

Document Title: General description	Function Group: 200	Information Type: Service Information	Date: 2014/3/26
Profile: WLO, L330E [GB]			

General description

Wheel loader L330E is equipped with an engine of type designation D16B.

The engine is a six-cylinder, four-stroke, direct-injected turbocharged diesel equipped with an intercooler and EMS (Engine Management System). The cylinder bore is 144 mm (5.67 in) and stroke is 165 mm (6.50 in), which provide a total stroke volume of 16.12 dm³ (lit) (983.7 cubic in).

The engine management system comprises the E-ECU (Engine Electronic Control Unit), sensors and actuators. The purpose of the system is to calculate and continuously control the amount of fuel injected during different operating conditions. This leads to more efficient combustion which results in reduced emissions and low fuel consumption. Information regarding temperature, pressure and rpm is sent in the form of electric impulses from sensors and other components to the engine control unit which then calculates the correct amount of fuel and sends signals to the injection pump. The EMS is a part of the vehicle control unit (V-ECU). The injection angle is mechanically/hydraulically controlled.

The cooling system comprises two separate coolant pumps. The larger pump, which is mounted in the timing gear, cools the engine, torque converter and brakes. (The torque converter and brakes are a part of the transmission circuits.)

The smaller pump cools the hydraulic oil using a separate circuit.

The cooling fan, which has an axial piston motor, is located behind the radiator and is driven hydrostatically with a variable piston pump, Pump 3 (P3).

Fan speed is adjusted by the trolley ECU (V-ECU) which receives temperature information in the following systems:

- Coolant temperature from the radiator
- Diesel engine coolant temperature
- Transmission oil temperature
- Hydraulic oil temperature

The cooling system is based on a concept designed to cool the engine, transmission, hydraulics and brakes and in which brake cooling is integrated in the transmission oil cooling. System cooling is determined by cooling fan speed.

The engine designation and serial number are stamped on the top side of the cylinder block near cylinder number 1.

Document Title: Function check, engine	Function Group: 200	Information Type: Service Information	Date: 2014/3/26
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Function check, engine

Test possible causes

1 Initial check:

- ☐ Liquid levels
- ☐ Control lamps/warning lamps
- ☐ Information instruments
- ☐ Battery voltage
- ☐ Fuses (whole, correct current)

2 Separate systems:

- ☐ If two or more systems and/or circuits function together.

NOTE!

Check the system circuits individually.

3 If the machine exhibits poor rimpull, the fault may have occurred in the engine, torque converter, transmission or brakes.

Check stall speed.

- ☐ If the engine stall speed is within the indicated values, the fault can be traced in the transmission, torque converter or brakes.
- ☐ If the engine stall speed is low, check according to step 4.

4 Checking the engine

- ☐ Check the oil and coolant for discoloration, odour, etc.
- ☐ Check the exhaust pipes (internal residue)
- ☐ Checking the air filter and turbo.
- ☐ The engine misfires (imbalance-high noise level)
- ☐ Checking for overpressure in the expansion tank.
- ☐ Crankcase ventilation (overpressure-clogged)
- ☐ Dipstick, remove (overpressure)
- ☐ Exhaust smoke (colour-contaminants, odour).
- ☐ Bleed the fuel system.
- ☐ Check rpm.
- ☐ Check feed pressure (before and after the filter).
- ☐ Perform a compression test (repeat with oil if fault is discovered).
- ☐ Check the injectors.
- ☐ Check the pilot injection.
- ☐ Check the diesel fuel.

Document Title: Engine, removing	Function Group: 210	Information Type: Service Information	Date: 2014/3/26
Profile: WLO, L330E [GB]			

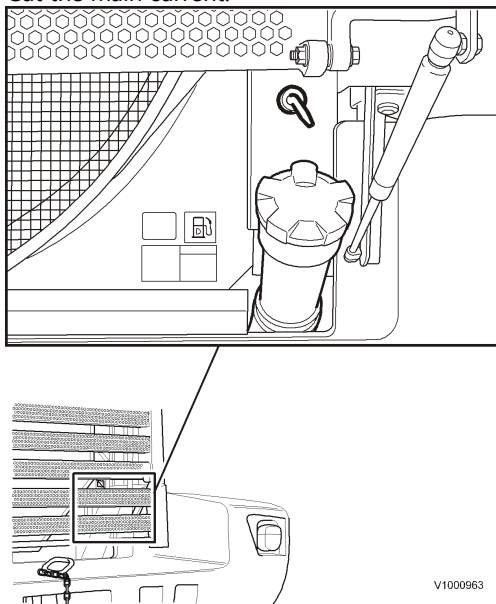
Engine, removing

Op nbr 21070

999 8547 Lifting yoke

Lifting eye 3/4"UNC

1. Park the machine in service position, see [191 Safety rules when servicing](#).
2. Cut the main current.



V1000963

Figure 1
Battery disconnect switch, location



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

Drain the coolant and engine oil.
Use the drain hoses stored in the right-hand battery box.

