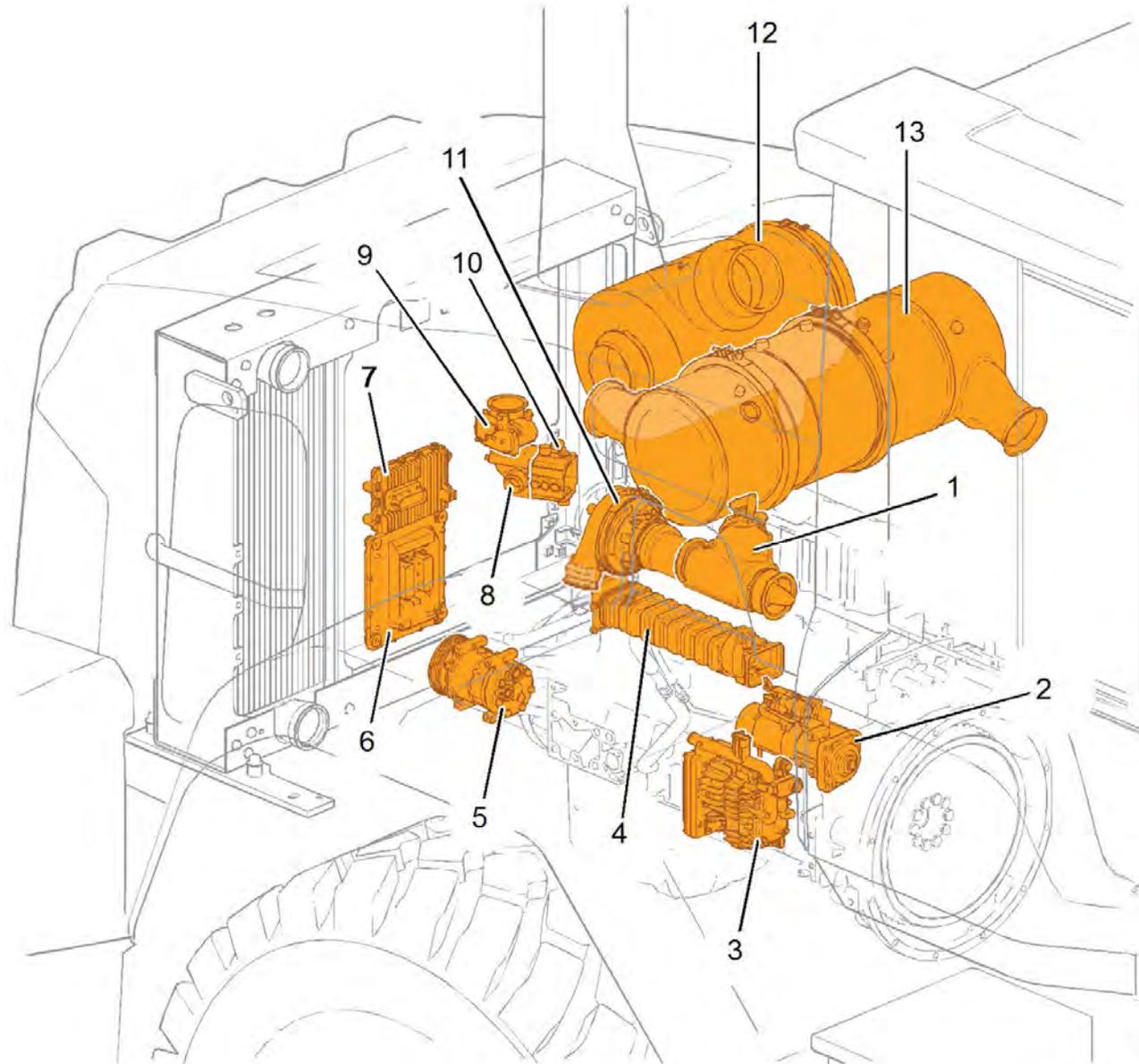


Document Title: <b>Component locations</b>	Function Group: <b>200</b>	Information Type: <b>Service Information</b>	Date: <b>2014/5/5 0</b>
Profile: <b>WLO, L120G [GB]</b>			

