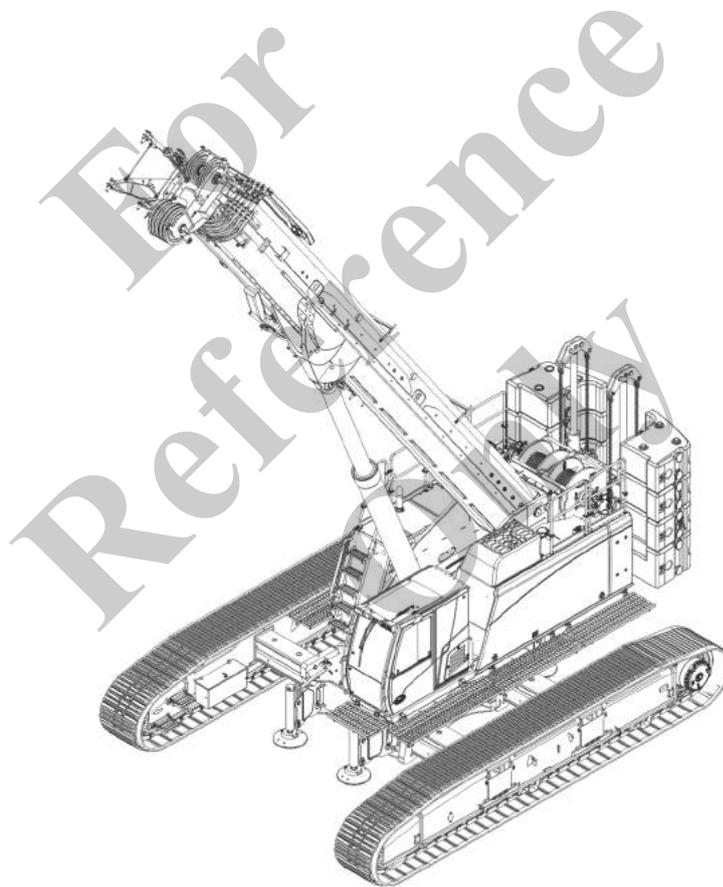


# Operation manual

140.5.204

Telescopic crane



140.5.204 en  
Operation manual

Read this manual prior to performing any task!

For  
Reference  
Only

GROVE U.S. L.L.C.

1565 East Buchanan Trail  
Shady Grove, PA 17256-0021

USA

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Translation of the original operation manual

140.5.204 BAWA, 2, en\_US

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# 1 General

## 1.1 Contact details of the manufacturer

**Company address** GROVE U.S. L.L.C.  
1565 East Buchanan Trail  
Shady Grove, PA 17256-0021  
USA  
Phone: 888-777-3378 (888-PSR.DEPT)  
Phone: 717-597-8121  
Fax: 717-593-5152  
Email: product.safety@manitowoc.com

## 1.2 Instructions concerning the operating manual

### 1.2.1 Purpose of the operating manual

This operating manual allows you to use the machine safely and efficiently.

The operating manual helps the machine operator to work with the machine, in order to ensure product safety and to prevent material damage and personal injury.

### 1.2.2 Target group

- Owner
- Machine operator
- Banksman

### 1.2.3 Structure of the documentation

The operating manual is part of the technical documentation and contain all necessary information and safety information about all stages of the machine life.

The operating manual contains the following sections:

- General
- Product description
- Safety instructions
- Design and function
- Control and display elements, operating modes
- Start-up and setup
- Operation
- Maintenance
- Transport

- Disposal
- Appendix

### 1.2.4 Illustrations and symbols

The illustrations used are exemplary and may deviate from the product in some details.

### 1.2.5 Storage, distributing

- The operating manual is an integral part of the machine.
- The operating manual should be accessible.
- The operating manual must be kept in the driver's cab in the corresponding storage compartment.
- When reselling the machine, the operating manual must be handed over with the machine.

For Reference Only

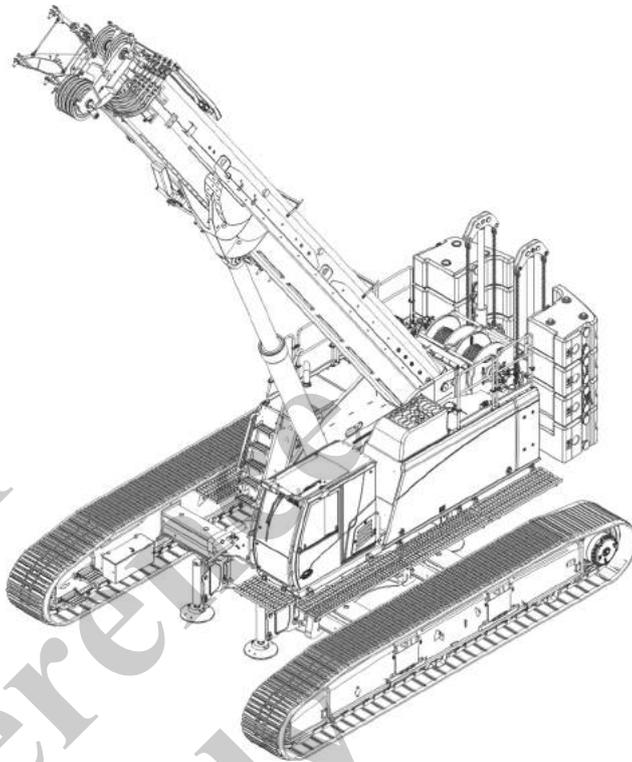
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For Reference Only

### 2.1 Overall view

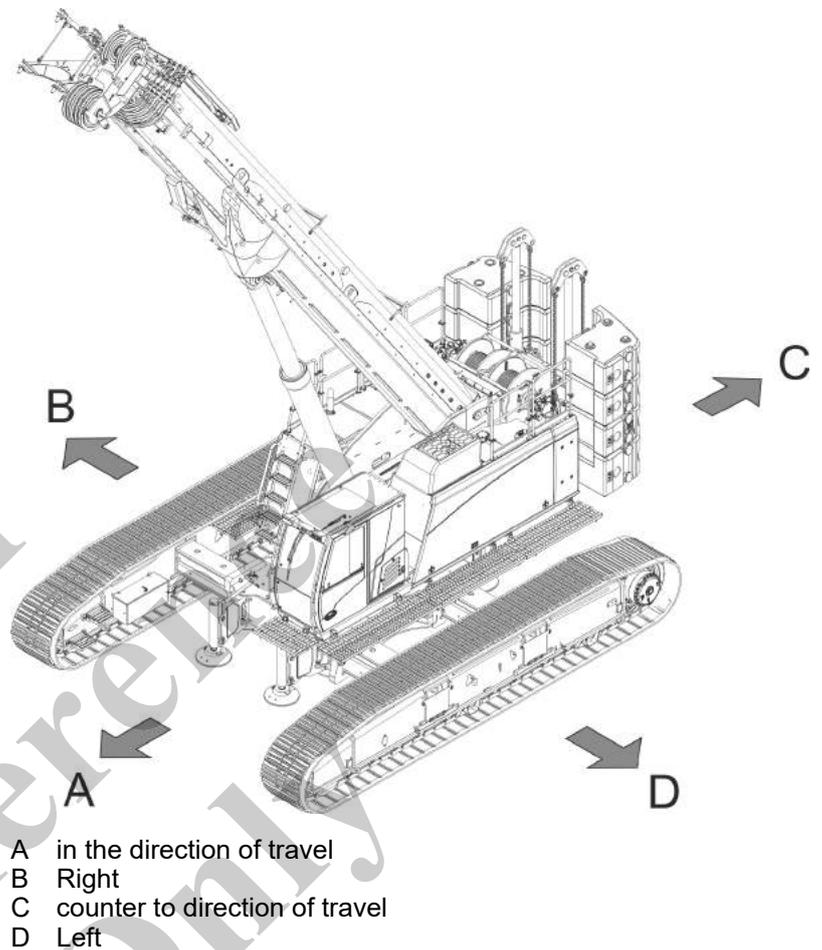
#### 2.1.1 Overall view of machine



Main components of the machine:

- Uppercarriage
- Cab
- Undercarriage
- functioning
  - Winch 1
  - Winch 2 (option)
  - Boom
  - Fly boom (option)
  - Fly boom extension (option)
  - Auxiliary jib (option)
  - Heavy-duty jib (option)

## 2.1.2 Directional information



### Uppercarriage position

Uppercarriage position	Definition
0°	The uppercarriage is in line with the direction of travel. <ul style="list-style-type: none"> <li>■ The direction of travel indicator on the track wheel carriers points forward.</li> <li>■ The uppercarriage locking on the slewing ring is visible from the cab.</li> </ul>
180°	The uppercarriage is counter to the direction of travel. <ul style="list-style-type: none"> <li>■ The direction of travel indicator on the track wheel carriers points backward.</li> <li>■ The uppercarriage locking on the slewing ring is not visible from the cab.</li> </ul>

## 2.2 Intended use

### 2.2.1 Proper use

The machine is solely for use in tasks which correspond to the machine's function and to the function of the work tool.

These are the intended tasks:

- Use of lifting equipment: The grabbing, lifting, and loading of loads with a load hook.  
The load must be attached to the load hook by one or more persons.
- Operation as carrier for driving and removing pile elements:
  - It must be ensured that no vibrations of the pile driving equipment are induced into the hoist rope or the carrier.  
An impact or vibration damper must be provided between the hoisting rope/load hook of the crane and the pile driving equipment.  
Freely suspended vibrator implements without vibration damper or free-falling impact masses must not be used.
  - Driving pile elements using pile driving equipment must be performed in vertical direction only.
  - Removing pile elements using pile driving equipment must be performed in vertical direction only.
  - Pile elements must only be vibrated out. Using telescopic cranes or lattice mast cranes to simply pull pile elements is not permissible.
  - Hoisting at an angle or lateral loads on the boom are not permissible.
- Use on a pontoon.

If in doubt about the machine's suitability for the present application, ask a service partner.

The following conditions must be met for use to be considered proper:

- The safety instructions and information given in this operating manual must be observed.
- All safety signs must be observed.
- All warning signals and fault indications must be observed. If a warning is issued or a fault occurs, all necessary measures must be taken immediately.
- The performance specifications of the machine and its equipment must be observed.
- The permissible ambient conditions must be observed.
- The load-bearing capacity of the ground must be suitable for the work.
- The permissible inclinations of the ground must be complied with.
- Personnel must wear any necessary protective equipment.
- The working range and travel range of the machine must be carefully monitored.
- The machine operator must have an unobstructed view of the working range or travel range of the machine, or must be able to communicate with an authorized person who has an unobstructed view.
- Maintenance and repairs must be performed at the specified intervals by authorized persons.
- Any damage must be rectified immediately.

### 2.2.2 Foreseeable misuse

These uses are classed as misuses:

- Use of work tools not authorized by the manufacturer.
- Exceeding the permitted safe load capacity. The weight of the work tool is part of the load capacity.
- Operation of the machine in environmental conditions that are not permitted according to the technical data.
- For the application of insufficient protective machine equipment.
- Non-compliance with the pre-heating and warm-up phase.
- Non-compliance with the permissible total weight of the machine with work tools.
- Modifications or alterations to the machine.  
This applies also for the installation and use of safety devices and valves, as well as for welding on load bearing parts.
- Not using original spare parts from the manufacturer.
- Pulling jammed loads free.
- Lifting loads at an angle.
- The attached load and work tool bumping into obstacles.
- Operating the machine on insufficiently stable, firm ground.
- Misuse by untrained and uninstructed personnel.
- Failure to perform the necessary inspection and maintenance tasks.
- Lifting, moving, and transport of persons.
- Operation in an explosive environment.

### 2.3 Limitation of liability

#### Limitation of liability on the part of the manufacturer

Misuse of the machine and its operating tools can lead to uncontrolled machine behavior and accidents. As a result, people can be killed or seriously injured. Misuse excludes all liability on the part of the manufacturer. The risk is borne solely by the operator.

### 2.4 Dangers

#### Safety precautions

There are risks of crushing, shearing and contact around the machine. Danger zones must be secured, e.g. through signaling or shutoff.

