

Document Title: General description	Function Group: 200	Information Type: Service Information	Date: 2014/5/13
Profile: WLO, L180E [GB]			

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General description

The engine is a straight six-cylinder, turbocharged, four-stroke and direct-injected diesel engine with an air-cooled intercooler.

It has an overhead camshaft, four valves per cylinder and unit injectors.

The engine designation is D12DLBE3.

The engine is of low-emission version.

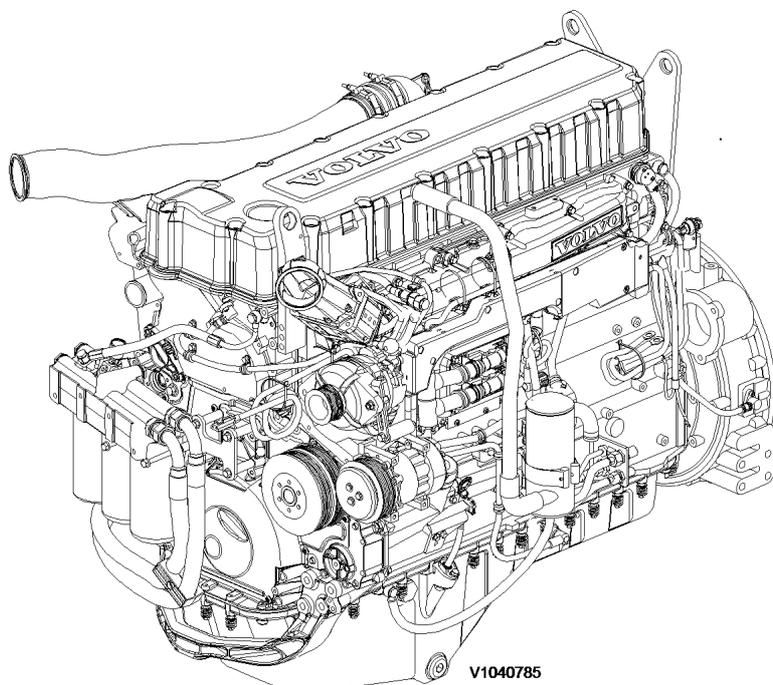


Figure 1

The cooling fan with vane motor is located in front of the radiator and is driven hydrostatically with a variable piston pump, Pump 3, (P3).

The speed of the fan is controlled by the vehicle ECU (V-ECU), which receives information about temperature in the following systems:

- Coolant temperature, radiator
- Coolant temperature, engine
- Transmission oil temperature
- Hydraulic oil temperature
- Temperature in front and rear axle (only when machine is equipped with axle oil cooler).
- Induction air temperature
- Charge-air temperature

Hydrostatically controlled cooling fan speed gives the engine high power as well as low sound level, since the cooling fan does not work at max. rpm as often.

The cooling system is based on a concept where cooling for engine, transmission, hydraulics and axle oil cooling (optional equipment) are integrated.

These systems' cooling depends on the cooling fan speed.

Engine identification

Identification plate 1

Engine designation, serial number, part number and assembly plant are stamped in one field on the engine block's left rear edge

Identification plate 2

A decal with the software's ID-number, the engine's serial number and assembly plant is located on the valve cover to ensure installation of correct ECU on the engine in production. On the back of the ECU, there is a decal indicating its hardware number.

Assembly plants:

A = Skövde, Sweden

E = Curitiba, Brazil

F = Flen, Sweden

L = Lyon, France

Identification plate 3

The certification decal is located on the valve cover as well as on the machine frame.

