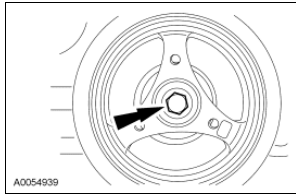
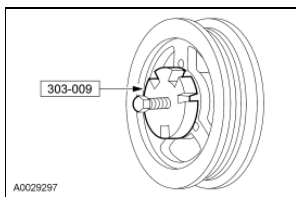


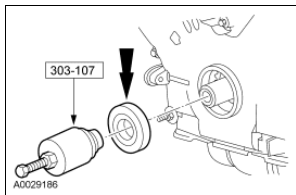
44. Remove the crankshaft pulley bolt.



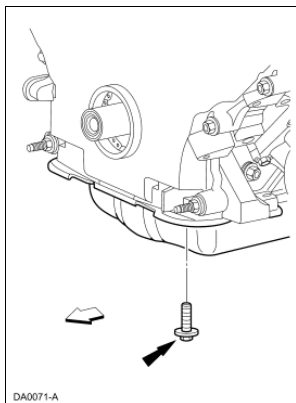
45. Using the special tool, remove the crankshaft pulley.



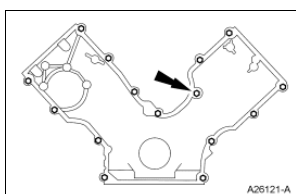
46. Using the special tool, remove the crankshaft front oil seal.



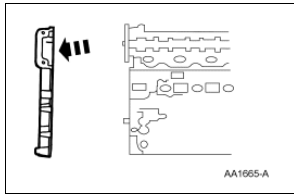
47. Remove the front four oil pan bolts.



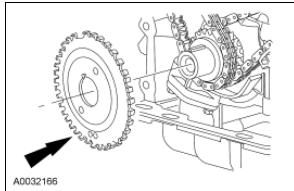
48. Remove the fasteners.



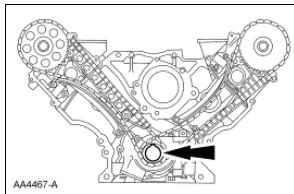
49. Remove the engine front cover from the cylinder block.
- Clean the sealing surfaces and discard the gaskets.



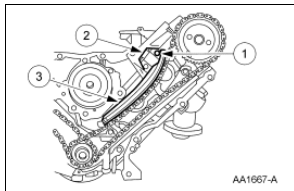
50. Remove the crankshaft sensor ring.



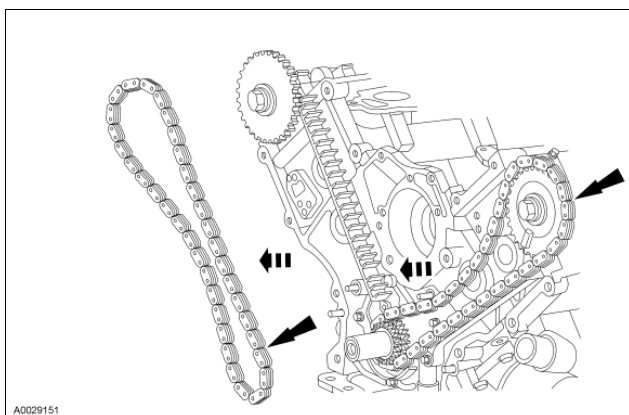
51. Position the crankshaft with the keyway at the 12 o'clock position.



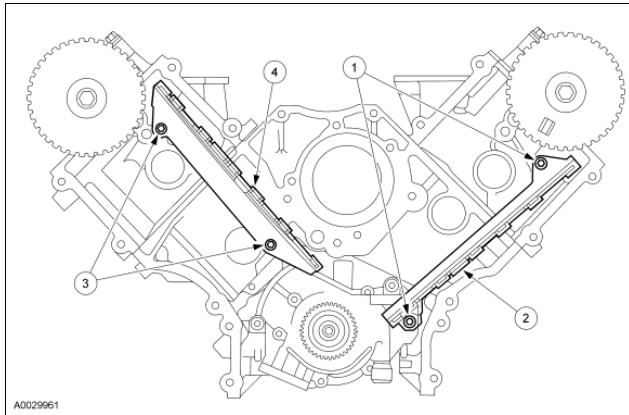
52. Remove the timing chain tensioning system from both timing chains.
1. Remove the bolts.
  2. Remove the timing chain tensioners.
  3. Remove the timing chain tensioner arms.



53. Remove the LH and RH timing chains and the crankshaft sprocket.
- Remove the RH timing chain from the camshaft sprocket.
  - Remove the RH timing chain from the crankshaft sprocket.
  - Repeat for the LH timing chain and crankshaft sprocket.

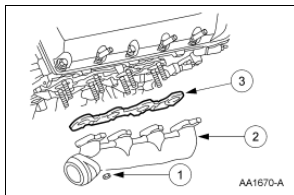


54. Remove both timing chain guides.
  1. Remove the bolts.
  2. Remove the LH timing chain guide.
  3. Remove the bolts.
  4. Remove the RH timing chain guide.



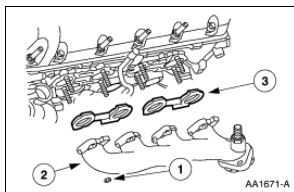
### RH cylinder head

55. Remove the RH exhaust manifold.
  1. Remove the nuts.
  2. Remove the RH exhaust manifold.
  3. Remove and discard the RH exhaust manifold gasket.

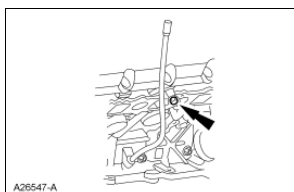


### LH cylinder head

56. Remove the LH exhaust manifold.
  1. Remove the nuts.
  2. Remove the LH exhaust manifold.
  3. Remove and discard the LH exhaust manifold gaskets.



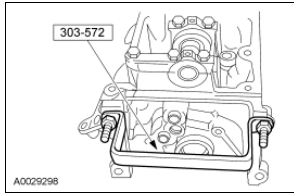
57. Remove the bolt and the oil level indicator tube.



### Both cylinder heads

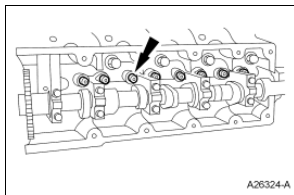
58. Clean and inspect the exhaust manifolds. For additional information, refer to [Section 303-00](#).

