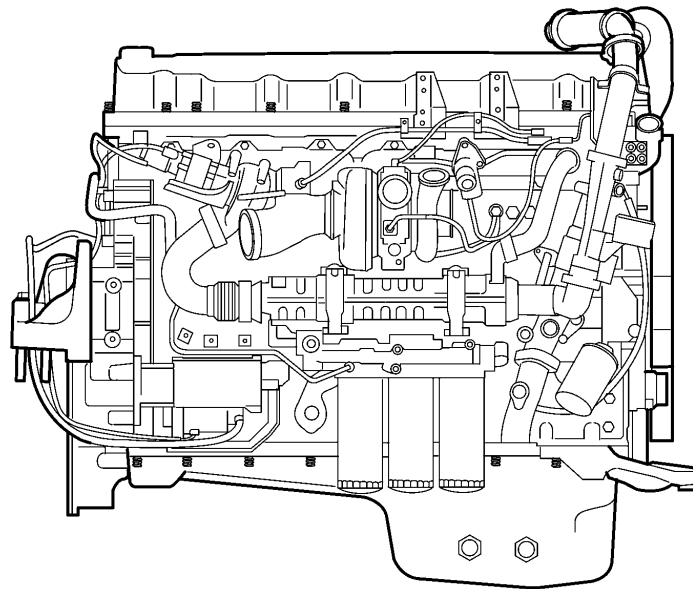


Date	Group	No.	Page
2.2007	215	46	1(25)

Timing Gear Cover
Replacement
D13F

Timing Gear Cover, Replacement



W2005779

This information covers replacement of the timing gear cover on a Volvo D13F engine.

Contents

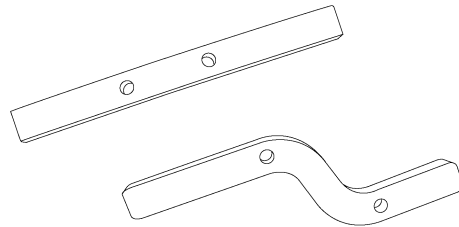
- "Special Tools" page 2
- "Timing Gear Cover, Replacement" page 3

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.

Tools

Special Tools

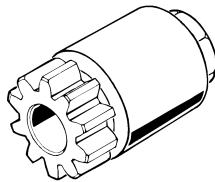
For special tool ordering instructions, see tool information in group 08.



W2006190

85111422A/B

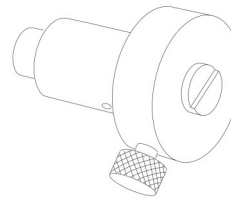
Timing Cover Clamp Tools



T0012612

88800014

Flywheel Turning Tool



W0002268

88800031

Sensor Depth Gauge

Service Procedures

2151-03-02-02

Timing Gear Cover, 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 the procedure.

Special tools: 85111422A, 85111422B, 88800014, 88800031

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.

3

Remove inner splash guard as an assembly.

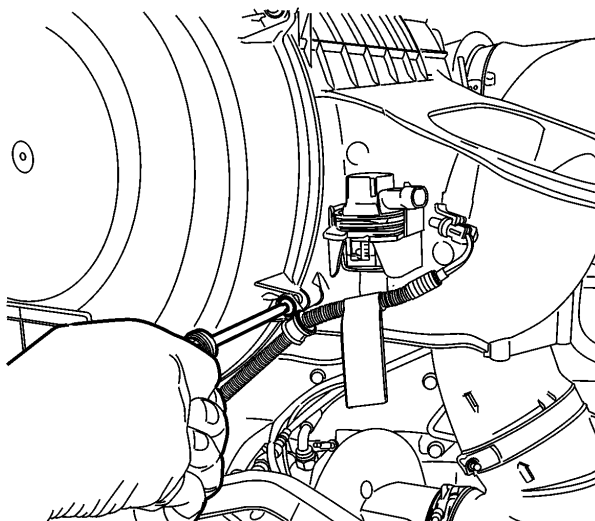
Note: Some models may be equipped with fender extenders, attached to the inner splash guard. Remove these as an assembly.

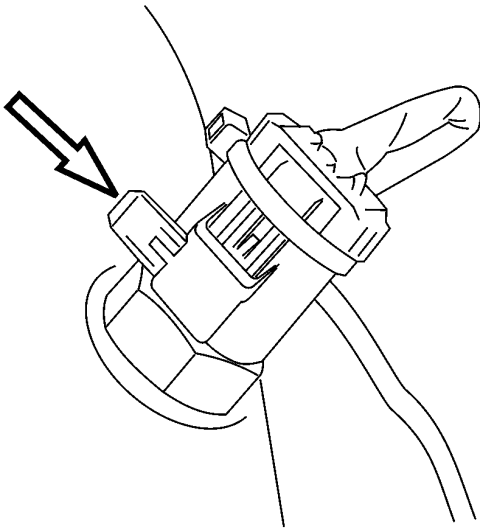
4

Remove engine cover.

5

Disconnect and remove the air filter restriction gauge wiring harness from air filter housing.

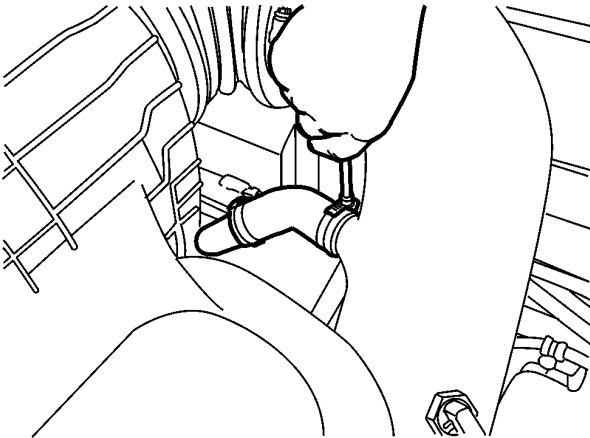




W2004720

6

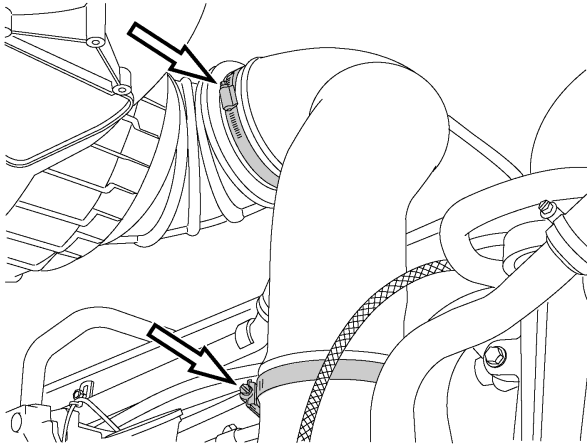
Unplug the air temperature sensor wiring harness connector. Remove the lock tab and separate the connector from the sensor. Remove the clamp from the main fresh air pipe.



