

Document Title: Engine, description	Function Group: 200	Information Type: Service Information	Date: 2014/8/1 0
Profile: ART, A30E [GB]			

Engine, description

Engine D9B, description

D9B is a straight, six-cylinder, direct-injected diesel engine with 9.4 litre displacement, turbocharger, intercooler and electronically controlled fuel injection. The valve mechanism receives its movement from the camshaft via rocker arms. The engine has an overhead camshaft and unit injectors, which are centred above the pistons and controlled by the camshaft and a control unit (E-ECU). The control unit is located on the engine's left side.

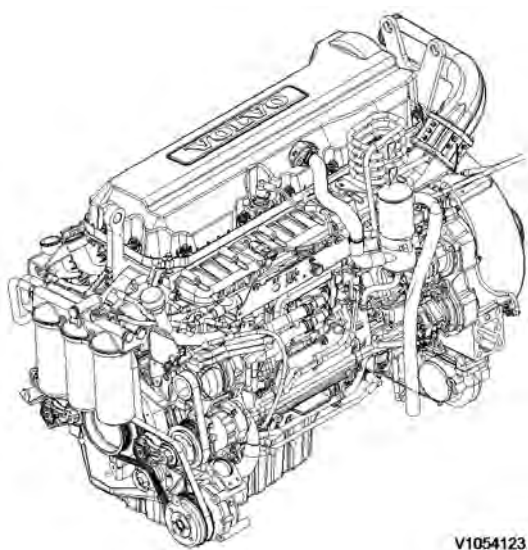


Figure 1

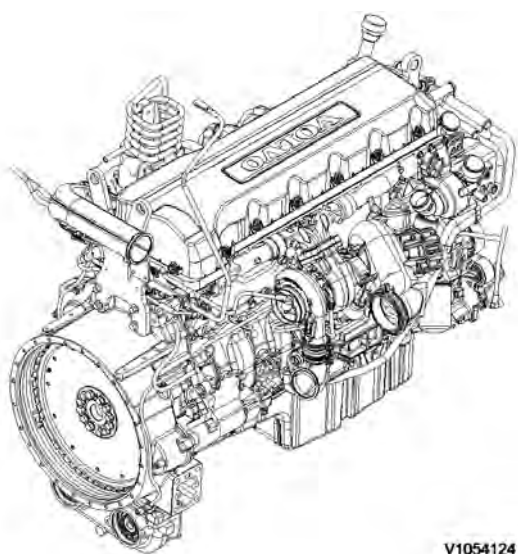


Figure 2

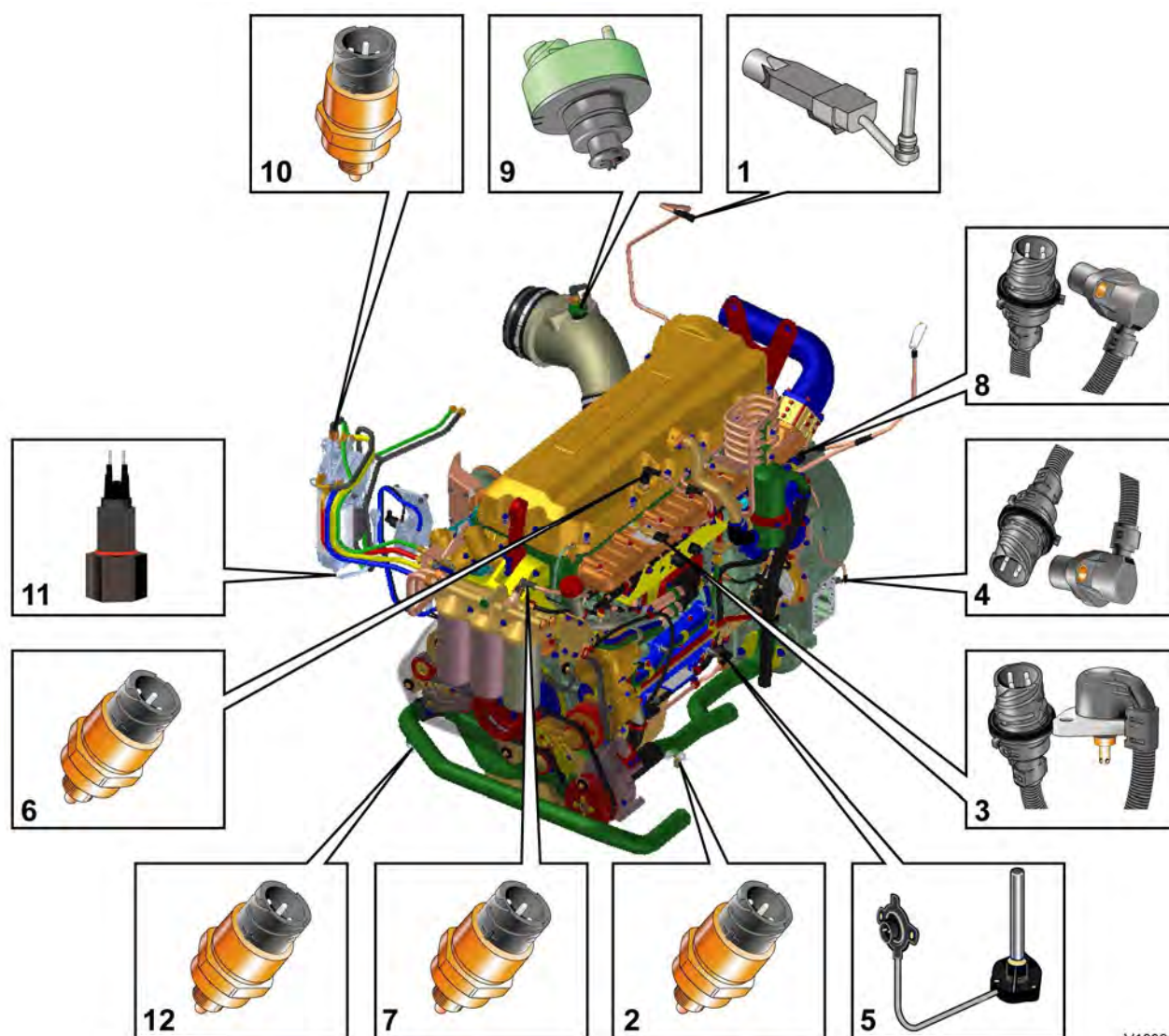
Document Title: Engine, sensor positions	Function Group: 200	Information Type: Service Information	Date: 2014/8/1 0
Profile: ART, A30E [GB]			

Engine, sensor positions

Control unit sensors

The following is a brief summary of the parts on the engine. There are a number of other parts that affect the system, for example, the throttle pedal sensor.

The central part of the system, the control unit is positioned on the left side of the engine. All cable connectors for the engine's sensors are of DIN-standard and are connected in a so-called cable box.



V1039126

Figure 1
Engine D9, sensors (some have double functions)

1. Sensor for coolant level, SE2603
2. Sensor for coolant temperature, cooling circuit converter, SE2601
3. Sensor for charge air pressure/temperature, SE2507/SE2508
4. Tachometer sensor, flywheel, SE2701

5. Sensor for oil level/temperature, SE2205/SE2202
6. Sensor for crankcase pressure, SE2509
7. Sensor for oil pressure, SE2203
8. Camshaft sensor, engine position, SE2703
9. Sensor for air pressure/temperature, SE2501/SE2502
10. Sensor for feed pressure, fuel, SE2301
11. Sensor for water indicator, SE2302
12. Sensor for coolant temperature, cooling circuit engine/retarder, SE2602

Document Title: Engine, identification	Function Group: 200	Information Type: Service Information	Date: 2014/8/1 0
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Engine, identification

Identification plate 1

Engine designation, serial number, part number and assembly plant are stamped in one field on the engine block's left front edge.

Identification plate 2

A decal with the software's ID-number, the engine's serial number and assembly plant is located on the valve cover to ensure installation of correct ECU on the engine in production. On the back of the ECU, there is a decal indicating its hardware number. The E-ECU is located on the engine's left side.

