

Document Title: <b>Description, TD122</b>	Function Group: <b>210</b>	Information Type: <b>Service Information</b>	Date: <b>2014/11/26</b>
Profile:			

## **Description, TD122**

### **GENERAL**

The TD 122 is a six-cylinder, direct-injected, four-stroke, turbocharged diesel engine. Certain engine versions also have an intercooler.

Lubrication is provided by a force feed lubrication system. An oil pump supplies all lubrications points with oil.

The turbocharger supplies the engine with air under pressure, which produces an excess of air. The quantity of fuel injected can thereby be increased, raising the engine output. The turbocharger is lubricated and cooled by the engine's lubrication system. It is driven by the engine's exhaust gases and thus utilizes energy that would otherwise be wasted.

The engine's type and serial number is stamped on the right and left-hand sides of the cylinder block.

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## **Description, TD122**

**The engine** has six separate cylinder heads that are interchangeable. They are made of cast iron and each secured with eight bolts (9/16"-12, UNC).

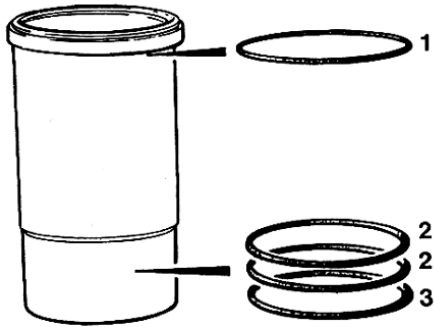
**The cylinder head** valve seats and valve guides of both intake and exhaust valves can be replaced.

**The intake and exhaust manifolds** are connected to opposite sides of the cylinder head. Valves are mounted in the cylinder head and have double valve springs.

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## Description, TD122

### Cylinder liners



N0721500

**Figure 1**  
**Cylinder liners**

Cylinder liners are replaceable and of the wet type.

Cylinder liners have a flame ridge that sits in a groove in the cylinder head. Four O-rings are used as outer seals for each cylinder liner.

- Sealing ring **1** under the liner collar has a diameter of 2.4 mm (0.094 in).
- The lower liner seal consists of three sealing rings. The lowest sealing ring **3** is made of fluor rubber, see the "General" section.

Document Title: <b>Engine specifications, engine speed</b>	Function Group: <b>210</b>	Information Type: <b>Service Information</b>	Date: <b>2014/11/26</b>
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## Engine specifications, engine speed

Working speed1)	30 rps (1 800 rpm)
High idling speed2) (control engine speed)	33.9 rps (2 035 ±40 rpm)
Idling speed (control engine speed)	10.3 rps (620 ± 40 rpm)
1) Maximum rpm with no load on engine. 2) Nominal rpm at max. specified power.	

Document Title: <b>General specifications</b>	Function Group: <b>210</b>	Information Type: <b>Service Information</b>	Date: <b>2014/11/26</b>
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## General specifications

Make	Volvo
Model	TD 122 KIE
Gross power at 1 800 rpm (according to SAE J1349)	284 kW (386 hp)
Net power at 1 800 rpm (according to ISO 9249/DIN 6271)	273 kW (371 hp)
Number of cylinders	6
Cylinder displacement	11.98 l (3.2 US gal)
Cylinder bore	130.17 mm (5.125 in)
Stroke	150 mm (5.9 in)
Valve clearance, inlet	0.40 mm (0.016 in)
Valve clearance, outlet	0.70 mm (0.028 in)

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## General specifications

### Wear tolerances

#### Cylinder head

Height, min. 124.65 mm (4.907 in)

#### Cylinder block (Fig.)

Height, upper block face - crankshaft centre **(A)** min. 463.8 mm (18.26 in)

Height, lower block face - crankshaft centre **(B)** 120 mm (4.724 in)

#### Cylinder liners

Cylinder liners (pistons and piston rings) should be replaced after 0.40-0.45 mm of wear, or if oil consumption is abnormally high.

#### Crankshaft

Max. permitted out-of-round of main and crankshaft journals 0.08 mm (0.003 in)

Max. permitted taper of main and crankshaft journals 0.05 mm (0.002 in)

Max. axial play of crankshaft 0.40 mm (0.016 in)

Max. radial play of crankshaft 0.20 mm (0.008 in)

#### Connecting rods

Straightness, max. deviation along 100 mm length 0.05 mm (0.002 in)

Distortion, max. deviation along 100 mm length 0.1 mm (0.004 in)

#### Valves

Valve spindle, max. permitted wear 0.07 mm (0.003 in)

Max. permitted clearance between valve spindle and valve guide

Intake 0.3 mm (0.012 in)

Exhaust 0.2 mm (0.008 in)

Edge of valve head shall be min.

