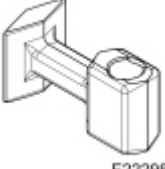
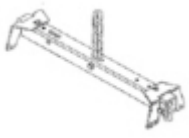



## Engine

### Special Tool(s) / General Equipment

 E222983	<a href="#">303-103</a> (T74P-6375-A) Holding Tool, Flywheel T74P-77000-A TKIT-2009TC-F
	<a href="#">303-F047</a> Lifting Bracket, Engine
	<a href="#">303-F070</a> Support Bar, Engine TKIT-1999A-F/LT TKIT-1999A-FM/FLM
Magnetic Socket	
Floor Crane	
Clutch Alignment Tool	
Trolley Jack	
Wooden Block	

### Materials

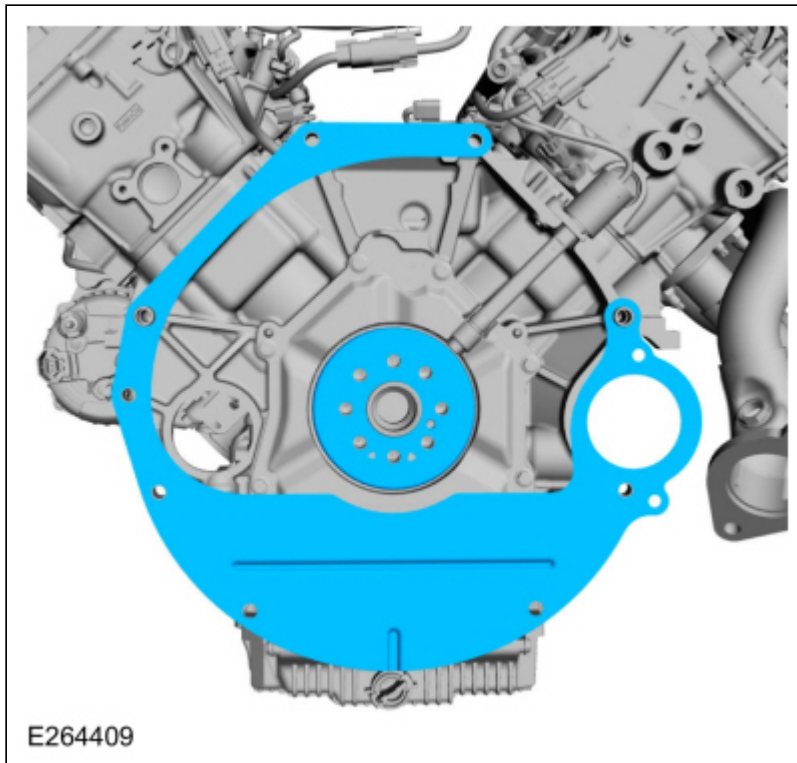
Name	Specification
Motorcraft® Multi-Purpose Grease Spray XL-5-A	ESB-M1C93-B

### All vehicles

- NOTE:** Engine equipped with manual transmission shown, automatic transmission engine similar.

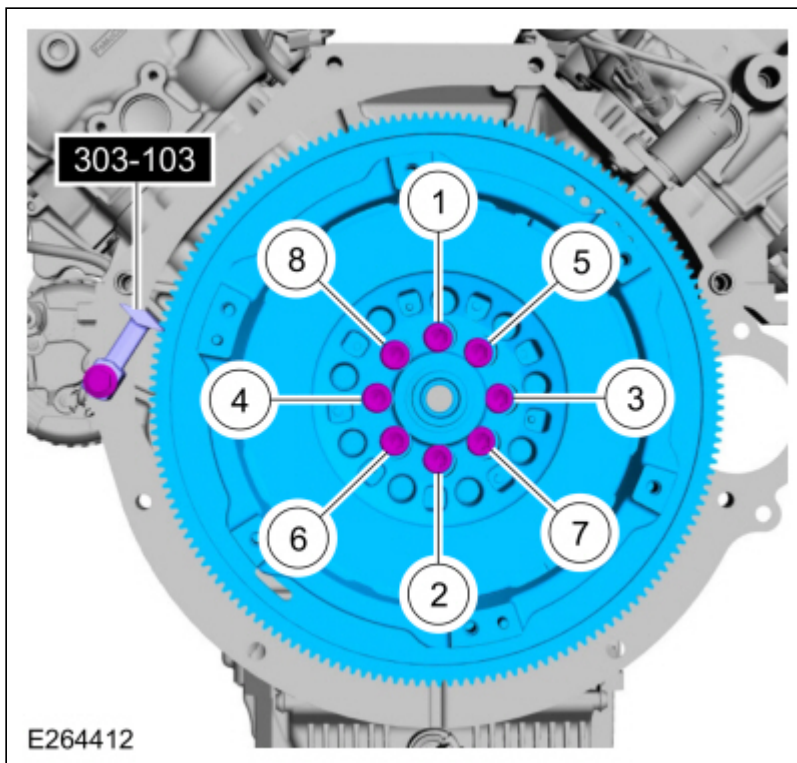
Install the engine-to-transmission spacer plate and the crankshaft sensor ring.





**6-Speed Manual Transmission – 3160/6-Speed Manual Transmission – MT82**

2. Install the flywheel and the bolts.  
 Install Special Service Tool: [303-103 \(T74P-6375-A\) Holding Tool, Flywheel.](#)  
*Torque:*  
 Stage 1: 28 lb.ft (38 Nm)  
 Stage 2: 90°



3. **NOTICE:** If installing a new pressure plate and/or flywheel, align the paint dot on the pressure plate as close as possible to the paint dot on the flywheel or a clutch system vibration can occur.

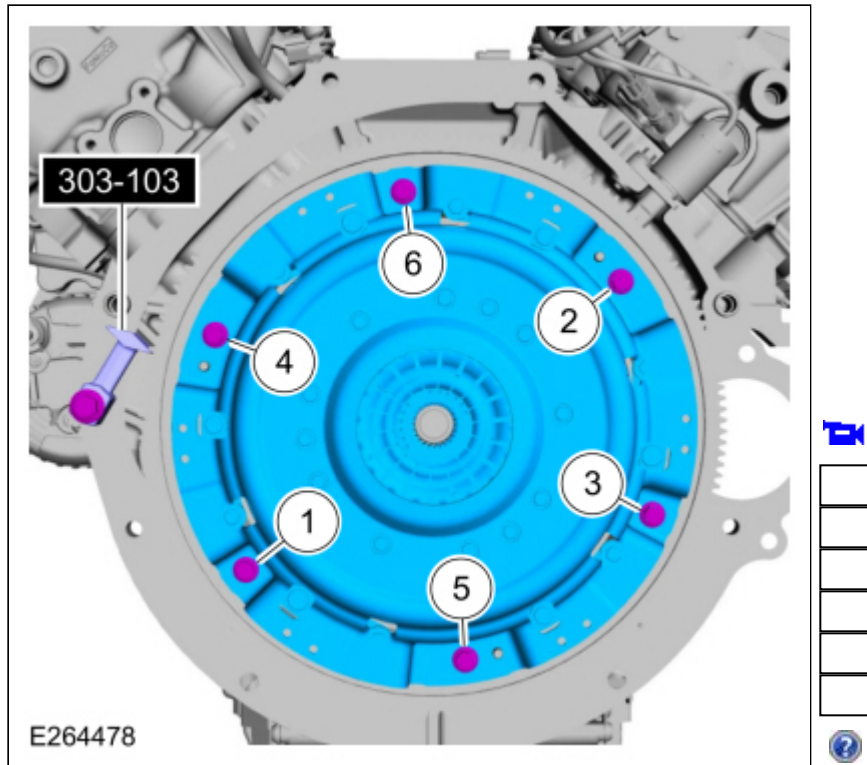
**NOTICE:** If installing the original pressure plate, align it using the index-marks made during removal or a clutch system vibration can occur.

Using a clutch aligner, position the clutch disc on the flywheel. If installing the original pressure plate, align the pressure plate to the flywheel using the index-marks made during removal. If installing a new pressure plate, align the pressure plate to the flywheel using the paint dots. Install new pressure plate bolts by turning the bolts 1 turn at a time in a star pattern until the clutch is fully secured.

Install Special Service Tool: [303-103 \(T74P-6375-A\) Holding Tool, Flywheel.](#)

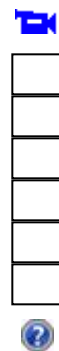
Use the General Equipment: Clutch Alignment Tool

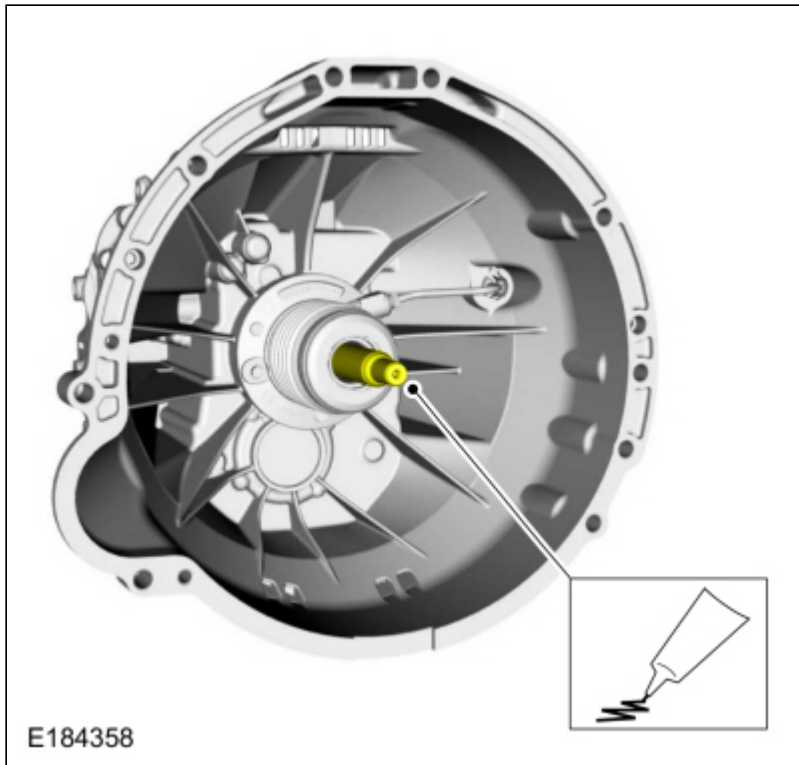
*Torque:* 26 lb.ft (35 Nm)



4. Lubricate the input shaft with multi-purpose grease.

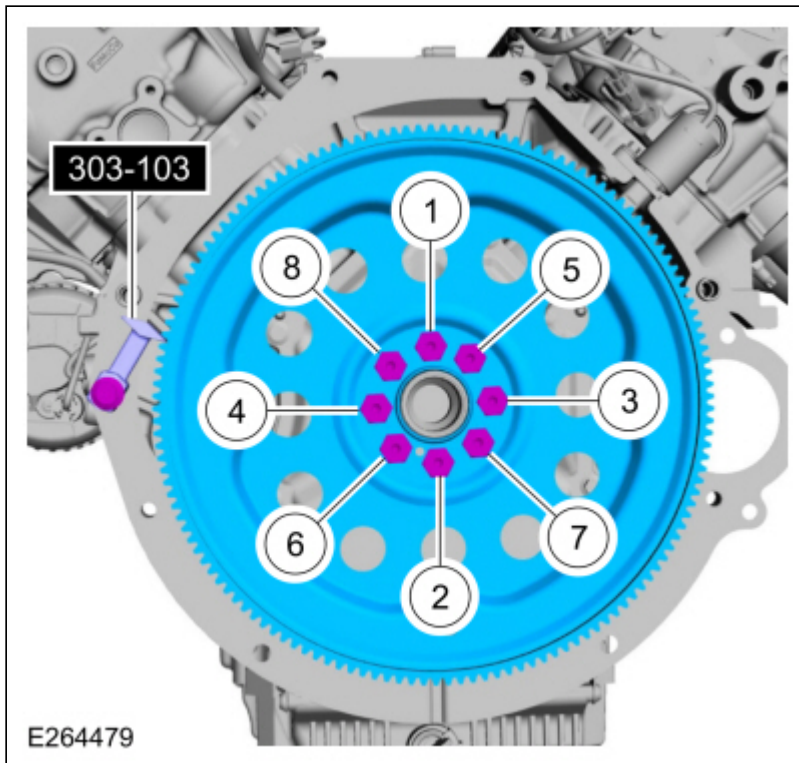
*Material:* Motorcraft® Multi-Purpose Grease Spray / XL-5-A (ESB-M1C93-B)





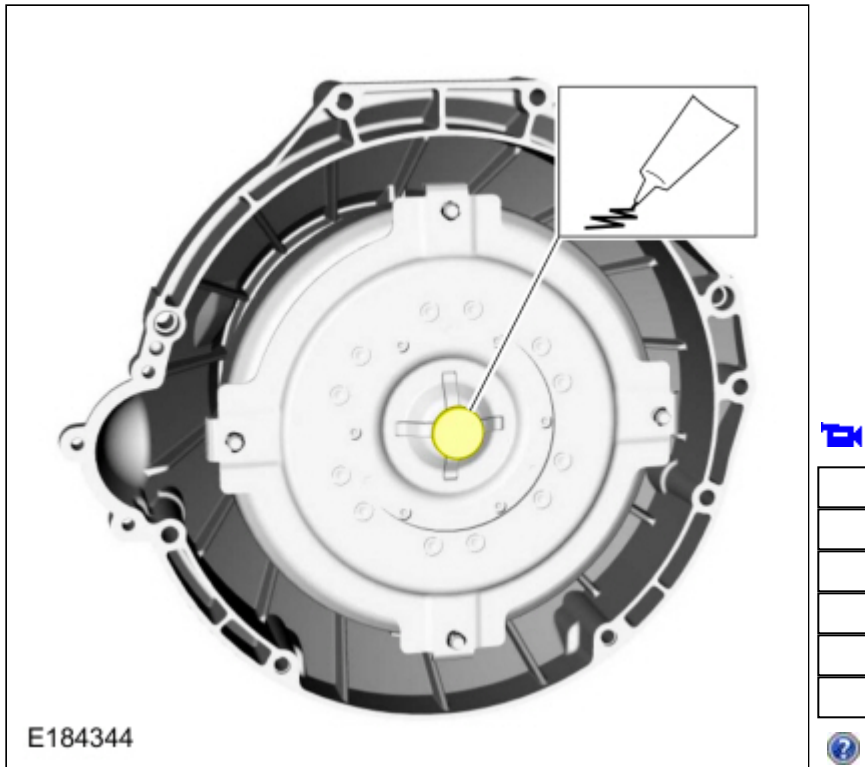
**10-Speed Automatic Transmission – 10R80**

5. Install the flexplate and the bolts.  
 Install Special Service Tool: [303-103 \(T74P-6375-A\) Holding Tool, Flywheel.](#)  
*Torque:*  
 Stage 1: 43 lb.ft (58 Nm)  
 Stage 2: 45°



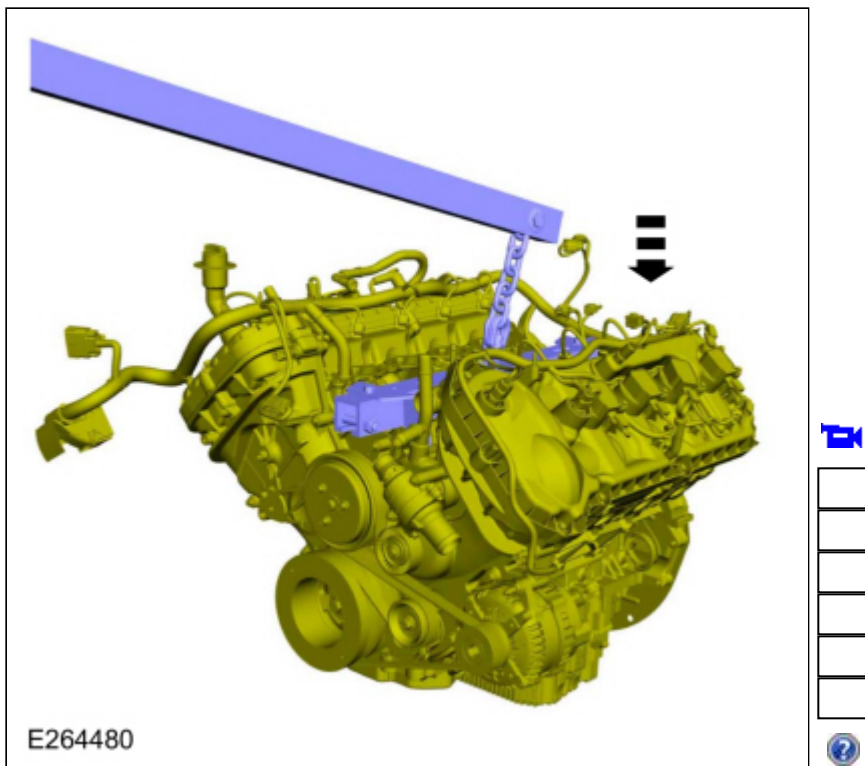
6. **NOTE:** Prior to installation of the engine, the torque converter pilot hub must be lubricated with multi-purpose grease or damage to the torque converter or the engine crankshaft can occur.