Improper operation causes multiple dangers. Hazardous situations must be avoided by careful training of the users.

## Product description

### Danger zones

The danger zones move with the movements of the machine.

Area	Danger
Visible area	<ul style="list-style-type: none"> <li>■ Areas without direct visual contact</li> <li>■ Poor visibility</li> </ul>
Route	<ul style="list-style-type: none"> <li>■ Running over</li> <li>■ Collision</li> </ul>
Telescopic route	<ul style="list-style-type: none"> <li>■ Falling load</li> <li>■ Contact with live wires</li> </ul>
Uppercarriage slewing range	<ul style="list-style-type: none"> <li>■ Trapping</li> <li>■ Crushing</li> </ul>
Boom slewing range	<ul style="list-style-type: none"> <li>■ Trapping</li> <li>■ Collision</li> </ul>
Swinging range of load or tools	<ul style="list-style-type: none"> <li>■ Trapping</li> <li>■ Collision</li> </ul>

### Hazardous situations

Hazardous situations may arise inadvertently during work.

Situation	Danger
Persons	Unauthorized persons may enter the machine danger zone.
Tipping over	<p>If the machine is not stable, it could tip over.</p> <p>Crushing occurs in the tilting radius of the machine structure.</p>
Refueling	Leaking fuel causes environmental damage in soil or in water.
Uncontrolled parts or loads	The machine or some of its components may be irreparably damaged following unintentional detachment of loads or parts in its vicinity.
Weather	Poor weather conditions may lead to uncontrolled machine movements.

## 2.5 Product designation

### Rating plate



- 1 Machine type
- 2 Machine number
- 3 Year of manufacture
- 4 Year of model

## 2.6 Technical data

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### 2.6.1 Performance characteristics

#### 2.6.1.1 Overall machine

##### Crane categorization

The machine is a mobile crane for assembly operation in accordance with ISO 4301-1:2016-07 and ISO 4301-2:2009-05.

Data	Value
Group classification	A1
Nominal load spectrum factor	Q1
Class of utilization	U2

##### Speeds

Data	Value	Unit
Maximum driving speed	2.5	km/h
Maximum driving speed	1.55	mph
Maximum uppercarriage slewing speed	2.0	RPM
Maximum uppercarriage slewing speed	2.0	rpm

## Product description

### Range of application for the machine

The values for the machine's range of application apply in driving and working mode.

Data	Value	Unit
Permissible temperature range during machine operation	-20 to +40	°C
Permissible temperature range during machine operation	-4 to +104	°F
Permissible low temperature range during machine operation (option)	-30 to +40	°C
Permissible low temperature range during machine operation (option)	-22 to +104	°F
Permissible low temperature range during machine operation (option)	-40 to +40	°C
Permissible low temperature range during machine operation (option)	-40 to +104	°F

### Track widths

Data	Value	Unit
Track width D	2,900	mm
Track width D	114.2	in
Track width C	3,050	mm
Track width C	120.1	in
Track width B	4,200	mm
Track width B	165.4	in
Track width A	5,400	mm
Track width A	212.6	in

2.6.1.2 Drive engine

**CUMMINS QSB6.7-C220 CM2850  
US EPA TIER 3/EU Stage IIIa**

Data	Value	Unit
Drive	Diesel engine	
Engine type	QSB6.7-C220 CM2850	
Emissions level	US EPA TIER 3/EU Stage IIIa	
Manufacturer	Cummins	
Engine power at nominal speed	164	kW
Engine power at nominal speed	220	hp
Nominal speed	2,000	RPM
Nominal speed	2,000	rpm
Displacement	6.7	l
Displacement	409	in <sup>3</sup>
Cylinder	6	Quantity

Further notes

Manufacturer documentation

**Cummins QSB6.7-C225 CM2350 US  
EPA TIER 4f/EU Stage IV**

Data	Value	Unit
Drive	Diesel engine	
Engine type	QSB6.7-C225 CM2350	
Emissions level	US EPA TIER 4f/EU Stage IV	
Manufacturer	Cummins	
Power at nominal speed	168	kW
Power at nominal speed	225	hp
Nominal speed	2,000	RPM
Nominal speed	2,000	rpm
Displacement	6.7	l
Displacement	409	in <sup>3</sup>
Cylinder	6	Quantity

Further notes

Manufacturer documentation

## Product description

### Cummins B6.7-C225 CM2350 US EPA TIER 4f/EU Stage V

Data	Value	Unit
Drive	Diesel engine	
Engine type	B6.7-C225 CM2350	
Emissions level	US EPA TIER 4f/EU Stage V	
Manufacturer	Cummins	
Power at nominal speed	186	kW
Power at nominal speed	249	hp
Nominal speed	2,200	RPM
Nominal speed	2,200	rpm
Displacement	6,700	cm <sup>3</sup>
Displacement	409	in <sup>3</sup>
Cylinder	6	Quantity

### Further notes

Manufacturer documentation

### 2.6.1.3 Hydraulic system

Data	Value	Unit
Delivery rate	approximately 310	l/min
Delivery rate	approximately 81.9	US gal/min
Maximum operating pressure	330	bar
Maximum operating pressure	4,786	psi
Hydraulic tank	900	l
Hydraulic tank	237.8	US gal

2.6.1.4 Undercarriage

Data	Value	Unit
Type	T119/540	
Crawler track with 3-grouser base plates	900	mm
Crawler track with 3-grouser base plates	35.4	in
Crawler track with flat base plates, welded (option)	900	mm
Crawler track with flat base plates, welded (option)	35.4	in

2.6.1.5 Boom

Data	Value	Unit
Type	Pin boom	
Minimum length	12.3	m
Minimum length	40.4	ft
Maximum length	52.2	m
Maximum length	171.3	ft
Basic body	1	Quantity
Telescopic thrusters	5	Quantity
Cylinder	1	Quantity

2.6.1.6 Cab

Data	Value	Unit
Type	Maxcab	
Maximum incline	20	°

2.6.1.7 Cab adjustment (option)

Data	Value	Unit
Type	E270	
Maximum incline	30	°
Maximum height	2.7	m
Maximum height	8.9	ft

## Product description

### 2.6.1.8 Winch

The technical data provided applies to winch 1 and winch 2.

The winch is classified according to ISO 4301-1:2016-07 and ISO 4301-2:2009-05 as follows:

Data	Value
Drive group	M5
Class of Utilization	T5
Load spectrum	L2

Data	Value	Unit
Maximum winch pulling force (7th position)	120	kN
Maximum rope speed (4th position)	115	m/min
Rope diameter	26	mm
Rope length	210	m
Rope length	689	ft

2.6.1.9 Hook

The machine can be operated with various hooks from the manufacturer.

The technical data of the hook relate to the use of a winch with the following performance features

Data	Value	Unit
Maximum winch pulling force (7th position)	120	kN
Rope diameter	26	mm

Load capacity	Hook weight	Unit
15 t	250	kg
16.5 tn.sh.	551.1	lb
40 t – 1 sheave	500	kg
44.1 tn.sh. – 1 sheave	1102.3	lb
60 t – 2 sheaves	600	kg
66.1 tn.sh. – 2 sheaves	1322.8	lb
80 t – 3 sheaves	1000	kg
88.2 tn.sh. – 3 sheaves	2204.6	lb
120 t – 5 sheaves	1100	kg
132.3 tn.sh. – 5 sheaves	2425.0	lb

2.6.1.10 Additional operating equipment

Fly boom (option)

Data	Value	Unit
Type	SA80.2	
Length	8	m
Length	26.2	ft
Lifting capacity	18.0	t
Lifting capacity	39.7	klb
permissible number of strands	2	
possible inclination angle	0/20/40	°

## Product description

### Fly boom extension (option)

Data	Value	Unit
Type	SA70.2	
Length	7	m
Length	23	ft
Lifting capacity	6.0	t
Lifting capacity	13.2	klb
permissible number of strands	1	
possible inclination angle	0/20/40	°

### Auxiliary jib (option)

Data	Value	Unit
Type	S12.5	
Lifting capacity	12.5	t
Lifting capacity	27.6	klb
permissible number of strands	1	

### Heavy-duty jib (option)

Data	Value	Unit
Type	S36.2	
Lifting capacity	36.0	t
Lifting capacity	79.4	klb
permissible number of strands	3	

### Emergency generator (option)

Data	Value	Unit
Power	7.5	kW
Power	10.2	hp

## 2.6.2 Lifting capacities

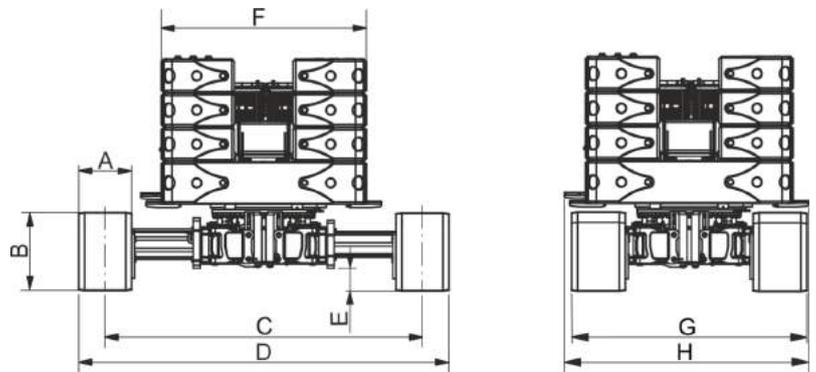
### Further notes

Lifting capacities

### 2.6.3 Dimensions and weights

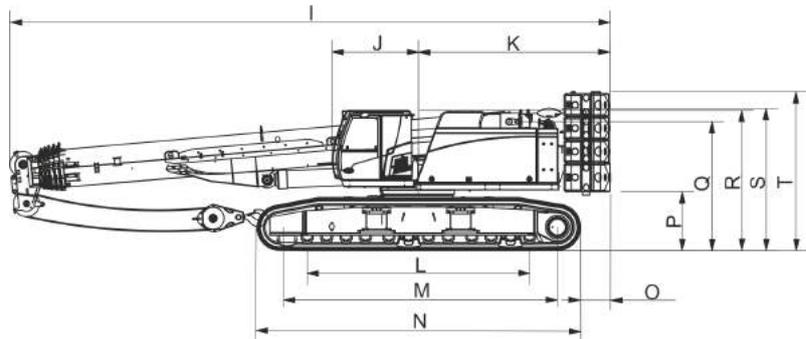
#### 2.6.3.1 Basic machine equipment

##### Dimensions



Data	Value	Unit
A	900	mm
A	35.4	in
B (with 3-grouser base plate 900 mm)	1,336	mm
B (with 3-grouser base plate 900 mm)	52.6	in
B (with flat base plate, welded 900 mm)	1,376	mm
B (with flat base plate, welded 900 mm)	54.2	in
C	5,400	mm
C	212.6	in
D	6,300	mm
D	248.0	in
E	390	mm
E	15.4	in
F	3,490	mm
F	137.4	in
G	3,950	mm
G	155.5	in
H	4,105	mm
H	161.6	in

## Product description



Data	Value	Unit
I	15,117	mm
I	595.2	in
J	2,173	mm
J	85.6	in
K	4,824	mm
K	189.9	in
L	5,600	mm
L	220.5	in
M	6,900	mm
M	271.7	in
N (with 3-grouser base plate 900 mm)	8,049	mm
N (with 3-grouser base plate 900 mm)	316.9	in
N (with flat base plate, welded 900 mm)	8,089	mm
N (with flat base plate, welded 900 mm)	318.5	in
O	747	mm
O	29.4	in
P (with 3-grouser base plate 900 mm)	1,479	mm
P (with 3-grouser base plate 900 mm)	58.2	in
P (with flat base plate, welded 900 mm)	1,499	mm
P (with flat base plate, welded 900 mm)	59.0	in
Q (with 3-grouser base plate 900 mm)	3,256	mm
Q (with 3-grouser base plate 900 mm)	128.2	in
Q (with flat base plate 900 mm)	3,276	mm
Q (with flat base plate, welded 900 mm)	129.0	in