Intake 1.9 mm (0.075 in)

Exhaust 1.4 mm (0.055 in)

Valve seat can be ground until distance from valve head (new valve) to cylinder head face is max:

Intake (if values are exceeded, replace the valve seats) 1.5 mm (0.059 in)

Exhaust 1.5 mm (0.059 in)

#### Camshaft

Max. permitted out-of-round (with new bearing) 0.05 mm (0.002 in)

Bearing, max. permitted wear 0.05 mm (0.002 in)

Lifting height, min.

Intake 8.4 mm (0.331 in)

Exhaust 9.0 mm (0.354 in)

Tappets, max. permitted radial play 0.08 mm (0.003 in)

#### Turbocharger

Compressor shaft

max. axial play 0.08 mm (0.003 in)

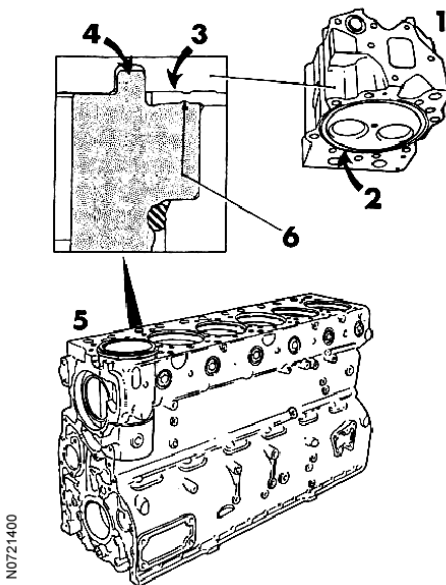
max. radial play 0.17 mm (0.007 in)

Document Title: <b>Short block</b>	Function Group: <b>210</b>	Information Type: <b>Service Information</b>	Date: <b>2014/11/26</b>
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## Short block

### Cylinder block

The cylinder block is made of cast iron and has wet, replaceable cylinder liners. The crankshaft is seated in bearings in the block for which there are prepared bearing shells. The camshaft bearing bushings must however be bored once pressed into the block.



**Figure 1**  
**Seal, cylinder block - cylinder head**

1. Cylinder head
2. Shallow groove (in cylinder head)
3. Gasket
4. Cylinder liner flame ridge
5. Cylinder block
6. Stepped edge

### Seal

The seal between the cylinder heads, block and liners comprises a solid steel gasket and a so-called flame ridge on each liner and a corresponding groove in the cylinder heads. The liners have a so-called stepped edge on the sealing surface between the liners and the gasket. This edge is raised between 0.47 and 0.52 mm (0.019 and 0.020 in) above the block face. There are also two shallow grooves in each cylinder head.

### Grooves

Cylinder head faces have two wide concentric grooves directly above the cylinder liner collar (see fig.). These grooves reduce the size of the sealing surface producing sufficient pressure at moderate tightening torques, thus eliminating the risk deforming the liner shelf in the cylinder block. Cylinder heads also have a groove for cylinder liner flame ridges.

- The shallow grooves in the cylinder head deform the gasket and secure it in place.
- The flame ridge of the cylinder liner protects the gasket from combustion pressure and heat.

Document Title: <b>Specifications, TD122</b>	Function Group: <b>210</b>	Information Type: <b>Service Information</b>	Date: <b>2014/11/26</b>
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## Specifications, TD122

### General

#### Cylinder liners

Type	Wet, replaceable
Height, total	313.5 mm (12.342 in)
Height of stepped edge above block face	0.47-0.52 mm (0.019 and 0.021 in)

#### Piston

Height, above block face	max. 0.55 mm (0.022 in)
Number of ring grooves	3
Front marking	Arrow pointing forward

#### Piston rings

##### Compression rings

Number	2
Piston ring play in groove	
upper compression ring	0.12 mm (0.005 in)
lower compression ring	0.09 mm (0.004 in)

##### Piston ring opening

1st ring	0.5 mm (0.020 in)
2nd ring	0.4 mm (0.016 in)

##### Oil ring

Number	1
Piston ring play in groove	0.05 mm (0.002 in)
Piston ring opening	0.05 mm (0.002 in)

#### Gudgeon pins

Play, gudgeon pin - connecting rod bushing	0.023 mm (0.001 in)
Gudgeon pins, std	54.998-55.004 mm (2.165-2.166 in)
Gudgeon pin hole diameter in piston	55.003-55.010 mm (2.165-2.166 in)