Coolant volume: **approx. 66 litres (17.4 US gal) (approx. 3 litres (0.8 US gal) remain in the cylinder block)**

Engine oil volume: **approx. 49 litres (12.9 US gal)**

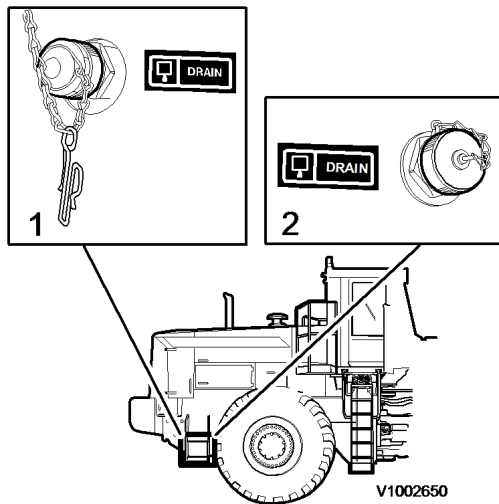


Figure 2

1. Draining the engine oil
2. Draining the coolant
4. Remove the engine hood, see [821 Engine hood, removing](#).
5. Remove the cooling water hose on the cooling water pump and the cooling water hose between the radiator and thermostat housing.
6. Remove the fuel hoses from the fuel filter and fuel pump.

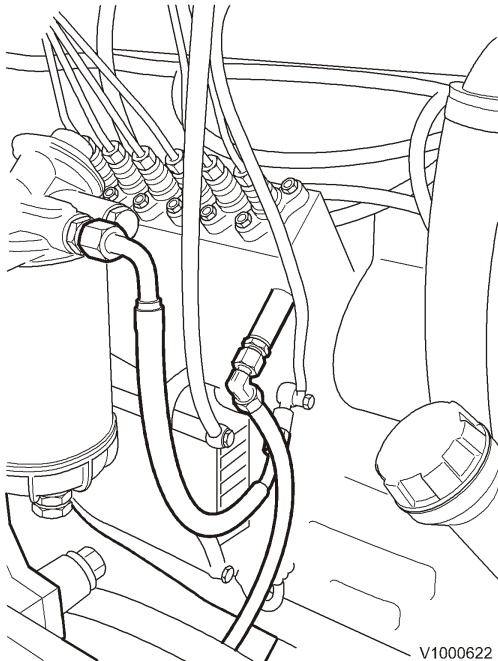


Figure 3
Fuel hoses to the fuel filter and fuel pump

7. Detach the connectors, clamps and cables on the engine.
8. Remove the air shroud over the alternator. Detach the power cable, ground cable and connector from the alternator.

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

Remove the drive belt and detach the AC compressor from its mounting. Carefully bind the AC compressor.

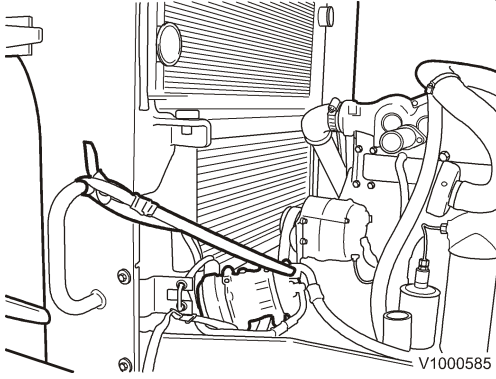


Figure 4
Bound AC compressor

10. Lower the shield under the tank and loosen the drain hose located at the back of the engine oil drain coupling.
11. Remove the air shroud at the condenser.
Weight: **35 kg (77 lbs.)**

