VOLVO

Construction Equipment

Document Title: **Engine, description**	Function Group: **200**	Information Type: **Service Information**	Date: **2015/2/16**
Profile: **ART, A25D 4x4 [GB]**			

Engine, description

Engine D10, description

Machine	Place of manufacture, serial number		
	EU	US	Brazil
A25D	11001–12999	61001–61118	71001–71999
A30D	10001–11999	60001–60093	70001–72999

The engine is a straight six cylinder, direct-injected diesel with 9.6 litres cylinder capacity, turbo, intercooler and electronically controlled fuel injection. The valve mechanism receives its movement from the camshaft via valve rods and rocker arms.
The injection pump is equipped with a smoke limiter for torque limitation of the engine. The injectors are mounted in copper sleeves that are pressed into the cylinder head and directly surrounded by the coolant.
The engine also has an electronic control unit (E-ECU), located on the right radiator bow.
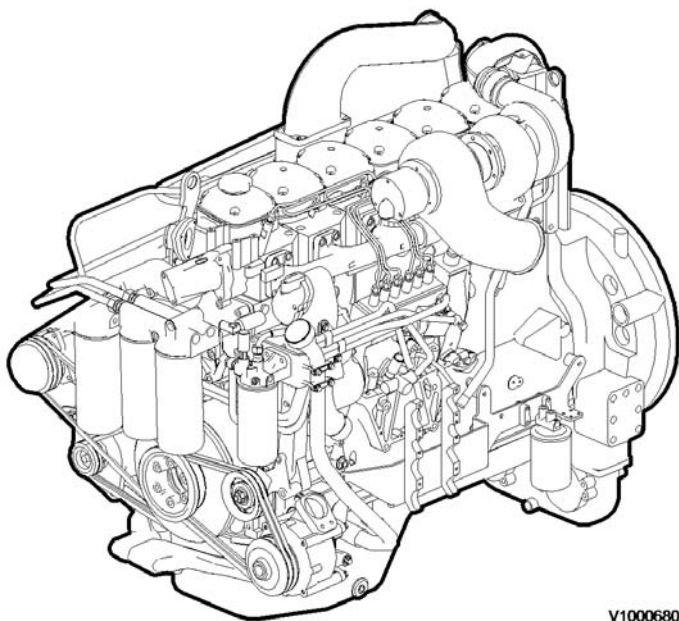
V1000680

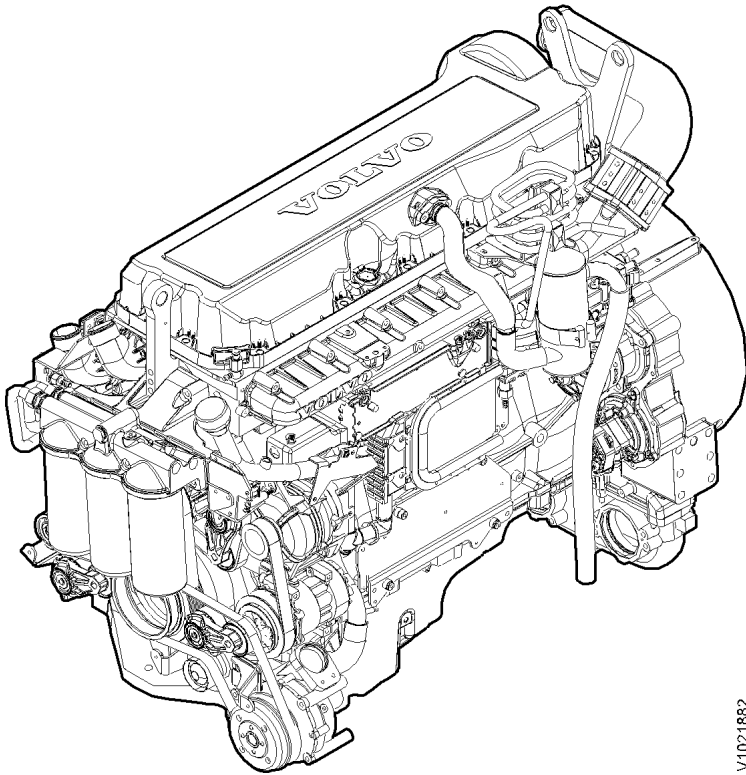**Figure 1**
Engine D10B, left side
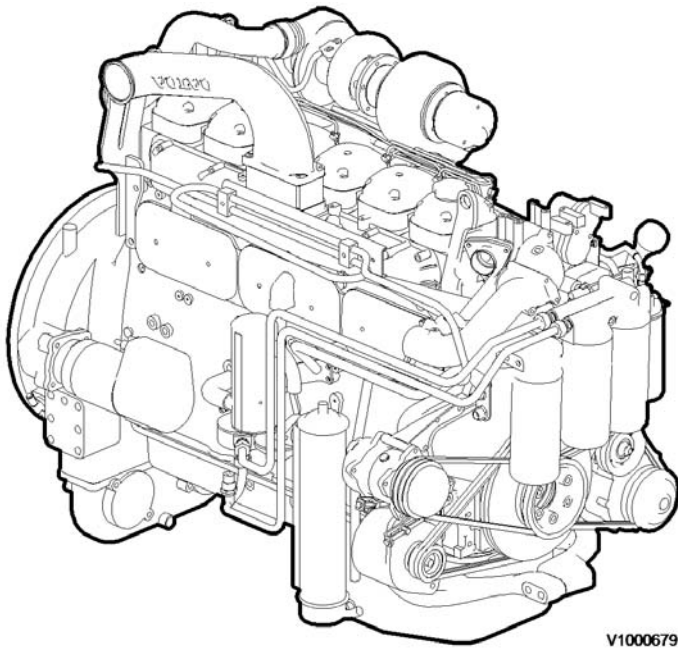
Figure 2
**Engine D10B, right side**