## Component locations

Engine, component positions

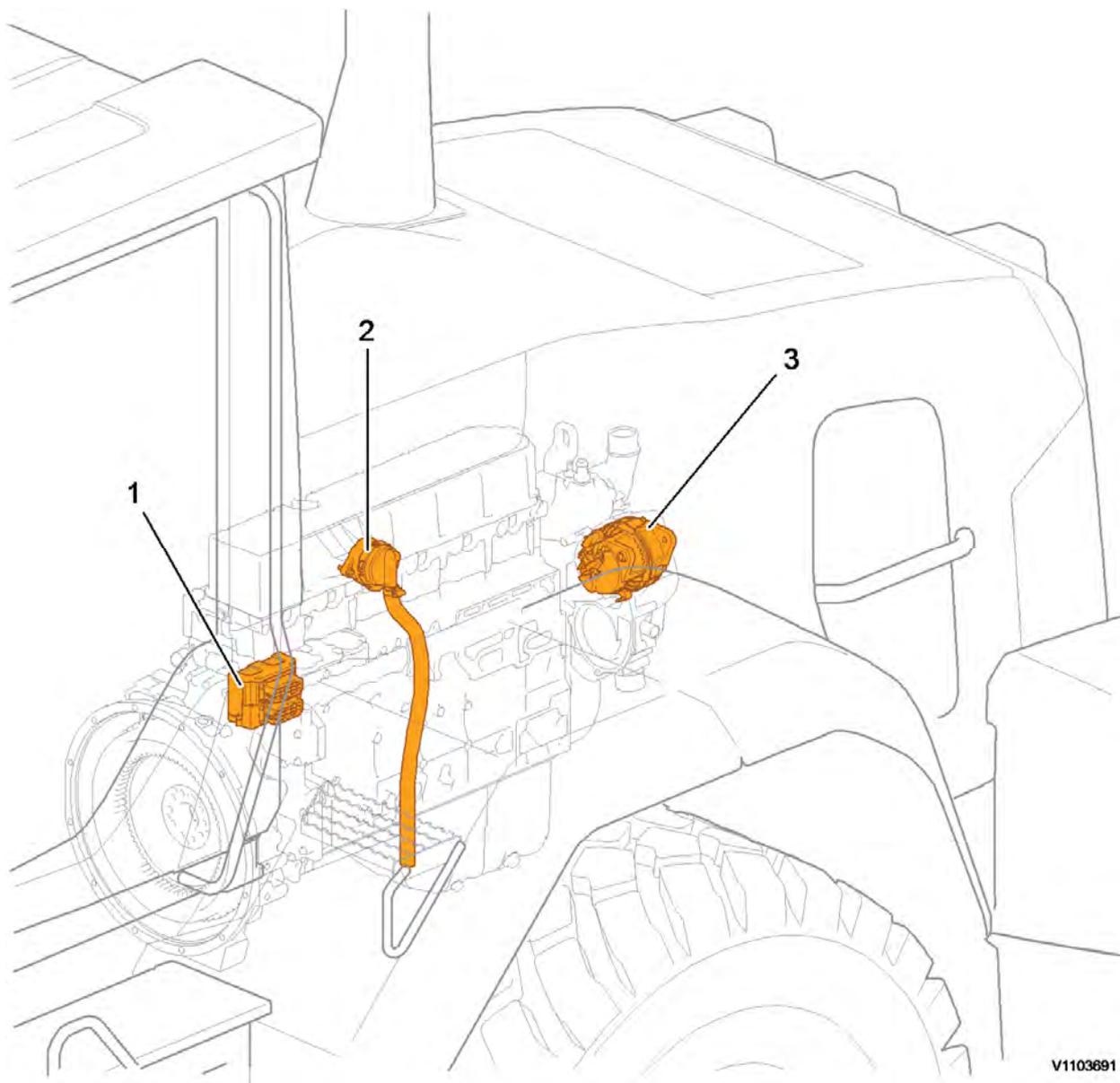


V1103690

**Figure 1**

1. Burner
2. Starter motor
3. Air pump
4. EGR-cooler

5. AC compressor
6. E-ECU
7. ACM
8. Mixing chamber
9. Inlet throttle
10. Preheater
11. Turbocharger
12. Air cleaner
13. Muffler



