en

Operator's manual

Hydraulic excavator

P 976 - 1428
P 976 - 1573
P 976 - 1574

From serial number 42000

Document ID

ORIGINAL OPERATOR'S MANUAL

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Contact

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LHB/12203743/01/2016-05-03/en

Economy
Profitability – efficiency and reduced operating costs

Reliability
World-renowned robustness

Comfort
Spacious cab, ergonomic and high-visibility

Easy maintenance
Simple and safe service check points

Ergonomic access and time-saving
For maximum safety during servicing different types of platforms are available with a large central platform in particular for access to engine and hydraulic system components. The two-piece engine hood facilitates easier opening and closing. Fluid level monitoring, such as the engine oil level or urea tank level can be carried out quickly and easily from the touchscreen in the cab. The automatic lubrication system reduces precious servicing time while guaranteeing optimal lubrication of the excavator.

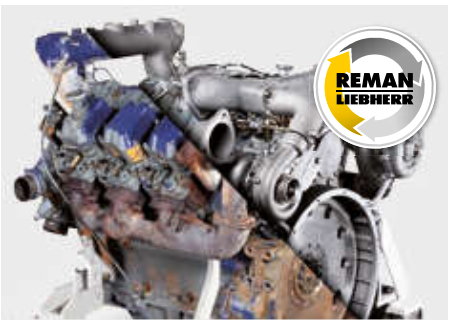
Less maintenance for more productivity
The frequency of the service intervals is optimised to guarantee that each part is functioning optimally and that the maintenance tasks are only performed as necessary. Whether it is the interval for changing the hydraulic oil, which can be up to 6,000 hours with periodic oil analysis, or 3,000 hours without monitoring, or the interval for changing the engine oil, every 500 hours, everything has been taken into account to reduce the frequency of interventions and thus limit the machine's downtime and lower costs.

Expert advice and service provisions
Liebherr offers an expert advice service. Qualified personnel will help you make the appropriate decisions to meet your needs: sales arguments based on the terrain, service agreements, advantageous repair alternatives, original parts management, and remote data transfer for fleet management.

LiDAT data transfer system
- Complete fleet management, all from one source
- Optimized economical performance of the machine park thanks to detailed view of the distribution of operating states and times
- Reports on capacity commitment and the use of the machine park can be called up daily via the Web portal
- Precise location of the machine
- Regional delimitation and fixed downtimes increase safety and reliability

Central lubrication system
- The fully-automatic central lubrication system, fitted as standard, allows for rapid maintenance: It saves time-consuming individual lubricating and downtime
- All the lubrication points on the superstructure of the undercarriage and the attachment hydraulics are supplied, with the exception of the connecting plate
- Engine oil level visible on display

Liebherr warranties and remanufacturing
- Significant warranties for the complete excavator and key components
- Optimal planning of all servicing activities
- Liebherr remanufacturing programme for processing worn components, conforming to the highest industrial standards



Lift Capacities

with Mono Boom 7.20 m and Counterweight 14.1 t

Stick 2.90 m

m	Under-carriage	3.0 m		4.5 m		6.0 m		7.5 m		9.0 m		10.5 m				m
10.5	HD													23.9*	23.9*	6.4
	LC-V													23.5*	23.5*	
9.0	HD							21.9*	21.9*					21.3*	21.3*	8.0
	LC-V							21.9*	21.9*					21.2*	21.2*	
7.5	HD							22.1*	22.1*	19.5	20.4*			19.5	20.2*	9.0
	LC-V							22.2*	22.2*	20.4	21.1*			20.1	20.2*	
6.0	HD					27.7*	27.7*	23.6*	23.6*	19.2	21.3*			16.9	19.9*	9.7
	LC-V					28.0*	28.0*	23.7*	23.7*	20.1	21.4*			17.6	19.9*	
4.5	HD					31.9*	31.9*	24.6	25.6*	18.6	22.2*			15.5	19.9	10.1
	LC-V					32.2*	32.2*	25.7	25.8*	19.5	22.3*			16.2	20.2*	
3.0	HD					32.2	35.5*	23.4	27.6*	18.0	23.2*			14.7	19.0	10.3
	LC-V					33.6	35.7*	24.5	27.7*	18.8	23.2*			15.5	20.8*	
1.5	HD					30.8	37.2*	22.4	28.9*	17.4	22.7			14.6	18.9	10.2
	LC-V					32.2	37.3*	23.5	28.9*	18.3	23.9*			15.4	20.9*	
0	HD					30.1	37.0*	21.8	29.1	17.0	22.3			15.0	19.5	9.9
	LC-V					31.6	36.9*	22.9	29.1*	17.9	23.7*			15.9	21.1*	
−1.5	HD			38.5*	38.5*	29.9	35.1*	21.6	28.0*	16.9	22.1			16.1	21.1*	9.3
	LC-V			40.4*	40.4*	31.5	34.9*	22.7	27.8*	17.8	22.2*			17.2	21.1*	
−3.0	HD	40.6*	40.6*	38.9*	38.9*	30.2	31.4*	21.8	25.0*					18.6	20.7*	8.5
	LC-V	42.5*	42.5*	38.4*	38.4*	31.0*	31.0*	23.0	24.5*					19.9	20.6*	
−4.5	HD			30.5*	30.5*	24.6*	24.6*							19.2*	19.2*	7.1
	LC-V			29.5*	29.5*	23.8*	23.8*							18.9*	18.9*	

