

# EC330B/EC360B/EC460B/EC700B SERVICE TRAINING



Volvo Construction Equipment  
Customer Support

01-01

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## EC330B/EC360B/EC460B/EC700B SERVICE TRAINING

This material is combined as below.

01\_General

02\_Engine

02-1\_D10B Engine(EC330B-EC360B)

02-2\_D12C Engine(EC330B-EC460B)

02-3\_D12D Engine(EC330B-EC460B)

02-3\_D16E Engine(EC700B)

03\_Electric system

03-1\_Before IECU application(EC330B-EC460B)

03-2\_IECU application(EC330B-EC460B)

03-3\_D12D Engine application(EC330B-EC460B)

03-4\_EC700B

04\_Power Transmission

04-1\_Swing motor(EC330B/EC360B)

04-2\_Swing motor(EC460B)

04-3\_Swing motor(EC700B)

04-4\_Travel motor\_Old(EC330B/EC360B)

04-5\_Travel motor\_New(EC330B/EC460B)

04-6\_Travel motor(EC460B)

04-7\_Travel motor(EC700B)

05\_Brake System

06\_Steering System

07\_Frame & Undercarriage

08\_Aircon

09\_Hydraulic

09-1\_Hydraulic\_D10B & D12C(EC330B/EC360B)

09-2\_Hydraulic\_D12D(EC330B-EC360B)

09-3\_Hydraulic\_D12C(E460B)

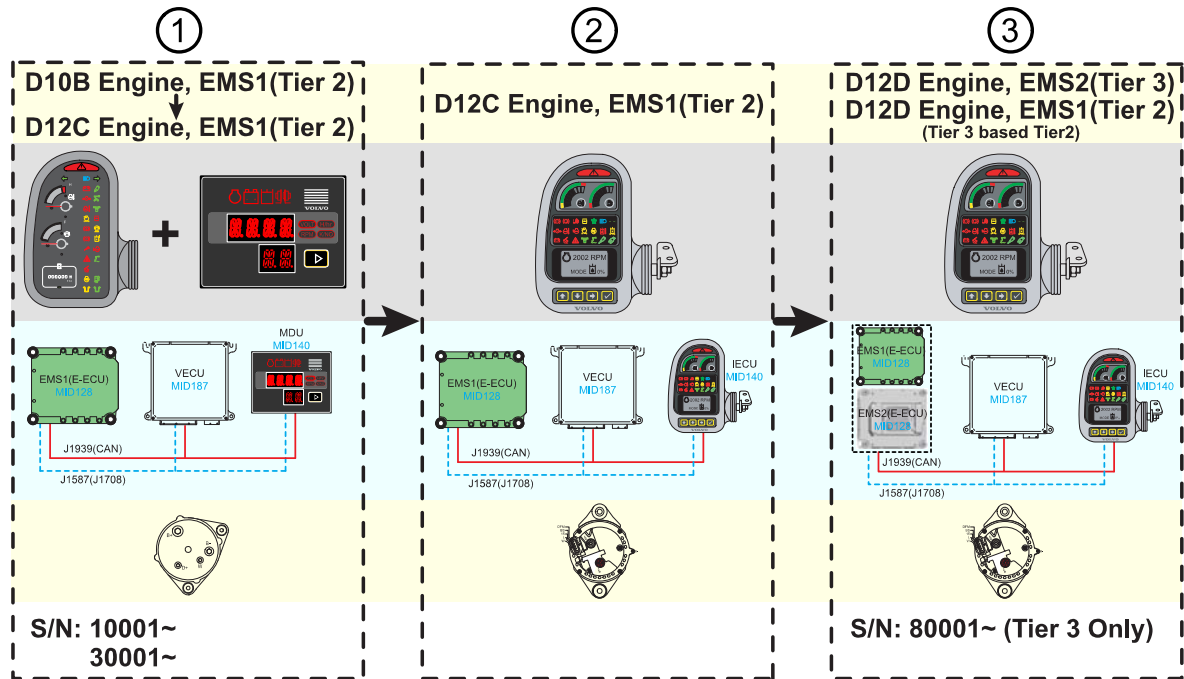
09-4\_Hydraulic\_D12D(EC460B)

09-5\_Hydraulic(EC700B)

09-6\_Hydraulic common

## Design Change Overview(EC330B/EC360B)

EC330B/EC360B



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## Design Change Overview(EC330B-EC360B)

### 1-Before I-ECU application

- D10B Engine, EMS1(Tier 2): Initial Production
- D12C Engine, EMS1(Tier 2)
- Instrument panel and MDU
- Old alternator

