

Engine

Special Tool(s) / General Equipment

 E133913	205-153 (T80T-4000-W) Handle
 E274084	303-050 (T70P-6000) Lifting Bracket, Engine
 E318522	303-050-01 7.3L Bracket, Engine (P558)
 E274084	303-1250 Seal Installer, Rear Main TKIT-2006UFFLM
 E318526	303-1250-01 7.3L Rear Seal Installer
 303-1508	303-1508 Installer, Front Crank Seal
 E318529	303-1661-03 7.3L OVC Bolt
 E318527	303-1700 7.3L Frt Seal Installer
 E318528	303-1702 7.3L VCT Locking Tools
 E222985	303-335 (T88T-6701-A) Installer, Front Cover Oil Seal TKIT-1988-FLM TKIT-1988-F
Strap Wrench	
Floor Crane	
Mounting Stand	
1/2 Inch Square Drive Breaker Bar	
Piston Ring Compressor	

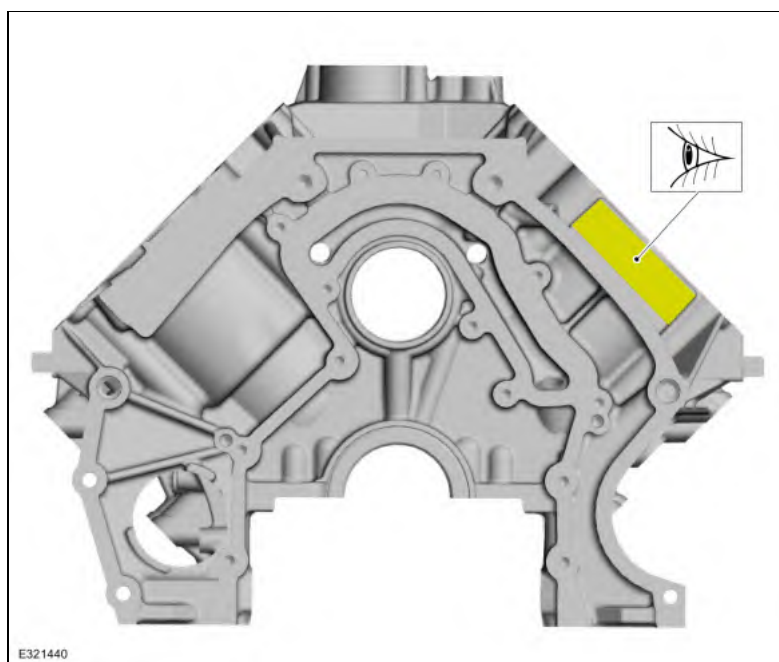
Materials

Name	Specification
Motorcraft® High Performance Engine RTV Silicone TA-357	WSE-M4G323-A6

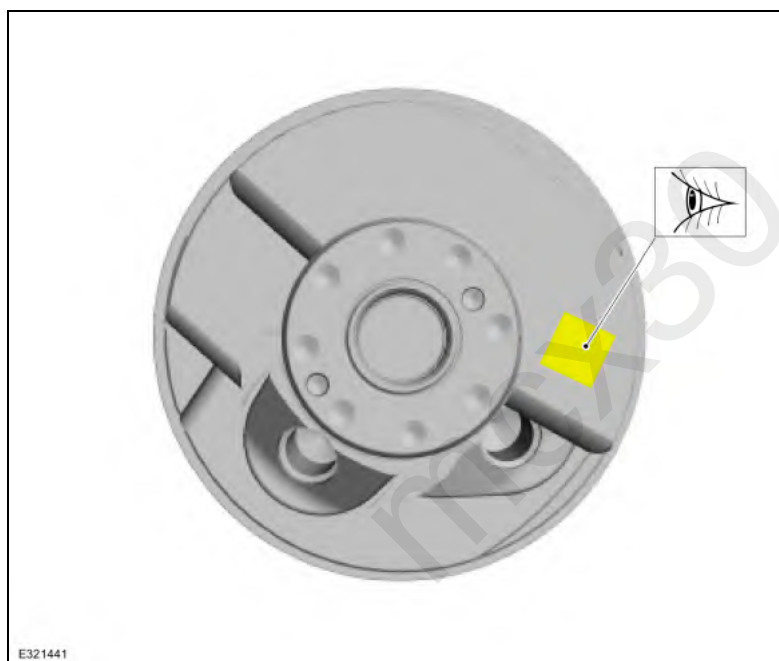
NOTICE: During engine repair procedures, cleanliness is extremely important. Any foreign material, including any material created while cleaning gasket surfaces, that enters the oil passages, coolant passages or the oil pan, can cause engine failure.

NOTE: During engine assembly it may become necessary to check bearing clearances and end play. Refer to Section 303-00.

1. Record the main bearing code found on the rear of the engine block.



- Record the main bearing code found on the rear of the crankshaft.



3. **NOTE:** This Main Bearing Select-Fit Chart is continued in the next step.

Using the data recorded earlier and the Main Bearing Select-Fit Chart, determine the required bearing grade for the main bearings.

1. Crankshaft main bearing code / Maximum crankshaft journal diameter.
 2. Engine block main bearing code / Minimum block bore diameter.
- Read the first letter of the engine block main bearing code and the first letter of the crankshaft main bearing code.
 - Read down the column below the engine block main bearing code letter and across the row next to the crankshaft main bearing code letter, until the 2 intersect. This is the required bearing grade for the No. 1 crankshaft main bearing.
 - As an example, if the engine block code letter is "J" and the crankshaft code letter is "F", the correct bearing grade for this main bearing is a "2".
 - Repeat the above steps using the second, third, fourth and fifth letters of the block and crankshaft codes to select the No. 2, 3, 4 and 5 bearings.

		2											
1		A	B	C	D	E	F	G	H	I	J	K	L
		72.400	72.401	72.402	72.403	72.404	72.405	72.406	72.407	72.408	72.409	72.410	72.411
U	67.503	1	1	1	1	1	1	1	1	1	1	1	1
T	67.502	1	1	1	1	1	1	1	1	1	1	1	1
S	67.501	1	1	1	1	1	1	1	1	1	1	1	1
R	67.500	1	1	1	1	1	1	1	1	1	1	1	1
Q	67.499	1	1	1	1	1	1	1	1	1	1	1	1
P	67.498	1	1	1	1	1	1	1	1	1	1	1	2
O	67.497	1	1	1	1	1	1	1	1	1	1	2	2
N	67.496	1	1	1	1	1	1	1	1	1	2	2	2
M	67.495	1	1	1	1	1	1	1	1	2	2	2	2
L	67.494	1	1	1	1	1	1	1	2	2	2	2	2
K	67.493	1	1	1	1	1	1	2	2	2	2	2	2
J	67.492	1	1	1	1	1	2	2	2	2	2	2	2
I	67.491	1	1	1	1	2	2	2	2	2	2	2	2
H	67.490	1	1	1	2	2	2	2	2	2	2	2	2
G	67.489	1	1	2	2	2	2	2	2	2	2	2	2
F	67.488	1	2	2	2	2	2	2	2	2	2	2	2
E	67.487	2	2	2	2	2	2	2	2	2	2	2	2
D	67.486	2	2	2	2	2	2	2	2	2	2	2	2
C	67.485	2	2	2	2	2	2	2	2	2	2	2	2
B	67.484	2	2	2	2	2	2	2	2	2	2	2	2
A	67.483	2	2	2	2	2	2	2	2	2	2	2	2

4. Main Bearing Select-Fit Chart (continued from previous step).

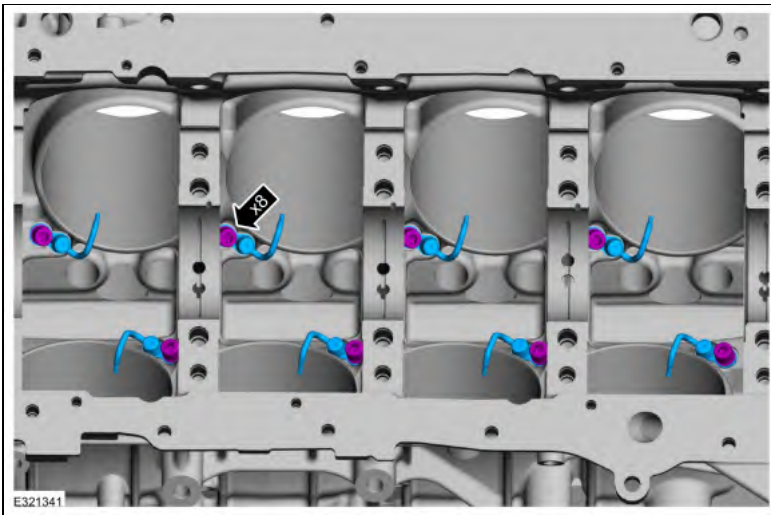
		2											
1		M	N	O	P	Q	R	S	T	U	V	W	X
		72.412	72.413	72.414	72.415	72.416	72.417	72.418	72.419	72.420	72.421	72.422	72.423
U	67.503	1	1	1	1	2	2	2	2	2	2	2	2
T	67.502	1	1	1	2	2	2	2	2	2	2	2	2
S	67.501	1	1	2	2	2	2	2	2	2	2	2	2
R	67.500	1	2	2	2	2	2	2	2	2	2	2	2
Q	67.499	2	2	2	2	2	2	2	2	2	2	2	2
P	67.498	2	2	2	2	2	2	2	2	2	2	2	2
O	67.497	2	2	2	2	2	2	2	2	2	2	2	2
N	67.496	2	2	2	2	2	2	2	2	2	2	2	2
M	67.495	2	2	2	2	2	2	2	2	2	2	2	2
L	67.494	2	2	2	2	2	2	2	2	2	2	2	2
K	67.493	2	2	2	2	2	2	2	2	2	2	3	3
J	67.492	2	2	2	2	2	2	2	2	2	3	3	3
I	67.491	2	2	2	2	2	2	2	2	3	3	3	3
H	67.490	2	2	2	2	2	2	3	3	3	3	3	3
G	67.489	2	2	2	2	2	2	3	3	3	3	3	3
F	67.488	2	2	2	2	2	3	3	3	3	3	3	3
E	67.487	2	2	2	2	3	3	3	3	3	3	3	3
D	67.486	2	2	2	3	3	3	3	3	3	3	3	3
C	67.485	2	2	3	3	3	3	3	3	3	3	3	3
B	67.484	2	3	3	3	3	3	3	3	3	3	3	3
A	67.483	3	3	3	3	3	3	3	3	3	3	3	3

5. Install the piston oil coolers and the bolts.

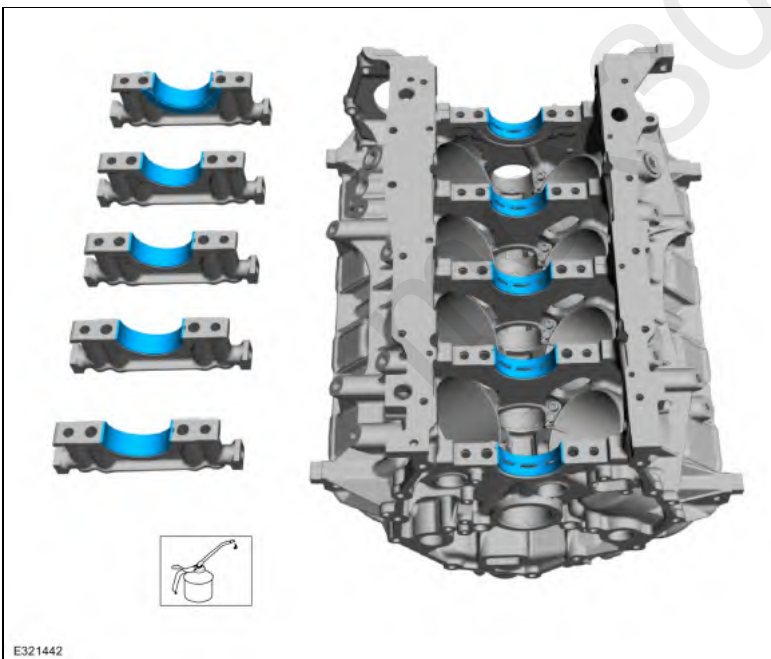
Torque:

Stage 1: 106 lb.in (12 Nm)

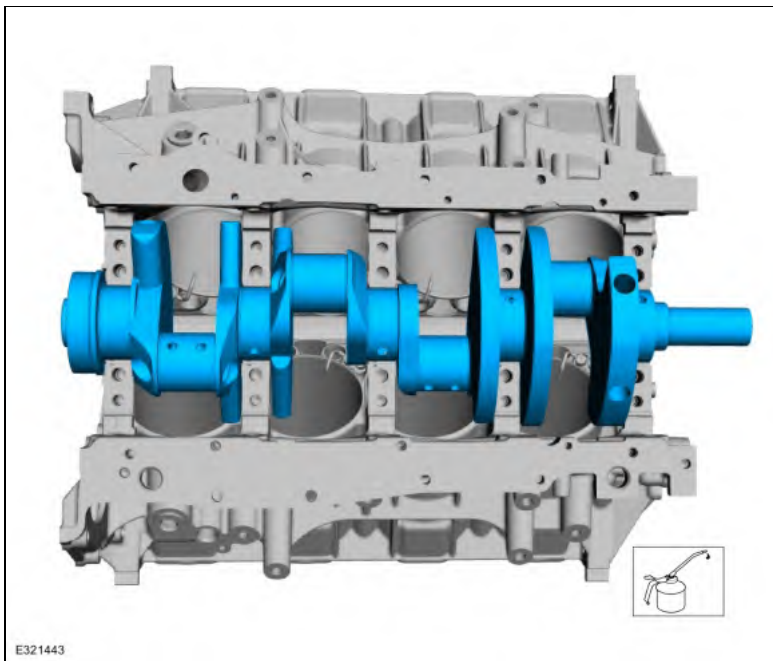
Stage 2: 25Â°



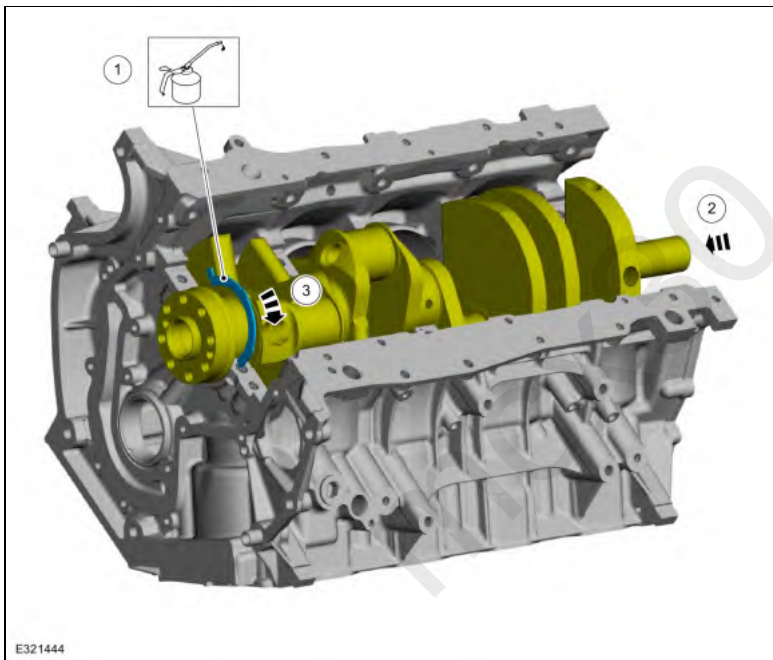
6. Install the crankshaft main bearings.
1. Install the crankshaft upper main bearings into the cylinder block.
 2. Install the crankshaft lower main bearings and thrust bearing into the bearing caps.
 3. Make sure all oil passages are aligned.
 4. Lubricate all main bearings with clean engine oil.



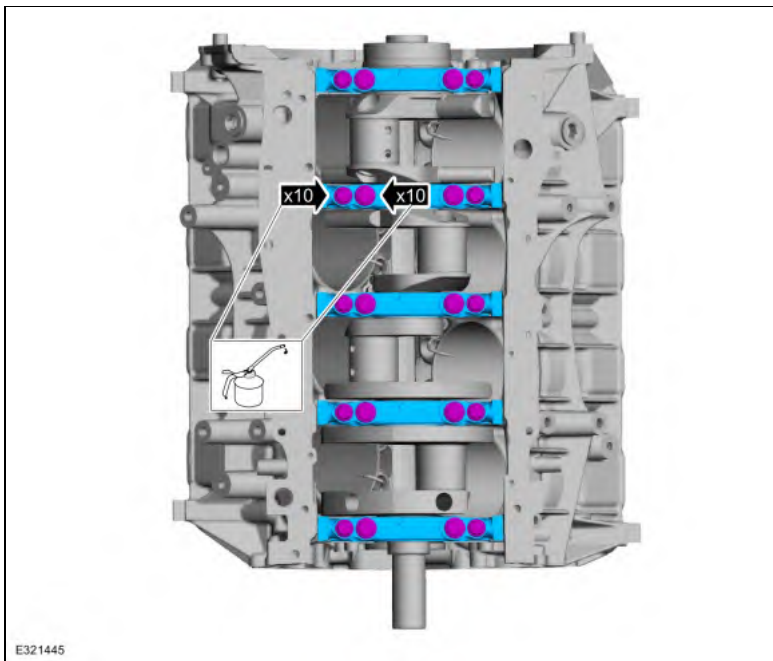
- 7.
1. Lubricate the crankshaft bearing journals with clean engine oil.
 2. Install the crankshaft into the cylinder block.



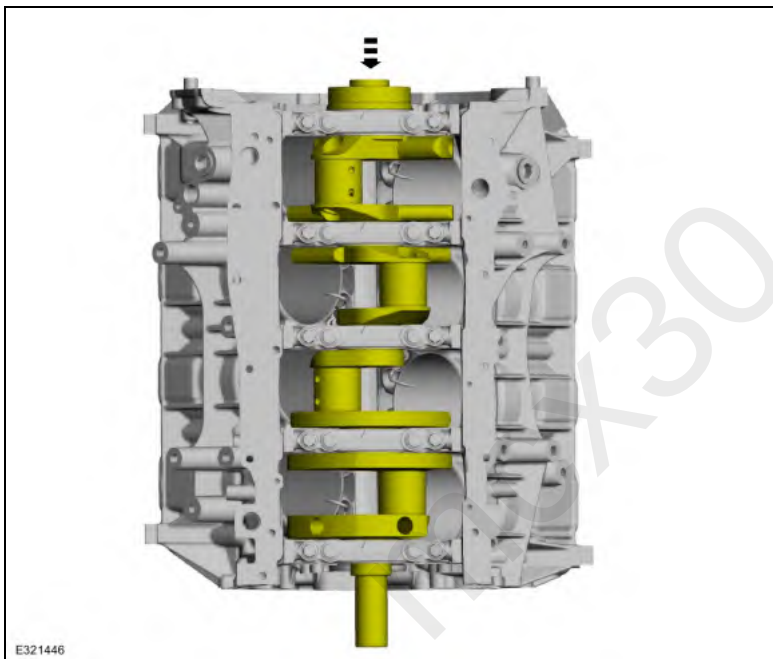
- 8.
1. Lubricate the thrust washer with clean engine oil.
 2. Push the crankshaft rearward.
 3. Install the rear crankshaft upper thrust washer at the back of the No. 5 main boss.



- 9.
1. Lubricate the fastener threads with clean engine oil.
 2. Install the main bearing caps and fasteners on the cylinder block and, keeping the caps as square as possible, alternately draw the caps down evenly using the cap fasteners.



10. Push the crankshaft forward to seat the crankshaft thrust washer.



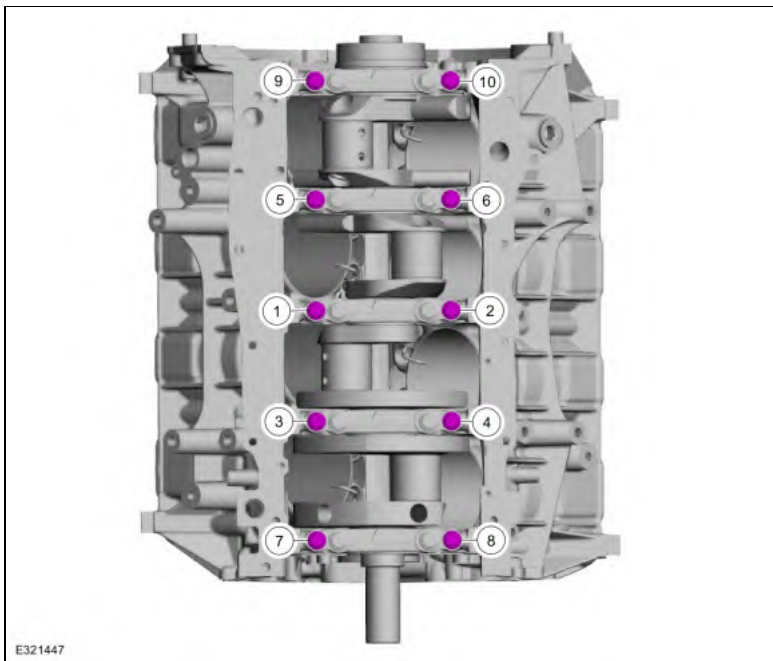
11. Tighten the outer vertical main bearing cap fasteners in sequence.

Torque:

Stage 1: 26 lb.ft (35 Nm)

Stage 2: 37 lb.ft (50 Nm)

Stage 3: 90°



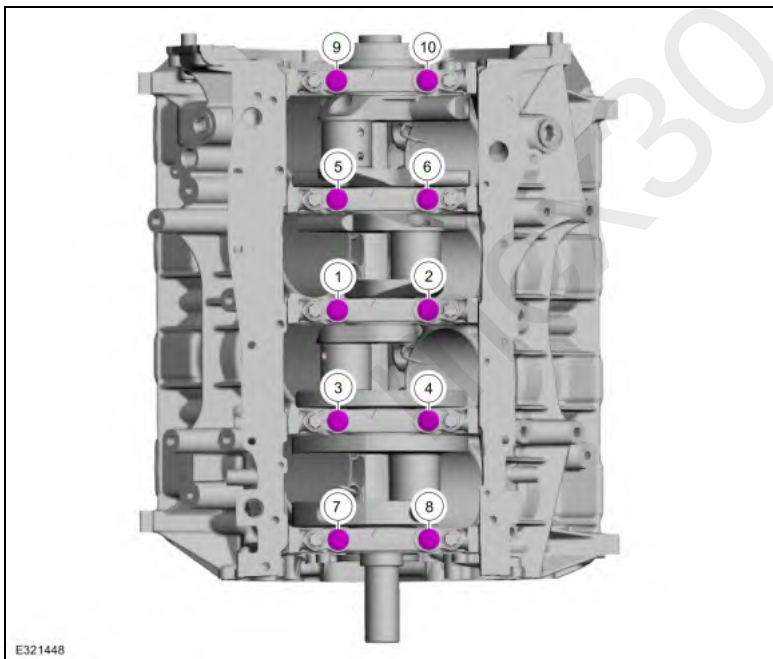
12. Tighten the inner vertical main bearing cap fasteners in sequence.

