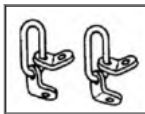
Engine - Body Off

Special Tool(s) / General Equipment

	303-050 (T70P-6000) Lifting Bracket, Engine
	303-1518 Bracket, Engine Removal TKIT-2009C-F TKIT-2009C-ROW
	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 cannot be removed, refer to Engine â€" Body On 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."*

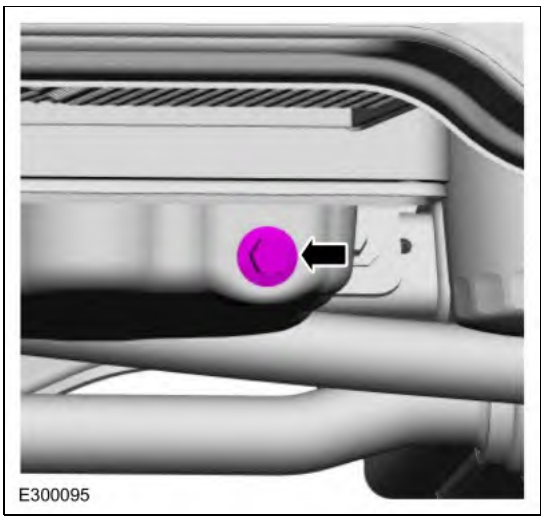
1. **WARNING: Do not work on the fuel system until the pressure has been released and the engine has cooled. Fuel in the high-pressure fuel system is hot and under very high pressure. High-pressure fuel may cause cuts and contact with hot fuel may cause burns. Failure to follow these instructions may 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).

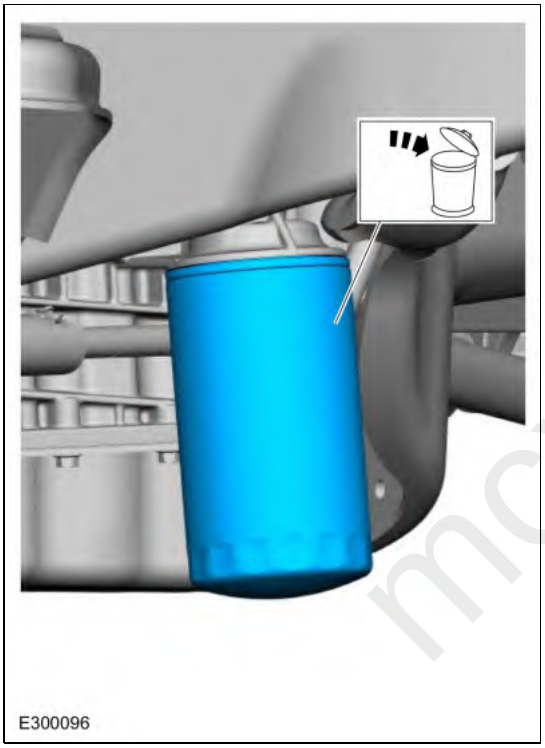
2. Remove the following items:
   1. Remove the transmission fluid cooler.
      Refer to: Transmission Fluid Cooler - 6.7L Power Stroke Diesel (307-02 Transmission Cooling - 6.7L Power Stroke Diesel) .
   2. Remove the body.
      Refer to: Body - 6.7L Power Stroke Diesel (502-02 Full Frame and Body Mounting, Removal and Installation).

3. Mark the location of the tires on the floor prior to rolling out the chassis. Roll the chassis out from under the body.

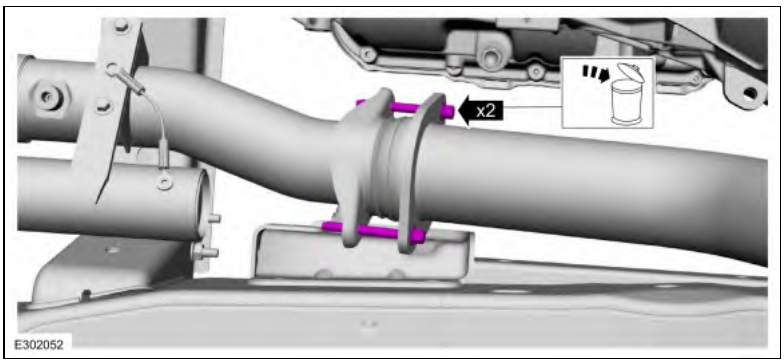
4. Remove the oil pan plug and drain the engine oil.
   Use the General Equipment: Oil Drain Equipment
   Torque: 19 lb.ft (26 Nm)



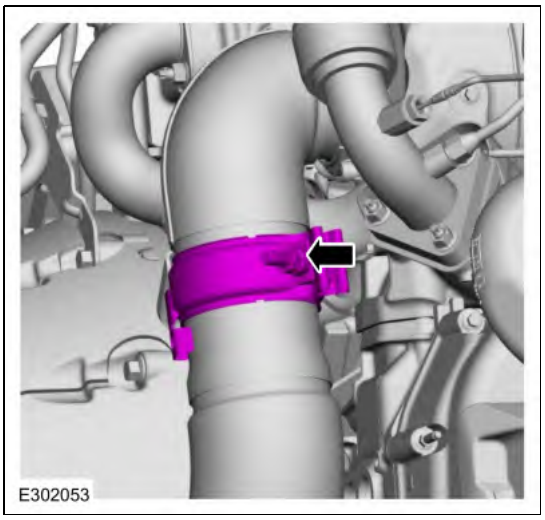
5. Remove and discard the oil filter.
   Use the General Equipment: Oil Drain Equipment



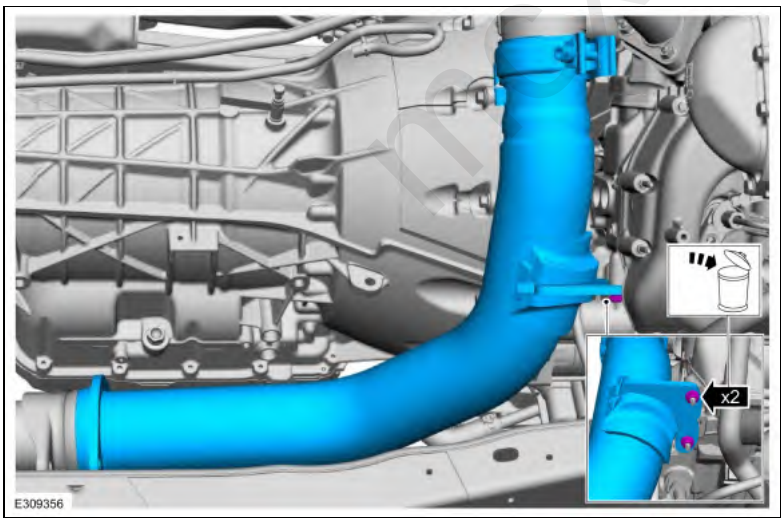
6. Remove and discard the exhaust downpipe bolts.



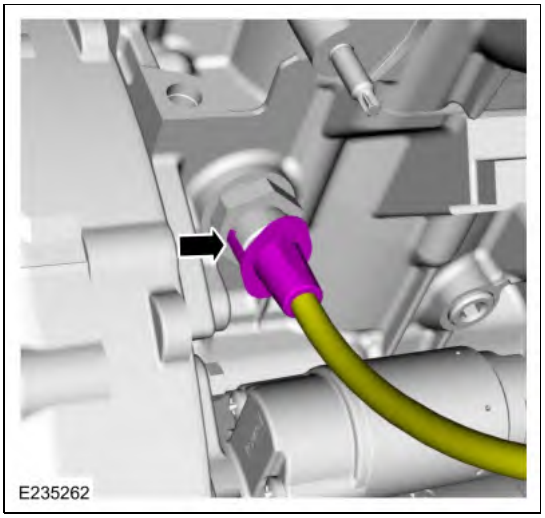
7. Loosen the clamp for the exhaust downpipe.



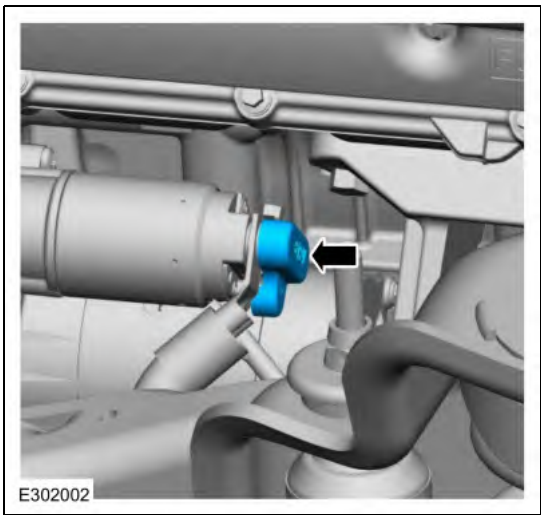
8. Remove and discard the nuts. Remove the exhaust downpipe.