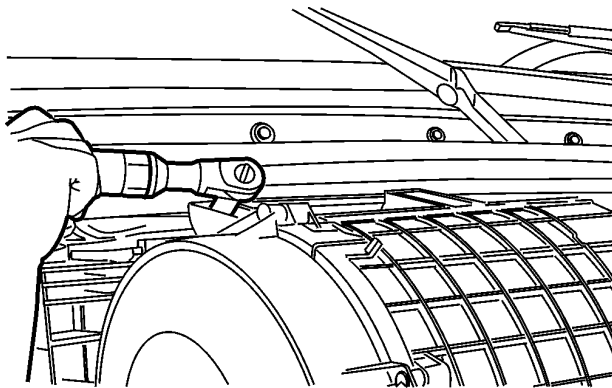
W2004719

7

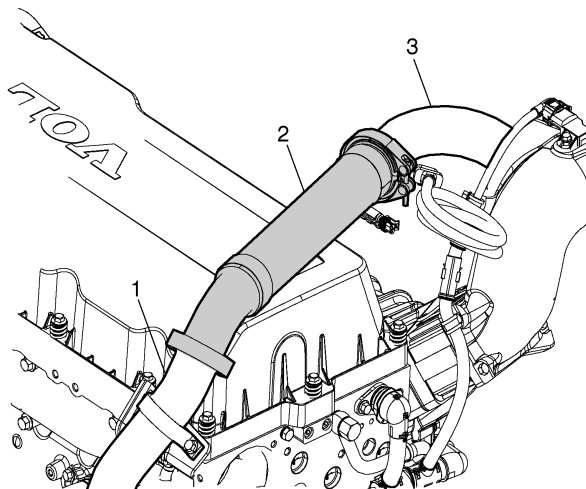
Loosen the air compressor fresh air hose clamp at the main fresh air pipe.



W2006005



W2003858



W2005960

8

Loosen the clamps and remove the main fresh air pipe clamp from the air compressor fresh air hose, the air filter housing and the turbocharger air inlet elbow.

9

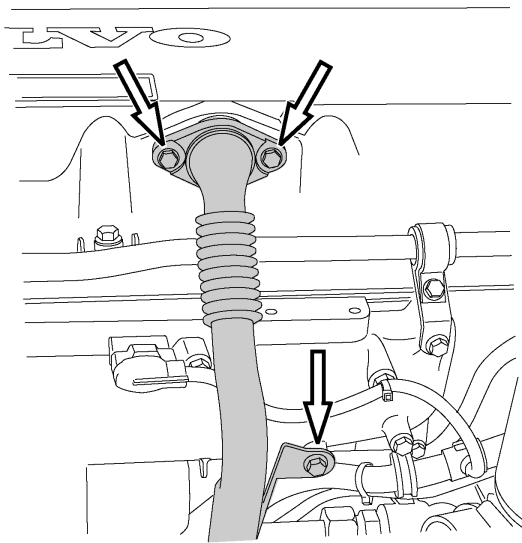
Remove the fasteners and lift the air filter housing away from the cab.

10

Loosen the V-clamps and remove the EGR crossover pipe.

11

Loosen the clamp and mounting brackets to allow air compressor fresh air pipe to be removed.



W2006122

12

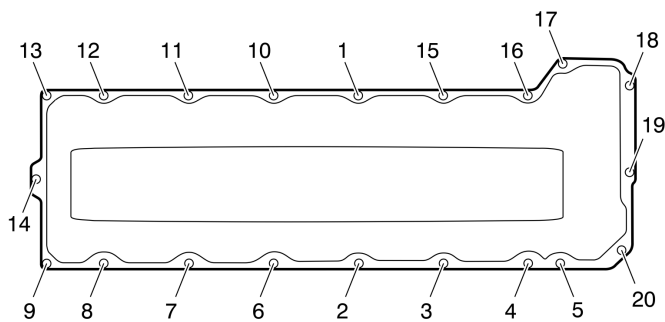
Remove the fasteners which secure crankcase ventilation tube and bracket to valve cover and intake manifold. Relocate the tube away from the manifold.

13

Remove the hydrocarbon (aftertreatment fuel) injector harness clips at the valve cover.

14

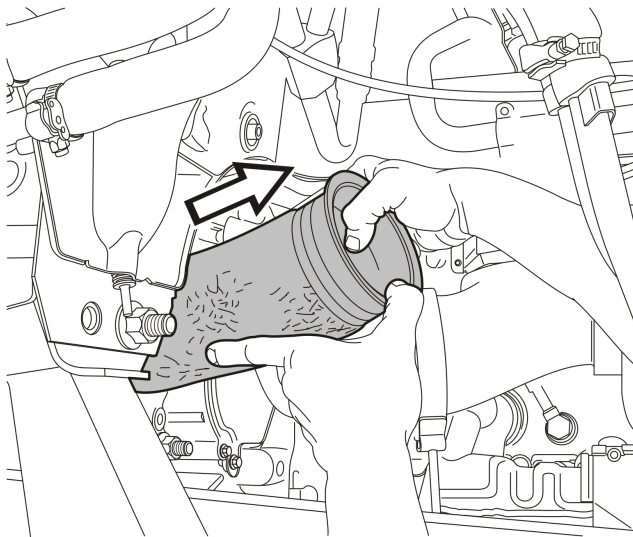
Remove the spring-loaded bolts from the valve cover.



T2022732

15

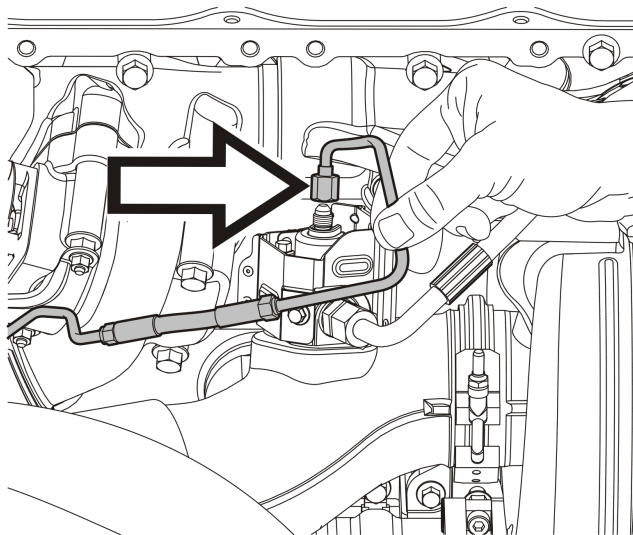
Lift and remove the valve cover.



W2005952

16

Remove the exhaust pipe from between the diffuser pipe and the Diesel Particulate Filter (DPF) muffler inlet pipe. Lift the pipe over the diffuser and out from under the cab.



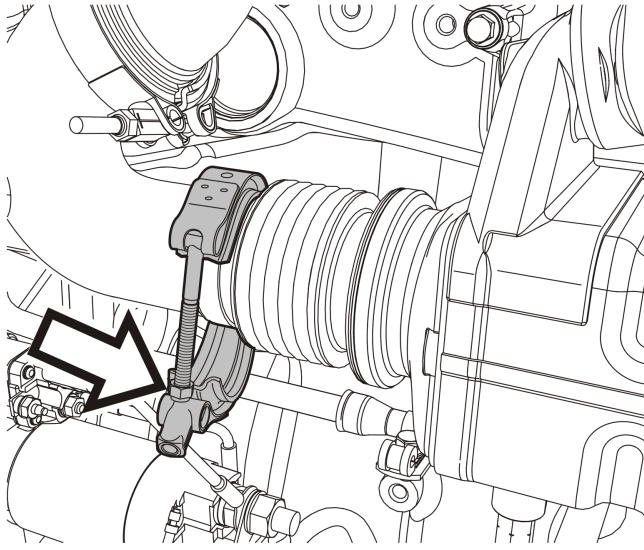
W2005951

17

Remove the fuel line from the hydrocarbon (aftertreatment fuel) injector.

