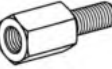


Engine

Special Tool(s) / General Equipment

 E129694	100-001 (T50T-100-A) Slide Hammer
 E139373	100-002 (TOOL-4201-C) Holding Fixture with Dial Indicator Gauge
 E234289	205-036 (T70P-4067-A) Wrench
	303-050 (T70P-6000) Lifting Bracket, Engine
 E222983	303-103 (T74P-6375-A) Holding Tool, Flywheel T74P-77000-A TKIT-2009TC-F
	303-1509 Installer, Front Crank Seal TKIT-2009C-F TKIT-2009C-ROW
 E318524	303-1509-01 6.7L Front Seal Installer
	303-1514 Installer, Rear Crank Seal TKIT-2009C-F TKIT-2009C-ROW
	303-1517 Adapter, Camshaft Remover/Installer TKIT-2009C-F TKIT-2009C-ROW
	303-1518 Bracket, Engine Removal TKIT-2009C-F TKIT-2009C-ROW
	303-214 (T83T-6312-B) Wrench, Fan Clutch Nut
Feeler Gauge	
Strap Wrench	
Floor Crane	
Mounting Stand	
Hose Clamp Remover/Installer	
Piston Ring Compressor	

Materials

Name	Specification

Motorcraft® Thread Sealant with PTFE TA-24-B	WSK-M2G350-A2
Motorcraft® High Performance Engine RTV Silicone TA-357	WSE-M4G323-A6
Motorcraft® Metal Surface Prep Wipes ZC-31-B	-

NOTICE: During engine repair procedures, cleanliness is extremely important. Any foreign material, including any material created while cleaning gasket surfaces that enters the oil passages, coolant passages or the oil pan, may cause engine failure.

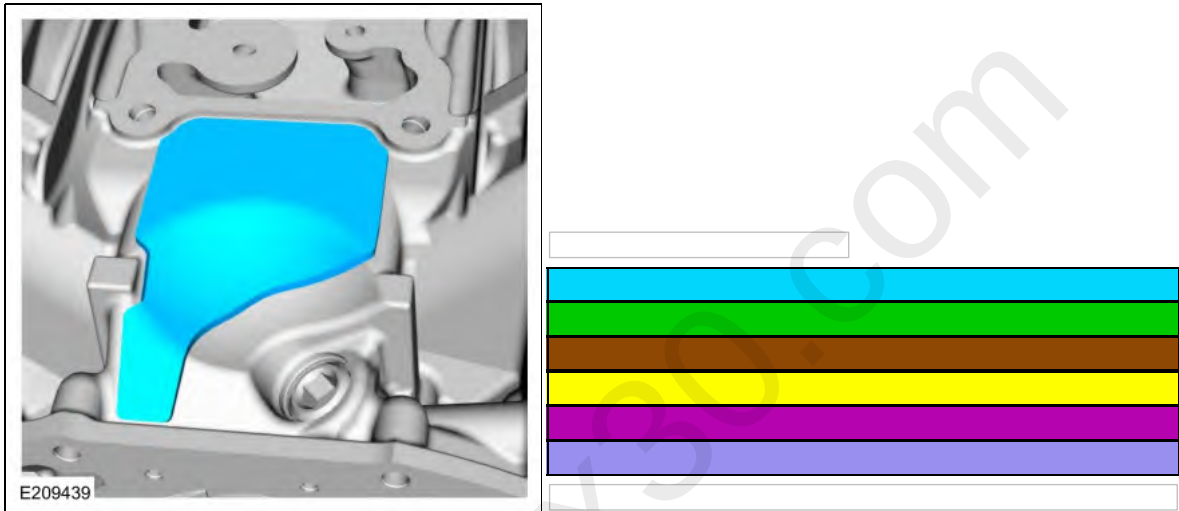
NOTE: This procedure assumes the engine will be installed using the recommended body off engine installation procedure. If it will be necessary to install the engine using the alternate body on engine installation procedure, some of the components in this procedure should not be installed at this time. Refer to Engine - Body On in this section.

NOTE: During the repair or installation of fuel-related components, cap, tape or otherwise appropriately protect all fuel opening to prevent the ingress of dirt or other contamination. Remove caps, tape and other protective materials prior to installation.

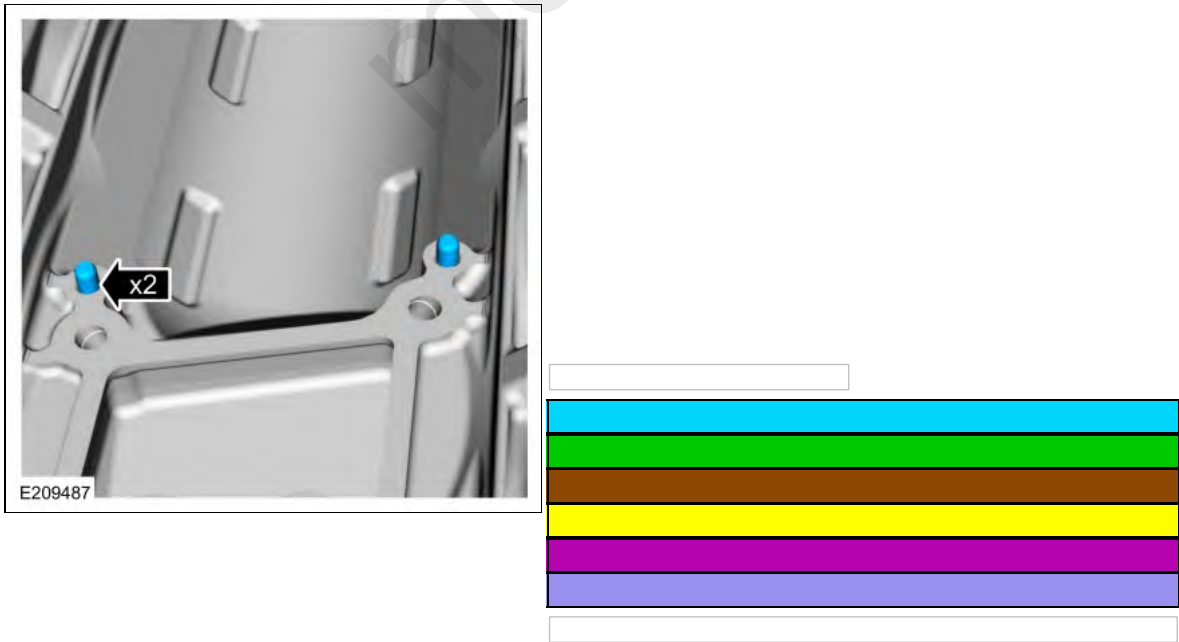
NOTE: Refer to the exploded view under the Engine Component View in the Description and Operation.

NOTE: For EXPORT ONLY vehicles (outside US/Canada) an Export Supplement is provided and should be referenced to identify differences that can impact service procedures. Vehicles can be identified by referring to the underhood Vehicle Emission Control Information (VECI) label which states, "Not certified for US EPA or CARB Regulations".

1. If removed, install a new cylinder block zero clearance patch on the engine.

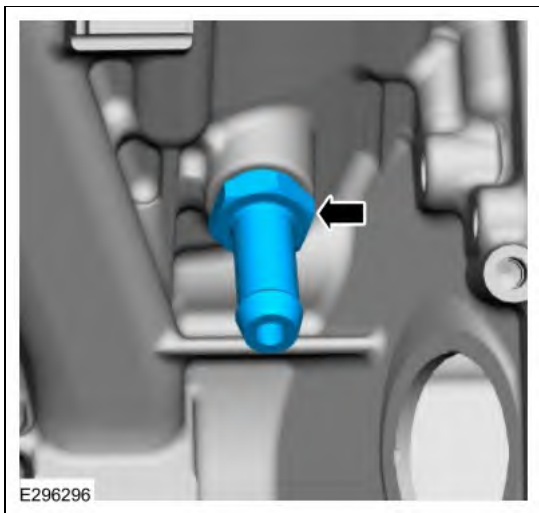


2. If removed, install the turbocharger alignment dowels.



3. If removed, apply thread sealant to the threads and install the oil cooler coolant fitting.

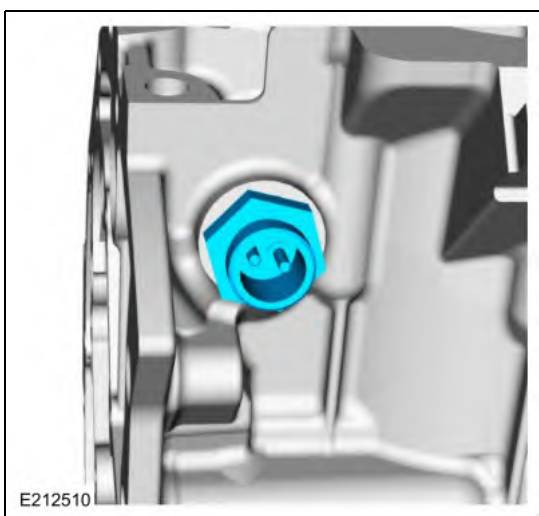
Material: Motorcraft® Thread Sealant with PTFE / TA-24-B (WSK-M2G350-A2)
Torque: 30 lb.ft (40 Nm)



4. If equipped, apply clean engine coolant to the O-ring seal and install the block heater.

Refer to: Specifications (303-03B Engine Cooling - 6.7L Power Stroke Diesel, Specifications).

Torque: 30 lb.ft (40 Nm)



5. **NOTE:** Only one pipe plug shown.

NOTE: Apply thread sealant to the threads prior to installing.

If removed, install the pipe plugs.

Material: Motorcraft® Thread Sealant with PTFE / TA-24-B (WSK-M2G350-A2)

Torque:

3/4 x 14 cylinder block plug (HP oil):

Stage 1: 177 lb.in (20 Nm)

Stage 2: 720 Å°

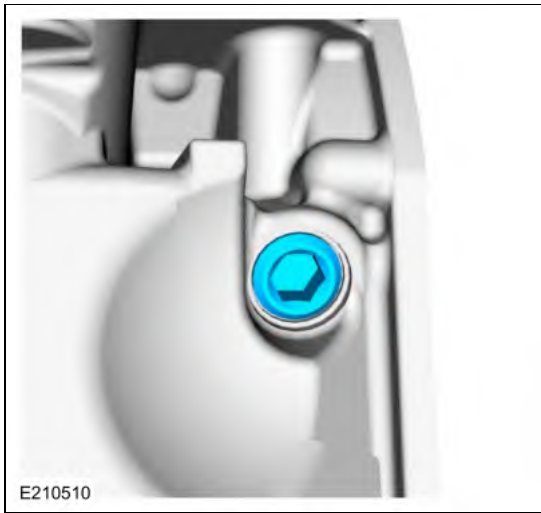
1/2 x 14 cylinder block upper plug (HP oil):

Stage 3: 30 lb.ft (40 Nm)

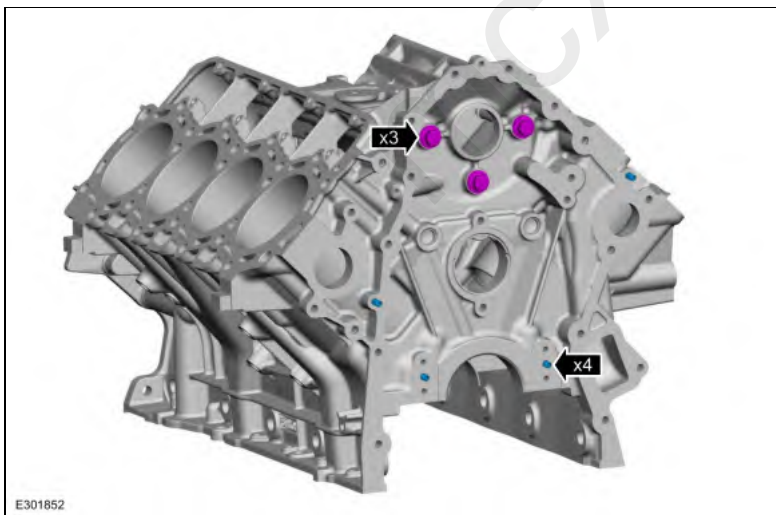
Stage 4: 360 Å°

1/2 x 14 cylinder block lower plug (water jacket drains) : 30 lb.ft (40 Nm)

M27 x 2 x 6 cylinder block heater plug : 53 lb.ft (72 Nm)



- 6.
- Install the high-pressure fuel injection pump mounting bolts.
- Torque: 35 lb.ft (48 Nm)*
- If removed, install the roll pin(s).

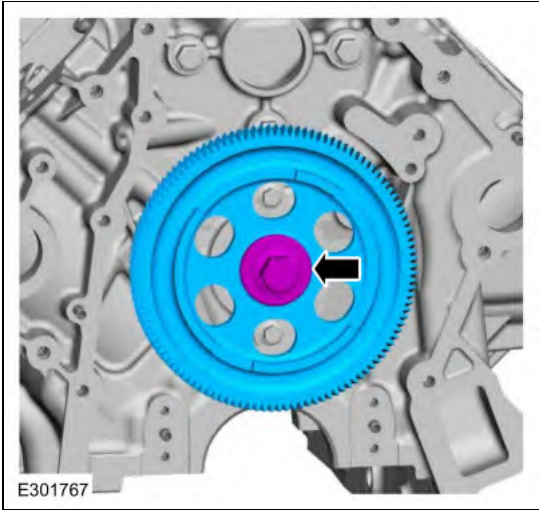


7. **NOTE:** Only one piston cooling tube shown.

Lubricate with clean engine oil and install the piston cooling tubes and the bolts.
 Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).
Torque: 89 lb.in (10 Nm)

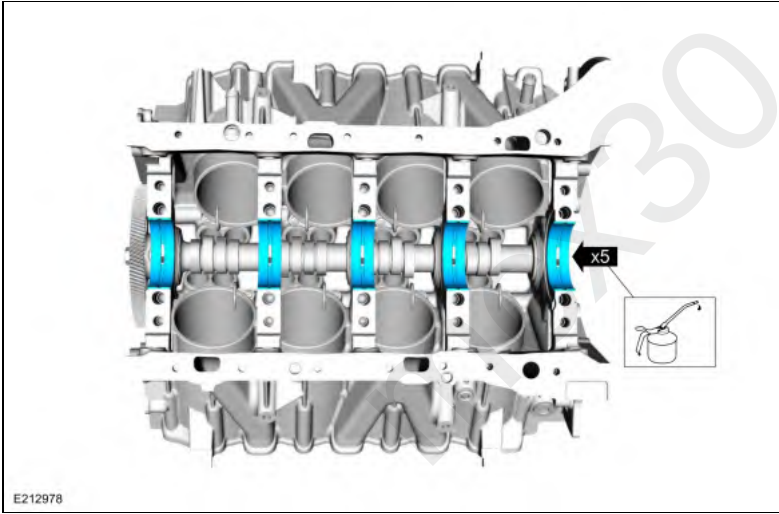
10. **NOTE:** Use a suitable tool in the top camshaft gear hole to prevent the camshaft from turning. Make sure the suitable tool is secured against the cylinder block prior to tightening the camshaft bolt.

Install the camshaft gear and bolt.
Torque:
Stage 1: 52 lb.ft (70 Nm)
Stage 2: 60 Å°



11. **NOTICE:** The crankshaft bearings are tangless and must be positioned in the center of the bearing cap or engine damage may occur.

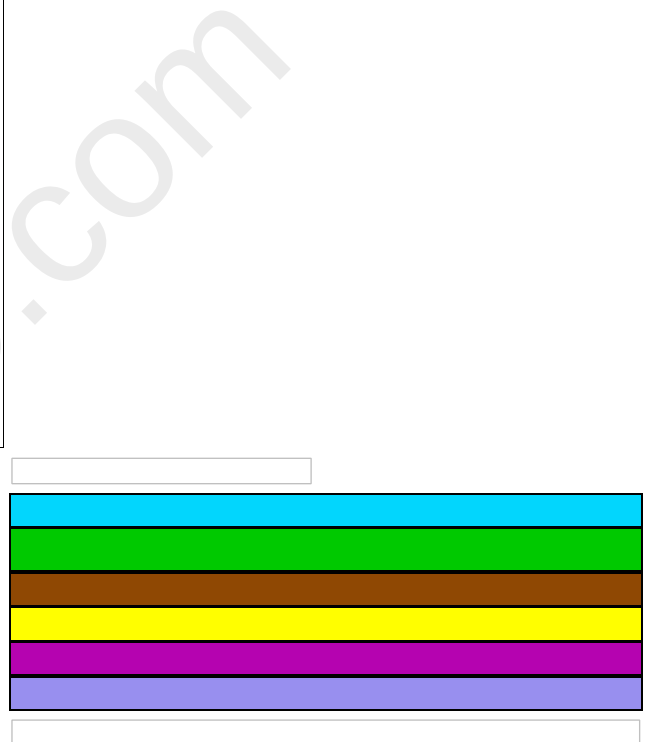
NOTE: Verify there is no debris in the saddles in the cylinder block or main bearing caps
Lubricate with clean engine oil and install the new upper crankshaft main bearings into the cylinder block.
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).



12. Position the camshaft with the 2 timing marks pointing up.

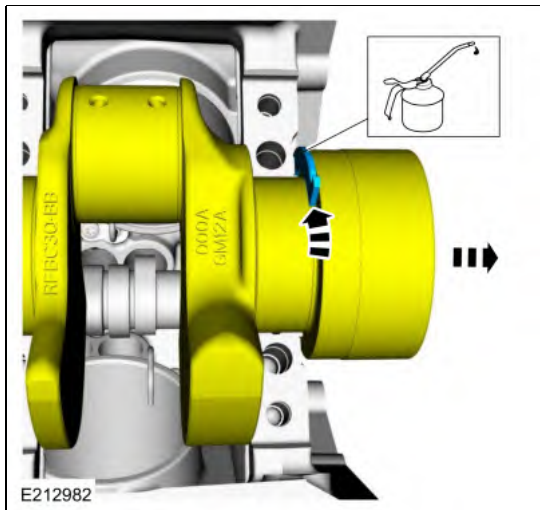


Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).



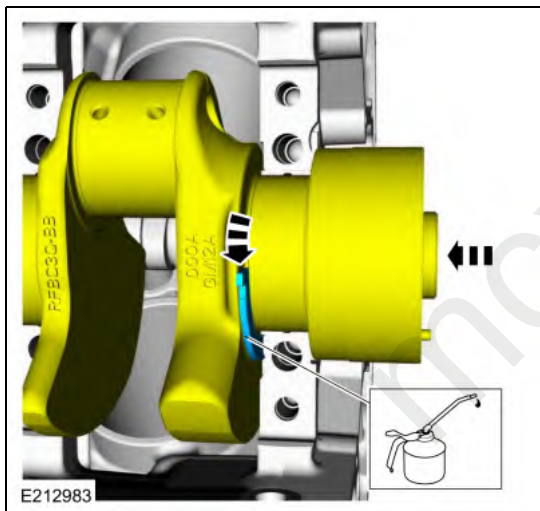
15. **NOTE:** Assemble the grooved side of the upper crankshaft main bearing thrust washer toward the crankshaft thrust surface.

- Apply clean engine oil to the thrust faces of the crankshaft prior to installing the upper crankshaft main bearing thrust washers. Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).
- Push the crankshaft rearward and install the upper crankshaft main bearing thrust washer to the rear of the number 5 bulkhead.



16. **NOTE:** Assemble the grooved side of the upper crankshaft main bearing thrust washer toward the crankshaft thrust surface.

- Apply clean engine oil to the thrust faces of the crankshaft prior to installing the upper crankshaft main bearing thrust washers. Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).
- Push the crankshaft forward and install the upper crankshaft main bearing thrust washer to the front of the number 5 bulkhead.



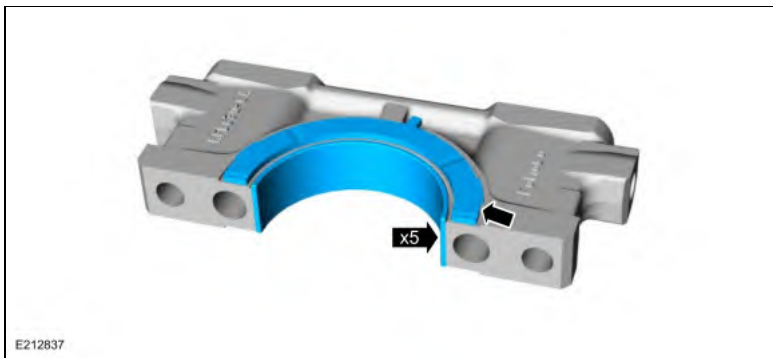
17. **NOTICE:** The crankshaft bearings are tangless and must be positioned in the center of the bearing cap or engine damage may occur.

NOTE: Assemble the grooved side of the lower crankshaft main bearing thrust washer toward the crankshaft thrust surface.

NOTE: The thrust washer tang will be positioned in a groove.

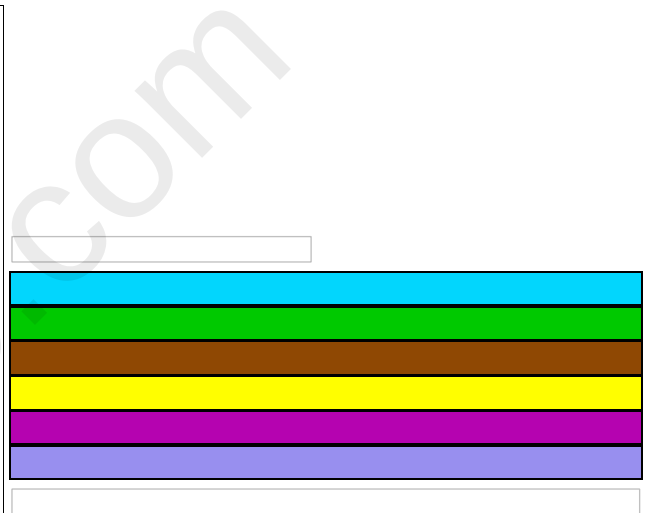
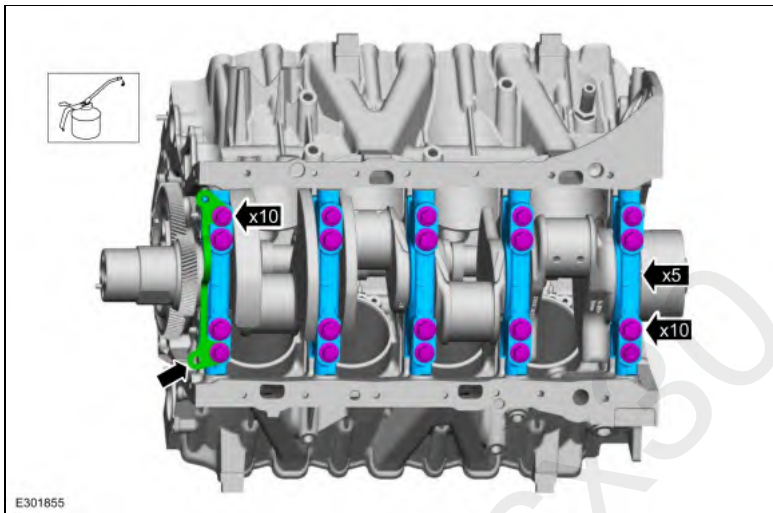
NOTE: Only one lower bearing shown.

Install the new lower crankshaft main bearings into the crankshaft main bearing caps. Position the lower crankshaft main bearing thrust washer on the number 5 crankshaft main bearing cap.



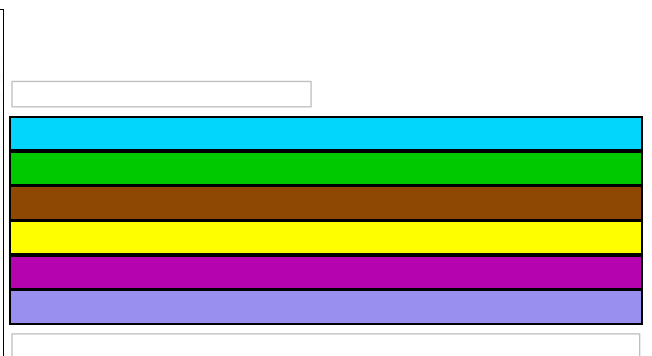
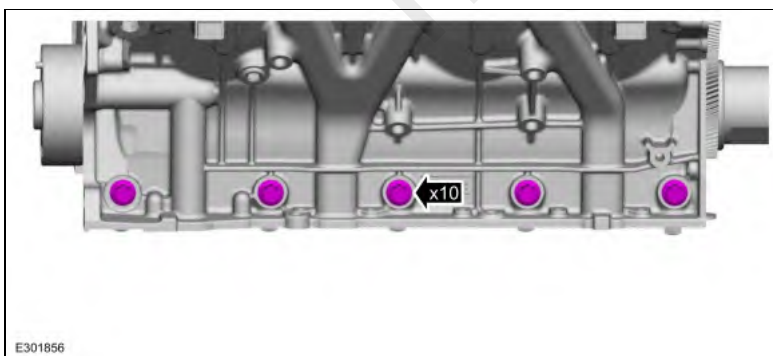
18. **NOTE:** Do not use the bolts to seat the crankshaft main bearing caps.

- Position commercially available plastigage in the center of each main bearing cap.
- Apply clean engine oil to the lower crankshaft main bearing thrust washer and to the rear face of number 5 crankshaft main bearing cap. Align the tab on the thrust washer with the slot in the number 5 main bearing cap.
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).
- Apply clean engine oil to the remaining lower crankshaft main bearings. Install the crankshaft main bearing caps in the cylinder block.
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).
- Install the oil pump support bracket and loosely install the crankshaft main bearing cap bolts.



19. **NOTE:** RH side shown, LH side similar.

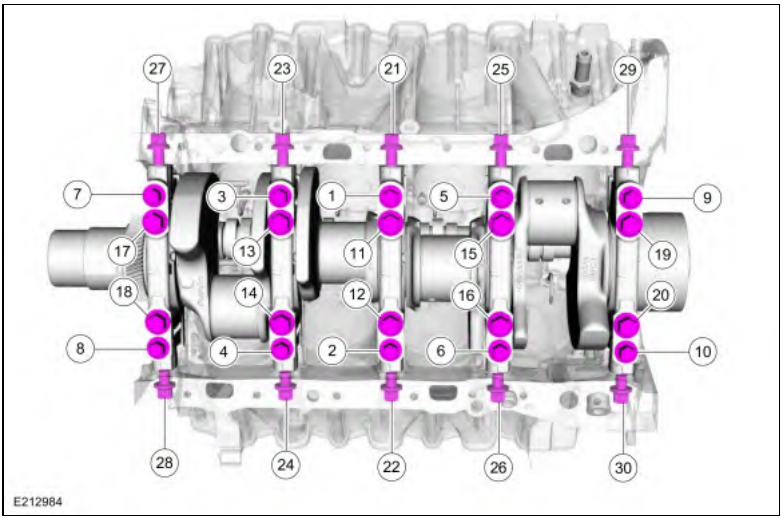
Loosely install the crankshaft main bearing cap side bolts.



20. Snug all the bolts. Tighten the crankshaft main bearing cap bolts.

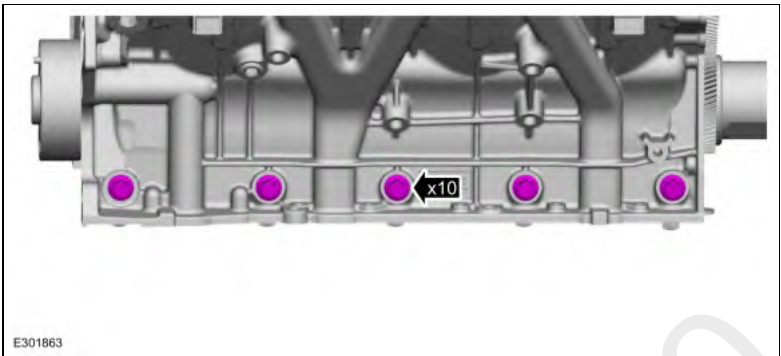
Torque:

- Stage 1: Tighten bolts 1 through 20 to : 177 lb.in (20 Nm)
- Stage 2: Tighten bolts 1 through 10 to : 59 lb.ft (80 Nm)
- Stage 3: Tighten bolts 11 through 20 to : 118 lb.ft (160 Nm)
- Stage 4: Tighten bolts 1 through 20 an additional : 90 Å°
- Stage 5: Tighten bolts 21 through 30 to : 30 lb.ft (40 Nm)
- Stage 6: Tighten bolts 21 through 30 an additional : 90Å°

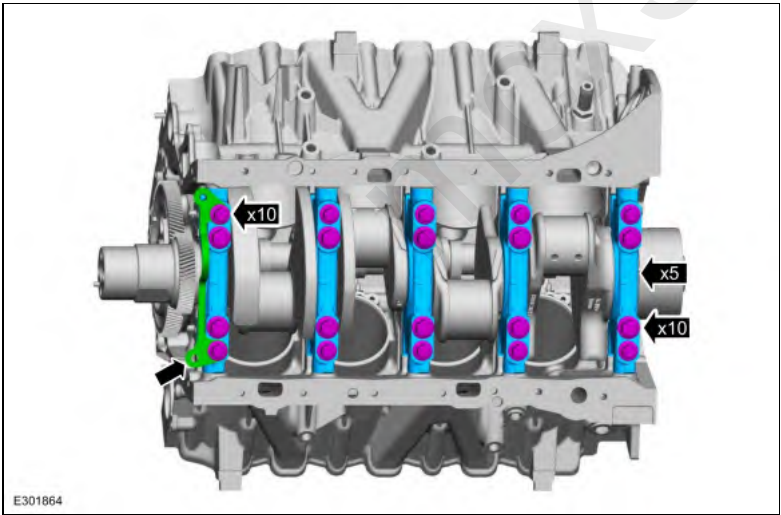


21. **NOTE:** *RH side shown, LH side similar.*

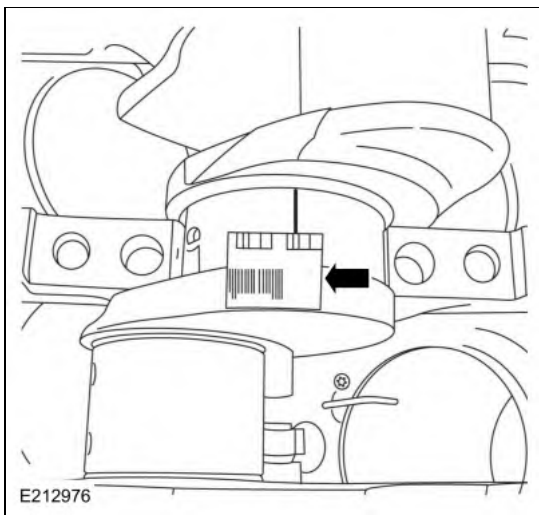
Remove the crankshaft main bearing cap side bolts.



- 22.
- Remove the crankshaft main bearing cap bolts and the oil pump support bracket.
 - Remove the crankshaft main bearing caps.

