en **Operator's manual**

Machine for Industrial Applications

Document ID

ORIGINAL OPERATOR'S MANUAL

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1.1.2 Uppercarriage

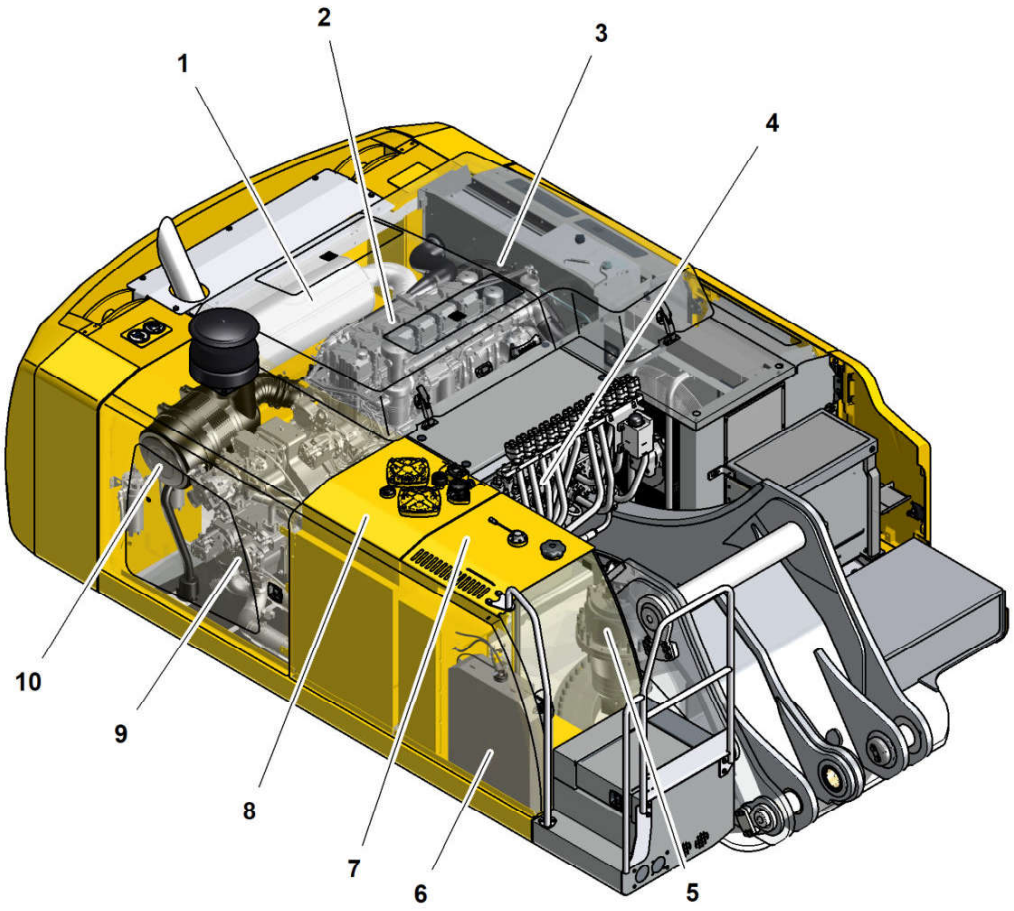

Fig. 3: Uppercarriage

1	Exhaust treatment system	**5**	Slewing gearbox	**9**	Hydraulic pump
2	Diesel engine	**6**	Diesel exhaust fluid tank	**10**	Engine air filter
3	Engine cooling	**7**	Fuel tank		
4	Control valve block	**8**	Hydraulic tank		

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Maximum Handling Capacity

New power unit
The LH 80 Industry material handling machine features a powerful Liebherr 6-cylinder in-line engine with constant 230 kW and 12.0 l displacement. This guarantees the high performance level of the machine and at the same time reduces fuel consumption.

High Swing Torque
The separate hydraulic pump in the closed slewing circuit only supplies hydraulic fluid to the swing mechanism. The maximum delivery volume is thus available at any time for turning the uppercarriage for fast and dynamic rotational movements.

Energy Recovery System ERC
The energy saved by lowering of the attachment in the ERC system is also available to the machine for the engine power, the resulting system performance for the material handling machine LH 80 is 437 kW. The result is more powerful, faster and more homogeneous operating cycles, which lead to increased handling capacity.

Precision Operation

LSC Hydraulic System with Electrical Pilot Control
The new 2-circuit Liebherr-Synchron-Comfort-system (LSC) with LUDV technology (flow distribution independent of load pressure) ensures faster working movements with up to 20 % less fuel consumption in comparison to the predecessor models. All work functions of the machine are controlled electrically, whereby the signals of the transmitters are only converted directly at the control block by hydraulic means. This technology enables end position damping of the attachment in order to protect the components and thus extend their service life. Simple, individual setting and adjustment of the working speed of boom, stick and slewing mechanism allow the driver to adjust the machine to each application and fully utilise the machine's capacity.

Firm and Stable Positioning
An essential prerequisite for precise working and maximum handling capacity is the firm and stable positioning of the machine. The design of the Liebherr undercarriage optimises the way forces are induced on components and minimised stress. Together with the elaborate support geometry, maximum stability and durability are guaranteed.

Liebherr Diesel Engine Compliant with Stage IV and IIIA
- Powerful, robust and reliable
- Maximum torque even at low speeds to ensure fast movements with low fuel consumption
- Common Rail injection system for maximum efficiency
- Emissions treatment with Liebherr SCR technology at stage IV

Closed Slewing Circuit
- High torque for maximum acceleration and fast rotary movements
- Integrated speed sensor for controlling and monitoring braking movement for greater safety
- Greater fuel efficiency thanks to intelligent energy management in the closed system

Electrical Pilot Control
- Precision control irrespective of the ambient temperature for maximum precision
- Simpler and faster fault diagnostics for optimal availability
- Up to 5 individual driver profiles can be saved

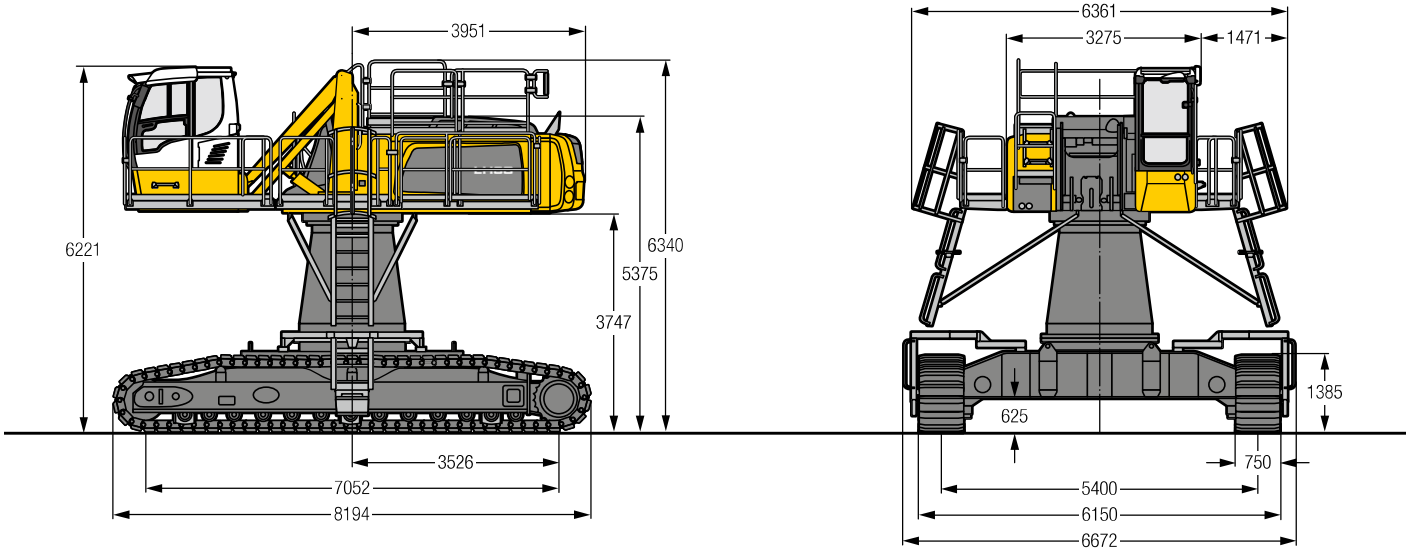
Uppercarriage

- 2-circuit Liebherr-Synchron-Comfort-system (LSC) with LUDV technology for faster working speed at up to 20 % less fuel consumption
- 230 kW engine output and greater pump flow for fast work cycles, convincing dynamics and maximum handling performance
- Electrical pilot control enables individual settings for the operator and new options such as load torque limitation
- Reduction in operating costs thanks to built-in maintenance advantages and optimum service accessibility

