



## FULL BORE PERFORMANCE EXHAUST MANIFOLDS F-150 ECOBOOST 3.5L

### INSTALLATION INSTRUCTIONS

<b>2011-2012 FORD F150 3.5L ECOBOOST</b>	<b>PART #5001010</b>
<b>2013-2016 FORD F150 3.5L ECOBOOST</b>	<b>PART #5001011</b>
<b>2015-2019 FORD Transit 3.5L ECOBOOST</b>	<b>PART #5001012</b>
<b>2016-2017 FORD Expedition 3.5L ECOBOOST</b>	<b>PART #5001013</b>

MANUALS ALSO AVAILABLE ONLINE AT [CRENGINEERING.COM](http://CRENGINEERING.COM)

***PLEASE READ ALL INSTRUCTIONS BEFORE INSTALLATION***

**THIS PRODUCT IS LEGAL IN CALIFORNIA FOR RACING VEHICLES ONLY, WHICH MAY NEVER BE USED UPON A HIGHWAY, UNLESS AN EO# IS LISTED.**

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## KIT CONTENTS

### PERFORMANCE MANIFOLDS



**Qty: 1 x 5001001 - Drivers Side Manifold ( FORD # BL3Z-9431-B )**

**Qty: 1 x 5001002 - Passenger Side Manifold ( FORD # BL3Z-9430-B )**

### HARDWARE

**Qty: 16 x W712244-S300 – Manifold Stud F150 3.5L**

**Qty: 16 x W701706-S440 – Grade 10 Locking Manifold Nut**

Note: If you believe you are missing any components shown above please contact us at [Contact@CRPEngineering.com](mailto:Contact@CRPEngineering.com)

## ESTIMATED INSTALL TIME

### *PROFESSIONAL INSTALLATION IS RECOMMENDED*

The F150 3.5L EcoBoost manifolds take approximately 8 hours to install with appropriate facilities.

**NOTE:** If the turbochargers are being replaced or rebuilt during the same install, the added install time for the manifolds is approximately 1 hour or less.

**NOTE:** Install time is reduced by approximately 2 hours if a cat back aftermarket exhaust is installed during the same service.

## OEM GASKETS & HARDWARE REQUIRED

<b>ALL APPLICATIONS</b>	
<b>1x DK4Z-9448-A</b> <b>1x BL3Z-9448-C</b>	2011-2016 DS F150 3.5L Manifold Gasket (L / DS) 2011-2016 PS F150 3.5L Manifold Gasket (R / PS) ( OR USE OUR 1 99C R21 Gasket Set for The Above )
<b>2x BL3Z-6N652-B</b> <b>2x BL3Z-9450-A</b>	2011+ F150 3.5L Turbo Oil Drain Gasket 2011+ F150 3.5L DownPipe Gasket (Not required unless separated)
<b>6x W715673-S900</b> <b>4x W716667-S900</b> <b>4x W520514-S440</b>	2011+ Turbo Mounting Bolt F150 3.5L 2011+ Downpipe Stud F150 3.5L (Recommended) 2011+ Downpipe Nut F150 3.5L
<b>4x BC3Z-6A968-C</b>	2011+ Ford Jiffy-Tite Coolant Fitting (Highly Recommended)
-Motorcraft Metal Surface Prep ZC-31-A (Or Equivalent) -High Temperature Nickel Anti-Seize Lubricant (XL-2) (Or Equivalent)	
<p><b>IMPORTANT NOTE:</b></p> <p><b>We highly recommend replacement of the Jiffy-Tite connectors for the coolant connections and having a 3/8 inch Jiffy-Tite quick disconnect tool, such as a Snap-on® LDTSP4 or equivalent.</b></p>	

<b>2011-2012 F150 REQUIREMENTS</b>	
<b>1x BL3Z-9450-C</b> <b>1x BL3Z-9450-B</b>	2011-12 F150 3.5L Turbo Turbine Inlet Gasket (L / DS) 2011-12 F150 3.5L Turbo Turbine Inlet Gasket (R / PS)

<b>2013-2016 F150 REQUIREMENTS</b>	
<b>1x CL3Z-9450-B</b> <b>1x CL3Z-9450-A</b>	2013-16 F150 3.5L Turbo Turbine Inlet Gasket (L / DS) 2013-16 F150 3.5L Turbo Turbine Inlet Gasket (R / PS)

## **OEM MANIFOLD REMOVAL**

### **1. Pre-Installation**

1. With the vehicle in Neutral, securely position it on a hoist.
2. Disconnect the battery negative cable.

### **2. Drain the Cooling System Coolant**

**WARNING:** Always allow the engine to cool before opening the cooling system. Do not unscrew the coolant pressure relief cap when the engine is operating or the cooling system is hot. The cooling system is under pressure; steam and hot liquid can come out forcefully when the cap is loosened slightly. Failure to follow these instructions may result in serious personal injury.

**NOTICE:** The coolant must be recovered in a suitable, clean container for reuse. If the coolant is contaminated it must be recycled or disposed of correctly. Failure to follow these instructions may result in engine or cooling system damage.

**NOTE:** Less than 80% of the coolant capacity can be recovered with the engine in the vehicle. Dirty, rusty or contaminated coolant requires replacement.

**NOTE:** During normal vehicle operation, Motorcraft Orange Antifreeze/Coolant may change color from orange to pink or light red. As long as the engine coolant is clear and uncontaminated, this color change does not indicate the engine coolant has degraded nor does it require the engine coolant to be drained, the system to be flushed, or the engine coolant to be replaced.

1. Make sure the engine is cool.
2. Wrap a thick cloth around the pressure relief cap. Slowly turn the cap counter clockwise until the pressure begins to release.
3. Step back while the pressure releases.
4. When sure all the pressure has been released, use the cloth to turn and remove the cap.
5. Place a suitable container below the radiator draincock. Drain the coolant.
  - Tighten the radiator draincock when finished.

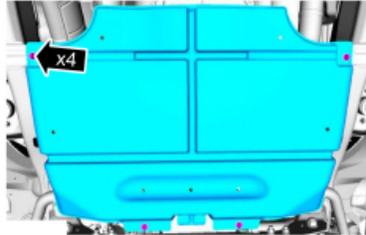
### 3. Exhaust Y-Pipe Removal

**Note:** This process is provided in full but can be shortened by a partial lowering the Y-Pipe out of the way. Please use your judgement regarding if a full removal of the front Exhaust system is required.

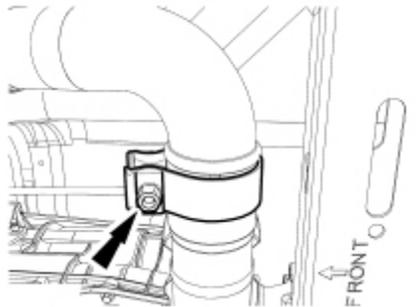
**NOTICE:** Do not use oil or grease-based lubricants on the isolators. These lubricants may cause deterioration of the rubber. This can lead to separation of the isolator from the exhaust hanger bracket during vehicle operation.

**NOTE:** The exhaust Y-pipe dual catalytic converter is a 2-piece assembly.

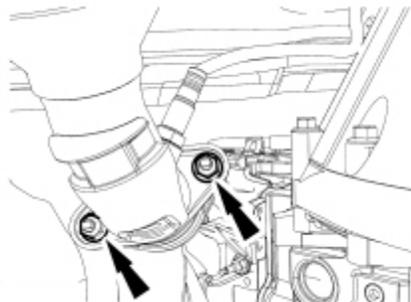
1. Disconnect the LH Heated Oxygen Sensor (HO2S) pushpin and electrical connector if required.
2. If equipped, release the 4 fasteners and remove the splash shield.



3. Disconnect the RH HO2S pushpin and electrical connector if required.
4. Disconnect the 2 Catalyst Monitor Sensor (CMS) electrical connectors if required.
5. Loosen the RH catalytic converter-to-LH catalytic converter clamp.

