

Document Title: <b>Engine, description</b>	Function Group: <b>200</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/24</b>
Profile: <b>WLO, L120E [GB]</b>			

## Engine, description

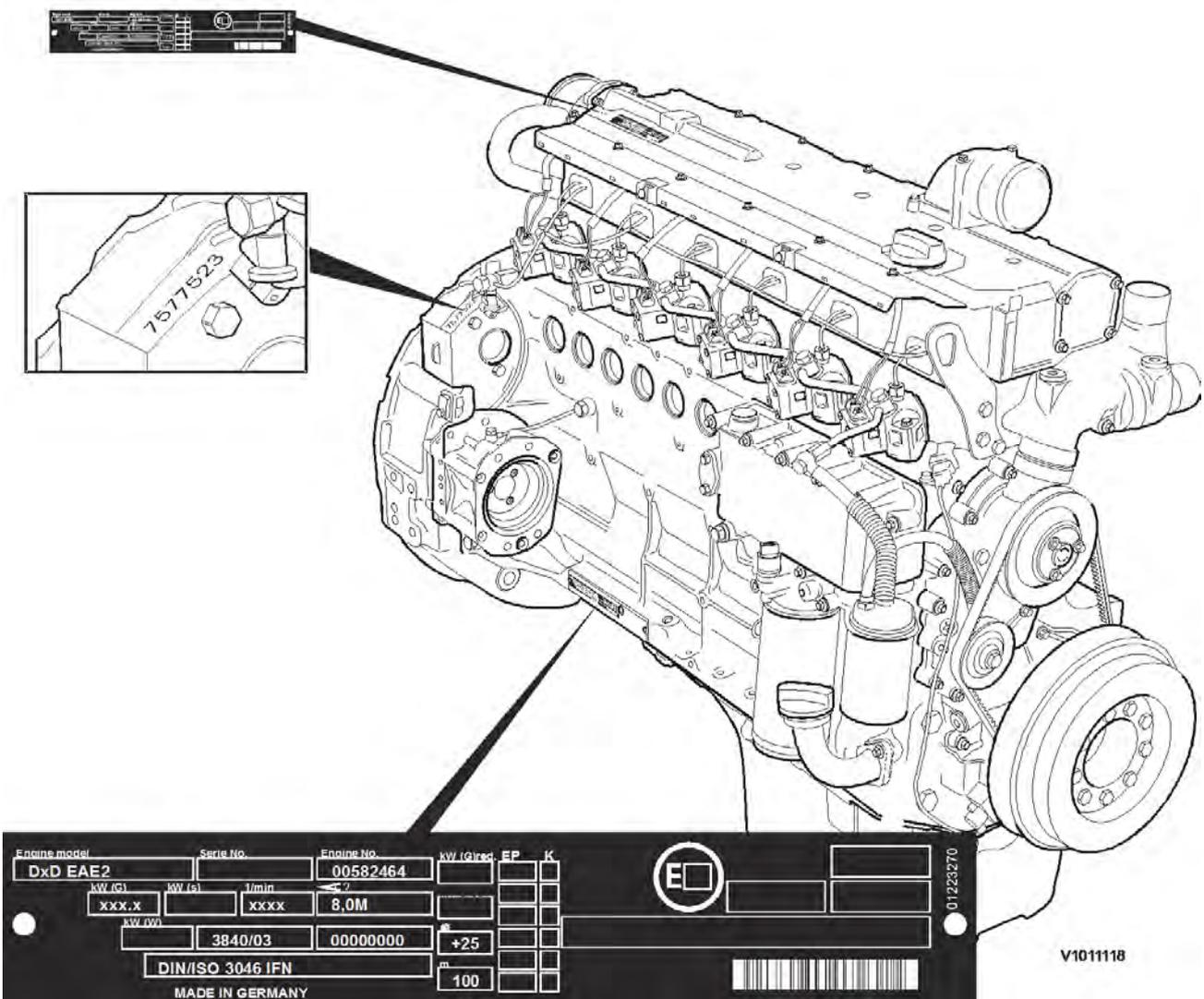
The engine is equipped with a four-stroke, straight six-cylinder turbocharged and direct-injected diesel engine with an air-cooled intercooler.

Fuel is injected with unit pumps and injectors. The injectors are positioned at an angle above the pistons and the unit pumps are controlled via the camshaft and the engine control unit (E-ECU) software.

D7D is equipped with wet replaceable cylinder liners. The engine is of the low-emission version.