Undercarriage

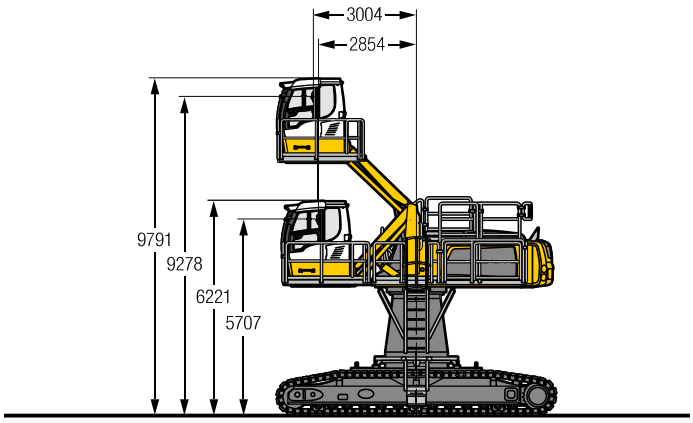
- Optimised hydraulics with closed slewing mechanism circuit for greater fuel efficiency and faster work cycles
- Central lubrication system (manual / full automatic) for more productive working time (optional available)
- Load-holding valves fitted as standard on all support cylinders for maximum stability in every application
- Low service costs thanks to travel drive without gearbox and cardan shafts

LH 80 C HR – Dimensions



LH 80 C HR – Choice of Cab Elevation

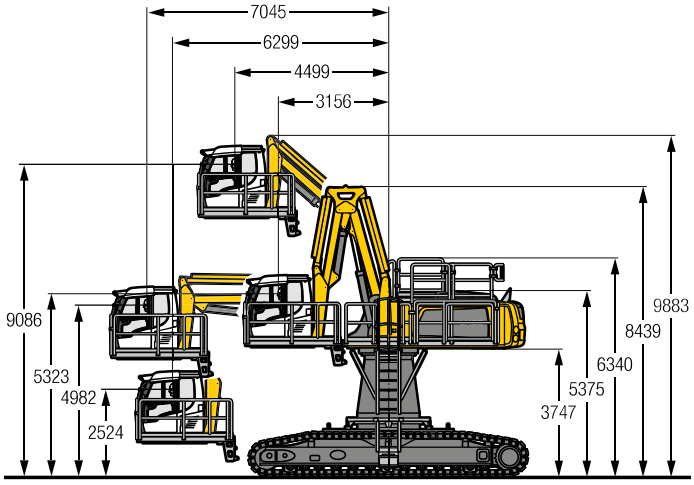
Cab Elevation LHC (Hydraulic Elevation)



Increase type **LHC 360-50**

The hydraulically adjustable cab allows the driver, that he can choose his field of view freely and at any time within the stroke.

Cab Elevation LHC-D (Hydraulic Elevation)

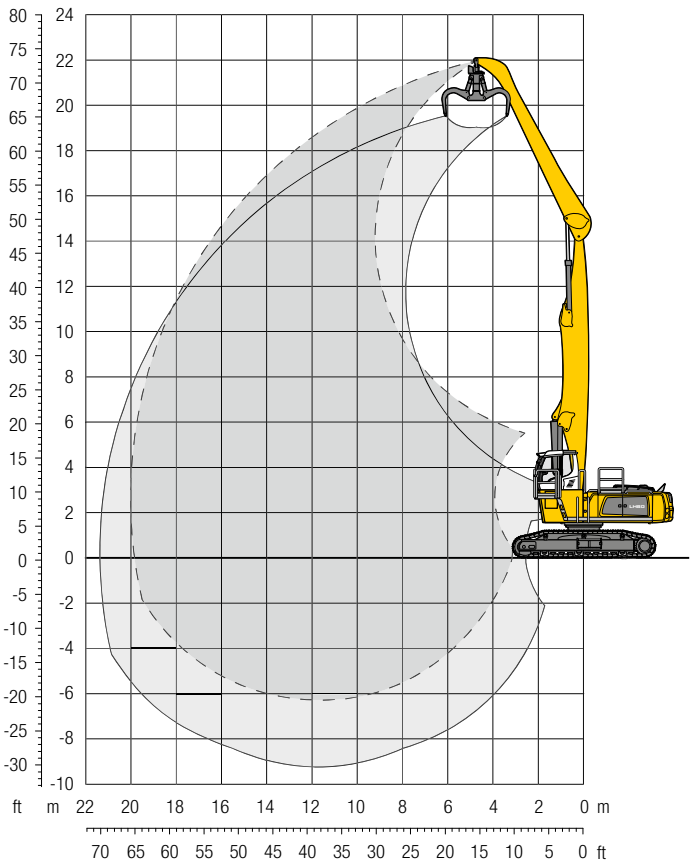


Increase type **LHC-D 730**

The hydraulically adjustable cab allows the driver, that he can choose his field of view freely and at any time within the stroke.

LH 80 C EW – Attachment GA20

Industry – Kinematic 2A

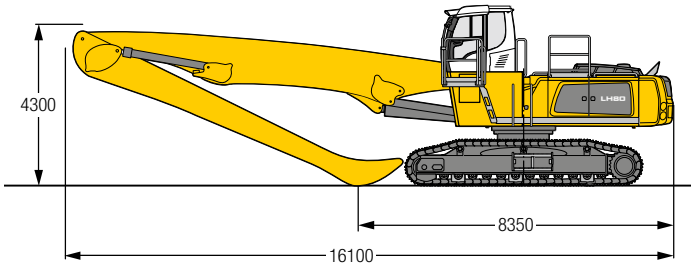


Operating Weight and Ground Pressure

The operating weight includes the basic machine with rigid cab elevation, straight boom 11.50 m, angled stick 9.00 m and grab model GMM 80-5/1.70 m³ semi-closed tines.

Weight	69,000 kg
Pad width	600 mm
Ground pressure	on request

Dimensions



m	Undercarriage	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				m
21.0	EW			11.7*	11.7*																			11.2*	11.2*	**7.8**
19.5	EW			13.3*	13.3*	11.8*	11.8*	9.6*	9.6*															9.2*	9.2*	**10.7**
18.0	EW					12.9*	12.9*	11.6*	11.6*	9.7*	9.7*													8.2*	8.2*	**12.8**
16.5	EW					13.1*	13.1*	11.5*	11.5*	10.3*	10.3*	9.4*	9.4*											7.6*	7.6*	**14.4**
15.0	EW							11.4*	11.4*	10.2*	10.2*	9.3*	9.3*	7.8	8.5*									6.9	7.2*	**15.8**
13.5	EW							11.4*	11.4*	10.2*	10.2*	9.2*	9.2*	7.9	8.5*	6.3	7.8*							6.0	6.9*	**16.8**
12.0	EW					13.0*	13.0*	11.4*	11.4*	10.2*	10.2*	9.2*	9.2*	7.9	8.4*	6.4	7.8*							5.3	6.7*	**17.7**
10.5	EW					13.2*	13.2*	11.6*	11.6*	10.3*	10.3*	9.3*	9.3*	7.8	8.5*	6.4	7.8*	5.1	6.8					4.8	6.4	**18.4**
9.0	EW					13.5*	13.5*	11.8*	11.8*	10.4*	10.4*	9.4*	9.4*	7.6	8.5*	6.2	7.8*	5.1	6.8					4.4	6.0	**19.0**
7.5	EW			16.4*	16.4*	13.9*	13.9*	12.0*	12.0*	10.6*	10.6*	9.0	9.5*	7.4	8.6*	6.1	7.8*	5.0	6.7					4.1	5.6	**19.4**
6.0	EW	18.5*	18.5*	17.1*	17.1*	14.3*	14.3*	12.3*	12.3*	10.6	10.8*	8.6	9.6*	7.1	8.7*	5.9	7.7	4.9	6.5	4.1	5.5			3.9	5.4	**19.8**
4.5	EW	22.6*	22.6*	17.9*	17.9*	14.8*	14.8*	12.5	12.6*	10.0	11.0*	8.2	9.7*	6.8	8.7*	5.6	7.5	4.7	6.4	4.0	5.5			3.8	5.2	**20.0**
3.0	EW	23.7*	23.7*	18.6*	18.6*	14.7	15.2*	11.6	12.9*	9.4	11.2*	7.7	9.8*	6.4	8.5	5.4	7.3	4.6	6.2	3.9	5.4			3.7	5.1	**20.0**
1.5	EW	8.9*	8.9*	17.4	19.0*	13.4	15.5*	10.7	13.1*	8.8	11.3*	7.3	9.7	6.1	8.2	5.2	7.0	4.4	6.1	3.8	5.3			3.6	5.0	**20.0**
0	EW	6.7*	6.7*	16.0	16.4*	12.4	15.6*	10.0	13.1*	8.2	11.1	6.9	9.3	5.8	7.9	5.0	6.8	4.3	5.9	3.7	5.2			3.6	4.9*	**19.9**
−1.5	EW	6.6*	6.6*	13.0*	13.0*	11.7	15.2*	9.5	12.8*	7.8	10.7	6.6	9.0	5.6	7.7	4.8	6.7	4.2	5.8	3.7	4.5*			3.7	4.4*	**19.6**
−3.0	EW	7.2*	7.2*	12.3*	12.3*	11.3	14.3*	9.1	12.2*	7.5	10.4	6.4	8.8	5.4	7.5	4.7	6.5	4.1	5.3*					3.9	4.5*	**18.7**
−4.5	EW			12.5*	12.5*	11.0	12.8*	8.9	11.1*	7.3	9.5*	6.2	8.2*	5.4	6.9*	4.7	5.6*							4.4	5.0*	**17.1**
−6.0	EW							8.8	9.3*	7.3	8.1*	6.2	6.8*											5.8	6.4*	**14.1**

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

The lift capacities on the stick end without attachment are stated in metric tons (t) and can be slewed through 360° on a firm, level supporting surface. Capacities are valid for 600 mm wide triple grouser pads (resp. flat pads). Indicated loads based on the ISO 10567 standard and do not exceed 75 % of tipping or 87 % of hydraulic capacity. The lift capacity values indicated are attained at the corresponding operating temperature. This operating temperature is ensured by continuous movement of the boom. Weights of fitted working tools (grabs, load hooks, etc.) and load accommodation equipment are to be deducted from the lift capacity values. The lift capacity of the unit is limited by its stability, the lifting capability of the hydraulic elements, or the maximum permissible lifting capacity of the load hook.
In accordance with the harmonised European Standard EN 474-5, hydraulic excavators used for lifting operations must be equipped with pipe fracture safety valves, an overload warning device, a load hook and a lift capacity chart.