Torque:

Stage 1: 26 lb.ft (35 Nm)

Stage 2: 43 lb.ft (58 Nm)

Stage 3: 150°



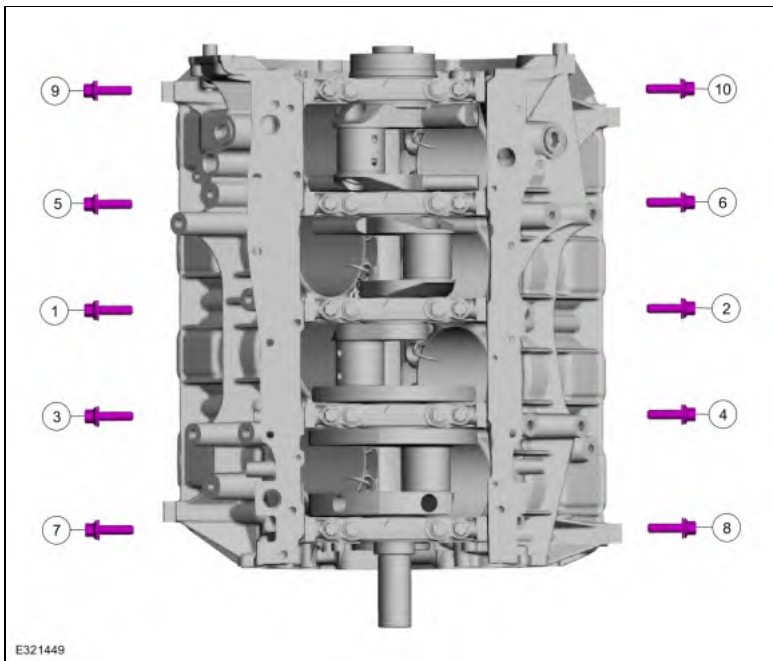
13. Install the cross-mounted main bearing cap fasteners.

Torque:

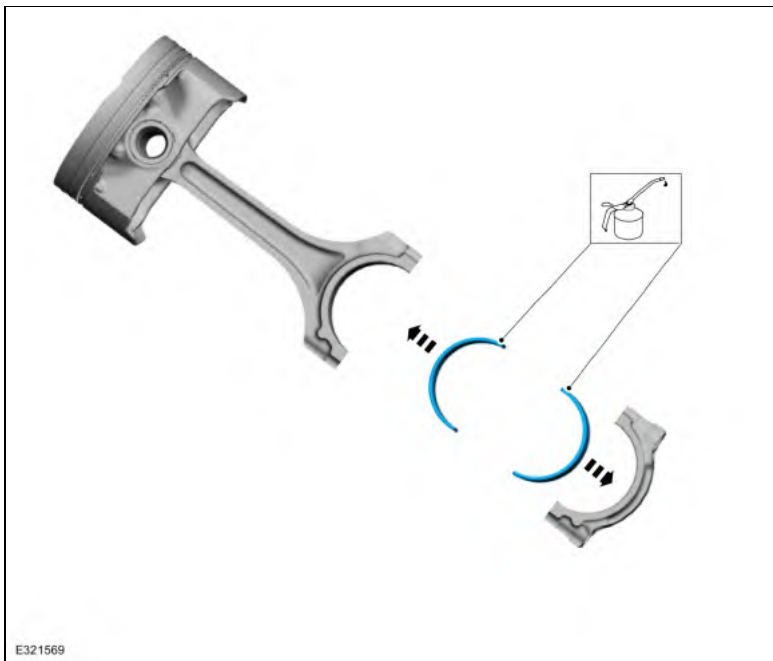
Stage 1: 177 lb.in (20 Nm)

Stage 2: 26 lb.ft (35 Nm)

Stage 3: 60°

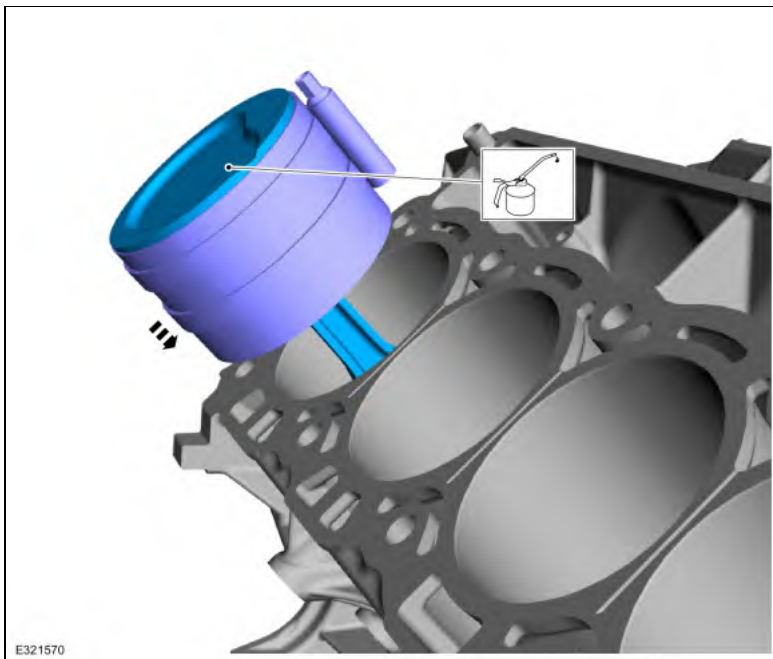


14.
 - Check the crankshaft end play.
Refer to: Specifications (303-01C Engine - 7.3L 2V DEVCT V8 (239kW/320PS) (J0), Specifications).
 - Check that crankshaft torque-to-turn does not exceed 6 Nm (53 lb-in).
 - Check the piston-to-cylinder block and piston ring clearances.
Refer to: Specifications (303-01C Engine - 7.3L 2V DEVCT V8 (239kW/320PS) (J0), Specifications).
 - Assemble the pistons and position the piston ring gaps.
Refer to: Piston (303-01C Engine - 7.3L 2V DEVCT V8 (239kW/320PS) (J0), Disassembly and Assembly of Subassemblies).
15.
 - Lubricate the connecting rod bearings with clean engine oil.
 - Install the connecting rod bearings.



16. **NOTICE:** Be sure not to scratch the cylinder wall or crankshaft journal with the connecting rod. Push the piston down until the connecting rod bearing seats on the crankshaft journal.

- Lubricate the piston with clean engine oil.
- Using a piston ring compressor, install the piston.
Use the General Equipment: Piston Ring Compressor

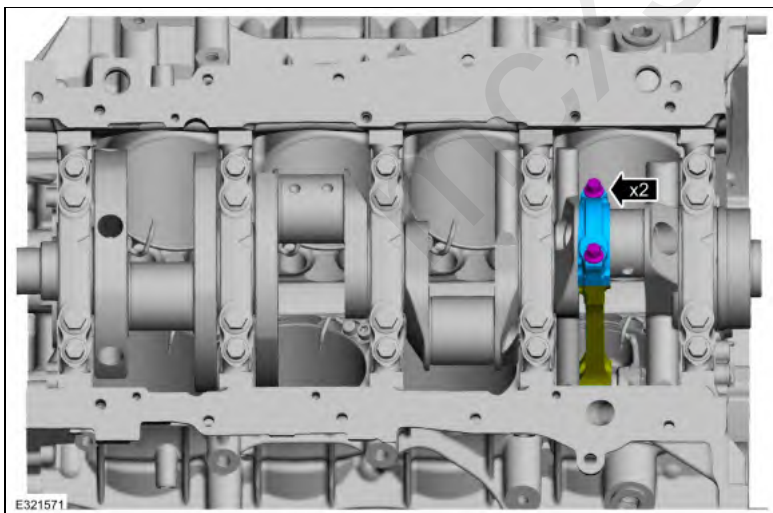


17. **NOTICE:** The rod cap installation must keep the same orientation as marked during disassembly or engine damage may occur.

NOTE: The connecting rod caps are of the "cracked" design and must mate with the connecting rod ends. Excessive bearing clearance will result if not mated correctly.

Install the connecting rod cap and bearing.

- Install the new bolts hand tight.



18. Repeat the previous 2 steps for each of the remaining pistons.

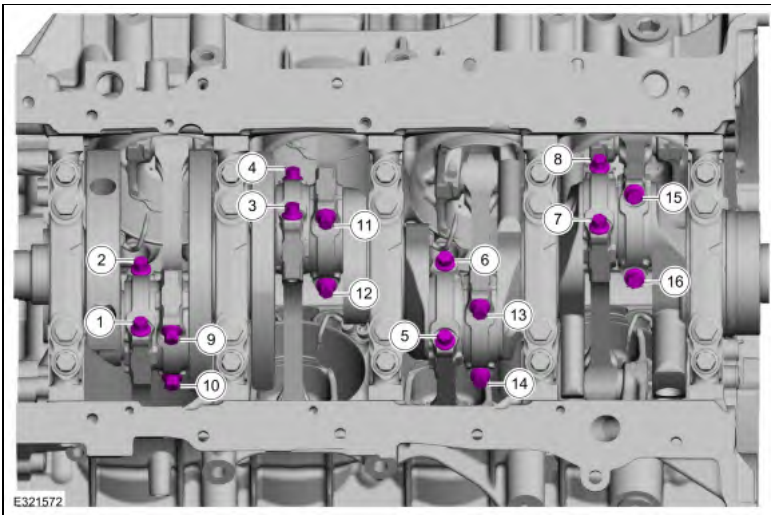
19. Tighten the connecting rod bolts.

Torque:

Stage 1: 177 lb.in (20 Nm)

Stage 2: 28 lb.ft (38 Nm)

Stage 3: 105Å°



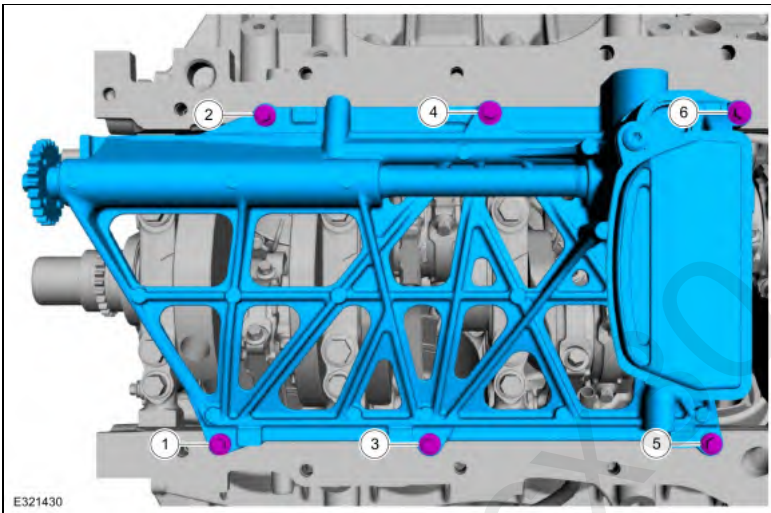
20. Prime the oil pump. Add 2 tablespoons of clean engine oil to the oil pump and rotate the oil pump by hand.

21. Install the oil pump and the bolts. Tighten in sequence.

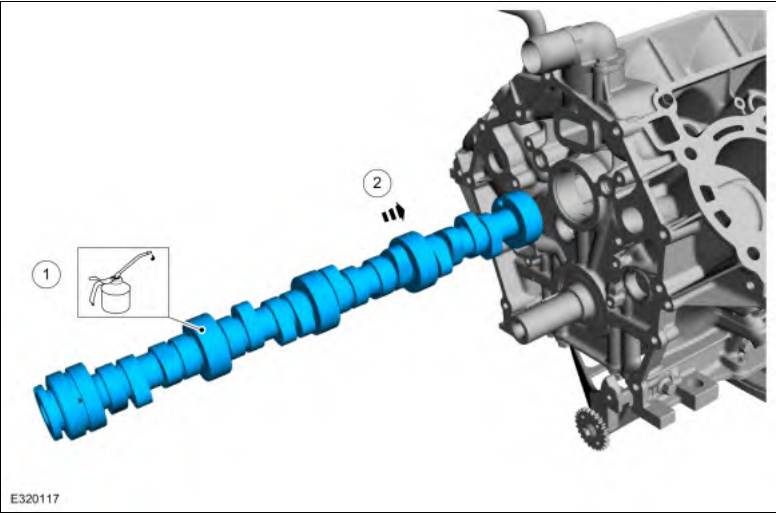
Torque:

Stage 1: 89 lb.in (10 Nm)

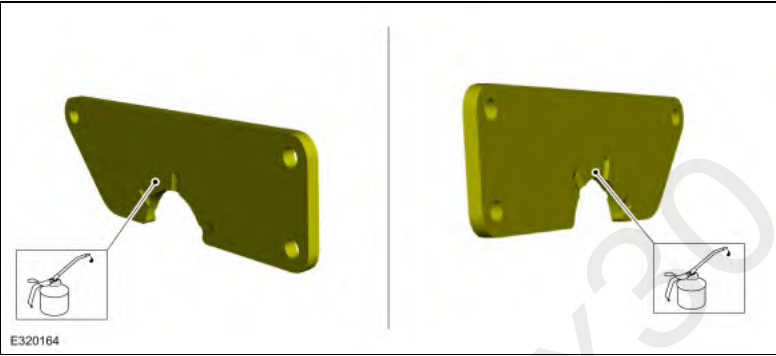
Stage 2: 45 Å°



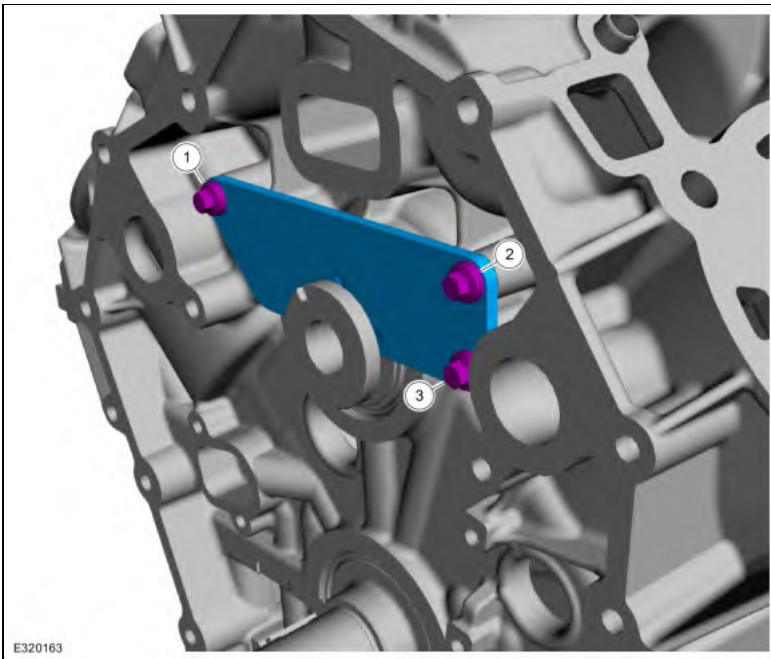
- 22.
1. Lubricate the camshaft with clean engine oil.
 2. Install the camshaft.



23. Lubricate the front and rear surfaces of the camshaft thrust plate with clean engine oil.

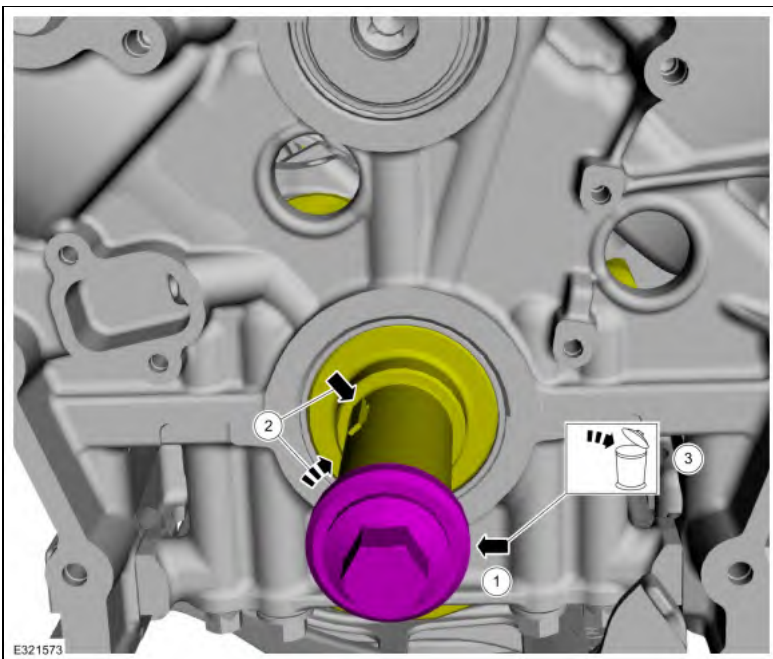


24. Install the camshaft thrust plate and the bolts. Tighten bolts in sequence.
Torque:
Stage 1: 89 lb.in (10 Nm)
Stage 2: 45°



25.

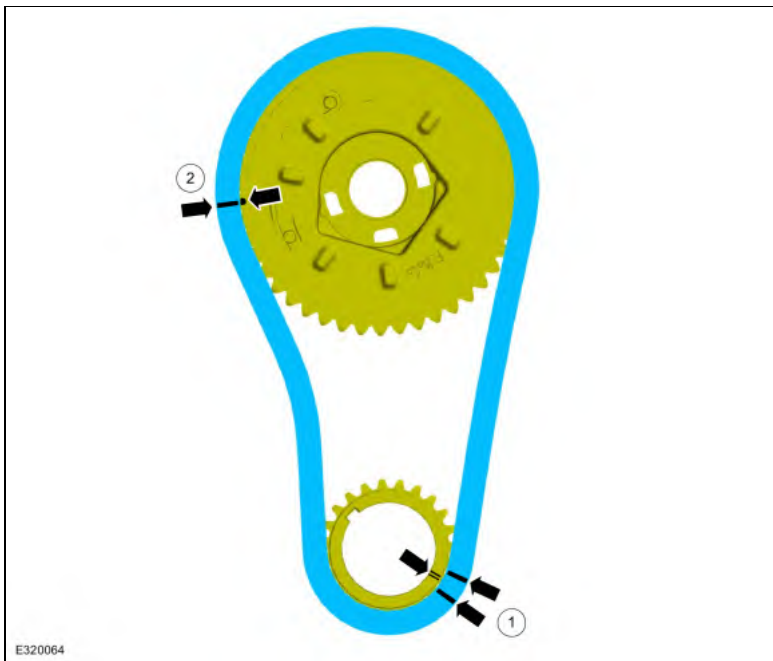
1. Install the original crankshaft pulley bolt.
2. Rotate the crankshaft clockwise until the crankshaft keyway is aligned as shown.
3. Remove and discard the original crankshaft pulley bolt.



26.

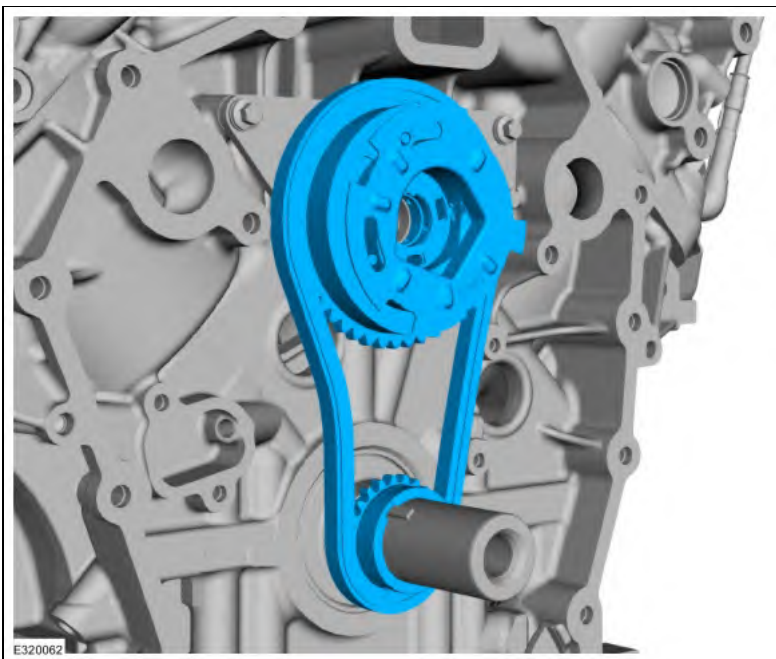
Install the timing chain onto the VCT unit and the crankshaft sprocket.

1. Align the timing mark on the crankshaft sprocket in between the 2 marked links on the timing chain.
2. Align the timing mark on the VCT unit with the marked link on the timing chain.



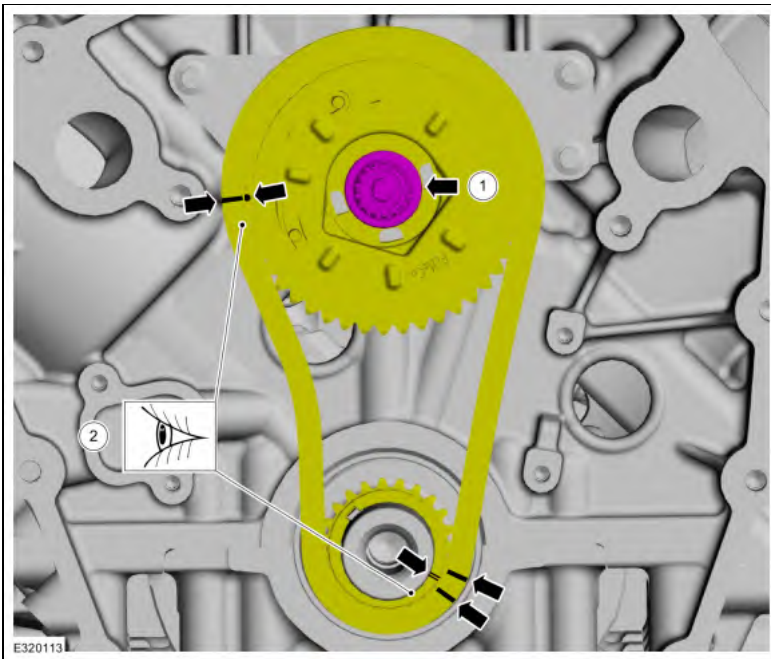
27. **NOTE:** The VCT unit must fit flush against the camshaft.

