2008 ENGINE

2.4L - Service Information - Compass & Patriot

DESCRIPTION

2.4L ENGINE

The 2.4 Liter (148 cu. in.) in-line four cylinder engine is a double over head camshaft design with mechanical lash tappets and four valves per cylinder design. This engine is NOT free-wheeling; meaning that the pistons will contact the valves in the event of a timing chain failure.

The cylinders are numbered from front of the engine to the rear. The firing order is 1-3-4-2.

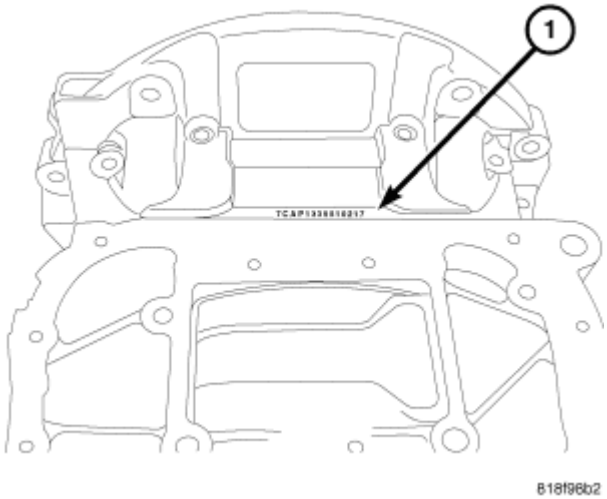

Fig. 1: Serial Number
Courtesy of CHRYSLER LLC

The engine serial number (1) is located on the rear of the cylinder block behind the oil pan. The serial number is visible with the oil pan in place. The serial number contains engine build date information.

DIAGNOSIS AND TESTING

CYLINDER COMBUSTION PRESSURE LEAKAGE TEST

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

Combustion pressure leakage testing will detect:

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

ENGINE CORE AND OIL GALLERY PLUGS

CYLINDER HEAD CORE PLUGS

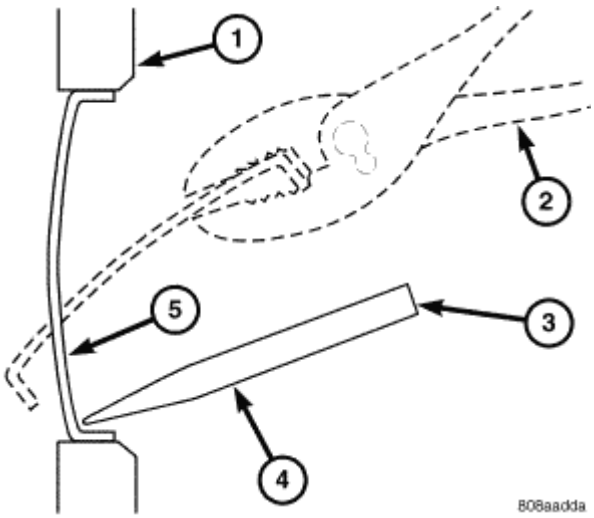

Fig. 2: Core Hole Plug Removal
Courtesy of CHRYSLER LLC

Using a blunt tool (3) such as a drift and a hammer, strike the bottom edge of the cup plug (5). With the cup plug rotated, grasp firmly with pliers or other suitable tool (2) and remove plug (5).

CAUTION: Do not drive cup plug into the casting as restricted cooling can result and cause serious engine problems.

Thoroughly clean inside of cup plug hole in cylinder head. Be sure to remove old sealer. Lightly coat inside of cup plug hole with Mopar® Stud and Bearing Mount (or equivalent). Make certain the new plug is cleaned of all oil or grease. Using proper drive plug, drive plug into hole so that the sharp edge of the plug is at least 0.5 mm (0.020 in.) inside the lead-in chamfer.

It is not necessary to wait for curing of the sealant. The cooling system can be refilled and the vehicle placed in service immediately.

CYLINDER BLOCK MAIN OIL GALLERY PLUGS

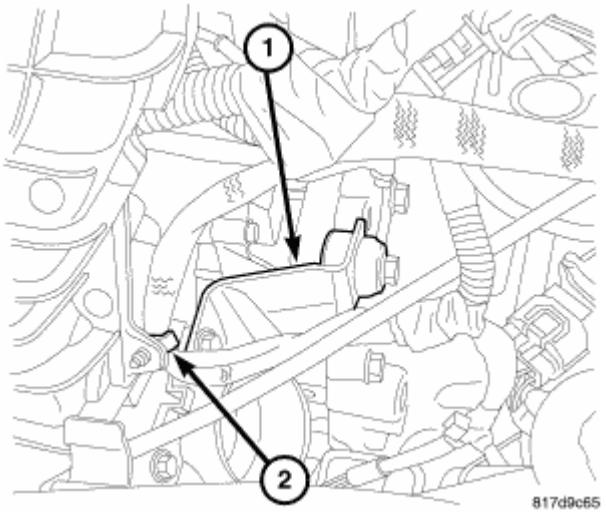

Fig. 17: Throttle Body Support
Courtesy of CHRYSLER LLC

21. Remove harness from intake (2).
22. Remove throttle body support bracket (1).
23. Remove vacuum lines from intake manifold.
24. Disconnect electronic throttle control and manifold flow control valve electrical connectors.