Engine D9, description

Machine	Place of manufacture, serial number		
	EU	US	Brazil
A25D	13001–	–	72000–
A30D	12001–	–	73000–

Engine D9 is a straight six cylinder, direct-injected diesel with 9.4 litres cylinder capacity, turbo, intercooler and electronically controlled fuel injection. The valve mechanism receives its movement from the camshaft via valve rods and 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.
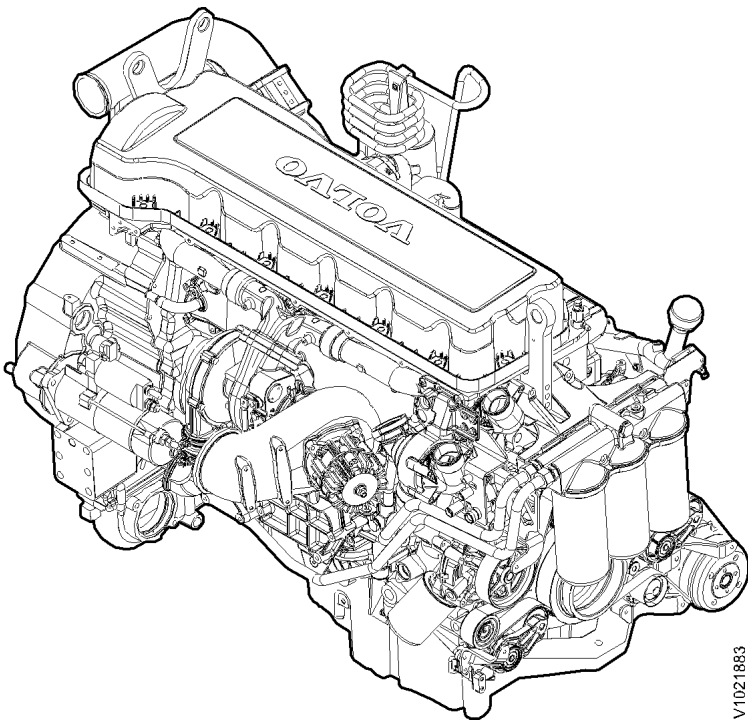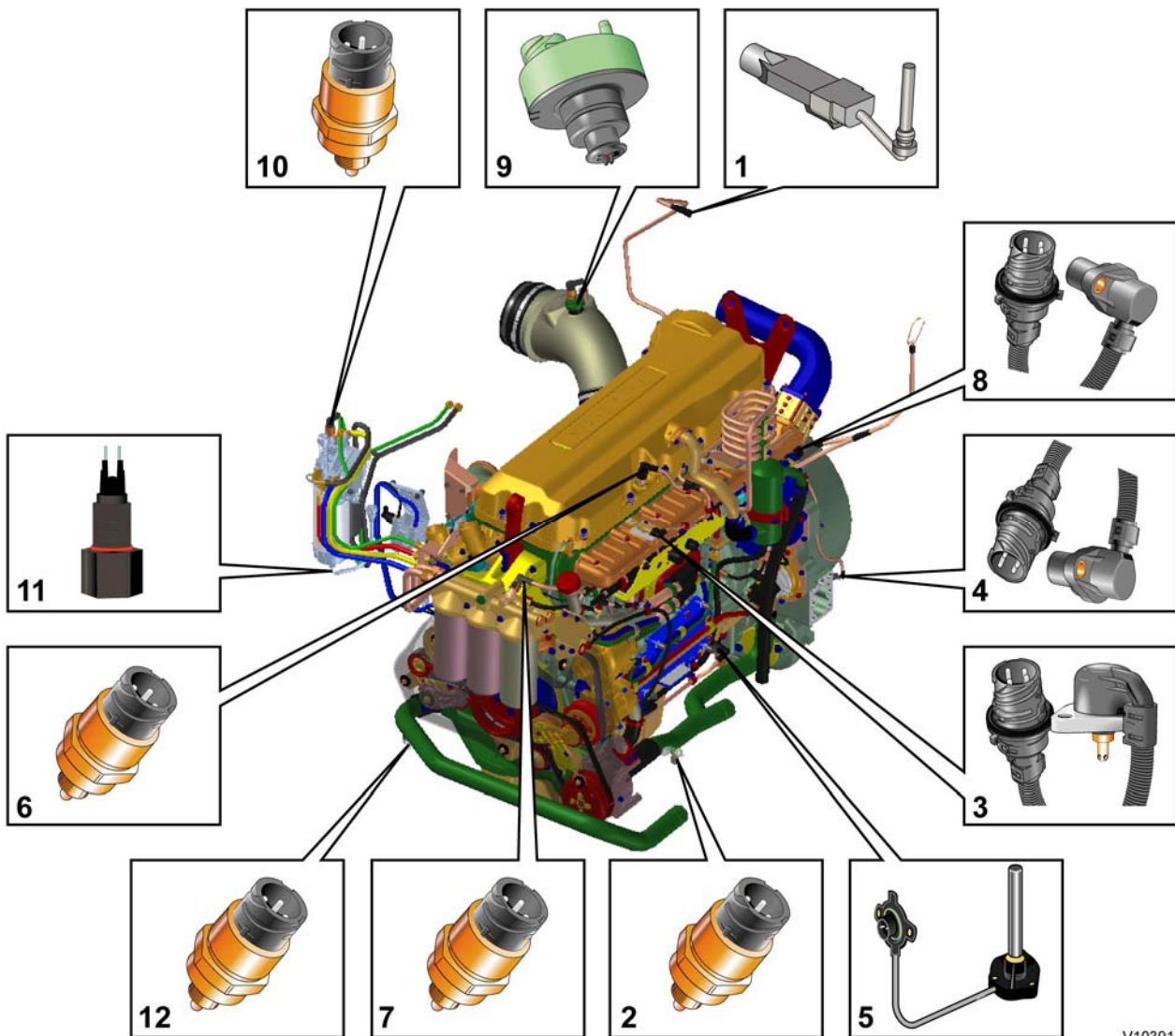
Figure 3
V1021882