### 2-I-ECU application

- D12C Engine, EMS1(Tier 2)
- IECU(Programmable)
- New alternator

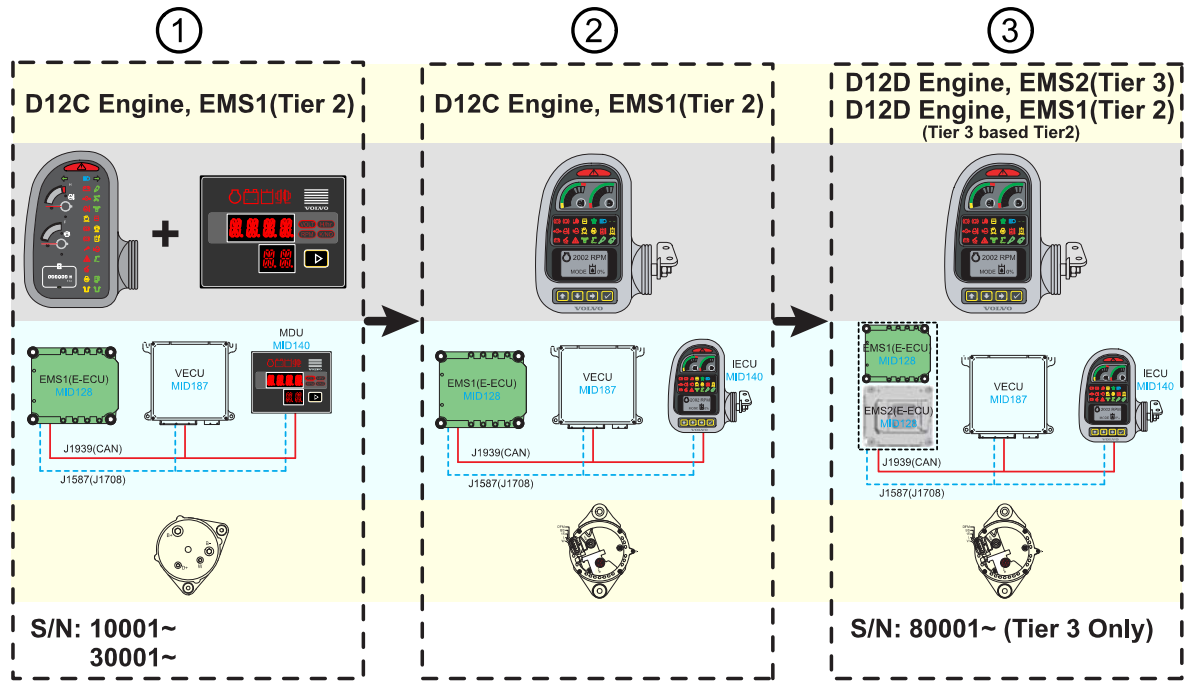
### 3-D12D application

- D12D Engine, EMS2(Tier 3): EU & NA only. Machine serial number starts from 80001
- D12D Engine, EMS1(Tier 3 based Tier 2): International region
- IECU(Programmable)
- New alternator

Picture text:

## Design Change Overview(EC460B)

EC460B



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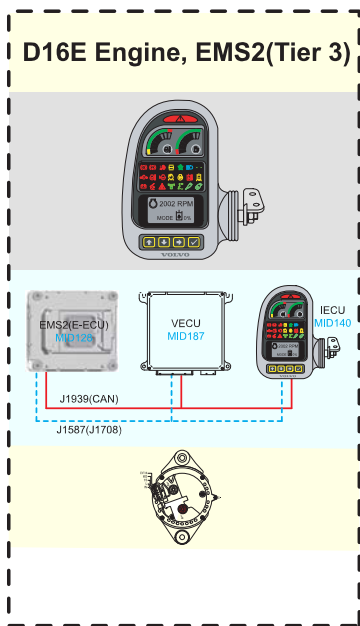
### Design Change Overview(EC460B)

1-Before I-ECU application  
-D12C Engine, EMS1(Tier 2)  
-Instrument panel and MDU  
-Old alternator

2-I-ECU application  
-D12C Engine, EMS1(Tier 2)  
-IECU(Programmable)  
-New alternator

3-D12D Engine application  
-D12D Engine, EMS2(Tier 3): EU & NA only. Machine serial number starts from 80001.  
-D12D Engine, EMS1(Tier 3 based Tier 2): International region  
-IECU(Programmable)  
-New alternator

Picture text:



**Design Change Overview(EC700B)**

- D16E Engine, EMS2(Tier 3)
- IECU(Programmable)
- New alternator

Picture text:

Engine(D10B)

