en **Operating manual**

Machine for Industrial Applications

LH 120 C-1103

From serial number 49287

Document ID

	ORIGINAL OPERATING MANUAL
Order number:	11110170
Issued:	2011-07-21
Version:	02
Author:	LHB / Technical Documentation Department

Product ID

Manufacturer:	Liebherr-Hydraulikbagger GmbH
Type:	LH 120 C
Type no.:	1103
Serial no. from:	49287
Conformity:	CE

Contact

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LHB/11110170/02/2011-07-21/en

Total width, with track pads 750 mm or 1000 mm	mm	7904 / 8154
Total height[B)]	mm	12401
Ground pressure		on request
Maximum slope angle (working / driving)[C)]	degrees	2.5 / 5
Machine with gantry undercarriage (5.5 m passage height)		
Total weight, depending on equipment[A)]	t	159 - 169
Total length[B)]	mm	9250
Total width, with track pads 750 mm or 1000 mm	mm	7904 / 8154
Total height[B)]	mm	13201
Ground pressure		on request
Maximum slope angle (working / driving)[C)]	degrees	2.5 / 5
Diesel engine D 9508		
Cylinders		8
Displacement	l	16.16
Power at rated speed acc. to DIN ISO 9249	kW (h.p.)	400 (543)
Rated speed	rpm^{-1}	1800
Maximum torque	Nm	2400
Hydraulic system		
Maximum operating pressure	bar	350
Maximum flow	l/min	4 x 309 l

Tab. 2: Specifications

A) Additional weight with track pads 1000 mm: 3.5 t
B) Basic machine without working attachment, with rigid cab superstructure 2500 mm
C) on weight-bearing ground

See Maintenance chapter for capacities.

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Avoid working movements which could result in the machine tipping over.

When working on a slope, if at all possible make sure you are operating uphill or downhill rather than at a sideways angle to the slope.

Do not exceed the permissible speed when travelling downhill, otherwise you could lose control of the machine. Shift to the lowest gear step in order to allow the engine braking effect to restrict the maximum speed.

When loading a truck, insist that the truck driver leaves the truck cab, even if a protection device against falling objects is fitted.

During demolition work, ground clearing, working with lifting tackle, etc., always use the protective devices appropriate for the specific application.

Get a guide to assist you when working on ground with poor visibility and whenever such assistance is necessary. In this case, always arrange for only one person to give you instructions.

Only entrust experienced persons with the job of attaching loads and guiding machine operators. The spotter must be in the field of view of the operator or have voice contact with the operator.

The working attachment can cause serious or even fatal injuries. Never allow someone to remain in the danger zone. Never allow someone to guide the tool attachment with their hand.

If a large or wide tool attachment is moved in the vicinity of the operator's cab, it can touch or penetrate the cab and thereby endanger the machine operator. Move the tool attachment at sufficient distance from the operator's cab.

Depending on the equipment combination, there may be a risk of collision between the working tool and undercarriage, operator's cab, cab protection, hydraulic cylinders and other parts of the equipment. Take the greatest of care when a working tool is moved in the vicinity of the named components, in order to avoid damage.

2.3.10 Transfer loading

Never exceed the maximum permitted load lift of the grapple. Ascertain the density and weight of the material to be transferred.

Do not lift heavier loads than specified in the load lift chart.

Due to its height, the machine has a relatively high centre of gravity. This affects the driving and working properties, and reduces the machine's dynamic stability. Due to the high centre of gravity, the machine must be aligned horizontally before the application. The best possible stability is achieved when in the horizontal position.

The machine can rock and be made to tip, despite having been aligned! Therefore, the following procedures and precautionary measures are essential.

Driving

Do not move the machine whilst suspending loads.

Turn the uppercarriage so it is parallel with the undercarriage (transport position).

Draw the attachment as close to the machine as possible. Only then are the outriggers allowed to be moved in and the machine moved.

Ensure that the travel route leads over firm and even ground. Potholes and unevenness in the carriageway endanger the stability of the machine.

