

Document Title: <b>Engine, description</b>	Function Group: <b>200</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/10</b>
Profile: <b>CWL, L45B [GB]</b>			

## Engine, description

Machines of **SN 1941001- / -1941499** and **1951001- / -1951499** are equipped with the DEUTZ-BF4M 1013 E engine.

Machines of **SN 1941500- / -1943000** and **1951500- / -1953000** are equipped with the VOLVO-D5D engine.

Both engines are four cylinder, four stroke, in-line direct-injected diesel engines, with exhaust turbo and liquid cooling.

Machines **from SN 1943001- and 1953001-** are equipped with the VOLVO-D5D engine.

The engine is a four-cylinder, four-stroke, in-line diesel engine with direct injection, exhaust turbocharger, liquid cooling and internal, unregulated exhaust gas recirculation (EGR).

To comply with exhaust gas limit values, the turbocharger is equipped with **unregulated, internal exhaust gas recirculation (IEGR)**, which returns the exhaust gas within the cylinder head to the combustion air. The oxygen content of this exhaust is low. A lower oxygen content reduces the temperature spike during combustion and thereby reduces nitrogen oxide (NO<sub>x</sub>).

The camshaft has an extra cam - the trailing cam. This causes the inlet valve to briefly open during the exhaust stroke so that exhaust gas also enters the engine intake system. In the subsequent induction stroke, this exhaust is sucked back in. There is no regulation of exhaust gas quantity.

The engine data plate specifies model, engine number and power data. The engine number is also stamped into the crankcase. Model and engine number must be specified when ordering spare parts. The direction of rotation is found on the flywheel, anticlockwise. Firing order: 1-3-4-2 (cylinder no. 1 on the flywheel side).

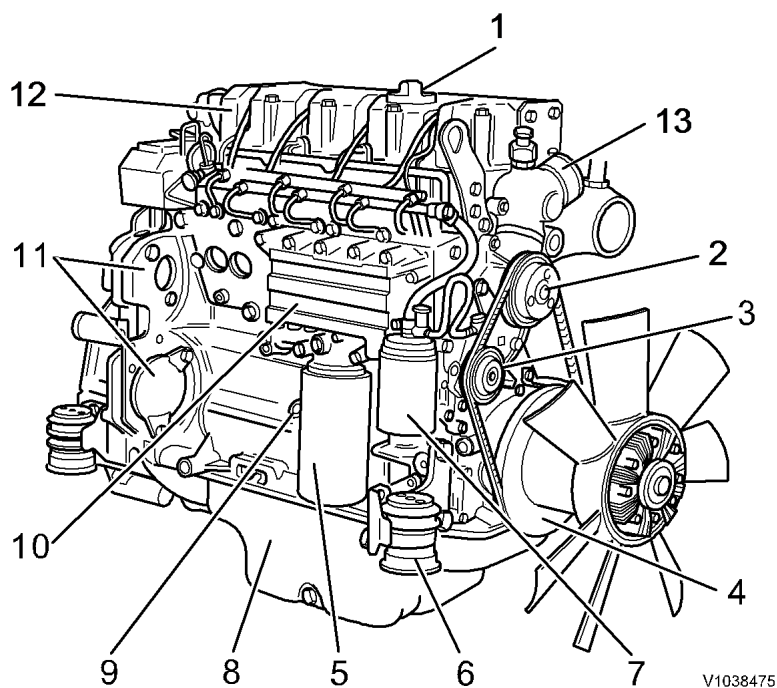
**IMPORTANT! Adjustments to the regulator may only be performed by trained staff in an authorized central repair workshop.**

The image shows a detailed engine data plate form. It includes fields for Model (A), KW (D), HP (D), RPM (E), CODE, SPEC, SER NO (C), C.SPEC (B), VALVE LASH (MM IN), EXH, TIM ?BTDC (F), FUEL RATE, DISPL, and a barcode. The Volvo logo is present, and it states 'MADE IN GERMANY'. The reference number V1044234 is at the bottom right.