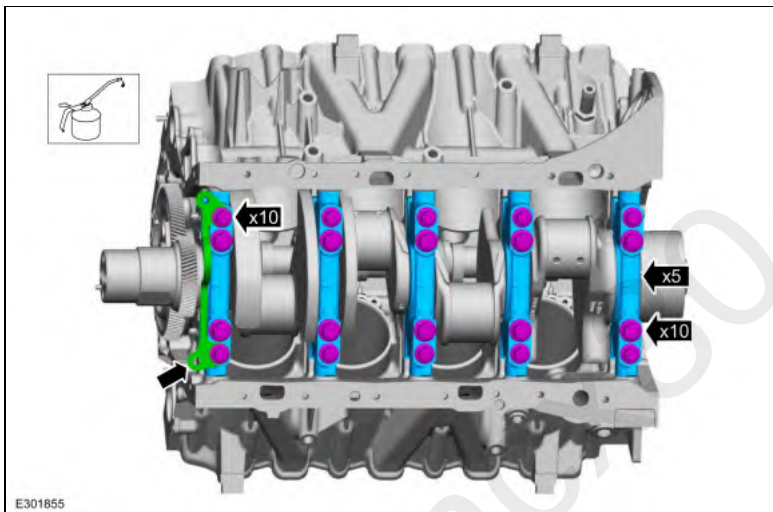


23. Measure the clearances for the crankshaft main bearing caps.
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).



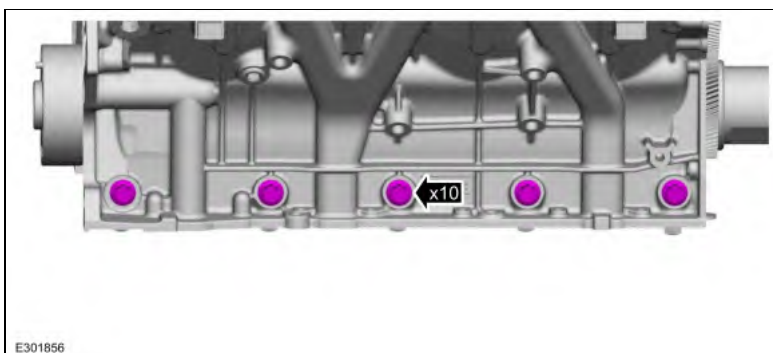
24. **NOTE:** Do not use the bolts to seat the crankshaft main bearing caps.

- Apply clean engine oil to the lower crankshaft main bearing thrust washer and to the rear face of number 5 crankshaft main bearing cap. Align the tab on the thrust washer with the slot in the number 5 main bearing cap.
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).
- Apply clean engine oil to the remaining lower crankshaft main bearings. Install the crankshaft main bearing caps into the cylinder block.
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).
- Install the oil pump support bracket and loosely install the crankshaft main bearing cap bolts.



25. **NOTE:** RH side shown, LH side similar.

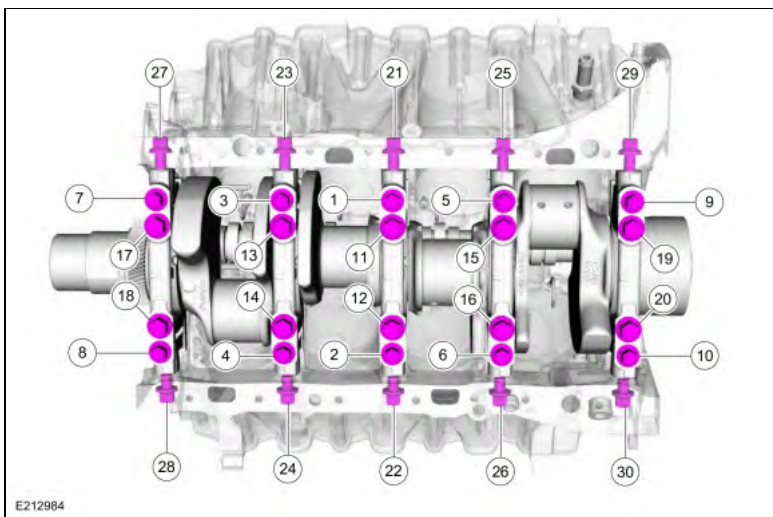
Loosely install the crankshaft main bearing cap side bolts.



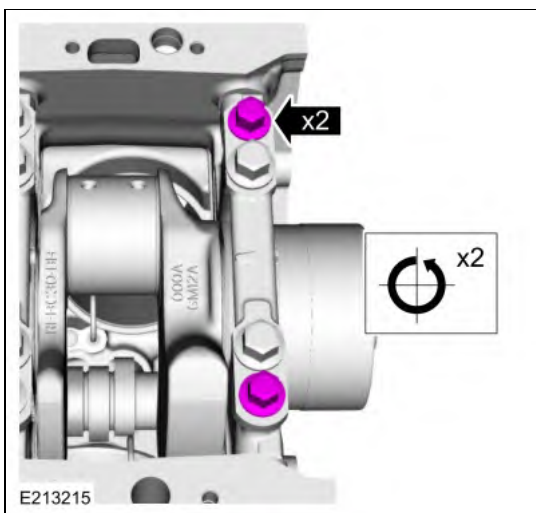
26. Snug all the bolts. Tighten the crankshaft main bearing cap bolts.

Torque:

Tighten bolts 1 through 20 to : 177 lb.in (20 Nm)



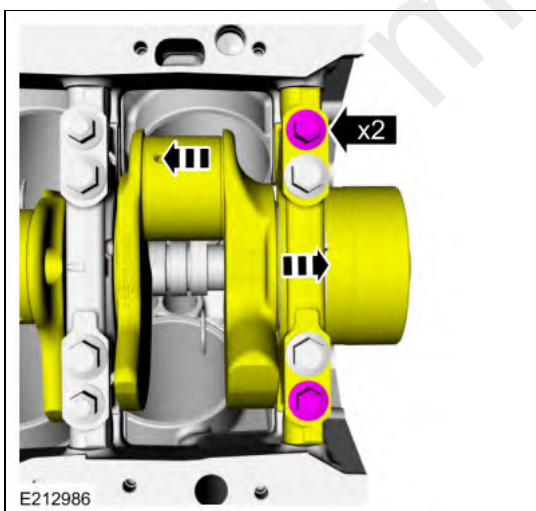
27. Back off the number 9 and 10 bolts.



28.

- Push the crankshaft forward and the number 5 crankshaft main bearing cap rearward to align the crankshaft rear thrust washers.
- Continue to hold the crankshaft forward and the number 5 crankshaft main bearing cap rearward against the crankshaft thrust surface while tightening the outer bolts 9 and 10 on the crankshaft main bearing cap.

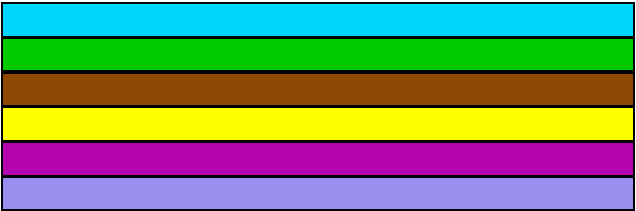
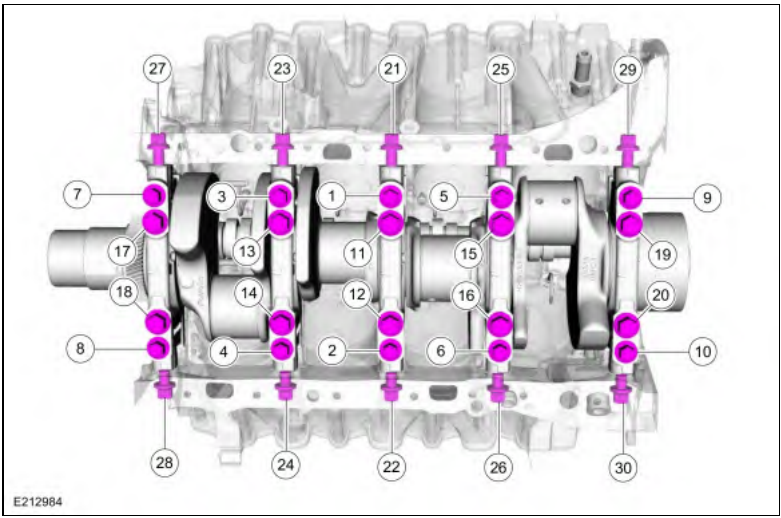
Torque: 177 lb.in (20 Nm)



29. Tighten the crankshaft main bearing cap bolts.

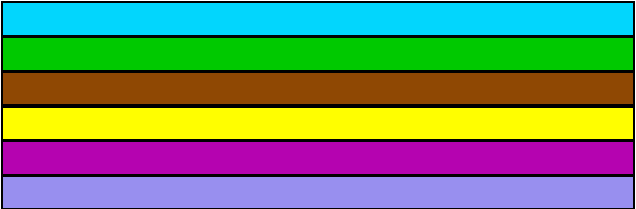
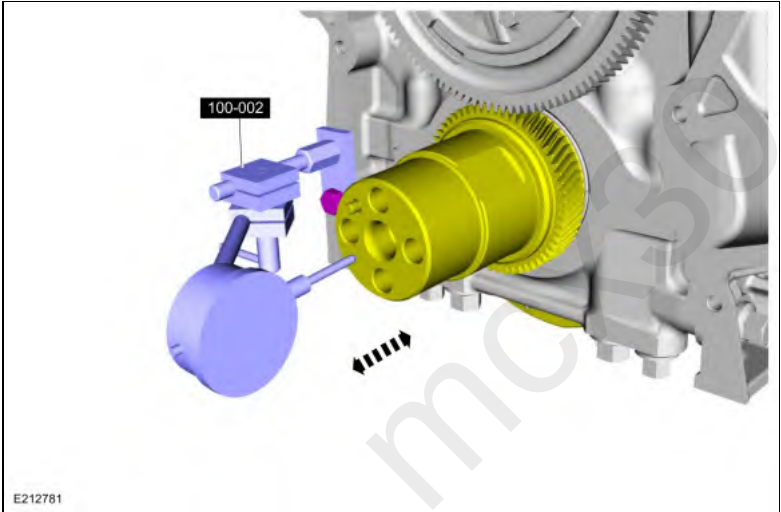
Torque:

- Stage 1: Tighten bolts 1 through 10 to : 59 lb.ft (80 Nm)
- Stage 2: Tighten bolts 11 through 20 to : 118 lb.ft (160 Nm)
- Stage 3: Tighten bolts 1 through 20 an additional : 90 Å°
- Stage 4: Tighten bolts 21 through 30 to : 30 lb.ft (40 Nm)
- Stage 5: Tighten bolts 21 through 30 an additional : 90Å°



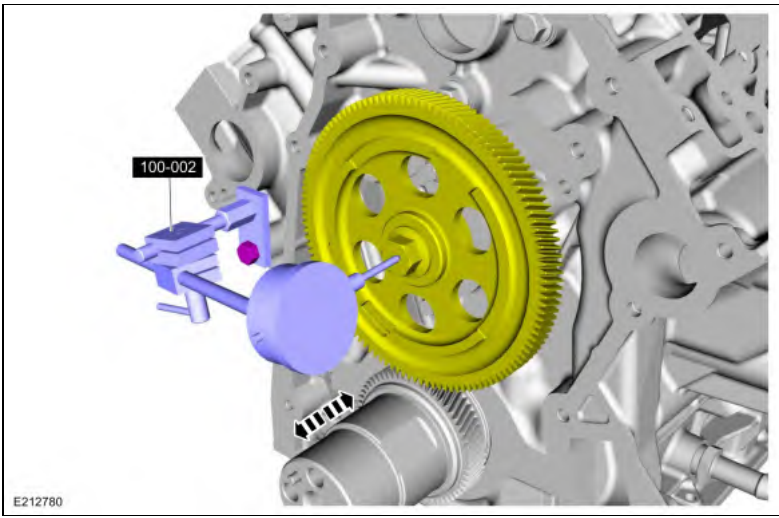
30. Using the special tool, measure the crankshaft end play.

Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).
Use Special Service Tool: 100-002 (TOOL-4201-C) Holding Fixture with Dial Indicator Gauge.

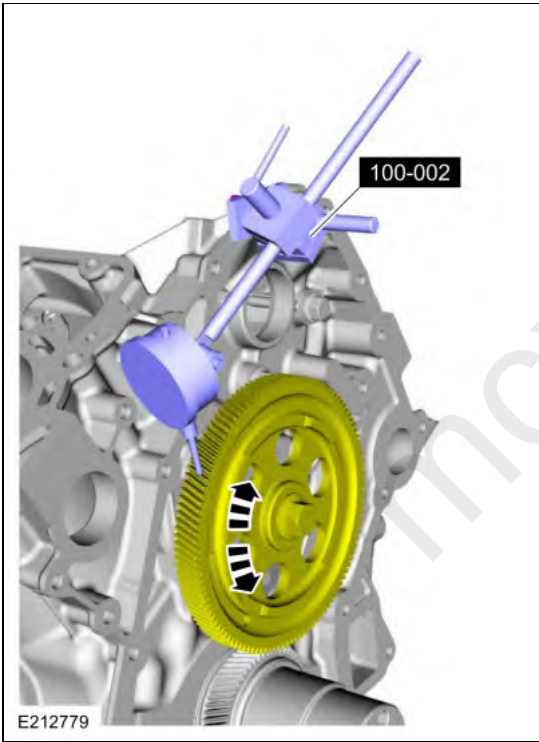


31. Using the special tool, measure the camshaft end play.

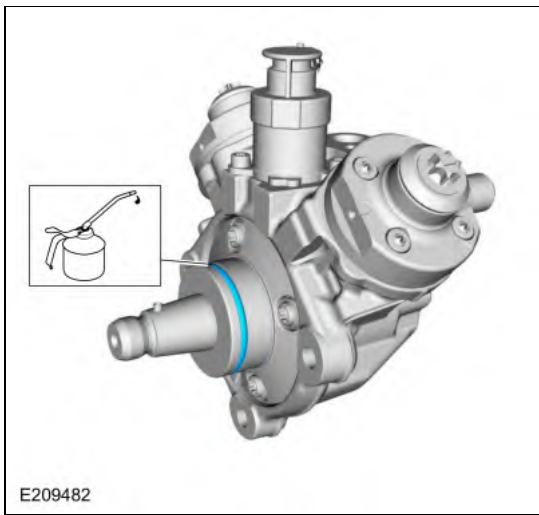
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).
Use Special Service Tool: 100-002 (TOOL-4201-C) Holding Fixture with Dial Indicator Gauge.



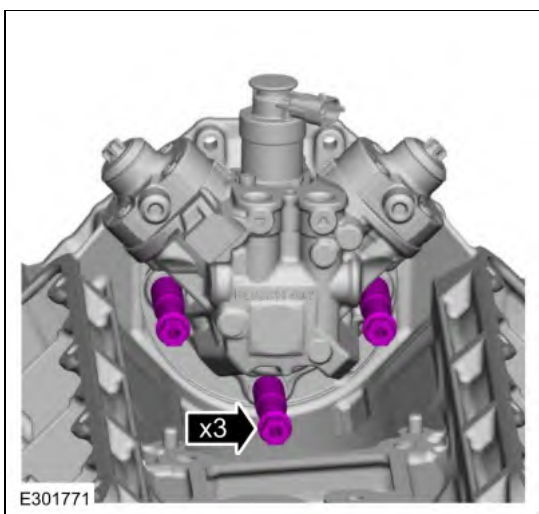
32. Using the special tool, measure the camshaft gear backlash.
- Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).
Use Special Service Tool: 100-002 (TOOL-4201-C) Holding Fixture with Dial Indicator Gauge.



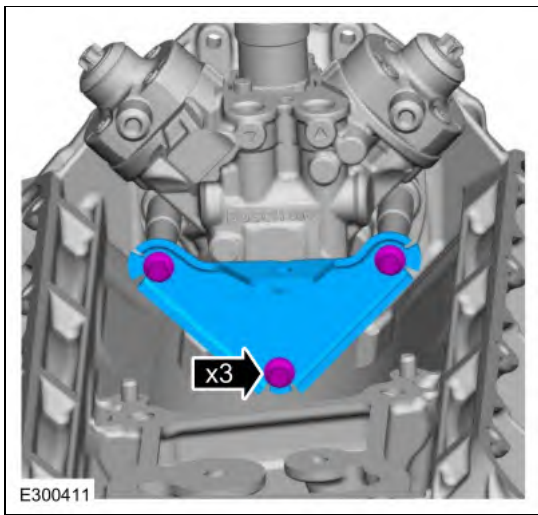
33. Install a new high-pressure fuel injection pump O-ring seal and lubricate with clean engine oil.
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).



34. Install the high-pressure fuel injection pump and the high-pressure fuel injection pump spacers.
Torque: 18 lb.ft (24 Nm)

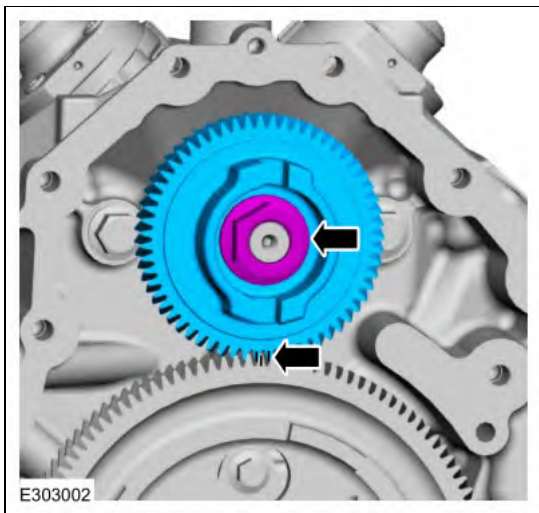


35. Install the fuel rail supply tube bracket and the bolts.
Torque: 89 lb.in (10 Nm)



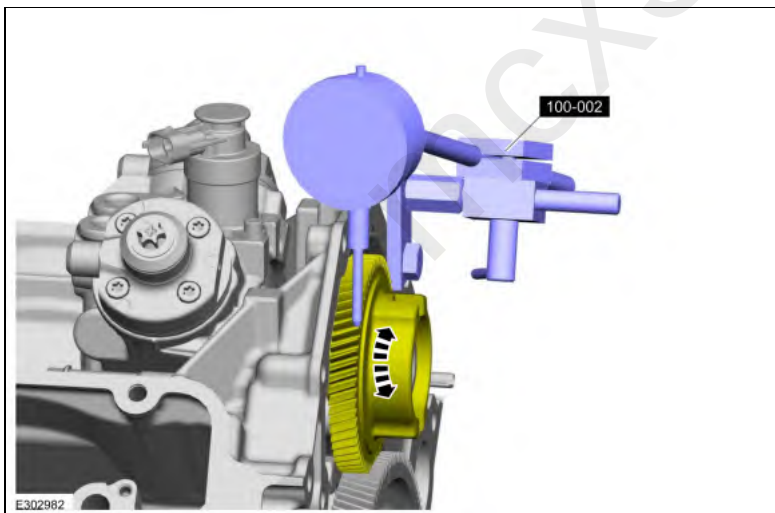
36. **NOTE:** The crankshaft gear contains a single timing mark. The camshaft gear contains a single timing mark and a double timing mark. The high-pressure fuel injection pump gear contains a double timing mark. The engine is timed correctly when the single mark on the crankshaft gear is aligned with the double mark on the camshaft gear, and the single mark on the camshaft gear is aligned with the double mark on the high-pressure fuel injection pump gear. Additionally, the keyway on the high-pressure fuel injection pump drive gear must be at 12 o'clock position.

- Install the high pressure fuel injection pump drive gear and the nut.
Torque: 59 lb.ft (80 Nm)
- Verify the timing marks are aligned.



37. Using the special tool, check the high-pressure fuel injection pump drive gear backlash.

Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).
Use Special Service Tool: 100-002 (TOOL-4201-C) Holding Fixture with Dial Indicator Gauge.



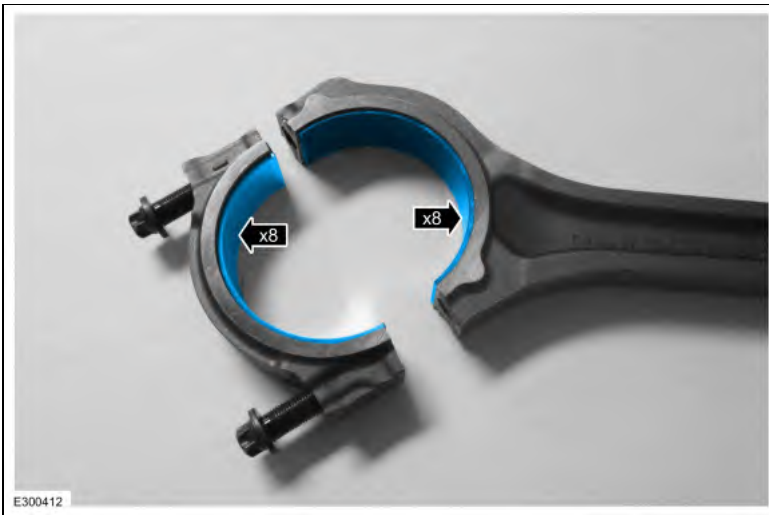
38. **NOTICE:** The connecting rods are powdered metal cracked rods. Make sure the connecting rod and cap are installed as a set or engine damage may occur.

NOTICE: The connecting rod bearings are tangless and must be positioned in the center of the bearing cap or engine damage may occur.

NOTE: Only one piston assembly shown.

NOTE: The dark bearing is the upper connecting rod bearing. The bright aluminum bearing is the lower connecting rod bearing.

Install the new connecting rod bearings.

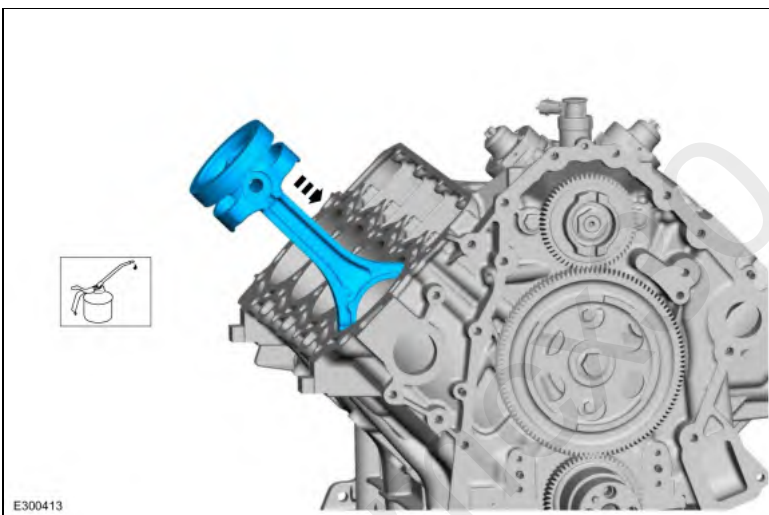


39. **NOTE:** Make sure the piston rings are positioned to specifications for installation. Refer to Piston in this section.

NOTE: Install the piston assembly with the arrow toward the front of the engine.

NOTE: Use care when installing the piston assembly to not damage the piston cooling tubes. If the tube is bent during installation of the piston assembly, install a new piston cooling tube.

- Lubricate the pistons, piston rings, connecting rod bearings and the entire cylinder bores with clean engine oil. Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).
- Using the piston ring compressor, install the piston and connecting rod assemblies. Repeat until all 8 piston assemblies are installed. Use the General Equipment: Piston Ring Compressor



40. **NOTICE:** The connecting rods are powdered metal cracked rods and care should be taken to make sure that the connecting rod caps are oriented correctly with the connecting rods or engine damage may occur.

NOTE: Only one connecting rod cap shown.

- Position a piece of plastigage across the bearing surface.
- Lubricate the connecting rod bearings with clean engine oil. Position the connecting rod caps and install the bolts. Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).

Torque:

Stage 1: 177 lb.in (20 Nm)

Stage 2: 35 lb.ft (48 Nm)

Stage 3: 105 Å°

43. **NOTICE:** The connecting rods are powdered metal cracked rods and care should be taken to make sure that the connecting rod caps are oriented correctly with the connecting rods or engine damage may occur.

NOTE: Only one connecting rod cap shown.

Lubricate the connecting rod bearings with clean engine oil. Position connecting rod caps and install the new bolts.

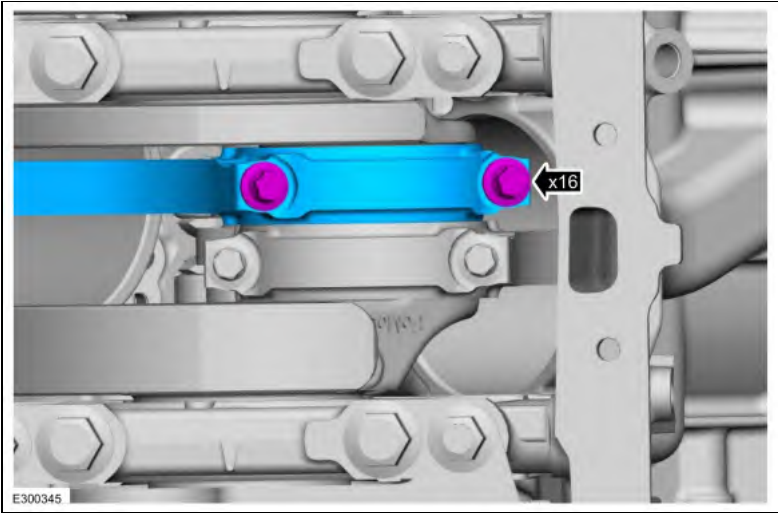
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).

Torque:

Stage 1: 177 lb.in (20 Nm)

Stage 2: 35 lb.ft (48 Nm)

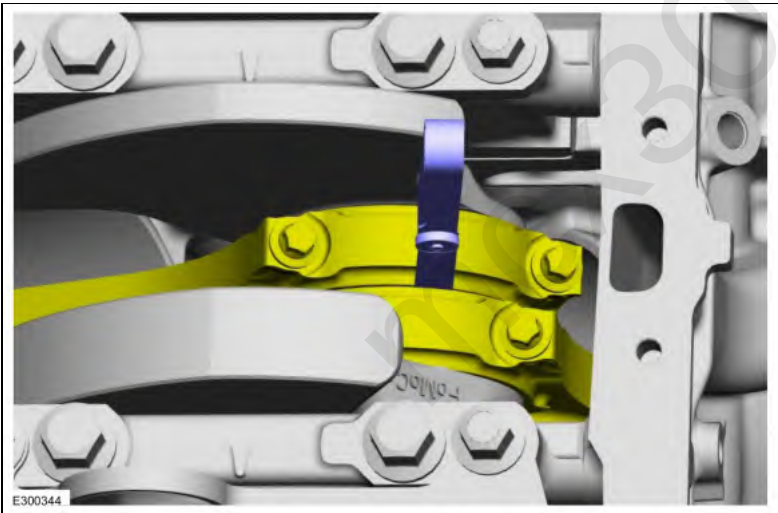
Stage 3: 105 Å°



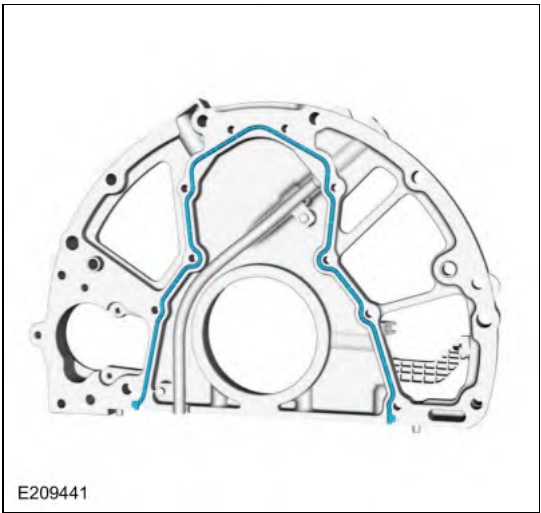
44. Using a feeler gauge, check the connecting rod side clearance.

Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).

Use the General Equipment: Feeler Gauge

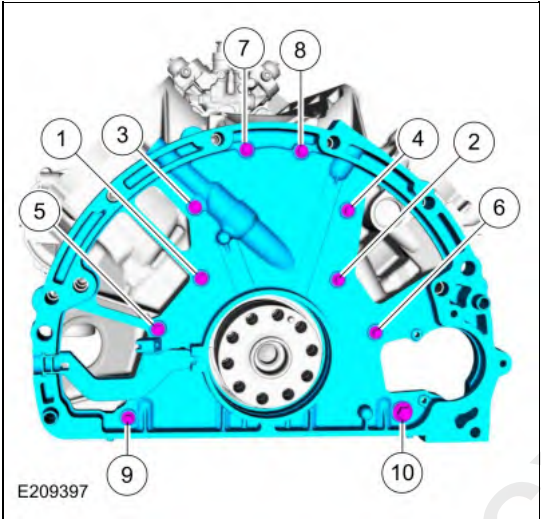


45. Install a new gasket in the engine rear cover.



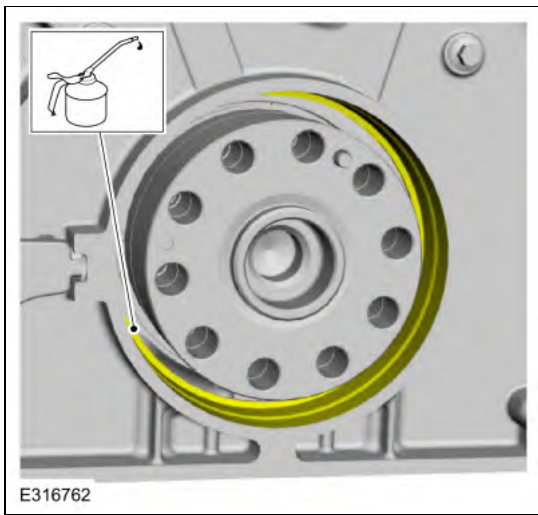
46. **NOTICE:** To prevent engine damage, replace damaged or missing dowel pins before installing the engine rear cover.

Install the engine rear cover and the bolts.
Torque:
Stage 1: Tighten bolts 1 through 9 to : 89 lb.in (10 Nm)
Stage 2: Tighten bolt 10 to : 35 lb.ft (48 Nm)



47. **NOTICE:** Do not use grease or petroleum jelly instead of oil. Failure to follow this may result in crankshaft rear seal leakage.

Apply clean engine oil to the inner diameter of the crankshaft seal bore in the engine rear cover.
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).

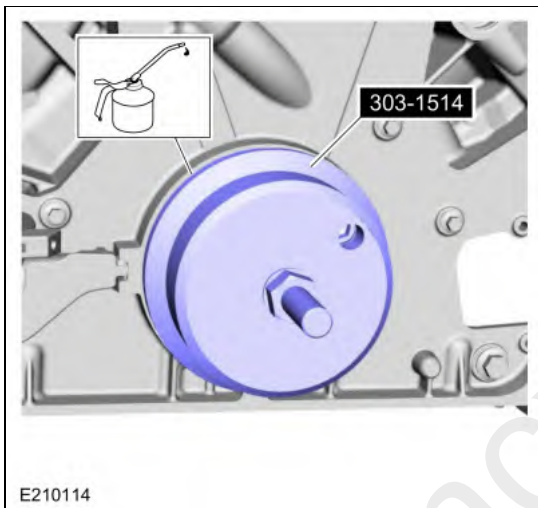


48. **NOTICE:** Failure to install the crankshaft rear seal with the part numbers facing out may result in engine damage.

NOTE: Do not discard the installation sleeve provided with the crankshaft rear seal. It is used for installation of the crankshaft rear seal.

NOTE: Check for correct orientation of the installation sleeve prior to sliding the seal on the crankshaft.

- Position the installation sleeve onto the crankshaft, slide the new crankshaft rear seal over the installation sleeve onto the crankshaft. Remove the installation sleeve.
- Using the special tool, install the new crankshaft rear seal.
Use Special Service Tool: 303-1514 Installer, Rear Crank Seal.



49. Prime the oil pump. Add 2 tablespoons of clean engine oil to the large round oil pump hole and rotate the oil pump by hand.
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).

50. **NOTICE:** Install the oil pump evenly or damage to the roll pins may occur.

Install the oil pump and the bolts finger tight.

