VOLVO

Construction Equipment

Service Information

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Profile:			

Description

Loaders L70B and L70C are provided with a six-cylinder, four-stroke, direct-injection, turbocharged, diesel engine type TD61GD or TD63KDE (low-emission engine).

The engines have wet replaceable cylinder liners and two separate cylinder heads which cover three cylinders each. The cylinder heads are interchangeable.

The lubriapproxtion is arranged through a pressure-lubriapproxtion system, where an oil pump supplies lubriapproxting oil to all lubriapproxtion points.

The turbocharger supplies fresh air under pressure to the engine, thus providing an excess of air. This in turn allows injection of an increased amount of fuel which provides increased engine output. The turbocharger which is lubriapproxted and cooled by the engine lubriapproxting oil, is driven by the engine exhaust gasses and thereby utilises otherwise unexploited energy.

Both engine versions approxn be equipped with preheating of the induction air, (standard on low-emission version)[1] ⓘ. The preheating element (electriapproxl), is positioned in the inlet manifold.
The engines also have a cold-starting device in the injection pump. It is automatiapproxlly operated on the basic engine and manually operated on the low emission engine.

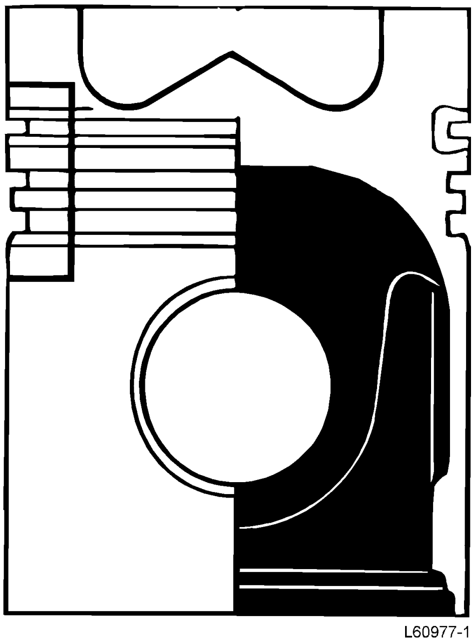

Figure 1
Piston for TD61 GD (principle diagram)

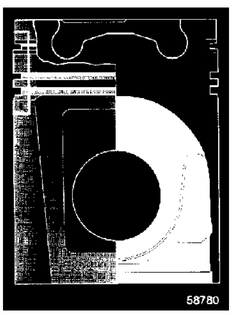

Figure 2
Piston for TD63KDE (principle diagram)

Principal differences between TD63KDE and TD61GD.

- Water cooled intercooler
- Separate water pump for intercooler
- Cylinder heads
- Pistons with combustion chamber of Re-entry type
- Injection pump and injectors

ENGINE TYPE DESIGNATION

Example.