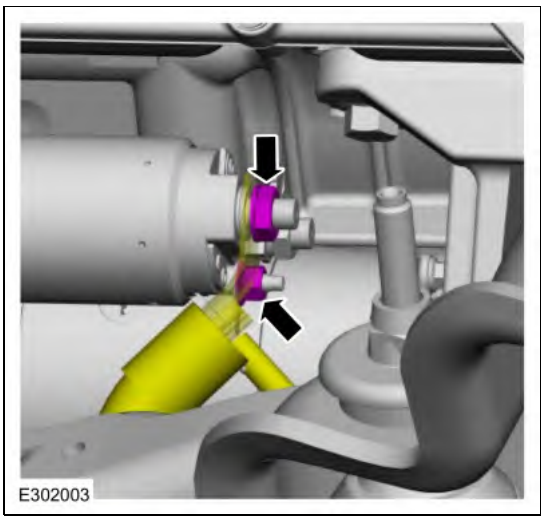
9. If equipped, disconnect the block heater electrical connector.



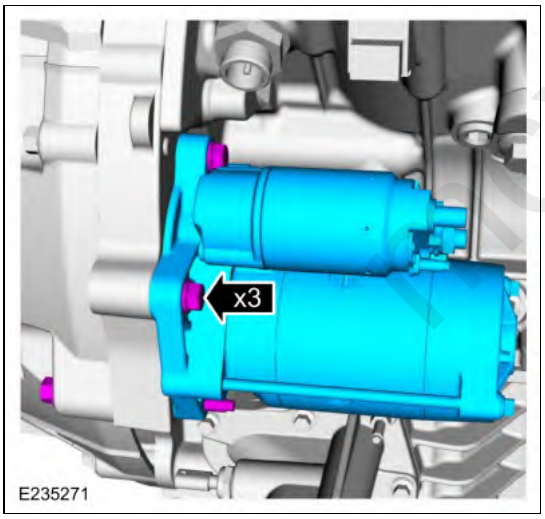
10. Remove the starter cable cover.



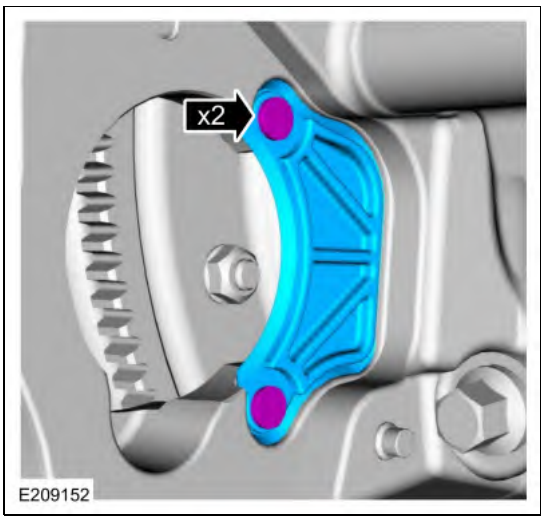
11. Remove the nuts and position aside the starter cables.



12. Remove the bolts and the starter.



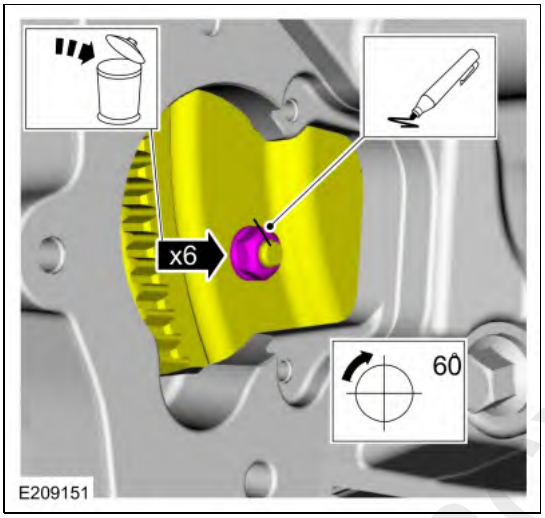
13. Remove the retainers and the access cover.



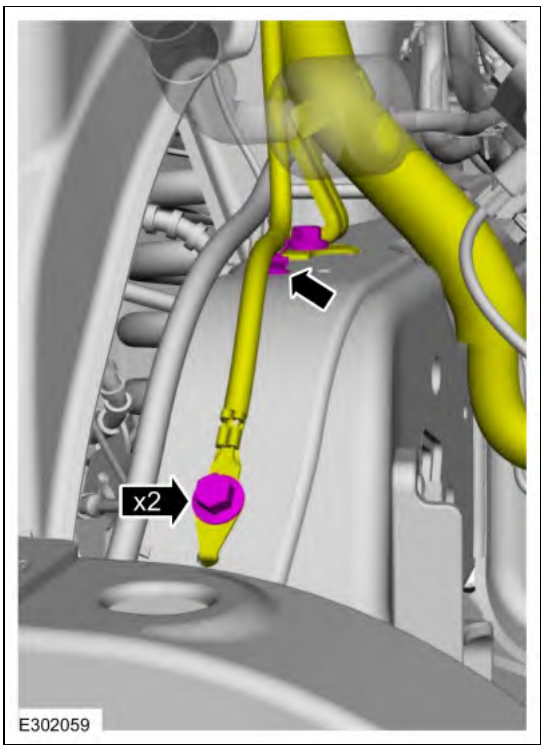
14. **NOTE:** *Index-mark the end of one torque converter stud and the flexplate for installation.*

    NOTE: *Using the crankshaft pulley bolts, turn the engine clockwise.*

    Remove and discard the torque converter nuts.

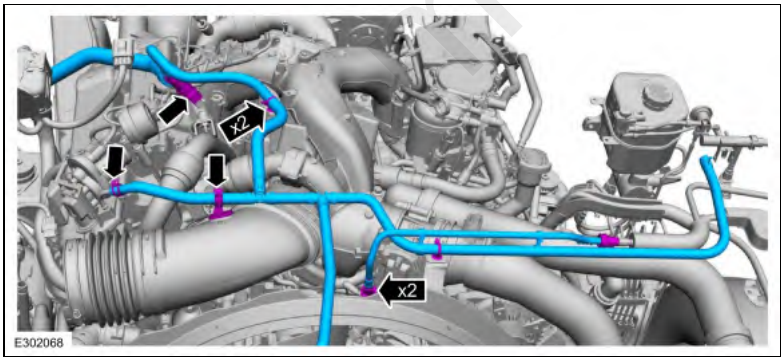


15. Remove the engine wire harness bracket bolt and the ground wire bolt. Disconnect the wire retainer and position the wire harness on the engine.

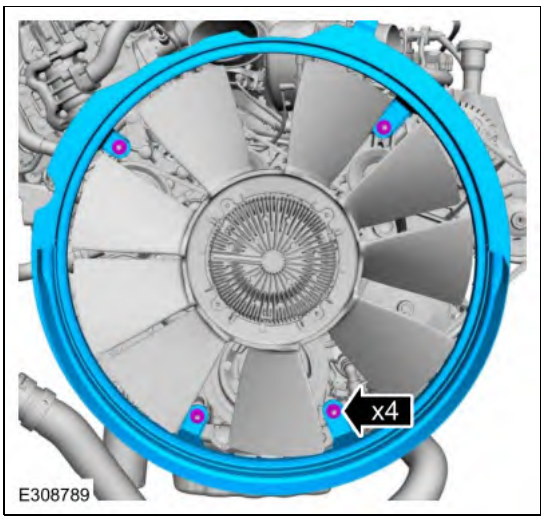


16.

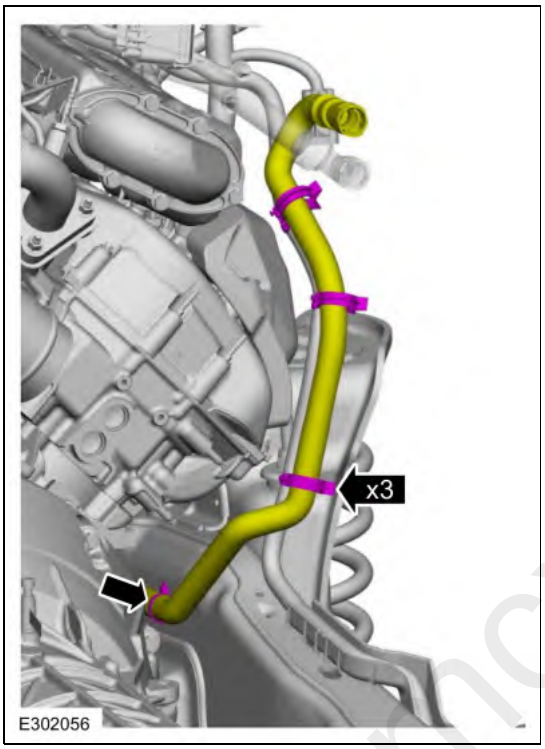
- Disconnect the vacuum hose connectors.
  Refer to: Quick Release Coupling (310-00 Fuel System - General Information - 6.7L Power Stroke Diesel) .
- Disconnect the coolant hoses and remove the hose assembly.
  Use the General Equipment: Hose Clamp Remover/Installer



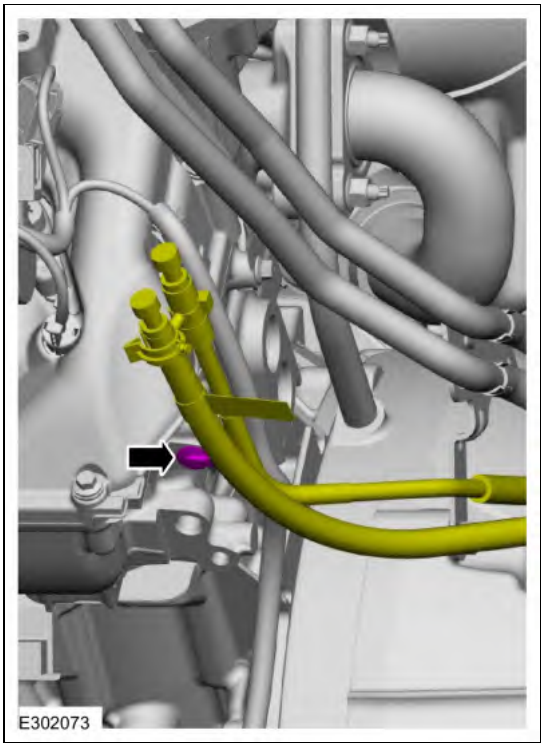
17. Remove the nuts and the cooling fan stator.



