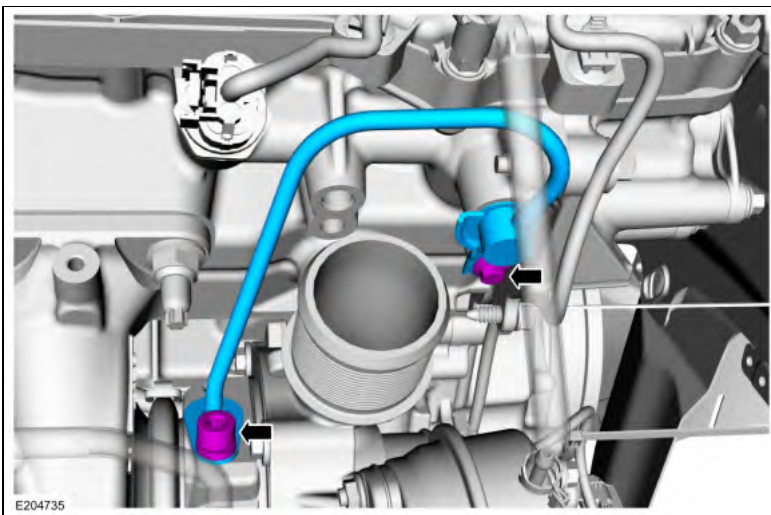


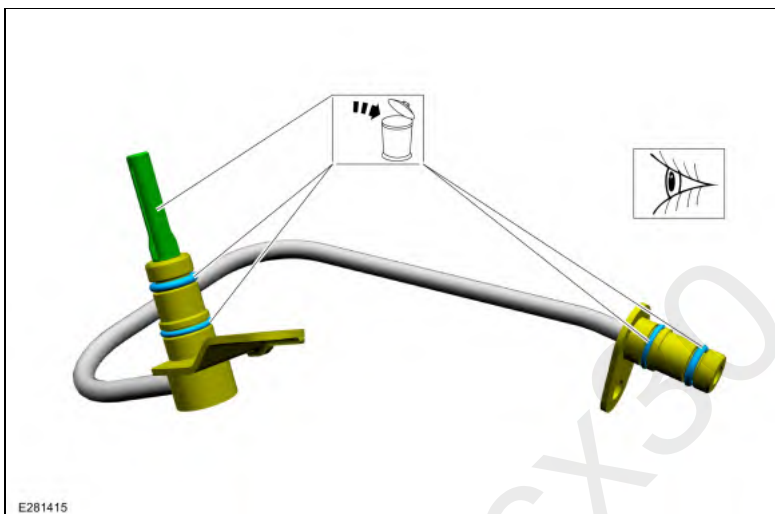


9. **NOTICE: Do not use a metal brush, damage to sealing area will result in leaks.**

- Inspect the turbocharger tube and the sealing surfaces. Ensure that the retaining bracket is not bent, check for square-ness of the retaining bracket to the O-ring area. Use brake cleaner and a nylon brush to clean. Install new components as needed.

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

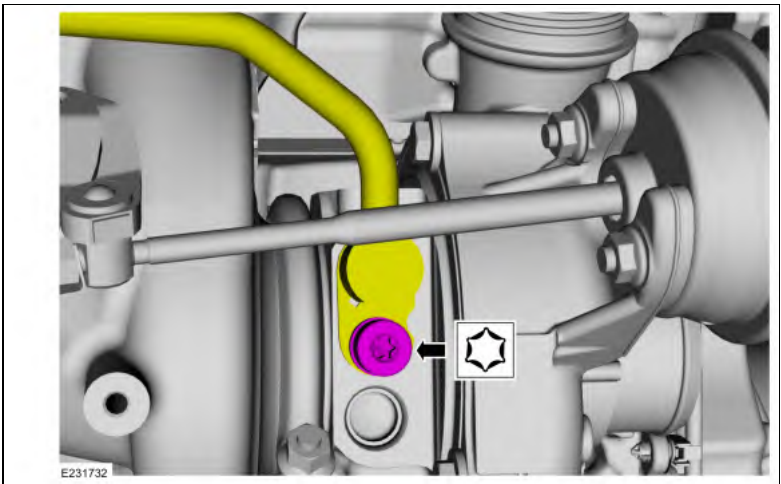
- Remove and discard the turbocharger oil supply tube O-ring seals and the turbocharger oil supply tube oil filter.



- Remove the catalytic converter RH.

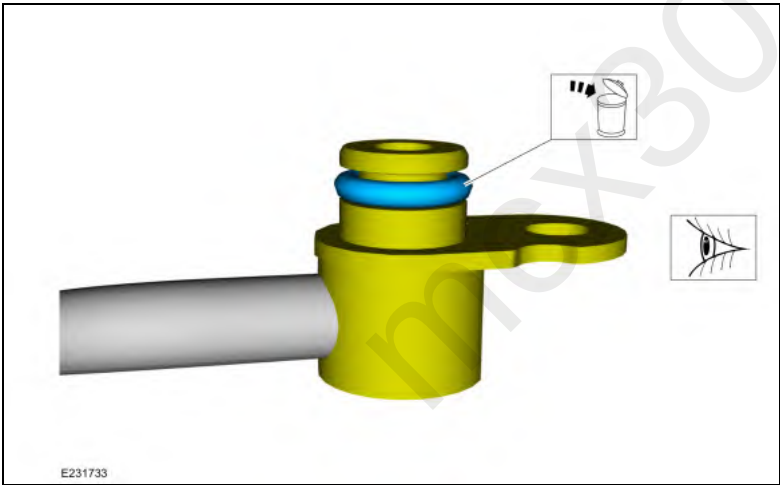
Refer to: Catalytic Converter RH (309-00B Exhaust System - 2.7L EcoBoost (238kW/324PS), Removal and Installation).

- Remove the turbocharger coolant return tube bolt, then disconnect the turbocharger coolant return tube and position out of the way.