Install the VCT unit, the timing chain and crankshaft sprocket together.



28.

1. Install the VCT valve finger-tight.
2. Verify the timing marks are still aligned. If the marks are not aligned, remove the timing components and repeat the previous 2 steps.



29. **NOTICE: Do not use power tools to tighten the VCT valve.**

Using the special tools, tighten the VCT valve.

Use Special Service Tool: 303-1702 7.3L VCT Locking Tools. , 303-1661-03 7.3L OVC Bolt.

Use the General Equipment: 1/2 Inch Square Drive Breaker Bar

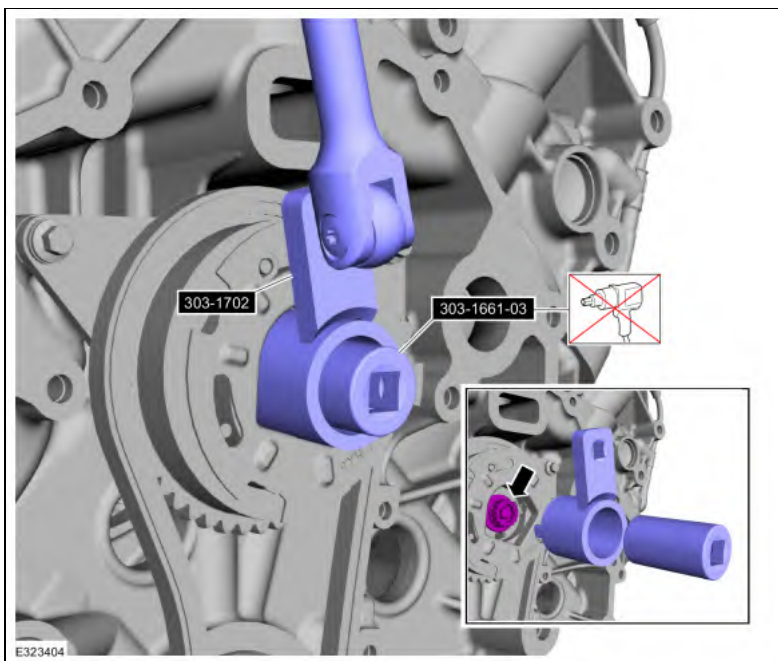
Torque:

Stage 1: 52 lb.ft (70 Nm)

Stage 2: Loosen: 90°

Stage 3: 41 lb.ft (55 Nm)

Stage 4: 35°

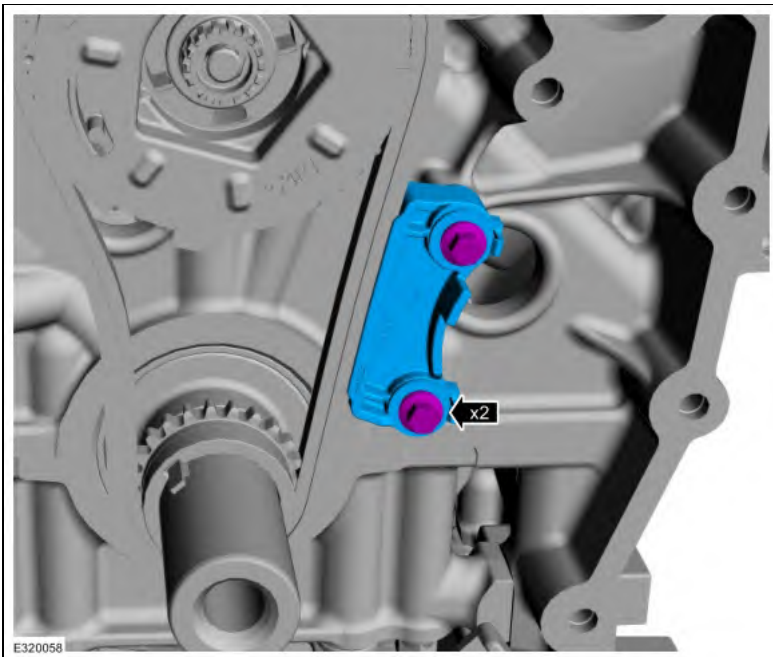


30. Install the timing chain guide and the bolts.

Torque:

Stage 1: 89 lb.in (10 Nm)

Stage 2: 45°

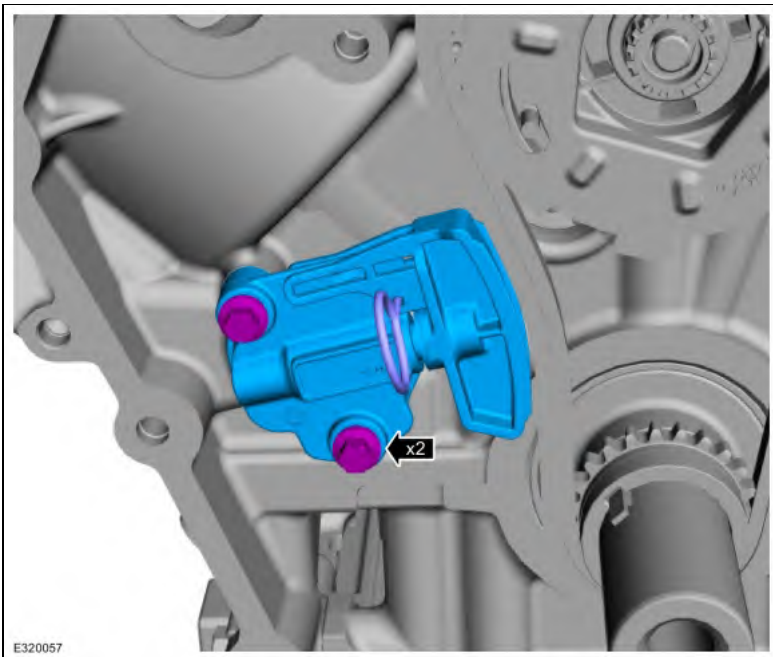


31. Install the timing chain tensioner and the bolts.

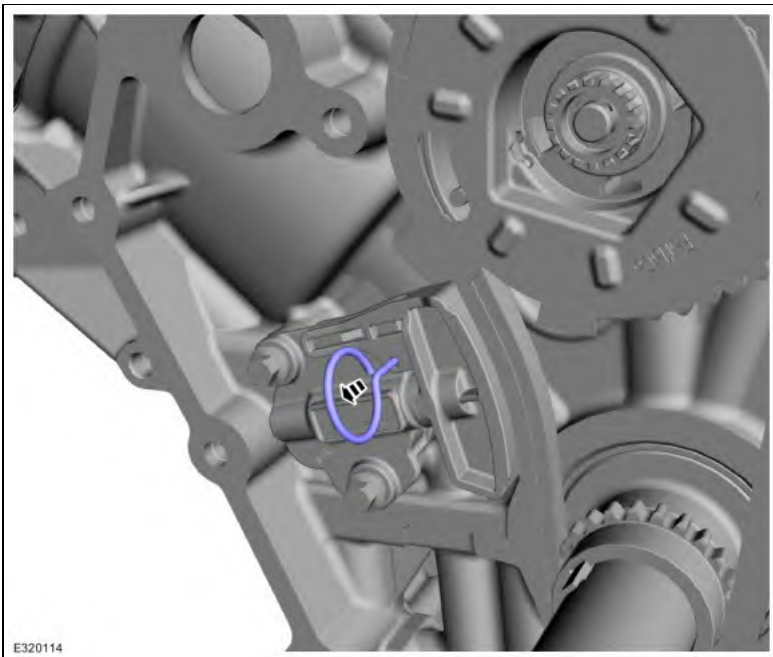
Torque:

Stage 1: 89 lb.in (10 Nm)

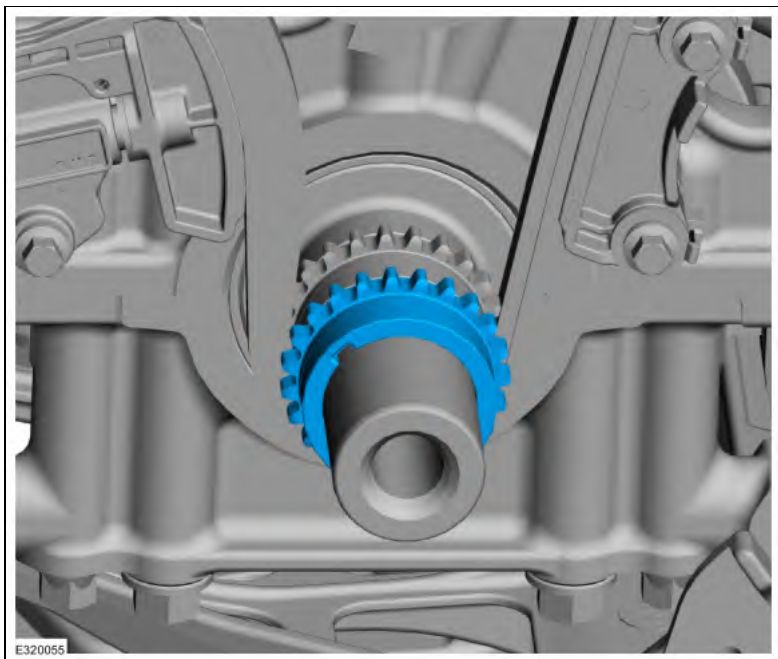
Stage 2: 45Å°



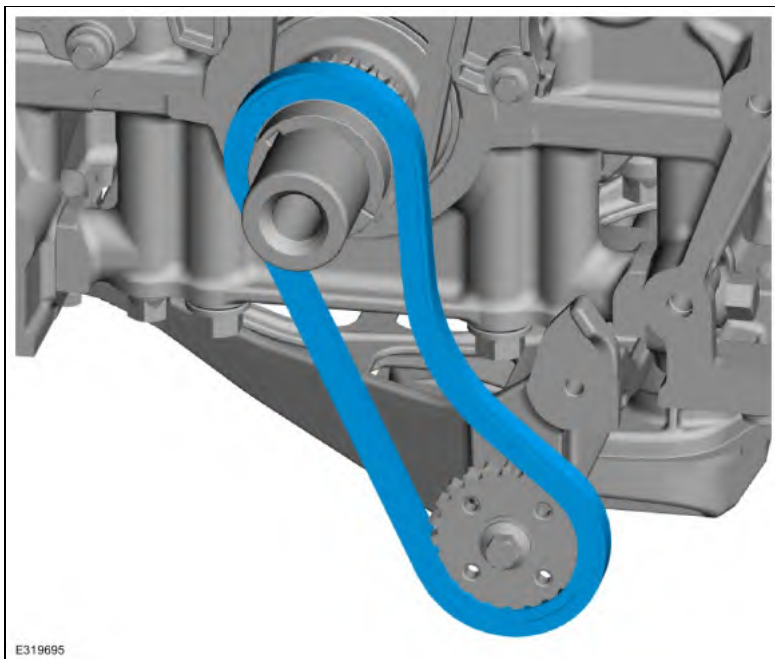
32. Remove the locking pin to release the timing chain tensioner plunger.



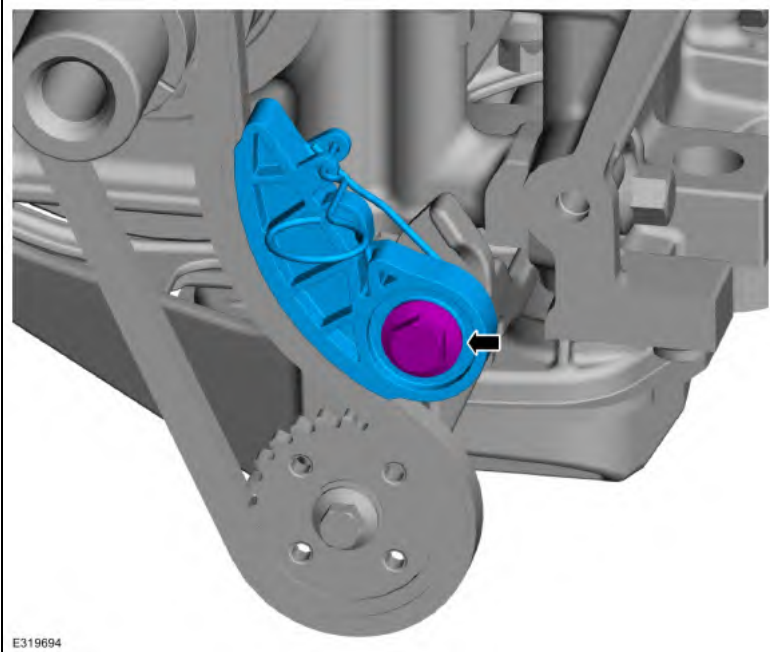
33. Install the oil pump drive chain sprocket.



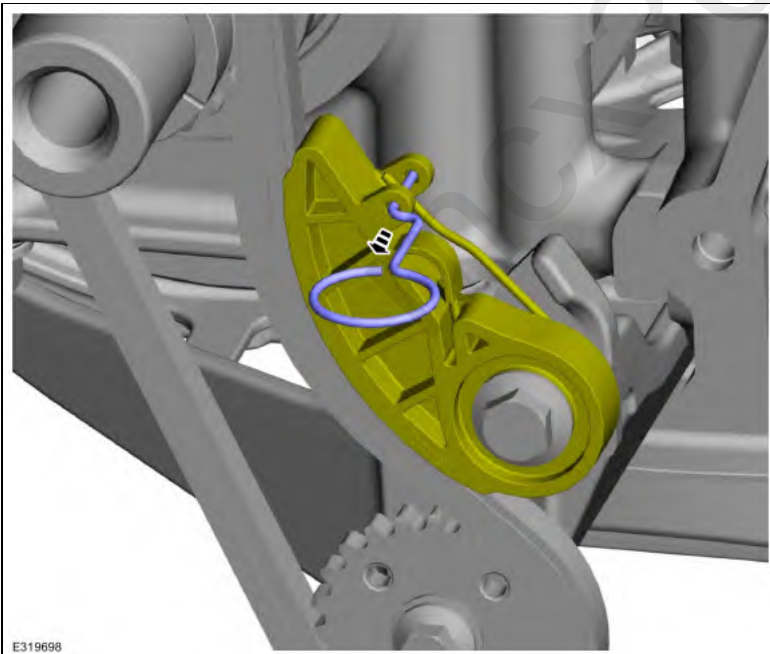
34. Install the oil pump drive chain.



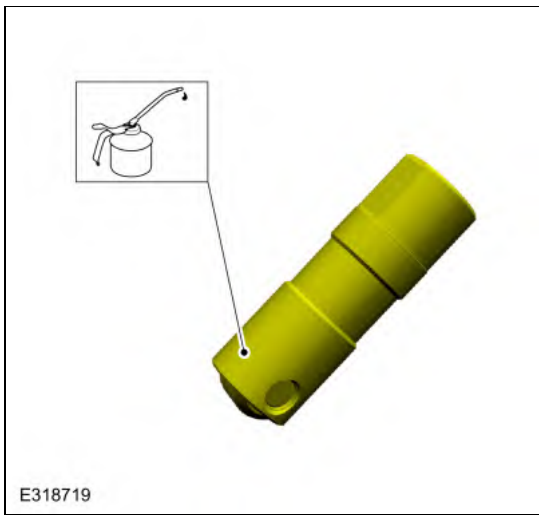
35. Install the oil pump drive chain tensioner and the bolt.
Torque: 89 lb.in (10 Nm)



36. Remove the pin to release the spring.



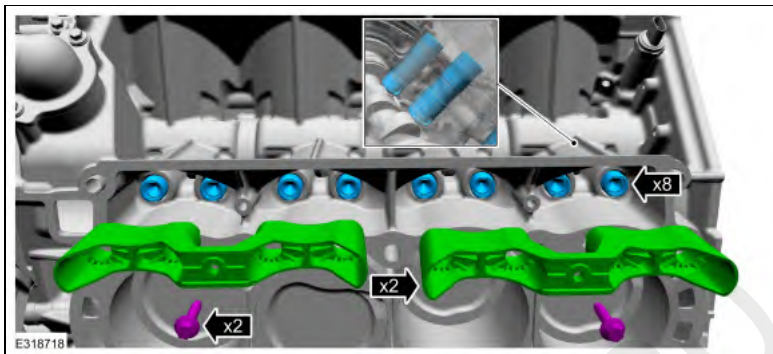
37. Lubricate the valve tappet with clean engine oil.



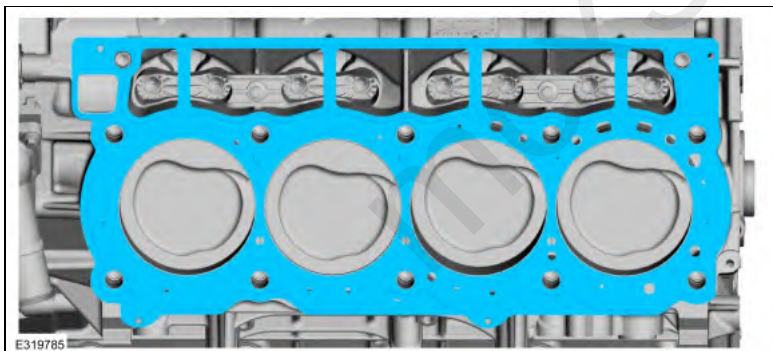
38. **NOTE:** If the components are to be reinstalled, they must be installed in the same positions or engine damage may occur.

NOTE: LH shown, RH similar.

Install the valve tappets, the guide plates and the bolts.
Torque: 89 lb.in (10 Nm)



39. Install a new LH cylinder head gasket.

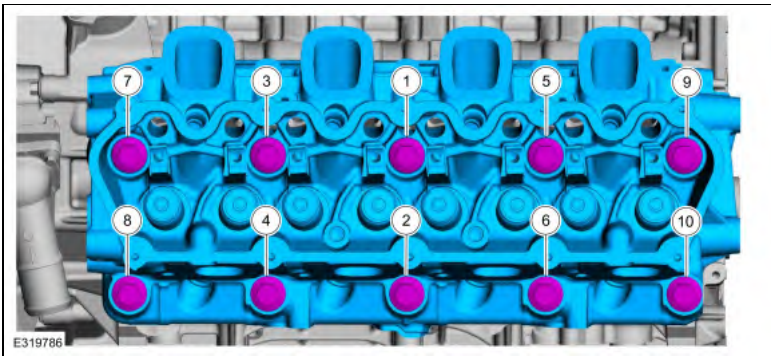


40. **NOTE:** The cylinder head bolts are torque-to-yield and must not be reused. New cylinder head bolts must be installed.

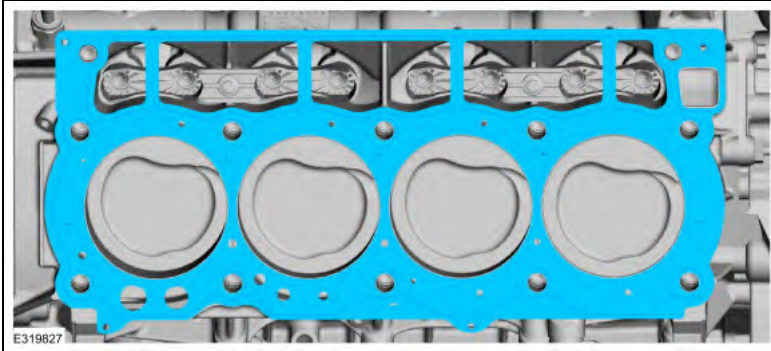
Install the LH cylinder head and hand start the new bolts.

Torque:

- Stage 1: 22 lb.ft (30 Nm)
- Stage 2: 44 lb.ft (60 Nm)
- Stage 3: 74 lb.ft (100 Nm)
- Stage 4: Tighten an additional : 90°
- Stage 5: Tighten an additional : 90°



41. Install a new RH cylinder head gasket.



42. **NOTE:** The cylinder head bolts are torque-to-yield and must not be reused. New cylinder head bolts must be installed.

Install the RH cylinder head and hand start the new bolts.

Torque:

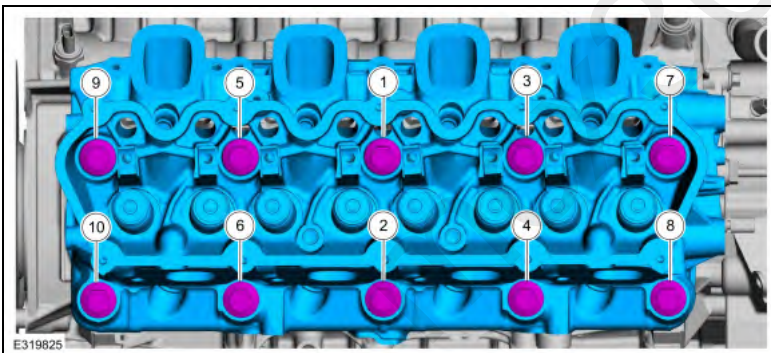
Stage 1: 22 lb.ft (30 Nm)

Stage 2: 44 lb.ft (60 Nm)

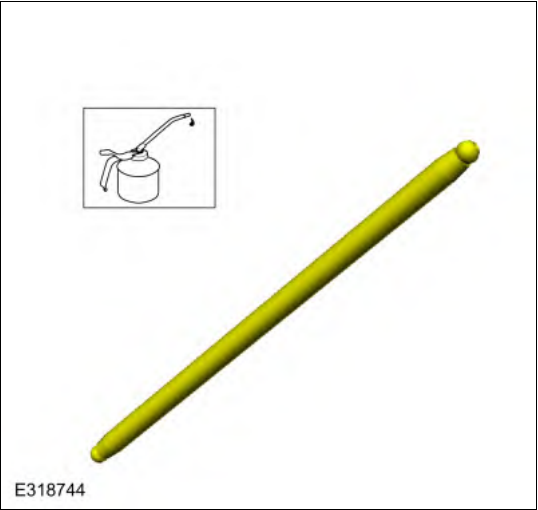
Stage 3: 74 lb.ft (100 Nm)

Stage 4: Tighten an additional : 90°

Stage 5: Tighten an additional : 90°



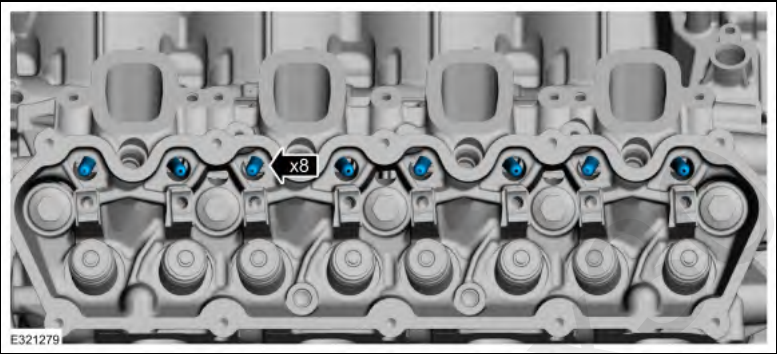
43. Lubricate the push rods with clean engine oil.



