Operator's manual

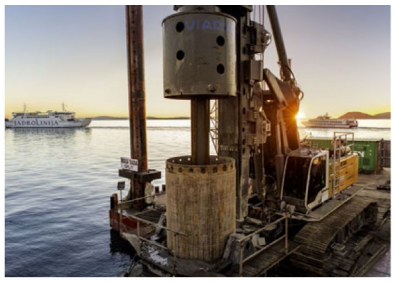
en

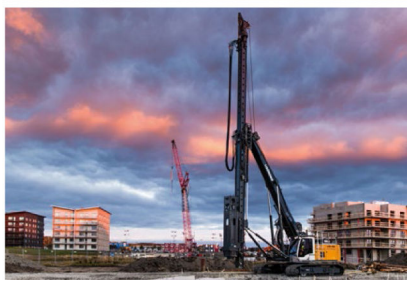
Model:

LR 1160

Serial number:

134237





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1.2 Declaration of conformity

Right behind the cover sheet, the documentation contains the EU declaration of conformity in acc. with guideline 2006/42/EU when delivering the machine with CE label. The EU declaration of conformity in its present version and language is valid in all countries of the European Union as well as in countries that recognize the guideline 2006/42/EU. Additional documentation may also be enclosed like documents relating to a prototype test or an international approval test. The test report for individual verification is archived with the manufacturer and can be requested if required.

Name		Value
L2	Rotation axis to front edge of the cabin	3805 mm
L3	Rotation axis to pivot point of main boom base section	1500 mm
L4	Rotation axis to center of tumbler	3625 mm
L5	Wheelbase (center of idler wheel to center of tumbler)	7200 mm
L6	Length of crawler side frame	8467 mm
L7	Rear edge of crawler side frame to rear edge of rear counterweight	1246 mm
L8	Rotation axis to rear counterweight	5541 mm
B1	Width of uppercarriage	3000 mm
B2	Width of rear counterweight	6050 mm
B3	Width of base plates	1000 mm
H1	Height of main boom base section pivot point	2171 mm
H2	Ground clearance rear counterweight	1558 mm
H3	Ground clearance undercarriage	540 mm
H4	Height of crawler side frame	1424 mm
R	A-frame1 swing radius	7700 mm
R1	Rear counterweight swing radius	5900 mm

Tab. 14: Dimensions of basic machine

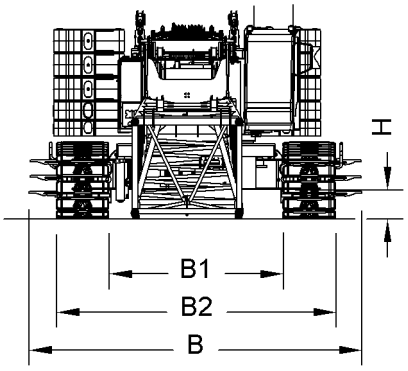


Fig. 8: Dimensions of basic machine with track width adjustment

Name		Value
B	Width of undercarriage with ladder	6100 mm
H	Maximum ground clearance basic machine (with carbody counter-weight)	540 mm
Detailed dimensions:		
B1	Width of inside edges of the base plates when narrow track is used	3600 mm
B2	Width of the outside edges of the base plates when narrow track is used	5600 mm

Tab. 15: Dimensions basic machine with track width adjustment

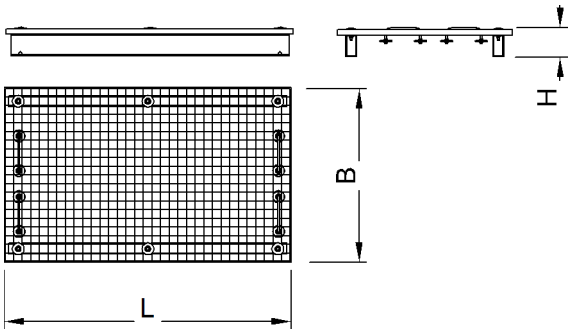


Fig. 26: Dimensions platform 1325 mm x 806 mm

Name		Value
L	Length	1325 mm
B	Width	806 mm
H	Height	133 mm
Weight		79 kg

Tab. 20: Technical data platform 1325 mm x 806 mm

Platform 4012 mm x 805 mm

Two platforms are included within the scope of delivery.

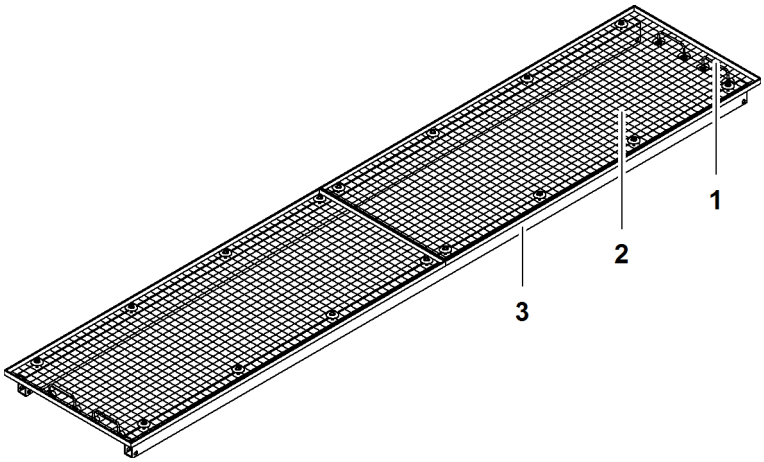


Fig. 27: Platform 4012 mm x 805 mm

1 Handle (4x)
2 Platform
3 Frame (2x)

8 Pivot point (2x) on uppercarriage
9 Catwalk
10 Limit switch main boom tilting-back supports (2x)
11 Main boom limit switch plate
12 Catwalk
20 Cable drum
21 Boom type plate (2x)
22 Pin connection point (4x)
23 Rope pulley for rope reeving winch
24 Transport bracket (4x) for double-taper pins

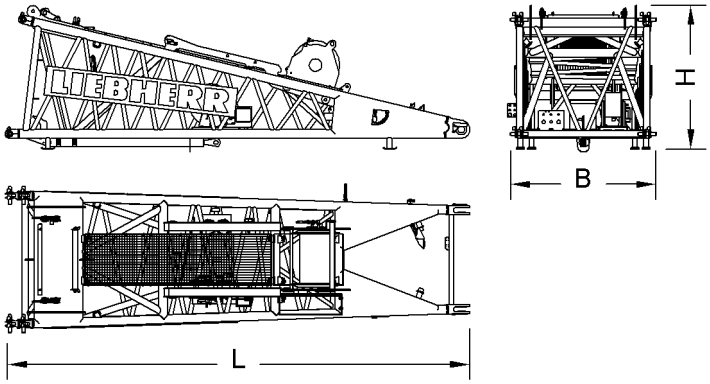


Fig. 50: Dimensions of main boom base section 2018.23

Name		Value
System length		7000 mm
System width		2000 mm
System height		1800 mm
L	Length	7300 mm
B	Width	2140 mm
H	Height	2300 mm
Weight (incl. pendant straps, luffing jib luffing winch and rope)		4600 kg
Weight (incl. pendant straps, without luffing jib luffing winch)		3000 kg
Double-taper pins Ø		65 mm

Tab. 29: Technical data main boom base section 2018.23

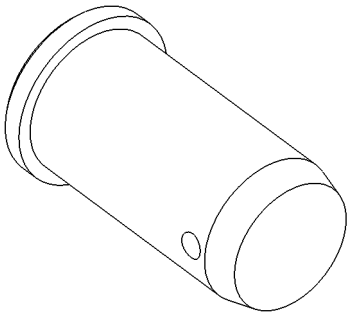


Fig. 71: Pins for pendant straps (illustration of principle)

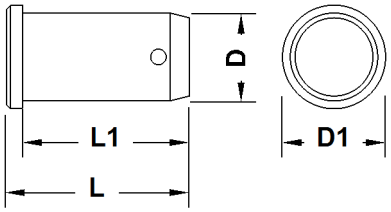


Fig. 72: Dimensions pins for pendant straps

Name		Value
L	Total length	120 mm
L1	Length	112 mm
D	Diameter	50 mm
D1	Outer diameter	58 mm

Tab. 39: Technical data pins for pendant straps

1.10.8 Pendant straps on main boom 2018

Pendant straps on main boom base section 2018.23

Connection link

The connection link serves to pin A-frame1 base of pendant straps with the main boom base section when using the basic machine as assembly crane.

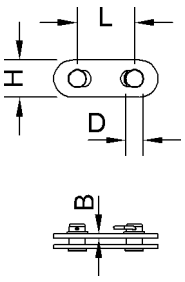


Fig. 73: Dimensions connection link on main boom base section 2018.23

Name		Value
L	Length of connection link	200 mm

Forks in front of reducing adapter

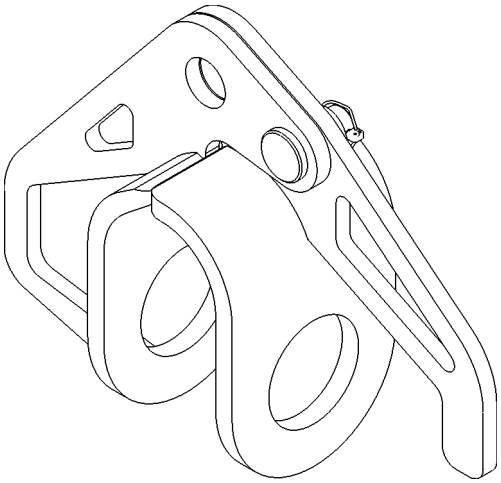


Fig. 91: Forks in front of reducing adapter (illustration of principle)

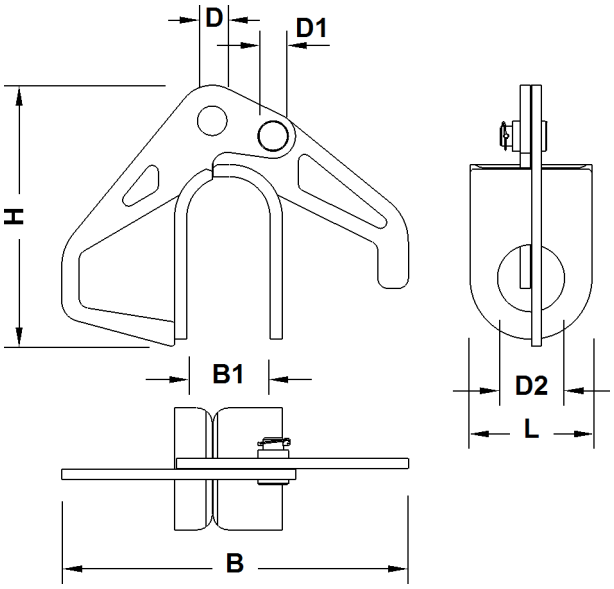


Fig. 92: Dimensions forks in front of reducing adapter

Name		Value
L	Length of fork	120 mm
B	Width	341 mm
B1	Width of fork	82 mm
H	Height	257 mm
D	Pin Ø	28 mm
D1	Pin Ø	20 mm
D2	Pin Ø	65 mm

Tab. 52: Technical data forks in front of reducing adapter

Forks in front of reducing adapter

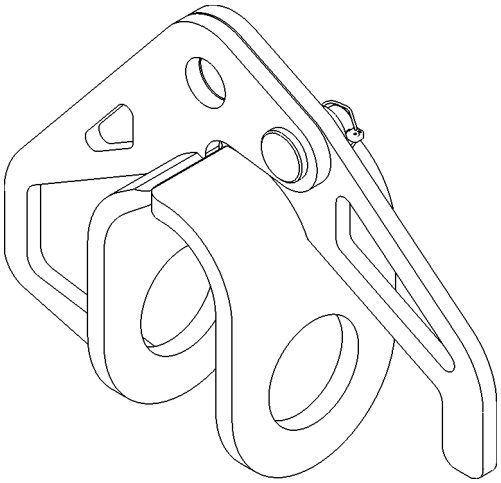


Fig. 118: Forks in front of reducing adapter (illustration of principle)

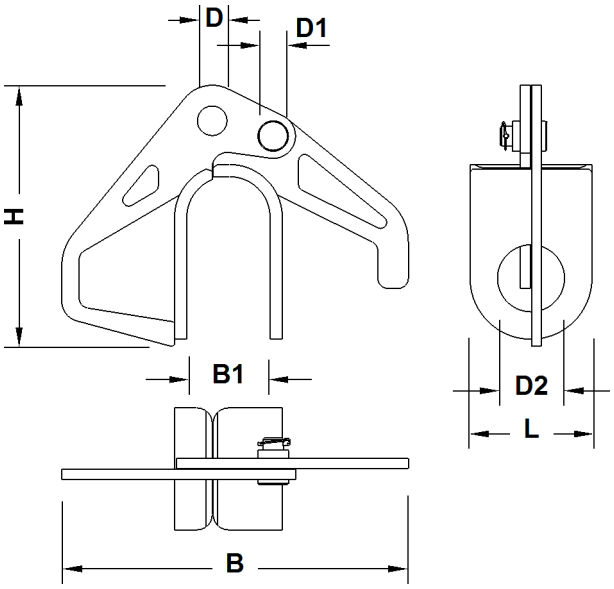


Fig. 119: Dimensions forks in front of reducing adapter

Name		Value
L	Length of fork	120 mm
B	Width	341 mm
B1	Width of fork	82 mm
H	Height	257 mm
D	Pin Ø	28 mm
D1	Pin Ø	20 mm
D2	Pin Ø	65 mm

Tab. 66: Technical data forks in front of reducing adapter

Name		Value
System height		800 mm
L	Length	6500 mm
B	Width	1090 mm
H	Height	1020 mm
Weight (incl. pendant straps)		920 kg

Tab. 79: 1008.20 jib head section, technical data

1.15.5 Pendant straps on fixed jib 1008

Pendant straps on A-frame2

A-frame2 base of pendant straps (jib backstay strap)

Installation site in operation:
– Fixed jib 1008 (For more information see: Jib backstay straps A-frame2 to main boom head section 2018, page 1119)

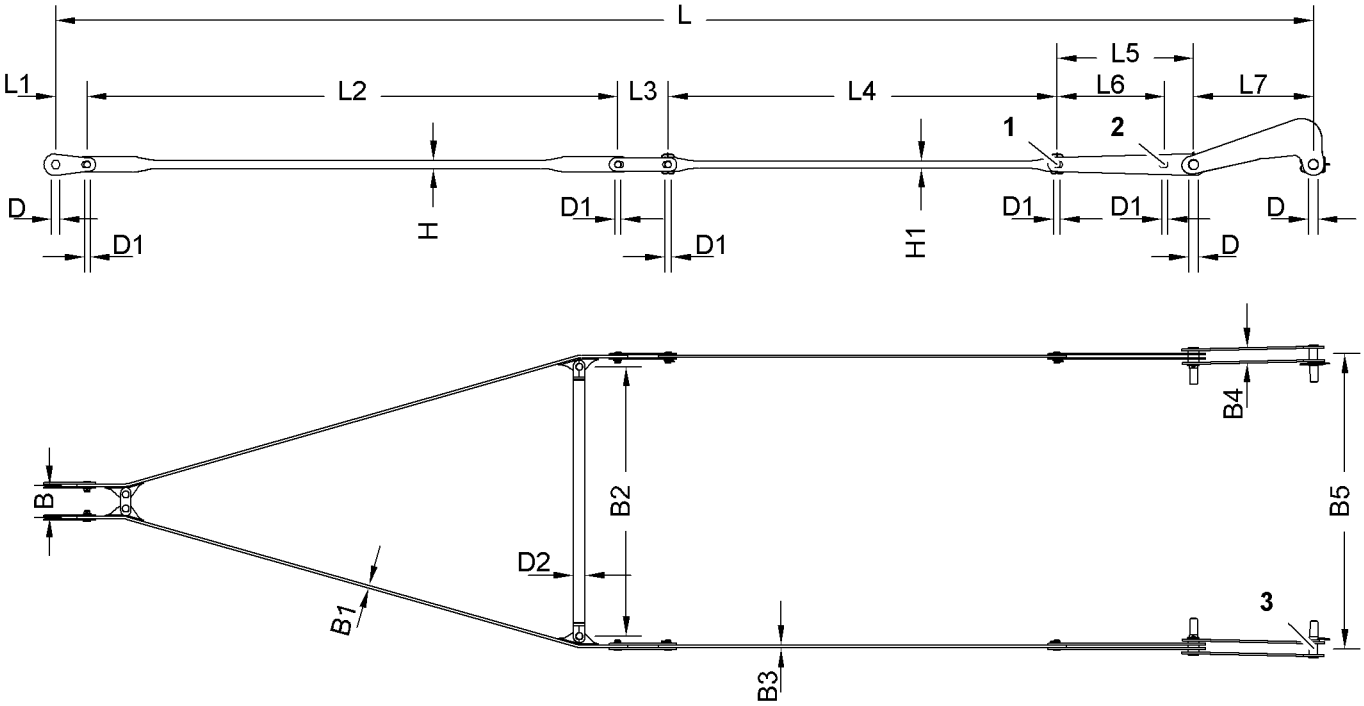


Fig. 146: Dimensions A-frame2 base of pendant straps (jib backstay strap)

1 Pin connection point 30° **2** Pin connection point 15° **3** Taper pin 285 mm/Ø65 mm (2x)

Taper pins (285 mm x Ø65 mm) **3** replaces the double-taper pins on the main boom head.

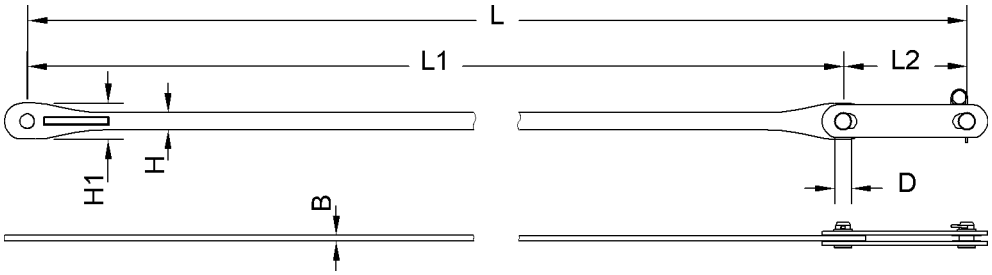


Fig. 170: Dimensions jib pendant strap 3 m

Name		Value
L	Length	3000 mm
L1	Length of pendant strap	2610 mm
L2	Length of connection link	390 mm
B	Width of pendant strap	18 mm
H	Height of pendant strap	54 mm
H1	Height	113 mm
D	Pin Ø	45 mm
Weight		48 kg

Tab. 95: Technical data jib pendant strap 3 m

Pendant straps on jib section 0806.15 6 m

Jib pendant strap 6 m

Installation site in operation:
– Fixed jib 0806 (For more information see: A-frame2 to jib head 0806 section pendant straps, page 1129)

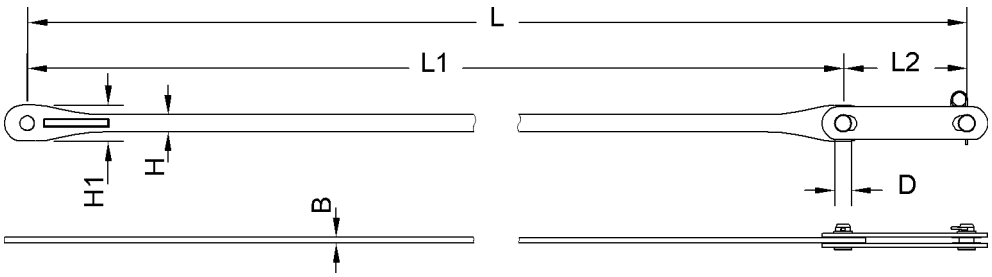


Fig. 171: Dimensions jib pendant strap 6 m

Name		Value
L	Length	6000 mm
L1	Length of pendant strap	5610 mm
L2	Length of connection link	390 mm
B	Width of pendant strap	18 mm
H	Height of pendant strap	54 mm

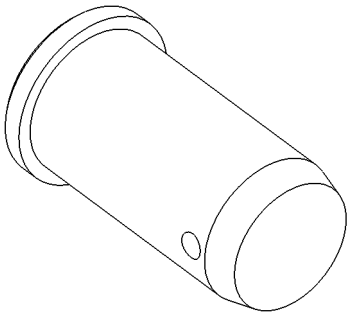


Fig. 193: Pins for pendant straps (illustration of principle)

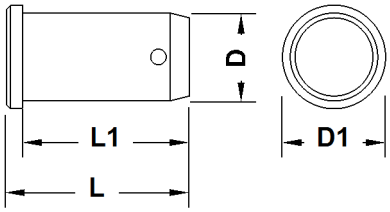


Fig. 194: Dimensions pins for pendant straps

Name		Value
L	Total length	106 mm
L1	Length	98 mm
D	Diameter	45 mm
D1	Outer diameter	53 mm

Tab. 107: Technical data pins for pendant straps

1.18.7 Pendant straps on luffing jib 1713

Pendant straps on A-frame2

A-frame2 base of pendant straps (jib backstay strap)

Installation site in operation:
- Luffing jib 1713 (For more information see: Jib backstay straps A-frame2 to main boom base section 2018, page 1184)
- Luffing jib 1713 + midfall 1713 (For more information see: Jib backstay straps A-frame2 to main boom base section 2018, page 1275)

Name		Value
B	Width	150 mm
B1	Width between links	48 mm
H	Height	243 mm
D	Pin Ø	45 mm
D1	Pin Ø	28 mm

Tab. 119: Technical data connecting elements

Forks

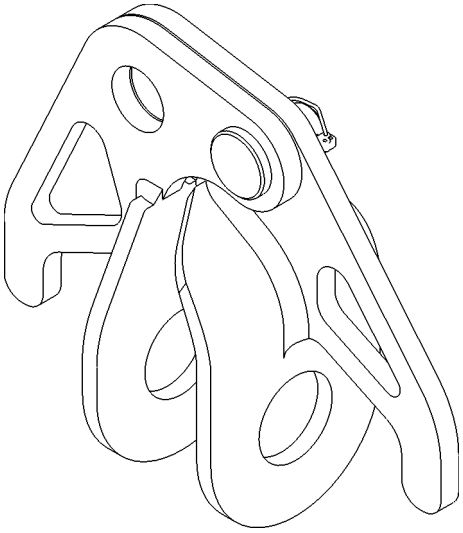


Fig. 214: Forks (illustration of principle)

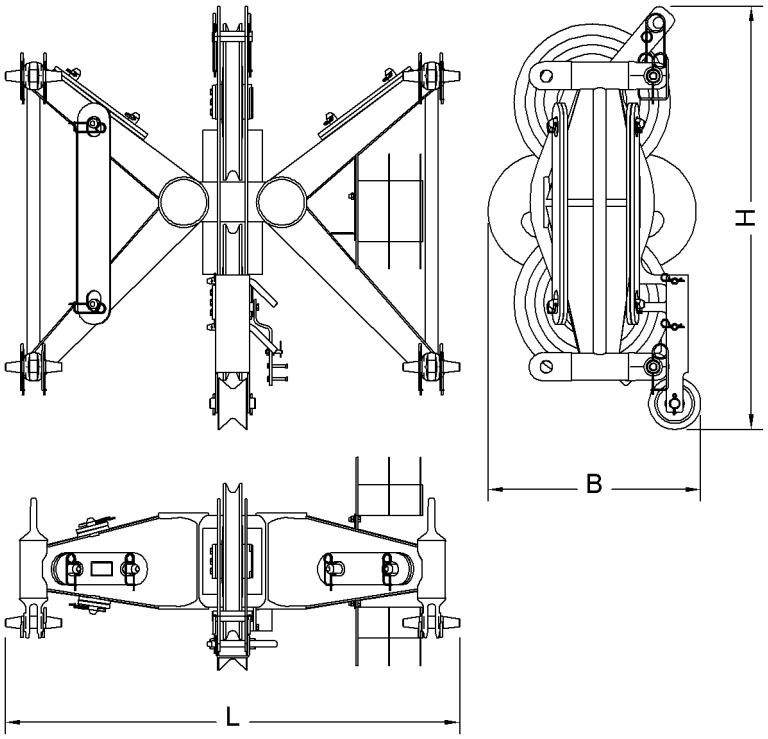


Fig. 234: Midfall 1309.32 dimensions

Name		Value
System length		350 mm
System width		1300 mm
System height		900 mm
L	Length	1485 mm
B	Width	695 mm
H	Height	1382 mm
Weight (incl. connecting links)		300 kg
Double-taper pins Ø		40 mm

Tab. 132: Technical data 1309.32 Midfall

1.26 Pulley block/hook*

1.26.1 Pulley block (160 t)

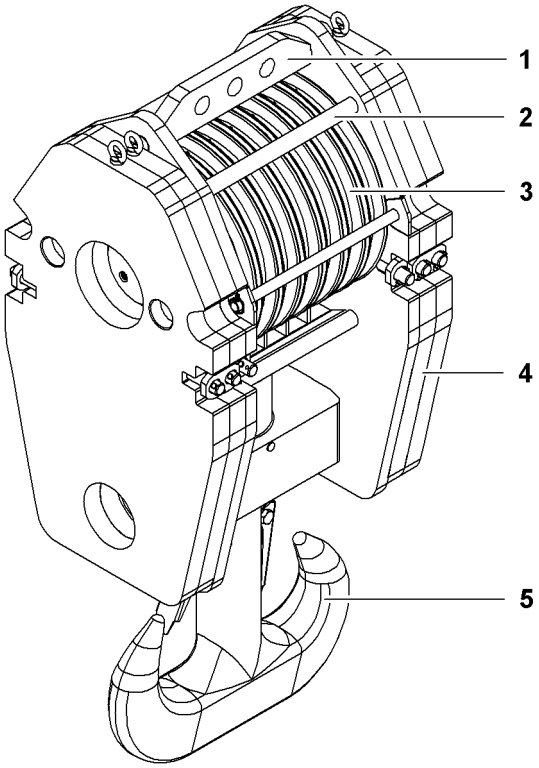


Fig. 252: Pulley block (160 t)

1 Rope fixing point fastening
2 Rope guard tube (4x)
3 Pulley (7x)
4 Additional weight (4x)
5 Hook

1.32 Outside mirror*

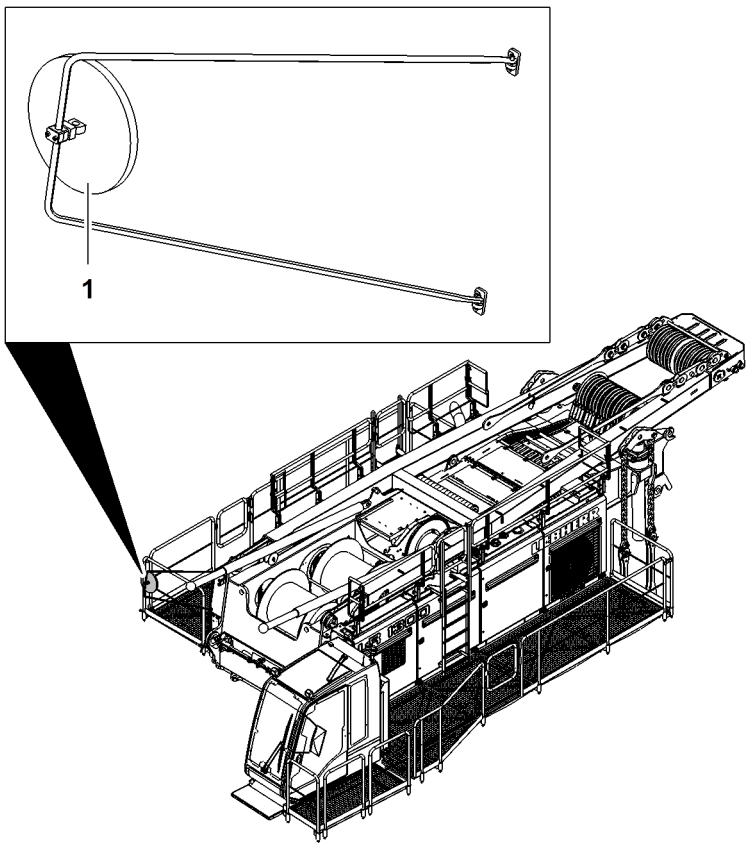


Fig. 268: Outside mirror (illustration of principle)

1 Outside mirror

The outside mirror **1** is installed on the right side of the uppercarriage.