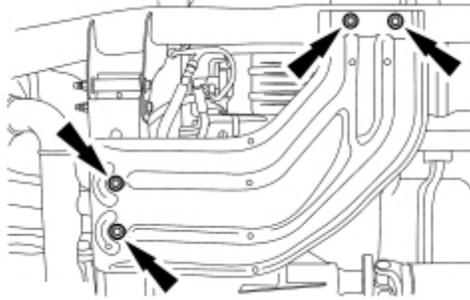


6. Remove and discard the 2 LH catalytic converter-to-exhaust manifold or turbocharger nuts.



7. Remove the LH catalytic converter from the vehicle.

8. **If equipped, remove the 4 bolts and the transfer case skid plate.**

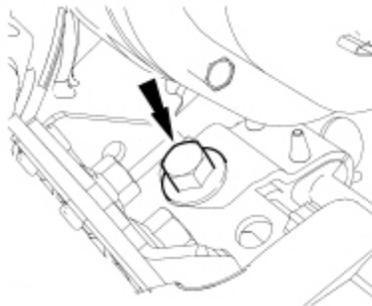


9. **Using an appropriate tool, support the transmission.**

10. **Remove the 2 heat shield bolts from the transmission crossmember.**  
**NOTE:** LH side shown, RH similar.

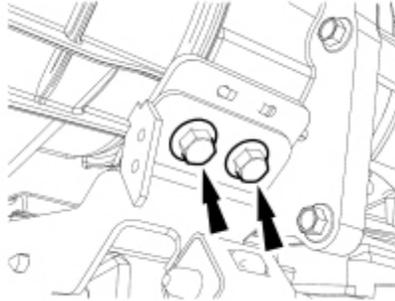


11. **Remove the 2 transmission insulator and retainer/exhaust support bracket assembly nuts.**
12. **Remove the 4 transmission crossmember nuts, the 4 bolts and remove the transmission crossmember from the vehicle.**
13. **Remove the LH isolator cap from the transmission insulator and retainer/exhaust support bracket assembly.**

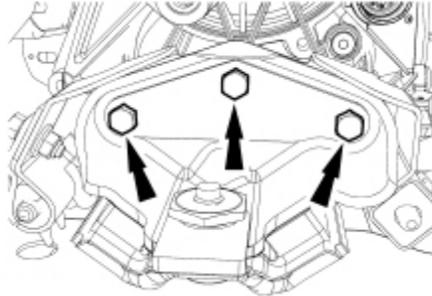


**4WD vehicles**

14. Remove the 4 transmission insulator and retainer/exhaust support bracket assembly bolts and remove the transmission insulator and retainer/exhaust support bracket assembly from the vehicle.

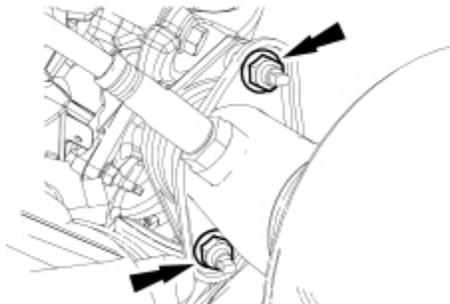
**2-Wheel Drive (2WD) vehicles**

15. Remove the 3 transmission insulator and retainer/exhaust support bracket assembly bolts and remove the transmission insulator and retainer/exhaust support bracket assembly from the vehicle.



**NOTICE:** Do not excessively bend, twist or allow the exhaust intermediate pipe to hang from the flexible pipe or damage to the muffler and tailpipe may occur.

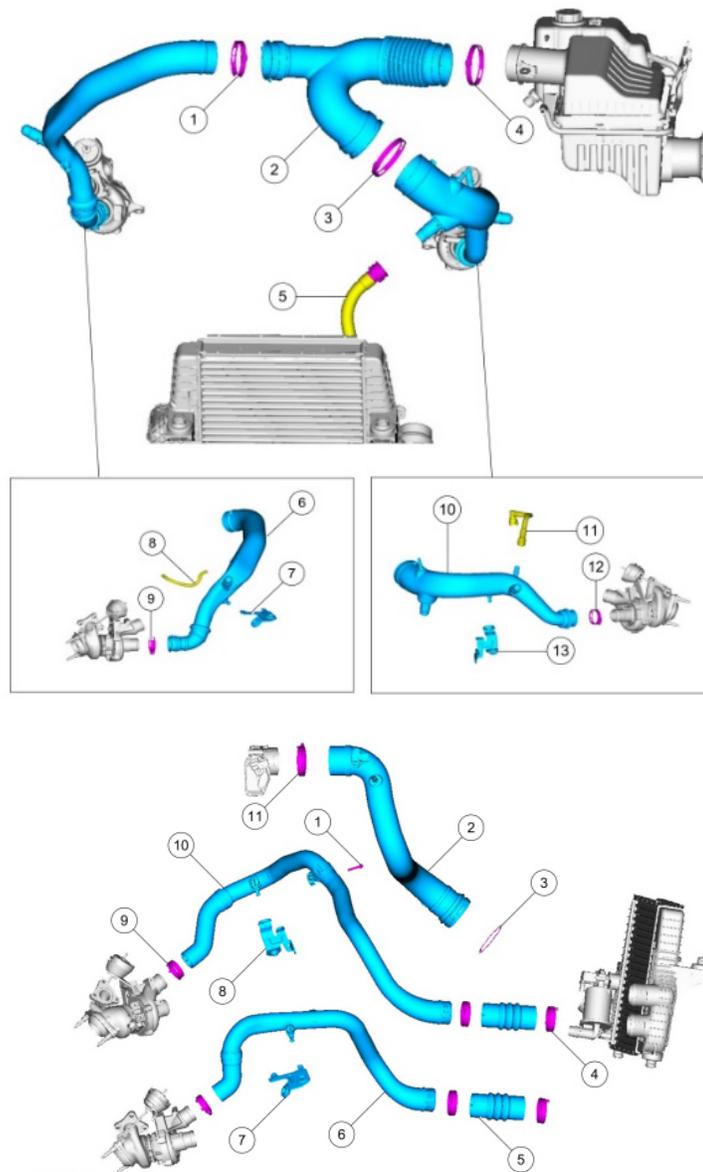
16. Support the exhaust intermediate pipe with a jackstand
17. Remove the 2 RH catalytic converter-to-exhaust intermediate pipe bolts. With help of an assistant, remove the 2 nuts on the RH catalytic converter-to-exhaust manifold or turbocharger joint and remove the RH catalytic converter from the vehicle. Discard the nuts.



## 4. Intake System 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.

1. Remove the Air Cleaner (ACL) outlet pipe, LH ACL pipe-to-turbocharger pipe, LH turbocharger bypass hose and the LH turbocharger-to-Charge Air Cooler (CAC) pipe. Refer to the exploded view of the Intake Air System Components in the installation section of this manual if required.

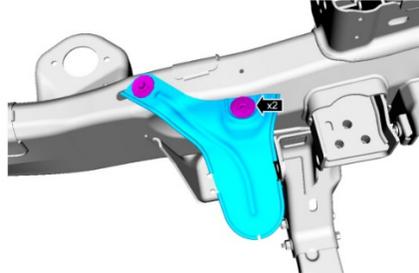


**NOTE:** Disconnect the fuel vapor management hose and the crankcase vent hose quick connect couplings from the LH ACL pipe-to-turbocharger pipe as necessary.

## 5. Drivers Side Turbocharger Removal LH

**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.

1. If equipped, remove the 2 exhaust system heat shield bolts and the exhaust system heat shield.

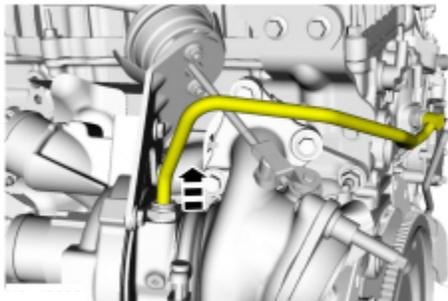


2. Using a commercially available quick disconnect tool, disconnect the turbocharger coolant supply tube at the turbocharger.

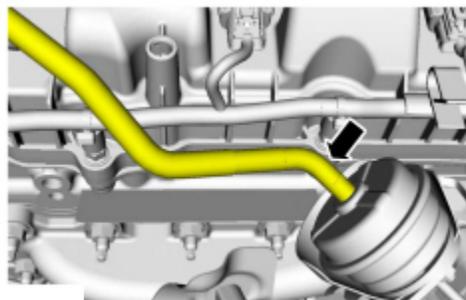
**NOTE:** Use a 3/8 inch Jiffy-tite quick disconnect tool, such as a Snap-on® LDTSP4 or equivalent, to disconnect the turbocharger coolant supply tube.