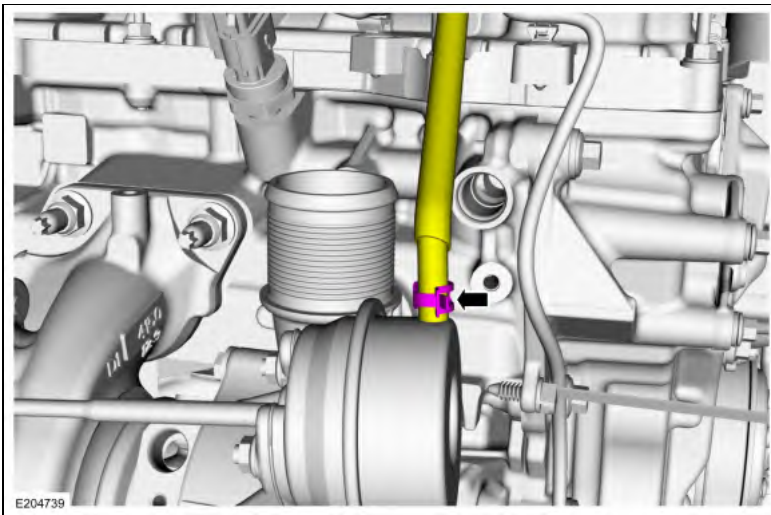


12. **NOTICE: Do not use a metal brush, damage to sealing area will result in leaks.**

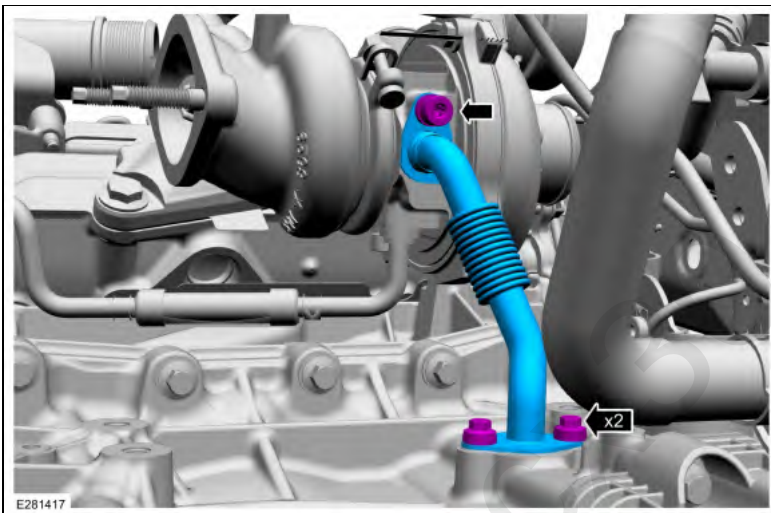
- Inspect the turbocharger tube and the sealing surfaces. Ensure that the retaining bracket is not bent, check for square-ness of the retaining bracket to the O-ring area. Use brake cleaner and a nylon brush to clean. Install new components as needed.
Material: Motorcraft® Metal Brake Parts Cleaner / PM-4-A, PM-4-B
1. Remove and discard the turbocharger coolant return tube O-ring seal.



13. Release the turbocharger wastegate control hose clamp, then disconnect the hose.
Use the General Equipment: Hose Clamp Remover/Installer



14. Remove the turbocharger oil return tube retainers, then remove the turbocharger oil return tube.

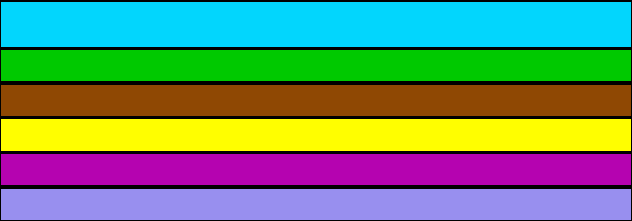
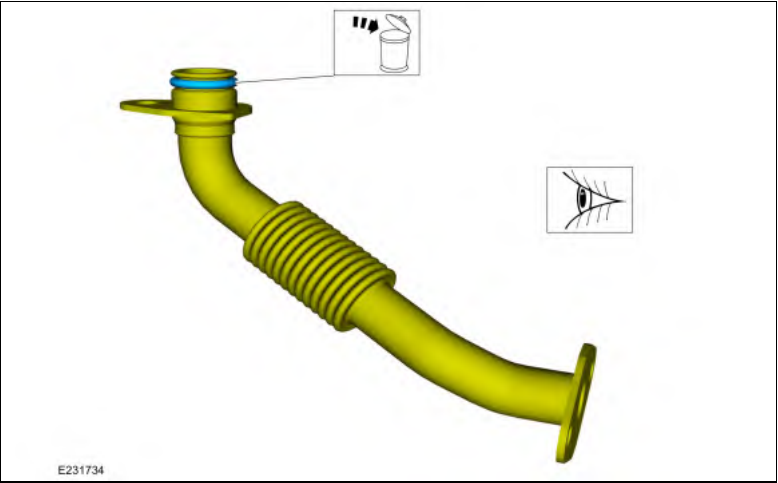


15. **NOTICE: Do not use a metal brush, damage to sealing area will result in leaks.**

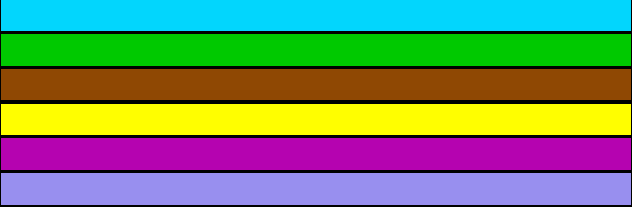
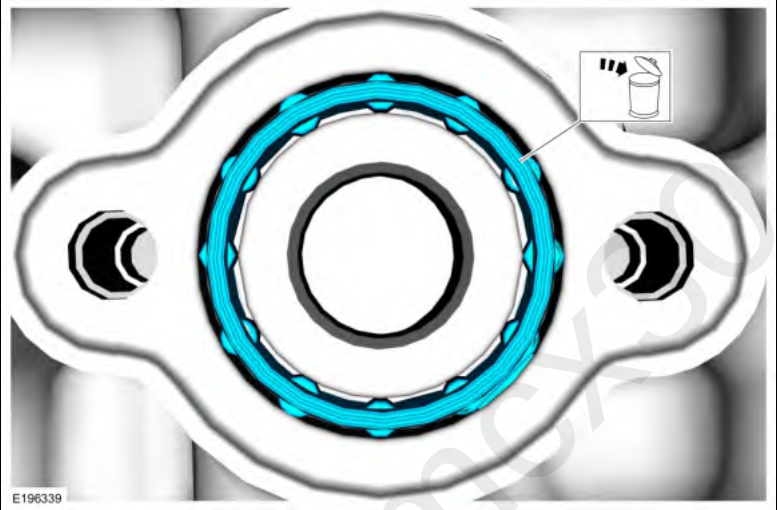
- Inspect for blockage in the turbocharger tube. Check the tube, the sealing surfaces and the flange for flatness and damage. Ensure that the retaining bracket is not bent, check for square-ness of the retaining bracket to the O-ring area. Use brake cleaner and a nylon brush to clean. Install new components as needed.