Data	Value	Unit
R (with 3-grouser base plate 900 mm)	3,539	mm
R (with 3-grouser base plate 900 mm)	139.3	in
R (with flat base plate, welded 900 mm)	3,559	mm
R (with flat base plate, welded 900 mm)	140.1	in
S (with 3-grouser base plate 900 mm)	3,593	mm
S (with 3-grouser base plate 900 mm)	141.5	in
S (with flat base plate, welded 900 mm)	3,613	mm
S (with flat base plate, welded 900 mm)	142.2	in
T (with 3-grouser base plate 900 mm)	4,014	mm
T (with 3-grouser base plate 900 mm)	158.0	in
T (with flat base plate, welded 900 mm)	4,034	mm
T (with flat base plate, welded 900 mm)	158.8	in

**Weight**

Machine equipment:

- 2 x winch
- Fly boom SA80.2 with fly boom extension SA70.2
- 80 t hook
- Counterweight, 35 t
- 3-grouser base plates 900 mm

Data	Value	Unit
Weight	119.2	t
Weight	262,791.0	lb

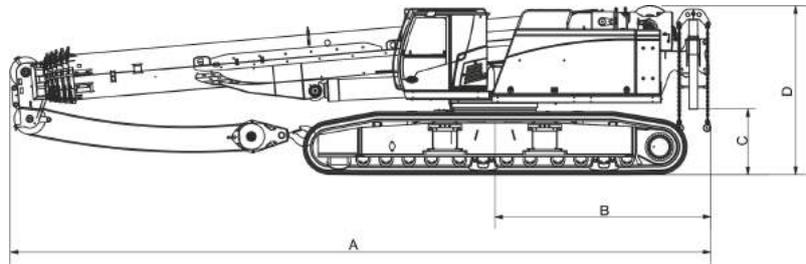
The weights quoted are approximate values. The weights quoted cannot be used for detailed planning.

Exact weight values are quoted in the cargo documents for your machine.

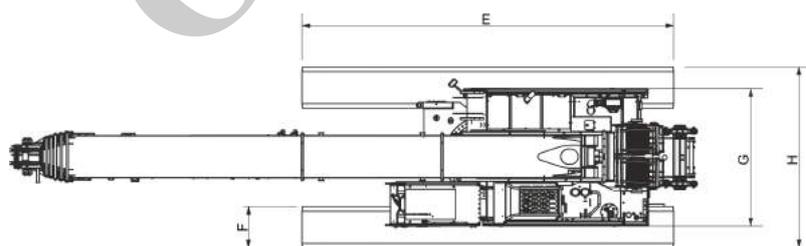
## Product description

### 2.6.3.2 Machine – without counterweight

#### Dimensions



Data	Value	Unit
A	14,879	mm
A	585.8	in
B	4,587	mm
B	180.6	in
C (with 3-grouser base plate 900 mm)	1,391	mm
C (with 3-grouser base plate 900 mm)	54.8	in
C (with flat base plate, welded 900 mm)	1,411	mm
C (with flat base plate, welded 900 mm)	55.6	in
D (with 3-grouser base plate 900 mm)	3,593	mm
D (with 3-grouser base plate 900 mm)	141.5	in
D (with flat base plate, welded 900 mm)	3,613	mm
D (with flat base plate, welded 900 mm)	142.2	in



Data	Value	Unit
E (with 3-grouser base plate 900 mm)	8,049	mm
E (with 3-grouser base plate 900 mm)	316.9	in
E (with flat base plate, welded 900 mm)	8,089	mm
E (with flat base plate, welded 900 mm)	318.5	in
F	900	mm

Data	Value	Unit
F	35.4	in
G	2,997	mm
G	118.0	in
H	3,950	mm
H	155.5	in

**Weight**

Machine equipment:

- 2 x winch
- Fly boom SA80.2 with fly boom extension SA70.2
- 80 t hook
- Counterweight, 0 t
- 3-grouser base plates 900 mm

Data	Value	Unit
Weight	82.6	t
Weight	182,102.0	lb

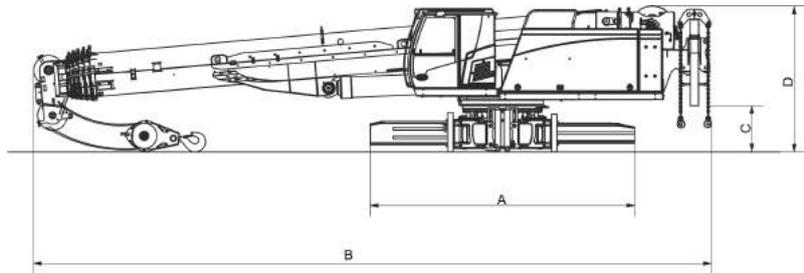
The weights quoted are approximate values. The weights quoted cannot be used for detailed planning.

Exact weight values are quoted in the cargo documents for your machine.

## Product description

### 2.6.3.3 Machine – without counterweight and without traveling gears

#### Dimensions



Data	Value	Unit
A	5,800	mm
A	228.3	in
B	14,879	mm
B	585.8	in
C	1,011	mm
C	39.8	in
D	3,213	mm
D	126.5	in

#### Weight

Machine equipment:

- 2 x winch
- Fly boom SA80.2 with fly boom extension SA70.2
- 80 t hook
- Counterweight, 0 t

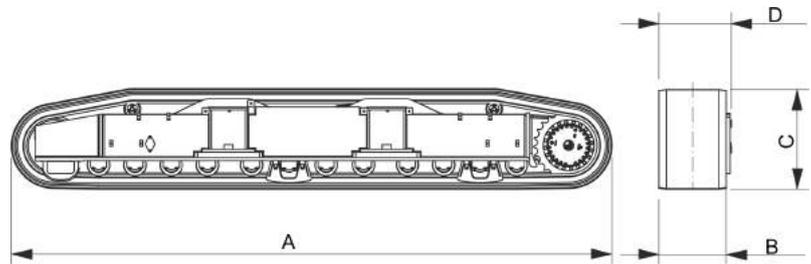
Data	Value	Unit
Weight	51.6	t
Weight	113,759.0	lb

The weights quoted are approximate values. The weights quoted cannot be used for detailed planning.

Exact weight values are quoted in the cargo documents for your machine.

2.6.3.4 components

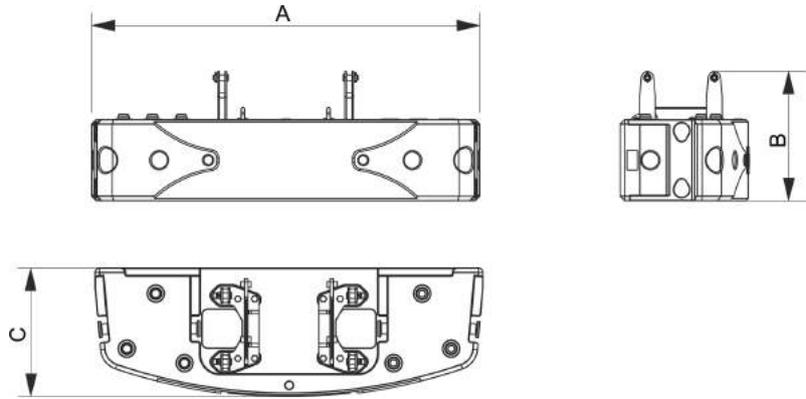
Track wheel carrier



Data	Value	Unit
Quantity	2	Quantity
Weight per track wheel carrier (with it 3-grouser base plates 900 mm)	16,000	kg
Weight per track wheel carrier (with 3-grouser base plate 900 mm)	35,280.0	lb
Weight per track wheel carrier (with flat base plate, welded 900 mm)	17,400	kg
Weight per track wheel carrier (with flat base plate, welded 900 mm)	38,367.0	lb
A (with 3-grouser base plate 900 mm)	8,049	mm
A (with 3-grouser base plate 900 mm)	316.9	in
A (with flat base plate, welded 900 mm)	8,089	mm
A (with flat base plate, welded 900 mm)	318.5	in
B	900	mm
B	35.4	in
C (with 3-grouser base plate 900 mm)	1,336	mm
C (with 3-grouser base plate 900 mm)	52.6	in
C (with flat base plate, welded 900 mm)	1,376	mm
C (with flat base plate, welded 900 mm)	54.2	in
D	969	mm
D	38.2	in

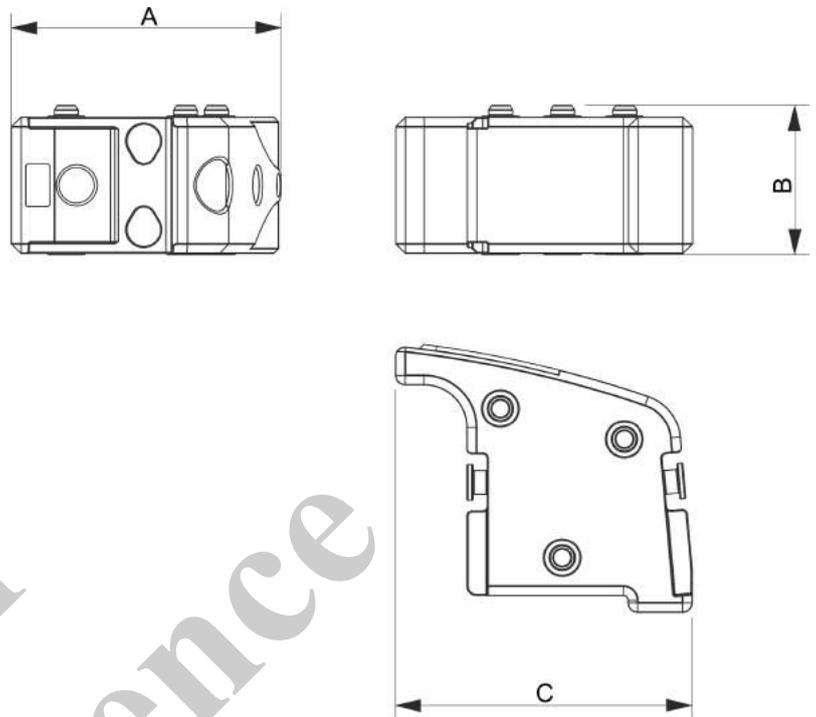
## Product description

### Ballast bracket



Data	Value	Unit
Quantity	1	Quantity
Weight	14,150	kg
Weight	31,195.4	lb
A	3,490	mm
A	137.4	in
B	1,160	mm
B	45.7	in
C	1,160	mm
C	45.7	in

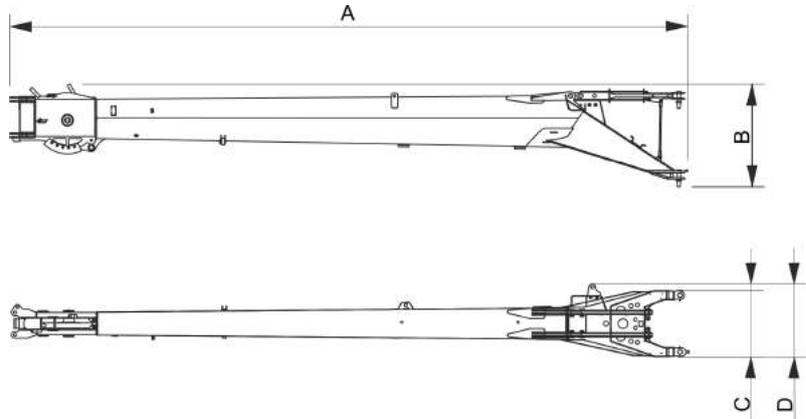
Ballast blocks



Data	Value	Unit
Quantity	6	-
Weight per ballast block	3,500	kg
Weight per ballast block	7,716.2	lb
A	1,130	mm
A	45.5	in
B	630	mm
B	24.8	in
C	1,245	mm
C	49.0	in