44. **NOTICE:** If the components are to be reinstalled, they must be installed in the same positions or engine damage may occur.

NOTE: RH shown, LH similar.

Install the RH and LH push rods.



45. Lubricate the rocker arms with clean engine oil.



46. NOTICE: Do not use power tools to install the bolts.

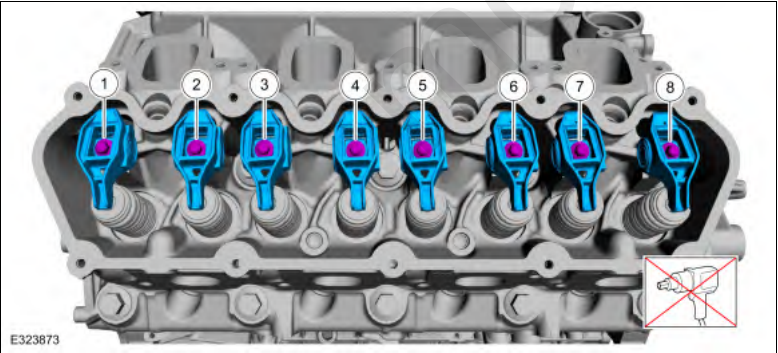
NOTE: If the components are to be reinstalled, they must be installed in the same positions or engine damage may occur.

Install the RH rocker arms. Tighten in sequence.

Torque:

Stage 1: 177 lb.in (20 Nm)

Stage 2: 30°



47. NOTICE: Do not use power tools to install the bolts.

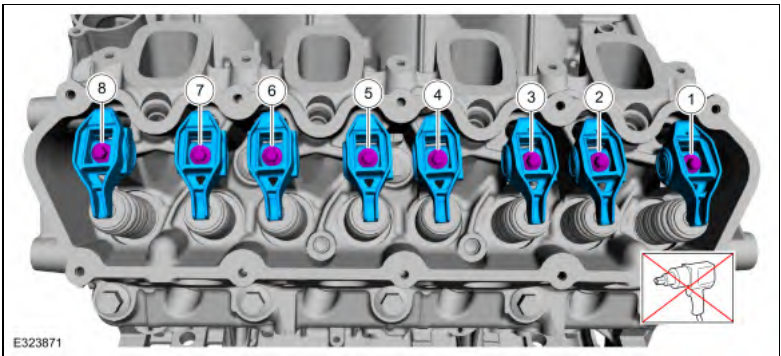
NOTE: If the components are to be reinstalled, they must be installed in the same positions or engine damage may occur.

Install the LH rocker arms. Tighten in sequence.

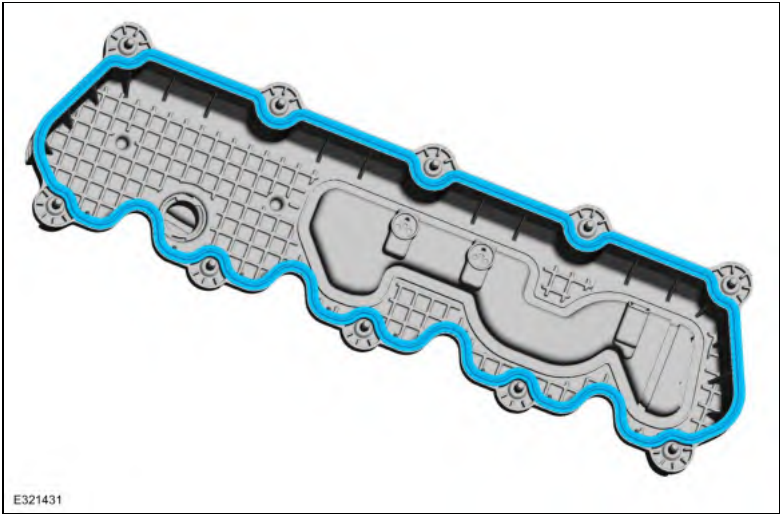
Torque:

Stage 1: 177 lb.in (20 Nm)

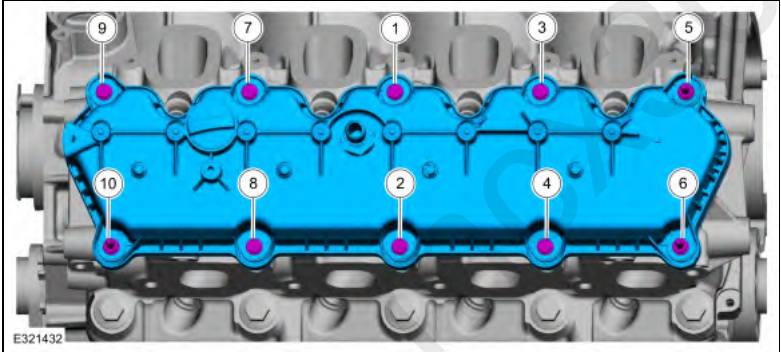
Stage 2: 30°



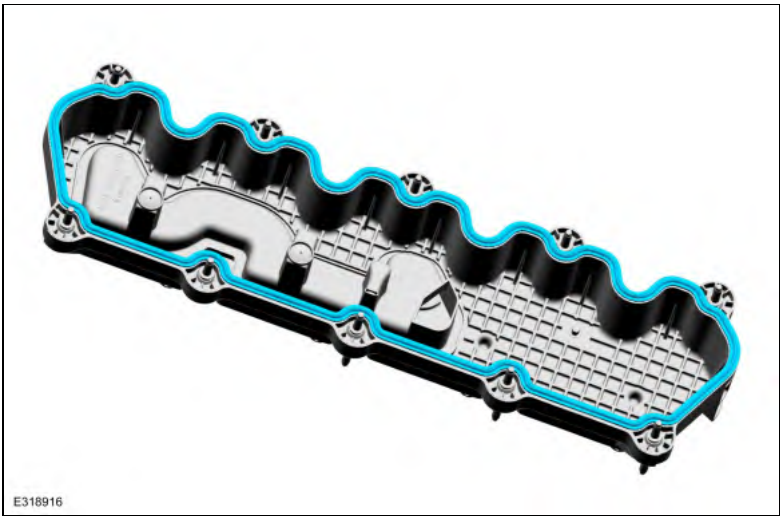
48. Install a new gasket.



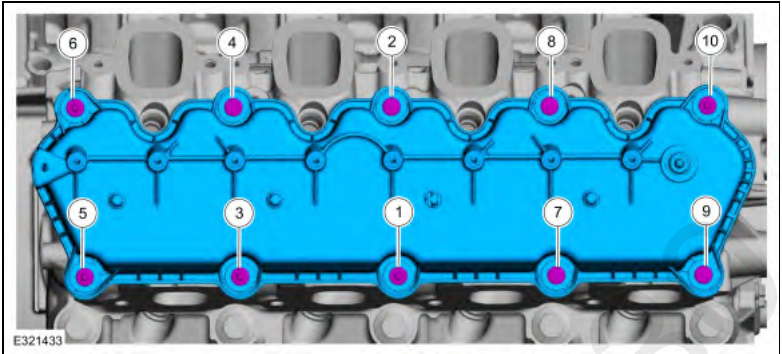
49. Install the LH valve cover and finger tighten the bolts.
Torque: 89 lb.in (10 Nm)



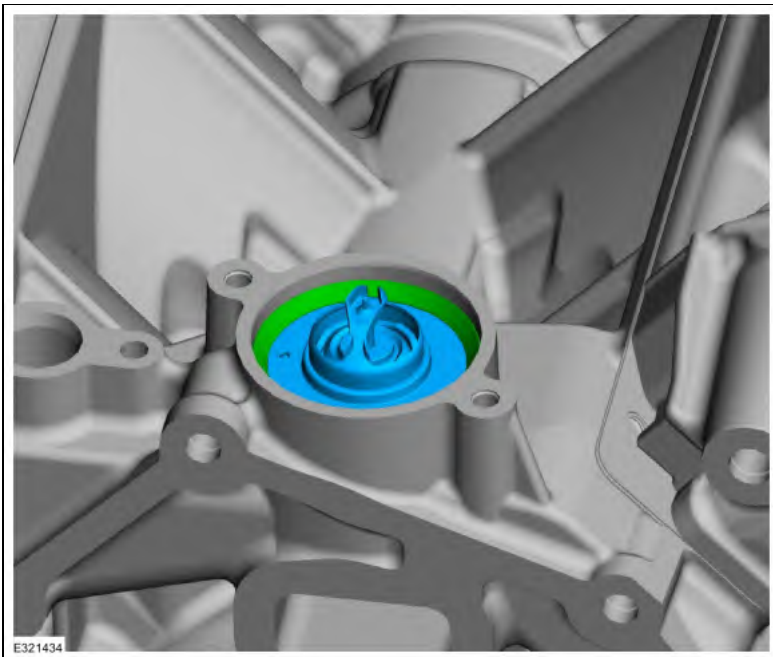
50. Install a new gasket.



51. Install the RH valve cover and finger tighten the bolts.
Torque: 89 lb.in (10 Nm)



- 52.
- 1. Install the thermostat.
 - 2. Install a new O-ring seal.

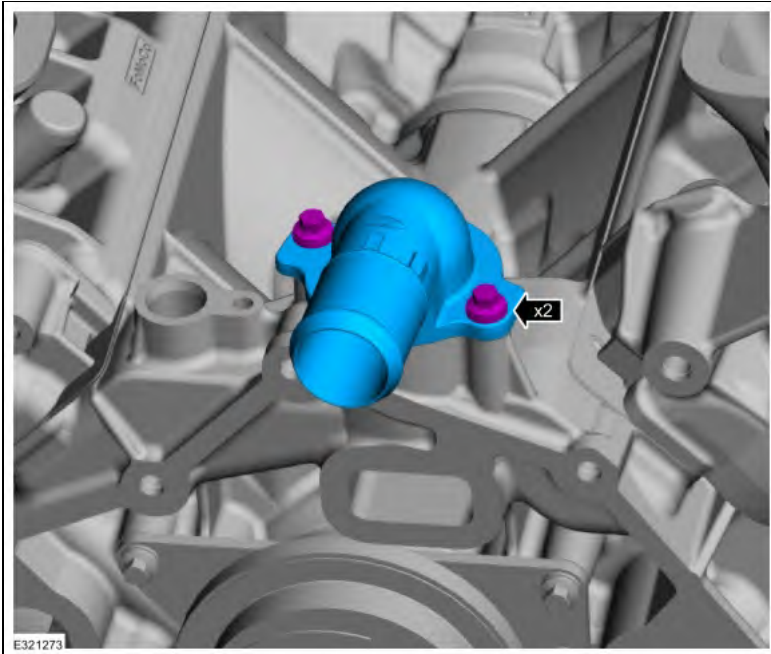


53. Install the thermostat housing and the bolts.

Torque:

Stage 1: 89 lb.in (10 Nm)

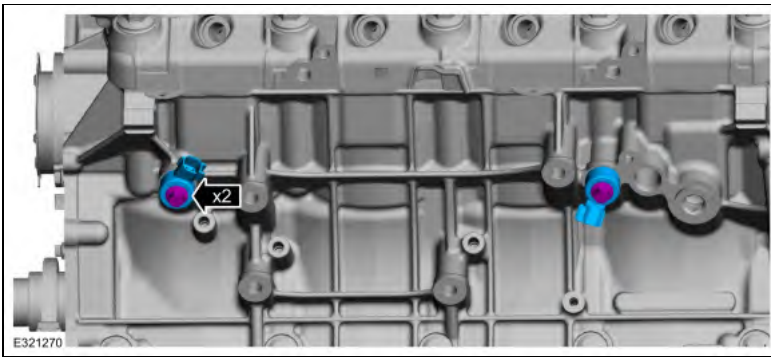
Stage 2: 45Â°



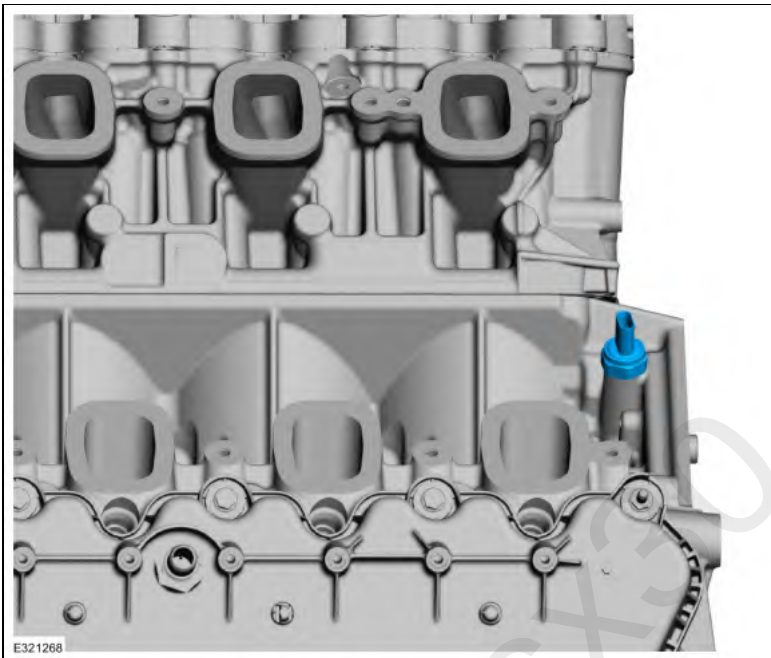
54. Install the KSs on the RH side of the engine block.
Torque: 177 lb.in (20 Nm)



55. Install the KSs on the LH side of the engine block.
Torque: 177 lb.in (20 Nm)



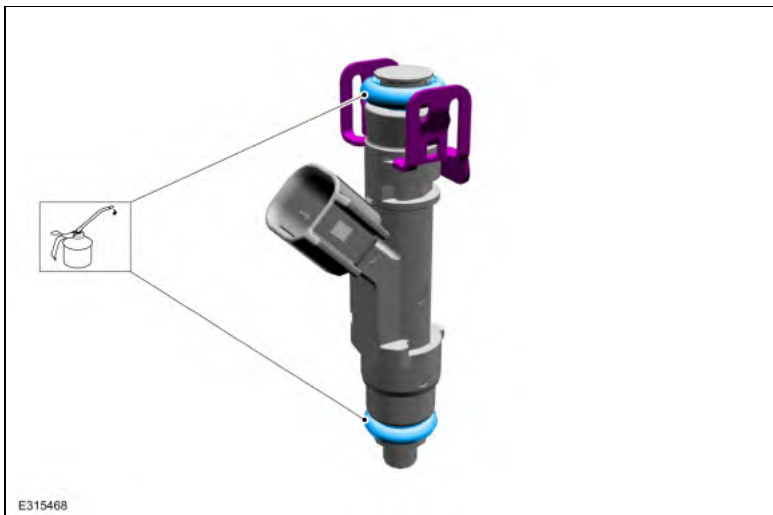
56. Install the EOP sensor.
Torque: 133 lb.in (15 Nm)



57. **NOTE:** Make sure that new fuel injector O-ring seals are installed.

NOTE: The fuel injector clip can be reused if it is not damaged during removal. If the clip is reused, the 2 sides of the clip should be squeezed back into shape by placing it between index finger and thumb.

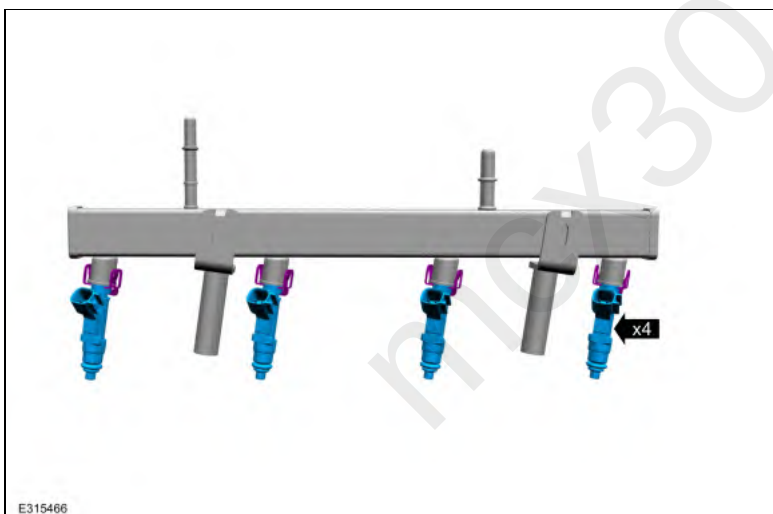
Install the new fuel injector O-ring seals and the new fuel injector retaining clips onto the fuel injectors. Lubricate the new fuel injector O-ring seals with clean engine oil.



58. **NOTE:** LH shown, RH similar.

NOTE: Orient the fuel injector assemblies so the flat sides of the fuel rail injector cup is aligned with the flat side of the fuel injector retainer.

Install the fuel injectors into the fuel rail.



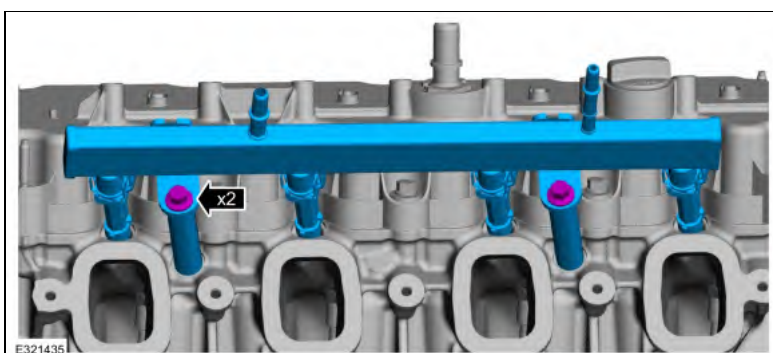
59. **NOTE:** LH shown, RH similar.

Install the fuel rail, then install and tighten the fuel rail bolts in the following 2 stages.

Torque:

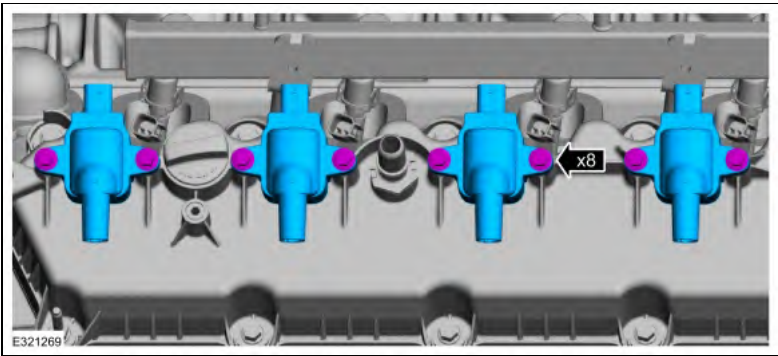
Stage 1: Tighten to: : 89 lb.in (10 Nm)

Stage 2: Tighten an additional: : 90°

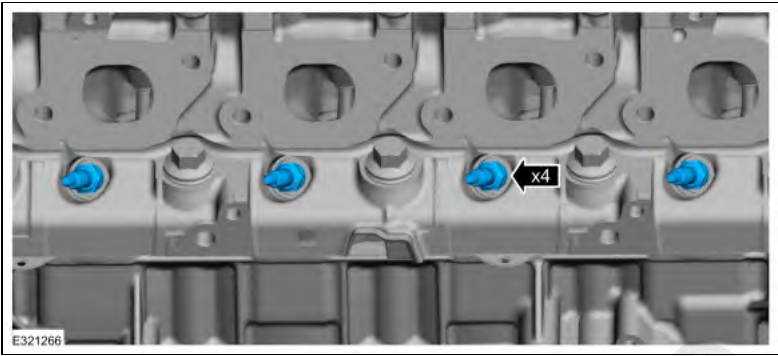


60. **NOTE:** LH shown, RH similar.

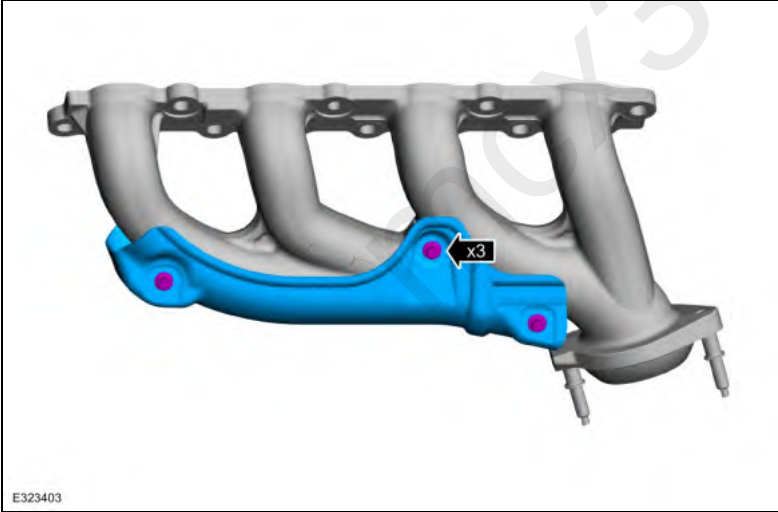
Install the ignition coils and the bolts.
Torque:
Stage 1: 62 lb.in (7 Nm)
Stage 2: 45Å°



61. Install the LH spark plugs.
Torque: 133 lb.in (15 Nm)

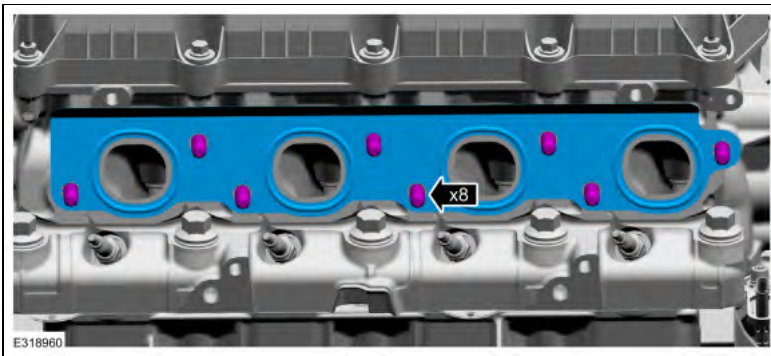


62. If removed, install the heat shield and the new bolts.
Torque: 106 lb.in (12 Nm)

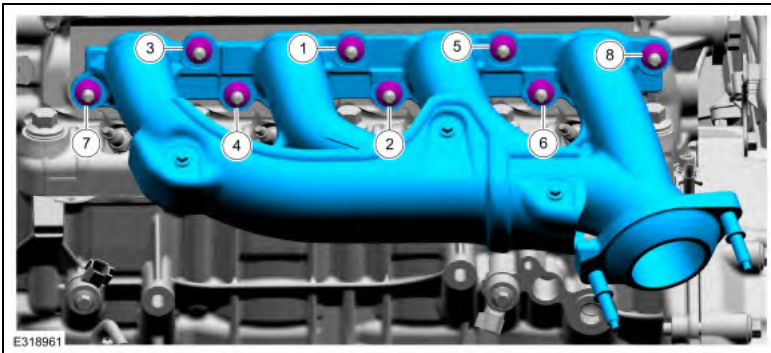


63.