2 Safety warnings

2.1 Information on these instructions

2.1.1 Representation of warning messages

Warning symbol

	The warning symbol warns of potential dangers. Obey all measures marked with this symbol to avoid injury or death.

Tab. 3: Warning symbol

Grading of warning messages

The grading of warning messages is defined by following signal words:

DANGER
WARNING
CAUTION
NOTICE

Definition of warning levels

	**DANGER**	Indicates an immediately 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 damage.

Tab. 4: Warning levels

2.1.2 Graphic symbols in these instructions

Symbol	Meaning
	**Note** Identifies useful information and tips.

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– Is not under any physical or mental impairment that limits one of the prescribed requirements.
– Is not under the influence of alcohol.
– Is not under the influence of drugs.

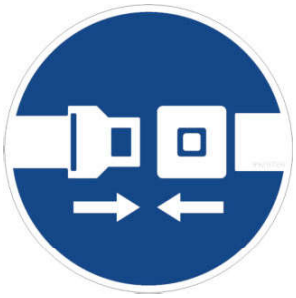
2.4 Signs on the machine

2.4.1 Warning signs

Note

▶ Make sure that all safety signs are in place on the machine and legible.

▶ Adhere to warning signs.

Sign	Description
	**Safety belt** Before putting machine into service, put on safety belt.
	**Safety glasses** Put on safety glasses before starting work.
	**Protective gloves** Put on protective gloves before starting work.

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2.5.2 Operator's cab

Danger to life

Unapproved working method

- Put on safety belt before starting work.
- Make sure that changes in the operator's cab (for example installation of accessories) do not restrict the operator's workspace.

Injuries

Objects in the operator's cab

- Remove objects that are not necessary for the work from the operator's cab.
- Stow and fasten objects that are necessary for the work before starting.
- Make sure that objects carried do not protrude into the operator’s workspace.

2.5.3 Height-adjustable operator's cab

Danger to life

Persons in the danger zone

- Make sure there are no persons in the danger zone under the operator's cab.
- Keep your distance from moving parts when the operator's cab is moving down.

Machine tipping

- On slopes, travel with lowered operator's cab.

Injuries

Falling from operator's cab

- Close cab door before raising and adjusting operator's cab.
- If operator's cab is raised: Make sure that cab door is closed.

Damage to operator's cab and machine

Collision with obstacles

- Make sure there are no obstacles in the range of movement of operator's cab.
- Exclusively adjust operator's cab when machine is at a standstill.
- Move operator's cab to upper park position before starting travel.
- Move slowly to end positions (upper or lower park position) using automatic mode.

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2.7.9 Load-lifting work

Danger to life

Machine tipping

- Make sure that machine is equipped for load-lifting work.
- Make sure that machine has safety equipment for load-lifting work.

Falling load

- Make sure that machine is equipped with line break safety on every hoist cylinder and stick cylinder.
- Make sure that the operator's cab contains a load chart.
- Exclusively use suitable slinging gear for load-lifting work.
- Exclusively tie down or loosen loads or stabilise them during transport with the help of another person.

2.8 Safe work

2.8.1 Machines with height adjustable cab

Danger to life

Persons in the danger zone

- Make sure there are no persons in the danger zone under the operator's cab.
- If operator's cab is being lowered: Keep distance from moving parts.

Machine tipping

- On slopes, exclusively travel with lowered operator's cab.

Injuries

Falling out of operator's cab

- Make sure that the cab door is closed during adjustment of operator's cab.
- Make sure that cab door is closed when in raised state.

Damage

Collision

- Make sure there are no obstacles in the range of movement of operator's cab.
- Exclusively adjust operator's cab when machine is stationary.
- Move operator's cab to park position before starting travel.
- Slowly approach park positions in automatic mode.
- Maintain sufficient distance from machine.
- Adjust operator's cab with caution.
- Exclusively switch off collision check in an emergency.

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Symbol	Meaning
	Air flow reversal blocked
	Refuelling active
	Hydraulic system emergency mode switched on
	Valves blocked
	Maintenance due
	Maintenance of working tool due
	Servo control inoperative
	Control changeover
	Control pressure too low
	Request denied
	Teleservice enabled
	Liebherr measuring system
	Socket on stick: Voltage 1
	Socket on stick: Voltage 2

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Symbol	Meaning
	Quick coupler 2 locks.
	Quick coupler unlocks.
	Quick coupler 2 unlocks.
	Quick coupler is unlocked.
	Quick coupler 2 is unlocked.
	No working tool in locking position

Tab. 16: Status symbols of quick coupler

Support

Symbol	Meaning
	Pontoon actuation active
	Outrigger movement
	Outrigger movement blocked
	Outrigger extension blocked
	Outrigger retraction blocked
	Support adjustment lever; neutral position required

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2 Remaining time until automatic engine stop

3 *Permanently deactivating automatic engine stop* button

5 *Increasing activation time for sensor-controlled low idle automatic* button

6 *Reducing activation time for sensor-controlled low idle automatic* button

▶ Activate sensor-controlled low idle automatic: (For more information see: 3.4.14 Sensor-controlled low idle automatic, page 151)

▶ (For more information see: 3.4.15 Automatic engine stop after idling (option), page 152)

3.2.9 *System settings* menu

Menu call: 

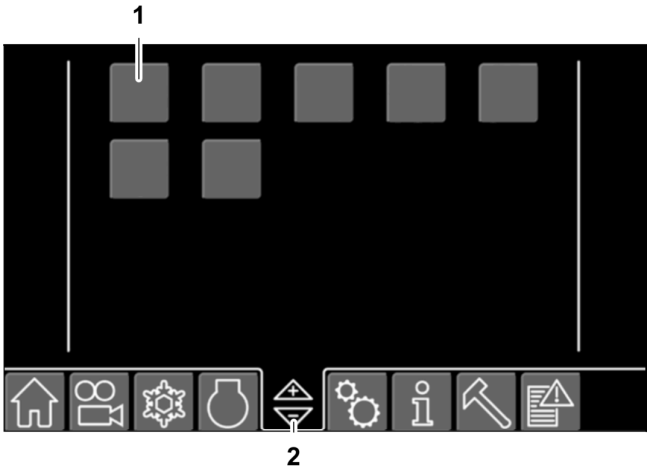

Fig. 244: System settings menu

1 Menu buttons

2 *System settings* menu

Quantity of menu buttons on the display depends on machine type and equipment.

Menu buttons	Description
	Operating hour meter and odometer (For more information see: 3.2.10 *Operating hour meter and odometer* submenu, page 88)
	Windscreen wiper interval (For more information see: 3.2.11 *Windscreen wiper interval* submenu, page 88)
	Radio remote control (For more information see: 3.2.12 *Radio remote control* submenu, page 89)
	Display settings (For more information see: 3.2.13 *Display settings* submenu, page 90)

Menu buttons	Description
	Central lubrication system (For more information see: 3.2.26 *Central lubrication system* submenu (option), page 98)
	Maintenance (For more information see: 3.2.27 *Maintenance* submenu, page 98)
	SF (For more information see: 3.2.28 *SF* submenu, page 100) User profile
	Auxiliary tank auxiliary heater
	Stick cylinder shut-off (For more information see: 3.2.29 *Stick cylinder shut-off* submenu (option), page 102)
	Hoist cylinder shut-off (For more information see: 3.2.30 *Hoist cylinder shut-off* submenu (option), page 103)
	Stick cylinder shut-off and hoist cylinder shut-off (For more information see: 3.2.31 Stick cylinder shut-off and hoist cylinder shut-off submenu (option), page 103)
	Workspace limitation (For more information see: 3.2.32 *Workspace limitation* submenu (option), page 104)
	Height-adjustable cab
	Wheeled undercarriage
	Rail undercarriage
	Automatic reversing fan drive (For more information see: 3.2.33 *Automatic reversible fan drive* submenu (option), page 104)
	Comfort slewing brake (For more information see: 3.2.34 *Comfort slewing brake* submenu (option), page 105)