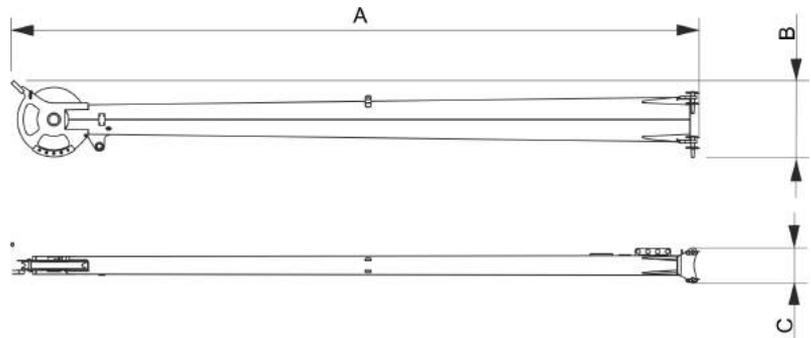
## Product description

### Fly boom (option)



Data	Value	Unit
Type	SA80.2	-
Quantity	1	-
Weight	920	kg
Weight	2,028.3	lb
A	8,459	mm
A	333.0	in
B	1,291	mm
B	50.8	in
C	833	mm
C	32.8	in
D	912	mm
D	35.9	in

Fly boom extension (option)

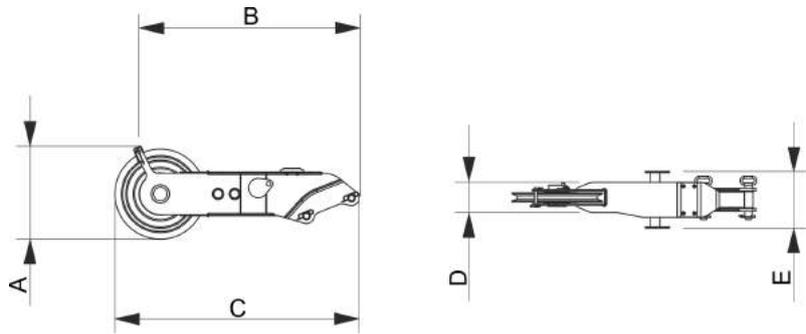


Data	Value	Unit
Type	SAV70.2	-
Quantity	1	Quantity
Weight	300	kg
Weight	661.4	lb
A	6,995	mm
A	275.4	in
B	785	mm
B	30.9	in
C	360	mm
C	14.2	in

For Reference Only

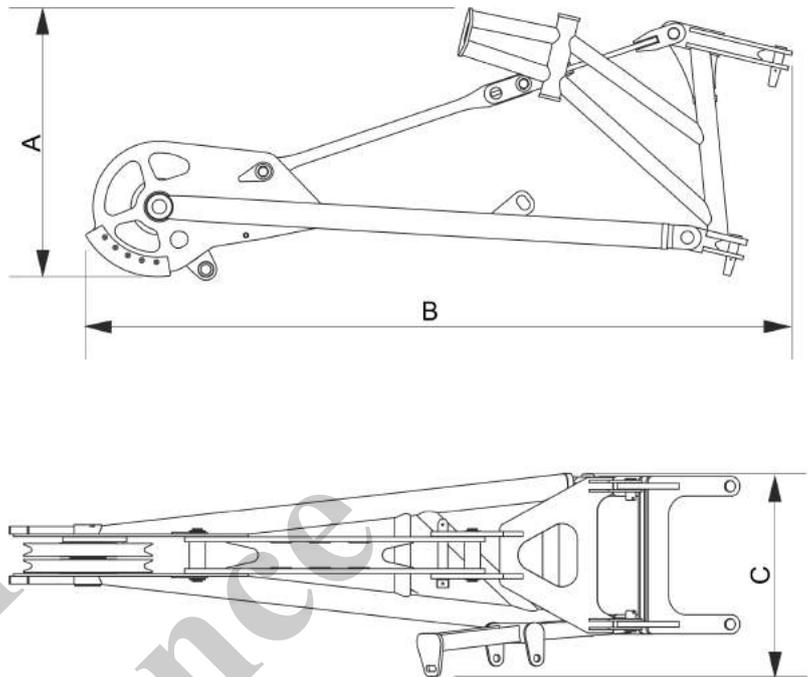
## Product description

### Auxiliary jib (option)



Data	Value	Unit
Type	S12.5	-
Quantity	1	Quantity
Weight	160	kg
Weight	352.7	lb
A	676	mm
A	26.6	in
B	1,601	mm
B	63.0	in
C	1,766	mm
C	69.5	in
D	219	mm
D	8.6	in
E	409	mm
E	16.1	in

Heavy-duty jib (option)



Data	Value	Unit
Type	S36.2	-
Quantity	1	Quantity
Weight	650	kg
Weight	1,433.0	lb
A	1,378	mm
A	54.3	in
B	3,605	mm
B	141.9	in
C	1,042	mm
C	41.0	in

2.6.4 Energy supply, interfaces, connections

2.6.4.1 Energy supply

Electrical system

Data	Value	Unit
Battery voltage	24	V
Number of batteries	2	Quantity
Capacity per battery	155	Ah

### 2.6.5 Operating fluids and aids

#### 2.6.5.1 Safety instructions

- Only mix oils, lubricants and operating fluids that are of the same type, or identical (same specifications) from **one** manufacturer.

##### 2.6.5.1.1 Diesel fuel

The factory filling for diesel fuel conforms to EN 590 as well as ASTM D975 S15 with a sulfur content of < 10 mg/kg.



Fig. 1: Information sign concerning the use of sulfur-free fuel



- US EPA Tier 4 interim / EU Stage III B
- US EPA Tier 4 final / EU Stage IV
- US EPA Tier 4 final / EU Stage V

The use of sulfur-free fuel in accordance with EN 590 or ASTM D975 ULSD is strictly required for engines of the following exhaust levels. The fuel quality requirements are indicated on an information sign on the diesel tank filler neck.



Observe the information in the engine manufacturer's operating manual.

#### NOTICE

##### Risk of engine damage due to use of high-sulfur fuels.

- Only use fuels with a sulfur content of no more than 15 mg/kg.

Fuels with sulfur content above 15 mg/kg can cause serious damage to the engine and the exhaust aftertreatment system. This can invalidate the emission certification of the diesel engine and can result in legal consequences for the owner.



The use of fuels with a sulfur content greater than 15 mg/kg is permitted under certain circumstances for engines subject to EU Stage II or IIIa and US EPA Tier 2 or 3 emissions standards. This however requires the use of an engine oil with special properties matched to this requirement. Engine oil filled at the factory is not suitable for this use and must be replaced.



Observe the information in the engine manufacturer's operating manual.

2.6.5.1.2 Engine oil

The manufacturer's factory filling of engine oil is selected for use with sulfur-free diesel fuel with a sulfur content of <15 mg/kg.



*The use of low-ash ACE E9-08 or API CJ-4 engine oils is mandatory for engines subject to EU Stage IIIb and US EPA Interim Tier 4 emissions standards. Observe the instructions in the operating manual for the engine.*

**NOTICE**

**Engine damage due to use of wrong engine oil!**

**The use of engine oils with specifications other than ACEA E9-08 and API CJ-4 will cause damage to the exhaust after-treatment system in engines subject to EU Stage IIIb and US EPA Interim Tier 4 emissions standards. This can invalidate the emission certification of the diesel engine and have legal consequences for the owner.**



*The use of engine oils with a specification other than ACEA E9-08 or API CJ-4 is permissible for engines of exhaust level EU Stage II or IIIA and US EPA Tier 2 or 3. Observe the instructions in the operating manual for the engine.*

2.6.5.2 Overview of capacities

**Fill quantities**

The following values are guide values. The fill level shown on the respective part is authoritative.

Data	Value	Unit
Fuel tank	450	l
Fuel tank	118.9	US gal
Hydraulic oil tank	820	l
Hydraulic oil tank	216.6	US gal
DEF tank	45	l
DEF tank	11.9	US gal
Secure locking unit tank	approximately 3	l
Secure locking unit tank	approximately 0.79	US gal
Travel gear	approximately 2x17.5	l
Travel gear	approximately 2x4.62	US gal
Winch gear	approximately 5.5	l
Winch gear	approximately 1.4	US gal

## Product description

Data	Value	Unit
Drive engine: engine oil	23.1	l
Drive engine: engine oil	6.1	US gal
Coolant tank	50	l
Coolant tank	13.2	US gal
Lubricant tank – central lubrication system (Lincoln) (option)	approximately 4	l
Lubricant tank – central lubrication system (Lincoln) (option)	approximately 1.1	US gal
Grease tank for slewing ring gearing/pinion lubrication	approximately 1	l
Grease tank for slewing ring gearing/pinion lubrication	approximately 0.26	US gal

### 2.6.5.3 Hydraulic system

#### 2.6.5.3.1 Hydraulic oils with extended change interval

Using the following hydraulic oils can extend change intervals depending on the results of regularly conducted hydraulic oil analyses (Shell LubeAnalyst).

To extend the replacement interval, the machine must be equipped with HydroClean.

#### Shell Tellus S4 VX 32 (for E-Series)

Order number	Specification	Temperature range	Sticker	Alternative
SE: 157284 Shell: 001D7769	DIN 51524-3 HVLP (ISO VG 32)	-30 to +40 °C -22 to +104 °F		Avia Syntofluid PEB 30

#### Shell Tellus S2 VA 46

Factory filling - standard temperature range

Order number	Specification	Temperature range	Sticker	Alternative
SE: 179233 Shell: 001D7756	DIN 51524 -3 HVLP- D ISO VG 46	-20 to +50 °C -4 to +122 °F		

**Panolin HLP Synth 46**

Rapidly biodegradable

Order number	Specification	Temperature range	Sticker	Alternative
SE: 149198	<ul style="list-style-type: none"> <li>■ ISO 15380 HEES saturated</li> <li>■ OECD 301B</li> </ul>	-15 to +50 °C +5 to +122 °F		Avia Syntofluid PEB 50

**Avia Syntofluid PEB 30 (for E-Series)**

- Rapidly biodegradable
- Low temperature range

Order number	Specification	Temperature range	Sticker	Alternative
SE: 149199	<ul style="list-style-type: none"> <li>■ ISO 15380 HEPR</li> <li>■ DIN 51524-3 HVLP-D</li> <li>■ CEC-L-33-A-93</li> </ul>	-30 to +40 °C -22 to +104 °F		

**Avia Syntofluid PEB 50**

- Rapidly biodegradable
- Low temperature range

Order number	Specification	Temperature range	Sticker	Alternative
SE: 149200	<ul style="list-style-type: none"> <li>■ ISO 15380 HEPR</li> <li>■ DIN 51524-3 HVLP-D</li> <li>■ CEC-L-33-A-93</li> </ul>	-25 to +50 °C -13 to +122 °F		

**2.6.5.3.2 Hydraulic oils without an extended change interval**

**Shell Tellus S2 MX 46**

Order number	Specification	Temperature range	Sticker	Alternative
SE: 217002 Shell: 001F8439	<ul style="list-style-type: none"> <li>■ DIN 51524-2 HLP/HLPD</li> <li>■ ISO VG 46</li> </ul>	-10 to +40 °C +14 to +104 °F		<ul style="list-style-type: none"> <li>■ Agip OSO-D46</li> <li>■ Shell Tellus S2 M 46</li> </ul>

## Product description

### Shell Tellus S2 MX 68

Order number	Specification	Temperature range	Sticker	Alternative
SE: 217001 Shell: 001F8440	<ul style="list-style-type: none"> <li>■ DIN 51524-2 HLP/ HLPD</li> <li>■ ISO VG 68</li> </ul>	-5 to +50 °C +23 to +122 °F		<ul style="list-style-type: none"> <li>■ Agip OSO-D68</li> <li>■ Shell Tellus S2 M 68</li> </ul>

### 2.6.5.4 Diesel engine

#### 2.6.5.4.1 Engine oil

##### Engine oils for standard change intervals

##### Engine oils for extended change intervals

### Cummins ES Compleat

Order number	Specification	Temperature range	Sticker	Alternative
SE: 181966	Cummins CES 14603	Mixing ratio Coolant concentrate/water <ul style="list-style-type: none"> <li>■ 50/50: Up to -37 °C (-34 °F)</li> <li>■ 60/40: Up to -52 °C (-61 °F)</li> </ul>		Cummins CES 14603

Use a coolant with a mixing ratio of at least 50/50 all year round.

