

2010 ENGINE**5.7L - Service Information - 2500****DESCRIPTION****DESCRIPTION**

The 5.7L engine (345 CID) eight-cylinder engine is a 90° V-Type lightweight, deep skirt cast iron block, aluminum heads, single cam, overhead valve engine with hydraulic roller tappets. The heads incorporate splayed valves with a hemispherical style combustion chamber and dual spark plugs. The cylinders are numbered from front to rear; 1, 3, 5, 7 on the left bank and 2, 4, 6, 8 on the right bank. The firing order is 1-8-4-3-6-5-7-2.

DIAGNOSIS AND TESTING**INTRODUCTION**

Engine diagnosis is helpful in determining the causes of malfunctions not detected and remedied by routine maintenance.

These malfunctions may be classified as either performance (e.g., engine idles rough and stalls) or mechanical (e.g., a strange noise).

Refer to **PERFORMANCE** and **MECHANICAL** for possible causes and corrections of malfunctions.

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

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

PERFORMANCE

CONDITION	POSSIBLE CAUSE	CORRECTION
ENGINE WILL NOT START	1. Weak battery 2. Corroded or loose battery connections. 3. Faulty starter.	1. Charge or replace as necessary. 2. Clean and tighten battery connections. Apply a coat of light mineral grease to the terminals. 3. Refer to <u>Electrical/Starting - Diagnosis and Testing</u> .

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	4. Faulty coil or control unit. 5. Incorrect spark plug gap. 6. Dirt or water in fuel system. 7. Faulty fuel pump, relay or wiring.	4. Refer to <u>Electrical/Ignition Control/COIL, Ignition - Removal</u>. 5. Correct as necessary. 6. Clean system and replace fuel filter. 7. Repair or replace as necessary.
ENGINE STALLS OR ROUGH IDLE	1. Dirty or incorrectly gapped spark plugs. 2. Idle mixture too lean or too rich. 3. Vacuum leak. 4. Faulty coil. 5. Incorrect engine timing.	1. Correct as necessary. 2. Refer to Powertrain Diagnosis Information. 3. Inspect intake manifold and vacuum hoses, repair or replace as necessary. 4. Refer to <u>Electrical/Ignition Control/COIL, Ignition - Removal</u>. 5. Refer to <u>Valve Timing</u>.
ENGINE LOSS OF POWER	1. Dirty or incorrectly gapped spark plugs. 2. Dirt or water in fuel system. 3. Faulty fuel pump. 4. Blown cylinder head gasket. 5. Low compression. 6. Burned, warped or pitted valves. 7. Plugged or restricted exhaust system. 8. Faulty coil.	1. Correct as necessary. 2. Clean system and replace fuel filter. 3. Refer to the Appropriate Diagnostic Information 4. Replace cylinder head gasket. 5. See <u>CYLINDER COMPRESSION PRESSURE LEAKAGE</u>. 6. Replace as necessary. 7. Inspect and replace as necessary. 8. Refer to <u>Electrical/Ignition Control/COIL, Ignition - Removal</u>.
ENGINE MISSES ON ACCELERATION	1. Spark plugs dirty or incorrectly gapped. 2. Dirt in fuel system. 3. Burned, warped or pitted valves. 4. Faulty coil.	1. Correct as necessary. 2. Clean fuel system. 3. Replace as necessary. 4. Refer to <u>Electrical/Ignition Control/COIL, Ignition - Removal</u>.
ENGINE MISSES AT HIGH	1. Spark plugs dirty or incorrectly	1. Correct as necessary.

SPEED	gapped. 2. Faulty coil. 3. Dirt or water in fuel system.	2. Refer to <u>Electrical/Ignition Control/COIL, Ignition - Removal</u> . 3. Clean system and replace fuel filter.
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CYLINDER COMPRESSION PRESSURE LEAKAGE

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

NOTE: Ensure the battery is completely charged and the engine starter motor is in good operating condition. Otherwise the indicated compression pressures may not be valid for diagnosis purposes.

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

CYLINDER COMBUSTION PRESSURE LEAKAGE

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

Combustion pressure leakage testing will detect:

- Exhaust and intake valve leaks (improper seating).
 - Leaks between adjacent cylinders or into water jacket.
 - Any causes for combustion/compression pressure loss.
1. Check the coolant level and fill as required. DO NOT install the radiator cap.
 2. Start and operate the engine until it attains normal operating temperature, then turn the engine OFF.
 3. Remove the spark plugs.
 4. Remove the oil filler cap.
 5. Remove the air cleaner hose.
 6. Calibrate the tester according to the manufacturer's instructions. The shop air source for testing should maintain 483 kPa (70 psi) minimum, 1,379 kPa (200 psi) maximum and 552 kPa (80 psi) recommended.
 7. Perform the test procedures on each cylinder according to the tester manufacturer's instructions. Set piston of cylinder to be tested at TDC compression. While testing, listen for pressurized air escaping through the throttle body, tailpipe and oil filler cap opening. Check for bubbles in the radiator coolant.

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

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

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

CYLINDER COMBUSTION PRESSURE LEAKAGE DIAGNOSIS CHART

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

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LUBRICATION

CONDITION	POSSIBLE CAUSES	CORRECTION
OIL LEAKS	1. Gaskets and O-Rings. a. Misaligned or damaged. b. Loose fasteners, broken or porous metal parts. 2. Crankshaft rear seal. 3. Crankshaft seal flange. Scratched, nicked or grooved. 4. Oil pan flange cracked. 5. Front cover seal, damaged or misaligned. 6. Scratched or damaged vibration damper hub. 7. Crankshaft Rear Flange Microporosity.	1. Replace as necessary. a. Replace as necessary. b. Tighten fasteners, Repair or replace metal parts. 2. Replace as necessary. 3. Polish or replace crankshaft. 4. Replace oil pan. 5. Replace seal. 6. Polish or replace damper. 7. Replace Crankshaft.
OIL PRESSURE DROP	1. Low oil level. 2. Faulty oil pressure sending unit. 3. Low oil pressure. 4. Clogged oil filter. 5. Worn oil pump. 6. Thin or diluted oil. 7. Excessive bearing clearance. 8. Oil pump relief valve stuck. 9. Oil pickup tube loose or damaged.	1. Check and correct oil level. 2. Replace sending unit. 3. Check pump and bearing clearance. 4. Replace oil filter. 5. Replace as necessary. 6. Change oil and filter. 7. Replace as necessary. 8. Replace oil pump. 9. Replace as necessary.
OIL PUMPING AT RINGS; SPARK PLUGS FOULING	1. Worn or damaged rings. 2. Carbon in oil ring slots. 3. Incorrect ring size installed. 4. Worn valve guides. 5. Leaking intake gasket(s). 6. Leaking valve guide seals.	1. Hone cylinder bores and replace rings. 2. Replace rings. 3. Replace rings. 4. Ream guides and replace valves. 5. Replace intake gasket(s). 6. Replace valve guide seals.

MECHANICAL

CONDITION	POSSIBLE CAUSES	CORRECTION
	1. High or low oil level in crankcase 2. Thin or diluted oil	1. Check for correct oil level. Adjust oil level by draining or adding as needed 2. Change oil. See <u>Engine/Lubrication/OIL - Standard</u>

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

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

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.

HYDROSTATIC LOCK

CAUTION: DO NOT use the starter motor to rotate the crankshaft. Severe damage could occur.

When an engine is suspected of hydrostatic lock (regardless of what caused the problem), follow the steps below.

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

REMOVAL

REMOVAL

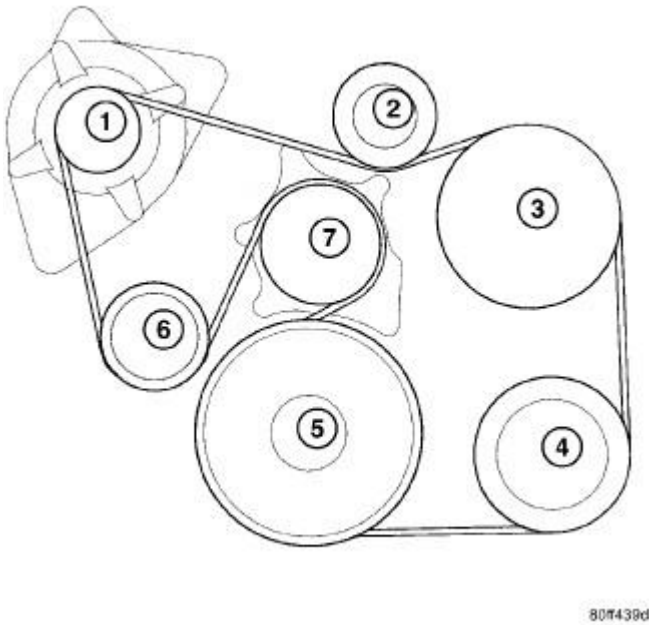


Fig. 1: Accessory Drive Belt Routing
Courtesy of CHRYSLER LLC

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| <ul style="list-style-type: none">1 - GENERATOR2 - IDLER PULLEY3 - POWER STEERING PUMP4 - A/C COMPRESSOR5 - CRANKSHAFT6 - BELT TENSIONER7 - WATER PUMP |
|--|

1. Perform the Fuel System Pressure Release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
2. Disconnect the battery negative cable.
3. Remove the air cleaner resonator and duct work as an assembly.
4. Drain cooling system. Refer to **Cooling - Standard Procedure** .
5. Remove the viscous fan/drive. Refer to **Cooling/Engine/FAN, Cooling - Removal** .
6. Remove the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .

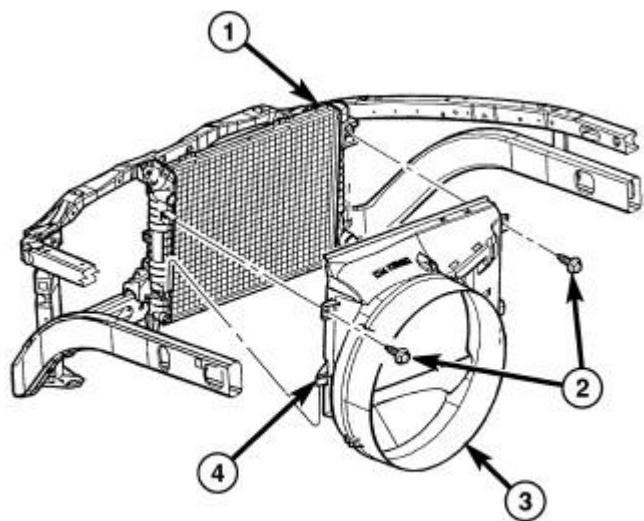
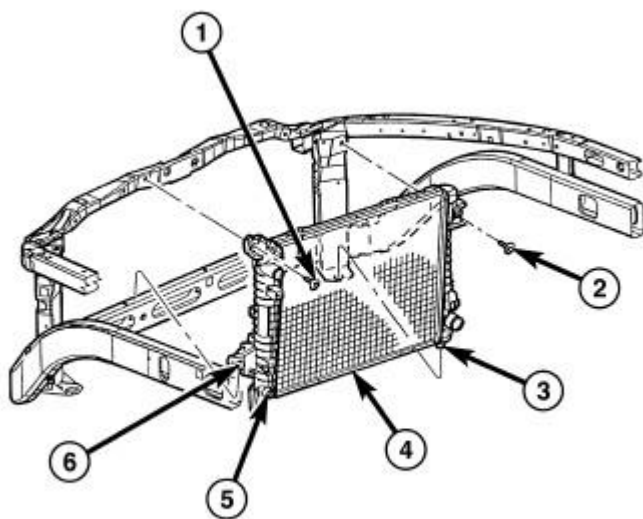


Fig. 2: Fan Shroud - Gas Engine
Courtesy of CHRYSLER LLC

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|---|
| 1 - RADIATOR
2 - SCREWS
3 - FAN SHROUD
4 - SLIDE MOUNT |
|---|

7. Remove the fan shroud (3).

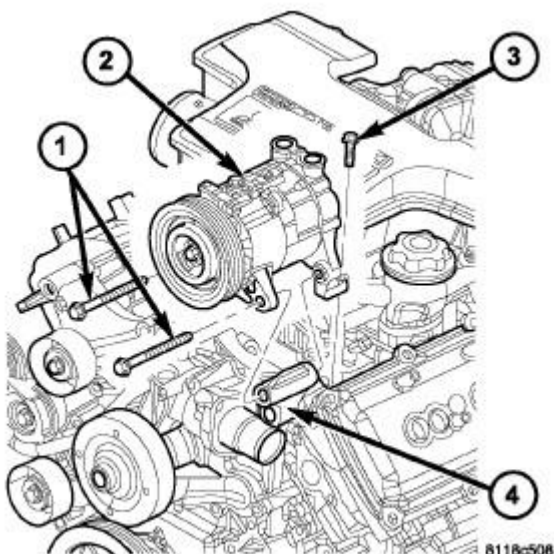


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Fig. 3: Radiator

Courtesy of CHRYSLER LLC

8. Remove radiator (1). Refer to Cooling/Engine/RADIATOR, Engine Cooling - Removal.
9. Remove the upper crossmember and top core support.



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Fig. 4: A/C COMPRESSOR - 5.7L ENGINE

Courtesy of CHRYSLER LLC

NOTE: It is not necessary to drain A/C system for engine removal.

10. Remove the A/C compressor (2) with the lines attached. Secure compressor out of the way.

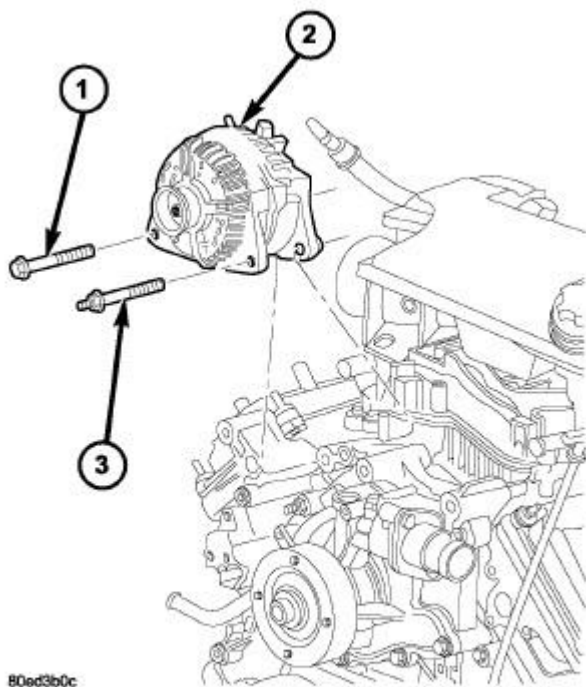


Fig. 5: REMOVE / INSTALL GENERATOR - 5.7L

Courtesy of CHRYSLER LLC

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|--|
| 1 - MOUNTING BOLT
2 - GENERATOR
3 - MOUNTING STUD / BOLT |
|--|

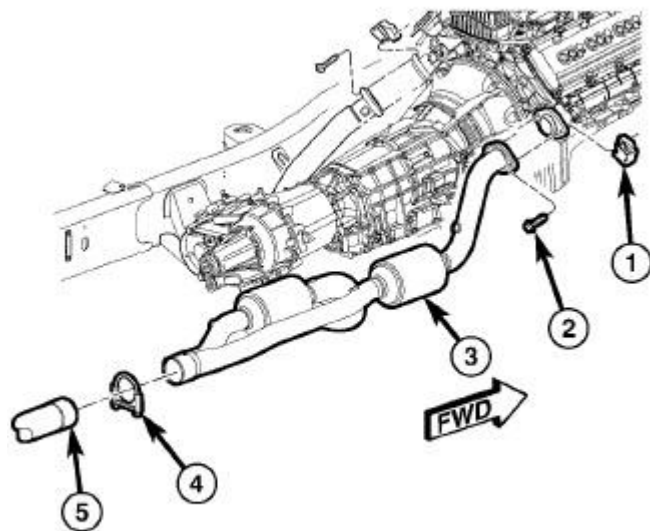
11. Remove generator assembly (2). Refer to **Electrical - Engine Systems/Charging/GENERATOR - Removal**.
12. Remove the intake manifold and IAFM as an assembly. See **Engine/Manifolds/MANIFOLD, Intake - Removal**.
13. Disconnect the heater hoses.

NOTE: It is not necessary to disconnect P/S hoses from pump, for P/S pump removal.

14. Remove the power steering pump and set aside.
15. Disconnect the fuel supply line. Refer to **Fuel System/Fuel Delivery/FITTING, Quick Connect -**

Standard Procedure .

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



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Fig. 6: CATALYTIC CONVERTER - 5.7L ENGINE
Courtesy of CHRYSLER LLC

- | |
|----------------------------|
| 1 - EXHAUST MANIFOLD NUTS |
| 2 - EXHAUST MANIFOLD BOLTS |
| 3 - CATALYTIC CONVERTER |
| 4 - CLAMP |
| 5 - EXHAUST PIPE |

17. Remove engine front mount through bolt nuts.
18. Remove right side axle retaining bolts.
19. Disconnect the transmission oil cooler lines from their retainers at the oil pan bolts.
20. Disconnect exhaust pipe at manifolds (2).

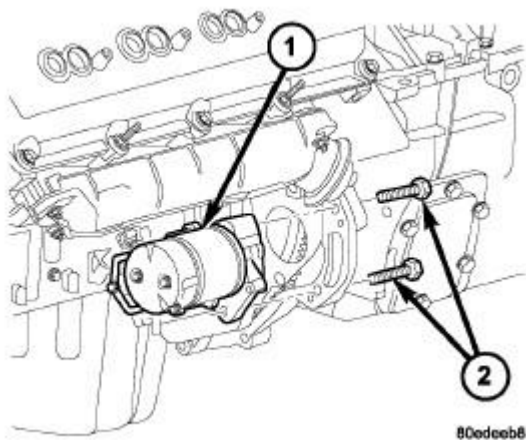


Fig. 7: STARTER REMOVE/INSTALL - 5.7L
 Courtesy of CHRYSLER LLC

1 - STARTER MOTOR 2 - MOUNTING BOLTS

21. Disconnect the starter wires. Remove starter motor (1). Refer to **Electrical - Engine Systems/Starting/STARTER - Removal**.

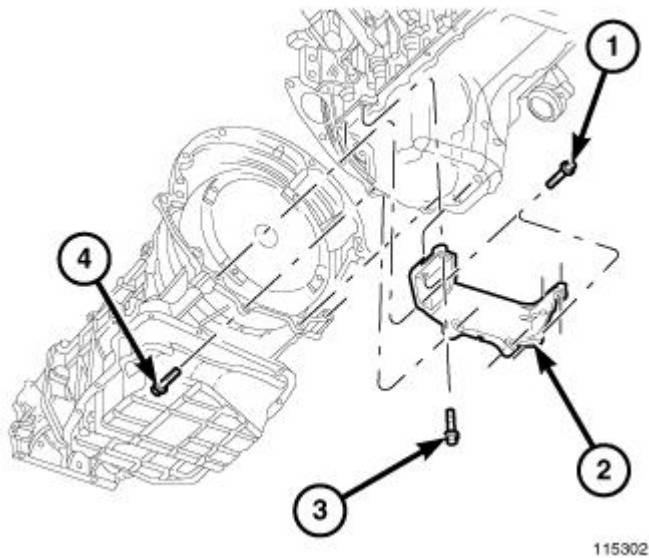


Fig. 8: Structural Cover
 Courtesy of CHRYSLER LLC

22. Remove the structural dust cover (1) and transmission inspection cover. See **Engine/Engine Block/COVER, Structural Dust - Removal**.
23. Remove drive plate to converter bolts (Automatic transmission equipped vehicles).

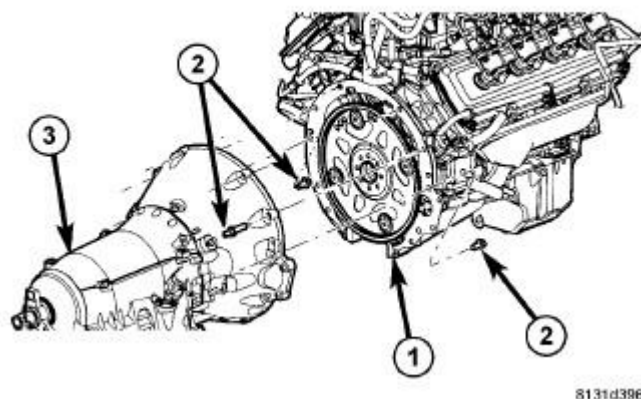


Fig. 9: Remove/Install Transmission To Engine Bolts
Courtesy of CHRYSLER LLC

1 - ENGINE 2 - BOLTS 3 - TRANSMISSION

24. Remove transmission bell housing to engine block bolts (2).
25. Lower the vehicle.

NOTE: Do not use air tools to install engine lift fixture 8984A (2).

26. Install engine lift fixture 8984A (2). **Do not use adapter (4).**
27. Separate engine from transmission, remove engine from vehicle, and install engine assembly on a repair stand.

INSTALLATION

INSTALLATION

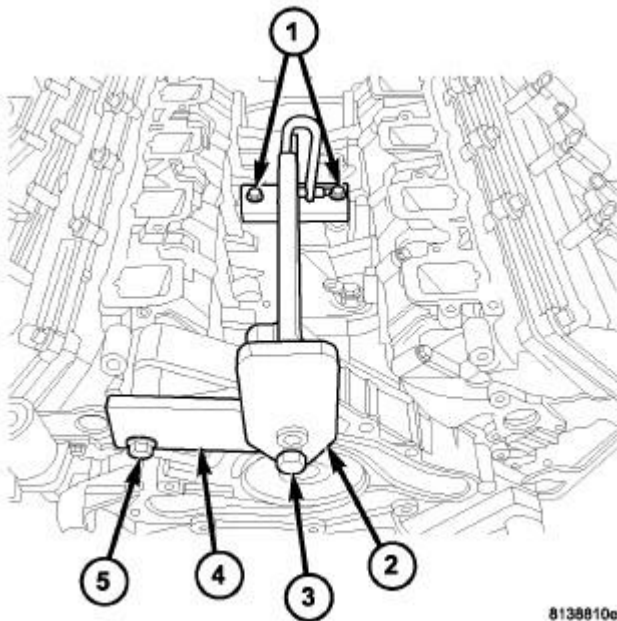
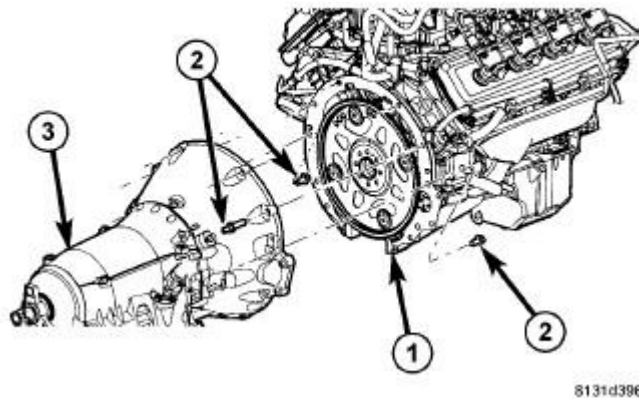


Fig. 10: ENGINE LIFT FIXTURE and ADAPTER
Courtesy of CHRYSLER LLC

- 1 - Bolts
- 2 - Engine Lift Fixture
- 3 - Adapter Bolt
- 4 - Adapter
- 5 - Adapter Nut

NOTE: Do not use air tools to install engine lift fixture 8984A (2).

1. Install engine lift fixture 8984A (2). **Do not use adapter (4).**
2. Position the engine in the engine compartment.
3. Lower engine into compartment and align engine with transmission:
 - Manual Transmission: Align clutch disc assembly (if disturbed). Install transmission input shaft into clutch disc while mating engine and transmission surfaces. Install two transmission to engine block mounting bolts finger tight.
 - Automatic Transmission: Mate engine and transmission and install two transmission to engine block mounting bolts finger tight.

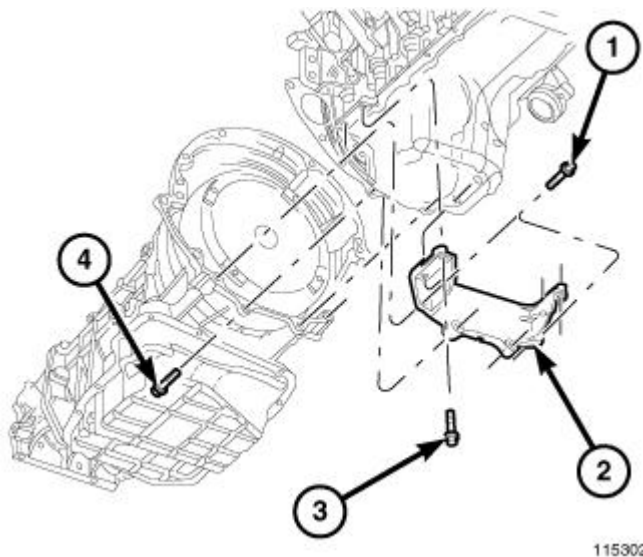


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Fig. 11: Remove/Install Transmission To Engine Bolts
 Courtesy of CHRYSLER LLC

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|---|
| 1 - ENGINE
2 - BOLTS
3 - TRANSMISSION |
|---|

4. Position the through bolt into the support cushion brackets.
5. Lower engine assembly until engine mount through bolts rest in mount perches.
6. Install remaining transmission to engine block mounting bolts (2) and tighten.



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Fig. 12: Structural Cover
 Courtesy of CHRYSLER LLC

7. Tighten engine mount through bolts.
8. Install drive plate to torque converter bolts. (Automatic transmission models)

9. Install the structural dust cover and transmission dust cover. See **Engine/Engine Block/COVER, Structural Dust - Installation**.

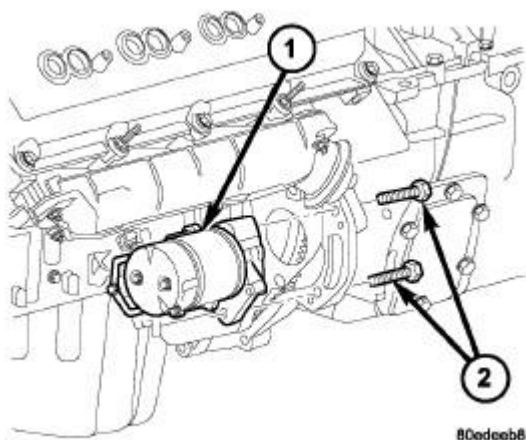


Fig. 13: STARTER REMOVE/INSTALL - 5.7L
 Courtesy of CHRYSLER LLC

- | |
|---|
| 1 - STARTER MOTOR
2 - MOUNTING BOLTS |
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10. Position the starter (1) and tighten bolts (2). Connect the starter wires. Refer to **Electrical - Engine Systems/Starting/STARTER - Installation**.

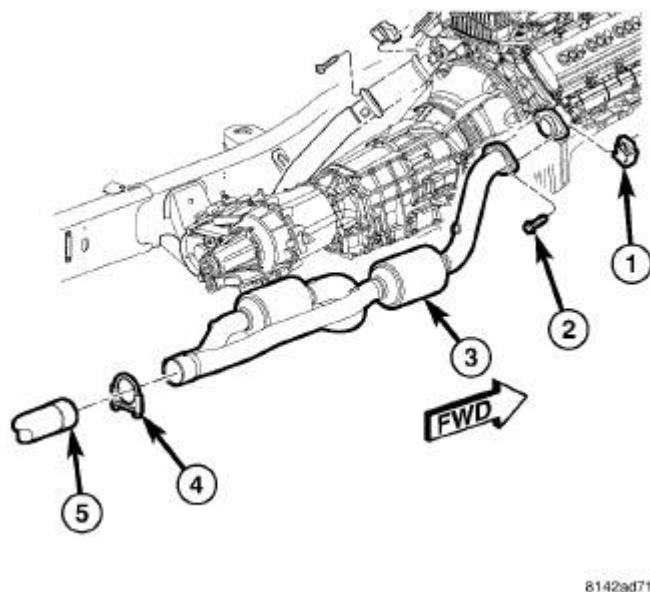


Fig. 14: CATALYTIC CONVERTER - 5.7L ENGINE

Courtesy of CHRYSLER LLC

- 1 - EXHAUST MANIFOLD NUTS
- 2 - EXHAUST MANIFOLD BOLTS
- 3 - CATALYTIC CONVERTER
- 4 - CLAMP
- 5 - EXHAUST PIPE

11. Install exhaust pipe to exhaust manifold bolts (2).
12. Lower the vehicle.

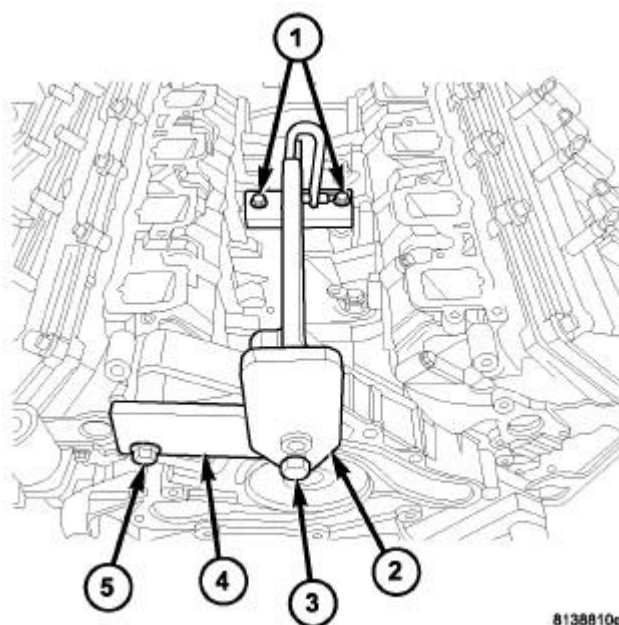


Fig. 15: ENGINE LIFT FIXTURE and ADAPTER
Courtesy of CHRYSLER LLC

- 1 - Bolts
- 2 - Engine Lift Fixture
- 3 - Adapter Bolt
- 4 - Adapter
- 5 - Adapter Nut

NOTE: Do not use air tools on engine lift fixture 8984A (2).

13. Remove engine lift fixture 8984A (2).
14. Connect the fuel supply line. Refer to Fuel System/Fuel Delivery/FITTING, Quick Connect - Standard Procedure.

15. Reinstall the power steering pump.
16. Connect the heater hoses.

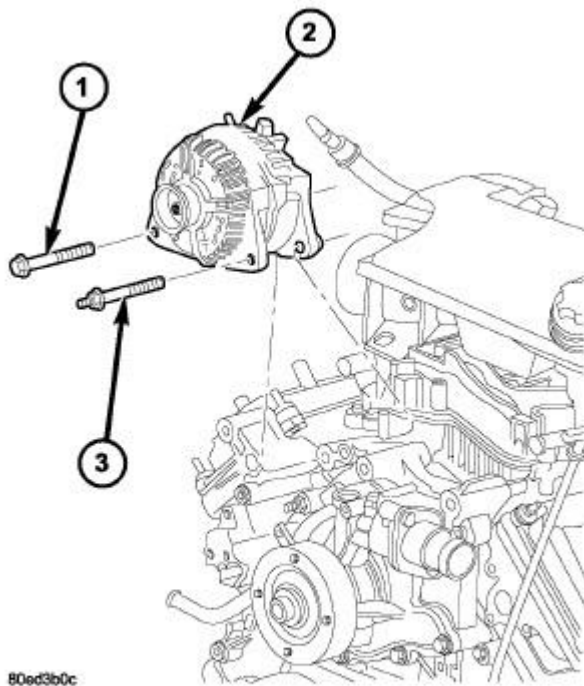


Fig. 16: REMOVE / INSTALL GENERATOR - 5.7L
Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - MOUNTING BOLT
2 - GENERATOR
3 - MOUNTING STUD / BOLT |
|--|

17. Install the intake manifold.
18. Using a new gasket, install throttle body. Refer to **Fuel System/Fuel Injection/THROTTLE BODY - Installation**.
19. Install the generator (2) and wire connections. Refer to **Electrical - Engine Systems/Charging/GENERATOR - Installation**.

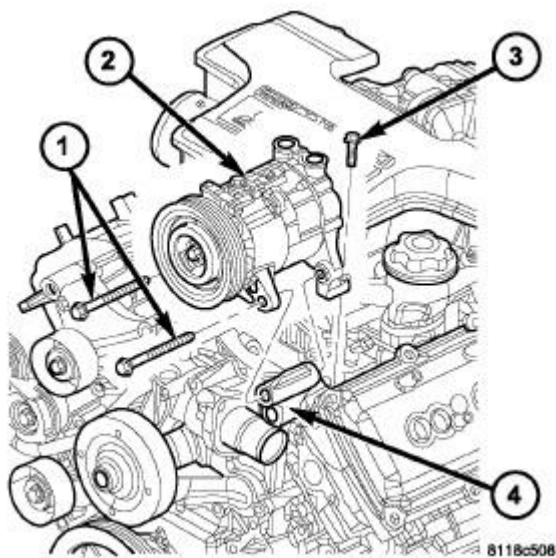


Fig. 17: A/C COMPRESSOR - 5.7L ENGINE

Courtesy of CHRYSLER LLC

20. Install a/c compressor (2). Refer to **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Installation** .

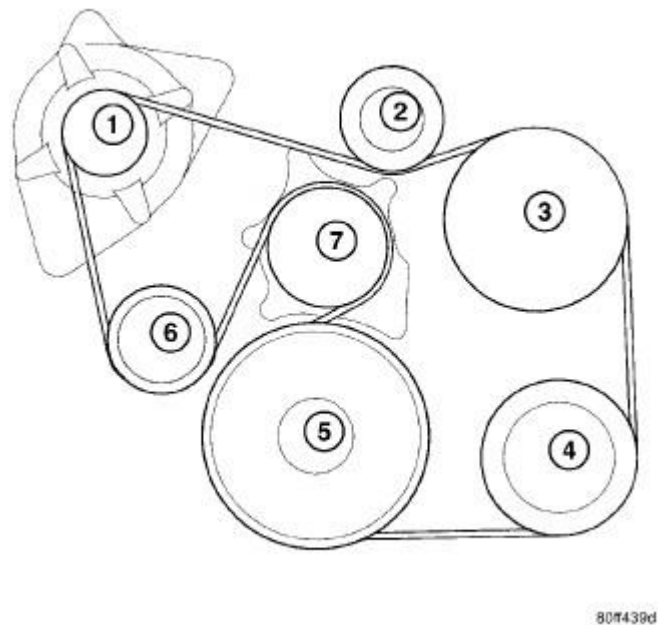


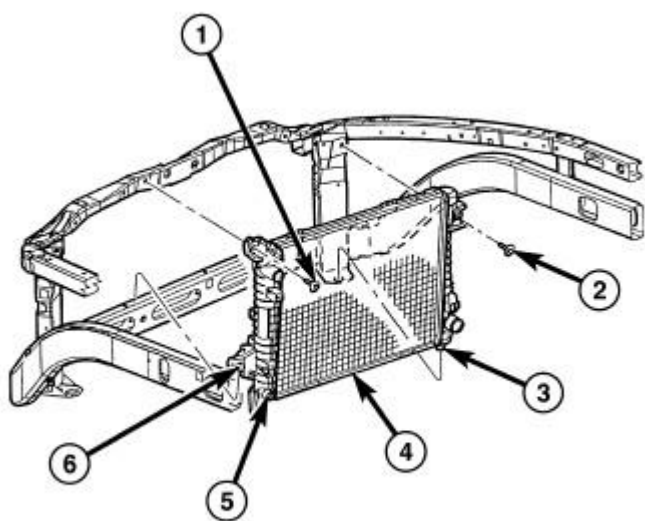
Fig. 18: Accessory Drive Belt Routing

Courtesy of CHRYSLER LLC

- 1 - GENERATOR
2 - IDLER PULLEY

- 3 - POWER STEERING PUMP
- 4 - A/C COMPRESSOR
- 5 - CRANKSHAFT
- 6 - BELT TENSIONER
- 7 - WATER PUMP

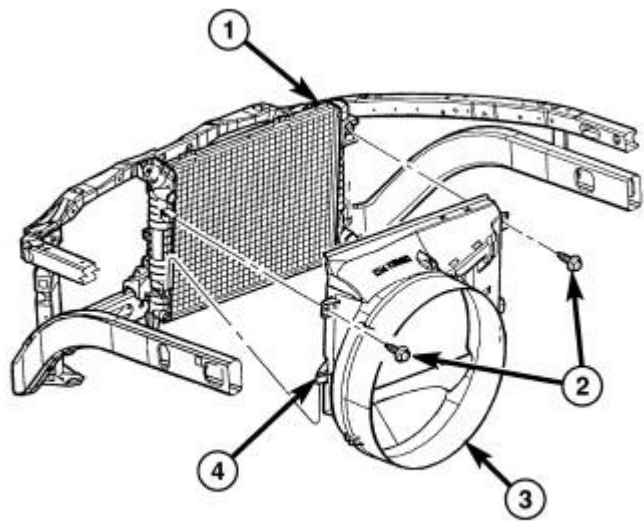
21. Install the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation**.
22. Install upper radiator support crossmember.



80db1e2d

Fig. 19: Radiator
Courtesy of CHRYSLER LLC

23. Install radiator (1). Refer to **Cooling/Engine/RADIATOR, Engine Cooling - Installation**.
24. Connect the radiator lower hose.
25. Connect the transmission oil cooler lines to the radiator.



80db20c9

Fig. 20: Fan Shroud - Gas Engine
Courtesy of CHRYSLER LLC

- | |
|-----------------|
| 1 - RADIATOR |
| 2 - SCREWS |
| 3 - FAN SHROUD |
| 4 - SLIDE MOUNT |

26. Install the fan shroud (3).
27. Install the fan. Refer to **Cooling/Engine/FAN, Cooling - Installation** .
28. Connect the radiator upper hose.
29. Install the washer bottle.
30. Connect the transmission cooler lines.
31. Install the air cleaner resonator and duct work.
32. Add engine oil to crankcase. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Specifications** .
33. Fill cooling system. Refer to **Cooling - Standard Procedure** .
34. Connect battery negative cable.
35. Start engine and inspect for leaks.
36. Road test vehicle.

SPECIFICATIONS

SPECIFICATIONS

2010 Dodge Pickup R2500

2010 ENGINE 5.7L - Service Information - 2500

GENERAL SPECIFICATIONS

DESCRIPTION -	SPECIFICATION	
	Metric	Standard
Engine Type	90° V-8 OHV	
Displacement	5.7 Liters	348 CID
Bore	99.5 mm	3.92 in.
Stroke	90.9 mm	3.58 in.
Compression Ratio	10.5:1	
Max. Variation Between Cylinders	25%	
Firing Order	1-8-4-3-6-5-7-2	
Lubrication	Pressure Feed - Full Flow Filtration	
Cooling System	Liquid Cooled	
Cylinder Block	Cast Iron	
Cylinder Head	Aluminum	
Crankshaft	Nodular Iron	
Camshaft	Cast Iron	
Pistons	Aluminum Alloy	
Connecting Rods	Powdered Metal	

CYLINDER BLOCK

DESCRIPTION -	SPECIFICATION	
	Metric	Standard
Cylinder Bore Diameter	99.50 mm	3.92 in.
Out of Round (MAX)	0.0076 mm	0.0003 in.
Taper (MAX)	0.0127 mm	0.0005 in.
Lifter Bore Diameter	21.45 - 21.425 mm	0.8444 - 0.8435 in.

PISTONS

DESCRIPTION -	SPECIFICATION	
	Metric	Standard
Clearance Measured at 38.0 mm (1.5 in.) Below Deck	- 0.031 - 0.058 mm	- 0.012 - 0.023 in.
Ring Groove Diameter	-	-
Top Groove	90.4 - 90.6 mm	3.56 - 3.57 in.
Second Groove	88.4 - 88.7 mm	3.48 - 3.49 in.
Weight	413 grams	14.56 oz
Piston Length	53.3 mm	2.10 in.
Ring Groove Width	-	-
No. 1	1.23 - 1.26 mm	0.048 - 0.0496 in.
No. 2	1.23 - 1.25 mm	0.048 - 0.0492 in.
No. 3	2.03 - 2.05 mm	0.079 - 0.080 in.

2010 Dodge Pickup R2500

2010 ENGINE 5.7L - Service Information - 2500

PISTON PINS

DESCRIPTION -	SPECIFICATION	
	Metric	Standard
Clearance In Piston	0.005 - 0.014 mm	0.0001 - 0.0005 in.
Diameter	24.004 - 24.007 mm	0.945 - 0.9451 in.
Length	62.99 - 63.21 mm	2.47 - 2.48 in.

PISTON RINGS

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

CONNECTING RODS

DESCRIPTION -	SPECIFICATION	
	Metric	Standard
Piston Pin Bore Diameter	24.014 - 24.024 mm	0.9454 - 0.9458 in.
Side Clearance	0.10 - 0.35 mm	0.003 - 0.0137 in.

CRANKSHAFT

DESCRIPTION -	SPECIFICATION	
	Metric	Standard
Main Bearing Journal Diameter	64.988 - 65.012 mm	2.5585 - 2.5595 in.
Bearing Clearance	0.023 - 0.051 mm	0.0009 - 0.002 in.
Out of Round (MAX)	0.005 mm	0.0002 in.
Taper (MAX)	0.003 mm	0.0001 in.
End Play	0.052 - 0.282 mm	0.002 - 0.011 in.
End Play (MAX)	0.282 mm	0.011 in.
Connecting Rod Journal Diameter	53.992 - 54.008 mm	2.126 in.
Bearing Clearance	0.020 - 0.060 mm	0.0007 - 0.0023 in.
Out of Round (MAX)	0.005 mm	0.0002 in.
Taper (MAX)	0.003 mm	0.0001 in.

2010 Dodge Pickup R2500

2010 ENGINE 5.7L - Service Information - 2500

CAMSHAFT

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

VALVE TIMING

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

CYLINDER HEAD

DESCRIPTION -	SPECIFICATION	
	Metric	Standard
Valve Seat Angle	44.5° - 45.0°	
Valve Seat Runout (MAX)	0.05 mm	0.0019 in.
Valve Seat Width (finish)	-	-
Intake	1.18 - 1.62 mm	0638 in.
Exhaust	1.48 - 1.92 mm	0.0583 - 0.0756 in.
Guide Bore Diameter (Std.)	7.975 - 8.00 mm	0.3134 - 0.315 in.

HYDRAULIC TAPPETS

DESCRIPTION -	SPECIFICATION	
	Metric	Standard

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2010 ENGINE 5.7L - Service Information - 2500

Body Diameter	21.387 - 21.405 mm	0.8420 - 0.8427 in.
Clearance (to bore)	0.020 - 0.063 mm	0.0008 - 0.0025 in.
Dry Lash	3.0 mm (at the valve)	0.1181 in. (at the valve)

VALVES

DESCRIPTION -	SPECIFICATION	
	Metric	Standard
Face Angle	45.0° - 45.5°	
Head Diameter	-	
Intake	50.67 - 50.93 mm	1.99 - 2.01 in.
Exhaust	39.27 - 39.53 mm	1.55 - 1.56 in.
Length (overall)	-	
Intake	123.38 - 123.76 mm	4.857 - 4.872 in.
Exhaust	120.475 - 120.855 mm	4.743 - 4.758 in.
Stem Diameter	-	
Intake	7.935 - 7.953 mm	0.312 - 0.313 in.
Exhaust	7.932 - 7.950 mm	0.312 - 0.313 in.
Stem - to - Guide Clearance	-	
Intake	0.022 - 0.065 mm	0.0008 - 0.0025 in.
Exhaust	0.025 - 0.065 mm	0.0009 - 0.0025 in.
Valve Lift (@ zero lash)	-	
Intake	12.0 mm	0.472 in.
Exhaust	11.70 mm	0.460 in.

VALVE SPRING

DESCRIPTION -	SPECIFICATION	
	Metric	Standard
Spring Force (valve closed)	435.0 N +/- 22.0 N @ 45 mm	97.8 lbs +/- 5.0 lbs. @ 1.771 in.
Spring Force (valve open)	1077.0 N +/- 48.0 N @ 32.6 mm.	242.0 lbs. +/- 11 lbs. @ 1.283 in.
Free Length (approx).	55.6 mm	2.189 in.
Number of Coils	7.95	
Wire Diameter	4.95 x 4.1 mm	0.194 - 0.161 in.
Installed Height (spring seat to bottom of retainer)	46.0 mm	1.81 in.

OIL PUMP

DESCRIPTION -	SPECIFICATION	
	Metric	Standard
Clearance Over Rotors (MAX)	0.095 mm	0.0038 in.
Outer Rotor to Pump Body Clearance (MAX)	235 mm	0.009 in.
Tip Clearance Between Rotors	0.150 mm	

2010 Dodge Pickup R2500

2010 ENGINE 5.7L - Service Information - 2500

(MAX)

0.006 in.