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Menu buttons	Description
	Operating time (For more information see: 3.2.37 *Operating time* submenu, page 107)
	Fuel consumption (For more information see: 3.2.38 *Fuel consumption* submenu, page 108)
	Power consumption
	Key assignment (For more information see: 3.2.39 *Key assignment* submenu, page 108)
	Rail operation odometer
	Road travel position

Tab. 28: Information menu

3.2.37 *Operating time* submenu

Menu call:  > 

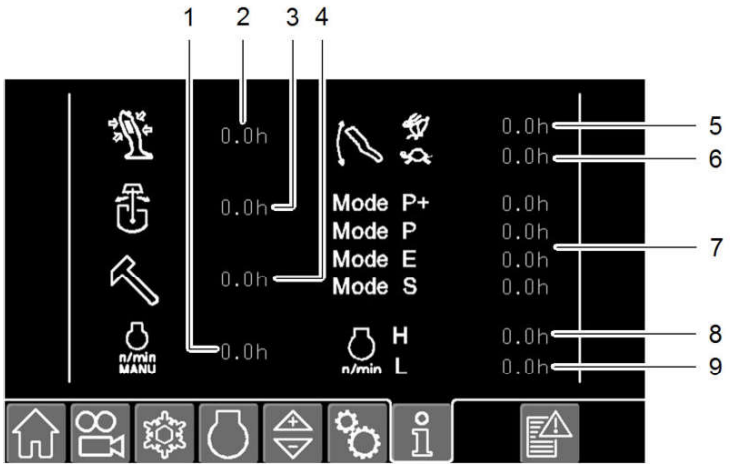

Fig. 320: Operating time submenu

1 No function assigned
2 Joysticks
3 Slewing gear
4 Working tool
5 Travelling in high gear
6 Travelling in creeper gear
7 Modes
8 Maximum engine speed
9 Minimum engine speed

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3 Safety belt
4 Adjusting armrest angle
5 Armrest
6 Head restraint
7 Seat heating, seat air conditioning[18)]
8 Lumbar support[18)]
11 Belt buckle
12 Horizontal suspension[18)]
13 Adjusting seat cushion
14 Adjusting seat height[18)]
15 Shock absorption

DANGER
Unexpected machine movement!
Danger to life.

▶ Exclusively adjust operator's seat when safety lever or folding console is in upper position.

Adjusting seat position

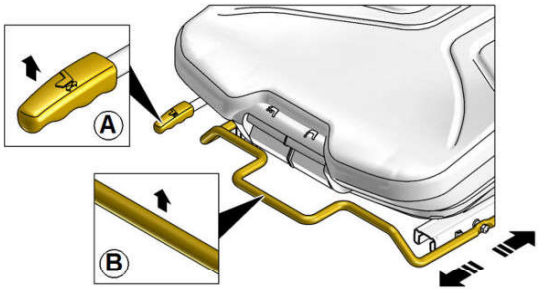

Fig. 341: Adjusting seat position

A Adjusting seat position without armrests
B Adjusting seat position with armrests

Adjusting armrests

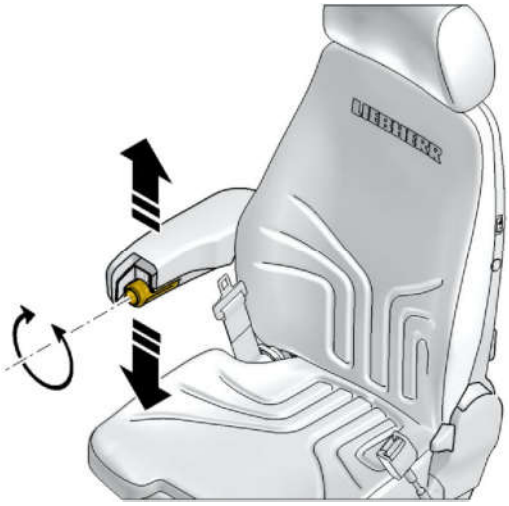

Fig. 342: Adjusting armrest angle

[18)] Option

NOTICE
Incorrect adjustment of operator's cab!
Damage to operator's cab and machine.

- ▶ Make sure there are no obstacles in the range of movement of operator's cab.
- ▶ Exclusively adjust operator's cab when machine is at a standstill.

Raising and lowering operator's cab

Note
Different machine configuration!

- ▶ Adhere to control description sticker. (For more information see: 2.4.3 Control description sticker, page 45)

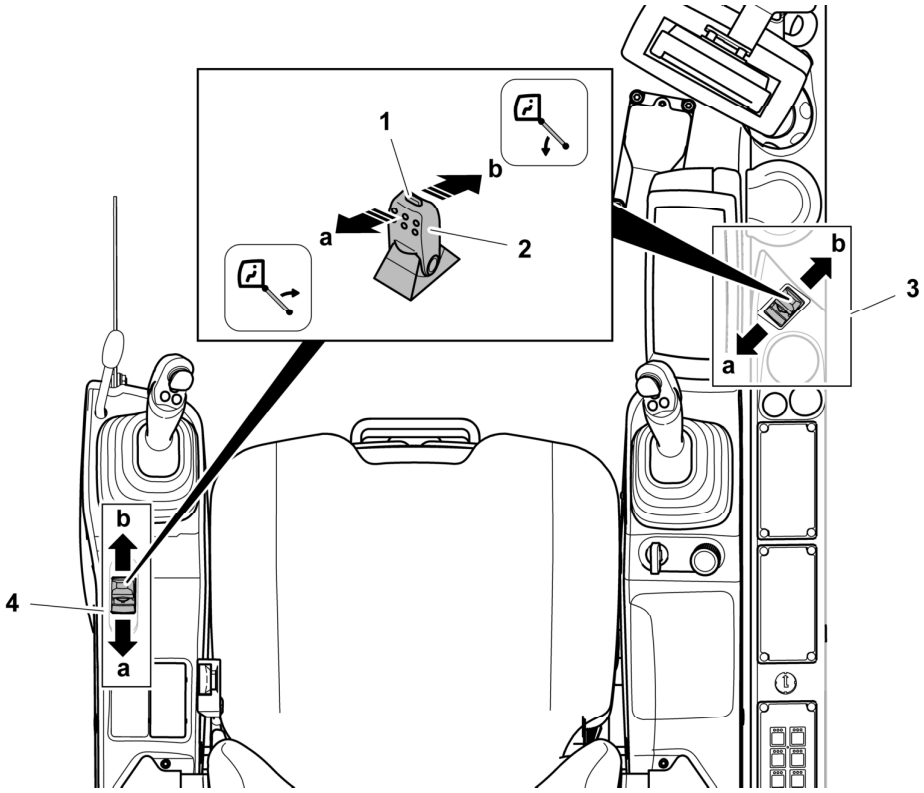

Fig. 372: Raising and lowering operator's cab

1	Unlocking button	**4**	Cab adjustment lever in left control console (control description sticker)
2	Cab adjustment lever	**a**	Raising operator's cab
3	Cab adjustment lever in right cab trim (control description sticker)	**b**	Lowering operator's cab

Raising operator's cab

- ▶ Press unlocking button **1**.
- ▶ Move cab adjustment lever **2** in direction **a**.

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3.3.20 Windscreen wipers

Key		Status of LEDs	Operating mode
Windscreen		○ ☀ ○	Intermittent operation: Press once.
		○ ○ ☀	Continuous operation: Press twice.
Roof glass panel		○ ☀ ○	Intermittent operation: Press once.
		○ ○ ☀	Continuous operation: Press twice.
Floor glass panel (without function for machines without floor glass panel)		○ ☀ ○	Intermittent operation: Press once.
		○ ○ ☀	Continuous operation: Press twice.

Tab. 35: Operating mode

3.3.21 Windscreen washer system

Windscreen washer system for windscreen

- ▶ Switch on windscreen washer system: Press and hold *windscreen* key.
  - ▷ Windscreen wiper is in continuous operation.
  - ▷ Washer fluid is sprayed onto the window.

Windscreen washer system for roof glass panel

- ▶ Switch on windscreen washer system: Press and hold *roof glass panel* key.
  - ▷ Windscreen wiper is in continuous operation.
  - ▷ Windscreen washer fluid is sprayed onto the glass panel.

Windscreen washer system for floor glass panel

In machines without floor glass panel, the *floor glass panel* key is without function.

- ▶ Switch on windscreen washer system: Press and hold *floor glass panel* key.
  - ▷ Windscreen wiper is in continuous operation.
  - ▷ Washer fluid is sprayed onto the window.

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3.4.9 Operator code (option)

The allocation of operator codes prevents use of the machine by unauthorised persons.

An authorised person programs operator codes into the machine and allocates the operator codes to authorised persons.

If operator codes have been programmed, machine can be enabled for starting only with the operator codes.