The engine serial number is stamped on the name plate, on the cylinder block side and on the valve cover. The engine model designation and serial number must be indicated when ordering spare parts.

The cylinders are numbered with cylinder one closest to the flywheel. The engine rotational direction is counter-clockwise, seen from the flywheel end. Firing order: 1-5-3-6-2-4.



**Figure 1**

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## Engine, description

### D7E - tier 3 compliant

The D7E configuration is a four stroke, straight six cylinder, turbocharged, direct injected diesel engine with charge air cooling and wet, replaceable cylinder liners.

The D7E engine uses a Common Rail Fuel System controlled by the engine electronic control (E-ECU) software.

The D7E uses V-ACT (Volvo Advanced Combustion Technology). The V-ACT D7E engine features split injection, optimized air handling and wastegate turbocharger. Electronically controlled IEGR (Internal Exhaust Gas Recirculation) reduces NO<sub>x</sub> formation and lowers emissions without the need for exhaust after treatment. Volvo's latest engine management system, EMS2 is used to control all engine electronic functions.

The cylinders are numbered consecutively beginning at the flywheel end. Engine rotational direction is counterclockwise as seen from the flywheel end.

The engine model, serial number and performance data are stamped on an identification plate which is attached to the right side of the crankcase. The engine model designation and serial number must be indicated when ordering spare parts.

Fig. model	Series No.	Engine No.	kw (C) (hp)	EP	K
D7E LAE 3		00582464			
162	2100	0.0M			
3840/03	00000000	+25			
ISO 1439E	100				
MADE IN GERMANY					