OIL PRESSURE

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

TORQUE

TORQUE CHART 5.7L ENGINE

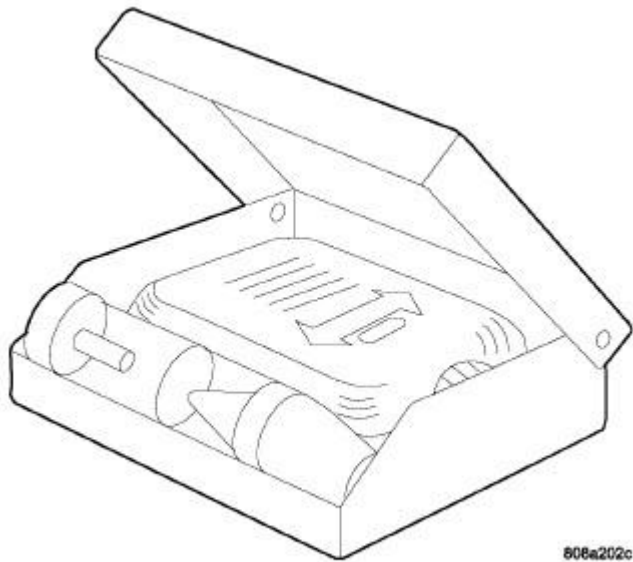
DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Block Pipe Plugs (1/4 NPT)	20	-	177
(3/8 NPT)	27	-	240
Camshaft Sprocket - Bolt	122	90	-
Camshaft Tensioner Plate - Bolts	28	-	250
Coil to Cylinder Head Cover - Bolts	7	-	62
Timing Chain Case Cover - Bolts	28	-	250
Lifting Stud	55	40	-
Connecting Rod Cap - Bolts	21 plus 90° Turn	15 plus 90° Turn	-
Main Bearing Cap - Bolts M-12	27 plus 90° Turn	-	-
Crossbolts M-8	28	-	-
Cylinder Head - Bolts M-12 Bolts			
Step 1	34	25	-
Step 2	54	40	-
Step 3	Turn 90°	Turn 90°	-
M-8 Bolts			
Step 1	20	15	-
Step 2	34	25	-
Cylinder Head Cover - Bolts	8	-	70
Exhaust Manifold to Cylinder Head	25	-	220
Flexplate to Crankshaft - Bolts	95	70	-
Flywheel to Crankshaft - Bolts	75	55	-
Front Insulator - Through bolt/nut	95	70	-
Front Insulator to Support Bracket			
Stud Nut (4WD)	41	30	-

2010 Dodge Pickup R2500

2010 ENGINE 5.7L - Service Information - 2500

Through Bolt/Nut (4WD)	102	75	-
Front Insulator to Block - Bolts (2WD)	95	70	-
Generator - Mounting Bolt	55	40	-
Intake Manifold - Bolts	Refer to Procedure. See INSTALLATION .		
Lifter Guide Holder	12	-	106
Oil Pan Bolts	12	-	105
Oil Dipstick Tube	12	-	105
Oil Pan - Drain Plug	34	25	-
Oil Pump - Attaching Bolts	28	-	250
Oil Pump Pickup Tube - Bolt and Nut	28	-	250
Rear Seal Retainer Attaching Bolts	15	-	132
Rear Insulator to Bracket Through - Bolt (2WD)	68	50	-
Rear Insulator to Crossmember Support Bracket - Nut (2WD)	41	30	-
Rear Insulator to Crossmember - Nuts (4WD)	68	50	-
Rear Insulator to Transmission - Bolts (4WD)	68	50	-
Rear Insulator Bracket - Bolts (4WD Automatic)	68	50	-
Rear Support Bracket to Crossmember Flange - Nuts	41	30	-
Rear Support Plate to Transfer Case - Bolts	41	30	-
Rocker Arm - Bolts	22	-	195
Spark Plugs	-	-	-
Thermostat Housing - Bolts	28	-	250
Throttle Body - Bolts	12	-	105
Transfer Case to Insulator Mounting Plate - Nuts	204	105	-
Transmission Support Bracket - Bolts (2WD)	68	50	-
Vibration Damper - Bolt	176	129	-
Water Pump to Timing Chain Case Cover - Bolts	28	-	250

SPECIAL TOOLS**SPECIAL TOOLS**



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Fig. 21: Bloc-Chek Kit - C-3685-A
Courtesy of CHRYSLER LLC

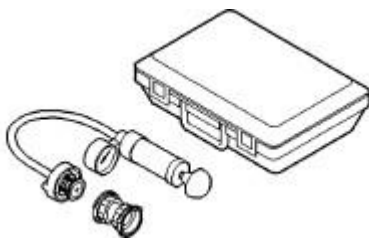
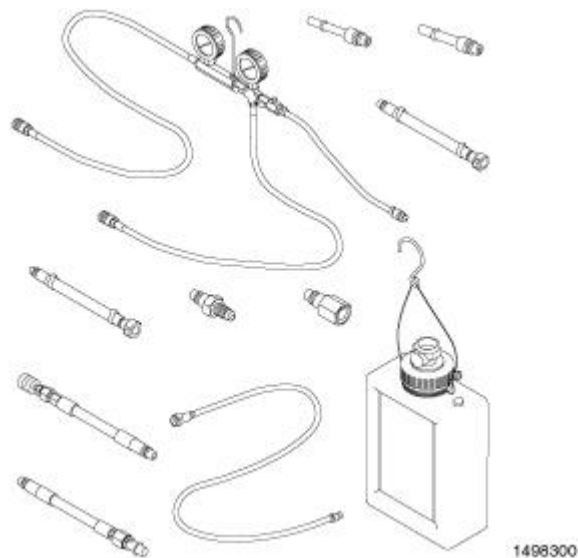


Fig. 22: Cooling System Tester - 7700-A
Courtesy of CHRYSLER LLC



1498300

Fig. 23: Fuel Decay Tester - 8978A
Courtesy of CHRYSLER LLC

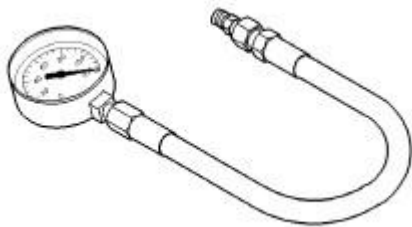


Fig. 24: Oil Pressure Gauge - C-3292A
Courtesy of CHRYSLER LLC

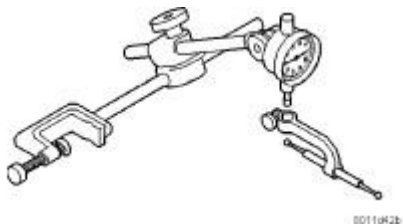


Fig. 25: Dial Indicator - C-3339A
Courtesy of CHRYSLER LLC

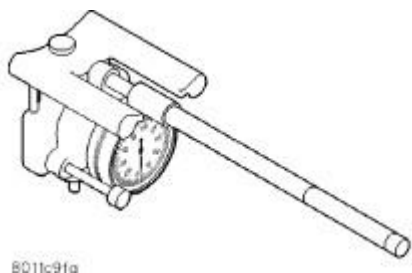


Fig. 26: Cylinder Indicator - C-119
Courtesy of CHRYSLER LLC

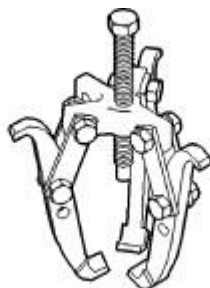


Fig. 27: Puller - 1023
Courtesy of CHRYSLER LLC

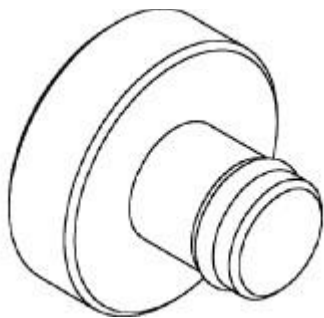


Fig. 28: Crankshaft Damper Removal Insert - 8513A
Courtesy of CHRYSLER LLC



2065300

Fig. 29: Crankshaft Damper Installer - 8512A
Courtesy of CHRYSLER LLC

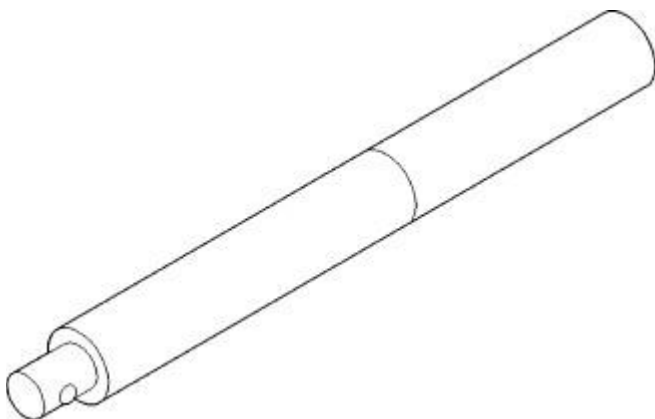


Fig. 30: Handle - C-4171
Courtesy of CHRYSLER LLC

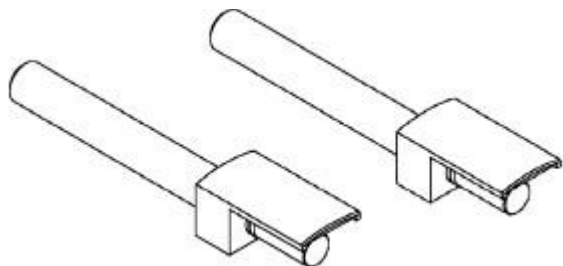


Fig. 31: Connecting Rod Guides - 8507
Courtesy of CHRYSLER LLC

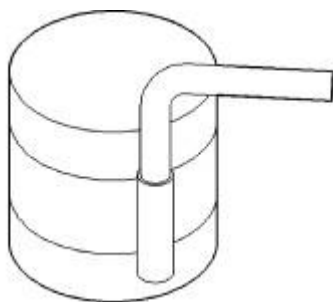


Fig. 32: Piston Ring Compressor - C-385
Courtesy of CHRYSLER LLC

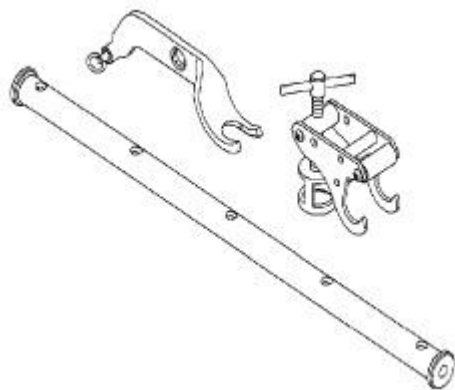


Fig. 33: Valve Spring Compressor - 9065A
Courtesy of CHRYSLER LLC

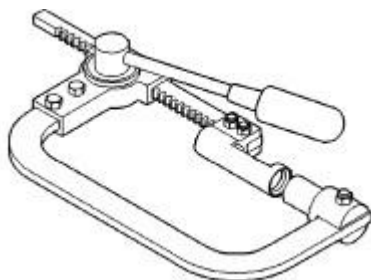


Fig. 34: Valve Spring Compressor - C-3422-D
Courtesy of CHRYSLER LLC

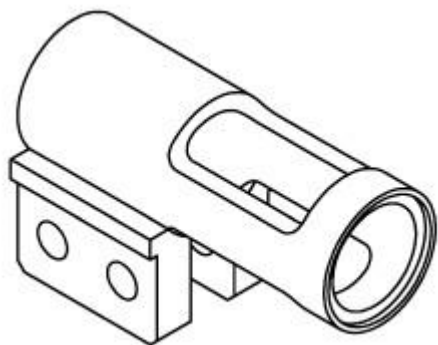


Fig. 35: Valve Spring Adapter - 8464
Courtesy of CHRYSLER LLC

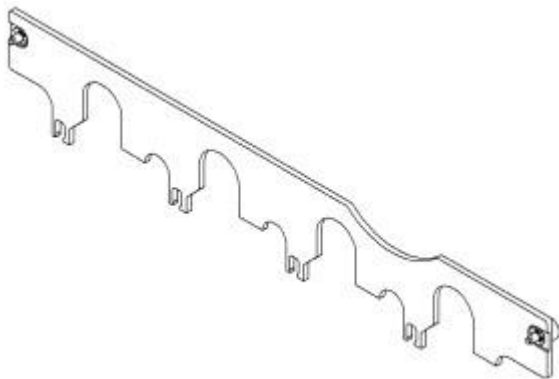


Fig. 36: Pushrod Retainer - 9070
Courtesy of CHRYSLER LLC

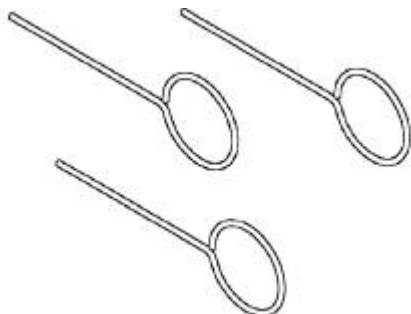


Fig. 37: Tensioner Pins - 8514
Courtesy of CHRYSLER LLC

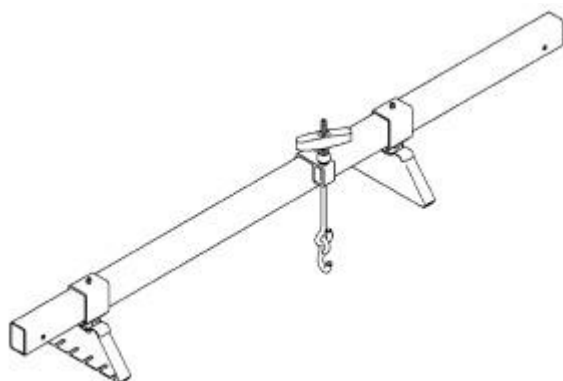


Fig. 38: Engine Support Fixture - 8534B
Courtesy of CHRYSLER LLC

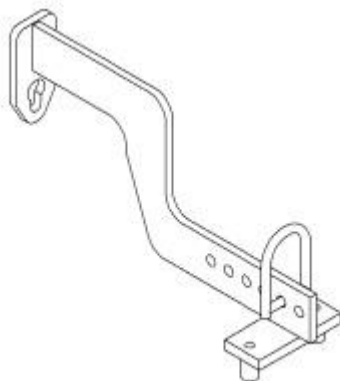
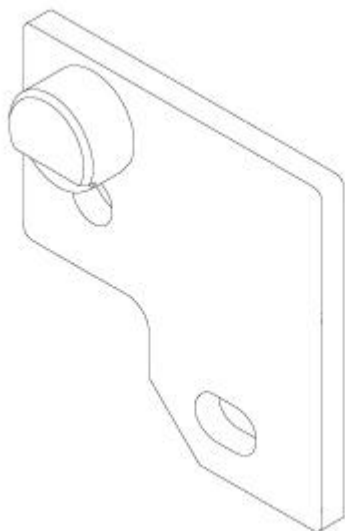


Fig. 39: Engine Lift Fixture - 8984A
Courtesy of CHRYSLER LLC



1245783

Fig. 40: Engine Lift Fixture Adapter - 8984-EAGLE
Courtesy of CHRYSLER LLC

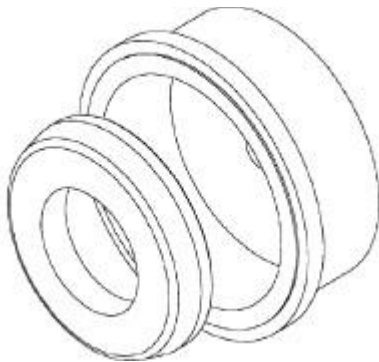


Fig. 41: Seal Installer - 8349
Courtesy of CHRYSLER LLC

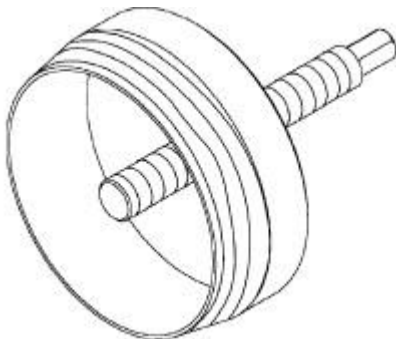


Fig. 42: Seal Remover - 8506
Courtesy of CHRYSLER LLC

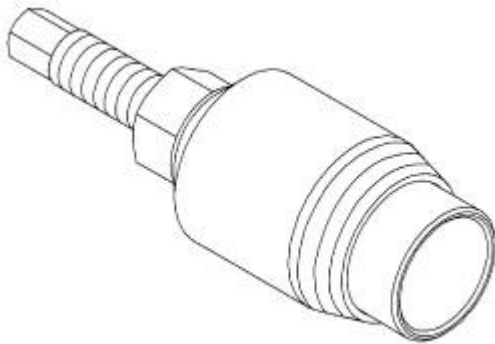


Fig. 43: Seal Remover - 9071
Courtesy of CHRYSLER LLC



Fig. 44: Seal Installer - 9072
Courtesy of CHRYSLER LLC

AIR INTAKE SYSTEM

AIR CLEANER

Removal

REMOVAL

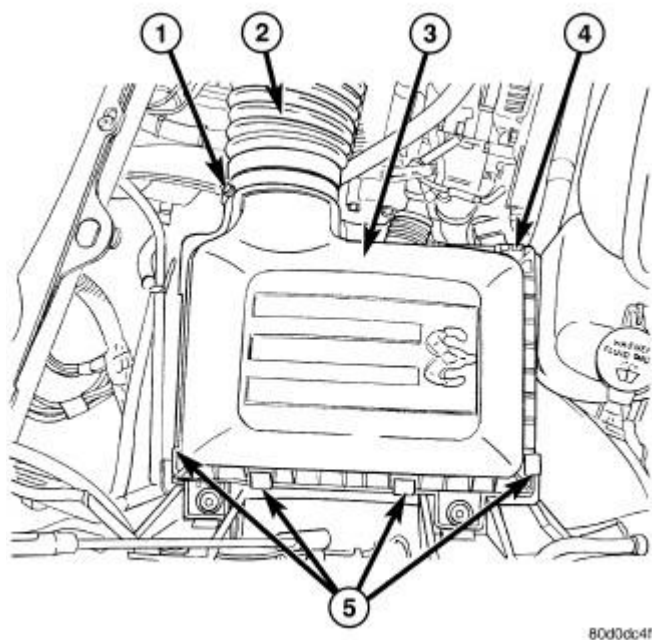


Fig. 45: AIR CLEANER HOUSING COVER
Courtesy of CHRYSLER LLC

1. Loosen clamp (1) and disconnect air duct (2) at air cleaner cover (3).
2. Pry over 4 spring clips (5) from housing cover (3).

3. Release housing cover (3) from locating tabs on housing and remove cover.
4. Remove air cleaner element (filter) from housing.
5. Clean inside of housing before replacing element.

Installation

INSTALLATION

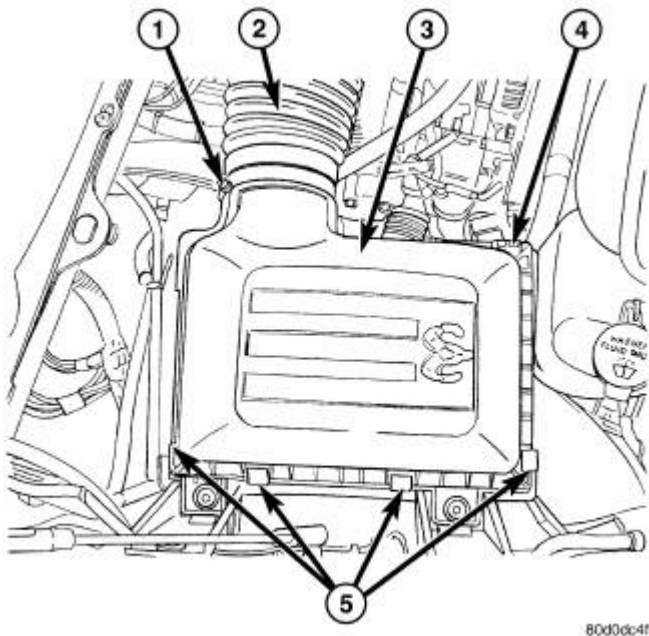


Fig. 46: AIR CLEANER HOUSING COVER

Courtesy of CHRYSLER LLC

1. Install filter element into housing.
2. Position housing cover (3) into housing locating tabs.
3. Pry up 4 spring clips (5) and lock cover to housing.
4. Install air duct (2) to air cleaner cover (3) and tighten hose clamp (1) to 3 N.m (30 in. lbs.).

BODY, AIR CLEANER

Removal

REMOVAL

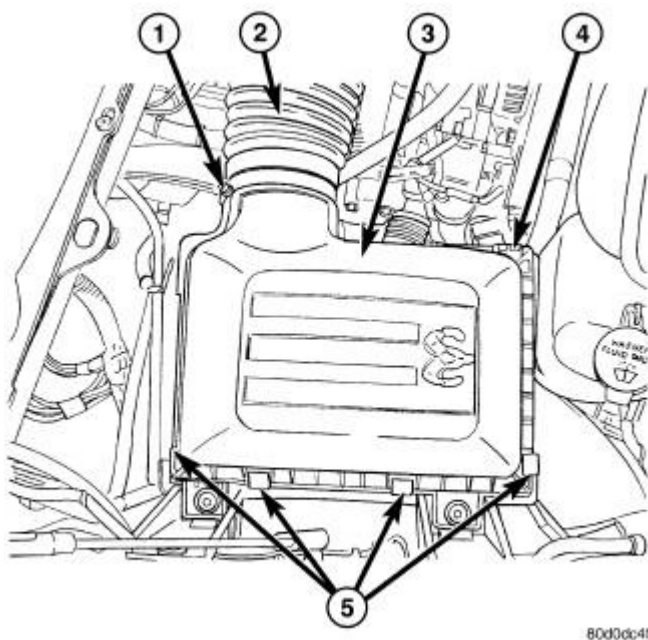


Fig. 47: AIR CLEANER HOUSING COVER
Courtesy of CHRYSLER LLC

1. Loosen clamp (1) and disconnect air duct (2) at air cleaner cover (3).

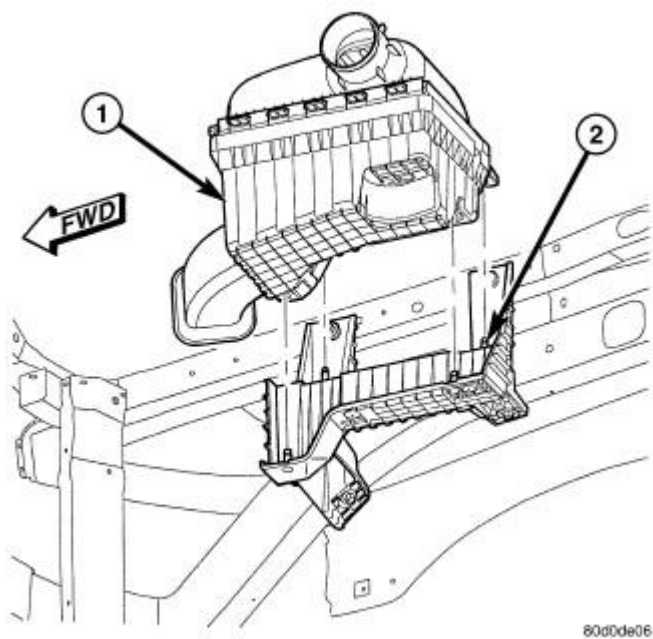


Fig. 48: AIR CLEANER HOUSING
Courtesy of CHRYSLER LLC

2. Lift entire housing (1) assembly from 4 locating pins (2).

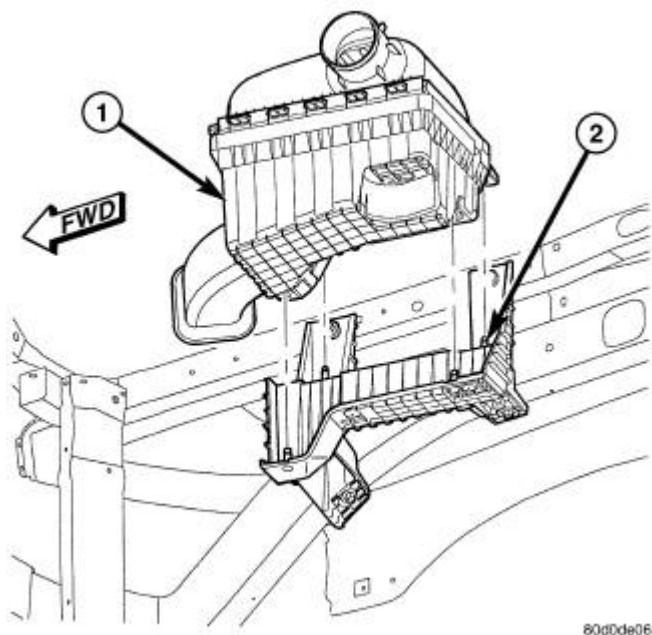
Installation**INSTALLATION**

Fig. 49: AIR CLEANER HOUSING
Courtesy of CHRYSLER LLC

1. Position housing assembly (1) into 4 locating pins (2).

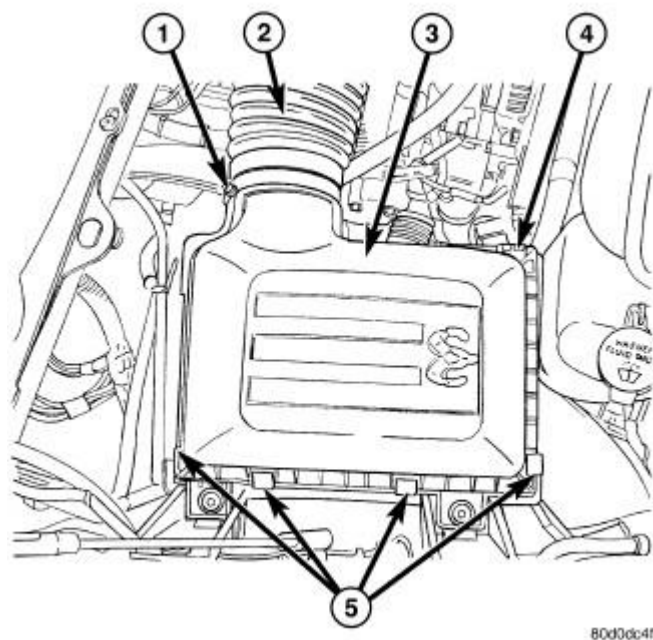


Fig. 50: AIR CLEANER HOUSING COVER
Courtesy of CHRYSLER LLC

2. Connect air duct (2) at air cleaner cover (3) and tighten clamp (1).

CYLINDER HEAD

OPERATION

OPERATION

The cylinder head closes the combustion chamber allowing the pistons to compress the air fuel mixture to the correct ratio for ignition. The valves located in the cylinder head open and close to either allow clean air into the combustion chamber or to allow the exhaust gases out, depending on the stroke of the engine.

DIAGNOSIS AND TESTING

CYLINDER HEAD GASKET FAILURE

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

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

are:

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

CYLINDER-TO-CYLINDER LEAKAGE TEST

To determine if an engine cylinder head gasket is leaking between adjacent cylinders, follow the procedures in **CYLINDER COMPRESSION PRESSURE LEAKAGE**. An engine cylinder head gasket leaking between adjacent cylinders will result in approximately a 50-70% reduction in compression pressure.

CYLINDER-TO-WATER JACKET LEAKAGE TEST

WARNING: Use extreme caution when the engine is operating with coolant pressure cap removed.

VISUAL TEST METHOD

With the engine cool, remove the coolant pressure cap. Start the engine and allow it to warm up until thermostat opens.

If a large combustion/compression pressure leak exists, bubbles will be visible in the coolant.

COOLING SYSTEM TESTER METHOD

WARNING: With cooling system tester in place, pressure will build up fast. Excessive pressure built up, by continuous engine operation, must be released to a safe pressure point. Never permit pressure to exceed 138 kPa (20 psi).

Install Cooling System Tester 7700 or equivalent to pressure cap neck. Start the engine and observe the tester's pressure gauge. If gauge pulsates with every power stroke of a cylinder a combustion pressure leak is evident.

CHEMICAL TEST METHOD

Combustion leaks into the cooling system can also be checked by using Bloc-Chek Kit C-3685-A or equivalent. Perform test following the procedures supplied with the tool kit.

REMOVAL

REMOVAL

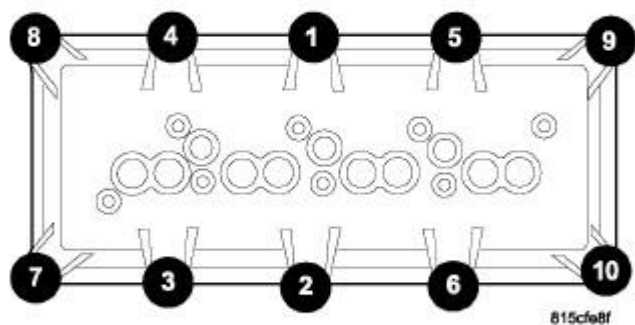


Fig. 51: Cylinder Head Cover Torque Sequence

Courtesy of CHRYSLER LLC

1. Perform the Fuel System Pressure Release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** . Disconnect the fuel supply line. Refer to **Fuel System/Fuel Delivery/FITTING, Quick Connect - Standard Procedure** .
2. Disconnect the battery negative cable.
3. Drain cooling system. Refer to **Cooling - Standard Procedure** .
4. Remove the air cleaner resonator and duct work.
5. Remove closed crankcase ventilation system.
6. Disconnect the exhaust at the exhaust manifolds.
7. Disconnect the evaporation control system.
8. Disconnect heater hoses.
9. Remove the power steering pump.
10. Remove cylinder head cover bolts as shown in illustration.

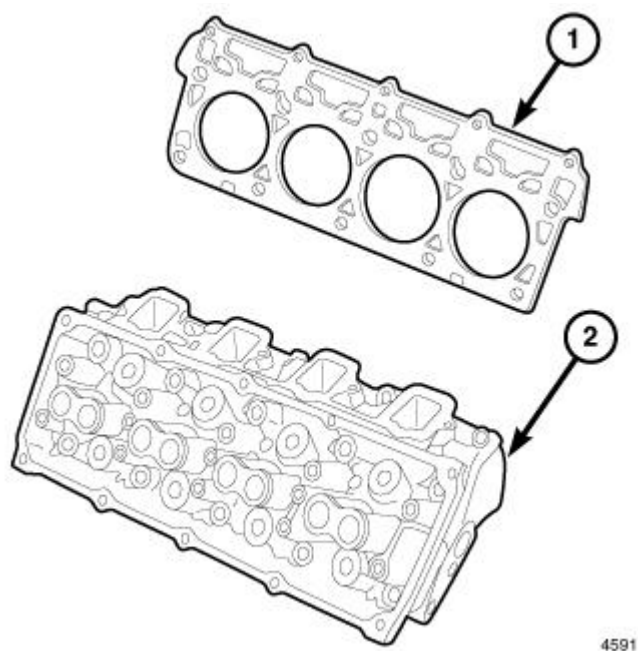


Fig. 52: Cylinder Head Components
Courtesy of CHRYSLER LLC

- | |
|-------------------------|
| 1 - CYLINDER HEAD COVER |
| 2 - GASKET |
| 3 - FASTENERS |
| 4 - CYLINDER HEAD |
| 5 - HEAD GASKET |

11. Remove cylinder head covers (1), using the sequence provided in illustration, and gaskets (2). See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal.**

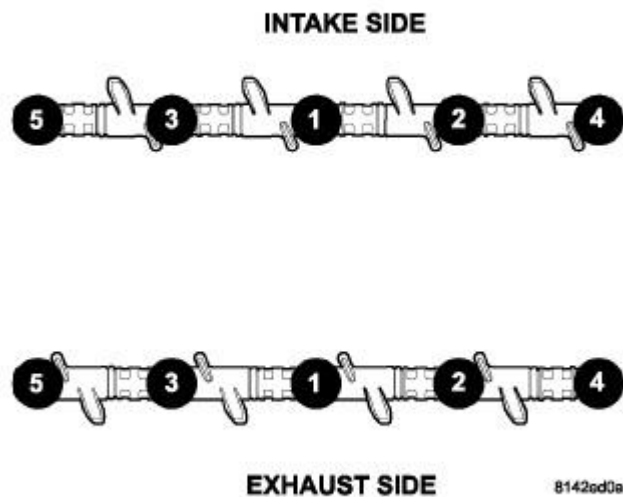


Fig. 53: Rocker Shaft Torque Sequence

Courtesy of CHRYSLER LLC

12. Remove intake manifold and throttle body as an assembly. See **Engine/Manifolds/MANIFOLD, Intake - Removal.**
13. Remove rocker arm assemblies and push rods. Identify to ensure installation in original locations. See **Engine/Cylinder Head/ROCKER ARM, Valve - Removal.**

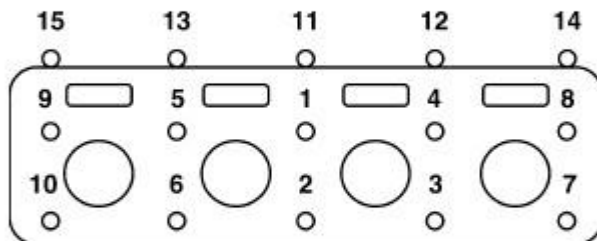


Fig. 54: Cylinder Head Tightening Sequence
Courtesy of CHRYSLER LLC

14. Remove the head bolts from each cylinder head, using the sequence provided in illustration, and remove cylinder heads. Discard the cylinder head gasket.

CLEANING

CLEANING

Clean all surfaces of cylinder block and cylinder heads.

Clean cylinder block front and rear gasket surfaces using a suitable solvent.

INSPECTION

INSPECTION

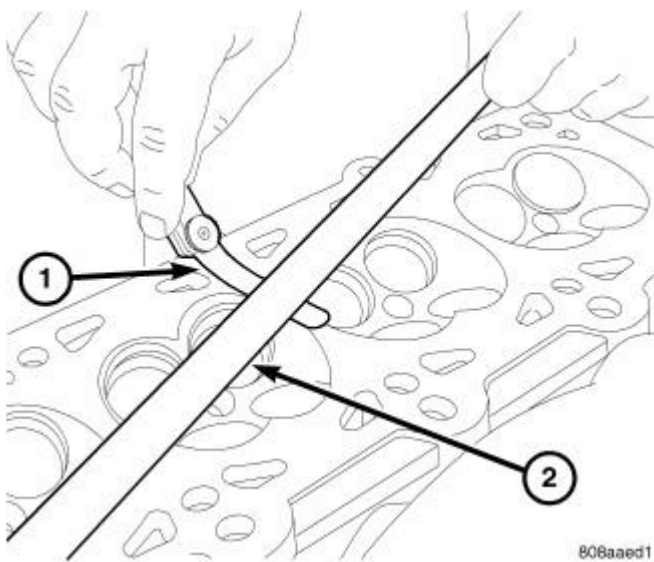
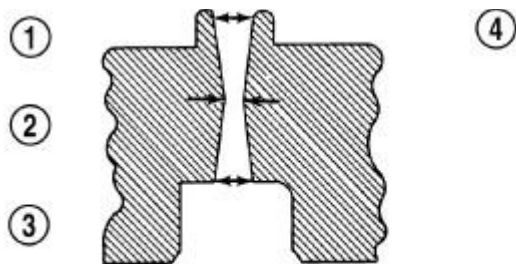


Fig. 55: Checking Cylinder Head Flatness - Typical
Courtesy of CHRYSLER LLC

1. Inspect the cylinder head for out-of-flatness, using a straightedge (2) and a feeler gauge (1). If tolerances exceed 0.0508 mm (0.002 in.) replace the cylinder head.



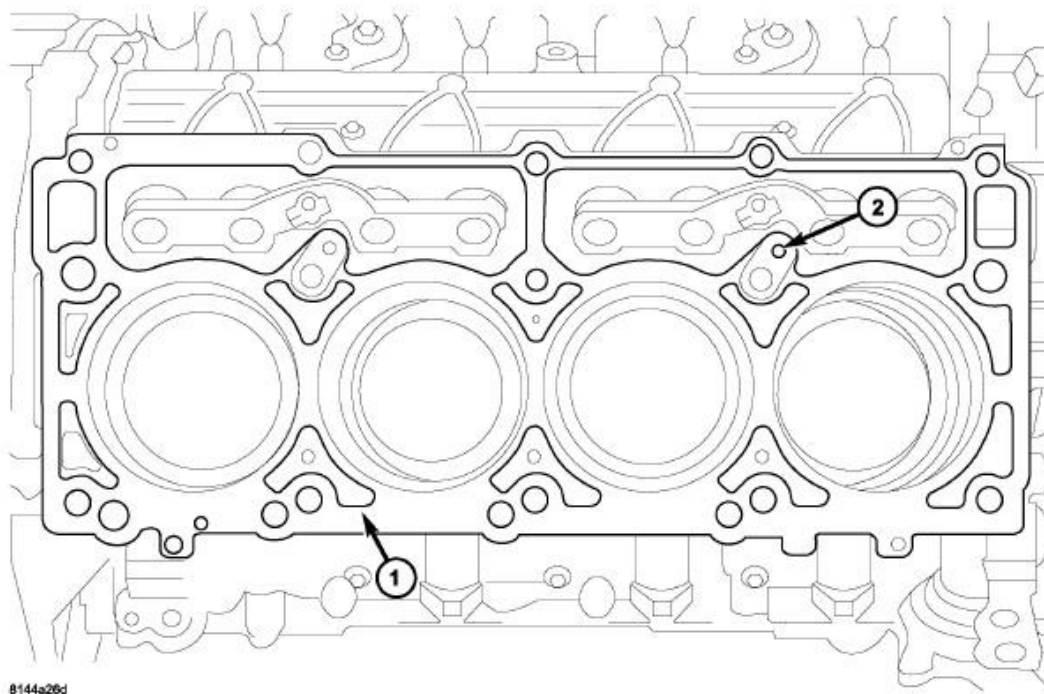
9109-98

Fig. 56: Checking Wear on Valve Guide-Typical
 Courtesy of CHRYSLER LLC

2. Inspect the valve seats for damage. Service the valve seats as necessary.
3. Measure the valve guides for wear in three places (1, 2, 3). Inspect for cracks or looseness. If either condition exist, replace the cylinder head.
4. Inspect push rods. Replace worn or bent push rods.

INSTALLATION

INSTALLATION



8144a26d

Fig. 57: Head Gasket Installation
 Courtesy of CHRYSLER LLC

1 - HEAD GASKET

2 - OIL HOLES

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

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

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

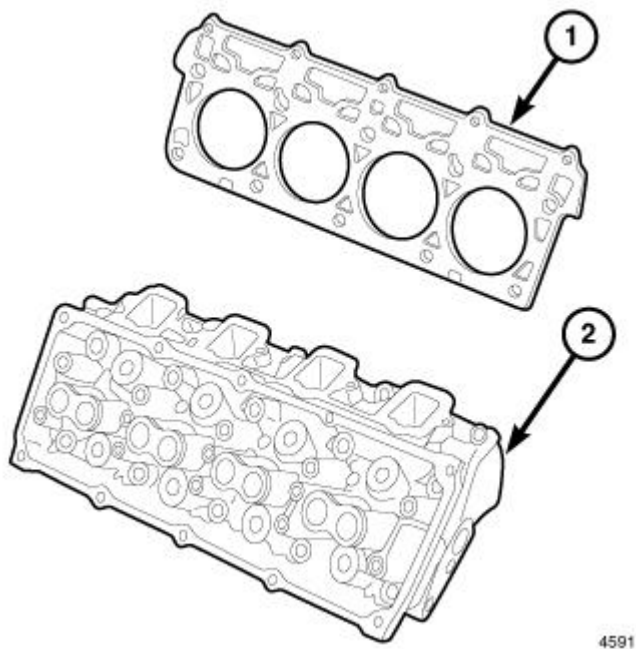
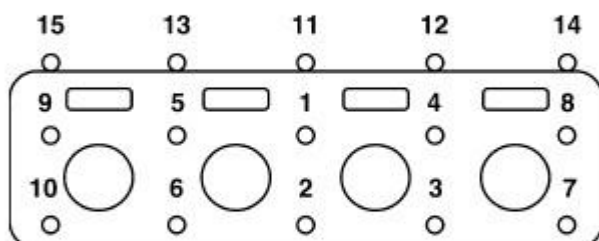


Fig. 58: Cylinder Head Components
Courtesy of CHRYSLER LLC

- | |
|-------------------------|
| 1 - CYLINDER HEAD COVER |
| 2 - GASKET |
| 3 - FASTENERS |
| 4 - CYLINDER HEAD |
| 5 - HEAD GASKET |

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



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Fig. 59: Cylinder Head Tightening Sequence
Courtesy of CHRYSLER LLC

5. Tighten the cylinder head bolts in three steps using the sequence provided :

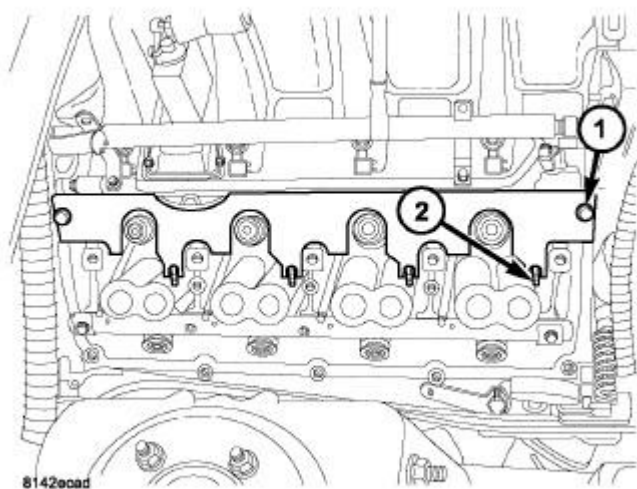


Fig. 60: PUSH ROD RETAINER 9070
Courtesy of CHRYSLER LLC

1 - PUSH ROD RETAINER FASTENER

2 - PUSH ROD RETAINER 9070

- Step 1 - Snug tighten M12 cylinder head bolts, in sequence, to 34 N.m (25 ft. lbs.) and M8 bolts to 20 N.m (15 ft. lbs.).
 - Step 2 - Tighten M12 cylinder head bolts, in sequence, to 54 N.m (40 ft. lbs.) and verify M8 bolts to 20 N.m (15 ft. lbs.).
 - Step 3 - Turn M12 cylinder head bolts, in sequence, 90 degrees and tighten M8 bolts to 34 N.m (25 ft. lbs.).
6. Install push rods and rocker arm assemblies in their original position, using push rod retainer 9070. See **Engine/Cylinder Head/ROCKER ARM, Valve - Installation.**
 7. Install the intake manifold and throttle body assembly. See **Engine/Manifolds/MANIFOLD, Intake - Installation.**
 8. If required, adjust spark plugs to specifications. Install the plugs.
 9. Connect the heater hoses.
 10. Install the fuel supply line.
 11. Install the power steering pump.
 12. Install the drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .

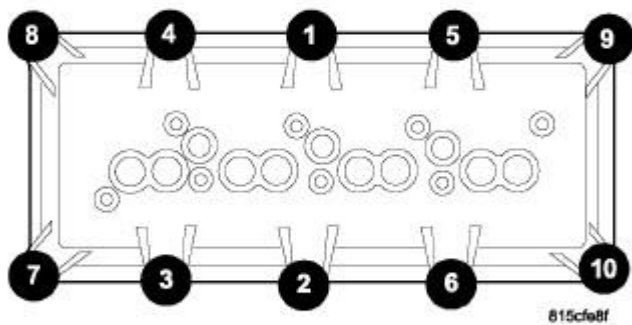


Fig. 61: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

13. Install cylinder head covers (1). See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation.**
14. Connect the evaporation control system.
15. Install the air cleaner.

16. Fill cooling system. Refer to **Cooling - Standard Procedure** .
17. Connect the negative cable to the battery.
18. Start engine check for leaks.

COVER(S), CYLINDER HEAD

Removal

REMOVAL

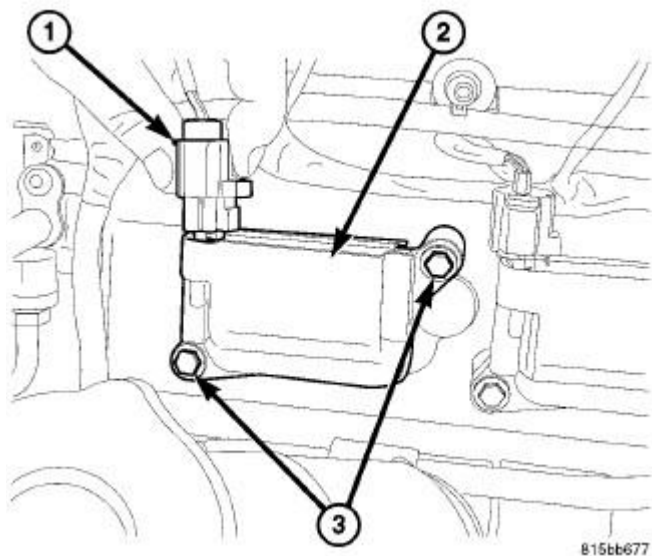


Fig. 62: Ignition Coil Mounting Bolts
Courtesy of CHRYSLER LLC

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

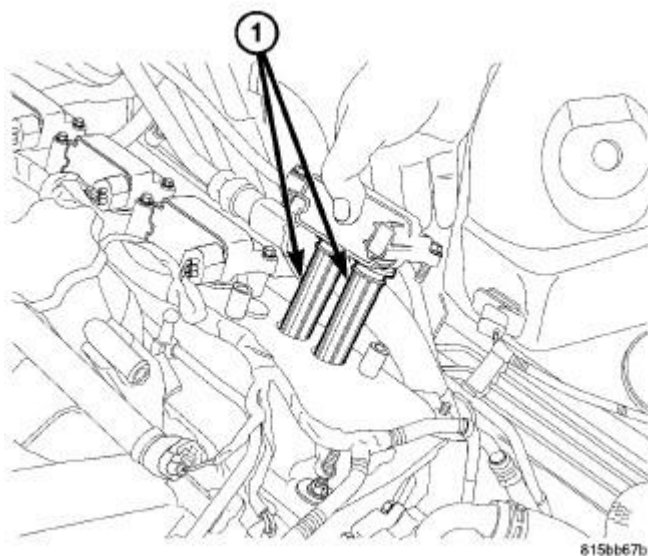


Fig. 63: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

4. Remove ignition coil (1).

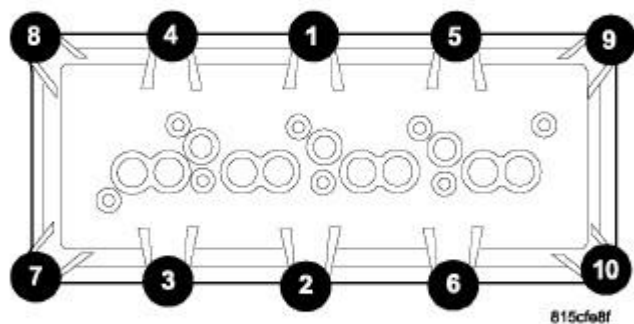


Fig. 64: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

5. Remove cylinder head cover retaining bolts.

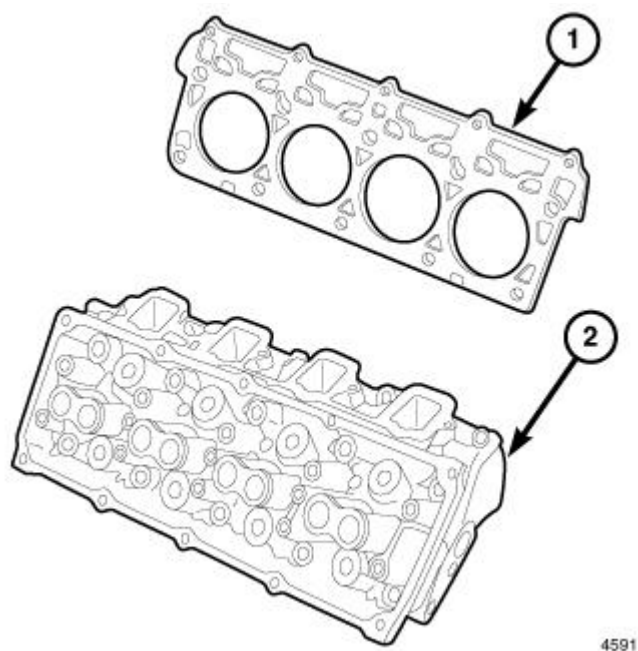


Fig. 65: Cylinder Head Components
Courtesy of CHRYSLER LLC

6. Remove cylinder head cover (1).

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

Installation

INSTALLATION

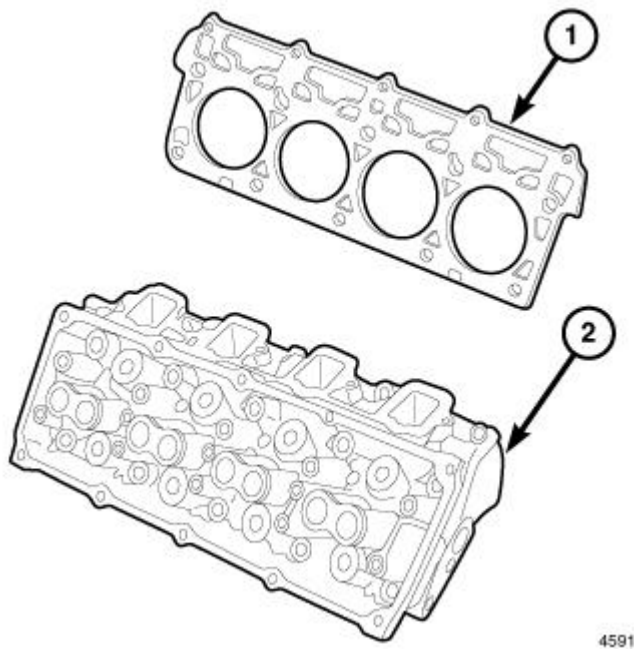


Fig. 66: Cylinder Head Components

Courtesy of CHRYSLER LLC

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

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

1. Clean cylinder head cover (1) and both sealing surface (4). Inspect and replace gasket (2) as necessary.
2. Install cylinder head cover and hand start all fasteners. Verify that all double ended studs (3) are in the correct location.