Assembly plants:

A = Skövde, Sweden

E = Curitiba, Brazil

F = Flen, Sweden

L = Lyon, France

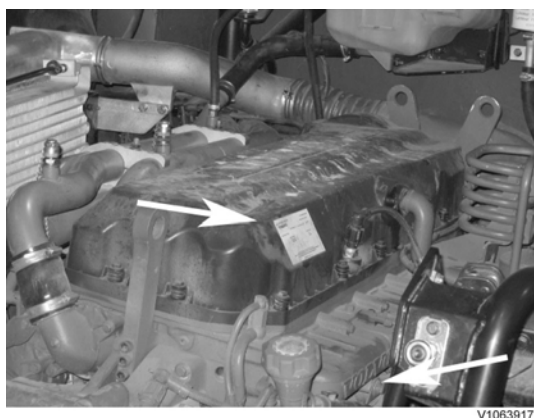


Figure 1

Identification plate 3

The certification decal is located on the valve cover as well as on the left side, at the back of the machine's front frame inside of the steps.



Figure 2

Document Title: E-ECU, MID 128, changing pre-programmed ECU	Function Group: 200	Information Type: Service Information	Date: 2014/8/1 0
Profile: ART, A30E [GB]			

E-ECU, MID 128, changing pre-programmed ECU

Op nbr 200-070

This operation also includes required tools and times for applicable parts of the following operations:

- [200 E-ECU, MID 128, changing non-programmed ECU](#)
 1. Connect VCADS Pro computer and perform 17030-3 Parameter, programming.
 - Use the function: Save all read parameters to job card.
 2. Perform [200 E-ECU, MID 128, changing non-programmed ECU](#) step 2–14.
 3. Connect VCADS Pro computer and perform 17030-3 Parameter, programming.
 - Program earlier read-out parameters according to the job card.

Document Title: E-ECU, MID 128, changing non-programmed ECU	Function Group: 200	Information Type: Service Information	Date: 2014/8/1 0
Profile: ART, A30E [GB]			

E-ECU, MID 128, changing non-programmed ECU

Op nbr 200-068

1. Connect VCADS Pro computer and perform 28423-3 MID 128 ECU, programming

- When instructed to connect the new control unit, perform steps 2–15.

Removing E-ECU



Always follow instructions according to Electrical system, work instructions, electronic components

[3001 Electrical system, special instructions for servicing, electronic components](#)



Always follow instructions according to Electrical system, work instructions, electronic components

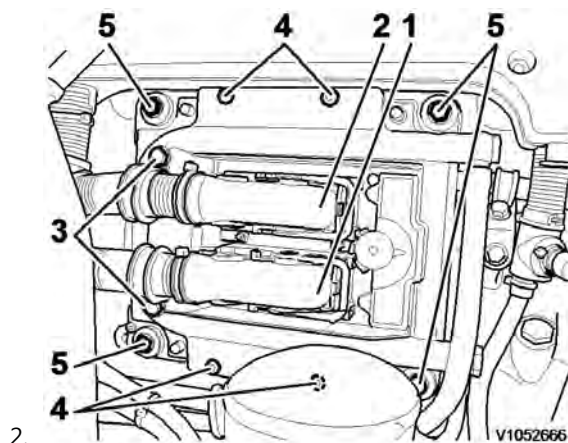


Figure 1
E-ECU

1. Connector EA
2. Connector EB
3. Screw for clamp
4. Screw for cooler
5. Screw for ECU

Place the machine in service position.

3. Open the engine hood.

NOTICE

Turn off the electric power with the battery disconnect switch before starting any work. Also remove the

fuse for respective component.

4. Remove the three screws (3) that disconnect the clamps from the E-ECU.
5. Unplug the connectors EA and EB from the E-ECU.
6. Remove the screws (4) (6 pcs.) that hold the cooler (3).
7. Remove the screws (5) (4 pcs.) that hold the E-ECU.
8. Carefully move aside the cooler and remove the E-ECU.

NOTE!

Work carefully so that hoses for the cooler are not damaged.

Mounting E-ECU

9. Lift in the E-ECU inside of the cooler.
10. Install the screws (5) (4 pcs.) that hold the E-ECU against the engine block.
11. Install the screws (4) (6 pcs.) that hold the cooler against the E-ECU.
12. Plug in the connectors EA and EB for the E-ECU.
13. Install the screws (3 pcs.) that hold the clamps against the E-ECU.
14. Close the engine hood.

NOTE!

When changing pre-programmed ECU, return to [200 E-ECU, MID 128, changing pre-programmed ECU](#) step 3.

15. Finish VCADS Pro operation 28423-3 MID 128 ECU, programming.

Document Title: Cylinder compression, PC test	Function Group: 210	Information Type: Service Information	Date: 2014/8/1 0
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Cylinder compression, PC test

Connect the VCADS Pro computer and carry out 21006-3 Cylinder compression, test.