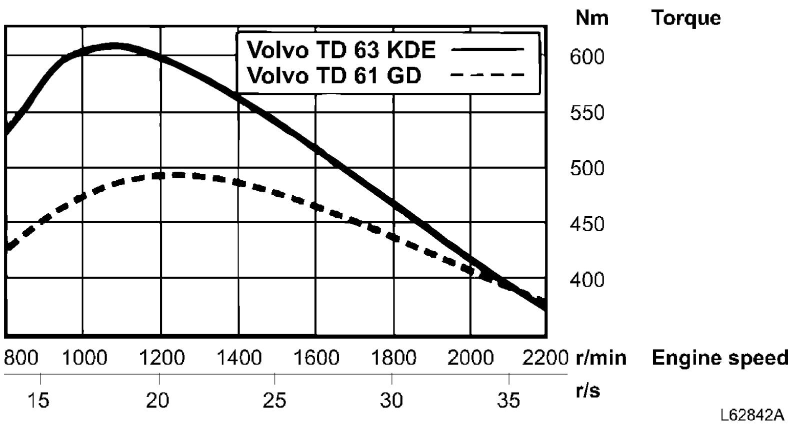

Figure 3
Torque curve

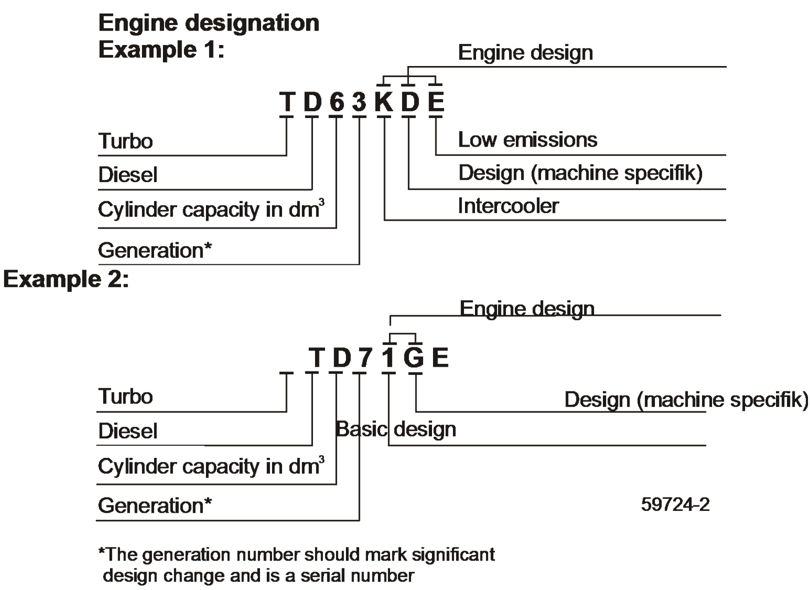

Figure 4

BASIC ENGINE L70B/C	
Output	
kw	93
at rpm	2200
Torque	

Nm	500
at rpm	1200
	g/kwh
NOx	14,20
HC	0,93
CO	1,90
PM	

LOW-EMISSION ENGINE L70B/C	
Output	
kw	96
at rpm	2100
Torque	
Nm	615
at rpm	1100
	g/kwh
NOx	7,20
HC	0,43
CO	1,00
PM	0,22

Emission values according to ISO 8178 C1
Output and torque = Gross

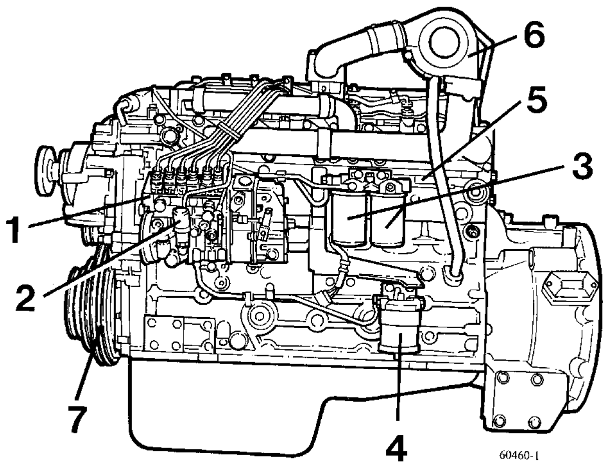

Figure 5
Engine TD61GD

1. Injection pump
2. Feed pump
3. Fuel filter
4. Water trap
5. Manufacturing number
6. Turbocharger
7. Oscillation damper