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

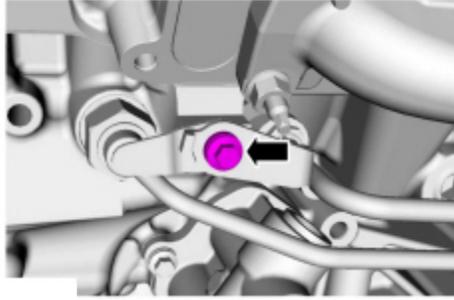
- Position the coolant supply tube aside.



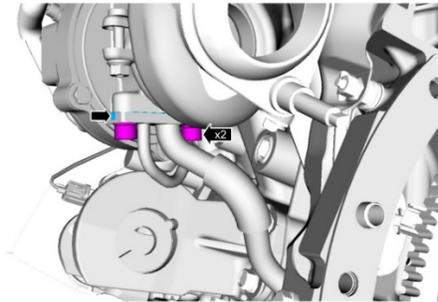
3. Disconnect the wastegate hose.



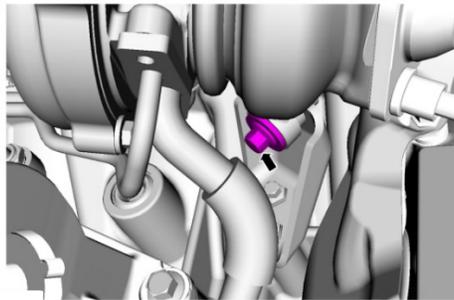
4. Remove the bolt for the LH turbocharger coolant and oil tubes.



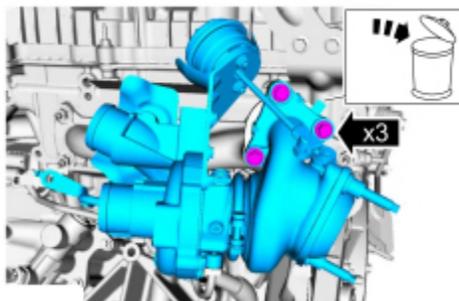
5. Remove the 2 bolts at the LH turbocharger oil return tube.
- Remove and discard the turbocharger oil return tube assembly gasket.
  - Leave the Turbocharger Oil Feed & Drain Assembly in position



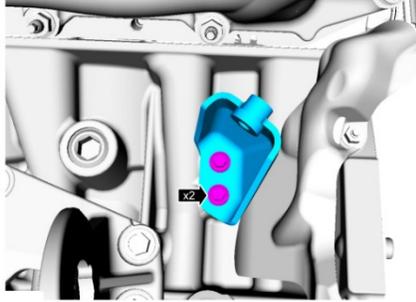
6. Remove the turbocharger bracket bolt.



7. Remove the 3 turbocharger mounting bolts and the turbocharger.
- Discard the turbocharger exhaust manifold gasket.

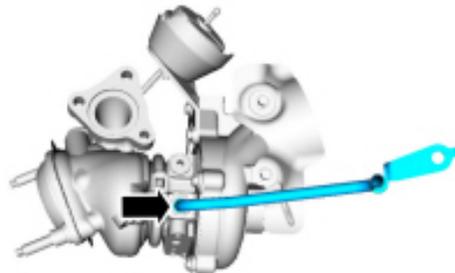


8. Loosen the 2 turbocharger bracket-to-cylinder block bolts if equipped, these should be loose on installation of the new manifold.

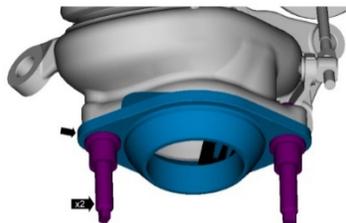


9. **NOTE:** Use a 3/8 inch Jiffy-tite quick disconnect tool, such as a Snap-on® LDTSP4 or equivalent, to disconnect the turbocharger coolant tubes.

If necessary, remove the turbocharger coolant tube from the engine. (Do not reuse O-ring if removed)



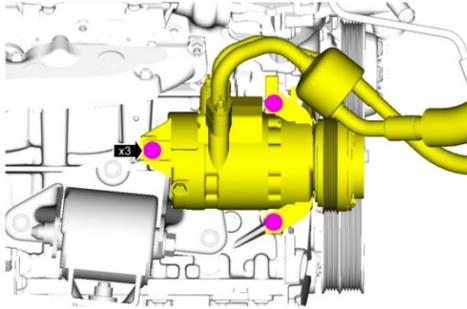
10. If necessary, remove the 2 turbocharger exhaust flange stud bolts and the turbocharger exhaust flange.
- Discard the 2 turbocharger exhaust flange stud bolts and the turbocharger exhaust flange gasket if it was removed.



## 6. Passenger Side Turbocharger Removal RH

**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.

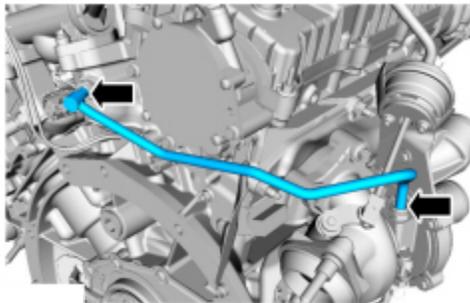
1. Remove the Air Conditioning (A/C) compressor belt. (Optional AC pump offset for clearance)
2. Remove the 3 A/C compressor bolts and position the A/C compressor aside.



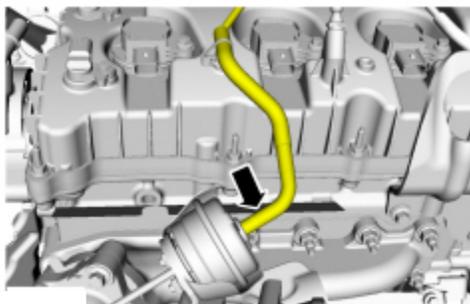
3. Using a commercially available quick disconnect tool, remove the turbocharger coolant supply tube.

**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.

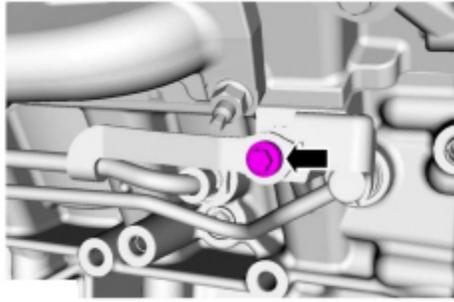
**NOTE:** Position a drain pan prior to disconnecting the turbocharger coolant supply tube.



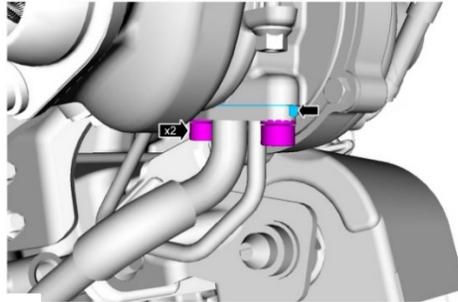
4. Disconnect the wastegate hose.



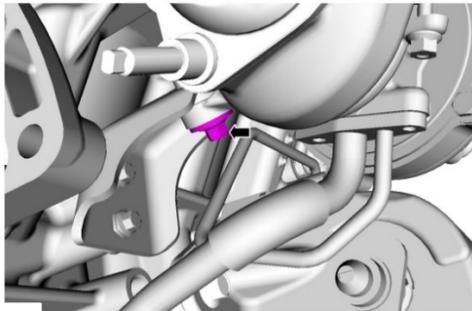
5. Remove the bolt for the RH turbocharger coolant and oil tubes.



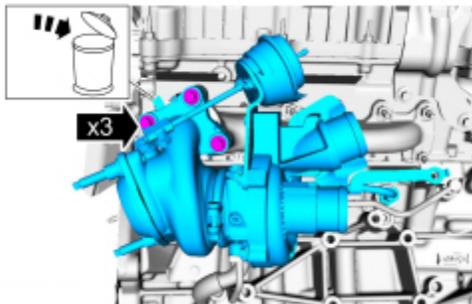
6. Remove the 2 bolts for the turbocharger oil return tube assembly.
- Remove and discard the turbocharger oil return tube gasket.
  - Leave the Turbocharger Oil Feed & Drain Assembly in position



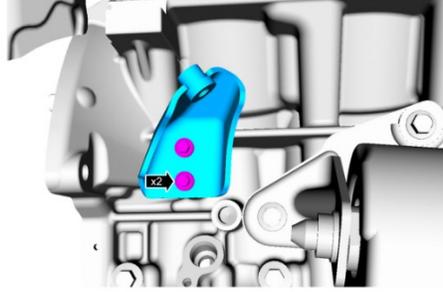
7. Remove the turbocharger bracket bolt.