Enabling machine for starting

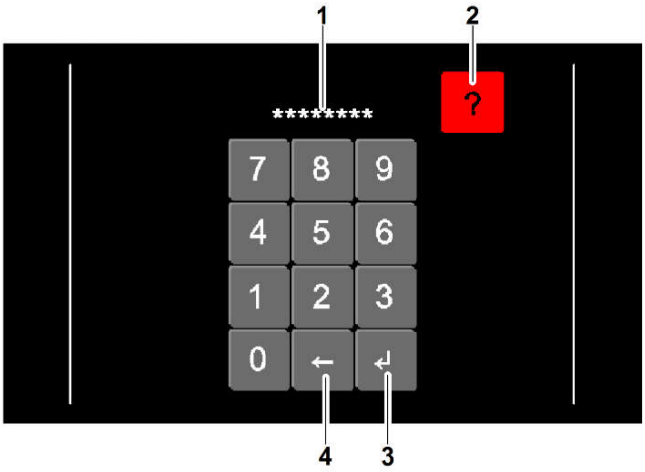

Fig. 424: Display keyboard for operator code

1	Display for operator code	**3**	*Accept* button
2	*Operator code incorrect* symbol	**4**	*Delete* button

Make sure the following preconditions are met:
- ❑ Battery main switch is switched on.
- ❑ Folding console is up.
- ❑ Ignition key is in position 1.

If no operator code has been programmed:
- ▶ Enter any 8-digit number via display keyboard.

If operator code has been programmed:
- ▶ Enter operator code via display keyboard.
  - ▷ Operator code is displayed as asterisks on display for operator code **1**.
- ▶ Confirm entry: Press *accept* button **3**.

If operator code was entered incorrectly:
- ▶ Enter operator code again.
  - ▷ Operator code is displayed as asterisks on display for operator code **1**.
- ▶ Confirm entry: Press *accept* button **3**.
  - ▷ *Operator code incorrect* symbol **2** disappears:

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3.4.19 Travel alarm (option)

Note
Different machine configuration!

▶ Observe control description sticker.

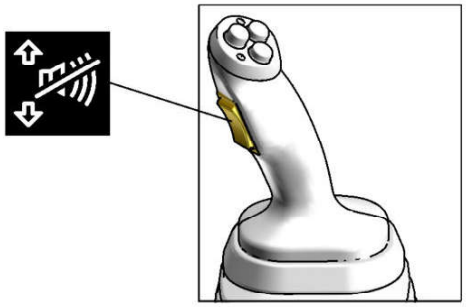

Fig. 455: Switching off travel alarm switch

▶ Push top of *switching off travel alarm* switch.
▷ Warning sound stops after 10 s.

3.4.20 Controlling working attachment

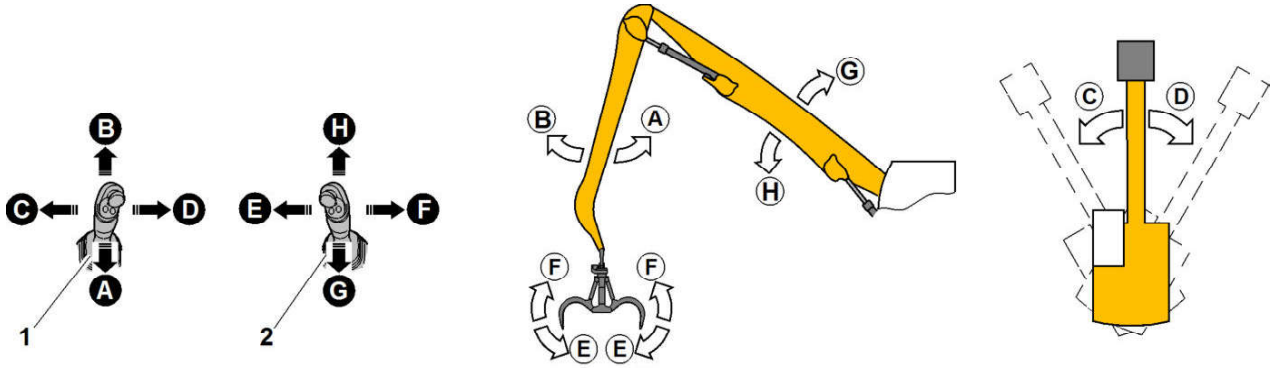

Fig. 456: Controlling working attachment with monoblock

1	Left joystick	**C**	Turning uppercarriage left	**G**	Raising boom
2	Right joystick	**D**	Turning uppercarriage right	**H**	Lowering boom
A	Retracting stick	**E**	Closing grapple		
B	Extending stick	**F**	Opening grapple		

Note
Different machine configuration!

▶ Observe control description sticker.

Left joystick

Function	Operation
Retract stick.	Move in direction retracting stick **A**.

3.4.29 Changing over control of right mini-joystick (option)

The option can be used to assign the control of the working tool from mini-joystick to the joystick.

Note
It is not possible to control the tipping mechanism if the control of the working tool is switched to the right joystick.

▶ Change control of working tool to right mini-joystick.

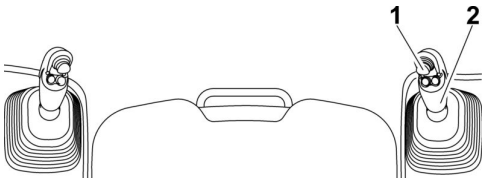

Fig. 484: Right joystick

1 Right mini-joystick **2** Right joystick

Controlling working tool with right joystick

Changing over control

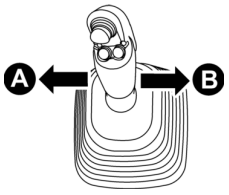

Fig. 485: Controlling working tool with joystick

▶ Press *control changeover* key.

▶ Press confirmation button.
▷ LEDs in key light up.
▷ *Control changed over* status symbol appears on the display:

Controlling working tool

▶ Move right joystick **2** in direction **A** or **B**.

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- ▶ Measure reaches.
- ▶ Make sure that the set minimum and maximum values are not exceeded.

Bypassing stick cylinder shut-off

- ▶ Press *bypassing stick cylinder shut-off* button.
- ▶ Press confirmation button.
  - ▷ *Stick cylinder shut-off bypassed* status symbol appears.

  - ▷ Warning sound sounds.
  - ▷ Shut-off points are bypassed for 10 seconds.
  - ▷ It is possible to move the stick without restrictions.

3.5.2 Hoist cylinder shut-off (option)

Hoist cylinder shut-off prevents collision between working attachment and obstacles in workspace.

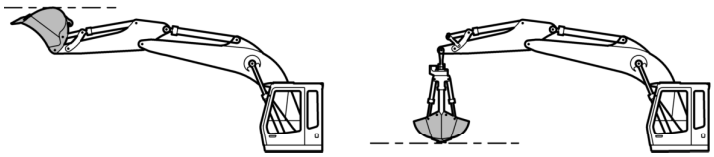

Fig. 527: Maximum height with bucket, minimum height with grapple

Depending on constellation of working tool and working attachment, the actual highest or lowest point is above or below the shut-off point of the hoist cylinders.

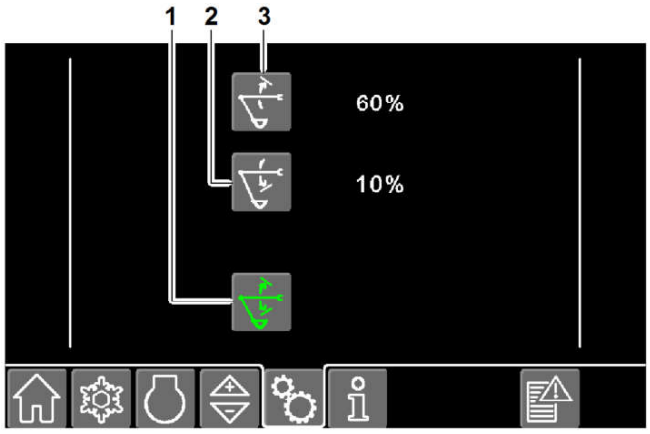

Fig. 528: Hoist cylinder shut-off menu

1 *Hoist cylinder shut-off* button
2 *Lower shut-off point* button
3 *Upper shut-off point* button

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Entering limit value of reduced working height manually

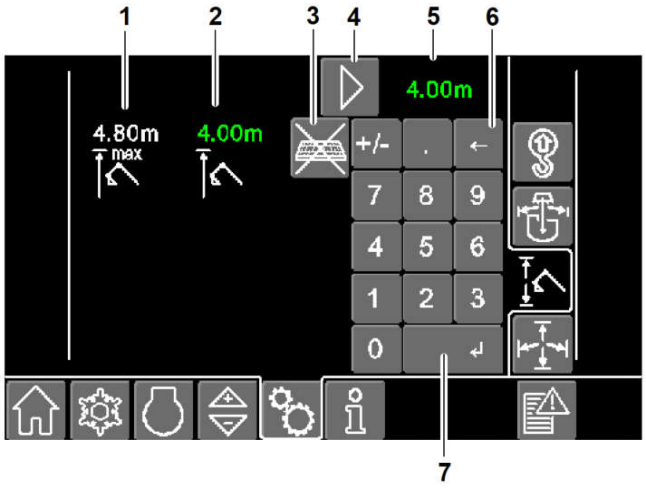

Fig. 569: Entering limit value manually

1	Limit value of maximum working height	**5**	Manually set limit value
2	Limit value of reduced working height	**6**	*Delete* button
3	*Hiding keyboard* button	**7**	*Accept* button
4	*Changeover* button		

Make sure the following preconditions are met:
- ❑ Height limitation is switched on.
- ❑ Machine is in working position.
- ❑ Working tool operating mode is selected.

▶ Press *showing keyboard* button.
▷ *Entering limit value manually* menu appears on the display.

