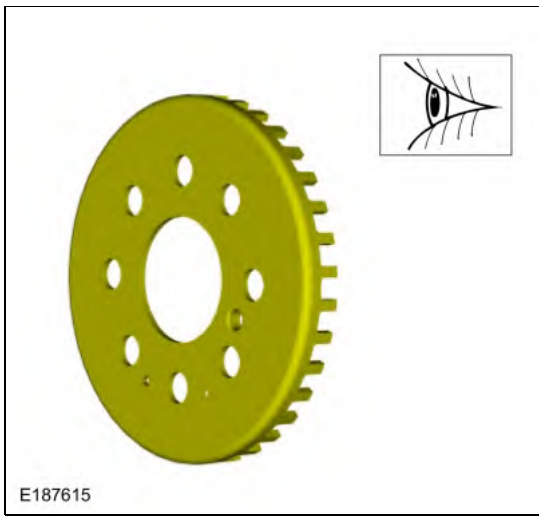
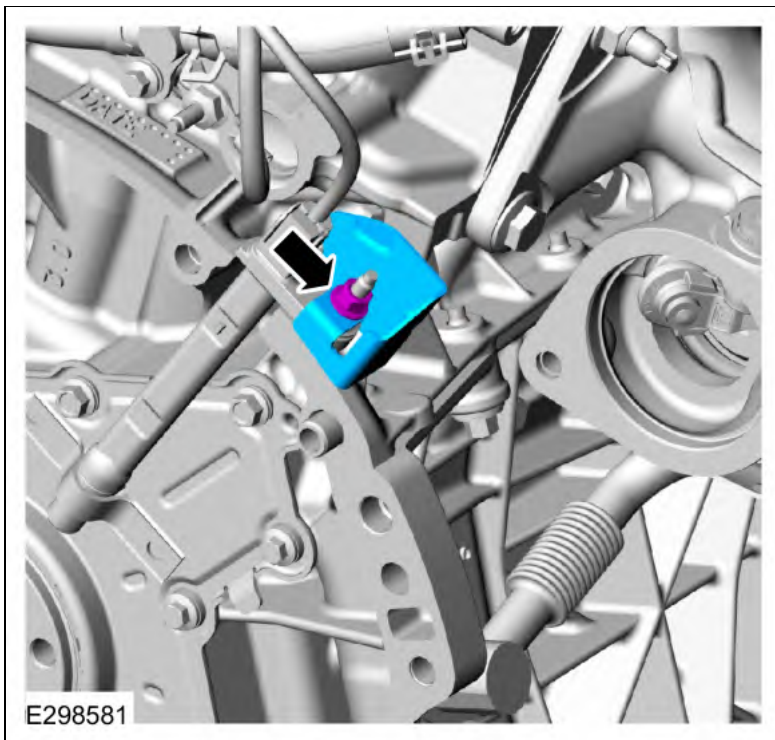
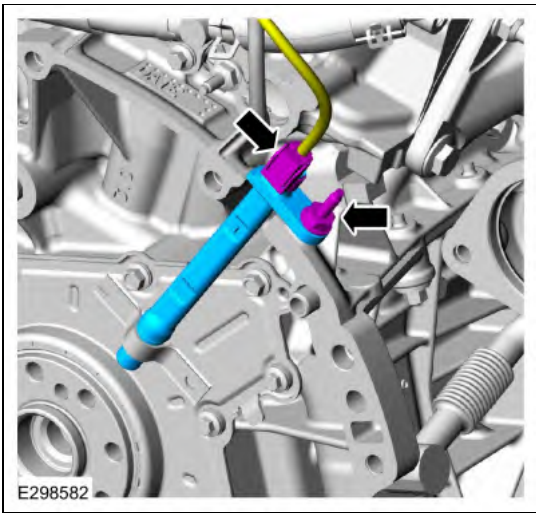




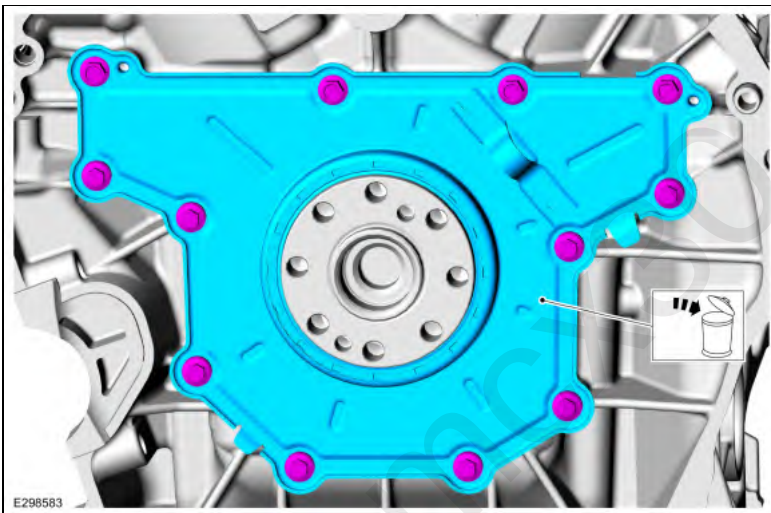
5. Remove the nut and the heat shield.



6.
 1. Disconnect the CKP sensor electrical connector.
 2. Remove the stud bolt and the CKP sensor.



- 7.
- Remove the bolts and the crankshaft rear seal and retainer plate.
 - Discard the crankshaft rear seal and retainer plate.



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

Clean and inspect the mating surface.

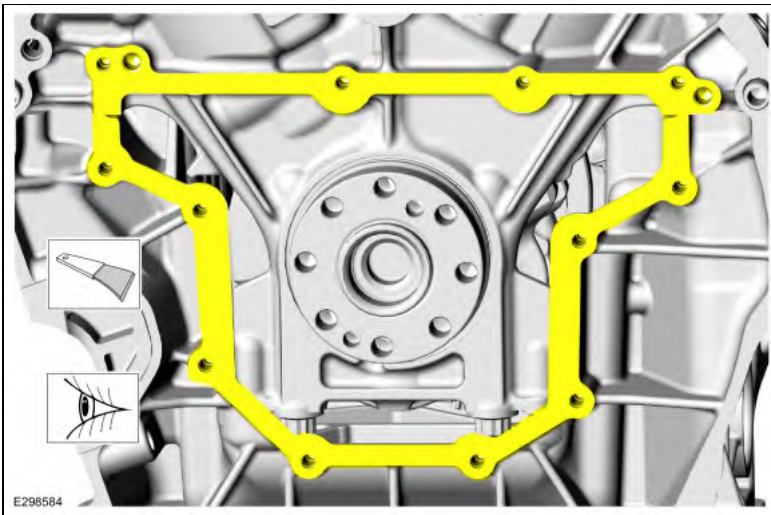
Refer to: RTV Sealing Surface Cleaning and Preparation (303-00 Engine System - General Information, General Procedures).

Use the General Equipment: Plastic Scraper

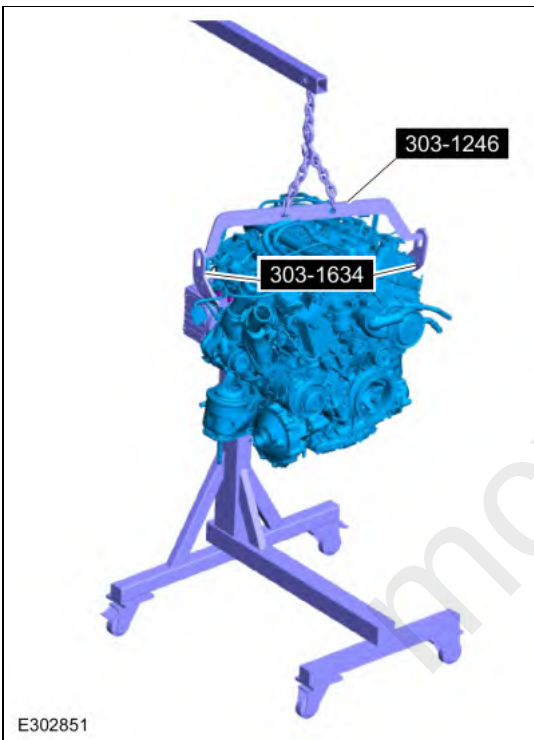
Material: Motorcraft® Silicone Gasket Remover / ZC-30-A

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

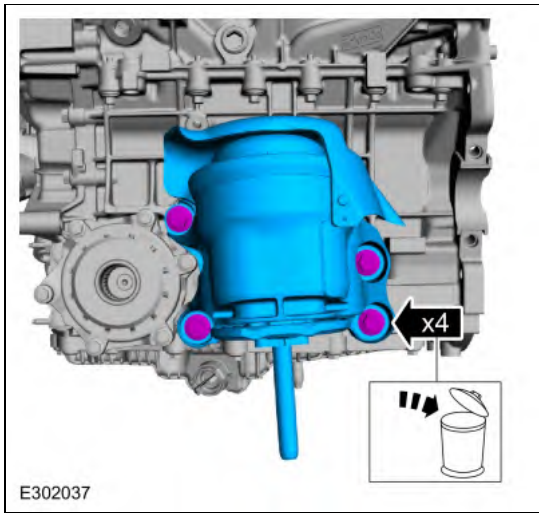
Material: Motorcraft® Metal Surface Prep Wipes / ZC-31-B



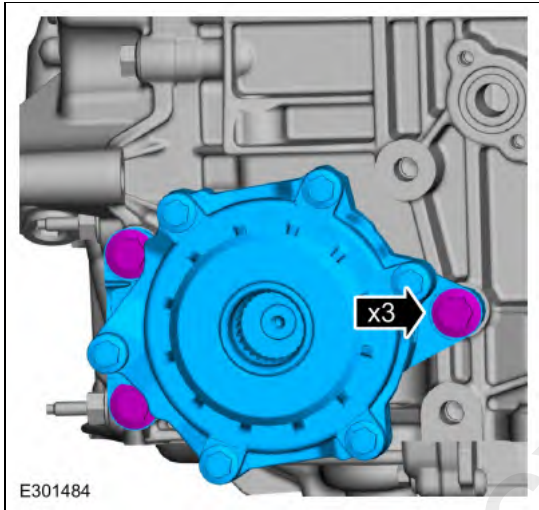
9. Using a floor crane, install the engine on a mounting stand.
 Remove Special Service Tool: 303-1246 Engine Spreader Bar , 303-1634 Lift Eyes (2).
 Use the General Equipment: Floor Crane
 Use the General Equipment: Mounting Stand



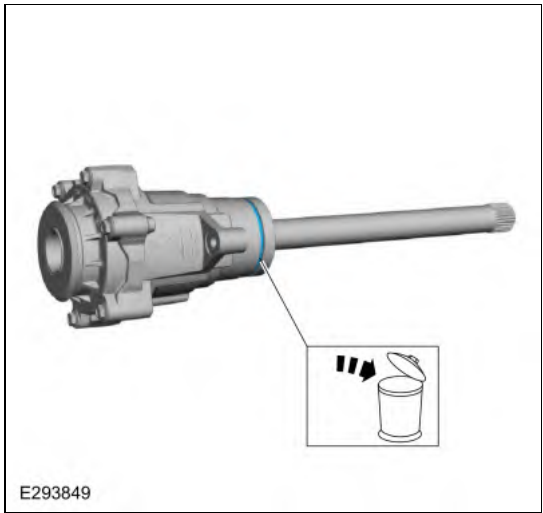
- 10.
- Remove the bolts and the LH engine mount.
 - Discard the bolts.



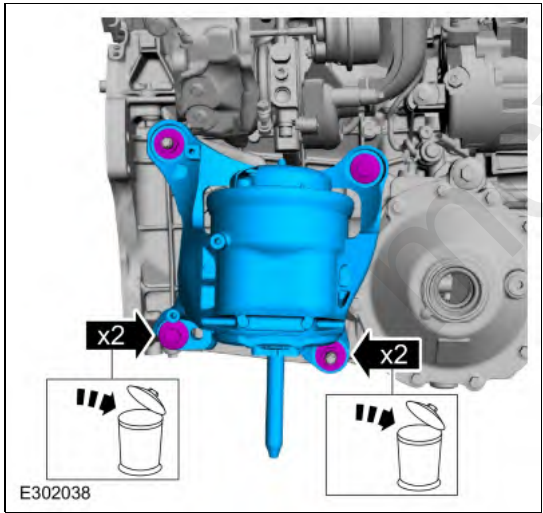
11. Remove the bolts and the front axle disconnect actuator.



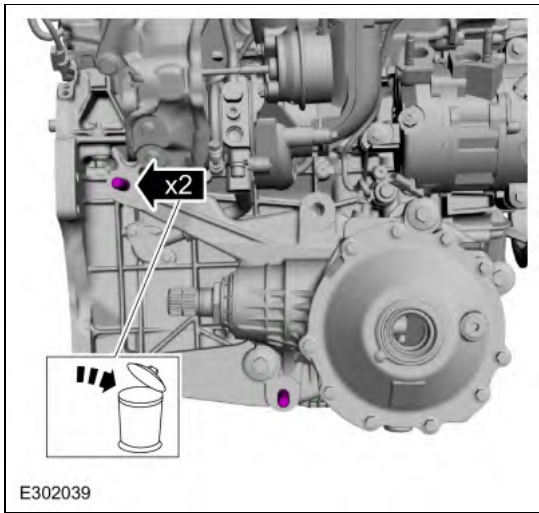
12. Remove and discard the seal.



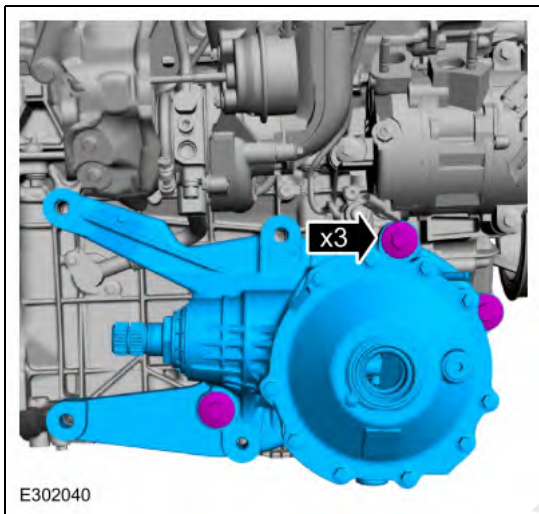
- 13.
- Remove and discard the nuts and bolts.
 - Remove the RH engine mount.