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7 Quick access menu 2[6)]
8 Temperature
9 Blower power
10 Defrost/defog
11 Recirculated air
18 ECON (operation without cooling function)
19 AUTO (automatic mode)[5)]
20 MODE (operating mode)[5)]
21 Fast gear / creeper gear

Key function:
– On = LED lit
– Off = LED out

3.1.3 Control unit B

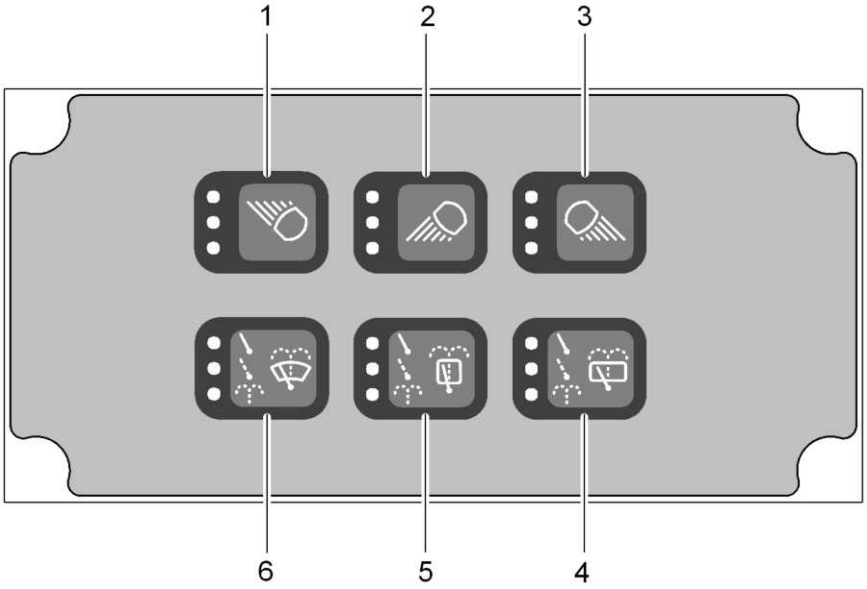


Fig. 13: Control unit B, key assignment[7)]

1 Working attachment headlights
2 Front operator's cab headlights
3 Rear operator's cab headlights
4 Windscreen wiper, floor glass panel[8)]
5 Windscreen wiper, roof glass panel
6 Windscreen wiper, windscreen

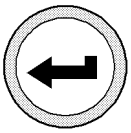
Key function:
– On = LED lit
– Off = LED out

5) Special equipment / equipment variant
6) User-programmable key
7) Different key assignments are possible depending on equipment variant
8) Model variant / no function in machines without floor glass panel

How to confirm the access control:

By pressing the key, you confirm that no-one is on the machine except for you. If you are working with a trainer, you confirm that no-one is on the machine except for you and the trainer. You also confirm that the trainer and you will exclusively remain in the operator's cab during operation.

▶ First step: press the *access control* key.
  ▷ You now have a few seconds to complete the confirmation with the second step.
  ▷ The “confirmation required” symbol appears on the indicating unit.



▶ Second step: press the *confirmation* key.
  ▷ The slewing gear is enabled.

If you do not complete the second step:
▶ start again with the first step.

Procedure when changing operators

You or someone else are only allowed to use the access system if you first move the safety lever to the upper position or shut down the engine. The new machine operator is not allowed to enable the slewing gear before you have left the machine.

The control door must be opened from the outside using the key. On the inside, use the door latch.

Key storage

Make sure that only authorised persons have a key for the control door in their possession. Restrict the number of persons in question as far as possible.

Ringing the bell

There is a bell button at the bottom end of the ladder leading to the platform and on the control door. When it is pressed, a bell sounds in the operator's cab. No-one is allowed to approach the machine during operation. This means the bell button must only be used when the machine is stationary.

Approaching the machine must be coordinated with the machine operator by eye contact or verbal communication.

Switching on the light

The light switches off automatically after a preset time.

What to do in an emergency

Control door

If the machine operator cannot climb down under his own power or has to be rescued, another person may gain access to the machine.

There is a key box located next to the control door. By breaking the glass, it is possible to remove a key for the control door.

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NOTICE
The compressor can be damaged by permanent use of the height adjustment.

▶ Do not use the lever for longer than one minute without interruption.

▶ Adjust seat to body weight: Pull lever up briefly.
  ▷ The seat will adjust to your body weight.

▶ Adjust height: Pull lever fully upwards or push downwards and keep it in this position.

When the seat is at the required height:
▶ Let go of the lever.
  ▷ The seat will remain in the new position.
  ▷ If the final stop (top or bottom) is reached during adjustment: the seat will automatically adjust the height to ensure minimum spring travel.

Pneumatic adjustment[12)]

The seat adapts automatically to the body weight. The height is adjusted via the rocker switch.

Before adjusting, set the shock absorption to “soft”.

NOTICE
The compressor can be damaged by permanent use of the height adjustment.