**Figure 1**  
**Engine data plate**

- A. Engine type
- B. Spare part number
- C. Engine number
- D. Capacity
- E. Rated speed
- F. Timing setting

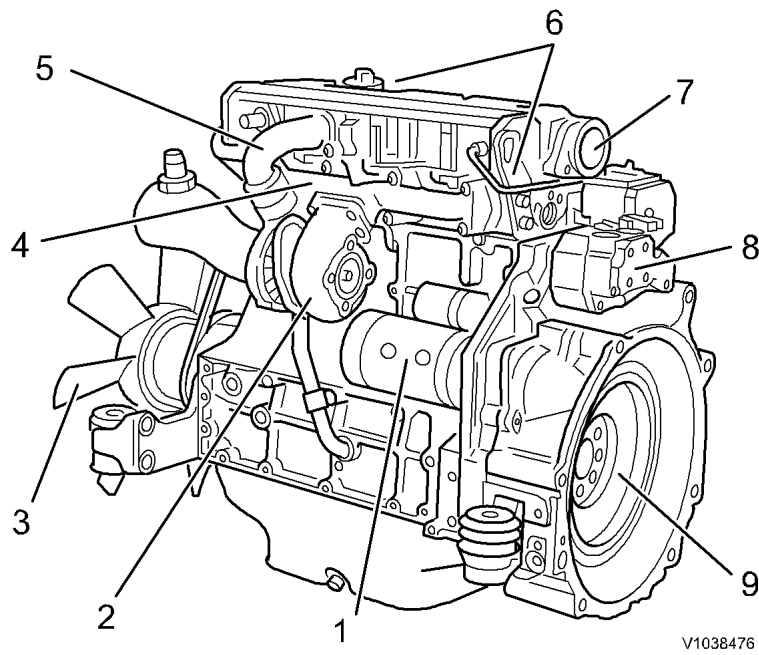
### Components, servicing view



**Figure 2**  
**Components, servicing view**

1. Oil filler pipe
2. Coolant pump
3. Fuel pump
4. Vibration damper
5. Oil filter
6. Engine mounting
7. Fuel filter
8. Oil sump
9. Oil dipstick
10. Oil cooler
11. Attachment for power take-off
12. Cylinder head
13. Coolant supply

**Components, exhaust view**



V1038476

**Figure 3**  
**Components, exhaust view**

1. Starter motor
2. Turbocharger
3. Engine fan
4. Exhaust manifold
5. Inlet manifold
6. Transport device
7. Crankcase ventilation
8. Speed (rpm) sensor.
9. Flywheel

Document Title: <b>Compression test</b>	Function Group: <b>210</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/10</b>
Profile: <b>CWL, L45B [GB]</b>			

## Compression test

Op nbr 210-002

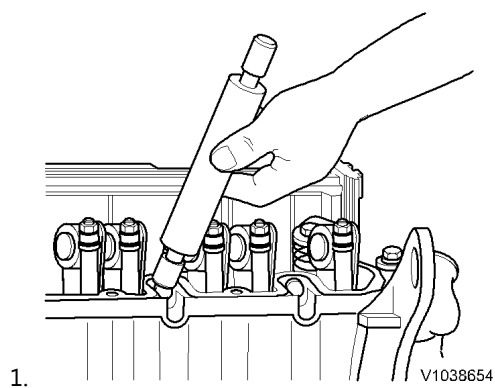
[9998694 Adapter](#)

[9988539 Pressure gauge](#)

[9998007 Adapter](#)

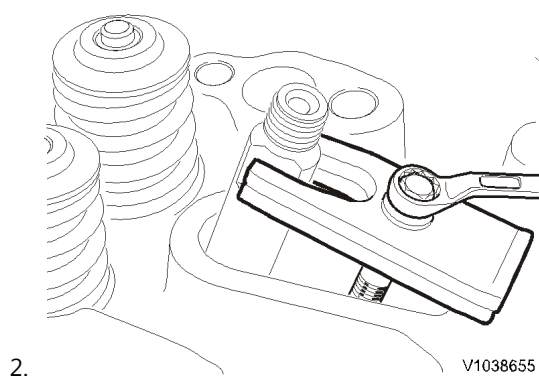
**Injection valves are removed and valve clearance checked.**