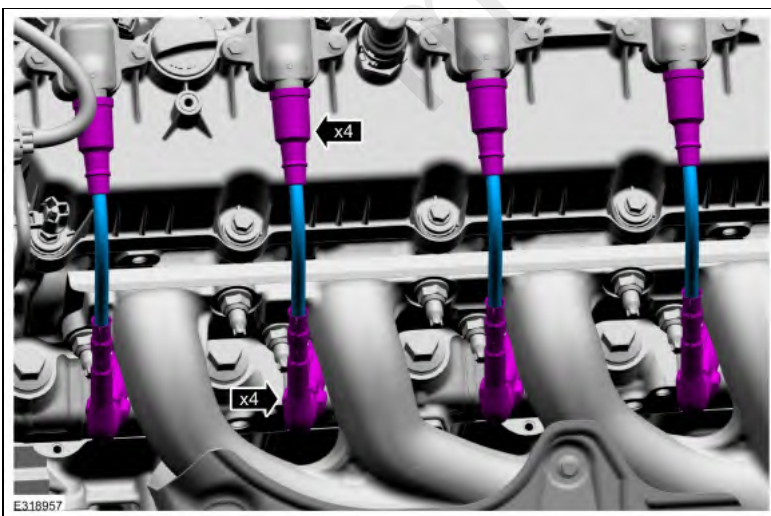
1. Install new studs.
Torque: 18 lb.ft (25 Nm)
2. Install a new gasket.



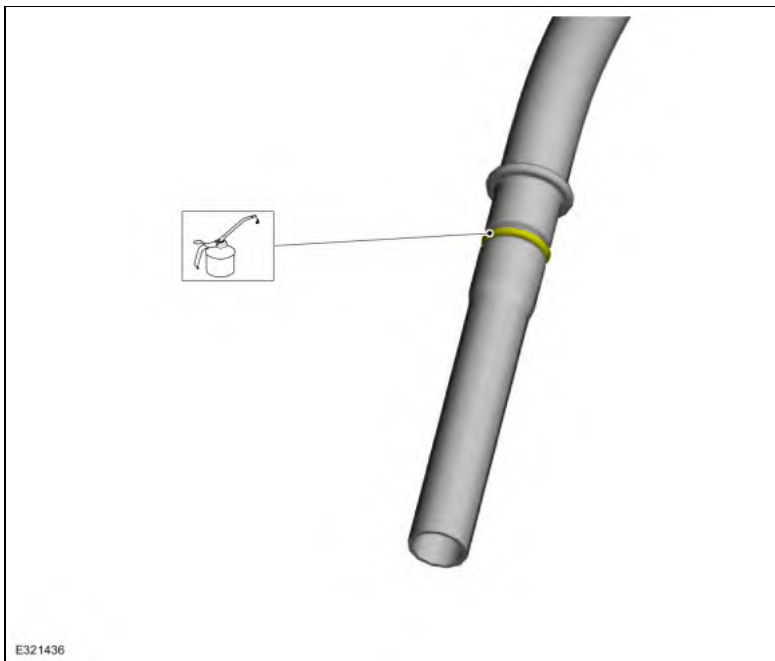
- 64.
1. Position the LH exhaust manifold onto the engine and finger-tighten the nuts.
 2. Tighten the nuts in the sequence shown.
- Torque:*
 Stage 1: 18 lb.ft (24 Nm)
 Stage 2: 24 lb.ft (32 Nm)
 Stage 3: 24 lb.ft (32 Nm)



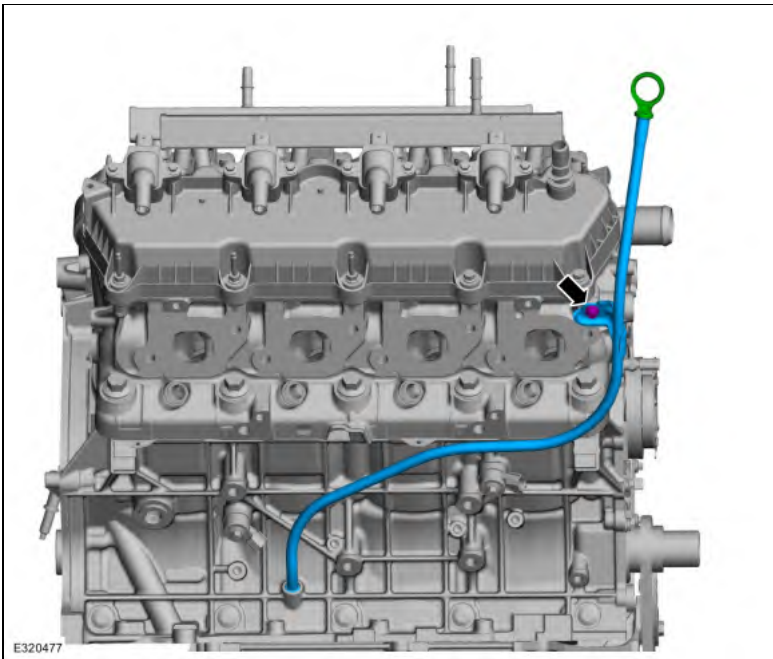
- 65.
1. Install the spark plug wires onto the spark plugs.
 2. Connect the spark plug wires to the ignition coils.



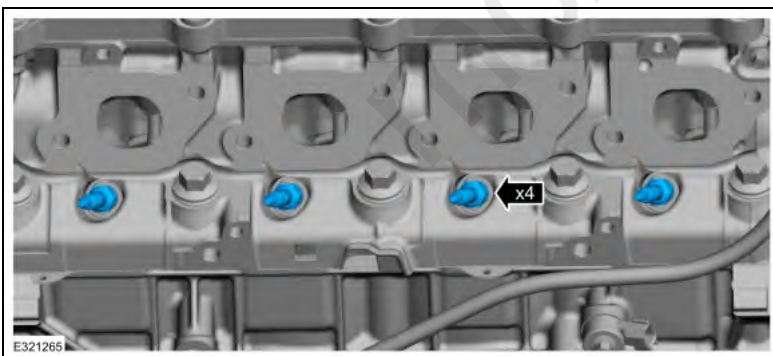
66. Lubricate the O-ring seal with clean engine oil.



- 67.
1. Install the oil level indicator tube and the bolt.
Torque: 89 lb.in (10 Nm)
 2. Install the oil level indicator.

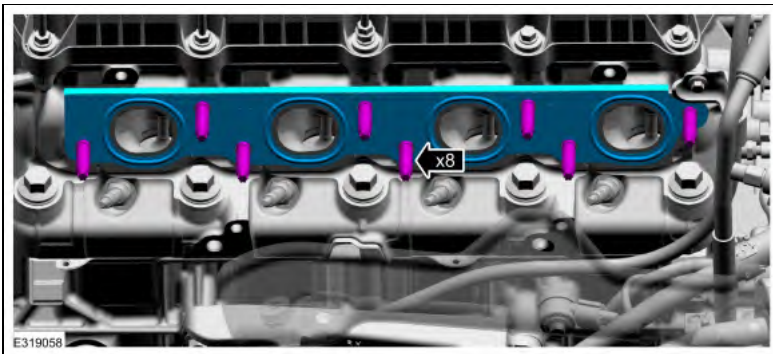


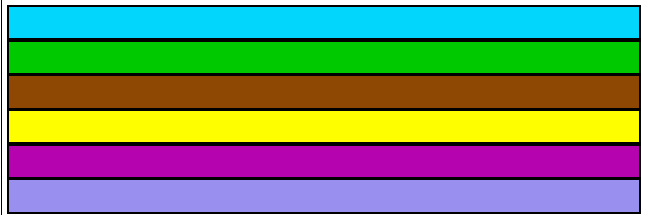
68. Install the RH spark plugs.
Torque: 133 lb.in (15 Nm)



69.

1. Install new studs.
Torque: 18 lb.ft (25 Nm)
2. Install a new gasket.





70.

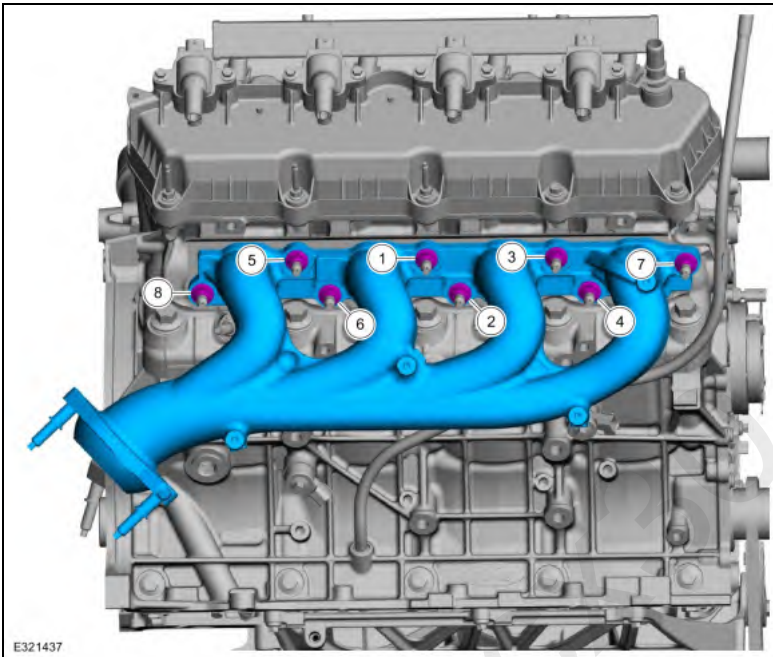
1. Position the RH exhaust manifold onto the engine and finger-tighten the nuts.
2. Tighten the nuts in the sequence shown.

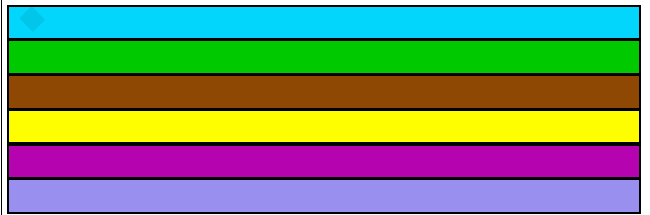
Torque:

Stage 1: 18 lb.ft (24 Nm)

Stage 2: 24 lb.ft (32 Nm)

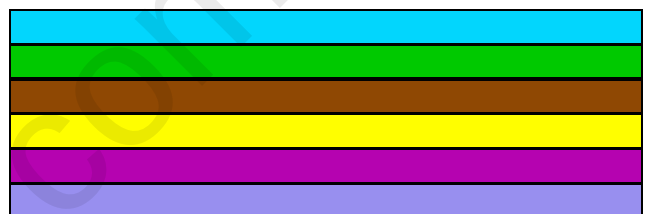
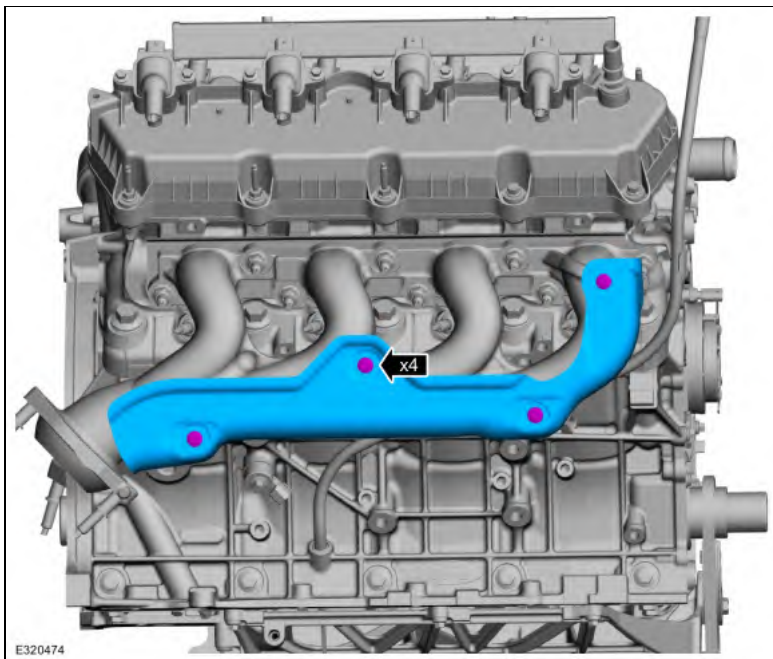
Stage 3: 24 lb.ft (32 Nm)





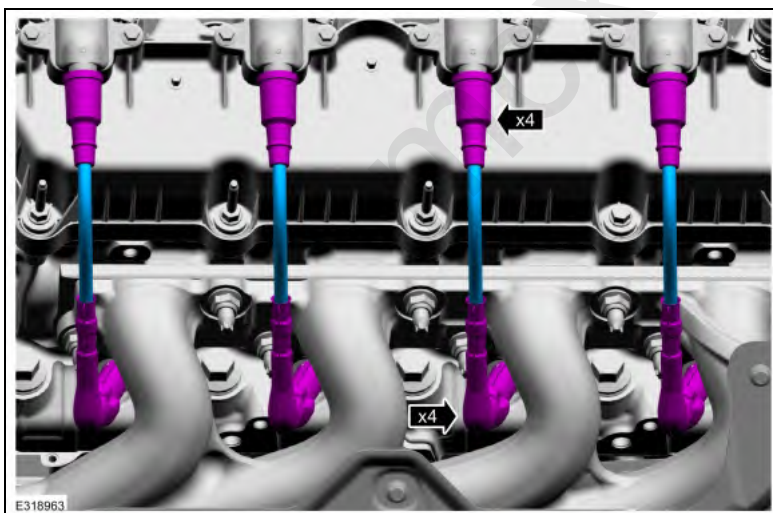
71. Install the heat shield and the new bolts.

Torque: 106 lb.in (12 Nm)

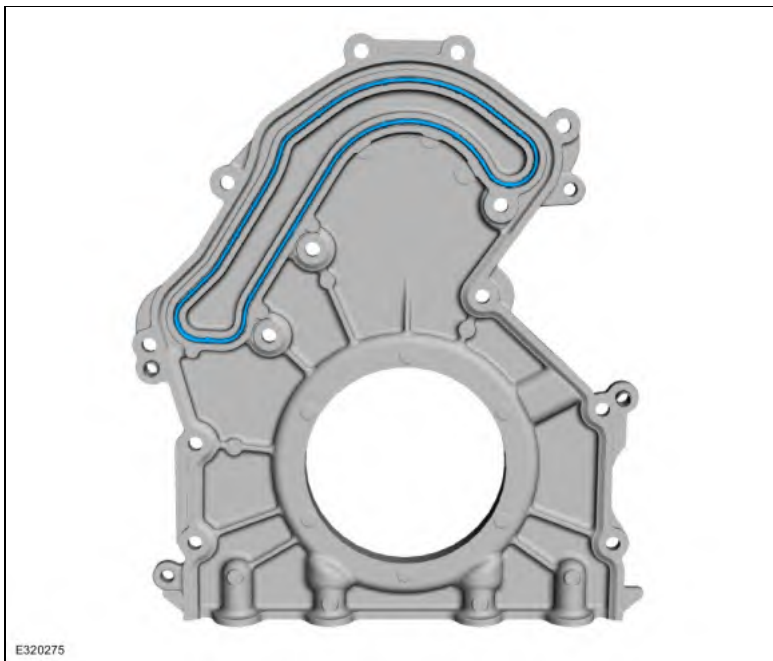


72.

1. Install the spark plug wires onto the spark plugs.
2. Connect the spark plug wires to the ignition coils.



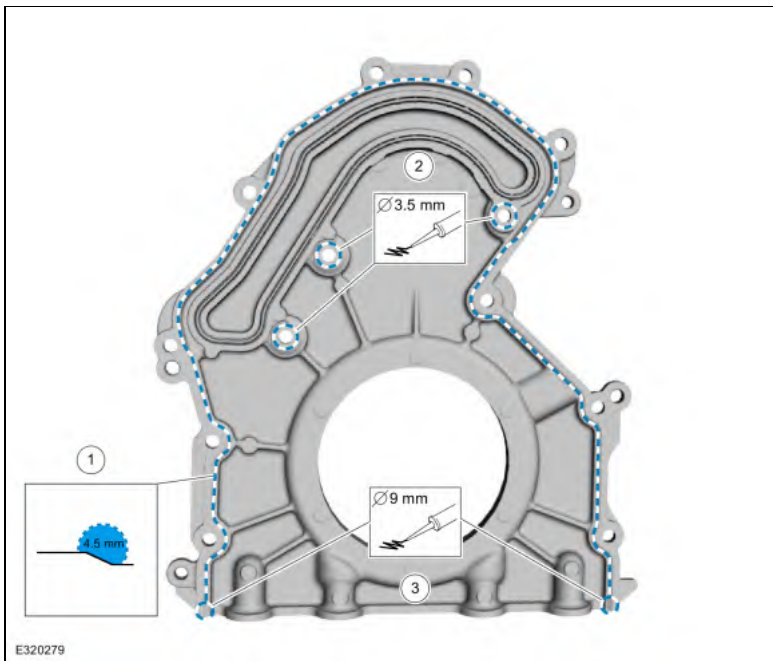
73. Install a new gasket.



74. **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 rear crankshaft seal retainer plate and bolts must be installed within 10 minutes of applying the sealer. The bolts must be tightened within 15 minutes of installing the rear crankshaft seal retainer plate. Failure to follow this procedure can cause future oil leakage.

1. Apply a 4.5 mm (0.18 in) bead of Motorcraft® High Performance Engine RTV Silicone to the chamfer of the rear crankshaft seal retainer plate sealing surfaces.
Material: Motorcraft® High Performance Engine RTV Silicone / TA-357 (WSE-M4G323-A6)
2. Apply a 3.5 mm (0.14 in) bead of Motorcraft® High Performance Engine RTV Silicone to the rear crankshaft seal retainer plate sealing surfaces of the inner bolt bosses.
Material: Motorcraft® High Performance Engine RTV Silicone / TA-357 (WSE-M4G323-A6)
3. Apply 9 mm (0.35 in) drops of Motorcraft® High Performance Engine RTV Silicone to the joints as indicated.
Material: Motorcraft® High Performance Engine RTV Silicone / TA-357 (WSE-M4G323-A6)

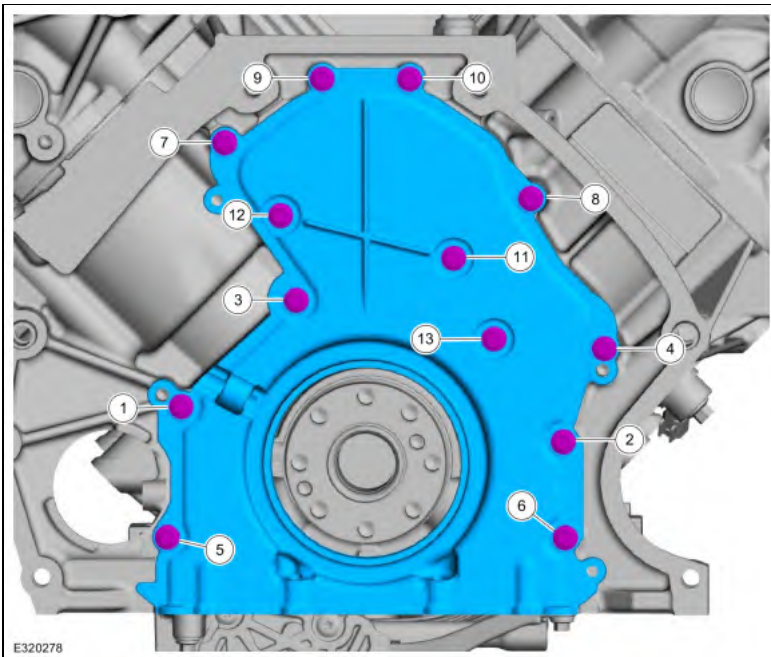


75. Install the rear crankshaft seal retainer plate and the bolts. Tighten in sequence.

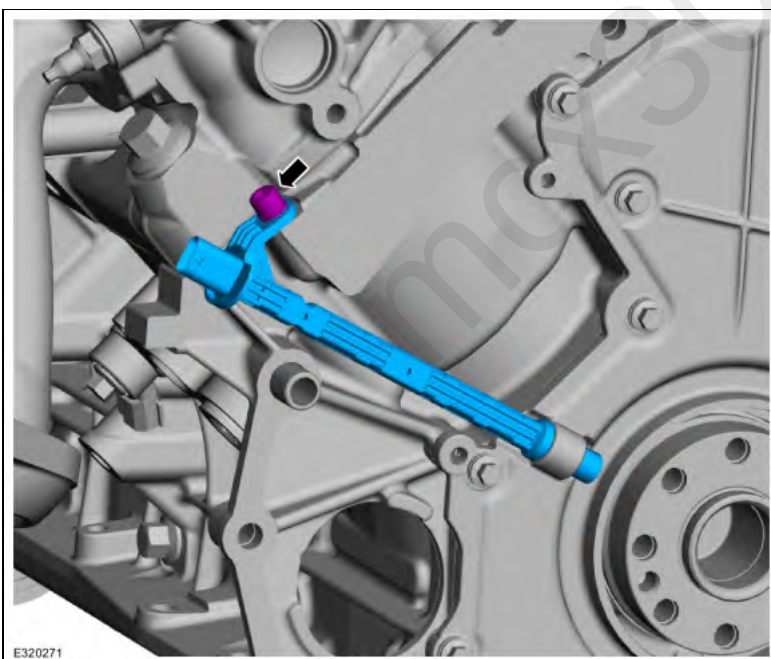
Torque:

Stage 1: 89 lb.in (10 Nm)

