

Document Title: <b>Oil level sensor, changing</b>	Function Group: <b>217</b>	Information Type: <b>Service Information</b>	Date: <b>2014/8/13</b>
Profile: <b>EXC, EC240C NL [GB]</b>			

## Oil level sensor, changing

Op nbr 217-005



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

### NOTE!

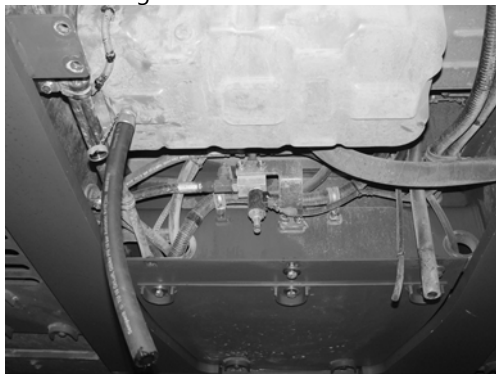
Cable ties and clamps that secure hoses and electrical wiring must be removed and then replaced when installing.

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.



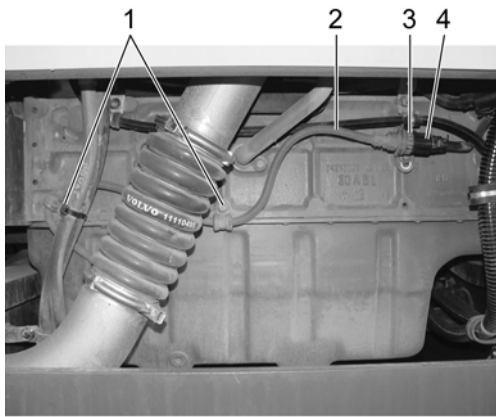
**Figure 1**

4. Drain the engine oil into a suitable container.



**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.

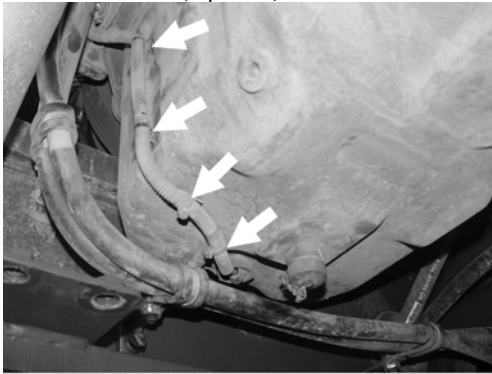


V1050030

**Figure 3**

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

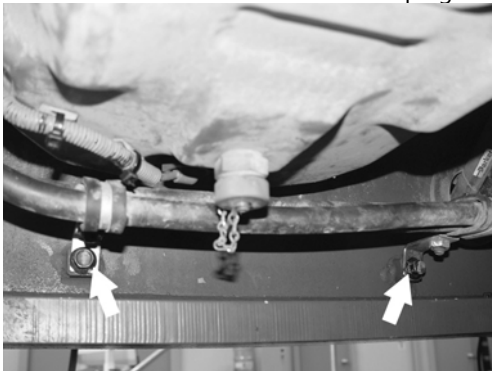
6. Remove the ties (4 places).