8. Remove the 3 turbocharger mounting bolts and the turbocharger.
- Discard the turbocharger exhaust manifold gasket.

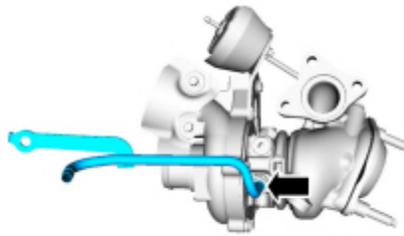


9. Loosen the 2 turbocharger bracket-to-cylinder block bolts if equipped, these should be loose on installation of the new manifold.

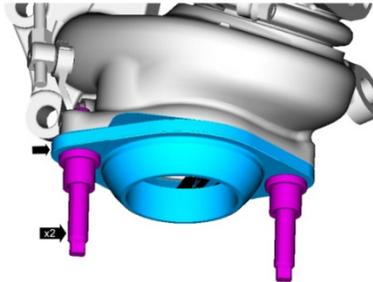


10. NOTE: Use a 3/8 inch Jiffy-tite quick disconnect tool, such as a Snap-on® LDTSP4 or equivalent, to disconnect the turbocharger coolant tubes.

If necessary, remove the turbocharger coolant tube from the engine. (Do not reuse O-ring if removed)

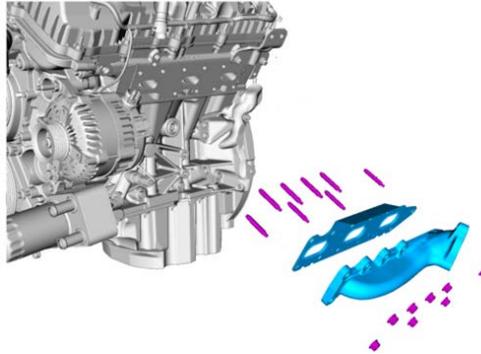


11. If necessary, remove the 2 turbocharger exhaust flange stud bolts and the turbocharger exhaust flange.
- Discard the 2 turbocharger exhaust flange stud bolts and the turbocharger exhaust flange gasket.



## 7. Drivers Side Exhaust Manifold Removal LH

1. Remove the 8 exhaust manifold nuts and the LH exhaust manifold. Discard the nuts and gasket.

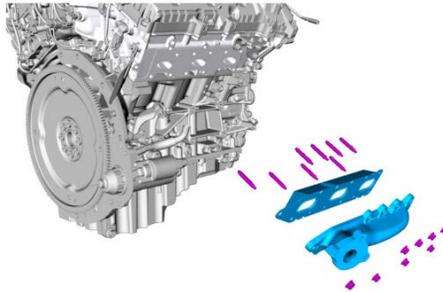


2. Remove and discard the 8 LH exhaust manifold studs.
3. Clean the exhaust manifold mating surface of the cylinder head with metal surface prep. Follow the directions on the packaging.

**NOTICE:** Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These may cause scratches and gouges resulting in leak paths. Use a plastic scraper to clean the sealing surfaces.

## 8. Passenger Side Exhaust Manifold Removal RH

1. Remove the 8 exhaust manifold nuts and the RH exhaust manifold. Discard the nuts and gasket.



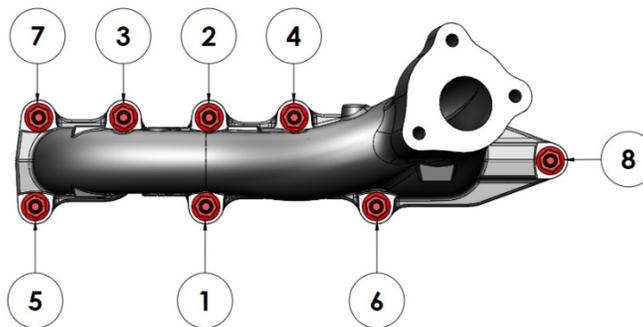
2. Remove and discard the 8 RH exhaust manifold studs.
3. Clean the exhaust manifold mating surface of the cylinder head with metal surface prep. Follow the directions on the packaging.

**NOTICE:** Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These may cause scratches and gouges resulting in leak paths. Use a plastic scraper to clean the sealing surfaces.

## MANIFOLD INSTALLATION

### 9. Drivers Side Exhaust CR Performance Manifold Installation LH

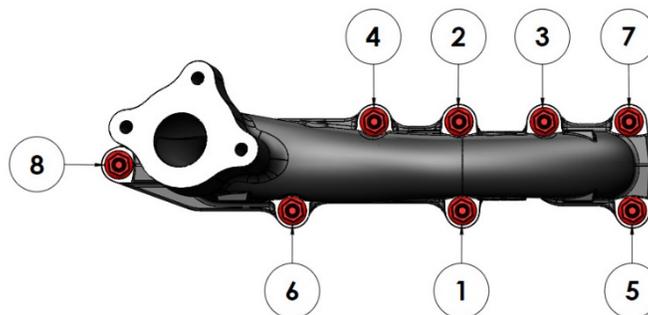
1. Install 8 new exhaust manifold studs (Provided)
  - Tighten to 12 Nm (106 lb-in).
2. Using a new gasket, install the LH exhaust manifold and 8 new nuts (Provided).  
Tighten in 2 stages in the sequence shown Using a 1/4" Drive Socket For Manifold Clearance:
  - Stage 1: Tighten to 19 Nm (168 lb-in).
  - Stage 2: Tighten to 25 Nm (18 lb-ft).



**IMPORTANT NOTICE:** Failure to tighten the exhaust manifold nuts to specification a second time will cause the exhaust manifold to develop an exhaust leak.

### 10. Passenger Side Exhaust CR Performance Manifold Installation RH

1. Install 8 new exhaust manifold studs (Provided)
  - Tighten to 12 Nm (106 lb-in).
2. Using a new gasket, install the RH exhaust manifold and 8 new nuts (Provided).  
Tighten in 2 stages in the sequence shown Using a 1/4" Drive Socket For Manifold Clearance:
  - Stage 1: Tighten to 19 Nm (168 lb-in).
  - Stage 2: Tighten to 25 Nm (18 lb-ft).

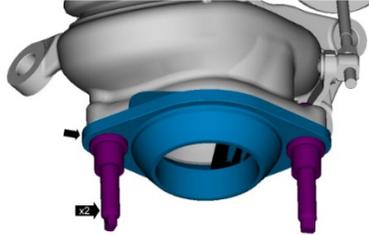


**IMPORTANT NOTICE:** Failure to tighten the exhaust manifold nuts to specification a second time will cause the exhaust manifold to develop an exhaust leak.

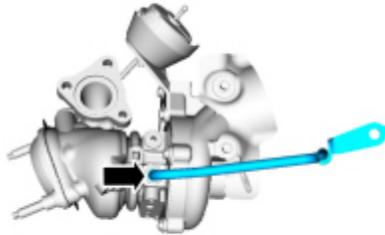
## 11. Drivers Side Turbocharger Installation LH

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

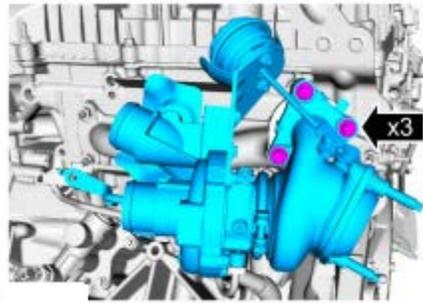
1. If removed, using a new turbocharger exhaust flange gasket, install the turbocharger exhaust flange and the 2 new turbocharger exhaust flange stud bolts.
  - Tighten to 40 Nm (30 lb-ft).