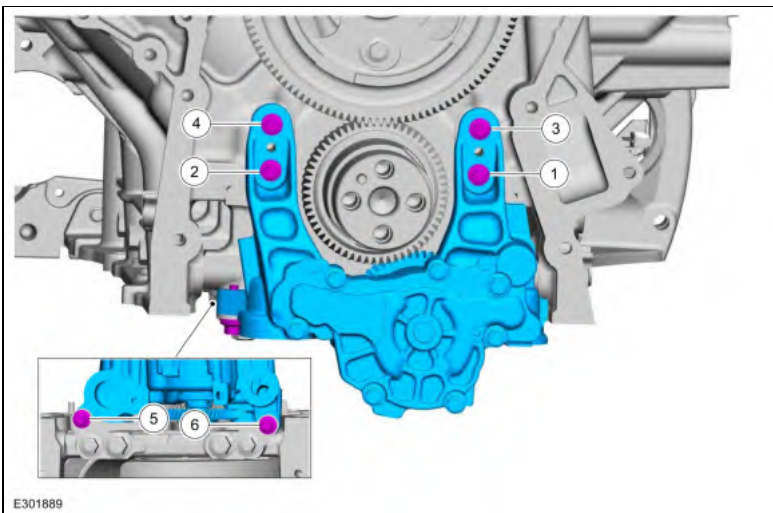
Torque:

Tighten bolts 1 through 4 to::

Stage 1: 89 lb.in (10 Nm)

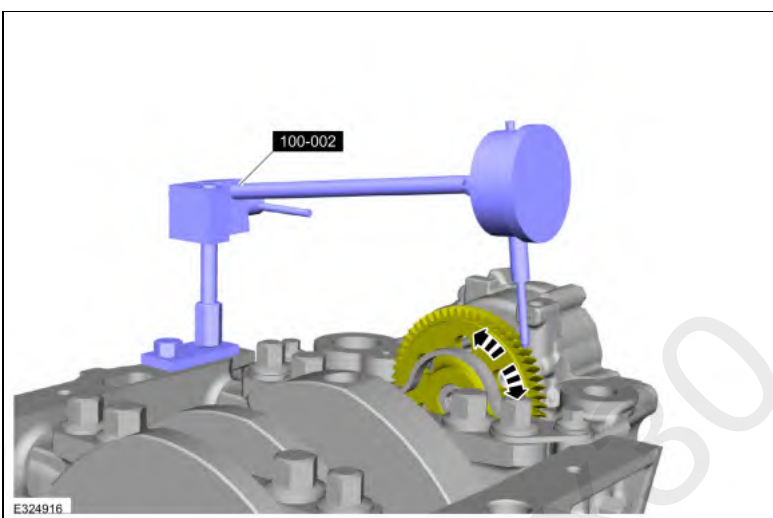
Stage 2: 45 Å°

Tighten the lower oil pump bolts 5 and 6 to: : 18 lb.ft (25 Nm)



51. Using the special tool, check the oil pump drive gear backlash.

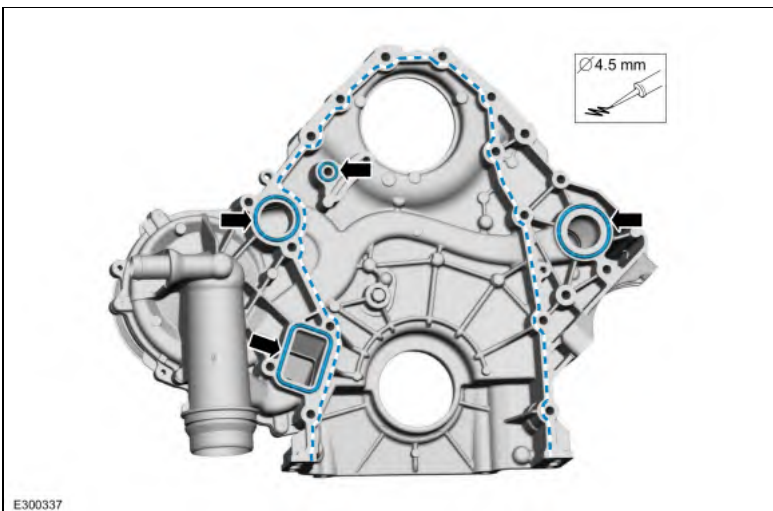
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).
Use Special Service Tool: 100-002 (TOOL-4201-C) Holding Fixture with Dial Indicator Gauge.



52. NOTICE: Failure to use Motorcraft® High Performance Engine RTV Silicone may cause the engine oil to foam excessively and result in serious engine damage.

NOTE: If the engine front cover is not secured within 10 minutes of sealant application, the sealant must be removed and the sealing area cleaned with metal surface prep. Allow to dry until there is no sign of wetness, or 10 minutes, whichever is longer. Failure to follow this procedure can cause future oil leakage.

- Install the engine front cover press-in-place gaskets.
- Apply a 4.5 mm (0.18 in) bead of Motorcraft® High Performance Engine RTV Silicone Sealant to the chamfer on the engine front cover sealing surface.
Material: Motorcraft® High Performance Engine RTV Silicone / TA-357 (WSE-M4G323-A6)



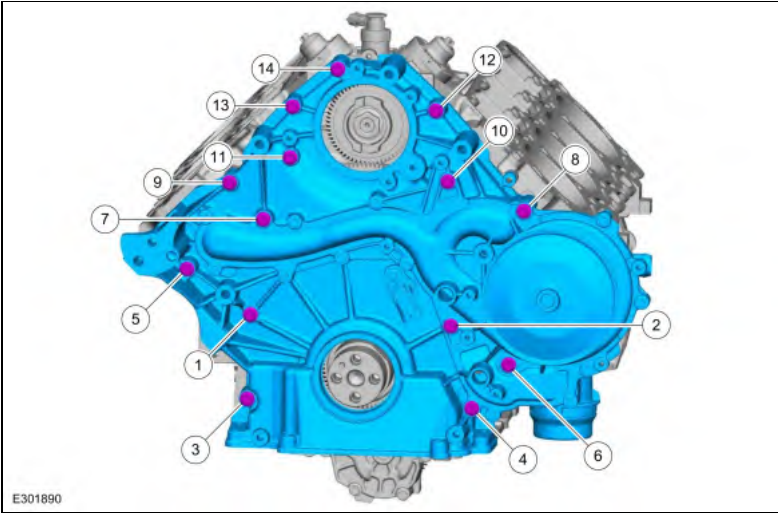
53. **NOTICE:** Use care when installing the engine front cover not to scratch the crankshaft sealing surface.

NOTE: If the engine front cover is not secured within 10 minutes of sealant application, the sealant must be removed and the sealing area cleaned with metal surface prep. Allow to dry until there is no sign of wetness, or 10 minutes, whichever is longer. Failure to follow this procedure can cause future oil leakage.

- Install the engine front cover.
- Hand start bolt numbers 1 and 2.
- Install the remaining engine front cover bolts. Tighten the engine front cover bolts.

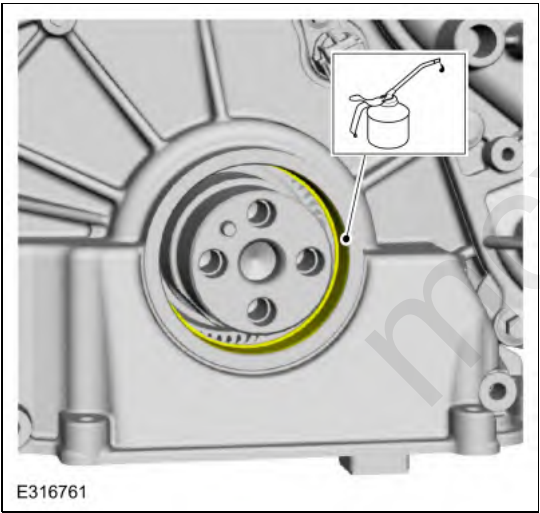
Torque: 18 lb.ft (24 Nm)

- Remove the excess sealant from the engine front cover to the cylinder block T-joint wiping outward from the crankshaft.



54. Apply clean engine oil to the inner diameter of the crankshaft seal bore in the engine front cover.

Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).

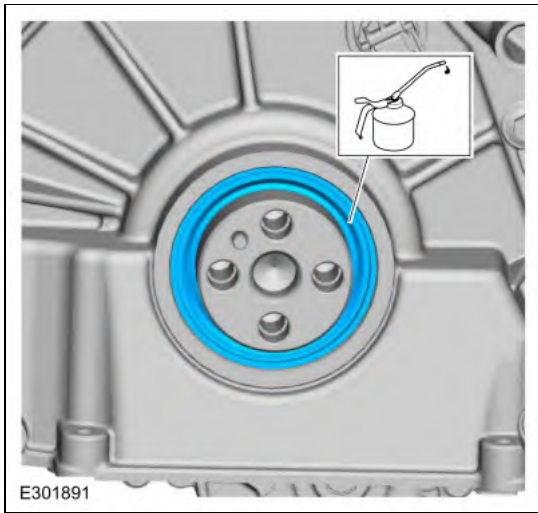


55. **NOTICE:** Failure to install the crankshaft front seal with the part numbers facing out may result in engine damage.

NOTE: Do not discard the installation sleeve provided with the crankshaft front seal. It is used for installation of the crankshaft front seal.

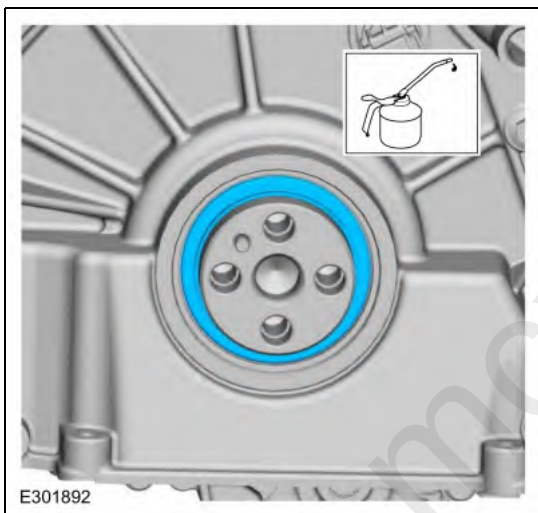
NOTE: Check for correct orientation of the installation sleeve prior to sliding the seal on the crankshaft.

Position the installation sleeve onto the crankshaft, slide the new crankshaft front seal over the installation sleeve onto the crankshaft. Remove the installation sleeve.



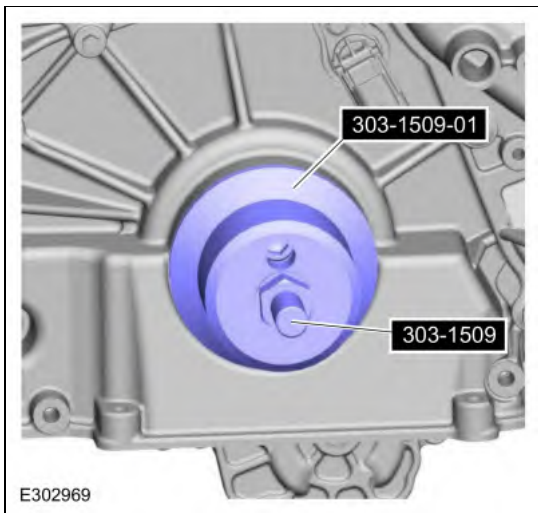
56.

- Apply clean engine oil to the inner diameter of the crankshaft oil slinger.
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).
- Position the new front crankshaft slinger on the crankshaft.



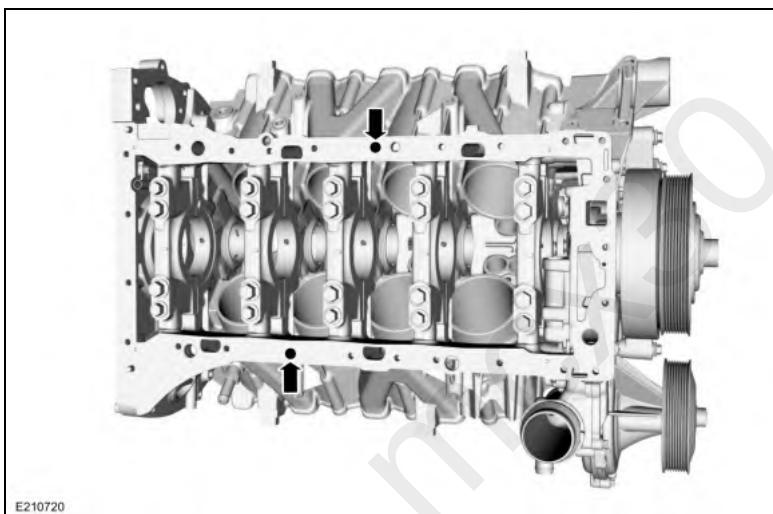
57. Using the special tools, install the new crankshaft front seal and the front crankshaft slinger.

Use Special Service Tool: 303-1509 Installer, Front Crank Seal. , 303-1509-01 6.7L Front Seal Installer.

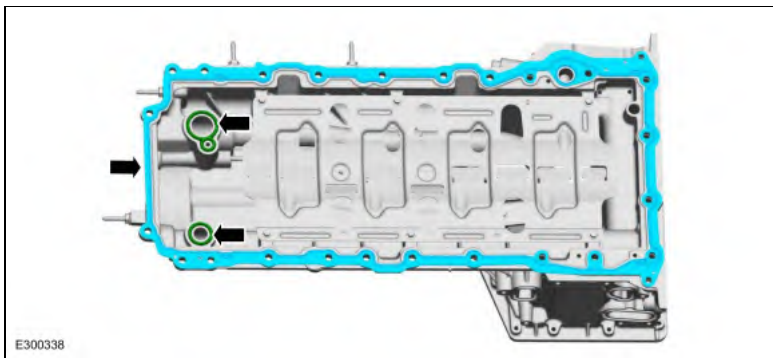


58. **NOTE:** Use guide studs to aid in installation. Studs must be fabricated locally.

Position 2 guide studs in the cylinder block at the location shown.



- 59.
- Install the oil pan press-in-place gaskets.
 - Position the upper oil pan gasket.



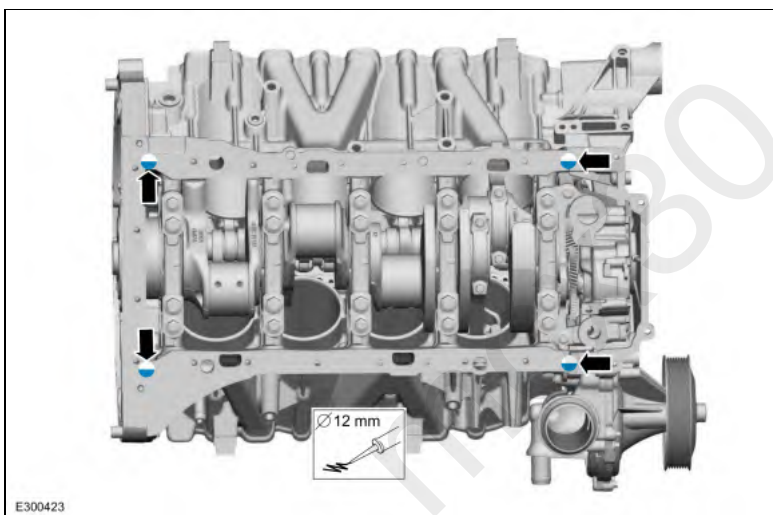
60. **NOTICE:** Failure to use Motorcraft® High Performance Engine RTV Silicone may cause the engine oil to foam excessively and result in serious engine damage.

NOTE: The bead of Motorcraft® High Performance Engine RTV Silicone Sealant should cover the openings of the front and rear engine cover gaskets.

NOTE: If the upper oil pan is not secured within 10 minutes of sealant application, the sealant must be removed and the sealing area cleaned with metal surface prep. Allow to dry until there is no sign of wetness, or 10 minutes, whichever is longer. Failure to follow this procedure can cause future oil leakage.

Apply a 12 mm (0.47 in) diameter of Motorcraft® High Performance Engine RTV Silicone Sealant at the T-joint areas.

Material: Motorcraft® High Performance Engine RTV Silicone / TA-357 (WSE-M4G323-A6)



61. **NOTE:** Final torque must be reached within 15 minutes of sealant application.

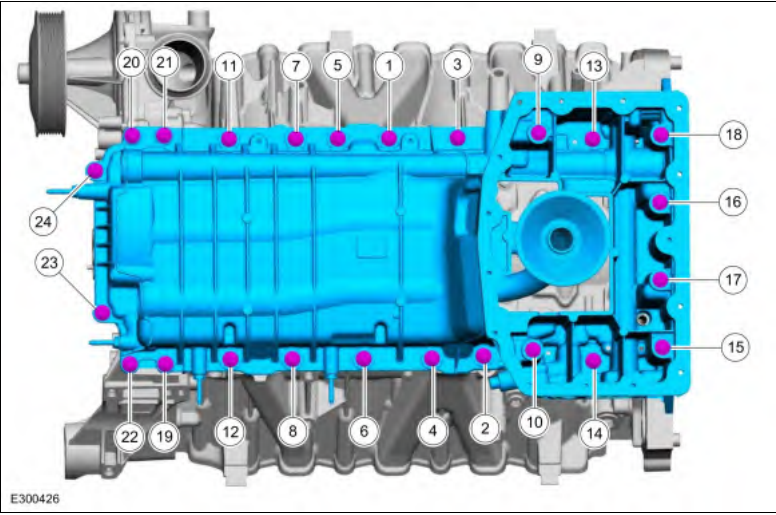
Install the upper oil pan and the bolts.

Torque:

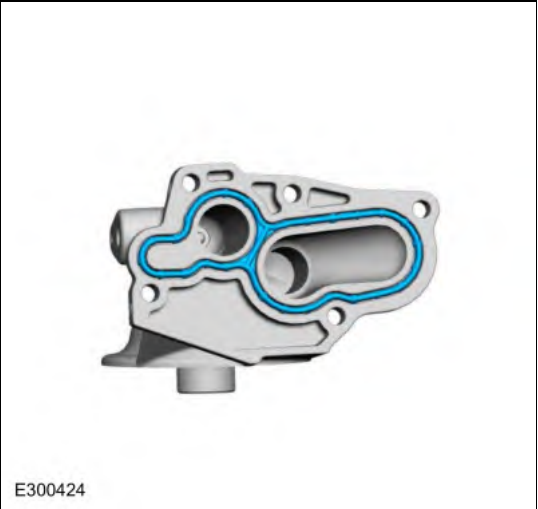
Stage 1: 18 lb.in (2 Nm)

Stage 2: Tighten bolts 1 through 8, 11 through 14 and 19 through 24 to 18 Nm (159 lb-in) plus : 25 Å°

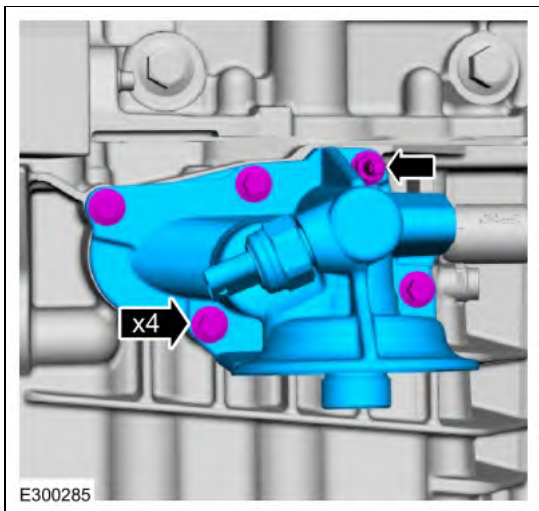
Stage 3: Tighten bolts 9, 10 and 15 through 18 to 18 Nm (159 lb-in) plus : 90 Å°



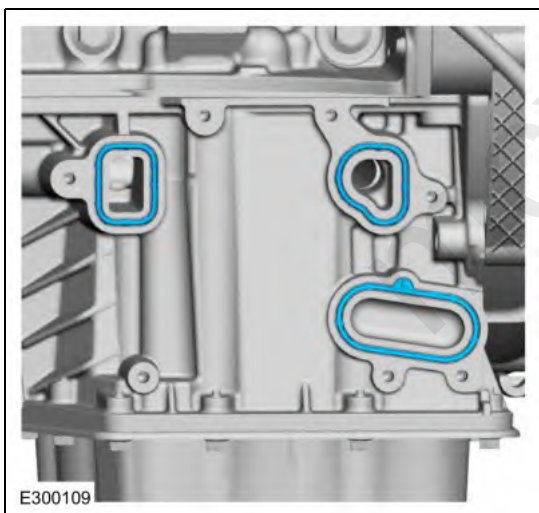
62. Install a new oil filter adapter gasket.



63. Install the oil filter adapter and retainers.
Torque: 89 lb.in (10 Nm)

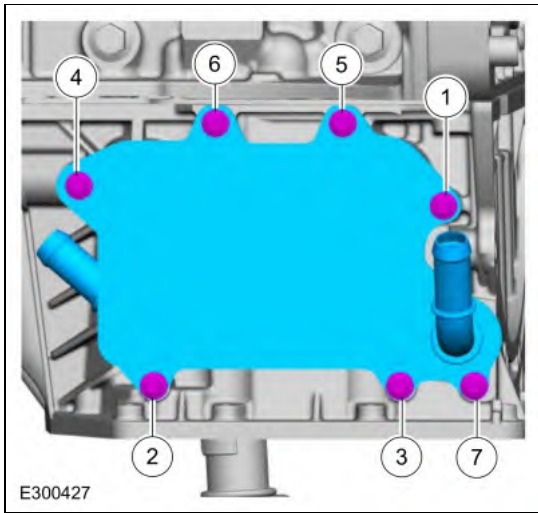


64. Install the new oil cooler gaskets.



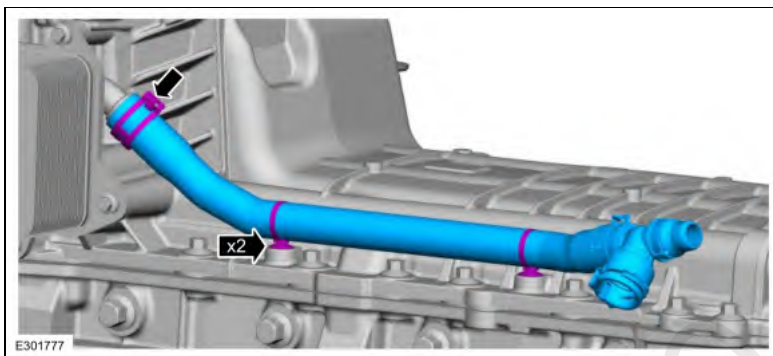
65. **NOTICE:** In the event of a catastrophic engine failure, or if installing a new short block, always install a new oil cooler. Foreign material cannot be removed from the oil cooler and engine damage may occur. Long blocks are equipped with a new oil cooler.

- Stage 1: Install the oil cooler assembly and hand start number 2, 4 and 7 bolts.
- Stage 2: Hand start number 1, 3, 5 and 6 bolts.
- Stage 3: Tighten to 2 Nm (18 lb-in) in a counter clockwise sequence starting with the number 1 bolt.
- Stage 4: Tighten to 10 Nm (89 lb-in) in a counter clockwise sequence starting with the number 1 bolt.



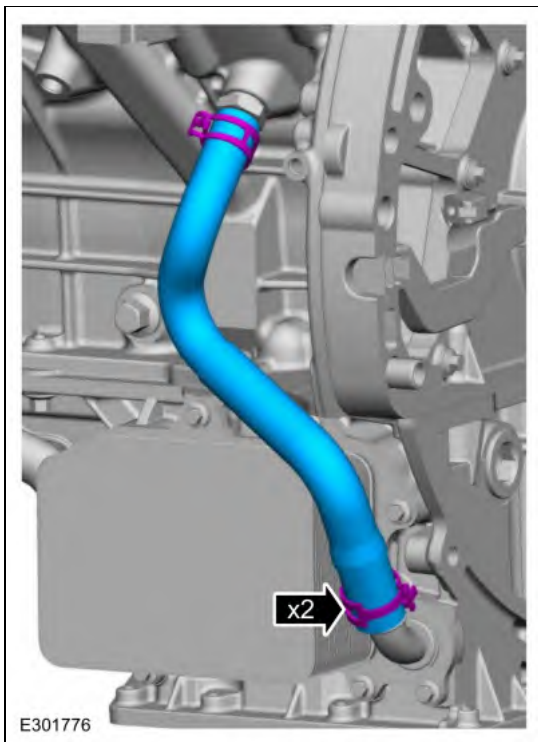
66. **NOTE:** Use care when installing the hose on the oil cooler, damage to the oil cooler may occur during installation.

Install the oil cooler outlet hose and connect the hose retainers.
Use the General Equipment: Hose Clamp Remover/Installer



67. **NOTE:** Use care when installing the hose on the oil cooler, damage to the oil cooler may occur during installation.

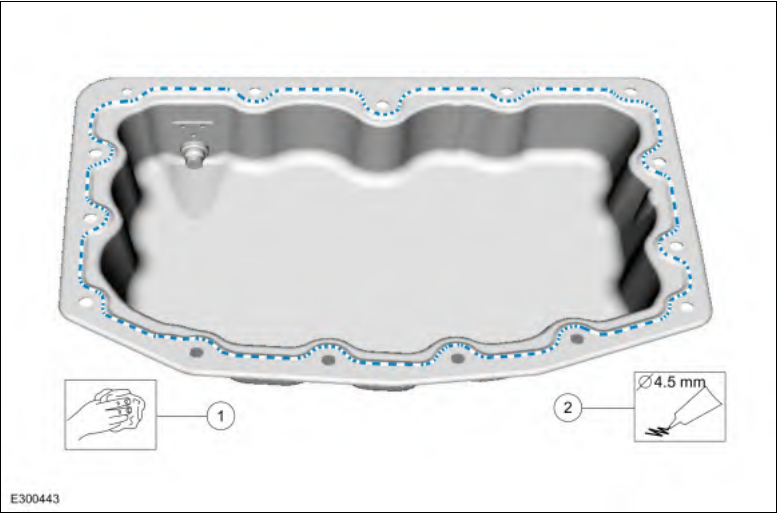
Install the oil cooler inlet hose.
Use the General Equipment: Hose Clamp Remover/Installer



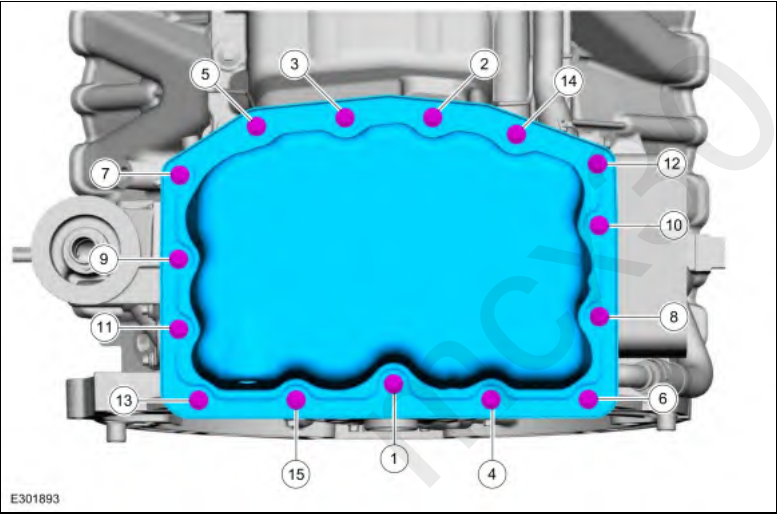
68.

1. Wipe the new lower oil pan sealing surface with a Motorcraft® Metal Surface Prep Wipe.
Material: Motorcraft® Metal Surface Prep Wipes / ZC-31-B
2. **NOTE:** If the lower oil pan is not secured within 10 minutes of sealant application, the sealant must be removed and the sealing area cleaned with metal surface prep. Allow to dry until there is no sign of wetness, or 10 minutes, whichever is longer. Failure to follow this procedure can cause future oil leakage.

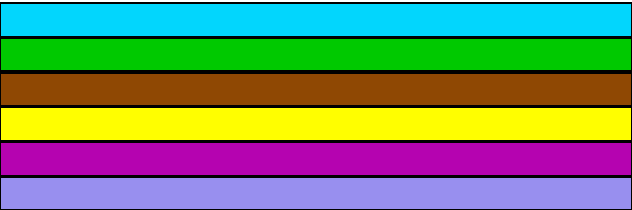
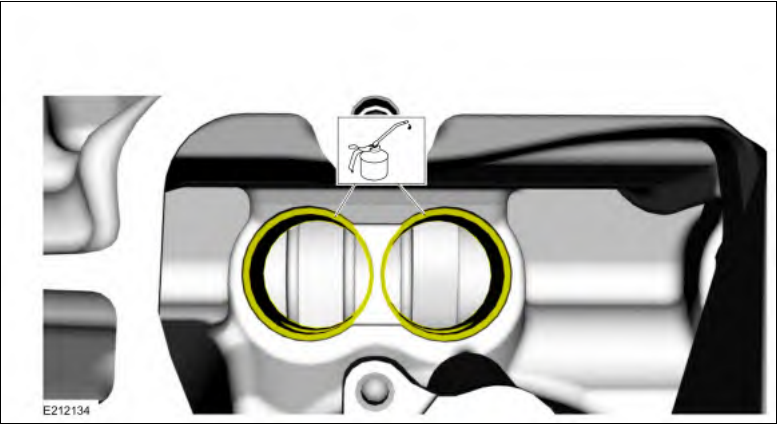
Apply a 4.5 mm (0.18 in) diameter bead of Motorcraft® High Performance Silicone Sealant to the chamfer on the lower oil pan sealing surface.
Material: Motorcraft® High Performance Engine RTV Silicone / TA-357 (WSE-M4G323-A6)



69. Install the lower oil pan and the bolts.
Torque: 89 lb.in (10 Nm)



70. **NOTE:** *Only one cylinder shown.*
Apply clean engine oil to the valve tappet bores.
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).



71. **NOTICE:** To prevent engine damage, keep the valve tappets in the order in which they were removed. Install all valve tappets back in their original positions.

NOTE: Always keep the valve tappets in the upright position or the hydraulic lash adjuster may fall out.

NOTE: Only one cylinder shown.

Apply clean engine oil to the valve tappets.
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).

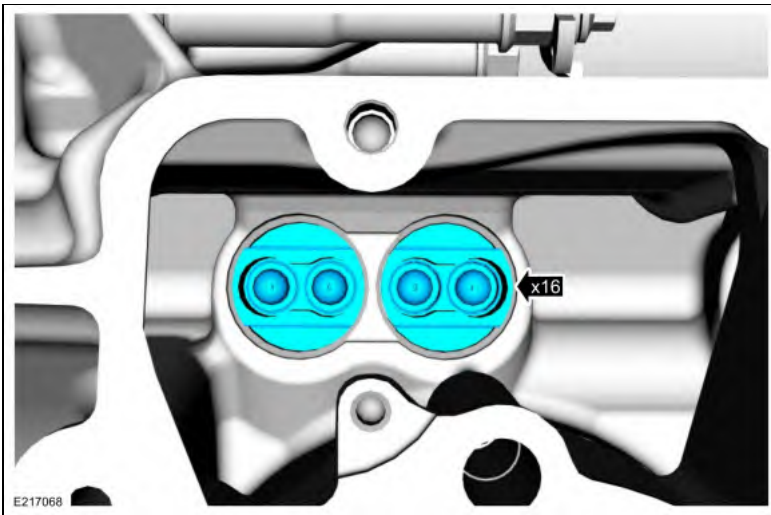


72. **NOTICE:** To prevent engine damage, keep the valve tappets in the order in which they were removed. Install all valve tappets back in their original positions.