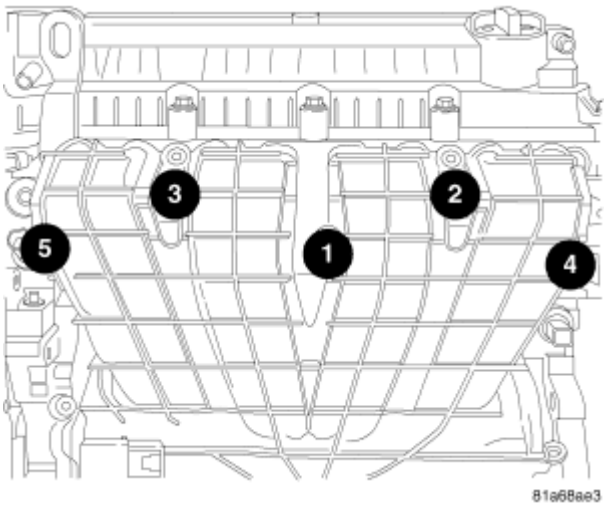

Fig. 18: Intake Manifold Bolt Torque Sequence
Courtesy of CHRYSLER LLC

25. Remove dipstick.
26. Remove intake bolts (1 - 5) and remove intake.
27. Disconnect coolant temperature sensor at block, knock sensor, oil pressure sensor, generator, starter, block heater (if equipped), A/C compressor (if equipped), and block ground.
28. Remove accessory drive belt.

2.4L ENGINE

GENERAL SPECIFICATIONS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Type	In-Line OHV, DOHC	
Number of Cylinders	4	
Firing Order	1-3-4-2	
Compression Ratio	10.5:1	
Max. Variation Between Cylinders	25%	
Displacement	2.4 Liters	146.5 cu. in.
Bore	88 mm	3.465 in.
Stroke	97 mm	3.819 in.
Compression Pressure	1172-1551 kPa	170-225 psi

CYLINDER BLOCK

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Material	Cast Aluminum	
Cylinder Bore Diameter	-	
A	88.000 < 88.010	3.4645 < 3.4649 in.
B	88.010 < 88.020	3.4649 < 3.4653 in.
C	88.020 - 88.030	3.4653 - 3.4657 in.
Cylinder Bore Diameter Out-of-Round (Max.)	0.020 mm	0.0008 in.
Cylinder Bore Diameter Taper (Max.)	0.028 mm	0.001 in.
Main Bearing Bore Diameter	-	
1	56.000 < 56.006 mm	2.2047 < 2.2049 in.
2	56.006 < 56.012 mm	2.2049 < 2.2051 in.
3	56.012 - 56.018 mm	2.2051 - 2.2054 in.
Main Bearing Bore Diameter Taper (Max.)	0.0082 mm	0.0003 in.

PISTONS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Piston Diameter	-	
A	87.995 - 88.015 mm	3.4644 - 3.4652 in.
B	88.005 - 88.025 mm	3.4648 - 3.4656 in.
C	88.015 - 88.035 mm	3.4652 - 3.4659 in.
Clearance to Bore	(-0.015) - 0.015 mm	(0.0006) - 0.0006 in.