Remove injection valves, see [237 Injectors all, testing and adjusting incl removing and fitting](#)



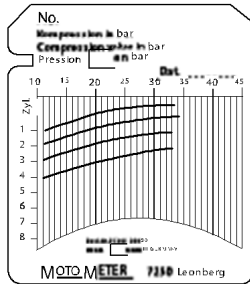
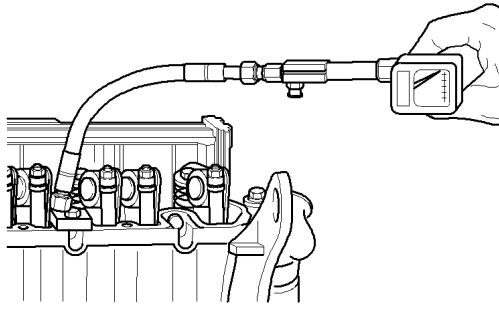
**Figure 1**

Insert adapter (9998694) in injection valve bore with new seal ring.



**Figure 2**

Place clamping claw on adapter. Tighten screw.



3.

V1038656

**Figure 3**

If necessary, screw on adapter 9998007 for the connector.

4. Connect compression tester 9988539. Crank engine with the starter.

5. Carry out compression test on each cylinder.

**Compression: 3 +0.8 MPa (30 +8 bar) (435 +116 psi)**

**NOTE!**

The compression measured depends on the starter rpm during the measurement and the engine's altitude. Therefore, exact limit values cannot be set. Compression measurement is recommended only for comparison of all engine cylinders. If a deviation of more than 15% is found, the cylinder in question should be dismantled to determine the cause.

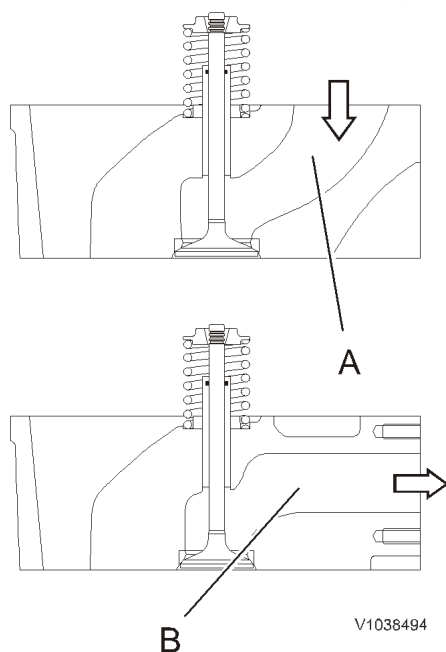
6. Install compression tester and connector.

7. Install injection valves.

Document Title: <b>Cylinder head, description</b>	Function Group: <b>211</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/10</b>
Profile: <b>CWL, L45B [GB]</b>			

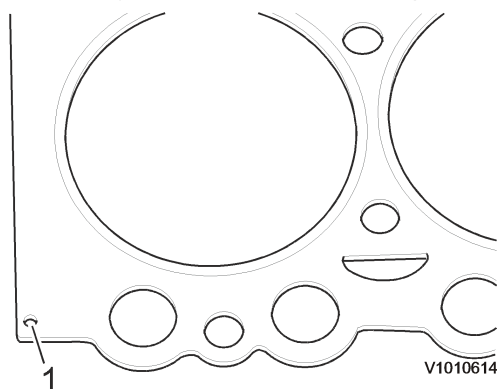
## Cylinder head, description

The cylinder head is made of cast iron. The inlet air enters vertically (A) and the exhaust gases exit horizontally (B). Inlet and exhaust are on the same side of the cylinder head.



**Figure 1**  
**Cylinder head**

The cylinder head gasket is a multi-layer gasket with 1, 2 or 3 identification holes to indicate the three different thicknesses. The choice of gasket thickness is determined by the piston protrusion over the cylinder head sealing surface. If new pistons or a new cylinder block are fitted, the gasket thickness must be evaluated and changed if necessary.