If limit value of maximum working height **1** appears green:

▶ Press *changeover* button **4**.
▷ Limit value of reduced working height **2** appears in green.

If limit value of reduced working height **2** appears in green:

▶ Enter limit value of reduced working height **2**.

▶ Press *accept* button **7**.

▶ Press confirmation button.
▷ Limit value of reduced working height **2** is saved.

▶ Press *hiding keyboard* button **3**.
▷ *Height limitation* menu appears on the display.

Working with height limitation

DANGER
Collision between working attachment and obstacles!
Danger to life.

▶ Move working attachment slowly.

Troubleshooting
Depth limitation not enabled?
If confirmation button is not pressed within 5 seconds, depth limitation is not enabled.

▶ Enable depth limitation again.

▶ Turn key to left.

▶ Pull out key.

▶ Hand over key to supervisor.

If depth limitation is to be locked:
▶ Turn key to left.

▶ Pull out key.

▶ Hand over key to supervisor.

Entering minimum working height manually

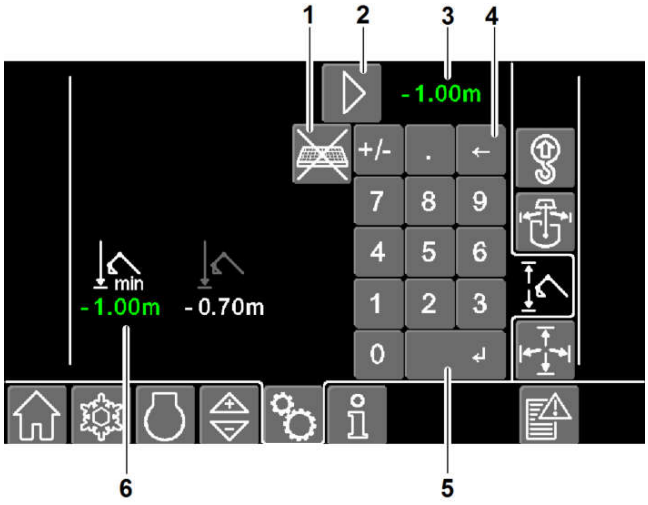

Fig. 605: Entering minimum working height manually menu

1	*Hiding display keyboard* button	**4**	*Delete* button
2	*Toggling height* button	**5**	*Accept* button
3	Manually set minimum working height	**6**	Limit value of minimum working height for bolt-in point of working tool

Make sure the following preconditions are met:
❑ Machine is in working position.
❑ Supervisor supervises adjusting of minimum working height.

▶ Insert authorisation key in key switch.

▶ Turn key to right into enabled position.

▶ Switch on depth limitation. (For more information see: Switching on depth limitation, page 194)

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Continuous warning sound

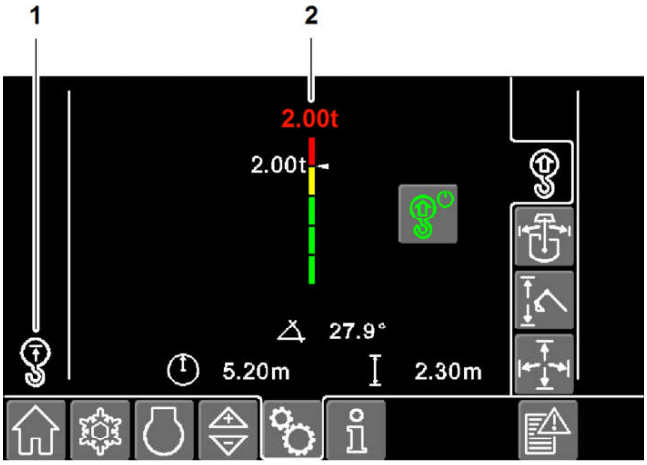

Fig. 650: Load moment limitation menu: Shut-off initiated

1 *Load moment limitation shut-off initiated* status symbol

2 Current load on hook

When 100% of limit value is reached, shut-off is initiated.

If shut-off has started:
- *Load moment limitation shut-off initiated* status symbol **1** appears on the display.
- Font colour for current load on hook **2** changes from yellow to red.
- Movements that increase load moment are stopped.
- Continuous warning sound sounds.

▶ Reduce reach.

▶ Put down load without increasing the reach.

▶ Turn uppercarriage to area that allows greater payload.

Switching off load moment limitation

Switching off load moment limitation using control unit A

▶ Press *load moment limitation* key.
▷ LEDs in *load moment limitation* key flash.
▷ *Confirmation required* status symbol appears on the display:

▶ Press confirmation button within 5 seconds.
▷ LEDs in *load moment limitation* key go off.
▷ *Load moment limitation not active* status symbol appears on the display:

- ▶ Exclusively raise and lower loads vertically.
- ▶ Move loads close to the ground.

3.6.9 Use of banksmen

Make sure the following preconditions are met:
- ❑ Banksman can be seen from the operator's platform.
- ❑ Banksman is aware of his task.
- ❑ Banksman knows hand gestures.
- ❑ Banksman wears high visibility clothing.
- ❑ In the dark or if visibility is poor, banksman works with signal lights.

3.6.10 Working in windy conditions

The wind gauge (option) is mounted on the uppercarriage. The warning thresholds for “high wind speed” and for “approved wind speed exceeded” are set machine-specifically by Liebherr customer service.

WARNING
Machine movement!
Injuries.

- ▶ Make sure that no-one is in danger zone.

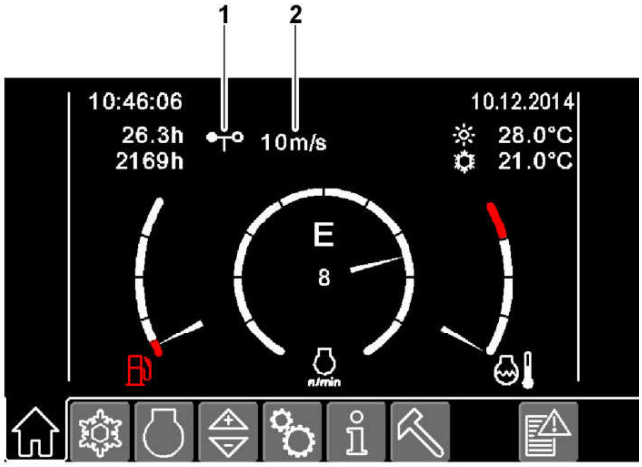

Fig. 675: Start page menu

1 Wind gauge symbol **2** Wind speed [27)]

If wind speed is high:
– Warning sound sounds once.
– Wind gauge **1** symbol switches from white to yellow.

If approved wind speed is exceeded:
– Continuous warning sound sounds.
– Wind gauge **1** symbol switches from yellow to red.

[27)] Display in m/s, km/h or mph possible. Is set by Liebherr customer service.

4 Malfunctions

Machine reports machines through following warnings:
- Warning symbols on the display
- Messages on the display
- Warning sounds in the operator's cab

Rectify malfunction:
- Identify meaning of warning.
- Identify effects and property of malfunction.
- Rectify cause of malfunction.

Contact Liebherr customer service:
- Specify machine type.
- Specify serial number.
- Specify year of manufacture.
- When work is performed on the machine:
  Make sure that the work is performed exclusively by trained staff.

4.1 Service code tables

4.1.1 Warning symbols

Symbol	Meaning	Effect, characteristic	Remedy
	Battery voltage is too high. Alternator is defective.	Electrical system is damaged.	Shut off diesel engine. Contact Liebherr customer service.
	Battery voltage is too low. Alternator is defective. Battery is defective.	Functionality is restricted.	
	Hydraulic oil level is too low. Hydraulic system leaks, oil loss.	Hydraulic system is damaged. Hydraulic output is reduced automatically.	Shut off diesel engine. Fill with hydraulic oil. If symbol is still displayed: Contact Liebherr customer service.
	Prewarning: Hydraulic oil temperature is high.	Hydraulic system is damaged. Hydraulic output is reduced automatically.	Shut off diesel engine. Check hydraulic oil cooler for contamination. Clean if necessary. If symbol is still displayed: Contact Liebherr customer service.
	Hydraulic oil temperature is too great. Hydraulic oil cooler is contaminated. Fan drive of hydraulic oil cooler is defective.		

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Malfunction / error	Cause	Remedy
Smoke development: Exhaust gas is blue.	Oil level is too high.	Correct oil level.
	Engine oil is entering the combustion chamber.	Contact Liebherr customer service.
	Compressor-side seal on the exhaust turbocharger is defective.	Contact Liebherr customer service.
	Crankcase ventilation is defective.	Contact Liebherr customer service.
Diesel engine is knocking.	Combustion process is malfunctioning.	Contact Liebherr customer service.
Diesel engine is pinging.	Valve clearance is excessive.	Contact Liebherr customer service.
	Injection nozzles are damaged or contaminated by carbon deposits.	Contact Liebherr customer service.
	There is bearing damage.	Contact Liebherr customer service.
	Piston rings are worn or broken.	Contact Liebherr customer service.
Unusual noises or noise emissions can be heard from the exhaust system.	Exhaust system has a leak.	Contact Liebherr customer service.
Diesel engine performance too low (underperformance).	Fill level in diesel exhaust fluid tank is too low.	Fill with diesel exhaust fluid.

4.2.2 Hydraulic system

Malfunction / error	Cause	Remedy
Unusual noises or noise emissions can be heard. Hydraulic pumps draw in air.	Stop valve on hydraulic tank is closed. Hydraulic oil level is too low.	Shut off diesel engine or electric motor immediately. Check stop valve and fill level.
Machine movements are too slow.	Selected speed step too low.	Select higher speed step or different operating mode.
Power modes do not achieve required performance.	Control is defective.	Contact Liebherr customer service.
Hydraulic oil temperature is too high.	Radiator is contaminated.	Clean radiator.
	Fan drive is defective.	Shut off diesel engine or electric motor. Contact Liebherr customer service.
Hydraulic oil level is too low.	Hydraulic system is leaking and losing oil.	Contact Liebherr customer service.
No function assigned to control elements.	Servo control is switched off. Folding console is up.	Switch on servo control. Move folding console down.
	Control is defective.	Contact Liebherr customer service.

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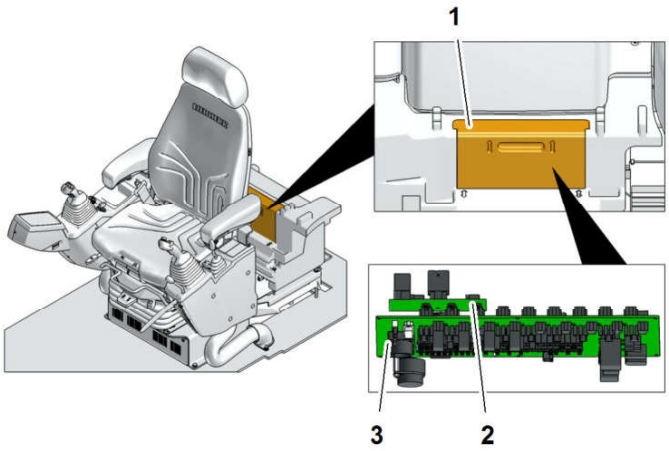

Fig. 758: Operator's platform fuses and relays

1 Cover
2 Additional printed circuit board A166
3 Main circuit board A161

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

Maintenance / inspection after service hours								Tasks to be performed		
On handover	All 8-10 h	All 50 h	All 500 h	All 1000 h	All 2000 h	Other intervals	Additional labelling	**By maintenance staff** ■ Once-only activity ● Repeat interval ✦ If necessary ❄ Annually before the winter **By authorised specialist staff** ☐ Once-only activity ❍ Repeat interval ✧ If necessary **Additional labelling** Assistance required Have this task carried out exclusively by a certified electrician	Confirm tasks	See page
		●	❍	❍	❍			Bypass filter (option): Check degree of contamination of filter cartridge.		314
						✧		Bypass filter (option): Replace filter cartridge. (For more information see: Filter replacement, page 269)		
						✧		Bypass filter (option) integrated in return filter: Replace filter cartridge. (For more information see: Filter replacement, page 269)		
			❍	❍	❍			Control oil unit: Replace filter cartridge.		
			❍	❍	❍			Supply pump: Replace filter cartridge.		
			❍	❍	❍			Hydraulic components: Checking mounting.		
				❍	❍			Hydraulic components: Check condition and tightness.		
						✧		Replace hydraulic hoses.		
Electrical system										
☐			❍	❍	❍			Checking internal and external lighting of the machine.		
			❍	❍	❍			Batteries: Check acid density and acid level in the battery cells.		
			❍	❍	❍			Batteries: Check and clean wire terminals and terminal posts.		
			❍	❍	❍			Batteries: Check condition and correct installation of degassing hoses.		
			❍	❍	❍			Rotary connection: Maintain slip rings.		
☐				❍	❍			Check entire electrical system and its components.		
					❍			Check condition of electrical cables and tightness of plug connections.		
Travel gearbox										
☐			❍	❍	❍			Travel gearbox: Check oil level and tightness.		
			☐		❍			**If travelling proportion of machine is less than 20 %:** Travel gearbox: Change oil (at least every 2 years).		
			☐	❍	❍			**If travelling proportion of machine is greater than 20 % or in dust intensive applications:** Travel gearbox: Change oil (at least every 2 years).		
				❍	❍			Check function of brakes.		
Travel gear										
☐	●	●	❍	❍	❍			Check track tension.		316
		●	❍	❍	❍			Track pads and sprocket wheels: Check mounting.		320

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Adhere to machine-specific filling quantity of air conditioning.

5.3.5 Coolant

Requirements for water used

Make sure that water used meets the following requirements:
– In accordance with directive on drinking water of the World Health Organisation (WHO) from 2006

Corrosion inhibitors

Liebherr recommendation

Description	Manufacturer
Caltex XL Corrosion Inhibitor Concentrate	Chevron Texaco
Chevron Heavy Duty Extended Life Corrosion Inhibitor Nitrite Free (ELC)	Chevron Texaco
Havoline Extended Life Corrosion Inhibitor (XLI)	Chevron Texaco
Total WT Supra	Total, Paris

Tab. 78: Liebherr recommendation with mixing ratio 50:50

Anti-freeze and corrosion protection agent

Liebherr recommendation

Type	Description
Concentrate	Liebherr-Antifreeze OS Concentrate
Premix A)	Liebherr-Antifreeze OS Mix

Tab. 79: Liebherr recommendation

Ambient temperature	Mixing ratio
down to -50 °C	40 % water 60 % anti-freeze and corrosion protection agent
down to -37 °C	50 % water 50 % anti-freeze and corrosion protection agent

Tab. 80: Mixing ratio

A) Premix = ready-mixed product (50% water and 50% anti-freeze and corrosion protection agent)

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5.5 Preparing for maintenance

5.5.1 Preparing for maintenance

Maintenance instructions

The sequence of maintenance work is based on the maintenance and inspection schedule. The ideal sequence for maintenance work is not allowed for.

- ▶ Clean machine carefully before starting maintenance work.
- ▶ Observe maintenance intervals.

Safety instructions

- ▶ Make sure that no persons are in the danger zone during maintenance and repair work.
- ▶ If necessary, secure a large area.
- ▶ Inform operating before starting maintenance and repair work.
- ▶ Appoint a supervisor.

If no other instructions have been made:
- ▶ Maintain machine on even, firm ground with working attachment lowered and diesel engine or electric motor switched off.

When working under machine:
- ▶ Hang warning sign stating "Do not switch on!" on ignition lock so it is clearly visible.
- ▶ Pull out ignition key.
- ▶ Switch off power supply.

If working above head height:
- ▶ Exclusively use approved safe ladders and working platforms.
- ▶ Exclusively use designated machine components as climbing aids.

Put on personal protective equipment against falling:
- – When working with one hand on the machine at a height above 2 m without a possibility of standing with your feet sufficiently far apart to ensure firm standing
- – When working with two hands on the machine at a height above 2 m without fall protection constructions
- ▶ Wear safety harnesses when working at height.
- ▶ Clean dirt, oil, ice and snow from steps, ladders, anti-slip mats, handrails, pedestals, platforms and handles.

If machine is equipped with height adjustable cab:
- ▶ Lower operator’s cab to bottom position.

If maintenance work or repair work requires operator's cab in top position:
- ▶ Make sure that operator’s cab is supported in proper and secure manner.

When working under a raised machine:
- ▶ Make sure that machine is supported in a proper and secure manner.
- ▶ Avoid metal on metal contact.
- ▶ Make sure that changes to weight distribution do not endanger stability of machine.

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5.8.4 Fuel pre-filter: Draining water

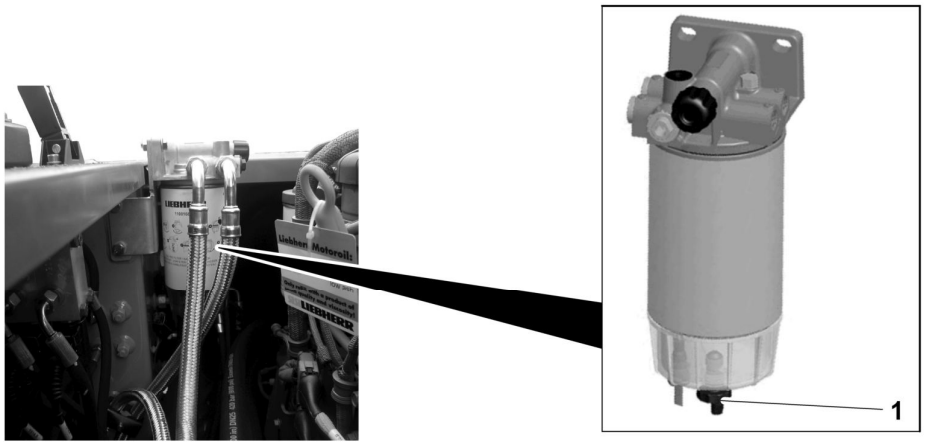

Fig. 777: Draining water

1 Water drain tap

DANGER
Explosion of highly flammable fuel!
Danger to life.

- ▶ Avoid naked flames.
- ▶ Do not smoke.

WARNING
Engine hot!
Burns.