Lubricate the torque converter pilot hub with multi-purpose grease.  
*Material:* Motorcraft® Multi-Purpose Grease Spray / XL-5-A (ESB-M1C93-B)

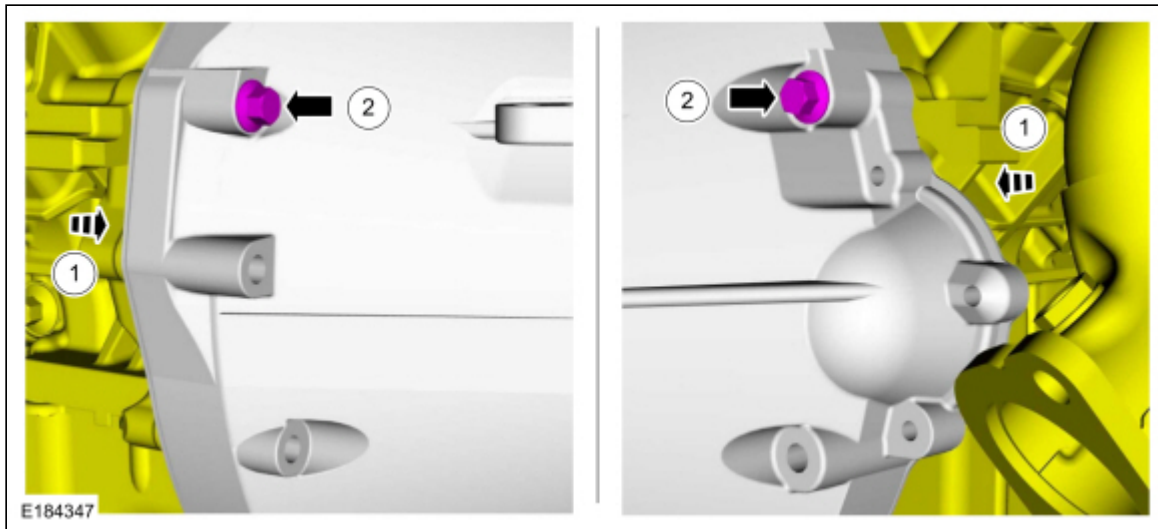


**All vehicles**

7. With the aid of an assistant, use the Floor Crane to install the engine into the vehicle.  
Use the General Equipment: Floor Crane



8.
  1. Align the engine to the transmission.
  2. Draw the engine and transmission together using the bolts.  
*Torque:* 35 lb.ft (48 Nm)

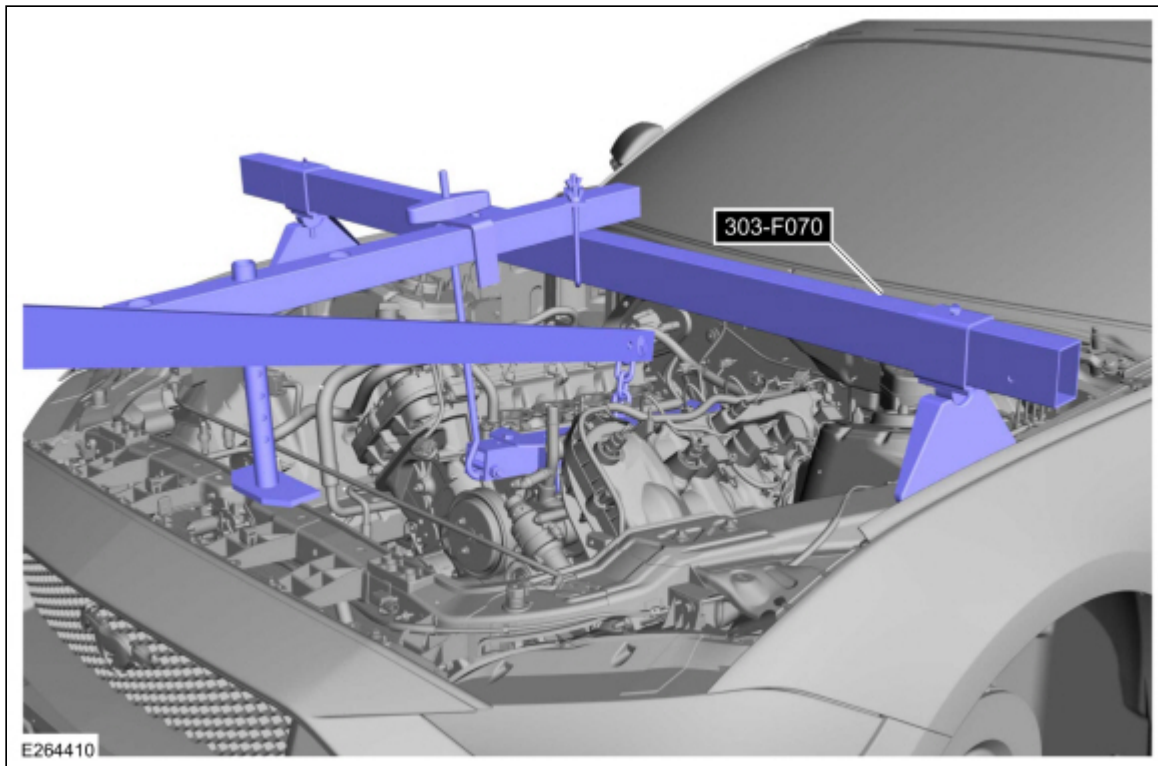


E184347



9. **NOTICE:** Do not position the legs of the Engine Support Bar on the fenders. Instead, the legs should be positioned on the body structure. Failure to follow these instructions may result in body damage.

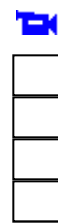
1. Install the special tools.  
Install Special Service Tool: [303-F070 Support Bar, Engine.](#)
2. Once the engine is supported by the Engine Support Bar, remove the Floor Crane.  
Use the General Equipment: Floor Crane

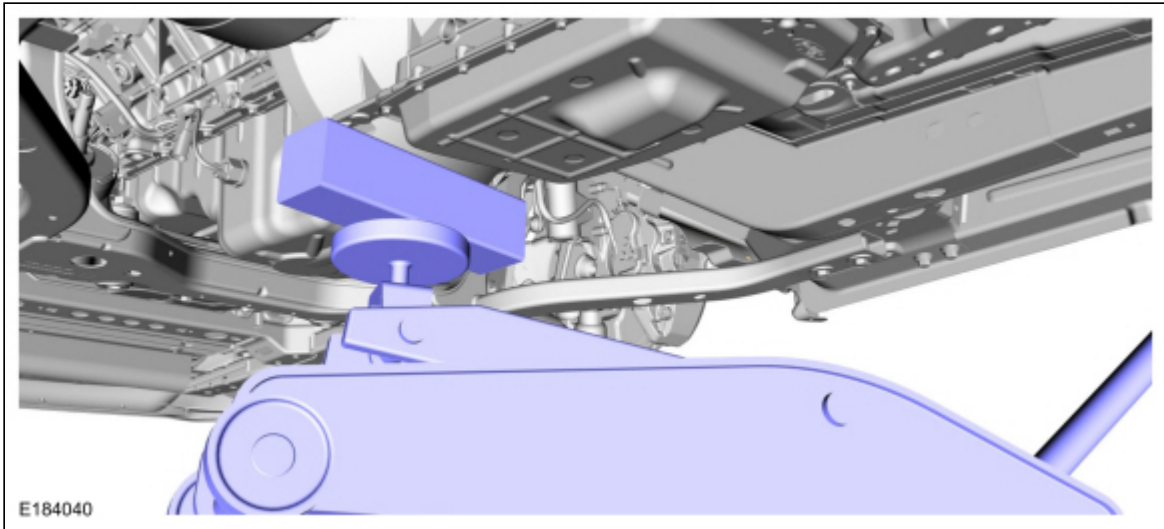


E264410



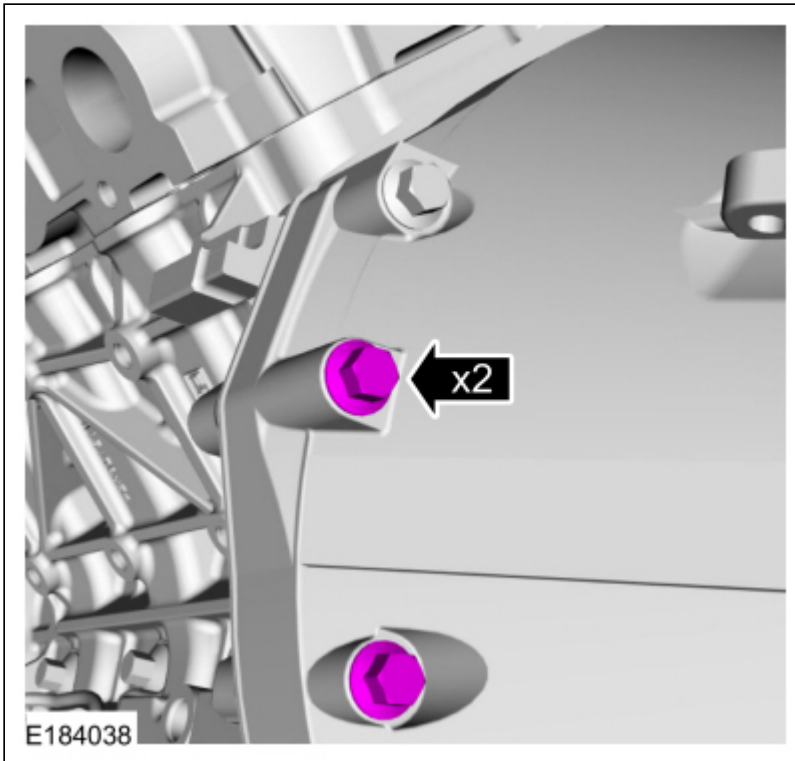
10. Remove the jack and wooden block.  
Use the General Equipment: Wooden Block  
Use the General Equipment: Trolley Jack





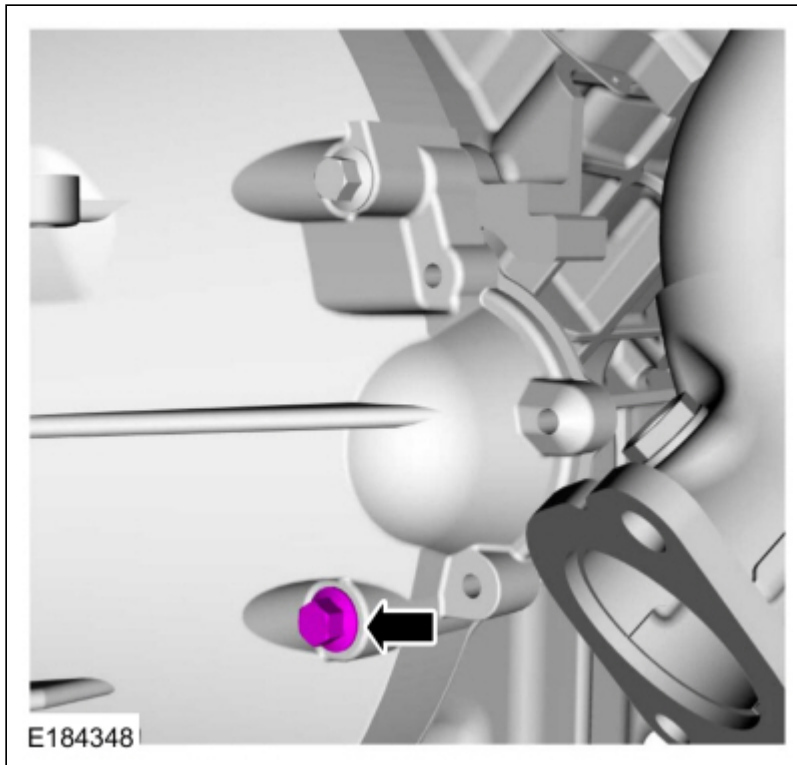
E184040

11. Install LH transmission-to-engine bolts.  
*Torque: 35 lb.ft (48 Nm)*

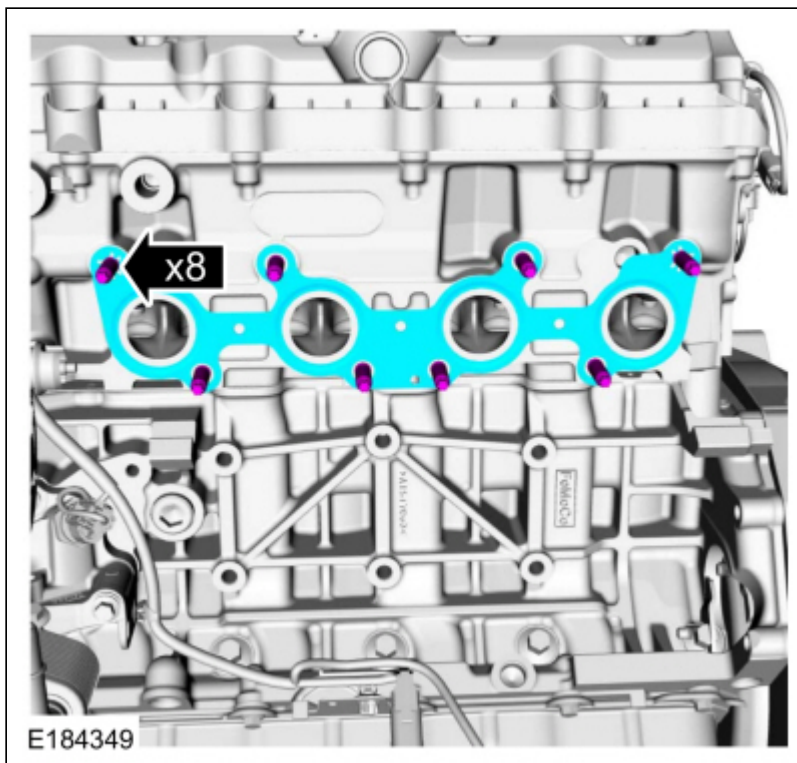


E184038

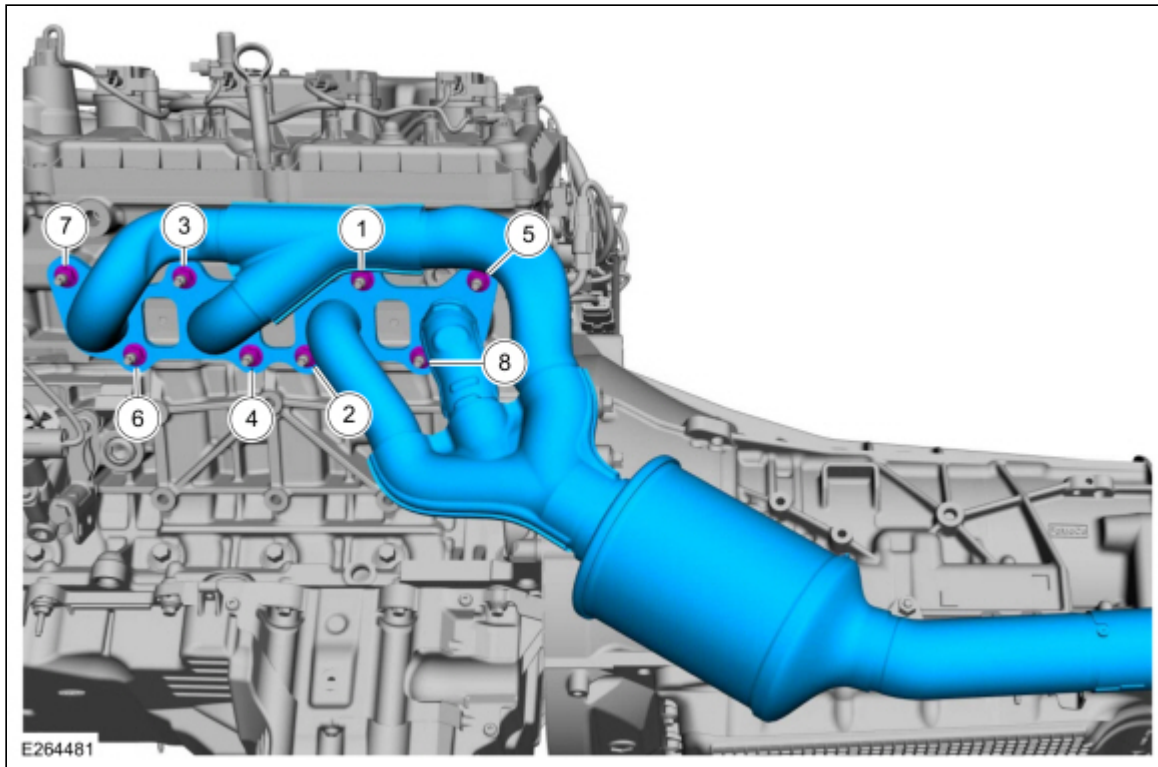
12. Install the RH transmission-to-engine bolt.