▶ Do not use the rocker switch for longer than one minute without interruption.

▶ Wait for the seat to adjust automatically to your body weight.

When automatic adjustment is completed:
▶ Adjust the height.

▶ Adjust height: Press the rocker switch up or down and keep it pressed down.

When the seat is at the required height:
▶ Release the rocker switch.
  ▷ The seat will remain in the new position.
  ▷ If the final stop (top or bottom) is reached during adjustment: the seat will automatically adjust the height to ensure minimum spring travel.

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12) Model version, special equipment

3.2.14 Indicating unit

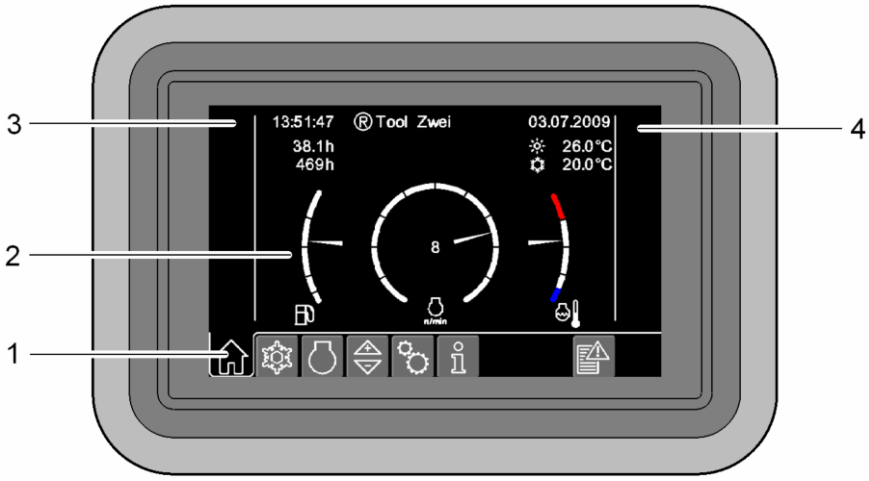
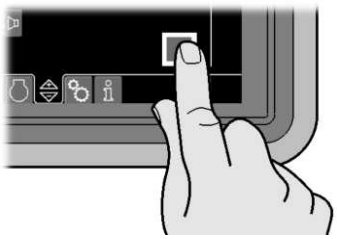


Fig. 72: Indicating unit, main menu

1	Menu bar	**3**	Status symbol display
2	Menu display	**4**	Warning symbol display

The indicating unit is the central source of information about machine operation. It provides information about operating data and functions in the form of texts and symbols. The machine is set, monitored and operated from the touch-sensitive touch screen with graphic user interface.

3.2.15 Touch screen



Symbols with a grey background are functions or menus which can be selected by touching the surface of the screen.

- ▶ Select and enter: touch the symbol.
- ▶ Select menu: touch the menu symbol.

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DANGER
Restricted visibility if the windows are fogged up during recirculating air mode with the cooling function switched off! Only a little fresh air is supplied to the operator's cab in recirculating air mode!
Increased risk of accidents when working with the windows fogged up.

- ▶ Do not use ECON operation (operation without cooling function) during recirculating air mode.
- ▶ Do not switch on recirculating air mode for long periods.

Operation via the menu

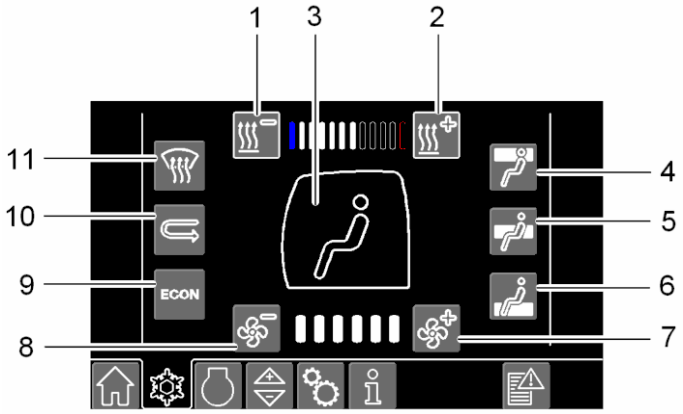

Fig. 154: Air Conditioning menu

1	Temperature–	**7**	Blower performance+
2	Temperature+	**8**	Blower performance-
3	Operating state for vents	**9**	ECON (operation without cooling function)
4	Vent at head height	**10**	Recirculated air
5	Vent at chest height	**11**	Defrost / dehumidify
6	Vent at floor height		

Set temperature

- ▶ Select symbol *Temperature–* or *Temperature+*.

Select blower setting

- ▶ Select symbol *Blower–* or *Blower+*.

Select vent

- ▶ Select symbol *Head height*, *Chest height* or *Floor height*

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Service indication

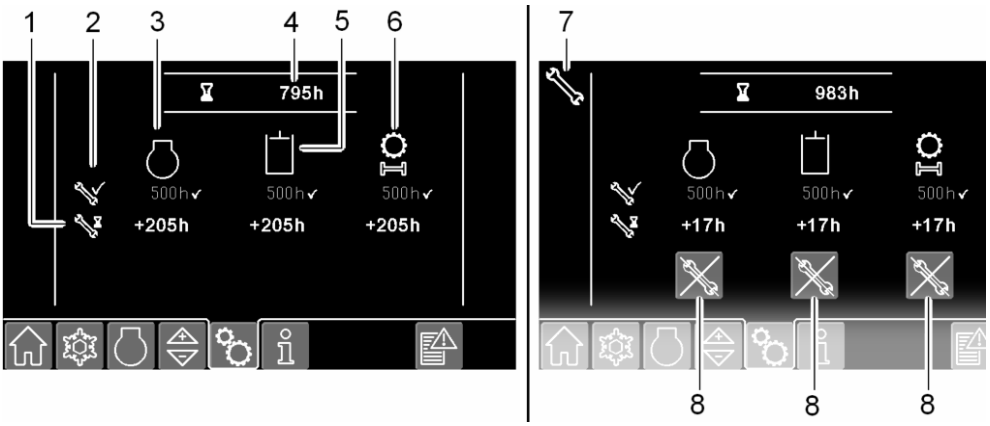

Fig. 192: Service indication menu

1 Time until the next service
2 Time of last service
3 Diesel engine service
4 Hourmeter
5 Hydraulic system service
6 Mechanical system service
7 Message: Service due
8 Confirm message
h Operating hours

The service indication menu states when a service was performed and how much time remains until the next service. The information is based on the hourmeter.

The example (see: fig. 192, page 91) shows the menu from a machine with components (diesel engine, hydraulic system and mechanical system) that have to be serviced every 500 operating hours.

Left figure: the last service was performed at 500 operating hours. 795 operating hours have now elapsed. The next service is due in 205 operating hours.

Right figure: the “Service due” symbol appears 100 operating hours before the next service, as well as the *Confirmation* symbol. 983 operating hours have now elapsed. The next service is due in 17 operating hours.

When the “Service due” symbol appears, you can confirm that you have seen the message.

▶ Confirm message: Select *Confirmation* symbol.
▷ The “Service due” status symbol is no longer displayed.

▶ Have service performed at the appropriate time (contact Liebherr customer service).

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Fuel consumption

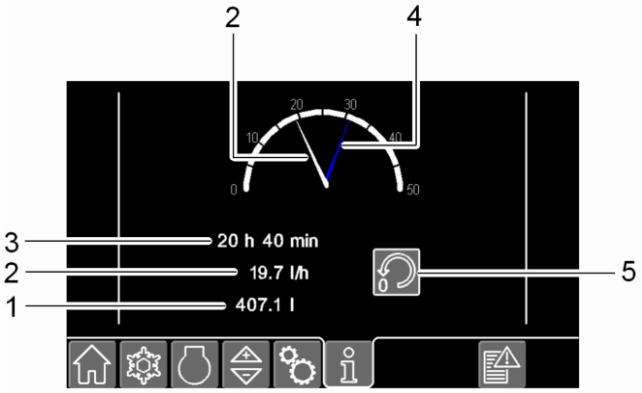

Fig. 218: Fuel consumption menu

1 Consumed fuel[30)]
2 Average consumption[30)]
3 Measurement period
4 Average consumption in the past 60 seconds
5 Reset meter

Key assignment

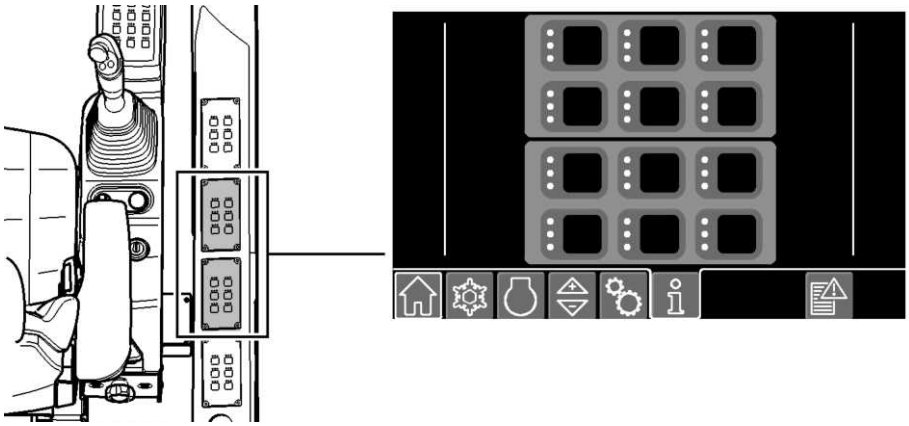

Fig. 219: Key assignment menu

The menu shows the key assignment of two control units depending on the equipment.

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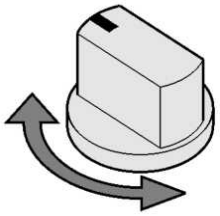
30) since the last meter reset

NOTICE
The LED for the most recently activated operating mode flashes after the engine is started. However, the operating mode is only activated by pressing the *MODE* key again.
After a cold start, activating an operating mode with a high engine speed too soon can result in engine damage.

▶ Before changing to P or P+ operating mode: slowly warm the engine up by running it at medium load and medium rpm.



▶ Press the *MODE* key until the required operating mode is active.
or

Turn the *Engine speed* controller to the right or left.
▷ The controller automatically selects the operating mode matching the speed step, and vice versa.

3.3.7 After starting

DANGER
Risk of suffocation due to exhaust fumes when the engine is run inside buildings.

▶ Do not run the engine in enclosed rooms unless there is adequate ventilation.

▶ Open the doors and windows of the building in order to ensure an adequate fresh-air supply.

WARNING
Low oil temperatures have the effect of the control system operating sluggishly. Risk of accidents if the functional check is not carried out.

▶ Before exposing the machine to full load, bring the engine and hydraulic oil to operating temperature.

▶ Carefully drive the machine onto open ground and check all safety-relevant functions.

Note
The power and service life of the diesel engine will be reduced significantly once a certain altitude is reached, with corresponding ambient temperatures! Under these circumstances, there is an increased risk of overheating in the coolant circuit. To avoid engine damage, the performance is automatically reduced in line with increasing altitude above sea level and ambient temperature.

▶ Under the specified conditions, pay more careful attention to the temperature of the engine and the hydraulic system.

Check during operation:
– Is the oil pressure constant?
– Are performance and rpm constant?
– Is the exhaust colourless?
– Is the coolant temperature stable?
– Are the engine noises normal?

▶ Plan a warm-up phase.

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3.3.16 Turning and moving the tool attachment

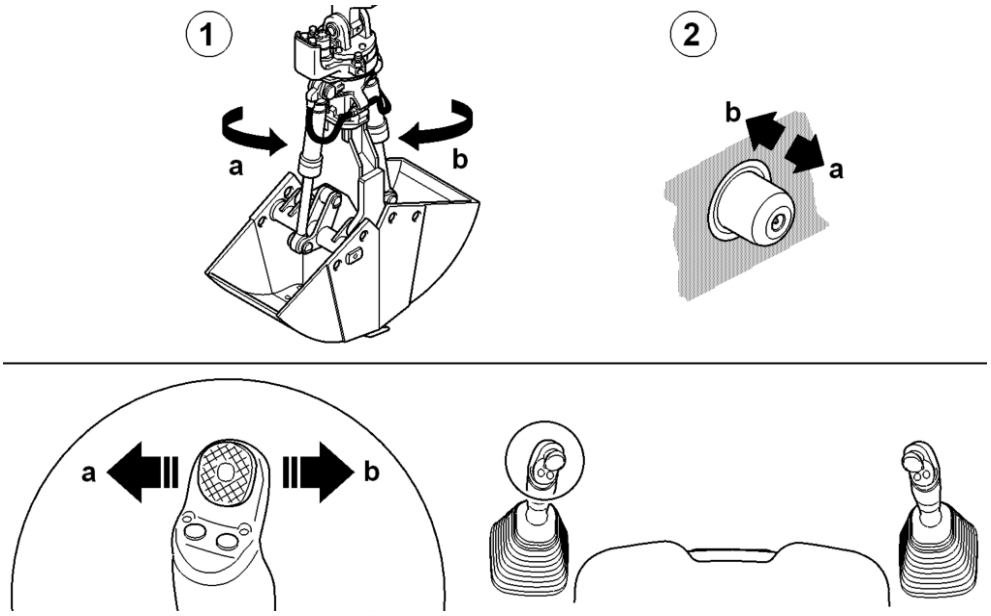

Fig. 250: Mini-joystick on the left joystick

1	Turn function (e.g. turning grapple)	**a**	Left
2	Lock bolts, hydraulic quick change system	**b**	Right

A mini-joystick on the left joystick is used for turning or moving tool attachments. This involves the "turning grapple" function which is used for grapples or other tool attachments.

The further the mini-joystick is moved in one direction, the faster the tool attachment moves.

▶ Press the mini-joystick to the left.
  ▷ The tool attachment turns to the left.
  ▷ The lock bolts move out.

▶ Press the mini-joystick to the right.
  ▷ The tool attachment turns to the right.
  ▷ The lock bolts move in.

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3.6 Transport and assembly

Normally, the machine is only fully assembled at the place of use. The individual working steps are performed in accordance with Liebherr assembly guidelines.

Assembly, disassembly and transport are only allowed to be carried out by trained specialist personnel from Liebherr, or by partners authorised by Liebherr.

Contact the responsible customer service if the machine is to be transported or converted.

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Malfunction / error	Cause	Remedy
Blue exhaust gases	Oil level too high	Correct the oil level
	Engine oil is entering the combustion chamber	Contact Liebherr customer service
	Crankcase ventilation defective	Contact Liebherr customer service
Engine pings	Combustion is incorrect	Contact Liebherr customer service
Engine knocks	Excessive valve lash	Contact Liebherr customer service
	Injection nozzles damaged or contaminated by carbon deposits	Contact Liebherr customer service
	Bearing damage	Contact Liebherr customer service
	Piston rings worn or broken	Contact Liebherr customer service
Engine does not reach full speed	The engine speed is not set to the maximum value	Select a higher speed step or a different operating mode
	Injection system is not set correctly	Contact Liebherr customer service
	Dry air filter clogged	Clean or renew the dry air filter
	Poor fuel supply, water in the fuel	Clean or renew the fuel filter, check the fuel lines, drain water from the fuel tank
Low engine power	Poor fuel supply, water in the fuel	see above
	Defective fuel system	Contact Liebherr customer service
	Charging pressure too low	Look and check for loose clamps, defective seals and hoses; clean or renew the dry air filter
	Injection system defective	Contact Liebherr customer service
	Compression too low	Contact Liebherr customer service
	Control defective	Contact Liebherr customer service
Low engine power, power reduction by engine control unit	Charging air temperature too high	Clean the intercooler, contact Liebherr customer service
	Coolant temperature too high	Check the coolant level; check the radiator for contamination and clean it if necessary; check the fan and thermostat: contact Liebherr customer service
	Fuel temperature too high	Shut down the engine and allow the fuel tank to cool down; check the radiator for contamination and clean it if necessary; contact Liebherr customer service
	Hydraulic oil temperature too high	Reduce the power demand
	Lack of oxygen in the combustion air, low air pressure at high altitude	Improve operating conditions, reduce the power demand

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Customer:.....Machine type:.....Serial no.:.....Service hours:.....Date:.....

Maintenance / inspection after service hours								Tasks to be performed	See page
On handover	All 8-10 h	All 50 h	All 500 h	All 1000 h	All 2000 h	All 3000 h	Other intervals	**By maintenance staff** ■ Once-only activity ● Repeat interval ✦ As necessary ❄ Annually before the winter **with authorised specialist staff** ☐ Once-only activity ❍ Repeat interval ✧ As necessary	
							✧	Checking the maintenance of the entire system, pumps and control (at least once a year)	
Quick change system									
☐	●	●	❍	❍	❍	❍		Checking the function of the visual and audible warning devices	
	●	●	❍	❍	❍	❍		Checking the lock bolt for damage when in extended position	
	●	●	❍	❍	❍	❍		Checking the condition of the hydraulic hoses and the electrical cable	
		●	❍	❍	❍	❍		Lubricating the lock bolt	
					❍			Cleaning the screen filter	
Working attachment and working tools									
	●	●						Checking the stability of the pin connections	201
	●	●						Performing a functional test	201
	●	●						Checking the steel structure for cracks	201
		●						Checking the amount of wear on the teeth	201
		●						Lubricating the bearings of the pins	201
		●						Checking the bearings of the pins for wear.	201
							✦	Renewing the teeth	201
Overall machine									
							❄	Checking the function of the heating system	
							❄	Applying silicone or talcum powder to the sealing rubber profiles on the operator's cab.	
							❄	Applying silicone or talcum powder to the sealing rubber profiles on the maintenance doors.	
☐			❍	❍	❍	❍		Checking the entire machine has been maintained properly and is in good condition	
		●	❍	❍	❍	❍		Lubricating all bearings on the machine (lubricate every day depending on the application of the machine or when working more than one shift in a day)	
							❍250h	Checking parts for cracks	
☐			❍	❍	❍	❍		Checking the mounting of the ballast weight and tank	
☐			❍	❍	❍	❍		Checking line and screw connections are firmly seated	
				❍	❍	❍		Checking the hinges, quick fasteners and gas pressure springs of doors and hoods	
☐								Informing the operating personnel about the designated use of the attachment	
☐								Having the operating personnel lubricate the machine according to the lubricating chart, and pointing out possible operating errors	
☐			❍	❍	❍	❍		Explaining the machine literature to the operating personnel (especially the operating manual and the safety instructions)	

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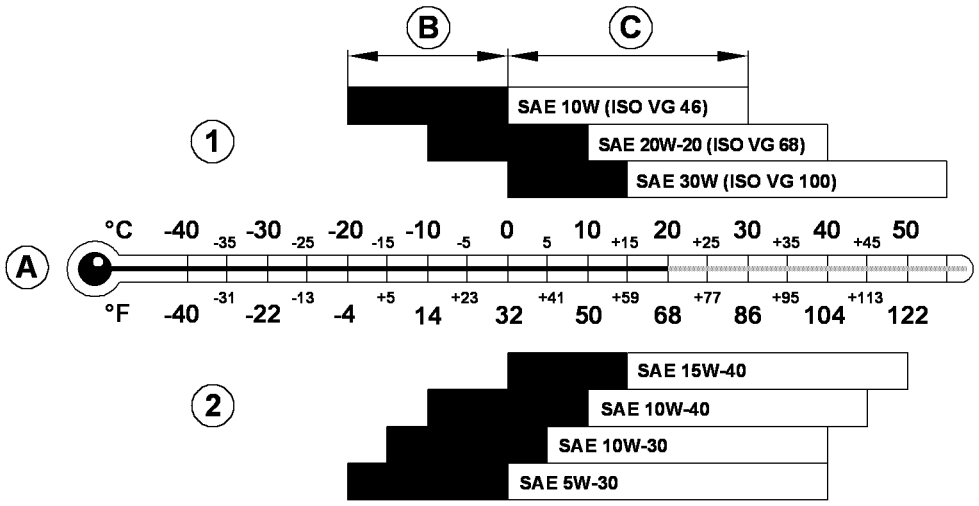

Fig. 330: Engine oils for use as hydraulic oil, selection of viscosity class according to temperature[43)]

A Ambient temperature
B Cold start range with prescribed warm-up phase
C Operating range
1 Single range oils
2 Multi-range oils

Warm-up instruction

The black bar **B** shows ambient temperatures which lie up to 20 °C below the operating range **C**.

If a cold start is performed at ambient temperatures within range **B**, the following warm-up instruction applies for the hydraulic oil:

1. after starting the diesel engine, set it to average engine speed (half of the maximum engine speed at most).
2. Carefully start operating hydraulic system. Actuate hydraulic cylinder and move it to the limit stop briefly.
3. After approx. five minutes start up the travel hydraulic system. Warm-up phase a total of approx. 10 minutes.

If a cold start is performed at even lower ambient temperatures, the following warm-up instruction applies: Pre-heat the hydraulic tank before starting the engine. Then start the warm-up instructions at no. **1**.

Biodegradable motor oils which degrade rapidly and easily

NOTICE
Incorrect mixture of hydraulic oils!
Mixing quickly and easily biodegradable, ester-based hydraulic oils with one another or with mineral oils can result in aggressive reactions. This will cause damage to the hydraulic system.

▶ Do not mix biodegradable motor oils which decompose rapidly from different manufacturers or with mineral oils.

43) With divergent viscosity class: check with customer service

5.5 Cleaning and care

5.5.1 Cleaning the machine

The machine should be cleaned before commencing maintenance or repair work. In particular, connection and fittings should be cleaned of oil, fuel or care products.

The machine must be cleaned particularly thoroughly if it has come into contact with road salt, e.g. when being transported under wintry road conditions. By washing off the salt in good time, it is possible to prevent corrosion damage to a large extent.