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

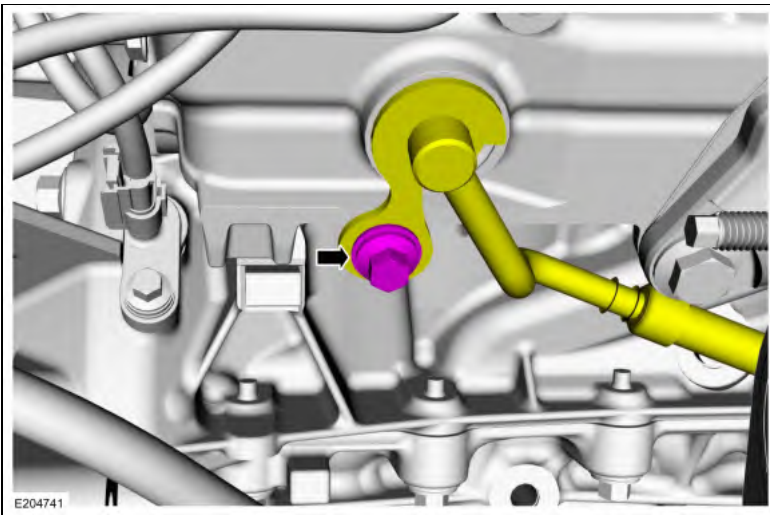
- Remove and discard the turbocharger oil return tube O-ring seal.



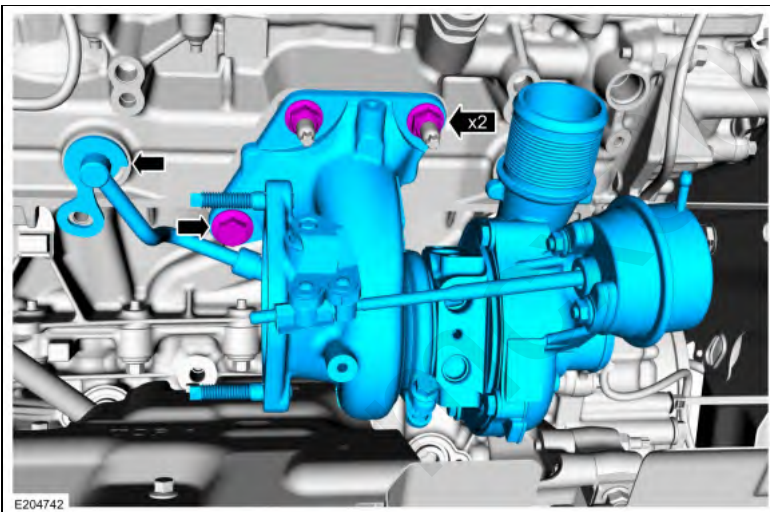
16. Remove and discard the turbocharger oil return tube to engine gasket.



17. Remove the turbocharger coolant supply tube bolt.



18. Remove the turbocharger coolant supply tube from the engine block while removing the turbocharger. Remove the turbocharger retainers, then remove the turbocharger.



19. **NOTICE: Do- not use a metal brush, damage to sealing area will result in leaks.**

- Inspect the turbocharger tube and the sealing surfaces. Ensure that the retaining bracket is not bent, check for square-ness of the retaining bracket to the O-ring area. Use brake cleaner and a nylon brush to clean. Install new components as needed.

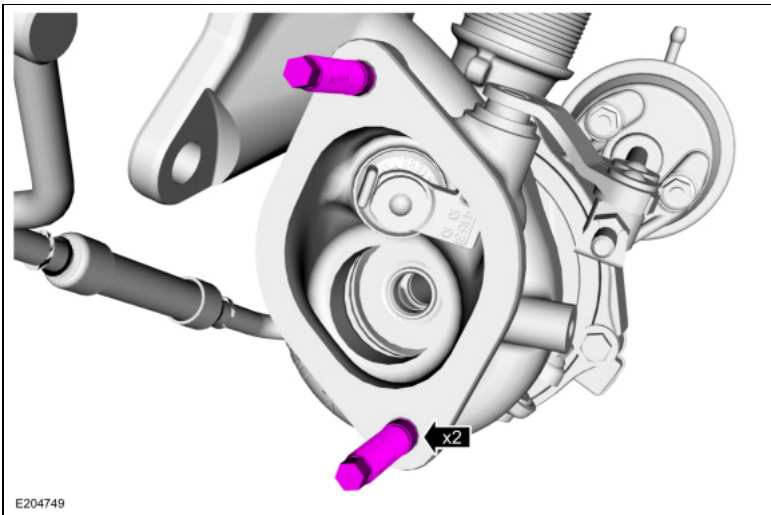
Material: Motorcraft® Metal Brake Parts Cleaner / PM-4-A, PM-4-B

- Remove and discard the turbocharger coolant return tube O-ring seal.



A horizontal bar chart consisting of six equally sized rectangular segments stacked vertically. From top to bottom, the colors are: light blue, green, brown, yellow, purple, and light purple. Each segment is outlined in black.