59. Install the special tool on both ends of the cylinder head.



60. **NOTE:** The hydraulic lash adjusters must be reinstalled in their original locations. Record the hydraulic lash adjuster locations.

Remove the hydraulic lash adjusters.



### RH cylinder head

61. **⚠ CAUTION:** The cylinder head must be cool before removing it from the engine. Cylinder head warpage can result if a warm or hot cylinder head is removed.

**⚠ CAUTION:** Place clean shop towels over exposed engine cavities. Carefully remove the towels so foreign material is not dropped into the engine.

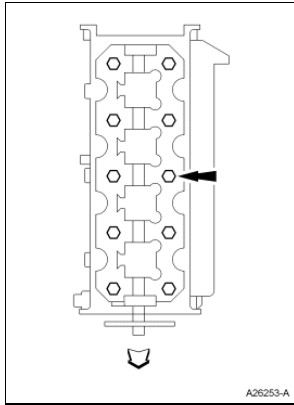
**⚠ CAUTION:** The cylinder head bolts must be discarded and new bolts installed. They are tighten-to-yield designed and cannot be reused.

**⚠ CAUTION:** Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools cause scratches and gouges that make leak paths. Use a plastic scraping tool to remove all traces of the head gasket.

**⚠ CAUTION:** Aluminum surfaces are soft and can be scratched easily. Never place the cylinder head gasket surface, unprotected, on a bench surface.

Remove the bolts and the RH cylinder head.

- Discard the cylinder head gasket.
- Discard the cylinder head bolts.



### LH cylinder head

62. **⚠ CAUTION:** The cylinder head must be cool before removing it from the engine. Cylinder head warpage can result if a warm or hot cylinder head is removed.

**⚠ CAUTION:** Place clean shop towels over exposed engine cavities. Carefully remove the towels so foreign material is not dropped into the engine.

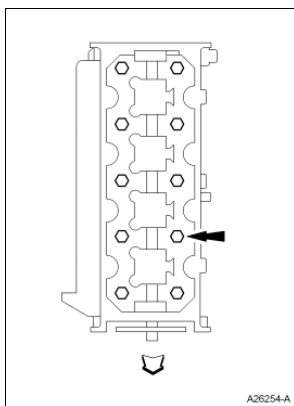
**⚠ CAUTION:** The cylinder head bolts must be discarded and new bolts installed. They are tighten-to-yield designed and cannot be reused.

**⚠ CAUTION:** Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools cause scratches and gouges that make leak paths. Use a plastic scraping tool to remove all traces of the head gasket.

**⚠ CAUTION:** Aluminum surfaces are soft and can be scratched easily. Never place the cylinder head gasket surface, unprotected, on a bench surface.

Remove the bolts and the LH cylinder head.

- Discard the cylinder head gasket.
- Discard the cylinder head bolts.



### Both cylinder heads

63. **⚠ CAUTION:** Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools cause scratches and gouges that make leak paths. Use a plastic scraping tool to remove all traces of the head gasket.

**⚠ CAUTION: Observe all warnings or cautions and follow all application directions contained on the packaging of the silicone gasket remover and the metal surface prep.**

**NOTE:** If there is no residual gasket material present, metal surface prep can be used to clean and prepare the surfaces.

Clean the cylinder head-to-cylinder block mating surfaces of both the cylinder head and the cylinder block.



1. Remove any large deposits of silicone or gasket material with a plastic scraper.
2. Apply silicone gasket remover, following package directions, and allow to set for several minutes.
3. Remove the silicone gasket remover with a plastic scraper. A second application of silicone gasket remover may be required if residual traces of silicone or gasket material remain.
4. Apply metal surface prep, following package directions, to remove any remaining traces of oil or coolant, and to prepare the surfaces to bond with the new gasket. Do not attempt to make the metal shiny. Some staining of the metal surfaces is normal.

64. **NOTE:** The straightedge used must be flat within 0.0051 mm (0.0002 in) per foot of tool length.

Support the cylinder head on a bench with the head gasket side up. Inspect all areas of the deck face with a straightedge, paying particular attention to the oil pressure feed area. The cylinder head must not have depressions deeper than 0.0254 mm (0.001 in) across a 38.1 mm (1.5 in) square area, or scratches more than 0.0254 mm (0.001 in).

**Engine**  [Printable View \(1023 KB\)](#)

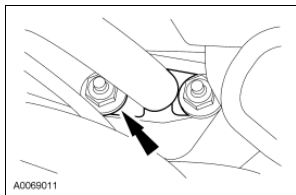
## Special Tool(s)

|   |  |
|---|--|
| <br>ST2443-A | Lifting Bracket Set, Engine<br>303-DS086 (D93P-6001-A)     |
| <br>ST1448-A | Socket, Exhaust Gas Oxygen Sensor<br>303-476 (T94P-9472-A) |

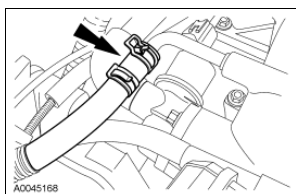
1. **⚠ WARNING: If equipped with fire suppression system, depower the system. For important safety warnings and procedures, refer to [Section 419-03](#).**

With the vehicle in NEUTRAL, position it on a hoist. For additional information refer to [Section 100-02](#).

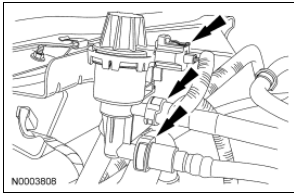
2. Remove the hood.
3. Disconnect both battery cables. For additional information, refer to [Section 414-01](#).
4. Remove the air cleaner and outlet pipe. For additional information, refer to [Section 303-12](#).
5. Remove the wiper mounting arm and pivot shaft. For additional information, refer to [Section 501-16](#).
6. Remove the support bracket.



7. Remove the accessory drive belt. For additional information, refer to [Section 303-05](#).
8. Drain the engine cooling system. For additional information, refer to [Section 303-03](#).
9. Disconnect the vacuum hose.

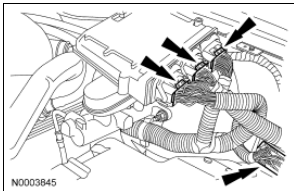


10. Disconnect the evaporative emission (EVAP) canister purge valve.
  - Disconnect the two quick release EVAP hoses.
  - Disconnect the electrical connector.