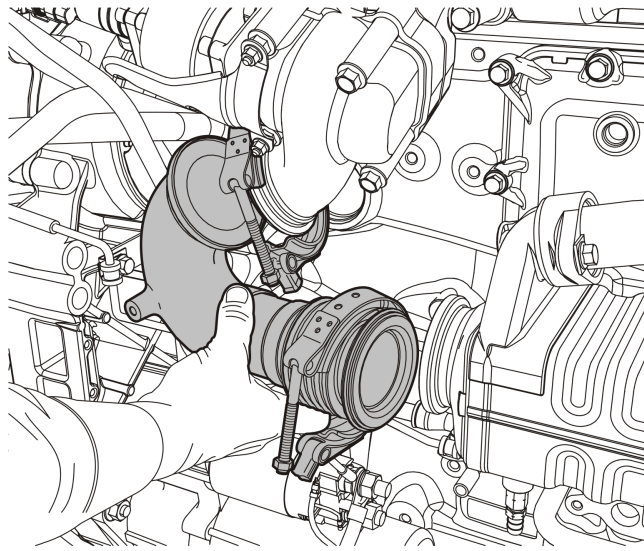
18

Remove the fasteners securing the hydrocarbon injector fuel line to the EGR valve heat shield.



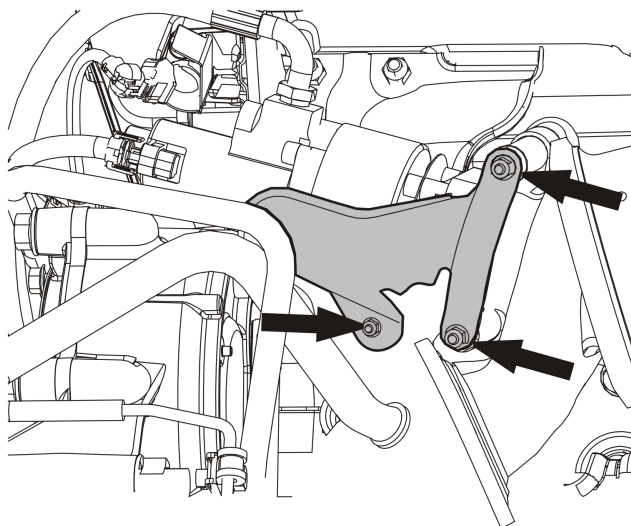
19

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



20

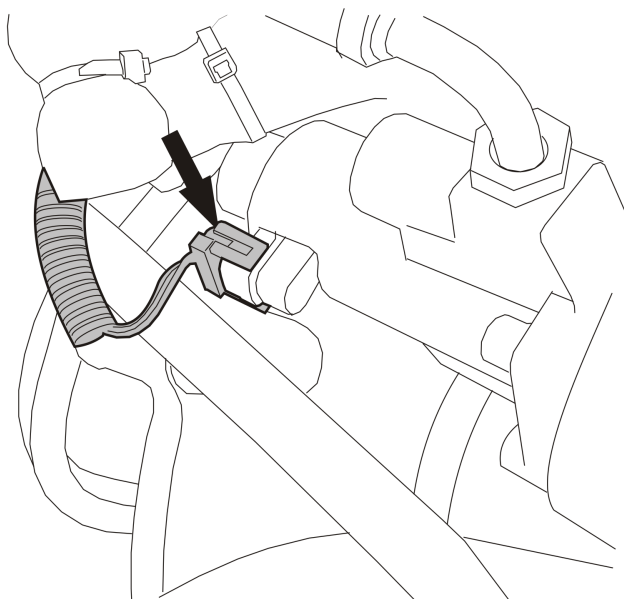
Remove the EGR hot pipe from between the EGR valve and the EGR cooler.



W2005685

21

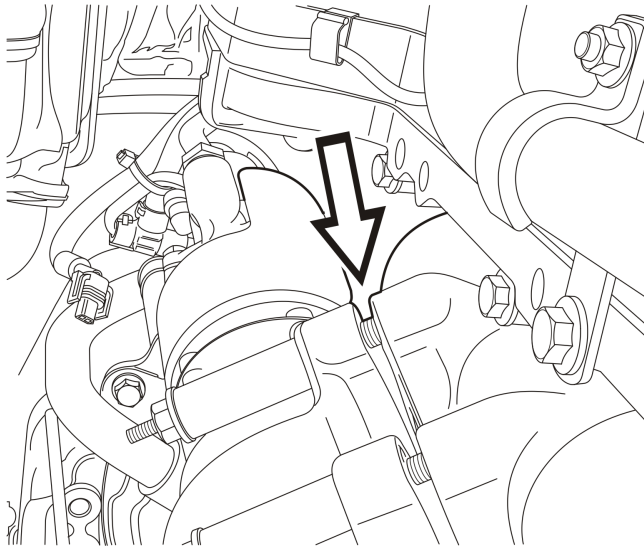
Remove the fasteners securing the EGR valve heat shield and remove the shield.



W2005689

22

Disconnect the wiring harness connector from the EGR valve.

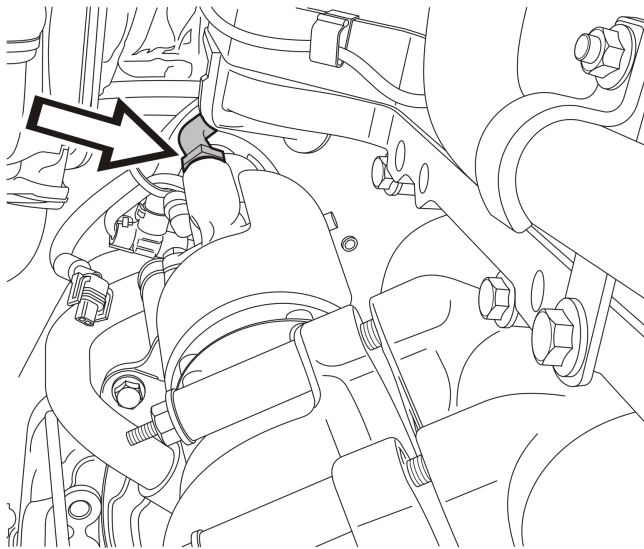


W2005954

23

Loosen, but do not remove, the EGR valve mounting bolts.

Note: Loosening the EGR valve provides clearance for removing the oil return line.



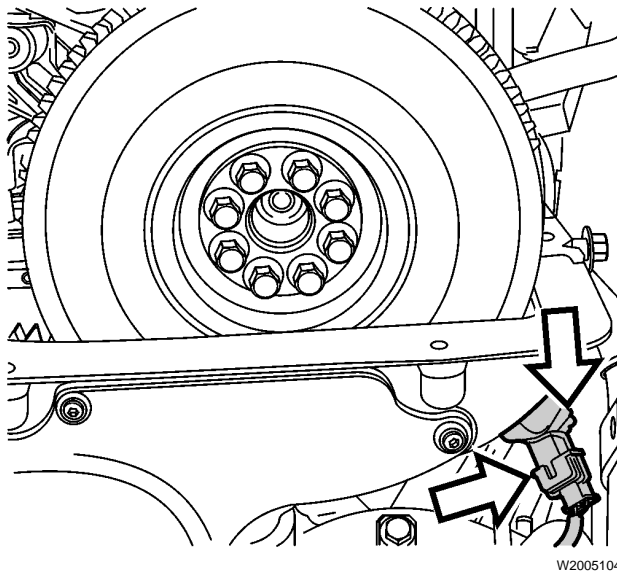
W2005955

24

Remove the EGR valve oil return line.