V1103691

**Figure 2**

1. Electrical connections, grouping point
2. Crankcase ventilation, separator
3. Alternator

Document Title: <b>Engine, description</b>	Function Group: <b>200</b>	Information Type: <b>Service Information</b>	Date: <b>2014/5/5 0</b>
Profile: <b>WLO, L120G [GB]</b>			

## Engine, description

Engine D8H is a straight six-cylinder, four-stroke, turbocharged diesel engine with direct injection and intercooler. The engine meets governing legislation according to Tier 4 interim for exhaust emissions.

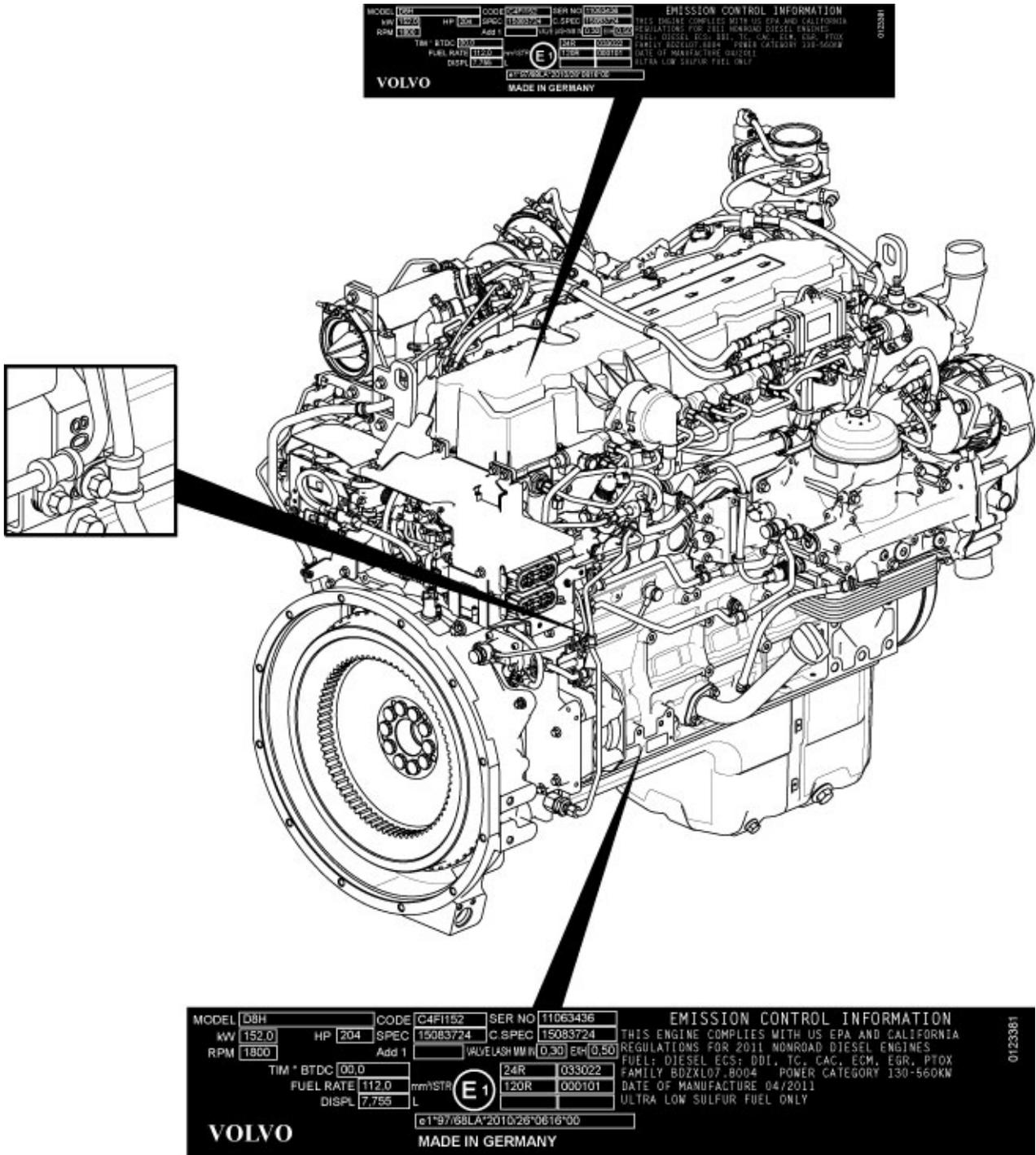
The engine features a Common Rail Fuel System controlled by the Engine Electronic Control Unit (E-ECU). The engine with ACT (Advanced Combustion Technology) features split injection and turbocharger with mechanical wastegate. The Exhaust Aftertreatment System (EATS) is equipped with a Diesel Oxidation Catalyst (DOC) and a Diesel Particulate Filter (DPF) to reduce the particulate content in the exhausts. Cooled Exhaust Gas Recirculation (EGR) reduces NO<sub>x</sub> contents and reduces emissions. All electronic functions in the engine are controlled by Volvo's Engine Management System, EMS2.2.

