Document Title: **Engine control unit D12, E–ECU, description of function**	Function Group: **200**	Information Type: **Service Information**	Date: **2014/7/15**
Profile: **ART, T450D [GB]**			

Engine control unit D12, E–ECU, description of function

Control unit sensors

The unit injectors in the D12 engine are controlled entirely electronically regarding amount of injected fuel and injection timing. The system is called EMS (Engine Management System).
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, A, is positioned on the left side of the engine. All cable connectors for the sensors of the engine are of the DIN standard and are connected in a so called cable terminal, B.

The cable terminal, which is positioned above the control unit, is made of plastic and is in three parts. The inner part nearest the engine contains all cables and connectors that concern the engine. On the outside of these there is a partition (C) and an outer cover (D). On the inside of the outer cover there is room for other cable harnesses that belong to the machine.

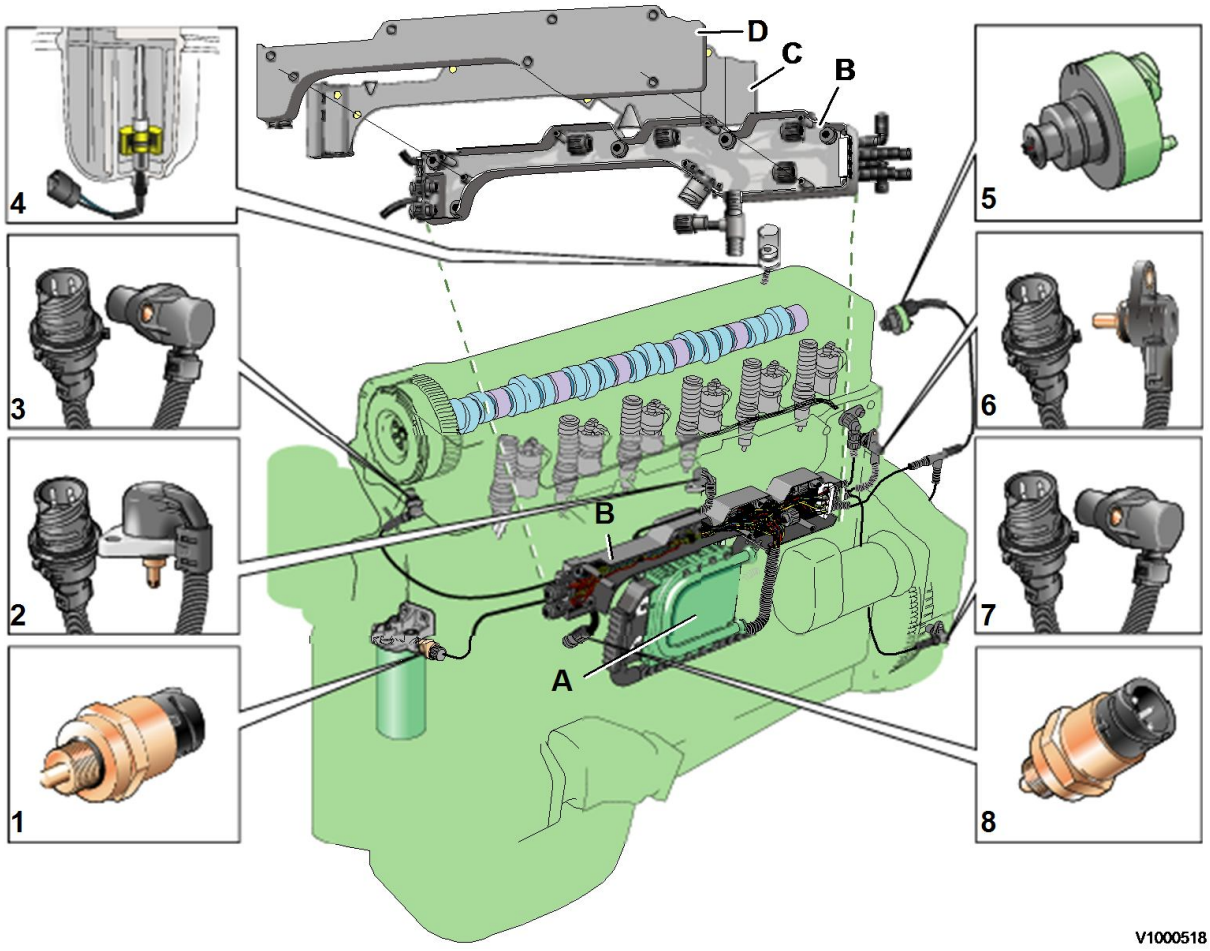

Figure 1
D12C. Engine sensors (some have dual functions)