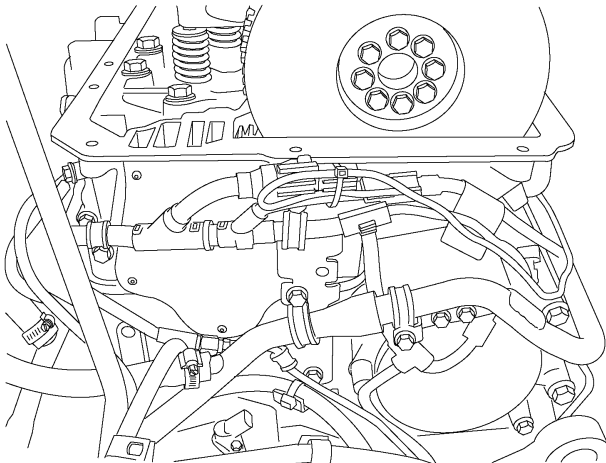
Note: P-clamp fasteners may need to be removed to free oil line.

Note: Oil supply line will remain attached.



25

Disconnect the camshaft position sensor harness connector, remove the bolt and pull out the sensor.



26

Remove all straps, P-clamps and other retainers used to restrain harnesses, oil lines and coolant tubes to the rear of the engine. This will allow support bracket at the rear of the engine to be removed.

27

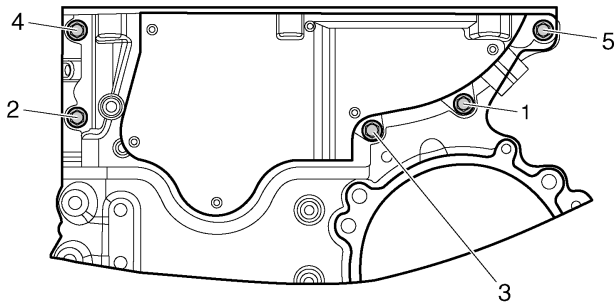
Remove support bracket fasteners and remove the rear support bracket.

28

Remove the fasteners securing the vibration damper to the camshaft gear. Leave camshaft gear in place.

29

Remove the timing gear cover fasteners and remove the cover.



W2006133

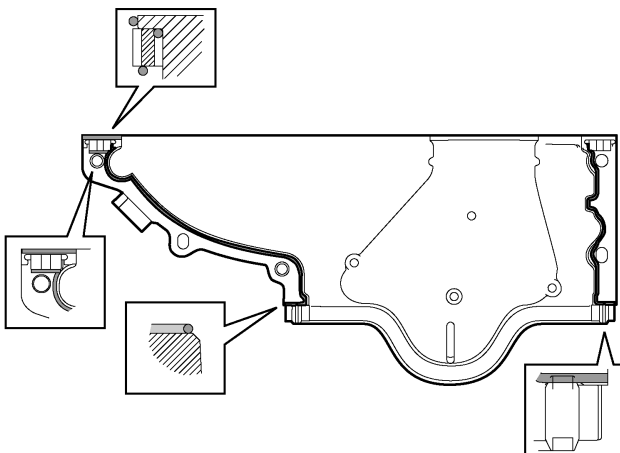
30

Clean all gasket sealing surfaces. All surfaces must be completely free of any grease or oil.

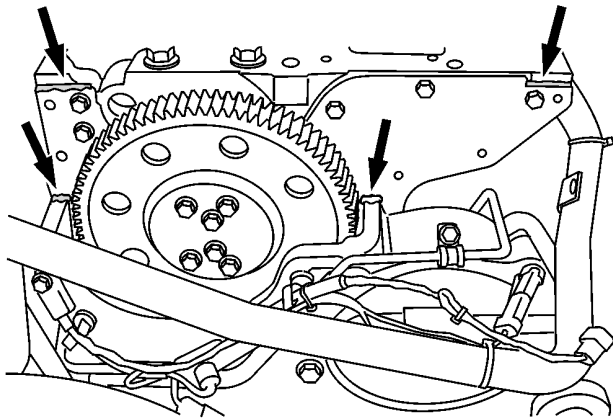
Installation

1

Install the timing gear cover seals and gaskets.



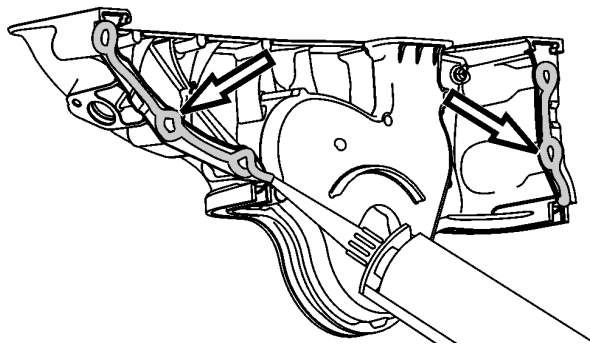
W2006134



W2005102

2

Apply sealant in the bottom corners where the timing gear plate and the flywheel housing meet. Also apply sealant to the top of the timing gear plate (in the corner) next to the cylinder head.



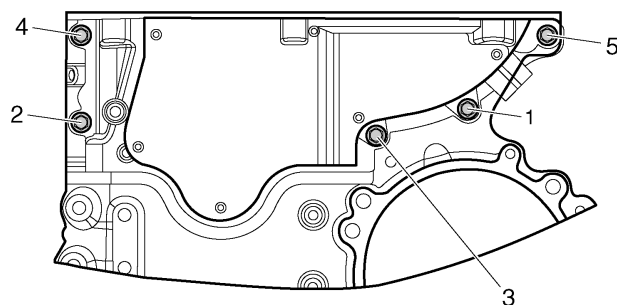
W2005137

3

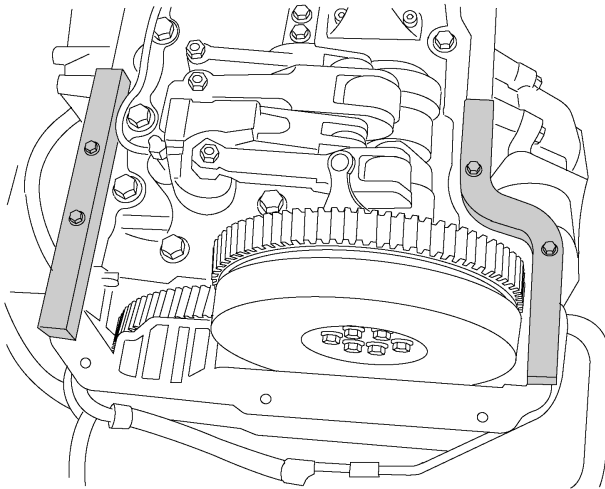
Apply sealant to the mating surfaces of the timing gear cover.

4

Position the timing gear cover, install the fasteners marked 1 and 2.