NOTE: Always keep the valve tappets in the upright position or the hydraulic lash adjuster may fall out.

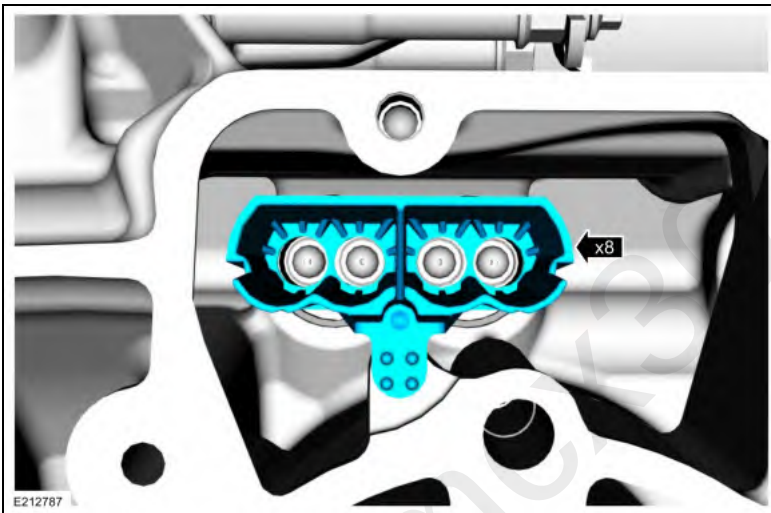
NOTE: Only one cylinder shown.

Install the valve tappets.

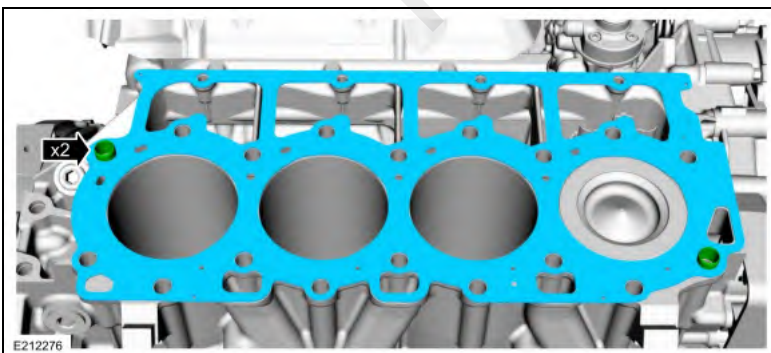


73. **NOTE:** Only one cylinder shown.

Install the valve tappet guides. Verify that the retainer is fully seated.

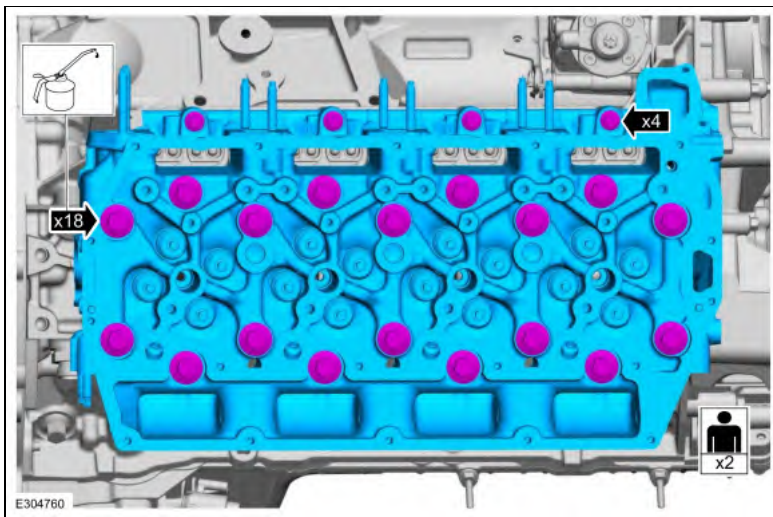


74. Install the new RH cylinder head dowels and the cylinder head gasket.



75. **NOTICE:** Using too much engine oil on the threads of the cylinder head bolts may cause damage to the threads and result in poor sealing. Using anti-seize compounds, grease or any other lubricants other than engine oil on the cylinder head bolt threads may affect the true torque value of the bolts.

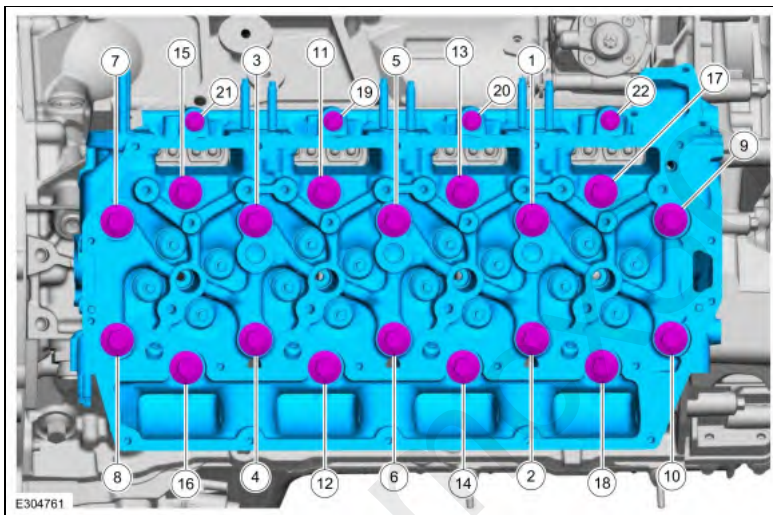
- Install the RH cylinder head.
- Lightly lubricate the new M12 cylinder head bolt threads and flanges with clean engine oil. Install the cylinder head bolts finger tight. Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).



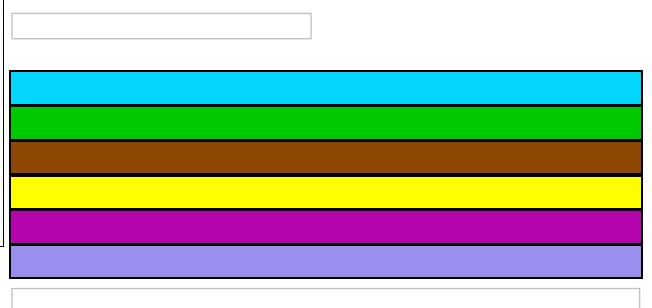
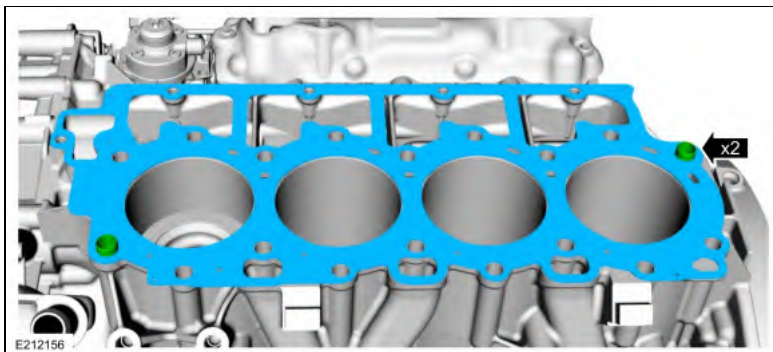
76. Tighten the RH cylinder head bolts.

Torque:

- Stage 1: Tighten bolts 1 through 18 to : 168 lb.in (19 Nm)
- Stage 2: Tighten bolts 1 through 18 to : 36 lb.ft (49 Nm)
- Stage 3: Tighten bolts 1 through 18, a second time to : 36 lb.ft (49 Nm)
- Stage 4: Tighten bolts 1 through 18, a third time to : 36 lb.ft (49 Nm)
- Stage 5: Tighten bolts 1 through 18, an additional : 90°
- Stage 6: Tighten bolts 1 through 18, a second time, an additional : 90°
- Stage 7: Tighten bolts 1 through 18, a third time, an additional : 90°
- Stage 8: Tighten bolts 19 through 22 to : 22 lb.ft (30 Nm)

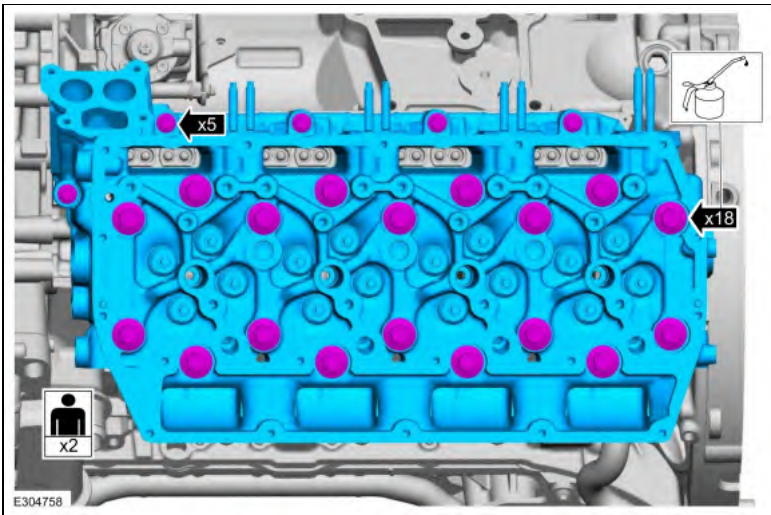


77. Install the new LH cylinder head dowels and the cylinder head gasket.



78. **NOTICE:** Using too much engine oil on the threads of the cylinder head bolts may cause damage to the threads and result in poor sealing. Using anti-seize compounds, grease or any other lubricants other than engine oil on the cylinder head bolt threads may affect the true torque value of the bolts.

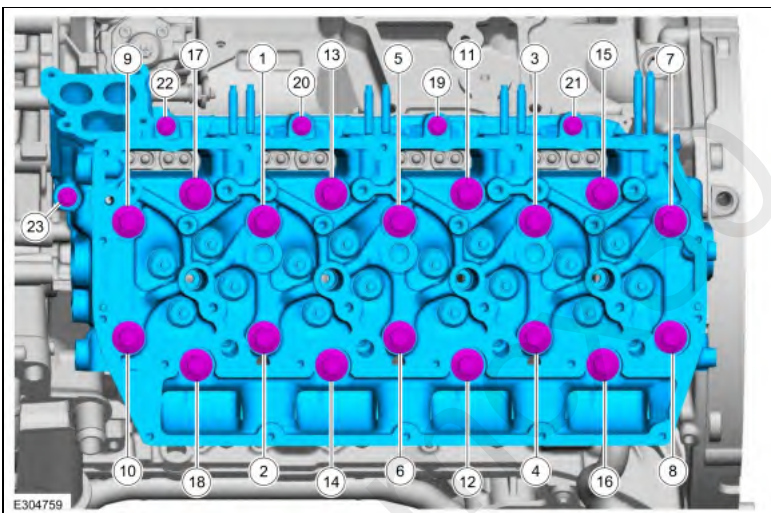
- Install the LH cylinder head.
- Lightly lubricate the new M12 cylinder head bolt threads and flanges with clean engine oil. Install the cylinder head bolts finger tight. Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).



79. Tighten the LH cylinder head bolts.

Torque:

- Stage 1: Tighten bolts 1 through 18 to : 168 lb.in (19 Nm)
- Stage 2: Tighten bolts 1 through 18 to : 36 lb.ft (49 Nm)
- Stage 3: Tighten bolts 1 through 18, a second time to : 36 lb.ft (49 Nm)
- Stage 4: Tighten bolts 1 through 18, a third time to : 36 lb.ft (49 Nm)
- Stage 5: Tighten bolts 1 through 18, an additional : 90°
- Stage 6: Tighten bolts 1 through 18, a second time, an additional : 90°
- Stage 7: Tighten bolts 1 through 18, a third time, an additional : 90°
- Stage 8: Tighten bolt 19 through 23 to : 22 lb.ft (30 Nm)

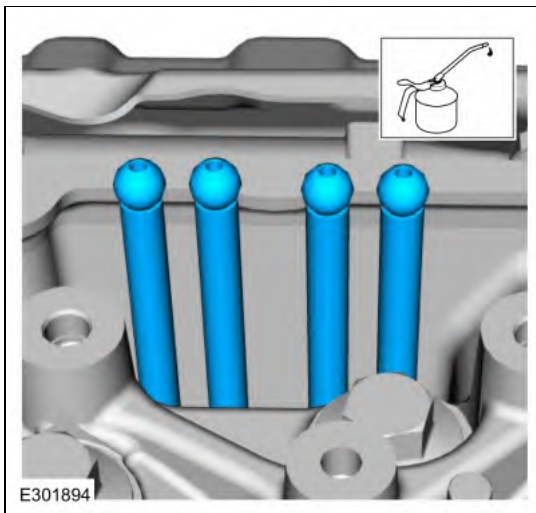


80. **NOTICE:** To prevent engine damage, keep the push rods in the order in which they were removed. Install all push rods back in their original positions.

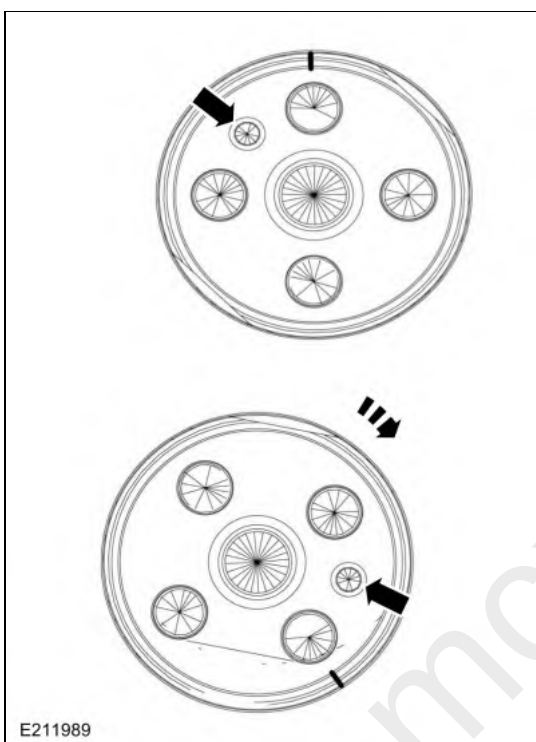
NOTE: Only one cylinder shown.

Apply clean engine oil to the ball end of the push rod. Install the push rods and verify the push rod socket is engaged on the hydraulic lash adjuster.

Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).



81. Rotate the crankshaft clockwise and position cylinder number No. 1 approximately 155 degrees after TDC by observing the crankshaft pulley dowel pin and clocking it to the 3:40 position (as viewed from the front of the engine).



82. **NOTE:** Verify the push rod socket is on the hydraulic lash adjuster prior to installing the rocker arm assembly.

- Determine which cylinder is actually in the firing position by observing the push rods. No. 1 cylinder exhaust push rods should be raised 1.0 mm (0.039 in) and No. 4 cylinder exhaust push rods should be raised 1.5 mm (0.059 in). If the push rods are not in the correct position, rotate the engine one full revolution clockwise (360 degrees).

- Apply clean engine oil to each rocker arm pivot ball of the rocker arm assemblies. Install the rocker arm assemblies for the RH cylinder head (cylinder numbers 1, 2, 3 and 4).

Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).

- Verify the top of the push rod engages the socket on each rocker arm.

Torque:

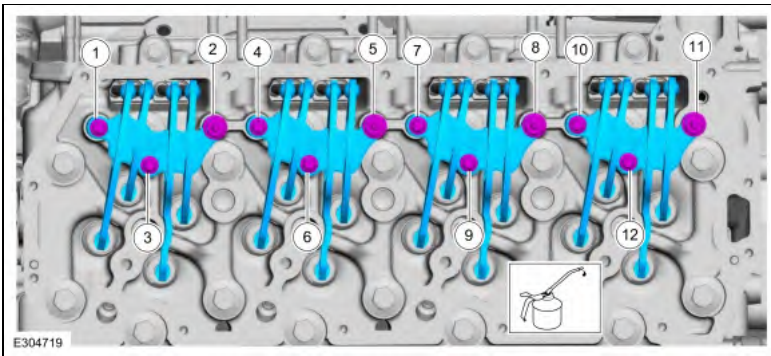
Stage 1: 35 lb.in (4 Nm)

Stage 2: 71 lb.in (8 Nm)

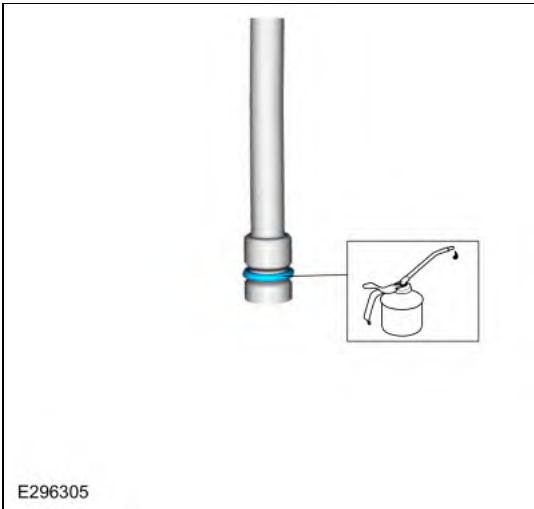
Stage 3: 115 lb.in (13 Nm)

Stage 4: Tighten a second time to : 115 lb.in (13 Nm)

Stage 5: Tighten an additional : 80°



83. Apply clean engine oil on the O-ring seal on the RH oil spray bar.
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).



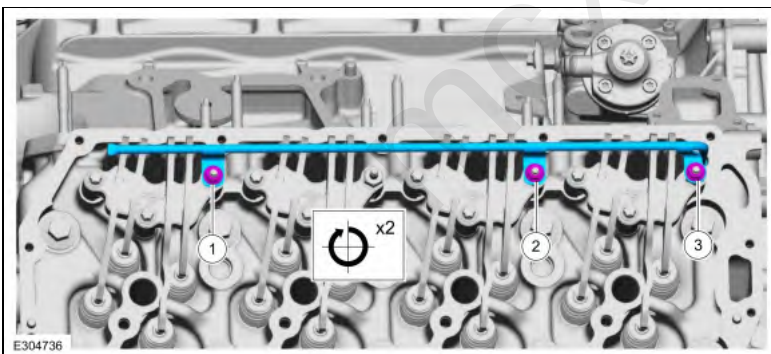
84. **NOTICE:** Failure to install the oil spray bar in steps may result in damage to the oil spray bar.

Install the RH oil spray bar. Turn the nuts 2 revolutions at a time in the sequence shown until the RH oil spray bar nuts can be tightened.

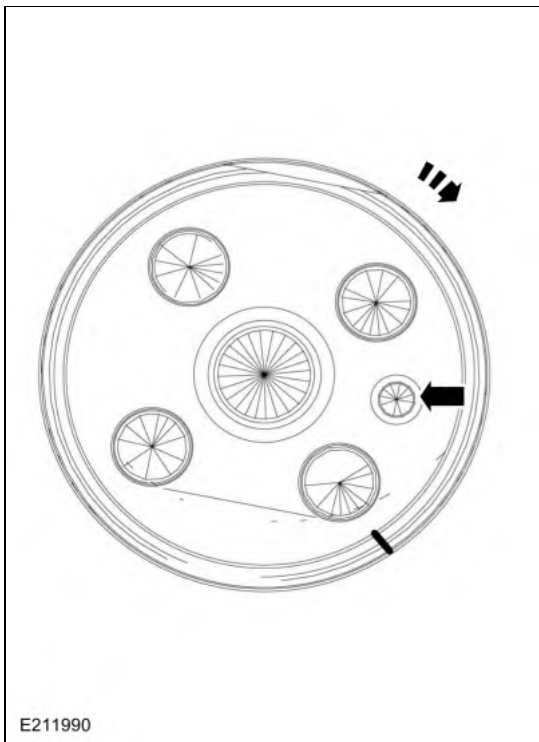
Torque:

Stage 1: : 106 lb.in (12 Nm)

Stage 2: Tighten a second time to: : 106 lb.in (12 Nm)



85. Rotate the crankshaft clockwise one revolution (360 degrees) back to 155 degrees after TDC by observing the crankshaft pulley dowel pin and clocking it to the 3:40 position (as viewed from the front of the engine).



86. **NOTE:** Verify the push rod socket is on the hydraulic lash adjuster prior to installing the rocker arm assembly.

- Apply clean engine oil to each rocker arm pivot ball of the rocker arm assemblies. Install the rocker arm assemblies for the LH cylinder head (cylinder numbers 5, 6, 7 and 8).

Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).

- Verify the top of the push rod engages the socket on each rocker arm.

Torque:

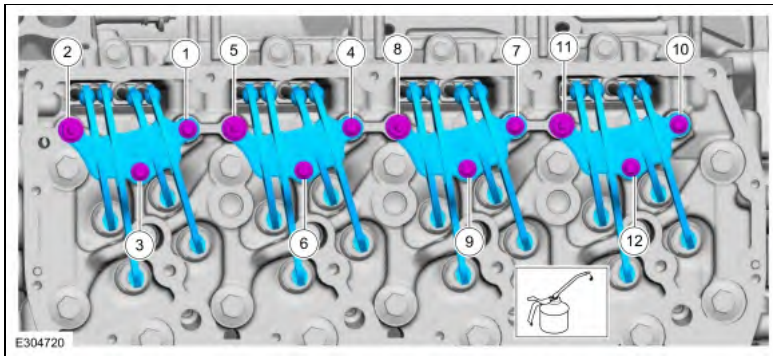
Stage 1: 35 lb.in (4 Nm)

Stage 2: 71 lb.in (8 Nm)

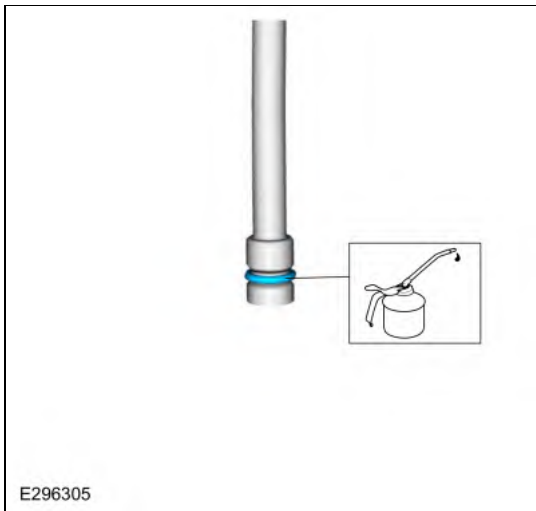
Stage 3: 115 lb.in (13 Nm)

Stage 4: Tighten a second time to : 115 lb.in (13 Nm)

Stage 5: Tighten an additional : 80°



87. Apply clean engine oil on the O-ring seal on the LH oil spray bar.
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).



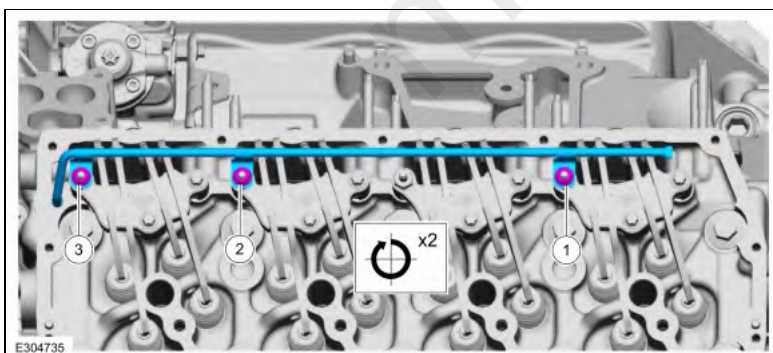
88. **NOTICE:** Failure to install the oil spray bar in steps may result in damage to the oil spray bar.

Install the LH oil spray bar. Turn the nuts 2 revolutions at a time in the sequence shown until the LH oil spray bar nuts can be tightened.

Torque:

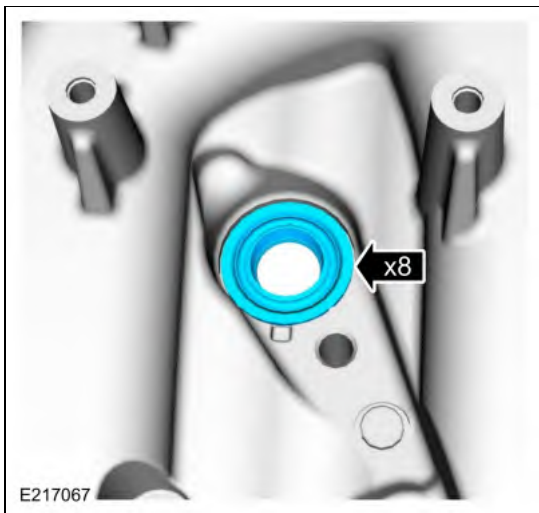
Stage 1: : 106 lb.in (12 Nm)

Stage 2: Tighten a second time to: : 106 lb.in (12 Nm)

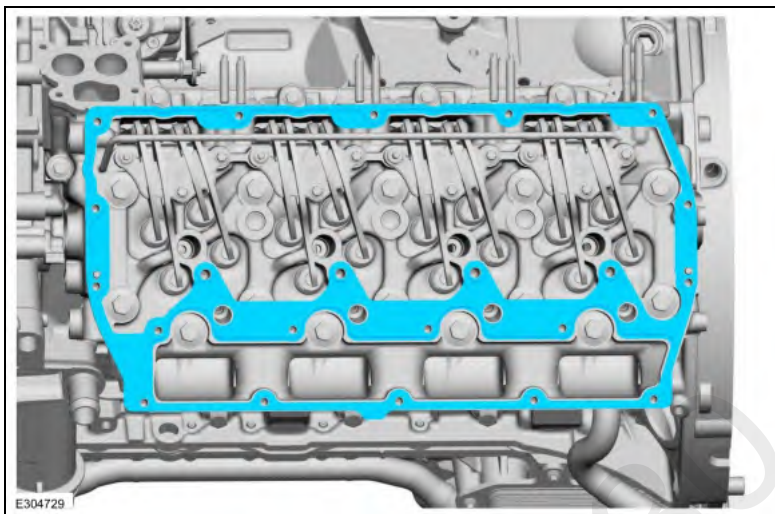


89. **NOTE:** Verify that the fuel injector-to-valve cover seal is squarely seated in the valve cover.

Using a 22 mm (0.866 in) socket or equivalent, install the new fuel injector-to-valve cover seals.



90. Install a new LH valve cover gasket.

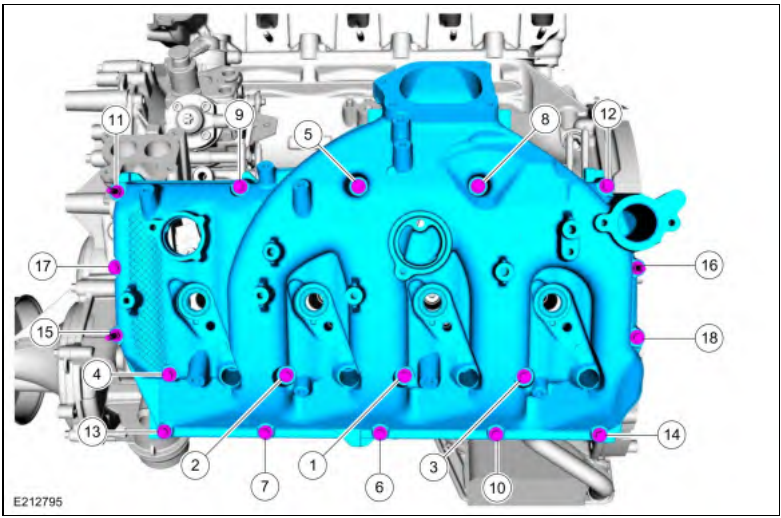


91. **NOTICE:** Failure to install the fuel injectors during the valve cover installation may result in engine failure.

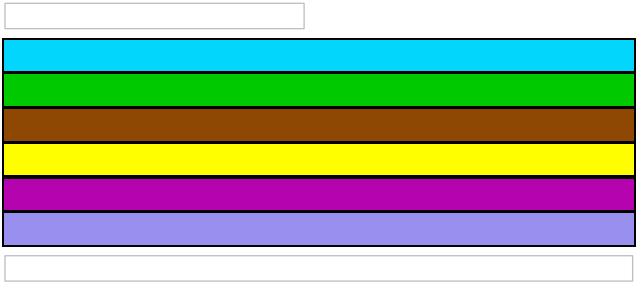
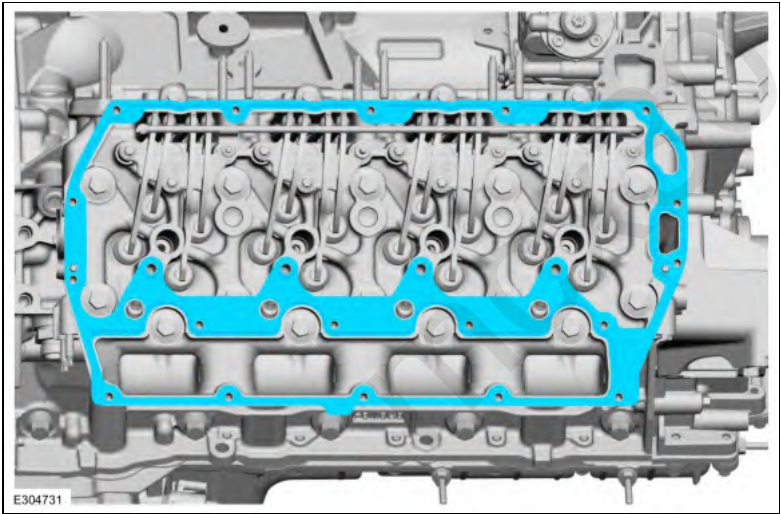
NOTE: The valve cover will have to be tightened a second time after the fuel injectors are installed.

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

Torque: 106 lb.in (12 Nm)



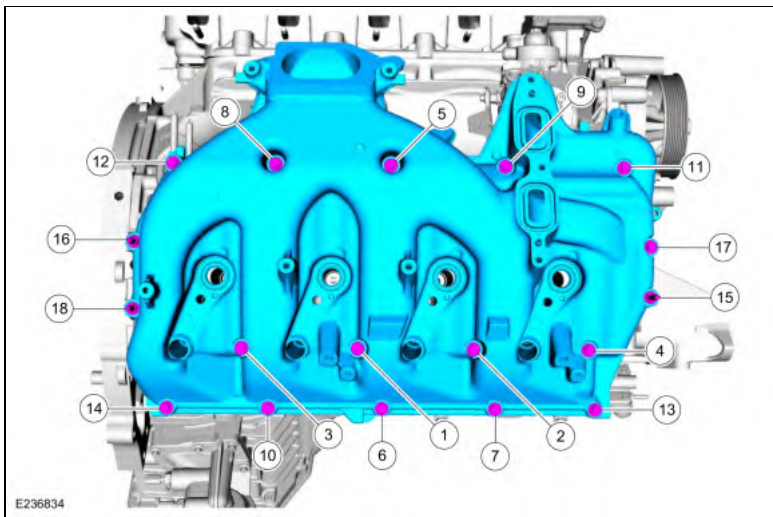
92. Install a new RH valve cover gasket.



93. **NOTICE:** Failure to install the fuel injectors during the valve cover installation may result in engine failure.

NOTE: The valve cover will have to be tightened a second time after the fuel injectors are installed.