Document Title: <b>Complete installation</b>	engine, <b>210</b>	Function Group: <b>210</b>	Information Type: <b>Service Information</b>	Date: <b>2014/11/26</b>
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## Complete engine, installation

### Op nbr 210-02

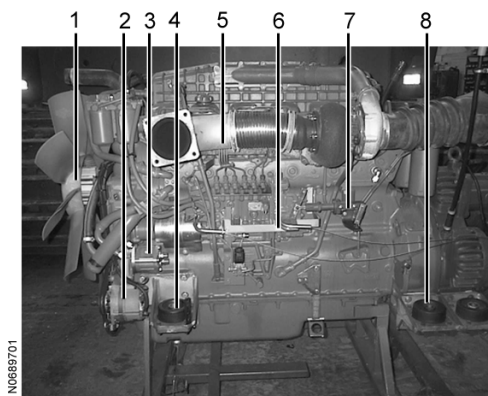
[14 360 000 Vacuum pump](#)

[Lifting chains, min. 2000 kg \(4400 lbs\)](#)

[Locking compound](#)

Replace all cable ties that have been removed from hoses and electrical cables.

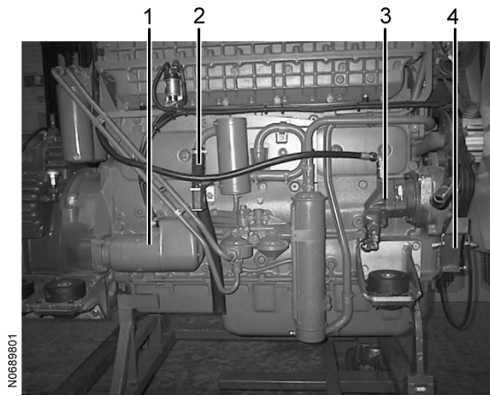
1. Transfer the fan **1**, alternator **2** and servo pump **3**.  
Transfer the engine mountings **4** and **8** (**3 mountings per side**).  
Apply locking compound to the bolts.  
Tightening torque: **90 (Nm) (66.38 lbf ft)**  
Transfer the exhaust pipe **5**, bracket **6** and hydraulic cylinder **7**.



**Figure 1**  
**Transfer of engine components**

- |   |                 |   |                    |
|---|-----------------|---|--------------------|
| 1 | Fan             | 5 | Exhaust pipe       |
| 2 | Alternator      | 6 | Bracket            |
| 3 | Servo pump      | 7 | Hydraulic cylinder |
| 4 | Engine mounting | 8 | Engine mounting    |

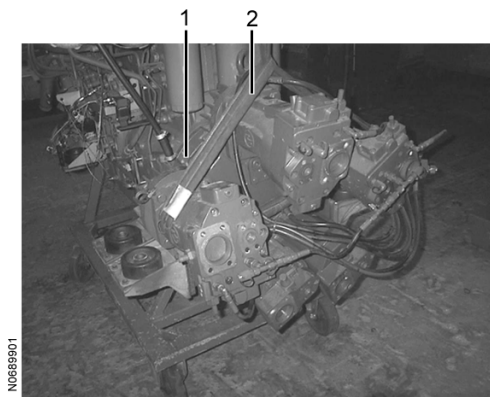
2. Transfer the starter motor **1**, hose **2** and electrical cables.  
Transfer the fan pump **3** and compressor mounting **4**.



**Figure 2**  
**Engine**

1. Starter motor
2. Hose
3. Fan pump
4. Mounting

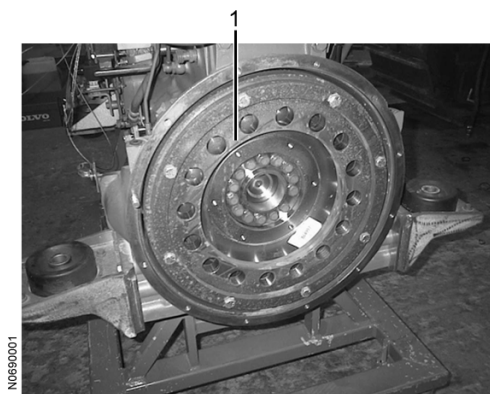
3. Loop a sling **2** round the three upper pumps. Remove the bolts **1** between the pump gearbox and engine and lift off the gearbox.



