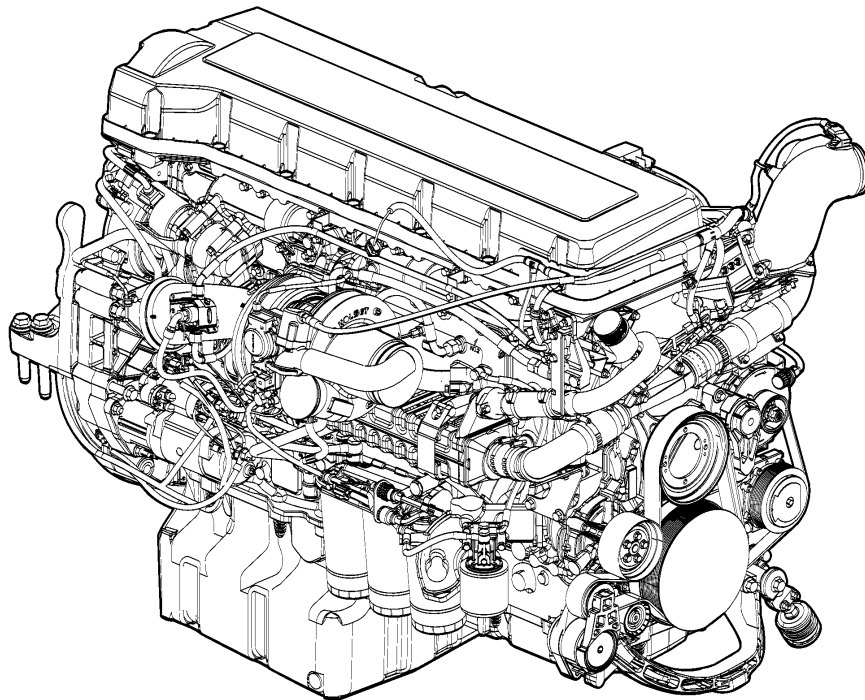


This Service Bulletin replaces SB 254-68, "EGR Cooler, Replacement" (6.2007), publication no. PV776-20180361.

Date	Group	No.	Page
10.2007	<b>293</b>	<b>08</b>	1(34)

EGR Cooler  
Replacement  
D16F

## EGR Cooler, Replacement



W2005772

This information covers the replacement procedure for the EGR cooler on the Volvo D16F engine.

### Contents

- "Special Tools" page 2
- "EGR Cooler, Replacement" page 3

**Note:** Information is subject to change without notice.  
Illustrations are used for reference only and can differ slightly from the actual vehicle being serviced. However, key components addressed in this information are represented as accurately as possible.

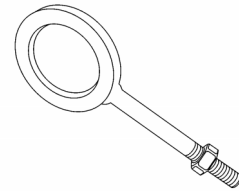
## Special Tools

For special tools ordering instructions, refer to Tool Information, group 08.



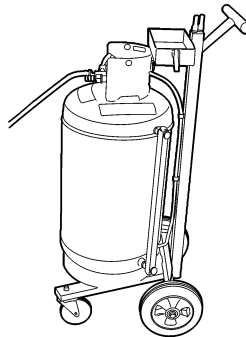
W0001795

**9996049**  
Coolant Drain Hose



W0002266

**85108575**  
Turbocharger Lifting Tool



W2004191

**DBT2V700**  
Coolant Extractor

## 2932-03-02-01 EGR Cooler, Replacement

You must read and understand the precautions and guidelines in Service Information, group 20, "General Safety Practices, Engine" before performing this procedure. If you are not properly trained and certified in this procedure, ask your supervisor for training before you perform it.

*Special tools: 9996049, 85108575,  
DBT2V700*

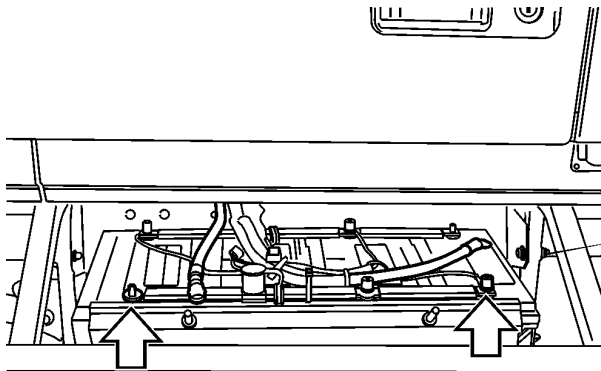
### Removal

**1**

Apply the parking brake and place the shift lever in neutral.

**2**

Remove all cables from ground (negative) battery terminals to prevent personal injury from electrical shock.



W2003815

**3**

Connect the coolant extractor to the drain fitting at the bottom of the radiator and drain the coolant.

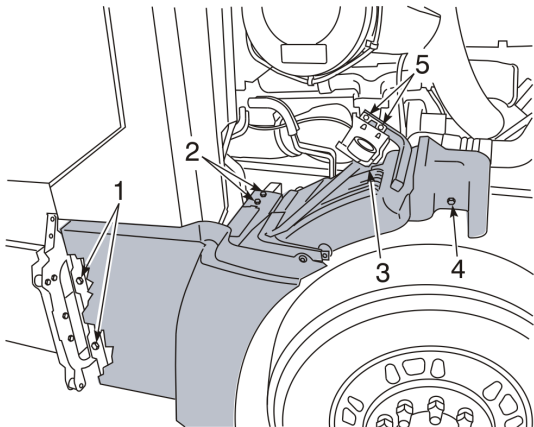
**Note:** An alternate method is to connect the drain hose to the drain fitting and drain the coolant into an approved container.

DBT2V700, 9996049

**4**

Remove inner splash guard as an assembly.

**Note:** Some models may be equipped with fender extenders, attached to the inner splash guard. Remove these as an assembly.



W2005189

1-Two (2) fender  
extender bolts [rear,  
at bracket]

2-Two (2) fender  
extender bolts [at  
brace]

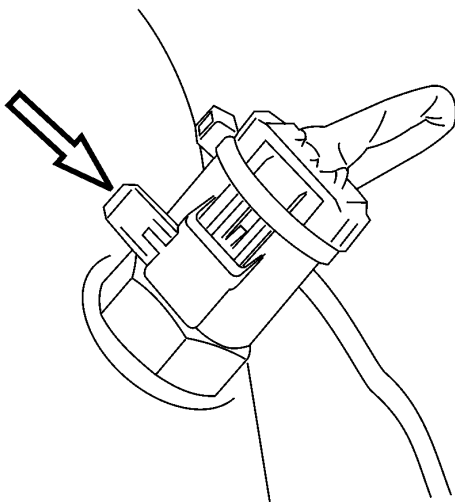
3-One (1) fender  
extender brace at  
hood release [bolt  
and nut]

4-One (1) splash  
guard bolt [lower, to  
frame]

5-Two (2) splash  
guard bolts [upper  
brace]

**5**

Disconnect the air temperature sensor connector from the sensor. Cut the tie strap and disengage the lock tab. Also, remove the bolt securing the temperature sensor harness P-clamp to the fresh air pipe for the turbocharger.

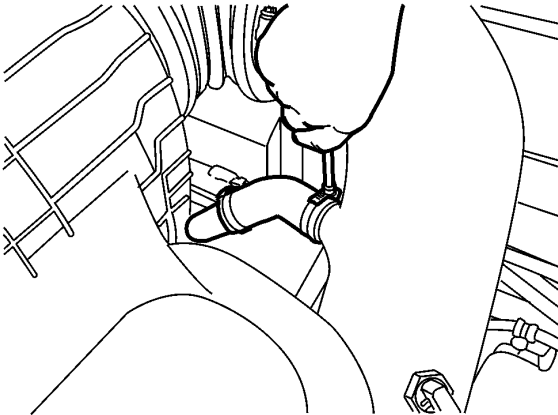


W2004720



**6**

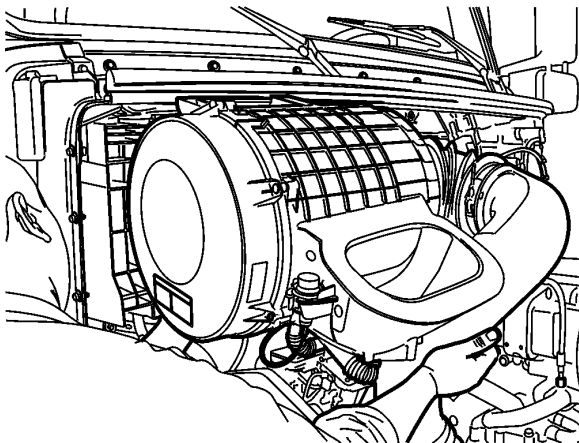
Loosen the clamp and remove the air compressor fresh air pipe from the main fresh air pipe.



W2004719

**7**

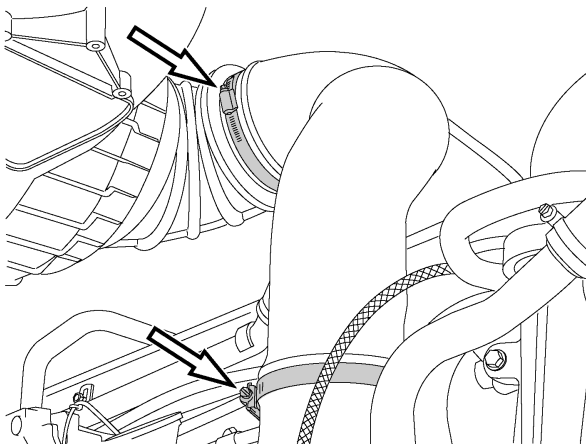
Remove the air main fresh air pipe.



W2003859

**8**

Loosen the clamp of the main fresh air pipe at the turbocharger inlet elbow. Disconnect the fresh air pipe from the turbocharger.