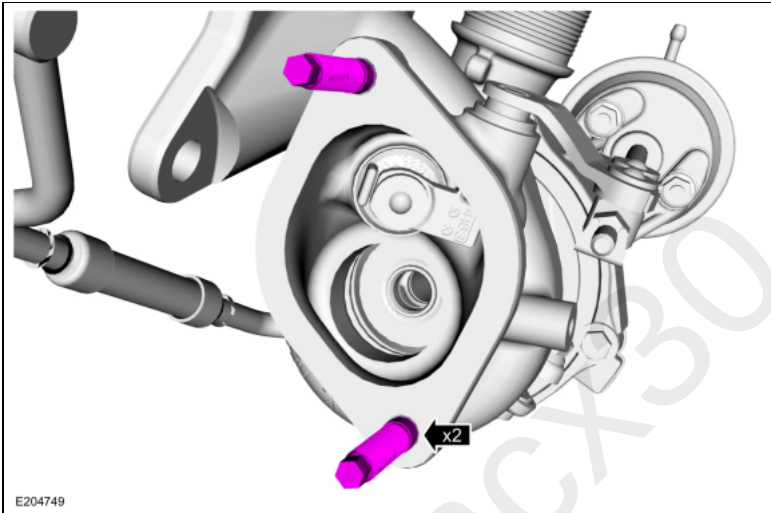


Installation

NOTICE: Make sure that the mating faces are clean and free of foreign material.

All vehicles

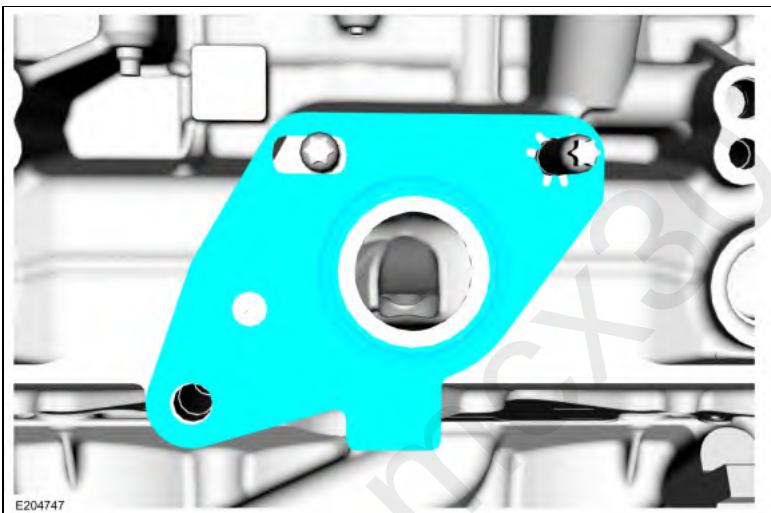
1. If removed install and tighten the turbocharger exhaust flange studbolts.
Torque: 18 lb.ft (25 Nm)



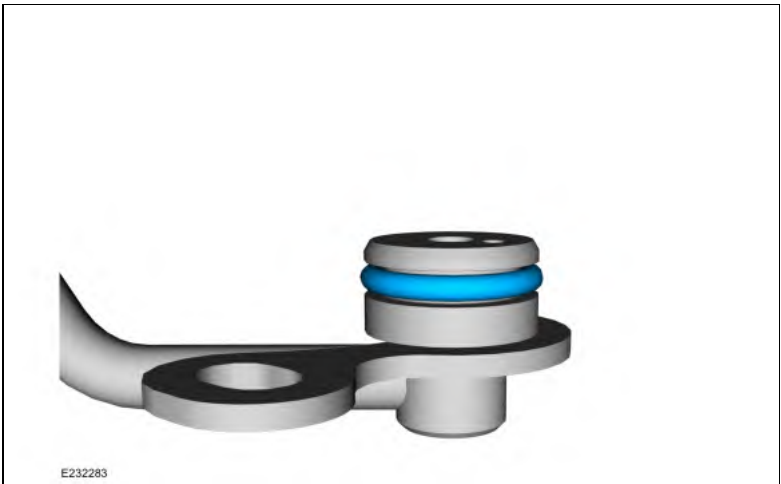
2. **NOTE:** Install short end of stud into engine cylinder head.
If removed install and tighten the turbocharger mounting studs.
Torque: 106 lb.in (12 Nm)



3. Install the new turbocharger gasket.



4. Install a new turbocharger coolant supply tube O-ring seal and lubricate with clean engine coolant.
Refer to: Specifications (303-03B Engine Cooling - 2.7L EcoBoost (238kW/324PS), Specifications).

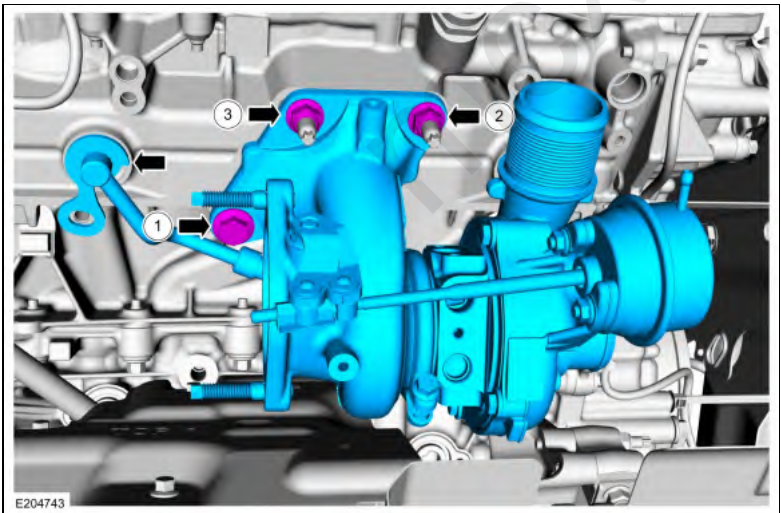


5. **NOTICE: Do not use a metal brush, damage to sealing area will result in leaks.**