V1050031

**Figure 4**

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



V1050032

**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.

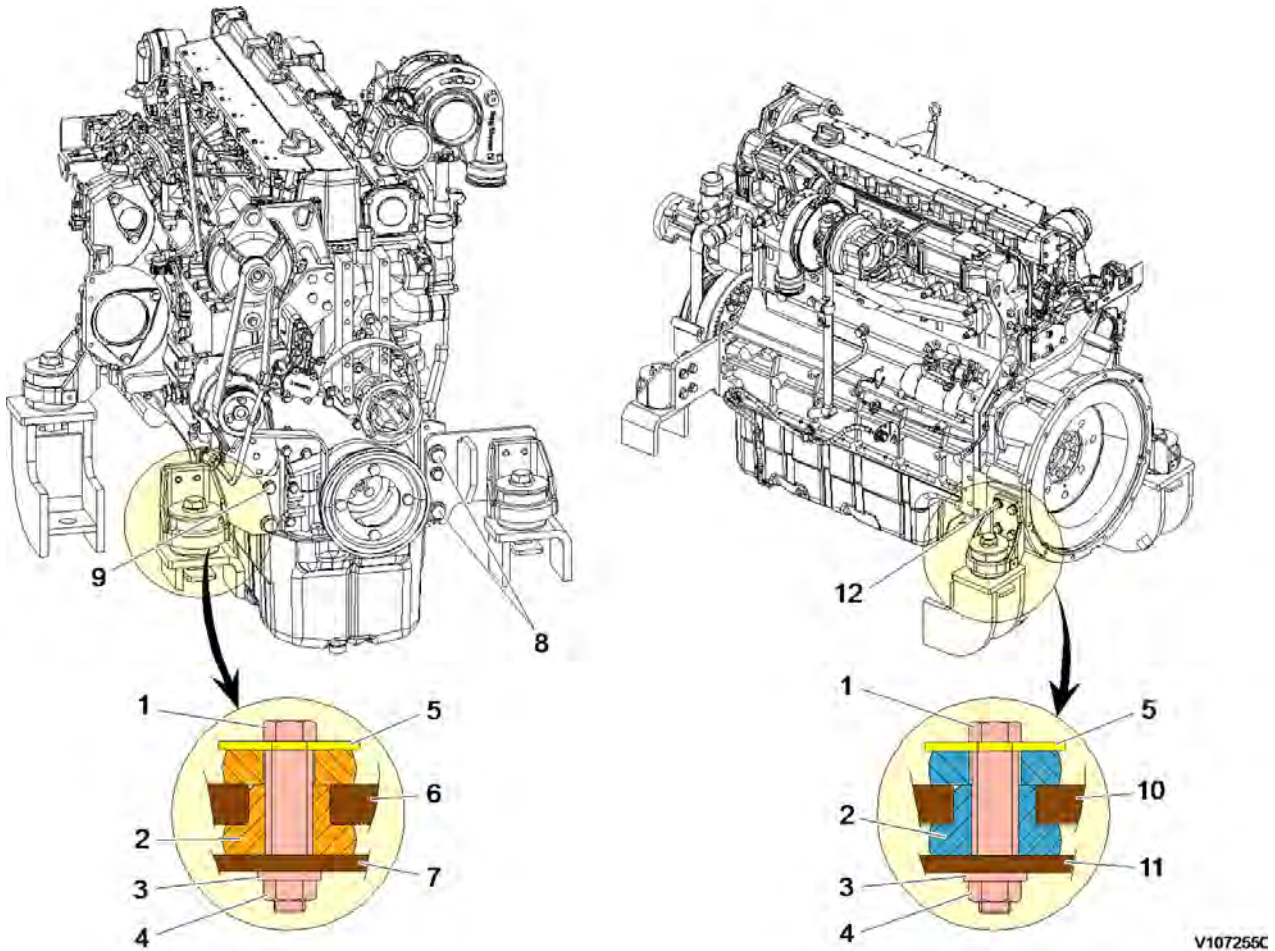


V1050080

**Figure 7**

Document Title: <b>Engine mounting</b>	Function Group: <b>218</b>	Information Type: <b>Service Information</b>	Date: <b>2014/8/13</b>
Profile: <b>EXC, EC240C NL [GB]</b>			