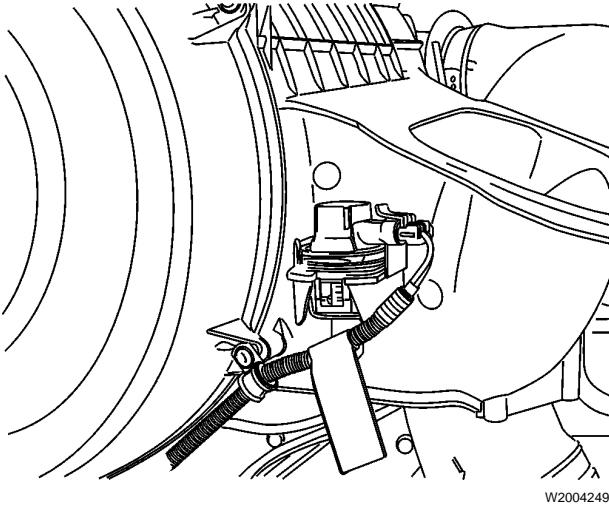
W2006005

**9**

Disconnect Discharge Recirculation Valve (DRV) air line, bypass hose clamp and remove the DRV housing and charge air pipe from the turbocharger.

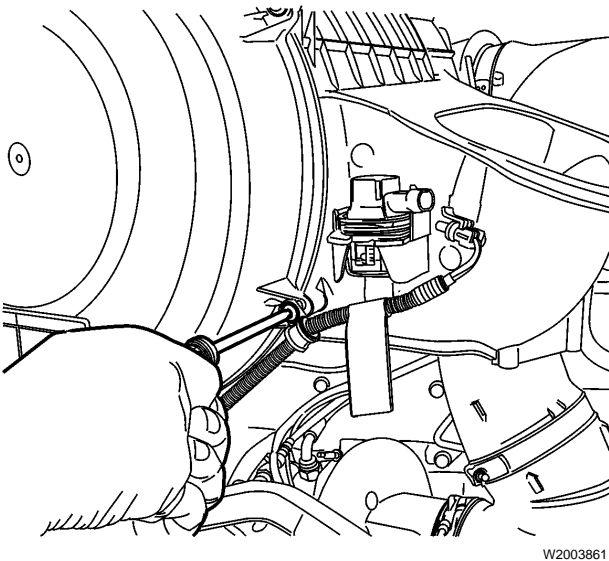
**10**

Remove the air filter housing by first disconnecting the air restriction gauge connector.



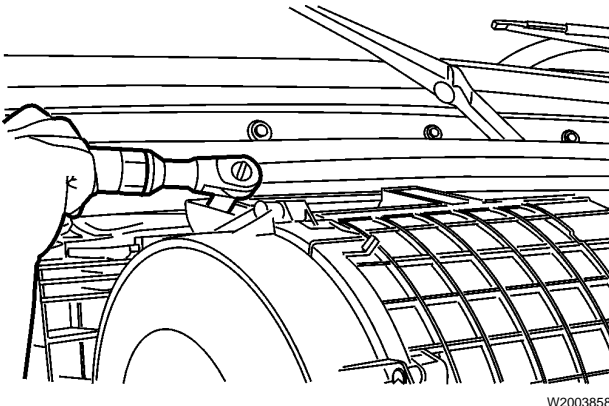
**11**

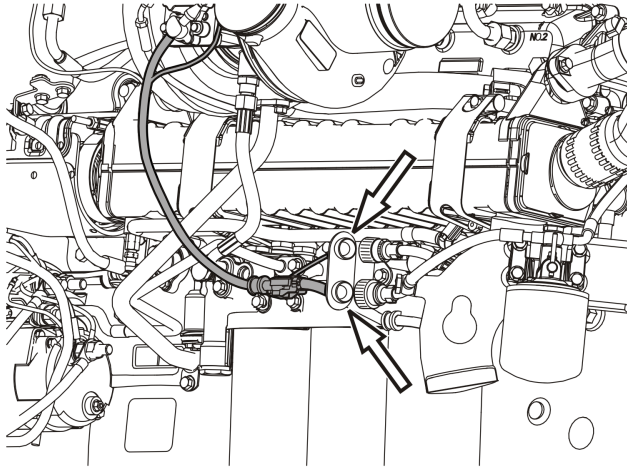
Remove the clamps securing the wiring harness to the air filter housing.



**12**

Remove the bolts at the top of the air filter housing and remove the housing assembly.

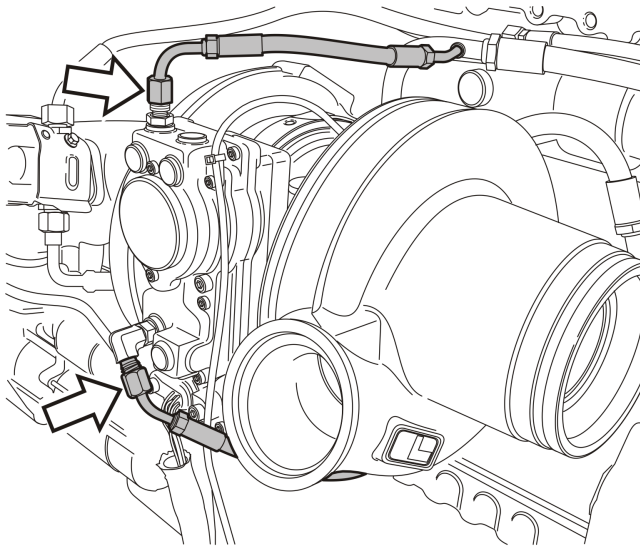




W2005620

**13**

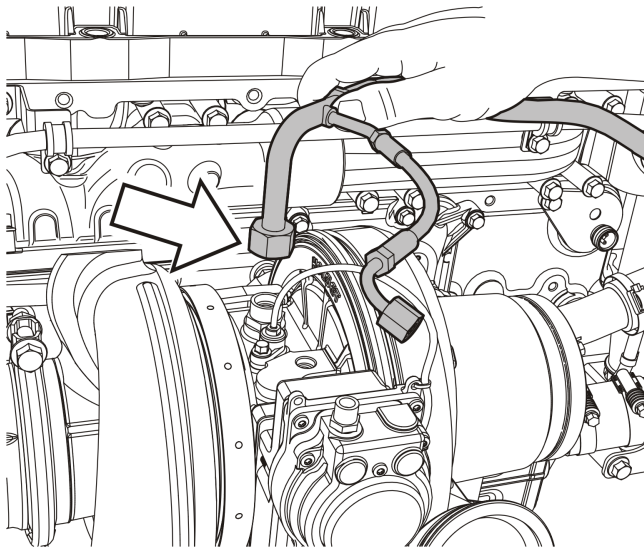
Release the actuator and turbocharger speed sensor wiring harnesses by cutting the nylon tie straps to free the harnesses. Disconnect the connectors located on the right side of the engine above the oil filter housing. Match mark the connectors for reassembly purposes.



W2005621

**14**

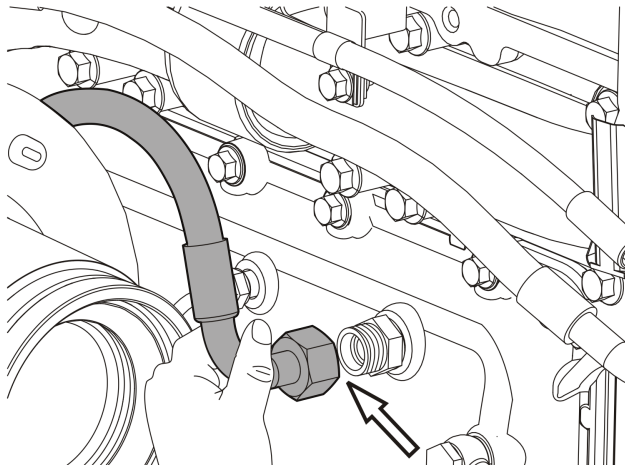
Disconnect the coolant inlet and outlet lines from the turbocharger actuator.



W2005622

**15**

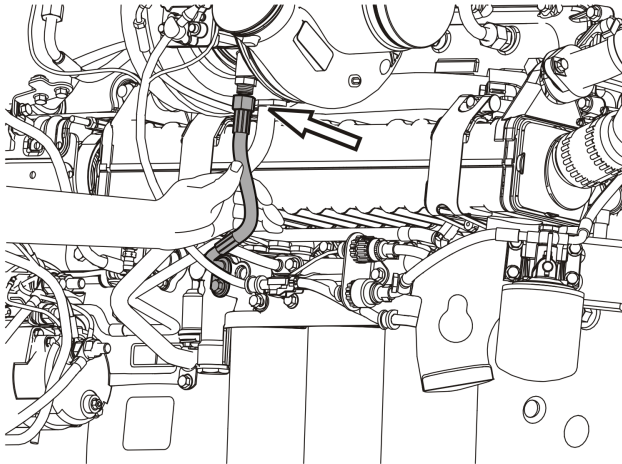
Disconnect the coolant line from the top of the turbocharger bearing housing.



W2005623

**16**

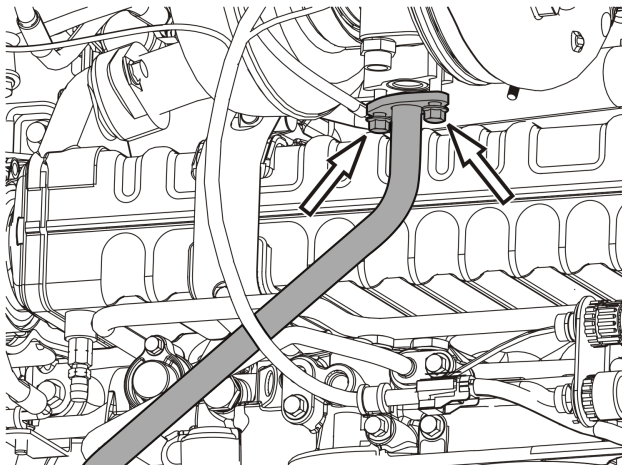
Disconnect the turbocharger coolant line that connects to the oil cooler cover.



W2005624

**17**

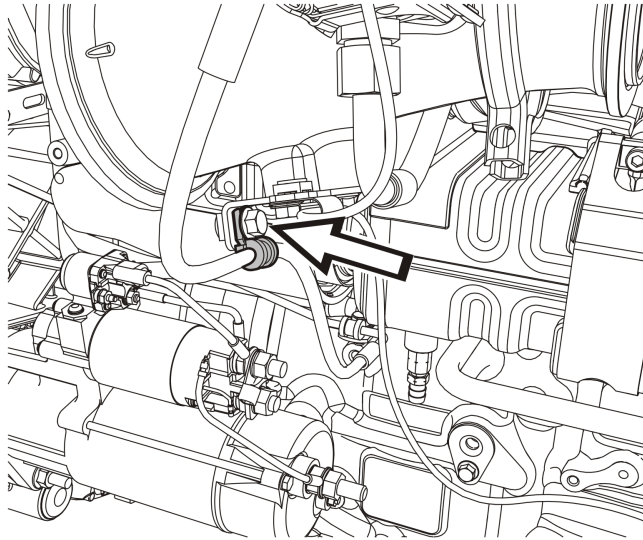
Disconnect the oil supply line that connects from the bottom of the turbocharger bearing housing to the oil filter housing.



