

Engine - Body On

Special Tool(s) / General Equipment

 E234289	205-036 (T70P-4067-A) Wrench
	303-050 (T70P-6000) Lifting Bracket, Engine
	303-1518 Bracket, Engine Removal TKIT-2009C-F TKIT-2009C-ROW
	303-214 (T83T-6312-B) Wrench, Fan Clutch Nut
 307-346	307-346 (T97T-7902-A) Retainer, Torque Converter TKIT-1998-LM (NavigatoR) TKIT-1997-F/FLM/LT
Floor Crane	
Oil Drain Equipment	
Transmission Jack	
Hose Clamp Remover/Installer	

NOTICE: Change the engine oil any time the turbocharger is removed from the engine. The passages in the block, located underneath the turbocharger, are direct passages to the lubrication system. Debris and/or coolant may enter the lubrication system and engine damage may occur.

NOTE: It is recommended that this component be serviced with the vehicle body removed. If the body can be removed, refer to Engine â€” Body Off in this section.

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

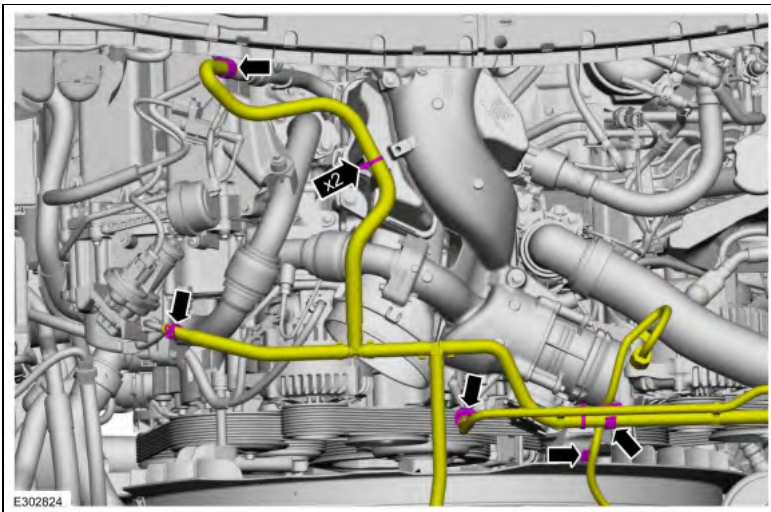
NOTE: For EXPORT ONLY vehicles (outside US/Canada), an Export Supplement is provided and should be referenced to identify differences that can impact service procedures. Vehicles can be identified by referring to the underhood Vehicle Emission Control Information (VECI) label which states, "Not certified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

1. With the vehicle in NEUTRAL, position it on a hoist.
Refer to: Jacking and Lifting - Overview (100-02 Jacking and Lifting, Description and Operation).
2. **WARNING: Do not work on the fuel system until the pressure has been released and the engine has cooled. Fuel in the high-pressure fuel system is hot and under very high pressure. High-pressure fuel may cause cuts and contact with hot fuel may cause burns. Failure to follow these instructions may result in serious personal injury.**

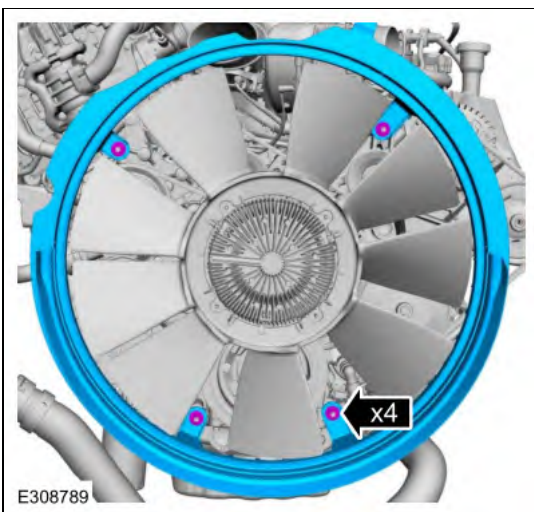
Release the fuel system pressure.

Refer to: Fuel System Pressure Release (310-00B Fuel System - General Information - 6.7L Power Stroke Diesel, General Procedures).

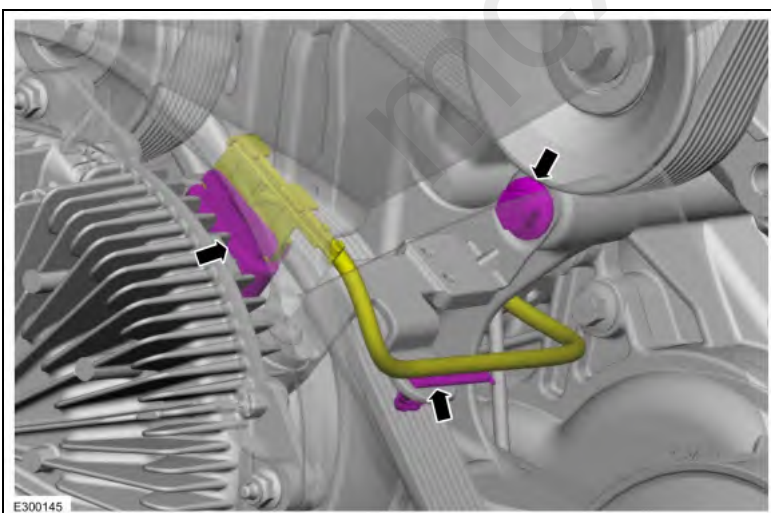
3. Remove the following items:
 1. Remove the cooling module.
Refer to: Cooling Module (303-03B Engine Cooling - 6.7L Power Stroke Diesel, Removal and Installation).
 2. Remove the CAC intake pipe.
Refer to: Charge Air Cooler (CAC) Intake Pipe (303-12B Intake Air Distribution and Filtering - 6.7L Power Stroke Diesel, Removal and Installation).
 3. Remove the CAC outlet pipe.
Refer to: Charge Air Cooler (CAC) (303-12B Intake Air Distribution and Filtering - 6.7L Power Stroke Diesel, Removal and Installation).
 4. Remove the CAC.
Refer to: Charge Air Cooler (CAC) (303-12B Intake Air Distribution and Filtering - 6.7L Power Stroke Diesel, Removal and Installation).
 5. Remove the RH and LH battery trays.
Refer to: Battery Tray (414-01 Battery, Mounting and Cables, Removal and Installation).
 6. Remove the cowl panel grille.
Refer to: Cowl Panel Grille (501-02 Front End Body Panels, Removal and Installation).
4.
 - Disconnect the vacuum hose connector.
Refer to: Quick Release Coupling (310-00 Fuel System - General Information - 6.7L Power Stroke Diesel) .
 - Disconnect the coolant hoses and position aside.
Use the General Equipment: Hose Clamp Remover/Installer



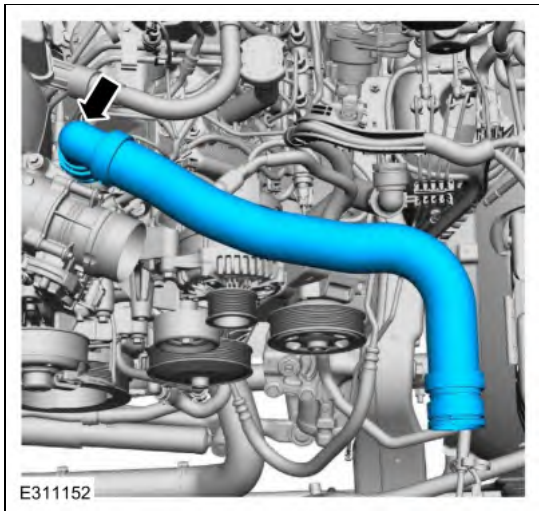
5. Remove the nuts and the cooling fan stator.



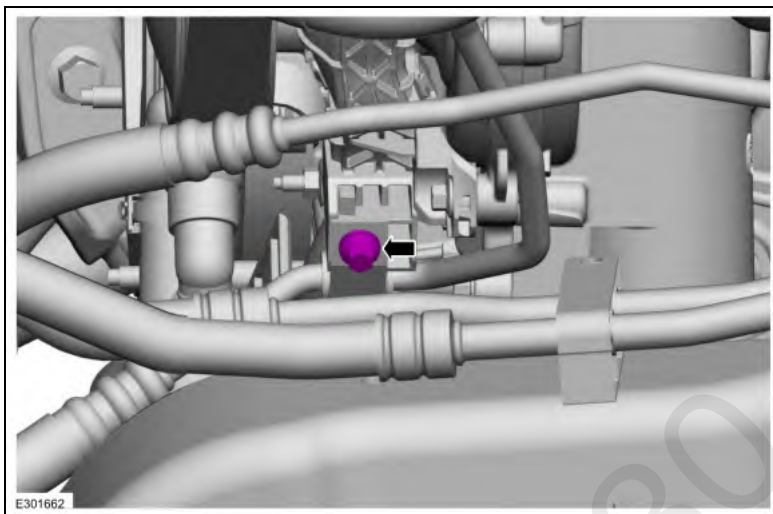
- 6.
- Disconnect the fan clutch electrical connector and the retainer.
 - Remove the fan clutch electrical connector bolt.



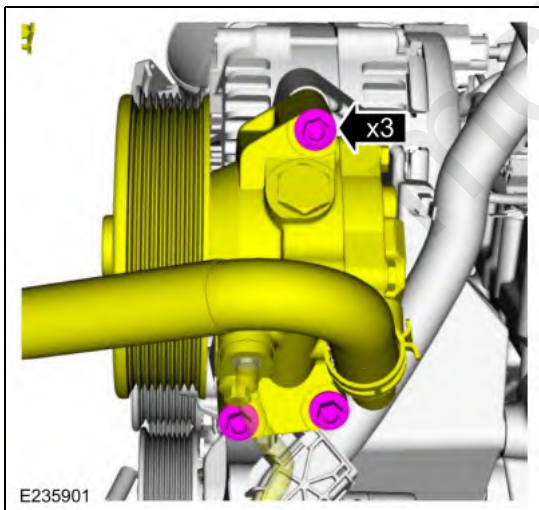
7. Using the special tools, remove the fan clutch.
 Use Special Service Tool: 205-036 (T70P-4067-A) Wrench , 303-214 (T83T-6312-B) Wrench, Fan Clutch Nut.



