en

Operating manual

Machine for Industrial Applications
R 984 C Litronic High Rise

from serial number 50200

Document identification

	ORIGINAL OPERATING MANUAL
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Product identification

Manufacturer:	LIEBHERR Hydraulikbagger GmbH
Type:	R 984 C Litronic High Rise
Type no.:	1138
Conformity:	CE

Address

Liebherr Hydraulikbagger GmbH
Liebherr-Straße 12
D - 88457 Kirchdorf / Iller

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1.3 Sound emission

The sound values of the machine are specified in the technical data.

The sound power level (Lwa) is determined according to Directive 2000/14/EC. The measurement uncertainty of the sound power level value corresponds to the difference between the guaranteed and the measured value.

The sound pressure level (Lpa) is determined according to ISO 6396. The measurement uncertainty is defined in the above standard.

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Lift Capacities

with Industrial-Type Gooseneck Boom 14,50 m

Industrial Stick 12,50 m (Variant 3D)

m	4,5 m		6,0 m		7,5 m		9,0 m		10,5 m		12,0 m		13,5 m		15,0 m		16,5 m		18,0 m		19,5 m		21,0 m		22,5 m		24,0 m		25,5 m		27,0 m		28,5 m		m
37,5																																	
36,0																																	
34,5																																	
33,0													14,8*	14,8*																			13,2*	13,2*	14,26
31,5															15,0*	15,0*																	12,3*	12,3*	16,30
30,0															15,0*	15,0*	14,3*	14,3*															11,7*	11,7*	17,98
28,5															14,7*	14,7*	14,0*	14,0*	13,4*	13,4*													11,2*	11,2*	19,39
27,0															14,6*	14,6*	13,9*	13,9*	13,3*	13,3*	12,8*	12,8*											10,9*	10,9*	20,60
25,5															14,5*	14,5*	13,8*	13,8*	13,2*	13,2*	12,7*	12,7*	12,2*	12,2*									10,7*	10,7*	21,63
24,0															14,6*	14,6*	13,9*	13,9*	13,2*	13,2*	12,7*	12,7*	12,2*	12,2*	10,6*	10,6*							10,6*	10,6*	22,51
22,5															14,8*	14,8*	14,0*	14,0*	13,3*	13,3*	12,7*	12,7*	12,2*	12,2*	11,7*	11,7*							10,5*	10,5*	23,26
21,0													16,2*	16,2*	15,2*	15,2*	14,3*	14,3*	13,5*	13,5*	12,8*	12,8*	12,3*	12,3*	11,8*	11,8*							10,5*	10,5*	23,89
19,5													16,7*	16,7*	15,6*	15,6*	14,6*	14,6*	13,8*	13,8*	13,0*	13,0*	12,4*	12,4*	11,8*	11,8*	11,4*	11,4*					10,5*	10,5*	24,41
18,0											18,9*	18,9*	17,3*	17,3*	16,1*	16,1*	15,0*	15,0*	14,0*	14,0*	13,2*	13,2*	12,6*	12,6*	12,0*	12,0*	11,4*	11,4*					10,6*	10,6*	24,83
16,5									22,1*	22,1*	19,9*	19,9*	18,1*	18,1*	16,6*	16,6*	15,4*	15,4*	14,4*	14,4*	13,5*	13,5*	12,8*	12,8*	12,1*	12,1*	11,5*	11,5*					10,8*	10,8*	25,15
15,0					31,8*	31,8*	27,0*	27,0*	23,6*	23,6*	21,0*	21,0*	18,9*	18,9*	17,2*	17,2*	15,9*	15,9*	14,8*	14,8*	13,8*	13,8*	13,0*	13,0*	12,3*	12,3*	11,6*	11,6*							10,9*	10,9*	25,37
13,5	61,1*	61,1*	44,5*	44,5*	35,2*	35,2*	29,3*	29,3*	25,1*	25,1*	22,1*	22,1*	19,8*	19,8*	17,9*	17,9*	16,4*	16,4*	15,1*	15,1*	14,1*	14,1*	13,2*	13,2*	12,4*	12,4*	11,8*	11,8*	11,1*	11,1*			11,1*	11,1*	25,51
12,0	16,8*	16,8*	50,0*	50,0*	38,5*	38,5*	31,5*	31,5*	26,7*	26,7*	23,2*	23,2*	20,6*	20,6*	18,5*	18,5*	16,9*	16,9*	15,5*	15,5*	14,4*	14,4*	13,4*	13,4*	12,6*	12,6*	11,9*	11,9*	11,2*	11,2*			11,2*	11,2*	25,55
10,5	9,3*	9,3*	20,7*	20,7*	41,4*	41,4*	33,4*	33,4*	28,1*	28,1*	24,3*	24,3*	21,4*	21,4*	19,2*	19,2*	17,4*	17,4*	15,9*	15,9*	14,7*	14,7*	13,7*	13,7*	12,8*	12,8*	12,0*	12,0*	11,2*	11,2*			11,2*	11,2*	25,51
9,0	8,5*	8,5*	15,3*	15,3*	27,7*	27,7*	35,0*	35,0*	29,3*	29,3*	25,2*	25,2*	22,1*	22,1*	19,7*	19,7*	17,8*	17,8*	16,3*	16,3*	15,0*	15,0*	13,9*	13,9*	12,9*	12,9*	12,0*	12,0*					11,3*	11,3*	25,37
7,5	9,2*	9,2*	14,0*	14,0*	22,2*	22,2*	36,2*	36,2*	30,3*	30,3*	26,0*	26,0*	22,7*	22,7*	20,2*	20,2*	18,2*	18,2*	16,6*	16,6*	15,2*	15,2*	14,0*	14,0*	13,0*	13,0*	12,0*	12,0*					11,3*	11,3*	25,14
6,0	10,3*	10,3*	14,1*	14,1*	20,4*	20,4*	31,0*	31,0*	30,9*	30,9*	26,5*	26,5*	23,2*	23,2*	20,6*	20,6*	18,5*	18,5*	16,8*	16,8*	15,3*	15,3*	14,1*	14,1*	13,0*	13,0*	12,0*	12,0*					11,4*	11,4*	24,82
4,5	11,5*	11,5*	14,8*	14,8*	19,9*	19,9*	28,3*	28,3*	31,2*	31,2*	26,8*	26,8*	23,4*	23,4*	20,8*	20,8*	18,7*	18,7*	16,9*	16,9*	15,4*	15,4*	14,1*	14,1*	12,9*	12,9*	11,8*	11,8*					11,5*	11,5*	24,40
3,0			15,7*	15,7*	20,2*	20,2*	27,3*	27,3*	31,2*	31,2*	26,9*	26,9*	23,5*	23,5*	20,9*	20,9*	18,7*	18,7*	16,9*	16,9*	15,3*	15,3*	14,0*	14,0*	12,7*	12,7*							11,6*	11,6*	23,88
1,5			16,7*	16,7*	20,8*	20,8*	27,1*	27,1*	30,8*	30,8*	26,6*	26,6*	23,3*	23,3*	20,7*	20,7*	18,5*	18,5*	16,7*	16,7*	15,1*	15,1*	13,7*	13,7*	12,3*	12,3*							11,6*	11,6*	23,25
0					21,5*	21,5*	27,5*	27,5*	30,0*	30,0*	26,0*	26,0*	22,9*	22,9*	20,3*	20,3*	18,2*	18,2*	16,3*	16,3*	14,7*	14,7*	13,2*	13,2*									12,0*	12,0*	22,12
-1,5									28,7*	28,7*	25,1*	25,1*	22,1*	22,1*	19,6*	19,6*	17,5*	17,5*	15,7*	15,7*													14,1*	14,1*	19,39
-3,0																																	
-4,5																																	
-6,0																																	
-7,5																																	

