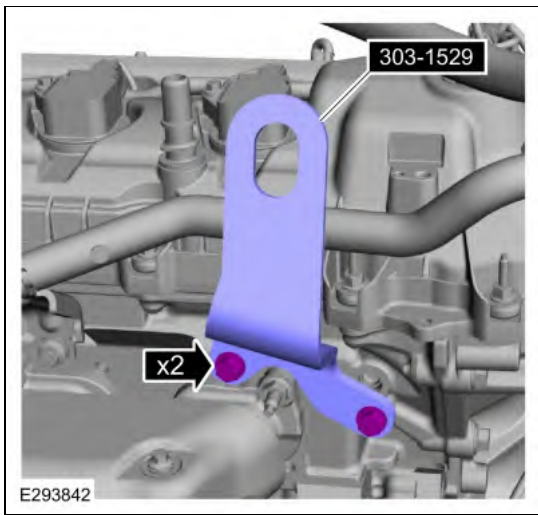
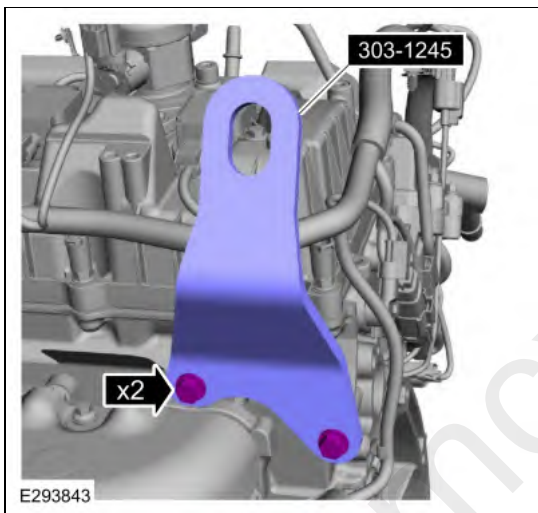




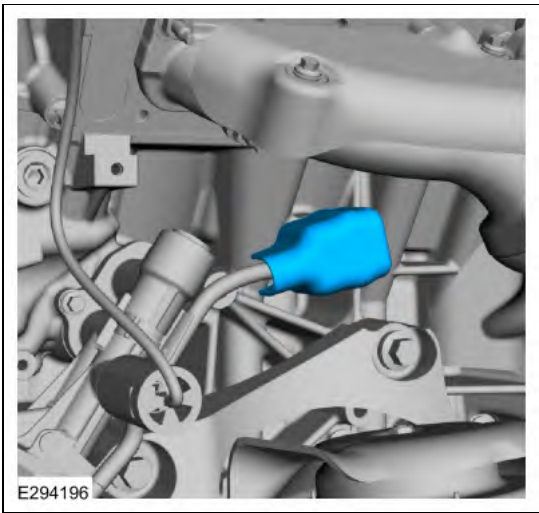


6. Remove Special Service Tool: 303-1245 Engine Lift Eye.

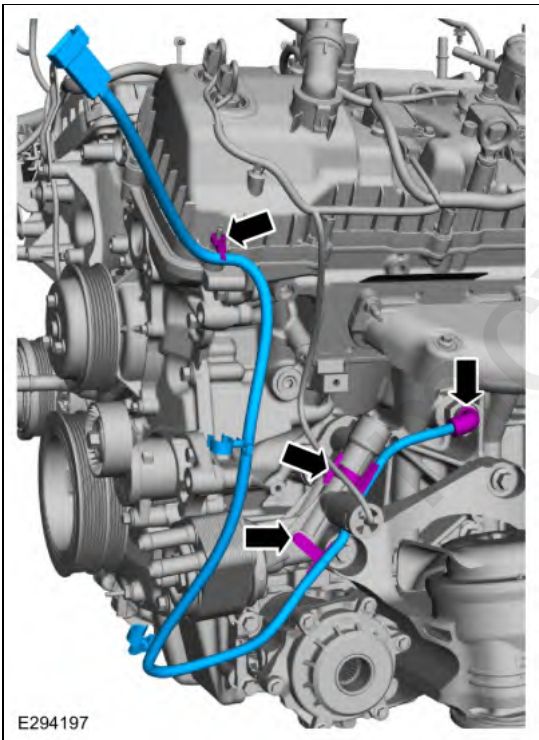




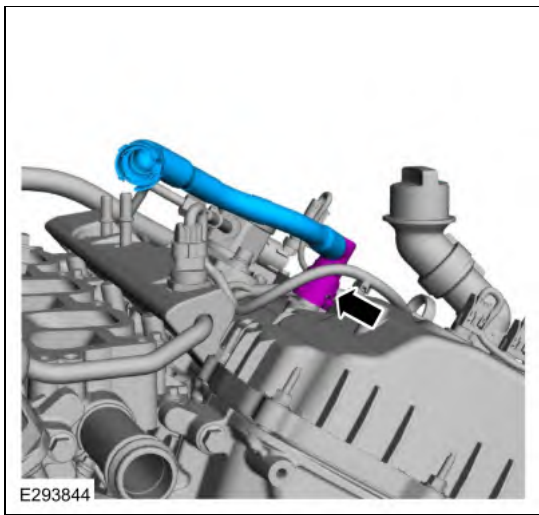
7. If equipped with block heater, remove the block heater electrical connector heat shield.



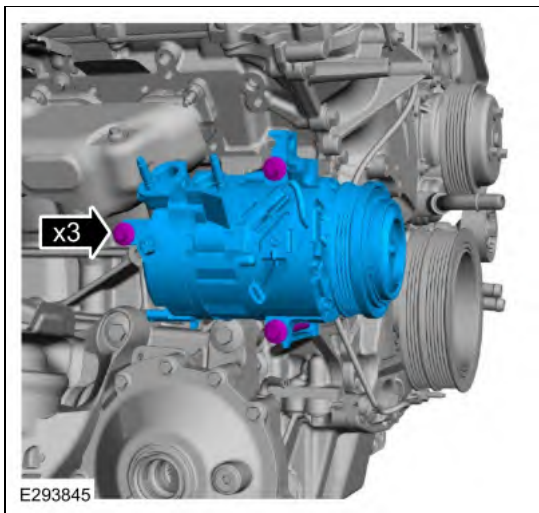
8. If equipped with block heater, disconnect the block heater electrical connector and wiring harness retainers.



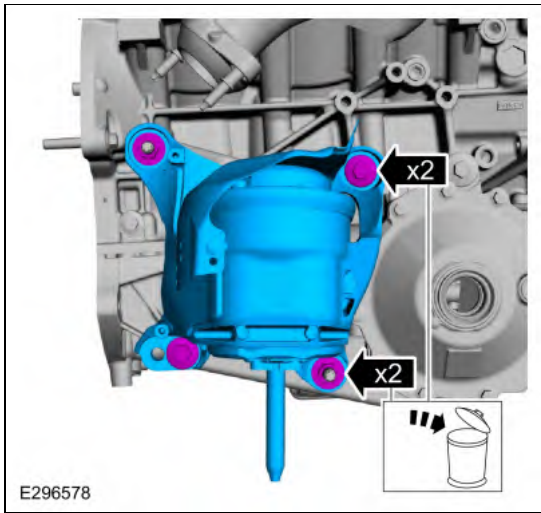
9. Remove the crankcase vent tube.



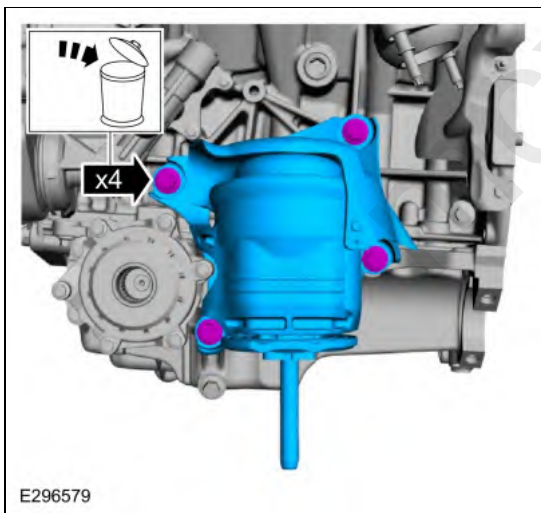
10. Remove the bolts and the A/C compressor.



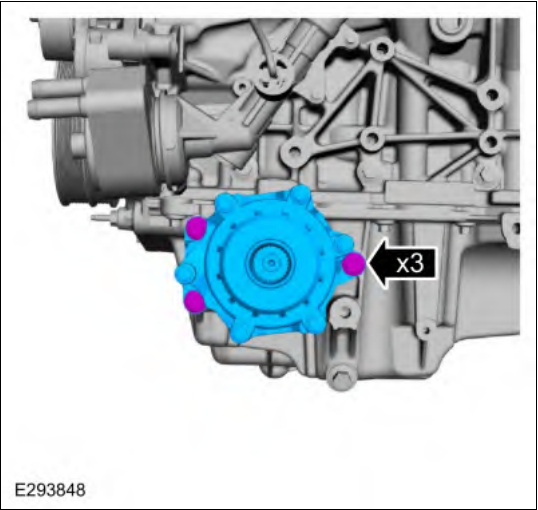
- 11.
- Remove the nuts, bolts and the RH engine mount.
 - Discard the nuts and bolts.



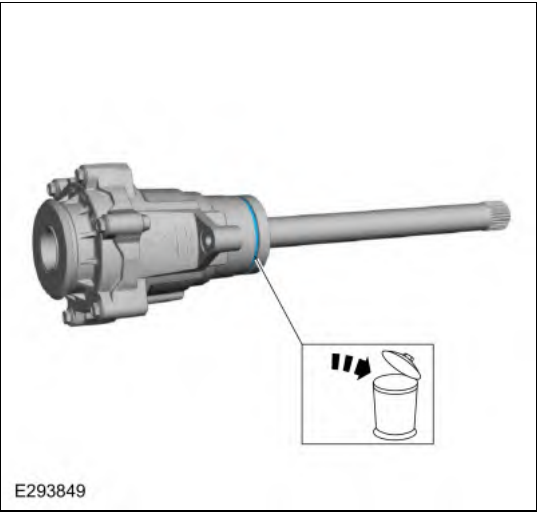
- 12.
- Remove the bolts and the LH engine mount.
 - Discard the bolts.



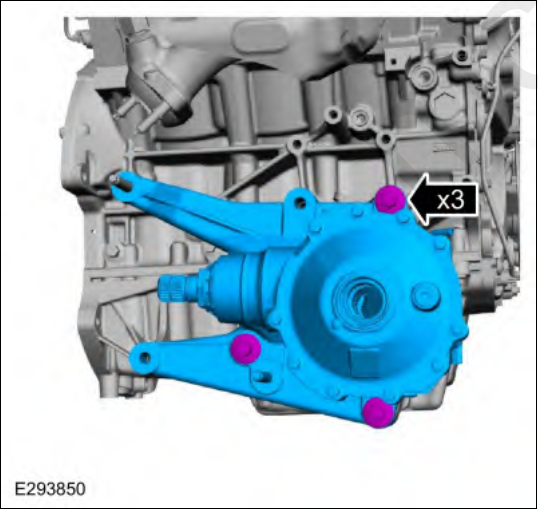
13. Remove the bolts and the LH axle connector.



14. Remove and discard the axle connector seal.



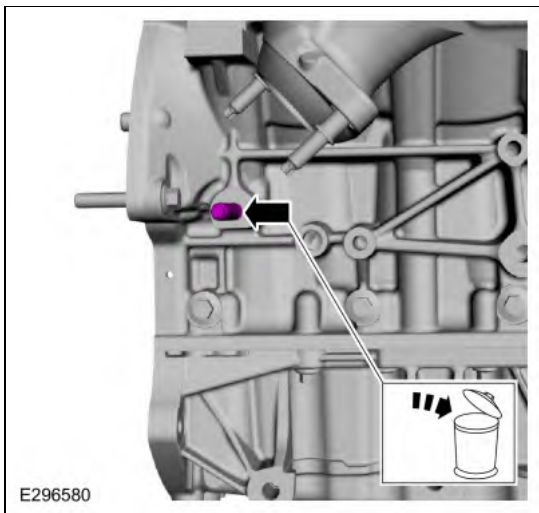
15. Remove the bolts and the front axle assembly.



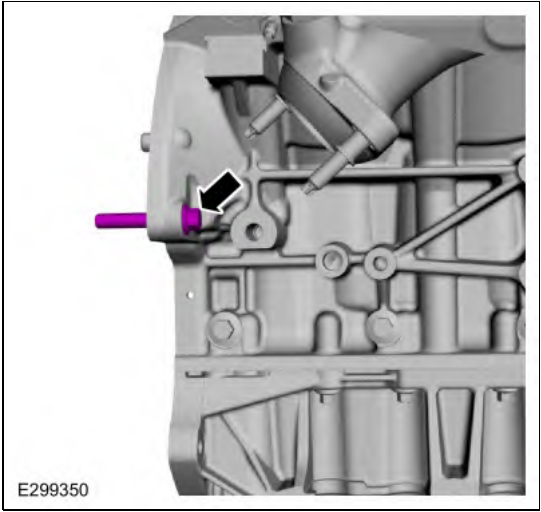
16. Remove and discard the front axle assembly seal.



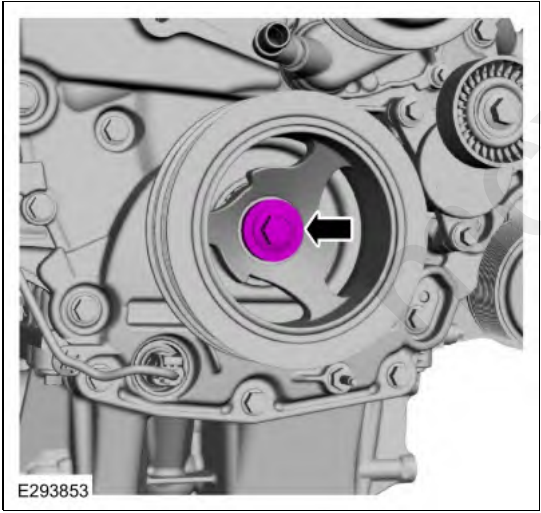
- 17.
- Remove the RH engine mount stud.
 - Discard the stud.



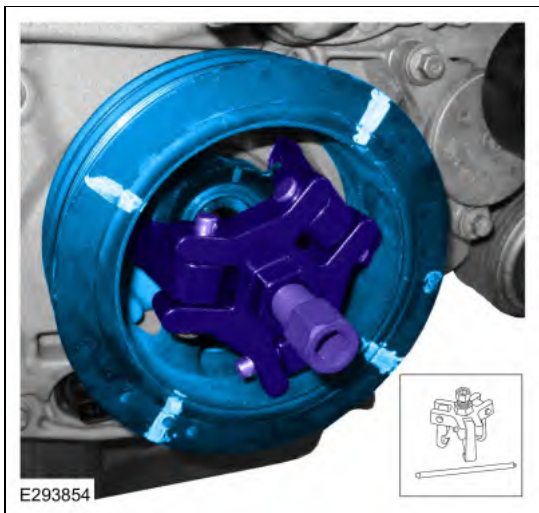
18. Remove the transmission bolt.



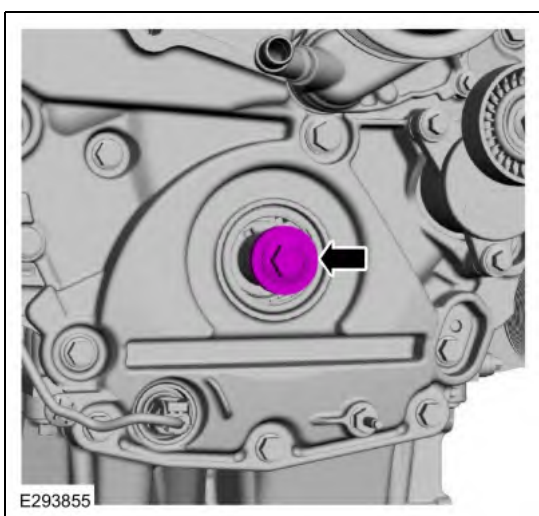
19. Remove the crankshaft pulley bolt and washer.



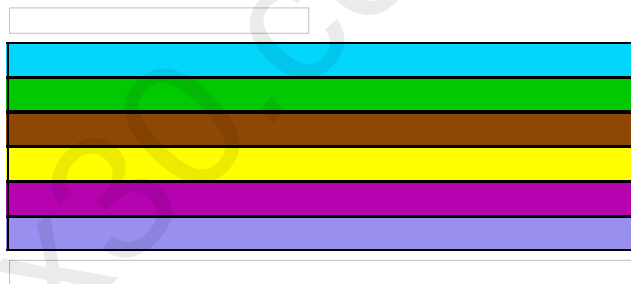
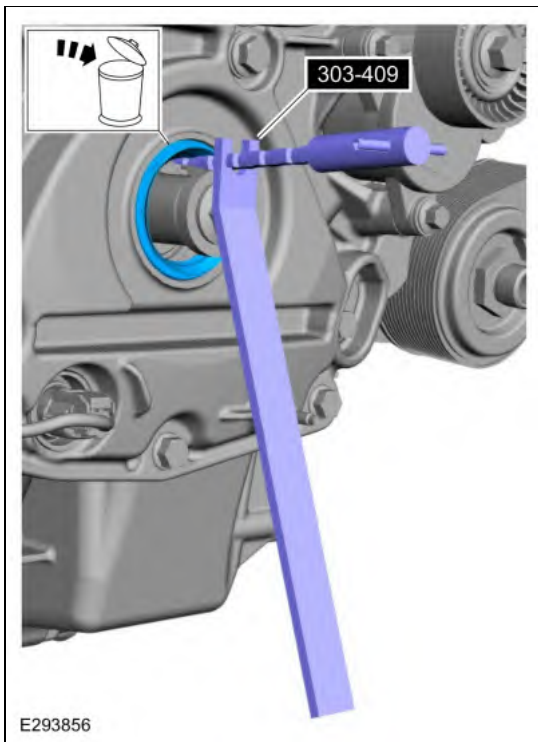
20. **NOTE:** Use a universal puller (such as an OTC 6667, or equivalent).
Using a universal puller, remove the crankshaft pulley.



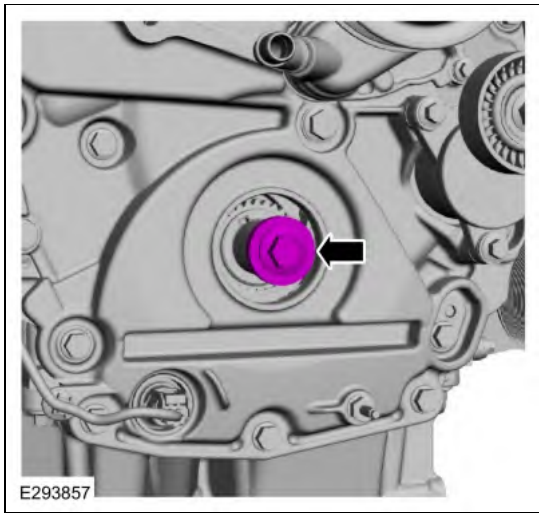
21. Install the original crankshaft pulley bolt and washer.