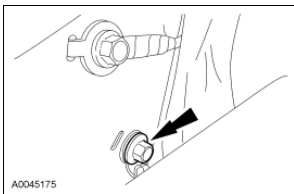


11. Disconnect the fuel tube spring lock coupling. For additional information, refer to [Section 310-00](#) .

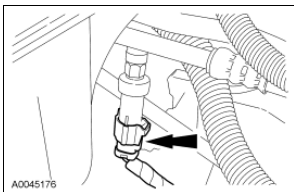
12. Disconnect the power distribution power supply electrical connectors.



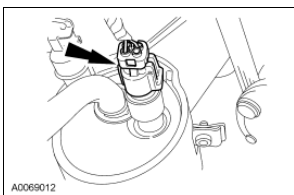
13. Disconnect the ground wire.



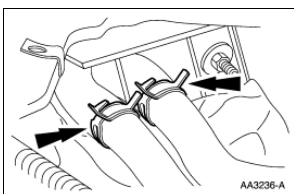
14. Disconnect the A/C electrical connector.



15. Disconnect the A/C low charge protection switch electrical connector.

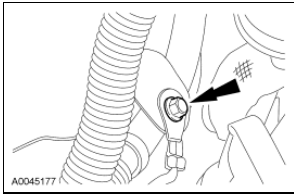


16. Disconnect the heater hoses.

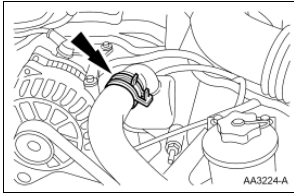


17. Remove the ground strap.

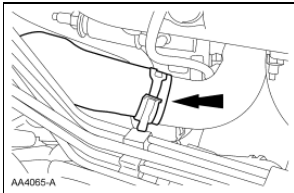




18. Disconnect the upper radiator hose from the hose connection. Secure the hose to the radiator assembly.



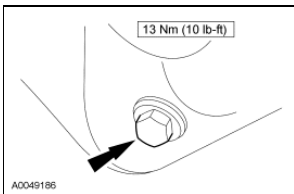
19. Disconnect the lower radiator hose from the oil filter adapter.



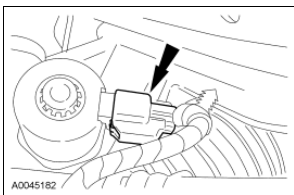
20. Remove the cooling fan. For additional information, refer to [Section 303-03](#).

21. Drain the engine oil.

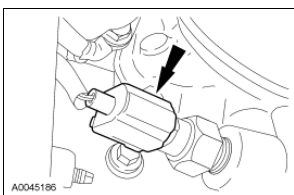
- Install the drain plug when finished.



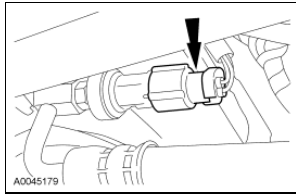
22. Disconnect the power steering electrical connector.



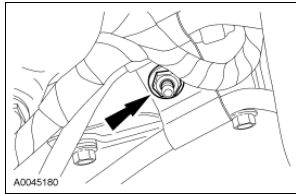
23. Disconnect the electrical connector.



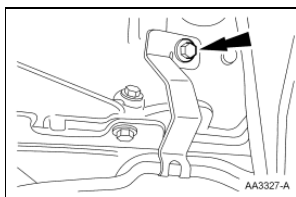
24. Disconnect the power steering pressure (PSP) switch electrical connector.



25. Remove the nut and the transmission cooler tube support bracket.

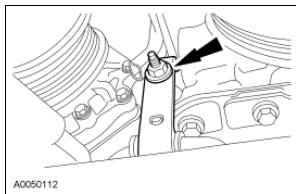


26. Remove the bolt.

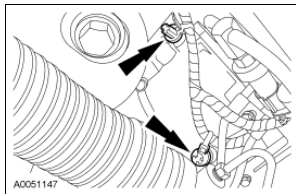


27. Disconnect the crankshaft position (CKP) sensor electrical connector.

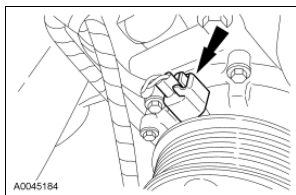
28. Position the power steering tube bracket aside.



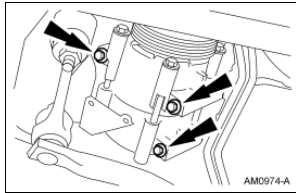
29. Disconnect the engine wiring harness retainers from the A/C compressor.



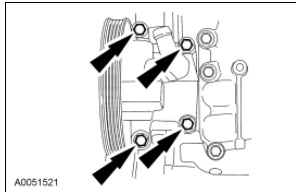
30. Disconnect the A/C compressor electrical connector.



31. Remove the four bolts and position the A/C compressor aside.

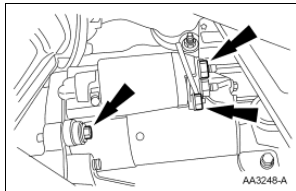


32. Remove the bolts and position the power steering pump aside.



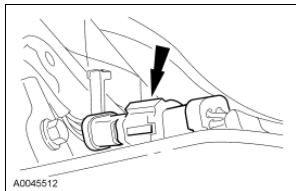
33. Remove the starter motor.

- Remove the starter motor solenoid cover.
- Disconnect the electrical connections.
- Remove the bolts.
- Remove the starter motor.

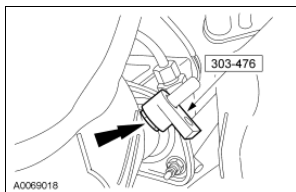


34. Disconnect the RH heated oxygen sensor (HO2S) electrical connectors.

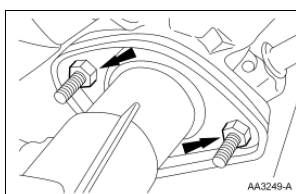
35. Disconnect the LH HO2S electrical connector.