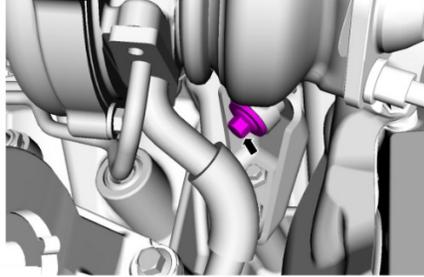
2. If removed, install the turbocharger coolant tube.



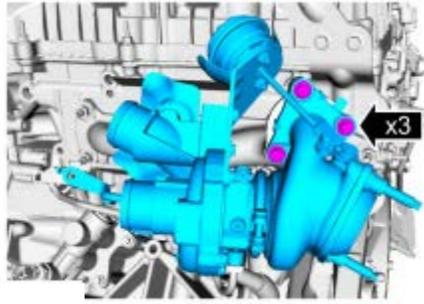
3. Using a new turbocharger exhaust manifold gasket, install the LH turbocharger and the 3 turbocharger mounting bolts.
  - Tighten finger tight.



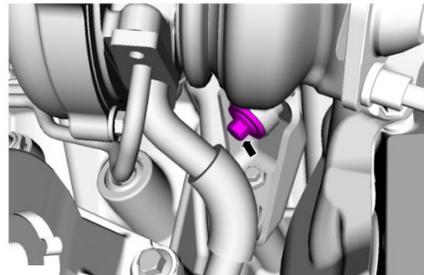
4. Install the turbocharger bracket bolt if equipped.
- Tighten finger tight.



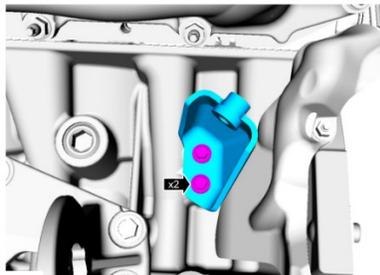
5. Tighten the 3 turbocharger mounting bolts.
- Tighten to 32 Nm (24 lb-ft).



6. Tighten the turbocharger bracket bolt if equipped.
- Tighten to 28 Nm (21 lb-ft).

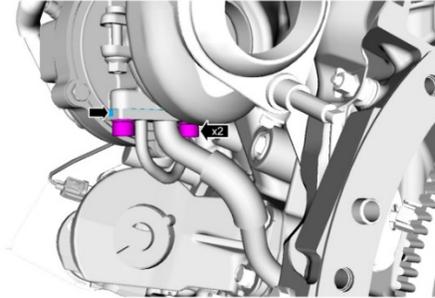


7. Tighten the 2 turbocharger bracket-to-cylinder block bolts if equipped.
- Tighten to 10 Nm (89 lb-in).



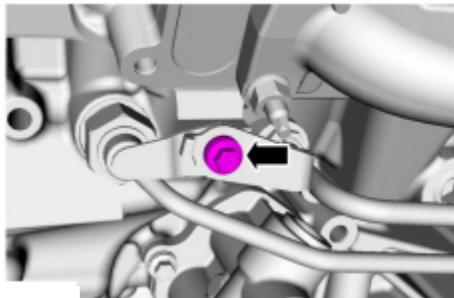
8. Using a new turbocharger oil return tube gasket, install the 2 turbocharger center housing bolts at the turbocharger. Tighten in the following stages:

- 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.

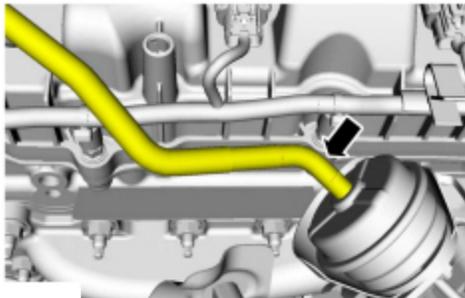


9. Install the bolt for the LH turbocharger coolant and oil tubes. Tighten in the following stages:

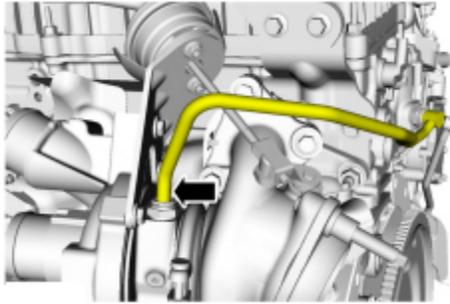
- Stage 1: Tighten to 8 Nm (71 lb-in).
- Stage 2: Tighten an additional 30 degrees.



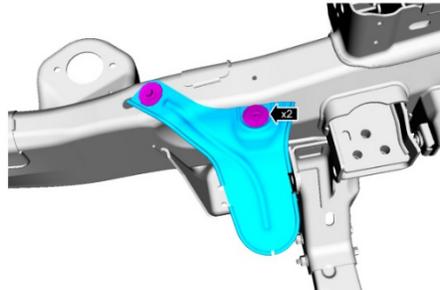
10. Connect the wastegate hose.



11. **Connect the turbocharger coolant supply tube to the turbocharger.**



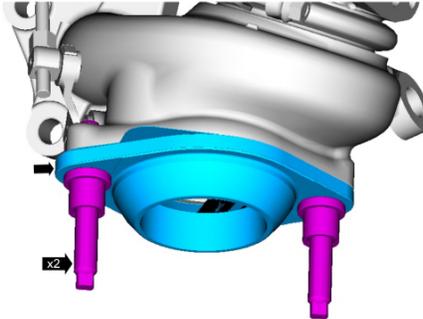
12. **If equipped, install the exhaust system heat shield and the 2 exhaust system heat shield bolts.**
- Tighten to 20 Nm (177 lb-in).



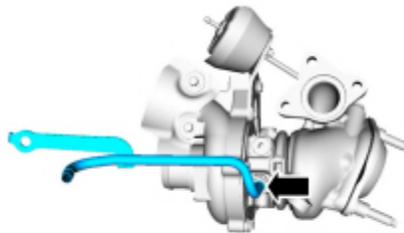
## 12. Passenger Side Turbocharger Installation RH

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

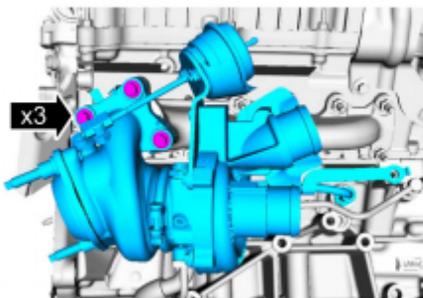
1. If removed, using a new turbocharger exhaust flange gasket, install the turbocharger exhaust flange and the 2 new turbocharger exhaust flange stud bolts.
  - Tighten to 40 Nm (30 lb-ft).



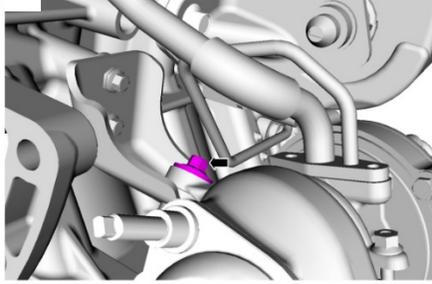
2. If removed, install the turbocharger coolant tube.



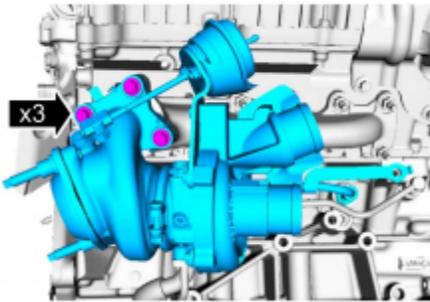
3. Using a new turbocharger exhaust manifold gasket, install the RH turbocharger and the 3 turbocharger mounting bolts.
  - Tighten finger tight.



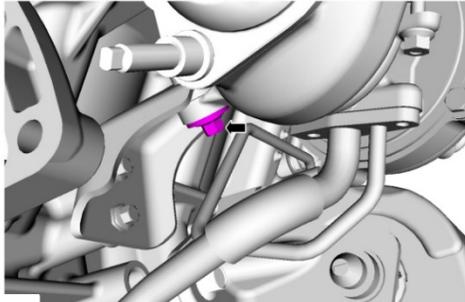
4. **Install the turbocharger bracket bolt.**
- Tighten finger tight.