Do not exceed a mixing ratio of 60/40.

### Senprotect

Order number	Specification	Temperature range	Sticker	Alternative
SE: 187301	Cummins CES 14603	Mixing ratio Coolant concentrate/water <ul style="list-style-type: none"> <li>■ 50/50: Up to -37 °C (-34 °F)</li> <li>■ 60/40: Up to -52 °C (-61 °F)</li> </ul>	--	Cummins CES 14603

Use a coolant with a mixing ratio of at least 50/50 all year round.

Do not exceed a mixing ratio of 60/40.

### 2.6.5.4.3 Fuel

#### Diesel fuel with low sulfur content

Order number	Specification	Temperature range	Sulfur content
-	<ul style="list-style-type: none"> <li>■ Diesel fuel DIN EN 590</li> <li>■ ASTM D975 ULSD 1 D, 2D</li> </ul>	-	≤ 15 mg/kg

Comply with the instructions concerning fuel in the operating manuals provided by the manufacturers of the diesel engines.

### 2.6.5.4.4 Diesel flow improvers

#### Fuchs Maintain Winterfit

Order number	Specification	Temperature range	Mixing ratio	Alternative		
SE: 180464	<ul style="list-style-type: none"> <li>■ MB 137.1</li> <li>■ BMW BG 13</li> </ul>	-31 to -10 °C	Summer			
		-23.8 to +14 °F	1:1000		-10 °C	14 °F
			2:1000		-18 °C	0 °F
			3:1000		-23 °C	-10 °F
			4:1000		-25 °C	-13 °F
		Winter	1:1000		-25 °C	-13 °F
			2:1000		-28 °C	-18 °F
			3:1000		-31 °C	-24 °F

#### AUTOL TP 10

Order number	Specification	Temperature range	Sticker	Alternative
SE: 182173	<ul style="list-style-type: none"> <li>■ MB 137.1</li> <li>■ BMW BG 13</li> </ul>		-	

### 2.6.5.4.5 DEF, diesel exhaust fluid for US EPA Tier 4 final / EU Tier IV diesel engines

#### DEF

Order number	Specification	Temperature range	Sticker	Alternative
SE: 149060	<ul style="list-style-type: none"> <li>■ ISO 22241</li> <li>■ DIN 70070</li> <li>■ AUS 32</li> </ul>	-10 to +30 °C -14 to +86 °F		

## Product description

### 2.6.5.5 Gearbox

#### 2.6.5.5.1 Slewing gear box

#### Gear oil

#### Shell Omala S4 GXV 220

Order number	Specification	Temperature range	Sticker	Alternative
SE: 179227 Shell: 001F8458	<ul style="list-style-type: none"> <li>■ CLP HC (PAO) 220</li> <li>■ DIN 51517 T3</li> </ul>	-30 to +50 °C -22 to +122 °F		<ul style="list-style-type: none"> <li>■ OMV gear oil SHG 220</li> <li>■ Castrol Alphasyn EP 220</li> </ul>

#### Panolin EP Gear Synth 220

Rapidly biodegradable

Order number	Specification	Temperature range	Sticker	Alternative
SE: 214837	<ul style="list-style-type: none"> <li>■ CLP</li> <li>■ DIN 51517</li> <li>■ OECD 301B</li> </ul>	-30 to +50 °C -22 to +122 °F	-	

#### Lubricating grease - roller bearings

#### Fuchs Stabyl LT 50

Order number	Specification	Temperature range	Sticker	Alternative
SE: 157280	<ul style="list-style-type: none"> <li>■ DIN 51502 - KPHC2N-50</li> <li>■ NLGI 2</li> </ul>	-30 to +50 °C -22 to +122 °F		Avia Grease PE Polar

#### Shell Gadus S2 V220 2

Factory filling - standard temperature range

Order number	Specification	Temperature range	Sticker	Alternative
SE: 179226 Shell: 001D8451	<ul style="list-style-type: none"> <li>■ DIN 51502 - KP2K-20</li> <li>■ NLGI 2</li> </ul>	-20 to +50 °C -4 to +122 °F		<ul style="list-style-type: none"> <li>■ OMV Signum CX 2</li> <li>■ AUTOL TOP 2000</li> <li>■ Castrol Olit 2 EP</li> </ul>

**Panolin Biogrease EP2**

Rapidly biodegradable

Order number	Specification	Temperature range	Sticker	Alternative
SE: 214840	<ul style="list-style-type: none"> <li>■ DIN 51502 KPE2K-3 0</li> <li>■ NLGI 2</li> <li>■ OECD 301B</li> </ul>	-25 to +50 °C -13 to +122 °F		<ul style="list-style-type: none"> <li>■ Avia Syntogrease 2</li> <li>■ BP Biogrease EP 2</li> <li>■ OMV Signum BD 2</li> </ul>

**2.6.5.5.2 Winch gear**

**Gear oil**

**Shell Omala S4 GXV 220**

Order number	Specification	Temperature range	Sticker	Alternative
SE: 179227 Shell: 001F8458	<ul style="list-style-type: none"> <li>■ CLP HC (PAO) 220</li> <li>■ DIN 51517 T3</li> </ul>	-30 to +50 °C -22 to +122 °F		<ul style="list-style-type: none"> <li>■ OMV gear oil SHG 220</li> <li>■ Castrol Alphasyn EP 220</li> </ul>

**Panolin EP Gear Synth 220**

Rapidly biodegradable

Order number	Specification	Temperature range	Sticker	Alternative
SE: 214837	<ul style="list-style-type: none"> <li>■ CLP</li> <li>■ DIN 51517</li> <li>■ OECD 301B</li> </ul>	-30 to +50 °C -22 to +122 °F	-	

**Refilling**

**Fuchs Stabyl LT 50**

Order number	Specification	Temperature range	Sticker	Alternative
SE: 157280	<ul style="list-style-type: none"> <li>■ DIN 51502 - KPHC2N-50</li> <li>■ NLGI 2</li> </ul>	-30 to +50 °C -22 to +122 °F		Avia Grease PE Polar

## Product description

### Shell Gadus S2 V220 2

Factory filling - standard temperature range

Order number	Specification	Temperature range	Sticker	Alternative
SE: 179226 Shell: 001D8451	<ul style="list-style-type: none"> <li>DIN 51502 - KP2K-20</li> <li>NLGI 2</li> </ul>	-20 to +50 °C -4 to +122 °F		<ul style="list-style-type: none"> <li>OMV Signum CX 2</li> <li>AUTOL TOP 2000</li> <li>Castrol Oliit 2 EP</li> </ul>

### Panolin Biogrease EP2

Rapidly biodegradable

Order number	Specification	Temperature range	Sticker	Alternative
SE: 214840	<ul style="list-style-type: none"> <li>DIN 51502 KPE2K-3 0</li> <li>NLGI 2</li> <li>OECD 301B</li> </ul>	-25 to +50 °C -13 to +122 °F		<ul style="list-style-type: none"> <li>Avia Syntogrease 2</li> <li>BP Biogrease EP 2</li> <li>OMV Signum BD 2</li> </ul>

### 2.6.5.5.3 Crawler travel drive

#### Crawler travel drive

### Shell Omala S4 GXV 220

Order number	Specification	Temperature range	Sticker	Alternative
SE: 179227 Shell: 001F8458	<ul style="list-style-type: none"> <li>CLP HC (PAO) 220</li> <li>DIN 51517 T3</li> </ul>	-30 to +50 °C -22 to +122 °F		<ul style="list-style-type: none"> <li>OMV gear oil SHG 220</li> <li>Castrol Alphasyn EP 220</li> </ul>

### Panolin EP Gear Synth 220

Rapidly biodegradable

Order number	Specification	Temperature range	Sticker	Alternative
SE: 214837	<ul style="list-style-type: none"> <li>CLP</li> <li>DIN 51517</li> <li>OECD 301B</li> </ul>	-30 to +50 °C -22 to +122 °F	-	

2.6.5.6 Lubrication

2.6.5.6.1 Central lubrication system

Fuchs Stabyl LT 50

Order number	Specification	Temperature range	Sticker	Alternative
SE: 157280	<ul style="list-style-type: none"> <li>DIN 51502 - KPHC2N-50</li> <li>NLGI 2</li> </ul>	-30 to +50 °C -22 to +122 °F		Avia Grease PE Polar

Shell Gadus S2 V220 2

Factory filling - standard temperature range

Order number	Specification	Temperature range	Sticker	Alternative
SE: 179226 Shell: 001D8451	<ul style="list-style-type: none"> <li>DIN 51502 - KP2K-20</li> <li>NLGI 2</li> </ul>	-20 to +50 °C -4 to +122 °F		<ul style="list-style-type: none"> <li>OMV Signum CX 2</li> <li>AUTOL TOP 2000</li> <li>Castrol Olit 2 EP</li> </ul>

Panolin Biogrease EP2

Rapidly biodegradable

Order number	Specification	Temperature range	Sticker	Alternative
SE: 214840	<ul style="list-style-type: none"> <li>DIN 51502 KPE2K-30</li> <li>NLGI 2</li> <li>OECD 301B</li> </ul>	-25 to +50 °C -13 to +122 °F		<ul style="list-style-type: none"> <li>Avia Syntogrease 2</li> <li>BP Biogrease EP 2</li> <li>OMV Signum BD 2</li> </ul>

2.6.5.6.2 Slewing ring, roller bearings

Fuchs Stabyl LT 50

Order number	Specification	Temperature range	Sticker	Alternative
SE: 157280	<ul style="list-style-type: none"> <li>DIN 51502 - KPHC2N-50</li> <li>NLGI 2</li> </ul>	-30 to +50 °C -22 to +122 °F		Avia Grease PE Polar

## Product description

### Shell Gadus S2 V220 2

Factory filling - standard temperature range

Order number	Specification	Temperature range	Sticker	Alternative
SE: 179226 Shell: 001D8451	<ul style="list-style-type: none"> <li>DIN 51502 - KP2K-20</li> <li>NLGI 2</li> </ul>	-20 to +50 °C -4 to +122 °F		<ul style="list-style-type: none"> <li>OMV Signum CX 2</li> <li>AUTOL TOP 2000</li> <li>Castrol Oliit 2 EP</li> </ul>

### Panolin Biogrease EP2

Rapidly biodegradable

Order number	Specification	Temperature range	Sticker	Alternative
SE: 214840	<ul style="list-style-type: none"> <li>DIN 51502 KPE2K-3 0</li> <li>NLGI 2</li> <li>OECD 301B</li> </ul>	-25 to +50 °C -13 to +122 °F		<ul style="list-style-type: none"> <li>Avia Syntogrease 2</li> <li>BP Biogrease EP 2</li> <li>OMV Signum BD 2</li> </ul>

### 2.6.5.6.3 Slewing ring, outer gearing

#### Fuchs Ceplattyn KG 10 HMF - LT

Order number	Specification	Temperature range	Sticker	Alternative
SE: 156982	<ul style="list-style-type: none"> <li>DIN 51502 - OGPFO0N-50</li> <li>NLGI 00</li> </ul>	-30 to +50 °C -22 to +122 °F		

### Shell Gadus S2 OG 80

Order number	Specification	Temperature range	Sticker	Alternative
SE: 184872 Shell: 001D8496	<ul style="list-style-type: none"> <li>DIN 51502- OGPFO0S-30</li> <li>NLGI 0</li> </ul>	-20 to +50 °C -4 to +122 °F		OKS 490

2.6.5.6.4 Manual lubricating points

Fuchs Stabyl LT 50

Order number	Specification	Temperature range	Sticker	Alternative
SE: 157280	<ul style="list-style-type: none"> <li>DIN 51502 - KPHC2N-50</li> <li>NLGI 2</li> </ul>	-30 to +50 °C -22 to +122 °F		Avia Grease PE Polar