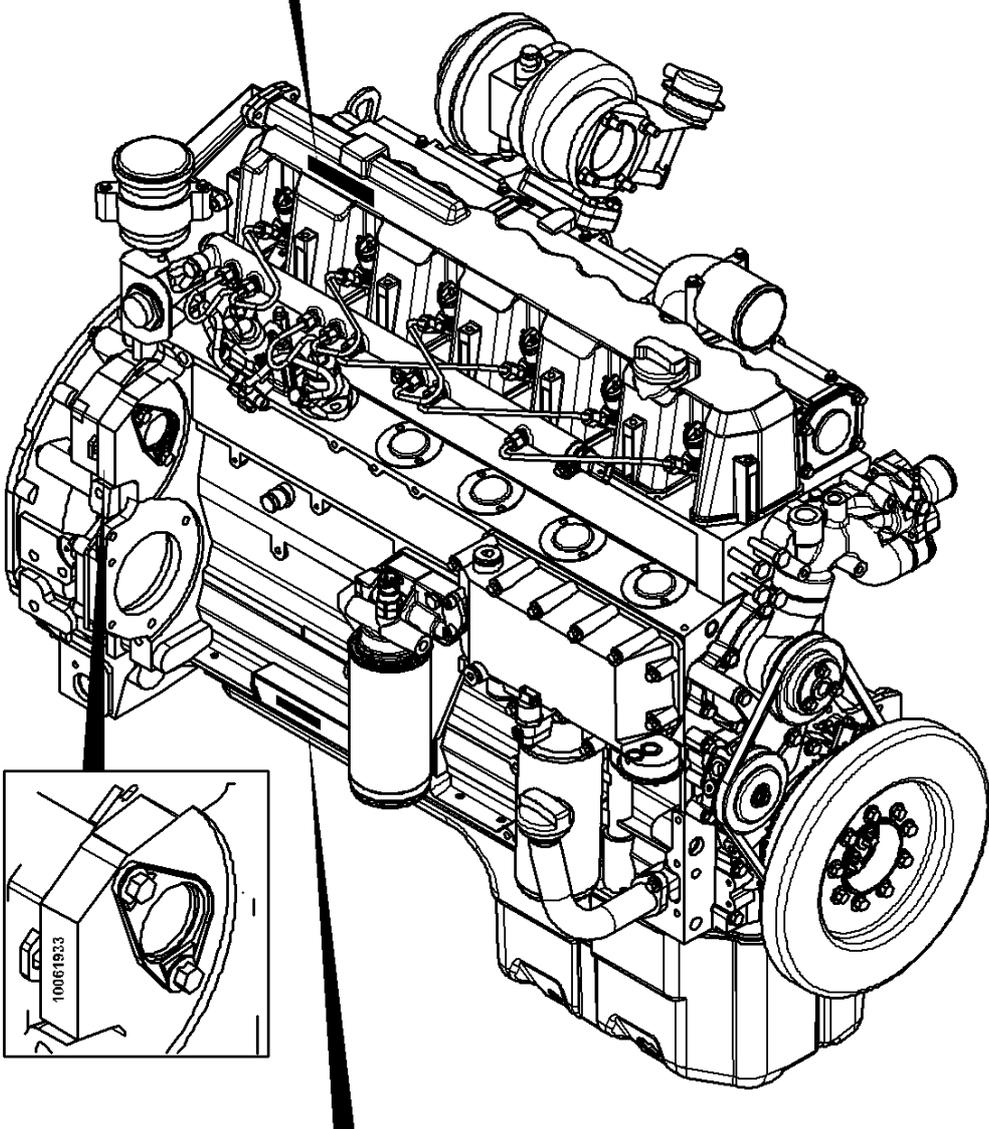


Fig. model	Series No.	Engine No.	kw (C) (hp)	EP	K
D7E LAE 3		00582464			
162	2100	0.0M			
3840/03	00000000	+25			
ISO 1439E	100				
MADE IN GERMANY					

V104\*234

Figure 1

Document Title: <b>Engine, removing</b>	Function Group: <b>210</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/24</b>
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## Engine, removing

### Op nbr 210-070

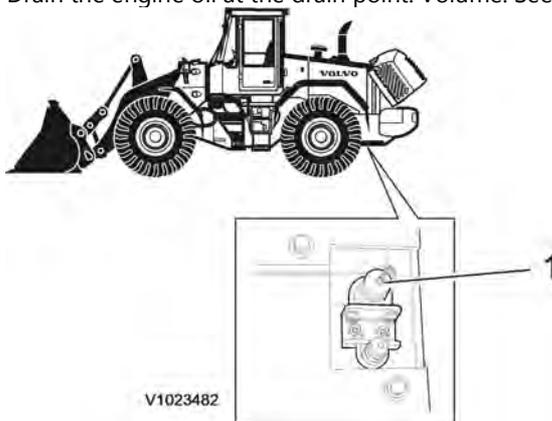
Sling 2.1 m (6.9 ft)

Sling 1 m (3.3 ft)

Sling 1.2 m (4 ft)

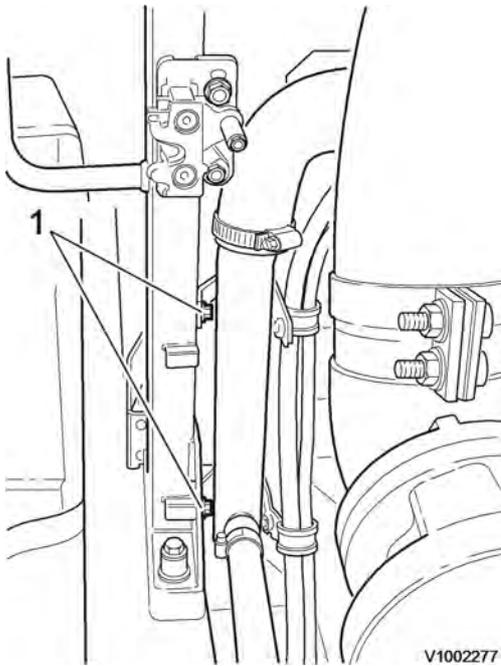
Lifting eyes, 4 pcs

1. Remove the engine hood, see [821 Engine hood, removing](#).
2. Drain the engine oil at the drain point. Volume: See [030 Engine, volume](#)



**Figure 1**

1. Drain point for engine oil
3. Remove the lower engine covers on both sides.
4. Remove the bolts for the bracket for coolant pipe.



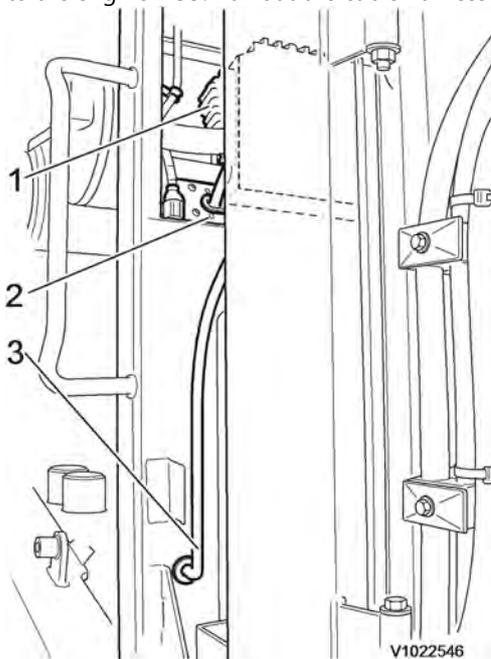
**Figure 2**

1. Bracket for coolant pipe

5. Part the fuel line to the fuel filter / hand pump at the joint on the inside of the intermediate wall. Plug any opened connections.