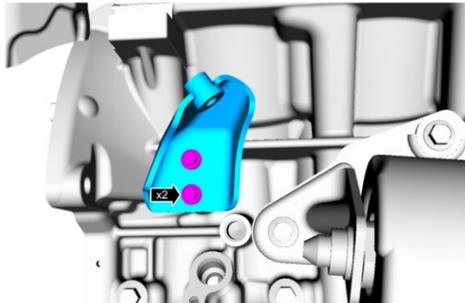
5. **Tighten the 3 turbocharger mounting bolts.**
- Tighten to 32 Nm (24 lb-ft).



6. **Tighten the turbocharger bracket bolt.**
- Tighten to 28 Nm (21 lb-ft).

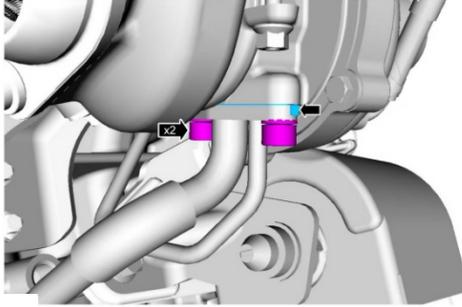


7. **Tighten the 2 turbocharger bracket-to-cylinder block bolts.**
- Tighten to 10 Nm (89 lb-in).



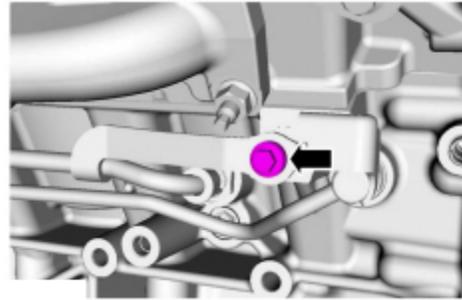
8. Using a new turbocharger oil return tube gasket, install the 2 turbocharger center housing bolts at the turbocharger. Tighten in the following stages:

- 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.

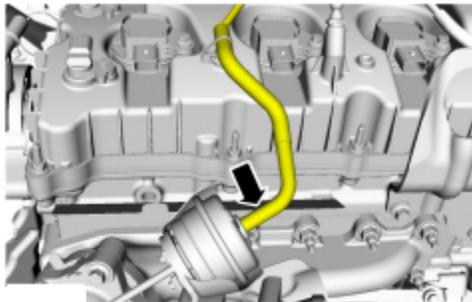


9. Install the bolt for the RH turbocharger coolant and oil tubes. Tighten in the following stages:

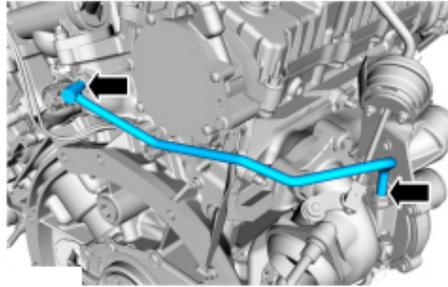
- Stage 1: Tighten to 8 Nm (71 lb-in).
- Stage 2: Tighten an additional 30 degrees.



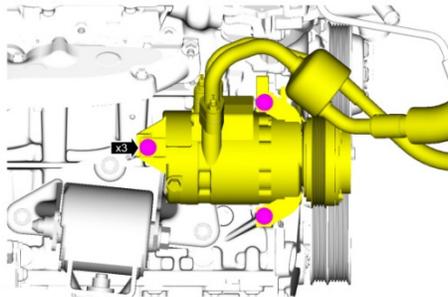
10. Connect the wastegate hose.



11. Install the turbocharger coolant supply tube.



12. Position the A/C compressor and install the 3 A/C compressor bolts.
- Tighten to 25 Nm (18 lb-ft).

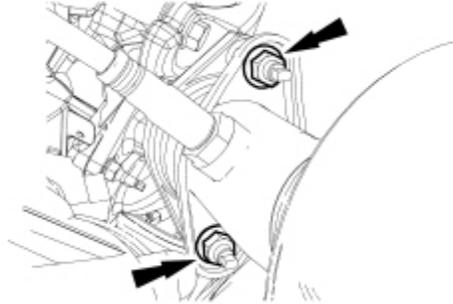


13. Install the A/C compressor belt.

### 13. Exhaust Y-Pipe Installation

**NOTE:** Clean the mating surfaces of the exhaust manifold outlet or turbocharger flares and the catalytic converter inlet flares.

1. With the help of an assistant, position the RH catalytic converter into the vehicle and loosely install 2 new RH catalytic converter-to-exhaust manifold or turbocharger nuts.

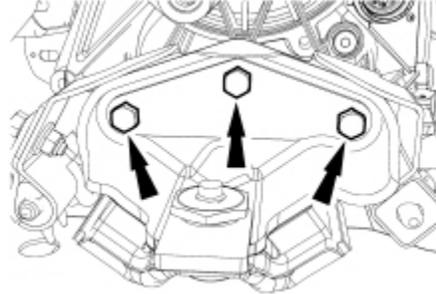


**NOTICE:** Do not excessively bend, twist or allow the exhaust to hang from the flexible pipe or damage to the muffler and tailpipe may occur.

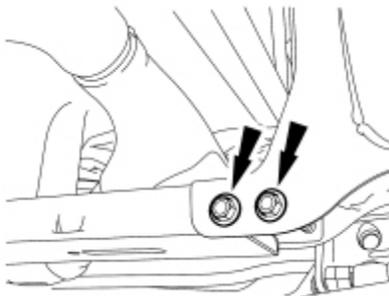
2. Loosely install the 2 RH catalytic converter-to-intermediate pipe bolts.

#### 2WD vehicles

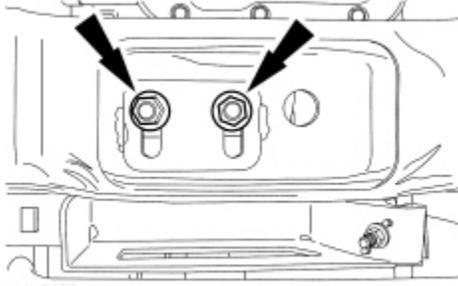
3. Install the transmission insulator and retainer/exhaust bracket assembly and 3 bolts.
  - Tighten to 90 Nm (66 lb-ft).



4. Install the transmission crossmember, 4 bolts and 4 nuts.
  - Tighten to 90 Nm (66 lb-ft).



5. Lower the transmission onto the transmission crossmember and install the 2 transmission insulator and retainer/exhaust support bracket assembly nuts.
- Tighten to 103 Nm (76 lb-ft).

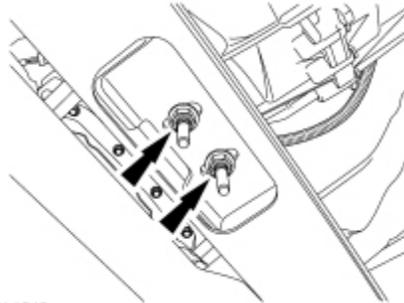


**4WD vehicles**

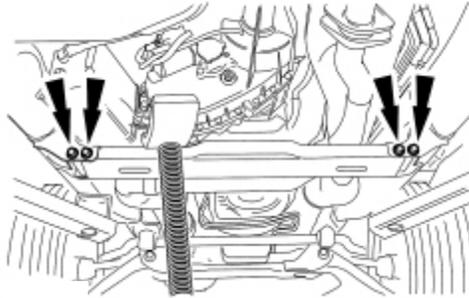
6. Loosely install the transmission insulator and retainer/exhaust support bracket assembly and the 4 bolts.



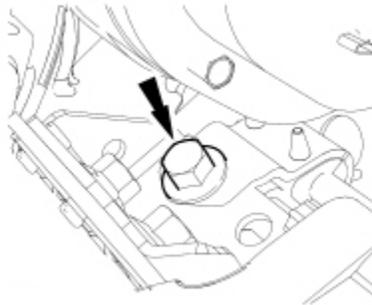
7. Position the transmission crossmember and loosely install the 2 transmission insulator and retainer/exhaust support bracket assembly nuts.



8. **Install the 4 transmission crossmember bolts and nuts.**
- Tighten the transmission insulator and retainer/exhaust support bracket assembly and 4 bolts to 90 Nm (66 lb-ft).
  - Tighten the transmission crossmember bolts and nuts to 90 Nm (66 lb-ft).
  - Tighten the 2 transmission insulator and retainer/exhaust support bracket assembly nuts to 103 Nm (75 lb-ft).



