| Document Title: | Function Group: | Information Type: | Date: |
|---|---|---|---|
| **Oil level sensor, changing** | **217** | **Service Information** | **2014/6/25** |
| Profile: **EXC, EC240C L [GB]** | | | |

# Oil level sensor, changing

**Op nbr 217-005**

**WARNING**

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

**NOTE!**
Cable ties and clamps that secure hoses and electrical wiring must be removed and then replaced when installing.

1. Place the machine in the service position B. See 091 Service positions
2. Turn the battery disconnect switch to off position.
3. Remove the underside cover plates.

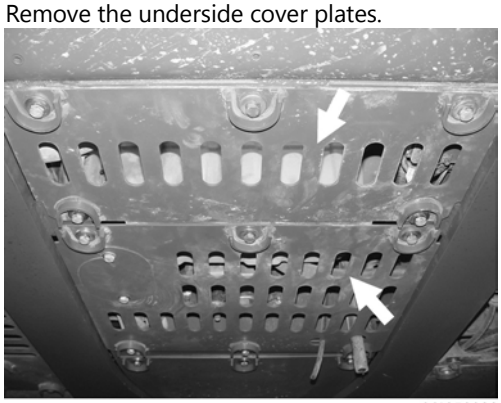
V1050028

**Figure 1**

4. Drain the engine oil into a suitable container.


V1050029

**Figure 2**

5. Disconnect oil level sensor connector (4) and remove nut (3) from the oil level sensor connector. Remove screws (1) and disassemble oil level sensor wire harness (2) from the bracket.

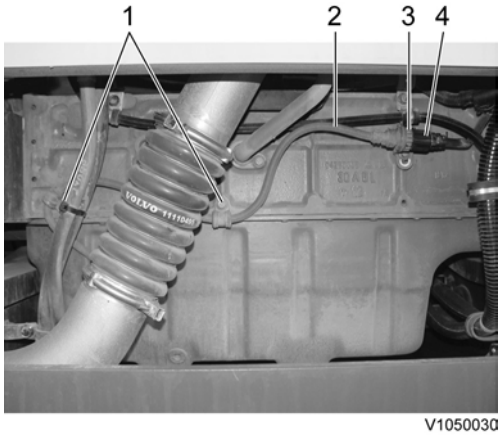


**Figure 3**

1. Screw
2. Wire harness
3. Nut
4. Connector

6. Remove the ties (4 places).

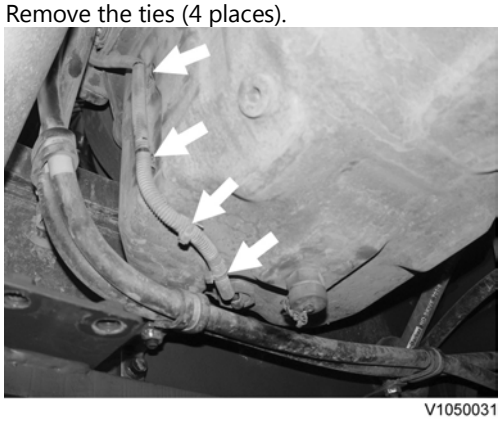


**Figure 4**

7. Remove the air conditioner hose clamping screws (2 places).


**Figure 5**

8. Remove the oil level sensor using a spanner 32 mm.

   Disassembled oil level sensor.

V1050063

**Figure 6**

9. Install the oil level sensor.
   **NOTE!**
   Assembly is reverse to disassembling.

   **NOTE!**
   Use a new copper washer when installing.

10. Fill the engine with the specified oil.

11. Start the engine and check the oil level on I-ECU.


V1050080

**Figure 7**

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# Service Information

| Document Title: | Function Group: | Information Type: | Date: |
|---|---|---|---|
| **Engine mounting** | **218** | **Service Information** | **2014/6/25** |
| Profile: **EXC, EC240C L [GB]** | | | |

