

Document Title: Fuel system, component location	Function Group: 230	Information Type: Service Information	Date: 2015/2/15
Profile: EXC, EC300D LR [GB]			

Fuel system, component location

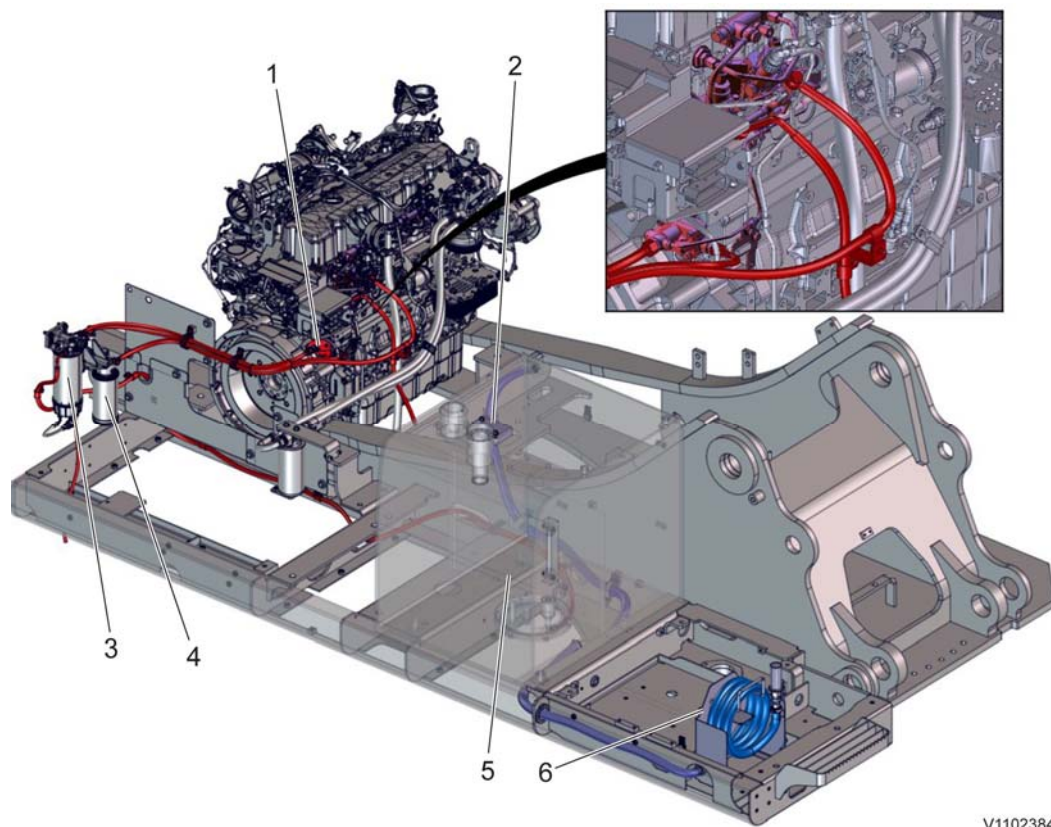


Figure 1

1. Fuel pump
2. Fuel level sensor
3. Water separator filter element
4. Fuel filter
5. Fuel tank
6. Fuel filling pump hose

Description

- [230 Fuel system description](#)

Document Title: Carbon monoxide in fuel system, check	Function Group: 230	Information Type: Service Information	Date: 2015/2/15
Profile: EXC, EC300D LR [GB]			

Carbon monoxide in fuel system, check

Carbon monoxide in fuel tank, check with carbon monoxide tester

Op nbr 230-001

[9808038 Leak detector](#)

1. Run the engine until it is warm.
2. Dismantle 9808038 Leak detector.
Lubricate the O-rings with silicone grease or clean vaseline.
3. Fill both chambers with reaction fluid up to the indicated line.
4. Cover the inlet hole at the same time as the carbon monoxide tester is assembled so that no fluid is pressed out.
NOTE!
The carbon monoxide tester and its fluids may not be exposed to cigarette smoke, exhausts, or similar.
Conduct the test on a machine that is not recently refuelled.
5. Rev up the engine several times.
6. Turn off the engine and open the tank cap.
Place 9808038 Leak detector over the tank opening and pump 3–5 times on the rubber bulb to suck in air from the tank. Wait 10–15 seconds to see if the reaction fluid reacts.
NOTE!
Fuel may not be sucked into the carbon monoxide tester.