(21006-3) This test indicates if there is any deviation in compression in any cylinder in relation to the other cylinders.

Document Title: Compression test	Function Group: 210	Information Type: Service Information	Date: 2014/8/1 0
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Compression test

Op nbr 210-002

[9990006 Puller](#)
[9990185 Lifting tool](#)
[9996400 Impact puller](#)
[9998599 Cleaning tool](#)
[9998248 Adapter](#)
[9998248 Adapter](#)
[9998248 Adapter](#)
[9998248 Adapter](#)
[9998248 Adapter](#)
[9998248 Adapter](#)
[9993590 Gear wheel](#)
[88880003 Bracket](#)
[9988539 Pressure gauge](#)
[88820016 Setting tool](#)

This operation also includes the tools and times needed for required parts of the following actions:

- ☐ [191 Service positions](#)
- ☐ [237 Unit injector, adjusting pretension](#)
- ☐ [233 Fuel system, bleeding](#)
- ☐ [214 Valves, adjusting](#)

Removing

1. Place the machine in service position, see [191 Service positions](#).
2. Lower the front grill and pump up the engine hood.
3. Drain the cylinder head to avoid fuel in the engine oil. Open the connection by the return line on the cylinder head and install a hose.



V1061153

Figure 1

4. Loosen the feed hose from the connection by the ECU. Use an air nozzle to get out all of the fuel. Lead the feed hose into a container. Since the feed pump will pump out fuel during the test, the container's volume must be at least 5 litres (1.3 US gal).



Figure 2

5. Secure the expansion tank with a strap, and then loosen the bracket for the expansion tank.

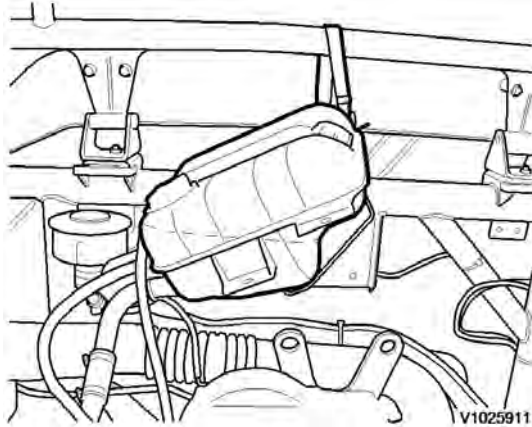


Figure 3

6. Remove the engine's front lifting eye. This is done to enable installation of the lifting tool on the rocker arm bridge.
7. Remove the hose from the oil trap and remove the valve cover.
8. The condition for reading off correct compression pressure is that the valve clearance is correct. See: [214 Valves, adjusting](#)
9. Remove the IEGR control valve's electrical connections and wipe clean around the control valve. Remove the valve.

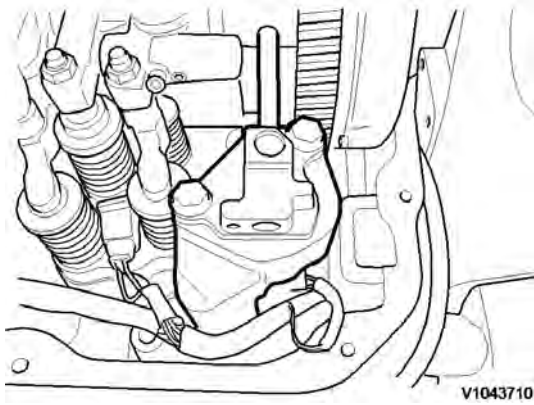


Figure 4

10. Loosen the bolts for the rocker arm shaft, evenly distributed across the rocker arm shaft to avoid shear stresses. Remove the bolts.
Lift away the rocker arm shaft with tool 9990185 and 88880003.
Rocker arm shaft's weight: : **approx. 30 kg (66 lbs)**

Figure 5

9990185

11. Clean very thoroughly around the unit injector. Remove the electrical connection. Remove the bolt for the attaching yoke. Remove the injector together with the attaching yoke. Use 9996400 Impact puller, 9990262 Adapter, and 9990006 Puller. Remove the other unit injectors in the same way.

NOTE!

