

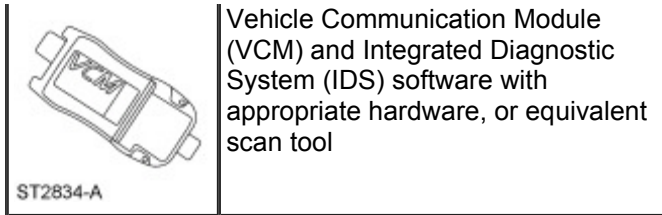
303-01A Engine — 3.5L
IN-VEHICLE REPAIR

2011 Edge, MKX
Procedure revision date: 02/02/2011

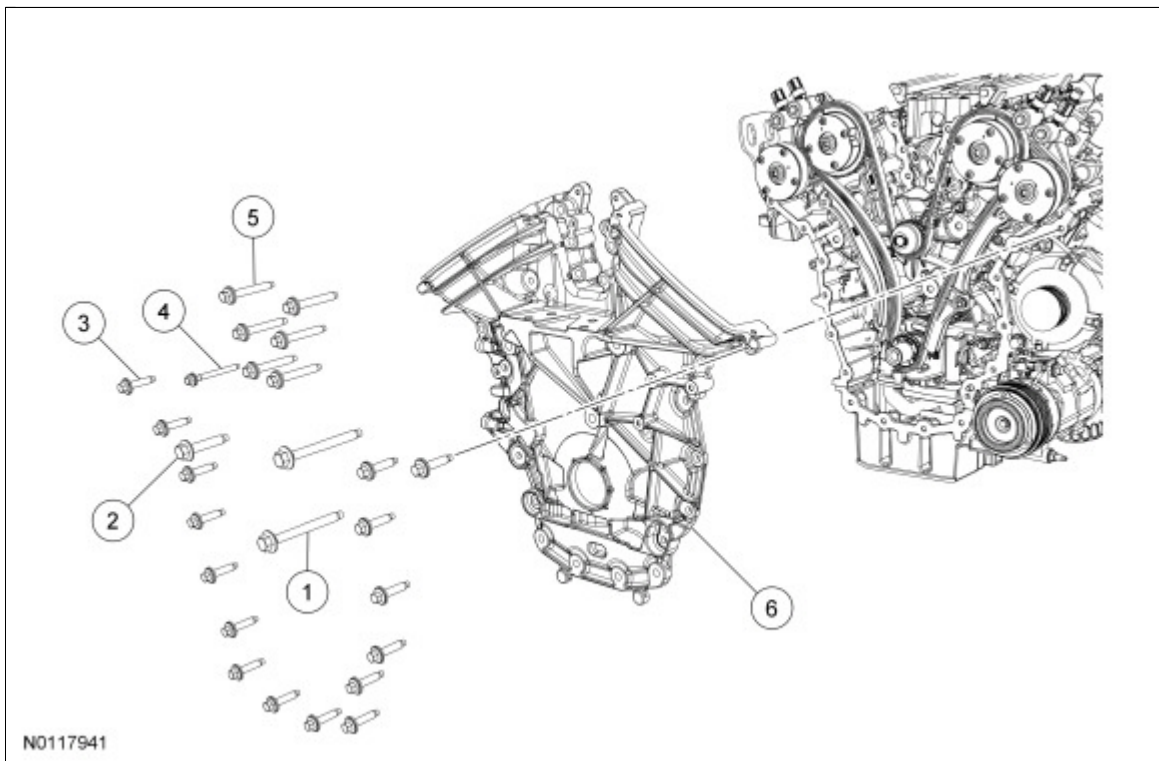
Engine Front Cover

Special Tool(s)

 <p>ST1184-A</p>	<p>3 Jaw Puller 303-D121 or equivalent</p>
 <p>ST2433-A</p>	<p>Alignment Pins 307-399</p>
 <p>ST2296-A</p>	<p>Installer, Front Cover Oil Seal 303-335 (T88T-6701-A)</p>
 <p>ST2981-A</p>	<p>Installer, Front Crankshaft Seal 303-1251</p>
 <p>ST1385-A</p>	<p>Remover, Oil Seal 303-409 (T92C-6700CH)</p>
 <p>ST1287-A</p>	<p>Replacer, Crankshaft Vibration Damper 303-102 (T74P-6312-B)</p>
 <p>ST1438-A</p>	<p>Strap Wrench 303-D055 (D85L-6000-A) or equivalent</p>

**Material**

Item	Specification
Motorcraft® High Performance Engine RTV Silicone TA-357	WSE-M4G323-A6
Motorcraft® Metal Surface Prep Wipes ZC-31-B	—
Motorcraft® SAE 5W-20 Synthetic Blend Motor Oil (US); Motorcraft® SAE 5W-20 Super Premium Motor Oil (Canada) XO-5W20-QSP (US); CXO-5W20-LSP12 (Canada)	WSS-M2C945-A
Motorcraft® Silicone Gasket Remover ZC-30-A	—



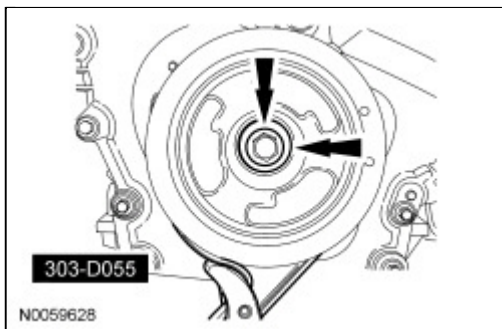
Item	Part Number	Description
1	W714821	Engine front cover bolt (2 required)
2	W714822	Engine front cover bolt
3	W503297	Engine front cover bolt (16 required)
4	W503285	Engine front cover bolt

5	W503301	Engine front cover bolt (6 required)
6	6019	Engine front cover

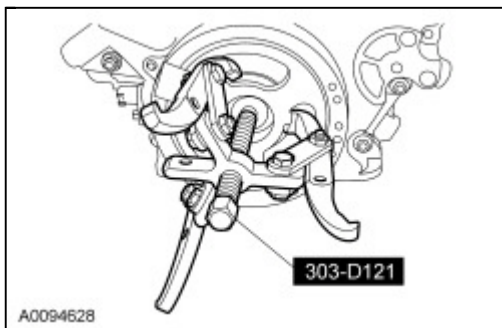
Removal

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.

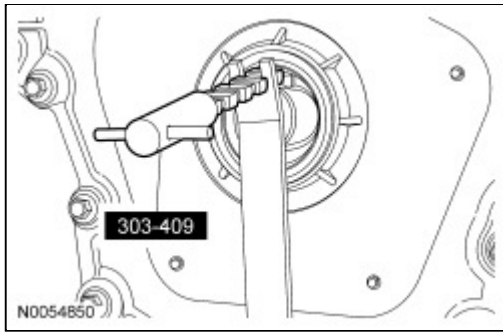
1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to [Section 100-02](#).
2. Recover the A/C system. For additional information, refer to [Section 412-00](#).
3. Disconnect the battery ground cable. For additional information, refer to [Section 414-01](#).
4. Remove the engine appearance cover. For additional information, refer to [Engine Appearance Cover — Exploded View](#) in this section.
5. Remove the accessory drive belt, tensioner and the power steering belt. For additional information, refer to [Section 303-05](#).
6. Using the Strap Wrench, remove the crankshaft pulley bolt and washer.
 - Discard the bolt.



7. Using the 3 Jaw Puller, remove the crankshaft pulley.



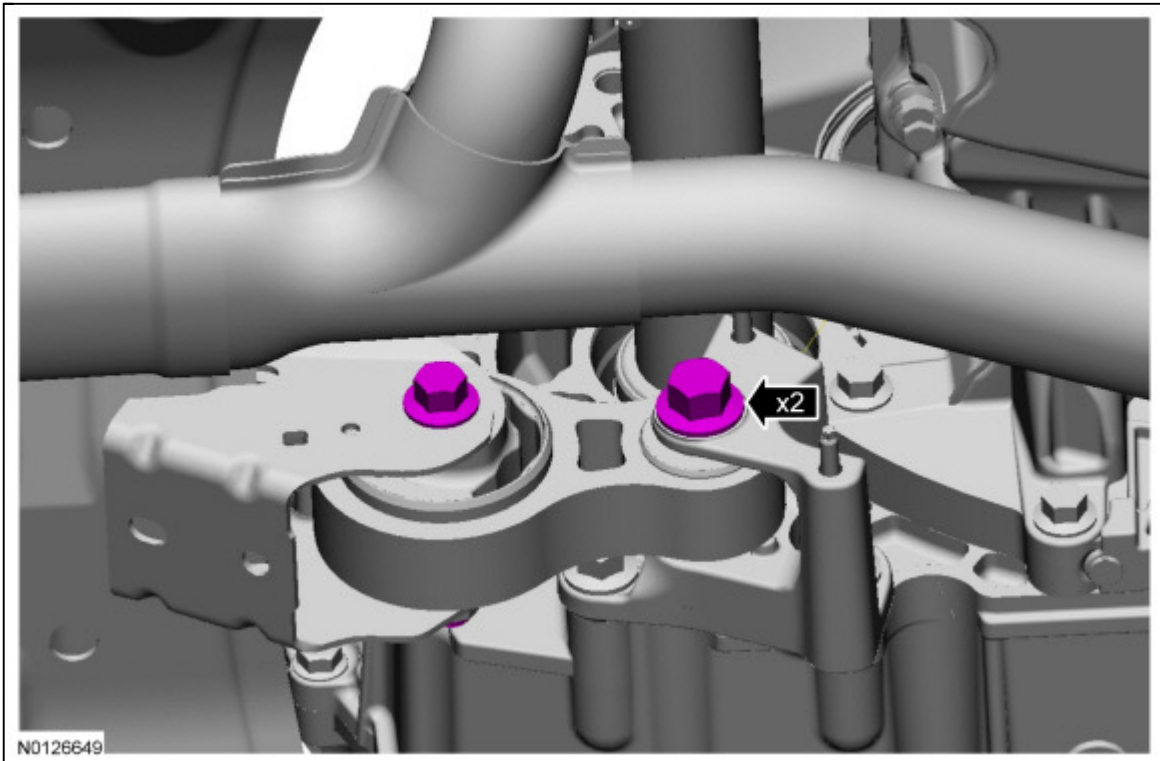
8. Using the Oil Seal Remover, remove and discard the crankshaft front seal.



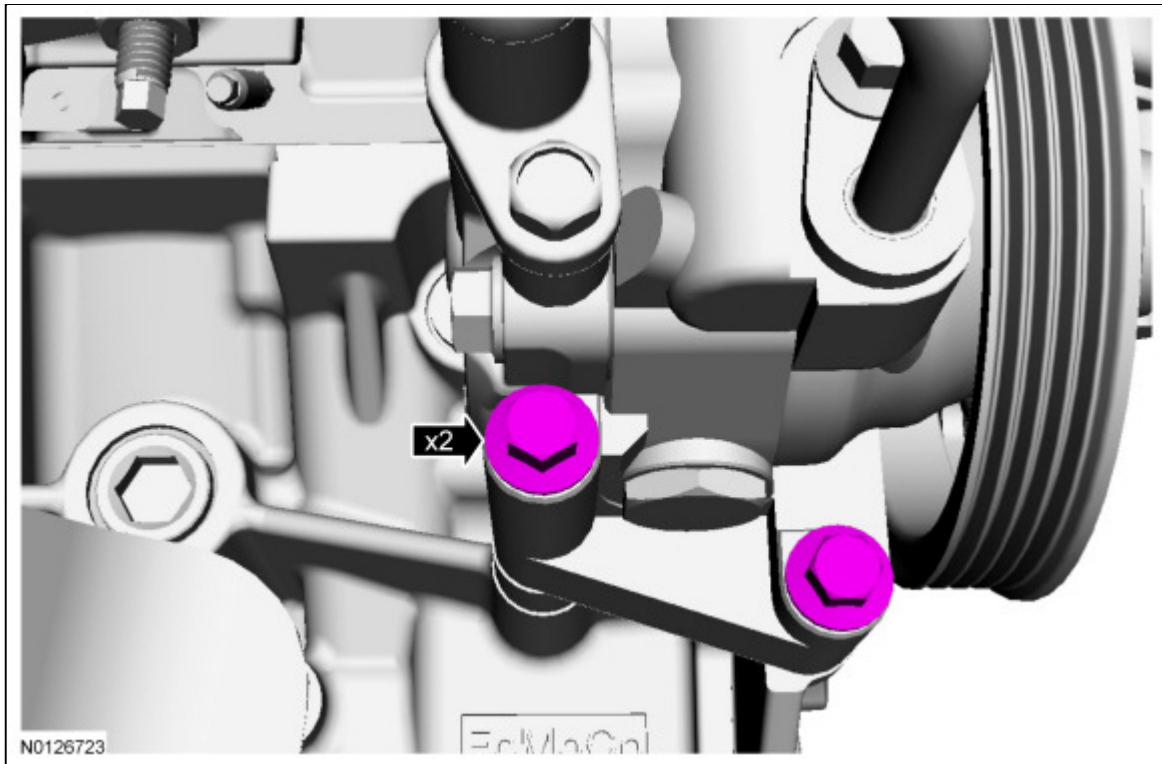
9. Remove the 2 nuts and the roll restrictor heat shield.



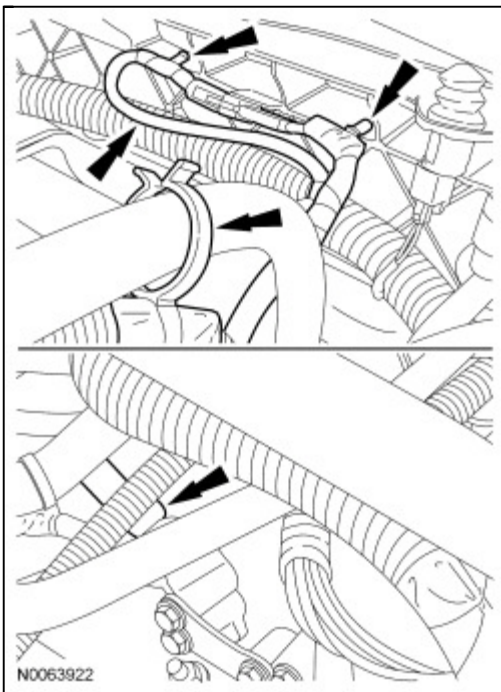
10. Loosen the 2 roll restrictor through bolts.