Shell Gadus S2 V220 2

Factory filling - standard temperature range

Order number	Specification	Temperature range	Sticker	Alternative
SE: 179226 Shell: 001D8451	<ul style="list-style-type: none"> <li>DIN 51502 - KP2K-20</li> <li>NLGI 2</li> </ul>	-20 to +50 °C -4 to +122 °F		<ul style="list-style-type: none"> <li>OMV Signum CX 2</li> <li>AUTOL TOP 2000</li> <li>Castrol Oliit 2 EP</li> </ul>

Panolin Biogrease EP2

Rapidly biodegradable

Order number	Specification	Temperature range	Sticker	Alternative
SE: 214840	<ul style="list-style-type: none"> <li>DIN 51502 KPE2K-30</li> <li>NLGI 2</li> <li>OECD 301B</li> </ul>	-25 to +50 °C -13 to +122 °F		<ul style="list-style-type: none"> <li>Avia Syntogrease 2</li> <li>BP Biogrease EP 2</li> <li>OMV Signum BD 2</li> </ul>

2.6.5.6.5 Undercarriage telescoping

Fuchs Stabyl LT 50

Order number	Specification	Temperature range	Sticker	Alternative
SE: 157280	<ul style="list-style-type: none"> <li>DIN 51502 - KPHC2N-50</li> <li>NLGI 2</li> </ul>	-30 to +50 °C -22 to +122 °F		Avia Grease PE Polar

## Product description

### Shell Gadus S2 V220 2

Factory filling - standard temperature range

Order number	Specification	Temperature range	Sticker	Alternative
SE: 179226 Shell: 001D8451	<ul style="list-style-type: none"> <li>DIN 51502 - KP2K-20</li> <li>NLGI 2</li> </ul>	-20 to +50 °C -4 to +122 °F		<ul style="list-style-type: none"> <li>OMV Signum CX 2</li> <li>AUTOL TOP 2000</li> <li>Castrol Oliit 2 EP</li> </ul>

### Panolin Biogrease EP2

Rapidly biodegradable

Order number	Specification	Temperature range	Sticker	Alternative
SE: 214840	<ul style="list-style-type: none"> <li>DIN 51502 KPE2K-3 0</li> <li>NLGI 2</li> <li>OECD 301B</li> </ul>	-25 to +50 °C -13 to +122 °F		<ul style="list-style-type: none"> <li>Avia Syntogrease 2</li> <li>BP Biogrease EP 2</li> <li>OMV Signum BD 2</li> </ul>

### 2.6.5.6.6 Wire ropes

#### Pfeifer RL-S

Order number	Specification	Temperature range	Sticker	Alternative
SE: 185735	Rope spray	-30 to +50 °C -22 to +122 °F	-	Rope grease F 315 L (adhering lubricating spray in the spray can)

#### Pfeifer RL-B

Order number	Specification	Temperature range	Sticker	Alternative
SE: 185736	Rope oil	-30 to +50 °C -22 to +122 °F	-	

### 2.6.5.7 Air conditioning system

#### 2.6.5.7.1 Refrigerant

##### KLEA 134a

Order number	Specification	Temperature range	Sticker	Alternative
SE: 185737	R134a	-30 to +50 °C -22 to +122 °F	-	

**2.6.5.7.2 Refrigerant oil**

**Sanden compressor**

**Sanden SP-10**

Order number	Specification	Temperature range	Sticker	Alternative
SE: 185732		-30 to +50 °C -22 to +122 °F		Sanden SP-15

**Bitzer compressor**

**Bitzer BSE32**

Order number	Specification	Temperature range	Sticker	Alternative
SE: 193700		-30 to +50 °C -22 to +122 °F	–	

**2.6.5.8 Windshield washer system**

**Windshield washer system anti-freeze**

Order number	Specification	Temperature range	Sticker	Alternative
SE: 185734	Fresh water with a proportion of at least 50% anti-freeze	-30 to +50 °C -22 to +122 °F	–	

**2.6.5.9 Starter battery**

**2.6.5.9.1 Battery terminal grease**

**Battery terminal grease**

Order number	Specification	Temperature range	Sticker	Alternative
SE: 071706			–	

**2.6.5.9.2 Battery terminal spray**

**Battery terminal spray**

Order number	Specification	Temperature range	Sticker	Alternative
SE: 113732			–	

### 2.6.6 Surrounding area

#### 2.6.6.1 Ground characteristics

##### NOTICE

**Danger of material damage if used on unsuitable ground.**

- Only perform the tasks on solid, level ground with sufficient soil strength
- Observe the permissible ground pressure.
- Position the machine on level ground with sufficient load-bearing capacity and stabilize the machine.
- Use suitable outrigger pads.

**The machine may suffer damage if positioned or used on unsuitable ground with insufficient soil strength.**

#### Pressure exerted on the ground by the machine

The machine exerts a maximum pressure on the ground depending on the width of the crawler tracks.

To ensure safe operation, the permissible ground pressure must be at least equal to the maximum pressure exerted by the machine.

Crawler track	maximum pressure exerted on the ground by the machine	Unit
3-grouser base plate 900 mm	4.5	kg/cm <sup>2</sup>
3-grouser base plate 900 mm	64.0	psi
Flat base plate 900 mm	4.4	kg/cm <sup>2</sup>
Flat base plate 900 mm	62.6	psi

#### Pressure exerted on the ground by the stabilized machine

When stabilized, the fully ballasted machine exerts a maximum pressure on the ground via the outrigger pads.

Data	Value	Unit
Diameter of outrigger pad	550.0	mm
Diameter of outrigger pad	21.6	in
Maximum pressure exerted by each outrigger pad	15.1	kg/cm <sup>2</sup>
Maximum pressure exerted by each outrigger pad	214.8	psi

If the load-bearing capacity of the ground is insufficient, a suitable support must also be used to reduce the ground pressure.

**Guide values for load-bearing capacity of the ground**

The stated values provide an orientation for the load-bearing capacity of the ground. The guide values must be taken into consideration for implementation planning.

To ensure safe operation, the permissible ground pressure must be at least equal to the maximum pressure exerted by the machine.

Type of ground		Max. ground pressure	Unit
1	Stirred, ground that has not been packed	0 to 1	kg/cm <sup>2</sup>
	Stirred, ground that has not been packed	0 to 14.2	psi
2	Natural, obviously untouched ground		
	2.1 Mud, peat, bog soil, top-soil	0	kg/cm <sup>2</sup>
	Mud, peat, bog soil, top-soil	0	psi
	2.2 Non-binding, sufficiently solid, seasoned ground		
	■ Fine to medium sand	1.5	kg/cm <sup>2</sup>
	■ Fine to medium sand	21.3	psi
	■ Coarse sand to gravel	2.0	kg/cm <sup>2</sup>
	■ Coarse sand to gravel	28.4	psi
3	Cohesive soil		
	■ Soggy	0	kg/cm <sup>2</sup>
	■ Soggy	0	psi
	■ Soft	0.4	kg/cm <sup>2</sup>
	■ Soft	5.7	psi
	■ Firm	1.0	kg/cm <sup>2</sup>
	■ Firm	14.2	psi
	■ Semi-solid	2.0	kg/cm <sup>2</sup>
	■ Semi-solid	28.4	psi
	■ Solid	4.0	kg/cm <sup>2</sup>
■ Solid	56.9	psi	

## Product description

Type of ground		Max. ground pressure	Unit
4	Artificially packed surface	15 to 30	kg/cm <sup>2</sup>
	Artificially packed surface	213.4 to 426.7	psi
4.1	Asphalt	5 to 15	kg/cm <sup>2</sup>
	Asphalt	71.1 to 213.4	psi
4.2	Concrete		
	■ Concrete group II	50 - 250	kg/cm <sup>2</sup>
	■ Concrete group II	711.2 to 3,555.8	psi
	■ Concrete group II	350 - 550	kg/cm <sup>2</sup>
	■ Concrete group II	4,978.2 to 7,822.8	psi

### Permissible fording depth

Data	Value	Unit
Maximum wading depth	0.5	m
Maximum wading depth	1.6	ft



*If the maximum fording depth is outside of the permissible values, contact the service partner.*

2.6.6.2 Safety distances

Distance to embankments and trenches

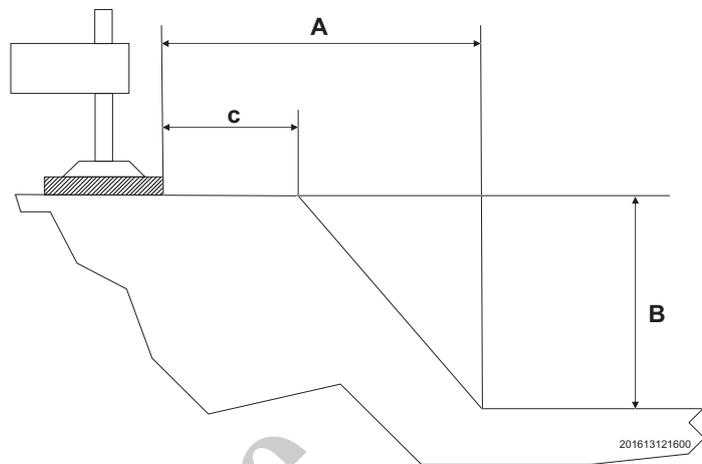


Fig. 2: Exemplary representation: Safety distance to embankments and trenches

- A Distance between machine outrigger/wheel/crawler track and the base of the embankment
- B Embankment height
- c Distance between machine outrigger/wheel/crawler track and embankment crown retainer

Minimum distances must be observed.

Data	Value	Unit
A	>2B	—
c	minimum 2	m
c	minimum 6.6	ft

- Only operate the machine on firm ground with sufficient load-bearing capacity. The ground characteristics must be checked before initial operation.
- Set up the machine at a safe distance from slopes and pits. This distance depends on the type of ground.
- The protective equipment of the machine must be sufficient for the specific application. Possible protective equipment includes protective grating or cab panes of bulletproof glass.
- The work area must be free of any obstacles.
- When the machine is operated underground or in enclosed spaces, these spaces must be sufficiently ventilated.

## Product description

### Safety distances to overhead electrical lines

The following safety distances to overhead electrical lines must be maintained:

Nominal voltage	Minimum safe distance	Unit
up to 1 kV	1.00	m
up to 1 kV	3.28	ft
above 1 kV up to 110 kV	3.00	m
above 1 kV up to 110 kV	9.84	ft
above 110 kV up to 220 kV	4.00	m
above 110 kV up to 220 kV	13.12	ft
above 220 kV up to 380 kV	5.00	m
above 220 kV up to 380 kV	16.4	ft
Nominal voltage unknown	5.00	m
Nominal voltage unknown	16.4	ft

For Reference Only

**Safety distances to overhead electrical lines**

The following safety distances to overhead electrical lines must be maintained, in accordance with ASME B30.5 2011:

Nominal voltage	Minimum safety distance (boom lowered)	Unit
up to 750 V	1.22	m
up to 750 V	4.0	ft
above 750 V up to 50 kV	1.83	m
above 750 V up to 50 kV	6.0	ft
above 50 kV up to 345 kV	3.05	m
above 50 kV up to 345 kV	10.0	ft
above 345 kV up to 750 kV	4.87	m
above 345 kV up to 750 kV	16.0	ft
above 750 kV up to 1 MV	6.10	m
above 750 kV up to 1 MV	20.0	ft

Nominal voltage	Minimum safe distance	Unit
up to 50 kV	3.05	m
up to 50 kV	10.0	ft
above 50 kV up to 200 kV	4.60	m
above 50 kV up to 200 kV	15.0	ft
above 200 kV up to 350 kV	6.10	m
above 200 kV up to 350 kV	20.0	ft
above 350 kV up to 500 kV	7.62	m
above 350 kV up to 500 kV	25.0	ft
above 500 kV up to 750 kV	10.67	m
above 500 kV up to 750 kV	35.0	ft
above 750 kV up to 1 MV	13.72	m
above 750 kV up to 1 MV	45.0	ft

## Product description

### 2.6.6.3 Permissible maximum wind speeds

#### Maximum wind speeds

The stated values apply whether the machine is used with or without attachments.

Data	Value	Unit
Permissible wind speed when machine is in operation	14	m/s
Permissible wind speed when machine is in operation	31	mph
Permissible wind speed when machine is not in operation	20	m/s
Permissible wind speed when machine is not in operation	44	mph

Gusts of wind must be taken into account when determining wind speeds.