Install the RH valve cover, the stud bolts and the bolts.
Torque: 106 lb.in (12 Nm)

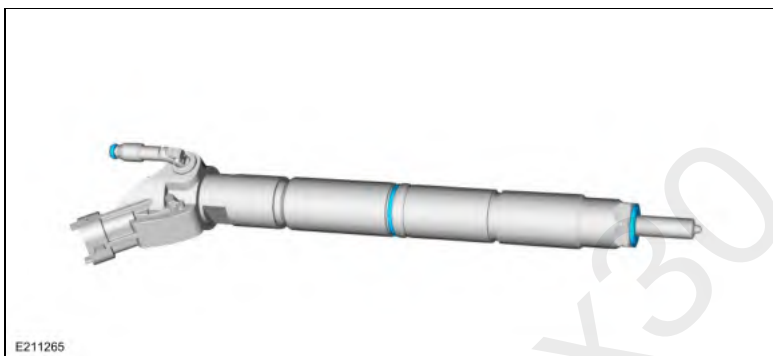


94. **NOTE:** *Do not apply engine oil to the fuel injectors.*

NOTE: Only one fuel injector shown.

NOTE: *If the fuel injector is being reused, make sure to install it in the original location.*

Install a new copper combustion gasket, O-ring seal and fuel injector return O-ring seal on the fuel injectors. Position the fuel injectors into the engine.



Category	Value
1	100
2	100
3	100
4	100
5	100
6	100

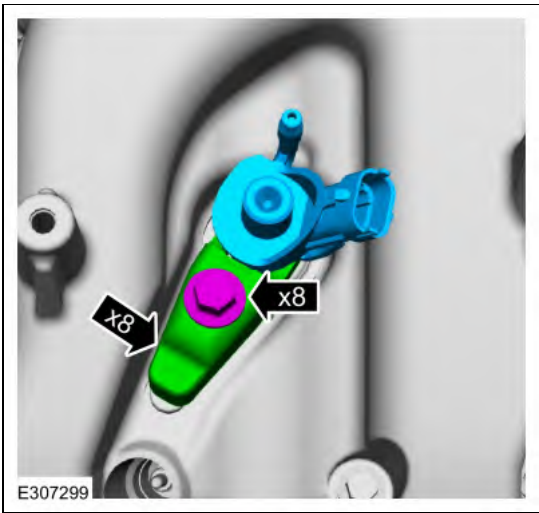
95. NOTICE: Failure to tighten the fuel injector correctly can lead to engine failure.

Install the fuel injector hold-down clamps and the new fuel injector bolts.

Torque:

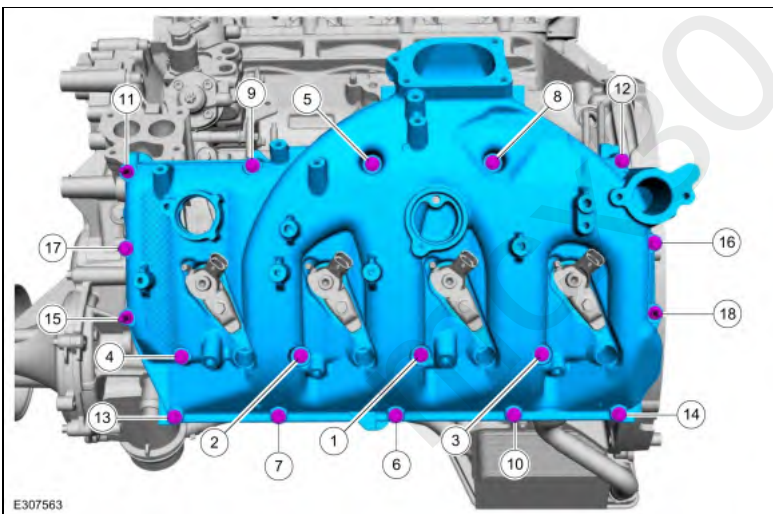
Stage 1: 22 lb.ft (30 Nm)

Stage 2: 90°



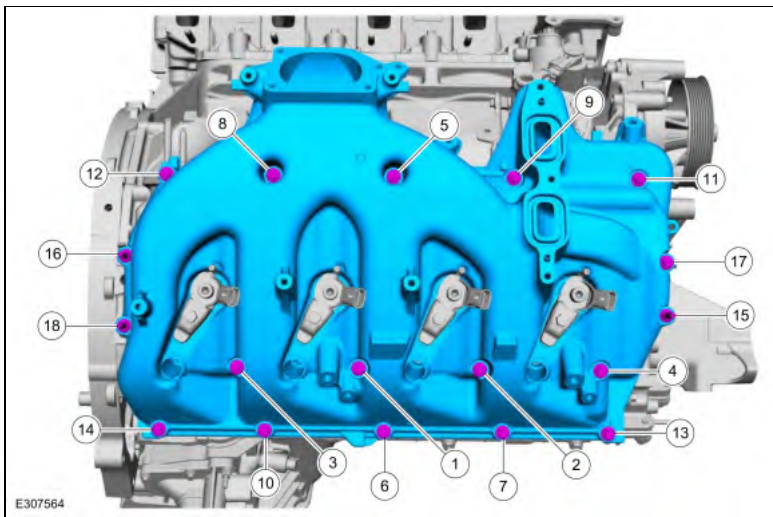
96. Final tighten the LH valve cover bolts in the sequence shown.

Torque: 106 lb.in (12 Nm)

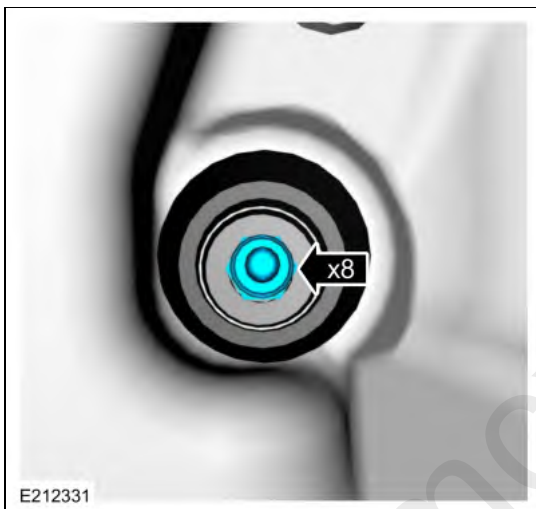


97. Final tighten the RH valve cover bolts in the sequence shown.

Torque: 106 lb.in (12 Nm)



98. Install the glow plugs.
Torque:
 Stage 1: 35 lb.in (4 Nm)
 Stage 2: 50 Å°

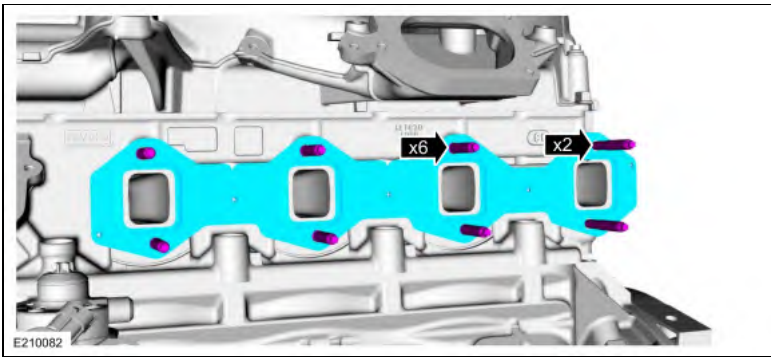


99. **NOTE:** Cylinder number 4 will have longer exhaust studs.

- Install the new exhaust manifold stud(s) as needed.

Torque: 115 lb.in (13 Nm)

- Install a new exhaust manifold gasket.



100. **NOTE:** Install the spacers as marked on removal.

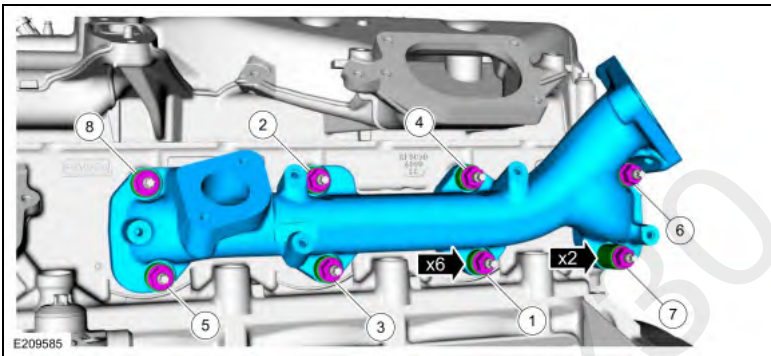
Install the RH exhaust manifold, the spacers and the new nuts.

Torque:

Stage 1: 159 lb.in (18 Nm)

Stage 2: 18 lb.ft (25 Nm)

Stage 3: Tighten a second time to: 18 lb.ft (25 Nm)

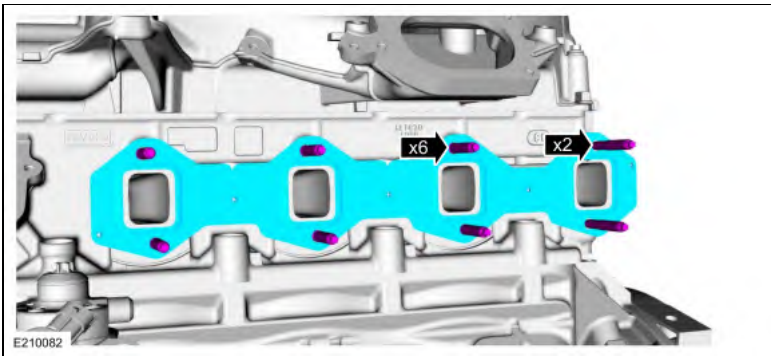


101. **NOTE:** Cylinder number 8 will have longer exhaust studs.

- Install the new exhaust manifold stud(s) as needed.

Torque: 115 lb.in (13 Nm)

- Install a new exhaust manifold gasket.



102. **NOTE:** Install the spacers as marked on removal.

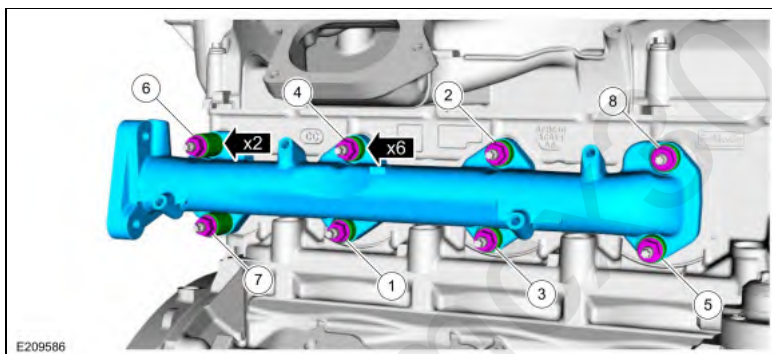
Install the LH exhaust manifold, the spacers and the new nuts.

Torque:

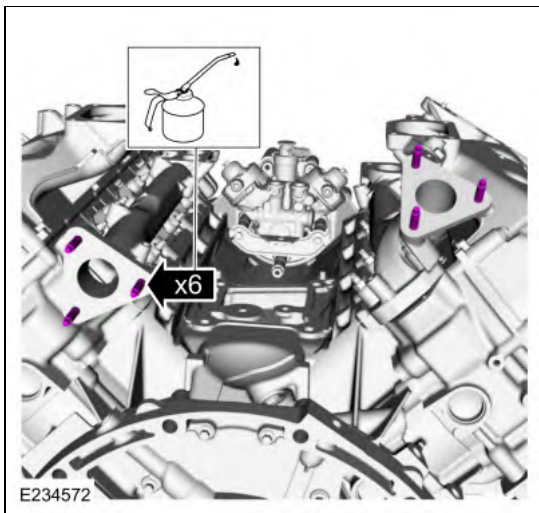
Stage 1: 159 lb.in (18 Nm)

Stage 2: 18 lb.ft (25 Nm)

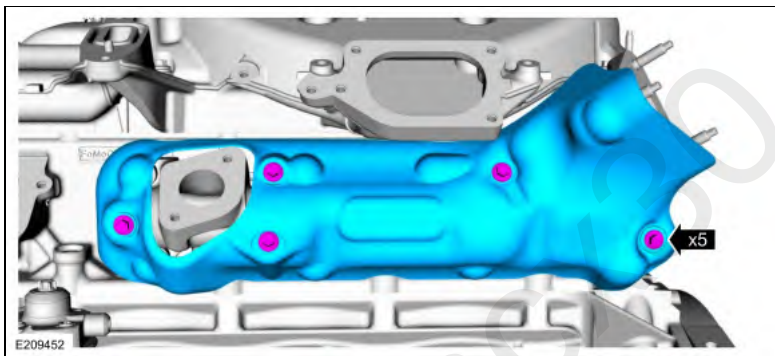
Stage 3: Tighten a second time to: 18 lb.ft (25 Nm)



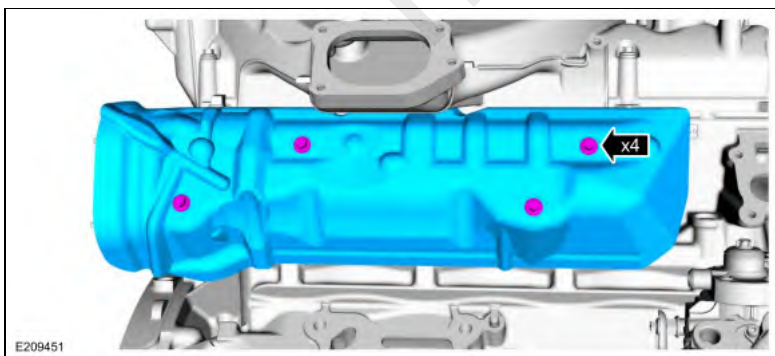
103. Apply clean engine oil to the threads and install the exhaust manifold studs.
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).
Torque: 115 lb.in (13 Nm)



104. Install the RH exhaust manifold heat shield and the bolts.
Torque: 89 lb.in (10 Nm)

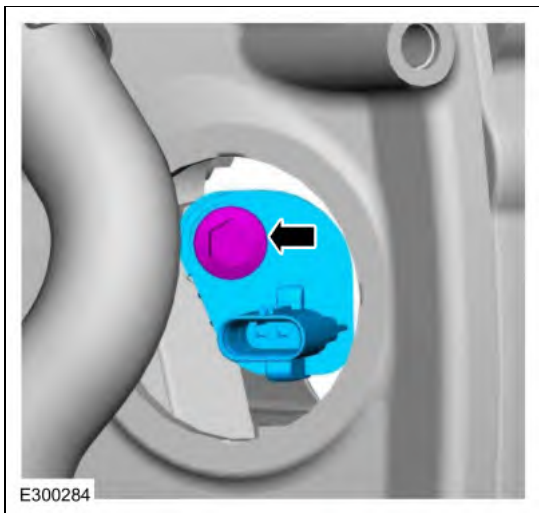


105. Install the LH exhaust manifold heat shield and the bolts.
Torque: 89 lb.in (10 Nm)

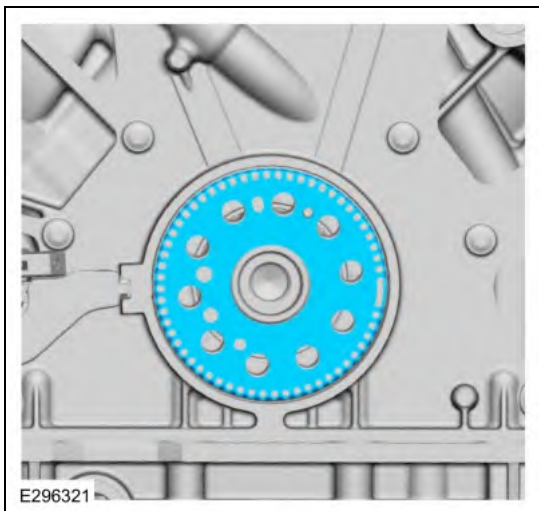


106. **NOTICE: Do not use magnetic screwdrivers or other magnetic tools around the CKP sensor and the crankshaft sensor pulse ring or damage to the components may occur.**

Install the CKP sensor and the bolt.
Torque: 89 lb.in (10 Nm)



107. Install the crankshaft sensor pulse ring.



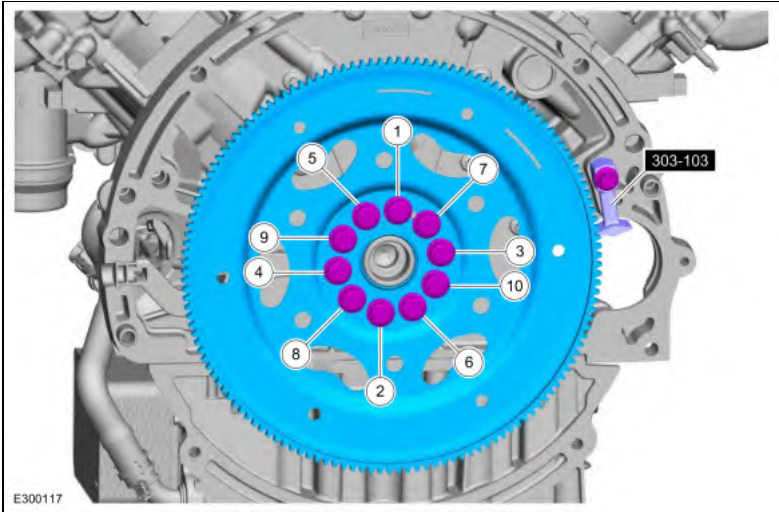
108. Install the flexplate and the new bolts.

Use Suggested Tool: 303-103 (T74P-6375-A) Holding Tool, Flywheel. Tool shown or a commercially available equivalent can be used.

Torque:

Stage 1: 44 lb.in (5 Nm)

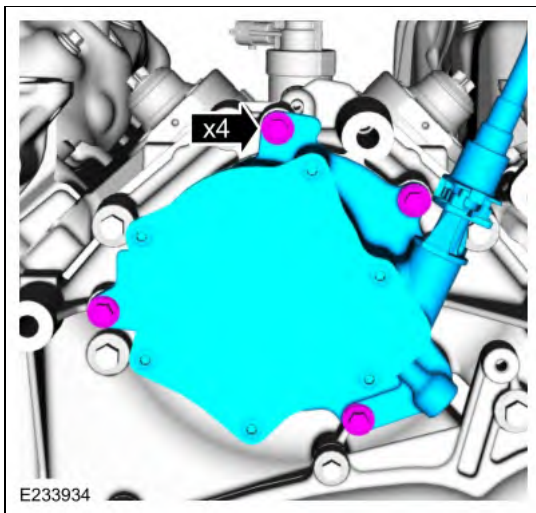
Stage 2: 74 lb.ft (100 Nm)



109. Install a new vacuum pump gasket.



110. Install the vacuum pump and the bolts.
Torque:
Stage 1: 89 lb.in (10 Nm)
Stage 2: 45 Å°



- 111. NOTICE:** To prevent engine damage, always install new bolts when installing the crankshaft pulley.

NOTE: Use the strap wrench to prevent the engine from turning while tightening the bolts.

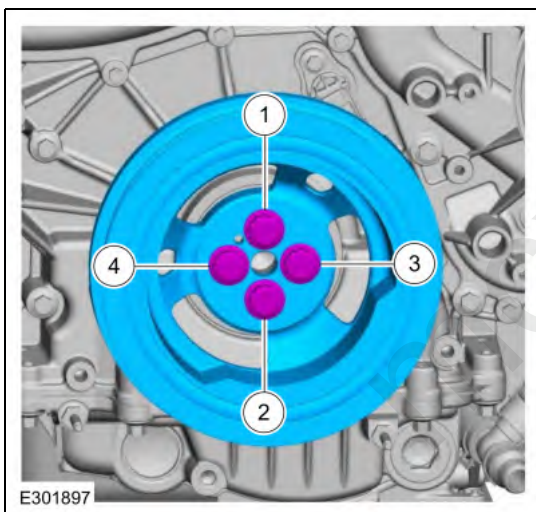
Position the crankshaft pulley and install the new bolts.

Use the General Equipment: Strap Wrench

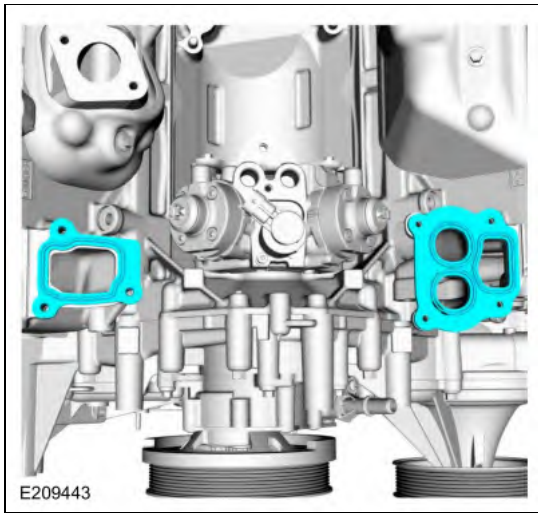
Torque:

Stage 1: 22 lb.ft (30 Nm)

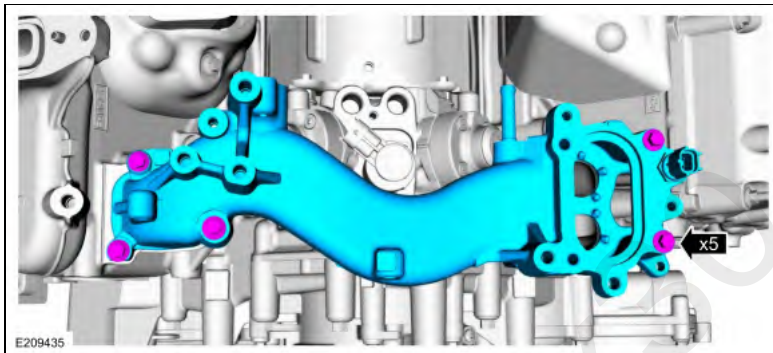
Stage 2: 90°



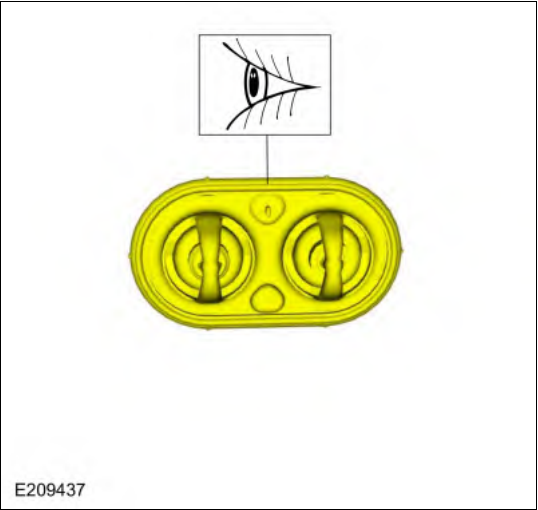
112. Install new coolant crossover manifold gaskets.



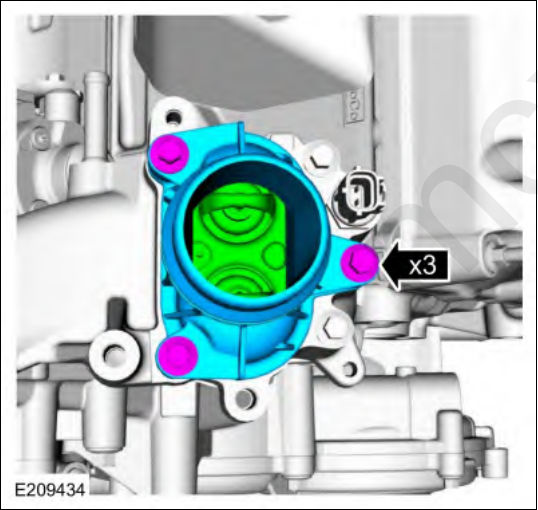
113. Install the coolant crossover manifold and the bolts. Finger-tighten the bolts.



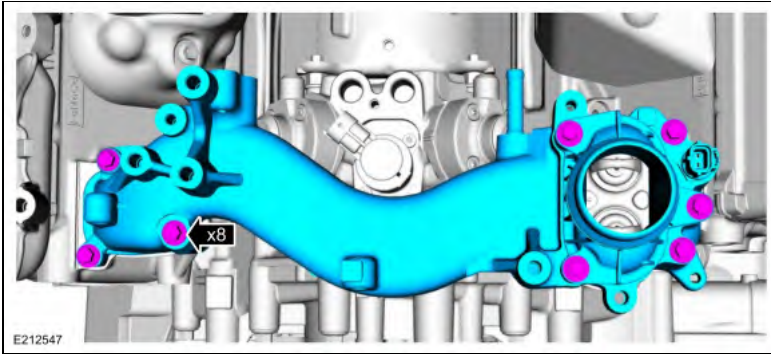
114. Inspect the thermostat seal for tears, nicks or cuts. Inspect the thermostat springs and valve seats for wear or damage. Replace if necessary.



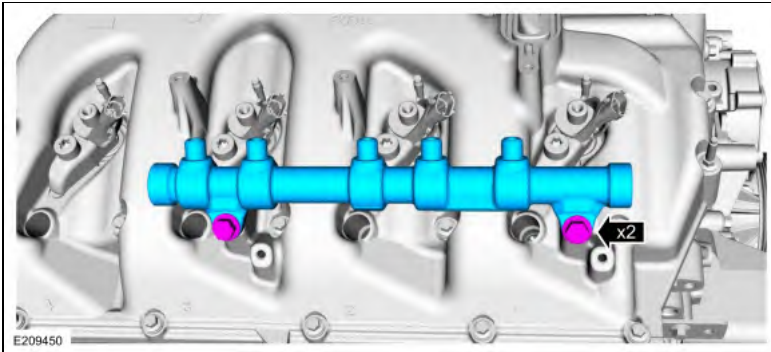
115. Install the thermostat, the thermostat housing and the bolts. Finger-tighten the bolts.



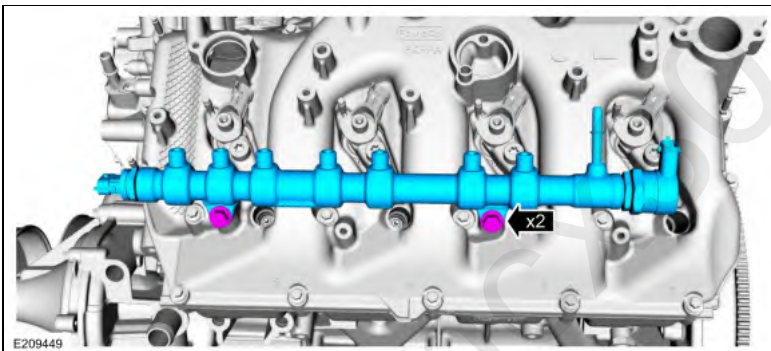
116. Tighten the coolant crossover manifold bolts and the thermostat housing bolts.
Torque: 89 lb.in (10 Nm)



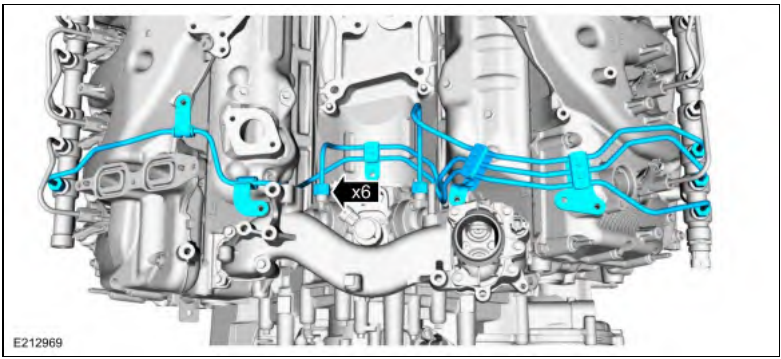
117. Position the RH fuel rail and loosely install the bolts.



118. Position the LH fuel rail and loosely install the bolts.



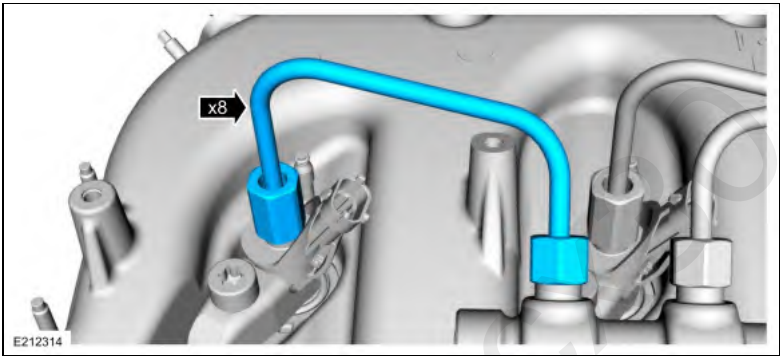
119. Position the fuel rail supply tube assembly. Hand start the fuel rail supply tube assembly connectors.



120. **NOTE:** Only 1 fuel injector supply tube shown.

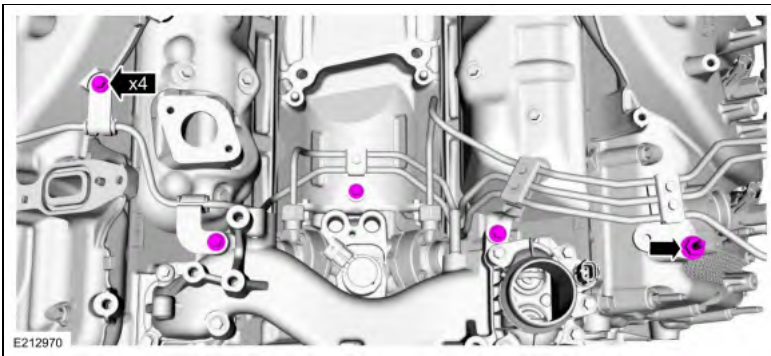
NOTE: Only hand start the fuel injector supply tube.

- Install the fuel injector supply tubes.
- Start from front to rear of the engine.



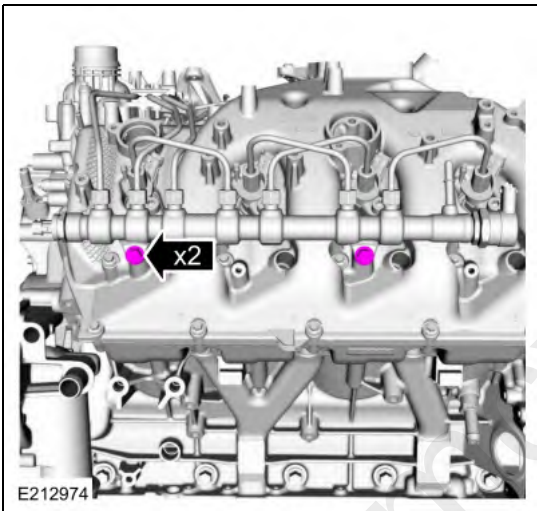
121. **NOTE:** Only hand start the fuel rail supply tube assembly bolts.

Install the fuel rail supply tube assembly bolts.



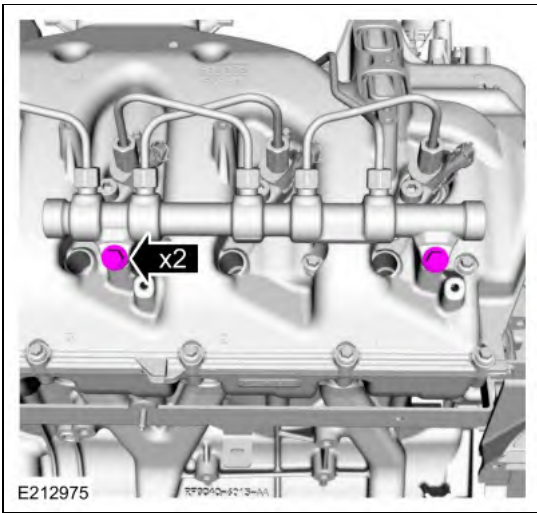
122. Tighten the LH fuel rail bolts.