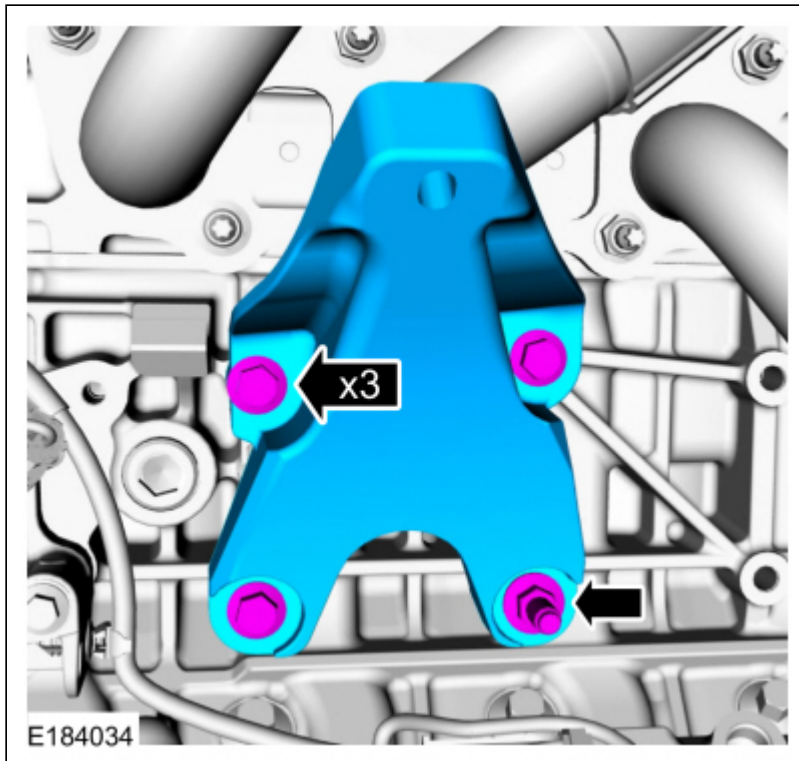
13. Install new studs and new gasket.  
*Torque:* 18 lb.ft (25 Nm)



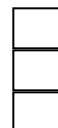
14. Install the LH catalytic converter.
- Install the new nuts.
- Torque:*  
 Stage 1: 18 lb.ft (24 Nm)  
 Stage 2: 24 lb.ft (32 Nm)

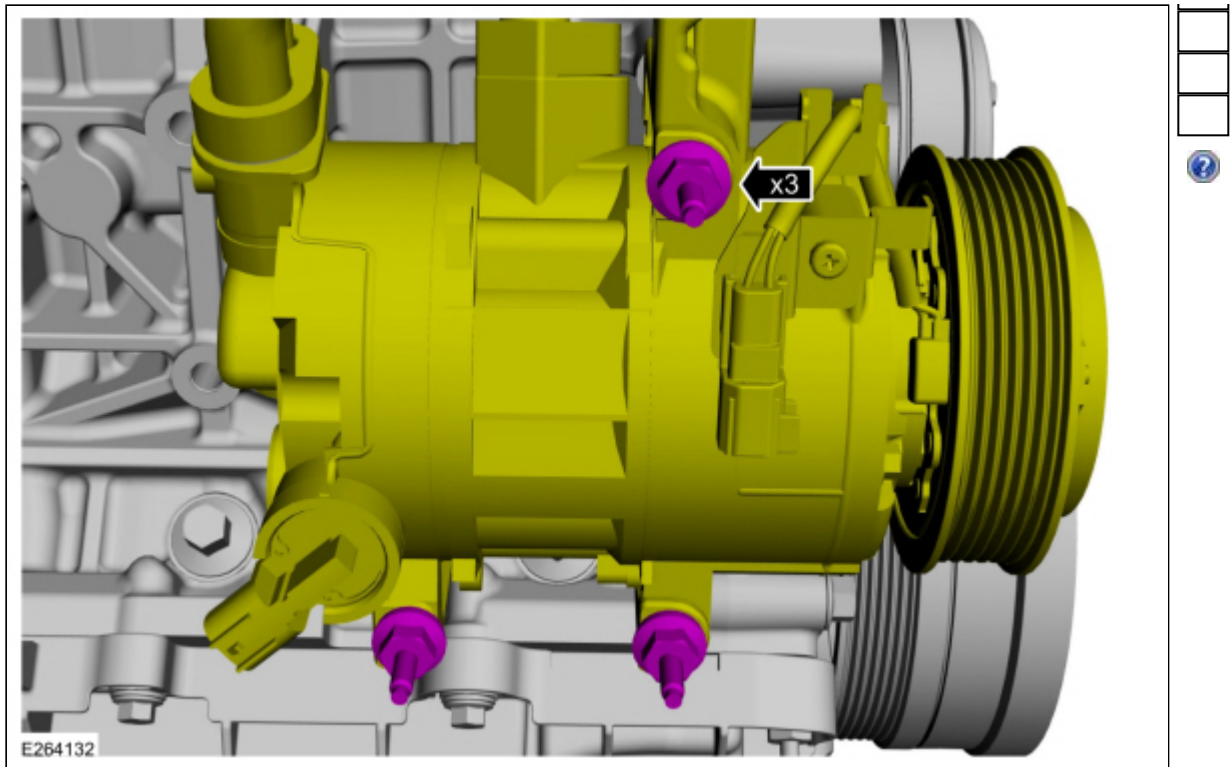


15. Install the LH engine mount bracket, bolts and stud bolt.  
*Torque: 46 lb.ft (62.5 Nm)*

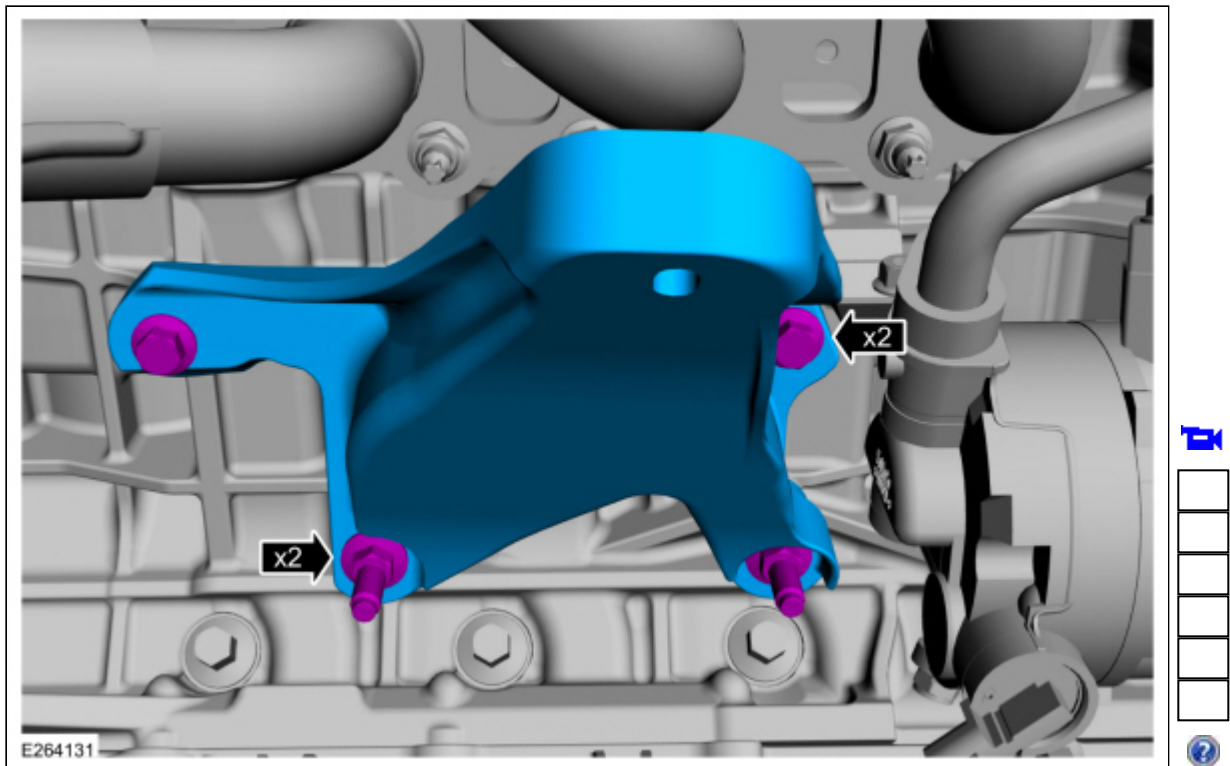


16. Install the A/C compressor and the stud bolts.  
*Torque: 18 lb.ft (25 Nm)*



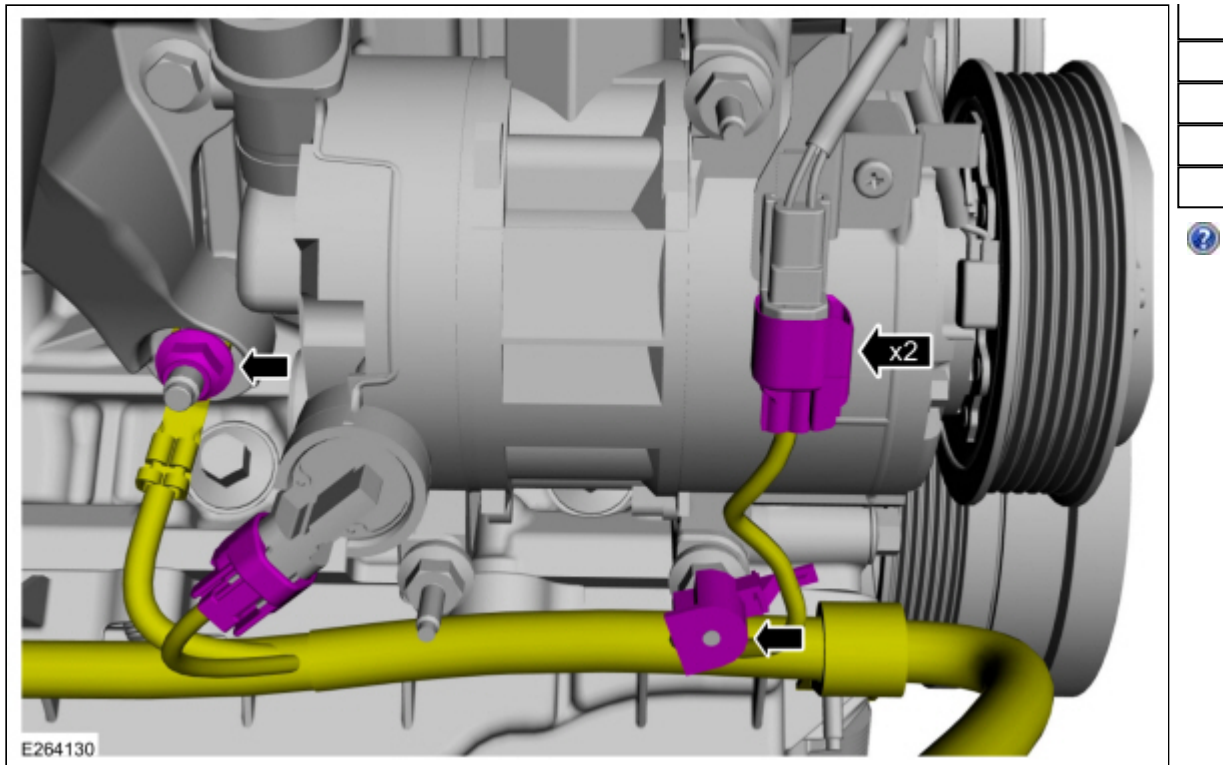


17. Install the RH engine mount bracket, bolts and stud bolts.  
*Torque: 46 lb.ft (62.5 Nm)*

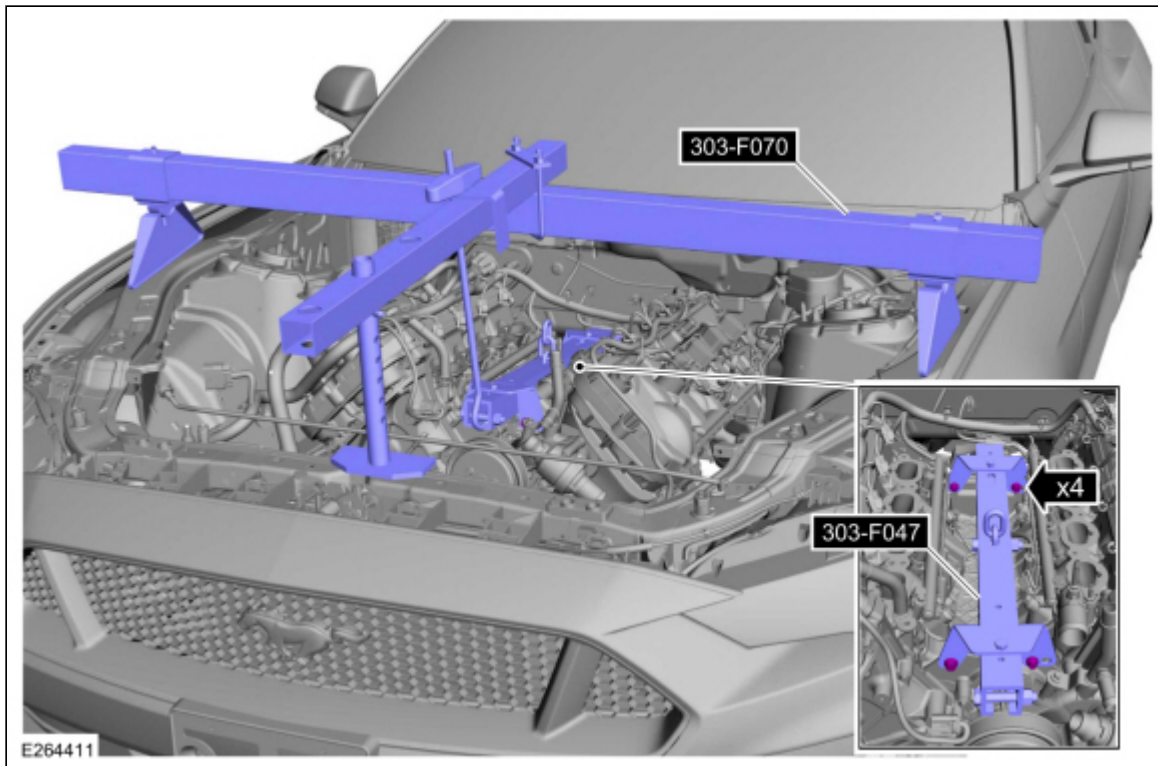


18. 1. Connect the A/C compressor electrical connectors.  
2. Attach the wiring harness retainer.  
3. Install the ground strap and nut onto the RH engine mount bracket stud bolt.  
*Torque: 35 lb.ft (48 Nm)*



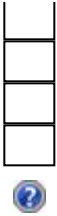
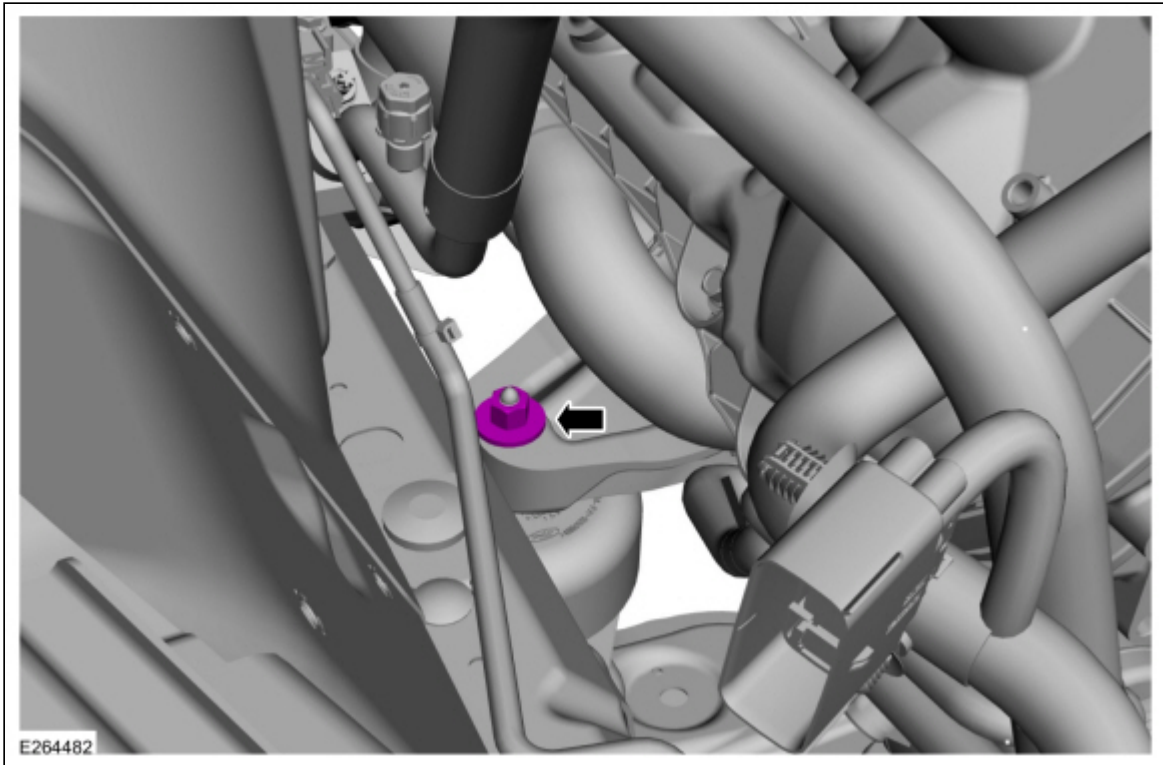


19. Lower the engine onto the engine mounts and remove the special tools  
 Install Special Service Tool: [303-F070 Support Bar, Engine.](#)  
 Use Special Service Tool: [303-F047 Lifting Bracket, Engine.](#)