11. Remove the RH front halfshaft. For additional information, refer to [Section 205-04](#).
12. Remove the 2 lower power steering pump bolts.

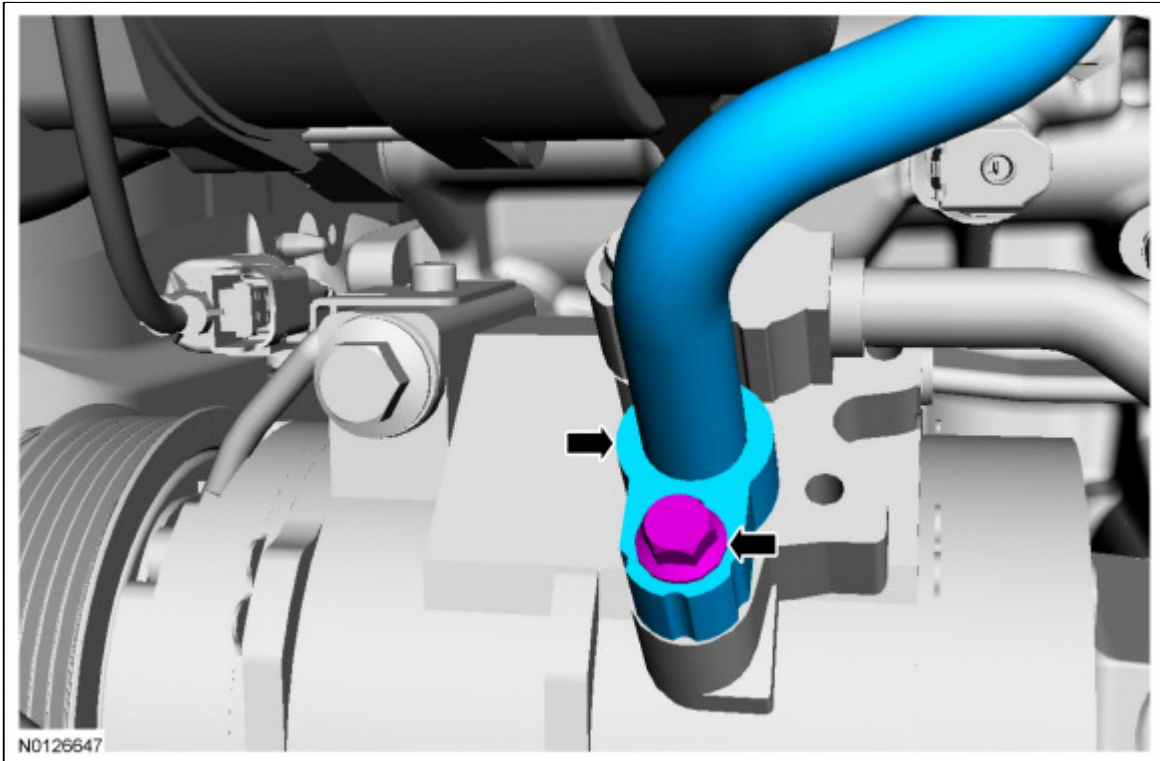


13. Remove the drain plug and drain the engine oil.
 - Install the drain plug and tighten to 27 Nm (20 lb-ft).
14. If equipped, detach the engine block heater harness from the radiator support, the A/C suction tube and the engine wiring harness.

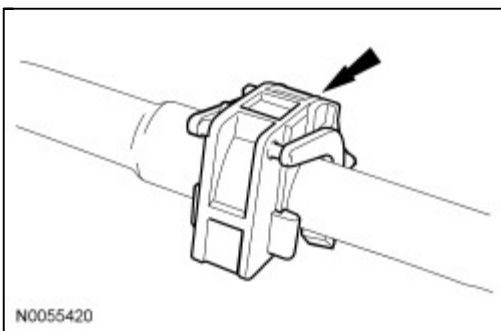


15. Remove the engine Air Cleaner (ACL) and ACL outlet pipe. For additional information, refer to [Section 303-12](#).

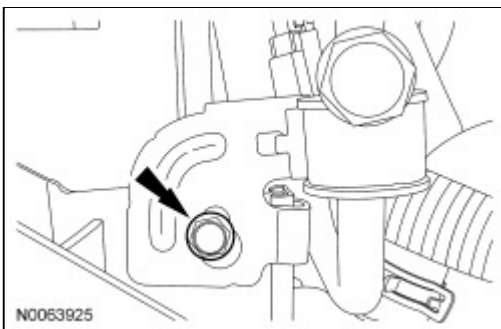
16. Remove the LH and RH valve covers. For additional information, refer to [Valve Cover — LH](#) and [Valve Cover — RH](#) in this section.
17. Remove the bolt and detach the A/C suction tube.



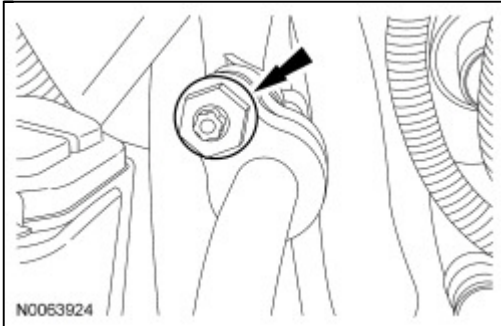
18. Remove the safety clip and disconnect the A/C suction tube fitting.
 - Remove the A/C suction tube.
 - Discard the O-ring seal.



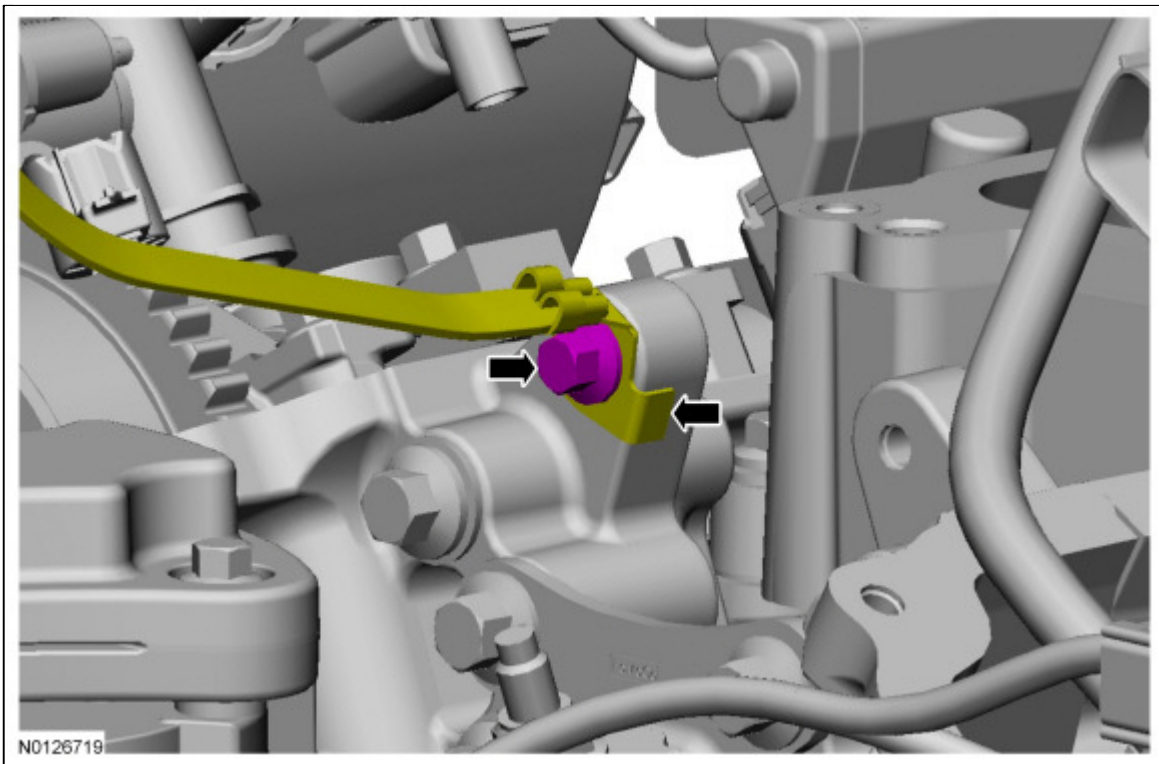
19. Remove the A/C pressure tube bracket bolt.



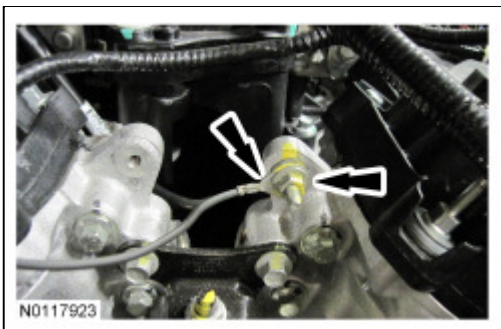
20. Remove the nut and disconnect the A/C pressure tube fitting.
- Discard the O-ring seal.
 - Position the A/C pressure tube aside.



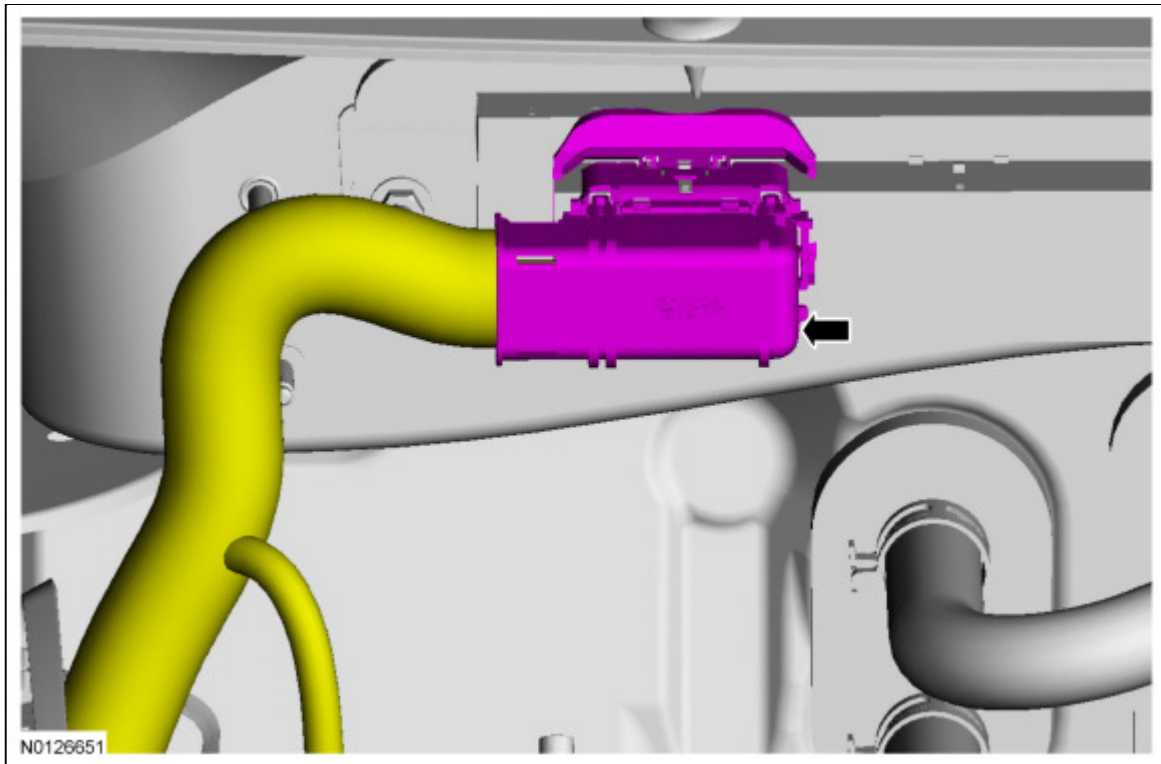
21. Remove the bolt and the ground wire from the engine front cover.



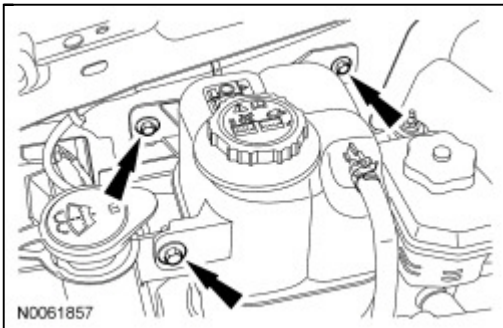
22. Remove the nut and the radio interference capacitor wire from the engine front cover stud.



23. Disconnect the PCM electrical connector and position the wiring harness aside.



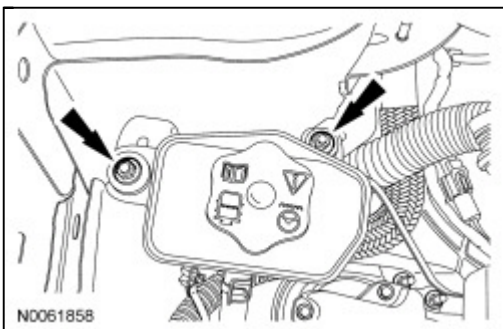
24. Remove the 3 bolts and position the degas bottle aside.