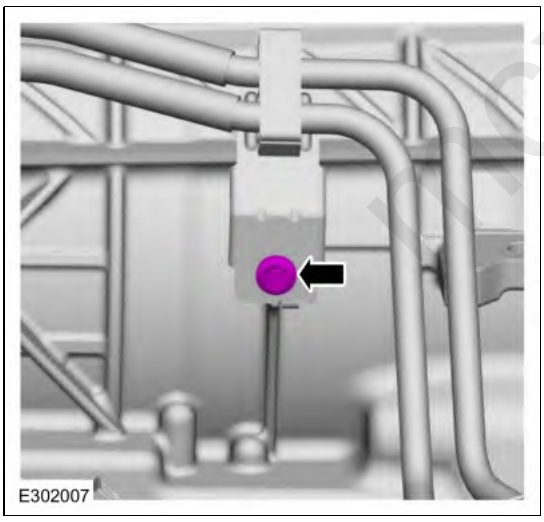
18. Disconnect the heater hose from the retainers. Disconnect the heater hose retainer from the frame.



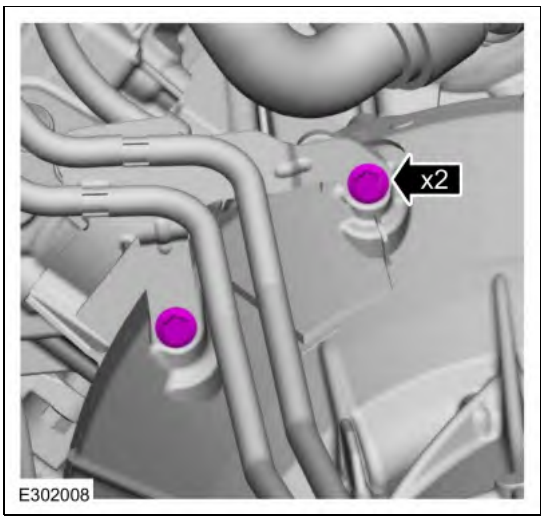
19. If equipped, disconnect the retainer for the transmission/ transfer case vent tubes.



20. Remove the fuel tube bracket bolt from the LH side of the transmission .

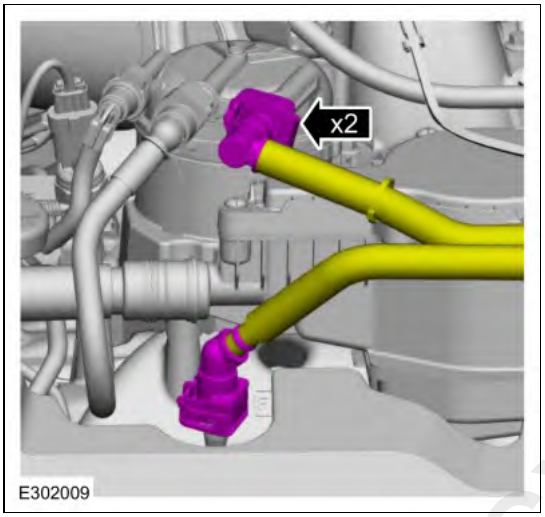


21. Remove the fuel tube bracket bolts from the transmission bellhousing.

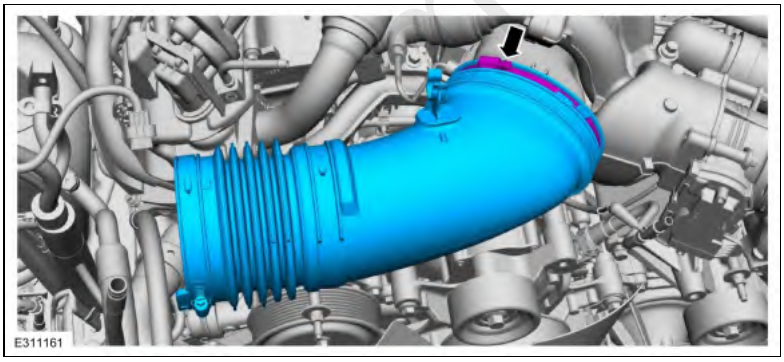


22. **NOTICE: Fuel injection equipment is manufactured to very precise tolerances and fine clearances. To prevent fuel system damage, it is essential that absolute cleanliness is observed when working with these components.**

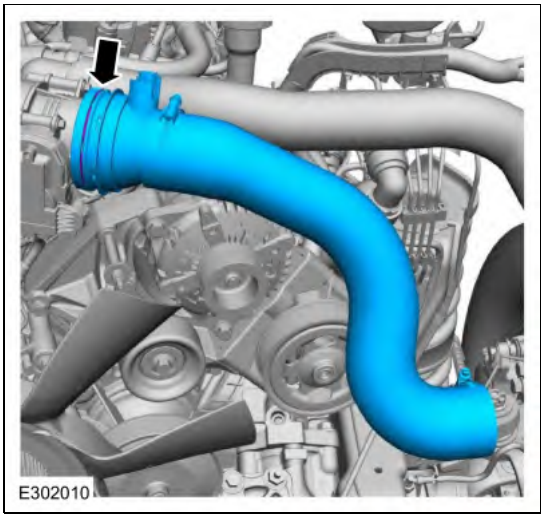
    Disconnect the fuel tubes and position aside.
    Refer to: Quick Release Coupling (310-00 Fuel System - General Information - 6.7L Power Stroke Diesel) .



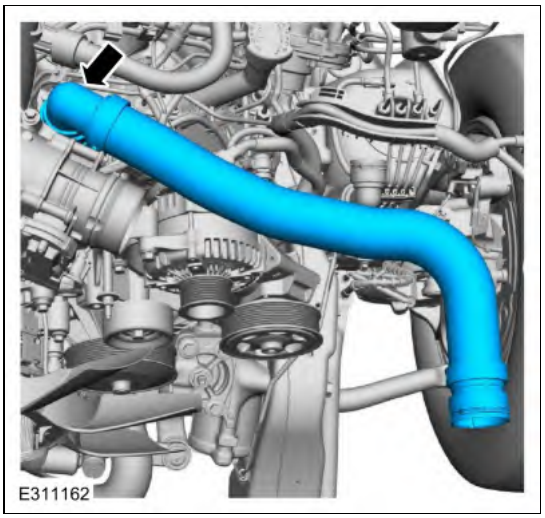
23. Loosen the clamp and remove the ACL (air cleaner) outlet pipe.



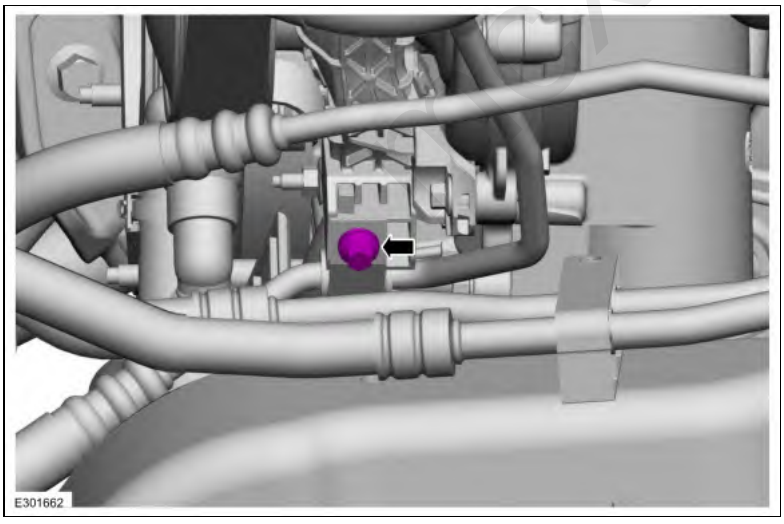
24. Release the clip and remove the CAC outlet pipe.



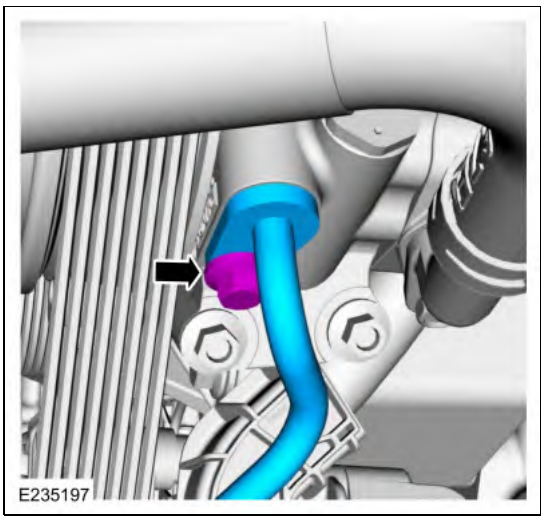
25. Release the clip and remove the upper radiator hose.