The outside mirror **1** is folded in or deinstalled for transport.

1.41 Virtual Private Network (VPN)*

This retrofit kit allows data sent from a 2G modem to be picked up by a 3G network.

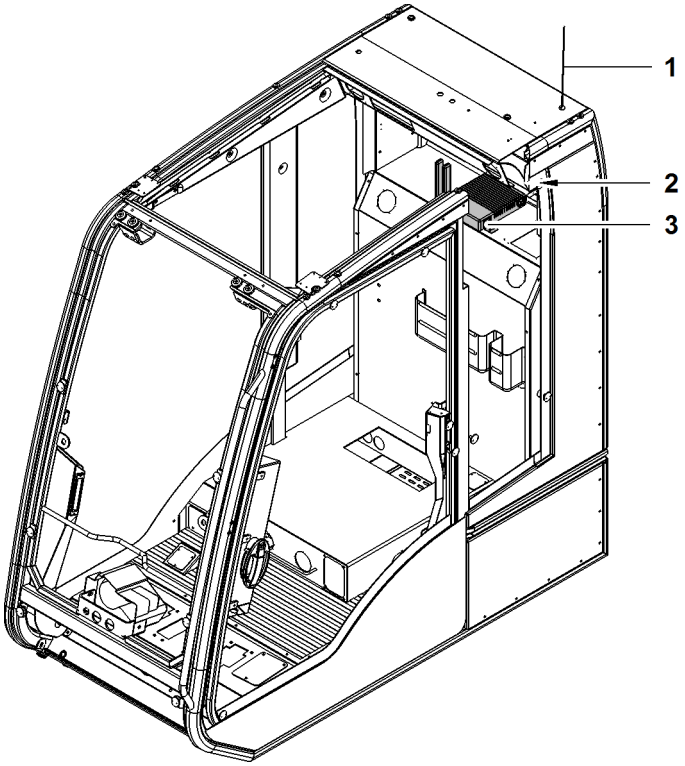


Fig. 280: Overview

1 Antenna
2 Power unit
3 3G VPN router

The 3G VPN router **3** is mounted on the back shelf of the cabin.

Power is supplied by the power unit **2**.

Reception occurs via SIM card and an antenna **1**.

1.41.1 Cisco 3G VPN router

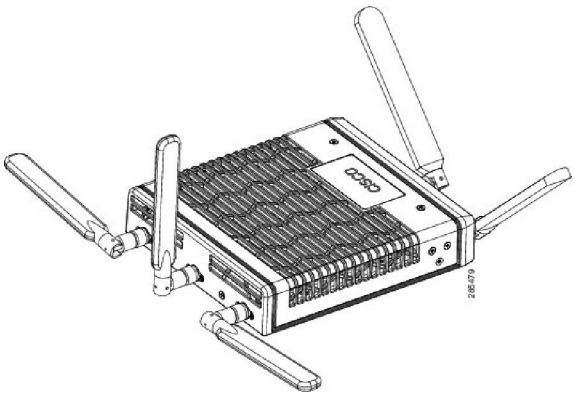


Fig. 281: Cisco 3G VPN router

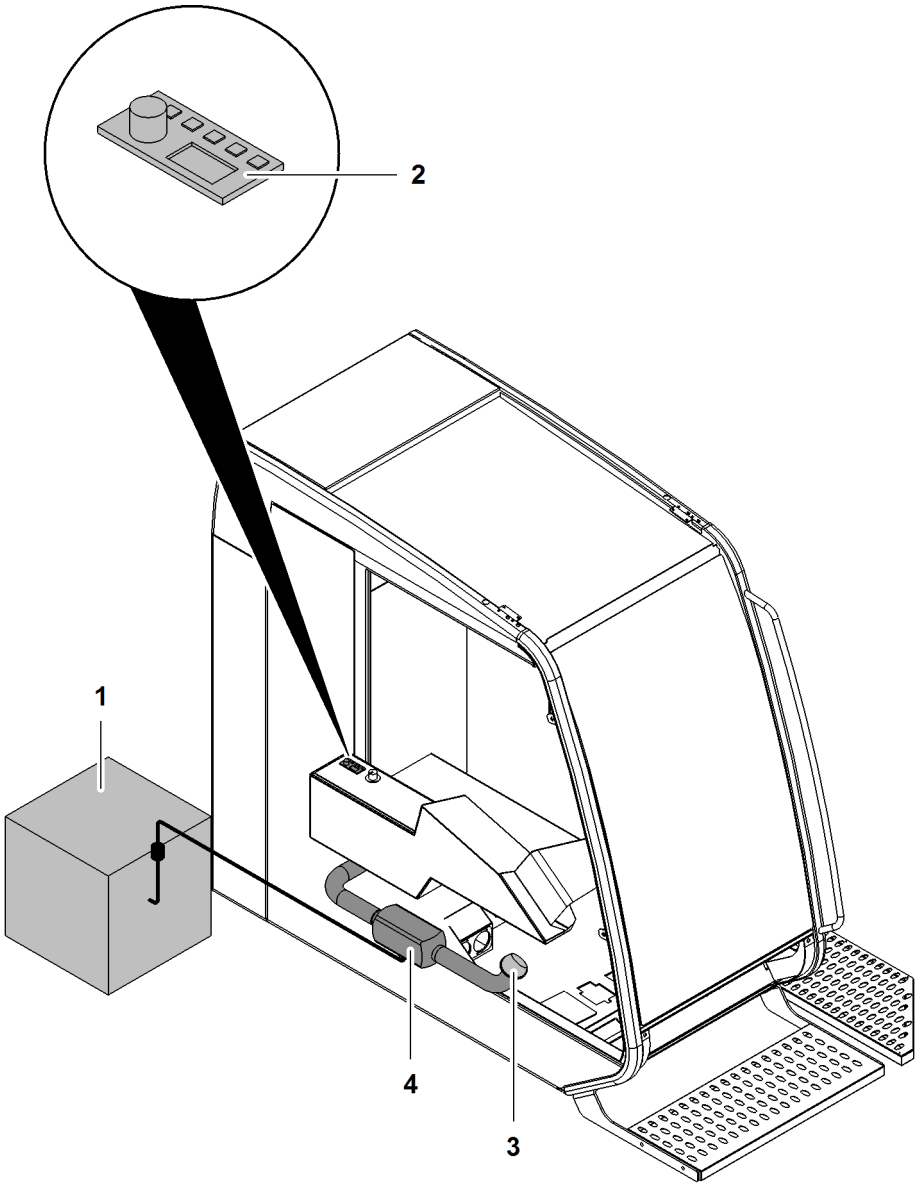


Fig. 297: Auxiliary air heating installation position (illustration of principle)

1 Fuel tank
2 *Auxiliary heating* control unit
3 Air vent
4 Auxiliary heating

Name	Value
Webasto air heater Airtronik D2	
Maximum heating output	2.2 kW
Nominal voltage	24 V
Maximum nominal output	34 W
Operating temperature	-40 °C to 70 °C
Weight	2.7 kg

Tab. 164: Technical data auxiliary air heating

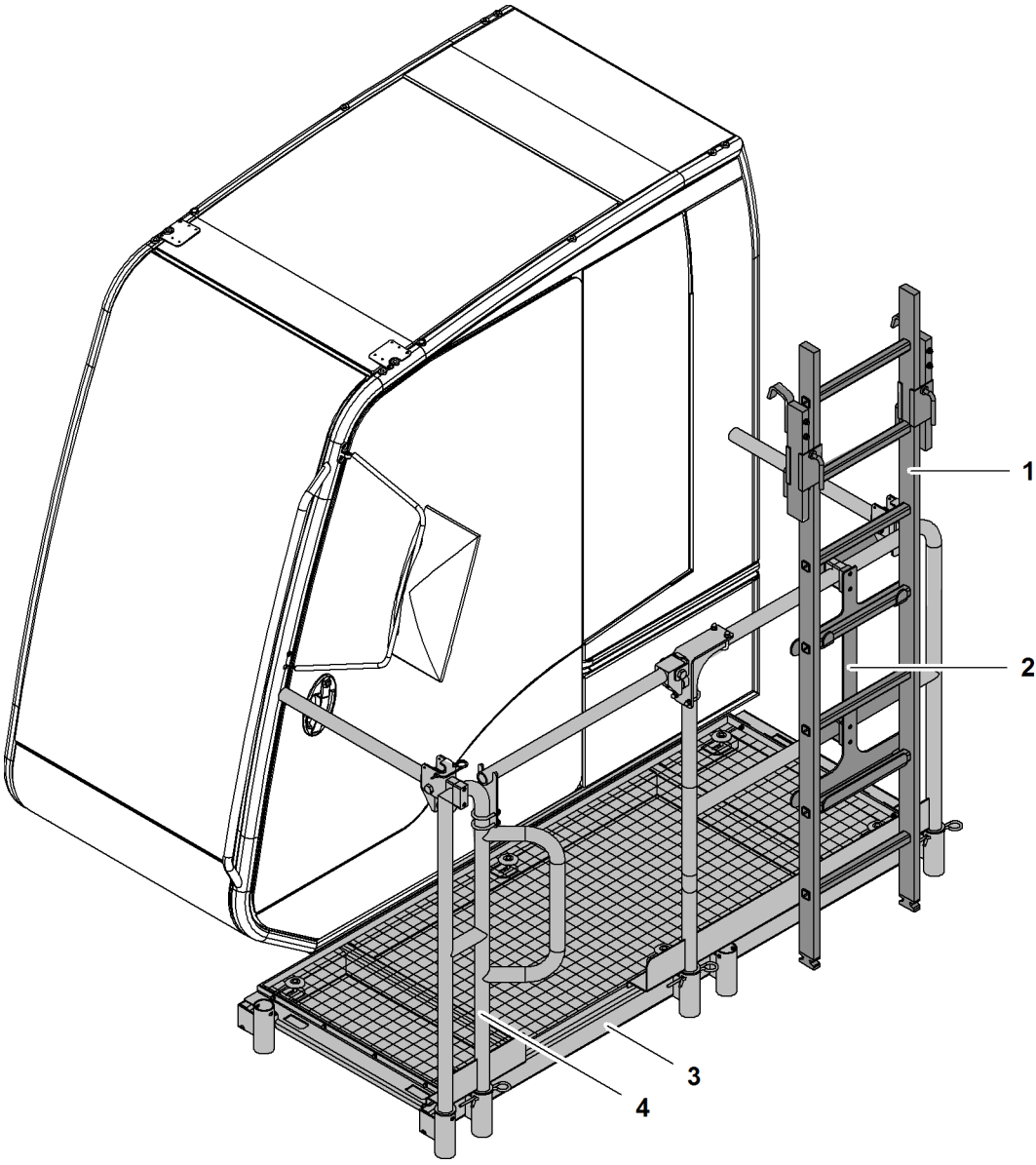


Fig. 312: Cabin handrail variant 2 with undercarriage without carbody counterweight

1	Ladder in transport position	**3**	Platform
2	Mount for ladder	**4**	Handrail (2x)

1.58 By-pass flow filter system*

The SDU-H350 RK/TWIN by-pass flow filter system comprises two filter housings with filter elements (SDFC), a dynamic pressure manometer, the hoses and an oil sump with drain screw.

The exact installation position varies according to machine type.

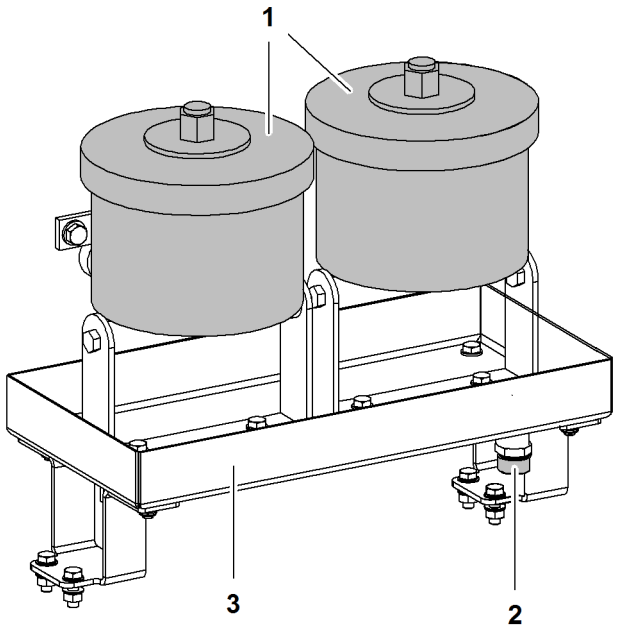


Fig. 328: By-pass flow filter system

1 Filter housing (2x)
2 Drain plug
3 Oil sump

The cellulose-based filter elements (SDFC) absorb abrasive and catalytic contamination, foreign matter (> 1 µm) and free water content from pressure liquids and other lubricants. Despite the fact that the filters are very fine (< 1 µm), oil additives and admixtures are not filtered out, as the filtration occurs at very low and gentle pressure levels (< 5 bar). Read the counter pressure off the dynamic pressure manometer situated under the left filter housing.

1.67.1 Top cover

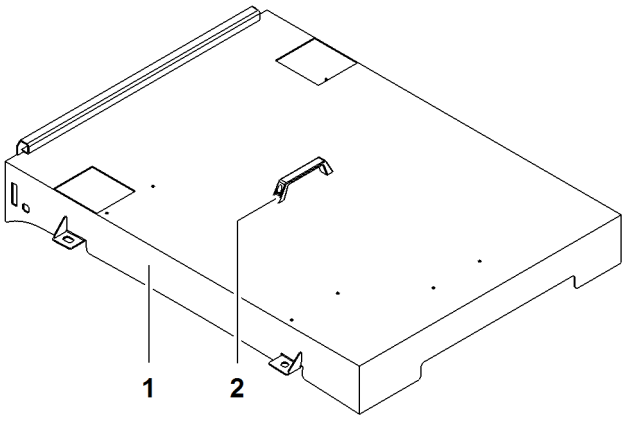


Fig. 341: Top cover

1 Top cover **2** Carrier handle

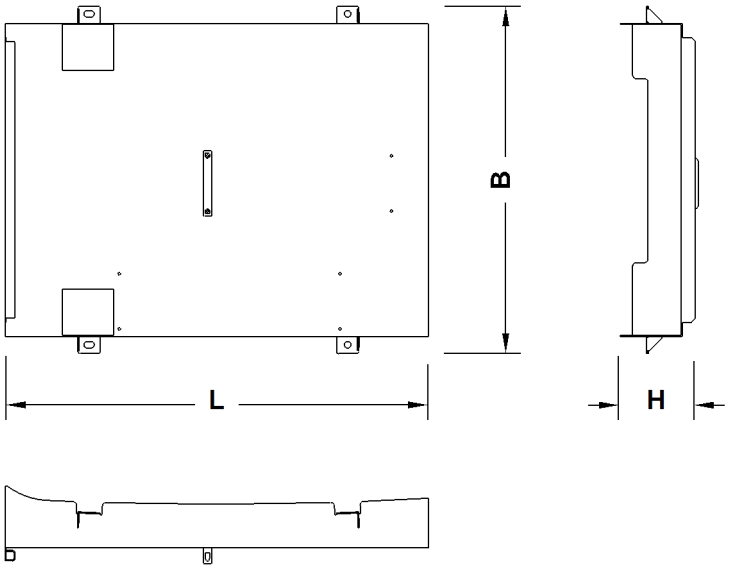


Fig. 342: Dimensions top cover

Name		Value
L	Length	1150 mm
B	Width	944 mm
H	Height	212 mm
Weight		11 kg

Tab. 184: Technical data top cover

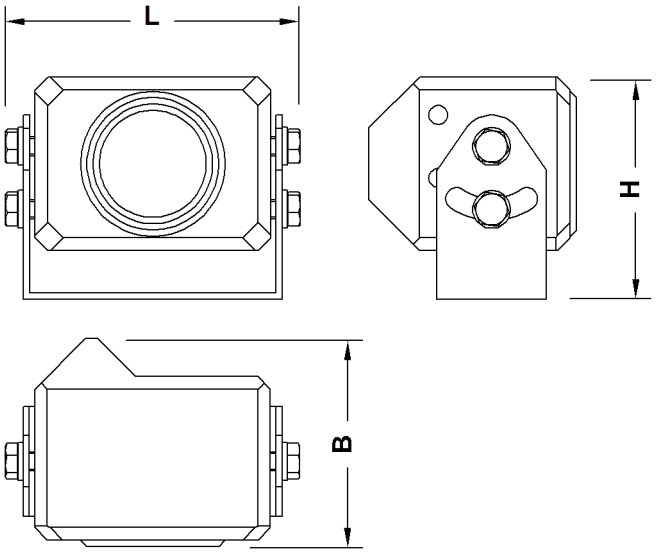


Fig. 368: Dimensions camera

Name		Value
L	Length	92 mm
B	Width	61 mm
H	Height	55 mm
Resolution		320,000 pixels
Nominal voltage		12 V
Current consumption		0.25 A
Protection class		IP 69K
Shock resistance		> 50 g
Operating temperature		-35 °C to 75 °C
Storage temperature		-40 °C to 80 °C
Windscreen heater		Automatically controlled
Brightness adjustment		Automatic

Tab. 195: Technical data camera

1.69 Central lubrication system

The central lubrication system lubricates the swing ring bearing. With the corresponding retrofit kit, the swing ring tooth flank is also lubricated via the central lubrication system.

The central lubrication system's lubricating pump is located in the uppercarriage.

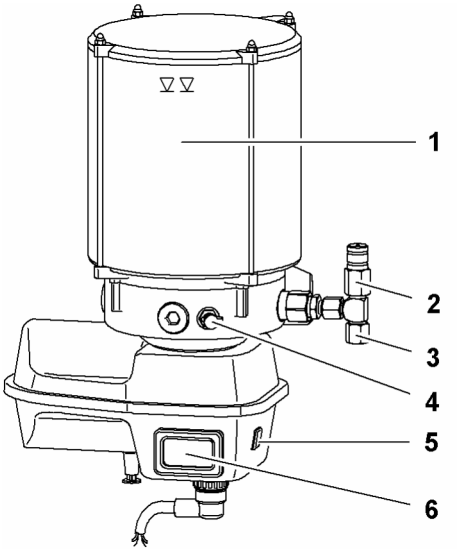


Fig. 386: Central lubrication system

1 Supply container
2 Positive pressure relief valve
3 Pump outlet
4 Filling nipple
5 Button *Interim lubrication*
6 Control unit

2 Safety instructions

This chapter deals with the following issues:
– Areas of responsibility and required personnel
– Dangers and remaining risks despite proper use
– Measures to prevent danger

WARNING
Inadmissible or improper procedure!
Severe injuries, damage to machine.

If the operation manual contains insufficient information:
▶ Contact Liebherr customer service.

2.1 Safe operation of the machine

2.1.1 Personnel selection

The safe operation of machines depends on the selection of competent personnel.

Training certificates and evidence of practical experience of persons, such as machine operators, prove helpful in the selection of competent personnel. The persons responsible for the selection must make sure that the employees are efficiently organized to ensure good cooperation in the course of the work.

Persons whose efficiency is impaired by alcohol, drugs or other factors may not be part of the personnel. The assigned tasks must be clear to the personnel. Personnel undergoing training must be properly supervised.

2.1.2 Safe system of work

A safe system of work is determined and must be followed whenever the machine is used, no matter whether it is a single lifting process, a work process or a group of repetitive processes. The same principles apply to machine operations carried out at a remote location (mobile machines), such as fixed machines, for instance in a factory or on a dock.

The safe system of work states the following:
– Operational planning: All machine operations are planned in advance to ensure that they are executed safely and that all foreseeable risks have been considered. Planning must be performed by persons that have the corresponding expertise and which have been appointed for this purpose. In case of repetitive use or routine operations, this planning is most probably only required for first use. On regular tests, it is to ensure that no factors have changed.
– Selection, preparation for commissioning and use of suitable machines and equipment.
– Preventive maintenance, tests, inspections on machines and equipment.

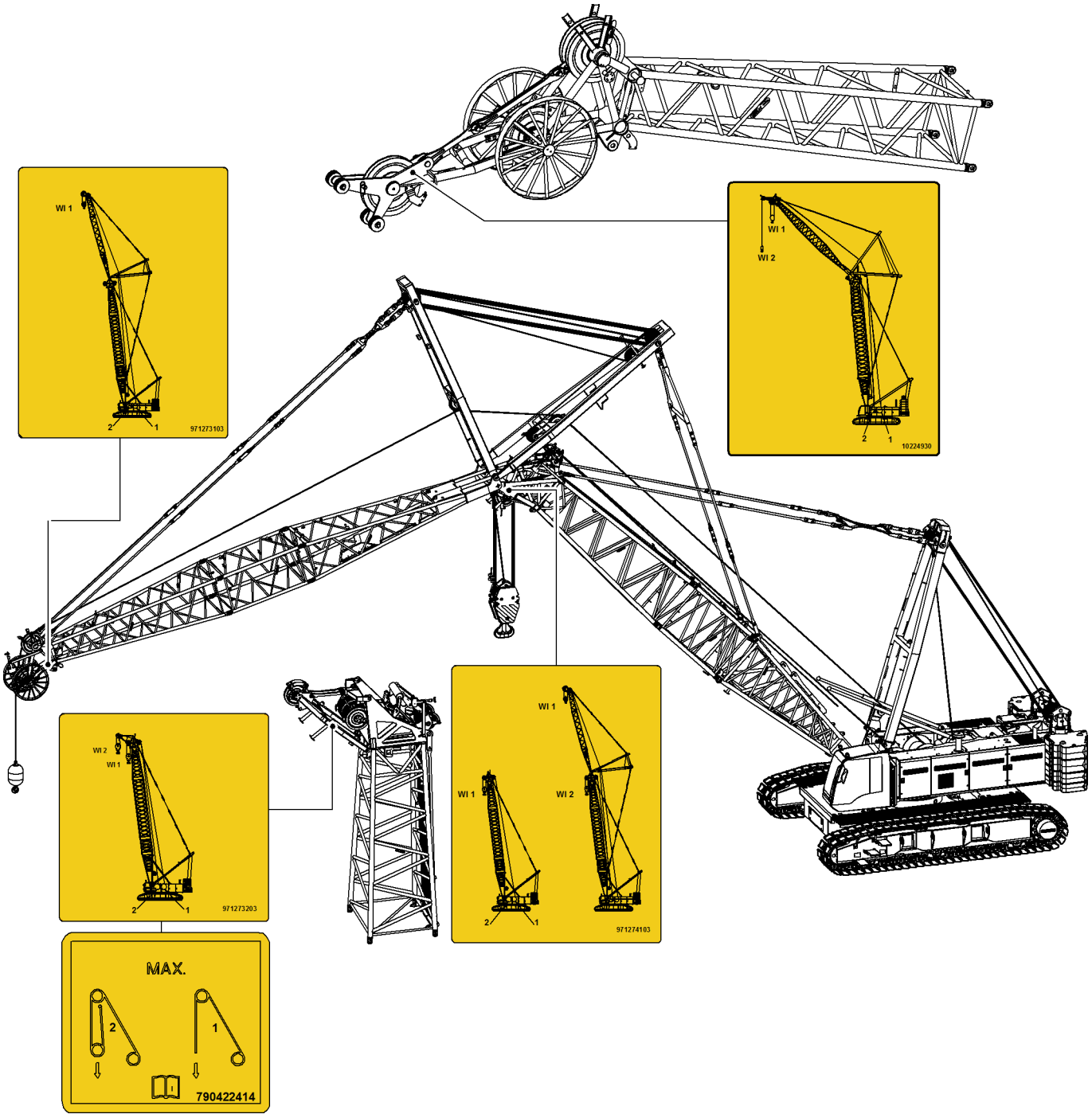
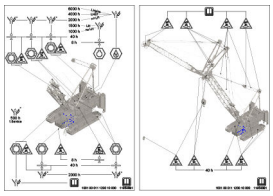


Fig. 409: Safety signs on boom

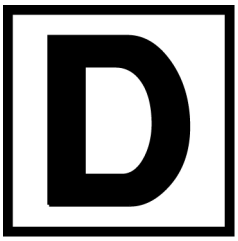
2.8 Safety signs on the machine (US market)

WARNING
Missing, damaged or illegible safety signs!

- ▶ Check safety signs to ensure they are complete and legible.
- ▶ Replace missing or illegible safety signs with new, original ones.



Lubrication diagram



Digital boom

2.11 Hazards

2.11.1 Mechanical action

WARNING
Mechanical actions due to moving machinery!
When operating the machine, numerous hazards and situations can arise that can cause life-threatening injuries.

▶ Observe handling-specific and situation-specific safety notes.

Note
Observe the following safety notes:

▶ Wear suitable personal protective equipment.

▶ Only work on non-moving parts.

Examples of mechanical impact:
– Standing under a suspended load.
– Danger of being drawn in by moving drive units or machine parts.
– Danger of falling when working without safety gear.
– Danger of crushing due to unsecured components such as doors or sliding elements.

First aid
1. Protection/personal safety
   - Identify - what is the nature of the emergency?
   - Think - what are the dangers for the injured party or the helper?
   - Act - make the situation safe.
2. Emergency call
3. Emergency life-saving measures
   - Recovery position
   - Cardiac massage, artificial respiration and defibrillation
   - Staunch bleeding, shock prevention
4. Additional first aid

Overhead line		Safety distance X
B	Low-voltage lines	3000 mm
	Medium-voltage lines	
A	High-voltage lines	6000 mm

Tab. 217: Safety distances (in accordance with ISO 12480-1 Cranes - Safe use)

Nominal voltage	Safety distance X
to 350 kV	6100 mm
over 350 kV	15250 mm

Tab. 218: Safety distances (in accordance with Occupational Safety and Health Administration OSHA Part 1926.1408 and 1926.1409)

2.11.14 Environment

NOTICE
Risk of damage to the environment caused by pollutants!
If their release is not controlled, fuels, oils, cleaning agents, coolant, etc. can enter the ground or rivers and cause environmental damage.

▶ Observe handling-specific and situation-specific safety notes.

Note
Observe the following safety notes:

▶ If the machine leaks, immediately collect the escaping liquid and seal the leak.

▶ Bind any spilled liquid with binding agent or neutralise it with suitable agents.

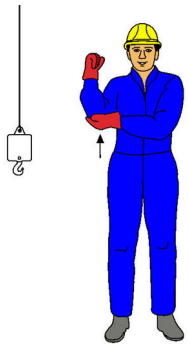
▶ When draining or catching liquids use suitable containers (capacities and resistant to chemicals).

▶ Carry out cleaning work on firm well-drained ground.

▶ Observe the national and international environmental regulations for the disposal of chemicals or waste.