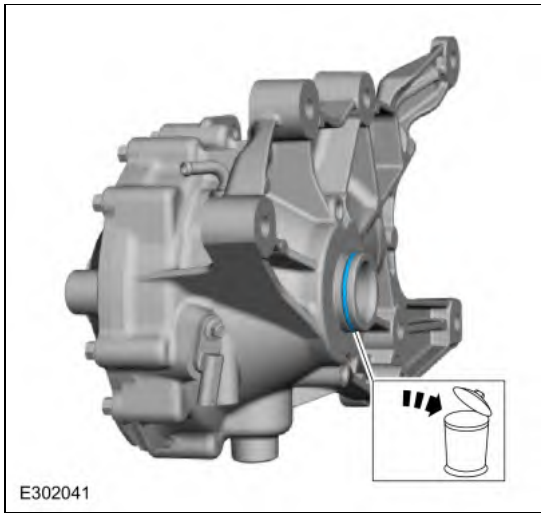
14. Remove and discard the studs.



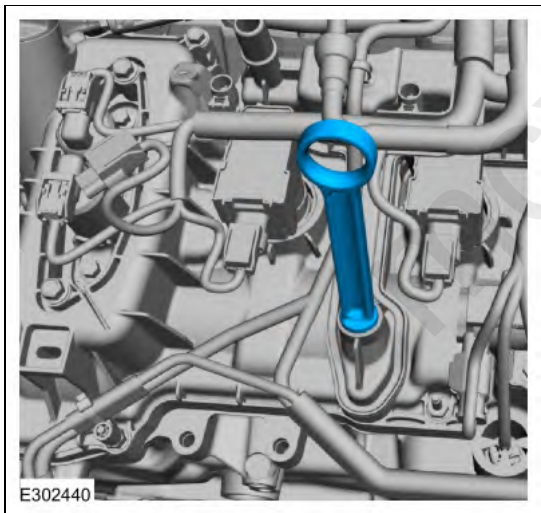
15. Remove the bolts and the front axle assembly.



16. Remove and discard the front axle assembly seal.

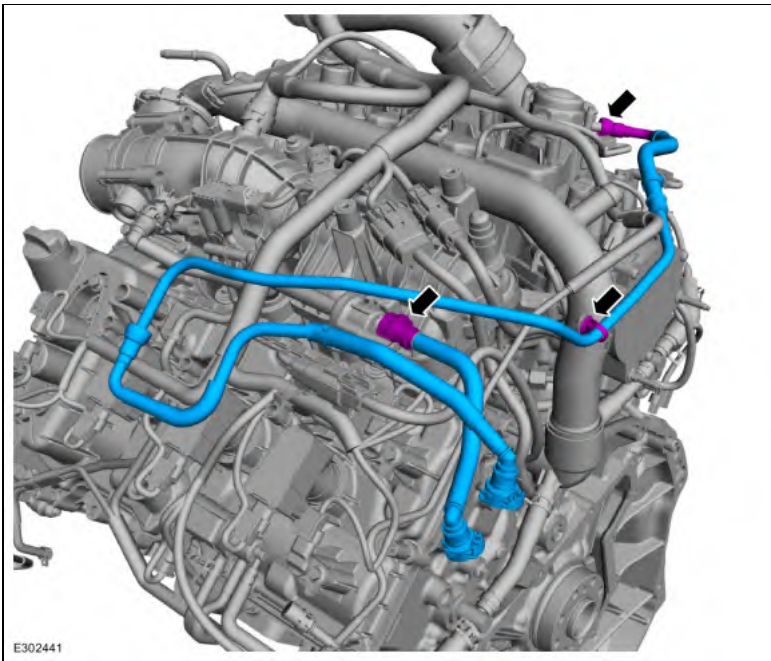


17. Remove the oil level indicator.

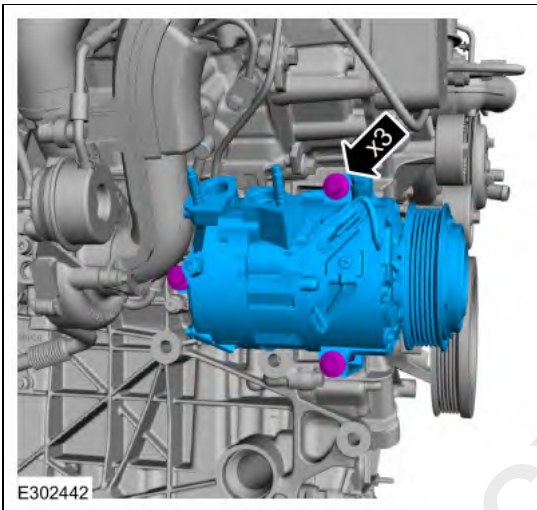


18.

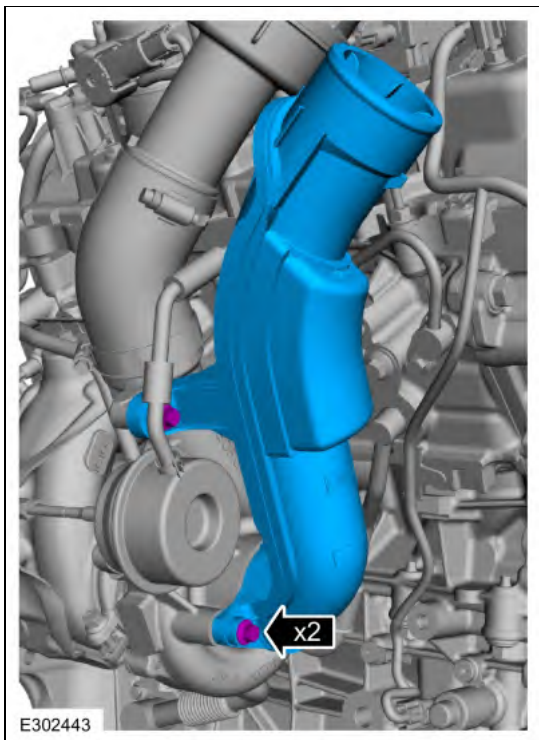
- Detach the fuel tube retainer.
- Disconnect the quick release coupling and remove the fuel tube assembly.
Refer to: Quick Release Coupling (310-00 Fuel System - General Information - 3.0L EcoBoost) .
- Disconnect the quick release coupling and remove the EVAP tube.
Refer to: Quick Release Coupling (310-00 Fuel System - General Information - 3.0L EcoBoost) .



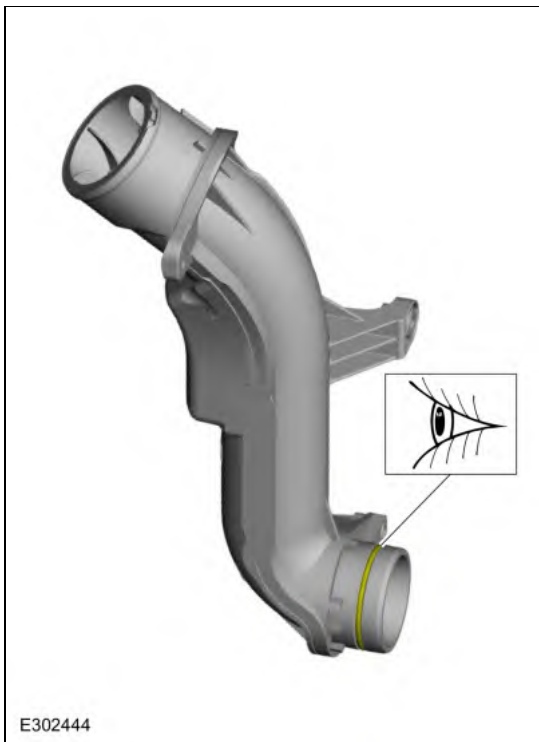
19. Remove the bolts and the A/C compressor.



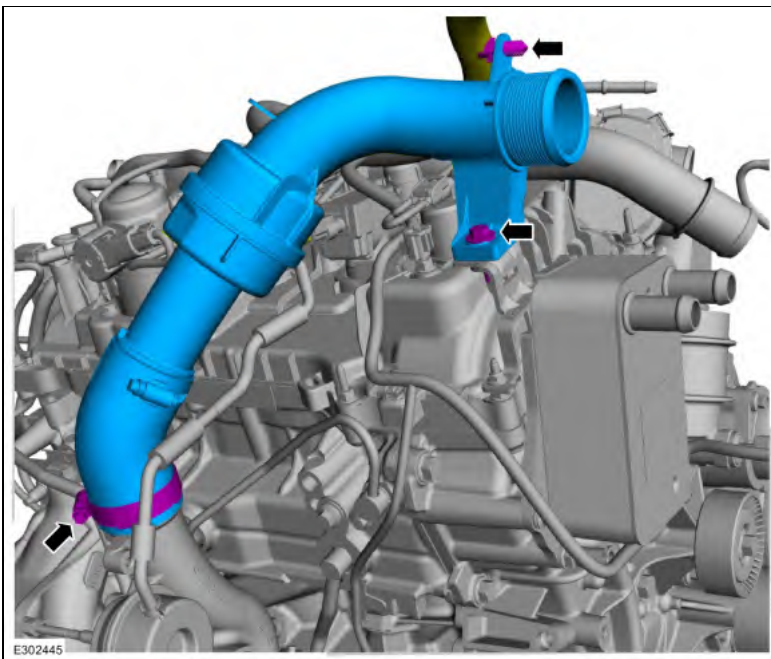
20. Remove the bolts and the air cleaner outlet pipe.



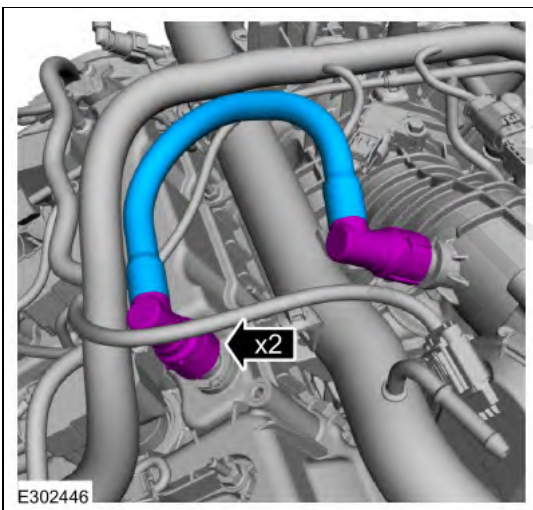
21. Inspect the O-ring seal and replace as necessary.



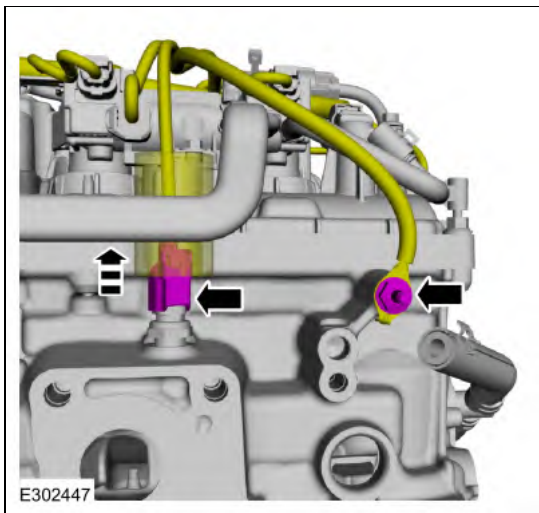
- 22.
- Detach the wiring harness retainer.
 - Remove the bolt.
 - Loosen the clamp and remove the CAC inlet pipe.



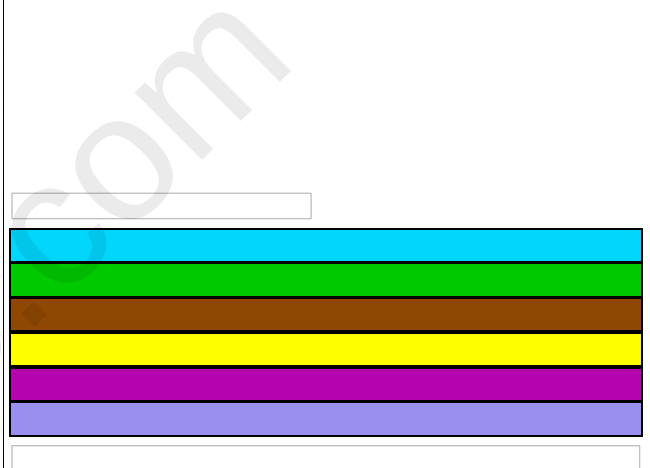
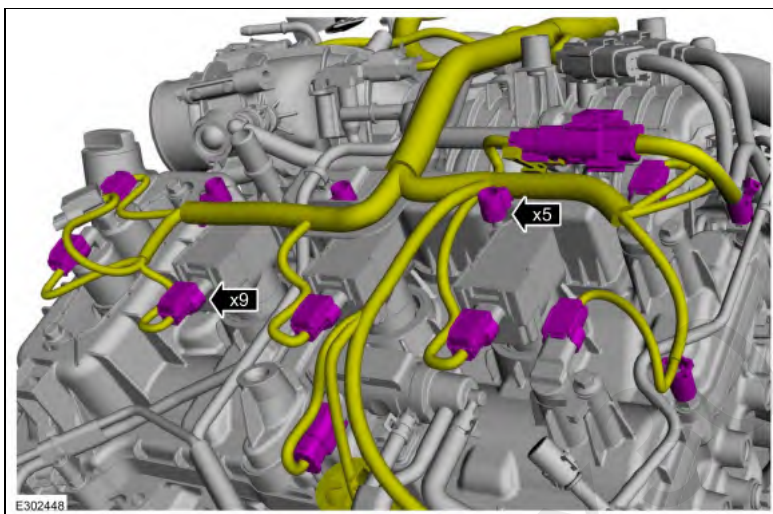
23. Disconnect the quick release couplings and remove the crankcase vent tube.
Refer to: Quick Release Coupling (310-00 Fuel System - General Information - 3.0L EcoBoost) .



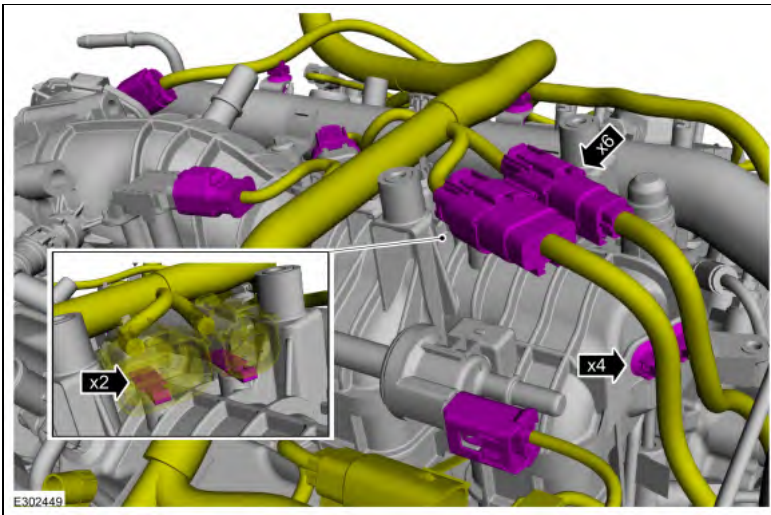
- 24.
- Remove the stud bolt and the ground wire.
 - Slide the wiring harness insulator up.
 - Disconnect the CHT electrical connector.