Figure 4
V1021883

Document Title:	Function Group:	Information Type:	Date:
Engine, sensor positions	**200**	**Service Information**	**2015/2/16**
Profile: **ART, A25D 4x4 [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.

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:	Function Group:	Information Type:	Date:
Engine, identification	**200**	**Service Information**	**2015/2/16**
Profile:			
ART, A25D 4x4 [GB]			

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.
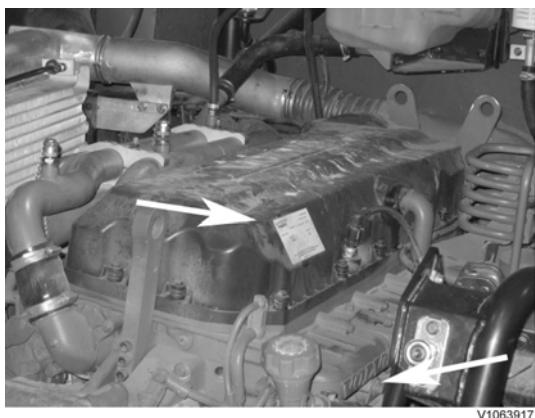
Assembly plants:
A = Skövde, Sweden
E = Curitiba, Brazil
F = Flen, Sweden
L = Lyon, France

V1063917

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.

V1063918

Document Title: **E-ECU, MID 128, changing pre-programmed ECU**	Function Group: **200**	Information Type: **Service Information**	Date: **2015/2/16**
Profile: **ART, A25D 4x4 [GB]**			

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

Op nbr 200-070

Applies to machine equipped with engine D10, with serial number according to the table.