1. Fuel pressure. Positioned on the fuel filter bracket. Senses feed pressure after the filter, SE2301 (PID 94).
2. Charge air pressure and charge air temperature. Combined sensor positioned on the inlet manifold, SE2507 (PID

105), SE2508 (PID 102).

3. Camshaft position. Positioned near the top of the cylinder head at the front, SE2703 (SID 21).
4. Coolant level. Positioned in the expansion tank, SE2603 (PID 111).
5. Air pressure and air temperature. Combined sensor, positioned on the connecting pipe between the air filter and the turbocharger, SE2501 (PID 172), SE2502 (PID 107).
6. Coolant temperature. Positioned in the rear end of the cylinder head, SE2606 (PID 110).
7. Flywheel position and rotational speed. Positioned in the flywheel housing, SE2701 (SID 22).
8. Oil pressure and oil temperature. Combined sensor positioned in the lubrication system main duct in the cylinder block, SE2202 (PID 175), SE2203 (PID 100).

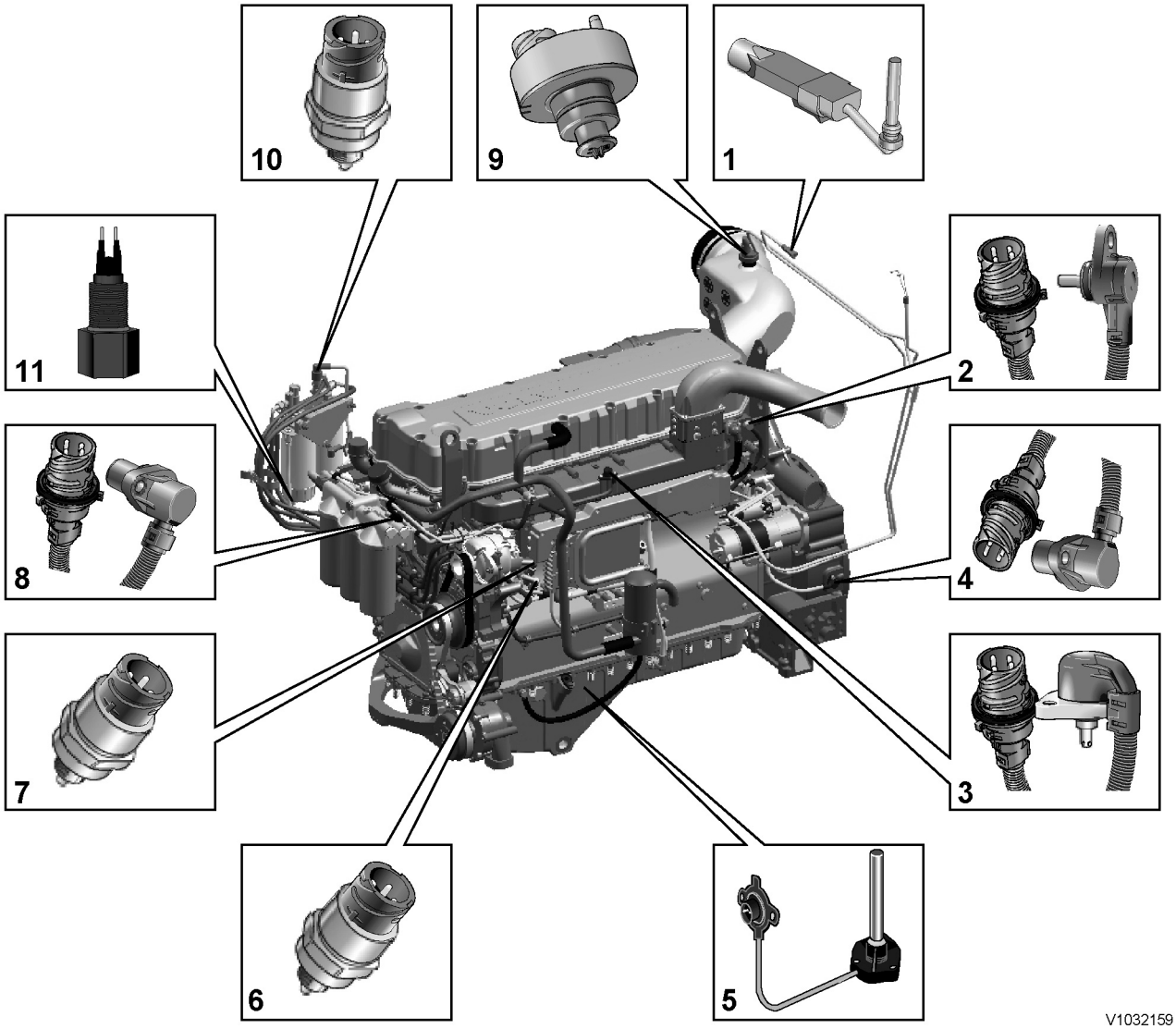

Figure 2
D12D Engine sensors (some have dual functions)

1. Sensor for coolant level, SE2603
2. Sensor for coolant temperature, SE2606
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

Document Title:	Function Group:	Information Type:	Date:
E–ECU D12, Functions	**200**	**Service Information**	**2014/7/15**
Profile: **ART, T450D [GB]**			

E–ECU D12, Functions

- Fuel amounts, unit injectors

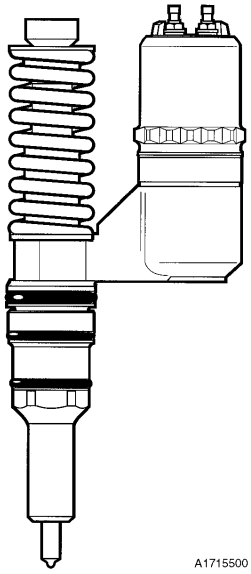

Figure 1
Unit injector "Bosch"

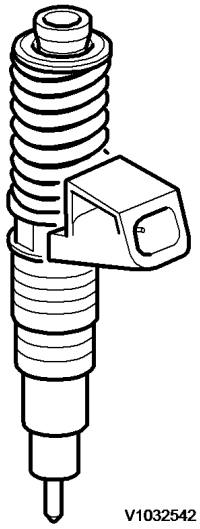

Figure 2
Unit injector "Delphi"

- Exhaust brake **Applies only to machine equipped with engine D12C**

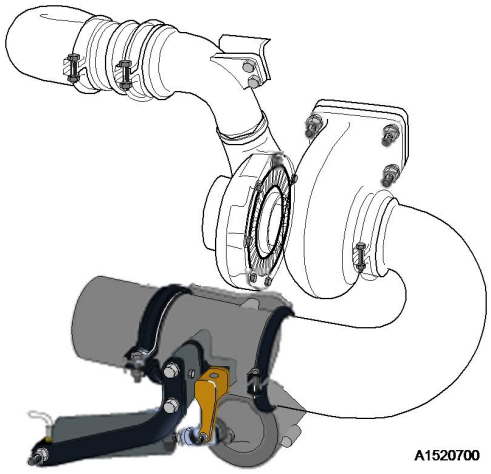

Figure 3
Exhaust brake

- Exhaust brake **Applies only to machine equipped with engine D12D**

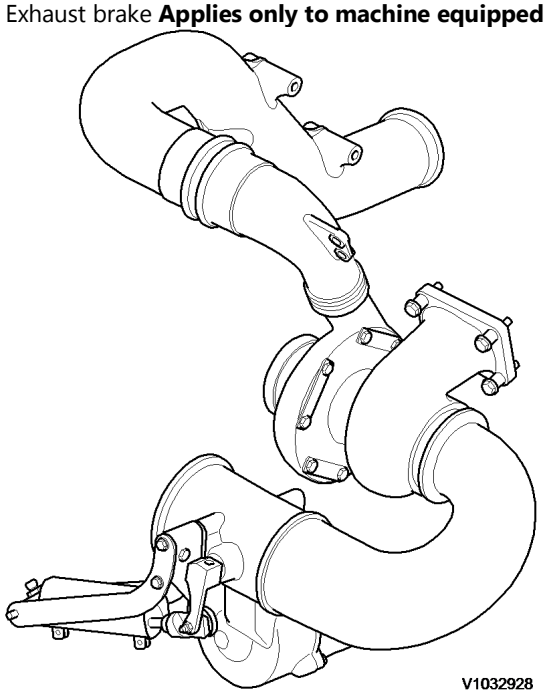

Figure 4
Exhaust brake

- Compression brake **Applies only to machine equipped with engine D12C**

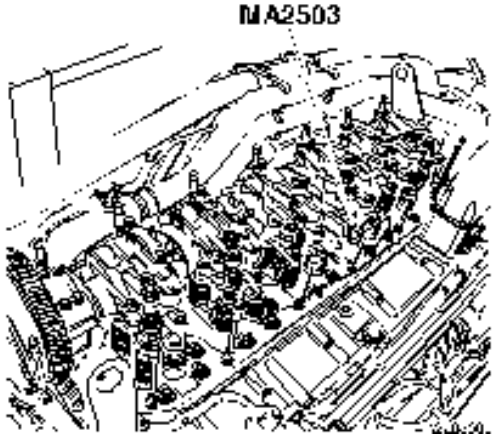

Figure 5
MA2503 (PPID 122), solenoid valve for compression brake

- Temperatures, pressures and rpms

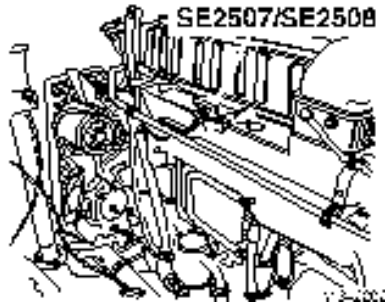

Figure 6
SE2507 (PID !05)/SE2508 (PID 102) Charge air temperature/pressure

- Preheating element, preheating

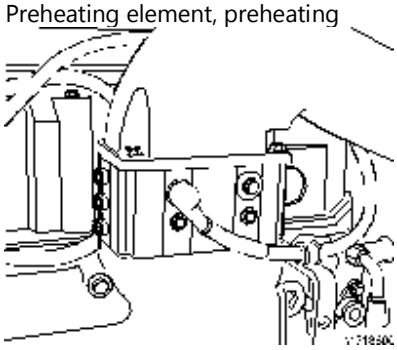

Figure 7
Preheating element

- Raised engine speed. The switch is connected to the cab control unit (C–ECU) which sends a message via the data bus to the engine control unit (E–ECU).

  NOTE!

  Raised engine speed is optional equipment.

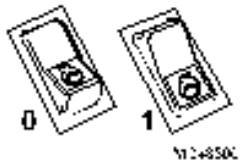

Figure 8
Switch, raised engine speed

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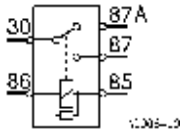
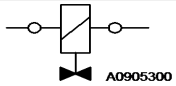
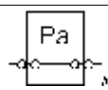
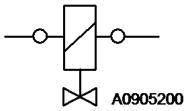
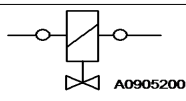
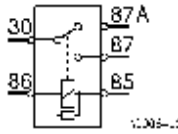
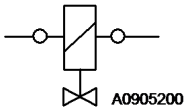
Construction Equipment

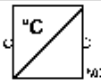
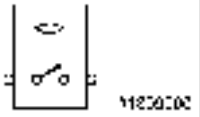
Service Information

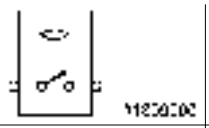
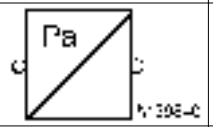
Document Title: **E–ECU D12D, Input and Output terminals**	Function Group: **200**	Information Type: **Service Information**	Date: **2014/7/15**
Profile: **ART, T450D [GB]**			

E–ECU D12D, Input and Output terminals

INPUTS		ECU	OUTPUTS	
Digital			**Digital**	
	Detection of preheating (RE2501, pin 87)		Control, injectors 1–6, MA2301–2306	
	Monitor, air filter, pressure, SE2502		Control, pressure governor, exhaust brake (EPG1), PWM2501	
	Monitor, coolant level, SE2603		Control, pressure governor / shutter, exhaust brake (EPG2), MA2502	
			Preheating induction air, RE2501	
			Control, exhaust circulation, MA2504 [T1]	

[T1]Only applies to A35D equipped with engine D12DAAE3 and A40D equipped with engine D12DABE3

INPUTS		ECU
Analogue		
	Sensor, engine oil temperature, SE2202	
	Sensor, engine oil pressure, SE2203	
	Sensor, fuel pressure, SE2301	
	Sensor, ambient air, temperature, SE2501	
	Sensor, charge-air temperature, SE2507	
	Sensor, charge-air pressure, SE2508	
	Sensor, coolant temperature, engine, SE2606	
	Sensor, engine speed, SE2701	
	Sensor, camshaft speed, SE2703	
	Monitor, water in fuel, SE2302	

	Monitor, engine oil level, SE2205
	Sensor, crankcase pressure, SE2509

VOLVO

Construction Equipment

Service Information

Document Title:	Function Group:	Information Type:	Date:
Engine D12, description	**200**	**Service Information**	**2014/7/15**
Profile: **ART, T450D [GB]**			

Engine D12, description

Engine D12, description

Engine D12 is available in two versions, D12C and D12D. See the product plate for the machine regarding which engine version applies to the machine.

Engine D12 is an straight, six-cylinder, direct injection, diesel engine with at cylinder capacity of 12 litres. It is equipped with a turbocharger and an intercooler and electronically controlled fuel injection, EMS (Engine Management System). It has an overhead camshaft and unit injectors instead of injection pump and injectors.

The unit injectors are positioned in the centre above the pistons and are controlled via the camshaft and a control unit (E-ECU).

The control unit is positioned on the left side of the cylinder block.

Engine D12C

Applies to machine equipped with engine D12C, with serial number according to the table.

Machine	Place of manufacture, serial number		
	BRA	ASH	PED
A35D	– 12999	– 61303	– 71999
A40D	– 11999	– 60286	

Engine D12D

Applies to machine equipped with engine D12D, with serial number according to the table.

Machine	Place of manufacture, serial number		
	BRA		PED
A35D	13001–		72001–
A40D	12001–		70001–

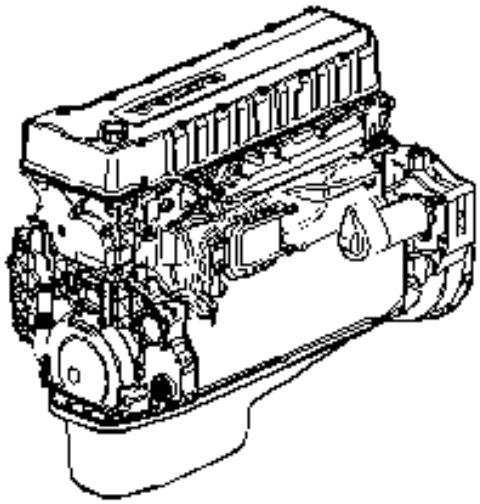


Figure 1

Document Title:	Function Group:	Information Type:	Date:
Engine, identification	**200**	**Service Information**	**2014/7/15**
Profile: **ART, T450D [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 rear 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.