**Figure 3**  
**Engine**

1. Bolts
2. Sling

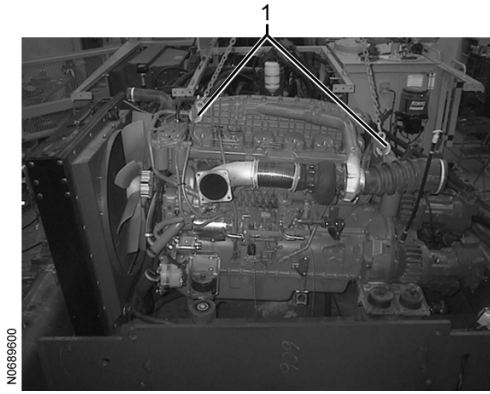
4. Transfer the clutch half **1** and fit the pump gear.



**Figure 4**  
**Engine**

1. Clutch half

5. Attach lifting chains to the lifting eyes **1** and lift in the engine.



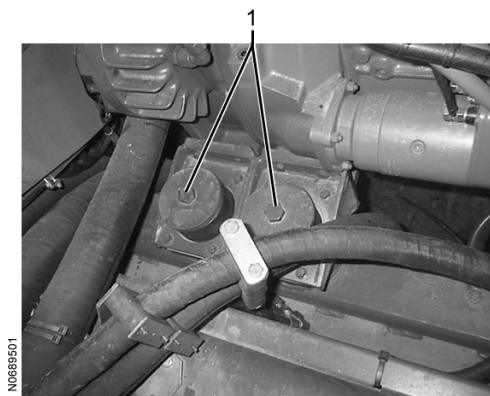
**Figure 5**  
**Engine**

1. Lifting eyes

6. Apply locking compound to the centre bolts **1** (6) and tighten them.  
Tightening torque: **540 Nm (398 lbft ft)**

**NOTE!**

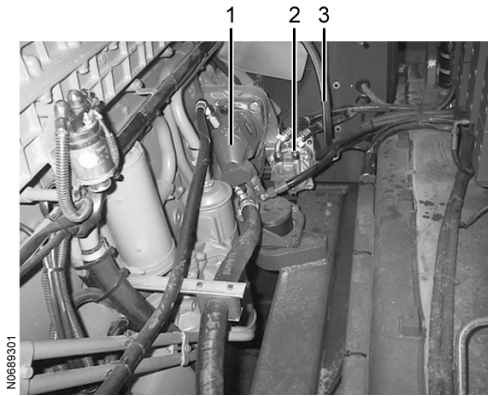
New bolts are recommended.



**Figure 6**  
**Engine compartment**

1. Centre bolts

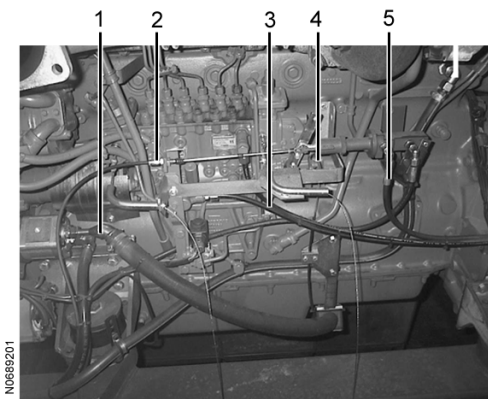
7. Fit the electrical cables to the engine as previously noted.
8. Turn on the battery disconnecter.
9. Start the vacuum pump.
10. Connect the hydraulic hoses to the fan pump **1** and the coolant hose **3** to the top side of the engine.  
Fit the compressor **2** to its mounting.



**Figure 7**  
**Engine compartment**

1. Fan pump
2. Compressor
3. Coolant hose

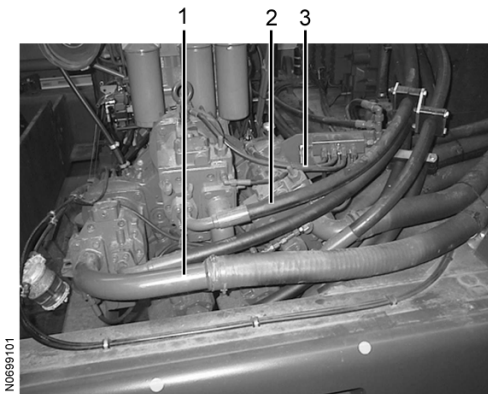
11. Connect the hydraulic hoses **1** to the servo pump and the fuel hoses **3** to the injection pump. Fit the throttle cable **2** to the bracket and the stop cable **4** to the injection pump. Connect the hose **5** to the hydraulic pump and all coolant hoses between the radiator and engine.