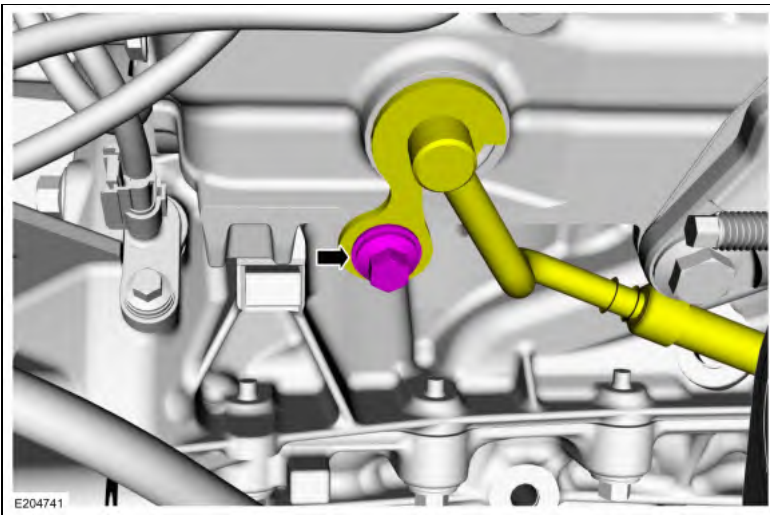
- Carefully use a nylon brush to remove the old O-ring residue and use brake cleaner to rinse the O-ring residue out of the turbocharger tube to engine O-ring bore. Inspect the area for deep scratches and gouges. Install new components as needed.
Material: Motorcraft® Metal Brake Parts Cleaner / PM-4-A, PM-4-B
- Install the turbocharger, then loosely install the turbocharger retainers. Install the turbocharger coolant supply tube to the engine block while installing the turbocharger.
- Tighten the turbocharger retainers in the following sequence.

Torque:

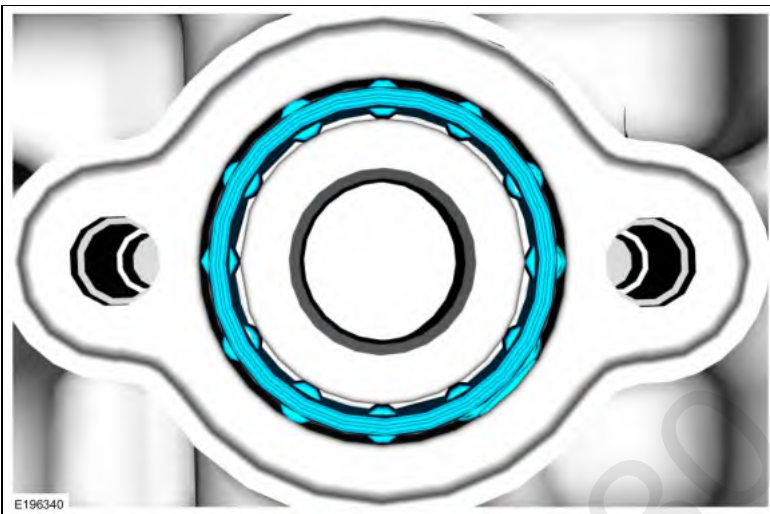
- Tighten 1 to: : 44 lb.ft (60 Nm)
- Tighten 2 to: : 44 lb.ft (60 Nm)
- Tighten 3 to: : 27 lb.ft (37 Nm)
- Re-tighten 1 to: : 44 lb.ft (60 Nm)
- Re-tighten 2 to: : 44 lb.ft (60 Nm)
- Re-tighten 3 to: : 27 lb.ft (37 Nm)



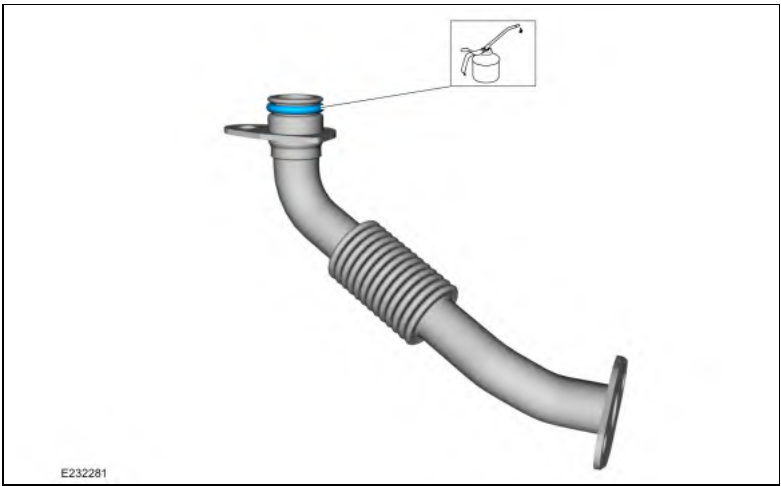
6. Install and tighten the turbocharger coolant supply tube bolt.
Torque: 18 lb.ft (24 Nm)



7. Install the new turbocharger oil return tube to engine gasket.

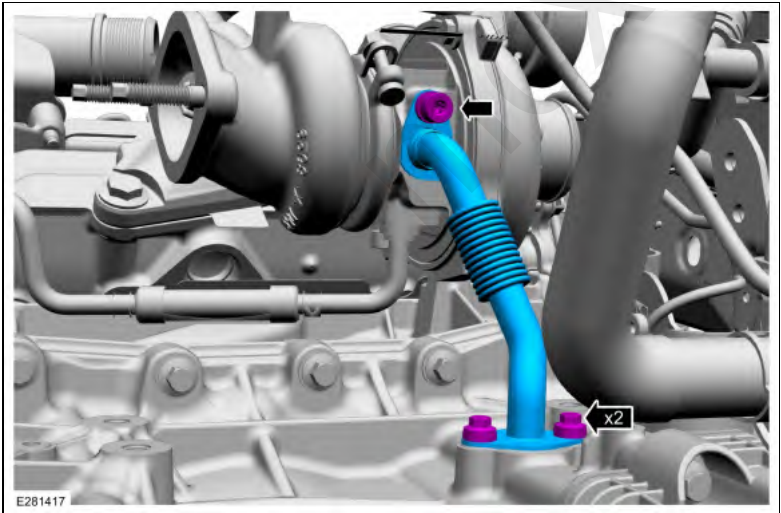


8. Install a new turbocharger oil return tube O-ring seal, then lubricate with clean engine oil.
Refer to: Specifications (303-01B Engine - 2.7L EcoBoost (238kW/324PS), Specifications).