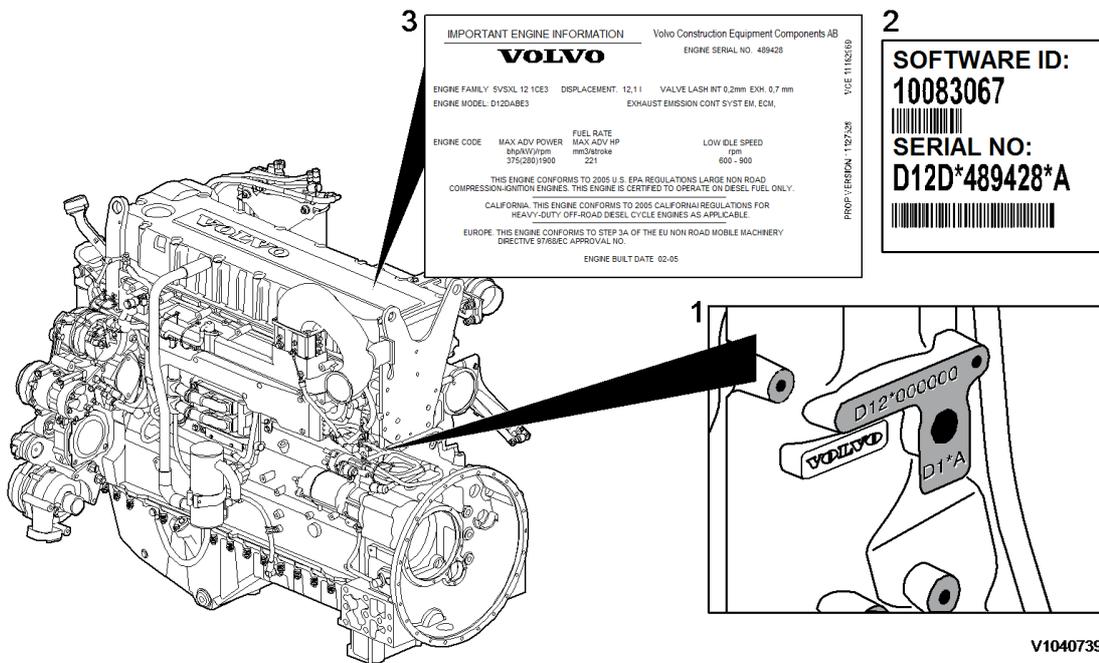


Figure 2
Engine identification, D12D

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General description

The engine is a straight, six-cylinder, four-stroke, direct-injection, turbocharged diesel engine with an air-cooled intercooler. It is provided with an overhead camshaft, four valves per cylinder and unit injectors. The engine type designation is D12CLBE2.

The engine is of the low-emission version.

Information about the engine and in which machine it is installed is stamped-in both on the right side of the cylinder block and on a plate next to the stamped-in information. It can also be found on a label on the engine ECU (E-ECU).

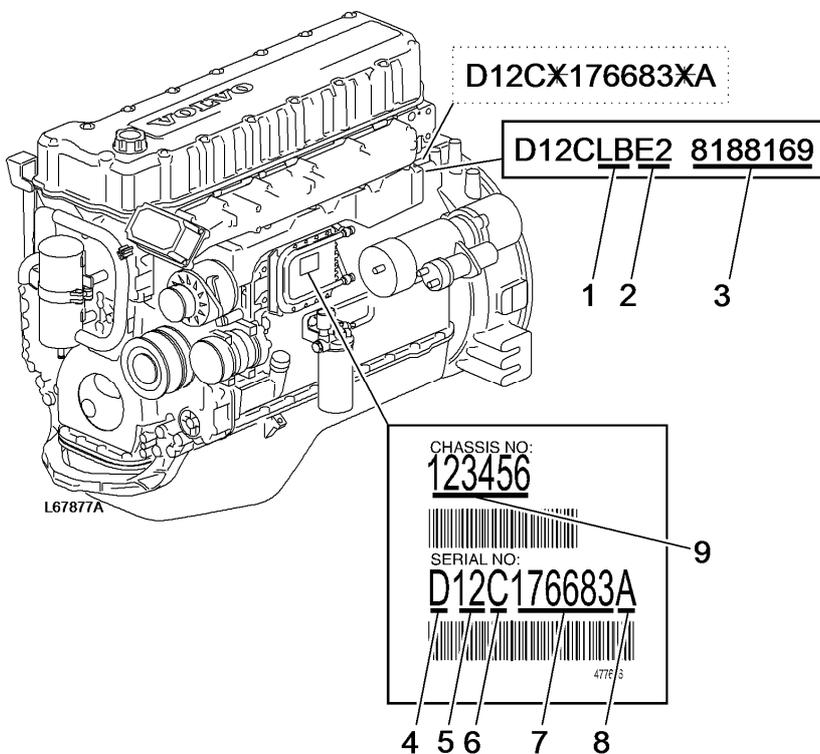


Figure 1

1. Machine connection, for example L220E
2. Euro 2, emission version
3. Product number
4. Diesel
5. Cylinder capacity
6. Generation
7. Serial number
8. Place of manufacture
9. Machine chassis number

The cooling fan with vane motor is positioned behind the radiator and is hydrostatically driven by a variable piston pump, Pump 3, (P3).