**Figure 8**  
**Engine**

- |   |                 |   |            |
|---|-----------------|---|------------|
| 1 | Hydraulic hoses | 4 | Stop cable |
| 2 | Throttle cable  | 5 | Hose       |
| 3 | Fuel hoses      |   |            |

12. Connect all suction pipes **1**, delivery pipes **2** and the marked drain hoses **3** to the pumps.

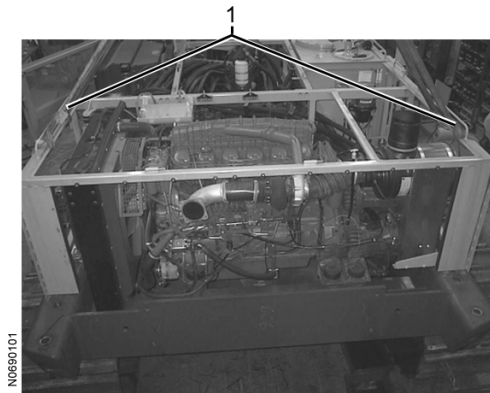


**Figure 9**  
**Pumps**

1. Suction pipe
2. Delivery pipe
3. Drain hoses

13. Disconnect the vacuum pump, see [Invalid linktarget] .

14. Open the suction flap valve.



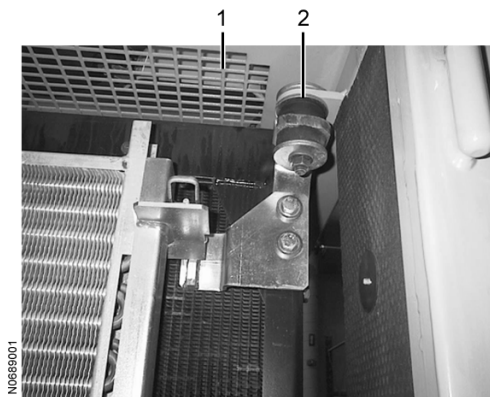
**Figure 10**  
**Rear section**

1. Slings

15. Attach two slings **1** to the short sides of the rear section and lift it in.

16. Fit the bolts to the short sides of the rear section.

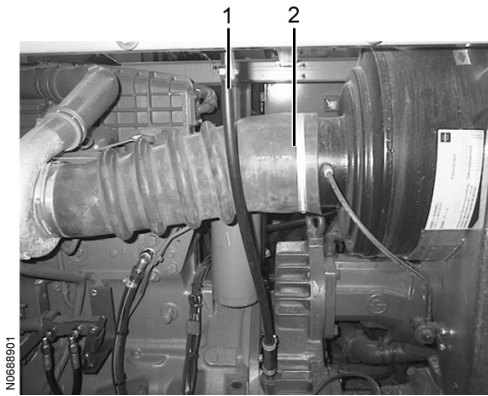
17. Fit the fasteners **2** to both sides of the radiator.  
Fit the hatch **1**.



**Figure 11**  
**Radiator**

1. Hatch
2. Fastener

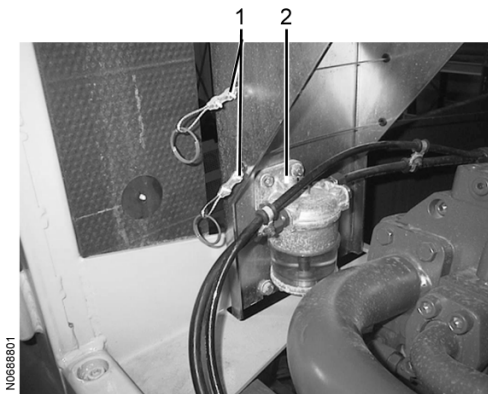
18. Fit the dipstick **1** and hose **2**.



**Figure 12**  
**Engine compartment**

- 1. Dipstick
- 2. Hose

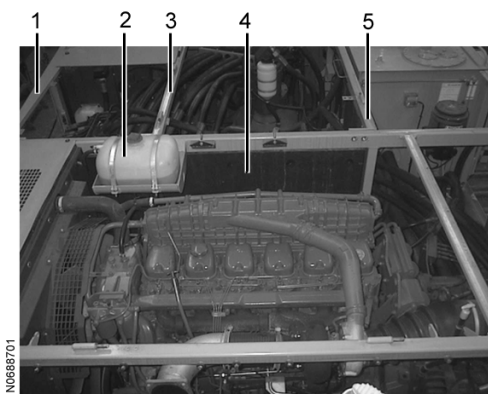
19. Fit the cables **1** and filter **2**.



**Figure 13**  
**Engine compartment**

- 1. Cables
- 2. Filter

20. Fit the frame sections **1**, **3** and **5** to the rear section, and refit the expansion tank **2** and partitions **4**.



**Figure 14**  
**Engine compartment**

- 1 Frame
- 2 Expansion tank
- 3 Frame
- 4 Partitions
- 5 Frame

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