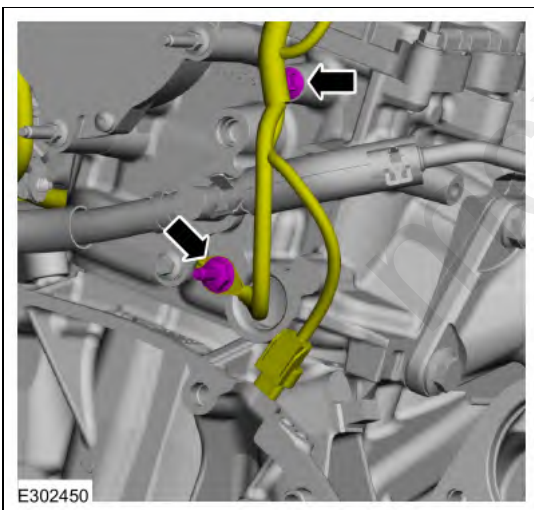
- 25.
- Disconnect the wiring harness electrical connectors.
 - Detach the wiring harness retainers.



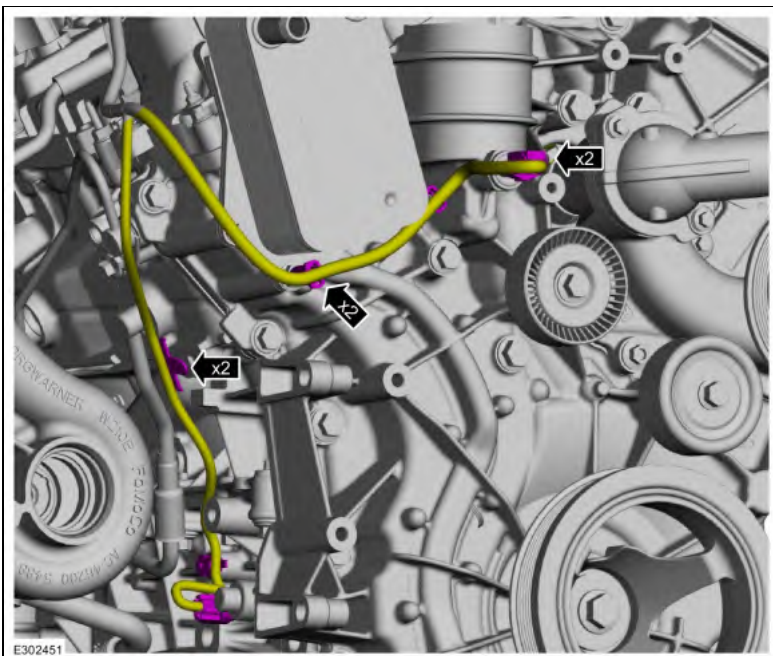
- 26.
- Disconnect the wiring harness electrical connectors.
 - Detach the wiring harness retainers.



- 27.
- Remove the stud bolt and the ground wire from the rear of the RH cylinder head.
 - Detach the wiring harness retainer.

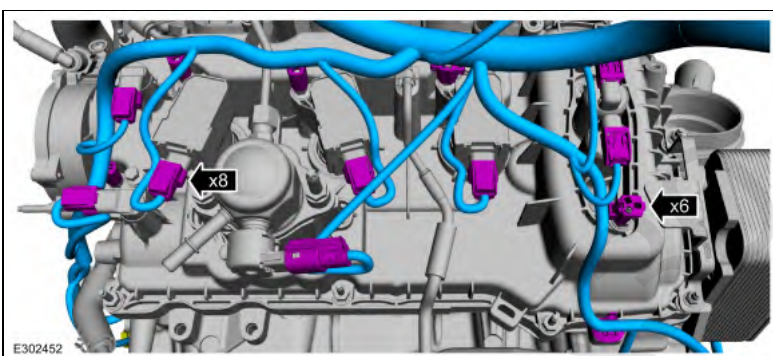


- 28.
- Disconnect the wiring harness electrical connectors.
 - Detach the wiring harness retainers.



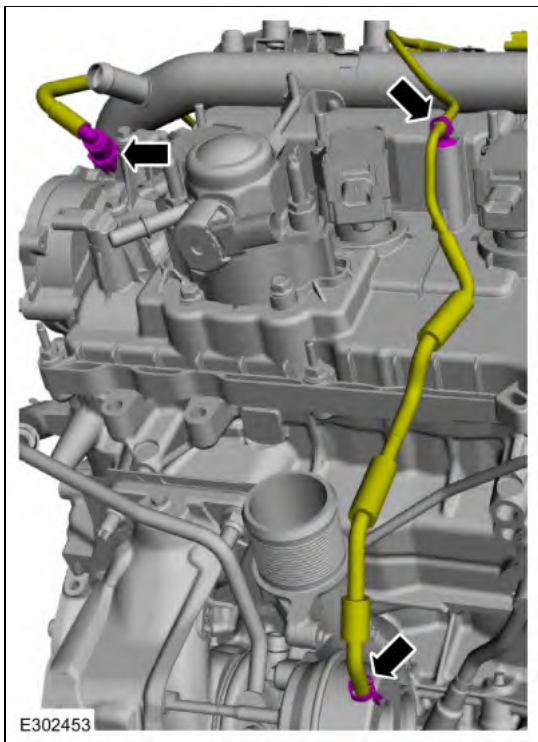
29.

- Disconnect the wiring harness electrical connectors.
- Detach the wiring harness retainers.
- Remove the wiring harness from the engine.



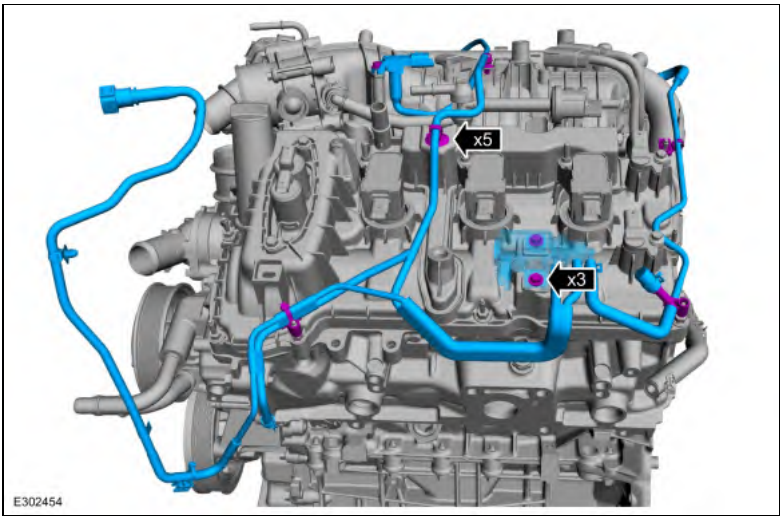
30.

- Release the clamp and disconnect the vacuum hose.
 - Detach the vacuum harness retainer.
 - Disconnect the vacuum harness quick release coupling.
- Refer to: Quick Release Coupling (310-00 Fuel System - General Information - 3.0L EcoBoost).

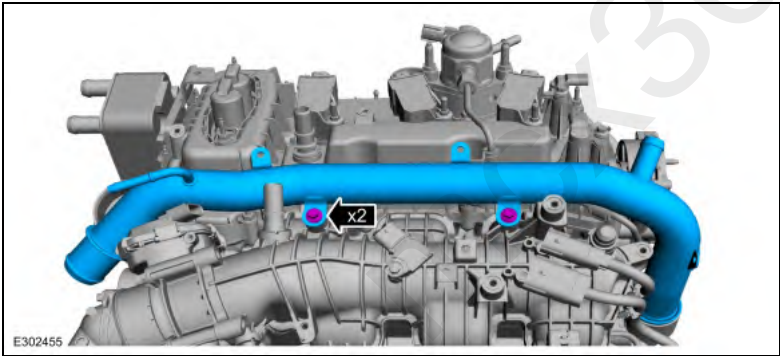


31.

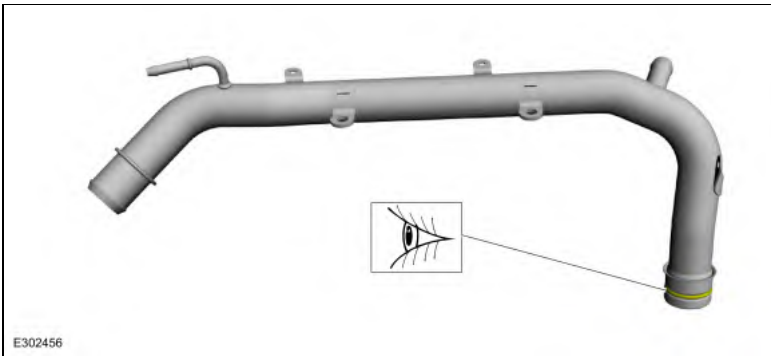
- Remove the bolts.
- Detach the vacuum harness retainers.
- Remove the vacuum harness from the engine.



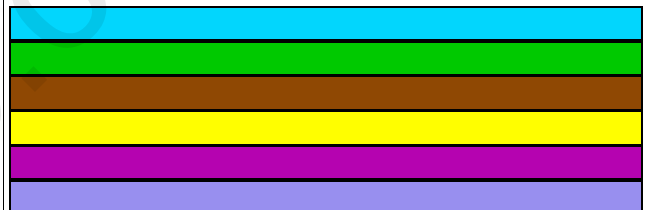
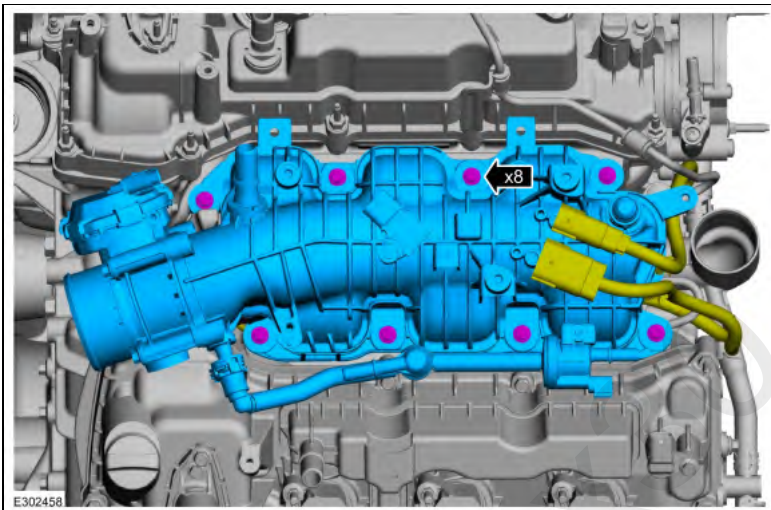
32. Remove the bolts and the coolant pipe.



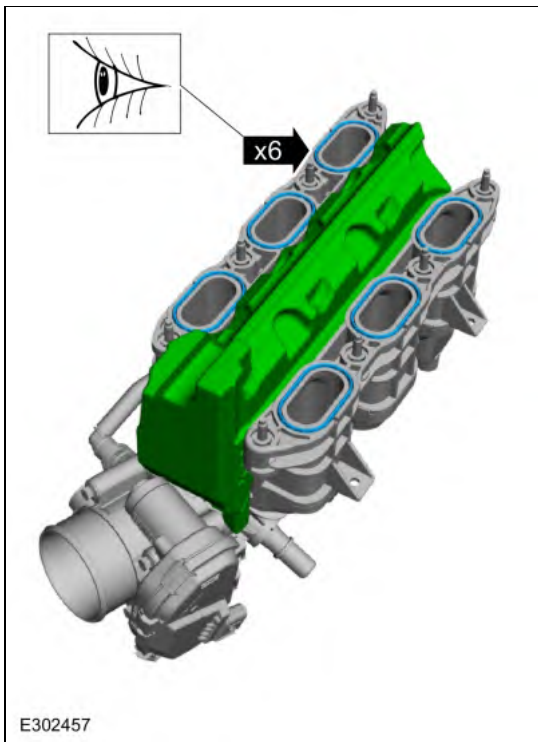
33. Inspect the O-ring seal and replace as necessary.



34. Loosen the bolts and remove the intake manifold.

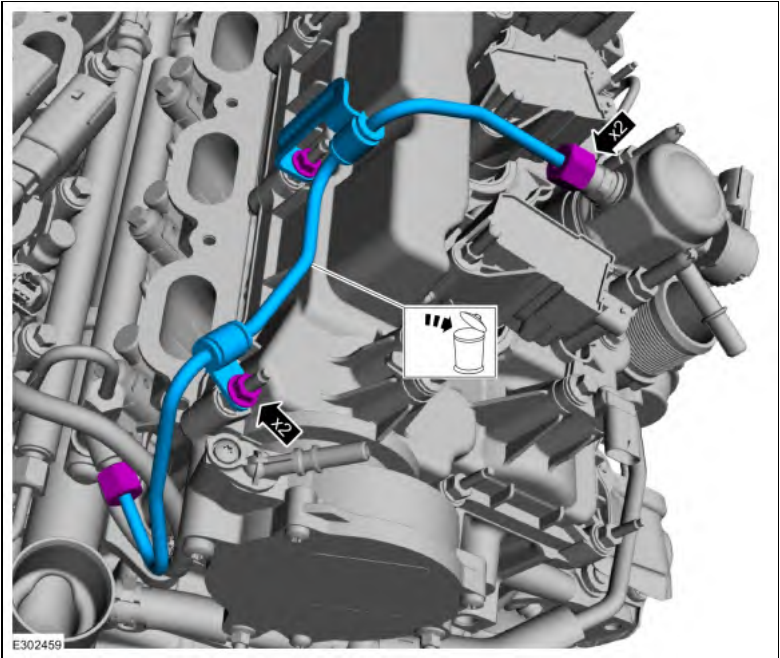


- 35.
- Remove the insulator.
 - Remove and inspect the gaskets, replace as necessary.