Machine	Place of manufacture, serial number		
	EU	US	Brazil
A25D	11001–12077	61001–61118	–
A30D	10001–10682	60001–60093	70001–72999

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 2–15.

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 pre-programmed ECU**	Function Group: **200**	Information Type: **Service Information**	Date: **2015/2/16**
Profile: **ART, A25D 4x4 [GB]**			

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

Op nbr 200-070

Applies to machine equipped with engine D9A, with serial number according to the table.

Machine	Place of manufacture, serial number		
	EU	US	Brazil
A25D	13001–	–	–
A30D	12001–	–	73000–

1. Connect VCADS Pro computer and perform 17030-3 Parameter, programming.

   • Use the function – Save all read parameters to job card.

2. Perform <u>200 E-ECU, MID 128, changing non-programmed ECU</u> step 2–17.

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 pre-programmed ECU**	Function Group: **200**	Information Type: **Service Information**	Date: **2015/2/16**
Profile: **ART, A25D 4x4 [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: **2015/2/16**
Profile: **ART, A25D 4x4 [GB]**			

Go back to Index Page

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

Op nbr 200-068

Applies to machine equipped with engine D10, with serial number according to the table.

Machine	Place of manufacture, serial number		
	EU	US	Brazil
A25D	11001–12077	61001–61118	–
A30D	10001–10682	60001–60093	70001–72999

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.

   ⚠️ **CAUTION**

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

   3001 Electrical system, special instructions for servicing, electronic components

Removing E–ECU

⚠️ **CAUTION**

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

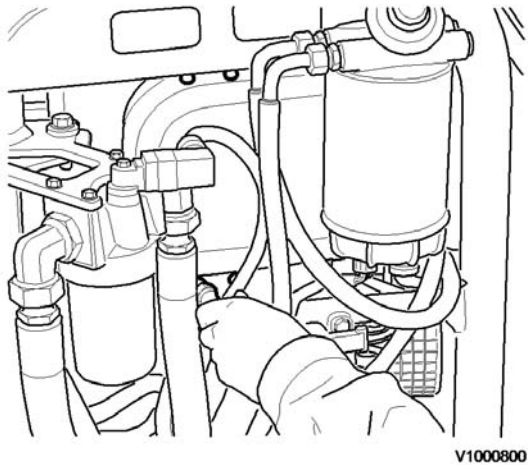2. Place the machine in service position.

   ℹ️ **NOTICE**

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

3. Open the engine hood.

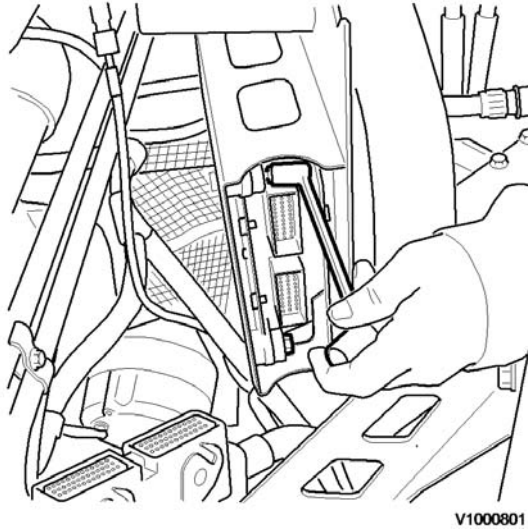4. Press in the catch and unplug the connector EA/EB from the E–ECU.