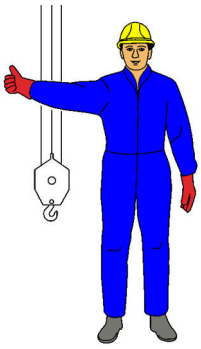
▶ Notify the emergency services and authorities if large amounts of substances that are harmful to the environment escape.

Examples of environmental hazards:
– Leakages
– Refilling consumables incorrectly



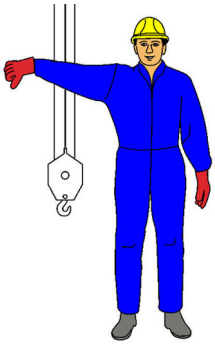
Use of auxiliary winch

– Angle right arm upwards
– Knock on your right elbow from below with left hand
– Then give more hand signals



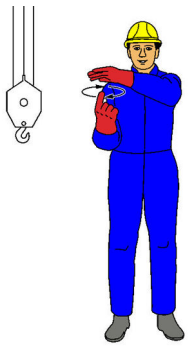
Lift main boom

– Extend right arm horizontally
– Extended thumb points upwards



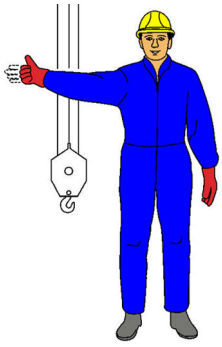
Lower main boom

– Extend right arm horizontally
– Extended thumb points down



Moving slowly

– Use one hand to give required hand signal. (E.g. lift load)
– Hold one hand over or underneath other hand



Raise main boom and lower load

– Extend right arm horizontally
– Extended thumb points upwards
– Extend/angle the other fingers alternately as long as the load is supposed to be lowered

Assigned functions for buttons on left control lever

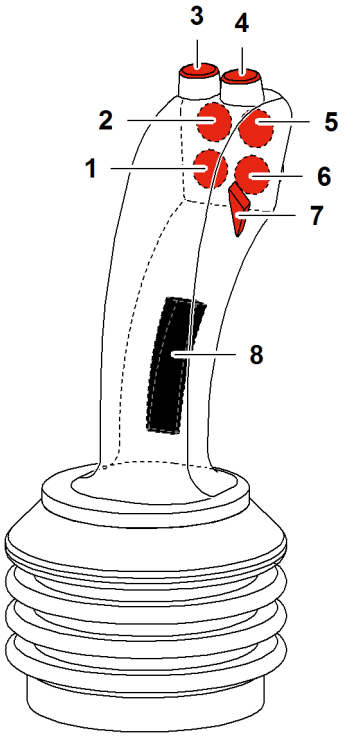
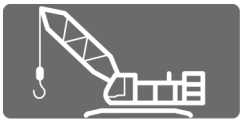
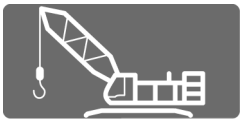
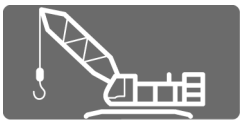
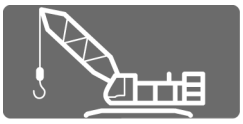
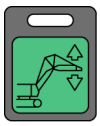
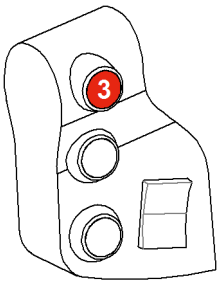
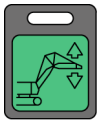
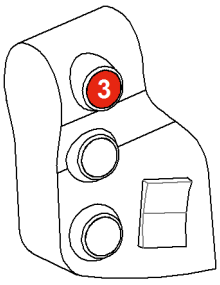
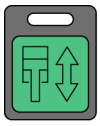


Fig. 637: Function assignment of buttons on left control lever

Button	Mode	Preselection or additional button	Name and function
1	 Lifting gear		[not used]
	 Assembly functions		[not used]
2	 Lifting gear		**Tagline winch free-turn** Switch on or switch off tagline winch free-turn.
	 Assembly functions		**Tagline winch free-turn** Switch on or switch off tagline winch free-turn.

Movement direction	Mode	Preselection or additional button	Function
A2	 Lifting gear		Lowering winch2
	 Lifting gear	 Luffing jib winch **or** 	Lowering jib
	 Assembly functions		Lowering winch2
	 Assembly functions	 Luffing jib winch **or** 	Lowering jib
	 Assembly functions	 Assembly cylinder	Extending assembly cylinder

Position 5

Swing gear speed level

Speed level 1 for the swing gear is set.

Swing gear speed level

Speed level 2 for the swing gear is set.

Swing gear speed level

Speed level 3 for the swing gear is set.

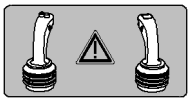
Swing gear free-wheel

Swing gear free-wheel is switched on.

Swing gear locked

Swing gear is locked.

Position 6



Assignment on a machine with two multi-directional control levers

Winch2

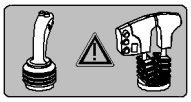
Winch2 is selected.

Winch2 locked

Winch2 is locked.

Derrick hoist cylinder (only in derrick mode)

Derrick hoist cylinder has been selected.



Assignment on a machine with a multi-directional control lever and a double T control lever

Speed level main boom

Speed level 1 selected for main boom.

Speed level main boom

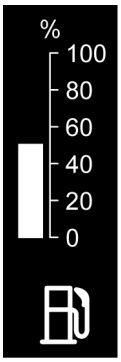
Speed level 2 selected for main boom.

Speed level main boom

Speed level 3 selected for main boom.

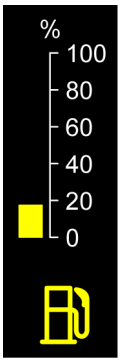
Main boom locked

Main boom is locked.



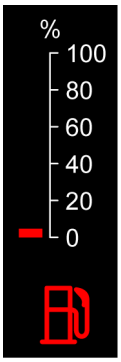
Fuel fill level

Fill level of the fuel tank as percentage of the maximum filling capacity.



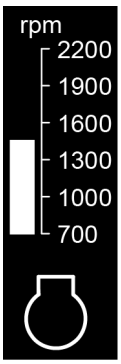
Fuel fill level (lit yellow)

Fill level of fuel tank is less than 15 % of the maximum filling capacity.



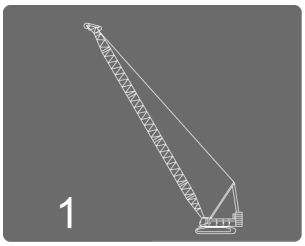
Fuel fill level (blinks red)

Fill level of fuel tank is less than 5 % of the maximum filling capacity.



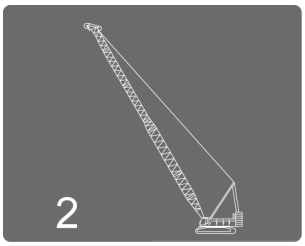
Diesel engine RPM

Diesel engine RPM.



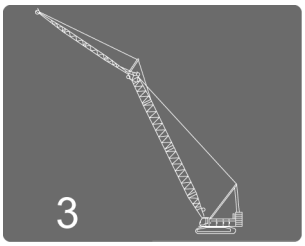
Boom configuration 1 - main boom

Select boom configuration 1 - main boom.



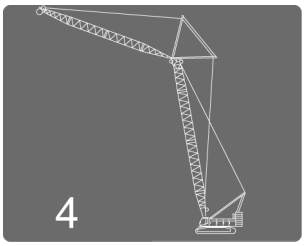
Boom configuration 2 - main boom + reducing adapter

Select boom configuration 2 - main boom + reducing adapter.



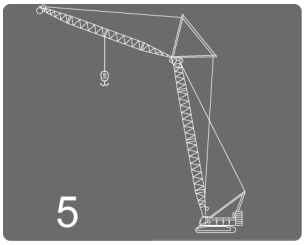
Boom configuration 3 - main boom + fixed jib

Select boom configuration 3 - main boom + fixed jib.



Boom configuration 4 - main boom + luffing jib

Select boom configuration 4 - main boom + luffing jib.



Boom configuration 5 - main boom + luffing jib + midfall

Select boom configuration 5 - main boom + luffing jib + midfall.

3.17.2 Setup - boom configuration 1 screen

Setup - basic machine screen

Setup - basic machine

Switch to the *Setup - basic machine* screen.

The *Setup - basic machine* screen serves to define and confirm the track width and counterweights.

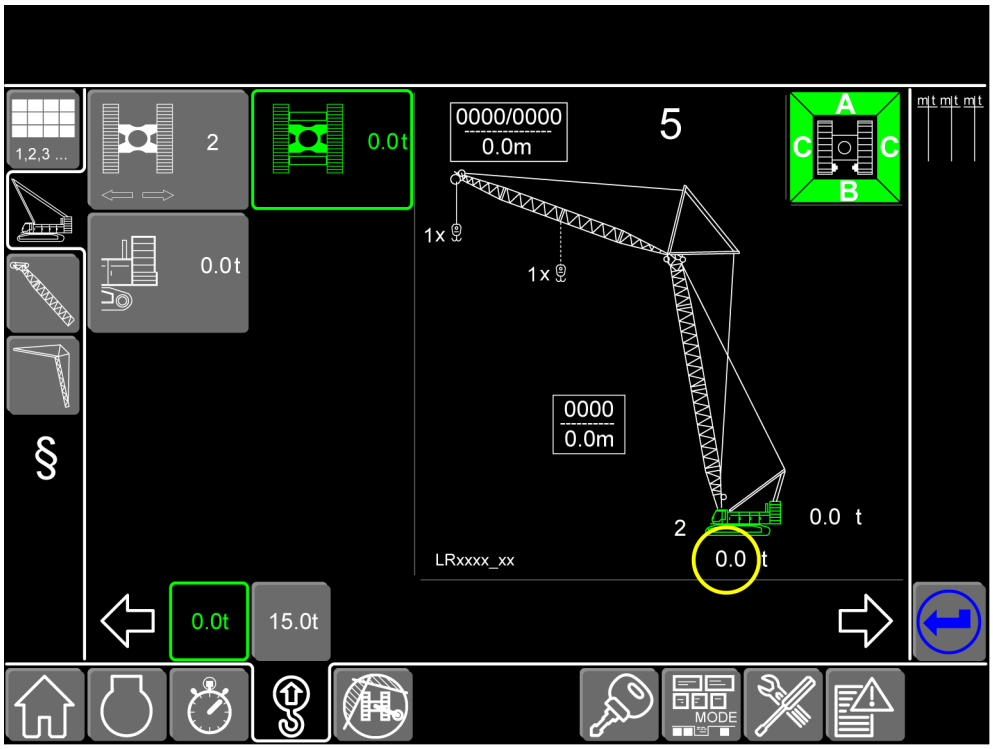
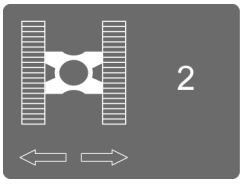


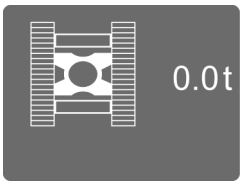
Fig. 1218: Setup - basic machine screen



Track width

Select the track width.

– **1**: Narrow track
– **2**: Wide track
– **3**: Blocked Crawlers



Carbody counterweight

Select the weight of carbody counterweight.

Rear counterweight

Select the weight of rear counterweight.

Smaller values

Switch to next smaller values.

Larger values

Switch to next larger values.

Value

Select value.

3.19 Screen *Access control*

Access control

Switch to the *Access control* screen.

The *Access control* screen serves to manage and/or control access to the machine.

3.19.1 Without retrofit kit access control (black ignition keys)

This situation occurs under the following conditions:
– Machine was delivered with software without the *access control* screen.
– Machine was delivered with black ignition keys.
– Machine receives a retrospective software update and now features the *access control* screen.
– Retrofit kit access control was not purchased.

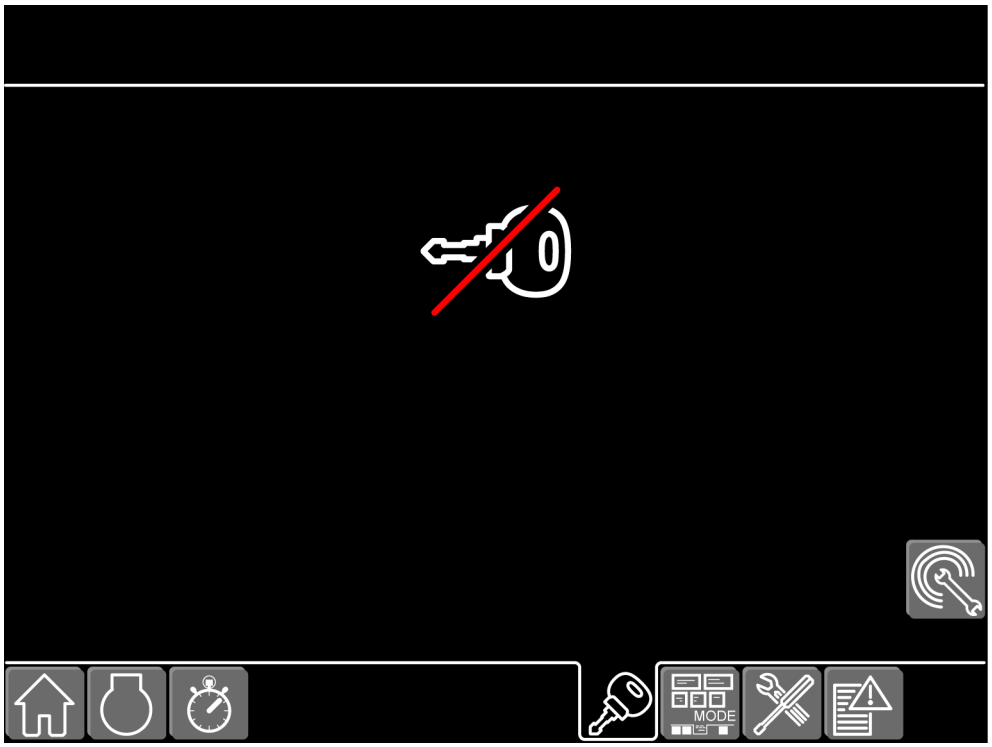


Fig. 1311: Access control screen - without retrofit kit access control (black ignition keys)

Remote service

Switch on remote service.

Remote service (lit green)

Switch off remote service.

7 8 9

4 5 6

1 2 3

0

Numbers

Enter numbers.

.

Comma

Enter comma.

P

Potencies

Select exponentiation.

+/-

Inverting numbers

Invert numbers.

E

Exponential numbers

Select exponents.

Increasing brightness of monitor

Increase brightness of monitor (3 stages).

Decreasing brightness of monitor

Decrease brightness of monitor (3 stages).

Increasing volume of warning buzzer

Increase volume of warning buzzer.

Decreasing volume of warning buzzer

Decrease volume of warning buzzer.

Settings - Litronic testing system - correction values

Call up *correction values* screen.

Screen

Call up last selected screen.

Settings - Litronic test system

Call up *Litronic test system* screen.

ENTER

Enter

Apply entered values.

Load moment limitation warning (lit yellow)

Load moment is utilized to more than 90% capacity.

Load moment limitation stop (lit red)

Load moment is utilized to more than 100% capacity.

Load moment limitation switched off

Load moment limitation is switched off.

Radio remote control locked

Radio remote control is locked. Machine cannot be operated via radio remote control.

Position 2

Swing gear speed level

Speed level 1 for the swing gear is set.

Swing gear speed level

Speed level 2 for the swing gear is set.

Swing gear speed level

Speed level 3 for the swing gear is set.

Swing gear free-turn

Swing gear free-turn is switched on.

Derrick hoist cylinder

Derrick hoist cylinder has been selected.

Rope change winch1

Assembly function rope change winch1 is selected.

Rope change winch2

Assembly function rope change winch2 is selected.

3.29 Central lubrication*

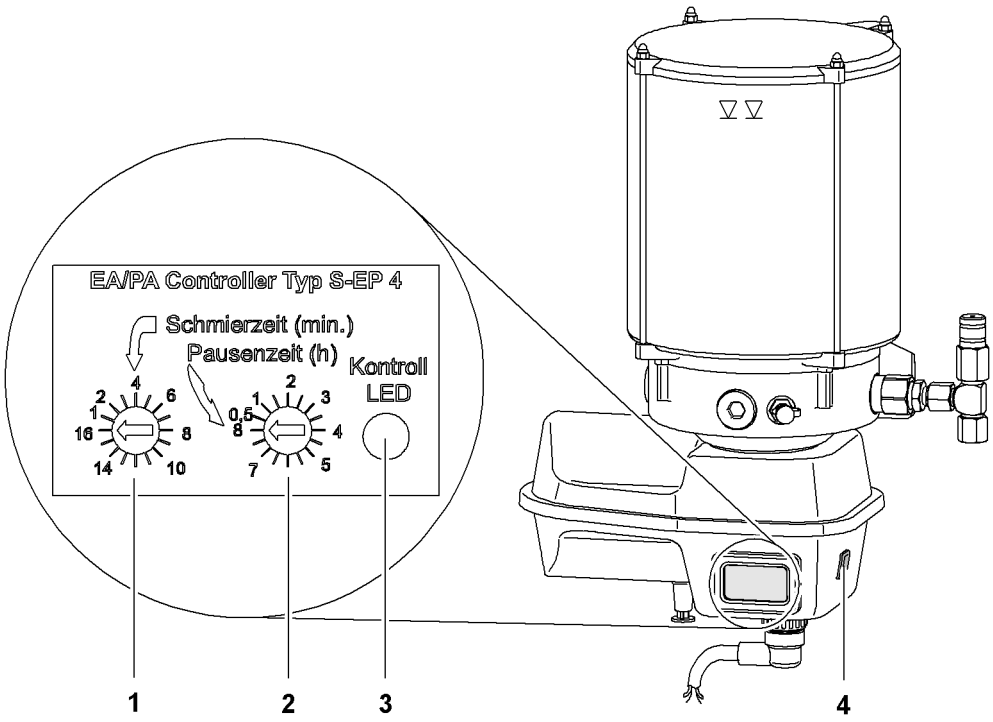
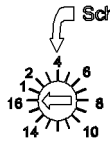


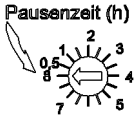
Fig. 1631: Central lubrication operating elements

1 *Set lubrication time* rotary control knob
2 *Set pause time* rotary control knob
3 Yellow indicator light
4 *Interim lubrication* button



Set lubrication time

Set lubrication interval.

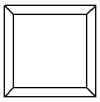


Set pause time

Set pause interval.

Yellow indicator light

Lights up for 1.5 seconds after the ignition is switched on to signal that the control system is ready for operation.



Interim lubrication

Perform interim lubrication.

4.3 Control panels

4.3.1 Setting control panel *X25** or control panel *X26**

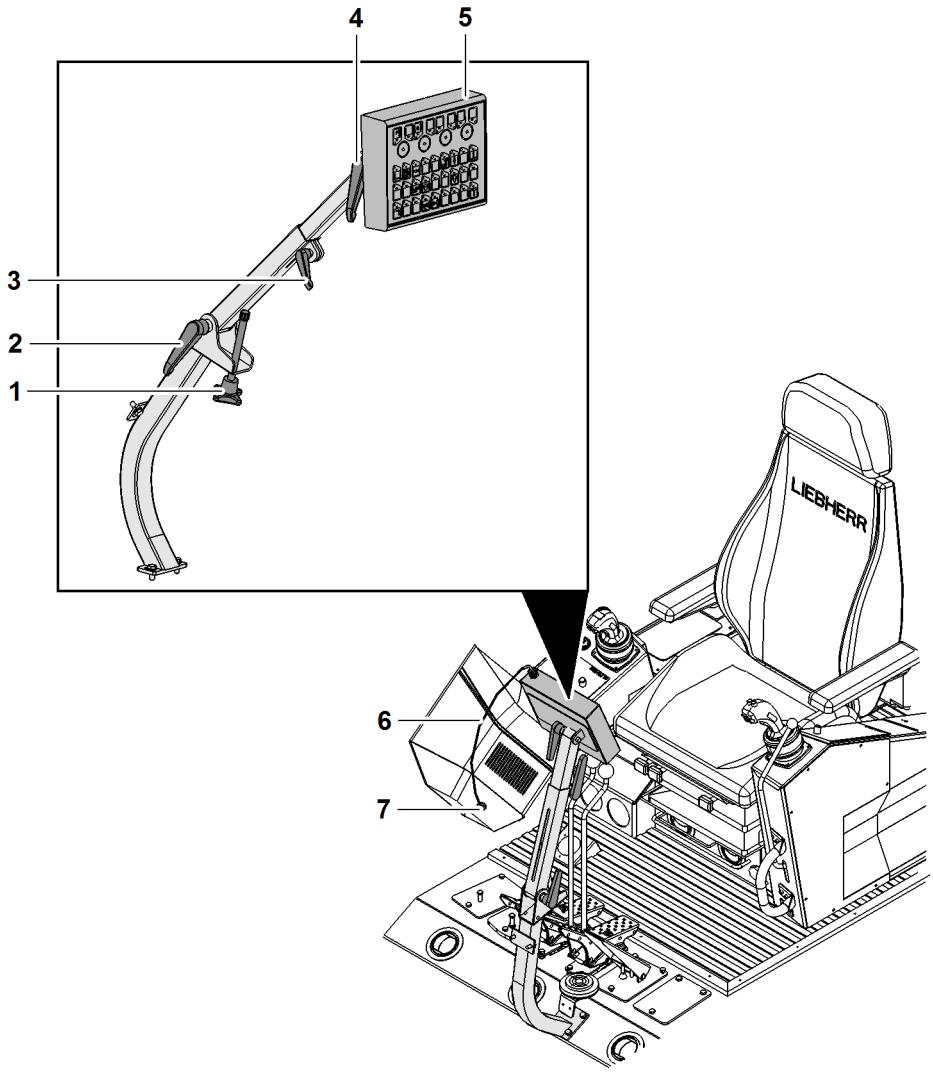


Fig. 1663: Setting control panel X25 or control panel X26

1 Inclination adjuster of bracket
2 Clamping device inclination adjuster
3 Clamping device bracket height adjuster
4 Clamping device inclination adjustment control panel
5 Control panel *X25* or control panel *X26*
6 Cable for control panel *X25* or control panel *X26*
7 Socket on the monitor for control panel *X25* or control panel *X26*

Clamping devices

The clamping devices **2 + 3 + 4** are ratchets and can be turned in any desired position.

▶ Pull out clamping device.

Button *Fan speed heating/air conditioning system*	**Rotary control knob *Temperature heating/air conditioning system***	**Button *Air conditioning system***	**Switch *Recirculated air/ fresh air***	**Position of the air vents**		
					Left	**Right**
at least level 1	all the way to the left (blue zone)	On	as required	Rear air vents	open to the top	open to the top
				Bottom air vents	closed	closed
				Front air vents	closed	open to the top
				Ventilation duct	open to the top	open to the top

Tab. 239: Recommended cooling setting

Button *Fan speed heating/air conditioning system*	**Rotary control knob *Temperature heating/air conditioning system***	**Button *Air conditioning system***	**Switch *Recirculated air/ fresh air***	**Position of the air vents**		
					Left	**Right**
at least level 1	all the way to the right (red zone)	On	Recirculated air	Rear air vents	open lateral towards window	open lateral towards window
				Bottom air vents	closed	closed
				Front air vents	open towards window	open towards window
				Ventilation duct	open towards window front	open lateral towards window

Tab. 240: Recommended dehumidification setting

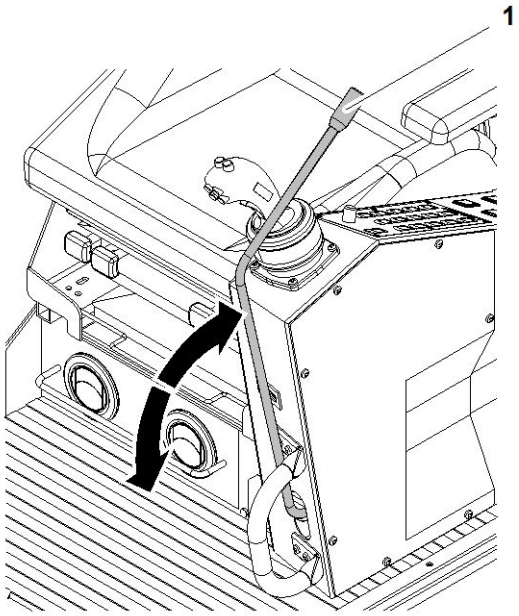


Fig. 1782: Operating the safety lever

1 Safety lever

▶ Lift safety lever **1**.
  ▷ This blocks the foot pedals, control lever and buttons.

The safety lever **1** must be lifted in the following situations:
– When leaving the cabin.
– During breaks (even if the machine operator is still in the cabin).
– When reading the operating manual.

▶ Lower safety lever **1** for operation.

4.8.3 Operating the radio

Ensure that the following conditions are fulfilled:
❑ Ignition key is in position “1” or position “P”.

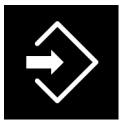


Fig. 1830: Data recording active symbol

The function “Load moment limitation shut-down” is deactivated in the following situations:
– Diesel engine is switched off.
– 30 minutes have passed since activation of the function and the control levers are in zero position.
– Machine operator actuates key switch *Turn off load moment limitation*.

▶ Actuate key switch *Load moment limitation shut-down*.
  ▷ Load moment limitation is active.
  ▷ Load moment limitation lamps light up according to the current status of the load moment limitation system.
  ▷ Load moment limitation signal sounds according to the current status of the load moment limitation system.
  ▷ The symbol *Load moment limitation off* disappears on the monitor.
  ▷ The *Data recording active* symbol disappears on the monitor.

4.13.4 Load moment limitation shut-off (ANSI load chart)

The following description of the function “Load moment limitation shut-off” is only valid for machines with an ANSI load chart.

DANGER
Inappropriate use of the function “Load moment limitation shut-down”!
Toppling of machine, structural breakdown.

▶ The function “Load moment limitation shut-down” is to be used exclusively for checking the machine using a test load or when the load moment limitation fails. These checks may only be carried out by specialists from the national, certified testing institute.

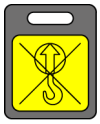
▶ If the load moment limitation fails, use the function “Load moment limitation shut-down” to move the machine out of the danger zone.

Make sure the following conditions are met:
❑ Diesel engine is switched on.
❑ Control levers are in zero position.

▶ Unlock control panel *X12*.

▶ Press the switch *Load moment limitation shut down key switch release* on control panel *X12*.

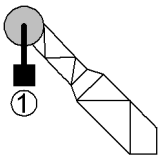
  ▷ The lamp in the switch *Load moment limitation shut down key switch release* lights up.
  ▷ The LED in the button*Load moment limitation assembly/self-lock* flashes.



▶ Press the button *Load moment limitation assembly/self-lock* on control panel *X23*.

  ▷ Load moment limitation is turned off.
  ▷ The LED in the button *Load moment limitation assembly/self-lock* is lit.
  ▷ Load moment limitation lamps blink red.

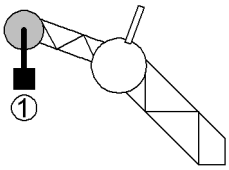
Main boom + reducing adapter



Load on main boom head (winch1 rope)

- ▶ Reeve winch1 rope on main boom head.
- ▶ Select main boom head.
- ▶ Select reeving of winch1 rope at main boom head.