25. **NOTE:** *The area between the front of the engine and the body of the vehicle must be unobstructed in order to properly remove and install the engine front cover.*

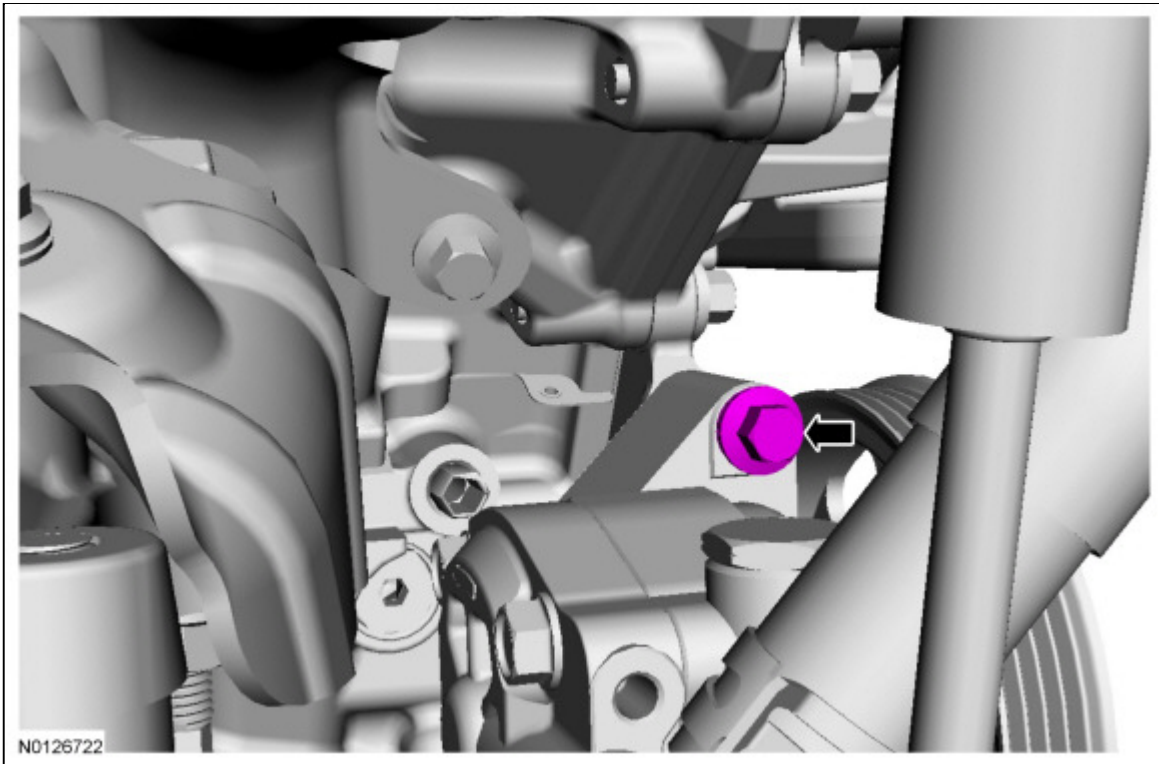
Remove the 2 power steering reservoir nuts.

- Support the power steering reservoir and hose away from the front of the engine with a length of mechanic's wire.

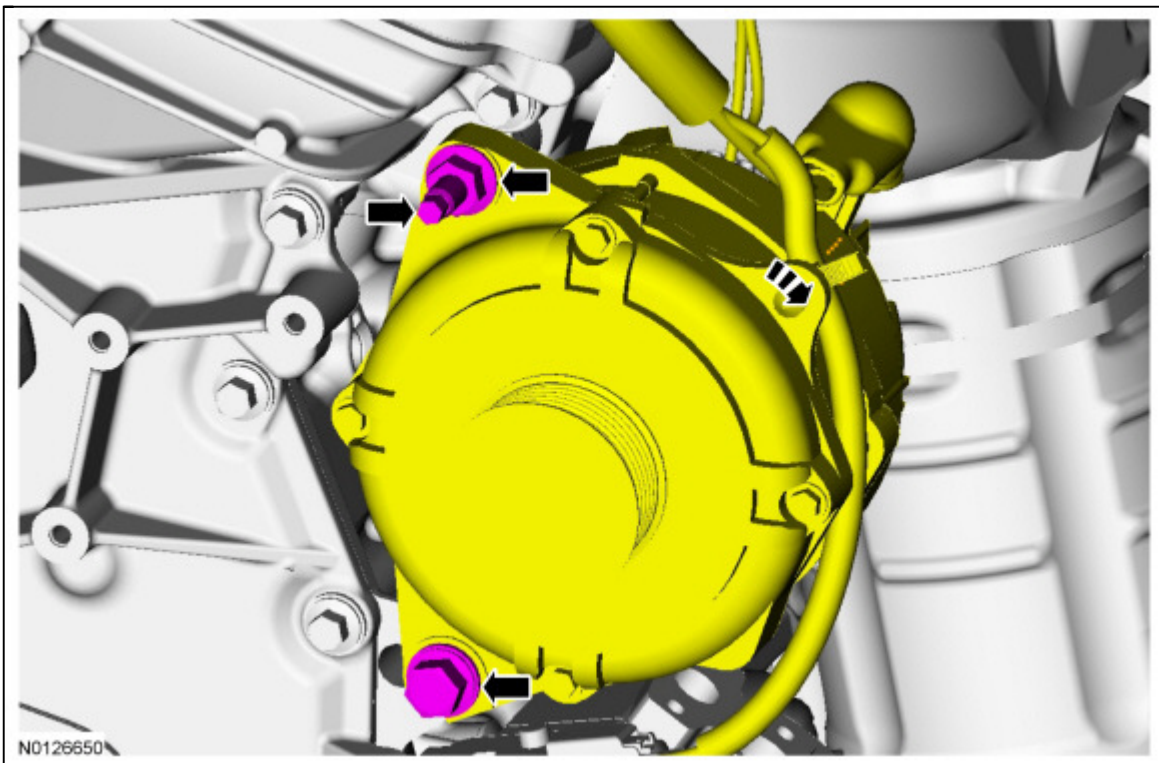


26. Remove the top power steering pump bolt.

- Support the power steering pump and hose away from the front of the engine with a length of mechanic's wire.

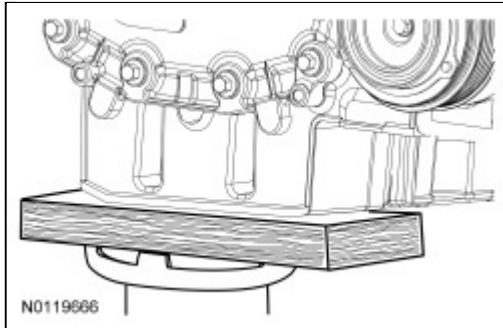


27. Remove the generator nut and stud.
- Loosen the bolt and position the generator aside.



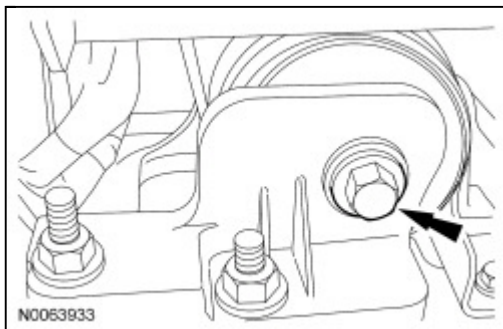
28. **NOTICE:** Failure to position the wood block and floor jack as illustrated can result in damage to the oil pan.

Position a floor jack with a block of wood under the front of the oil pan.

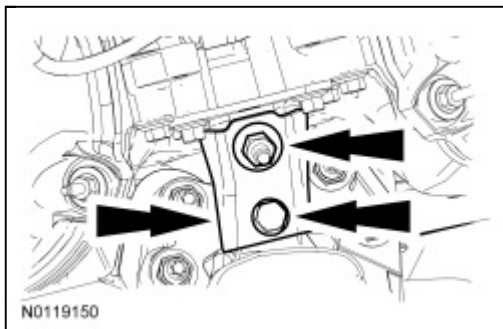


29. **NOTICE:** The transaxle through bolt must be loosened prior to removing the engine mount and lowering the front of the engine. Failure to follow these instructions may cause internal damage to the hydraulic transaxle mount and possible fluid leakage.

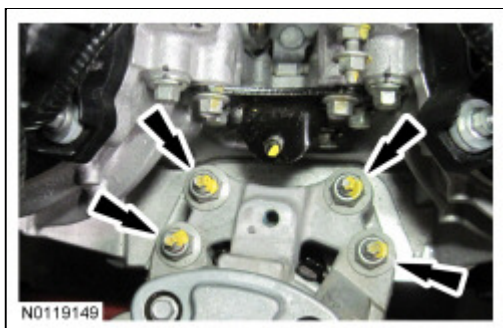
Loosen the transaxle mount through bolt.



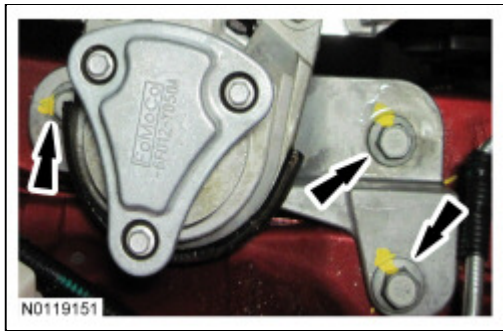
30. Remove the nut, bolt and engine mount brace.



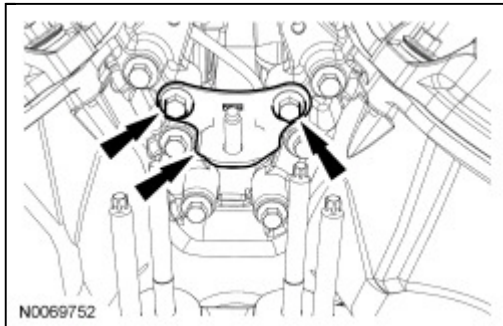
31. Remove the 4 engine mount nuts.



32. Remove the 3 bolts and the engine mount.



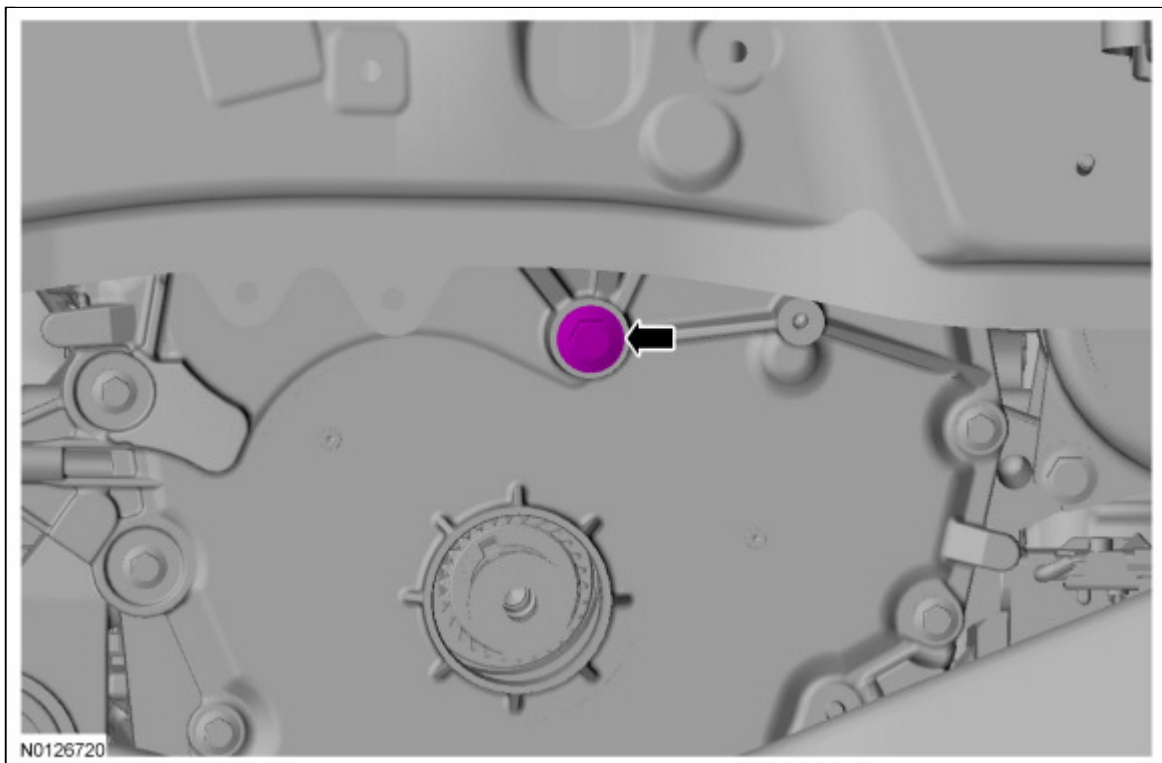
33. Remove the 2 bolts and the engine mount bracket.



34. **NOTICE:** Do not allow the A/C compressor to contact the subframe. Failure to follow this direction may result in damage to the A/C compressor.

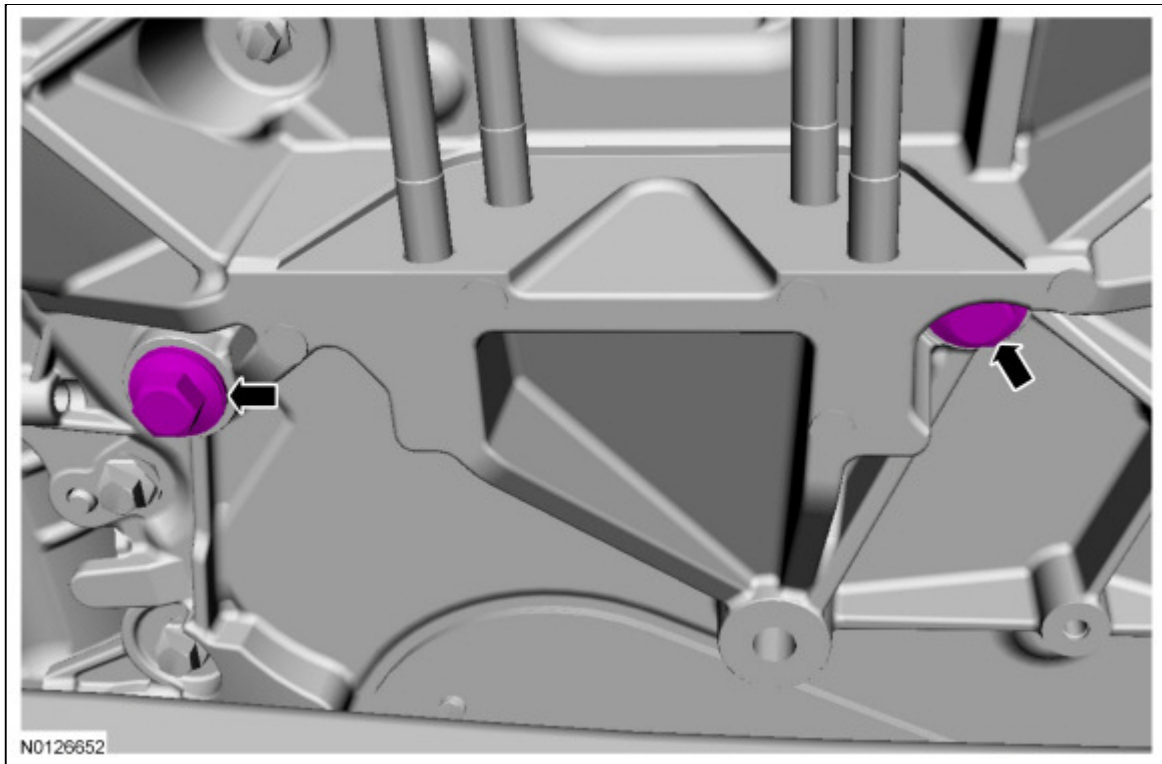
Using the floor jack, lower the engine to access the lower engine front cover bolt.