If the reaction fluid in 9808038 Leak detector changes colour, this indicates that there is carbon monoxide in the tank.

Very small quantities of carbon monoxide are often present in the machine's systems, that is why the measurement should be repeated if the first measurement generates a reaction.
7. Suck fresh air into 9808038 Leak detector by pumping a few times on the bulb. Pump until the reaction fluid has returned to its original colour.
8. Ventilate the air above the filler hole to the tank and repeat the test.
NOTE!
Do not blow with exhaled air as it contain carbon dioxide.
9. Reinstall the tank cap.

Document Title: Feed pump, checking feed pressure	Function Group: 233	Information Type: Service Information	Date: 2015/2/15
Profile: EXC, EC300D LR [GB]			

Feed pump, checking feed pressure

Op nbr 233-004

[15018967 Testing nipple](#)

[14290266 Hose](#)

[11666052 Pressure gauge](#)



High pressure. Wait 30 seconds after switching off the engine before working on the fuel system.

NOTICE

Maintain greatest possible cleanliness when working on the fuel system.

Testing conditions

1. Batteries are in good conditions and fully charged.
2. Abnormal fuel feed pressure value with VCADS Pro. See [030 Fuel pressure. specifications](#).

Pressure checking procedures

1. Place the machine in service position B, see [091 Service positions](#).
2. Turn off the electric power with the battery disconnect switch.