36. Using the special tool, remove the LH HO2S.

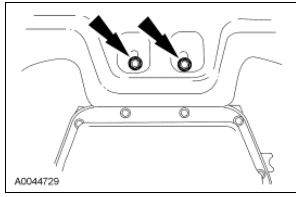


37. Support the exhaust and remove the four nuts.

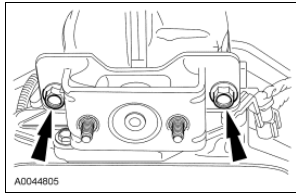


38. Install a suitable lifting device under the transmission and support.

39. Remove the rear transmission insulator nuts.

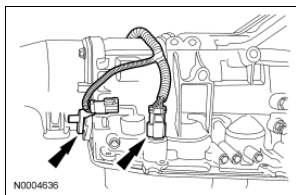


40. Raise the transmission and remove the rear transmission insulator bolts.

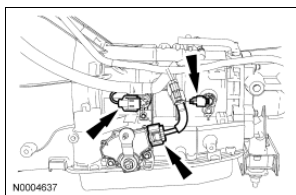


41. Remove the transmission rear insulator and lower the transmission down to rest on the rear crossmember.

42. Disconnect the HO2S sensor and the solenoid body sensor electrical connectors.

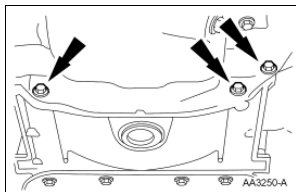


43. Disconnect the output shaft speed sensor, transmission range sensor and the turbine shaft speed sensor electrical connectors.

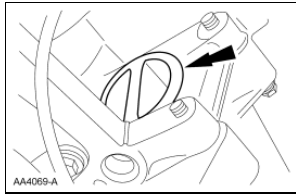


44. Release the wiring harness from the retainers on the transmission.

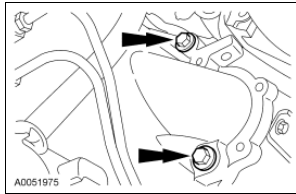
45. Remove the bolts and the inspection cover.



46. Remove the torque converter nut access plug.  
• Remove the four nuts.

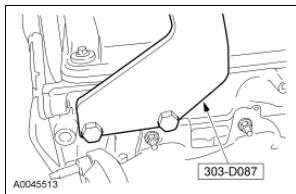


47. Remove the four bolts and one stud.

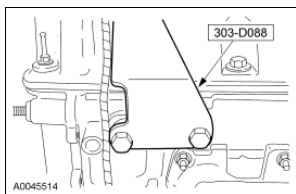


48. Remove the engine support insulator nuts.

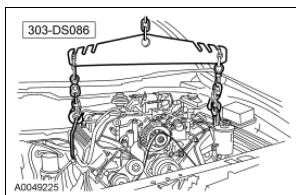
49. Install the special tool to the RH cylinder head.



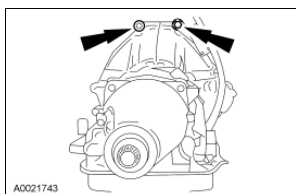
50. Install the special tool to the LH cylinder head.



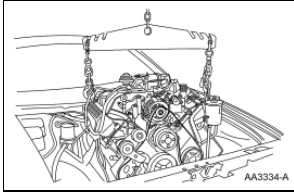
51. Install the special tools.



52. Remove the bolts.




53. Remove the engine assembly from the vehicle.



**Engine**  [Printable View \(2306 KB\)](#)

Special Tool(s)

|   |  |
|---|--|
| <br>ST1286-A   | Remover, Crankshaft Vibration Damper<br>303-009 (T58P-6316-D)  |
| <br>ST1730-A   | Remover, Crankshaft Front Oil Seal<br>303-107 (T74P-6700-A)    |
| <br>ST2443-A   | Lifting Bracket Set, Engine<br>303-DS086 (D93P-6001-A)         |
| <br>ST1330-A   | Compressor, Valve Spring<br>303-567 (T97P-6565-AH)             |
| <br>ST1331-A  | Spacer, Valve Spring Compressor<br>303-382 (T91P-6565-AH)      |
| <br>ST1658-A | Remover/Installer, Cylinder Head<br>303-572 (T97T-6000-A)      |
| <br>ST1185-A | Impact Slide Hammer<br>100-001 (T50T-100-A)                    |
| <br>ST1481-A | Remover, Crankshaft Rear Oil Slinger<br>303-514 (T95P-6701-AH) |
| <br>ST1382-A | Remover, Crankshaft Rear Oil Seal<br>303-519 (T95P-6701-EH)    |
| <br>ST1337-A | Installer, Connecting Rod<br>303-442 (T93P-6136-A)             |
| <br>ST1276-A | Cylinder Ridge Reamer<br>303-016 (T64L-6011-EA)                |

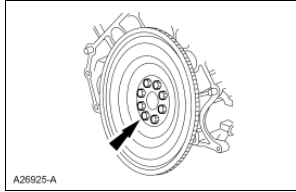
Material

| Item                                   | Specification |
|--|---------------|
| Silicone Gasket Remover<br>ZC-30       |               |
| Motorcraft Metal Surface Prep<br>ZC-31 |               |

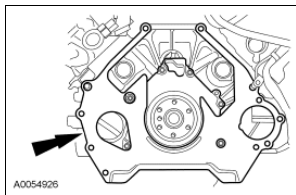
## Disassembly

**⚠ CAUTION:** Servicing the bottom end of the engine (crankshaft, bearings) requires that cylinder heads be removed. Failure to do so can result in engine damage.

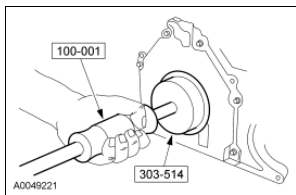
1. Remove the bolts and the flexplate.



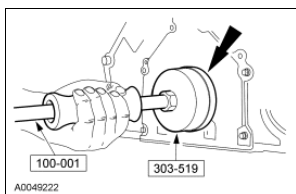
2. Remove the engine/transmission spacer plate.



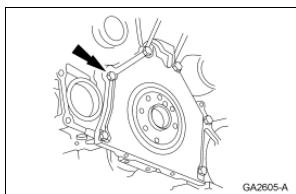
3. Using the special tools, remove the rear oil seal slinger.



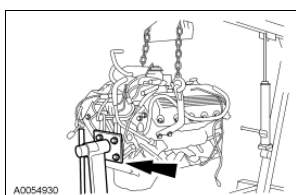
4. Using the special tools, remove the rear main seal.



5. Remove the eight bolts and the crankcase rear oil seal retainer.



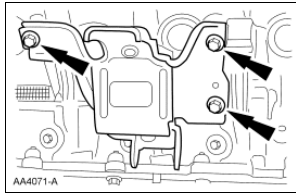
6. Mount the engine on a suitable engine stand.





7. **NOTE:** RH shown; LH similar.

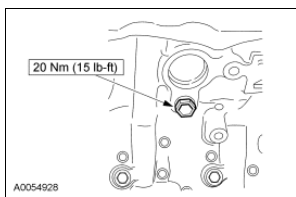
Remove the LH and the RH engine mount.



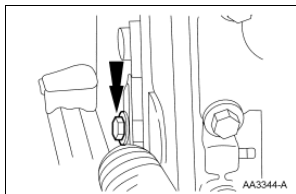
8. **NOTE:** LH shown; RH similar.

Remove the drain plugs from the engine block. Allow the coolant to completely drain.

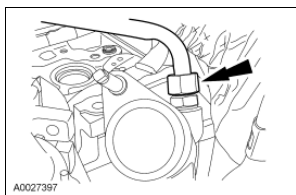
- Install the drain plugs when finished.



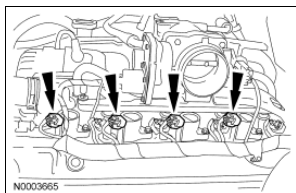
9. Remove the bolt and the battery cables from the engine.



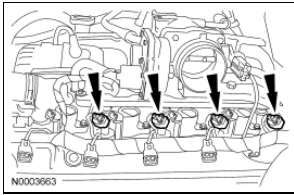
10. Disconnect the exhaust gas recirculation (EGR) tube from the exhaust manifold.



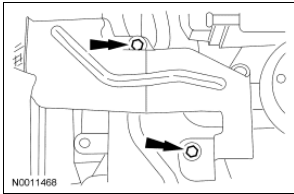
11. Disconnect the eight ignition coil electrical connectors.



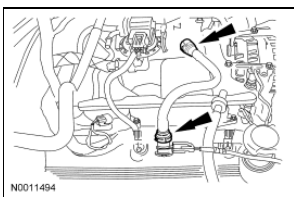
12. Disconnect the eight fuel injector electrical connectors.



13. Remove the bolts and the EGR tube heat shield.

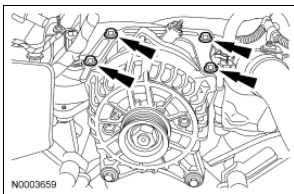


14. Disconnect and remove the crankcase ventilation tube.

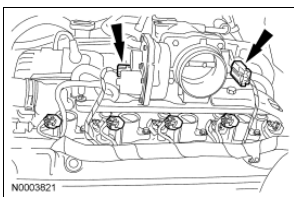


15. Remove the generator mounting bracket.

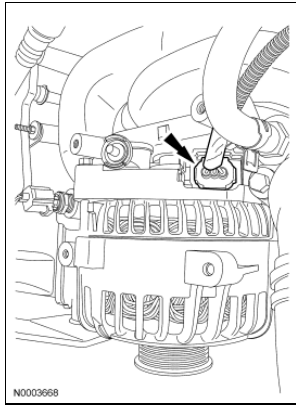
- Remove the bolts.
- Remove the bracket.



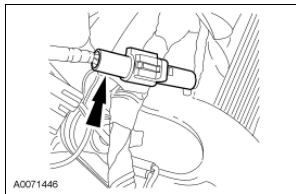
16. Disconnect the throttle control and the throttle position (TP) sensor electrical connectors.



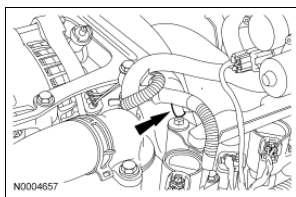
17. Disconnect the generator electrical connector.



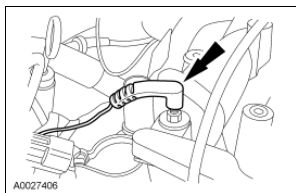
18. Disconnect the cylinder head temperature (CHT) sensor electrical connector.



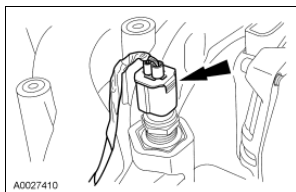
19. Remove the generator wiring harness anchor from the LH front stud.



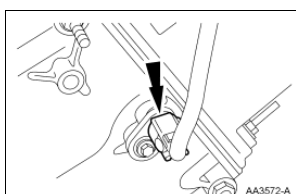
20. Disconnect the ground wire from the RH rear stud.



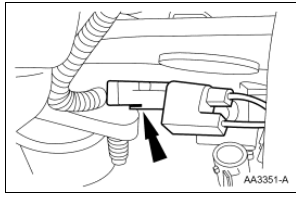
21. Disconnect the engine coolant temperature (ECT) sensor electrical connector.



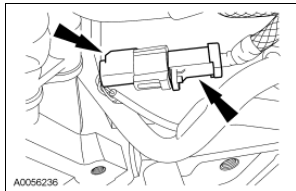
22. Disconnect the camshaft position (CMP) sensor electrical connector.



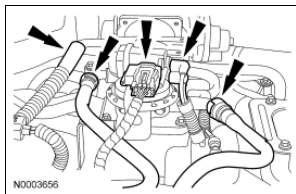
23. Disconnect the radio ignition interference capacitor and remove the engine control sensor wiring.



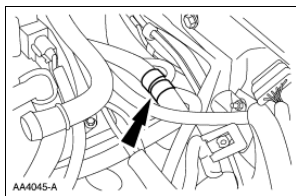
24. Disconnect the knock sensor (KS) electrical connector and the wiring harness pin-type retainer.



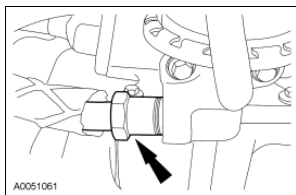
25. Disconnect the vacuum hoses and the electrical connector.



26. Disconnect the fuel charging wiring from the crash bracket and remove the harness from the engine assembly.

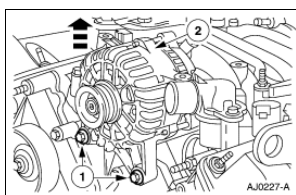


27. Disconnect the EGR tube nut from the EGR valve.

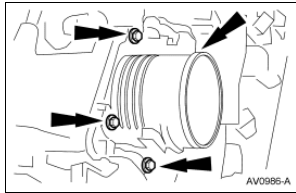


28. Remove the generator.

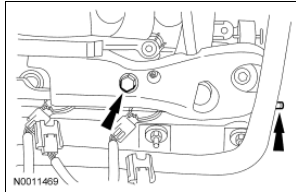
1. Remove the bolts.
2. Remove the generator.



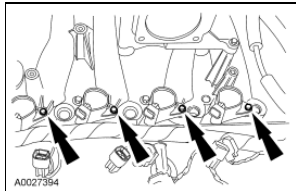
29. Remove the four bolts.