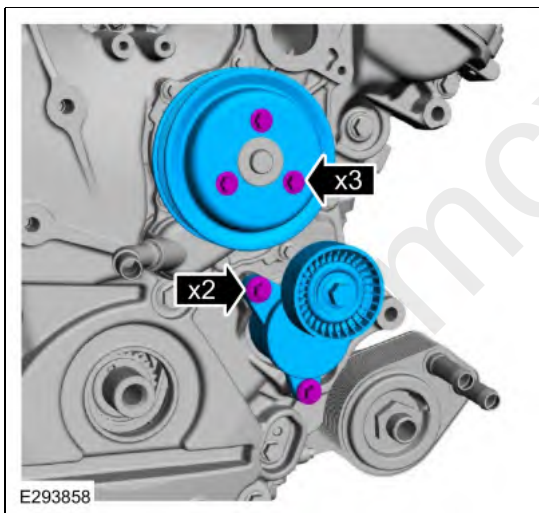
22. Using the special tool, remove and discard the crankshaft front seal.
Use Special Service Tool: 303-409 (T92C-6700-CH) Remover, Crankshaft Seal.



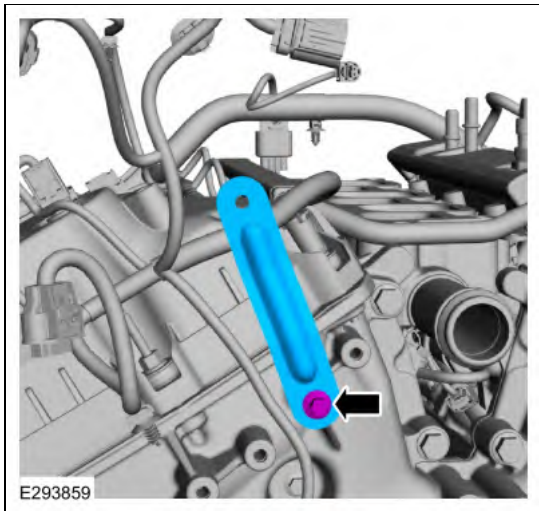
23. Remove the original crankshaft pulley bolt and washer.



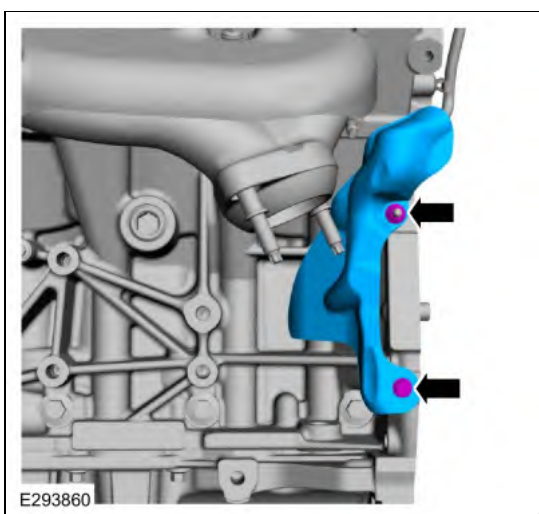
- 24.
- Remove the bolts and the coolant pump pulley.
 - Remove the bolts and the accessory drive belt tensioner.



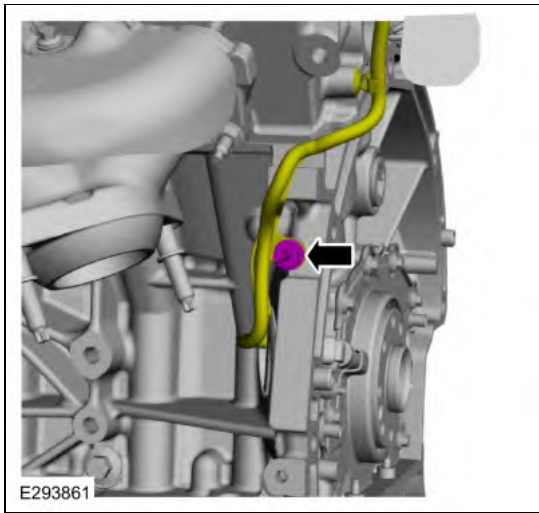
25. Remove the bolt and the upper intake manifold support bracket.



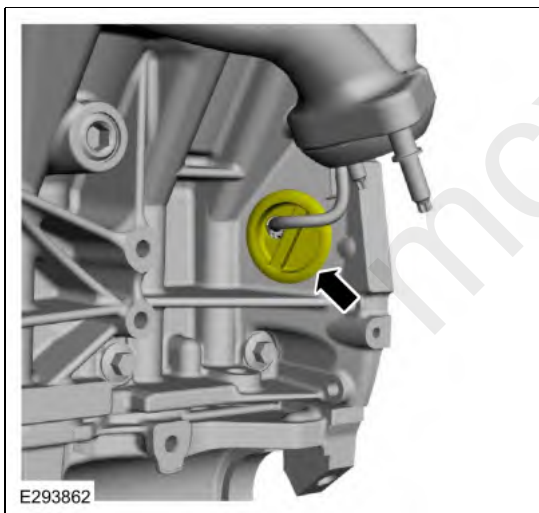
26. Remove the nut, bolt and the heat shield.



27. Remove the wiring harness retainer stud bolt.

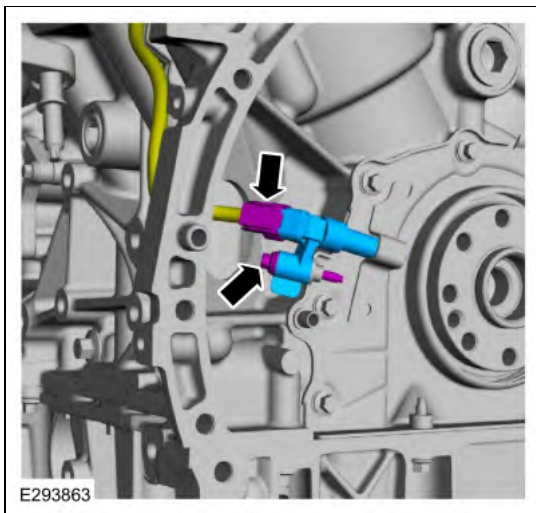


28. Remove the wiring harness grommet.



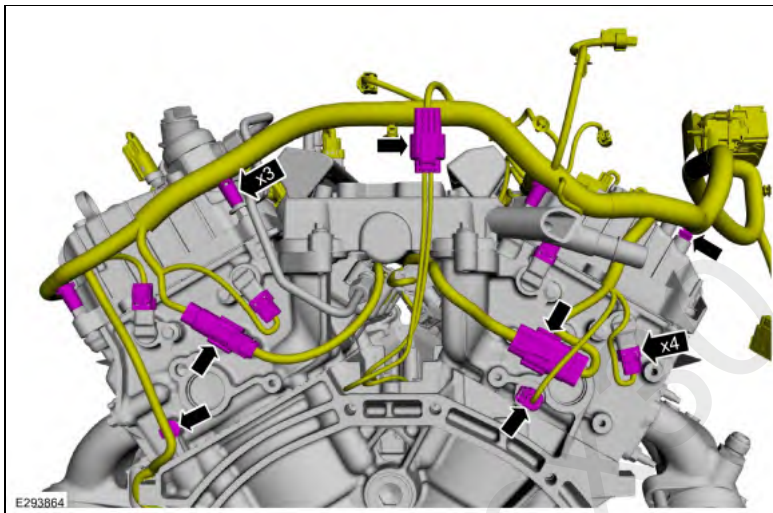
29.

- Disconnect the CKP sensor electrical connector.
- Remove the bolt and the CKP sensor.



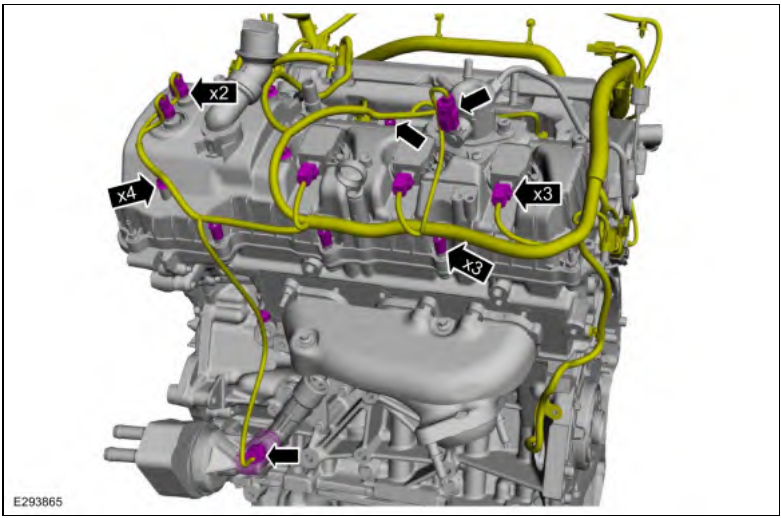
30.

- Disconnect the KS and CHT sensor electrical connectors.
- Disconnect the CMP sensor electrical connectors.
- Disconnect the direct injection fuel rail electrical connectors.
- Detach the wiring harness retainers.

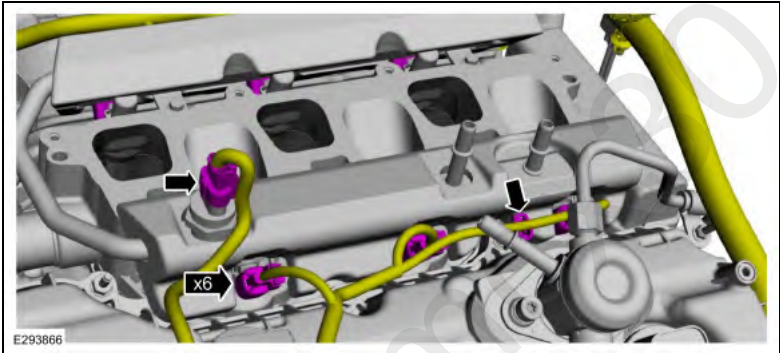


31.

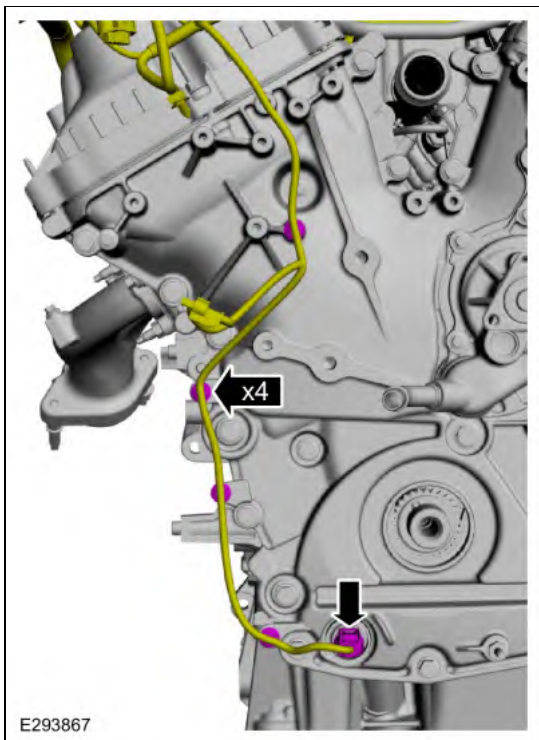
- Disconnect the high-pressure fuel pump electrical connector.
- Disconnect the VCT oil control solenoids electrical connectors.
- Disconnect the ignition coil-on-plug electrical connectors.
- Disconnect the oil pressure sensor electrical connector.
- Detach the wiring harness retainers.



- 32.
- Disconnect the FRP temperature sensor electrical connector.
 - Detach the wiring harness retainer.
 - Disconnect the port injector fuel rail electrical connectors.

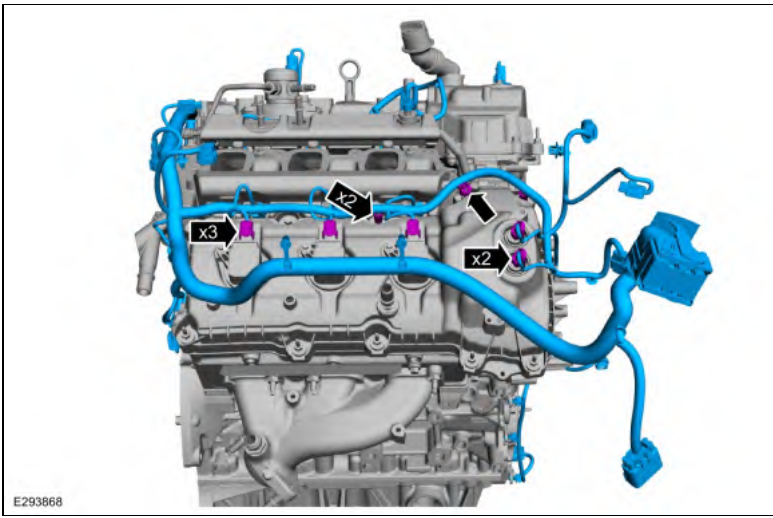


33. Disconnect the oil pressure control solenoid, EGR valve electrical connectors and detach the wiring harness retainers.

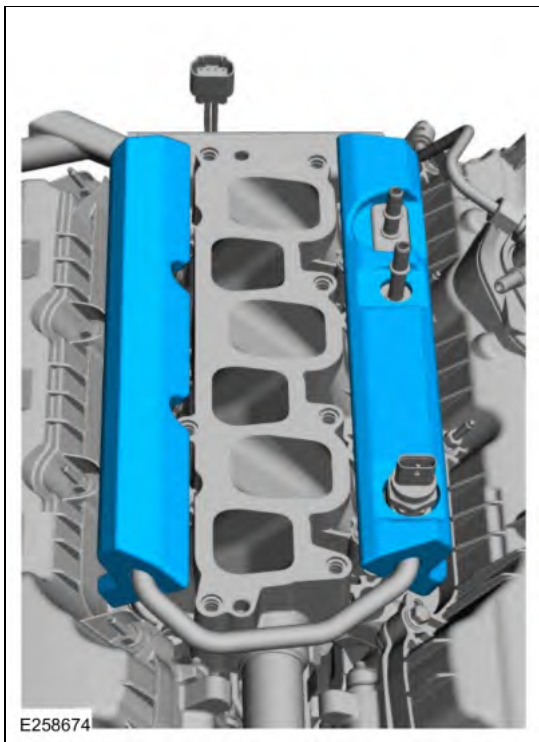


34.

- Disconnect the VCT oil control solenoids electrical connectors.
- Disconnect the ignition coil-on-plug electrical connectors.
- Detach the wiring harness retainers and remove the engine wiring harness.

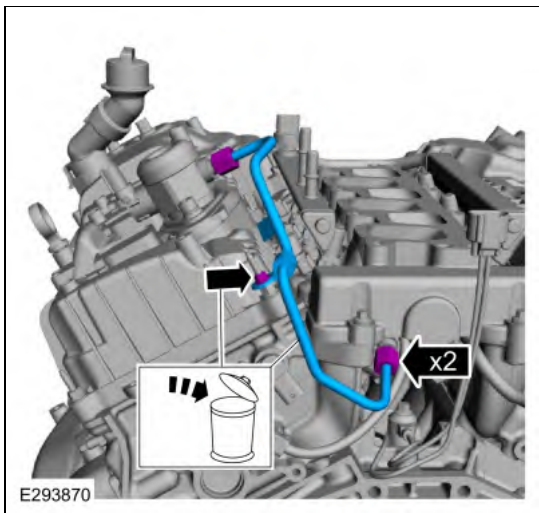


35. Remove the fuel rail insulators.



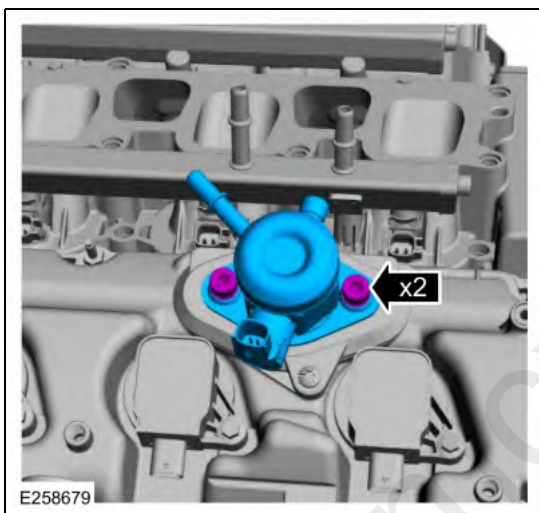
36.

- Remove and discard the high-pressure fuel pump to direct injection fuel rail tube nut.
- Loosen the high-pressure fuel pump to direct injection fuel rail tube flare nuts.
- Remove and discard the high-pressure fuel pump to direct injection fuel rail tube.

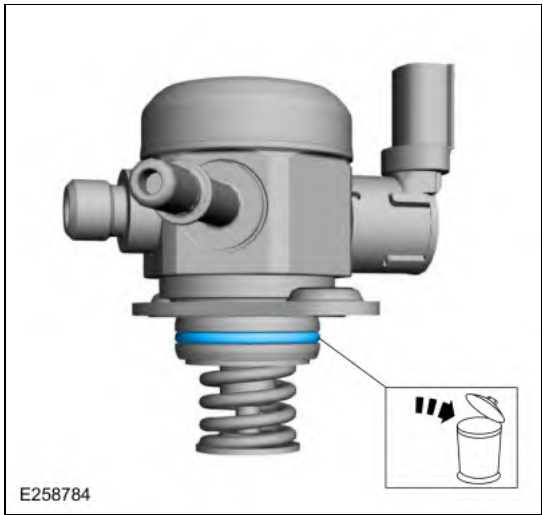


37. **NOTE:** Alternately loosen the high-pressure fuel pump bolts one complete revolution at a time.

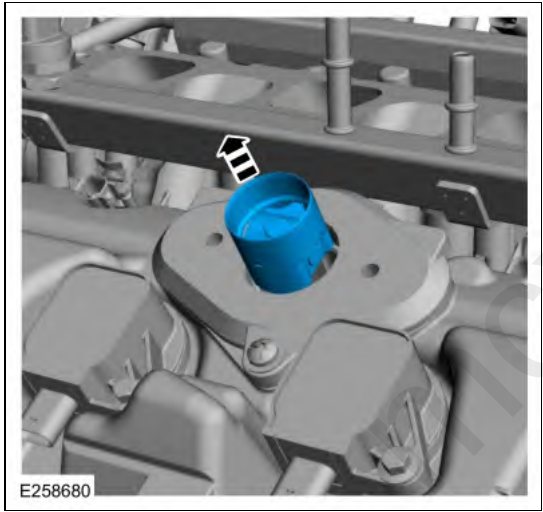
Remove the bolts and the high-pressure fuel pump.



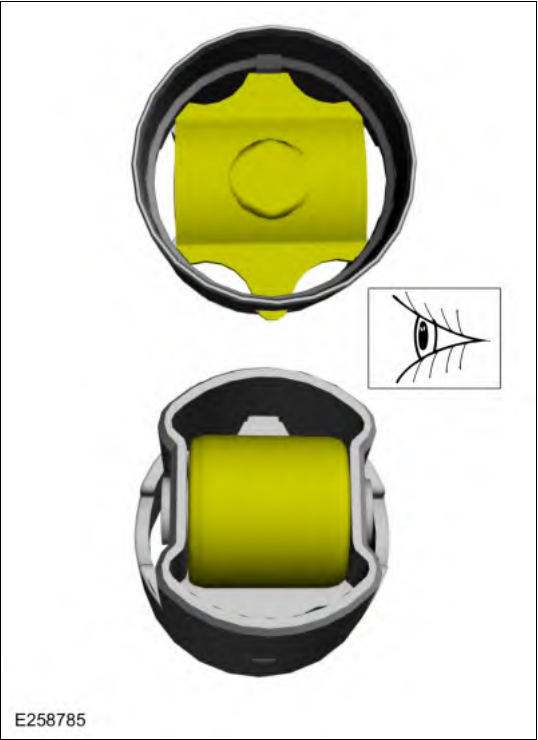
38. Remove and discard the high-pressure fuel pump O-ring seal.