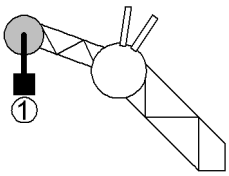
Main boom + fixed jib



Load on jib head section (winch1 rope)

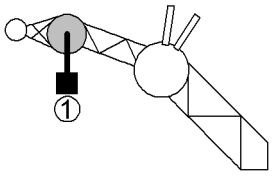
- ▶ Reeve winch1 rope on jib head section.
- ▶ Select reeving of winch1 rope at jib head section.
- ▶ Select load position 1 (jib head section).

Main boom + luffing jib



Load on jib head section (winch1 rope)

- ▶ Reeve winch1 rope on jib head section.
- ▶ Select reeving of winch1 rope at jib head section.
- ▶ Select load position 1 (jib head section).



Load on jib head section (winch1 rope) with installed auxiliary jib

There is no load chart for this configuration. The static moment of the auxiliary jib reduces the valid load charts of the jib.

The auxiliary jib falsifies the load display on *operation* screen. The load moment limitation switches off at the maximum permitted load moment.

- ▶ Reeve winch1 rope on jib head section.
- ▶ Select reeving of winch1 rope at jib head section.
- ▶ Select load position 1 (jib head section).
- ▶ Calculate reduced load before every lift.

For approximate calculation of the reduced load with installed auxiliary jib (30 t):

$\mathbf{SWL}_{RED} = \mathbf{SWL}_{NDL}$ - 500 kg

For approximate calculation of the reduced load with installed auxiliary jib (15 t):

$\mathbf{SWL}_{RED} = \mathbf{SWL}_{NDL}$ - 400 kg

$\mathbf{SWL}_{RED}$ = Reduced load for hoist with jib head section
$\mathbf{SWL}_{NDL}$ = Load for hoist with jib head section according to load chart

- ▶ Observe reduction of the valid loads through installed auxiliary jib.

Moving the machine backwards

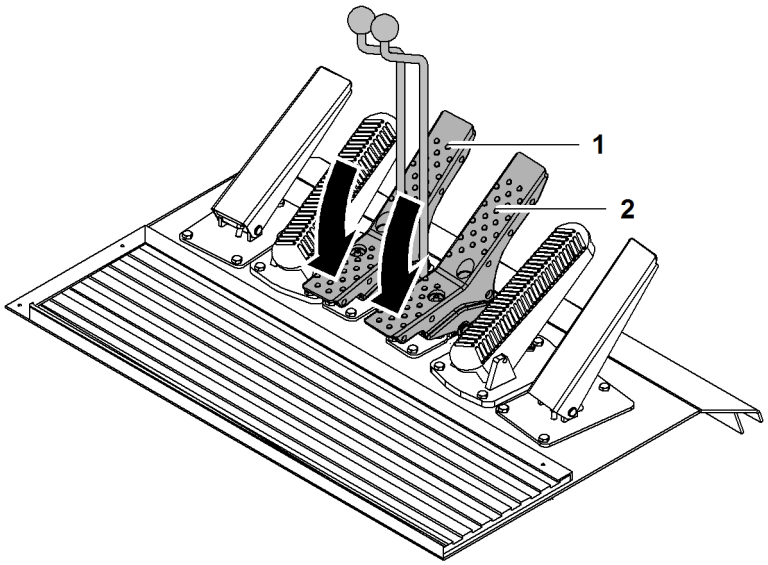


Fig. 1915: Moving the machine backwards

1 Foot pedal for *left crawler* **2** Foot pedal for *right crawler*

▶ Press foot pedal *left crawler* **1** and foot pedal *left crawler* **2** backward at the same time.
  ▷ A movement buzzer sounds.
  ▷ Machine moves backward:

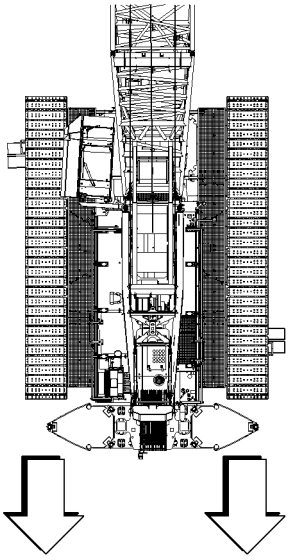


Fig. 1916: Machine moves backward

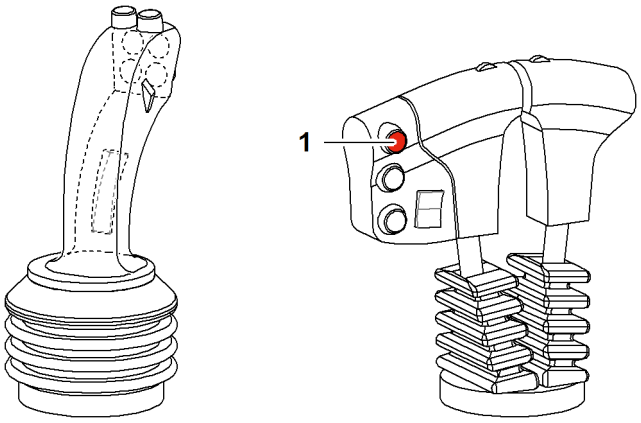


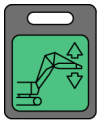
Fig. 1956: Selecting the jib

1 Button *Luffing jib winch*

▶ Press button *Luffing jib winch* **1** on the right double T-lever.
▷ Luffing jib winch is selected.
▷ Symbol *Jib adjustment speed level* appears on monitor:

Fig. 1957: Symbol Jib adjustment speed level

Selecting the jib on control panel *X23*



▶ Press button *Luffing jib winch* on control panel *X23*.

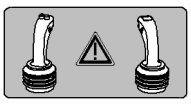
▷ Luffing jib winch is selected.
▷ Symbol *Jib adjustment speed level* appears on monitor:

Fig. 1959: Symbol Jib adjustment speed level

4.20.2 Operating the jib

Ensure the following conditions are met:
❑ No limit switch is active and blocking a movement.
❑ There are no persons or obstacles in the danger zone.

Lifting jib



Procedure on a machine with two control levers

In object handling mode, main boom and jib cannot be adjusted at the same time.

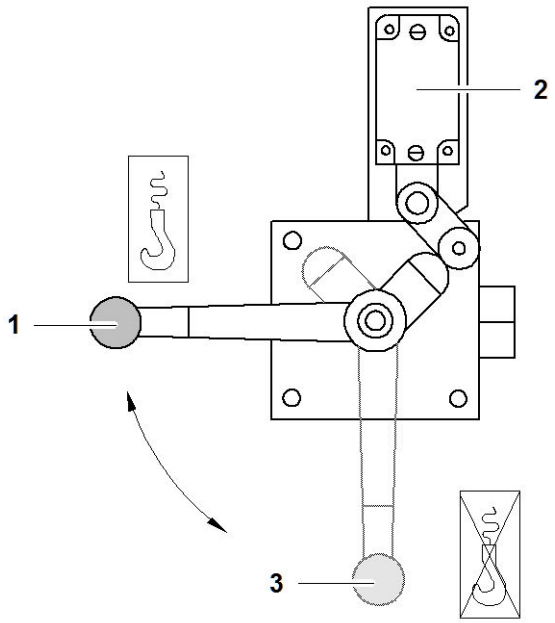


Fig. 2001: Switching on free-fall operation

1 “ON” position
2 Limit switch
3 “OFF” position

▶ Set locking element *Free-fall operation* to position “ON” **1**.
▷ Limit switch **2** tells the Litronic control system that free-fall operation is switched on.
▷ Symbol *Secured free-fall operation* appears on monitor:

Fig. 2002: Symbol Secured free-fall operation

4.22.2 Selecting free-fall mode

Ensure the following conditions are met:
❑ *Free-fall operation* shut-off element is set to “ON”.

Selecting secured free-fall operation

Secured free-fall operation is selected by default.

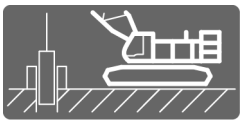
If switch *Unsecured free-fall operation* is lit on control panel *X12*:
▶ Actuate switch *Unsecured free-fall operation* switch on control panel *X12*.

▷ Secured free-fall operation selected.
▷ Symbol *Secured free-fall operation* appears on monitor:

Fig. 2004: Symbol Secured free-fall operation

4.24.4 Select *foundation works* mode

Ensure the following conditions are met:
❑ *Mode* screen is displayed on monitor.



▶ Select *foundation works* mode (For more information see: 4.11.2 Selecting mode, page 662) .
▷ *Foundation works* mode is selected.
▷ Symbol *Foundation works* appears on *Operation* screen on the monitor:

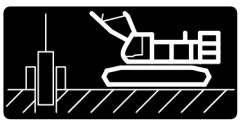


Fig. 2033: Symbol Foundation works

Radio transmission interruptions

Remedying radio transmission interruptions of less than 8 seconds

Machine functions are controlled with the radio remote control.

▶ Radio transmission is being interrupted.
  ▷ Winches, swing gear and crawler are being locked.
  ▷ Movements are limited via integration time.
  ▷ Symbol *Radio remote control* connection error* is displayed on the cabin monitor:

Fig. 2070: Symbol Radio remote control connection error*

  ▷ Radio connection is automatically reestablished within 8 seconds.

▶ Put control lever to zero position.
  ▷ Control of machine functions is released.

Remedying radio transmission interruptions longer than 8 seconds

Machine functions are controlled with the radio remote control.

▶ Radio transmission is interrupted for more than 8 seconds.
  ▷ Receiver of radio remote control triggers emergency stop.
  ▷ Symbol *Radio remote control* connection error* is displayed on the cabin monitor:

Fig. 2071: Symbol Radio remote control connection error*

  ▷ Radio connection is reestablished automatically.
  ▷ The screen *Confirm connection* appears on the monitor of the radio remote control:

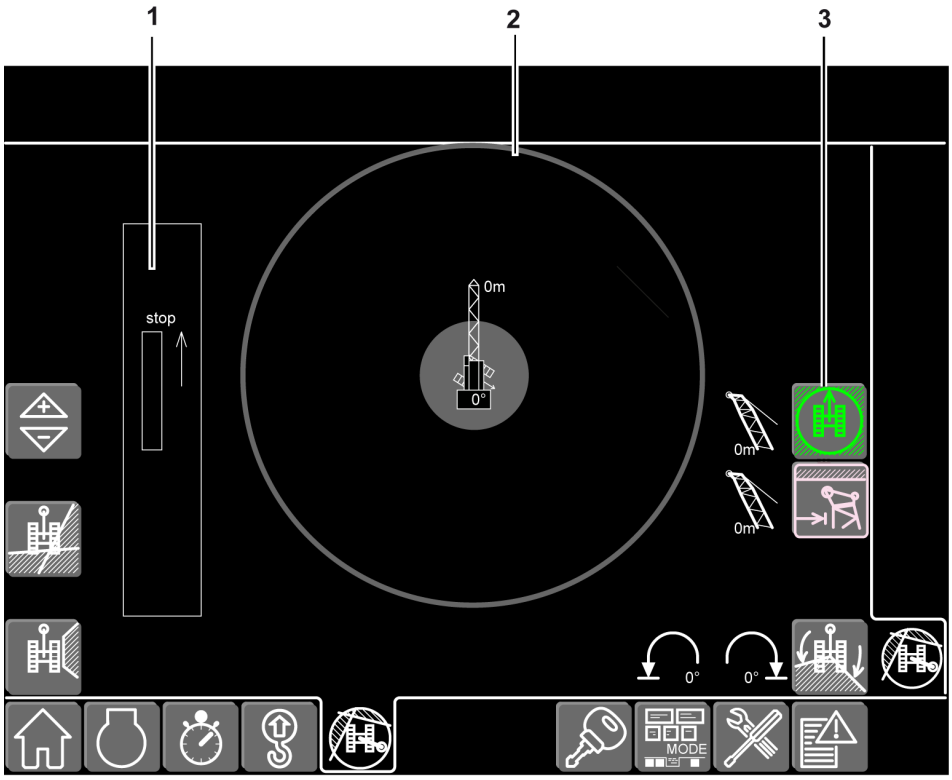


Fig. 2127: Working range limitation - working range limitation screen - radius limitation maximum radius switched on

1 Bar display

2 Programmed radius limitation maximum radius

3 Button *Radius limitation maximum radius*

▶ Press button *Radius limitation maximum radius* (lit green) for main boom or jib on monitor.
▷ Radius limitation maximum radius is switched off for main boom or jib.

Decreasing the pull force of the tagline winch

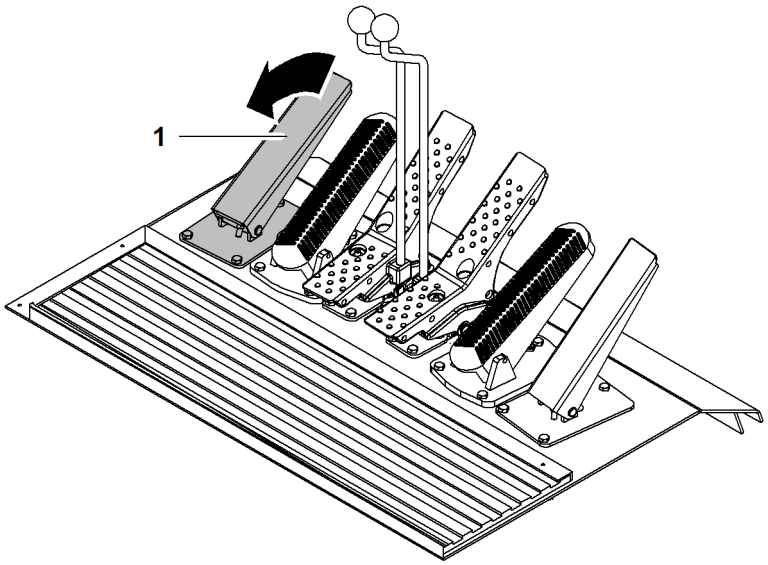


Fig. 2185: Decreasing the pull force of the tagline winch

1 Foot pedal for *tagline winch*

▶ Let the foot pedal *of the tagline winch* **1** move backwards.
▷ Pull force of tagline winch is reduced.

4.37.5 Select maximum pull force of the tagline winch

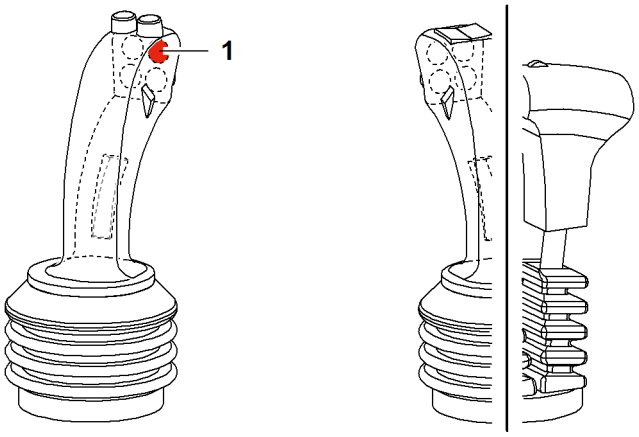


Fig. 2186: Select maximum pull force of the tagline winch

1 Button *Maximum pull force tagline winch*

▶ Press and hold the button *Maximum pull force tagline winch* **1** on the left multi-directional control lever.
▷ Tagline winch winds up the tagline with maximum pull force.

▶ Release button *Maximum pull force tagline winch* **1**.
▷ Tagline winch winds up the tagline with set constant pull.

4.37.6 Turning tagline winch free-wheel on or off

The free-wheel unwinds the tagline from the tagline winch without braking.

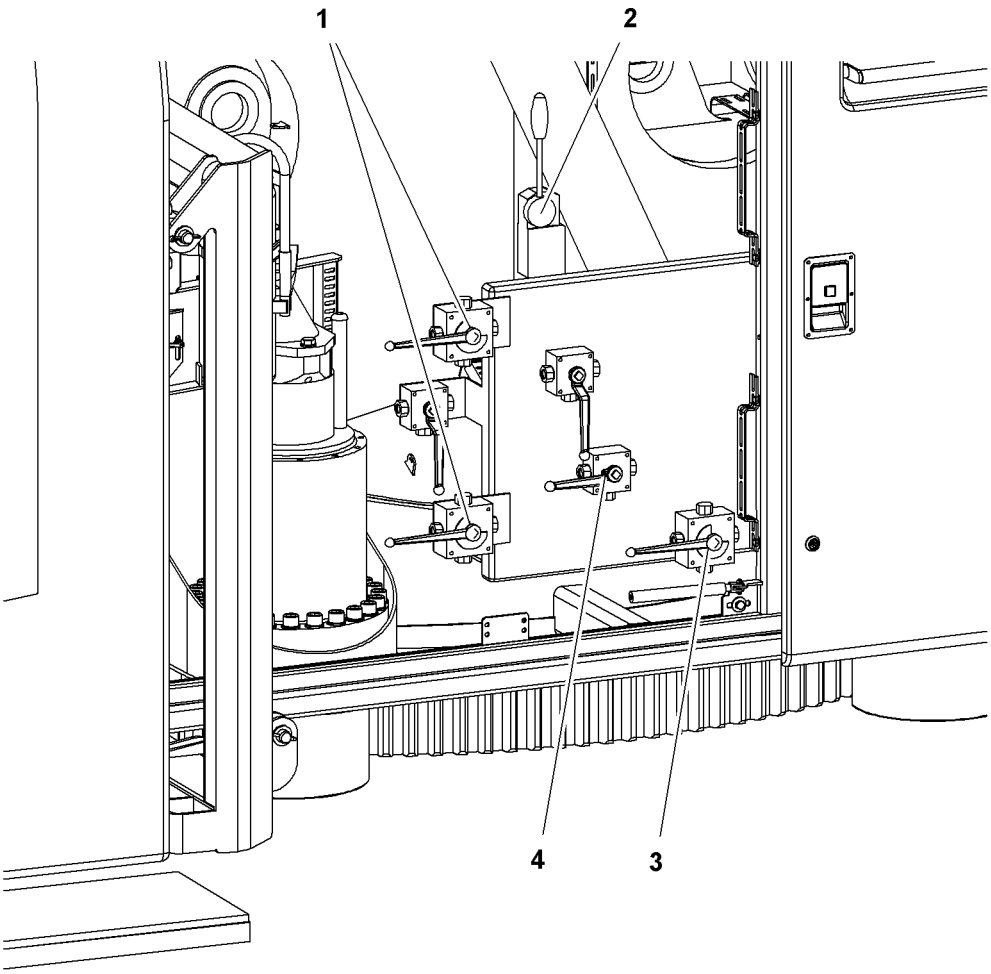


Fig. 2210: Emergency mode gate valves in “Control main boom winch” position

1	*Function selection high-pressure lines* gate valve (2x)	**3**	*Function selection brake* gate valves
2	Control lever	**4**	,*Brake main boom winch* gate valve

- ▶ Turn *Function selection High-pressure lines* gate valves **1** to “Control main boom winch” position.
- ▶ Turn *Function selection brake* gate valves **3** to “Control main boom winch” position.
- ▶ Turn *Brake main boom adjusting winch* gate valve **4** to “Control main boom winch” position.
- ▶ Move the control lever **2** to the right.
  ▷ The main boom rises.
- ▶ Move the control lever **2** to the left.
  ▷ The main boom lowers.

4.45.3 Swing emergency mode

Swing emergency mode controls a single swing gear. If a second swing gear is present, only the brakes are released.

– *PREVIOUS PAGE* and *NEXT PAGE* to switch between the pages. One page contains 16 markers of the selected section.
– *PREVIOUS* and *NEXT* move between the flags. The highlighted flag is displayed as an inverse M.
– The marked marker can be taken over into the select list with *SELECT*. If the marker was already selected, the marker is deleted from the list again. The inverse display of the marker shows whether a marker has been selected.
– *MENU 1/2* switches between the two menu bars.
– *DOCUMENT* displays the markers with comment text.
– *IDENTIFY* displays the flags with the identifier.
– *BACK* returns to the main screen.

Screen *SELECT*

The values can be entered in the select list to prevent having to switch between the input menu, output menu and marker menu pages. Now the entries can be viewed and edited on the *SELECT* screen. The select screen may consist of several pages. If the list is full and a new value is entered, the oldest value is deleted from the list. The select lists can also be saved on memory cards and loaded from there.

How to add entries to the Select list:
– With the *SELECT* button on the *INPUT/OUTPUT*, *MEMORY* screens or *CORRECTION*
– With the *ADD* button on the *SELECT* screen by entering the IEC address
– With the *LOAD FROM CARD* button on the *SELECT* screen from a file

How to delete entries from the Select list:
– Reselect a selected value with the *SELECT* button on the *INPUT/OUTPUT*, *MEMORY* or *CORRECTION* screens.
– Delete the marked entry with the *DELETE* button on the *SELECT* screen.

Description of the buttons:
– *ADD* adds a new entry to the Select list. A menu bar is displayed in which the IEC address is entered.
– *DELETE* deletes the marked entry from the select list.
– *PREVIOUS* and *NEXT* to switch between the individual select entries. The marked entry is displayed with an inverted I, O or M.
– *NEXT PAGE* moves to the next page of the Select list so that more values can be viewed.
– *IDENTIFY* displays the inputs, outputs and markers with the identifier.
– *DOCUMENT* displays the inputs, outputs and markers with comment text.
– *LOAD FROM CARD* loads a new Select list from a file A menu is then displayed. The menu contains a list of files, one of which can be selected, and also allows a specific file name to be entered .
– *SAVE TO CARD* saves the current Select list in a file. A menu appears from which the name of the file can be selected .
– *MENU 1/2* switches between the two menu bars.
– *BACK* returns to the main screen.

Screen *Add Selection*

The *Add Selection* screen is called up with the *ADD* button on the *SELECT* screen. The IEC address of a new select entry can be entered this way. The ICE address is entered with the corresponding buttons in the input field.

Example:
– Desired IEC address: %QW1.17.1
– %, Q and W are entered using the appropriate buttons.
– 1.17.1 is entered as a normal number and can be edited as necessary using the button *TAKE & BACK* to apply the address.

6.2 Tools required

Liebherr recommends:
– Wooden blocks for supporting the boom component
– Regular grease to lubricate the pins (For more information see: 9.2.3 Lubrication chart, page 1391)

6.2.1 Machine with self-assembly system

The machine is designed to be assembled without the need for an assist crane.

If there is not enough space or the ground conditions are not suitable for self assembly, an assist crane should be used for support.

All the rigging is supplied.

6.2.2 Machine without self-assembly system

WARNING
Incorrect work planning!

- ▶ Consider what aids will be necessary when assembling a machine without a self-assembly system.
- ▶ Any questions or uncertainties must be referred to Liebherr after sales service for clarification.

The customer is responsible for selecting the appropriate tools.

Description	Value
Main boom angle	72° to 80°
Jib length	11 m to 32 m
Jib offset	15° or 30°

Tab. 276: Parking position of main boom 2018 + fixed jib 0806

Parking position of main boom 2018 + luffing jib 1713 (+ auxiliary jib)

Description	Value
Maximum wind speed	22 m/s
Main boom length	25.7 m to 60.8 m
Main boom angle	80°
Jib length	20 m to 65 m
Jib angle	67° to 70°

Tab. 277: Parking position of main boom 2018 + luffing jib 1713 (+ auxiliary jib)

Description	Value
Maximum wind speed	20 m/s
Main boom length	25.7 m to 60.8 m
Main boom angle	80°
Jib length	68 m to 83 m
Jib angle	67° to 70°

Tab. 278: Parking position of main boom 2018 + luffing jib 1713 (+ auxiliary jib)

Parking position of main boom 2018 + luffing jib 1309 (+ auxiliary jib)

Description	Value
Maximum wind speed	22 m/s
Main boom length	25.7 m to 60.8 m
Main boom angle	80°
Jib length	22.7 m to 78.5 m
Jib angle	67° to 70°

Tab. 279: Parking position of main boom 2018 + luffing jib 1309 (+ auxiliary jib)

Permitted gradient for main boom 2018 + luffing jib 1309 (+ auxiliary jib)

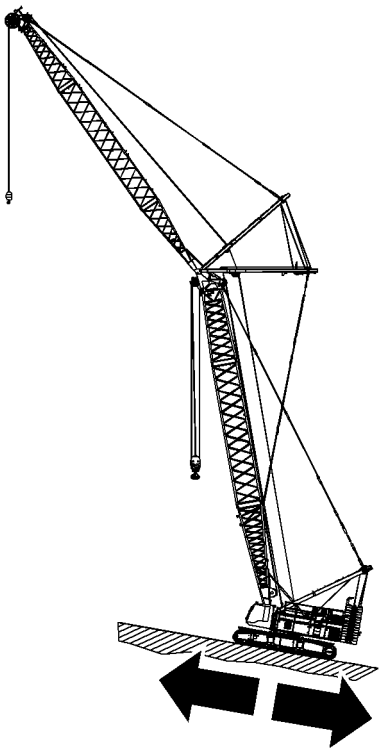


Fig. 2288: Permitted gradient for main boom 2018 + luffing jib 1309 (+ auxiliary jib), boom travel uphill

Description	Value		
Main boom angle	75°		
Jib angle	55°		
Jib length	22.7 m to 46.1 m	49.1 m to 66.8 m	69.5 m to 78.5 m
Main boom length	**max. gradient in %, boom travel uphill**		
20 m to 43.4 m	20	20	15
46.4 m to 60.8 m	20	20	15

Tab. 295: Permitted gradient for main boom 2018 + luffing jib 1309 (+ auxiliary jib), boom travel uphill

- ▶ Insert the split pin.
- ▶ Bend ends of split pins outwards with screwdriver **1**.
- ▶ Completely bend ends of split pins outwards with hammer **2**.

7.3.2 Linchpin

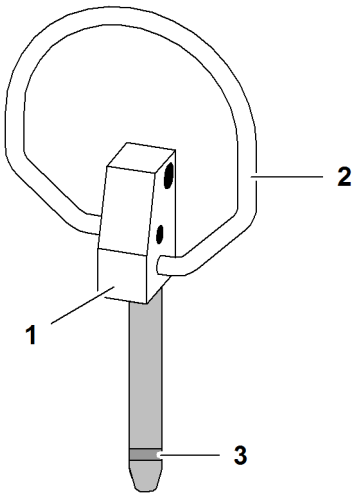


Fig. 2310: Linchpin

1	Linchpin	**3**	Notch
2	Ring		

WARNING
Improper closing of linchpin!
Unintended loosening of linchpin.
Severe injury.

- ▶ Snap ring **2** into notch **3**.

Securing handrail with spring cotter pin outside

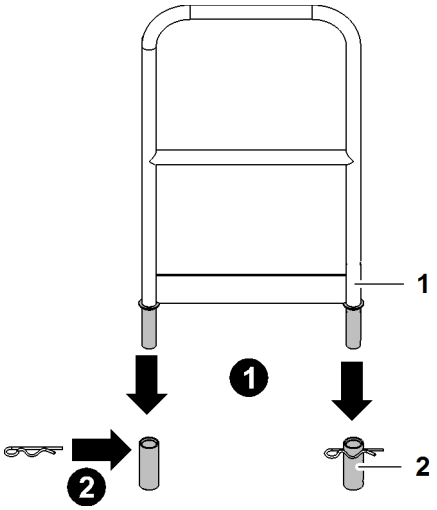


Fig. 2330: Securing handrail with spring cotter pin outside

1 Handrail **2** Mount for handrail

▶ Insert handrail **1** into mount **2**.

▶ Repeat process with all handrails.

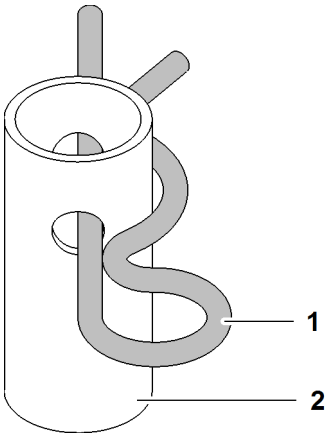


Fig. 2331: Inserting the spring cotter pin

1 Spring cotter pin **2** Mount for handrail

▶ Insert spring cotter pin **1**.