- Remove the lower M10 engine front cover bolt.

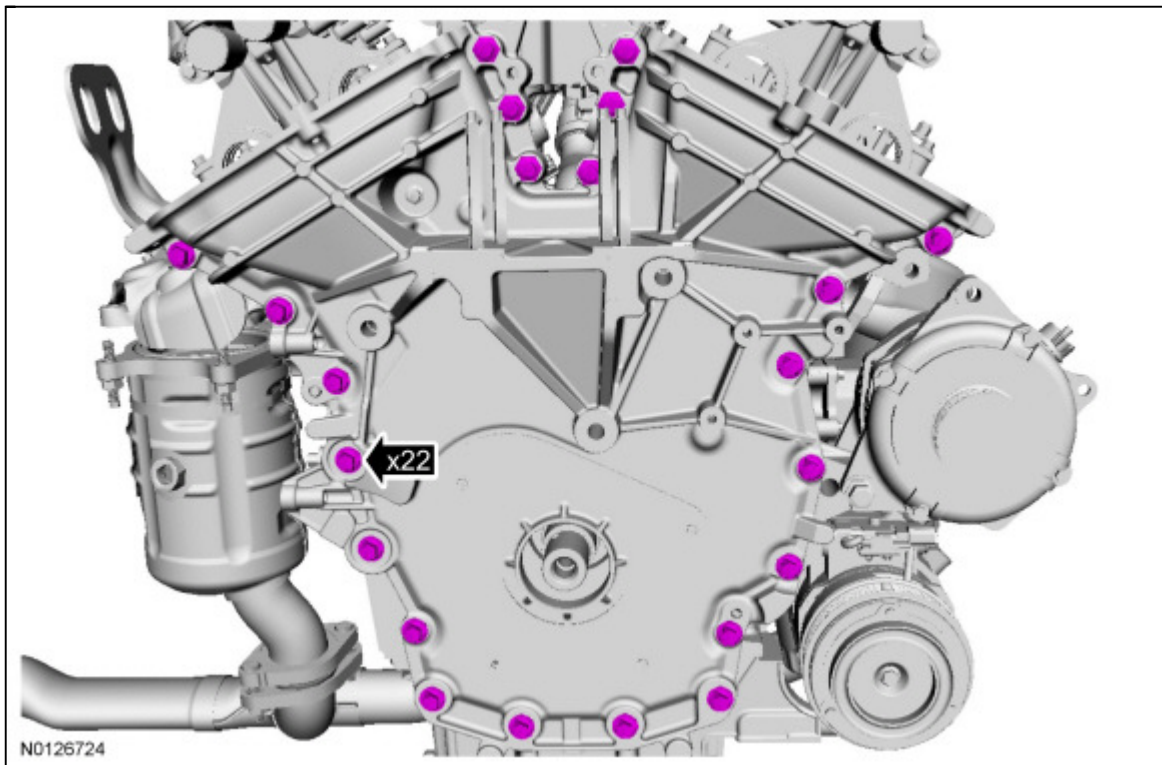


35. Using the floor jack, raise the engine 100 mm (3.937 in).

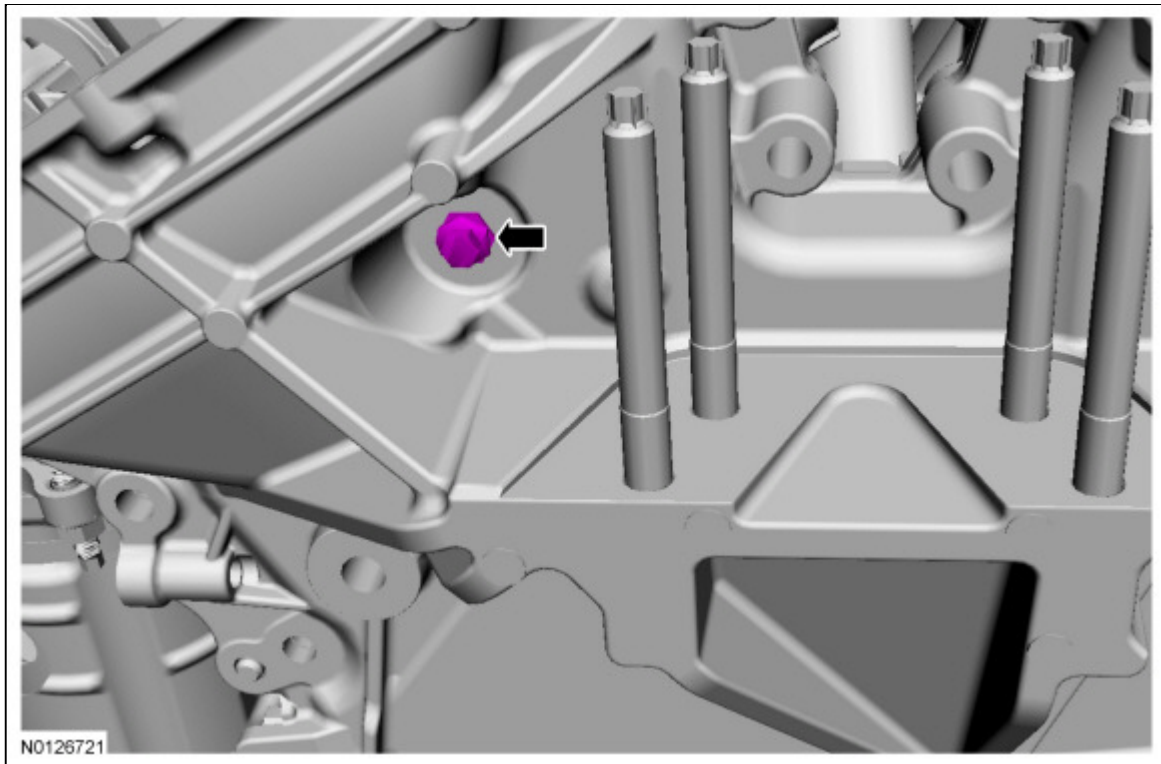
36. Remove the 2 M10 engine front cover bolts.



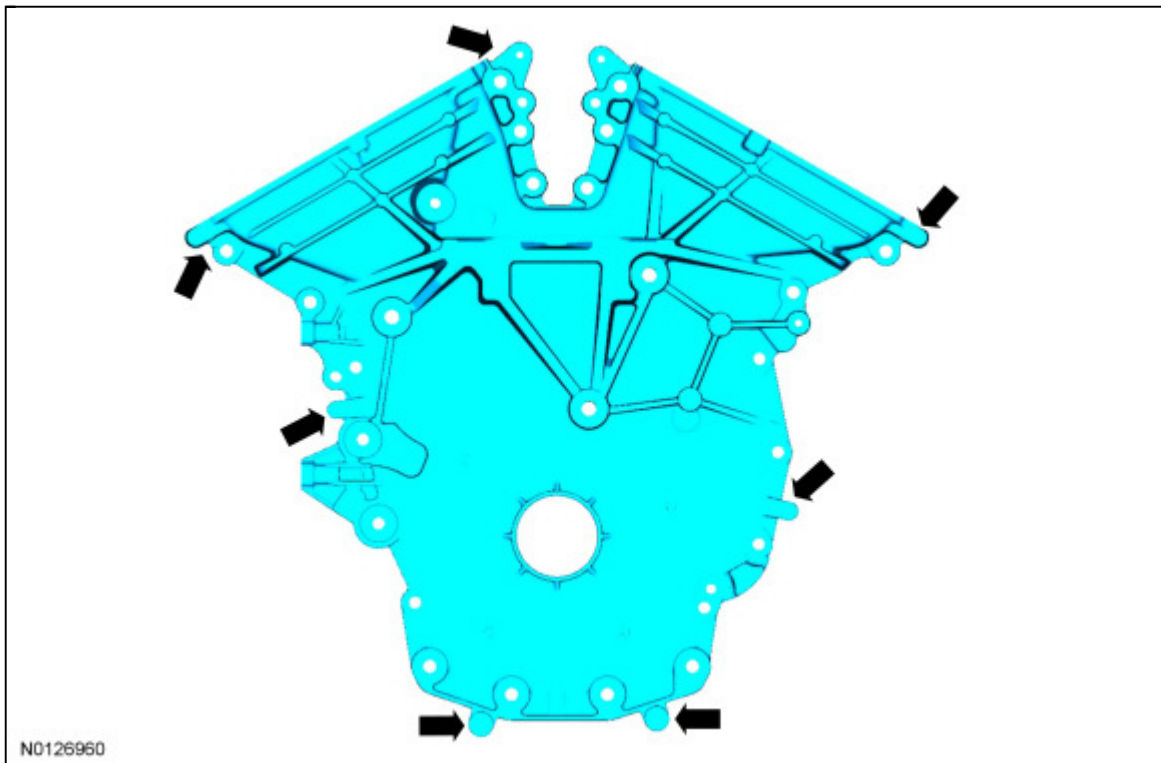
37. Remove the 22 M8 engine front cover bolts.



38. Remove the M6 engine front cover bolt.



39. Using a suitable pry tool, locate the 7 pry pads shown and pry the engine front cover loose and remove.



Installation

1. **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.

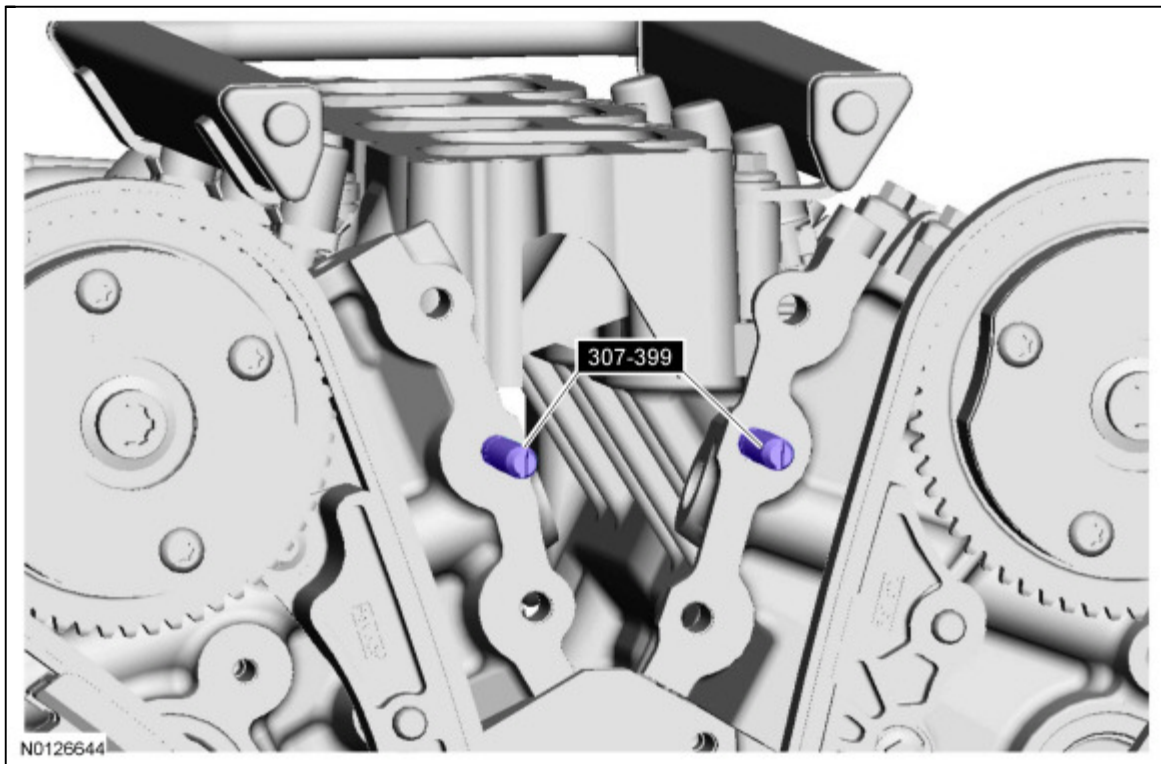
- Thoroughly wash the engine front cover to remove any foreign material, including any abrasive particles created during the cleaning process.

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

NOTICE: Do not use wire brushes, power abrasive discs or 3M™ Roloc® Bristle Disk (2-in white part number 07528) to clean the sealing surfaces of engine block, cylinder heads, and oil pan. These tools can cause contamination that will cause premature engine failure. Remove all traces of the gasket.

Clean the sealing surfaces of the cylinder heads, the cylinder block and the oil pan in the following sequence.

1. Remove any large deposits of silicone or gasket material.
 2. Apply silicone gasket remover and allow to set for several minutes.
 3. Remove the silicone gasket remover. A second application of silicone gasket remover may be required if residual traces of silicone or gasket material remain.
 4. Apply metal surface prep to remove any remaining traces of oil or coolant and to prepare the surfaces to bond. Do not attempt to make the metal shiny. Some staining of the metal surfaces is normal.
 5. Make sure the 2 locating dowel pins are seated correctly in the cylinder block.
3. Install the Alignment Pins.