Pull the fuel line out through the rubber grommet.

Unplug the connector for the engine-ECU and loosen the plate with the rubber leadthrough for the cable harness to the engine-ECU. Pull out the cable harness through the hole.



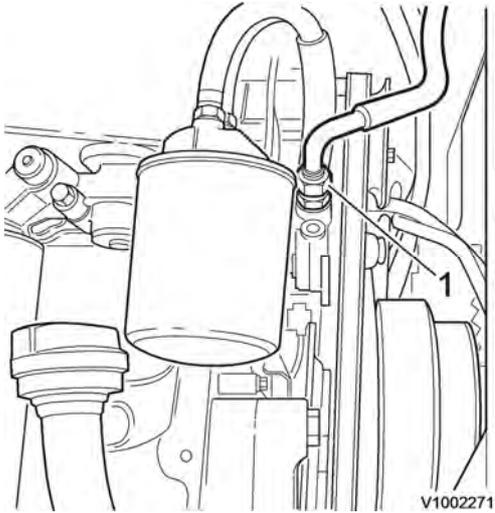
**Figure 3**

1. Connector for engine ECU

2. Grommet

3. Fuel line

6. Remove the fuel line from the feed pump and plug the connections.



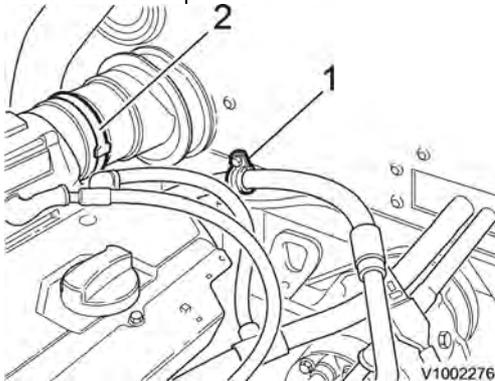
**Figure 4**

1. Fuel line
7. Detach the coolant filter from the partition wall.

### **NOTICE**

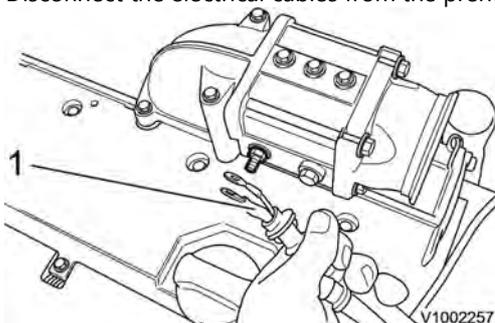
**Refrigerant under pressure. Do not disconnect any hoses or connections on the air conditioning, thereby involuntarily releasing refrigerant.**

8. Slacken the clamp for the AC hose. Slacken the clamp on the preheating element and intermediate pipe.



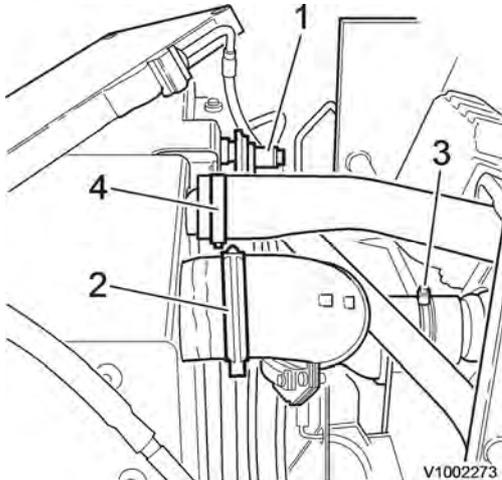
**Figure 5**

1. Clamp, AC hose
  2. Clamp, inlet manifold
9. Disconnect the electrical cables from the preheating element.



**Figure 6**

1. Electrical cables
10. Remove the pipe between intercooler and inlet manifold.  
Remove the bolt from the upper radiator bracket. Slacken the clamp and pull the upper coolant hose off the radiator.