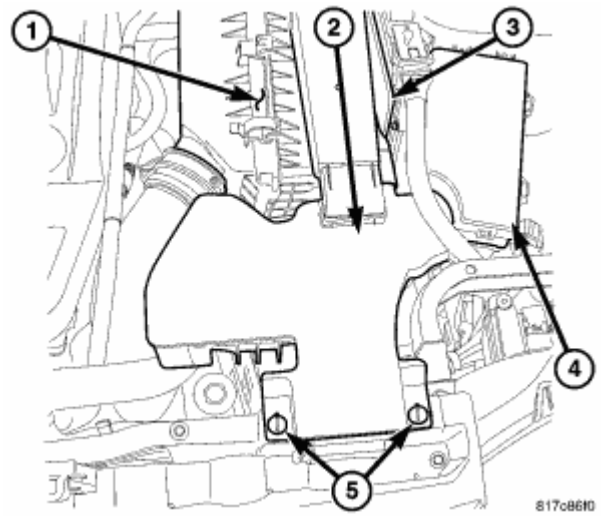

Fig. 78: Air Cleaner Housing Assembly
Courtesy of CHRYSLER LLC

5. Install fresh air inlet (2) on air cleaner housing (1) and lock retainers (5).

HOUSING-AIR CLEANER

REMOVAL

AIR CLEANER HOUSING

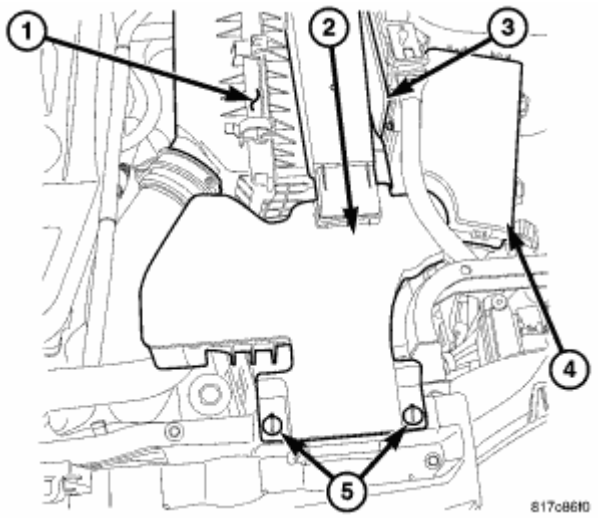

Fig. 79: Air Cleaner Inlet
Courtesy of CHRYSLER LLC

1. Remove fresh air inlet (2) from air cleaner housing (1).

2. Place two pea size dots of Mopar® engine sealant RTV or equivalent (1) on cylinder block as shown in illustration.

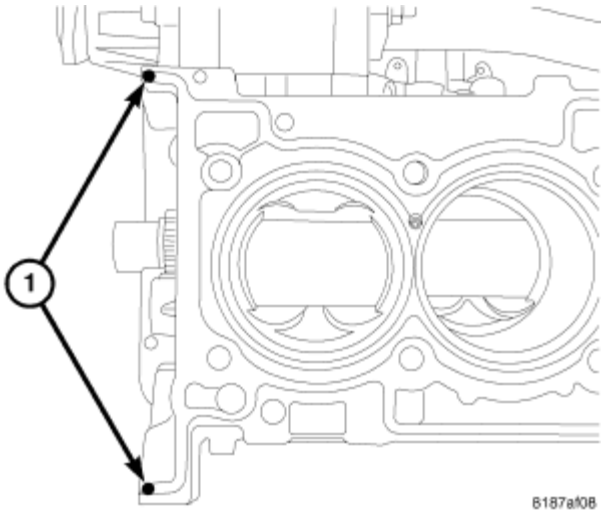

Fig. 106: Cylinder Head Gasket RTV
Courtesy of CHRYSLER LLC

3. Position the new cylinder head gasket on engine block with the part number facing up. Ensure gasket is seated over the locating dowels in block.
4. Place two pea size dots of Mopar® engine sealant RTV or equivalent (1) on cylinder head gasket as shown in illustration.

NOTE: The head must be installed within 15 minutes before the RTV skins.

