

Construction Equipment

Document Title: Engine, description	· ·	Information Type: Service Information	Date: <b>2014/3/18</b>
Profile: BHL, BL71 PLUS [GB]			

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# **Engine, description**

Numbering of cylinders

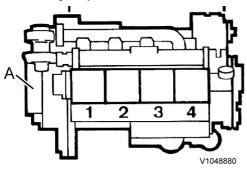
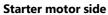
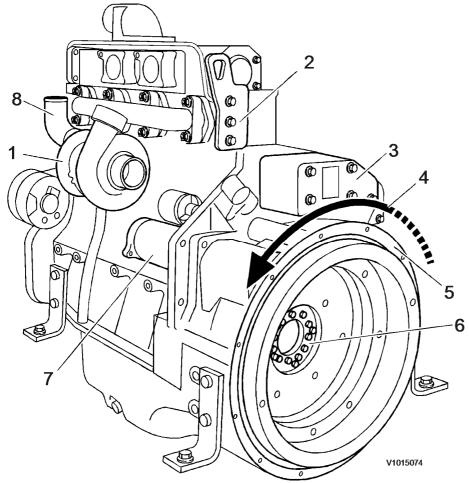


Figure 1 A = flywheel





#### Figure 2

- 1. Turbocharger
- 2. Lifting eye
- 3. Engine revolution governor
- 4. Direction of rotation
- 5. Flywheel housing
- 6. Flywheel
- 7. Starter motor
- 8. Outlet pipe, coolant

# NOTICE

The governor's settings may only be adjusted by trained personnel at a central overhaul workshop.

#### **Engine revolution governor (Heinzmann).**

The engine revolution governor on the D4D engine is of the centrifugal type.

Engine type, serial number and rated speed (rpm) must always be stated when ordering a governor as spare part. Each regulator for the above mentioned engines has been especially made for a particular engine. This means that a governor cannot be moved from one engine to another.

#### NOTE!

An incorrectly adjusted governor may cause the engine not to meet the applicable regulations for emissions and performance.

#### Service side

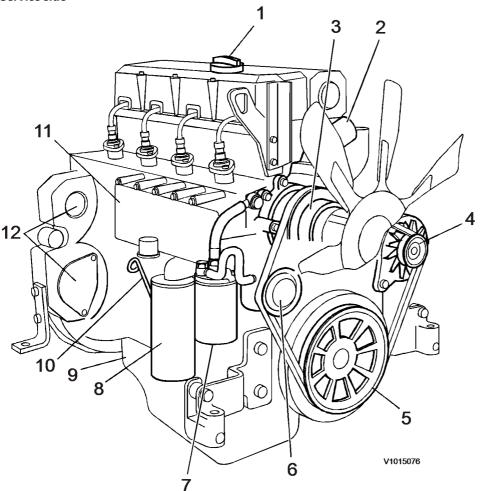


Figure 3

- 1. Oil filling point
- 2. Inlet pipe, coolant
- 3. Coolant pump
- 4. Alternator
- 5. Crankshaft belt pulley
- 6. Fuel pump
- Fuel filter
- 7. 8. Lubricating oil filter
- 9. Oil pan
- 10. Oli dipstick
- Lubricating oil cooler 11.
- 12. Power take-off for, for example, hydraulic pump, air compressor etc.
- 13. Cylinder head



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# **Engine, description**

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.

#### **Engine data plate**

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.