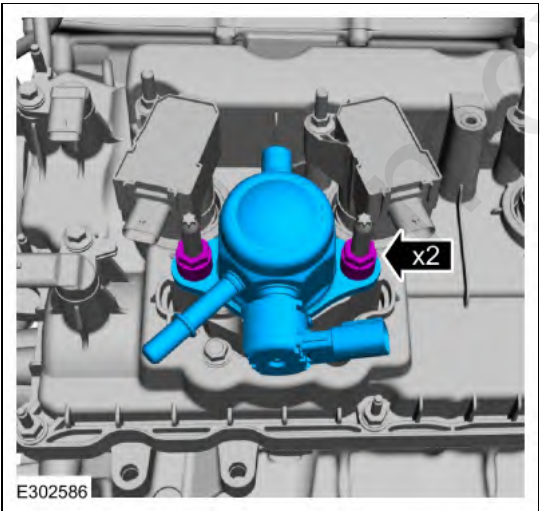


36. **NOTICE:** To release the fuel pressure in the high-pressure fuel tube, wrap the high-pressure fuel tube flare nuts with a shop towel to absorb any residual fuel pressure during the loosening of high-pressure fuel tube flare nuts.

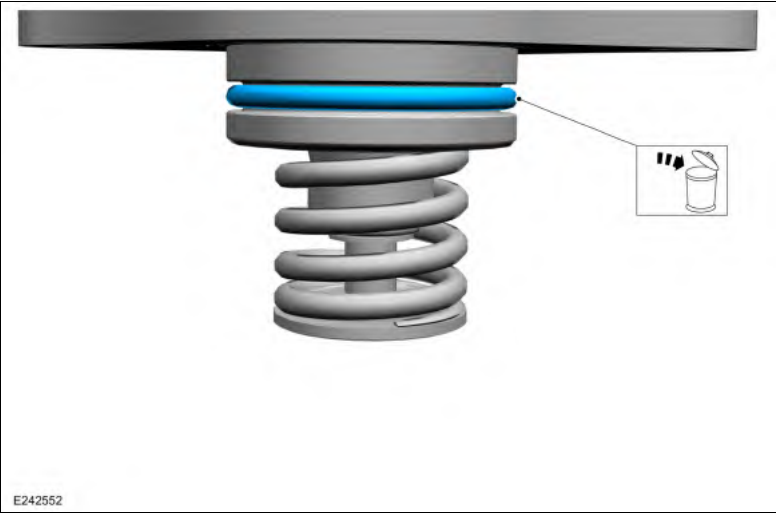
- Loosen the fuel tube flare nut fittings.
- Remove the nuts.
- Remove and discard the fuel tube.



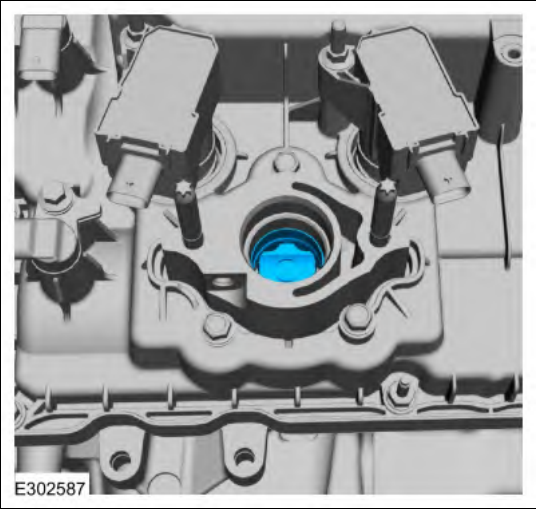
37. **NOTE:** Alternately loosen the high-pressure fuel pump nuts one revolution at a time.
Remove the nuts and the high-pressure fuel pump.



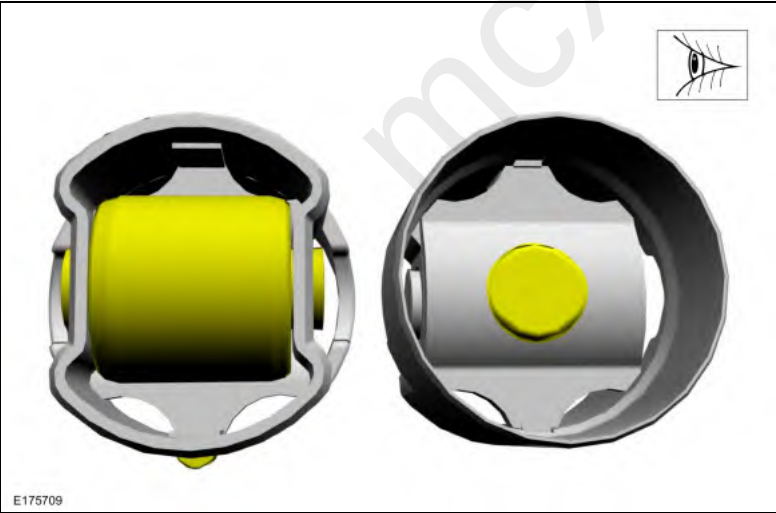
38. Remove and discard the high-pressure fuel pump O-ring seal.



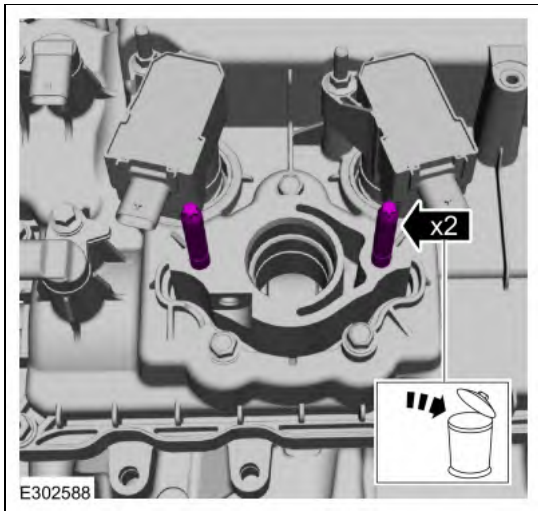
39. Remove the high-pressure fuel pump tappet.



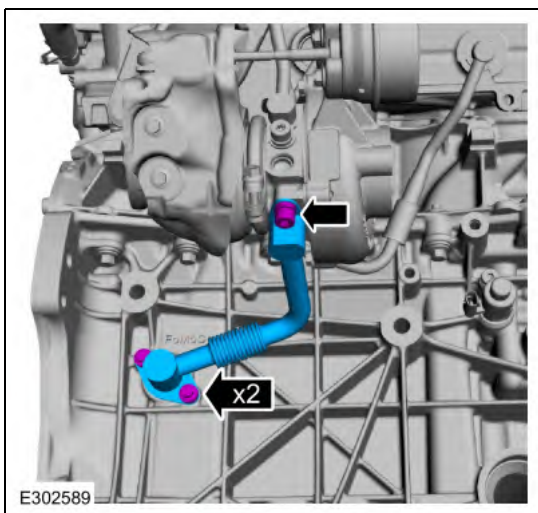
40. Inspect the high-pressure fuel pump roller tappet. If any flat spots or scoring are found, especially in the indicated areas, then inspect the high-pressure fuel pump and the high-pressure fuel pump roller tappet drive lobe. Install new components as necessary.



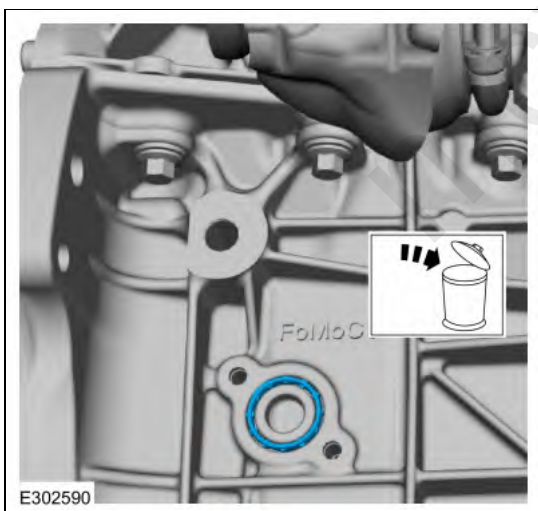
41. If damaged, remove and discard the studs.



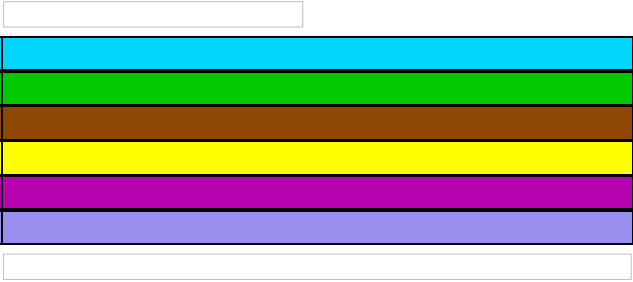
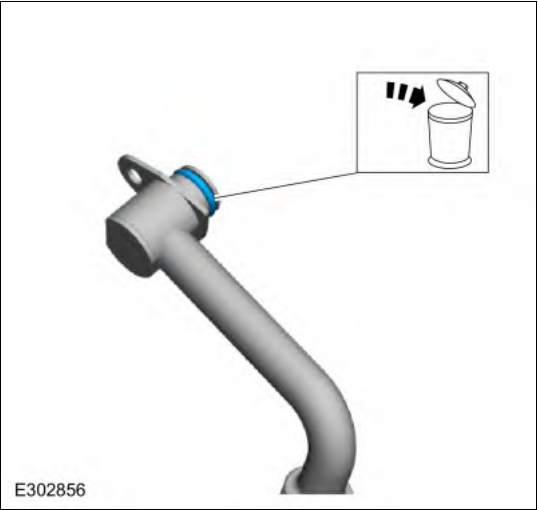
42. Remove the fasteners and the TC oil return tube.



43. Remove and discard the TC oil return tube tube-to-engine block gasket.



44. Remove and discard the TC oil return tube O-ring seal.

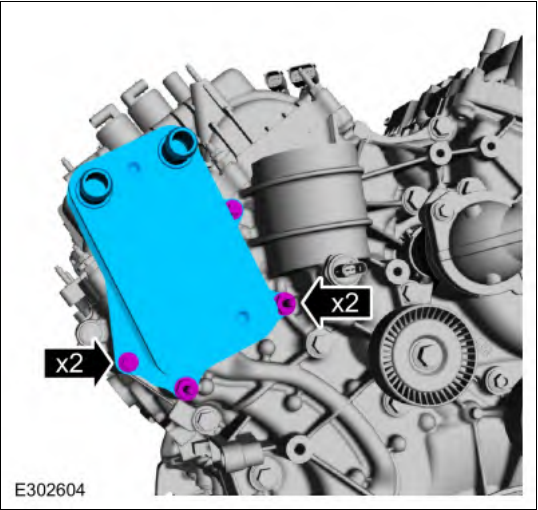


45. **NOTICE:** Inspect for blockage in the turbocharger tube. Check the tube, the sealing surfaces and the flange for flatness and damage. Ensure that the retaining bracket is not bent, check for square-ness of the retaining bracket to the O-ring area. Use brake cleaner and a NYLON brush to clean. **DO NOT USE A METAL BRUSH; DAMAGE TO SEALING AREA WILL RESULT IN LEAKS.**

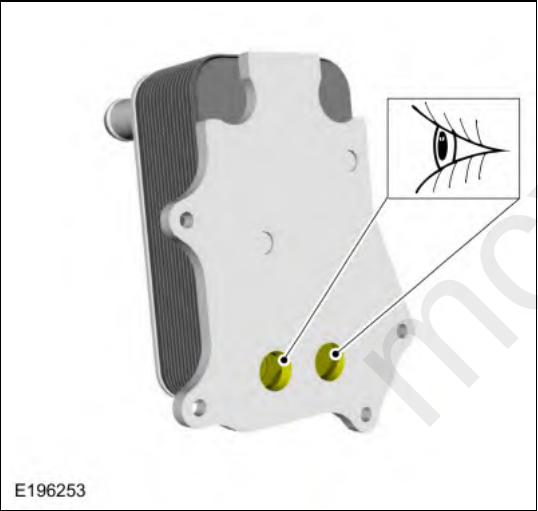
Clean and inspect the TC oil return tube.
Material: Motorcraft® Metal Brake Parts Cleaner / PM-4-A, PM-4-B



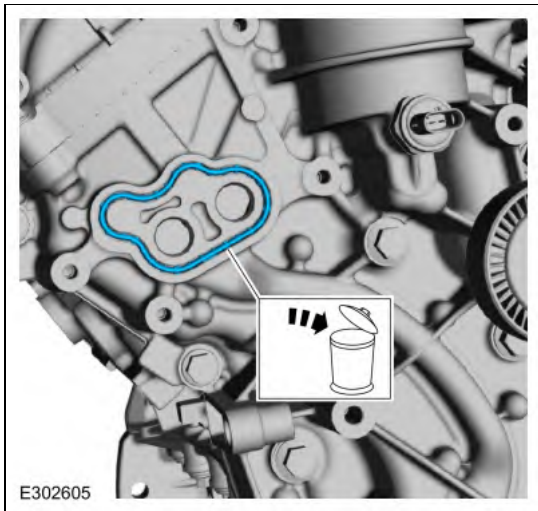
46. Remove the bolts and the oil cooler.



47. Inspect the oil cooler. If metal or aluminum material is present in the oil cooler, mechanical concerns exist. Failure to correct these concerns may cause engine failure. Refer to: Engine (303-00 Engine System- General Information, Diagnosis and Testing).