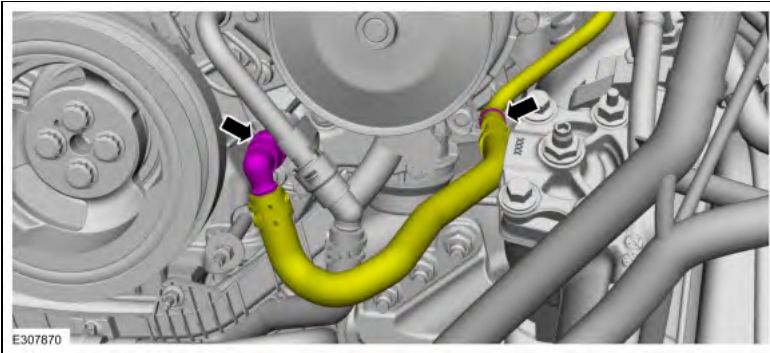
11. Remove the retainer from the power steering line bracket.



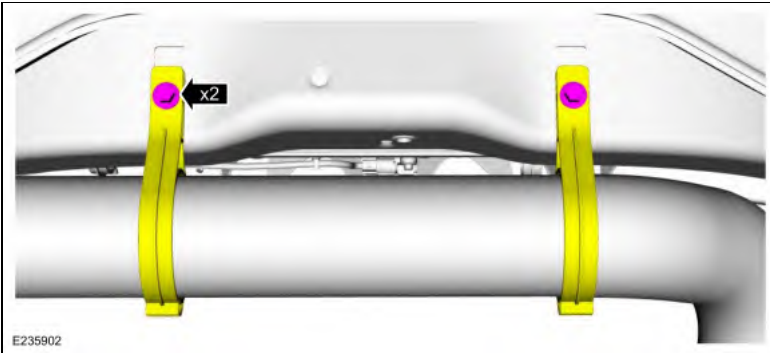
12. Remove the bolts and position aside the power steering pump.



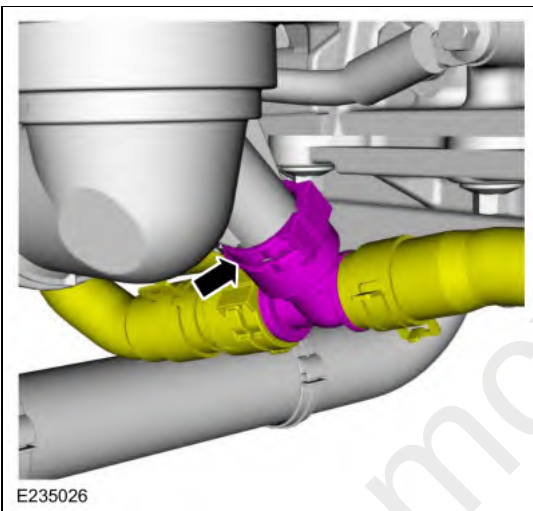
13. Disconnect the coolant hose from the transmission oil cooler coolant tube. Disconnect the retainer on the frame and position aside the coolant hose.



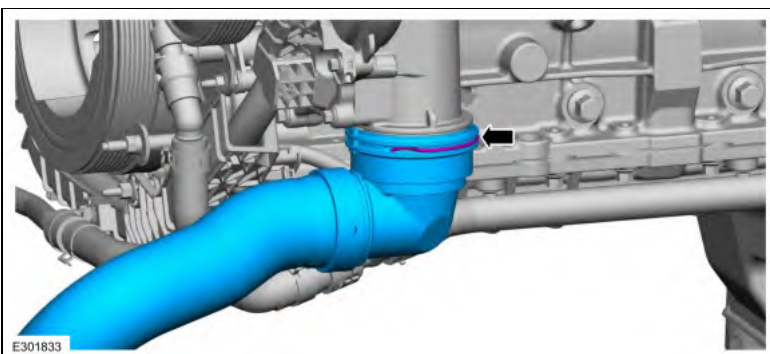
14. Remove the bolts for the lower radiator hose.



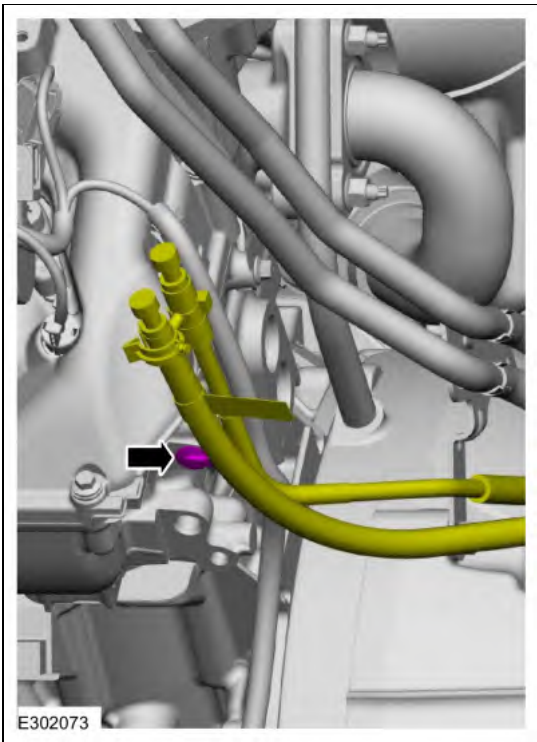
15. Remove the clip and disconnect the coolant hose.



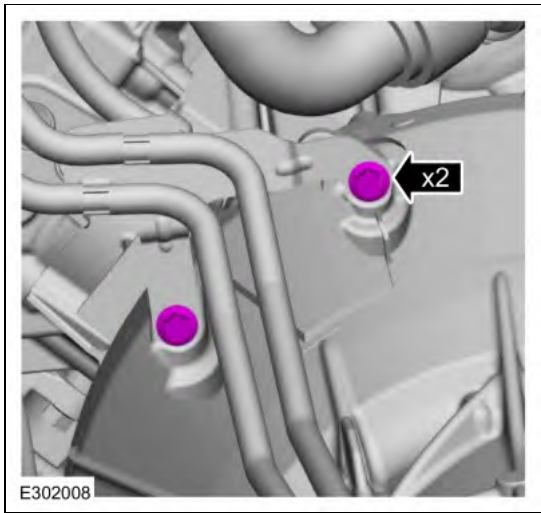
16. Remove the clip and remove the lower radiator hose.



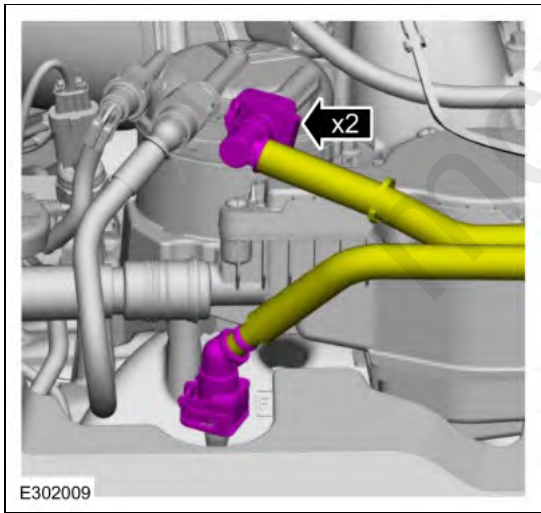
17. If equipped, disconnect the retainer for the transmission/ transfer case vent tubes.



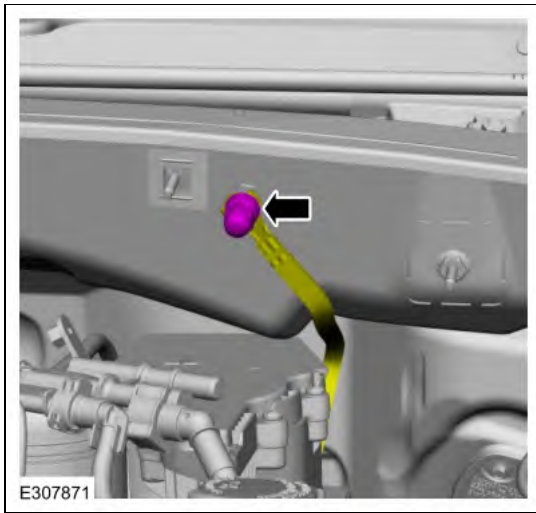
18. Remove the fuel tube bracket bolts from the transmission bellhousing.



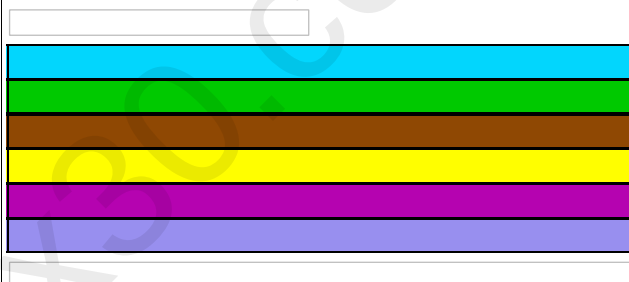
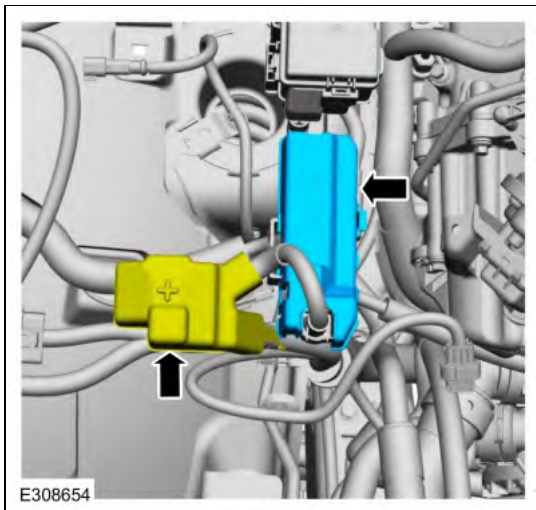
19. **NOTICE:** Fuel injection equipment is manufactured to very precise tolerances and fine clearances. To prevent fuel system damage, it is essential that absolute cleanliness is observed when working with these components.
- Disconnect the fuel tubes and position aside.
Refer to: Quick Release Coupling (310-00 Fuel System - General Information - 6.7L Power Stroke Diesel) .



