

Document Title: Injector, replacing one	Function Group: 237	Information Type: Service Information	Date: 2015/3/13
Profile: EXC, EC160C NL [GB]			

Injector, replacing one

Op nbr 237-004

1. Place the machine in service position B, see [091 Service positions](#)

NOTICE

Observe the greatest possible cleanliness!

2. Open the engine hood.
3. Remove the engine oil dipstick pipe bracket (1).

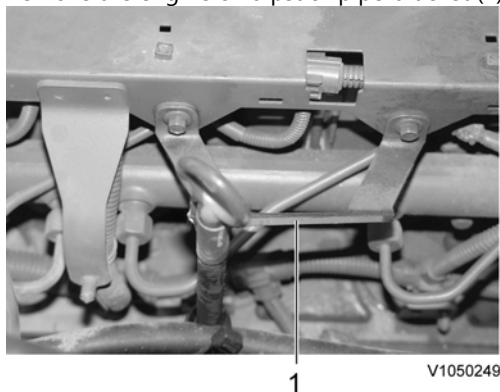


Figure 1

4. Disconnect cable bracket (1) from the valve cover and carefully fold aside the cable bracket.

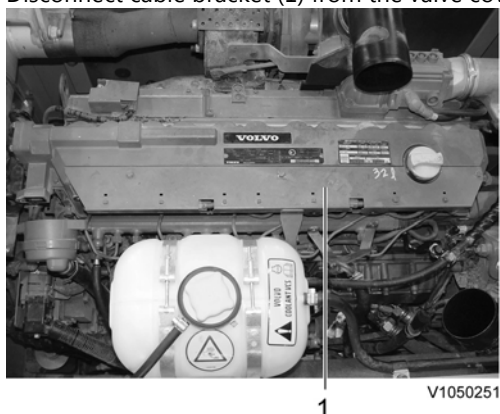


Figure 2

5. Disconnect electric connections (1, 2) for the injectors.

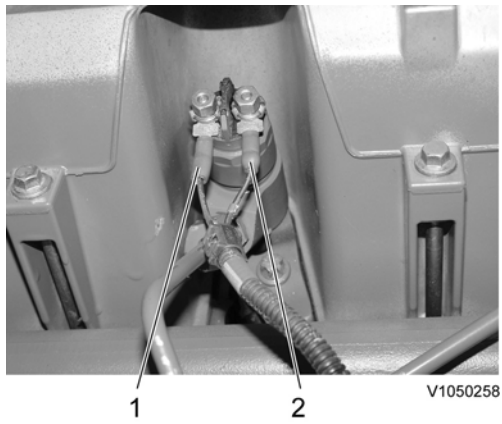


Figure 3

6. Remove fuel delivery pipe (1) between the rail and injector.

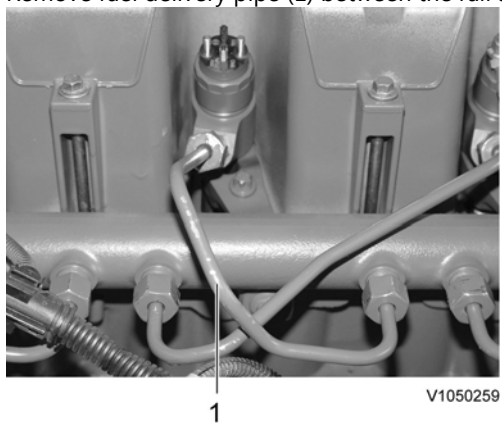


Figure 4

7. Remove injector attaching yoke (2) and carefully remove injector (1) .

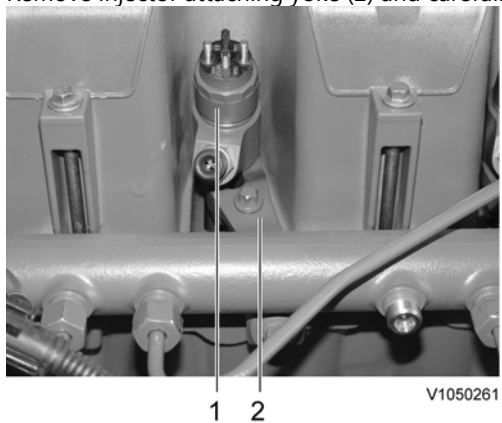


Figure 5

1. Injector
2. Attaching yoke

NOTE!