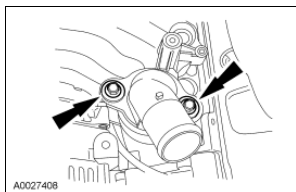
30. Remove the bolt and the stud.
- Remove the crash bracket.



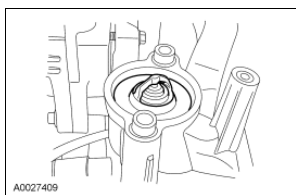
31. Remove the eight bolts and the eight ignition coils.



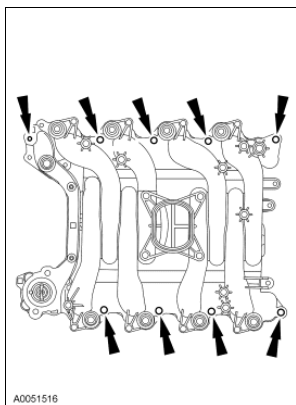
32. Remove the bolts and the coolant outlet adapter.



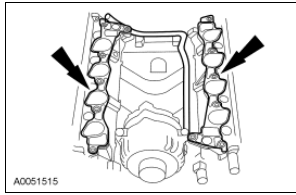
33. Remove the thermostat.



34. Remove the bolts and the intake manifold.

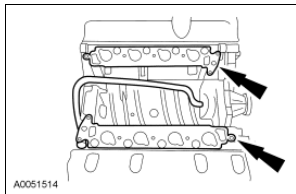


35. Remove the intake manifold gaskets.



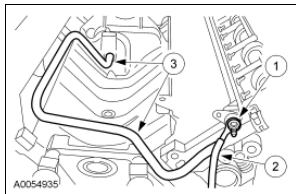
36. **⚠ CAUTION:** Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools cause scratches and gouges which make leak paths.

Clean the sealing surfaces.

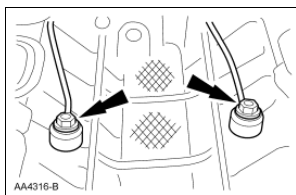


37. Remove the coolant bypass tube.

1. Remove the retaining nut.
2. Remove the ground strap.
3. Remove the coolant bypass tube.

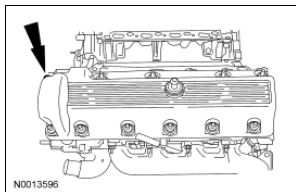


38. Remove the knock sensor.



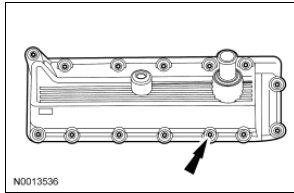
39. Remove the studs and bolts and remove the valve cover.

- Clean the mating surface and, if necessary, install new gaskets.



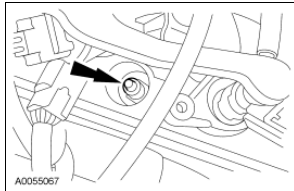
40. Remove the studs and bolts, and remove the right valve cover.

- Clean the mating surface and, if necessary, install new gaskets.

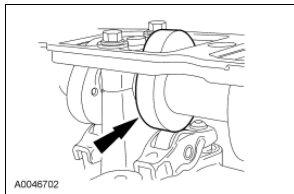


41. **NOTE:** Use compressed air to remove any foreign material from the spark plug well before removing the spark plugs.

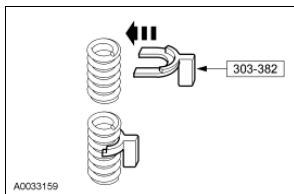
Remove the spark plugs.



42. Position the lobe of the camshaft up.

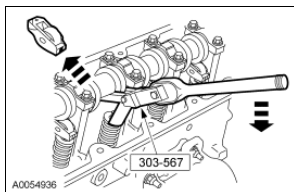


43. Install the special tool between the valve spring coils to prevent valve stem seal damage.

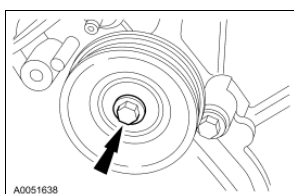


44. **NOTE:** The roller followers are positional. Mark the followers for installation in their original locations.

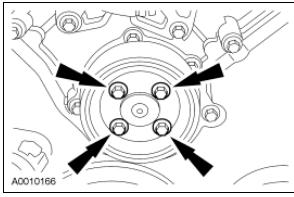
Use the special tool to compress the valve springs and remove the camshaft roller followers.



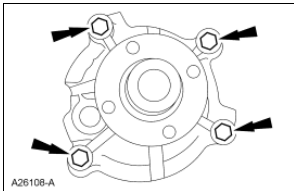
45. Remove the bolt and the belt idler pulley.



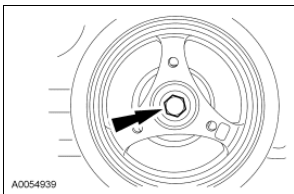
46. Remove the bolts and the coolant pump pulley.



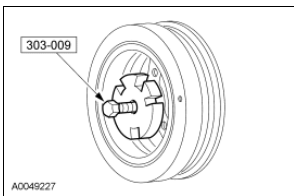
47. Remove the bolts and the coolant pump.



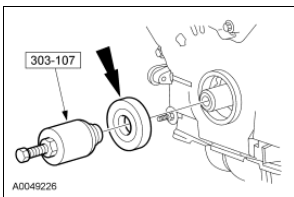
48. Remove the crankshaft pulley bolt.



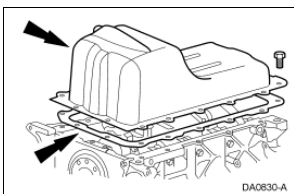
49. Remove the crankshaft pulley bolt.  
Use the special tool to remove the crankshaft pulley.