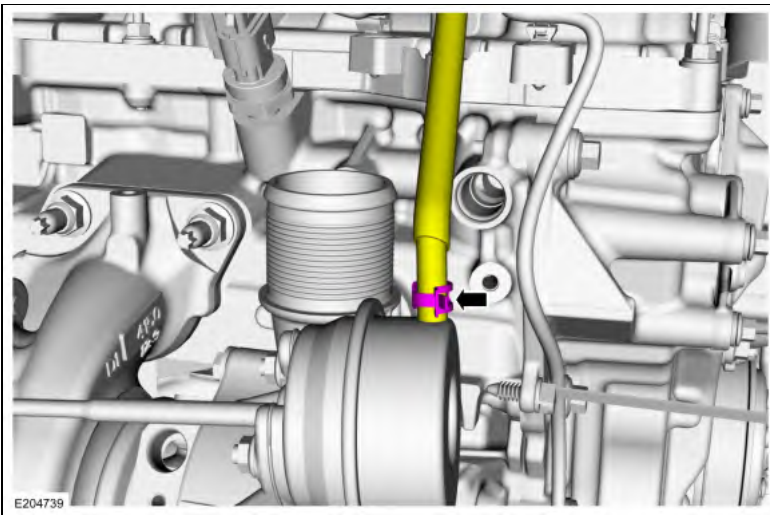


9. **NOTICE: Do not use a metal brush, damage to sealing area will result in leaks.**

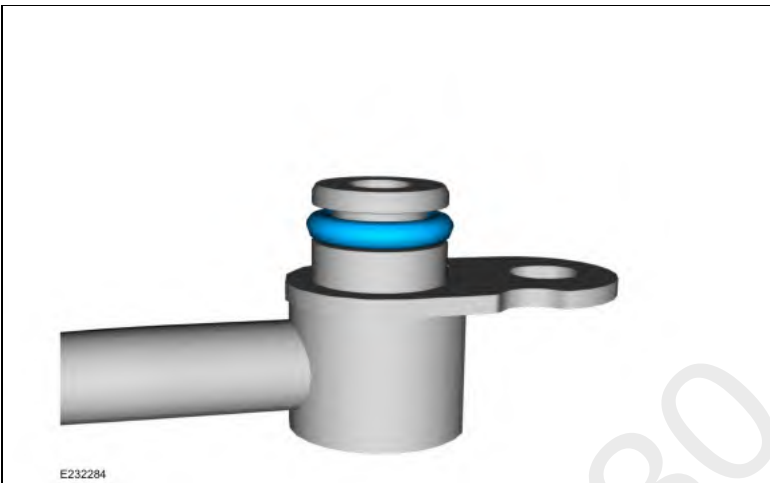
- Carefully use a nylon brush to remove the old O-ring residue and use brake cleaner to rinse the O-ring residue out of the turbocharger O-ring bore. Inspect the area for deep scratches and gouges. Install new components as needed.
Material: Motorcraft® Metal Brake Parts Cleaner / PM-4-A, PM-4-B
- 1. Install the turbocharger oil return tube, then install and tighten the turbocharger oil return tube retainers.
Torque: 89 lb.in (10 Nm)



10. Connect the turbocharger wastegate control hose and clamp.
Use the General Equipment: Hose Clamp Remover/Installer

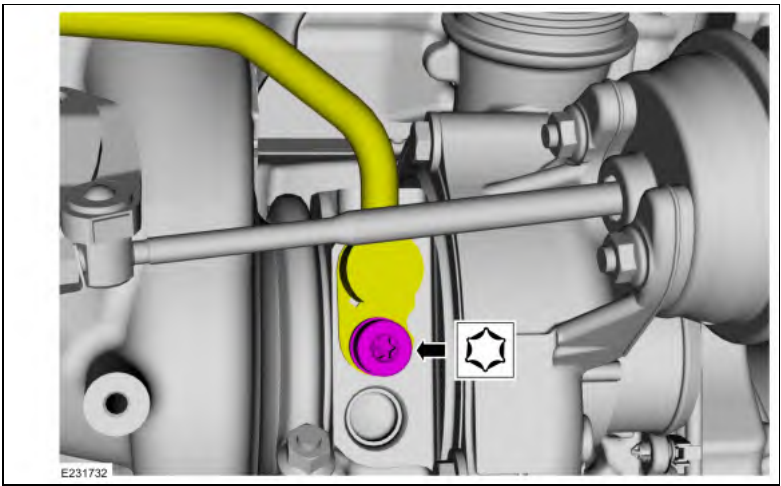


11. Install a new turbocharger coolant return tube O-ring seal, then lubricate the new O-ring seal with clean engine coolant. Refer to: Specifications (303-03B Engine Cooling - 2.7L EcoBoost (238kW/324PS), Specifications).

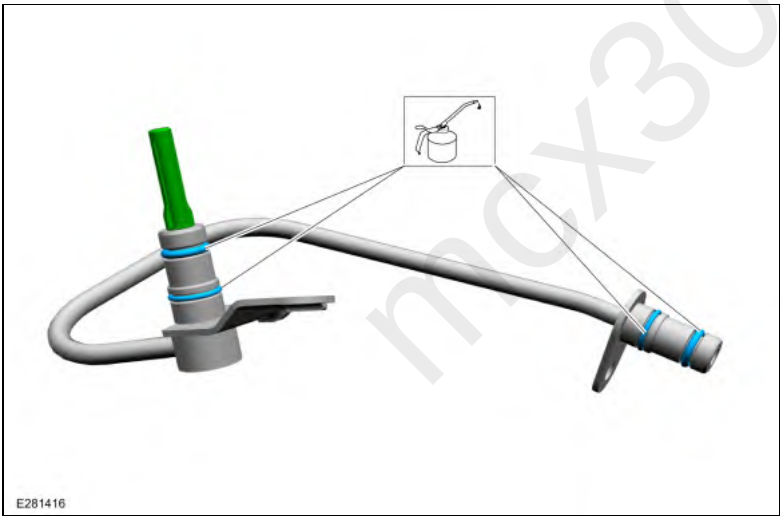


12. **NOTICE: Do not use a metal brush, damage to sealing area will result in leaks.**