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Figure 1

3. Open the engine hood.
4. Disconnect the wire-harness connector.

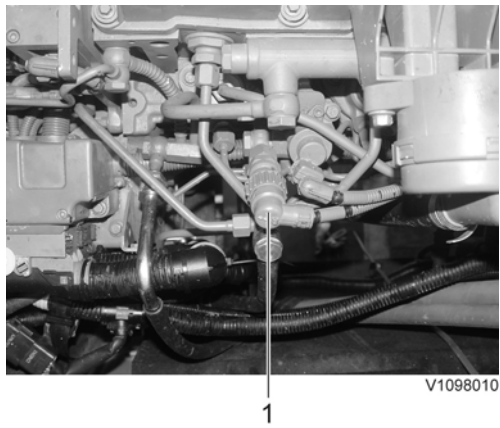


Figure 2

1. Wire-harness connector

5. Remove the pressure sensor.

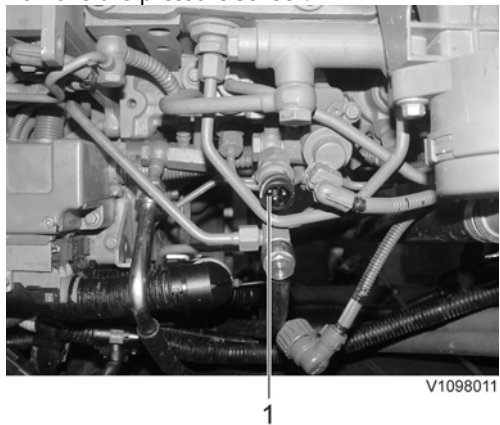


Figure 3

1. Sensor

6. Install the nipple, hose and the pressure gauge on the connection for incoming fuel.

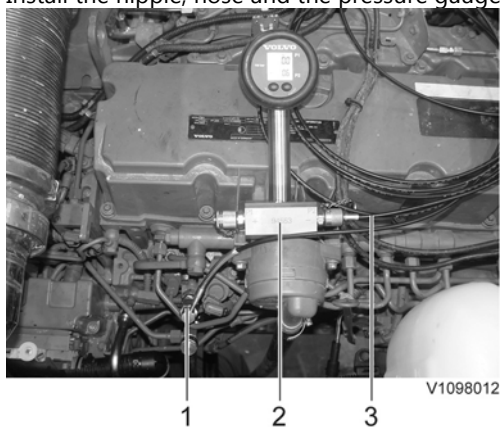


Figure 4

1. 15018967 Testing nipple
2. 14290266 Hose
3. 11666052 Pressure gauge

7. Bleed the fuel system according to [233 Fuel system, bleeding](#).

Engine running

8. Start the engine.
9. Put the control lockout lever in the unlocked (up) position. Check if the fuel feed pressure values are according to the specifications without load and with load. See [030 Fuel pressure, specifications](#).

NOTE!

Create the hydraulic load by moving the dipper arm and the bucket to their full stroke.

NOTE!

Check the pressure at the different positions of the engine speed control switch, see [030 Fuel pressure, specifications](#). The pressure values should be stable at each positions.

In case the output pressure is not normal

Check the fuel tank, water separator, fuel line and fuel feed pump.

In case the pressure is normal

Check the fuel filter and the fuel line to the fuel control unit.

10. Stop the engine.
11. Remove the nipple, hose and the pressure gauge on the connection for incoming fuel.
12. Restore the machine to operating condition.

Document Title: Fuel system, bleeding	Function Group: 233	Information Type: Service Information	Date: 2015/2/15
Profile: EXC, EC300D LR [GB]			

Fuel system, bleeding

Op nbr 233-001

1. Place the machine in the service position B. See [091 Service positions](#)
2. Turn the hand pump counterclockwise to unlock the plunger. Pump approximately 200 to 300 strokes until a heavy resistance can be felt. Push the plunger down and turn clockwise to lock into position. Then bleed the fuel system.



Figure 1

1. Hand pump on the filter head.

NOTE!

Air bleeding may not be performed using the starter motor.

3. Start the engine and let it idle at low idle speed for a few minutes. If the engine is difficult to start, bleed again with the hand pump.

NOTE!

The hand pump must not be used when the engine is running.

NOTE!

Run the engine at idle for 5 minutes before increasing the engine rpm, to allow purging of any remaining air.

Document Title: Fuel tank, description	Function Group: 234	Information Type: Service Information	Date: 2015/2/15
Profile: EXC, EC300D LR [GB]			

Fuel tank, description

The fuel tank acts as a reservoir for supplying fuel to the engine. It is mounted towards right side of the upper frame. Refer to [030 Fuel tank, specifications](#) for the fuel tank filling capacity.

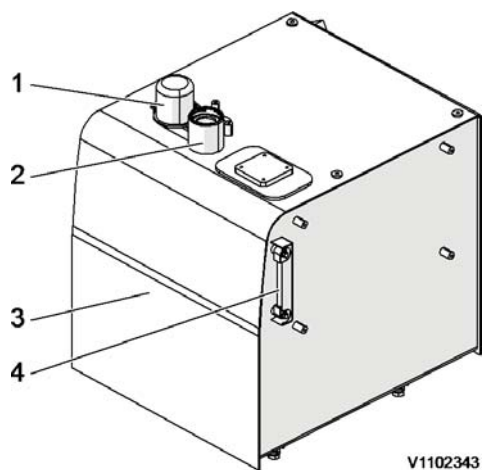


Figure 1

1. Fuel tank air ventilation filter
2. Strainer
3. Fuel tank
4. Fuel level gauge

Document Title: Fuel filling pump, removing	Function Group: 234	Information Type: Service Information	Date: 2015/2/15
Profile: EXC, EC300D LR [GB]			

Fuel filling pump, removing

Op nbr 234-041

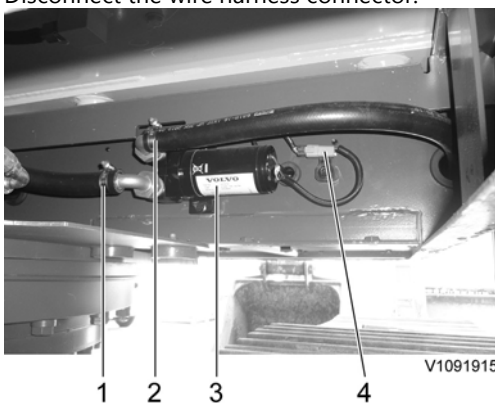
1. Place the machine in the service position C. See [091 Service positions](#)
2. Remove the under cover