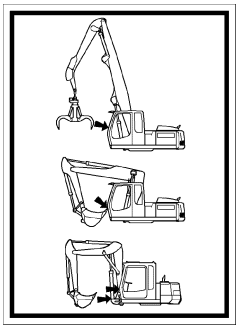
Industrial Stick 12,50 m (Variant 3C)

m	4,5 m		6,0 m		7,5 m		9,0 m		10,5 m		12,0 m		13,5 m		15,0 m		16,5 m		18,0 m		19,5 m		21,0 m		22,5 m		24,0 m		25,5 m		27,0 m		28,5 m		m
37,5																																	
36,0																																	
34,5																																	
33,0																																	
31,5																																	
30,0																																	11,7*	11,7*	17,98
28,5																			11,7*	11,7*													11,2*	11,2*	19,39
27,0																					11,3*	11,3*											10,9*	10,9*	20,60
25,5																					11,2*	11,2*	10,9*	10,9*									10,7*	10,7*	21,63
24,0																					11,1*	11,1*	10,9*	10,9*	10,6*	10,6*							10,6*	10,6*	22,51
22,5																			11,6*	11,6*	11,2*	11,2*	10,9*	10,9*	10,7*	10,7*							10,5*	10,5*	23,26
21,0																			11,8*	11,8*	11,4*	11,4*	11,0*	11,0*	10,7*	10,7*							10,5*	10,5*	23,89
19,5																			12,1*	12,1*	11,6*	11,6*	11,1*	11,1*	10,8*	10,8*	10,5*	10,5*					10,5*	10,5*	24,41
18,0																	13,1*	13,1*	12,4*	12,4*	11,9*	11,9*	11,4*	11,4*	10,9*	10,9*	10,6*	10,6*					10,5*	10,5*	24,83
16,5															14,6*	14,6*	13,6*	13,6*	12,8*	12,8*	12,2*	12,2*	11,6*	11,6*	11,1*	11,1*	10,7*	10,7*					10,5*	10,5*	25,15
15,0													16,6*	16,6*	15,3*	15,3*	14,2*	14,2*	13,3*	13,3*	12,5*	12,5*	11,9*	11,9*	11,3*	11,3*	10,9*	10,9*					10,5*	10,5*	25,37
13,5									22,2*	22,2*	19,6*	19,6*	17,6*	17,6*	16,1*	16,1*	14,8*	14,8*	13,8*	13,8*	12,9*	12,9*	12,2*	12,2*	11,6*	11,6*	11,1*	11,1*	10,6*	10,6*			10,6*	10,6*	25,51
12,0	16,8*	16,8*	45,0*	45,0*	34,6*	34,6*	28,3*	28,3*	24,0*	24,0*	20,9*	20,9*	18,6*	18,6*	16,8*	16,8*	15,4*	15,4*	14,3*	14,3*	13,3*	13,3*	12,5*	12,5*	11,8*	11,8*	11,2*	11,2*	10,8*	10,8*			10,7*	10,7*	25,55
10,5	9,3*	9,3*	20,7*	20,7*	38,0*	38,0*	30,6*	30,6*	25,7*	25,7*	22,2*	22,2*	19,6*	19,6*	17,6*	17,6*	16,0*	16,0*	14,7*	14,7*	13,7*	13,7*	12,8*	12,8*	12,1*	12,1*	11,4*	11,4*	10,9*	10,9*			10,9*	10,9*	25,51
9,0	8,5*	8,5*	15,3*	15,3*	27,7*	27,7*	32,7*	32,7*	27,2*	27,2*	23,4*	23,4*	20,5*	20,5*	18,3*	18,3*	16,6*	16,6*	15,2*	15,2*	14,1*	14,1*	13,1*	13,1*	12,3*	12,3*	11,6*	11,6*					11,0*	11,0*	25,37
7,5	9,2*	9,2*	14,0*	14,0*	22,2*	22,2*	34,3*	34,3*	28,5*	28,5*	24,4*	24,4*	21,4*	21,4*	19,0*	19,0*	17,2*	17,2*	15,7*	15,7*	14,4*	14,4*	13,4*	13,4*	12,5*	12,5*	11,7*	11,7*					11,2*	11,2*	25,14
6,0	10,3*	10,3*	14,1*	14,1*	20,4*	20,4*	31,0*	31,0*	29,5*	29,5*	25,3*	25,3*	22,1*	22,1*	19,6*	19,6*	17,6*	17,6*	16,0*	16,0*	14,7*	14,7*	13,6*	13,6*	12,7*	12,7*	11,8*	11,8*					11,4*	11,4*	24,82
4,5	11,5*	11,5*	14,8*	14,8*	19,9*	19,9*	28,3*	28,3*	30,3*	30,3*	25,9*	25,9*	22,6*	22,6*	20,1*	20,1*	18,0*	18,0*	16,4*	16,4*	15,0*	15,0*	13,8*	13,8*	12,8*	12,8*	11,8*	11,8*					11,6*	11,6*	24,40
3,0	12,8*	12,8*	15,7*	15,7*	20,2*	20,2*	27,3*	27,3*	30,7*	30,7*	26,3*	26,3*	23,0*	23,0*	20,4*	20,4*	18,3*	18,3*	16,6*	16,6*	15,1*	15,1*	13,9*	13,9*	12,8*	12,8*							11,8*	11,8*	23,88
1,5	13,9*	13,9*	16,7*	16,7*	20,8*	20,8*	27,1*	27,1*	30,8*	30,8*	26,5*	26,5*	23,2*	23,2*	20,5*	20,5*	18,4*	18,4*	16,6*	16,6*	15,1*	15,1*	13,8*	13,8*	12,6*	12,6*							12,0*	12,0*	23,25
0	15,1*	15,1*	17,7*	17,7*	21,5*	21,5*	27,5*	27,5*	30,5*	30,5*	26,4*	26,4*	23,1*	23,1*	20,5*	20,5*	18,3*	18,3*	16,5*	16,5*	15,0*	15,0*	13,6*	13,6*									12,3*	12,3*	22,50
-1,5			18,7*	18,7*	22,5*	22,5*	28,3*	28,3*	29,9*	29,9*	25,9*	25,9*	22,7*	22,7*	20,2*	20,2*	18,0*	18,0*	16,2*	16,2*	14,6*	14,6*	13,1*	13,1*									12,5*	12,5*	21,61
-3,0					23,5*	23,5*	29,4*	29,4*	28,8*	28,8*	25,0*	25,0*	22,0*	22,0*	19,6*	19,6*	17,4*	17,4*	15,6*	15,6*	13,9*	13,9*											12,6*	12,6*	20,58
-4,5											23,7*	23,7*	20,9*	20,9*	18,5*	18,5*	16,4*	16,4*															15,0*	15,0*	17,58
-6,0																																	
-7,5																																	

Height | Can be slewed through 360° | In longitudinal position of undercarriage | Max. reach | * Limited by hydr. capacity

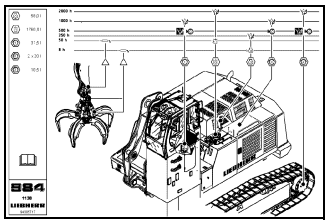
The lift capacities are stated in metric tonnes (t) on the lifting gear's stick tip, and can be lifted 360° on firm, level supporting surface. Capacities are valid for 750 mm wide flat track pads. Indicated loads are based on ISO 10567 standard and do not exceed 75 % of tipping or 87 % of hydraulic capacity (indicated via *). Lifting capacity of the excavator is limited by machine stability, hydraulic capacity and maximum permissible load of the load hook.

According to European Standard, EN 474-5: In the European Union excavators have to be equipped with an overload warning device, a load diagram and automatic check valves on the hoist cylinders, when they are used for lifting operations which require the use of lifting accessories.



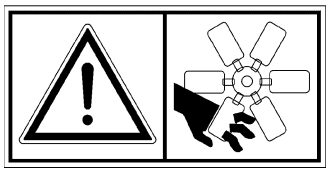
4: Accident prevention, attachment

The working attachment can reach the operator's cab! Proceed with extreme caution when retracting the attachment.



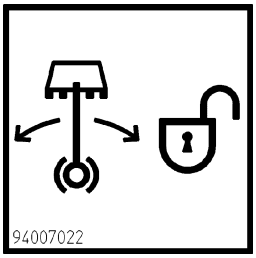
5: Lubricating chart

Provides information on work to be carried out in connection with lubricants and specifies the test, lubrication and change intervals.



6: Engine shut-down

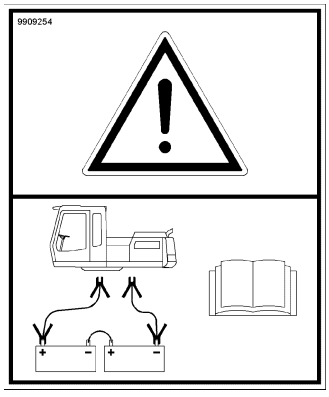
Before opening the bonnet, shut down the engine.



7: Slewing gear release

Indicates the "Slewing gear release" button at the access ladder. By pressing this button, the machine operator confirms that no persons other than himself/herself are located on the machine.

After pressing a second button in the operator's cab, the slewing gear is released and the uppercarriage can be swivelled.



8: Jump-starting

When jump-starting the machine, strictly adhere to the instructions in the operating manual.

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3.1.3.1 Section A: monitoring of diesel engine

P2 –Display: diesel engine coolant temperature

Display must be in green range during operation.

In the event of overheating, the red LEDs **P2.1** at the edge of the **P2** display flashes.

The buzzer is on in the operator's cab.

- ▶ Be sure to interrupt work as soon as possible.
- ▶ Let the engine run on at high idle speed.
- ❑ The alarm message remains displayed for more than 60 seconds.
- ▶ Immediately switch the engine to low idle gear.
- ▶ Let the engine run at low idle speed for 3 to 5 minutes.
- ▶ Switch off the engine.
- ▶ Find and eliminate cause.

P3– Display: fuel reserve

The lit LEDs indicate the current fuel is left in the tank.

When the red LEDs **P3.1** are on, there are only 100 litres of fuel in the tank (reserve).

H2 – Indicator light: low engine oil pressure

The indicator light is on, if the engine oil pressure drops below the preset value.

The buzzer is on in the operator's cab.

When this indicator light is lit, error code E 501 is logged.

- ▶ Immediately switch the engine to low idle speed.
- ▶ Switch off the engine.

H12 – Indicator light: battery

The indicator light is on as soon as the ignition key is in contact position.

The indicator light is off when the engine is started.

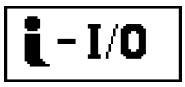
During engine operation, the indicator light is on, if the V-ribbed belt or the electrical charging system is defective.

- ▶ Immediately switch the engine to low idle speed.
- ▶ Let the engine run at low idle speed for about 5 seconds.
- ▶ Switch off the engine.
- ▶ Find and eliminate cause.

H19 – no function assigned

H20 – no function assigned

H23 – no function assigned



Menu: Status of hydraulic pumps and electrical inputs/outputs

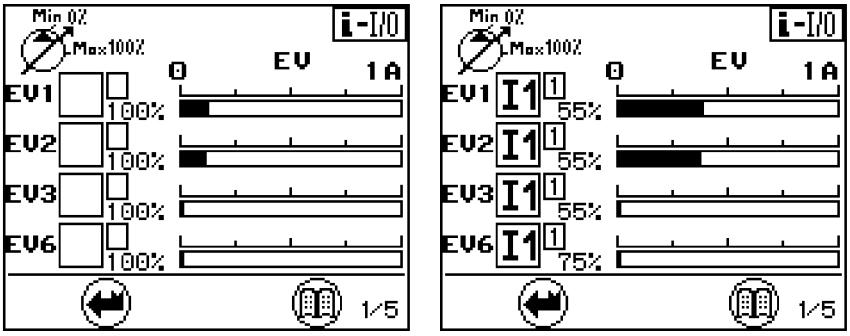


Fig. 3-16 *Pressure and flow limitation currents menu*

▶ Repeatedly press the **Menu** button until the desired page is displayed.

Page 1 shows the pressure and flow reduction values of the hydraulic system. If there are not limitations, all values are set to 100 % (figure to the left).

If the machine is operated with pressure and flow limitation, the currently applied settings are displayed (figure to the right). Examples of application: operation of working tools with Tool Control (optional equipment) or other internal hydraulic settings aimed at optimising operating statuses.

In the example shown here, the values of one working tool are shown, which are saved with the name "Option 1" (for the adjustment of the working tool settings, see Tool Control menu).

For the consumer used here, the oil flow rate (EV1, EV2, EV3) is reduced to 55 %, while the pressure (EV6) is reduced to 75 %.

If several reductions are activated simultaneously, the smallest value is relevant.

When a consumer with a set flow reduction is activated, the ® symbol is displayed on the main screen (if enabled).

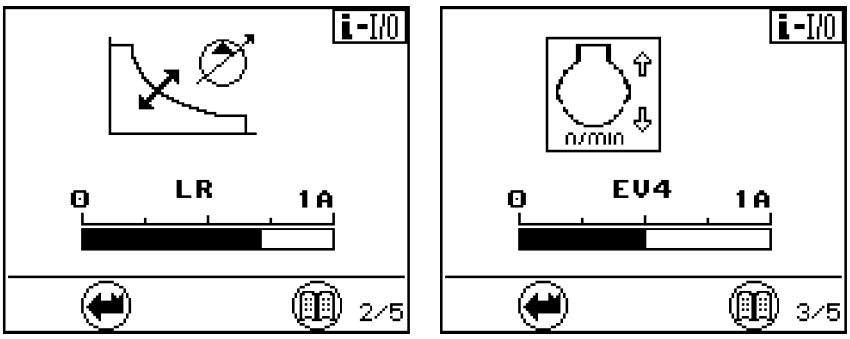


Fig. 3-17 *Power control, speed control currents menu*

Page 2 shows the current of the power control solenoid.

Page 3 shows the current of the speed control of the diesel engine.

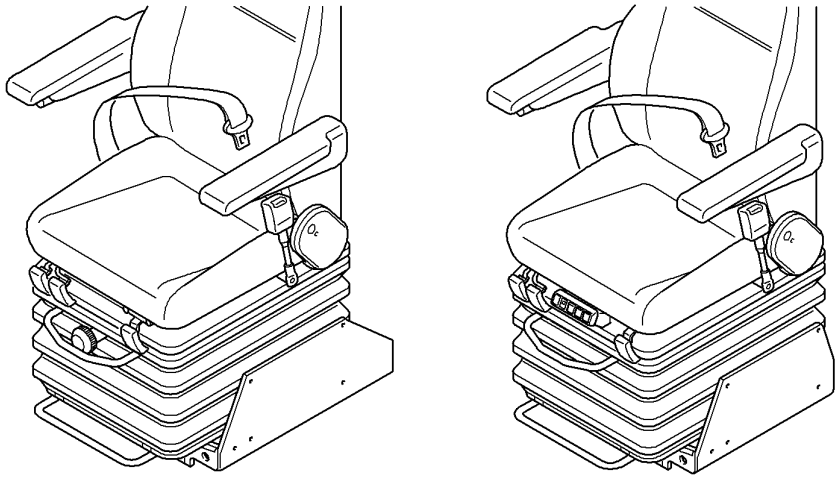


Fig. 3-29 Standard operator seat (left) and seat with air suspension (right, optional equipment)

3.2.3.1 Adjusting armrest

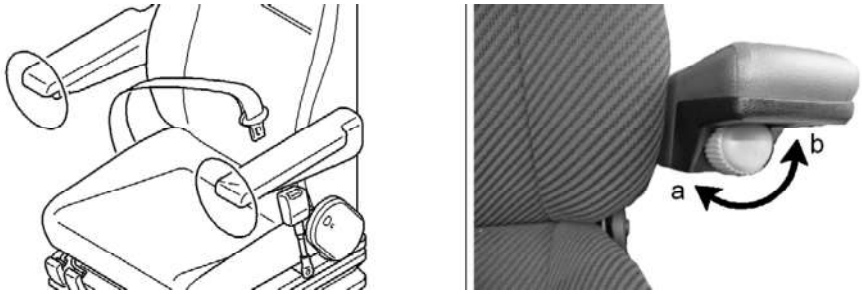


Fig. 3-30 Adjusting armrest

- ▶ Turn knurled screw in direction **a**.
  - ↳ The angle of the armrest is adjusted upwards.
- ▶ Turn knurled screw in direction **b**.
  - ↳ The angle of the armrest is adjusted downwards.

3.2.3.2 Adjusting seat and backrest

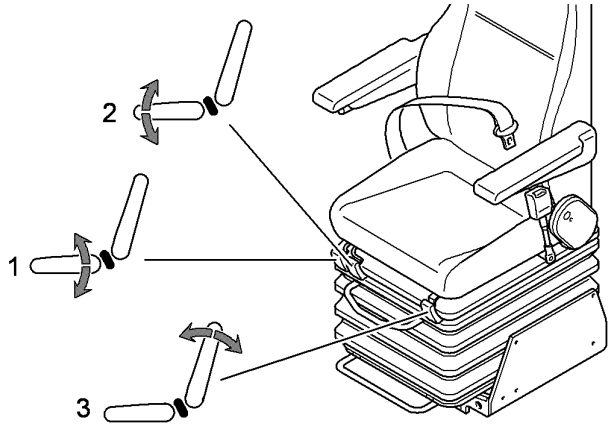


Fig. 3-31 Adjusting seat and backrest

Note!
To avoid the starter and battery from overloading, only switch on the air-conditioning system after starting the diesel engine.

▶ If the machine is to be used for a lengthy period of time without switching on the air conditioning system, operate the compressor every 2 weeks by pressing REHEAT key **6**.

Switch on the control unit:

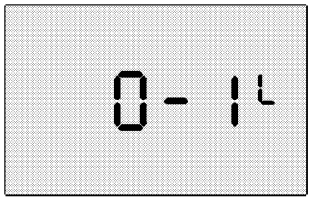


Fig. 3-43 *Control unit self-test*

▶ Switch on the system by pressing key **4**.
  ⇩ The software version will be displayed for approximately 12 seconds while the control unit performs its self-test.

The heating and air conditioning in the cab are in operation. Heating performance and fan speed are automatically controlled when the **AUTO (20)** symbol is displayed.

Adjusting the cab temperature:

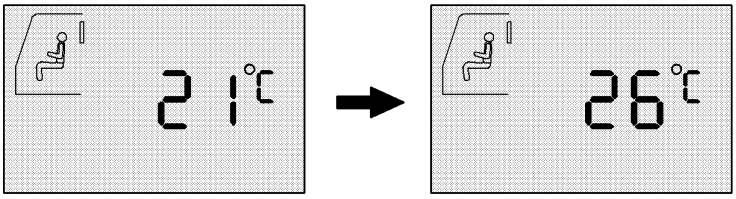


Fig. 3-44 *Example: increase the temperature*

The desired cab temperature is displayed on-screen.

▶ Press key **2** to increase the temperature.

▶ Press key **3** to reduce the temperature.

Example: Press key **2** five times to increase the cab temperature by 5 °C.

The set temperature value will remain stored until the next change is made.

To start cooling, switch on a/c operation (key **1**).

3.3.3.4 Switching on the electrical system

Switching on the main battery switch:

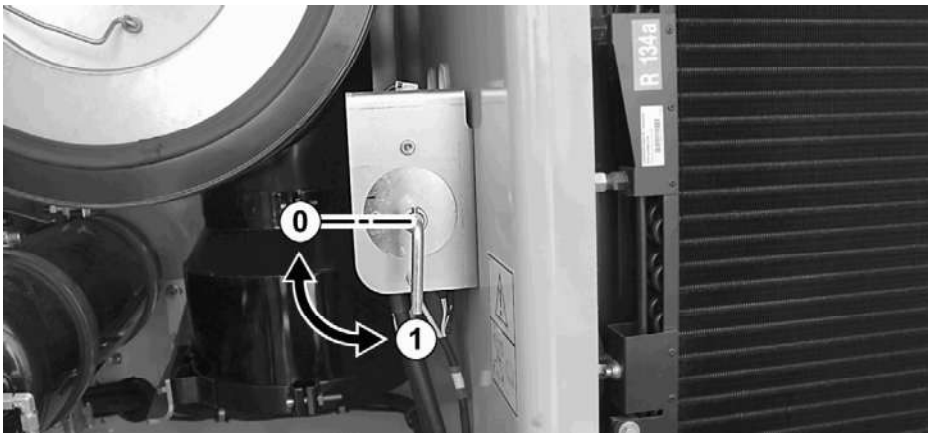


Fig. 3-54 *Battery main switch*

▶ Turn battery main switch to position **1** (ON).

Switching on the ignition:

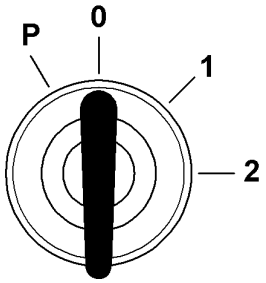


Fig. 3-55 *Ignition*

0	Neutral position	**1**	Contact position
2	Ignition position	**P**	Parking position

❑ Turn battery main switch to position **1** (ON).

▶ Turn the ignition key to contact position **1**.
- The ignition is switched on.
- As soon as the system is switched on, it completes a **self-test** of the control panel keyboard and the indicating instruments: All indicator lights, with the exception of the two LEDs of the switch **S22** are briefly on.
- The LIEBHERR logo is shown on the monitoring display.

▶ During the **self-test**, observe the indicating instruments.

Note!
If the system fails to complete a self-test of the control panel keyboard and the indicating instruments, check whether the battery main switch is in the "ON" position.

3.3.9 Travel alarm system (optional equipment)

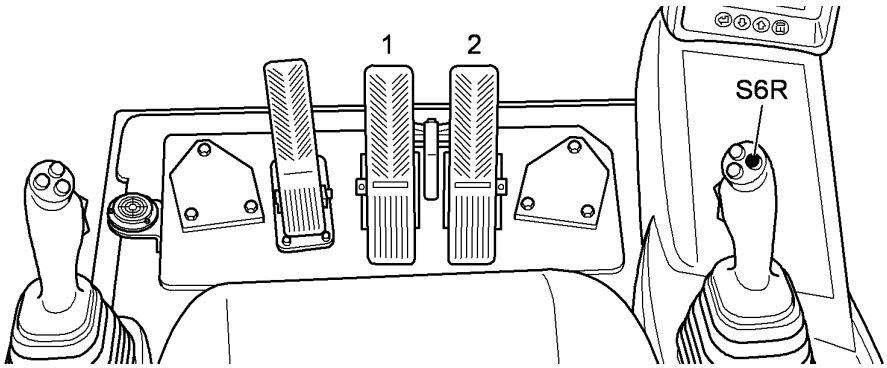


Fig. 3-63 *Travel alarm system*

▶ Actuate the travel pedal **1** or **2**.
  ↳ The travel alarm system is automatically switched on.
  ↳ An acoustic signal (warning signal) is generated.

Deactivating the travel alarm system:

▶ Press the button **S6R** at the right joystick.
  ↳ The travel alarm system is switched off.

Note!
The travel alarm system can be switched off earliest 10 seconds after travel start. If a travel pedal is actuated again, the travel alarm system is reactivated.

3.4 Working with the machine

3.4.1 Safety Instructions

3.4.1.1 Working with the machine

– Before starting to work, familiarize yourself with the specific conditions of the job site and any local regulations. These include: the obstacles in the working or movement area, the load carrying capacity of the ground and required safeguards for the job site to protect machines and personnel from public highway traffic.
– Always keep an adequate safety distance to overhangs, edges, embankments and an unsecured substrate.
– Be particularly cautious in conditions of reduced visibility and changing ground conditions.
– Always locate any underground utilities before you dig. Observe the required clearance distances to any underground utilities.
– Familiarize yourself with the location of power lines and use caution when working near them. Observe the required clearance distances to any power lines.
– In the case of contact with a power line:
  • do not move the machine or its attachment,
  • do not leave the operator's platform,
  • warn people in the vicinity not to approach or touch the machine,
  • have the power turned off.

Note
The working attachment can be lowered thanks to the pressure reserve in the control oil unit. This reserve is however limited and allows only for a limited number of operations of the pilot control units.

▶ Therefore only use the joysticks to lower the working attachment and do not attempt to perform other movements.

3.4.8 Mechanical stick cylinder shut-off

3.4.8.1 Operating principle

When the boom is moved, it can reach great heights and outreaches. The stick with attached load might collide with the operator's cab or impact on other objects.

There is even a risk of collision with the operator's cab or the object, which would likely result in injury to the operator, and damage to equipment or the attached load.

In order to assist the machine operator, the range of movement of the stick can be limited by the stick cylinder shut-off function.

If this option is activated, the stick can only be moved within the preset angle range. The reach of the attachment thus depends on the stick cylinder shut-off point and the angle of the boom.

The stick cylinder shut-off function has two shut-off points:

– Inner shut-off point **MIN** - stops the retracting movement of the stick
– Outer shut-off point **MAX** (optional equipment) - stops the extending movement of the stick

3.4.8.2 Use of stick cylinder shut-off

The stick cylinder shut-off function remains permanently on and cannot be switched off during machine operation. If the stick is to be moved beyond a shut-off point, the stick cylinder shut-off function can be overridden.

Danger!
The stick cylinder shut-off is **not** a safety device in the narrow sense of the word and serves only as a utility for the machine operator!

▶ Please note that the machine operator is responsible for the adjustment of the relevant settings!

▶ Press and hold the left button **L**.
  ↳ The buzzer is off.
  ↳ The lock pins are extended.
  ↳ The "quick-change adapter" icon on the screen disappears.
  ↳ The quick-change adapter is locked.

Quick-change adapter icon

This symbol, together with a buzzer warning sound, indicates that the quick-coupling system is not properly locked.

3.5.3.5 Attaching working tool

❑ The working tool must be securely positioned on the ground or secured in a frame.

❑ The working tool must be in such a position that the openings of the half shells face upwards or away from the machine.

▶ Switch off the magnet system (if installed).

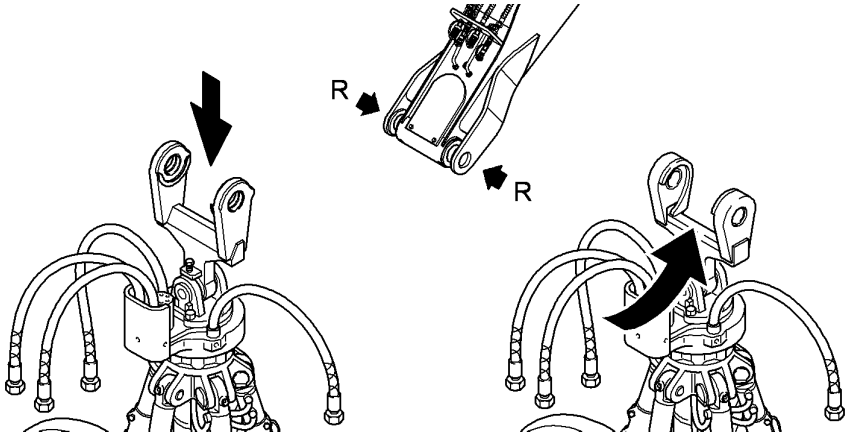


Fig. 3-81 *Releasing and attaching working tool*

▶ Release the quick-change adapter.

▶ Release all buttons.

▶ Move the industrial stick in such a way that the front side is inserted between the half shells of the suspension tackle.
  ↳ If positioned correctly, the lock bolts are aligned with the bores of the grapple suspension.

Caution!
Risk of injury during work.

- ▶ Always wear safety footwear. If required by the nature of the work to be carried out, wear hard hat and protective goggles.
- ▶ Always wear the safety belt.
- ▶ Before starting work, operate the horn to warn other workers.

- ▶ Position the transport vehicle and the machine in such a way that the machine operator can properly supervise the transfer of the load.
- ▶ If possible, position the machine at a higher point than the transport vehicle, in order to avoid unnecessary lifting of the load.
- ▶ Lock the oscillating axle.
- ▶ Extend the supports until the wheels are fully lifted from the ground.

3.6.3 Working with grapples

Danger!
Risk to life and limb or damage to the machine by swinging grapple:

- The grapple can collide with and damage the operator's cab and injure the operator.
- The grapple can also injure other persons.
- A swinging grapple can also affect the stability of the machine.

- ▶ Prevent the grapple from swinging near the operator's cab.
- ▶ Ensure that the stick is in a position where the grapple cannot collide with the machine when the excavator travels or when the brakes are applied.
- ▶ Move the joystick slowly and smoothly to prevent swinging of the grapple.
- ▶ Ensure that the moving grapple cannot collide with persons.
- ▶ Do not lift heavy loads with a fully extended boom and stick. Do not move loads to the far right or left.
- ▶ Observe the load lift chart showing the permissible lift loads that can be attached to the end of the stick, depending on its actual extension.

3.6.4 Loading operation

Danger!
Even when properly levelled, the machine can rock and tip over! Sinking of an outrigger below ground level would have devastating consequences!

- ▶ Therefore always check whether the ground it is firm.
- ▶ Carry out all movements with increased caution.
- ▶ Do not travel with suspended loads. Before setting the machine into motion for travel, lower the load to the ground (empty the grapple).
- ▶ Observe the load lift chart: showing the permissible lift loads that can be attached to the end of the stick, depending on its actual extension.

Special equipment: If the engine protection shut-down function has been activated, the diesel engine is automatically shut down to prevent damage.

The engine monitoring system reduces the power or speed in the event of

- high fuel temperature
- high crankcase pressure
- low engine oil pressure (1st stage)
- low coolant pressure (1st stage)
- high coolant temperature (1st stage)
- high air temperature in suction section of diesel engine (1st stage)

The motor monitoring system automatically shuts down the diesel engine in the event of

- insufficient engine oil pressure (2nd stage)
- insufficient coolant pressure (2nd stage)
- coolant overtemperature (2nd stage)
- excessive air temperature in suction section of diesel engine (2nd stage)

4.2.2 Eliminating fault

▶ In the event of a fault, shut down the diesel engine.

▶ Contact the relevant customer service department of LIEBHERR or of the engine manufacturer (Cummins).

4.2.3 Viewing error codes

The customer service department has detailed error code lists that allow for the accurate system diagnosis of the diesel engine.

Logged error codes are indicated in the form of flashing sequences of the indicator lights when the **PROTECTION** switch is pressed. To proceed to the next error code, actuate the **DIAGNOSTIC** rotary switch.

▶ Switch off the ignition and switch it on again.

▶ Press the **PROTECTION** switch.
  - If no error codes are logged, all indicator lights flash once.
  - If there are error codes, the **WARNING** indicator light flashes once, and the **STOP** indicator switch subsequently flashes repeatedly, indicating the individual digits of the error code. After each digit sequence, the **WARNING** indicator light flashes once.

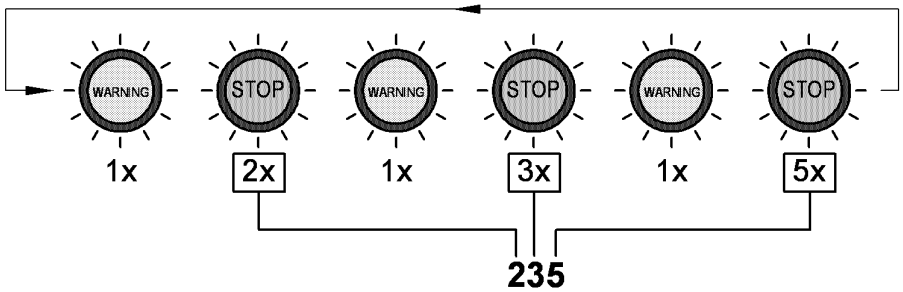


Fig. 4-2 *Example: Flashing sequence for error code 235*

The control oil unit can be accessed from the engine compartment.

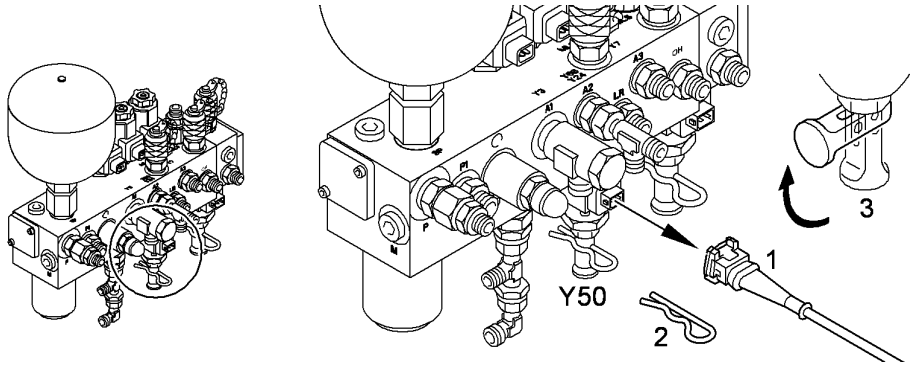


Fig. 4-8 *Control oil unit, emergency operation of hydraulic pump*

- ▶ Switch off the diesel engine.
- ▶ Disconnect the plug connector **1 (Y50)**.
- ▶ Remove the cotter pin **2**.
- ▶ Move the lever **3** into a horizontal position (emergency position).
  ↳ The hydraulic pump is switched to emergency operation.
- ▶ Start the diesel engine.

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1 Refuelling system control device **2** Clutch drain hose
3 Compressed air connection

The service unit s located to the side of the tower superstructure and is accessible from the platform. Several connections are combined:

– **1. Refuelling system control device**: fuel connection, control unit and electrical connection (see chapter "Refuelling system").
– **2. Drain hose connection:** In the following chapters, a drain hose is referred to, used for the draining of lubricants and other media. We recommend connecting one end of the drain hose to the respective unit and the other to this coupling point.
The line ends in the undercarriage where you should place a collecting vessel of suitable dimensions to collect the drained off substances.
– **3. Compressed air connection:** An external compressed air compressor can be connected at the undercarriage. This line connects the platform to the compressor.

5.2.5 Electric slewing crane (special equipment)

5.2.5.1 Operating instructions

The slewing crane is designed for the movement of loads during repair and maintenance work on the machine. Any other use, for example the pulling of loads, is deemed improper.

Proper use includes compliance with the instructions in the operating manual and the inspection and maintenance schedules.

5.2.5.2 Commissioning, testing

Before commissioning the slewing crane, the operator must have it approved for use according to the applicable statutory regulations. In certain countries, these regulations might require that the crane be inspected and tested at specific intervals, and these regulations must be complied with.

The enclosed crane test log must be properly completed to document the inspections and tests that have been carried out.

5.2.5.3 Power source

The power source of the crane (mains power, generator on the platform) must meet the following requirements:

– Fault current/insulation monitored
– Earthing conductor installed (for generator: earth connection through vehicle frame)
– For connection ratings, see operating manual of crane manufacturer.

5.6.2 Engine oils

Liebherr recommendation

Description
Liebherr Motoroil 5W- 30
Liebherr Motoroil 10W-40
Liebherr Motoroil 10W-40 low ash[2)]

Tab. 5-3 *Liebherr recommendation*

[1)] The sulphur content of the fuel determines the change interval in dependence on the quality of the engine oil.

[2)] For machines with diesel particulate filters, use low ash engine oil (LH-00-ENG3A LA).

Minimum quality requirement

Specification
LH-00-ENG3A
LH-00-ENG3A LA

Tab. 5-4 *Minimum quality requirement*

If engine oils from other manufacturers are used, information on the change intervals must be obtained from the respective manufacturer or supplier.

5.6.2.1 Adverse factor

Adverse factors affect the change interval of the engine oil.

Adapt change interval of the engine oil.

Adverse factors are:

- Frequent cold starts
- Sulphur content of fuel
- Environmental factors
  - Operating temperature
  - Dust
  - High humidity

The sulphur content of the fuel determines the change interval in dependence on the quality of the engine oil.

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- ❑ Ensure that the machine is in a horizontal position.
- ▶ Switch off the diesel engine.
- ▶ Wait a few minutes until the engine oil has collected in the oil pan.
- ▶ Pull out the dip stick and clean with a clean cloth.
- ▶ Insert the dip stick to the stop.
- ▶ Pull out the dip stick again and check the oil level.

The oil level must be between the **min** and **max** marks.

- ▶ If necessary, add engine oil until the level reaches the **max** mark.

5.7.2 Changing engine oil

Preparation:

- ❑ Ensure that the machine is in a horizontal position.
- ❑ The engine oil must be warm (increased fluidity).

The diesel engine can be accessed from the engine compartment. The oil pan and the oil filter cartridges can be accessed through an opening at the bottom of the upper carriage.

- ▶ Remove the cover plate of the diesel engine and replace it after completion of the maintenance tasks.

Draining off engine oil:

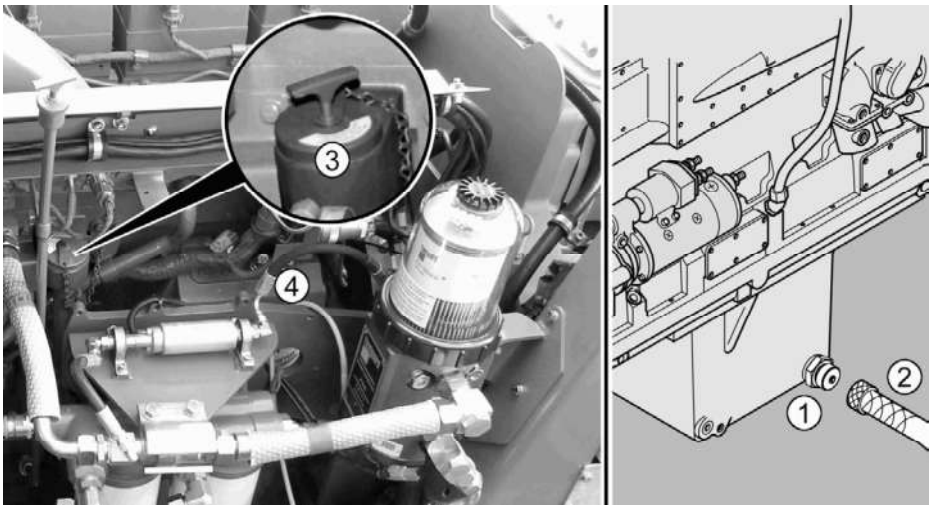

Fig. 5-14 *Filler neck, drain valve*

1 Drain valve
2 Drain hose
3 Filler neck
4 Oil filter cartridges (see Fig. 5-15)

- ▶ protect the V-ribbed belt against escaping engine oil.
- ▶ Open the filler neck **3**.
- ▶ Remove the cover cap from the drain valve **1** on the oil pan.
- ▶ Screw the drain hose **2** to the drain valve of the oil pan.

The dry air filter is designed in such a way that it provides excellent protection with relatively long maintenance intervals.

Note!
By blowing out the housing, dirt can be blown into the suction area, resulting in increased wear to the diesel engine.

▶ Do not clean the housing by blowing it out with compressed air.

5.10.1 Checking suction vacuum

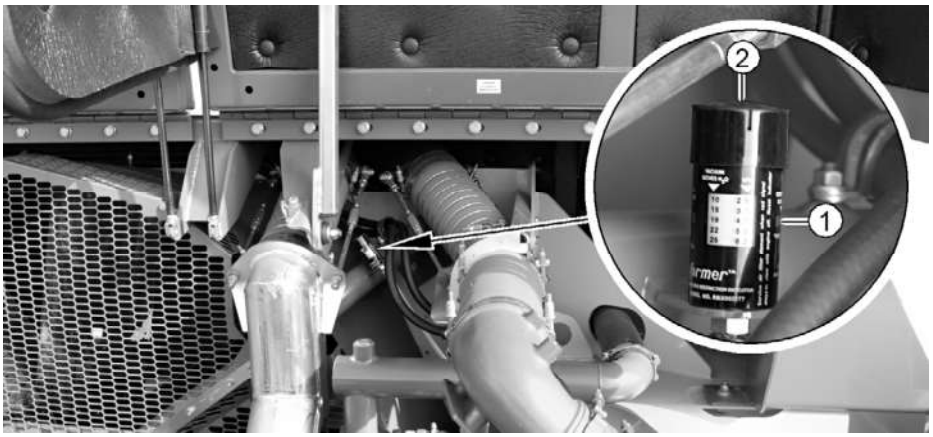

Fig. 5-27 *Underpressure indicator*

The underpressure indicator stores the maximum reached underpressure at the filter output during operation. The component can be accessed from the engine compartment.

If the red indicator strip is visible in the alarm window **1**, the maximum permissible underpressure of 50 mbar has been reached.

▶ When the red indicator strip is visible, replace the main element.

▶ To delete the stored underpressure value, press the reset button **2**.

5.10.2 Cleaning pre-filter

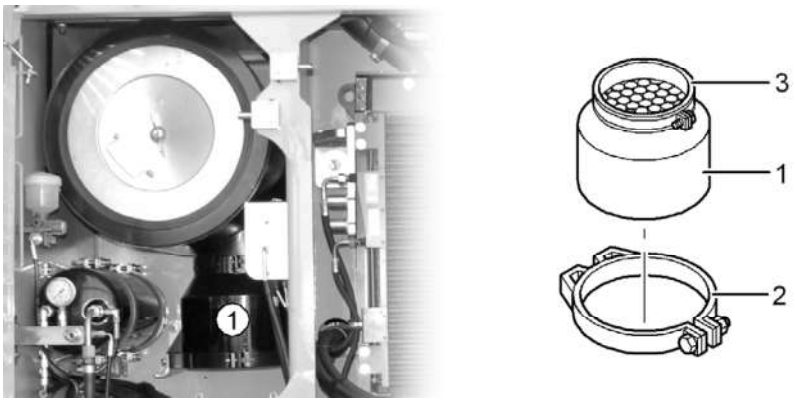

Fig. 5-28 *Pre-filter*

- ▶ Place a suitable container to collect the hydraulic oil under the bleed point.
- ▶ Open the leak oil hose or the screw plug a little to allow the air to escape.
  ↳ The hydraulic pump is being bled.
- ▶ As soon as the hydraulic oil escapes without bubbles, tighten the screw plug or leak oil hose connection.

5.11.9 Removing the suction hose

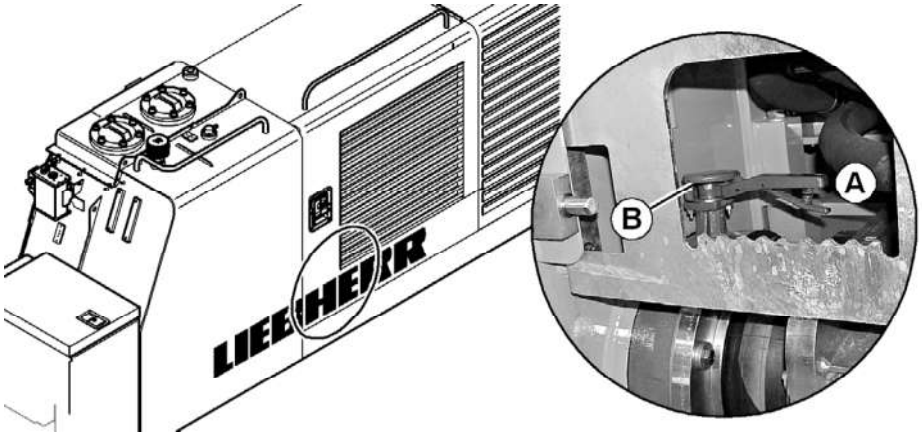

Fig. 5-39 *Suction hose, shut-off valve*

The shut-off valve of the suction hose has two positions:

- **A** open
- **B** closed

- ❑ Depressurise the hydraulic system.
- ▶ If the suction hose is to be disconnected at the pump or at the hydraulic tank, close the shut-off valve **B**.
- ▶ Place a suitable container to collect the hydraulic oil under the bleed point.
- ▶ Drain the hydraulic oil from the pump and suction hose.
- ▶ After completion of the repair, turn the shut-off valve to its initial position **A** and engage it.

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No.	Mounting	Tightening torque [Nm]
3	Tumbler wheel	2100
4	Hydraulic motor	960

5.13.3 Checking chain tension

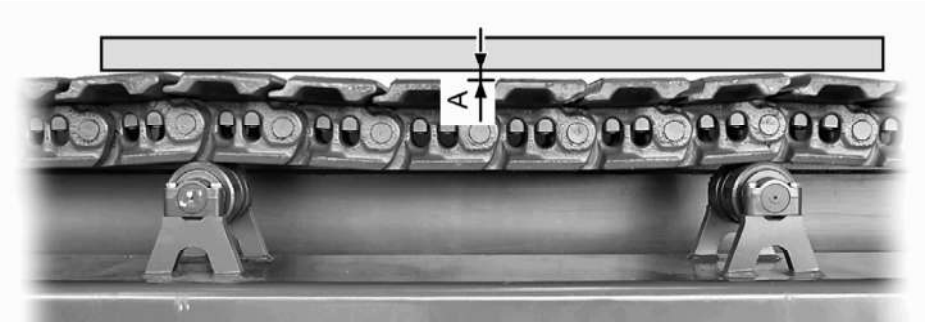


Fig. 5-51 *Checking chain tension*

Under normal operating conditions, the dip between the two support rollers should be between **25 to 30 mm**.

- ▶ Release the chain by moving the machine forward and back.
- ▶ Place the measuring rod onto the section between two support rollers.
- ▶ Measure the distance **A** between the measuring rod lower edge and the base plate.
- ▶ If necessary, tension the chain.

5.13.4 Tensioning chain

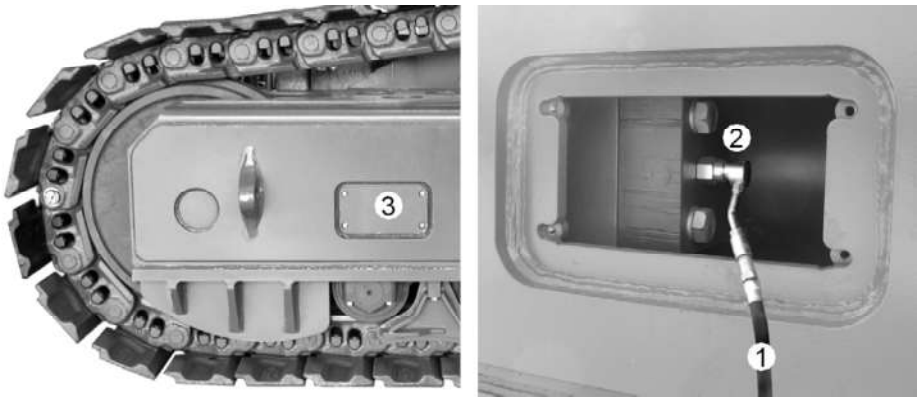


Fig. 5-52 *Tensioning chain*

As the travel gear is exposed to normal wear, the chain tension must be regularly checked and retightened, if necessary.

- ▶ Remove the lid **3** from the longitudinal member of the undercarriage.
- ▶ Screw the high pressure hose **1** to the hand grease gun.

The lubrication system can be refilled with grease in two different ways:
– Grease tank designed to hold a grease bucket (standard equipment)
– Grease tank with connection to an external filling pump (optional equipment)

5.17.2.1 Operation

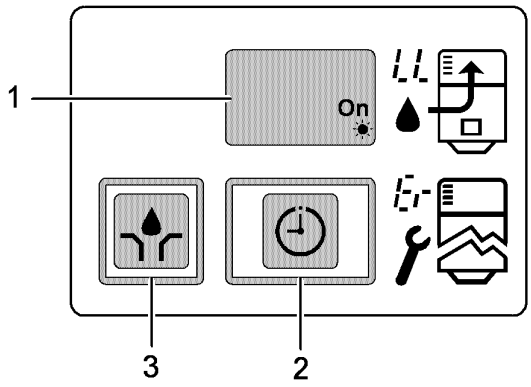


Fig. 5-63 *Control console*

1 Display
2 Timer key
3 Double function button "additional lubrication / reset"

Setting lubricating interval:

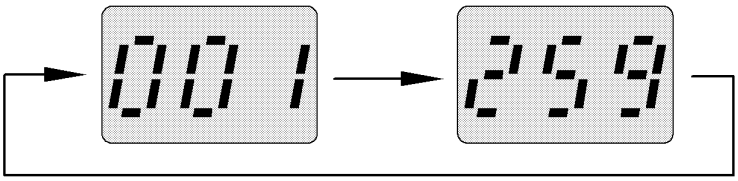
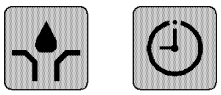


Fig. 5-64 *Display texts*

Adjustment range: 1 min to 2 h 59 min; factory setting: 2 h

The interval between two lubricating cycles can be adjusted by simultaneously press the buttons **2** and **3**.



▶ Press and hold the button **2**.

▶ Simultaneously press and hold the button **3**.
↳ The interval is shown on the display **1**, and the interval time is incremented. If the buttons are pressed for a longer period of time, the values increment at a faster rate.

▶ Release the buttons when the desired interval time is displayed.
↳ The new interval time is saved.

Displaying interval:

Press the button **2** briefly twice. The set interval time (PP) and the time remaining to the next lubricating cycle (rP) are displayed.

Releasing additional lubricating cycle:

Press the button **3** to release a lubricating cycle before the set interval has lapsed.