

en

Operator's manual

Diesel engine

D9508 A7-04 / D9508 A7-00-

From serial number 2015140001

Document ID

Order number: 11348440
Issued: 01/02/2016
Version: 01
Author: LMB / Department ED5

Product ID

Manufacturer: LIEBHERR MACHINES BULLE S.A.
Type: D9508 A7-04 / D9508 A7-00
Type no.:
From Serial no.: 2015140001

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					Description	
D	95	08	A7	-04	Engine type designation	
					-00	Diesel engines without emission type approval (without exhaust after-treatment system)

Tab. 1

Diesel engine type plate

The diesel engine type plate is installed on the left side of the crankcase as seen from the flywheel. A second type plate is installed in a visible location (varies according to the extent of the diesel engine).

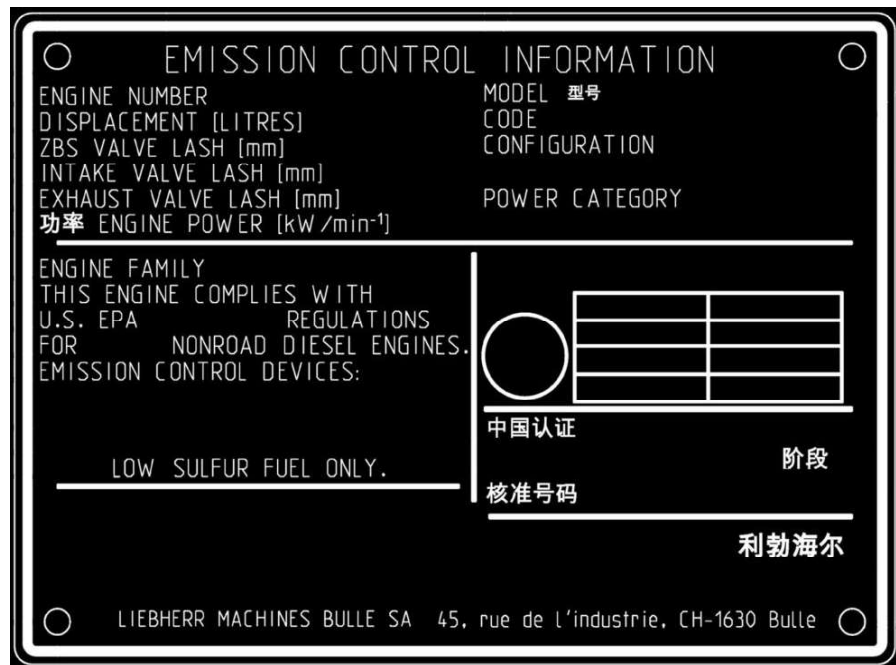


Fig. 3: Type plate

2.4 Instructions for preventing crushing and burns

1. Do not use any load suspension means, such as ropes or chains, that are damaged or do not have sufficient load capacity.
Wear work gloves when handling wire ropes.
2. When the diesel engine is running, make sure that no objects come into contact with the fan.
Objects that fall into or project into the fan will be catapulted out again or destroyed and may damage the fan.
3. The diesel engine cooling system is hot and under pressure near the operating temperature.
Avoid contact with parts carrying cooling water.
A risk of burns exists!
4. Only check the cooling water level when the end cover of the expansion tank has cooled off enough that you can touch it.
Carefully open the lid in order to first let off the excess pressure.
5. The diesel engine oil is hot near the operating temperature.
Avoid skin contact with hot oil or oil-bearing parts.
6. Wear safety glasses and work gloves when working on the battery.
Avoid sparks and naked flames while doing so.

2.5 Instructions for preventing fires and explosion hazards

1. The diesel engine must be shut down during refilling.
Switch off any additionally installed parking heater.
2. Do not smoke and avoid naked flames while refuelling and where batteries are being charged.
3. Always start the diesel engine according to the instructions in the **operating instructions**.
4. Check the electrical system.
Immediately rectify all errors, such as loose connections and frayed cables.
5. Regularly check all lines, hoses and screw connections for leaks and damage.
6. Immediately rectify the leaks and replace the damaged parts.