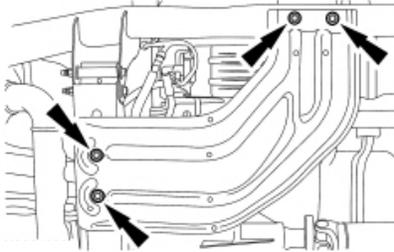
9. **Loosely install the LH isolator cap and bolt onto the transmission insulator and retainer/exhaust support bracket assembly.**



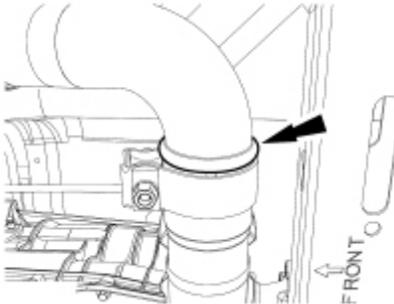
10. **NOTE: LH side shown, RH similar.**  
**Install the 2 heat shield bolts into the transmission crossmember.**
- Tighten to 15 Nm (133 lb-in).



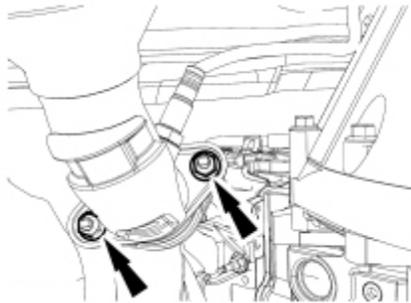
11. If equipped, install the transfer case skid plate and 4 bolts.
- Tighten to 24 Nm (18 lb-ft).



12. Slide the LH catalytic converter into the RH catalytic converter up to the stop on the LH catalytic converter and position the LH catalytic converter into place.

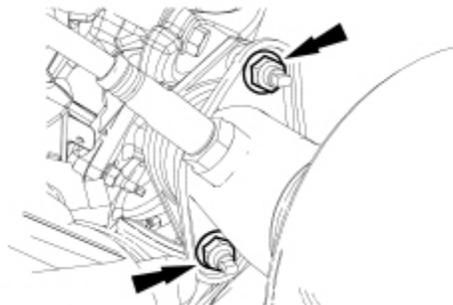


13. Loosely install the 2 new LH catalytic converter-to-exhaust manifold or turbocharger nuts.

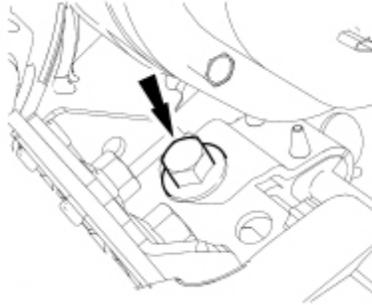


14. Tighten the 2 new RH catalytic converter-to-exhaust manifold or turbocharger nuts in the following sequence.

1. Tighten the RH lower catalytic converter-to-exhaust manifold or turbocharger nut to 40 Nm (30 lb-ft).
2. Tighten the RH upper catalytic converter-to-exhaust manifold or turbocharger nut to 40 Nm (30 lb-ft).



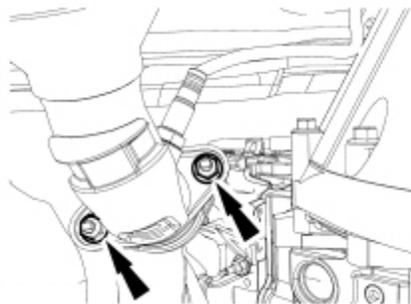
15. Tighten the LH isolator cap bolt.
- Tighten to 55 Nm (41 lb-ft).



16. Tighten the RH catalytic converter-to-LH catalytic converter clamp.
- Tighten to 55 Nm (41 lb-ft).



17. Tighten the 2 new LH catalytic converter-to-exhaust manifold or turbocharger nuts in the following sequence.
1. Snug the LH inner catalytic converter-to-exhaust manifold or turbocharger nut.
  2. Tighten the LH outer catalytic converter-to-exhaust manifold or turbocharger nut to 40 Nm (30 lb-ft).
  3. Tighten the LH inner catalytic converter-to-exhaust manifold or turbocharger nut to 40 Nm (30 lb-ft).



**NOTICE:** Do not excessively bend, twist or allow the exhaust to hang from the flexible pipe or damage to the muffler and tailpipe may occur.

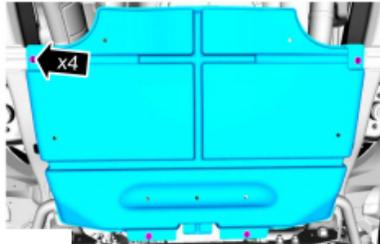
**18. Tighten the exhaust Y-pipe dual catalytic converter-to-exhaust intermediate pipe bolts in the following sequence.**

- 1. Snug the outer exhaust Y-pipe dual catalytic converter-to-exhaust intermediate pipe bolt.**
- 2. Tighten the inner exhaust Y-pipe dual catalytic converter-to-exhaust intermediate pipe bolt to 63 Nm (46 lb-ft).**
- 3. Tighten the outer exhaust Y-pipe dual catalytic converter-to-exhaust intermediate pipe bolt to 63 Nm (46 lb-ft).**

**19. Connect the 2 CMS electrical connectors if removed.**

**20. Connect the RH HO2S pushpin and electrical connector if removed.**

**21. If equipped, install the splash shield and the 4 fasteners.**

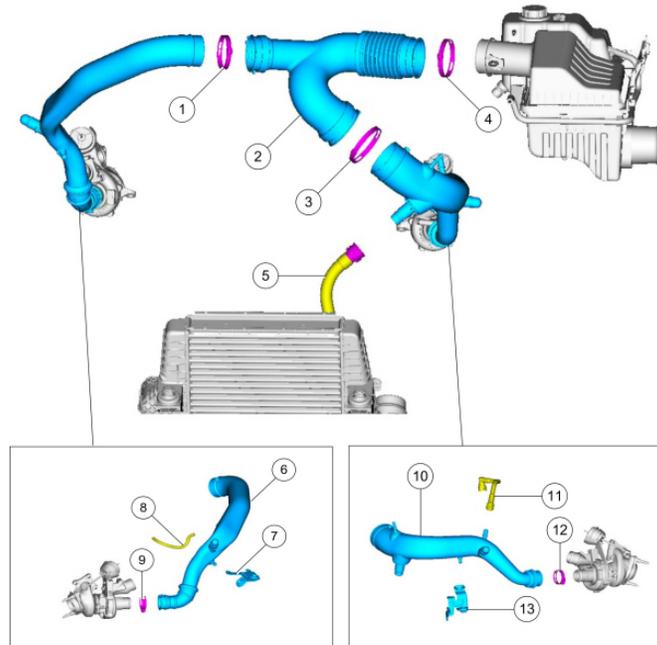


**22. Connect the LH HO2S pushpin and electrical connector if removed.**

## 14. Intake System Installation

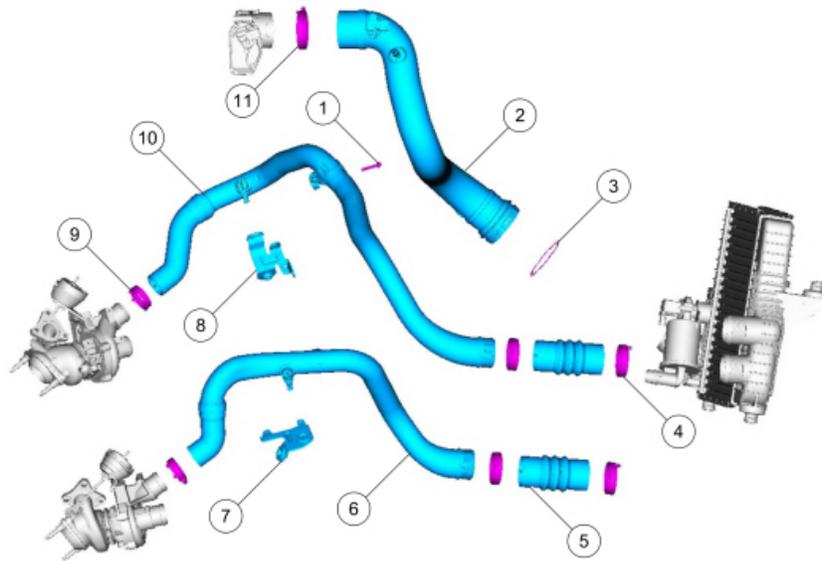
1. Install the ACL outlet pipe, RH ACL pipe to-turbocharger pipe, RH turbocharger bypass hose and the RH turbocharger-to- CAC pipe. Refer to Intake Air System Components — Exploded View Below