## Engine mounting

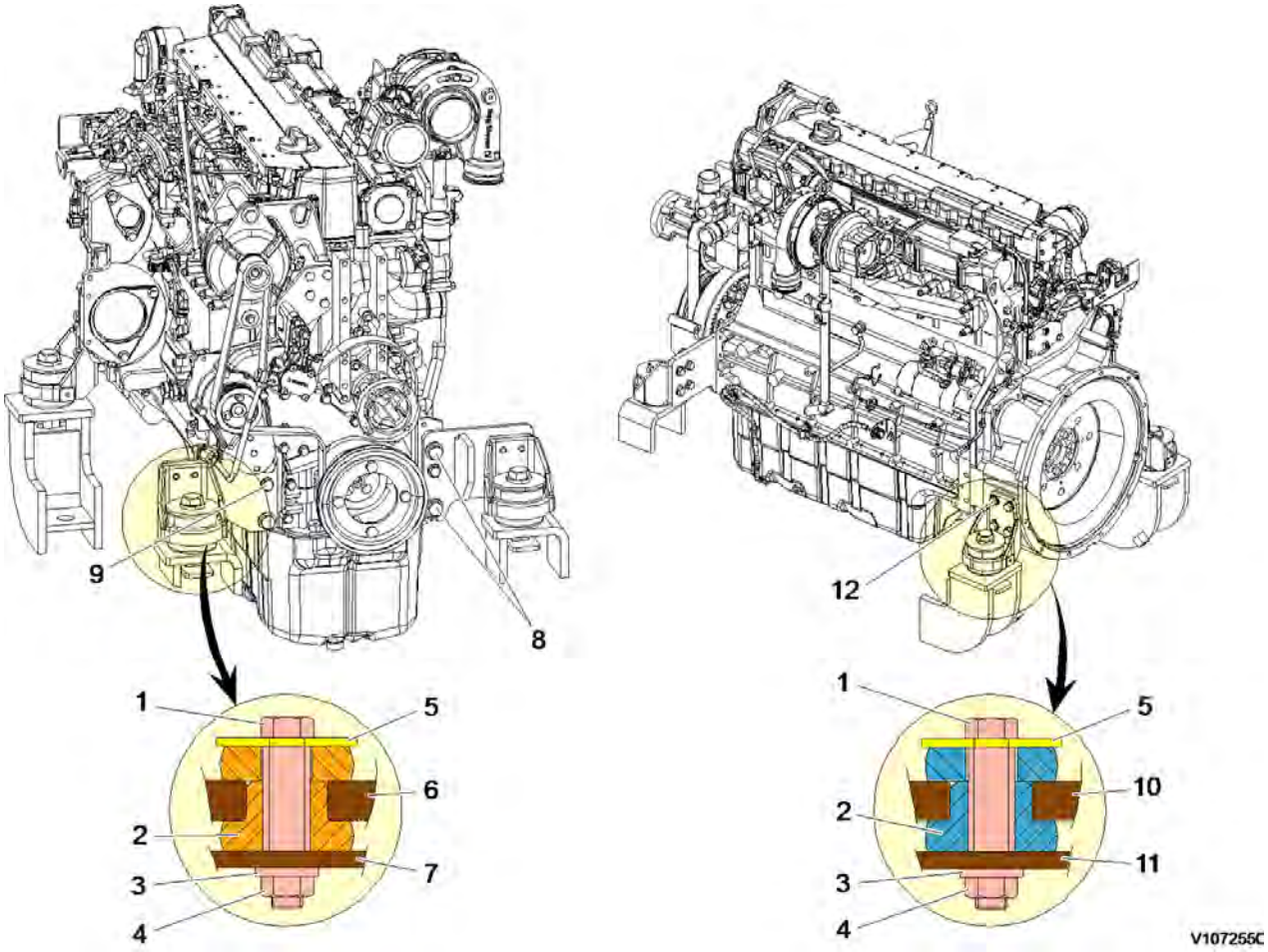


**Figure 1**
**Engine mounting**

1 Screw
2 Cushion
3 Washer
4 Nut
5 Plate
6 Engine mounting bracket (front)
7 Frame
8 Screw
9 Screw
10 Engine mounting bracket (rear)
11 Frame
12 Screw

**NOTE!**
Check the color markings for cushion installation.

- Front (fan end): green and white
- Rear (flywheel end): violet and white

**Screw tightening torque, unit: Nm (kgfm, lbf ft)**

| No. | Thread size | Tightening torque |
|---|---|---|
| 1 | M 22 × 130 | 686 ±69 (70 ±7, 505 ±50.5) |
| 8 | M 16 × 45 | 265 ±24.5 (27 ±2.5, 195 ±18)<br>**Assembling after coated with Loctite.** |
| 9 | M 12 × 40 | 113 ±5 (11.5 ±0.5, 83 ±3.6)<br>**Assembling after coated with Loctite.** |
| 12 | | |

| Document Title: **Lubrication system, description** | Function Group: **220** | Information Type: **Service Information** | Date: **2014/6/25** |
|---|---|---|---|
| Profile: **EXC, EC240C L [GB]** | | | |

# Lubrication system, description

Engine lubricating oil is supplied to the contact faces of rotating components such as turbocharger, crankshaft, camshaft, piston, inlet/exhaust valve, rocker arm and timing gear by means of forced lubrication from the oil pump.