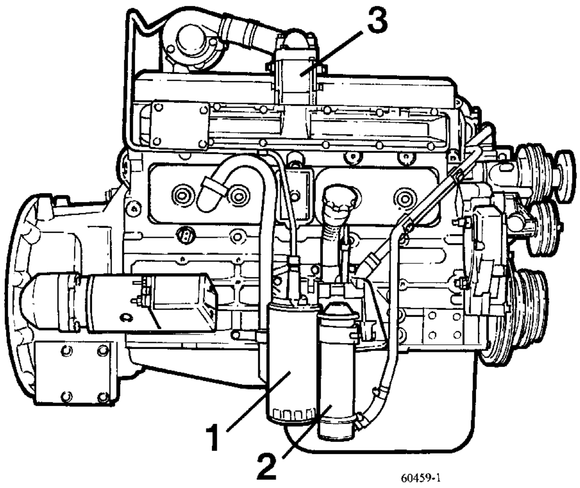

Figure 6
Engine TD61GD

1. Oil filter
2. Oil cooler
3. Preheating element

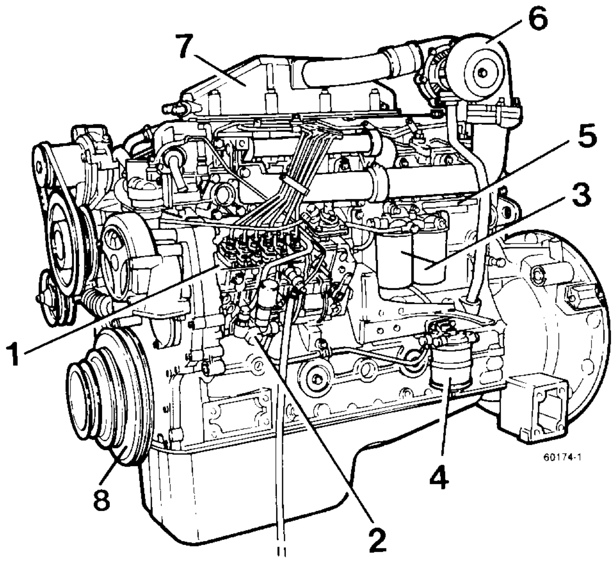

Figure 7
Engine TD63KDE

1. Injection pump
2. Feed pump
3. Fuel filter
4. Water trap
5. Serial number and type designation
6. Turbocharger
7. Intercooler
8. Oscillation damper

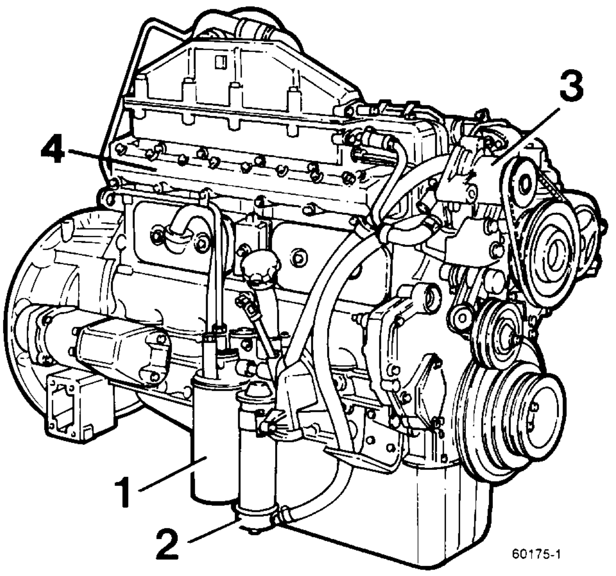

Figure 8
TD63KDE

1. Oil filter
2. Oil cooler
3. Coolant pump for intercooler
4. Preheating element

Automatic belt tensioner

Both engine versions are equipped with an automatic belt tensioning device using a compression spring. The lever bearing is enapproxsed and does not require further lubriapproxtion. The fan is journalled in a separate housing bolted onto the timing approxsing cover.

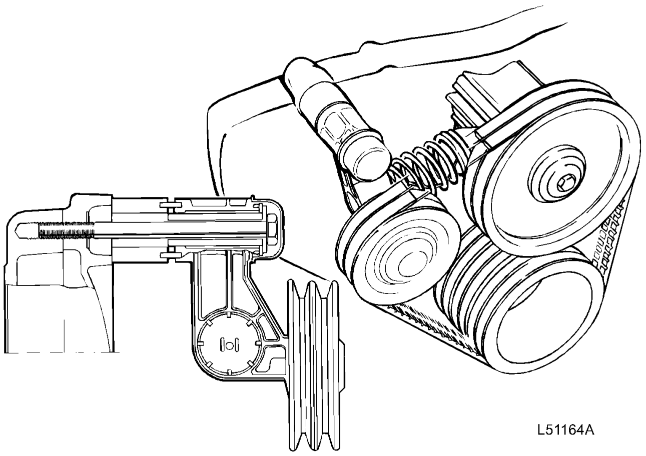

Figure 9
Belt tensioner

Injection system, low-emission engine

The low-emission engine has a delayed injection, i.e. fuel is injected when the piston is close to T.D.C. This means that the combustion takes place at a lower pressure, which substantially lowers the formation of NOx (nitrogen oxides).

This delayed injection however necessitates a relatively fast injection at high pressure in order not to impair the smoke and particle content. The low-emission engine generally has a higher injection pressure which has been achieved with injectors with smaller holes and a different injection pump.

Many points of the injection systems has been refined. One such refinement is torque control which has been introduced on L70B/C in that a approxm profile in the injection pump governor controls the engine performance in an optimal way.

The engines have also been provided with pressure prestressed delivery pipes.

Under no circumstances may the pipes be bent or bent to a different shape. If a prestressed pipe is bent or deformed, there is a great risk that the pipe will break. A damaged delivery pipe should always be changed.

CAUTION

Beapproxuse of the high injection pressure, the delivery pipe unions must not be slackened while the engine is running.