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

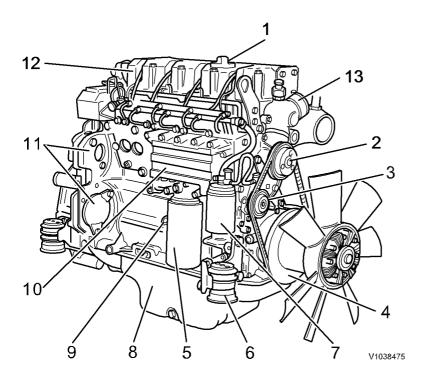


Figure 2 Components, servicing view

- 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

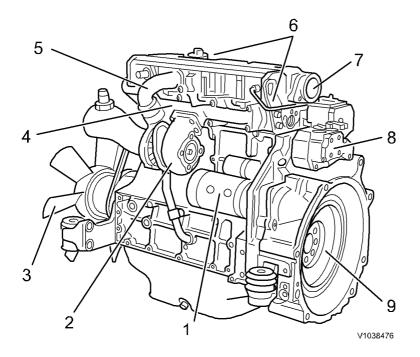


Figure 3 Components, exhaust view

- 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



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# **Engine, removal**

### Op nbr 21070-1

14360000 Vacuum pump Lifting chains, min. 1000 kg (2200 lb)



To avoid severe burns, DO NOT attempt the next procedure when the engine is HOT. Wait for the engine, silencer and tailpipe to cool before proceeding.

#### NOTE

In general, all strip clamps that secure hoses and electrical cables must be removed. All disconnected hoses and open connections must be plugged.

- 1. Remove the engine hood, see 821 Engine hood, removal
- 2. Detach cable from the bracket.

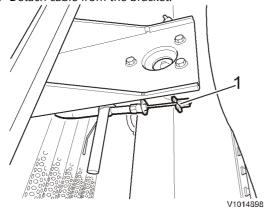


Figure 1

- 1. Cable
- 3. Remove the grille and the front plate.

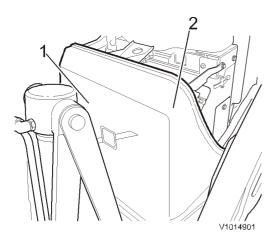


Figure 2

- 1. Grille
- 2. Front plate
- 4. Remove the clamps from both sides of the cooler.

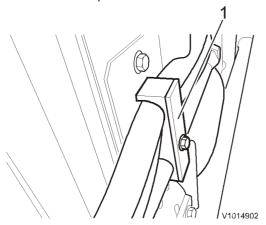
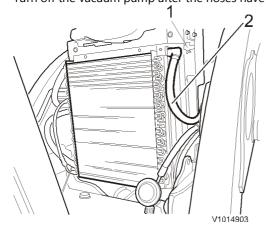


Figure 3

- 1. Clamp
- 5. Connect the vacuum pump, see 900 Vacuum pump, connection
- 6. Open the locking device and let down the hydraulic oil cooler. Disconnect the hoses (4 hoses) from the hydraulic oil cooler. Turn off the vacuum pump after the hoses have been plugged.



### Figure 4

- 1. Locking device
- 2. Hoses
- 7. Connect a drain hose to the valve and place the drain hose down into a container. Open the valve and drain the coolant into the container.

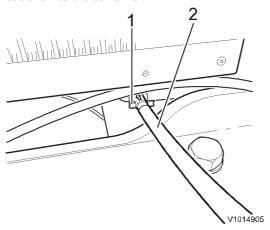


Figure 5

- 1. Valve
- 2. Drain hose
- 8. Disconnect the radiator hoses and the lower hose (hidden).

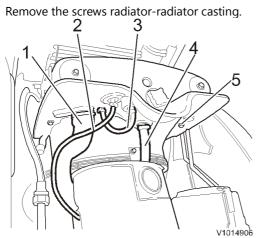


Figure 6

- 1. Hose
- 2. Hose
- 3. Hose
- 4. Hose
- 5. Screws
- 9. Remove the screws from both sides and lift out the hydraulic oil cooler and the radiator.

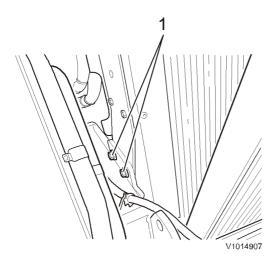


Figure 7

1. Screw

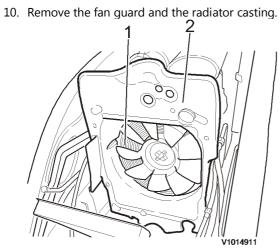


Figure 8

- 1.
- Fan guard Radiator casting 2.
- 11. Remove the fan.