▶ Repeat process with all mounts **2**.

▶ Ensure that the spring cotter pin **1** is inserted correctly.
▷ Handrails secured with spring cotter pin outside.

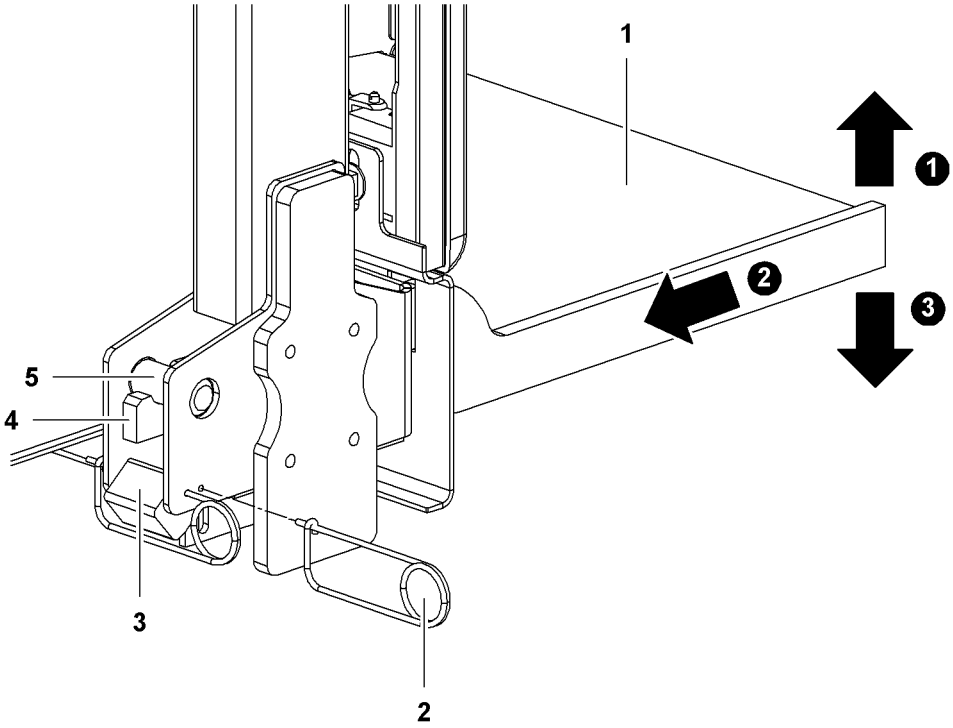


Fig. 2351: Mounting the boom walkway on the uppercarriage

1 Boom walkway
2 Safety pin
3 Locking element
4 Boom walkway mount
5 Pin

▶ Remove safety pins **2**.

▶ Tilt locking element **3** downwards.

▶ Push boom walkway **1** upwards and push into the guide.

If the boom walkway mount **4** is underneath the pin **5**:
▶ Lower boom walkway **1**.

▶ Tilt locking element **3** upwards and secure with the safety pin **2**.

7.4.8 Mounting the ladder on the uppercarriage

The ladder is mounted on the left side of the uppercarriage.

If a second, optional ladder* is supplied, it is mounted on the right side of the uppercarriage.

If the machine is equipped with hydraulic cabin elevation*, the ladder on the left side of the uppercarriage can only installed after the hydraulic cabin elevation mast was erected.

CAUTION
Improper mounting of ladder!
Fall from ladder.

▶ Secure pin with linchpins.

▶ Check ladder for damage and tears prior to ascending.

Placing the slewing brackets in support position

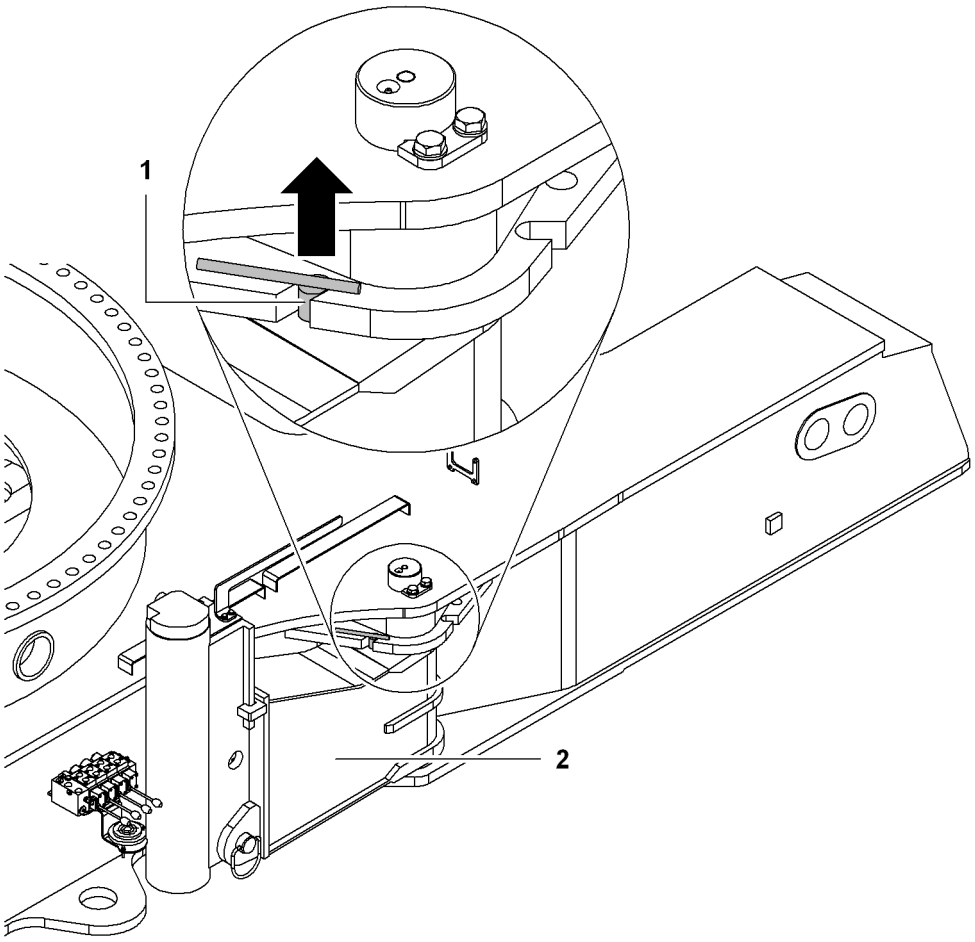


Fig. 2373: Placing the slewing brackets in support position

1 Pin **2** Slewing bracket

▶ Remove pin **1**.

A mount for the cover **3** of the multi-coupling and dummy sockets for the electrical system are located on the catwalk of the main boom base section.

▶ Fit the hand lever of the multi-coupling.

▶ Remove spring cotter pin **4** on cover **3**.

▶ Turn hand lever in the direction of the arrow.
  ▷ Multi-coupling can be taken out of mount.
  ▷ Cover **3** remains in mount on main boom base section.

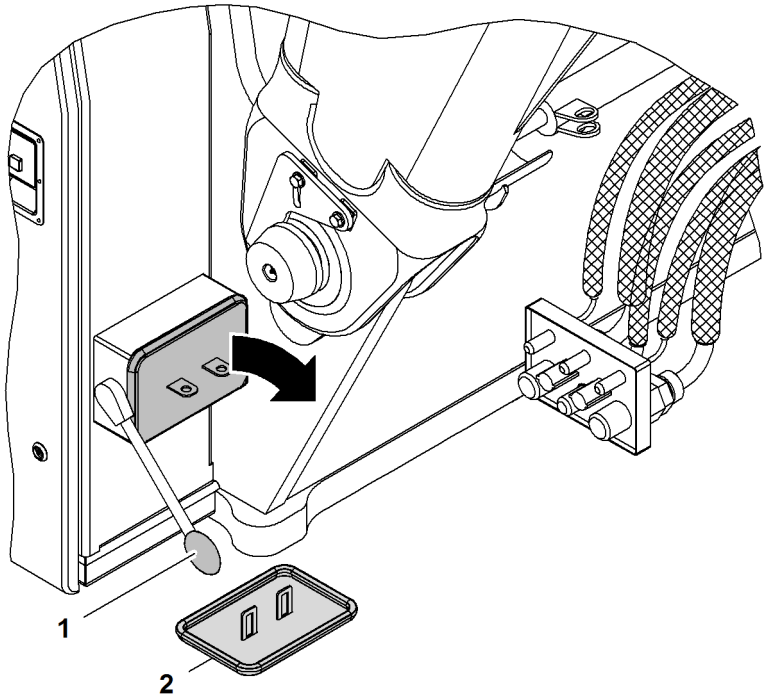


Fig. 2390: Removing the cover of the multi-couplings

1	Hand lever	**3**	Cover
2	Cover	**4**	Locking spring

▶ Fit the hand lever **1** of the multi-coupling.

▶ Remove the locking spring **4** on the cover **3**.

▶ Turn hand lever **1** in the direction of the arrow.
  ▷ Cover **2** is loose.

▶ Mount cover **3** on bracket of the main boom base section and secure with locking spring.

▶ Stow away cover **2**.

Installing the first crawler side frame

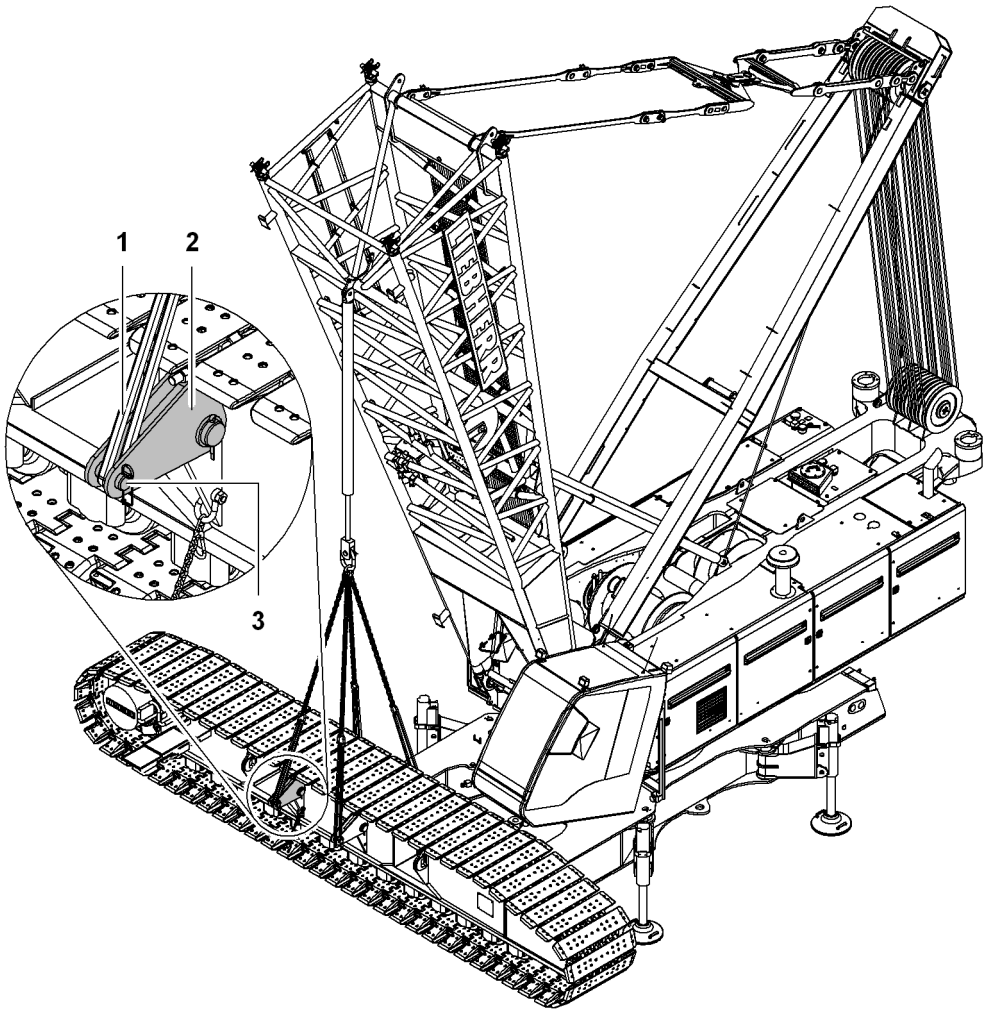


Fig. 2412: Installing the first crawler side frame

1 Sling gear
2 Folding bracket
3 Pin

▶ Lift crawler side frames from transport vehicle.

▶ Remove transport vehicle.

WARNING
Machine swings with a suspended load!
Crush, fatal injury.

▶ Ensure that no persons are located in the danger zone.

▶ Leave danger zone.

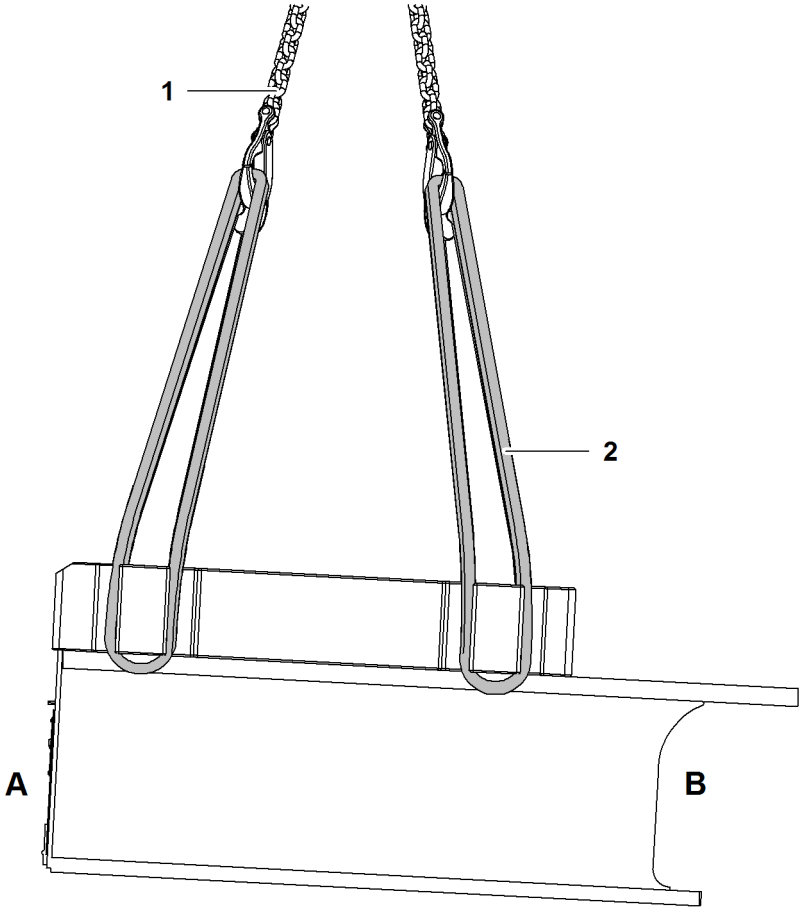


Fig. 2435: Rigging the carbody counterweight slab 10 t

1	4-strand round sling rigging with chain shortening devices	**A**	Direction tool box
2	Round sling (4x)	**B**	Direction basic machine

▶ Shorten chains of the round sling rigging (direction toolbox **A**) by 12 chain links.

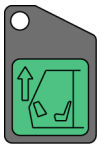
▶ Shorten chains of the round sling rigging (direction basic machine **B**) by 11 chain links.

▶ Rig the carbody counterweight slab 10 t.

Installing the carbody counterweight slab 10 t

NOTICE
Horizontal cabin!
Damage to cabin.

▶ Tilt cabin upwards by 10 t before attaching the carbody counterweight slab.



If the cabin is tilted down:

▶ Press the *Tilt cabin up* button on control panel *X11*.
▷ The cabin tilts upwards.

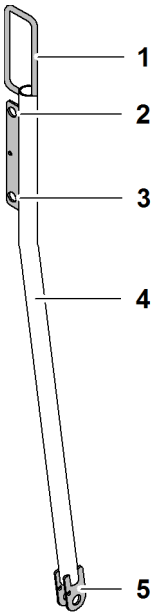


Fig. 2453: Hand lever for pin mechanics

1 Handle
2 Removal position “pin connection closed”
3 Removal position “pin connection open”
4 Hand lever
5 Pin connection point

WARNING
Opening of pin connection of rear counterweight due to unsecured pin!
Death, grave injuries. Damage to machine.

▶ Ensure that hand lever **4** is secured with a linchpin on slinging plate.

▶ Remove hand lever **4** on slinging plate in removal position “pin connection open” **3**.

▶ Secure hand lever **4** with linchpin.

▶ Repeat process with second hand lever **4**.

Lifting and pinning the rear counterweight

DANGER
Slewing of uppercarriage with rear counterweight attached not permitted!
Machine toppling over.

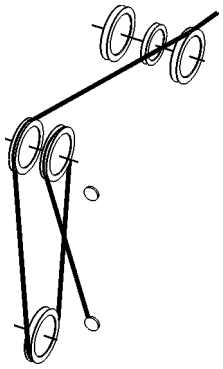
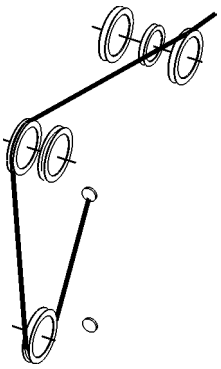
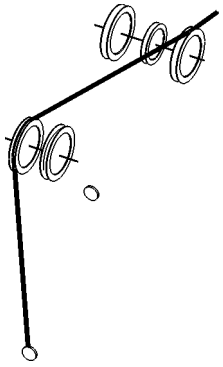
▶ Only turn uppercarriage according to the table (see: tab. 312, page 1010) .

DANGER
When the narrow track is being used swing of uppercarriage is not permitted!
Machine toppling over.

▶ Ensure that machine is set up with a wide track width.

DANGER
Incorrect number of reevings!
Structural breakdown, toppling of machine.

▶ Choose the correct number of reevings as per the load chart.

Reeving diagrams for one rope across auxiliary jib (36 t) on main boom head 2018 (load position1)	
 3x	 2x
 1x	

Tab. 318: Reeving diagrams for one rope across auxiliary jib (36 t) on main boom head 2018 (load position1)

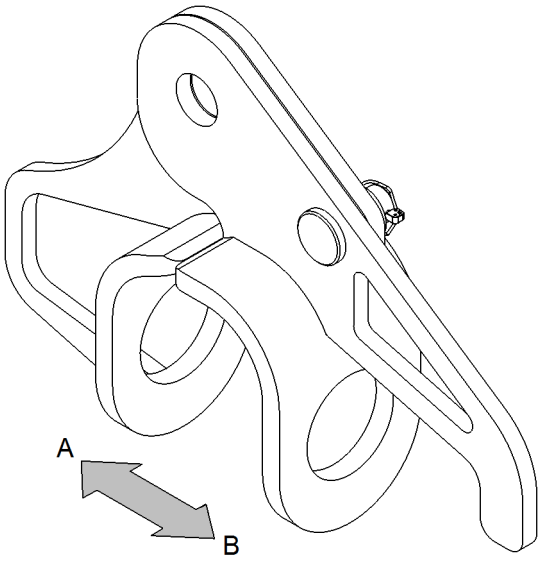


Fig. 2647: Mid-point suspension forks

A Main boom interior **B** Main boom exterior

The forks may have different shapes. The permissible shape depends on the boom configuration (For more information see: 1 Product description, page 47) .

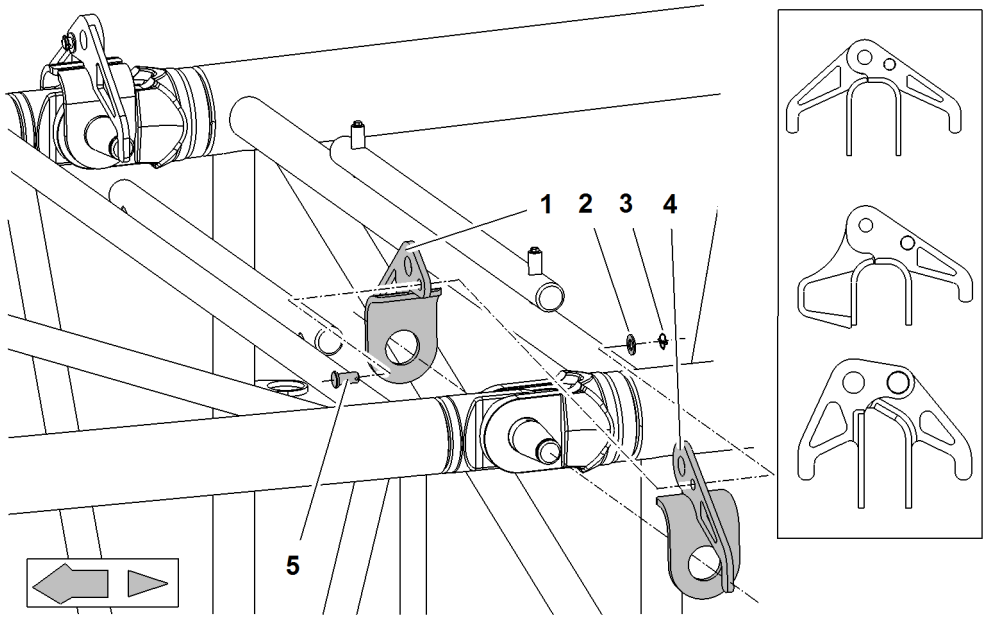


Fig. 2648: Assembling the mid-point suspension forks

1 Inner section of fork
2 Washer
3 Linchpin
4 Outer section of fork
5 Pin

Note
Special assembly procedure with identical installation position of mid-point suspension and rope guide on main boom!

▶ Replace mid-point suspension forks with rope guide forks.

▶ Mount inner section of fork **1** on double-taper pin.

Reeving rope with rope reeving winch

Dismantling rope protection pipes

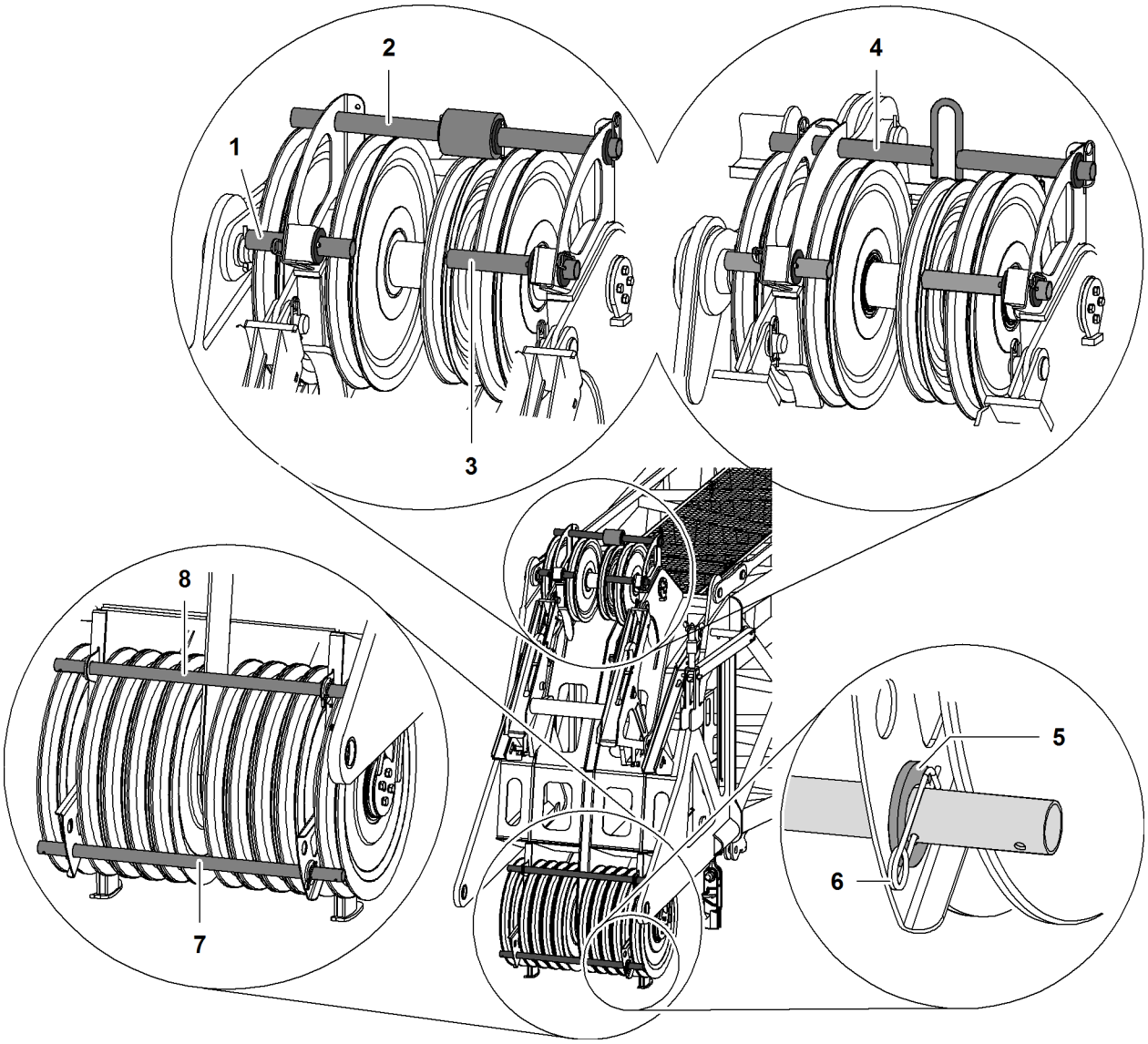


Fig. 2666: Rope protection pipes main boom head 1311, 2017, 2018, 2320, 2220, 2821

1	Rope protection pipe	**4**	Rope protection pipe variant2	**7**	Rope protection pipe
2	Rope protection pipe variant1	**5**	Washer	**8**	Rope protection pipe
3	Rope protection pipe	**6**	Locking spring		

The rope protection pipes are secured on one side with a split pin, on the other side with the locking spring.

- ▶ Remove locking springs **6** and washer **5**.
- ▶ Remove rope protection pipes **1 + 2 + 3 + 4 + 7 + 8**.