## Engine mounting



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

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

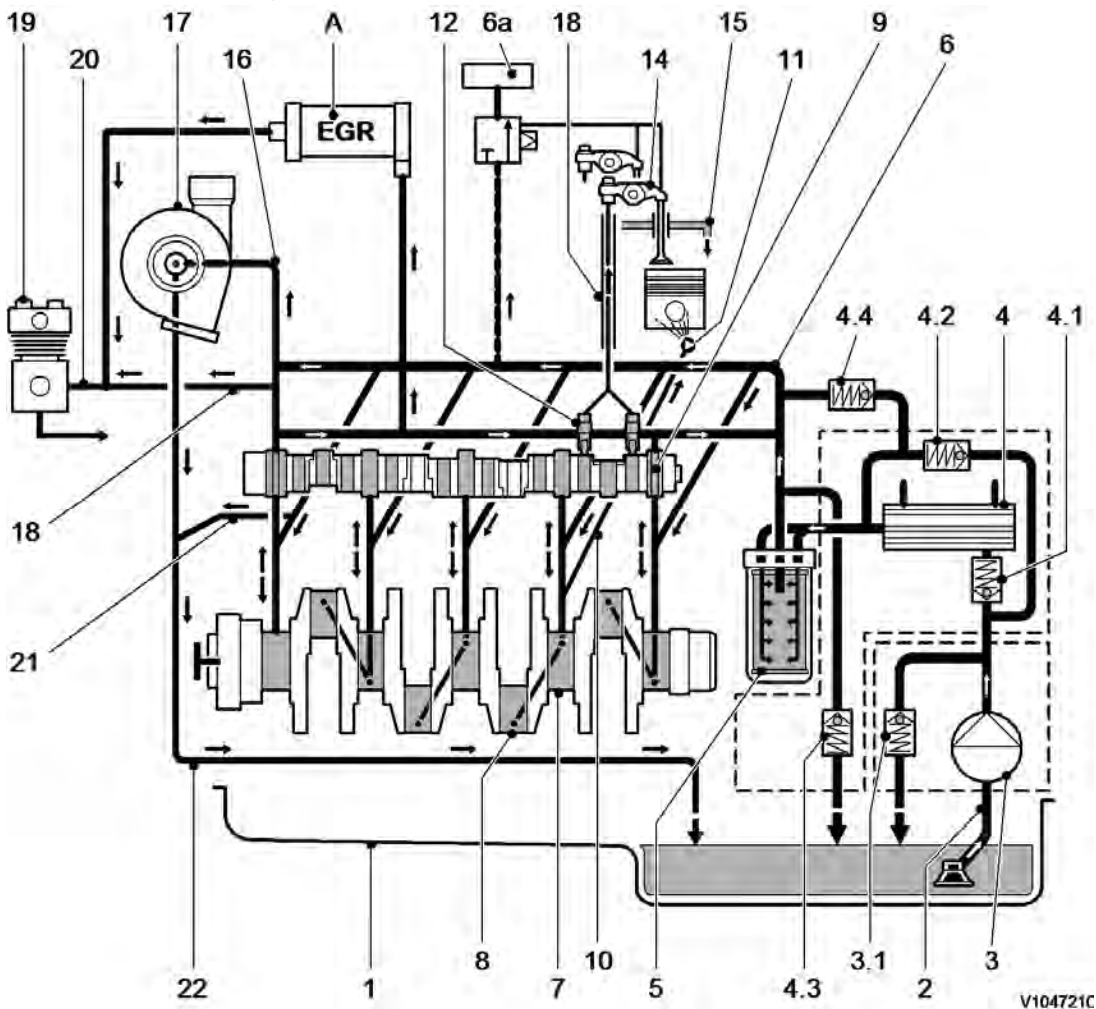
No.	Thread size	Tightening torque
1	M 22 × 130	686 ±69 (70 ±7, 505 ±50.5)
8	M 16 × 45	265 ±24.5 (27 ±2.5, 195 ±18) <b>Assembling after coated with Loctite.</b>
9 12	M 12 × 40	113 ±5 (11.5 ±0.5, 83 ±3.6) <b>Assembling after coated with Loctite.</b>

Document Title: <b>Lubrication description</b>	Function Group: <b>system, 220</b>	Information Type: <b>Service Information</b>	Date: <b>2014/8/13</b>
Profile: <b>EXC, EC240C NL [GB]</b>			

## 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: <b>Lubrication system, principle of operation</b>	Function Group: <b>220</b>	Information Type: <b>Service Information</b>	Date: <b>2014/8/13</b>
Profile: <b>EXC, EC240C NL [GB]</b>			

## 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

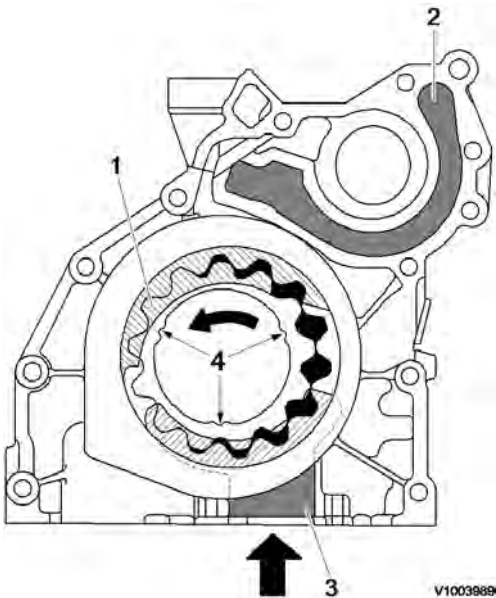
The secondary oil gallery supplies:

- 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

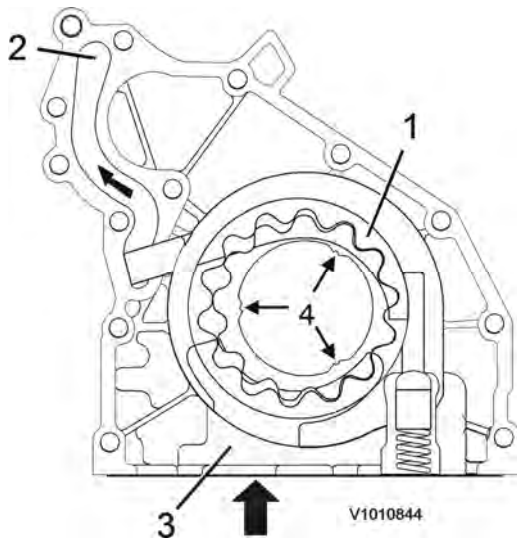
	Unit	Specification
Rotor width	mm (in)	12.3 (0.48)



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

**Thank you very much for reading.**

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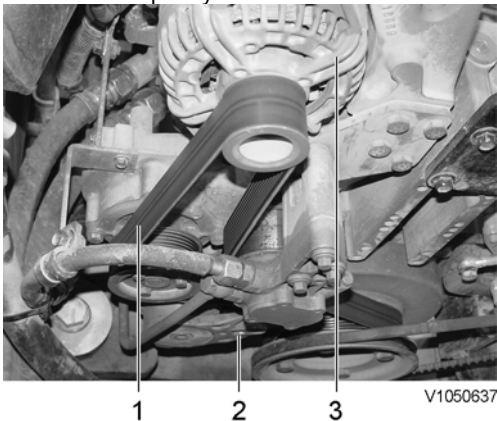
Document Title: <b>Fuel pump, inspection</b>	Function Group: <b>233</b>	Information Type: <b>Service Information</b>	Date: <b>2014/8/13</b>
Profile: <b>EXC, EC240C NL [GB]</b>			

## 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.

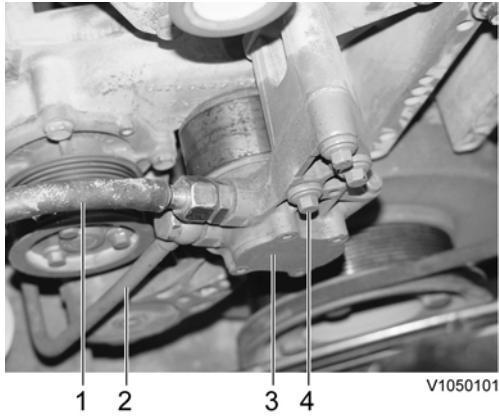
4. Remove hose (1), pipe (2), screws (4) and fuel feed pump (3).

**NOTE!**

Cover the ends of the hoses to prevent contamination from entering the fuel system.

**NOTE!**

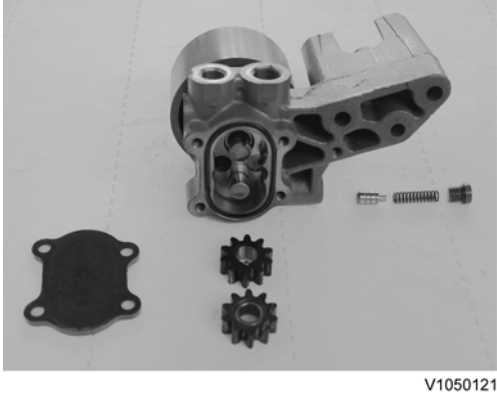
Pay attention not to drop any fuel on the belt when removing the fuel feed pump.



**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.