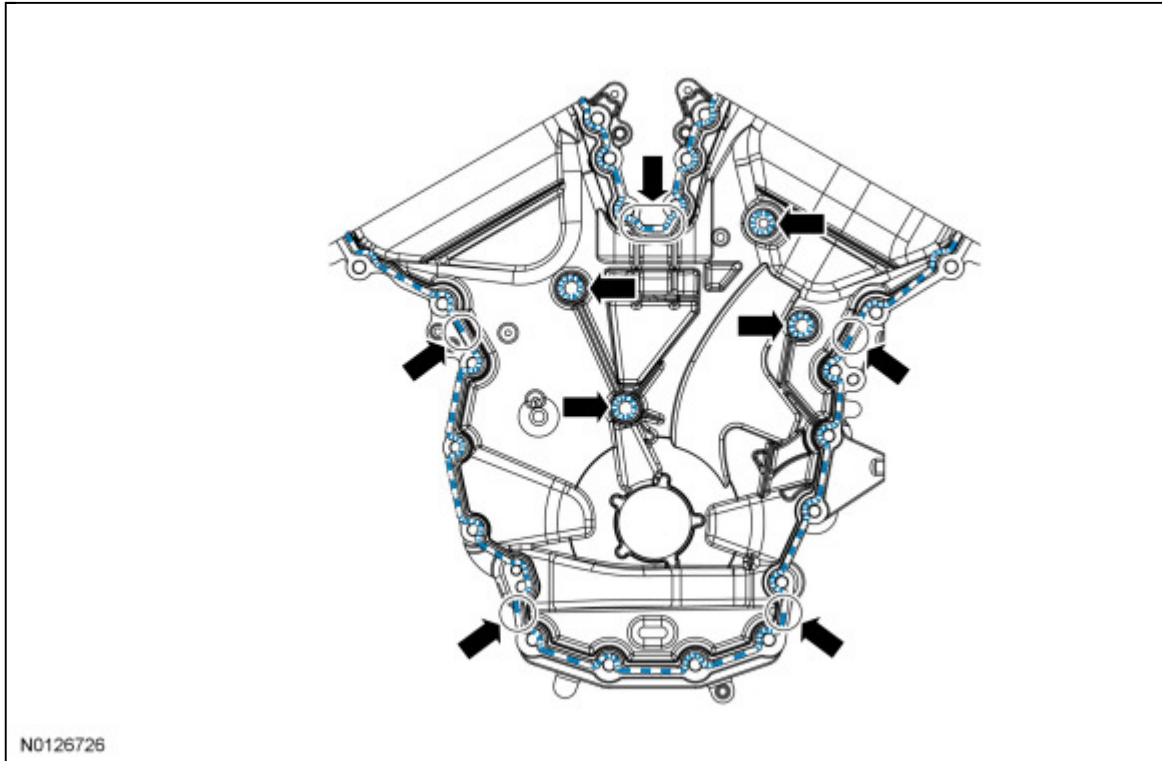
4. **NOTICE: Failure to use Motorcraft® High Performance Engine RTV Silicone may cause the engine oil to foam excessively and result in serious engine damage.**

NOTE: The engine front cover and bolts 7, 8, 15, 17, 18, 21 and 22 must be installed within 4 minutes of the initial sealant application. The remainder of the engine front cover bolts must be installed and

tightened within 35 minutes of the initial sealant application. If the time limits are exceeded, the sealant must be removed, the sealing area cleaned and sealant reapplied. To clean the sealing area, use silicone gasket remover and metal surface prep. Failure to follow this procedure can cause future oil leakage.

Apply a 3.0 mm (0.11 in) bead of Motorcraft® High Performance Engine RTV Silicone to the engine front cover sealing surfaces including the 4 inner bolt bosses.

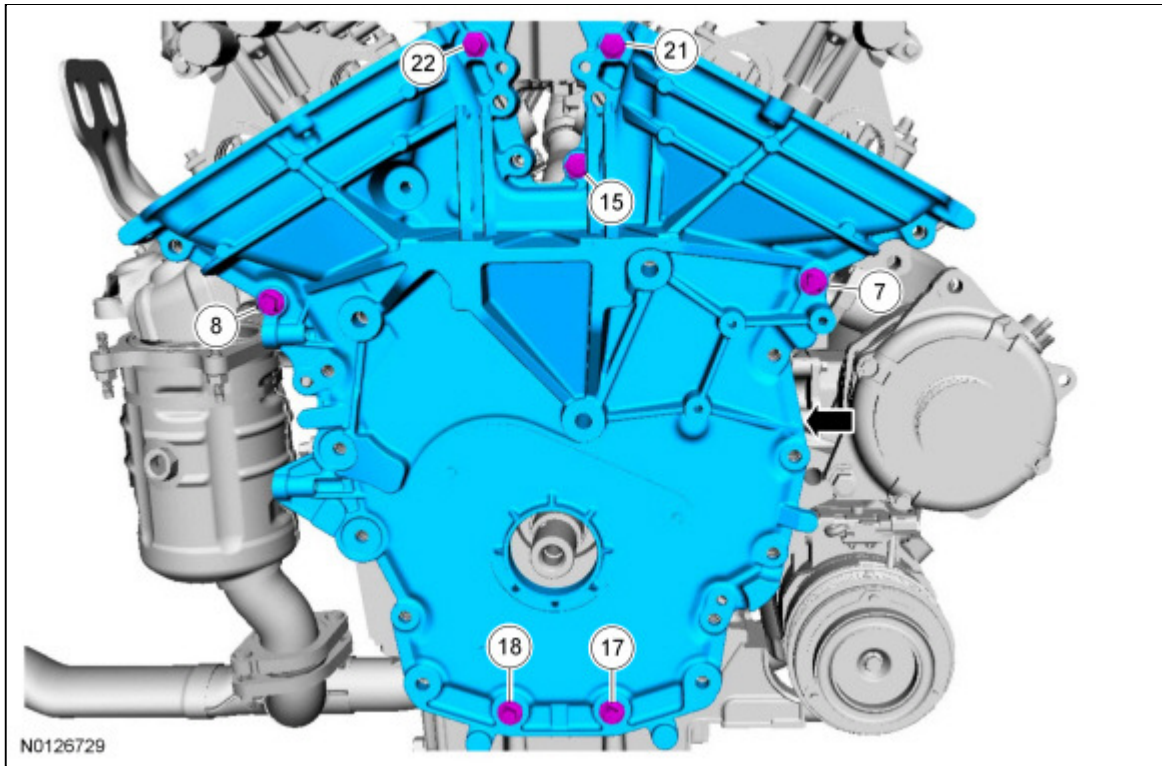
- Apply a 5.5 mm (0.21 in) bead of Motorcraft® High Performance Engine RTV Silicone to the oil pan-to-cylinder block joint and the cylinder head-to-cylinder block joint areas of the engine front cover in 5 places as indicated.



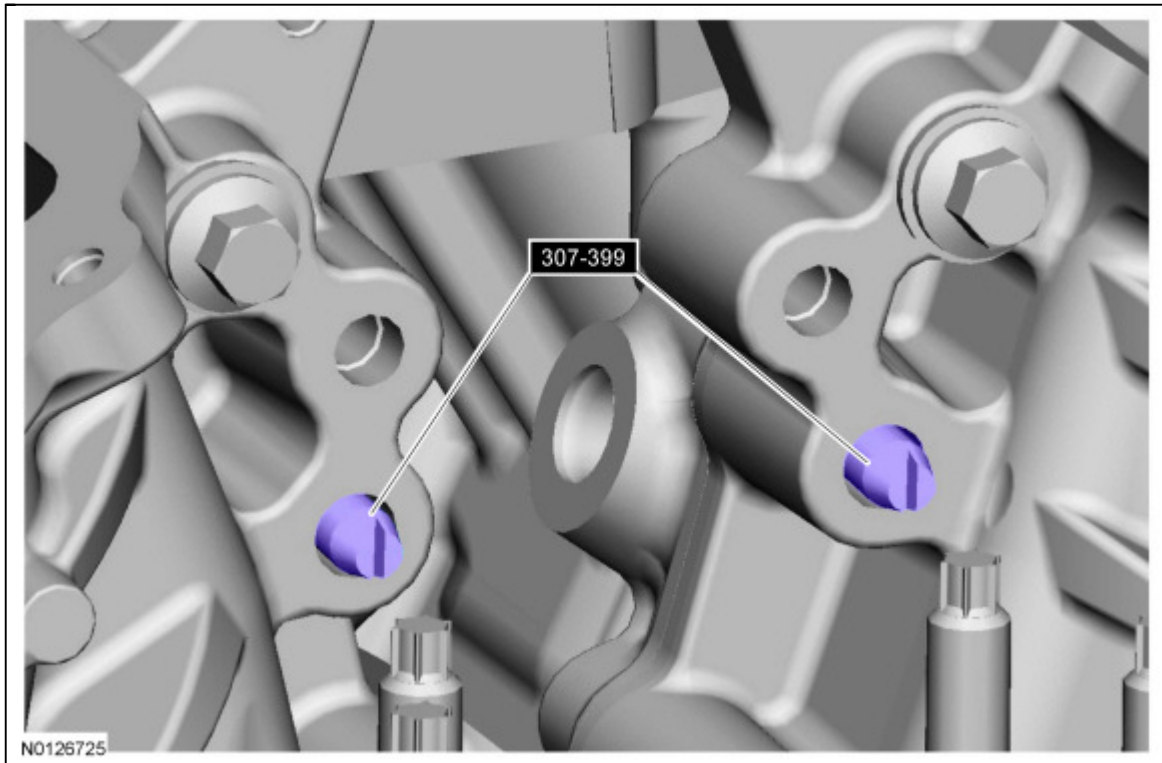
5. **NOTE:** Make sure the 2 locating dowel pins are seated correctly in the cylinder block.

Install the engine front cover and bolts 7, 8, 15, 17, 18, 21 and 22.

- Tighten in sequence to 3 Nm (27 lb-in).

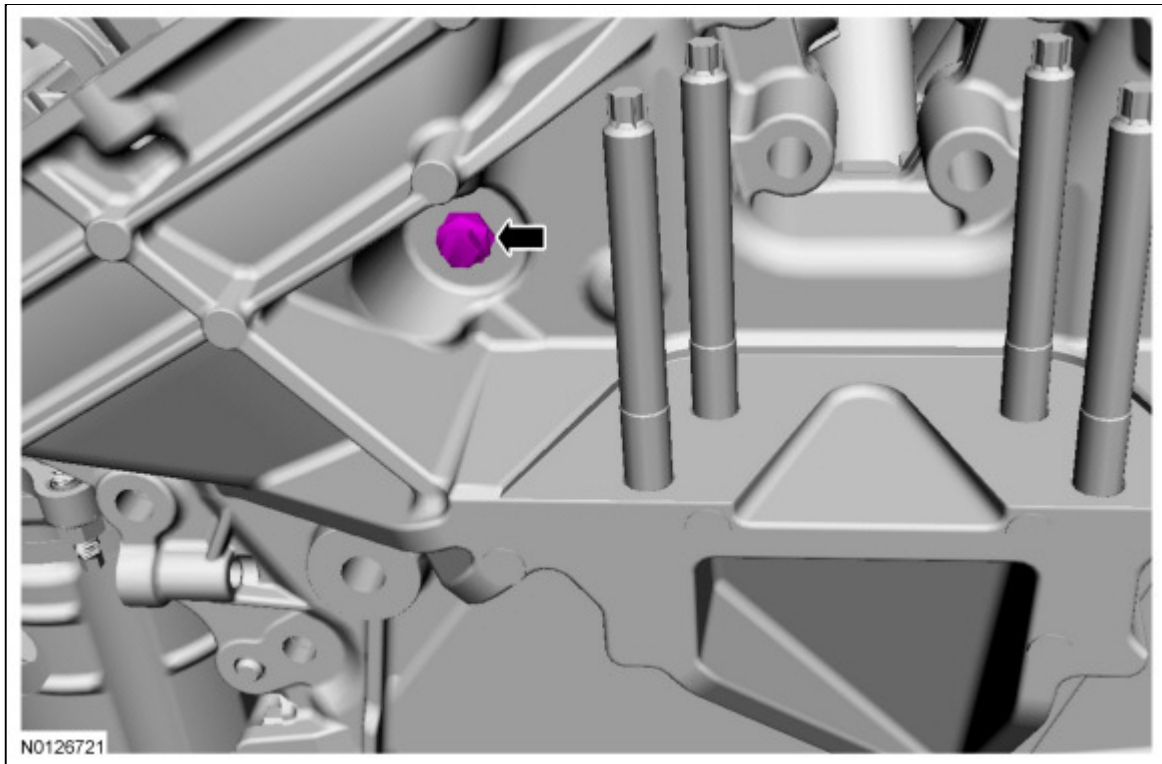


6. Remove the Alignment Pins.



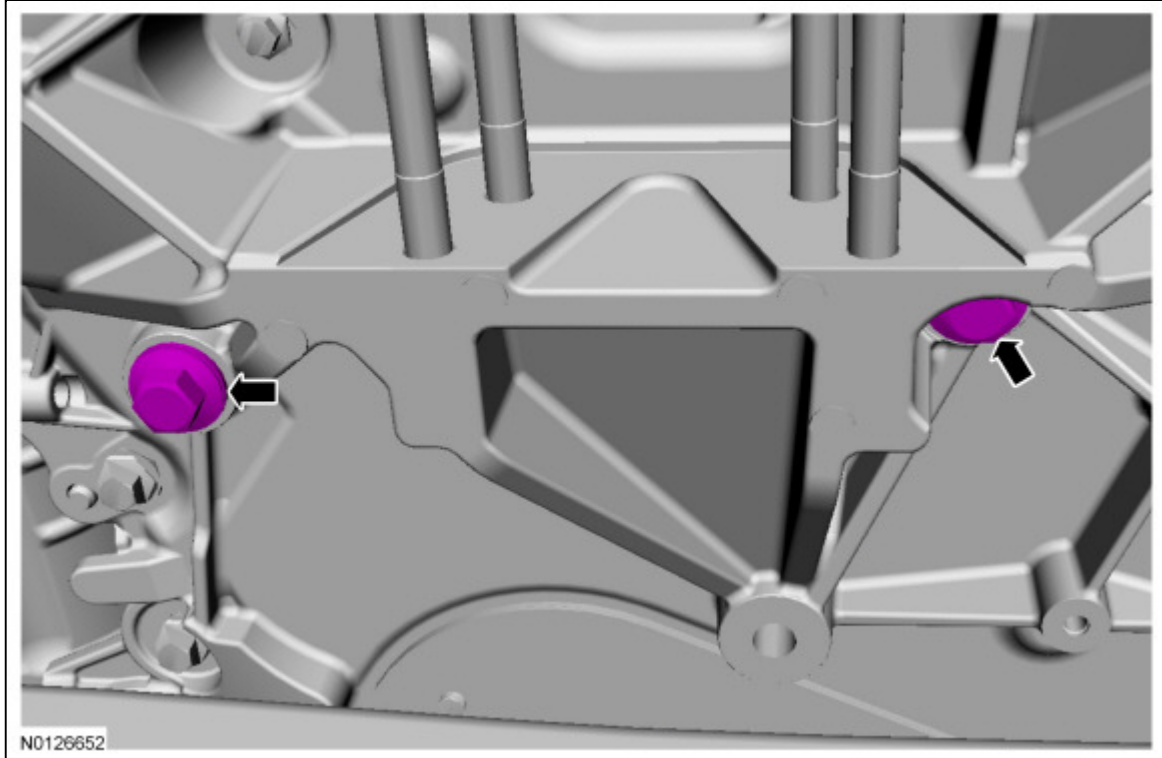
7. **NOTE:** Do not tighten the bolt at this time.