V1102345

Figure 1

3. Disconnect the wire harness connector.



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Figure 2

1. Hose (fuel tank line)
 2. Hose (suction line)
 3. Fuel filling pump
 4. Wire harness connection
4. Disconnect the hoses from the fuel filling pump.
 5. Remove the mounting screws and the fuel filling pump from the machine.

Document Title: Fuel filling pump, installing	Function Group: 234	Information Type: Service Information	Date: 2015/2/15
Profile: EXC, EC300D LR [GB]			

Fuel filling pump, installing

Op nbr 234-042

1. Place the machine in the service position C. See [091 Service positions](#)
2. Install a new fuel feed pump with the mounting screws.

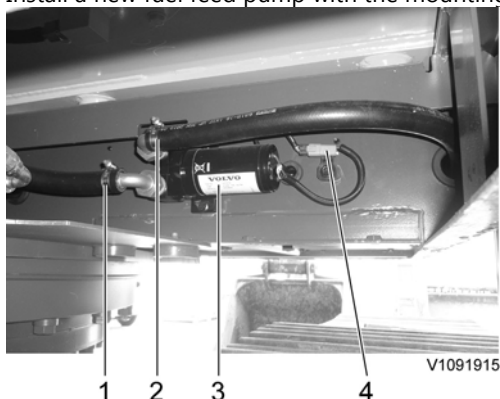


Figure 1

1. Hose (fuel tank line)
 2. Hose (suction line)
 3. Fuel filling pump
 4. Wire harness connection
3. Connect the hoses.
 4. Connect the wire harness connector to the fuel feed pump.
 5. Check the fuel filler pump.
 6. Install the cover.