Make sure that the copper washer on the injector lower part also comes out.

8. Install new O-ring on the injector. Lube the O-ring sparingly with oil.

9. Install the new copper washer on the injector. Install the injector and attaching yoke. Tightening torque, see [030 Fuel system, tightening torques](#)
10. Connect the cable harness to the injector. Tightening torque, see [030 Fuel system, tightening torques](#).
11. Install a new fuel delivery pipe between the rail and injector. Tightening torque, see [030 Fuel system, tightening torques](#).

NOTE!

Use correct torques and angles when pipe get changed.

12. Bleed the fuel system, according to [233 Fuel system, bleeding](#).
NOTE!
It is not allowed to loose a injector pipe for bleeding the system.
13. Start the engine, and check for leaks.

Document Title: Fuel rail pressure, checking	Function Group: 237	Information Type: Service Information	Date: 2015/3/13
Profile: EXC, EC160C NL [GB]			

Fuel rail pressure, checking

Op nbr 237-037

Testing conditions

1. Batteries are in good conditions and fully charged.
2. There is no fault code displayed on the VCADS Pro.

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.
3. Connect the VCAD Pro computer to the machine through the service socket (1). Start the VCADS Pro engine test, 23017-3 fuel supply pressure check.

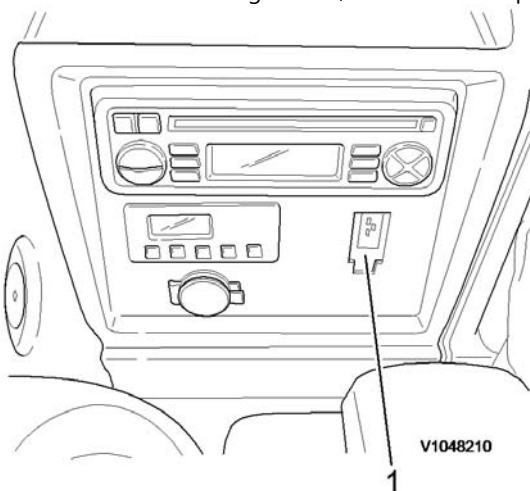


Figure 1
VCADS Pro, connection

1. Service socket

NOTE!

This test is used only if there are the engine starting problems.

Engine starting condition

4. Remove the injector cover (1) from the engine, disconnect all cables (2) for the injectors.

NOTE!

Isolate the disconnected cables.

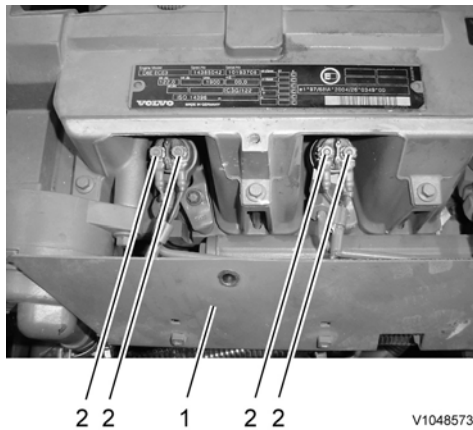


Figure 2
Injector cables, disconnection

- 1. Injector cover
- 2. Injector cables

5. Crank the engine with the starter motor for 15 to 20 seconds, check if the fuel rail pressure values are according to the specifications. See [030 Fuel pressure, specifications](#).

NOTE!

Engine crank speed: 150 ±30 rpm

In case the engine crank speed is not normal

Check the battery, cables, starter motor and engine load.

In case the fuel feed pressure is not normal

Check the fuel filter and the fuel feed pump.

In case the rail pressure is not normal

Check the fuel control unit, the high pressure pump and the rail pressure relief valve.

NOTE!

If there are very abnormal results, check the fuel rail pressure sensor and the E-ECU.

6. Stop the engine.
7. Save the job card, and connect the injector cables.

Engine running, without load condition

8. Start the VCADS Pro engine test, 23017-3 fuel supply pressure check.
9. Start the engine.
10. Put the control lockout lever in the unlocked (up) position.
Check if the fuel rail pressure values are according to the specifications when there is a load below 28%. See [030 Fuel pressure, specifications](#).

NOTE!

Check the engine load at I-ECU service mode.

NOTE!

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

In case the charge air pressure is too low

Check the air intake system.