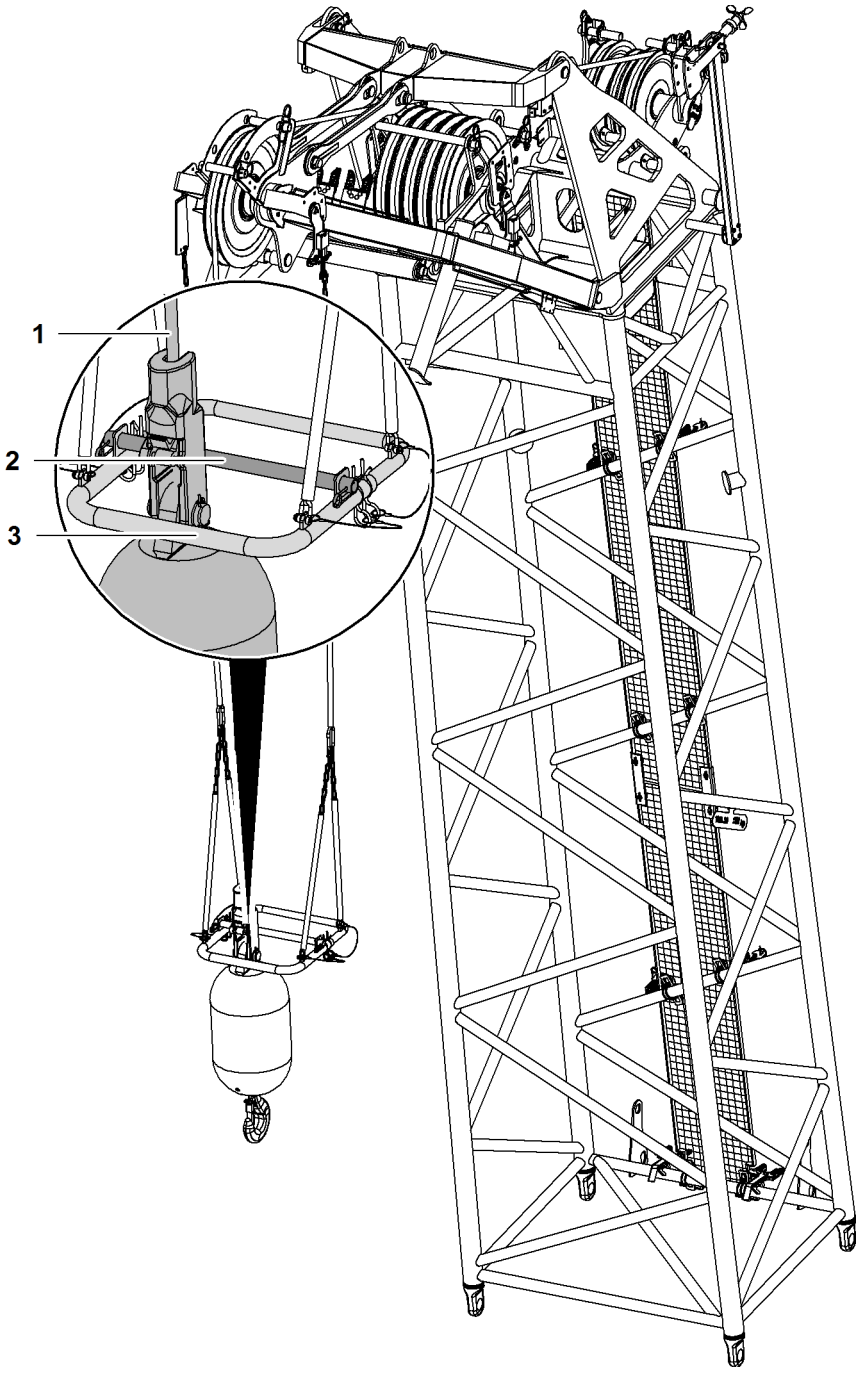


Fig. 2688: Installing hoist limit switch bracket with single reeving on auxiliary jib head (36 t)

1 Rope
2 Spacer pipe
3 Hoist limit switch bracket

▶ Position rope **1** in front of spacer pipe **2** of hoist limit switch bracket **3**.

▶ Mount hoist limit switch bracket **3** and secure with spring cotter pins.

Installing hoist limit switch bracket with multiple reeving on auxiliary jib head (36 t)

With multiple reeving, the transverse pipe is removed and the hoist limit switch bracket must be installed turned by 180°.

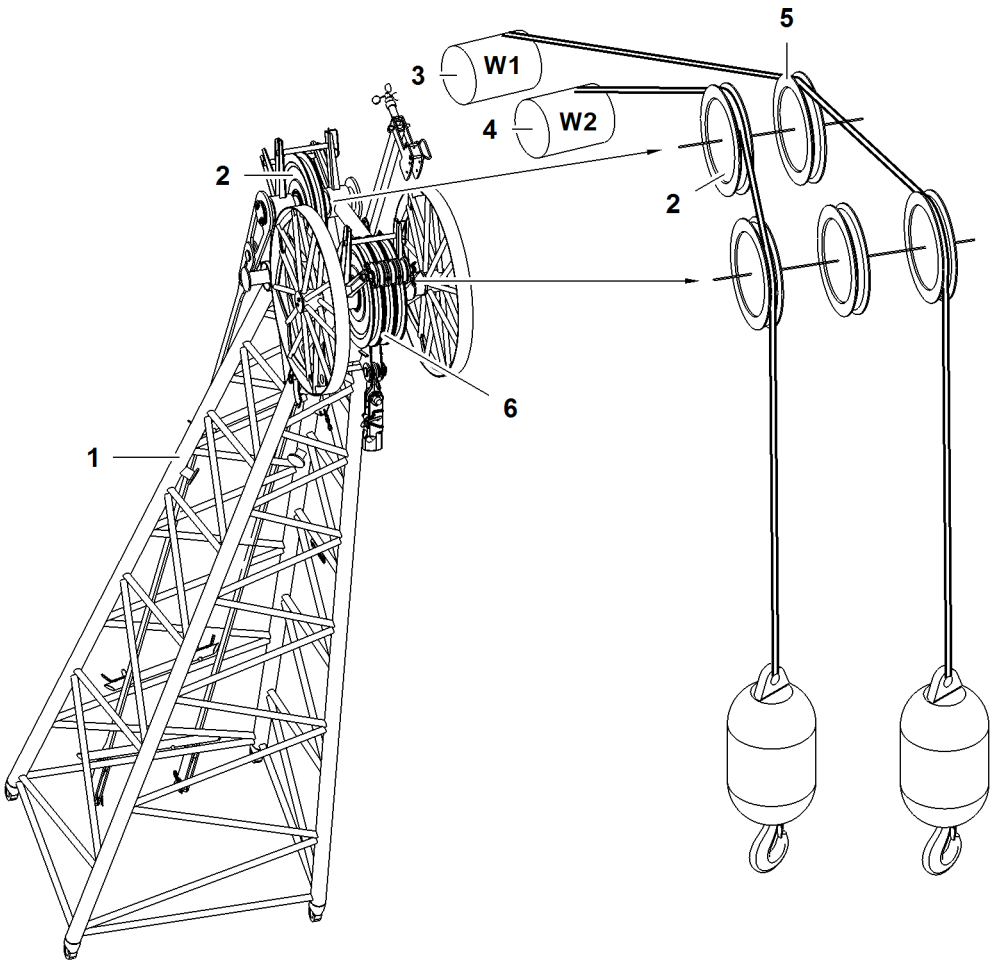


Fig. 2809: Reeving diagrams for two ropes across main boom head 1713 (load position1)

1	Main boom head	**4**	Winch2
2	Gantry pulley of main boom head	**5**	Retrofit kit* for operation with two ropes across jib head
3	Winch1	**6**	Pulley (3x) of main boom head

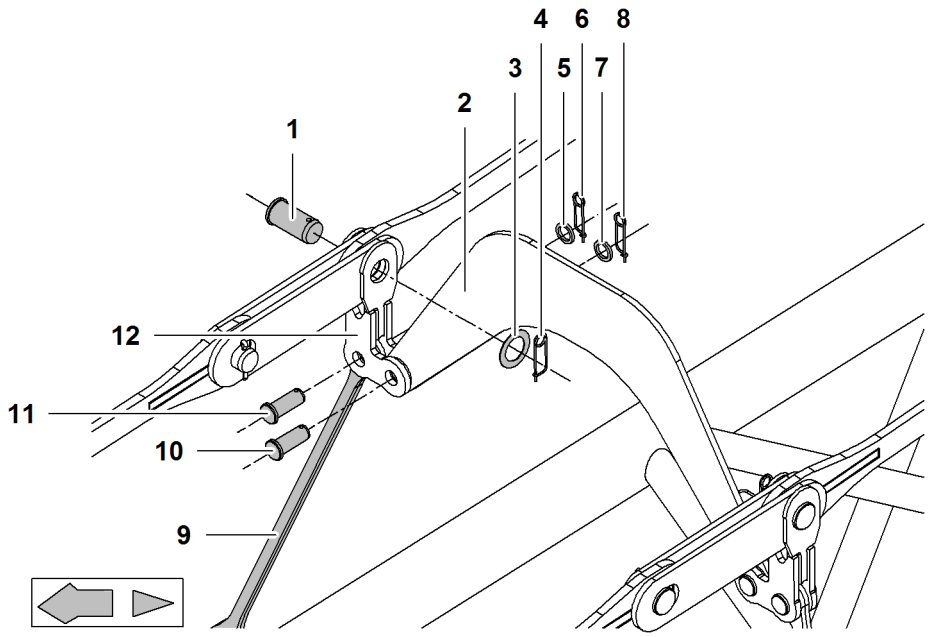


Fig. 3156: Installing pendant straps, spacer bracket, connecting elements and mid-point suspension backstay shackles behind the reducing adapter

1	Pins for pendant strap	**7**	Washer
2	Spacer bracket	**8**	Locking spring
3	Washer	**9**	Top backstay shackle (2x)
4	Locking spring	**10**	Pin for spacer bracket
5	Washer	**11**	Pin for backstay shackle
6	Locking spring	**12**	Connecting element

- ▶ Pin connecting element **12** to pendant strap.
- ▶ Secure pin **1** with washer **3** and locking spring **4**.

NOTICE
Inadmissible run of winch1/winch2 rope!
Damage to winch1/winch2 rope.

- ▶ Ensure that rope of winch1/winch2 with installation position of spacer bracket **2** up runs below spacer bracket **2**.

- ▶ Pin connecting element **12** to spacer bracket **2**.
- ▶ Secure pin **10** with washer **7** and locking spring **8**.

Note

If stay ropes instead of backstay shackles must be installed according to system details:

- ▶ Install stay ropes using the same procedure as with backstay shackles.

- ▶ Pin connecting element **12** to top backstay shackles **9**.
- ▶ Secure pin **11** with washer **5** and locking spring **6**.
- ▶ Repeat procedure on opposite side.

7.10.4 Reeving diagrams for one rope across jib head 1008 (load position1)

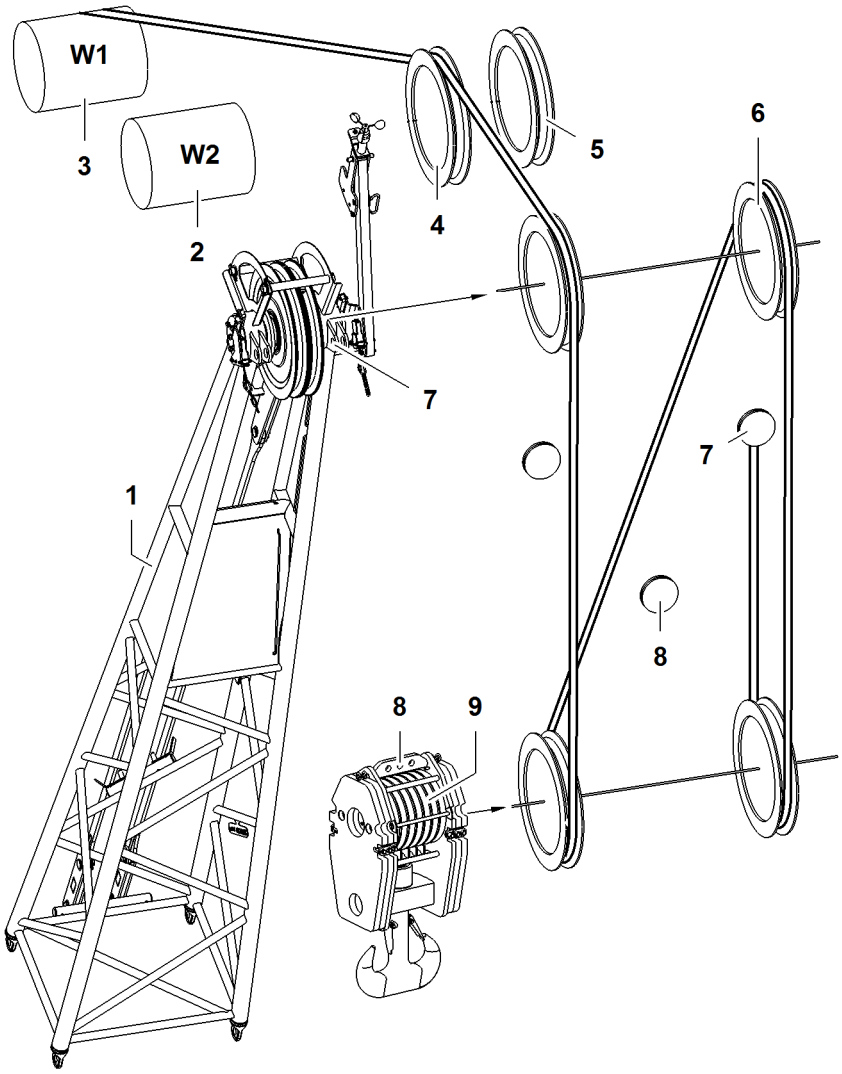


Fig. 3193: Reeving diagrams for one rope across jib head 1008 (load position1)

1 Jib head
2 Winch2
3 Winch1
4 Pulley of A-frame2
5 Retrofit kit* for operation with two ropes across jib head
6 Pulley (2x) of jib head
7 Rope fixing point (2x) of jib head
8 Rope fixing points of pulley block
9 Pulley set of pulley block

DANGER
Incorrect number of reevings!
Structural breakdown, toppling of machine.

▶ Choose the correct number of reevings as per the load chart.

DANGER
Wrong alignment of jib sections!
Structural failure.

- ▶ Assemble boom according to the relevant system requirements.
- ▶ Do not replace one jib section 6 m with two jib sections 3 m.
- ▶ Do not replace one jib section 12 m with two jib sections 6 m.

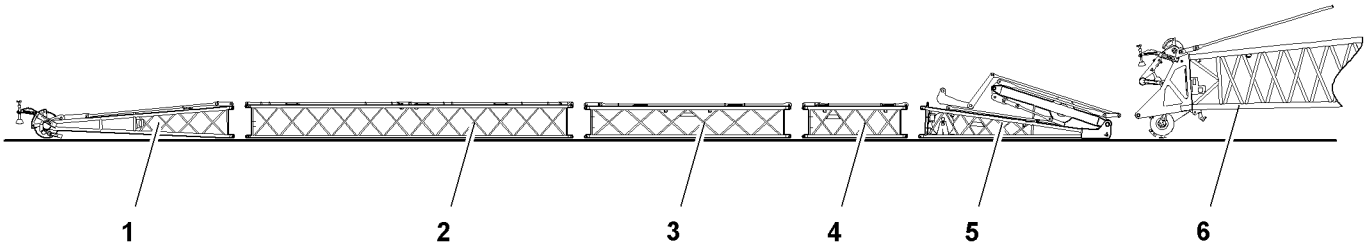


Fig. 3262: Positioning jib components according to relevant system specifications (illustration of principle)

1	Jib head section	**3**	Jib section6 m	**5**	Jib base section
2	Jib section12 m	**4**	Jib section3 m	**6**	Main boom head

- ▶ Direct transport vehicles with boom components.
- ▶ Lash boom components with sling gear to rigging points.
- ▶ Unload boom components using the basic machine or assist crane and position according to the relevant system instructions.

7.12.4 Pinning jib head section and jib section

WARNING
Standing between jib sections during assembly!
Severe injury.

- ▶ Only stay outside the jib sections.

Moving the lightning rods* on the fixed jib head into working position

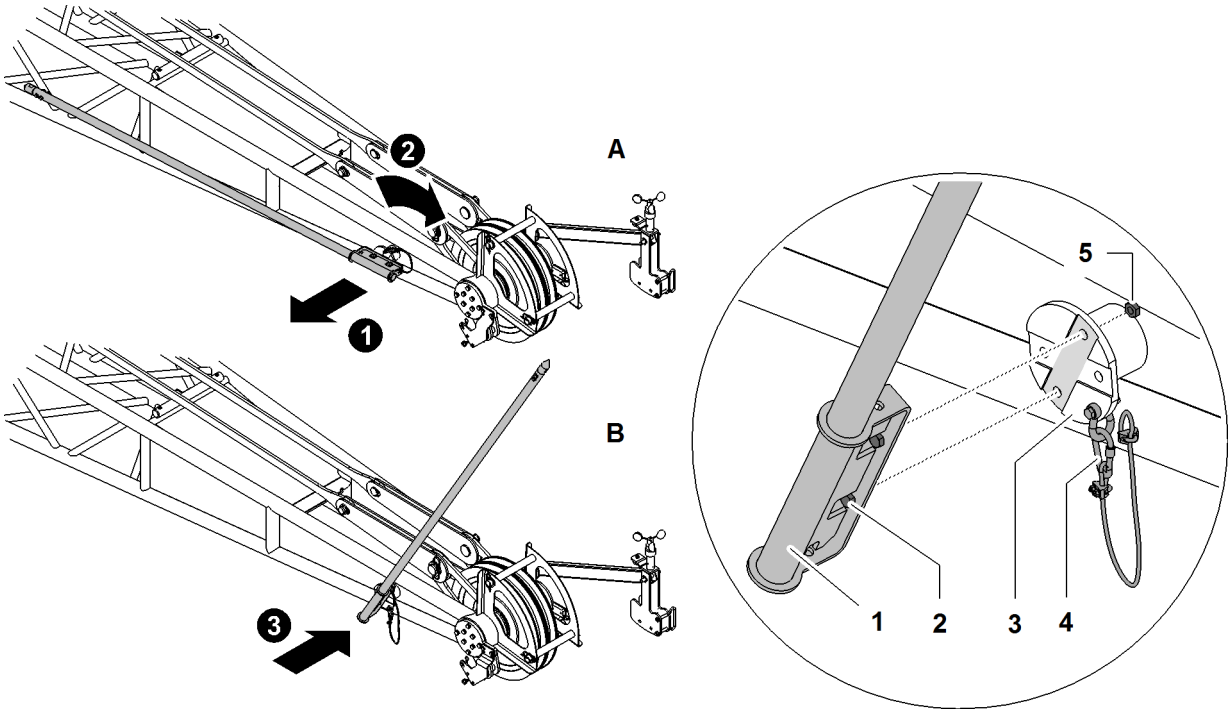


Fig. 3280: Moving the lightning rods on the fixed jib head into working position (illustration of principle)*

A Transport position
B Working position
1 Lightning rod
2 Screw (2x)
3 Mounting plate
4 Safety rope
5 Nut (2x)

- ▶ Undo safety rope **4**.
- ▶ Undo nuts **5**.
- ▶ Undo screws **2**.
- ▶ Move lightning rod **1** from transport position **A** to working position **B**.

Note
Liebherr recommends:

- ▶ Grease threads of the screws **2**.

- ▶ Attach lighting rod **1** withscrews **2**.
- ▶ Lock screws **2** with nuts **5**.

NOTICE
Safety rope not attached!
Dropping parts.

- ▶ Ensure that safety rope **4** is attached.

- ▶ Attach safety rope **4**.

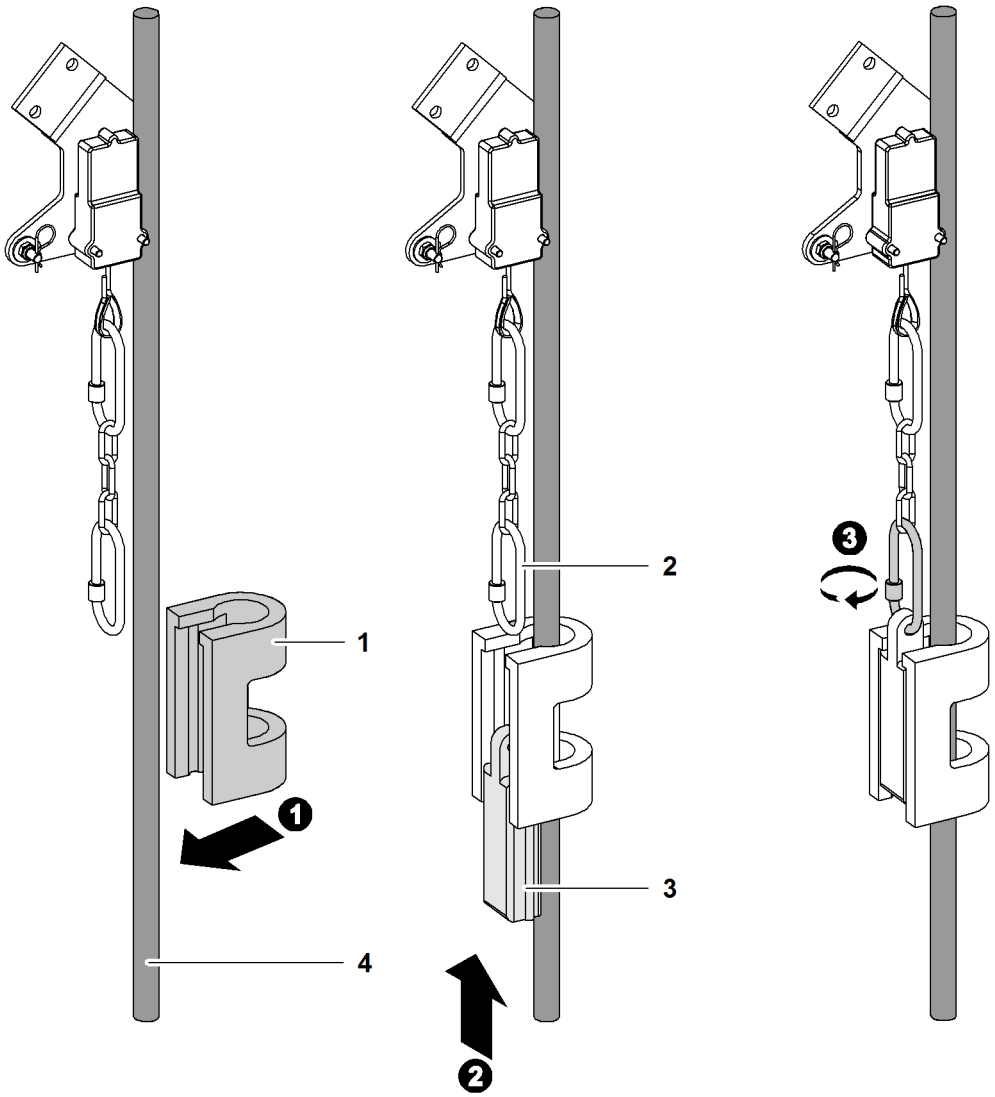


Fig. 3301: Installing the hoist limit switch weight

1 Hoist limit switch weight (U shape)
2 Carabiner
3 Hoist limit switch weight (wedge)
4 Rope of winch1/winch2

▶ Guide the hoist limit switch weight (U shape) **1** over the rope of winch1/ winch2 **4**.

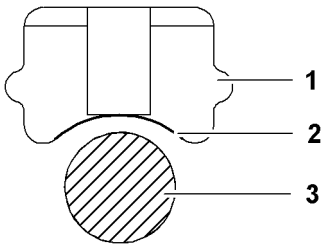


Fig. 3302: Hoist limit switch weight (wedge) view from above

1 Hoist limit switch weight (wedge)
2 Curvature
3 Rope of winch1/winch2

The hoist limit switch weight (wedge) **1** has a curvature **2** on one side.

Required number of jib backstay straps 11.7 m (**L3**) is the same as the number of boom sections 11.7 m.

Note

▶ Permitted number of boom sections 3 m, 6 m, 11.7 m can be found in the load chart.

Pendant straps linking A-frame3 to jib head section 1713

Name			Value
X1	**A-frame3 equalizer (jib pendant strap)** (For more information see: A-frame3 base of pendant straps (jib pendant strap), page 195)		7410 mm
X	**Jib pendant straps** consisting of:		Total **X2** + Total **X3** + Total **X4**
	X2	**Jib pendant strap 3 m** (For more information see: Jib pendant strap 3 m, page 196)	
	X3	**Jib pendant strap 6 m** (For more information see: Jib pendant strap 6 m, page 196)	
	X4	**Jib pendant strap 12 m** (For more information see: Jib pendant strap 12 m, page 197)	
X5	**Jib pendant strap on jib head 1713** (For more information see: Jib pendant strap on jib head 1713.21, page 198)		6500 mm

Tab. 360: Pendant straps A-frame3 to jib head 1713

Configuration of jib pendant straps (X):

Required number of jib pendant straps 3 m (**X2**) is the same as the number of jib sections 3 m.

Required number of jib pendant straps 6 m (**X3**) is the same as the number of jib sections 6 m.

Required number of jib pendant straps 12 m (**X4**) is the same as the number of jib sections 12 m.

Note

▶ Permitted number of jib sections 3 m, 6 m, 12 m can be found in the following table: (For more information see: 7.13.1 Configuration of jib, page 1181)

7.14.6 Reeving diagrams for one rope across jib head section 1309 (load position 1)

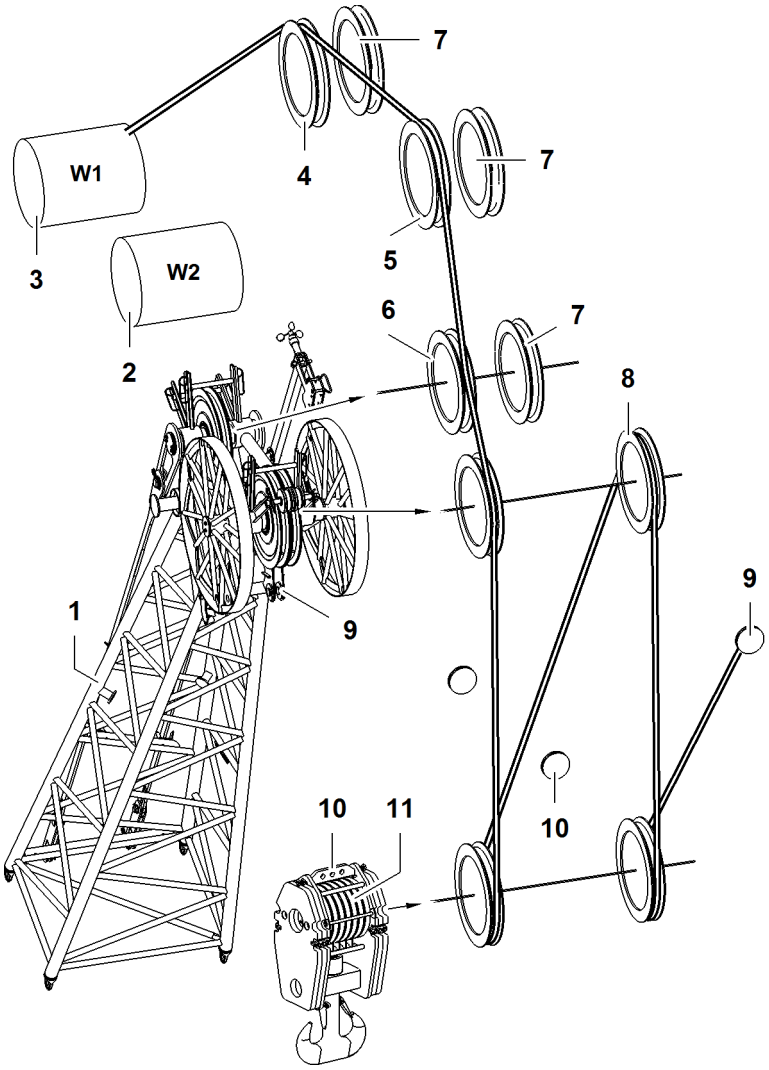


Fig. 3599: Reeving diagrams for one rope across jib head section 1309 (load position 1)

1	Jib head section	**7**	Retrofit kit* for operation with two ropes across jib head section
2	Winch2	**8**	Rope pulley (2x) of jib head section
3	Winch1	**9**	Rope fixing point (2x) of jib head section
4	Rope pulley of A-frame2	**10**	Rope fixing points of pulley block
5	Rope pulley of A-frame3	**11**	Pulley set of pulley block
6	Gantry pulley of jib head section		

DANGER
Inadmissible number of reevings!
Structural breakdown, toppling of machine.

▶ Select correct number of reevings as indicated in load chart.

On A-frame2 and on the crossbar a shackle and a round sling have been fit in the factory.

Ensure that the following conditions are fulfilled:
- ❑ The shackle and round sling are fitted to A-frame 2.
- ❑ The shackle and round sling are fitted to the crossbar.
- ❑ The round sling on A-frame 2 passes through the round sling on the crossbar.

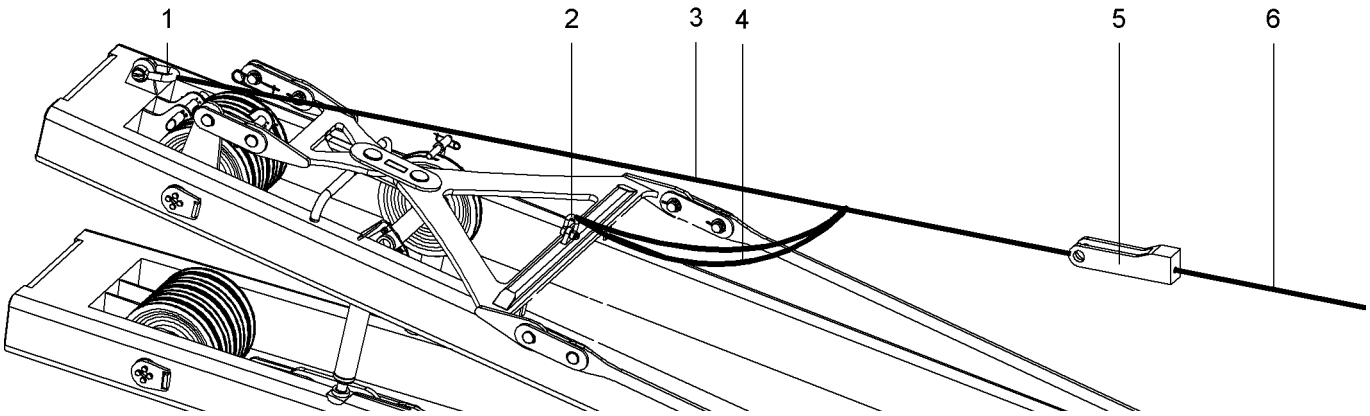


Fig. 3627: Connect A-frame2 with the rope of winch1/winch2.

1	Shackle on A-frame 2	**3**	Round sling on A-frame 2	**5**	Pocket lock
2	Shackle on crossbar	**4**	Round sling on crossbar	**6**	Rope of winch1/winch2

To connect the rope of winch1/winch2 **6** with the round sling, use the pocket lock **5** of the main boom head.

- ▶ Attach pocket lock **5** to round sling **3** on A-frame2.
- ▶ Pull rope of winch1/winch2 **6** forward across the main boom up to the pocket lock **5**.
- ▶ Connect the rope of winch1/winch2 **6** with the pocket lock **5**.

7.15.10 Reeving A-frame2/A-frame 3

WARNING
Unsecured walking on the boom!
Falling from the boom.

- ▶ A fall arrest system must be worn when working on booms to prevent falling.

WARNING
Rope of the luffing jib winch is reeved incorrectly!

- ▶ Reeve the rope of the luffing jib winch according to the reeving plan.

The reeving diagram of the rope of the luffing jib winch can be found in the relevant jib unstructions.

When a rope guide has been installed, the rope of the luffing jib winch must be reeved in the rope guide. The rope of winch1/winch2 must be above the closed rope guide.

- ▶ Open up the rope guide, if present.
- ▶ Reeve the rope of the luffing jib winch.

- ▶ Remove the linchpin **1** of the locking element **3**.
- ▶ Remove **3** locking element.
- ▶ Swing pendulum **4** down.
- ▶ Slide locking element **3** through pendulum **4** and secure with linchpins **1**.

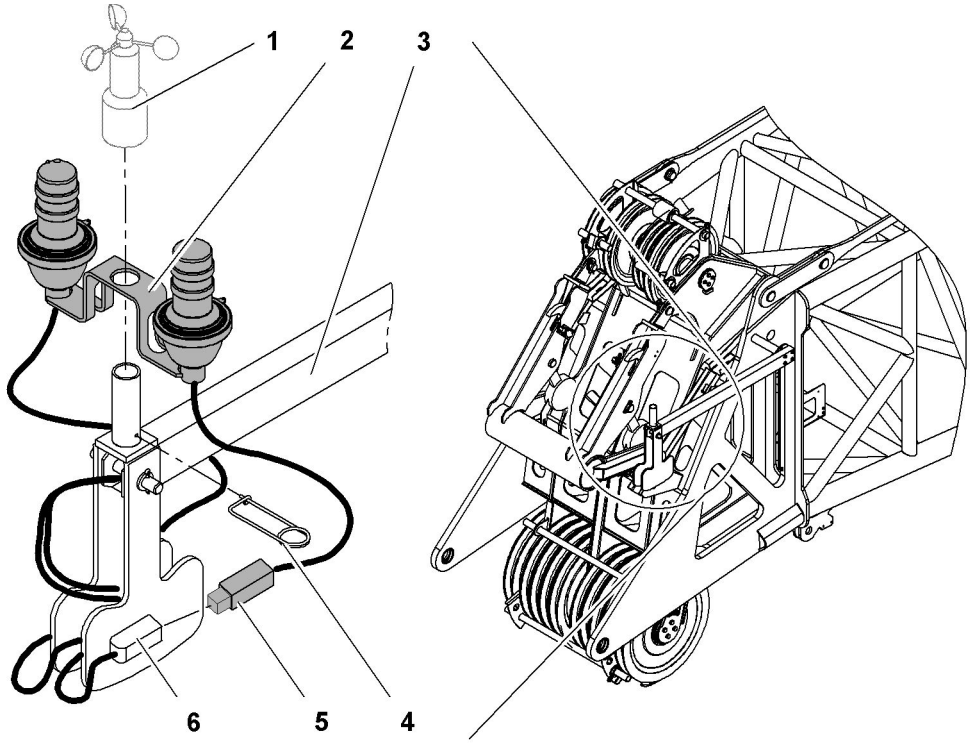


Fig. 3645: Installing the aircraft warning light

1	Anemometer	**4**	Locking spring
2	Aircraft warning light	**5**	Plug
3	Mount	**6**	Coupling

- ▶ Place aircraft warning light **2** on pipe.
  - ▷ Aircraft warning light is secured by the pipe and axis on the mount **3**.

NOTICE
Wrong insertion of locking spring!
Damage to electric cable.

- ▶ Carefully push through locking spring.

- ▶ Push through locking spring **4**.
  - ▷ Aircraft warning light **2** is secured.
- ▶ Connect plug **5** with coupling **6**.
- ▶ Lock plug **5**.

7.15.20 Installing anemometer

Make sure the following conditions are met:

- ❑ Aircraft warning light is installed (if available).

WARNING
Inadmissible installation of swivels!
Severe injuries, damage to machine.

▶ Install rope with no twists.

▶ Install rope without swivels.

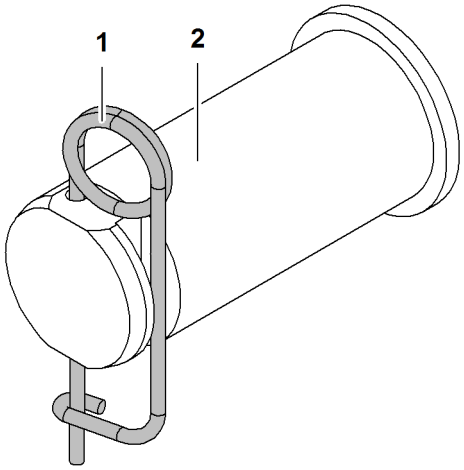


Fig. 3666: Securing pins

1 Locking spring **2** Pin

DANGER
Pins **2** not completely secured!
Load breakaway.

▶ Ensure that locking spring **1** completely secures the pin **2**.

Mounting rope fixing point on auxiliary jib on jib head section

DANGER
Wrong installation of pin and pocket lock!
Load breakaway.

▶ Install pins and pocket lock according to specifications.

The collar of the pins and the pocket lock openings are decisive for the installation direction of the rope fixing point.

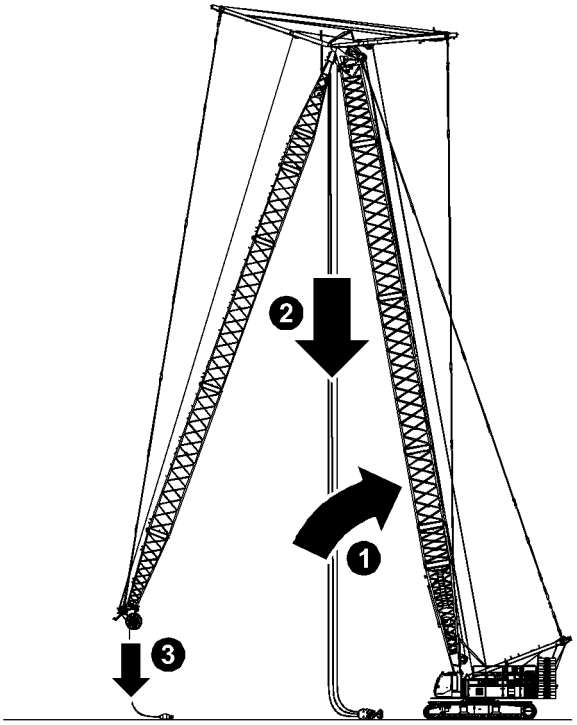


Fig. 3686: Lifting the main boom until main boom has reached an angle of 85° (illustration of principle)

When the bottom jib limit switch triggers:

▶ Lift main boom until main boom has reached an angle of 85°.
  ▷ Jib head lifts off the ground.

NOTICE
Incorrect erection procedure!
Damage to equipment.

▶ Do not drag hook or pulley block along the ground.

▶ Avoid slack rope.

▶ Unwind rope of winch1/winch2 on main boom when necessary.

▶ Unwind rope of winch1/winch2 on jib when necessary.

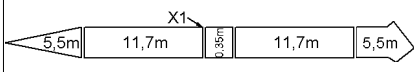
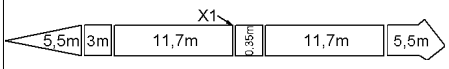
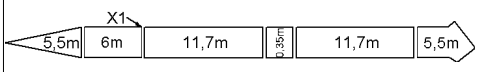
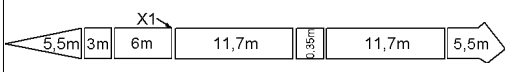
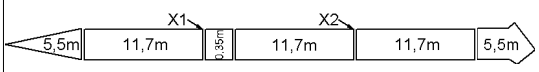
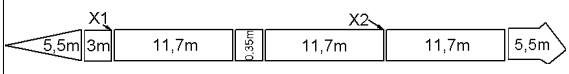
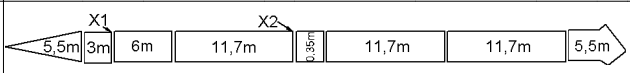
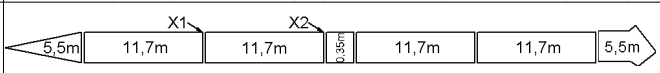
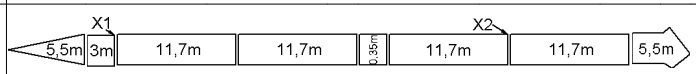
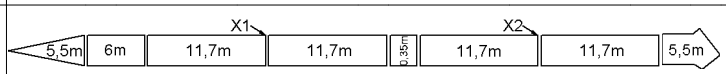
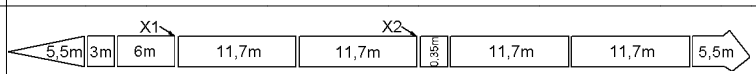
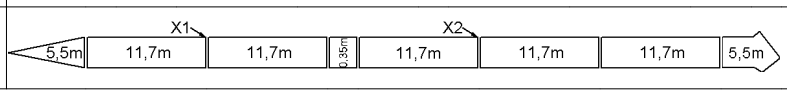
7.17 1309 luffing jib + 1309 Midfall

System-relevant information for 1309 luffing jib + 1309 Midfall:
- Configuration of jib
  - Mid-point suspension assembly positions
- Lengths of jib mid-point suspensions
- Configuration of main boom
- Pendant straps of 1309 luffing jib + 1309 Midfall overview
- Reeving diagrams for one rope across jib head 1309 (load position1)
- Reeving diagrams for one rope across midfall 1309 (load position3)

7.17.1 Configuration of jib

DANGER
Incorrect jib length assembled!
Structural breakdown.

▶ Check the jib length in the load chart for validity.

Jib length	Position of midfall	Configuration of jib (symbolic)
34.75 m	17.2 m	
37.75 m	20.2 m	
40.75 m	23.2 m	
43.75 m	26.2 m	
46.45 m	17.2 m	
49.45 m	20.2 m	
52.45 m	23.2 m	
55.45 m	26.2 m	
58.15 m	28.9 m	
61.15 m	31.9 m	
64.15 m	34.9 m	
67.15 m	37.9 m	
69.85 m	28.9 m	

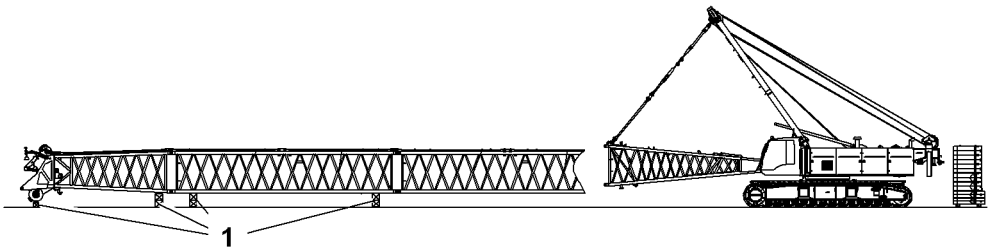


Fig. 3968: Laying down the boom and laying down the rear counterweight

1 Wooden blocks

- ▶ Lower boom.
- ▶ Place boom on wooden blocks **1**.
- ▶ Separate boom from main boom base section.
- ▶ Lay down rear counterweight.
- ▶ Erect main boom base section to approx. 70°.

Deinstalling platforms on undercarriage

WARNING
Movable crawler side frames!
Death, crushing of body parts.

- ▶ Ensure that no persons are located in the danger zone.
- ▶ Leave danger zone.

- ▶ Slightly tighten loop by lifting.
- ▶ By turning the loops of the jib luffing winch, align it in such a way that the jib luffing winch can be installed in the main boom base section.
  ▷ Jib luffing winch is lashed.
- ▶ Secure hydraulic lines of the jib luffing winch with cable ties against sliding.
- ▶ Secure electric cable of the jib luffing winch with cable ties against sliding.
- ▶ If required, de-install pins of the jib luffing winch.
- ▶ Grease bolts.
- ▶ Provide securing material.
  ▷ Jib luffing winch ready for installation.

7.21.3 Installation of jib luffing winch

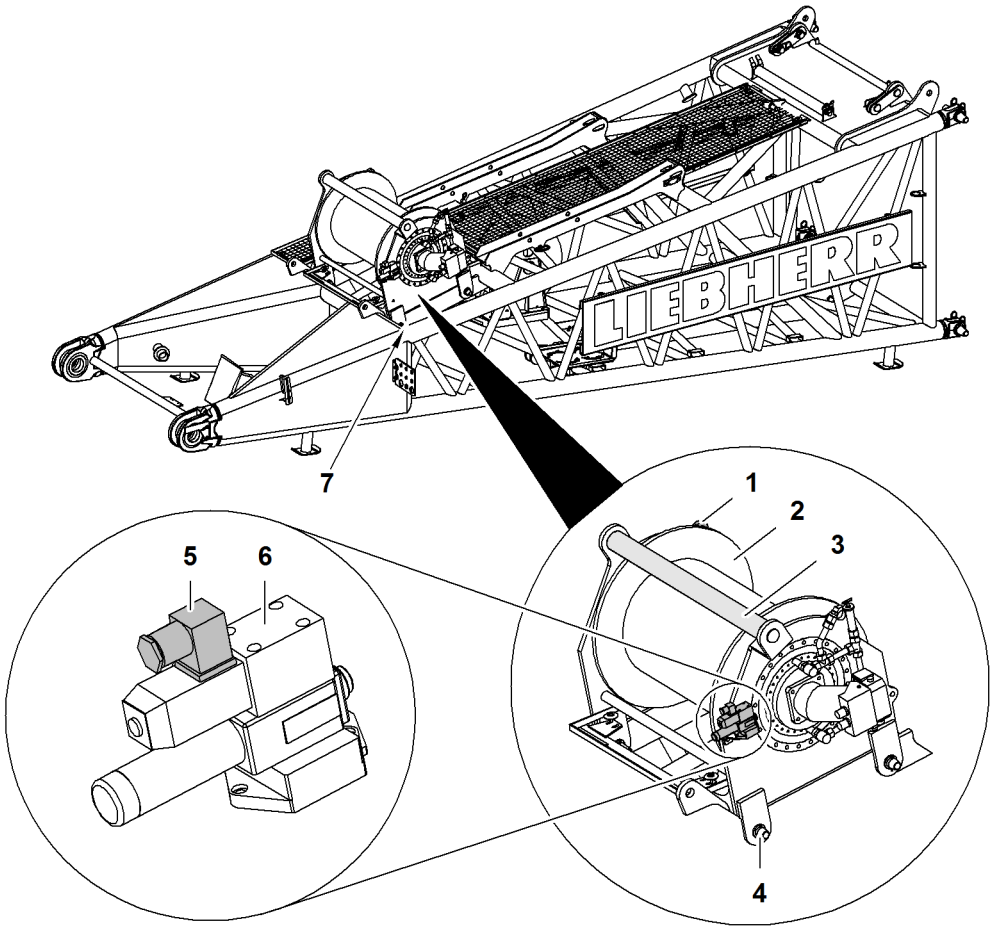


Fig. 3985: Overview installation of jib luffing winch

1	Attachment point for rope pressure roller (2x)	**5**	Electrical plug *+4E-Y06* for brake valve
2	Luffing jib luffing winch	**6**	Brake valve
3	Rope protection roller	**7**	Position electrical plug
4	Pin (4x)		

- ▶ Lift jib luffing winch **2** with auxiliary crane into main boom base section.
- ▶ Bolt jib luffing winch **2** with main boom base section.
- ▶ Secure all pins **4** with cotter and washer.
  ▷ Jib luffing winch installed in main boom base section.

7.25.2 Lower jib up to load moment limitation stop

DANGER
Erectability chart is not followed!
Machine toppling over.

▶ Only lay down boom when erection is permitted according to the erectability chart.

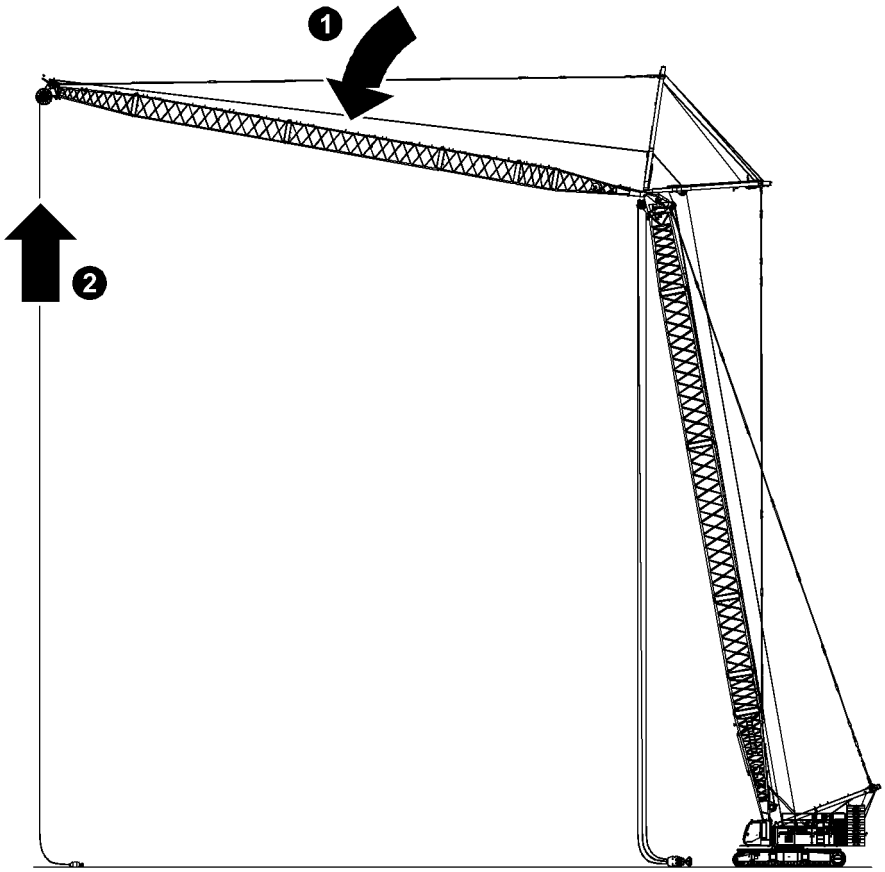


Fig. 3999: Lower jib up to load moment limitation stop (illustration of principle)

▶ Lower jib.

NOTICE
Incorrect laying down procedure!
Damage to equipment.

▶ Do not drag hook or pulley block along the ground.

▶ Avoid slack rope.

▶ Reeve rope of winch1/winch2 on jib when necessary.

If a load moment limitation stop is triggered:
▶ Press button *Load moment limitation assembly/self-lock* on control panel *X23*.

No load chart exist for machine geometry:
▷ Function “load moment limitation assembly” is active.
▷ LED in button *Load moment limitation assembly/self-lock* is lit.

- ▶ Remove ladders on uppercarriage.
- ▶ Use the uppercarriage locking device to prevent the uppercarriage from turning.
- ▶ Move the cabin's platform into transport position.
- ▶ Swing the cabin into transport position and bolt it.
- ▶ Close the cabin and secure the machine against unauthorized start-up.
- ▶ Switch off the battery main switch.

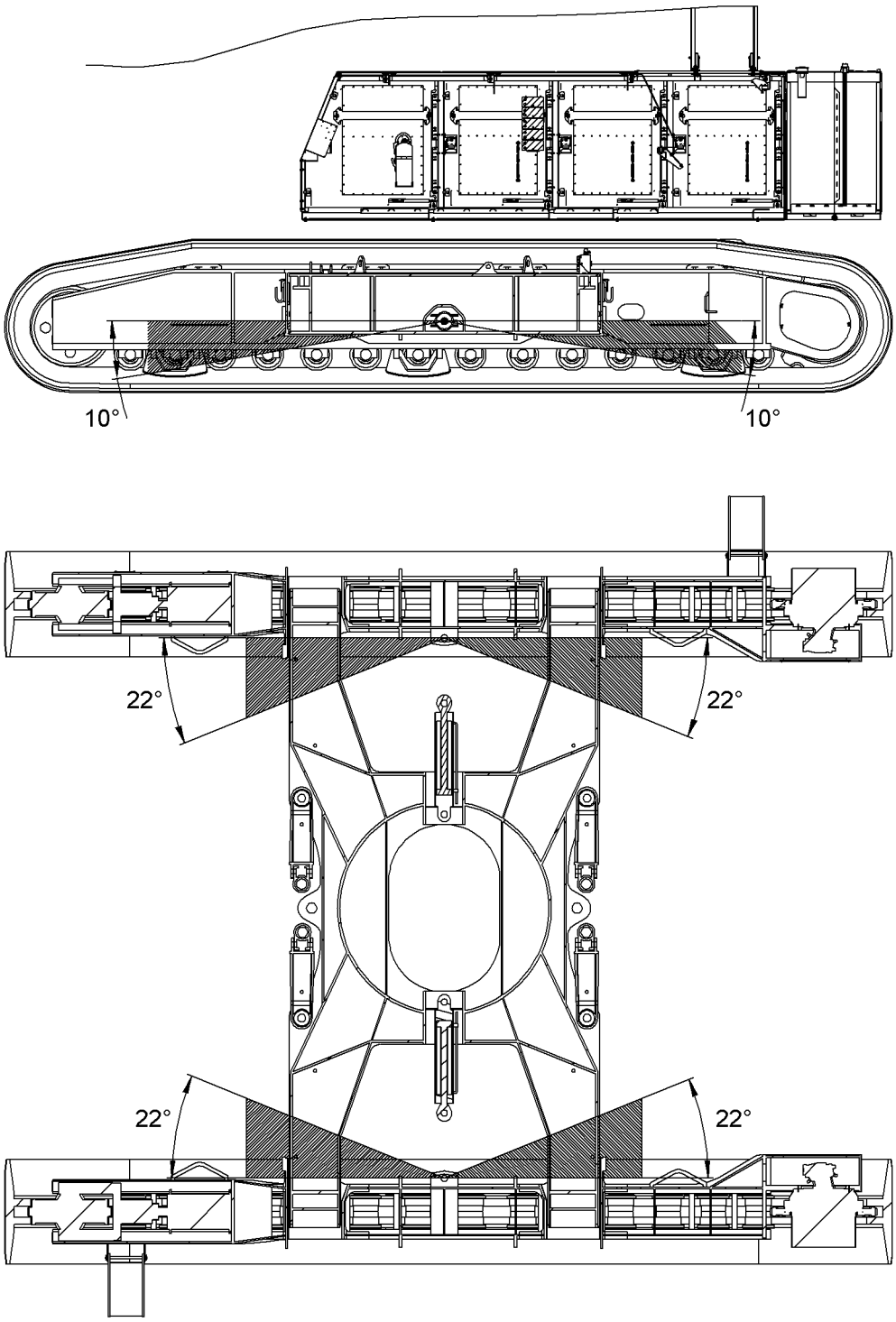


Fig. 4030: Inner critical angle - transporting the basic machine by ship

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

Maintenance / inspection after service hours								Tasks to be performed	
8h/Daily	40h/Weekly	500h/Quarterly	1000h/Every six months	2000h/Annually	4000h/2 years	6000h/3 years	Special intervals	**By maintenance staff** ■ Once-only activity ● Repeat interval ✦ If necessary ❄ Annually before the winter **by Liebherr service personnel** ☐ Once-only activity ❍ Repeat interval ✧ If necessary	See page
Cooling system (see operation manual of the engine manufacturer on CD)									
●								Checking the coolant level	
		❍						Checking cooling system and heating system for leaks and condition	
				❍			❄	Check anti-corrosive concentration and antifreeze concentration in coolant (at least 1 x a year)	
							❍	Change coolant (anti-freeze OS mix) every 6,000 hours (at least every 4 years)	
Swing gear									
	●							Check the gearbox oil level.	1408
			❍					Check gearbox for leak tightness.	
		☐		❍				Change the gearbox oil.	
					❍			Check the fastening screws for tight fit (fastening screws may only be used for a maximum of two more further assembly processes).	
			❍					Visually check the pinion and crown gear ring.	
			❍					Check holding brake for function.	
Swing connection									
		☐			❍			Checking the fastening screws for tight fit (exchanging fastening screws and nuts at each bearing exchange)	
●								Lubricating external teeth	1410
●								Lubricating the bearing races via the central lubrication point (preferably at the end of the shift)	1410
							✧	Measuring the bearing play	
Winch1/winch2									
	●							Checking the gearbox oil level	1412
			❍					Check the winch gearbox for leaks and perform oil analysis if necessary	
		☐		❍				Changing the gearbox oil	
		●						Checking oil level of holding brake	1413
				❍				Changing hydraulic oil of the holding brake	1414
	●							Lubricate counter bearings if lubrication option is available	1417
	●							Checking the rope end fastening for tight fit	1417
			❍				✧	Checking 3-windings limit switch for tight fit and function (at 1,000h or when changing ropes)	
			❍					Check winch for tight fit (pin clearance, pin locking)	
			❍					Check fastening screws for tight fit	
				❍				Performing a visual inspection	
			❍					Check holding brake for function	
			❍					Checking the free-fall brake for function (if available)	

Ordering data

Engine oil

	5 l canister	20 l canister	210 l barrel	1000 l container
Liebherr engine oil 10W-40	10 29 05 06	10 33 02 39	10 33 02 46	10 28 62 79
Liebherr engine oil 10W-40 low ash	10 32 61 13	10 32 61 12	10 32 61 11	10 32 61 10
Liebherr engine oil 5W-30	10 42 57 12	10 42 57 13	10 42 57 15	10 42 57 19
Liebherr engine oil 5W-30 low ash	11 06 60 29	11 06 60 30	11 06 60 31	11 06 60 32

Tab. 395: Order note engine oil

Gear oil

	5 l canister	20 l canister	210 l barrel	1000 l container
Liebherr Hypoid 90 EP	10 66 48 74	10 66 48 75	10 66 48 76	10 44 16 36
Liebherr Syntogear Plus 75W-90	10 33 02 85	10 33 02 87	10 33 02 88	10 29 64 77
Liebherr Syntogear Plus 220	10 19 03 87	10 19 03 88	10 19 03 89	10 19 03 90

Tab. 396: Order notice gearbox oil

Hydraulic oil

	5 l canister	20 l canister	210 l drum	1000 l container
Liebherr Hydraulic 37	10 66 48 65	10 66 48 67	10 66 47 12	10 66 48 56
Liebherr Hydraulic Plus	10 29 64 80	10 33 02 72	10 33 02 76	10 29 64 81
Liebherr Hydraulic Plus Arctic	10 29 64 79	10 33 02 77	10 33 02 78	10 29 64 78

Tab. 397: Hydraulic oil ordering data

Oil concentrate

	5 l canister	20 l canister
Liebherr special additive NL	10 51 53 00	10 51 57 52

Tab. 398: Order notice oil concentrate

Grease

	Cartridge	5 kg bucket	10 kg bucket	25 kg bucket
Liebherr Universal Grease 9900	10 29 68 16 (400 g)		10 29 68 13	10 29 68 12
Liebherr Universal Grease Arctic	10 29 68 28 (400 g)		10 29 68 25	10 29 68 24
Liebherr spray paste	10 33 03 08 (950 g)	10 33 03 11		

NOTICE
Inadmissible or contaminated gearbox oil!
Damage to the swing gear.