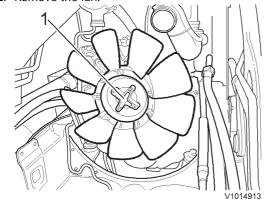


Figure 9

1. Fan 12. Remove the attaching screws (4 attaching screws, 2 underneath). Remove the nuts and remove the silencer.

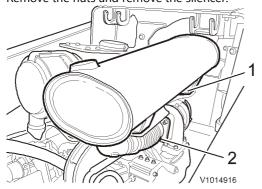


Figure 10

- 1. Attaching screws
- 2. Nuts
- 13. Loosen the hose clamp. Remove the screws and remove the air cleaner. Remove the screws (3 pcs) and remove the bracket.

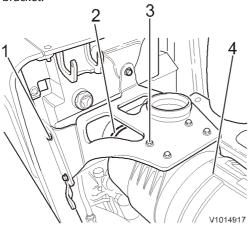


Figure 11

- 1. Screws
- 2. Hose clamp
- 3. Screws
- 4. Air cleaner
- 14. Disconnect hose from the engine.

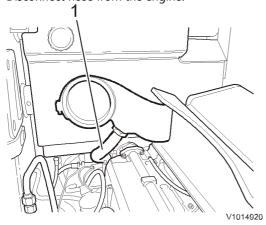


Figure 12

#### 1. Hose

15. Disconnect the hoses (2 hoses, one hidden) from the engine and release the fuel filter/pump from the hydraulic tank.

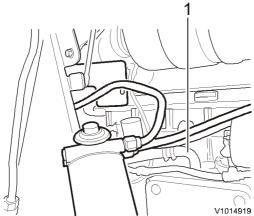


Figure 13

1. Hoses

16. Detach the seat , move the seat back, and lift up the rubber mat from the floor against the seat.  $1 \qquad \qquad 2$ 

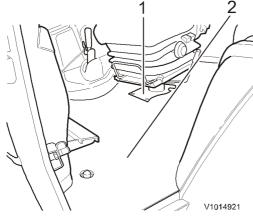
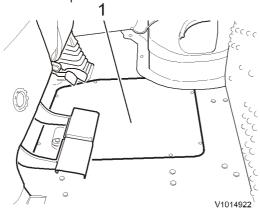


Figure 14

- 1. Seat
- 2. Rubber mat

17. Remove the plate.



## Figure 15

- 1. Plate
- 18. Remove the shift lever.

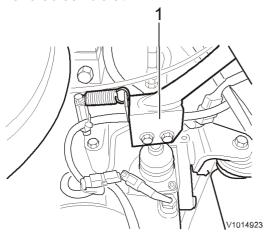


Figure 16

19. Disconnect the hoses from the gearbox.

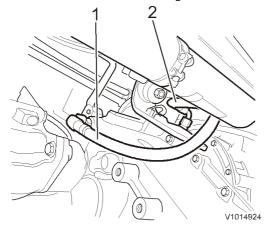


Figure 17

- 1. Hose
- 2. Hose
- 20. Disconnect the hoses from the gearbox.

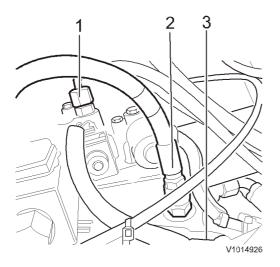


Figure 18

- 1. Hose
- 2. Hose
- 3. Hose
- 21. Disconnect the hose from the gearbox.

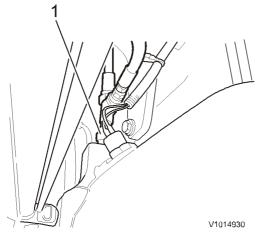


Figure 19

- 1. Hose
- 22. Disconnect ground cables from the gearbox.

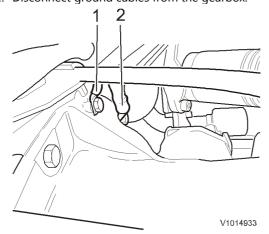


Figure 20



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