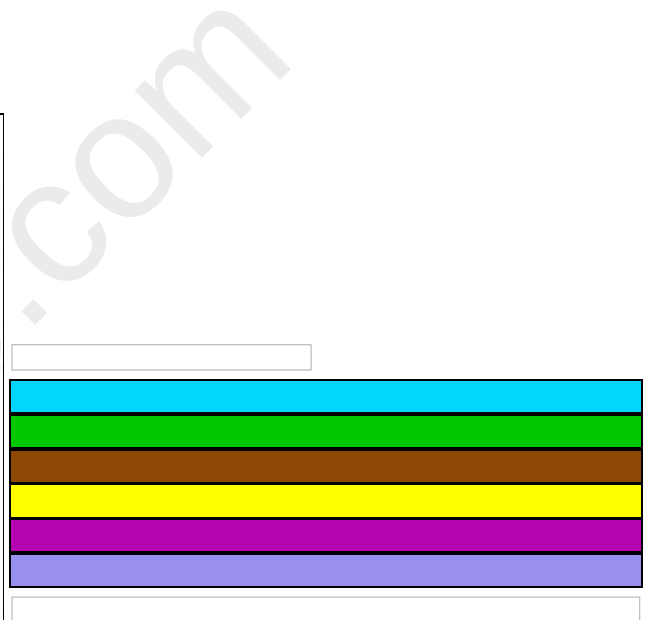
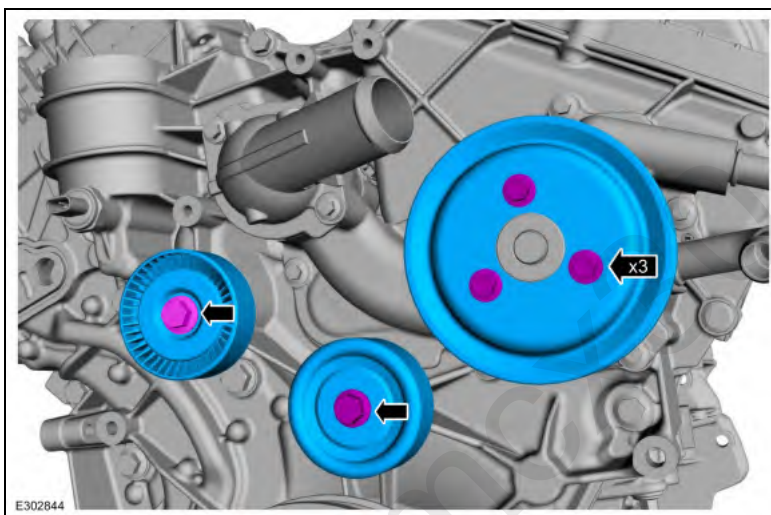


48. Remove and discard the oil cooler gasket.

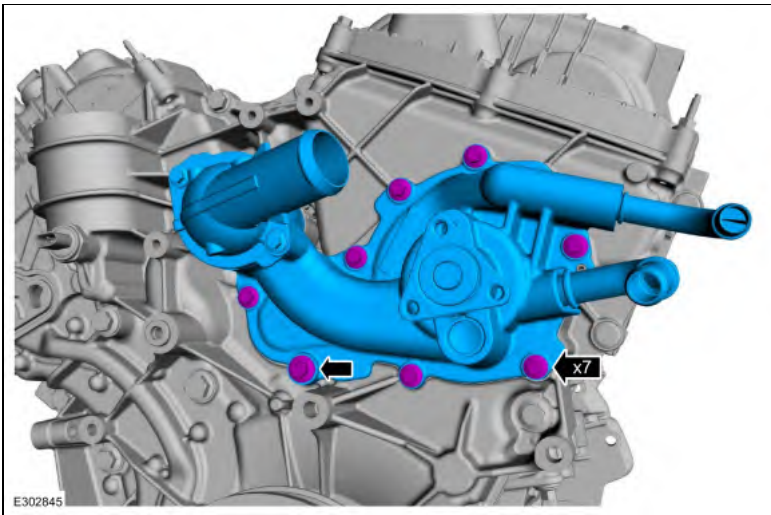


49.

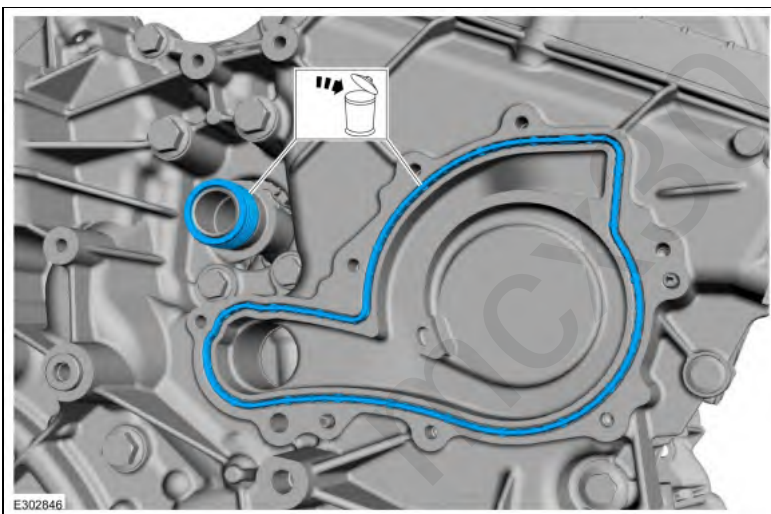
- Remove the bolts and the coolant pump pulley.
- Remove the bolt and the idler pulley.
- Remove the bolt and the idler pulley.



50. Remove the bolts and the coolant pump.

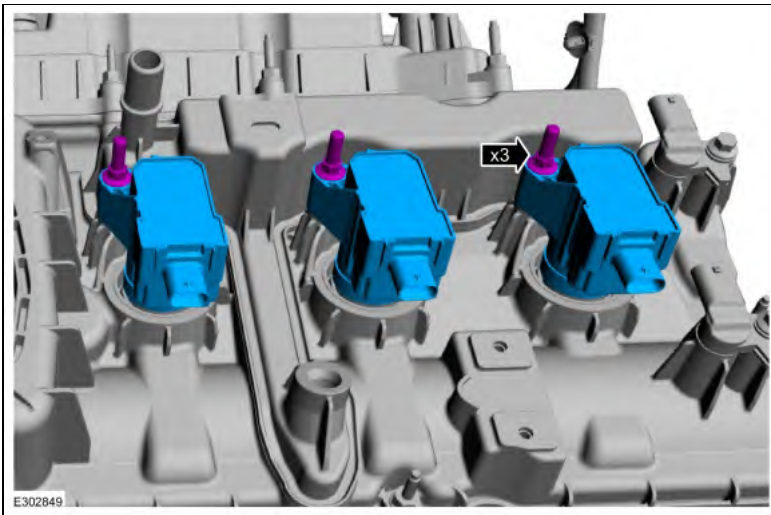


51. Remove and discard the coolant pump gasket and seal.



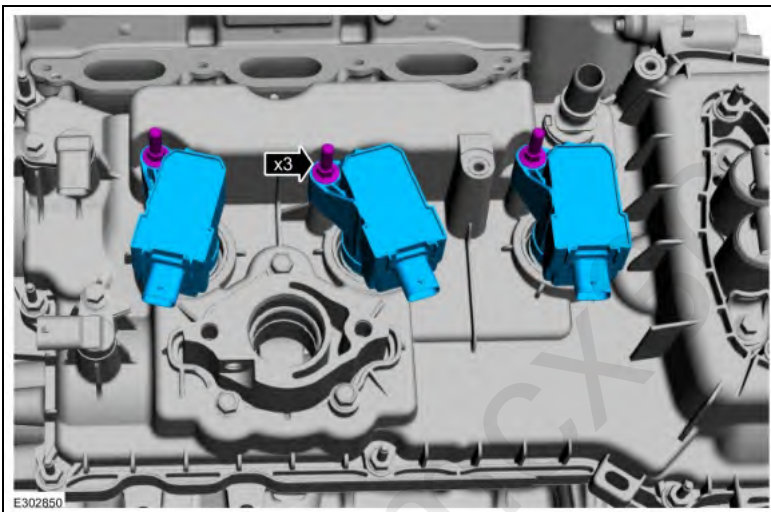
52. **NOTE:** When removing the ignition coil-on-plugs, a slight twisting motion will break the seal and ease removal.

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

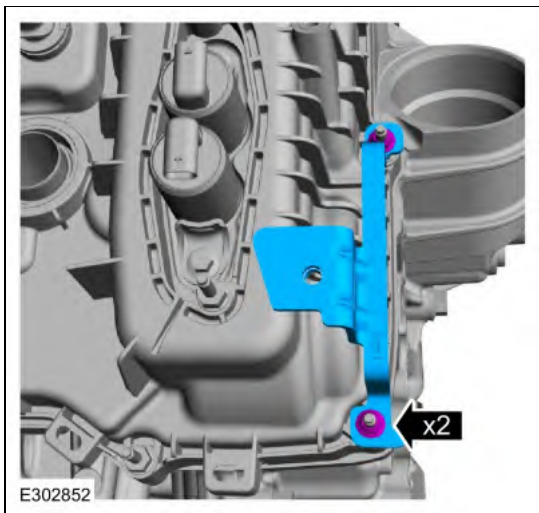


53. **NOTE:** When removing the ignition coil-on-plugs, a slight twisting motion will break the seal and ease removal.

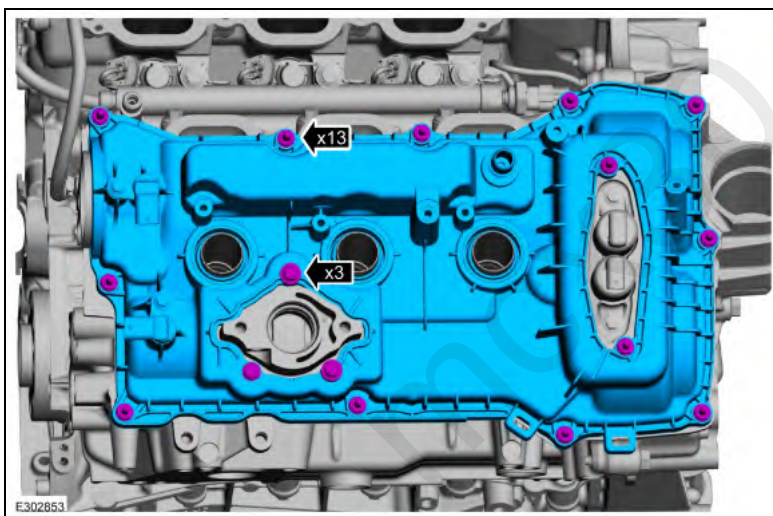
Remove the stud bolts and the RH ignition coil-on-plugs.



54. Remove the nuts and the bracket.

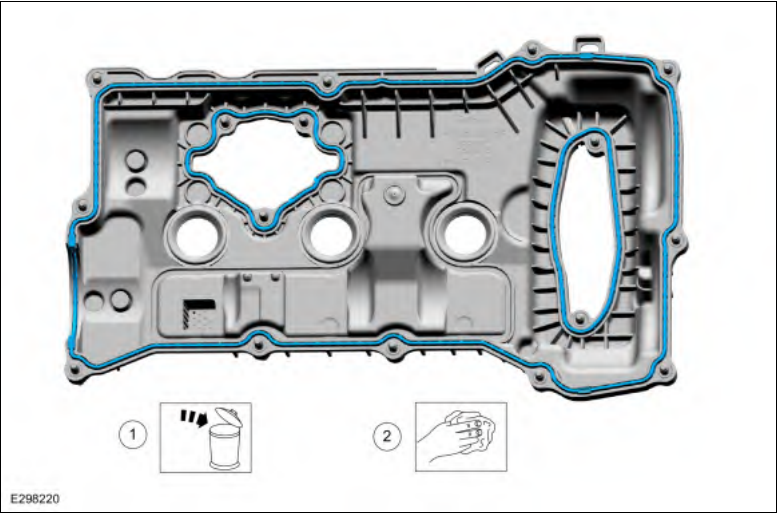


55. Loosen the fasteners and remove the valve cover.

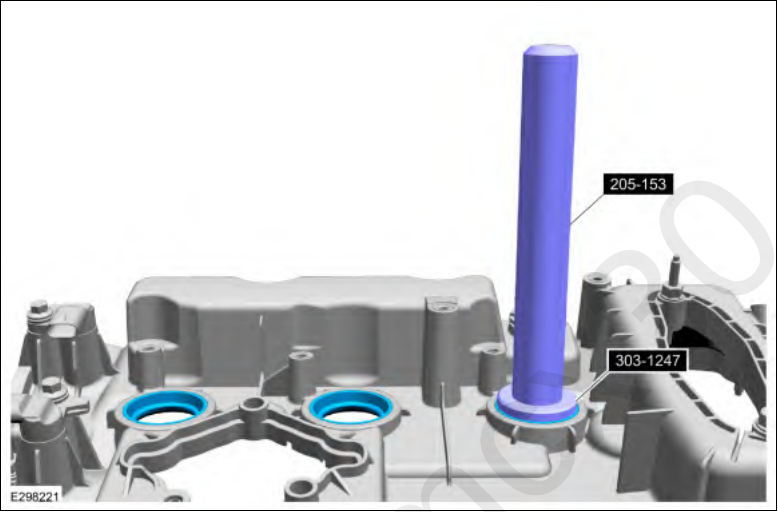


56.

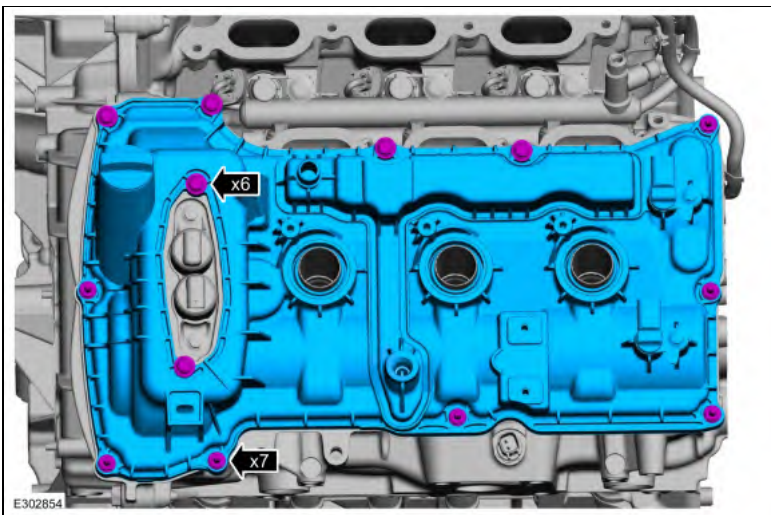
1. Remove and discard the gaskets.
2. Clean the valve cover gasket groove with soap and water or a suitable solvent.



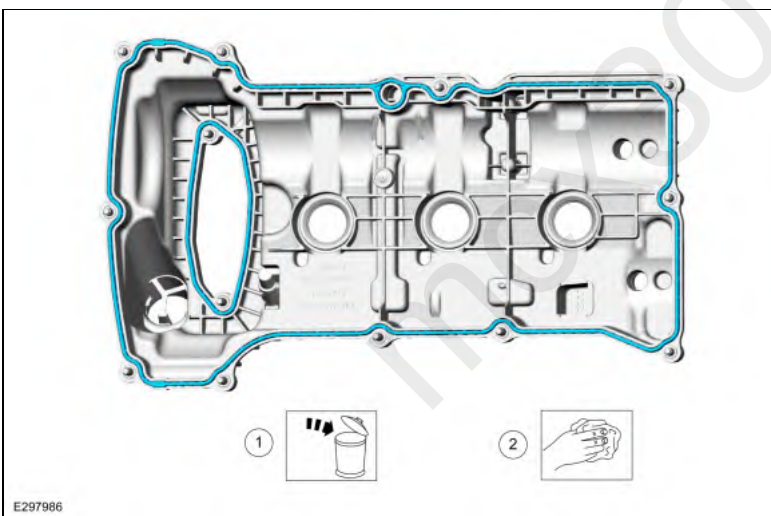
57. Inspect the spark plug seals. Remove any damaged seals using the special tools.
Use Special Service Tool: 205-153 (T80T-4000-W) Handle. , 303-1247 VCT Spark Plug Tube Seal Remover and Installer.