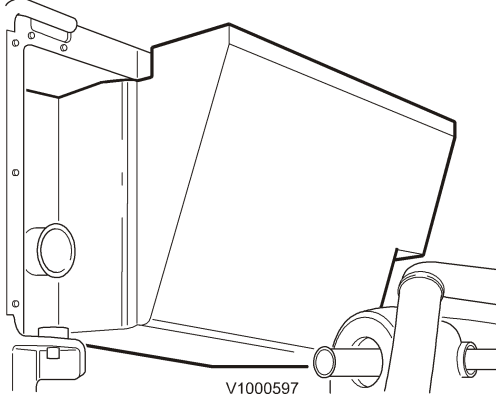


Figure 5
Air shroud at the condenser

12. Detach the connector hose between the flywheel housing and torque converter.

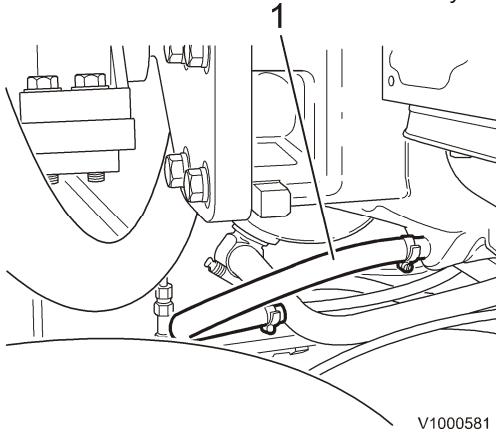


Figure 6

1. Connector hose
13. Secure the torque converter with 2 6m (19.7 ft) slings, 2 3m (9.8 ft) slings and 2 ratchet blocks with lifting eyes (750 kg) (1653 lbs.).

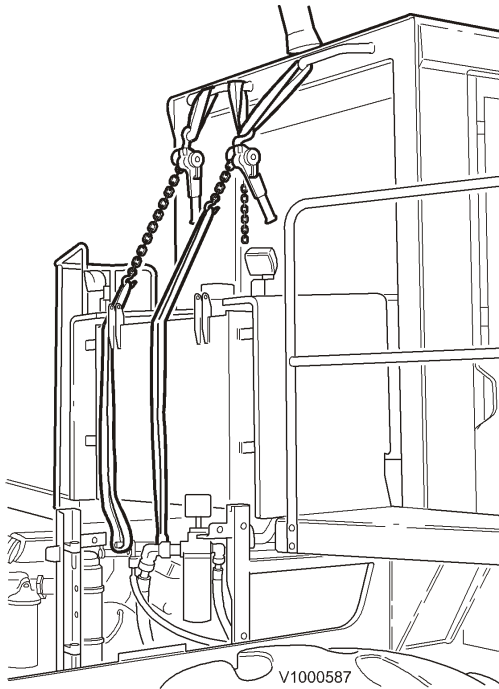


Figure 7
Securing the torque converter

14. Secure the torque converter to the rear axle attachment with a spacer, approx. 55 mm (2.17 in). The spacer should be placed between the torque converter pump and axle attachment.
15. Detach the engine from the torque converter.
16. Connect the lifting sling and lifting device to the engine.

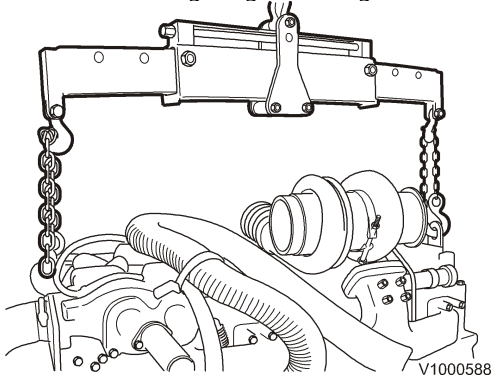


Figure 8

17. Remove the front engine mountings.
18. Loosen the cable on the oil pan sensor. Remove the bolts for the rear engine mounting pad. Raise the engine high enough to remove the engine mounting.

NOTE!

The stud bolts should also be removed.