In case the engine load is too high

Check the hydraulic system load and the engine conditions.

In case the fuel feed pressure is too low

Check the fuel filter and the fuel feed pump.

In case the rail pressure is too low

Check the fuel control unit, the high pressure pump and the rail pressure relief valve.

In case the rail pressure is too high

Check the Injectors.

NOTE!

If there are very abnormal results, check the fuel rail pressure sensor and the E-ECU.

11. Stop the engine.

12. Save the job card.

Engine running, with load condition

13. Start the VCADS Pro engine test, 23017-3 fuel supply pressure check.

14. Start the engine.

15. Check if the fuel rail pressure values are according to the specifications when there is a load above 60%. See [030 Fuel pressure, specifications](#).

NOTE!

Check the engine load at I-ECU service mode.

NOTE!

Engine speed: 1900 rpm

NOTE!

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

In case the charge air pressure is too low

Check the air intake system.

In case the engine load is too high

Check the hydraulic system load and the engine conditions.

In case the fuel feed pressure is too low

Check the fuel filter and the fuel feed pump.

In case the rail pressure is too low

Check the fuel control unit, the high pressure pump and the rail pressure relief valve.

In case the rail pressure is too high

Check the hydraulic system load.

NOTE!

If there are very abnormal results, check the fuel rail pressure sensor and the E-ECU.

16. Stop the engine.

17. Save the job card, and disconnect the VCADS Pro cable.

18. Restore the machine to operating condition.

Document Title: Fuel control valve (FCV), replacing	Function Group: 237	Information Type: Service Information	Date: 2015/3/13
Profile: EXC, EC160C NL [GB]			

Fuel control valve (FCV), replacing

Op nbr 237-033



WARNING

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.

1. Place the machine in service position B, see [091 Service positions](#).
2. Turn the battery disconnect switch to off position.
3. Open the engine hood.
4. Disconnect connectors (1) and (2).

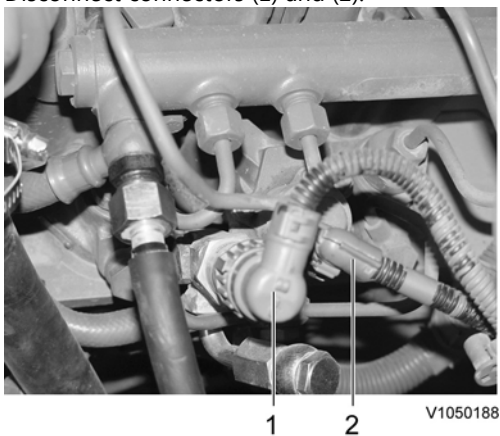


Figure 1
Fuel control valve, connectors

1. Connector for fuel pressure sensor
 2. Connector for fuel control valve
5. Remove fuel feed pipe (1) from fuel rail (2).

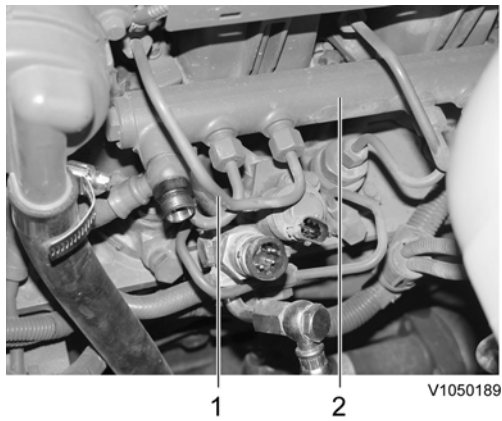


Figure 2
Fuel feed pipe, removal

1. Fuel feed pipe
2. Fuel rail

6. Loosen banjo bolt (1) and remove the fuel control inlet block.

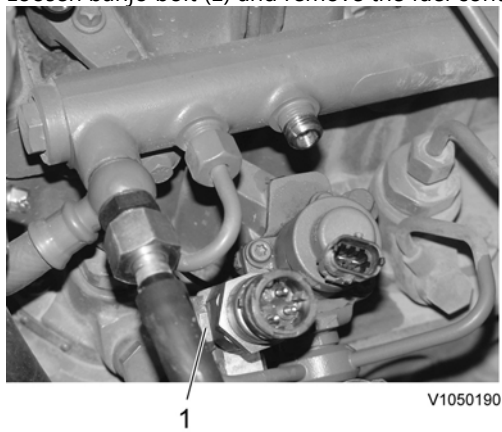


Figure 3
Fuel control inlet block, removal

7. Remove fuel feed pipe (1), banjo bolt (2) for the fuel return line and two mounting screws (4) for flow control valve (3).