Install the M6 engine front cover bolt.



8. **NOTE:** Do not tighten the bolts at this time.

Install the 2 upper M10 engine front cover bolts.

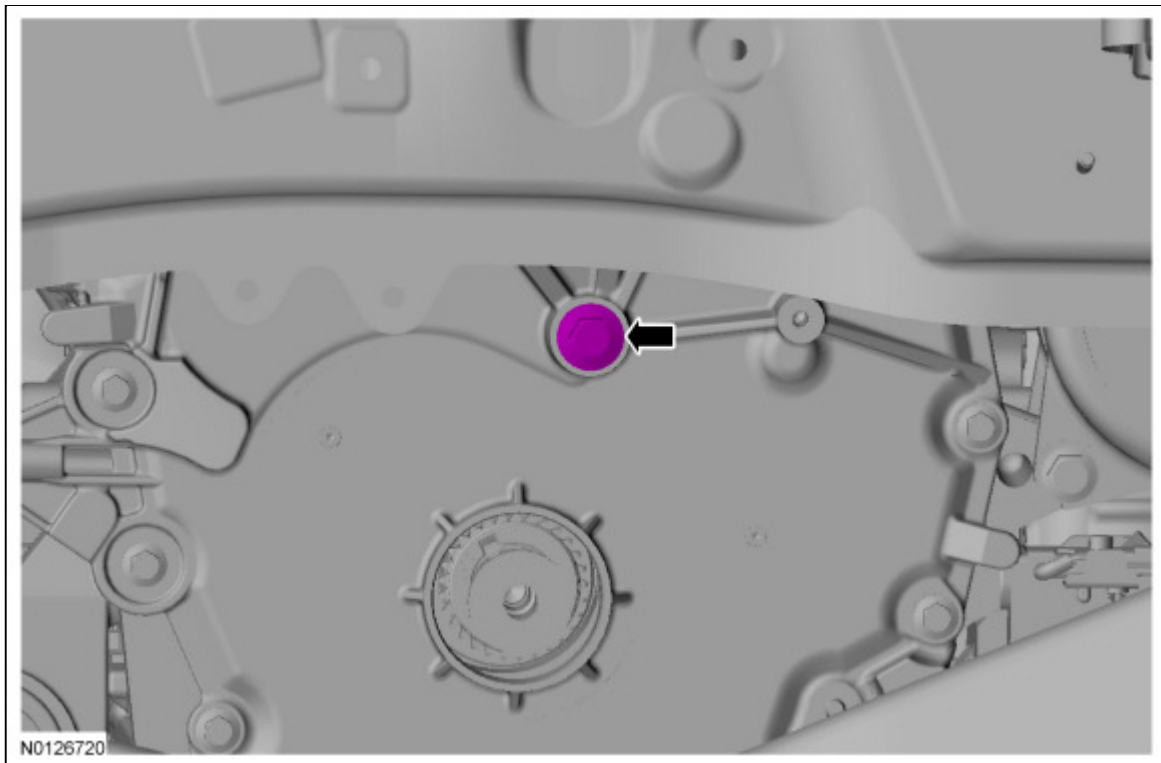


9. **NOTICE:** Do not allow the A/C compressor to contact the subframe. Failure to follow this direction may result in damage to the A/C compressor.

NOTE: Do not tighten the bolt at this time.

Using the floor jack, lower the engine to allow installation of the lower M10 engine front cover bolt.

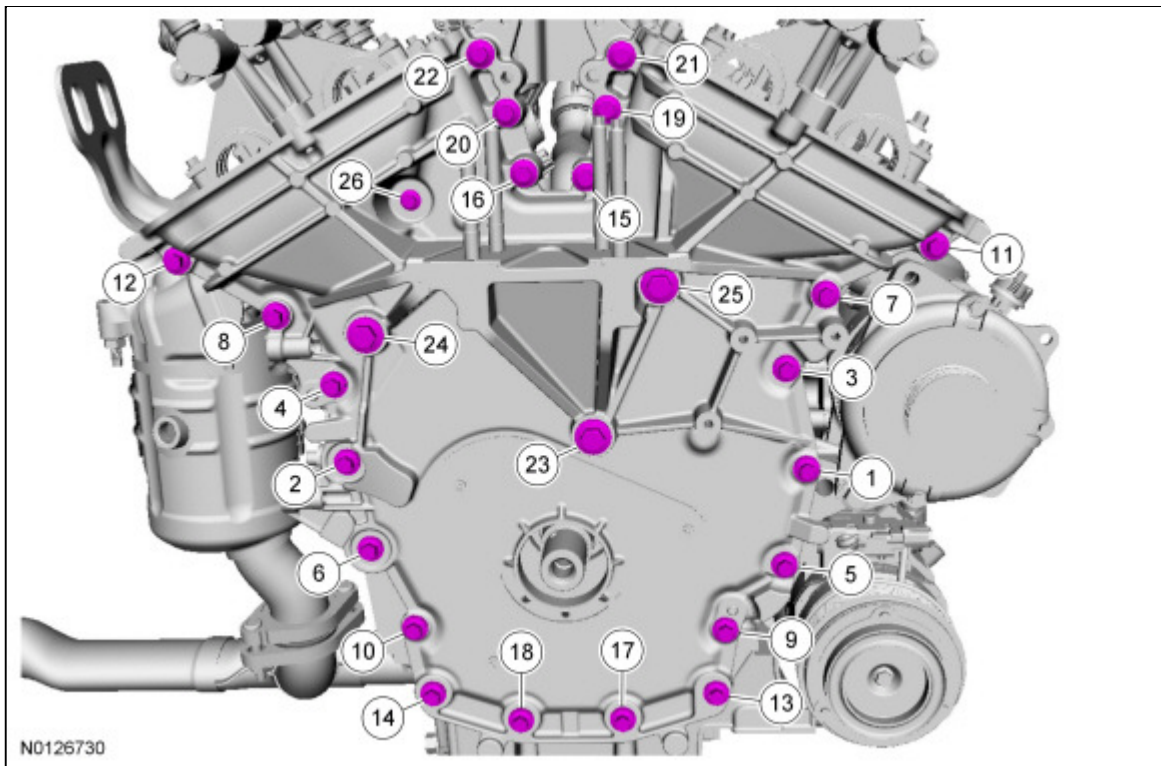
- Install the lower M10 engine front cover bolt.



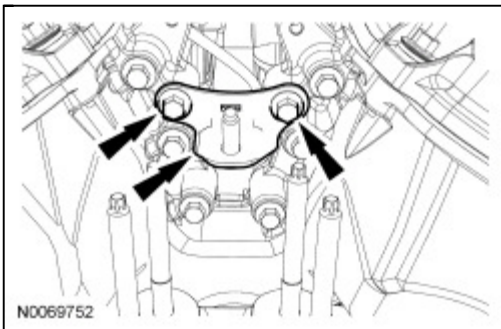
10. **NOTICE: Do not expose the Motorcraft® High Performance Engine RTV Silicone to engine oil for at least 90 minutes after installing the engine front cover. Failure to follow this instruction may cause oil leakage.**

Install the remaining engine front cover bolts. Tighten all of the engine front cover bolts and engine mount bracket bolts in the sequence shown in 7 stages:

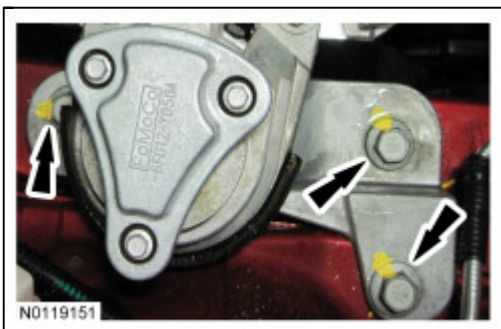
- Stage 1: Tighten bolts 1 thru 22 to 10 Nm (89 lb-in).
- Stage 2: Tighten bolts 23, 24 and 25 to 15 Nm (133 lb-in).
- Stage 3: Tighten bolt 26 to 10 Nm (89 lb-in).
- Stage 4: Loosen bolt 26 one full turn.
- Stage 5: Tighten bolts 23, 24 and 25 to 30 Nm (22 lb-ft) plus an additional 90 degrees.
- Stage 6: Tighten bolts 1 thru 22 to 20 Nm (177 lb-in) plus an additional 45 degrees.
- Stage 7: Tighten bolt 26 to 10 Nm (89 lb-in) plus an additional 45 degrees.



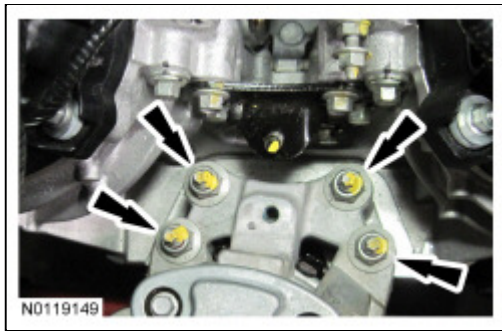
11. Install the engine mount bracket and the 2 bolts.
 - Tighten to 30 Nm (22 lb-ft).



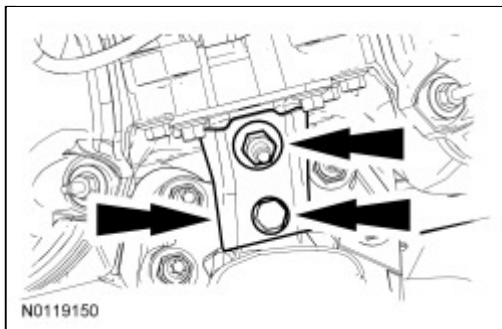
12. Use the floor jack to raise the engine to the installed position and install the engine mount and the 3 bolts.
 - Tighten to 90 Nm (66 lb-ft).



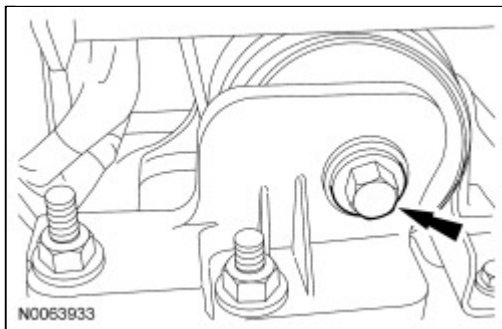
13. Install the 4 engine mount nuts.
 - Tighten to 63 Nm (46 lb-ft).



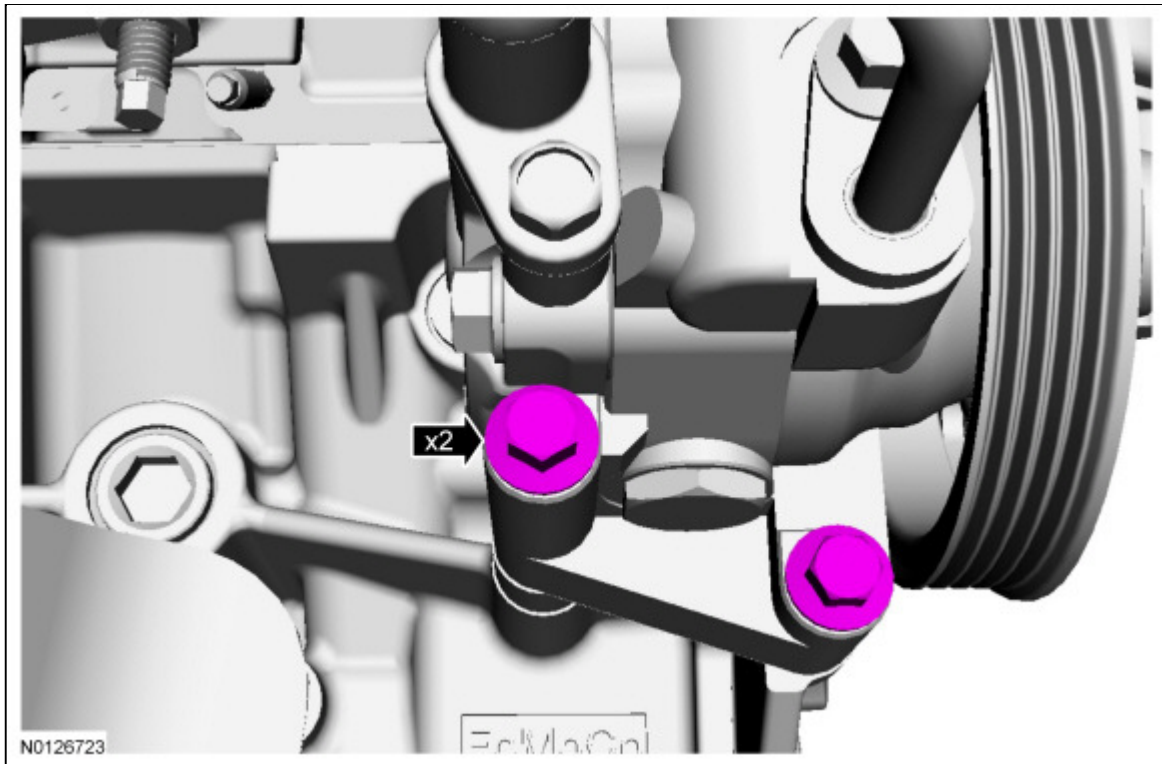
14. Install the engine mount brace, nut and bolt.
 - Tighten to 20 Nm (177 lb-in).