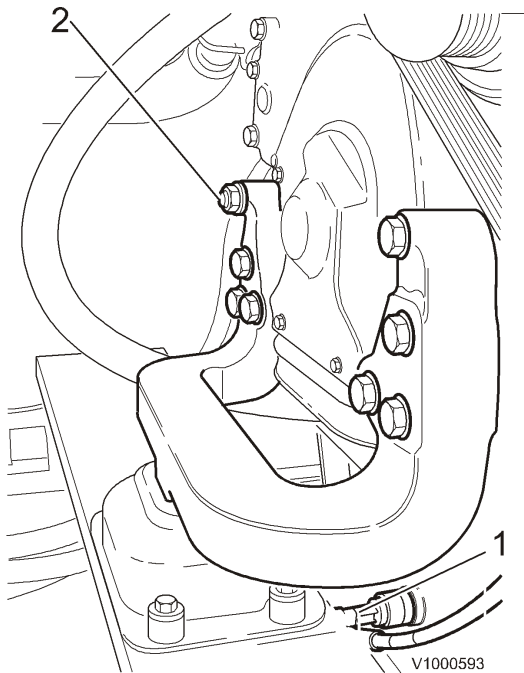


Figure 9

1. Oil pan sensor
2. Stud bolt

19. Remove the bolts between the torque converter and the engine.

20. Loosen the engine from the torque converter and raise approx. 450 mm (17.7 in).

NOTE!

Mind the oil level sensor on the oil pan.

21. Loosen the engine oil drain hose from the frame on the right-hand side of the machine near the oil filter (rubber clamp).

22. Lift out the engine.

Engine weight with lifting sling: **approx. 1525 kg (3362 lbs.)**

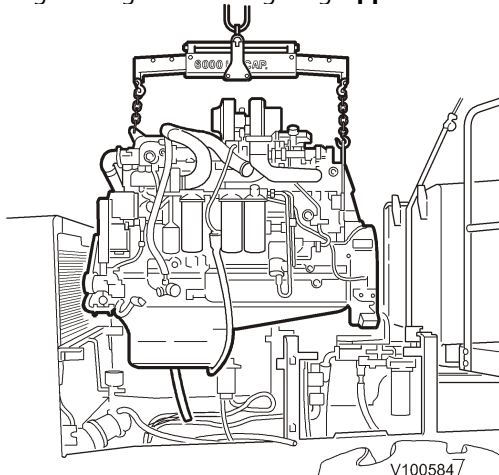


Figure 10

23. If replacing the engine, transfer the required components to the new engine.

NOTE!

Never transfer a component that could cause a malfunction.

Document Title: Engine, installing	Function Group: 210	Information Type: Service Information	Date: 2014/3/26
Profile: WLO, L330E [GB]			

Engine, installing

Op nbr 21072

999 8547 Lifting yoke

Lifting eye 3/4"UNC

1. Connect the lifting sling and lifting device to the engine.
Engine weight: **1525 kg (3362 lbs.)**

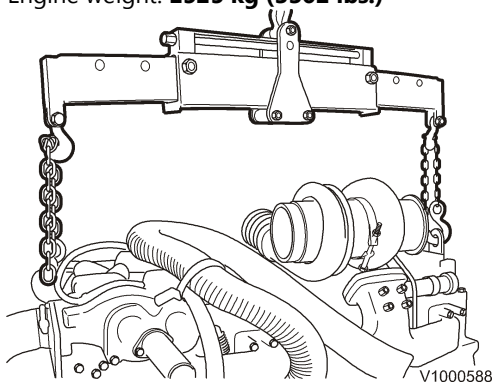


Figure 1
Lifting sling with lifting chains

2. Fit a new O-ring and apply new sealant to the torque converter.
3. Lift in and align the engine and torque converter. Fit the retaining bolts and secure the torque converter to the engine.
Tightening torque: **60 Nm(44 lbf ft)**

NOTE!

Mind the oil level sensor when lowering the engine.

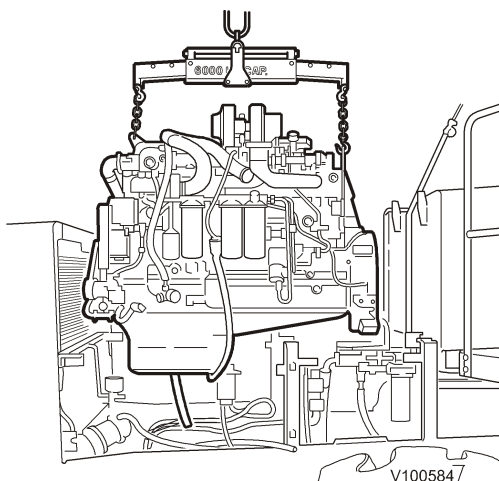


Figure 2

4. Fit the oil hose at the frame on the right-hand side of the machine near the engine oil filter.
5. Fit the front engine mountings on the left-hand and right-hand sides of the engine near the flywheel housing.
Tightening torque to the engine: **220 Nm (162 lbf ft)**
Tightening torque to the frame: **350 Nm (258 lbf ft)**
6. Detach the ratchet blocks and slings, remove the spacers under the torque converter pump.

