

SECTION 303-04E: Fuel Charging and Controls — Turbocharger
REMOVAL AND INSTALLATION

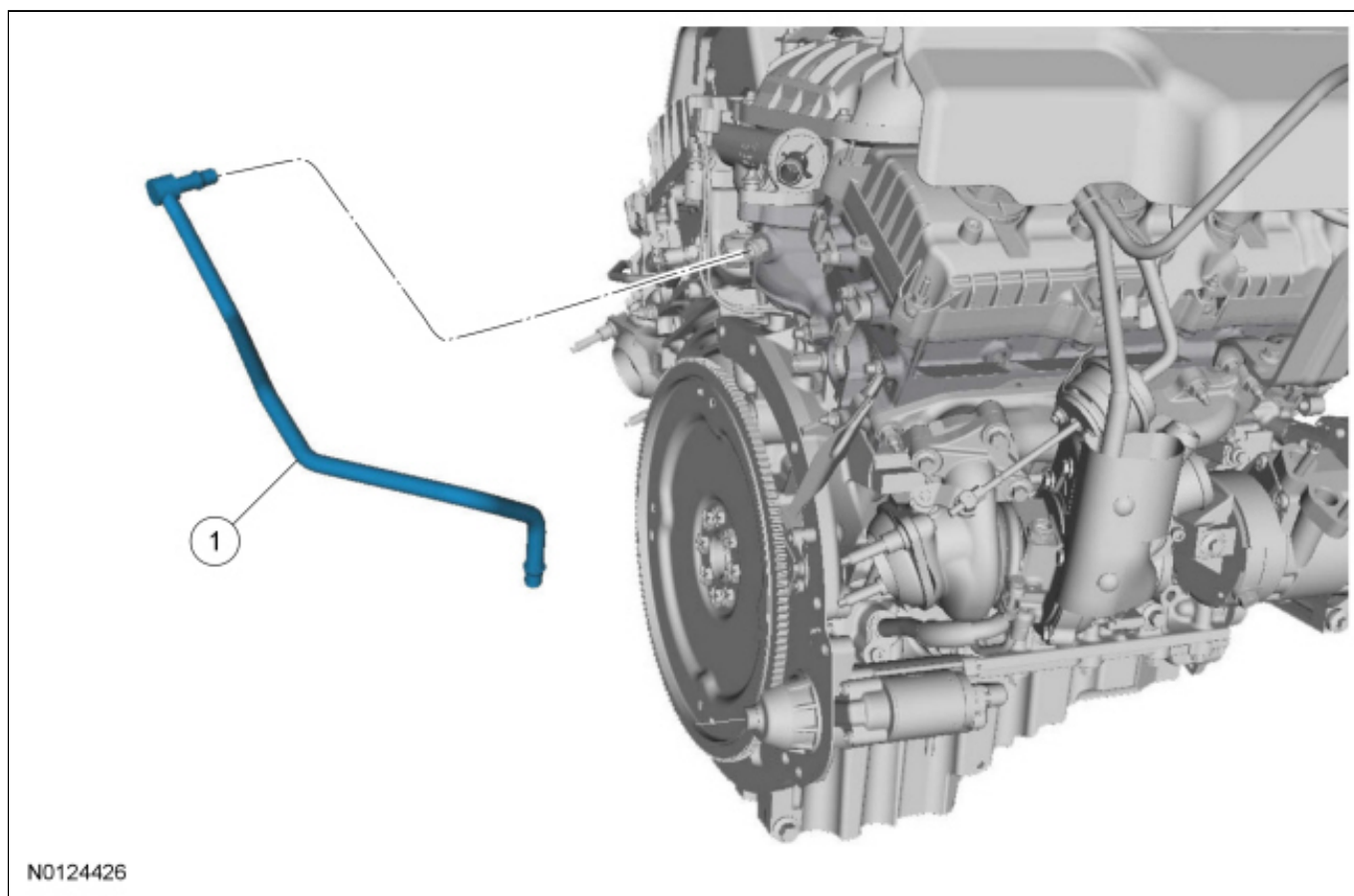
2012 F-150 Workshop Manual
 Procedure revision date: 10/31/2011

Turbocharger — RH

Material

Item	Specification
High Temperature Nickel Anti-Seize Lubricant XL-2	—
Motorcraft® SAE 5W-30 Premium Synthetic Blend Motor Oil (US); Motorcraft® SAE 5W-30 Super Premium Motor Oil (Canada) XO-5W30-QSP (US); CXO-5W30-LSP12 (Canada)	WSS- M2C946-A

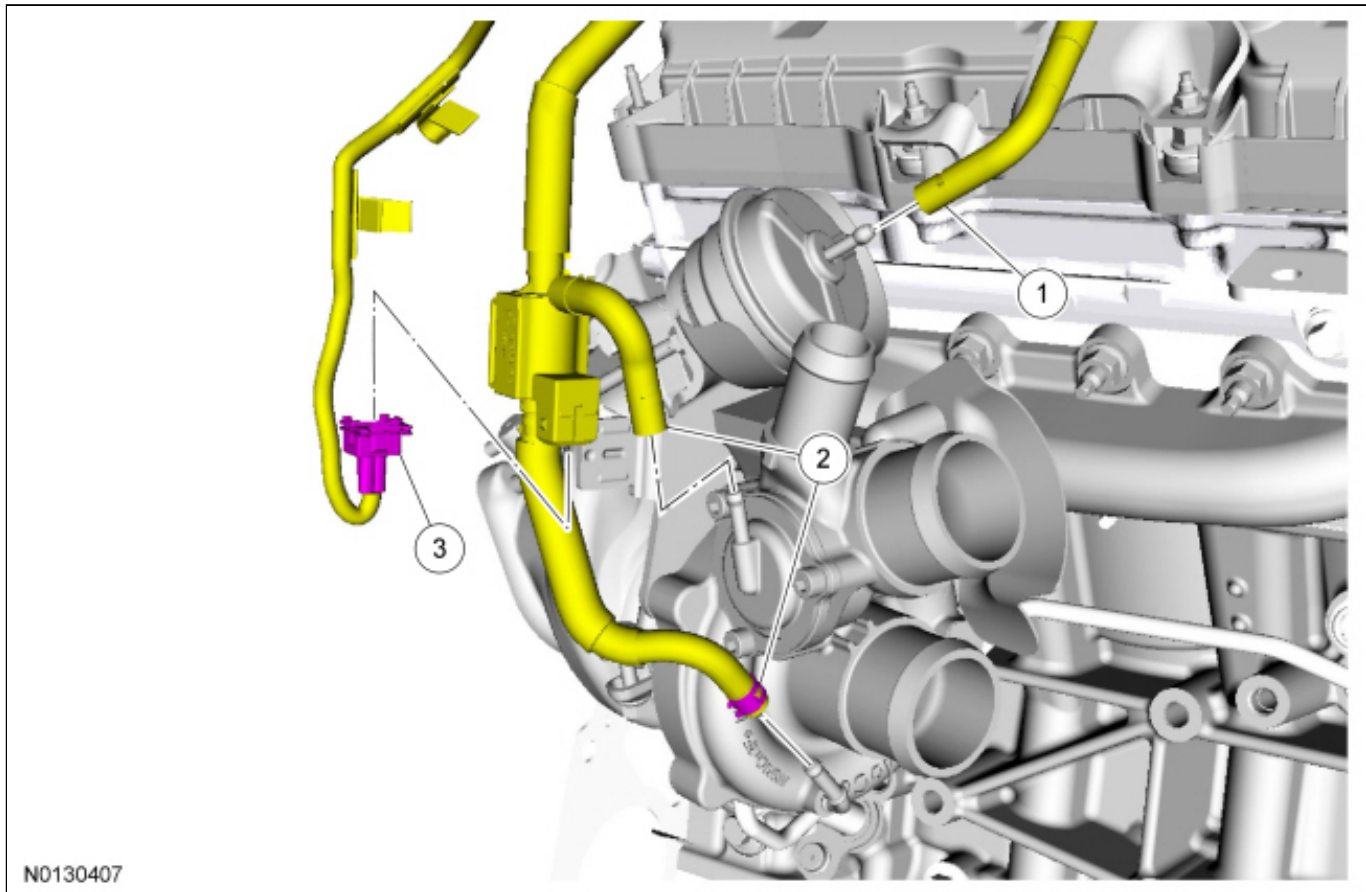
RH Turbocharger (View 1 of 4)



Item	Part Number	Description
1	8A520	RH turbocharger coolant supply tube

RH Turbocharger (View 2 of 4)

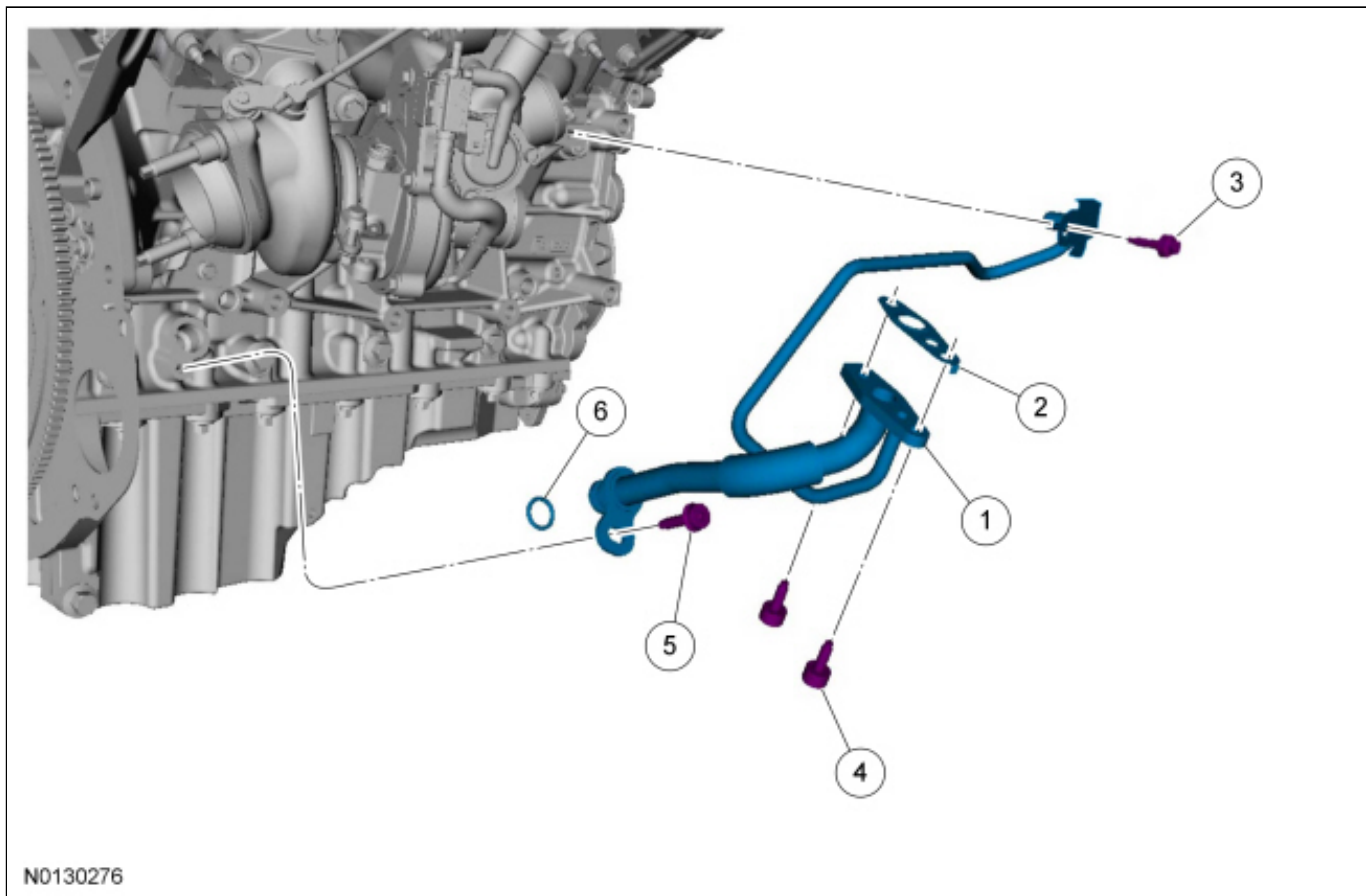
NOTE: Heat insulating wrap remove for clarity.



N0130407

Item	Part Number	Description
1	—	RH turbocharger wastegate hose (part of 9E499)
2	9E449	Vacuum hose connectors
3	—	Turbocharger bypass valve electrical connector (part of 12C508)