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

Identification plate 3

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

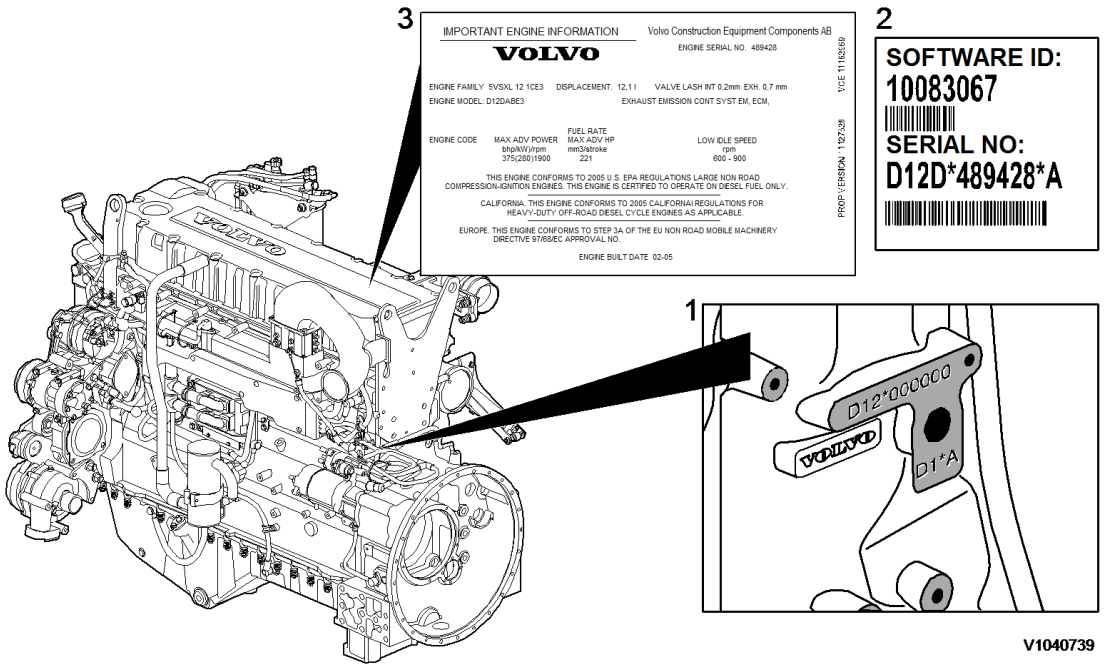
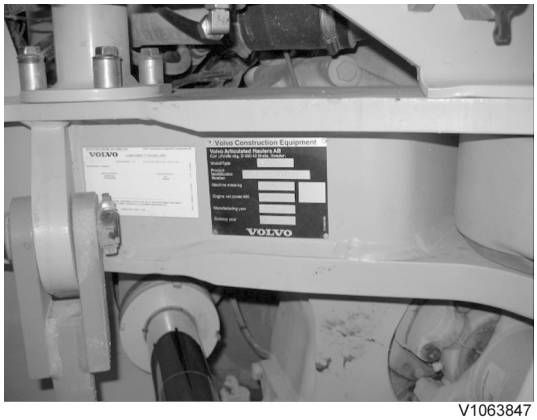


Figure 1
Engine identification, D12D



V1063847

Figure 2
Certification decal

Document Title: **E-ECU, MID 128, changing pre-programmed ECU**	Function Group: **200**	Information Type: **Service Information**	Date: **2014/7/15**
Profile: **ART, T450D [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.

VOLVO
Construction Equipment

Service Information

Document Title: **E-ECU, MID 128, changing non-programmed ECU**	Function Group: **200**	Information Type: **Service Information**	Date: **2014/7/15**
Profile: **ART, T450D [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

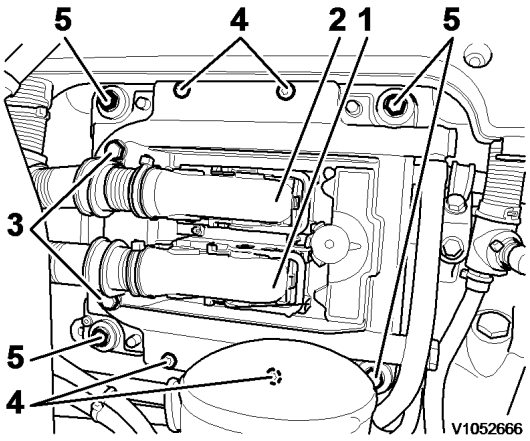
2. 

   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 200 E-ECU, MID 128, changing pre-programmed ECU step 3.
15. Finish VCADS Pro operation 28423-3 MID 128 ECU, programming.

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Construction Equipment

Service Information

Document Title:	Function Group:	Information Type:	Date:
Cylinder compression, PC test	**210**	**Service Information**	**2014/7/15**
Profile: **ART, T450D [GB]**			

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.

Our support email:

ebooklibonline@outlook.com