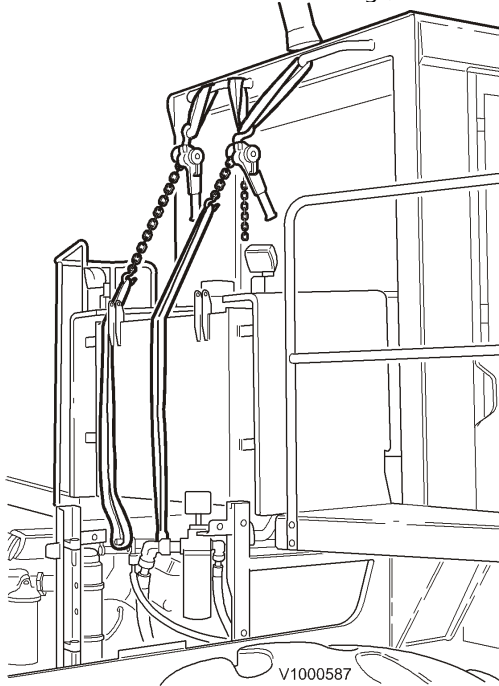


Figure 3
Ratchet block with sling

7. Fit the stud bolt for the rear engine mounting.
8. Raise the engine high enough to tighten the rear engine mounting to the engine.
Connect the cable to the oil level sensor on the oil pan.
NOTE!
Avoid raising the engine too high. There is a risk of damage to the pump suction pipes.