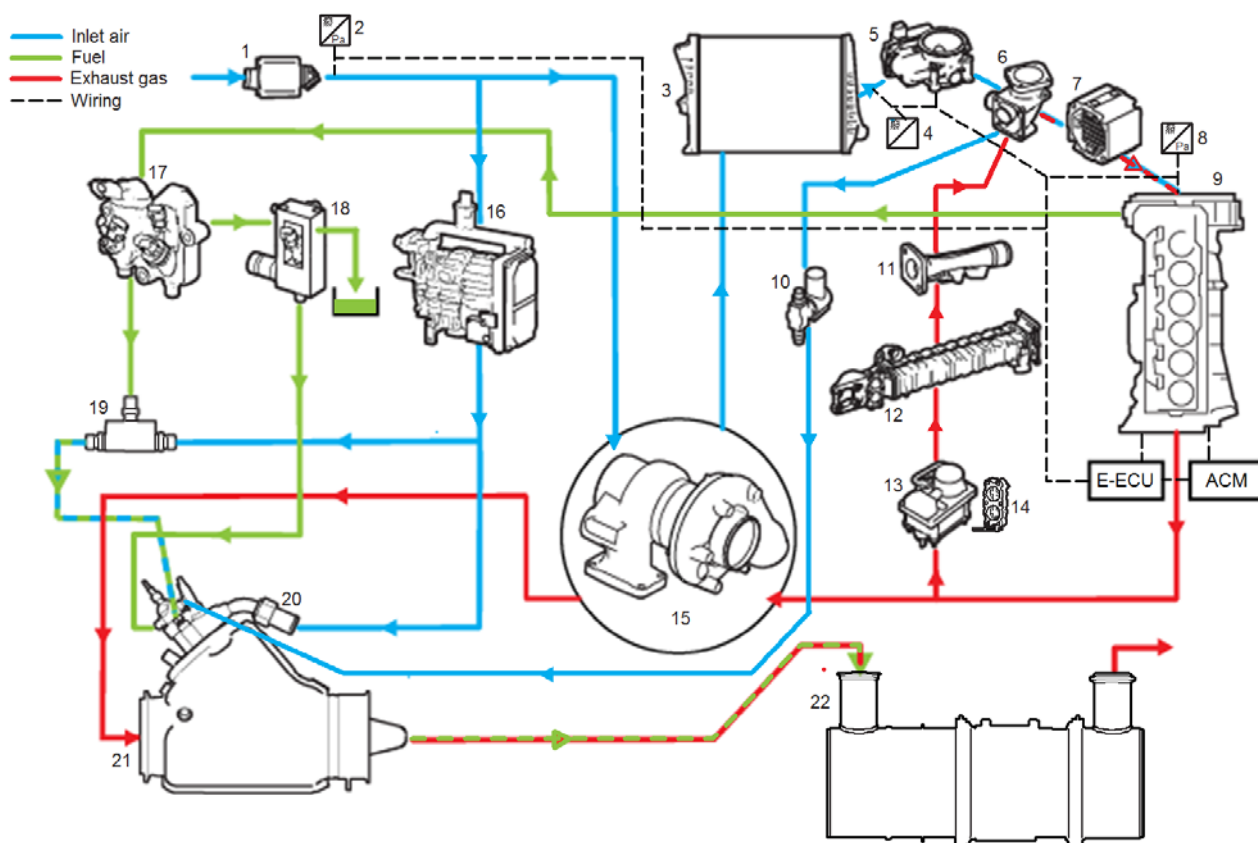
Figure 2

Document Title: Inlet and exhaust system, description	Function Group: 250	Information Type: Service Information	Date: 2015/2/15
Profile: EXC, EC300D LR [GB]			

Inlet and exhaust system, description

The engine takes in clean air through the inlet system and the exhausts pass through a number of subsystems such as the exhaust aftertreatment system (EATS), the turbocharger, and the exhaust gas recirculation (EGR) system. For information about the subsystems, see

- [254 Exhaust Aftertreatment System, description](#)
- [255 Turbocharger, description](#)
- [293 Exhaust Gas Recirculation \(EGR\), description](#)



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Figure 1
Inlet and exhaust system

Blue = Inlet air
Green = Fuel
Red = Exhausts
Black, dashed = Wiring

1. Air filter
2. Ambient air temperature and pressure sensor (FX1008)

3. Charge-air cooler
4. Charge-air cooler temperature sensor (SE2512)
5. Inlet throttle (MO2503)
6. Mixing chamber
7. Preheater (HE2501)
8. Charge-air temperature and pressure sensor (FX1007)
9. Diesel engine
10. Purge air valve (MA2510)
11. Venturi tube
12. EGR-cooler
13. EGR-actuator (MO2505)
14. EGR-valve
15. Turbocharger
16. Air pump (MO2502)
17. HCI fuel metering unit A (MUA)
18. Burner fuel metering unit B (MUB)
19. T-coupling
20. Air pump safety valve
21. Burner
22. Muffler

The air is drawn in through the air filter and flows to the turbocharger. Then the air is cooled in the charge-air cooler. Before the air is finally drawn into the cylinders, it passes the inlet throttle, the mixing chamber, and the preheater. In the mixing chamber, the air is mixed with the EGR-gases.

Some of the inlet air is also used in the exhaust aftertreatment system. The air pump supplies the burner with air, via the T-coupling where it is mixed with fuel, to supply the hydrocarbon injection. It also supplies the burner with combustion air via the air pump's safety valve into the vaporization chamber.

EATS also takes inlet air from the mixing chamber to use as purge air, controlled by the purge air valve, to clean the vaporization chamber.

The exhausts flow from the engine's exhaust manifold via the turbocharger and into the burner and muffler. Inside the muffler the exhausts are filtered in a diesel particulate filter (DPF). During regeneration, the exhausts are injected with additional fuel, via the HC injector inside the burner, to reach the temperature needed to oxidize the soot in the DPF.