W2005628

**18**

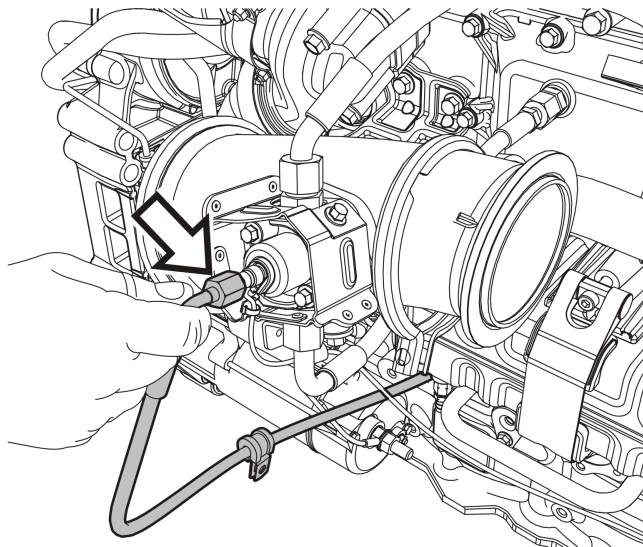
Remove the small capscrews securing the oil return/drain back pipe to the bottom of the turbocharger bearing housing and disconnect the pipe from the spacer block. Collect the spacer block. Discard the gasket and O-ring from the spacer block.



W2005657

**19**

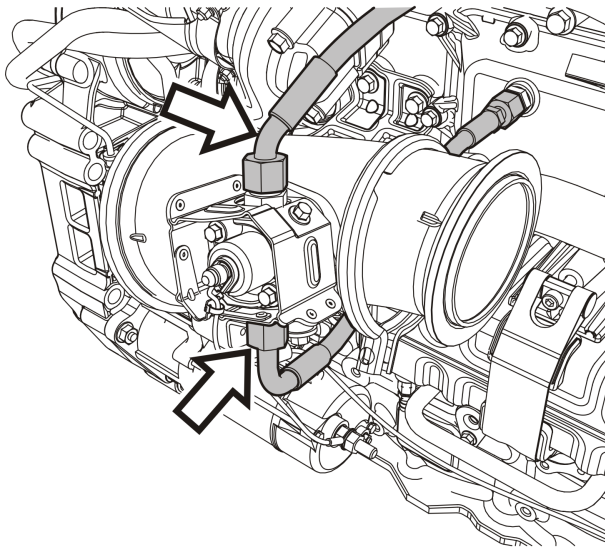
Remove the fuel line support clamp from the aftertreatment fuel injector. The clamp is located at the bottom of the exhaust pipe.



W2005656

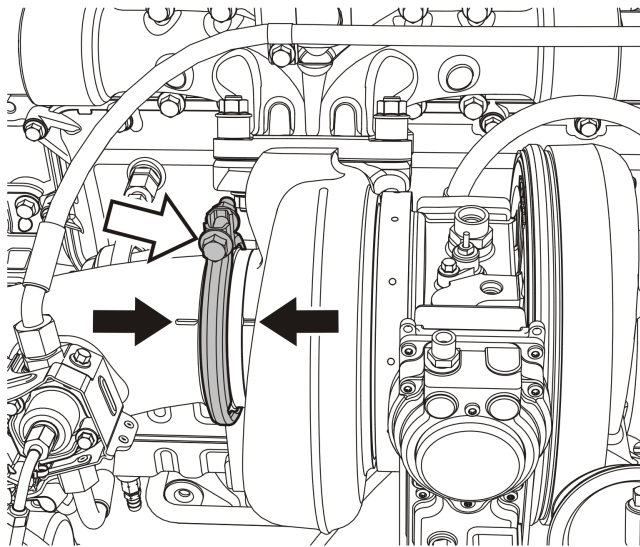
**20**

Remove the fuel line from the aftertreatment fuel injector.



**21**

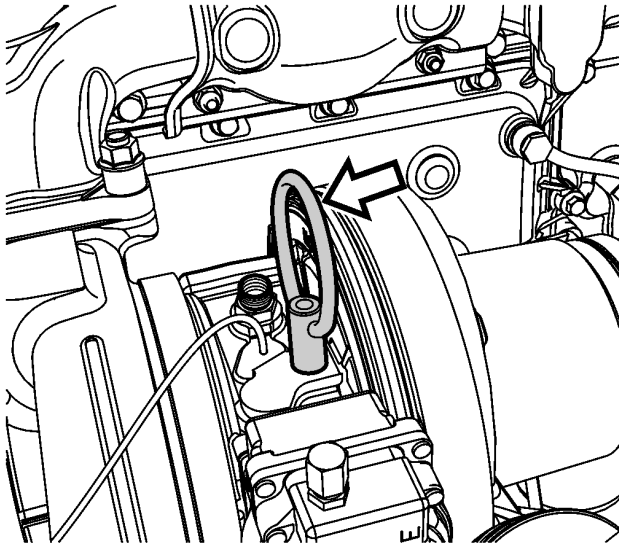
Remove the coolant inlet and outlet lines that connect to the aftertreatment fuel injector.



**22**

Loosen the diffuser clamp at the turbocharger and the clamp at the flex pipe. Disconnect the aftertreatment fuel injector from the wiring harness, cut the tie strap and remove the clamp. Remove the aftertreatment fuel injector assembly.



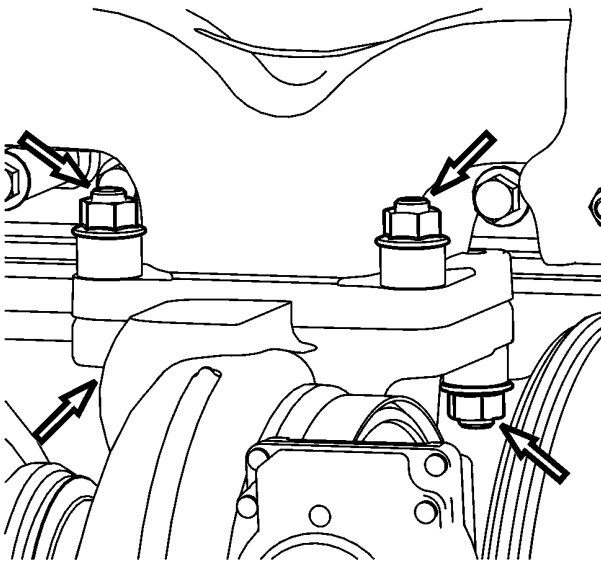


W2005042

**23**

Remove the bolt/plug at the top of the turbocharger bearing housing and install the turbocharger lifting tool into the threaded hole.

85108575



W2005011

**24**

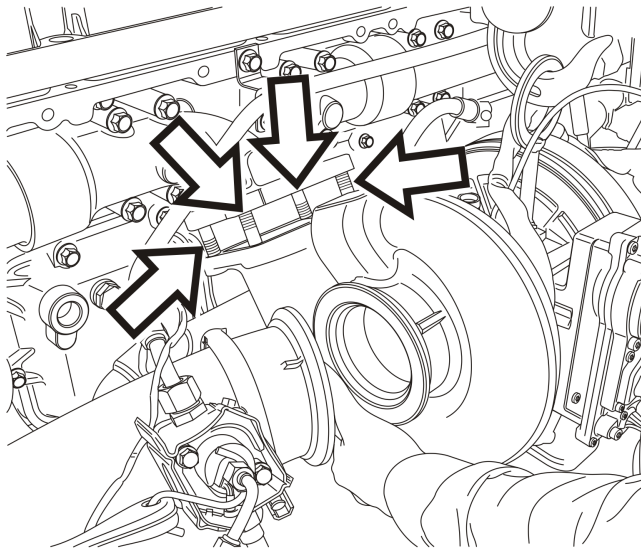
Support the weight of the turbocharger using a mobile floor crane such as OTC 16-1815 or equivalent, capable of safely lifting the weight of the turbocharger. Remove the turbocharger mounting nuts and spacers.



**WARNING**

The turbocharger is heavy and bulky. Be sure to use a crane to support the weight of the turbocharger. Failure to do so can result in the turbocharger suddenly falling and causing damage or serious personal injury.





W2005629

**25**

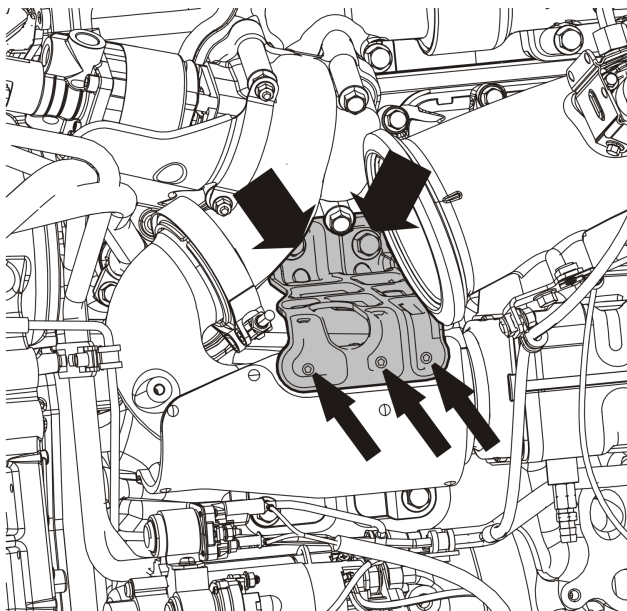
With the aid of an assistant, lower the turbocharger away from the exhaust manifold studs and remove it from the engine.