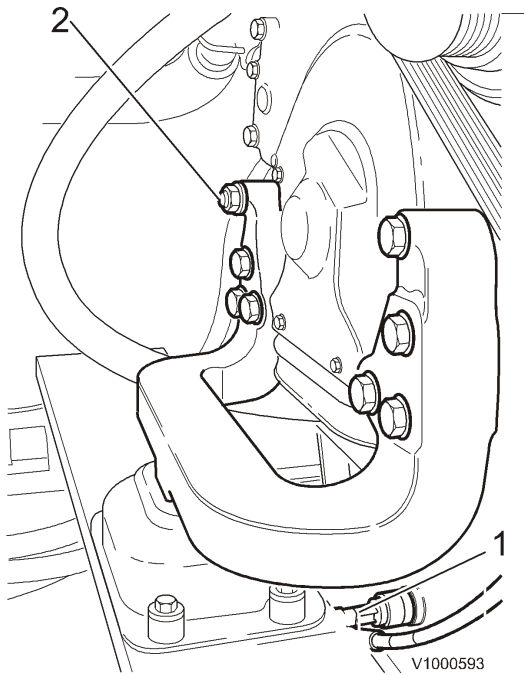


Figure 4

1. Stud bolt

9. Lower the engine and fit the rear engine mounting in the frame.

10. Remove the lifting sling and lifting device from the engine.

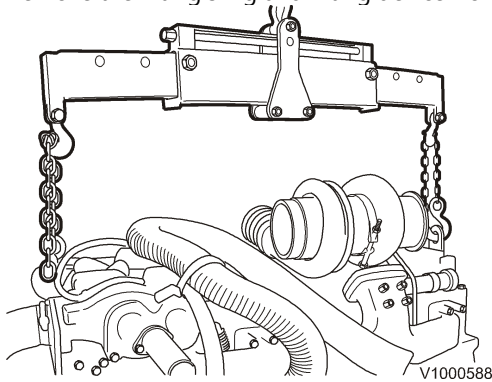


Figure 5
Lifting sling with lifting chains

11. Fit the connector hose between the flywheel housing and torque converter.

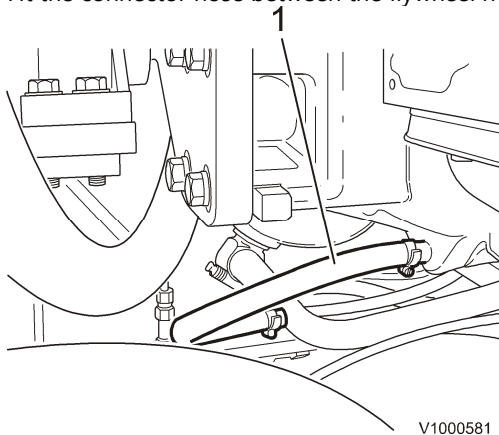


Figure 6

1. Connector hose
12. Fit the drain hose to the back of the engine oil drain coupling. Lift and tighten the shields.
13. Fit the air shroud at the condenser.
Weight: **35 kg (77 lbs.)**

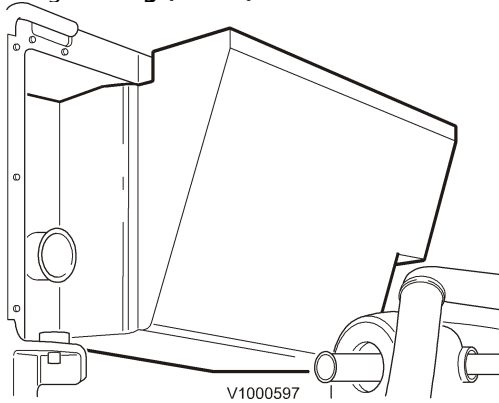


Figure 7

14. Fit the charge air pipes between the engine and intercooler.
15. Fit the alternator loosely. Connect the power cable, ground cable and connector to the alternator.
16. Fit the AC compressor and attach the connector.

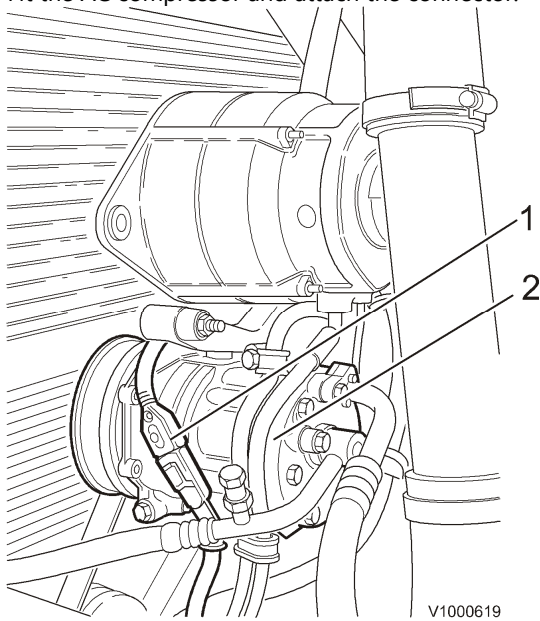


Figure 8

1. Connector
2. AC compressor
17. Couple the connectors, clamps and cables on the engine.
18. Connect the fuel lines to the fuel filter and fuel pump.

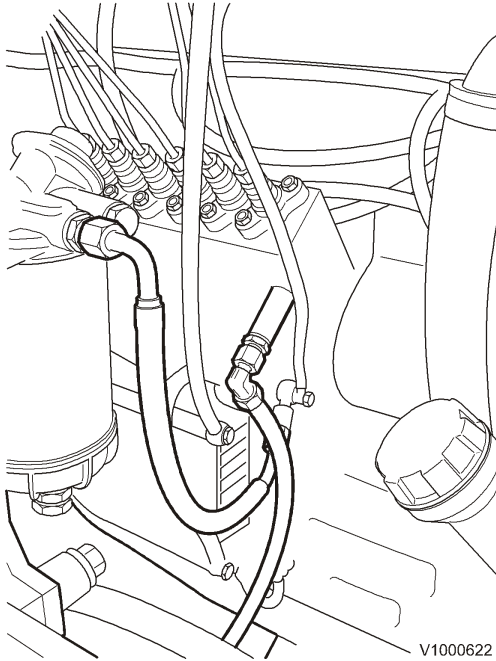


Figure 9

19. Connect the cooling water hose to the cooling water pump. Fit the cooling water hose between the radiator and thermostat housing.
20. Fit the alternator and AC compressor drive belts.
Apply tension to the drive belt as follows:
 - Tighten the adjusting screw until the belt can only be depressed **8 mm (0.31 in)**. Depress with a force of **25-30 Nm (18.4-22.1 lbf ft)**.
 - Tighten the alternator retaining bolts.