- ▶ Let engine cool down.
- ▶ Wear protective gloves.
- ▶ Avoid skin contact with engine when hot.

- ▶ Place suitable receptacle under the fuel pre-filter.
- ▶ Open water drain tap **1**.
  ▷ Condensed water in transparent container flows out.
- ▶ Drain water until pure fuel emerges.
- ▶ Close water drain tap **1**.
- ▶ Dispose of condensed water in an eco-friendly manner.

5.8.5 Fuel tank: Draining water and sediments

NOTICE
Condensed water in tank!
Engine damage.

- ▶ Make sure that fuel tank is filled during idle times.

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Contamination level of diesel particulate filter

NOTICE
Contaminated diesel particulate filter!
Damage to diesel engine.

- ▶ Shut off diesel engine.
- ▶ Have diesel particulate filter checked by Liebherr customer service.

The bar chart display on the display shows the contamination level of the diesel particulate filter in five stages. The pointer above the bar chart display indicates the degree of contamination of the diesel particulate filter.

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 5
Stage shown on the display						
Activation of filter regeneration	—	—	—	Manual	Manual	Manually by Liebherr customer service
Deactivating or cancelling filter regeneration	—	—	—	Deacti-vating or cancelling possible	Cancelling possible	Cancelling possible

Tab. 101: Contamination level of diesel particulate filter

Warning symbols and status symbols on the display

Symbol on the display		Meaning	Effect
	*Increased exhaust temperature* status symbol appears on the display.	Exhaust temperature is increased.	Automatic filter regeneration is active.
	*Diesel particulate filter contaminated* status symbol appears on the display.	Diesel particulate filter is contaminated.	Filter regeneration is required. (For more information see: Activating filter regeneration, page 298)
	*Diesel particulate filter heavily contaminated* status symbol appears on the display.	Diesel particulate filter is heavily contaminated.	Filter regeneration is required. (For more information see: Activating filter regeneration, page 298)
	*Prewarning: Control error of diesel engine* warning symbol appears on the display.	Engine power and hydraulic flow are restricted to 75%.	Filter regeneration is required. (For more information see: Activating filter regeneration, page 298)

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5.10 Working hydraulics

5.10.1 Depressurising hydraulic system

Depressurising hydraulic hoses

Make sure the following preconditions are met:
❑ Ignition key is in position 1.

▶ Lower working attachment to the ground.

▶ Shut off diesel engine or electric motor immediately.

▶ Move folding console downwards.

▶ Operate joysticks and pedals carefully in all directions.
▷ Hydraulic lines are depressurised.

Depressurising hydraulic tank

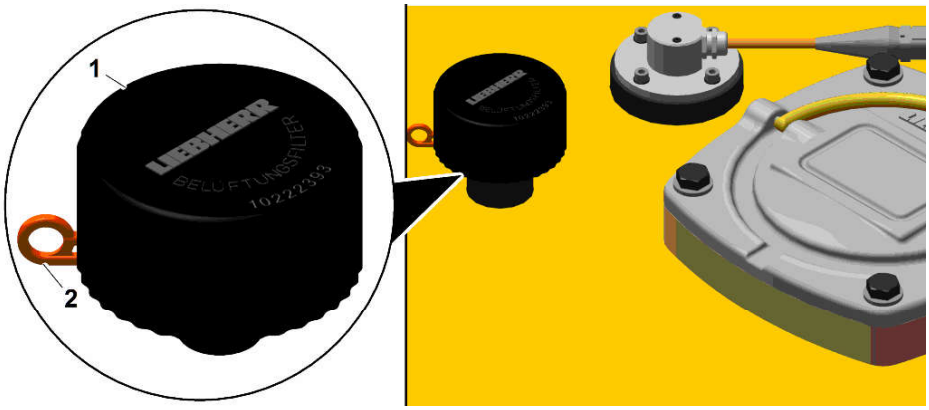

Fig. 816: Depressurising hydraulic tank

1 Breather filter **2** Securing pin

▶ Insert securing pin **2**.

▶ Unscrew breather filter **1** by hand by a maximum of one turn. Use open-end spanner if necessary.
▷ Hydraulic tank is depressurised.

When maintenance tasks on hydraulic system are complete:
▶ Screw in breather filter **1**.

▶ Pull out securing pin **2** (theft prevention).

5.10.2 Hydraulic tank: Checking oil level

Checking hydraulic oil level

The hydraulic oil level depends on the hydraulic oil temperature.

Make sure the following preconditions are met:
– Machine is parked on level ground.

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5.12.2 Tightening track

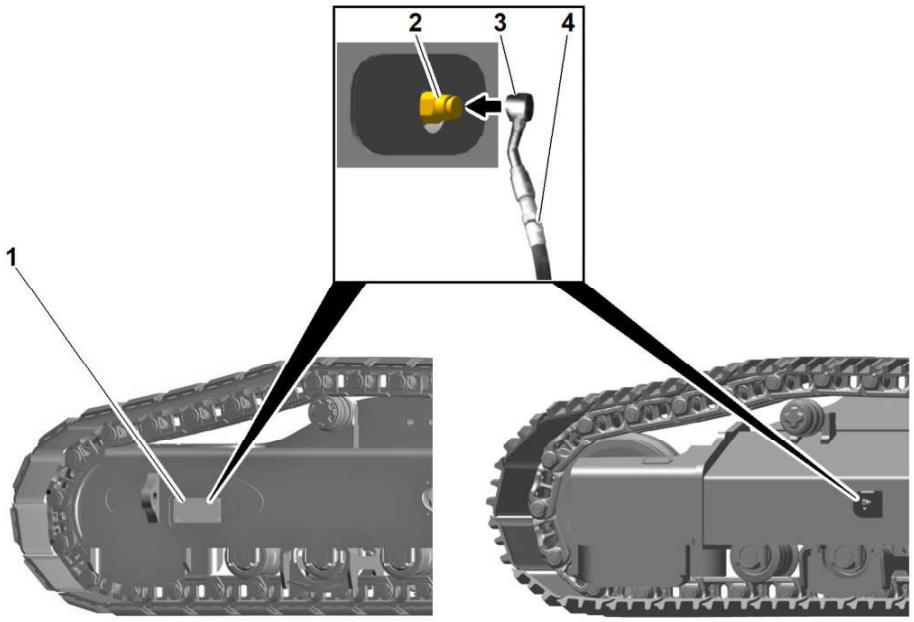

Fig. 825: Tightening track

1	Cover (type dependent)	**3**	Grease fitting adapter
2	Grease fitting	**4**	Grease gun hose

Make sure the following preconditions are met:
- ❑ Machine is parked on level and firm ground.
- ❑ Machine is secured against rolling away.

▶ Clean track.

▶ Remove objects jammed in track.

If cover **1** is installed:

▶ Remove cover **1**.

▶ Clean grease fitting **2**.

▶ Connect supplied grease fitting adapter **3** to grease gun hose **4**.

▶ Connect grease fitting adapter **3** to grease fitting **2**.

▶ Inject grease until track tension corresponds to specifications. (For more information see: 5.12.1 Checking track tension, page 316)

▶ Attach cover **1**.

Troubleshooting
Track tension is not increasing?
Grease fitting or tensioning unit is damaged.

▶ Replace grease fitting and tensioning unit. For procedure see service manual under chapter 130.

If service manual cannot be accessed:

▶ Have repairs performed by Liebherr customer service.

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5.14.3 Auxiliary heater (option): Checking function

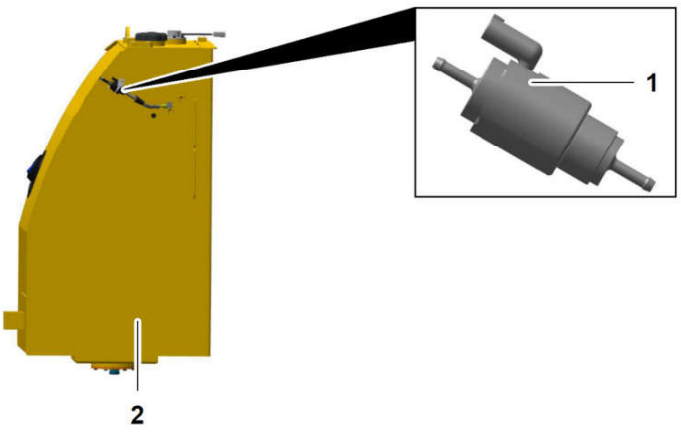

Fig. 837: Checking auxiliary heater

1 Fuel filter **2** Fuel tank

- ▶ Put auxiliary heater into service according specifications in manufacturer's manual.
- ▶ Check heating air flow for sufficient air outlet output.
- ▶ Repair auxiliary heater. For procedure, refer to component documentation.

If component documentation cannot be accessed:

- ▶ Have repairs performed by Liebherr customer service.
- ▶ Clean fuel filter **1** if necessary.

5.14.4 Switching on air conditioning unit

NOTICE
Downtime too long!
Damage to air conditioning unit.

- ▶ Switch on air conditioning unit in winter too.

- ▶ Make sure diesel engine or electric motor is running.
- ▶ Activate AUTO operating mode.
- ▶ Wait 15 minutes.
- ▶ Deactivate AUTO operating mode.

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