5. Position cylinder head onto engine block.

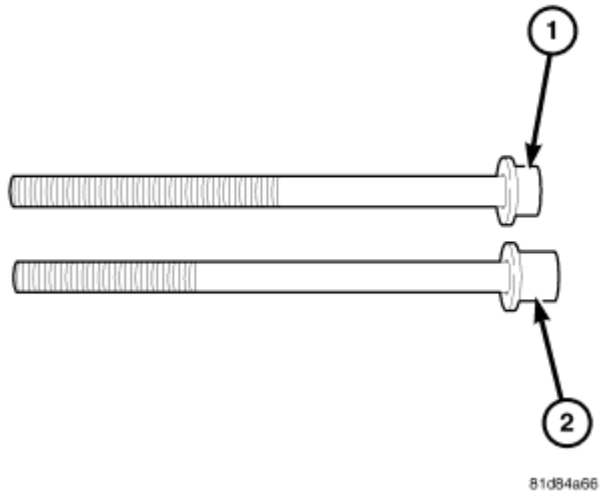

Fig. 107: Cylinder Head Bolt Identification
Courtesy of CHRYSLER LLC

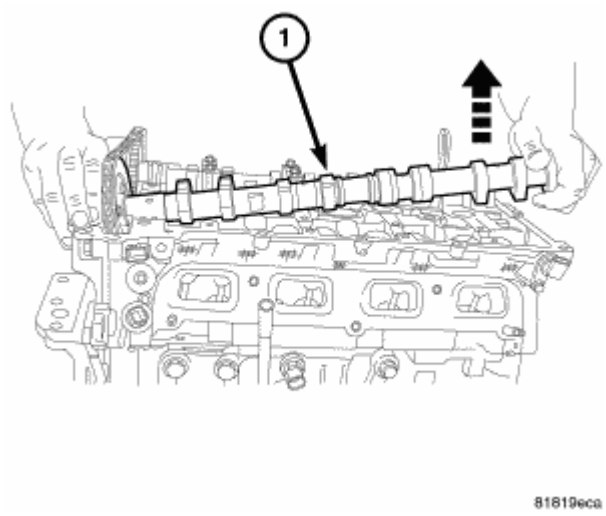

Fig. 135: Raise Intake CAM
Courtesy of CHRYSLER LLC

18. Remove intake camshaft (1) by lifting the rear of the camshaft upward.

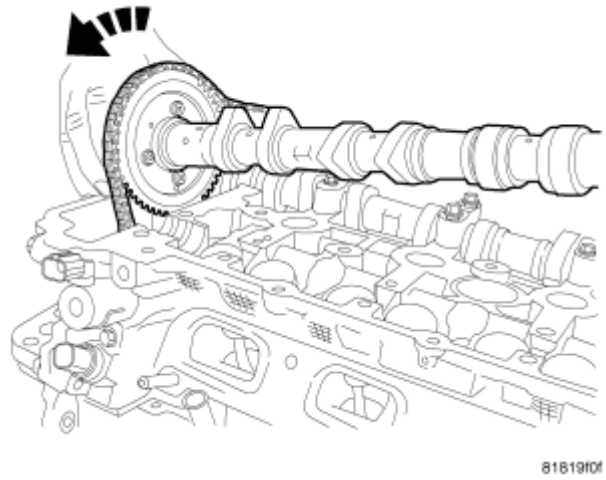

Fig. 136: Roll Camshaft
Courtesy of CHRYSLER LLC

19. Rotate the camshaft while lifting out of the front bearing cradle.

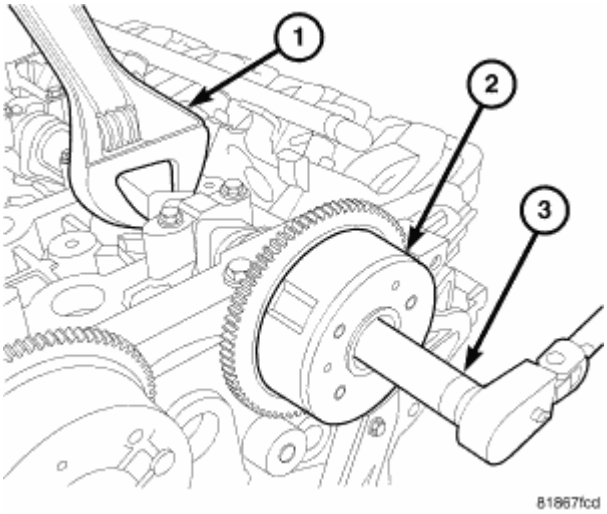

Fig. 174: CAMSHAFT PHASER
Courtesy of CHRYSLER LLC

CAUTION: Do not use an impact wrench to tighten camshaft sprocket bolts. Damage to the camshaft-to-sprocket locating dowel pin and camshaft phaser may occur.

1. Install phaser (2) assembly on camshaft.

NOTE: Make sure the dowel is seated in the dowel hole and not in a oil feed hole. The dowel hole is larger than the 4 oil feed holes.

2. Install phaser retaining bolt and torque while holding camshaft in place with a wrench (1).
3. Install camshafts. See **INSTALLATION**).

ENGINE MOUNTING

DESCRIPTION

ENGINE MOUNTING

The engine mounting system consists of a four-point system utilizing two load-carrying mounts and two torque controlling mounts. The load-carrying mounts are located on each frame rail. The right and left mounts are hydro-elastic mounts. The two torque controlling mounts are attached to a fore/aft member and the front and rear of the engine.

OPERATION

ENGINE MOUNT

The four-point engine mounting system minimizes the transmission of structure-borne engine noise to the passenger compartment. The load-carrying right and left mounts dampen and isolate vertical motion and