For more information, see:

- [220 Lubrication system, description](#)
- [230 Fuel system, description](#)
- [250 Inlet and exhaust system, description](#)
- [254 Exhaust Aftertreatment System, description](#)
- [255 Turbocharger, description](#)
- [260 Cooling system, description](#)
- [293 Exhaust Gas Recirculation \(EGR\), description](#)

The cylinders are numbered in sequence, starting at the flywheel. Ignition order: 1-5-3-6-2-4. The engine's rotational direction is counter-clockwise, seen from the flywheel side.

### Engine identification



**Figure 1**  
**Identification plates**

The engine's serial number is stamped on the cylinder block's side. The identification plates on the cylinder block's side and on the valve cover contain model designation, serial number, manufacturing country, recommended fuels, and so on. The identification plates also include emission-related supplementary information. The engine's model designation and serial number must be indicated when ordering spare parts.

**Engine protection**

The ECU contains functionality designed to protect the engine from damage during extreme operating conditions or from further damage when an essential engine component fails. There are several proactive functions, and different applications have different functions activated. The functions that can be activated are:

- High coolant temperature

- High inlet manifold air pressure
- High inlet manifold air temperature
- High oil temperature
- Low oil pressure
- Low coolant level
- High temperature of cooled EGR exhausts after the EGR-cooler
- High crankcase pressure
- High temperature of EGR actuator
- High soot load
- High differential pressure across Diesel Particulate Filter (DPF)
- High exhaust temperature
- High ECU temperature
- High DPF temperature
- EATS air pump failure

Various protective actions such as warning lights, engine torque reduction, engine speed limitation, and vehicle speed limitation may be taken when the above functions reach dangerous levels that may damage the engine. In order to always allow the operator to move a machine away from an unsafe situation, there is a delay of at least 30 seconds before the protective actions (such as forced idle and forced shutdown) are activated after a Key-ON. If the engine has been forced to shut down or forced to idle due to an active engine protection function, the operator can obtain a 30 second delay by powering down the EMS with a Key-OFF for 7 seconds and then a Key-ON (the EMS is powered down by the Vehicle-ECU (V-ECU) after the ignition key has been in its OFF position for approx. 7 seconds). In addition to the above protective functions, other software functions may request engine protection, such as:

- High Altitude (ensures that high compressor charge-air temperature is never reached)
- Low Coolant Temp
- Crank Sensor Failure
- Gear Ratio
- Regeneration

### Warning lights

There are two levels for warning lights, an amber caution light and a red stop light.