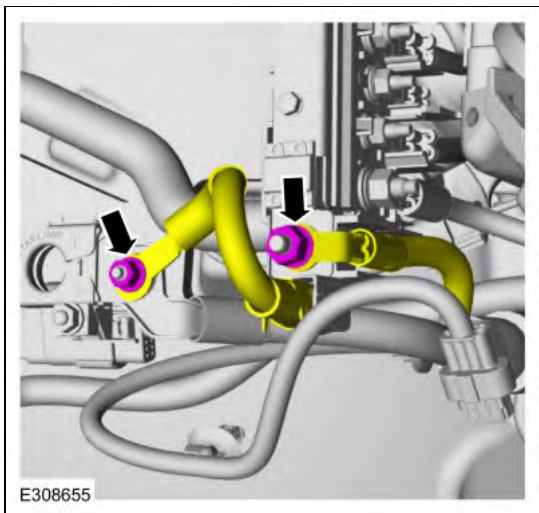
20. Remove the retainer for the ground strap and position aside.



- 21.
- Remove the power distribution cover.
 - Position aside the battery cable cover.



- 22.
- Remove the nut from the power distribution box and disconnect the cable.
 - Remove the nut and disconnect the cable from the battery harness.

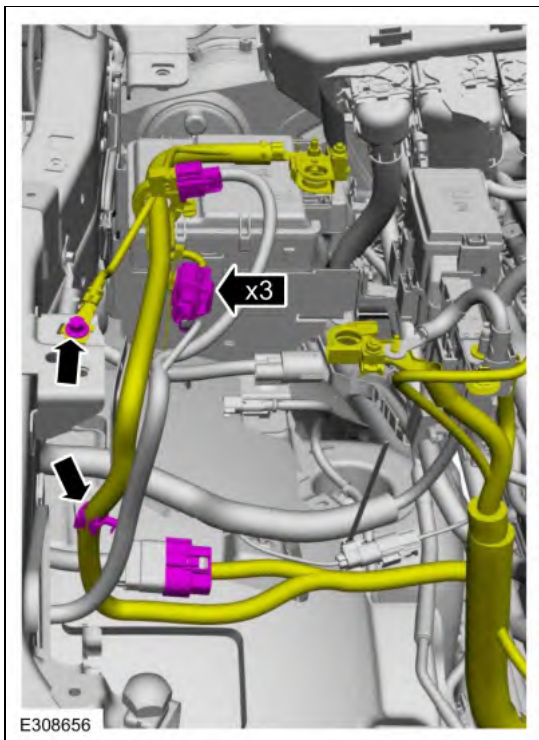


23.

- **NOTE:** *Note the position of the electrical connectors.*

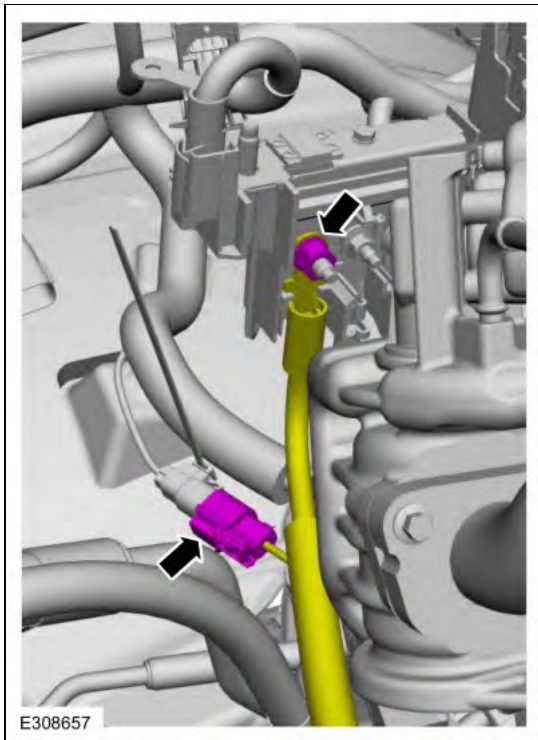
Disconnect the electrical connectors and the harness retainer.

- Remove the bolt and position side the battery harness.

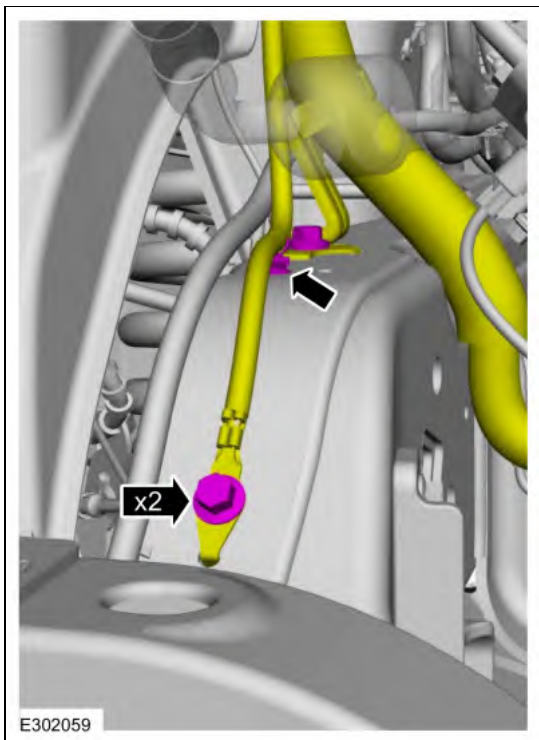


24.

- If equipped with dual generators, disconnect the electrical connector.
- Remove the nut and position aside the harness.



25. Remove the engine wire harness bracket bolt and the ground wire bolt. Disconnect the wire retainer and position the wire harness on the engine.

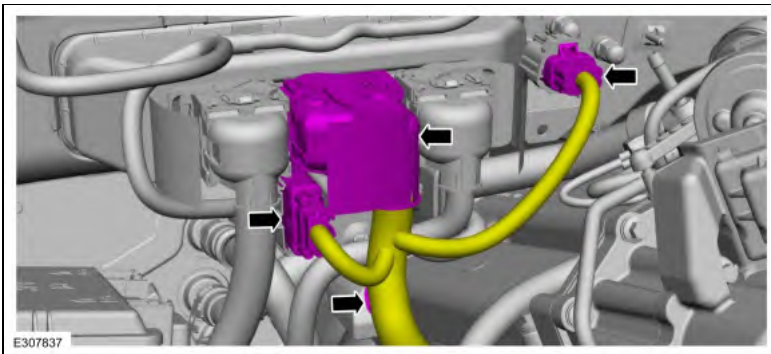


26.

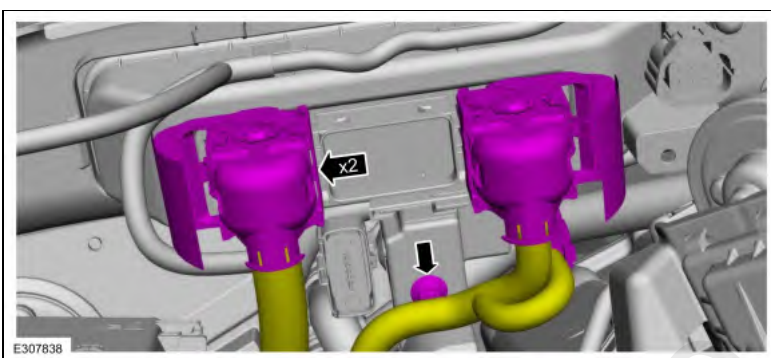
- **NOTE:** *Note the position of the electrical connectors.*

Disconnect the engine PCM electrical connector and the electrical connectors.

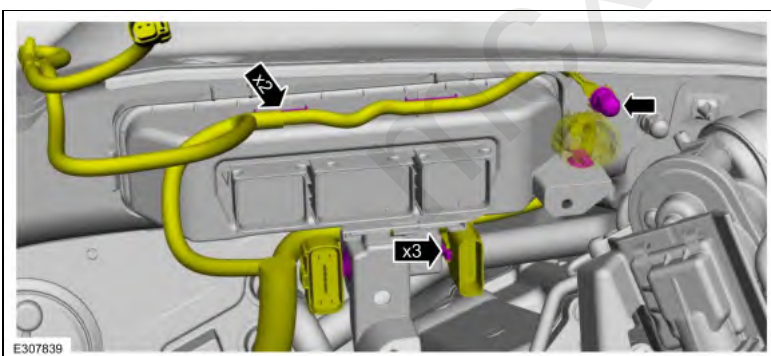
- Disconnect the retainer and position aside the wire harness.