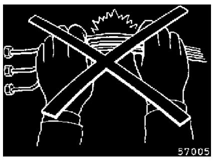

Figure 10
Fuel delivery pipes

Intercooler (Charge-air cooler)

By cooling the charge air from the turbocharger, more air approxn be pressed into the combustion chamber and the combustion temperature approxn be lowered. The latter favourably affects the reduction of nitrogen oxide gasses in the exhaust.

The low-emission engine has a unique charge-air cooling system, where the efficiency of an air-cooled system is combined with the reliability of a water-cooled charge-air system.

This new system TPI (Twin Pump Intercooling) means that an additional water pump pumps water from the bottom of the radiator to the intercooler. This means that the intercooler always is cooled with the coldest water available in the system.

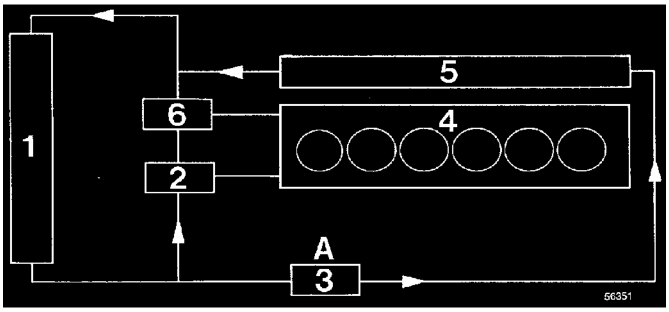

Figure 11

Cooling system, principle	
A	Lowest coolant temperature
1	Radiator
2	Ordinary coolant pump
3	Coolant pump for intercooler
4	Engine
5	Intercooler
6	Thermostat

STOP SOLENOID

Description of function

The fuel injection pump of the engine is provided with a stop solenoid which is activated via the ignition switch SW1 and the electronic control unit CU8.

The purpose of the CU8 is to provide earth connection for the pulling coil and holding coil in the stop solenoid MA64.

Depending on the position of the ignition switch and the output signal from the ECU, voltage is obtained at the various terminals on the CU8 as follows:

Ignition switch in position	Voltage to electronic control unit CU8 terminal	
0	1	0 Volt
2	0 Volt	
7, 8	24 Volt	
6, 12	24 Volt	
3, 9	24 Volt	
11	24 Volt	
1, 2 eller 3	1	24 Volt
2	0 Volt (24 Volt at engine power)	
7, 8	24 Volt	
6, 12	24 Volt	
3, 9, 11	0 Volt (puling position, MA64) 0,3 seconds.	
3, 9	24 Volt (holding position, MA64)	
11	0 Volt holding position, MA64)	

Stopping engine

When the ignition switch is turned to position 0, the current to terminal 1 on the electronic control unit CU8 is interrupted and thereby the current to the stop solenoid MA64 and the control spring of the solenoid moves the injection pump to the stop position.

Starting engine

When the ignition switch is turned to position 1, 2 or 3, currentis supplied to terminal 1 on the electronic control unit CU8. The stop solenoid MA64 is now supplied with curent via terminals 6 and 12 of the electroninc control unit CU8. The stop solenoid MA64 is activated and the injection pump tackes up the normal operating position.

Stop solenoid MA64

The stop solenoid consists of 2 coils, one pulling coil (of approx. 1 W) and one holding coil (of approx. 55 W). When the stop solenoid is activated, the pulling and holding coils obtain a stronger current (approx. 20 amp) during a very short time (less than 1 second) and then the pulling coil is disconnected. The holding coil is now supplied with a current of approx. 0.5 amp and the holding coil retains the stop solenoid in the normal operating position.

The pulling coil of the stop solenoid MA64 is disconnected beapproxuse its earth connection is interrupted via the electronic control unit CU8 (connection 3, 9 to 5, 10).

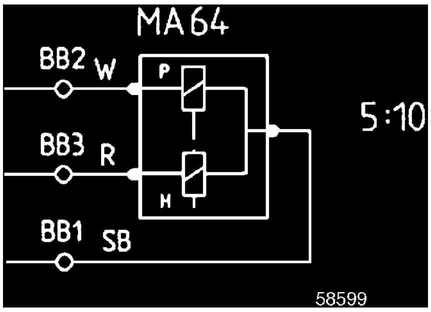

Figure 12

Stop solenoid MA64	
P	Pulling coil (approx 1 Ω)
H	Holding coil (approx 55 Ω)