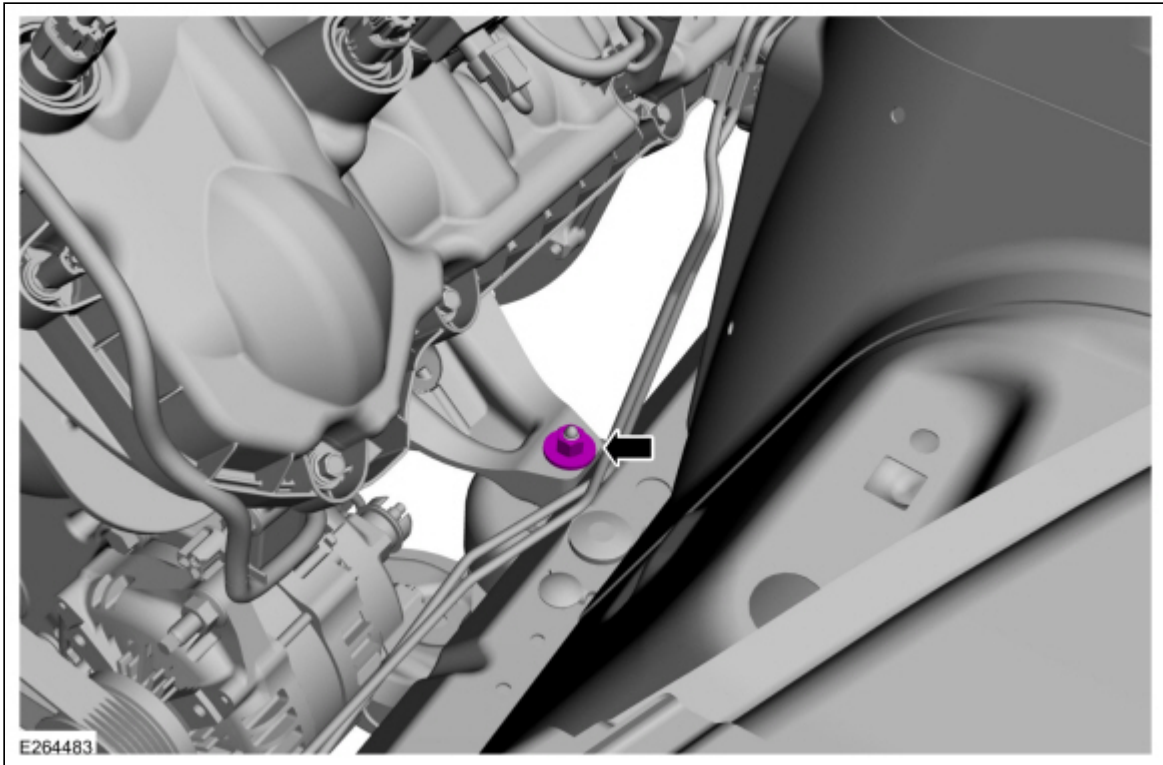


20. Install the RH engine mount nut.  
 Torque: 46 lb.ft (63 Nm)



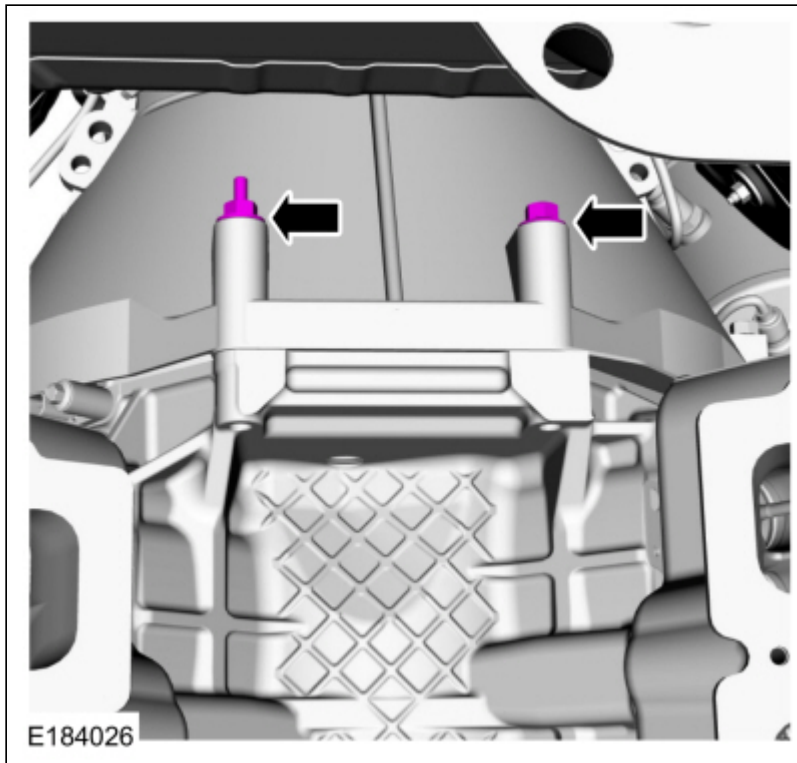


21. Install the LH engine mount nut.  
*Torque: 46 lb.ft (63 Nm)*

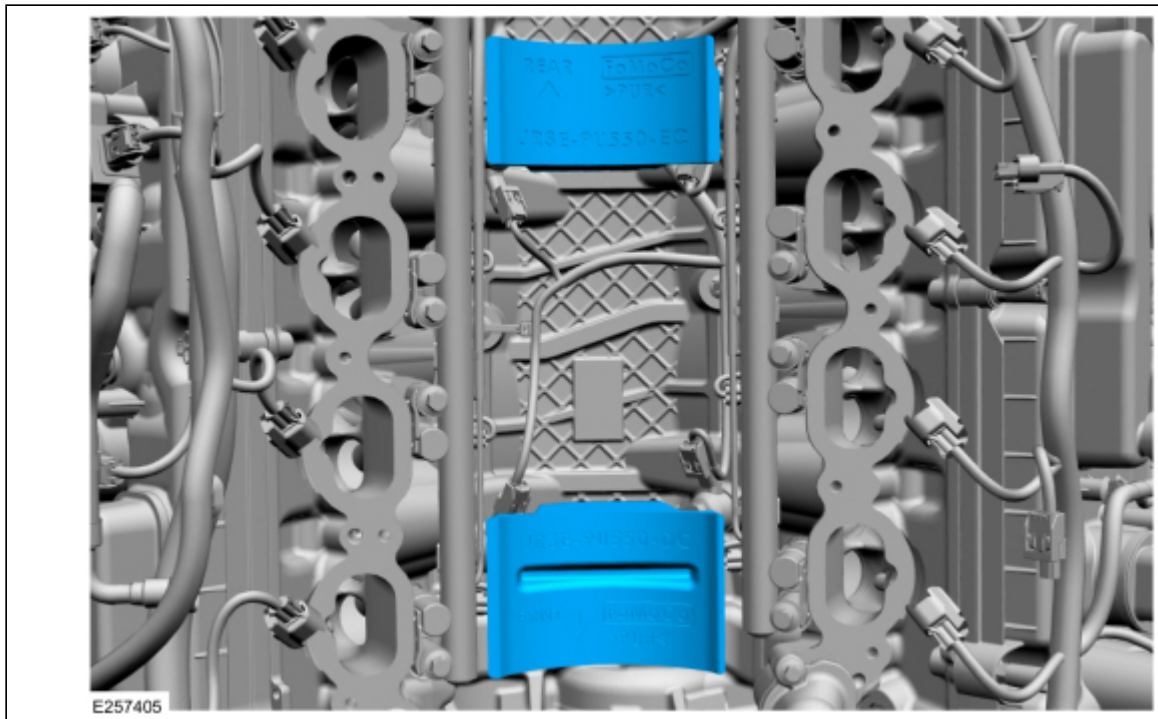


22. Install the top transmission-to-engine bolt and stud bolt.  
*Torque: 35 lb.ft (48 Nm)*





23. Install the insulators.

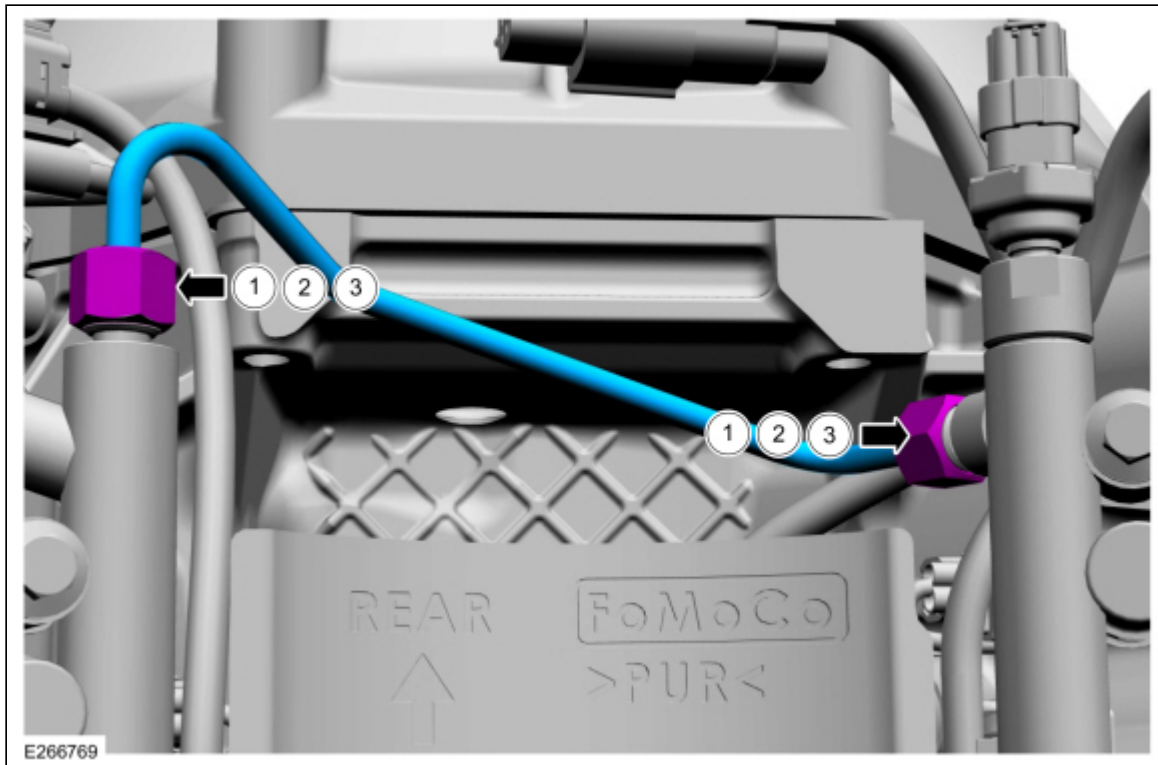


24. **NOTICE:** In stage 3, if the torque required to tighten any flare nut on the new high-pressure fuel tube reaches or exceeds 55 lb.ft (50 Nm), then that high pressure fuel tube must be discarded and replaced with another new high-pressure fuel tube.

*Torque:*

- Stage 1: Tighten the high-pressure fuel tube flare nuts to : 71 lb.in (8 Nm)
- Stage 2: Tighten the high-pressure fuel tube flare nuts to : 89 lb.in (10 Nm)
- Stage 3: Tighten the high-pressure fuel tube flare nuts an additional : 25°

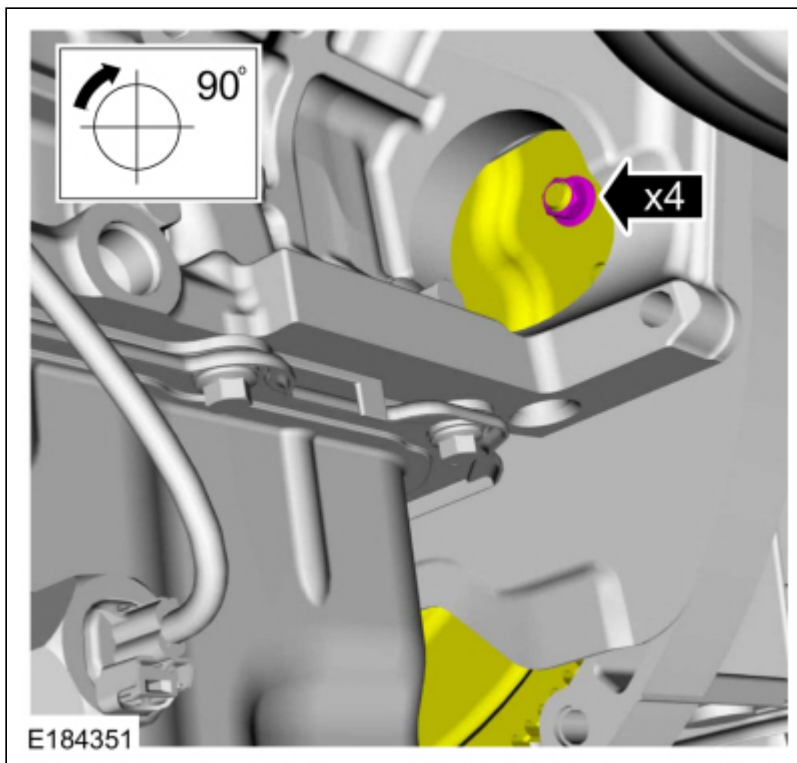




**10-Speed Automatic Transmission – 10R80**

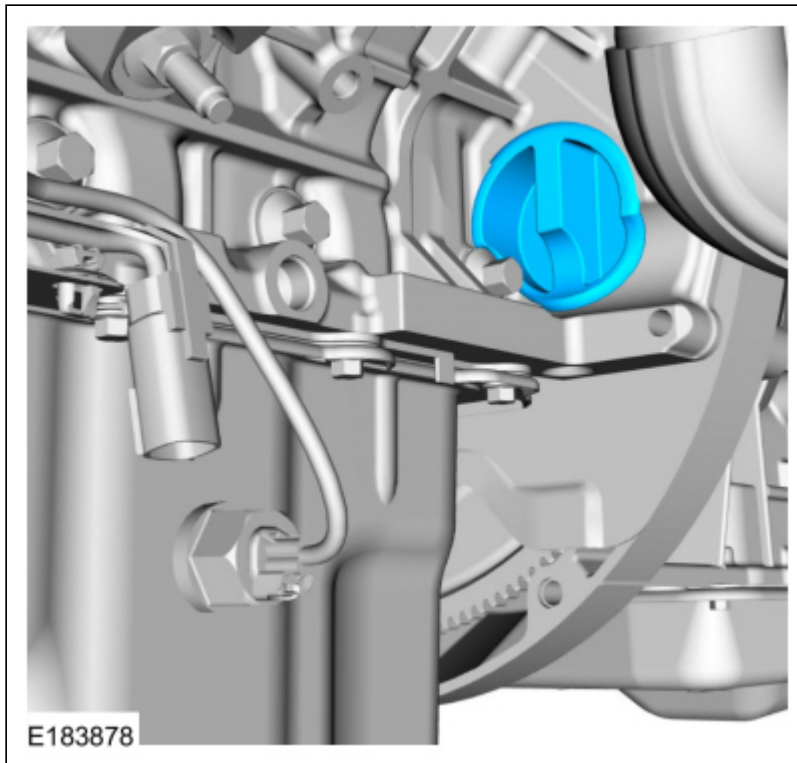
25. **NOTE:** Only rotate the crankshaft in a clockwise direction.

Install the new torque converter nuts.  
 Use the General Equipment: Magnetic Socket  
 Torque: 35 lb.ft (48 Nm)