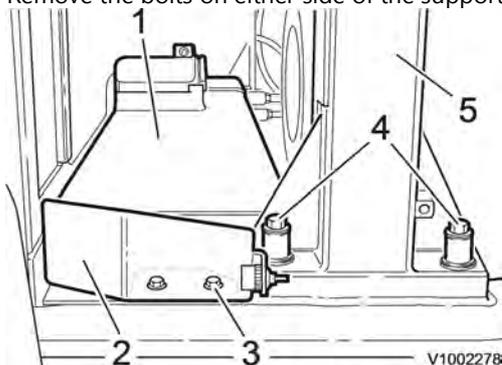
**Figure 7**

1. Upper radiator bracket
  2. Inlet pipe, intercooler
  3. Lower clamp for inlet pipe
  4. Upper coolant hose
11. Remove the guide plates, the partition wall and the cover plate over the hydraulic oil cooler. Detach the AC receiver/drier from the partition wall.

**NOTE!**

Do not loosen any pipe connections on the receiver/drier.

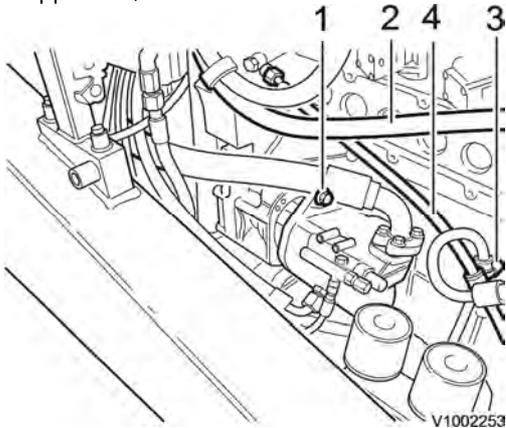
Remove the bolts on either side of the support frame. Remove the support frame.



**Figure 8**

1. Cover plate
2. Guide plate
3. Attaching bolt
4. Attaching bolt
5. Rear support frame

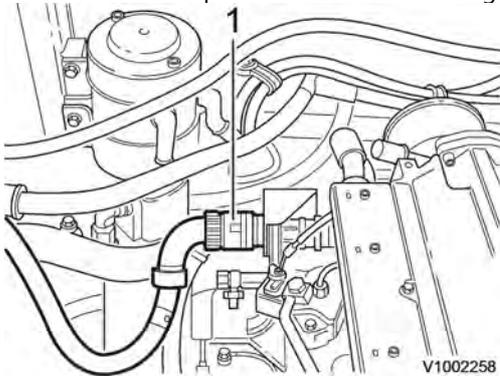
12. Disconnect the draining hose from the oil pan.
13. Remove cooling fan pump (P3) without slackening the hose connections. Secure the pump to the frame with tensioning straps.  
Disconnect the hose for the heater radiator in the cab from the engine.  
Remove the return fuel line and detach the line from the engine.  
If applicable, also remove the bracket for the line to the electric engine heater.



**Figure 9**

1. Attaching bolt
2. Heater hose
3. Bracket for electrical engine heater
4. Fuel return line

14. Disconnect the return fuel line from the fuel cooler. Collect spilled fuel in a vessel and plug the connections.
15. Disconnect the 48 pin connector from the engine ECU.



**Figure 10**

1. 48 pin connector

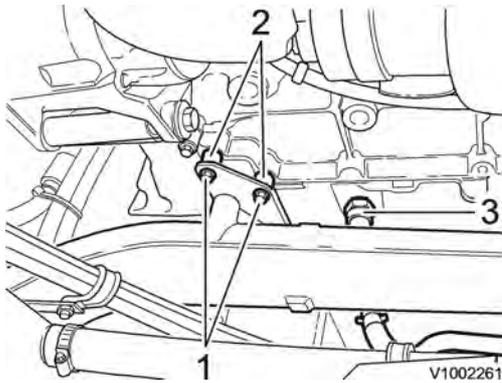
16. Remove the AC compressor from its bracket and lay it down against the frame.

**NOTE!**

Do not slacken any pipe connection on the compressor.