# EC330B-EC360B(D10B)



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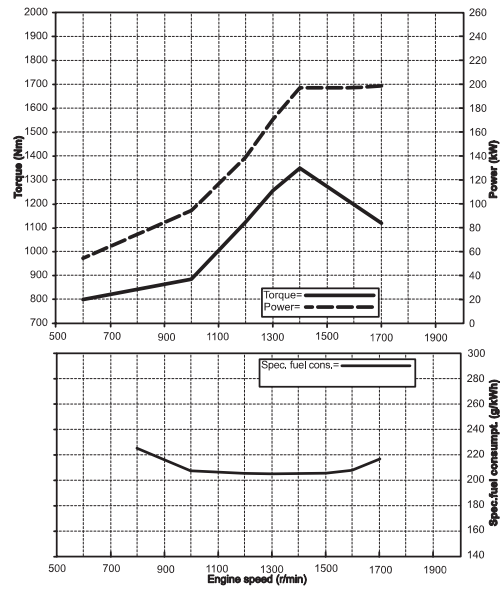
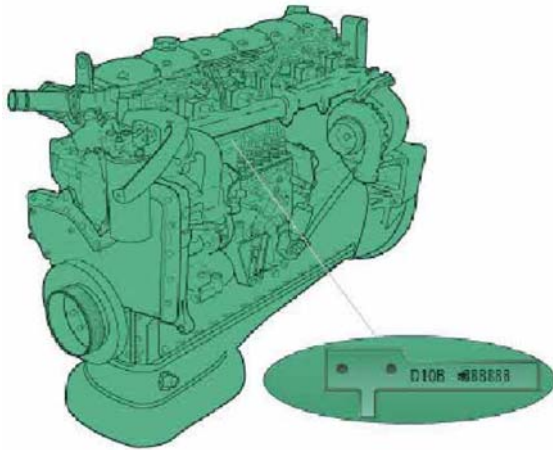
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Engine(D10B)

Picture text:



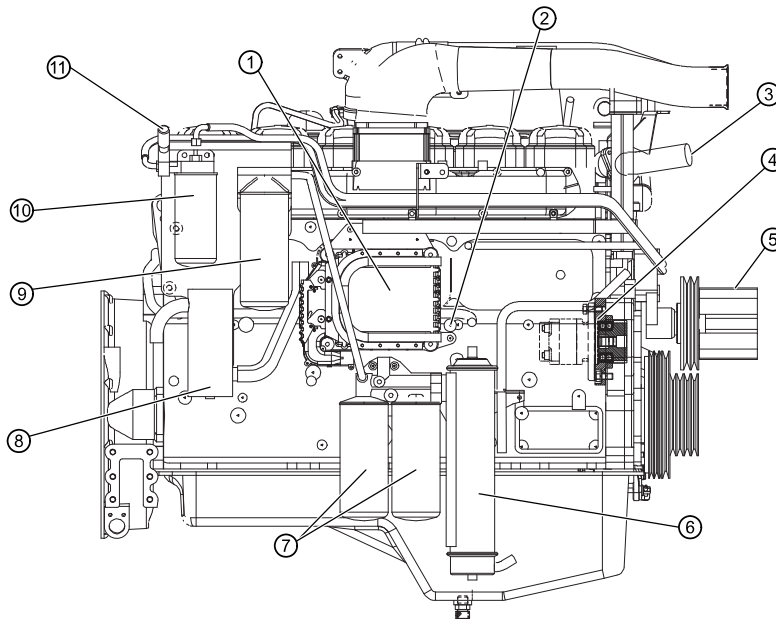
**Engine specification**

Model: D10B EAE2  
 Power(kW): 198 at 1700 rpm  
 Power(hp): 269 hp at 1700 rpm  
 Torque: 1345 Nm at 1400 rpm  
 Bore x Stroke: 120.65mm x 140mm  
 DISPLACEMENT: 9600 cc  
 Type: 4 cycle-diesel-turbo & charge air cooled

Picture text:

## External View(1)

EC330B/EC360B



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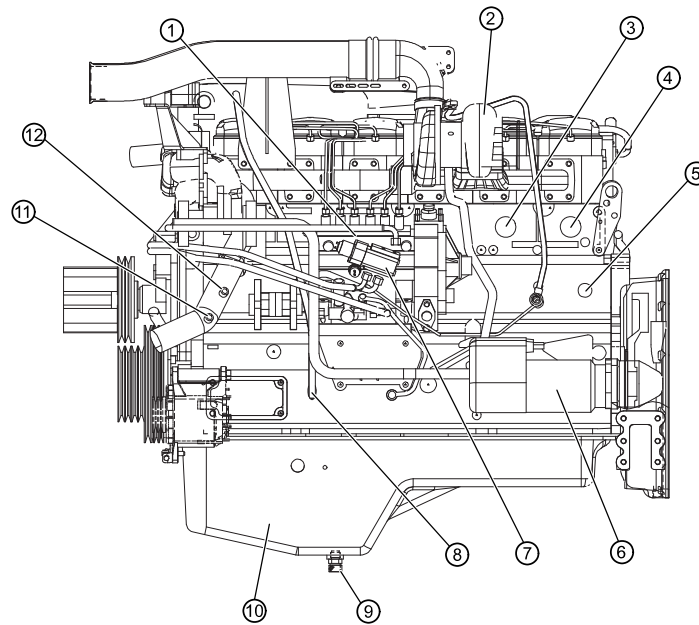
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### External view(1)

1. EMS(E-ECU)
2. Fuel inlet
3. Water outlet
4. Engine PTO
5. Fan drive & Pulley
6. Engine oil cooler
7. Engine oil filter(full)
8. Breather
9. Engine oil filter(bypass)
10. Fuel filter
11. Fuel feed pump

Picture text:

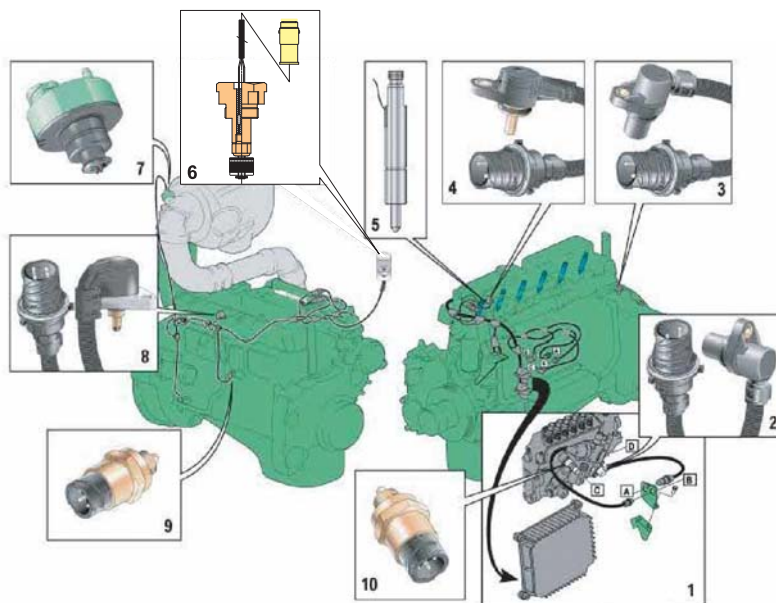


**External view(2)**

- 1. Fuel pump
- 2. Turbochargher
- 3. Cooler block heater
- 4. Cab heater supply
- 5. Coolant filter heater
- 6. Starter
- 7. Fuel shut-off solenoid
- 8. Dipstick
- 9. Oil drain valve
- 10. Oil pan
- 11. Coolant filter return
- 12. Cab heater return

Picture text:





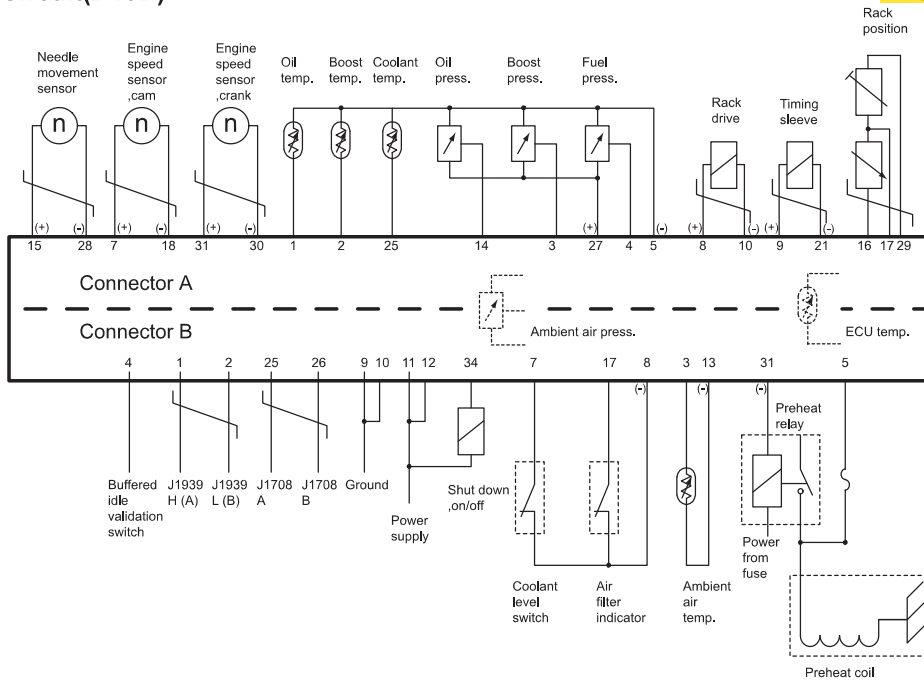
**E-ECU Sensors**

- 1. E-ECU
- 2,3. Speed sensor
- 4. Coolant temp.
- 5. Needle movement
- 6. Coolant level
- 7. Inlet air press. & temp.
- 8. Boost air press. & temp.
- 9. Oil press. & temp.
- 10. Fuel press. & temp.

Picture text:

# E-ECU Circuit(D10B)

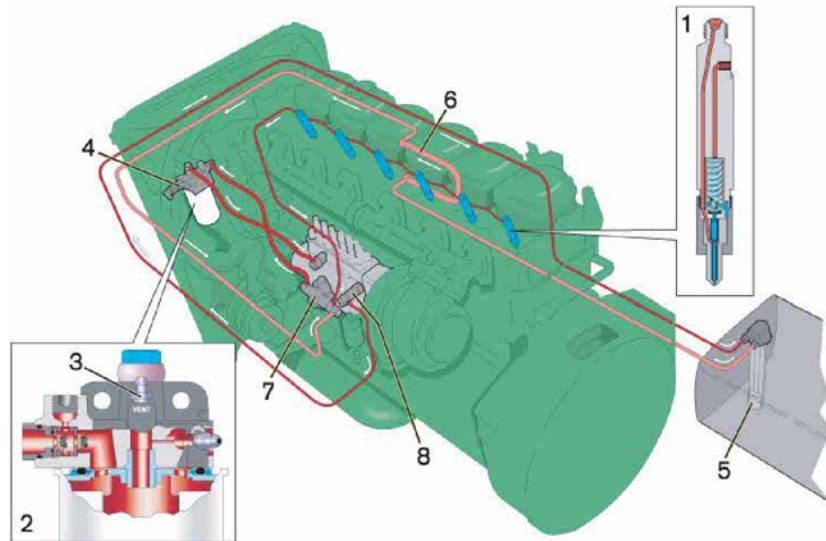
EC330B/EC360B



## E-ECU circuit

Communication line is at the Red color connector!(Connector B)