**26**

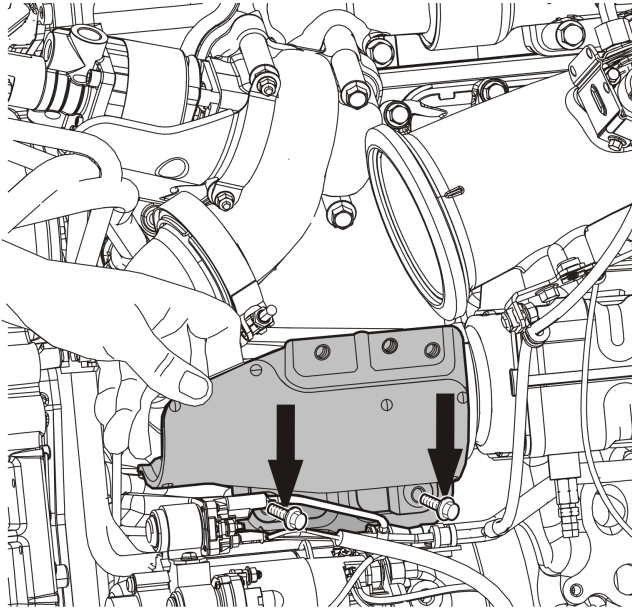
Place the turbocharger on a suitable support. Plug the turbocharger oil lines and outlet openings to prevent contamination. Install the cover on the turbocharger intake and exhaust openings to prevent foreign material from entering.

**27**

Remove the fasteners securing the upper portion of the EGR hot pipe shield and remove the shield.



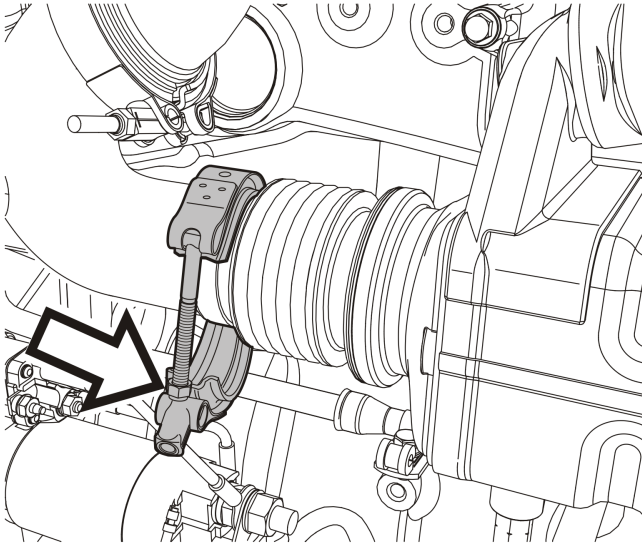
W2005686



W2005687

**28**

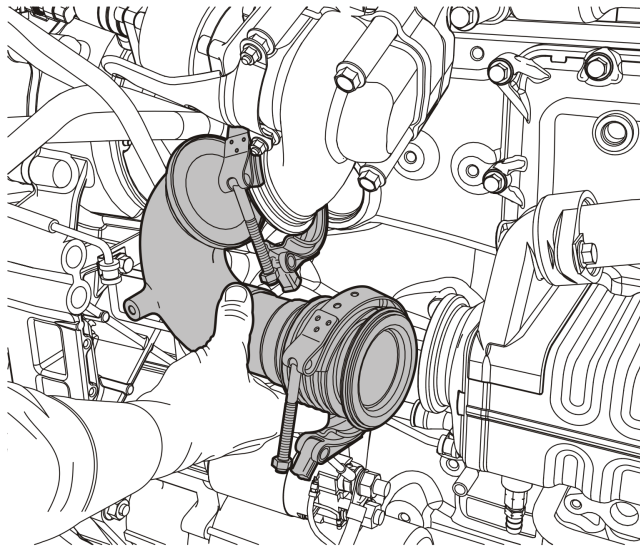
Remove the bolts securing the lower portion EGR pipe heat shield and remove the shield.



W2005642

**29**

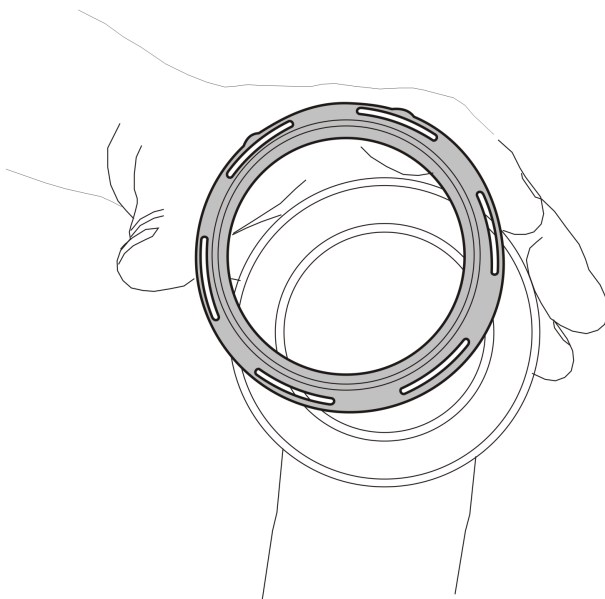
Loosen both high temperature V-clamps from the EGR hot pipe by removing the nuts from the T-bolts. Free the clamps from the EGR hot pipe flanges.



W2005641

**30**

Remove the EGR hot pipe from between the EGR valve and the EGR cooler.



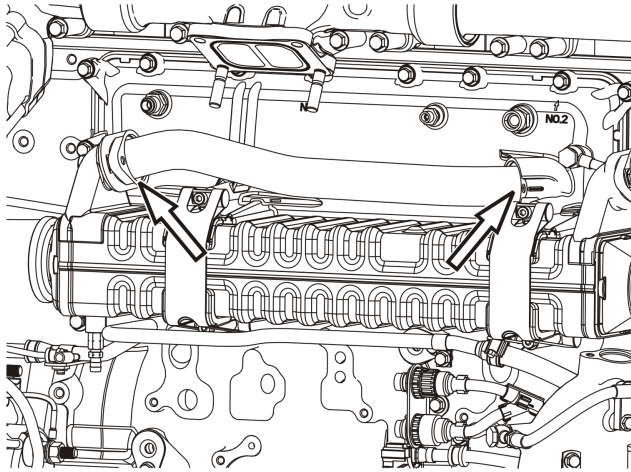
W2005688

**31**

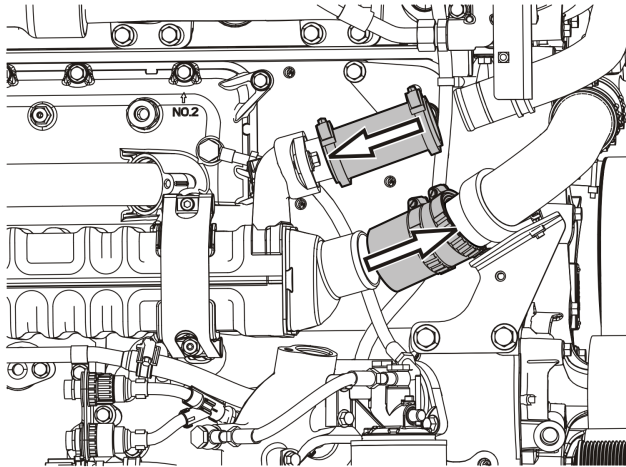
Remove the special high temperature gaskets from the EGR valve end of the hot pipe and the EGR cooler. Discard the gaskets.

**32**

Place a suitable drain pan under the EGR cooler. Open the drain fitting and allow the coolant to drain from the cooler.



W2005646



W2005647

**33**

Remove the capscrews securing the coolant hard pipe clamps at the oil cooler cover port and the EGR cooler and remove the clamps. Tie the straps out of the way.

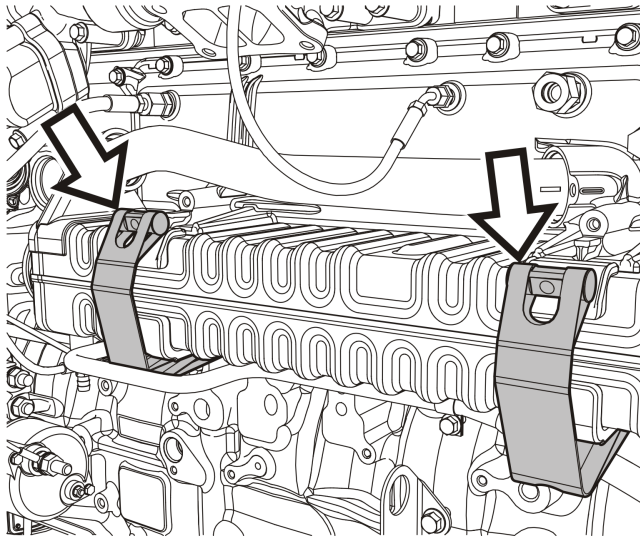
**34**

Remove the hose clamps and pipe retainer securing the coolant hose from the EGR cooler to the thermostat housing and slide the hose rearward. Remove the clamps securing the EGR cool gas hose to the venturi tube and slide the hose forward. Remove both hoses and discard.

**Note:** These hoses must not be reused.

**35**

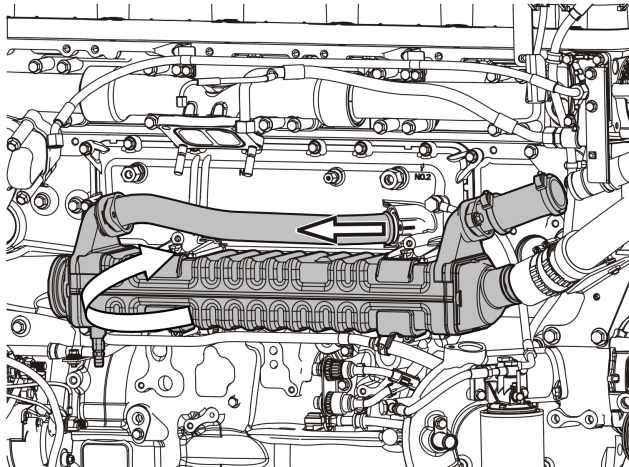
Remove the clamp bracket screws, hose clamp, retainer and then remove the static fill pipe.



W2005645

**36**

Disconnect the EGR cooler straps by removing the top bolts.