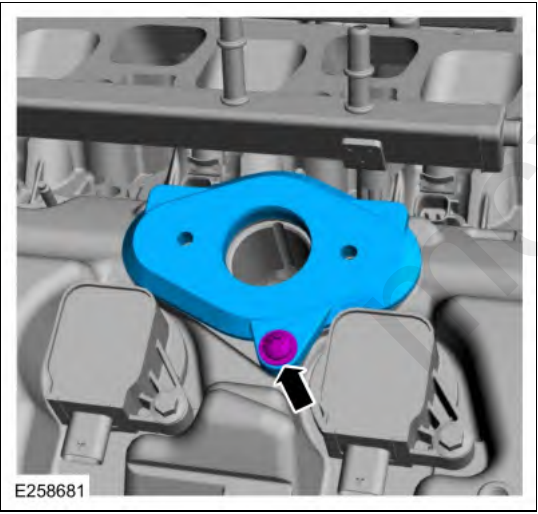
39. Remove the high-pressure fuel pump roller tappet.



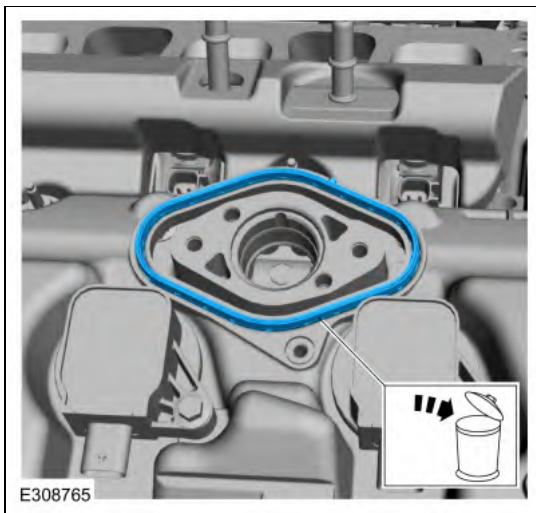
40. Inspect the high-pressure fuel pump roller tappet. If any flat spots or scoring are found, especially in the indicated areas, then inspect the high-pressure fuel pump and the high-pressure fuel pump roller tappet drive lobe. Install new components as needed.



41. Loosen the high-pressure fuel pump mounting plate bolt and remove the mounting plate.



42. Remove and discard the high-pressure fuel pump mounting plate seal.



43. Remove and discard the high-pressure fuel pump mounting plate O-ring seals.



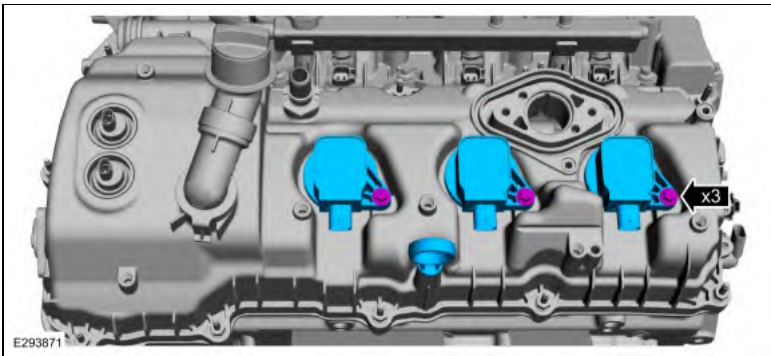
44.

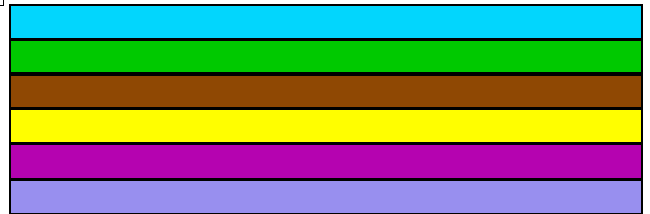
- **NOTE:** Use compressed air to remove any foreign material from the ignition coil-on-plugs and surrounding area before removing the ignition coil-on-plugs.

NOTE: When removing the ignition coil-on-plugs, a slight twisting motion will break the seal and ease removal.

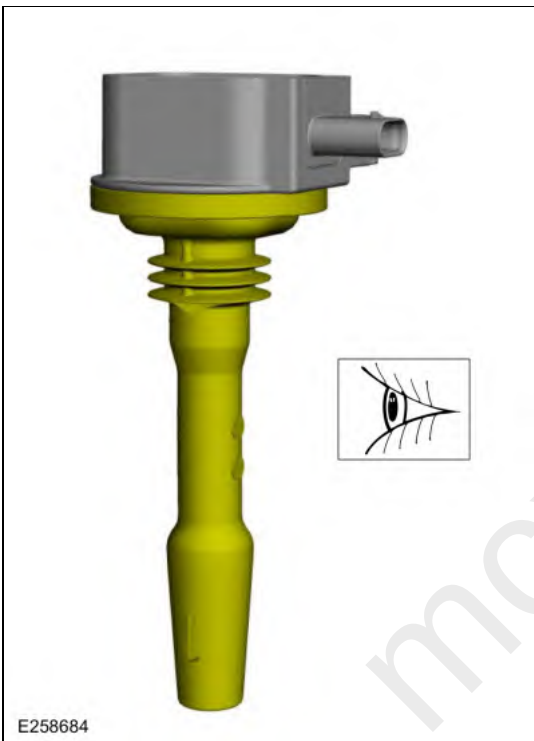
Remove the bolts and the ignition coil-on-plugs.

- Remove the oil level indicator.





45. Inspect the coil seals for rips, nicks or tears and replace if necessary.

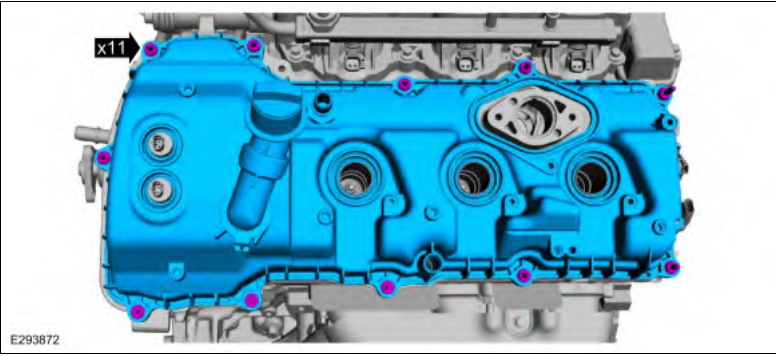




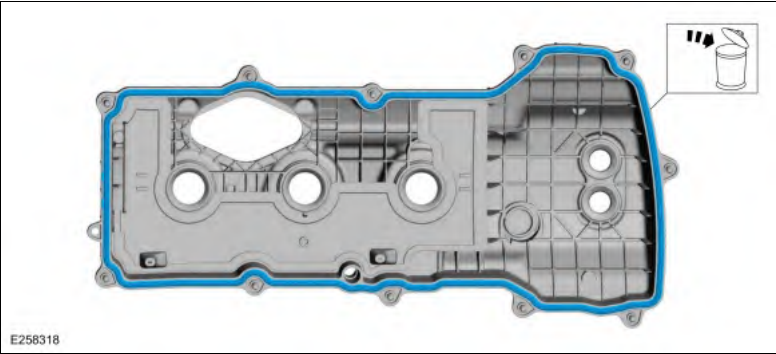
46. **NOTICE:** While removing the valve cover do not apply excessive force to the VCT oil control solenoid or damage may occur.

NOTICE: If the VCT oil control solenoid sticks to the VCT seal, carefully wiggle the valve cover until the bond breaks free or damage to the VCT seal and VCT oil control solenoid may occur.

Loosen the bolts, stud bolts and the LH valve cover.

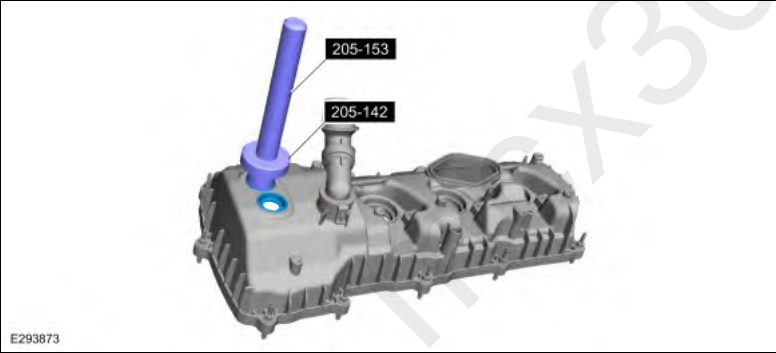


47. Discard the valve cover gasket.



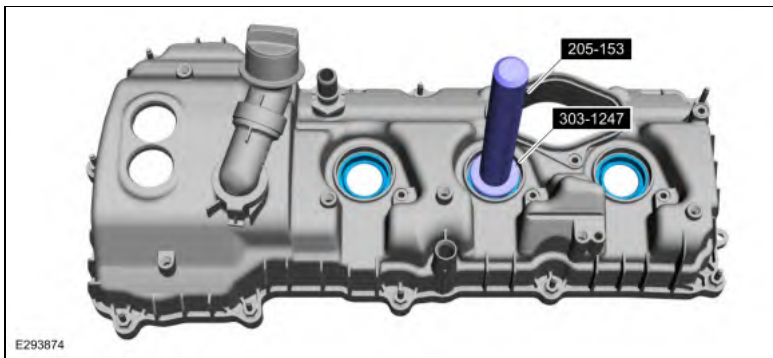
48. **NOTE:** *Inspect the VCT solenoid seals. Remove any damaged seals.*

Using the special tools, remove and discard the seal(s).
Use Special Service Tool: 205-142 (T80T-4000-J) Installer, Differential Bearing Cone. , 205-153 (T80T-4000-W) Handle.

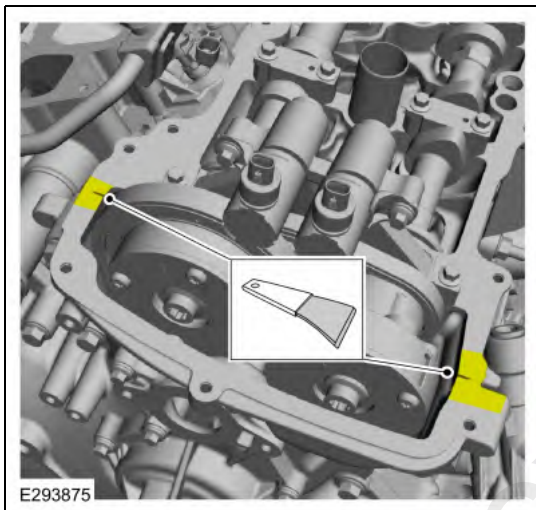


49. **NOTE:** *Inspect the spark plug tube seals. Remove any damaged seals.*

Using the special tools, remove and discard the seal(s).
Use Special Service Tool: 205-153 (T80T-4000-W) Handle. , 303-1247 VCT Spark Plug Tube Seal Remover and Installer.

A horizontal bar chart consisting of six stacked rectangular segments of equal height. From top to bottom, the colors are cyan, green, brown, yellow, purple, and light blue. The segments are separated by thin black lines. The entire chart is enclosed in a black border. There are empty white rectangular boxes above and below the chart.

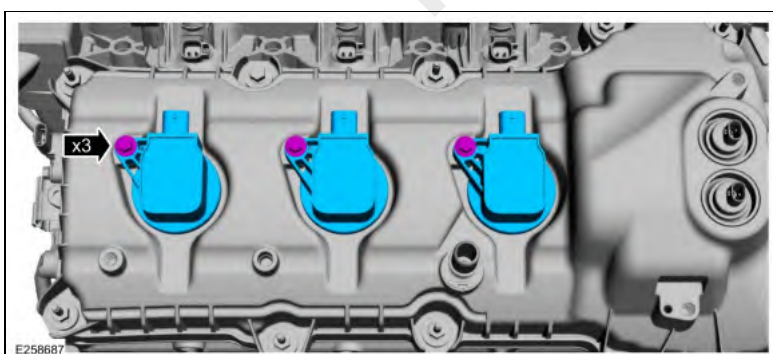
50. Make sure that the mating faces are clean and free of foreign material.
Use the General Equipment: Plastic Scraper
Material: Motorcraft® Silicone Gasket Remover / ZC-30-A
Material: Motorcraft® Metal Brake Parts Cleaner / PM-4-A, PM-4-B
Material: Motorcraft® Metal Surface Prep Wipes / ZC-31-B



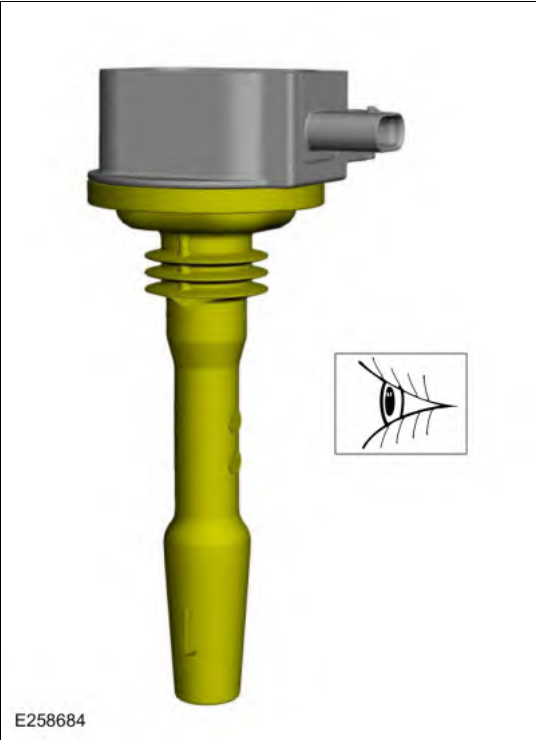
51. **NOTE:** Use compressed air to remove any foreign material from the ignition coil-on-plugs and surrounding area before removing the ignition coil-on-plugs.

NOTE: When removing the ignition coil-on-plugs, a slight twisting motion will break the seal and ease removal.

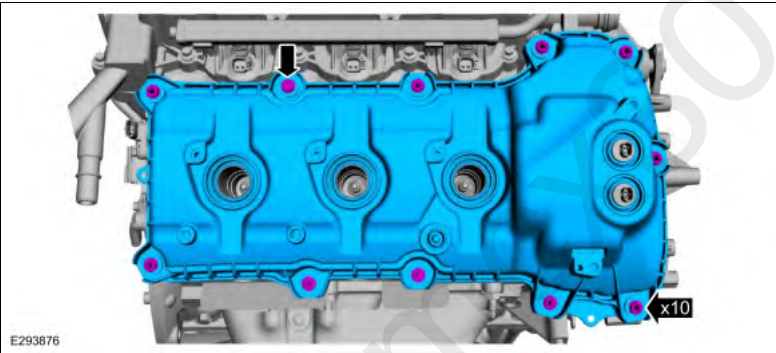
Remove the bolts and the ignition coil-on-plugs.



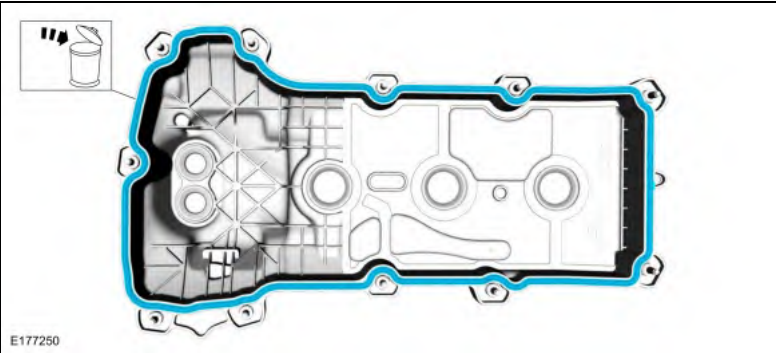
52. Inspect the coil seals for rips, nicks or tears and replace if necessary.



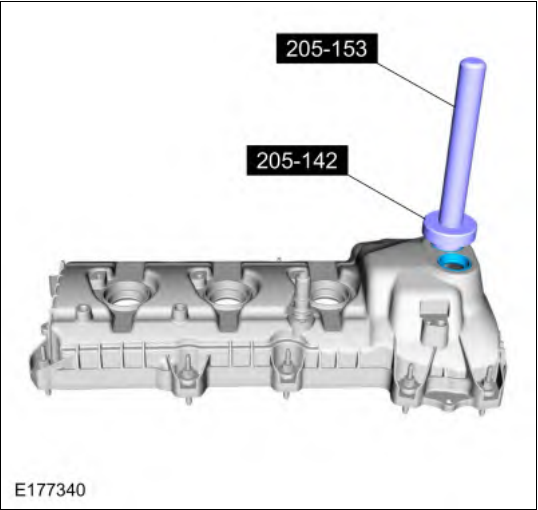
53. **NOTICE:** While removing the valve cover do not apply excessive force to the VCT oil control solenoid or damage may occur.
- NOTICE:** If the VCT oil control solenoid sticks to the VCT seal, carefully wiggle the valve cover until the bond breaks free or damage to the VCT seal and VCT oil control solenoid may occur.
- Loosen the bolts and remove the RH valve cover.



54. Discard the valve cover gasket.

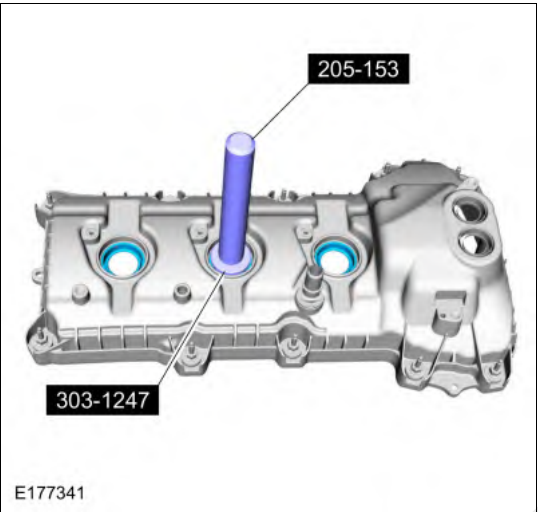


55. **NOTE:** Inspect the VCT solenoid seals. Remove any damaged seals.
- Using the special tools, remove and discard the seal(s).
- Use Special Service Tool: 205-142 (T80T-4000-J) Installer, Differential Bearing Cone. , 205-153 (T80T-4000-W) Handle.