Data	Value	Unit
Permissible wind speed of a 3-second gust	14.1	m/s
Permissible average wind speed at a height of 10 m	10	m/s

### 2.6.7 Emissions

#### Noise

The continuous sound pressure level  $L_{pA}$  of the machine is measured in the driver seat with the cab closed.

Data	Value	Unit
Sound power level $L_{pA}$ (in the cab) in accordance with DIN EN ISO 11201:2010-10	<80	db(A)
Sound power level $L_{wA}$ (outside) in accordance with Directive 2000/14/EC	102	db(A)

#### Vibration

Data	Value	Unit
Hand/arm vibrations	<2.5	m/s <sup>2</sup>
Full body vibrations	<0.5	m/s <sup>2</sup>

## 2.7 Equipment

The standard version of the machine can be retrofitted with additional equipment that is available for purchase. In this manual, additional equipment is labeled with "Option" in the product description.

### 3 Safety instructions

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#### 3.1 Shown

Warnings are used to convey dangers and important notices in this operating manual. You will find relevant warnings at the start of a chapter and/or before a step is explained.

### 3.1.1 Structure of a warning



Warnings in this operating manual have the following structure:

**Type and source of danger**

- **Measures to avoid the danger situation.**

**Consequences of ignoring the warning.**

### 3.1.2 Signal words and warning signs

Signal words and warning/information symbols are used to introduce warnings. The signal words indicate the severity and the probability of occurrence of the danger.

The following signal words are used in this operating manual:

Signal word	Meaning
<b>DANGER!</b>	This combination of symbol and signal word indicates an imminently dangerous situation that will result in death or serious injury if it is not avoided.
<b>WARNING!</b>	This combination of symbol and signal word indicates a potentially dangerous situation that can result in death or serious injury if it is not avoided.
<b>CAUTION!</b>	This combination of symbol and signal word indicates a possible dangerous situation that can result in minor injury if it is not avoided.
<b>NOTICE!</b>	This combination of symbol and signal word indicates a potentially dangerous situation that can result in material and environmental damage if it is not avoided.

### 3.1.3 Structure of other information



*This symbol highlights useful tips, recommendations and other information for efficient, failure-free operation.*

## 3.2 Product safety

### 3.2.1 State-of-the-art

The machine complies with state-of-the-art technology and the recognized safety regulations.

Nevertheless, hazards can arise if the safety instructions in this operating manual are not followed and implemented.

The machine may only be operated in perfect technical condition while observing the operating manual.

### 3.2.2 Regular safety tests

The machine must be regularly subjected to a safety inspection.

The safety tests must be carried out by suitable, competent and authorized persons.

National regulations must be observed.

### 3.2.3 Basic safety instructions

#### Personal protective equipment

Personal protective equipment must be worn at all times when working on the machine.

#### Accident prevention regulations

Applicable accident prevention regulations must be observed at all times when working on the machine. All regulations and guidelines in place at the work site where the machine is located must be observed too.

#### Maintenance and repairs performed by trained specialists

Only trained specialists may perform work not described in this manual on electrical equipment, undercarriages, brake and steering systems, and hydraulic equipment. The machine operator may only perform the work on the machine described in this manual.

#### During drive and/or work mode

- Monitor the machine for defects during your shift.
  - Notify your supervisor and the oncoming operator of any defects discovered.
  - Stop working if defects are discovered that threaten operational safety.

#### Persons in the danger zone

The operator must take safety precautions to ensure that the machine's danger zone is only occupied by slingers and banksmen. The slinger, banksman, and machine operator should maintain visual contact or otherwise be in communication. The machine operator must ensure that they can see the danger zone. The danger zone corresponds to the slewing range with load attached or with work equipment installed, including attachments.

### Ground condition

Only work on and with the machine on a solid, level substrate with sufficient soil strength. It is important to comply with the specified ground pressure. Position the machine on level ground with sufficient load bearing capacity and use suitable outrigger pads to stabilize the machine.

## 3.3 Danger zones

### 3.3.1 Zones with stringent safety requirements

Zones with stringent safety requirements are the areas in which persons can be injured by the machine, or its tools, attachments, or loads. The danger zone shifts with the travel movements.

The following are the main areas with stringent safety requirements:

- Areas in which persons can be struck by the slewing motions of the machine.
- Areas in which persons can be injured by the machine moving, rolling or tipping over.
- Areas in which persons can be injured by loads swinging out or falling.
- Areas in which persons can be crushed between the machine and objects such as buildings and scaffolding.
- Areas in which persons can fall from the machine.
- Areas in which persons can be injured by hot or pressurized substances.
- Areas with hot surfaces.

### Measures

- Make sure no one is in the danger zone.
- Keep a safe distance from the danger zone.
- Machine operator: Give warning signals if there is danger for persons.
  - Shut down the machine if persons do not leave the danger zone despite this warning.
- Make sure that only the machine operator is in the cab of the machine while it is in operation.
- If the machine operator's view is restricted while driving and working, a banksman should be used. The communication between the banksman and the machine operator must be ensured.

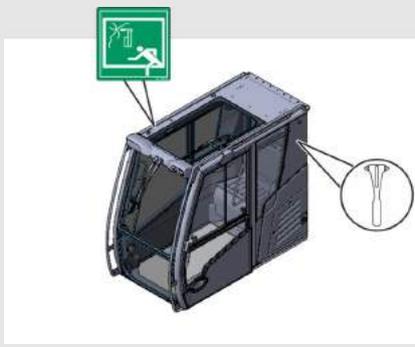
- Cordon off the area between solid structures and the work area of the machine.
- Check the following before starting work:
  - Load-bearing capacities
  - The required condition and safe load-bearing capacity of the ground
  - Ground inclination
  - Distance from embankments and excavations
  - Concealed deficiencies of the ground (old basement, vault, etc.)
  - Permissible maximum wind speeds

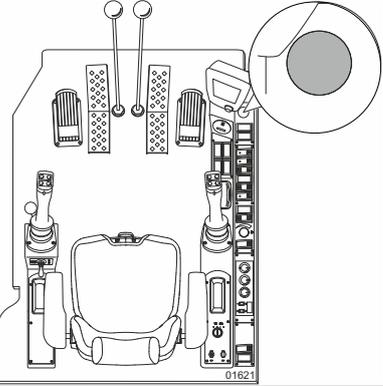
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Only

## Safety instructions

### 3.3.2 Safety and monitoring equipment

The safety devices of the machine protect the machine operator and the surroundings while the machine is in operating mode. Safety devices must not be dismantled or modified.

Safety feature	Description	Illustration
Load moment limitation	<p>When the crane nears the load-bearing capacity limit, a warning signal rings in the cab and simultaneously the light for the load moment limitation gives out an optical warning signal.</p> <p>If the permitted load moment is exceeded, the load moment limitation switches off all load moment increasing machine movements and the light for the load moment limitation give out an optical and acoustic signal.</p>	
Protective grating and protective covering	Protective gratings and protective coverings should prevent contact with dangerous machine components.	
Safety lever	With the safety lever, the operator can lock all of the work and travel operations during work breaks and before leaving the cab.	
Emergency hammer and emergency exit	If, in an emergency, the exit via the cab door is locked, the operator can exit the cab through the right-hand cab window. The emergency hammer is for breaking the window.	
Protective roof (FOPS) (option)	The protective roof protects the operator from falling objects.	

Safety feature	Description	Illustration
Armored-glass roof window (option)	The armored-glass roof window protects the operator from falling objects.	
Seat belt	If used correctly, the seat belt prevents the machine driver being thrown through or out of the cab.	
Beacon	<p>The beacon indicates to those in the vicinity of the machine that the machine is a source of danger.</p> <p>The use of the beacon is compulsory when operating the machine with remote radio control.</p>	
Emergency stop	Activation of the emergency stop stops all machine operations.	
Horn and acoustic signals	The horn and acoustic signals indicate to those in the vicinity of the machine that the machine is a source of danger.	
Fire extinguisher	<p>The fire extinguisher is used, in the case of fire, to extinguish flames.</p> <p>The storage location of the fire extinguisher in the machine is marked by a relevant sticker.</p>	

## Safety instructions

Safety feature	Description	Illustration
Lifting limit switch	The lifting limit switch switches off lifting movement in the winch at a determined height. As a result, a collision between the bottom hook block and the pulley head is prevented. Additionally, extending and retracting are switched off.	
Length indicator and angle indicator	The length and angle transmitter measures both the angle and the length of the telescopic boom. This is transmitted to the RCL. If the length or angle of the telescopic boom fall in the non-permitted area, the RCL switches off all load moment-raising machine operations.	

Reference Only

Safety feature	Description	Illustration
Rope end limiter	<p>The rope end limiter ensures that sufficient rope always remains wound on the winch. If the remaining rope on the winch falls below the permissible length, lowering operations are automatically switched off.</p>	
Pressure sensor	<p>The pressure sensors measure the pressure on the piston head and on the rod side of the hoist cylinder.</p>	