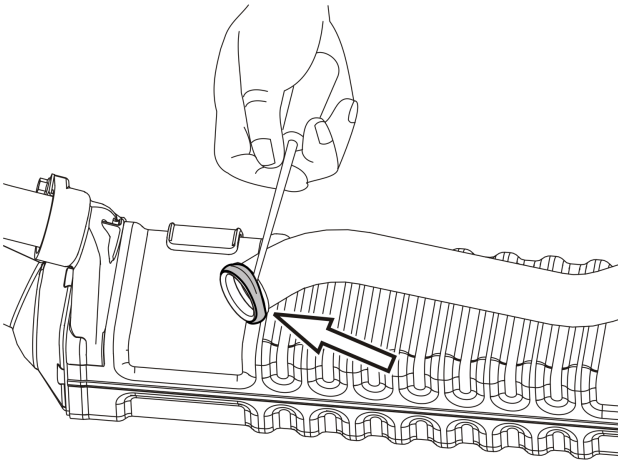
W2005658

**37**

Pull the EGR cooler outward and at same time, slide it backward to free the coolant supply pipe from the oil cooler cover. Remove the coolant supply pipe and remove the EGR cooler from the left side of the engine.

**38**

Using a small pick, remove the O-ring from both ends of the EGR cooler coolant supply pipe.



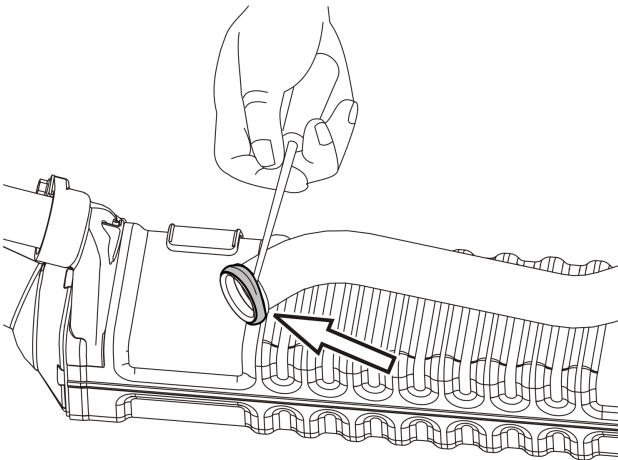
W2005659

## Installation

**Note:** The EGR cooler can require cleaning before installation.

**1**

Place a new O-ring seal on both ends of the EGR cooler hard pipe and lubricate with a coating of fresh antifreeze, or liquid soap. Slide the coolant pipe into the top port of the EGR cooler. Make sure the O-ring on the coolant pipe is not pinched during installation.

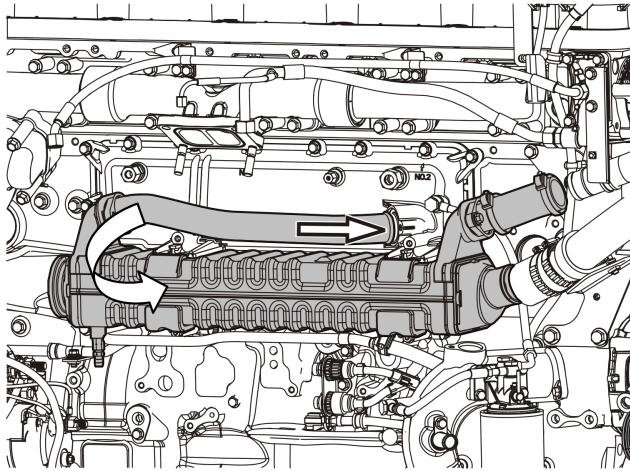


W2005659

**2**

Slide new coupling hoses on the EGR cooler coolant return and exhaust gas outlet pipes. Place the hose clamps in position over the hoses. Do not tighten at this time.

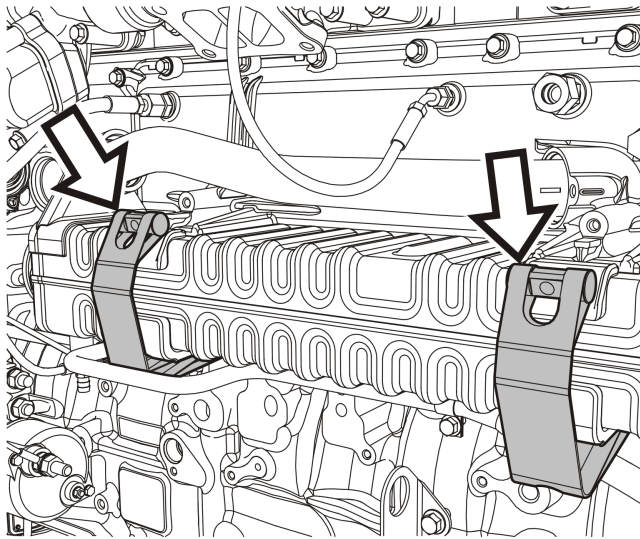




W2005660

**3**

Position the EGR cooler onto the cast brackets located on the oil cooler cover and at same time, slide it forward to connect the coolant supply pipe with the oil cooler cover coolant port. Make sure the O-ring on the coolant supply pipe is not pinched during installation.



W2005645

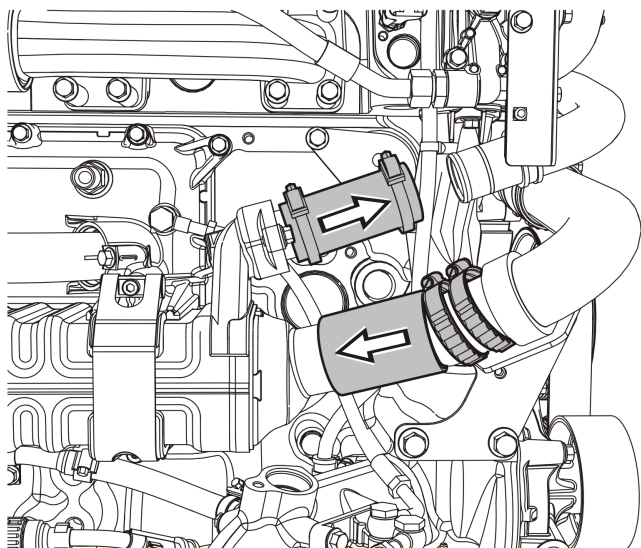
**4**

Install the EGR cooler strap bolts and hand tighten.

**5**

Torque-tighten the EGR strap bolts located at the top to  $12 \pm 1$  Nm ( $106 \pm 9$  in-lb).

$12 \pm 1$  Nm  
( $106 \pm 9$  in-lb)



W2005648

**6**

Slide the new EGR cool gas hose to the venturi pipe rearward to its original position. Secure the hose with the original clamps tightened securely.

**Note:** It is important to install new hoses at both locations for the EGR cooler.

**7**

Lubricate and install a new O-ring at the bottom end of the static fill pipe. Place the pipe in position and install the clamp bracket and retainer screws. Tighten to  $24 \pm 4$  Nm ( $18 \pm 3$  ft-lb). Tighten the hose clamp securely.

---

$24 \pm 4$  Nm  
( $18 \pm 3$  ft-lb)

**8**

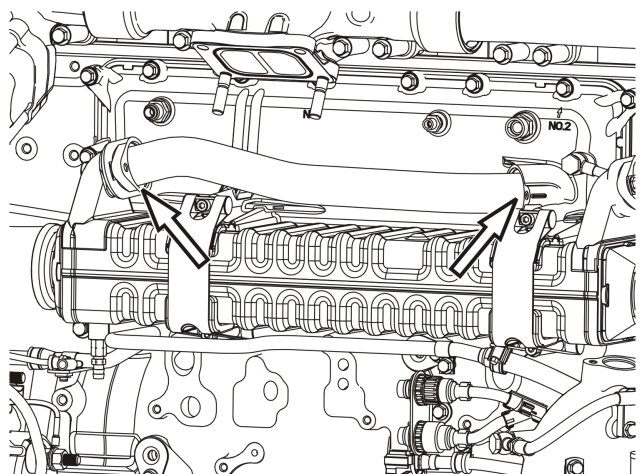
Install a new hose and O-ring on the EGR cooler coupling adapter. Lubricate the O-ring, place the clamps in position over the hose and install the adapter. Install the retainer and tighten the clamps securely.

**9**

Install the coolant supply pipe clamps at the oil cooler cover port and the EGR cooler port. Install the capscrews securing the clamps and tighten to  $24 \pm 4$  Nm ( $18 \pm 3$  ft-lb).

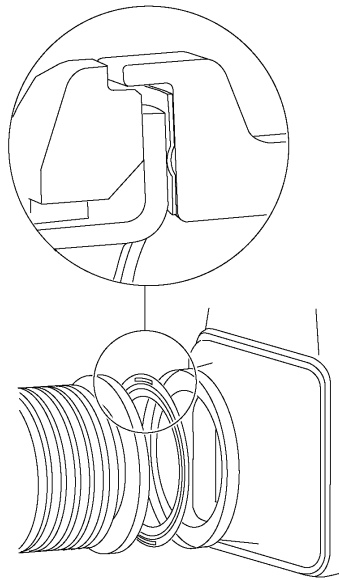
---

$24 \pm 4$  Nm  
( $18 \pm 3$  ft-lb)

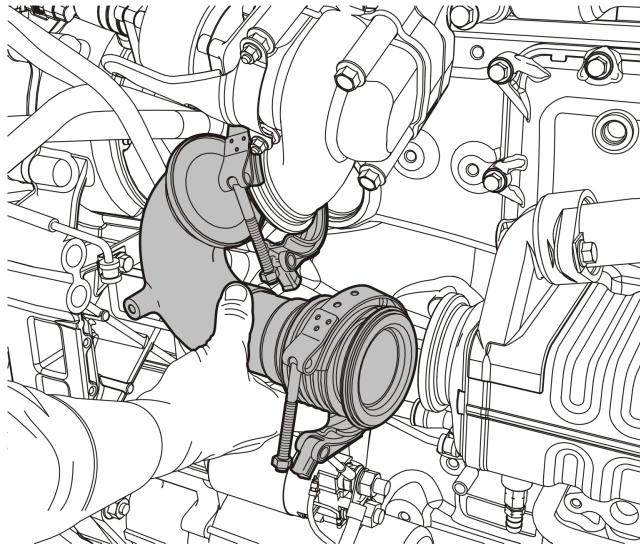


W2005646





W2006187



W2005641

**10**

Install new special high temperature gaskets into the EGR valve end of the hot pipe and the inlet of the EGR cooler. Make sure the gaskets lay flat against the flange surfaces with the bead of the gasket facing toward the hot pipe.

**11**

Inspect the V-clamps and T-bolt threads for wear or damage. If they are OK, lubricate the V-inserts of the clamps.