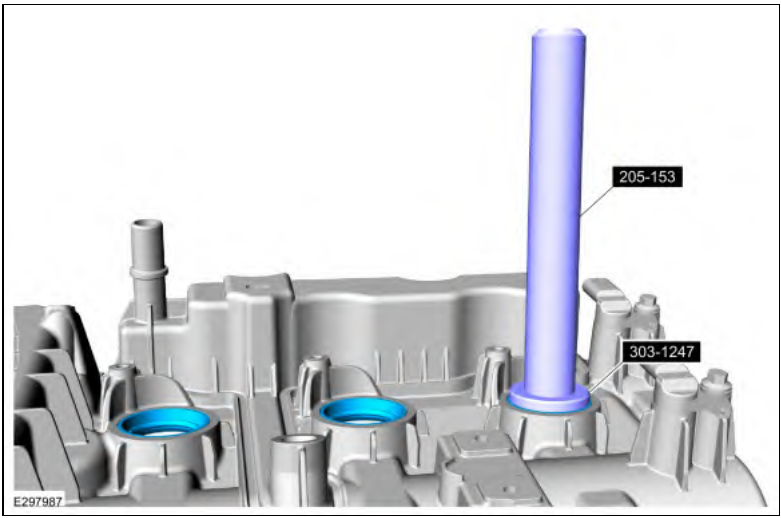
58. Loosen the fasteners and remove the valve cover.



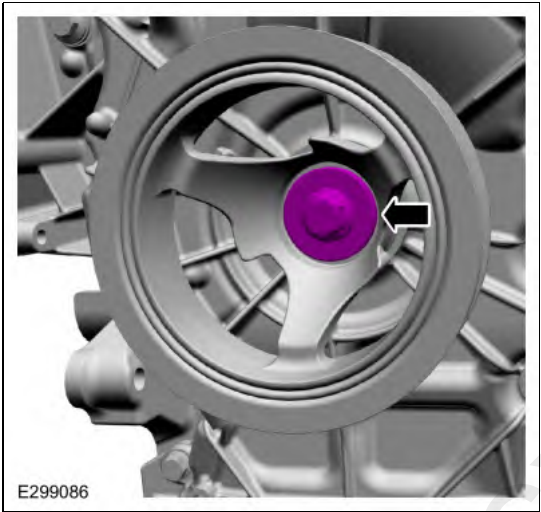
- 59.
1. Remove and discard the gaskets.
 2. Clean the valve cover gasket groove with soap and water or a suitable solvent.



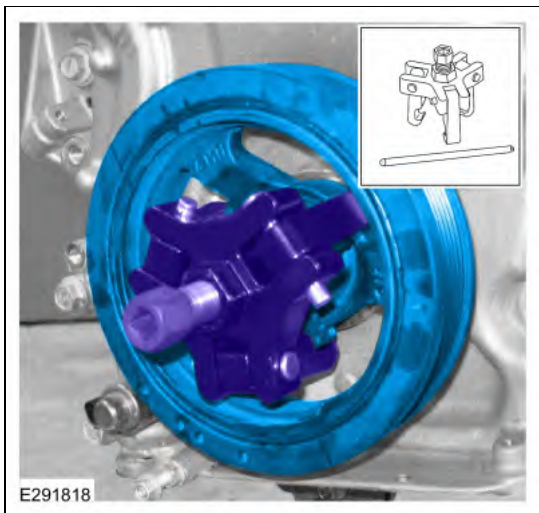
60. Inspect the spark plug seals. Remove any damaged seals using the special tools.
 Use Special Service Tool: 205-153 (T80T-4000-W) Handle. , 303-1247 VCT Spark Plug Tube Seal Remover and Installer.



61. Remove the crankshaft pulley bolt.



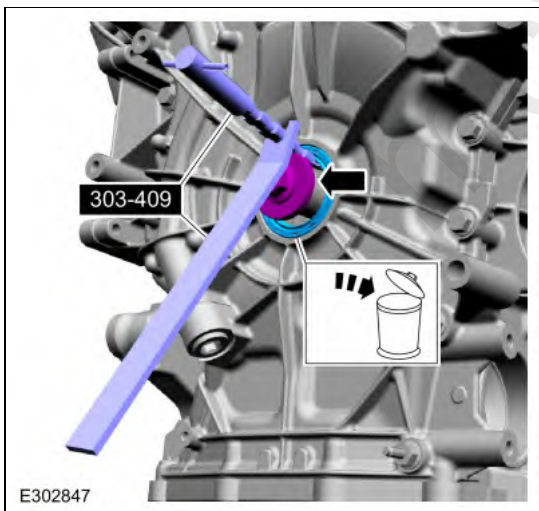
62. **NOTE:** Use a universal puller (such as an OTC 6667, or equivalent).
Using a universal puller, remove the crankshaft pulley.



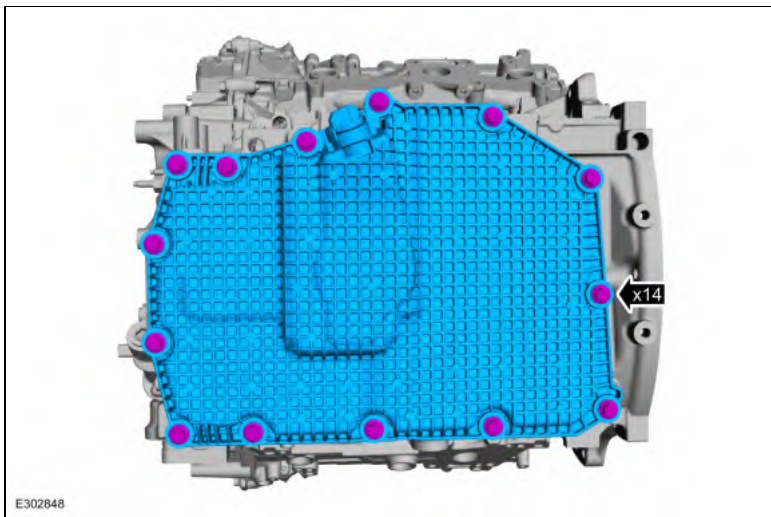
63. **NOTICE:** Use care not to damage the engine front cover or the crankshaft when removing the seal.

1. Install the crankshaft pulley bolt.
2. Using the special tool, remove and discard the crankshaft front oil seal.
Use Special Service Tool: 303-409 (T92C-6700-CH) Remover, Crankshaft Seal.
3. **NOTE:** Retain the original crankshaft pulley bolt for turning the crankshaft while the pulley is removed.

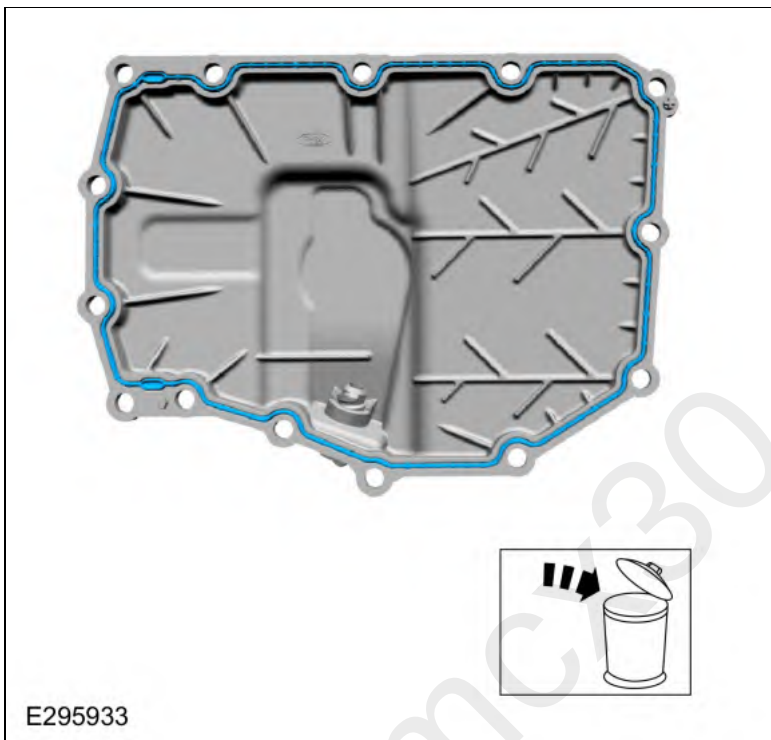
Remove the crankshaft pulley bolt.



64. Remove the bolts and the oil pan.

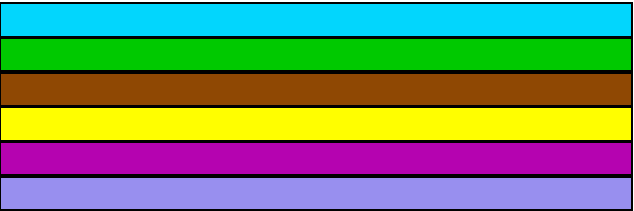
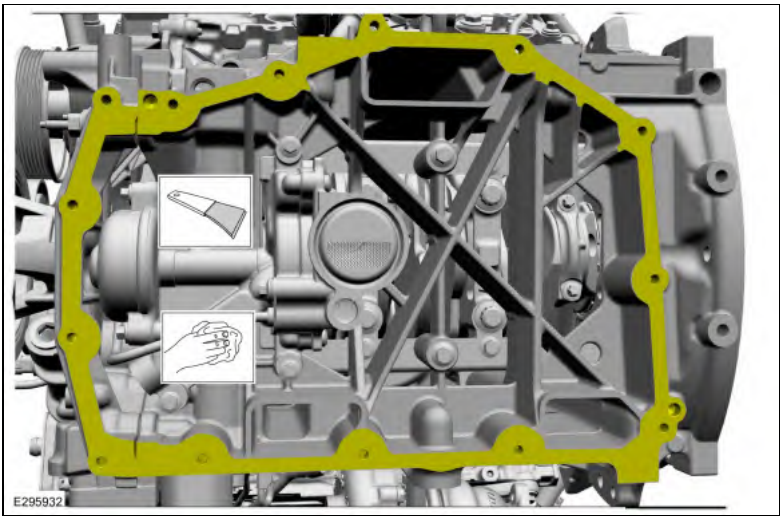


65. Remove and discard the oil pan gasket.



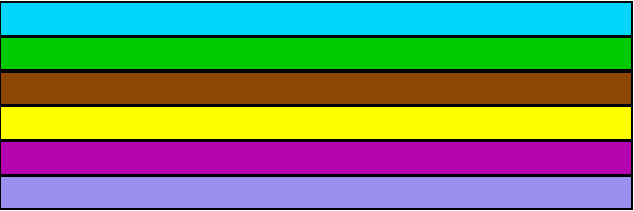
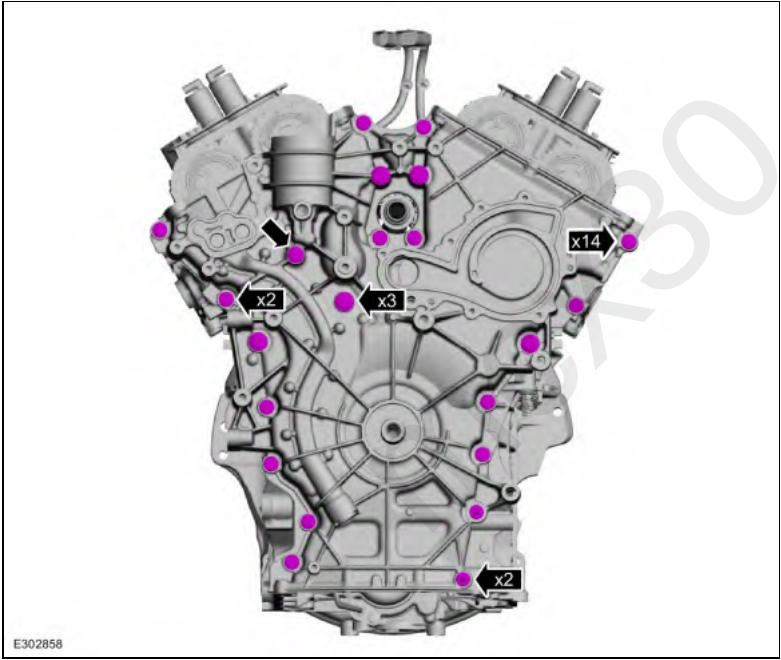
66. **NOTICE: Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools cause scratches and gouges, which make leak paths. Use a plastic scraping tool to remove traces of sealant.**

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

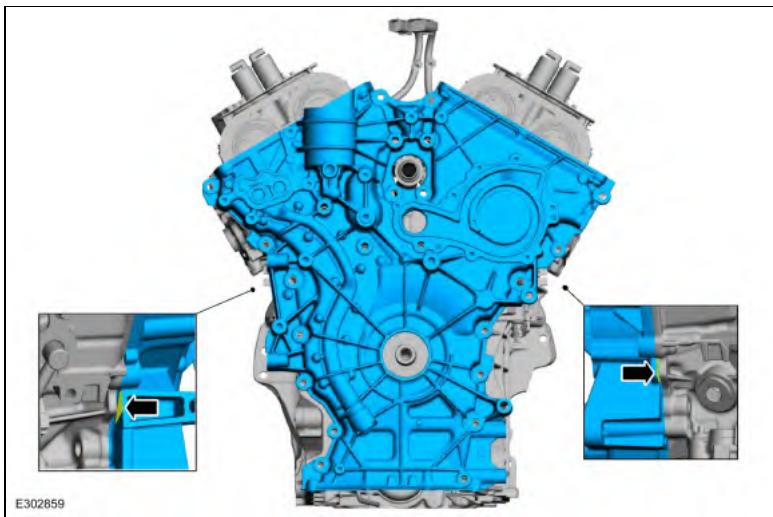


67. **NOTE:** There are 5 different types of fasteners, note location of each fastener for assembly.

Remove the engine front cover fasteners.