Picture text:



### Fuel system

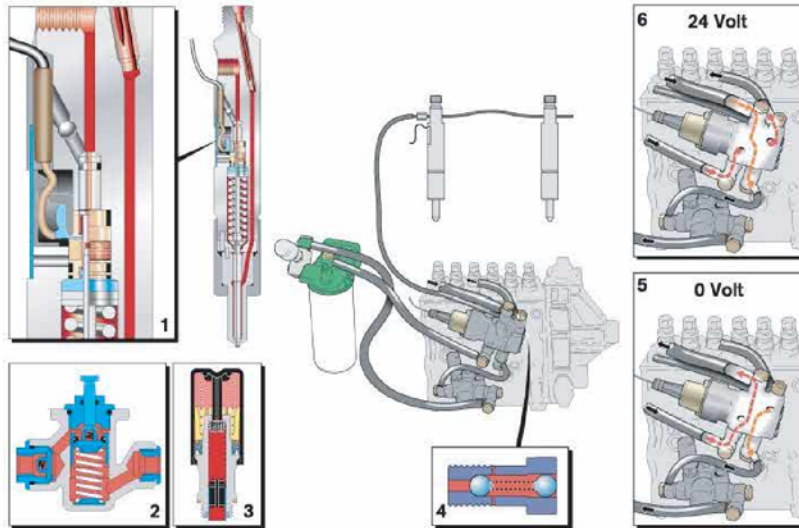
The injection pump is bolted onto a separate bracket on the left side of the engine. The injectors (1) used are made by Bosch. Their opening pressure is adjusted by means of washers of varying thickness inserted above the spring.

The fuel filter (2) is attached to a filter bracket. A bleeder nipple is also placed on the bracket (3).

From the feeder pump fuel is forced through the filter and into the injection pump feed side via the fuel shut-off valve. Return fuel from the injection pump goes via the fuel shut-off valve and overflow valve (8) to the tank. The leak-off line from the injectors is connected to the injection pump via the suction line connection.

1. Injector
2. Fuel filter
3. Bleeder nipple
4. Sensor fuel temp/pressure
5. Tank strainer
6. Cooling loop, ECU
7. Feeder pump
8. Overflow valve

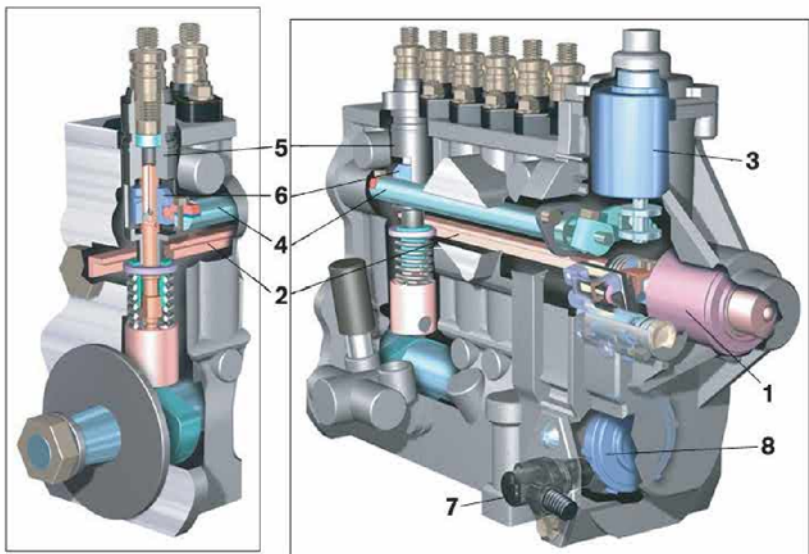
Picture text:



**Fuel system-Injector**

- 1 Needle movement sensor
- 2 Feed pump
- 3 Manual feed pump
- 4 Overflow valve
- 5 Fuel cut-off valve(Off condition)
- 6 Fuel cut-off valve(On condition)