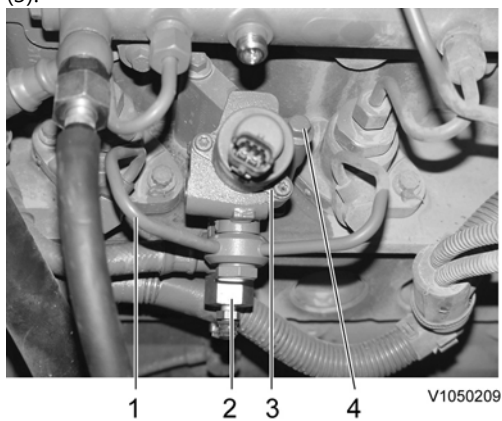


Figure 4

1. Fuel feed pipe
2. Banjo bolt for fuel return line
3. Fuel control valve
4. Screw

Installing

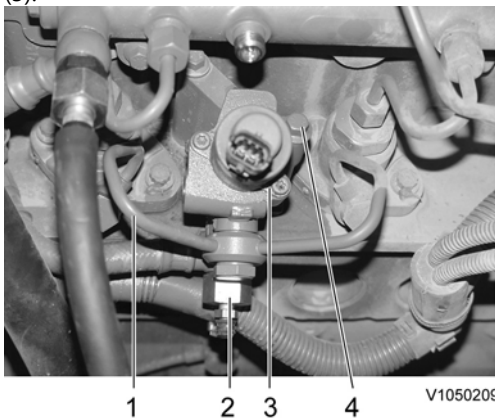
8. Install the new fuel control valve.



V1050191

Figure 5
Fuel Control Valve (FCV)

9. Install fuel feed pipe (1), banjo bolt (2) for the fuel return line and two mounting screws (4) for flow control valve (3).



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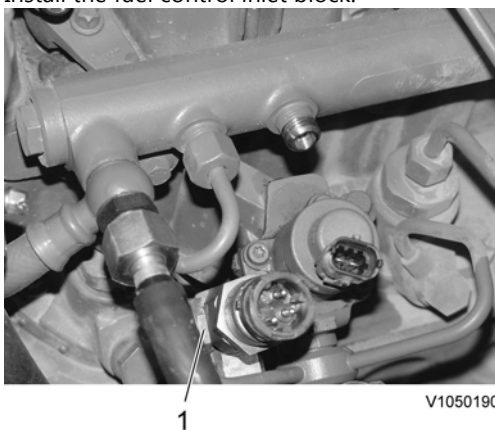
Figure 6

1. Fuel feed pipe
2. Banjo bolt for fuel return line
3. Fuel control valve
4. Screw

NOTE!

Use new copper washers when installing.

10. Install the fuel control inlet block.



V1050190

Figure 7
Fuel control inlet block

1. Banjo bolt

NOTE!

Use new copper washers when installing.