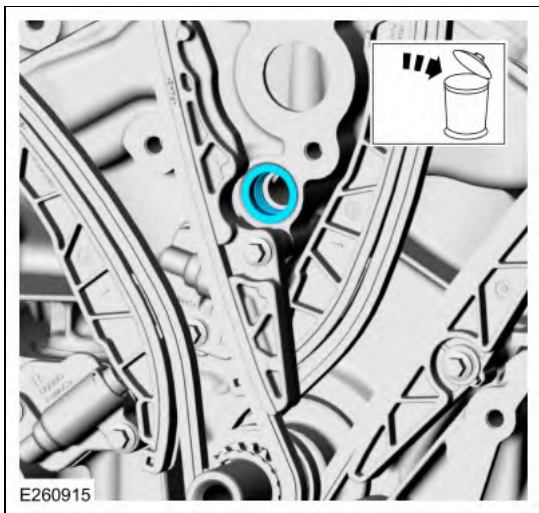
68. Using a large flat-bladed screwdriver and the indicated pry pads, release the sealer and remove the engine front cover.
Use the General Equipment: Flat-Bladed Screwdriver



69. Remove and discard the engine front cover gaskets.

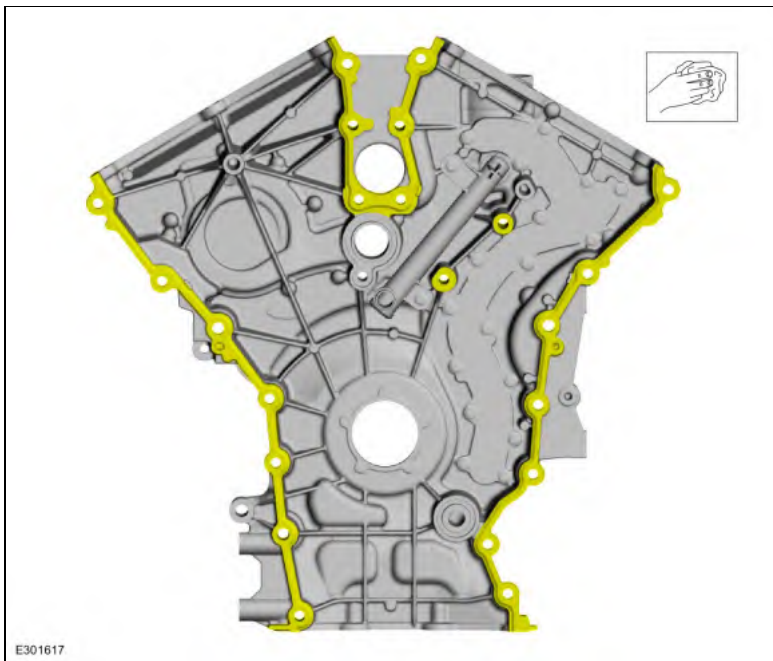


70. Remove and discard the oil gallery seal (6G068).



71. **NOTICE:** Only use a 3M[®], Roloc[®] Bristle Disk (2-in white, part number 07528) to clean the engine front cover. Do not use metal scrapers, wire brushes or any other power abrasive disk to clean front cover.

- Clean the engine front cover using a 3M[®], Roloc[®] Bristle Disk (2-in white, part number 07528) in a suitable tool turning at the recommended speed of 15,000 rpm.
Refer to: RTV Sealing Surface Cleaning and Preparation (303-00 Engine System - General Information, General Procedures).
- Thoroughly wash the engine front cover to remove any foreign material, including any abrasive particles created during the cleaning process.
Material: Motorcraft[®] Silicone Gasket Remover / ZC-30-A
Material: Motorcraft[®] Metal Brake Parts Cleaner / PM-4-A, PM-4-B
Material: Motorcraft[®] Metal Surface Prep Wipes / ZC-31-B



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

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

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

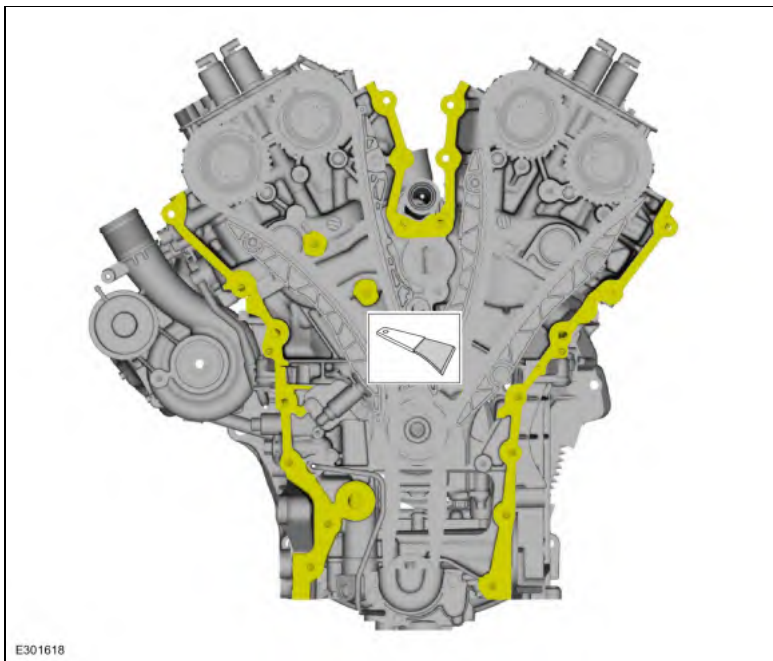
Refer to: RTV Sealing Surface Cleaning and Preparation (303-00 Engine System - General Information, General Procedures).

Use the General Equipment: Plastic Scraper

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

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

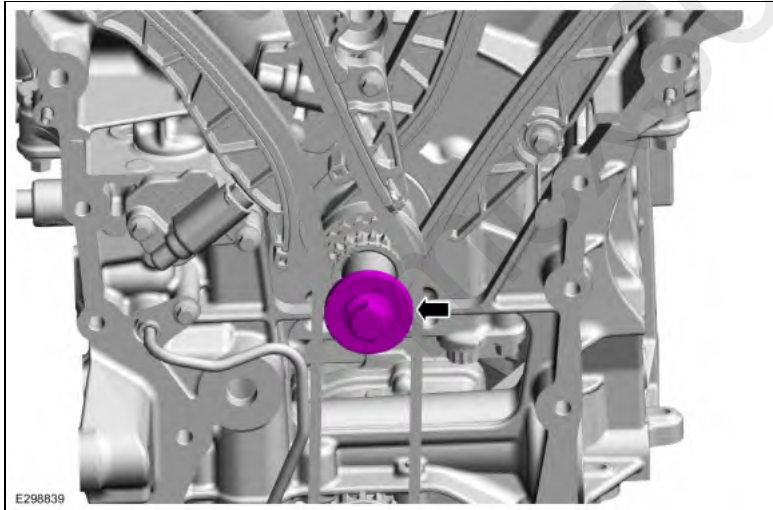
Material: Motorcraft[®] Metal Surface Prep Wipes / ZC-31-B

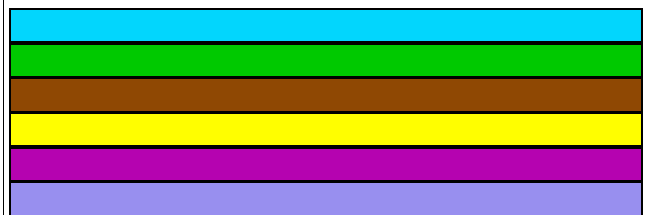




73. **NOTICE:** Rotate the crankshaft utilizing only the original crankshaft pulley bolt. Failure to follow this direction may cause damage to the crankshaft and result in engine failure.

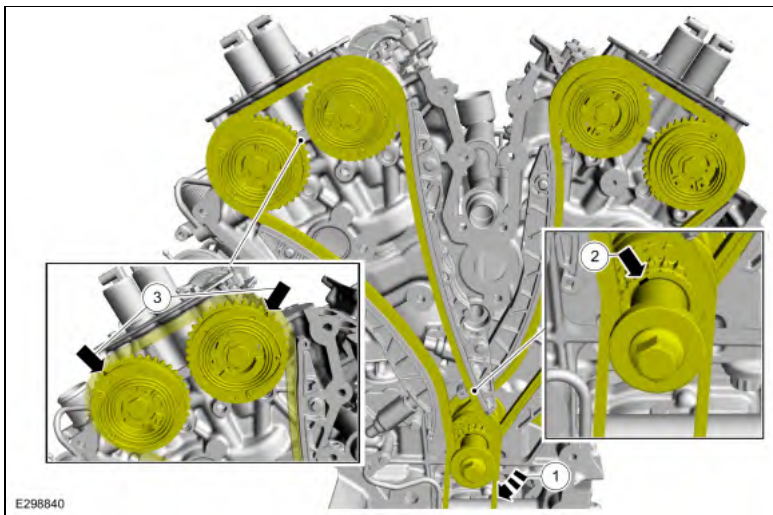
Install the original crankshaft pulley bolt.



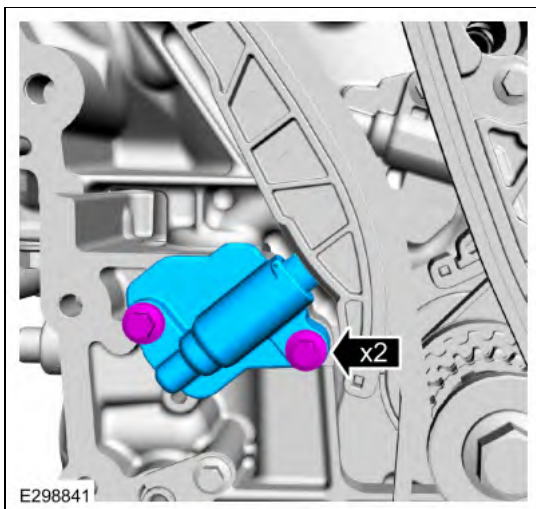


74. **NOTICE:** The VCT units have 2 timing marks on them, a triangle and a circle. For removal and installation of the RH side the triangle marks are used.

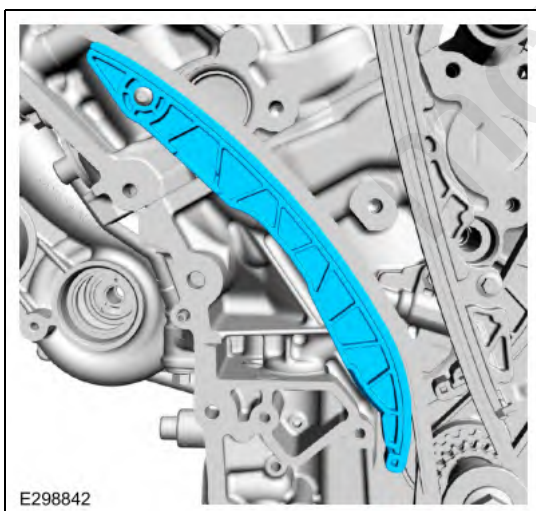
1. Rotate the crankshaft clockwise.
2. Position the crankshaft sprocket keyway at the 11 o'clock position.
3. Verify the **triangle** timing marks on the VCT units are at the 2 o'clock (intake) and 11 o'clock (exhaust) positions. If the **circle** timing marks are at these positions the crankshaft must be turned clockwise one revolution (360 degrees).



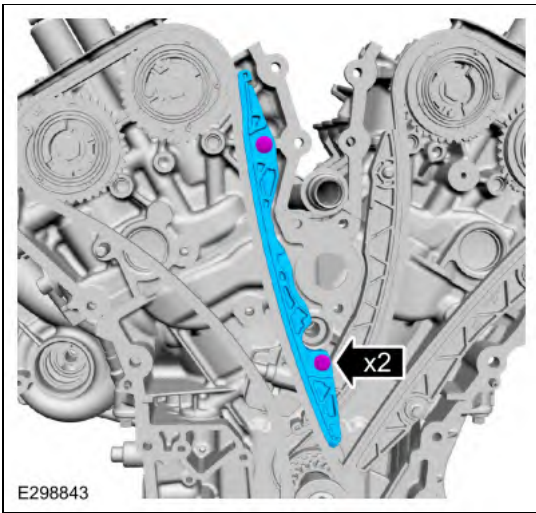
75. Remove the bolts and the RH timing chain tensioner.



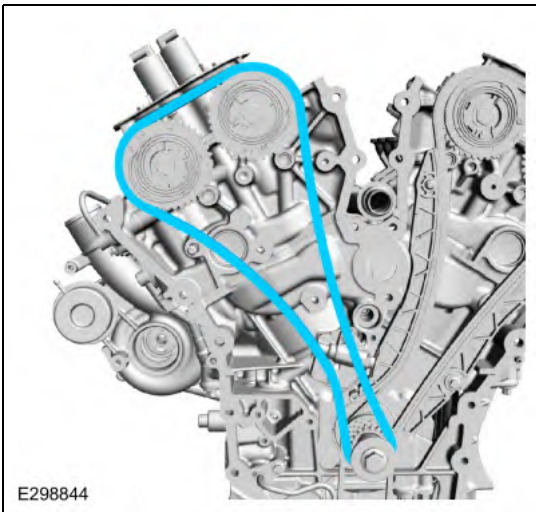
76. Remove the RH timing chain tensioner arm.



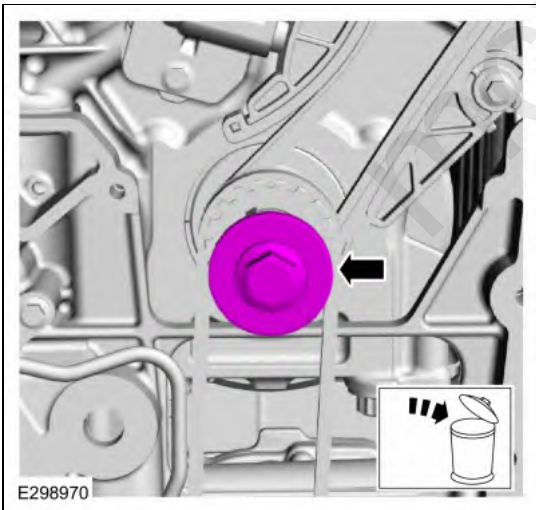
77. Remove the bolts and the RH timing chain guide.