Stick 3.30 m

m	Under-carriage	3.0 m		4.5 m		6.0 m		7.5 m		9.0 m		10.5 m				m
10.5	HD													20.1*	20.1*	7.0
	LC-V													19.9*	19.9*	
9.0	HD							20.6*	20.6*					18.2*	18.2*	8.4
	LC-V							20.5*	20.5*					18.1*	18.1*	
7.5	HD							21.0*	21.0*	19.8	20.0*			17.3*	17.3*	9.4
	LC-V							21.1*	21.1*	20.0*	20.0*			17.3*	17.3*	
6.0	HD					26.3*	26.3*	22.6*	22.6*	19.4	20.5*			15.9	17.1*	10.1
	LC-V					26.7*	26.7*	22.8*	22.8*	20.2	20.5*			16.5	17.1*	
4.5	HD					30.6*	30.6*	24.8*	24.8*	18.7	21.5*			14.6	17.3*	10.5
	LC-V					31.0*	31.0*	25.0*	25.0*	19.6	21.6*	15.3	17.4*	15.3	17.4*	
3.0	HD					32.7	34.5*	23.6	26.9*	18.0	22.7*	14.2	18.4	13.9	18.0*	10.6
	LC-V					34.0	34.8*	24.6	27.1*	18.9	22.7*	15.0	20.0*	14.6	18.0*	
1.5	HD					31.1	36.8*	22.6	28.5*	17.4	22.7	13.9	18.0	13.8	17.8	10.6
	LC-V					32.5	36.9*	23.6	28.6*	18.3	23.6*	14.6	20.1*	14.5	19.3*	
0	HD					30.2	37.2*	21.9	29.0*	16.9	22.2			14.1	18.3	10.3
	LC-V					31.7	37.1*	23.0	29.0*	17.8	23.7*			14.9	20.1*	
−1.5	HD			36.8*	36.8*	29.9	35.8*	21.5	28.3*	16.7	22.0			15.1	19.7	9.7
	LC-V			38.3*	38.3*	31.4	35.6*	22.7	28.2*	17.6	22.7*			16.0	20.2*	
−3.0	HD	36.6*	36.6*	41.3*	41.3*	30.0	32.6*	21.6	25.9*					17.1	20.1*	8.9
	LC-V	38.2*	38.2*	40.8*	40.8*	31.5	32.2*	22.7	25.6*					18.3	20.0*	
−4.5	HD			33.5*	33.5*	26.8*	26.8*	20.1*	20.1*					19.1*	19.1*	7.7
	LC-V			32.7*	32.7*	26.1*	26.1*	19.2*	19.2*					18.9*	18.9*	

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

The load values are quoted in tons (t) at stick end (without bucket), and may be swung 360° on firm and even ground. Adjacent values are valid for the undercarriage when in the longitudinal position. Capacities are valid for 600 mm wide track pads. Indicated loads are based on ISO 10567 standard and do not exceed 75 % of tipping or 87 % of hydraulic capacity (indicated via *). Without bucket cylinder, link and lever the lift capacities will increase by 1,320 kg. Lifting capacity of the excavator is limited by machine stability and hydraulic capacity. 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 safety check valves on hoist cylinders and stick cylinder(s), when they are used for lifting operations which require the use of lifting accessories.

2 Safety warnings, signs

Working with the machine represents a risk of serious or fatal injury, which you as the owner, machine operator or a member of the maintenance personnel can counteract. You can avoid dangers and accidents by reading the various safety instructions attentively on a regular basis, and by following them at all times. This applies in particular to personnel who only work on the machine occasionally, e.g. for setup or maintenance work.

The safety instructions are listed below. If you comply with these instructions conscientiously, you can be sure to safeguard your own safety and the safety of other people, and you will avoid causing damage to the machine.

The descriptions of work in this publication describe the necessary safety precautions which must be taken to prevent people and the machine from being exposed to hazards.

2.1 Safety advices and symbols

2.1.1 Designation of safety advices

	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

Tab. 2

The safety alert symbol appears always together with one of the following signal words:

DANGER
WARNING
CAUTION

	**DANGER**	indicates a hazardous situation which, if not avoided, will result in death or serious injury
	**WARNING**	indicates a hazardous situation which, if not avoided, could result in death or serious injury
	**CAUTION**	indicates a hazardous situation which, if not avoided, could result in minor or moderate injury
	NOTICE	indicates a hazardous situation which, if not avoided, could result in property damages

Tab. 3

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Before checking the coolant level, make sure that the cover of the expansion tank has cooled down enough to be touched. Carefully unscrew the cover to drain off the excess pressure.

Wear safety glasses and protective gloves when working on the battery. Avoid any sparks near naked flames.

Never let a third party guide the grapple by hand.

2.5.3 Avoid fire and explosions

Fire extinguisher

Familiarise yourself with the attachment points and operation of fire extinguishers on the machine as well as with the fire alarm and fire-fighting possibilities on site.

The source of a fire can only be extinguished if it is accessible.

Before starting, close all locks for the covers on the machine. In case of a fire, the covers can be opened immediately and the fire extinguished.

Electrical system

Regularly check the electrical system and have all faults repaired without delay.
Examples:
- Loose connections
- Blown fuses
- Defective bulbs
- Charred or chafed cables

When charging batteries, do not smoke or use naked flames. Wear safety glasses and protective gloves when you are working on the battery.

Diesel engine

Do not use any ether starting aids to start diesel engines with a pre-heat system or flame glow unit.

Always start the diesel engine as described in the operating manual.

Refuelling

Prior to refuelling, shut down the diesel engine and switch off the auxiliary heater (option).

When refuelling, do not smoke or use naked flames.

Avoid contact with fuels. Contact with the skin or inhalation of vapours can result in impairments to health.

Refuelling with the wrong fuel will result in damage to the fuel system and engine. Do not start the engine if the wrong fuel has been filled by mistake. The tank and the fuel lines will then have to be drained. Notify a qualified specialist workshop. Have the tank and the fuel lines drained fully.

Flammable liquids

Do not carry any flammable liquids on the machine, except for in the tanks intended for such.