**12**

Hook the upper V-clamp over the EGR valve flange. Next, place the remaining V-clamp over the bellows on the hot pipe.

**13**

Lubricate the flange on the EGR cooler inlet and the flange on the EGR hot pipe with engine oil. Lubrication aids in V-clamp installation.

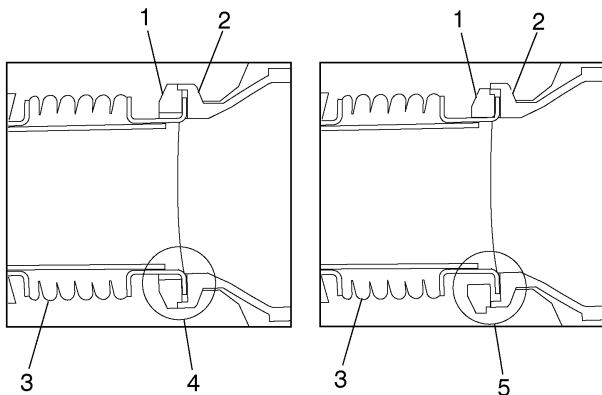
**14**

Position the EGR hot pipe between the EGR valve and the EGR cooler. Make sure the flanges engage properly. While holding the hot pipe in position, slide the upper V-clamp over the flange and tighten until snug. Next, slide the lower V-clamp over the flange of the EGR cooler and tighten the clamp until snug.

**15**

Visually inspect the floating flange through the gap in the V-clamp to make sure it is properly seating in the EGR cooler flange. The floating flange must be concentric with the EGR cooler flange.

**Note:** If the floating flange is not properly seated in the EGR cooler flange, the gasket will not be compressed and the seal will leak.



W2006163

- 1 EGR Pipe Floating Flange
- 2 EGR Cooler Flange
- 3 EGR Pipe
- 4 Flange Assembled Correctly
- 5 Flange Assembled Incorrectly

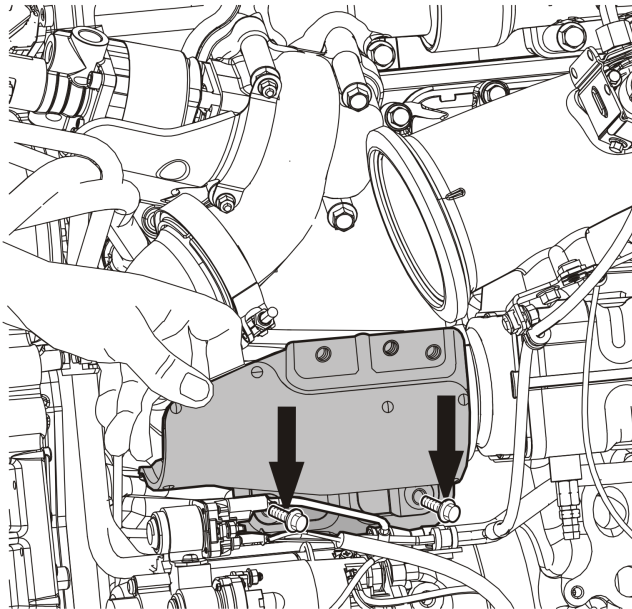
**16**

Position the V-clamps so that the T-bolts clear both heat shields. Apply anti-seize to the threads of the T-bolts and tighten to specification.

**Note:** After reaching the specified torque, inspect the V-clamps to make sure that no portion of the clamp has "bottomed out."

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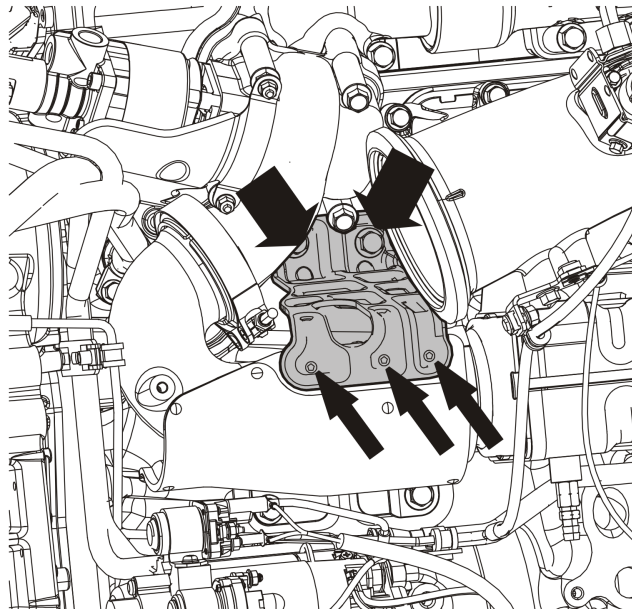
20 ± 3 Nm  
(15 ± 2 ft-lb)



W2005687

**17**

Position the lower portion of the EGR valve heat shield over EGR hot pipe and secure with bolts. Do not tighten at this time.



W2005686

**18**

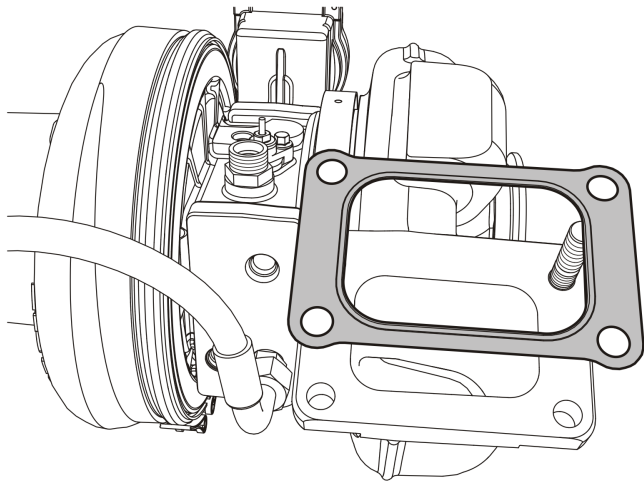
Position the upper portion of the EGR hot pipe shield and install the fasteners to secure the shield to the cylinder block. Tighten the fasteners to specification.

**19**

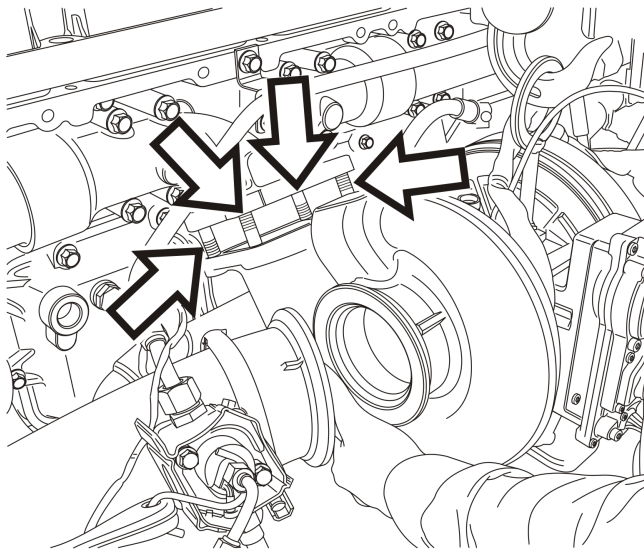
Clean the contact surface on the exhaust manifold and the oil return/drain back pipe and spacer block.

**20**

Remove the plugs from the turbocharger oil lines. Remove the covers used on the turbocharger intake and exhaust openings.



W2005636



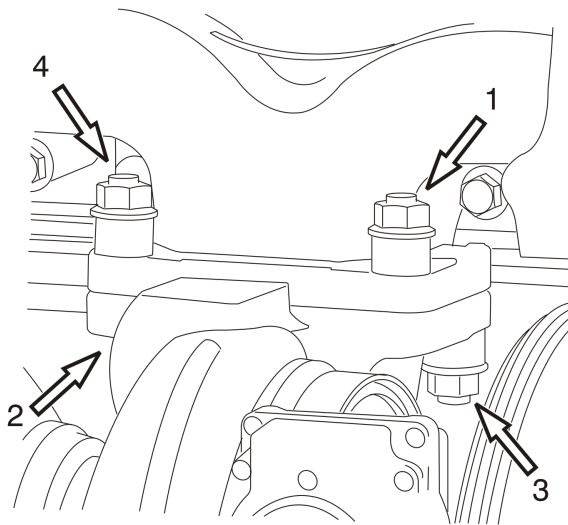
W2005629

**21**

Replace the turbocharger metal gasket and install it onto the two studs of the turbocharger exhaust opening.

**22**

Support the weight of the turbocharger using a mobile floor crane such as OTC 16-1815 or equivalent crane capable of safely lifting the weight of the turbocharger. With the aid of an assistant, position the turbocharger against the exhaust manifold and align the two studs of the turbocharger with the two studs of the exhaust manifold.



W2005206

**23**

Install the turbocharger flange nuts and spacers to the exhaust manifold and torque-tighten to the specification of 135 Nm (100 ft-lb). Nuts should be tightened in the sequence shown.

**Note:** Apply anti-seize compound to the threads and under the heads or contact surfaces of the fasteners. Anti-seize helps prevent fastener oxidation corrosion and reduces friction to help achieve the intended clamp load on the component when tightening the fasteners to specification.

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135 Nm  
(100 ft-lb)

**24**

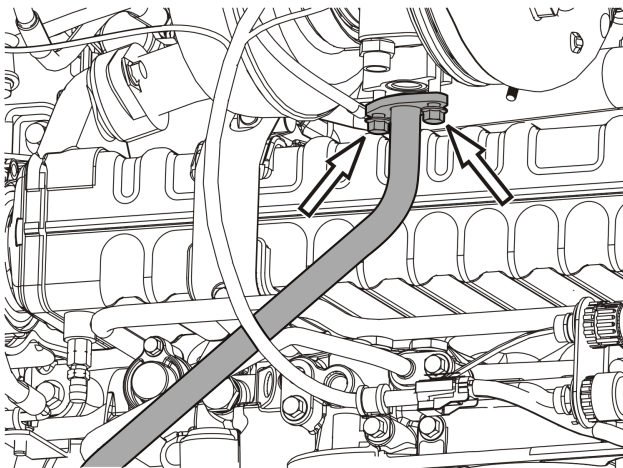
Remove the hoist and turbocharger lifting tool. Reinstall the bolt/plug in the threaded hole.