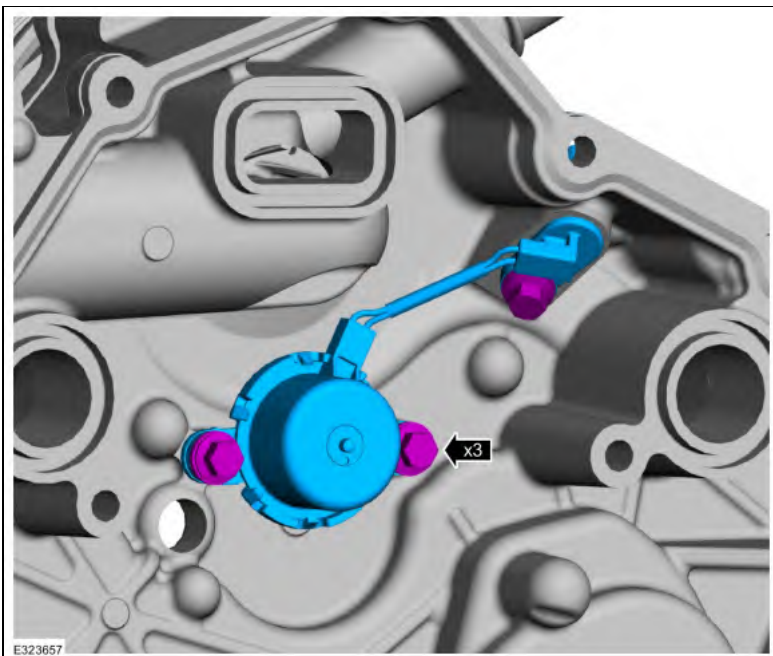
Stage 2: Tighten an additional : 45°



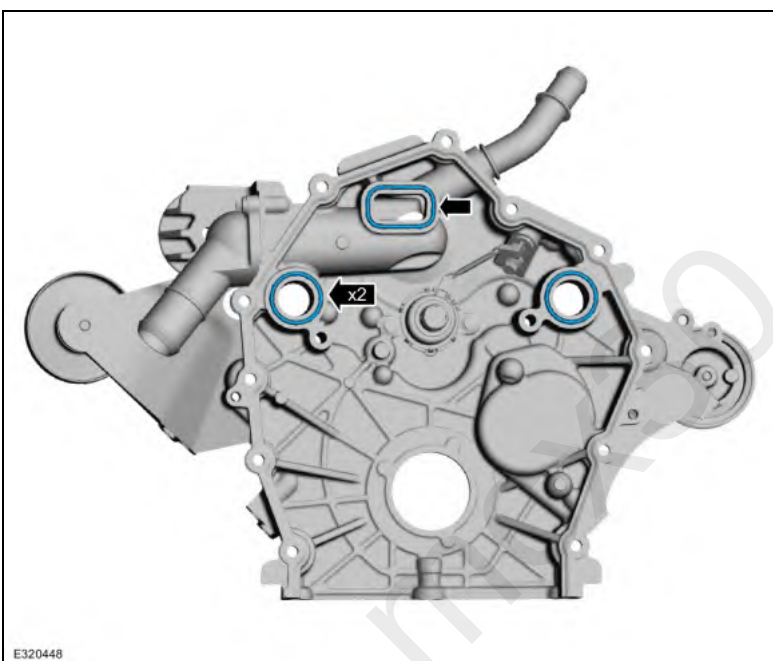
76. Install the CKP sensor and the bolt.
Torque: 89 lb.in (10 Nm)



77. If removed, install the VCT solenoid assembly and the bolts.
Torque: 89 lb.in (10 Nm)



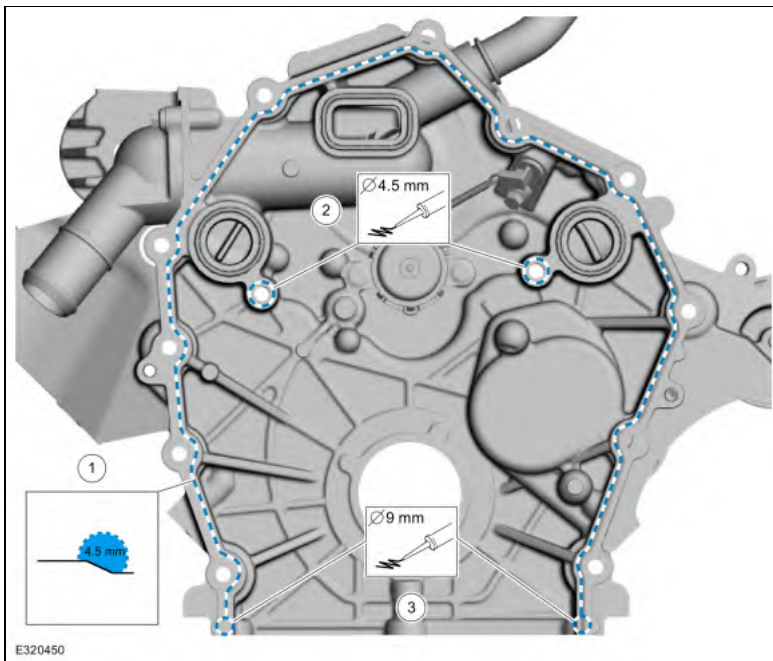
78. Install new gaskets.



79. **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 engine front cover and bolts must be installed within 10 minutes of applying the sealer. The bolts must be tightened within 15 minutes of installing the engine front cover. Failure to follow this procedure can cause future oil leakage.

1. Apply a 4.5 mm (0.18 in) bead of Motorcraft® High Performance Engine RTV Silicone to the chamfer of the engine front cover sealing surfaces.
Material: Motorcraft® High Performance Engine RTV Silicone / TA-357 (WSE-M4G323-A6)
2. Apply a 4.5 mm (0.18 in) bead of Motorcraft® High Performance Engine RTV Silicone to the engine front cover sealing surfaces of the inner bolt bosses.
Material: Motorcraft® High Performance Engine RTV Silicone / TA-357 (WSE-M4G323-A6)
3. Apply 9 mm (0.35 in) drops of Motorcraft® High Performance Engine RTV Silicone to the joints as indicated.
Material: Motorcraft® High Performance Engine RTV Silicone / TA-357 (WSE-M4G323-A6)



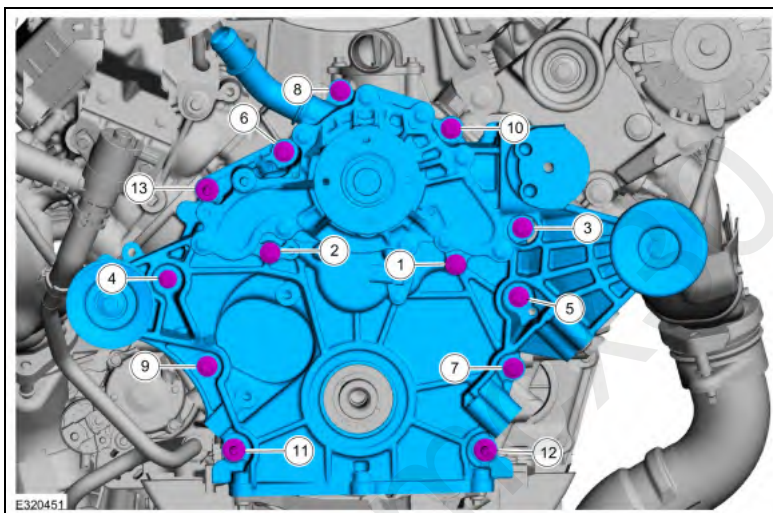
80. Install the engine front cover and the fasteners. Tighten in sequence.

Torque:

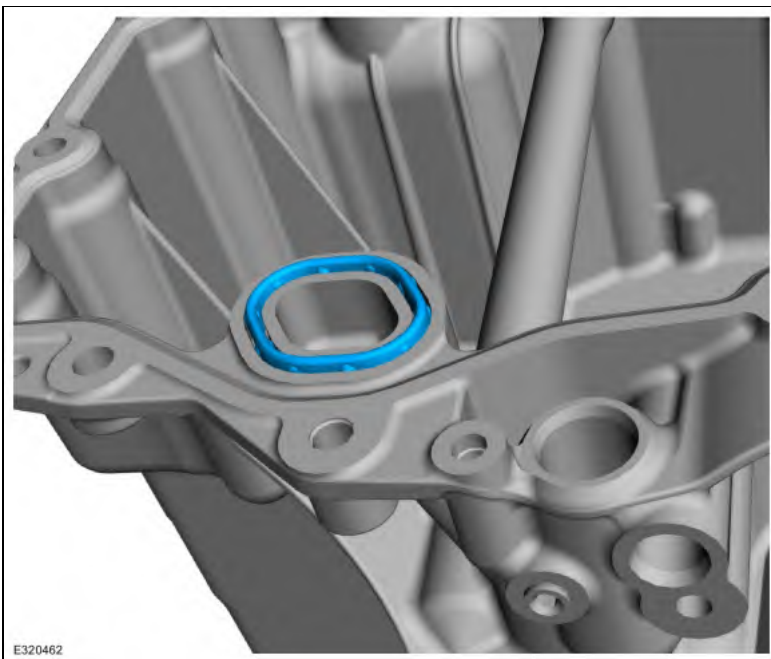
Stage 1: 89 lb.in (10 Nm)

Stage 2: 177 lb.in (20 Nm)

Stage 3: Tighten an additional : 45°



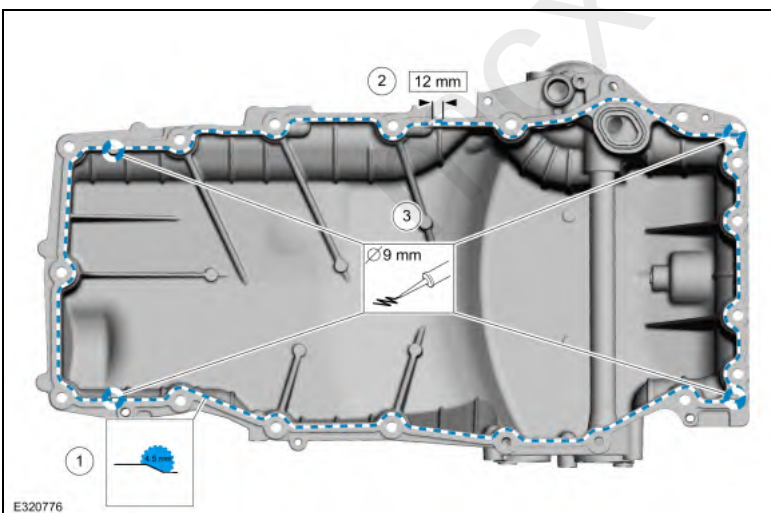
81. Install a new gasket.



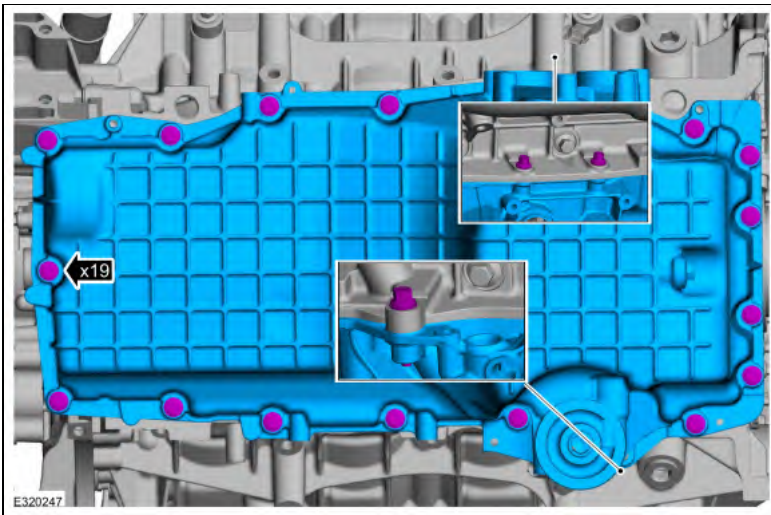
82. **NOTE:** The engine front cover and bolts must be installed within 10 minutes of applying the sealer. The bolts must be tightened within 15 minutes of installing the engine front cover. Failure to follow this procedure can cause future oil leakage.

NOTE: The oil pan and bolts must be installed within 10 minutes of applying the sealer. The bolts must be tightened within 15 minutes of installing the oil pan. Failure to follow this procedure can cause future oil leakage.

1. Apply a 4.5 mm (0.18 in) bead of Motorcraft® High Performance Engine RTV Silicone to the chamfer of the oil pan sealing surfaces.
Material: Motorcraft® High Performance Engine RTV Silicone / TA-357 (WSE-M4G323-A6)
2. Overlap the beginning and ending of the sealant bead 12 mm (0.47 in).
Material: Motorcraft® High Performance Engine RTV Silicone / TA-357 (WSE-M4G323-A6)
3. Apply 9 mm (0.35 in) drops of Motorcraft® High Performance Engine RTV Silicone to the joint areas as indicated.
Material: Motorcraft® High Performance Engine RTV Silicone / TA-357 (WSE-M4G323-A6)



- 83.
1. Position the oil pan onto the engine.
 2. Install the bolts finger-tight.

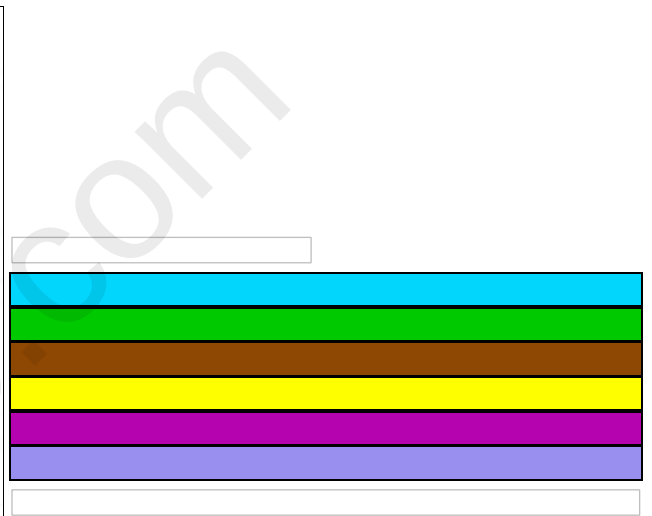
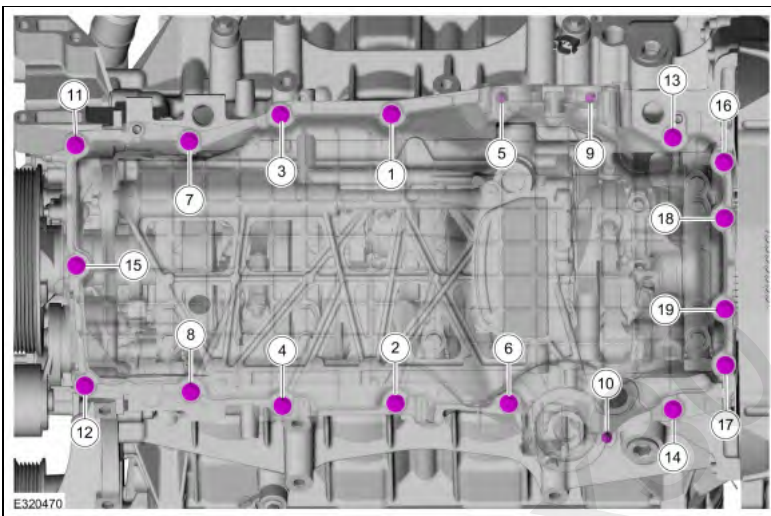


84. Tighten the bolts in sequence.

Torque:

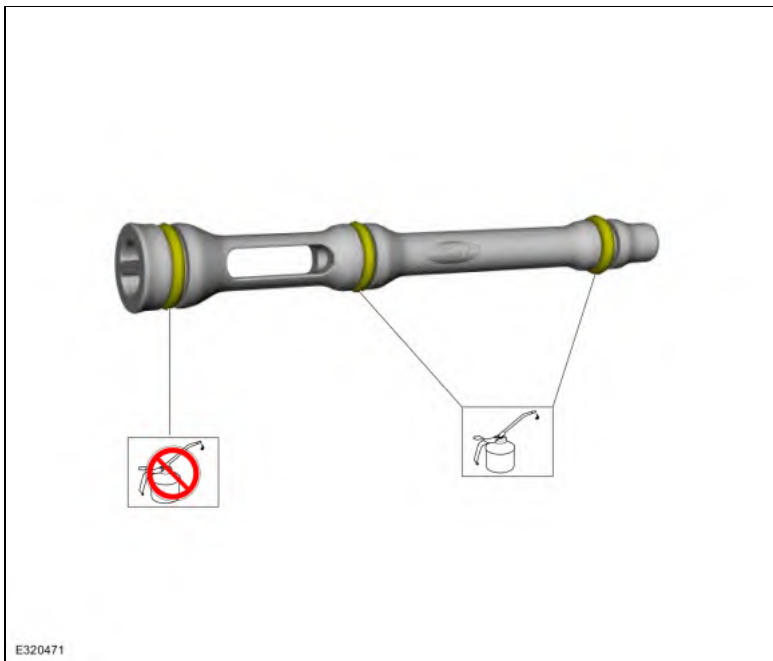
Stage 1: 177 lb.in (20 Nm)

Stage 2: 60°



85. **NOTE:** Do not lubricate the large outer O-ring seal.

Lubricate the middle and inner O-ring seals with clean engine oil.

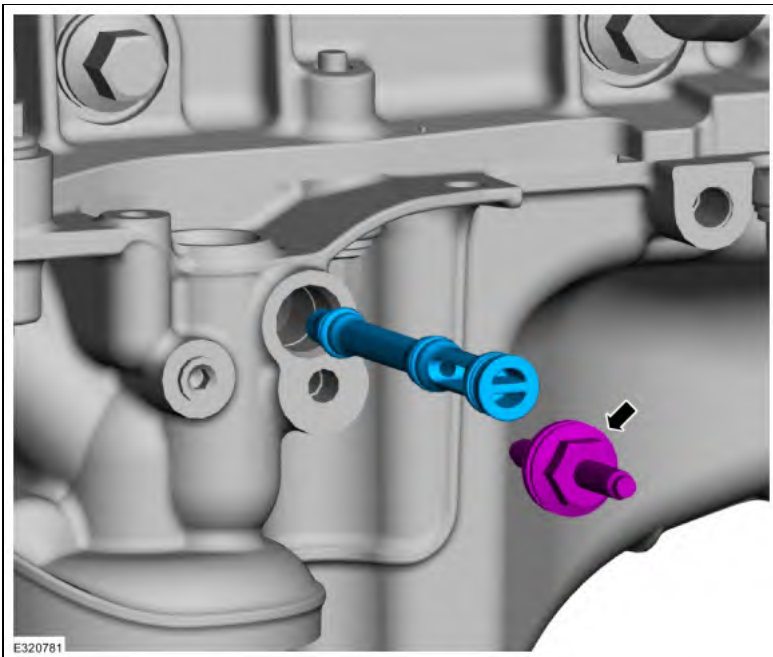


86. Install the oil return tube and the stud bolt.

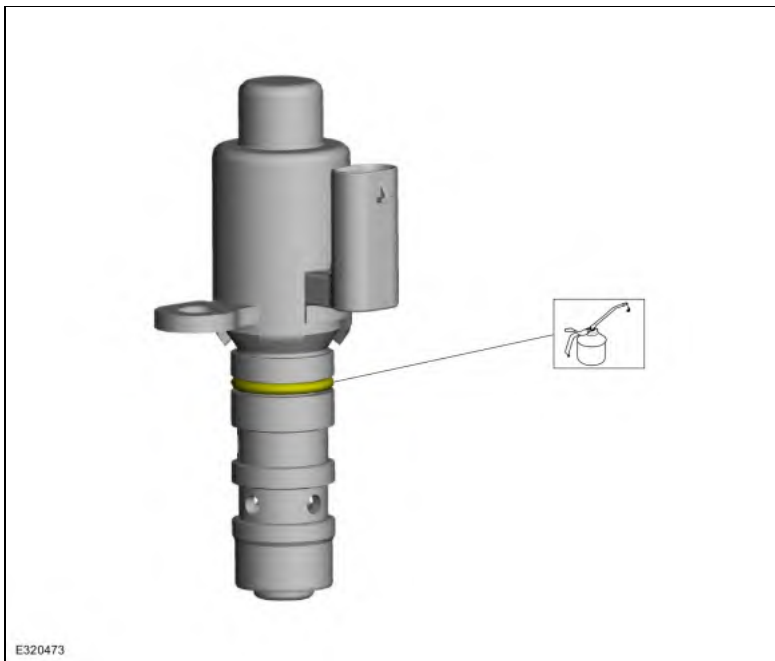
Torque:

Stage 1: 124 lb.in (14 Nm)

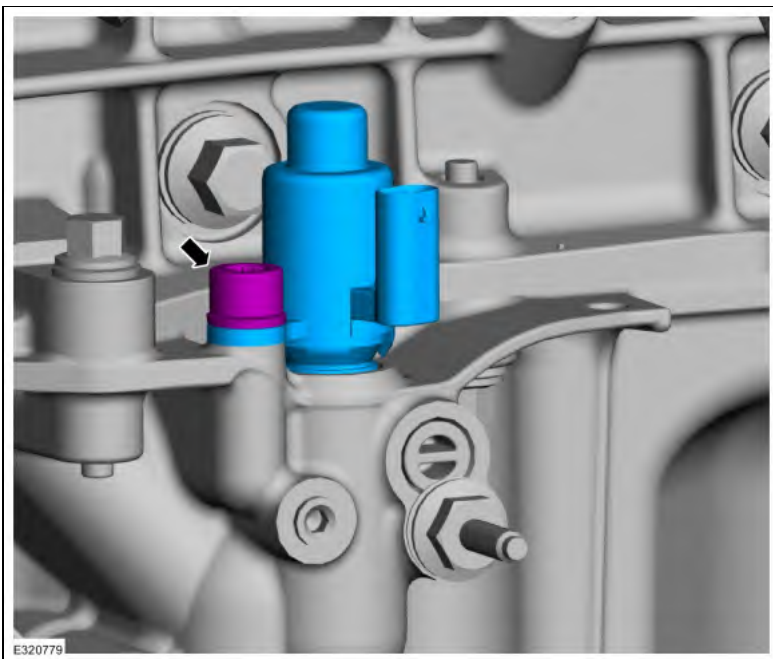
Stage 2: 30Â°



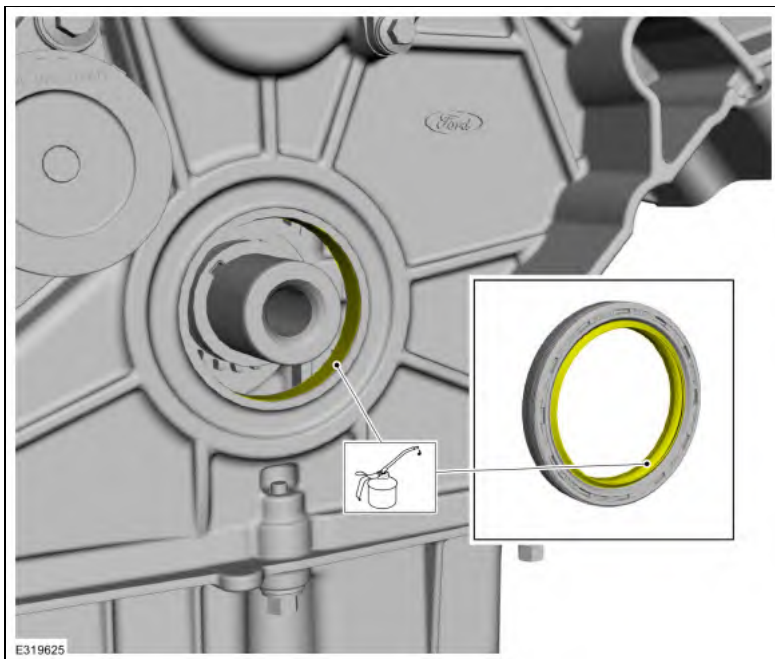
87. Lubricate the O-ring seal with clean engine oil.