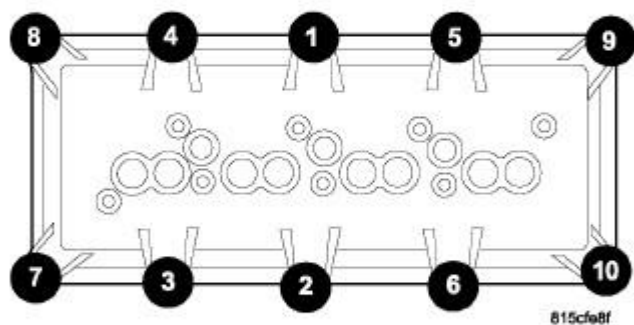


Fig. 67: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

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

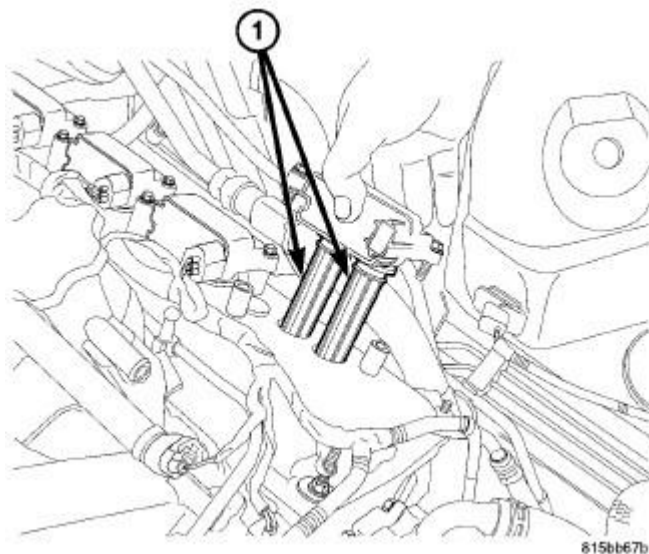


Fig. 68: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

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

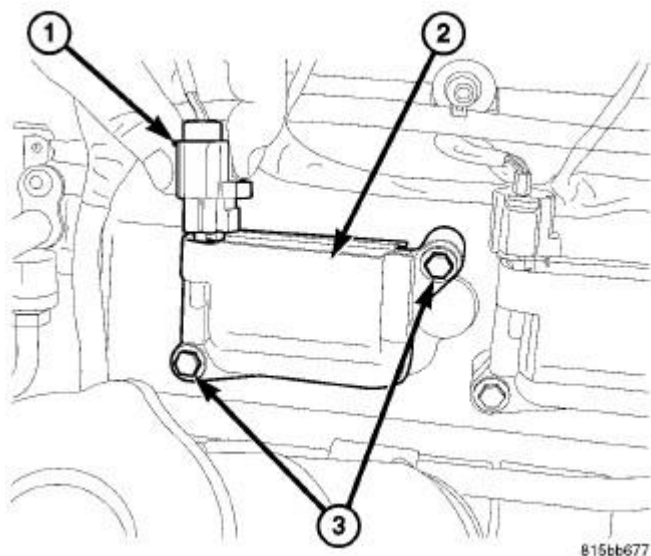


Fig. 69: Ignition Coil Mounting Bolts
Courtesy of CHRYSLER LLC

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

ROCKER ARM, VALVE

Removal

REMOVAL

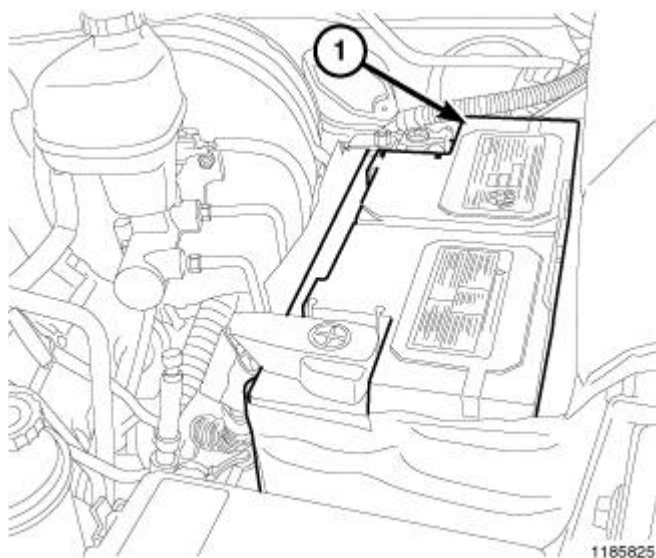
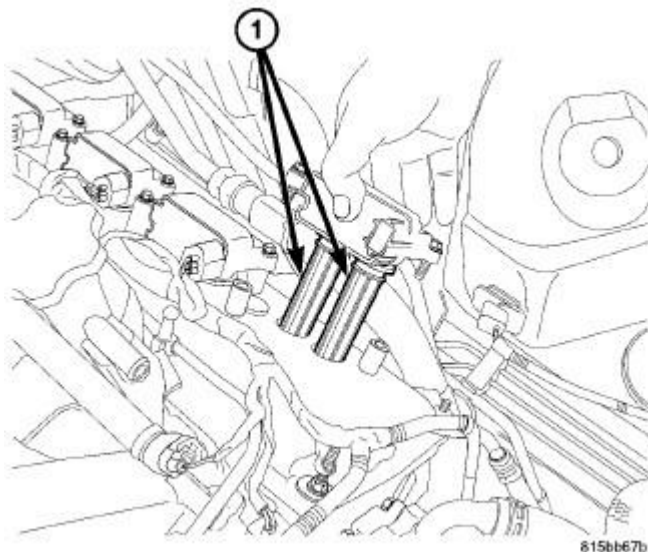


Fig. 70: Battery

Courtesy of CHRYSLER LLC

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

**Fig. 71: Removing/Installing Ignition Coil**

Courtesy of CHRYSLER LLC

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

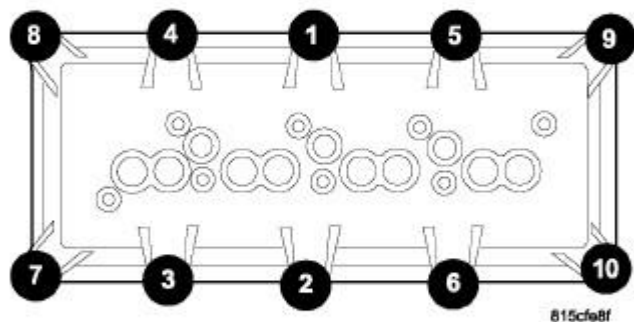
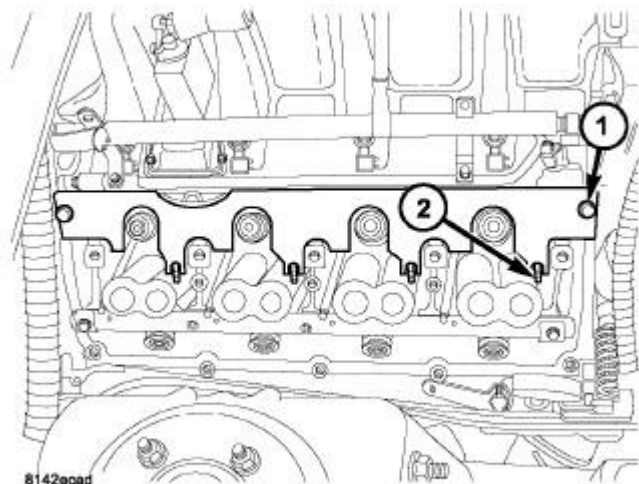


Fig. 72: Cylinder Head Cover Torque Sequence

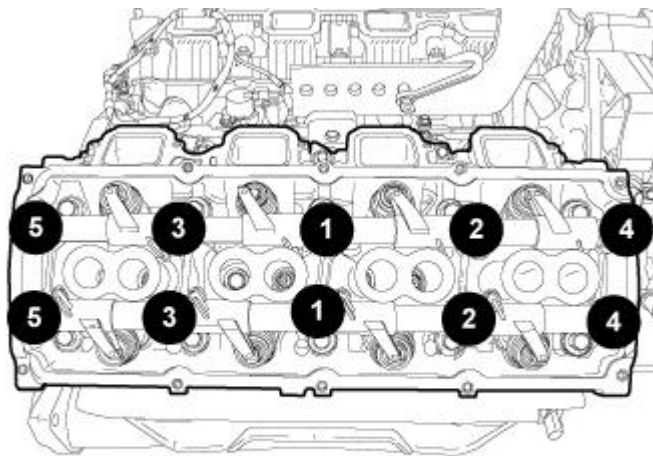
Courtesy of CHRYSLER LLC

4. Using the sequence shown in illustration, remove the cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**

**Fig. 73: PUSH ROD RETAINER 9070**

Courtesy of CHRYSLER LLC

5. Install the pushrod retainer 9070 (1).



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Fig. 74: Rocker Shafts Retaining Bolt Removal & Tightening Sequence

Courtesy of CHRYSLER LLC

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

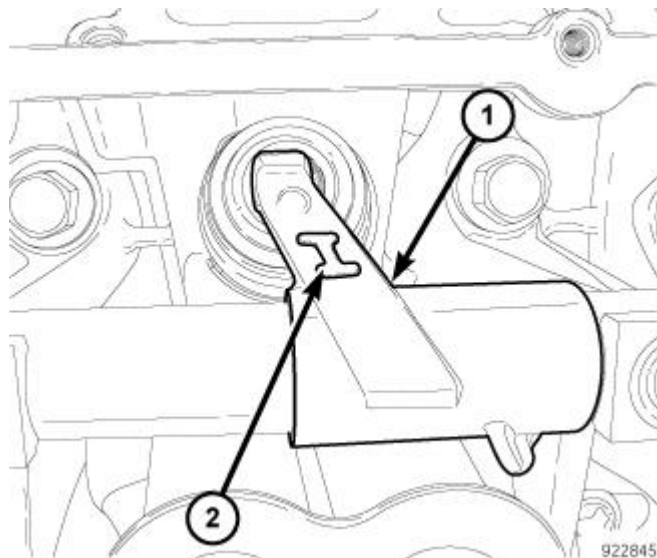


Fig. 75: Intake Rocker Arm Marking
Courtesy of CHRYSLER LLC

CAUTION: The rocker shaft assemblies are not interchangeable between the intake and the exhaust, failure to install them in the correct location could result in engine damage. The intake rocker arms (1) are marked with the letter "I" (2).

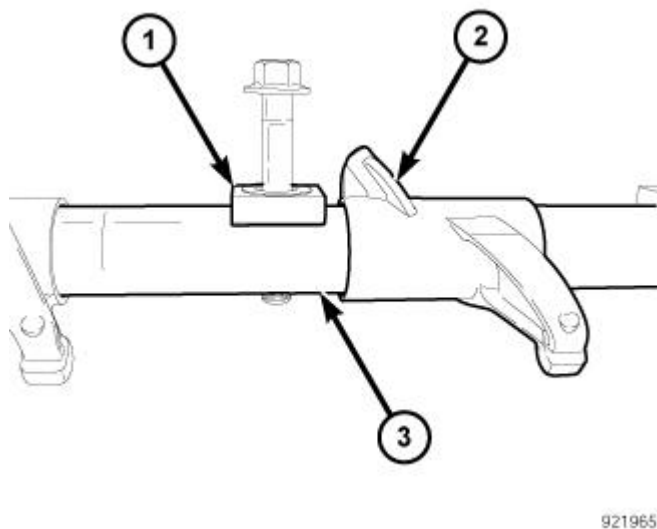


Fig. 76: Rocker Shaft Retainers
Courtesy of CHRYSLER LLC

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

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

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

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

Installation

INSTALLATION

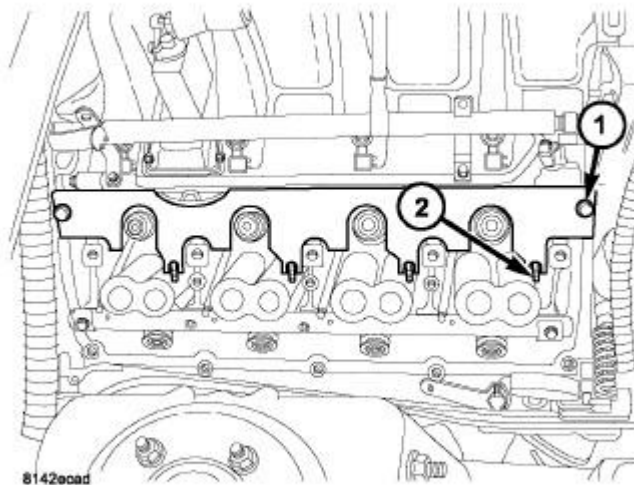
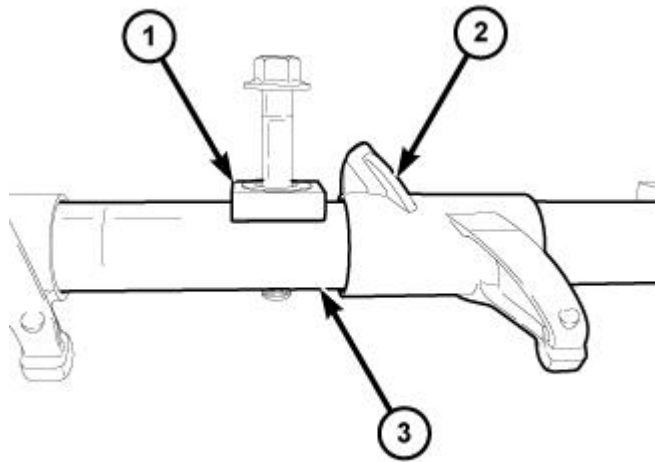


Fig. 77: PUSHROD RETAINING PLATE

Courtesy of CHRYSLER LLC

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

1. Install the pushrods in the same order as removed.
2. Install the pushrod retainer 9070 (1).

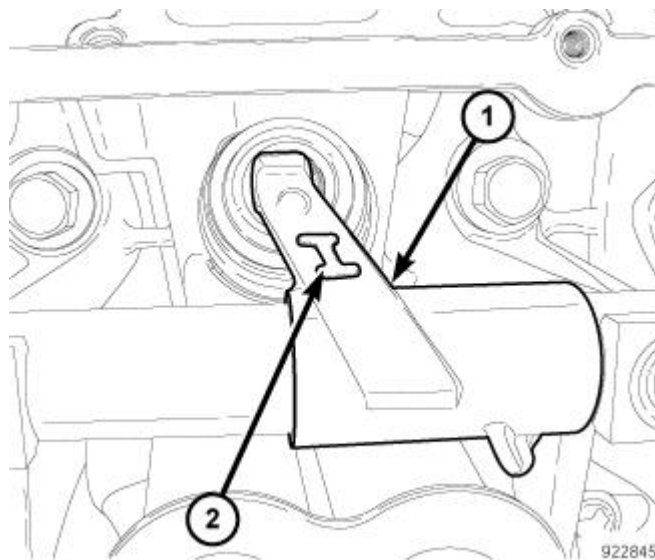


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Fig. 78: Rocker Shaft Retainers
Courtesy of CHRYSLER LLC

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

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

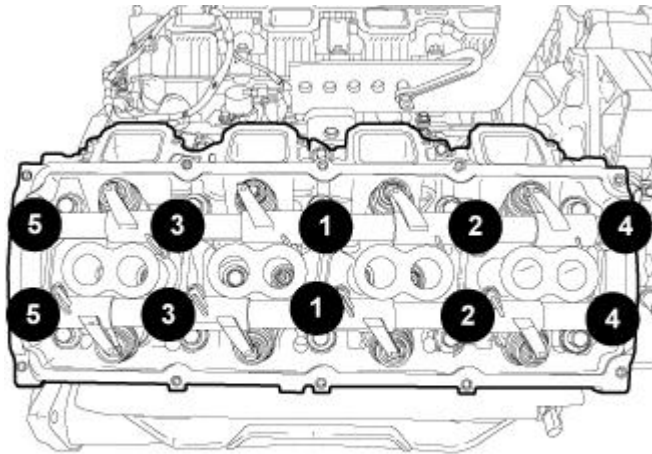


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Fig. 79: Intake Rocker Arm Marking

Courtesy of CHRYSLER LLC

CAUTION: The rocker shaft assemblies are not interchangeable between the intake and the exhaust, failure to install them in the correct location could result in engine damage. The intake rocker arms (1) are marked with the letter "I" (2).



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Fig. 80: Rocker Shafts Retaining Bolt Removal & Tightening Sequence

Courtesy of CHRYSLER LLC

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

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

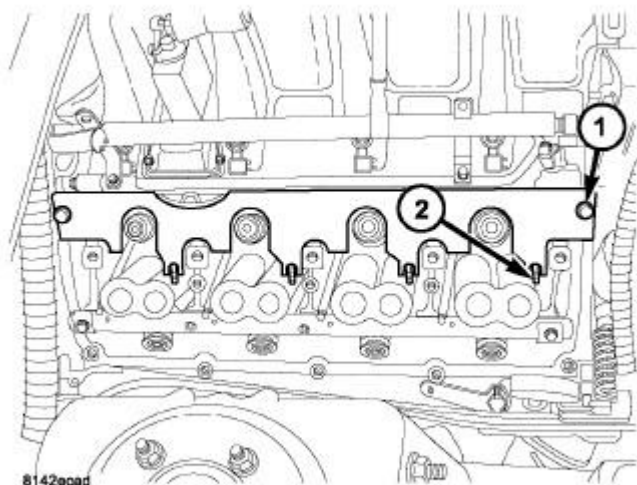


Fig. 81: PUSHROD RETAINING PLATE

Courtesy of CHRYSLER LLC

5. Remove pushrod retainer 9070 (1).

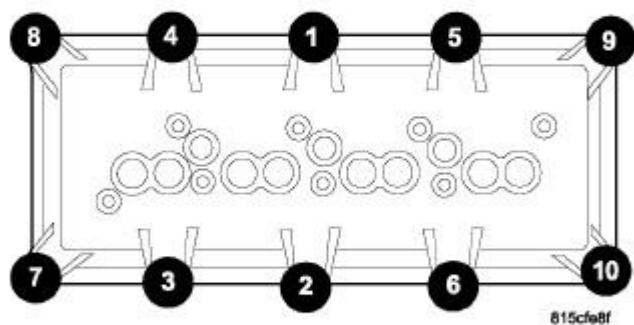


Fig. 82: Cylinder Head Cover Torque Sequence

Courtesy of CHRYSLER LLC

6. Using the sequence shown in illustration, install the cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**.

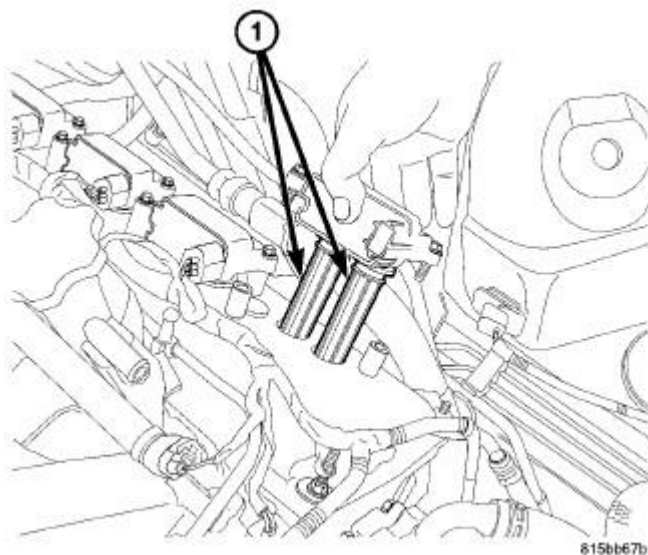


Fig. 83: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

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

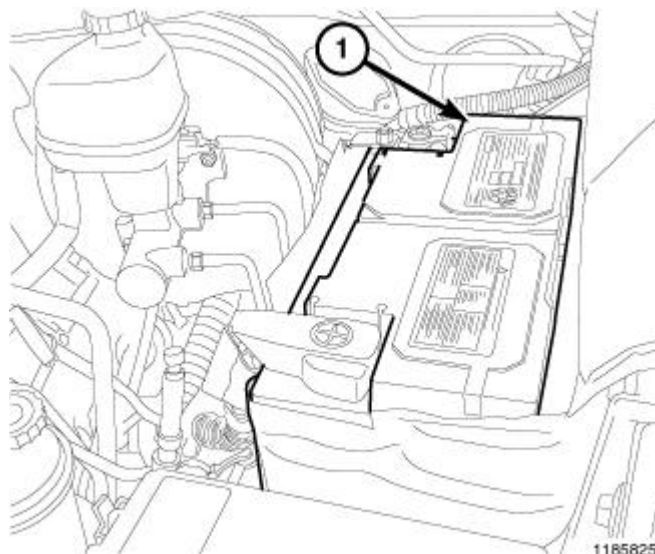


Fig. 84: Battery
Courtesy of CHRYSLER LLC

9. Connect the negative battery cable (1).

SEAL(S), VALVE GUIDE

Description**DESCRIPTION**

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

Removal**REMOVAL**

The valve stem seal is integral with the valve spring seat. For removal, see **Engine/Cylinder Head/SPRING(S), Valve - Removal.**

Installation**INSTALLATION**

The valve stem seal is integral with the valve spring seat. For installation, see **Engine/Cylinder Head/SPRING(S), Valve - Installation.**

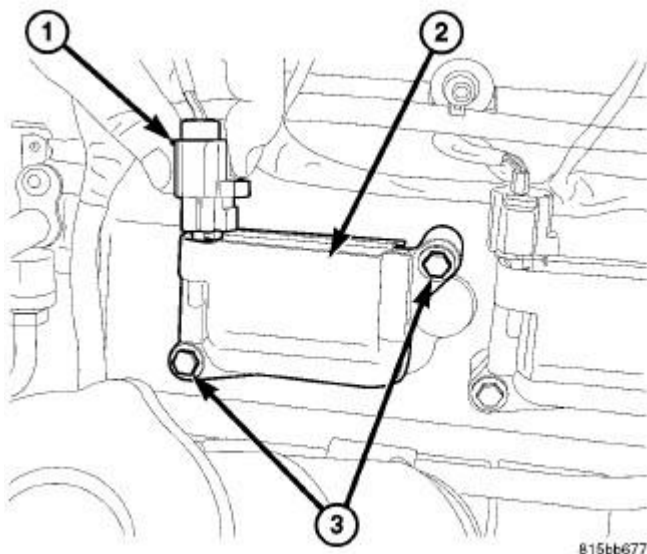
SPRING(S), VALVE**Removal****REMOVAL**

Fig. 85: Ignition Coil Mounting Bolts
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable.

2. Remove the air cleaner assembly and the air intake resonator. See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.
3. Remove the ignition coil electrical connectors (1).
4. Remove the ignition coils (2).
5. Remove the spark plugs.

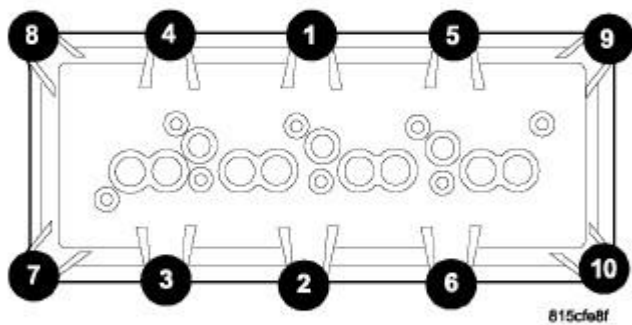


Fig. 86: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

6. Using the sequence shown in illustration, remove the cylinder head cover retaining bolts and remove the cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.

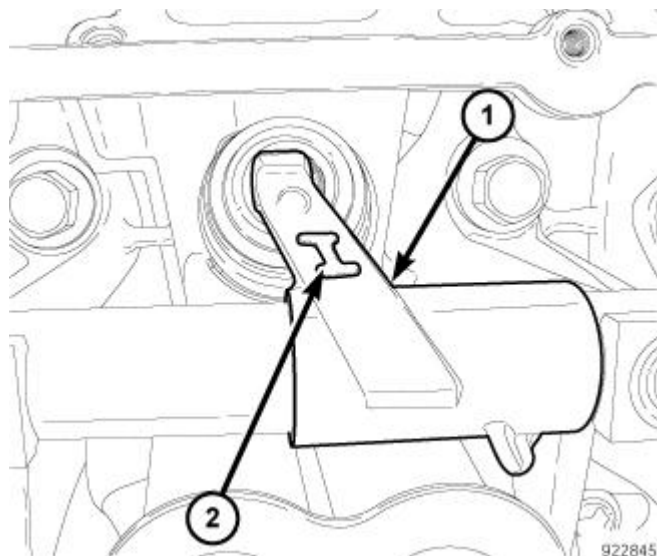


Fig. 87: Intake Rocker Arm Marking

Courtesy of CHRYSLER LLC

CAUTION: The rocker shaft assemblies are not interchangeable between the intake and the exhaust, failure to install them in the correct location could result in engine damage. The intake rocker arms (1) are marked with the letter "I" (2).

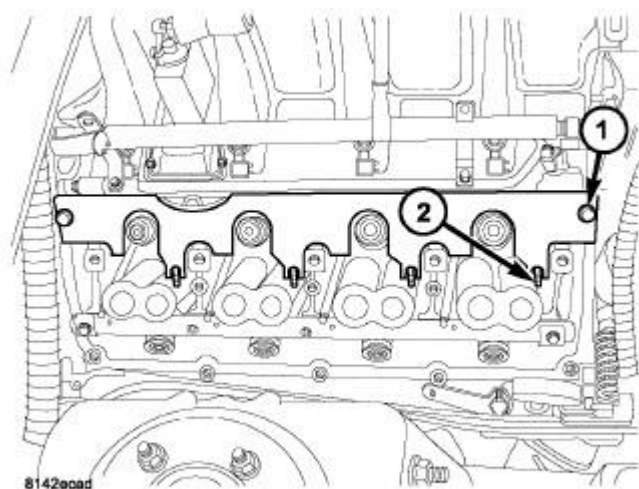


Fig. 88: PUSH ROD RETAINING PLATE

Courtesy of CHRYSLER LLC

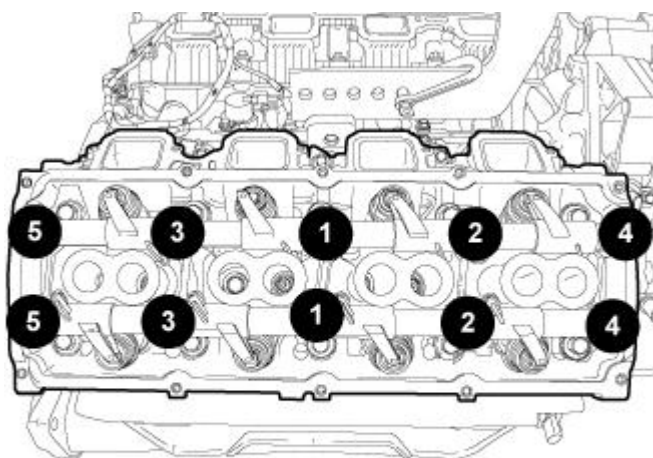
CAUTION: The piston must be at TDC and both valves closed on the cylinder to

be serviced.

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

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

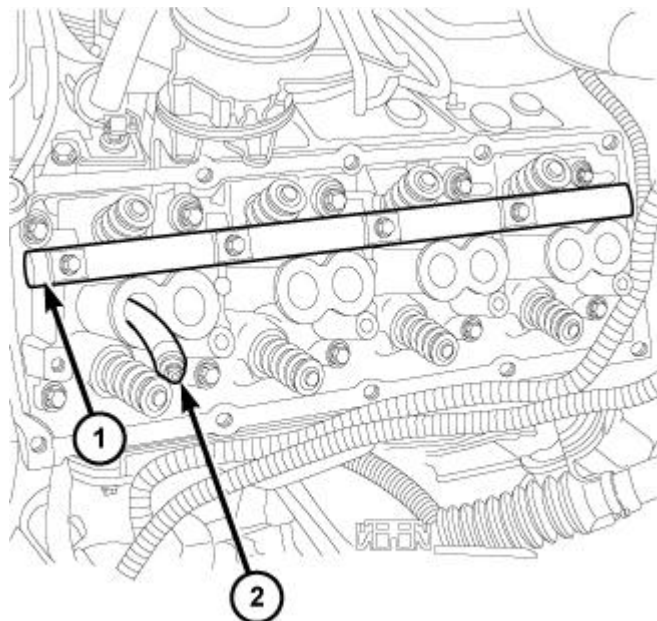
NOTE: If removing the intake valve spring, install the pushrod retainer 9070 (1).



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Fig. 89: Rocker Shafts Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

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



44571

Fig. 90: ROCKER SHAFT

Courtesy of CHRYSLER LLC

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

8. Install the rocker arm valve spring compressor shaft 9065A (1).
9. Install the spring compressor adapter arm 9065A if needed.
10. Insert an air hose (2) into the spark plug hole and charge the cylinder with air.

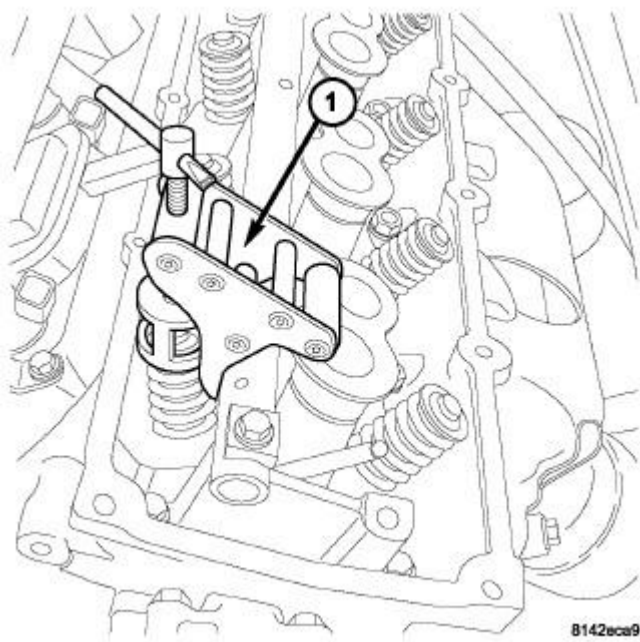


Fig. 91: Remove/Install Valve Spring Intake
Courtesy of CHRYSLER LLC

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

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

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

13. Remove the valve seal.

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

Installation

INSTALLATION

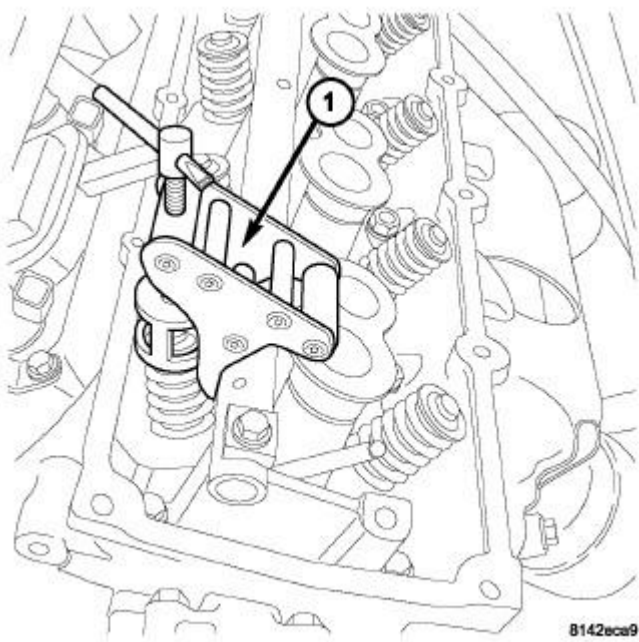


Fig. 92: Remove/Install Valve Spring Intake
Courtesy of CHRYSLER LLC

1. Install the valve seal.
2. Install the valve spring.
3. Using the valve spring compressor 9065A (1), compress the valve spring and install the valve spring retainer and locks.
4. Remove the spring compressor.
5. Remove the air hose from the spark plug hole.

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

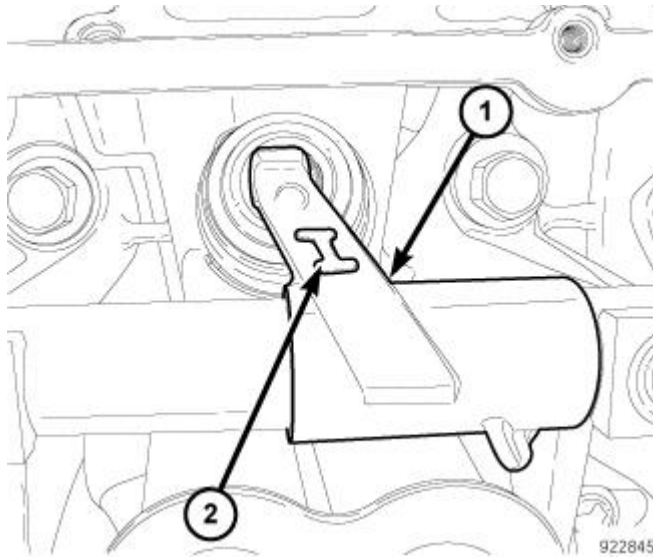


Fig. 93: Intake Rocker Arm Marking
Courtesy of CHRYSLER LLC

CAUTION: The rocker shaft assemblies are not interchangeable between the intake and the exhaust, failure to install them in the correct location could result in engine damage. The intake rocker arms (1) are marked with the letter "I" (2).

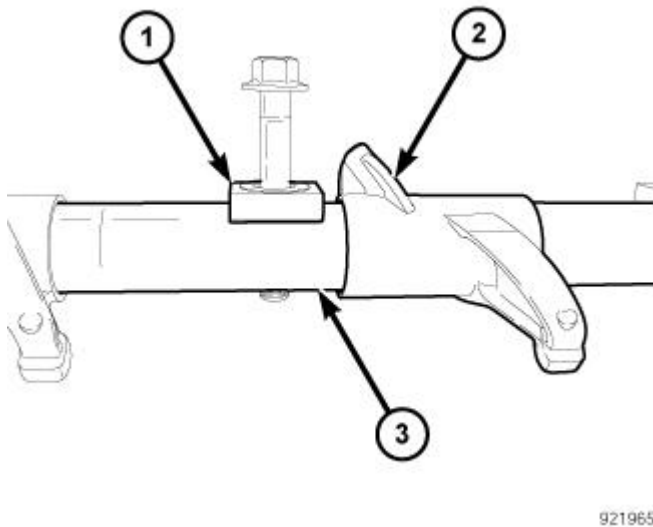
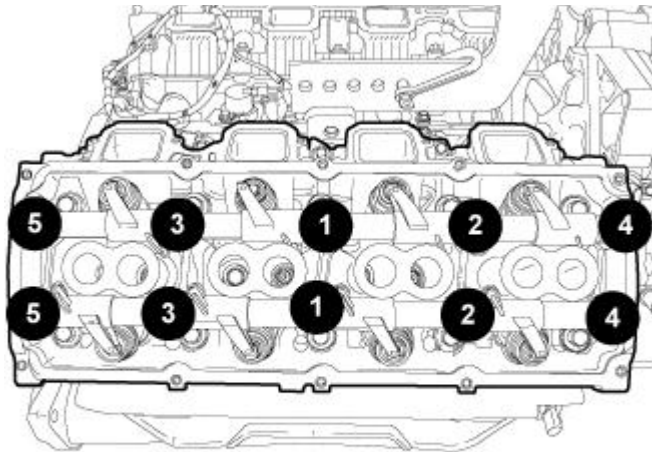


Fig. 94: Rocker Shaft Retainers
Courtesy of CHRYSLER LLC

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



921225

Fig. 95: Rocker Shafts Retaining Bolt Removal & Tightening Sequence

Courtesy of CHRYSLER LLC

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

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

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

6. Install the rocker arm shaft and pushrods. See Engine/Cylinder Head/ROCKER ARM, Valve - Installation
7. Using the sequence shown in illustration, tighten the rocker shaft bolts to 22 N.m (16 ft. lbs.).

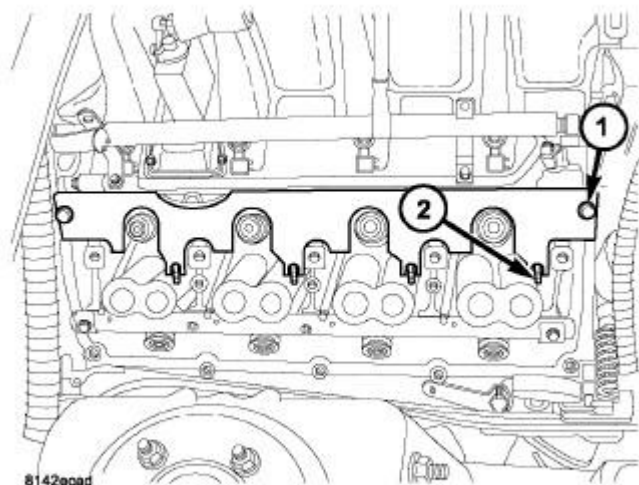


Fig. 96: PUSHROD RETAINING PLATE
Courtesy of CHRYSLER LLC

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

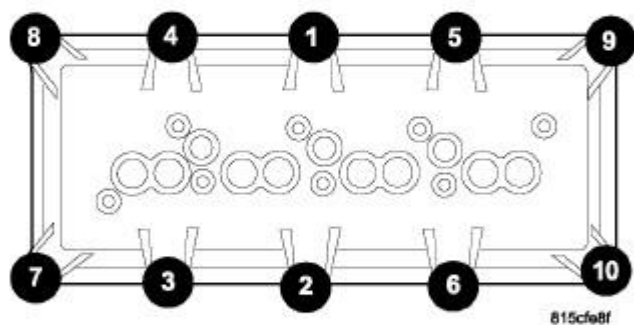


Fig. 97: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

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

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

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

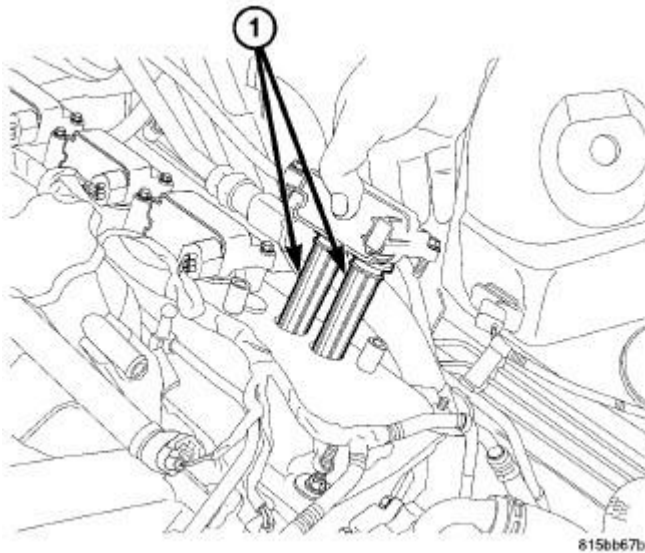


Fig. 98: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

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

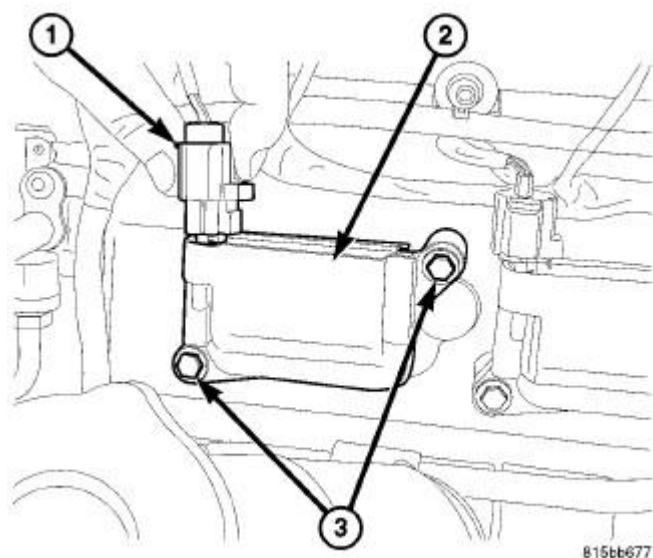


Fig. 99: Ignition Coil Mounting Bolts
Courtesy of CHRYSLER LLC

14. Install the ignition coil (2) on the plugs and tighten the fasteners (3) to 7 N.m (62 in. lbs).
15. Connect the ignition coil electrical connectors (1).
16. Install the air intake resonator and the air cleaner assembly. See **Engine/Air Intake System/BODY, Air Cleaner - Installation.**
17. Connect the negative battery cable.

VALVES, INTAKE AND EXHAUST

Description

VALVE GUIDES

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

VALVES

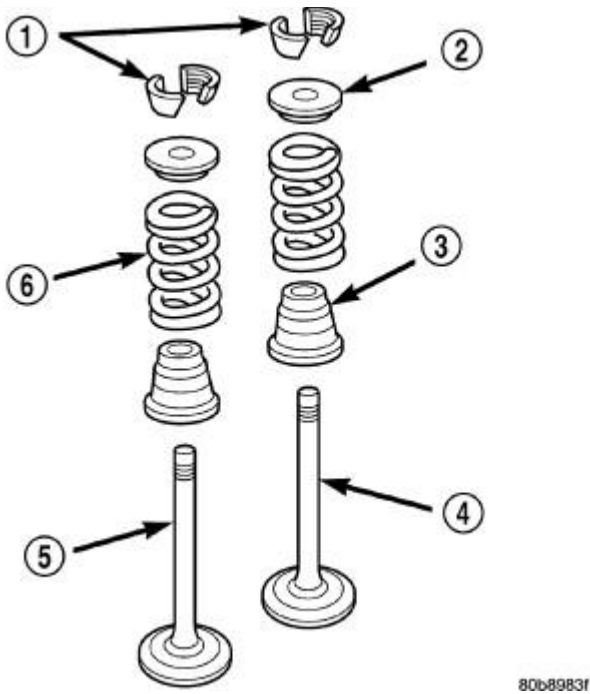


Fig. 100: Valve Assembly Configuration
 Courtesy of CHRYSLER LLC

Both the intake and exhaust valves (5,6) are made of steel. The intake valve is 50.93 mm (2.00 inches) in diameter and the exhaust valve is 39.53 mm (1.55 inches) in diameter. All valves use three bead lock keepers (1) to retain the springs (6) and promote valve rotation.

Standard Procedure

REFACING

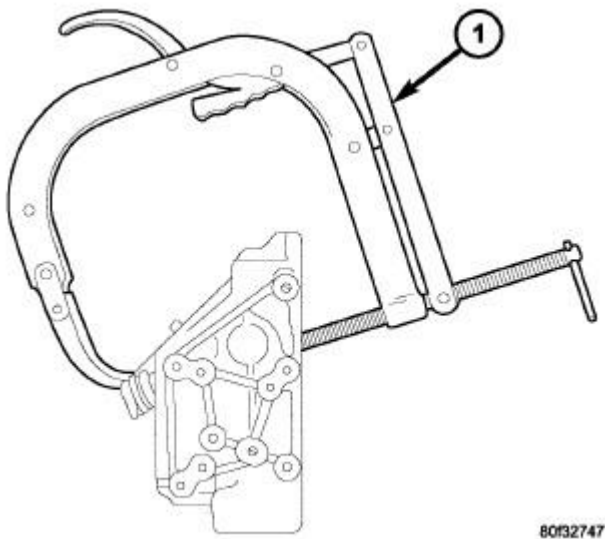
- NOTE:** Valve seats that are worn or burned can be reworked, provided that correct angle and seat width are maintained. Otherwise the cylinder head must be replaced.
- NOTE:** When refacing valves and valve seats, it is important that the correct size valve guide pilot be used for reseating stones. A true and complete surface must be obtained.
1. Using a suitable dial indicator measure the center of the valve seat Total run out must not exceed 0.051 mm (0.002 in).
 2. Apply a small amount of Prussian blue to the valve seat, insert the valve into the cylinder head, while applying light pressure on the valve rotate the valve. Remove the valve and examine the valve face. If the blue is transferred below the top edge of the valve face, lower the valve seat using a 15 degree stone. If the blue is transferred to the bottom edge of the valve face, raise the valve seat using a 65 degree stone.
 3. When the seat is properly positioned the width of the intake seat must be 1.18 - 1.62 mm (0.0464 - 0.0637 in.) and the exhaust seat must be 1.48 - 1.92 mm (0.058 - 0.075 in.).

4. Check the valve spring installed height after refacing the valve and seat. The installed height for both intake and exhaust valve springs must not exceed 46.0 mm (1.81 in.).

VALVE FACE AND VALVE SEAT ANGLE CHART

DESCRIPTION	SPECIFICATION
SEAT WIDTH	-
INTAKE	1.18 - 1.62 mm (0.0464 - 0.0637 in.)
EXHAUST	1.48 - 1.92 mm (0.058 - 0.075 in.)
FACE ANGLE (INT. AND EXT.)	- 45° - 45 1/2°
SEAT ANGLE (INT. AND EXT.)	- 44 1/2° - 45°

5. The valve seat must maintain an angle of 44.5 - 45.0 degrees angle.
6. The valve face must maintain a face angle of 45.0 - 45.5 degrees angle.

Removal**REMOVAL**

80132747

Fig. 101: Valve Spring Removal/Installation**Courtesy of CHRYSLER LLC**

1. Remove the cylinder head. See **Engine/Cylinder Head - Removal**.
2. Compress valve springs using Valve Spring Compressor C-3422-D (1) and valve spring adapter 8464.

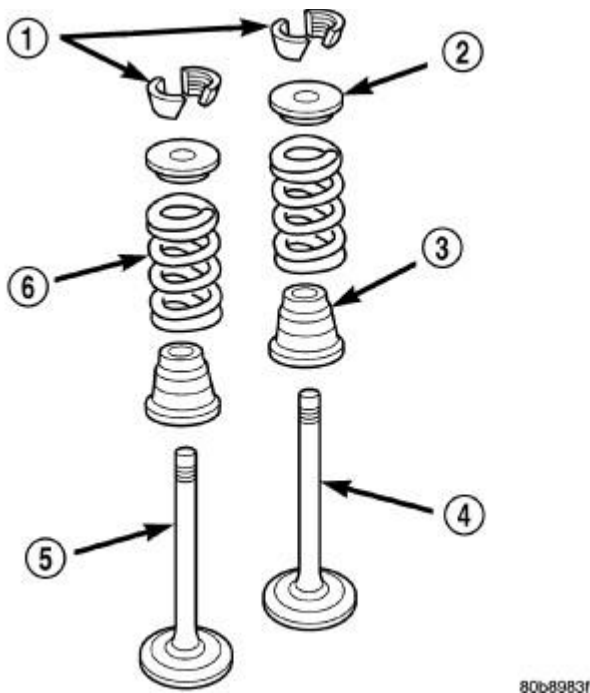


Fig. 102: Valve Assembly Configuration
Courtesy of CHRYSLER LLC

3. Remove valve retaining locks (1) , valve spring retainers (2) , valve springs (6), and valve stem seals (3).
4. Before removing valves (4, 5) , remove any burrs from valve stem lock grooves to prevent damage to the valve guides. Identify valves to ensure installation in original location.

Installation

INSTALLATION

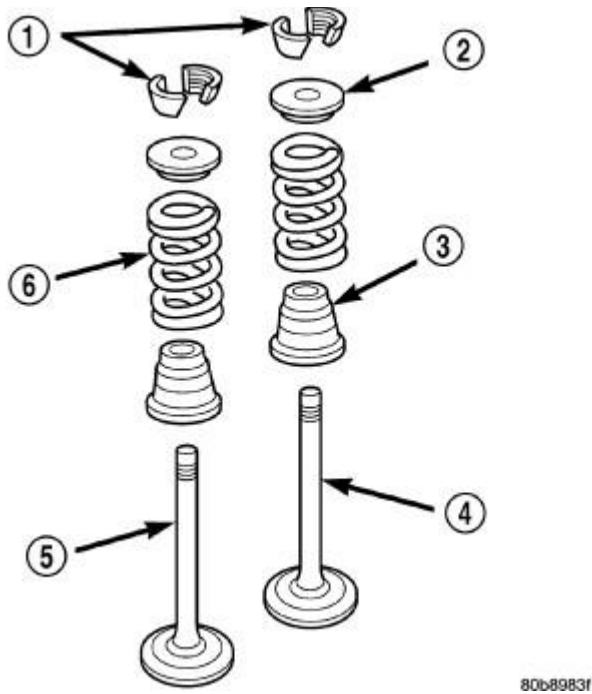


Fig. 103: Valve Assembly Configuration
Courtesy of CHRYSLER LLC

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

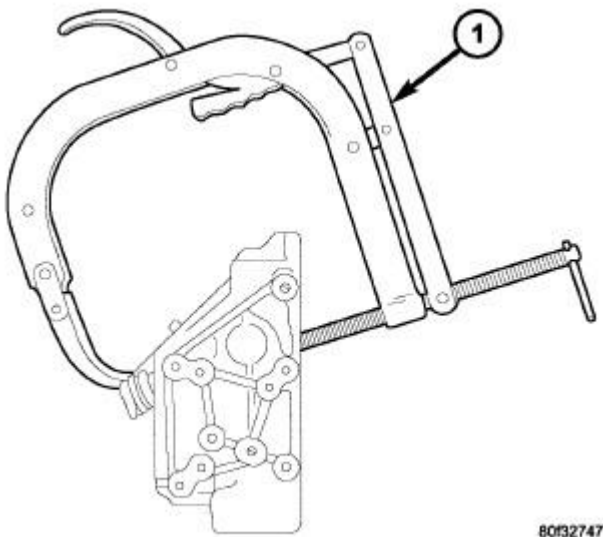
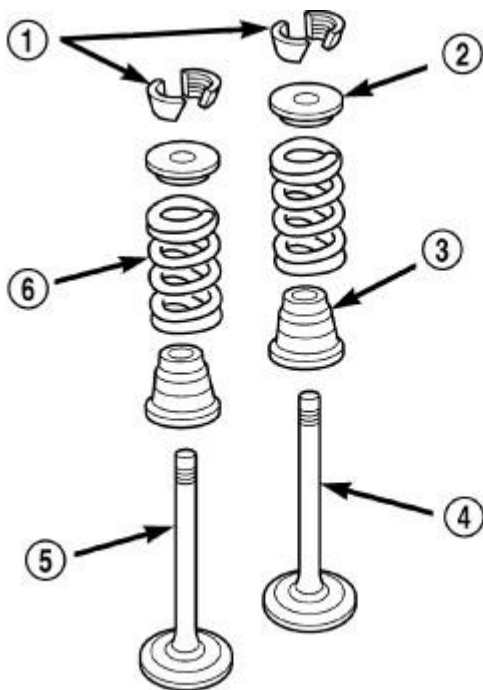


Fig. 104: Valve Spring Removal/Installation

Courtesy of CHRYSLER LLC

7. Compress valve springs with Valve Spring Compressor C-3422-D (1) and Valve Spring Adapter 8464 .

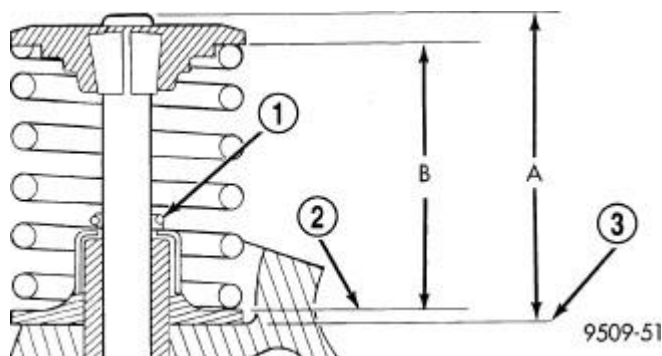


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Fig. 105: Valve Assembly Configuration

Courtesy of CHRYSLER LLC

8. Install valve keepers (1) and release tool.



9509-51

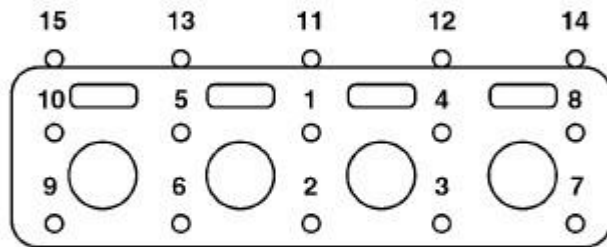
Fig. 106: Measuring Valve Tip Height and Valve Spring Installed Height

Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - VALVE SEAL
2 - VALVE SPRING SEAT
3 - CYLINDER HEAD SURFACE |
|--|

NOTE: If valves and/or seats are ground, measure the installed height (B) of springs.