Figure 1

5. Remove the screws (8 screws) that hold the cooling coil on the E–ECU.
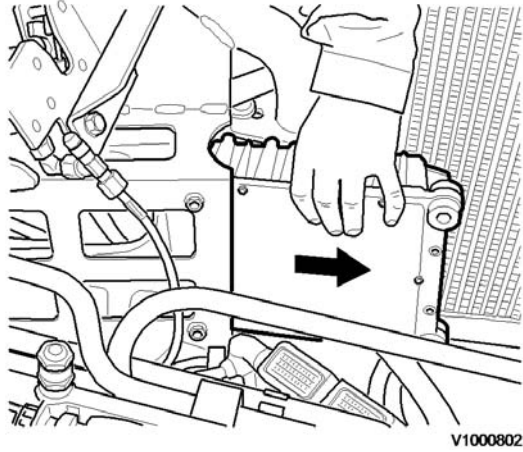

Figure 2

6. Remove two of the four bolts that hold the E–ECU against the console.

Figure 3
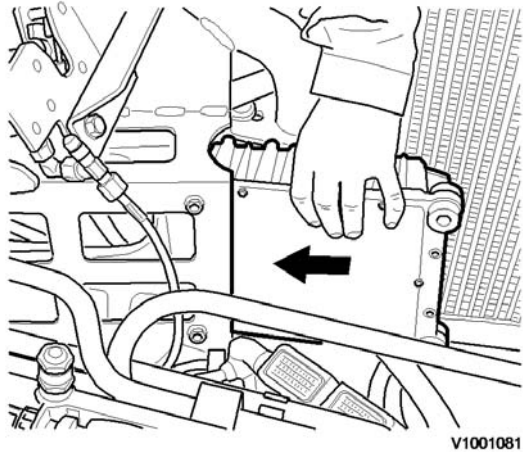
7. Hold the E–ECU and remove the two remaining bolts.

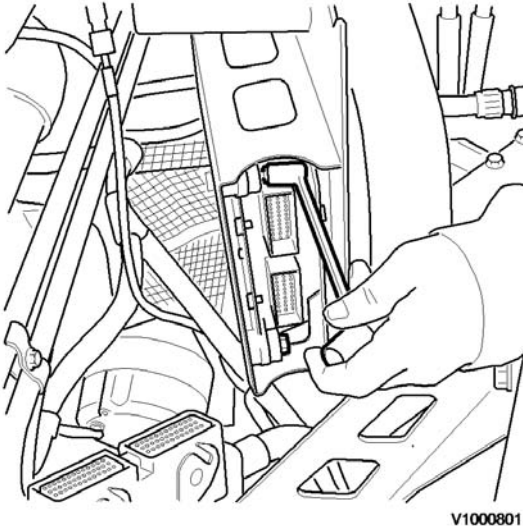8. Lift away the E–ECU.

Figure 4

Mounting E–ECU

9. Grease the upper right connection point with contact grease (to safeguard ground connection).

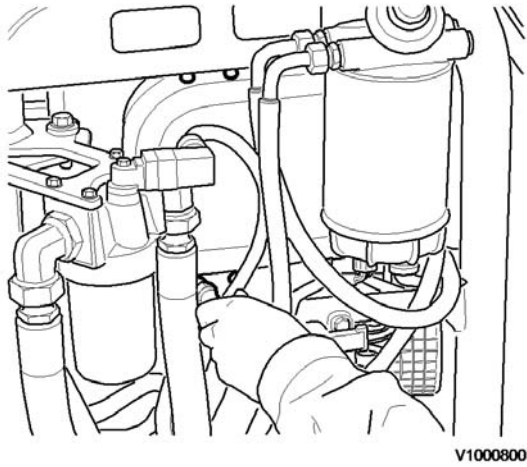10. Lift the E–ECU into place.

Figure 5

11. Hold the E–ECU and fit two of the bolts holding the E–ECU against the bracket.

Figure 6

12. Fit the two remaining bolts.

13. Fit the screws (8 screws) that hold the cooling coil on the E–ECU.

V1000800

Figure 7

14. Plug in the connector EA/EB to the E–ECU.

V1001079

Figure 8

15. Close the engine hood.
    NOTE!
    When changing pre-programmed ECU, return to <u>200 E-ECU, MID 128, changing pre-programmed ECU</u> step 3.

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

Document Title: E-ECU, MID 128, changing non-programmed ECU	Function Group: 200	Information Type: Service Information	Date: 2015/2/16
Profile: ART, A25D 4x4 [GB]			

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

Op nbr 200-068

Applies to machine equipped with engine D9A, with serial number according to the table.

Machine	Place of manufacture, serial number		
	EU	US	Brazil
A25D	13001–	–	–
A30D	12001–	–	73000–

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

   • When instructed to connect the new control unit, perform steps 2–17.