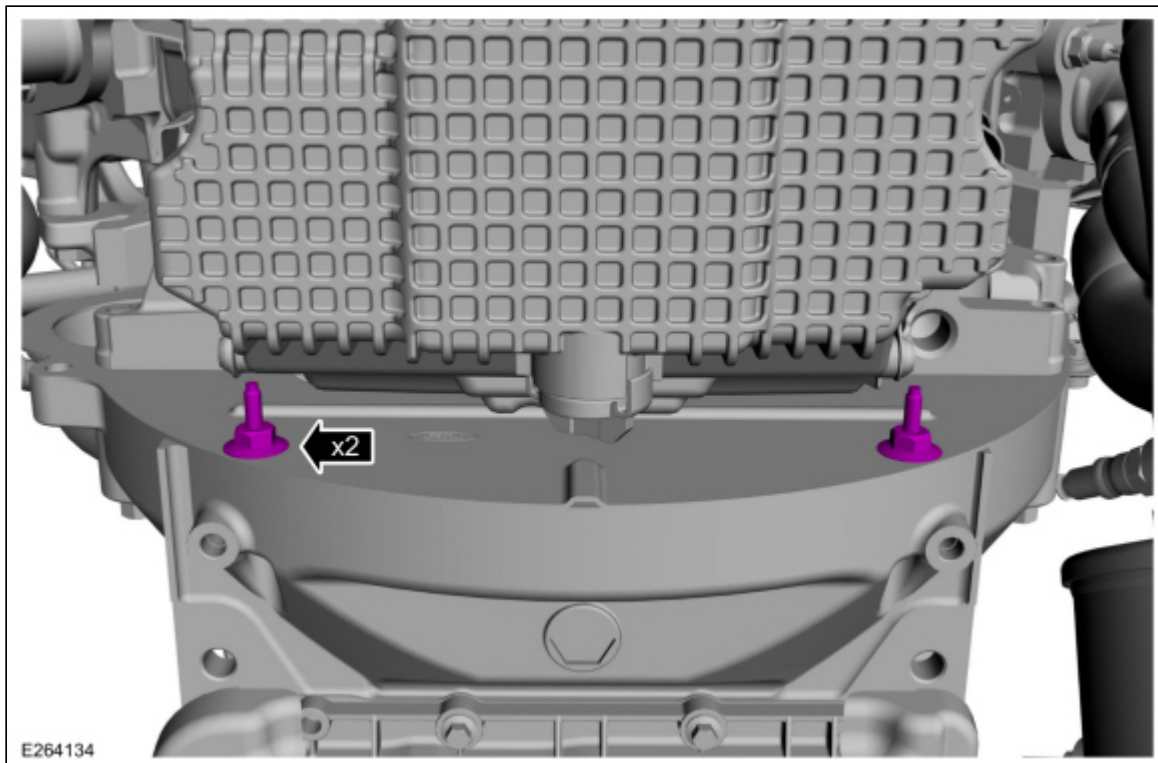


26. Install the rubber access plug.



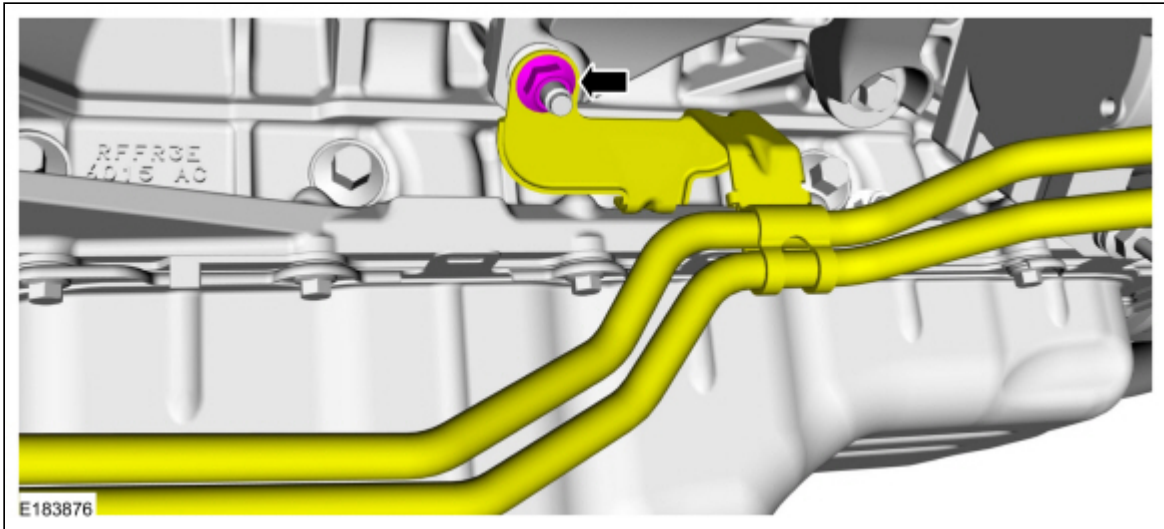


27. Install the stud bolts.  
*Torque: 35 lb.ft (48 Nm)*

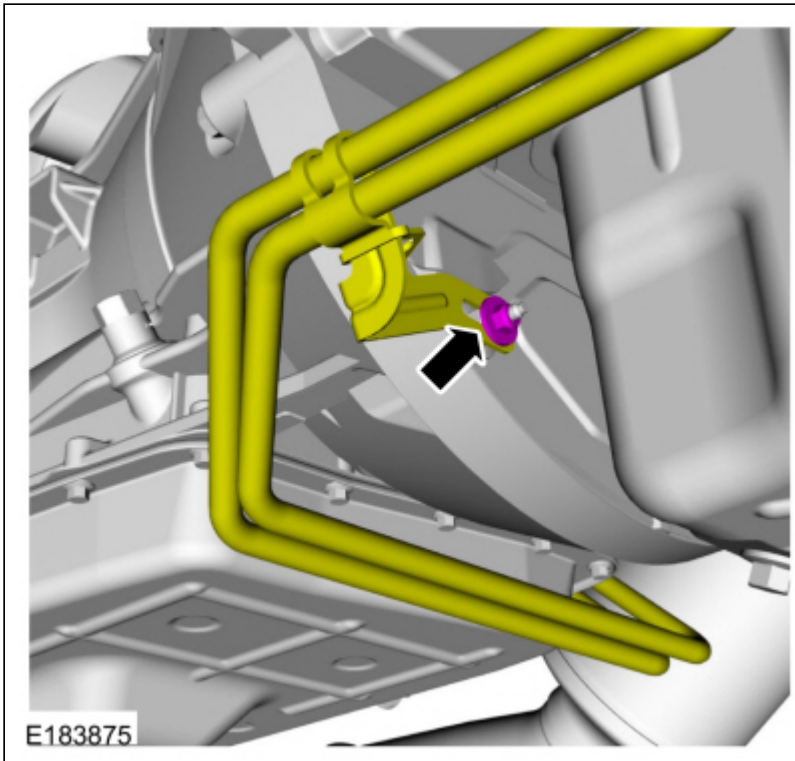


28. Install the transmission cooling tube bracket and nut.  
*Torque: 35 lb.ft (48 Nm)*

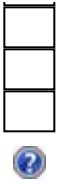


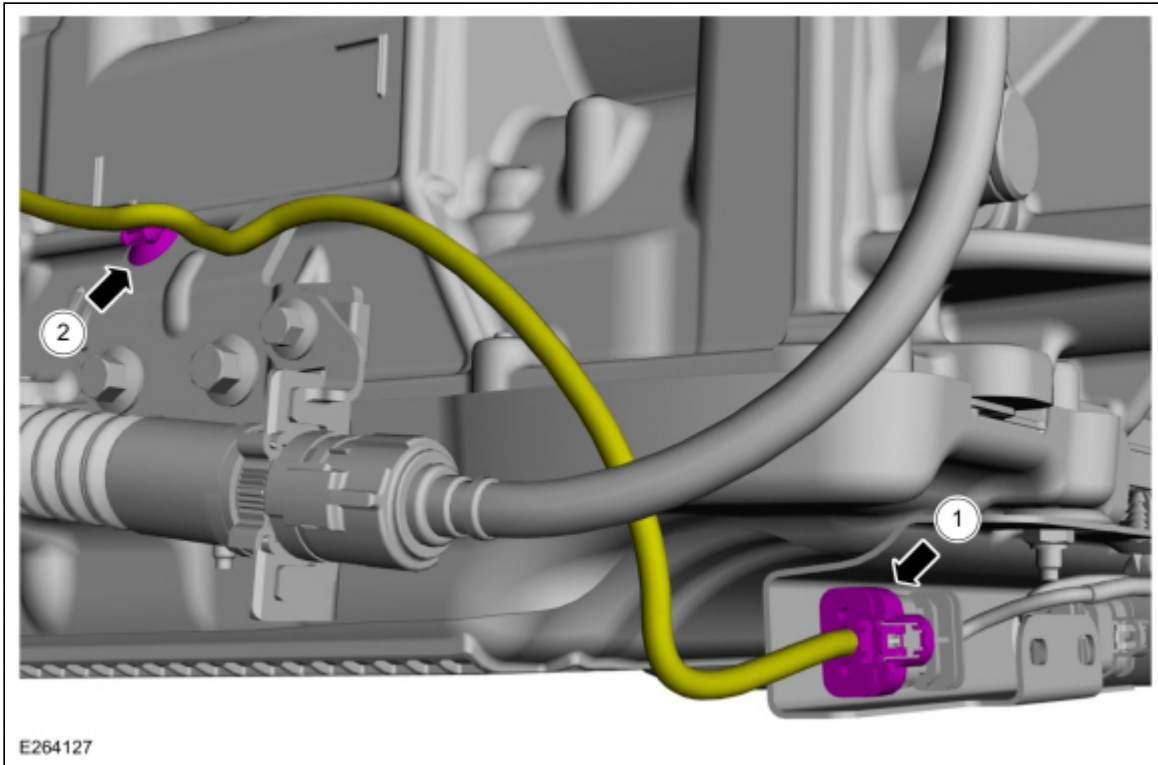


29. Install the transmission cooling tube bracket and nut.  
*Torque: 124 lb.in (14 Nm)*

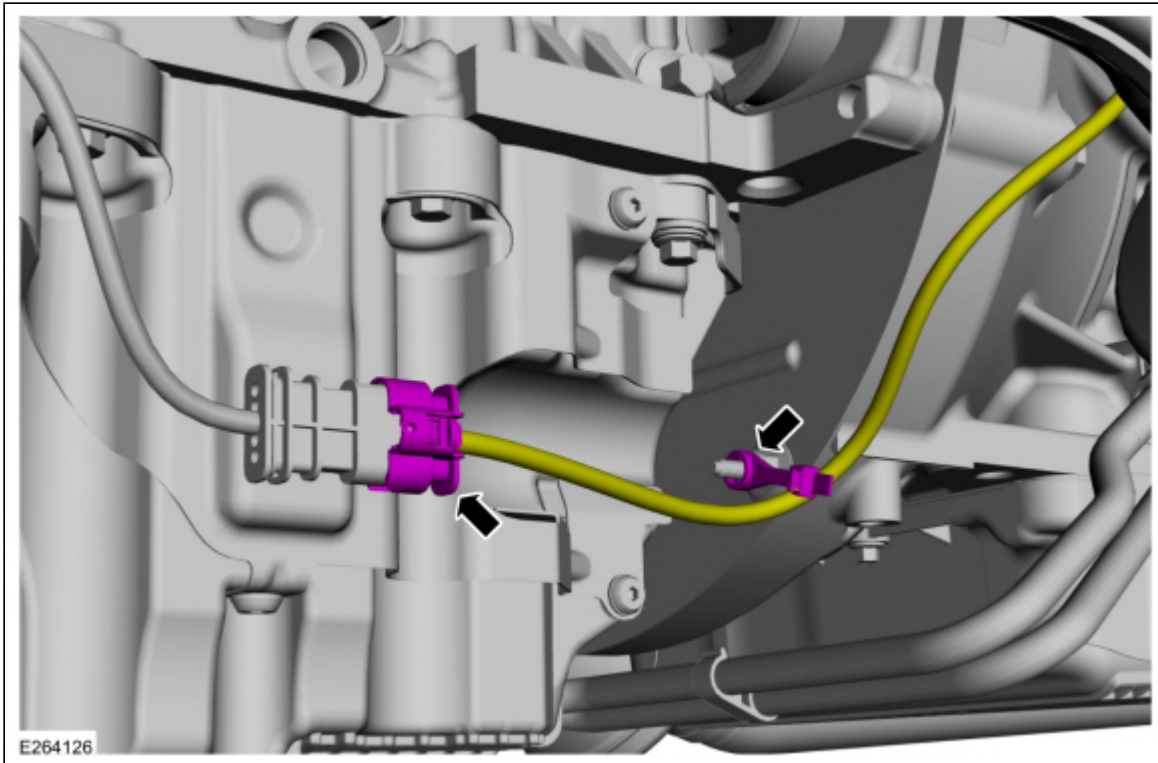


30. 1. Connect the HO2S electrical connector.  
2. Attach the wiring harness retainer.

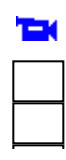
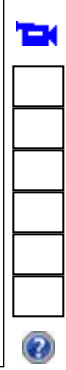


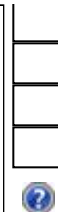
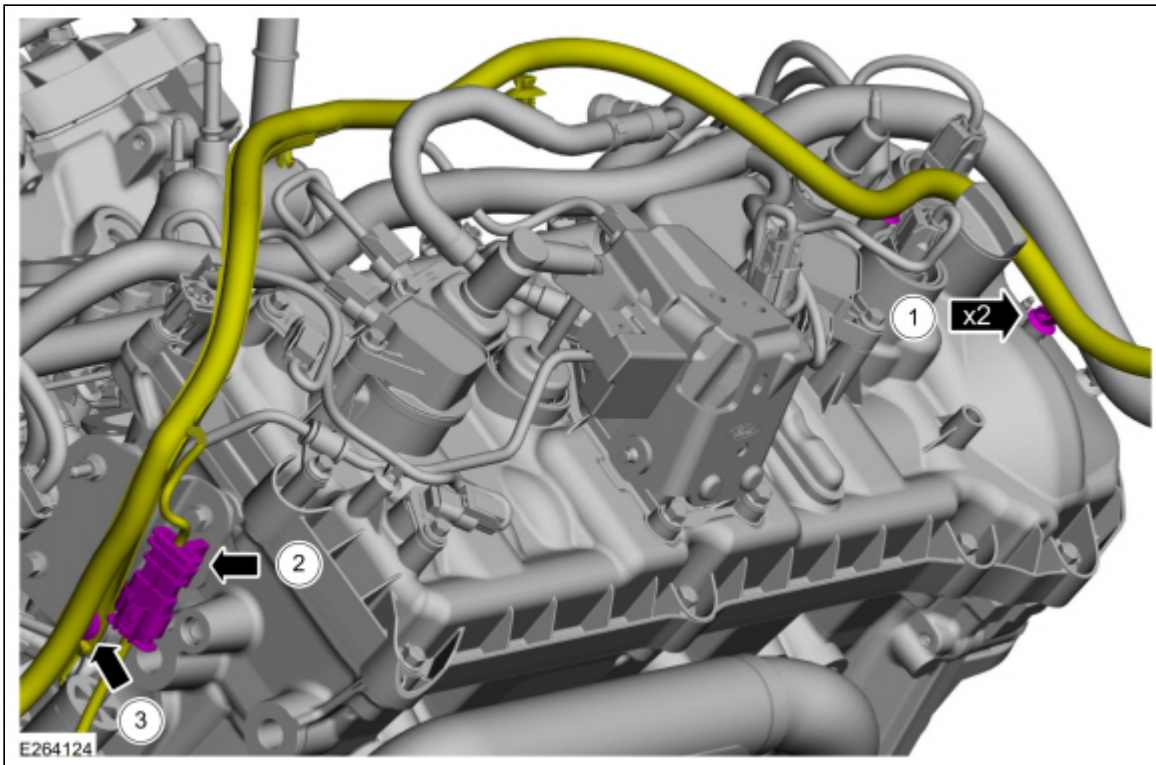


31. 1. Connect the HO2S electrical connector.  
 2. Attach the wiring harness retainer.



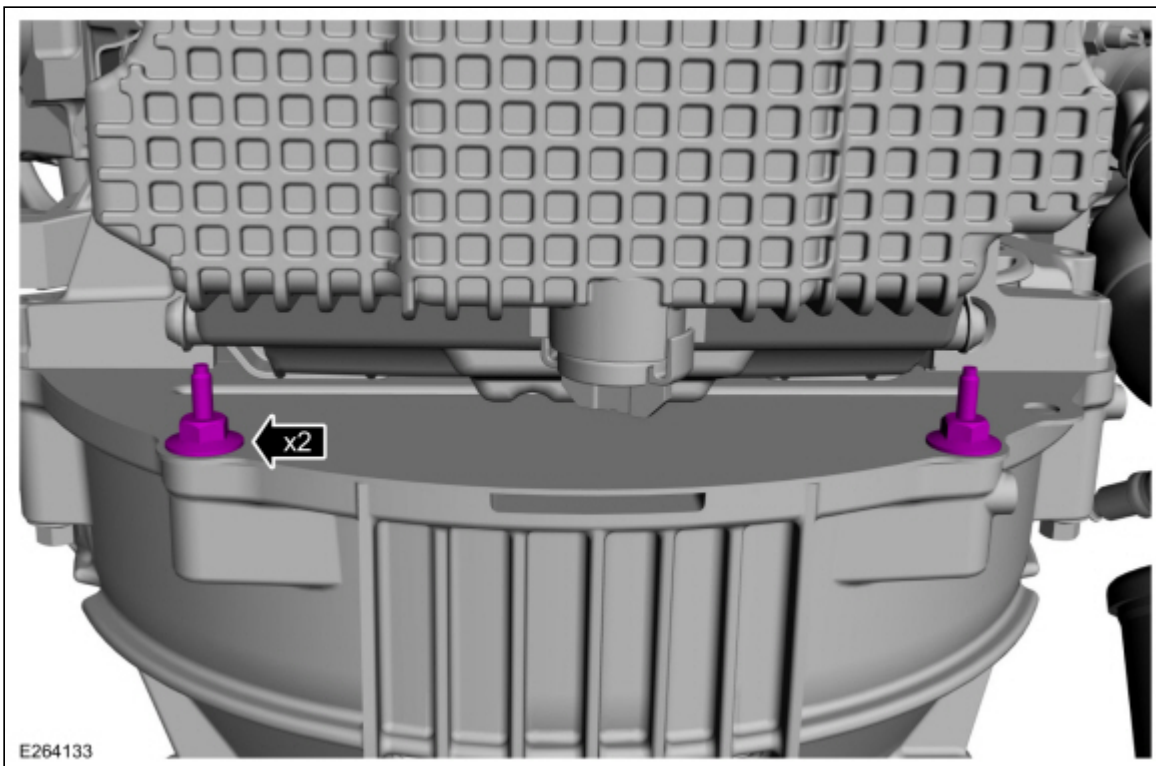
32. 1. Attach the wiring harness retainers.  
 2. Connect the HO2S electrical connector.  
 3. Attach the wiring harness retainer.