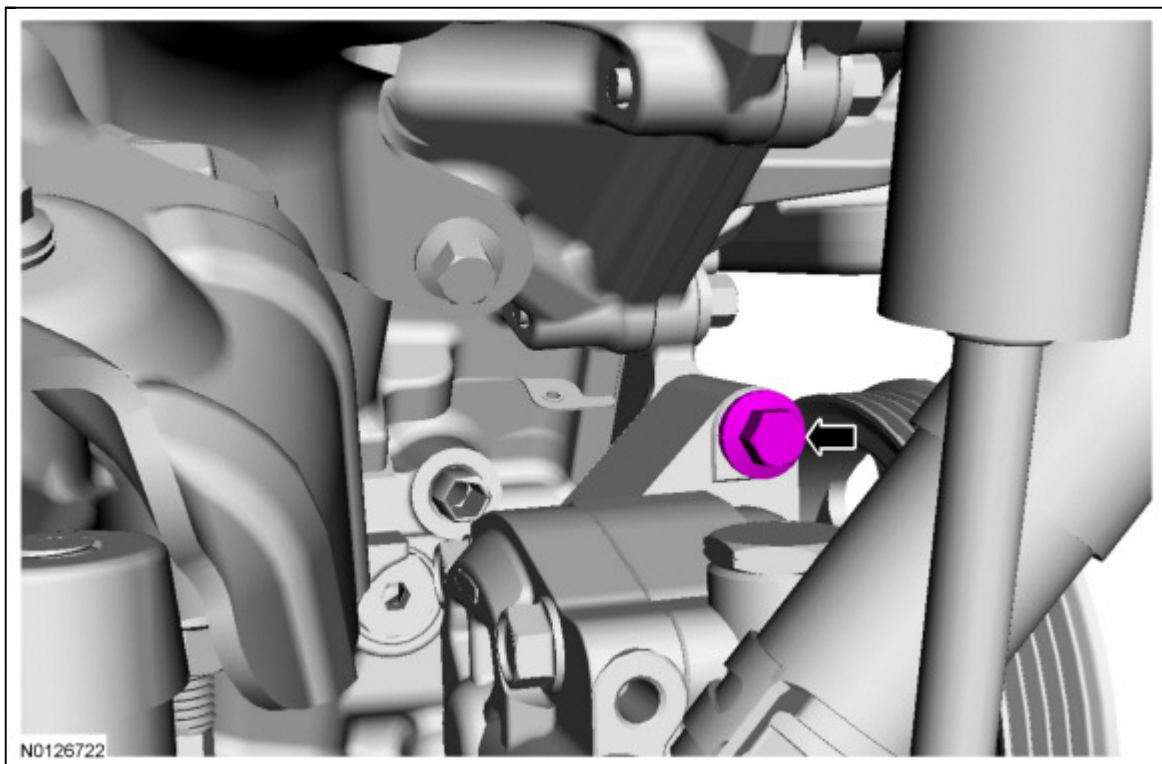
15. Tighten the transaxle mount through bolt to 175 Nm (129 lb-ft).



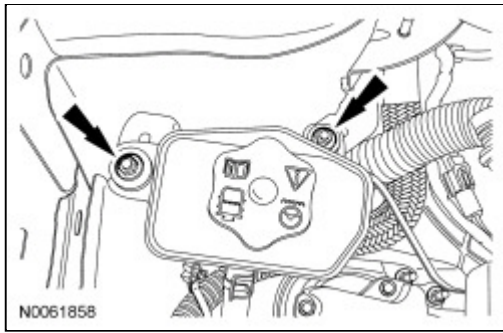
16. Install the power steering pump and the 2 lower bolts.
 - Tighten to 25 Nm (18 lb-ft).



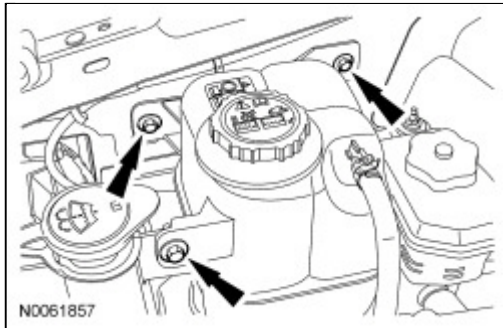
17. Install the upper power steering pump bolt.
 - Tighten to 25 Nm (18 lb-ft).



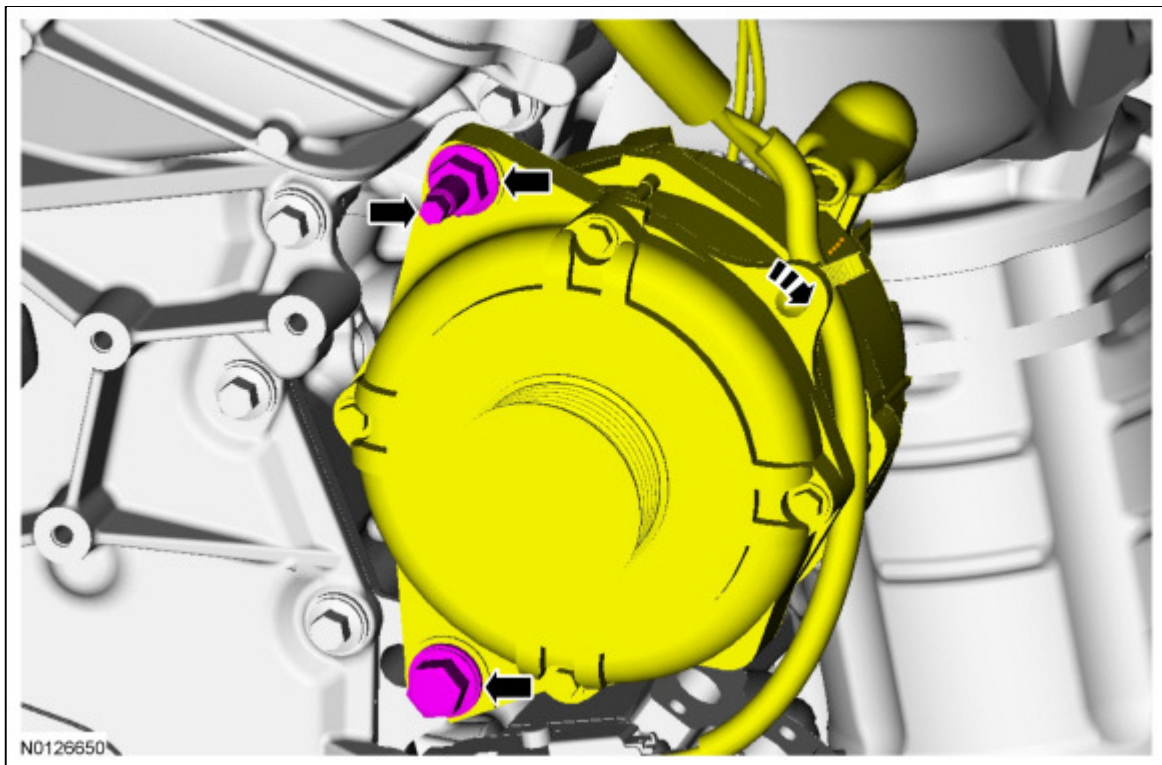
18. Install the power steering reservoir and the 2 nuts.
 - Tighten to 8 Nm (71 lb-in).



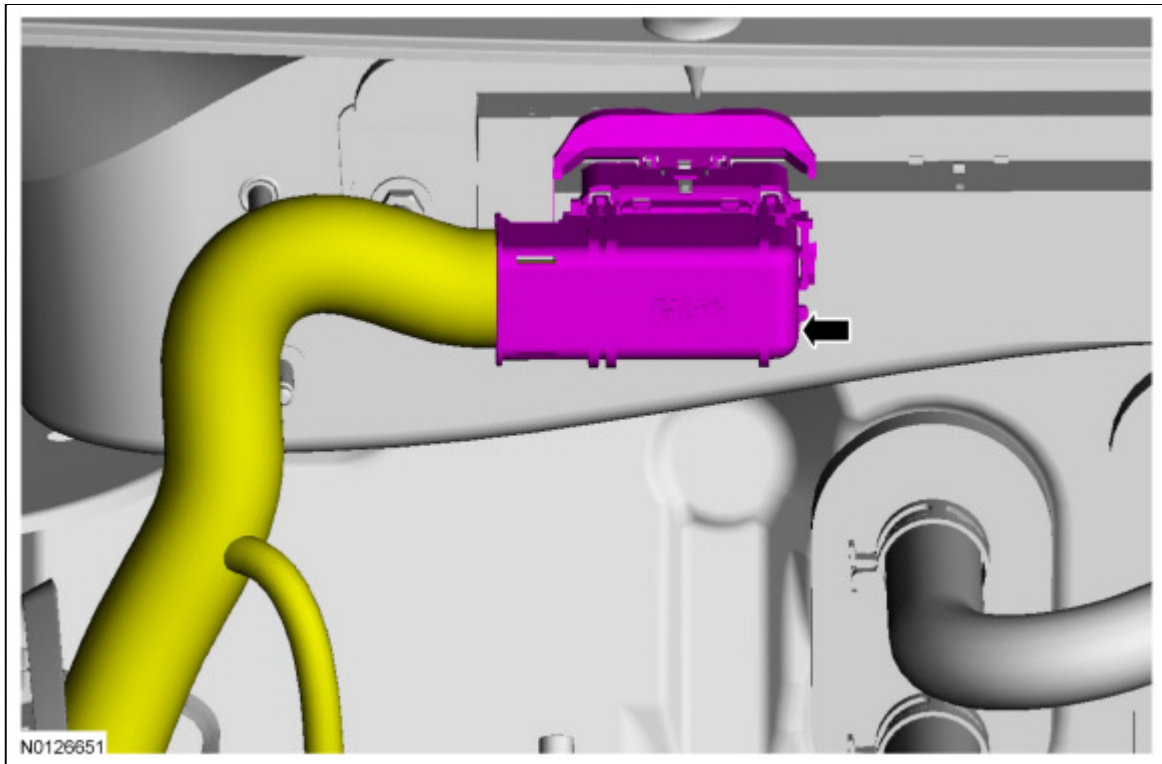
19. Install the degas bottle and the 3 bolts.
- Tighten to 9 Nm (80 lb-in).



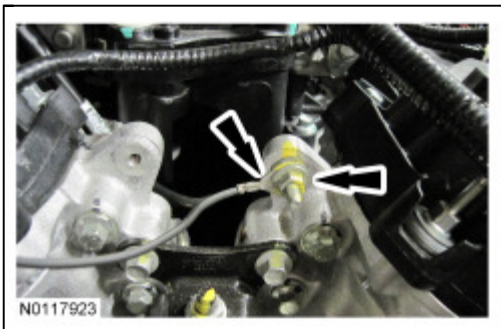
20. Position the generator and install the stud and nut.
- Tighten the stud to 8 Nm (71 lb-in).
 - Tighten the nut to 47 Nm (35 lb-ft).
 - Tighten the bolt to 47 Nm (35 lb-ft).



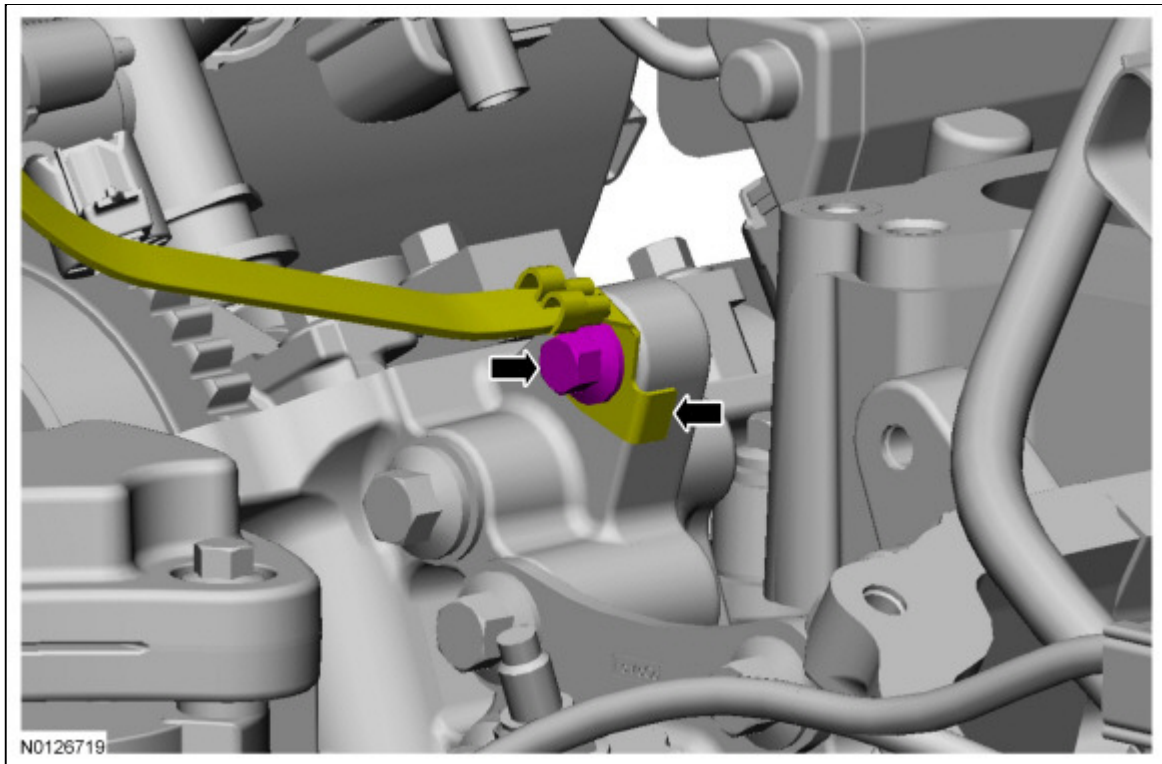
21. Connect the PCM electrical connector.