**Releasing right-hand side**

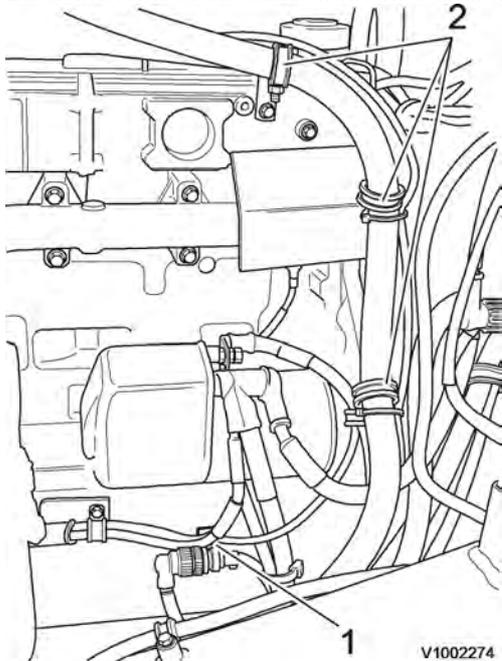
17. Remove oil level sensor SE213.  
Release the air pipe from the turbocharger to the intercooler. Take care of the spacers so that they do not fall down.



**Figure 11**

1. Attaching bolts
2. Spacers
3. Oil level sensor SE213

18. Remove the clamps for the coolant hoses. Remove the bracket for connector RL. Remove the heat dissipation plate on the starter motor. Label and remove the cables from the starter motor.



**Figure 12**

1. Bracket for connector RL
2. Clamp, 3 pcs

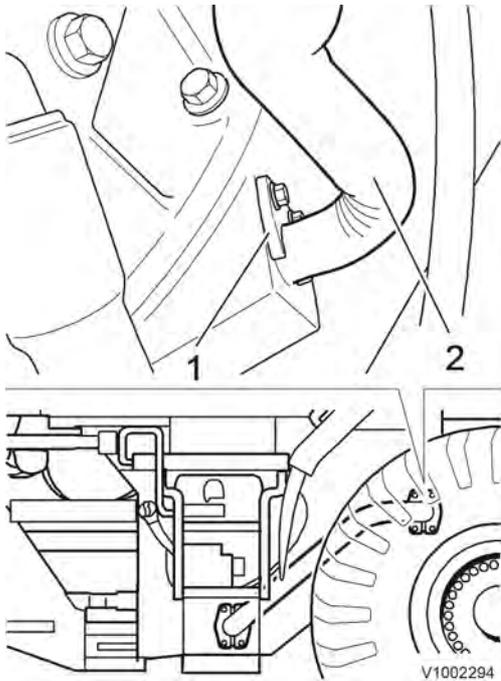
19. Remove the clamps and connector RD as well as the cable from the alternator.

### **Under the machine**

20. Remove the clamp bracket retaining the return pipe to the flywheel housing. Loosen the lower bracket slightly and turn the bracket downward approx. 25 mm (1 in). Tighten down the pipe again.

#### **NOTE!**

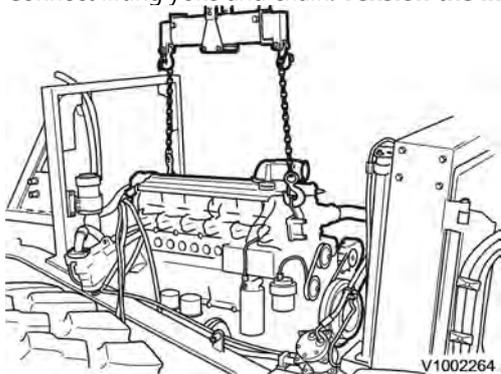
Use a vessel for collecting any oil spillage under the lower connection.



**Figure 13**

1. Clamp bracket
2. Return pipe

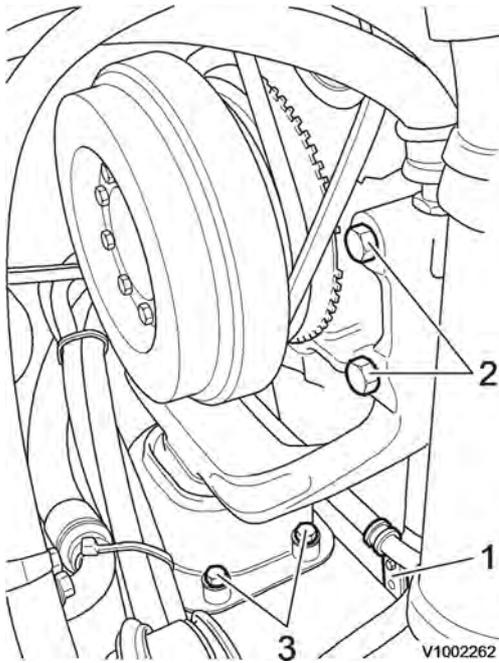
21. Connect lifting yoke and chain. **Tension the lifting device.**