- The **amber light** indicates a warning situation
- The **red light** indicates that the vehicle must be stopped.

For more information, see [387 Central warning](#).

### Forced Idle

The engine can be forced to idle speed by the engine protection function. Forced idle is active until conditions triggering the problem are back within the normal working range or the EMS is powered down.

### Engine shutdown

The engine can be forced to shut down after conditions have reached levels that may cause engine failure and the machine speed is below a specified value.

### Machine speed and engine speed limits

The engine protection function can limit the machine's speed and/or the engine's rpm.

### Levels of engine protection

Available proactive functions depend not only on the application but also on what level of protection has been activated for the specific machine. Two levels of engine protection are offered; the standard level is Basic protection and the optional level is Extended protection. The general difference between basic and extended engine protection is that no active actions such as forced idle and forced shutdown will be taken in basic engine protection (with the exception of crankcase pressure that can cause shutdown in either setup). Warnings will be given to the operator regardless of engine protection level.

### Parameters

- (MCJ) Trimcode CRIN 3.3 injector cylinder 1
- (MCK) Trimcode CRIN 3.3 injector cylinder 2
- (MCL) Trimcode CRIN 3.3 injector cylinder 3
- (MCM) Trimcode CRIN 3.3 injector cylinder 4
- (MCN) Trimcode CRIN 3.3 injector cylinder 5

- (MCO) Trimcode CRIN 3.3 injector cylinder 6
- (FAU) Automatic engine shut off
- (FAV) Automatic engine shut off, time
- (YA) Idle speed, setting

### Supplementary information

- [200 Component locations](#)

### Function check

- 17030-3 Parameter, programming

### Diagnostics

Detailed information about the following relevant warnings and error codes is available under the diagnostics tab.

Component	Control unit	Message ID
FX1006	MID128	PID98
	MID128	PID175
SE2203	MID128	PID100
SE2302	MID128	PID97
SE2507	MID128	PID105
SE2508	MID128	PID102
SE2516	MID128	PID412
SE2519	MID128	PID81
SE2603	MID128	PID111
SE2606	MID128	PID110
E-ECU temperature	MID128	PPID55
Emergency stop (Engine shutdown)	MID128	PPID235
Soot load	MID128	PPID326

Document Title: <b>E-ECU, MID 128, changing non-programmed ECU</b>	Function Group: <b>200</b>	Information Type: <b>Service Information</b>	Date: <b>2014/5/5 0</b>
Profile: <b>WLO, L120G [GB]</b>			