9. Make sure the measurement is taken from bottom of spring seat in cylinder head to the bottom surface of spring retainer (B).



815a0232

Fig. 107: HEAD BOLT TIGHTENING SEQUENCE
Courtesy of CHRYSLER LLC

10. Install cylinder head. See Engine/Cylinder Head - Installation.

ENGINE BLOCK

CLEANING

CLEANING

Thoroughly clean the oil pan and engine block gasket surfaces.

Use compressed air to clean out:

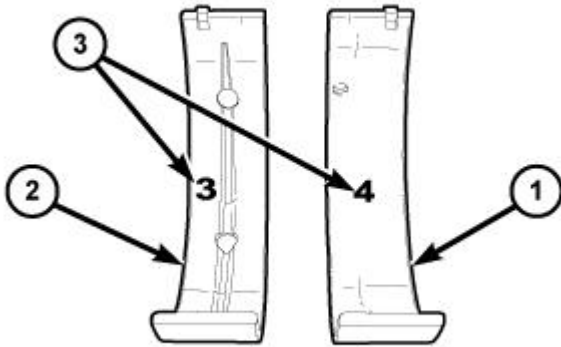
- The galley at the oil filter adaptor hole.
- The front and rear oil galley holes.
- The feed holes for the crankshaft main bearings.

Once the block has been completely cleaned, apply Loctite PST pipe sealant with Teflon 592 to the threads of the front and rear oil galley plugs. Tighten the 1/4 inch NPT plugs to 20 N.m (177 in. lbs.) torque. Tighten the

3/8 inch NPT plugs to 27 N.m (240 in. lbs.) torque.

INSPECTION

INSPECTION



2767936

Fig. 108: Identifying Main Bearing Inserts

Courtesy of CHRYSLER LLC

1. Wipe the main bearing inserts (1, 2) clean.
2. Inspect the inserts for abnormal wear patterns, scoring, grooving, fatigue, pitting and for metal or other foreign material imbedded in the lining.
3. Inspect the back of the inserts for fractures, scrapes or irregular wear patterns.
4. Inspect the insert locking tabs for damage.
5. Inspect the crankshaft thrust washers for scoring, scratches, wear or blueing.
6. Replace any bearing that shows abnormal wear.
7. Inspect the main bearing bores for signs of scoring, nicks and burrs.
8. If the cylinder block main bearing bores show damage, replace the engine block.

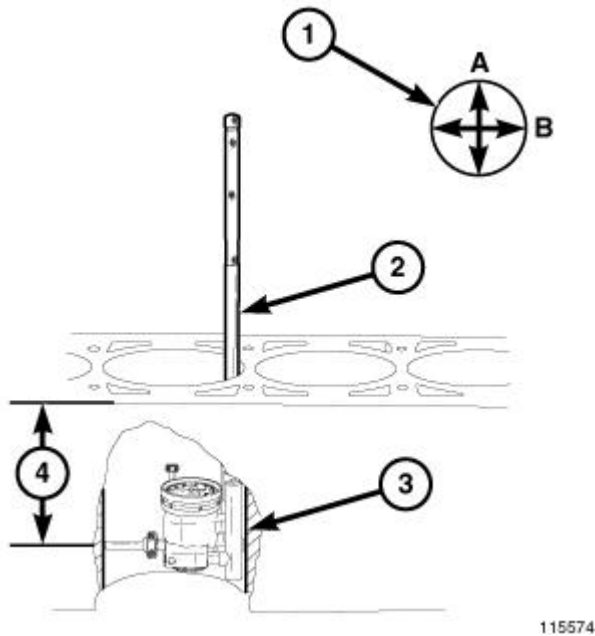


Fig. 109: Measuring Cylinder Bore Diameter
Courtesy of CHRYSLER LLC

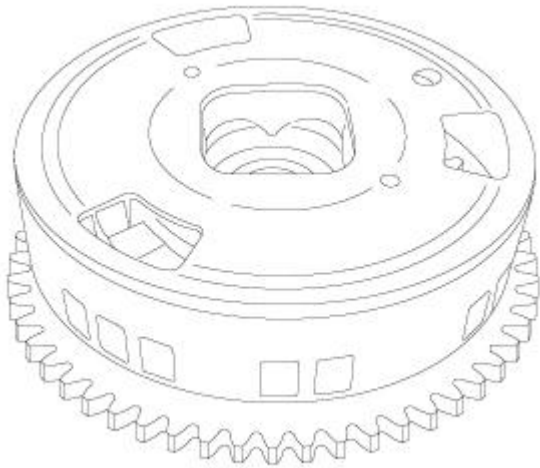
9. Use Cylinder Indicator C-119 (2) to correctly measure the inside diameter of the cylinder bore (3). A cylinder bore gauge capable of reading in 0.003 mm (0.0001 in.) Increments is required. If a bore gauge is not available, do not use an inside micrometer.
10. Measure the inside diameter of the cylinder bore at three levels below the top of the bore (4). Start at the top of the bore, perpendicular (across or at 90°) to the axis of the crankshaft at point A (1).
11. Repeat the measurement near the middle of the bore then repeat the measurement near the bottom of the bore.
12. Determine the taper by subtracting the smaller diameter from the larger diameter.
13. Rotate the measuring device 90° to point B (1) and repeat the three measurements. Verify that the maximum taper is within specifications.
14. Determine out-of-roundness by comparing the difference between each measurement.
15. If the cylinder bore taper does not exceed 0.025 mm (0.001 inch) and out-of-roundness does not exceed 0.015 mm (0.0006 inch) then the cylinder bore can be honed. If the cylinder bore taper or out-of-round condition exceeds the maximum limits, replace the cylinder block.

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

ASSEMBLY, VARIABLE VALVE TIMING

Description

DESCRIPTION



1225995

Fig. 110: Variable Cam Timing (VCT)

Courtesy of CHRYSLER LLC

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

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

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

Operation

OPERATION

The Variable Cam Timing (VCT) assembly is actuated with engine oil pressure. The oil flow to the VCT assemblies are controlled by an Oil Control Valve (OCV). The OCV consist of a Pulse Width Modulated (PWM) solenoid and a spool valve. The PCM actuates the OCV to control oil flow through the spool valve into the VCT assemblies. The VCT assembly consists of a rotor, stator, and sprocket. The stator is connected to the timing chain through the sprocket. The rotor is connected to the camshaft. Oil flow in to the VCT assembly rotates the rotor with respect to the stator, thus rotating the exhaust camshaft with respect to the timing chain and intake camshaft. An infinitely variable cam timing position can be achieved within the limits of the hardware. The CMP monitors the position of the camshaft with respect to the crankshaft and provides feedback to the PCM.

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

Removal

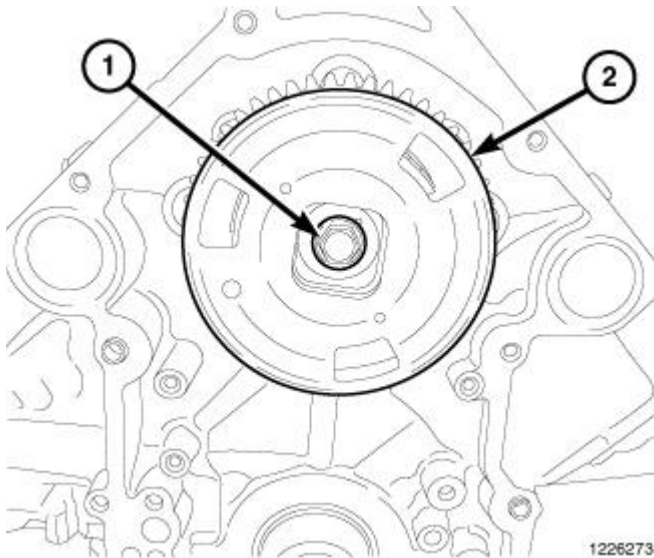
REMOVAL

Fig. 111: Camshaft Phaser & Bolt
Courtesy of CHRYSLER LLC

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

1. Remove the timing chain and sprockets. See Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Removal.
2. Remove the camshaft phaser bolt (1).
3. Remove camshaft phaser (2).

Installation**INSTALLATION**

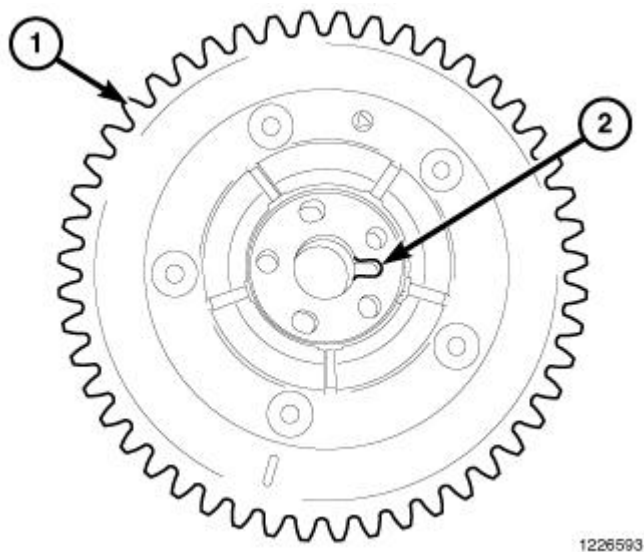


Fig. 112: Phaser Alignment Slot
Courtesy of CHRYSLER LLC

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

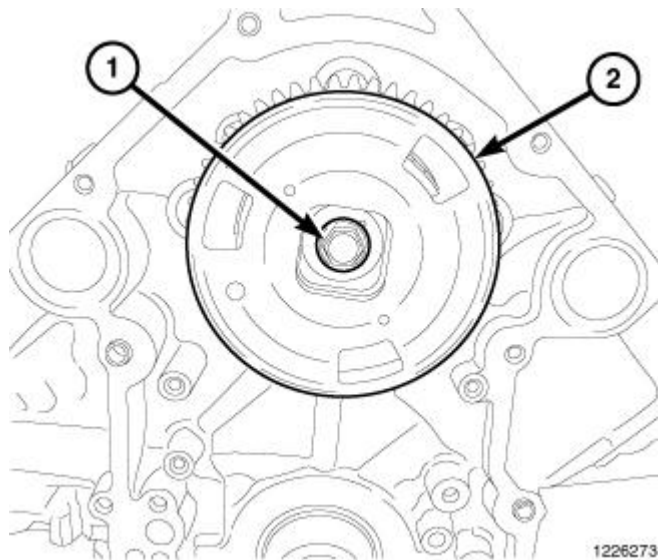


Fig. 113: Camshaft Phaser & Bolt
Courtesy of CHRYSLER LLC

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

2. Position the phaser (2) in place and install phaser retaining bolt (1) and tighten to 122 N.m (90 ft. lbs.).
3. Install the timing chain and sprockets. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Installation**.

BEARING(S), CRANKSHAFT, MAIN**Standard Procedure****CRANKSHAFT MAIN BEARING - FITTING****MAIN BEARING JOURNAL DIAMETER (CRANKSHAFT REMOVED)**

Crankshaft removed from the cylinder block.

Clean the oil off the main bearing journal.

Determine the maximum diameter of the journal with a micrometer. Measure at two locations 90° apart at each end of the journal.

The maximum allowable taper is 0.008 mm (0.0004 inch.) and maximum out of round is 0.005 mm (0.0002 inch). Compare the measured diameter with the journal diameter specification (Main Bearing Fitting Chart). Select inserts required to obtain the specified bearing-to-journal clearance.

CRANKSHAFT MAIN BEARING SELECTION

The main bearings are "select fit" to achieve proper oil clearances. For main bearing selection, the crankshaft counterweight has grade identification marks stamped into it. These marks are read from left to right, corresponding with journal number 1, 2, 3, 4 and 5.

NOTE: Service main bearings are coded. These codes identify what size (grade) the bearing is.

MAIN BEARING SELECTION CHART - 5.7L

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

Inspection**INSPECTION**

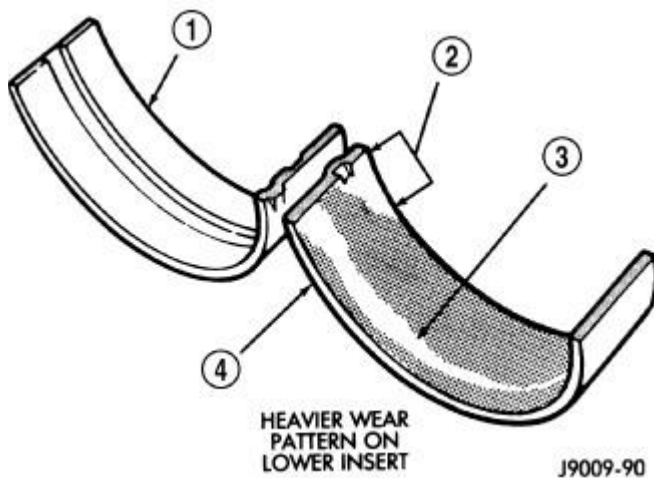


Fig. 114: Main Bearing Wear Patterns

Courtesy of CHRYSLER LLC

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

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

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

Inspect the upper insert locking tabs for damage.

Replace all damaged or worn bearing inserts.

CAMSHAFT, ENGINE

Removal

CAMSHAFT CORE HOLE PLUG

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

1. Remove the rear cam bearing core plug.

CAMSHAFT

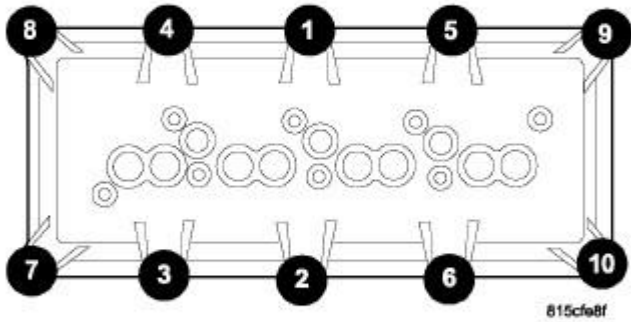


Fig. 115: Cylinder Head Cover Torque Sequence
 Courtesy of CHRYSLER LLC

1. Remove the battery negative cable.
2. Remove the air cleaner assembly.
3. Drain coolant. Refer to **Cooling - Standard Procedure** .
4. Remove the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
5. Remove the generator.
6. Remove the A/C compressor, and set aside.
7. Remove the radiator. Refer to **Cooling/Engine/RADIATOR, Engine Cooling - Removal** .
8. Remove intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Removal**.
9. Remove cylinder head covers. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.

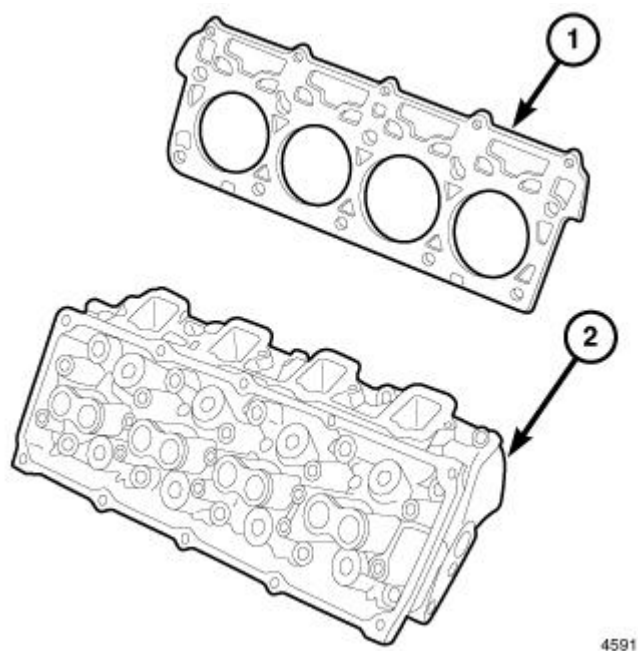
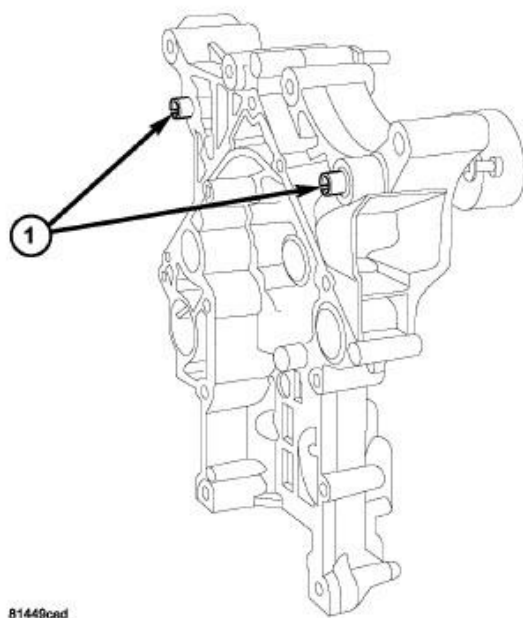


Fig. 116: Cylinder Head Components
Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - CYLINDER HEAD COVER
2 - GASKET
3 - FASTENERS
4 - CYLINDER HEAD
5 - HEAD GASKET |
|--|

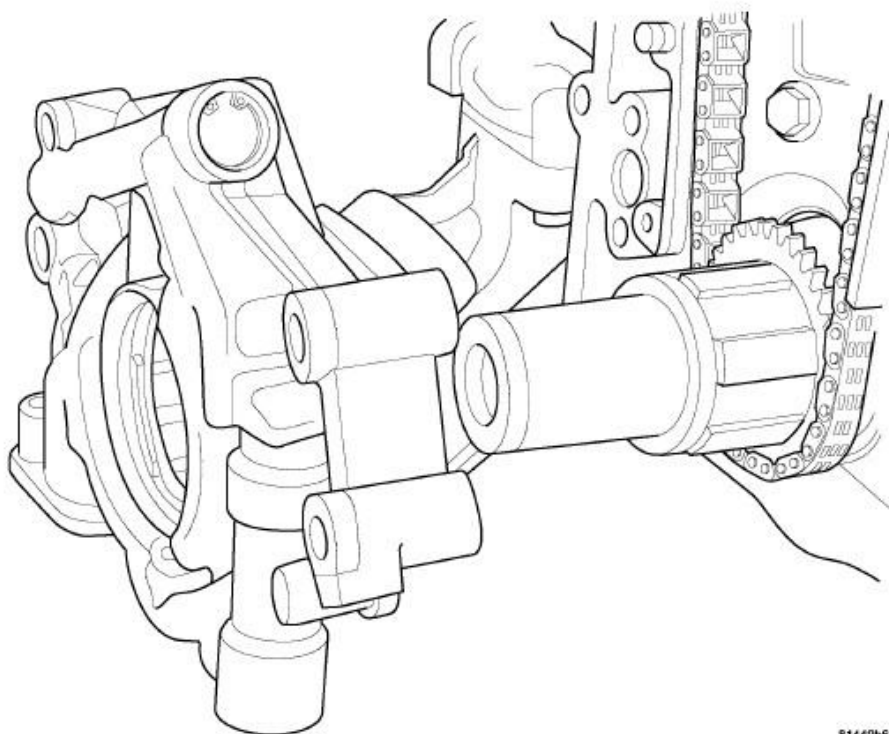
10. Remove both left and right cylinder heads (4). See **Engine/Cylinder Head - Removal**.
11. Remove the oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.



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Fig. 117: Front Cover Slide Bushings
Courtesy of CHRYSLER LLC

12. Remove timing case cover (1). See **Engine/Valve Timing/COVER(S), Engine Timing - Removal.**
13. Remove the oil pick up tube.



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Fig. 118: Removing/Installing Oil Pump

Courtesy of CHRYSLER LLC

14. Remove the oil pump. See Engine/Lubrication/PUMP, Engine Oil - Removal.

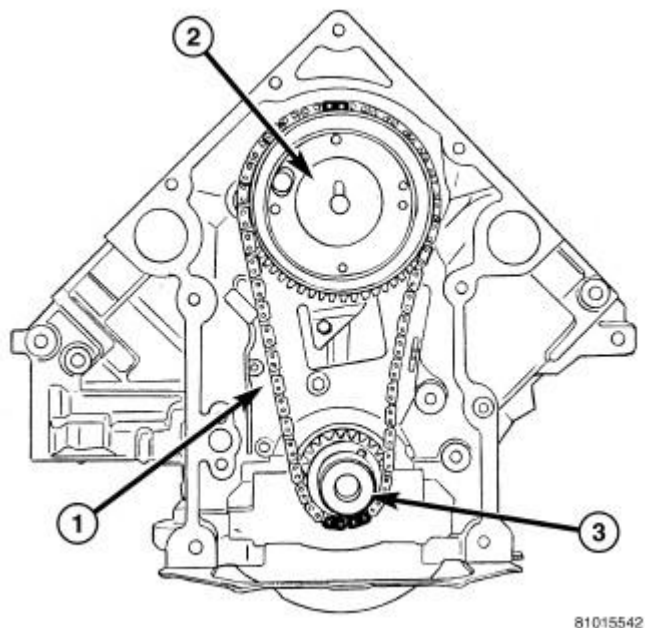


Fig. 119: Timing Mark Alignment
Courtesy of CHRYSLER LLC

- | |
|---|
| 1 - Chain Tensioner
2 - Camshaft Sprocket
3 - Crankshaft Sprocket |
|---|

15. Remove timing chain (2). See Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Removal.
16. Remove camshaft tensioner/thrust plate assembly.

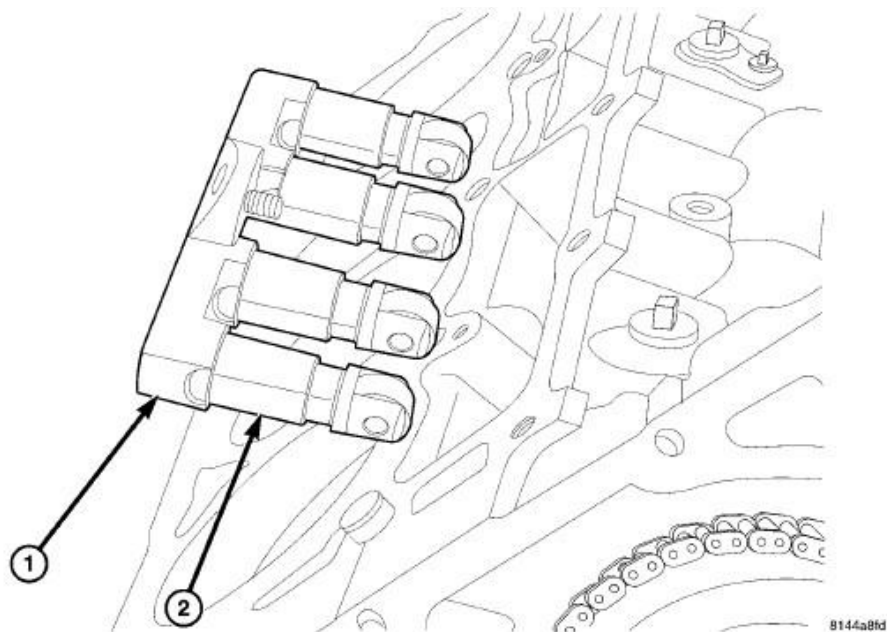


Fig. 120: Removing/Installing Hydraulic Roller Tappet
Courtesy of CHRYSLER LLC

1 - TAPPET RETAINER 2 - HYDRAULIC ROLLER TAPPET
--

NOTE: Identify lifters to ensure installation in original location.

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

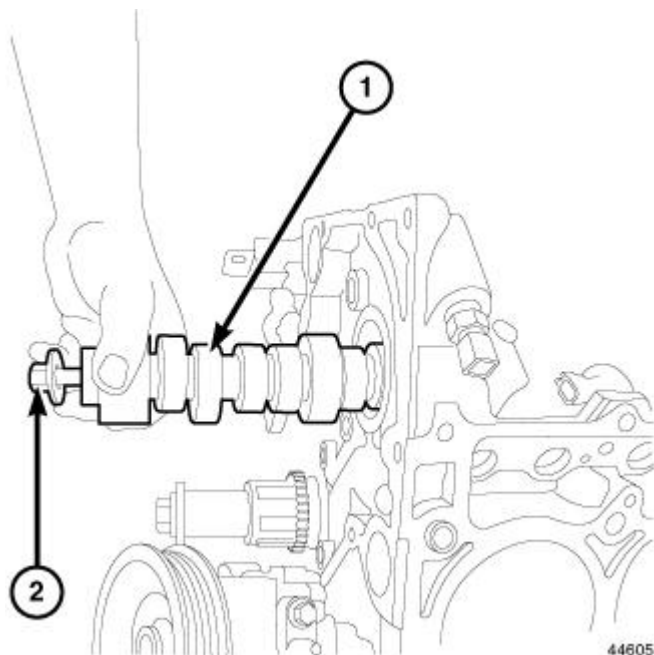


Fig. 121: Removing/Installing Camshaft
Courtesy of CHRYSLER LLC

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

Inspection

INSPECTION

The cam bearings are not serviceable. Do not attempt to replace cam bearings for any reason.

Installation

CAMSHAFT CORE HOLE PLUG

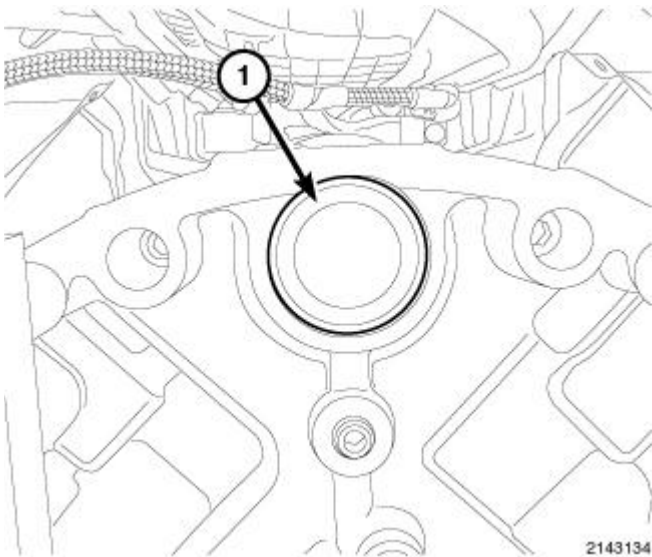


Fig. 122: Camshaft Core Hole Plug
Courtesy of CHRYSLER LLC

1. Clean the core hole in the cylinder block.

NOTE: Do not apply adhesive to the new camshaft core hole plug. A new plug has adhesive pre-applied.

2. Install a new camshaft core hole plug (1) located at the rear of cylinder block, using a suitable flat faced tool. The plug must be fully seated on the cylinder block shoulder.
3. Install the flexplate. See **Engine/Engine Block/FLEXPLATE - Installation**.
4. Install the engine. See **Engine - Installation**.

CAMSHAFT

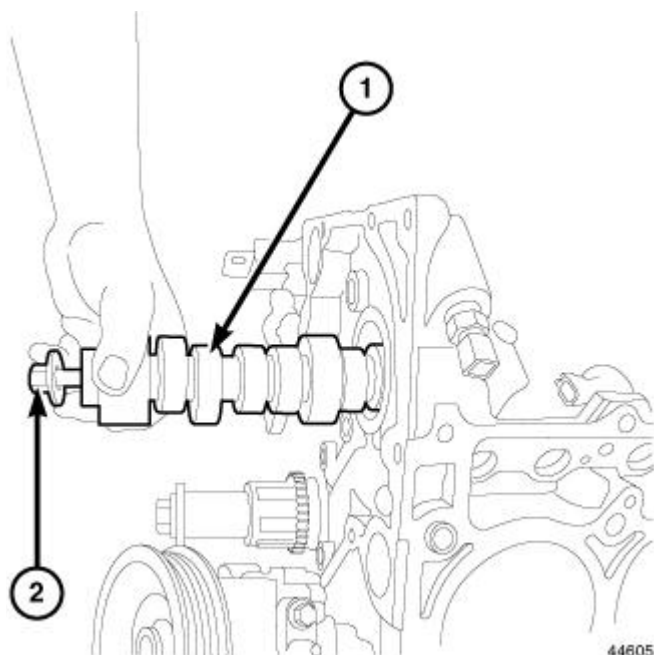


Fig. 123: Removing/Installing Camshaft

Courtesy of CHRYSLER LLC

CAUTION: 5.7L engines equipped with MDS uses a unique camshaft for use with the Multi Displacement System. When installing a new camshaft, the replacement camshaft must be compatible with the Multi Displacement System.

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

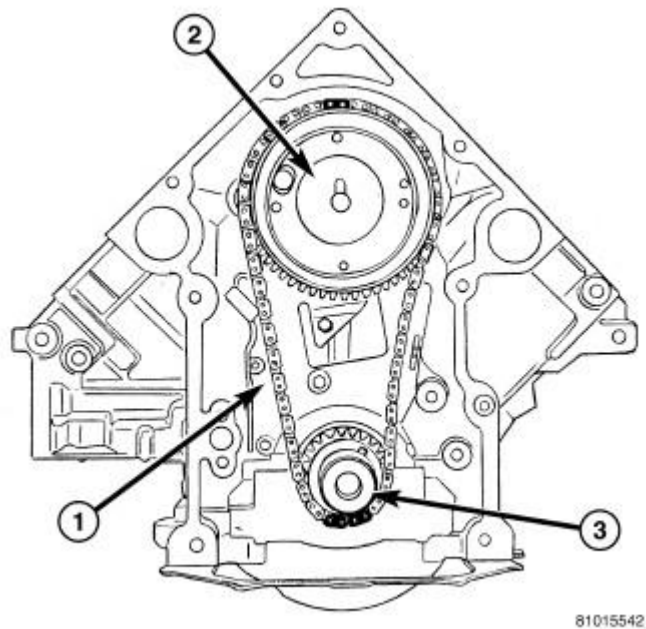
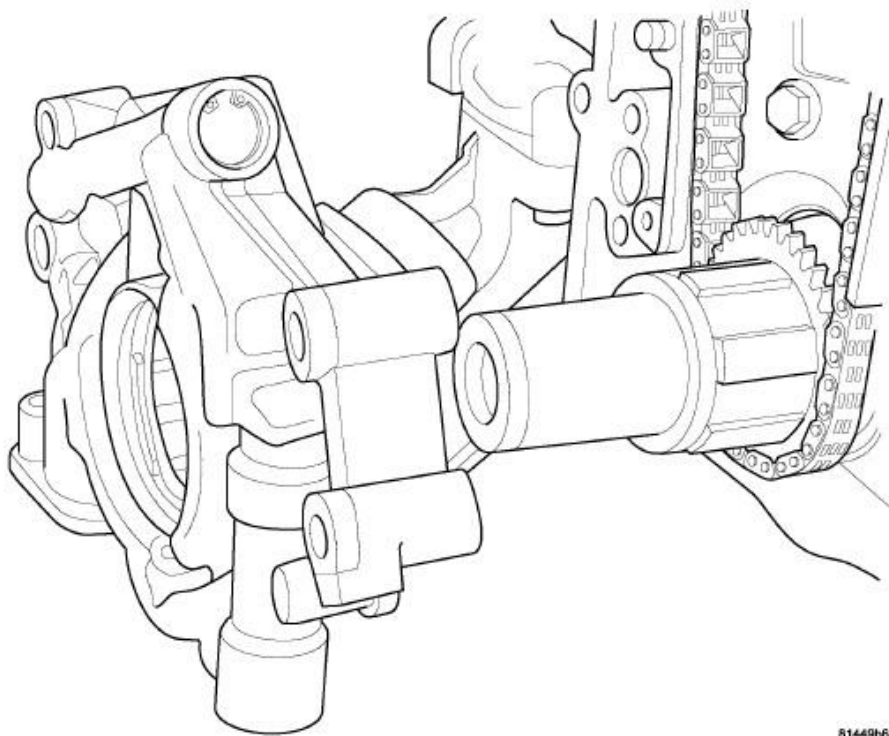


Fig. 124: Timing Mark Alignment
Courtesy of CHRYSLER LLC

- | |
|---|
| 1 - Chain Tensioner
2 - Camshaft Sprocket
3 - Crankshaft Sprocket |
|---|

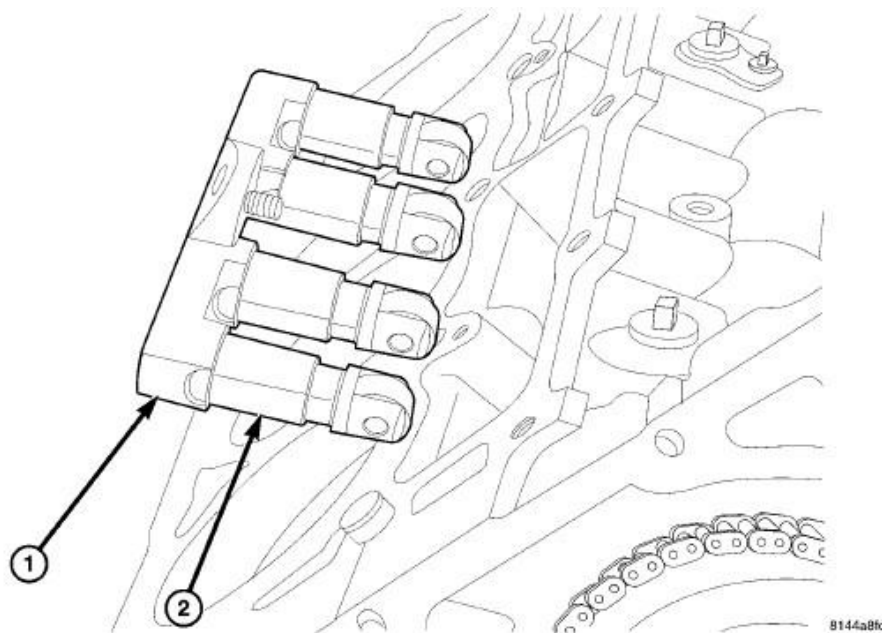
2. Install camshaft Tensioner plate assembly. Tighten bolts to 28 N.m (250 in. lbs.).
3. Install timing chain and sprockets. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Installation**.
4. Measure camshaft end play. See **Engine - Specifications**. If not within limits install a new thrust plate.



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Fig. 125: Removing/Installing Oil Pump
Courtesy of CHRYSLER LLC

5. Install the oil pump. See **Engine/Lubrication/PUMP, Engine Oil - Installation**.
6. Install the oil pick up tube.



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Fig. 126: Removing/Installing Hydraulic Roller Tappet

Courtesy of CHRYSLER LLC

- 1 - TAPPET RETAINER
- 2 - HYDRAULIC ROLLER TAPPET

7. Each tappet (2) reused must be installed in the same position from which it was removed. **When camshaft is replaced, all of the tappets must be replaced.**

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

8. Install tappets (2) and retaining yoke assembly (1). See Engine/Engine Block/LIFTER(S), Hydraulic - Installation.

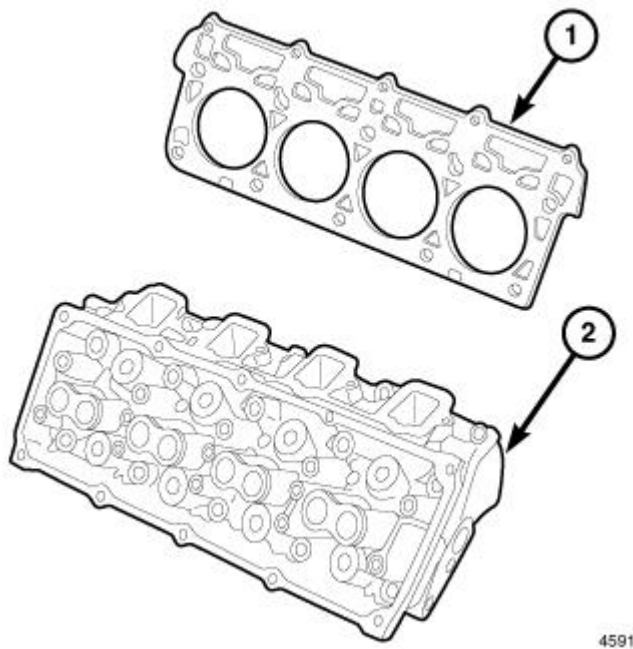


Fig. 127: Cylinder Head Components
Courtesy of CHRYSLER LLC

- 1 - CYLINDER HEAD COVER
- 2 - GASKET
- 3 - FASTENERS
- 4 - CYLINDER HEAD
- 5 - HEAD GASKET

9. Install both left and right cylinder heads (4). See Engine/Cylinder Head - Installation.

10. Install push rods.

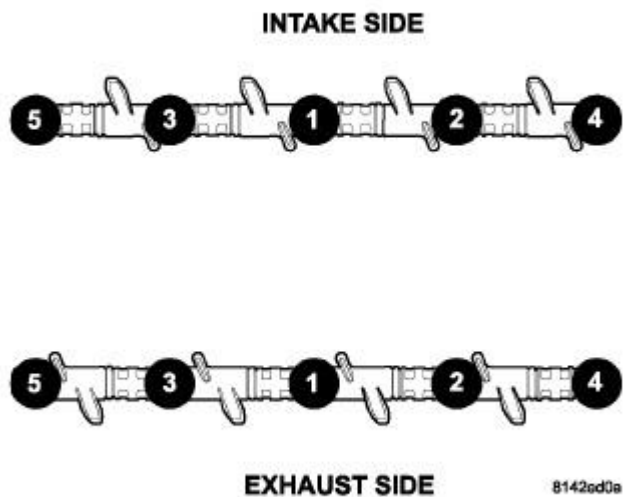


Fig. 128: Rocker Shaft Torque Sequence
Courtesy of CHRYSLER LLC

11. Install rocker arms. See Engine/Cylinder Head/ROCKER ARM, Valve - Installation.

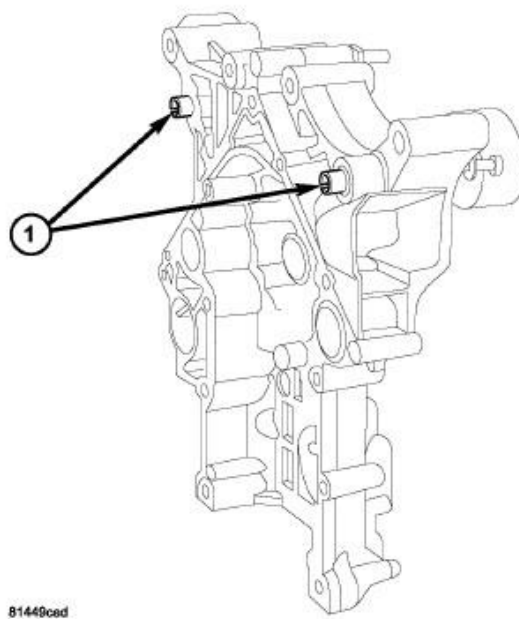


Fig. 129: Front Cover Slide Bushings
Courtesy of CHRYSLER LLC

12. Install timing case cover. See Engine/Valve Timing/COVER(S), Engine Timing - Installation.
13. Install the oil pan. See Engine/Lubrication/PAN, Oil - Installation.

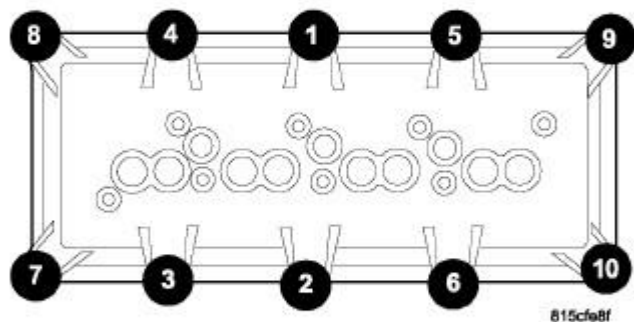


Fig. 130: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

14. Install cylinder head covers. See Engine/Cylinder Head/COVER(S), Cylinder Head - Installation.

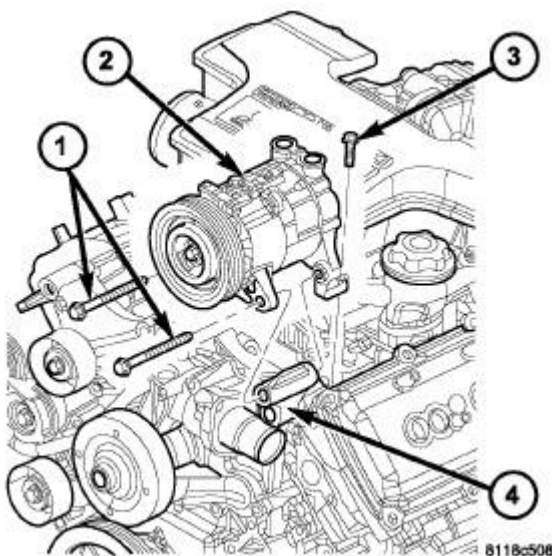


Fig. 131: A/C COMPRESSOR - 5.7L ENGINE
Courtesy of CHRYSLER LLC

15. Install intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Installation.**
16. Install the A/C compressor (2).

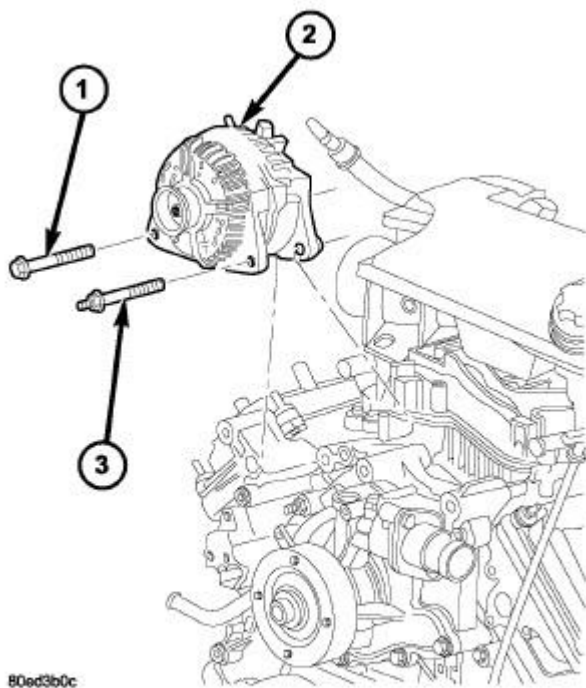
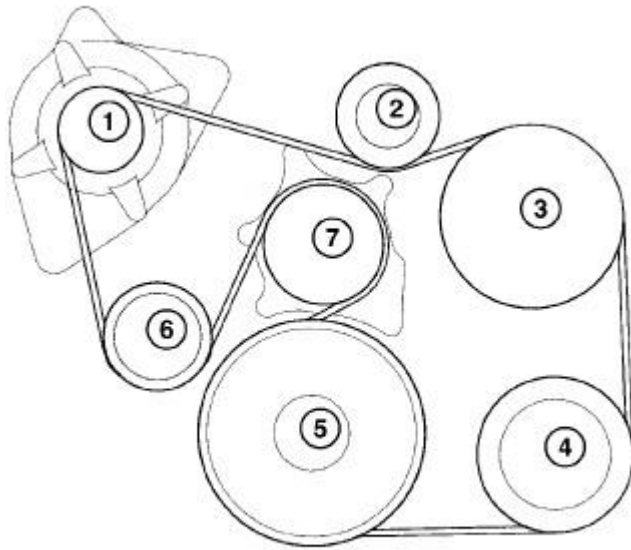


Fig. 132: REMOVE / INSTALL GENERATOR - 5.7L
Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - MOUNTING BOLT
2 - GENERATOR
3 - MOUNTING STUD / BOLT |
|--|

17. Install the generator (2).



807439d

Fig. 133: Accessory Drive Belt Routing
 Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - GENERATOR
2 - IDLER PULLEY
3 - POWER STEERING PUMP
4 - A/C COMPRESSOR
5 - CRANKSHAFT
6 - BELT TENSIONER
7 - WATER PUMP |
|--|

18. Install the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
19. Install the radiator. Refer to **Cooling/Engine/RADIATOR, Engine Cooling - Installation** .
20. Install the air cleaner assembly.
21. Install the battery negative cable.
22. Refill coolant. Refer to **Cooling - Standard Procedure** .
23. Refill engine oil.
24. Start engine and check for leaks.

COVER, STRUCTURAL DUST

Description

DESCRIPTION

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

to the engine.

Operation

OPERATION

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

Removal

REMOVAL

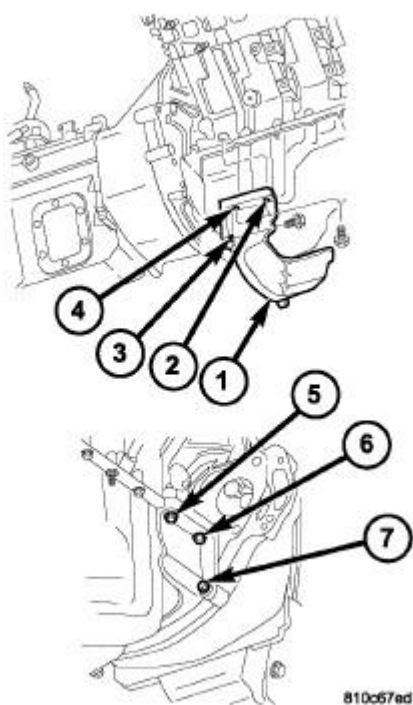


Fig. 134: Structural Cover - Manual Transmission
Courtesy of CHRYSLER LLC

- 1 - STRUCTURAL COVER
- 2 - BOLT
- 3 - BOLT
- 4 - BOLT
- 5 - BOLT
- 6 - BOLT
- 7 - BOLT

CAUTION: On manual transmission vehicles, the 7/16 inch engine block to clutch

housing bolts must be loosened before removal of the structural dust cover (1). Clutch housing distortion will occur if this procedure is not followed.