**Lubrication oil flow diagram**

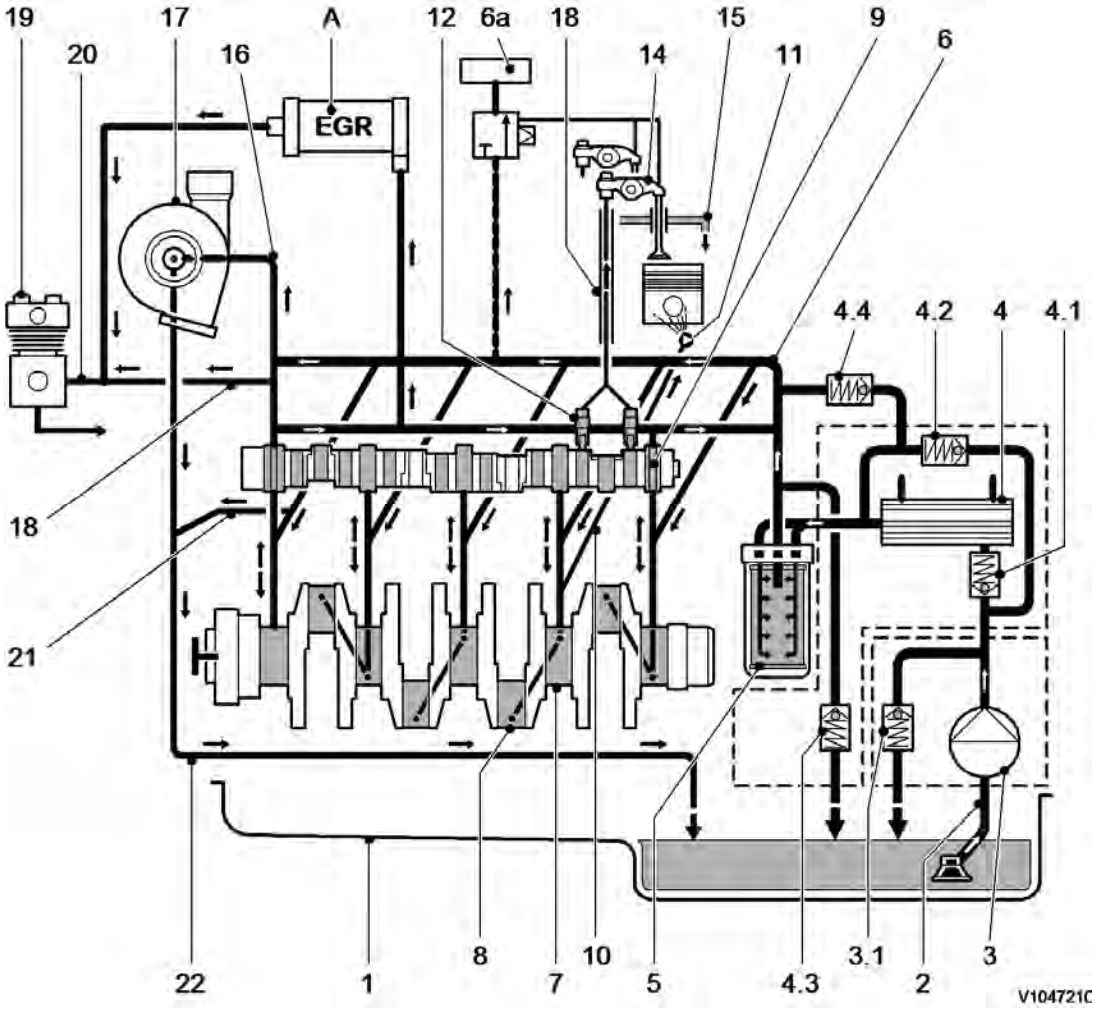


**Figure 1**
**Lubrication oil flow**

| | | | |
|---|---|---|---|
| 1 | Oil pan | 9 | Camshaft bearing |
| 2 | Intake pipe | 10 | line to injection nozzle |
| 3 | Lube oil pump | 11 | Injection nozzle for piston cooling |
| 3-1 | Safety valve | 12 | Tappet with rocker arm pulse lubrication |
| 4 | Lube oil cooler | 13 | Stop rod, oil supply for rocker arm lubrication |
| 4-1 | Reverse lock valve | 14 | Rocker arm |
| 4-2 | Bypass valve | 15 | Return line to oil pan |