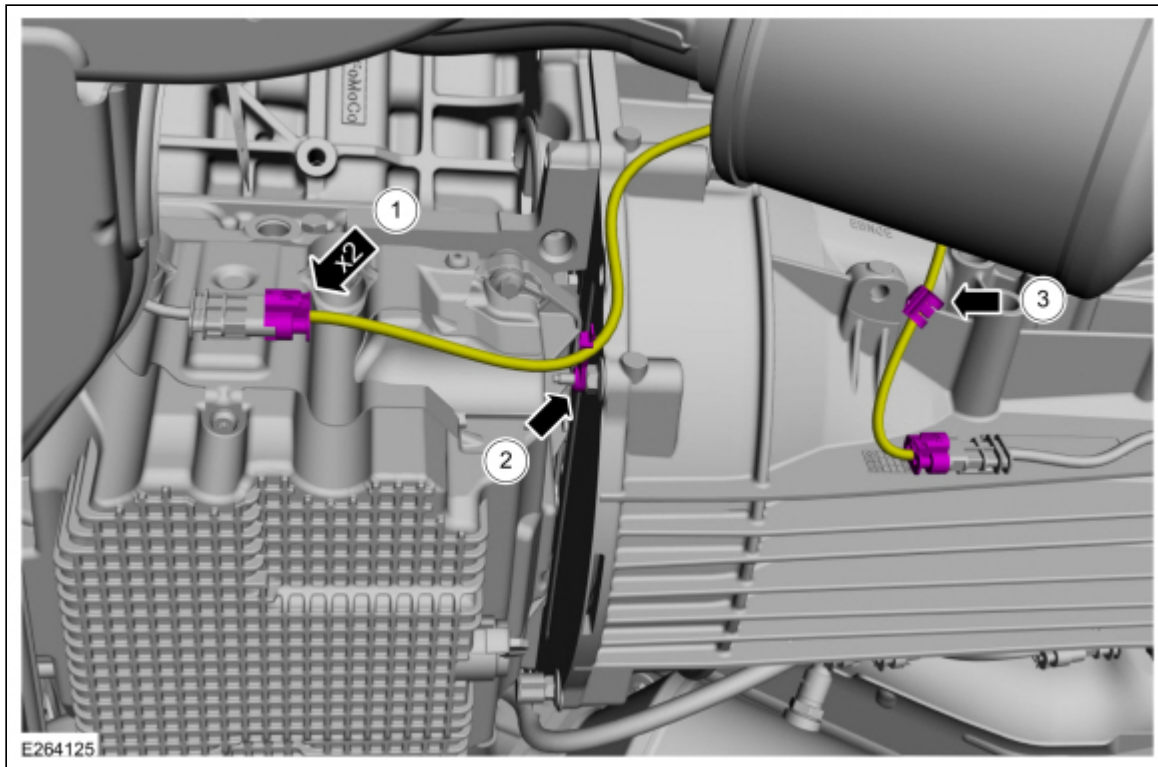
**6-Speed Manual Transmission – 3160/6-Speed Manual Transmission – MT82**

- 33. Install the engine rear cover plate stud bolts.  
*Torque: 35 lb.ft (48 Nm)*

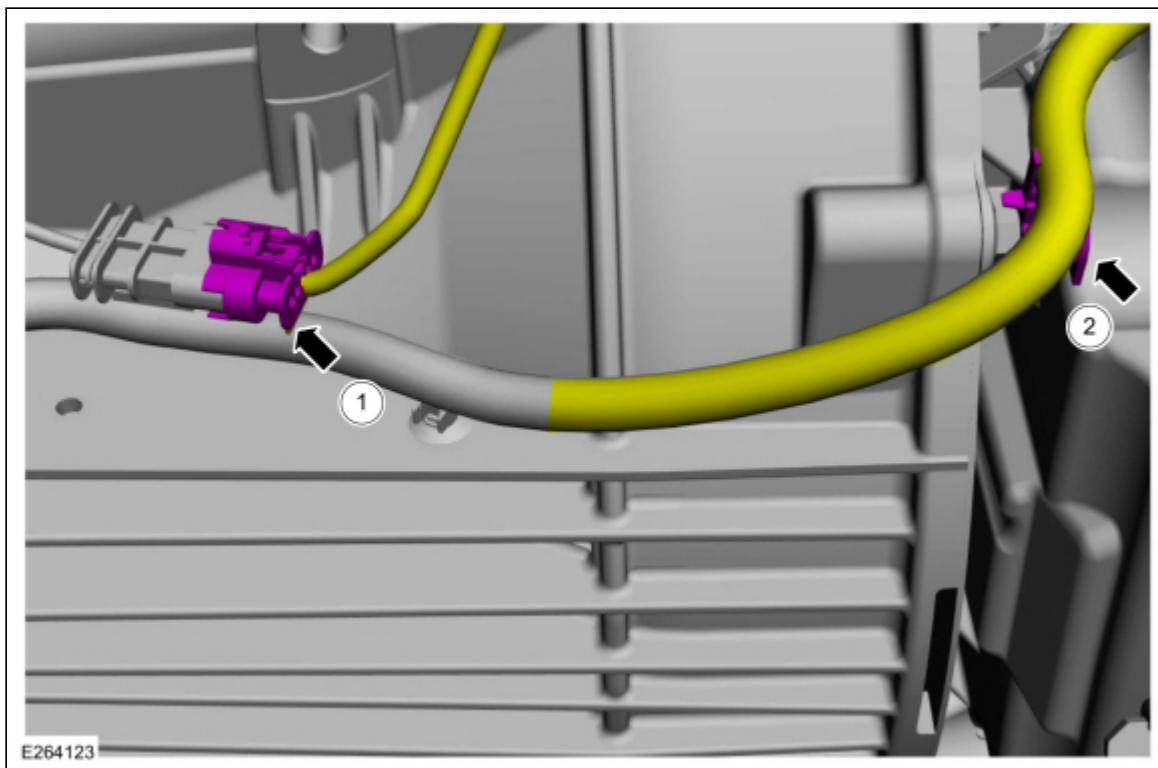


- 34.
  1. Connect the 2 wiring harness electrical connectors.
  2. Attach the wiring harness retainer.
  3. Attach the wiring harness retainer.






35. 1. Connect the HO2S electrical connector.  
 2. Attach the wiring harness retainer.

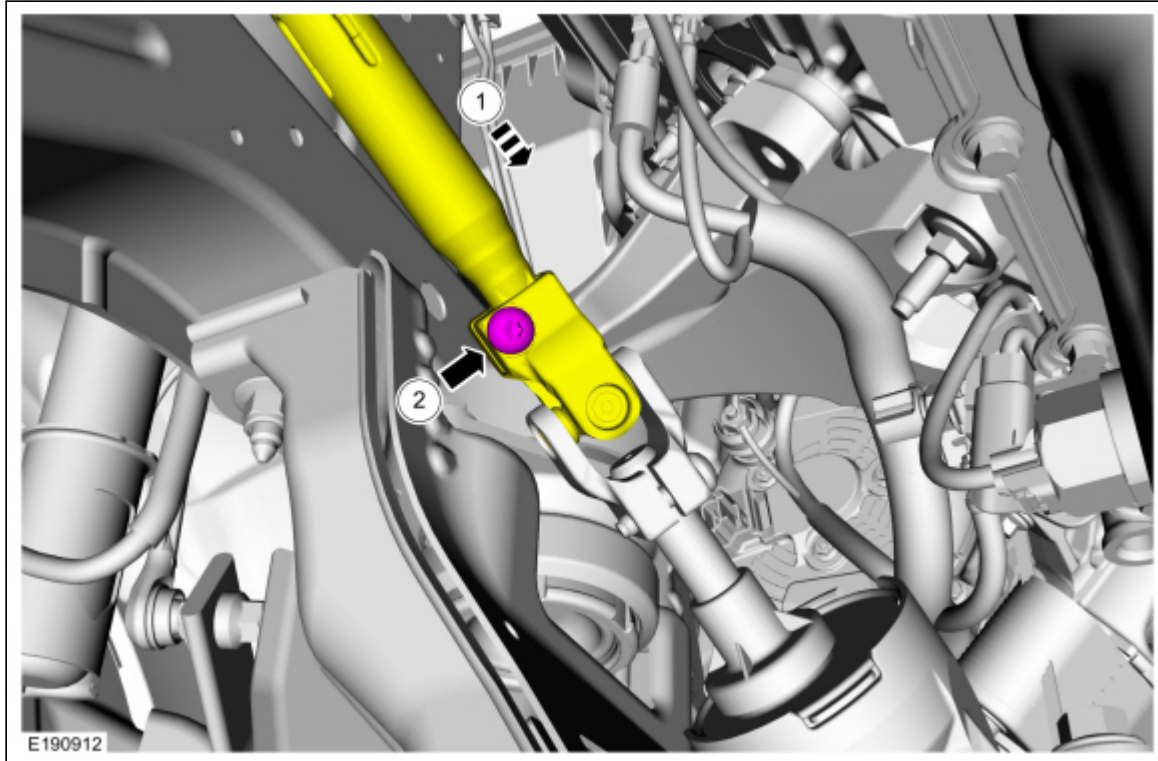


All vehicles

36.  **WARNING: DO NOT** hammer, pry or force steering column and column shafts during installation or removal. Failure to follow this instruction may cause damage to steering components that could lead to loss of steering control during vehicle operation and could result in serious personal injury or death.

**⚠ WARNING: DO NOT attempt to remove or install the steering column lower u-joint at the steering gear without first loosening the steering column dash seal and fasteners. Failure to follow this instruction may cause damage to steering components that could lead to loss of steering control during vehicle operation and could result in serious personal injury or death.**

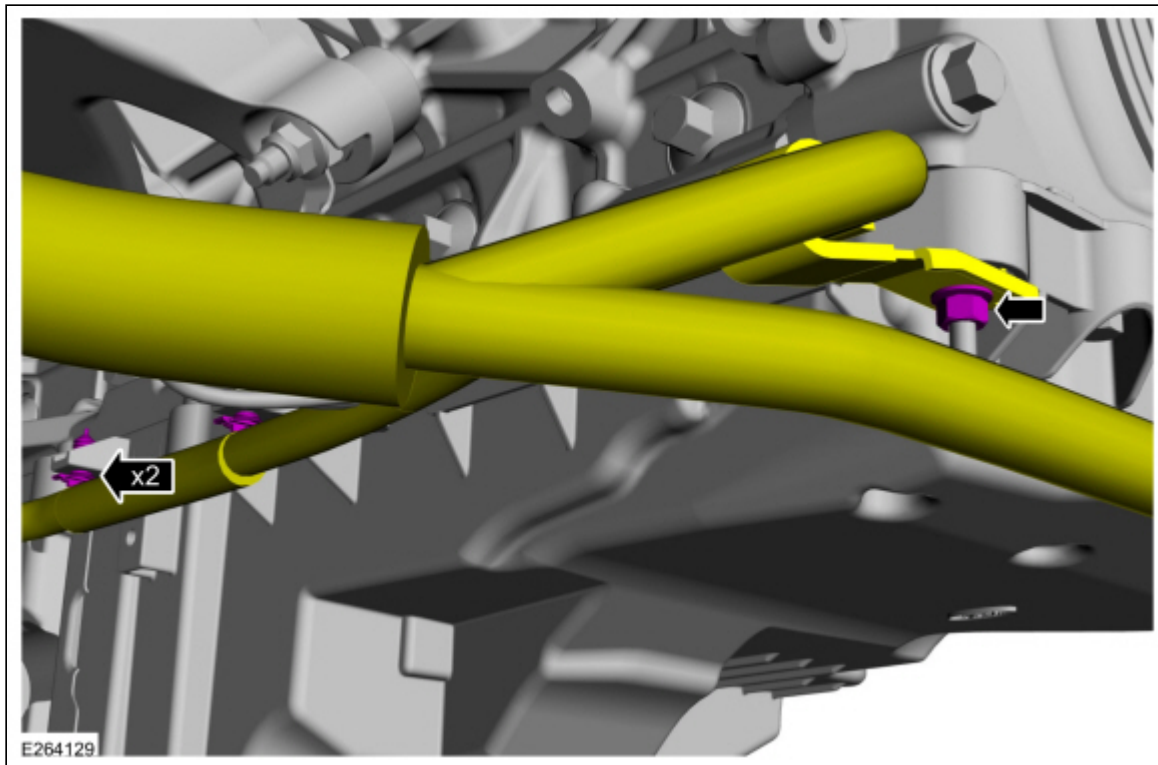
1. Connect the steering column shaft to the steering gear universal joint.
2. Install the new steering column shaft bolt.  
*Torque: 22 lb.ft (30 Nm)*



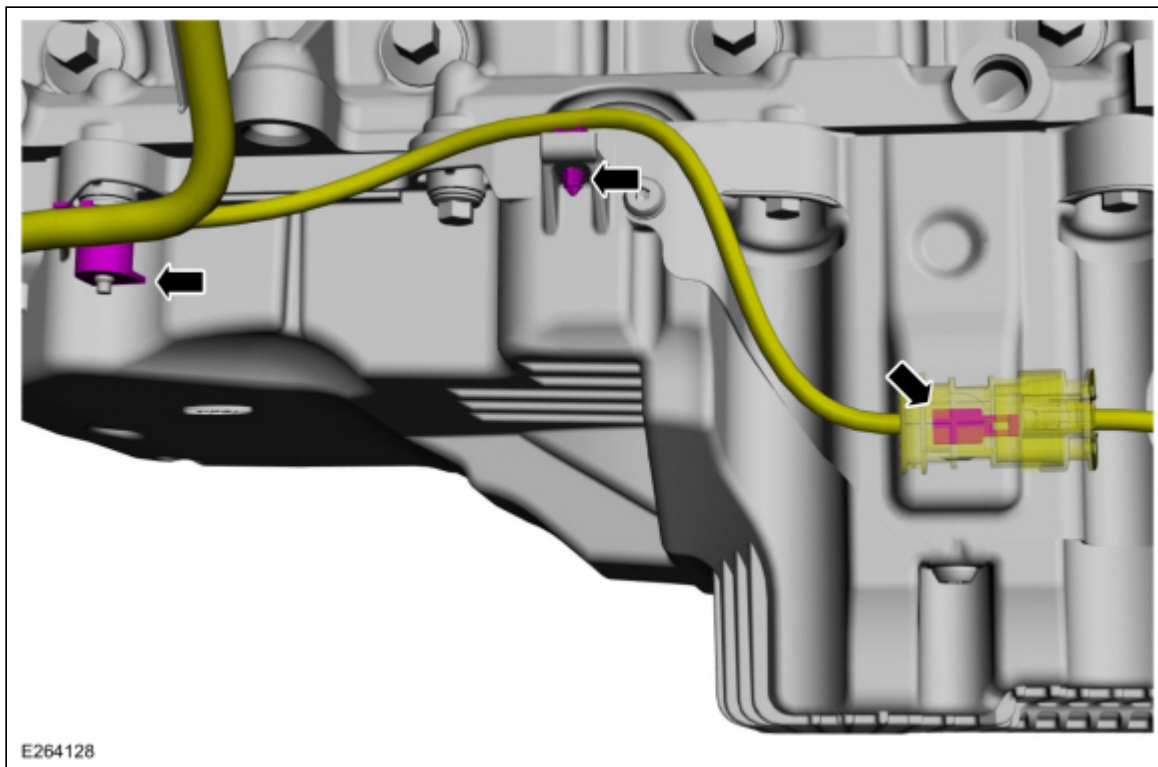
37. Inspect the steering column lower shaft.  
Refer to: [Steering Column Collapsed Check](#) (211-04 Steering Column, General Procedures).

- 38.
- Install the wiring harness bracket and the nut.  
*Torque: 124 lb.in (14 Nm)*
  - Attach the wiring harness retainers to the oil pan.





39. Attach the wiring harness retainers to the oil pan.



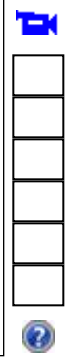
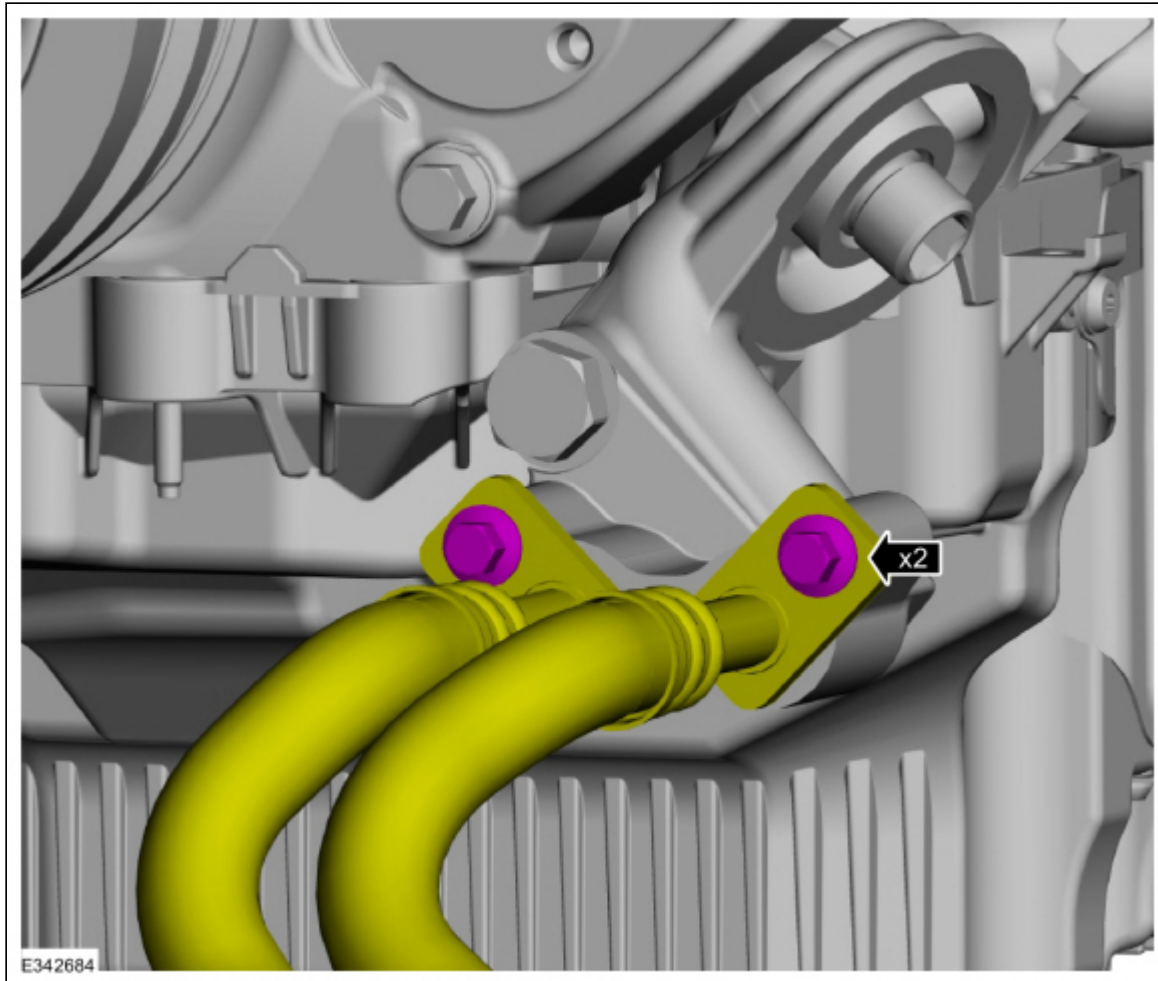
40. Install the following items:

1. Refer to: [Starter Motor](#) (303-06B Starting System - 5.0L 32V Ti-VCT (359kW/486PS) (WU)/5.0L Ti-VCT V8 (343kW/466PS) (MF), Removal and Installation).
2. [RH](#) catalytic converter.  
Refer to: [Catalytic Converter RH](#) (309-00B Exhaust System - 5.0L 32V Ti-VCT (359kW/486PS) (WU)/5.0L Ti-VCT V8 (343kW/466PS) (MF), Removal and Installation).