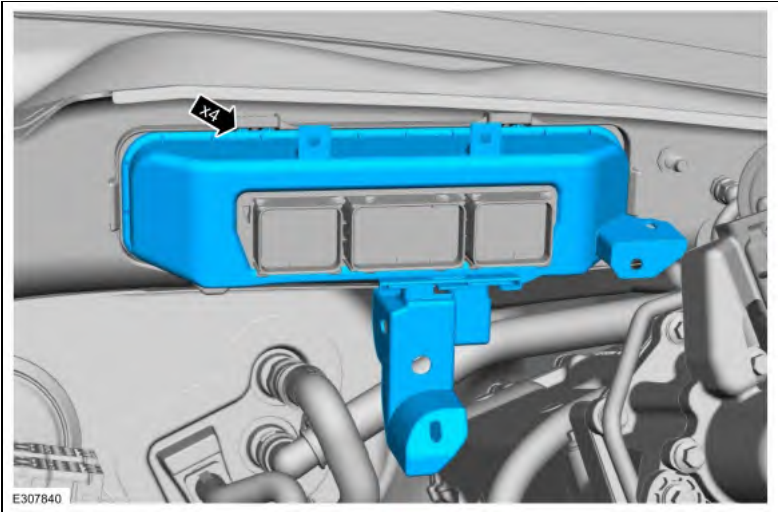
- 27.
- Disconnect the PCM electrical connectors and the electrical connector.
 - Disconnect the retainer and position the wire harnesses aside.



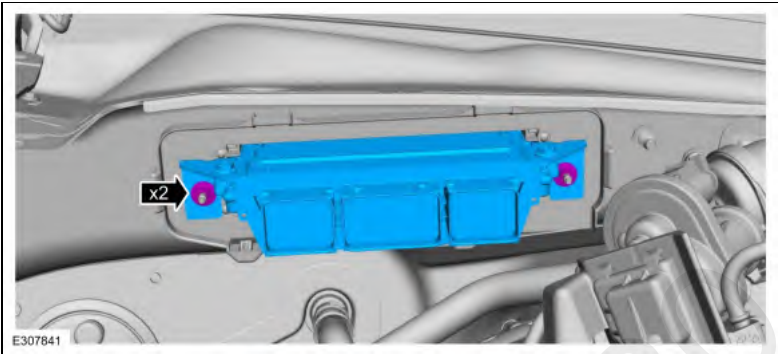
- 28.
- Remove the ground cable nut.
 - **NOTE:** Note the position of the electrical connectors.
- Disconnect the retainers and position the wire harnesses aside.



29. Disconnect the tabs and remove the PCM cover.

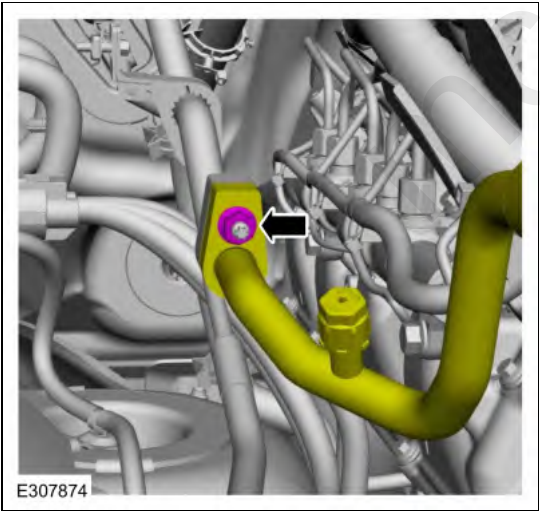


30. Remove the nuts and the PCM.

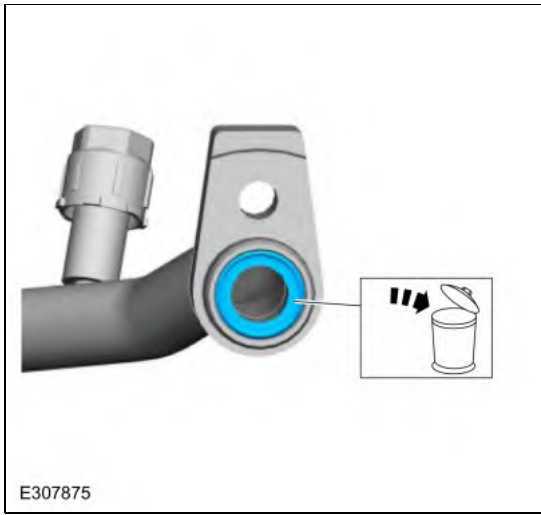


31. **NOTE:** Make sure that all openings are sealed.

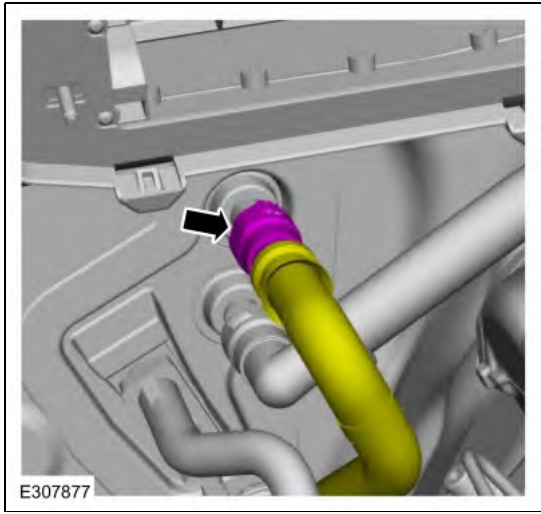
Remove the nut from the evaporator-to-compressor suction tube fitting and position aside the tube.



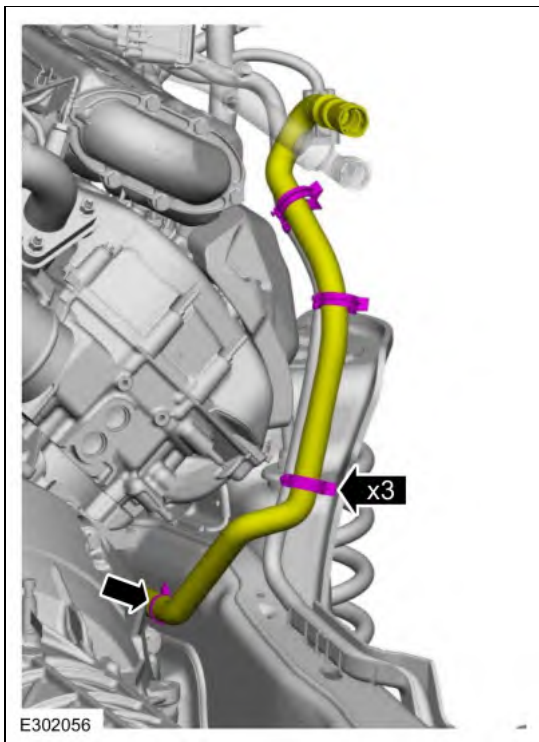
32. Remove and discard the O-ring seal.



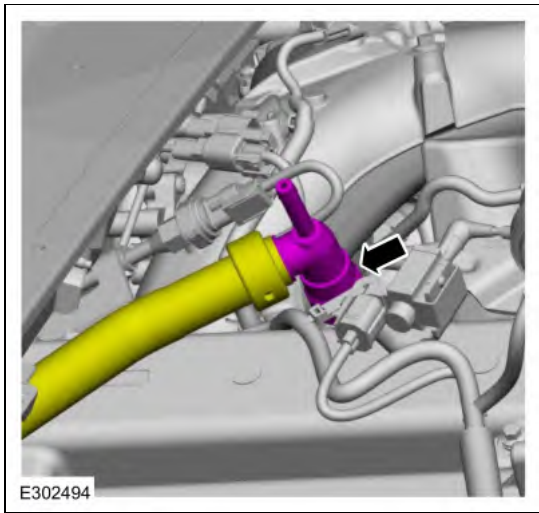
33. Disconnect the heater hose.



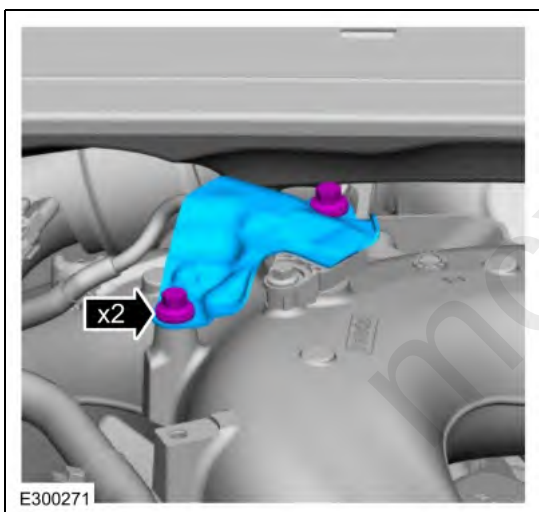
34. Disconnect the heater hose retainers.



35. Disconnect the heater hose from the heater supply tube.

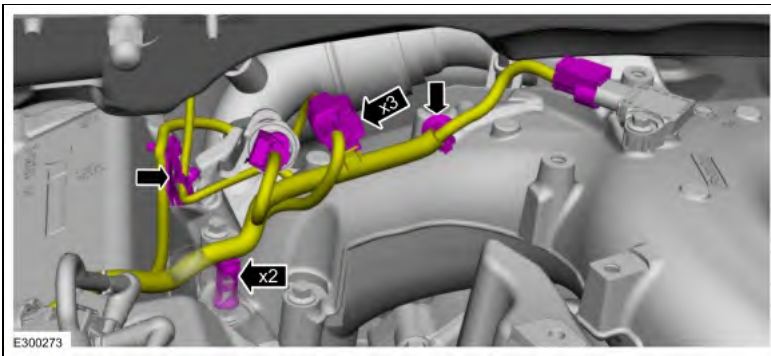


36. Remove the bolts and the intake manifold support.

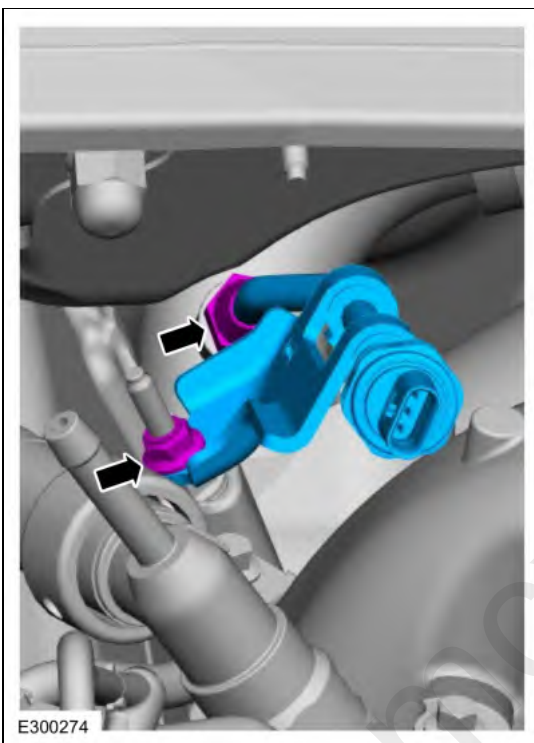


37.