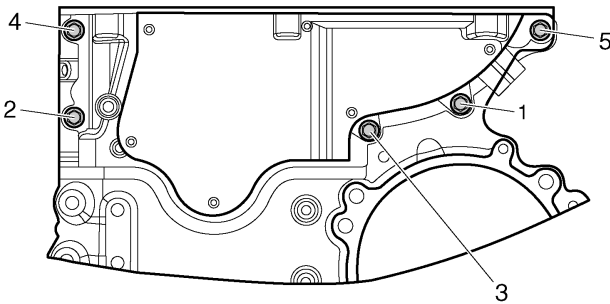
W2006133



W2006191

- 5**
Install the timing cover clamp tools so that the timing gear cover surface is flush with the seal surface on the cylinder head.

85111422A, 85111422B

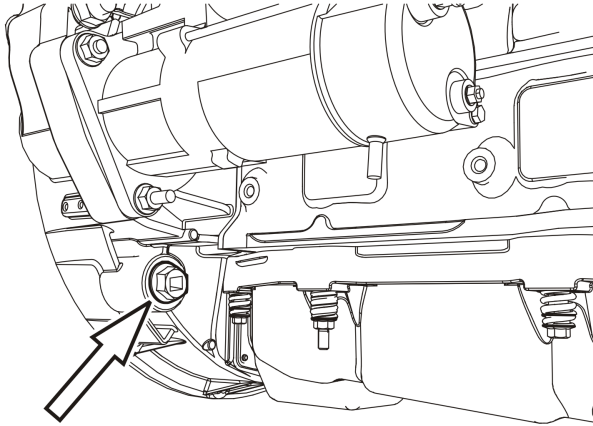


W2006133

- 6**
Torque the timing gear cover fasteners to 24 ± 4 Nm (18 ± 3 ft-lb) in the sequence shown.

24 ± 4 Nm
(18 ± 3 ft-lb)

- 7**
Remove the timing cover clamp tools.

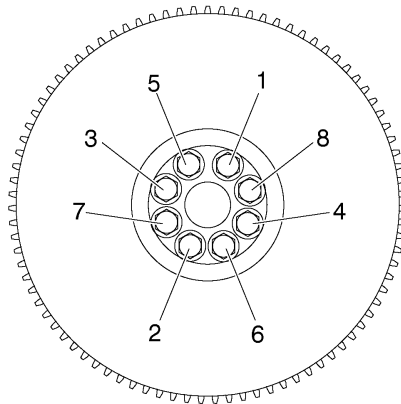


W0002368

8

Remove the plug from the flywheel housing and install the flywheel turning tool.

88800014



W2006135

9

Install vibration damper and gear clamp plate with new fasteners if the reusability limit has been exceeded (refer to Specifications, Tightening Torques and Patterns). Torque-tighten damper mounting screws in two steps in the sequence shown.

Step 1 — 45 ± 5 Nm (33 ± 4 ft-lb)

Step 2 — 90 ± 5 degrees

Note: Bolts and screws that have limited reusability must be marked with a punch each time they are installed in service. Bolts and screws with four punch marks when removed have been tightened five times and must be discarded and replaced with new.



CAUTION

Do not reuse timing gear mounting plate bolts.

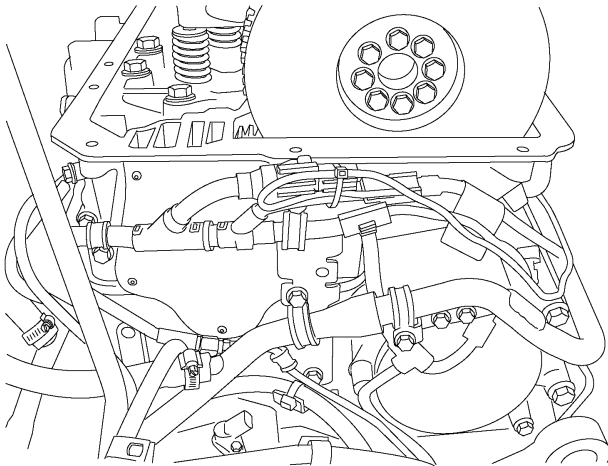
45 ± 5 Nm

(33 ± 4 ft-lb)

90 ± 5 degrees

10

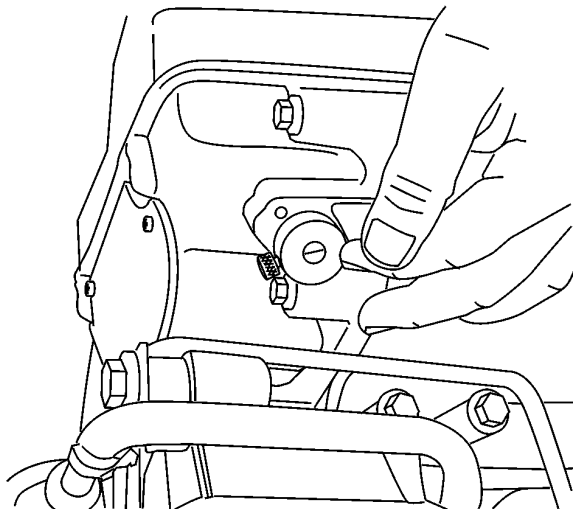
Position the rear support bracket onto the rear of engine and install support bracket fasteners to secure.



W2006132

11

Install all tie straps, P-clamps and other retainers used to restrain harnesses, oil lines and coolant tubes to the rear of the engine.



W2005068

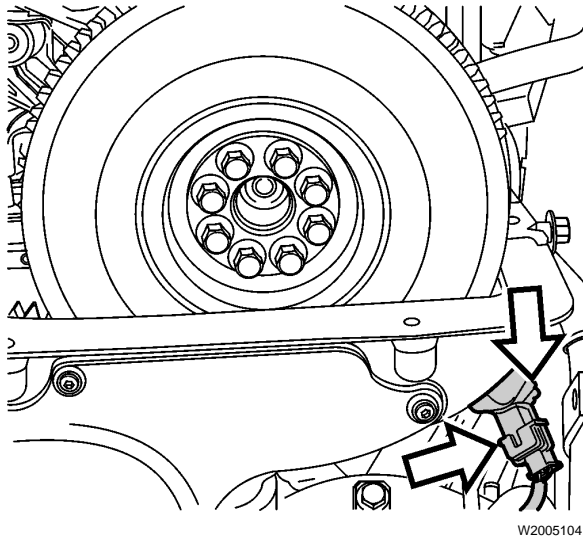
12

Check for proper camshaft position sensor clearance using the sensor depth gauge to determine if shims are required for sensor depth. The camshaft position sensor clearance specification is 0.3–1.0 mm (0.011–0.039 inch).

- 1 Rotate the engine until a tooth of the camshaft toothed wheel is aligned with the sensor bore.
- 2 Insert the depth gauge into the sensor bore until the outer part of the gauge is fully seated against the timing gear cover.
- 3 Loosen the thumb screw of the gauge and push the inner part of the gauge in until it contacts a tooth of the toothed wheel.
- 4 Tighten the thumb screw to secure the inner part of the gauge.
- 5 Carefully remove the gauge from the camshaft sensor bore and observe the location of steps between the inner and outer portions of the gauge:

- Both steps below the surface of the gauge = no shims required.
- One step below the surface of the gauge = one shim required.
- Both steps above the surface of the gauge = two shims required.