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Check the electrical system regularly. Any faults such as loose connections, blown fuses and bulbs, charred or chafed cables must be repaired by specialist personnel without delay.

Only use genuine fuses with the prescribed amp ratings.

Only a qualified electrician is allowed to work on high-voltage modules.

Do not work on live components.

When working on medium and high-voltage modules, switch the voltage off and ground the power cable in order to discharge any remaining charge.

First check the parts are no longer live, ground and then short-circuit them. Provide insulation against adjacent live parts.

Disconnect the battery before you start work on the electrical system or conduct arc welding work on the machine.

Heavy parts

Do not attempt to lift heavy parts. Use lifting devices with sufficient load-carrying capacity. Use suitable and functional lifting tackle with a corresponding load-carrying capacity to replace individual parts or large assemblies. This is in order to guarantee safe movement during installation.

Never stand under suspended loads, and do not work under such loads either.

Wear protective gloves when handling wire ropes.

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

Lubricants and service products

When handling oils, greases and other chemical substances, comply with the safety instructions applicable to the product in question.

Make sure that service products, consumables and replaced parts are disposed of in a safe and environmentally acceptable manner.

Take care when working with hot lubricants and service products (danger of burns and scalds).

Spare parts

Spare parts must correspond to the technical requirements defined by the manufacturer. This is always assured when genuine spare parts are used. Spare parts that do not correspond to the technical requirements of the manufacturer can impair the safety and function of the machine.

When replacing parts, re-secure unscrewed bolt-connections with the correct torque.

Maintenance intervals

The intervals specified for recurrent checks and inspections in this operating manual must be complied with.

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- ▶ Shut off the diesel engine.
- ▶ Move the safety lever to the upper position.
- ▶ Push the handle **5** downwards.
- ▶ Open the cab door and engage it in the locking mechanism **1**.
- ▶ Climb out with your face towards the machine.
- ▶ Move the release lever **4** outwards.
- ▶ Close the door.

3.2.3 Emergency exit

Fig. 45: Warning sign of the emergency exit

A warning sign on the rear window indicates that the rear of the operator's cab is the emergency exit.

- ▶ Pull the tab.
- ▶ Remove the seal completely.
- ▶ Push the rear window outward.
- ▶ Leave the operator's cab.

3.2.4 Fire extinguisher (option)

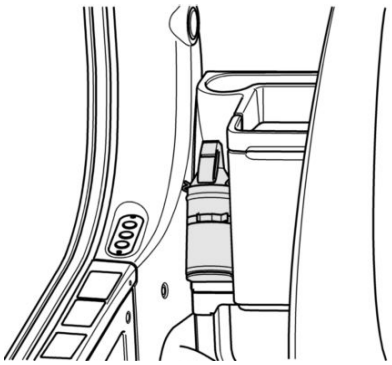

Fig. 46: Fire extinguisher

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Rolling out sun blind on the windscreen

▶ Pull sun blind on windscreen down to desired position using tab **1**.

Rolling up sun blind on the windscreen

▶ Push roll up button **2** upwards.

Sun blind on the roof glass panel

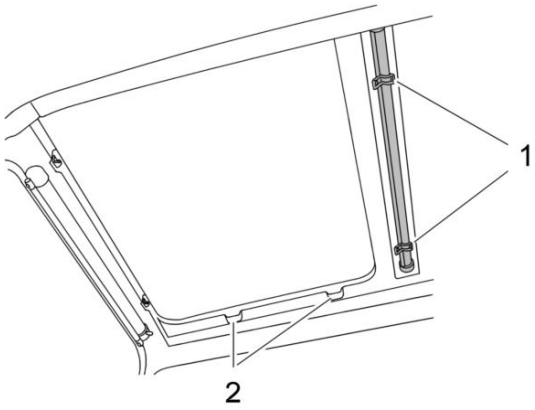

Fig. 64: Sun blind on the roof glass panel

1 Handle **2** Groove

Rolling out sun blind on the roof glass panel

▶ Pull sun blind forward on the roof glass panel using handles **1**.

▶ Clip sun blind into grooves **2** on the roof glass panel.

Rolling back sun blind on the roof glass panel

▶ Lift sun blind out of grooves **2** carefully and let it roll back carefully.

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Operating modes

AUTO operating mode

The temperature in the operator's cab is controlled according to the set nominal temperature, the outside temperature and amount of sunshine.

Air distribution, blower power, cooling power and heating power are adjusted automatically.

Note
The temperature in the operator's cab can be controlled by means of the sun sensor. The sun sensor is located on back of display.

▶ Do not cover sun sensor.

ECON operating mode

Air conditioning unit is deactivated.

Machine consumes less fuel.

Recirculated air mode

When working in enclosed spaces operator is exposed to less exhaust fumes.

Intake of fresh air is reduced.

Air in operator's cab is recirculated.

DANGER
Limited visibility caused by fogged windows!
Danger to life, injuries, damage.

▶ Do not leave recirculated air mode switched on for long periods.

▶ Activate AUTO operating mode.

Defrosting operating mode

Fan runs on maximum power.

Front air outlet (at windscreen) is open, other air outlets are closed.

Operator can control temperature.

Setting air conditioning unit

▶ Set temperature and blower power: Press corresponding display button.

▶ Set air supply: Press corresponding display button.
▷ Corresponding display button is displayed in green.

Activating and deactivating operating mode

▶ Activate mode: Press corresponding display button or corresponding key on control unit A.
▷ Corresponding display button is displayed in green.
▷ LEDs in corresponding key of control unit A light up.

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3.2.22 *Function settings* menu

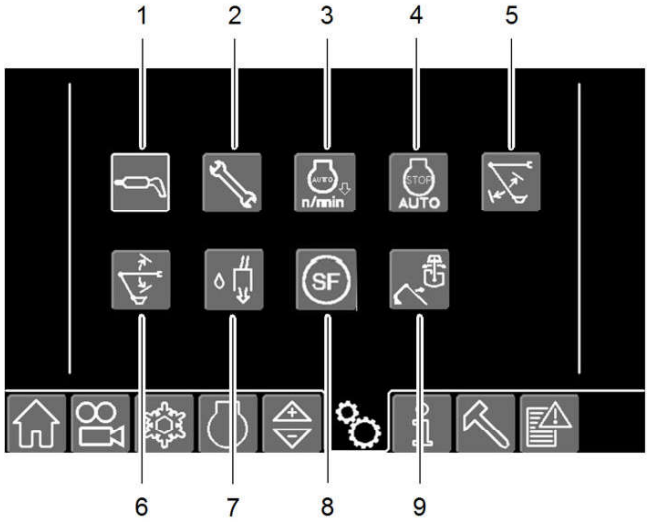

Fig. 139: Function settings menu

1 *Central lubrication system* button
2 *Maintenance* button
3 *Activation time for sensor-controlled low idle automatic* button
4 *Delay of automatic diesel engine shut-off in dependence on water temperature* button [11)]
5 *Stick cylinder shut-off* button [11)]
6 *Hoist cylinder shut-off* button [11)]
7 *Control valve block bleeding* button
8 *Sensitivity of mini-joysticks* button
9 *Priority between lifting boom and turning uppercarriage* button

[11)] Option

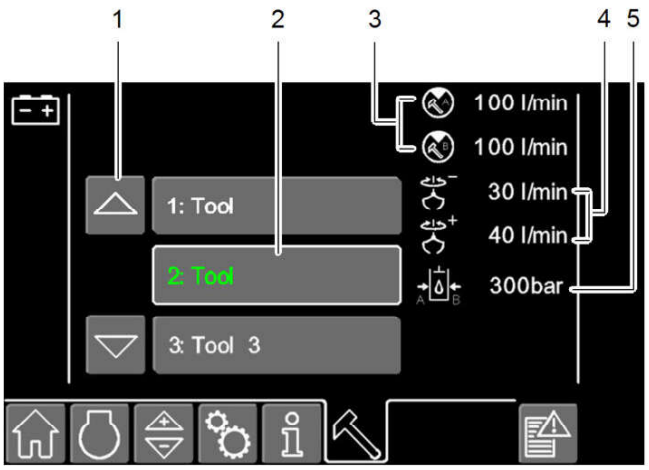

Fig. 159: Tool Control menu

1 *Scroll* button

2 *Selected special working attachment* button

3 Maximum flow rate in high pressure circuit of special working attachment during operation

4 Maximum flow rate in medium pressure circuit of special working attachment during operation

5 Maximum pressure of special working attachment in operation

NOTICE
Unsuitable parameters!
Damage to special working attachment.

- ▶ Select suitable parameters for special working attachment.
- ▶ Adhere to maximum permitted values for pressure and flow rate.

- ▶ Press *scroll* buttons **1** until desired *selected special working attachment* button **2** is outlined in white.
- ▶ Press required *selected special working attachment* button **2**.
  - ▷ Name of special working attachment is displayed in green.
  - ▷ Special working attachment is selected.
  - ▷ Parameters of special working attachment are activated.

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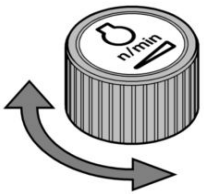
Engine speed



Ten speed steps can be selected.

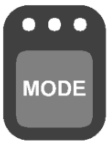
- ▶ Increase speed step: Turn engine speed controller in clockwise direction.
- ▶ Reduce speed step: Turn engine speed controller in counter-clockwise direction.

Operating mode

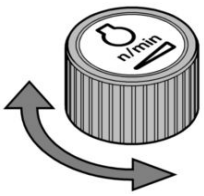
The four operating modes permit optimum use of the machine according to the work to be done.

Operating mode			Operation	Speed step	Hydraulic power
Key	Status of LEDs	Mode			
	☀ ○ ○	S (SENSITIVE)	Precise work or lifting loads	7	Limited
	○ ☀ ○	E (ECO)	Light to medium work	8	Slightly limited
	○ ○ ☀	P (POWER)	Heavy work	9	Unlimited
	☀ ☀ ☀	P+ (POWER PLUS)	Very heavy work	10	Unlimited

Tab. 15: Operating modes



- ▶ Activate operating mode E, P or S: Press *operating mode* key until relevant LED lights up. (see: tab. 15, page 99)



- ▶ Activate operating mode P+: Turn engine speed controller to speed step 10.

3.3.7 After starting

Precautions related to conditions of machine use

Altitude and outside temperature

Altitude and outside temperature affect the performance capacity and service life of the diesel engine.

The performance of the diesel engine is automatically adjusted according to the altitude and the outside temperature.

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Deactivating overload warning system

▶ Press *overload warning system* key.
▷ *Confirmation required* status symbol appears on the display.
▷ LEDs in *overload warning system* key flash.

▶ Press confirmation button within 5 seconds.
▷ *Confirmation required* status symbol is hidden.
▷ LEDs in *overload warning system* key go out.

3.3.15 Float position of hoist cylinders

The float position of hoist cylinders allows the boom to move freely according to the terrain profile or the movements of the uppercarriage.

DANGER
Falling loads!
Death, injuries, damage.

When float position of hoist cylinders is activated:
▶ Do not lift any loads.

Make sure the following preconditions are met:
❑ Working attachment has been lowered to the ground.

Selecting operating mode

Key	Status of LEDs	Operating mode
	○ ○ ○	Switched off
	○ ○ ☀	Continuous operation
	○ ☀ ○	Manual

Tab. 18: Operating modes

▶ Press and hold *float position of hoist cylinders* key until required operating mode is selected. (see: tab. 18, page 109)

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3.4 Shut-down and limitation devices

3.4.1 Stick cylinder shut-off and hoist cylinder shut-off (option)

The shut-off is carried out exclusively to prevent exceeding the permitted range.

On approaching limits of permitted range *end of permitted range before stick cylinder shut-off* status symbol or *end of permitted range before hoist cylinder shut-off* status symbol is displayed on the display.

DANGER
Impairment of stability of the machine!
Death, injuries, damage.

▶ At the limits of permitted range carry out slow movements.

DANGER
Inadvertent deactivation of the shut-off!
Death, injuries, damage.

▶ Check before and after work if shut-off is activated.

Setting shut-off

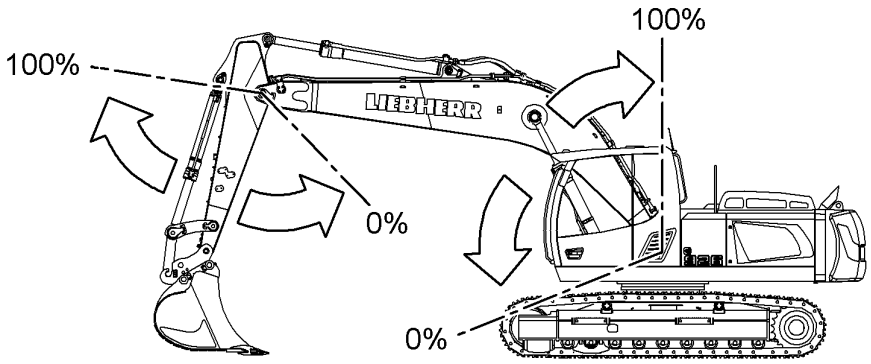

Fig. 225: Percentages of the full stroke

DANGER
Unintentionally leaving the permitted range with working tool!
Death, injuries, damage.

▶ When setting shut-off, maintain a safe distance appropriate to the work and size of working tool.

Note
Percentages of full stroke are valid for specific stick or boom types.

▶ Determine full stroke after installing a new stick or after installing a new boom type: Contact Liebherr customer service.

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- ▶ Align the stick at right angle to the ground.
- ▶ Completely open the clamshell buckets.
- ▶ Set the clamshell down at right angle to the ground.
- ▶ Close the clamshell buckets. Raise the boom at same time.
- ▶ Completely close the clamshell buckets.
- ▶ Raise the boom.

Dumping the material

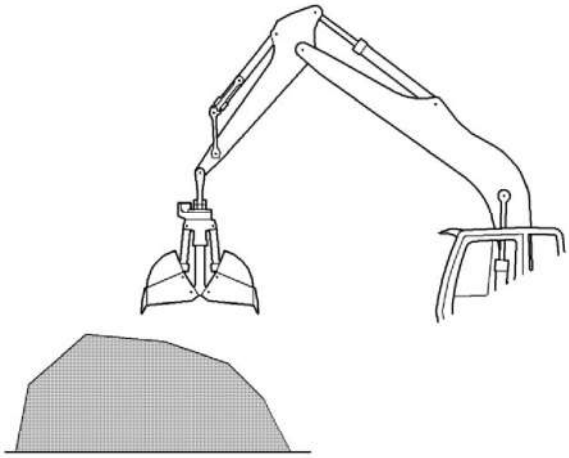

Fig. 244: Dumping the material

DANGER
Stability is at risk!
Fatal or serious injuries, damage.

- ▶ Do not extend the boom and stick too far.
- ▶ Do not swing heavy loads too far to the right or left.

- ▶ Position the working attachment at the dumping point.
- ▶ Open the clamshell.

3.5.10 Transferring loads

DANGER
Incorrect operation and unsuitable ground endanger the stability of the machine!
The machine can rock or tip over! The travel gear can sink into the ground!

- ▶ Check the ground has a sufficient load-bearing capacity.
- ▶ Carry out all movements with increased care.
- ▶ Move the attachment as close as possible to the machine and carry the load close to the ground if possible.
- ▶ Note the load lift chart.

- ▶ Pick up the load carefully.

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▶ Remove plate **1** and remove pin **2** from bearing.

▶ Make it easier to pull out pin **2**: Lift attachment.

3.6.5 Installing and removing grapple on industrial stick

Two people are required for installing and removing a grapple.

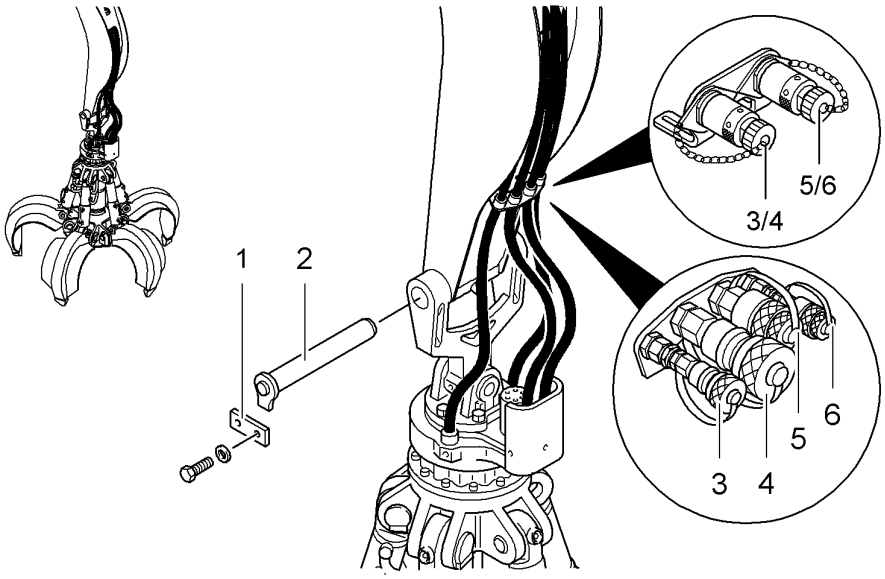

Fig. 251: Installing and removing grapple on industrial stick

1	Plate	**4**	Connection
2	Pin	**5**	Connection
3	Connection	**6**	Connection

DANGER
Swinging grapple!
Death, injuries, damage.

▶ Always maintain eye contact with the spotter.

Make sure the following preconditions are met:
❑ Hydraulic hoses required for grapple operation are on the stick.
❑ Grappler is on the ground in upright position and with fully opened tines.

Installing grapple on industrial stick

▶ Position attachment so that bearings of the stick are aligned with bearings of the grapple.

▶ Insert pin **2** and secure with plate **1**.

▶ Depressurise hydraulic system. (For more information see: 5.9.1 Depressurising hydraulic system, page 219)

▶ Move safety lever up.

▶ Connect hydraulic hoses of the opening and closing cylinders of the grapple to connection **4** and connection **5**.

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3.8.3 Tying down machine

The machine can be tied down with or without elastic coupling. (For more information see: Removing elastic coupling, page 146)

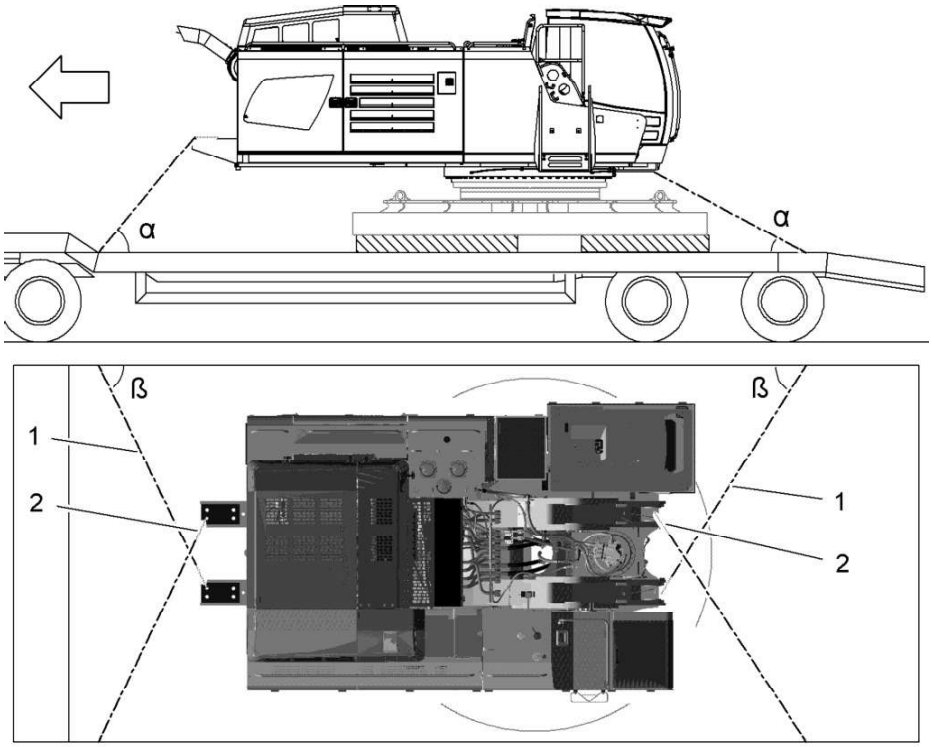

Fig. 260: Tying down machine

α	Tie-down angle between lashing chain and horizontal level	**1**	Lashing chain
β	Tie-down angle between lashing chain and vertical level	**2**	Textile lifting tackle

Tie-down angle α	Tie-down angle β	Tolerance of tie-down angles α and β
α ≥ 5°	25° ≤ β ≤ 65°	±5°

Tab. 24: Tie-down angle

DANGER
Slipping or falling of the machine!
Danger to life.

- ▶ Tie down machine and any attached components securely before transport.
- ▶ Use tear-resistant, non-slip straps with friction coefficient μ over 0.6 as per standard EN 12195-1.

Make sure the following preconditions are met:

- ❑ Lashing chains **1** have a lashing capacity of 13000 daN as per standard EN 12195-3.
- ❑ Textile lifting tackle **2** has a WLL of over 4 t as per standard NF EN 1492.

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Symbol	Meaning	Effect	Remedy
	Warning threshold: Coolant temperature too high	Damage to diesel engine; automatic reduction of diesel engine power	Shut off diesel engine. Reduce load. Fill with coolant. Clean radiator. If symbol is still displayed: Contact Liebherr customer service.
	Safety threshold: Coolant temperature too high		
	Air filter contaminated. Dust collecting tank full	Damage to diesel engine; automatic reduction of diesel engine power	Empty dust collecting tank. Replacing main filter cartridge of air filter
	Warning threshold: Charge air temperature too high	Damage to diesel engine; automatic reduction of diesel engine power	Clean radiator. If symbol is still displayed: Contact Liebherr customer service.
	Safety threshold: Charge air temperature too high		
	Warning threshold: Engine speed too high	Damage to diesel engine	Shut off diesel engine. Contact Liebherr customer service.
	Safety threshold: Engine speed too high	Automatic shut-off of diesel engine	Contact Liebherr customer service.
	Warning threshold: Oil pressure of diesel engine too low	Automatic shut-off of diesel engine	Fill with diesel engine oil. If symbol is still displayed: Contact Liebherr customer service.
	Safety threshold: Oil pressure of diesel engine too low		
	Warning threshold: Oil level of diesel engine too low	Damage to diesel engine	Shut off diesel engine. Fill with diesel engine oil. If symbol is still displayed: Contact Liebherr customer service.
	Safety threshold: Oil level of diesel engine too low		
	Safety threshold: Malfunction of diesel engine in emergency mode	Damage to diesel engine	Shut off diesel engine. Contact Liebherr customer service.
	Safety threshold: Diesel engine shut-off triggered by engine control unit. Diesel engine in emergency mode	Damage to diesel engine	Shut off diesel engine. Contact Liebherr customer service.

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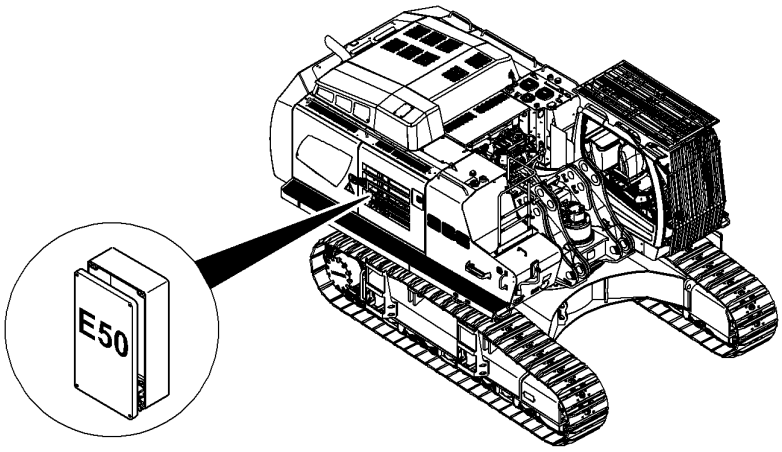

Fig. 317: Position of electric cabinet E50

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Main fuses

Main fuses are under a protective plate behind front right door.

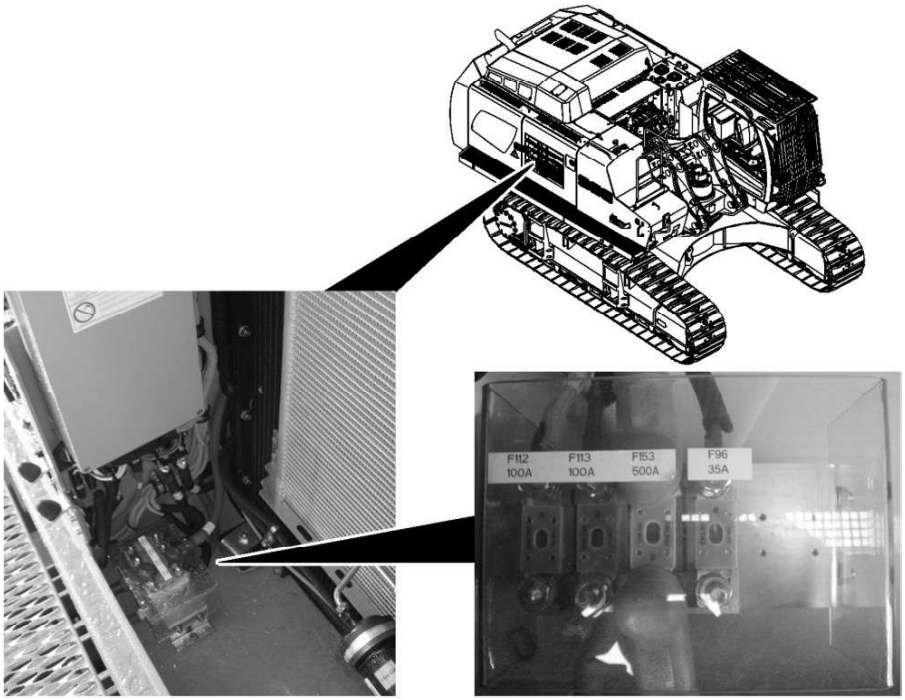

Fig. 322: Main fuses

	Current value [A]	Function
Main fuses		
F96	35	Power supply of electric refuelling pump
F112	100	Power supply of electric cabinet E50
F113	100	Power supply of electric cabinet E62
F153	500	Power supply for starter circuit

Tab. 30: Main fuses

▶ When replacing main fuses, tighten nut and lock nut to 16 Nm.

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Symbol	Meaning
	Hydraulic system
	Check oil level of the hydraulic tank
	Diesel engine
	Check oil level of the diesel engine
	Gearbox
	Check oil level of the gearbox
	Lubricating points
	Lubrication
h	Operating hours
	Adhere to instructions in the operator's manual

Tab. 34: Meaning of the symbols on the lubrication chart

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Minimum quality requirements

Thickener	Shelf life	Specification
Soap-based (lithium complex)	At least 3 years	Pumpable according to KP 2 K (DIN 51502)
		VKA welding force: ≥ 2300 N (DIN 51350/4, ASTM D 2596)

Tab. 53: Minimum quality requirements

5.3.10 Windscreen washer fluid

Liebherr recommendation

Liebherr recommends commercial washer fluid with anti-freeze.

Minimum quality requirements

Use mixture of water and denatured alcohol.

5.3.11 Lubricants and care products for electrical and mechanical systems

Liebherr recommendation

Application	Product
Contact spray for slip rings	Cramolin
Lubricant for pistons, piston nuts and piston bearing installation on hydraulic cylinders	Gleitmo 800
Special corrosion inhibitor for installation spaces of sealing elements on hydraulic cylinders	Rostilo Tarp CFX

Tab. 54: Liebherr recommendation

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▶ Pull out dipstick **2** again and check that oil level is between *MIN* mark and *MAX* mark.