The fan speed is controlled by the vehicle ECU (V-ECU), which receives information about the temperature in the following systems:

- Coolant temperature, radiator
- Coolant temperature, engine
- Transmission oil temperature
- Hydraulic oil temperature
- Temperature in the front and rear axles (only if the machine is equipped with axle oil coolers.)
- Induction air temperature
- Charge air temperature

The hydrostatically controlled cooling fan speed results in higher engine output and a low sound level, as the cooling fan does not often work at maximum speed.

The cooling system is based on a concept where the cooling of the engine, transmission, hydraulics and axle oil cooling, (optional equipment) is integrated.

The cooling of these systems are dependent on the cooling fan speed.

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Engine, removing

Op nbr 21070

[9998257 Lifting tool](#)

[9998547 Lifting device](#)

Bolt M14 x 35 mm, 2 pcs

Lifting eye M16, 4 pcs

1. Remove the engine hood, see [821 Engine hood, removing](#)

WARNING

2. **Risk of burns when removing the header tank cap because of excess pressure in the cooling system.**

Remove the cap from the header tank.

Drain the coolant. Use the drain hose stored in the right-hand battery box or the toolbox on the machine.

Volume: **approx. 41 litres (10.8 US gal) (approx. 3 litres (2.6 US gal) will remain in the engine block)**

Drain the oil if necessary. Use the drain hose stored in the toolbox on the machine.

Volume: **approx. 48 litres (2.7 US gal).**

Remove the clamp securing the oil drain plug.

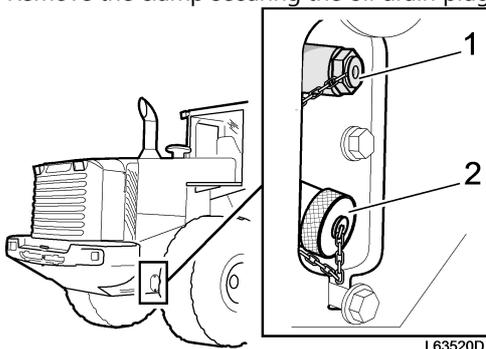


Figure 1

1. Draining the coolant
2. Draining the engine oil

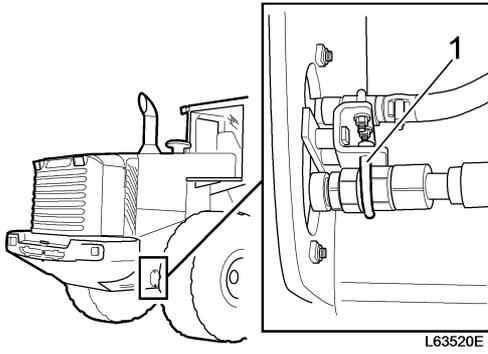


Figure 2

1. Clamp
3. Disconnect the oil pipe between the flywheel housings and the hydraulic transmissions from the flywheel housing.
 - Disconnect the hose to the cab heater from the engine block.
 - Remove the charge air pipe. Remove the header tank.
 - Remove the upper radiator hose.
 Disconnect the cable to the optional engine heater.