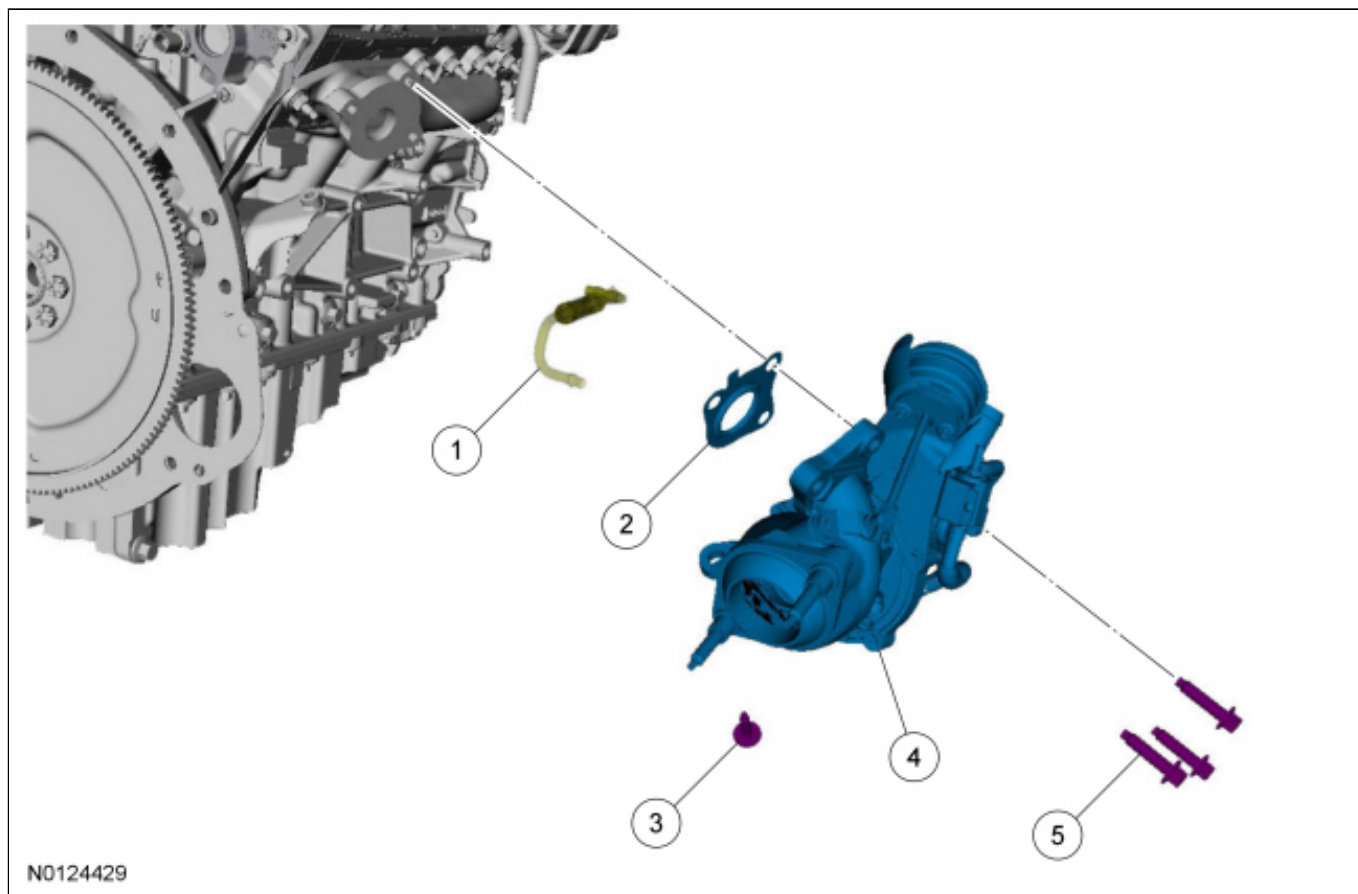
RH Turbocharger (View 3 of 4)



N0130276

Item	Part Number	Description
1	9G441	RH turbocharger oil return tube assembly
2	6N652	RH turbocharger oil return tube assembly gasket
3	W715564	RH turbocharger oil supply tube bolt
4	W715539	RH turbocharger oil tube assembly bolt (2 required)
5	W716088	RH turbocharger oil return tube bolt
6	00815	Turbocharger oil return tube O-ring seal

RH Turbocharger (View 4 of 4)



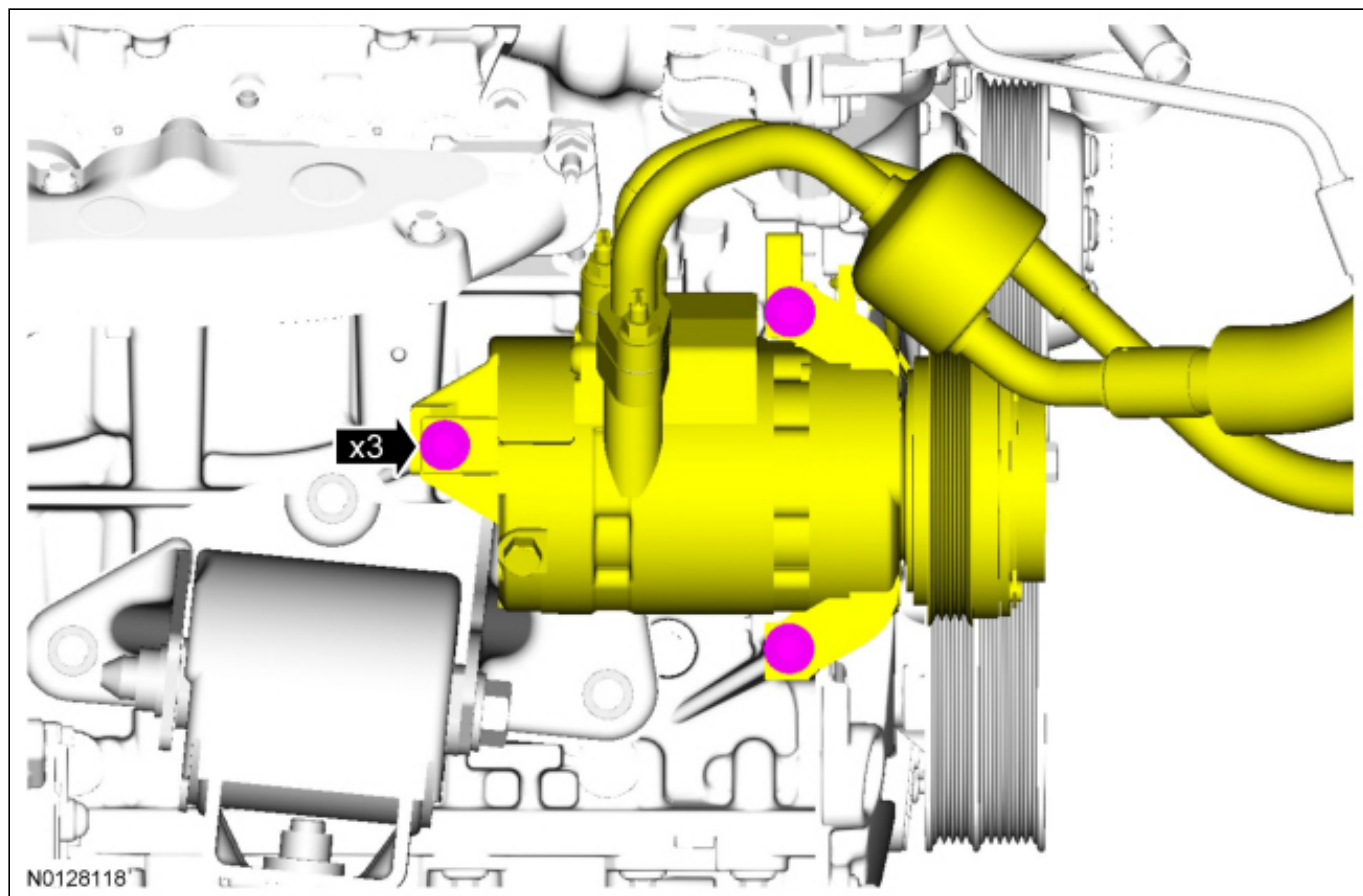
Item	Part Number	Description
1	8K153	RH turbocharger coolant outlet tube
2	9450	RH turbocharger exhaust manifold gasket
3	W714867	RH turbocharger bracket bolt - 18 Nm (159 lb-in)
4	6K682	RH turbocharger
5	W715673	RH turbocharger mounting bolt (3 required) - 32 Nm (24 lb-ft)

Removal

NOTICE: Whenever turbocharger air intake system components are removed, always cover open ports to protect from debris. It is important that no foreign material enter the system. The turbocharger compressor blades are susceptible to damage from even small particles. All components should be inspected and cleaned, if necessary, prior to installation or reassembly.