1. If equipped with a manual transmission, loosen the 7/16 inch engine block to clutch housing bolts.

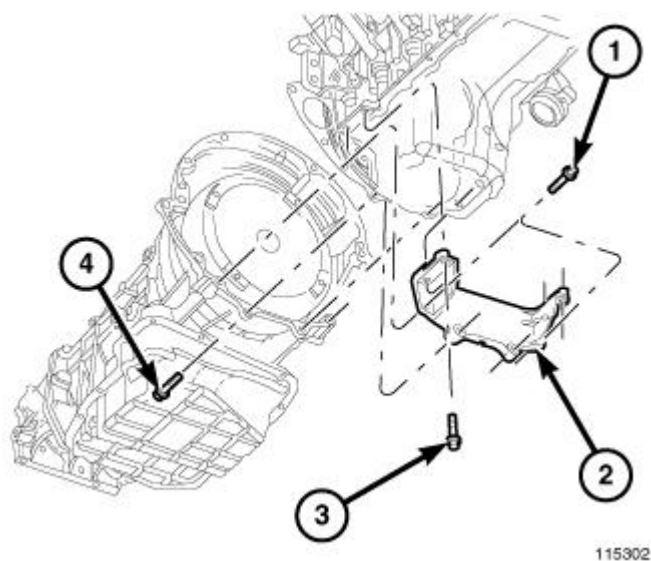


Fig. 135: Structural Cover
Courtesy of CHRYSLER LLC

2. Raise vehicle on hoist.
3. Remove the bolts retaining structural cover (1,2).
4. Remove the structural cover.

Installation

INSTALLATION

AUTOMATIC TRANSMISSION

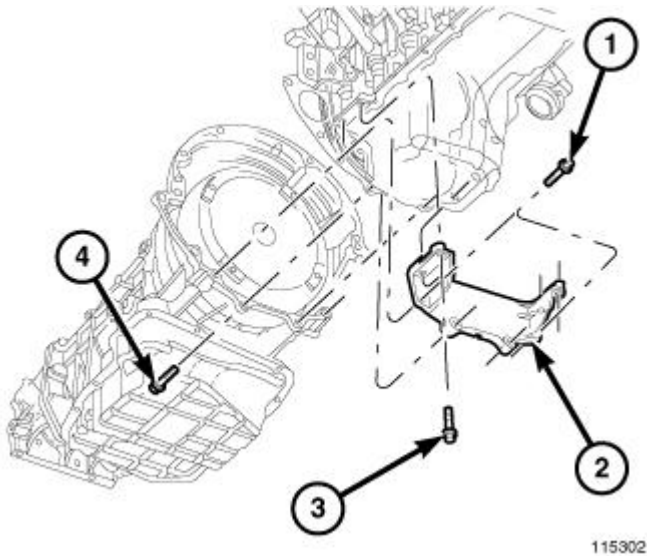


Fig. 136: Structural Cover
Courtesy of CHRYSLER LLC

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

1. Position the structural cover in the vehicle.
2. Install all four bolts retaining the cover-to-engine. DO NOT tighten the bolts at this time.
3. Install the four cover-to-transmission bolts. Do NOT tighten at this time.

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

4. Tighten the (4) structural dust cover bolts that go into the transmission to 6-11 N.m (50-100 in. lbs.).
5. Tighten the (4) structural dust cover bolts that go into the engine block to 6-11 N.m (50-100 in. lbs.).
6. Starting with the two rear cover-to-engine bolts, tighten bolts (1) to 54 N.m (40 ft. lbs.), then tighten bolts (2) and (3) to 54 N.m (40 ft. lbs.) in the sequence shown in illustration.
7. Install the exhaust pipe on left hand exhaust manifold.
8. Tighten exhaust manifold-to-exhaust pipe retaining bolts to 20-26 N.m (15-20 ft. lbs.).

MANUAL TRANSMISSION

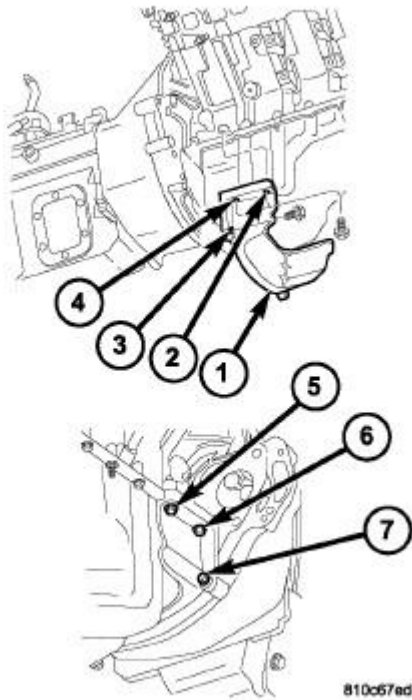


Fig. 137: Structural Cover - Manual Transmission
Courtesy of CHRYSLER LLC

- 1 - STRUCTURAL COVER
- 2 - BOLT
- 3 - BOLT
- 4 - BOLT
- 5 - BOLT
- 6 - BOLT
- 7 - BOLT

CAUTION: The 7/16 inch engine block to clutch housing bolts must be loosened before removal/installation of the structural dust cover. Clutch housing distortion will occur if this procedure is not followed.

1. Position the structural cover in the vehicle.

CAUTION: The structural cover must be installed as described in the following steps. Failure to do so will cause severe damage to the cover, and engine noise.

2. Install all bolts retaining the cover-to-engine. DO NOT tighten the bolts at this time.
3. Install the cover-to-transmission bolts. Do NOT tighten at this time.

CAUTION: The structural cover must be held tightly against the corner formed by the engine and the transmission clutch housing during tightening sequence. Failure to do so may cause damage to the cover and engine noise.

4. Tighten the (2) structural dust cover bolts that go into the clutch housing to 6-11 N.m (50-100 in. lbs.).
5. Tighten the (4) structural dust cover bolts that go into the engine block to 6-11 N.m (50-100 in. lbs.).
6. Tighten the structural cover bolt that is closest to the rear face of block on the passenger side of block to 54 N.m (40 ft. lbs.).
7. Tighten the structural cover bolt that is closest to the front face of block on the drivers side to 54 N.m (40 ft. lbs.).
8. Tighten the remaining (2) structural cover bolts that go into the **block** in an "X" pattern to 54 N.m (40 ft. lbs.).
9. Tighten the structural cover bolts that go into the **clutch housing** to 54 N.m (40 ft. lbs.).
10. Tighten the 7/16 inch engine block to clutch housing bolts to 68 N.m (50 ft. lbs.).

CRANKSHAFT

Removal

REMOVAL

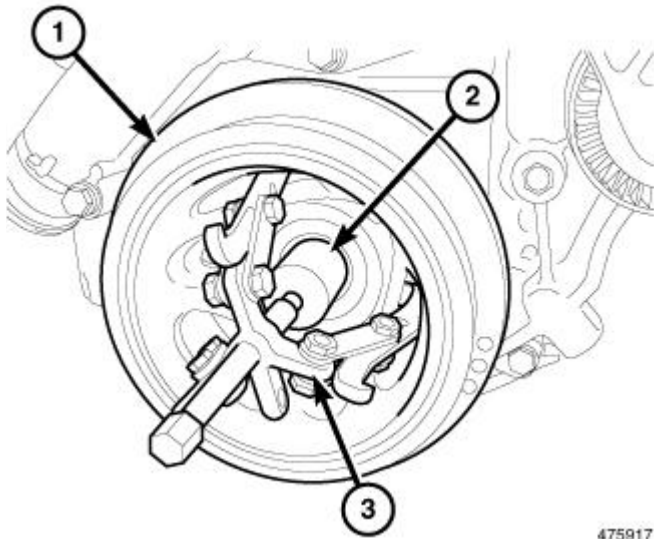


Fig. 138: Removing Vibration Damper
Courtesy of CHRYSLER LLC

1. Remove engine. See **Engine - Removal**.
2. Remove the vibration damper (1) using Crankshaft Insert 8513A (2) and Puller 1023 (3). See **Engine/Engine Block/DAMPER, Vibration - Removal**.

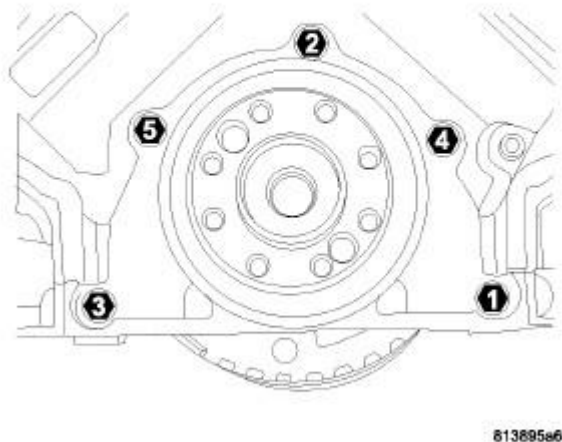


Fig. 139: REAR SEAL RETAINER TORQUE SEQUENCE

Courtesy of CHRYSLER LLC

3. Remove the rear oil seal retainer. See Engine/Engine Block/RETAINER, Crankshaft Rear Oil Seal - Removal.
4. Remove the oil pan. See Engine/Lubrication/PAN, Oil - Removal.

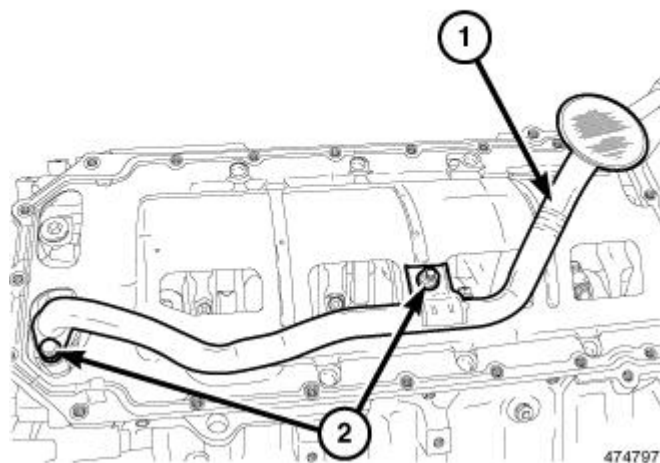


Fig. 140: Oil Pick Up Tube

Courtesy of CHRYSLER LLC

5. Remove the oil pump pickup (1).
6. Remove the windage tray/oil pan gasket.

7. Remove the timing chain cover. See Engine/Valve Timing/COVER(S), Engine Timing - Removal.

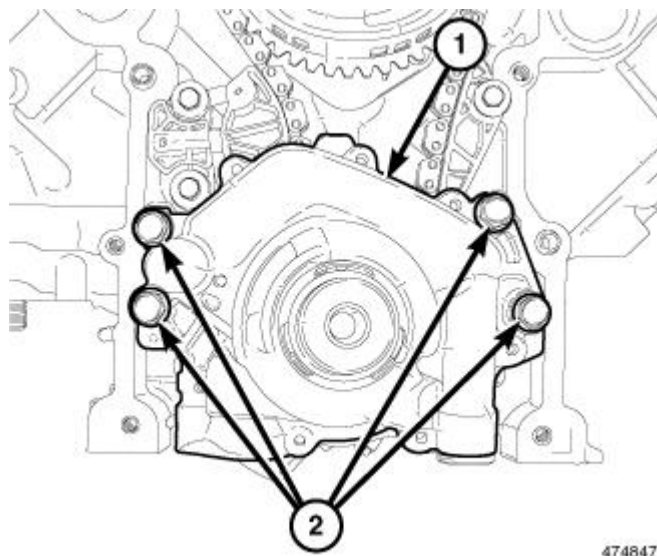


Fig. 141: Oil Pump Retaining Bolts
Courtesy of CHRYSLER LLC

8. Remove the oil pump (1). See Engine/Lubrication/PUMP, Engine Oil - Removal.

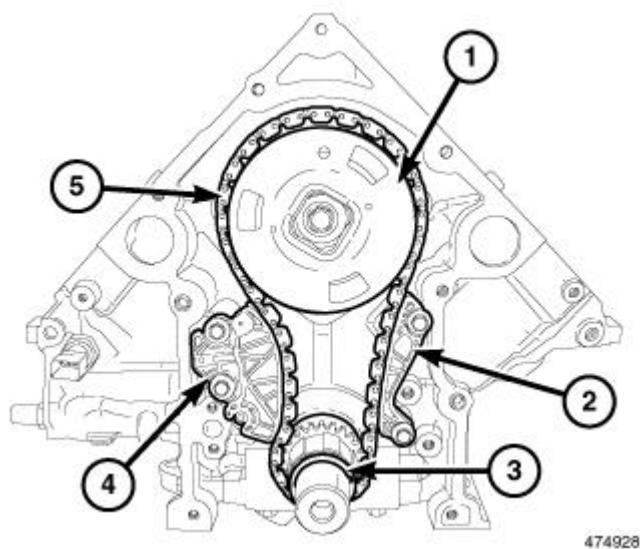


Fig. 142: Timing Chain
Courtesy of CHRYSLER LLC

9. Remove the timing chain (5) and sprockets (1,3). See Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Removal.

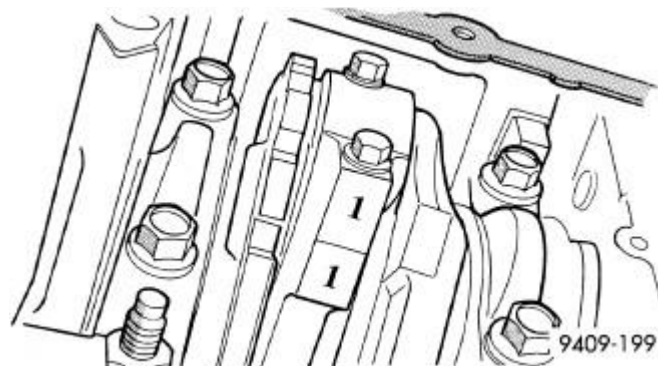


Fig. 143: Identifying Mark On Connecting Rod And Bearing Cap
Courtesy of CHRYSLER LLC

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

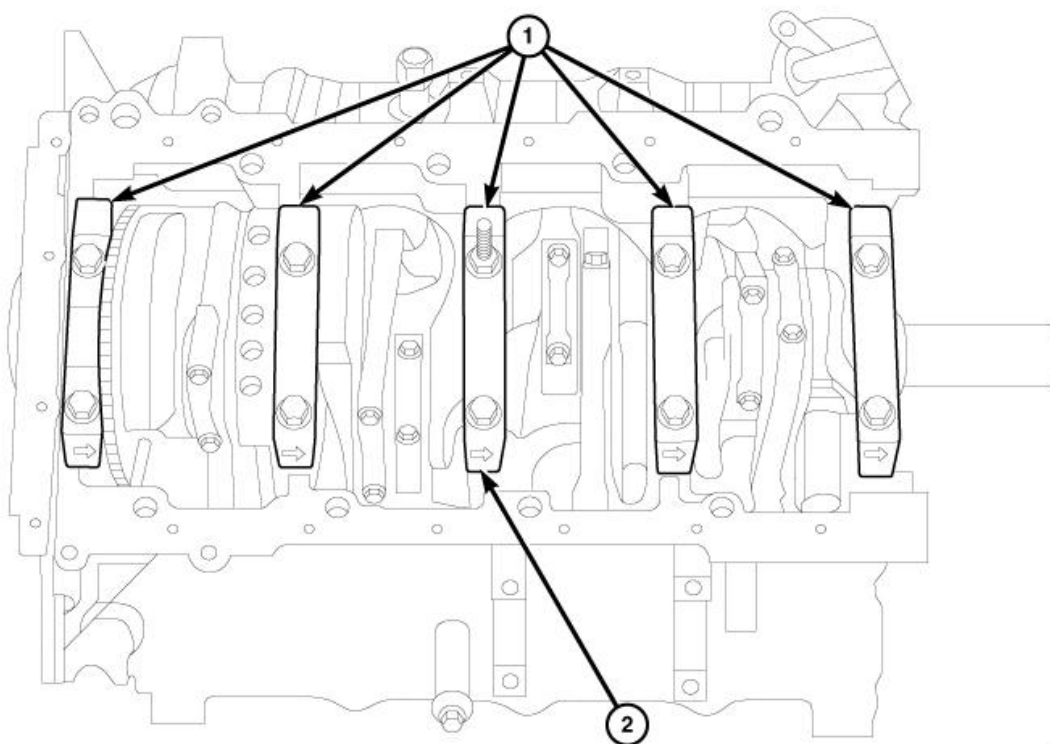


Fig. 144: MAIN BEARING CAPS
Courtesy of CHRYSLER LLC

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

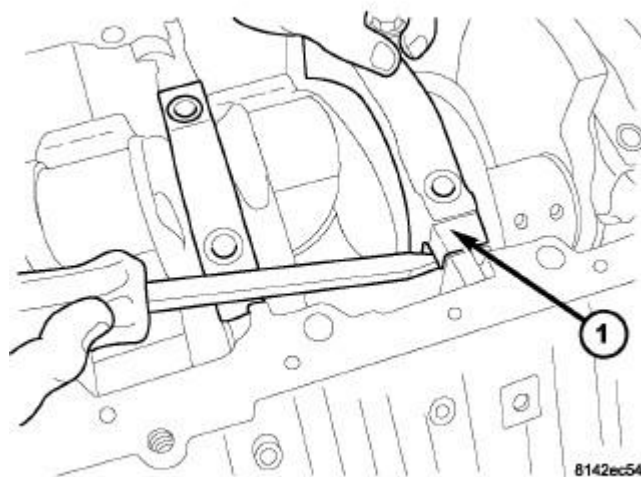


Fig. 145: MAIN CAP REMOVAL
Courtesy of CHRYSLER LLC

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

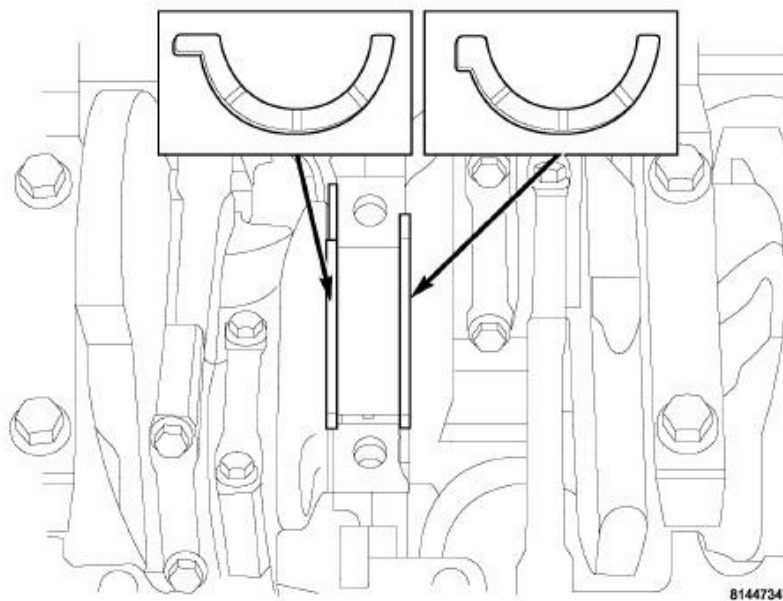
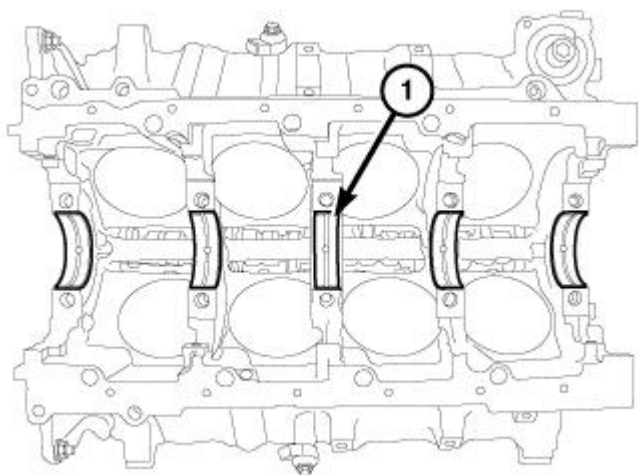


Fig. 146: THRUST WASHER LOCATION
Courtesy of CHRYSLER LLC

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

Installation

INSTALLATION

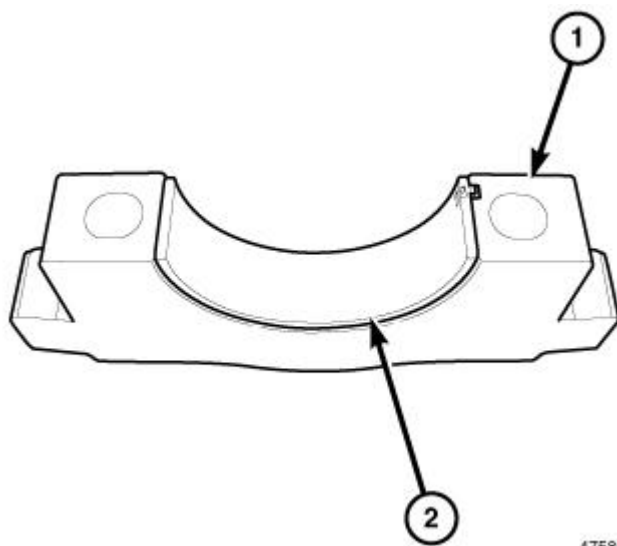


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Fig. 147: Main Bearings

Courtesy of CHRYSLER LLC

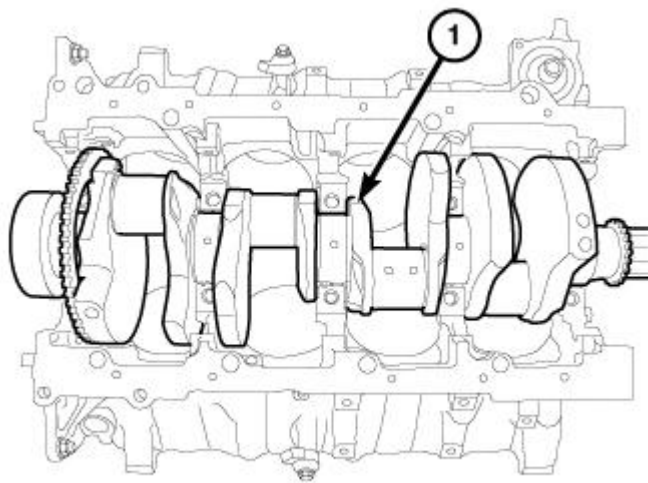
1. Select the proper main bearings. See Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure.
2. Install main bearings in block (1).



475850

Fig. 148: Main Bearing Shells In The Bearing Caps
Courtesy of CHRYSLER LLC

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

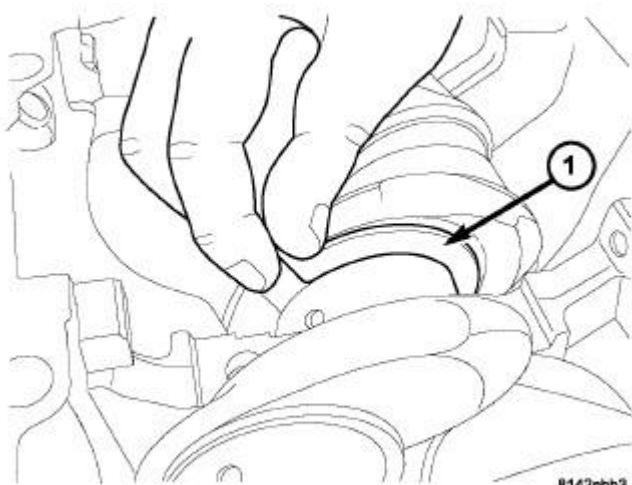


475840

Fig. 149: Crankshaft

Courtesy of CHRYSLER LLC

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

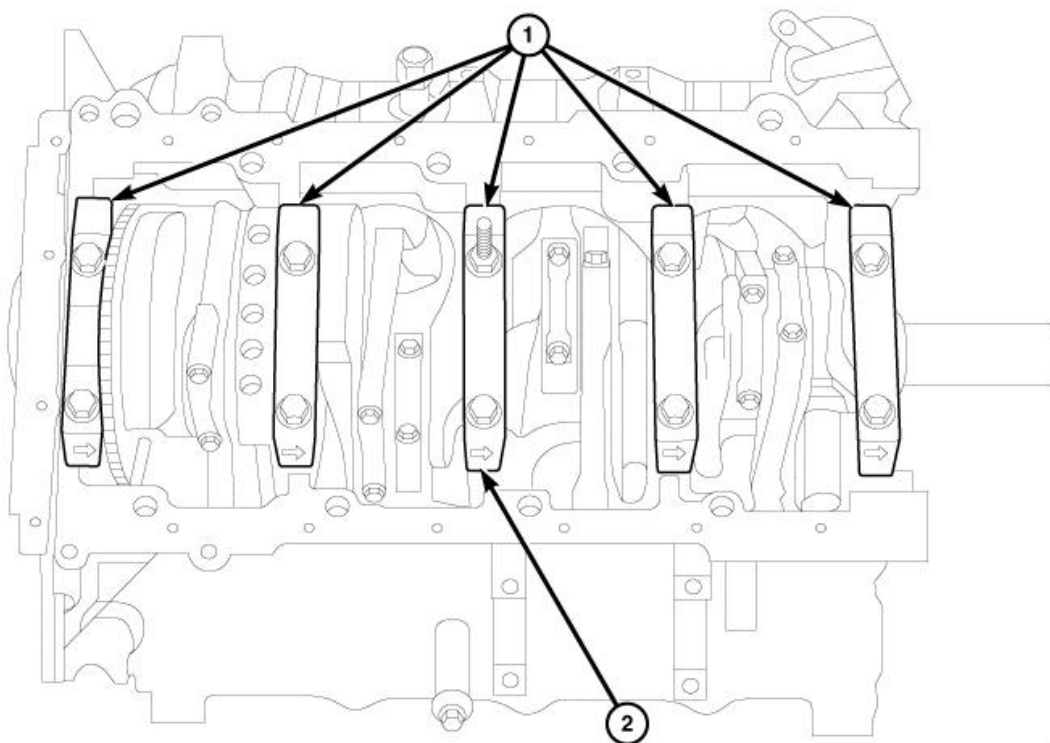


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Fig. 150: Removing/Installing Thrust Washer

Courtesy of CHRYSLER LLC

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



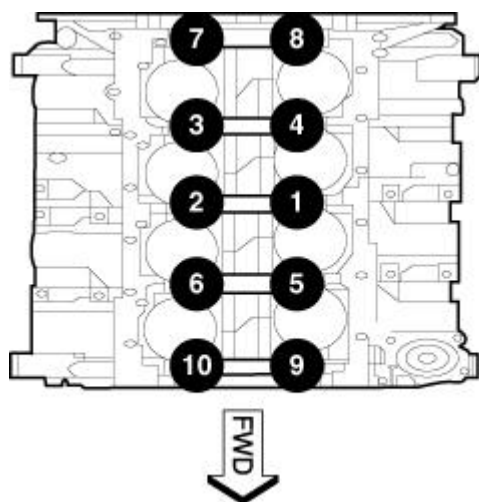
44625

Fig. 151: MAIN BEARING CAPS

Courtesy of CHRYSLER LLC

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

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

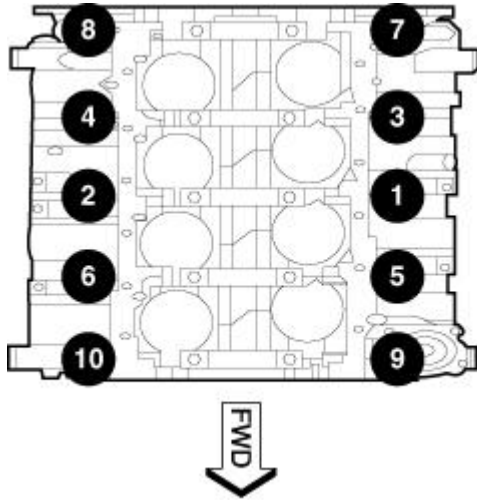


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Fig. 152: Main Bearing Cap Bolt Tightening Sequence

Courtesy of CHRYSLER LLC

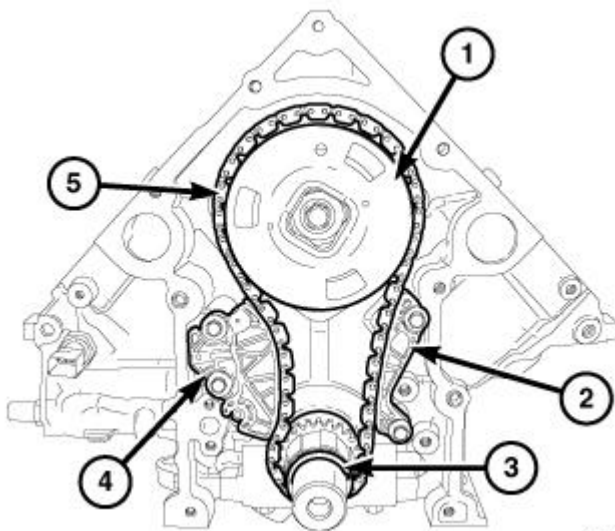
8. Tighten main bearing cap bolts to 13 N.m (10 ft. lbs.) in the sequence shown in illustration.
9. Tighten main bearing cap bolts to 27 N.m (20 ft. lbs.) in the sequence shown in illustration.
10. Rotate main cap bolts an additional 90° in the sequence shown in illustration.



161728

Fig. 153: Crossbolt Tightening Sequence
 Courtesy of CHRYSLER LLC

11. Install the crossbolts with new seal washer. Starting with crossbolt A,
12. Tighten crossbolt to 28 N.m (21 ft. lbs.).
13. Repeat crossbolt tightening procedure.
14. Measure crankshaft end play. See **Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure.**
15. Position the connecting rods onto the crankshaft and install the rod bearing caps. See **Engine/Engine Block/ROD, Piston and Connecting - Installation.**



474928

Fig. 154: Timing Chain

Courtesy of CHRYSLER LLC

16. Install timing chain (5) and sprockets (1, 3). See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Installation**.
17. Install the timing chain tensioner (4) and guide (2).

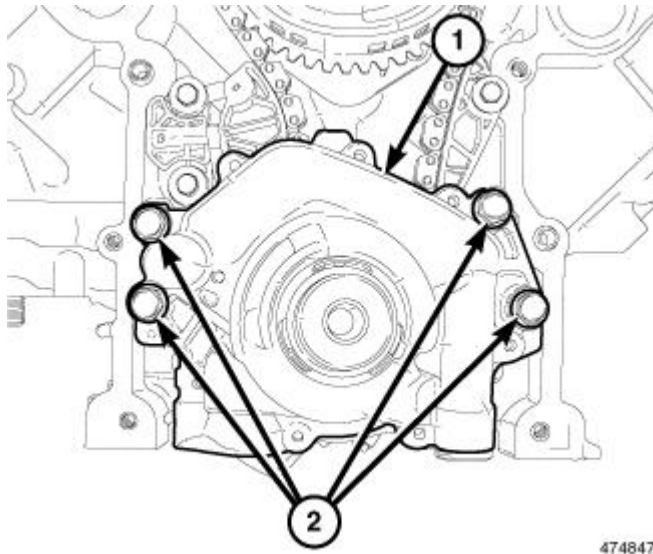


Fig. 155: Oil Pump Retaining Bolts
Courtesy of CHRYSLER LLC

18. Install the oil pump (1). See **Engine/Lubrication/PUMP, Engine Oil - Installation**.
19. Install the timing chain case cover (1). See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.

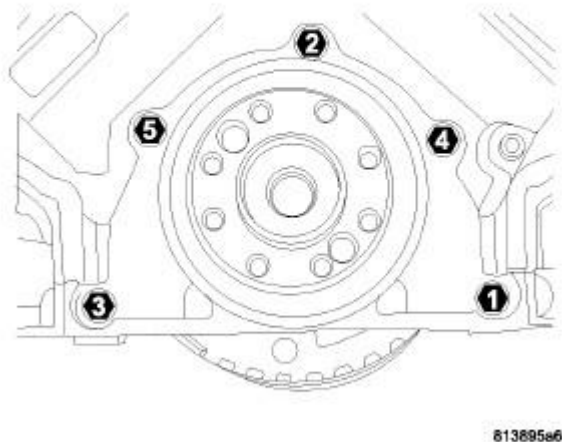


Fig. 156: REAR SEAL RETAINER TORQUE SEQUENCE

Courtesy of CHRYSLER LLC

20. Install the rear main seal and retainer. See **Engine/Engine Block/RETAINER, Crankshaft Rear Oil Seal - Installation.**

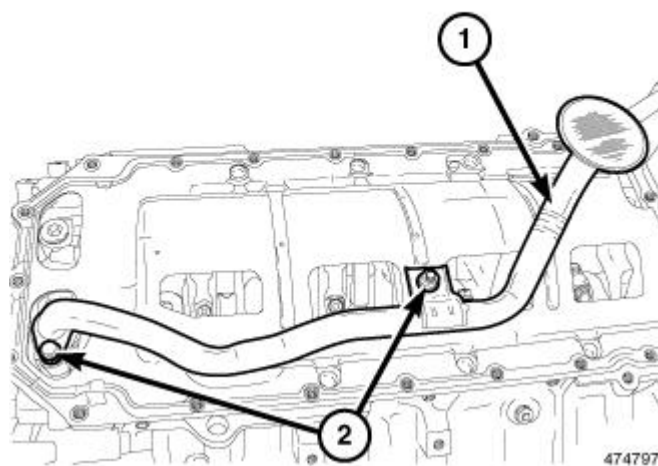


Fig. 157: Oil Pick Up Tube

Courtesy of CHRYSLER LLC

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

24. Install the oil pan. See Engine/Lubrication/PAN, Oil - Installation.
25. Install the vibration damper. See Engine/Engine Block/DAMPER, Vibration - Installation.
26. Install the engine. See Engine - Installation.

DAMPER, VIBRATION

Removal

REMOVAL

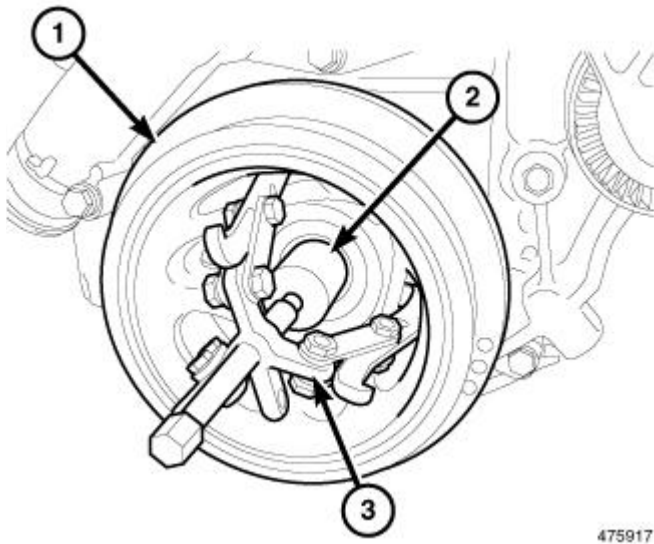


Fig. 158: Removing Vibration Damper
Courtesy of CHRYSLER LLC

1. Disconnect negative cable from battery.
2. Remove accessory drive belt. Refer to Cooling/Accessory Drive/BELT, Serpentine - Removal.
3. Drain cooling system. Refer to Cooling - Standard Procedure.
4. Remove radiator upper hose.
5. Remove fan shroud. Refer to Cooling/Engine/FAN, Cooling - Removal.
6. Remove crankshaft damper bolt.
7. Remove damper (1) using Crankshaft Insert 8513A (2) and Three Jaw Puller 1023 (3).

Installation

INSTALLATION

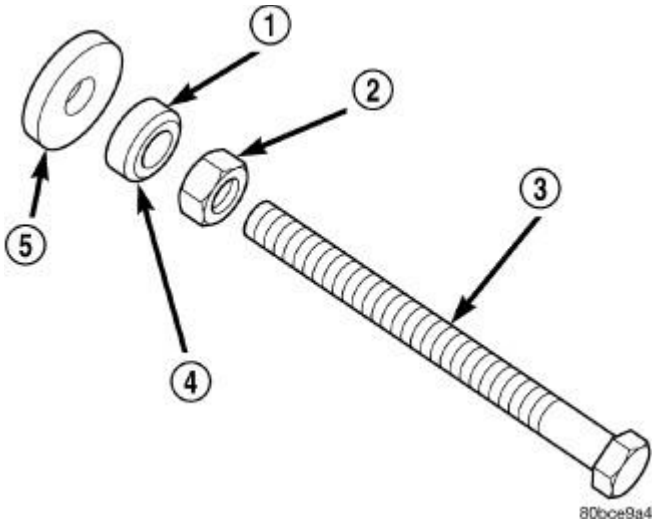


Fig. 159: Proper Assembly Method for Special Tool 8512A
 Courtesy of CHRYSLER LLC

- 1 - BEARING
- 2 - NUT
- 3 - THREADED ROD
- 4 - BEARING HARDENED SURFACE (FACING NUT)
- 5 - HARDENED WASHER

CAUTION: To prevent severe damage to the Crankshaft, Damper or Damper Installer 8512A, thoroughly clean the damper bore and the crankshaft nose before installing Damper.

1. Slide damper onto crankshaft slightly.

CAUTION: Special Tool 8512A, is assembled in a specific sequence. Failure to assemble this tool in this sequence can result in tool failure and severe damage to either the tool or the crankshaft.

2. Assemble Damper Installer 8512A as follows, thread nut (2) onto the bolt (3) then install the roller bearing (1) followed by the hardened washer (5) slides onto the threaded rod (3). Once assembled coat the threaded rod's threads with Mopar® Nickel Anti-Seize (or equivalent).
3. Using Damper Installer 8512A, press damper onto crankshaft.
4. Install then tighten crankshaft damper bolt to 176 N.m (129 ft. lbs.).
5. Install radiator upper hose.
6. Install accessory drive belt. Refer to Cooling/Accessory Drive/BELT, Serpentine - Installation .
7. Refill cooling system. Refer to Cooling - Standard Procedure .
8. Connect negative cable to battery.

FLEXPLATE

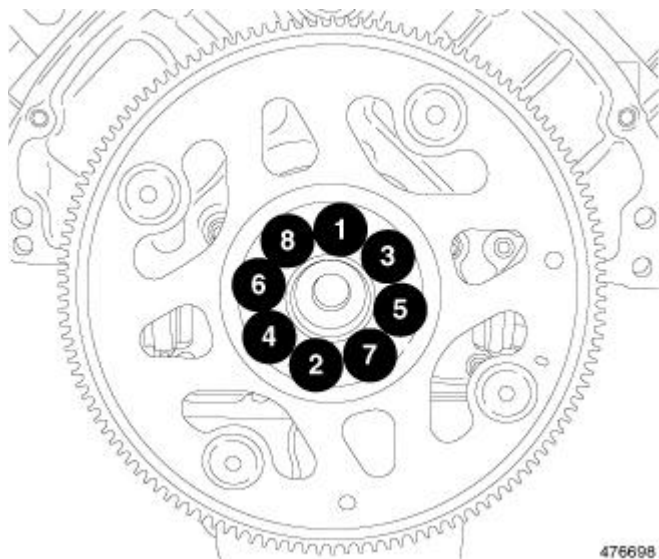
Removal**REMOVAL**

Fig. 160: Flexplate Retaining Bolt Removal & Tightening Sequence
Courtesy of CHRYSLER LLC

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

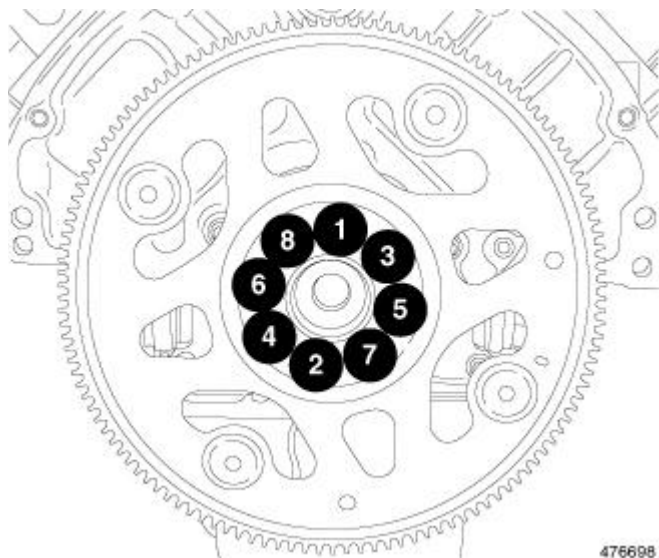
Installation**INSTALLATION**

Fig. 161: Flexplate Retaining Bolt Removal & Tightening Sequence

Courtesy of CHRYSLER LLC

1. Position the flexplate onto the crankshaft and install the retaining bolts hand tight.
2. Using the sequence shown in illustration, tighten the flexplate retaining bolts to 95 N.m (70 ft. lbs.).
3. Install the transmission. Refer to **INSTALLATION**.

LIFTER(S), HYDRAULIC, ROLLER**Diagnosis and Testing****HYDRAULIC TAPPETS**

Check the oil pressure before disassembling any part of the engine to correct tappet noise. If vehicle has no oil pressure gauge, install a reliable gauge at the pressure sending-unit. The pressure should be between 207-552 kPa (30-80 psi) at 3,000 RPM.

Check the oil level after the engine reaches normal operating temperature. Allow five minutes for the oil level to stabilize before checking the oil level. The oil level in the pan should never be above the FULL mark or below the ADD OIL mark on the dipstick. Either of these two conditions could be responsible for noisy tappets.

OIL LEVEL - HIGH

If the oil level is above the FULL mark, it is possible for the connecting rods to dip into the oil. With the engine running, this condition could create foam in the oil pan. Foam in the oil pan would be fed to the hydraulic tappets by the oil pump causing them to lose length and allow the valves to seat noisily.

OIL LEVEL - LOW

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

TAPPET NOISE DIAGNOSIS

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

NOTE: **Worn valve guides or cocked springs are sometimes mistaken for noisy tappets. If such is the case, noise may be dampened by applying side thrust on the valve spring. If noise is not appreciably reduced, it can be assumed the noise is in the tappet. Inspect the rocker arm pushrod sockets and pushrod ends for wear.**

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

Removal

REMOVAL

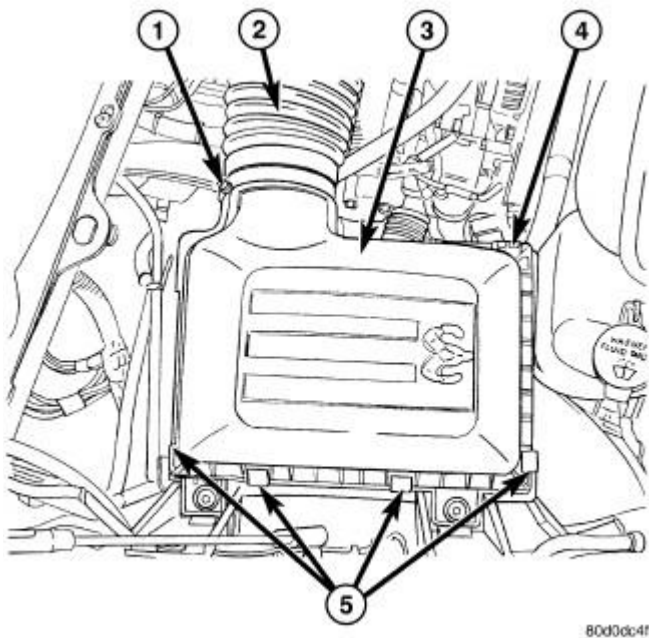


Fig. 162: AIR CLEANER HOUSING COVER
Courtesy of CHRYSLER LLC

1. Disconnect the negative cable from the battery.
2. Remove the air cleaner housing (3). See **Engine/Air Intake System/BODY, Air Cleaner - Removal.**
3. Remove intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Removal.**
4. Remove cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal.**
5. Remove rocker arm assembly and push rods. See **Engine/Cylinder Head/ROCKER ARM, Valve - Removal.** Identify push rods to ensure installation in original location.
6. Remove the cylinder head. See **Engine/Cylinder Head - Removal.**

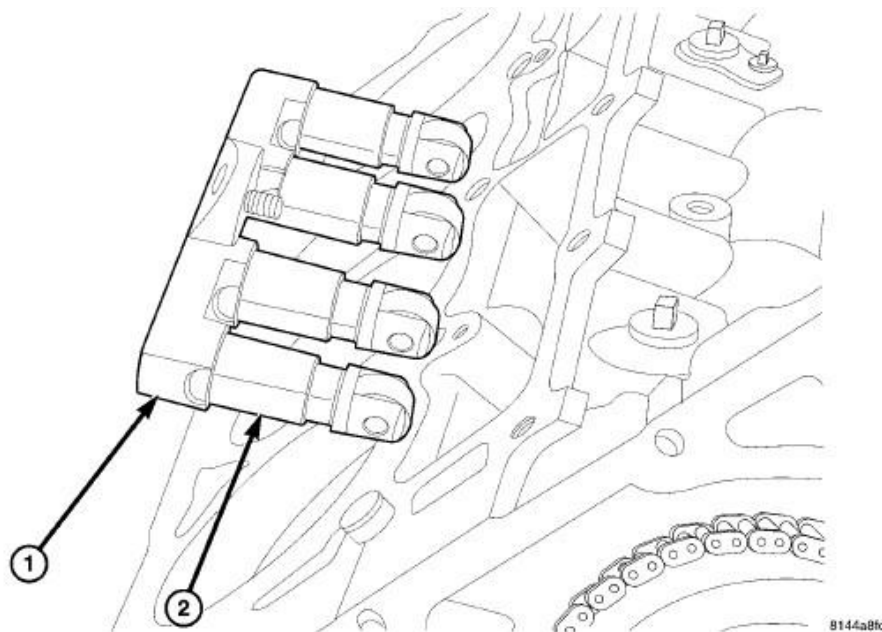


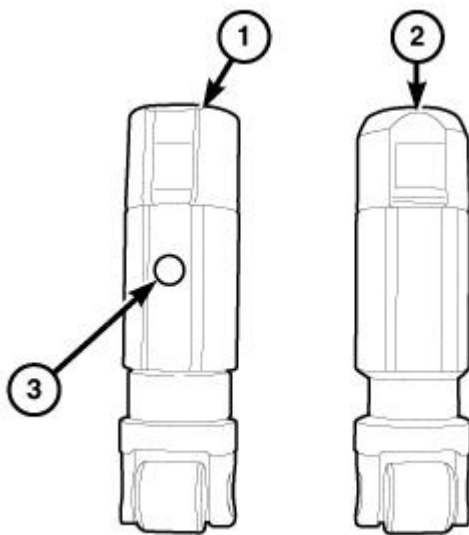
Fig. 163: Removing/Installing Hydraulic Roller Tappet
Courtesy of CHRYSLER LLC

1 - TAPPET RETAINER 2 - HYDRAULIC ROLLER TAPPET
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7. Remove bolt from tappet retainer (1).
8. Remove tappet retainer (1).
9. Pull tappet out of bore with a twisting motion. If all tappets are to be removed and reused, identify tappets to ensure installation in original location.
10. Check camshaft lobes for abnormal wear.

Installation

INSTALLATION

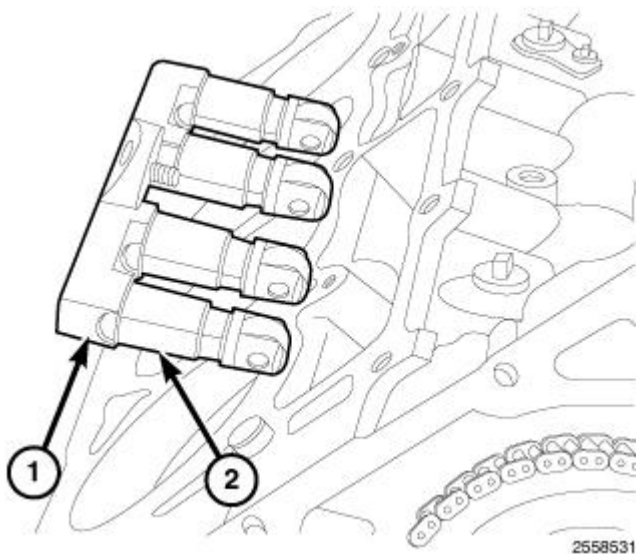
**Fig. 164: MDS Lifter**

Courtesy of CHRYSLER LLC

The Multiple Displacement System (MDS) provides cylinder deactivation during steady speed, low acceleration and shallow grade climbing conditions to increase fuel economy.

