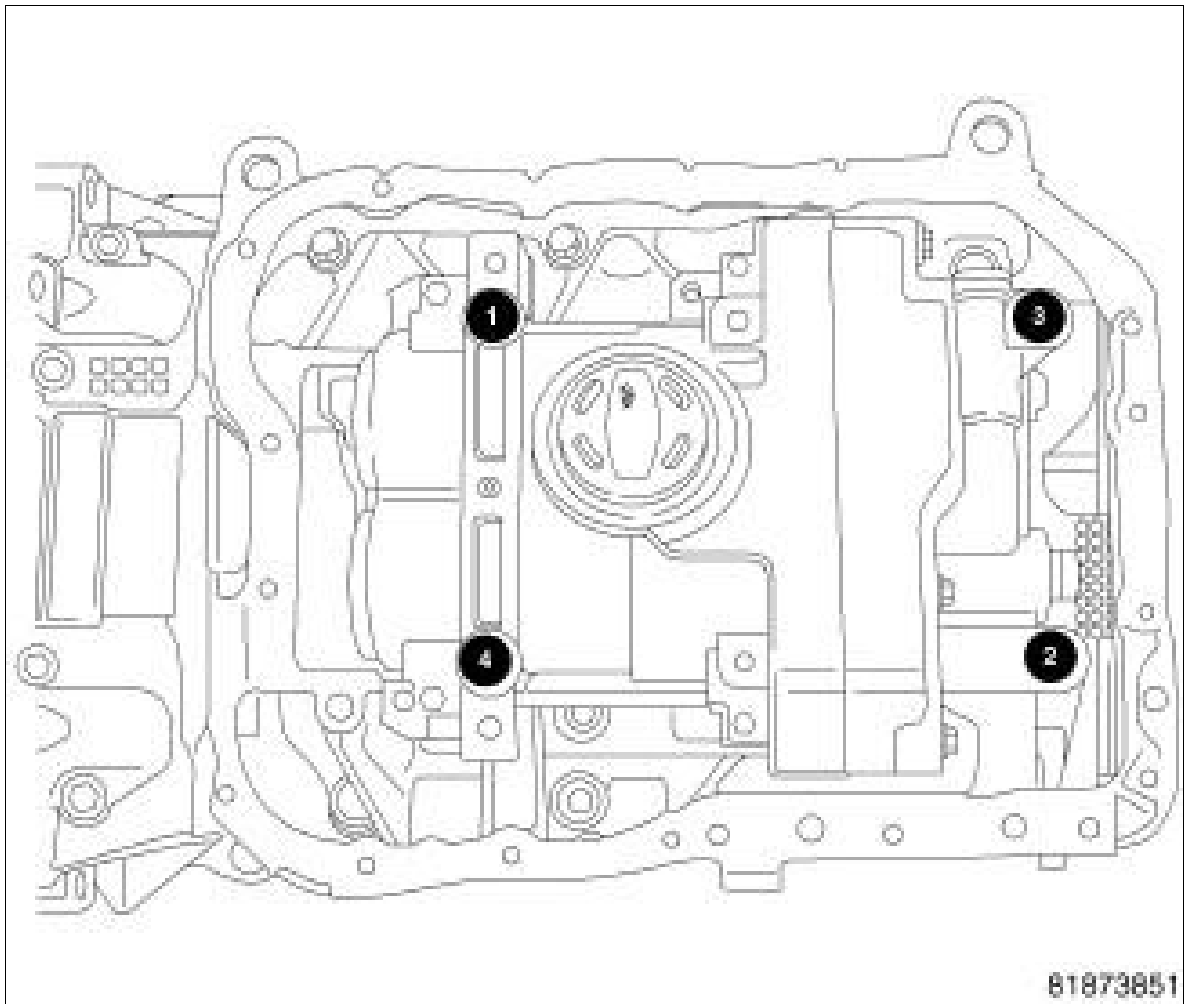
Fig 13: Marking Chain Link Corresponding To Balance Shaft/Oil Pump Sprocket Timing Mark



Courtesy of CHRYSLER GROUP, LLC

27. Align the timing chain onto the balance shaft/oil pump sprocket mark using the painted link (1) as a guide.
28. With the rear of the balance shaft/oil pump assembly on a slight angle, position the gear into the chain links and install the balance shaft/oil pump assembly on the ladder frame. Make sure the paint marks are aligned.

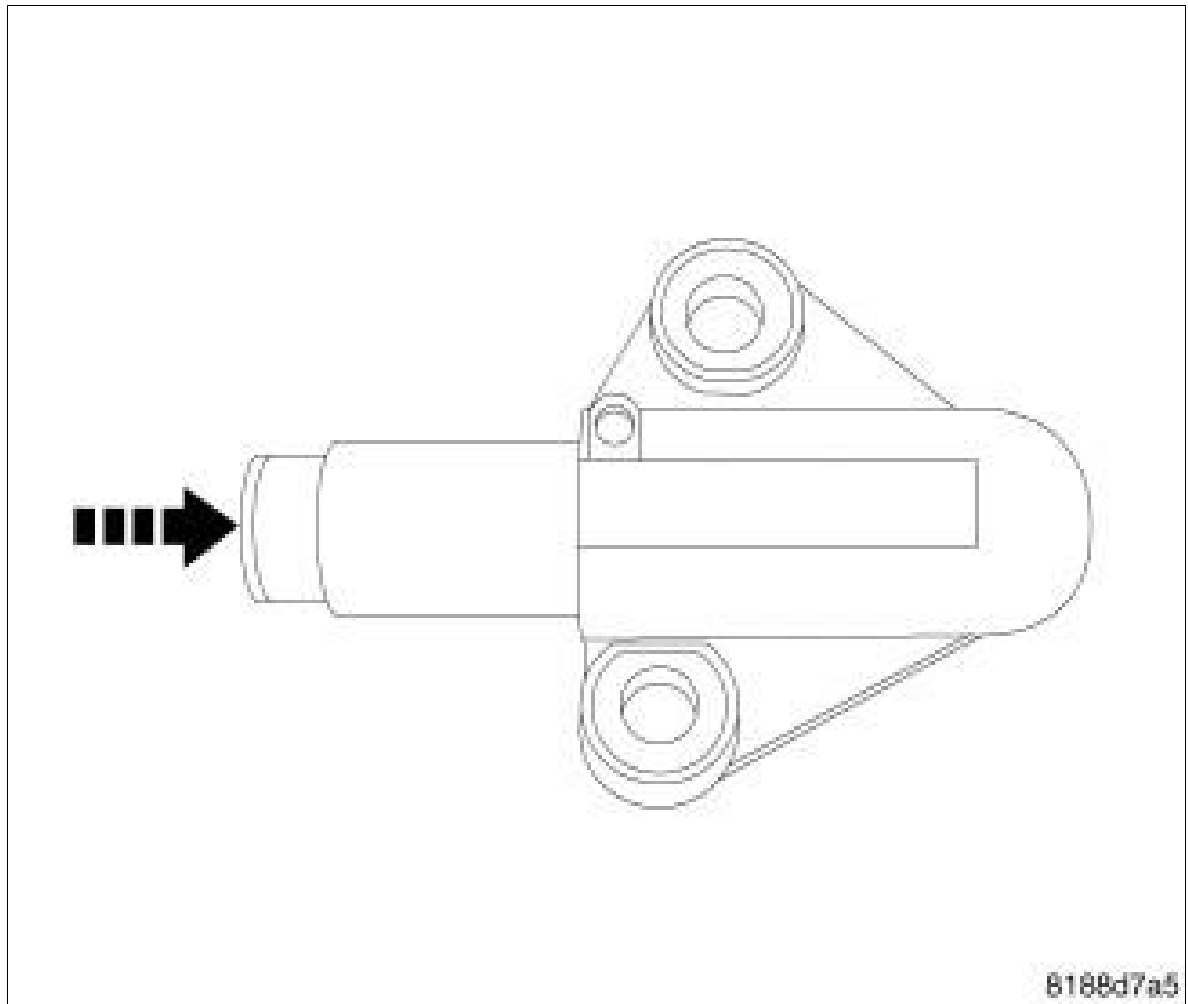
Fig 14: BSM Mounting Bolts Tightening Sequence



Courtesy of CHRYSLER GROUP, LLC

29. Install the four balance shaft/oil pump bolts finger tight.
30. Tighten the balance shaft/oil pump bolts in the sequence shown in illustration, following the 3 step torque plus an ending torque angle method. Tighten according to the following torque values:
 1. Step 1: All to 15 N.m (11 ft. lbs.)
 2. Step 2: All to 29 N.m (22 ft. lbs.)
 3. Step 3: All an additional 90° **Do not use a torque wrench for this step.**

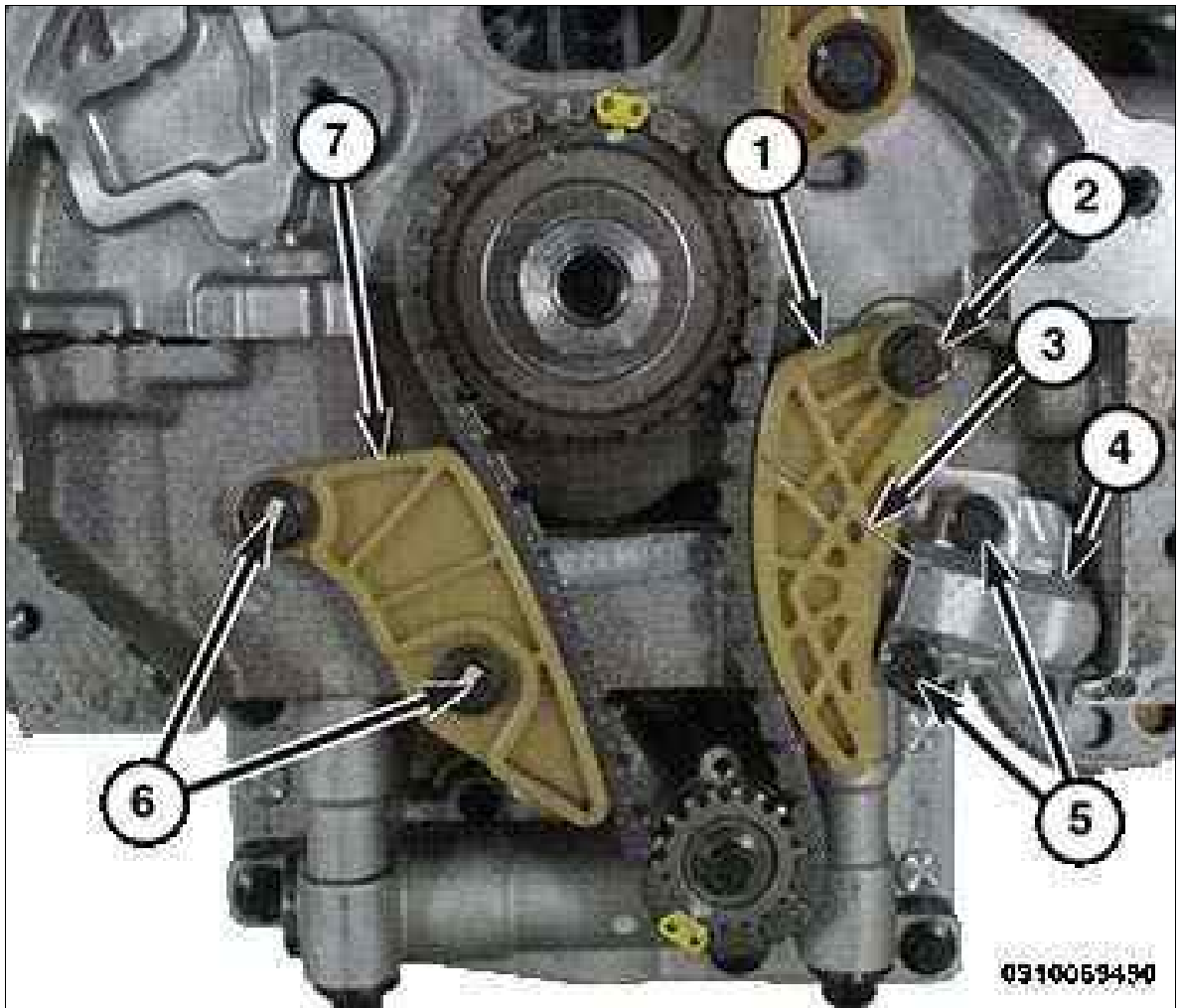
Fig 15: Oil Pump Tensioner Reset



Courtesy of CHRYSLER GROUP, LLC

31. Reset the balance shaft/oil pump chain tensioner by pushing the plunger inward and installing a pin to hold the plunger in the retracted position.

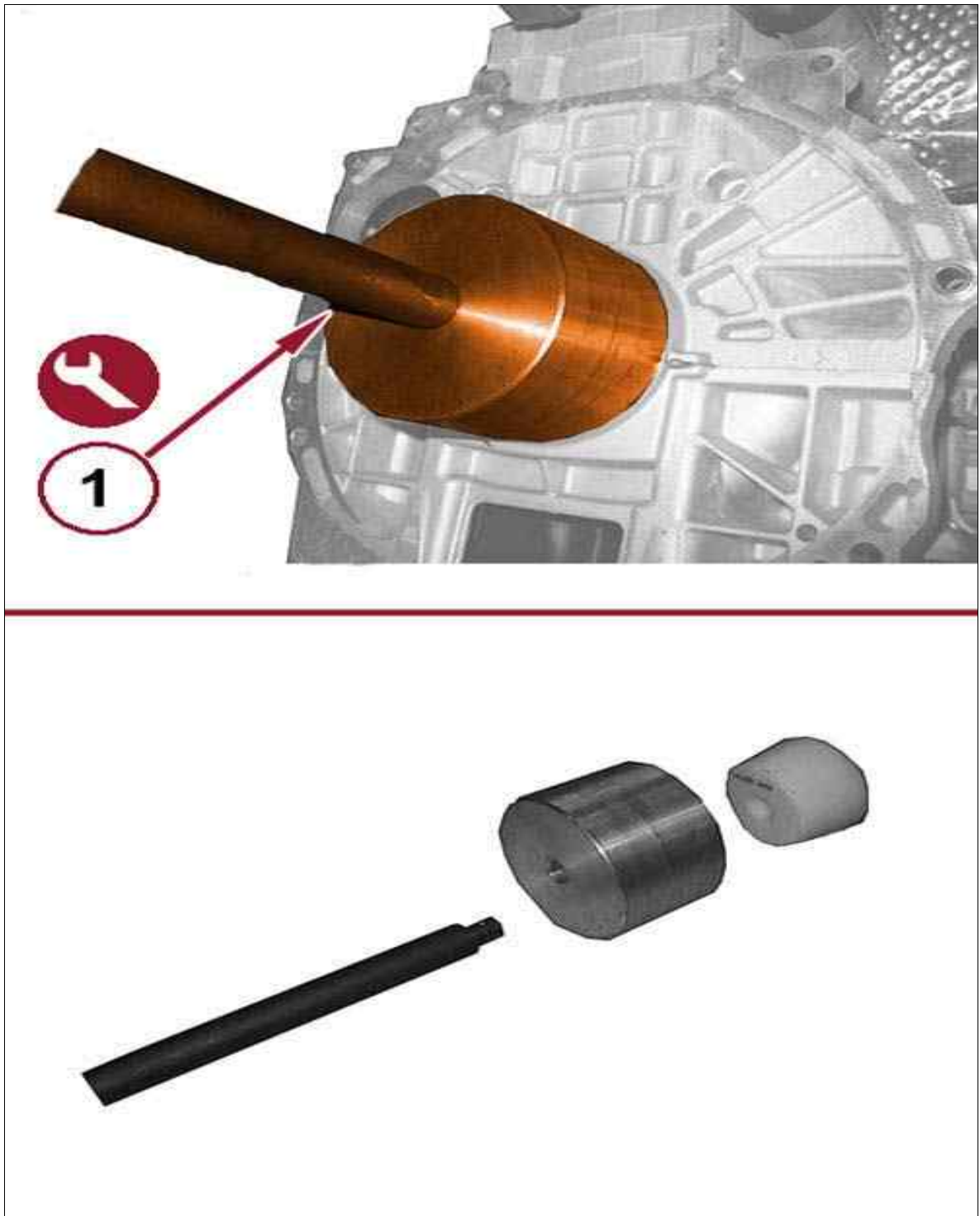
Fig 16: Tensioner, Tension Arm, Chain Guide & Bolts



Courtesy of CHRYSLER GROUP, LLC

32. Install the fixed chain guide (7) with two bolts (6) tightened to the proper specification. Refer to TORQUE SPECIFICATIONS .
33. Install the tensioner arm (1) with the bolt (2) tightened to the proper specification. Refer to TORQUE SPECIFICATIONS .
34. Install the tensioner (4) with the two bolts (5) tightened to the proper specification. Refer to TORQUE SPECIFICATIONS .
35. Remove the tensioner pin (3) from the tensioner (4).

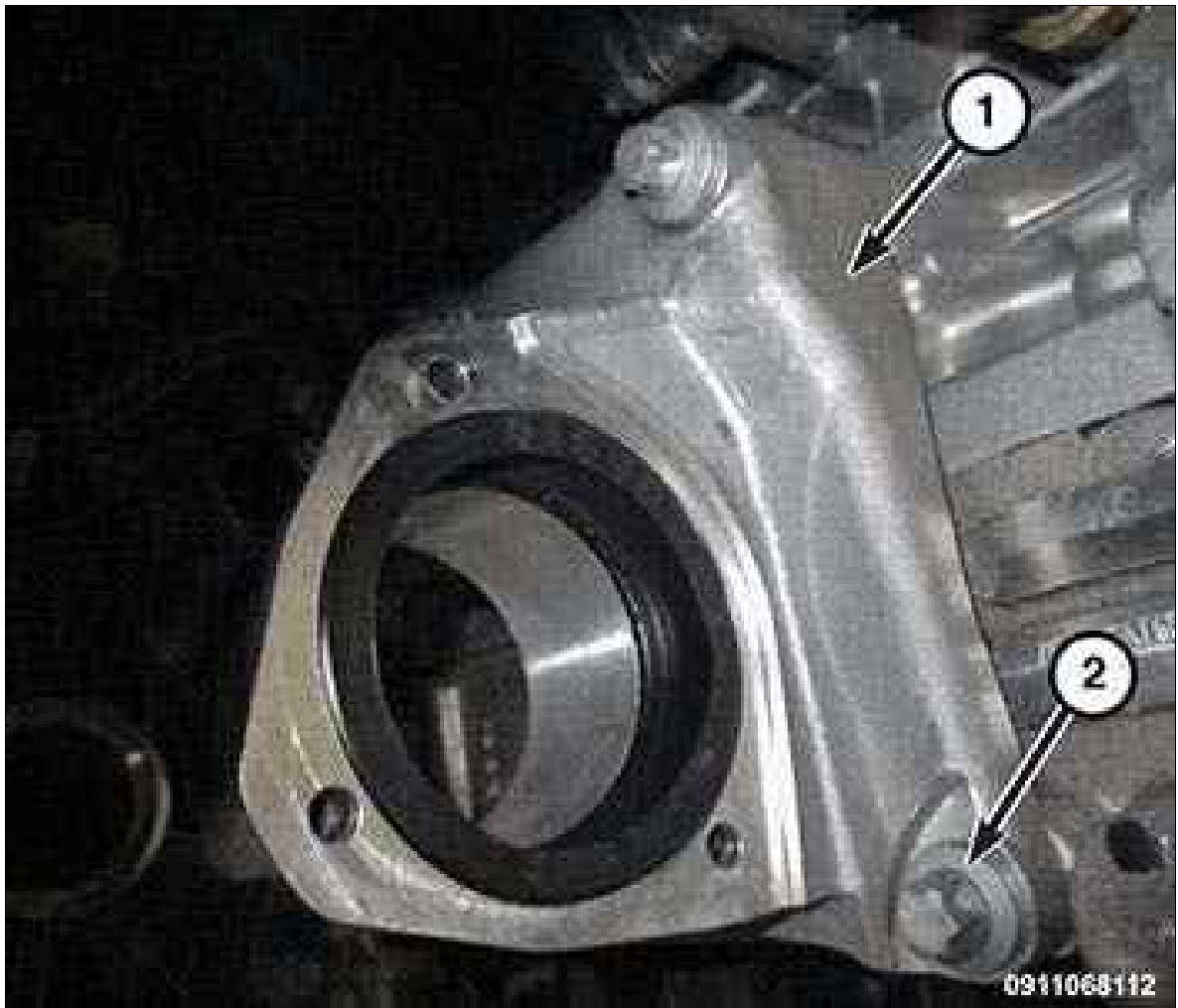
Fig 17: Installing Crankshaft Oil Seal Flywheel Side Using Special Tool



Courtesy of CHRYSLER GROUP, LLC

36. Using the 2000040586 (EMEA) or C-4171 (NAFTA), 2000040298 (EMEA) or (special tool #9706, Installer, Crankshaft Rear Oil Seal) (NAFTA) and 2000040246 (EMEA) or (special tool #9509, Installer, Oil Seal) (NAFTA) tools (1), install a new crankshaft oil seal, flywheel side.

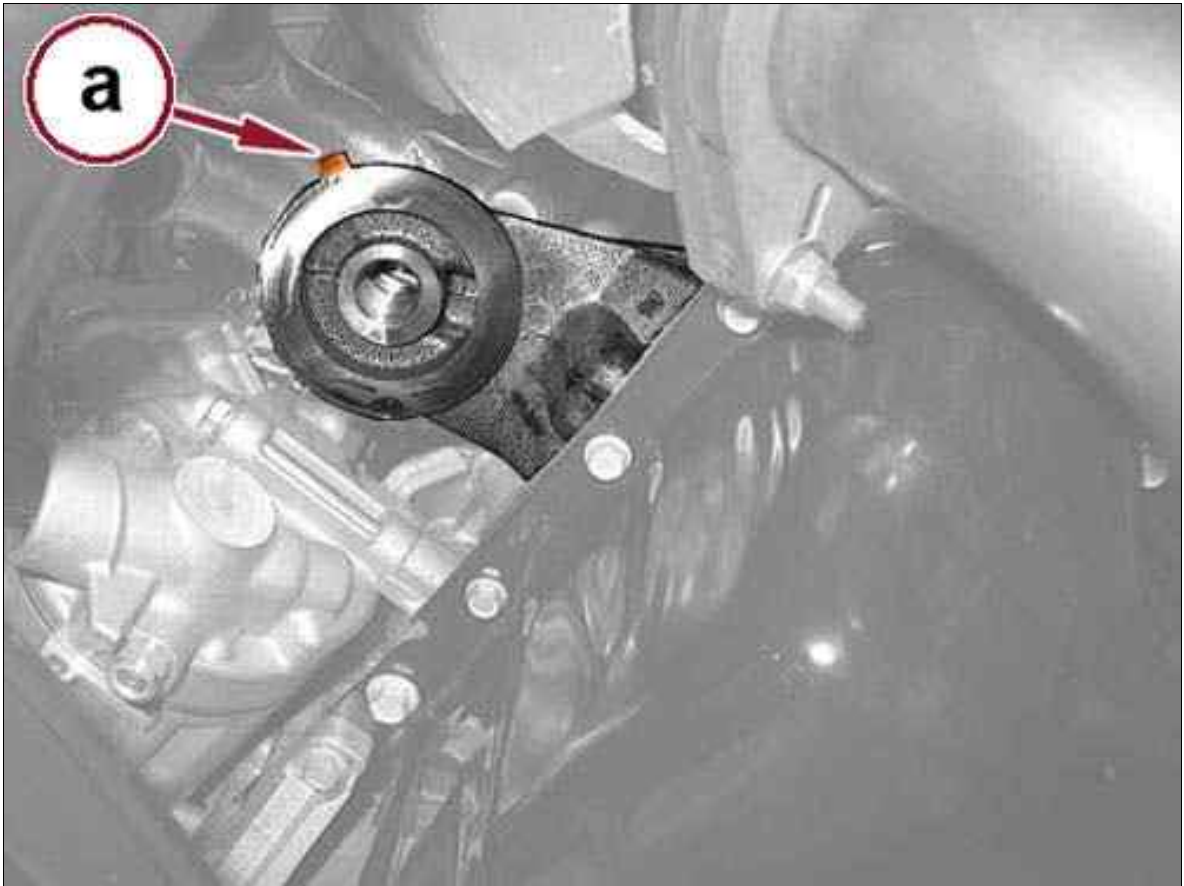
Fig 18: Intermediate Shaft Bearing Housing & Bolts



Courtesy of CHRYSLER GROUP, LLC

37. If equipped, install the intermediate shaft bearing housing (1) with three bolts (2) tightened to the proper specification. Refer to SPECIFICATIONS .

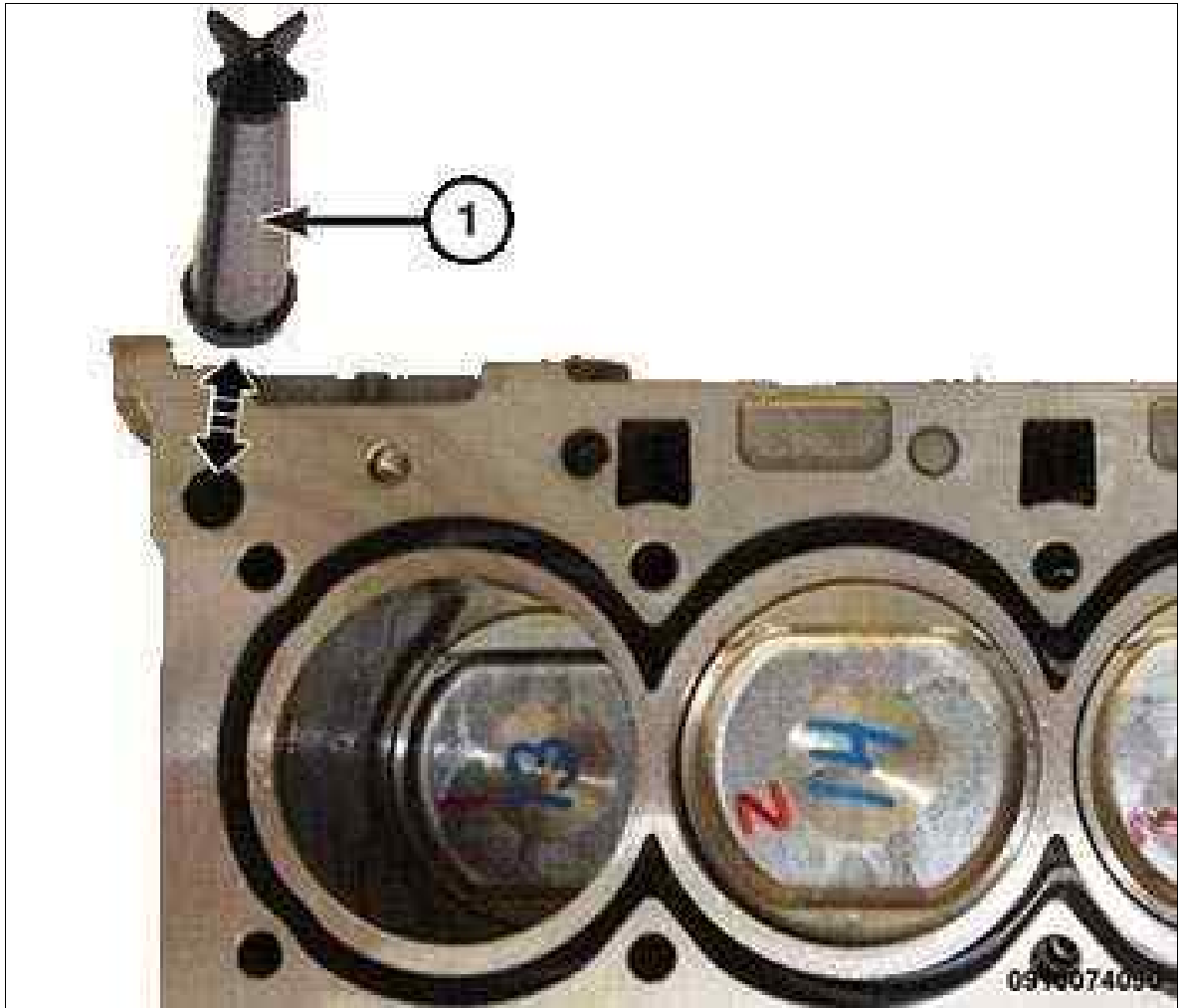
Fig 19: Installing Motor Oil Cooler By Engaging Reference Centering With Tab



Courtesy of CHRYSLER GROUP, LLC

38. Install the motor oil cooler, engaging the reference centering with the tab (a) shown in the figure and tighten the union.
39. Install the heat shield and tighten the screws.
40. Lubricate the seal with engine oil and mount the engine oil filter tightening it completely by hand.
41. Connect the water flow and return pipes to the engine oil cooler and tighten the clamps.

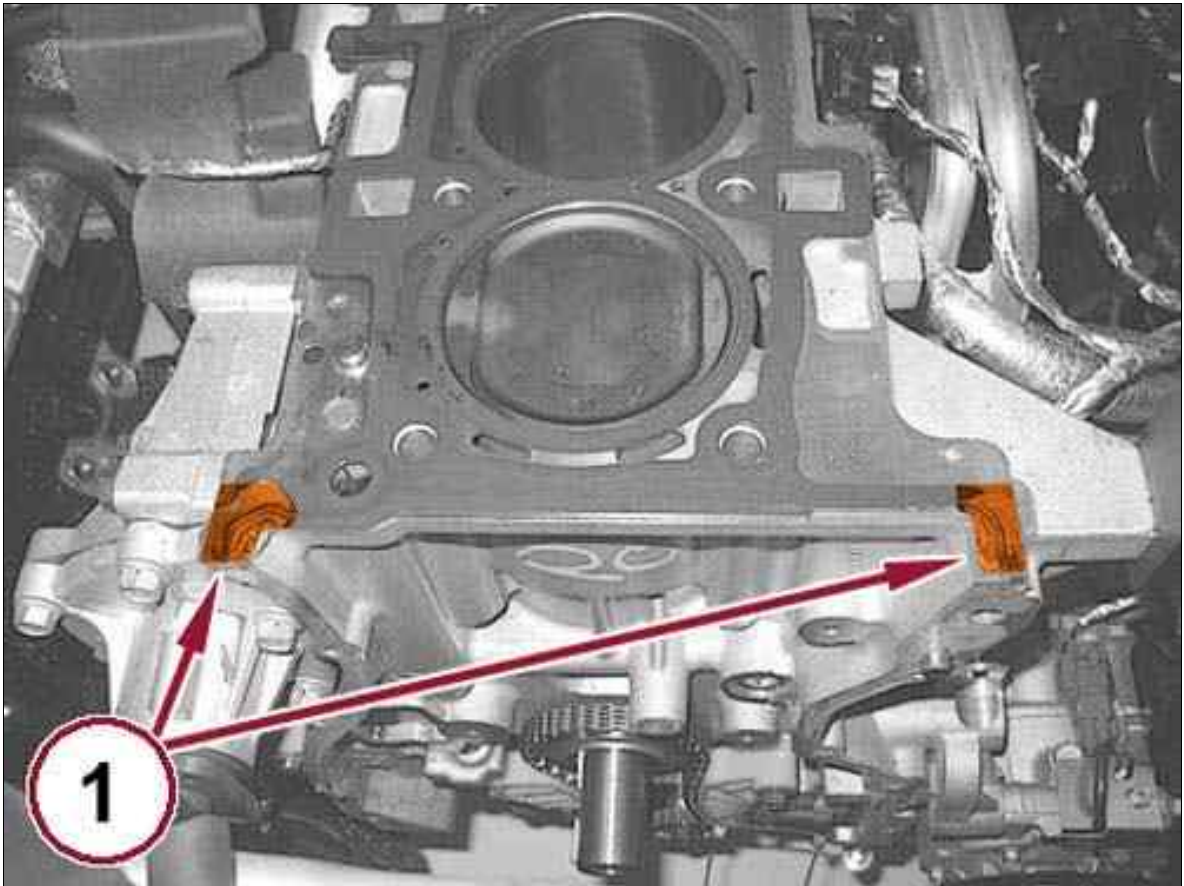
Fig 20: Locating Variable Valve Actuation Assembly (VVAA) Oil Supply Filter



Courtesy of CHRYSLER GROUP, LLC

42. Install the Variable Valve Actuation Assembly (VVAA) oil supply filter (1) in the engine block.

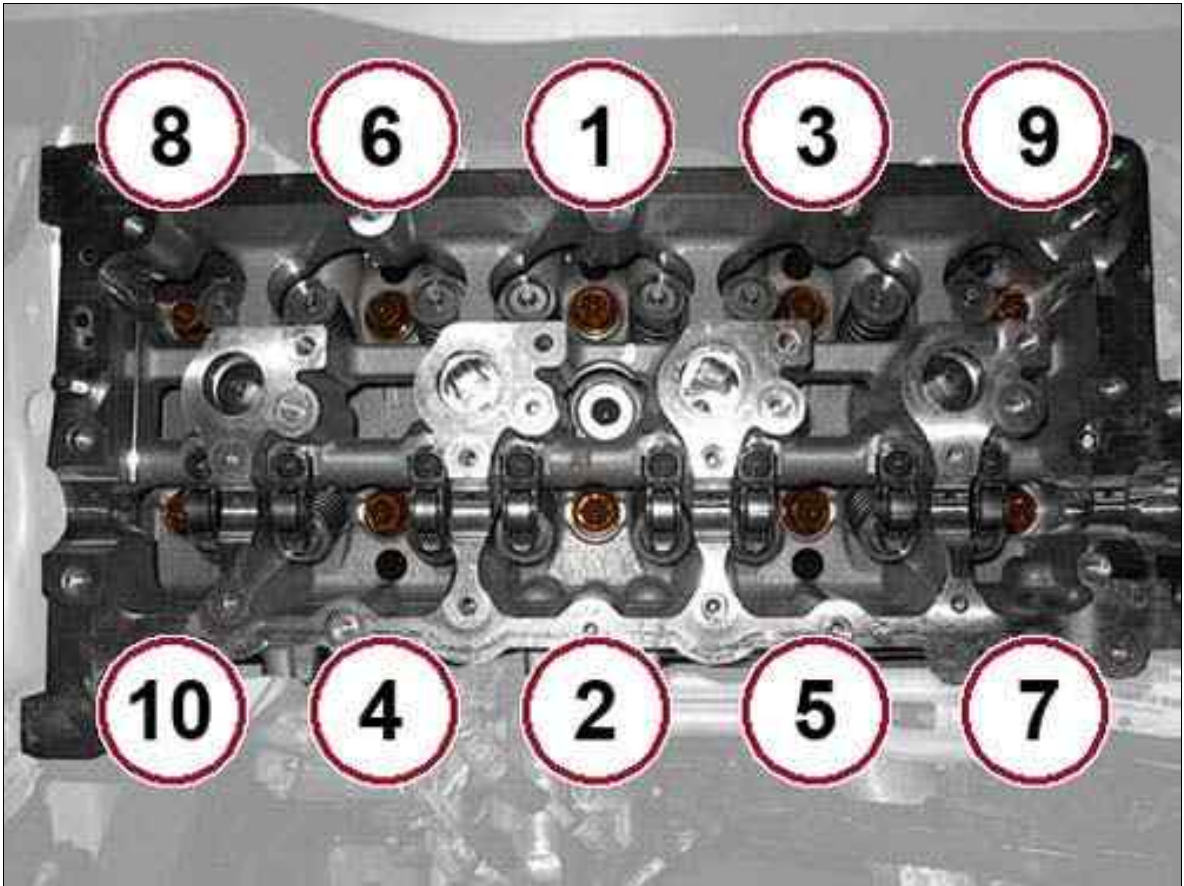
Fig 21: Placing Sealant On Cylinder Head Gasket At Specified Locations



Courtesy of CHRYSLER GROUP, LLC

43. Position the cylinder head gasket engaging the centering bushings.
44. Place sealant on the cylinder head gasket at the points indicated (1) in the figure.

Fig 22: Cylinder Head Bolts Tightening Sequence



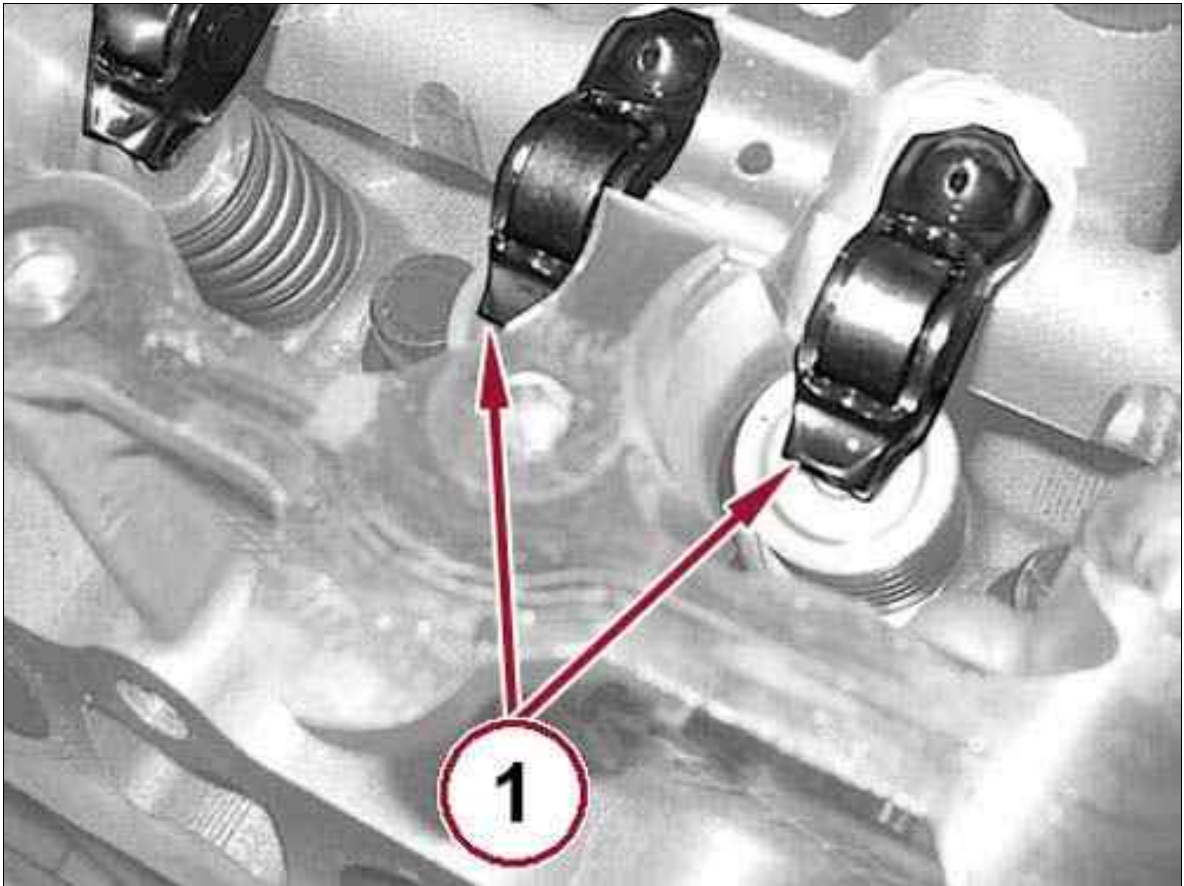
Courtesy of CHRYSLER GROUP, LLC

 **NOTE:**

For each tightening sequence, follow the order shown in illustration.

45. Install the cylinder head and bolts securing the cylinder head. Torque all bolts to the proper specification. Refer to TORQUE SPECIFICATIONS .

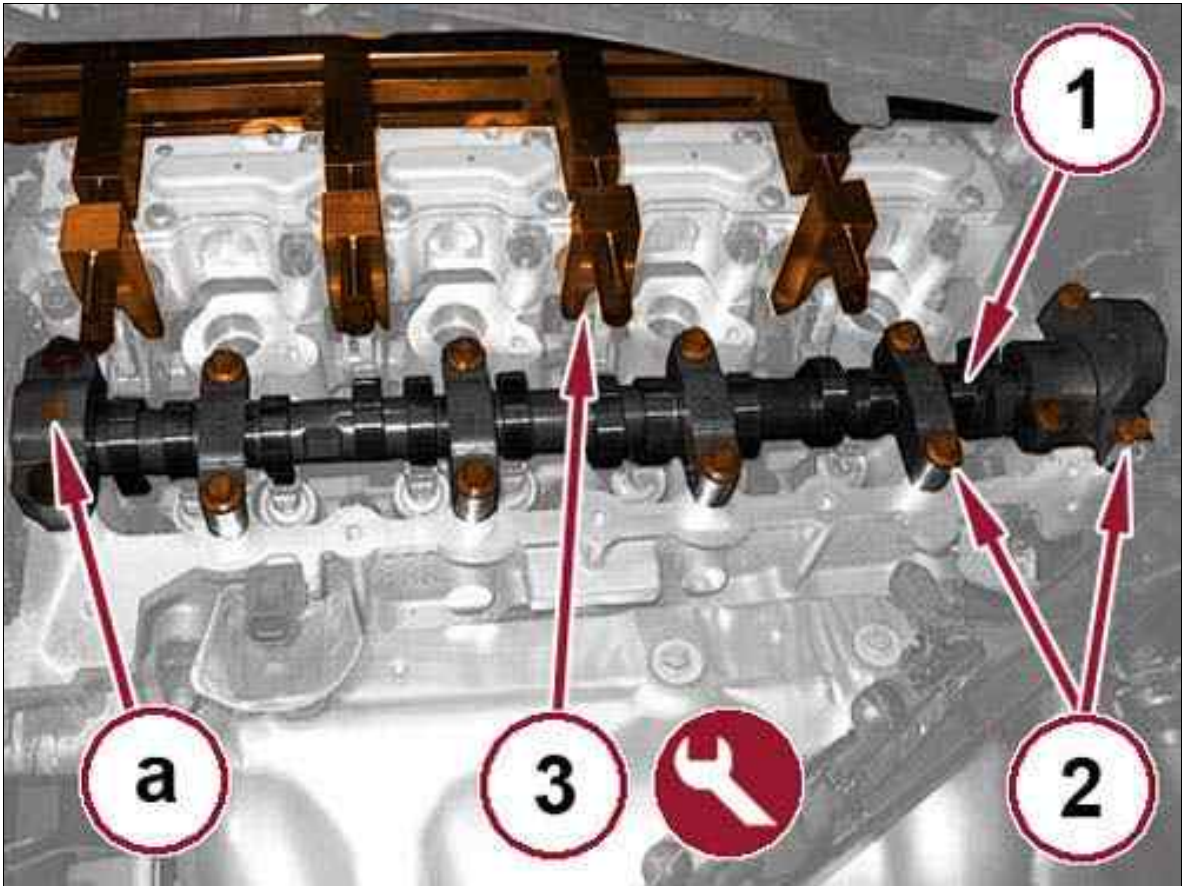
Fig 23: Hydraulic Tappets



Courtesy of CHRYSLER GROUP, LLC

46. Install the hydraulic tappets (1).

Fig 24: MULTIAIR Actuator, Camshaft & Camshaft Caps



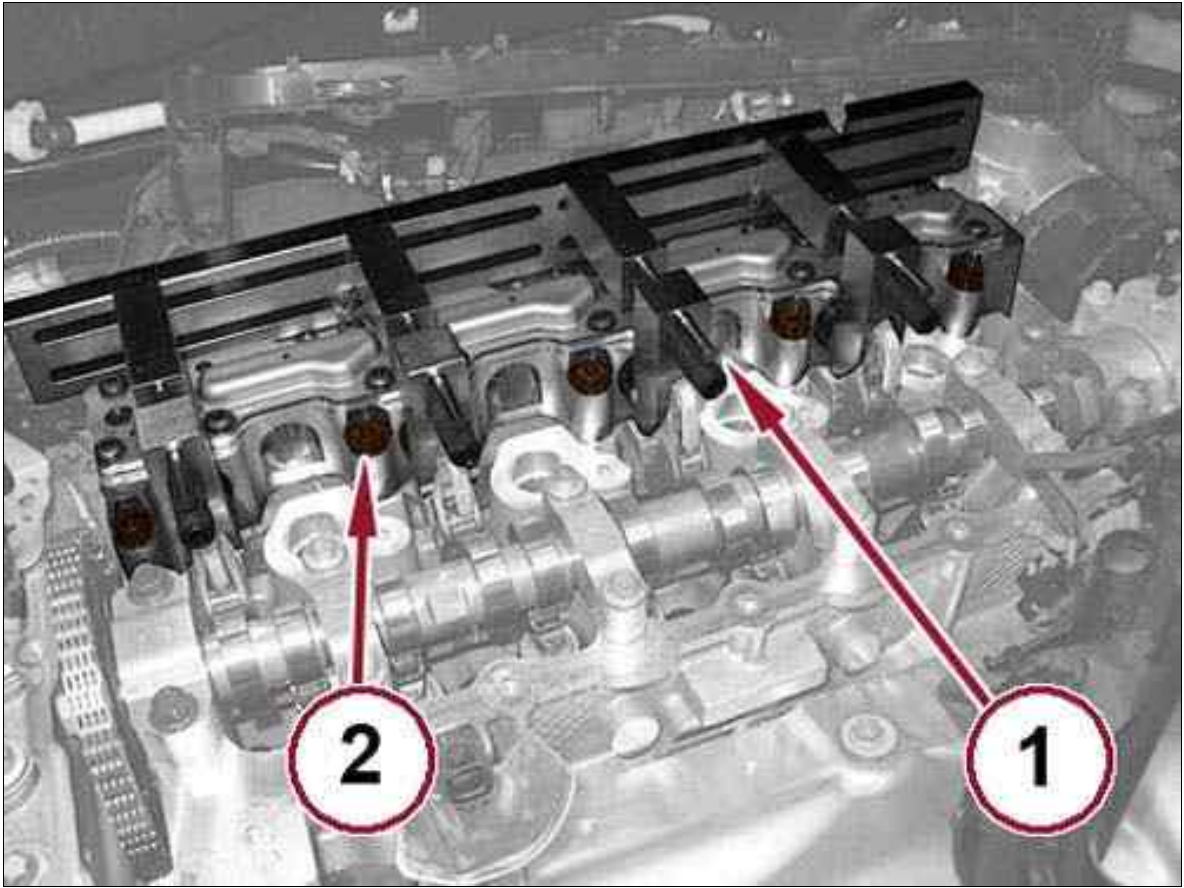
Courtesy of CHRYSLER GROUP, LLC

47. Install the camshaft (1) into the cylinder head.
48. Install the bearing caps (2), respecting the numbering of the cylinders stamped at the top of each cap, and tighten the camshaft cap to cylinder head bolts to the proper specification. Refer to TORQUE SPECIFICATIONS .

 **NOTE:**

The arrow on the bearing cap "a" must point to the timing side.

Fig 25: Compressing MULTIAIR Actuator Spring Using Special Tool & Locating Front MULTIAIR Actuator To Cylinder Head Bolt



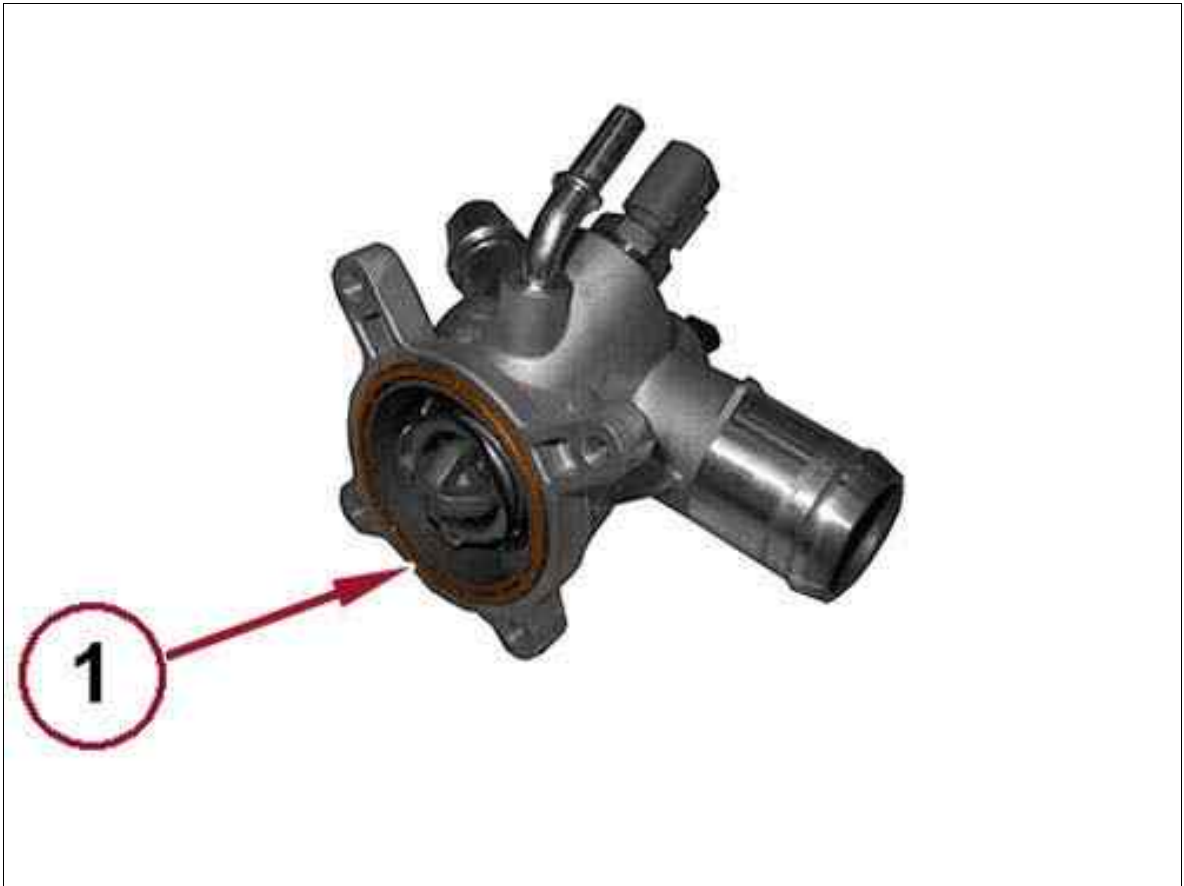
Courtesy of CHRYSLER GROUP, LLC

 NOTE:

During all the handling operations, the MUTIAIR actuator should not be overturned with hydraulic tappets above.

49. Install a **NEW** metal gasket on the cylinder head top.
50. Position the MULTIAIR actuator into the vehicle, and tighten the front MULTIAIR actuator to cylinder head bolts to the proper specification. Refer to TORQUE SPECIFICATIONS .
51. Remove the 2020000090 (EMEA) or (special tool #10259B, Compressor, MultiAir® Spring) (NAFTA) tool from the MULTIAIR actuator.
52. Install and tighten the rear MULTIAIR actuator to cylinder head bolts to the proper specification. Refer to TORQUE SPECIFICATIONS .

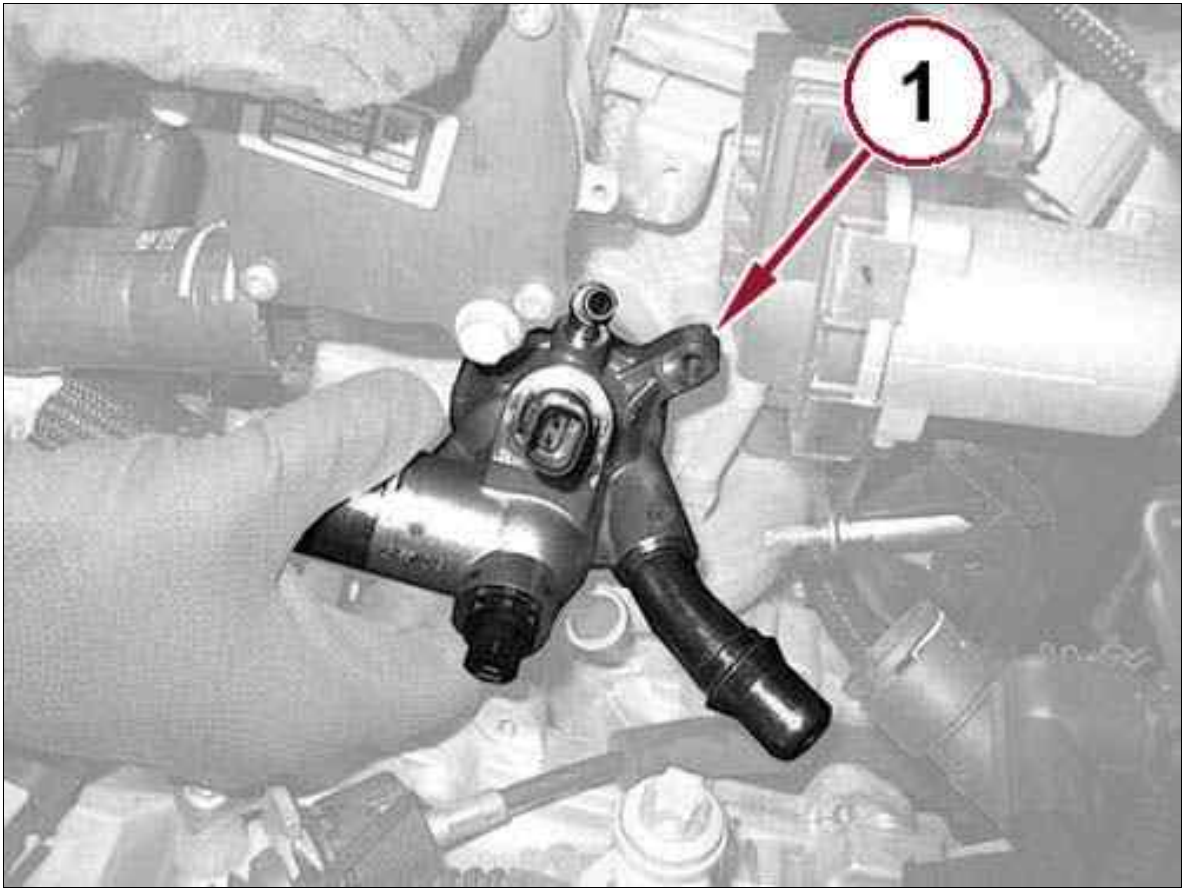
Fig 26: Thermostat Housing Gasket



Courtesy of CHRYSLER GROUP, LLC

- 53. Clean the gasket mating surfaces.
- 54. Install a **NEW** thermostat housing gasket (1).

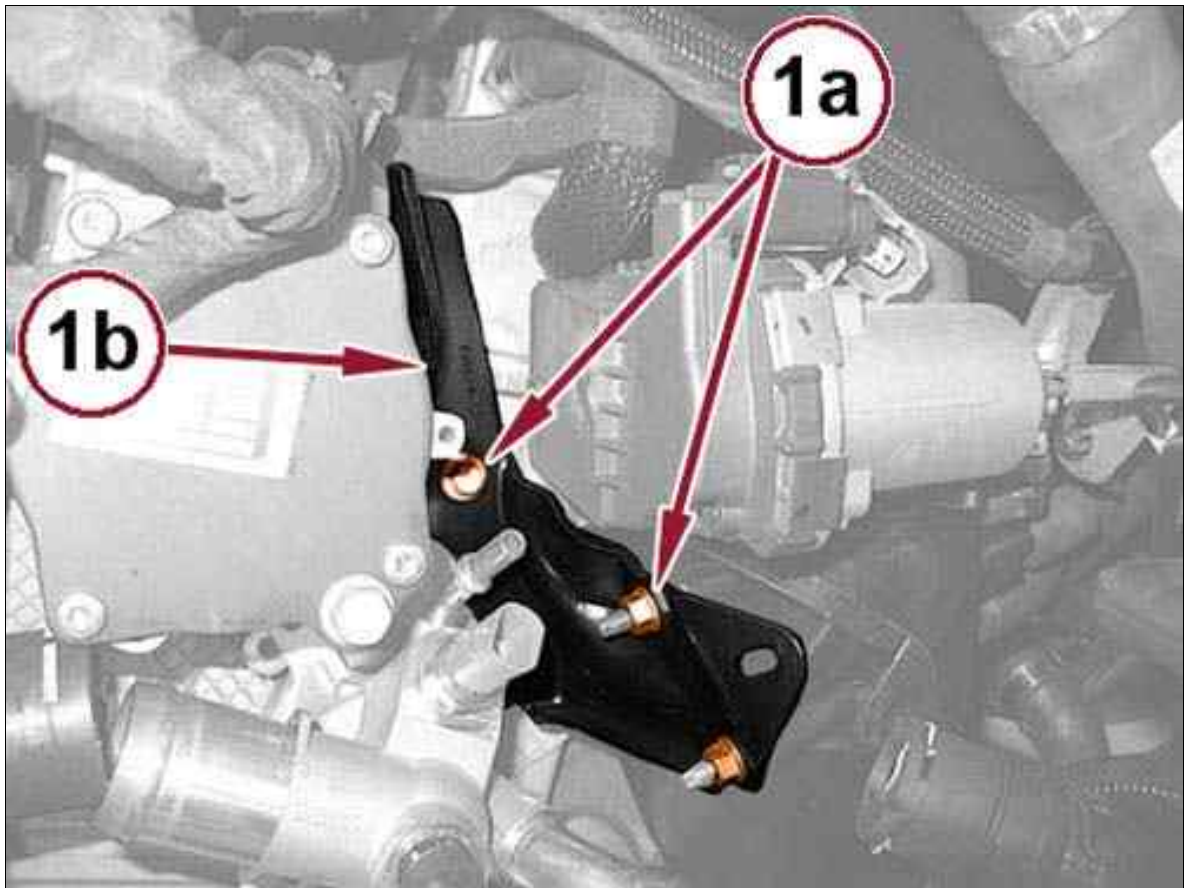
Fig 27: Thermostat Housing



Courtesy of CHRYSLER GROUP, LLC

55. Install the thermostat housing (1) and tighten bolt finger tight.

Fig 28: Vacuum Pump Support Bracket & Fasteners



Courtesy of CHRYSLER GROUP, LLC

56. Install the vacuum pump support bracket (1b) and securely tighten fasteners (1a).

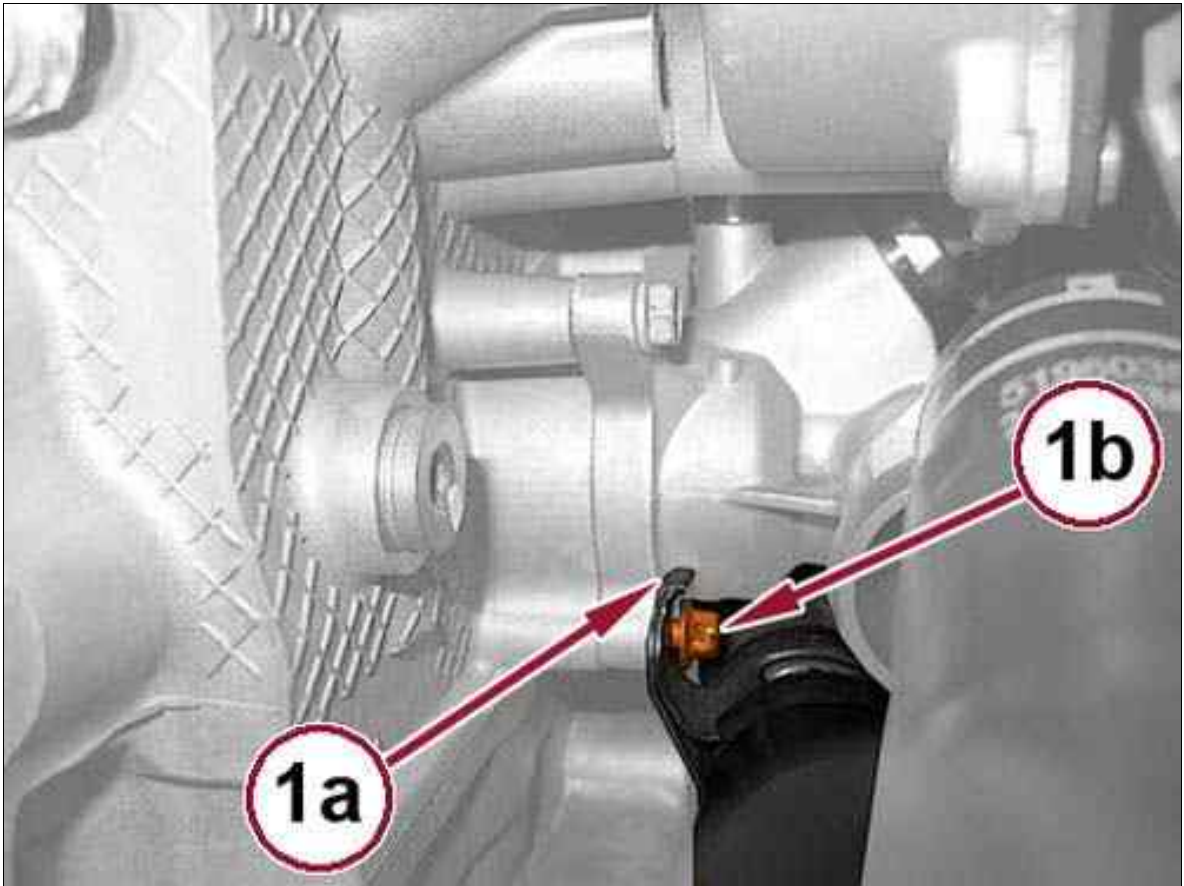
Fig 29: Thermostat Housing Bolts



Courtesy of CHRYSLER GROUP, LLC

57. Tighten the thermostat housing bolts (1) in a crisscross pattern to the proper specification. Refer to SPECIFICATIONS .

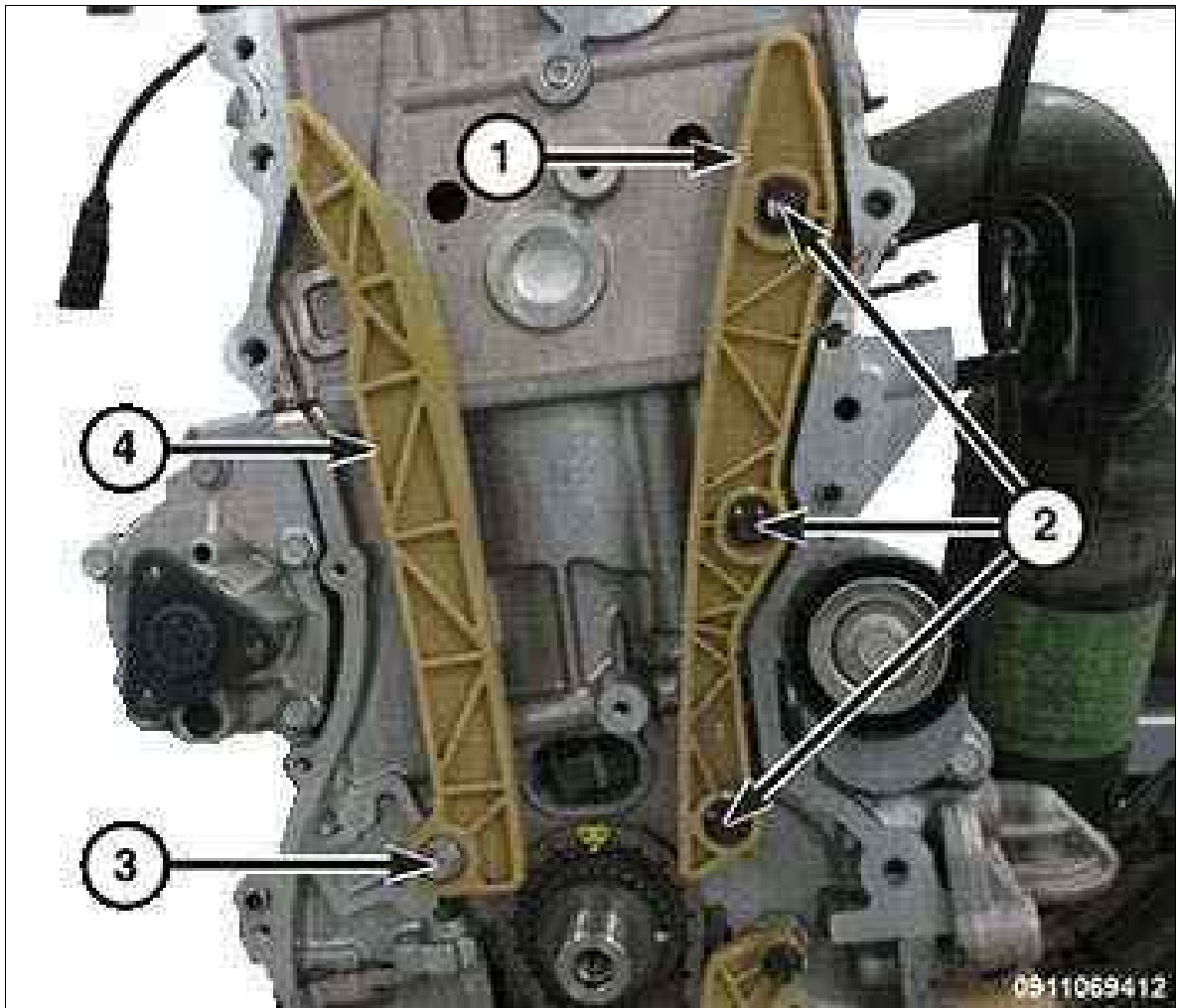
Fig 30: Coolant Tube To Thermostat Housing Lock Tab & Bolt



Courtesy of CHRYSLER GROUP, LLC

58. Install the bolt (1b) securing the coolant tube to the thermostat housing and tighten to the proper then bend lock tab to secure bolt (1a). Refer to SPECIFICATIONS .

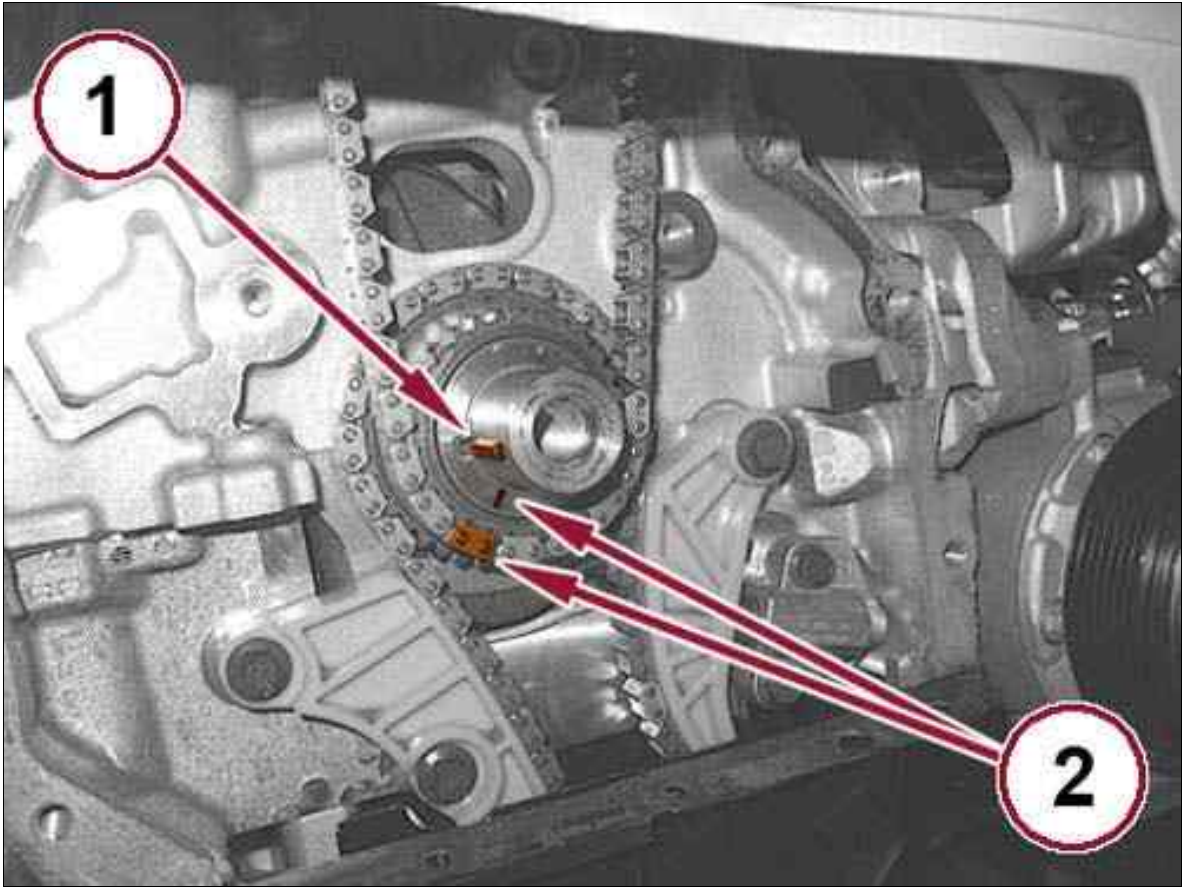
Fig 31: Timing Chain Guide, Guide Bolts, Tensioner Arm & Bolt



Courtesy of CHRYSLER GROUP, LLC

59. Install the timing chain guide (1) with three bolts (2) tightened to the proper specification. Refer to TORQUE SPECIFICATIONS .
60. Install the tensioner arm (4) with the bushing and bolt (3) tightened to the proper specification. Refer to TORQUE SPECIFICATIONS .

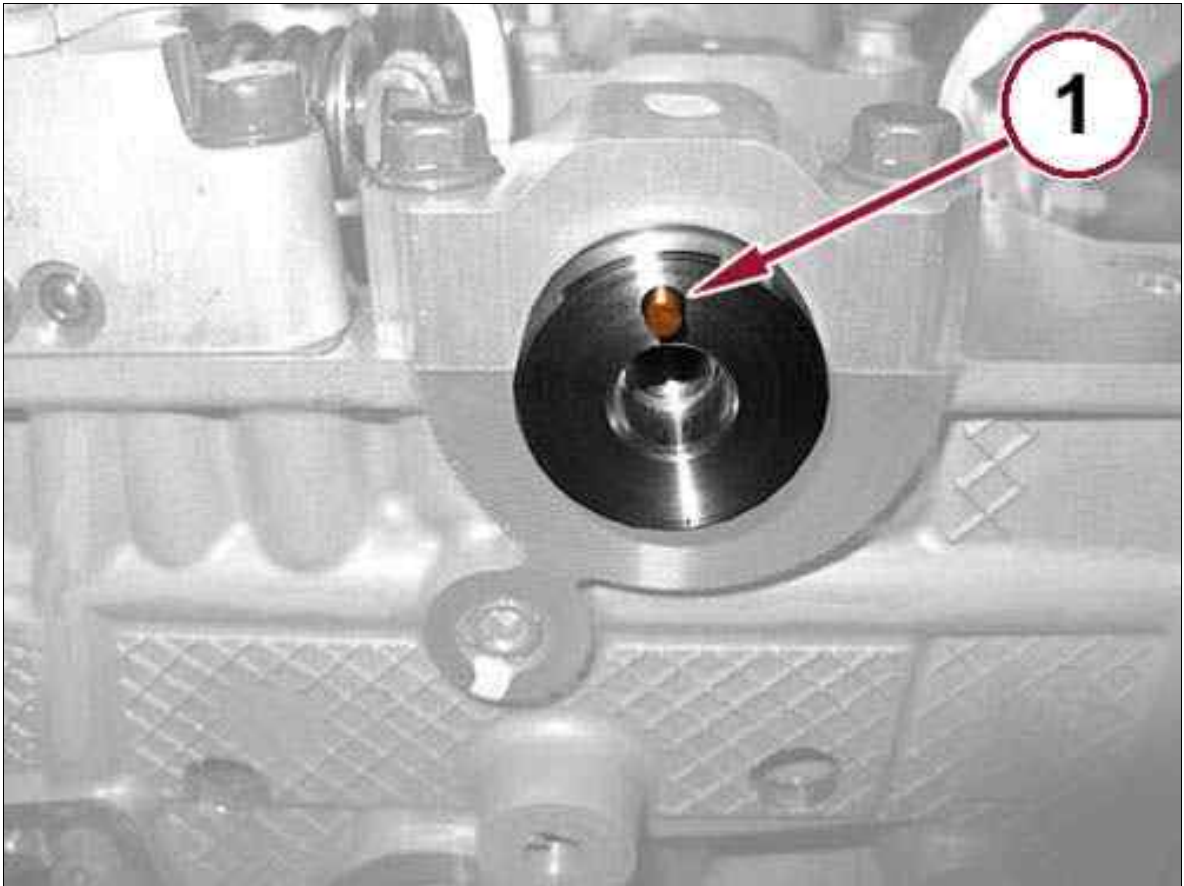
Fig 32: Positioning Crankshaft Key At "9" O-Clock Position & Marking Chain Link At Point Marked On Crankshaft Gear



Courtesy of CHRYSLER GROUP, LLC

61. Verify that the crankshaft key is in the "9 o'clock" in correspondence with the surfaces of contact between the lower and upper crankcase.
62. Install the chain, align the drive gear with the painted link. If you mount a new chain, the alignment reference is yellow.

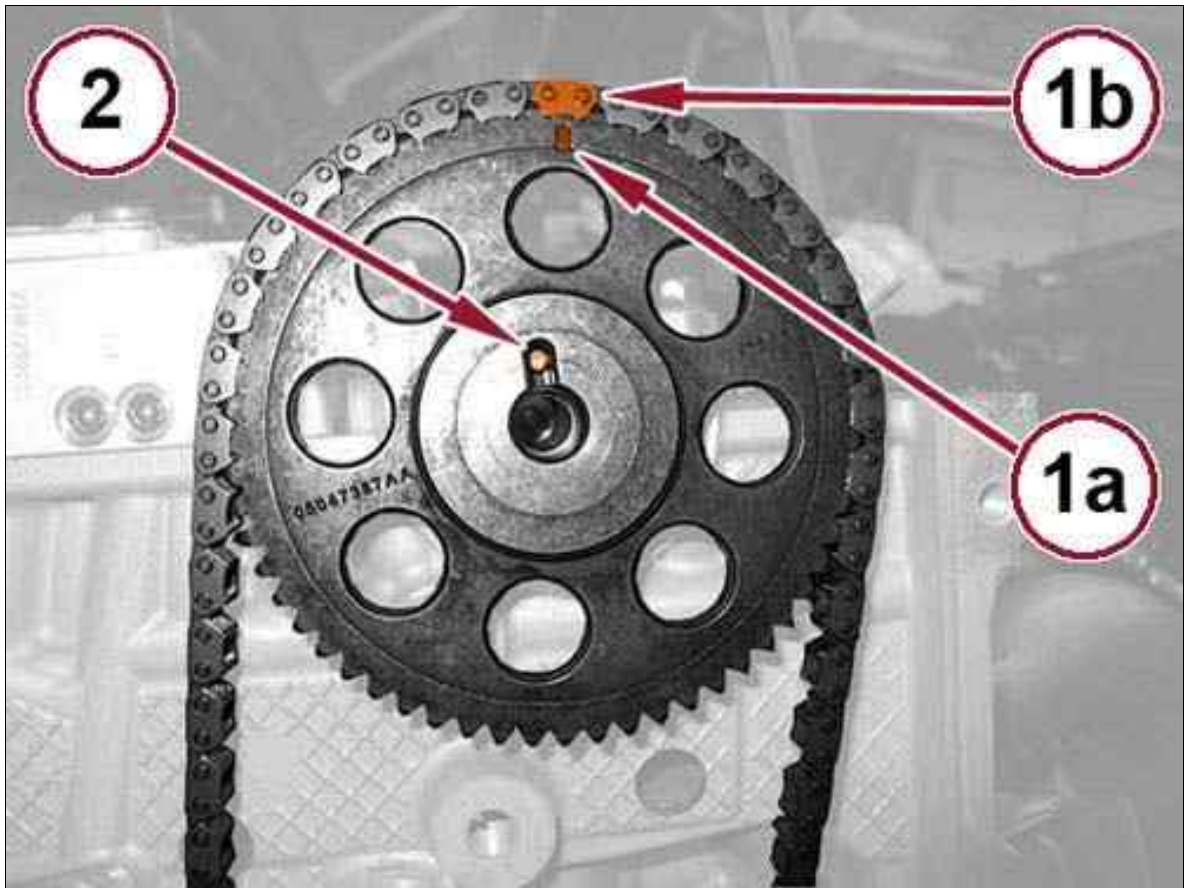
Fig 33: Placing Alignment Mark In "12" O-Clock Position



Courtesy of CHRYSLER GROUP, LLC

63. Check that the alignment mark (1) is in the "12 o'clock" position.

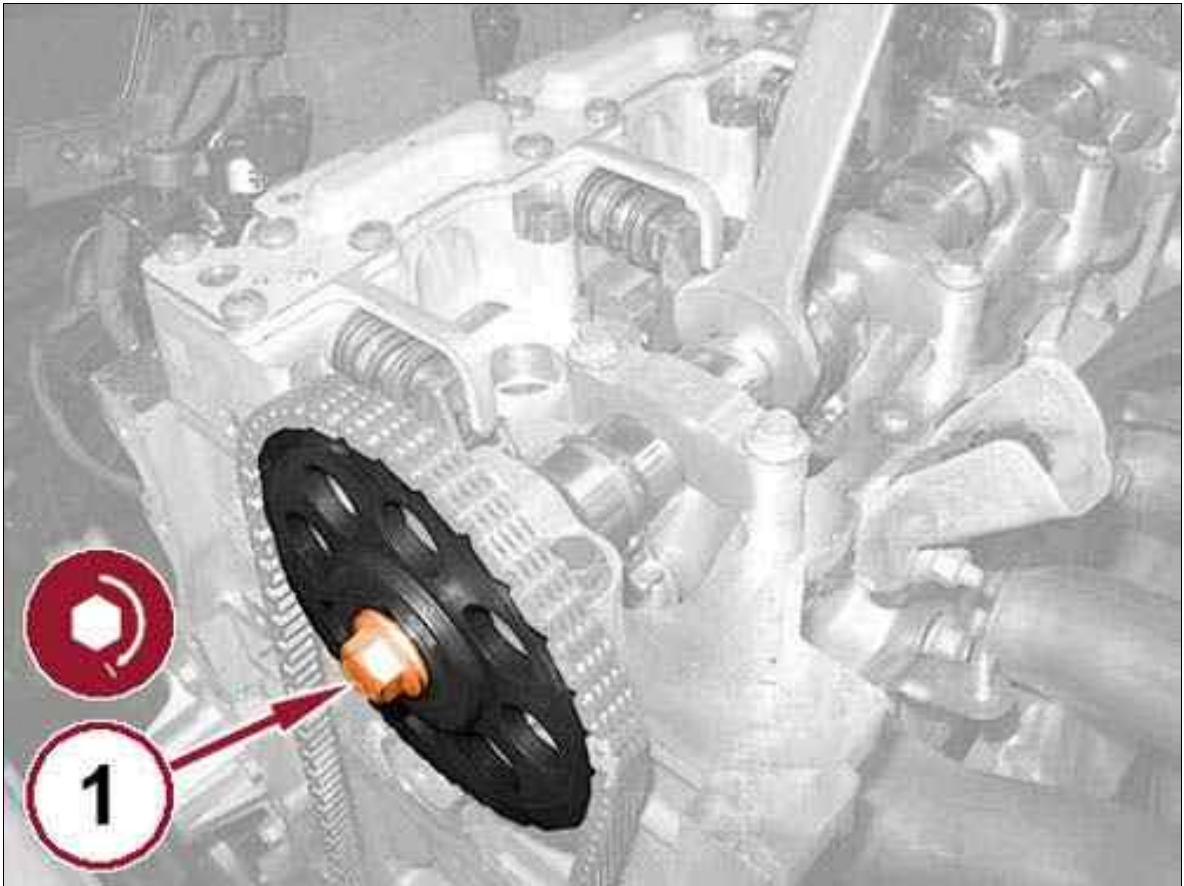
Fig 34: Matching Camshaft Sprocket Gear Notch To Marked Link



Courtesy of CHRYSLER GROUP, LLC

64. Fit the chain on the camshaft sprocket by matching the gear notch (1a) with the marked link (1b). If you mount a new chain, the alignment reference is yellow.
65. Align the pin (2) and install the camshaft sprocket.

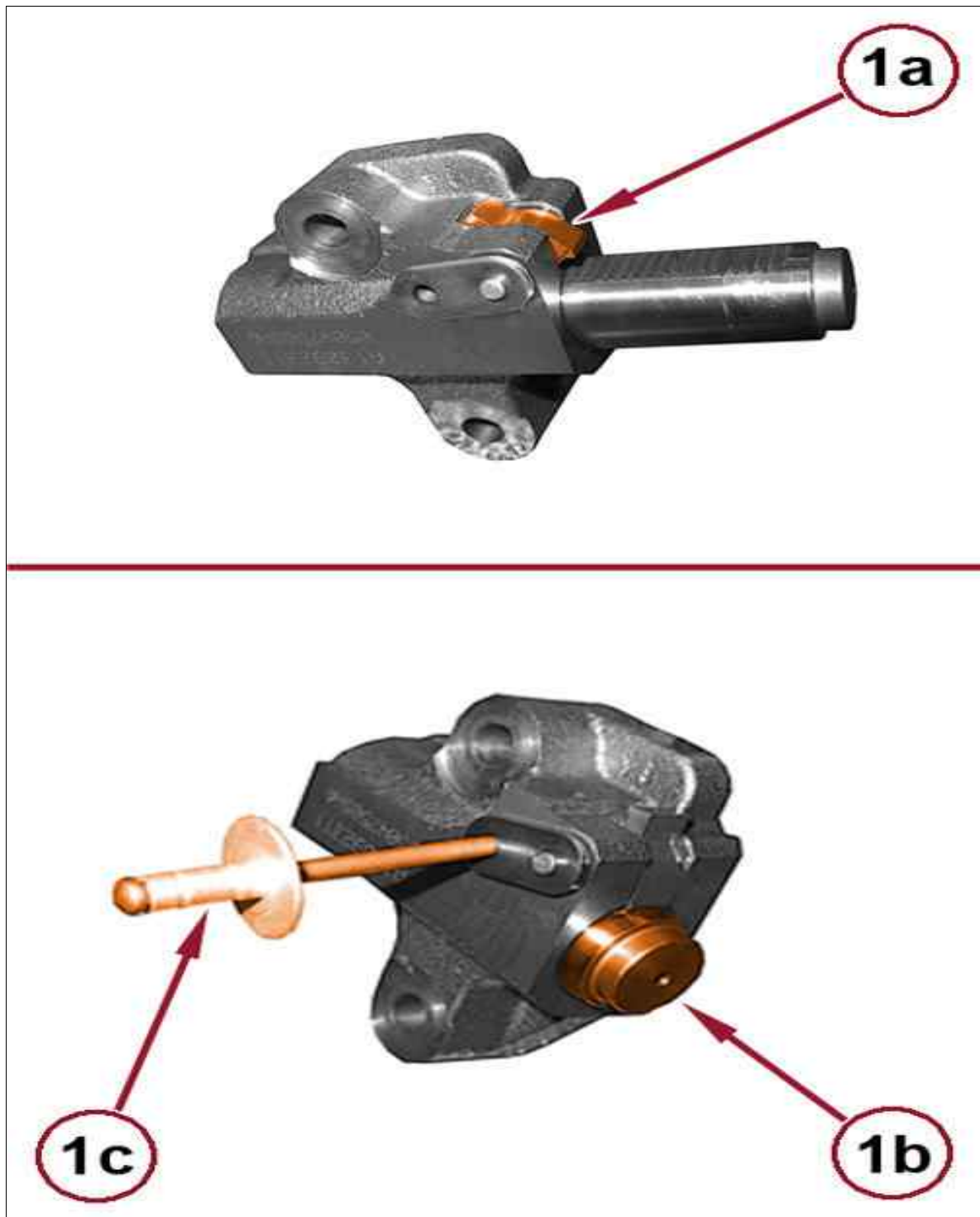
Fig 35: Camshaft Sprocket Bolt



Courtesy of CHRYSLER GROUP, LLC

66. Tighten the camshaft sprocket bolt (1) to the proper specification. Refer to SPECIFICATIONS .

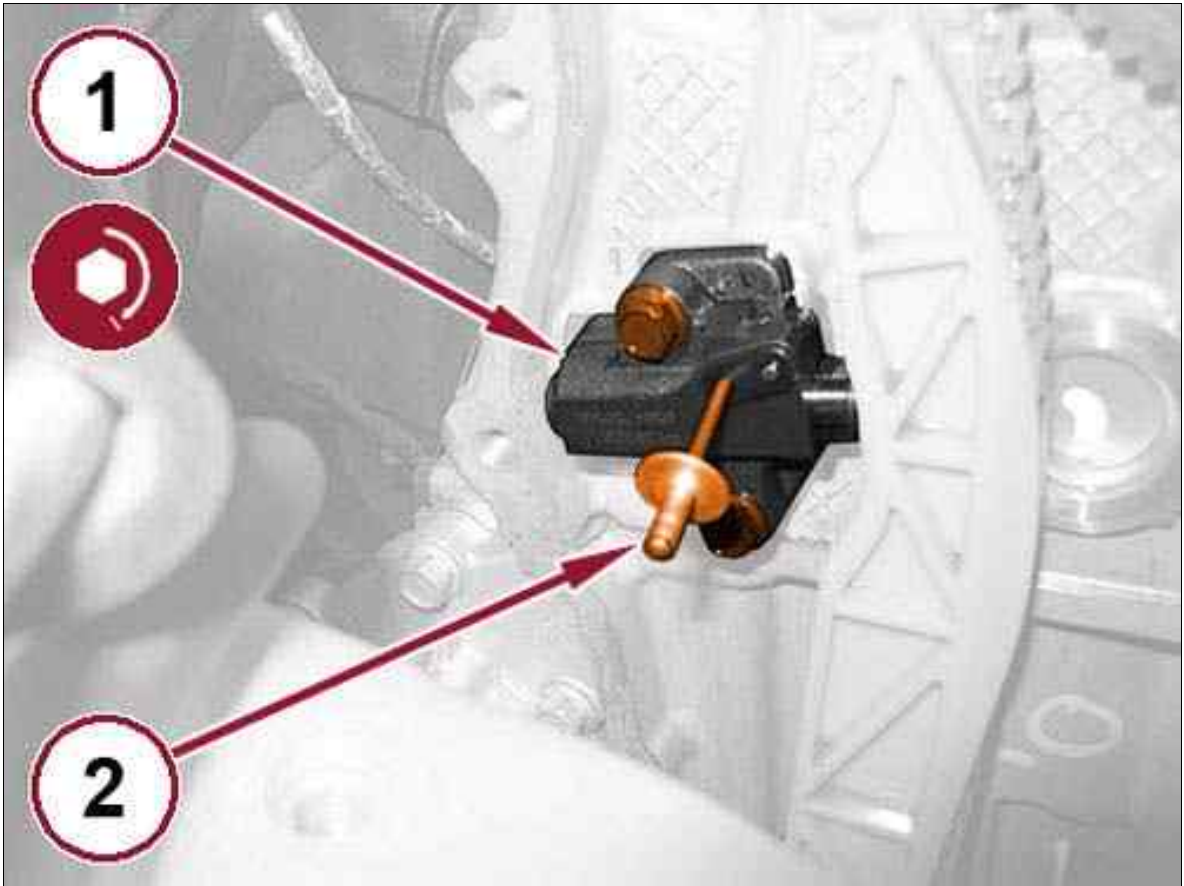
Fig 36: Pawl & Piston & Pin Lock



Courtesy of CHRYSLER GROUP, LLC

67. Disengage the pawl (1a) from the rack, compress the piston (1b) and insert the pin lock (1c).

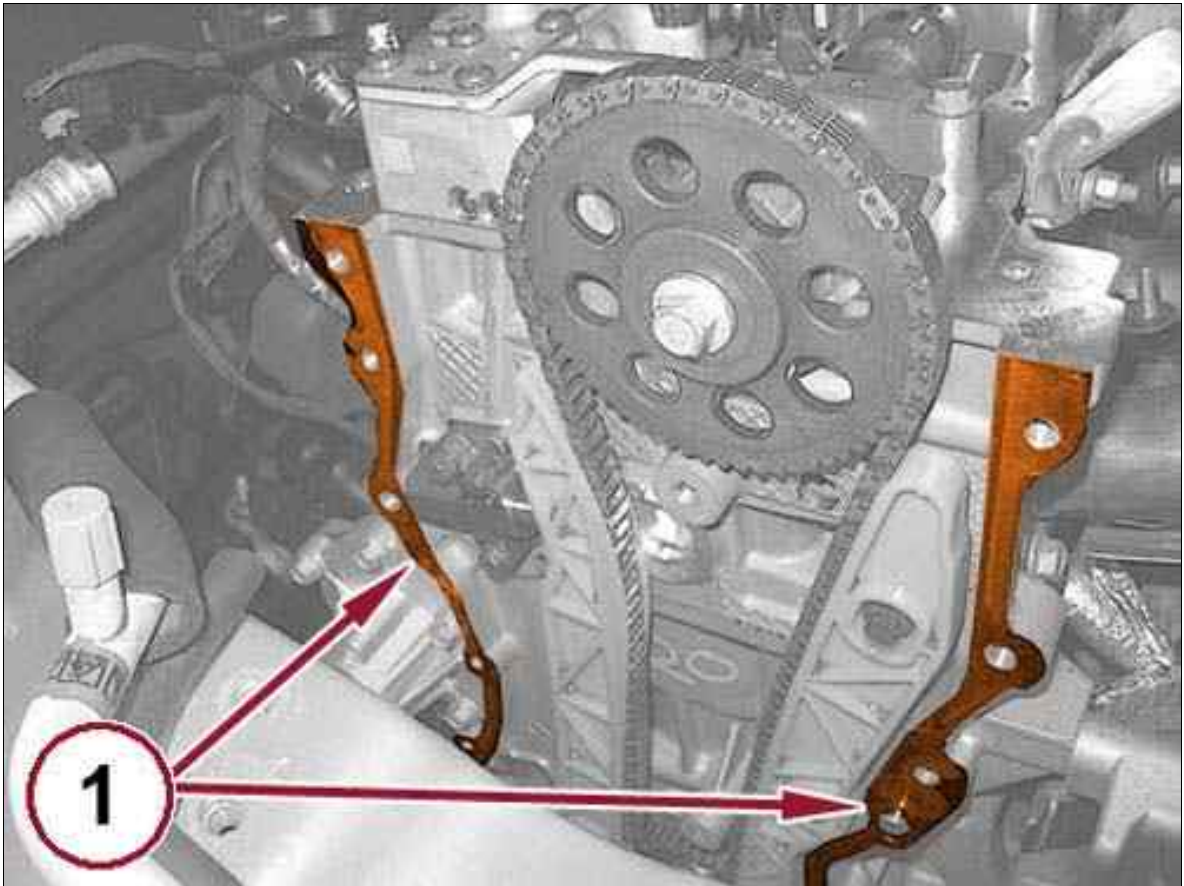
Fig 37: Tensioner & Locking Plunger Pin



Courtesy of CHRYSLER GROUP, LLC

68. Install the tensioner (1) and tighten the screws to the proper specification. Refer to TORQUE SPECIFICATIONS .
69. Remove the locking plunger pin (2).

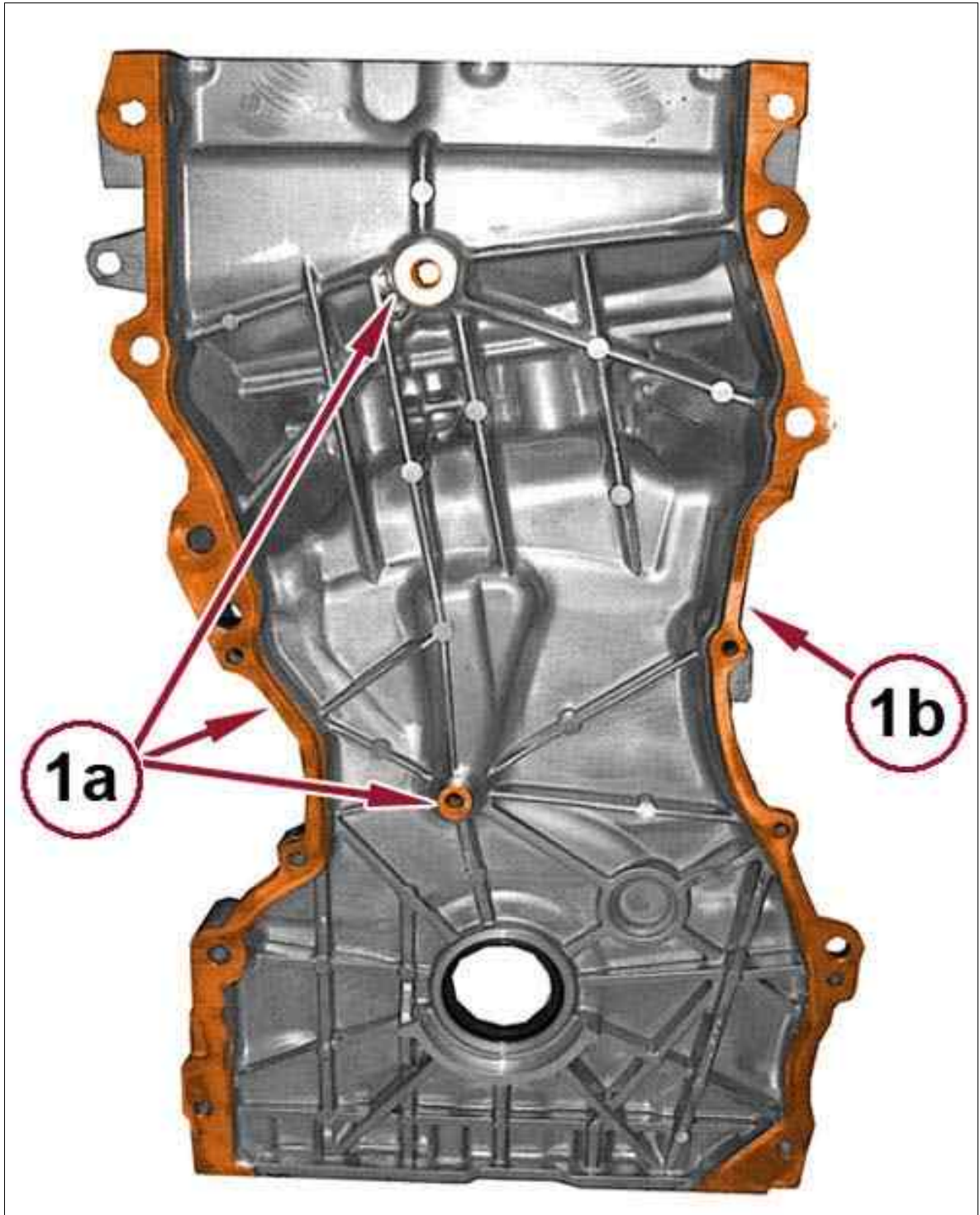
Fig 38: Applying Sealant To Engine Timing Cover To Engine Block Gasket Surface



Courtesy of CHRYSLER GROUP, LLC

70. Apply a suitable silicone sealant to the engine timing cover to engine block gasket surface (1) as shown in the figure.

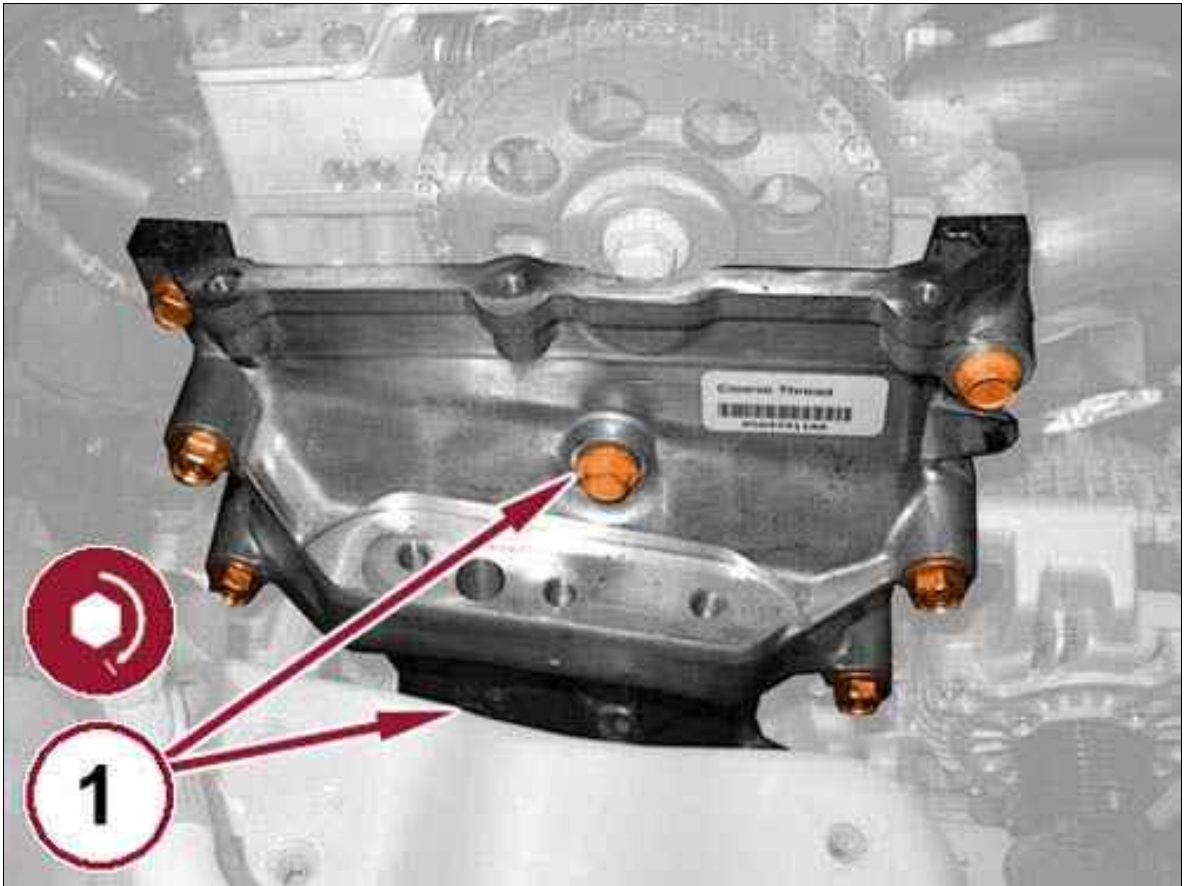
Fig 39: Applying Sealant To Indicated Surfaces



Courtesy of CHRYSLER GROUP, LLC

71. Apply a bead (2 mm) of a suitable silicone sealant (1a) and (1b) to the surfaces indicated in the figure.

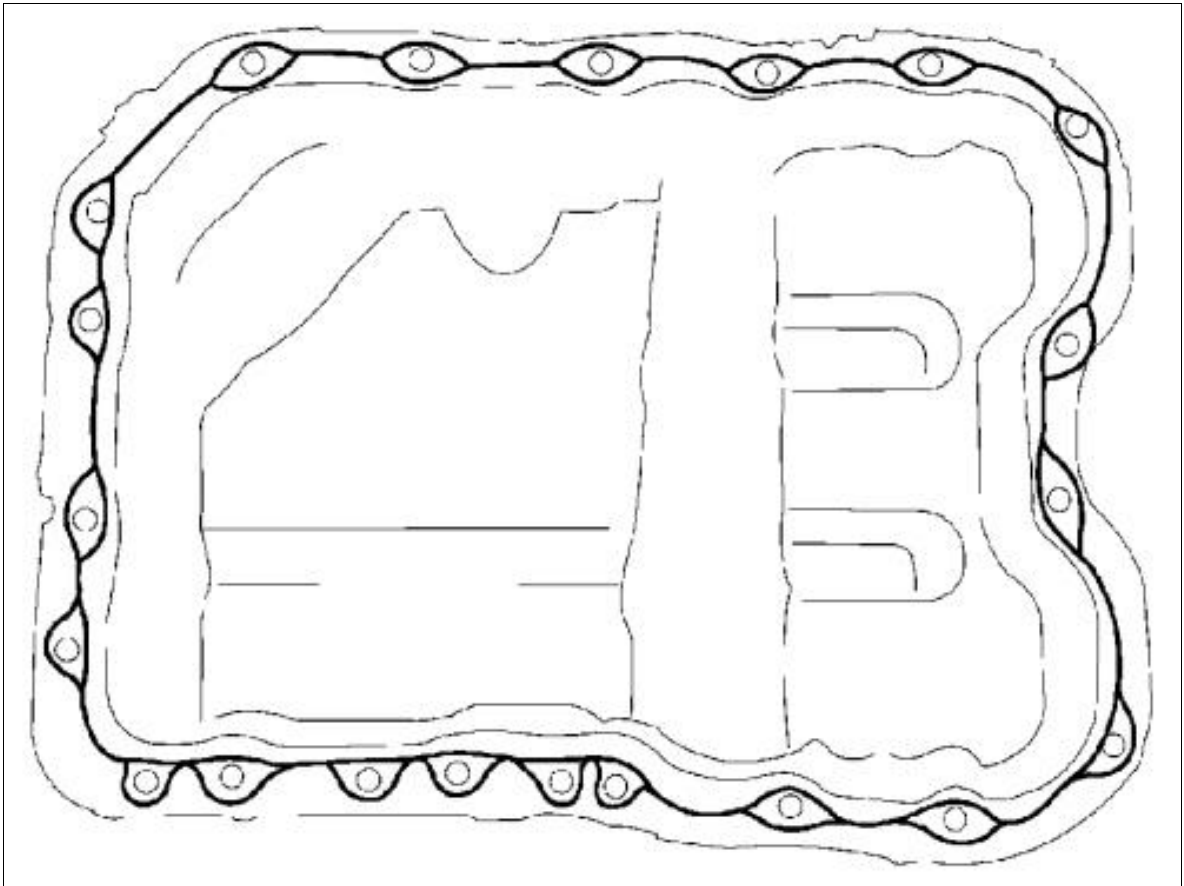
Fig 40: Engine Timing Cover & Mounting Bolts



Courtesy of CHRYSLER GROUP, LLC

72. Install the engine timing cover and tighten the mounting bolts (1) to the proper specification. Refer to TORQUE SPECIFICATIONS .

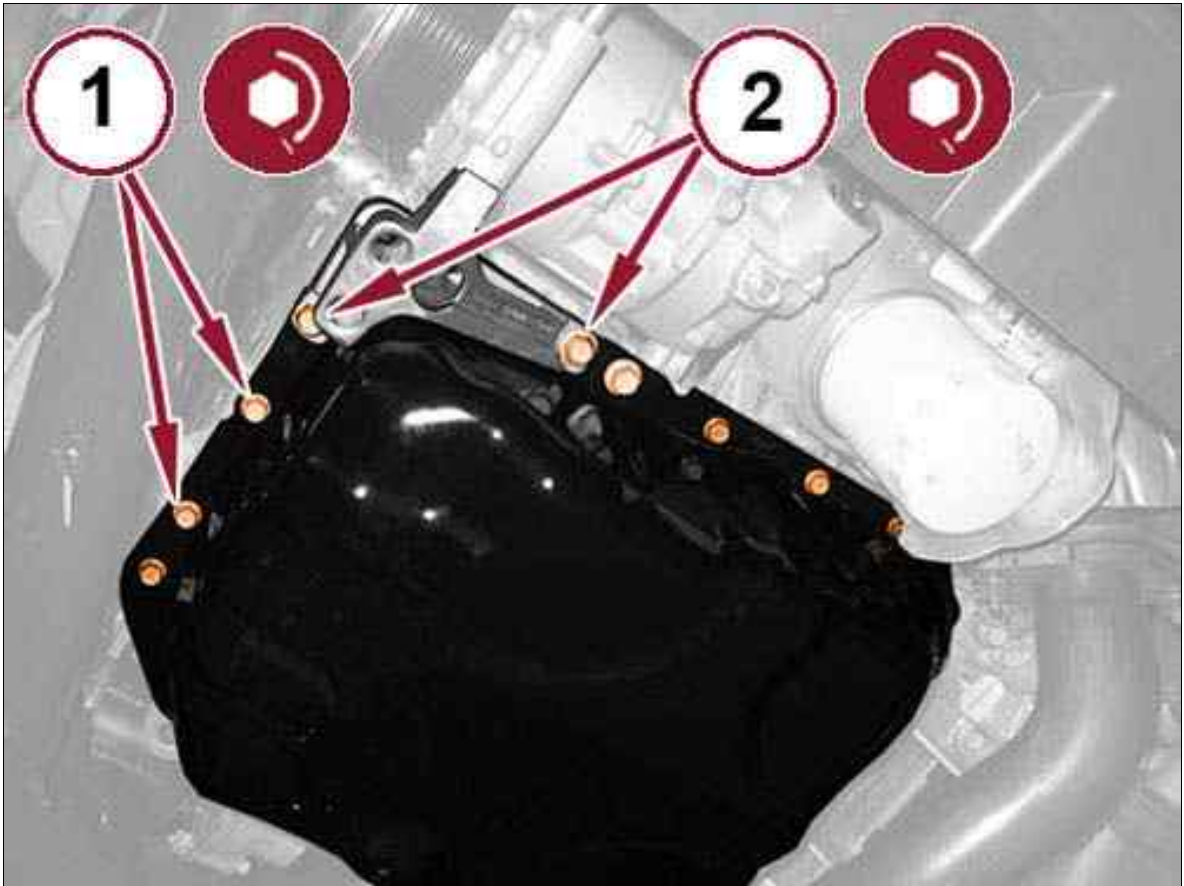
Fig 41: Applying Sealant To Oil Pan



Courtesy of CHRYSLER GROUP, LLC

73. Apply a 2 mm bead of Mopar® Engine Sealant RTV Silicone Rubber Adhesive around the oil pan as shown in illustration.

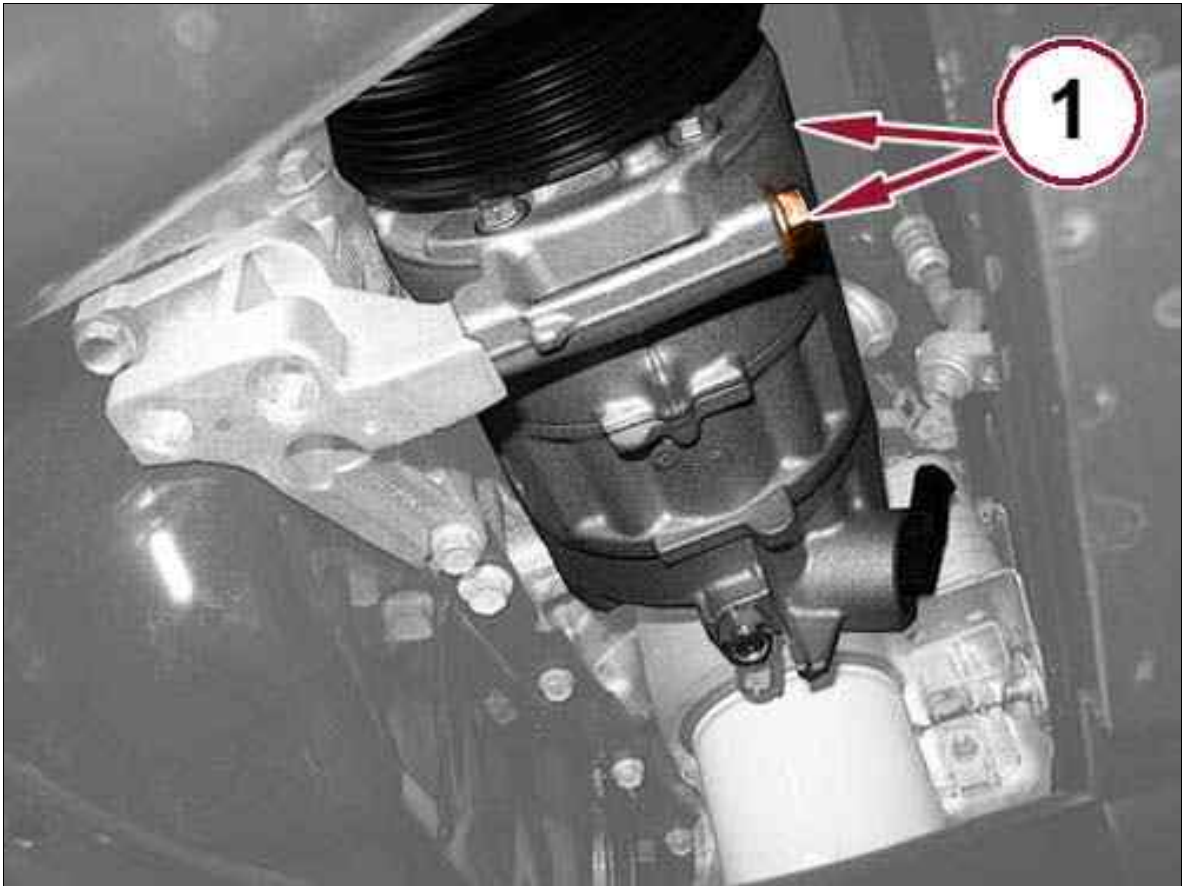
Fig 42: Engine Oil Pan & Bolts



Courtesy of CHRYSLER GROUP, LLC

74. Install the oil pan and tighten the bolts (1) to the proper specification. Refer to TORQUE SPECIFICATIONS .
75. Install the A/C compressor mounting bracket and tighten the bolts (2) to the proper specification. Refer to SPECIFICATIONS .

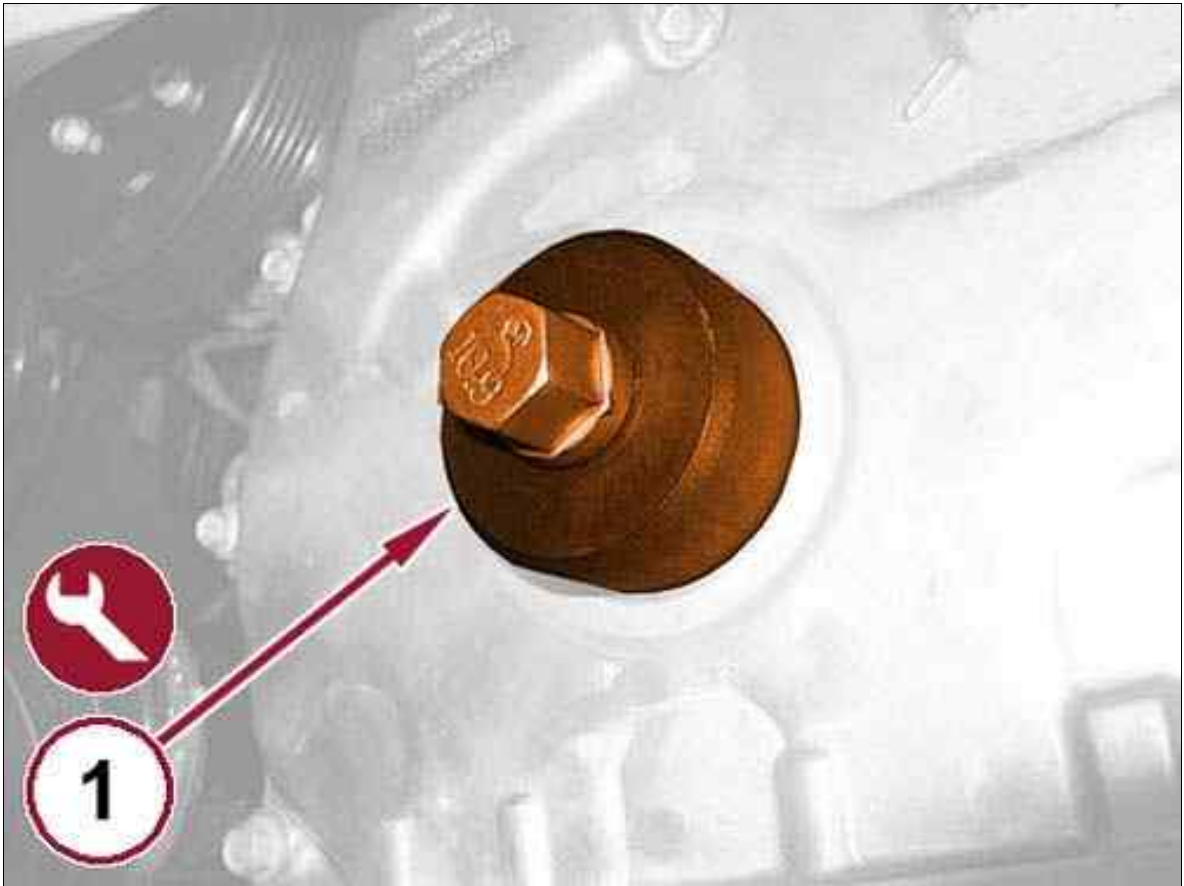
Fig 43: A/C Compressor & Bolts



Courtesy of CHRYSLER GROUP, LLC

76. Install the A/C compressor with three bolts (1) and tighten the bolts to the proper specification. Refer to SPECIFICATIONS .

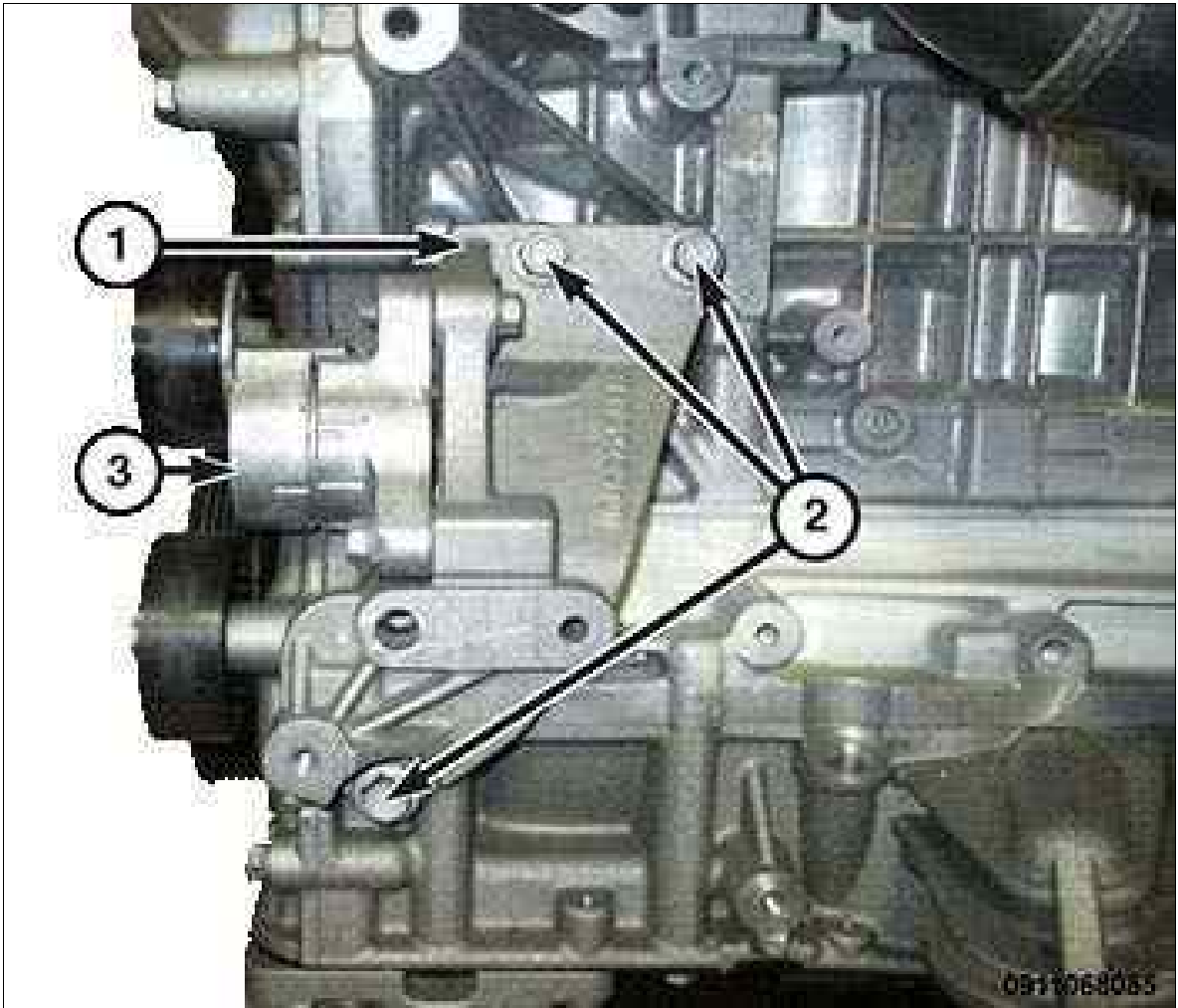
Fig 44: Installing Front Crankshaft Oil Seal Using Special Tool



Courtesy of CHRYSLER GROUP, LLC

77. Install a new front crankshaft oil seal with the 2000040245 (EMEA) or (special tool #9506, Installer, Oil Seal) (NAFTA) tool (1).

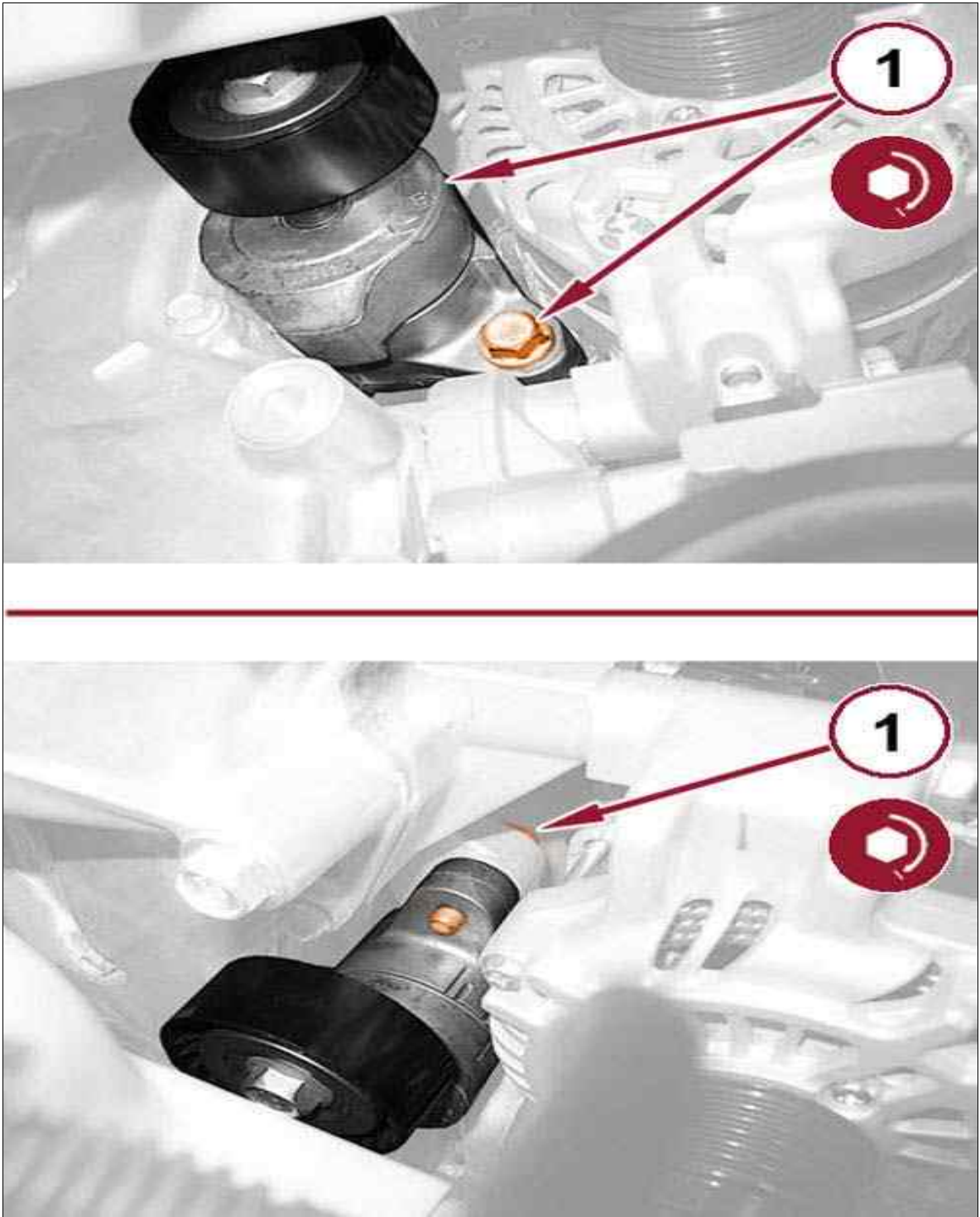
Fig 45: Generator Mounting Bracket, Accessory Belt Tensioner & Bolts



Courtesy of CHRYSLER GROUP, LLC

78. Install the generator mounting bracket (1) with three bolts (2) tightened to the proper specification. Refer to TORQUE SPECIFICATIONS .

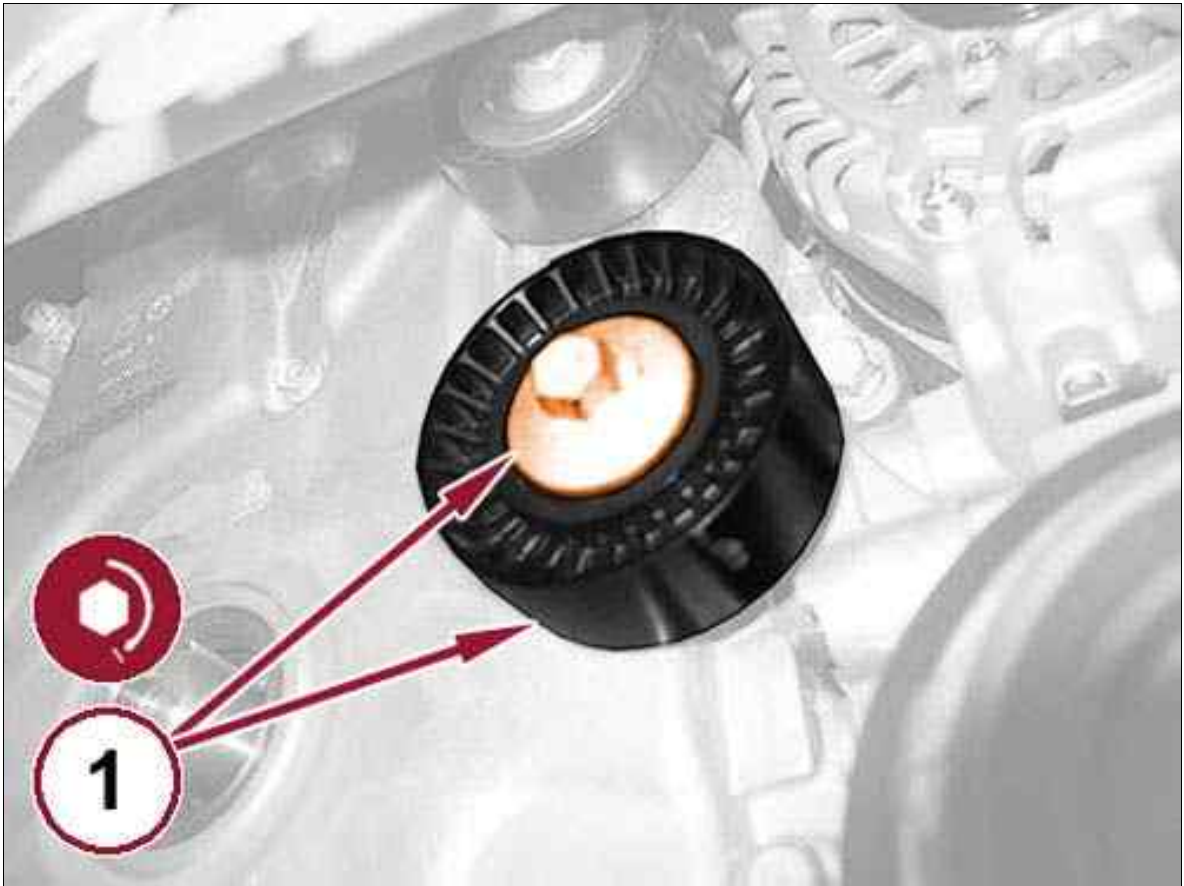
Fig 46: Accessory Drive Belt Tensioner & Bolts



Courtesy of CHRYSLER GROUP, LLC

79. If removed, install the accessory drive belt tensioner (1) and tighten the bolts to the proper specification. Refer to TORQUE SPECIFICATIONS .

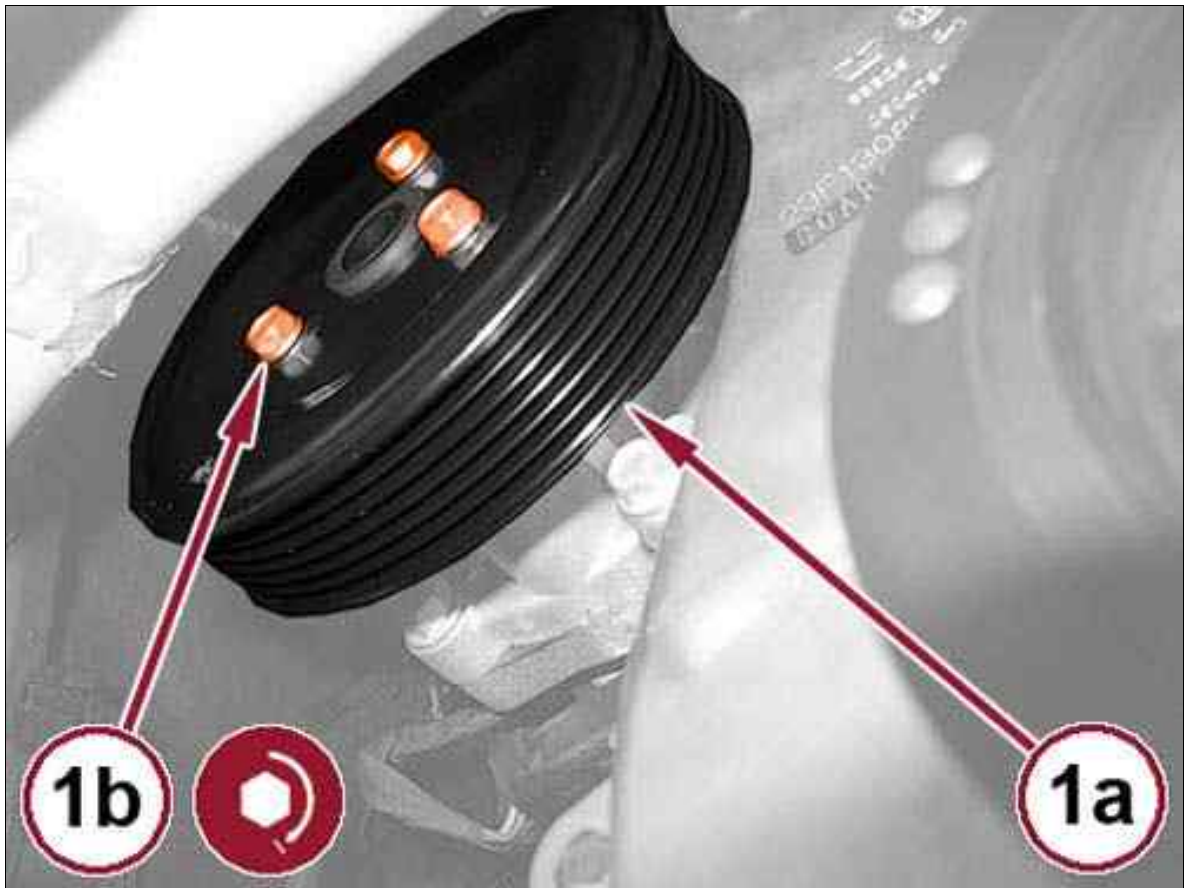
Fig 47: Accessory Drive Belt Idler Pulley & Bolt



Courtesy of CHRYSLER GROUP, LLC

80. Install the accessory drive belt idler pulley (1) and tighten the bolt to the proper specification. Refer to TORQUE SPECIFICATIONS .

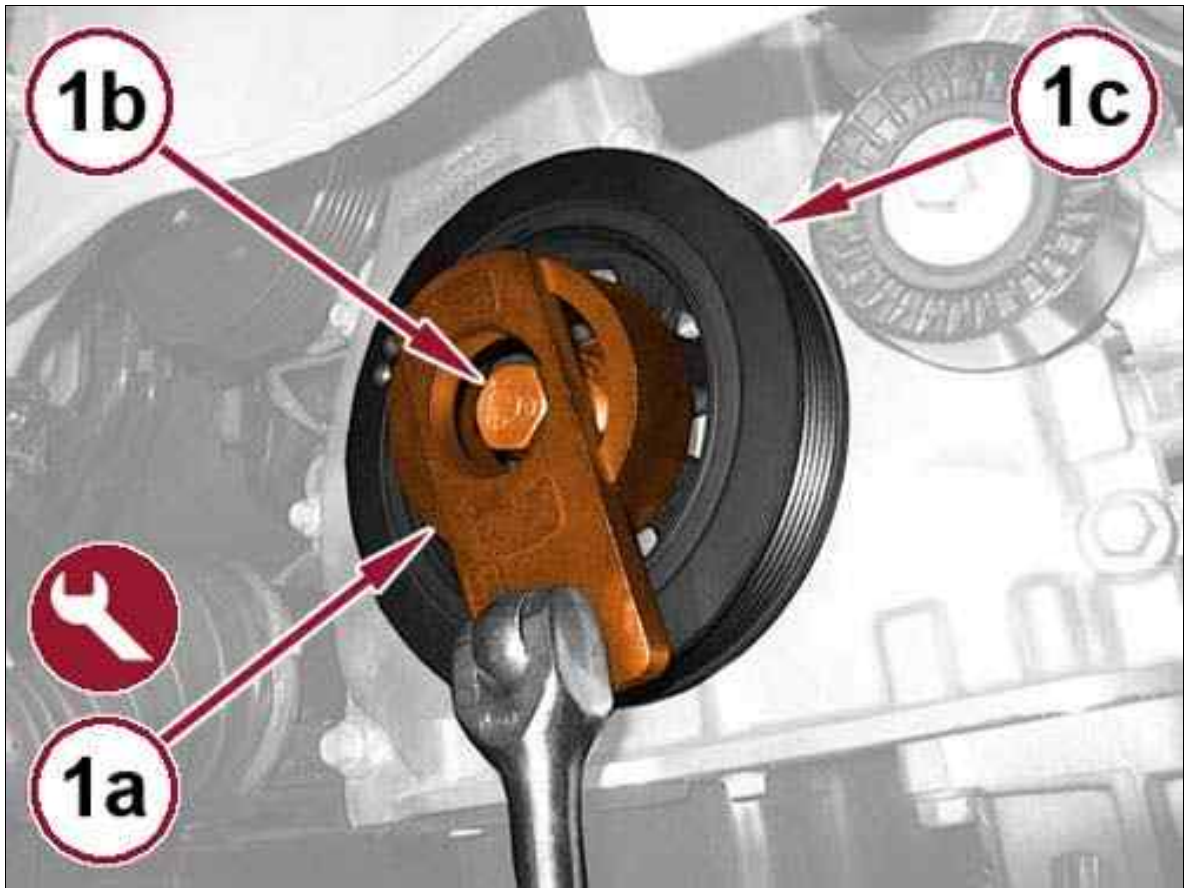
Fig 48: Water Pump Pulley & Bolts



Courtesy of CHRYSLER GROUP, LLC

81. Install the water pump pulley (1a). Tighten the three bolts (1b) to the proper specification. Refer to SPECIFICATIONS .

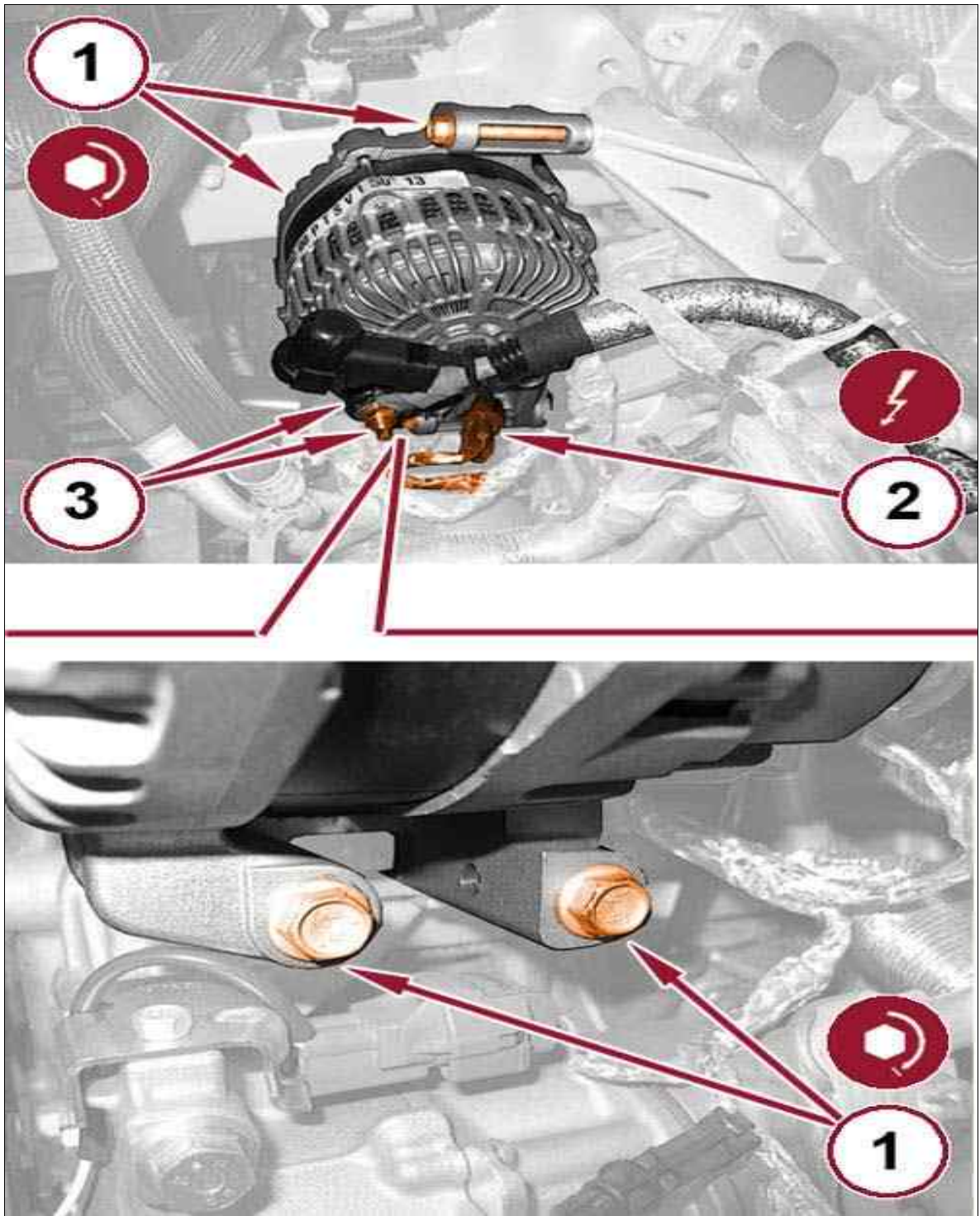
Fig 49: Special Tool, Bolt & Vibration Damper



Courtesy of CHRYSLER GROUP, LLC

82. Install the vibration damper onto the crankshaft (1c).
83. Using the 2000040299 (EMEA) or (special tool #9707, Holder, Vibration Damper) (NAFTA) tool (1a), Install the vibration damper bolt (1b) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS .

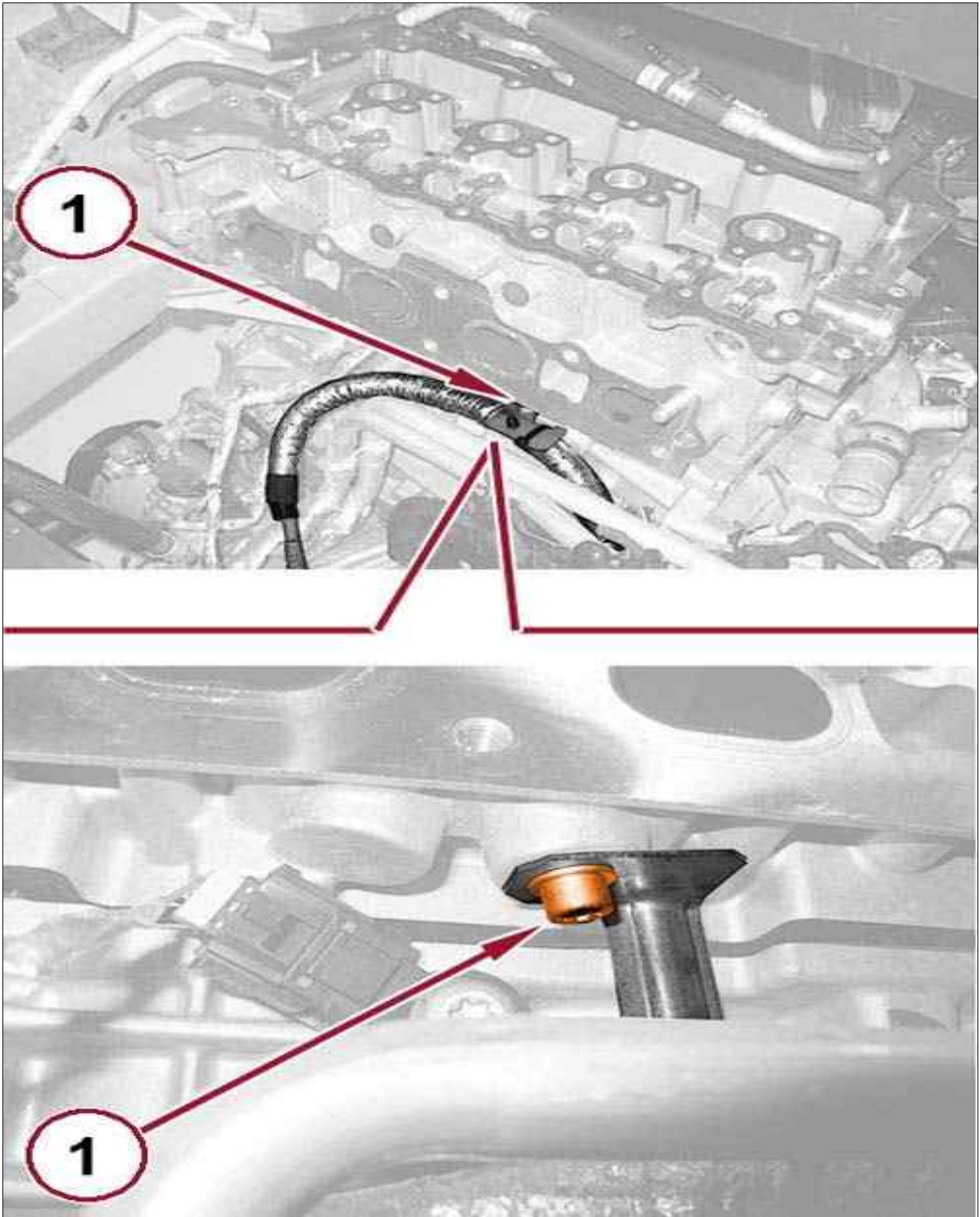
Fig 50: Alternator Wire Harness Connector, Bolts, Cap & Nut



Courtesy of CHRYSLER GROUP, LLC

84. Install the alternator, engaging the centering bushing and tighten the bolts (1) to the proper specification. Refer to SPECIFICATIONS .
85. Connect the alternator wiring with the nut (3) and engage the cap (3).
86. Connect the wire harness connector (2) to the alternator.

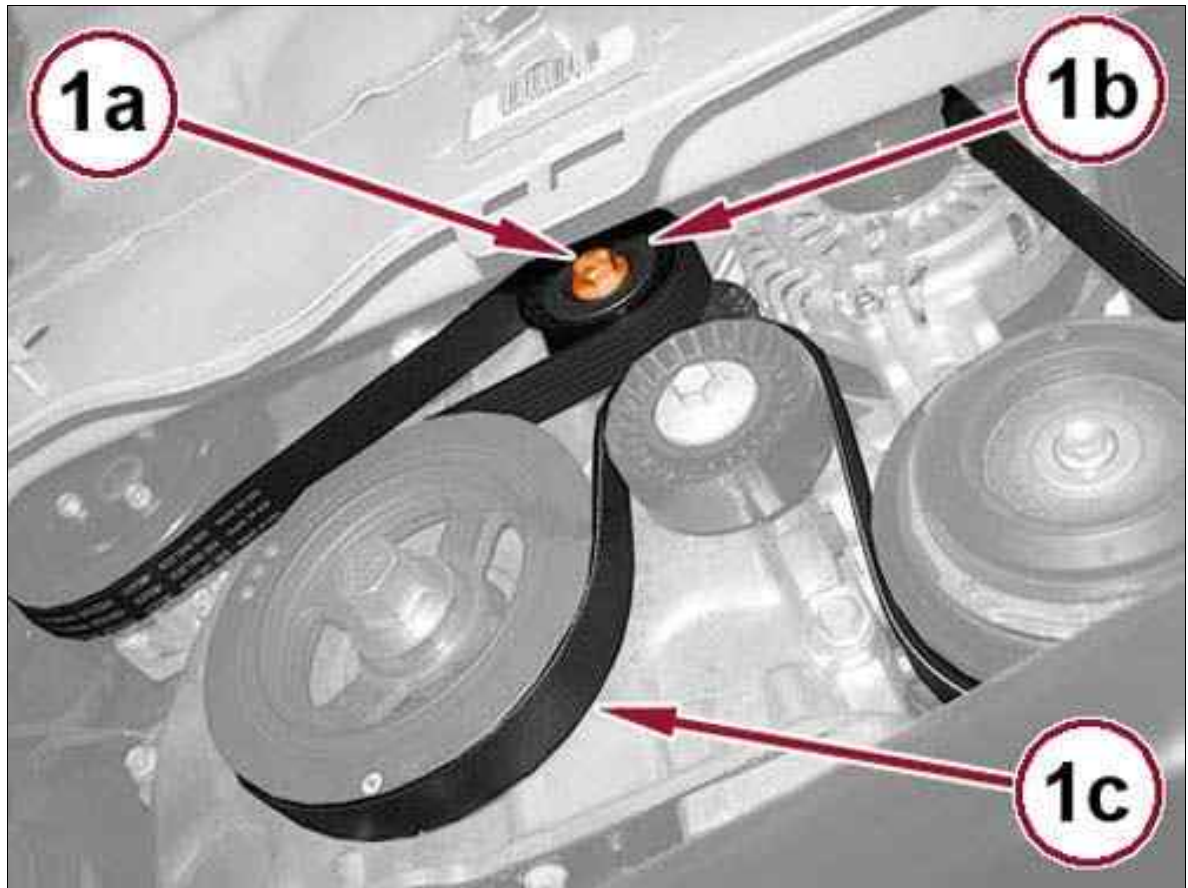
Fig 51: Wiring Retaining Bracket To Cylinder Head & Bolt



Courtesy of CHRYSLER GROUP, LLC

87. Install the wiring retaining bracket to the cylinder head with the screw (1) tighten to the proper specification. Refer to TORQUE SPECIFICATIONS .

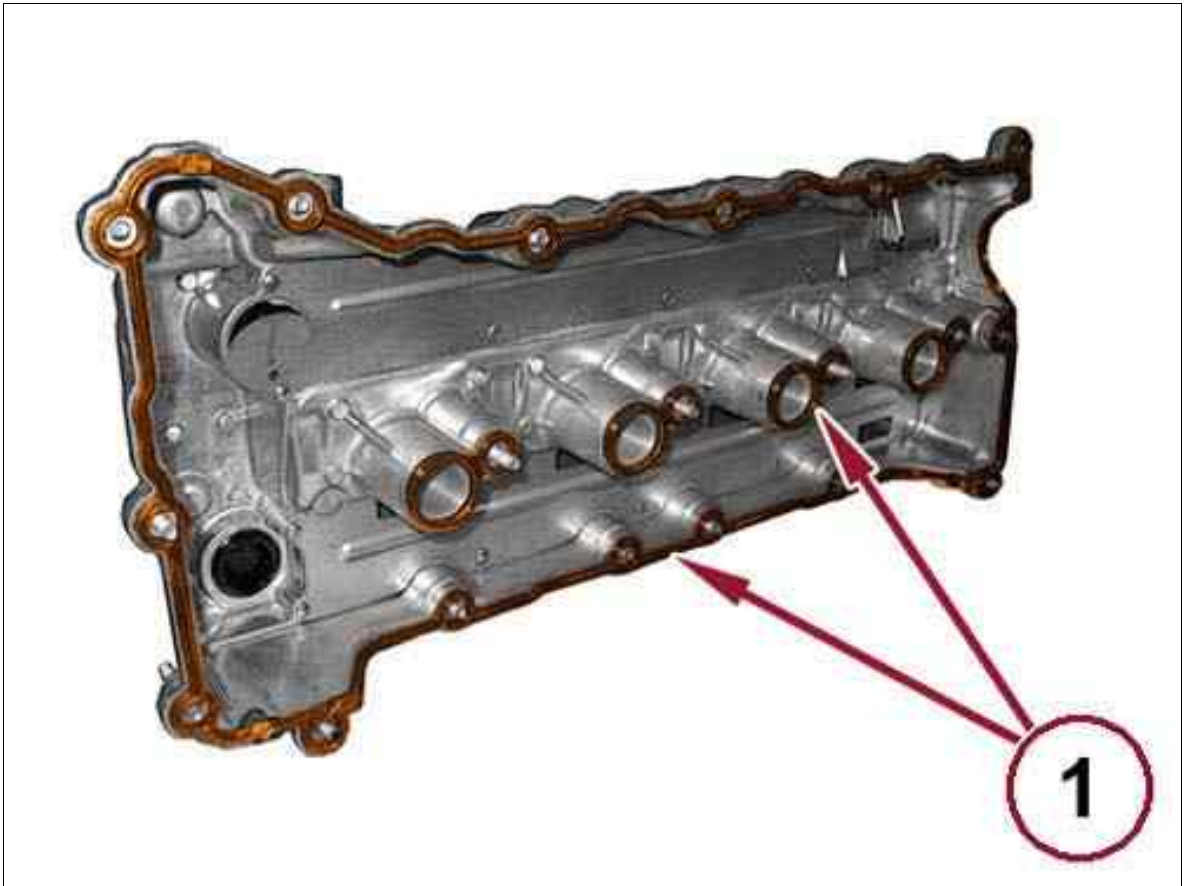
Fig 52: Belt Tensioner, Bolt & Serpentine Belt



Courtesy of CHRYSLER GROUP, LLC

88. Rotate the belt tensioner (1b) and install the serpentine belt (1c).

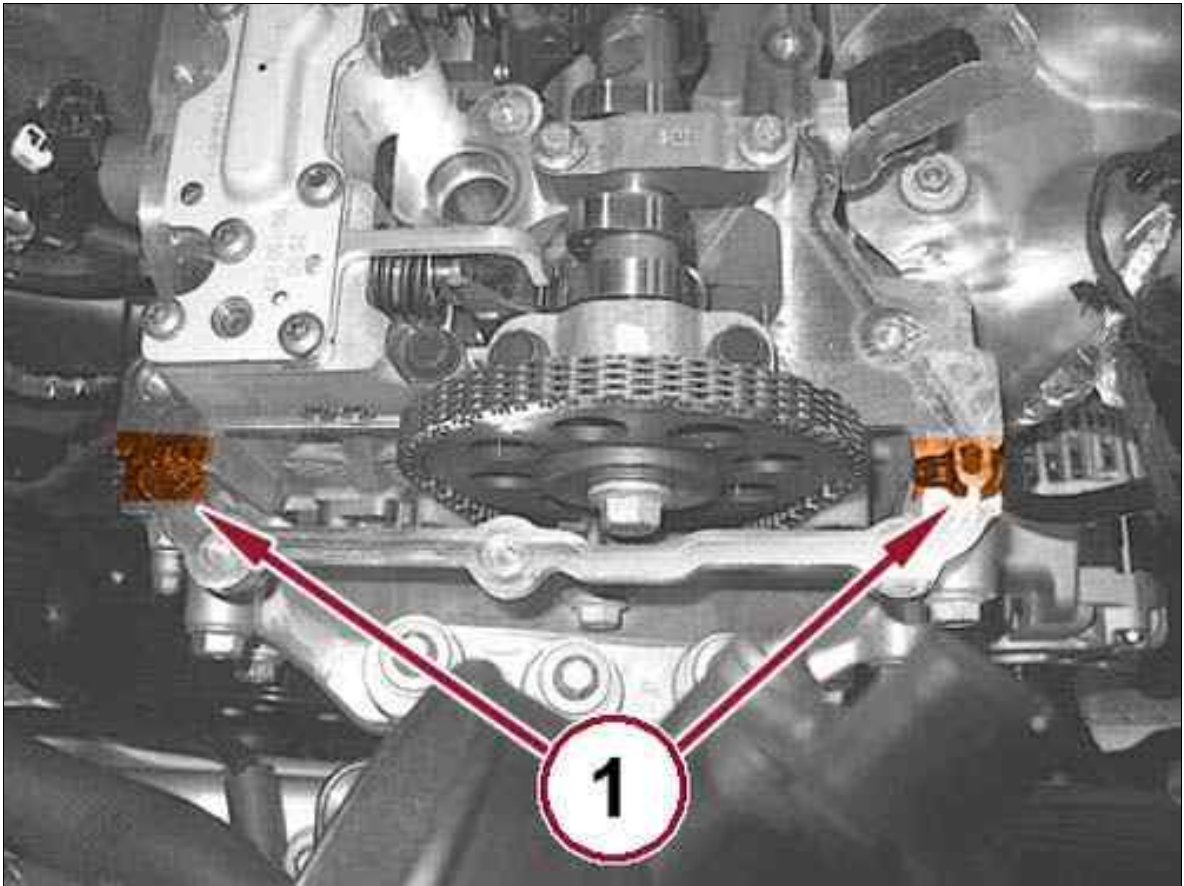
Fig 53: Valve Cover Seals



Courtesy of CHRYSLER GROUP, LLC

89. Install new seals on the valve cover.

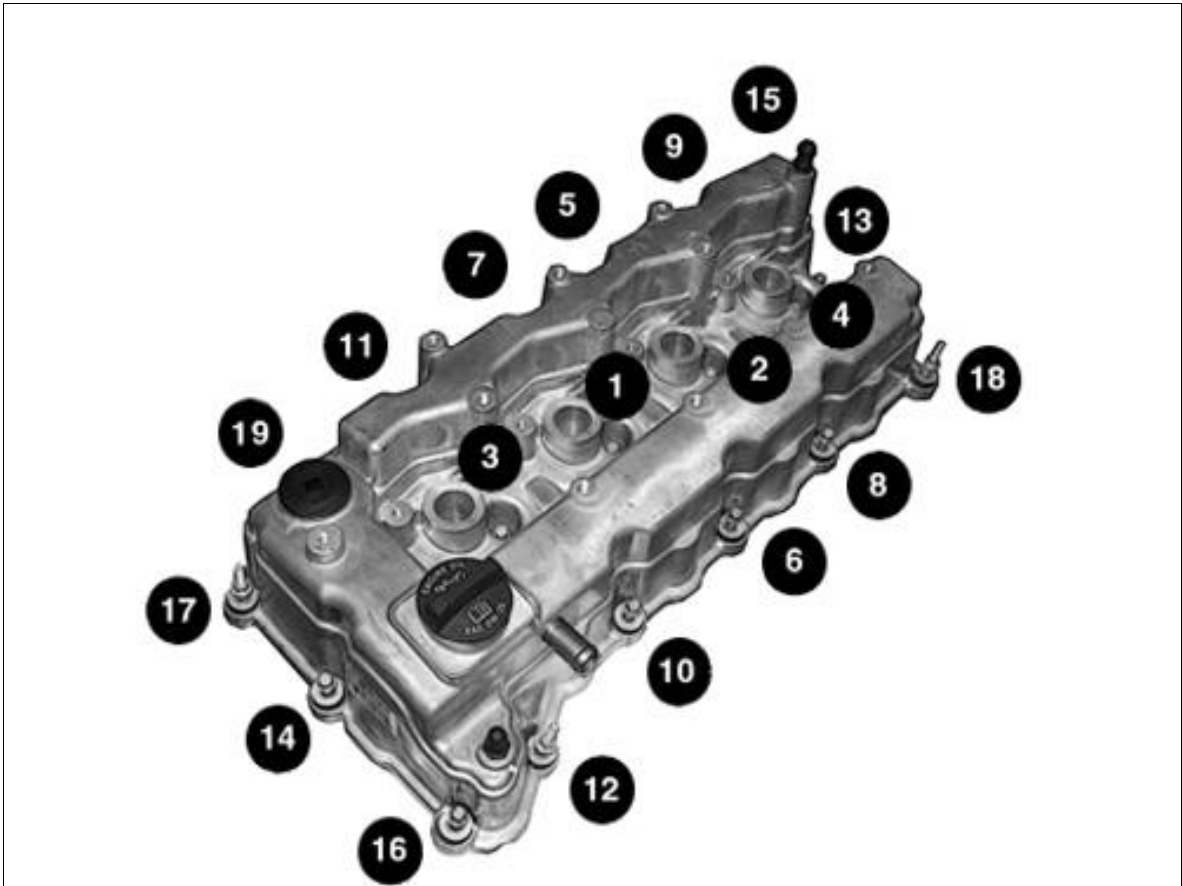
Fig 54: Placing Sealant On Cylinder Head At Specified Locations



Courtesy of CHRYSLER GROUP, LLC

90. Apply sealant in the points shown in illustration (1).

Fig 55: Valve Cover Bolts Tightening Sequence



Courtesy of CHRYSLER GROUP, LLC

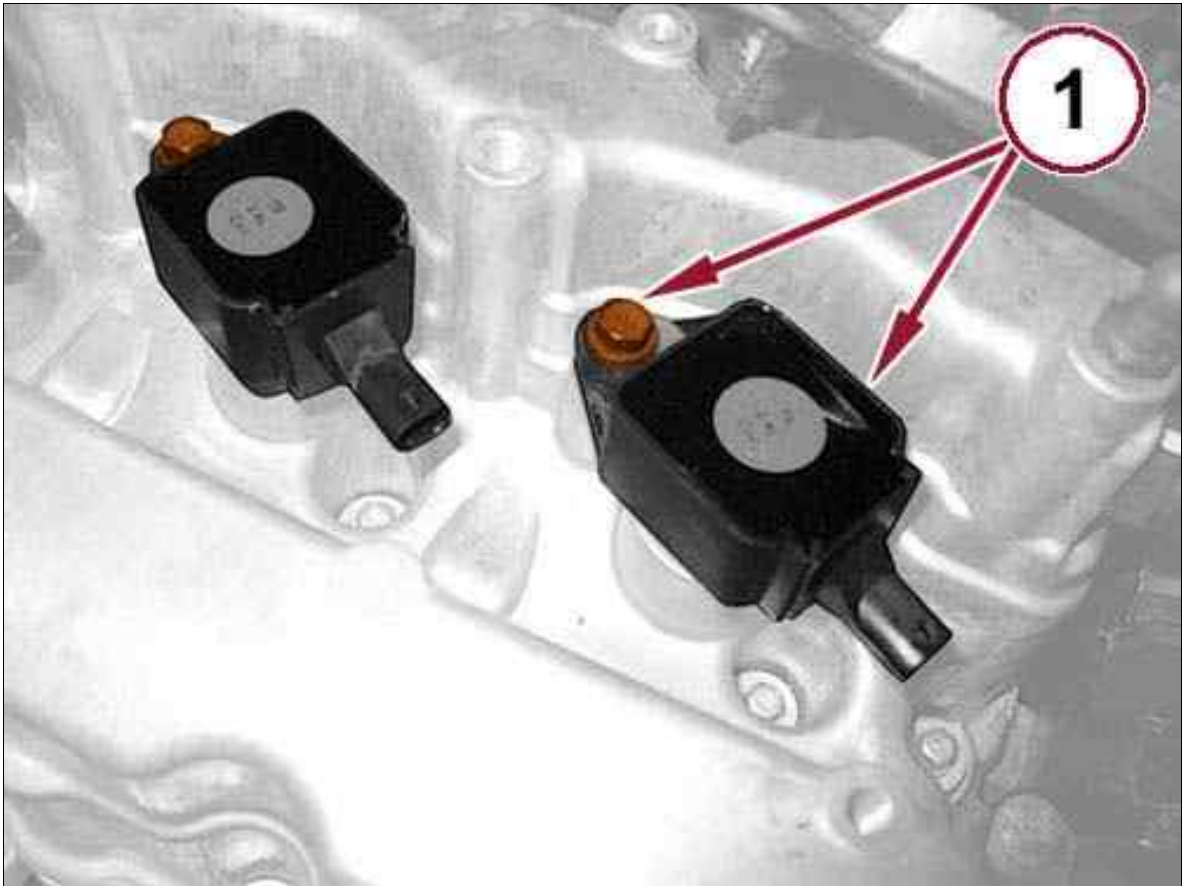


NOTE:

Place the studded screws in the positions previously marked for installation.

91. Put into place the valve cover and tighten the screws in the order shown in illustration. Tighten the screws to the proper specification. Refer to TORQUE SPECIFICATIONS .

Fig 56: Ignition Coils & Bolts

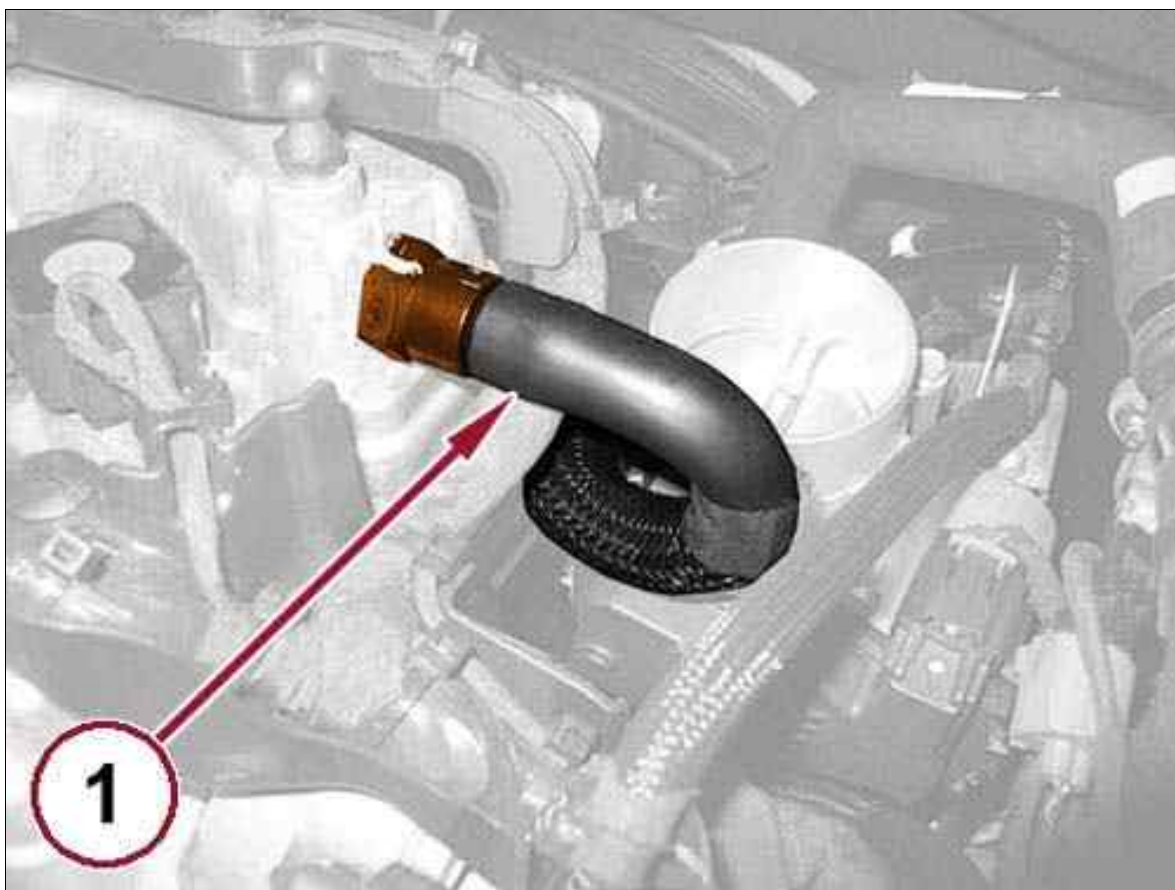


Courtesy of CHRYSLER GROUP, LLC

92. Install the ignition coils (1) and tighten the screws (1) to the proper specification. Refer to TORQUE SPECIFICATIONS .
93. Using **NEW** gaskets, install the intake manifold and tighten the fasteners to the proper specification. Refer to TORQUE SPECIFICATIONS .
94. Install the intake manifold support bracket nuts and securely tighten.
95. Install the intake manifold lower support bracket bolt and securely tighten.
96. Install the intake manifold silencer cover and securely tighten the four screws.
97. Install the fuel rail with injectors and securely tighten the retaining screws.
98. Install the fuel vapor solenoid.
99. Connect the fuel vapor delivery pipe to the air box.
100. Install the sound absorber.
101. Install a new gasket on the inlet plenum.
102. Install the throttle body, positioning it correctly on the centering pin.
103. Install the throttle body fasteners and tighten to the proper specification. Refer to FUEL INJECTION, SPECIFICATIONS .

104. Install the throttle body reinforcement bracket and tighten the fastener to the proper specification. Refer to FUEL INJECTION, SPECIFICATIONS .

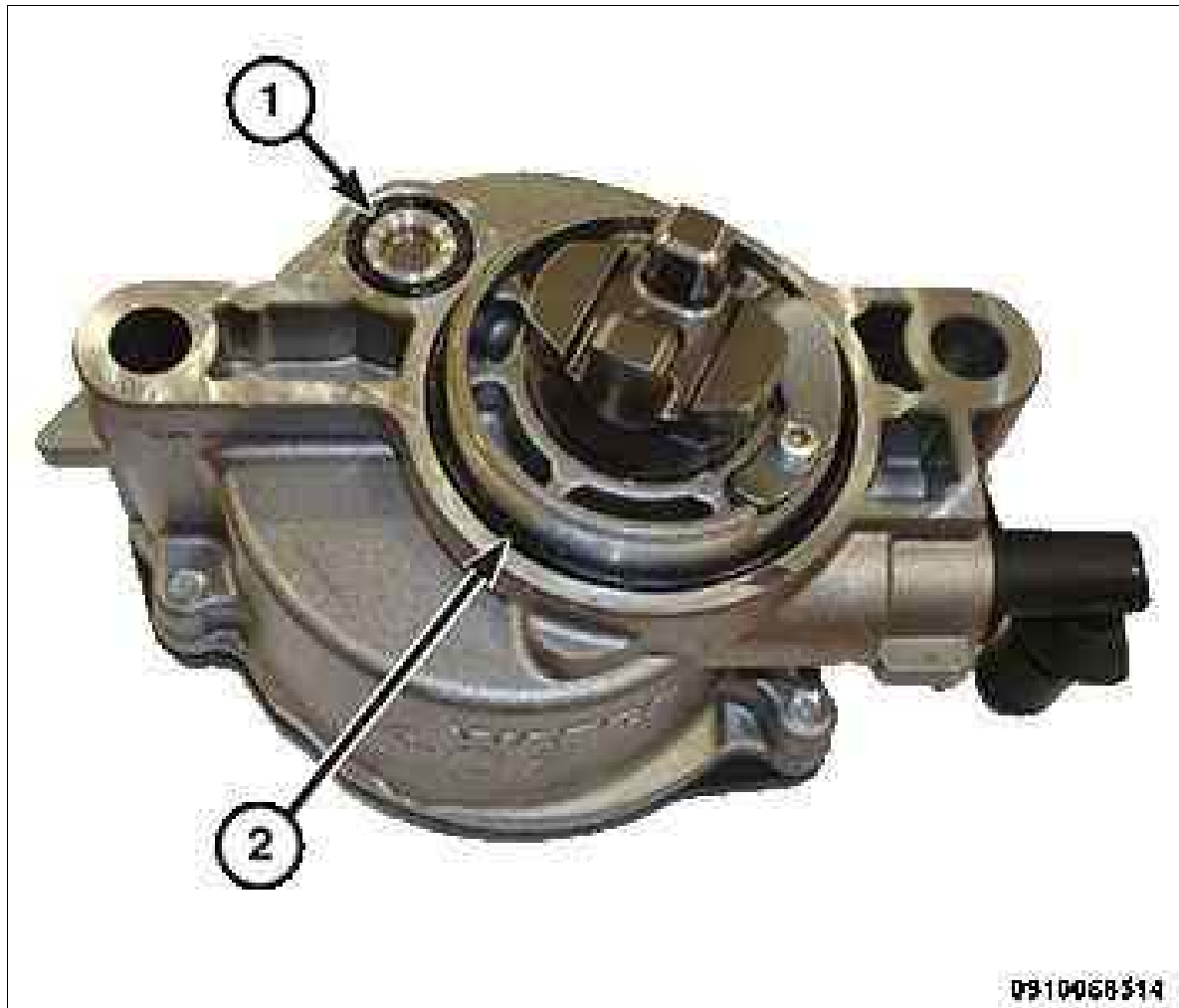
Fig 57: Oil Vapor To Air Capacity Airbox Pipe



Courtesy of CHRYSLER GROUP, LLC

105. Connect the pipe (1) that delivers oil vapor to the air capacity airbox.

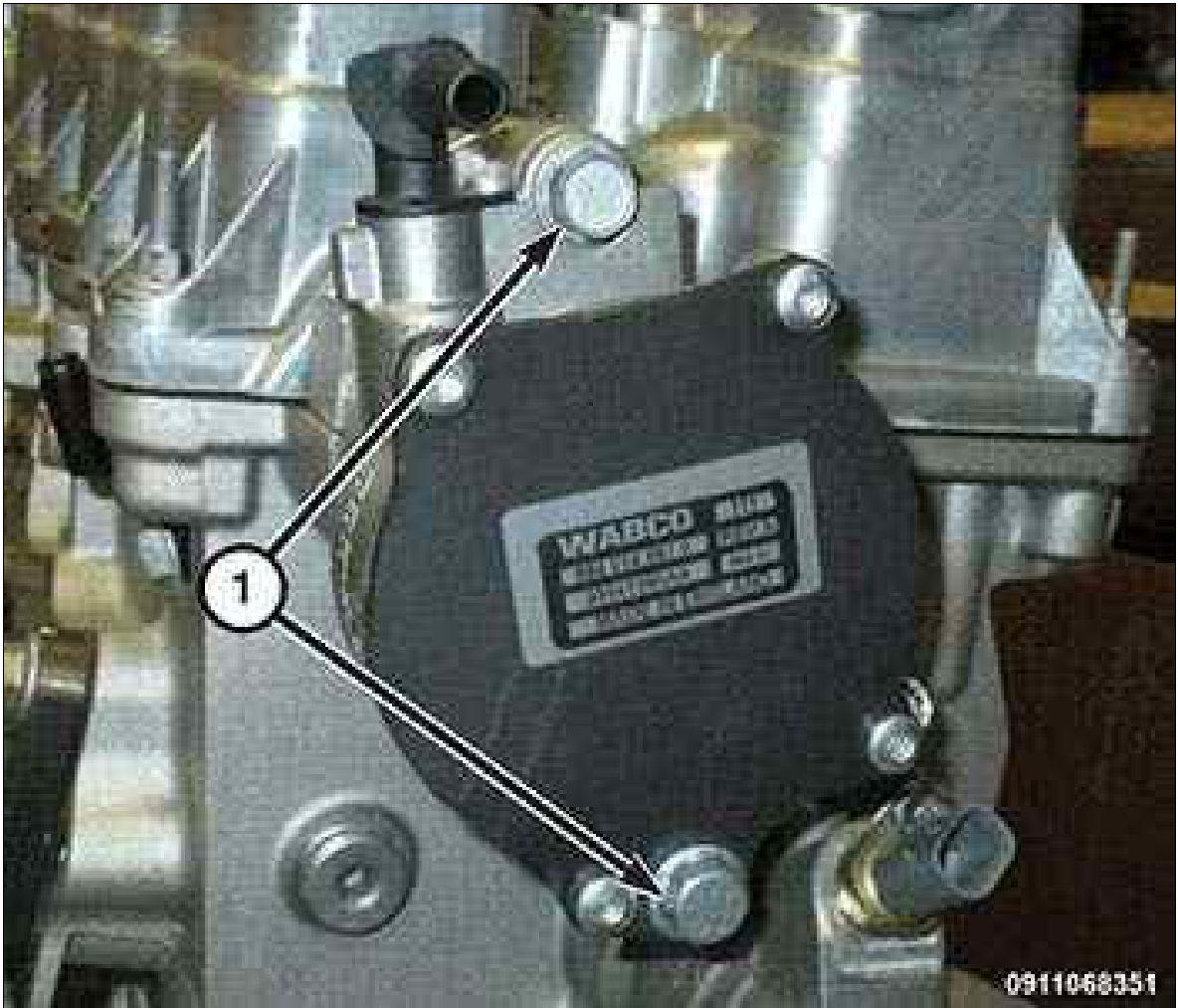
Fig 58: Vacuum Pump O-Ring Seals



Courtesy of CHRYSLER GROUP, LLC

106. Install new vacuum pump O-ring seals (1, 2).

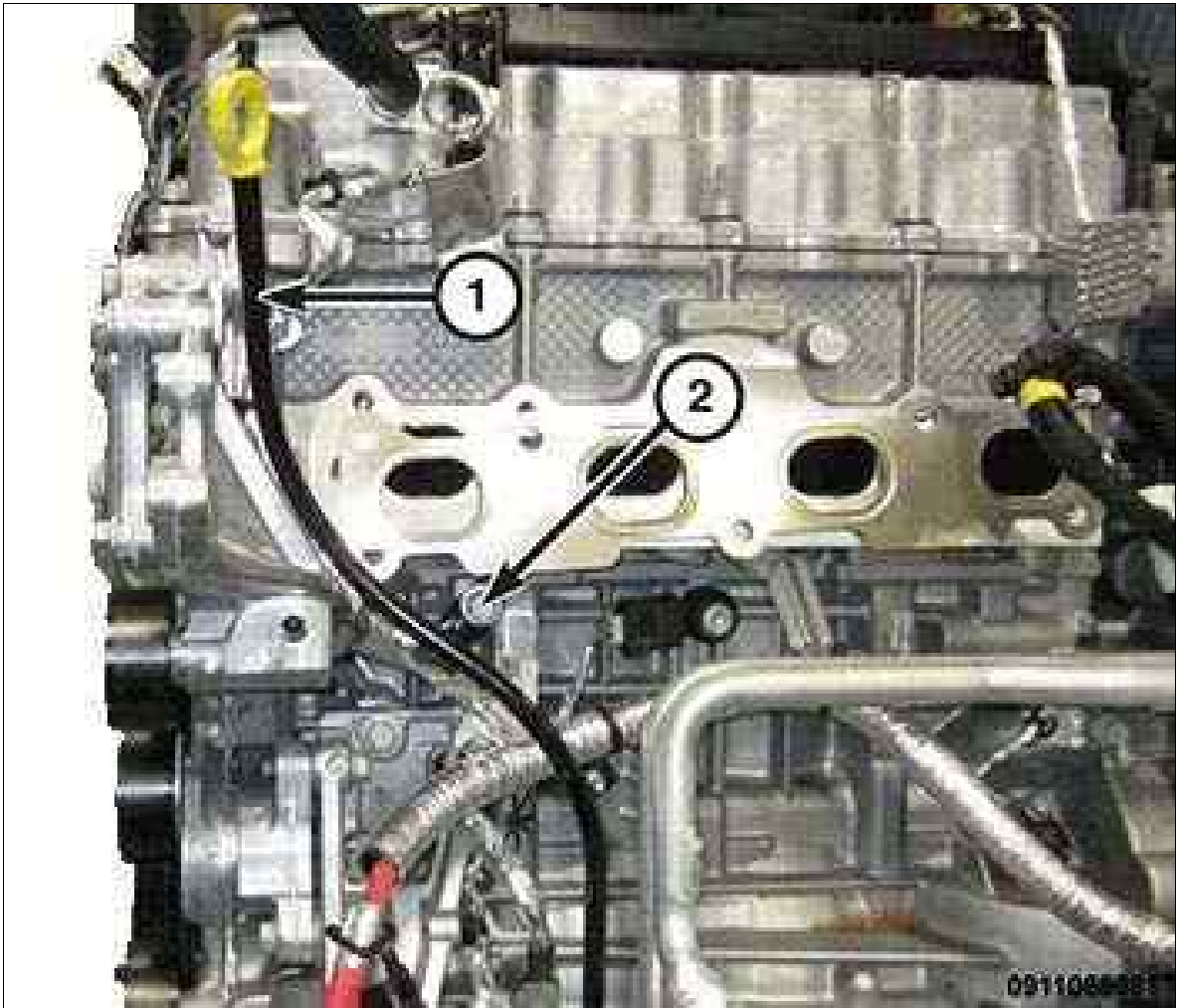
Fig 59: Vacuum Pump Mounting Bolts



Courtesy of CHRYSLER GROUP, LLC

107. Install the vacuum pump into the cylinder head opening with two bolts (1) tightened to the proper specification. Refer to TORQUE SPECIFICATIONS .

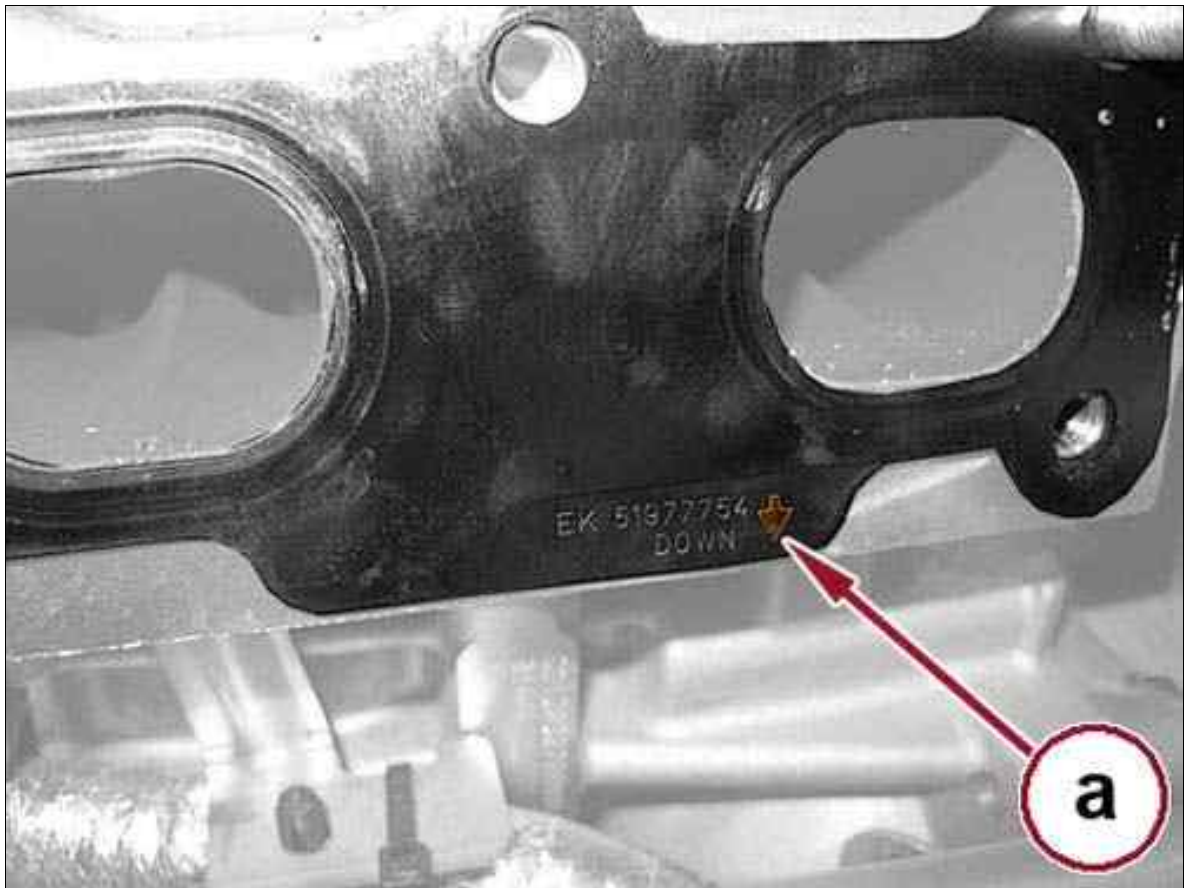
Fig 60: Dipstick Tube & Bolt



Courtesy of CHRYSLER GROUP, LLC

108. Install the oil dipstick tube (1) to the engine with the bolt (2) tightened to the proper specification. Refer to TORQUE SPECIFICATIONS .

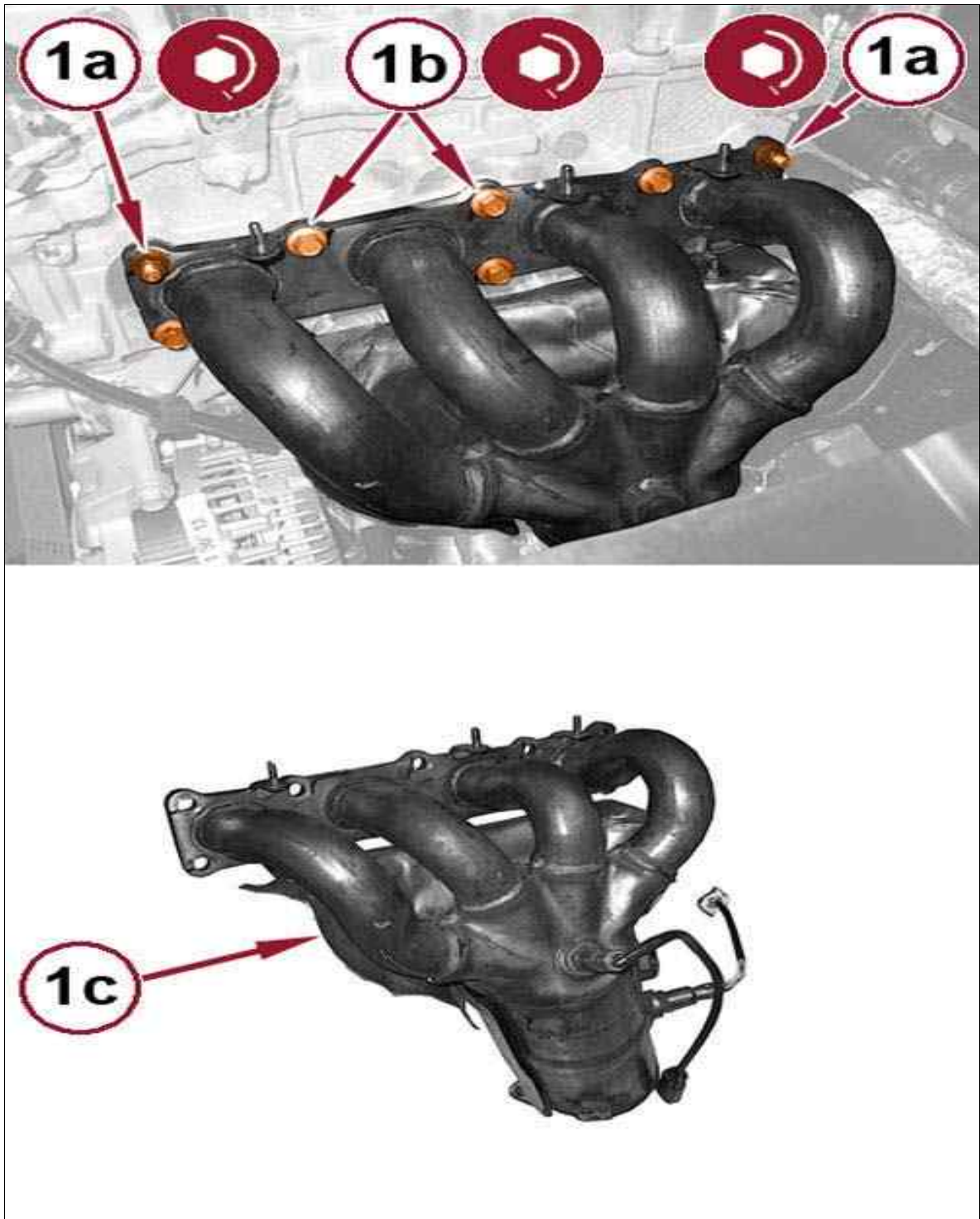
Fig 61: Ensure Arrow On Exhaust Manifold Gasket Is Pointing Downward



Courtesy of CHRYSLER GROUP, LLC

109. Install a new exhaust manifold gasket onto the cylinder head, taking care that the arrow (a) shown in the figure is pointing downwards.

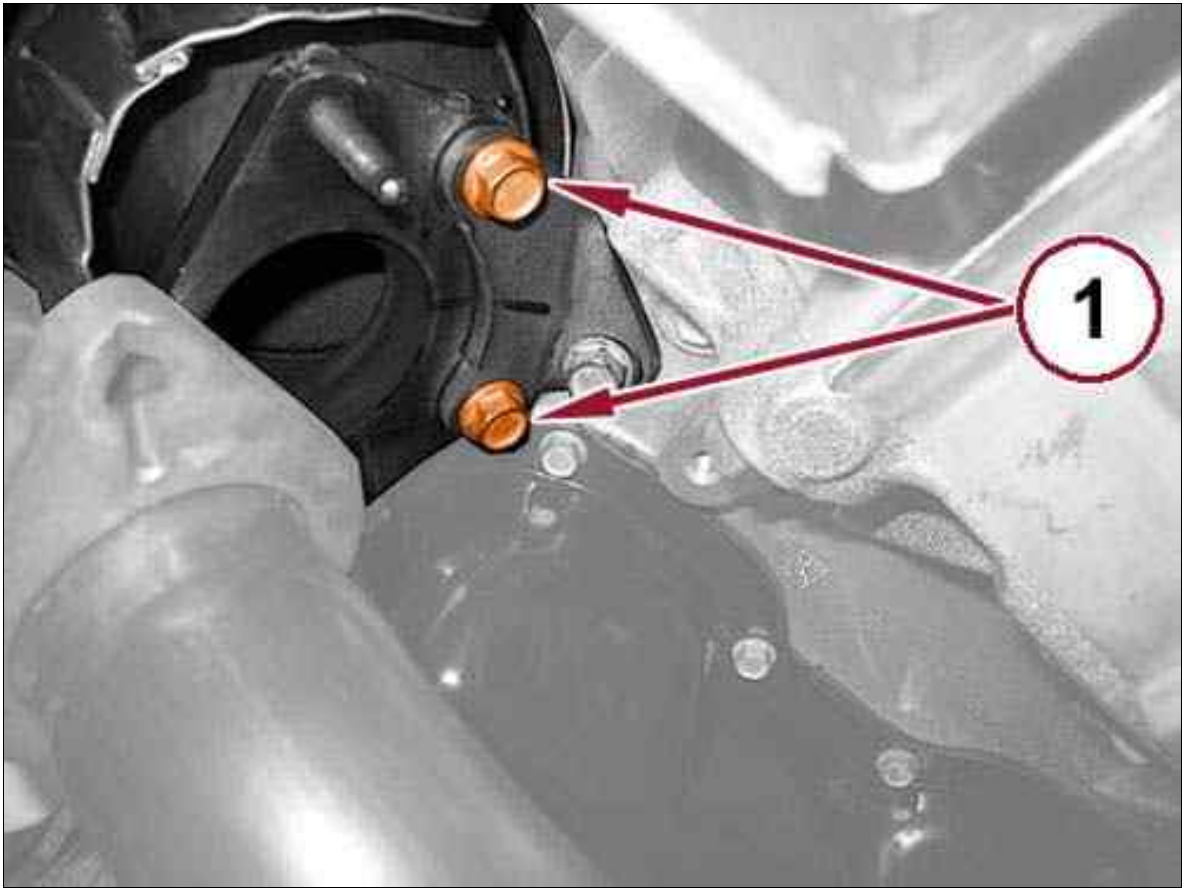
Fig 62: Exhaust Manifold Catalyst, Nuts & Bolts



Courtesy of CHRYSLER GROUP, LLC

110. Install the manifold catalyst (1c). Tighten the bolts (1b) and the nuts (1a) to the proper specification. Refer to TORQUE SPECIFICATIONS .

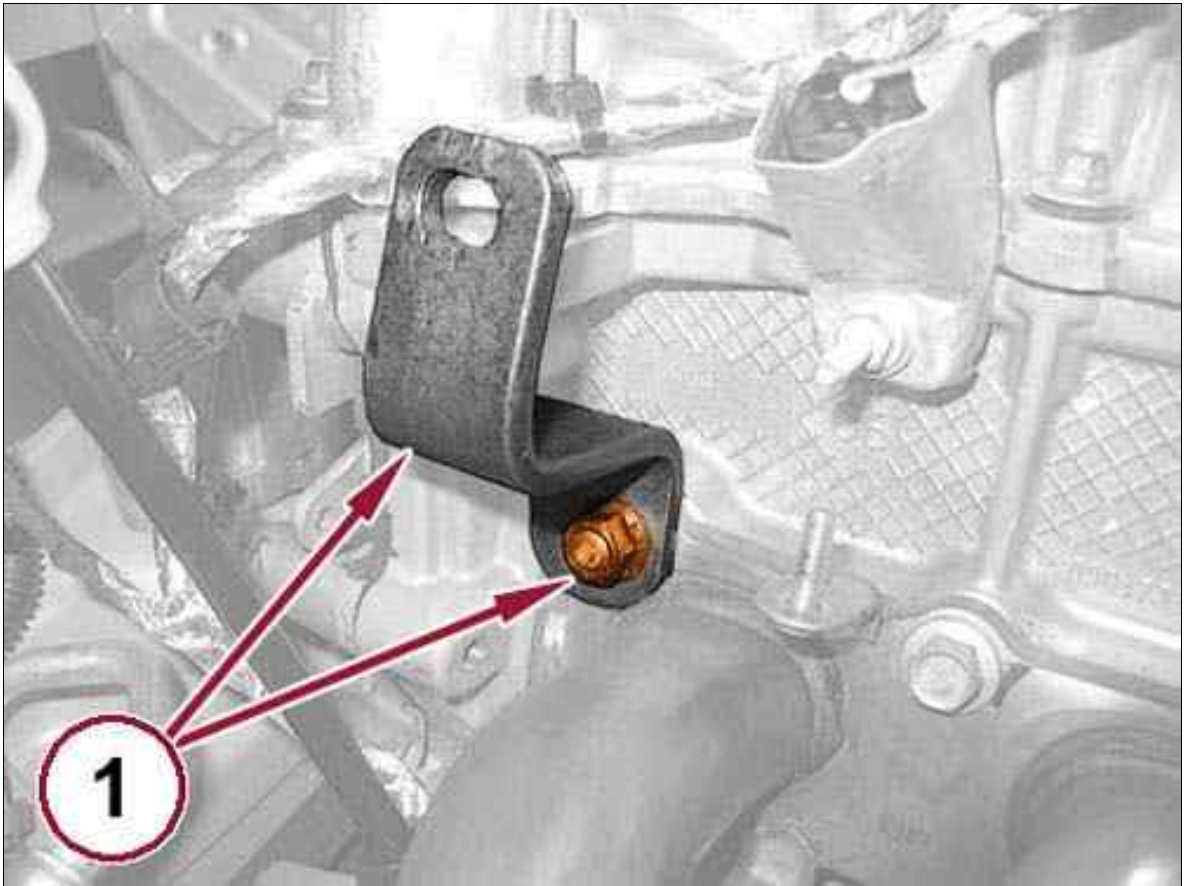
Fig 63: Catalytic Converter Support Bracket Bolts



Courtesy of CHRYSLER GROUP, LLC

111. Install the catalytic converter support bracket and tighten the bolts (1) to the proper specification. Refer to TORQUE SPECIFICATIONS .

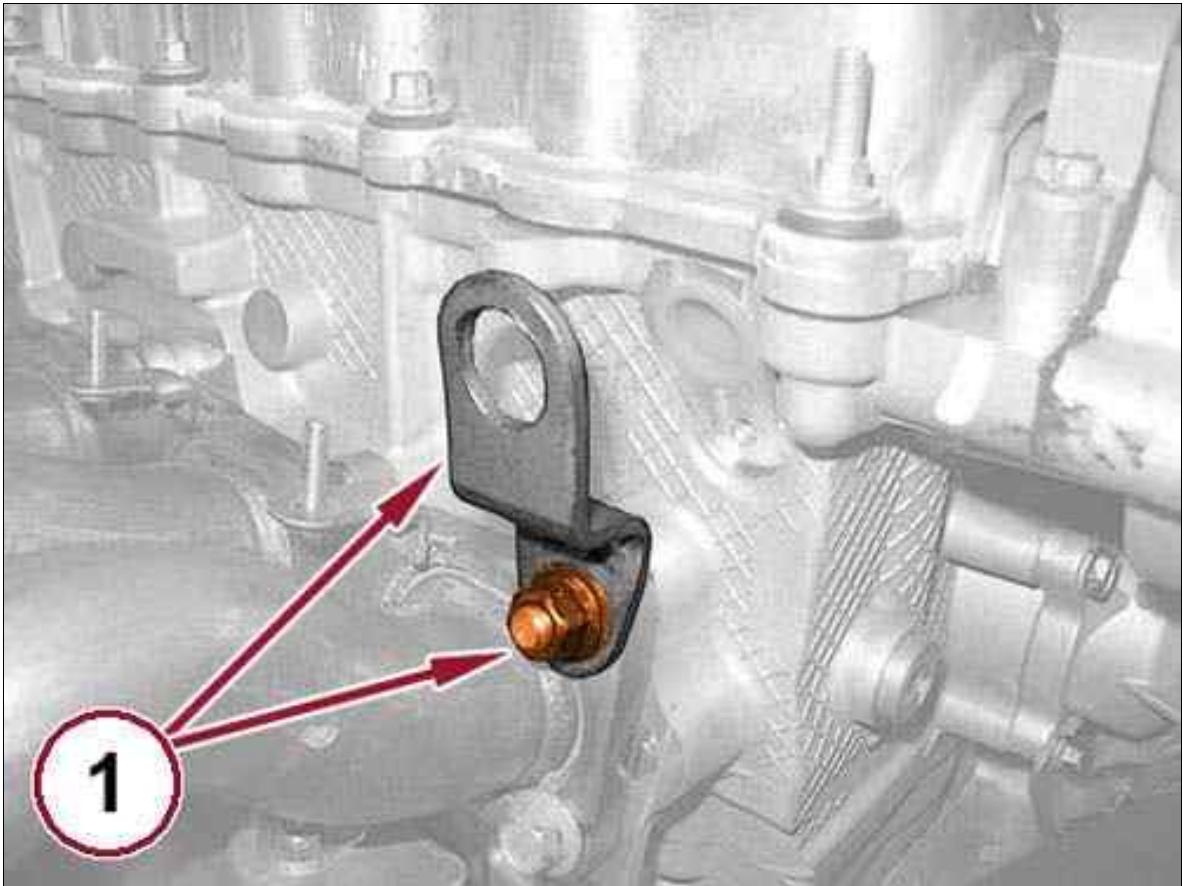
Fig 64: Engine Lifting Bracket & Exhaust Manifold Nut



Courtesy of CHRYSLER GROUP, LLC

112. Install a suitable engine lifting bracket (1) under the exhaust manifold nut.

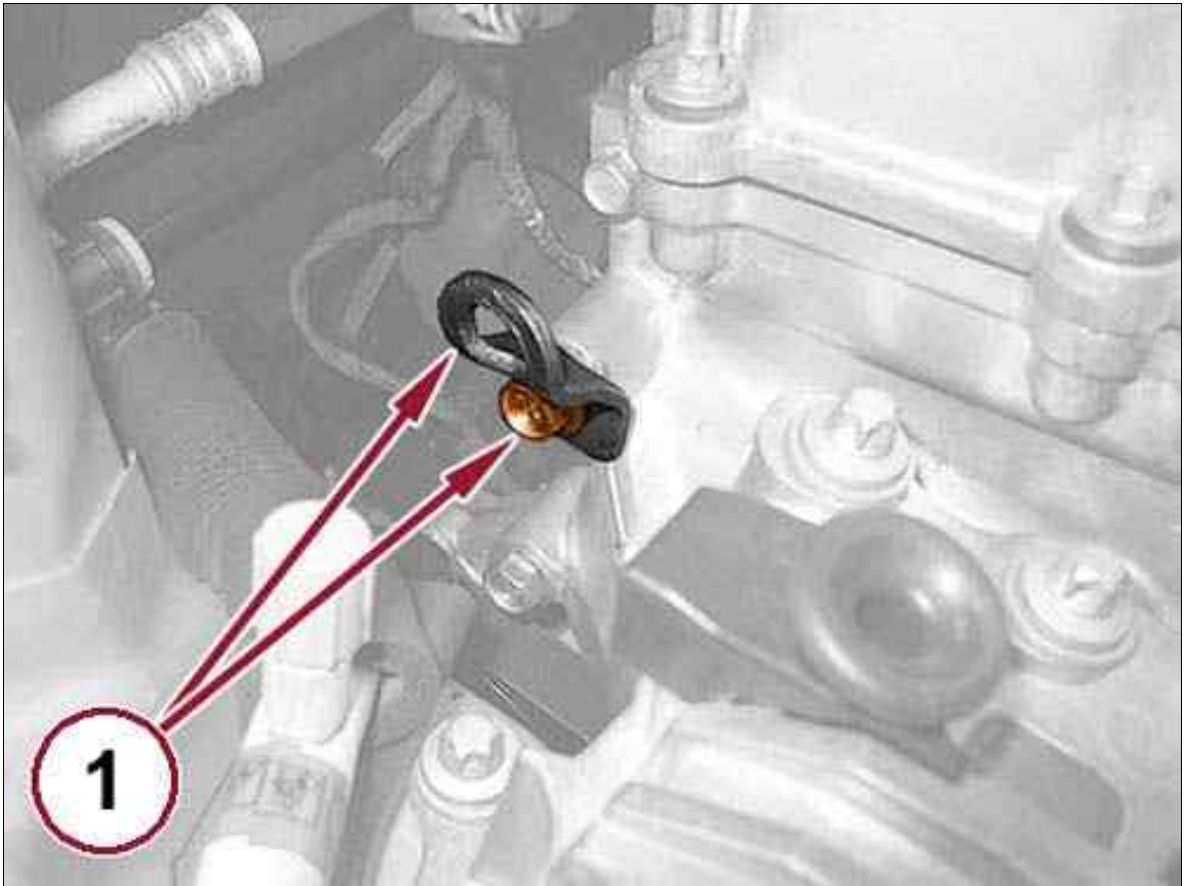
Fig 65: Engine Lifting Bracket & Exhaust Manifold Nut



Courtesy of CHRYSLER GROUP, LLC

113. Install a suitable engine lifting bracket (1) under the exhaust manifold nut.

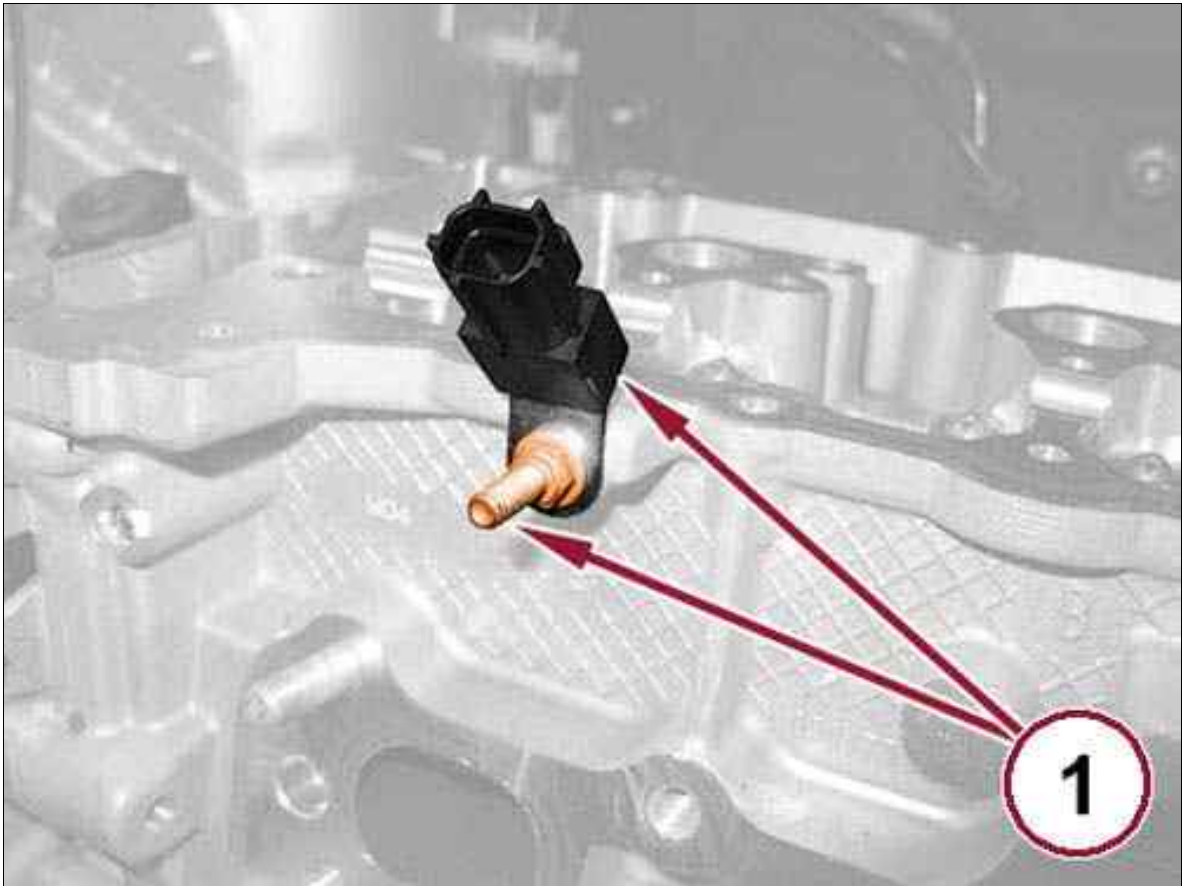
Fig 66: Engine Lifting Bracket & Engine Timing Cover Bolt



Courtesy of CHRYSLER GROUP, LLC

114. Install a suitable engine lifting bracket (1) under the engine timing cover bolt.

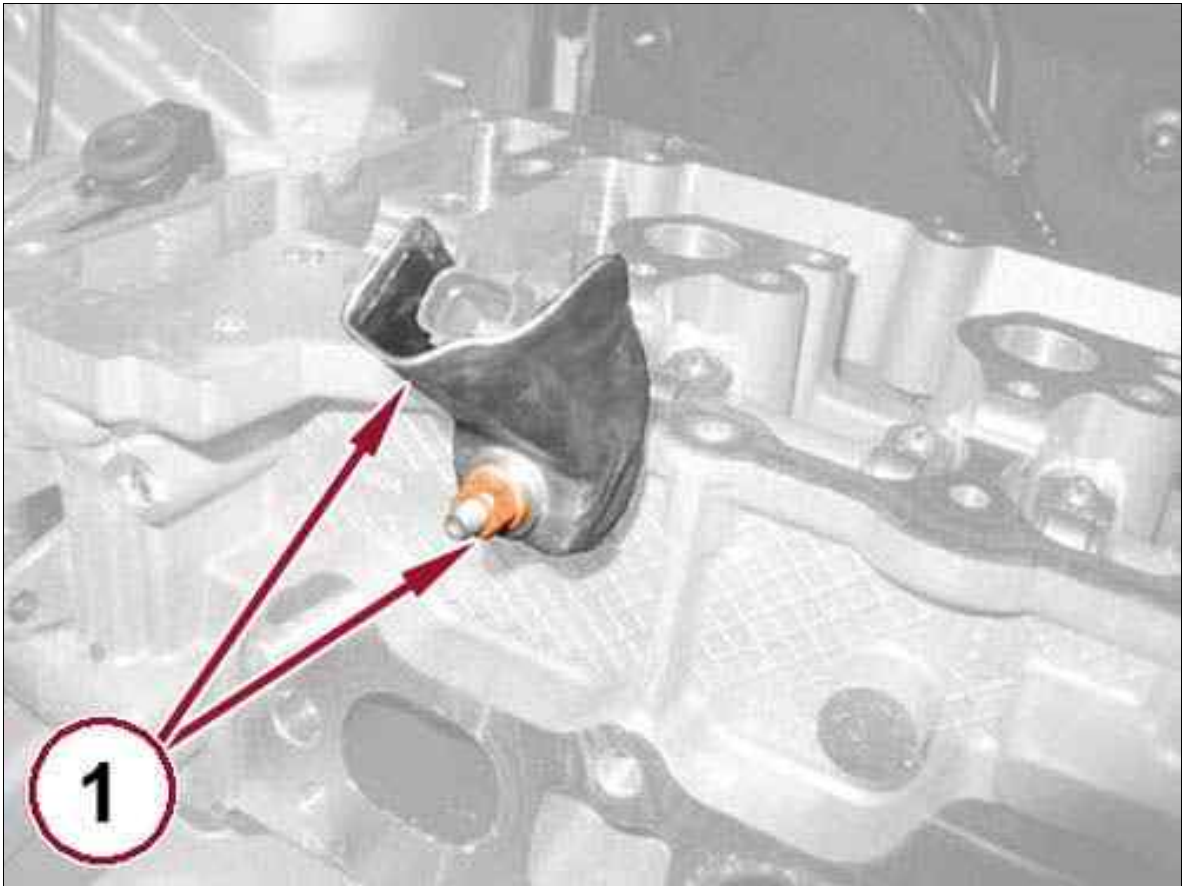
Fig 67: Ground Terminal & Stud



Courtesy of CHRYSLER GROUP, LLC

115. Install the ground terminal (1) and tighten the bolt securely.

Fig 68: Heat Shield & Nut



Courtesy of CHRYSLER GROUP, LLC

116. Install the heat shield of the ground terminal (1) and tighten the nut securely.

117. Position the wire harness on the engine and make the following connections:

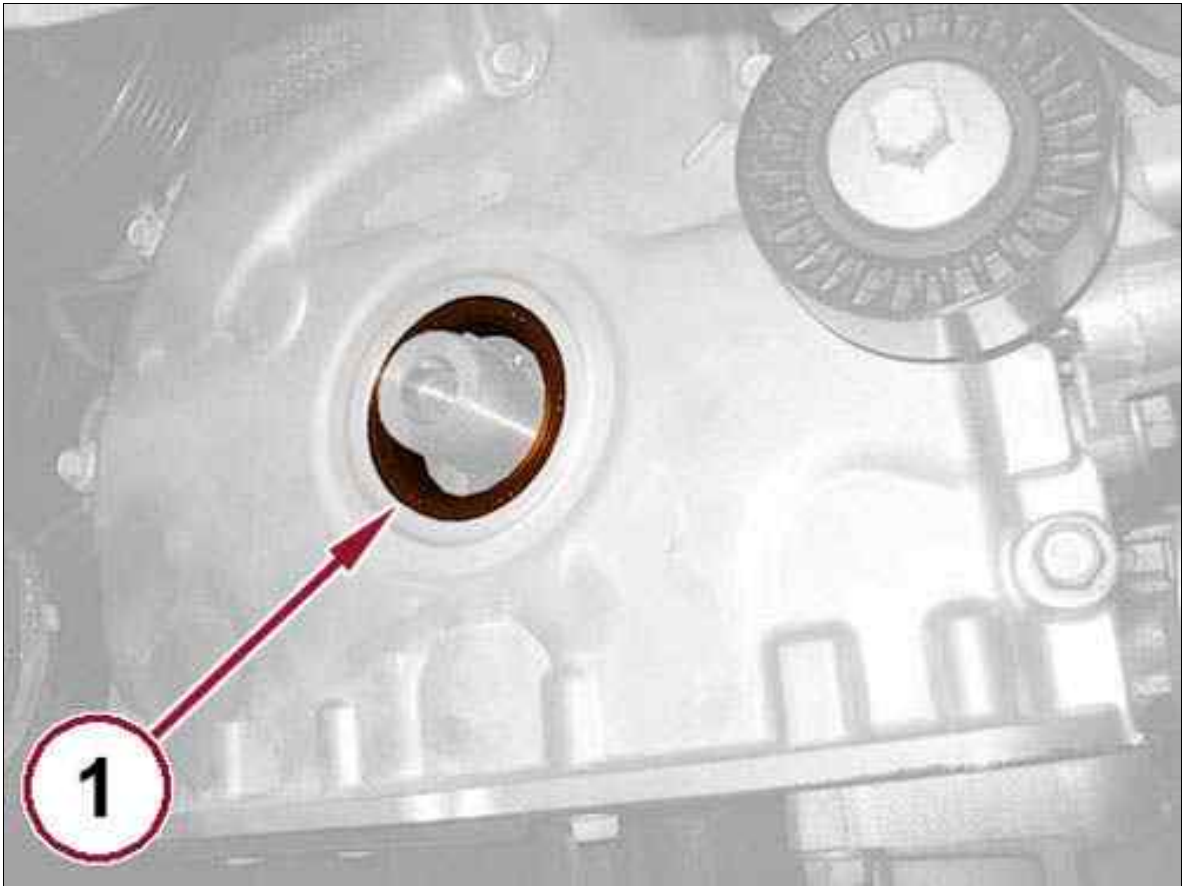
1. Install the screws securing the wiring duct on the intake side.
2. Install the screws securing the wiring duct on the exhaust side.
3. Connect the knock sensor wire harness connector
4. Connect the crankshaft position sensor wire harness connector
5. Connect the A/C compressor wire harness connector
6. Connect the manifold pressure and temperature sensor wire harness connector and engage the retaining clips
7. Connect the engine oil pressure sensor wire harness connector
8. Connect the throttle body wire harness connector
9. Connect the coolant temperature sensor wire harness connector
10. Connect the purge solenoid wire harness connector
11. Connect the fuel injector wire harness connectors

12. Connect the engine oil temperature sensor wire harness connector
13. Connect the variable valve actuator wire harness connectors
14. Connect the ignition coil wire harness connectors
15. Connect the ground terminal wire harness connector
118. Install the lower heat shield onto the exhaust manifold and securely tighten the bolts.
119. Install the upper heat shield and securely tighten the nuts.
120. Install the upstream oxygen sensor support bracket and securely tighten the bolts then engage the wire harness retainer.
121. Connect the upstream oxygen sensor wire harness connector.
122. Connect the downstream oxygen sensor wire harness connector.
123. Install a new oil drain plug and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS .
124. Service the engine with the proper quality and quantity of engine oil. Refer to CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS .
125. Install the flexplate and transmission to the engine and install the engine in the vehicle. Refer to REMOVAL AND INSTALLATION .
126. Fill the transmission. Refer to FLUID AND FILTER, STANDARD PROCEDURE .
127. Fill the cooling system. Refer to STANDARD PROCEDURE .
128. Connect the negative battery cable.
129. Evacuate and charge the refrigerant system. Refer to PLUMBING, STANDARD PROCEDURE .
130. Start engine and check for leaks.
131. Run the engine until it reaches normal operating temperature. Check cooling system for correct fluid level. Refer to STANDARD PROCEDURE .

ENGINE BLOCK > SEAL, CRANKSHAFT OIL, FRONT > REMOVAL AND INSTALLATION > 2.4L MULTI AIR > REMOVAL

1. Remove the vibration damper. Refer to DAMPER, VIBRATION, REMOVAL AND INSTALLATION .

Fig 1: Locating Front Crankshaft Oil Seal

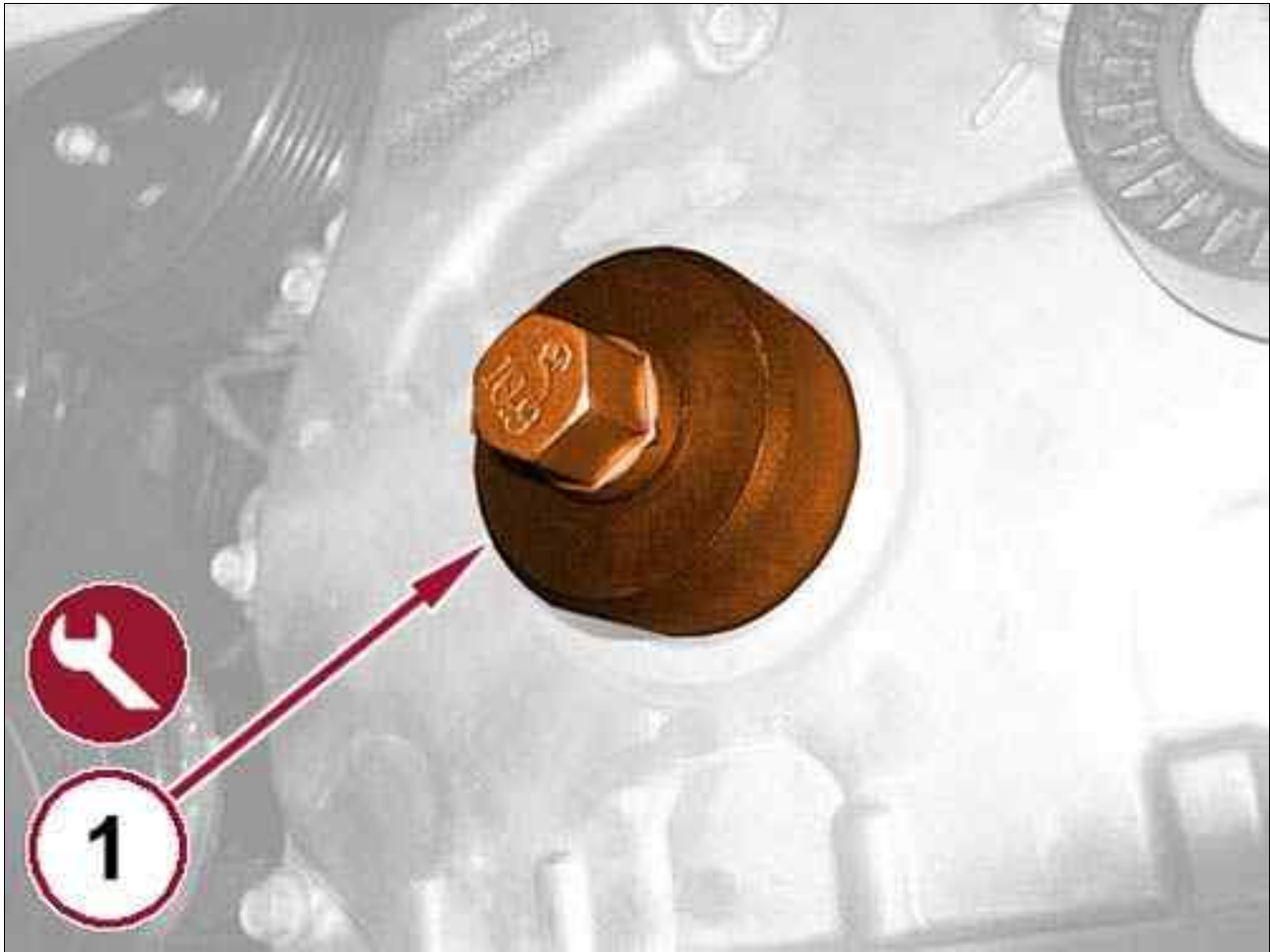


Courtesy of CHRYSLER GROUP, LLC

2. Using a screwdriver, remove the front crankshaft oil seal (1).

**ENGINE BLOCK > SEAL, CRANKSHAFT OIL, FRONT > REMOVAL AND
INSTALLATION > 2.4L MULTI AIR > INSTALLATION**

Fig 1: Installing Front Crankshaft Oil Seal Using Special Tool



Courtesy of CHRYSLER GROUP, LLC

1. Using the 2000040245 (EMEA) or (special tool #9506, Installer, Oil Seal) (NAFTA) tool (1), Install the **NEW** front crankshaft oil seal (1) onto the front cover.
2. Install the vibration damper. Refer to DAMPER, VIBRATION, REMOVAL AND INSTALLATION .

ENGINE BLOCK > SEAL, CRANKSHAFT OIL, REAR > REMOVAL AND INSTALLATION > REMOVAL - 2.4L

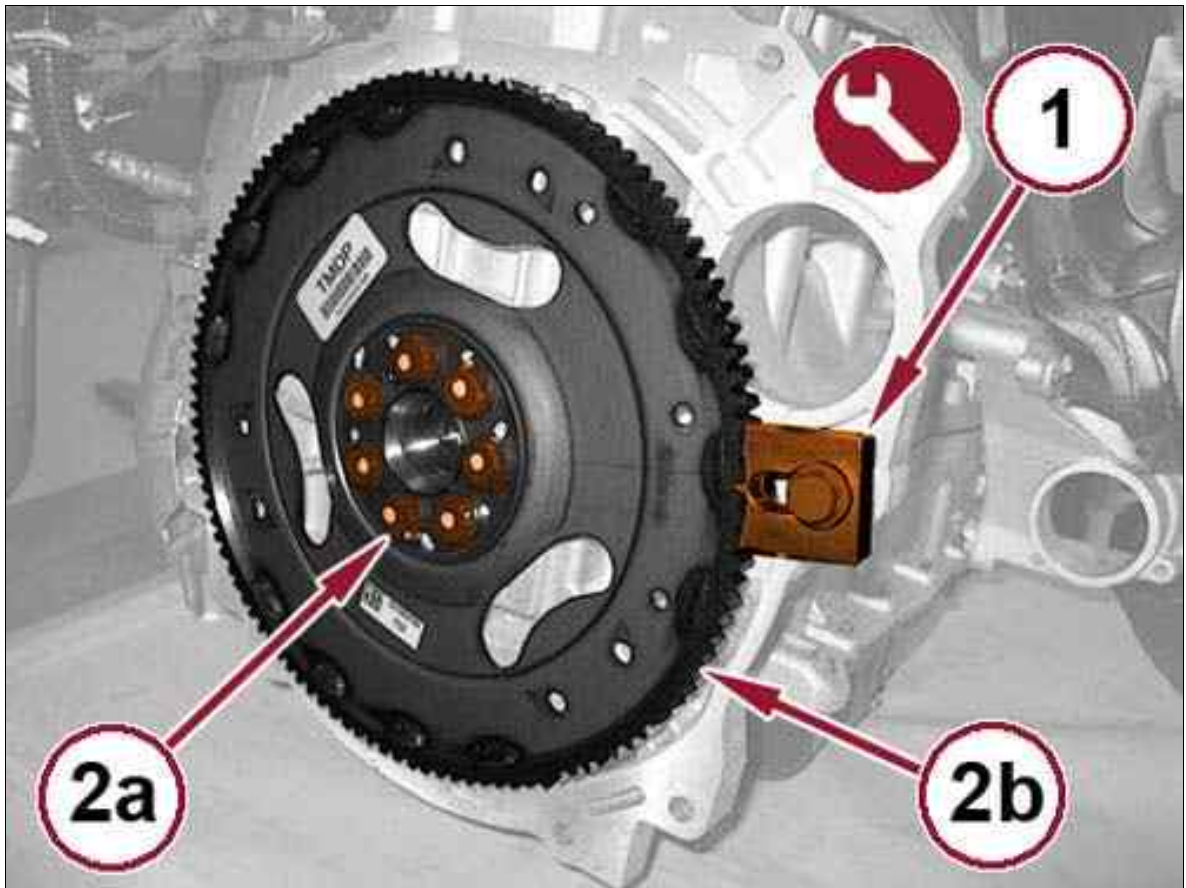
1. Raise and support the vehicle. Refer to HOISTING, STANDARD PROCEDURE .
2. Place the gear selector lever in "N" (neutral).
3. Remove fuse F21 from the Power Distribution Center (PDC).
4. Start and run the engine until it stalls from fuel starvation.
5. Return fuse F21 to the PDC.
6. Remove the front wheels. Refer to REMOVAL AND INSTALLATION .

7. Remove the front belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
8. Remove the right front wheel splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
9. Remove the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
10. Remove the battery. Refer to BATTERY, REMOVAL AND INSTALLATION .
11. Remove the battery tray. Refer to TRAY, BATTERY, REMOVAL AND INSTALLATION .
12. Drain the cooling system.

Refer to STANDARD PROCEDURE .
13. Recover the refrigerant from the refrigerant system.

Refer to PLUMBING, STANDARD PROCEDURE .
14. Remove the left and right half shafts. Refer to REMOVAL AND INSTALLATION .
15. Remove the front fascia. Refer to FASCIA, FRONT, REMOVAL AND INSTALLATION .
16. Remove the left front head lamp. Refer to UNIT, FRONT LAMP, REMOVAL AND INSTALLATION .
17. Remove the right front head lamp. Refer to UNIT, FRONT LAMP, REMOVAL AND INSTALLATION .
18. Remove the headlamp mounting crossmember. Refer to CROSSMEMBER, HEADLAMP MOUNTING, REMOVAL AND INSTALLATION .
19. Remove the air cleaner body. Refer to BODY, AIR CLEANER, REMOVAL AND INSTALLATION .
20. Remove the engine and transmission from the vehicle. Refer to REMOVAL AND INSTALLATION .
21. Remove the transmission from the engine. Refer to REMOVAL AND INSTALLATION .

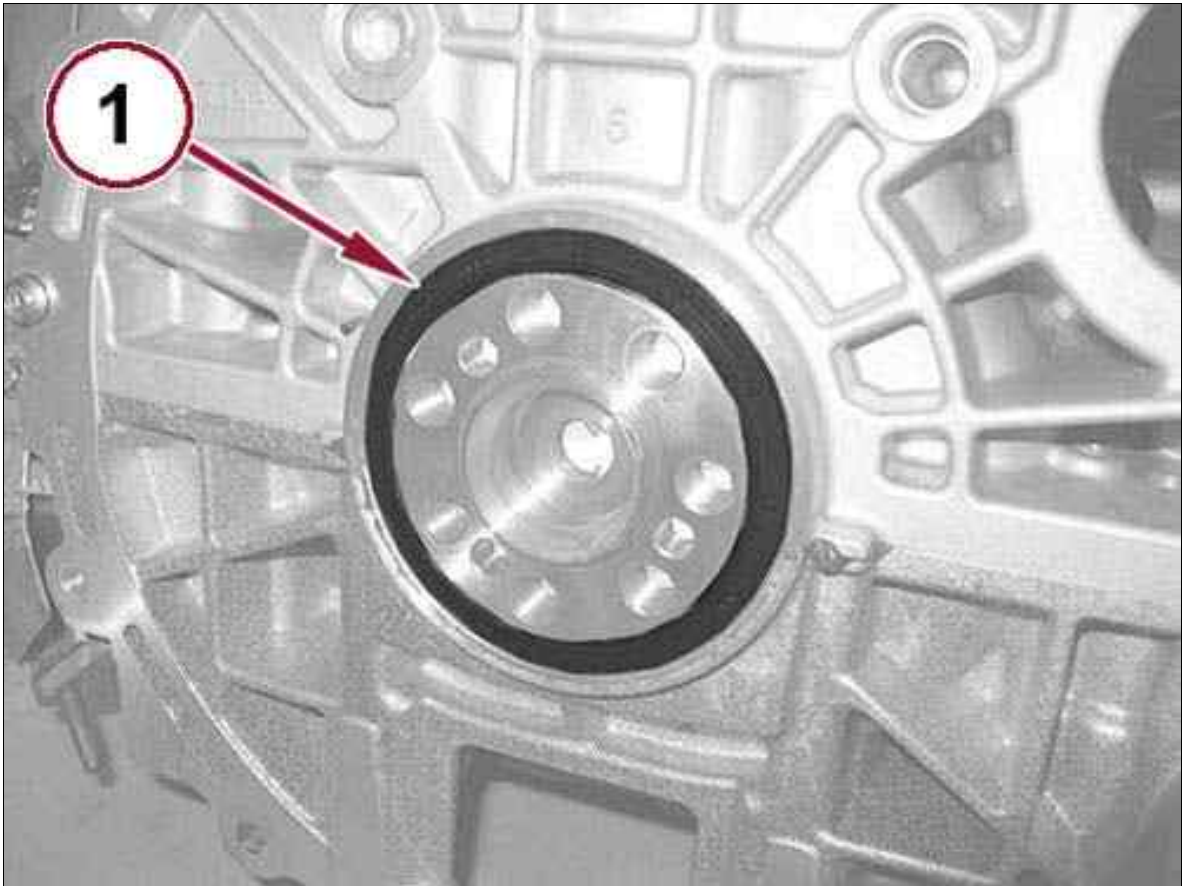
Fig 1: Flywheel Stop Tool, Flexplate & Bolts



Courtesy of CHRYSLER GROUP, LLC

22. Fit the 1860741000 (EMEA) flywheel stop tool (1).
23. Remove the bolts (2a) and remove the flywheel (2b) with spacer.
24. Remove the 1860741000 (EMEA) flywheel stop tool.

Fig 2: Crankshaft Oil Seal, Flywheel Side



Courtesy of CHRYSLER GROUP, LLC



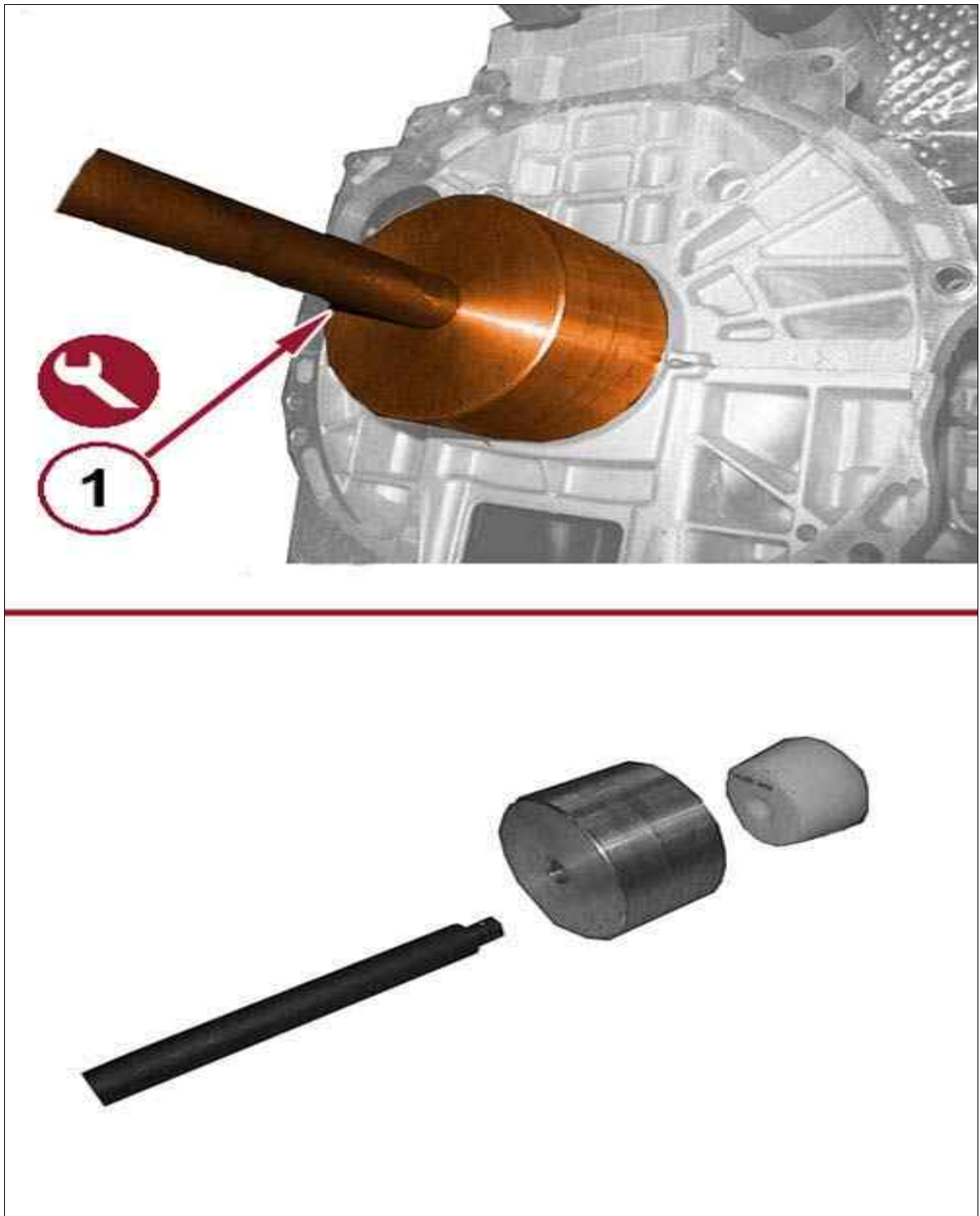
NOTE:

Be careful not to damage the oil seal seat during its removal.

25. Remove the crankshaft oil seal (1), flywheel side.

**ENGINE BLOCK > SEAL, CRANKSHAFT OIL, REAR > REMOVAL AND INSTALLATION
> INSTALLATION - 2.4L**

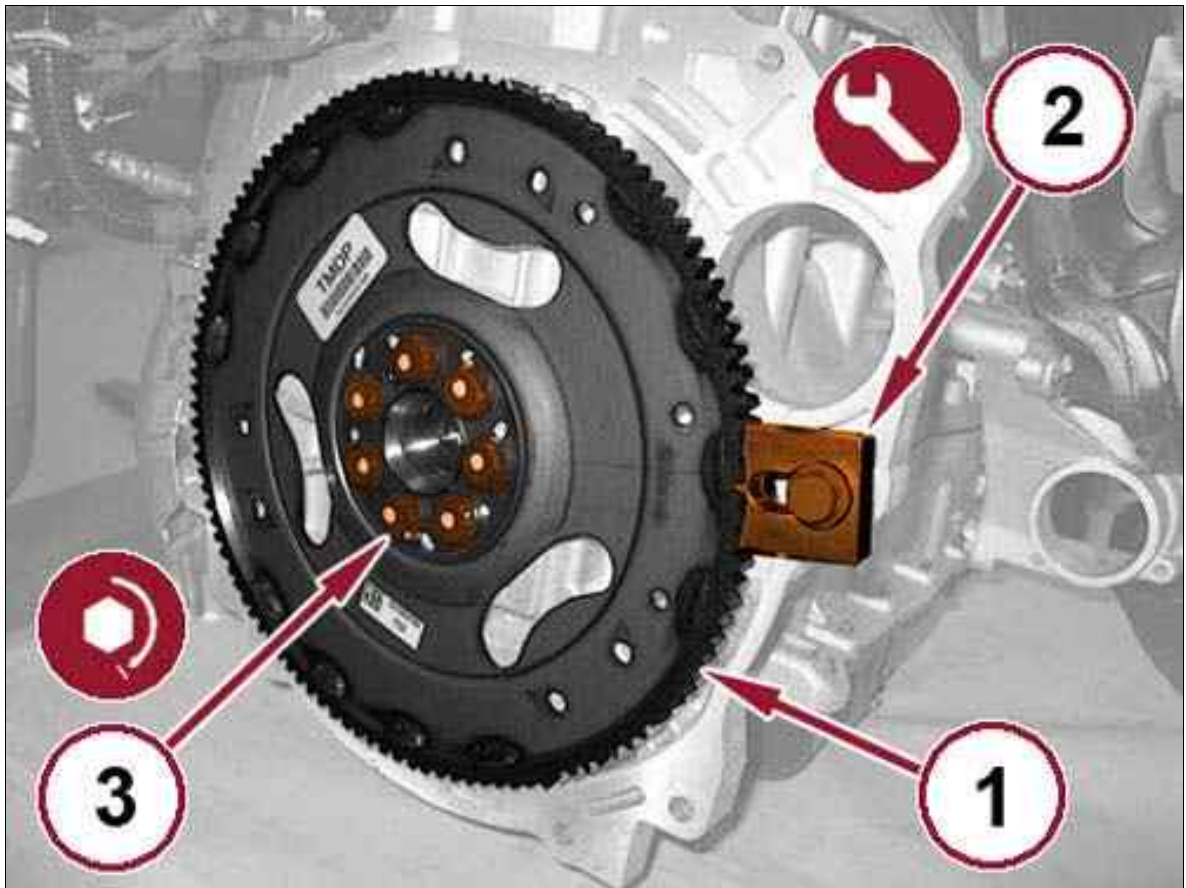
Fig 1: Installing Crankshaft Oil Seal Flywheel Side Using Special Tool



Courtesy of CHRYSLER GROUP, LLC

1. Using the 2000040586 (EMEA) or C-4171 (NAFTA), 2000040298 (EMEA) or (special tool #9706, Installer, Crankshaft Rear Oil Seal) (NAFTA) and 2000040246 (EMEA) or (special tool #9509, Installer, Oil Seal) (NAFTA) tools (1), install a new crankshaft oil seal, flywheel side.

Fig 2: Flywheel Stop Tool, Flexplate & Bolts



Courtesy of CHRYSLER GROUP, LLC

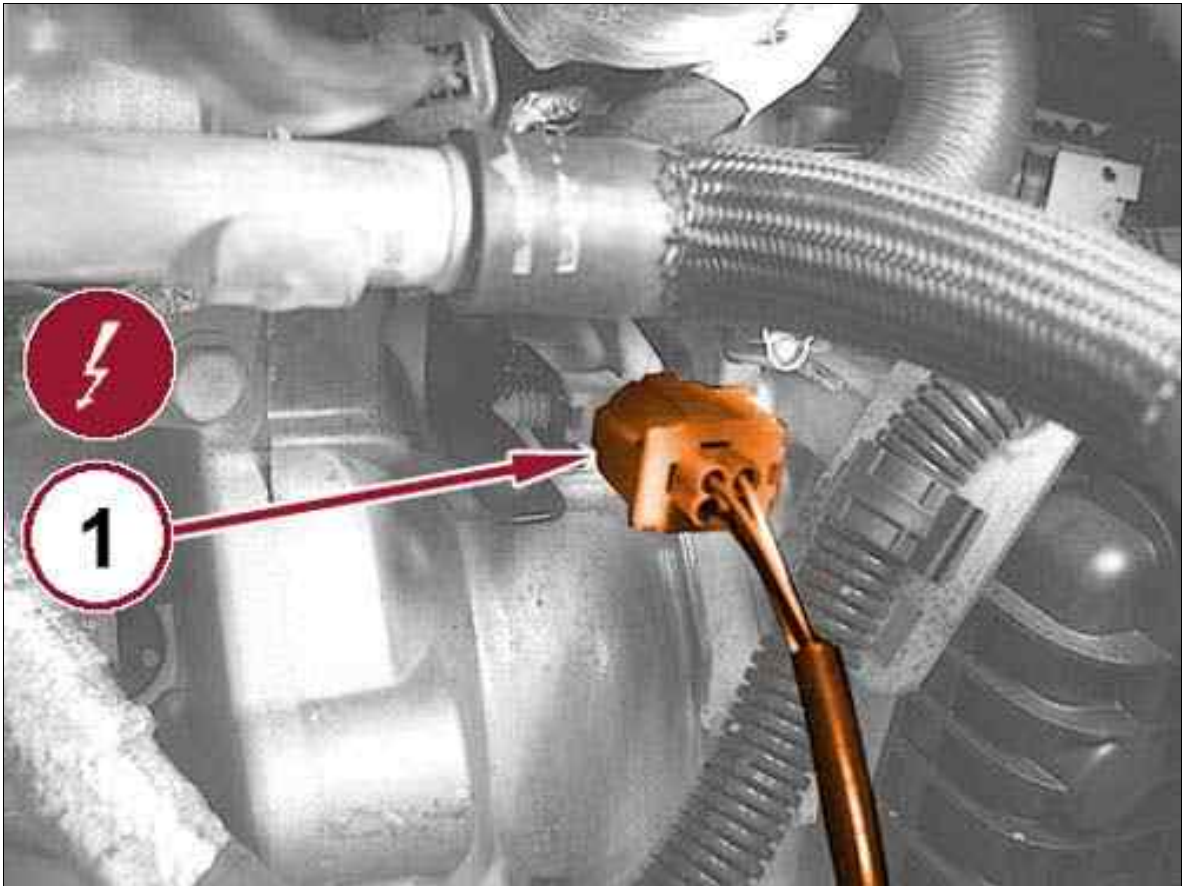
2. Install the engine flywheel (1) and partially tighten the bolts (3).
3. Fit the 1860741000 (EMEA) flywheel stop tool (2).
4. Tighten the flywheel mounting bolts (3) to the proper specification. Refer to TORQUE SPECIFICATIONS .
5. Remove the 1860741000 (EMEA) flywheel stop tool.
6. Install the transmission to the engine.
Refer to REMOVAL AND INSTALLATION .
7. Install the engine and transmission in the vehicle. Refer to REMOVAL AND INSTALLATION .
8. Install the air cleaner body. Refer to BODY, AIR CLEANER, REMOVAL AND INSTALLATION .
9. Install the headlamp mounting crossmember. Refer to CROSSMEMBER, HEADLAMP MOUNTING, REMOVAL AND INSTALLATION .
10. Install the right front head lamp. Refer to UNIT, FRONT LAMP, REMOVAL AND INSTALLATION .
11. Install the left front head lamp. Refer to UNIT, FRONT LAMP, REMOVAL AND INSTALLATION .
12. Install the front fascia. Refer to FASCIA, FRONT, REMOVAL AND INSTALLATION .

13. Install the left and right half shafts. Refer to REMOVAL AND INSTALLATION .
14. Evacuate and charge the refrigerant system. Refer to PLUMBING, STANDARD PROCEDURE .
15. Fill the cooling system. Refer to STANDARD PROCEDURE .
16. Install the battery tray. Refer to TRAY, BATTERY, REMOVAL AND INSTALLATION .
17. Install the battery. Refer to BATTERY, REMOVAL AND INSTALLATION .
18. Install the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
19. Install the right front wheel splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
20. Install the front belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
21. Install the front wheels. Refer to REMOVAL AND INSTALLATION .
22. Remove the vehicle from the lift.

MANIFOLDS > MANIFOLD, EXHAUST > REMOVAL AND INSTALLATION > 2.4L MULTI AIR > REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
3. Raise and support the vehicle. Refer to HOISTING, STANDARD PROCEDURE .
4. Remove the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .

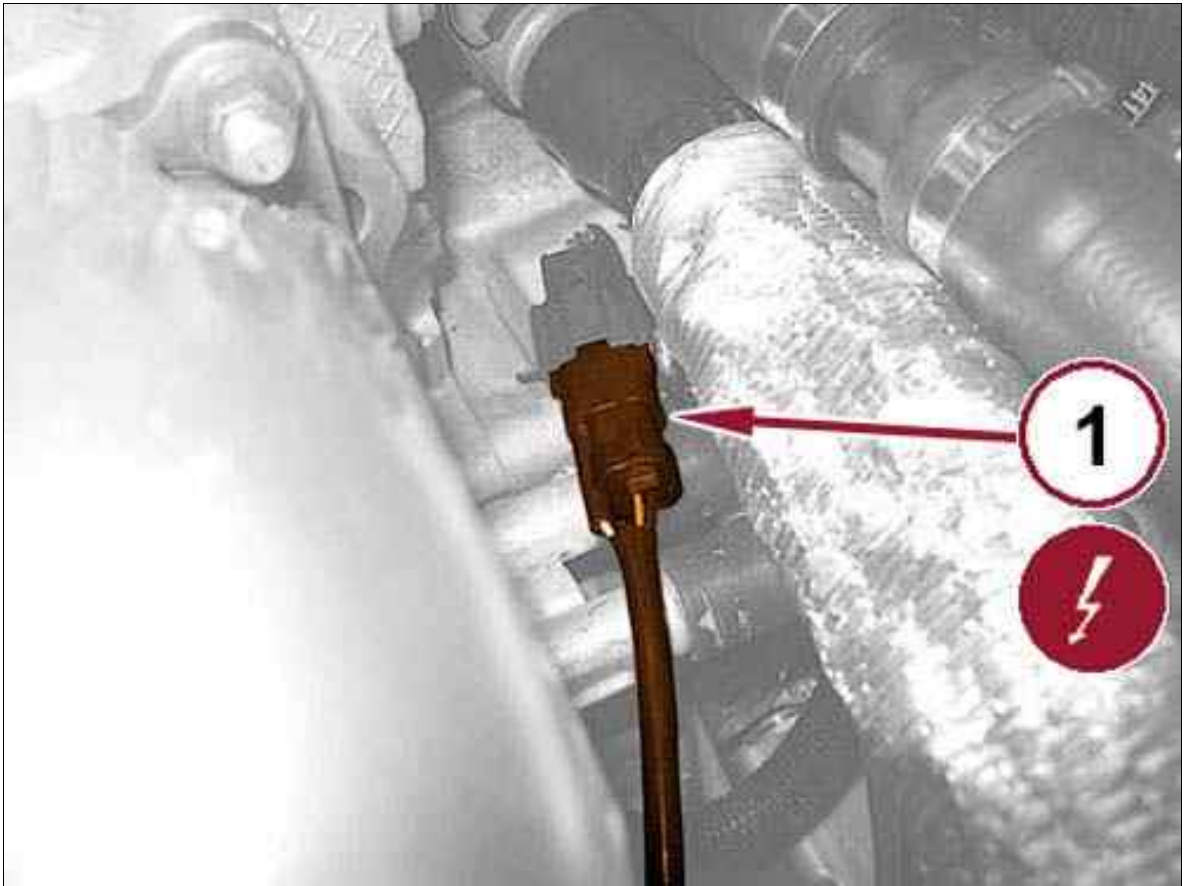
Fig 1: Downstream Oxygen Sensor Wire Harness Connector



Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the downstream oxygen sensor wire harness connector (1).

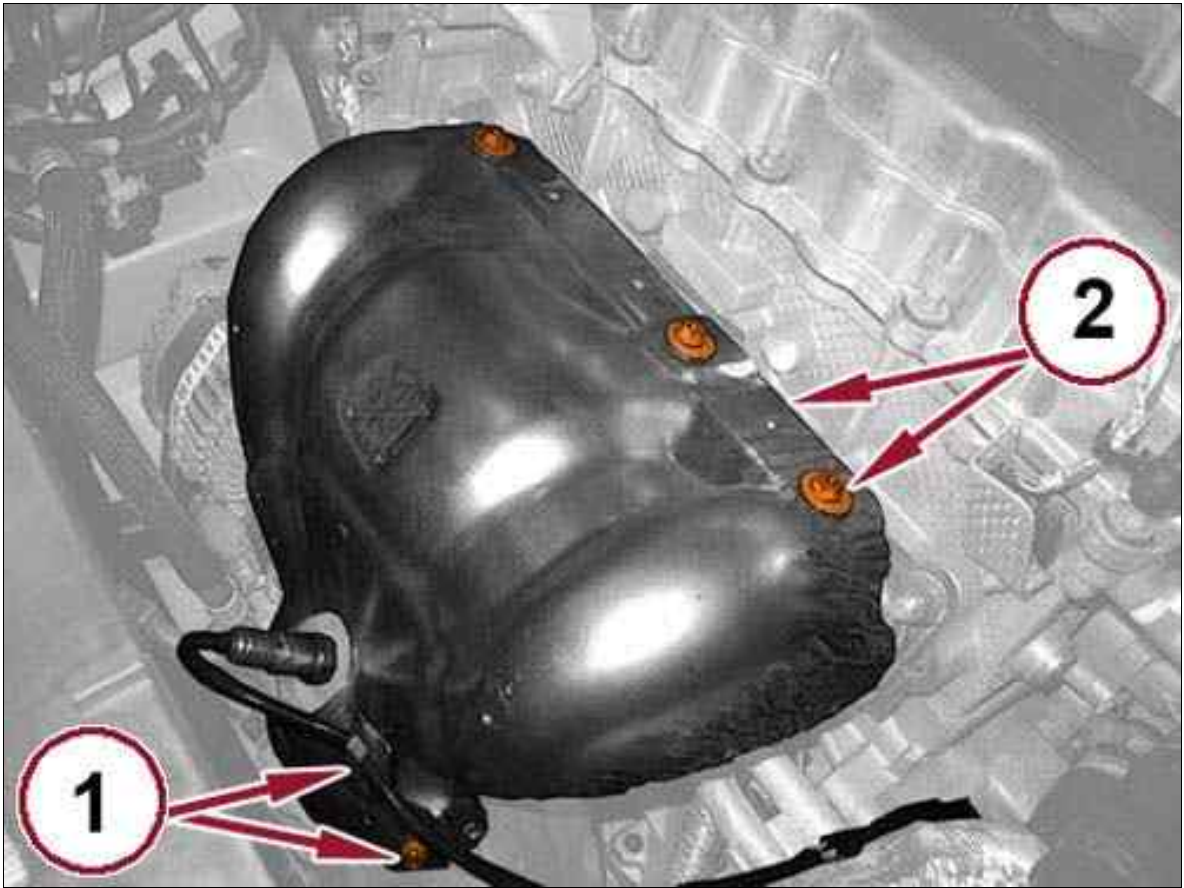
Fig 2: Upstream Oxygen Sensor Wire Harness Connector



Courtesy of CHRYSLER GROUP, LLC

6. Disconnect the upstream oxygen sensor wire harness connector (1).

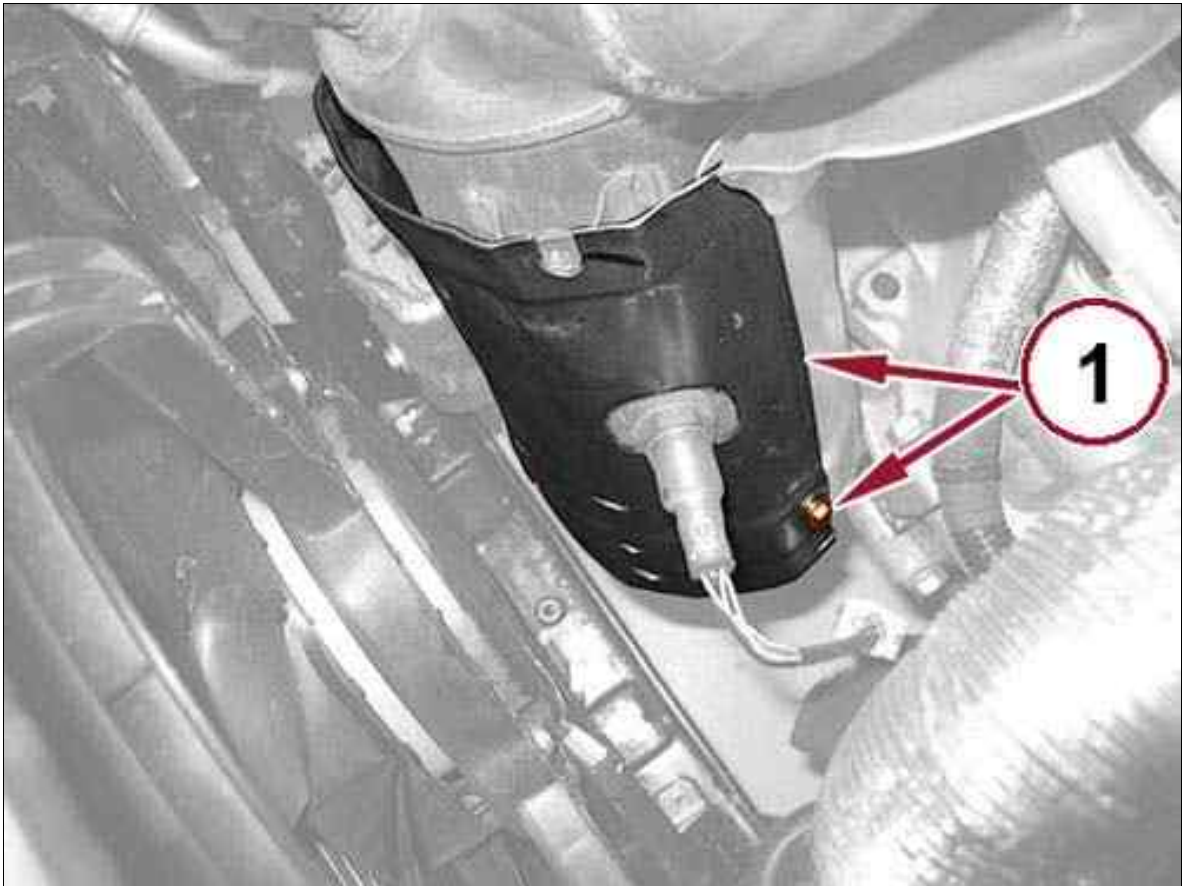
Fig 3: Upper Heat Shield, Nuts & Wire Harness Retainer



Courtesy of CHRYSLER GROUP, LLC

7. Disengage the upstream oxygen sensor wire harness from the retainer (1) and remove the bolt and bracket.
8. Remove the nuts (2) and the upper heat shield from the exhaust manifold.

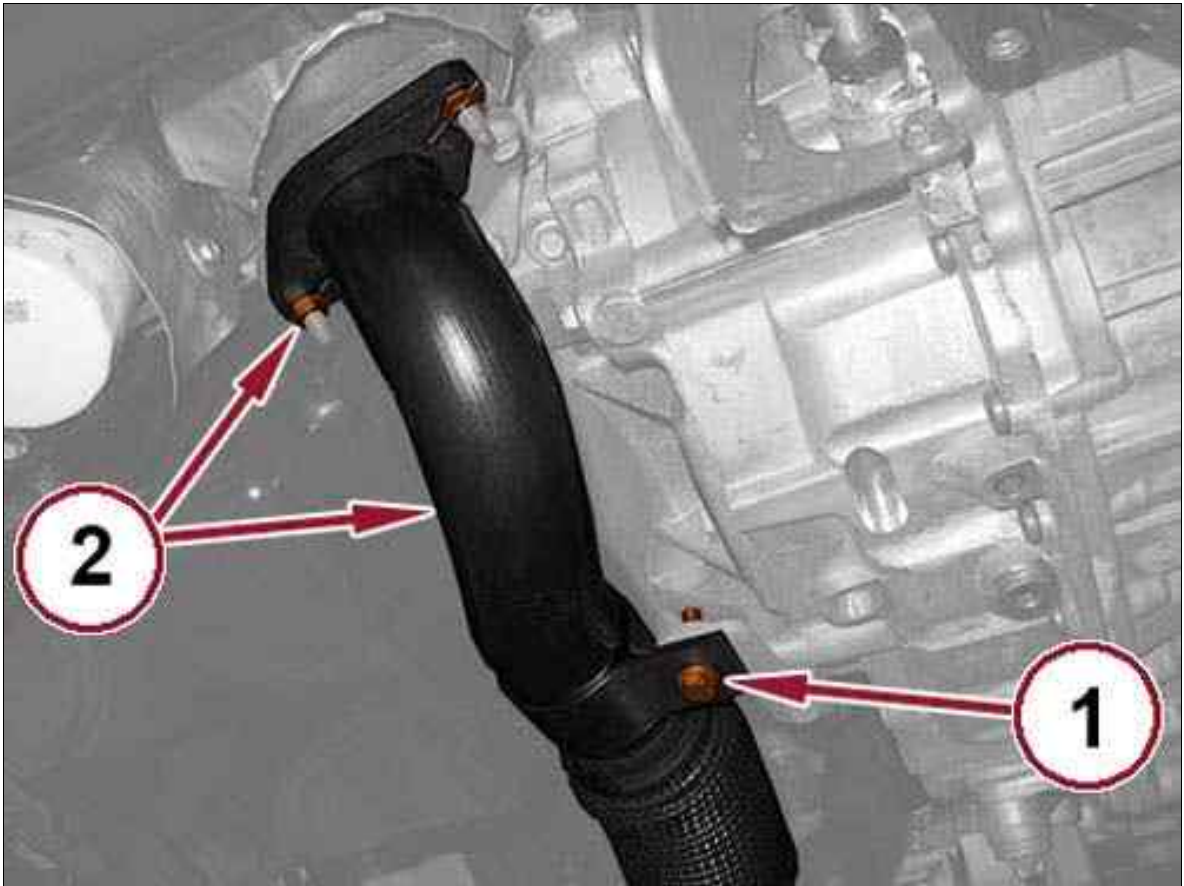
Fig 4: Lower Heat Shield & Bolts



Courtesy of CHRYSLER GROUP, LLC

9. Remove the bolts (1) and the lower heat shield.

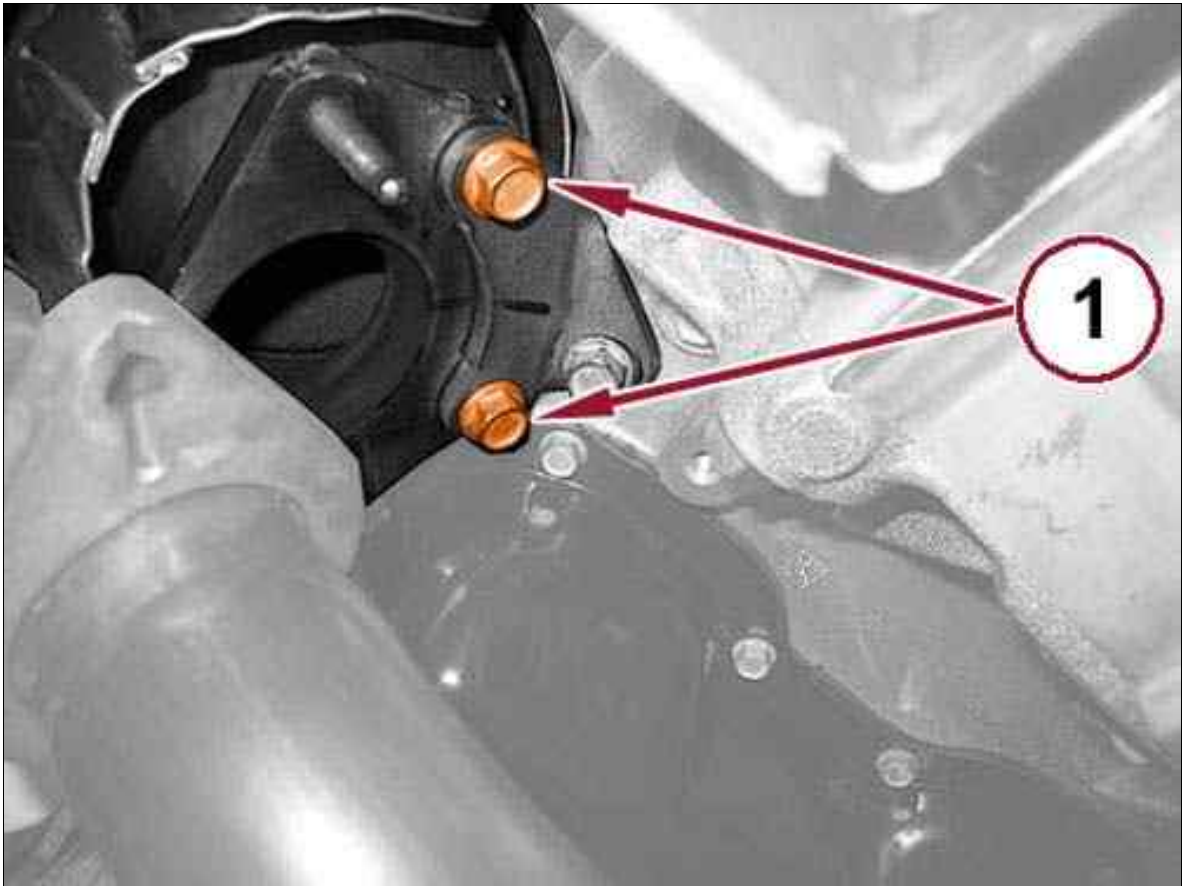
Fig 5: Exhaust Pipe To Transmission Bracket Bolt & Exhaust Pipe At Catalyst Nuts



Courtesy of CHRYSLER GROUP, LLC

10. Remove the bolt (1) securing the exhaust pipe to the transmission bracket.
11. Remove the nuts (2) and disconnect the exhaust pipe from the catalyst.
12. Remove and discard the gasket.

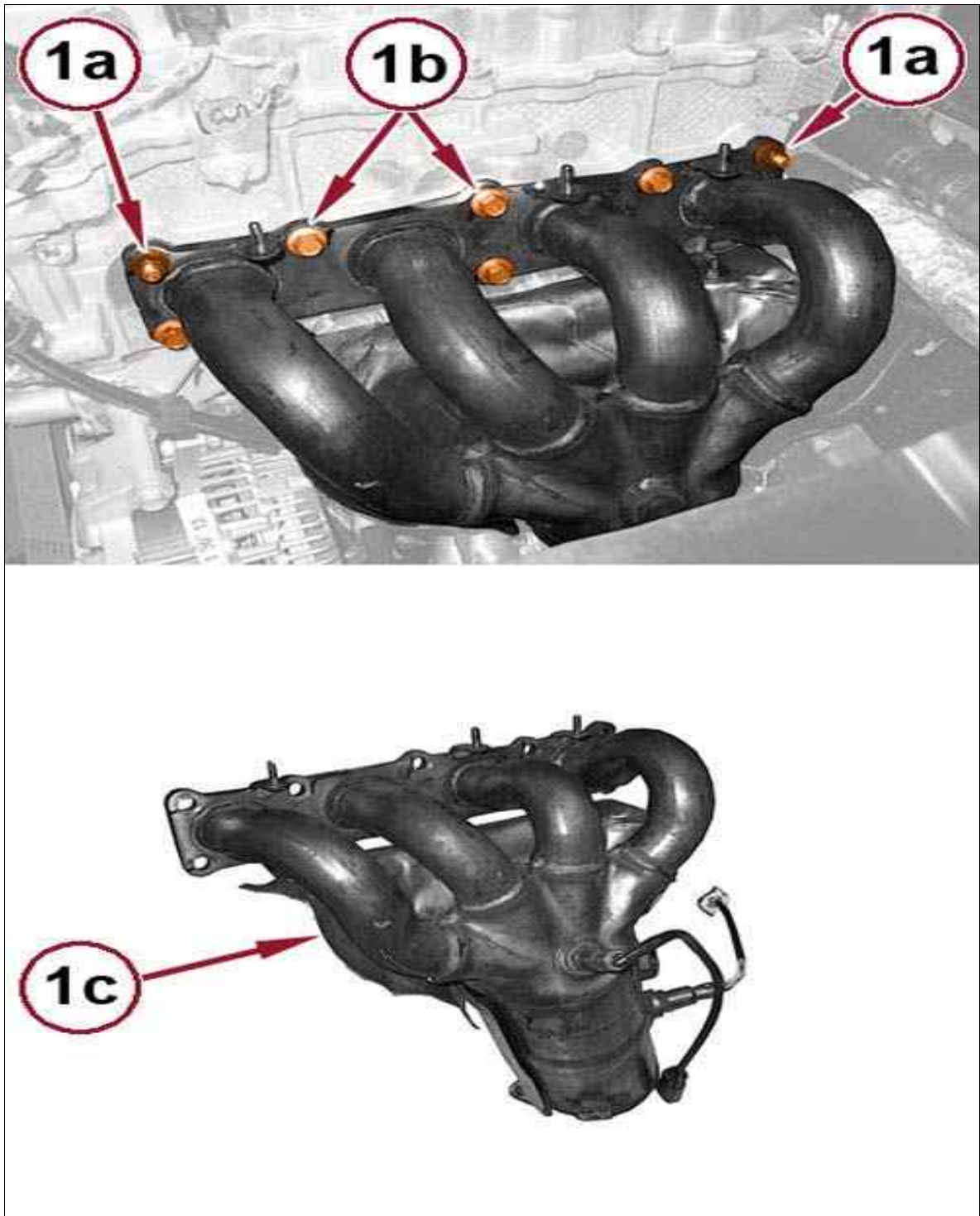
Fig 6: Catalytic Converter Support Bracket Bolts



Courtesy of CHRYSLER GROUP, LLC

13. Remove the bolts (1) and the catalytic converter support bracket.

Fig 7: Exhaust Manifold Catalyst, Nuts & Bolts



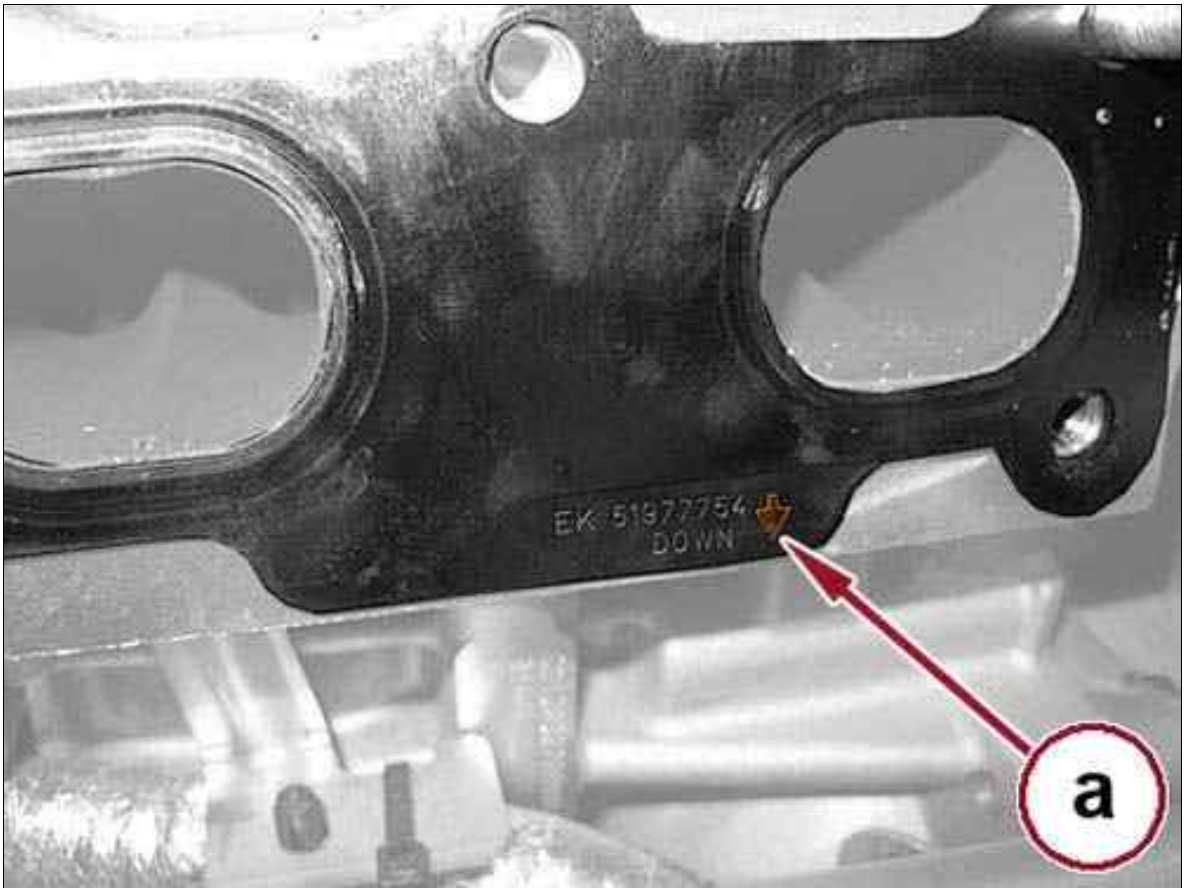
Courtesy of CHRYSLER GROUP, LLC

14. Remove the nuts (1a) and the bolts (1b) and the exhaust manifold catalyst (1c).

15. Remove and discard the manifold gasket.

AIR > INSTALLATION

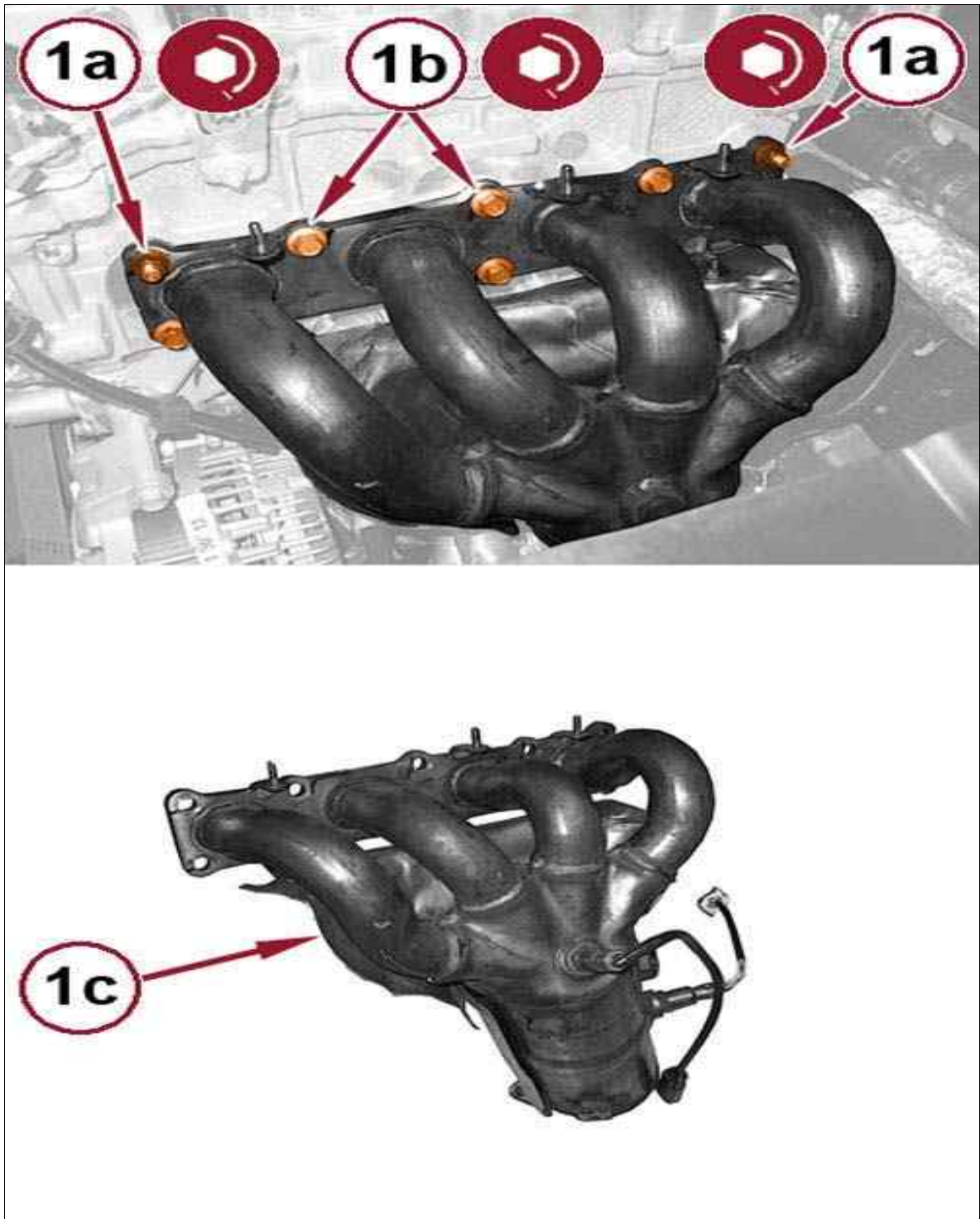
Fig 1: Ensure Arrow On Exhaust Manifold Gasket Is Pointing Downward



Courtesy of CHRYSLER GROUP, LLC

1. Install a new exhaust manifold gasket onto the cylinder head, taking care that the arrow (a) shown in the figure is pointing downwards.

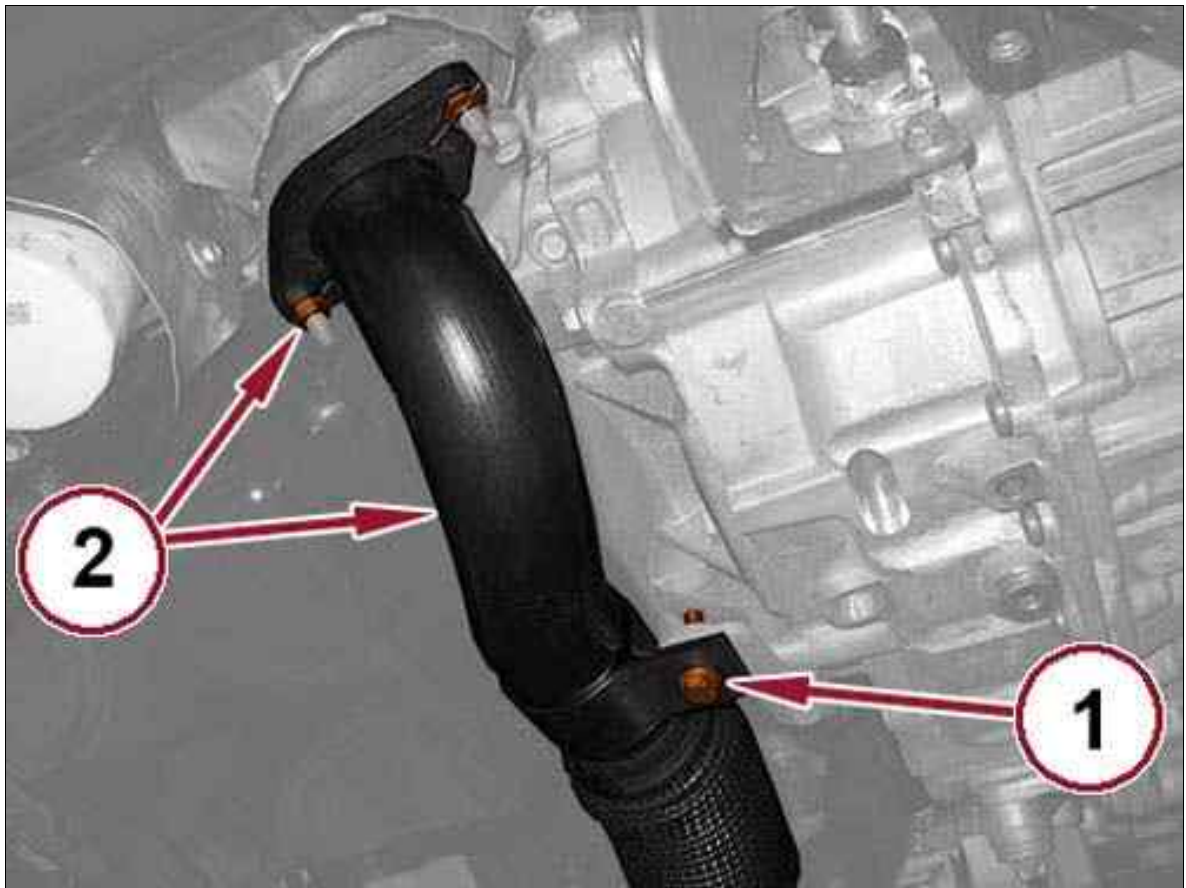
Fig 2: Exhaust Manifold Catalyst, Nuts & Bolts



Courtesy of CHRYSLER GROUP, LLC

2. Install the manifold catalyst (1c). Tighten the bolts (1b) and the nuts (1a) to the proper specification. Refer to TORQUE SPECIFICATIONS .

Fig 3: Exhaust Pipe To Transmission Bracket Bolt & Exhaust Pipe At Catalyst Nuts



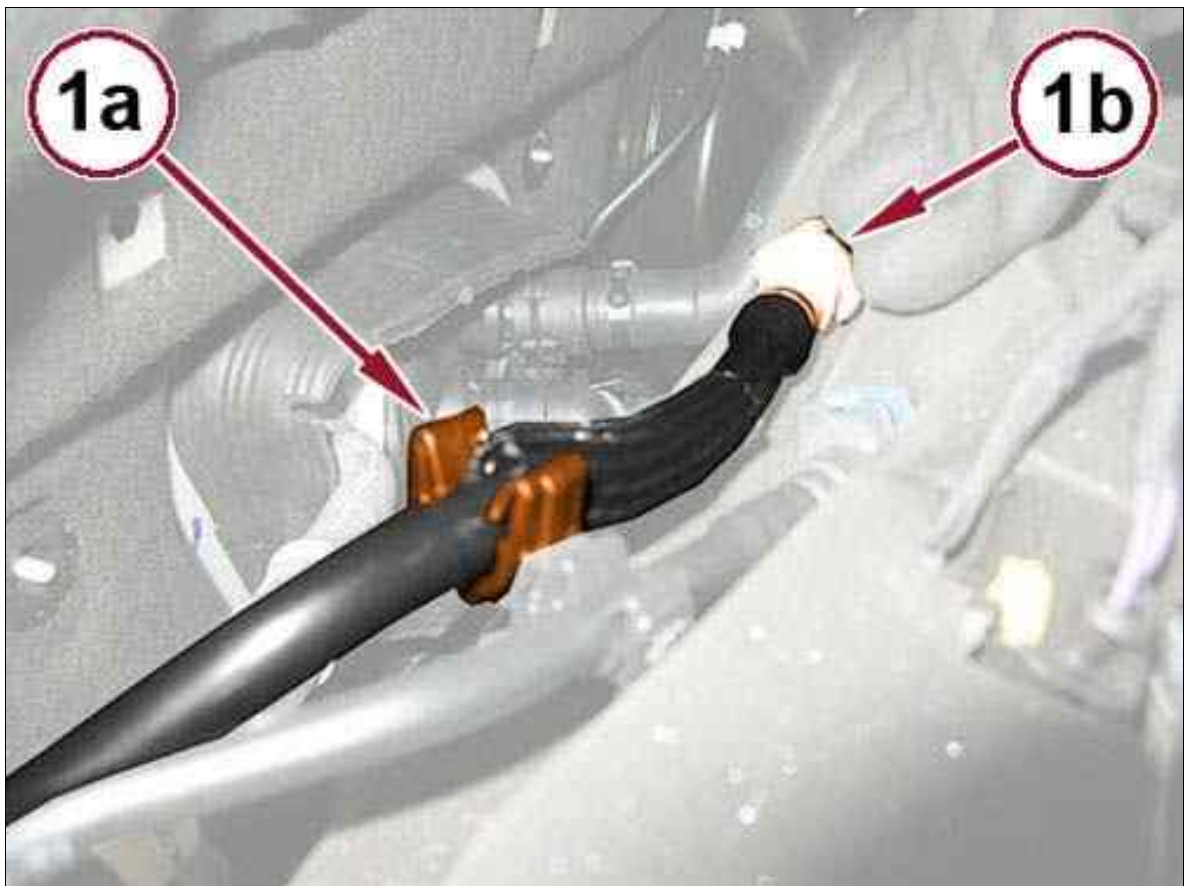
Courtesy of CHRYSLER GROUP, LLC

3. Install the catalytic converter lower support bracket and securely tighten the bolts.
4. Using a **NEW** gasket, install the exhaust pipe (2) to the catalyst flange. Using **NEW** nuts install and tighten the nuts to the proper specification. Refer to TORQUE SPECIFICATIONS .
5. Install the bolt (1) securing the exhaust pipe to the transmission bracket and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS .
6. Install the lower heat shield and securely tighten the bolts.
7. Install the upper heat shield onto the exhaust manifold and securely tighten the nuts.
8. Install the front oxygen sensor support bracket and securely tighten the bolts then engage the wire harness retainer.
9. Connect the front oxygen sensor wire harness connectors.
10. Connect the lambda sensor wire harness connector.
11. Install the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
12. Install the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
13. Connect the negative battery cable.

MANIFOLDS > MANIFOLD, INTAKE > REMOVAL AND INSTALLATION > 2.4L MULTI AIR > REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Remove the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
3. Remove the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
4. Remove the cylinder head cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL AND INSTALLATION .
5. Remove the throttle body. Refer to THROTTLE BODY, REMOVAL AND INSTALLATION .
6. Drain the cooling system. Refer to STANDARD PROCEDURE .
7. Recover the A/C refrigerant. Refer to PLUMBING, STANDARD PROCEDURE .

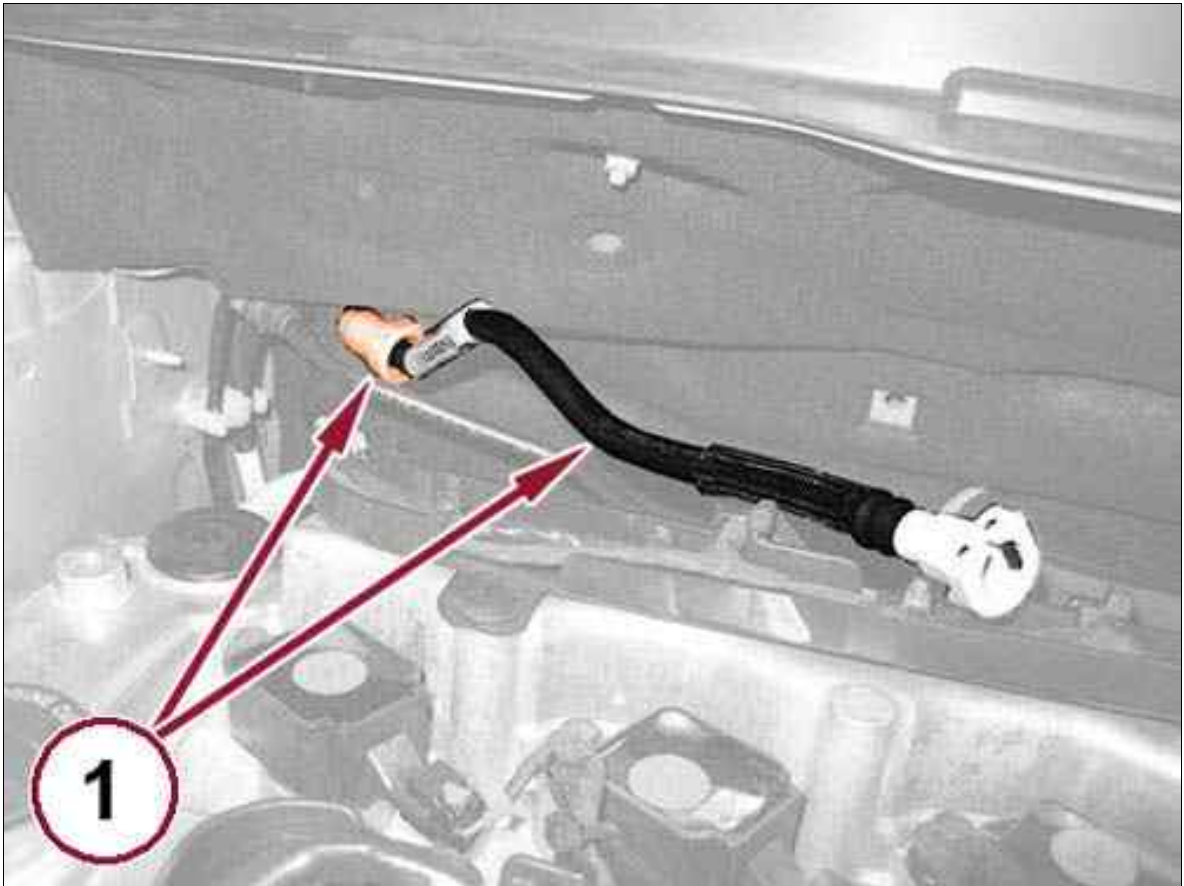
Fig 1: Retaining Clip & Fuel Vapor Hose Quick Connect Fitting



Courtesy of CHRYSLER GROUP, LLC

8. Open the retaining clip (1a) and disconnect the fuel vapor hose quick connect fitting (1b).

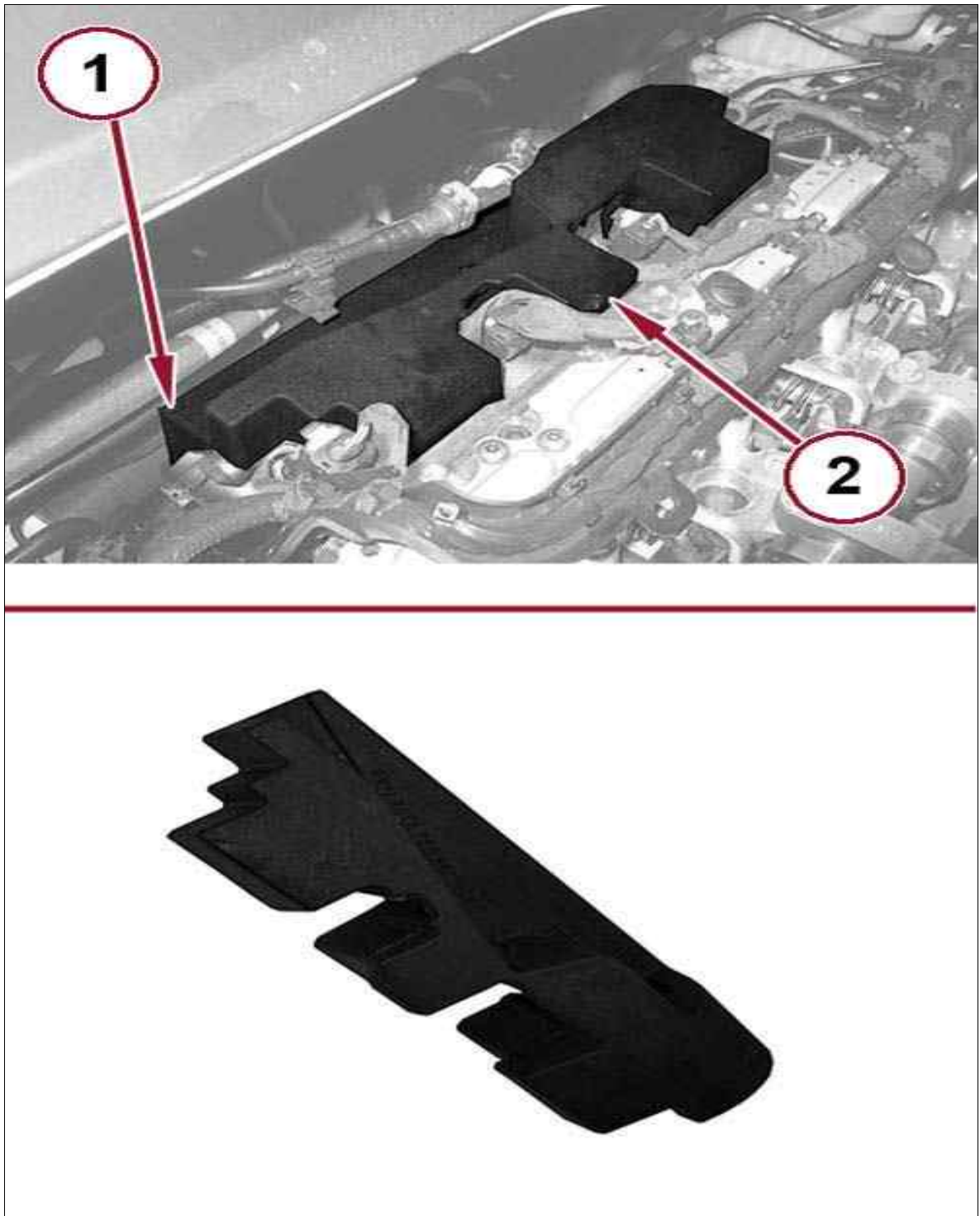
Fig 2: Fuel Vapor Hose Quick Connect Fitting & Fuel Vapor Hose



Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the fuel vapor hose quick connect fitting (1) and remove the fuel vapor hose.

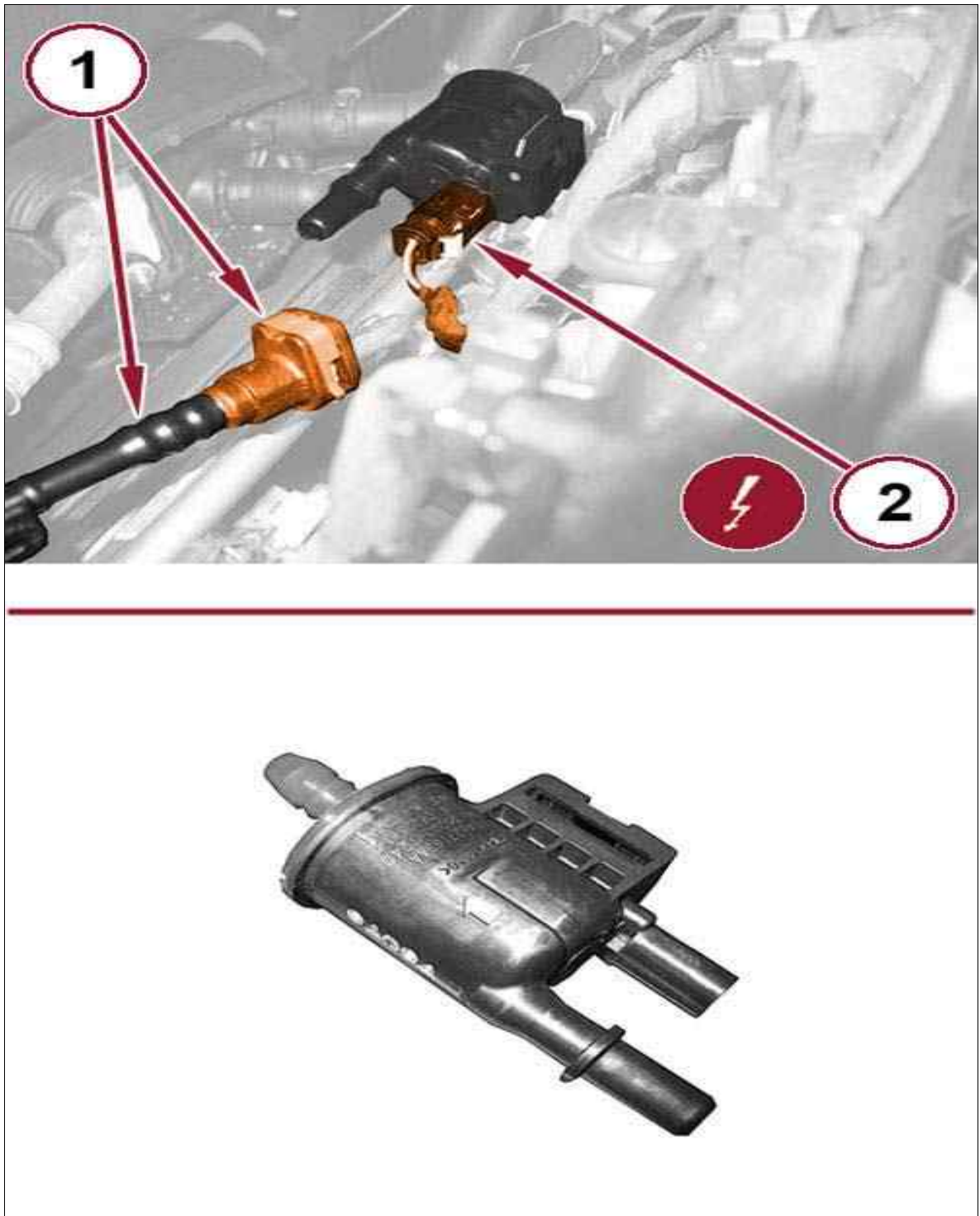
Fig 3: Precut Sound Absorbing Panel & Panel Edges



Courtesy of CHRYSLER GROUP, LLC

10. Separate the two edges of the precut sound absorbing panel (1).
11. Remove the sound absorbing panel (2).

Fig 4: Fuel Vapors Solenoid Wire Harness Connector & Fuel Vapors Solenoid



Courtesy of CHRYSLER GROUP, LLC

12. Disconnect the fuel vapor hose quick connect fitting (1).
13. Disconnect the fuel vapors solenoid wire harness connector (2) and remove fuel vapors solenoid.

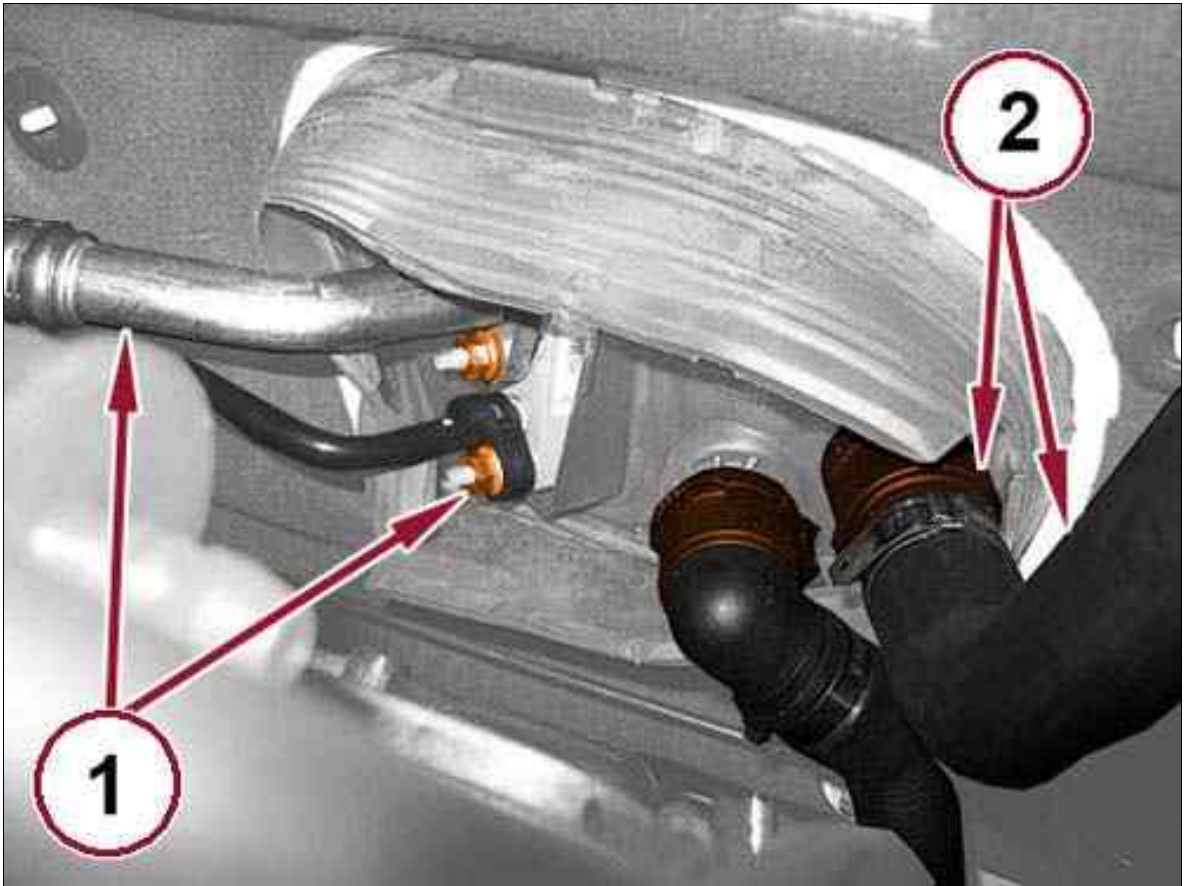
Fig 5: A/C lines & Retaining Clips



Courtesy of CHRYSLER GROUP, LLC

14. Open the retaining clips and detach the A/C lines (1).

Fig 6: Coolant Hoses & A/C Lines Nuts

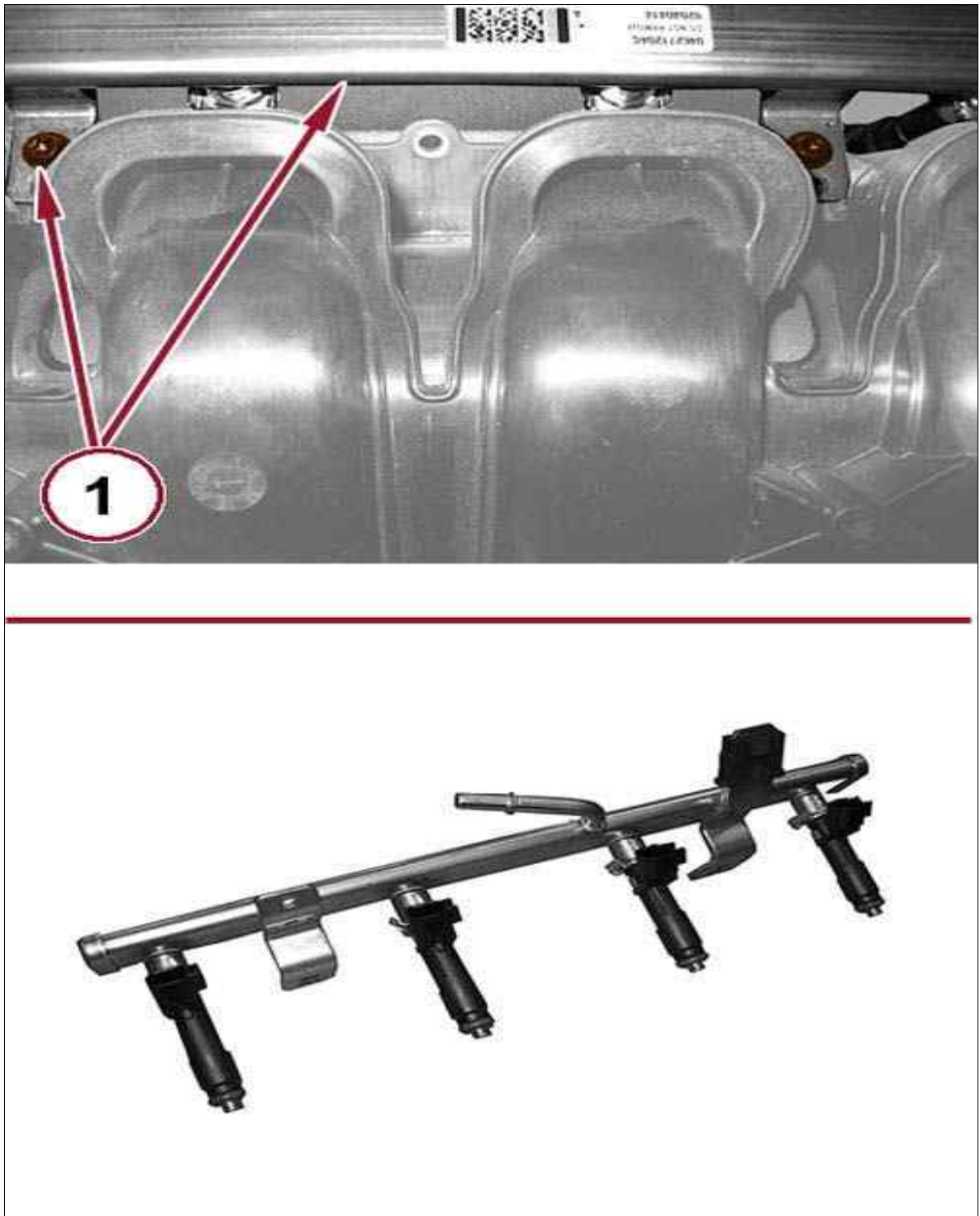


Courtesy of CHRYSLER GROUP, LLC

15. Remove the nuts (1) and disconnect the A/C lines.

16. Remove the coolant hoses (2) from the heater.

Fig 7: Fuel Injectors & Fuel Rail



Courtesy of CHRYSLER GROUP, LLC

17. Remove the fuel rail (1) and fuel injectors. Refer to INJECTOR(S), FUEL, REMOVAL AND INSTALLATION .

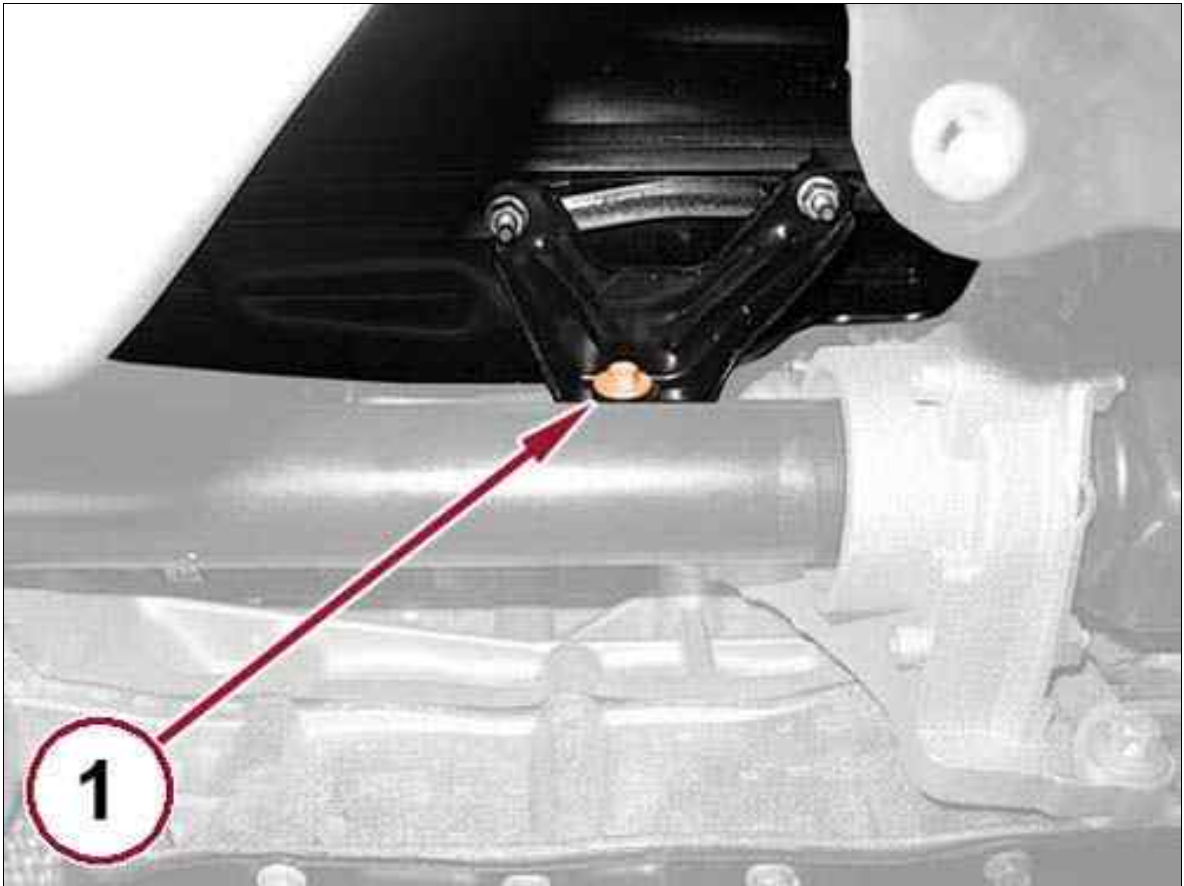
Fig 8: Intake Manifold Silencer Cover



Courtesy of CHRYSLER GROUP, LLC

18. Remove the four screws (1) and the intake manifold silencer cover.

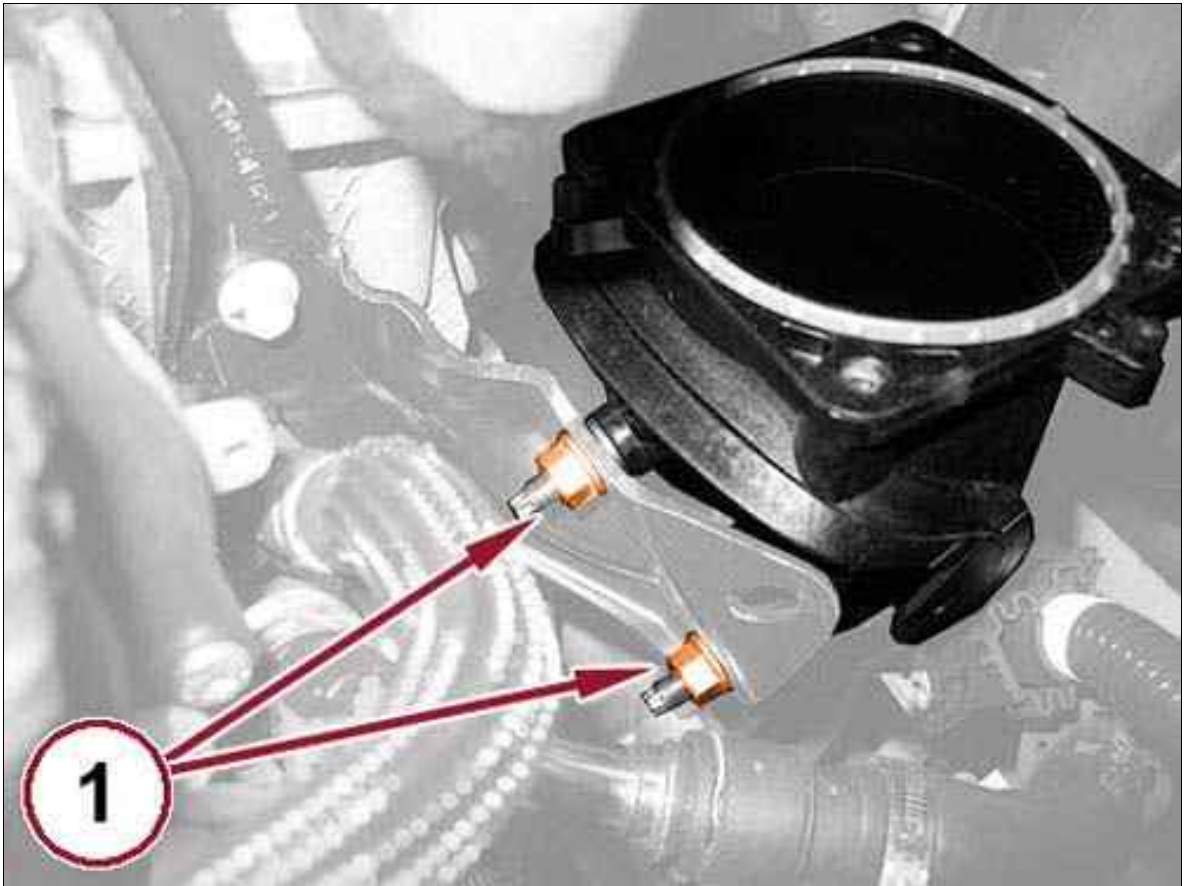
Fig 9: Intake Manifold Support Bracket & Bolt



Courtesy of CHRYSLER GROUP, LLC

19. Remove the bolt (1) securing the intake manifold support bracket.

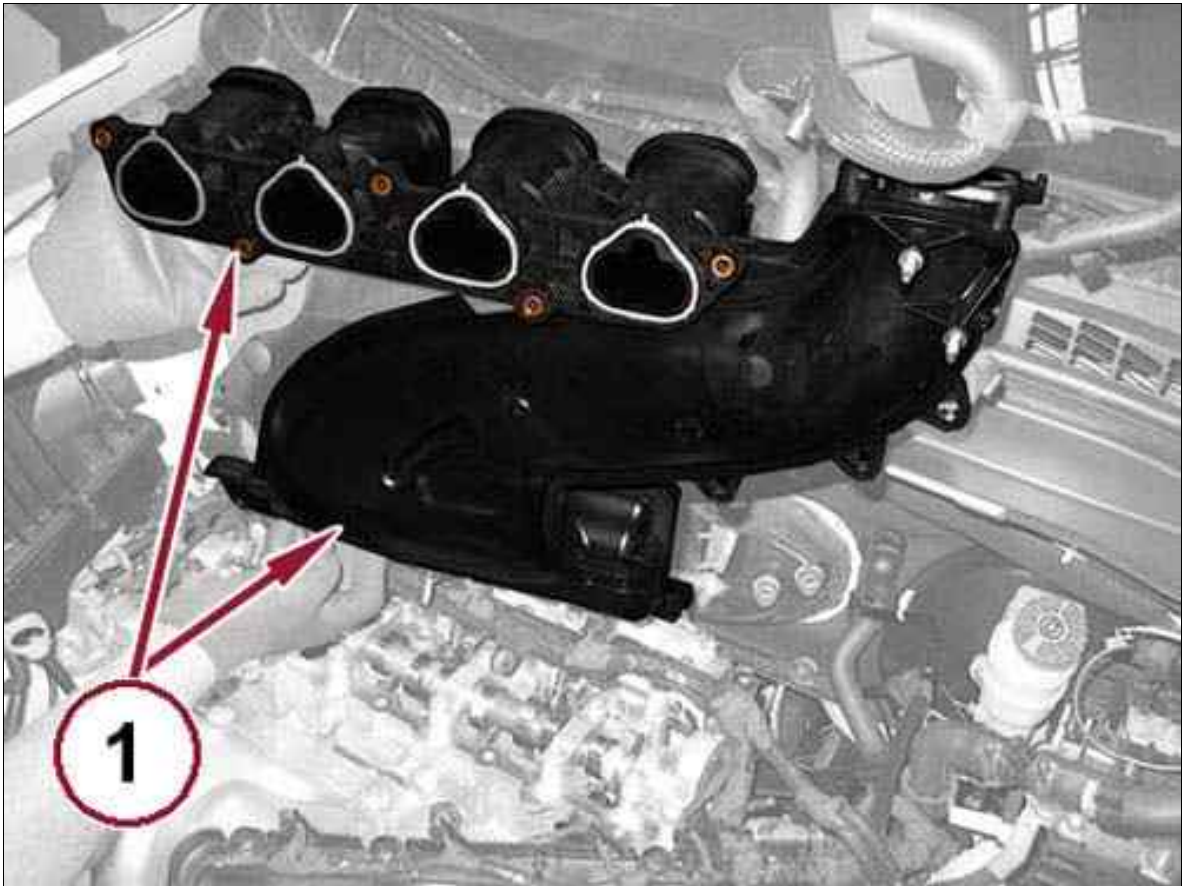
Fig 10: Intake Manifold Support Bracket Nuts



Courtesy of CHRYSLER GROUP, LLC

20. Remove the intake manifold support bracket nuts (1).

Fig 11: Intake Manifold & Fasteners



Courtesy of CHRYSLER GROUP, LLC

21. Remove the fasteners (1) and the intake manifold.
22. Remove and discard the gasket seals

MANIFOLDS > MANIFOLD, INTAKE > REMOVAL AND INSTALLATION > 2.4L MULTI AIR > INSTALLATION

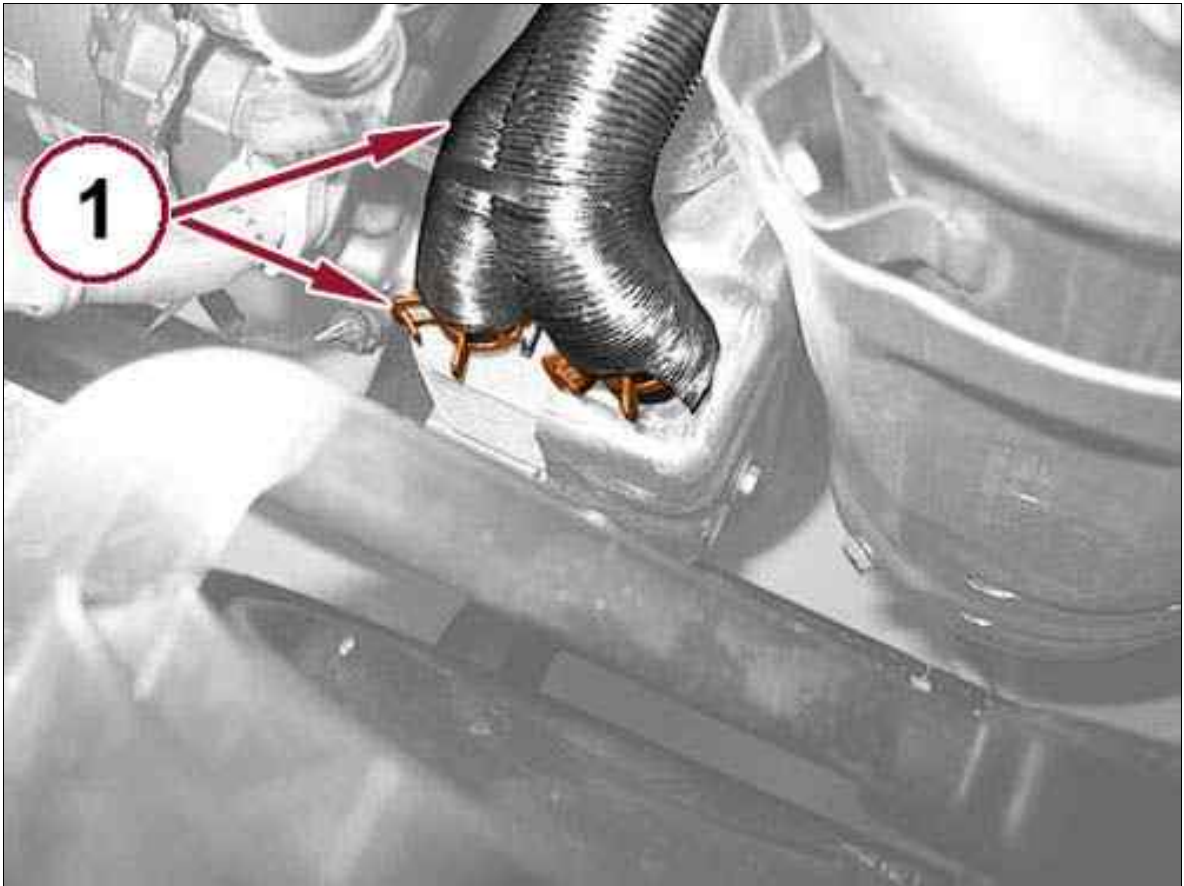
1. Using **NEW** gaskets, install the intake manifold and tighten the fasteners to the proper specification. Refer to TORQUE SPECIFICATIONS .
2. Install the intake manifold support bracket nuts and securely tighten.
3. Install the intake manifold lower support bracket bolt and securely tighten.
4. Install the intake manifold silencer cover and securely tighten the four screws.
5. Install the fuel rail and fuel injectors. Refer to INJECTOR(S), FUEL, REMOVAL AND INSTALLATION .
6. Install the coolant hoses (2) to the heater.
7. Using **NEW** gasket seals, connect the A/C lines and securely tighten the nuts.

8. Attach the A/C lines into retaining clip and close the clip.
9. Install the fuel vapor solenoid and connect the wire harness connector.
10. Connect the fuel vapor hose quick connect fitting.
11. Install the sound absorbing panel.
12. Install the fuel vapor hose and connect the fuel vapor hose quick connect fitting.
13. Connect the fuel vapor hose quick connect fitting and close the retaining clip.
14. Evacuate the refrigerant system. Refer to PLUMBING, STANDARD PROCEDURE .
15. Charge the refrigerant system. Refer to PLUMBING, STANDARD PROCEDURE .
16. Fill the cooling system. Refer to STANDARD PROCEDURE .
17. Install the throttle body. Refer to THROTTLE BODY, REMOVAL AND INSTALLATION .
18. Install the cylinder head cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL AND INSTALLATION .
19. Install the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
20. Install the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
21. Connect the negative battery cable.

LUBRICATION > COOLER, OIL > REMOVAL AND INSTALLATION > 2.4L > REMOVAL

1. Raise and support the vehicle.
2. Remove the engine beauty cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
3. Drain the engine coolant. Refer to STANDARD PROCEDURE .

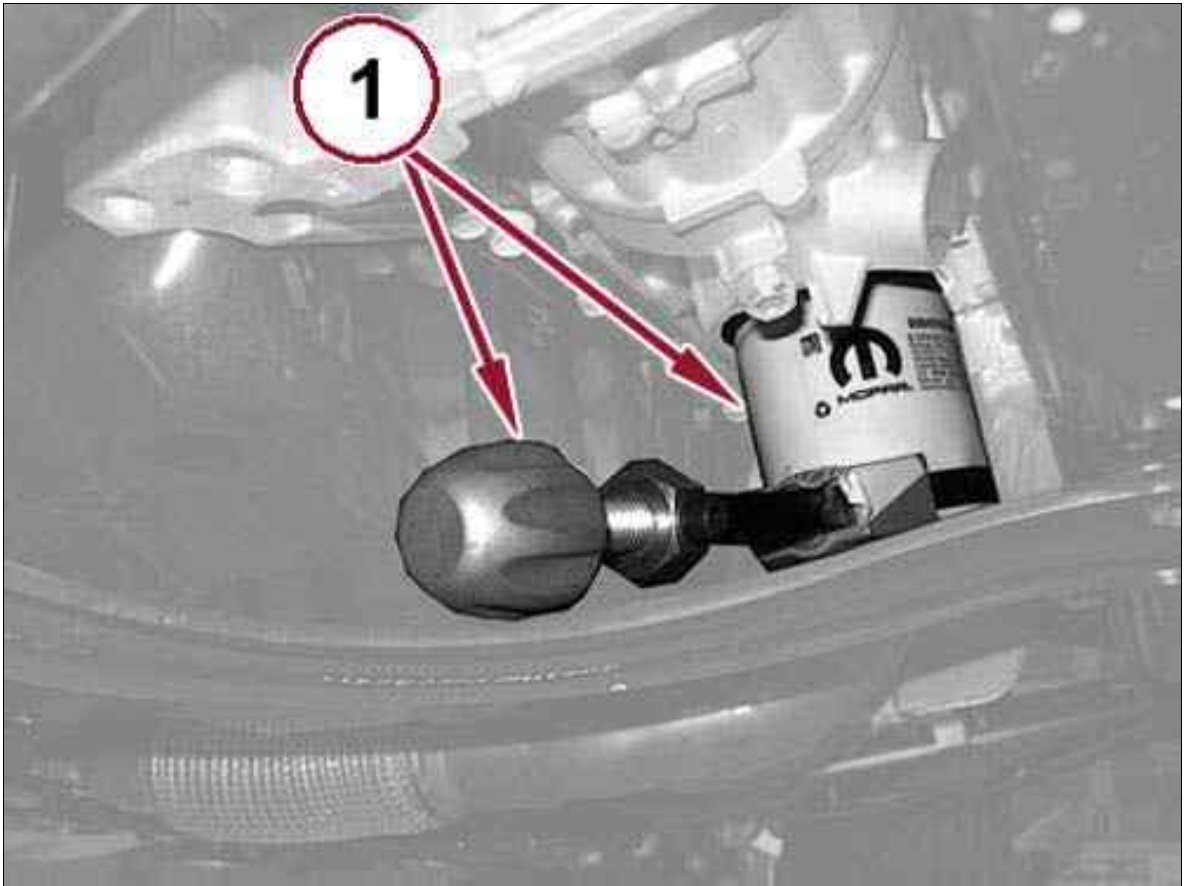
Fig 1: Water Supply And Return Hoses & Clamps



Courtesy of CHRYSLER GROUP, LLC

4. Loosen the clamps and disconnect the water supply and return hoses (1) to the engine oil cooler.

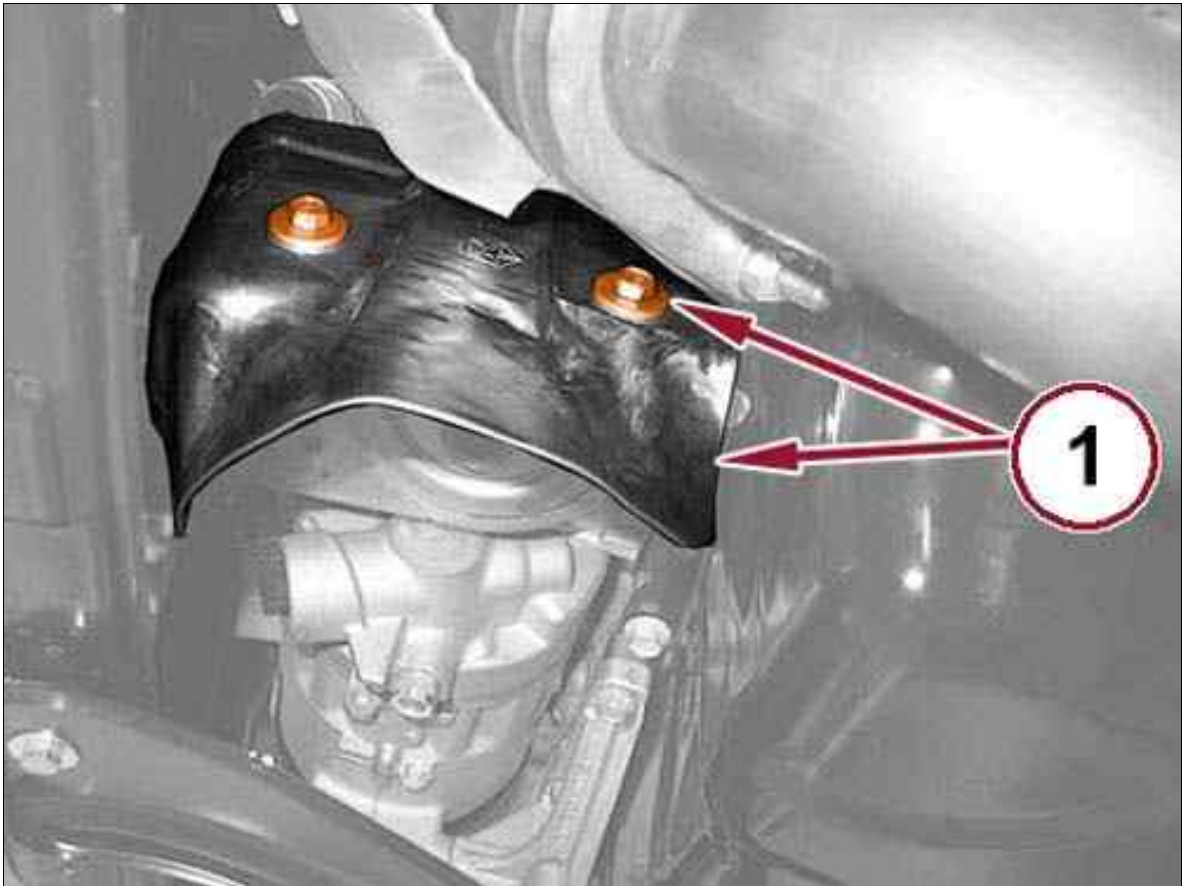
Fig 2: Removing Oil Filter Using Oil Filter Wrench



Courtesy of CHRYSLER GROUP, LLC

5. Remove the engine oil filter (1). Recover engine oil that comes out in a suitable container.

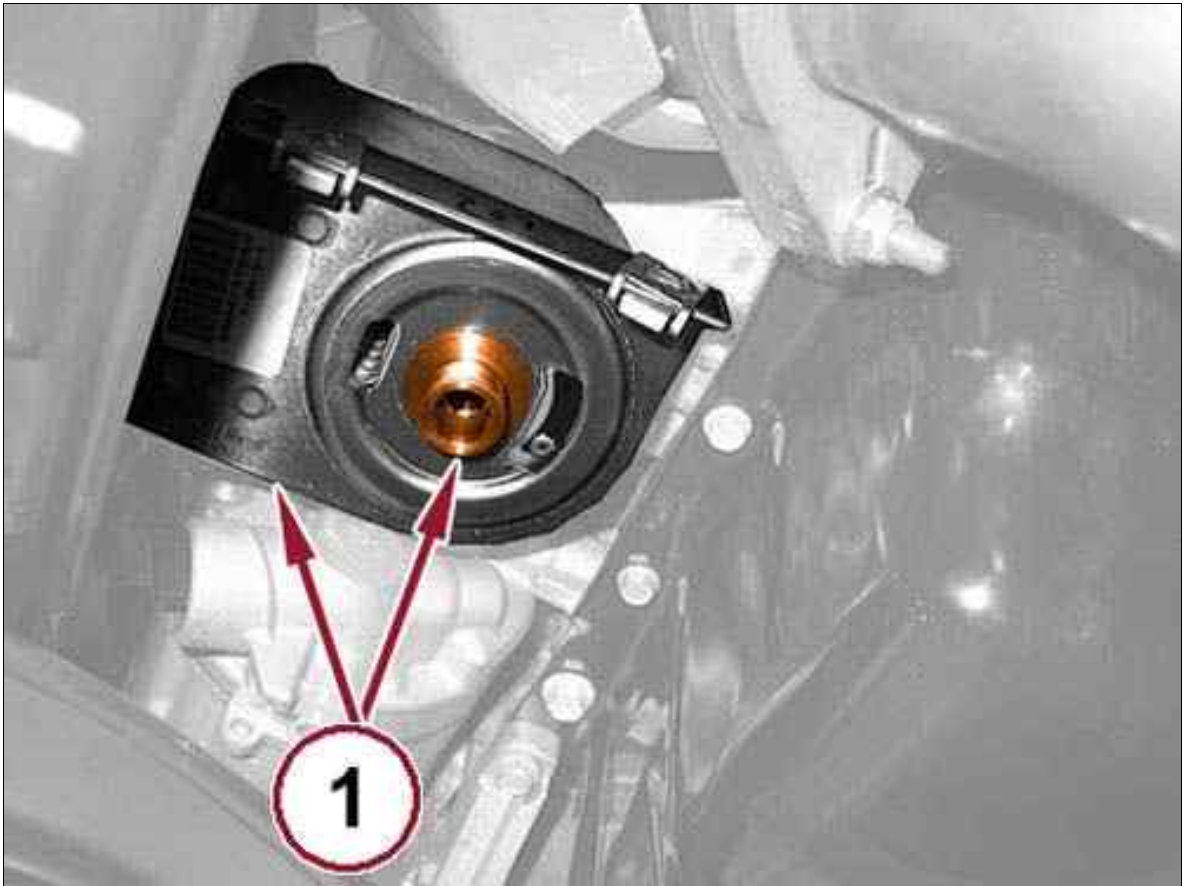
Fig 3: Heat Shield & Bolts



Courtesy of CHRYSLER GROUP, LLC

6. Remove the screws and remove the heat shield (1).

Fig 4: Filter Housing & Motor Oil Cooler



Courtesy of CHRYSLER GROUP, LLC

7. Unscrew the filter (1) and remove the motor oil cooler.

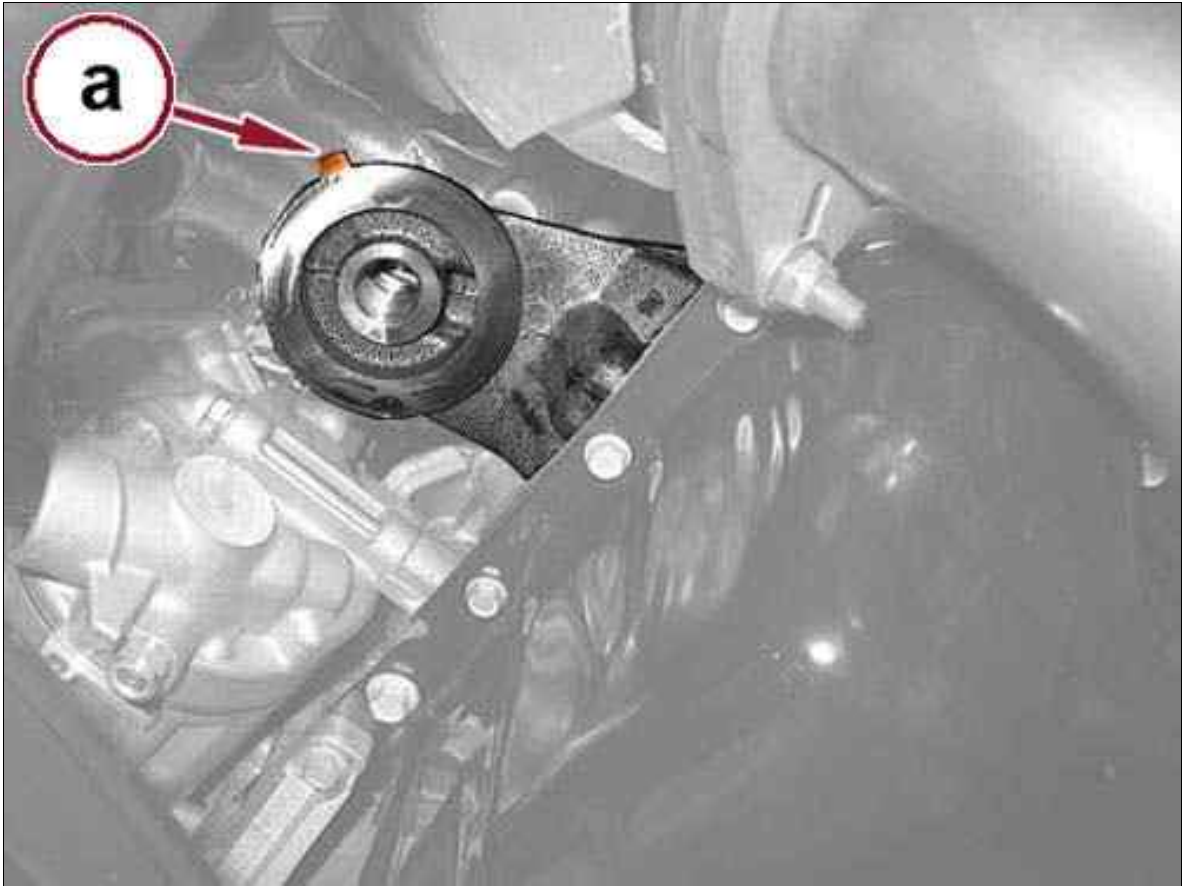
LUBRICATION > COOLER, OIL > REMOVAL AND INSTALLATION > 2.4L > INSTALLATION

1. Install the motor oil cooler, engaging the reference centering with the tab (a) shown in the figure and tighten the union.
2. Install the heat shield and tighten the screws.
3. Lubricate the seal with engine oil and mount the engine oil filter tightening it completely by hand.
4. Connect the water flow and return pipes to the engine oil cooler and tighten the clamps.
5. Fill the engine coolant. Refer to STANDARD PROCEDURE .
6. Install the engine beauty cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .

LUBRICATION > COOLER, OIL > REMOVAL AND INSTALLATION > OIL COOLER

LINES > REMOVAL

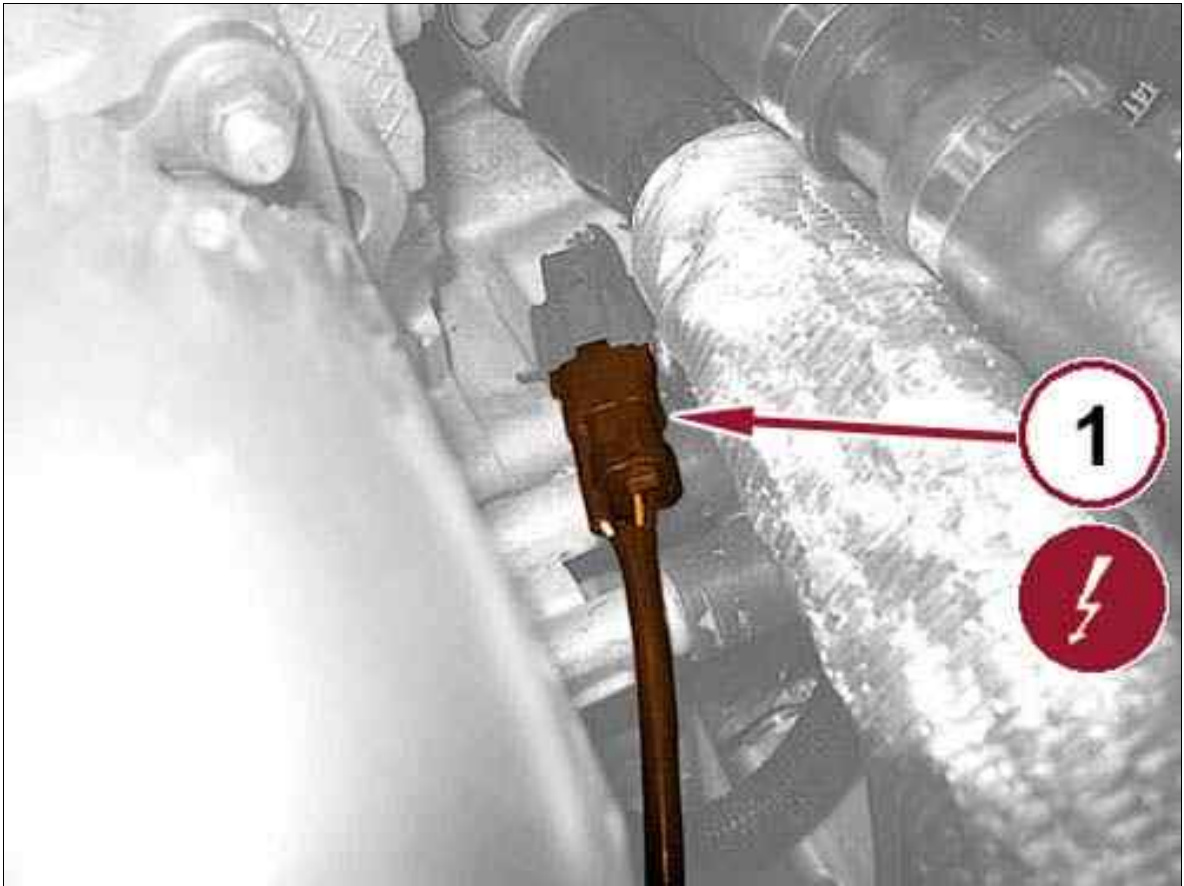
Fig 1: Installing Motor Oil Cooler By Engaging Reference Centering With Tab



Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle. Refer to HOISTING, STANDARD PROCEDURE .
2. Remove the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
3. Drain the cooling system. Refer to STANDARD PROCEDURE .

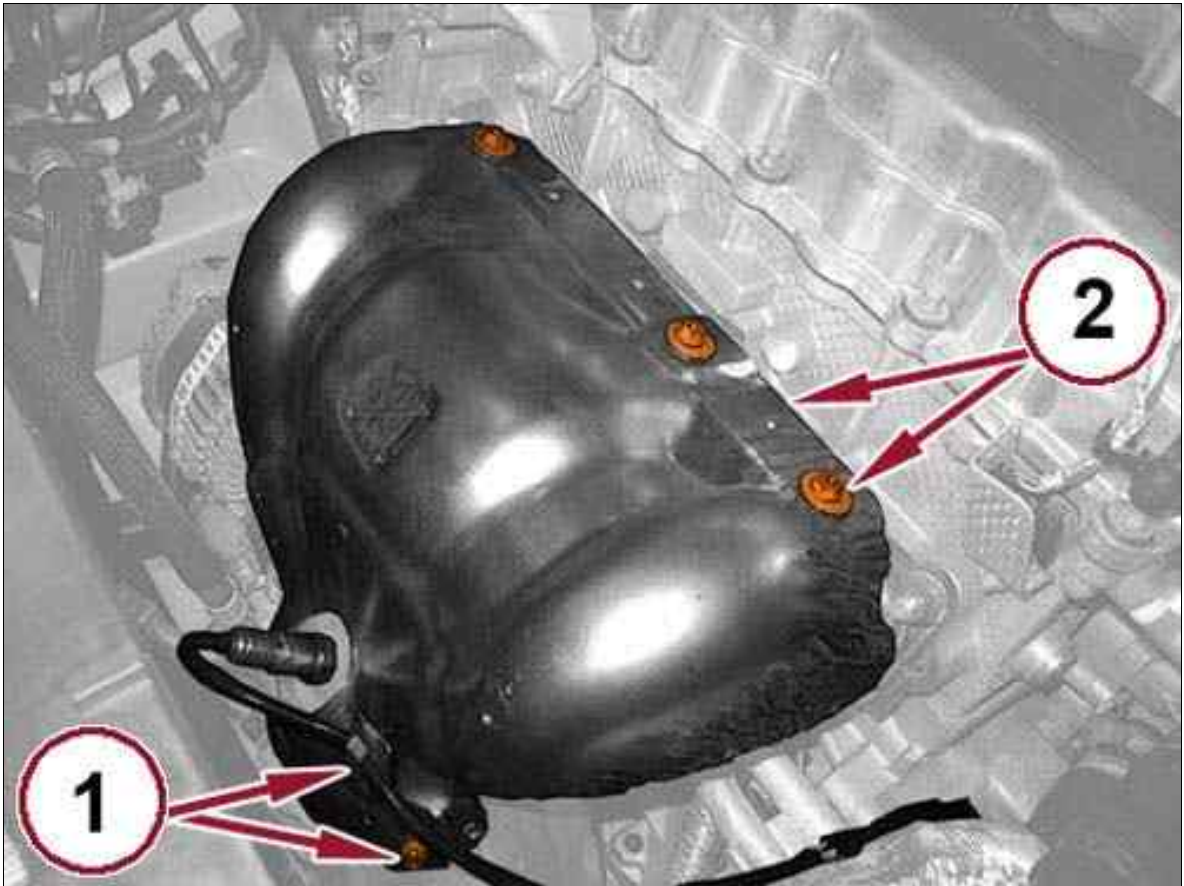
Fig 2: Upstream Oxygen Sensor Wire Harness Connector



Courtesy of CHRYSLER GROUP, LLC

4. Disconnect the electrical connection of the upper oxygen sensor.
5. Disengage the top oxygen sensor wiring harness, and loosen the bolt (1) and remove the bracket.

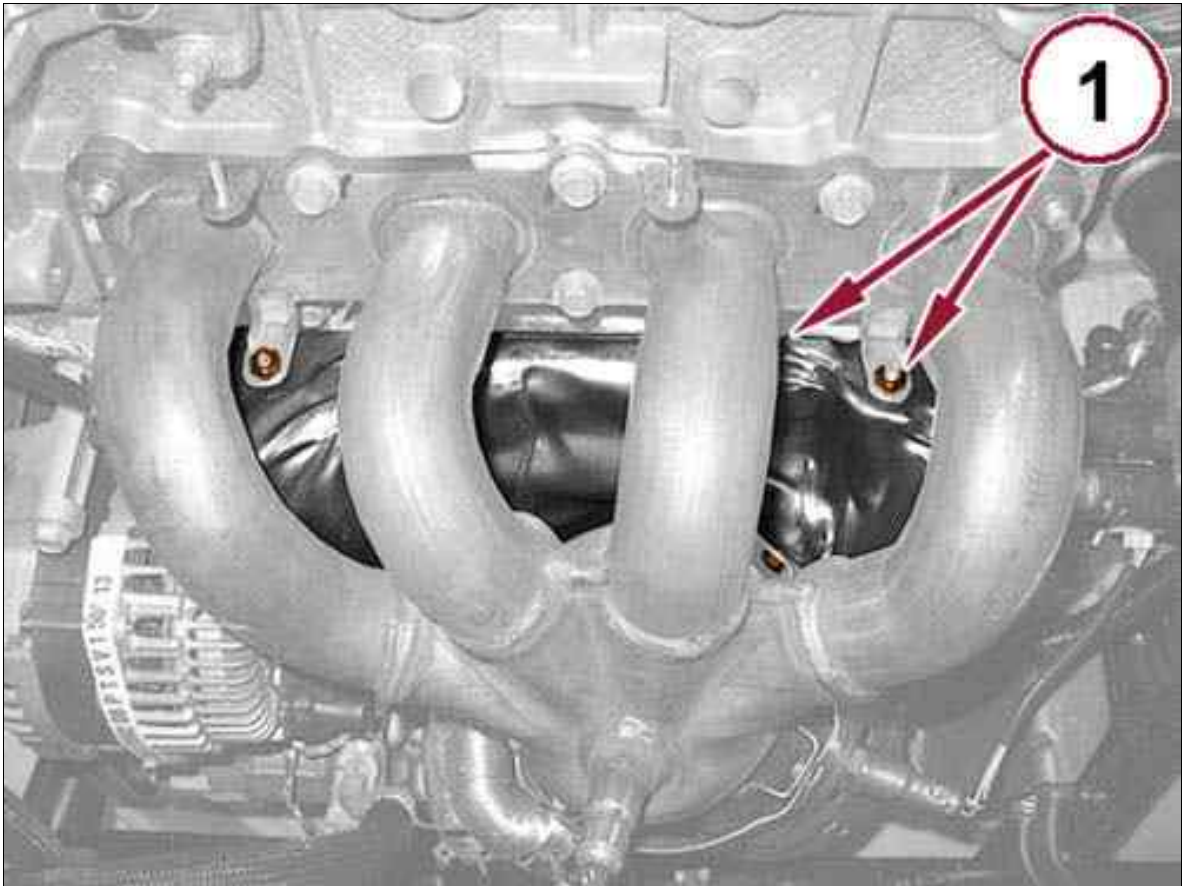
Fig 3: Upper Heat Shield, Nuts & Wire Harness Retainer



Courtesy of CHRYSLER GROUP, LLC

6. Remove the bolts (2) and the exhaust manifold heat shield.

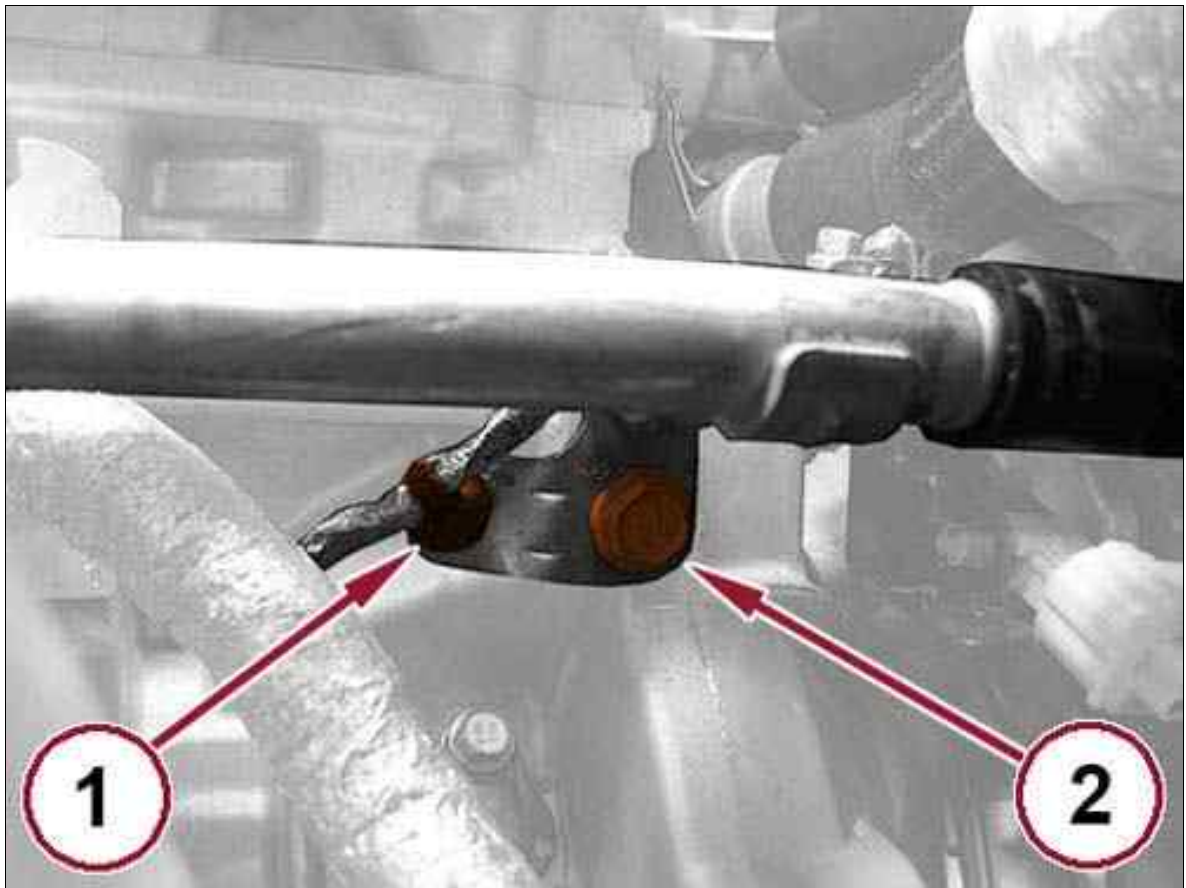
Fig 4: Bottom Exhaust Manifold Heat Shield & Nuts



Courtesy of CHRYSLER GROUP, LLC

7. Remove the nuts and the bottom exhaust manifold heat shield.

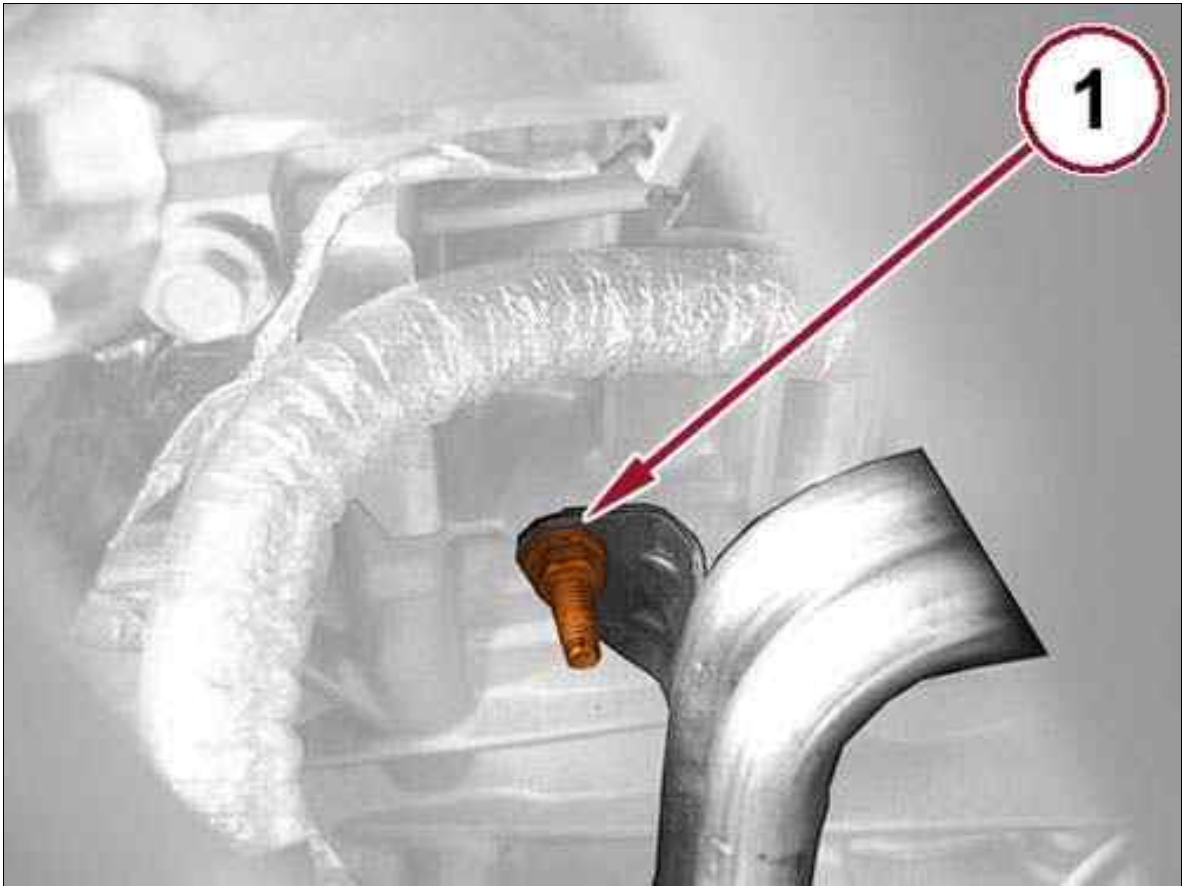
Fig 5: Upper Oxygen Sensor Wiring & Retainer



Courtesy of CHRYSLER GROUP, LLC

8. Detach the retainer (1) securing the upper oxygen sensor wiring.
9. Remove the rear bracket bolt (2) securing the coolant tube assembly.

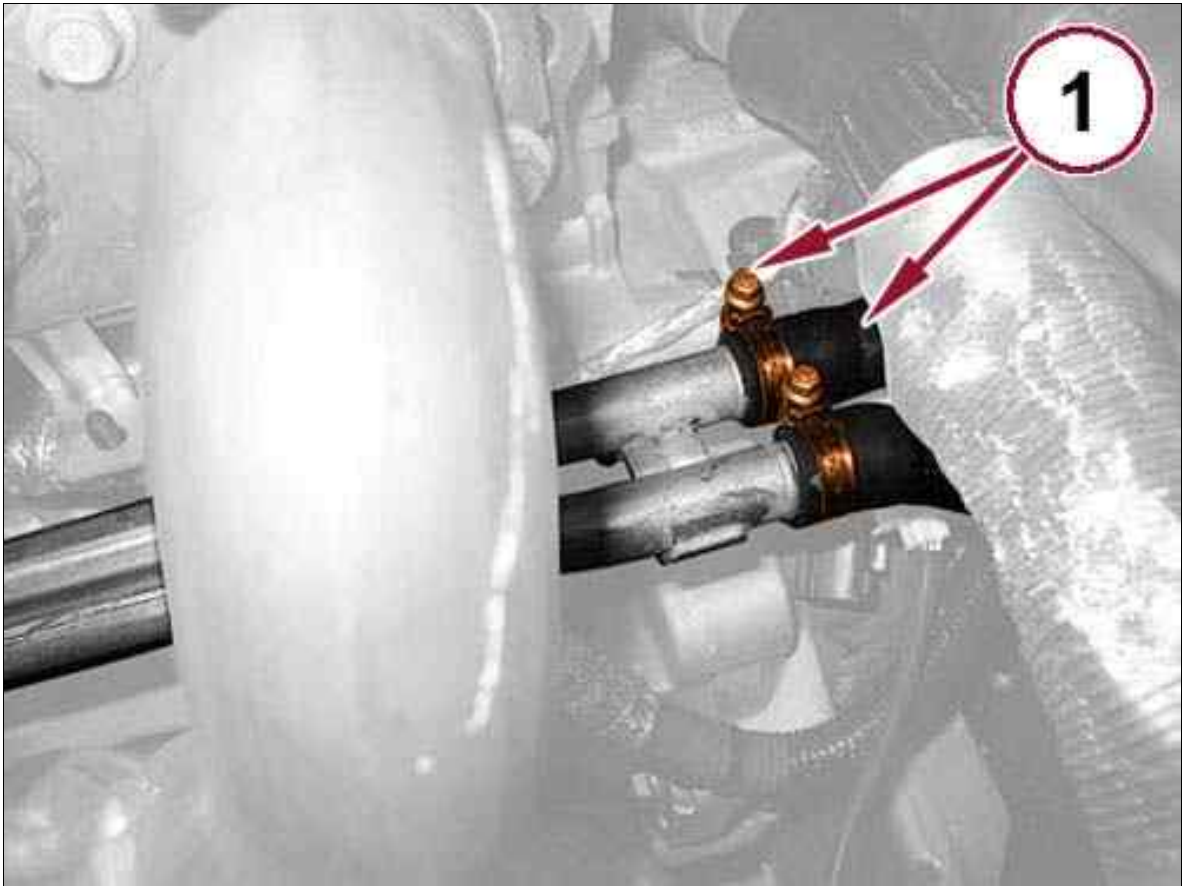
Fig 6: Coolant Tube Assembly Front Bracket Nut



Courtesy of CHRYSLER GROUP, LLC

10. Remove the front bracket nut (1) securing the coolant tube assembly.

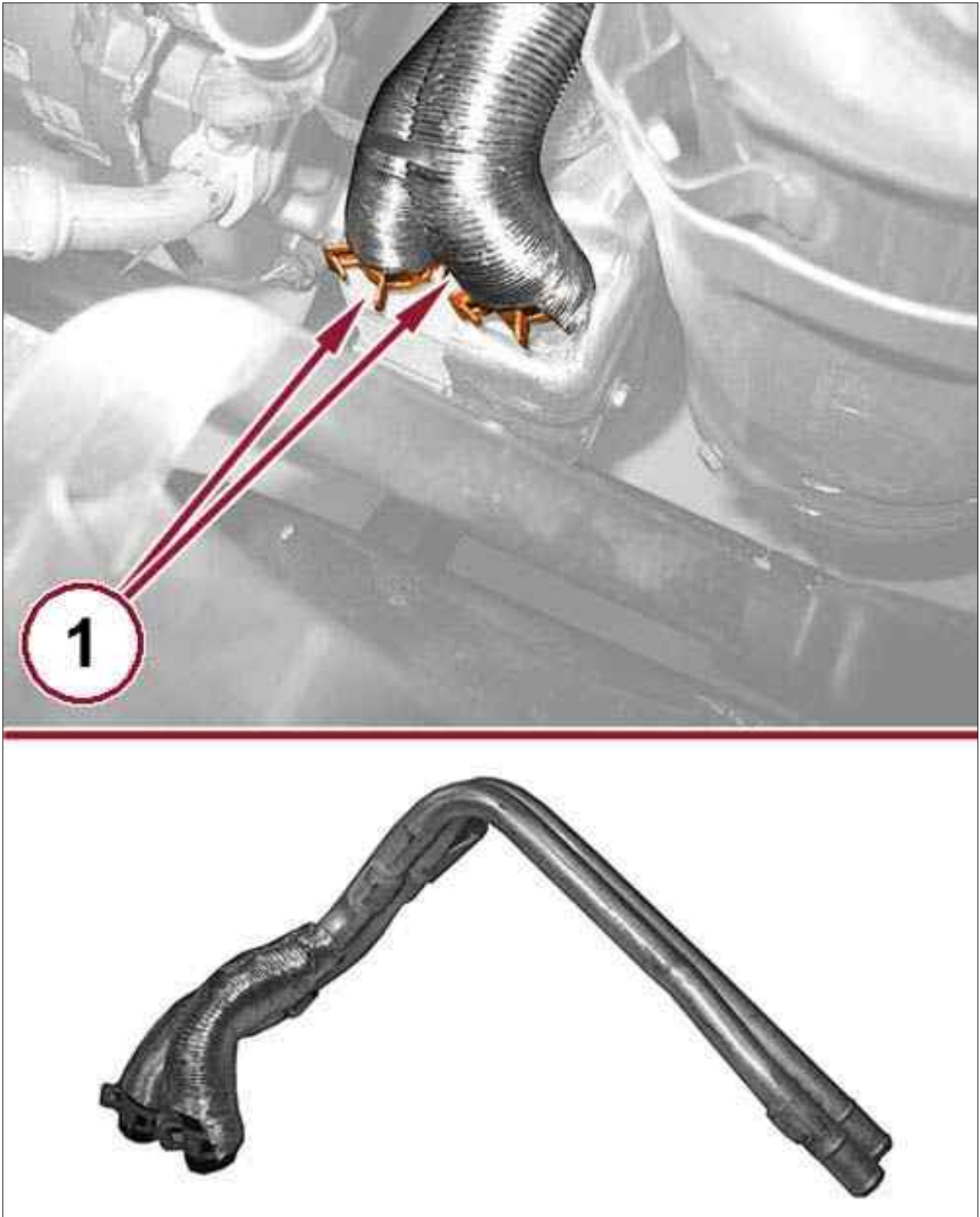
Fig 7: Water Supply And Return Hoses & Hose Clamps



Courtesy of CHRYSLER GROUP, LLC

11. Loosen the hose clamps (1) and disconnect the water supply and return hoses.

Fig 8: Coolant Hoses & Clamps



Courtesy of CHRYSLER GROUP, LLC

12. Disconnect the coolant hoses (1) and remove the coolant tubes.

**LUBRICATION > COOLER, OIL > REMOVAL AND INSTALLATION > OIL COOLER
LINES > INSTALLATION**

1. Install the coolant tubes and tighten the clamps.
2. Connect the water supply and return hoses and tighten the clamps.
3. Install the front bracket nut securing the tubes assembly and securely tighten.
4. Install the rear bracket bolt securing the tubes assembly and securely tighten.
5. Engage the retaining clip oxygen sensor harness.
6. Install the lower exhaust manifold heat shield and securely tighten the nuts.
7. Install the top exhaust manifold heat shield and securely tighten the bolts.
8. Install the top oxygen sensor wiring bracket and securely tighten the bolt and engage the wiring retaining clip.
9. Connect the electrical connection of the upper oxygen sensor.
10. Fill the cooling system. Refer to STANDARD PROCEDURE .
11. Install the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
12. Remove the support and lower the vehicle.

LUBRICATION > FILTER, ENGINE OIL > REMOVAL AND INSTALLATION > 1.4L MULTIAIR TURBO

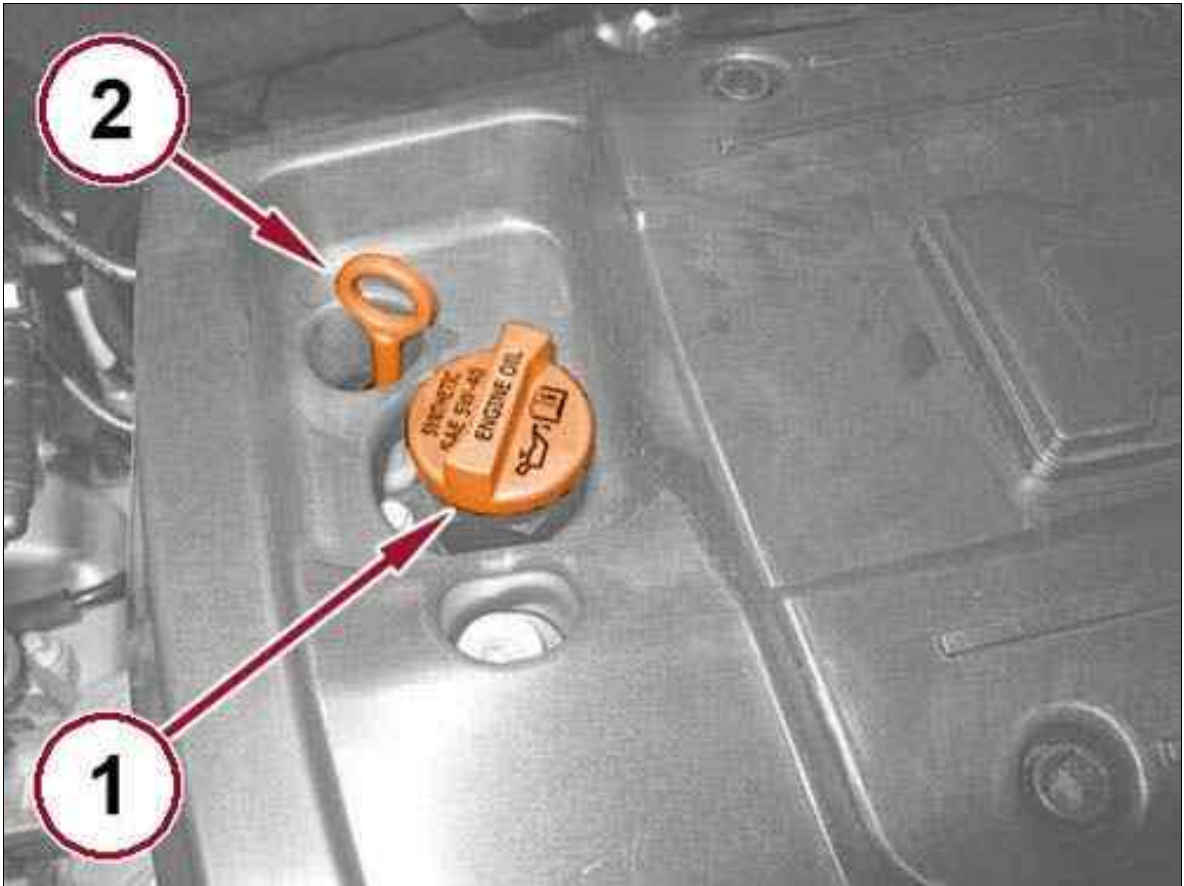


NOTE:

Minimize skin contact with engine oil. Engine oil is harmful to the skin. In case of contact, wash with soap and water.

1. Raise and support the vehicle Refer to HOISTING, STANDARD PROCEDURE .

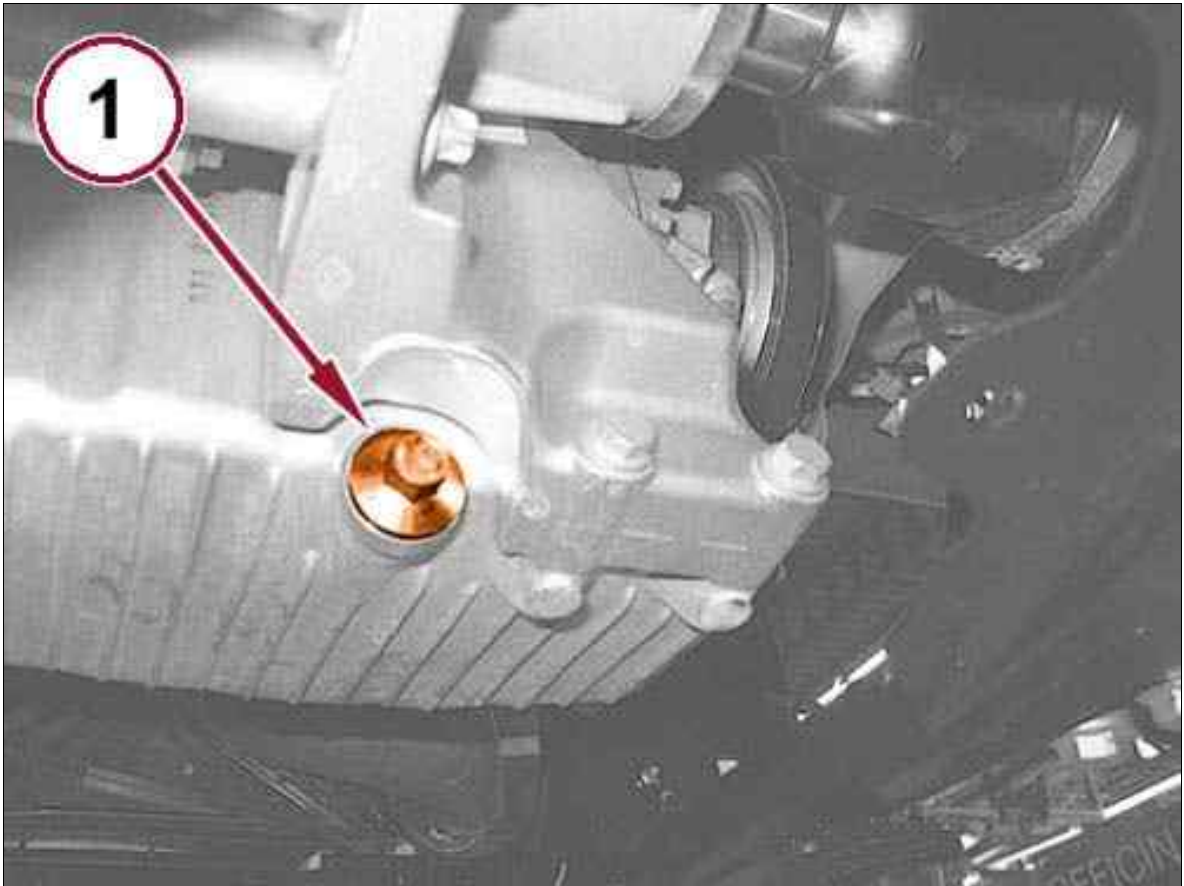
Fig 1: Dipstick & Engine Oil Filler Cap



Courtesy of CHRYSLER GROUP, LLC

2. When the engine is warm, remove the engine oil filler cap (1).
3. Pull out the dipstick (2) to check the engine oil level.
4. Remove the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .

Fig 2: Oil Pan Drain Plug



Courtesy of CHRYSLER GROUP, LLC

 NOTE:

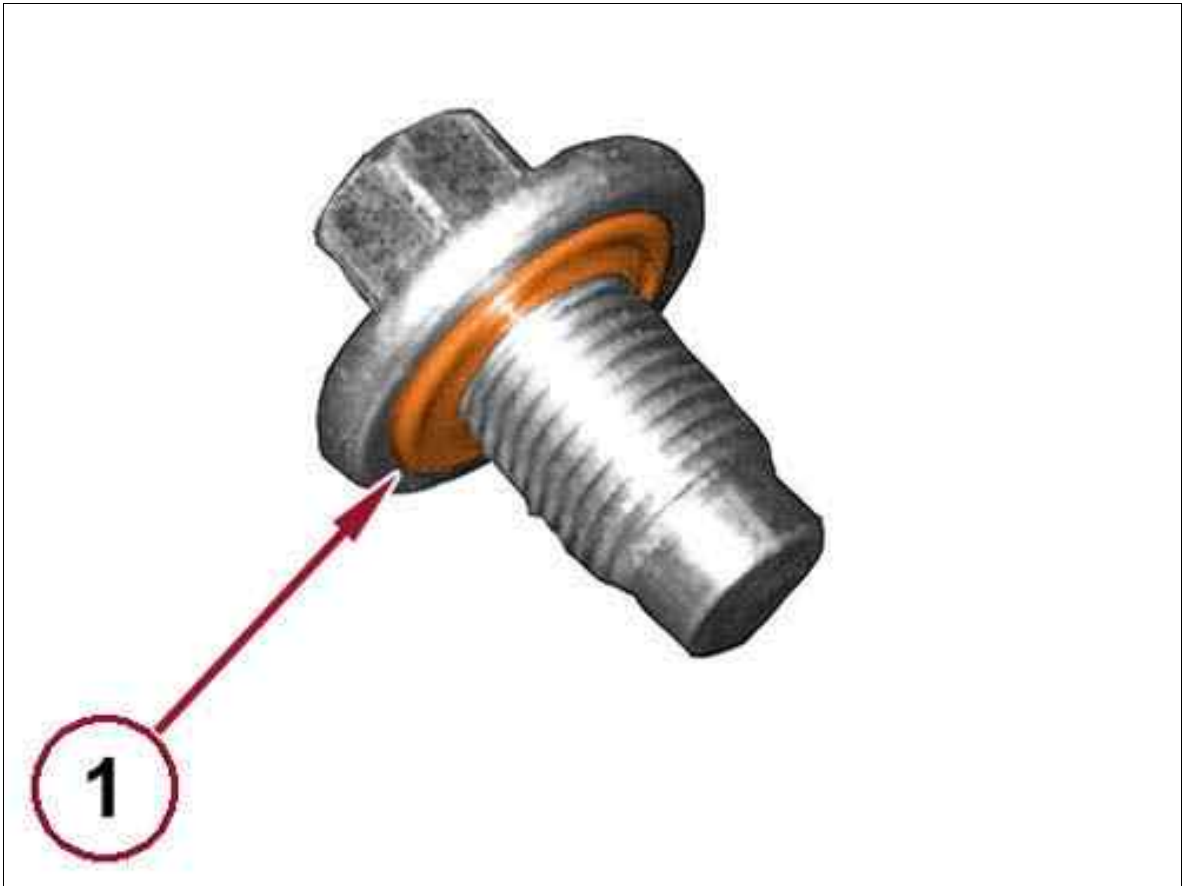
When removing the drain plug, use caution as the oil may be very hot.

 NOTE:

Do not spill any oil, as the indiscriminate dispersal of the product causes pollution.

5. Unscrew the drain plug (1) from the oil pan and allow the engine oil to completely drain into a suitable container.

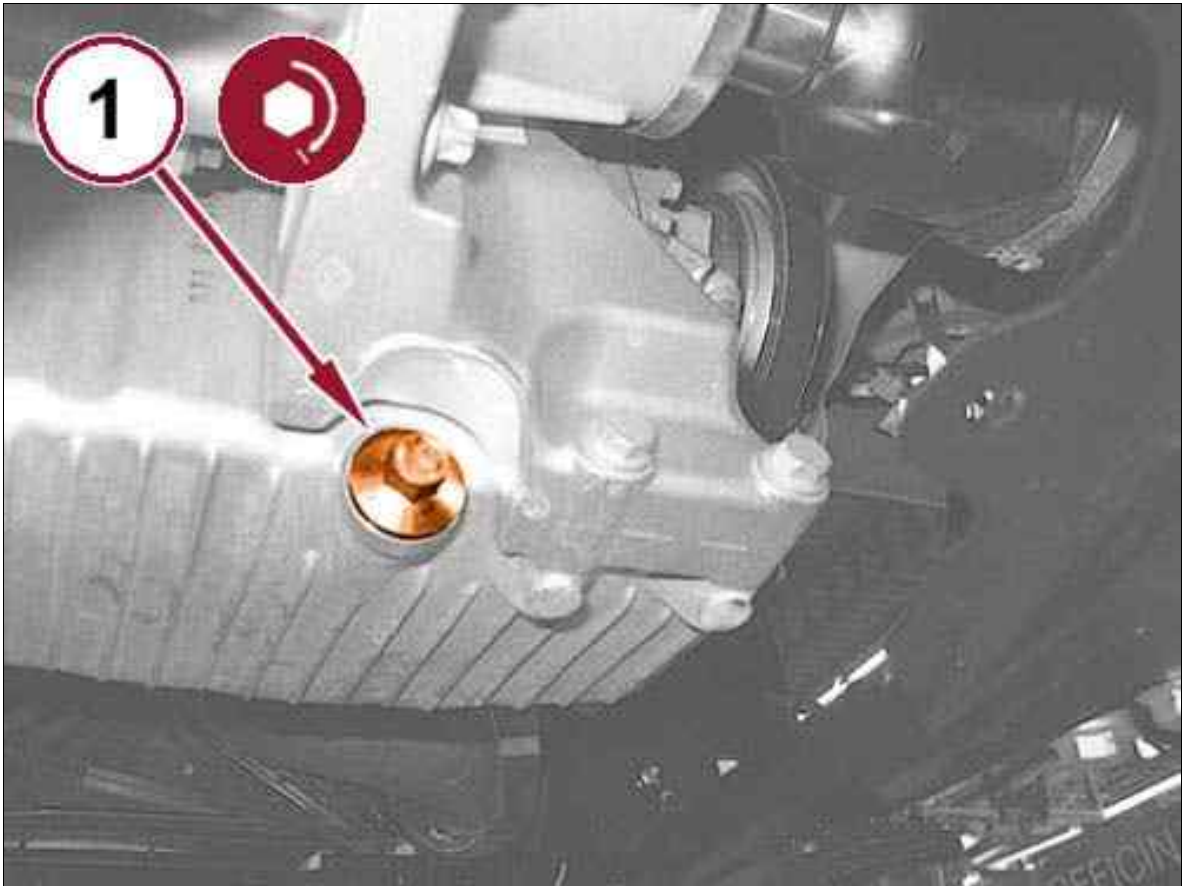
Fig 3: Oil Pan Drain Plug Seal



Courtesy of CHRYSLER GROUP, LLC

6. Check the integrity of the seal (1) on the engine oil drain plug.

Fig 4: Oil Pan Drain Plug



Courtesy of CHRYSLER GROUP, LLC

7. Clean the engine oil drain plug (1) and tighten it with the gasket to the proper specification. Refer to TORQUE SPECIFICATIONS .

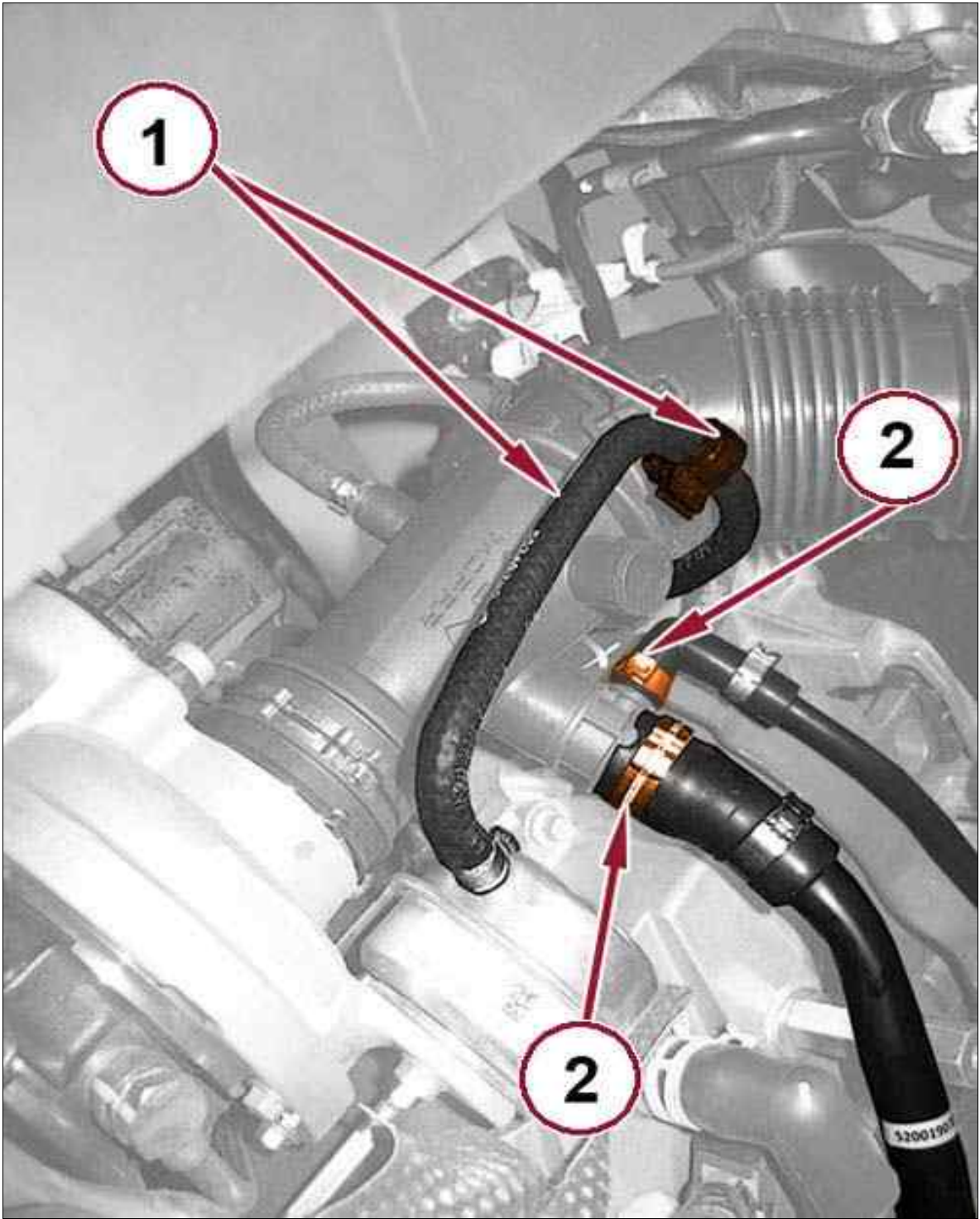
Fig 5: Air Inlet Hose & Clamp



Courtesy of CHRYSLER GROUP, LLC

8. Loosen the clamp (1) and disconnect the air inlet hose from the air filter cover.

Fig 6: Waste-Gate Actuator Air Control Hose, Engine Oil Vapor Hoses, Clip & Clamps



Courtesy of CHRYSLER GROUP, LLC

9. Open the clip (1) and release the Waste-Gate actuator air control hose.
10. Loosen the hose clamps (2) and disconnect the engine oil vapor hoses.

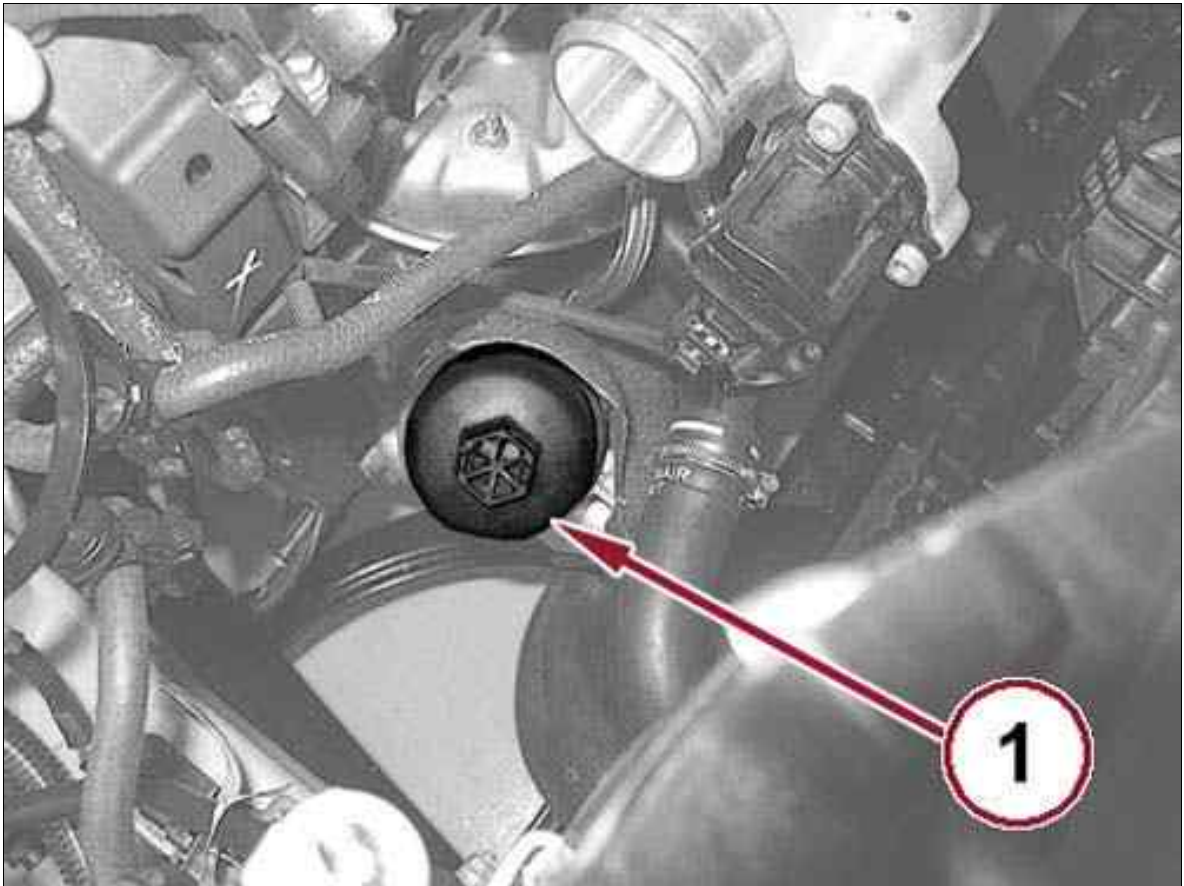
Fig 7: Air Control Hose, Clip & Clamp



Courtesy of CHRYSLER GROUP, LLC

11. Open the clip (1), loosen the clamp and disconnect the air control hose from the Waste-Gate actuator.
12. Loosen the clamp (2) and remove the air inlet hose from the turbocharger.

Fig 8: Engine Oil Filter Cover



Courtesy of CHRYSLER GROUP, LLC

13. Unscrew the engine oil filter cover (1).

Fig 9: Oil Filter Element



Courtesy of CHRYSLER GROUP, LLC

14. Remove the oil filter element (1).
15. Install a new oil filter element.
16. Install the oil filter cover and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS .
17. Install the air inlet hose to the turbocharger and tighten the clamps at the air filter cover and turbocharger.
18. Connect the air control hose to the Waste-Gate actuator, tighten the clamp and engage the retaining clip.
19. Connect the engine oil vapor hoses and tighten the clamps.
20. Engage the spring retaining clip to the Waste-Gate actuator air control hose.
21. Refill the engine lubrication system with the proper quality and quantity of engine oil. Refer to CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS .

 NOTE:

In the table is shown the amount for periodic replacement.

22. Check the engine oil level with the dipstick.

 NOTE:

Checking the oil level should be carried out with the vehicle on level ground.

23. Install the oil filler cap, run the engine at idle speed for about 2 minutes, turn off the engine and wait a few minutes.

24. When the engine is cold, check the oil level and check for leakage.

25. Install the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .

26. Remove the vehicle from the lift.

LUBRICATION > FILTER, ENGINE OIL > REMOVAL AND INSTALLATION > 2.0L TURBO DIESEL/1.6L TURBO DIESEL

 NOTE:

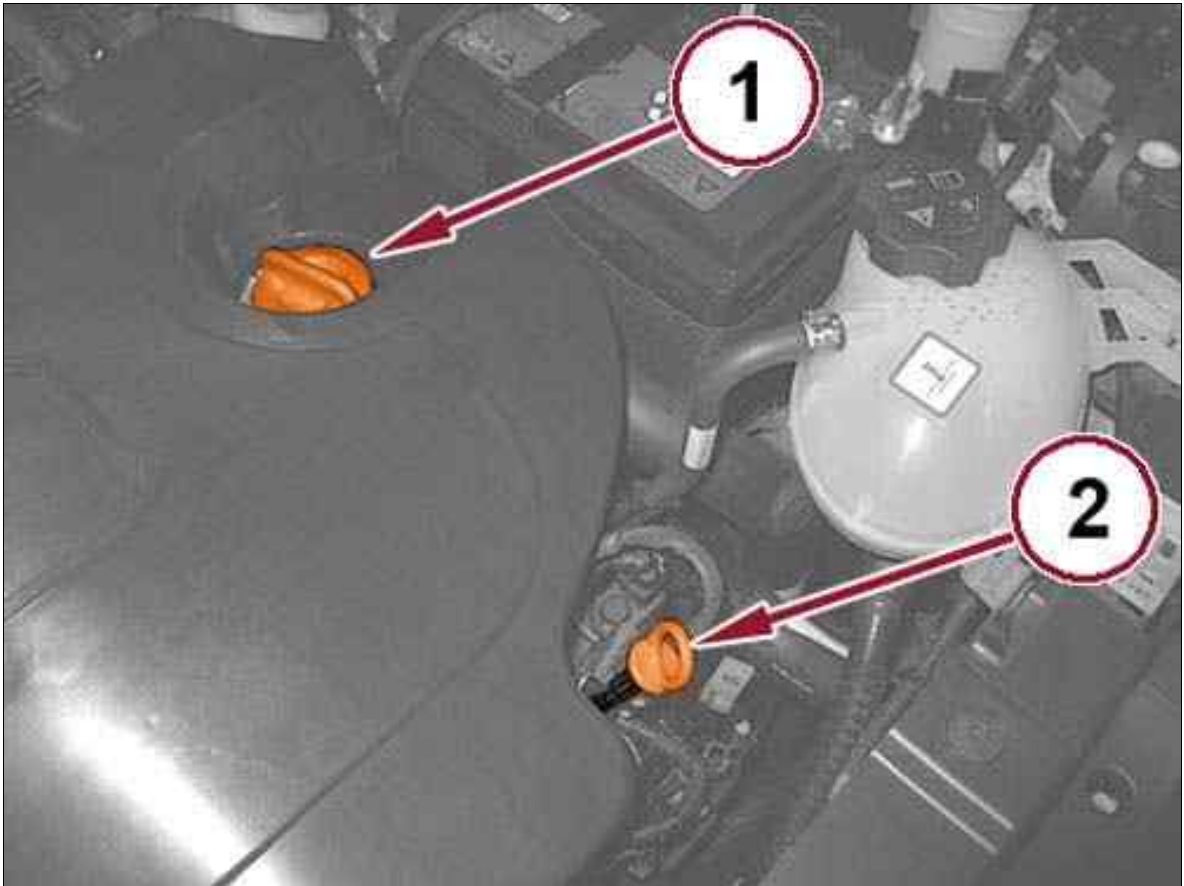
Following a complete replacement of the engine oil, update the "change engine oil" function in the specific engine Control Module using the diagnostic tool.

 NOTE:

Minimize skin contact with engine oil. Engine oil is harmful to the skin. In case of contact, wash with soap and water.

1. Raise and support the vehicle Refer to HOISTING, STANDARD PROCEDURE .

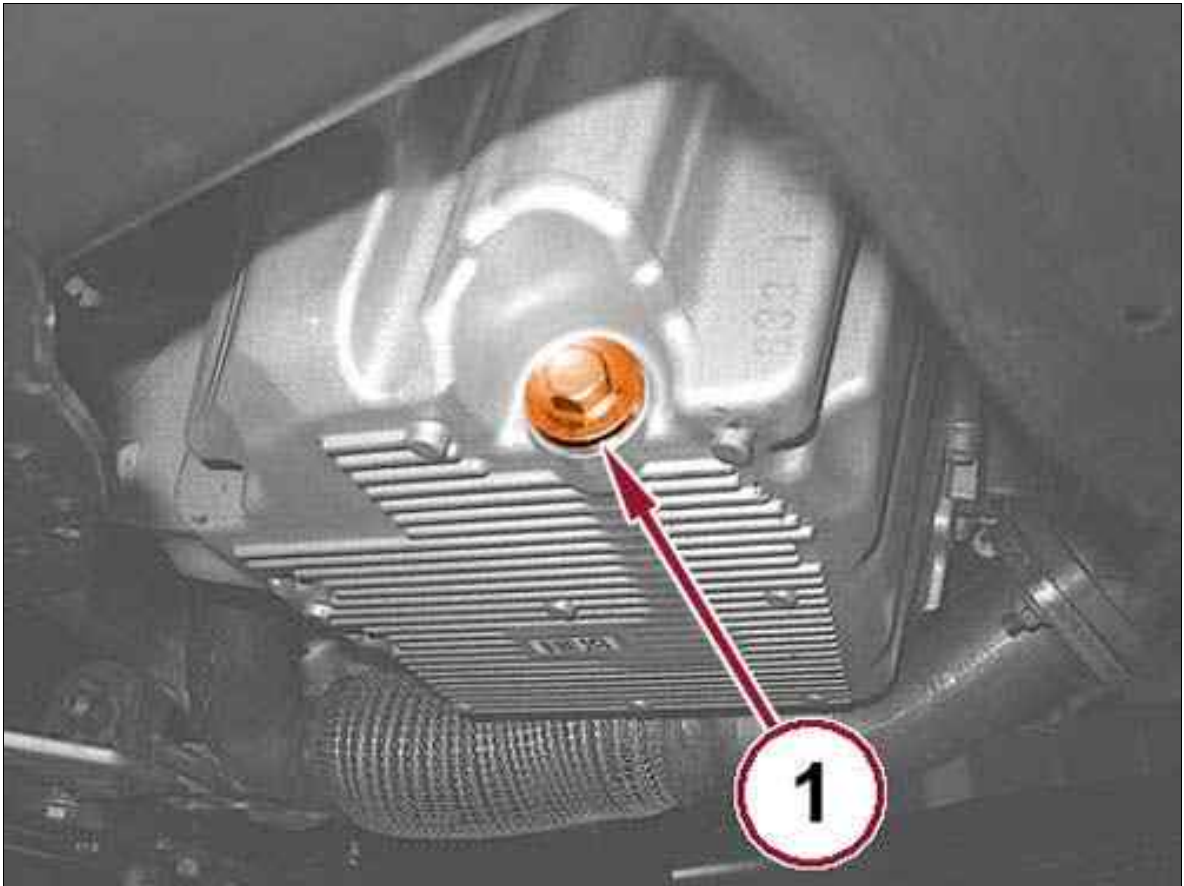
Fig 1: Dipstick & Engine Oil Filler Cap



Courtesy of CHRYSLER GROUP, LLC

2. When the engine is warm, remove the engine oil filler cap (1).
3. Pull out the dipstick (2) to check the engine oil level.
4. Remove the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .

Fig 2: Engine Oil Pan Drain Plug



Courtesy of CHRYSLER GROUP, LLC

 NOTE:

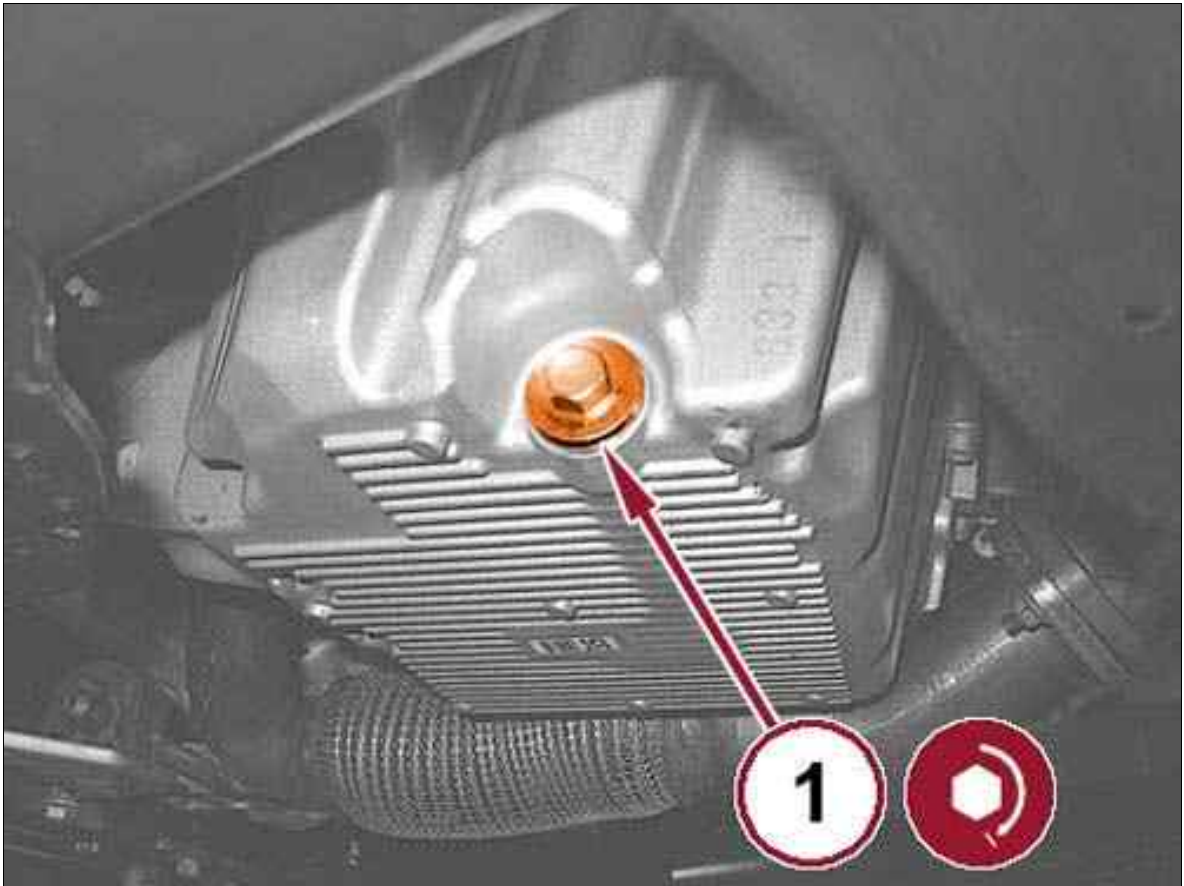
When removing the drain plug, use caution as the oil may be very hot.

 NOTE:

Do not spill any oil, as the indiscriminate dispersal of the product causes pollution.

5. Unscrew the drain plug (1) from the oil pan and allow the engine oil to completely drain into a suitable container.

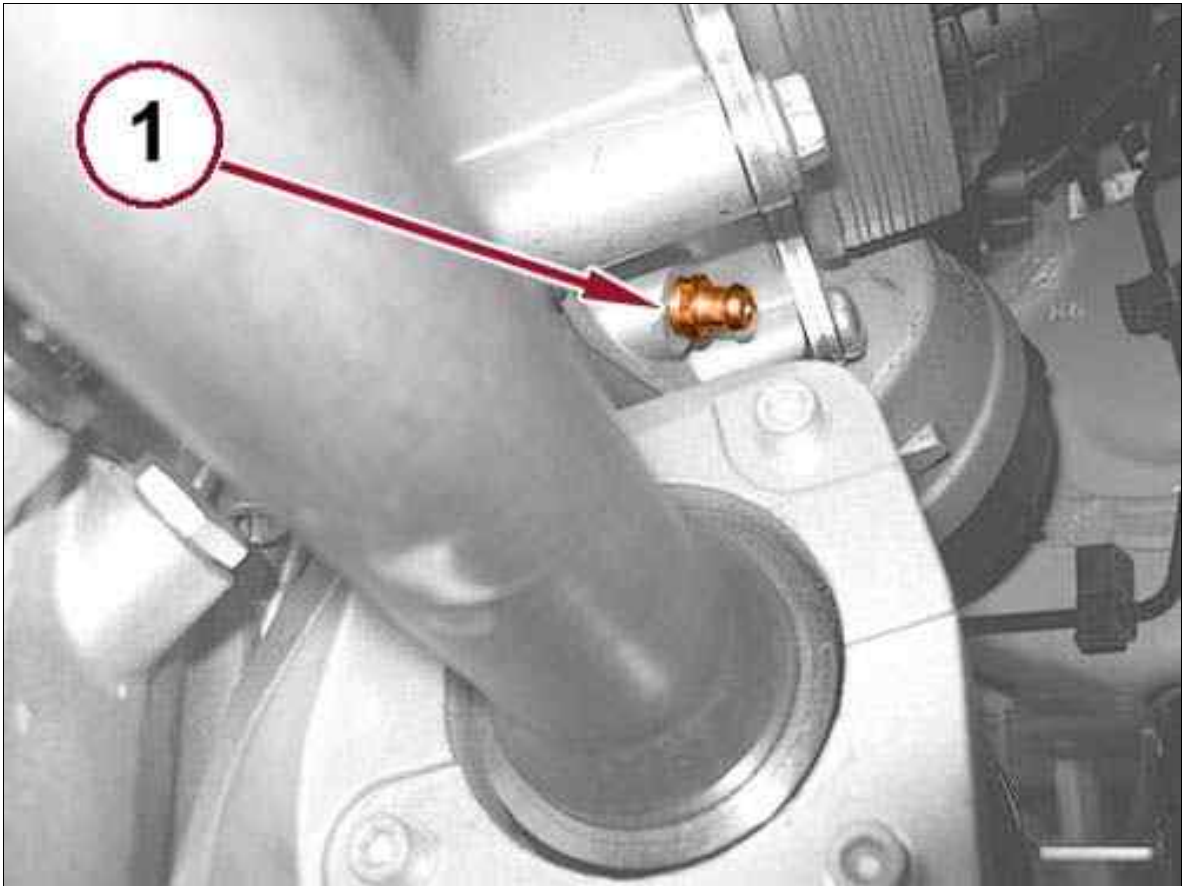
Fig 3: Engine Oil Pan Drain Plug



Courtesy of CHRYSLER GROUP, LLC

6. Clean the engine oil drain plug (1) and tighten it with the gasket to the proper specification. Refer to TORQUE SPECIFICATIONS .

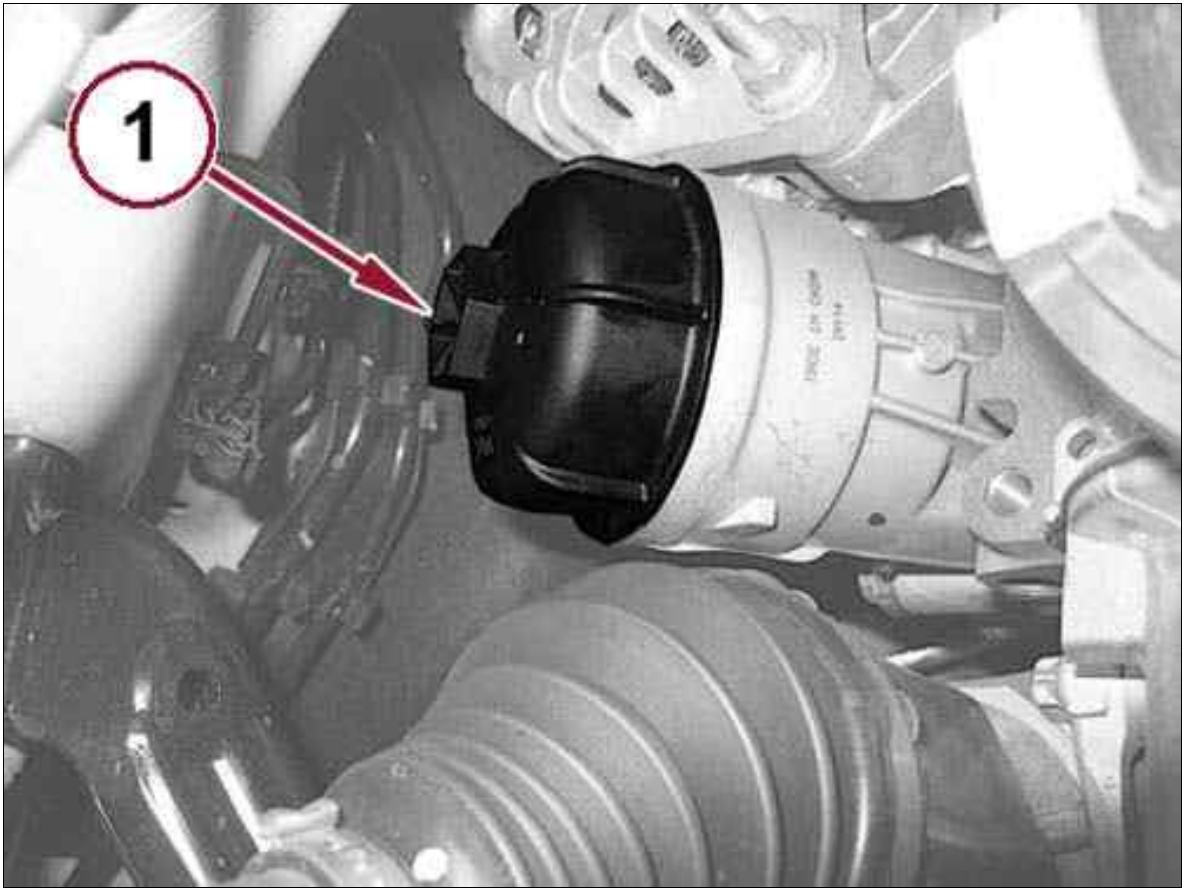
Fig 4: Fitting On Oil Filter Housing



Courtesy of CHRYSLER GROUP, LLC

7. Remove the cap and insert a suitable drain hose onto the fitting (1) on the oil filter housing for the recovery of oil that comes out when you remove the oil filter cover.

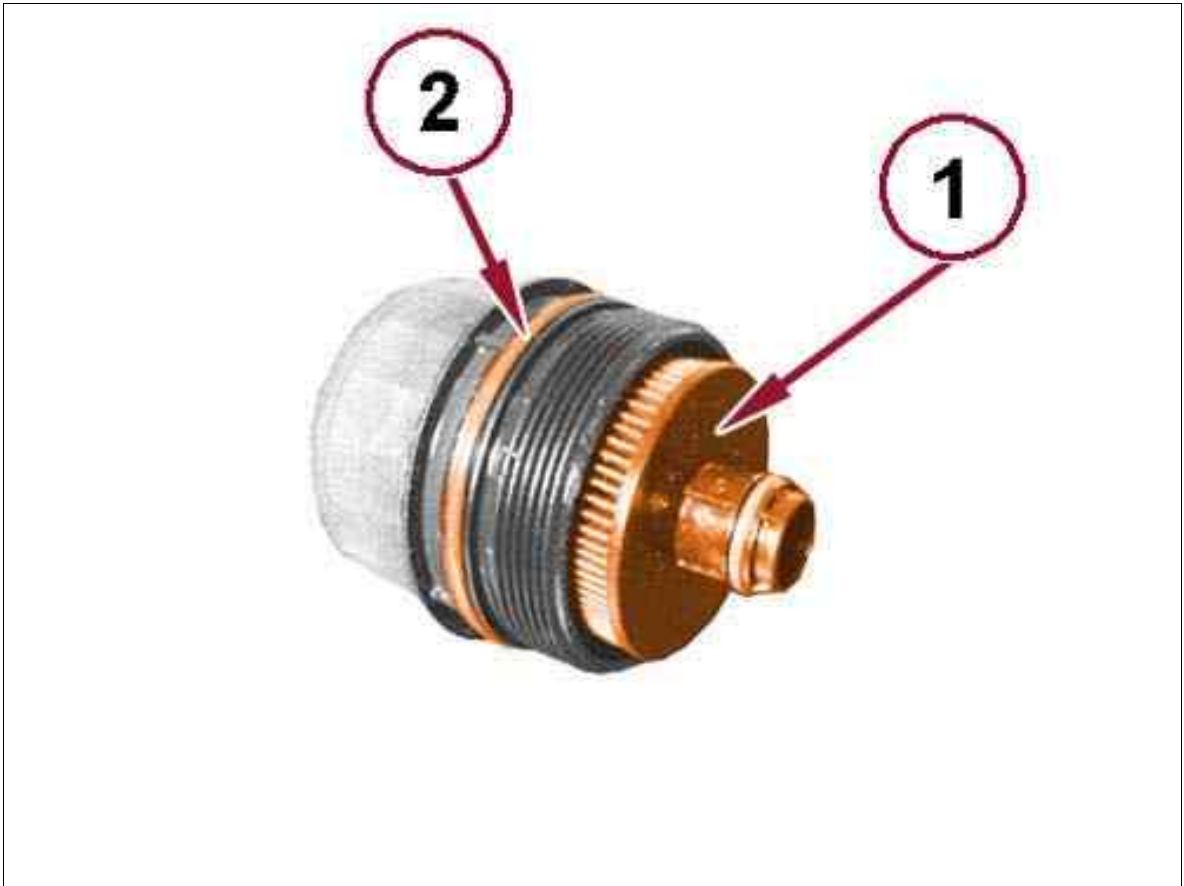
Fig 5: Engine Oil Filter Cartridge Cover



Courtesy of CHRYSLER GROUP, LLC

8. Unscrew and remove the engine oil filter cartridge cover (1).

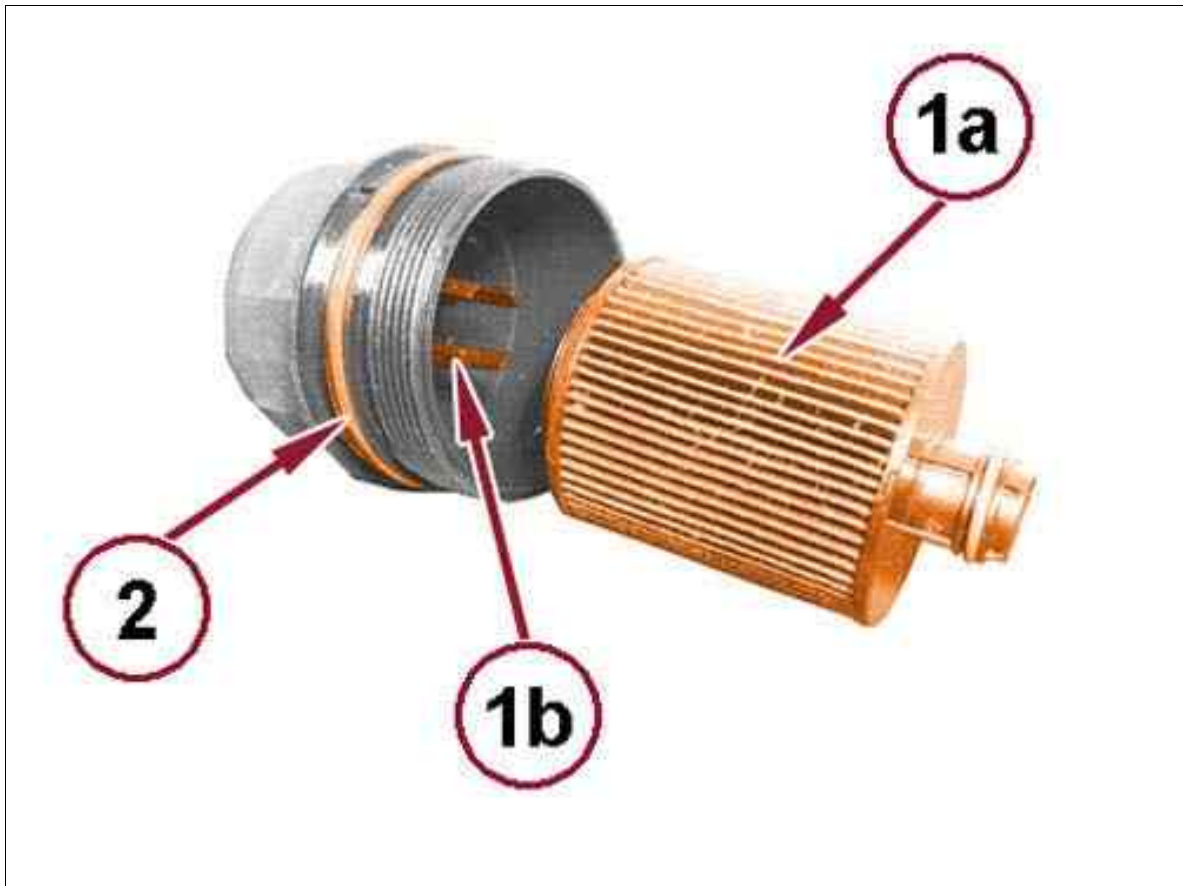
Fig 6: Oil Filter Element & Oil Filter Cover O-Ring



Courtesy of CHRYSLER GROUP, LLC

9. Remove the oil filter element (1) from the oil filter cover.
10. Remove the O-ring (2) from the oil filter cover.

Fig 7: Oil Filter Element, O-Ring & Retaining Clips



Courtesy of CHRYSLER GROUP, LLC

11. Install a new oil filter element (1a) engaging the retaining clips (1b).
12. Install a new O-ring (2) on the oil filter cover.
13. Install the oil filter cover and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS .
14. Remove the drain hose used for oil recovery and install the cap on the fitting.
15. Refill the engine lubrication system with the proper quality and quantity of engine oil. Refer to CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS .

 NOTE:

In the table is shown the amount for periodic replacement.

16. Check the engine oil level with the dipstick.

 NOTE:

Checking the oil level should be carried out with the vehicle on level ground.

17. Install the oil filler cap, run the engine at idle speed for about 2 minutes, turn off the engine and wait a few minutes.
18. When the engine is cold, check the oil level and check for leakage.
19. Install the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
20. Remove the vehicle from the lift.

LUBRICATION > FILTER, ENGINE OIL > REMOVAL AND INSTALLATION > 2.4L MULTIAIR2

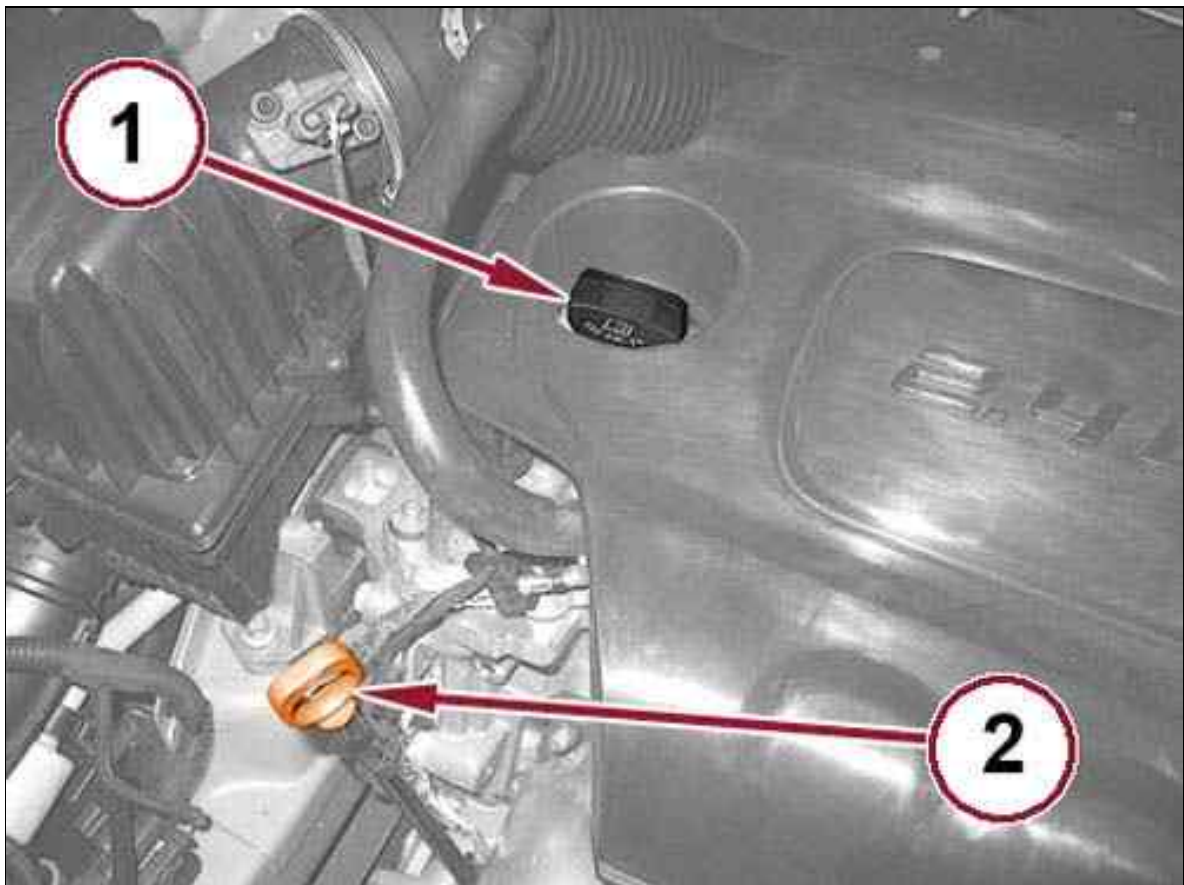


NOTE:

Minimize skin contact with engine oil. Engine oil is harmful to the skin. In case of contact, wash with soap and water.

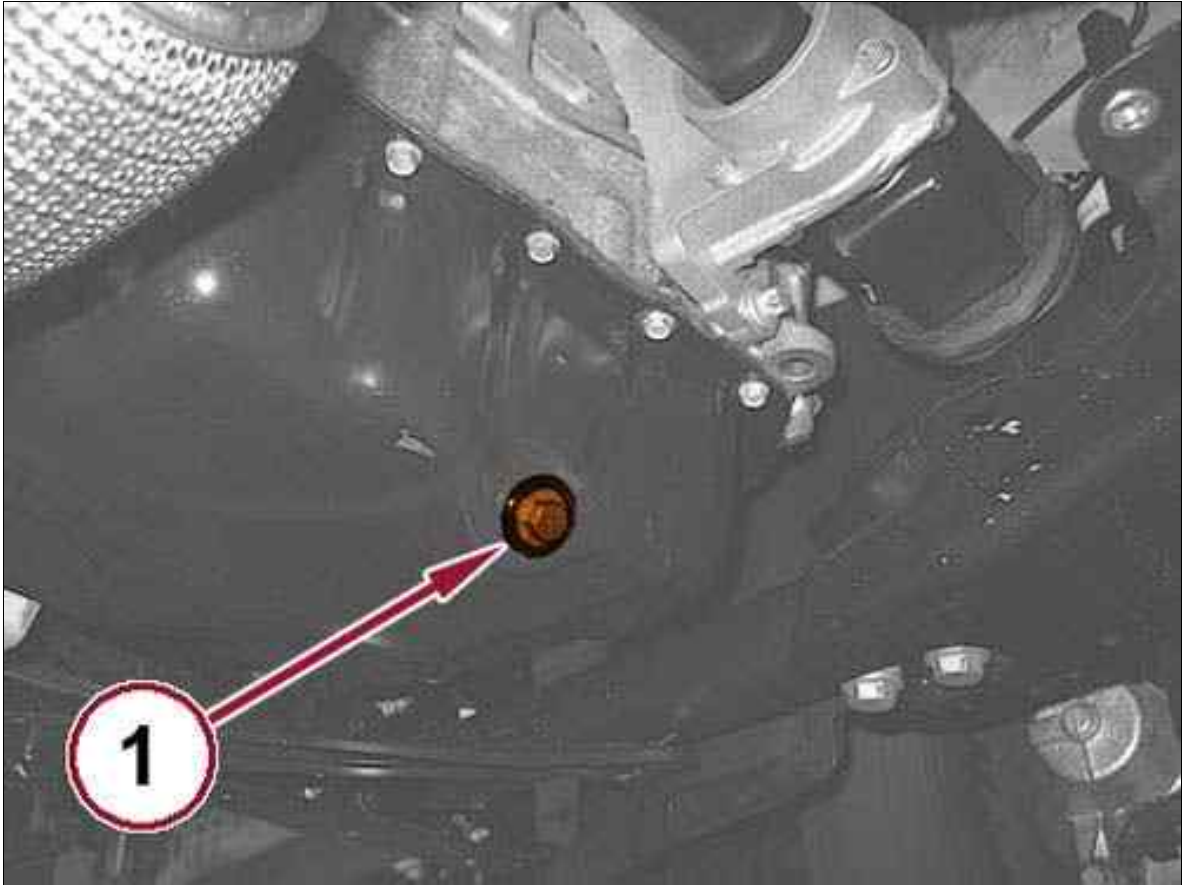
1. Raise and support the vehicle Refer to HOISTING, STANDARD PROCEDURE .

Fig 1: Engine Oil Filler Cap & Dipstick



2. When the engine is warm, remove the engine oil filler cap (1).
3. Pull out the dipstick (2) to check the engine oil level.
4. Remove the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .

Fig 2: Oil Pan Drain Plug



Courtesy of CHRYSLER GROUP, LLC

 NOTE:

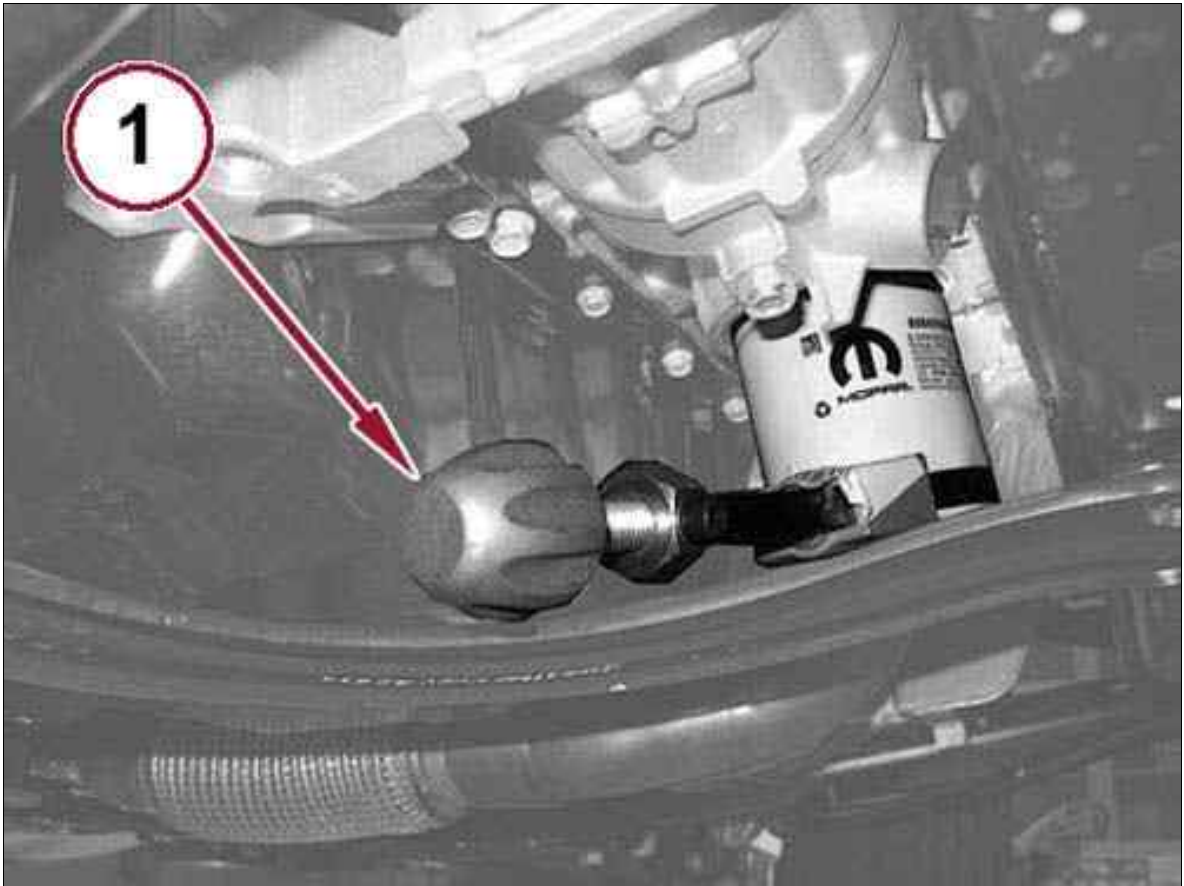
When removing the drain plug, use caution as the oil may be very hot.

 NOTE:

Do not spill any oil, as the indiscriminate dispersal of the product causes pollution.

5. Unscrew the oil pan drain plug (1) and allow the engine oil to completely drain into a suitable container.
6. Clean the engine oil drain plug and tighten it with the gasket to the proper specification. Refer to TORQUE SPECIFICATIONS .

Fig 3: Removing Oil Filter Using Oil Filter Wrench



Courtesy of CHRYSLER GROUP, LLC

7. Unlock the engine oil filter and remove it using an appropriate oil filter wrench (1).
8. Lubricate the gasket on the new oil filter with engine oil and tighten it by hand.
9. Refill the engine lubrication system with the proper quality and quantity of engine oil. Refer to CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS .

 **NOTE:**

In the table is shown the amount for periodic replacement.

10. Check the engine oil level with the dipstick.

 **NOTE:**

Checking the oil level should be carried out with the vehicle on level ground.

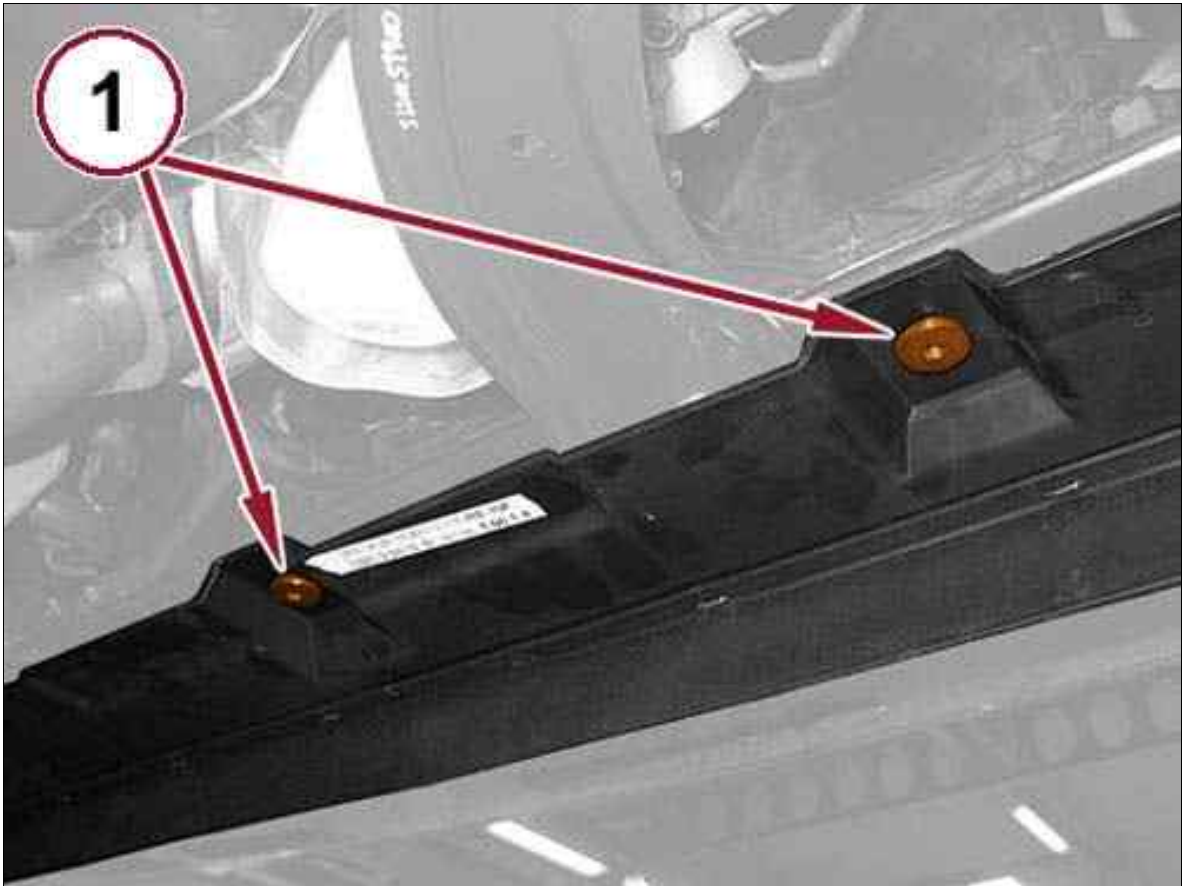
11. Install the oil filler cap, run the engine at idle speed for about 2 minutes, turn off the engine and wait a few minutes.

12. When the engine is cold, check the oil level and check for leakage.
13. Install the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
14. Remove the vehicle from the lift.

LUBRICATION > PAN, OIL > REMOVAL AND INSTALLATION > 2.4L MULTI AIR > REMOVAL

1. Raise and support the vehicle. Refer to HOISTING, STANDARD PROCEDURE .
2. Remove the right front tire and wheel assembly. Refer to REMOVAL AND INSTALLATION .
3. Remove the right front wheelhouse splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
4. Remove the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
5. Drain the engine oil and remove the oil filter. Refer to FILTER, ENGINE OIL, REMOVAL AND INSTALLATION .
6. Remove the serpentine belt. Refer to BELT, SERPENTINE, REMOVAL AND INSTALLATION .
7. Remove the vibration damper. Refer to DAMPER, VIBRATION, REMOVAL AND INSTALLATION .

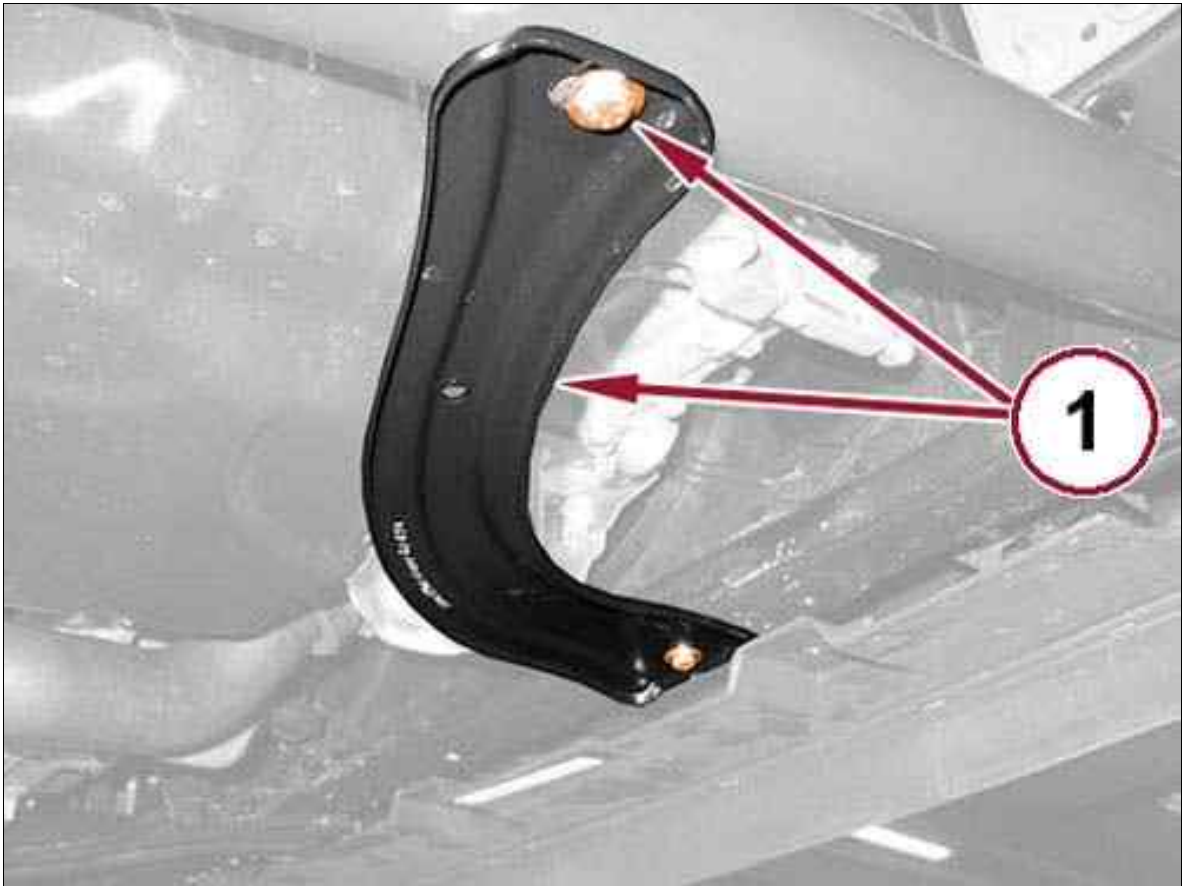
Fig 1: Front Fascia To Front Bumper Bolts



Courtesy of CHRYSLER GROUP, LLC

8. Remove the bolts (1) securing the front fascia to the front bumper.

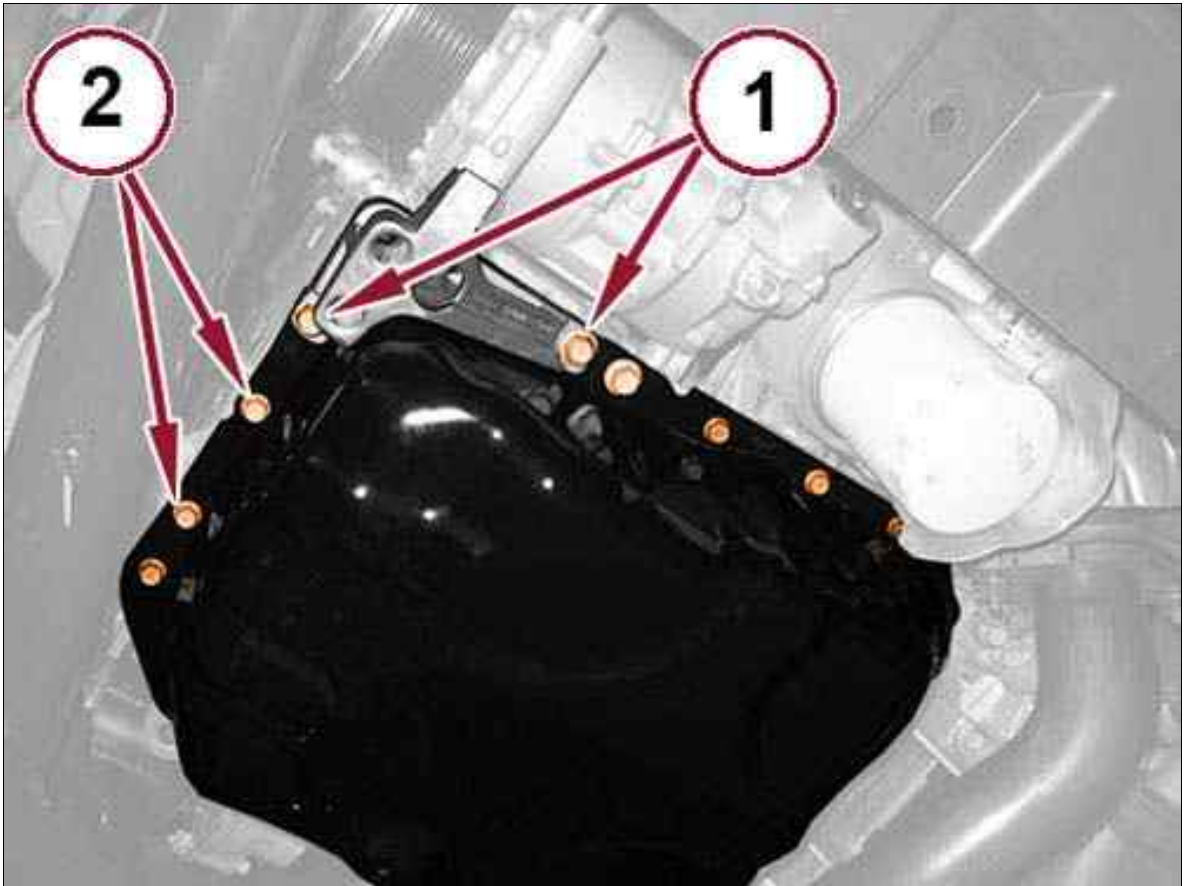
Fig 2: Front Bumper Support Bracket & Bolts



Courtesy of CHRYSLER GROUP, LLC

9. Remove the bolts (1) and the front bumper support bracket.

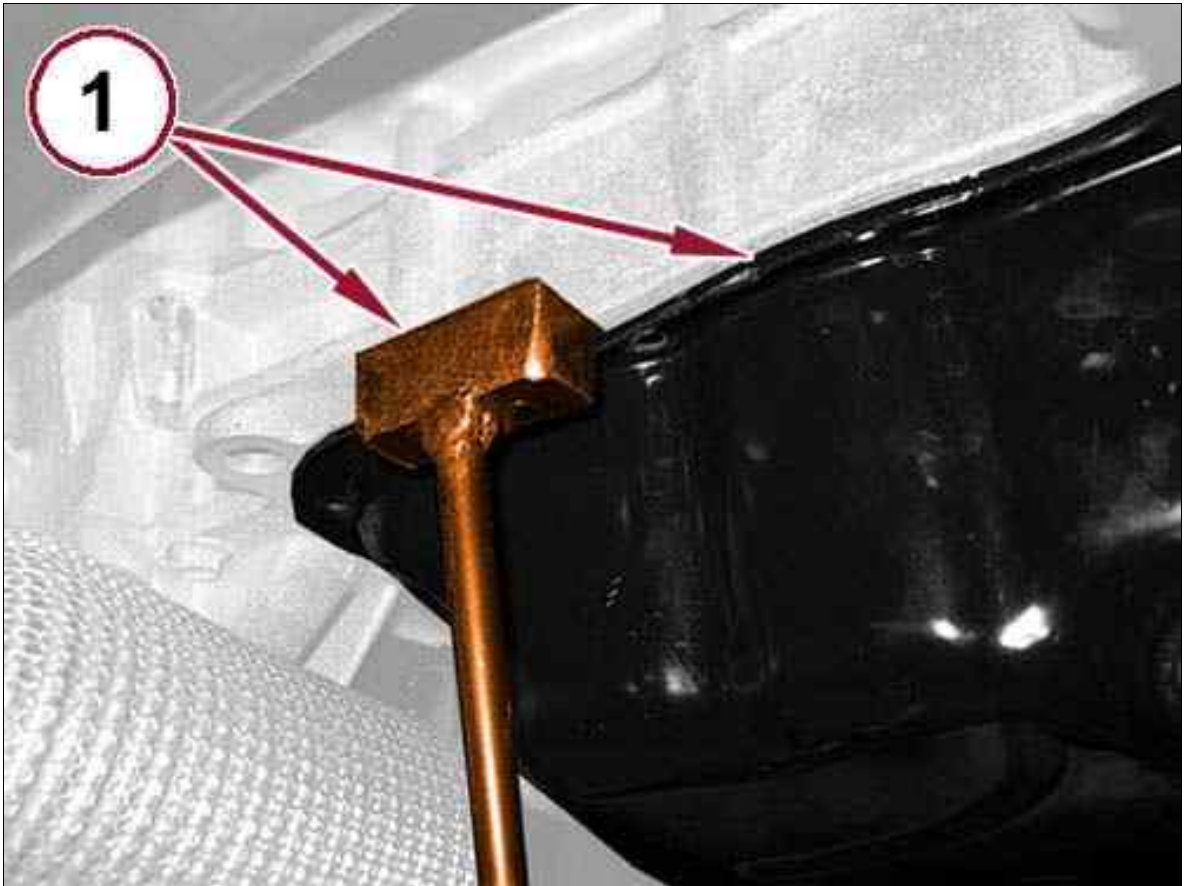
Fig 3: Engine Oil Pan & Bolts



Courtesy of CHRYSLER GROUP, LLC

10. Remove the bolts (1) and the lower A/C compressor mounting bracket.
11. Remove the bolts (2) securing oil pan.

Fig 4: Cutting Sealant Around Perimeter Of Engine Oil Pan Using Special Tool

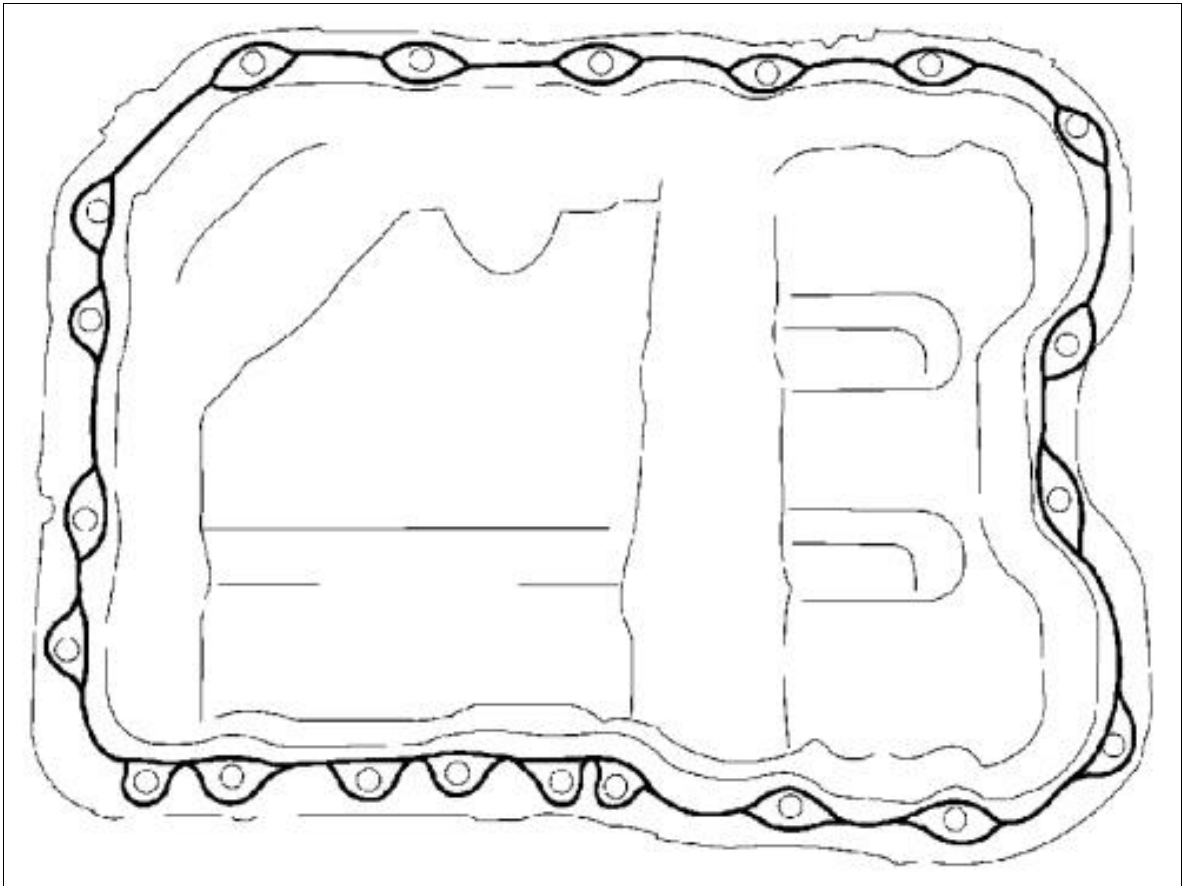


Courtesy of CHRYSLER GROUP, LLC

12. Using the 1870718000 tool (1) to loosen the seal and remove the oil pan from the engine.
13. Remove all residual sealant from the oil pan and engine block.

LUBRICATION > PAN, OIL > REMOVAL AND INSTALLATION > 2.4L MULTI AIR > INSTALLATION

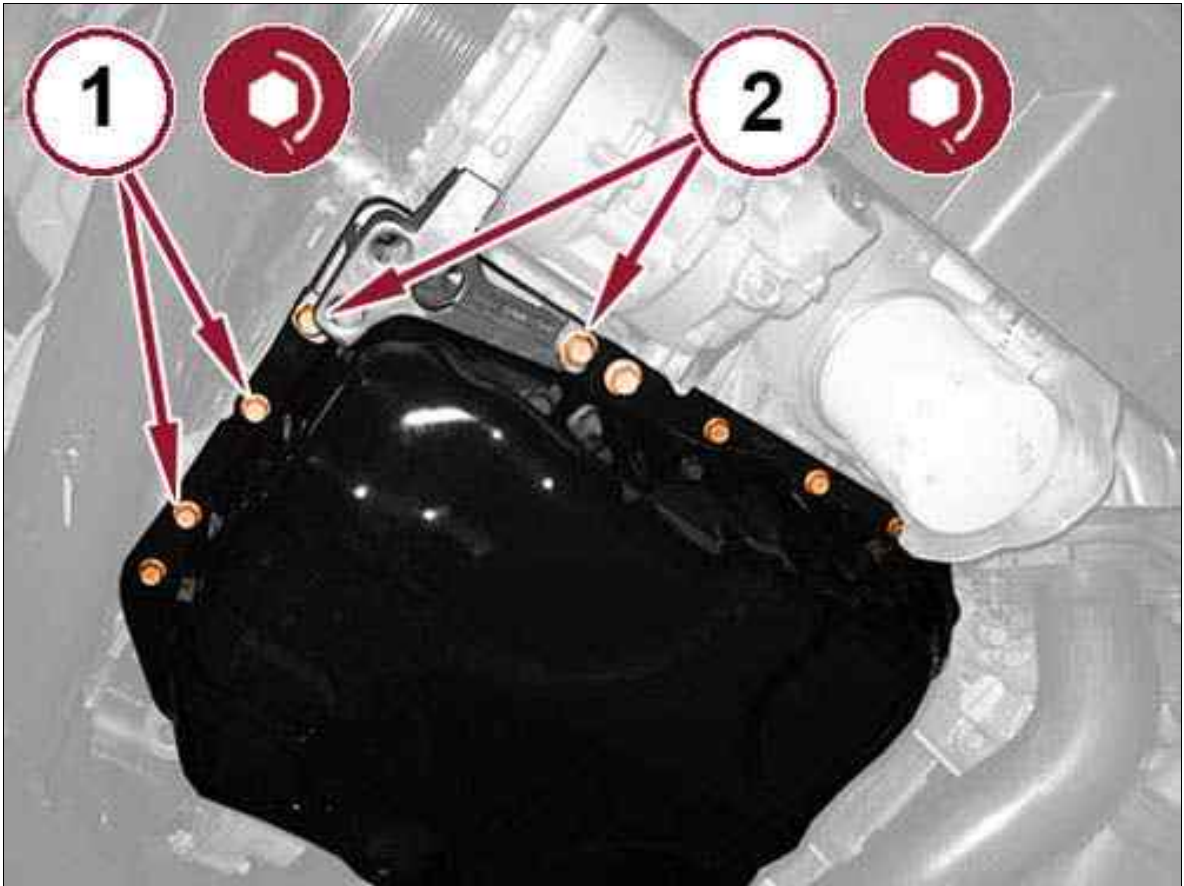
Fig 1: Applying Sealant To Oil Pan



Courtesy of CHRYSLER GROUP, LLC

1. Apply a 2 mm bead of Mopar® Engine Sealant RTV Silicone Rubber Adhesive around the oil pan as shown in illustration.

Fig 2: Engine Oil Pan & Bolts



Courtesy of CHRYSLER GROUP, LLC

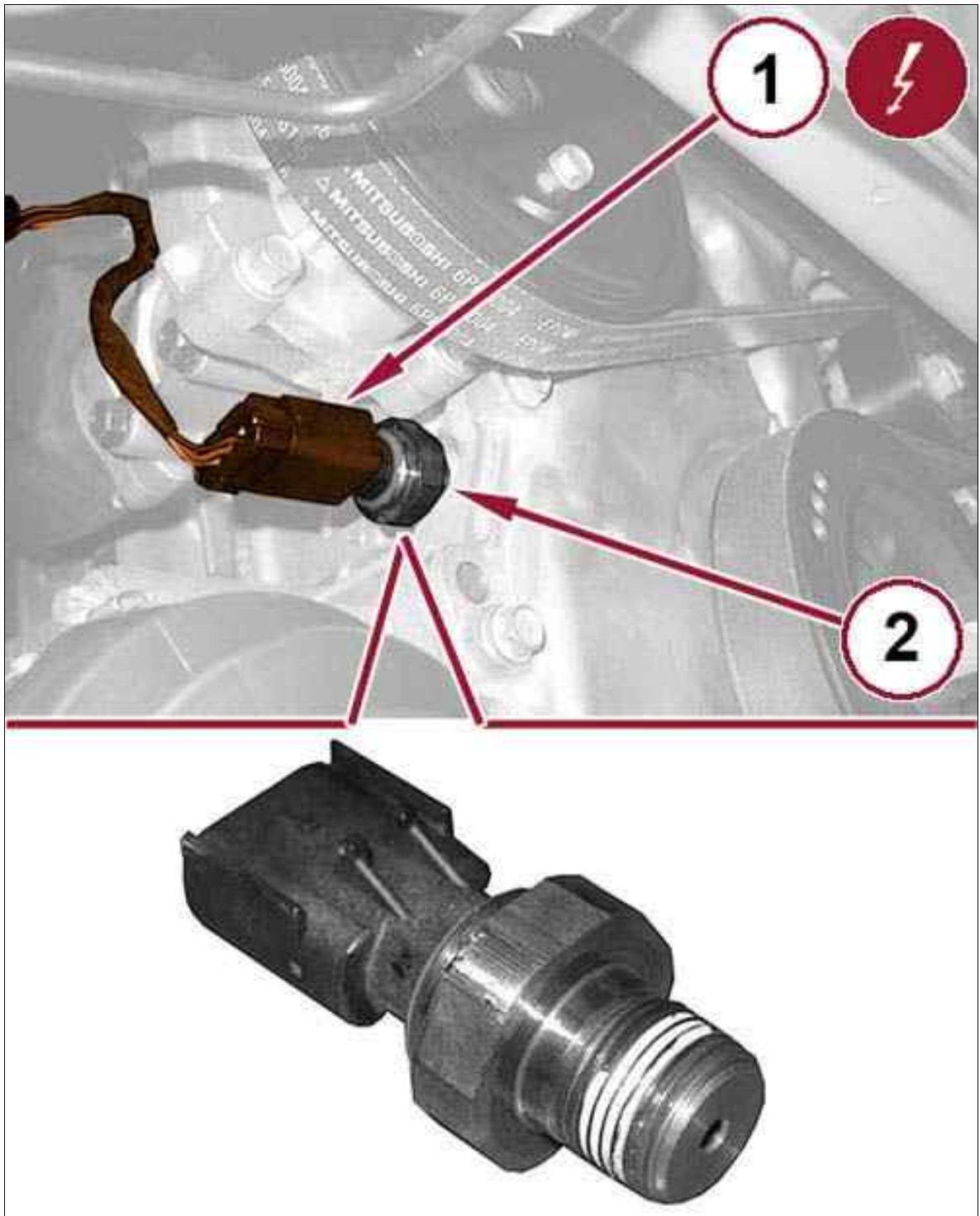
2. Install the oil pan and tighten the bolts (1) to the proper specification. Refer to TORQUE SPECIFICATIONS .
3. Install the A/C compressor mounting bracket and tighten the bolts (2) to the proper specification. Refer to SPECIFICATIONS .
4. Install the front bumper support bracket and securely tighten the bolts.
5. Install the bolts (1) securing the front fascia to the front bumper and securely tighten.
6. Install the vibration damper. Refer to DAMPER, VIBRATION, REMOVAL AND INSTALLATION .
7. Install the serpentine belt. Refer to BELT, SERPENTINE, REMOVAL AND INSTALLATION .
8. Install the oil filter and fill the engine crankcase with the proper oil to the correct level. Refer to FILTER, ENGINE OIL, REMOVAL AND INSTALLATION .
9. Install the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
10. Install the right front wheelhouse splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
11. Install the right front tire and wheel assembly. Refer to REMOVAL AND INSTALLATION .

12. Remove support and lower the vehicle.

LUBRICATION > SENSOR, OIL PRESSURE > REMOVAL AND INSTALLATION > 2.4L MULTI AIR > REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to HOISTING, STANDARD PROCEDURE .
3. Remove the right front tire and wheel assembly. Refer to REMOVAL AND INSTALLATION .
4. Remove the wheelhouse splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .

Fig 1: Oil Pressure Sensor Wire Harness Connector & Oil Pressure Sensor

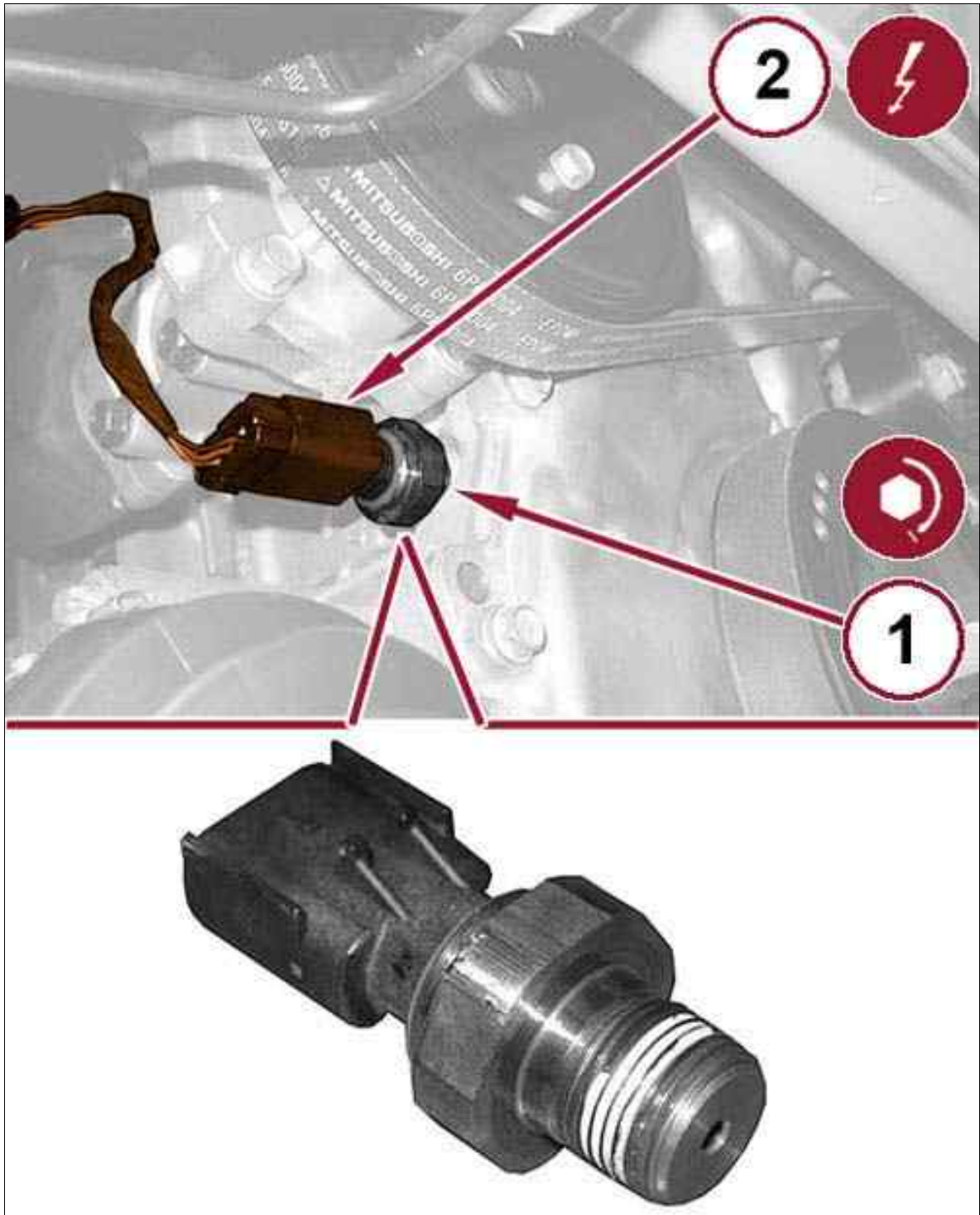


Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the oil pressure sensor wire harness connector (1).
6. Remove the oil pressure sensor (2).

MULTI AIR > INSTALLATION

Fig 1: Oil Pressure Sensor Wire Harness Connector & Oil Pressure Sensor



Courtesy of CHRYSLER GROUP, LLC

1. Install the oil pressure sensor (1) and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS .
2. Connect the oil pressure sensor wire harness connector (2).

3. Install the wheelhouse splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
4. Install the right front tire and wheel assembly. Refer to REMOVAL AND INSTALLATION .
5. Remove the support and lower the vehicle.
6. Connect the negative battery cable.

LUBRICATION > PUMP, ENGINE OIL > REMOVAL AND INSTALLATION > 2.4L > REMOVAL



NOTE:

The engine oil pump is integrated in the front crankshaft cover, refer to the following:

1. Remove the right front wheel and splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
2. Remove the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
3. Remove the engine oil pan. Refer to PAN, OIL, REMOVAL AND INSTALLATION .
4. Remove the serpentine belt tensioner.
5. Remove the crank pulley. Refer to DAMPER, VIBRATION, REMOVAL AND INSTALLATION .

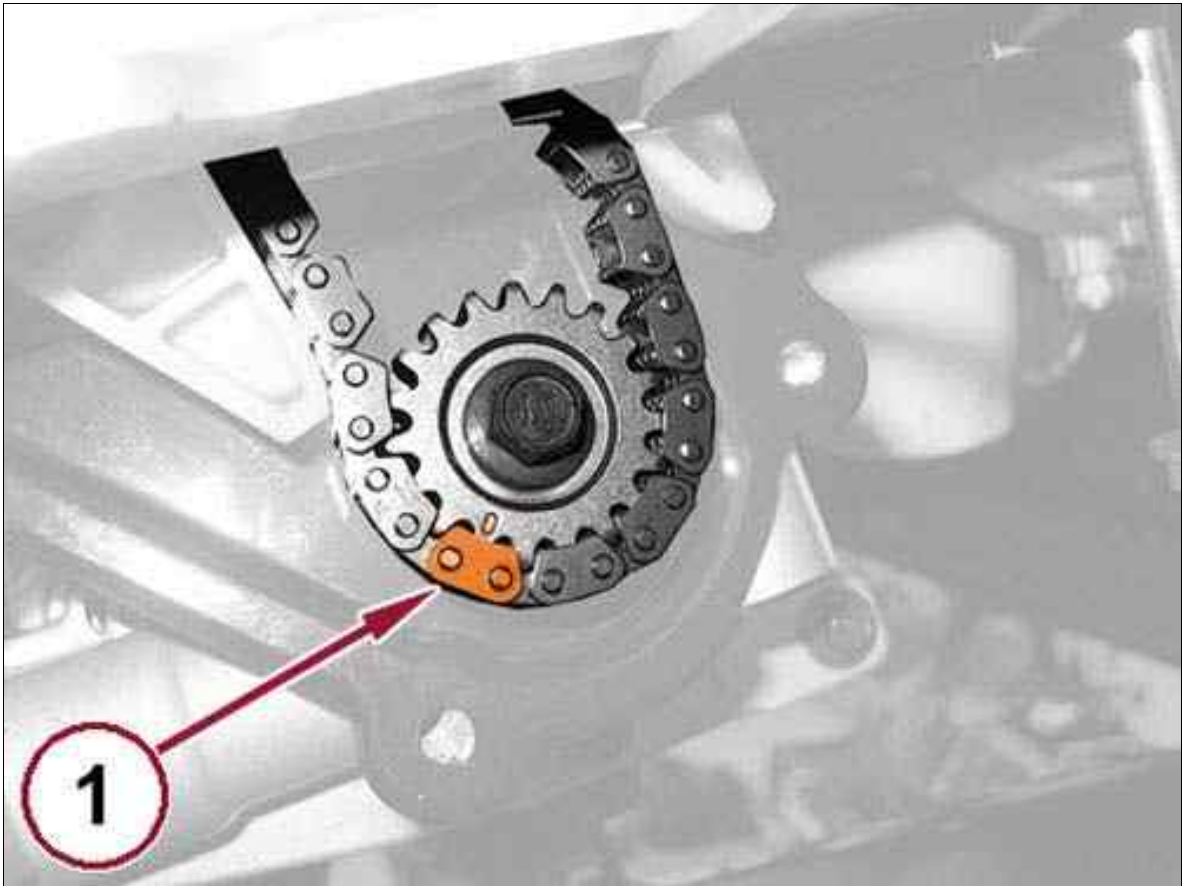
Fig 1: Lower Front Of Oil Pump Chain Control & Bolts



Courtesy of CHRYSLER GROUP, LLC

6. Remove the screws (1) and remove the lower front of the oil pump chain control.

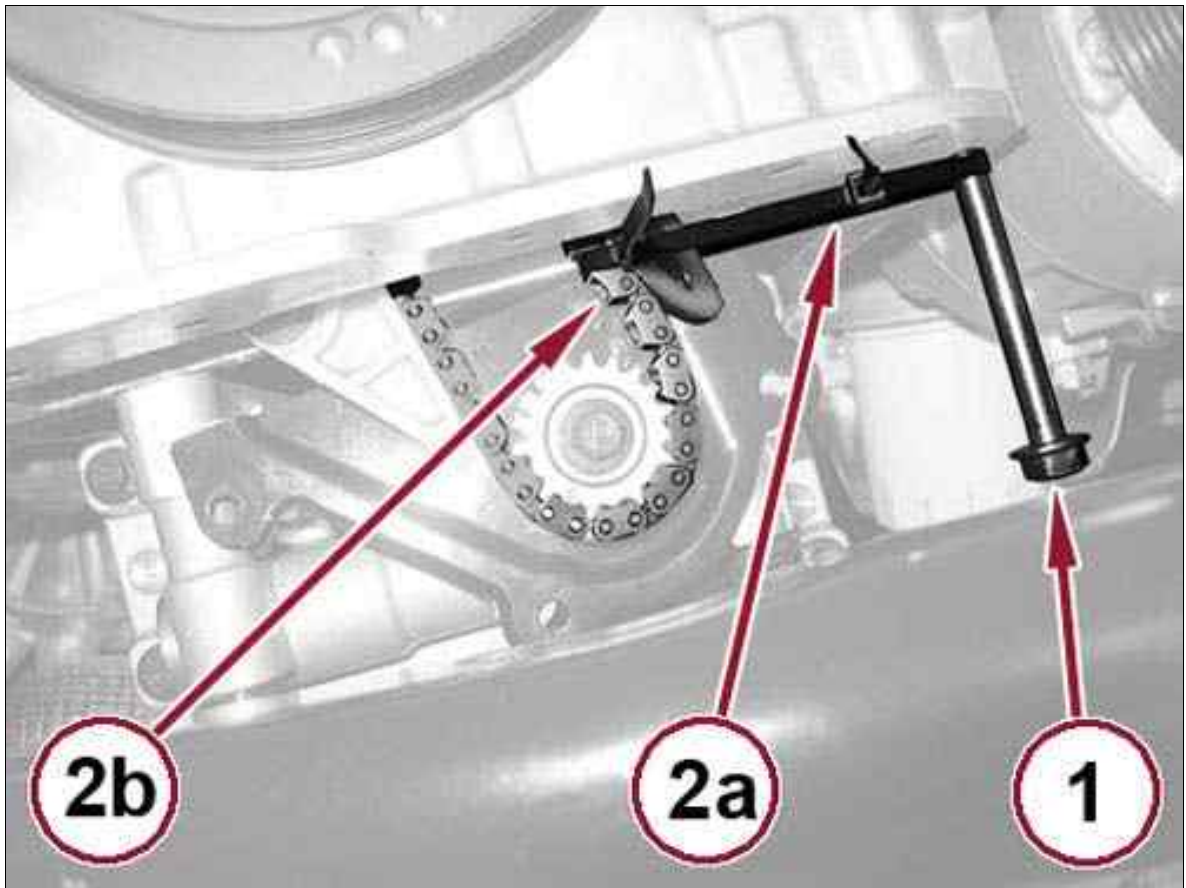
Fig 2: Marking Chain Link Corresponding To Balance Shaft/Oil Pump Sprocket Timing Mark



Courtesy of CHRYSLER GROUP, LLC

7. Mark the link of the oil pump chain (1) at the point marked on the oil pump pulley.

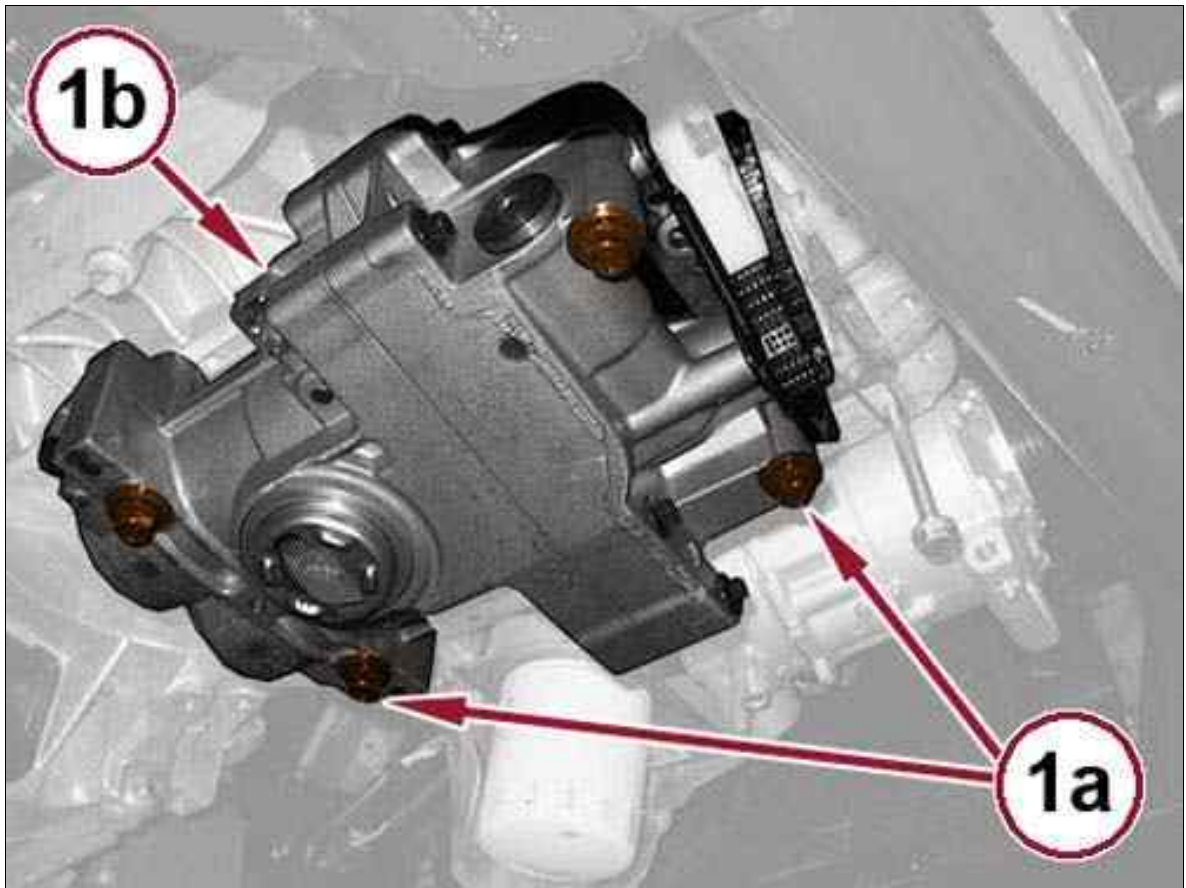
Fig 3: A/C Conditioning Compressor, Oil Pump Chain Link, Clamp & Bolt



Courtesy of CHRYSLER GROUP, LLC

8. Remove the screw at the conditioning compressor at the point shown in illustration (1).
9. With suitable clamp (2a) hook the oil pump chain link (2b) closest to the engine block, and fasten the screw (1). With this operation, the plunger of the automatic tensioner is fully compressed.

Fig 4: Oil Pump Assembly - Balancing Assembly & Bolts

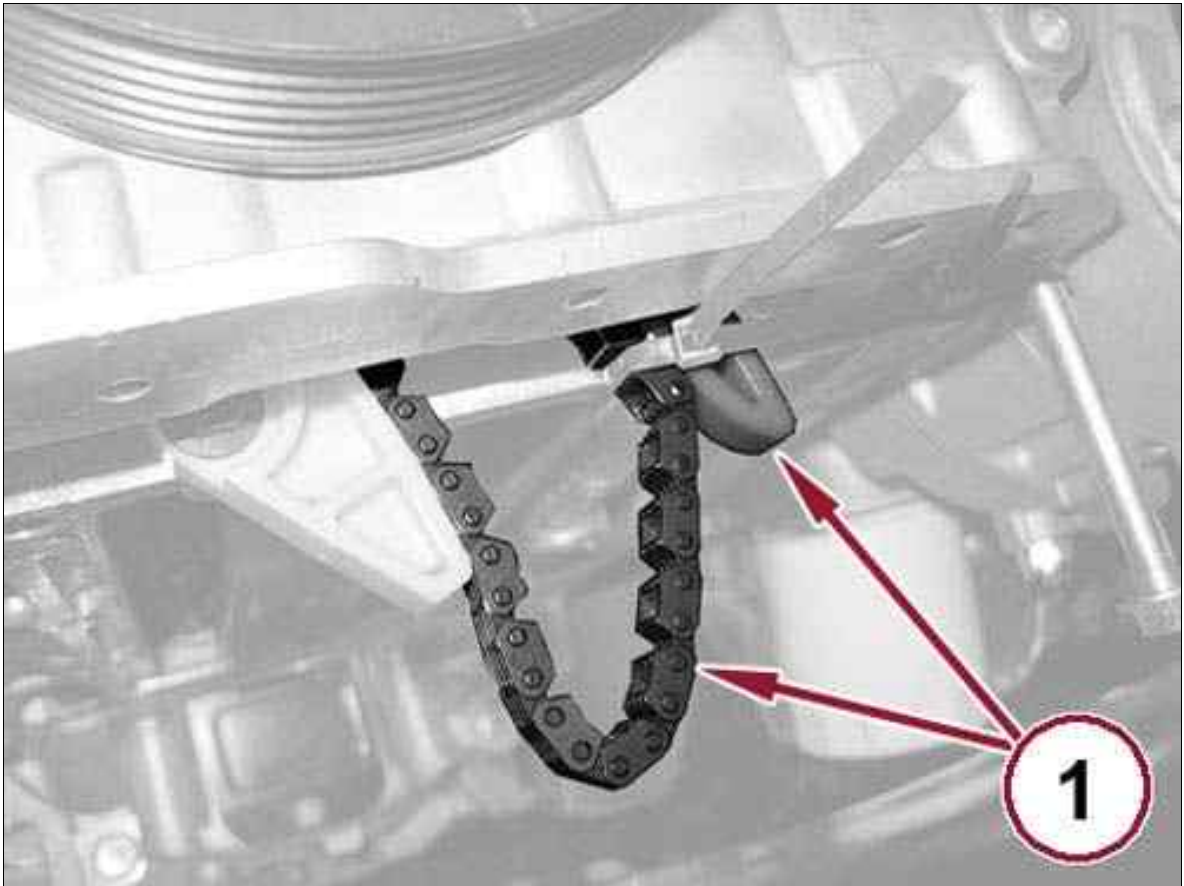


Courtesy of CHRYSLER GROUP, LLC

10. Remove the screws (1a), disengage the chain from the engine oil pump control and remove the oil pump assembly - balancing assembly (1b).

LUBRICATION > PUMP, ENGINE OIL > REMOVAL AND INSTALLATION > 2.4L > INSTALLATION

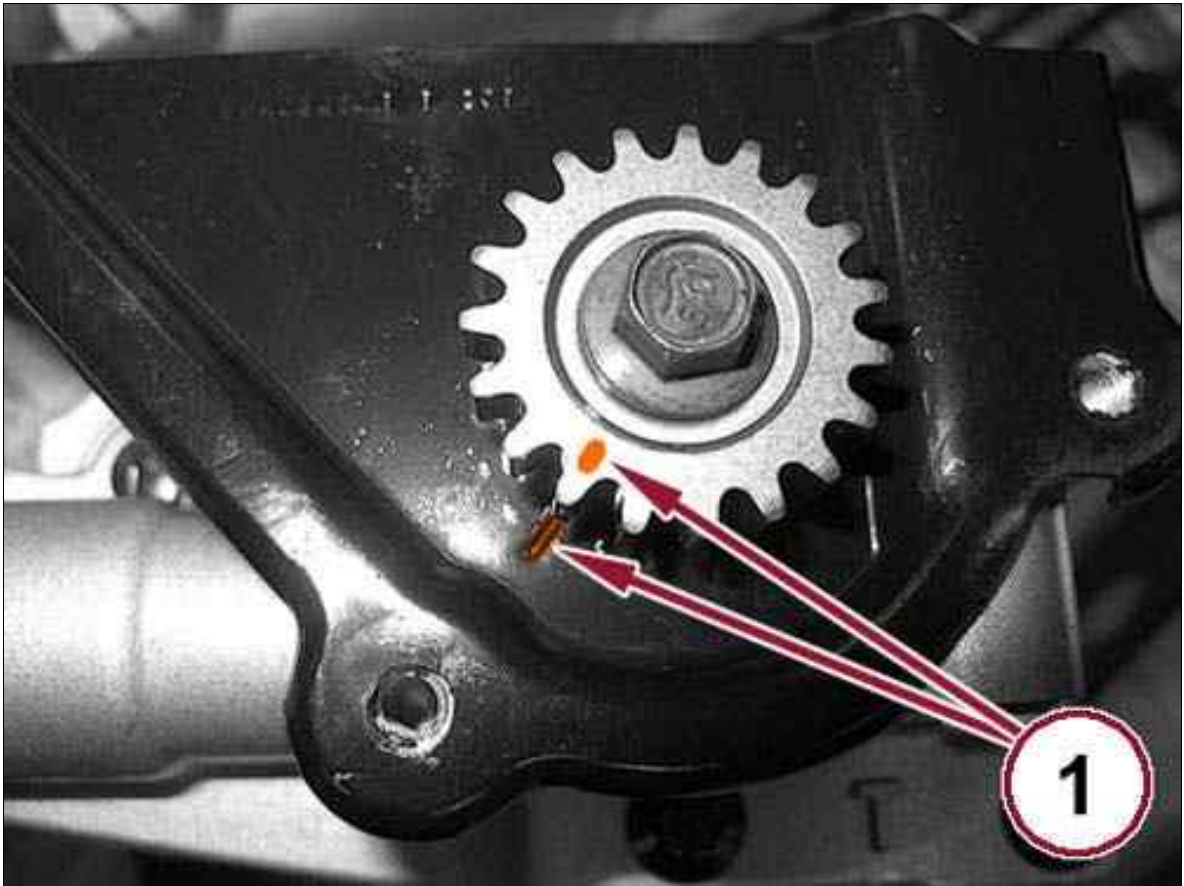
Fig 1: Oil Pump Chain & Shoe



Courtesy of CHRYSLER GROUP, LLC

1. Check that the oil pump chain and shoe (1) are in the position shown in the figure.

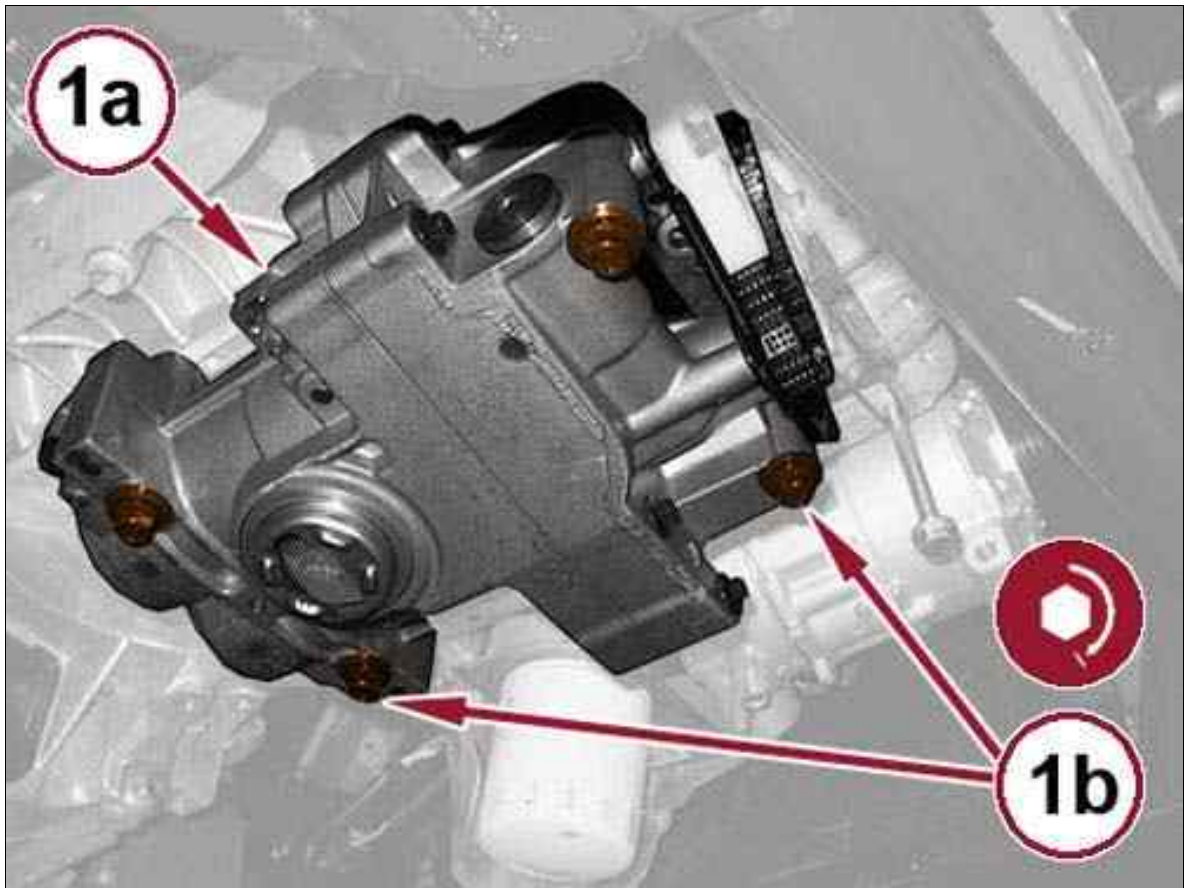
Fig 2: Ensure Point Marked On Oil Pump Gear Is Aligned With Notch On Inside Cover



Courtesy of CHRYSLER GROUP, LLC

2. Check that the point marked on oil pump gear is in aligned (1) with the notch on the inside cover.

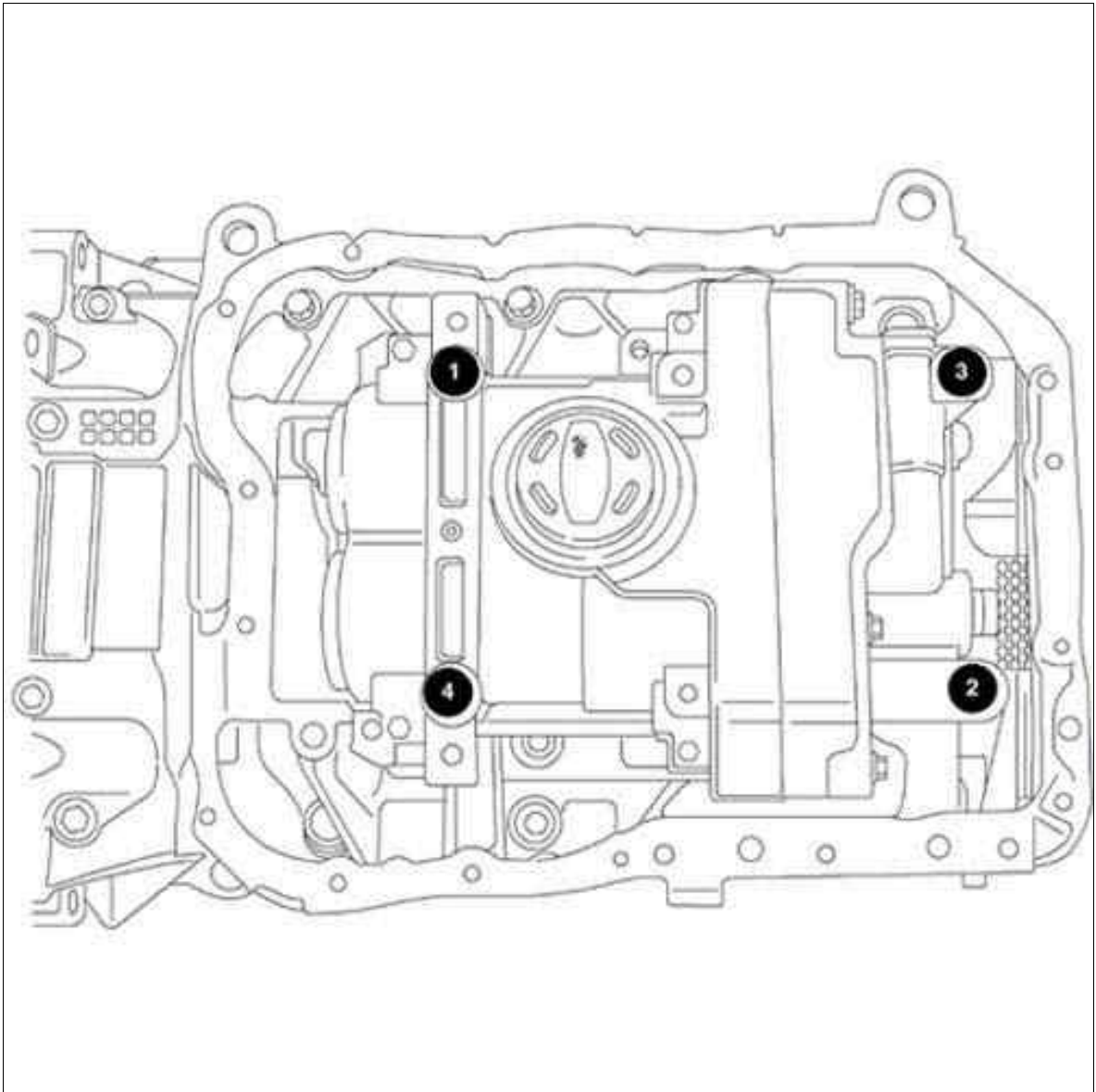
Fig 3: Oil Pump Motor - Balancing Assembly & Bolts



Courtesy of CHRYSLER GROUP, LLC

3. Install the complete oil pump motor - balancing assembly (1a) engaging the chain and tightening the screws (1b) to the proper specification. Refer to TORQUE SPECIFICATIONS .

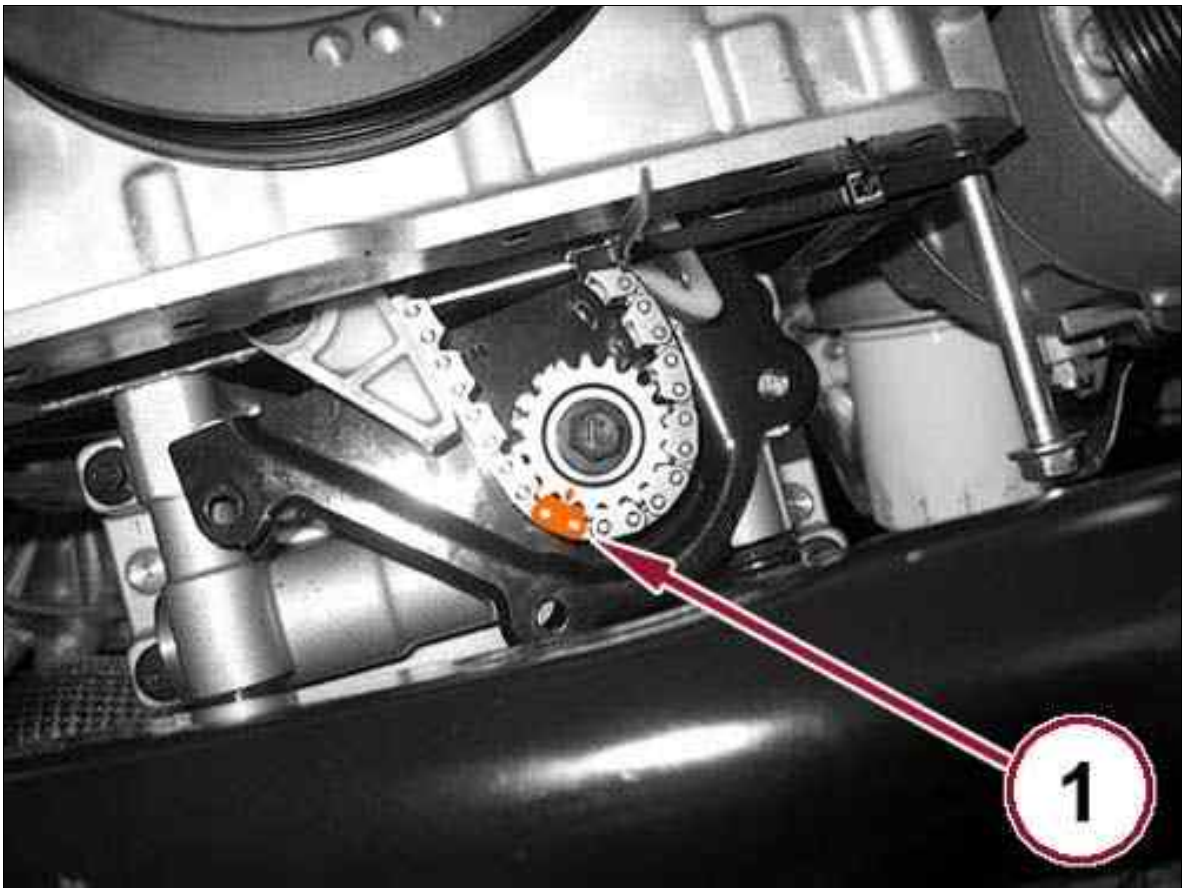
Fig 4: Oil Pump - Balancing Assembly Bolt Tightening Sequence



Courtesy of CHRYSLER GROUP, LLC

4. To tighten the screws of the complete oil pump - balancing assembly, follow the order as shown in illustration.

Fig 5: Ensuring Timing Marks Between Oil Pump Gear And Oil Pump Chain Motor Are Aligned



Courtesy of CHRYSLER GROUP, LLC

5. Check that the timing marks between the oil pump gear and oil pump chain motor are aligned (1).
6. Remove the clamp and the screw used to draw back the piston of the automatic tensioner.
7. Install the oil pump chain motor front cover and tighten the screws.
8. Install the engine oil pan. Refer to PAN, OIL, REMOVAL AND INSTALLATION .
9. Install the crank pulley. Refer to DAMPER, VIBRATION, REMOVAL AND INSTALLATION .
10. Install the serpentine drive belt tensioner.
11. Install the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
12. Install the right front wheel and splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
13. Remove the vehicle from the lift.
14. Install the front cover crankshaft oil seal. Refer to SEAL, CRANKSHAFT OIL, FRONT, REMOVAL AND INSTALLATION .

LUBRICATION > SENSOR, OIL TEMPERATURE > REMOVAL AND INSTALLATION > 2.4L > REMOVAL

1. Disconnect the negative battery cable.
2. Remove the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
3. Remove the clean air tube assembly.

Fig 1: Oil Temperature Sensor Electrical Connector



Courtesy of CHRYSLER GROUP, LLC

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

Fig 2: Removing & Installing Oil Temperature Sensor At MULTIAIR Actuator

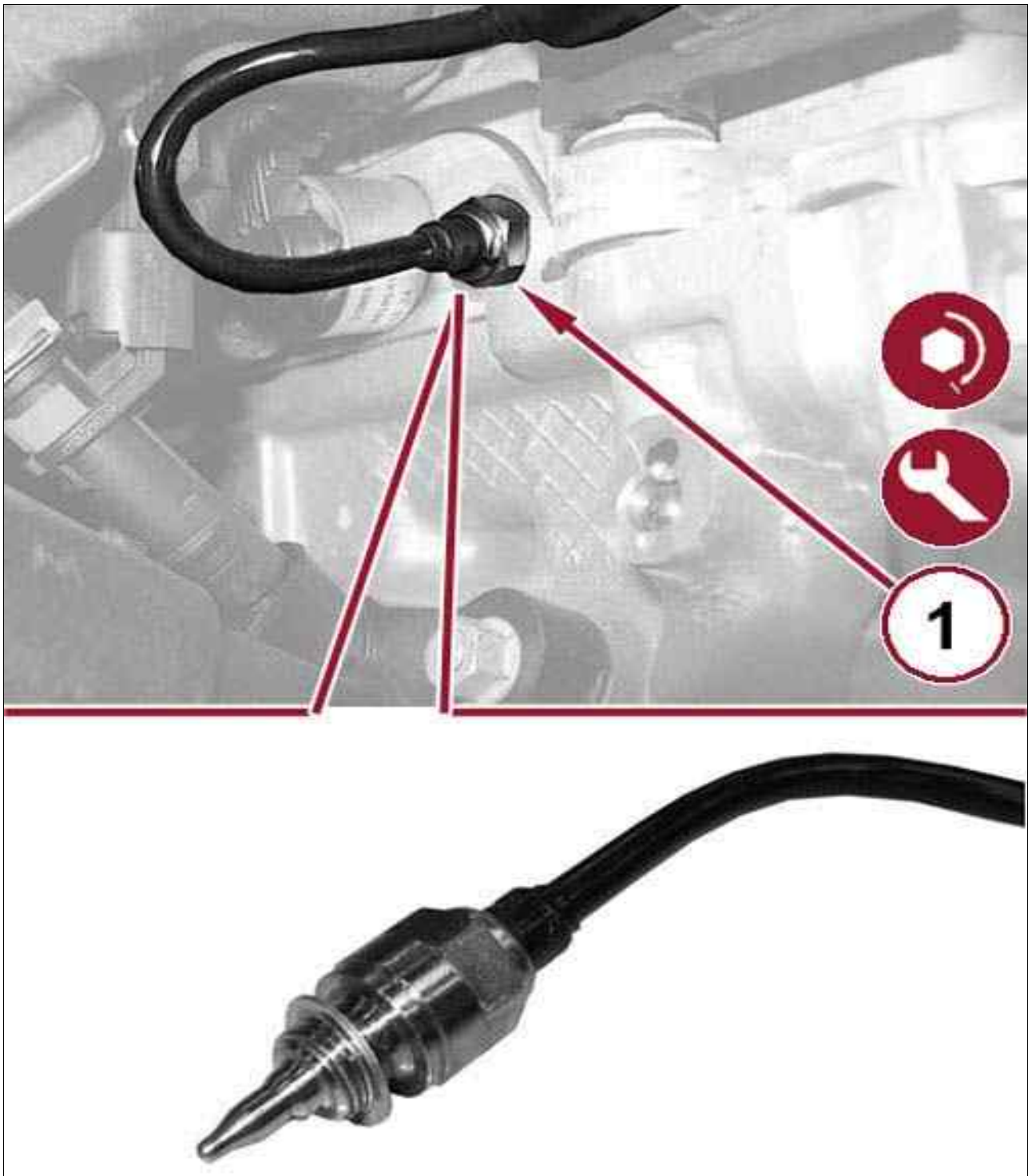


Courtesy of CHRYSLER GROUP, LLC

5. With tool 2000034800, unscrew and remove the oil temperature sensor from the MULTIAIR actuator (1).

**LUBRICATION > SENSOR, OIL TEMPERATURE > REMOVAL AND INSTALLATION >
2.4L > INSTALLATION**

Fig 1: Removing & Installing Oil Temperature Sensor At MULTIAIR Actuator



Courtesy of CHRYSLER GROUP, LLC

1. With tool 2000034800 mount the oil temperature sensor in the MULTIAIR actuator and tighten to the proper specification. Refer to TORQUE SPECIFICATIONS .
2. Connect the oil temperature sensor electrical connector.
3. Install the clean air tube assembly.
4. Install the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .

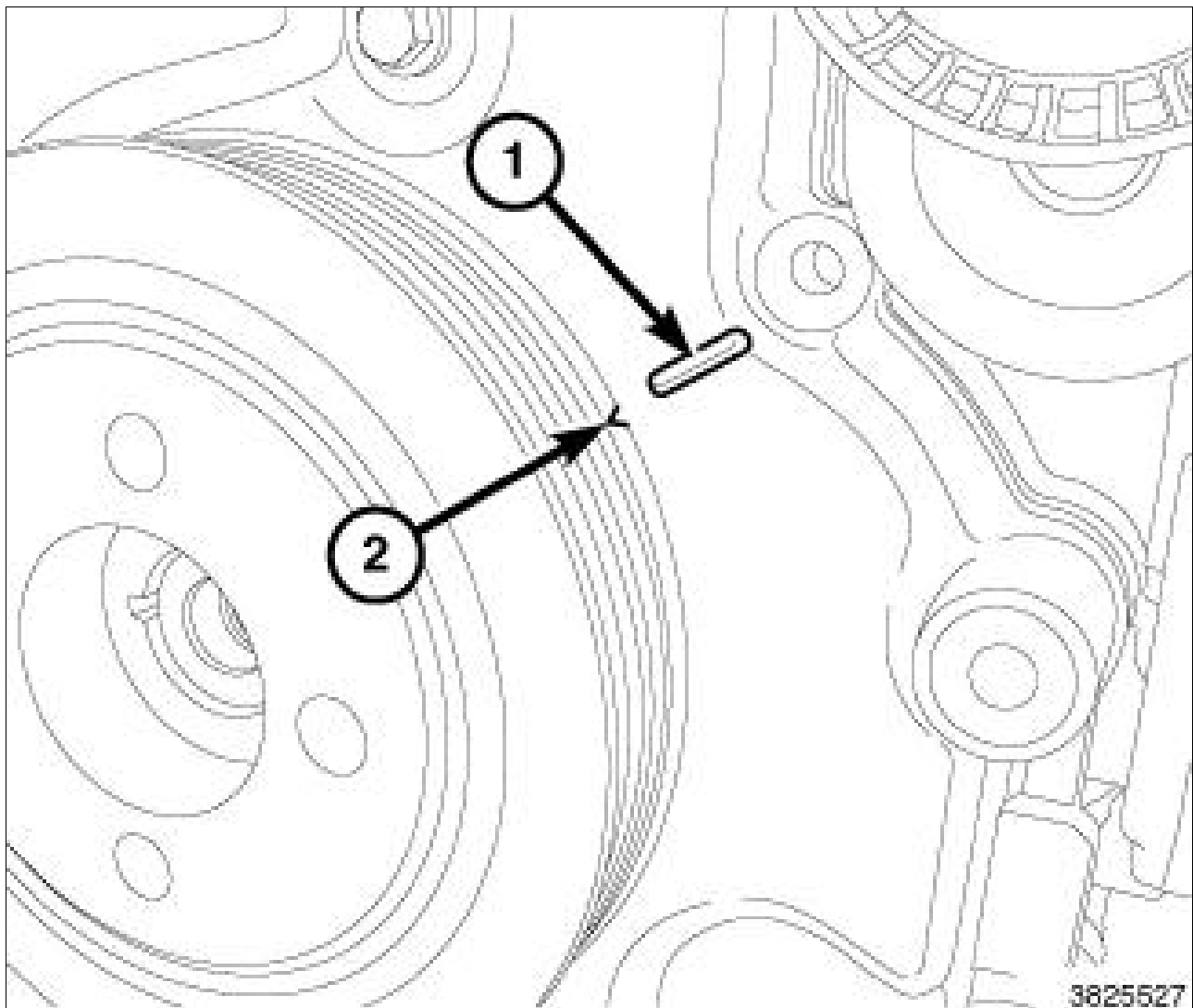
5. Connect the negative battery cable.

VALVE TIMING > STANDARD PROCEDURE > 2.4L - VALVE TIMING VERIFICATION

 CAUTION:

Painted or colored chain links are used during initial engine assembly and can not be relied upon for valve timing verification. Only use top-dead-center marks, cylinder head cover mounting surface and camshaft sprocket marks to verify valve timing or engine damage may result.

Fig 1: Timing Cover Mark & Notch



Courtesy of CHRYSLER GROUP, LLC

Correct timing is critical for the NON free-wheeling designed engine. Engine timing can be verified by using the following procedures:

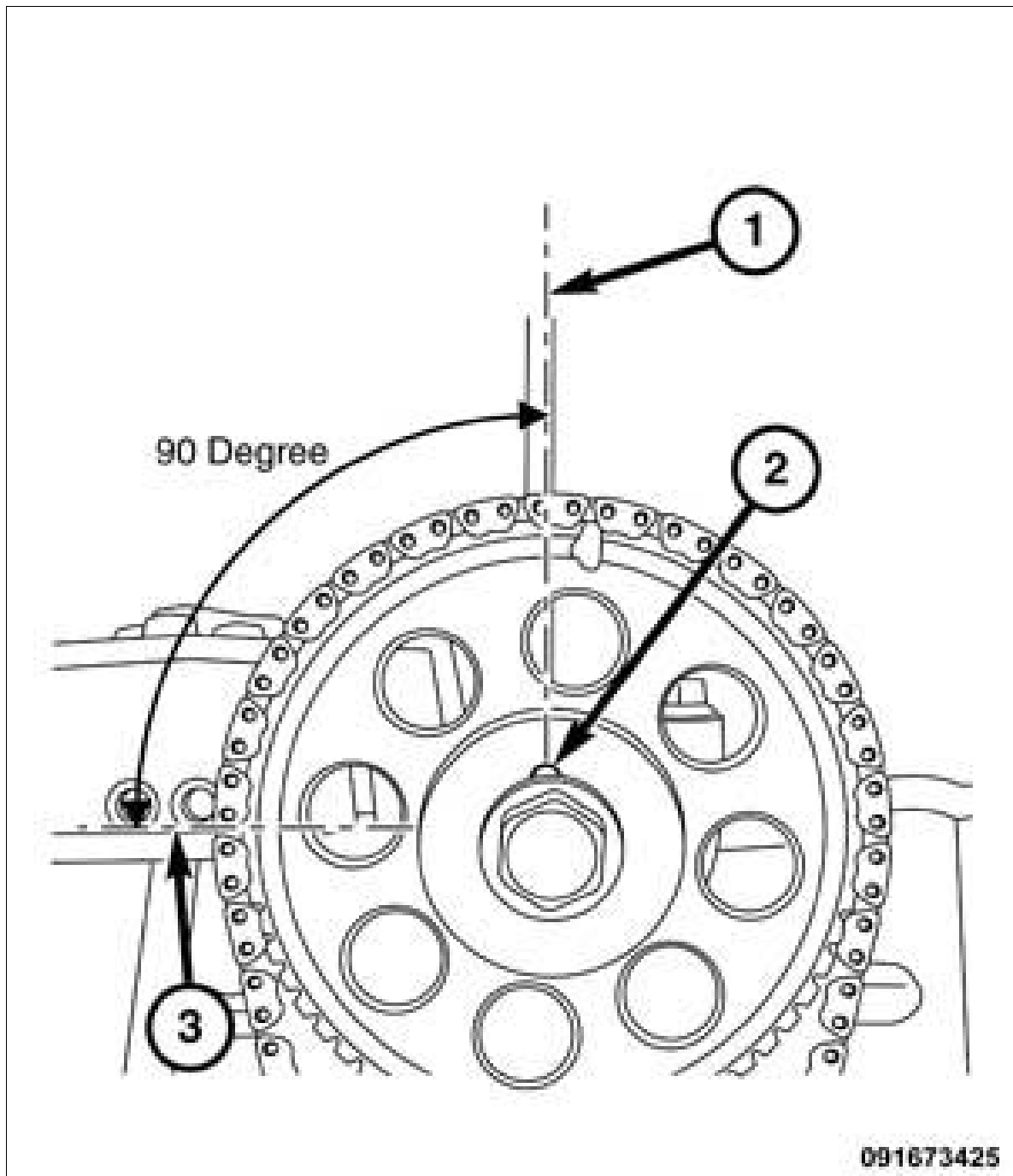
1. Remove the cylinder head cover. Refer to COVER(S), CYLINDER HEAD .
2. Remove the spark plugs. Refer to SPARK PLUG, REMOVAL AND INSTALLATION .

 CAUTION:

When aligning timing marks, always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.

3. Rotate the crankshaft clockwise (as viewed from the front) to align the timing cover mark (1) with the damper notch (2) to place the number one cylinder piston at top-dead-center on the compression stroke.

Fig 2: Vertical Center Line Of Camshaft, Dowel & Cylinder Head



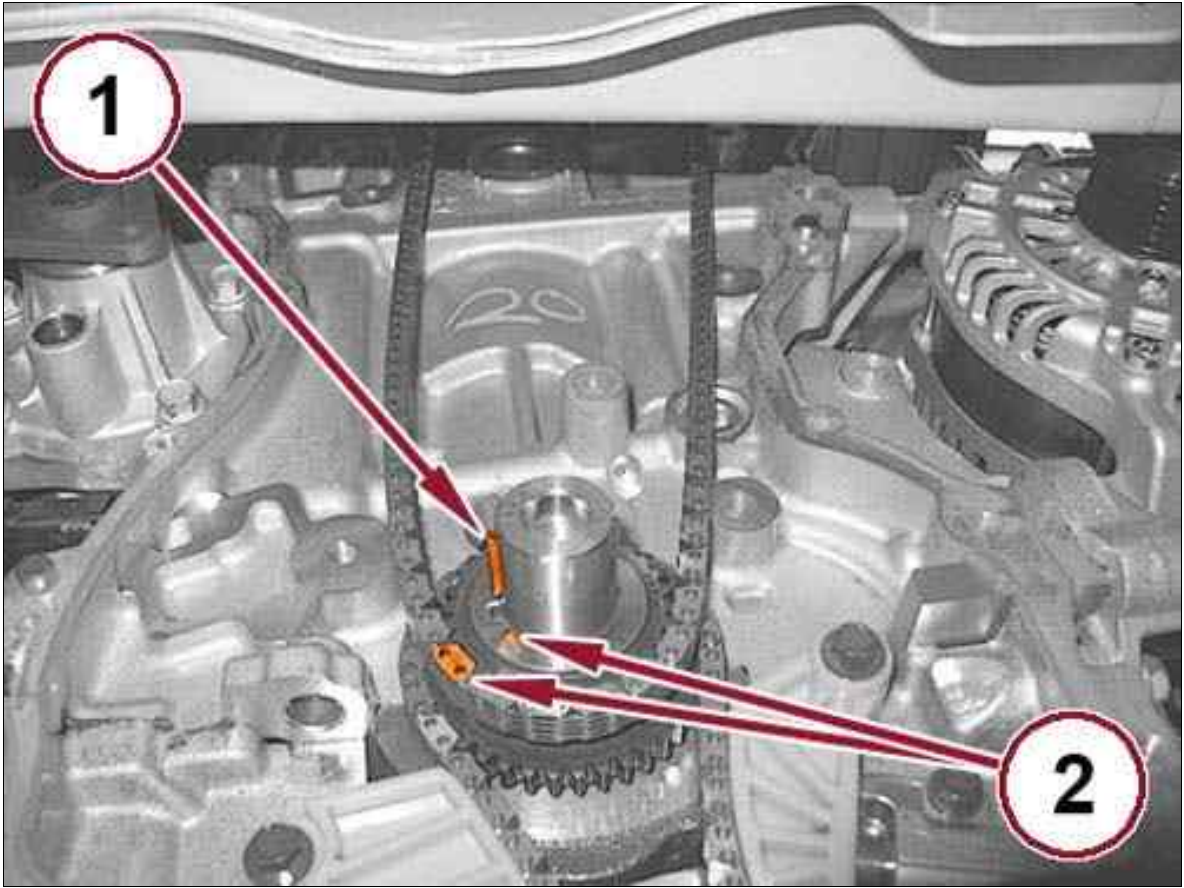
Courtesy of CHRYSLER GROUP, LLC

4. While maintaining this alignment, verify that the **dowel window** (2) on the camshaft sprocket point toward 12 o'clock.
5. Using a straightedge tool (1), place the tool vertically at the center of the cam gear. Using the top edge of the cylinder head (3) as a reference point, the angle between the straightedge and the cylinder head needs to be 90°.
6. If the engine timing is not correct, proceed to CHAIN AND SPROCKETS, TIMING for service procedures.

VALVE TIMING > CHAIN AND SPROCKETS, TIMING > REMOVAL AND INSTALLATION > TIMING CHAIN > REMOVAL

1. Remove the engine beauty cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
2. Remove the right front wheel and splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
3. Remove the engine cylinder head cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL AND INSTALLATION .
4. Remove the air cleaner assembly. Refer to BODY, AIR CLEANER, REMOVAL AND INSTALLATION .
5. Remove the water pump pulley bolts and remove the pulley. Refer to PUMP, WATER, REMOVAL AND INSTALLATION .
6. Remove the vibration damper. Refer to DAMPER, VIBRATION, REMOVAL AND INSTALLATION .
7. Remove the timing chain cover. Refer to COVER(S), ENGINE TIMING, REMOVAL AND INSTALLATION .
8. Remove the timing chain tensioner. Refer to TENSIONER, ENGINE TIMING, REMOVAL AND INSTALLATION .
9. Remove the timing chain fixed and movable tensioner guides. Refer to GUIDES, TIMING CHAIN, REMOVAL AND INSTALLATION .

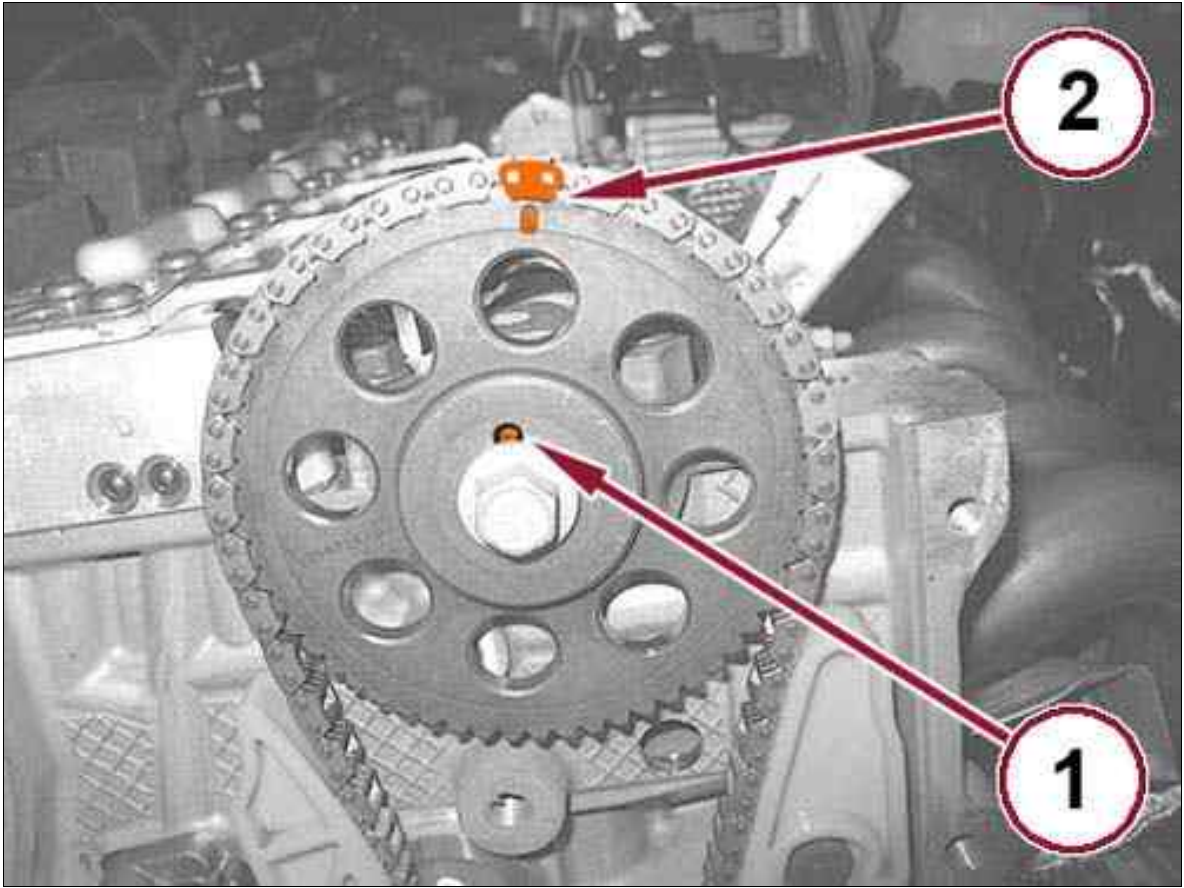
Fig 1: Positioning Crankshaft Key At "9" O-Clock Position & Marking Chain Link At Point Marked On Crankshaft Gear



Courtesy of CHRYSLER GROUP, LLC

10. Check that the crankshaft key is in the "9 o'clock" position (1).
11. Using the same chain, mark the link of the chain that is at the point marked (2) on the drive gear.

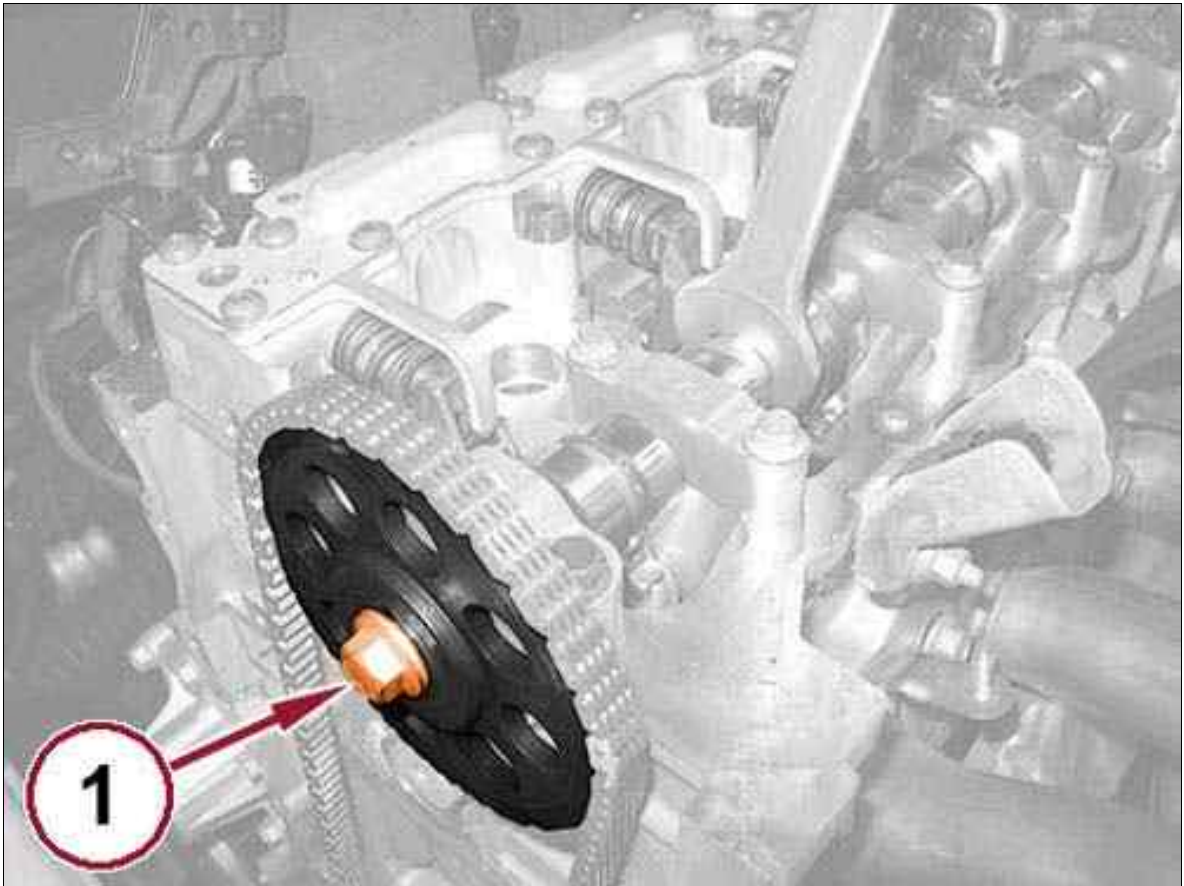
Fig 2: Positioning Camshaft Centering Pin At "12" O-Clock Position & Marking Chain Link At Point Marked On Camshaft Sprocket



Courtesy of CHRYSLER GROUP, LLC

12. Check that the camshaft centering pin (1) is in the "12 o'clock" position".
13. Using the same chain, mark the link of the chain (2) that corresponds with the notch on the camshaft sprocket.

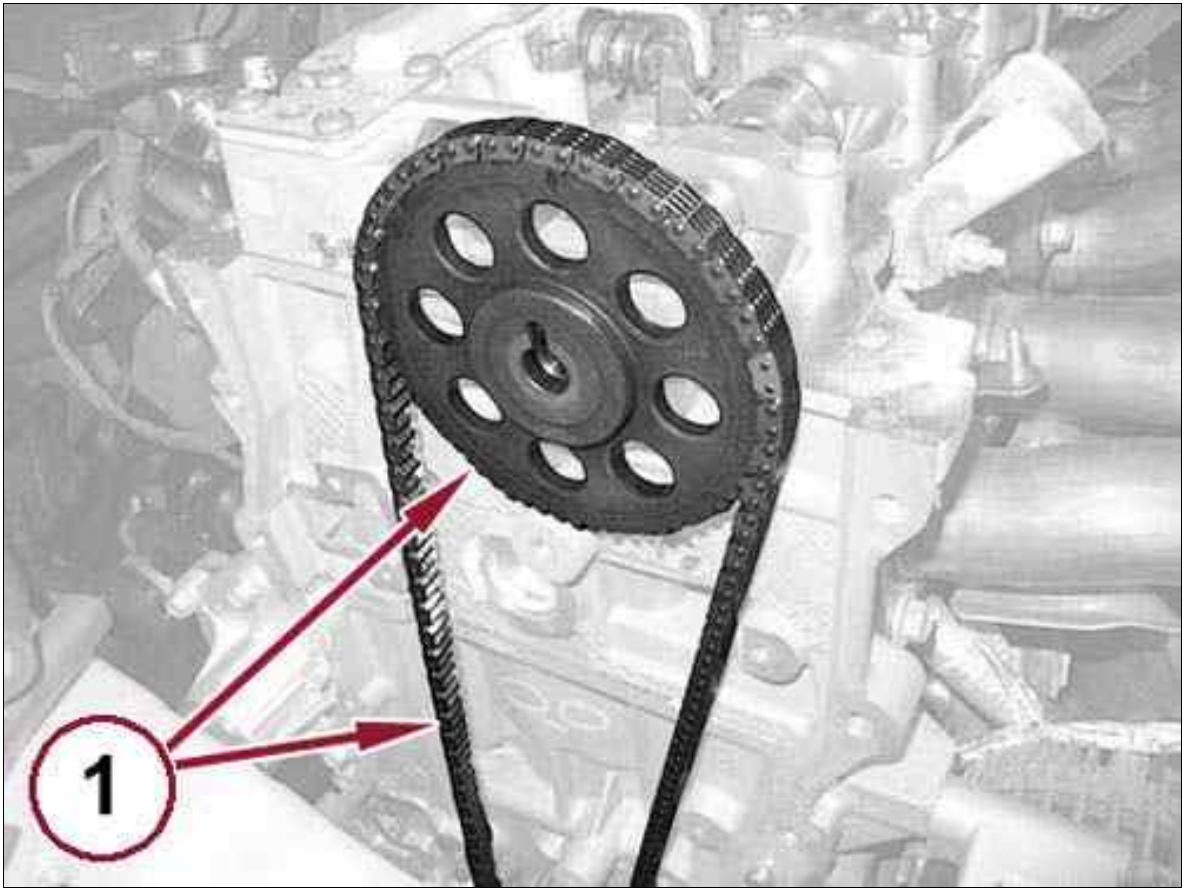
Fig 3: Camshaft Sprocket & Bolt



Courtesy of CHRYSLER GROUP, LLC

14. Remove the camshaft sprocket screw (1).

Fig 4: Camshaft Sprocket & Chain

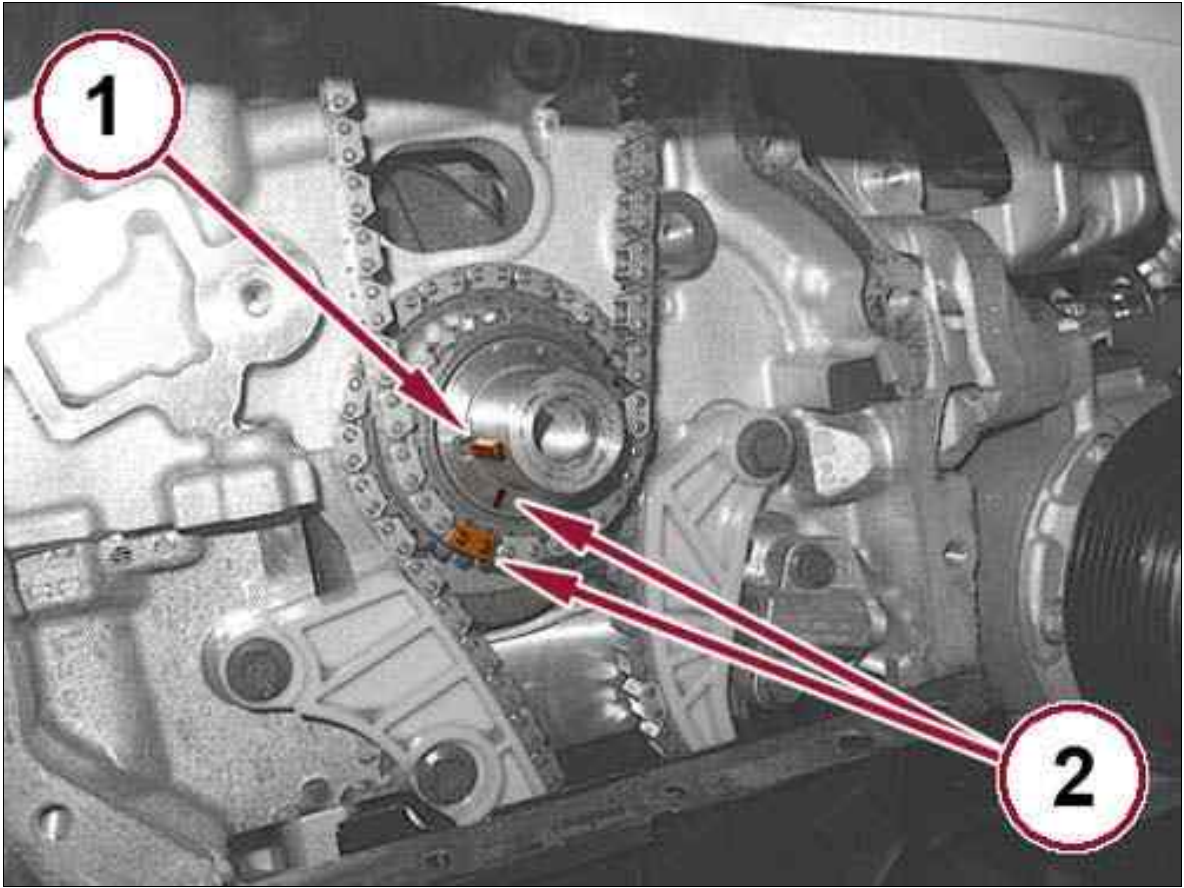


Courtesy of CHRYSLER GROUP, LLC

15. Disengage the camshaft sprocket (1) from the shaft and remove it along with the chain.

**VALVE TIMING > CHAIN AND SPROCKETS, TIMING > REMOVAL AND INSTALLATION
> TIMING CHAIN > INSTALLATION**

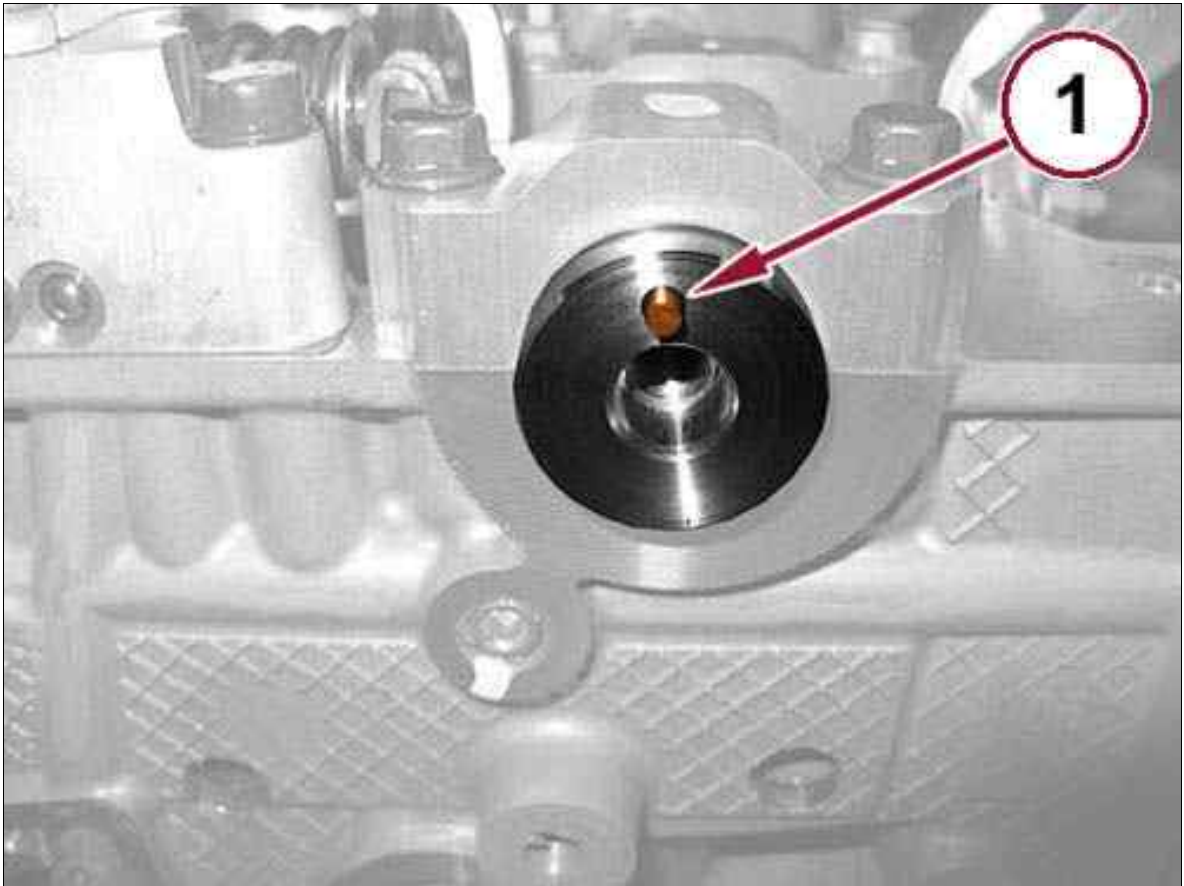
Fig 1: Positioning Crankshaft Key At "9" O-Clock Position & Marking Chain Link At Point Marked On Crankshaft Gear



Courtesy of CHRYSLER GROUP, LLC

1. Verify that the crankshaft key is in the "9 o'clock" in correspondence with the surfaces of contact between the lower and upper crankcase.
2. Install the chain, align the drive gear with the painted link. If you mount a new chain, the alignment reference is yellow.

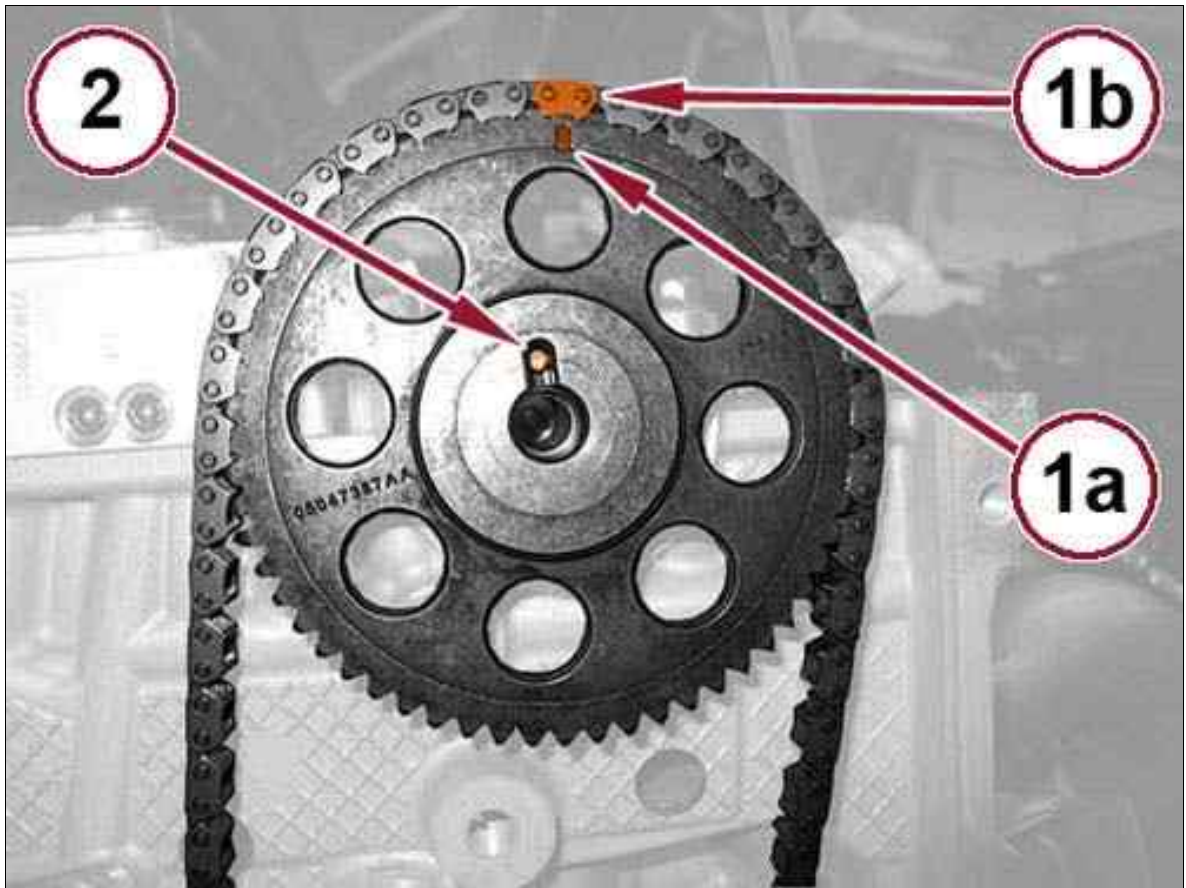
Fig 2: Placing Alignment Mark In "12" O-Clock Position



Courtesy of CHRYSLER GROUP, LLC

3. Check that the alignment mark (1) is in the "12 o'clock" position.

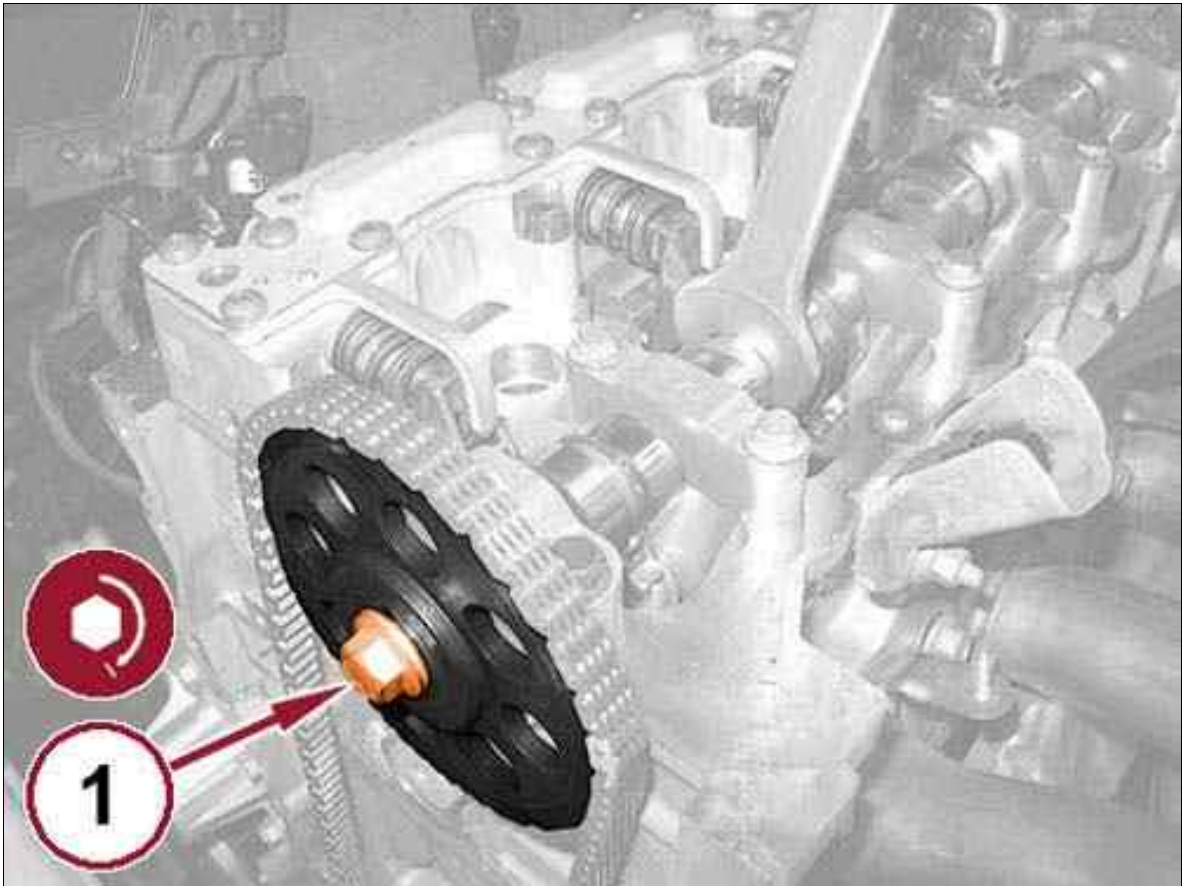
Fig 3: Matching Camshaft Sprocket Gear Notch To Marked Link



Courtesy of CHRYSLER GROUP, LLC

4. Fit the chain on the camshaft sprocket by matching the gear notch (1a) with the marked link (1b). If you mount a new chain, the alignment reference is yellow.
5. Install the camshaft sprocket pin.

Fig 4: Camshaft Sprocket Bolt

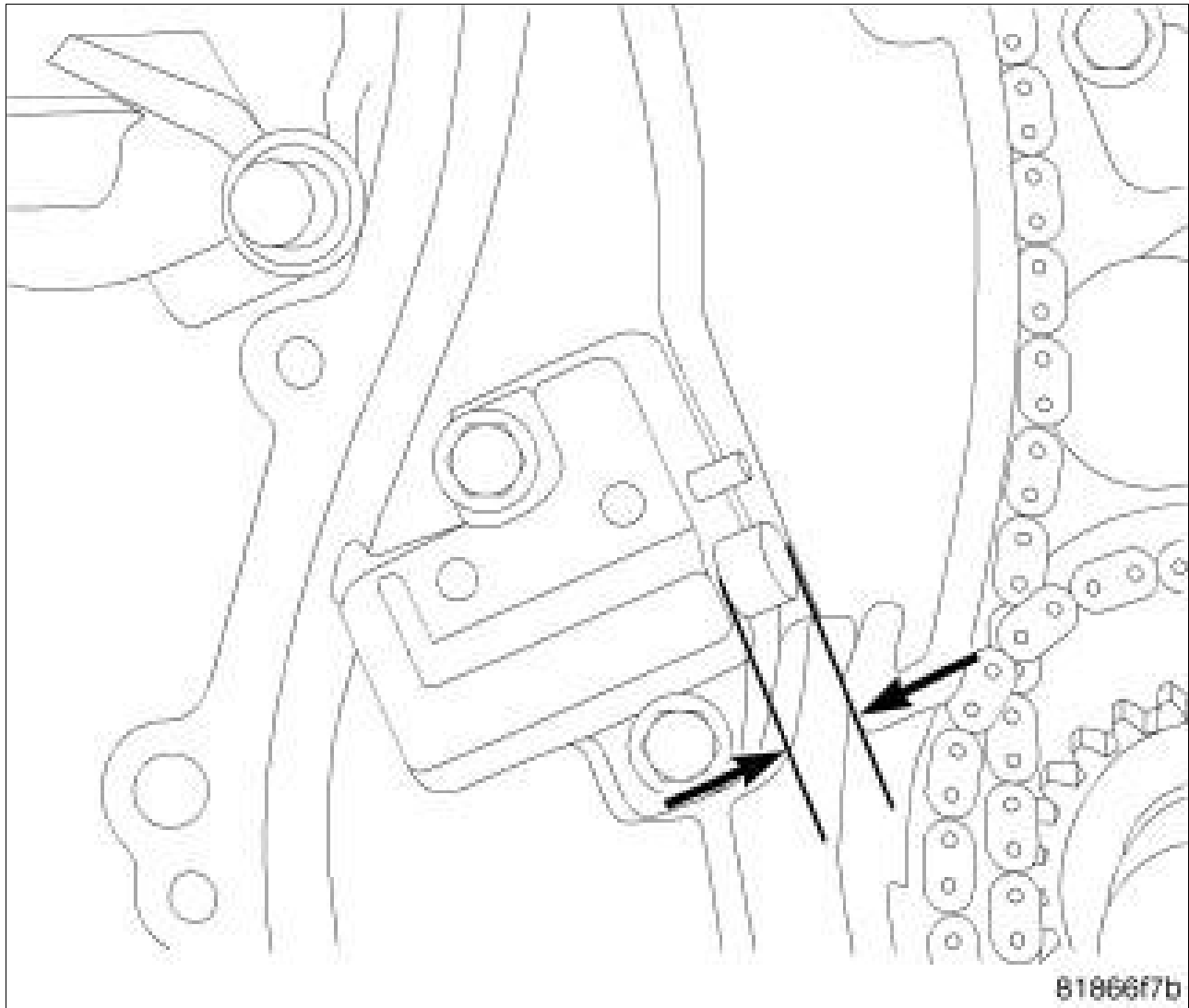


Courtesy of CHRYSLER GROUP, LLC

6. Tighten the camshaft sprocket bolt (1) to the proper specification. Refer to SPECIFICATIONS .
7. Install the timing chain fixed and movable tensioner guides. Refer to GUIDES, TIMING CHAIN, REMOVAL AND INSTALLATION .
8. Install the timing chain tensioner. Refer to TENSIONER, ENGINE TIMING, REMOVAL AND INSTALLATION .
9. Install the timing chain cover. Refer to COVER(S), ENGINE TIMING, REMOVAL AND INSTALLATION .
10. Install the crankshaft pulley. Refer to DAMPER, VIBRATION, REMOVAL AND INSTALLATION .
11. Install the water pump pulley. Refer to PUMP, WATER, REMOVAL AND INSTALLATION .
12. Install the air cleaner assembly. Refer to BODY, AIR CLEANER, REMOVAL AND INSTALLATION .
13. Install the engine cylinder head cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL AND INSTALLATION .
14. Install the right front wheel and splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
15. Install the engine beauty cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .

VALVE TIMING > CHAIN AND SPROCKETS, TIMING > INSPECTION > INSPECTION

Fig 1: Measuring Distance From Tensioner Body To Edge Of Chain Guide



Courtesy of CHRYSLER GROUP, LLC

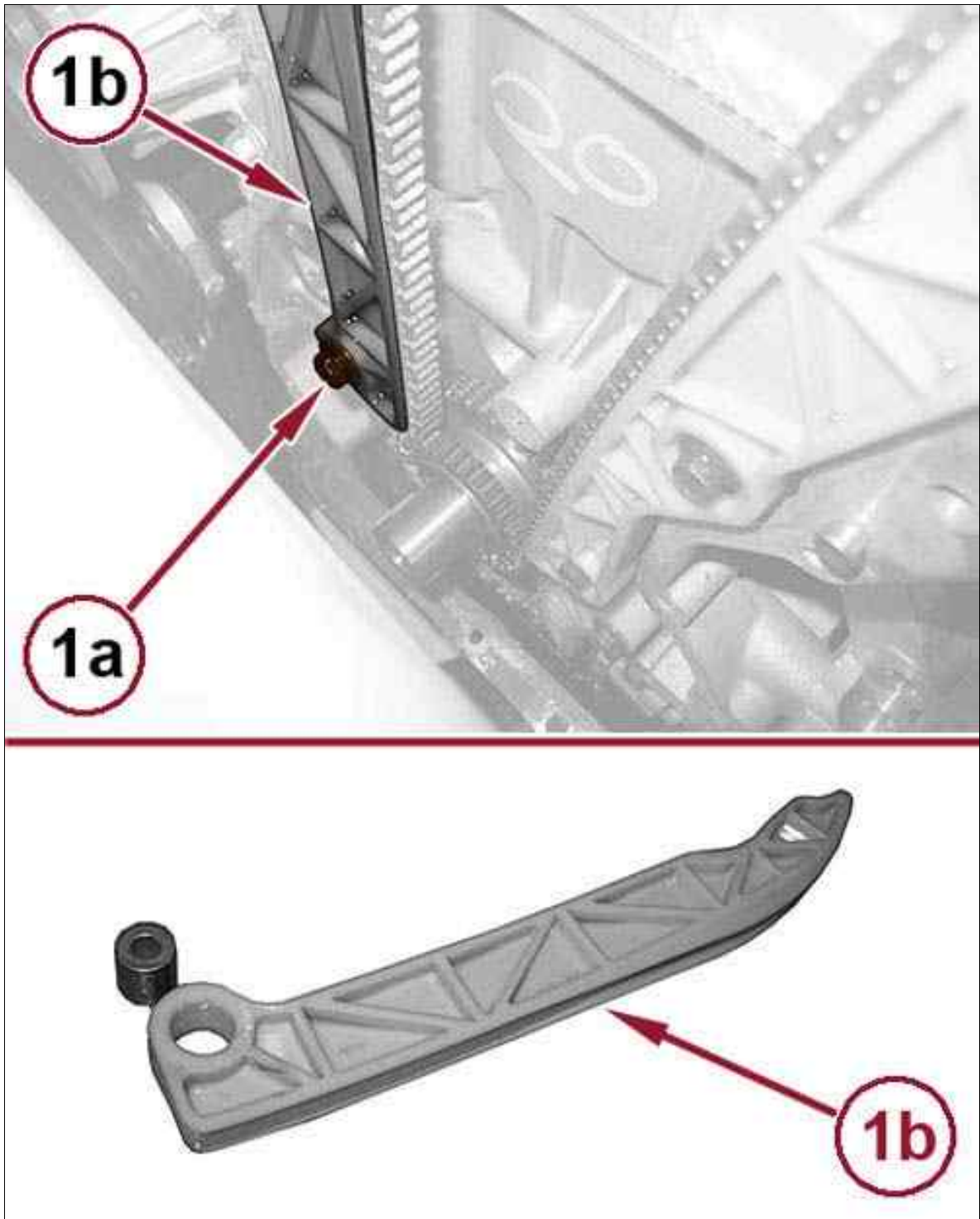
Inspect the timing chain for stretching prior to removal.

- Rotate the engine while watching timing chain tensioner plunger. When the plunger reaches its maximum extension, stop rotating engine.
- Measure the distance from the tensioner body to the edge of the chain guide as shown in illustration.
- If the distance is greater than 20.5 mm (0.81 in.) inspect the guide shoes for excessive wear.
- If the guide shoes are not excessively worn, replace the timing chain.

VALVE TIMING > GUIDES, TIMING CHAIN > REMOVAL AND INSTALLATION > 2.4L TIMING CHAIN GUIDE SHOE > REMOVAL

1. Remove the right front wheel and splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
2. Remove the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
3. Remove the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
4. Remove the cylinder head cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL AND INSTALLATION .
5. Remove the air cleaner assembly. Refer to BODY, AIR CLEANER, REMOVAL AND INSTALLATION .
6. Remove the accessory drive belt. Refer to BELT, SERPENTINE, REMOVAL AND INSTALLATION .
7. Remove the crank pulley. Refer to DAMPER, VIBRATION, REMOVAL AND INSTALLATION .
8. Remove the water pump pulley. Refer to PUMP, WATER, REMOVAL AND INSTALLATION .
9. Remove the timing chain cover. Refer to COVER(S), ENGINE TIMING, REMOVAL AND INSTALLATION .
10. Remove the engine timing tensioner. Refer to TENSIONER, ENGINE TIMING, REMOVAL AND INSTALLATION .
11. Remove the timing belt. Refer to CHAIN AND SPROCKETS, TIMING .

Fig 1: Timing Chain Tensioner Guide & Bolt



Courtesy of CHRYSLER GROUP, LLC

12. Remove the screw (1a) and remove the timing chain tensioner guide (1b) complete with bushing.

**VALVE TIMING > GUIDES, TIMING CHAIN > REMOVAL AND INSTALLATION > 2.4L
TIMING CHAIN GUIDE SHOE > INSTALLATION**

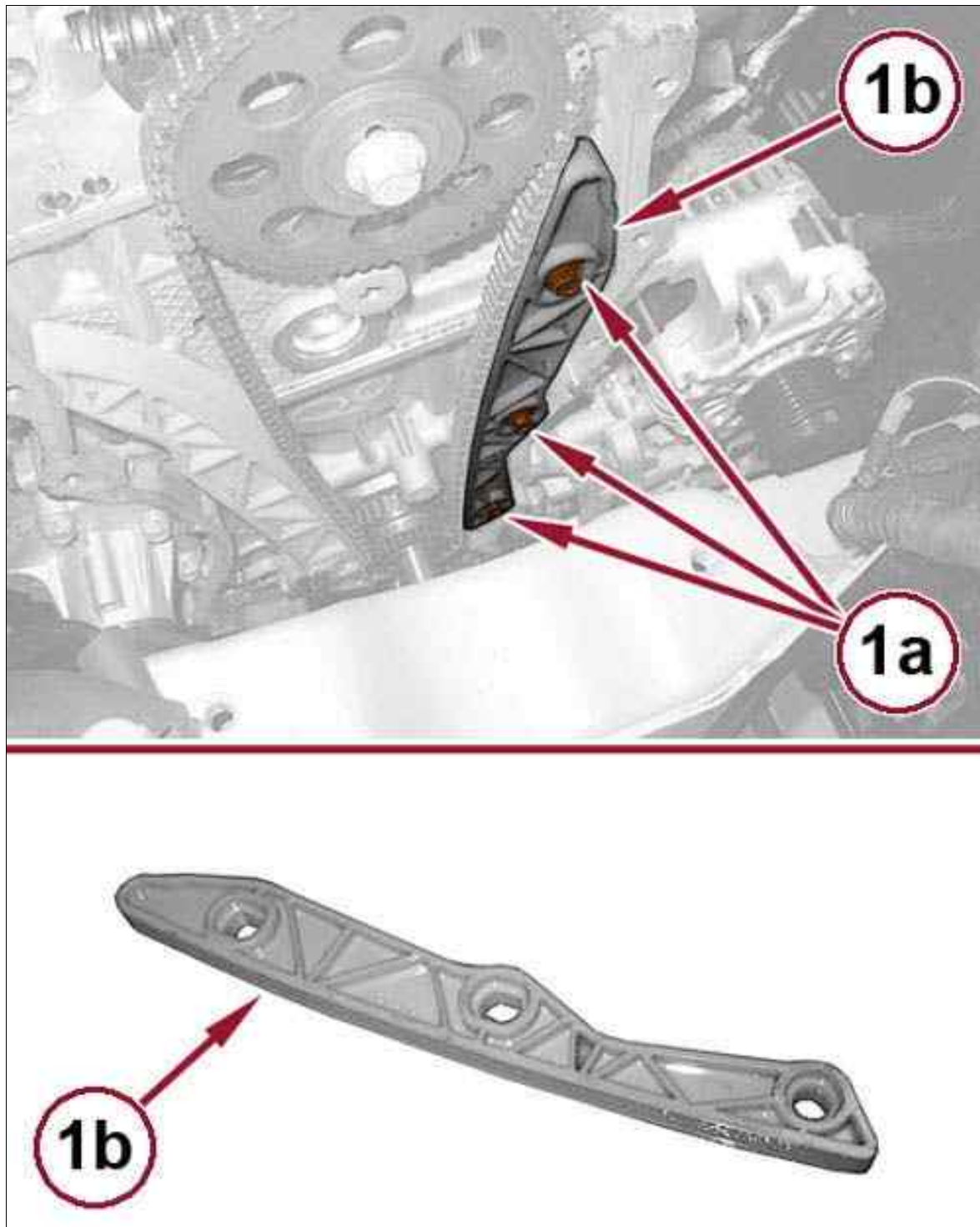
1. Install the timing chain tensioner guide complete with bushing and tighten the screw.
2. Install the timing belt. Refer to CHAIN AND SPROCKETS, TIMING .
3. Install the engine timing tensioner. Refer to TENSIONER, ENGINE TIMING, REMOVAL AND INSTALLATION .
4. Install the timing chain cover. Refer to COVER(S), ENGINE TIMING, REMOVAL AND INSTALLATION .
5. Install the water pump pulley. Refer to PUMP, WATER, REMOVAL AND INSTALLATION .
6. Install the crank pulley. Refer to DAMPER, VIBRATION, REMOVAL AND INSTALLATION .
7. Install the accessory drive belt. Refer to BELT, SERPENTINE, REMOVAL AND INSTALLATION .
8. Install the air cleaner assembly. Refer to BODY, AIR CLEANER, REMOVAL AND INSTALLATION .
9. Install the cylinder head cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL AND INSTALLATION .
10. Install the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
11. Install the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
12. Install the right front wheel and splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .

VALVE TIMING > GUIDES, TIMING CHAIN > REMOVAL AND INSTALLATION > 2.4L TIMING CHAIN GUIDE TENSIONER > REMOVAL

1. Remove the right front wheel and splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
2. Remove the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
3. Remove the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
4. Remove the cylinder head cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL AND INSTALLATION .
5. Remove the air cleaner assembly. Refer to BODY, AIR CLEANER, REMOVAL AND INSTALLATION .
6. Remove the accessory drive belt. Refer to BELT, SERPENTINE, REMOVAL AND INSTALLATION .
7. Remove the crank pulley. Refer to DAMPER, VIBRATION, REMOVAL AND INSTALLATION .
8. Remove the water pump pulley. Refer to PUMP, WATER, REMOVAL AND INSTALLATION .

9. Remove the timing chain cover. Refer to COVER(S), ENGINE TIMING, REMOVAL AND INSTALLATION .
10. Remove the engine timing tensioner. Refer to TENSIONER, ENGINE TIMING, REMOVAL AND INSTALLATION .
11. Remove the timing belt. Refer to CHAIN AND SPROCKETS, TIMING .

Fig 1: Timing Chain Tensioner Guide & Bolt



Courtesy of CHRYSLER GROUP, LLC

12. Remove the screw (1a) and remove the timing chain tensioner guide (1b).

VALVE TIMING > GUIDES, TIMING CHAIN > REMOVAL AND INSTALLATION > 2.4L TIMING CHAIN GUIDE TENSIONER > INSTALLATION

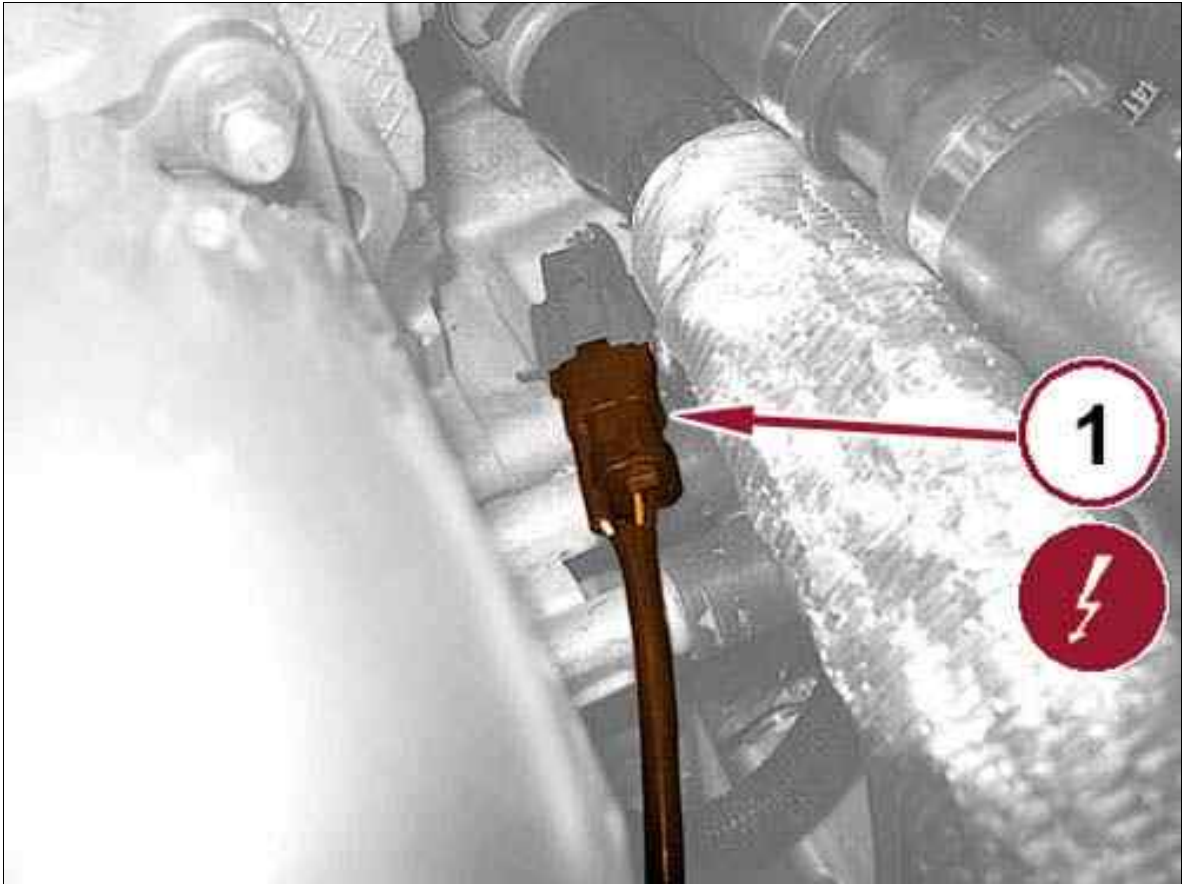
1. Install the timing chain tensioner guide and tighten the screw.
2. Install the timing belt. Refer to CHAIN AND SPROCKETS, TIMING .
3. Install the engine timing tensioner. Refer to TENSIONER, ENGINE TIMING, REMOVAL AND INSTALLATION .
4. Install the timing chain cover. Refer to COVER(S), ENGINE TIMING, REMOVAL AND INSTALLATION .
5. Install the water pump pulley. Refer to PUMP, WATER, REMOVAL AND INSTALLATION .
6. Install the crank pulley. Refer to DAMPER, VIBRATION, REMOVAL AND INSTALLATION .
7. Install the accessory drive belt. Refer to BELT, SERPENTINE, REMOVAL AND INSTALLATION .
8. Install the air cleaner assembly. Refer to BODY, AIR CLEANER, REMOVAL AND INSTALLATION .
9. Install the cylinder head cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL AND INSTALLATION .
10. Install the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
11. Install the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
12. Install the right front wheel and splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .

VALVE TIMING > COVER(S), ENGINE TIMING > REMOVAL AND INSTALLATION > REMOVAL

1. Remove the right front wheel and splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
2. Remove the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
3. Remove the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
4. Remove the cylinder head cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL AND INSTALLATION .
5. Remove the air cleaner body. Refer to BODY, AIR CLEANER, REMOVAL AND INSTALLATION .

6. Remove the accessory drive belt. Refer to BELT, SERPENTINE, REMOVAL AND INSTALLATION .
7. Remove the vibration damper. Refer to DAMPER, VIBRATION, REMOVAL AND INSTALLATION .
8. Remove the water pump pulley. Refer to PUMP, WATER, REMOVAL AND INSTALLATION .

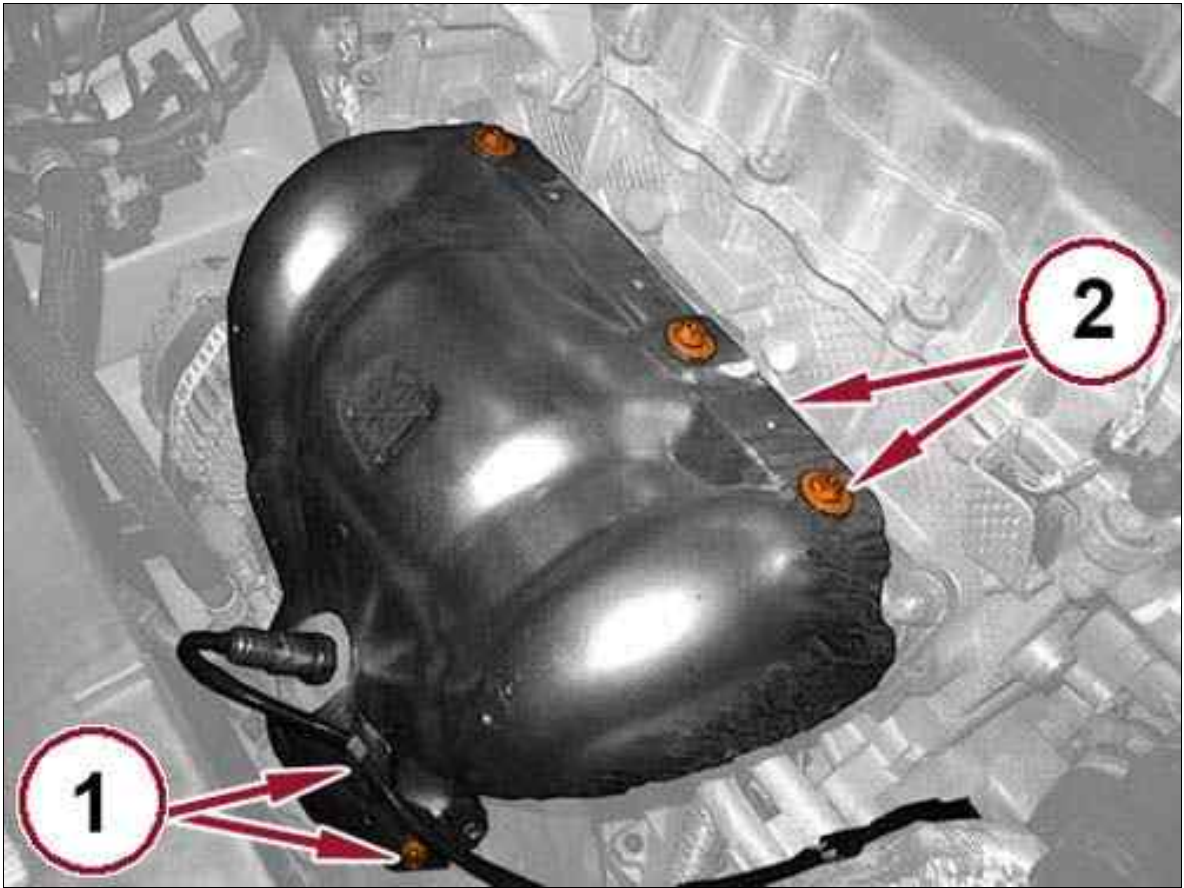
Fig 1: Upstream Oxygen Sensor Wire Harness Connector



Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the electrical connection from the upstream oxygen sensor (1).

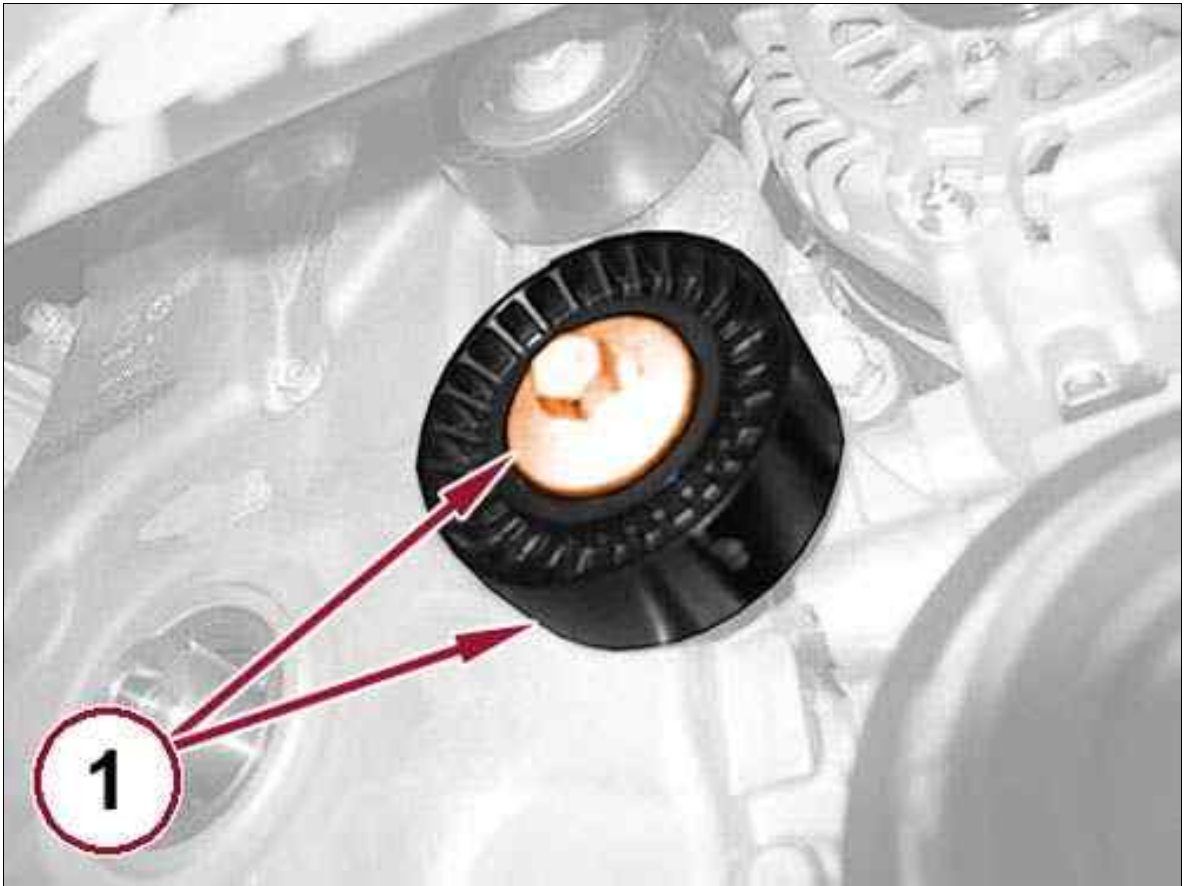
Fig 2: Upper Heat Shield, Nuts & Wire Harness Retainer



Courtesy of CHRYSLER GROUP, LLC

10. Disengage the wiring of the upstream oxygen sensor (1), loosen the screw and remove the bracket.
11. Remove the bolts (2) and remove the top cover of the exhaust manifold.