**Figure 2**  
**Cylinder head gasket, marking**

Document Title: <b>Valves, description</b>	Function Group: <b>214</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/10</b>
Profile: <b>CWL, L45B [GB]</b>			

## Valves, description

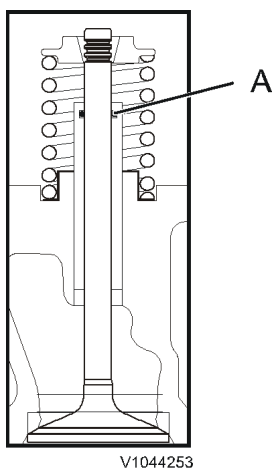
The engines are equipped with one inlet and one exhaust valve per cylinder.

The upper area of the valve guide (on the valve stem) houses an O-ring (A). This O-ring seal should prevent a large level of oil consumption and reduce the amount of hydrocarbons in the exhaust.

Valve rotation is achieved through the eccentric position of the rocker arm.

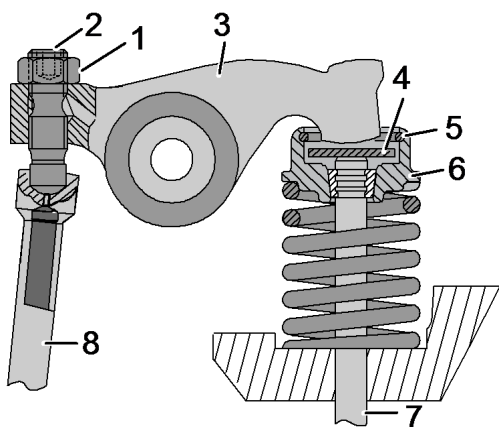
The valve springs have a prescribed direction of installation. The closely wound end of the valve spring must point toward the cylinder head.

Rocker arm lubrication is a component of the centralized lubricating system. The oil is supplied via the tappets and push rods.



**Figure 1**

Due to a new valve spring guide design, it is no longer possible to use a feeler gauge to adjust the valves of **L40B machines from SN 1913001 – / 1923001 – and L45B machines from SN 1943001 – / 1953001 –**. For this reason, valve clearance must be adjusted using the rotation angle disc.



**Figure 2**  
**Valve system**

1. Jam nut
2. Adjustment screw
3. Rocker arm
4. Washer
5. Snap ring
6. Spring disc
7. Valve
8. Push rod



Document Title: <b>Valves, adjusting</b>	Function Group: <b>214</b>	Information Type: <b>Service Information</b>	Date: <b>2014/3/10</b>
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## Valves, adjusting

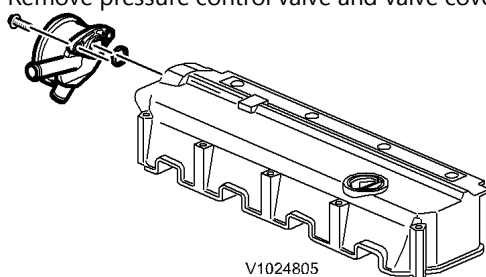
Op nbr 214-012

[885530 Rotation tool](#)

### NOTE!

Only adjust the valve clearance with cold engine.

1. Place the machine in service position.
2. Remove pressure control valve and valve cover.



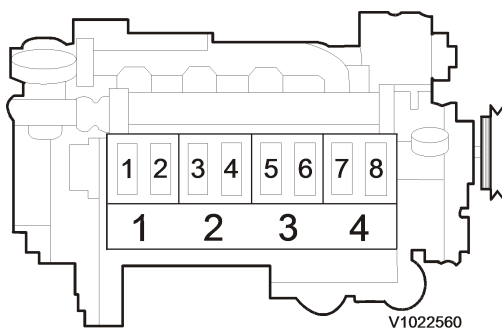
**Figure 1**

**Valve cover with pressure control valve**

3. Remove retainer plate with cabling.

### NOTICE

**Valve adjustment with the engine running is not allowed since the valves may strike the piston, causing severe damage.**



**Figure 2**

1. Exhaust valves: 1, 3, 5, 7
2. Inlet valves: 2, 4, 6, 8

4. Rotate the engine until the valves on cylinder no. 1 stand at "valve overlap".



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