   ⚠ **CAUTION**

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

   3001 Electrical system, special instructions for servicing, electronic components

**Removing E–ECU**

⚠ **CAUTION**

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

2. Place the machine in service position.

   ℹ **NOTICE**

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

3. Open the engine hood.
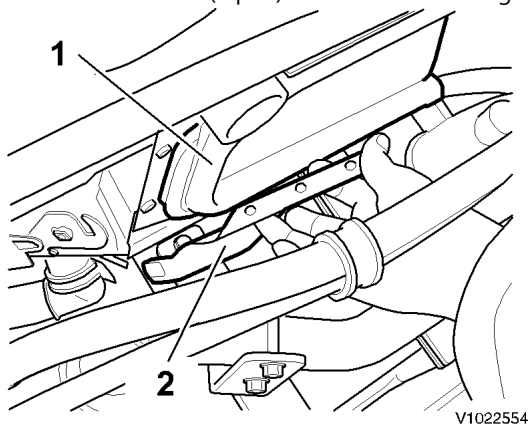
4. Unplug the EM connector from the engine.
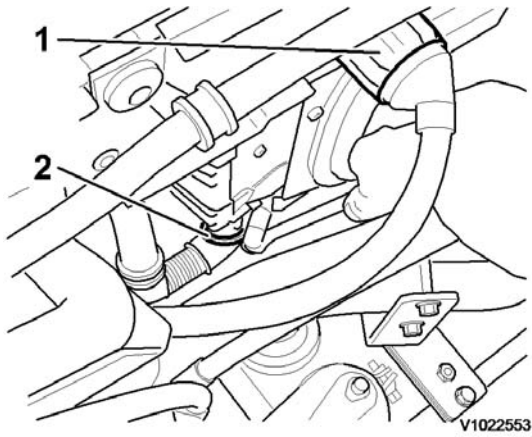
Figure 1

1. EM connector
2. Clamp

5. Remove the clamp that holds the cable harness to the E–ECU.

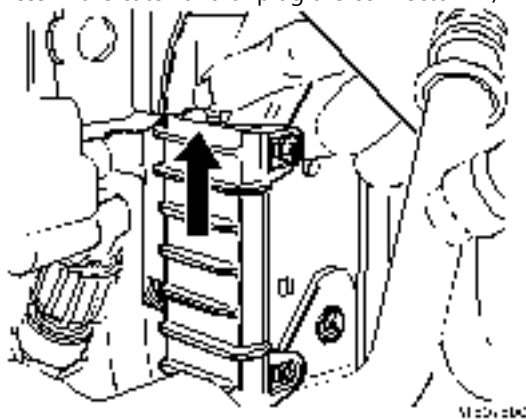6. Remove the screws (8 pcs.) that hold the cooling circuit and the console for the clamp.
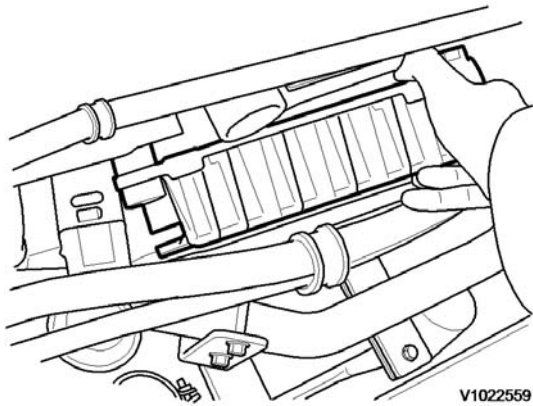

Figure 2

1. Cooling circuit
2. Console

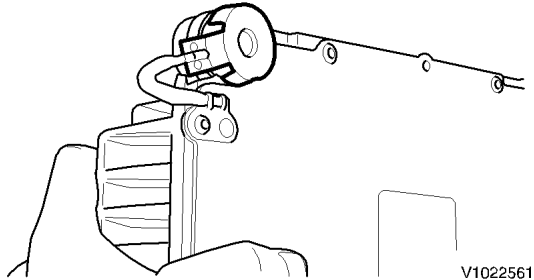7. Press in the catch and unplug the connector EA/EB from the E–ECU.

Figure 3

8. Remove the four screws that hold the E–ECU against the engine block
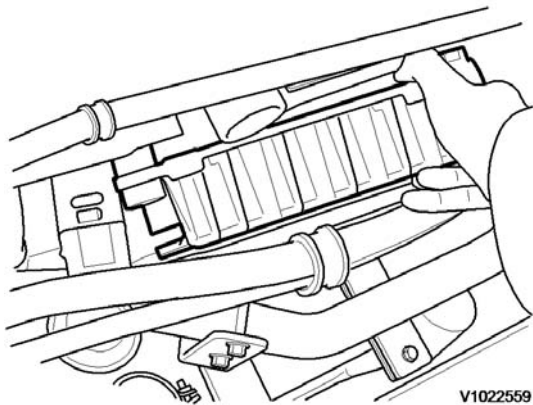
9. Uncover and lift away the E-ECU upward