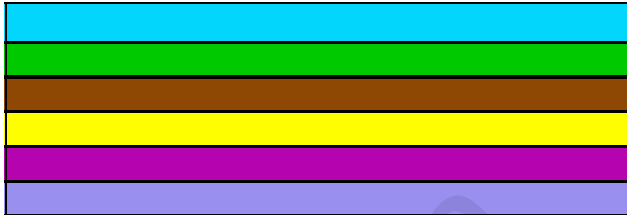
Torque: 18 lb.ft (24 Nm)



123. Tighten the RH fuel rail bolts.

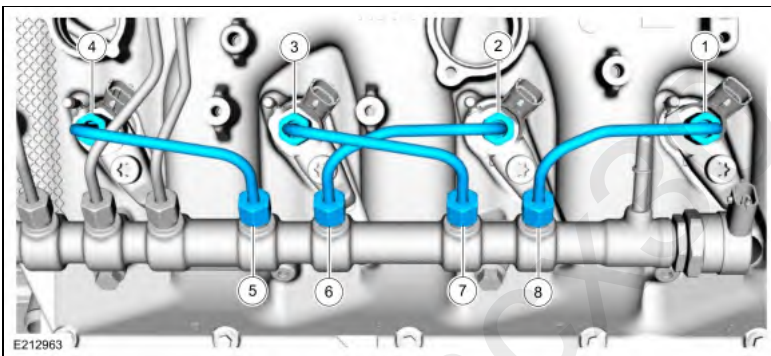
Torque: 18 lb.ft (24 Nm)

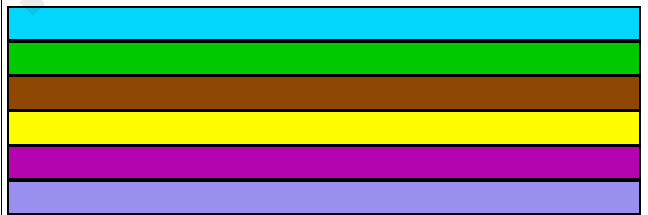




124. Tighten the LH fuel injector supply tubes in the sequence shown.

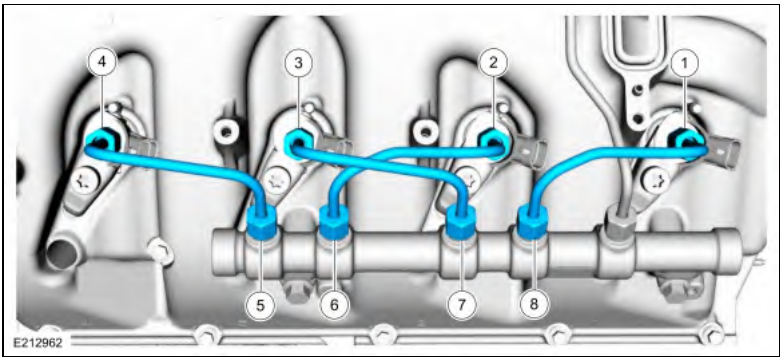
Torque: 89 lb.in (10 Nm)





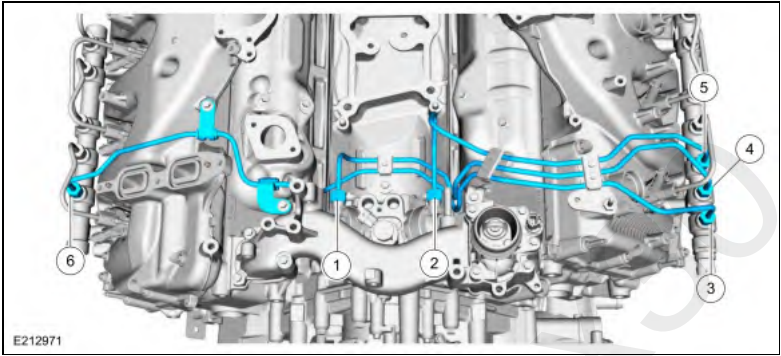
125. Tighten the RH fuel injector supply tubes in the sequence shown.

Torque: 89 lb.in (10 Nm)



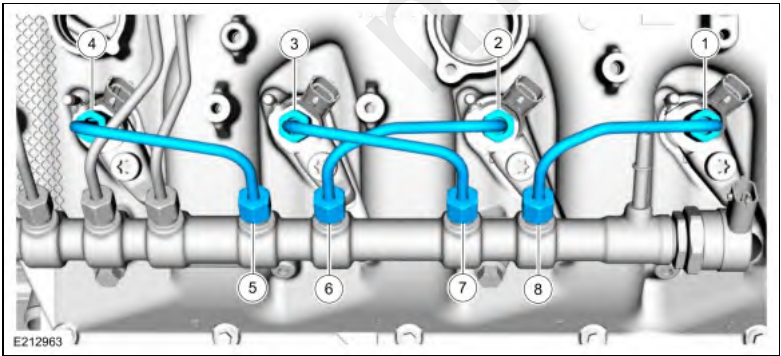
126. Tighten the fuel rail supply tube assembly connectors in the sequence shown.

Torque: 89 lb.in (10 Nm)



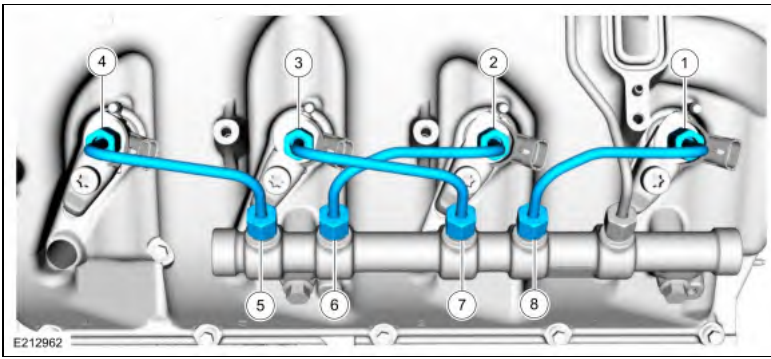
127. Tighten the LH fuel injector supply tubes in the sequence shown.

Torque: 65 Å°



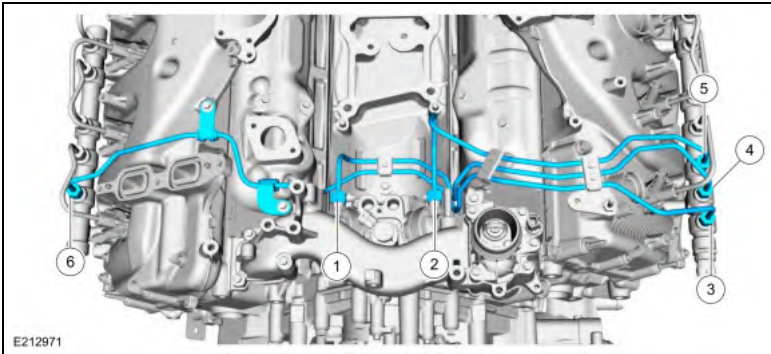
128. Tighten the RH fuel injector supply tubes in the sequence shown.

Torque: 65 Å°



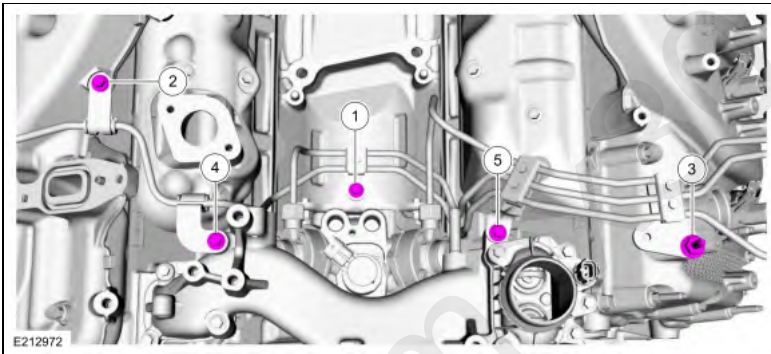
129. Tighten the fuel rail supply tube assembly connectors in the sequence shown.

Torque: 65 Å°



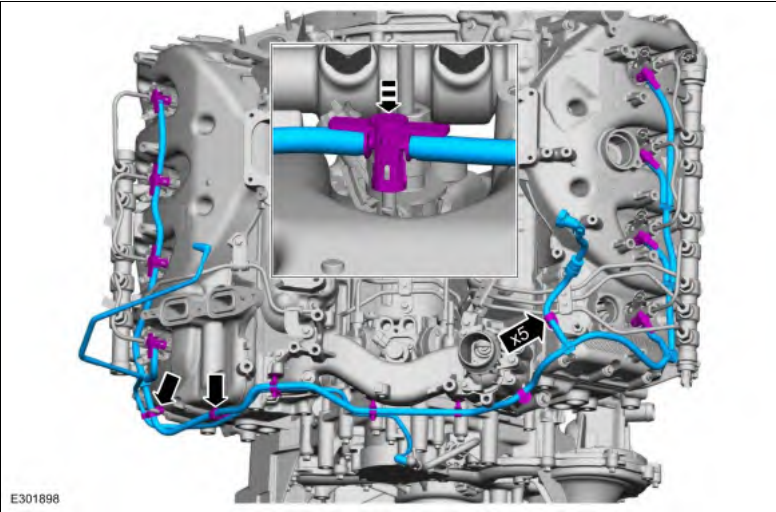
130. Tighten the fuel rail supply tube assembly bolts in the sequence shown.

Torque: 89 lb.in (10 Nm)

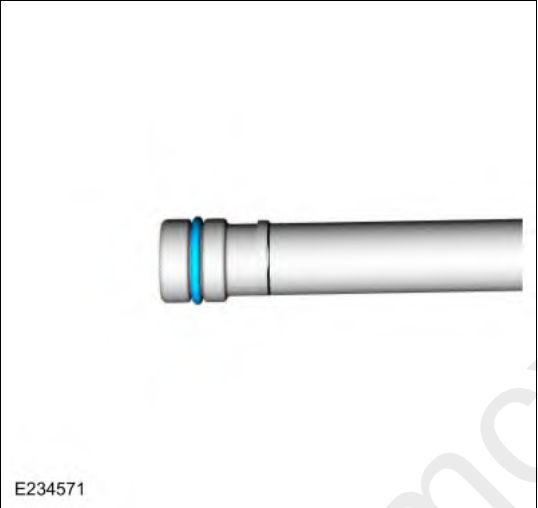


131.

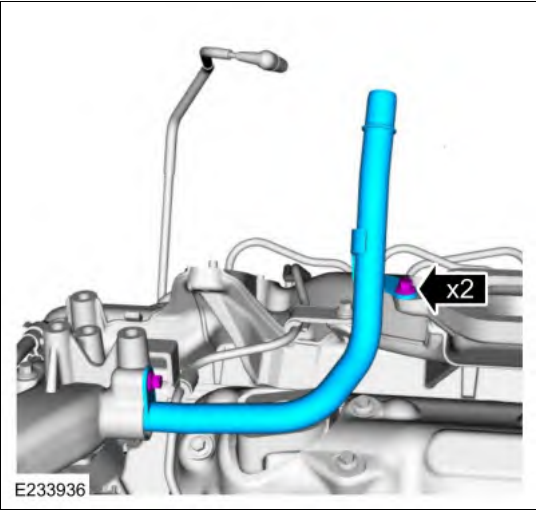
- Position the fuel injector return hose and vacuum hose assembly on the engine and connect the retaining clips.
- Connect the fuel injector return hose fittings to the fuel injectors.
- Push down on the center of the fuel injector return hose fitting to lock the fitting.



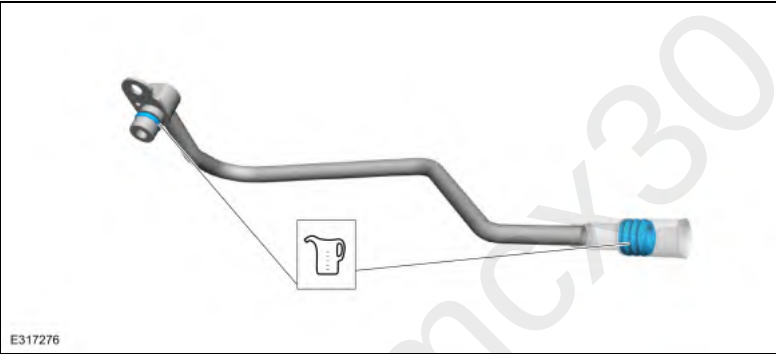
132. Install a new O-ring seal on the heater supply tube and lubricate with clean engine coolant.
Refer to: Specifications (303-03B Engine Cooling - 6.7L Power Stroke Diesel, Specifications).



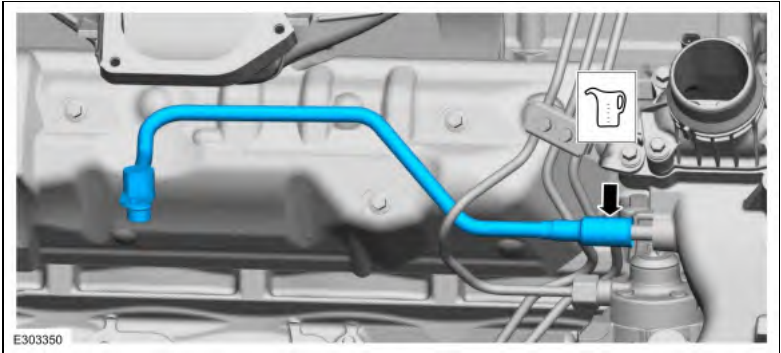
133. Install the heater supply tube and the bolts.
Torque: 89 lb.in (10 Nm)



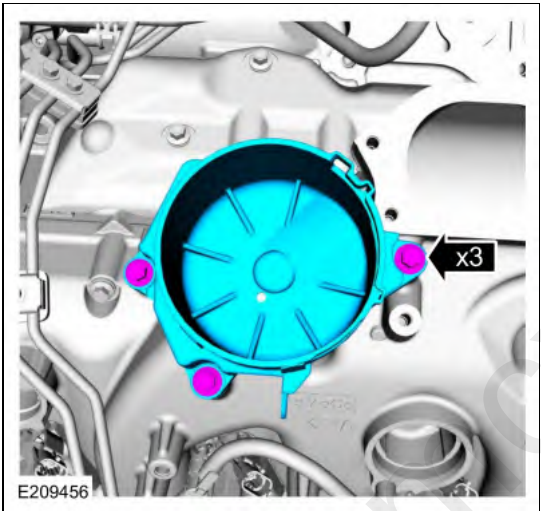
134. **NOTE:** Make sure the grommet is properly seated in the tube.
Install the TC coolant tube O-ring seal and the grommet.



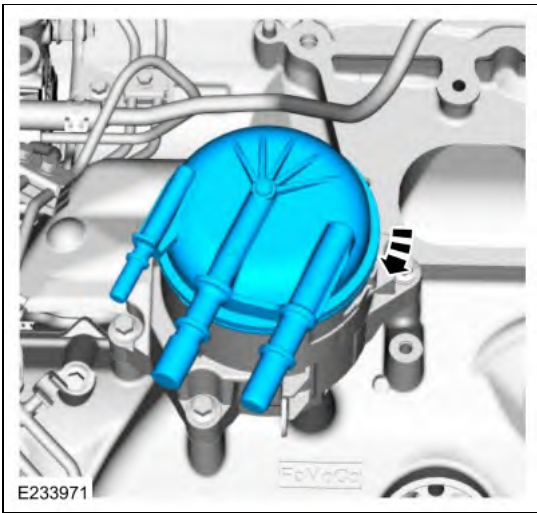
135. Lubricate with clean engine coolant and install the TC coolant tube.
Refer to: Specifications (303-03B Engine Cooling - 6.7L Power Stroke Diesel, Specifications).

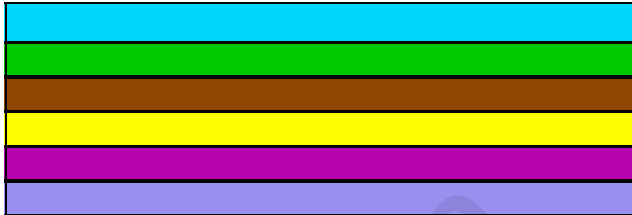


136. Install the secondary fuel filter bracket and the bolts.
- Torque:*
- Stage 1: 71 lb.in (8 Nm)
 - Stage 2: 45 Å°

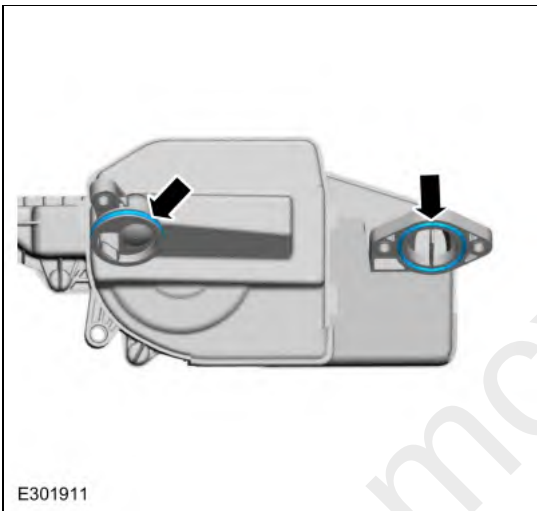


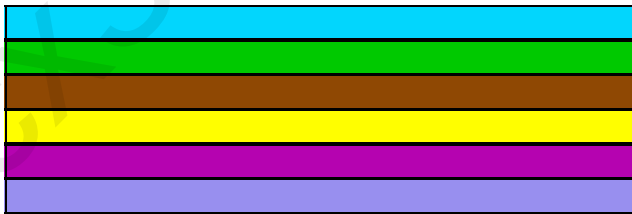
137. **NOTE:** Rotate the fuel filter clockwise to install.
- Install the new secondary fuel filter.





138. If necessary, install the new crankcase vent oil separator gasket and the O-ring seal.





139. **NOTE:** Do not lubricate the O-ring seal or gasket prior to installation.

Install the crankcase vent oil separator and bolts.

Torque:

Stage 1: 89 lb.in (10 Nm)

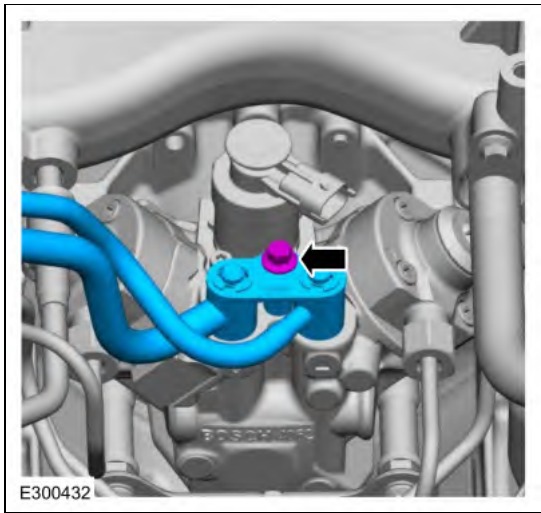
Stage 2: 45 Å°



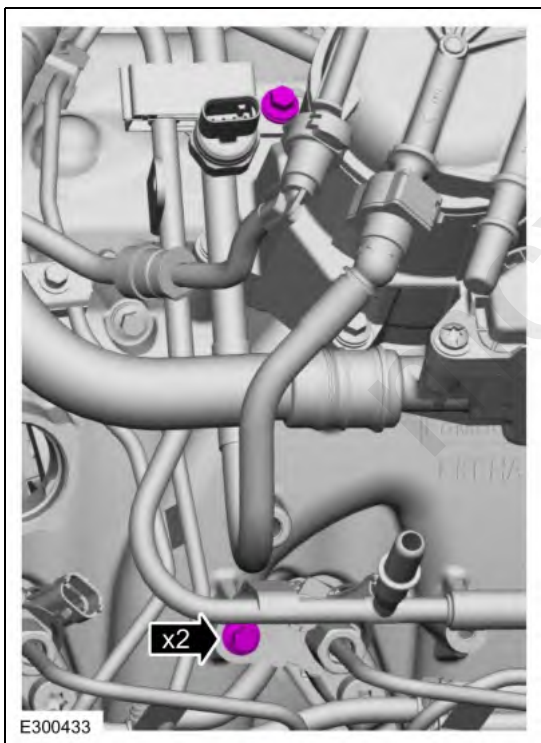
- 
- x4**
- E300431



141. Install the fuel injection pump supply tube assembly and hand start the bolt.



142. Hand start the fuel injection pump supply tube assembly bolts.

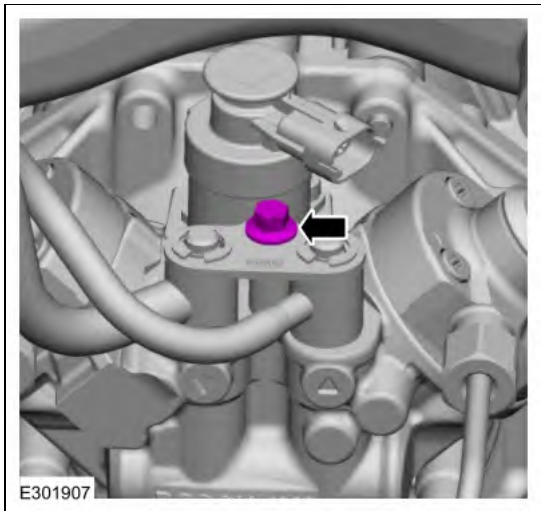


143. Tighten the fuel injection pump supply tube assembly bolt.

Torque:

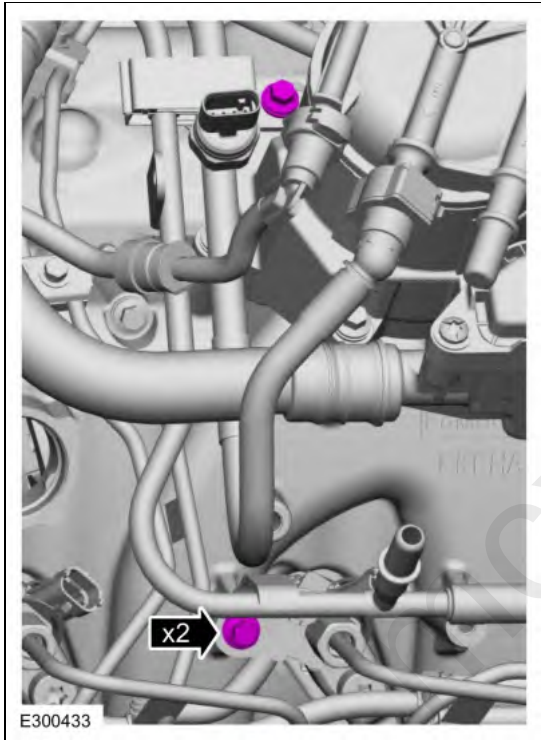
Stage 1: 89 lb.in (10 Nm)

Stage 2: 45 Å°

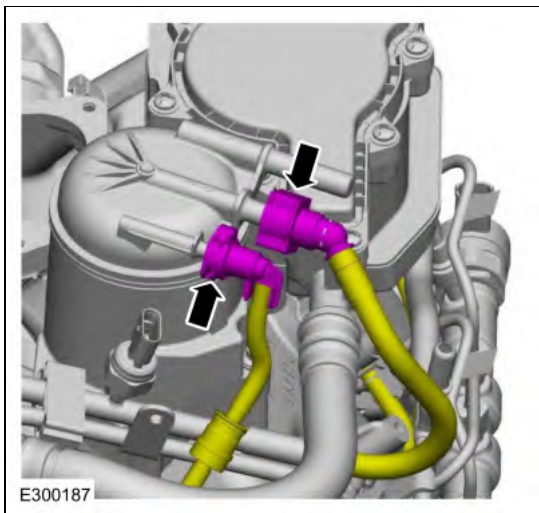


144. Tighten the fuel injection pump supply tube assembly bolts.

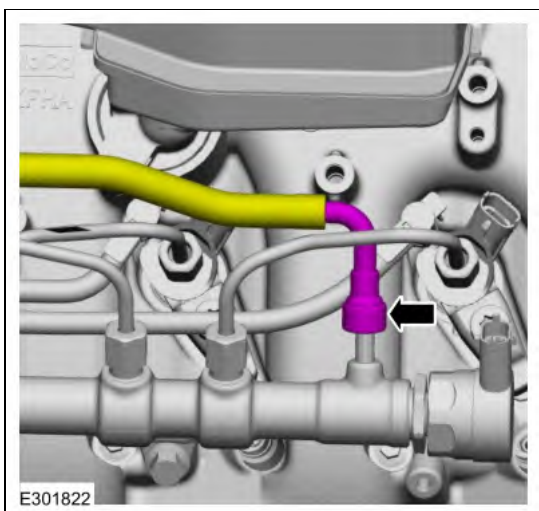
Torque:
 Stage 1: 89 lb.in (10 Nm)
 Stage 2: 45 Å°



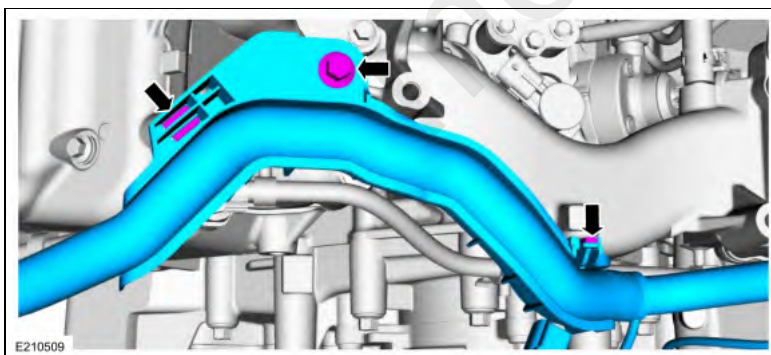
145. Position back and connect the fuel injector return hose and the fuel injection pump supply tube.
 Refer to: Quick Release Coupling (310-00 Fuel System - General Information - 6.7L Power Stroke Diesel) .



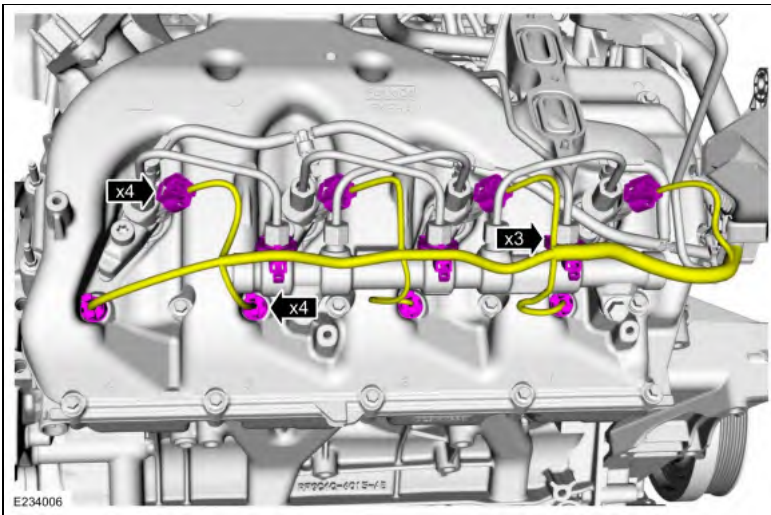
146. Connect the fuel injection pump hose to the fuel rail.
 Refer to: Spring Lock Couplings (310-00B Fuel System - General Information - 6.7L Power Stroke Diesel, General Procedures).



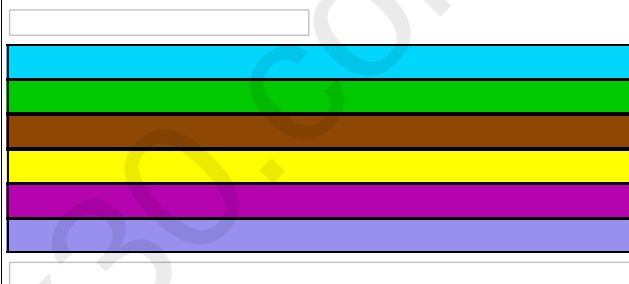
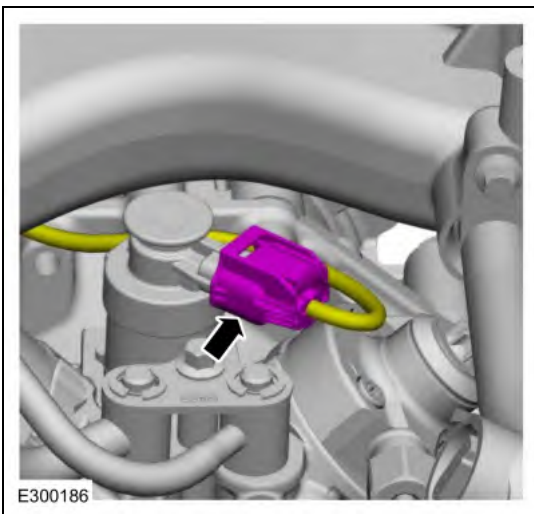
147. Position the engine wire harness over the engine. Connect the retainers and install the bolt.
Torque: 106 lb.in (12 Nm)



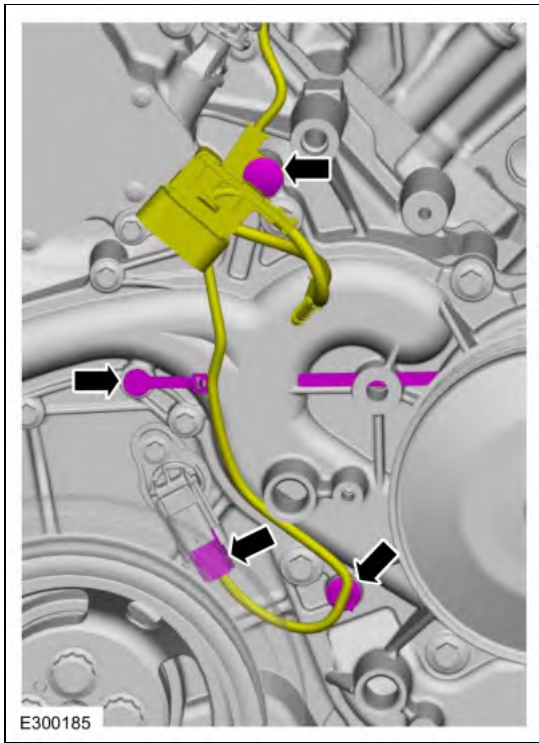
148. Connect the RH valve cover wiring.



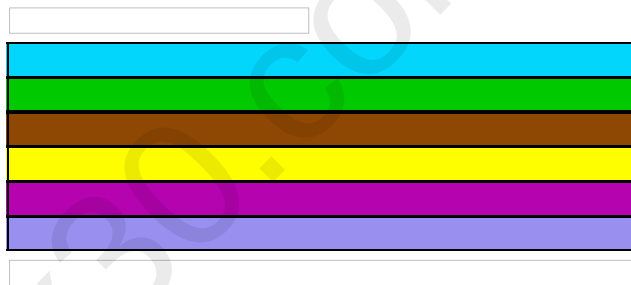
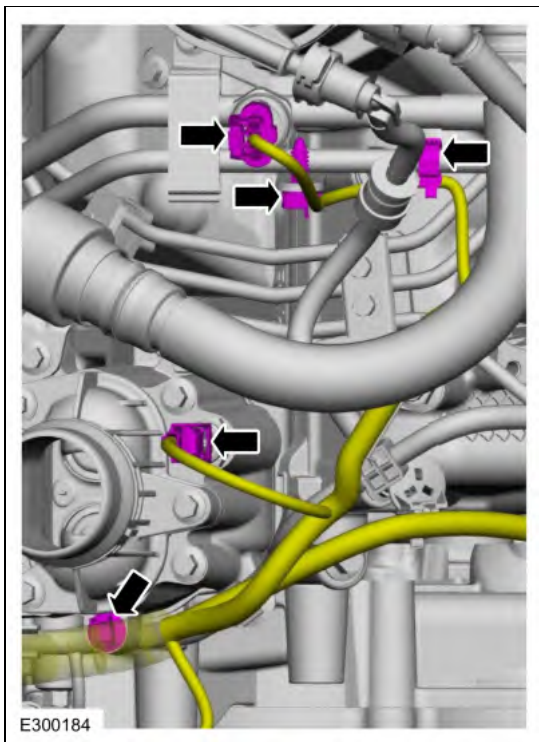
149. Connect the fuel volume control valve electrical connector.