11. Install fuel feed pipe (1) to fuel rail (2).

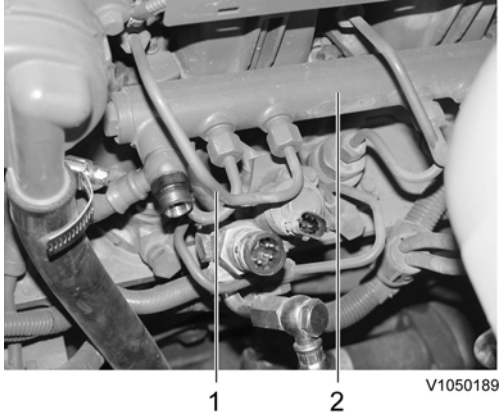


Figure 8
Fuel feed pipe, installation

12. Plug in the connector for fuel control valve (2) and fuel pressure sensor (1).

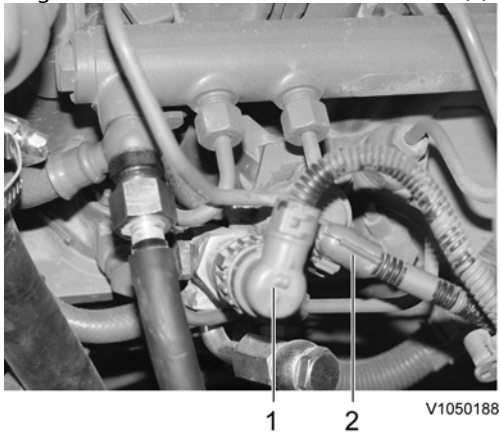


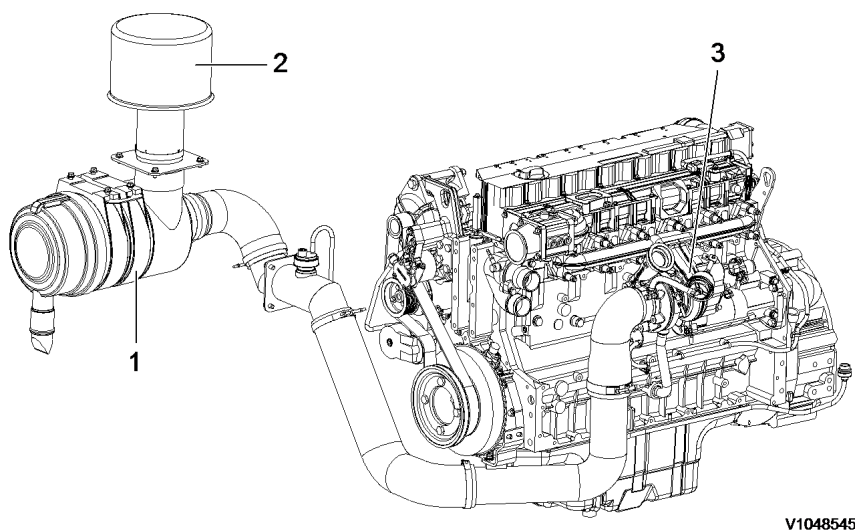
Figure 9
Fuel control valve, connectors

13. After completion of the work, start the engine and check for leaks.

Document Title: Inlet system, description	Function Group: 250	Information Type: Service Information	Date: 2015/3/13
Profile: EXC, EC160C NL [GB]			

Inlet system, description

- The air required for combustion is filtered by the pre-cleaner, air cleaner filter, and then supplied to the engine combustion chamber through the turbocharger.
- For operator convenience the clogging of the inlet system is sensed and activates a warning lamp on the dash board.



V1048545

Figure 1
Inlet system

1. Air cleaner
2. Pre-cleaner
3. Turbocharger

Document Title: Exhaust system, description	Function Group: 250	Information Type: Service Information	Date: 2015/3/13
Profile: EXC, EC160C NL [GB]			

Exhaust system, description

1. The exhaust system is designed so that exhaust noise is remarkably reduced when the exhaust gas is passed through the manifold and muffler.

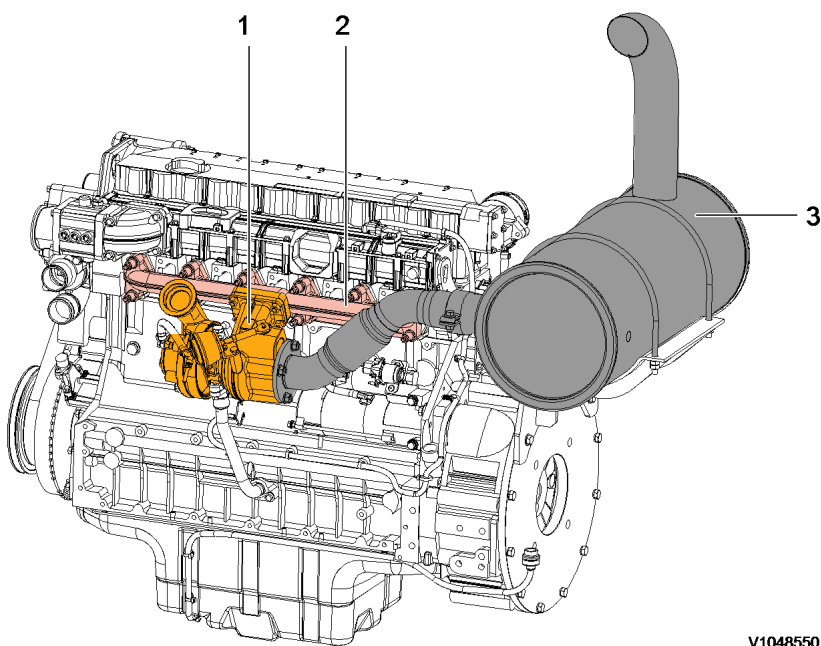


Figure 1
Exhaust system

1. Turbocharger
2. Exhaust manifold
3. Muffler

Document Title: Silencer, replacing	Function Group: 252	Information Type: Service Information	Date: 2015/3/13
Profile: EXC, EC160C NL [GB]			