V1022559

Figure 4

Mounting E–ECU

10. Grease the upper right connection point with contact grease (to safeguard ground connection).
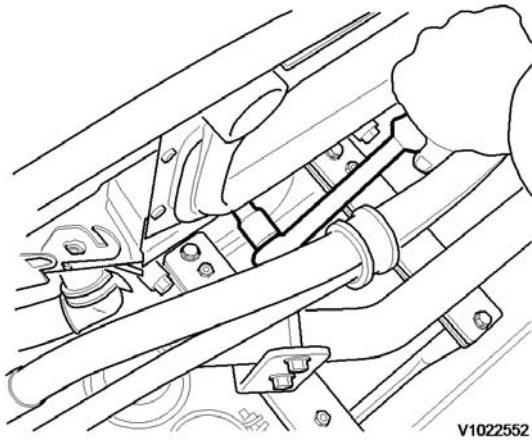

V1022561

Figure 5

11. Lift the E–ECU into place.

V1022559

Figure 6

12. Fit the screws that hold the E–ECU against the engine block

13. Fit the screws (8 pcs.) that hold the cooling circuit and the console.

Figure 7

14. Plug in the connector EA/EB to the E–ECU.

15. Secure the cable harness for the ECU by fitting the clamp in the console.

16. Plug in the connector EM for the engine.

17. Close the engine hood.
    NOTE!
    When changing pre-programmed ECU, return to [200 E-ECU, MID 128, changing pre-programmed ECU](#) step 3.

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

Document Title: **E-ECU, MID 128, changing non-programmed ECU**	Function Group: **200**	Information Type: **Service Information**	Date: **2015/2/16**
Profile: **ART, A25D 4x4 [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.
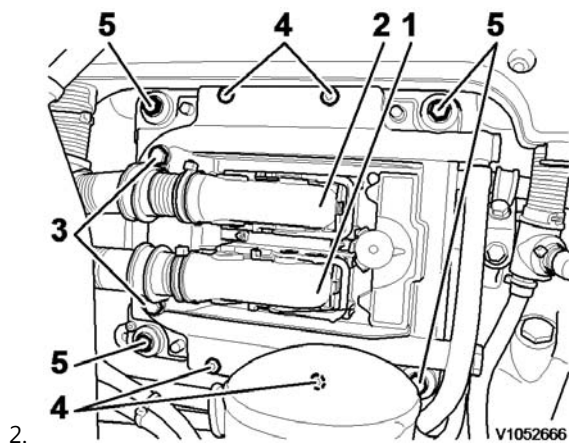
   Removing E–ECU

⚠ CAUTION

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

3001 Electrical system, special instructions for servicing, electronic components

⚠ CAUTION

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

2.

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 th 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

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

Document Title: **Compression test**	Function Group: **210**	Information Type: **Service Information**	Date: **2015/2/16**
Profile: **ART, A25D 4x4 [GB]**			

Compression test

Op nbr 210-002

9998009 Adapter
9998532 Extractor
9988539 Pressure gauge

Condition: Valves correctly adjusted, see 214 Valves, adjusting

1. Place the machine in service position.

2. Clean thoroughly around the injectors, also around the connections for the fuel pressure lines and leak-off fuel lines.

    ⚠ **WARNING**

    The fuel pressure lines are pre-shaped and may not be altered for any reason.

    If a pre-shaped fuel line is bent or deformed, there is a great risk that it will rupture.

    A damaged fuel pressure line must always be changed!

Removing

3. Remove the fuel pressure lines. The pipes are clamped in two groups of three, and the clamping should not be loosened.

    NOTICE

    Fit protective caps on all injectors and on the injection pump's connections.
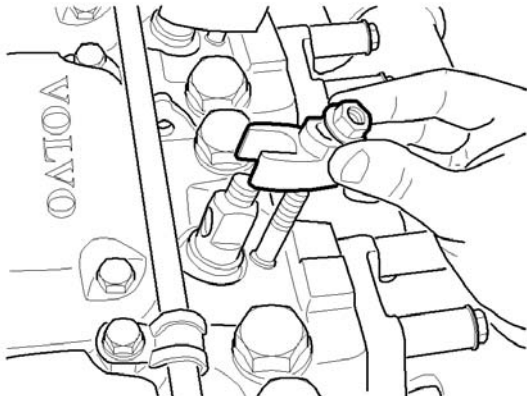