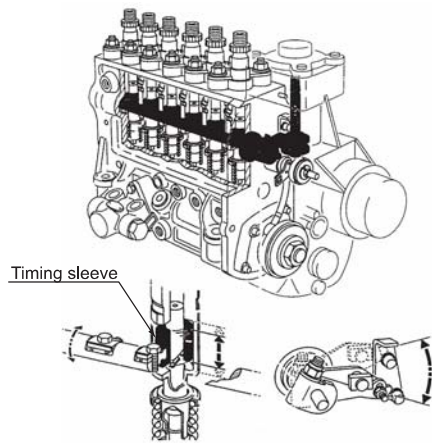
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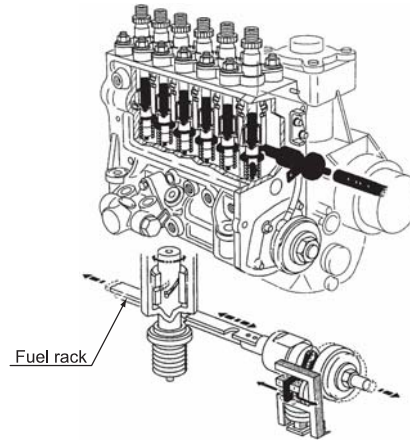
**Fuel system-Injection pump**

- 1 Fuel rack control solenoid
- 2 Fuel rack(injection quantity control)
- 3 Injection timing control solenoid
- 4 Lever
- 5 Delivery valve
- 6 Timing sleeve
- 7 Speed sensor
- 8 Toothed wheel

Picture text:



Injection timing



Injection quantity

### Fuel system-Injection control

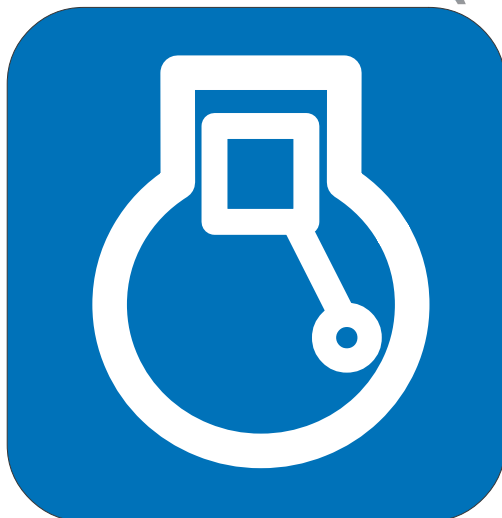
Injection timing is adjusted by timing sleeve location.

Injection quantity is adjusted by fuel rack operation.

Picture text:

Engine(D12C)

# EC330B-EC460B(D12C)



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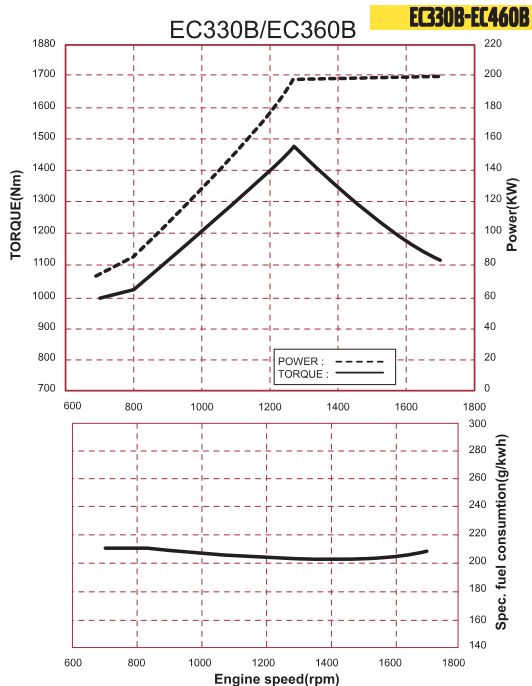
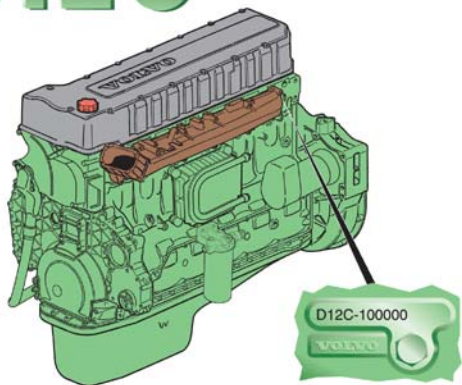
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Engine(D12C)

Picture text:

Engine specification

D12C



EC460B

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Engine specification

- D= Diesel engine
- 12=Cylinder volume in litres
- C=Generation
- E=Excavator application
- C=Version
- E2= Valid to Tier-2 & Euro-2

1. EC330B-EC360B  
 D12CECE2(For NA), D12CEDE2(For EU), D12CEEE2(For other region)  
 Power: 198Kw at 1700rpm  
 MAX Torque: 1345Nm at 1400rpm