Silencer, replacing

Op nbr 252-020

WARNING

Risk of burns - stop the diesel engine and allow it to cool down before starting any work.

WARNING

The parts are heavy. Take appropriate safety cautions when handling them.

1. Place the machine in the service position B. See [091 Service positions](#)
2. Open the engine hood.
3. Remove screws (1, 2) and then remove silencer hood (3).

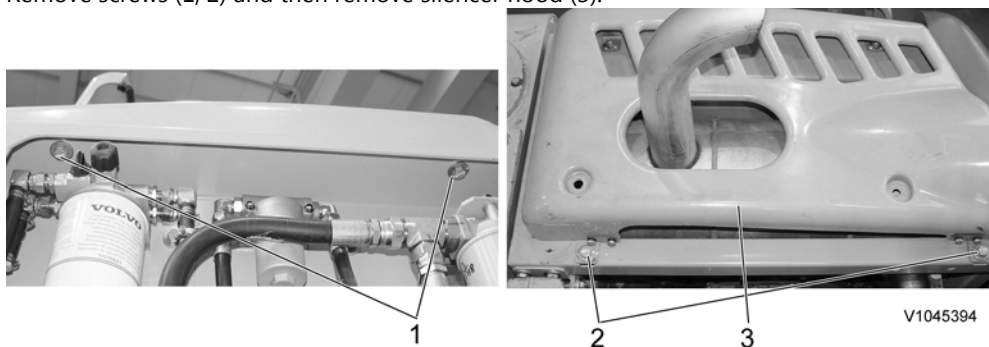


Figure 1
Removal, silencer hood

1. Screw
 2. Screw
 3. Silencer hood
4. Remove mounting screws (4) of water separator (1), servo hydraulic filter (2) and hydraulic oil drain filter (3).