88. Install the oil control solenoid and the bolt.
Torque: 89 lb.in (10 Nm)

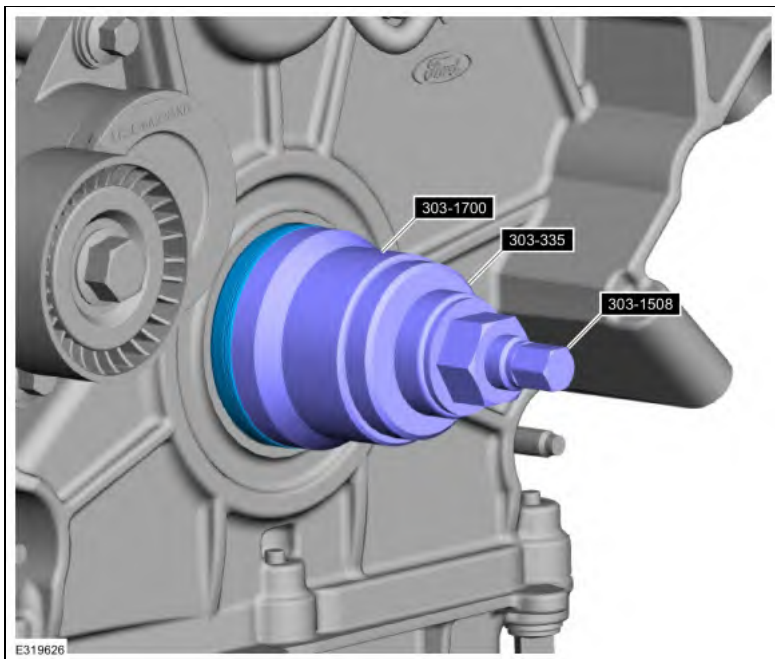


89. Lubricate the engine front cover bore and the crankshaft front oil seal inner lip with clean engine oil.

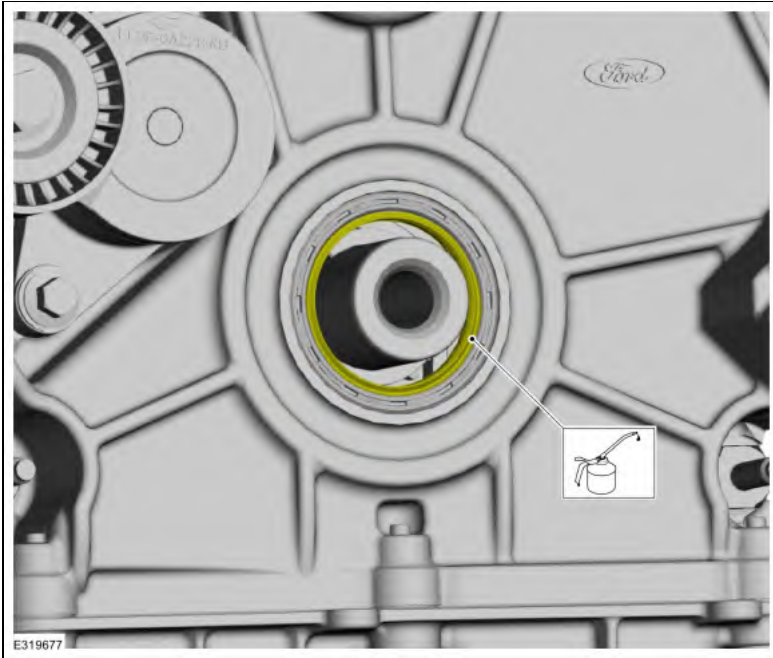


90. Using the special tools, install the new crankshaft front oil seal.

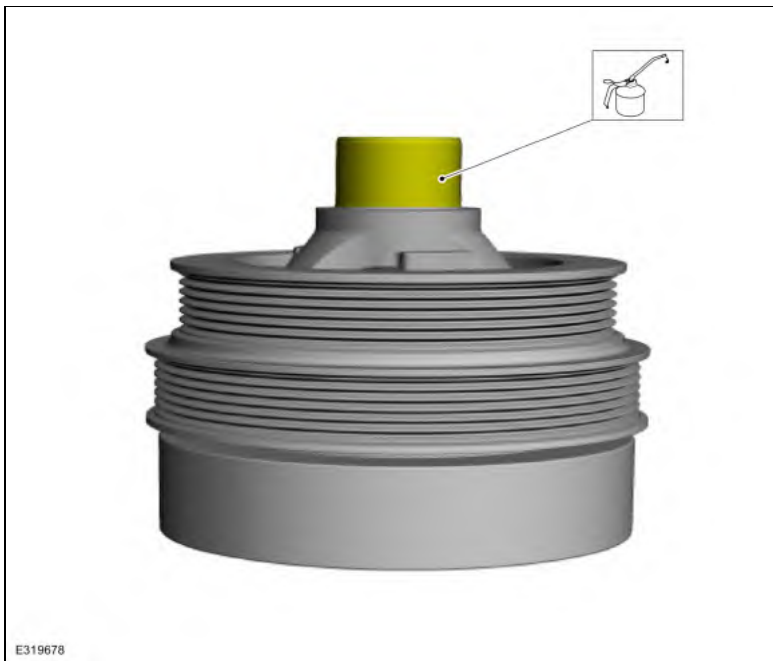
Use Special Service Tool: 303-335 (T88T-6701-A) Installer, Front Cover Oil Seal , 303-1508 Installer, Front Crank Seal , 303-1700 7.3L Frt Seal Installer.



91. Lubricate the crankshaft front oil seal inner lip with clean engine oil.

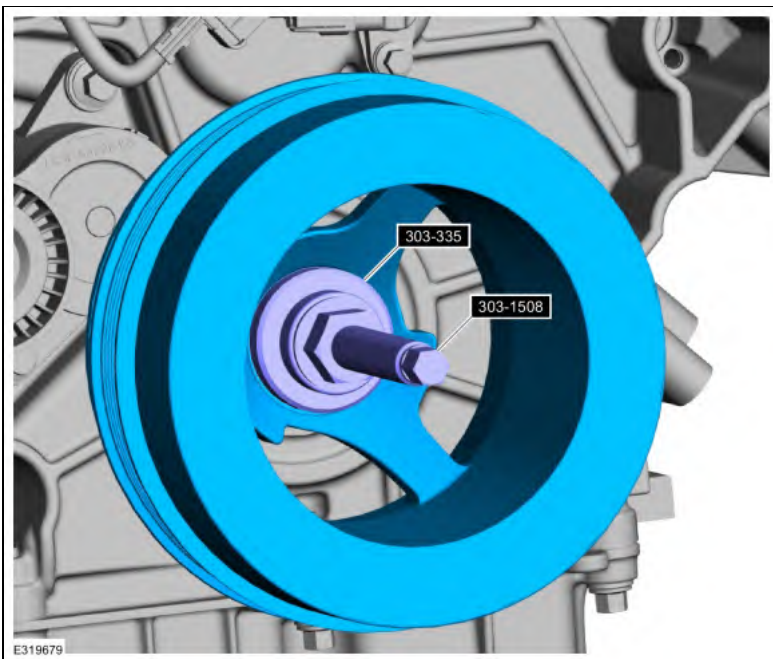


92. Lubricate the crankshaft pulley sealing surface with clean engine oil prior to installation.



93. Using the special tools, install the crankshaft pulley.

Use Special Service Tool: 303-335 (T88T-6701-A) Installer, Front Cover Oil Seal , 303-1508 Installer, Front Crank Seal.



94. With the aid of an assistant, use a Strap Wrench to install a new crankshaft pulley bolt.
Use the General Equipment: Strap Wrench

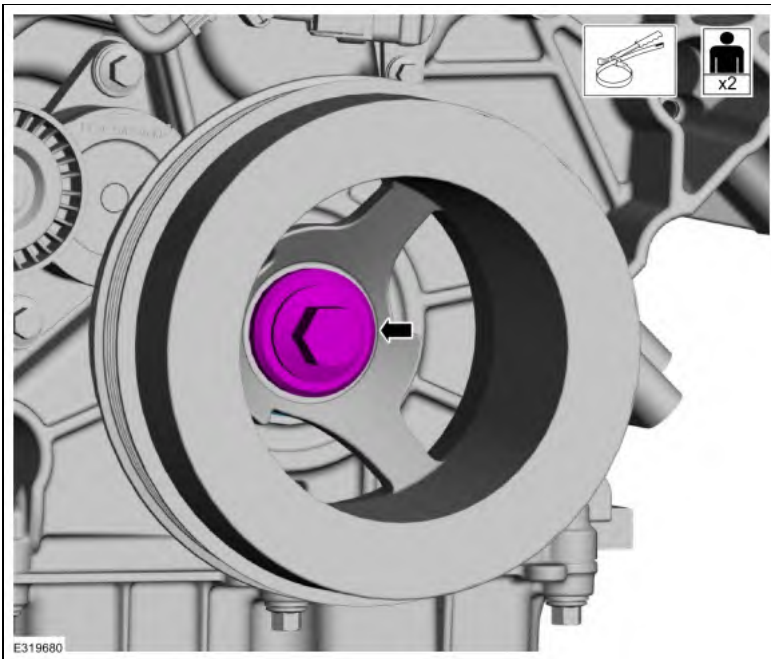
Torque:

Stage 1: 66 lb.ft (90 Nm)

Stage 2: Loosen: 360°

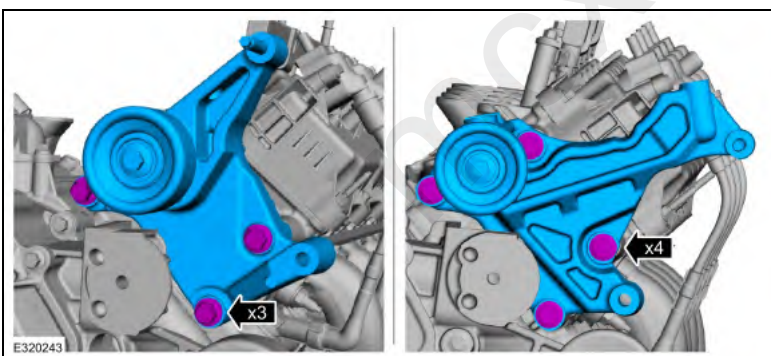
Stage 3: 129 lb.ft (175 Nm)

Stage 4: Tighten an additional : 150°

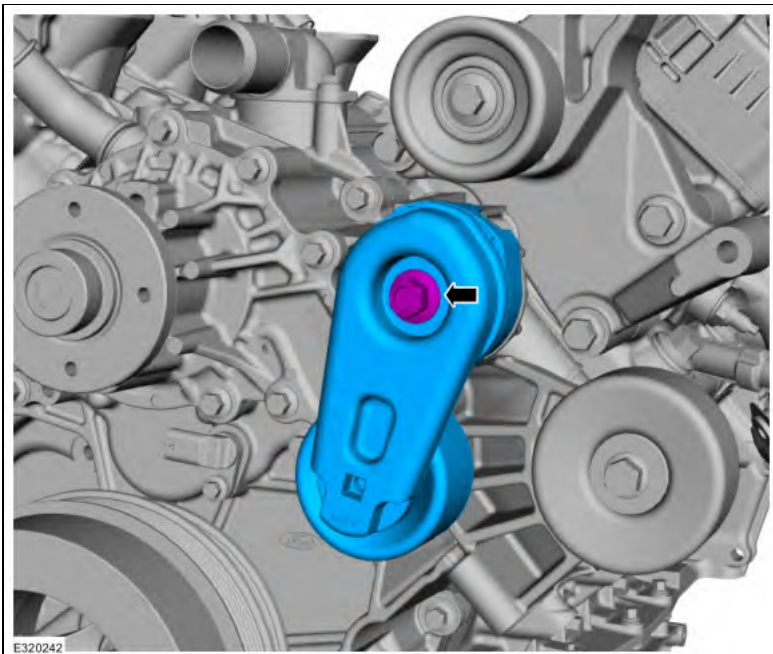


95. **NOTE:** The dual generator bracket has an additional bolt.

Install the generator bracket and the bolts.
Torque: 35 lb.ft (48 Nm)

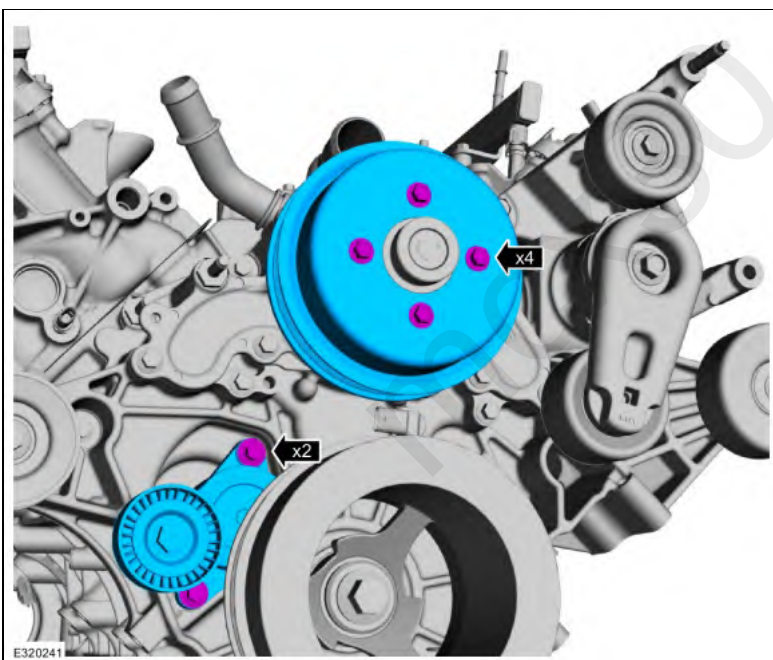


96. Install the belt tensioner and the bolt.
Torque: 35 lb.ft (48 Nm)



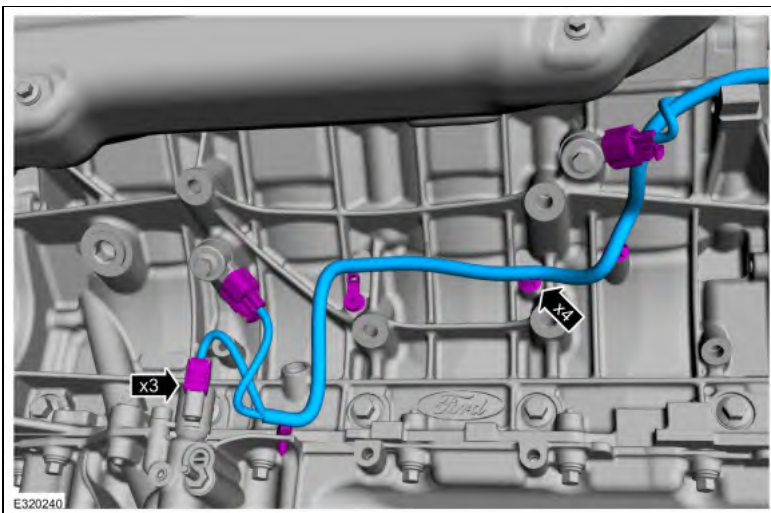
97.

- Install the coolant pump pulley and the bolts.
Torque: 18 lb.ft (25 Nm)
- Install the belt tensioner and the bolts.
Torque: 18 lb.ft (25 Nm)



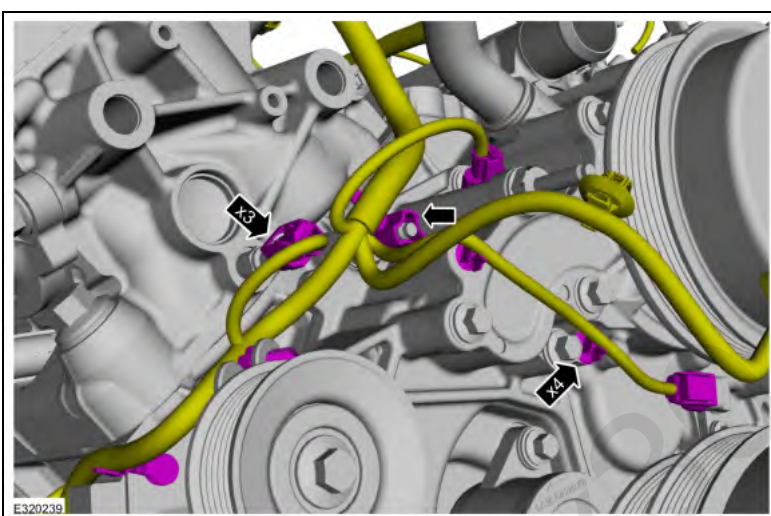
98.

- Install the wiring harness onto the engine.
- Attach the engine wiring harness retainers.
- Connect the engine wiring harness electrical connectors.



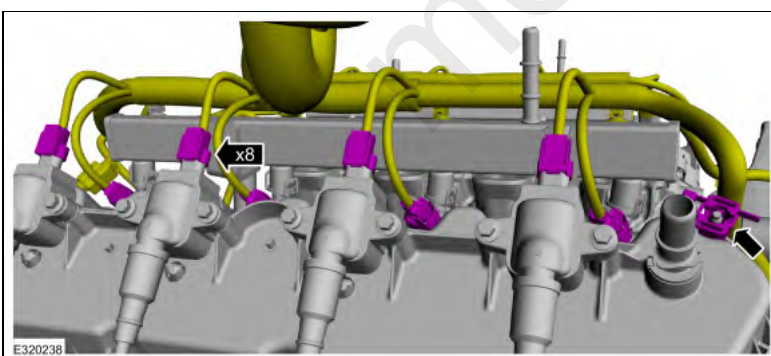
99.

- Connect the engine wiring harness electrical connectors.
- Attach the engine wiring harness retainers.



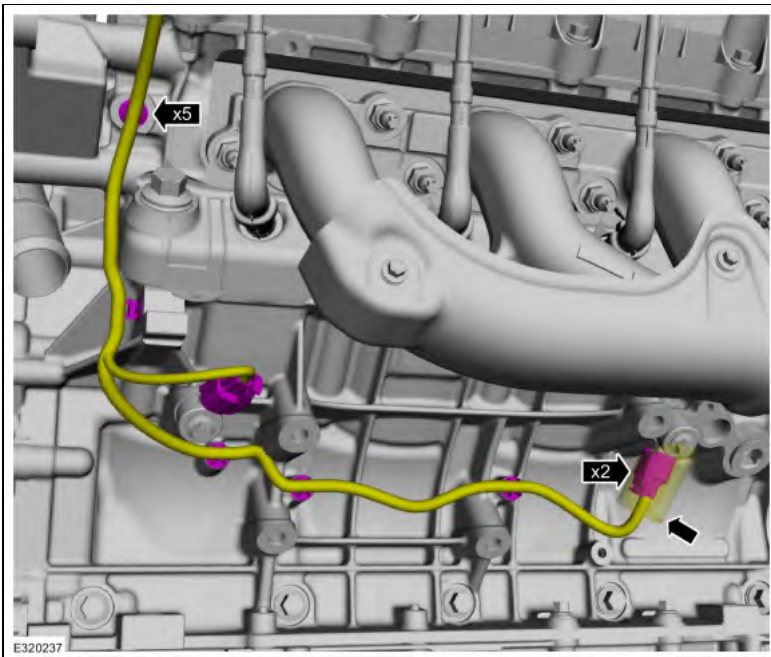
100.

- Connect the engine wiring harness electrical connectors.
- Attach the engine wiring harness retainer.



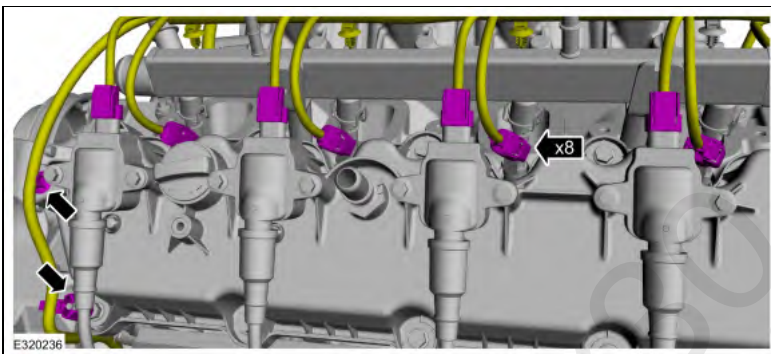
101.

- Attach the engine wiring harness retainers.
- Connect the engine wiring harness electrical connectors.
- Position the wiring harness electrical connector insulator.