| | | | |
|---|---|---|---|
| 4-3 | Bypass valve | 16 | Oil line to exhaust turbocharger |
| 4-4 | Control valve | 17 | Exhaust turbocharger |
| 5 | Exchangeable lube oil filter | 18 | Return line from hydraulic pump |
| 6 | Main oil pipe | 19 | Hydraulic pump |
| 6a | Engine brake lubrication | 20 | Oil line to hydraulic pump |
| 7 | Crankshaft bearing | 21 | Return line from cylinder head |
| 8 | Con rod spring | 22 | Exhaust turbocharger return to crankcase |

| Document Title: **Lubrication system, principle of operation** | Function Group: **220** | Information Type: **Service Information** | Date: **2014/6/25** |
|---|---|---|---|
| Profile: **EXC, EC240C L [GB]** | | | |

# Lubrication system, principle of operation

**Lube oil ducts**

The engine is provided with forced-fed circulation lubrication with lube oil cooler and lube oil filter arranged in full flow. The lube oil is supplied by the lube oil pump through the oil cooler to the oil filter. Both components are mounted to the lube oil cooler housing which is flanged to the crankcase. Downstream of the filter the lube oil flows into the main oil gallery and secondary oil gallery. From here the oil is ducted to the lubricating points.

The main oil gallery supplies:
– Crankshaft
– Camshaft
– Valve tappets
– Roller tappets

The secondary oil gallery supplies:
– Exhaust turbocharger

Lubrication of the rockers is effected via the tappets and the push rods.

**Lube oil pump**

The lube oil rotary pump is installed in the front cover. The inner rotor (1) is seated on the crankshaft and is driven by same. Its driver contour (4) has no 120° partition, i.e. the rotor can only be slid onto the crankshaft in a specific position.
This is attributable to deviating rotor widths.

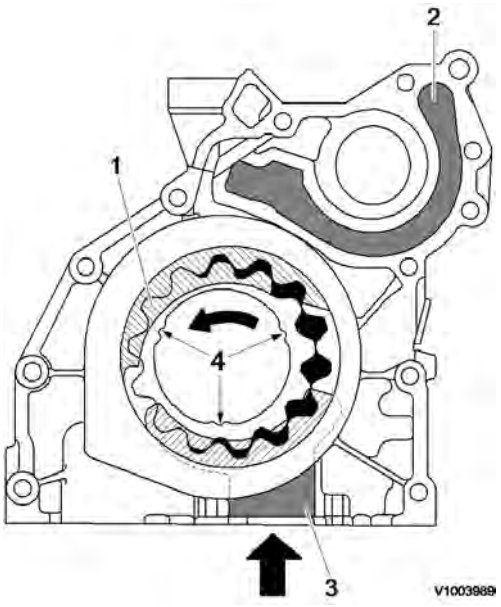


**Figure 1**
**Lube oil pump, sectional view**

| | | | |
|---|---|---|---|
| 1 | Inner rotor | 3 | Suction chamber |
| 2 | Delivery chamber towards crankcase | 4 | Driver contour |

| | Unit | Specification |
|---|---|---|
| Rotor width | mm (in) | 12.3 (0.48) |

| | | |
|---|---|---|
| Volume flow | l/min | 65 at 2500 rpm |

Minimum oil pressure at 120 °C (248 °F) oil temperature, measured at oil filter bracket.

The lubrication oil pump is designed as a rotor pump and is mounted in the front cover. The inner rotor (1) is located on the crankshaft (4), by which it is driven.
Its flange profile has an irregular shape, that is, it can only be fitted on the crankshaft in a certain position.