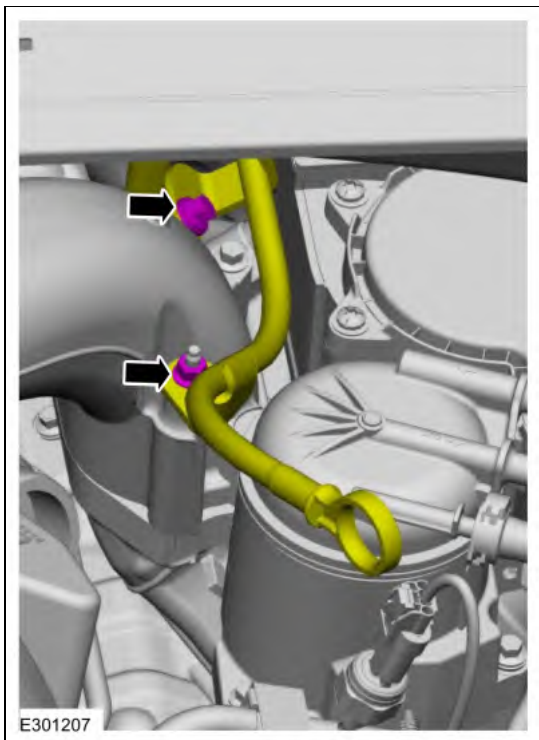
- Disconnect the wiring harness retainers.
- Disconnect the MAP sensor, EP (exhaust pressure) sensor, and the EGRT sensor electrical connectors.



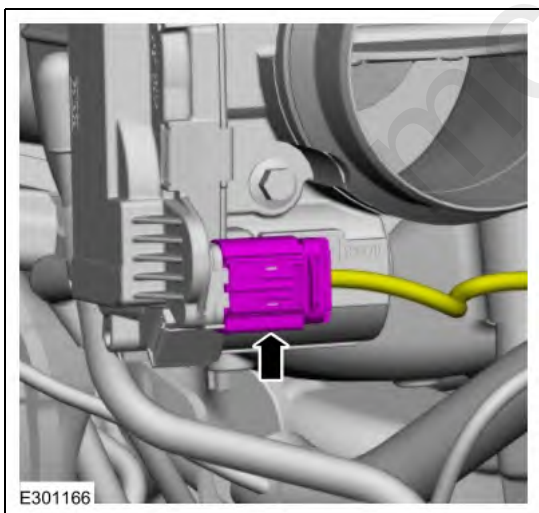
- 38.
- Remove the nut for the EP sensor tube.
 - Remove the EP sensor tube assembly.



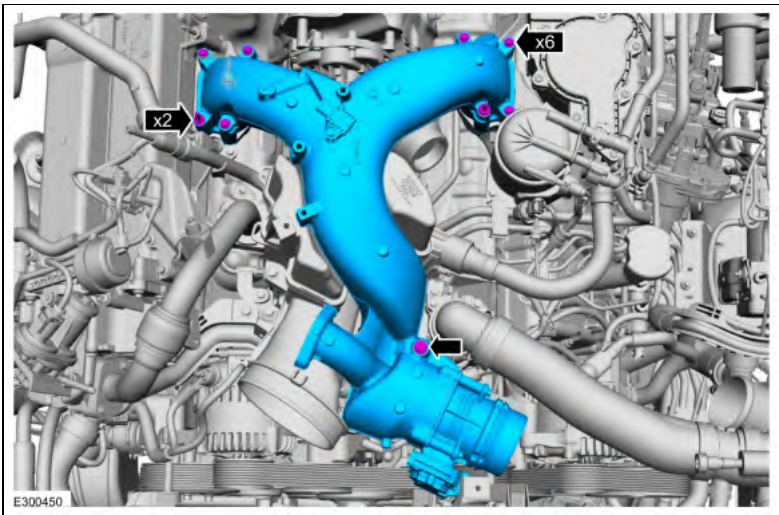
39. Remove the nut, the bolt and position aside the oil level indicator.



40. Remove the EGR cooler.
 Refer to: Exhaust Gas Recirculation (EGR) Cooler (303-08B Engine Emission Control - 6.7L Power Stroke Diesel, Removal and Installation).
41. Disconnect the TB (throttle body) electrical connector.

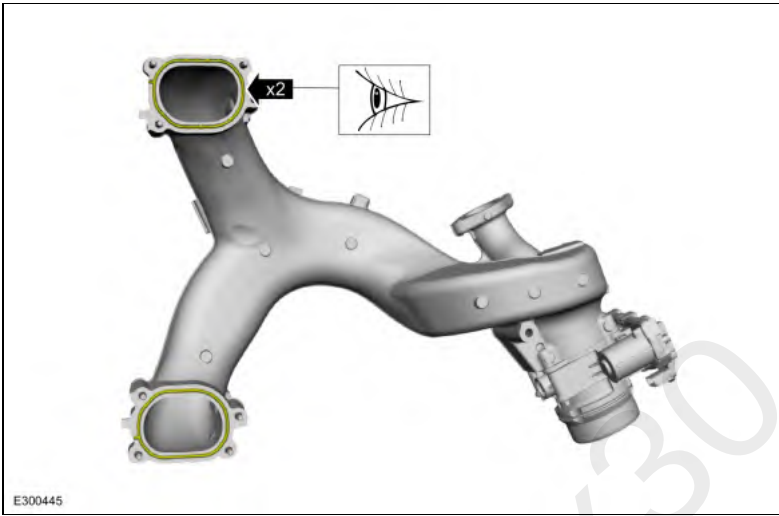


- 42.
- Loosen the retainers and remove the upper intake manifold.
 - Cover or tape the opening on the valve covers and the lower intake manifold.



43. **NOTE:** Visually inspect the intake manifold gaskets for nicks, cuts and abrasions. If these conditions are not present, the gasket may be reused.

Inspect the upper intake manifold gaskets. Replace as necessary.

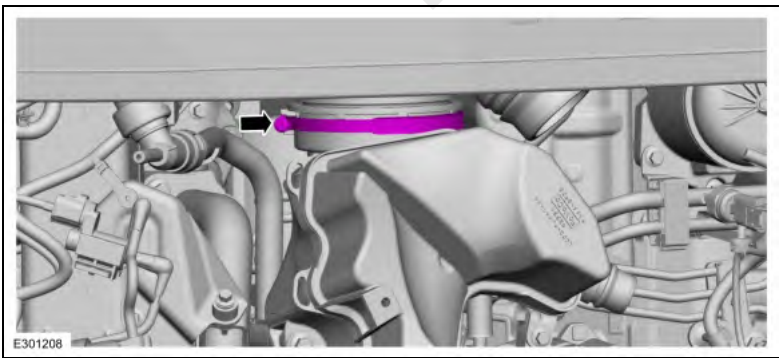


44. **NOTE:** The crankcase vent oil separator must be replaced whenever the crankcase vent oil separator outlet hose is disconnected from the lower intake manifold.

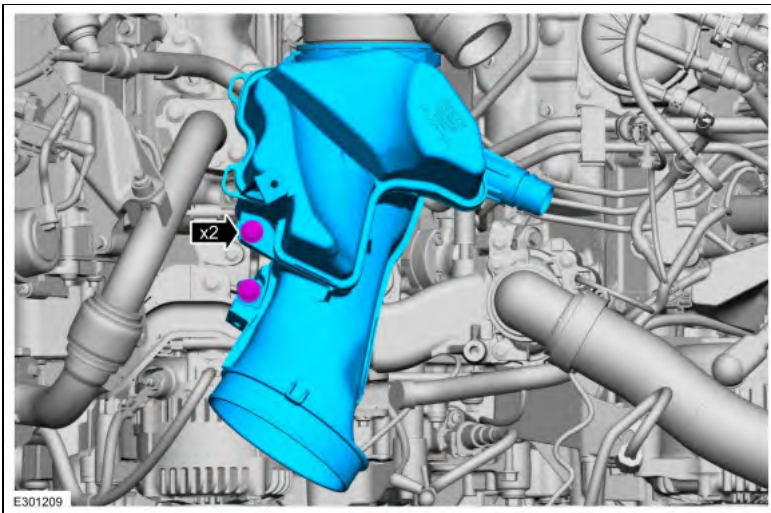
Remove the crankcase vent oil separator.

Refer to: Crankcase Vent Oil Separator (303-08B Engine Emission Control - 6.7L Power Stroke Diesel, Removal and Installation).