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

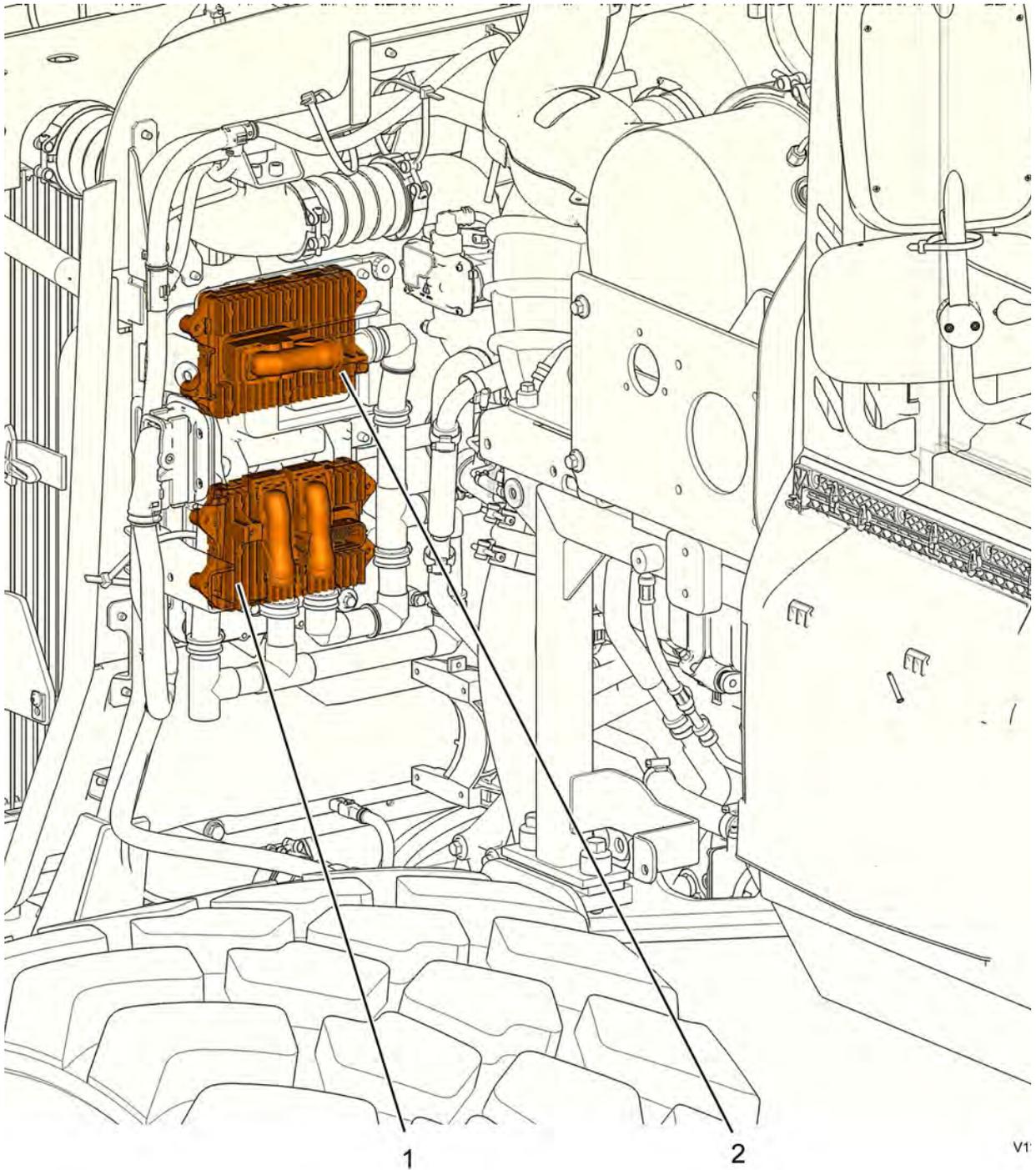
**Op nbr 200-068**

[VCADS Pro VCADS Pro Service Tool](#)

[88890180 Interface](#)

[88890027 Cable](#)

1. Place the machine in service position 1, see [191 Service position](#).
2. Connect VCADS Pro and start operation 28423-3 MID 128 ECU, programming.
3. Turn off the voltage with the battery disconnecter.
4. Remove the engine cover on the right side.



**Figure 1**

1. E-ECU
2. ACM

5. Unplug the connectors from the E-ECU and loosen the cable harness clamps.
6. Replace the E-ECU.
7. Plug in the connectors and install the cable harness clamps.
8. Install the engine cover.
9. Turn on the voltage with the battery disconnecter.

10. Finish the VCADS Pro operation 28423-3 MID 128 ECU, programming.
11. If read-out of parameters was not possible with the programming operation, then VCADS Pro operation 25438-3 NOx sensor, age compensation, reset must also be run.
12. Start the machine and check that there are no error messages.
13. Restore the machine.

Document Title: <b>E-ECU, MID 128, changing pre-programmed ECU</b>	Function Group: <b>200</b>	Information Type: <b>Service Information</b>	Date: <b>2014/5/5 0</b>
Profile: <b>WLO, L120G [GB]</b>			