All vehicles

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to [Section 100-02](#).
2. Drain the engine cooling system. For additional information, refer to [Section 303-03](#).
3. Remove the Air Cleaner (ACL) outlet pipe, RH ACL pipe to-turbocharger pipe, RH turbocharger bypass hose and the RH turbocharger-to-Charge Air Cooler (CAC) pipe. For additional information, refer to Intake Air System Components — Exploded View, 3.5L Gasoline Turbocharged Direct Injection (GTDI) in [Section 303-12](#).
4. Remove the Air Conditioning (A/C) compressor belt. For additional information, refer to [Section 303-05](#).
5. Remove the 3 A/C compressor bolts and position the A/C compressor aside.

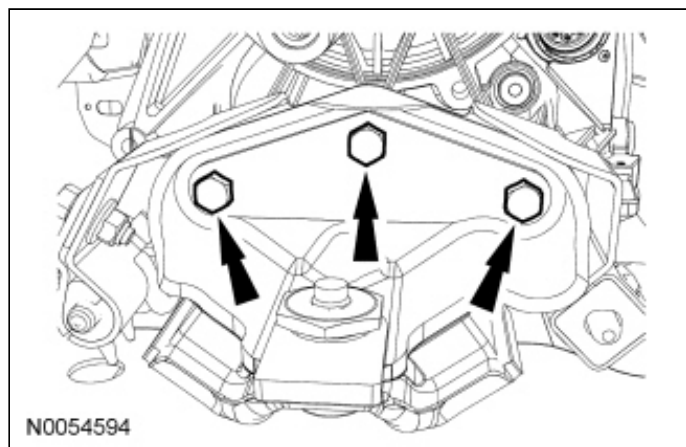


6. Remove the exhaust Y-pipe - dual catalytic converter. For additional information, refer to [Section 309-00](#).

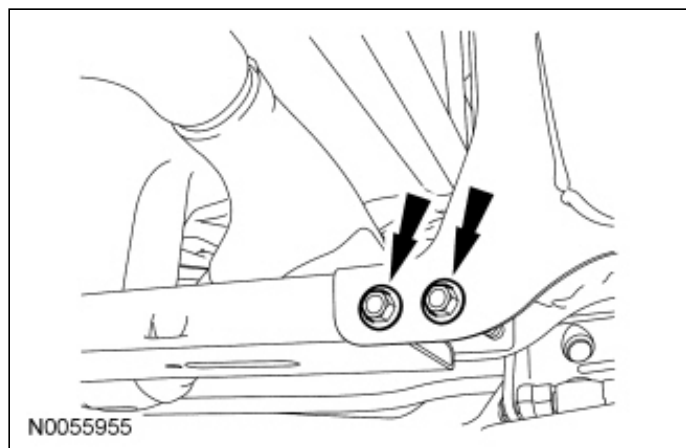
Rear Wheel Drive (RWD) vehicles

NOTE: The exhaust Y-pipe - dual catalytic converter procedure requires the removal of the transmission insulator and retainer and the transmission crossmember. The transmission insulator and retainer and the transmission crossmember must be installed to continue the procedure.

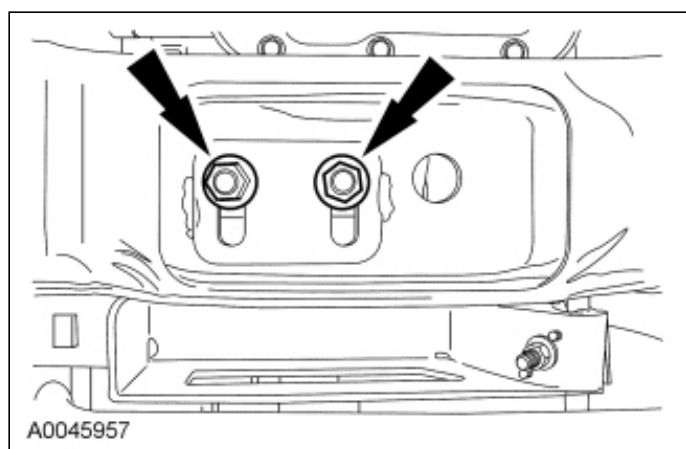
7. Install the transmission insulator and retainer and the 3 transmission insulator and retainer bolts.
- Tighten to 90 Nm (66 lb-ft).



8. Install the transmission crossmember and the 4 transmission crossmember nuts and bolts (2 each side).
- Tighten to 90 Nm (66 lb-ft).



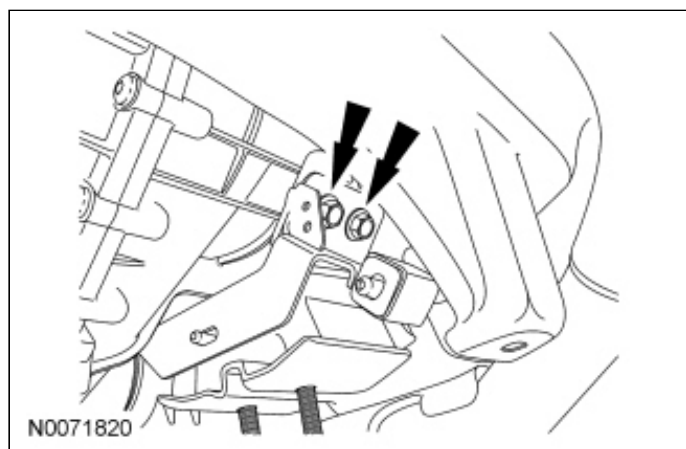
9. Lower the transmission onto the transmission crossmember and install the 2 transmission insulator and retainer nuts.
- Tighten to 103 Nm (75 lb-ft).