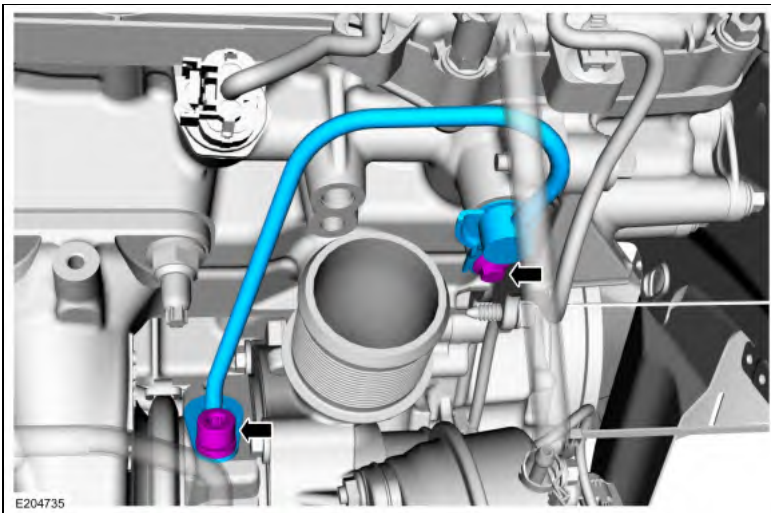
- Carefully use a nylon brush to remove the old O-ring residue and use brake cleaner to rinse the O-ring residue out of the turbocharger O-ring bore. Inspect the area for deep scratches and gouges. Install new components as needed.
Material: Motorcraft® Metal Brake Parts Cleaner / PM-4-A, PM-4-B
- 1. Install the turbocharger coolant return tube, then install and tighten the turbocharger coolant return tube bolt.
Torque: 89 lb.in (10 Nm)



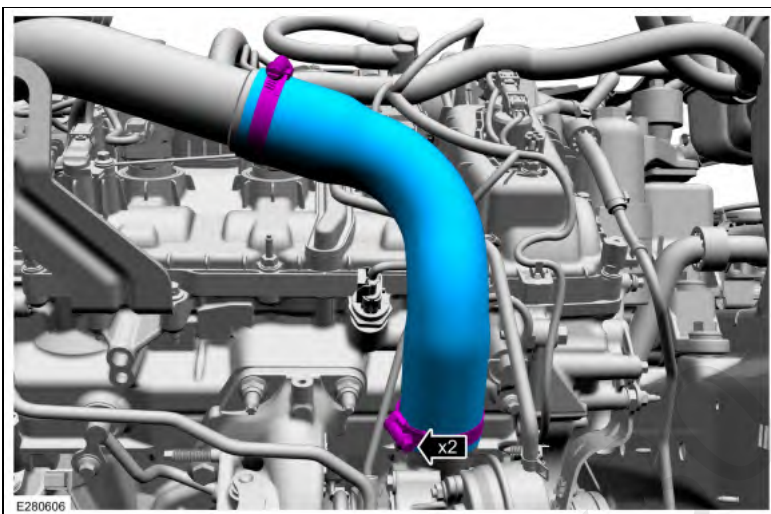
13. Install the catalytic converter RH.
Refer to: Catalytic Converter RH (309-00B Exhaust System - 2.7L EcoBoost (238kW/324PS), Removal and Installation).
14. Install the new turbocharger oil supply tube O-ring seals and the new turbocharger oil supply tube oil filter. Lubricate the O-ring seals with clean engine oil.
Refer to: Specifications (303-01B Engine - 2.7L EcoBoost (238kW/324PS), Specifications).



15. **NOTICE: Do not use a metal brush, damage to sealing area will result in leaks.**
- NOTICE: When installing the turbocharger oil supply tube into the engine block, use care not to damage the new turbocharger oil supply tube oil filter.**
- Carefully use a nylon brush to remove the old O-ring residue and use brake cleaner to rinse the O-ring residue out of the turbocharger tube to turbocharger O-ring bore and the turbocharger tube to engine O-ring bore. Inspect the area for deep scratches and gouges. Install new components as needed.
1. Install the turbocharger oil supply tube, then install and tighten the turbocharger oil supply tube bolts.
Material: Motorcraft® Metal Brake Parts Cleaner / PM-4-A, PM-4-B
Torque: 89 lb.in (10 Nm)



16. Install the right lower charge air cooler intake pipe, then tighten the clamps.
Torque: 44 lb.in (5 Nm)



17. Install the upper and lower air cleaner outlet pipe RH.
Refer to: Air Cleaner Outlet Pipe RH (303-12B Intake Air Distribution and Filtering - 2.7L EcoBoost (238kW/324PS), Removal and Installation).

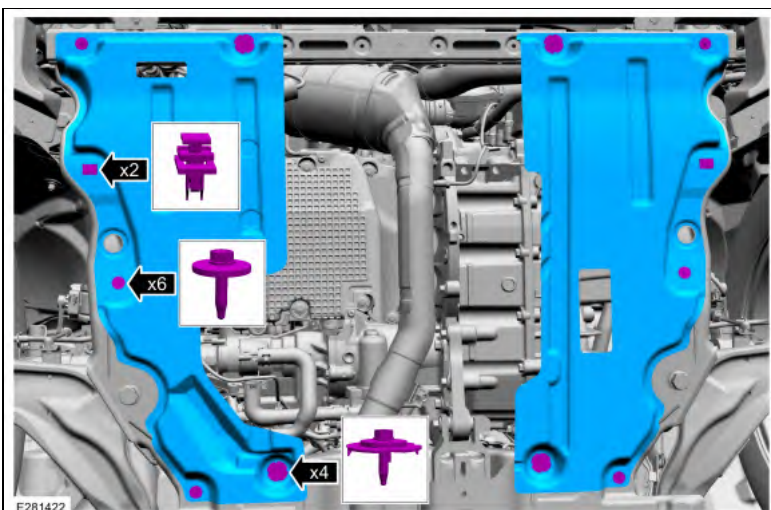
AWD (all-wheel drive)

18. Install the transfer case.

All vehicles

19. Install the underbody shields and the retainers.
20. Install the right front wheel and tire.

Refer to: Wheel and Tire (204-04A Wheels and Tires, Removal and Installation).