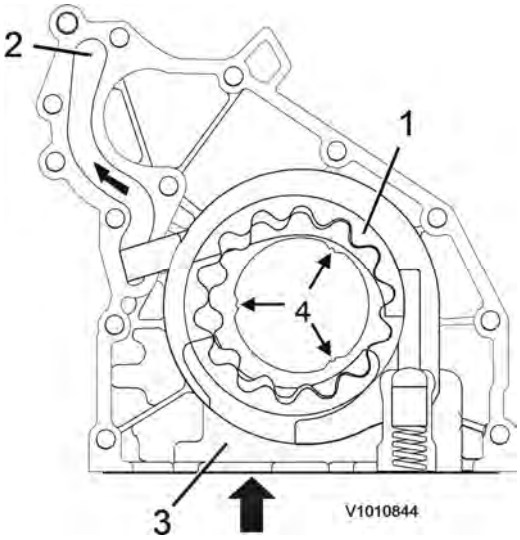


**Figure 2**

1. Rotor
2. Pressure chamber
3. Suction chamber
4. Crankshaft

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**Service Information**

| Document Title: **Fuel pump, inspection** | Function Group: **233** | Information Type: **Service Information** | Date: **2014/6/25** |
|---|---|---|---|
| Profile: **EXC, EC240C L [GB]** | | | |

# Fuel pump, inspection

**Op nbr 233-010**

**NOTE!** Take care of fuel spills by using collection containers.

1. Place the machine in the service position B. See 091 Service positions

2. Open the engine hood.

3. Turn belt tensioner (2) clockwise using a socket handle (1/2"), and remove alternator belt (1) from alternator (3) and the tensioner pulley.

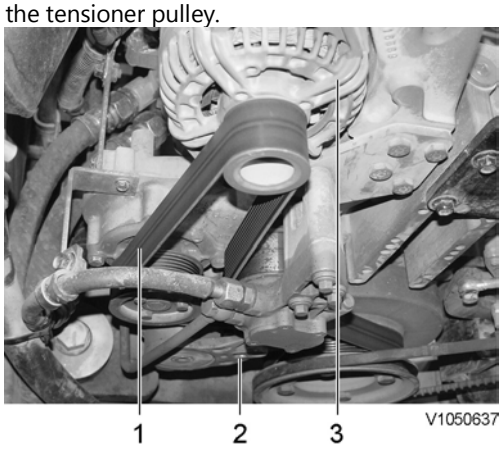


**Figure 1**

1. Alternator belt
2. Belt tensioner (socket handle installation position)
3. Alternator

**NOTE!**
The belt adjuster tension is very strong. Therefore pay attention to prevent injury after removing belt.

4. Remove hose (1), pipe (2), screws (4) and fuel feed pump (3).
**NOTE!**
Cover the ends of the hoses to prevent contamination from entering the fuel system.

**NOTE!**
Pay attention not to drop any fuel on the belt when removing the fuel feed pump.

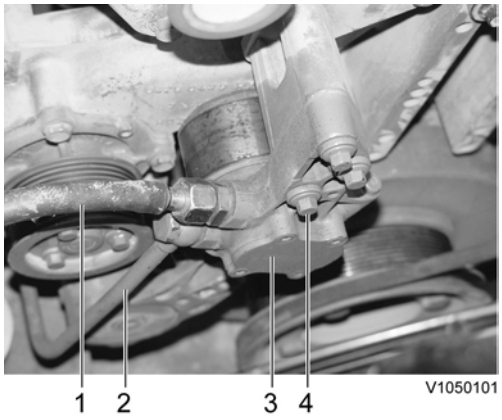


**Figure 2**

1. Hose
2. Pipe
3. Fuel feed pump
4. Mounting screw

5. Dismantle the feed pump and check the feed pump drive for damage. If damaged, change the feed pump.

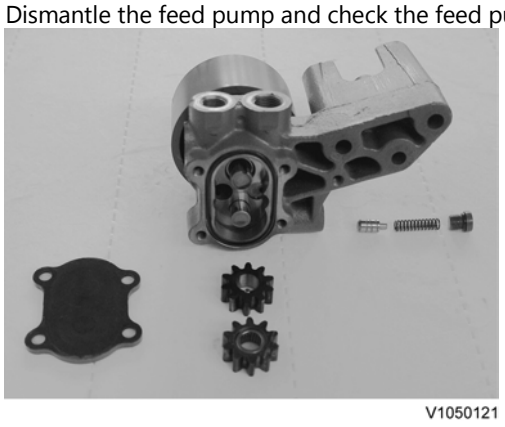


**Figure 3**

6. If undamaged, clean all parts very thoroughly and assemble the pump.
7. Install the feed pump.
8. Install the alternator belt.
9. Install the fuel hose and pipe on the feed pump.
   **NOTE!**
   Copper washers disassembled should be replaced with new ones.
10. Perform the air bleeding operation. See 233 Fuel system, bleeding
11. Start the engine and check for leaks.
12. Following any action, check the feed pressure.
13. Close the engine hood.