    Figure 1

4. Unplug the connector for sensor SE2308 and remove the bracket.

5. Remove the leak-off fuel line between the injectors.

NOTE!
If compression check is to be performed on cylinder 6, loosen and fold aside the pipe between the turbocharger and intercooler.
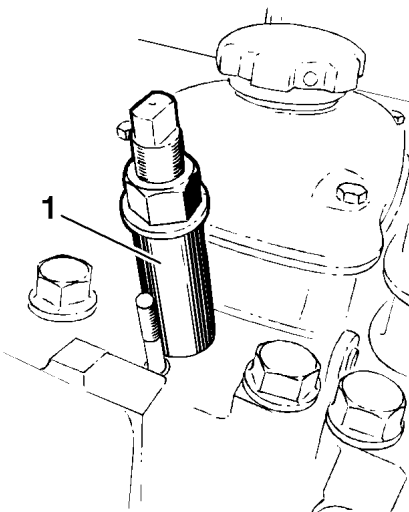
6. Remove the nuts for the injector yokes and remove the yokes.

V1000755

Figure 2

7. Remove the rubber seals around the injectors.

8. Remove the injector on cylinder no. 1 by twisting the injector and pulling up at the same time. If needed, use 9998532 Extractor to remove the injector.
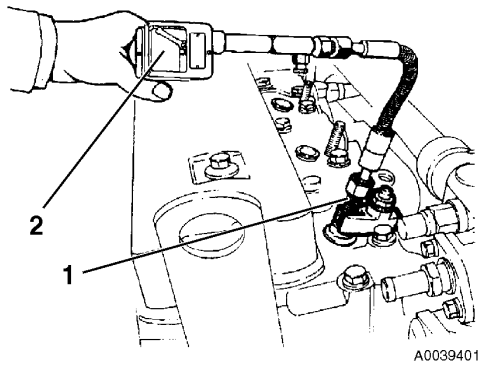
1

V1000750

Figure 3

9. Install 9998009 Adapter and tighten it down with the injector's attaching yoke and nut.
   Tightening torque: **50 Nm(37 lbf ft)**.
   NOTE!
   Check that the compression gauge's seal ring is intact.

Figure 4

1. 9998009 Adapter
2. 9988539 Pressure gauge

10. Connect 9988539 Pressure gauge.

11. Press in the Safety stop. The safety stop is located on the right side of the operator's panel. This is to prevent fuel from flowing out from the pressure valves on the injection pump when the engine is turned with the starter motor.

12. Check that the gearshift selector is in neutral.

13. Turn over the engine with the starter motor for 5 seconds and read off the value.

14. Remove the checking equipment and refit the injector with new copper washer and rubber seal.
    Tightening torque: **50 Nm(37 lbf ft)**.

15. Perform compression check on cylinders 2, 3, 4, 5 and 6 in the same way as for cylinder 1.
    Normal compression pressure is **3.8 MPa (38 bar)(551 psi)** at 180 rpm.

    ## NOTICE
    A difference of up to 10% in compression between cylinders is acceptable and does not indicate a need for further action, i.e. reconditioning of the valves.

Installing

16. Fit the yokes and the nuts.
    Tightening torque: **50 Nm(37 lbf ft).**
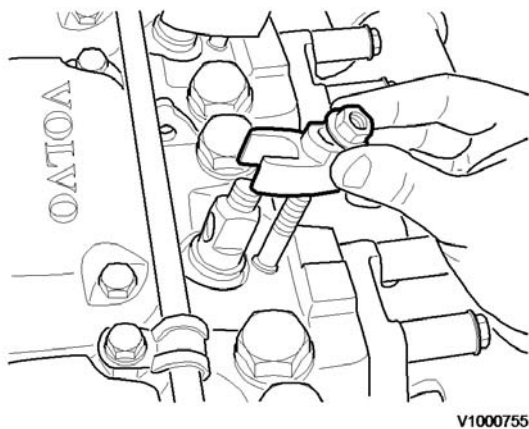
Figure 5

17. Fit the leak-off fuel line, use new copper washers.
    NOTE!

If compression check has been performed on cylinder 6, fit the pipe between the turbo and the intercooler.

⚠️ WARNING

The fuel pressure lines are pre-shaped and may not be altered for any reason.

If a pre-shaped fuel line is bent or deformed, there is a great risk that it will rupture.

A damaged fuel pressure line must always be changed!

18. Fit the fuel pressure lines. Make sure that the area is clean and that the fuel pressure lines are not bent or altered in any way. Tighten the pressure line nuts.
    Tightening torque: **15–25 Nm(11–18 lbf ft)**.

    Figure 6

19. Fit the bracket and sensor SE2308.

20. Restore the stop function. Start the engine and check to make sure that there are no leaks.

21. Run the engine with increased engine speed for approx. 5 minutes to remove any remaining air.

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