The exhausts also flow through the EGR-system. The EGR-system contains the EGR actuator, the EGR control valve, the EGR-cooler, and the venturi tube. The EGR-gas is mixed with inlet air in the mixing chamber before being reintroduced into the engine's inlet manifold. This is done to reduce the NO_x content in the exhausts.

Air filter

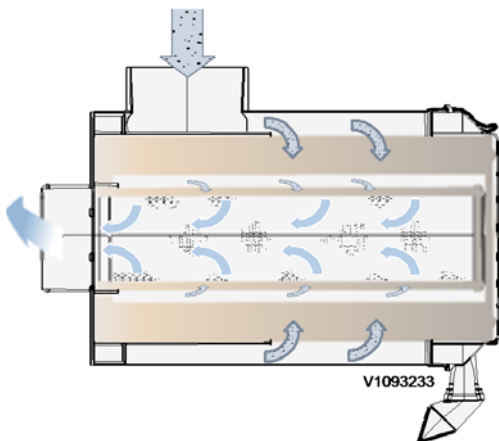


Figure 2
Air filter

It is important that the air which is drawn into the engine is free from impurities. The air filter insert consists of a folded filter paper which is protected by a mesh. The air is forced to flow in the intended direction through the inlet.

Charge-air cooler

Turbocharging increases the temperature of the air entering the engine. If the air is cooled when exiting the turbocharger, its

volume is reduced so that more air (oxygen) can be forced into the cylinders. This is done with a charge-air cooler. The cooled air makes it possible to inject more fuel and produce more engine power. It also creates less thermal stress on the engine.

The charge-air cooler is an air-to-air cooler and reduces the air temperature and increases engine power. Torque increases and fuel consumption is reduced.

Inlet throttle

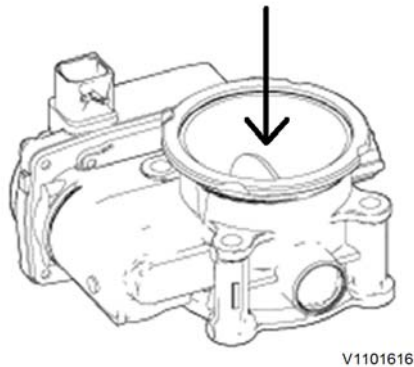


Figure 3
Inlet throttle, arrow indicating air flow direction

The two main functions of the throttle valve are:

- To facilitate easier burner start-up by increasing the exhaust temperature. By throttling the air flow through the engine, the engine runs under warmer conditions with higher exhaust temperature.
- For EGR to flow, a pressure difference is required between the intake and exhaust manifold. The throttle valve is used to reduce the pressure in the engine's inlet manifold to a pressure that is lower than the back-pressure in the exhaust manifold.

As the engine is accelerated in rpm and/or load, the EGR amount is set to a minimum to facilitate good engine response, during which the inlet throttle valve is kept fully opened. The valve is controlled by the E-ECU.

Mixing chamber

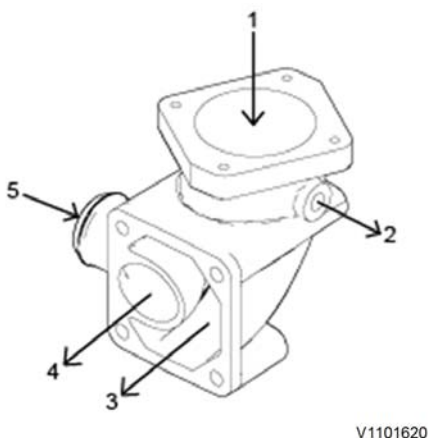


Figure 4
Mixing chamber

1. Air from the charge-air cooler via the inlet throttle
2. Charge-air to the purge air valve
3. Charge-air to the inlet manifold
4. EGR-gases to the inlet manifold
5. EGR-gases from the EGR-cooler via the venturi tube

The cooled recirculated EGR-gases and the intake air, which has been cooled in the charge-air cooler, meet in the mixing chamber. From here the mixture flows through the inlet manifold into the engine's combustion chambers. The most important function of the mixing chamber is to facilitate equal EGR distribution to each cylinder, which is very important in the EGR-system.