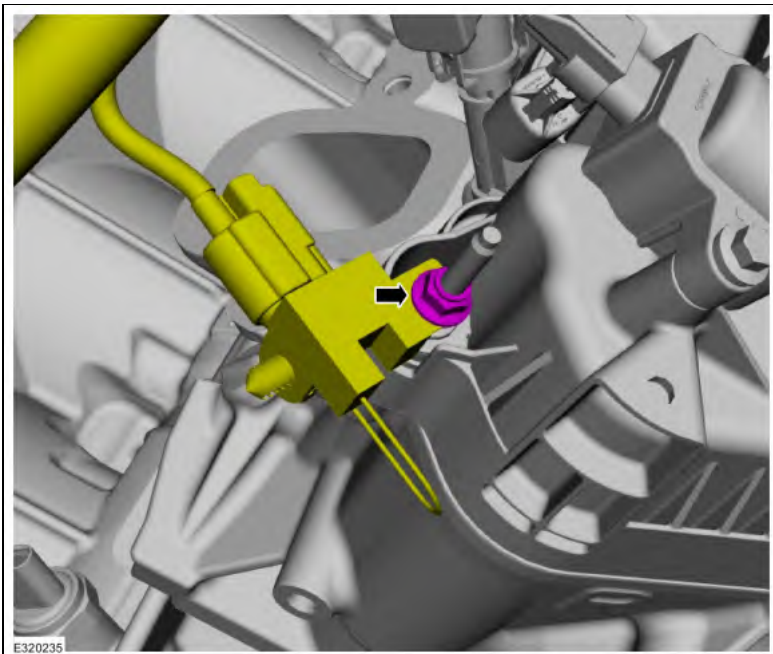


102.

- Connect the engine wiring harness electrical connectors.
- Attach the engine wiring harness retainers.

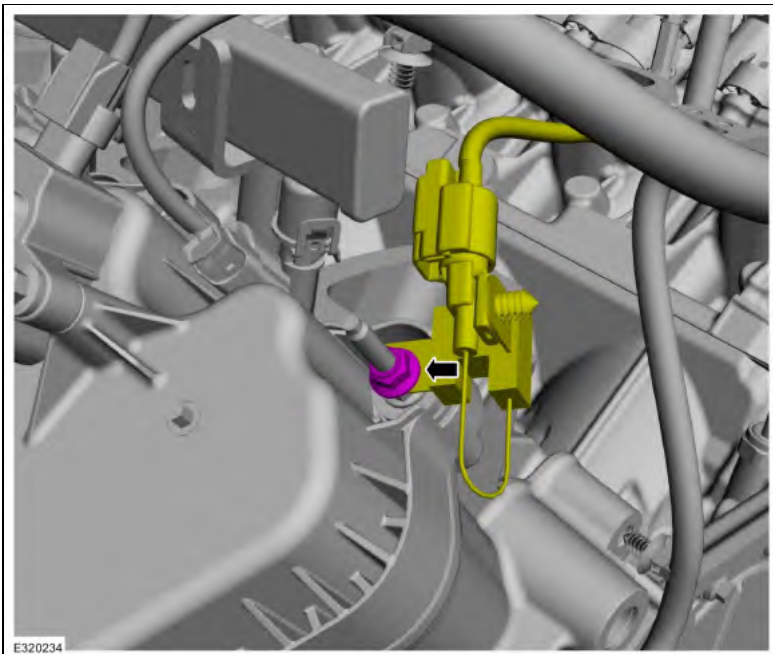


103. Install the RFI capacitor and the nut.
Torque: 53 lb.in (6 Nm)



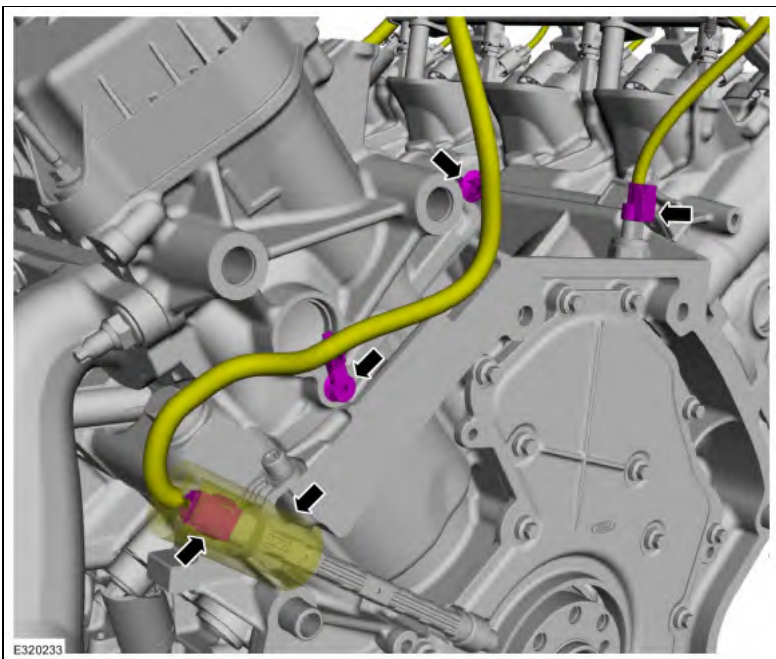
104. Install the RFI capacitor and the nut.
Torque: 53 lb.in (6 Nm)



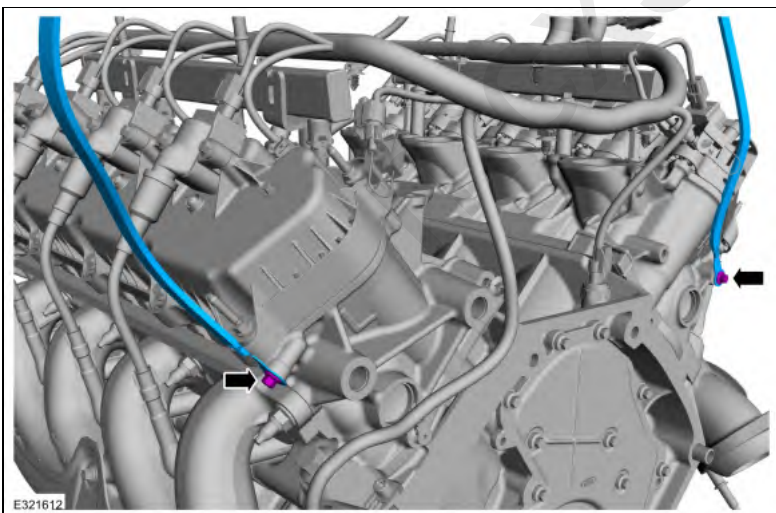


105.

- Attach the engine wiring harness retainers.
- Connect the engine wiring harness electrical connectors.
- Position the wiring harness electrical connector insulator.



106. Install the ground straps and the bolts.
Torque: 97 lb.in (11 Nm)



107. **NOTICE:** Only use hand tools when tightening the engine mount nuts or damage to the engine mount may occur.

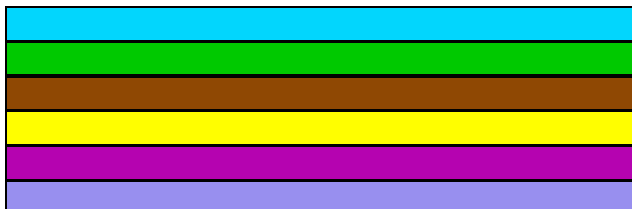
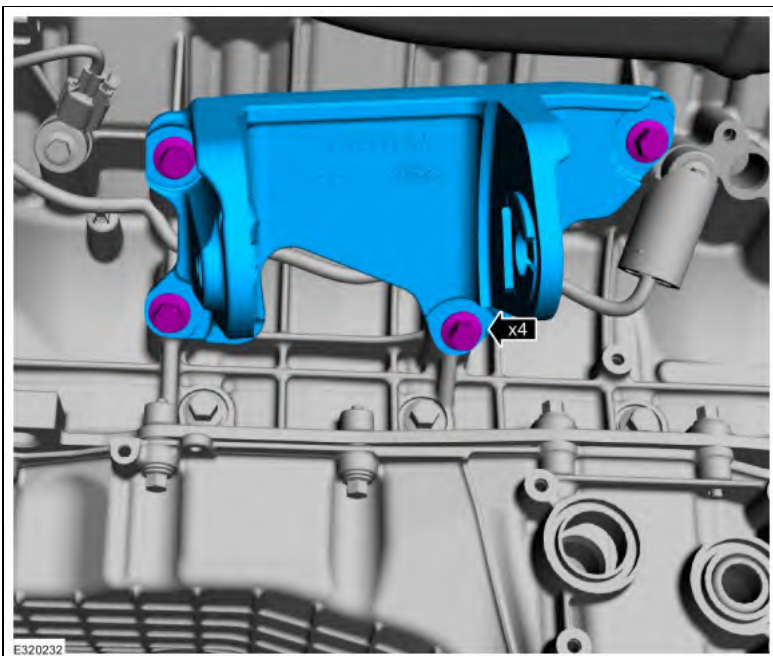
NOTE: Clean the engine mount bracket-to-cylinder block surfaces of any dirt or foreign material prior to installation.

Install the LH engine support insulator bracket and the new bolts.

Torque:

Stage 1: 22 lb.ft (30 Nm)

Stage 2: 60°



108. **NOTICE:** Only use hand tools when tightening the engine mount nuts or damage to the engine mount may occur.

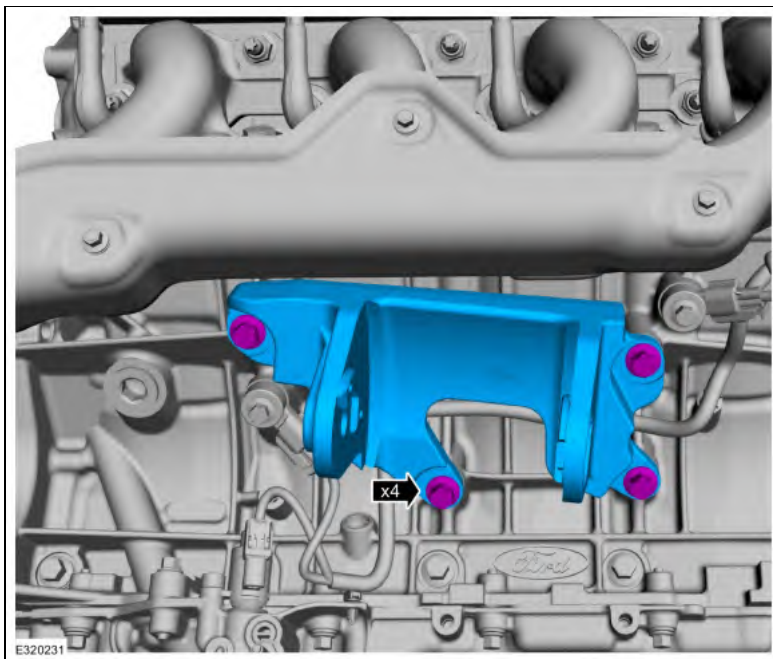
NOTE: Clean the engine mount bracket-to-cylinder block surfaces of any dirt or foreign material prior to installation.

Install the RH engine support insulator bracket and the new bolts.

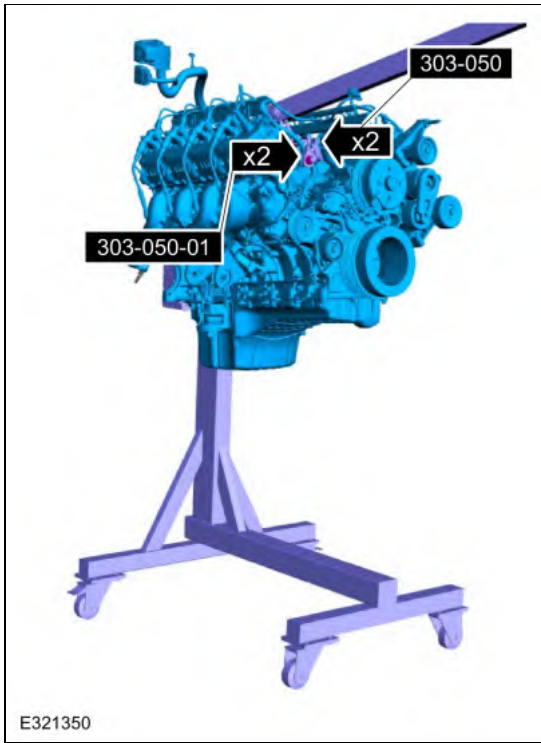
Torque:

Stage 1: 22 lb.ft (30 Nm)

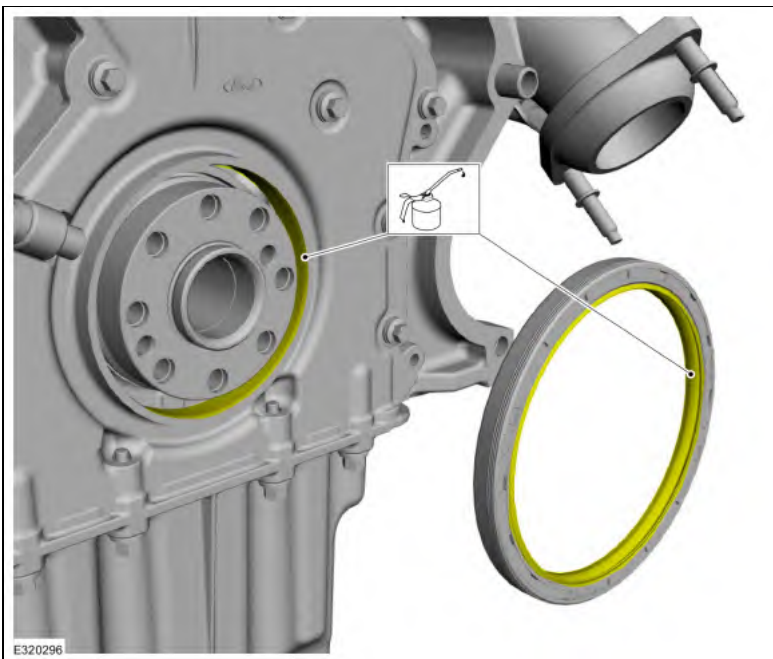
Stage 2: 60°



109. Install the special tool and remove the engine from the engine stand using a floor crane.
 Install Special Service Tool: 303-050-01 7.3L Bracket, Engine (P558). , 303-050 (T70P-6000) Lifting Bracket, Engine.
 Use the General Equipment: Floor Crane
 Use the General Equipment: Mounting Stand

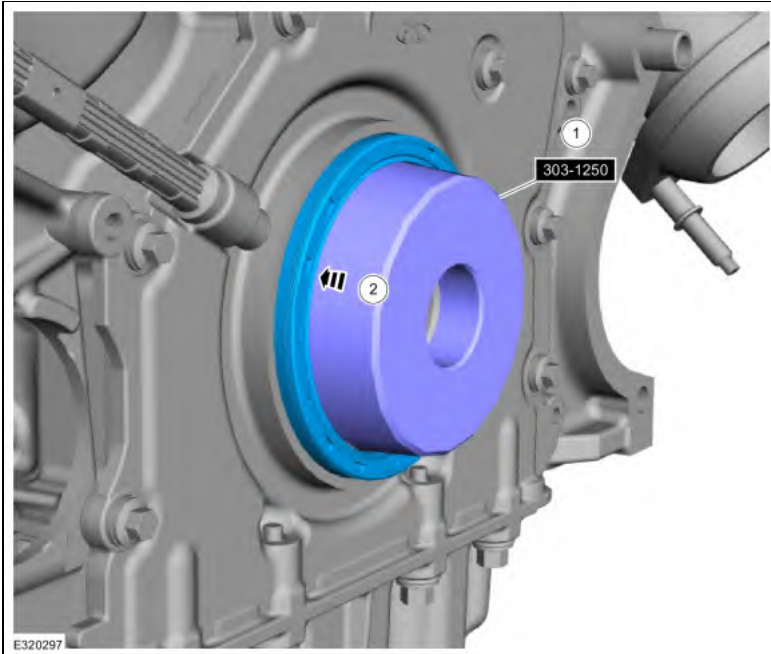


110. Lubricate the seal bore and the seal lips with clean engine oil.

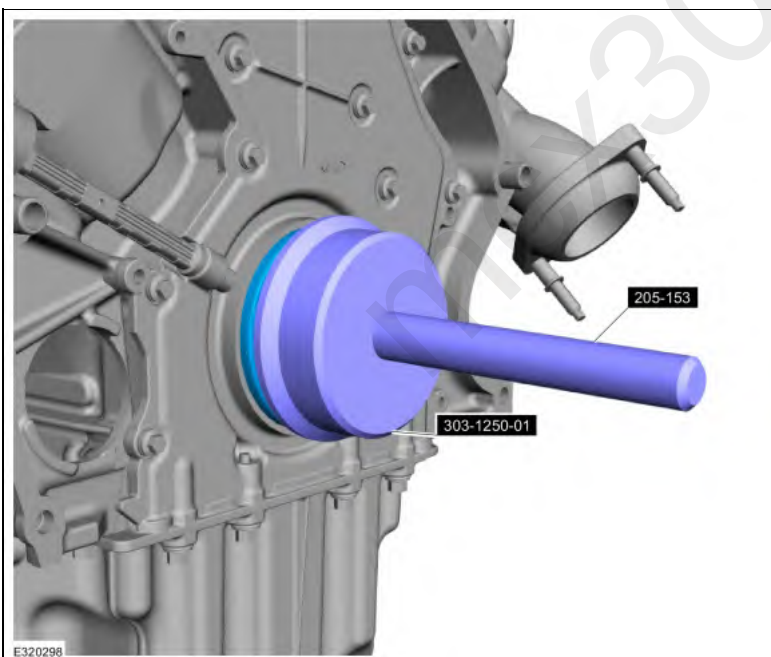


111.

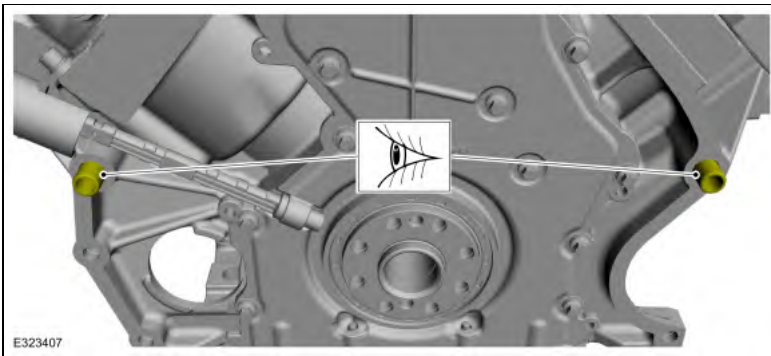
1. Position the special tool onto the end of the crankshaft.
Use Special Service Tool: 303-1250 Seal Installer, Rear Main.
2. Slide the new crankshaft rear seal onto the tool.



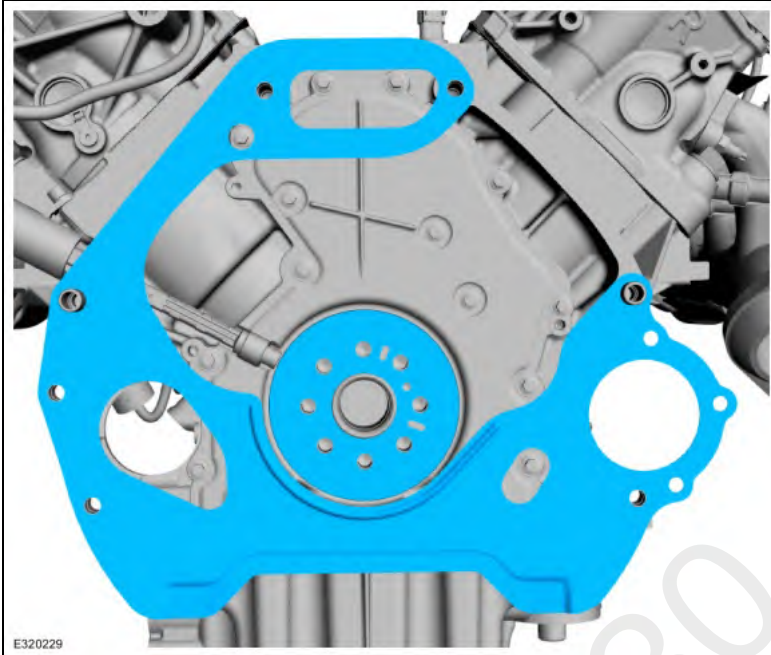
112. Using the special tools, install the crankshaft rear seal.
Use Special Service Tool: 205-153 (T80T-4000-W) Handle. , 303-1250-01 7.3L Rear Seal Installer.



113. Inspect the engine block dowels. If the dowels are damaged or missing, install new engine block dowels.



114. Install the crankshaft sensor ring and the engine-to-transmission spacer plate.

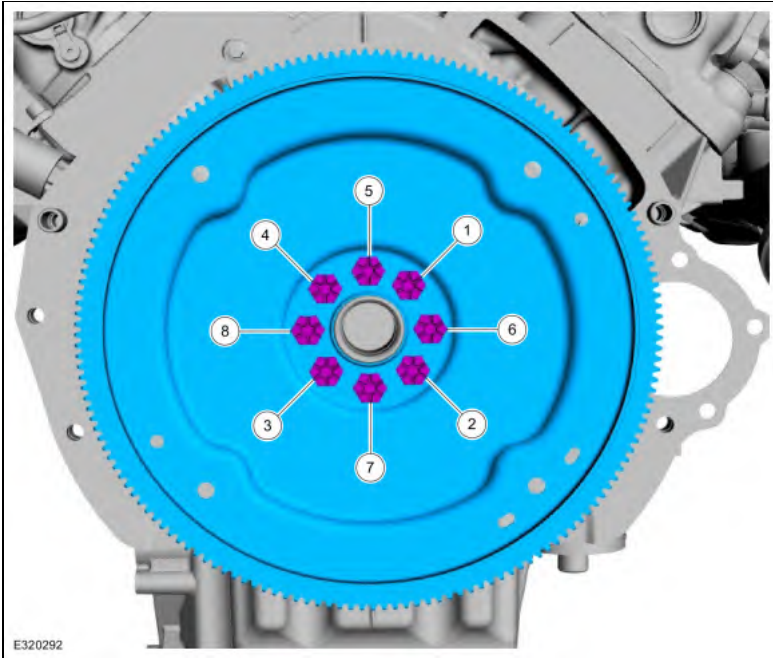


115.

- Install the flexplate and the new bolts finger-tight.
- Tighten the bolts in sequence shown in 6 stages.

Torque:

- Stage 1: Tighten fasteners 1 through 4 in sequence to: 177 lb.in (20 Nm)
- Stage 2: Tighten fasteners 1 through 4 in sequence to: 26 lb.ft (35 Nm)
- Stage 3: Tighten fasteners 1 through 4 in sequence an additional: 60°
- Stage 4: Tighten fasteners 5 through 8 in sequence to: 177 lb.in (20 Nm)
- Stage 5: Tighten fasteners 5 through 8 in sequence to: 26 lb.ft (35 Nm)
- Stage 6: Tighten fasteners 5 through 8 in sequence an additional: 60°



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