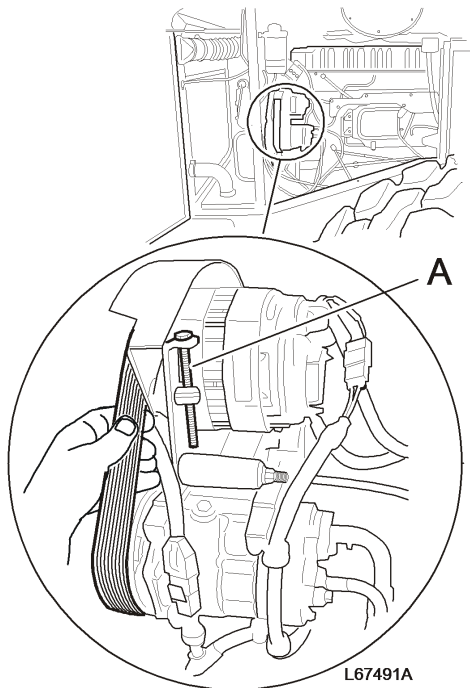


Figure 10

A. Adjusting screw

21. Fit the coolant pump drive belt.
Fit the drive belt guards.
22. Fit the engine hood, see [821 Engine hood, installing](#).
23. Fill with oil and coolant.
24. Bleed the fuel system, see [233 Fuel system, bleeding](#).
25. Switch on the main current.

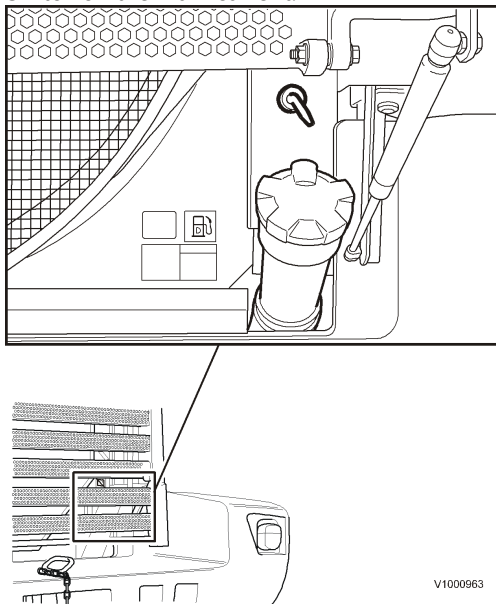


Figure 11
Battery disconnect switch, location

26. Start the engine and run at increased idling speed for 10 minutes in order to release any remaining air from the fuel system. Check for leaks. Check oil and coolant levels.

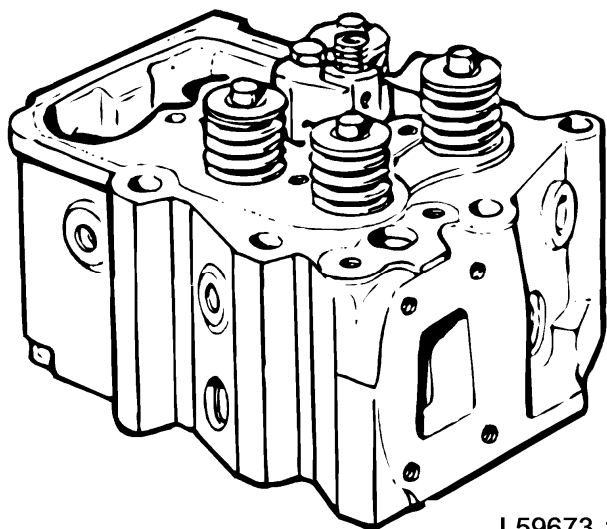
Document Title: Cylinder head, description	Function Group: 211	Information Type: Service Information	Date: 2014/3/26
Profile: WLO, L330E [GB]			

Cylinder head, description

The engine has separate cylinder heads with one for each cylinder. The heads are made from cast iron and have replaceable guides and seats for the valves. The cylinder head has four valves per cylinder (two inlet and two exhaust valves).

The inlet and exhaust ducts open out on either side of the cylinder head.

The injector is positioned vertically directly above the centre of the piston crown in a thin replaceable copper sleeve which is in direct contact with the circulating coolant.



L59673-1

Figure 1
Cylinder head



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