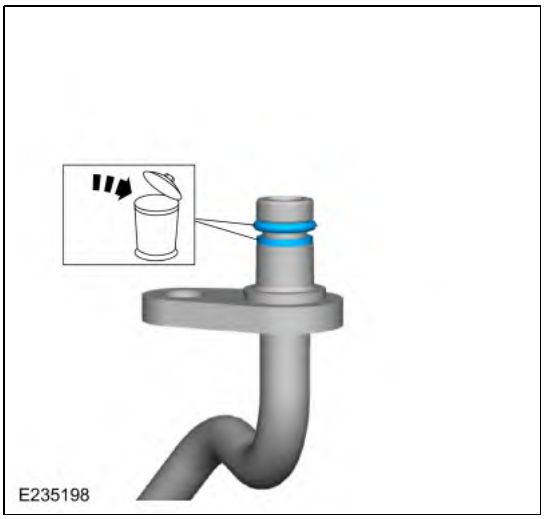
26. Remove the retainer from the power steering line bracket.



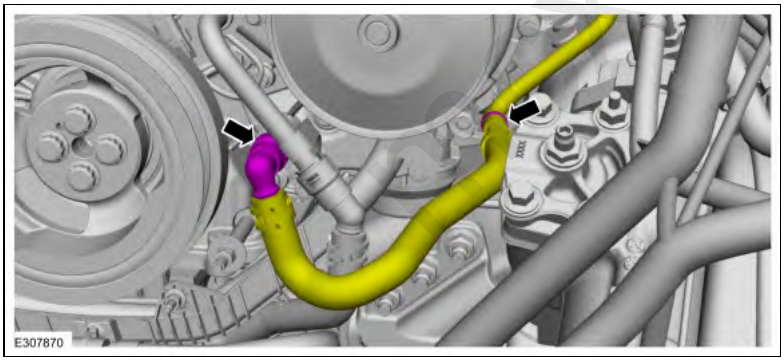
27. Remove the bolt and the power steering hose.



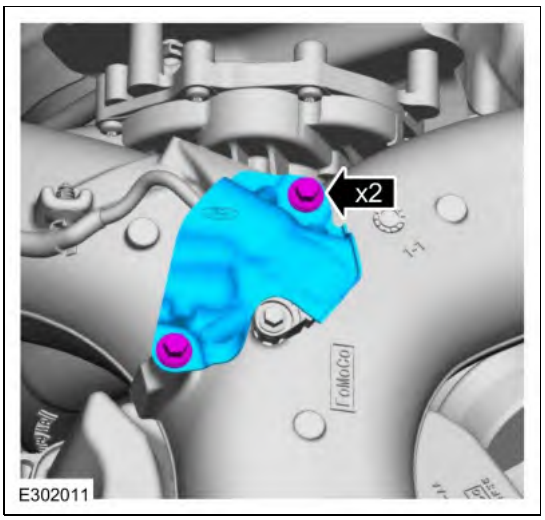
28. Remove and discard the power steering tube O-ring seals.



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

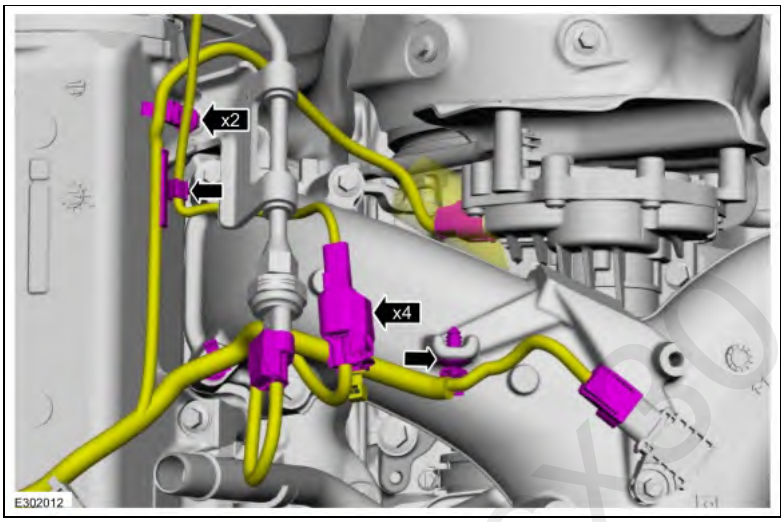


30. Remove the bolts and the intake manifold support.



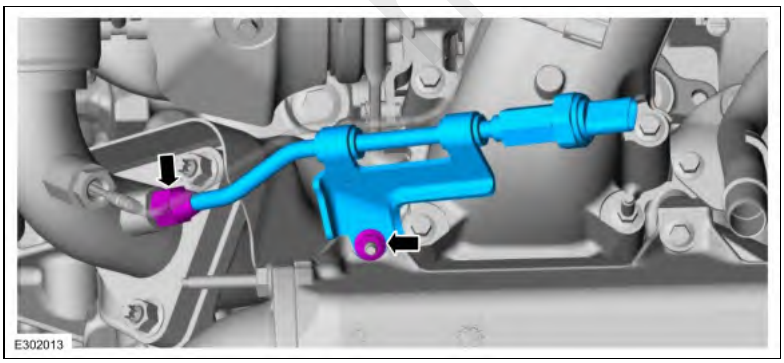
31.

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

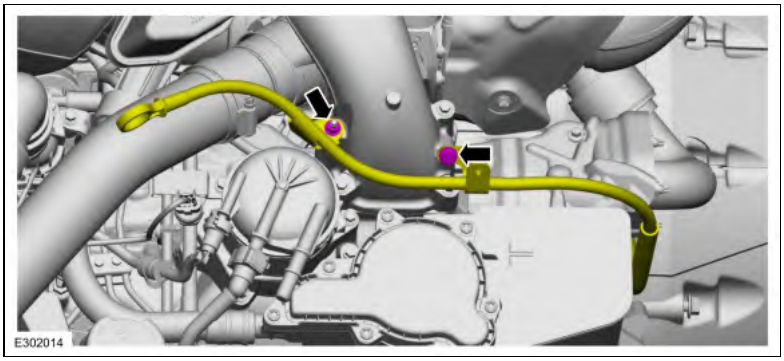


32.

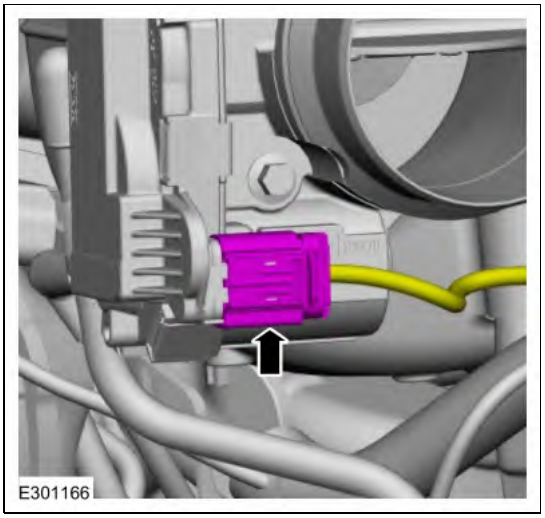
- Remove the nut for the EP sensor tube.
- Remove the EP sensor tube assembly.



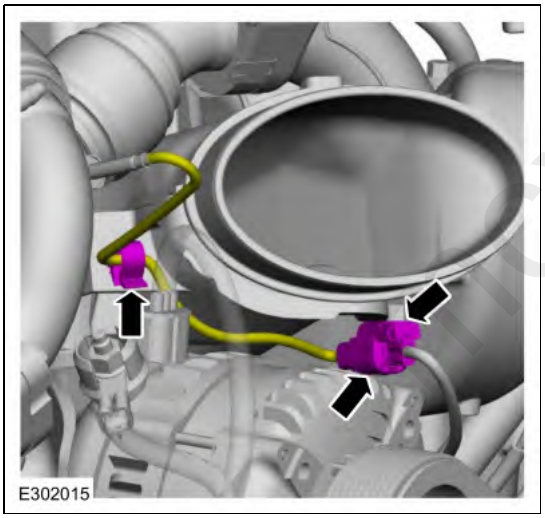
33. Remove the nut, the bolt and position aside the oil level indicator.