41. Install the engine oil cooler.  
Refer to: [Oil Cooler](#) (303-01B Engine - 5.0L 32V Ti-VCT (359kW/486PS) (WU)/5.0L Ti-VCT V8 (343kW/466PS) (MF), Removal and Installation).

**Mach 1**

42. Connect the oil cooler hoses and install the bolts.  
*Torque: 22 lb.ft (30 Nm)*



**All vehicles**

43. **NOTE:** *GT vehicle shown, Mach 1 similar.*

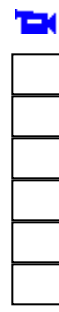
**NOTE:** *Do not lubricate the O-ring seal.*

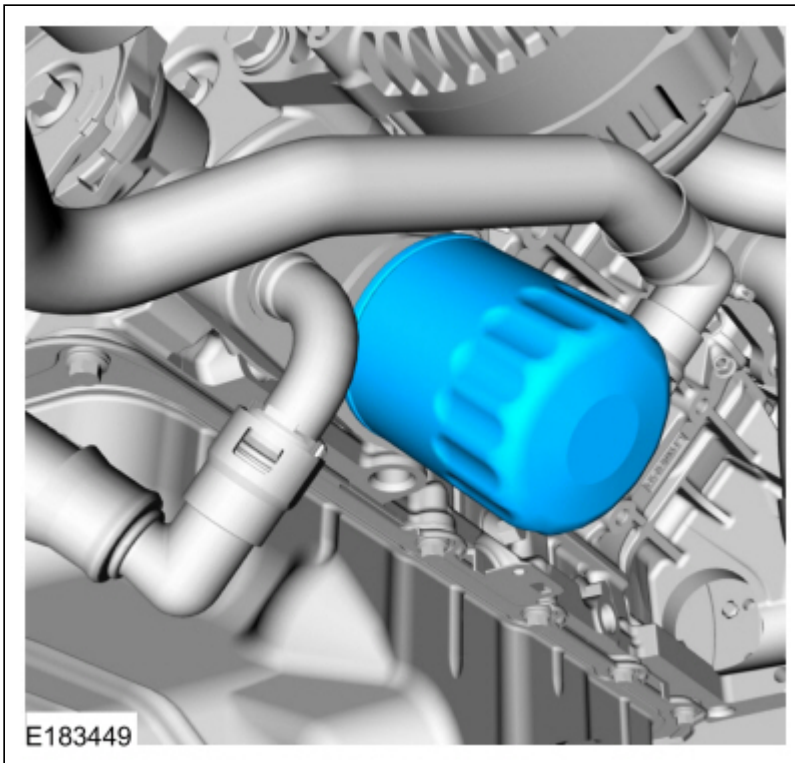
Install a new oil filter.

*Torque:*

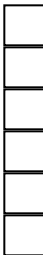
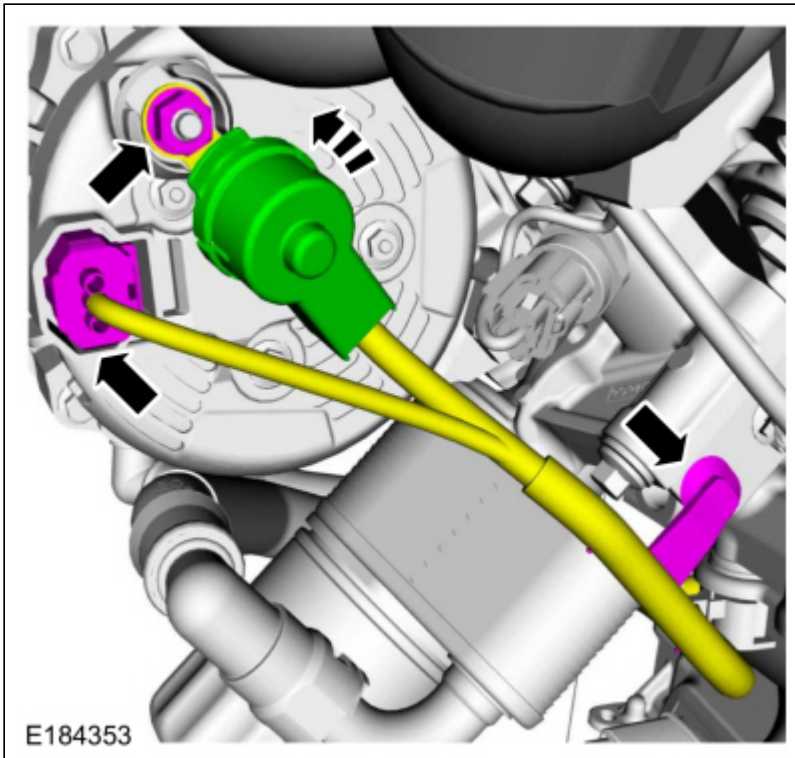
Stage 1: 44 lb.in (5 Nm)

Stage 2: 180°

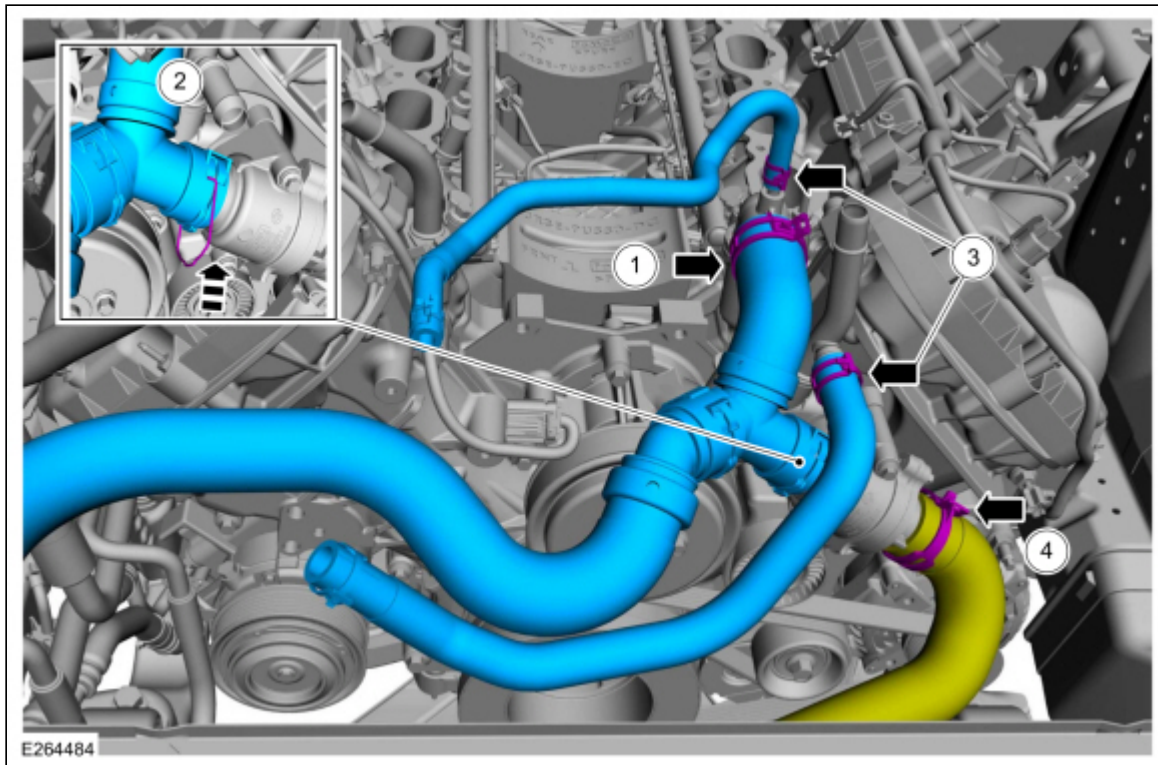




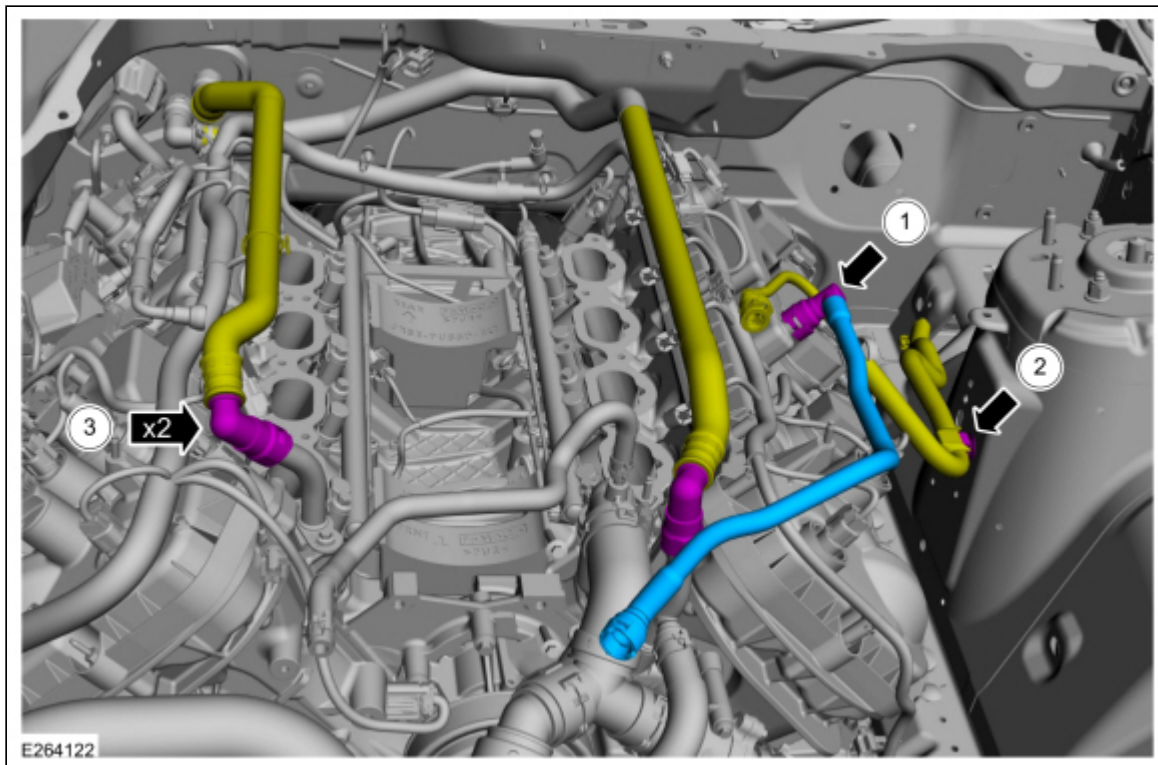
44.
  1. Attach the wiring harness retainer.
  2. Connect the wiring harness electrical connector.
  3. Connect the B+ cable and install the nut.  
*Torque: 159 lb.in (18 Nm)*
  4. Position the cover.



45.
  1. Install the coolant bypass T assembly and the clamp.
  2. Slide the spring clip until it hits the stop on the hose fitting.
  3. Install the coolant hoses and clamps.
  4. Install the lower radiator hose and clamp.

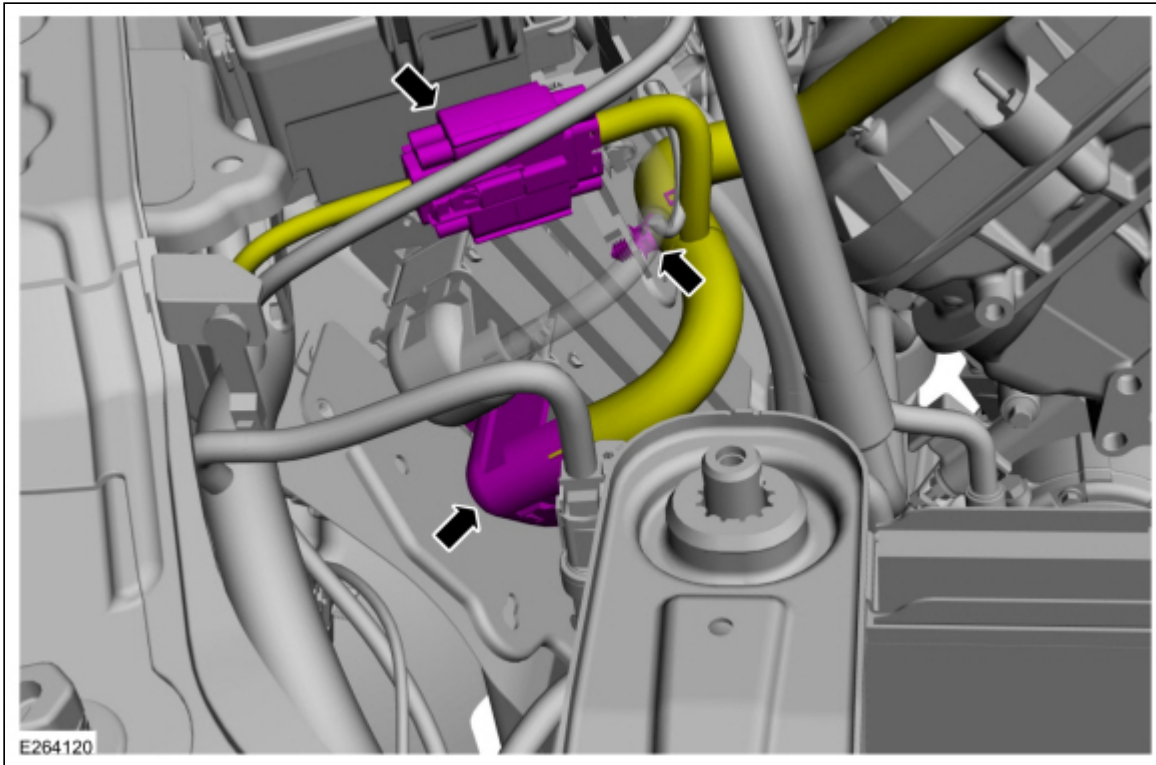


46. 1. Install the crankcase vent tube.  
 Refer to: [Quick Release Coupling](#) (310-00B Fuel System - General Information - 5.0L 32V Ti-VCT (359kW/486PS) (WU)/5.0L Ti-VCT V8 (343kW/466PS) (MF), General Procedures).  
 2. Attach the fuel supply tube retainer.  
 3. Connect the heater hoses.