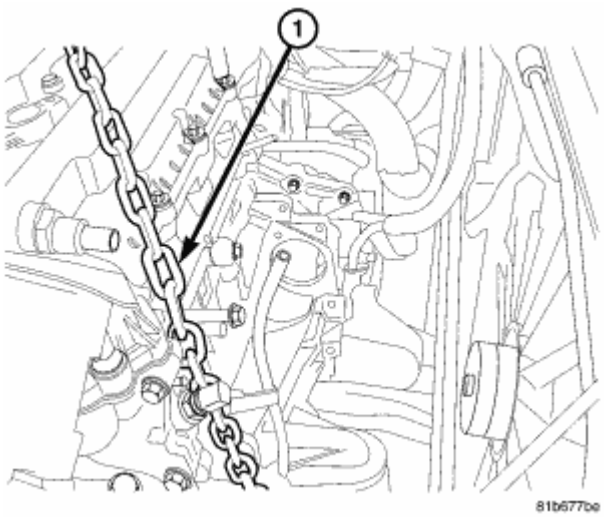

Fig. 196: Lift Chain
Courtesy of CHRYSLER LLC

5. Remove engine from lift chain (1) and mount engine on a suitable repair stand.

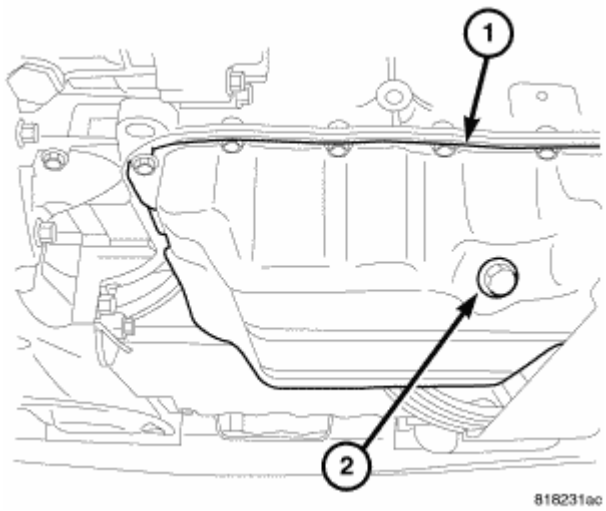

Fig. 197: Oil Drain Plug
Courtesy of CHRYSLER LLC

6. Drain engine oil (2).

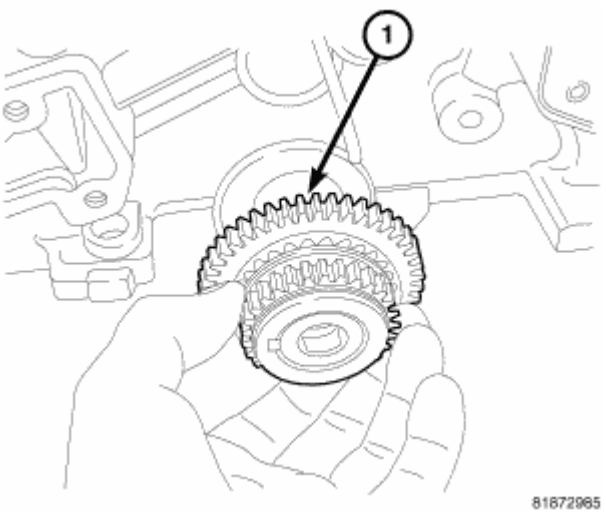

Fig. 213: Crankshaft Sprocket
Courtesy of CHRYSLER LLC

25. Install front crankshaft sprocket (1).
26. Install the timing chain. See **INSTALLATION**.
27. Install the timing chain front cover. See **INSTALLATION**).
28. Install the oil pan. See **INSTALLATION**.
29. Install rear crankshaft oil seal. See **INSTALLATION**.
30. Install front crankshaft oil seal. See **INSTALLATION**.

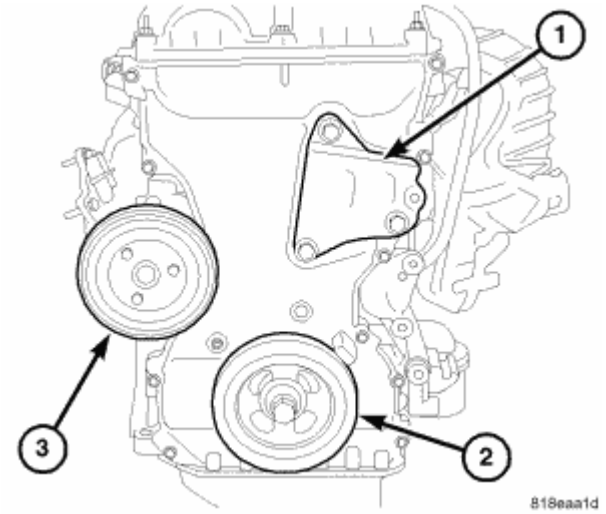

Fig. 214: Right Engine Mount Bracket
Courtesy of CHRYSLER LLC

31. Install engine mount support bracket (1).
32. Install crankshaft vibration damper (2). See **INSTALLATION**.
33. Install water pump pulley (3).