56. **NOTE:** *Inspect the spark plug tube seals. Remove any damaged seals.*

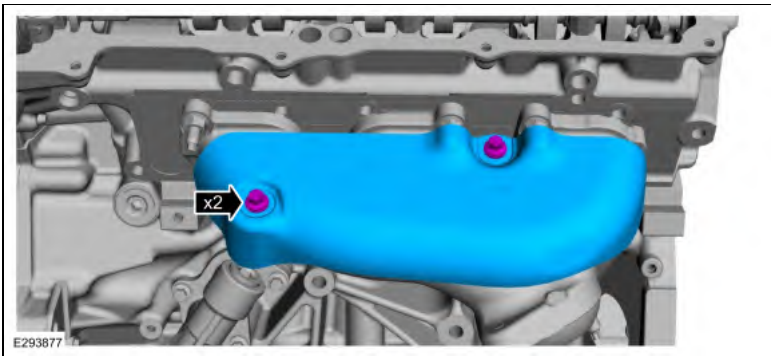
Using the special tools, remove and discard the seal(s).
Use Special Service Tool: 205-153 (T80T-4000-W) Handle , 303-1247 VCT Spark Plug Tube Seal Remover and Installer.



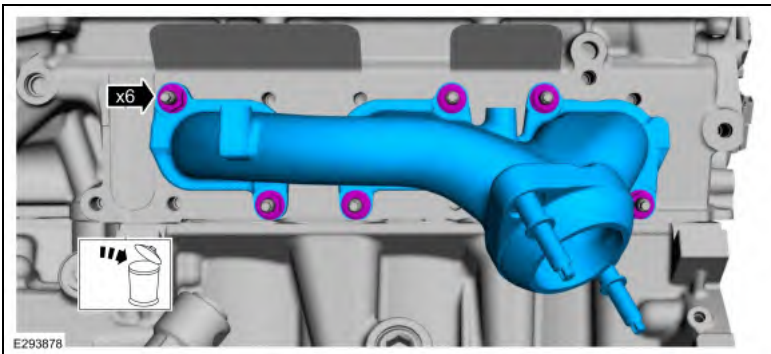
57. Make sure that the mating faces are clean and free of foreign material.
Use the General Equipment: Plastic Scraper
Material: Motorcraft® Silicone Gasket Remover / ZC-30-A
Material: Motorcraft® Metal Brake Parts Cleaner / PM-4-A, PM-4-B
Material: Motorcraft® Metal Surface Prep Wipes / ZC-31-B



58. Remove the bolts and the LH exhaust manifold heat shield.

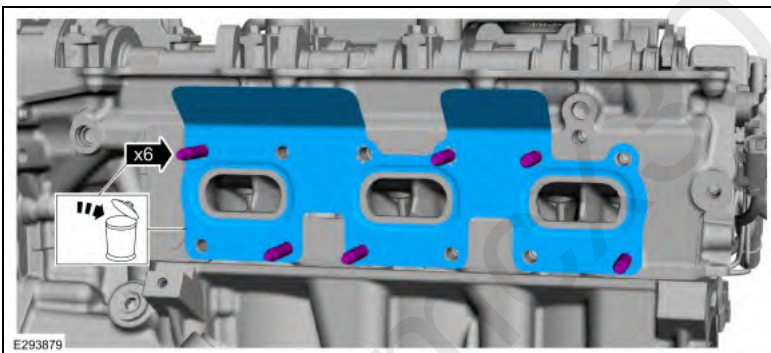


- 59.
- Remove the nuts and the LH exhaust manifold.
 - Discard the nuts.

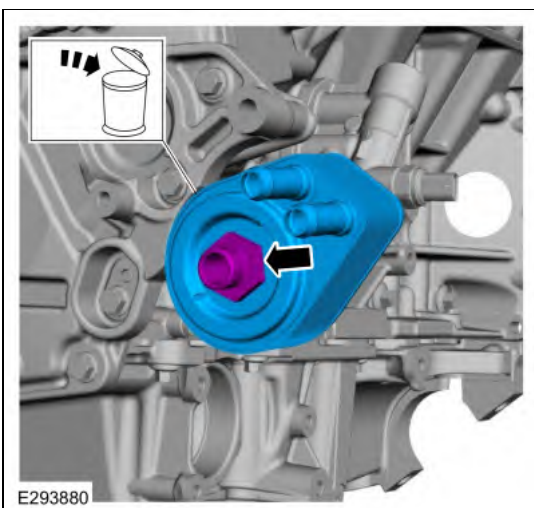


60. Clean and inspect the exhaust manifold.
Refer to: Exhaust Manifold Cleaning and Inspection (303-00 Engine System - General Information, General Procedures).

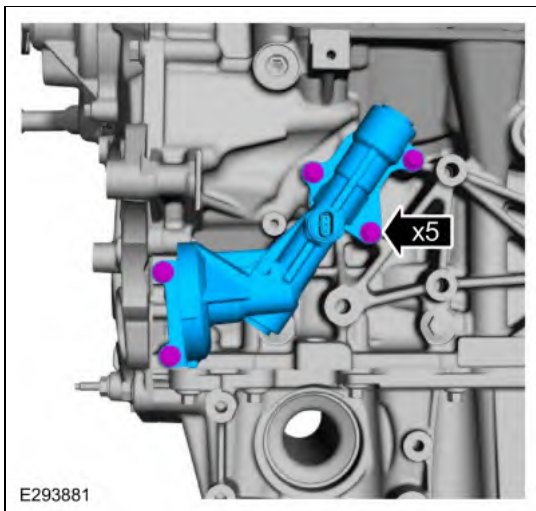
61. Remove and discard the LH exhaust manifold gasket and studs.



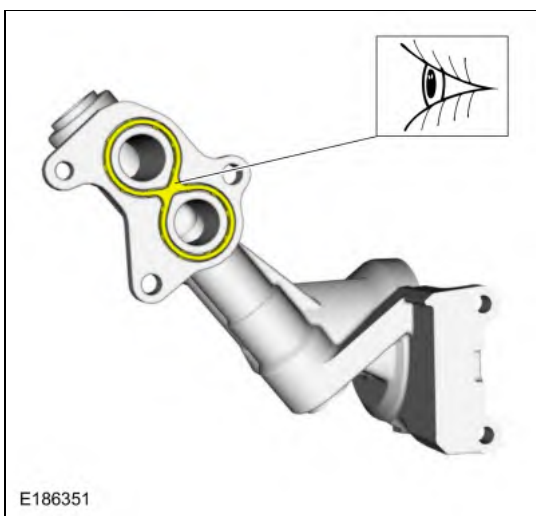
- 62.
- Remove the bolt and the oil cooler.
 - Discard the oil cooler.



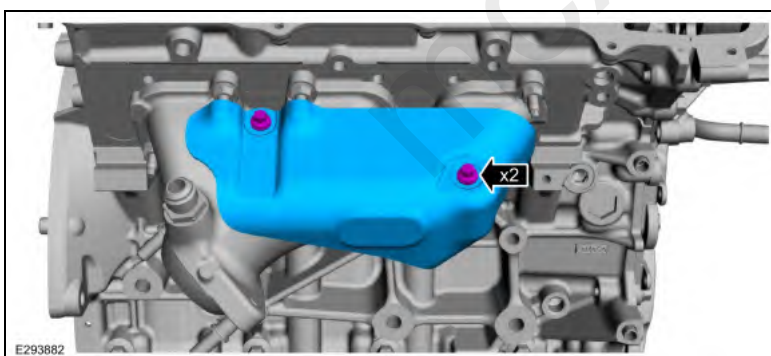
63. Remove the bolts and the oil filter adapter.



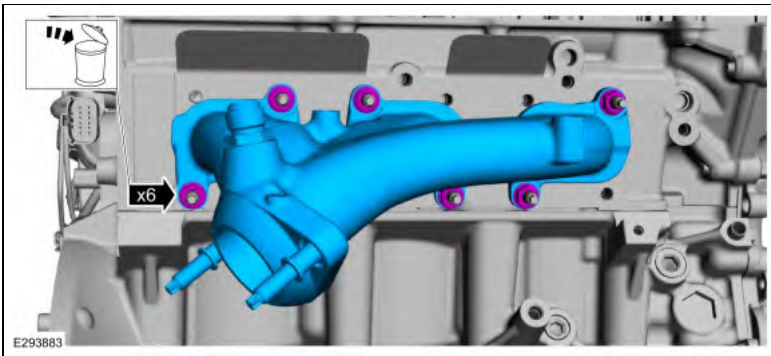
64. Inspect and replace if necessary.



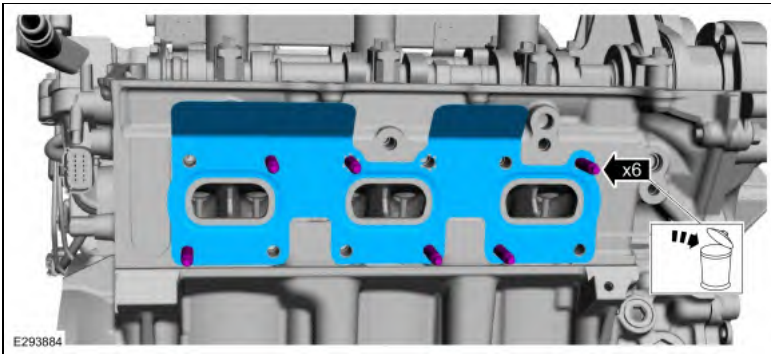
65. Remove the bolts and the RH exhaust manifold heat shield.



- 66.
- Remove the nuts and the RH exhaust manifold.
 - Discard the nuts.

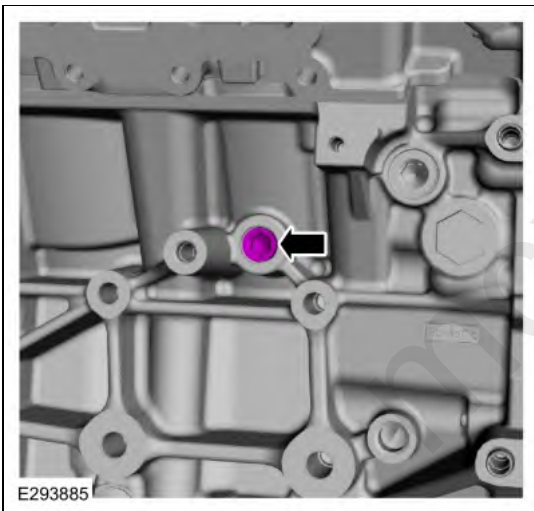


67. Remove and discard the RH exhaust manifold gasket and studs.

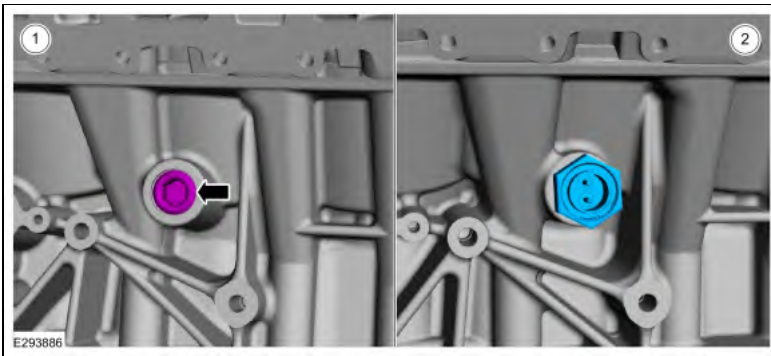


68. Clean and inspect the exhaust manifold.
Refer to: Exhaust Manifold Cleaning and Inspection (303-00 Engine System - General Information, General Procedures).

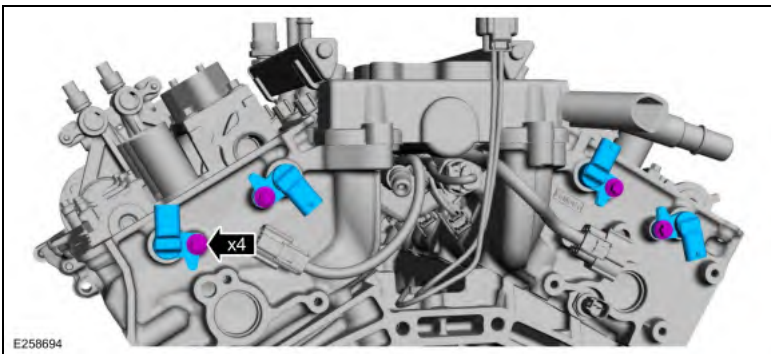
69. Remove the RH block coolant drain plug and allow coolant to drain from the cylinder block.



- 70.
1. Remove the LH block coolant drain plug and allow coolant to drain from the cylinder block.
 2. If equipped, remove the block heater and allow coolant to drain from the cylinder block.

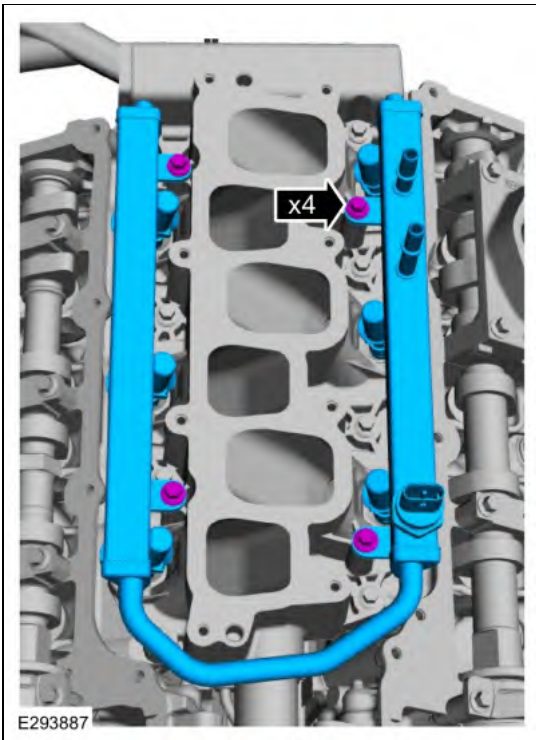


71. Remove the bolts and the CMP sensors.



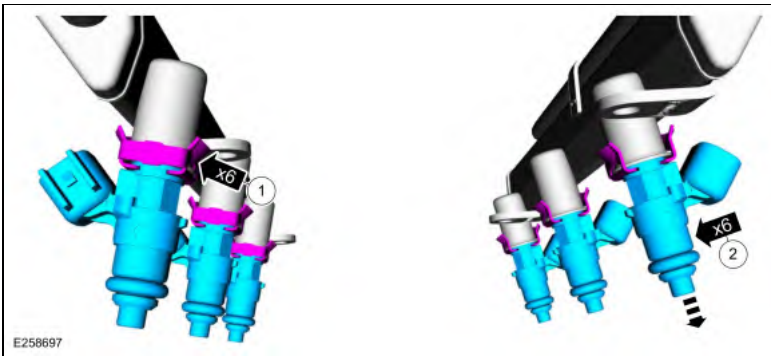
72. Remove and bolts and the port injection fuel rail.

mcx30.com

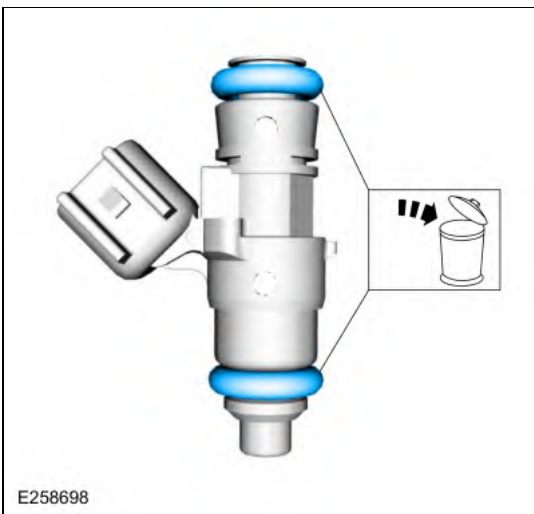


73.

1. Remove the fuel injector retaining clips.
2. Remove the fuel injectors from the fuel rail.

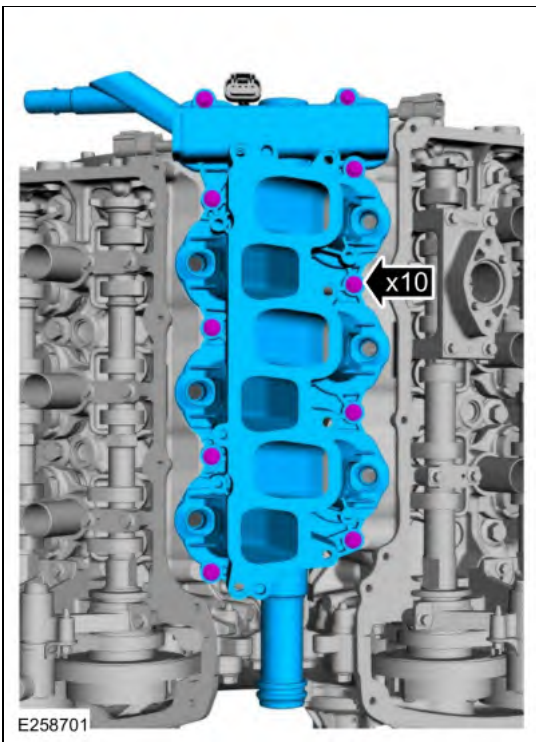


74. Remove and discard all of the fuel injector O-ring seals.



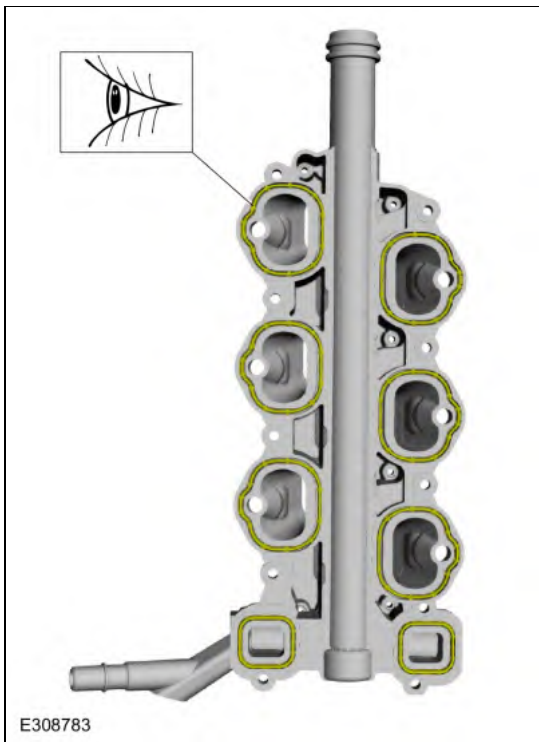
75. Remove the bolts and the lower intake manifold.

mcx30.com

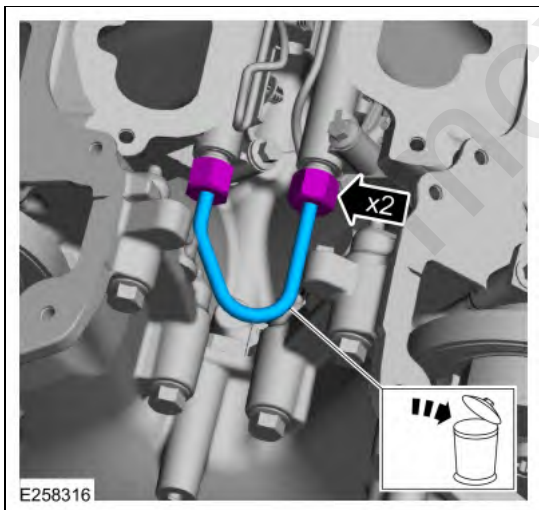


76.