Preheater

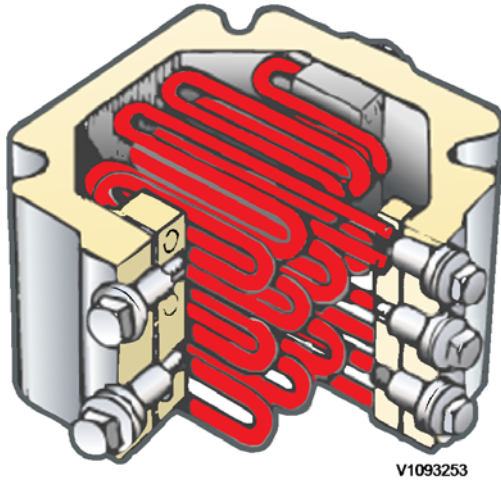


Figure 5
Preheater

The purpose of the preheating coil is to heat the air in the inlet manifold before the engine is started. This heated air helps the engine to start easier and reduces white smoke at cold starts. The preheater is heated electrically and consists of two or three heater coils through which the air flows.

The preheater is powered from the battery and is engaged if needed by the E-ECU or with a switch in the cab. The time that it is engaged is controlled by the E-ECU depending on coolant temperature and atmospheric pressure.

Inlet and exhaust manifold

Each cylinder has a separate inlet channel and a separate exhaust channel on the same side of the cylinder head.

The inlet manifold is mounted from above, supplying air and EGR-gases vertically into each cylinder. Gaskets are used to prevent leakage between each cylinder's inlet and the manifold.

The exhaust manifold is mounted under the inlet manifold, receiving exhausts horizontally. The exhaust manifold covers the cylinders' exhaust outlets. Gaskets are used to prevent exhaust leakage between the cylinder head and the manifold flanges. The turbocharger and the EGR control valve connect to the exhaust manifold.

Summary

The inlet and exhaust system contains several subsystem. The inlet air is used for normal engine operation as well as in the EATS and for cleaning (purging). The exhausts drive the turbocharger and are filtered in the DPF to reduce the particle content. Some of the exhausts are recirculated in the EGR-system to reduce the NO_x content as well.

Parameters

- There are no parameters for this function.

Supplementary information

- [250 Inlet and exhaust system component location](#)

Function check

- 28407-3 Sensor values, monitoring

Diagnostics

Component/Display message	Control unit	Message ID
FX1007	MID128	PID102

FX1008	MID128	PID105
	MID128	PID107
	MID128	PID108
HE2501	MID128	PID45
	MID128	SID70
MO2503	MID128	PID51
	MID128	PSID7
SE2512	MID128	PID52

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Inlet and exhaust system, component location