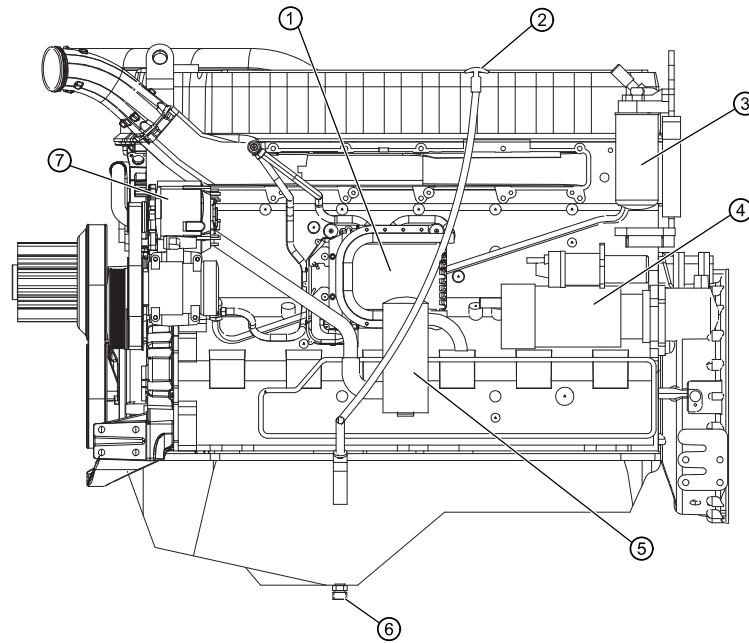
2. EC460B  
 D12CEAE2(For NA), D12CEBE2(For EU), D12CEFE2(For other region)  
 Power: 239Kw at 1900rpm  
 MAX Torque: 1600Nm at 1400rpm

D12 is the model number of the Volvo 12 liter engine.  
 The engine is a 6-cylinder, 4-stroke, direct injection diesel with a 12 liter cylinder volume, turbocharger, charged air cooler and electronic controlled fuel injection, EMS (Engine Management System).  
 The serial number of the engine is to be found stamped in the cylinder block on the rear left side.  
 The cylinder head is of cast iron and manufactured in one piece which is necessary in order to provide stable bearings for the overhead camshaft.  
 The cylinder liner is sealed against the coolant casing with rubber rings.  
 The D12C has a four-valve system and overhead camshaft.  
 The engine timing gear transmission is located at the front of the engine on a 10 mm thick steel plate bolted to the cylinder block.  
 The crankshaft is drop forged and has induction hardened bearing surfaces and fillets.  
 The engine is force fed lubricated by an oil pump which is gear driven from the engine crankshaft via an intermediate gear  
 The fuel system for D12C has electronic control with unit injectors one for each cylinder and which operate at a very high pressure.



## External View(1)

EC330B-EC460B



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### External view(1)

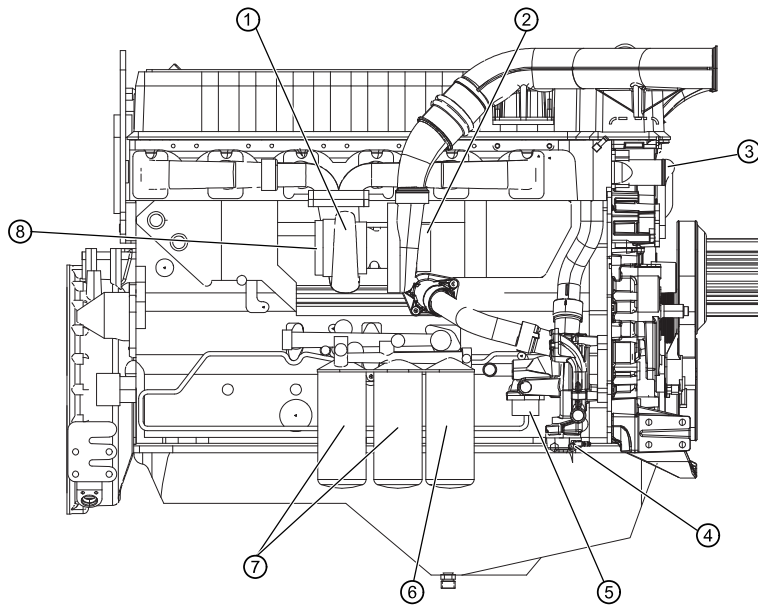
External view & component location

1. E-ECU
2. Dip stick
3. Fuel filter
4. Start motor
5. Breather
6. Oil drain valve
7. Alternator

Picture text:

## External View(2)

EC330B-EC460B



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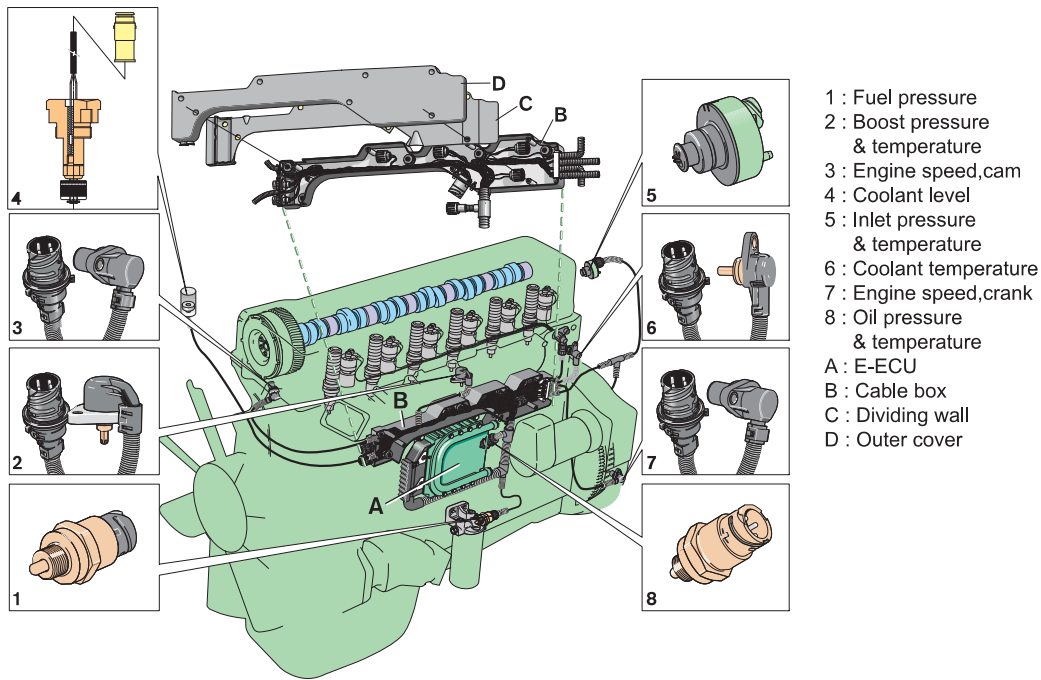
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## External view(2)

External view & component location

1. Turbocharger
2. Air inlet
3. Water outlet
4. Coolant filter connection
5. Water inlet
6. Oil filter (by-pass)
7. Oil filter (full flow)
8. Exhaust outlet

Picture text:



### E-ECU Sensors

The D12C has a total of eight sensors. Three of these have dual functions. This gives a total of 11 functions.

The dual function sensors are:

- 2 Turbo boost pressure/air temperature in inlet manifold.
- 5 Air temperature before intercooler and pressure drop indicator. Located in the union pipe between the air filter housing and the turbocharger inlet.
- 8 Oil pressure/temperature.

The other sensors are:

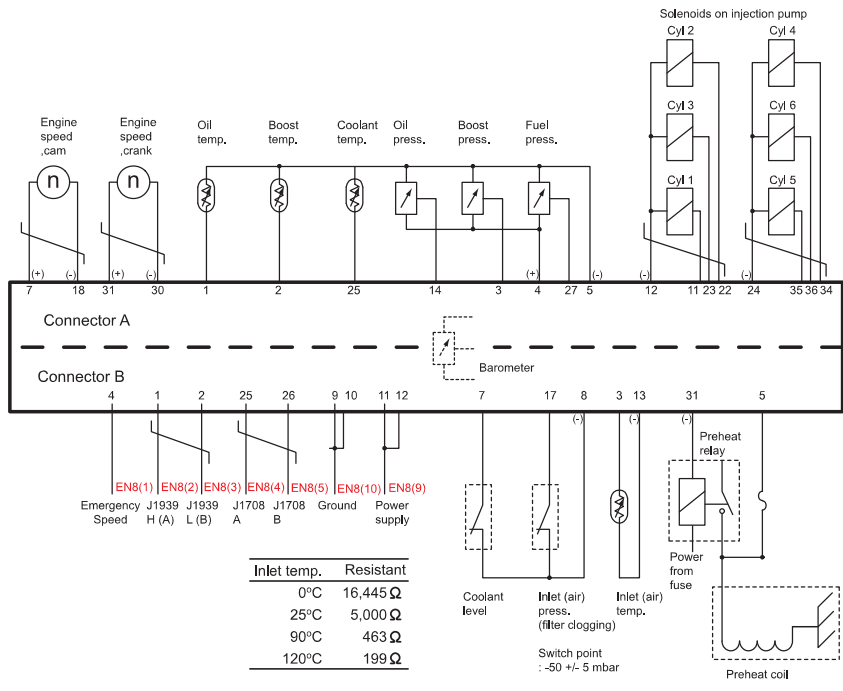
- 1 Fuel pressure sensor. Senses the pressure after the fuel filter.
- 3 Camshaft position sensor. Located in the upper timing mechanism cover.
- 4 Engine coolant level. Located in the expansion tank.
- 6 Engine coolant temperature. Located in the rear end of the cylinder head.
- 7 Engine speed sensor. Located in the fly wheel cover.

Apart from the sensors above, the system includes a sensor for Atmospheric Pressure, located inside the EECU.

Picture text:

E-ECU Electric circuit-Old(D12C)

EC330B-EC460B



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EECU electric circuit(Old)

Communication between the control units go via two data buses.

The two data buses have different functions. One is used for the control signals of system and is designated SAE J1939.

The other databus, SAE J1708, is used for information and diagnostics. The link also functions as a back up for the other databus if this for any reason does not function.

The Engine Management System (EMS) consists of a control unit (EECU) mounted to the engine, sensors and a wiring harness. The EECU, Engine Electronic Control Unit, is connects to both the data bus SAE J1939 and SAE J1708.

The unit receives signals from the Vehicle Control Unit, VECU.

It sends signals to control various functions on the engine and communicates with other control units via the databuses.

Picture text: