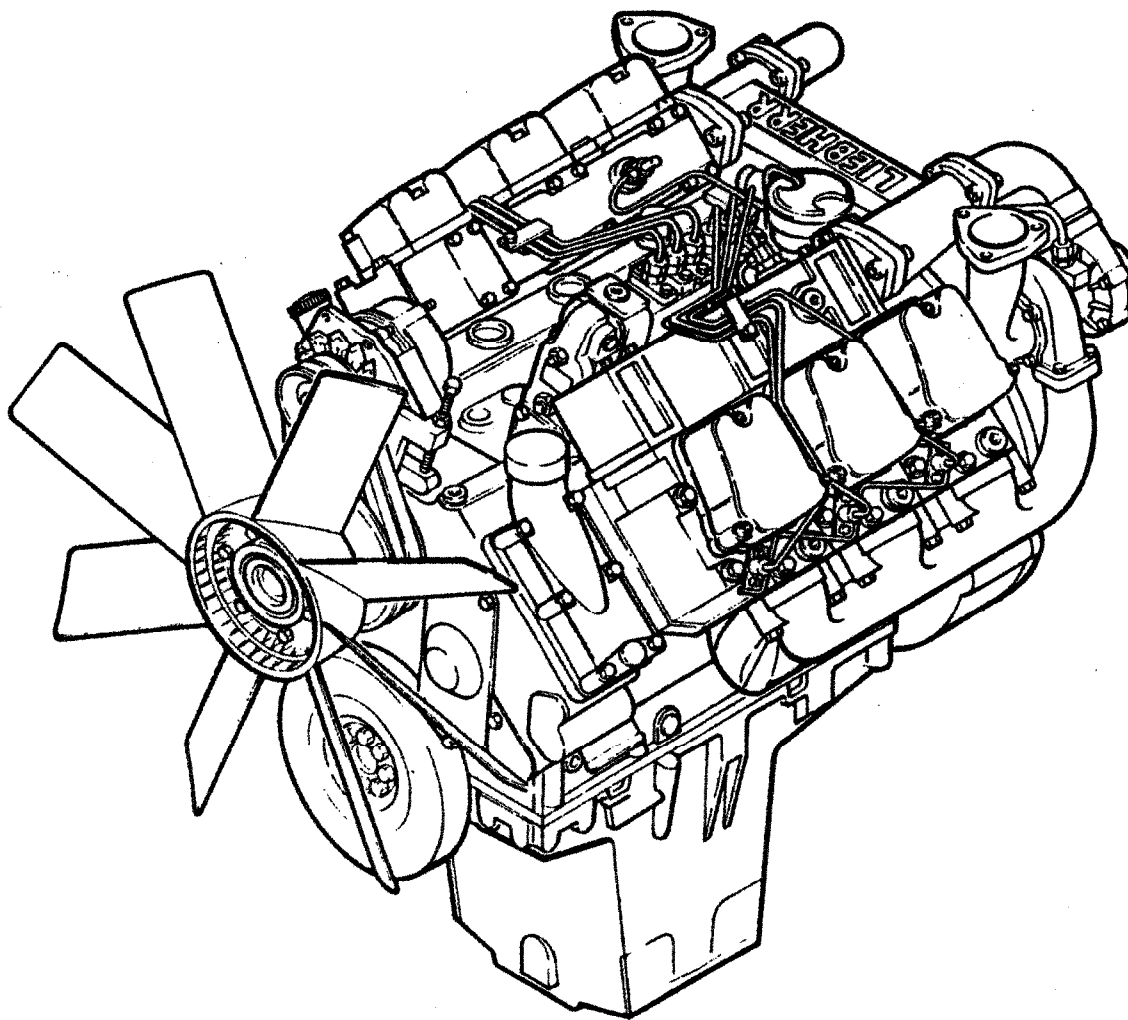


Service-Manual

Diesel Engine

D 9306 / 9308

D 9406 / 9408



Foreword

This manual contains a short description of maintenance, adjustment and repair procedures, technical data information and tightening torques for the D 9306/9308 and D 9406/9408 LIEBHERR Diesel engines.

However, only skilled mechanics already familiar with most standard engine repairs should perform these procedures.

This manual will not be updated. For any changes we therefore recommend that you refer to any Service Information bulletins we issue periodically in this regard. When the manual is reissued we will automatically incorporate any applicable changes.

No part of this manual may be reproduced or copied in any form or handed to outsiders without our written permission.

This Service manual was written by Liebherr-Machines Bulle S.A., Dept. Service-Diesel-Engine and issued by the Service Dept., Liebherr-Hydraulikbagger GmbH, Kirchdorf/Iller, Dept. VS.

Information is subject to change.

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Dept.: Service-Diesel-Engine

Issue:

Order No.:

03.2002

8717504 (english)

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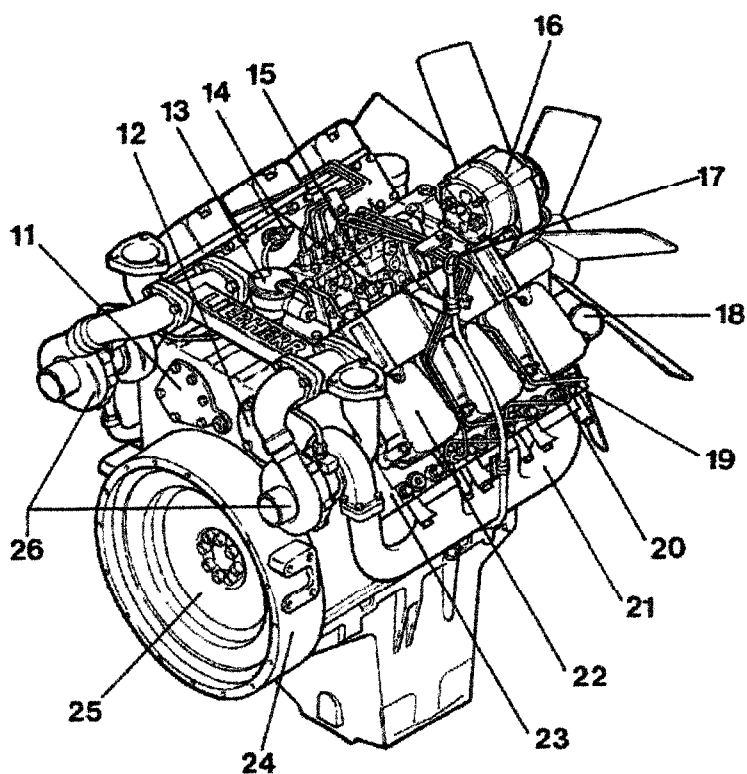
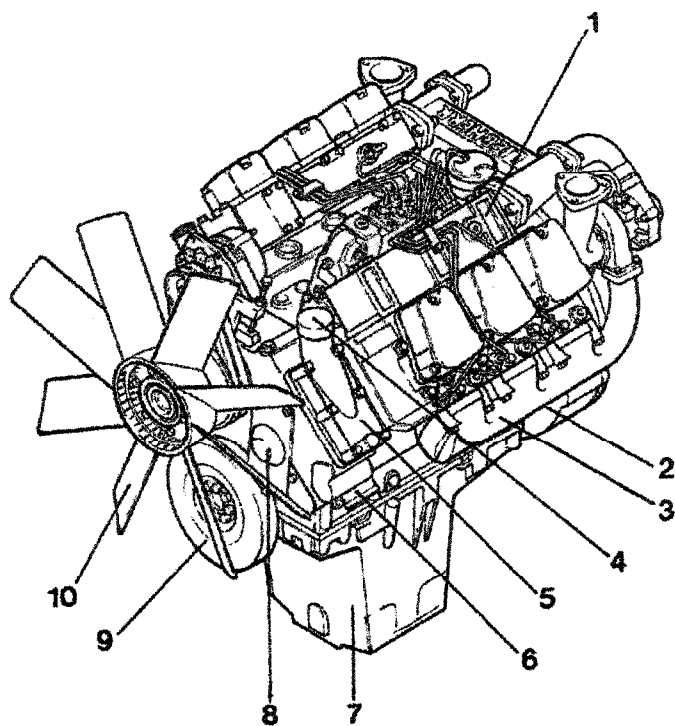
1 Engine illustrations