**Figure 14**

Lifting yoke 999 8547

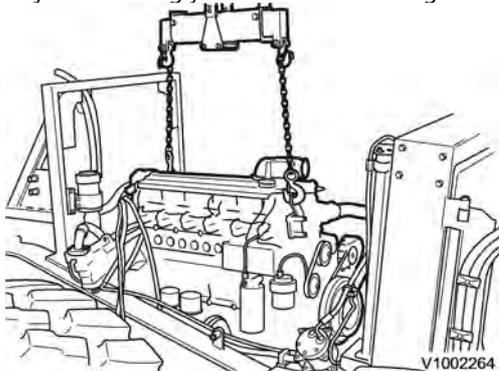
22. Remove the clamps for the coolant drainage and fuel return hoses on either side of the engine mounting. Press down the hoses under the engine.  
Remove the bolts for the engine front mounting and remove the mounting.



**Figure 15**

1. Clamp
2. Attaching bolt, engine mounting
3. Attaching bolt, engine pad

23. Lift the engine approx. 30 mm (1.2 in) and place a spacer of approx. 110 mm (4.3 in) between the transmission and the rear axle bridge. Lower until the transmission is resting on the spacer.
24. Detach the engine from the transmission.
25. Adjust the lifting yoke to the correct angle.



**Figure 16**

26. Lift away the engine. Weight approx. 760 kg (1676 lb).

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## Engine, removing

Op nbr 210-070

[9998547 Lifting tool](#)

Sling 1 m (3.3 ft)

Sling 3 m (9.8 ft), 2 pcs.

Lifting eyes M12, 4 pcs.

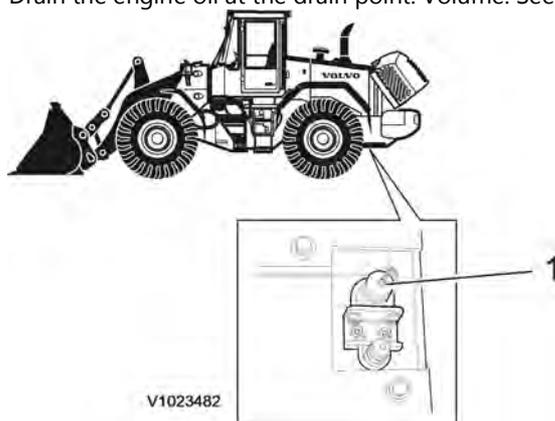
Ratchet block, 750 kg (1653 lbs)

Lift ring

Shackle, 4 pcs.

Starter motor wrench 17 mm

1. Remove the engine hood, see [821 Engine hood, removing](#).
2. Drain the engine oil at the drain point. Volume: See [030 Engine, volume](#)



**Figure 1**

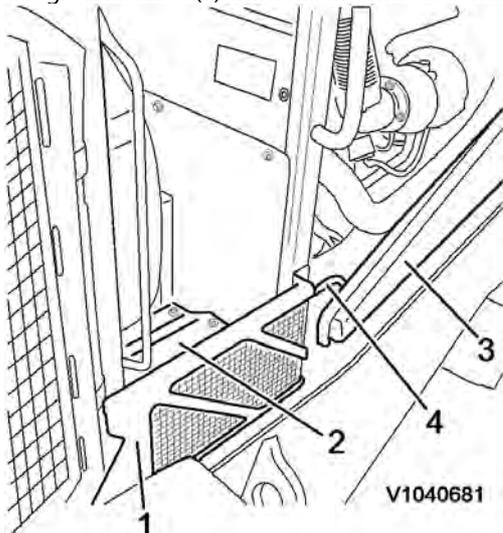
1. Drain point for engine oil
3. Drain the transmission oil. Volume, hydraulic transmission: see [030 Hydraulic transmission, volume](#)
4. Remove the mudguards and the side panels on the hydraulic tank. Weight, fender: approx. 30 kg (66 lbs).