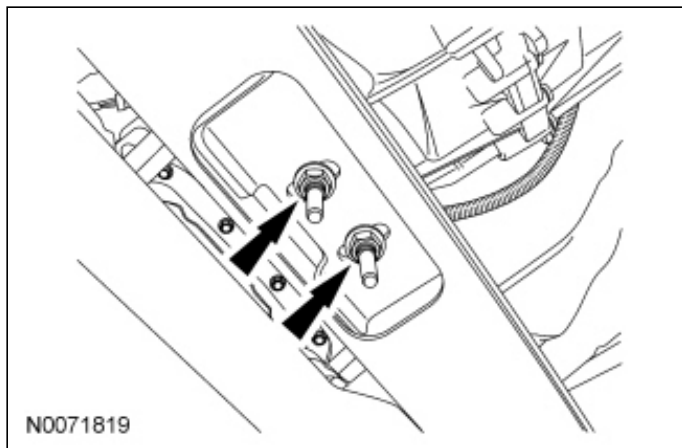
Four-Wheel Drive (4WD)

NOTE: The exhaust Y-pipe - dual catalytic converter procedure requires the removal of the transmission insulator and retainer and the transmission crossmember. The transmission insulator and retainer and the transmission crossmember must be installed to continue the procedure.

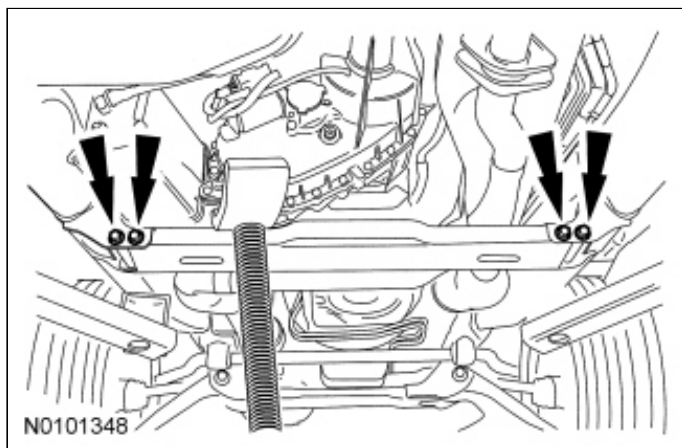
10. Loosely install the transmission insulator and retainer and the 4 transmission insulator and retainer bolts.



11. Position the transmission crossmember and loosely install the 2 transmission insulator and retainer nuts.



12. Install the 4 transmission crossmember bolts and nuts.
 - Tighten the transmission insulator and retainer bolts to 90 Nm (66 lb-ft).
 - Tighten the transmission crossmember bolts and nuts to 90 Nm (66 lb-ft).
 - Tighten the transmission insulator and retainer nuts to 103 Nm (75 lb-ft).



All vehicles

13. Remove the starter. For additional information, refer to [Section 303-06](#).
14. **NOTE:** Use a 3/8 inch Jiffy-tite quick disconnect tool, such as a Snap-on® LDTSP4 or equivalent, to disconnect the turbocharger coolant supply tube.

NOTE: Position a drain pan prior to disconnecting the turbocharger coolant supply tube.

Using a commercially available quick disconnect tool, disconnect the turbocharger coolant supply tube at the turbocharger.

- Position the coolant supply tube aside.

15. **NOTE:** The heat insulating wrap is removed with the turbocharger bypass valve.

Disconnect the turbocharger bypass valve electrical connector. Disconnect the wastegate hose and the 2 bypass vacuum hoses.

- Remove the turbocharger bypass valve from the bracket and position aside.

16. Remove the 4 bolts for the turbocharger oil return tube assembly.
 - Remove the 2 turbocharger center housing bolts.
 - Remove the oil pressure tube bolt.
 - Remove the oil drain tube bolt.
 - Remove and discard the turbocharger oil return tube gasket.

17. Remove the turbocharger bracket bolt.

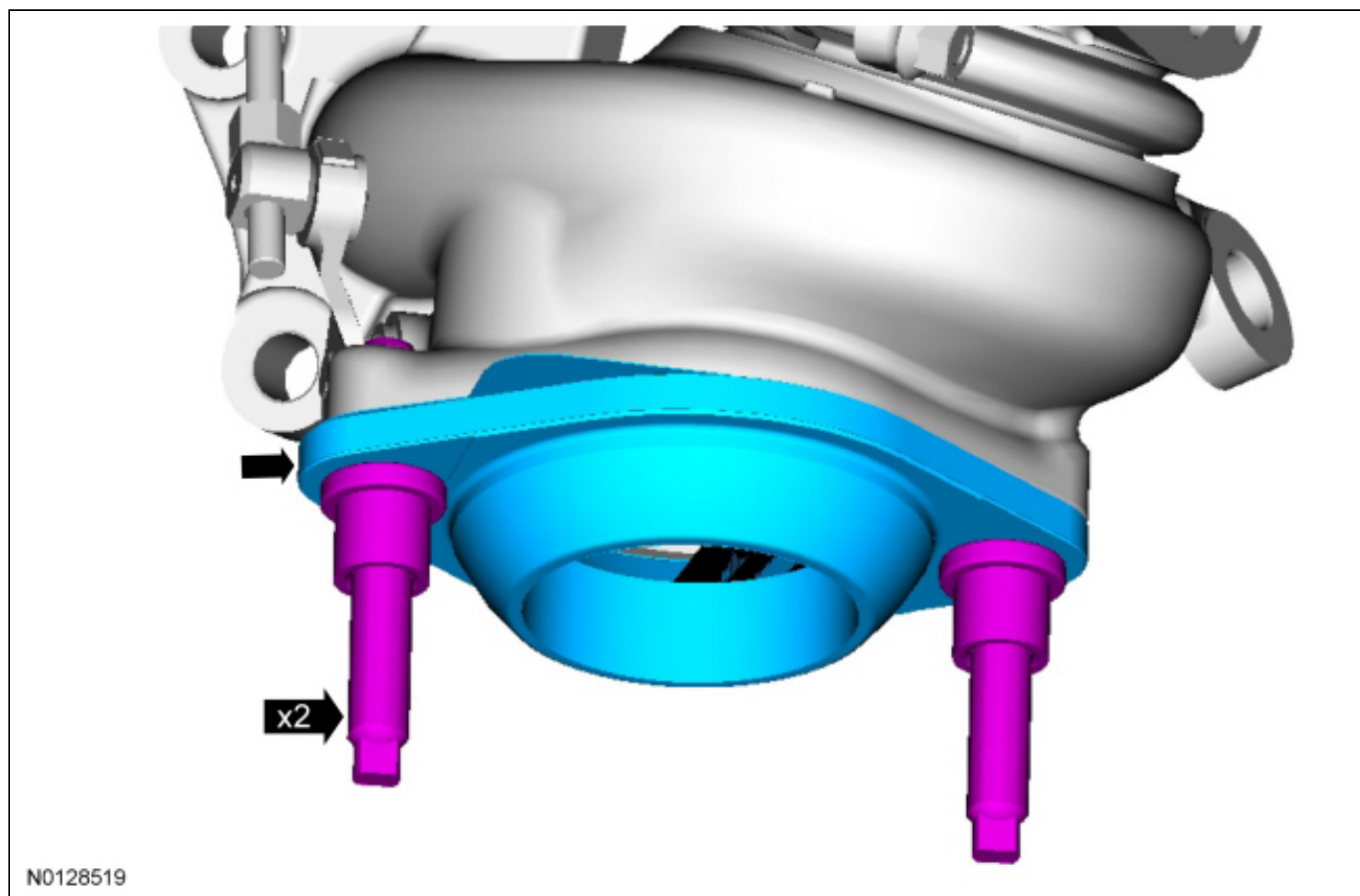
18. **NOTE:** Use a 3/8 inch Jiffy-tite quick disconnect tool, such as a Snap-on® LDTSP4 or equivalent, to disconnect the turbocharger coolant return tube.

