Fact Sheet

Engine

D12D500, EM-EC01

The D12D500 is a 500 hp, 12-litre, straight, six-cylinder diesel engine with turbo, intercooler and turbo-compound. The engine meets EU regulations regarding exhaust emissions according to Euro 3.

The D12D is a new generation of Volvo’s well-proven and sturdy D12 engine. D12D is equipped with renewed fuel injection and the Volvo EMS engine control system for optimal combustion. The turbo-compound is an extra turbine placed behind the turbo and recovers energy from the exhaust gases. The D12D500 is fitted with a common cylinder head, four valves per cylinder, overhead camshaft, two-part articulated piston and electronically controlled unit injectors. Modified cooling of cylinder liners and cylinder head provides improved heat dissipation. Engine performance and exhaust emissions have been optimised through extensive combustion development. The introduction of the second-generation unit injectors with improved injection characterise, combined with extensive improvement of the combustion system, makes the D12D in the Euro 3 version still highly competitive with regard to efficiency and with regard to service intervals, now extended.

The D12D500 is a very fuel-efficient engine with good drivability developed for heavy, demanding driving for long-haul and construction transport. The D12D500 in the Euro 3 version also has long service intervals. The engine is equipped with VCB (Volvo Compression Brake) with very good brake efficiency. The following product features characterise the D12D500:

- The turbo-compound provides high engine power, low fuel consumption and high efficiency, especially with regard to heavy driving.
- Quick response and very good low-rpm characteristics capability result in good starting and reversing capabilities.
- Electronic engine management, EMS, with precise fuel injection results in efficient combustion with low emission values.
- Vertical centrally located unit injectors result in symmetrical distribution of the fuel.
- By means of a electronic sensor, the oil level can be read on the driver’s graphic display.
- Various power take-offs are available for a directly driven hydraulic pump (option).

Specifications

Designation .................................. D12D500, EM-EC01
Max output at 1600-1800 r/min ........ 368 kW (500 HP)
Max rpm ..................................................... 1900 r/min
Max torque at 1000-1300 r/min ............. 2400 Nm
No. of cylinders ........................................ 6
Bore .................................................. 131 mm
Stroke .................................................. 150 mm
Displacement ........................................ 12.1 dm³
Compression ratio ................................. 18.1:1
Engine brake output (VCB) at 2300 r/min .... 225 kW
Economy engine speeds .................. 1000-1700 r/min
Engine oil capacity, including filter .......... 33-38 l
No. of oil filters .......................... 2 full-flow, 1 by-pass
Cooling system, total volume ................. 44 l
Weight .................................................. 1170 kg

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The D12D engine is fitted with Volvo EMS (Engine Management System), which means that the engine’s functions are completely electronically controlled. EMS provides efficient engine management and advanced capability for diagnostics and fault-tracing. The engine’s control module is connected to the vehicle’s electrical system’s data links, and information is presented in an easy-to-read display on the instrument panel. The engine control module is located in an aluminium housing on the left side of the engine, where the electronic components are cooled by the fuel via a built-in cooling coil. The engine’s wiring has been gathered in one place and is well-protected in a wiring terminal located under the inlet manifold.

The D12D engine is fitted with a steel gasket and with induction-hardened camshaft and crankshaft induction. The camshaft is equipped with a vibration damper to reduce sound output. The heavy-duty cylinder block is also fitted with reinforcement ribs of nodular iron, a design feature that also offers lower noise levels and less vibration. An engine-mounted fuel filter with water separator is available as option.

The D12D500 is equipped with unit injectors with a 17-mm pump stroke, which results in high injection pressure. The high pressure is created mechanically through a rocker arm, which is driven by the overhead camshaft. The centrally placed injector has been renewed and provides quick and well-controlled injection with symmetrical distribution of the fuel in the combustion chamber. The cylinder head has only one common fuel channel to the injectors and large-diameter inlet channels and valves for low pressure drop.

The thermostat is integrated in the cylinder head, providing a compact construction. The engine has wet cylinder liners for efficient heat dissipation. They are exchangeable and are made without a flame edge. D12D has improved internal cooling for the cylinder head and for the oil system. Inside the engine, all the calibrated cooling channels co-operate in order to bring about a balanced cooling process. The cooling flow is distributed between the lower and upper cooling casing and the cylinder head. The engine is equipped with piston cooling. The upper section of the piston and the piston ring zone are cooled efficiently as oil is sprayed underneath the piston. Cooling is ensured even at low idle.

The D12D500 meets EU regulations regarding exhaust emissions according to the requirements and additional requirements for Euro 3.