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

CAUTION: The lifter and guide holder assembly must be installed as an assembly and in their original locations or engine damage could result.

**Fig. 165: Tappet Guide Holder Assembly**

Courtesy of CHRYSLER LLC

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

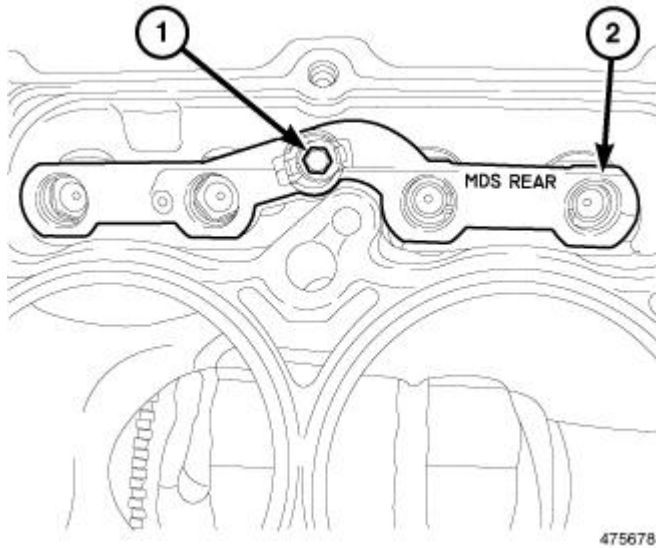


Fig. 166: Rear MDS Lifter Assembly
Courtesy of CHRYSLER LLC

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

2. Install the tappet guide holder (2) and tappets.
3. Tighten the tappet retainer bolt (1) to 12 N.m (9 ft. lbs.).
4. Install the cylinder head. See Engine/Cylinder Head - Installation.
5. Connect the negative battery cable.

CAUTION: To prevent damage to valve assemblies, do not run the engine above fast idle until all hydraulic lifters have filled with oil and have become quiet.

6. Start the engine and check for leaks.
7. Road test the vehicle.

RETAINER, CRANKSHAFT REAR OIL SEAL

Diagnosis and Testing

REAR SEAL AREA LEAKS

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

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

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

1. Raise and support the vehicle.
2. Remove the transmission inspection/torque converter access cover.
3. Inspect the rear of the cylinder block for evidence of oil leakage, note the following:
 - Circular spray pattern generally indicates seal leakage or crankshaft damage.
 - Where leakage tends to run straight down, possible causes are a porous block, camshaft bore cup plugs, oil galley pipe plugs, oil filter runoff, and main bearing cap to cylinder block mating surfaces. See appropriate Engine component for proper repair procedures of these items.
4. If no leaks are detected, pressurize the crankcase as outlined in **AIR LEAK DETECTION TEST METHOD**.

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

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

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

6. For bubbles that remain steady with shaft rotation, no further inspection can be done. See **Engine/Engine Block/RETAINER, Crankshaft Rear Oil Seal - Removal**.

Removal

REMOVAL

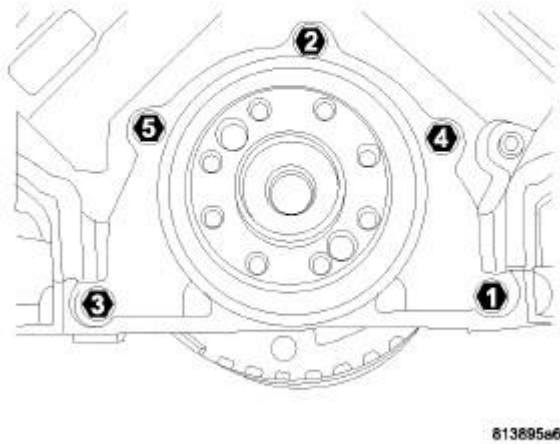


Fig. 167: REAR SEAL RETAINER TORQUE SEQUENCE

Courtesy of CHRYSLER LLC

NOTE: The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and must be replaced as an assembly.

NOTE: The crankshaft rear oil seal retainer can not be reused after removal.

NOTE: This procedure can be performed in vehicle.

1. Disconnect the negative battery cable.
2. Remove the transmission. Refer to **REMOVAL**.
3. Remove the flexplate. See **Engine/Engine Block/FLEXPLATE - Removal**.
4. Remove the oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.
5. Using the sequence shown in illustration, remove the rear oil seal retainer mounting bolts.
6. Carefully remove the retainer from the engine block.

Installation

INSTALLATION

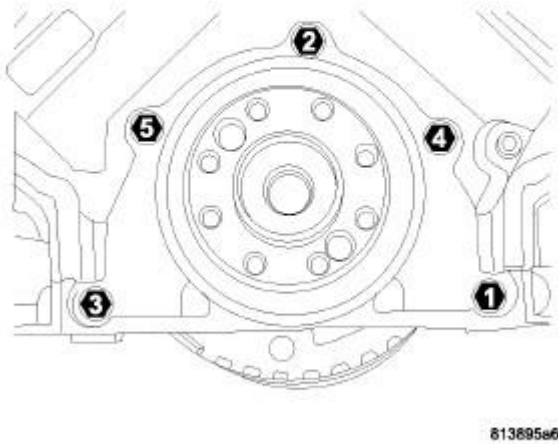


Fig. 168: REAR SEAL RETAINER TORQUE SEQUENCE

Courtesy of CHRYSLER LLC

NOTE: The crankshaft rear oil seal is integral to the crankshaft rear oil seal retainer and must be replaced as an assembly.

NOTE: The crankshaft rear oil seal retainer can not be reused after removal.

1. Thoroughly clean all gasket residue from the engine block.
2. Position the gasket onto the new crankshaft rear oil seal retainer.
3. Position the crankshaft rear oil seal retainer onto the engine block.
4. Using the sequence shown in illustration, install the crankshaft rear oil seal retainer mounting bolts and tighten to 15 N.m (11 ft. lbs.).
5. Install the oil pan. See Engine/Lubrication/PAN, Oil - Installation.
6. Install the flexplate. See Engine/Engine Block/FLEXPLATE - Installation.
7. Install the transmission. Refer to INSTALLATION.
8. Fill the engine with oil.
9. Start the engine and check for leaks.

RING(S), PISTON

Standard Procedure

PISTON RING FITTING

PISTON RING END GAP

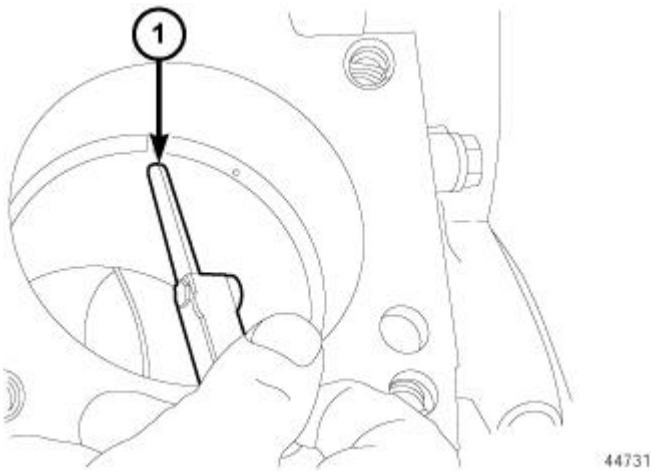


Fig. 169: Checking Piston Ring End Gap Using Feeler Gauge
Courtesy of CHRYSLER LLC

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

1. Wipe the cylinder bore clean.
2. Insert the ring in the cylinder bore.

NOTE: The ring gap measurement must be made with the ring positioned at least 12 mm (0.50 inch.) from bottom of cylinder bore.

3. Using a piston, to ensure that the ring is squared in the cylinder bore, slide the ring downward into the cylinder.
4. Using a feeler gauge check the ring end gap. Replace any rings not within specification.

PISTON RING SIDE CLEARANCE

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

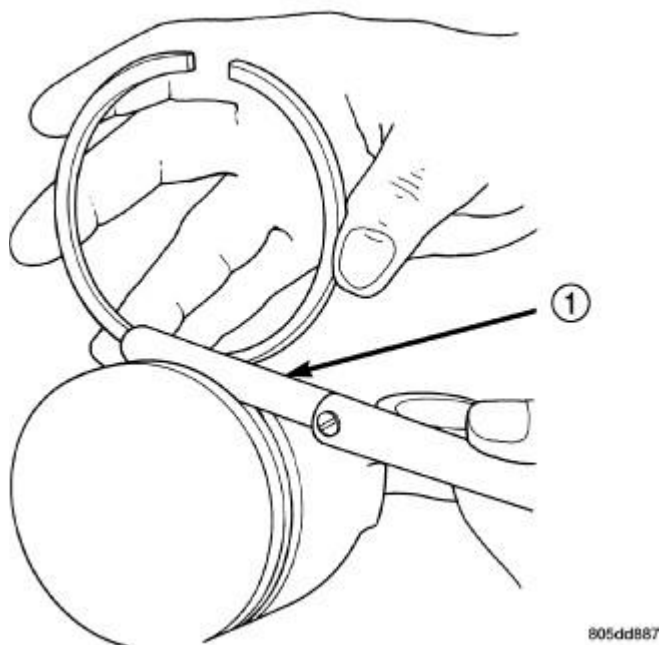
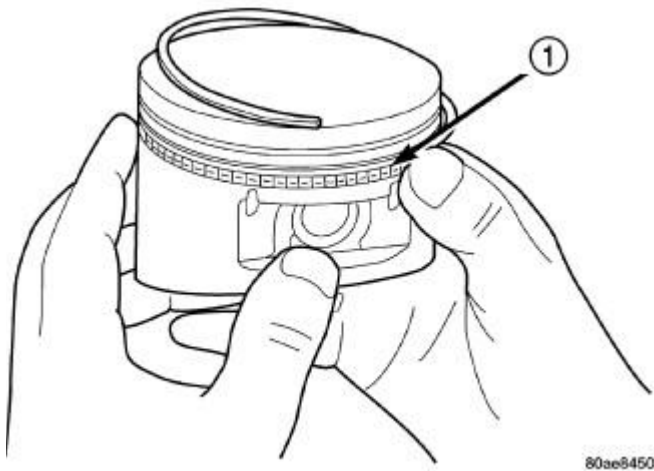


Fig. 170: Measuring Piston Ring Side Clearance
 Courtesy of CHRYSLER LLC

1. Measure the ring side clearance as shown in illustration. Make sure the feeler gauge (1) fits snugly between the ring land and the ring. Replace any ring not within specification.
2. Rotate the ring around the piston, the ring must rotate in the groove with out binding.

PISTON RING SPECIFICATION CHART

Piston Ring Position	Piston Ring Side Clearance	Maximum Clearance
Upper Ring	-	-
	Metric 0.04 - 0.09 mm	0.11 mm
	Standard 0.0015 - 0.0035 in.	0.004 in.
Intermediate Ring	-	-
	Metric 0.04 - 0.08 mm	0.10 mm
	Standard 0.0015 - 0.0031 in.	0.004 in.
Piston Ring Position	Piston Ring End Gap	Wear Limit
Upper Ring	-	-
	Metric 0.40 - 0.55 mm	0.43 mm
	Standard 0.0157 - 0.0216 in.	0.017 in.
Intermediate Ring	-	-
	Metric 0.24 - 0.51 mm	0.74 mm
	Standard 0.0094 - 0.0200 in.	0.029 in.
Oil Control Ring (Steel Rail)	-	-
	Metric 0.015 - 0.66 mm	0.76 mm
	Standard 0.0059 - 0.0259 in.	0.030 in.

PISTON RING INSTALLATION

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Fig. 171: SIDE RAIL - INSTALLATION

Courtesy of CHRYSLER LLC

NOTE: The No. 1 and No. 2 piston rings have a different cross section. Ensure No. 2 ring is installed with manufacturers I.D. mark (Dot) facing up, towards top of the piston.

NOTE: Piston rings are installed in the following order:

- Oil ring expander.
- Lower oil ring side rail.
- Upper oil ring side rail.
- No. 2 Intermediate piston ring.
- No. 1 Upper piston ring.

1. Install the oil ring expander.
2. Install upper side rail by placing one end between the piston ring groove and the expander ring. Hold end firmly and press down the portion to be installed until side rail is in position. Repeat this step for the lower side rail.

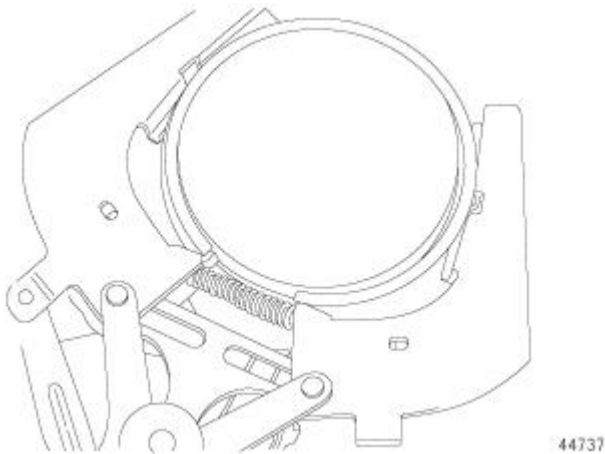
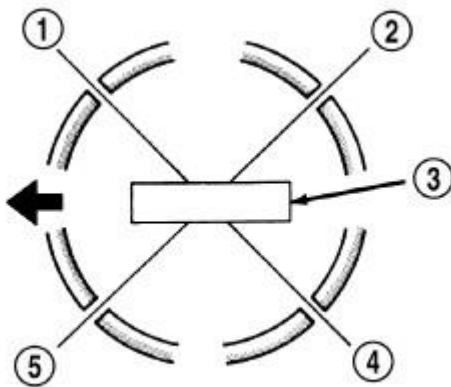


Fig. 172: UPPER AND INTERMEDIATE RINGS
Courtesy of CHRYSLER LLC

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



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Fig. 173: PISTON RING END GAP POSITION
Courtesy of CHRYSLER LLC

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

NOTE: Staggering ring gap is important for oil control.

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

ROD, PISTON AND CONNECTING

Description

DESCRIPTION

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

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

Standard Procedure

PISTON FITTING

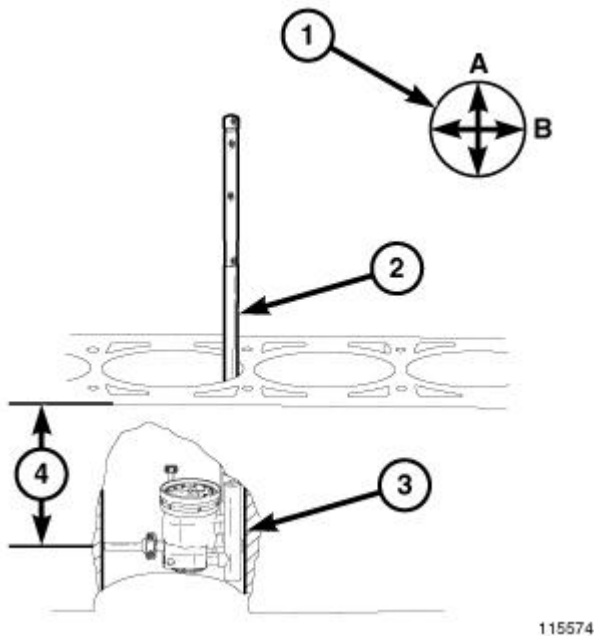


Fig. 174: Measuring Cylinder Bore Diameter
Courtesy of CHRYSLER LLC

1. To correctly select the proper size piston, use Cylinder Indicator C-119 (2) to measure the inside diameter of the cylinder bore (3). A cylinder bore gauge capable of reading in 0.003 mm (0.0001 in.) Increments is required. If a bore gauge is not available, do not use an inside micrometer.
2. Measure the inside diameter of the cylinder bore at a point 38.0 mm (1.5 inches) below the top of bore (4). Start perpendicular (across or at 90°) to the axis of the crankshaft at point A (1) and then take an additional bore reading 90° at point B (1).
3. The coated pistons will be serviced with the piston pin and connecting rod pre-assembled. The piston-rod assembly is specific for the left cylinder bank (odd numbered) and the right cylinder bank (even

numbered) and must not be interchanged.

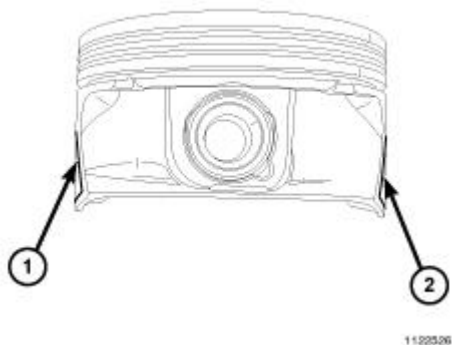


Fig. 175: Piston Diameter Measuring Points
Courtesy of CHRYSLER LLC

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

Removal

REMOVAL

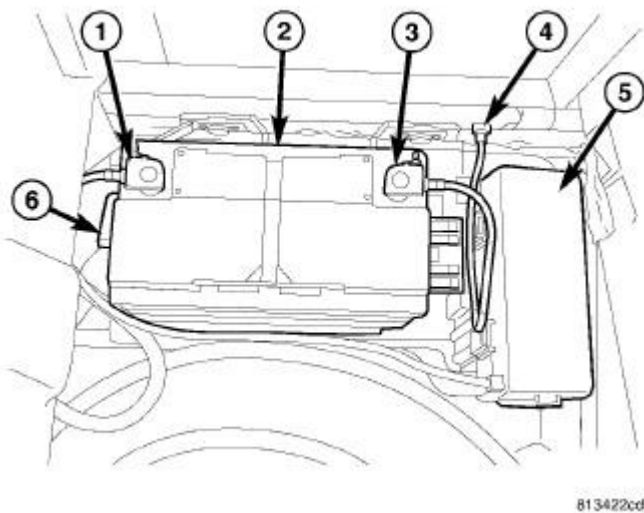
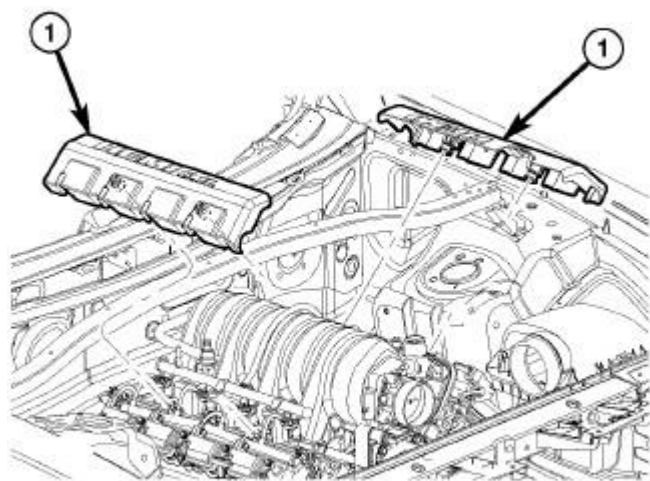


Fig. 176: Battery System Components And PDC Cover
Courtesy of CHRYSLER LLC

1. Perform the fuel system pressure release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure**.
2. Disconnect and isolate the negative battery cable (3).

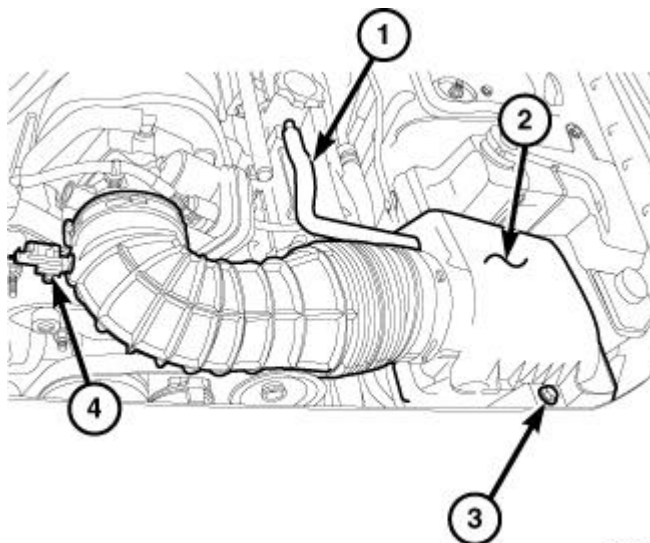


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Fig. 177: Engine Covers

Courtesy of CHRYSLER LLC

3. Remove the engine covers (1).



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Fig. 178: Air Duct To Throttle Body

Courtesy of CHRYSLER LLC

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

8. Remove the cylinder head(s). See **Engine/Cylinder Head - Removal**.
9. Raise and support the vehicle.

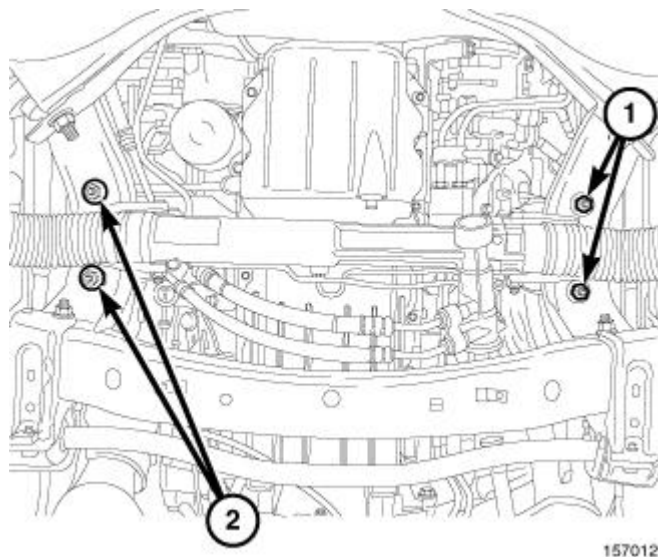


Fig. 179: Engine Mount Nuts
Courtesy of CHRYSLER LLC

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

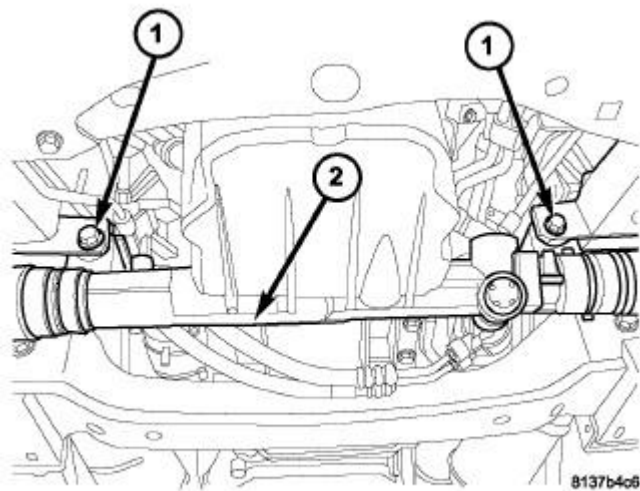


Fig. 180: GEAR MOUNTING BOLTS
Courtesy of CHRYSLER LLC

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

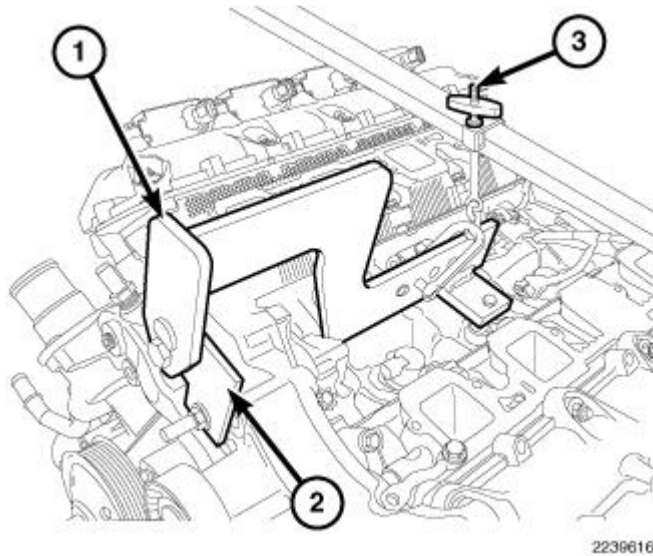


Fig. 181: Engine Lift Fixture & Adapter
Courtesy of CHRYSLER LLC

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

14. Install the Engine Lift Fixture 8984A (1), Engine Lift Adapter 8984-UPD (2) and the Engine Support Fixture 8534B (3).
15. Raise the engine to provide clearance to remove the oil pan.
16. Raise and support the vehicle.
17. Remove the oil pan. See **Engine/Lubrication/PAN, Oil - Removal.**
18. Lower the vehicle.
19. Remove the timing chain cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal.**
20. If necessary, remove the ridge on top of the cylinder bores with a reliable ridge reamer before removing the pistons from the cylinder block. **Be sure to keep the tops of the pistons covered during this operation.**

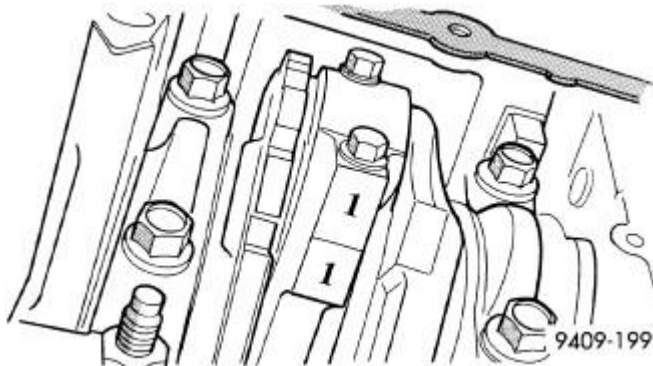


Fig. 182: Identifying Mark On Connecting Rod And Bearing Cap
Courtesy of CHRYSLER LLC

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

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

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

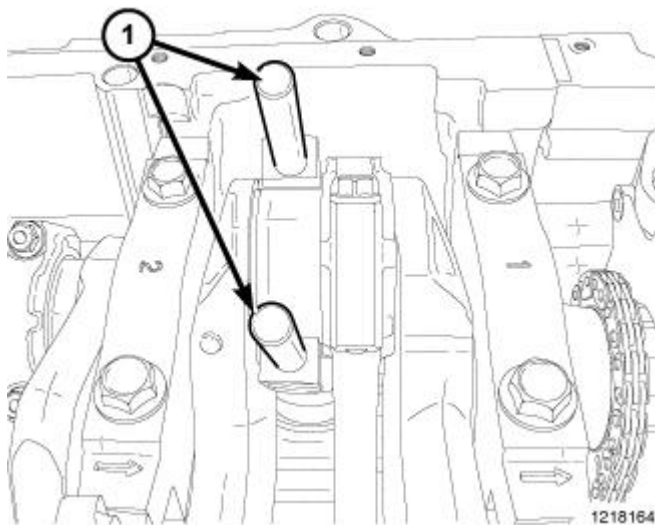


Fig. 183: Connecting Rod Guides
Courtesy of CHRYSLER LLC

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

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

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

23. Remove the connecting rod cap, install the Connecting Rod Guides 8507 (1) and carefully remove the piston from the cylinder bore, repeat this procedure for each piston being removed.
24. Immediately after removing the piston and connecting rod, install the bearing cap on the mating connecting rod to prevent damage to the fractured cap and rod surfaces.
25. Carefully remove the piston rings from the piston(s), starting from the top ring down.

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.

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

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

Inspection**INSPECTION**

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

Check the connecting rod for signs of twist or bending.

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

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

Installation**INSTALLATION**

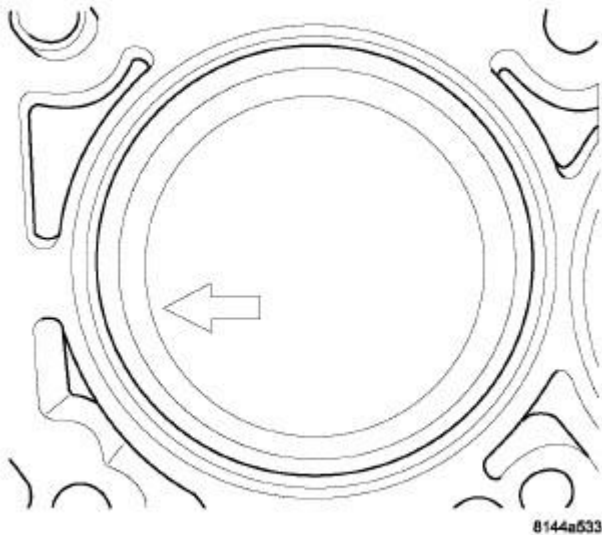


Fig. 184: PISTON DIRECTION ARROW

Courtesy of CHRYSLER LLC

1. Before installing piston and connecting rod assemblies into the bore, install the piston rings. See **Engine/Engine Block/RING(S), Piston - Standard Procedure**.
2. Immerse the piston head and rings in clean engine oil. Position a ring compressor over the piston and rings. Tighten ring compressor. **Make sure the position of the rings do not change during this operation.**
3. Position bearing onto connecting rod. Lubricate bearing surface with clean engine oil.
4. Install Connecting Rod Guides 8507 into connecting rod bolt threads.
5. The pistons are marked on the piston pin bore surface with an raised "F" or arrow on top of piston indicating installation position. This mark must be pointing toward the front of engine on both cylinder banks.
6. Wipe cylinder bore clean and lubricate with engine oil.
7. Rotate crankshaft until connecting rod journal is on the center of cylinder bore. Insert rod and piston into cylinder bore and carefully position connecting rod guides over crankshaft journal.
8. Tap piston down in cylinder bore using a hammer handle. While guiding the connecting rod into position on rod journal.

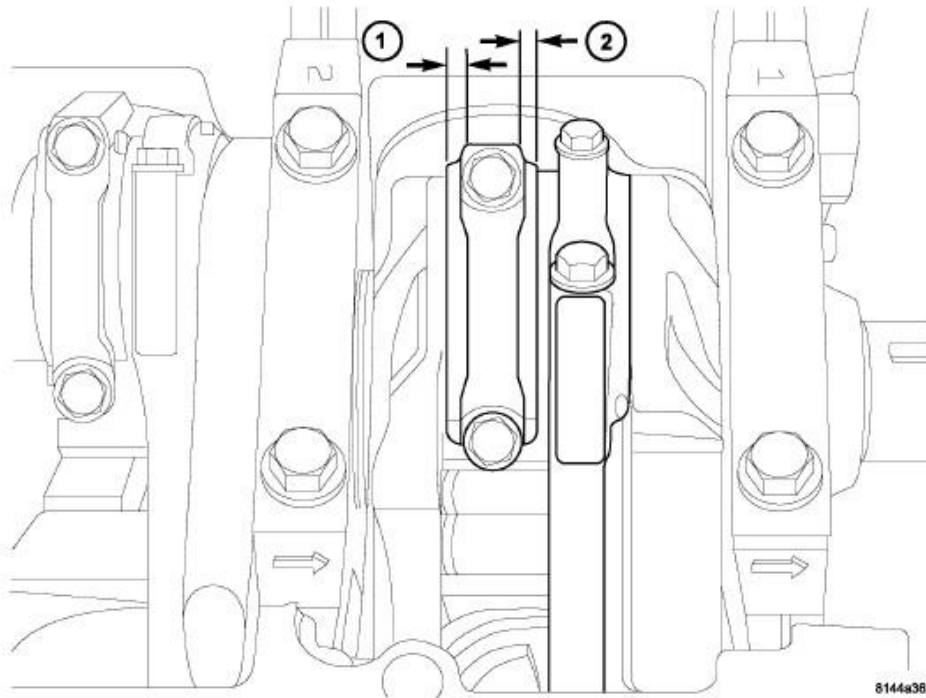


Fig. 185: CONNECTING ROD REMOVAL/INSTALLATION

Courtesy of CHRYSLER LLC

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

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

SEAL, CRANKSHAFT OIL, FRONT

Removal

REMOVAL

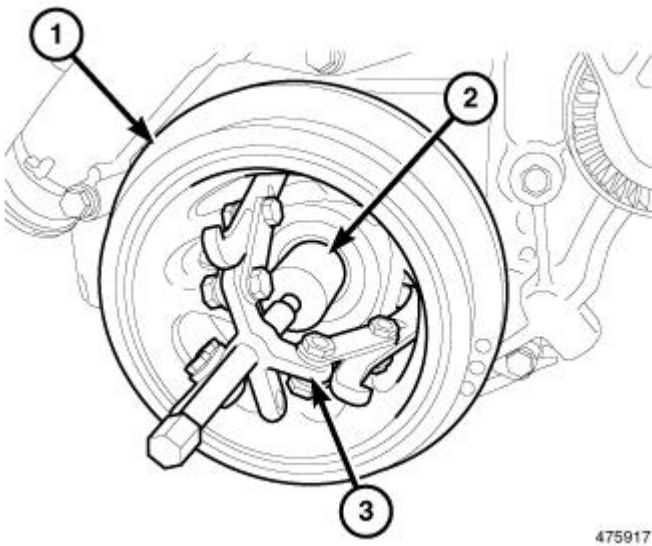


Fig. 186: Removing Vibration Damper

Courtesy of CHRYSLER LLC

1. Disconnect negative cable from battery.
2. Remove accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
3. Drain cooling system. Refer to **Cooling - Standard Procedure** .
4. Remove upper radiator hose.
5. Remove radiator shroud attaching fasteners.
6. Remove radiator cooling fan and shroud. Refer to **Cooling/Engine/FAN, Cooling - Removal** .
7. Remove crankshaft damper bolt.
8. Remove damper using Crankshaft Insert 8513A (2) and Three Jaw Puller 1023 (1). See **Engine/Engine Block/DAMPER, Vibration - Removal**.

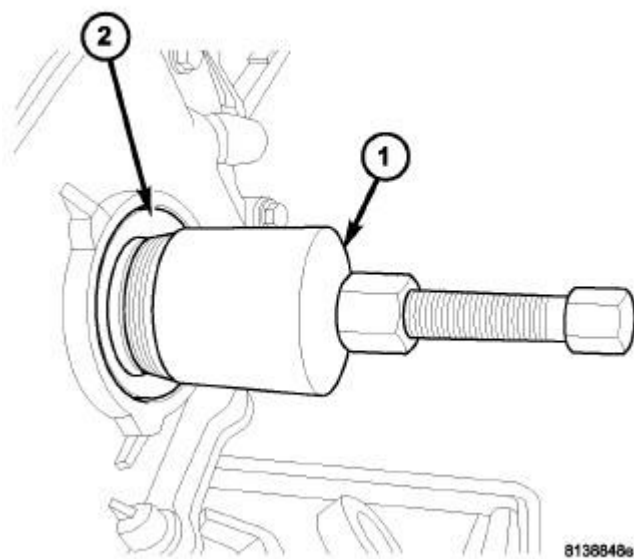


Fig. 187: FRONT CRANKSHAFT SEAL REMOVAL
 Courtesy of CHRYSLER LLC

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

Installation

INSTALLATION

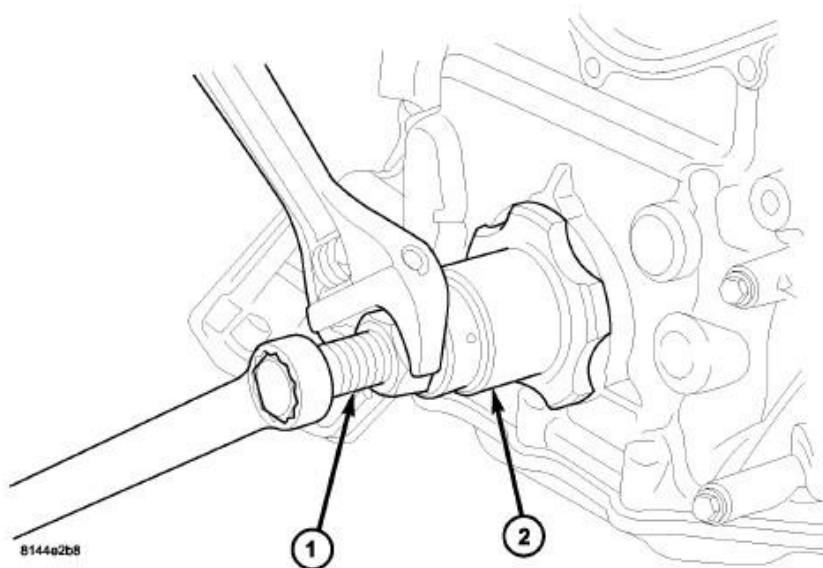


Fig. 188: FRONT SEAL INSTALLATION

Courtesy of CHRYSLER LLC

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

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

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

2. Install vibration damper. See Engine/Engine Block/DAMPER, Vibration - Installation.
3. Install radiator cooling fan and shroud. Refer to Cooling/Engine/FAN, Cooling - Installation.
4. Install upper radiator hose.
5. Install accessory drive belt refer. Refer to Cooling/Accessory Drive/BELT, Serpentine - Installation.
6. Refill cooling system. Refer to Cooling - Standard Procedure.
7. Connect negative cable to battery.

SEAL, CRANKSHAFT OIL, REAR

Description

DESCRIPTION

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

- **Diagnosis and Testing** . See Engine/Engine Block/RETAINER, Crankshaft Rear Oil Seal - Diagnosis and Testing.
- **Removal** . See Engine/Engine Block/RETAINER, Crankshaft Rear Oil Seal - Removal.
- **Installation** . See Engine/Engine Block/RETAINER, Crankshaft Rear Oil Seal - Installation.

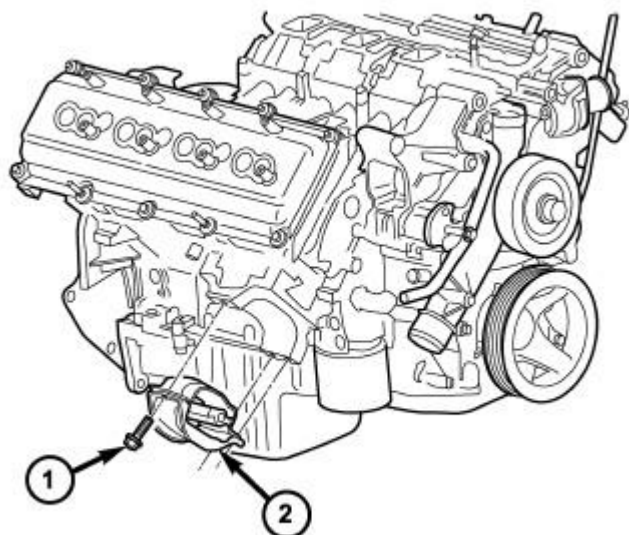
ENGINE MOUNTING

INSULATOR, ENGINE MOUNT, FRONT

Removal

REMOVAL

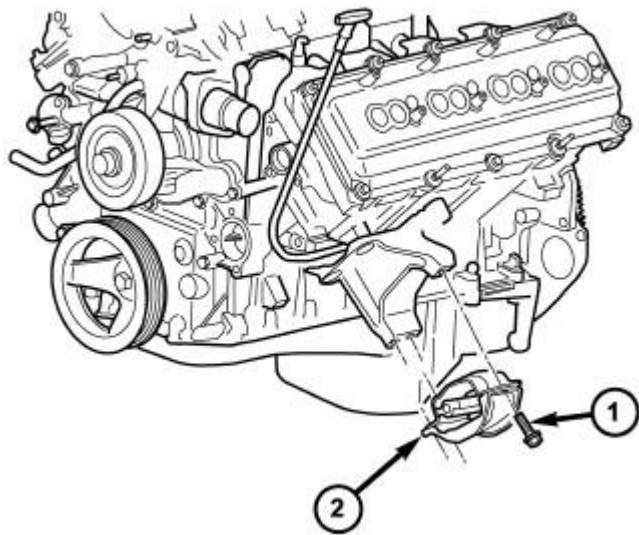
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Fig. 189: RH INSULATOR
Courtesy of CHRYSLER LLC

- 1 - BOLT
- 2 - INSULATOR



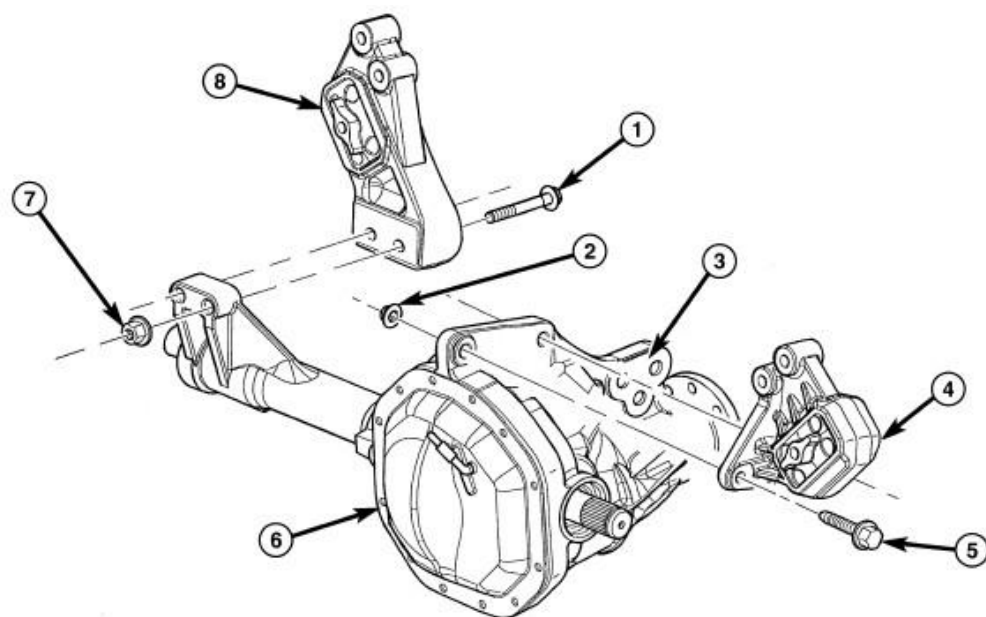
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Fig. 190: LH INSULATOR
Courtesy of CHRYSLER LLC

1 - BOLT

2 - INSULATOR

1. Disconnect negative battery cable.
2. Raise vehicle.
3. Remove engine mount through bolts.
4. Raise engine using engine support fixture special tool 8534B.
5. Remove engine mount to insulator bolts (1).
6. Remove insulator (2) from engine.

4WD

60cd82c63

Fig. 191: ENGINE INSULATOR MOUNTS 4X4

Courtesy of CHRYSLER LLC

1 - RH INSULATOR TO AXLE BOLT

2 - NUT

3 - PINION SUPPORT MOUNT

4 - LH INSULATOR MOUNT

5 - LH INSULATOR TO AXLE BOLT

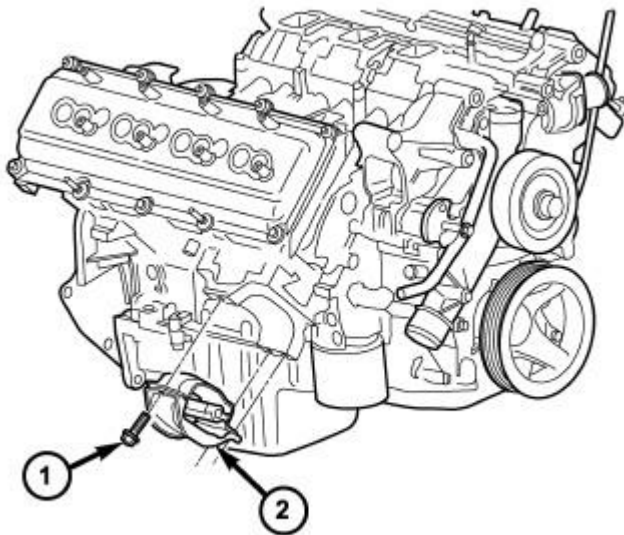
6 - FRONT AXLE

7 - NUT

8 - RH INSULATOR MOUNT

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

4. Remove the front crossmember. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Removal** .
5. Remove the engine oil filter.
6. Support the engine using engine support fixture, special tool 8534B.
7. Support the front axle with a suitable jack.
8. Remove the (4) bolts that attach the engine mounts to the front axle .
9. Remove the (3) bolts that attach the front axle to the left engine bracket.
10. Lower the front axle.
11. Remove the (6) through bolts
12. Raise the engine far enough to be able to remove the left (4) and right (8) engine mounts.
13. Remove the engine mounts (4,8).

Installation**INSTALLATION****2WD**

81011a73

Fig. 192: RH INSULATOR
Courtesy of CHRYSLER LLC

- | |
|---------------------------|
| 1 - BOLT
2 - INSULATOR |
|---------------------------|

1. Install insulator (2) on the engine.

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

2. Install upper and lower mount mounting bolts. Tighten bolts to 61 N.m (45 ft. lbs.).
3. Lower the engine using engine support fixture special tool 8534B.
4. Install mount through bolts.
5. Tighten through bolts on both sides to 61 N.m (45 ft. lbs.).
6. Lower vehicle.
7. Connect negative battery cable.

4WD

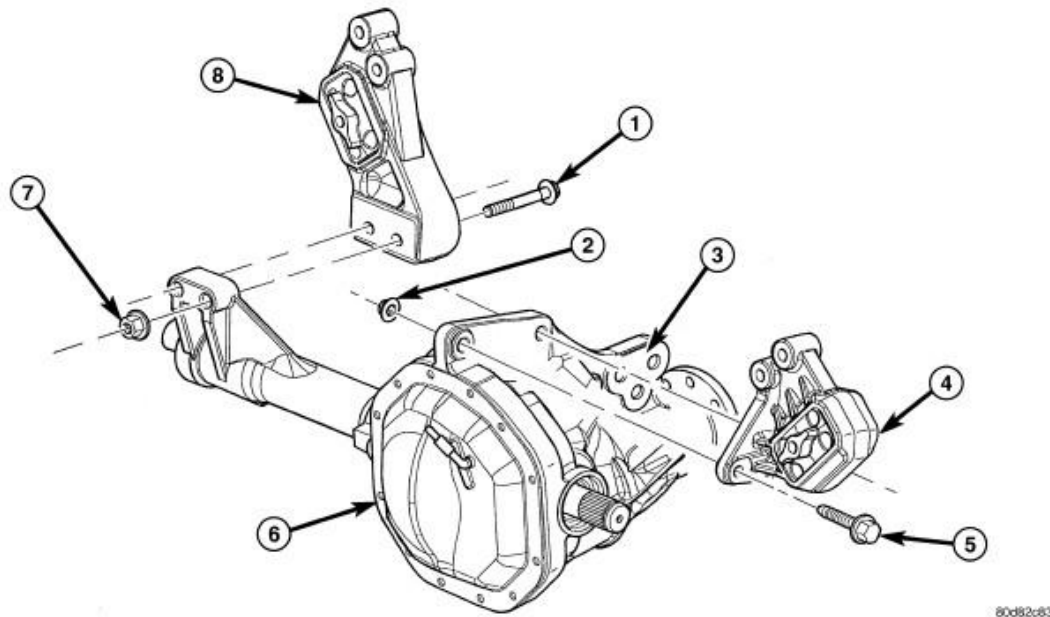


Fig. 193: ENGINE INSULATOR MOUNTS 4X4
Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - RH INSULATOR TO AXLE BOLT
2 - NUT
3 - PINION SUPPORT MOUNT
4 - LH INSULATOR MOUNT
5 - LH INSULATOR TO AXLE BOLT
6 - FRONT AXLE
7 - NUT
8 - RH INSULATOR MOUNT |
|--|

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

1. Install the right (8) and left (4) side engine mounts to the front axle. Torque nuts to 94 N.m (70 ft. lbs.).
2. Raise the front axle into the frame and install the left and right side through bolts. Torque nuts to 94 N.m (70 ft. lbs.).
3. Insert the two upper through bolts into the right and left side engine mounts and loose assemble the two nuts onto the through bolts.
4. Lower the engine using engine support fixture special tool 8534B, until the left and right side engine brackets rest on the through bolts, and the lower engine bracket through holes align with the engine mounts, and the left engine bracket holes align with the front axle slots.
5. Loose assemble the 3 bolts that attach the front axle to the left engine bracket.
6. Loose assemble the lower through bolts.
7. Torque the nuts for the 4 through bolts to 101 N.m (75 ft. lbs.).
8. Torque the 3 bolts that attach the front axle to the left engine bracket to 101 N.m (75 ft. lbs.).
9. Install the engine oil filter, if removed.
10. Install the front crossmember. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Installation** .
11. Install the skid plate.
12. Lower the vehicle.
13. Reconnect the negative battery cable.

INSULATOR, ENGINE MOUNT, REAR

Removal

REMOVAL

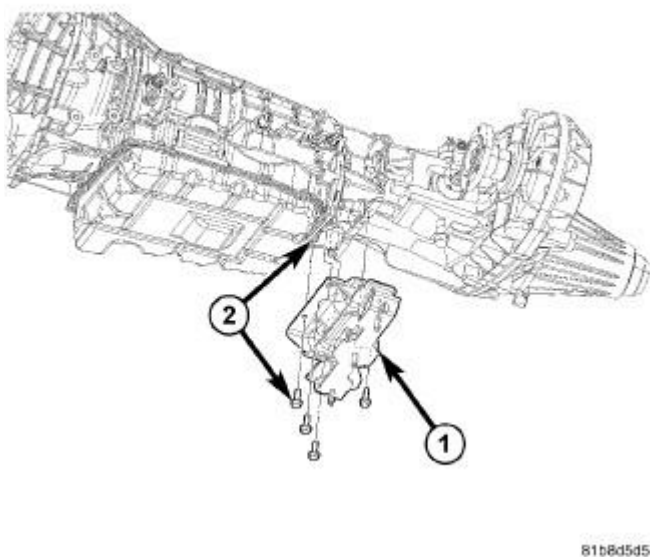
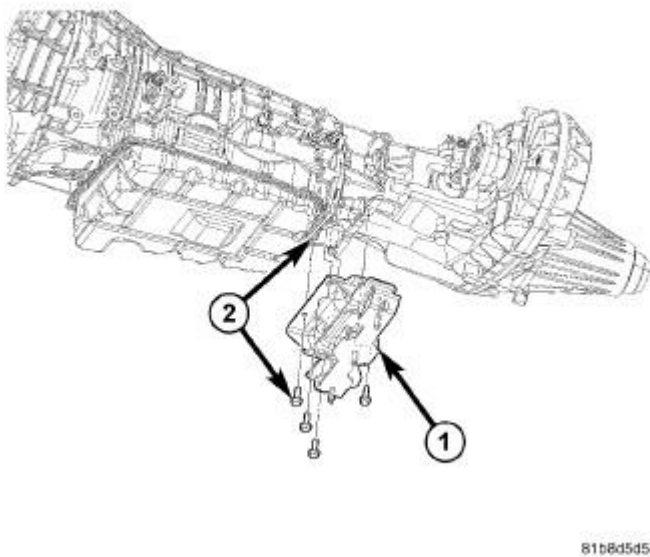


Fig. 194: 545RFE HD-MOUNTING

Courtesy of CHRYSLER LLC

1. Raise the vehicle on a hoist.
2. Using a suitable jack, support transmission.
3. Remove the fasteners from the transmission mount (1).
4. Remove the bolts (2) that attach the transmission mount to the engine bracket.
5. Raise the transmission enough to remove the mount from the crossmember.
6. Remove the mount.

Installation**INSTALLATION****Fig. 195: 545RFE HD-MOUNTING****Courtesy of CHRYSLER LLC**

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

1. Install the bolts (2) that attach the transmission mount to the transmission bracket.
2. Tighten the bolts to 61 N.m (45 ft. lbs.) torque.
3. Lower the transmission so the transmission mount rests on the crossmember, and the studs of the transmission mount are aligned in the slots in the crossmember.
4. Install the nuts onto the transmission mount studs through the crossmember access slot.
5. Tighten the nuts to 54 N.m (40 ft. lbs.).

LUBRICATION

DIAGNOSIS AND TESTING

CHECKING ENGINE OIL PRESSURE

1. Remove oil pressure sending unit and install gauge assembly C-3292A.

CAUTION: If oil pressure is 0 at idle, do not perform the 3000 RPM test.

2. If oil pressure is 0 at idle, shut off engine.
 - Check for a clogged oil pick-up screen or a pressure relief valve stuck open.
 - Remove oil pan and inspect for debris.
 - Remove oil pressure relief valve.
 - Inspect oil pressure relief valve, if scored or damaged replace.
 - If pressure relief valve is okay, replace oil pump assembly.
3. Run engine at 3,000 RPM, oil pressure should be 170 - 758 kPa (25 - 110 psi).
4. Remove oil pressure gauge.
5. Install oil pressure sensor.

ENGINE OIL LEAK

Begin with a thorough visual inspection of the engine, particularly at the area of the suspected leak. If an oil leak source is not readily identifiable, the following steps should be followed:

1. Do not clean or degrease the engine at this time because some solvents may cause rubber to swell, temporarily stopping the leak.
2. Add an oil soluble dye (use as recommended by manufacturer). Start the engine and let idle for approximately 15 minutes. Check the oil dipstick to make sure the dye is thoroughly mixed as indicated with a bright yellow color under a black light.
3. Using a black light, inspect the entire engine for fluorescent dye, particularly at the suspected area of oil leak. If the oil leak is found and identified, repair per service information instructions.
4. If dye is not observed, drive the vehicle at various speeds for approximately 24 km (15 miles), and repeat inspection.

If the oil leak source is not positively identified at this time , proceed with AIR LEAK DETECTION TEST METHOD.

Air Leak Detection Test Method

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

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

3. Gradually apply air pressure from 1 psi to 2.5 psi maximum while applying soapy water at the suspected source. Adjust the regulator to the suitable test pressure that provide the best bubbles which will pinpoint the leak source. If the oil leak is detected and identified, repair per service information procedures.
4. If the leakage occurs at the rear oil seal area, refer to **INSPECTION FOR REAR SEAL AREA LEAKS**.
5. If no leaks are detected, turn off the air supply and remove the air hose and all plugs and caps. Install the PCV valve.
6. Clean the oil off the suspect oil leak area using a suitable solvent. Drive the vehicle at various speeds approximately 24 km (15 miles). Inspect the engine for signs of an oil leak by using a black light.

INSPECTION FOR REAR SEAL AREA LEAKS

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

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

1. Disconnect the battery.
2. Raise the vehicle.
3. Remove torque converter or clutch housing cover and inspect rear of block for evidence of oil. Use a black light to check for the oil leak:
 - a. Circular spray pattern generally indicates seal leakage or crankshaft damage.
 - b. Where leakage tends to run straight down, possible causes are a porous block, distributor seal, camshaft bore cup plugs oil galley pipe plugs, oil filter runoff, and main bearing cap to cylinder block mating surfaces.
4. If no leaks are detected, pressurize the crankcase as outlined in **AIR LEAK DETECTION TEST METHOD**

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

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

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

6. For bubbles that remain steady with shaft rotation, no further inspection can be done until disassembled.

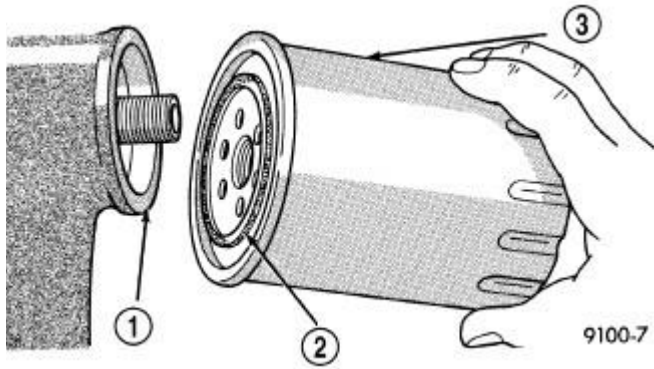
FILTER, ENGINE OIL**Removal****REMOVAL**

Fig. 196: Oil Filter Sealing Surface - Typical
Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - SEALING SURFACE
2 - RUBBER GASKET
3 - OIL FILTER |
|--|

All engines are equipped with a high quality full-flow, disposable type oil filter. Chrysler Corporation recommends a Mopar® or equivalent oil filter be used.

1. Position a drain pan under the oil filter.
2. Using a suitable oil filter wrench loosen filter (3).
3. Remove oil filter.
4. When filter separates from cylinder block oil filter boss, tip gasket end upward to minimize oil spill. Remove filter from vehicle.

NOTE: **Make sure filter gasket was removed with filter.**

5. With a wiping cloth, clean the gasket sealing surface of oil and grime.

Installation**INSTALLATION**

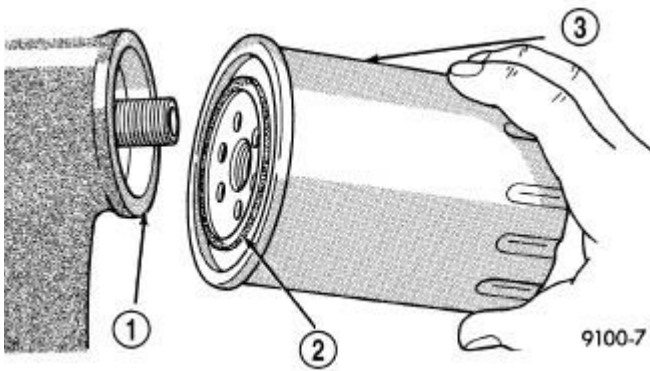


Fig. 197: Oil Filter Sealing Surface - Typical
Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - SEALING SURFACE
2 - RUBBER GASKET
3 - OIL FILTER |
|--|

1. Lightly lubricate oil filter gasket (2) with engine oil.
2. Thread filter (3) onto adapter nipple. When gasket makes contact with sealing surface, hand tighten filter one half turn, or 180°, do not over tighten.
3. Add oil, verify crankcase oil level and start engine. Inspect for oil leaks.

OIL

Standard Procedure

ENGINE OIL SERVICE

The engine oil level indicator is located at the left hand of the engine on the 5.7L engines.

CRANKCASE OIL LEVEL INSPECTION

CAUTION: Do not overfill crankcase with engine oil, pressure loss or oil foaming can result.

Inspect engine oil level approximately every 800 kilometers (500 miles). Unless the engine has exhibited loss of oil pressure, run the engine for about ten minutes before checking oil level. Checking engine oil level on a cold engine is not accurate.

To ensure proper lubrication of an engine, the engine oil must be maintained at an acceptable level. The acceptable levels are indicated between the ADD and SAFE marks on the engine oil dipstick.

1. Position vehicle on level surface.
2. With engine OFF, allow approximately five minutes for oil to settle to bottom of crankcase, remove engine oil dipstick.

3. Wipe dipstick clean.
4. Install dipstick and verify it is seated in the tube.
5. Remove dipstick, with handle held above the tip, take oil level reading.
6. Add oil only if level is below the ADD mark on dipstick.

ENGINE OIL CHANGE

Change engine oil at mileage and time intervals described in Maintenance Schedules. Refer to **Vehicle Quick Reference/Maintenance Schedules - Description** .

Run engine until achieving normal operating temperature.

1. Position the vehicle on a level surface and turn engine off.
2. Hoist and support vehicle on safety stands.
3. Remove oil fill cap.
4. Place a suitable drain pan under crankcase drain.
5. Remove drain plug from crankcase and allow oil to drain into pan. Inspect drain plug threads for stretching or other damage. Replace drain plug if damaged.
6. Install drain plug in crankcase. Tighten to 34 N.m (25 ft. lbs.).
7. Lower vehicle and fill crankcase with specified type and amount of engine oil.
8. Install oil fill cap.
9. Start engine and inspect for leaks.
10. Stop engine and inspect oil level.

USED ENGINE OIL DISPOSAL

Care should be exercised when disposing used engine oil after it has been drained from a vehicle engine. Refer to the WARNING at beginning of this section.

PAN, OIL**Removal****REMOVAL**

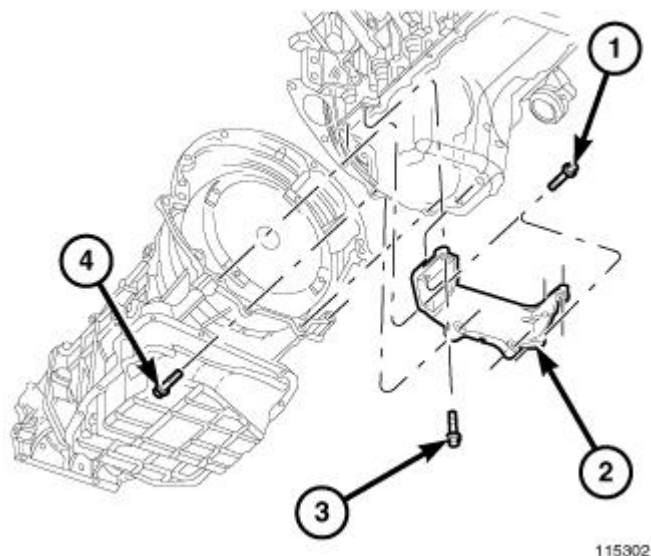


Fig. 198: Structural Cover

Courtesy of CHRYSLER LLC

NOTE: Automatic transmission shown in illustration. Manual transmission similar.

1. Disconnect the negative battery cable.
2. Install Engine Support Fixture 8534B. **Do not raise engine at this time.**
3. **For 2WD vehicles**, Remove both engine mount to frame through bolts.
4. **For 4WD vehicles**, Loosen both left and right side engine mount bracket to mount bolts, and remove the lower bolt on each side. The upper hole in the engine bracket is slotted.
5. Remove the structural cover (2). See **Engine/Engine Block/COVER, Structural Dust - Removal.**
6. Drain engine oil.
7. Remove the front crossmember. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Removal .**

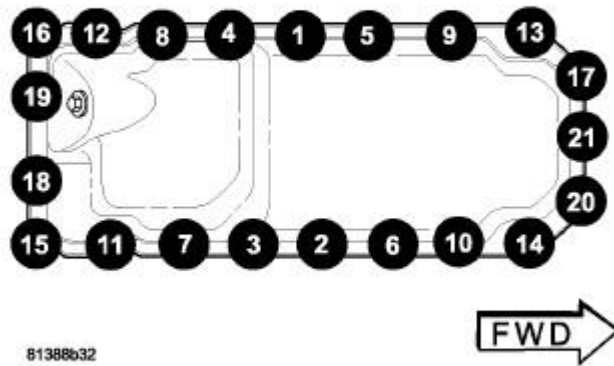


Fig. 199: OIL PAN TORQUE SEQUENCE

Courtesy of CHRYSLER LLC

CAUTION: Only raise the engine enough to provide clearance for oil pan removal. Check for proper clearance at fan shroud to fan and cowl to intake manifold.

8. Raise engine using Engine Support Fixture 8534B to provide clearance to remove oil pan.
9. Remove the nuts from the transmission mount to crossmember.
10. Using suitable transmission jack, raise the transmission approximately 3 inches off of the crossmember.

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

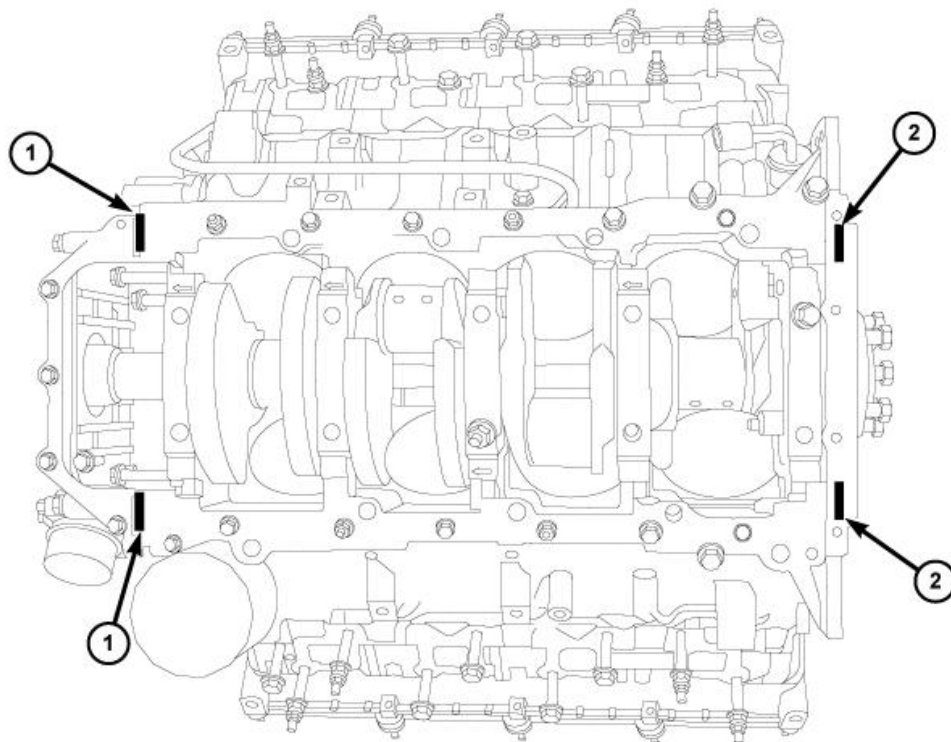
11. Remove the oil pan mounting bolts using the sequence shown in illustration above, and remove oil pan.

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

12. Unbolt oil pump pickup tube and remove tube.

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

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

Installation**INSTALLATION**

44843

Fig. 200: T-JOINT RTV APPLICATION

Courtesy of CHRYSLER LLC

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

NOTE: Mopar® Engine RTV must be applied to the 4 T-joints (area where front cover, rear retainer, block and oil pan gasket meet). The bead of RTV should cover the bottom of the gasket. This area is approximately 4.5 mm x 25 mm in each of the 4 T-joint locations.

2. Apply Mopar® Engine RTV at the 4 T- joints (1 and 2).

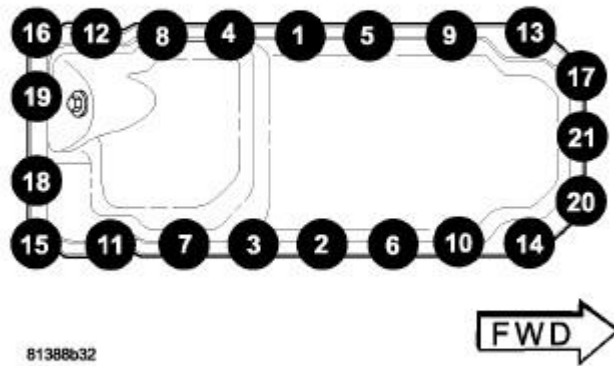


Fig. 201: OIL PAN TORQUE SEQUENCE

Courtesy of CHRYSLER LLC

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

3. Install a new integral windage tray and gasket.
4. Reinstall the oil pump pickup tube with new o-ring. Tighten tube to pump fasteners to 28 N.m (250 in. lbs.).

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

5. Position the oil pan and install the mounting bolts and studs. Tighten the mounting bolts to 12 N.m (105 in. lbs.), using the sequence above.
6. Lower the transmission onto the crossmember. Install nuts, and tighten.
7. Lower the engine into mounts using Engine Support Fixture 8534B.
8. **For 2WD vehicles,** Install both the left and right side engine mount through bolts. Tighten the nuts to 68 N.m (50 ft. lbs.).
9. **For 4WD vehicles,** Install both the left and right side engine mount bracket to mount bolts. Tighten the nuts to 68 N.m (50 ft. lbs.).
10. Remove Engine Support Fixture 8534B.

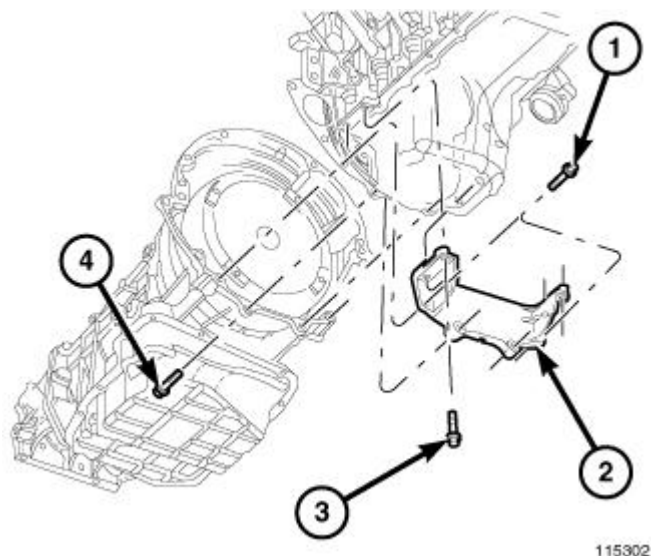


Fig. 202: Structural Cover
Courtesy of CHRYSLER LLC

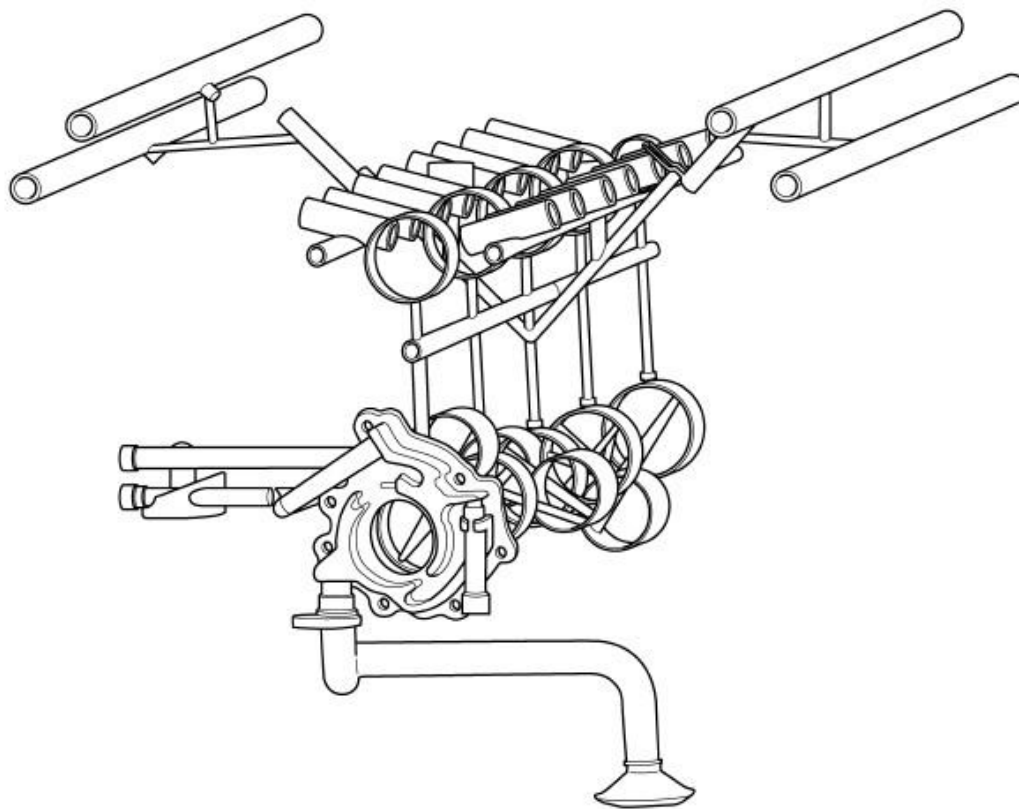
NOTE: Automatic transmission shown in illustration. Manual transmission similar.

11. Install the structural cover (2). See Engine/Engine Block/COVER, Structural Dust - Installation.
12. Install the front crossmember. Refer to Frame and Bumpers/Frame/CROSSMEMBER - Installation.
13. Fill engine oil.
14. Reconnect the negative battery cable.
15. Start engine and check for leaks.

PUMP, ENGINE OIL

Description

DESCRIPTION



810115ad

Fig. 203: Engine Oil Lubrication System
Courtesy of CHRYSLER LLC

The lubrication system is a full flow filtration pressure feed type.

Removal

REMOVAL

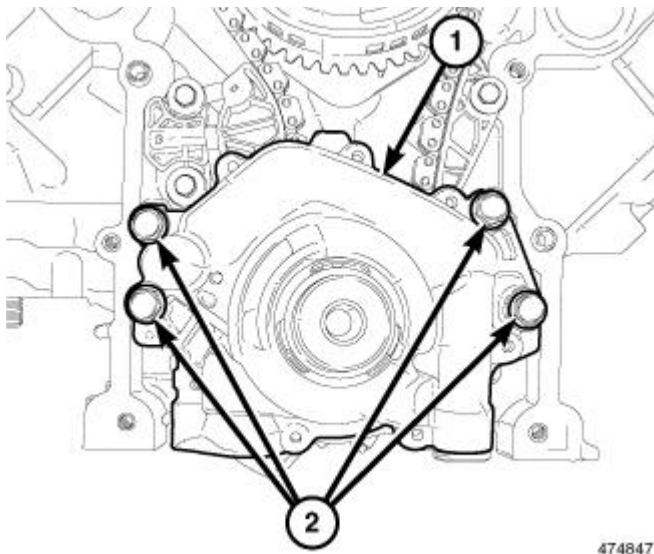


Fig. 204: Oil Pump Retaining Bolts

Courtesy of CHRYSLER LLC

1. Remove the oil pan. See [Engine/Lubrication/PAN, Oil - Removal](#).
2. Remove the timing cover. See [Engine/Valve Timing/COVER\(S\), Engine Timing - Removal](#).
3. Remove the four bolts (2) and the oil pump (1).

Cleaning

CLEANING

1. Wash all parts in a suitable solvent.

Inspection

INSPECTION

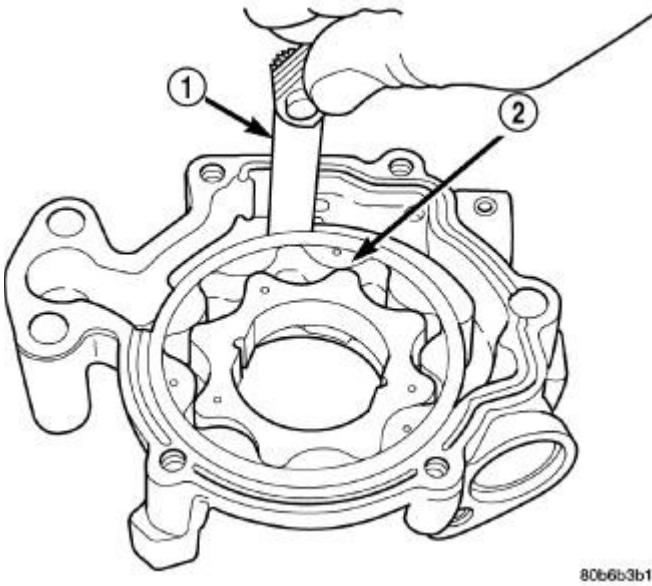


Fig. 205: Measuring Outer Rotor Clearance in Housing
Courtesy of CHRYSLER LLC

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

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

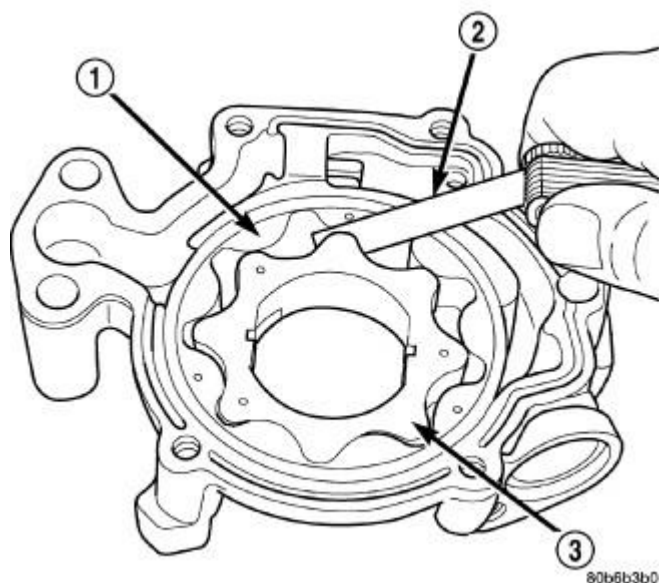


Fig. 206: Measuring Clearance Between Rotors
Courtesy of CHRYSLER LLC

4. Install the inner rotor into the oil pump body. Measure the clearance between the inner (3) and outer rotors (1). If the clearance between the rotors is 0.150 mm (0.006 in.) or more the oil pump assembly must be replaced.

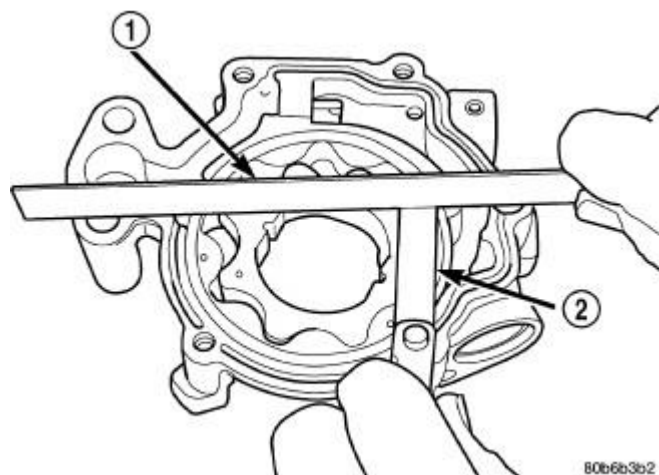


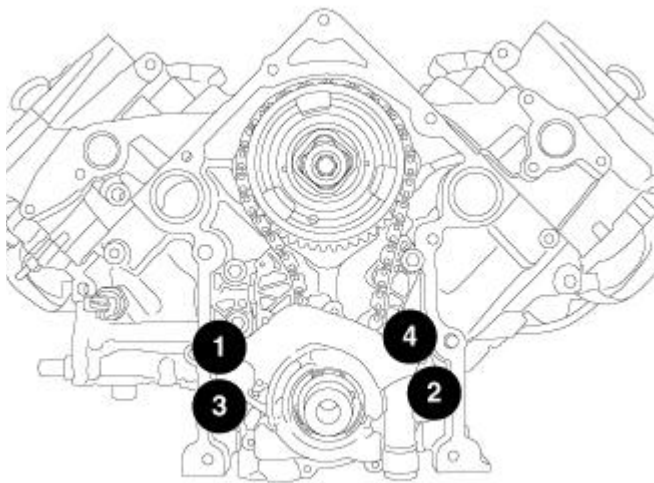
Fig. 207: Measuring Clearance Over Rotors
Courtesy of CHRYSLER LLC

5. Place a straight edge (1) across the body of the oil pump (between the bolt holes), if a feeler gauge (2) of 0.095 mm (0.0038 in.) or greater can be inserted between the straightedge and the rotors, the pump must be replaced.
6. Reinstall the pump cover. Tighten fasteners to 15 N.m (132 in. lbs.).

NOTE: The 5.7 Oil pump is serviced as an assembly. In the event the oil pump is not functioning or out of specification, it must be replaced as an assembly.

Installation

INSTALLATION



439119

Fig. 208: Oil Pump Retaining Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

1. Position the oil pump on the crankshaft and install the oil pump retaining bolts finger tight.
2. Using the sequence shown in illustration, tighten the oil pump retaining bolts to 28 N.m (21 ft. lbs.).
3. Install the timing cover. See Engine/Valve Timing/COVER(S), Engine Timing - Installation.
4. Install the oil pan. See Engine/Lubrication/PAN, Oil - Installation.

SENSOR, OIL PRESSURE

Description

DESCRIPTION

The oil pressure sensor uses the following three circuits:

- Signal circuit to the PCM
- Sensor ground circuit from the PCM
- 5 volt reference circuit from the PCM

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

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

oil gallery.

Removal

REMOVAL

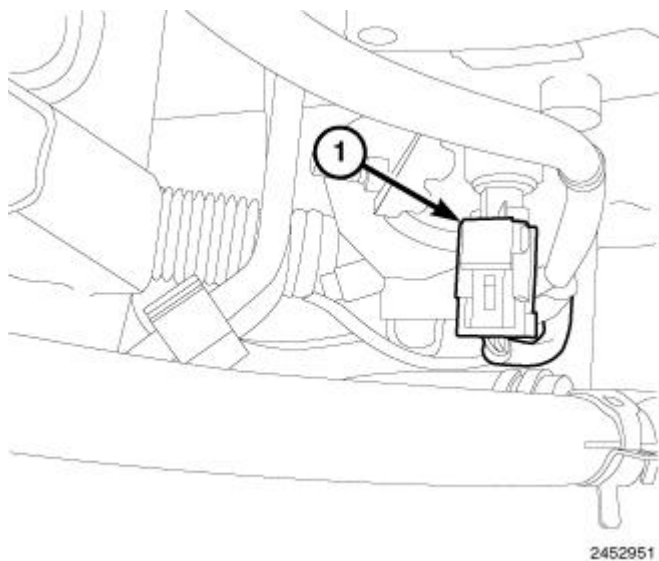


Fig. 209: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER LLC

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

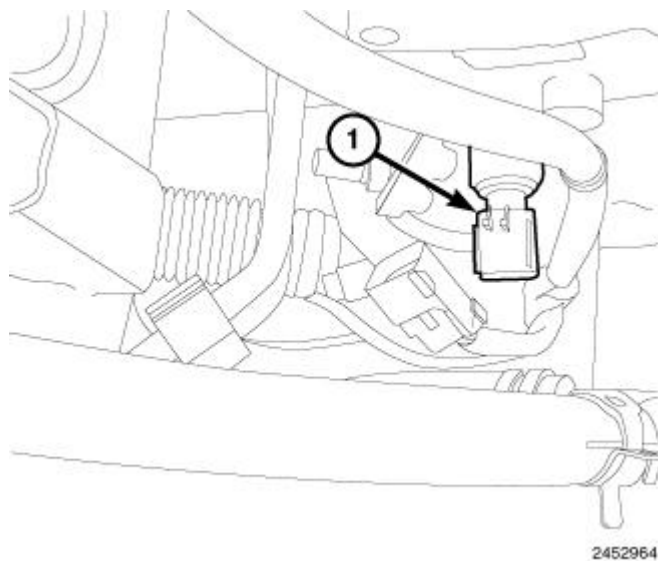


Fig. 210: Oil Pressure Sensor
Courtesy of CHRYSLER LLC

3. Remove the oil pressure sensor (1).

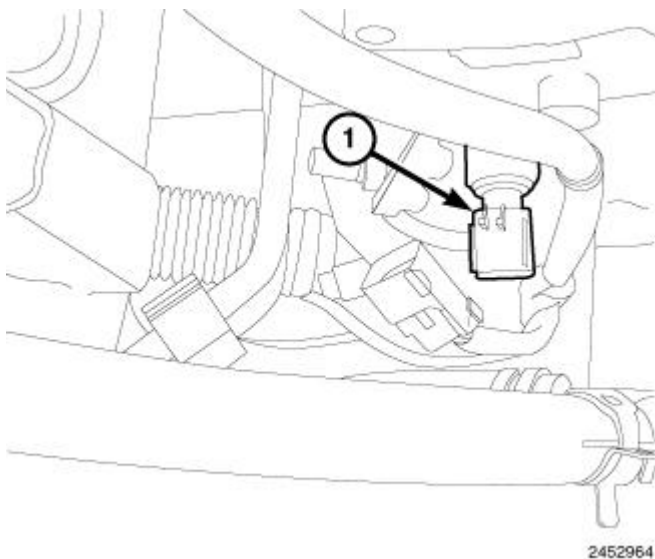
Installation**INSTALLATION**

Fig. 211: Oil Pressure Sensor
Courtesy of CHRYSLER LLC

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

1. Install the oil pressure sensor (1).

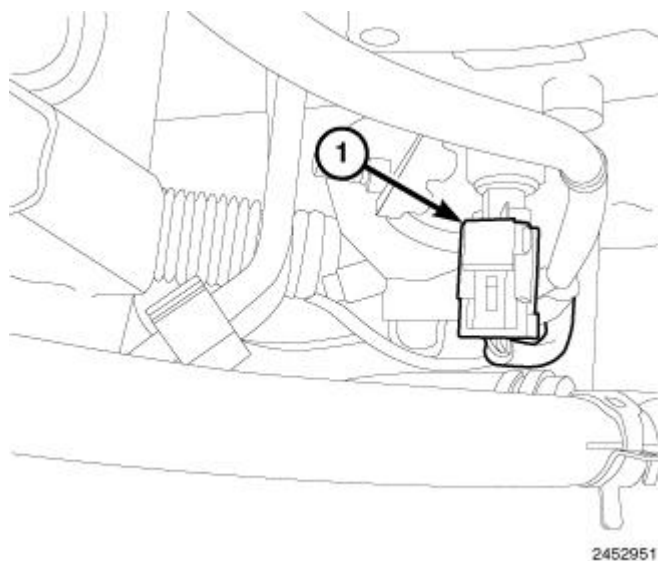


Fig. 212: Oil Pressure Sensor Electrical Connector
Courtesy of CHRYSLER LLC

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

3. Connect the negative battery cable.

SENSOR, OIL TEMPERATURE

Description

DESCRIPTION

The oil temperature sensor uses the following two circuits:

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

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

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

Removal

REMOVAL

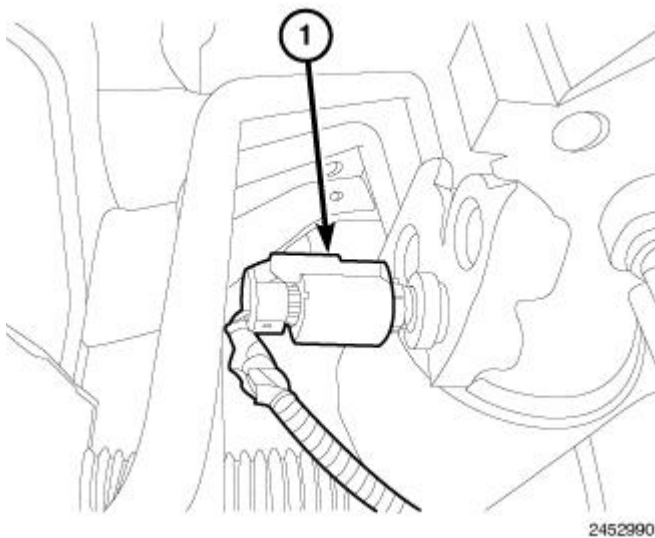


Fig. 213: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER LLC

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

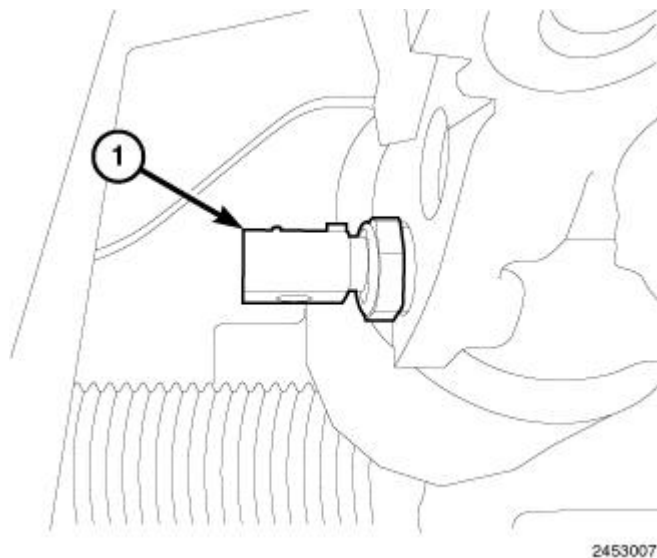


Fig. 214: Oil Temperature Sensor
Courtesy of CHRYSLER LLC

3. Remove the oil temperature sensor (1).

Installation

INSTALLATION

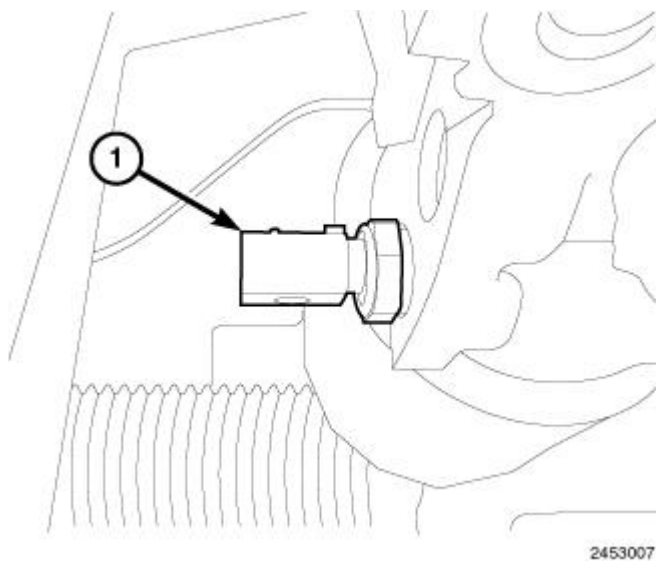


Fig. 215: Oil Temperature Sensor
Courtesy of CHRYSLER LLC

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

1. Install the oil temperature sensor (1).

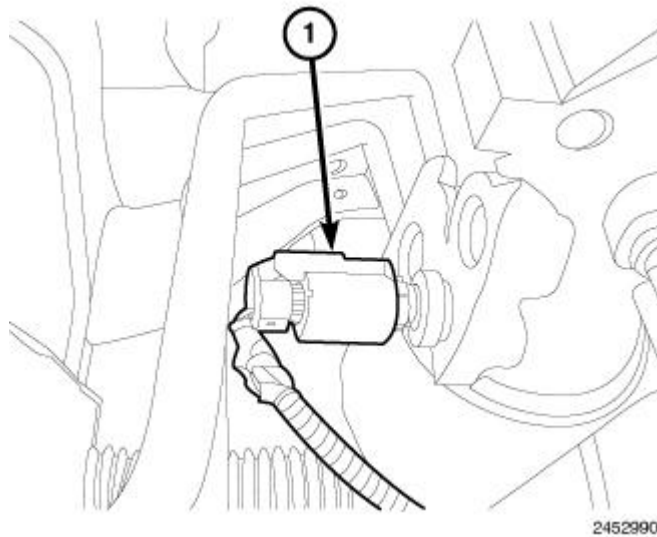


Fig. 216: Oil Temperature Sensor Electrical Connector
Courtesy of CHRYSLER LLC

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

MANIFOLDS

MANIFOLD, EXHAUST

Description

DESCRIPTION

The exhaust manifolds are log style with a patented flow enhancing design to maximize performance. The exhaust manifolds are made of high silicon molybdenum cast iron. A perforated core graphite exhaust manifold gasket is used to improve sealing to the cylinder head. The exhaust manifolds are covered by a three layer laminated heat shield for thermal protection and noise reduction. The heat shields are fastened with a torque prevailing nut that is backed off slightly to allow for the thermal expansion of the exhaust manifold.

Operation

OPERATION

The exhaust manifolds collect the engine exhaust exiting the combustion chambers, then channels the exhaust gases to the exhaust pipes attached to the manifolds.

Removal

REMOVAL

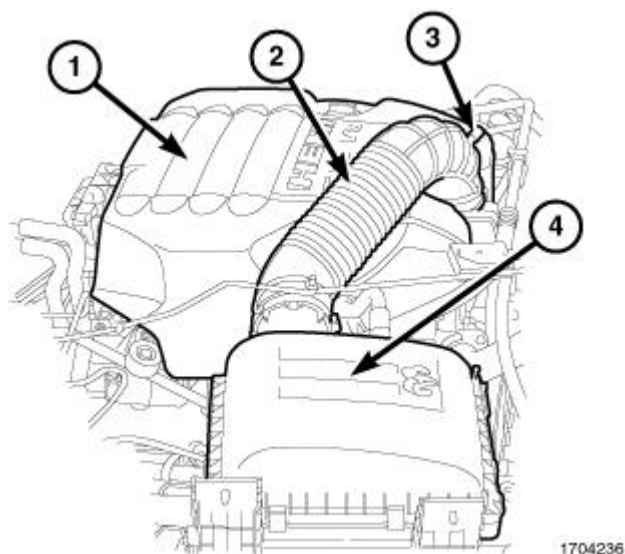


Fig. 217: Engine Cover

Courtesy of CHRYSLER LLC

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

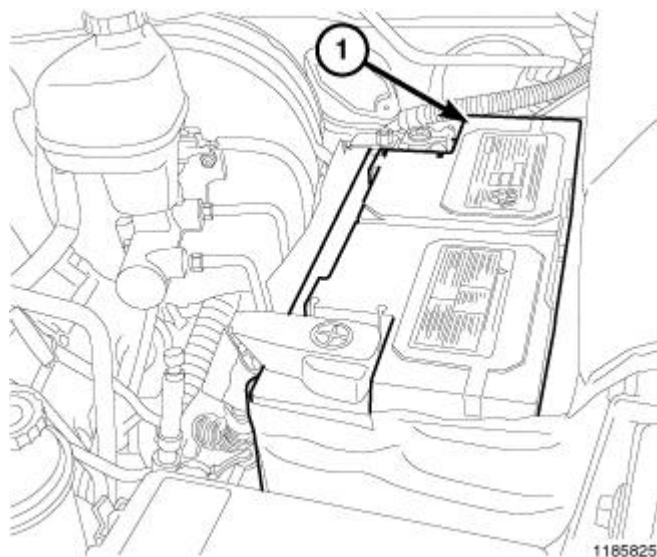


Fig. 218: Battery

Courtesy of CHRYSLER LLC

5. Disconnect the negative battery cable (1).

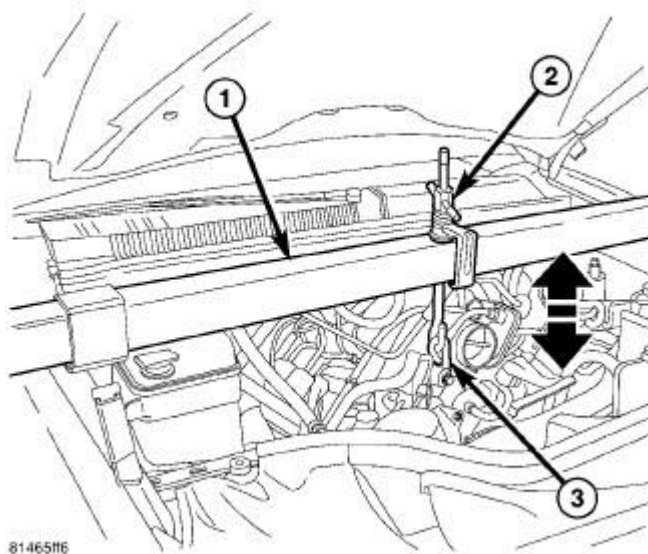


Fig. 219: Engine Support Tool
Courtesy of CHRYSLER LLC

6. Install Engine Support Fixture 8534B (1).

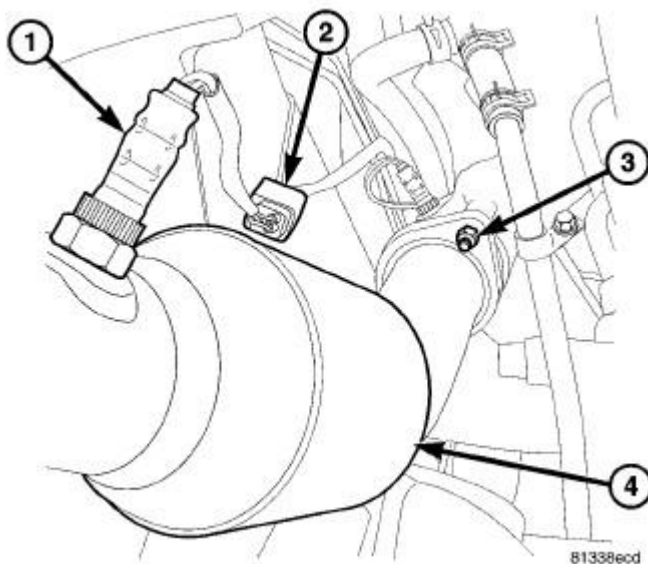


Fig. 220: LH CATALYTIC CONVERTER
Courtesy of CHRYSLER LLC

7. Raise and support the vehicle.

CAUTION: When servicing or replacing exhaust system components, disconnect the oxygen sensor connector(s). Allowing the exhaust to hang by the oxygen sensor wires will damage the harness and/or sensor.

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

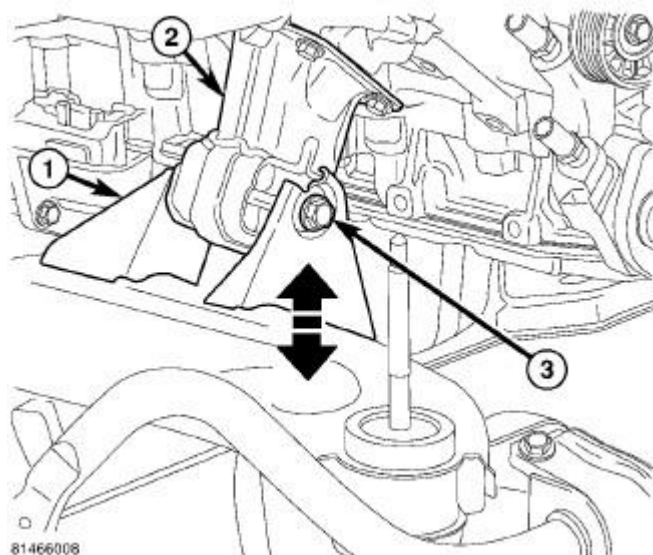
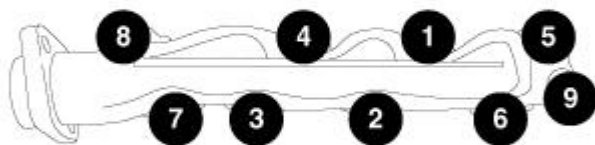


Fig. 221: Identifying Engine Mount Bolts
Courtesy of CHRYSLER LLC

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

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

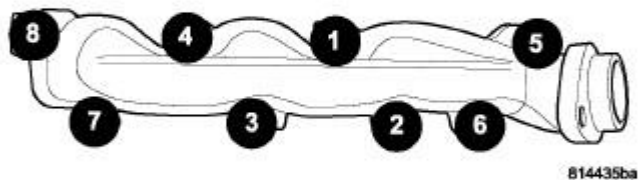
13. Using the Engine Support Fixture 8534B, raise the engine enough to gain access to the exhaust manifold retaining bolts.
14. Remove the exhaust manifold heat shield.



44921

Fig. 222: Exhaust Manifold Bolt Tightening Sequence - Right
Courtesy of CHRYSLER LLC

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



814435ba

Fig. 223: Exhaust Manifold Bolt Tightening Sequence - Left
Courtesy of CHRYSLER LLC

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

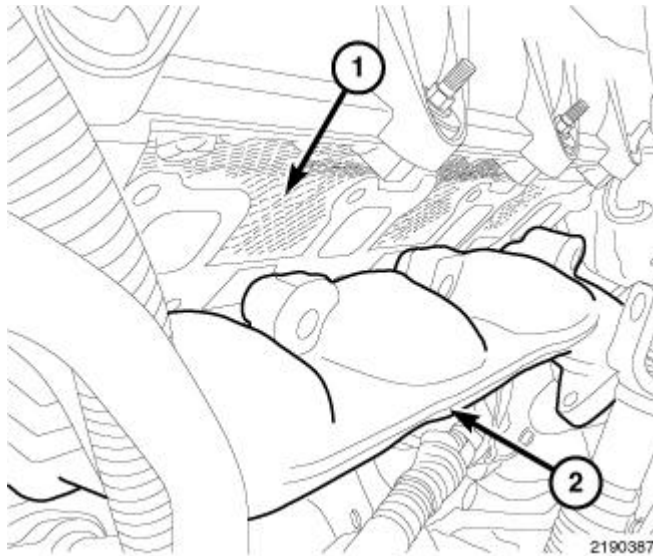


Fig. 224: Locating Exhaust Manifold & Gasket
Courtesy of CHRYSLER LLC

17. Remove the exhaust manifold (2) and gasket, (left side shown in illustration, right similar).
18. Inspect the exhaust manifold for any damage. See **Engine/Manifolds/MANIFOLD, Exhaust - Inspection**.
19. Clean the mating surfaces (1, 2).

Cleaning

MATING SURFACES

Clean mating surfaces on cylinder head and manifold. Wash with solvent and blow dry with compressed air.

Inspection

MATING SURFACES

Inspect manifold for cracks.

Inspect mating surfaces of manifold for flatness with a straight edge. Gasket surfaces must be flat within 0.2 mm per 300 mm (0.008 inch per foot).

Installation

INSTALLATION

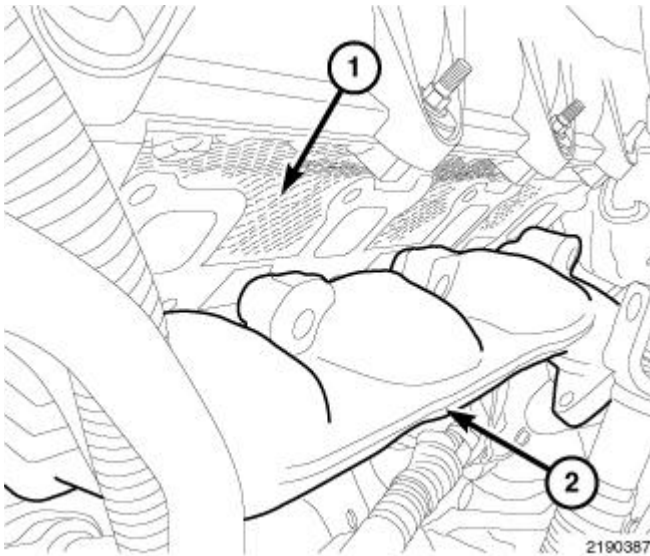


Fig. 225: Locating Exhaust Manifold & Gasket
Courtesy of CHRYSLER LLC

1. Prior to installation, make sure all gasket mating surfaces (1, 2) are clean and free of any debris, (left side shown in illustration, right similar).
2. Position the exhaust manifold gasket and manifold.

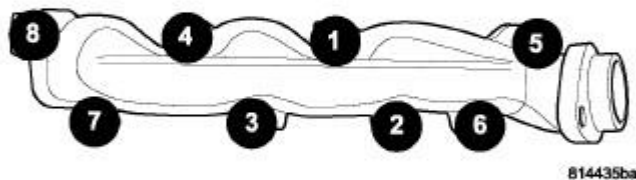
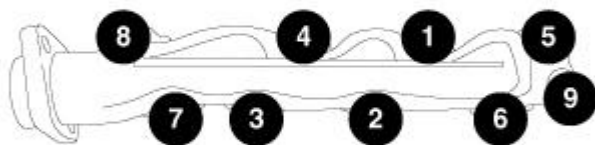


Fig. 226: Exhaust Manifold Bolt Tightening Sequence - Left
Courtesy of CHRYSLER LLC

3. **Left Side:** Using the sequence shown in illustration, Install the exhaust manifold retaining bolts and tighten to 25 N.m (18 ft. lbs.).



44921

Fig. 227: Exhaust Manifold Bolt Tightening Sequence - Right
Courtesy of CHRYSLER LLC

4. **Right Side:** Using the sequence shown in illustration, install the exhaust manifold retaining bolts and tighten to 25 N.m (18 ft. lbs.).
5. Install the heat shield and tighten nuts to 8 N.m (70 in. lbs.).

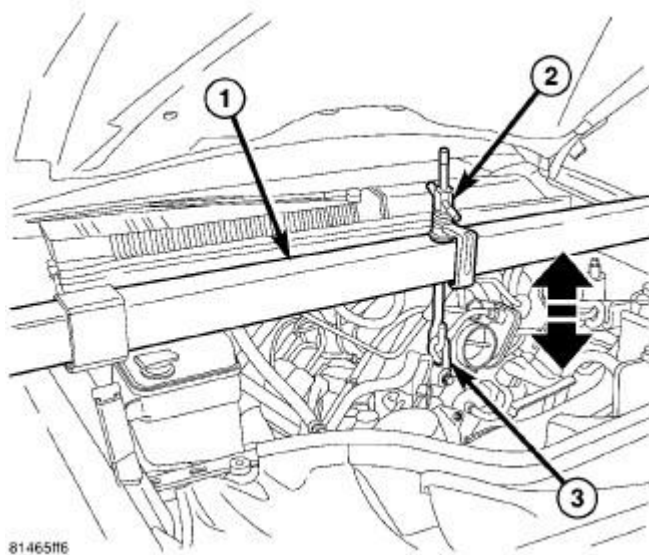


Fig. 228: Engine Support Tool
Courtesy of CHRYSLER LLC

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

6. Using the Engine Support Fixture 8534B, lower the engine into position.
7. Raise and support the vehicle.
8. Install the right and left engine mount through bolts and tighten to 100 N.m (74 ft. lbs.).

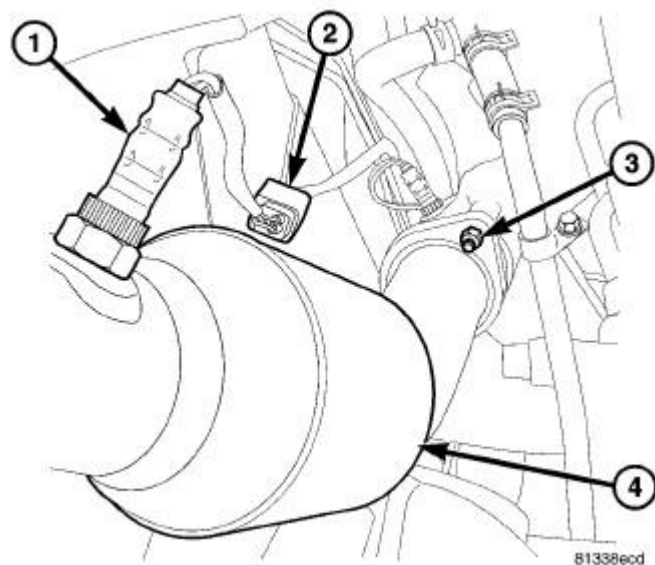


Fig. 229: LH CATALYTIC CONVERTER
Courtesy of CHRYSLER LLC

9. Install the right and left exhaust pipe/catalytic converter assembly. Refer to **Exhaust System/CONVERTER, Catalytic - Installation**.
10. Connect the oxygen sensor electrical connectors (2).
11. Lower the vehicle.
12. Remove Engine Support Fixture 8534B.

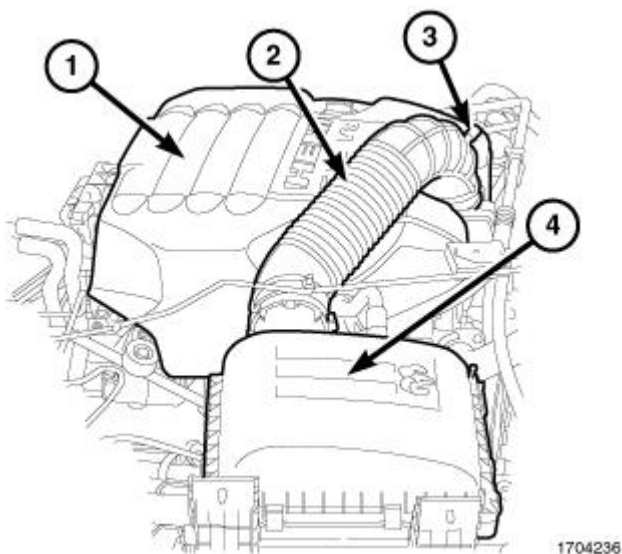
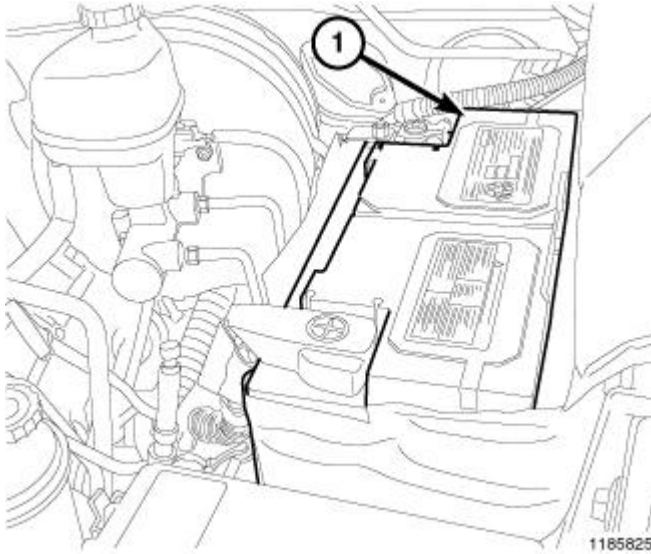


Fig. 230: Engine Cover

Courtesy of CHRYSLER LLC

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

**Fig. 231: Battery**

Courtesy of CHRYSLER LLC

17. Connect the negative battery cable (1).
18. Start the engine and check for leaks.

MANIFOLD, INTAKE

Description

DESCRIPTION

The intake manifold is made of a composite material and features long runners which maximizes low end torque. The intake manifold uses single plane sealing which consist of eight individual press in place port gaskets to prevent leaks.

Diagnosis and Testing

INTAKE MANIFOLD LEAKAGE

An intake manifold air leak is characterized by lower than normal manifold vacuum. Also, one or more cylinders may not be functioning.

WARNING: Use extreme caution when the engine is operating. Do not stand in a direct line with the fan. Do not put your hands near the pulleys, belts or the fan. Do not wear loose clothing.

1. Start the engine.
2. Spray a small stream of water at the suspected leak area.
3. If a change in RPM is observed the area of the suspected leak has been found.
4. Repair as required.

Removal

REMOVAL

1. Disconnect negative cable from battery.
2. Remove resonator assembly and air inlet hose.
3. Disconnect electrical connectors for the following components:
 - Manifold Absolute Pressure (MAP) Sensor
 - Intake Air Temperature (IAT) Sensor
 - Throttle Position (TPS) Sensor
 - Coolant Temperature (CTS) Sensor
4. Disconnect brake booster hose and positive crankcase ventilation (PCV) hose.
5. Remove generator and set aside.

NOTE: It is not necessary to remove lines or remove freon from A/C compressor.

6. Remove air conditioning compressor and set aside.
7. Bleed fuel system. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
8. Remove intake manifold retaining fasteners in a crisscross pattern starting from the outside bolts and ending at the middle bolts.
9. Remove intake manifold and IAFM as an assembly.

Cleaning

CLEANING

NOTE: There is NO approved repair procedure for the intake manifold. If severe damage is found during inspection, the intake manifold must be replaced.

Before installing the intake manifold thoroughly clean the mating surfaces. Use a suitable cleaning solvent, then air dry.

Inspection

INSPECTION

1. Inspect the intake sealing surface for cracks, nicks and distortion.
2. Inspect the intake manifold vacuum hose fittings for looseness or blockage.
3. Inspect the manifold to throttle body mating surface for cracks, nicks and distortion.

Installation**INSTALLATION**

1. Install intake manifold seals.
2. Position intake manifold and IAFM.
3. Install intake manifold retaining bolts, and tighten in sequence from the middle bolts towards the outside in a crisscross pattern. Torque fasteners to 12 N.m (105 in. lbs.).
4. Connect electrical connectors for the following components:
 - Manifold Absolute Pressure (MAP) Sensor
 - Intake Air Temperature (IAT) Sensor
 - Throttle Position (TPS) Sensor
 - Coolant Temperature (CTS) Sensor
 - Idle Air Control (IAC) Motor
5. Install generator.
6. Install A/C compressor.
7. Connect Brake booster hose and Positive crankcase ventilation (PCV) hose.
8. Install resonator assembly and air inlet hose.
9. Connect negative cable to battery.

VALVE TIMING**CHAIN AND SPROCKETS, TIMING****Removal****REMOVAL**

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

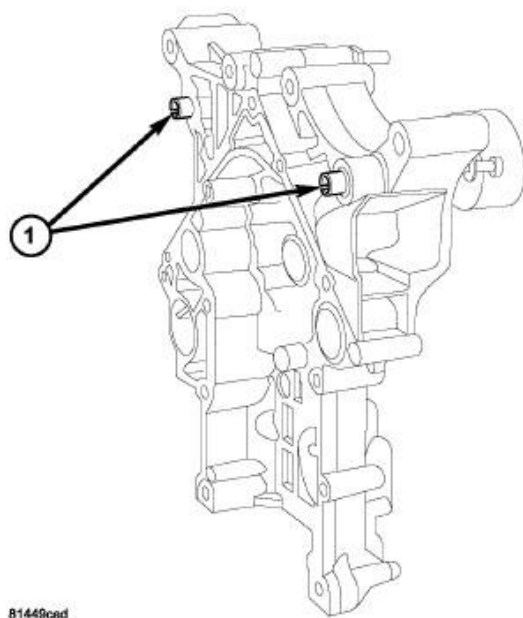


Fig. 232: Front Cover Slide Bushings
Courtesy of CHRYSLER LLC

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

3. Remove the timing chain cover. See Engine/Valve Timing/COVER(S), Engine Timing - Removal.
4. Verify the slide bushings (1) remain installed in the timing chain cover during removal.

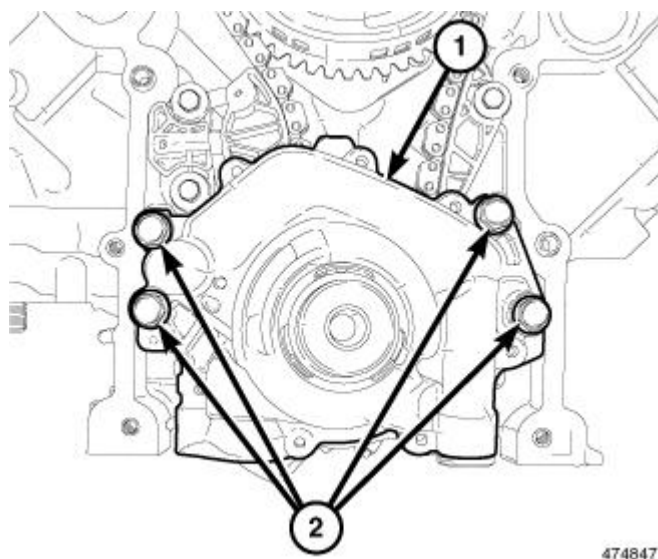
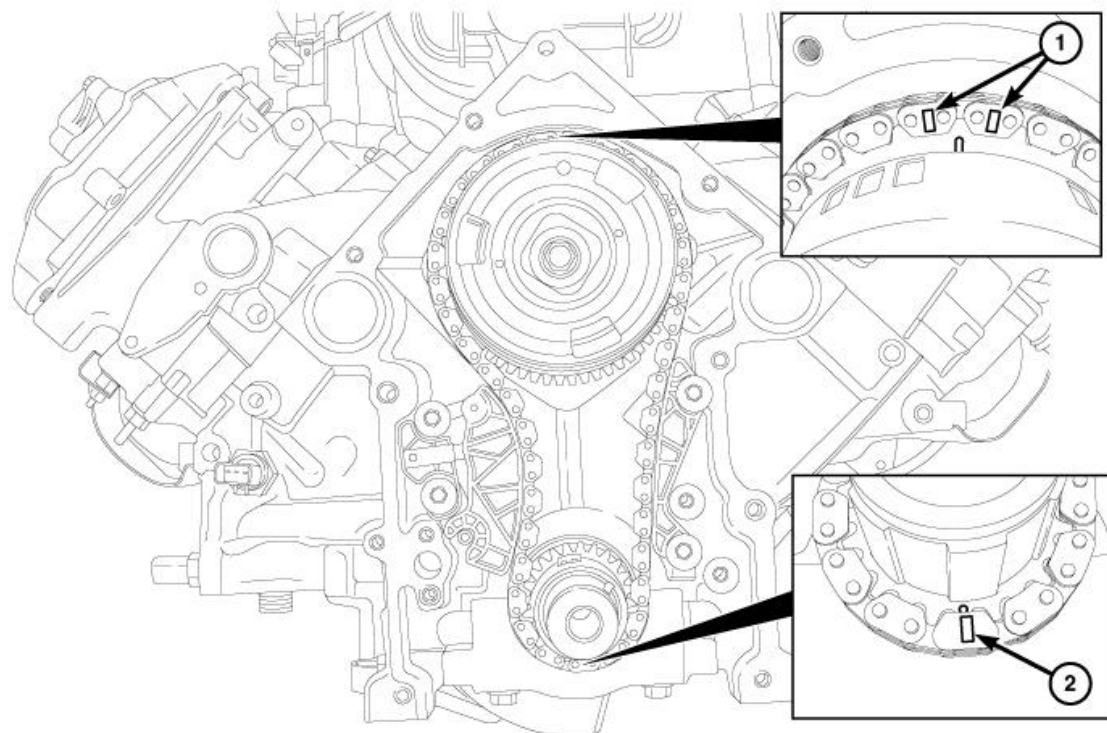


Fig. 233: Oil Pump Retaining Bolts
Courtesy of CHRYSLER LLC

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

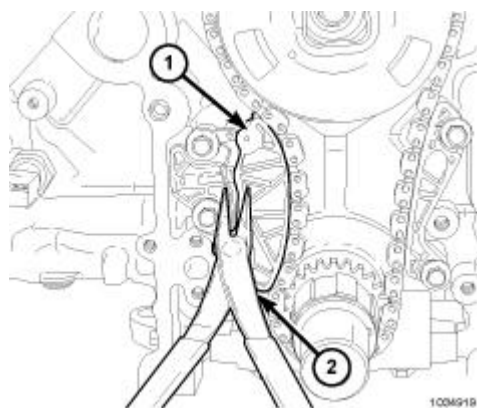


487402

Fig. 234: Aligning Timing Marks With Timing Chain Sprockets

Courtesy of CHRYSLER LLC

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



103M919

Fig. 235: Chain Tensioner Arm

Courtesy of CHRYSLER LLC

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

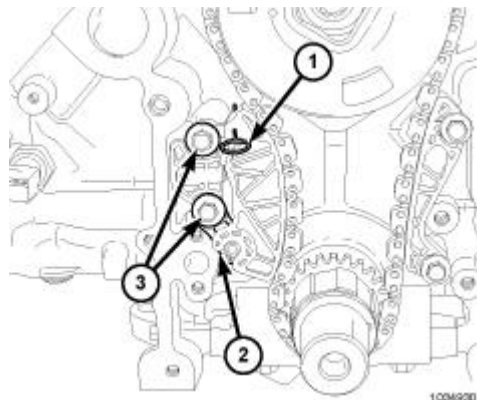


Fig. 236: Timing Chain Tensioner Pin
 Courtesy of CHRYSLER LLC

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

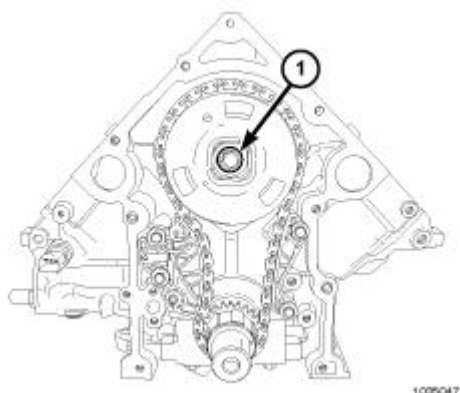


Fig. 237: Camshaft Phaser Retaining Bolt
 Courtesy of CHRYSLER LLC

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

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

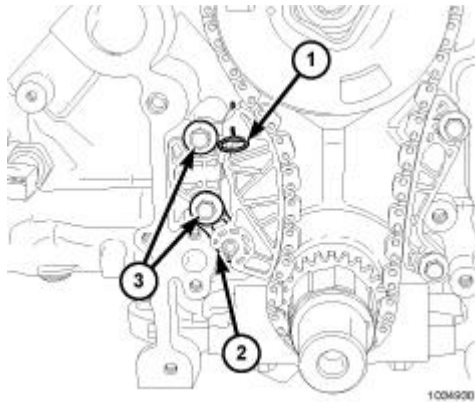


Fig. 238: Timing Chain Tensioner Pin
Courtesy of CHRYSLER LLC

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

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

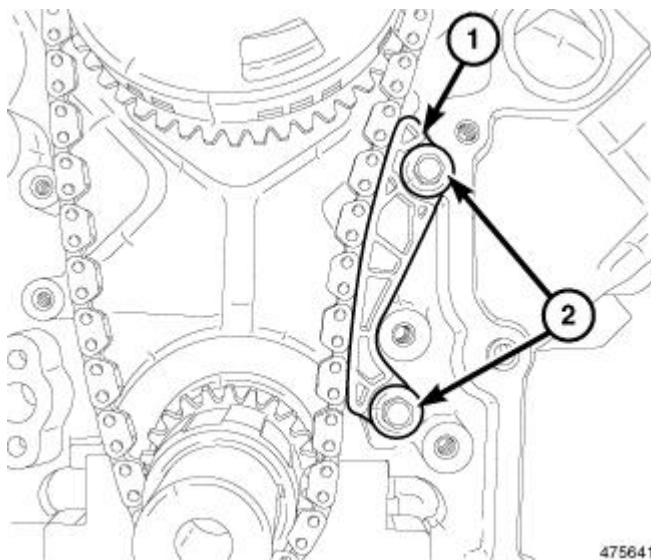
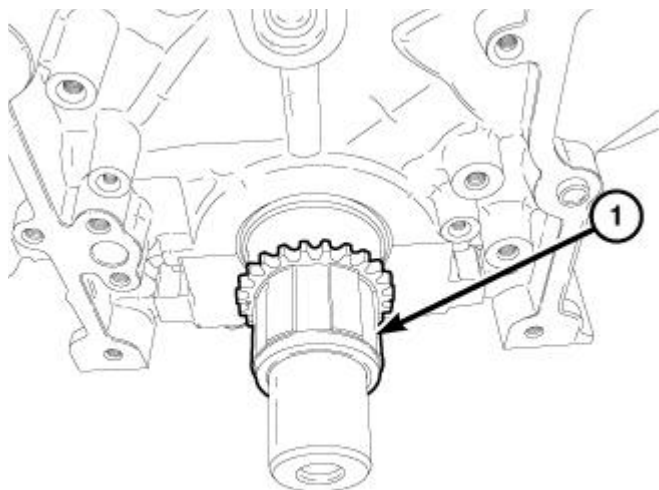


Fig. 239: Timing Chain Guide
Courtesy of CHRYSLER LLC

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

Installation

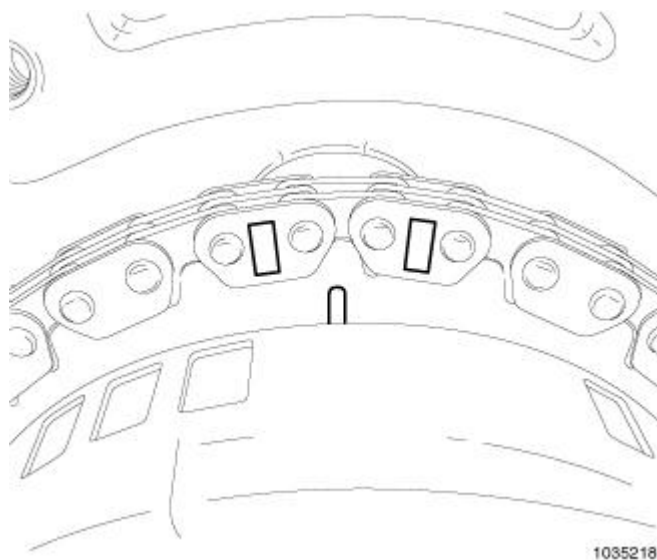
INSTALLATION



475580

Fig. 240: Crankshaft Sprocket
Courtesy of CHRYSLER LLC

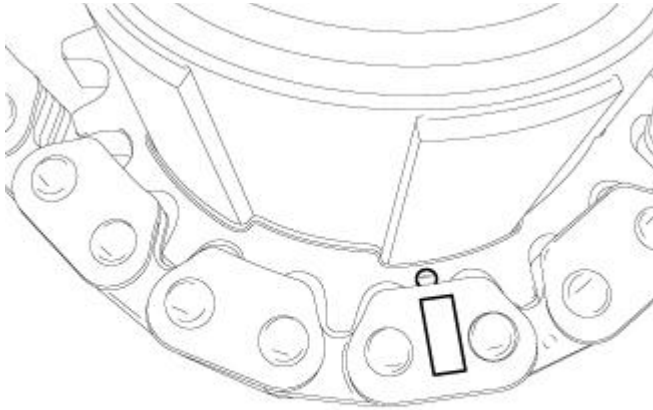
1. Install the crankshaft sprocket (1) and position halfway onto the crankshaft.



1035218

Fig. 241: Aligning Timing Chain & Camshaft Phaser Marks
Courtesy of CHRYSLER LLC

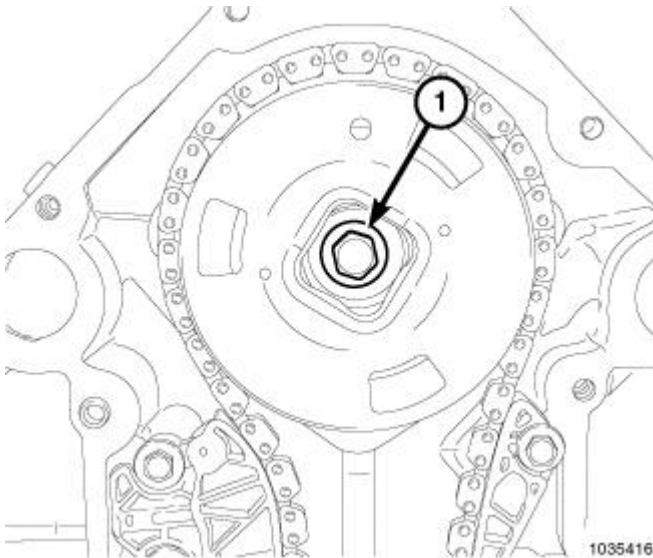
2. While holding the camshaft phaser in hand, position the timing chain on the camshaft phaser and align the timing marks as shown in illustration.



475628

Fig. 242: Aligning Timing Chain & Crankshaft Sprocket Marks
Courtesy of CHRYSLER LLC

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



1035416

Fig. 243: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER LLC

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

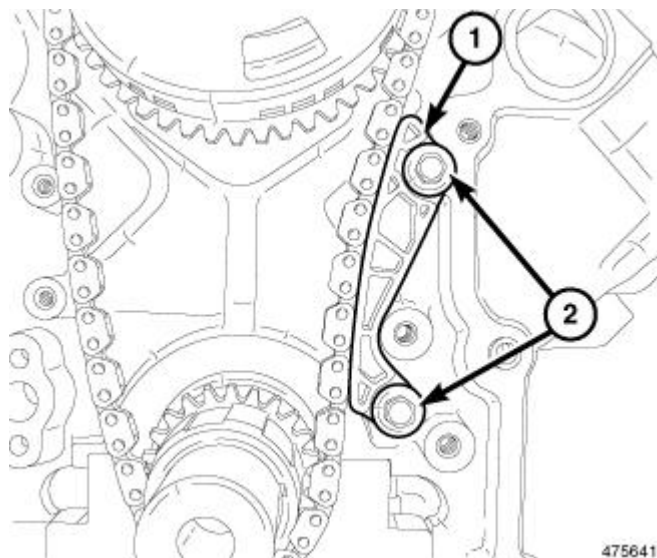


Fig. 244: Timing Chain Guide
Courtesy of CHRYSLER LLC

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

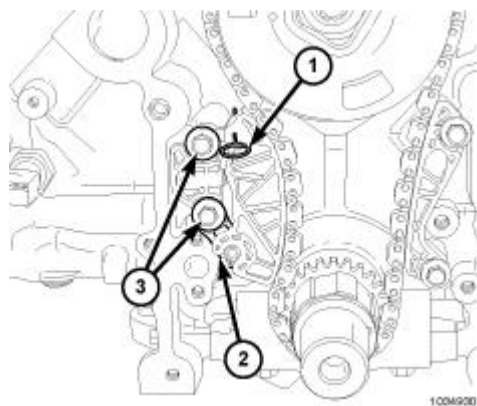


Fig. 245: Timing Chain Tensioner Pin
Courtesy of CHRYSLER LLC

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

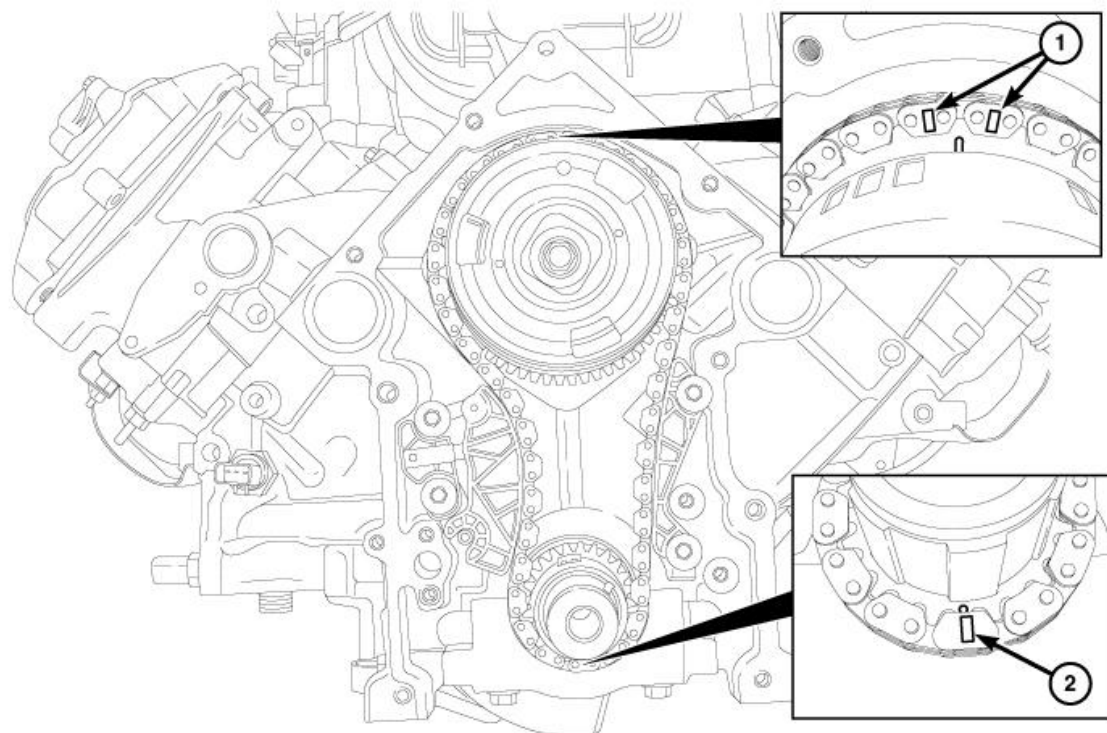


Fig. 246: Aligning Timing Marks With Timing Chain Sprockets
Courtesy of CHRYSLER LLC

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

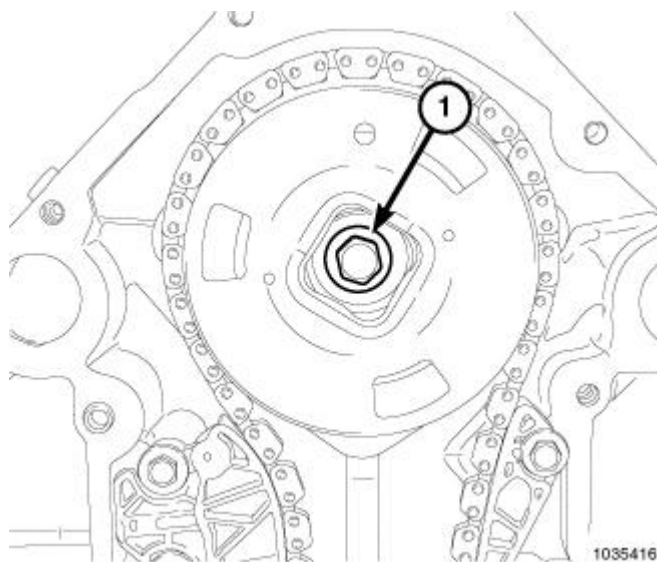
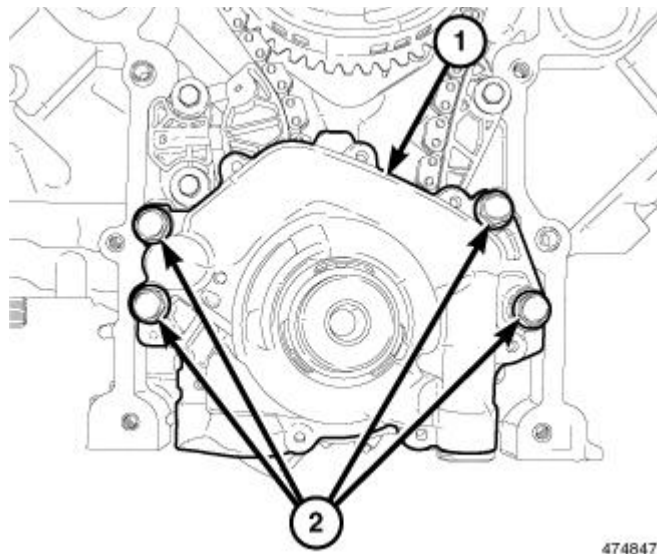


Fig. 247: Camshaft Phaser Retaining Bolt
Courtesy of CHRYSLER LLC

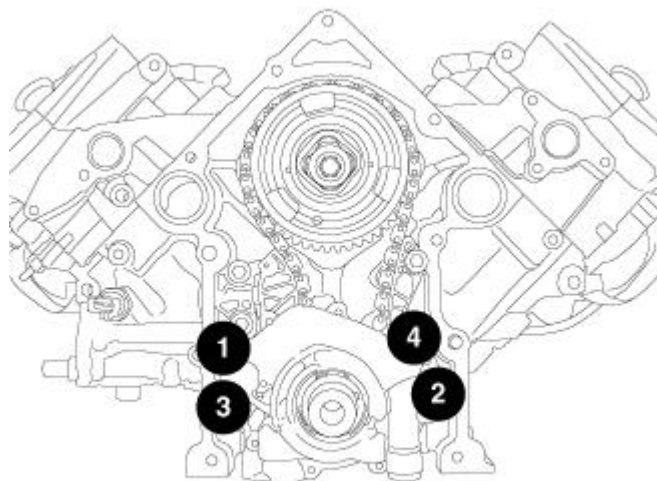
10. Tighten the camshaft phaser bolt (1) to 85 N.m (63 ft. lbs.).



474847

Fig. 248: Oil Pump Retaining Bolts
Courtesy of CHRYSLER LLC

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



439119

Fig. 249: Oil Pump Retaining Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

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

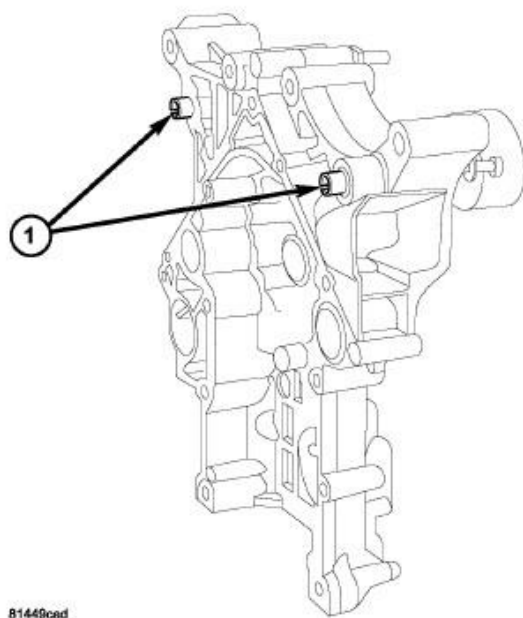


Fig. 250: Front Cover Slide Bushings
Courtesy of CHRYSLER LLC

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

COVER(S), ENGINE TIMING

Removal

REMOVAL

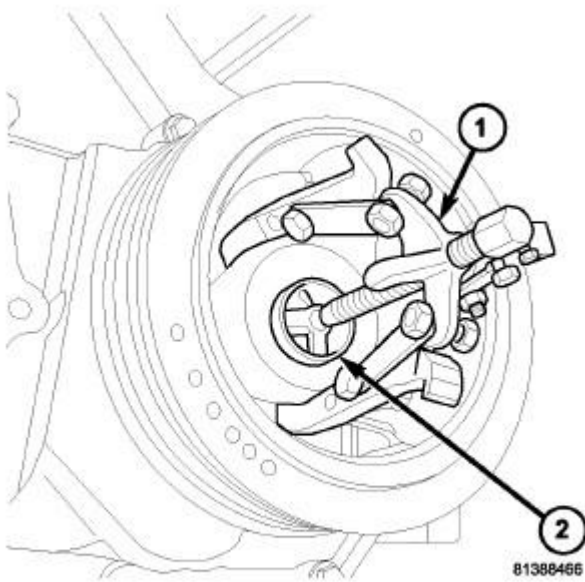


Fig. 251: CRANKSHAFT DAMPER REMOVAL
Courtesy of CHRYSLER LLC

- 1 - 3 - Jaw Puller 1023
2 - Crankshaft Insert 8513A

1. Disconnect the battery negative cable.
2. Remove the engine cover.
3. Remove air cleaner assembly.
4. Drain cooling system.
5. Remove accessory drive belt.
6. Remove fan and fan drive assembly.
7. Remove coolant bottle and washer bottle.
8. Remove fan shroud.

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

9. Remove A/C compressor and set aside.
10. Remove the generator.
11. Remove upper radiator hose.
12. Disconnect both heater hoses at timing cover.
13. Disconnect lower radiator hose at engine.
14. Remove accessory drive belt tensioner and both idler pulleys.
15. Remove crankshaft damper (2). See **Engine/Engine Block/DAMPER, Vibration - Removal**.

NOTE: Do not remove the hoses from the power steering pump.

16. Remove power steering pump and set aside.

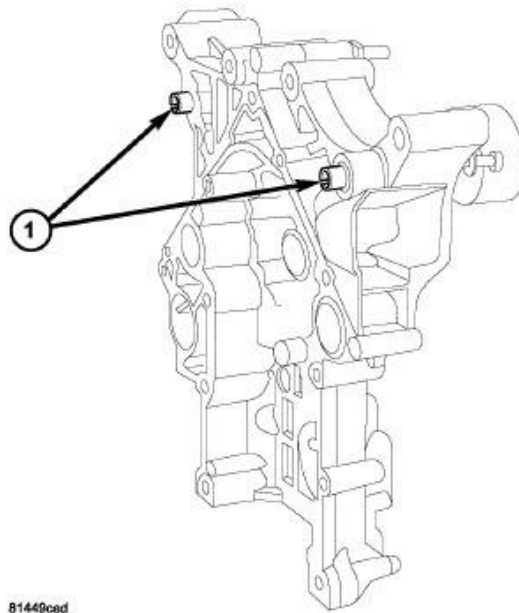


Fig. 252: Front Cover Slide Bushings
Courtesy of CHRYSLER LLC

17. Remove the dipstick support bolt.
18. Drain the engine oil.
19. Remove the oil pan and pick up tube. See Engine/Lubrication/PAN, Oil - Removal.

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

20. Remove timing cover bolts and remove cover.
21. Verify that timing cover slide bushings (1) are located in timing cover.

Installation

INSTALLATION

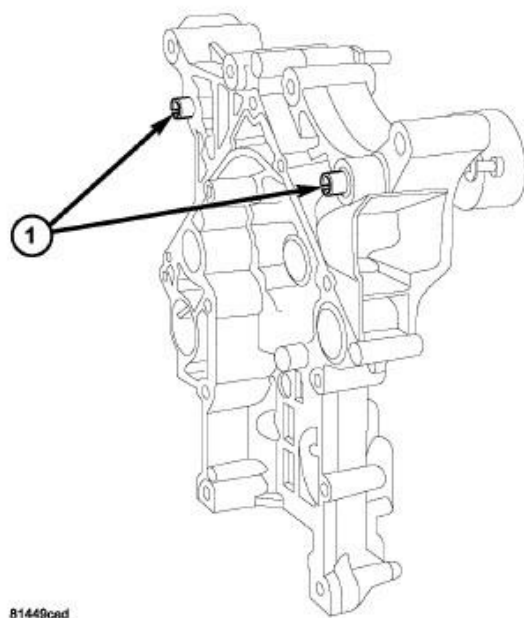


Fig. 253: Front Cover Slide Bushings
Courtesy of CHRYSLER LLC

1. Clean timing chain cover and block surface.

NOTE: Always install a new gasket on timing cover.

2. Verify that the slide bushings (1) are installed in timing cover.
3. Install cover and new gasket. Tighten fasteners to 28 N.m (250 in. lbs.).

NOTE: The large lifting stud is tightened to 55 N.m (40 ft. lbs.).

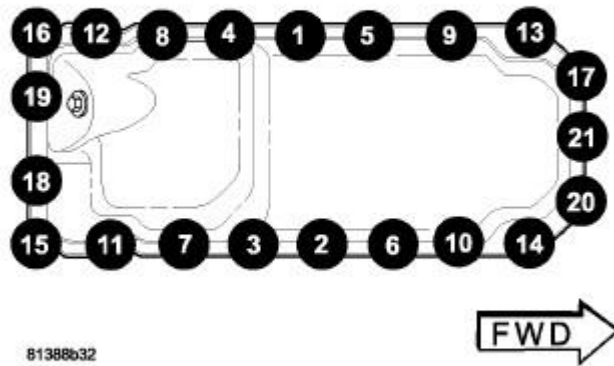


Fig. 254: OIL PAN TORQUE SEQUENCE

Courtesy of CHRYSLER LLC

4. Install the oil pan and pick up tube. See [Engine/Lubrication/PAN, Oil - Installation](#).
5. Install the A/C compressor.
6. Install the generator.
7. Install power steering pump.
8. Install the dipstick support bolt.
9. Install the thermostat housing.
10. Install crankshaft damper. See [Engine/Engine Block/DAMPER, Vibration - Installation](#).
11. Install accessory drive belt tensioner assembly and both idler pulleys.
12. Install radiator lower hose.
13. Install both heater hoses.
14. Install the cooling module.
15. Install the accessory drive belt.
16. Install the coolant bottle and washer bottle.
17. Install the upper radiator hose.
18. Install the air cleaner assembly.
19. Fill cooling system.
20. Refill engine oil.
21. Connect the battery negative cable.

TENSIONER, ENGINE TIMING

Description**DESCRIPTION**

The timing chain tensioner is a stamped steel constant tension mechanical design. It is mounted to the front of the engine, behind the timing chain drive.

Operation**OPERATION**

The timing chain tension is maintained by routing the timing chain through the tensioner assembly. A nylon covered spring steel arm presses on the timing chain maintaining the correct chain tension.

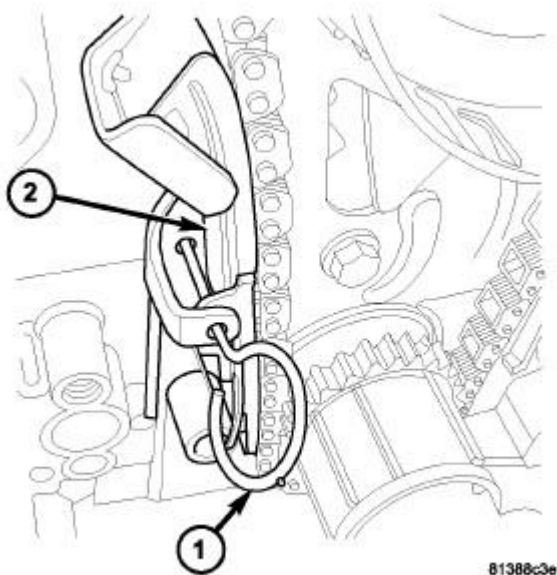
Removal**REMOVAL**

Fig. 255: TENSIONER PIN

Courtesy of CHRYSLER LLC

1. Remove timing chain. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Removal**.
2. Remove timing chain tensioner (2).

Installation**INSTALLATION**

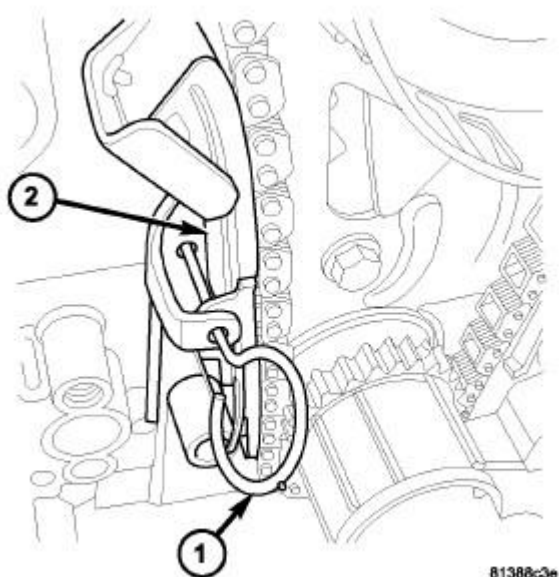


Fig. 256: TENSIONER PIN

Courtesy of CHRYSLER LLC

1. Install timing chain tensioner (2).
2. Install timing chain. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Installation.**