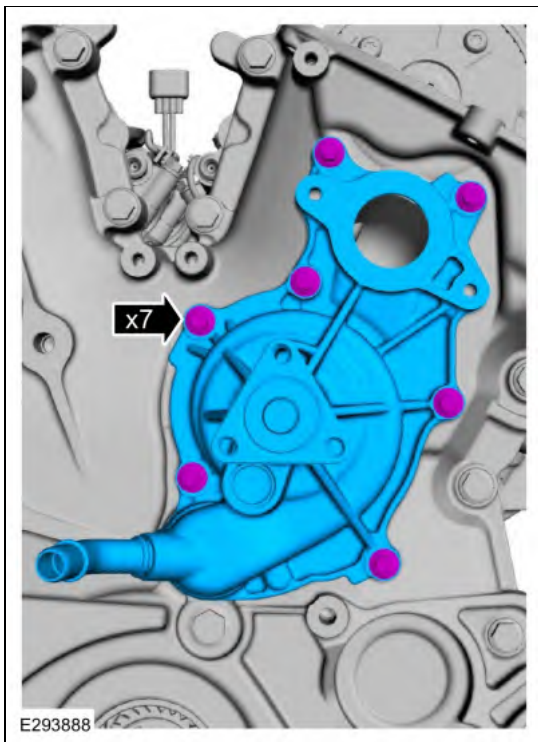
- Loosen the fuel rail to fuel rail high-pressure fuel tube flare nuts and remove.
- Clean and inspect all sealing surfaces.



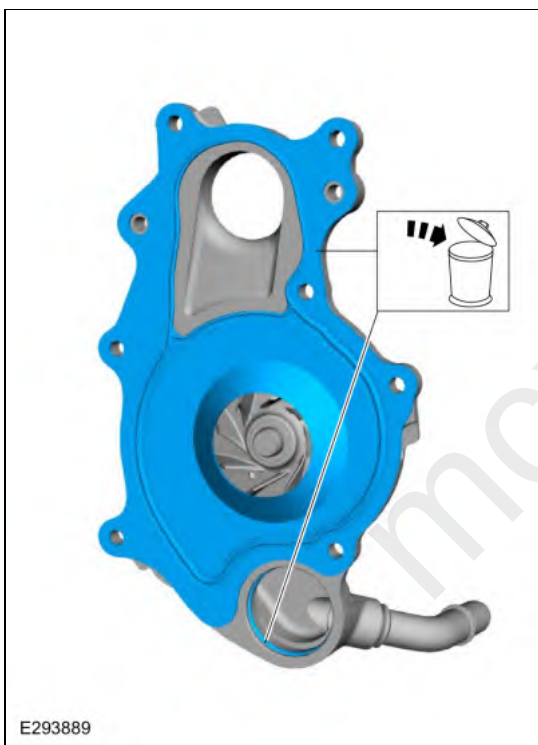
- 77.
- Visually inspect the upper intake manifold gaskets for nicks, cuts and abrasions. If these conditions are not present, the gaskets may be re-used.
 - Discard the fuel rail to fuel rail high-pressure fuel tube.



78. Remove the bolts and the coolant pump.



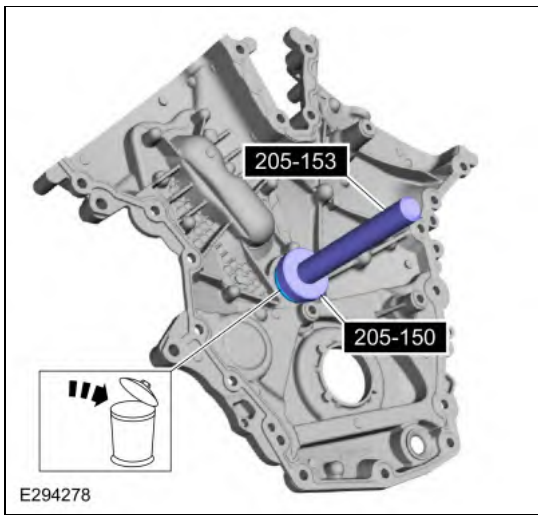
79. Remove and discard the coolant pump gasket and O-ring seal.



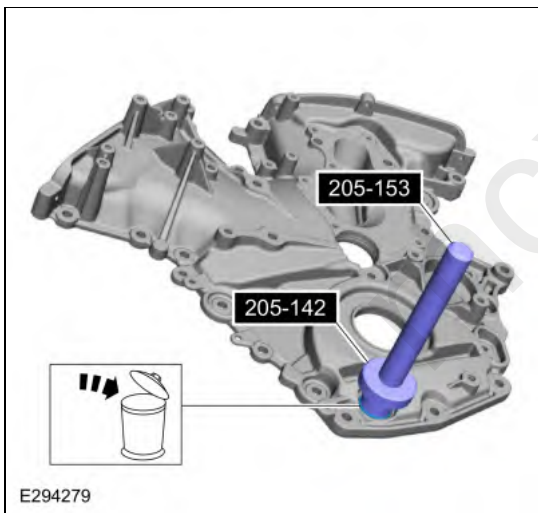
80. Remove the engine front cover bolts.



82. Using the special tools, remove the engine front cover to coolant pipe seal.
Use Special Service Tool: 205-150 (T80T-4000-S) Installer, Spindle Bearing , 205-153 (T80T-4000-W) Handle.



83. Using the special tools, remove and discard the oil pump electrical connector seal.
Use Special Service Tool: 205-142 (T80T-4000-J) Installer, Differential Bearing Cone. , 205-153 (T80T-4000-W) Handle.

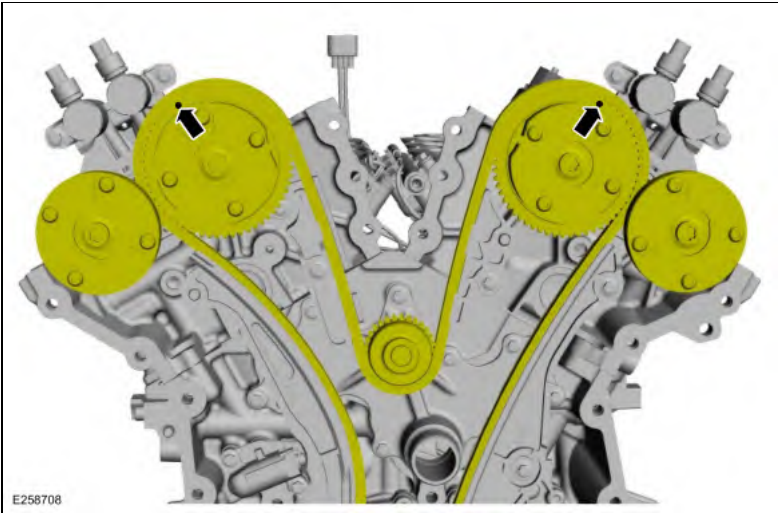


84. **NOTICE:** Only use a 3M[®] Roloc[®] Bristle Disk (2-in white, part number 07528) in a suitable tool turning at the recommended speed of 15,000 rpm, to clean the engine front cover. Do not use metal scrapers, wire brushes or any other power abrasive disk to clean front cover.

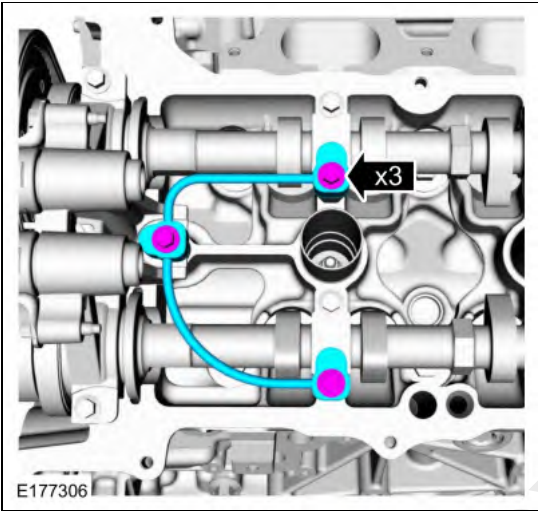
- Make sure that the mating faces of the front cover are clean and free of foreign material.
Refer to: RTV Sealing Surface Cleaning and Preparation (303-00 Engine System - General Information, General Procedures).
Material: Motorcraft[®] Silicone Gasket Remover / ZC-30-A
Material: Motorcraft[®] Metal Brake Parts Cleaner / PM-4-A, PM-4-B
Material: Motorcraft[®] Metal Surface Prep Wipes / ZC-31-B
- Thoroughly wash the engine front cover to remove any foreign material, including any abrasive particles created during the cleaning process.

87. **NOTE:** Rotate the crankshaft in a clockwise direction only.

Using the crankshaft bolt, rotate the crankshaft clockwise and align the timing marks on the intake VCT units as shown.

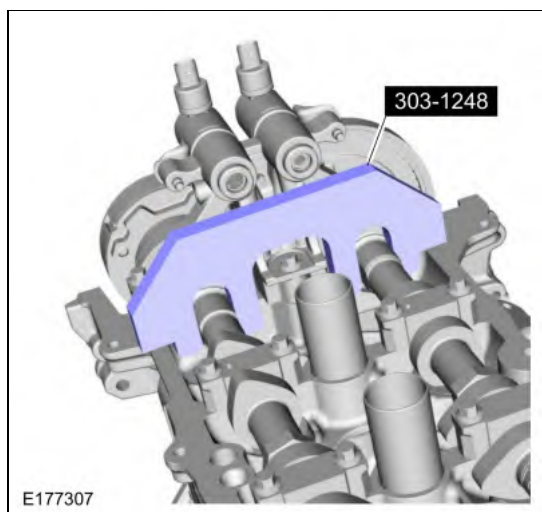


88. Remove the bolts and the LH oil tube.

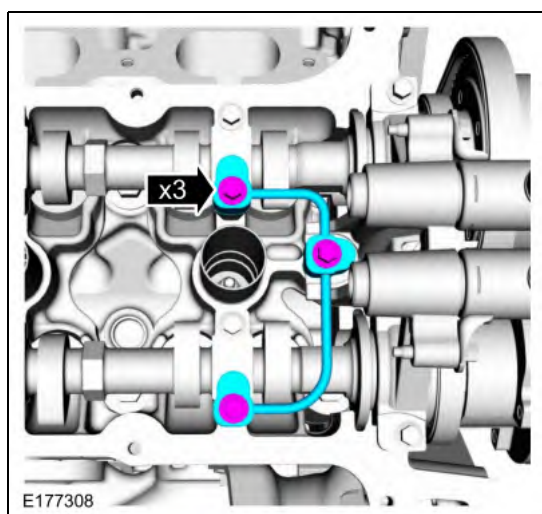


89. **NOTE:** The Camshaft Holding Tool will hold the camshafts in the TDC position.

Install Special Service Tool: 303-1248 Camshaft holding tools.

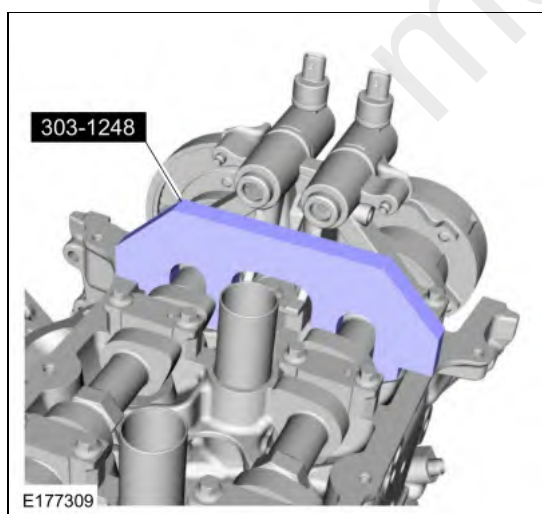


90. Remove the bolts and the RH oil tube.



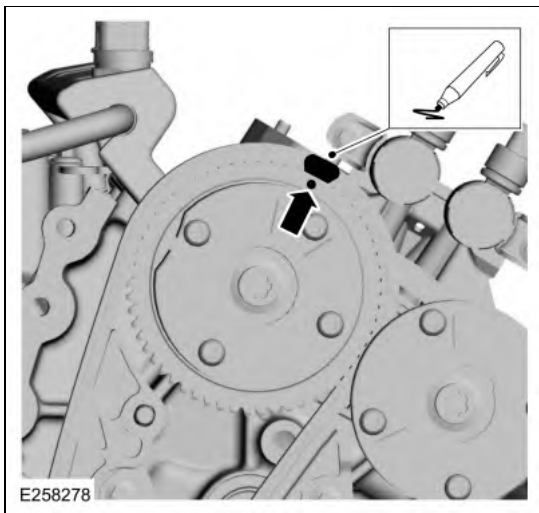
91. **NOTE:** The Camshaft Holding Tool will hold the camshafts in the TDC position.

Install Special Service Tool: 303-1248 Camshaft holding tools.

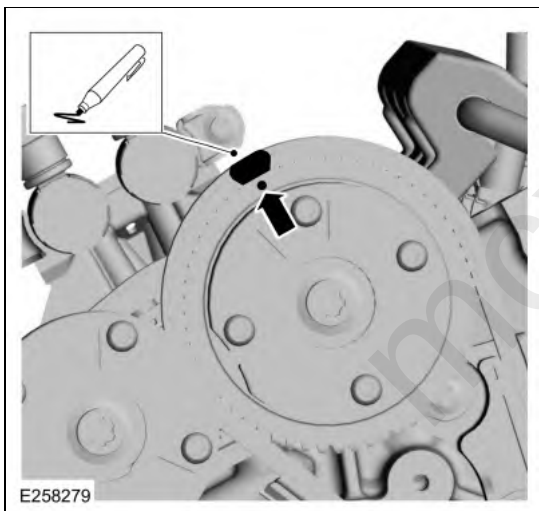


NOTE: The following 3 steps are for primary timing chains that the colored links are not visible.

92. Mark the timing chain link that aligns with the timing mark on the LH intake VCT unit as shown.

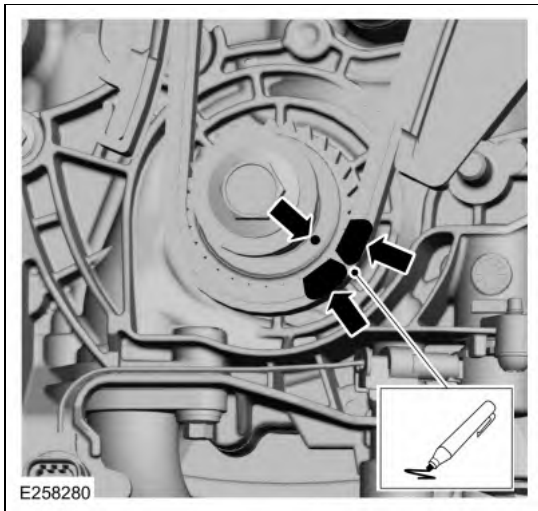


93. Mark the timing chain link that aligns with the timing mark on the RH intake VCT unit as shown.

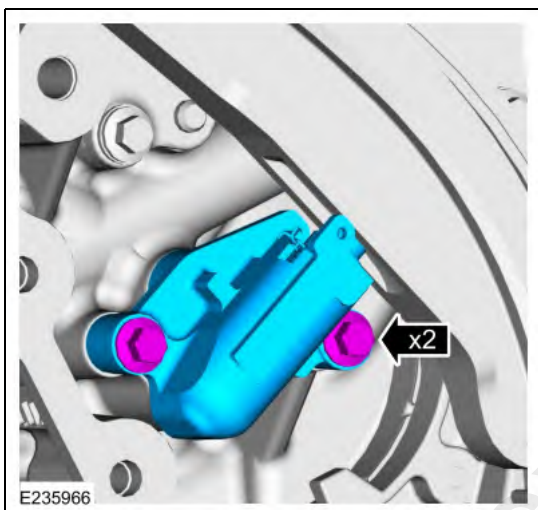


94. **NOTE:** The crankshaft sprocket timing mark should be between the colored links.

Mark the timing chain links that aligns with the timing mark on the crankshaft sprocket as shown.



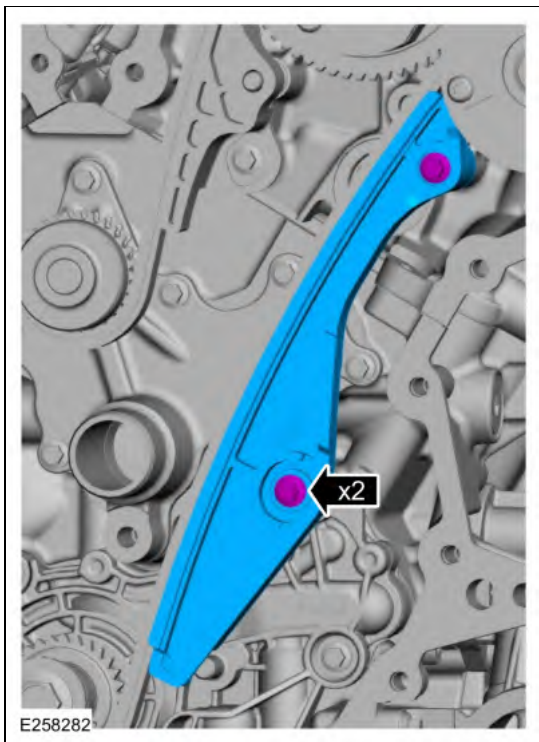
95. Remove the bolts and the timing chain tensioner.



96. Remove the timing chain tensioner arm.



97. Remove the bolts and the lower LH timing chain guide.

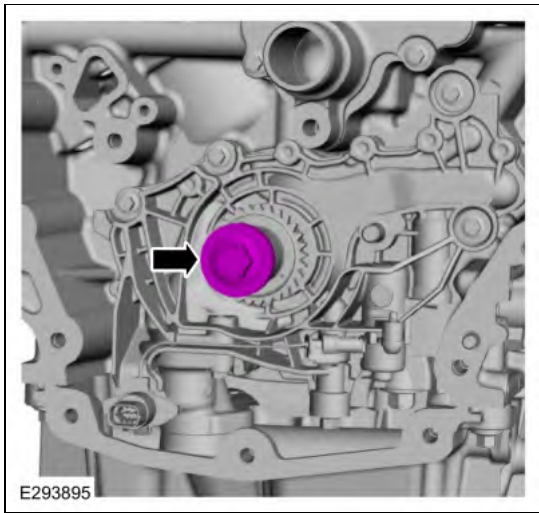


98. **NOTE:** Removal of the VCT oil control solenoid will aid in the removal of the timing chain.

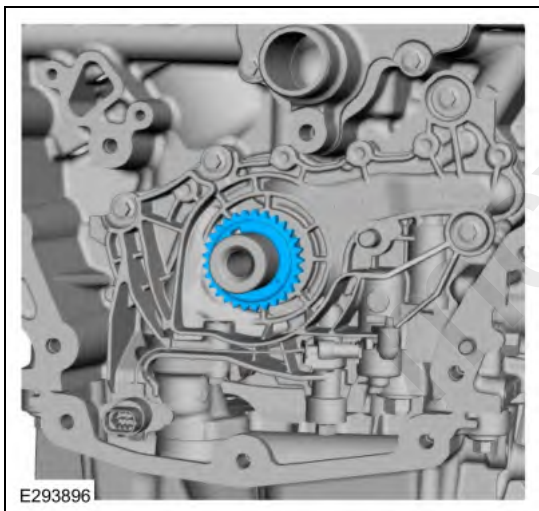
NOTE: A slight twisting motion will aid in the removal of the VCT oil control solenoids.