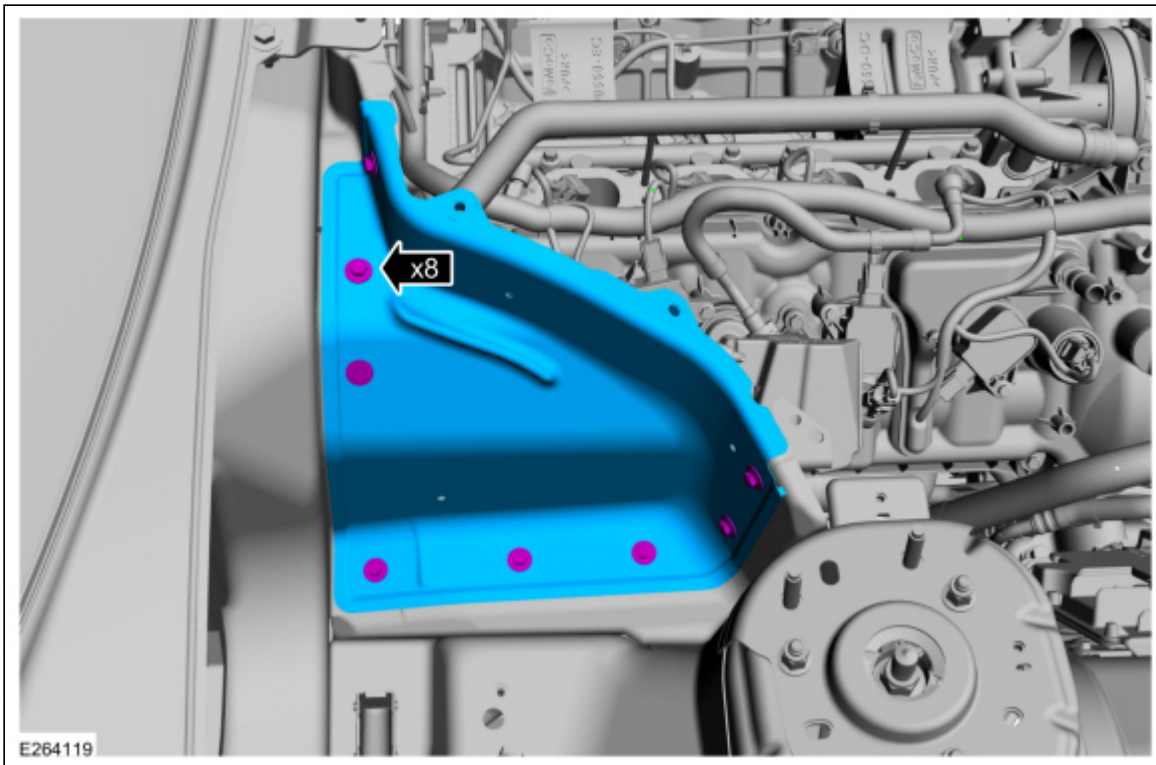


47. Connect the PCM electrical connector, the 16 pin electrical connector and attach the wiring harness retainer.



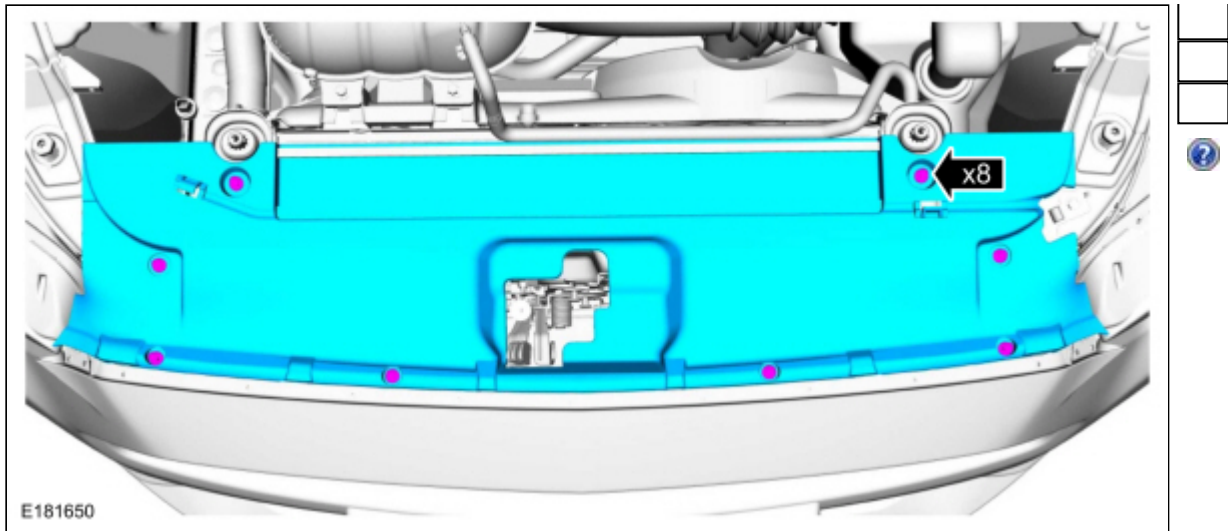


48. Install the battery heat shield and fasteners.  
Torque: 80 lb.in (9 Nm)

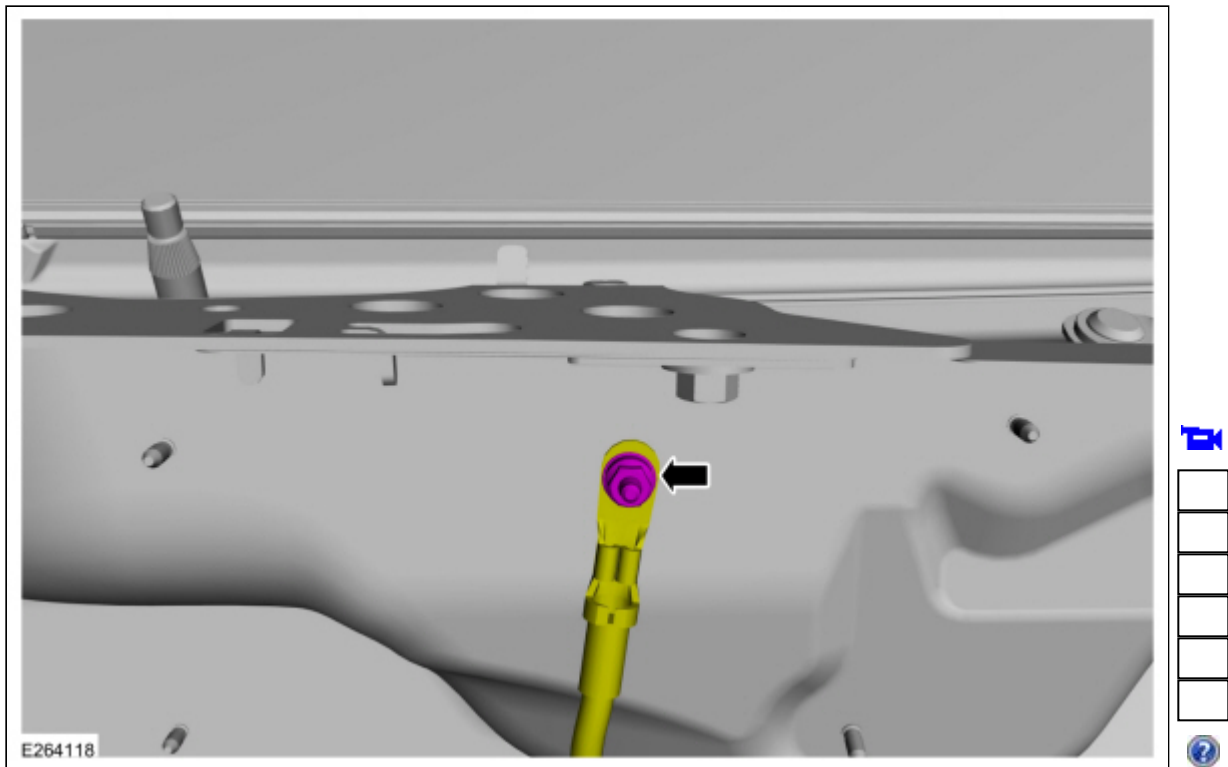


49. Install the radiator top shield and the fasteners.





50. Install the engine ground wire and nut.  
*Torque: 80 lb.in (9 Nm)*



51. Install the following items:

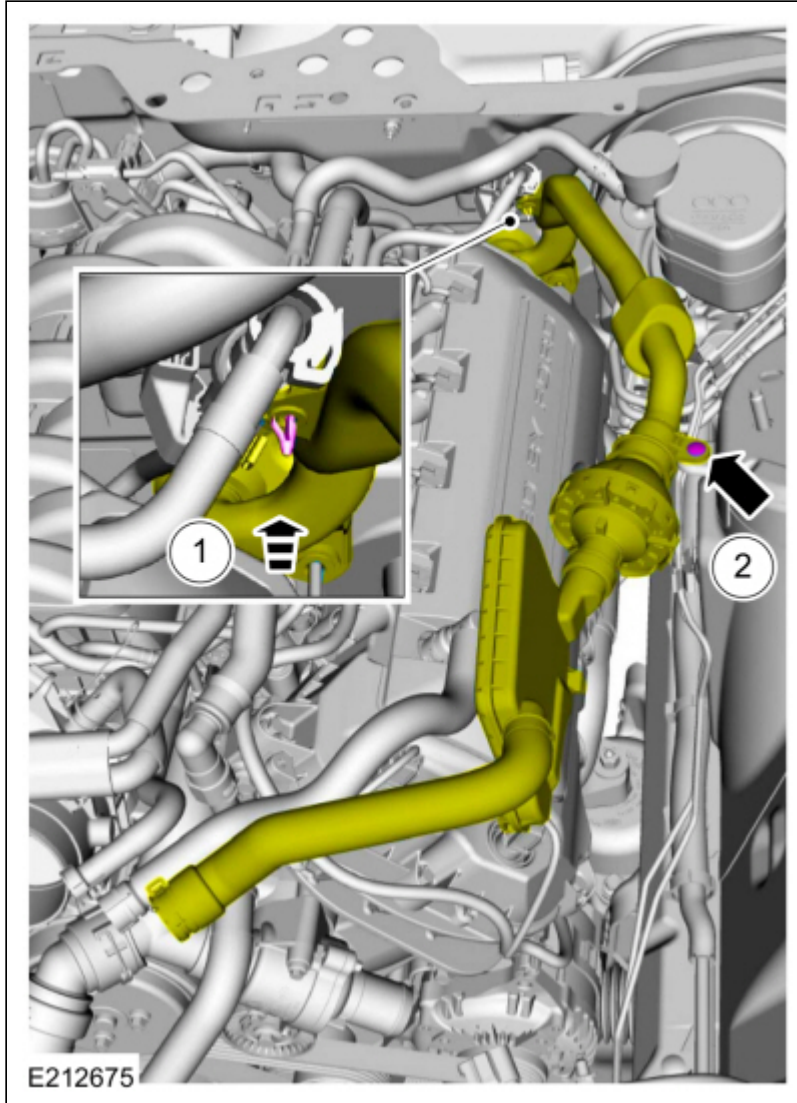
1. Battery tray.  
Refer to: [Battery Tray](#) (414-01 Battery, Mounting and Cables, Removal and Installation).
2. Intake manifold.  
Refer to: [Intake Manifold](#) (303-01B Engine - 5.0L 32V Ti-VCT (359kW/486PS) (WU)/5.0L Ti-VCT V8 (343kW/466PS) (MF), Removal and Installation).
3. A/C compressor belt.  
Refer to: [Air Conditioning \(A/C\) Compressor Belt](#) (303-05B Accessory Drive - 5.0L 32V Ti-VCT (359kW/486PS) (WU)/5.0L Ti-VCT V8 (343kW/466PS) (MF), Removal and Installation).
4. Cooling fan motor and shroud.  
Refer to: [Cooling Fan Motor and Shroud](#) (303-03B Engine Cooling - 5.0L 32V Ti-VCT (359kW/486PS) (WU)/5.0L Ti-VCT V8 (343kW/466PS) (MF), Removal and Installation).
5. Air cleaner.  
Refer to: [Air Cleaner](#) (303-12B Intake Air Distribution and Filtering - 5.0L 32V Ti-VCT (359kW/486PS) (WU)/5.0L Ti-VCT V8 (343kW/466PS) (MF), Removal and Installation).

6. **NOTE:** It is not necessary to separate the air cleaner outlet pipe and the air cleaner, the 2 components can be removed as an assembly.

Air cleaner outlet pipe.

Refer to: [Air Cleaner Outlet Pipe](#) (303-12B Intake Air Distribution and Filtering - 5.0L 32V Ti-VCT (359kW/486PS) (WU)/5.0L Ti-VCT V8 (343kW/466PS) (MF), Removal and Installation).

52. 1. Position the sound enhancement pipe onto the retainer.  
2. Install the pin-type retainer.



53. Install the following items:

1. Degas bottle.

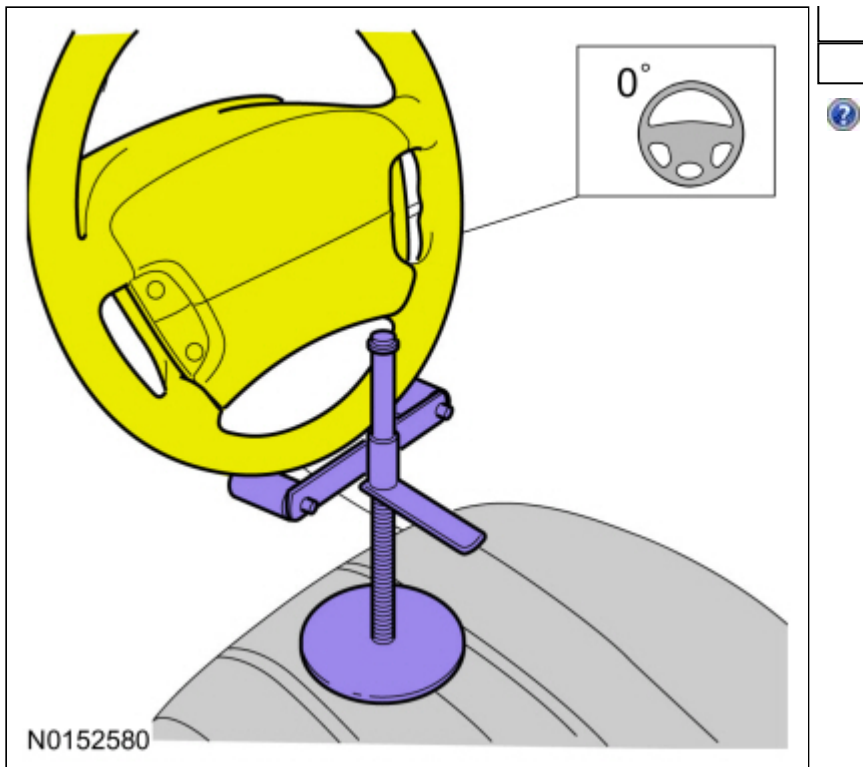
Refer to: [Degas Bottle](#) (303-03B Engine Cooling - 5.0L 32V Ti-VCT (359kW/486PS) (WU)/5.0L Ti-VCT V8 (343kW/466PS) (MF), Removal and Installation).

2. Hood.

Refer to: [Hood](#) (501-02 Front End Body Panels, Removal and Installation).

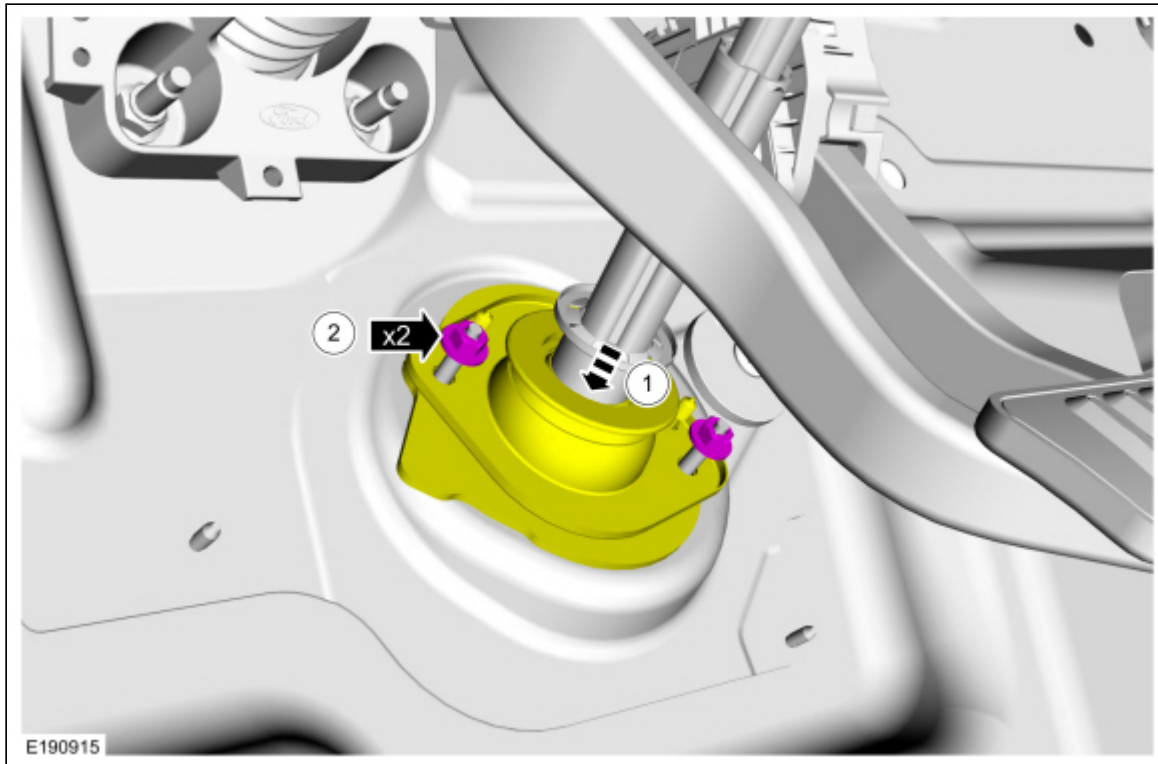
54. Remove the holding device.





55.
  1. Position the steering column dash seal.
  2. Tighten the steering column dash seal nuts.

*Torque: 80 lb.in (9 Nm)*



56. Fill the engine with clean engine oil.  
Refer to: [Specifications](#) (303-01B Engine - 5.0L 32V Ti-VCT (359kW/486PS) (WU)/5.0L Ti-VCT V8 (343kW/466PS) (MF), Specifications).
57. Connect the battery ground and positive cables.  
Refer to: [Battery Disconnect and Connect](#) (414-01 Battery, Mounting and Cables, General Procedures).

58. Pressurize the fuel system.

Refer to: [Fuel System Pressure Release](#) (310-00B Fuel System - General Information - 5.0L 32V Ti-VCT (359kW/486PS) (WU)/5.0L Ti-VCT V8 (343kW/466PS) (MF), General Procedures).

59. Fill and bleed the engine cooling system.

Refer to: [Engine Cooling System Draining, Vacuum Filling and Bleeding](#) (303-03B Engine Cooling - 5.0L 32V Ti-VCT (359kW/486PS) (WU)/5.0L Ti-VCT V8 (343kW/466PS) (MF), General Procedures).

60. Start engine and check exhaust system for leaks.

61. Use the Powertrain Control Module (PCM) Misfire Monitor Profile Correction routine in the diagnostic scan tool.

62. Road test the vehicle.