**25**

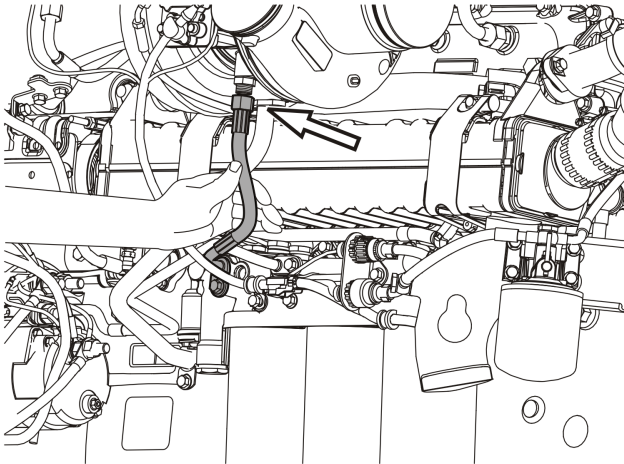
Position a new lubricated O-ring and gasket on the oil return/drain back spacer block and install the turbocharger oil return/drain back pipe with spacer to the bottom of the turbocharger. Secure using the two small capscrews. Torque-tighten the capscrews to  $24 \pm 4$  Nm ( $18 \pm 3$  ft-lb).

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$24 \pm 4$  Nm  
( $18 \pm 3$  ft-lb)



W2005628



W2005624

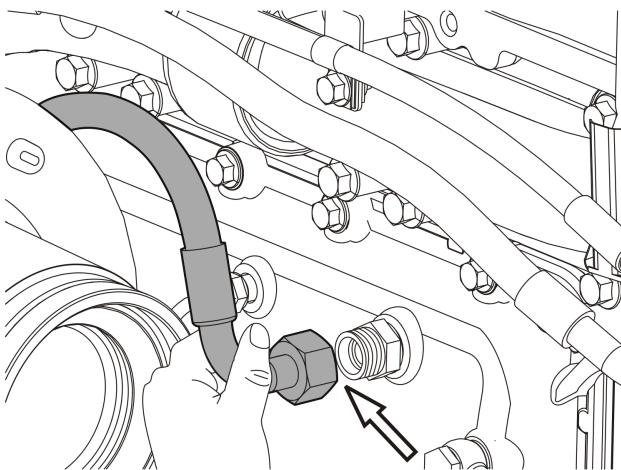
**26**

Install the turbocharger oil supply line to the bottom fitting of the bearing housing and tighten the fittings.



**CAUTION**

Before starting the engine after turbocharger replacement, make sure the turbocharger is pre-filled with clean engine oil. Starting the engine without oil pressure and a "dry" turbocharger can damage the turbocharger bearings.

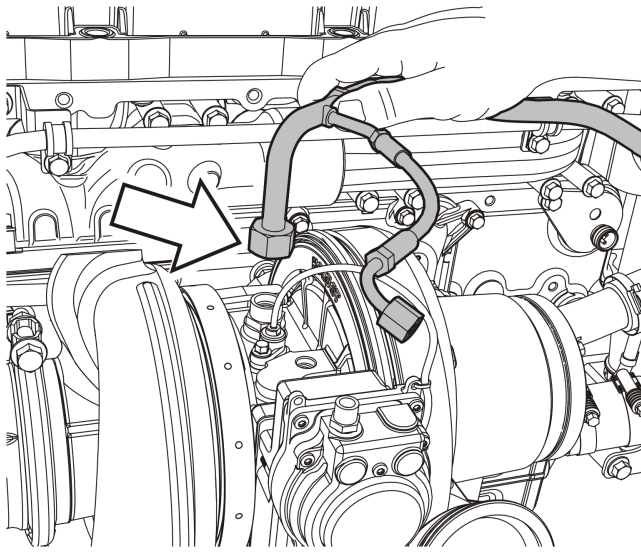


W2005623

**27**

Install the coolant line that connects from the rear of the turbocharger to a fitting on the oil cooler and tighten the fitting.

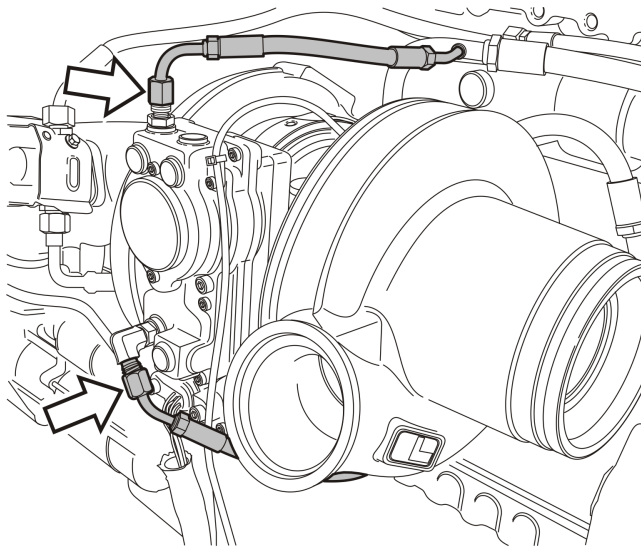




W2005622

**28**

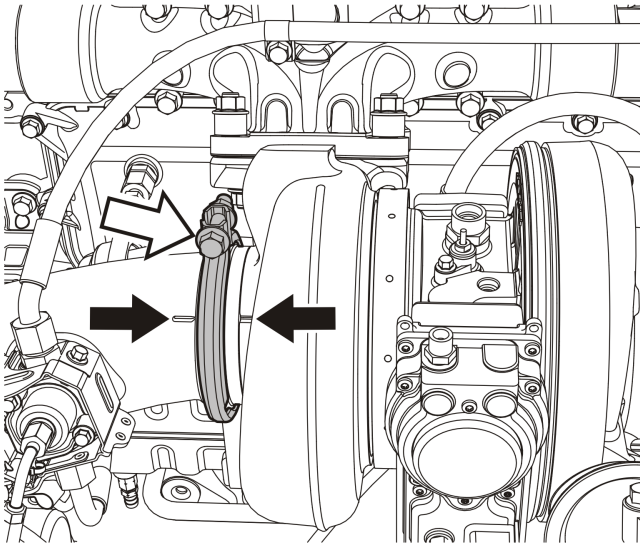
Install the coolant line that connects to the fitting at the top of the turbocharger bearing housing and tighten the fitting. This coolant line also branches off the turbocharger actuator top coolant fitting.



W2005621

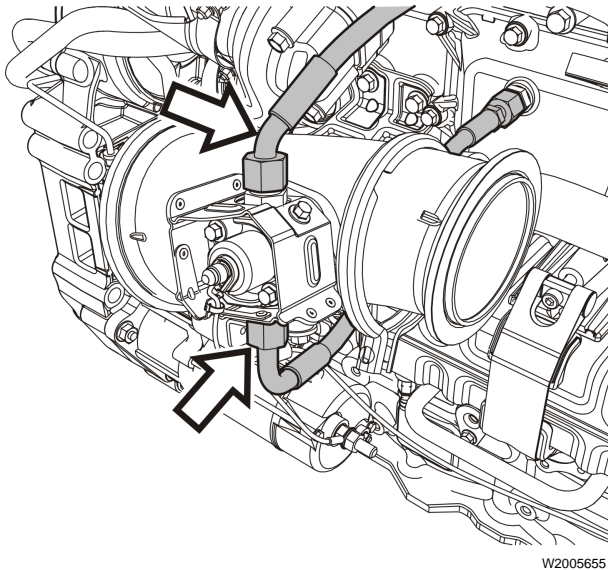
**29**

Install the coolant lines that connect to the fittings at the top and bottom of the turbocharger actuator and tighten the fittings.



**30**

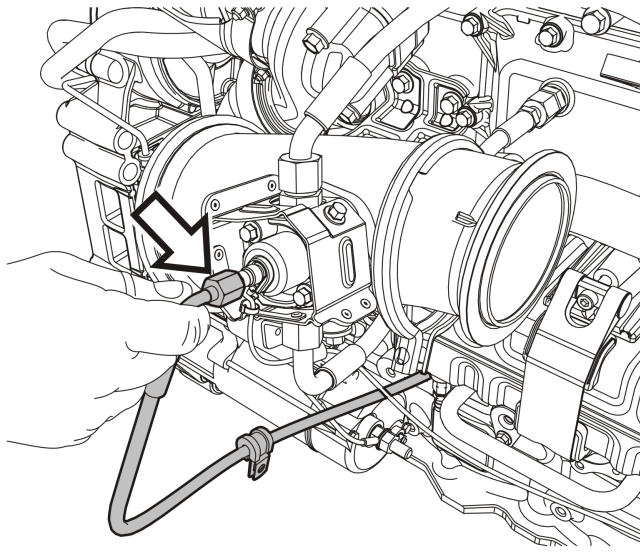
Place the diffuser and exhaust pipe assembly in position between the turbocharger and flex pipe. Install a new clamp from the exhaust pipe to the turbocharger. Align the cast in marks on the exhaust pipe with the turbocharger and tighten the clamp to secure. Tighten the flex pipe clamp to specification.



**31**

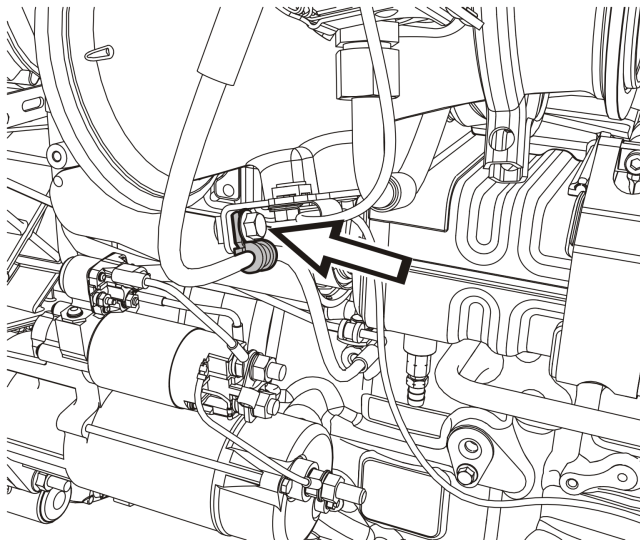
Install the coolant inlet and outlet lines that connect to the aftertreatment fuel injector.