Note
High-pressure cleaners (steam cleaners) can damage the paintwork.

- ▶ Do not use high-pressure cleaners during the first two months after commissioning (or after repainting).
- ▶ Observe the operating instructions for the high-pressure cleaner. This applies in particular with regard to the pressure adjustment and the distance from the high-pressure nozzle to the object to be cleaned.

Before cleaning

Before cleaning with water or a high-pressure cleaner, the following activities must be performed in order to avoid water penetration.

- ▶ Switch off the ignition.
- ▶ Lubricate all bearings, pin connections and the slewing ring, using the central lubrication system, if required.
- ▶ Cover or mask off all openings where water penetration must be prevented for reasons of safety and function[49)] .

Cleaning

- ▶ Use lint-free cleaning cloths.
- ▶ Use water to soften the dirt and then rinse it off.
- ▶ Do not use aggressive cleaning agents or flammable liquids.

If a fire warning and extinguishing system is fitted:
- ▶ Make sure that no temperature sensors come into contact with hot cleaning agents during cleaning work in the engine compartment.

After cleaning

- ▶ Remove the covers.
- ▶ Check all fuel, engine oil and hydraulic lines (leaks, loose connections, chafe marks and damage).
- ▶ Rectify any defects that are detected.

49) The following components are at particular risk: electric motors, electrical components, switch cabinets, plug connections, transmitters and air filters.

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5.10 Hydraulic components

5.10.1 Checking the oil level in the hydraulic tank

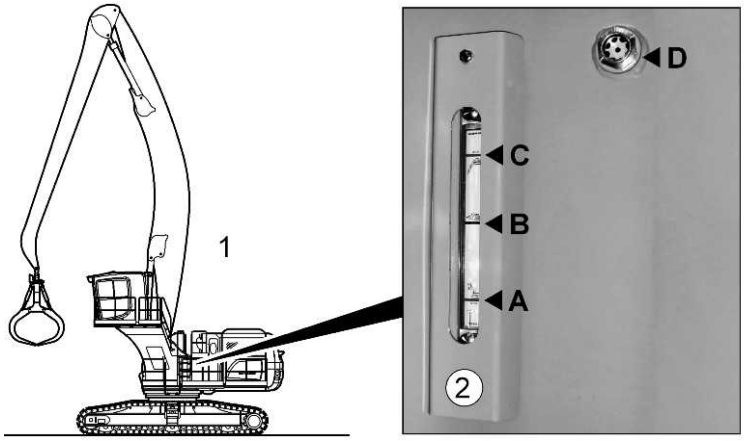

Fig. 361: Machine in inspection position, sight glass on hydraulic tank

1	Machine in inspection position	**B**	Medium oil level (inspection position)
2	Sight glass	**C**	Maximum oil level
A	Minimum oil level	**D**	Oil level sight glass (tank protection)

Before the oil level is checked, the machine must be parked on a horizontal surface and positioned in the **inspection position**: boom at top, stick moved in, cab lift[50)] fully lowered (all hydraulic cylinders are fully retracted).

The sight glass shows the oil level. The fill height depends on the oil temperature and the position of the hydraulic cylinders. The oil level rises with increasing oil temperature and when the hydraulic cylinders are retracted. The oil level falls with declining oil temperature and when the hydraulic cylinders are extended.

Oil level	
A	**Minimum.** The level must not be below this marking when all hydraulic cylinders are fully extended.
B	**Test position.** The level may not be significantly below or above this marking when the machine is at inspection temperature and in the inspection position (hydraulic cylinders fully retracted).
C	**Maximum.** The level may reach and slightly exceed this marking when all hydraulic cylinders are fully retracted at operating temperature.
D	**Tank protection.** The oil level is too high if the level reaches the oil level eye. Exceeding the level can cause the tank to burst.

50) Special equipment

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The hydraulic pumps must be bled one after another in the specified sequence via the leak oil connection on each pump (hose fittings 1 to 9). Start bleeding from the lowest hydraulic pump and finish with the highest one.

▶ Prepare a suitable container for collecting the hydraulic oil.

▶ Open hose fitting 1 (one rotation) and allow the air to escape.

As soon as hydraulic oil emerges free from bubbles:
▶ tighten the hose fitting.

▶ Continue with the next hose fitting.

Further procedure

The fill level in the hydraulic tank drops slightly when the hydraulic pumps are bled. Top up hydraulic oil if necessary.

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