Using a commercially available quick disconnect tool, disconnect the RH turbocharger coolant return tube at the turbocharger.

19. Remove the 3 turbocharger mounting bolts and the turbocharger.
- Discard the turbocharger exhaust manifold gasket.
20. Remove the turbocharger oil return tube assembly.
- Remove and discard the turbocharger oil return tube O-ring seal.
21. Loosen the 2 turbocharger bracket-to-cylinder block bolts.
22. **NOTE:** Use a 3/8 inch Jiffy-tite quick disconnect tool, such as a Snap-on® LDTSP4 or equivalent, to disconnect the turbocharger coolant tubes.

If necessary, remove the turbocharger coolant supply and the coolant outlet tubes.

23. If necessary, remove the 2 turbocharger exhaust flange stud bolts and the turbocharger exhaust flange.
- Discard the 2 turbocharger exhaust flange stud bolts and the turbocharger exhaust flange gasket.



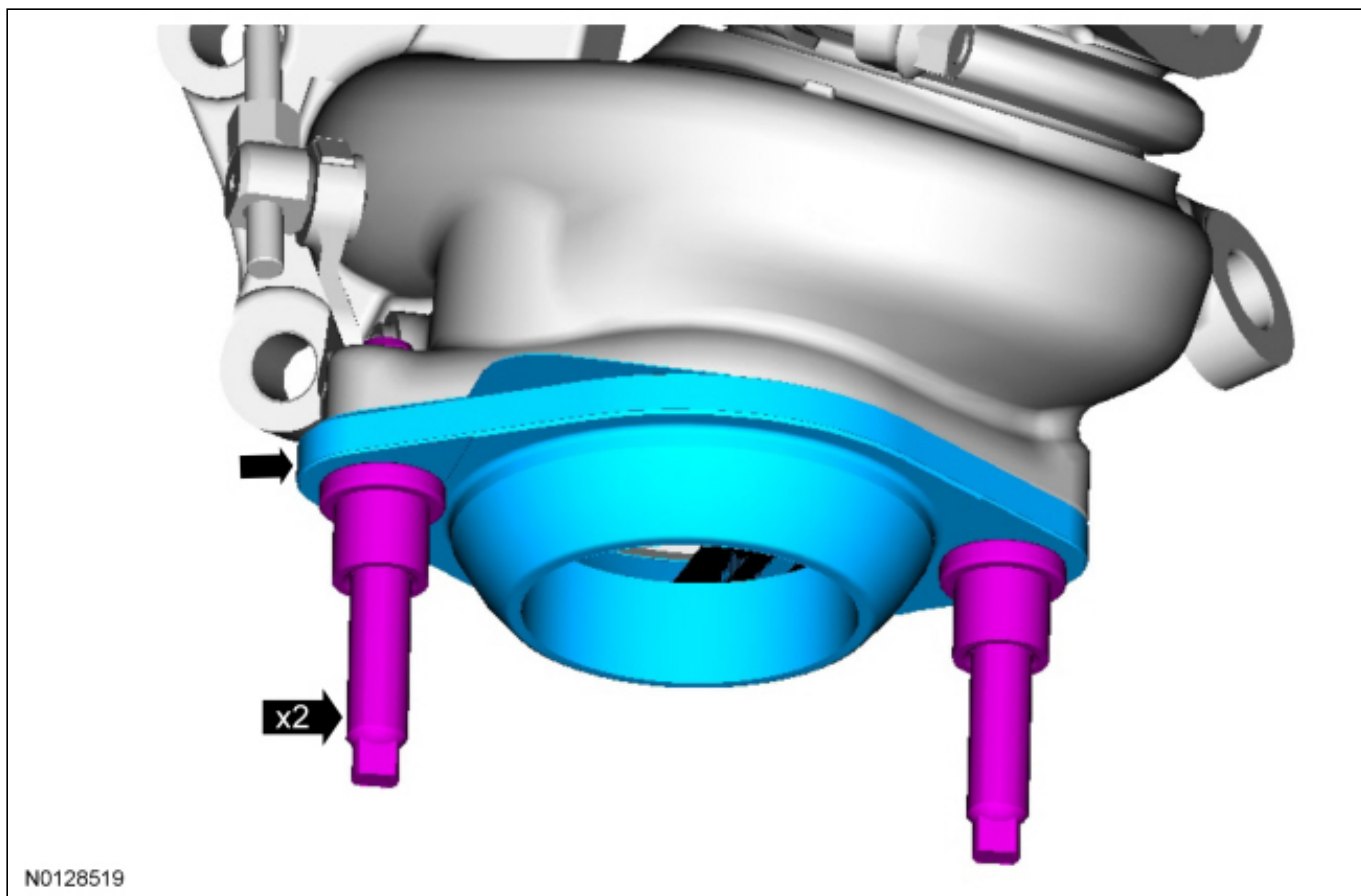
Installation

All vehicles

1. **NOTE:** Apply high temperature nickel anti-seize lubricant to the turbocharger exhaust flange stud bolt threads prior to installation of the turbocharger exhaust flange.

If removed, using a new turbocharger exhaust flange gasket, install the turbocharger exhaust flange and the 2 new turbocharger exhaust flange stud bolts.

- Tighten to 40 Nm (30 lb-ft).



2. If removed, install the turbocharger coolant supply and the coolant outlet tubes.

3. **NOTE:** Lubricate the cylinder block bore with clean engine oil.

NOTE: Apply clean engine oil to the turbocharger oil return tube O-ring seal.

NOTE: Make sure the turbocharger oil supply tube is positioned in the cylinder block during the installation of the turbocharger oil return tube assembly.

Using a new turbocharger oil return tube O-ring seal, install the turbocharger oil return tube assembly.

4. Using a new turbocharger exhaust manifold gasket, install the RH turbocharger and the 3 turbocharger mounting bolts.

- Tighten finger tight.

5. Install the turbocharger bracket bolt.

- Tighten finger tight.

6. Tighten the 3 turbocharger mounting bolts.

- Tighten to 32 Nm (24 lb-ft).

7. Tighten the turbocharger bracket bolt.

- Tighten to 18 Nm (159 lb-in).

8. Tighten the 2 turbocharger bracket-to-cylinder block bolts.

- Tighten to 10 Nm (89 lb-in).