50. Use the special tool to remove the crankshaft front seal.

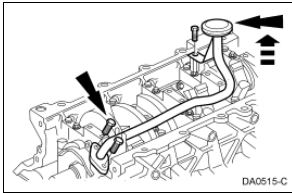


51. Remove the bolts, and the oil pan and gasket.

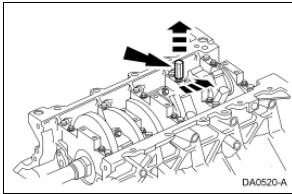


52. Remove the bolts, and the oil pump screen cover and tube.



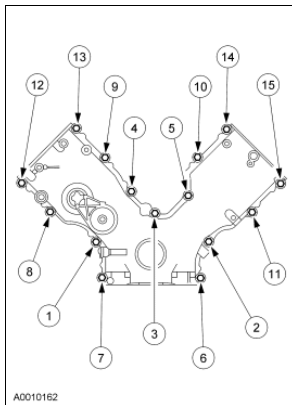


53. Remove the oil pump screen cover and tube spacer.

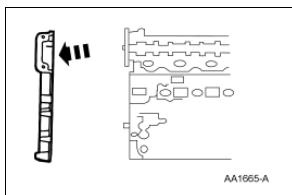


54. **NOTE:** Correct fastener location is essential for the assembly procedure. Record fastener location.

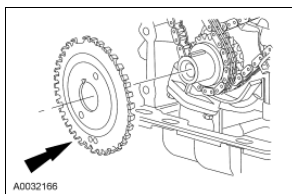
Remove the fasteners in the sequence shown.



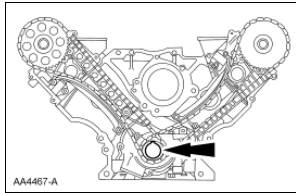
55. Remove the engine front cover from the cylinder block.



56. Remove the crankshaft sensor ring from the crankshaft.

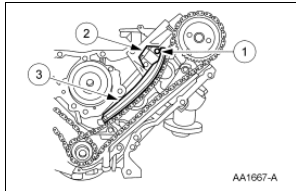


57. Position the crankshaft with the keyway at the 12 o'clock position.



58. Remove the timing chain tensioning system from both timing chains.

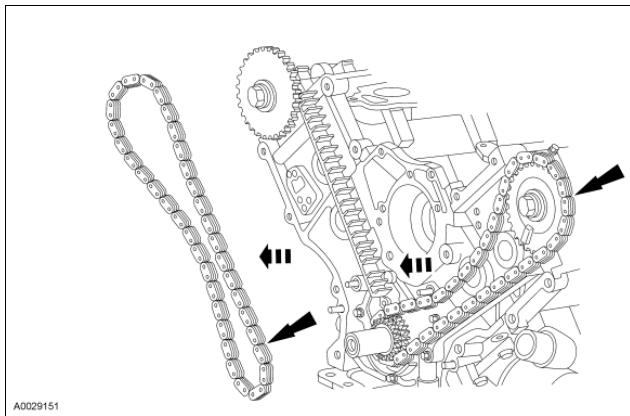
1. Remove the bolts.
2. Remove the timing chain tensioners.
3. Remove the timing chain tensioner arms.



59. **⚠ CAUTION:** Unless otherwise instructed, at no time when the timing chains are removed and the cylinder heads are installed is the crankshaft or camshaft to be rotated. Severe piston and valve damage will occur.

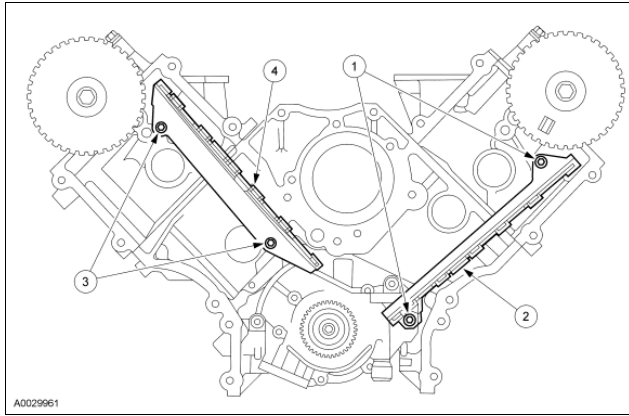
Remove the LH and RH timing chains and the crankshaft sprocket.

- Remove the RH timing chain from the camshaft sprocket.
- Remove the RH timing chain from the crankshaft sprocket.
- Repeat for the LH timing chain and crankshaft sprocket.

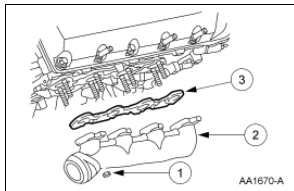


60. Remove both timing chain guides.

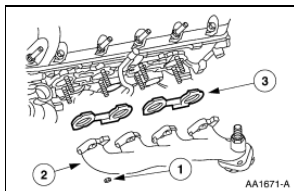
1. Remove the bolts.
2. Remove the LH timing chain guide.
3. Remove the bolts.
4. Remove the RH timing chain guide.



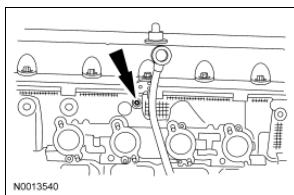
61. Remove the RH exhaust manifold.
  1. Remove the nuts.
  2. Remove the RH exhaust manifold.
  3. Remove the RH exhaust manifold gasket.



62. Remove the LH exhaust manifold.
  1. Remove the nuts.
  2. Remove the LH exhaust manifold.
  3. Remove the LH exhaust manifold gaskets.

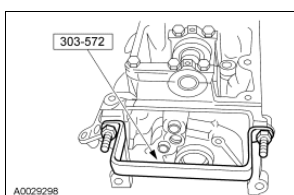


63. Remove the bolt and the oil level indicator tube.



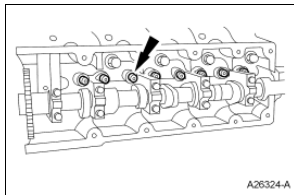
64. Clean and inspect the exhaust manifolds. For additional information, refer to [Section 303-00](#).

65. Install the special tool on both ends of the cylinder head.



66. **NOTE:** The hydraulic lash adjusters must be reinstalled in their original locations. Record the hydraulic lash adjuster locations.

Remove the hydraulic lash adjusters.



67. **CAUTION:** The cylinder head must be cool before removing it from the engine. Cylinder head warpage can result if a warm or hot cylinder head is removed.

**CAUTION:** Place clean shop towels over exposed cavities. Carefully remove the towels so foreign material is not dropped into the engine.

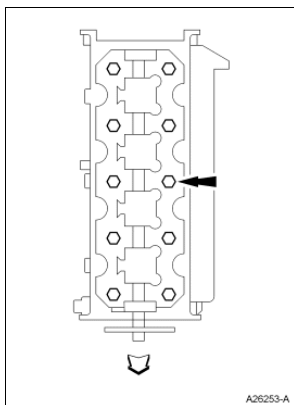
**CAUTION:** The cylinder head bolts must be discarded and new bolts installed. They are tighten-to-yield designed and cannot be reused.