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

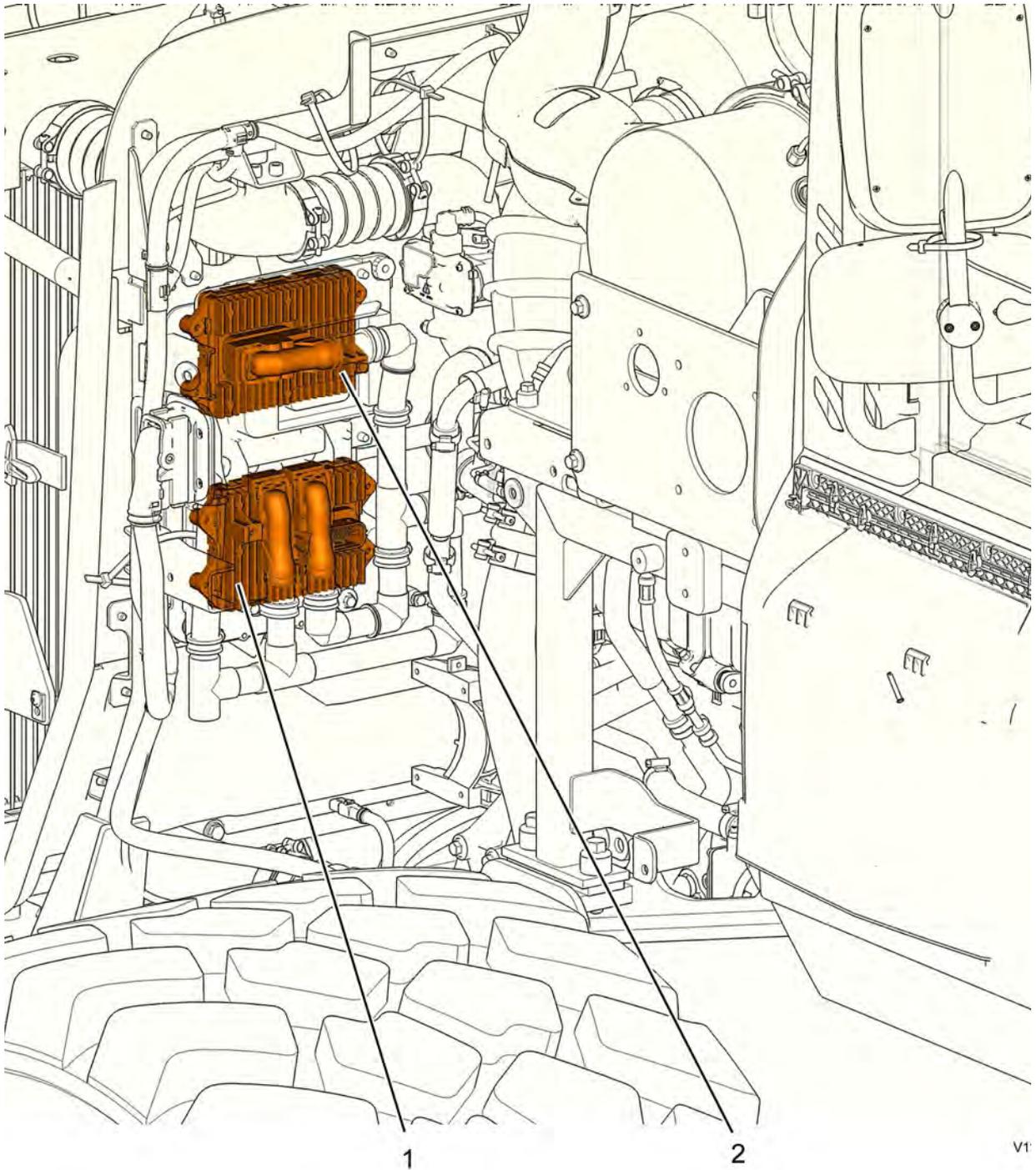
**Op nbr 200-070**

[VCADS Pro VCADS Pro Service Tool](#)

[88890180 Interface](#)

[88890027 Cable](#)

1. Place the machine in service position 1, see [191 Service position](#).
2. The new control unit has basically adjusted parameters for the machine. Connect VCADS Pro and read out customer parameters with operation 17030-3 Parameter, programming. If it is possible to read out customer parameters from the old control unit, save them on the job card.
3. Turn off the voltage with the battery disconnecter.
4. Remove the engine cover on the right side.