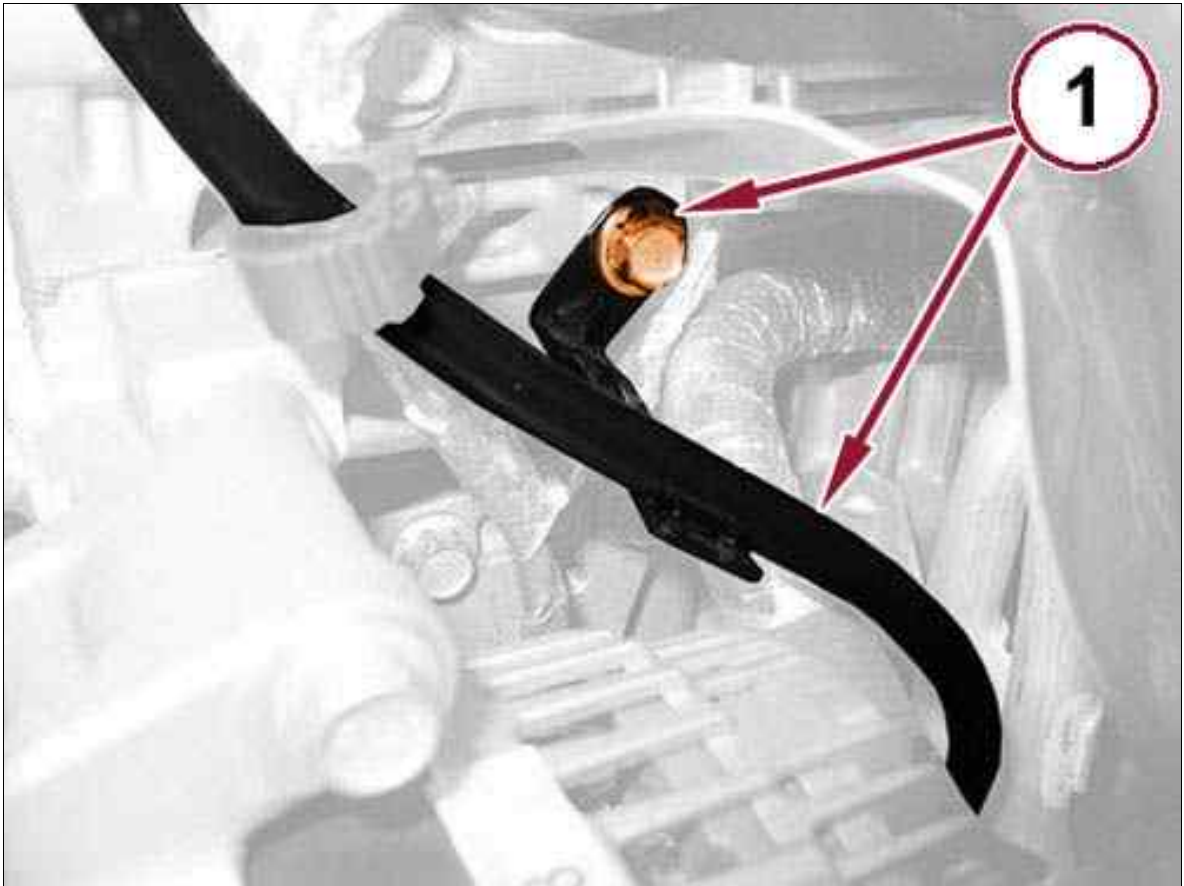
Fig 3: Accessory Drive Belt Idler Pulley & Bolt



Courtesy of CHRYSLER GROUP, LLC

12. Remove the bolt (1) and remove the accessory drive belt idler pulley.

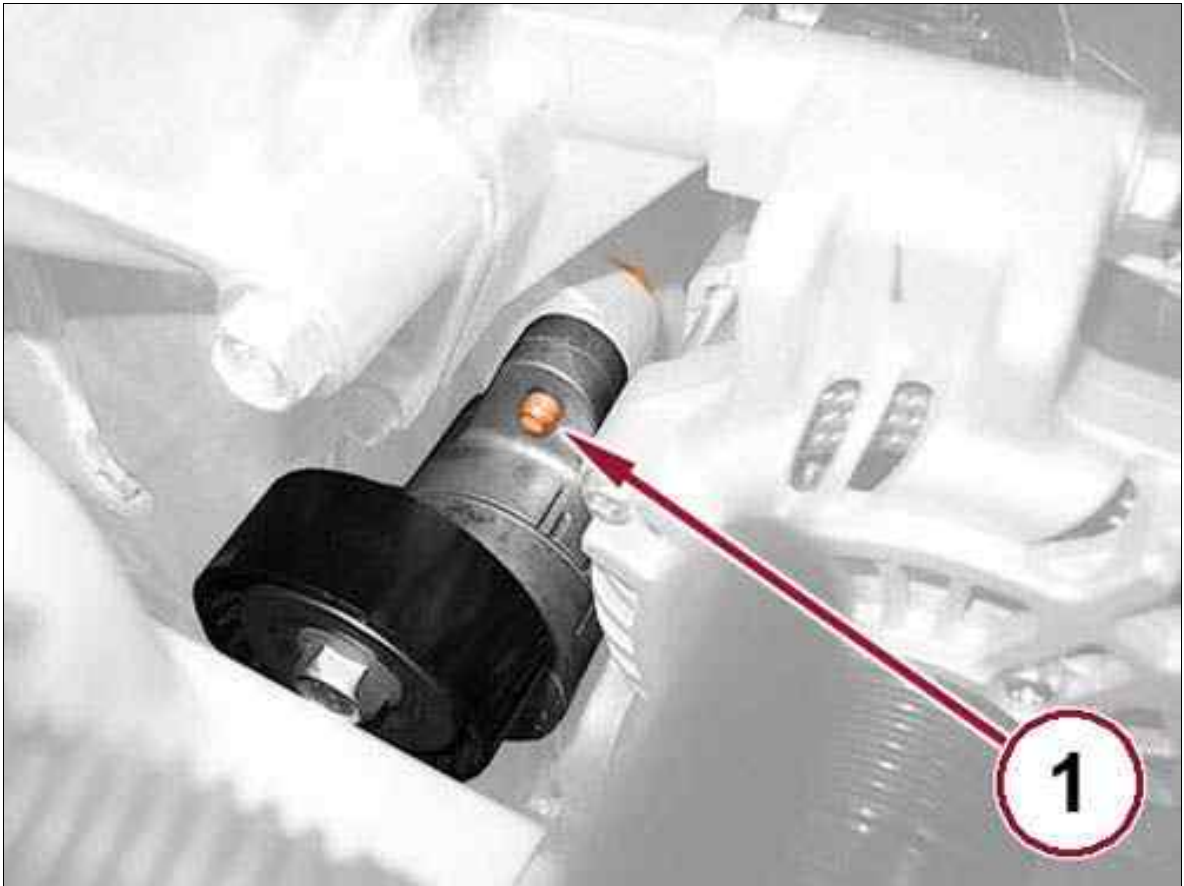
Fig 4: Engine Oil Dipstick Tube & Bolt



Courtesy of CHRYSLER GROUP, LLC

13. Remove the bolt (1) and remove the engine oil dipstick tube.

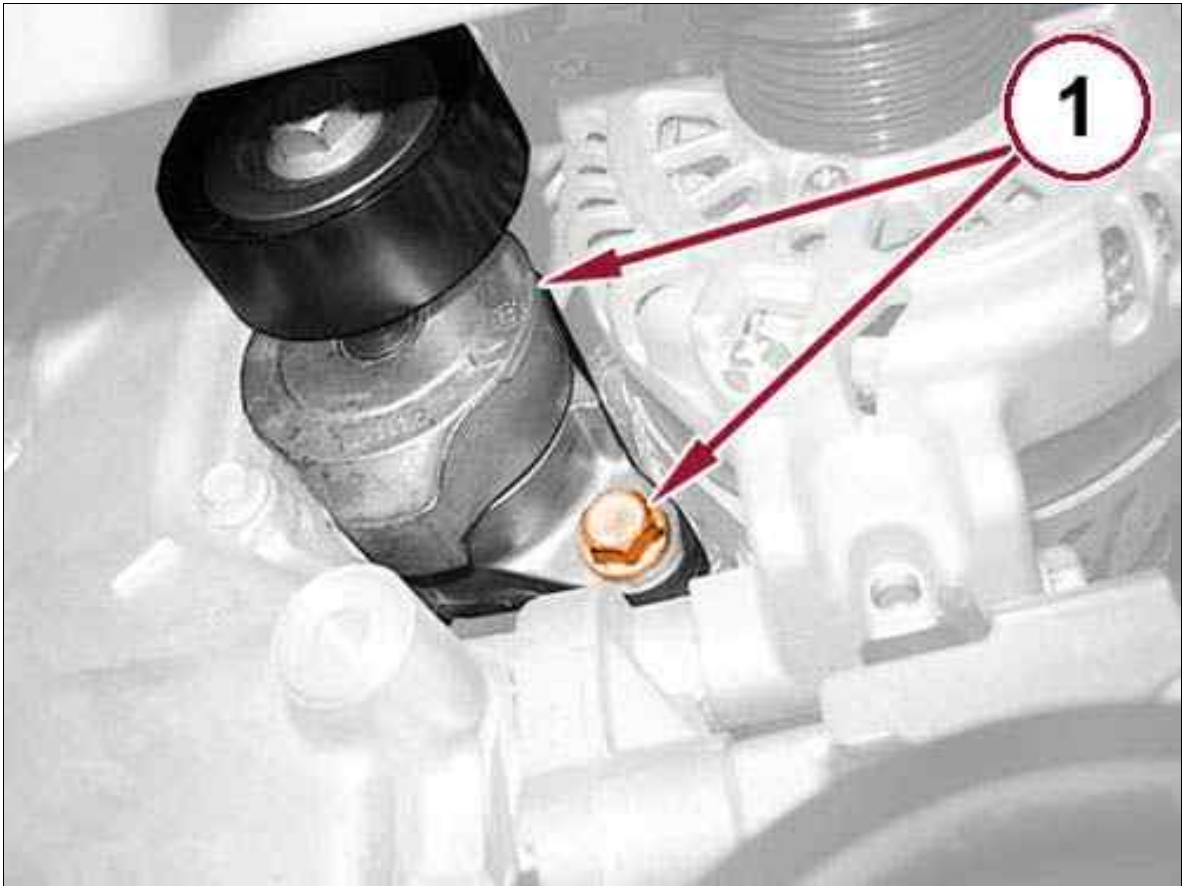
Fig 5: Accessory Drive Belt Tensioner Top Bolt



Courtesy of CHRYSLER GROUP, LLC

14. Remove the top bolt (1) from the accessory drive belt tensioner.

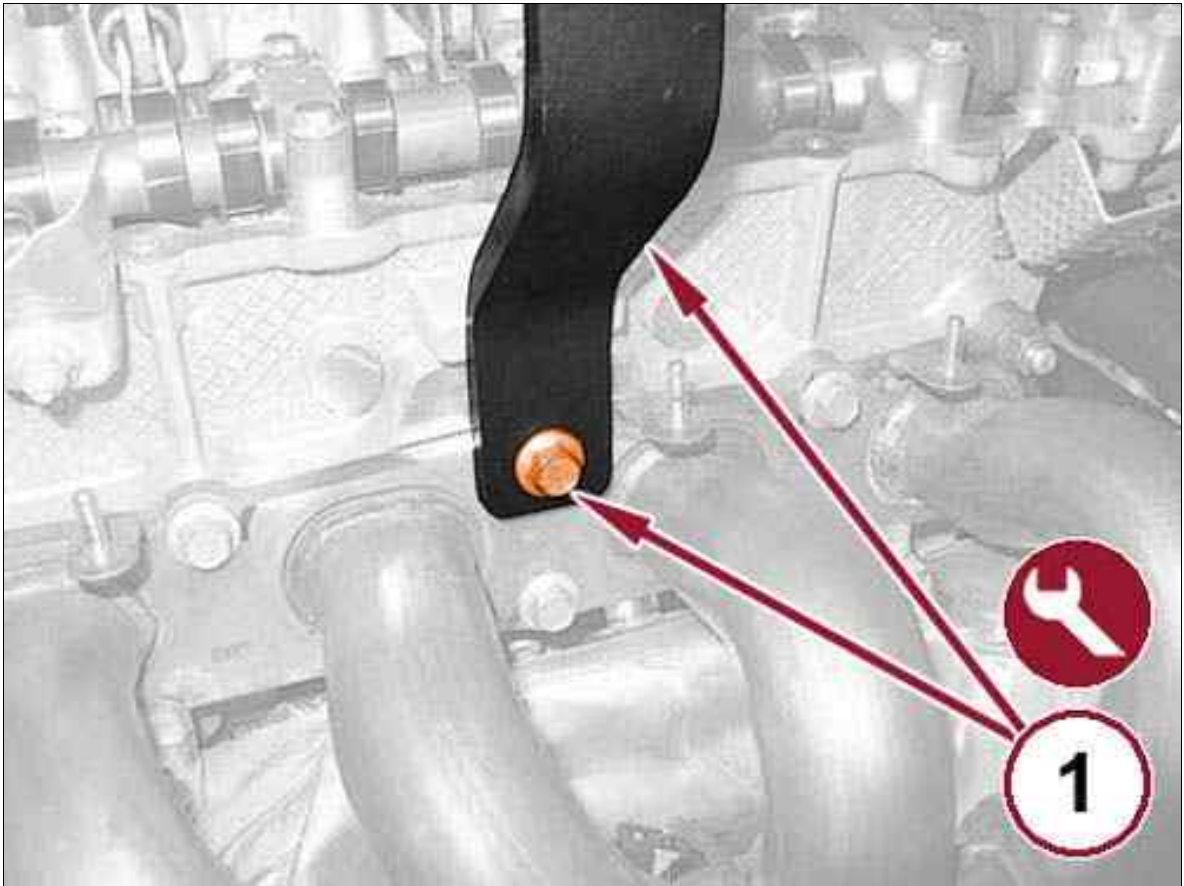
Fig 6: Accessory Drive Belt Tensioner & Bolt



Courtesy of CHRYSLER GROUP, LLC

15. Remove the bolt (1) and remove the accessory drive belt tensioner.

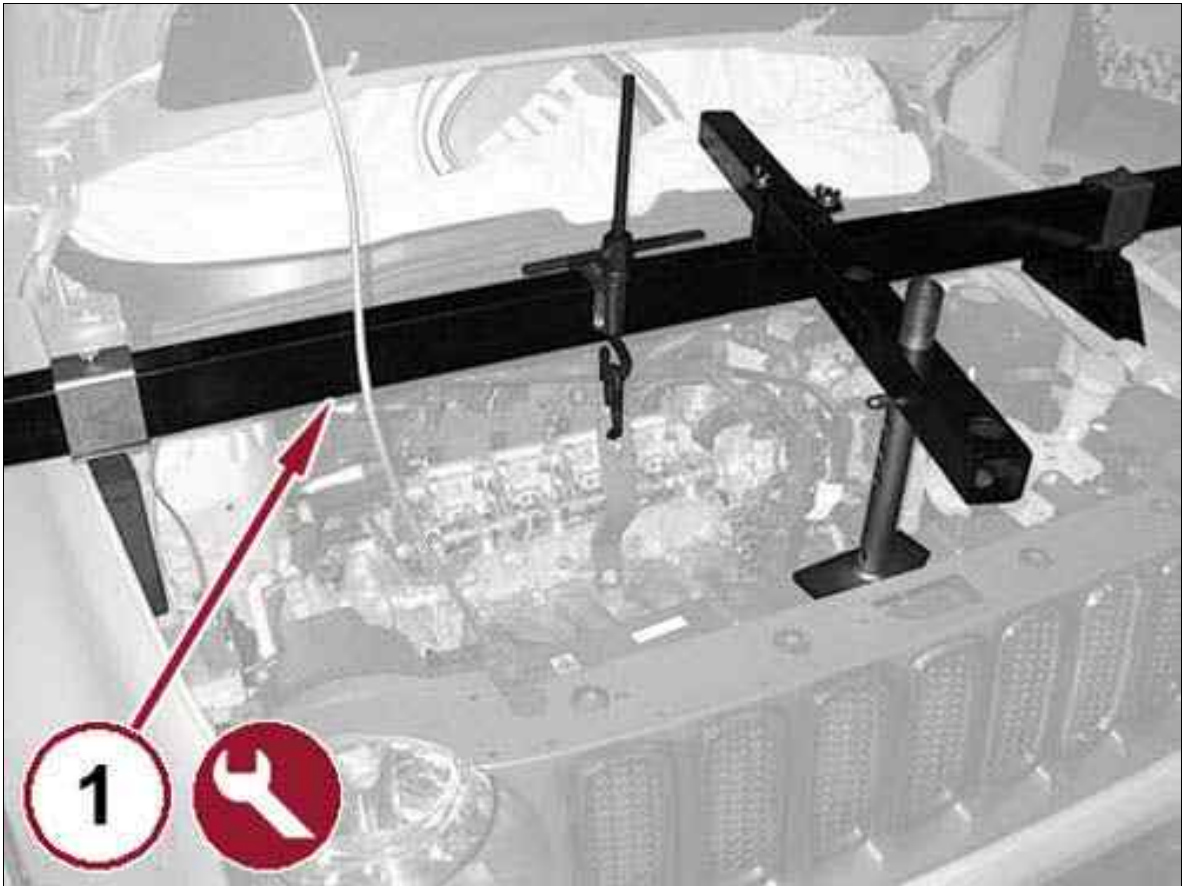
Fig 7: Center Exhaust Manifold Bolt & Bracket



Courtesy of CHRYSLER GROUP, LLC

16. Remove the center exhaust manifold bolt (1) and install the bracket from the 2000040436 powertrain support tool.

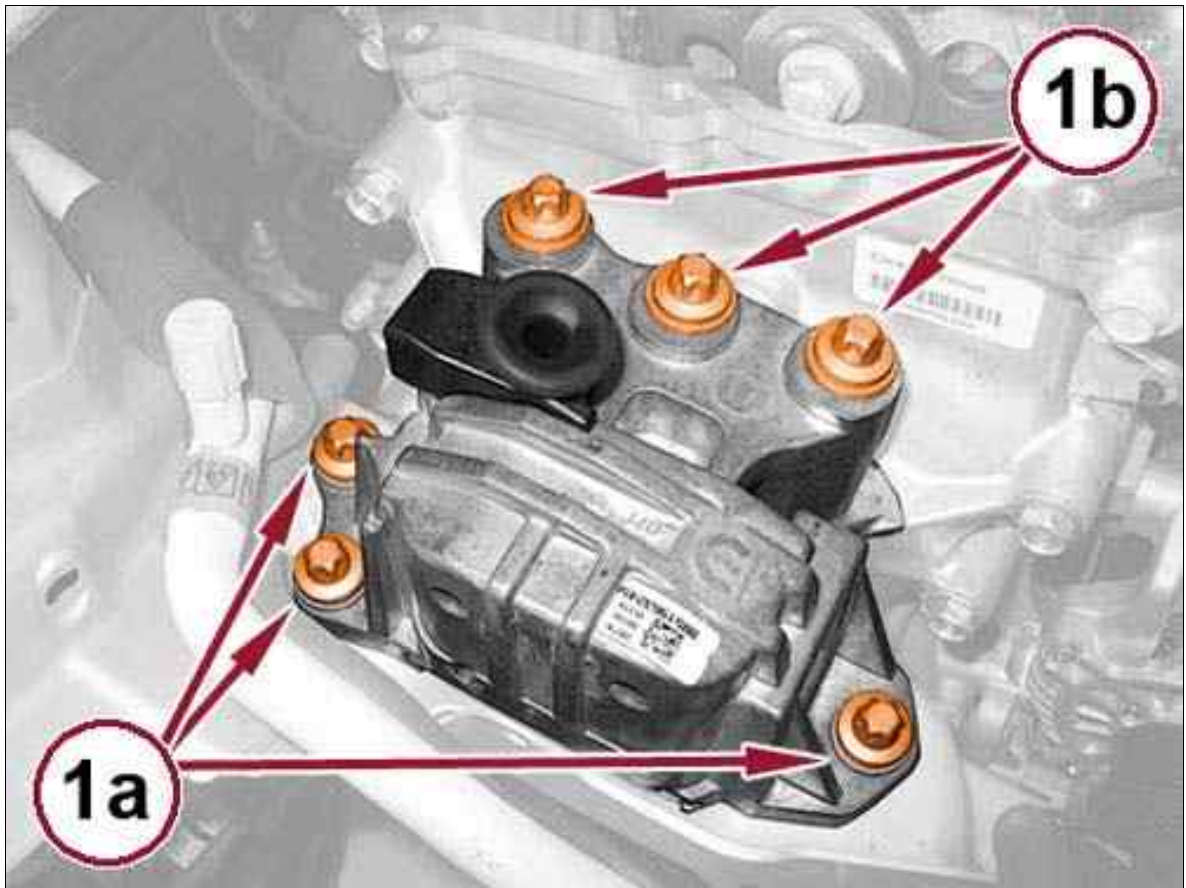
Fig 8: Driveline Support Fixture



Courtesy of CHRYSLER GROUP, LLC

17. Assemble the 2000040436 (EMEA) or (special tool #8534B, Fixture, Driveline Support) (NAFTA) tool (1).

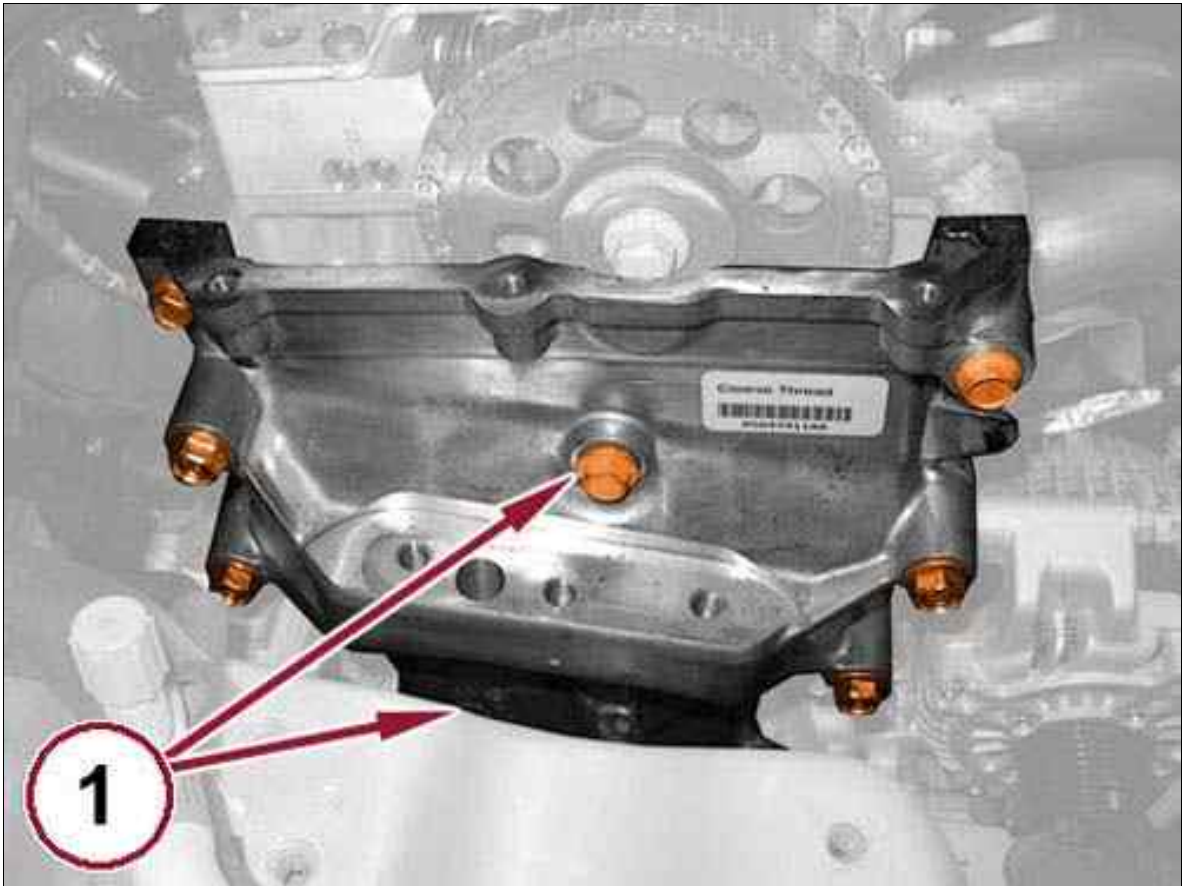
Fig 9: Right Engine Mount Isolator & Bolts



Courtesy of CHRYSLER GROUP, LLC

18. Remove the bolts (1a) and (1b) and remove the right engine mount isolator.

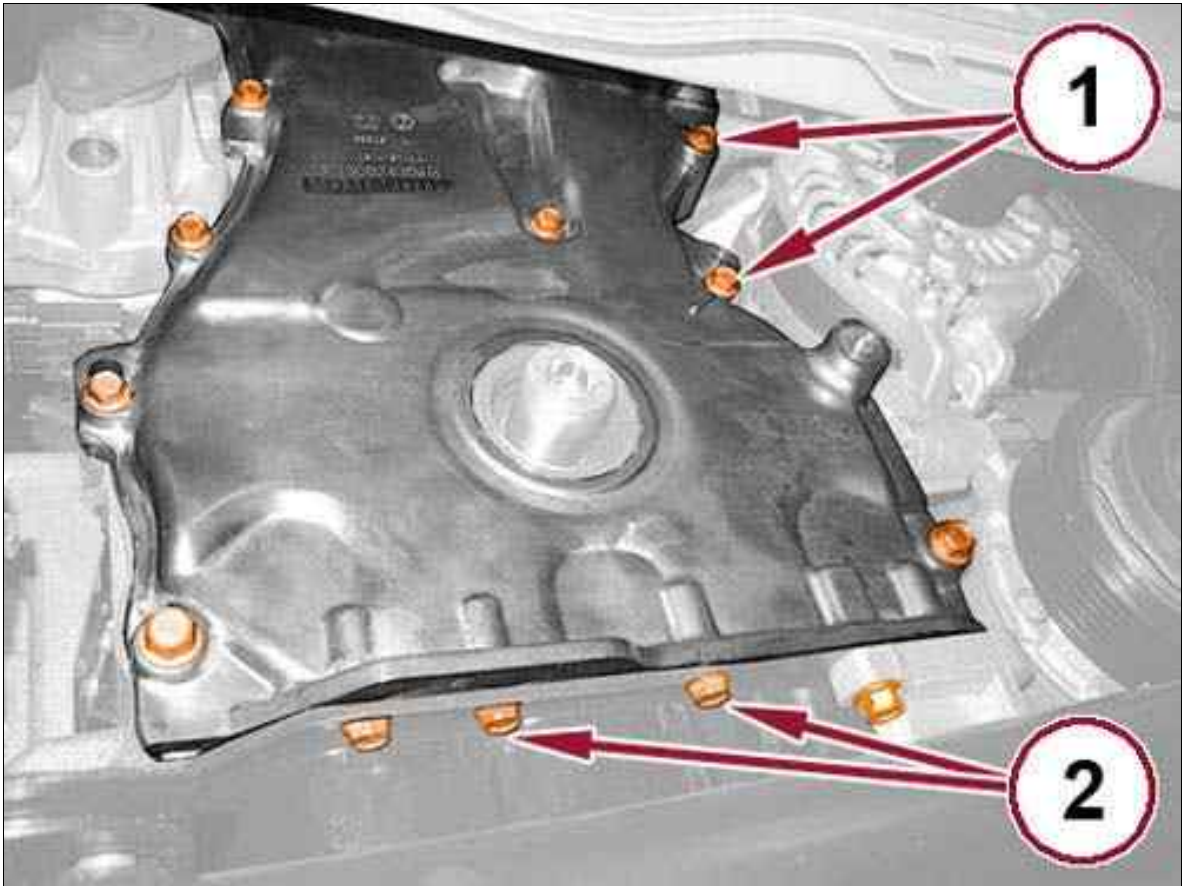
Fig 10: Engine Timing Cover To Cylinder Head Upper Bolts



Courtesy of CHRYSLER GROUP, LLC

19. Remove the upper bolts (1) securing the engine timing cover to the cylinder head.

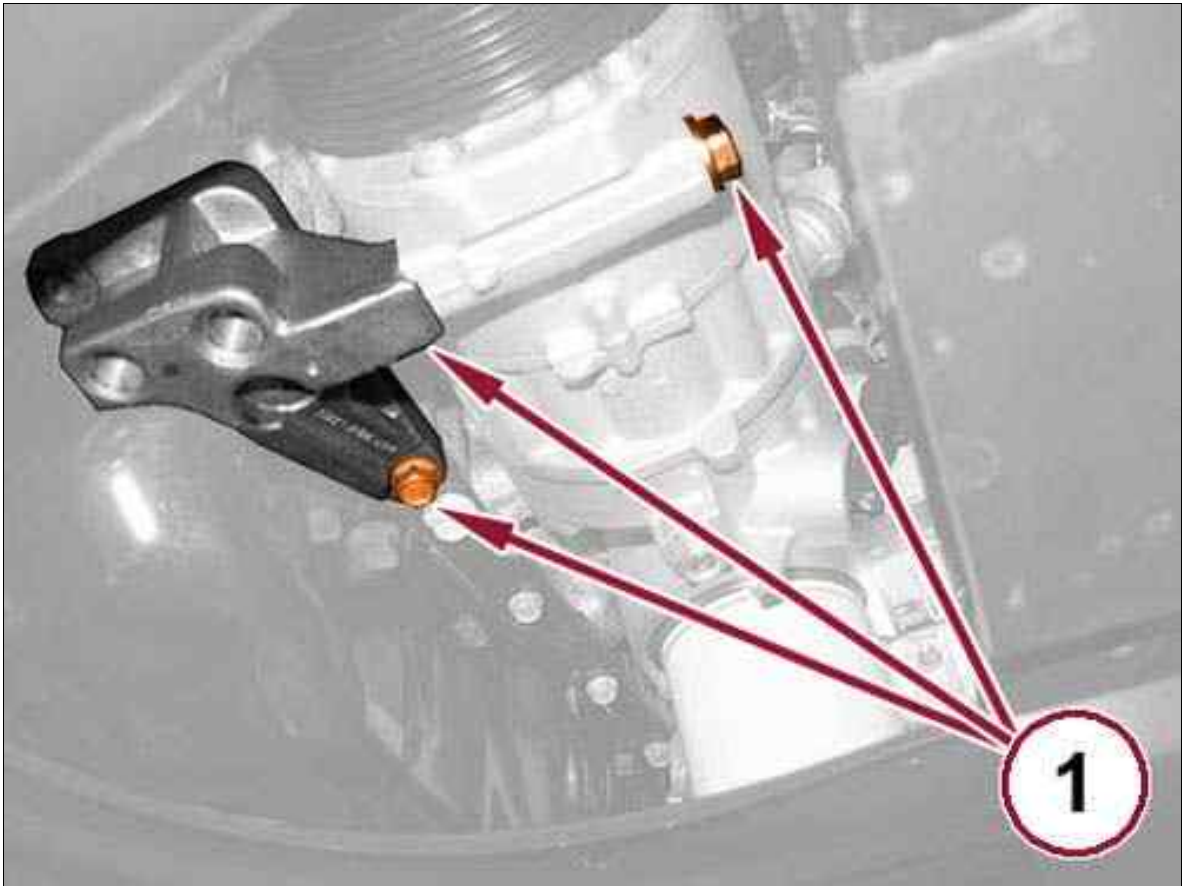
Fig 11: Engine Timing Cover To Engine Block & Engine Oil Pan Bolts



Courtesy of CHRYSLER GROUP, LLC

20. Remove the bolts (1) securing the engine timing cover to the engine block.
21. Remove the bolts (2) securing the engine timing cover to the engine oil pan.

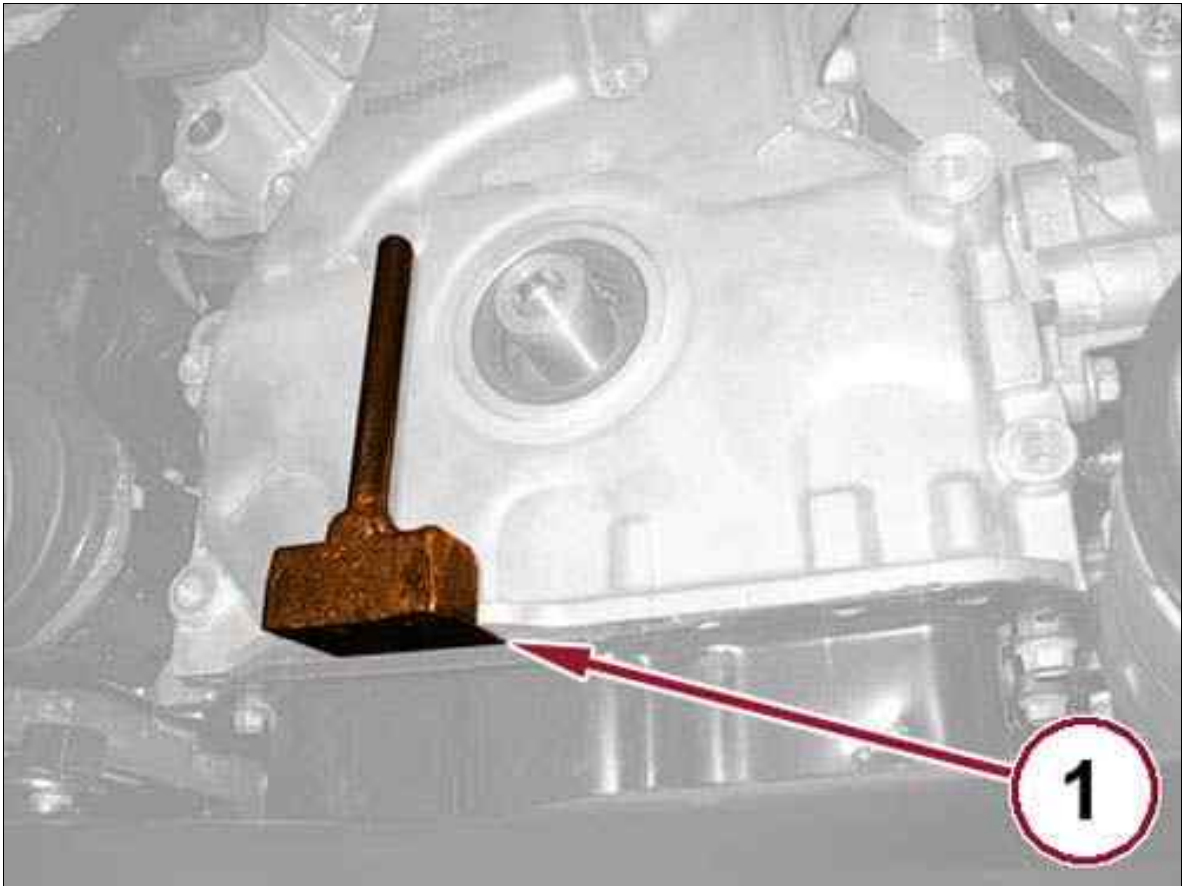
Fig 12: A/C Compressor And Support Bracket Bolts



Courtesy of CHRYSLER GROUP, LLC

22. Remove the bolts (1) and remove the A/C compressor support bracket.

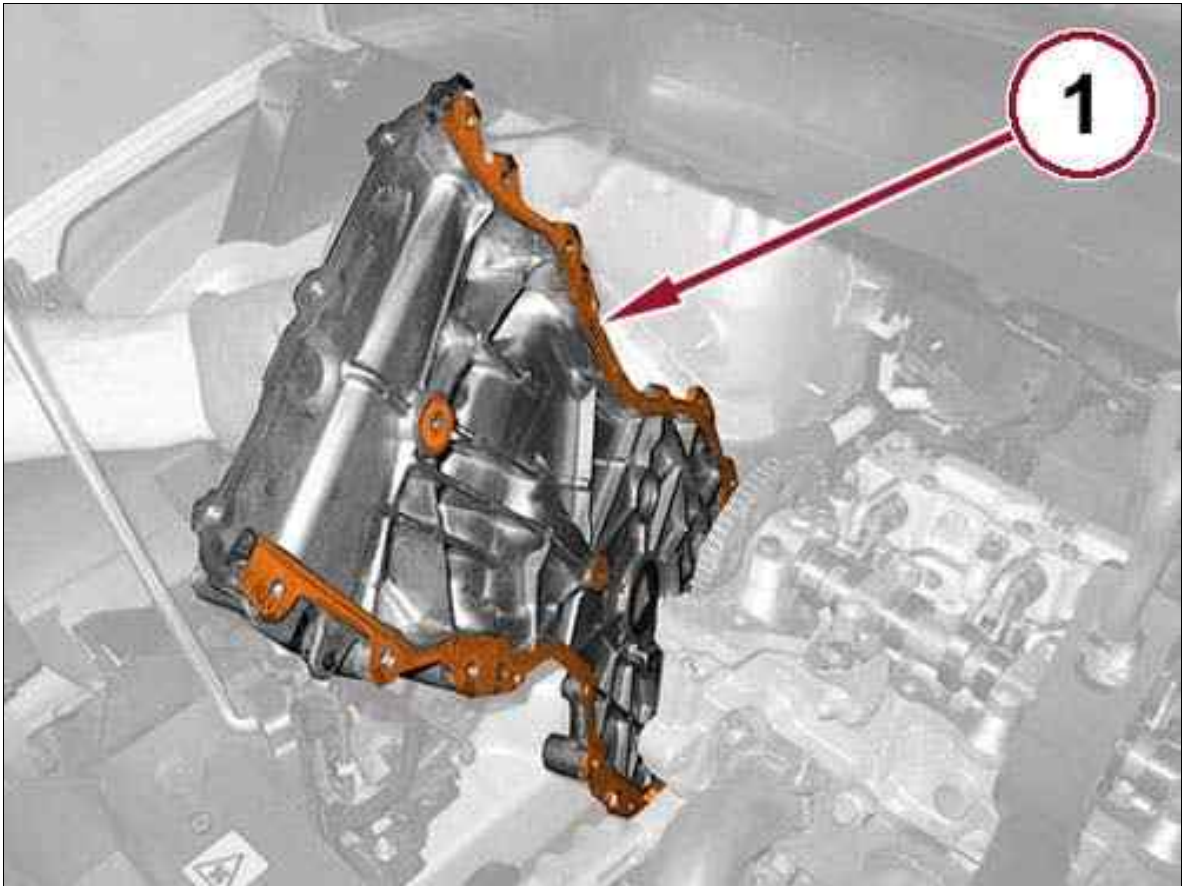
Fig 13: Cutting Sealant Between Engine Timing Cover & Engine Oil Pan Using Special Tool



Courtesy of CHRYSLER GROUP, LLC

23. With the tool (1) cut the sealant from between the engine timing cover and the engine oil pan.

Fig 14: Engine Timing Cover

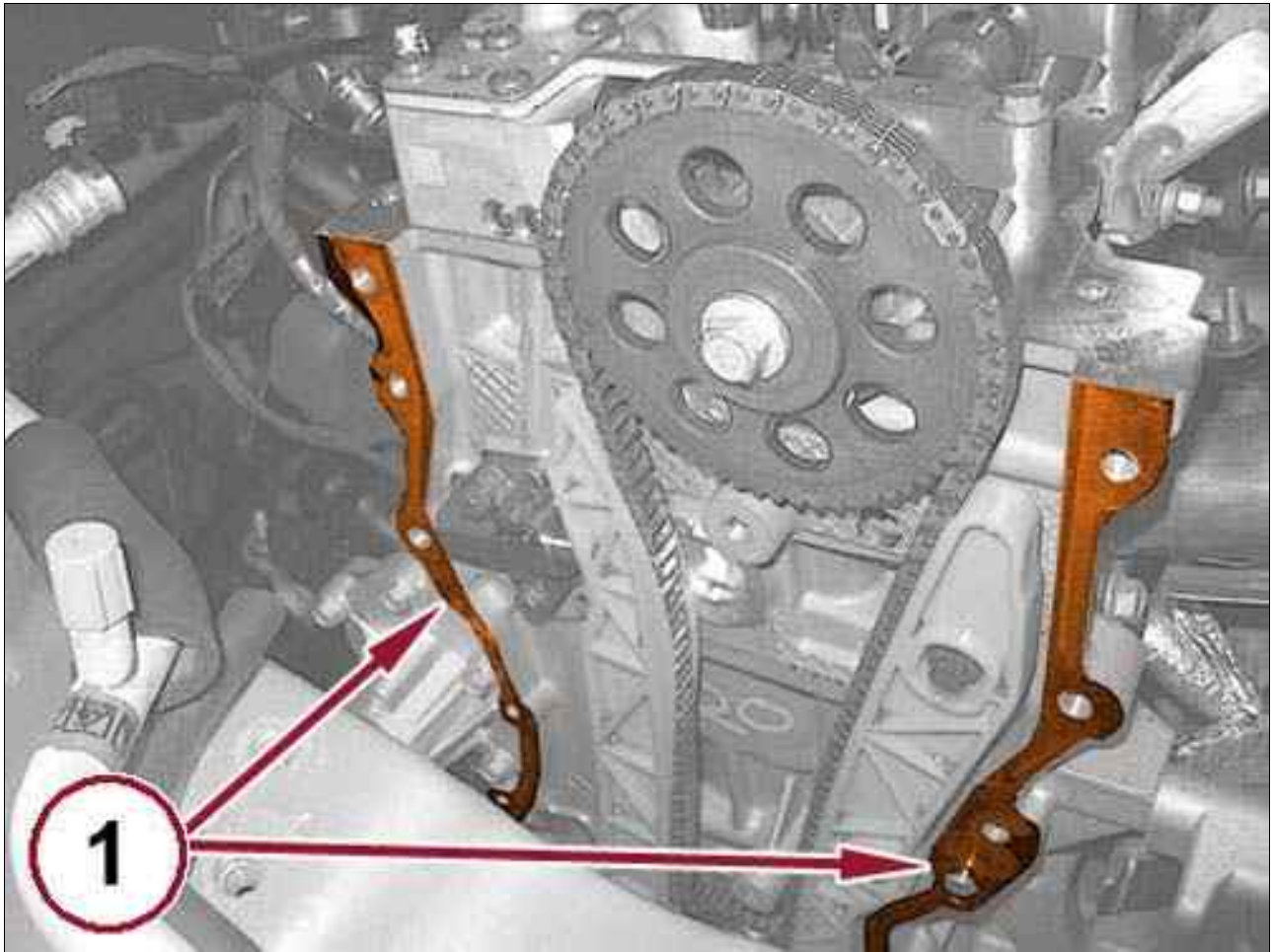


Courtesy of CHRYSLER GROUP, LLC

24. Remove the engine timing cover (1).
25. Remove the residual silicone gasket material from the cover and check the integrity of the centering bushings.
26. Pry off and remove the front crankshaft oil seal from the timing cover.

VALVE TIMING > COVER(S), ENGINE TIMING > REMOVAL AND INSTALLATION > INSTALLATION

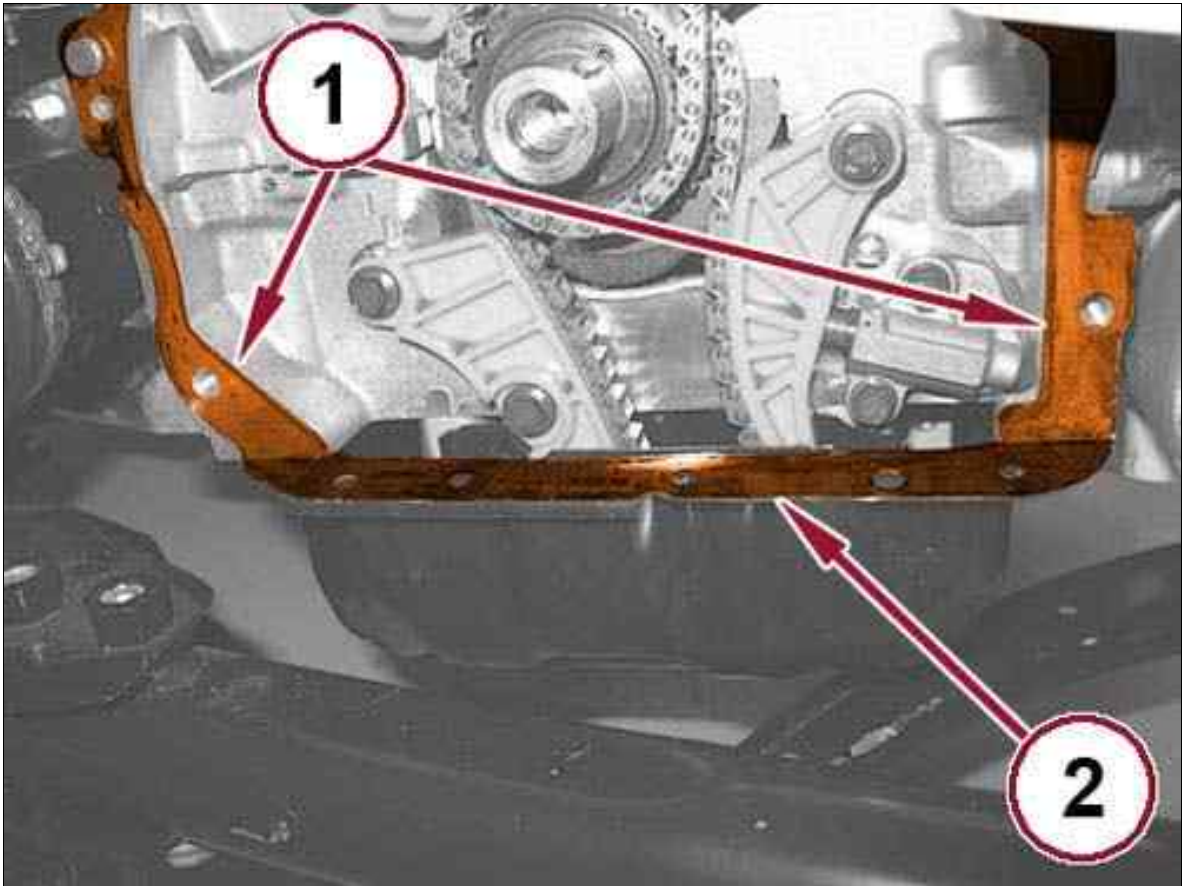
Fig 1: Applying Sealant To Engine Timing Cover To Engine Block Gasket Surface



Courtesy of CHRYSLER GROUP, LLC

1. Apply a suitable silicone sealant to the engine timing cover to engine block gasket surface (1) as shown in the figure.

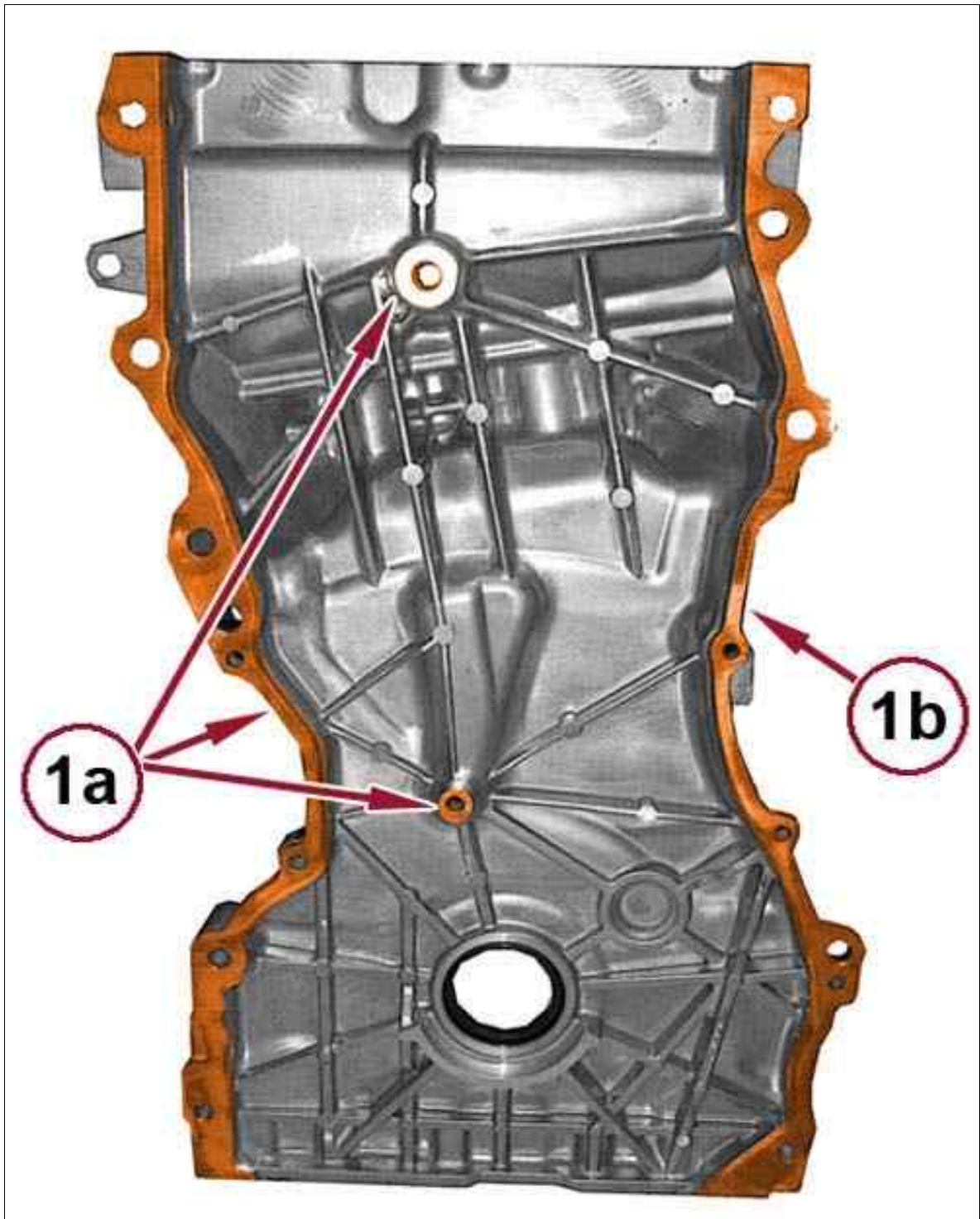
Fig 2: Applying Sealant To Engine Timing Cover To Engine Block Gasket Surface & Oil Pan



Courtesy of CHRYSLER GROUP, LLC

2. Apply a suitable silicone sealant to the engine timing cover to engine block gasket surface (1) as shown in the figure.
3. Apply a bead (2 mm) of suitable silicone sealant to the oil pan (2) as shown in the figure.

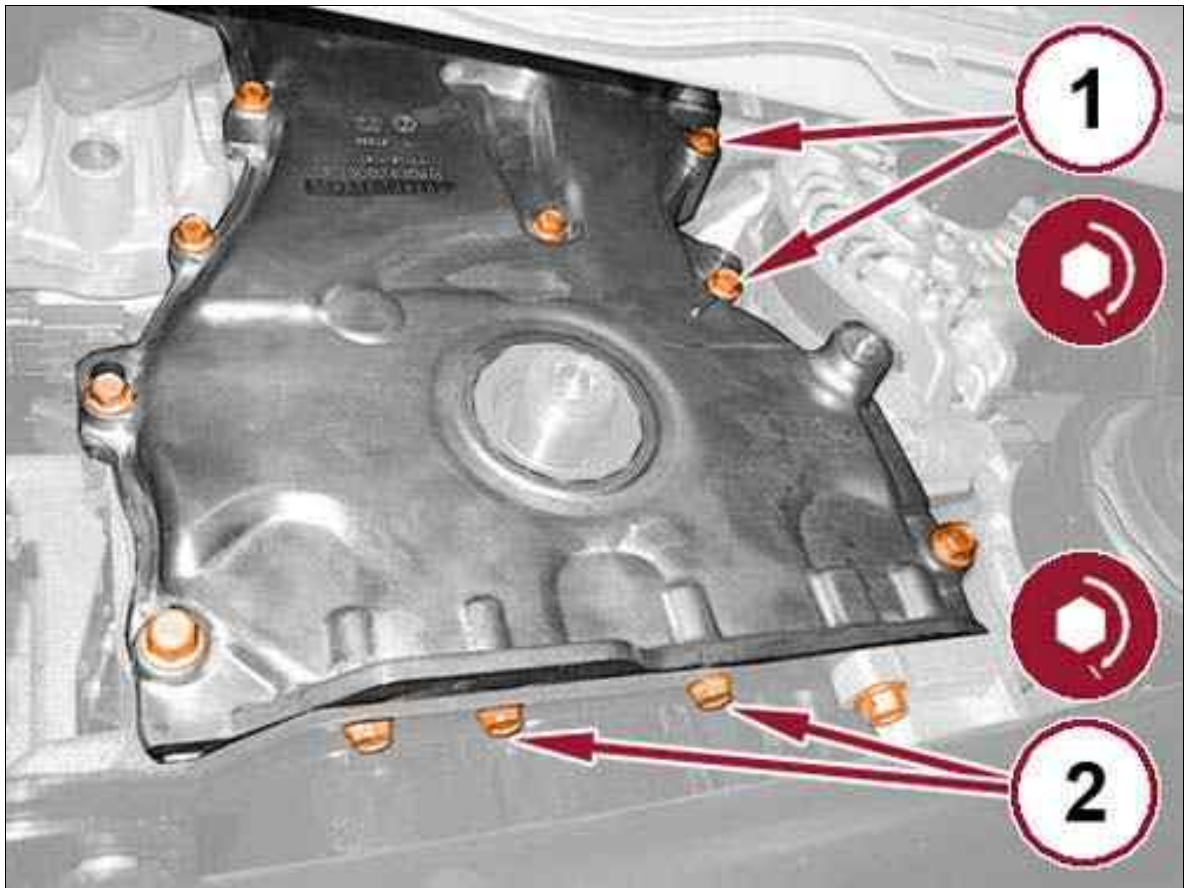
Fig 3: Applying Sealant To Indicated Surfaces



Courtesy of CHRYSLER GROUP, LLC

4. Apply a bead (2 mm) of a suitable silicone sealant (1a) and (1b) to the surfaces indicated in the figure.

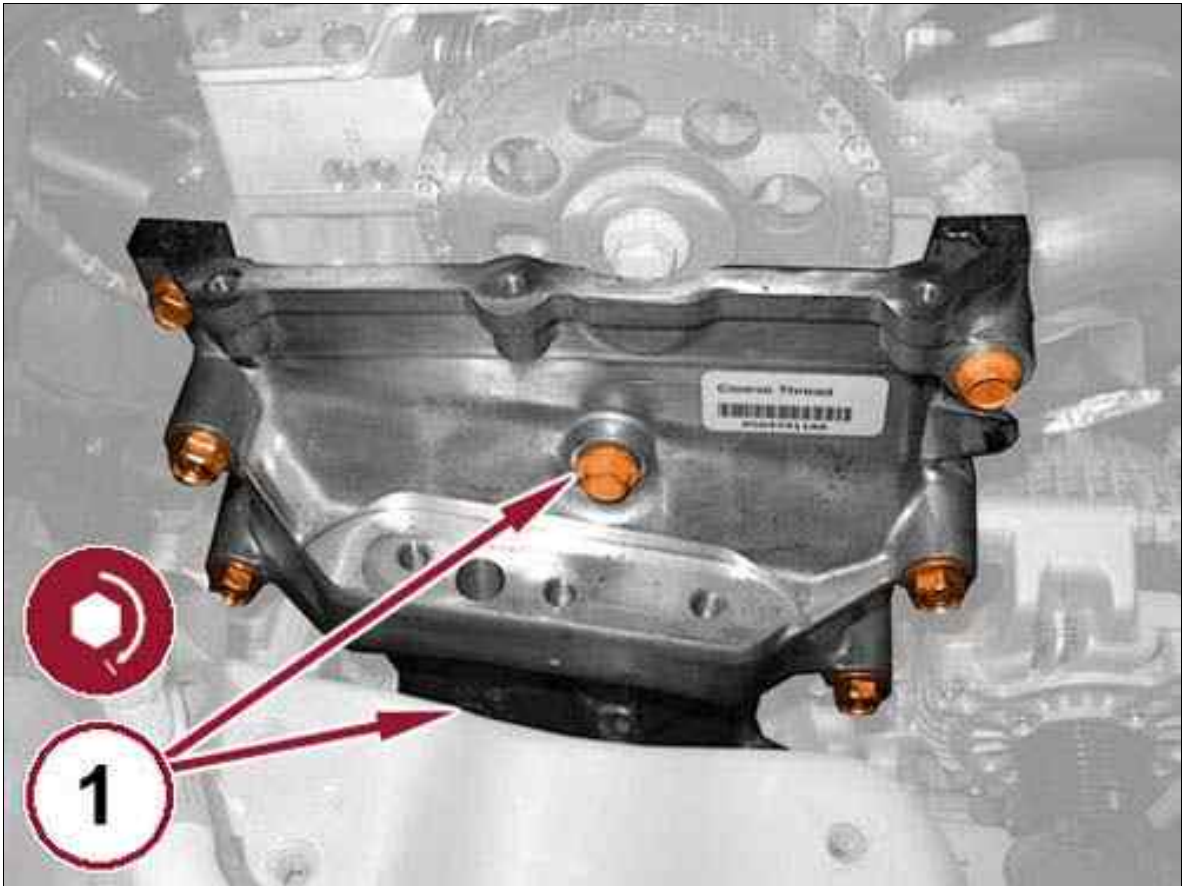
Fig 4: Installing Engine Timing Cover & Bolts



Courtesy of CHRYSLER GROUP, LLC

5. Working from the wheel well, install the engine timing cover and tighten the lower mounting bolts (1) to the proper specification. Refer to TORQUE SPECIFICATIONS .
6. Install the A/C compressor support bracket and tighten the bolts to the proper specification. Refer to TORQUE SPECIFICATIONS .
7. Tighten the engine timing cover to oil pan bolts (2) to the proper specification. Refer to TORQUE SPECIFICATIONS .

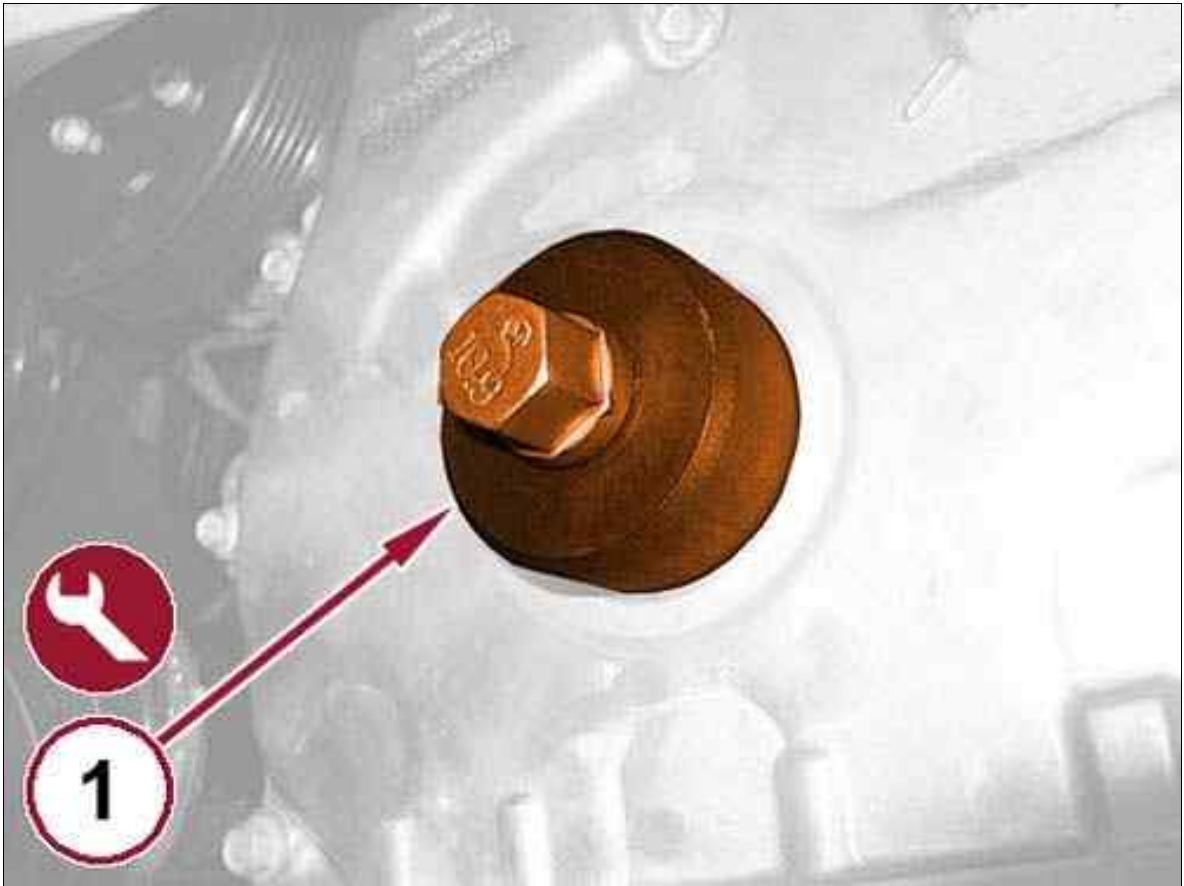
Fig 5: Engine Timing Cover & Mounting Bolts



Courtesy of CHRYSLER GROUP, LLC

8. Tighten the engine timing cover to cylinder head bolts (1) to the proper specification. Refer to TORQUE SPECIFICATIONS .

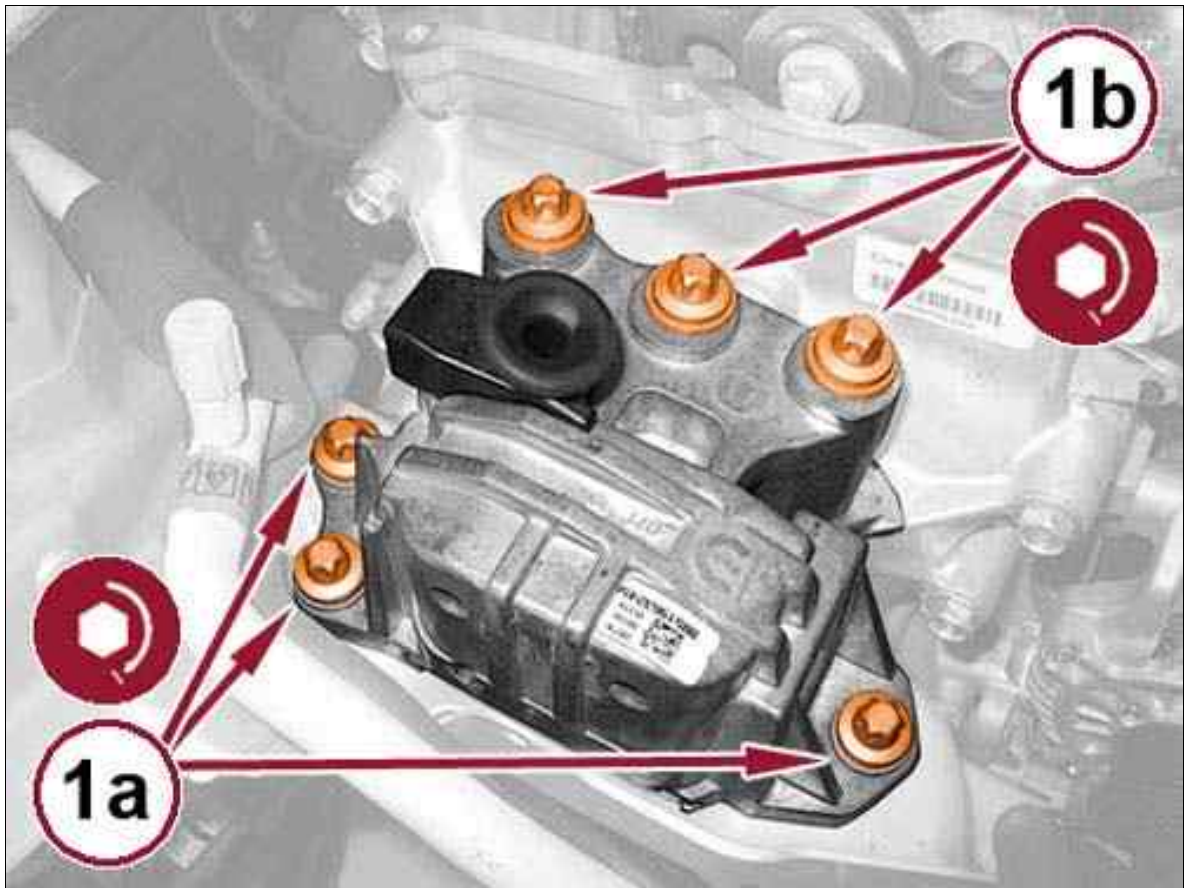
Fig 6: Installing Front Crankshaft Oil Seal Using Special Tool



Courtesy of CHRYSLER GROUP, LLC

9. Install a new front crankshaft oil seal with the 2000040245 (EMEA) or (special tool #9506, Installer, Oil Seal) (NAFTA) tool (1).

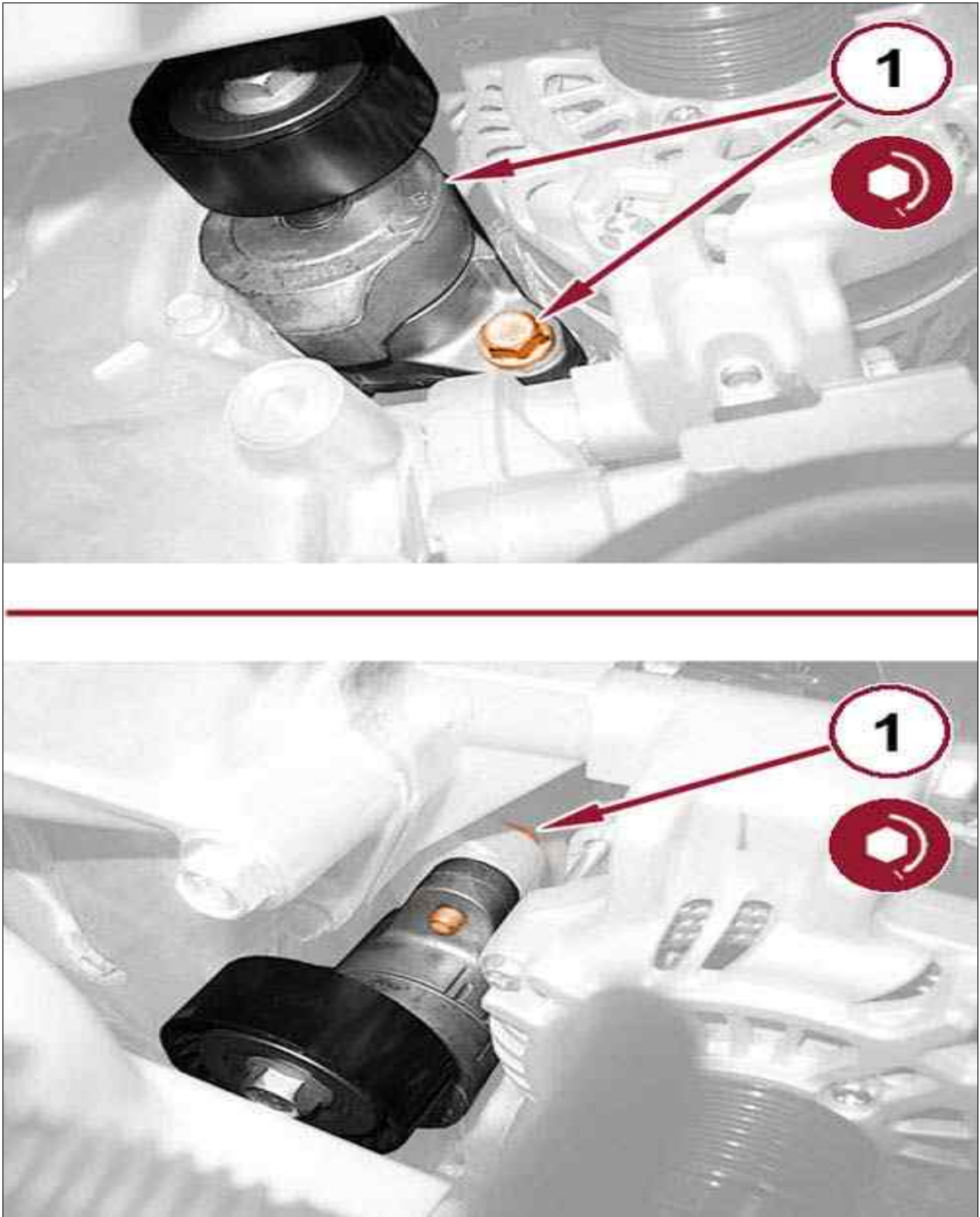
Fig 7: Right Engine Mount Isolator & Bolts



Courtesy of CHRYSLER GROUP, LLC

10. Install the right engine mount isolator and tighten the bolts (1a) and (1b) to the proper specification. Refer to TORQUE SPECIFICATIONS .
11. Remove the 2000040436 (EMEA) or (special tool #8534B, Fixture, Driveline Support) (NAFTA) tool and tighten the center exhaust manifold bolt to the proper specification. Refer to TORQUE SPECIFICATIONS .

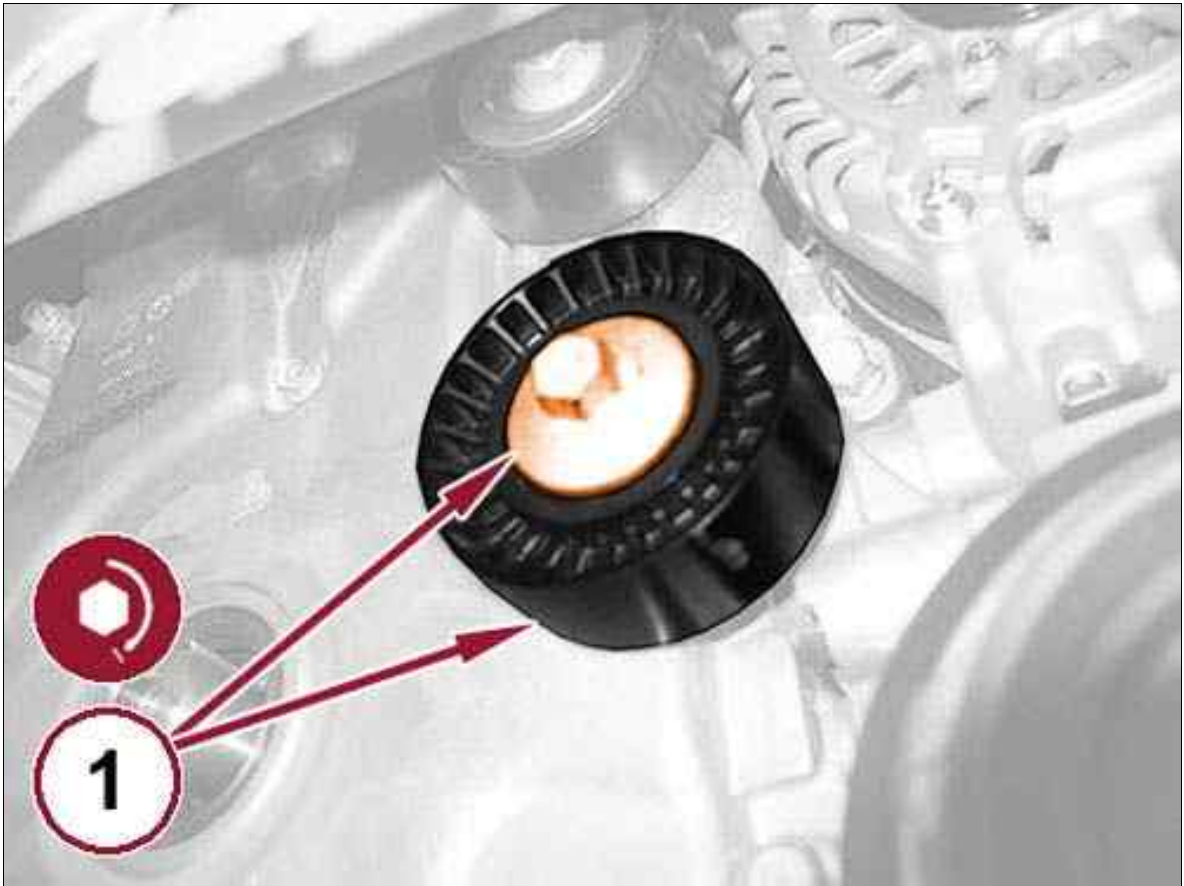
Fig 8: Accessory Drive Belt Tensioner & Bolts



Courtesy of CHRYSLER GROUP, LLC

12. Install the accessory drive belt tensioner (1) and tighten the bolts to the proper specification. Refer to TORQUE SPECIFICATIONS .

Fig 9: Accessory Drive Belt Idler Pulley & Bolt



Courtesy of CHRYSLER GROUP, LLC

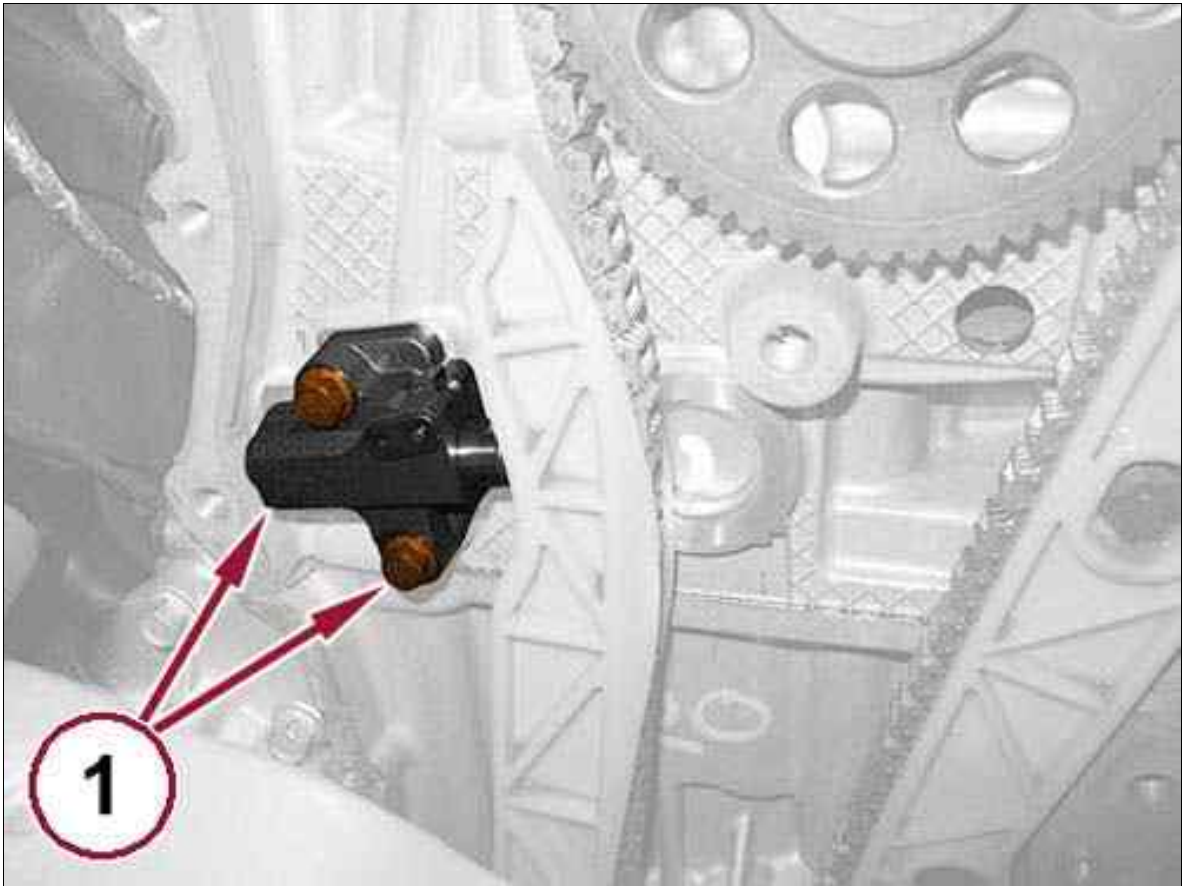
13. Install the accessory drive belt idler pulley (1) and tighten the bolt to the proper specification. Refer to TORQUE SPECIFICATIONS .
14. Install the top cover of the exhaust manifold and tighten the bolts to the proper specification. Refer to TORQUE SPECIFICATIONS .
15. Install the upstream oxygen sensor wiring bracket, tighten the bolt and engage the wire harness in the retaining clip.
16. Connect the electrical connection of the upstream oxygen sensor.
17. Install the water pump pulley. Refer to PUMP, WATER, REMOVAL AND INSTALLATION .
18. Install the vibration damper. Refer to DAMPER, VIBRATION, REMOVAL AND INSTALLATION .
19. Install the accessory drive belt. Refer to BELT, SERPENTINE, REMOVAL AND INSTALLATION .
20. Install the air cleaner body. Refer to BODY, AIR CLEANER, REMOVAL AND INSTALLATION .
21. Install the cylinder head cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL AND INSTALLATION .
22. Install the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .

23. Install the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
24. Install the right front splash shield and wheel. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
25. Remove the vehicle from the lift.

VALVE TIMING > TENSIONER, ENGINE TIMING > REMOVAL AND INSTALLATION > 2.4L ENGINE TIMING TENSIONER > REMOVAL

1. Remove the right front wheel and splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .
2. Remove the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .
3. Remove the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
4. Remove the cylinder head cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL AND INSTALLATION .
5. Remove the air cleaner assembly. Refer to BODY, AIR CLEANER, REMOVAL AND INSTALLATION .
6. Remove the accessory drive belt. Refer to BELT, SERPENTINE, REMOVAL AND INSTALLATION .
7. Remove the crank pulley. Refer to DAMPER, VIBRATION, REMOVAL AND INSTALLATION .
8. Remove the water pump pulley. Refer to PUMP, WATER, REMOVAL AND INSTALLATION .
9. Remove the timing belt. Refer to CHAIN AND SPROCKETS, TIMING .

Fig 1: Tensioner & Bolts

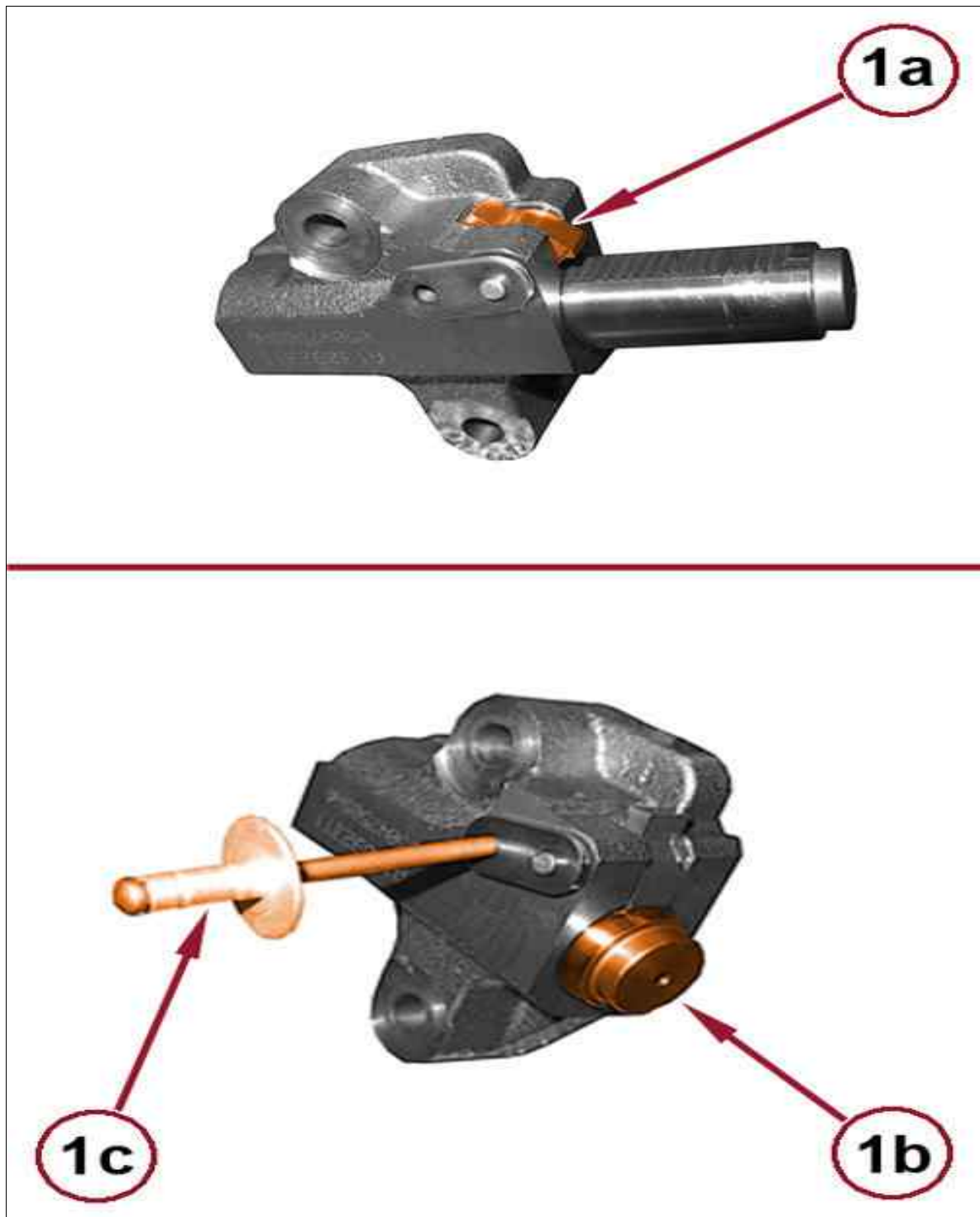


Courtesy of CHRYSLER GROUP, LLC

10. Remove the screws (1) and remove the tensioner.

**VALVE TIMING > TENSIONER, ENGINE TIMING > REMOVAL AND INSTALLATION >
2.4L ENGINE TIMING TENSIONER > INSTALLATION**

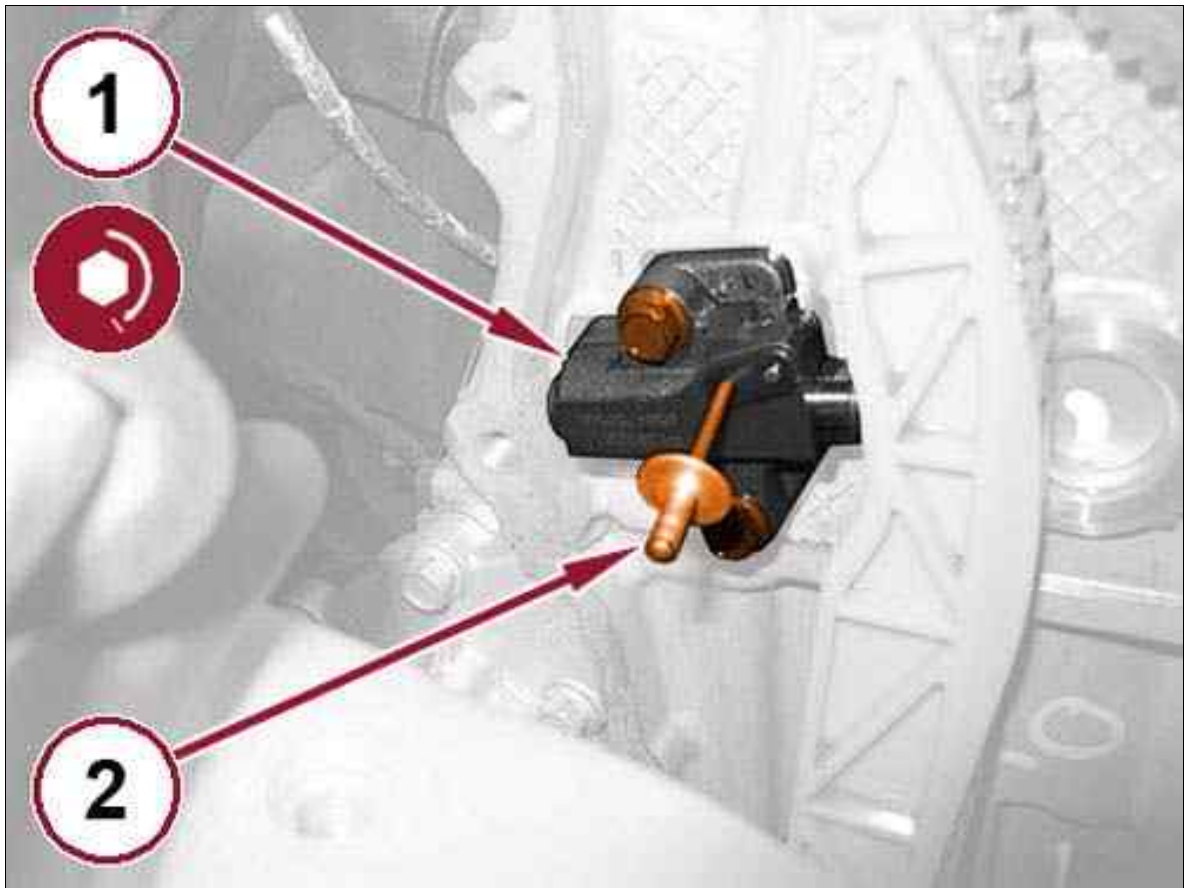
Fig 1: Pawl & Piston & Pin Lock



Courtesy of CHRYSLER GROUP, LLC

1. Disengage the pawl (1a) from the rack, compress the piston (1b) and insert the pin lock (1c).

Fig 2: Tensioner & Locking Plunger Pin



Courtesy of CHRYSLER GROUP, LLC

2. Install the tensioner (1) and tighten the screws to the proper specification. Refer to TORQUE SPECIFICATIONS .
3. Remove the locking plunger pin (2).
4. Install the timing belt. Refer to CHAIN AND SPROCKETS, TIMING .
5. Install the water pump pulley. Refer to PUMP, WATER, REMOVAL AND INSTALLATION .
6. Install the crank pulley. Refer to DAMPER, VIBRATION, REMOVAL AND INSTALLATION .
7. Install the accessory drive belt. Refer to BELT, SERPENTINE, REMOVAL AND INSTALLATION .
8. Install the air cleaner assembly. Refer to BODY, AIR CLEANER, REMOVAL AND INSTALLATION .
9. Install the cylinder head cover. Refer to COVER(S), CYLINDER HEAD, REMOVAL AND INSTALLATION .
10. Install the engine cover. Refer to COVER, ENGINE, REMOVAL AND INSTALLATION .
11. Install the belly pan. Refer to BELLY PAN, REMOVAL AND INSTALLATION and BELLY PAN, SIDE, REMOVAL AND INSTALLATION .

12. Install the right front wheel and splash shield. Refer to SHIELD, SPLASH, FRONT WHEELHOUSE, REMOVAL AND INSTALLATION .