**CAUTION:** Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools cause scratches and gouges, which make leak paths. Use a plastic scraping tool to remove all traces of the head gasket.

**CAUTION:** Aluminum surfaces are soft and can be scratched easily. Never place the cylinder head gasket surface, unprotected, on a bench surface.

Remove the bolts and the RH cylinder head.

- Discard the cylinder head gasket.
- Discard the cylinder head bolts.



68. **CAUTION:** The cylinder head must be cool before removing it from the engine. Cylinder head warpage can result if a warm or hot cylinder head is removed.

**CAUTION:** Place clean shop towels over exposed engine cavities. Carefully remove the towels so foreign material is not dropped into the engine.

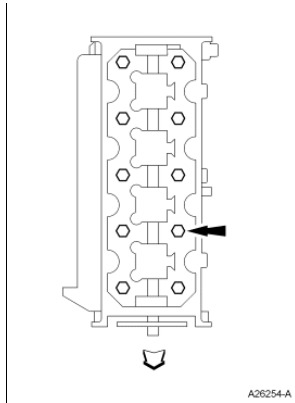
**CAUTION:** The cylinder head bolts must be discarded and new bolts installed. They are tighten-to-yield designed and cannot be reused.

**⚠ CAUTION: Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools cause scratches and gouges, which make leak paths. Use a plastic scraping tool to remove all traces of the head gasket.**

**⚠ CAUTION: Aluminum surfaces are soft and can be scratched easily. Never place the cylinder head gasket surface, unprotected, on a bench surface.**

Remove the bolts and the LH cylinder head.

- Discard the cylinder head gasket.
- Discard the cylinder head bolts.



69. **⚠ CAUTION: Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools cause scratches and gouges, which make leak paths. Use a plastic scraping tool to remove all traces of the head gasket.**

**⚠ CAUTION: Observe all warnings or cautions and follow all application directions contained on the packaging of the silicone gasket remover and the metal surface prep.**

**NOTE:** If there is no residual gasket material present, metal surface prep can be used to clean and prepare the surfaces.

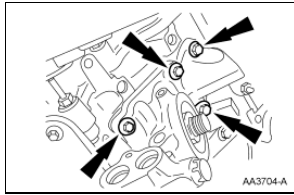
Clean the cylinder head-to-cylinder block mating surfaces of both cylinder heads and the cylinder block.

1. Remove any large deposits of silicone or gasket material with a plastic scraper.
2. Apply silicone gasket remover, following package directions, and allow to set for several minutes.
3. Remove the silicone gasket remover with a plastic scraper. A second application of silicone gasket remover may be required if residual traces of silicone or gasket material remain.
4. Apply metal surface prep, following package directions, to remove any remaining traces of oil or coolant, and to prepare the surfaces to bond with the new gasket. Do not attempt to make the metal shiny. Some staining of the metal surfaces is normal.

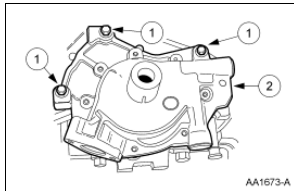
70. **NOTE:** The straightedge used must be flat within 0.0051 mm (0.0002 in) per foot of tool length.

Support the cylinder heads on a bench with the head gasket side up. Inspect all areas of the deck face with a straightedge, paying particular attention to the oil pressure feed area. The cylinder heads must not have depressions deeper than 0.0254 mm (0.001 in) across at 38.1 mm (1.5 in) square area, or scratches more than 0.0254 mm (0.001 in).

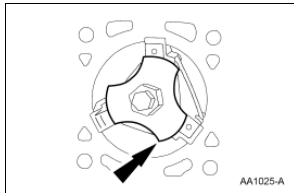
71. Remove the bolts and the oil filter adapter and oil gasket.



72. Remove the oil pump.
1. Remove the bolts.
  2. Remove the oil pump.

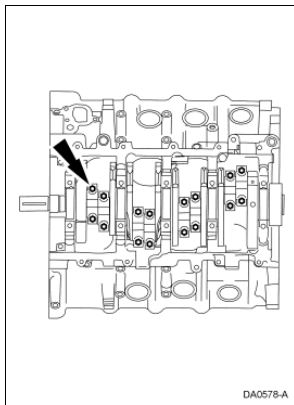


73. Before removing the pistons, inspect the top of the cylinder bores. If necessary, remove the ridge or carbon deposits from each cylinder using a cylinder ridge reamer, following the manufacturer's instructions.



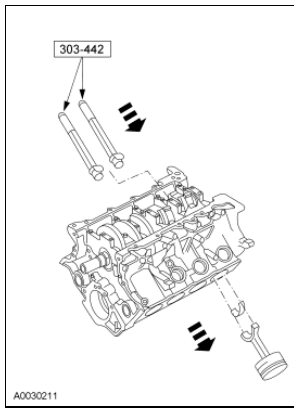
74. **⚠ CAUTION:** Verify that the connecting rods and rod caps have orientation numbers cast into them. If not, number the connecting rods and rod caps for correct orientation.

Remove the bolts and the connecting rod cap. Discard the bolts.



75. **⚠ CAUTION:** Do not scratch the cylinder walls or crankshaft journals with the connecting rod.

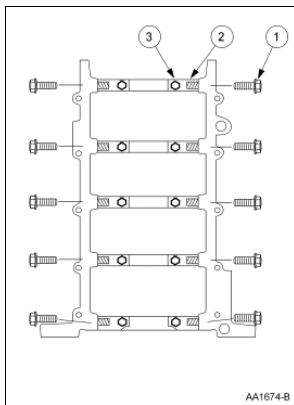
Use the special tool to push the piston through the top of the cylinder block.



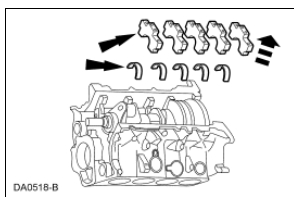
76. **⚠ CAUTION:** Servicing the bottom end of the engine (crankshaft, bearings) requires that cylinder heads be removed. Failure to do so can result in engine damage.

Remove the crankshaft bearing cap fasteners.

1. Remove and discard the cross-mounted main cap bolts.
2. Loosen the jack screws.
3. Remove and discard the main cap bolts.



77. Remove the five main bearing caps and the lower crankshaft main bearings.



78. Remove the crankshaft and the upper crankshaft main bearings from the cylinder block.