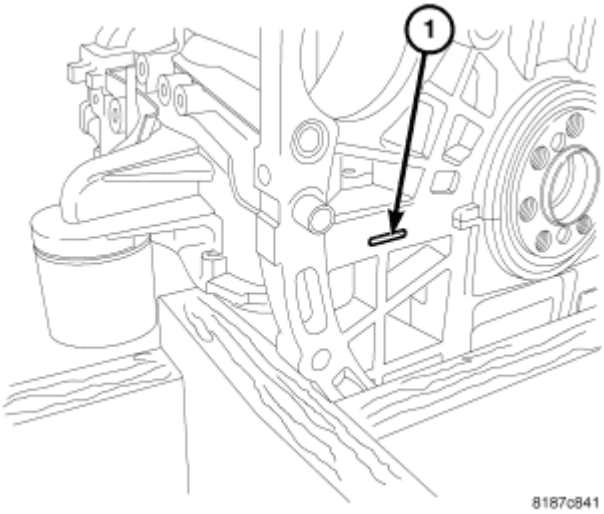

Fig. 251: Rear Of Block Ladder Frame Pry Point
Courtesy of CHRYSLER LLC

1. Remove oil pan. See **REMOVAL**.
2. Remove balance shaft assembly. See **REMOVAL**.
3. Remove ladder frame retaining bolts.
4. Remove ladder frame using pry point cast in the rear of the block (1).

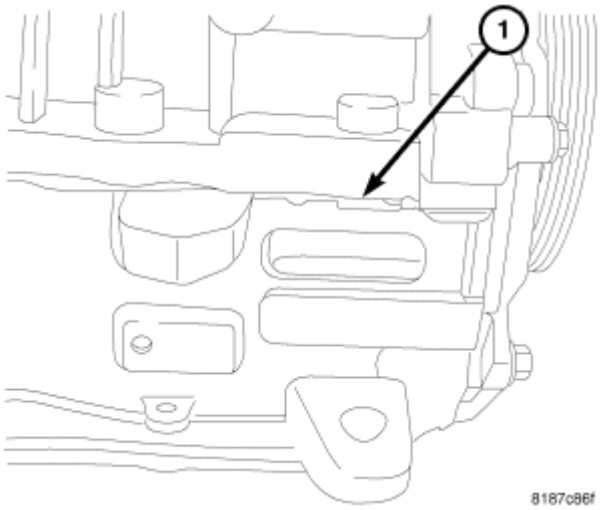

Fig. 252: Right Side Of Block Ladder Frame Pry Point
Courtesy of CHRYSLER LLC

5. To assist in removing the ladder frame another (1) pry point cast in the right side of the block.

CLEANING

CLEANING

Clean ladder frame with a plastic or wooden scraper and a suitable solvent. See **STANDARD PROCEDURE**.

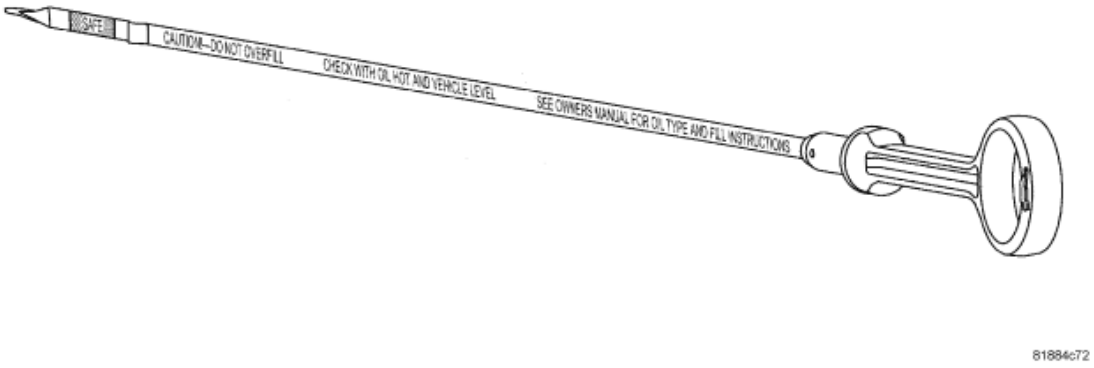

Fig. 269: Engine Oil Dipstick
Courtesy of CHRYSLER LLC

NOTE: The engine must be HOT when checking oil level.

The best time to check engine oil level is after the engine is at operating temperature. Allow the engine to be shut off for at least 5 minutes before checking oil level.