**Figure 2**

1. Side panel
2. Sling, 1 m
3. Mudguard

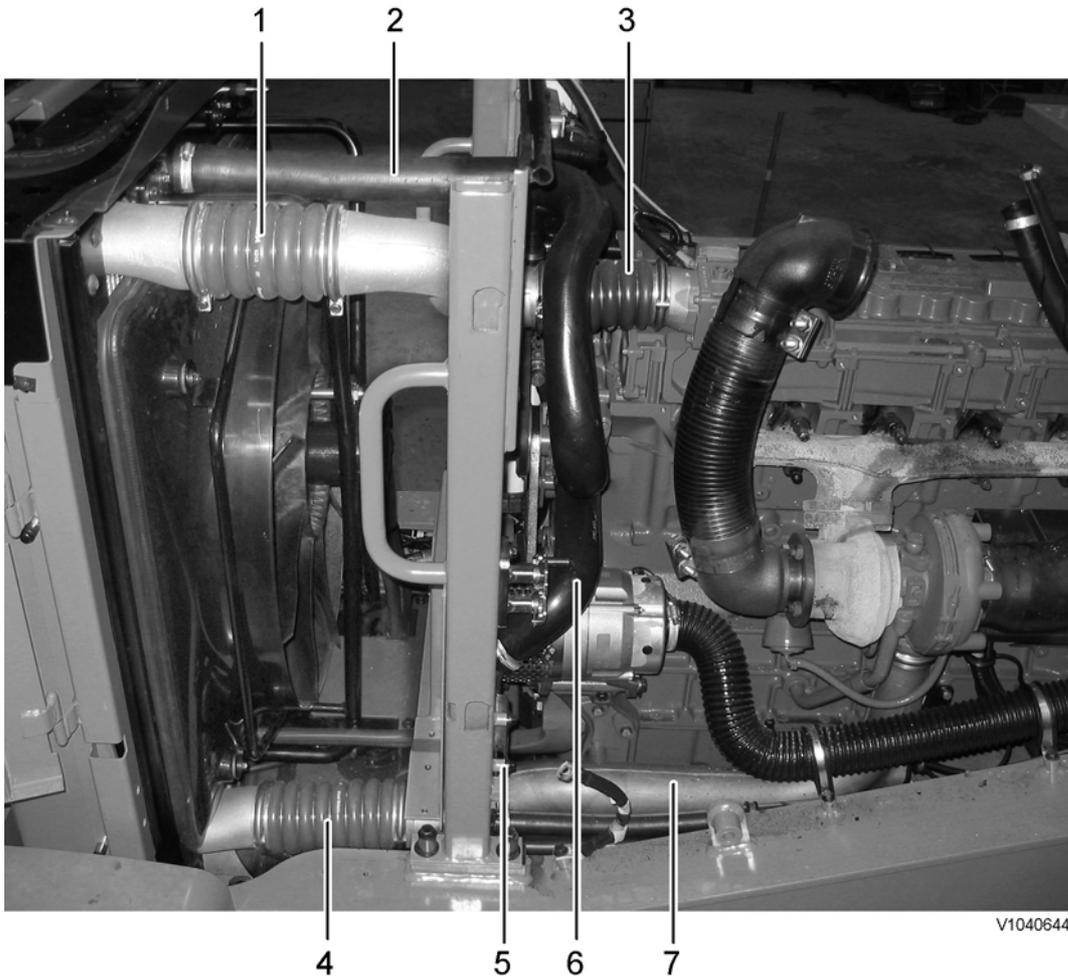
5. Drain the hydraulic oil. Volume, hydraulic tank: see [030 Hydraulic system, volume](#)
6. Remove the lower engine covers (3), lower grating covers (1) and the bottom plates (2) on both sides. Disconnect the ground cable (4) from the intermediate wall.



**Figure 3**

7. Disconnect the upper coolant hose from the engine and radiator. Remove the bolts for the bracket for coolant pipe.

Disconnect the coolant hose from the engine.  
Disconnect the hoses from the engine and intercooler.  
Disconnect the air hose from the alternator.  
Disconnect the clamping from the frame.



**Figure 4**

1. Charge air pipe
2. Coolant hose
3. Charge air pipe
4. Charge air pipe
5. Bracket, coolant hose
6. Coolant hose
7. Charge air pipe

8. **NOTICE**

**Refrigerant under pressure. Do not disconnect any hoses or connections on the air conditioning, thereby involuntarily releasing refrigerant.**

Unplug connector MA802 on the AC compressor. Remove the belt guard and loosen the belt from the AC compressor. Disconnect the adjusting rod from the engine.

Remove the AC compressor from its bracket and lay the compressor on the wheel and the condenser on the hydraulic oil tank.

9. Unplug the connectors (1) for E-ECU. Disconnect the cable harness from the intermediate wall. Disconnect the hose from the air filter (2). Mark the connections for the fuel filter bracket (3). Disconnect the fuel hoses from the fuel filter bracket. Plug opened connections. Disconnect the sensor for water in fuel (SE2302).

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