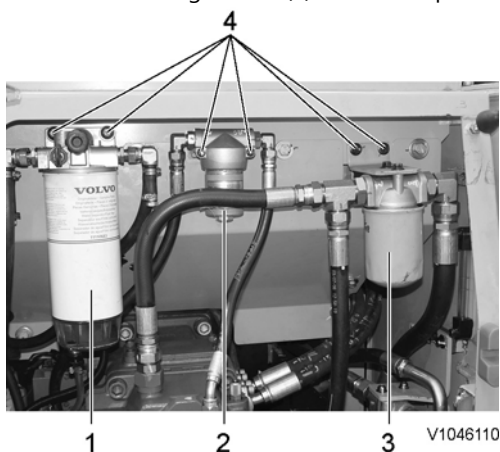


Figure 2

1. Water separator
2. Servo hydraulic filter
3. Hydraulic oil drain filter
4. Mounting screw

5. Remove covers (1, 2).

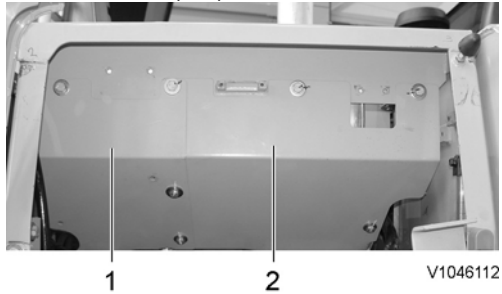


Figure 3

6. Remove clamping screws (1).

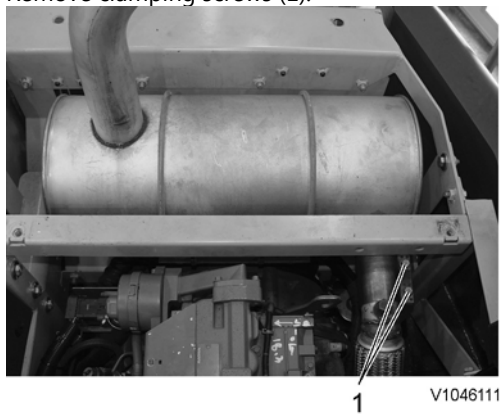


Figure 4

Removal, clamping screw

7. Remove U-bolts (1) and silencer (2) using a lifting device.

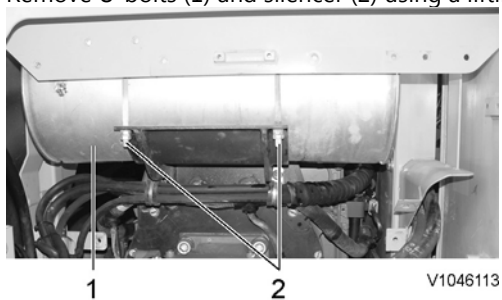


Figure 5

Removal, U-bolts

8. For assembling, reverse disassembly procedure.

Document Title: Exhaust pipe, flexible tube, replacing	Function Group: 252	Information Type: Service Information	Date: 2015/3/13
Profile: EXC, EC160C NL [GB]			

Exhaust pipe, flexible tube, replacing

Op nbr 252-021



Risk of burns - stop the diesel engine and allow it to cool down before starting any work.

1. Place the machine in the service position B. See [091 Service positions](#)
2. Turn the battery disconnect switch to off position.
3. Open the engine hood.
4. Remove screws (1, 2) and then remove silencer hood (3).