NOTE: Keep the VCT oil control solenoid clean of dirt and debris.

Remove the bolts and the VCT oil control solenoids.

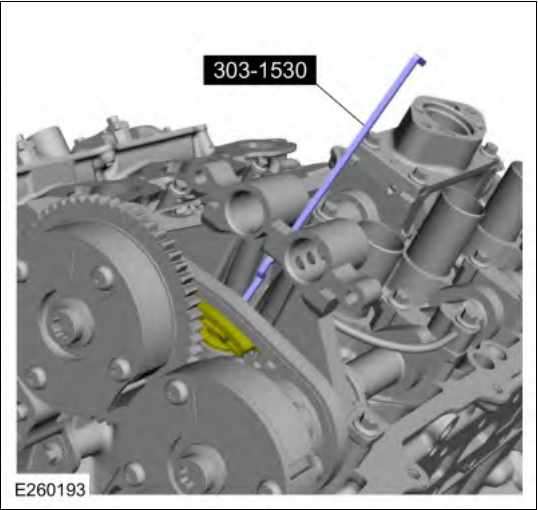


101. Remove the crankshaft sprocket.

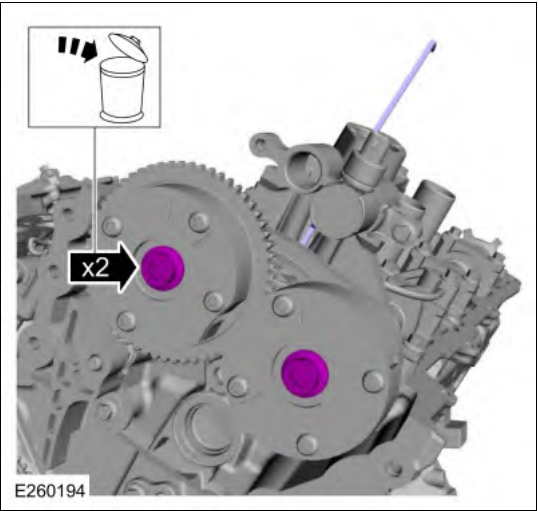


102. **NOTE:** The VCT oil control solenoids are removed for clarity.

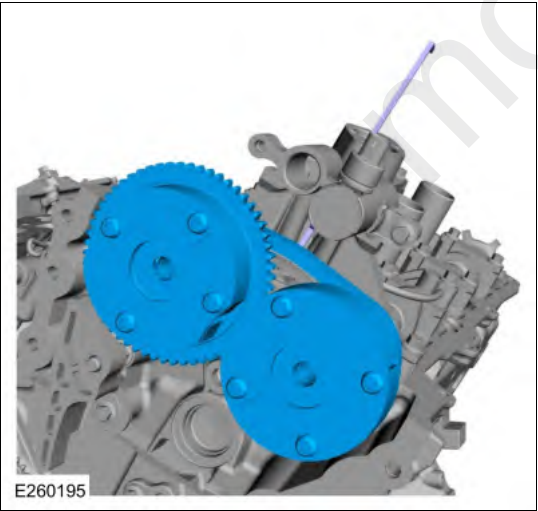
Compress the LH secondary timing chain tensioner and install the special tool in the hole on the rear of the secondary timing chain tensioner guide and let it hold against the mega cap to retain the tensioner in the collapsed position.
Install Special Service Tool: 303-1530 Tool, Chain Tensioner Hold Down.



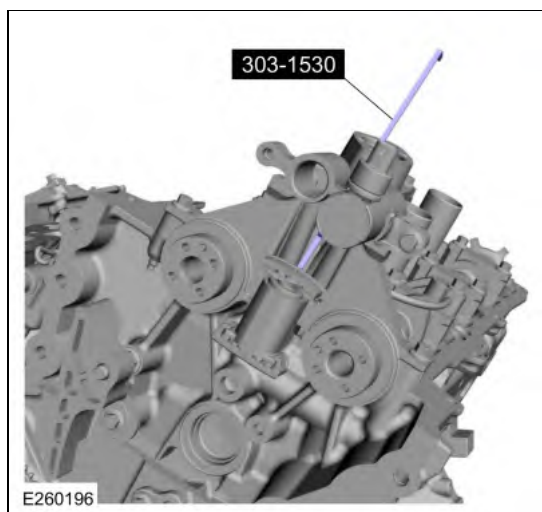
103. Remove and discard the LH VCT unit bolts.



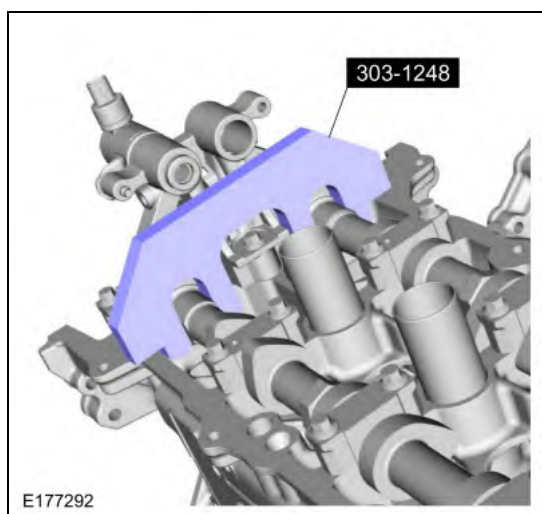
104. Remove the LH VCT units and secondary timing chain.



105. Remove Special Service Tool: 303-1530 Tool, Chain Tensioner Hold Down.



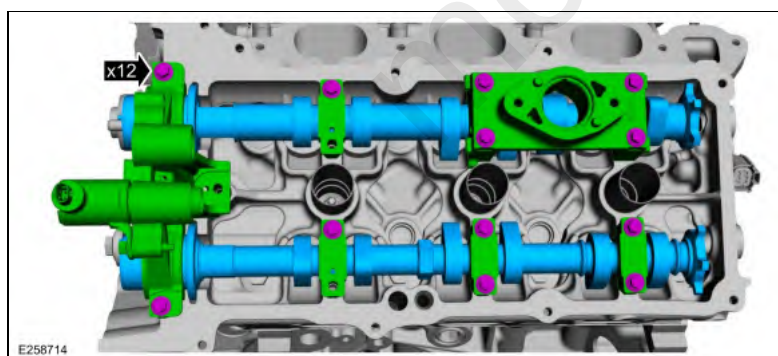
106. Remove Special Service Tool: 303-1248 Camshaft holding tools.



107. **NOTE:** Cylinder head camshaft bearing caps are numbered to verify that they are assembled in their original positions.

NOTE: Mark the exhaust and intake camshafts for installation into their original locations.

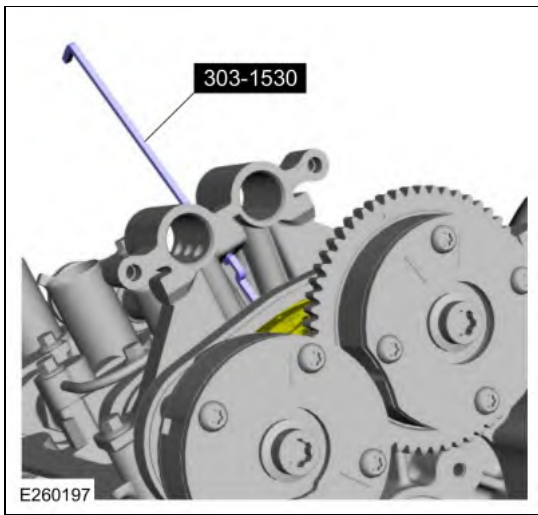
Remove the bolts, camshaft caps and the camshafts.



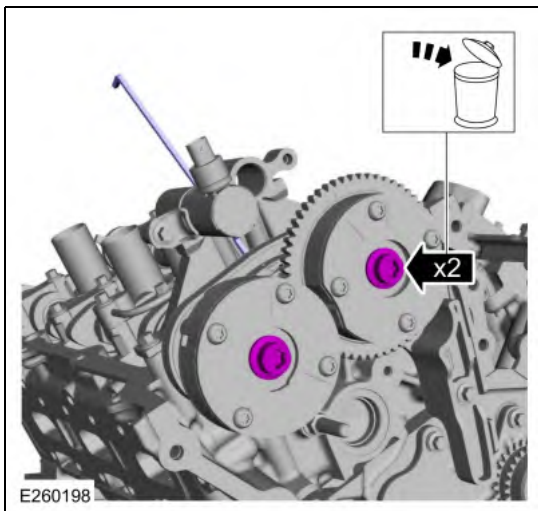
108. **NOTE:** The VCT oil control solenoids are removed for clarity.

Compress the RH secondary timing chain tensioner and install the special tool in the hole on the rear of the secondary timing chain tensioner guide and let it hold against the mega cap to retain the tensioner in the collapsed position.

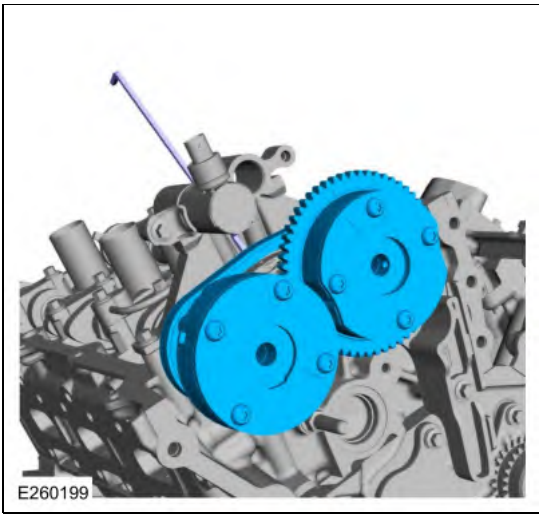
Install Special Service Tool: 303-1530 Tool, Chain Tensioner Hold Down.



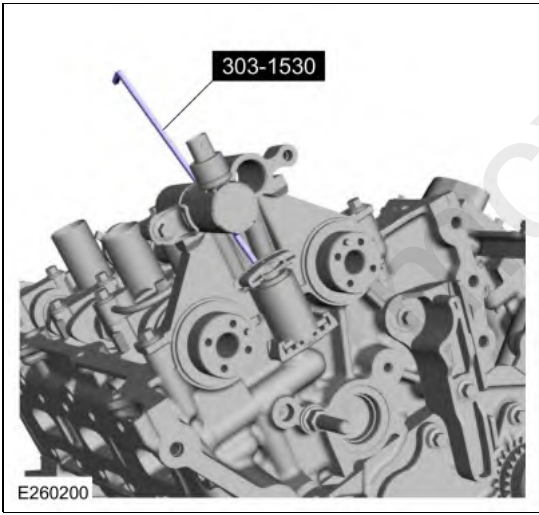
109. Remove and discard the RH VCT unit bolts.



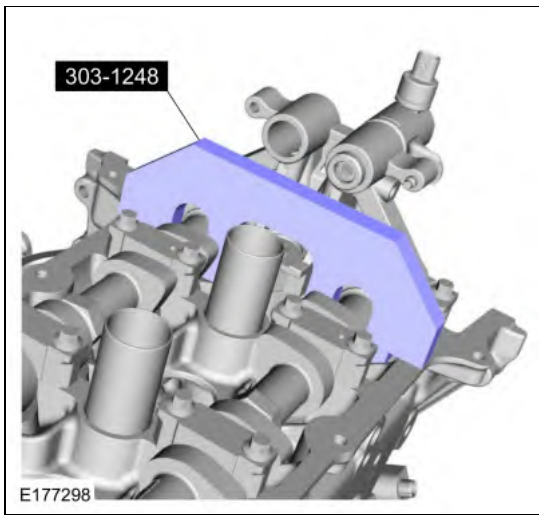
110. Remove the RH VCT units and secondary timing chain.



111. Remove Special Service Tool: 303-1530 Tool, Chain Tensioner Hold Down.



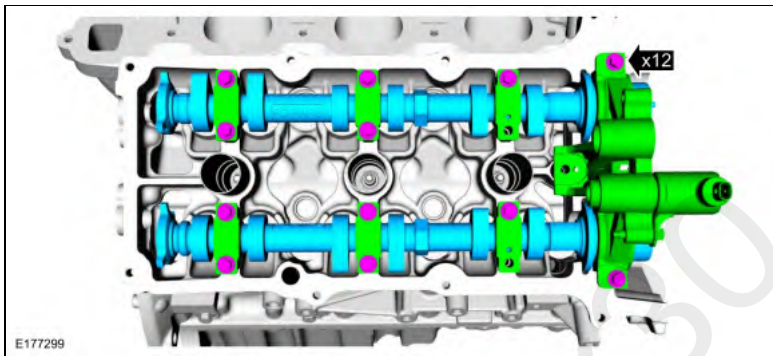
112. Remove Special Service Tool: 303-1248 Camshaft holding tools.



113. **NOTE:** Cylinder head camshaft bearing caps are numbered to verify that they are assembled in their original positions.

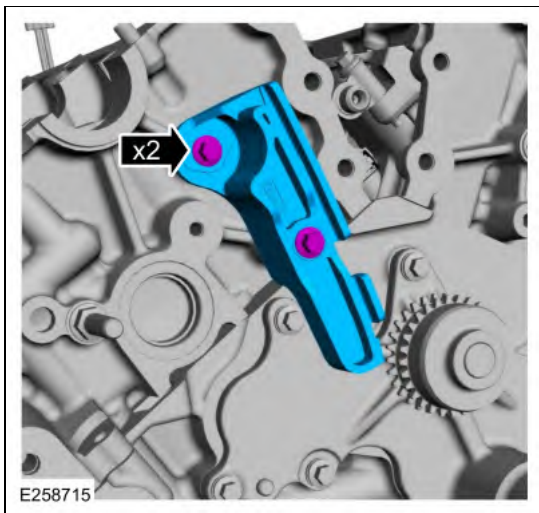
NOTE: Mark the exhaust and intake camshafts for installation into their original locations.

Remove the bolts, camshaft caps and the camshafts.



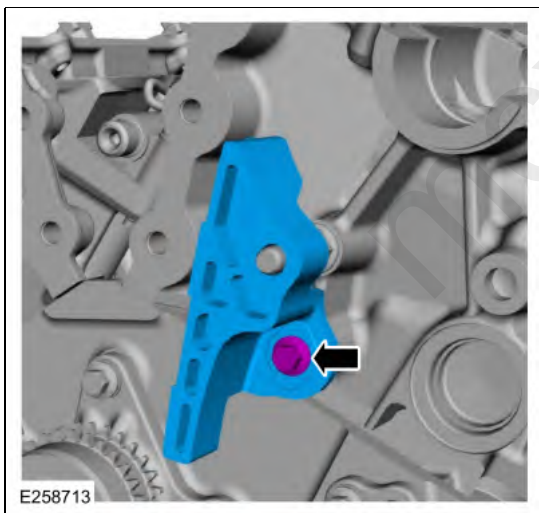
114. **NOTICE:** Do not use power tools to remove the bolt or damage to the RH primary timing chain guide may occur.

Remove the bolts and the RH timing chain guide.



115. **NOTICE:** Do not use power tools to remove the bolt or damage to the LH primary timing chain guide may occur.

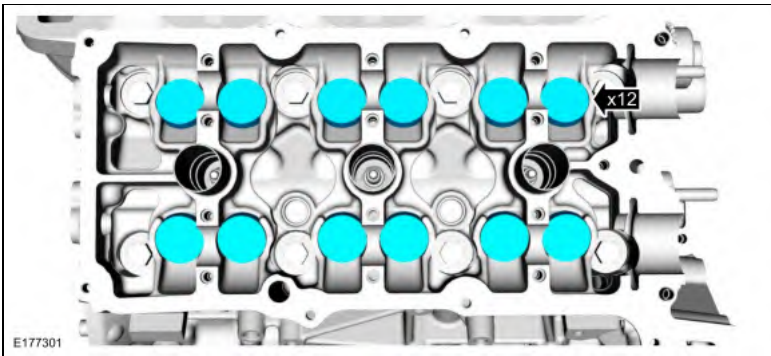
Remove the bolt and the upper LH timing chain guide.



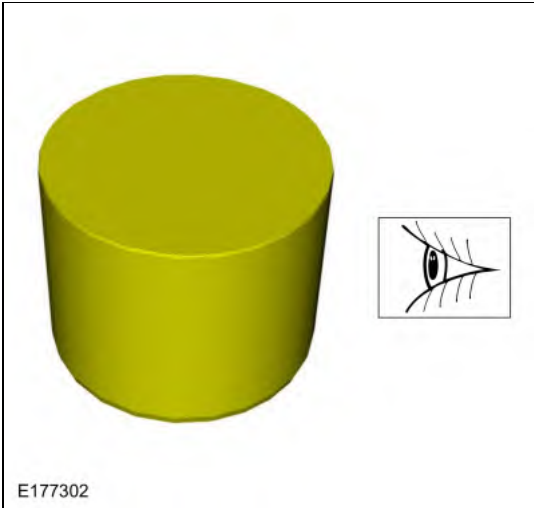
116. **NOTE:** If the components are to be reinstalled, they must be installed in the same positions. Mark the components for installation into their original locations.

NOTE: RH shown, LH similar.

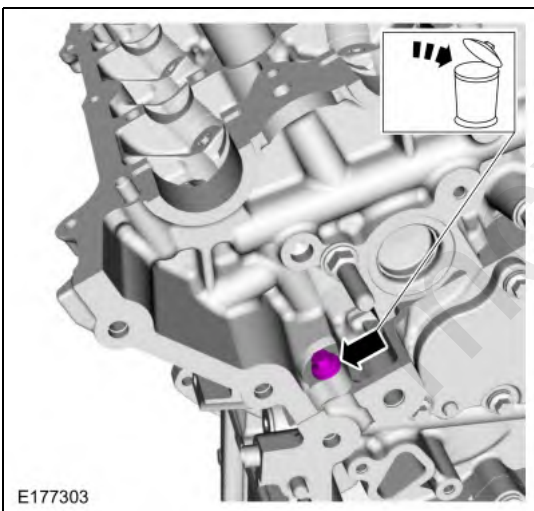
Remove the valve tappets from the cylinder heads.



117. Inspect and install new components as necessary.



118. Remove and discard the M6 bolt.

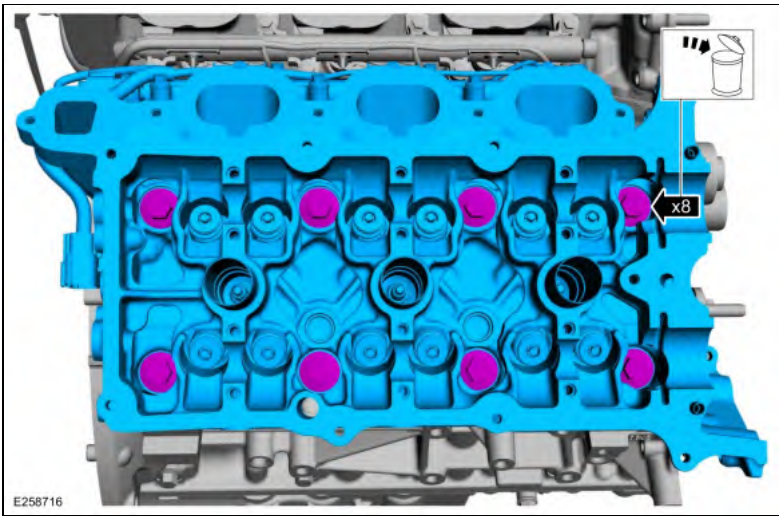


119. **NOTICE:** Place clean shop towels over exposed engine cavities. Carefully remove the towels so foreign material is not dropped into the engine. Any foreign material (including any material created while cleaning gasket surfaces) that enters the oil passages or the oil pan, may cause engine failure.