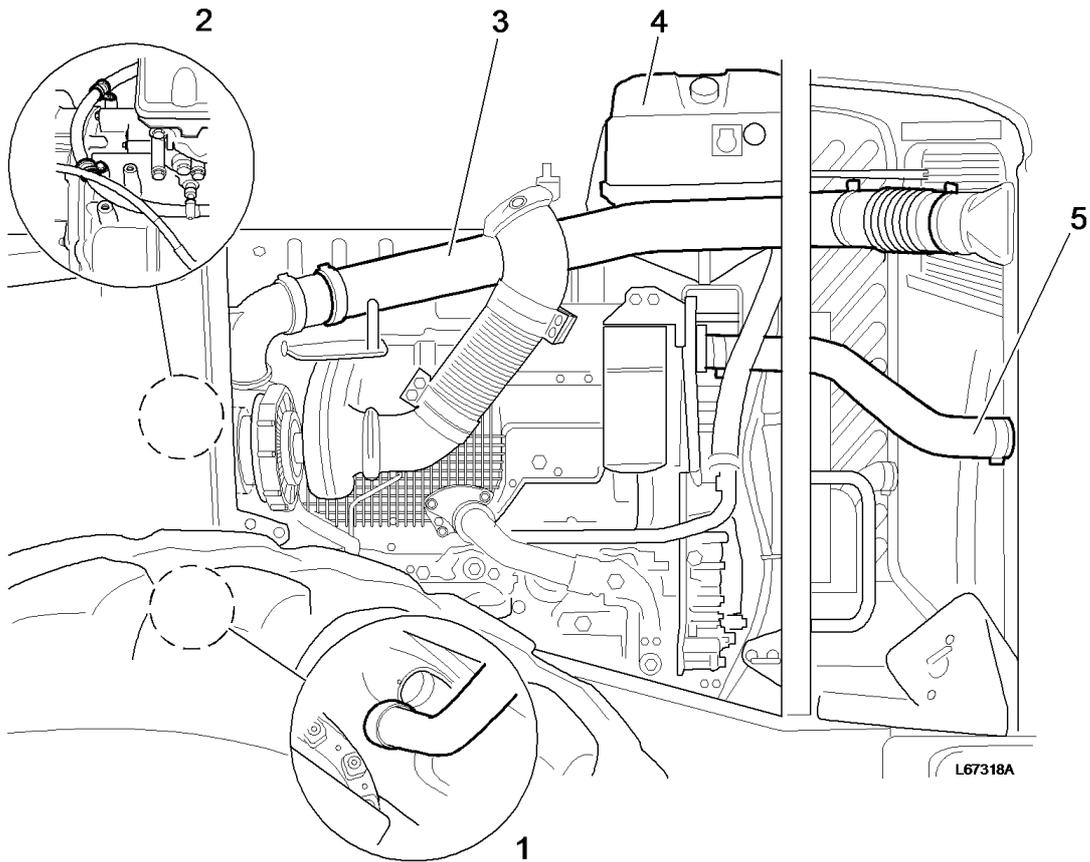


Figure 3

1. Oil pipe
2. Hose to cab heater
3. Charge air pipe
4. Header tank
5. Upper radiator hose

4. **WARNING**

Do not disconnect or loosen connections for the air conditioning unit (AC). Risk of gas leakage.

Remove the condenser and place it on the radiator.

- Detach the receiver drier. Remove the protective plate.
 - Detach the lower radiator hose from the engine.
 - Disconnect the fuel lines from the fuel pump and fuel filter.
 - Remove the charge air pipe and the hose between the preheating coil and radiator.
 - Remove the relay and clamps along with the bracket located on the member behind the hydraulic tank.
 - Disconnect the connector from the E-ECU, the cables from the starter motor and the connector from the oil level sensor.
 - Undo the alternator at the adjustment point for the belt tensioner. Remove the belt.
 - Unplug the connectors by the A/C compressor.
- Remove the A/C compressor from the engine.