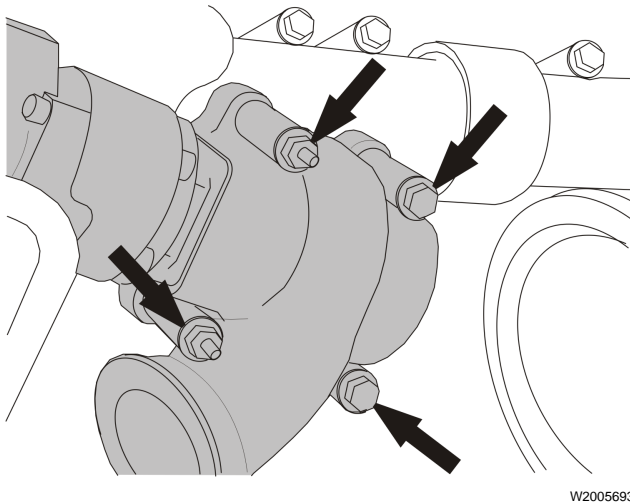
88800031



13

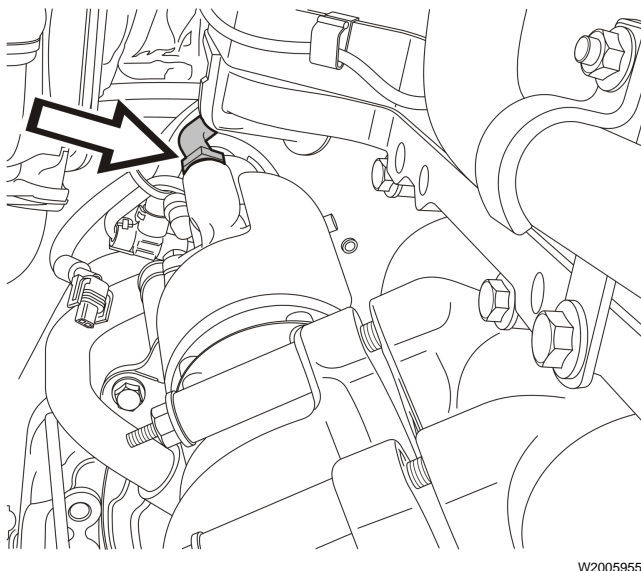
Install the camshaft position sensor with appropriate shim(s), new O-ring, secure with bolt and plug in harness connector.

Note: The camshaft position sensor shim part number is 20556179.



14

With the EGR valve near the exhaust manifold ports, remove mounting bolts then slip a new metal gasket between the valve and the exhaust manifold. Start new bolts to hold the EGR valve and gasket in place.



15

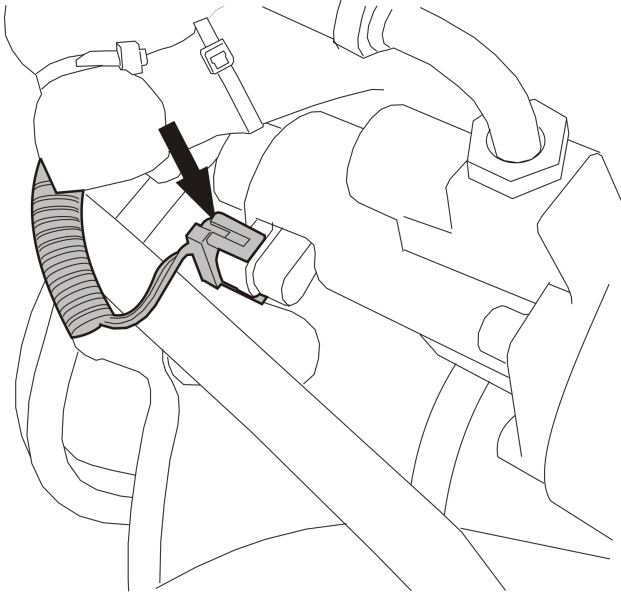
Install EGR valve oil line and torque-tighten to specification.

16

Torque-tighten the EGR valve mounting bolts to specification.

17

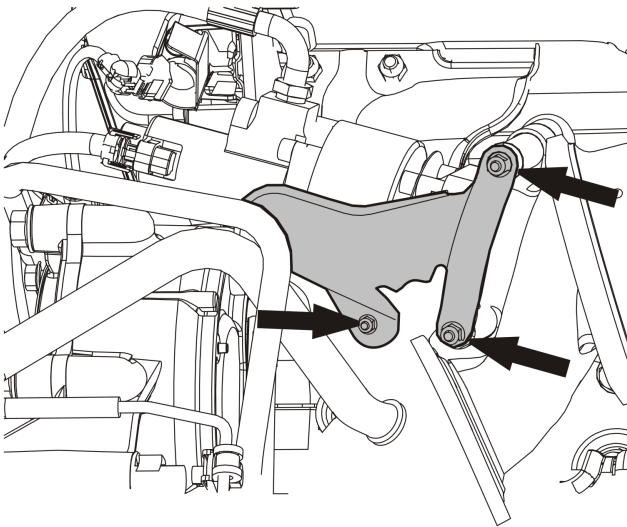
Connect the wiring harness connector to the EGR valve.



W2005689

18

Place the EGR heat shield in position over the EGR valve. Install the fasteners to secure the shield to the cylinder block and to the studs on the valve mounting bolt heads. Tighten the fasteners to specification.



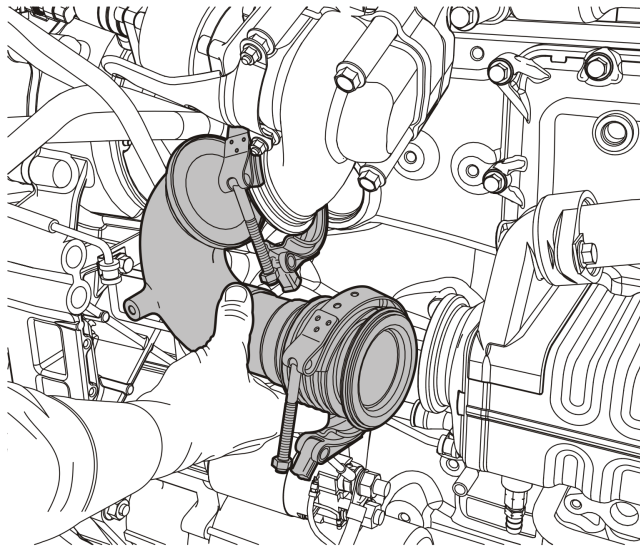
W2005685

19

Install new high temperature gaskets into the EGR valve end of the hot pipe and the inlet of the EGR cooler. Ensure the gaskets lay flat against the flange surfaces.

20

Inspect the V-clamps and T-bolt threads for wear or damage. If they are OK, apply anti-sieze compound to the T-bolt threads. Lubricate the V-inserts of the clamps with oil.



21

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

22

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

23

Position the EGR hot pipe between the EGR valve and the EGR cooler. Make sure the flanges engage properly. Slide the upper V-clamp over the flange and tighten until snug. Slide the lower V-clamp over the flange and tighten the clamp until snug.