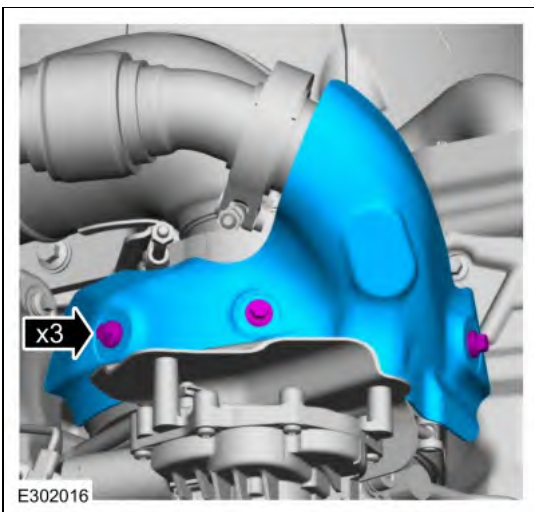
45. Loosen the lower intake manifold clamp.



46. Remove the bolts and the lower intake manifold.

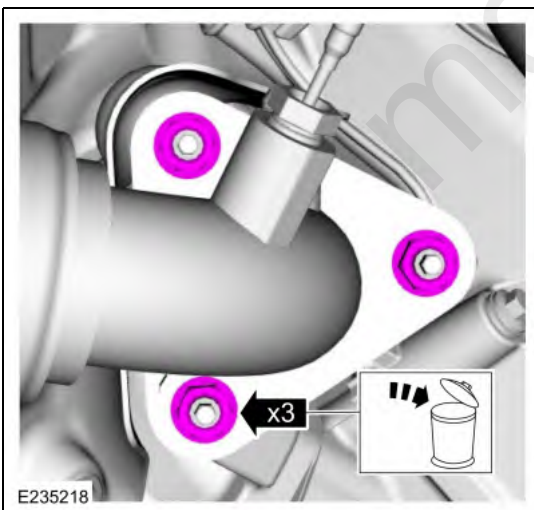


47. Remove the bolts and the TC heat shield.



48. **NOTICE:** Do not bend or twist the turbocharger inlet pipes or damage to the bellows on the turbocharger inlet pipes may occur.

Remove and discard the RH turbocharger inlet pipe nuts.

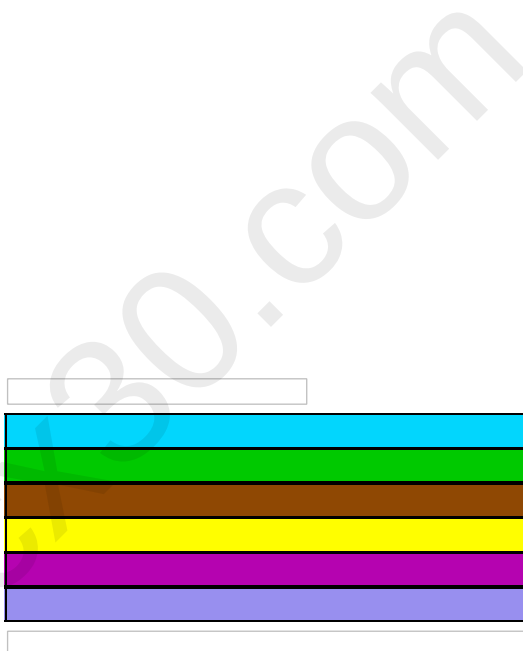


49. **NOTICE:** Do not bend or twist the turbocharger inlet pipes or damage to the bellows on the turbocharger inlet pipes may occur.

- **NOTE:** Note the position of the clamp.

Loosen the RH turbocharger inlet pipe clamp and remove the RH turbocharger inlet pipe.

- Remove and discard the clamp.

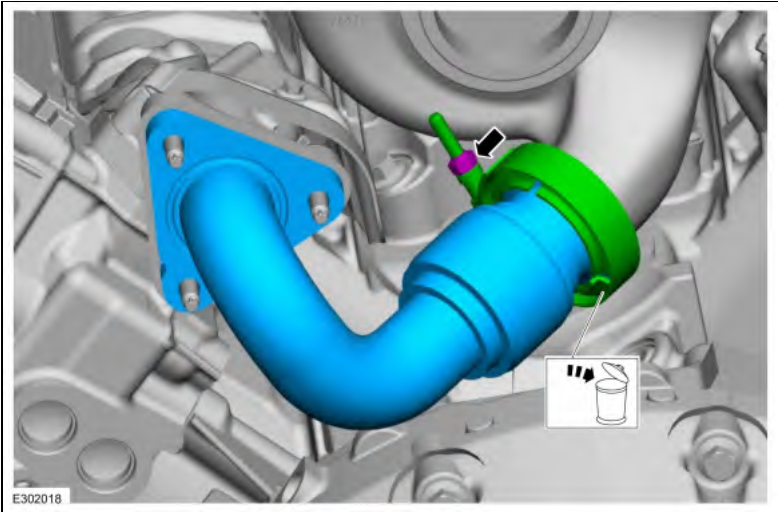


pipes or damage to the bellows on the turbocharger inlet pipes may occur.

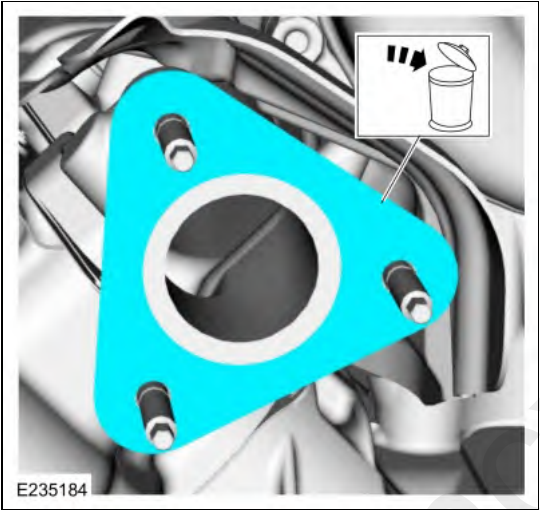


53. NOTICE: Do not bend or twist the turbocharger inlet pipes or damage to the bellows on the turbocharger inlet pipes may occur.

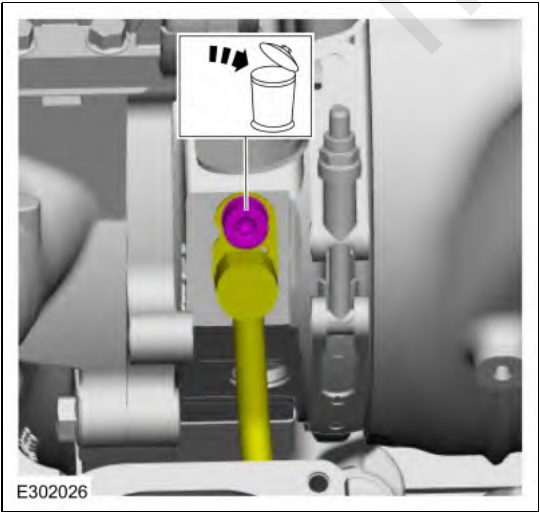
- NOTE: Note the position of the clamp.
- Loosen the LH turbocharger inlet pipe clamp and remove the LH turbocharger inlet pipe.
- Remove and discard the clamp.



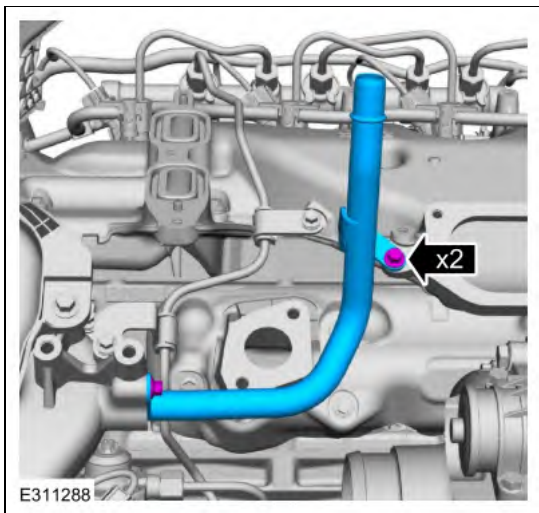
54. Remove and discard the LH turbocharger inlet pipe gasket.



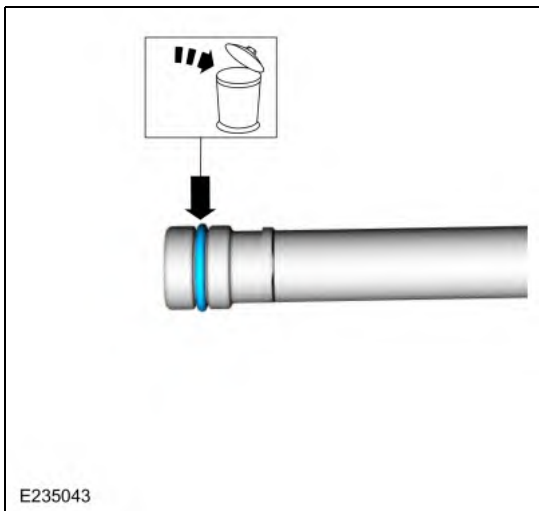
55. Remove the bolt and position aside the TC coolant outlet tube. Discard the bolt.



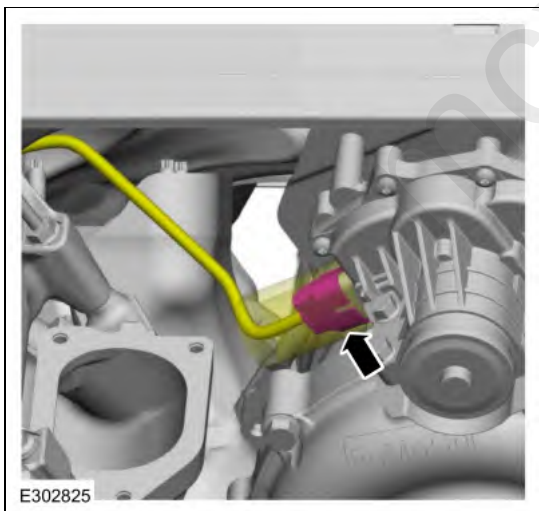
56. Remove the bolts and the heater supply tube.