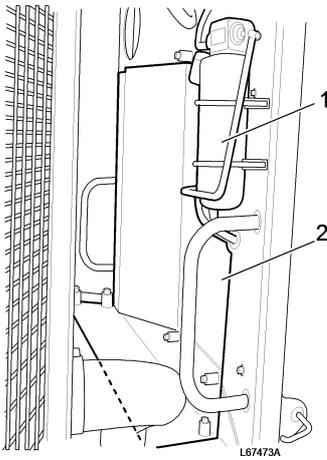


Figure 4

1. Receiver drier
2. Protective plate

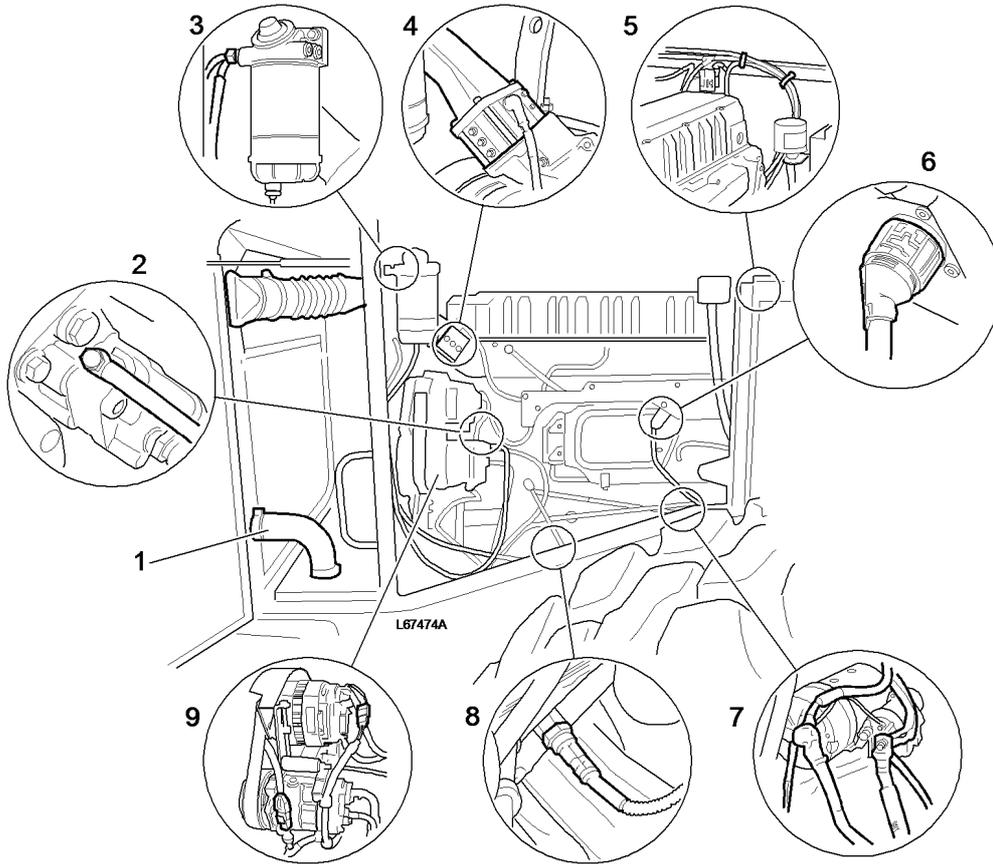


Figure 5

- | | | | |
|---|----------------------------------|---|------------------------------------|
| 1 | Lower radiator hose | 6 | Connector, E-ECU |
| 2 | Fuel line, fuel pump | 7 | Wiring, starter motor |
| 3 | Fuel connection, fuel filter | 8 | Connector, oil level sensor SE213 |
| 4 | Charge air pipe, preheating coil | 9 | Alternator, compressor, connectors |
| 5 | Relay, clamp | | |