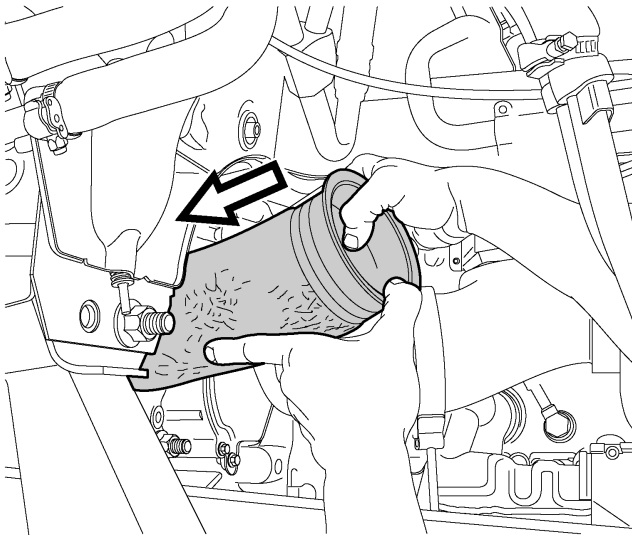
24

Make sure the hot pipe flange is seated properly in the EGR cooler. The hot pipe flange must be concentric with the cooler flange.

25

Position the V-clamps so that the T-bolts clear both heat shields. Tighten the clamps to specification.

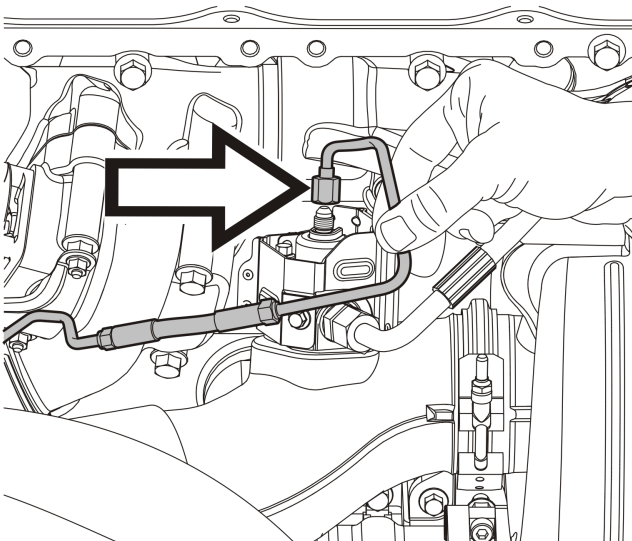
Note: After reaching the specified torque, inspect the V-clamps to make sure that no portion of the clamp has "bottomed out."



W2006038

26

Position the exhaust pipe between the diffuser pipe and the DPF muffler inlet pipe and loosely install the V-clamps.



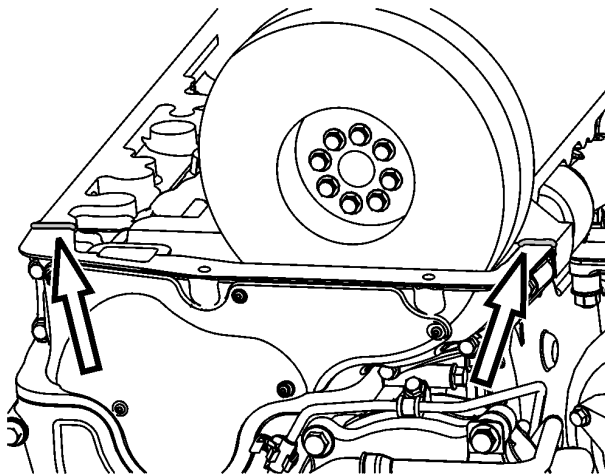
W2005951

27

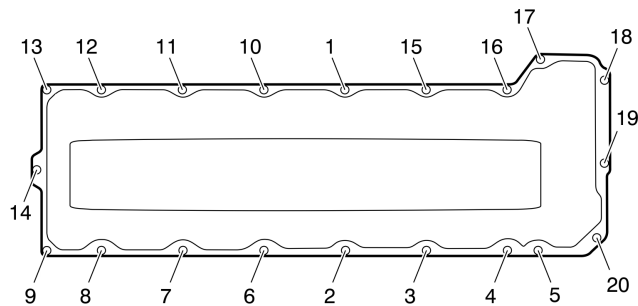
Adjust the exhaust pipe and diffuser pipe as needed and then, tighten the V-clamps to specification.

28

Install the fuel line to the hydrocarbon injector. Install the hydrocarbon injector fuel line clamp to the EGR valve heat shield.



W2005157



T2022732

29

Apply a 2 mm (0.079 inch) bead of Volvo sealant to the area where the timing cover and the cylinder head meet. This parting line is on both sides of the cylinder head. Carefully position the valve cover on the cylinder head and make sure that the seal remains properly seated.

30

Install the spring-loaded bolts in the valve cover. Torque-tighten the valve cover bolts to 24 ± 4 Nm (18 ± 3 ft-lb) in the sequence shown.

24 ± 4 Nm
(18 ± 3 ft-lb)

31

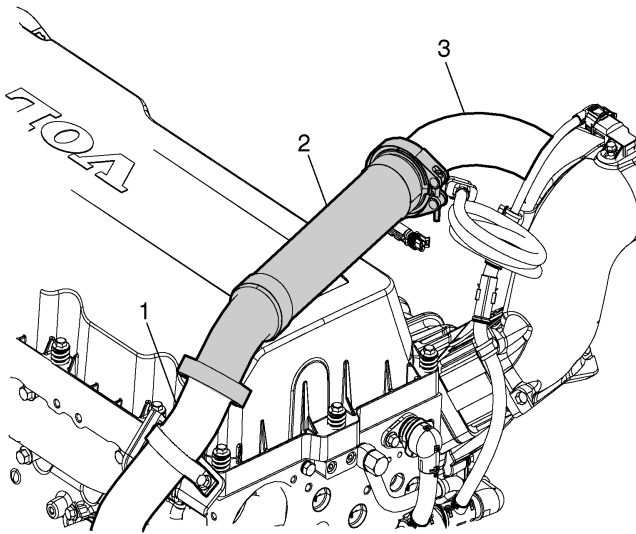
Connect the discharge line and mounting brackets to the air compressor.

32

Install the hydrocarbon injector harness clips to the valve cover.

33

Position the crossover pipe (with new O-rings) between the venturi outlet pipe and the mixer inlet pipe.



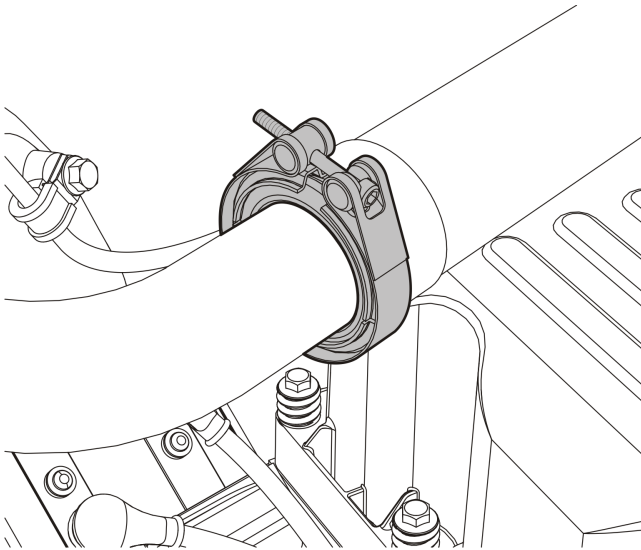
W2005960

- 1 Venturi Outlet Pipe
- 2 Crossover Pipe
- 3 Mixer Inlet Pipe

34

Install a V-clamp at each end of the crossover pipe and tighten the clamps to secure the pipe.