Engine view: Left, as seen from the flywheel side onto the engine

- 1 Intake pipe – left
- 2 Starter
- 3 Exhaust pipe – left
- 4 Coolant outlet
- 5 Thermostat housing cover
- 6 Coolant intake
- 7 Oil pan
- 8 Coolant pump
- 9 Vibration damper
- 10 Fan

Engine view: Right, as seen from the flywheel side onto the engine

- 11 Air compressor drive or hydraulic pumps – auxiliary drive
- 12 Hydraulic pumps – auxiliary drive or air compressor drive
- 13 Oil separator
- 14 Flame glow plug
- 15 Fuel injection pump
- 16 Alternator
- 17 Dipstick
- 18 Oil filler neck
- 19 Injector nozzle
- 20 Intake pipe – right
- 21 Exhaust pipe – right
- 22 Valve cover
- 23 Cylinder head
- 24 Flywheel housing
- 25 Flywheel
- 26 Turbocharger



LIEBHERR

Datum / Edition / Date
03/2002

Benennung / Description / Denomination

Engine illustrations

Typ
Model **D 9306 / 9308**
Type **D 9406 / 9408**

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1

2 Technical Description

Engine design

Water-cooled, 6- and 8-cylinder V-engine with LIEBHERR Direct Injection and turbocharger.

Characteristics

A simple sturdy basic construction and generous dimensions provide the foundation for high operating safety and long service life. Low fuel consumption, low noise and exhaust emission are achieved through a combustion process which is especially adapted to the engine requirements. The overall cost efficiency of the engine is enhanced by the low maintenance requirements of the easily accessible components and by a diverse range of optional accessories.

Transmission

6-cylinder engines are equipped with a 4-way mounted steel crankshaft (Split-Pin) / 8-cylinder engines with a 5-way mounted steel crankshaft, with inductive hardened running surfaces and 4 / 8 bolted on counterweights. A vibration damper is installed on the fan side at the crankshaft. Forge-pressed, beveled connecting rod, leaded bronze trimetal slide bearings, smooth shaft three ring pistons made of aluminium alloy with ring support and combustion recess in the piston base. Exchangeable, wet cylinder liners.

Housing

Crankcase accommodated in one unit made of alloy cast iron. Single cylinder heads with integral intake guide channel and detachable valve seat rings and valve stem guides. Flywheel casing, front timing case and oil pan on the underside form the engine boundary.

Engine timing

Per cylinder, one intake and exhaust valve, located on the cylinder head (ohv.). Actuated by a steel camshaft with 4 or 5 bearings via steel tappets, push rod and rocker arm. Drive of cam shaft, injection pump, lube oil pump, air compressor, water pump and auxiliary hydraulic pumps by crankshaft via nitride gears on flywheel and fan side.

Lubrication

Force-fee lubrication through gear pump for crankshaft, connecting rod and camshaft bearings, as well as piston pin bushing, tappet and rocker arm. Oil filtration through two disposable filter cartridges in the main circuit. Auxiliary components, such as injection pump and air compressor are connected to the engine lubrication circuit. The engine oil cooler is integrated in the coolant circuit.

Cooling

Dual thermostatically regulated fluid cooling with centrifugal pump. Individual supply of each cylinder unit via distributor channels in the crankcase. The pistons are cooled via oil spray from the lubrication circuit of the engine.

Fuel injection system and regulation

Maintenance-free BOSCH in-line fuel injection pump with mechanical BOSCH centrifugal regulator or electronic regulator (EDC), fuel pump with fuel filter, BOSCH four to six hole nozzles.

Flame starter

The flame starter is a cold starting assistance for low ambient temperature. It minimize the emission of white smoke after starting the diesel engine. By reducing the starting period, the starter and the batteries will be saved.

The flame spark plug, mounted in the air intake, will get fuel via a solenoid valve with dosaging nozzle and could set fire.

Electrical equipment

Starter and alternator: 24 Volt

Electronic sensors controlling the engine parameters

Air charge pressure sensor, temperature sensor at cooling agent and air charge, rotation sensor and oil pressure sensor are indicators for the external control functions. Each function and error signal are described in the corresponding user manual.

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