9. **NOTE:** The best access for the tube is from above.

Connect the RH turbocharger coolant return tube into the turbocharger.

10. Using a new turbocharger oil return tube gasket, install the 2 turbocharger center housing bolts at the

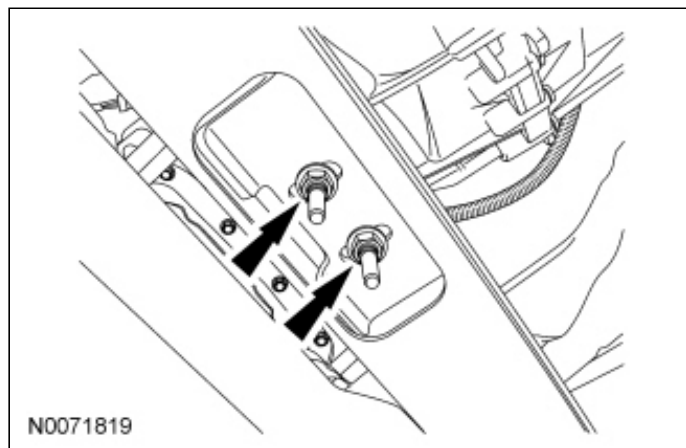
turbocharger. Tighten in the following stages:

- Stage 1: Install the bolt for the oil pressure tube side halfway.
- Stage 2: Install the bolt for the oil drain tube side and tighten to 10 Nm (89 lb-in).
- Stage 3: Tighten the bolt for the oil drain tube side an additional 30 degrees.
- Stage 4: Tighten the bolt for the oil pressure tube side to 10 Nm (89 lb-in).
- Stage 5: Tighten the bolt for the oil pressure tube side an additional 30 degrees.

11. Install the turbocharger oil return tube bolt at the cylinder block. Tighten in the following stages:
 - Stage 1: Tighten to 8 Nm (71 lb-in).
 - Stage 2: Tighten an additional 30 degrees.
12. Install the turbocharger oil supply tube bracket and bolt. Tighten in the following stages:
 - Stage 1: Tighten to 8 Nm (71 lb-in).
 - Stage 2: Tighten an additional 30 degrees.
13. Position back the turbocharger bypass valve on the bracket. Connect the 2 bypass vacuum hoses and the wastegate hose.
 - Connect the turbocharger bypass valve electrical connector.
14. Connect the turbocharger coolant supply tube to the turbocharger.
15. Install the starter. For additional information, refer to [Section 303-06](#).

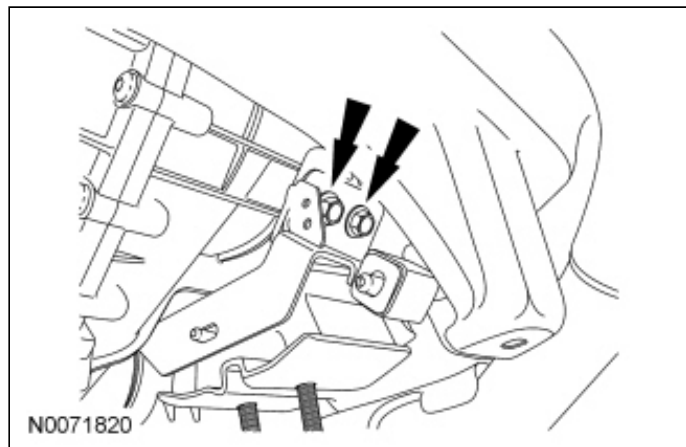
4WD vehicles

16. Remove the 2 transmission insulator and retainer nuts.

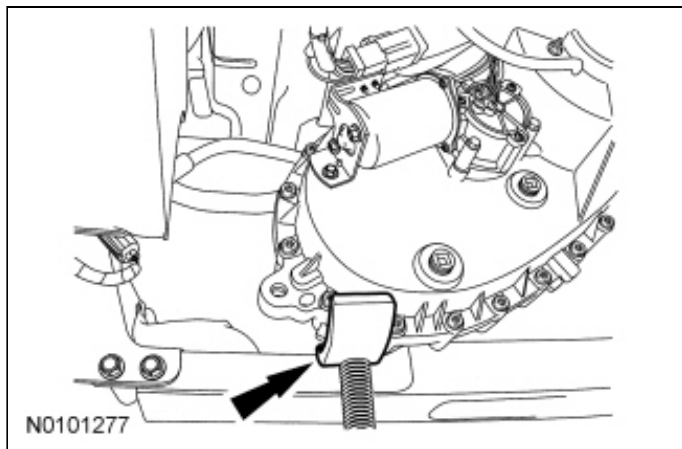


17. **NOTE:** Right side shown, left side similar. Transmission crossmember removed for clarity.

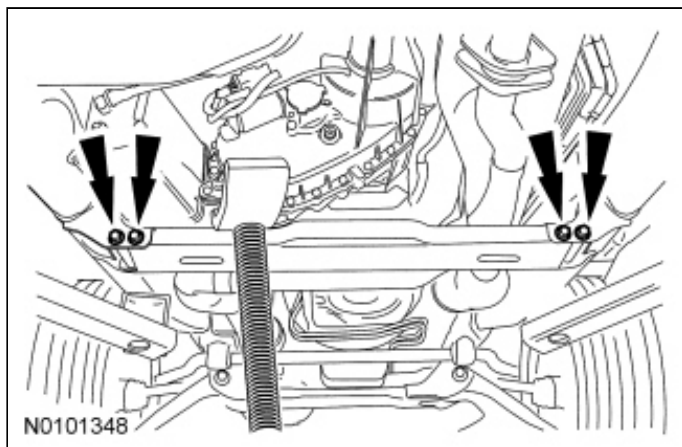
Remove the 4 transmission insulator and retainer bolts.



18. Support the transfer case.



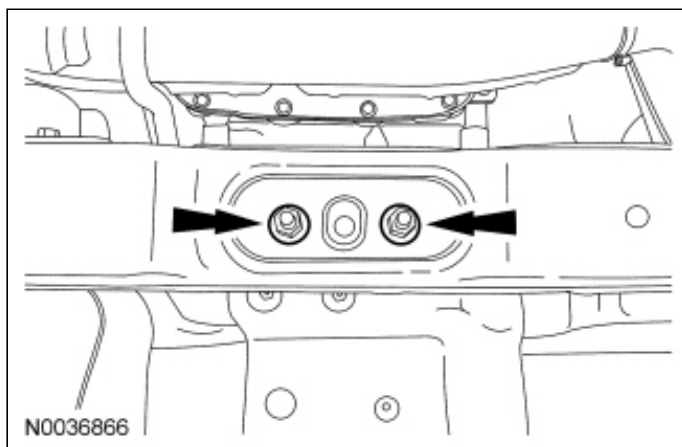
19. Remove the 4 transmission crossmember nuts and bolts.