**Figure 1**

1. E-ECU
2. ACM

5. Unplug the connectors from the E-ECU and loosen the cable harness clamps.
6. Replace the E-ECU.
7. Plug in the connectors and install the cable harness clamps.
8. Install the engine cover.
9. Turn on the voltage with the battery disconnecter.

10. If customer parameters have been read out from the old control unit, they should be compared with the parameters in the new control unit.
  - Connect VCADS Pro and run operation 17030-3 Parameter, programming. Save all read parameters to job card.
  - Compare the parameter settings on the job cards.
  - Run the operation 17030-3 Parameter, programming and change customer parameters according to job cards for the old control unit.
11. Also run the operation 25438-3 NOx sensor, age compensation, reset.
12. Start the machine and check that there are no error messages.
13. Restore the machine.

Document Title: <b>VCADS Pro, Operations</b>	Function Group: <b>200</b>	Information Type: <b>Service Information</b>	Date: <b>2014/5/5 0</b>
Profile: <b>WLO, L120G [GB]</b>			

## VCADS Pro, Operations

The following VCADS Pro operations are available for function group 2. Operations used when changing or working on components are mandatory.

### Tests

Operation	Application
21006-3 Cylinder compression, test	Used when there is a suspicion of malfunction and/or in case of abnormal values/readings. This test indicates if there is any deviation in compression in any cylinder in relation to the other cylinders. As a first check this operation is both easy and fast to perform instead of an actual compression test.
23777-3 Fuel System, Check	Used when there is a suspicion of malfunction and/or in case of abnormal values/readings.
23712-3 Injectors shut off, manual	Used when there is a suspicion of malfunction and/or in case of abnormal values/readings.
25410-3 Air pump exhaust aftertreatment, test	Used when there is a suspicion of malfunction and/or in case of abnormal values/readings.
25411-3 Burner exhaust aftertreatment, test	Used when there is a suspicion of malfunction and/or in case of abnormal values/readings.
25433-3 Fuel system exhaust aftertreatment, bleeding	The operation is used after work has been performed on the fuel system to ensure that there is no air in the EATS fuel system.
25438-3, Nox sensor, age compensation, reset	The operation is used to reset the NO <sub>x</sub> age compensation value stored in MID 128 Engine control unit, either when the NO <sub>x</sub> -sensor has been replaced with a new one or the MID 128 Engine control unit has been replaced with a new one, and it is not possible to read out the values from the old control unit.
25440-3 Fuel pressure, exhaust aftertreatment system, test	The operation is used to test the fuel system for the exhaust aftertreatment system.
25456-3 Exhaust aftertreatment diagnostics	Used to test components in the exhaust aftertreatment system.
25457-3 Diesel Particulate Filter Service Regeneration	See <a href="#">254 Perform a service regeneration</a>
26385-3 Reversible cooling fan, test	When there is a suspicion of malfunction and/or in case of abnormal values/readings.
27102-3 Accelerator pedal, test	In case of abnormal values/readings.
28407-3 Sensor values, monitoring	When there is a suspicion of malfunction and/or in case of abnormal values/readings.

### Programming

Operation	Application
25801-3 MID 233 Control unit, programming	When changing ACM or only reprogramming. See <a href="#">254 ACM, replacing, non-programmed</a>
28423-3 MID 128 ECU, programming	When changing ACM or only reprogramming. See <a href="#">200 E-ECU, MID 128, changing non-programmed ECU</a>

Document Title: <b>Engine belts, replacing</b>	Function Group: <b>200</b>	Information Type: <b>Service Information</b>	Date: <b>2014/5/5 0</b>
Profile: <b>WLO, L120G [GB]</b>			

## Engine belts, replacing

### Op nbr 200-200

1. Place the machine in service position according to [191 Service position](#).
2. Remove the left protective plate. Remove the plastic protection on the right and left side.



**Figure 1**

1. Protective plate
  2. Plastic protection
3. Remove the AC-belt and the alternator belt.

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