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

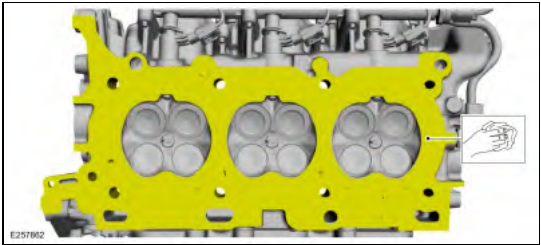
NOTE: The cylinder head bolts must be discarded and new bolts must be installed. They are tighten-to-yield designed and cannot be reused.

- Remove and discard the bolts from the cylinder head.
- Remove the cylinder head.

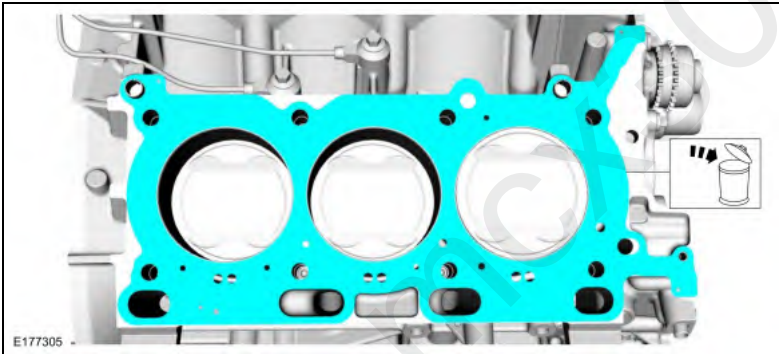


120. **NOTICE:** Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools cause scratches and gouges that make leak paths. Use a plastic scraping tool to remove all traces of the head gasket.

Make sure that the mating faces of the cylinder head are clean and free of foreign material.



121. Remove and discard the cylinder head gasket.



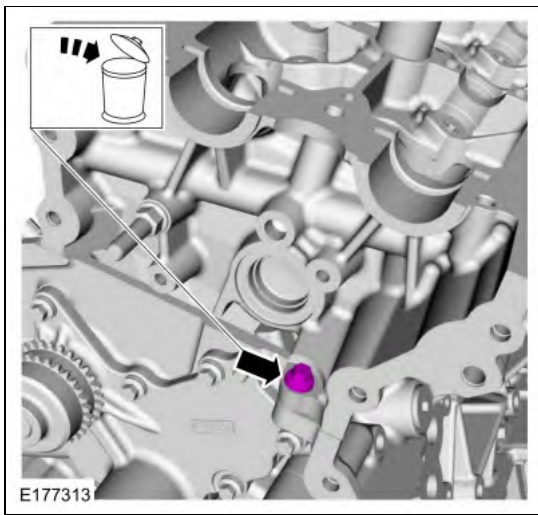
122. **NOTICE:** Place clean, lint-free shop towels over exposed engine cavities. Carefully remove the towels so foreign material is not dropped into the engine. Any foreign material (including any material created while cleaning gasket surfaces) that enters the oil passages or the oil pan, may cause engine failure.

NOTICE: 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.

Make sure that the mating faces of the engine block are clean and free of foreign material.



123. Remove and discard the M6 bolt.

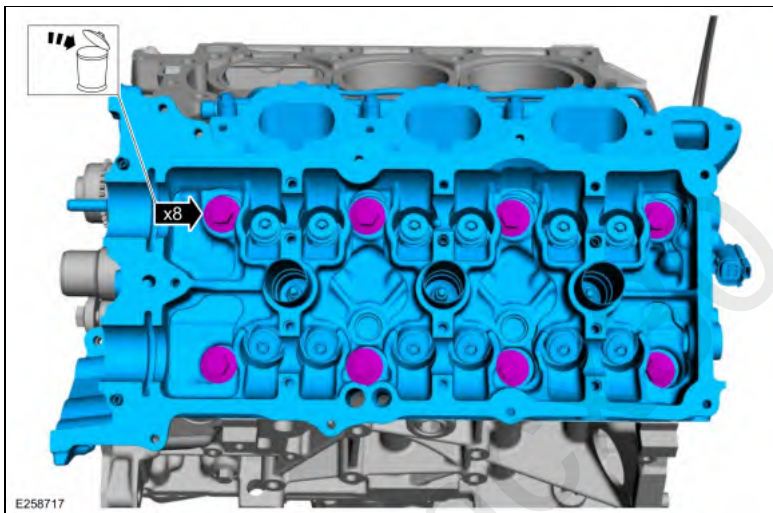


124. **NOTICE:** Place clean shop towels over exposed engine cavities. Carefully remove the towels so foreign material is not dropped into the engine. Any foreign material (including any material created while cleaning gasket surfaces) that enters the oil passages or the oil pan, may cause engine failure.

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

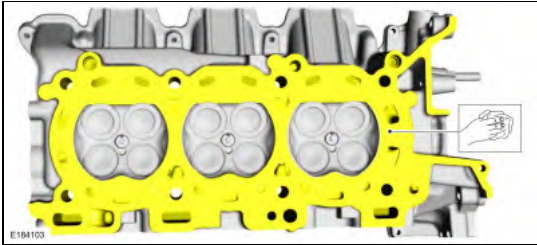
NOTE: The cylinder head bolts must be discarded and new bolts must be installed. They are tighten-to-yield designed and cannot be reused.

- Remove and discard the bolts from the cylinder head.
- Remove the cylinder head.

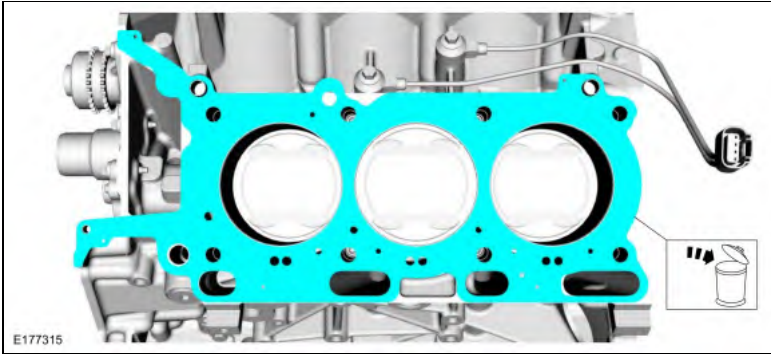


125. **NOTICE:** Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools cause scratches and gouges that make leak paths. Use a plastic scraping tool to remove all traces of the head gasket.

Make sure that the mating faces of the cylinder head are clean and free of foreign material.



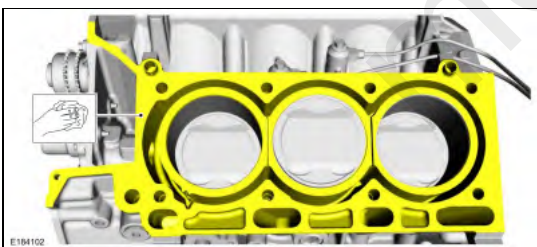
126. Remove and discard the cylinder head gasket.



127. **NOTICE:** Place clean, lint-free shop towels over exposed engine cavities. Carefully remove the towels so foreign material is not dropped into the engine. Any foreign material (including any material created while cleaning gasket surfaces) that enters the oil passages or the oil pan, may cause engine failure.

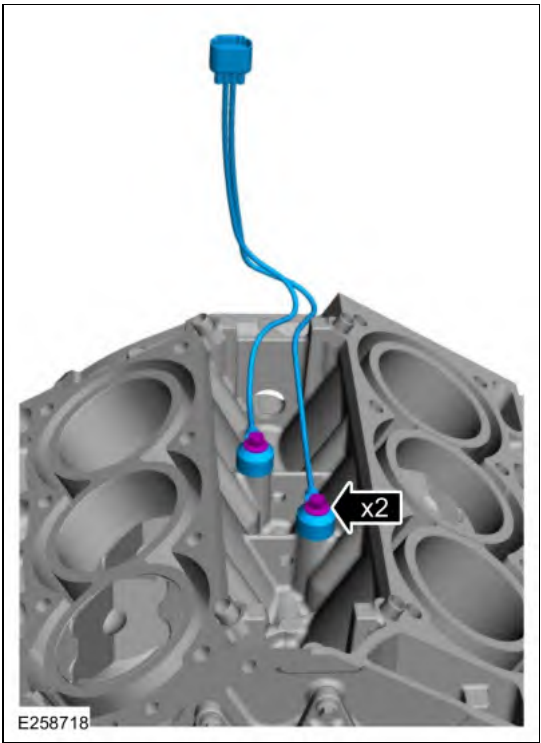
NOTICE: Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools cause scratches and gouges that make leak paths. Use a plastic scraping tool to remove all traces of the head gasket.

Make sure that the mating faces of the engine block are clean and free of foreign material.

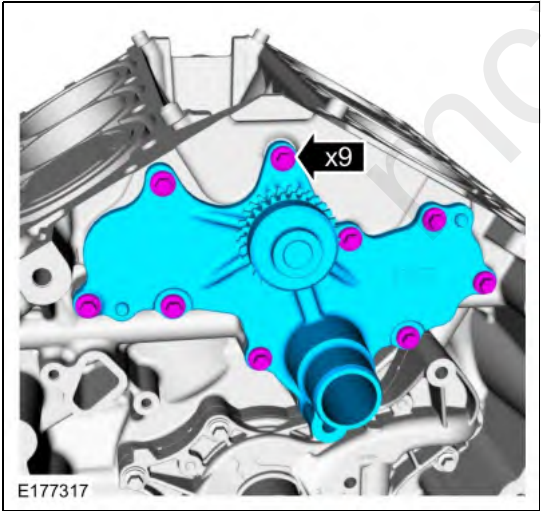


128. Support the cylinder head on a bench with the head gasket side up. Check the cylinder head distortion. Refer to: Cylinder Head Distortion (303-00 Engine System - General Information, General Procedures).

129. Remove the bolts and the K.S.



130. Remove the bolts and the channel cover plate.

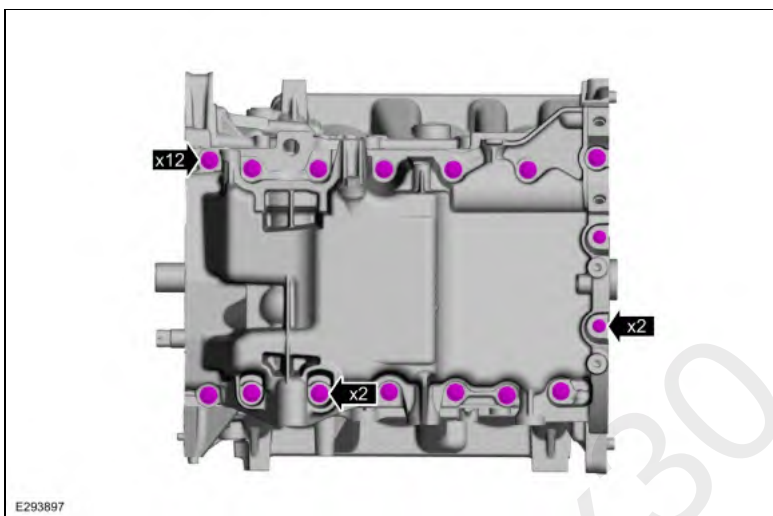


131. Inspect and replace if necessary.

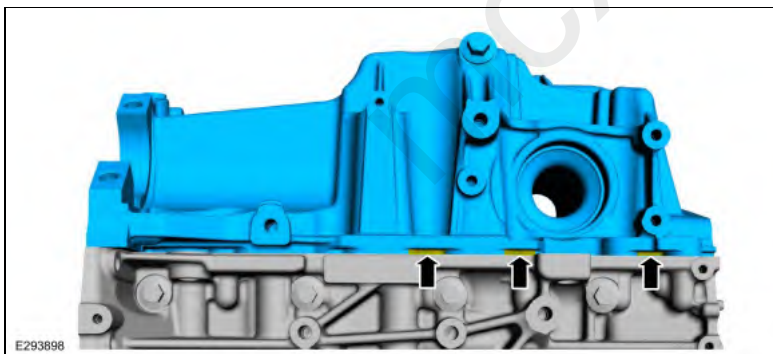


132.

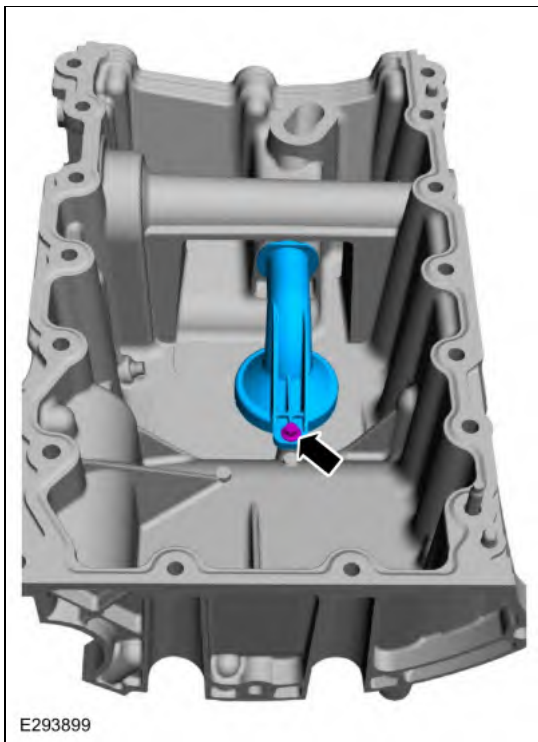
- Rotate the engine so the oil pan is facing upwards.
- Remove the oil pan bolts.



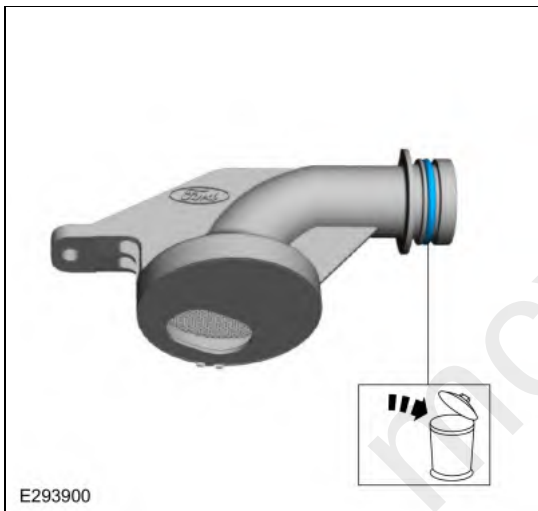
133. Using a pry tool, locate the pry pads at the side of the oil pan and pry the oil pan loose and remove.



134. Remove the bolt and the oil pump screen and pickup tube.

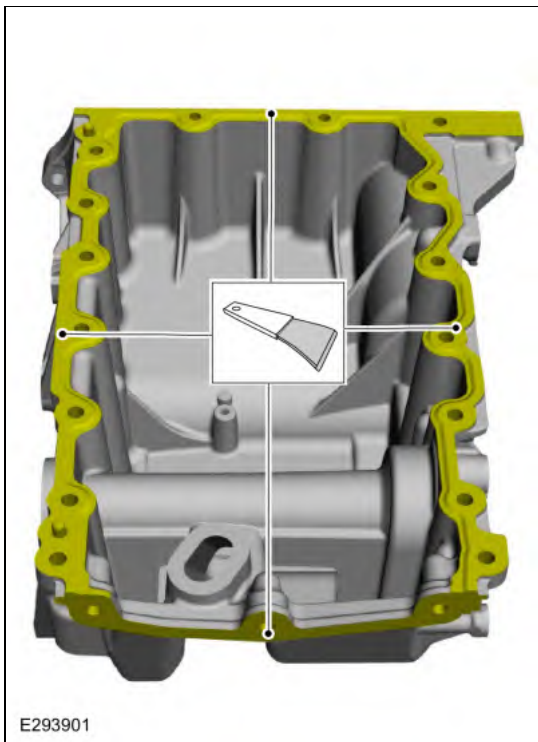


135. Remove and discard the oil pump screen and pickup tube O-ring seal.

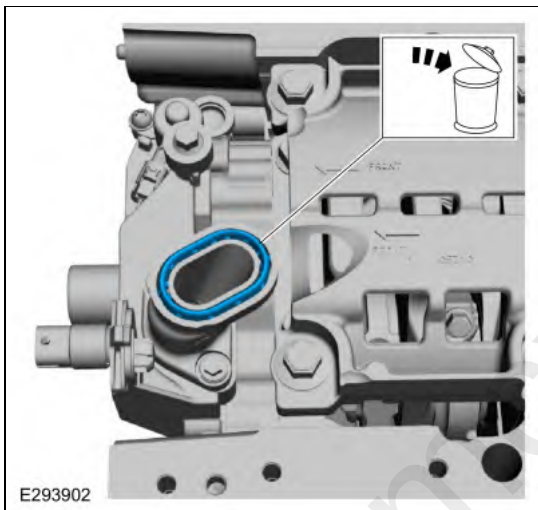


136. **NOTICE:** Only use a 3M[®] Roloc[®] Bristle Disk (2-in white, part number 07528) in a suitable tool turning at the recommended speed of 15,000 rpm, to clean the oil pan. Do not use metal scrapers, wire brushes or any other power abrasive disk to clean. These tools cause scratches and gouges that make leak paths.

- Make sure that the mating faces of the oil pan are clean and free of foreign material.
Refer to: RTV Sealing Surface Cleaning and Preparation (303-00 Engine System - General Information, General Procedures).
Material: Motorcraft[®] Silicone Gasket Remover / ZC-30-A
Material: Motorcraft[®] Metal Brake Parts Cleaner / PM-4-A, PM-4-B
Material: Motorcraft[®] Metal Surface Prep Wipes / ZC-31-B
- Thoroughly wash the oil pan to remove any foreign material, including any abrasive particles created during the cleaning process.



137. Remove and discard the oil pan-to-oil pump seal.



138. **NOTICE:** Do not use wire brushes, power abrasive discs or 3M[®] Roloc[®] Bristle Disk (2-in white, part number 07528) to clean the sealing surfaces of the engine block. These tools cause scratches and gouges that make leak paths. They also cause contamination that causes premature engine failure. Remove all traces of the gasket.

Make sure that the mating faces of the engine block are clean and free of foreign material.

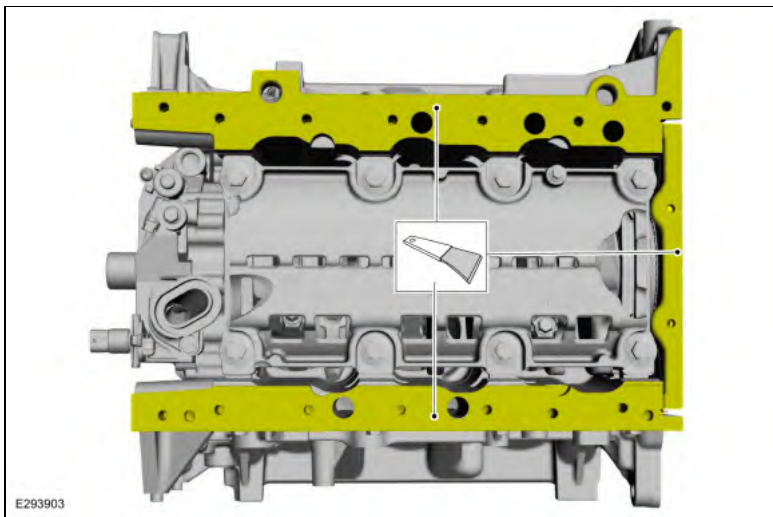
Refer to: RTV Sealing Surface Cleaning and Preparation (303-00 Engine System - General Information, General Procedures).