34. Disconnect the TB (throttle body) electrical connector.

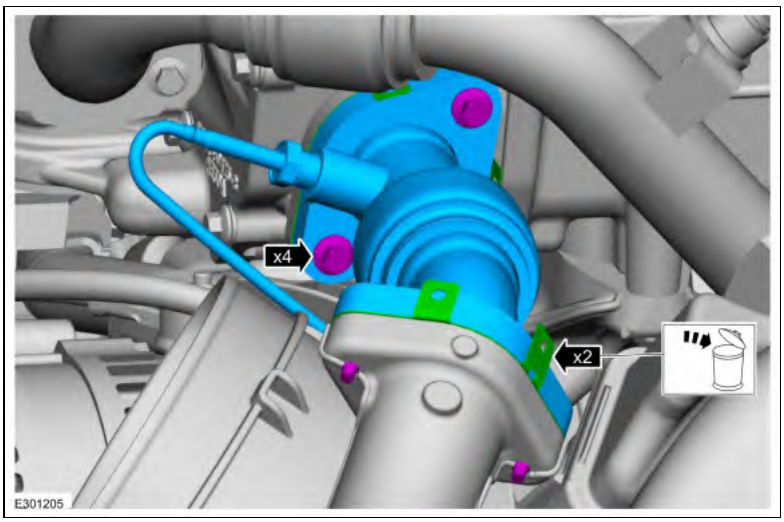


35. Disconnect the EGRT sensor electrical connector and the wire retainer.



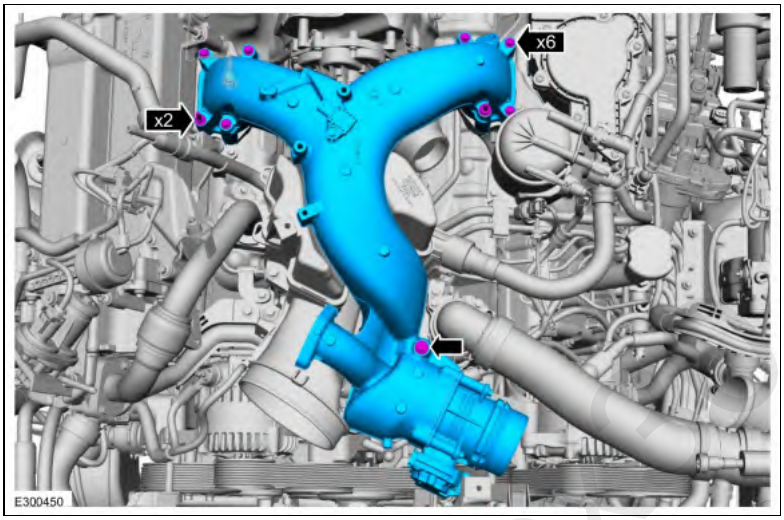
36.

- Remove the bolts and the EGR cooler outlet tube.
- Remove and discard the EGR outlet tube gaskets.



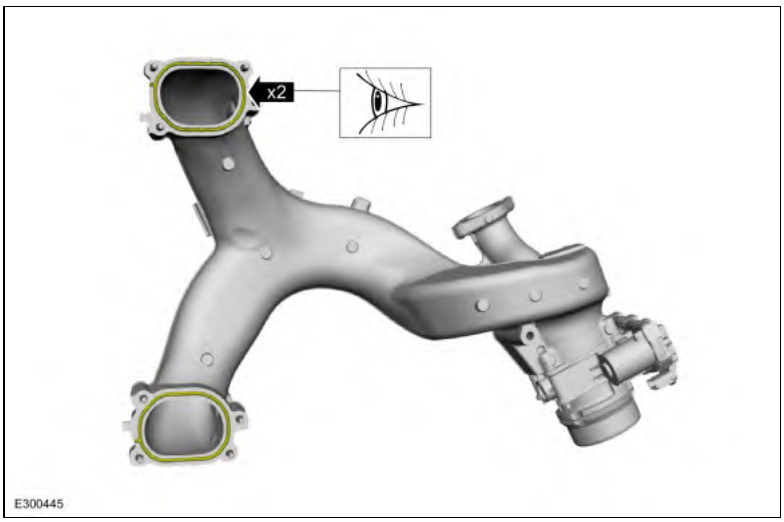
37.

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



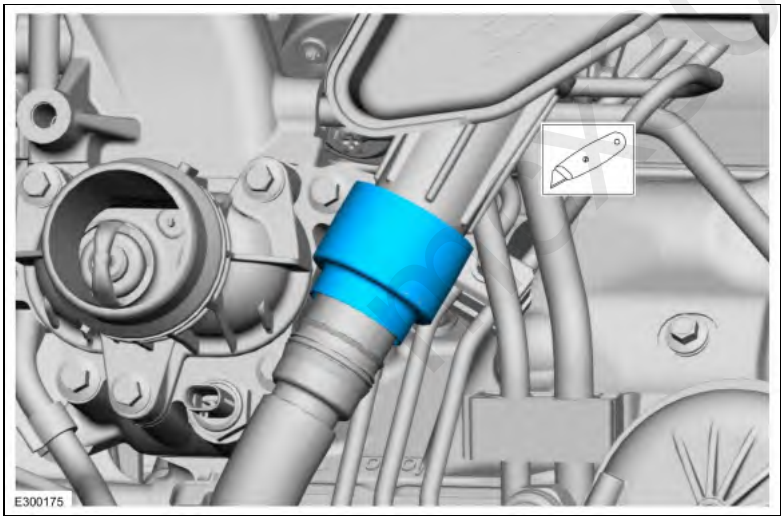
38. **NOTE:** *Visually inspect the intake manifold gaskets for nicks, cuts and abrasions. If these conditions are not present, the gasket may be reused.*

Inspect the upper intake manifold gaskets. Replace as necessary.



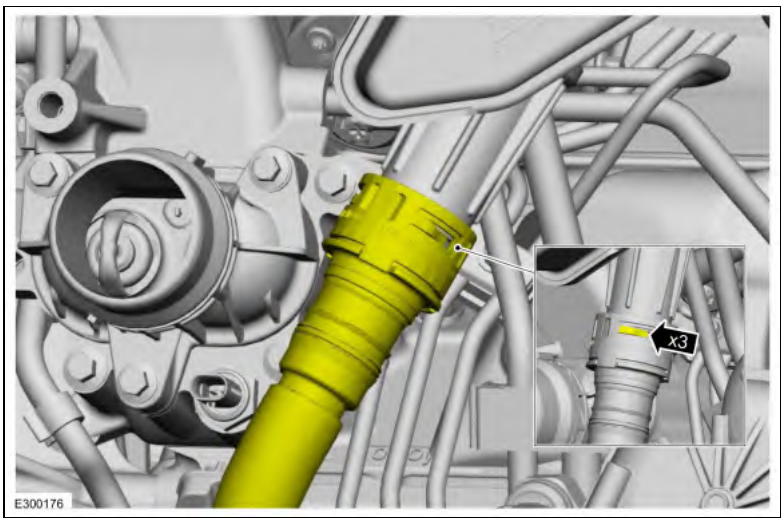
39. **NOTE:** *The crankcase vent oil separator must be replaced whenever the crankcase vent oil separator hose is disconnected from the lower intake manifold.*

    Cut the rubber sleeve cover and peel it back out of the way.

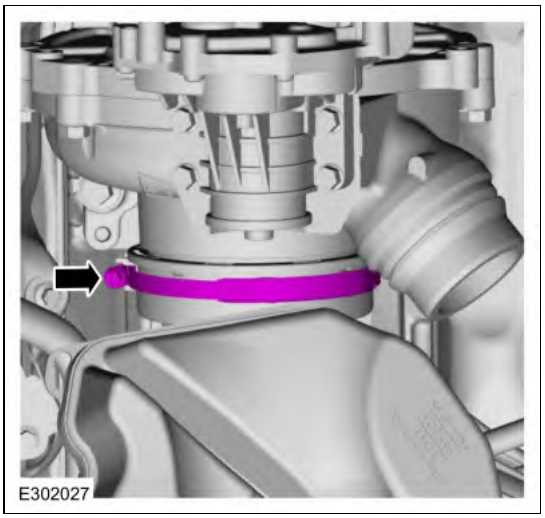


40.

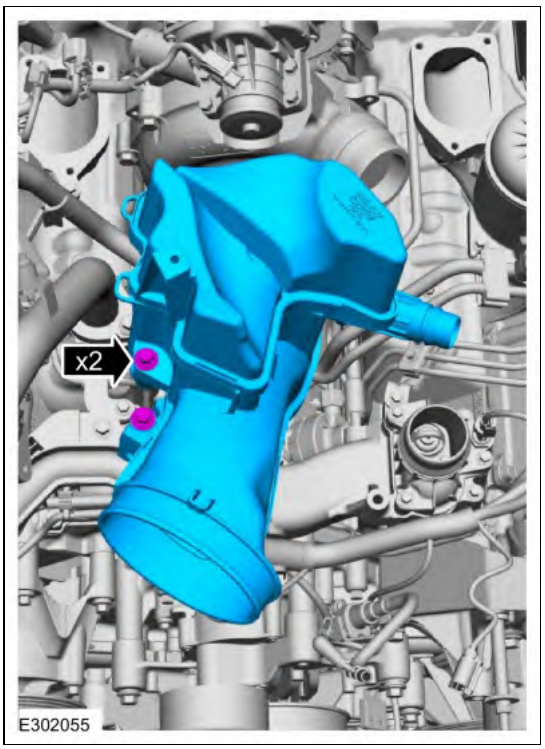
- Release the crankcase vent oil separator outlet hose retainers, break the tabs as needed.
- Disconnect the crankcase vent oil separator outlet hose from the lower intake manifold.