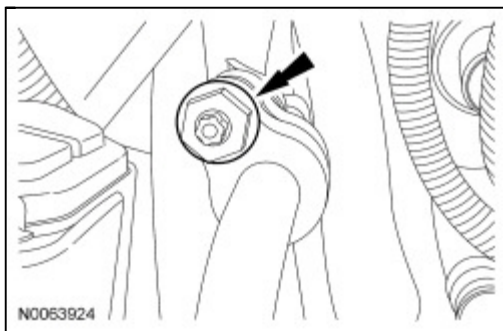
22. Install the radio interference capacitor wire and the nut to the engine front cover stud.
- Tighten to 10 Nm (89 lb-in).



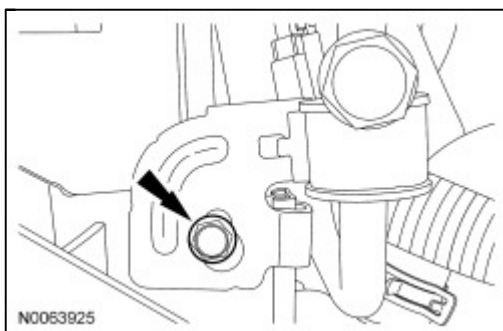
23. Install the ground wire and bolt on the engine front cover.
- Tighten to 10 Nm (89 lb-in).



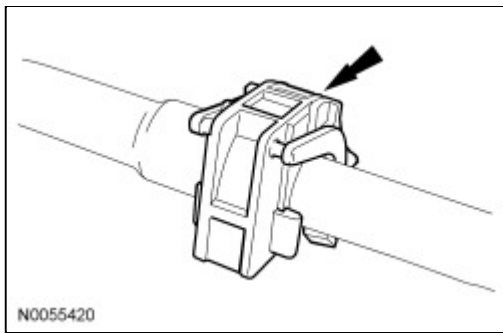
24. Using a new O-ring seal, connect the A/C pressure tube fitting and install the nut.
- Tighten to 8 Nm (71 lb-in).



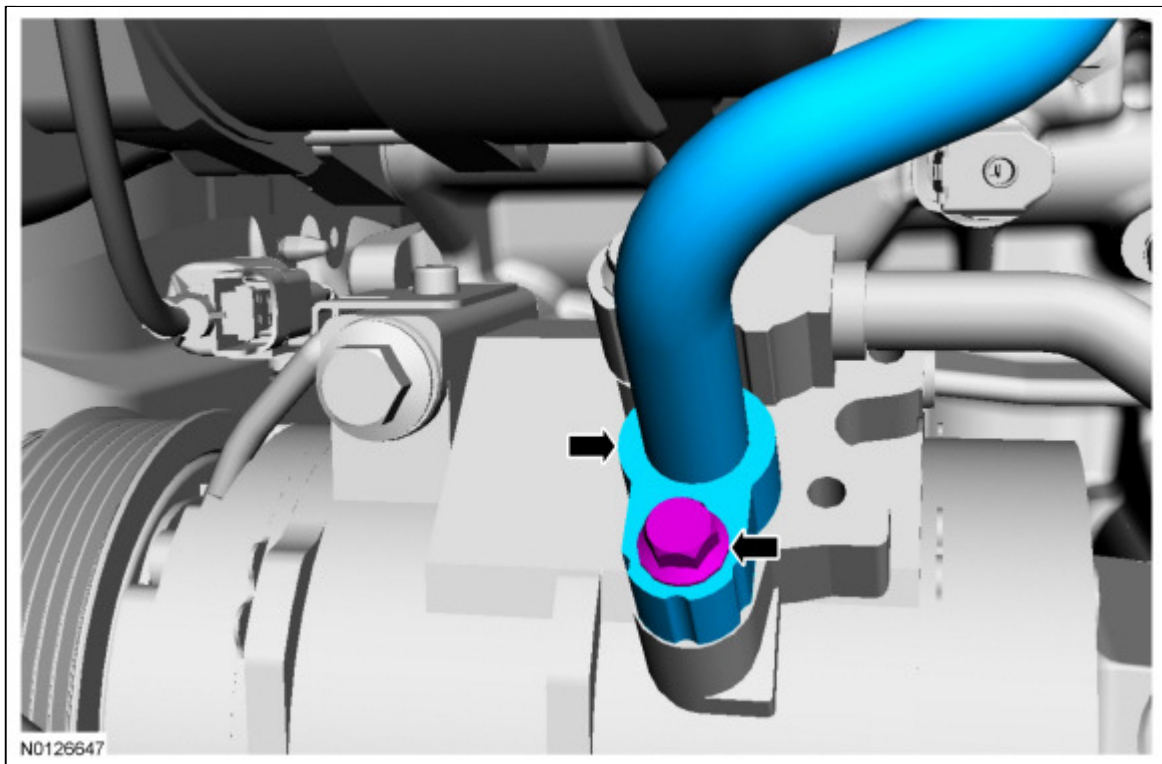
25. Install the A/C pressure tube bracket and bolt.
- Tighten to 8 Nm (71 lb-in).



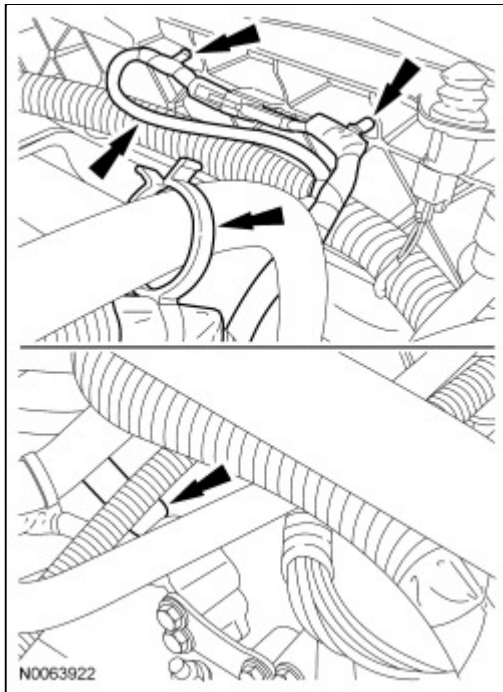
26. Install the A/C suction tube and connect the fitting.
- Install the safety clip onto the fitting.



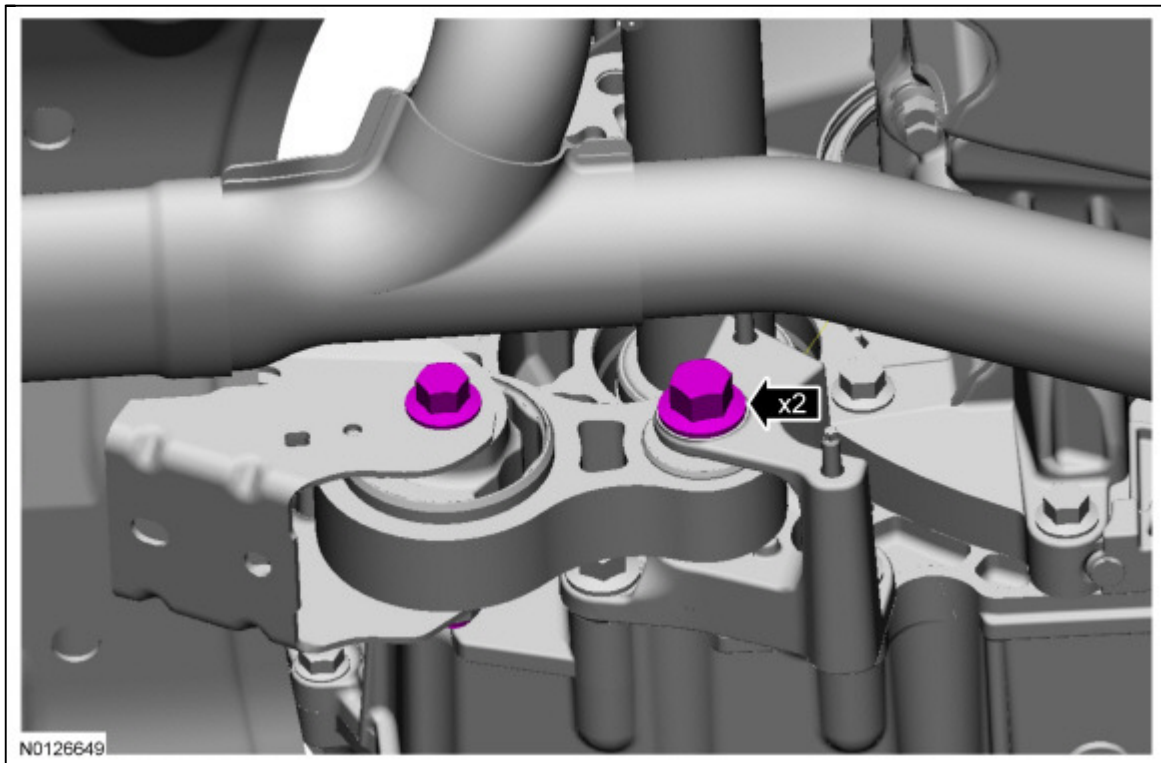
27. Using a new O-ring seal, install the A/C suction tube and bolt.
- Tighten to 9 Nm (80 lb-in).



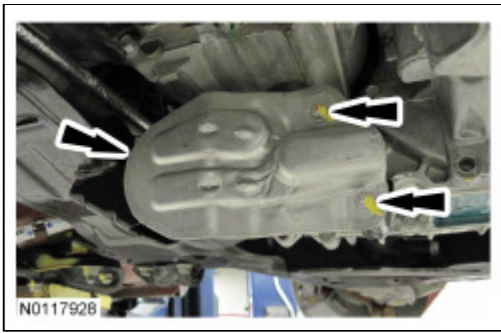
28. Install the LH and RH valve covers. For additional information, refer to [Valve Cover — LH](#) and [Valve Cover — RH](#) in this section.
29. Install the engine Air Cleaner (ACL) and ACL outlet pipe. For additional information, refer to [Section 303-12](#).
30. If equipped, attach the engine block heater harness to the radiator support, the A/C suction tube and the engine wiring harness.



31. Install the RH front halfshaft. For additional information, refer to [Section 205-04](#).
32. Tighten the 2 engine roll restrictor through bolts to 115 Nm (85 lb-ft).

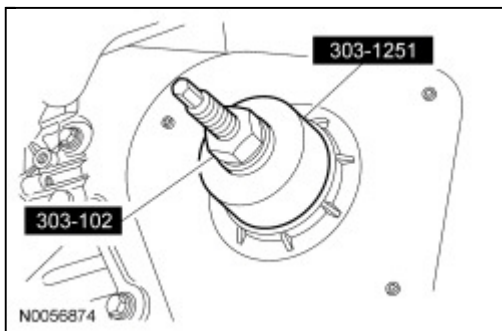


33. Install the roll restrictor heat shield and the 2 nuts.
 - Tighten to 9 Nm (80 lb-in).



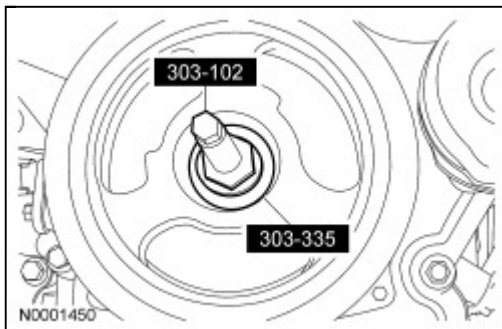
34. **NOTE:** Apply clean engine oil to the crankshaft front seal bore in the engine front cover.

Using the Crankshaft Vibration Damper Replacer and Front Crankshaft Seal Installer, install a new crankshaft front seal.

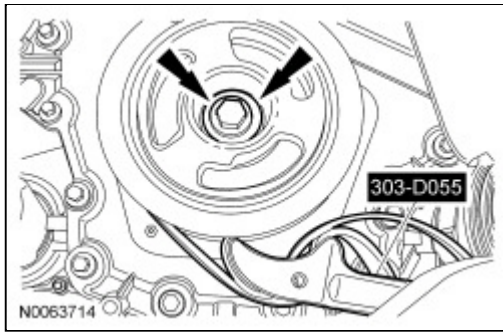


35. **NOTE:** Lubricate the outside diameter sealing surfaces with clean engine oil.

Using the Crankshaft Vibration Damper Replacer and Front Cover Oil Seal Installer, install the crankshaft pulley.



36. Using the Strap Wrench, install the crankshaft pulley washer and new bolt and tighten in 4 stages.
- Stage 1: Tighten to 120 Nm (89 lb-ft).
 - Stage 2: Loosen one full turn.
 - Stage 3: Tighten to 50 Nm (37 lb-ft).
 - Stage 4: Tighten an additional 90 degrees.



37. Install the accessory drive belt, tensioner and the power steering belt. For additional information, refer to [Section 303-05](#).
38. Install the engine appearance cover. For additional information, refer to [Engine Appearance Cover — Exploded View](#) in this section.
39. **NOTICE: Do not expose the Motorcraft® High Performance Engine RTV Silicone to engine oil for at least 90 minutes after installing the engine front cover. Failure to follow this instruction may cause oil leakage.**

Fill the engine with clean engine oil.
40. Connect the battery ground cable. For additional information, refer to [Section 414-01](#).
41. Evacuate and recharge the A/C system. For additional information, refer to [Section 412-00](#).
42. After completing the repairs, use the scan tool to perform the Misfire Monitor Neutral Profile Correction procedure following the on-screen instructions.

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