### Air Cleaner (ACL) Assembly and ACL Outlet Pipes



Item	Part Number	Description
1	—	<u>ACL</u> outlet pipe clamp - 5 Nm (44 lb-in) (part of 9C623)
2	9C623	<u>ACL</u> outlet pipe
3	—	<u>ACL</u> outlet pipe clamp - 5 Nm (44 lb-in) (part of 9C623)
4	—	<u>ACL</u> outlet pipe clamp - 5 Nm (44 lb-in) (part of 9C623)
5	9J478	Air bypass hose assembly
6	9B659	RH <u>ACL</u> pipe-to-turbocharger pipe
7	9647	RH <u>ACL</u> and <u>CAC</u> pipe bracket
8	9E499	Vacuum hose
9	—	RH <u>ACL</u> pipe-to-turbocharger pipe clamp - 5 Nm (44 lb-in) (part of 9B659)
10	—	LH <u>ACL</u> pipe-to-turbocharger pipe (part of 9C623)
11	3E675	Crankcase vent tube assembly
12	—	LH <u>ACL</u> pipe-to-turbocharger pipe - 5 Nm (44 lb-in) (part of 9C623)
13	9647	LH <u>ACL</u> and <u>CAC</u> pipe bracket

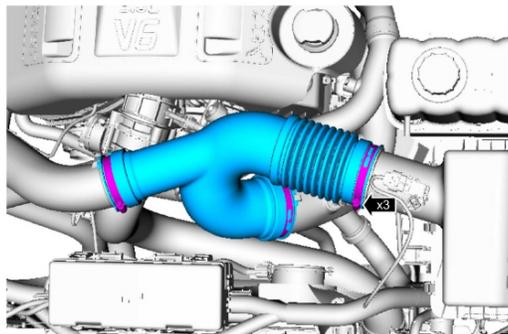
### Charge Air Cooler (CAC) and Tubes



Item	Part Number	Description
1	W503280	LH turbocharger-to- <u>CAC</u> pipe bracket bolt - 6 Nm (53 lb-in)
2	6F073	<u>CAC</u> -to- Throttle Body (TB) pipe
3	—	<u>CAC</u> -to- <u>TB</u> pipe spring clip (part of 6F073)
4	—	<u>CAC</u> pipe clamp - 5 Nm (44 lb-in) (part of 6C646) (4 required)
5	—	<u>CAC</u> tube flex joint (part of 6C646) (4 required)
6	6C646	LH turbocharger-to- <u>CAC</u> pipe
7	9647	RH <u>ACL</u> and <u>CAC</u> pipe bracket
8	9647	LH <u>ACL</u> and <u>CAC</u> pipe bracket
9	—	Turbocharger-to- <u>CAC</u> pipe clamp - 5 Nm (44 lb-in) (part of 9C623) (2 required)
10	6C646	RH turbocharger-to- <u>CAC</u> pipe
11	—	<u>CAC</u> -to- <u>TB</u> pipe clamp - 5 Nm (44 lb-in) (part of 6F073)

**NOTE:** Securely seal the ACL outlet pipe and the turbocharger pipes to prevent unmetred air from entering the engine.

#### 2. Tighten the ACL Y Pipe hose clamps to 5Nm (44 lb-in).



## 15. Fill and Bleed the Cooling System Coolant

**NOTICE:** The engine cooling system is filled with Motorcraft® Orange Antifreeze/Coolant. Always fill the cooling system with the manufacturer's specified coolant. Chemically flush the cooling system if a non-specified coolant has been used. Refer to [Cooling System Flushing](#) in this section. Failure to follow these instructions may damage the engine or cooling system.

**NOTICE:** Engine coolant provides boil protection, corrosion protection, freeze protection and cooling efficiency to the engine and cooling components. In order to obtain these protections, maintain the engine coolant at the correct concentration and fluid level in the degas bottle.

To maintain the integrity of the coolant and the cooling system:

- Add Motorcraft® Orange Antifreeze/Coolant or equivalent. Do not mix coolant types.
- Do not add or mix with any other type of engine coolant. Mixing coolants may degrade the coolant's corrosion protection.
- Do not add alcohol, methanol, or brine, or any engine coolants mixed with alcohol or methanol antifreeze. These can cause engine damage from overheating or freezing.
- Ford Motor Company does NOT recommend the use of recycled engine coolant in vehicles originally equipped with Motorcraft® Orange Antifreeze/Coolant since a Ford-approved recycling process is not yet available.

### 1. Fill the radiator through the degas bottle until the coolant level is between the COOLANT FILL LEVEL marks.

**When adding or topping of the engine coolant:**

1. Measure the coolant concentration in the vehicle using the Coolant/Battery Refractometer 300-ROB75240 or equivalent.
2. Determine the concentration desired based on the vehicle duty cycle of extreme hot or cold operating conditions.
3. Add/top off or adjust coolant as follows:
  - For concentrations measured 48/52 to 50/50 (equates to a freeze point between -31°C [-30°F] and -34°C [-37°F]), use Motorcraft® Orange Antifreeze/Coolant Prediluted to maintain a coolant concentration in this same range.
  - For all other concentrations, use Motorcraft® Orange Antifreeze/Coolant Concentrated and/or distilled water to get to the desired concentration.
  - When refilling the engine coolant after a flush procedure, use a mixture of Motorcraft® Orange Antifreeze/Coolant Concentrated and distilled water to get to the desired concentration.
4. Recommended coolant concentration is 48/52 to 50/50 engine coolant to distilled water (freeze protection -31°C [-30°F] to -34°C [-37°F]).
5. For extremely cold climates (less than -37°C [-34°F]):
  - It may be necessary to increase the coolant concentration above 50%.
  - NEVER increase the coolant concentration above 60%.
  - Maximum coolant concentration is 60/40 for cold weather areas.
  - A coolant concentration of 60% provides freeze point protection down to -50°C (-58°F).
  - Engine coolant concentration above 60% decreases the overheat protection characteristics of the engine coolant and may damage the engine.
6. For extremely hot climates:
  - It is still necessary to maintain the coolant concentration above 40%.
  - NEVER decrease the coolant concentration below 40%.
  - Minimum coolant concentration is 40/60 for warm weather areas.
  - A coolant concentration of 40% provides freeze point protection down to -26°C (-15°F).
  - Engine coolant concentration below 40% decreases the corrosion and freeze protection characteristics of the engine coolant and may damage the engine.
7. Vehicles driven year-round in non-extreme climates should use a 48/52 to 50/50 mixture of engine coolant and distilled water (freeze protection -31°C [-30°F] to -34°C [-37°F]) for optimum cooling system and engine protection.

2. **Select the maximum heater temperature and blower motor speed settings. Position the control to discharge air at A/C vents in instrument panel.**
3. **Reconnect Battery Cables and any other required electrical.**
4. **Start the engine and allow to idle. While engine is idling, feel for hot air at A/C vents.**
5. ***NOTICE:* If the air discharge remains cool and the Engine Coolant Temperature (ECT) gauge does not move, the engine coolant level is low and must be filled. Stop the engine, allow the engine to cool and fill cooling system. Failure to follow these instructions may result in damage to the engine.**

**Start the engine and allow it to idle until normal operating temperature is reached. Hot air should discharge from A/C vents. The Engine Coolant Temperature (ECT) gauge should maintain a stabilized reading in the middle of the NORMAL range. The upper radiator hose should feel hot to the touch.**

6. **Shut the engine off and allow the engine to cool.**
7. **Check the engine coolant level in the degas bottle and fill as necessary.**
8. **Repeat the previous 4 steps as necessary.**
9. **Road Test and recheck fluids.**

<b>WE RECOMMEND RE-TORQUE ALL ACCESSIBLE MAIN COMPONENTS AFTER ONE HEAT CYCLE</b>
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**THANK YOU AND PLEASE CONTACT US IF YOU HAVE ANY INSTALL QUESTIONS  
SALES@CRPENGINEERING.COM**