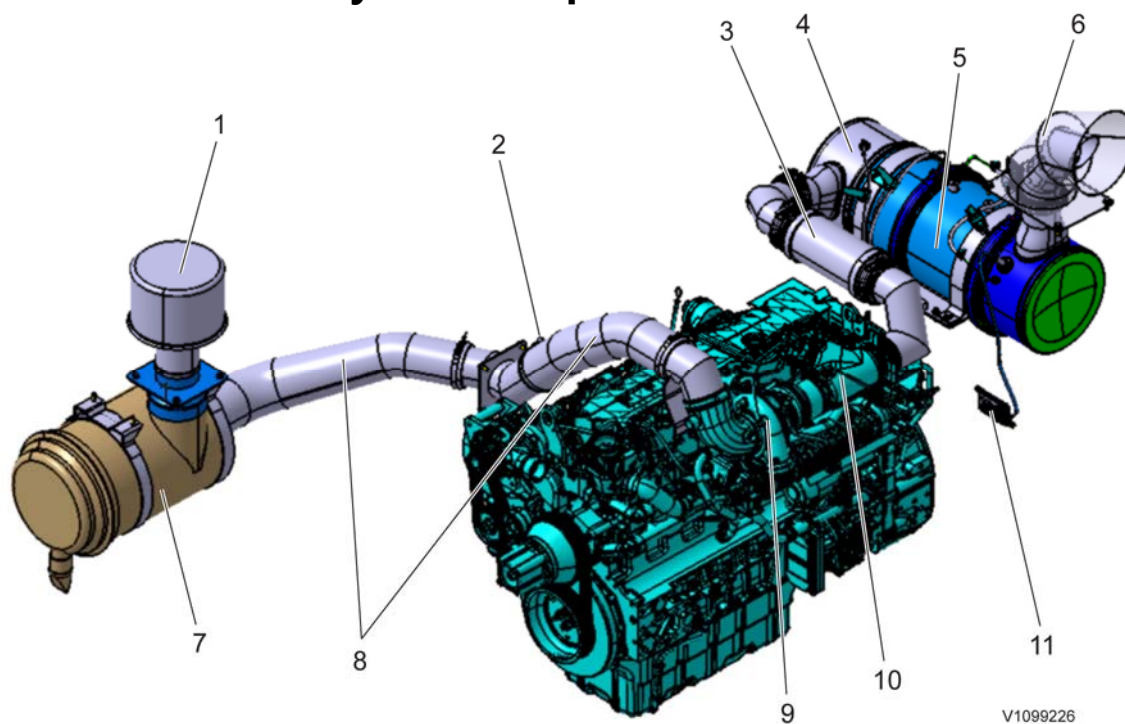


Figure 1

1. Pre-cleaner (optional: rain cap, oil bath cleaner)
2. Intake air pressure & temperature sensor
3. Exhaust flexible tube
4. DOC (Diesel oxidation catalyst)
5. DPF (Diesel particulate filter)
6. Diffuser
7. Air cleaner
8. Inlet hose
9. Turbocharger
10. Burner
11. Nox sensor

Document Title: Exhaust pipe, flexible tube, replacing	Function Group: 252	Information Type: Service Information	Date: 2015/2/15
Profile: EXC, EC300D LR [GB]			

Exhaust pipe, flexible tube, replacing

Op nbr 252-021

NOTE!

If the flexible tube is to be reused, mark the tube by drawing a line between the clamps.

1. Park the machine in service position B, see [091 Service positions](#).
2. Open the engine hood.
3. Remove the clamps.

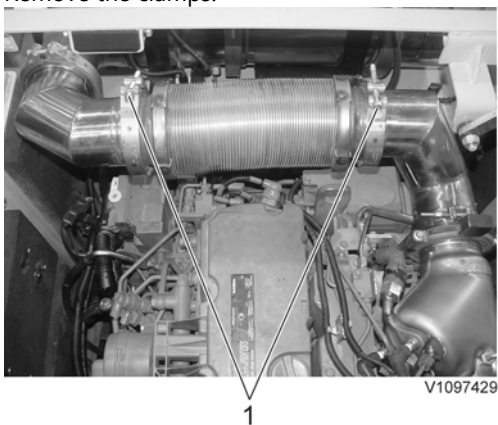
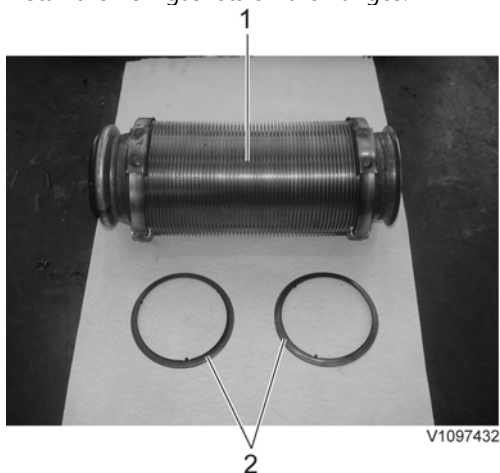


Figure 1

1. Clamp
4. Remove the flexible tube.
5. Install the new gaskets on the flanges.



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