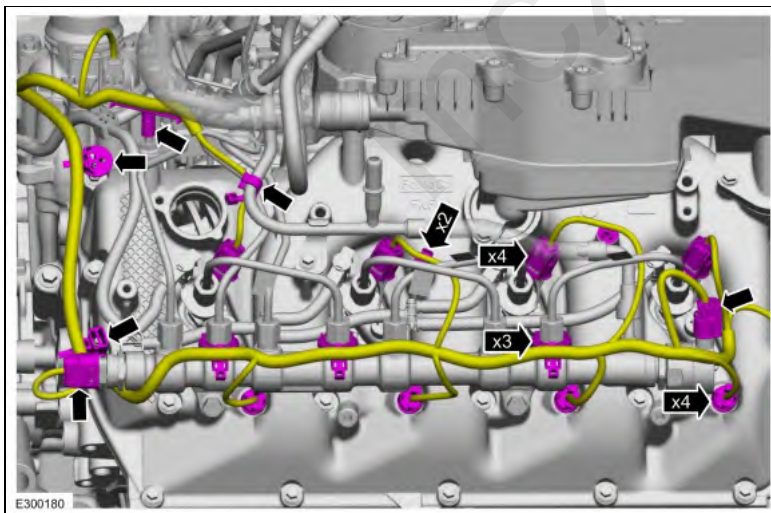
150. Connect the CMP sensor electrical connector and the wire retainers.



151. Connect the fuel pressure and temperature sensor, the ECT sensor electrical connectors and the wire retainers.

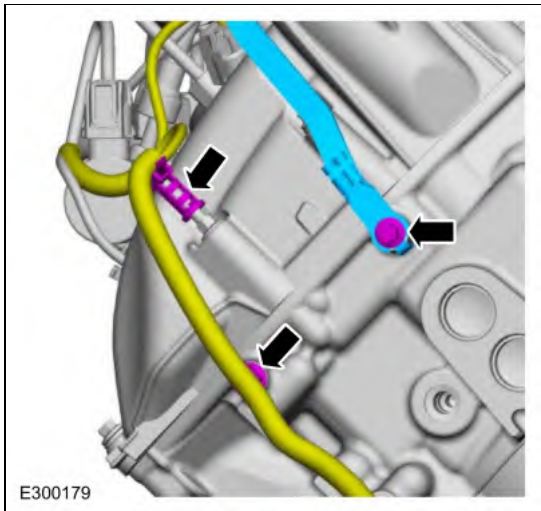


152. Connect the LH valve cover wiring.

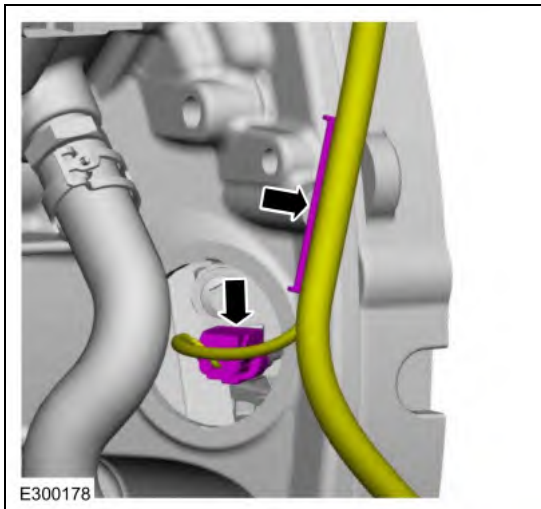


153.

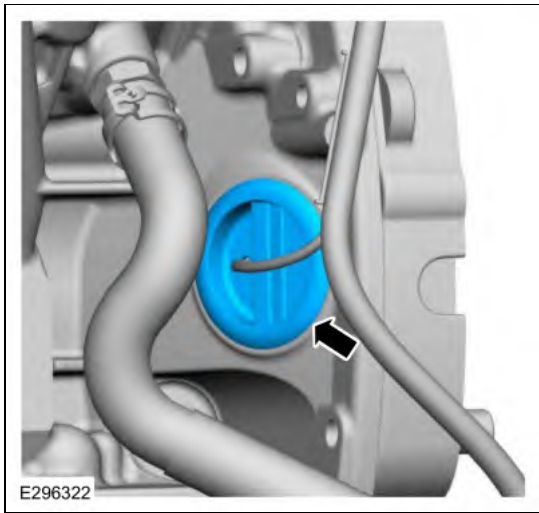
- Connect the wire retainers.
 - Install the ground strap and the bolt.
- Torque: 97 lb.in (11 Nm)*



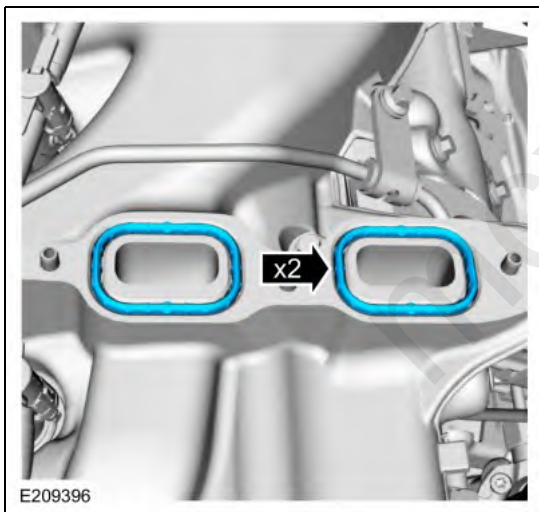
154. Connect the CKP sensor electrical connector and the wire retainer.



155. Install the CKP sensor cover.



156. Install the new EGR cooler gaskets.



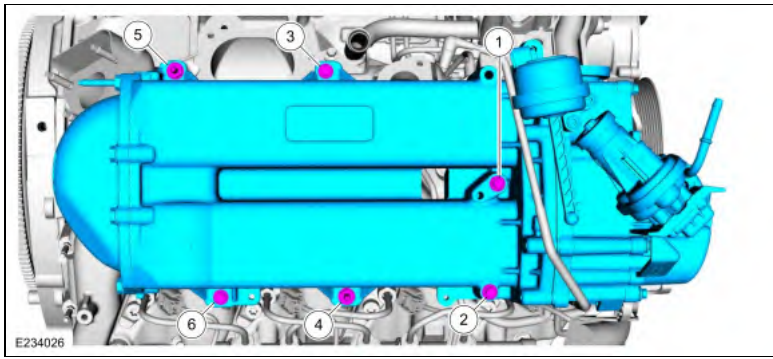
157. Install the EGR cooler assembly and the bolts.

Torque:

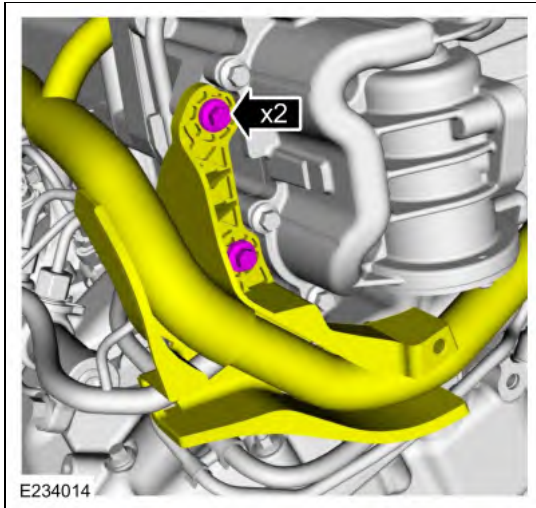
Stage 1: Tighten bolt 3 to: 89 lb.in (10 Nm)

Stage 2: Tighten bolt 1 to: 89 lb.in (10 Nm)

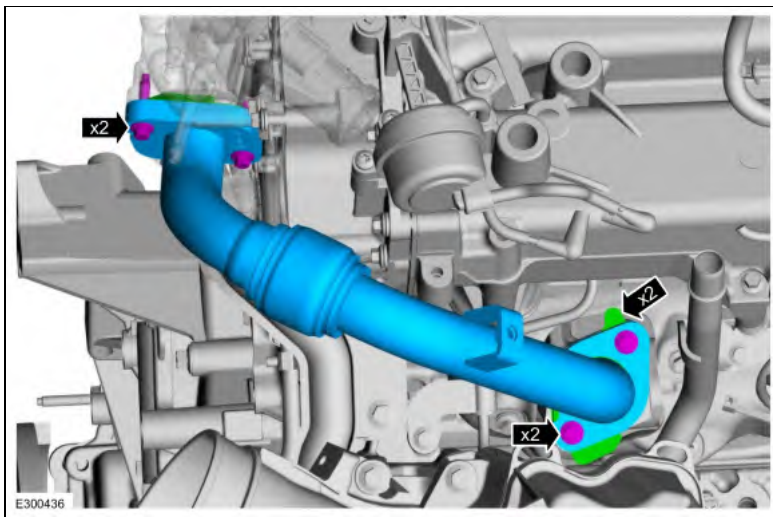
Stage 3: Tighten bolts 2, 4, 5 and 6 to: 89 lb.in (10 Nm)



158. Position the engine wire harness and install the bolts.
Torque: 80 lb.in (9 Nm)

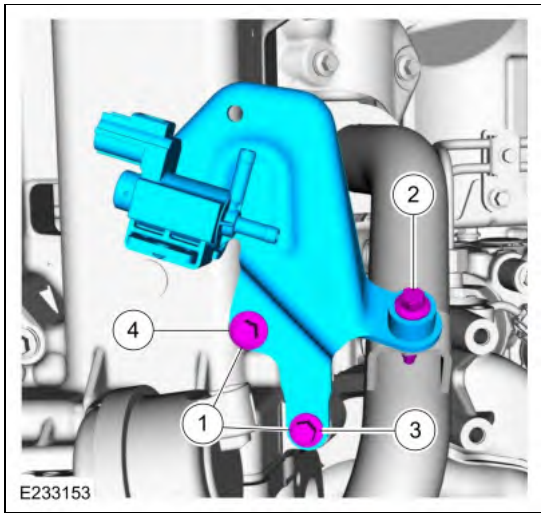


- 159.
- Using new gaskets, install the EGR cooler inlet tube and the bolts.
 - Tighten the bolts at the exhaust manifold.
- Torque: 177 lb.in (20 Nm)*
- Tighten the bolts at the EGR cooler.
- Torque: 89 lb.in (10 Nm)*

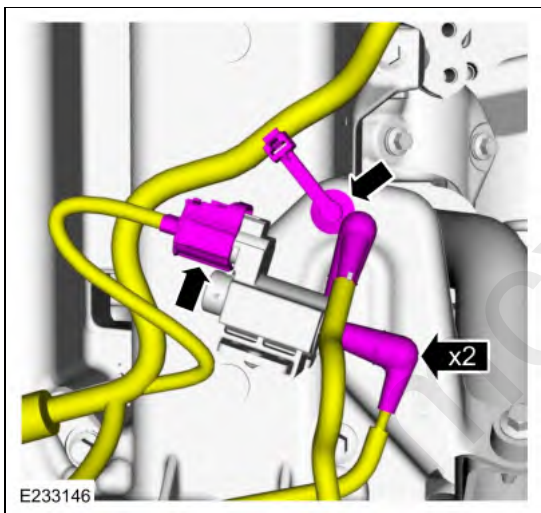


160.

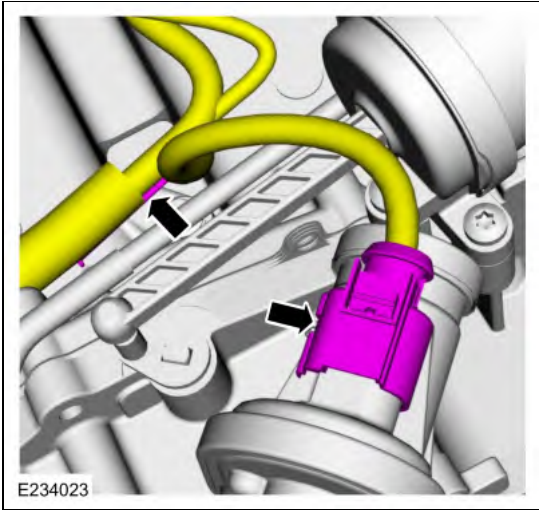
1. Install the EGR cooler inlet tube bracket and hand start the bolts.
2. Install the bolt.
Torque:
Stage 1: 89 lb.in (10 Nm)
Stage 2: 45 Å°
3. Tighten the bolt.
Torque:
Stage 1: 89 lb.in (10 Nm)
Stage 2: 45 Å°
4. Tighten the bolt.
Torque:
Stage 1: 89 lb.in (10 Nm)
Stage 2: 45 Å°



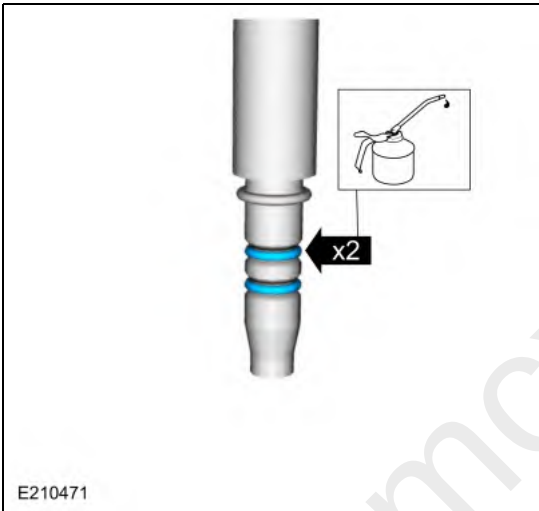
161. Connect the electrical connector and the vacuum tubes to the EGR bypass valve solenoid. Attach the wire harness retainer.



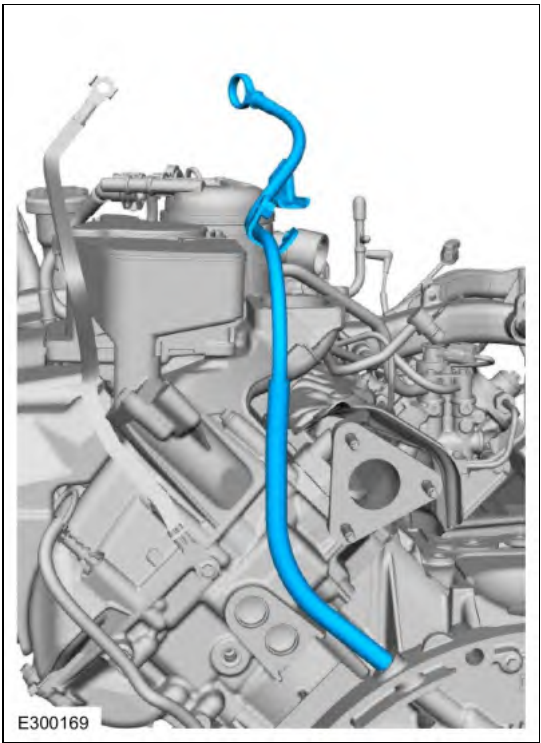
162. Connect the EGR valve electrical connector and the wire retainer.



163. Install new O-ring seals on the oil level indicator tube and lubricate with clean engine oil.
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).



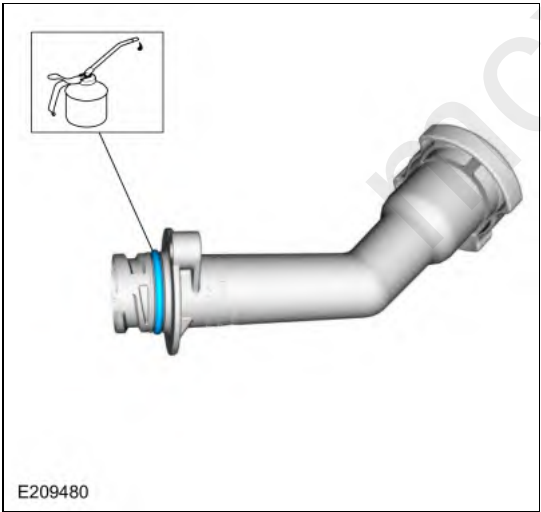
164. Install the oil level indicator tube.



E300169



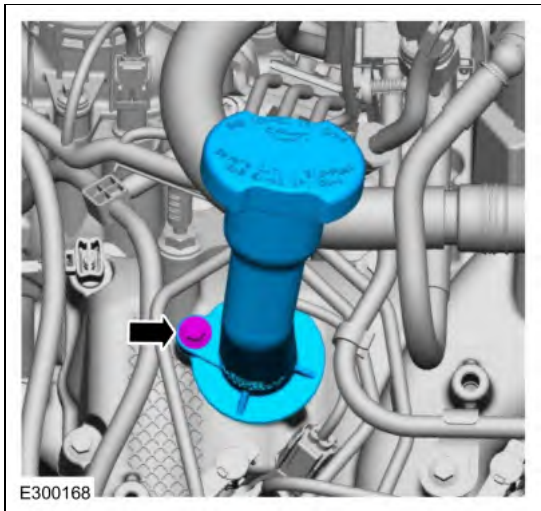
165. Install a new O-ring seal on the oil fill pipe and lubricate with clean engine oil.
Refer to: Specifications (303-01B Engine - 6.7L Power Stroke Diesel, Specifications).



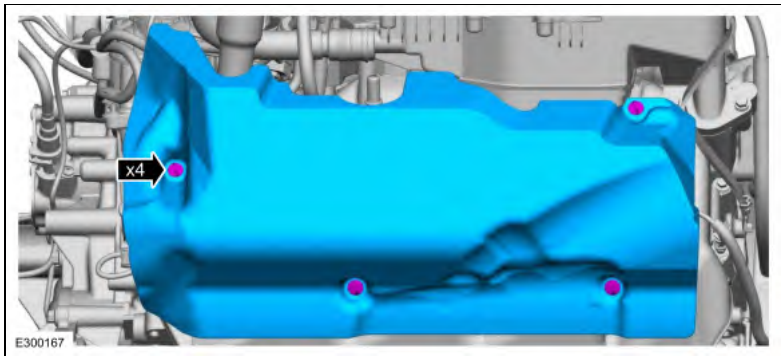
E209480



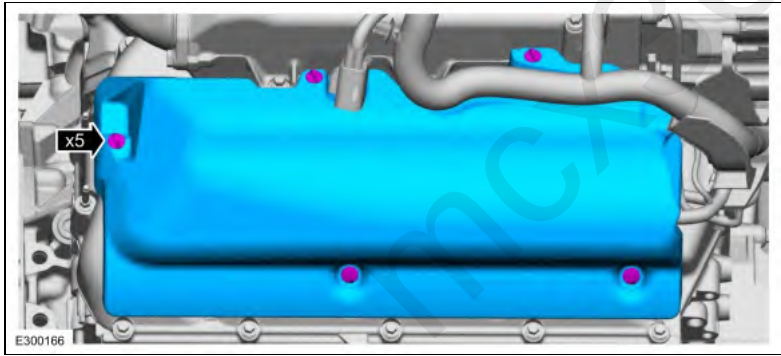
166. Install the oil fill pipe and the bolt.
Torque: 89 lb.in (10 Nm)



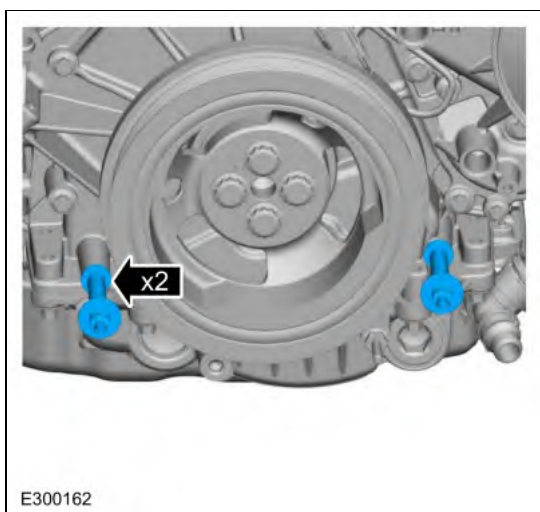
167. If equipped, install the LH sound shield and the push pins.



168. If equipped, install the RH sound shield and the push pins.

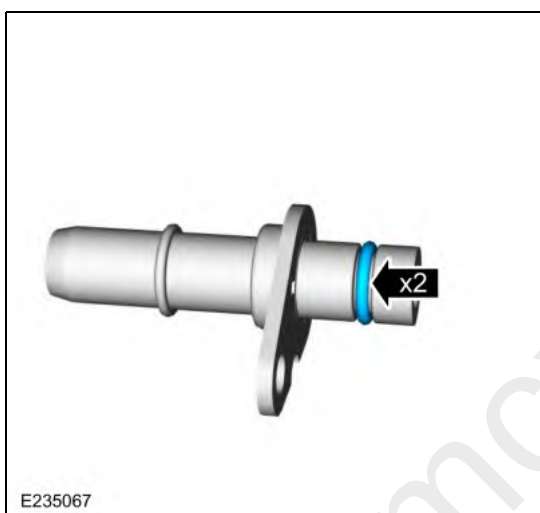


169. Install the stator standoffs.
Torque: 17 lb.ft (23 Nm)

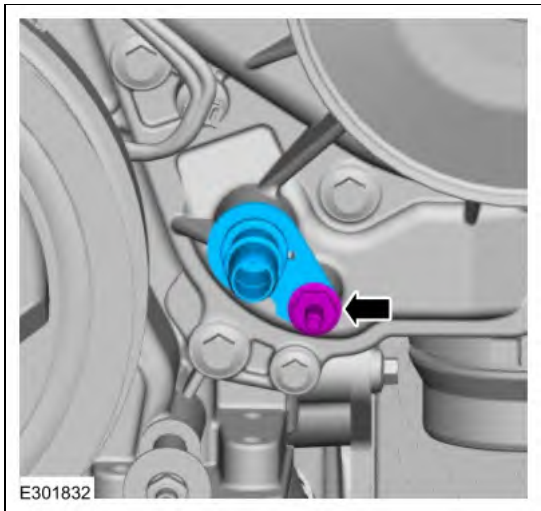


170. **NOTE:** *Only one tube shown.*

Install the new transmission oil cooler coolant tube O-ring seals and lubricate with clean engine coolant. Refer to: Specifications (303-03B Engine Cooling - 6.7L Power Stroke Diesel, Specifications).



171. Install the transmission oil cooler coolant tube and the stud bolt.
Torque: 89 lb.in (10 Nm)

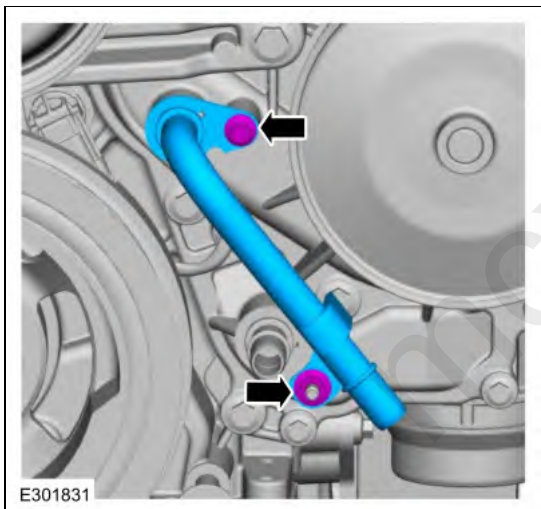


172. Install the transmission oil cooler coolant tube, the bolt and the nut.

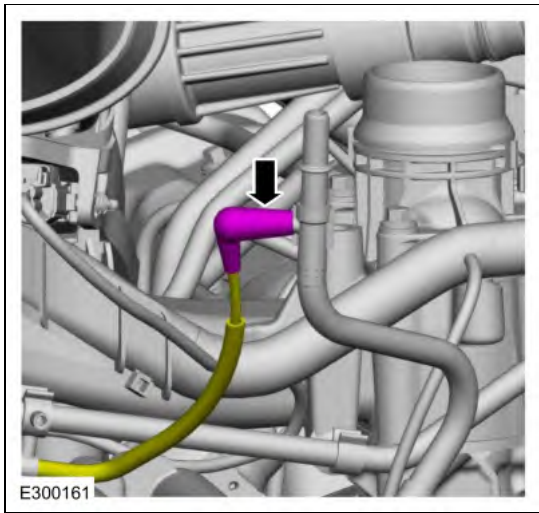
Torque:

Bolt : 89 lb.in (10 Nm)

Nut : 115 lb.in (13 Nm)

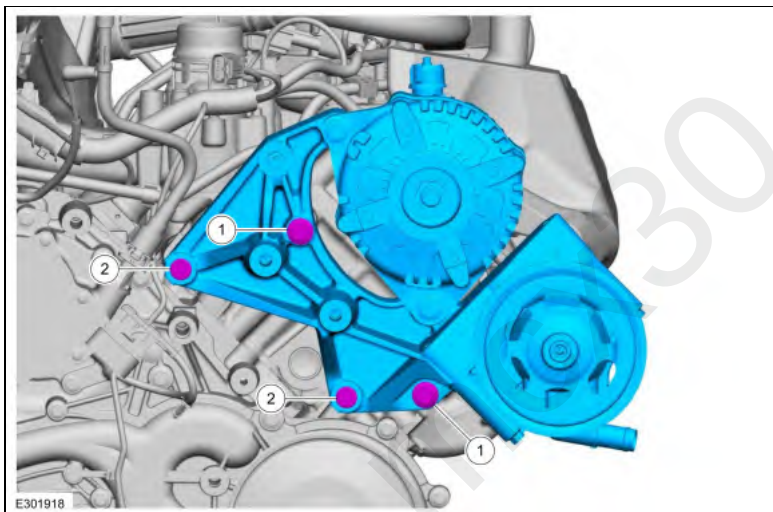


173. Connect the engine vacuum hose at the tee.



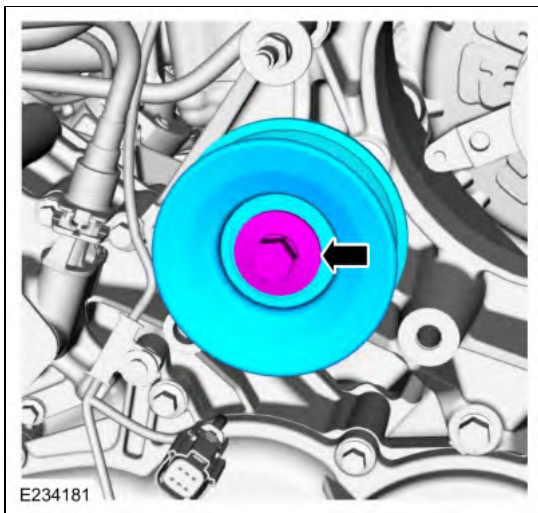
174.

1. Install the power steering pump mounting bracket and the bolts.
Torque: 18 lb.ft (25 Nm)
2. Install the remaining bolts.
Torque: 18 lb.ft (25 Nm)

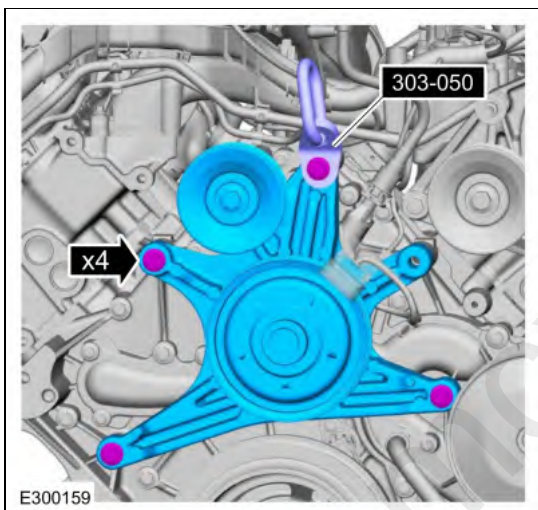


175. If equipped with dual generator, install the idler pulley.

Torque: 35 lb.ft (48 Nm)

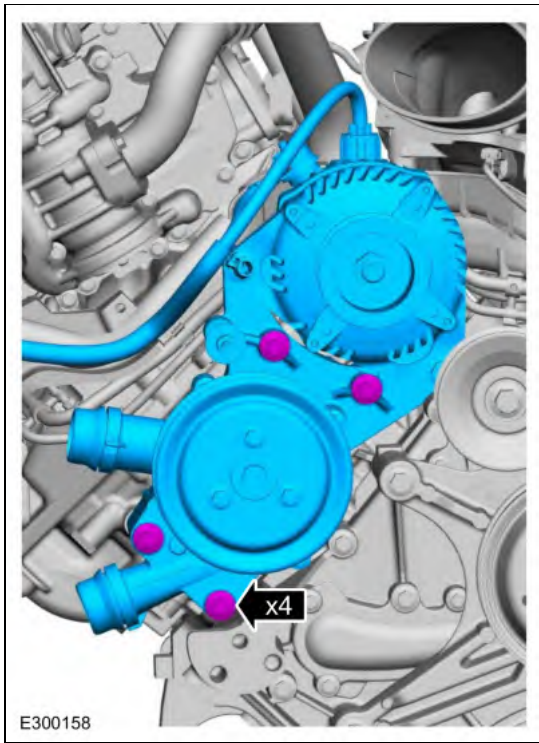


176. Install the cooling fan drive assembly, the engine lifting bracket and the bolts.
 Use Special Service Tool: 303-050 (T70P-6000) Lifting Bracket, Engine.
Torque: 18 lb.ft (25 Nm)

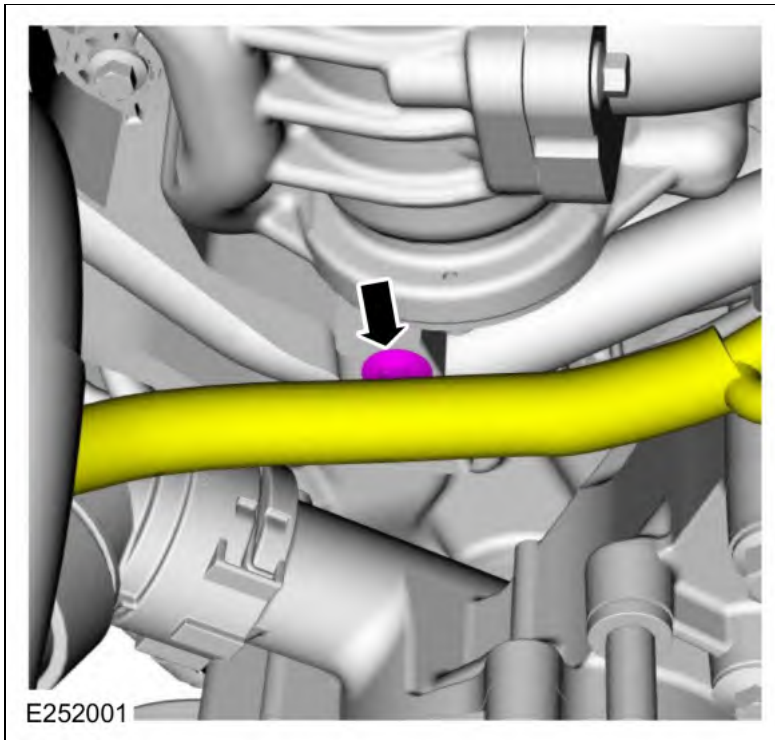


177. **NOTE:** *Dual generator shown, single generator similar.*

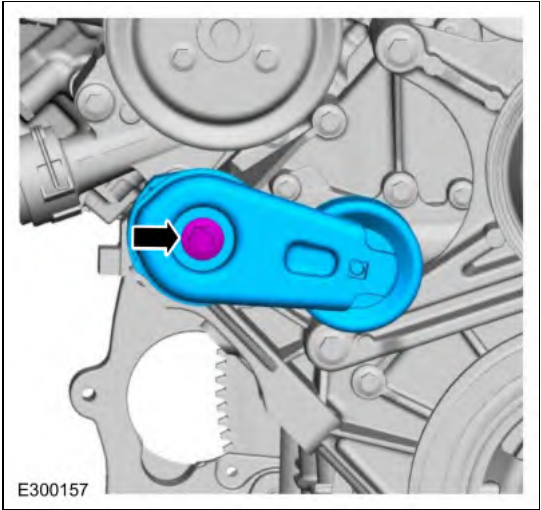
Install the secondary coolant pump assembly and the bolts.
Torque: 18 lb.ft (25 Nm)



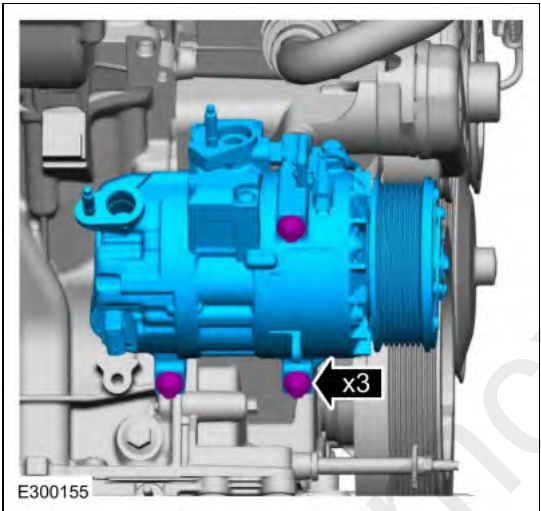
178. If equipped with dual generator, connect the wire retainer.