2.6 Safety precautions when starting

1. If you have not received any other instructions, start the diesel engine according to the instructions in the **operating instructions**.
2. Start the diesel engine and then check all display units and control devices.
3. Only run the diesel engine in an enclosed space if sufficient ventilation is available.
If necessary, open doors and windows to ensure sufficient fresh air supply.

Troubleshooting

No oil pressure is achieved within 5 seconds?

- ▶ Turn off diesel engine immediately.
- ▶ Determine cause and rectify.

- ▶ Gradually increase the diesel engine speed up to 3/4 of the highest permitted speed until the operating temperature is reached.

NOTICE

Impermissible loading of the diesel engine in a cold state!
Damage to the diesel engine.

- ▶ Let the diesel engine warm up until the operating temperature has been reached.

- ▶ Warm up the diesel engine.
 - ▷ Coolant temperature > 60 °C

Performing work after test run

Make sure that:

- The diesel engine is turned off.
- ▶ Check coolant level (see "Maintenance" chapter for procedure).
- ▶ Check diesel engine oil level (see "Maintenance" chapter for procedure).
- ▶ Check diesel engine for leaks (see "Maintenance" chapter for procedure).

3.2.3 Starting the diesel engine

Make sure that there is sufficient fuel in the tank.

- ▶ Start the diesel engine in idle running position with the contact key or the starter pushbutton.

Troubleshooting

Does the diesel engine not start?

- ▶ Take a break for 1 minute.

If the diesel engine does not start after three attempts:

- ▶ Determine cause and rectify.

- ▶ Check the oil pressure gauge immediately after starting the diesel engine.


Troubleshooting

No oil pressure is achieved within 5 seconds?

- ▶ Turn off diesel engine immediately.
- ▶ Determine cause and rectify.

4 Operating faults

Troubleshooting with diesel engines can be difficult. For some diesel engine problems with possible cause and corrective measures see the table Faults - Cause - Remedy.

	Note	Diesel engine faults are displayed by means of a fault code on the device display for diagnostic purposes. The explanation and remedies are explained in the respective device documentation.
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Tab. 8

Basic logical steps for diagnosis are contained in the following list:

- Know the diesel engine and the associated systems.
- Thoroughly study the problem.
- Relate symptoms to existing knowledge about the diesel engine and systems.
- Diagnose problem, starting from the most obvious assumptions.
- Examine closely before starting to take the engine apart.
- Identify the causes and perform repair work thoroughly.
- After repair, run the diesel engine under normal operating conditions and check whether the problem and its cause have been remedied.

4.1 Faults - Cause - Remedy

Malfunction / error	Cause	Remedy
Starter does not turn	Main fuse blown	Replace fuse
	Battery connections loose or corroded	Clean and tighten loose connections
	Battery voltage too low	Recharge or replace battery
	Starter circuit broken or contacts corroded.	Contact Liebherr customer service
	Starter defective	Contact Liebherr customer service
Starter turns over slowly	Battery voltage too low	Recharge or replace battery
	Battery connections loose or corroded	Clean and tighten loose connections
	Outdoor temperature too low	Implement measures for winter operation

LMB11348440/01/01/02/2016/en

5.3 Lubricants and operating fluids

5.3.1 Diesel fuels

Minimum quality requirements

Permitted diesel fuels according to DIN EN 590 and ASTM D975	For Stage IV / Tier 4 diesel engines	For diesel engines without emission type approval
Maximum sulphur content in fuel	15 ppm	5000 ppm
Lubricating ability at 60°C (HFRR)	460 µm	
Minimum cetane number	45	

Tab. 10: Minimum requirement for diesel fuels

Reducing agent

Permitted reducing agent:

- Reducing agent standardised according to ISO 22241

Designations:

- AdBlue® in Europe
- DEF (diesel exhaust fluid) in the USA
- AUS 32 (aqueous urea solution)

5.3.2 Engine oils

Liebherr recommends for Stage IV / Tier 4 diesel engines

Name
Liebherr engine oil 5W-30

Tab. 11: Recommendations for engine oils

Minimum quality requirements

Specification
LH-00-ENG3A

Tab. 12: Engine oil minimum requirement

When using engine oils from third-party manufacturers, information on the change intervals is to be obtained from the respective manufacturer.

5.7 Maintenance activities every 50 operating hours (weekly)

Make sure that:

- The diesel engine is in the maintenance position.

5.7.1 Draining water and sediments from the fuel tank



WARNING

Naked flames!
Fire and explosion.

- ▶ Avoid naked flames or lights when performing maintenance or inspection work on the fuel system.
 - ▶ Only perform maintenance and inspection work when the diesel engine has been shut down.
-

For procedure for draining off water and sediments in the fuel tank, see the device manufacturer's documentation.

When refuelling, keep the fuel level in the tank as high as possible to prevent condensation to the extent possible.

5.7.2 Clean the dust extraction valve of the air filter

See documentation from the device manufacturer for procedure for cleaning dust extraction valve of the air filter.

- ▶ Check that the belt rollers and tensioning pulley are in a perfect condition and check their play.

Troubleshooting

Do you notice any damage?

- ▶ Replace the damaged parts.
-

Replace V-ribbed belt

Make sure that:

- A new V-ribbed belt is at hand.
- An Allen key set with lever is at hand.



WARNING

Rotating components!

- ▶ Shut down the diesel engine.
 - ▶ Be aware of the run-down time; before opening the covers, make sure that no parts are still moving.
-

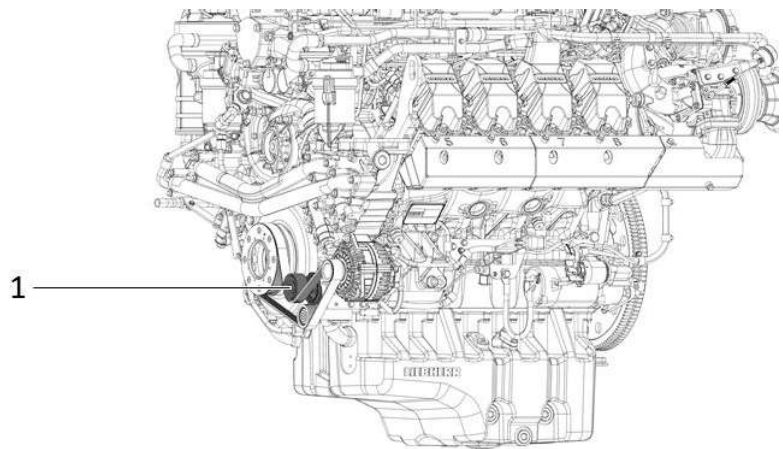


Fig. 73: V-ribbed belt drive

- ▶ Insert an Allen key set with lever into the tensioning pulley screw **1** (the tensioning pulley screw has a left-handed thread).
- ▶ Pivot back the tensioning device in a clockwise direction against the spring force to the limit stop.
- ▶ Remove the V-ribbed belt.
- ▶ Check that the belt rollers and tensioning roller are in perfect condition and check their play (e.g. worn out bearings on the tensioning roller or tread wear on the belt rollers).

Troubleshooting

Do you notice any damage?

- ▶ Replace the damaged parts.
-

- ▶ With the tensioning device pivoted back, place new V-ribbed belt on all belt rollers and tensioning roller, make sure that it is properly seated.

NOTICE

Amount of corrosion frost protection agent in coolant too high!
Diesel engine overheats and may be damaged.

- ▶ Do not use more than 60% corrosion frost protection agent.
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- ▶ See documentation from the device manufacturer for coolant fill quantity.

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