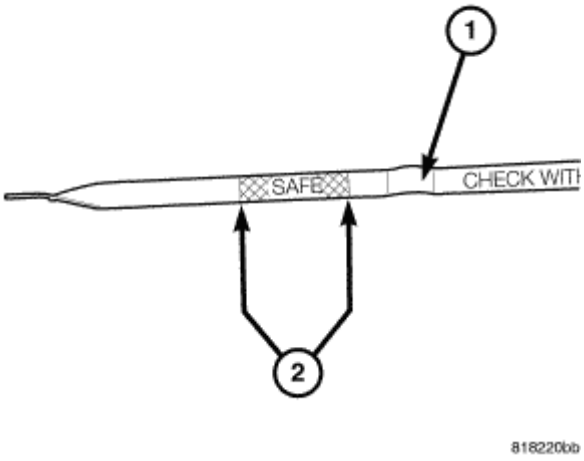

Fig. 270: Identifying SAFE Mark
Courtesy of CHRYSLER LLC

Checking the oil while the vehicle is on level ground will improve the accuracy of the oil level reading. Remove dipstick (1), and observe oil level. Add oil only when the level is at or below the SAFE mark. If the oil level is in the safe (2) range, do not add oil.

CAUTION: Do not operate engine if the oil level is above the MAX mark on the dipstick. Excessive oil volume can cause oil aeration which can lead to engine failure due to loss of oil pressure or increase in oil temperature.

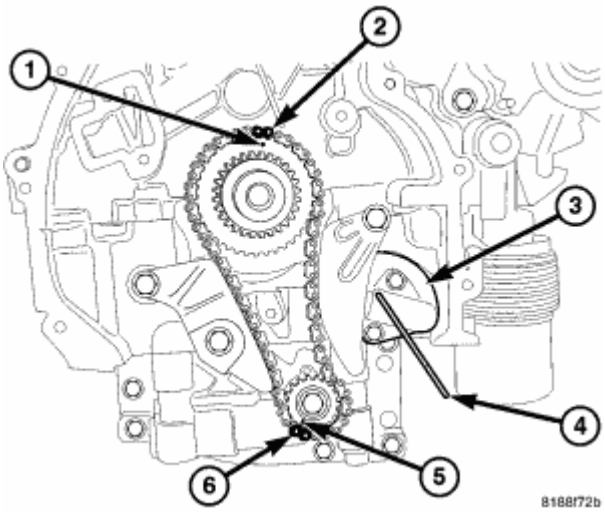

Fig. 298: Timing Chain Mark & Tensioner Pin
Courtesy of CHRYSLER LLC

5. With piston held back insert tensioner pin 9703 (4) into the tensioner body to hold the piston in the retracted position.

NOTE: Do not remove sprocket from BSM.

6. Remove BSM mounting bolts and discard.
7. Lower the back of the BSM and remove the chain (6) from the sprocket (5).
8. Remove BSM from the engine.

INSPECTION

INSPECTION - OIL PUMP DRIVE CHAIN

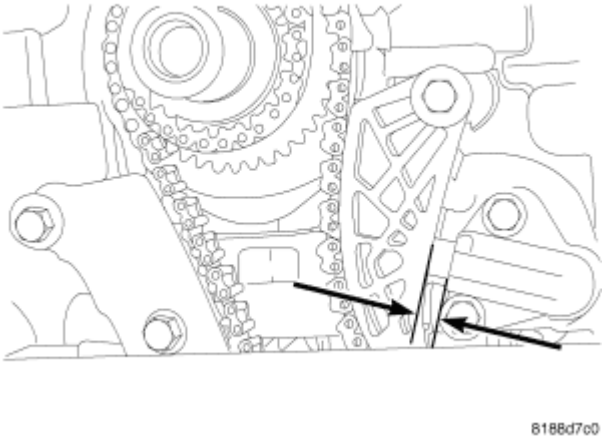

Fig. 299: OIL PUMP CHAIN STRETCH
Courtesy of CHRYSLER LLC

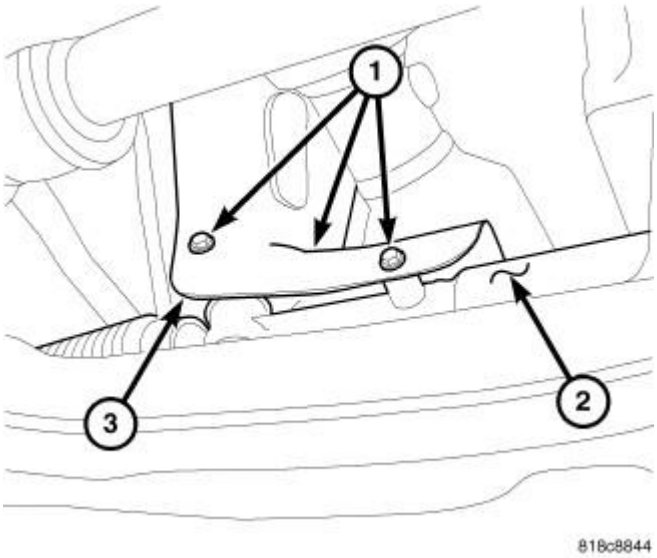

Fig. 317: Removing/Installing Bolts Securing Steering Gear Heat Shield
Courtesy of CHRYSLER LLC

13. Remove the front engine mount bolt (2) and the front fore and aft crossmember (4). Refer to **CROSSMEMBER-FRONT FORE/AFT** .