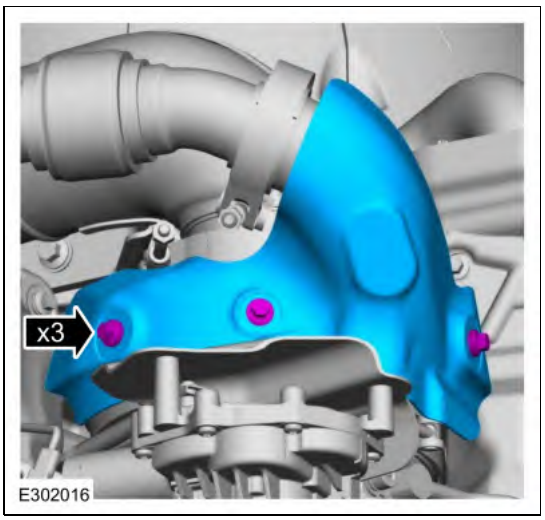
41. Loosen the lower intake manifold clamp.



42. Remove the bolts and the lower intake manifold.

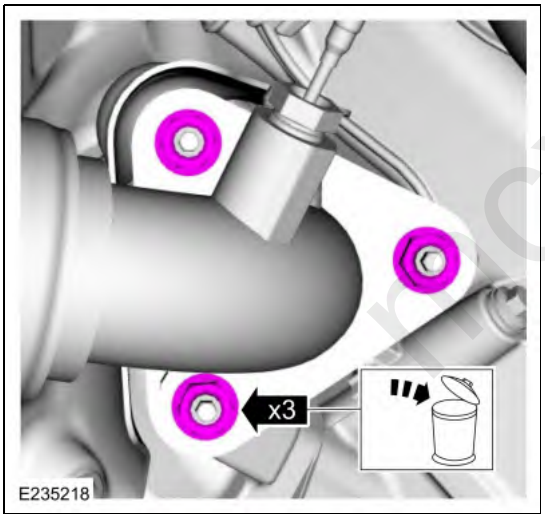


43. Remove the bolts and the TC heat shield.



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

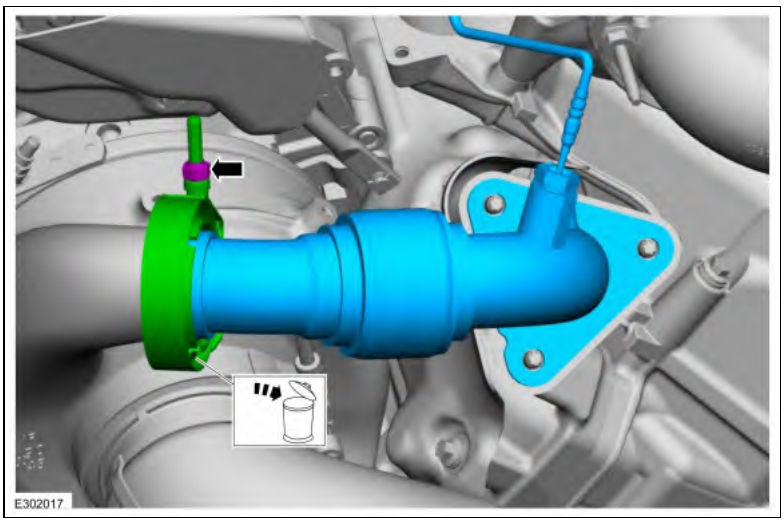
    Remove and discard the RH turbocharger inlet pipe nuts.



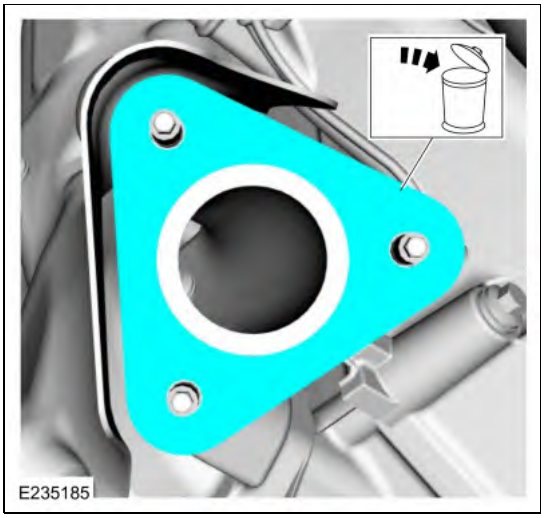
45. **NOTICE: Do not bend or twist the turbocharger inlet pipes or damage to the bellows on the turbocharger inlet pipes may occur.**

    NOTE: *Note the position of the clamp.*

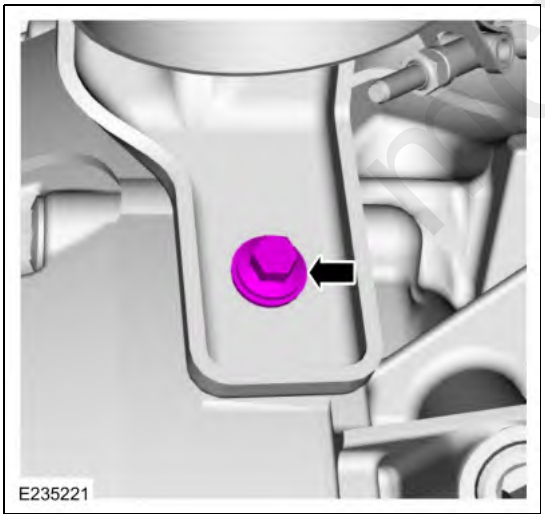
    - Loosen the RH turbocharger inlet pipe clamp and remove the RH turbocharger inlet pipe.
    - Remove and discard the clamp.



46. Remove the discard the RH turbocharger inlet pipe gasket.

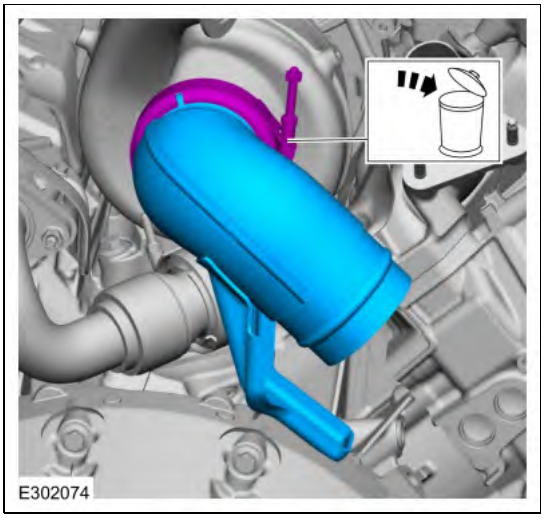


47. Remove the bolt for the TC outlet pipe.



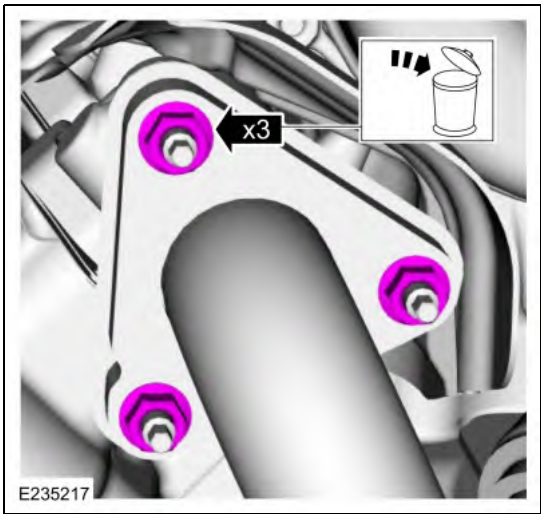
48. **NOTE:** *Note the position of the clamp.*

    Remove the clamp and the TC outlet pipe. Discard the clamp.



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

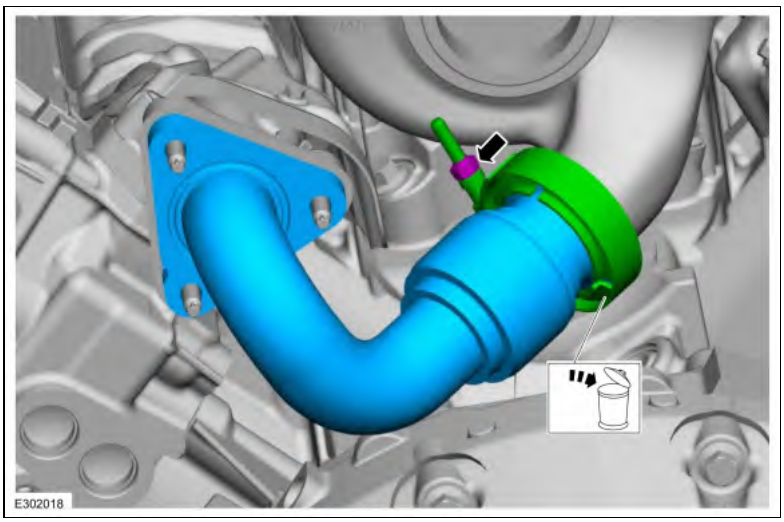
    Remove and discard the LH turbocharger inlet pipe nuts.



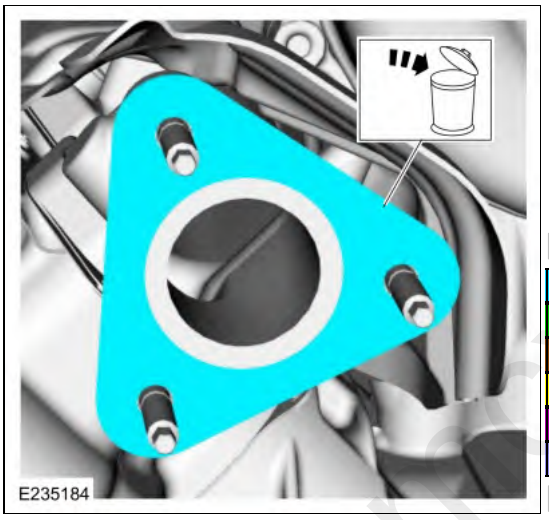
50. **NOTICE: Do not bend or twist the turbocharger inlet pipes or damage to the bellows on the turbocharger inlet pipes may occur.**

    NOTE: *Note the position of the clamp.*

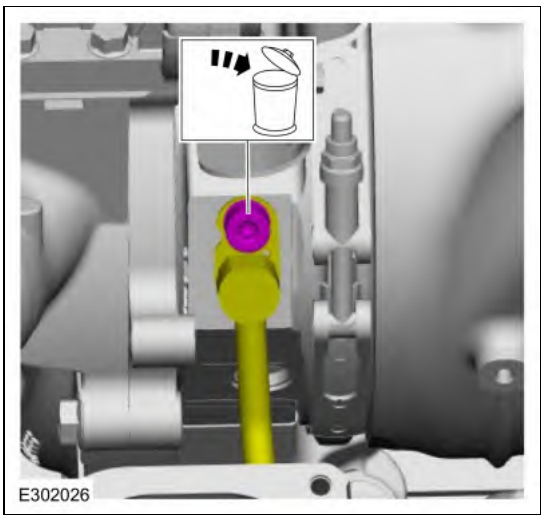
    - Loosen the LH turbocharger inlet pipe clamp and remove the LH turbocharger inlet pipe.
    - Remove and discard the clamp.



51. Remove the discard the LH turbocharger inlet pipe gasket.



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

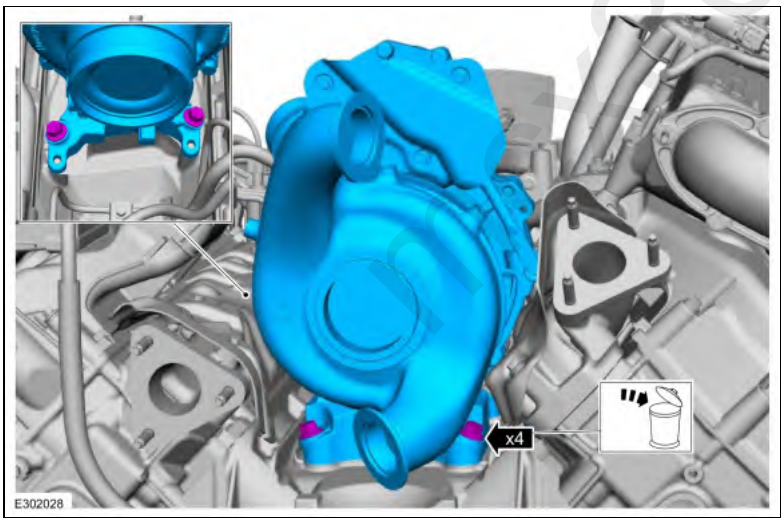


53.

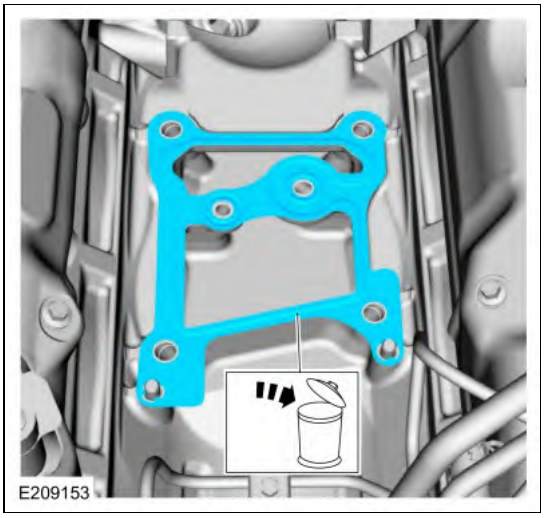
- **NOTE:** *The turbocharger mounting bolts are torque-to-yield design and cannot be reused.*

  NOTE: *Lift the turbocharger off of the locating dowels before positioning rearward for removal.*

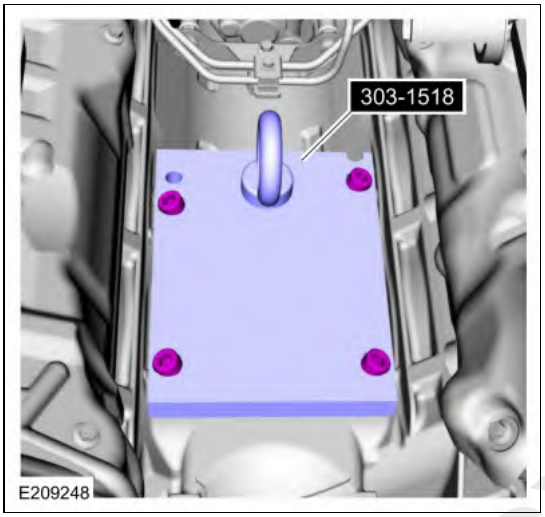
  Remove and discard the TC mounting bolts.
- Remove the TC.



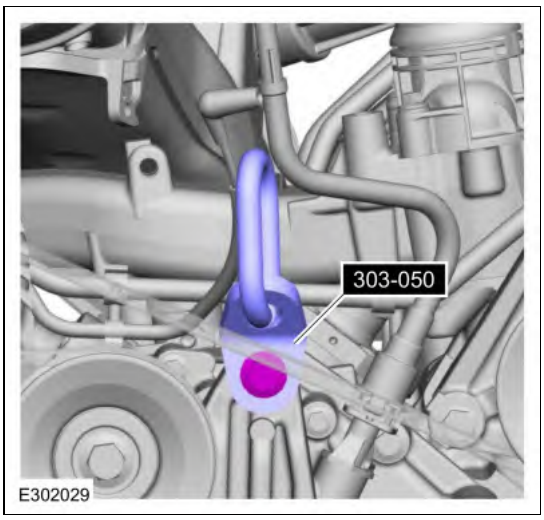
54. Remove and discard the TC mounting gasket.



55. Install Special Service Tool: 303-1518 Bracket, Engine Removal.
Torque: 41 lb.ft (55 Nm)

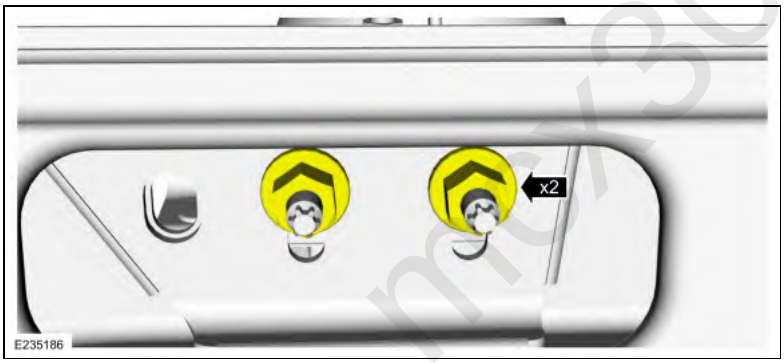


56.
Install Special Service Tool: 303-050 (T70P-6000) Lifting Bracket, Engine.
Torque: 18 lb.ft (25 Nm)



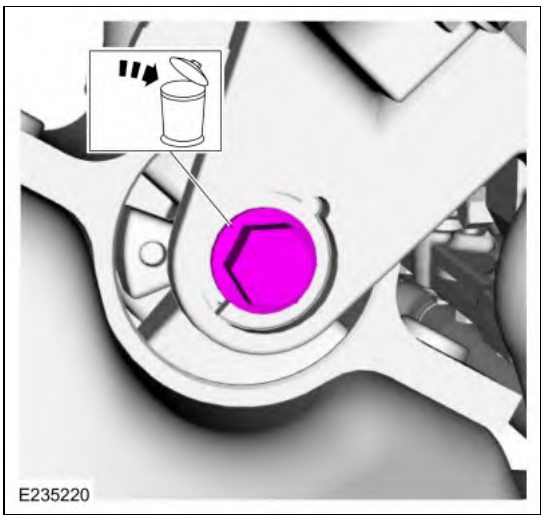
57. **NOTICE: Failure to replace the transmission support insulator nuts may result in transmission support insulator damage.**

    Loosen the transmission support insulator nuts.



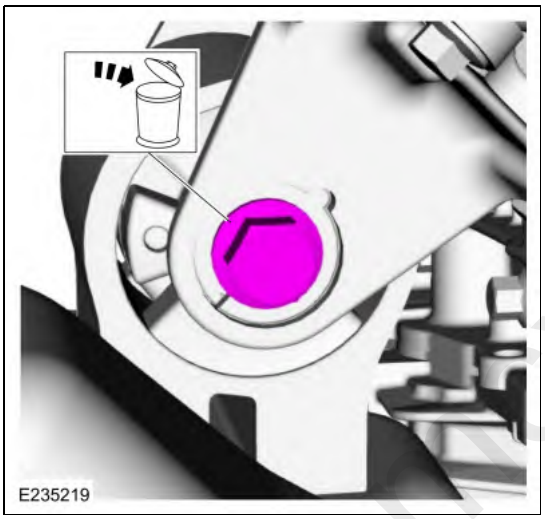
58. **NOTICE: Failure to replace the engine mount cross bolts may result in engine mount damage.**

    Remove and discard the LH engine mount cross through bolt.