5. Remove the side panels.

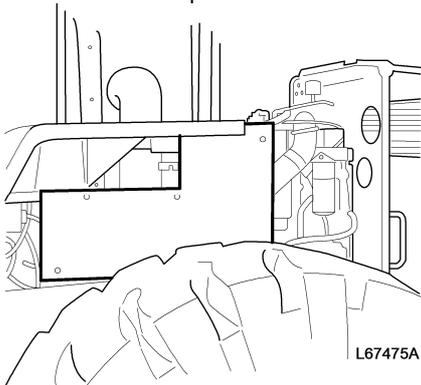


Figure 6

6. Remove the partition wall.
 Partition wall, weight: **approx. 45 kg (approx. 100 lbs).**

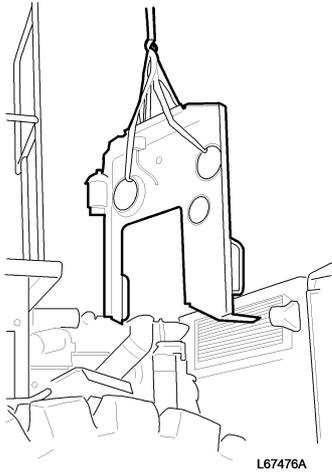


Figure 7

7. Secure the hydraulic transmission in place with a sling and a ratchet blocks as illustrated.

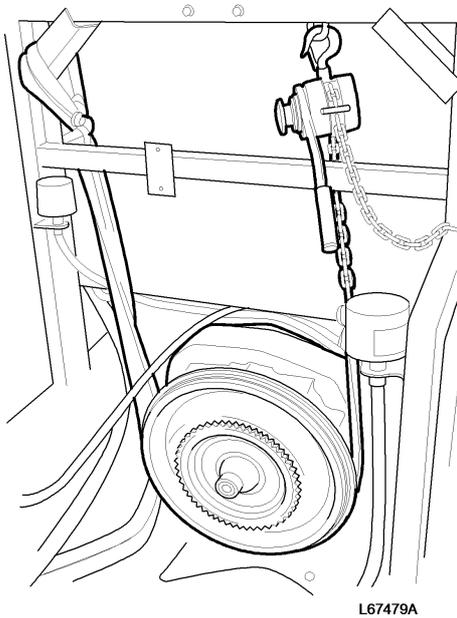


Figure 8
Hydraulic transmission secured (engine removed)

8. Fit tool 9998257 and connect 9998547 and a lifting device to the engine.

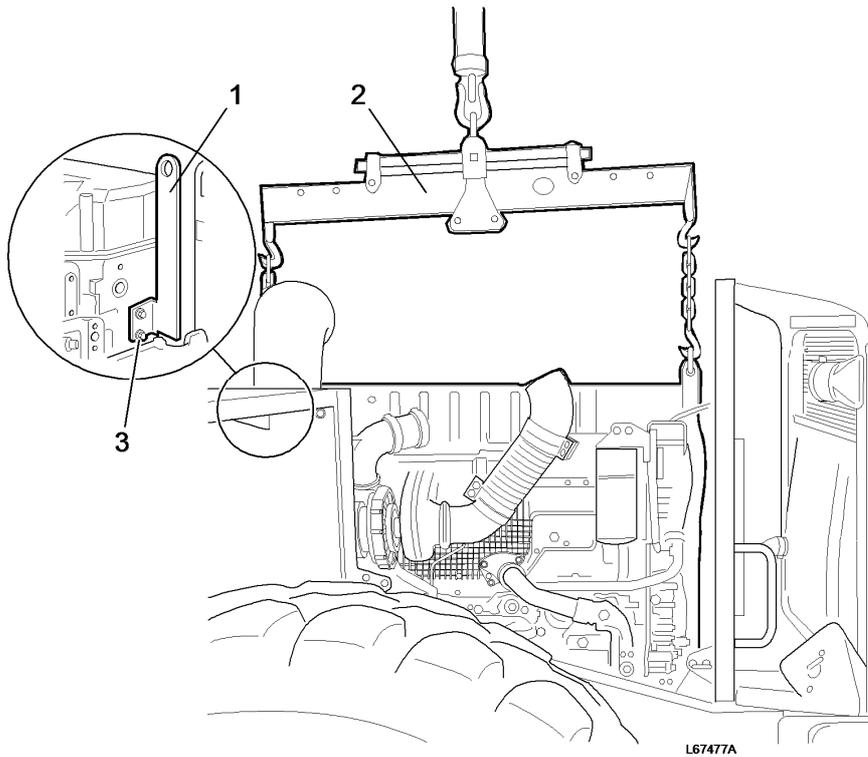


Figure 9

1. 9998257
2. 9998547
3. Bolts M14 x 35, 2 pcs

9. Remove the retaining bolts securing the hydraulic transmission.

NOTE!

To remove one of the bolts, remove the protective plate by the gear selector valve.