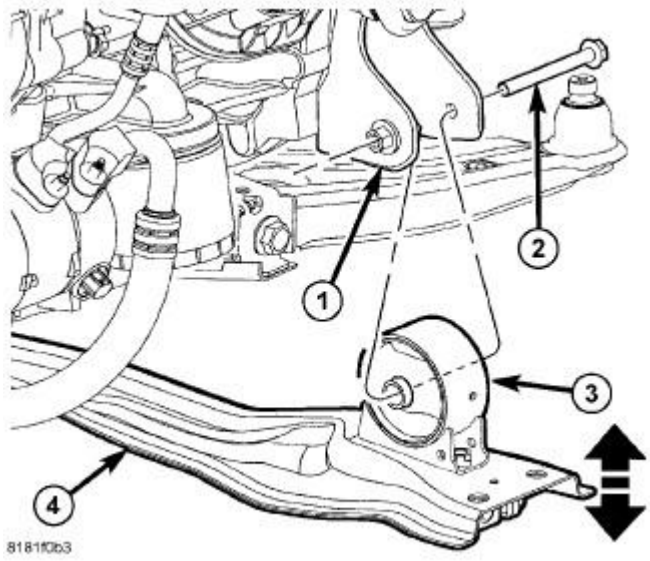

Fig. 318: Removing/Installing Fore/Aft Crossmember
Courtesy of CHRYSLER LLC

14. Remove the four bolts (1) and the maniverter support bracket (2).

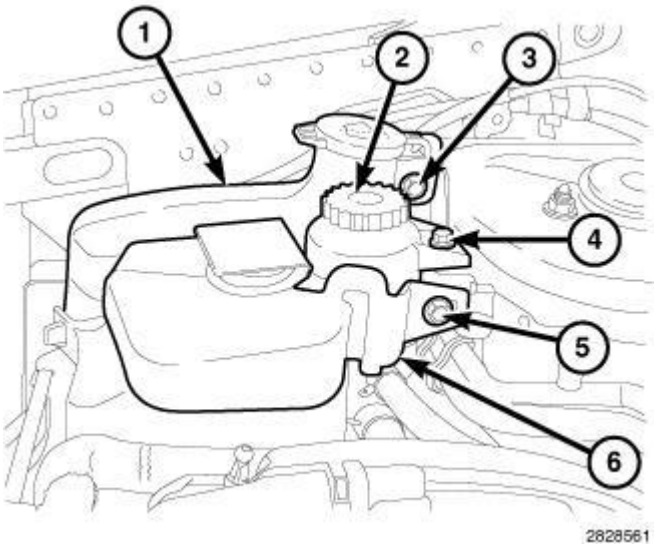

Fig. 338: Coolant Reservoir, Power Steering Fluid Reservoir, Washer Fluid Reservoir & Bolts
Courtesy of CHRYSLER LLC

10. Install the engine coolant reservoir (6) with the bolt (5) tightened to 4 N.m (35 in. lbs.).
11. Install two engine cover mounting posts (1) and tighten to 4 N.m (35 in. lbs.).

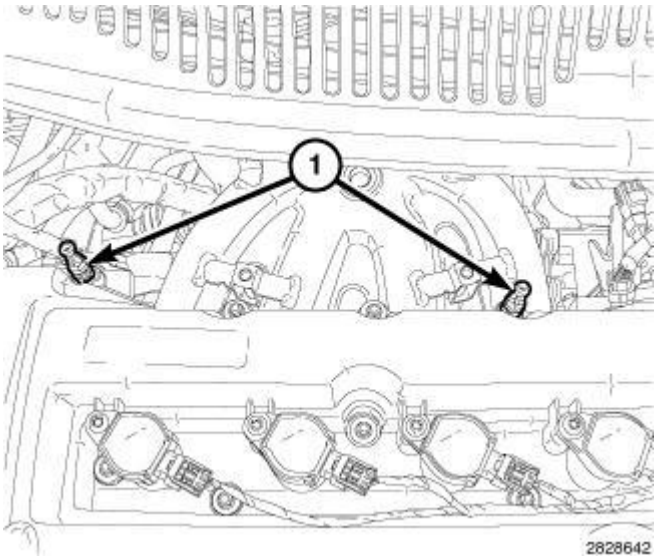

Fig. 339: Engine Cover Mounting Posts
Courtesy of CHRYSLER LLC

12. Install the engine lift bracket (2) with the stud bolt (3) tightened to 25 N.m (18 ft. lbs.).