20. Remove the transmission insulator and retainer.

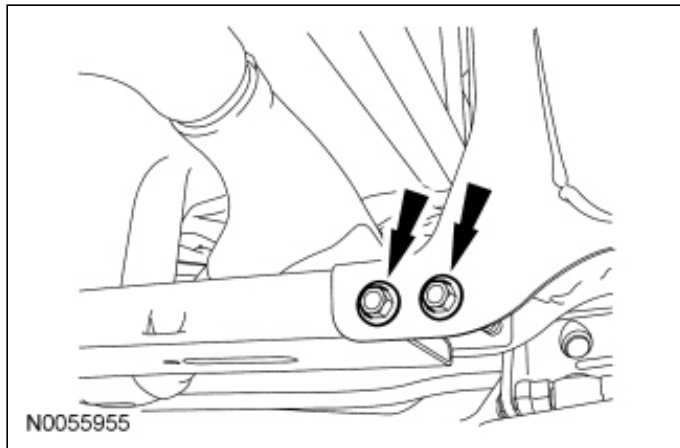
RWD

21. Remove the 2 transmission insulator and retainer nuts.

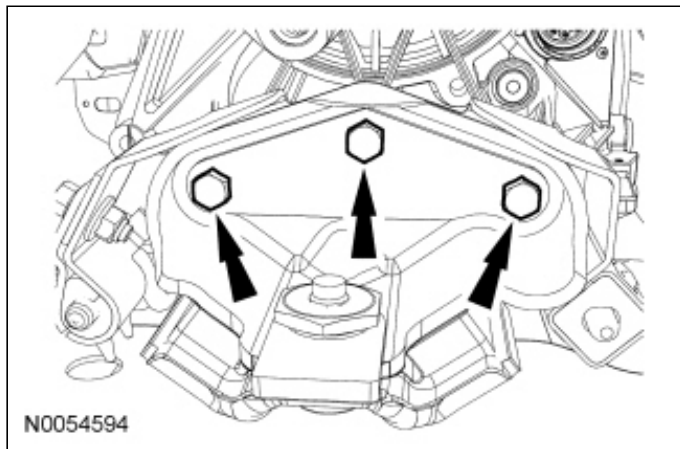


22. Position a suitable high-lift transmission jack under the transmission.

23. Remove the 4 transmission crossmember nuts and bolts (2 each side) and remove the transmission crossmember.

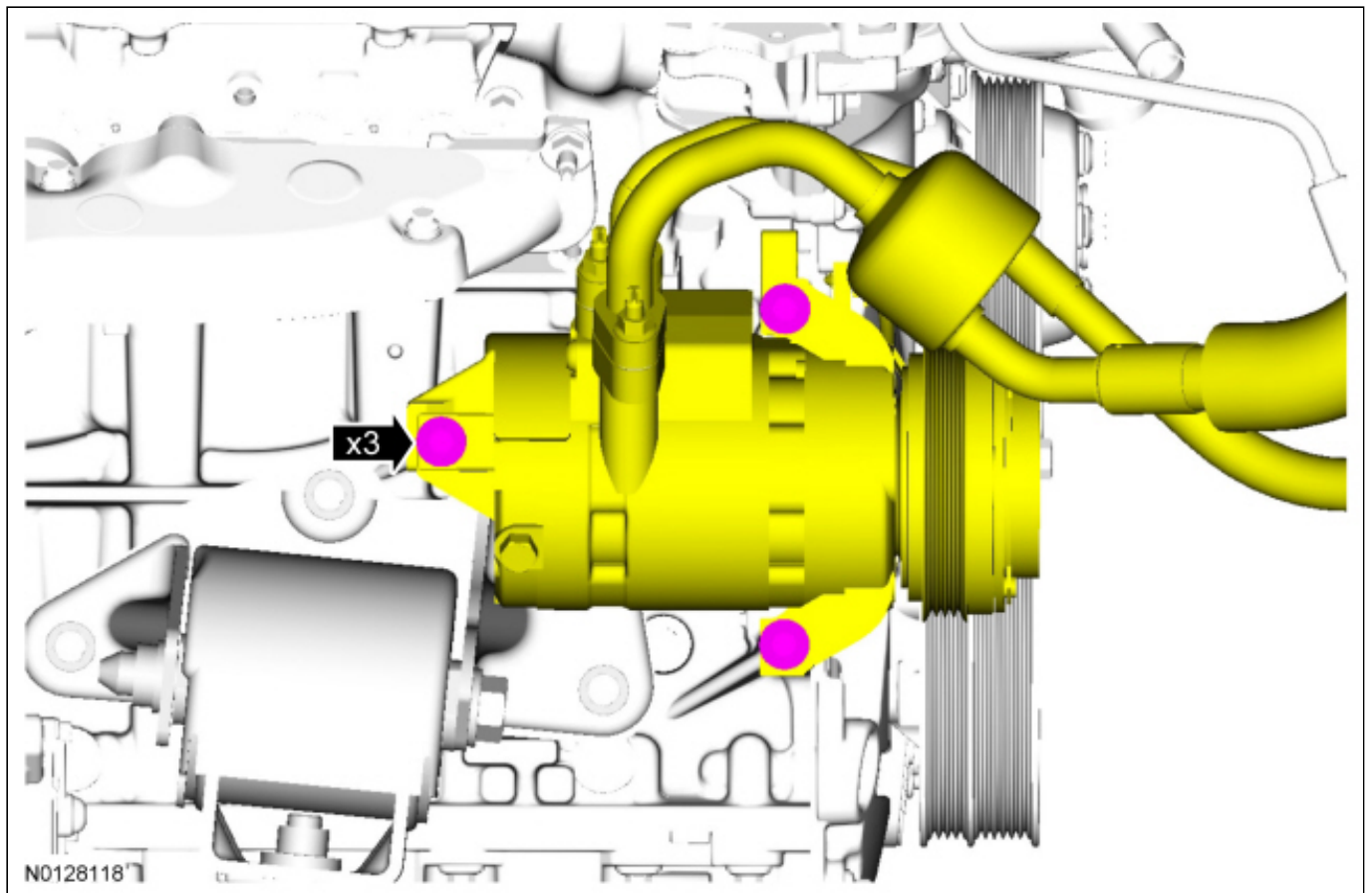


24. Remove the 3 transmission insulator and retainer bolts and remove the transmission insulator and retainer.



All vehicles

25. Install the exhaust Y-pipe - dual catalytic converter. For additional information, refer to [Section 309-00](#).
26. Position the A/C compressor and install the 3 A/C compressor bolts.
- Tighten to 25 Nm (18 lb-ft).



27. Install the A/C compressor belt. For additional information, refer to [Section 303-05](#).
 28. Install the ACL outlet pipe, RH ACL pipe to-turbocharger pipe, RH turbocharger bypass hose and the RH turbocharger-to- CAC pipe. For additional information, refer to Intake Air System Components — Exploded View, 3.5L GTDI in [Section 303-12](#).
 29. Fill the engine cooling system. For additional information, refer to [Section 303-03](#).
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