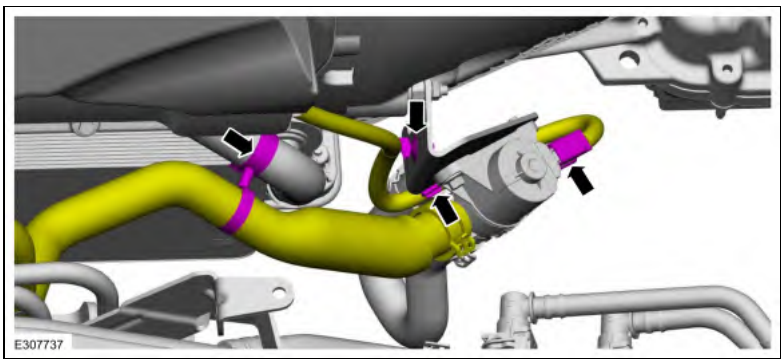


59. **NOTICE: Failure to replace the engine mount cross bolts may result in engine mount damage.**

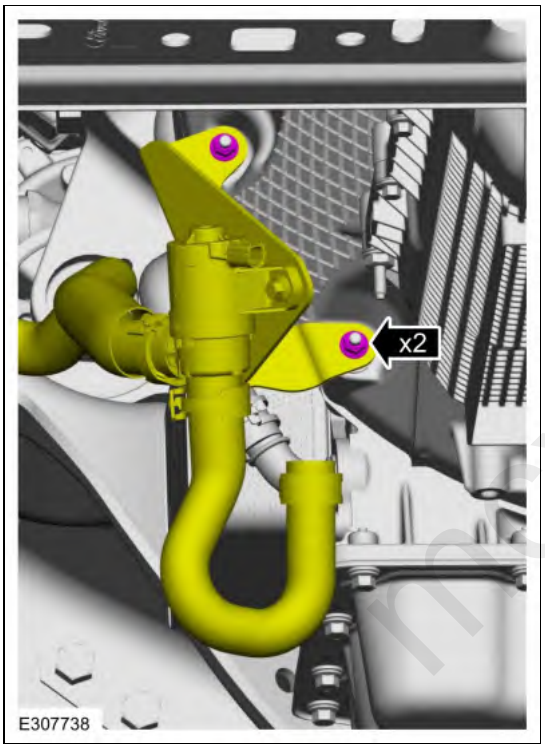
    Remove and discard the RH engine mount cross bolt.



60. Disconnect the electrical connector and the retainers.



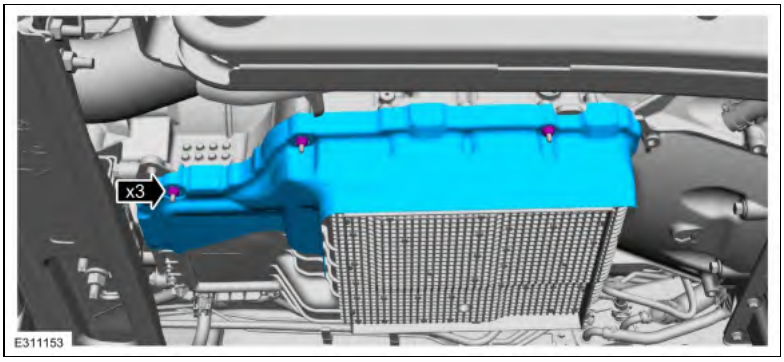
61. Remove the nuts and position aside the valve.



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

    Remove the stud bolt and the lower bellhousing bolts.

63. Remove the nuts and the transmission heat shield.

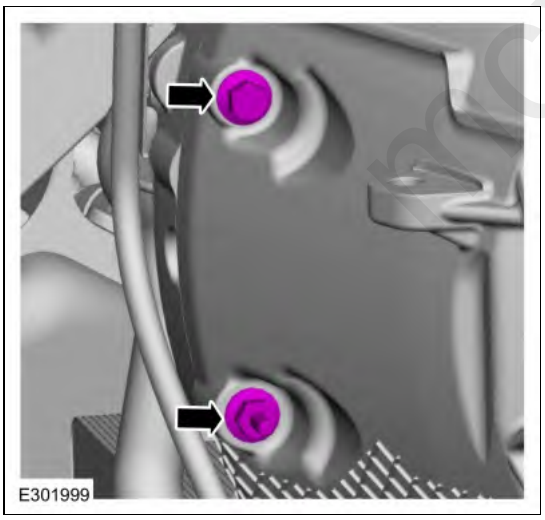


64. **NOTICE: Secure the transmission to the transmission jack with a safety strap or chain.**

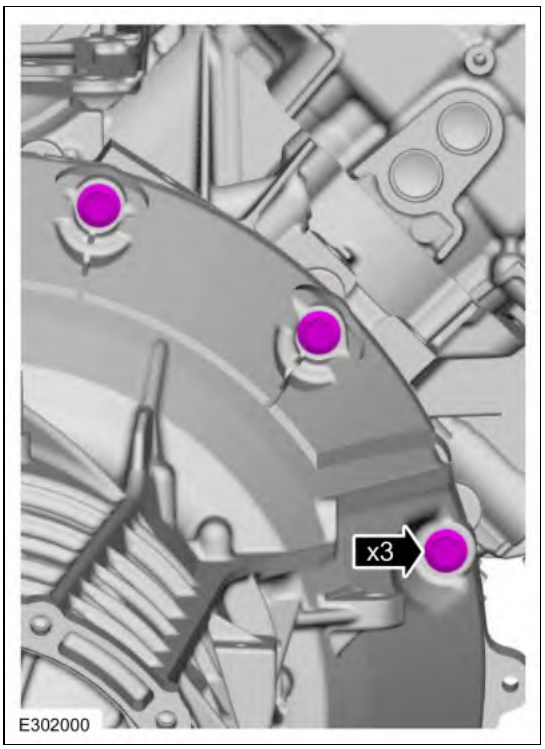
    Position a transmission jack and support the transmission.
    Use the General Equipment: Transmission Jack

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

    Remove the LH side bellhousing stud bolt and the bolt.



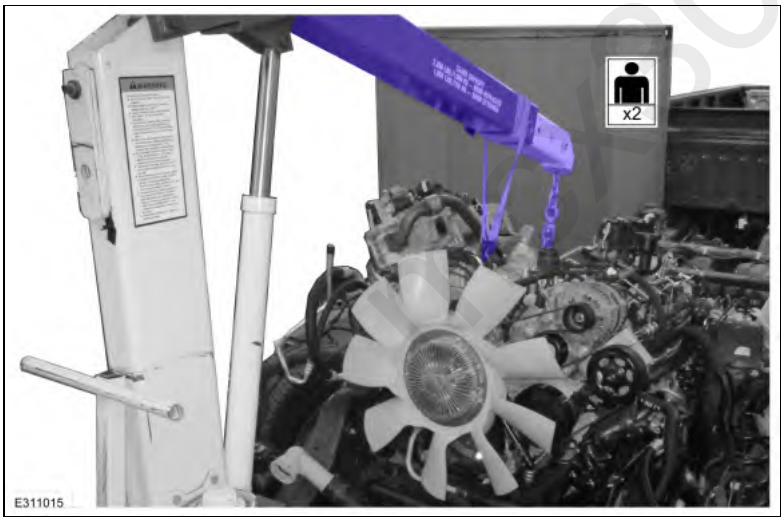
66. Remove the RH side bellhousing bolts.



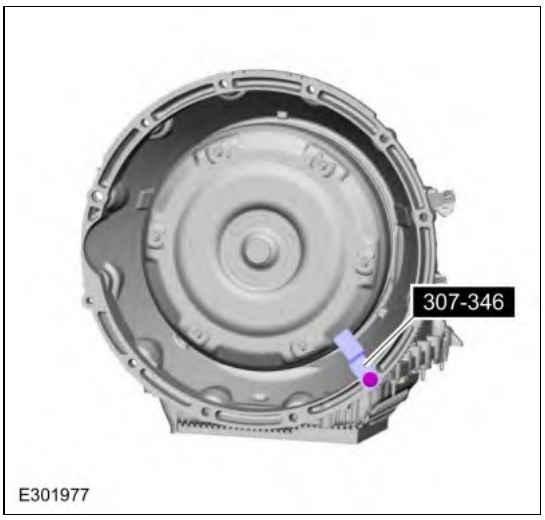
67. **NOTICE: During removal of the engine, the engine oil cooler will pass very close to the frame crossmember. Remove the engine slowly, continually checking to make sure the engine oil cooler does not hit the frame crossmember, or component damage may occur.**

    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
    - Install a suitable ratchet strap from the arm of the floor crane to the engine lifting bracket to adjust the angle of the engine.
    - Raise and remove the engine from the vehicle.



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



69. **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)