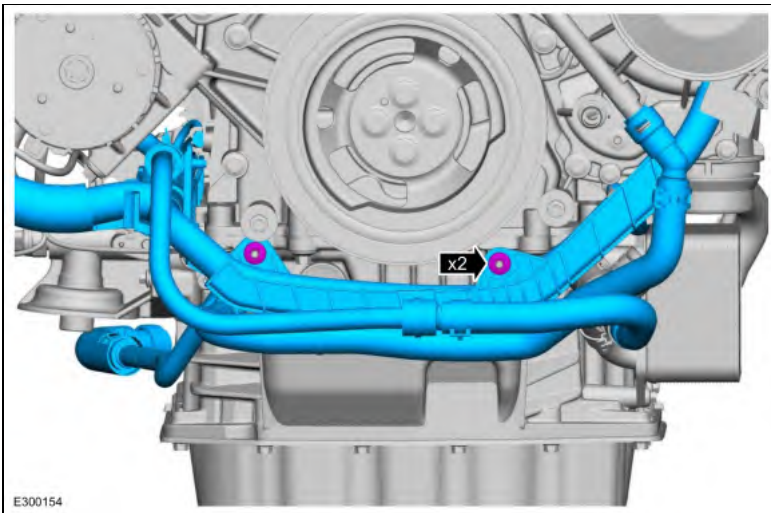
179. Install the accessory drive belt tensioner and the bolt.
Torque: 35 lb.ft (48 Nm)



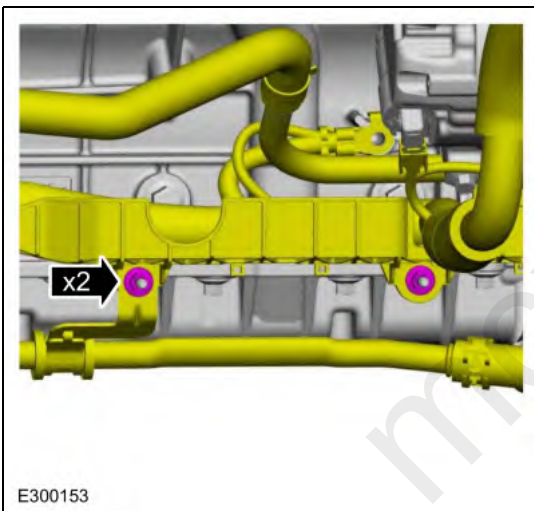
180. Install the A/C compressor and the bolts.
Torque: 18 lb.ft (25 Nm)



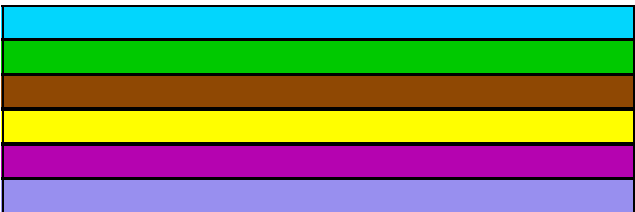
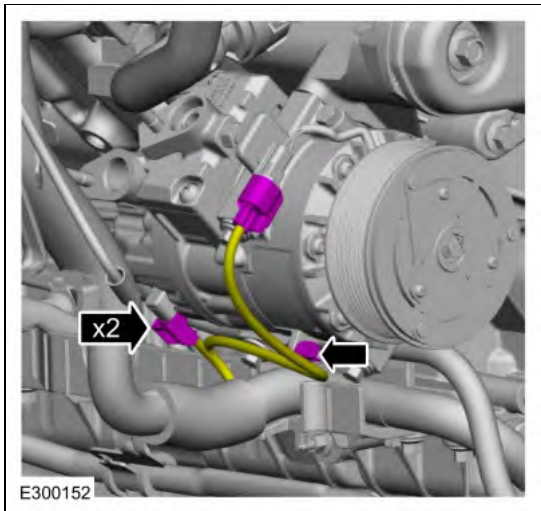
181. Install the battery wire harness, the coolant hoses and the nuts.
Torque: 106 lb.in (12 Nm)



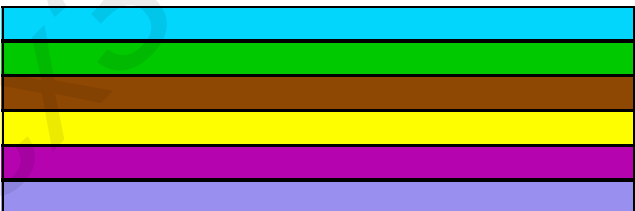
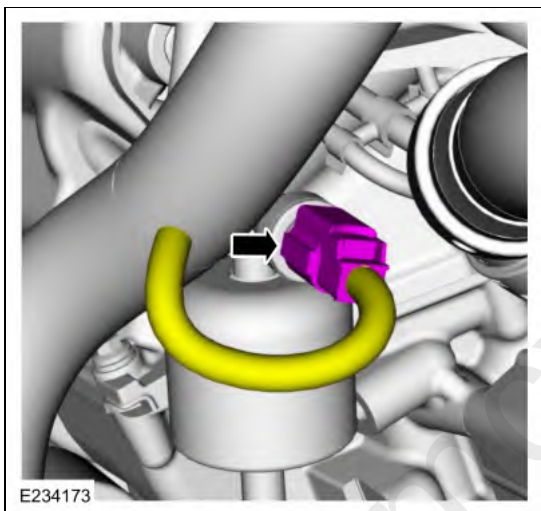
182. Position back the battery wire harness and coolant tube. Install the nuts.
Torque: 106 lb.in (12 Nm)



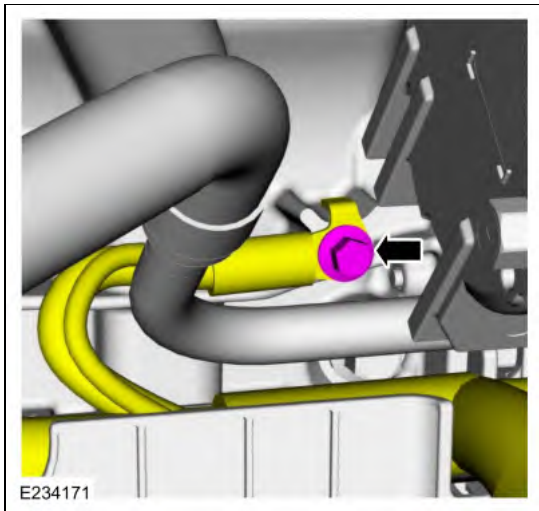
183. Connect the A/C electrical connectors and the wire retainer.



184. Connect the A/C pressure switch electrical connector.

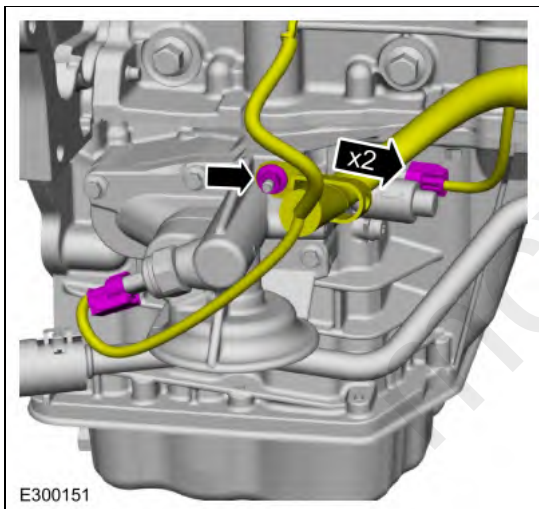


185. Position back the RH ground cable and install the bolt.
Torque: 18 lb.ft (25 Nm)

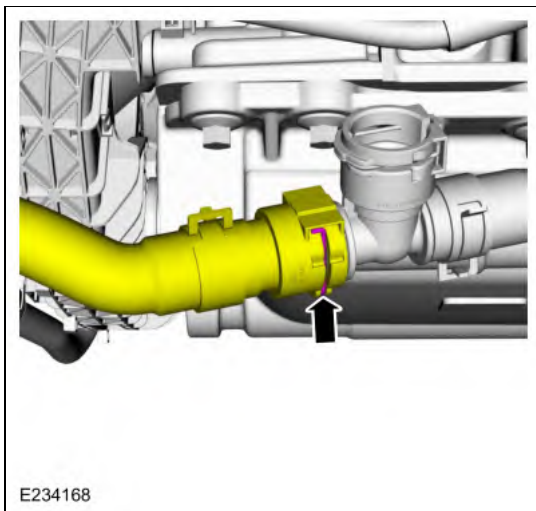


186.

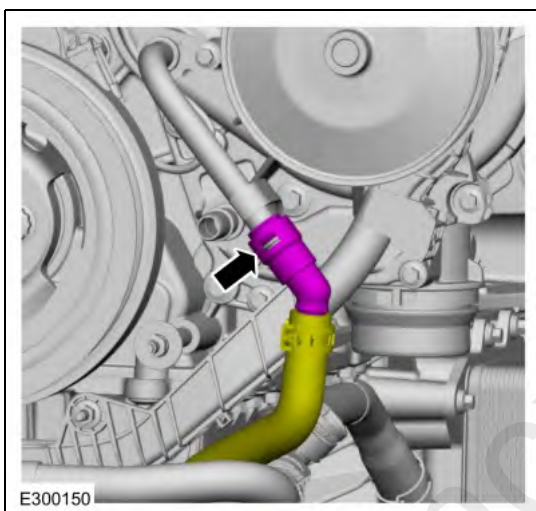
- Position back the battery wire harness and install the nut.
Torque: 106 lb.in (12 Nm)
- Connect the electrical connectors.



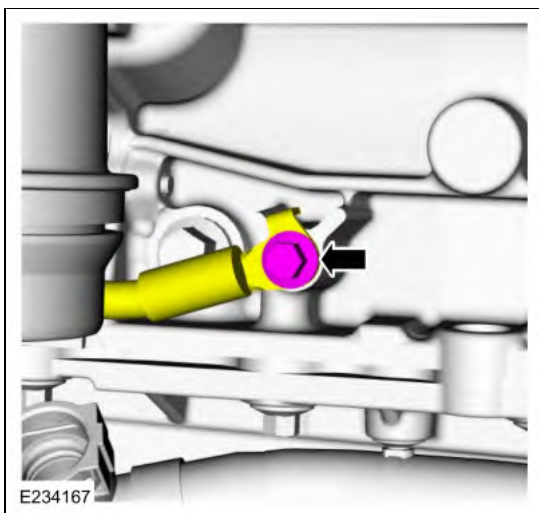
187. Connect the heater hose and install the clip.



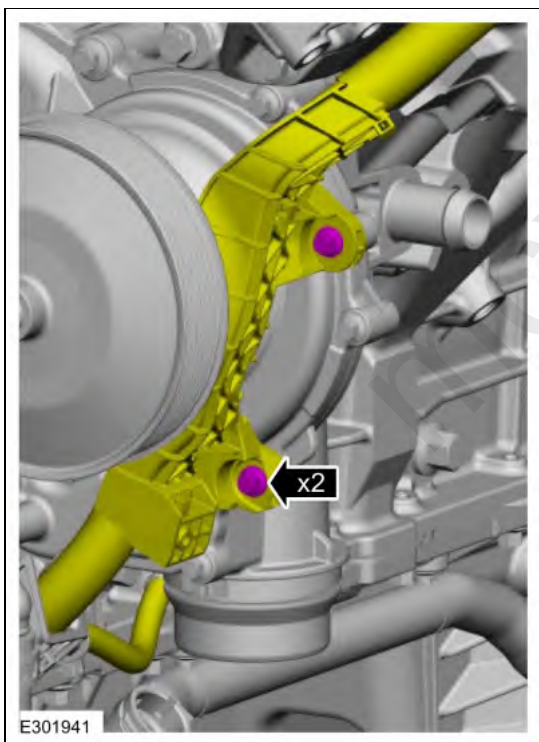
188. Connect the transmission oil cooler coolant hose.



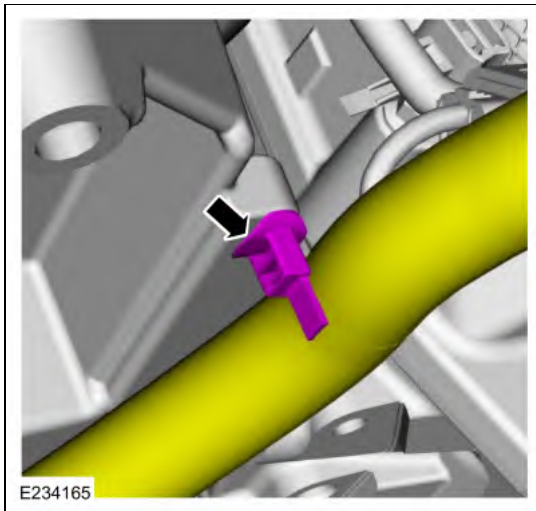
189. Position back the LH ground cable and install the bolt.
Torque: 18 lb.ft (25 Nm)



190. Install the bolts for the battery wire harness.
Torque: 106 lb.in (12 Nm)

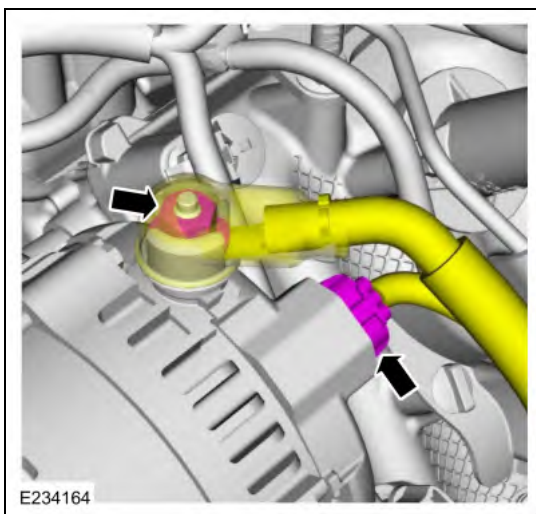


191. Connect the battery wire harness retainer to the bracket.

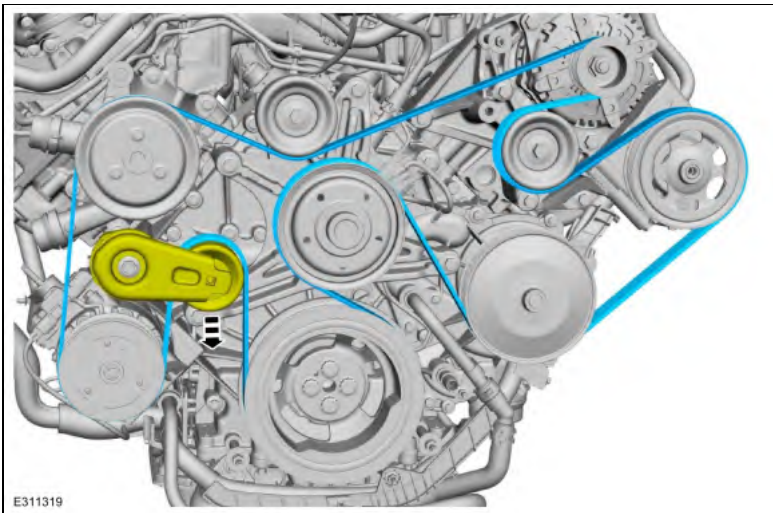


192.

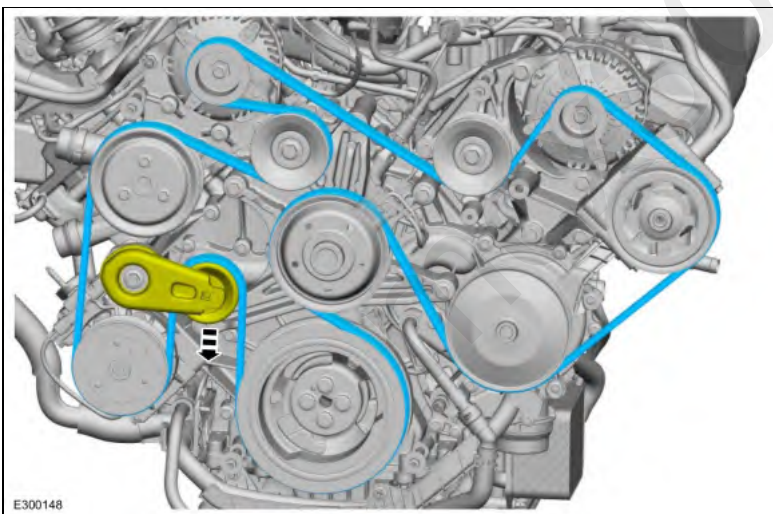
- Position back the cable and install the nut. Position back the boot.
Torque: 159 lb.in (18 Nm)
- Connect the generator electrical connector.



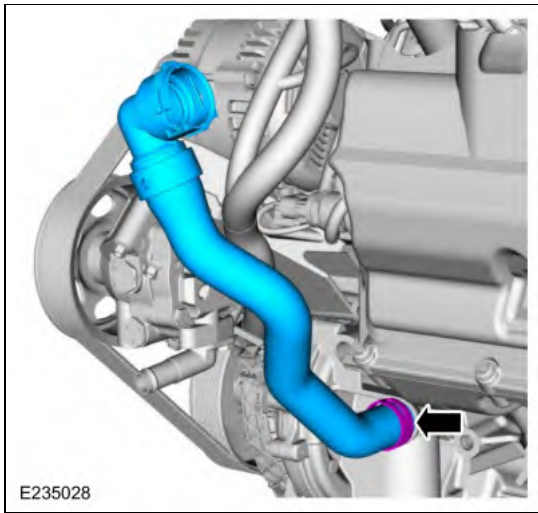
193. If equipped with single generator, install the accessory drive belt.



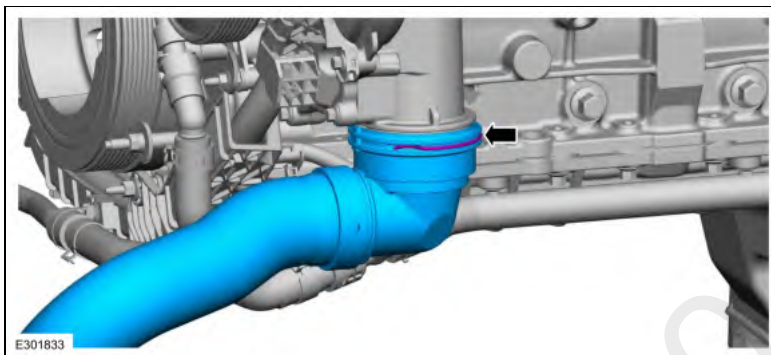
194. If equipped with dual generator, install the accessory drive belt.



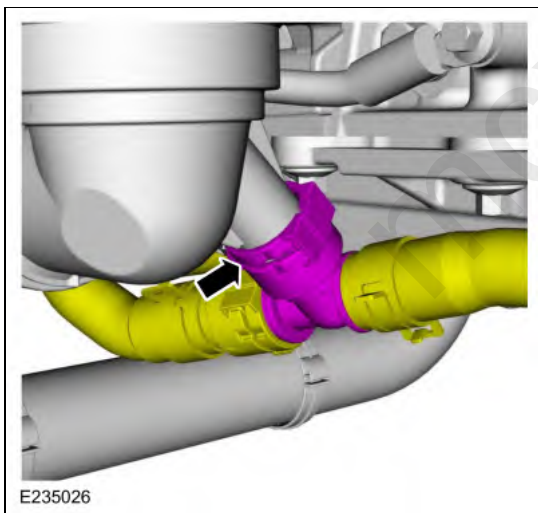
195. Install the coolant engine fill hose.
Use the General Equipment: Hose Clamp Remover/Installer



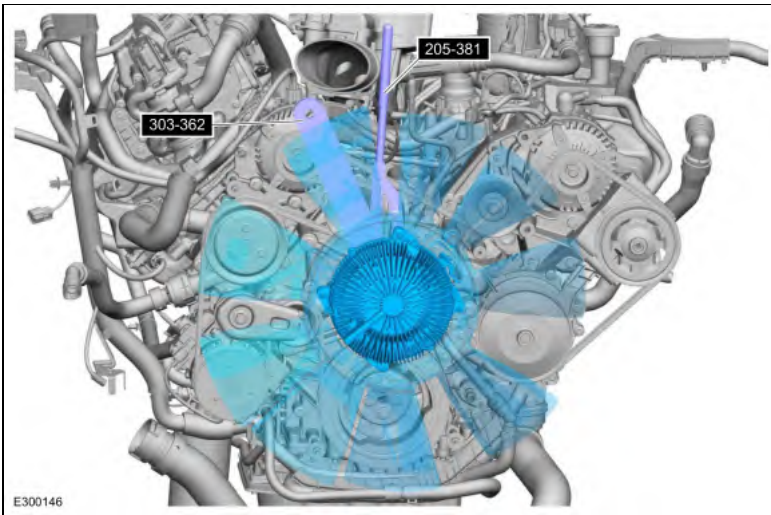
196. Install the lower radiator hose and install the clip.



197. Connect the coolant hose and install the clip.

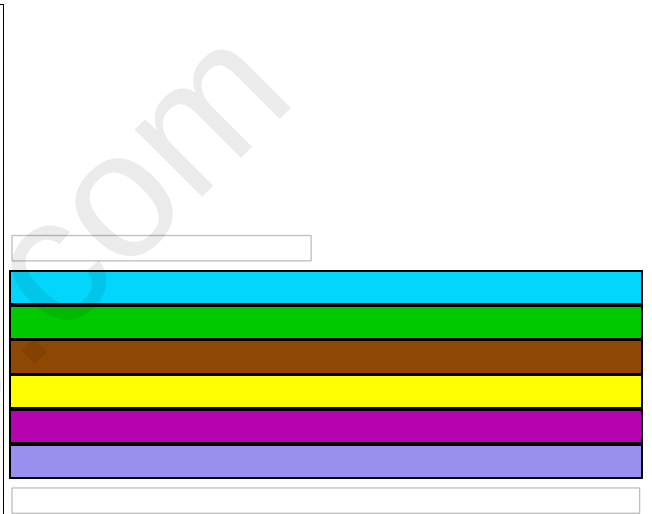
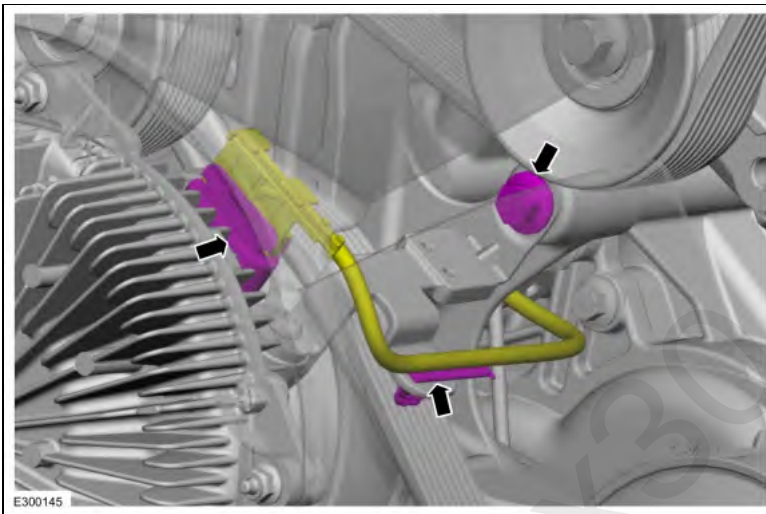


198. Using the special tools, install the cooling fan assembly.
 Use Special Service Tool: 205-036 (T70P-4067-A) Wrench , 303-214 (T83T-6312-B) Wrench, Fan Clutch Nut.
Torque: 98 lb.ft (133 Nm)

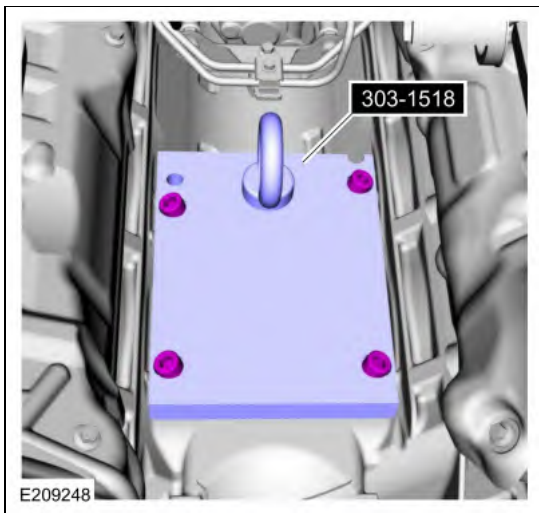


199.

- Install the fan clutch electrical connector bolt.
Torque: 18 lb.ft (25 Nm)
- Connect the fan clutch electrical connector and the wire retainer.

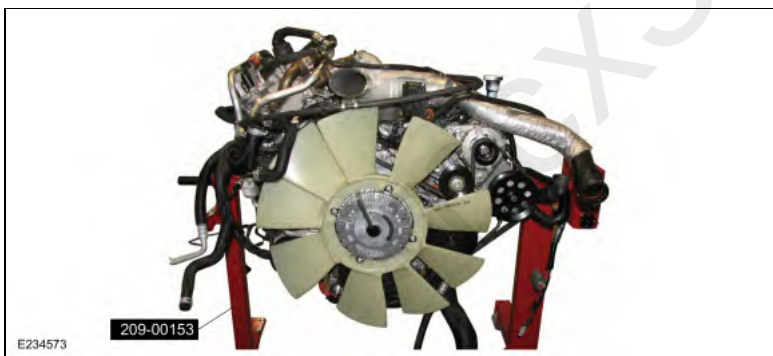


200. Install Special Service Tool: 303-1518 Bracket, Engine Removal.
Torque: 41 lb.ft (55 Nm)



201. Using a floor crane and the ratchet strap, remove the engine from the mounting stand.

Use the General Equipment: Mounting Stand
Use the General Equipment: Floor Crane



202. **NOTICE:** Do not tighten the engine mount bracket bolts more than 90 degrees after initial torque or damage to the bolts may occur.

NOTICE: Clean the engine mount mating surfaces of any dirt or foreign material prior to installation. Failure to follow these instructions may result in engine mount bracket or engine mount damage.

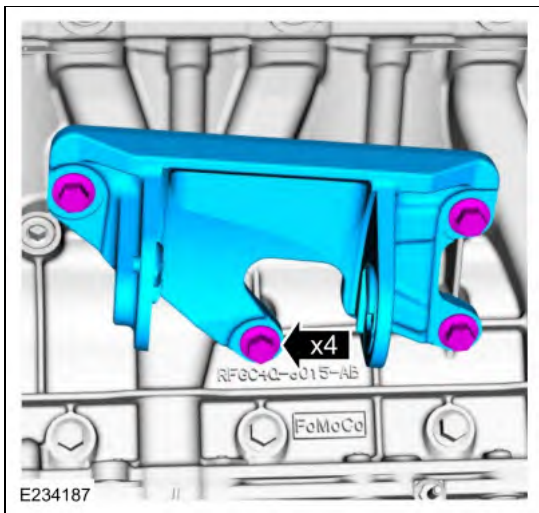
NOTE: Place a visible mark on the engine mount bracket and bracket bolts. Turning the bolt 1 flat of the bolt head is equal to 60 degrees.

Install the RH engine mount bracket and the new bolts.

Torque:

Stage 1: 41 lb.ft (55 Nm)

Stage 2: 60 Å°



203. **NOTICE:** Do not tighten the engine mount bracket bolts more than 90 degrees after initial torque or damage to the bolts may occur.

NOTICE: Clean the engine mount mating surfaces of any dirt or foreign material prior to installation. Failure to follow these instructions may result in engine mount bracket or engine mount damage.

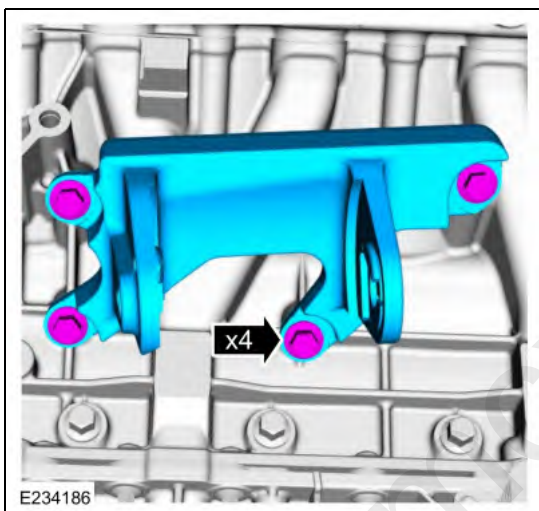
NOTE: Place a visible mark on the engine mount bracket and bracket bolts. Turning the bolt 1 flat of the bolt head is equal to 60 degrees.

Install the LH engine mount bracket and the new bolts.

Torque:

Stage 1: 41 lb.ft (55 Nm)

Stage 2: 60 Å°



204. Install the engine.

Refer to: Engine - Body Off (303-01B Engine - 6.7L Power Stroke Diesel, Installation).

Refer to: Engine - Body On (303-01B Engine - 6.7L Power Stroke Diesel, Installation).