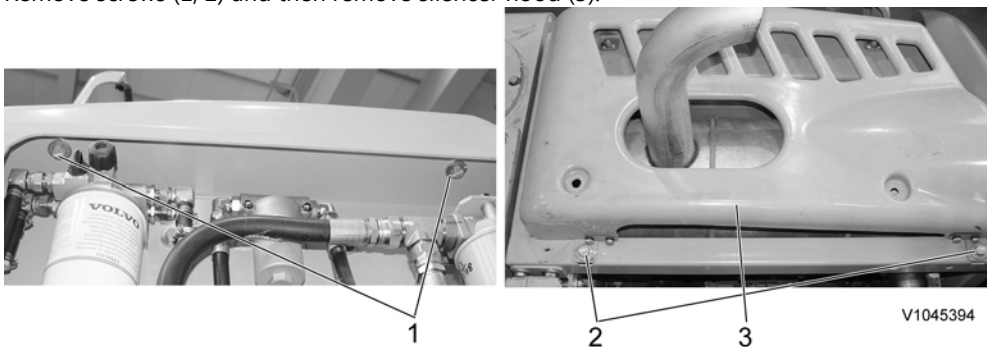


Figure 1
Removal, silencer hood

1. Screw
 2. Screw
 3. Silencer hood
5. Remove heat shield (1) of the starter.

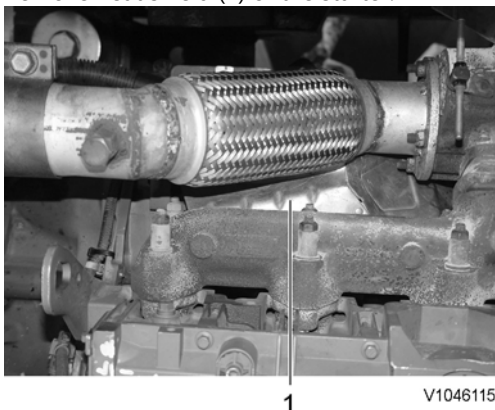


Figure 2

6. Remove clamping screws (1).

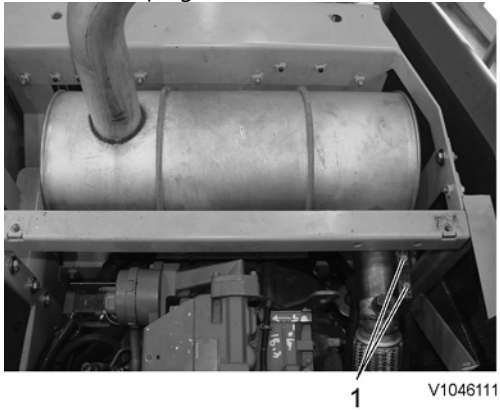


Figure 3

7. Remove nuts (1).

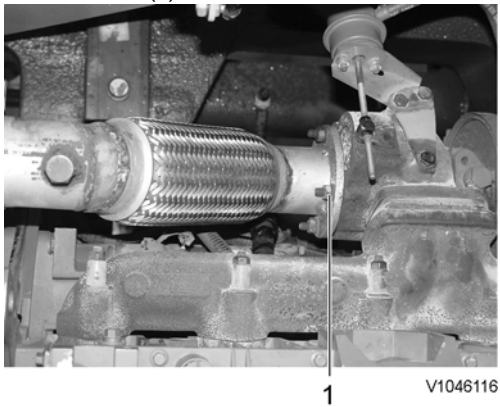


Figure 4

8. Remove two double nuts of the U-bolt on the engine side.

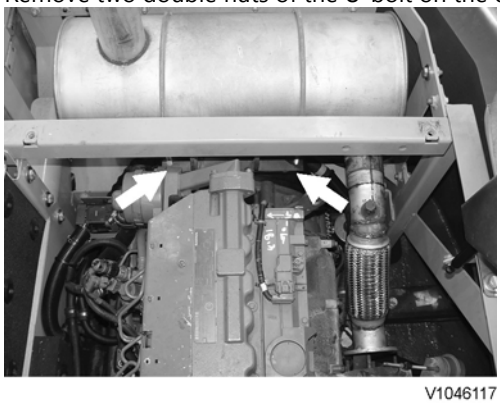


Figure 5
Removal, nut

9. Remove the exhaust pipe from the silencer by rotating the silencer.
10. Install the new exhaust pipe.
11. For assembling, reverse disassembly procedure.

Document Title: Turbocharger, description	Function Group: 255	Information Type: Service Information	Date: 2015/3/13
Profile: EXC, EC160C NL [GB]			

Turbocharger, description

The turbocharger is driven by the exhaust gasses as they pass through the turbine housing.

The exhaust gas flow causes the turbine rotor in the turbine housing to rotate. The compressor rotor is positioned on the same shaft as the turbine rotor. The compressor rotor is positioned in a housing which is connected between the air cleaner and the engine induction manifold.

When the compressor rotor rotates, air is drawn from the air cleaner. The air is compressed and forced into the engine cylinders, after it first has been cooled down while passing through the intercooler.

The turbochargers on some engines are equipped with a wastegate valve. The waste-gate valve, which is controlled by the charge-air pressure, allows a small amount of the exhaust gasses to by-pass the turbine rotor at high engine speeds (high charge-air pressure). This design makes the turbocharger efficient at low engine speeds.

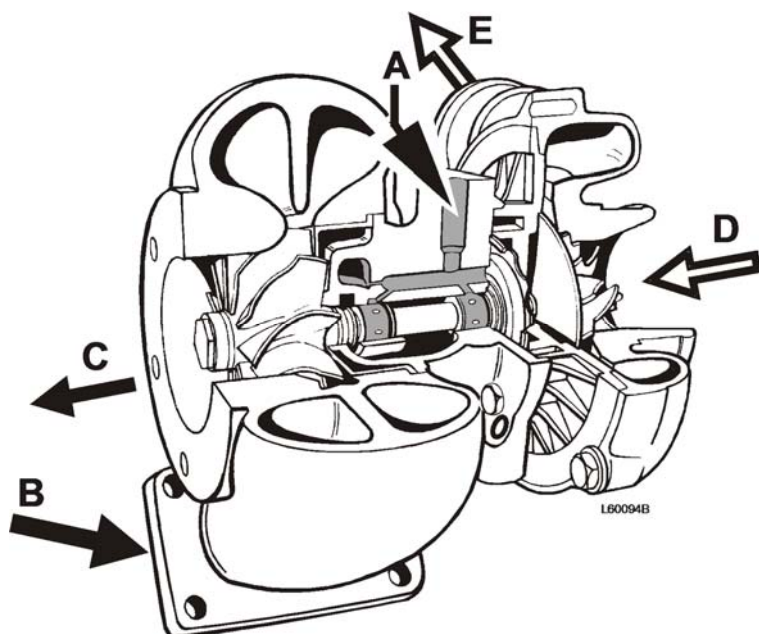


Figure 1
Turbocharger, principle diagram

- A. Supply of lubricating oil
- B. Exhaust gases from engine into turbocharger
- C. Exhaust gases out from turbocharger
- D. Air via air filter
- E. Air to inlet manifold

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