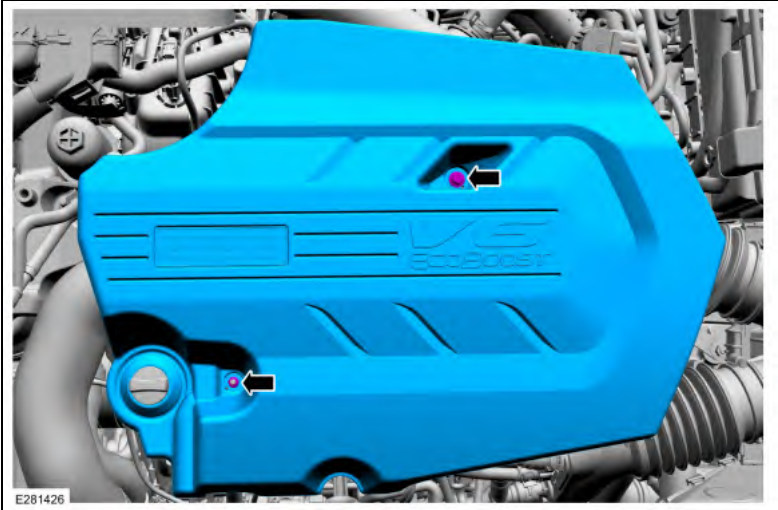


21. Install the engine appearance cover, then install and tighten the engine appearance cover retainers.

Torque:

Tighten the nut to: : 42 lb.in (4.8 Nm)

Tighten the bolt to: : 97 lb.in (11 Nm)



22. Check and top off the engine oil level as needed.

Refer to: Specifications (303-01B Engine - 2.7L EcoBoost (238kW/324PS), Specifications).

23. Fill the cooling system.

Refer to: Engine Cooling System Draining, Vacuum Filling and Bleeding (303-03B Engine Cooling - 2.7L EcoBoost (238kW/324PS), General Procedures).

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Turbocharger Coolant Return Tube LH

Special Tool(s) / General Equipment

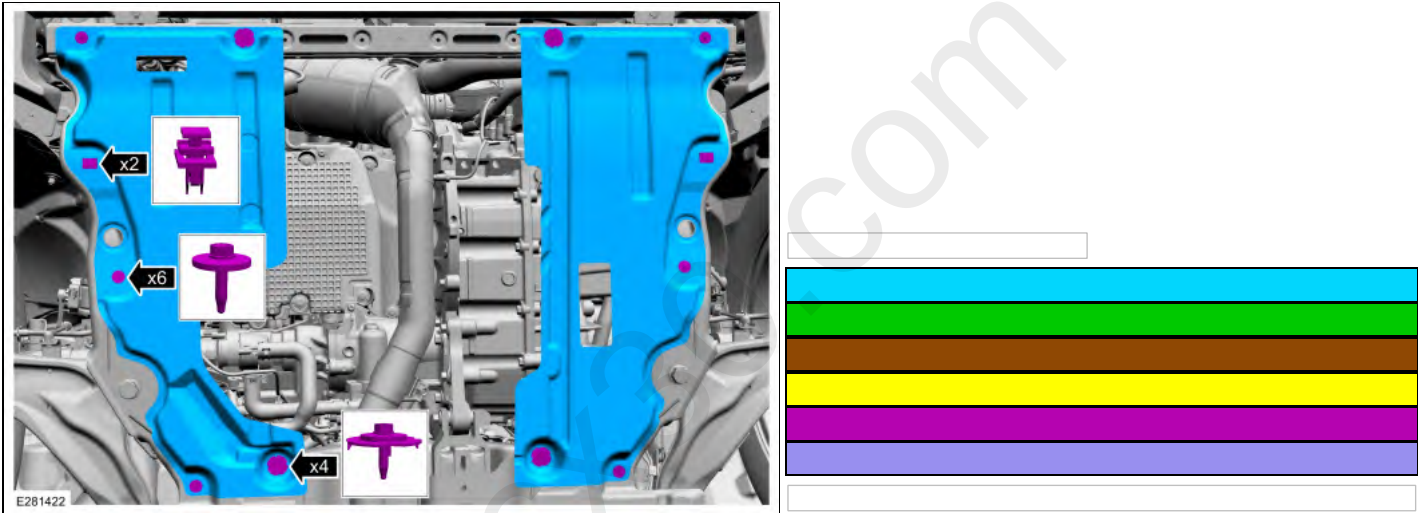
Hose Clamp Remover/Installer

Materials

Name	Specification
Motorcraft® Metal Brake Parts Cleaner - PM-4-A, PM-4-B	-

Removal

- NOTICE:** The turbocharger compressor vanes can be damaged by even the smallest particles. When removing any turbocharger or engine air intake system component, ensure that no debris enters the system. Failure to do so may result in damage to the turbocharger.
- NOTICE:** Special attention needs to be given to the sealing ports for the oil feed, the oil drain, and the coolant lines, on turbocharged engines. The sealing ports must be totally clean and free from O-ring residue, have no damage to the sealing surface and the lines to ensure that there are no leaks or repeat repairs.
1. Remove the retainers and the underbody shields.



2. Drain the cooling system.
Refer to: Engine Cooling System Draining, Vacuum Filling and Bleeding (303-03B Engine Cooling - 2.7L EcoBoost (238kW/324PS), General Procedures).
3. Remove the air cleaner outlet pipe LH.
Refer to: Air Cleaner Outlet Pipe LH (303-12B Intake Air Distribution and Filtering - 2.7L EcoBoost (238kW/324PS), Removal and Installation).
4. Remove the charge air cooler intake pipe RH.
Refer to: Charge Air Cooler (CAC) Intake Pipe (303-12B Intake Air Distribution and Filtering - 2.7L EcoBoost (238kW/324PS), Removal and Installation).
5. Remove the catalytic converter LH.
Refer to: Catalytic Converter LH (309-00B Exhaust System - 2.7L EcoBoost (238kW/324PS), Removal and Installation).
6. If equipped, remove the bolt, then move the bracket and sensor out of the way.