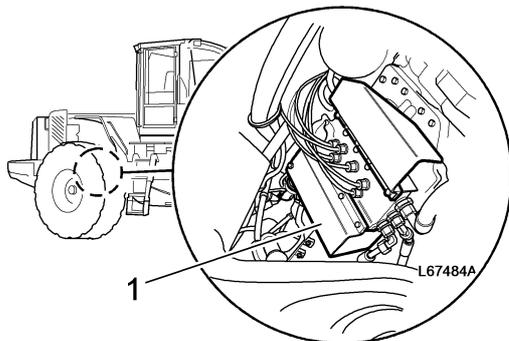


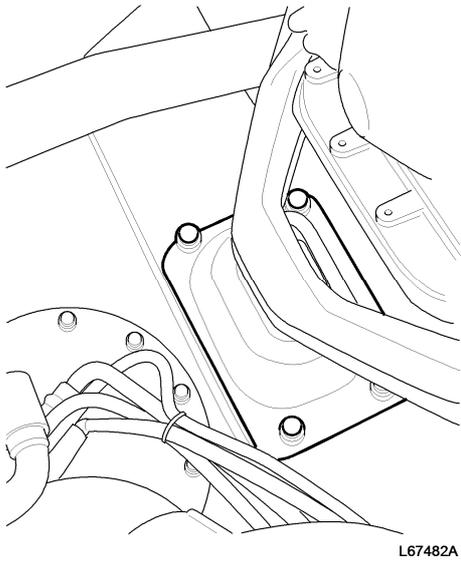
Figure 10

1. Protective plate

10. Remove the bolts securing the engine mounting.

Remove the engine.

Engine's weight, including oil: **approx. 1350 kg (approx. 3000 lbs).**



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Figure 11

11. If changing the engine, transfer the components required to the new engine.

NOTE!

Never transfer a component that could cause a malfunction.

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Engine, removing

Op nbr 210-070

[9998547 Lifting tool](#)

Sling, 3 m, 2 pcs.

Sling, 4 m, 1 pcs.

Lifting eye M12, 2 pcs.

Washer M12, 2 pcs.

Nut M12, 2 pcs.

Shackle, 6 pcs.

Ratchet block, 750 kg

The operation also includes tools and times for steps to which references are given.

1. Place the machine in service position, see [191 Safety rules when servicing](#).
2. Turn off the main electric power with the battery disconnect switch.



WARNING

Risk of burns when removing the header tank cap because of excess pressure in the cooling system.

3. Remove the cap from the expansion tank.
Drain the coolant. Use the drain hose located in the machine's toolbox.
Volume, see [260 Cooling system volume](#).

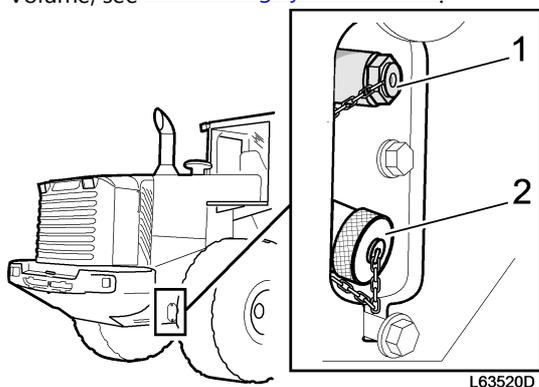


Figure 1

1. Drain point for coolant
 2. Drain for engine oil
4. Remove the engine hood, see [821 Engine hood, removing](#).
 5. Drain the engine oil. Use the drain hose located in the machine's toolbox.
Volume, see [210 Engine, volume](#).
 6. Remove the side panels by the engine and remove the clamp that holds the oil drain.

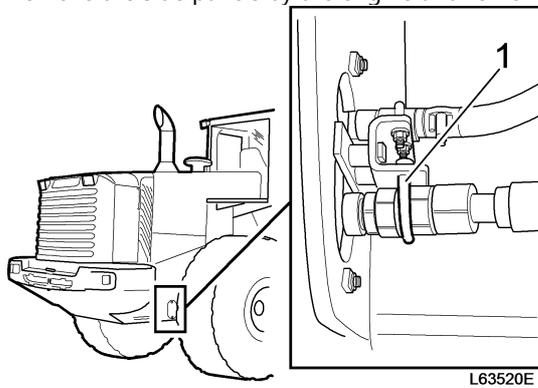


Figure 2

1. Clamp
7. Drain the transmission oil. Volume, see [030 Hydraulic transmission, volume](#)
 8. Remove the oil pipe from the flywheel housing.