- ▶ Top up using only appropriate gearbox oil according to lubrication chart (For more information see: 9.2.3 Lubrication chart, page 1391) .
- ▶ Check purity of gearbox oil.

- ▶ Fill in gearbox oil up to center of sight glass.
- ▶ Closing the cover: turn the cover clockwise all the way.
- ▶ Start diesel engine and allow it to idle for 10 minutes.
- ▶ Move the swing gear in both directions.
- ▶ Switch off diesel engine and wait 1 minute before checking gearbox oil level again.

9.12 Crawler

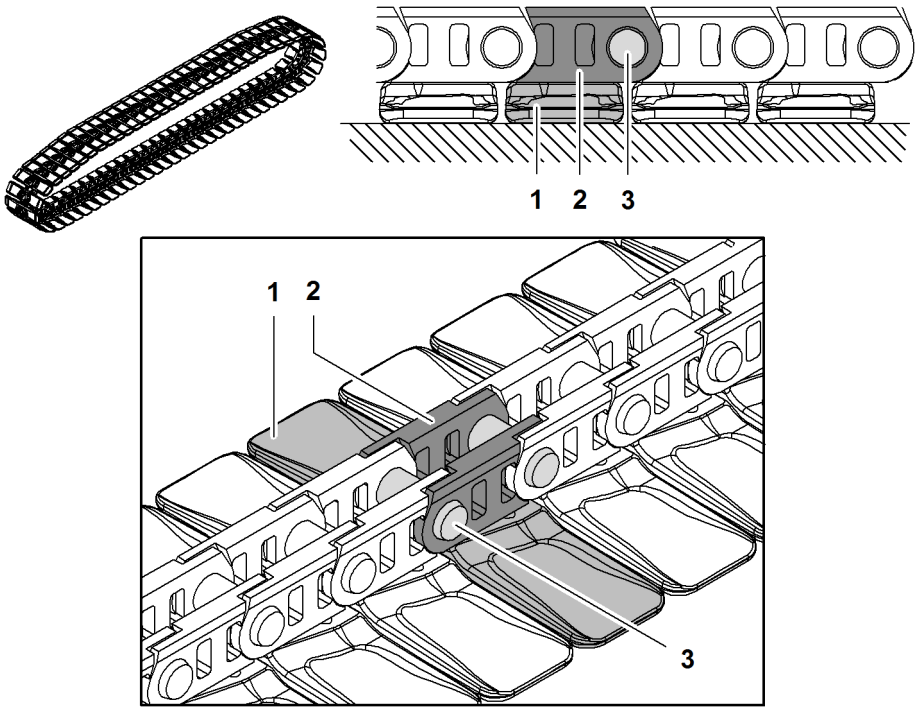


Fig. 4076: Chain crawler

1 Base plate
2 Chain link/guide
3 Pin connection

With the chain crawler, the base plate **1** of the crawler is screwed onto a chain link **2**. The chain links **2** are pinned with each other. The crawler is guided with the chain links **2**.

9.12.1 Checking the gearbox oil level

Make sure the following conditions are met:
- ❑ Inspection lamp is available.
- ❑ Allen key from the Liebherr tool kit is available.
- ❑ Torque wrench 120 Nm is available.
- ❑ Diesel engine has been switched off for 5 minutes.
- ❑ Machine is level.
- ❑ Machine is secured against unauthorized startup.
- ❑ The Liebherr lettering on the crawler drive is horizontally readable from left to right.

CAUTION
Hot crawler components and hot gearbox oil!
Burns.

▶ Maintenance work and inspection work on the crawlers must only be carried out when the machine is switched off and has cooled down.

▶ Wear protective equipment.

NOTICE
Inadmissible hydraulic oil or incorrect filling of hydraulic oil!
Damage to hydraulic system.

- ▶ Top up with suitable hydraulic oil only (For more information see: 9.2.3 Lubrication chart, page 1391) .
- ▶ Only fill in clean and water-free hydraulic oil.
- ▶ Only add approved additives or concentrates (For more information see: 9.2.3 Lubrication chart, page 1391) .
- ▶ Ensure that no dirt or foreign bodies enter the return filter.
- ▶ Only fill in pre-filtered hydraulic oil via the return filter.

- ▶ Fill with hydraulic oil.
- ▶ Replace the housing cover and align it so that the screw holes match.

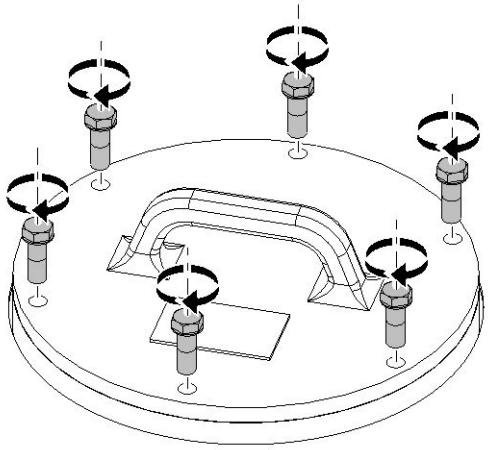


Fig. 4090: Closing the return filter

- ▶ Tighten the screws by hand.
- ▶ Tighten screws with a torque of 69 Nm.

9.16.3 Draining the hydraulic oil

Note
Environmental pollution!

- ▶ Fluids such as hydraulic oil, fuel and coolant must be disposed of in accordance with national and international regulations and guidelines.

At the bottom of the hydraulic oil tank is a drain valve.

- ▶ Remove the cover from the drain valve.
- ▶ Connect the oil drain hose from the Liebherr tool kit to the drain valve.
- ▶ Drain the hydraulic oil.

9.16.4 Cleaning the magnetic rod in the return filter

Ensure that a torque wrench 69 Nm (width across flats 19) is available.

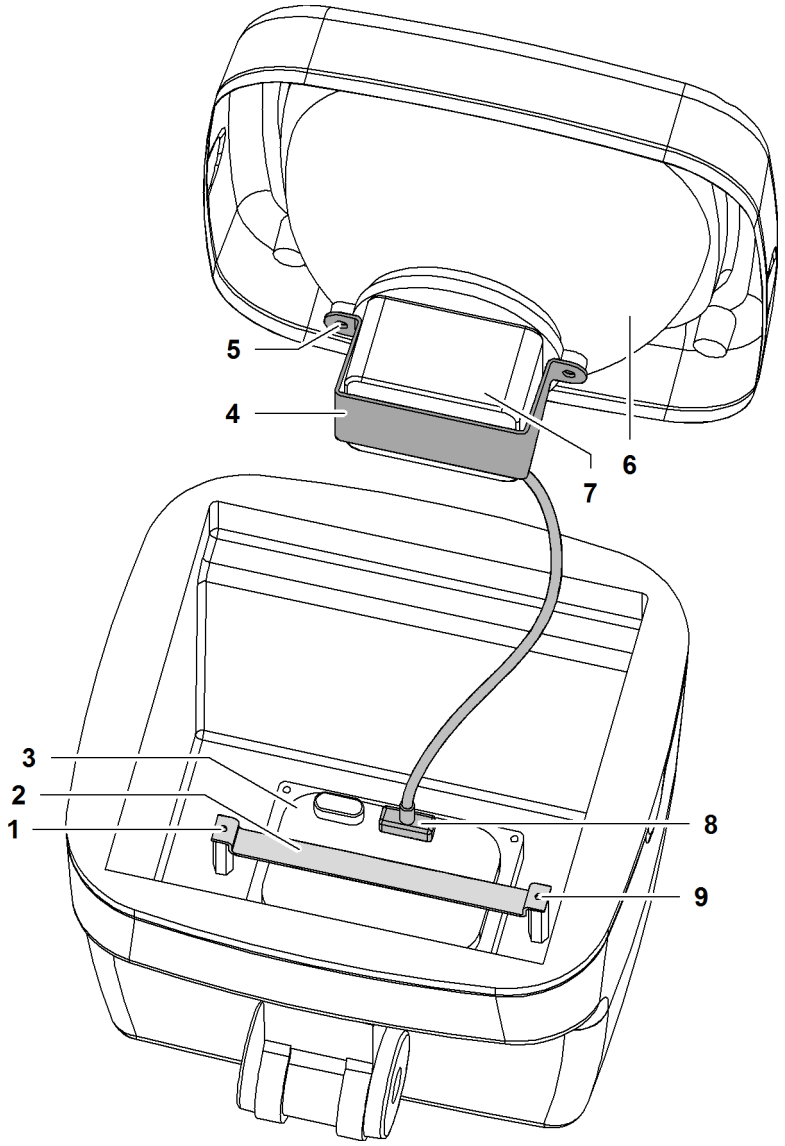


Fig. 4102: Open xenon floodlight

1	Left screw	**6**	Floodlight with reflector
2	Bracket control gear	**7**	Bulb with electric cable
3	Control gear	**8**	Electric plug
4	Bracket bulb	**9**	Right screw
5	Screw (2x)		

The electric plug **7** is secured with a plug locking mechanism on the side of the control gear.

- ▶ Lift floodlight **6** with reflector.
- ▶ Loosen the left screw **1** of the bracket **2**.
- ▶ Remove the right screw **9** of the bracket **2**.
- ▶ Take off bracket **2**.
- ▶ Lift control gear **3** and undo plug locking mechanism of the electric plug **8**.
- ▶ Pull out electric plug **8**.
- ▶ Undo both screws **5**.
- ▶ Remove bracket **4**.

Checking the availability of the spring cotter pin

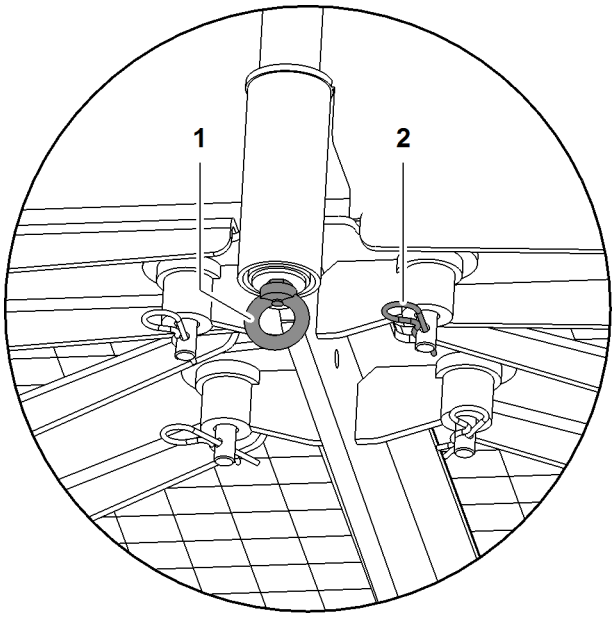


Fig. 4111: Checking the availability of the spring cotter pin

1 Eye bolt for railing stabilization **2** Spring cotter pin

▶ Checking the availability of the spring cotter pin **2**.

If no spring cotter pin **2** is available:

▶ Insert spring cotter pin **2**.

▶ Repeat procedure with all spring cotter pins **2**.

9.33.4 Jib head section: Checking wheels for ease of movement

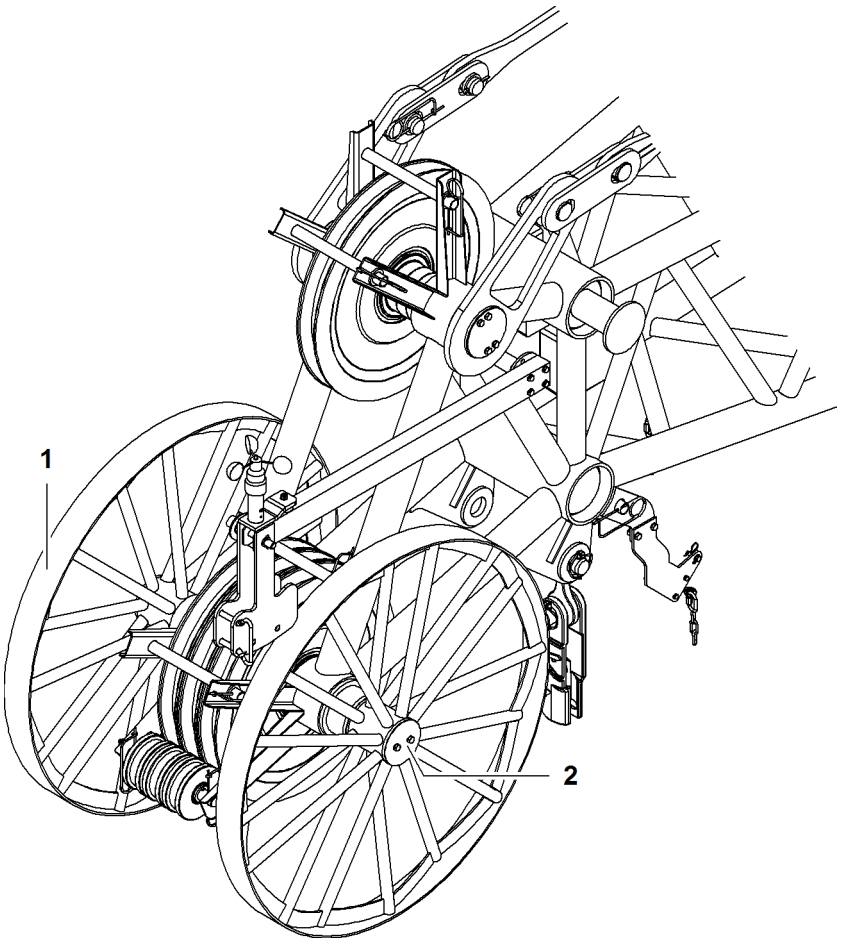


Fig. 4125: Jib head section: Checking wheels for ease of movement

1 Wheel (2x) **2** Wheel bearing

▶ Check jib head section wheels **1** for free running.

Note
Wheels do not move easily!

Liebherr recommends:
▶ Work on polymer bearings with sandpaper.

If the wheels do not move easily:
▶ Undo bearing **2** screws.

▶ Pull wheels off of polymer bearing.

▶ Grind out polymer bearing.

▶ Grease polymer bearing.

▶ Press wheels onto polymer bearing.

9.38.3 Checking connecting links for damage and wear

▶ Check connecting links for damage and wear (cracks, notches, corrosion, deformation, etc.).

If connecting links show damage or wear:

▶ Replace connecting links.

▶ Contact Liebherr customer service.

Check for:	Images of damage:
Looping: Individual wires or groups of wires penetrate out of the rope structure. In most cases, the loops are in several strands in succession.	
Necking: Defined as a reduction of the wire rope diameter in short stretches. Rope parts must be especially carefully checked for necking right before the final attachment. Necking is often hard to identify in these places.	
Knots: are deformations of the wire rope. These are caused by pulling a loop tight which the wire rope cannot compensate by twisting its axis.	

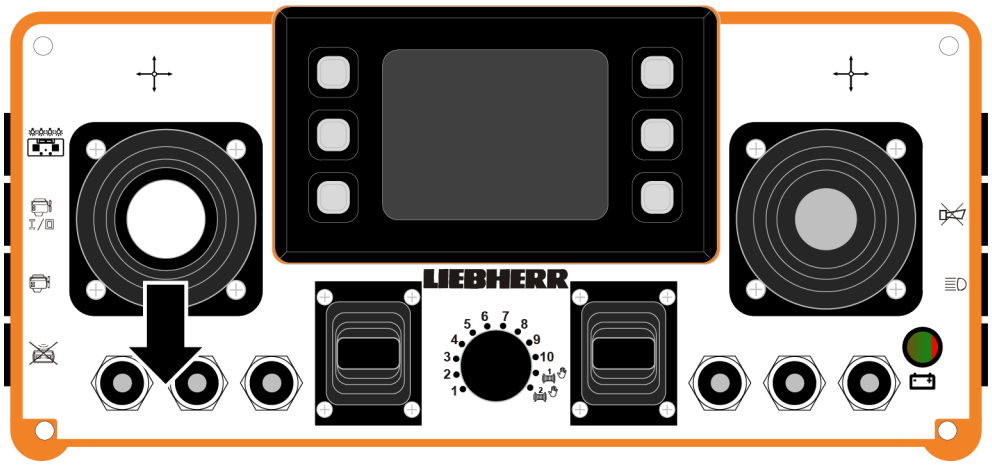
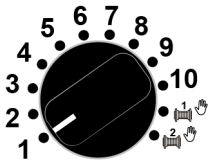


Fig. 4178: Lifting winch2

- ▶ Move left control lever backward.
  - ▷ Auxiliary rope is reeved on winch2.
  - ▷ Vibration button on outer T-control lever vibrates.
- ▶ Reeve auxiliary rope on winch2 until rope is located in front of winch2.
- ▶ Loosen rope stocking and unreel auxiliary rope winch2.

Switching off radio remote control* *Rope change assembly function*



- ▶ Set rotary switch on control panel *Radio remote control* to position “1”.
  - ▷ Symbol *Confirmation* appears on radio remote control monitor:

Fig. 4180: Symbol Confirmation

- ▶ Press button *Confirmation* on *radio remote control* control panel.
  - ▷ Rope change assembly function is switched off.
  - ▷ All other machine functions are operable.
  - ▷ Control of winch1 and winch2 is released.

9.45.2 Opening foldable falling object protection*

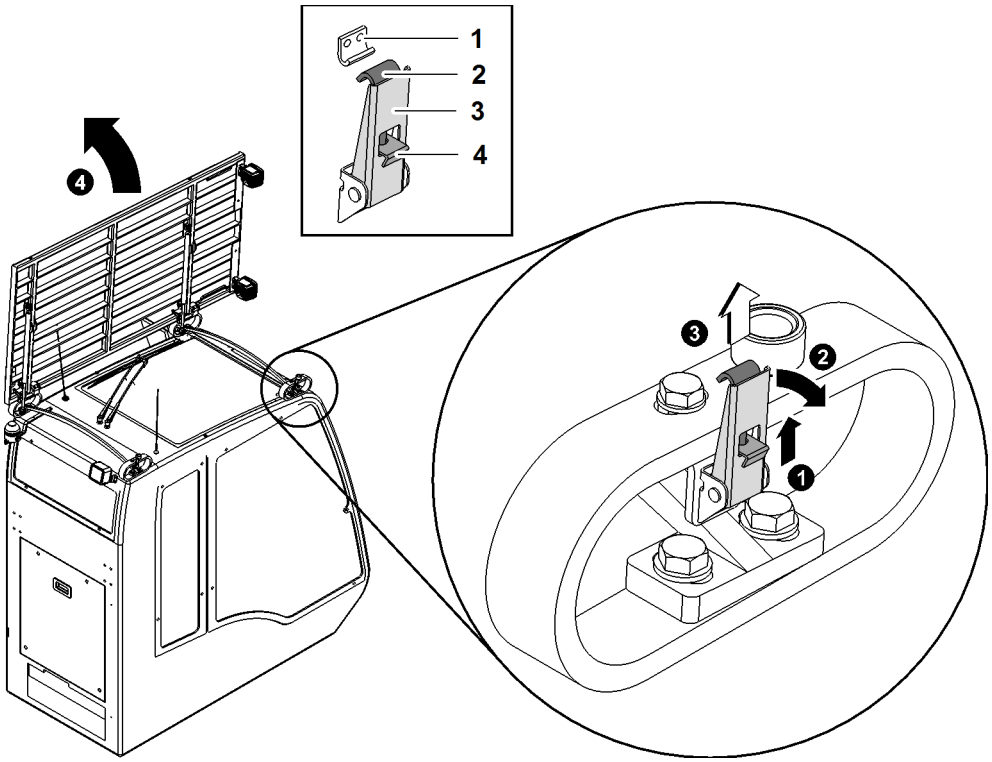


Fig. 4194: Opening foldable falling object protection

1	Hook on locking lever	**3**	Locking lever
2	Hook on latch	**4**	Safety latch

There are two locking levers on the falling object protection.

▶ Lift safety latch **4** and hold.

▶ Fold down locking lever **3**.
▷ Locking lever hook **2** moves up.

▶ Unhook hook on locking lever **1** and hook on locking lever **1**.
▷ Latch on falling object protection is open.

▶ Repeat procedure on other side.
▷ Open falling object protection.

9.45.3 Check the windows of the cab for damage

▶ Check the windows of the cab for damage.

If any of the cab windows are damaged:
▶ Replace cabin windows.

▶ Contact Liebherr after sales service.

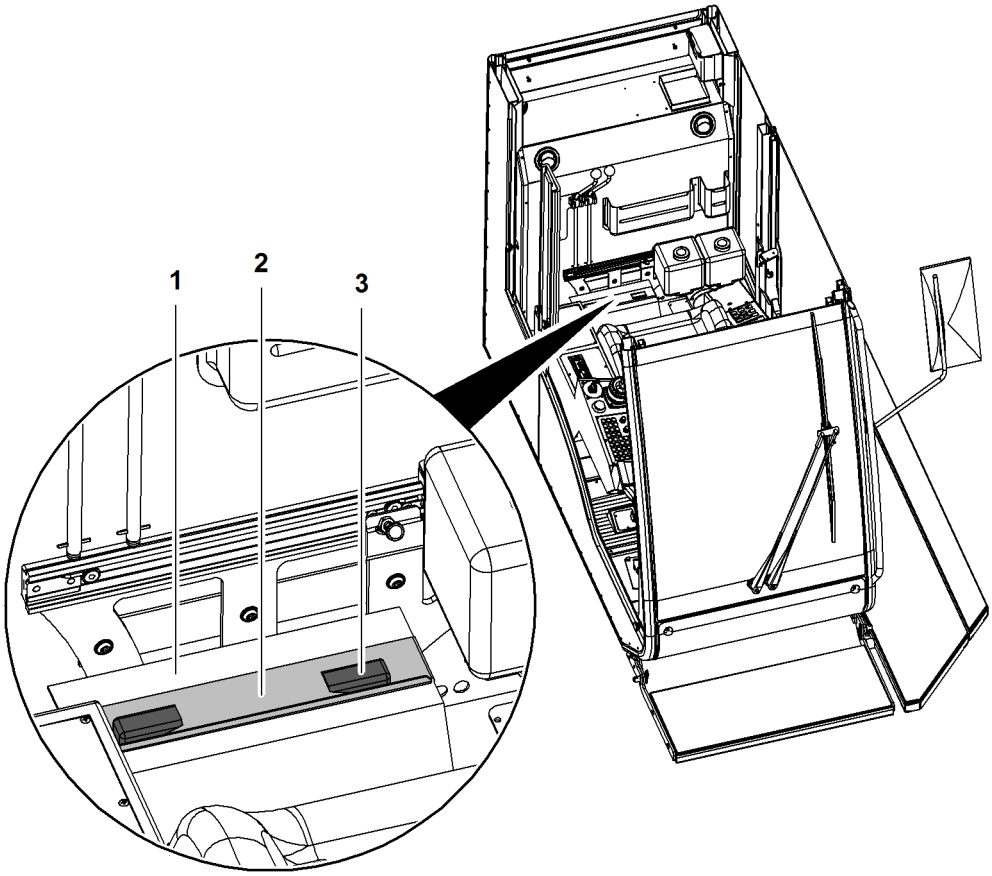


Fig. 4209: Placing cover on housing

1 Housing of recirculated air filter
2 Cover
3 Clamp (2x)

▶ Place cover **2** on housing **1**.

▶ Close clamps **3** of cover **2**.

9.48 Machine care

9.48.1 Cleaning the machine

Liebherr recommends that the external machine parts are cleaned regularly to maintain an even surface quality. This is strongly advised following work with highly corrosive materials.

NOTICE
Unsuitable cleaning agent is used!
The surfaces will be damaged.

- ▶ Do not use any aggressive cleaning agents.
- ▶ Do not use any abrasive cleaning agents.
- ▶ Do not use any phosphate cleaners.
- ▶ Do not use and solvents or solvent-containing cleaning agents.
- ▶ Only use cleaning agents with a pH value of ≤ 12.
- ▶ Ensure that the cleaning agent to water ratio does not exceed 3%.
- ▶ Rinse with clear water (not salt water).

Make sure the following conditions are met:
- ❑ The machine is switched off and secured to prevent unauthorized startup.
- ❑ The machine has cooled down.
- ❑ Main battery switch is switched off.
- ❑ Boom is laid down.

CAUTION
Hot steam and compressed air!
Burns.

- ▶ Wear protective equipment.

The machine may only be cleaned with a maximum pressure of 150 bar and a distance of at least 40 cm. Do not exceed water temperature of 80 °C.

The water jet must not be directed onto the following components:
– Intake manifold for engine cooling air
– Machinery room
– Electrical connectors
– Cabin interior

- ▶ Clean the machine using a high-pressure cleaner.

Note
Environmental pollution!

- ▶ Dispose of the oil-stained tools and cleaning agents in accordance with national and international guidelines and regulations.
- ▶ Cleaning water must pass through an oil separator before it enters the sewer system.