If oil level is below *MIN* mark:

▶ Fill with oil. (For more information see: Filling with oil, page 209)

▶ Put in dipstick **2**.

Filling with oil

Make sure the following preconditions are met:

❑ Oil used is approved.

▶ Remove plug of oil filling hole **1**.

▶ Fill with oil via oil filling hole **1** until oil level is between *MIN* mark and *MAX* mark.

▶ Clean plug of oil filling hole **1**.

▶ Put on plug of oil filling hole **1**.

5.7.3 Fuel pre-filter: Draining water

The fuel pre-filter is on the radiator side under the middle hood.

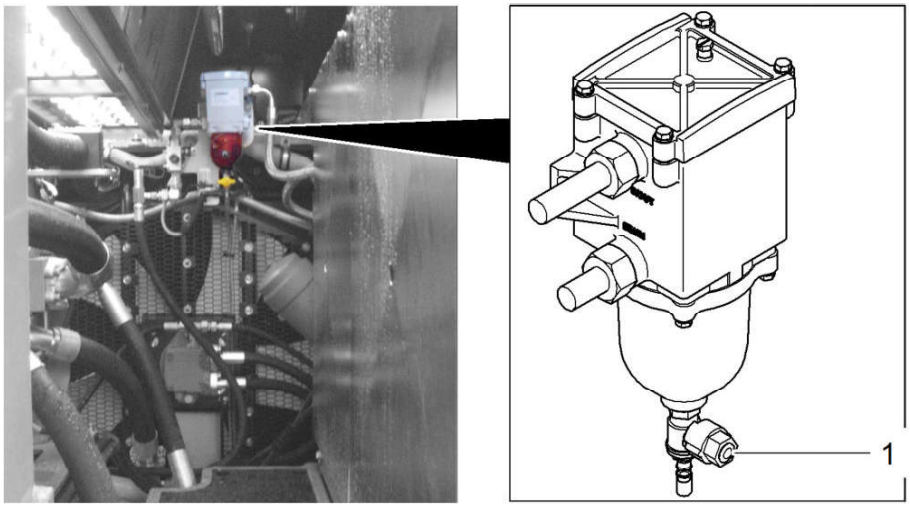

Fig. 342: Fuel pre-filter: Draining water

1 Water drain tap

DANGER
Fire! Explosion!
Death, injuries, damage.

▶ Do not smoke.

▶ Avoid flames.

Make sure the following preconditions are met:

❑ Diesel engine is shut off.

▶ Put suitable receptacle under fuel pre-filter.

▶ Open water drain tap **1**.

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5.9 Working hydraulics

5.9.1 Depressurising hydraulic system

Depressurising hydraulic hoses

- ▶ Lower working attachment to the ground.
- ▶ Shut off diesel engine.
- ▶ Turn ignition key to position I.
- ▶ Move safety lever to the down position.
- ▶ Carefully operate joysticks and pedals in all directions.

Depressurising hydraulic tank

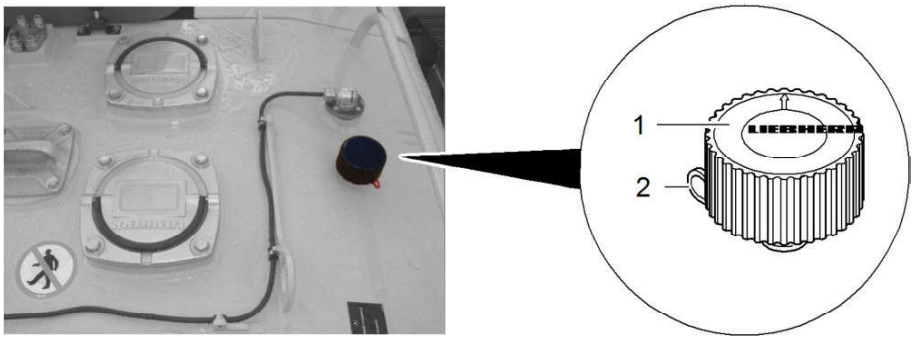

Fig. 352: Depressurising hydraulic tank

1 Breather filter **2** Securing pin

- ▶ Insert securing pin **2**.
- ▶ Unscrew breather filter **1** by hand no more than one turn. Use an open-end spanner if required.
- ▶ Screw breather filter **1** tight.
- ▶ Pull out securing pin **2**.

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5.12 Operator's cab, heating and air conditioning

5.12.1 Filling with windscreen washer fluid

The windscreen washer fluid tank is located on the rear of the operator's cab.

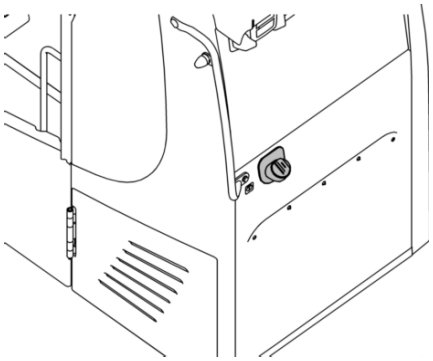

Fig. 366: Windscreen washer fluid tank

- ▶ Unscrew cover of windscreen washer fluid tank.
- ▶ Filling with windscreen washer fluid.
- ▶ Screw cover back onto windscreen washer fluid tank.

5.12.2 Switching on air conditioning unit

NOTICE
Long downtime of air conditioning unit!
Damage.

- ▶ Switch on air conditioning system in winter too.

Make sure the following preconditions are met:
- ❑ Diesel engine is started.
- ▶ Activate AUTO operating mode. (For more information see: 3.2.19 Air conditioning unit, page 68)
- ▶ Wait approximately 15 minutes.
- ▶ Deactivate AUTO operating mode.

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