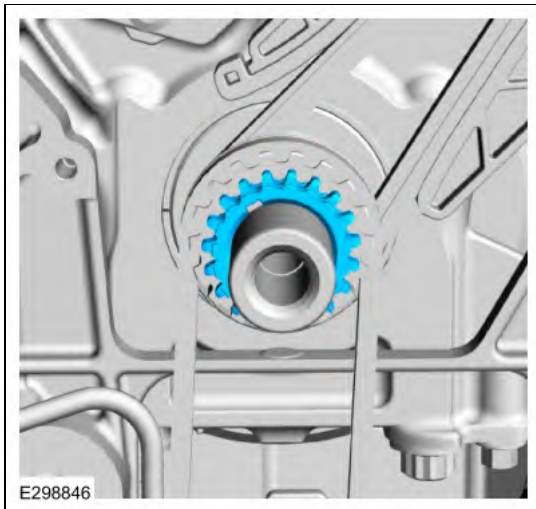
78. Remove the RH timing chain.



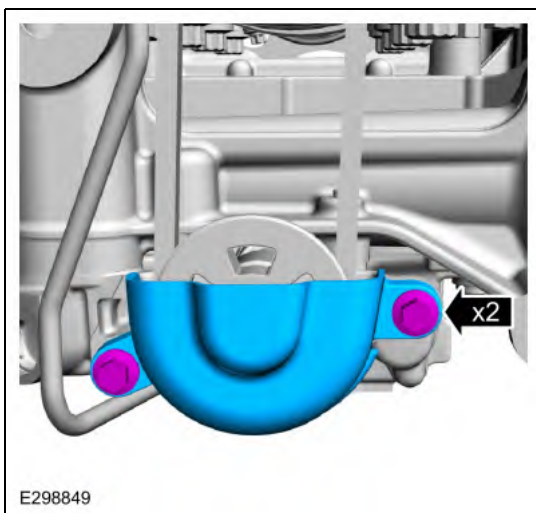
79. Remove and discard the crankshaft pulley bolt.



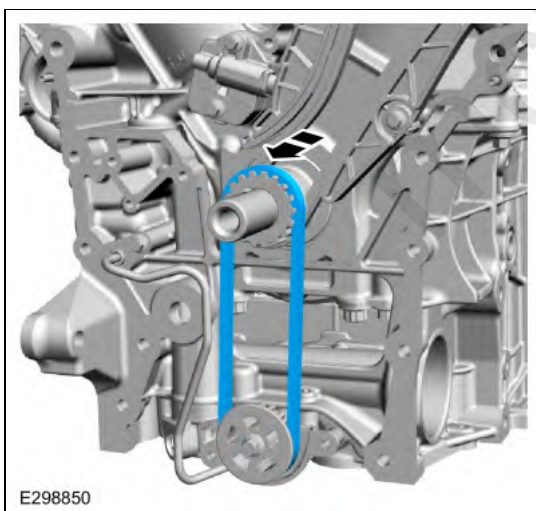
80. Remove the timing chain sprocket.



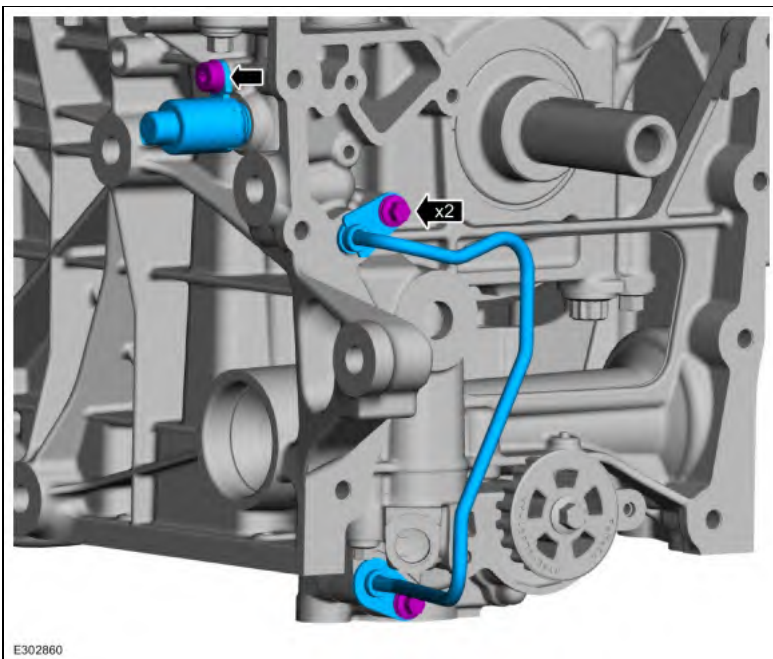
81. Remove the bolts and the splash shield.



82. Slide the oil pump drive belt off of the crankshaft sprocket and remove the belt.



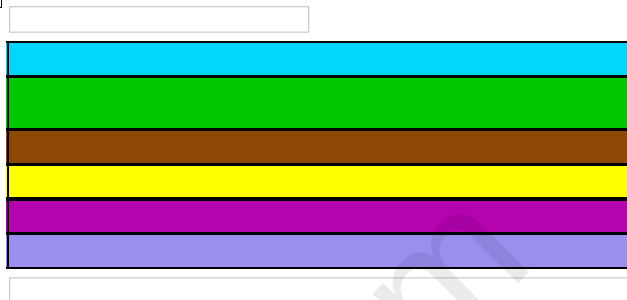
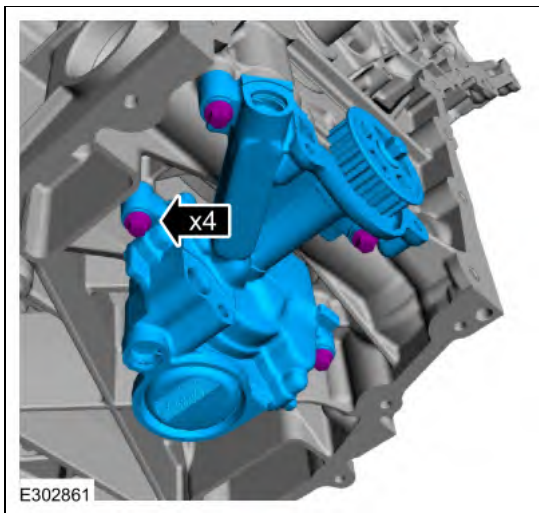
- 83.
- Remove the bolts and the oil return tube,
 - Remove the bolt and the oil control solenoid.



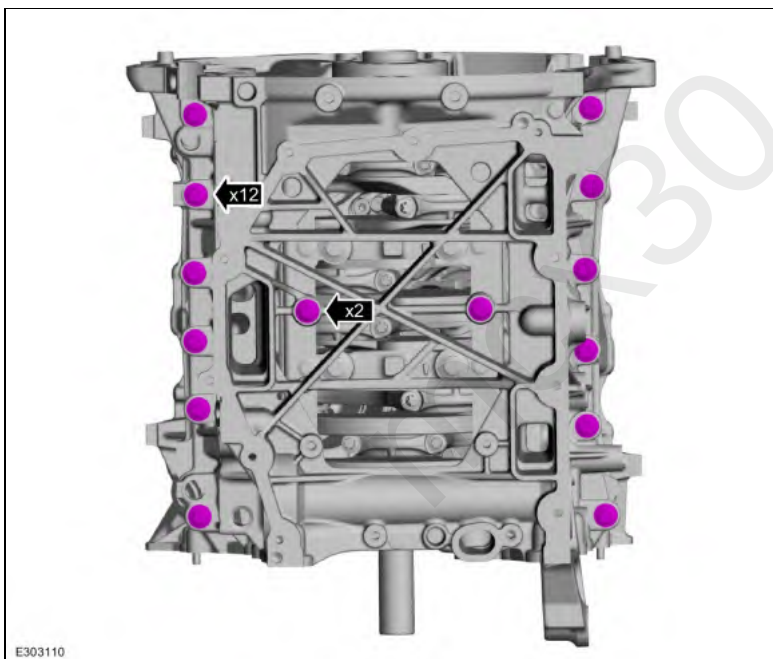
84. Remove and discard the O-ring seals.



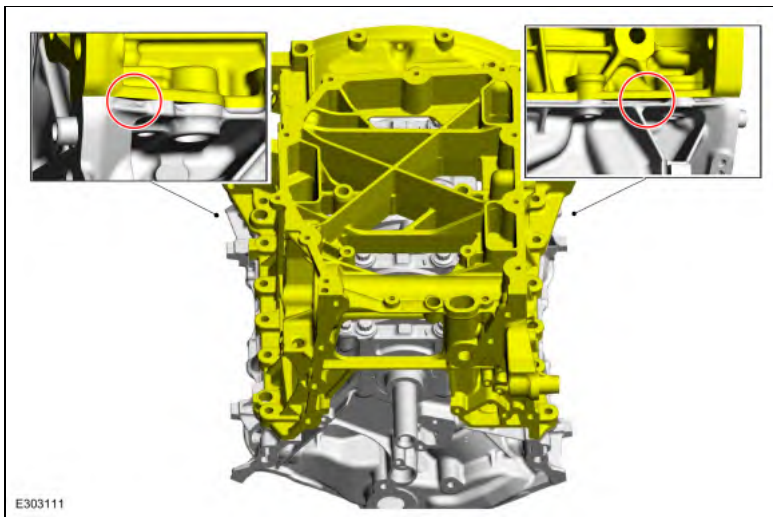
85. Remove the bolts and the oil pump.



86. Remove the engine block skirt stiffener bolts.

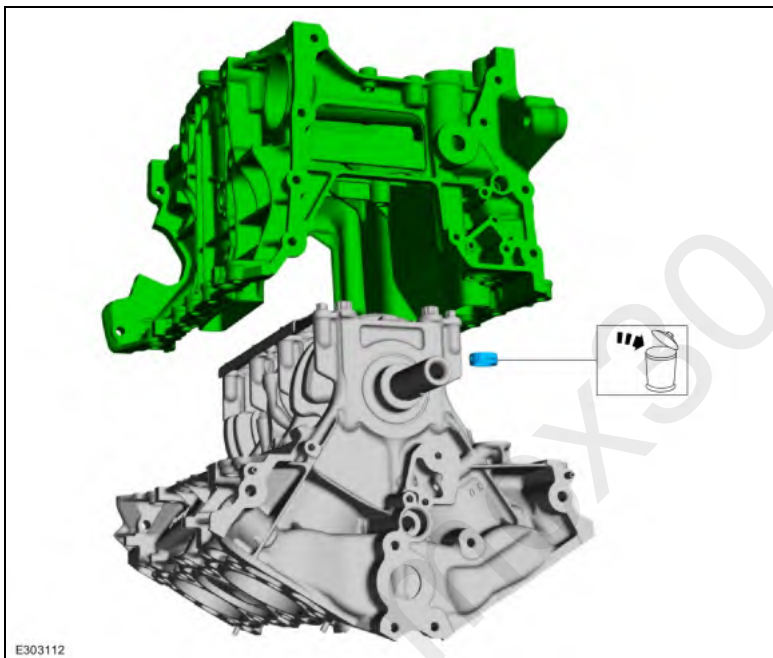


87. Using a suitable pry bar at the pry pad locations, release the engine block skirt stiffener-to-engine block seal.



88.

- Remove the engine block skirt stiffener.
- Remove and discard the oil seal.



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

Clean and inspect the mating surfaces.

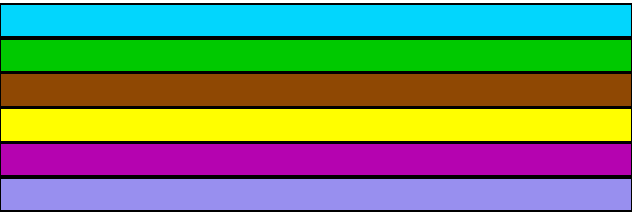
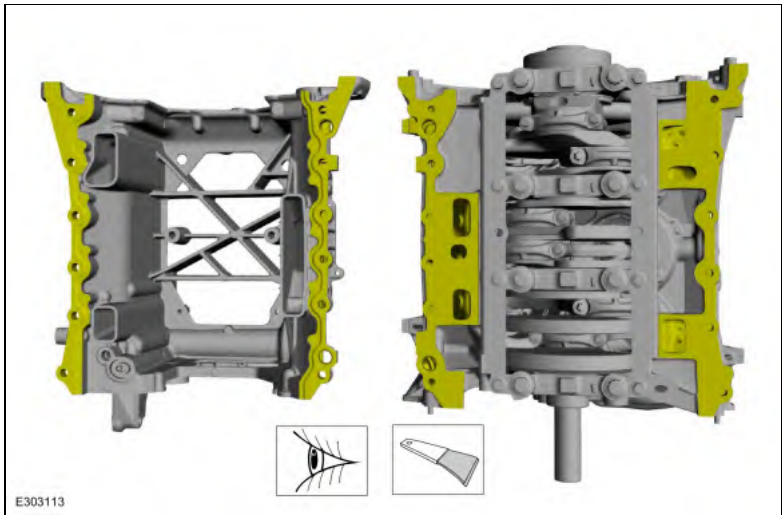
Refer to: RTV Sealing Surface Cleaning and Preparation (303-00 Engine System - General Information, General Procedures).

Use the General Equipment: Plastic Scraper

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

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

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



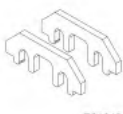
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Disassembly

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Engine

Special Tool(s) / General Equipment

 E133913	205-153 (T80T-4000-W) Handle
 E175042	303-1246 Engine Spreader Bar TKIT-2006UF-FLM TKIT-2006UF-ROW
 E175042	303-1247 VCT Spark Plug Tube Seal Remover and Installer TKIT-2006UF-FLM TKIT-2006UF-ROW
 E216421	303-1248 Camshaft holding tools TKIT-2006UF-FLM TKIT-2006UF-ROW
 E188625	303-1634 Lift Eyes (2) TKIT-2014D-ROW3 TKIT-2014D-FL_ROW
 E302614	303-1696 Cam Comb Tool Study
 E134603	303-409 (T92C-6700-CH) Remover, Crankshaft Seal TKIT-1992-FH/FMH/FLMH TKIT-1993-LMH/MH
Floor Crane	
Mounting Stand	
Plastic Scraper	
Flat-Bladed Screwdriver	

Materials

Name	Specification
Motorcraft® Silicone Gasket Remover ZC-30-A	-
Motorcraft® Metal Surface Prep Wipes ZC-31-B	-
Motorcraft® Metal Brake Parts Cleaner PM-4-A, PM-4-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, can cause engine failure.

NOTICE: The turbocharger compressor vanes can be damaged by even the smallest particles. When removing any turbocharger or engine air intake system component, ensure that no debris enters the system. Failure to do so may result in damage to the turbocharger.

NOTICE: Remove the cylinder heads before removing the crankshaft. Failure to do so can result in engine damage.

NOTE: If the components are to be reinstalled, they must be installed in their original location. Mark the components for installation into their original location.

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

1. Remove the bolts and the flexplate.