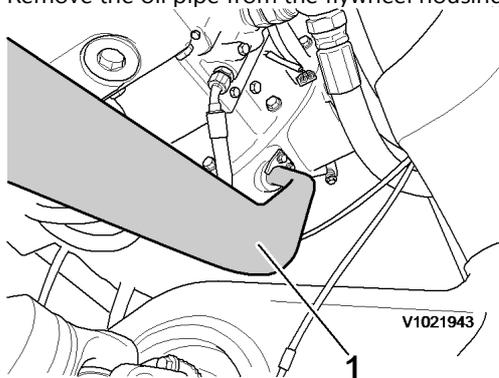
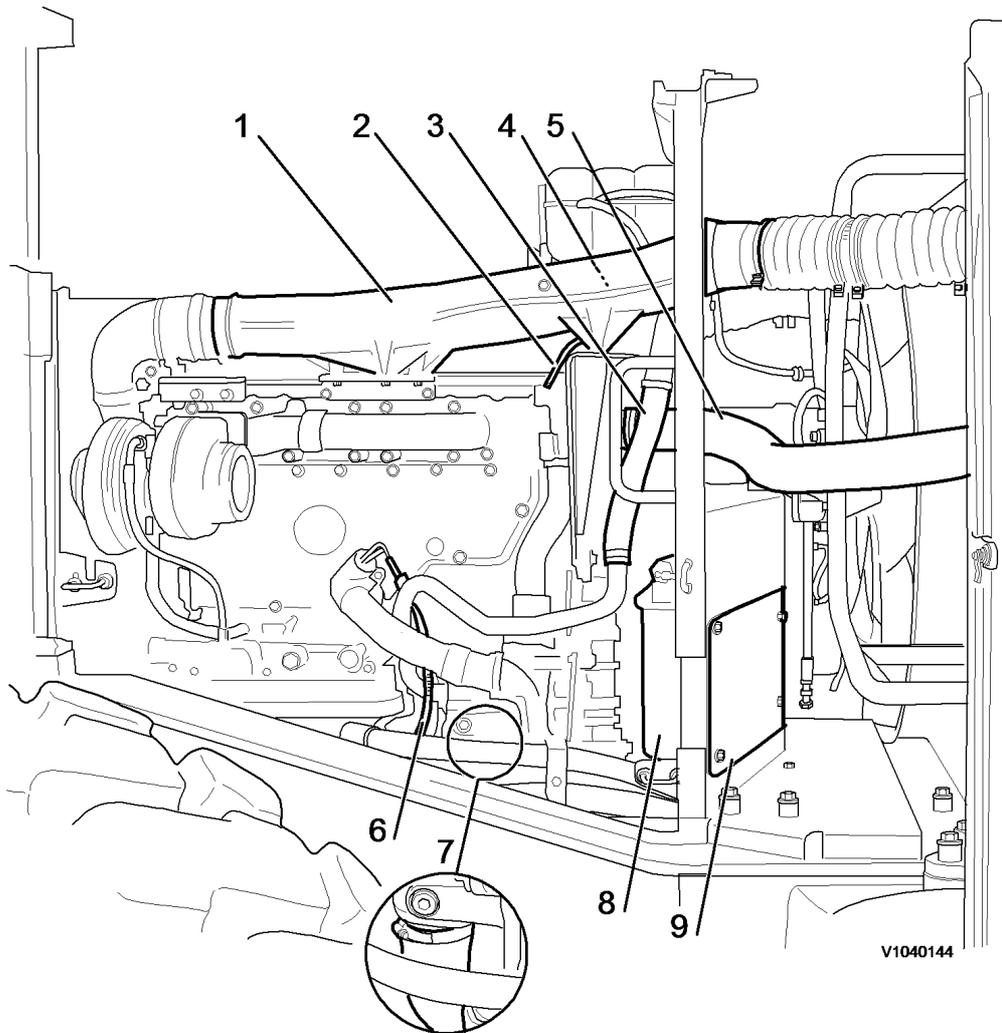


Figure 3

1. Oil pipe

Left side



V1040144

Figure 4

- | | |
|-------------------------|-------------------------|
| 1. Charge-air pipe | 6. Cable, engine heater |
| 2. Radiator hose | 7. Radiator hose, lower |
| 3. Hose | 8. Filter housing |
| 4. Connector (SE2603) | 9. Plate |
| 5. Radiator hose, upper | |

9. Remove the charge-air pipe.
10. Disconnect the upper and lower radiator hose from the engine.
11. Disconnect the cable to the optional engine heater.
12. Disconnect the hose at the cylinder head and the hose at the expansion tank.
Unplug the connector for the coolant level sensor (SE2603) on the expansion tank.
13. Remove the plate by the oil filters.
14. Remove the filter housing from the intermediate wall and remove the clamp.

Right side

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