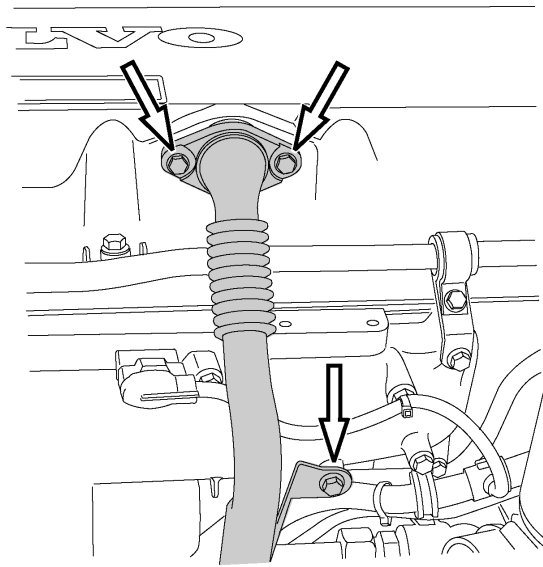
Note: Make sure the O-rings remain in place while positioning the pipe.



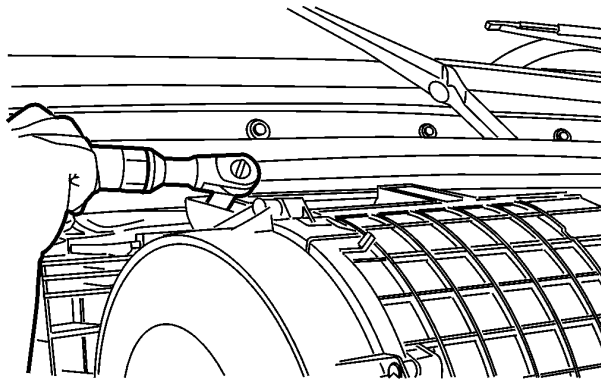
W2005804

35

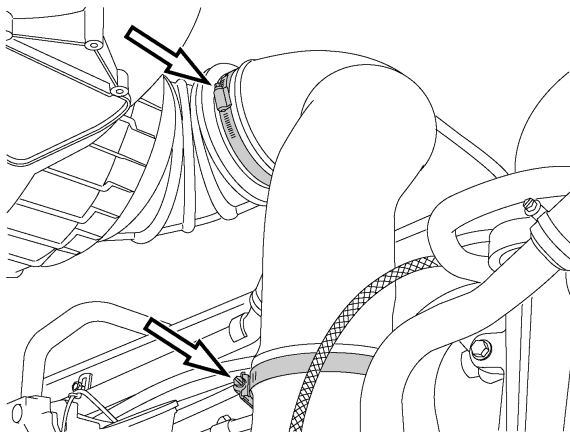
Install the air compressor fresh air pipe to the air compressor. Secure the mounting brackets to the cylinder head.



W2006122



W2003858



W2006005

36

Install the fasteners securing crankcase ventilation tube and bracket to valve cover and intake manifold. Torque-tighten fasteners to 24 ± 4 Nm (18 ± 3 ft-lb).

Note: Inspect the crankcase ventilation tube O-ring and replace if necessary.

Note: Ensure that the same bolts that were removed at disassembly are reinstalled in the same location. Damage to the valve cover will result if too long of bolts are installed.

24 ± 4 Nm
(18 ± 3 ft-lb)

37

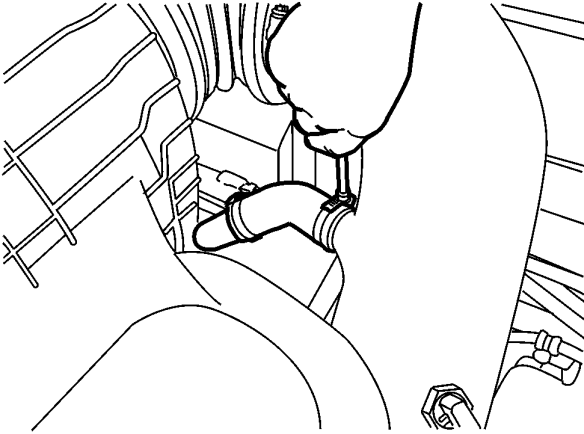
Position the air filter housing against the cab and install fasteners to secure.

38

Install the main fresh air pipe between the air filter housing and the turbocharger air inlet elbow. Position the clamps and tighten to secure.

39

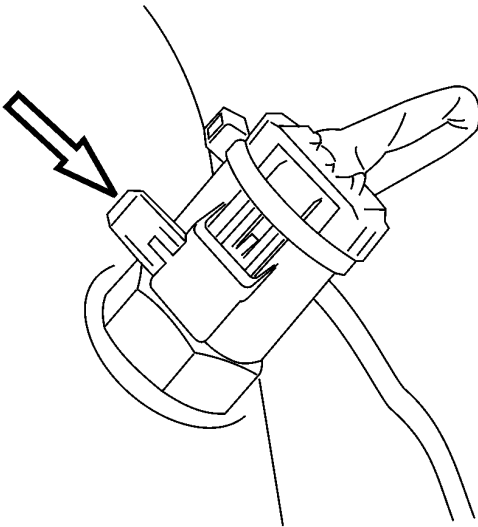
Install the air compressor fresh air hose to the main fresh air pipe, position the clamp and tighten to secure.



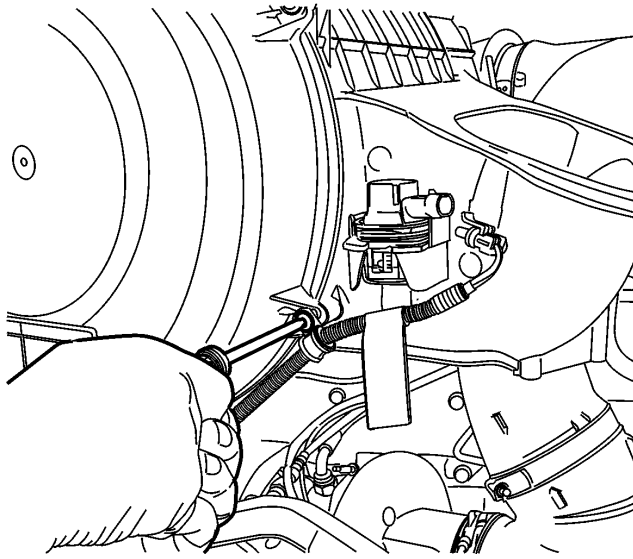
W2004719

40

Install the air temperature sensor connector to the sensor. Insert and secure the connector lock tab. Install the sensor harness clamp to the main fresh air pipe.



W2004720



41

Connect and secure the air filter restriction gauge wiring harness to air filter housing.

42

Install engine cover.

43

Install the inner splash guard assembly.

44

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

45

Start the engine, check for leaks and proper operation.