Place each injector in separate new plastic bags. Mark which cylinder they were installed in. It is important to not mix up the injectors since they are classed for a certain cylinder.

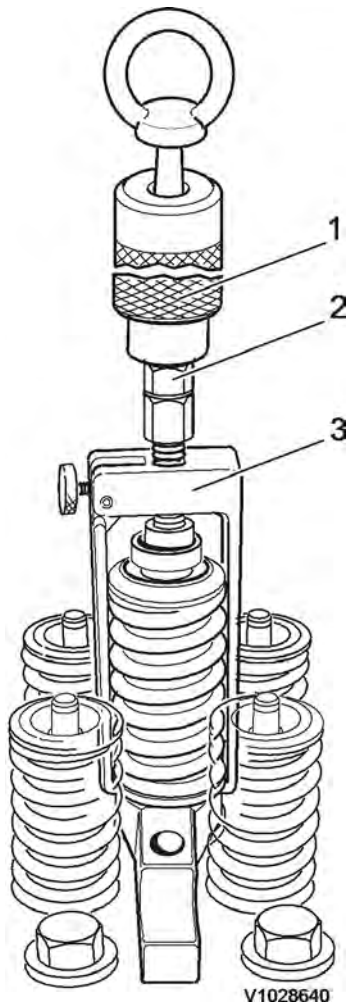


Figure 6

1. 9996400, Impact hammer
2. 9990262, Adapter
3. 9990006, Puller

12. Clean the copper sleeve with the brush/brushes included in kit 9998599.

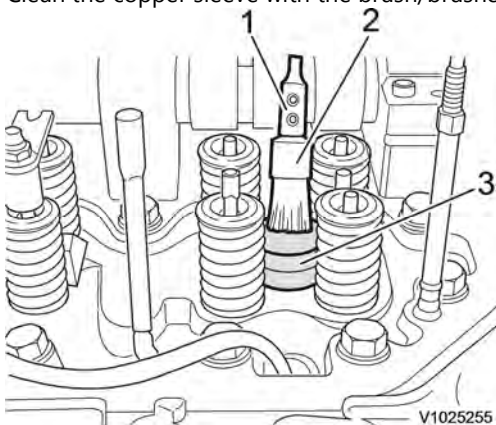


Figure 7

1. Extension
2. Brush
3. Protective sleeve

13. Check that all adapters have O-rings and seal against the copper sleeve. Install adapters 9998248 in the unit injectors' place in the cylinder head.

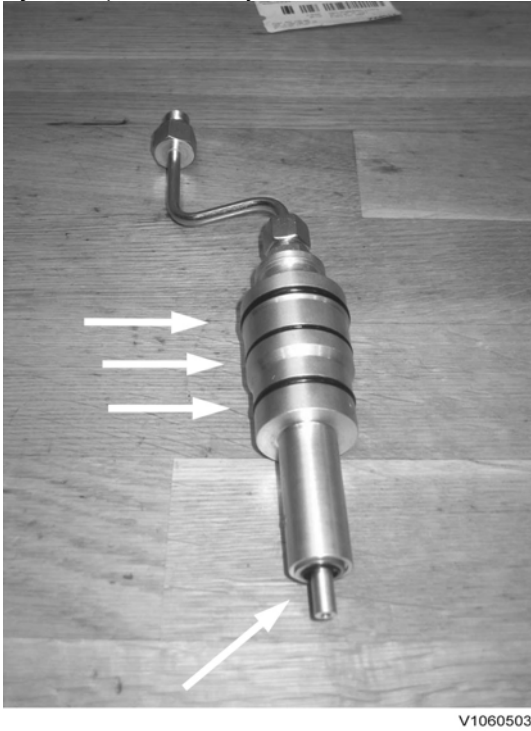


Figure 8

14. Tighten down the adapter with the unit injector's attaching yoke. Tightening torque: **40 Nm (30 lbf ft)**.

NOTE!

Keep in mind that the tightening torque here is only for holding the adapter during the test



Figure 9

15. Install the rocker arm bridge with the lifting tool 9990185. Tighten the bolts along the whole rocker arm shaft to prevent warping and to make sure that the guide pins fit in the camshaft's support bearing. See [214 Rocker arm shaft, tightening torques](#).
16. Install the rubber bands so that they are located between the adapter and the unit injector's rocker arm. This is done so that the rocker arm will not rattle.



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