57. Remove and discard the heater supply tube O-ring seal.



58. Disconnect the TC actuator electrical connector.

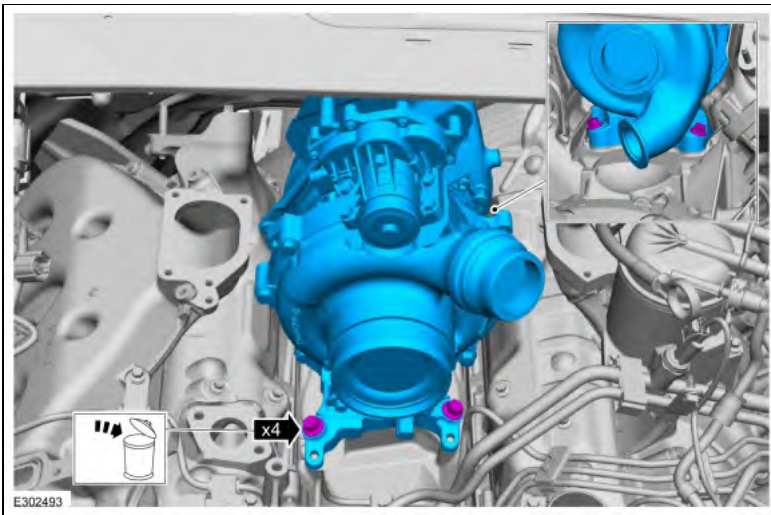


59.

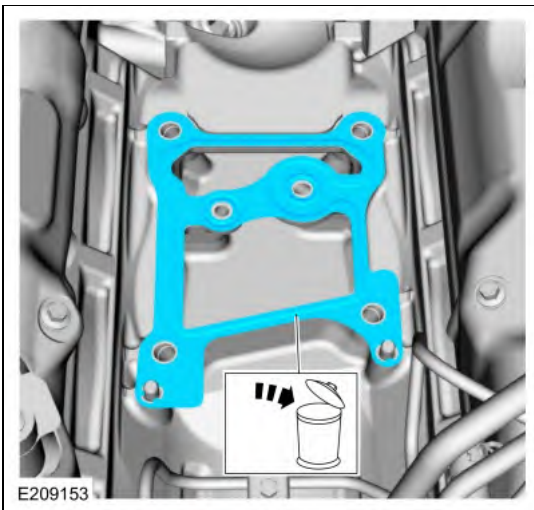
- **NOTE:** The turbocharger mounting bolts are torque-to-yield design and cannot be reused.

Remove and discard the TC mounting bolts.

- Remove the TC.



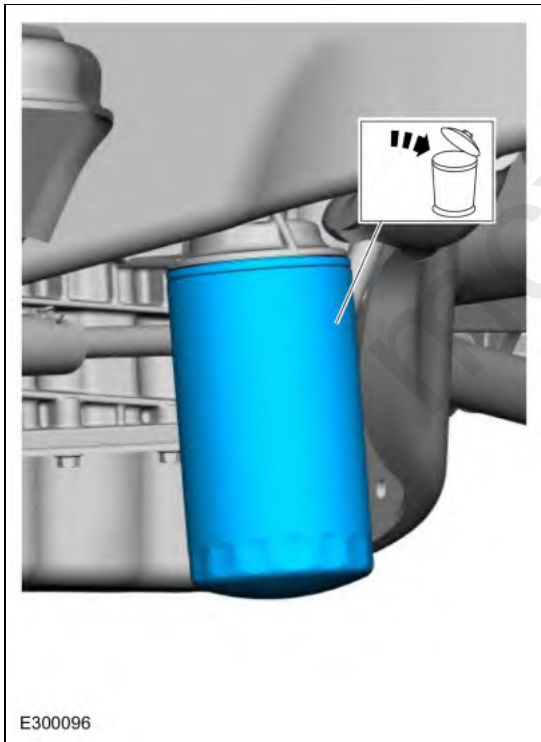
60. Remove and discard the TC mounting gasket.



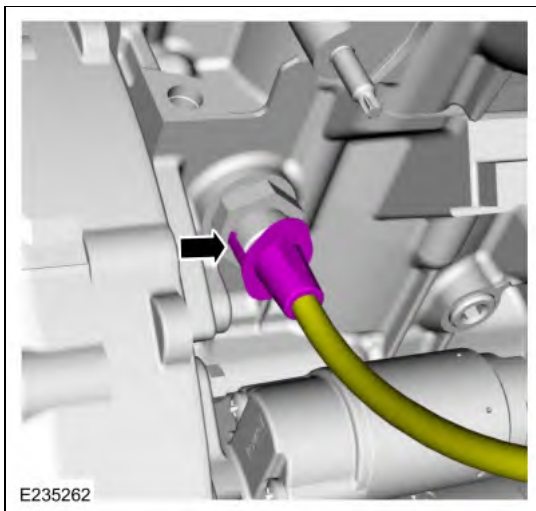
61. Remove the oil pan plug and drain the engine oil.
Use the General Equipment: Oil Drain Equipment
Torque: 19 lb.ft (26 Nm)



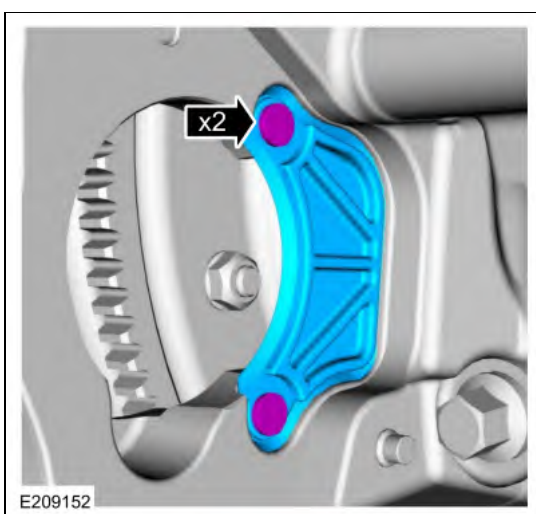
62. Remove and discard the oil filter.
Use the General Equipment: Oil Drain Equipment



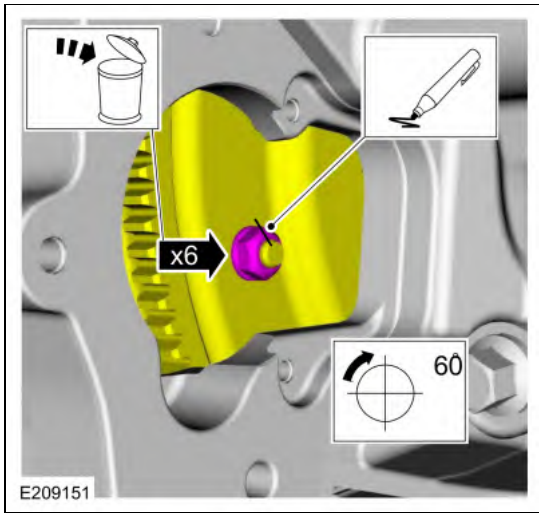
63. If equipped, disconnect the block heater electrical connector.



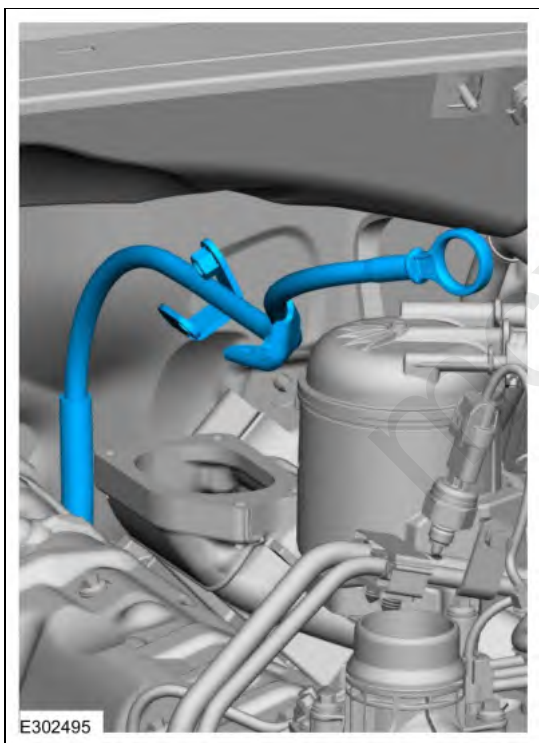
64. Remove the starter motor.
 Refer to: Starter Motor (303-06B Starting System - 6.7L Power Stroke Diesel, Removal and Installation).
65. Remove the retainers and the access cover.



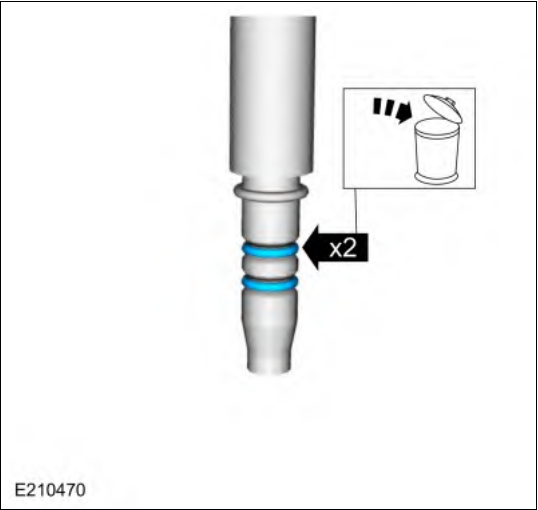
66. **NOTE:** Index-mark the end of one torque converter stud and the flexplate for installation.
- NOTE:** Using the crankshaft pulley bolts, turn the engine clockwise.
- Remove and discard the torque converter nuts.