Use the General Equipment: Plastic Scraper

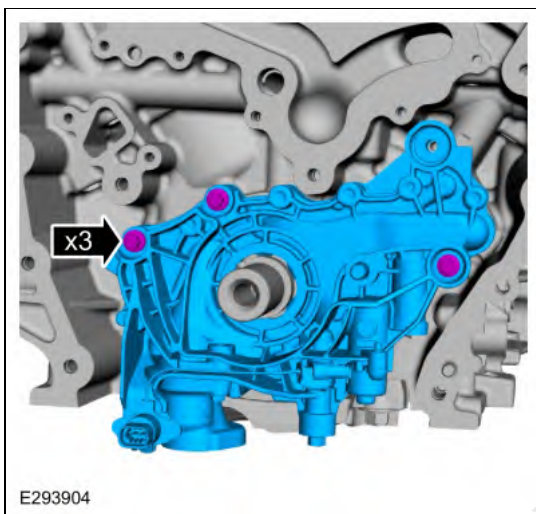
Material: Motorcraft[®] Silicone Gasket Remover / ZC-30-A

Material: Motorcraft[®] Metal Brake Parts Cleaner / PM-4-A, PM-4-B

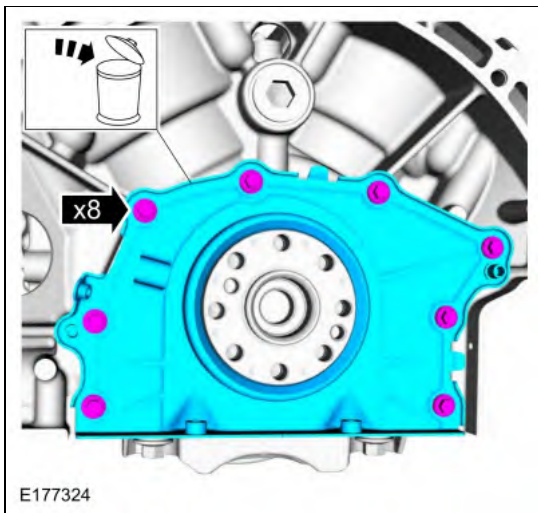
Material: Motorcraft[®] Metal Surface Prep Wipes / ZC-31-B



139. Remove the bolts and the oil pump.



- 140.
- Remove the bolts and the crankshaft rear seal.
 - Discard the crankshaft rear seal.



141. **NOTICE:** Do not use wire brushes, power abrasive discs or 3M[®] Roloc[®] Bristle Disk (2-in white, part number 07528) to clean the sealing surfaces of the engine block. These tools cause scratches and gouges that make leak paths. They also cause contamination that causes premature engine failure. Remove all traces of the gasket.

Make sure that the mating faces is clean and free of foreign material.

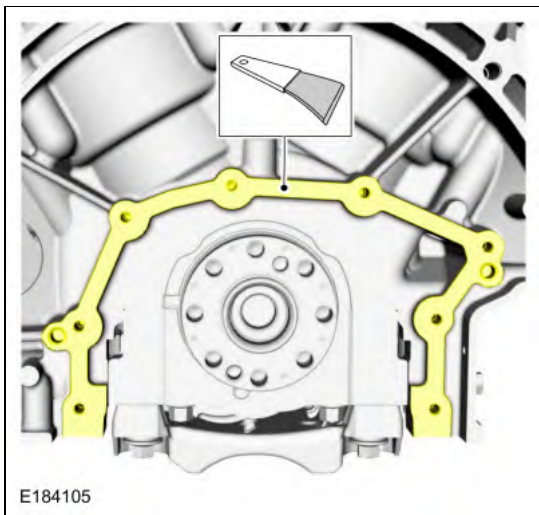
Refer to: RTV Sealing Surface Cleaning and Preparation (303-00 Engine System - General Information, General Procedures).

Use the General Equipment: Plastic Scraper

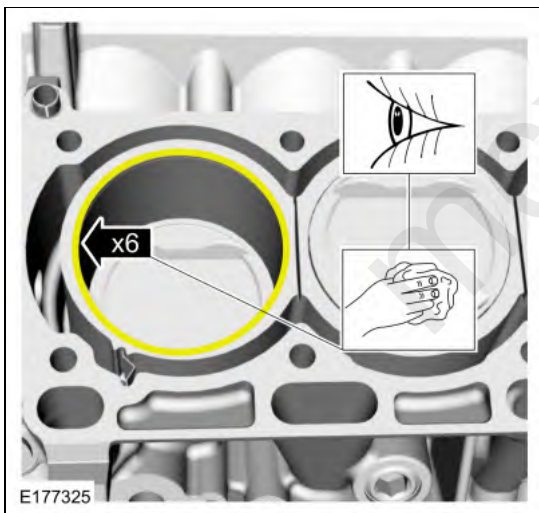
Material: Motorcraft[®] Silicone Gasket Remover / ZC-30-A

Material: Motorcraft[®] Metal Brake Parts Cleaner / PM-4-A, PM-4-B

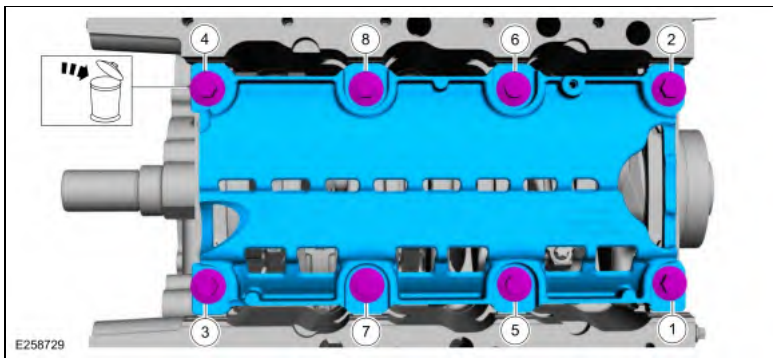
Material: Motorcraft[®] Metal Surface Prep Wipes / ZC-31-B



142. Inspect and clean the specified component with a abrasive pad.



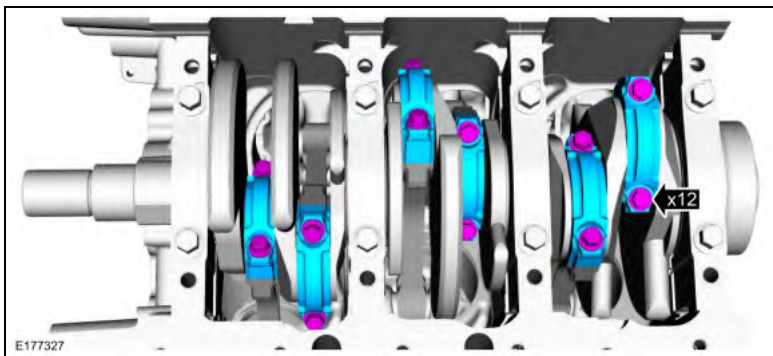
- 143.
- Remove and discard the bolts in the sequence shown.
 - Remove the main bearing cap support brace.



144. **NOTE:** The connecting rod cap bolts are a torque-to-yield design. The original connecting rod cap bolts will be used when measuring the connecting rod large end bore during assembly. The connecting rod cap bolts will be discarded after measurement.

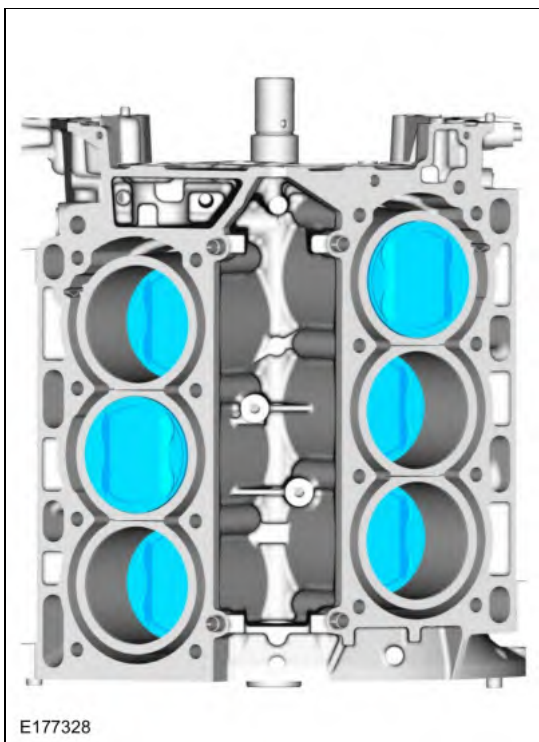
NOTE: Clearly mark the position and orientation of the connecting rods, connecting rod caps and connecting rod bearings for reassembly.

Remove the connecting rod cap bolts and caps.

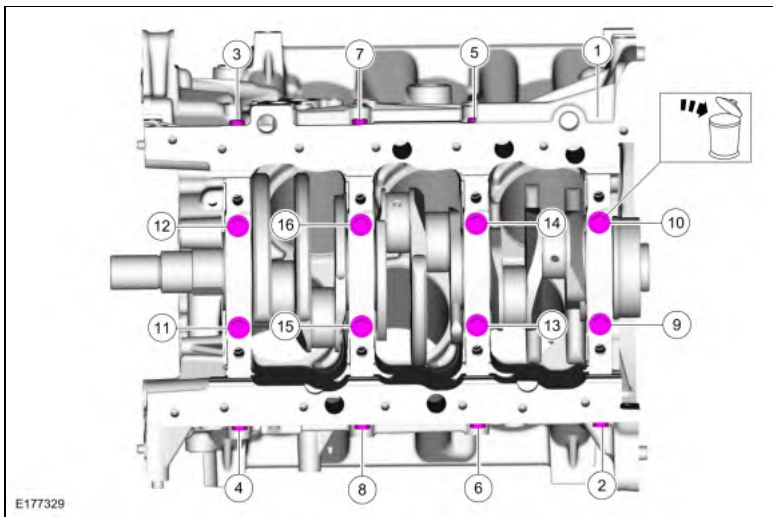


145. **NOTICE:** Do not scratch the cylinder walls or crankshaft journals with the connecting rod while removing the pistons.

Remove the piston/rod assembly from the engine block.



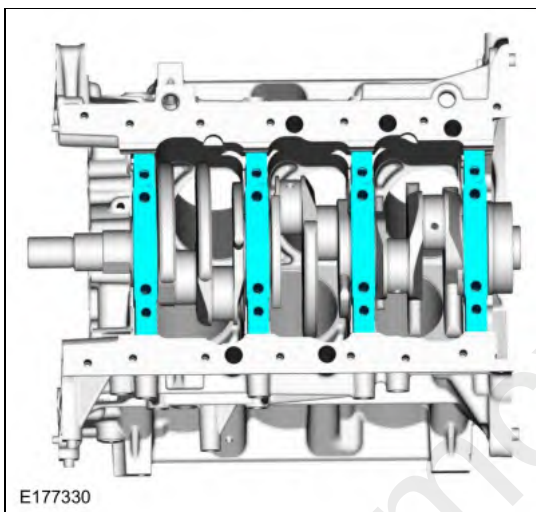
146. Inspect the pistons.
Refer to: Piston Inspection (303-00 Engine System - General Information, General Procedures).
147. **NOTE:** *Clearly mark the position and orientation of the main bearing caps for reassembly.*
Remove and discard the main bearing caps bolts in the sequence shown.



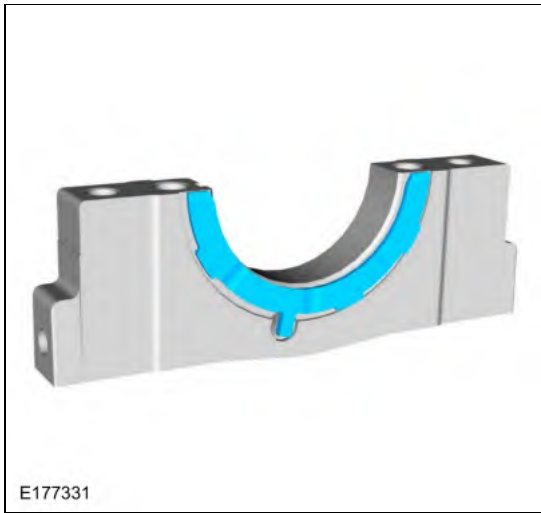
148. **NOTE:** If the main bearings are being reused, mark them for correct position and orientation for reassembly.

NOTE: Note the position of the thrust washer on the outside of the No. 4 rear main bearing cap.

Remove the main bearing caps.

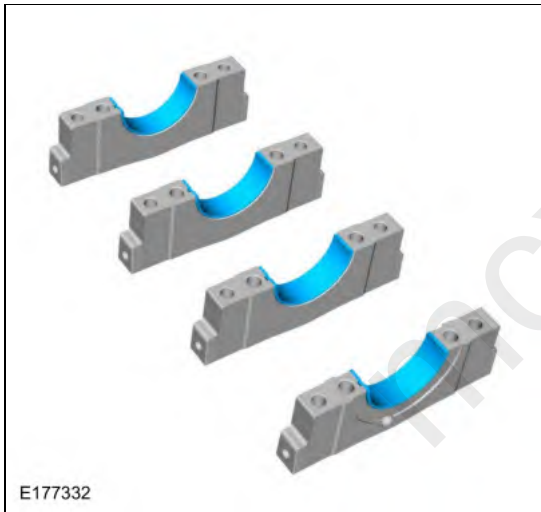


149. Remove the lower crankshaft thrust washer from the back side of the No. 4 rear main bearing cap.



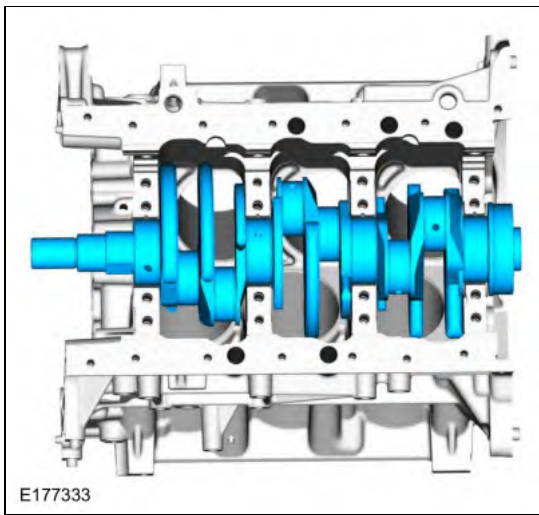
150. **NOTE:** *If the main bearings are being reused, mark them for correct position and orientation for reassembly.*

Remove the crankshaft main bearings from the main bearing caps.

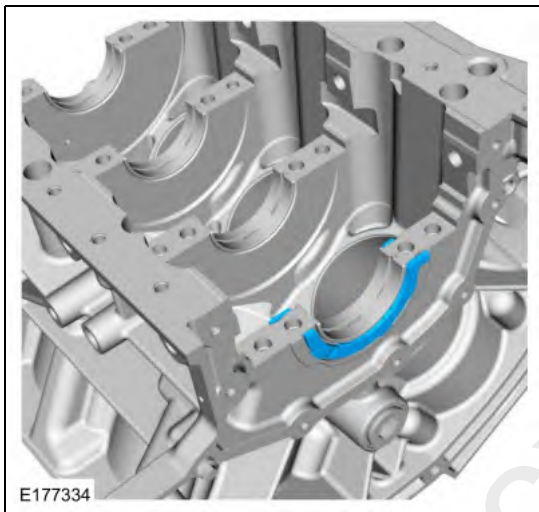


151. **NOTE:** *Note the position of the 2 thrust washers on the inside and outside of the rear main bearing bulkhead.*

Remove the crankshaft.

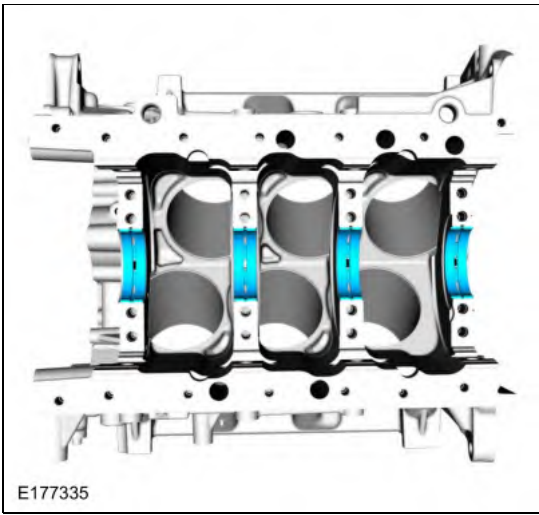


152. Remove the crankshaft thrust bearings from the rear main bearing bulkhead.

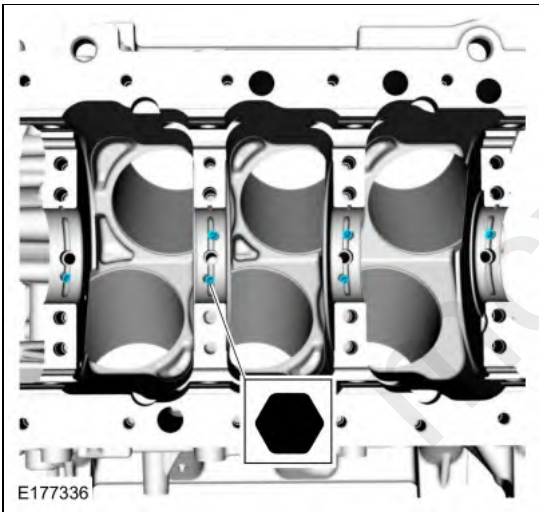


153. **NOTE:** *If the main bearings are being reused, mark them for correct position and orientation for reassembly.*

Remove the crankshaft main bearings from the cylinder block.



154. Using a hex bit, remove the piston oil cool valves.

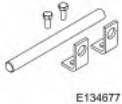


155. Inspect the cylinder block distortion.
Refer to: Cylinder Block Distortion (303-00 Engine System - General Information, General Procedures).

Disassembly and Assembly of Subassemblies

Cylinder Head

Special Tool(s) / General Equipment

 E223048	303-1249 Valve Spring Compressor TKIT-2006UF-FLM TKIT-2006UF-ROW
 E222987	303-1567 Sizer, Teflon Seal TKIT-2010C-FLM
 E134677	303-300 (T87C-6565-A) Set, Valve Spring Compressor TKIT-1988-FESTIVA T88C-1000-ST TKIT-1988-TRACER TKIT-2009TC-F
 E134678	303-350 (T89P-6565-A) Compressor, Valve Spring TKIT-1990-LMH TKIT-1989-F TKIT-1989-FM TKIT-1989-FLM
 E222982	307-005 (T59L-100-B) Slide Hammer
 E223046	310-205 Fuel Injector Brush
 E168032	310-206 Remover, Fuel Injector TKIT-2009A-FLM
 E223047	310-207 Installer, Fuel Injector Seal Assembly TKIT-2009A-FLM

DISASSEMBLY

LH cylinder head

1. Remove the bolts and the exhaust manifold heat shield.