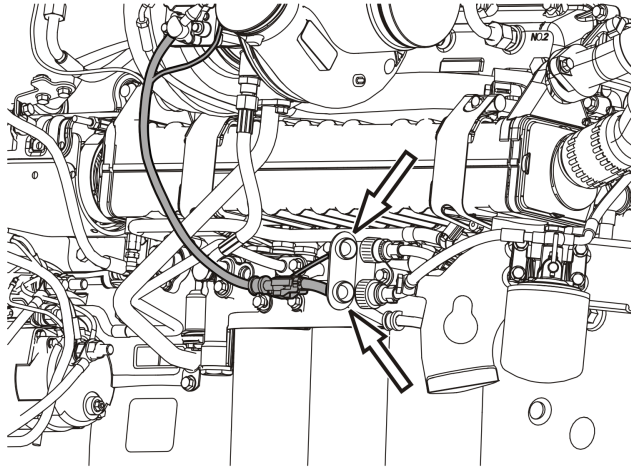
**32**

Install the fuel line onto the aftertreatment fuel injector.



**33**

Install the fuel line support clamp onto the aftertreatment fuel injector. The clamp is located at the bottom of the exhaust pipe.



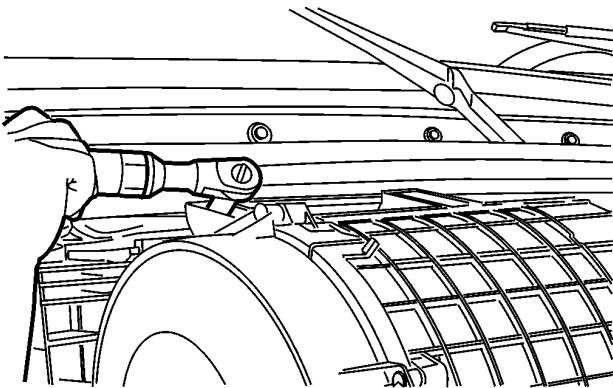
W2005620

**34**

Reconnect the turbocharger actuator, turbocharger wheel speed sensor and aftertreatment fuel injector wiring harness. Make sure the connectors are reconnected in the same positions as marked at disassembly and position the connector with the flat side toward the flat in the bracket. Reinstall the cable clamp on the oil filter housing and using the proper high temperature ties, secure the wiring harness to itself and the turbocharger drain pipe.

**35**

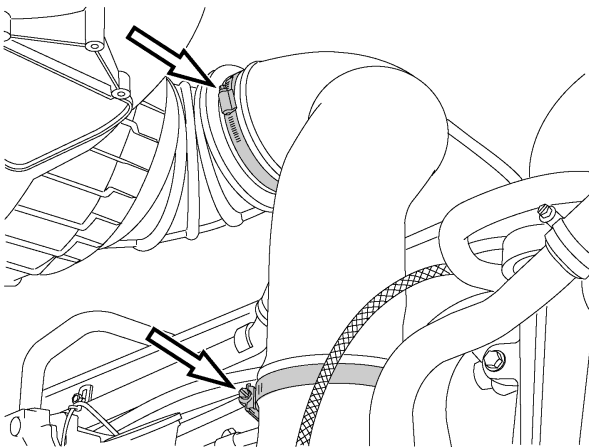
Position the filter housing against the cab. Install the two bolts at the top of the air filter housing.



W2003858

**36**

Place the main fresh air pipe between the air cleaner and the turbocharger inlet elbow, and tighten the clamps. Connect the air compressor hose to the main fresh air pipe and tighten the clamp.



W2006005

**37**

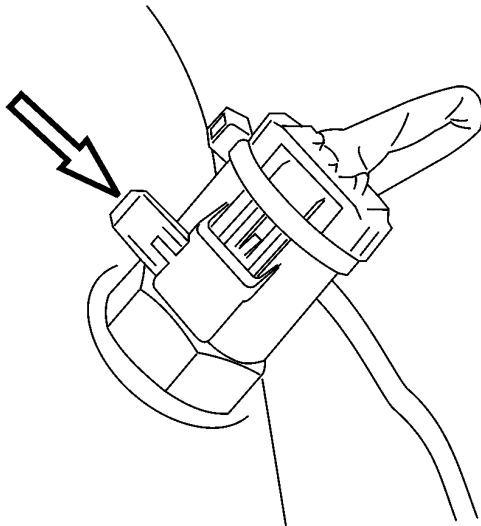
Inspect the charge air inlet pipe clamps for damage and replace if necessary. Install new O-rings, lubricate the clamps and install the charge air cooler inlet pipe (with DRV).

**38**

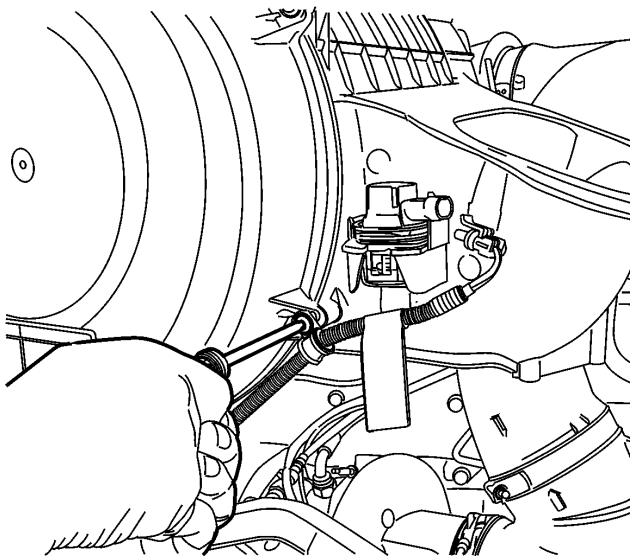
Install the air temperature sensor connector to the sensor. Insert the connector lock tab, push in place and secure with a tie strap. Also, install the P-clamp securing the temperature sensor harness to the fresh air pipe for the turbocharger. Tighten the clamp bolt to  $8 \pm 1.2$  Nm ( $6 \pm 1$  ft-lb).

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$8 \pm 1.2$  Nm  
( $6 \pm 1$  ft-lb)



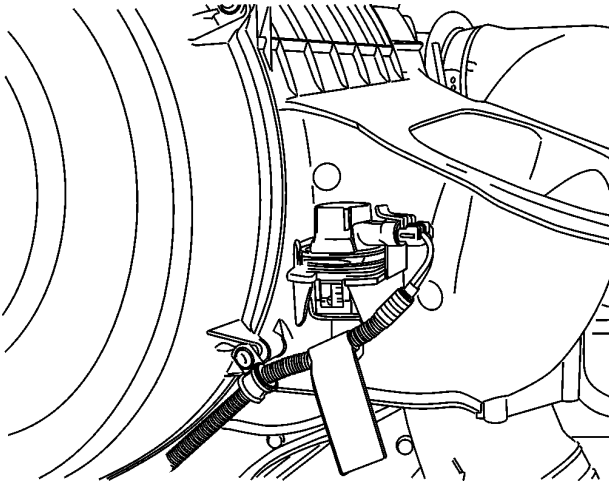
W2004720



W2003861

**39**

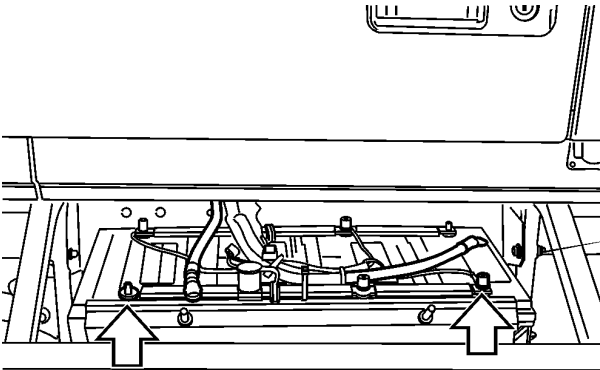
Install the filter restriction gauge wiring harness to the air filter housing and tighten the clamps.



W2004249

**40**

Connect the air restriction gauge electrical harness connector.



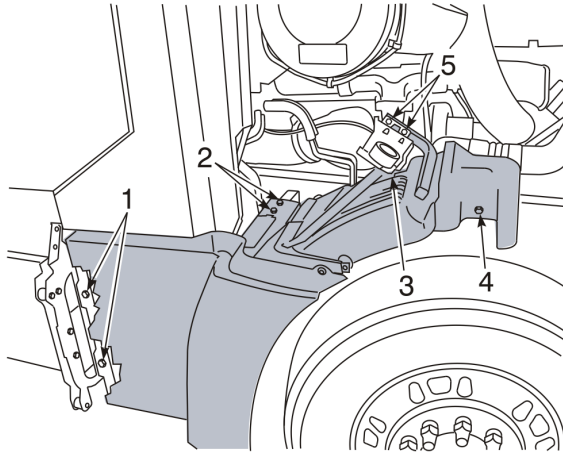
W2003815

**41**

Install all previously removed cables to the ground (negative) battery terminals.

**42**

Install the inner splash guard assembly.



W2005189

- |  |   |
|--|---|
| 1-Two (2) fender extender bolts [rear, at bracket]             | 4-One (1) splash guard bolt [lower, to frame] |
| 2-Two (2) fender extender bolts [at brace]                     | 5-Two (2) splash guard bolts [upper brace]    |
| 3-One (1) fender extender brace at hood release [bolt and nut] |   |

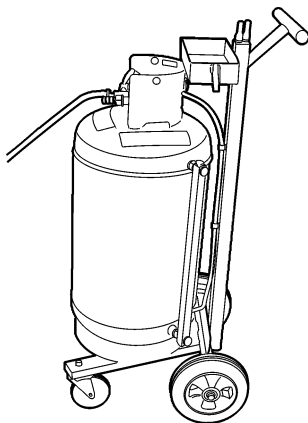
**43**

Check the engine oil level and replenish as necessary with approved engine oil.

**44**

Using the coolant extractor, fill the system with approved coolant per specification.

DBT2V700



W2004191

**45**

Due to the Engine Electronic Control Unit (EECU) self learning capability, it is necessary to reset learned EECU parameters after servicing some engine related components. This allows the EECU to learn the new components behavior. After servicing is complete, perform the "Learned Data Reset" using the PC tool. This is located in the Function Group 1 menu.

**46**

Start the engine, check for leaks and proper operation. After shutdown, replenish fluids as necessary.