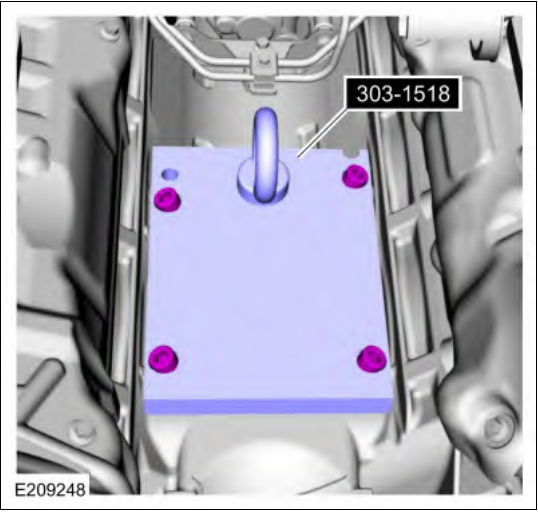
67. Remove the oil level indicator tube.



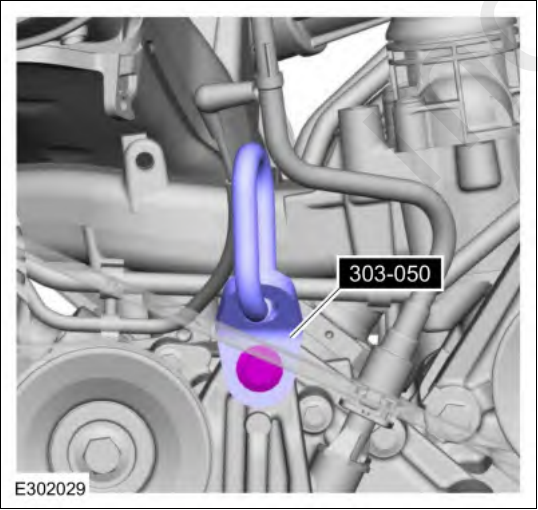
68. Remove and discard the oil level indicator tube O-ring seals.



69. Install Special Service Tool: 303-1518 Bracket, Engine Removal.

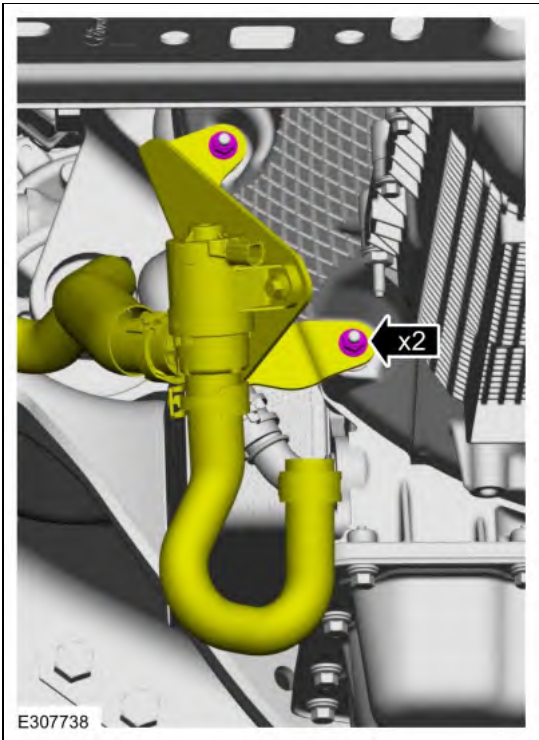


70. Install Special Service Tool: 303-050 (T70P-6000) Lifting Bracket, Engine.
Torque: 18 lb.ft (25 Nm)



71. **NOTICE:** Failure to replace the transmission support insulator nuts may result in transmission support insulator damage.
Loosen the transmission support insulator nuts.

75. Remove the nuts and position aside the valve.

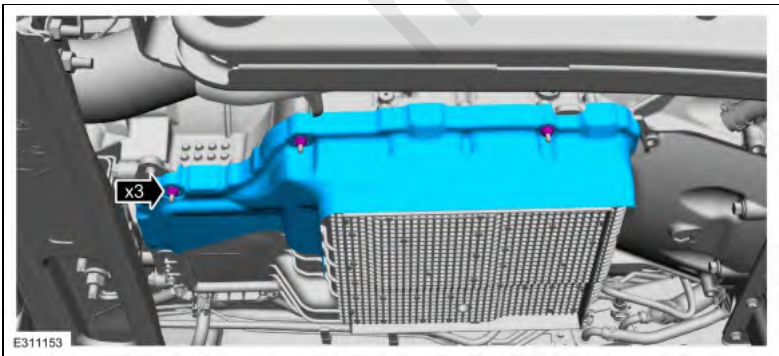


76. **NOTE:** Mark the location of the stud bolt.

Remove the stud bolt and the lower bellhousing bolts.



77. Remove the nuts and the transmission heat shield.

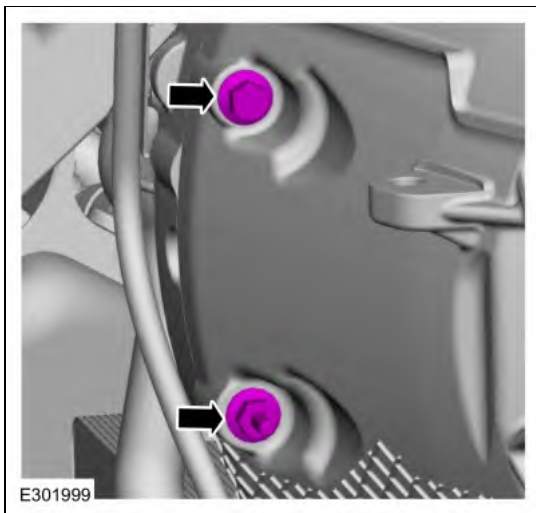


78. **NOTICE:** Secure the transmission to the transmission jack with a safety strap or chain.

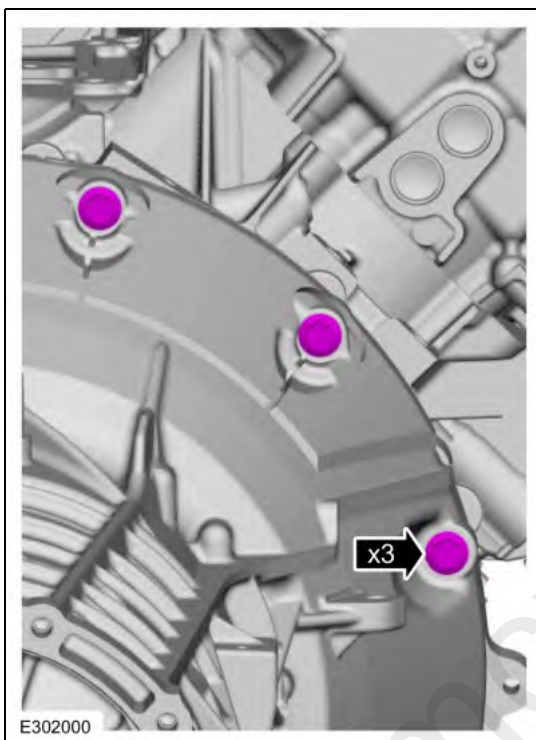
Position a transmission jack and support the transmission.
Use the General Equipment: Transmission Jack

79. **NOTE:** Mark the location of the stud bolt.

Remove the LH side bellhousing stud bolt and the bolt.



80. Remove the RH side bellhousing bolts.

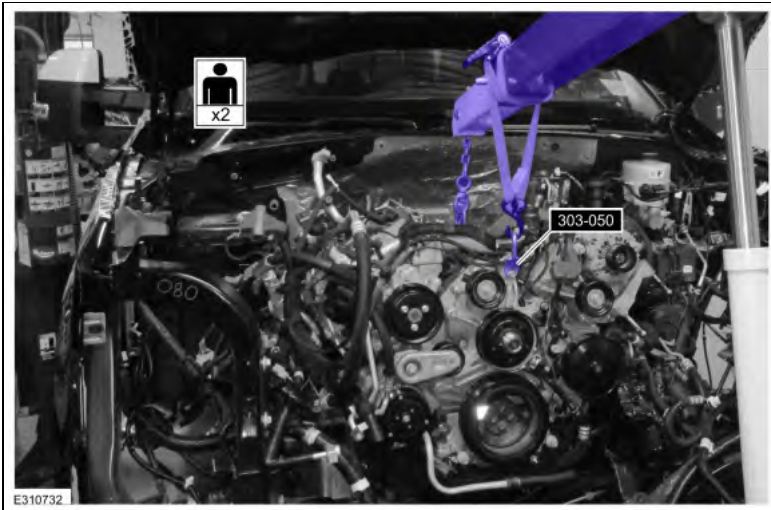


81. **NOTICE:** During removal of the engine, the engine oil cooler will pass very close to the frame crossmember. Remove the engine slowly, continually checking to make sure the engine oil cooler does not hit the frame crossmember, or component damage may occur.

NOTICE: After the engine is removed, position the engine close to the floor in case of lifting crane failure. Failure to lower the engine may result in engine damage.

- Position a floor crane and connect to the engine removal bracket.
Use the General Equipment: Floor Crane
- Raise the engine until the engine is near the cowl.

- Rolling the engine forward, continue to raise the engine until the engine clears the cross member.
- Install a ratchet strap and level the engine.
- Raise and remove the engine from the vehicle.



82. Install Special Service Tool: 307-346 (T97T-7902-A) Retainer, Torque Converter.



83. **NOTICE:** Failure to inspect the components for debris may result in repeat failures.

NOTE: It may be necessary to use a borescope to inspect the components.

When an engine or turbocharger is replaced due to a failure, inspect the following components for potential metal debris. If evidence of debris is found, clean or replace the components as needed.

- CAC and the CAC tubes
- Intake air system
- Exhaust manifolds
- EGR cooler and pipes
- Diesel Oxidation Catalyst (DOC)
- Turbocharger (on engine failure only)