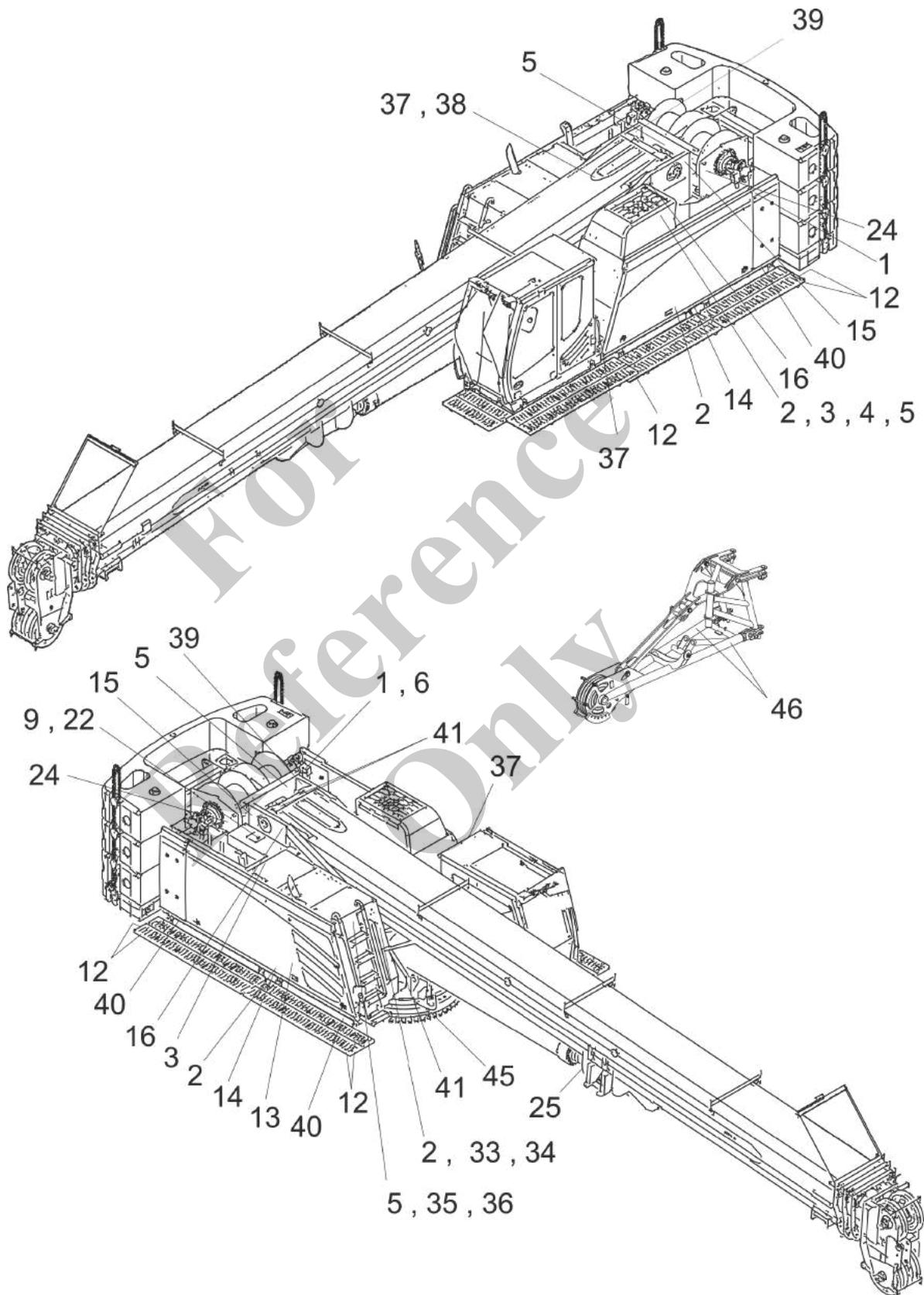
For Reference Only

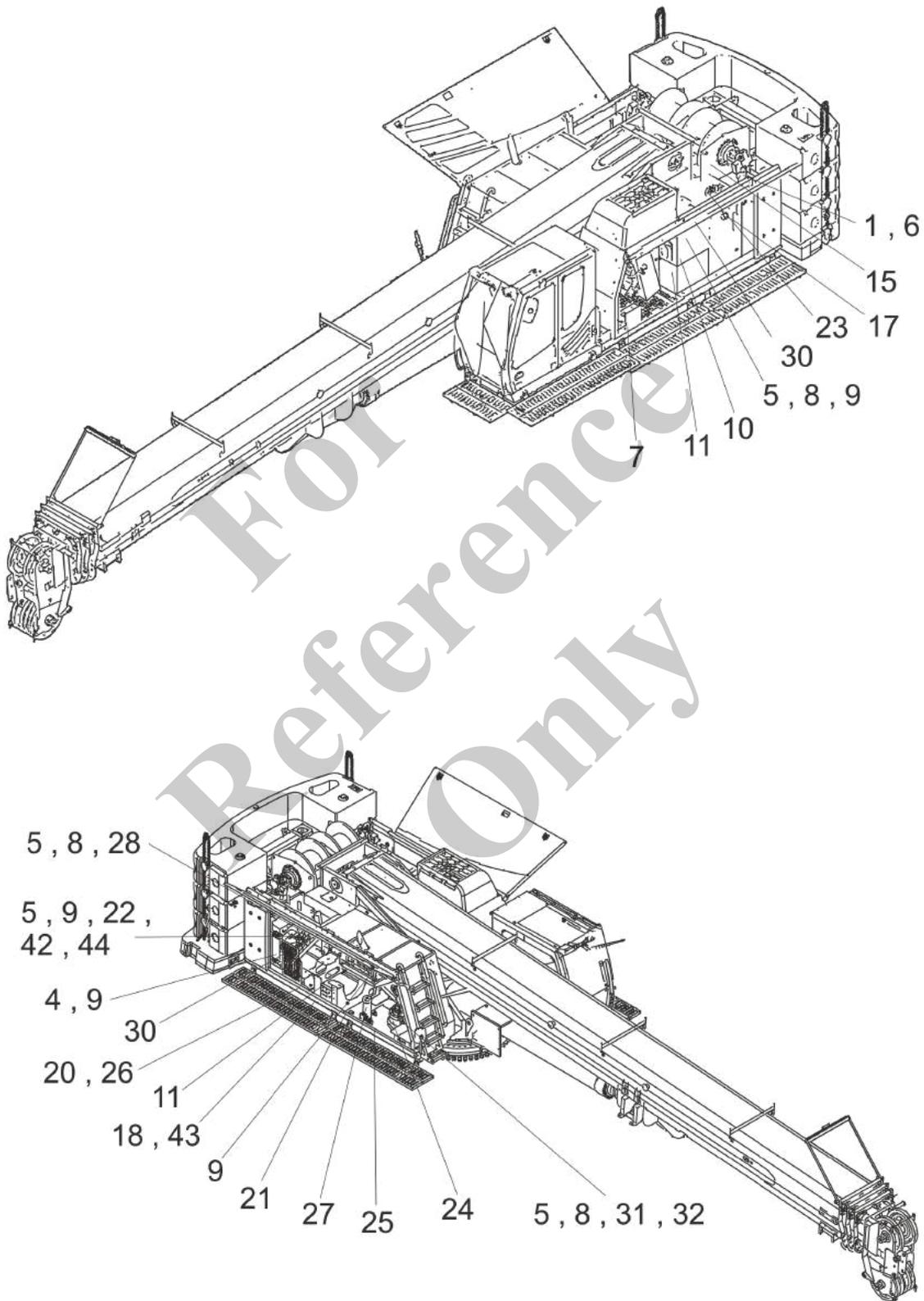
### **3.4 Signage**

#### **3.4.1 Uppercarriage signage**

##### **3.4.1.1 Overview diagrams for uppercarriage**

*For  
Reference  
Only*





- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1 Smoking prohibited!</li> <li>2 Read the maintenance manual!</li> <li>3 Keep off!</li> <li>4 Warning of rotating fan blades</li> <li>5 Read the operating manual!</li> <li>6 Note diesel fuel</li> <li>7 DEF fuel</li> <li>8 Warning of escaping fluid</li> <li>9 Danger of burn injuries</li> <li>10 Warning - high voltage</li> <li>11 24 V power socket label</li> <li>12 Warning sign hatching</li> <li>13 Hand signals</li> <li>14 Warning against collapse</li> <li>15 Danger of being pulled in by rope drive</li> <li>16 Danger of crushing on boom</li> <li>17 Notice on min. and max. hydraulic oil tank fill level</li> <li>18 40 A ignition fuse label</li> <li>19 -</li> <li>20 Note engine oil</li> <li>21 Sampling point label</li> <li>22 Warning of overflow or boil-over of fluids</li> <li>23 Hydraulic oil</li> </ol> | <ol style="list-style-type: none"> <li>24 Transmission oil</li> <li>25 Lubricating grease</li> <li>26 Engine oil</li> <li>27 HydroClean label</li> <li>28 Warning of rotating belt drive</li> <li>29 -</li> <li>30 High-pressure cleaning forbidden</li> <li>31 Warning of corrosive battery acid</li> <li>32 Warning of danger of explosion</li> <li>33 Warning of falling load</li> <li>34 Keep away from danger zones</li> <li>35 Do not climb</li> <li>36 Danger of uppercarriage falling</li> <li>37 Keep off</li> <li>38 Chains on uppercarriage</li> <li>39 Winch rope not attached correctly</li> <li>40 Warning of rotating machine</li> <li>41 Lifting point label</li> <li>42 Coolant</li> <li>43 Battery disconnect switch label</li> <li>44 Cooling system filling</li> <li>45 Operating fluids</li> <li>46 Heavy-duty jib working position</li> </ol> |
|---|---|

### 3.4.1.2 Warning and safety signs for the uppercarriage

#### Smoking prohibited!

Shown	Meaning	SEBO no.
	<p>Diesel fuel is easily ignited. Severe injury and death can result in the case of fire.</p> <ul style="list-style-type: none"> <li>■ Smoking or open fire in the vicinity of the machine is prohibited.</li> </ul>	187984

#### Read the maintenance manual!

Shown	Meaning	SEBO no.
	<p>Warning of serious injury or death from failing to observe maintenance manual.</p> <p>Wear protective equipment!</p>	187976

## Safety instructions

### Keep off!

Shown	Meaning	SEBO no.
	<p>Warning against falling. Stay clear of the danger zone!</p>	187985

### Warning of rotating fan blades

Shown	Meaning	SEBO no.
	<p>Rotating fan blades can cause severe injury.</p> <ul style="list-style-type: none"> <li>■ Do not reach into the fan blades.</li> <li>■ Maintain a safety distance.</li> </ul>	187941

### Read the operating manual!

Shown	Meaning	SEBO no.
	<p>Warning of serious injury or death from failing to observe operating manual. Keep operating manual inside the machine.</p>	187975

### Note diesel fuel

Shown	Meaning	SEBO no.
	<p>Sulfur-free diesel fuel or diesel fuel with less than 15 mg/kg sulfur content only.</p>	186976

### DEF fuel

Shown	Meaning	SEBO no.
	<p>DEF fuel</p>	187996

**Warning of escaping fluid**

Shown	Meaning	SEBO no.
	<p>Corrosive fluids can cause serious injury.</p> <ul style="list-style-type: none"> <li>Wear protective gloves and eye protection.</li> </ul>	187981

**Danger of burn injuries**

Shown	Meaning	SEBO no.
	<p>There is a risk of burns from hot surfaces.</p> <ul style="list-style-type: none"> <li>Do not touch hot surfaces.</li> <li>Maintain a safety distance.</li> </ul>	187978

**Warning - high voltage**

Shown	Meaning	SEBO no.
	<p>Electrical voltages can result in death or serious injury.</p> <ul style="list-style-type: none"> <li>Do not touch live parts.</li> </ul>	187980

**24 V power socket label**

Shown	Meaning	SEBO no.
	24 V power socket label	186587

**Warning sign hatching**

Shown	Meaning	SEBO no.
	<p>Danger area label</p> <ul style="list-style-type: none"> <li>Pay special attention to danger areas.</li> <li>Maintain a safety distance.</li> </ul>	187969

## Safety instructions

### Hand signals

Shown	Meaning	SEBO no.
	Hand signals for communication between crane operator and guide.	187239

### Warning against collapse

Shown	Meaning	SEBO no.
	<p>Danger of falling due to exceeding the maximum load of the walkway per segment.</p> <ul style="list-style-type: none"> <li>Do not exceed the maximum load of the walkway.</li> </ul>	187962

### Danger of being pulled in by rope drive

Shown	Meaning	SEBO no.
	<p>Warning of dismemberment due to winch rope winding in.</p> <ul style="list-style-type: none"> <li>Stay away from the winch rope when it is winding in.</li> </ul>	187943

### Danger of crushing on boom

Shown	Meaning	SEBO no.
	<p>Warning of crushing or dismemberment due to moving boom.</p> <ul style="list-style-type: none"> <li>Stay out of the danger zone.</li> </ul>	187945

**Notice on min. and max. hydraulic oil tank fill level**

Shown	Meaning	SEBO no.
	<p>Maximum oil level on sight glass:</p> <ul style="list-style-type: none"> <li>■ The oil level must not exceed the upper marking.</li> </ul> <p>Minimum oil level on sight glass:</p> <ul style="list-style-type: none"> <li>■ The oil level is displayed on the SENCON.</li> </ul>	258842

**40 A ignition fuse label**

Shown	Meaning	SEBO no.
	40 A ignition fuse label	187992

**Note engine oil**

Shown	Meaning	SEBO no.
	Only use engine oils as per specification ACEA E9-08 or API CJ-4.	186977

**Sampling point label**

Shown	Meaning	SEBO no.
	Hydraulic oil sampling point label	186594

## Safety instructions

### Warning of overflow or boil-over of fluids

Shown	Meaning	SEBO no.
	Fluids can cause serious injury or scalding when overflowing or during boil-over. <ul style="list-style-type: none"> <li>■ Maintain a safety distance.</li> </ul>	187960

### Hydraulic oil

Shown	Meaning	SEBO no.
	Shell Tellus S2 VA 46 hydraulic oil	187999

### Transmission oil

Shown	Meaning	SEBO no.
	Shell Omala S4 GX 220 gear oil	187939

### Lubricating grease

Shown	Meaning	SEBO no.
	Shell Gadus S2 V220 2 lubricating grease	187995

### Engine oil

Shown	Meaning	SEBO no.
	Shell Rimula R5 LE 10W-30 engine oil	187997

HydroClean label

Shown	Meaning	SEBO no.
	HydroClean label	187994

Warning of rotating belt drive

Shown	Meaning	SEBO no.
	<p>The rotating belt drive can cause serious injury.</p> <ul style="list-style-type: none"> <li>Do not reach into the belt drive.</li> <li>Maintain a safety distance.</li> </ul>	187982

High-pressure cleaning forbidden

Shown	Meaning	SEBO no.
	<p>The use of a high-pressure cleaner in the engine compartment can cause engine damage.</p> <ul style="list-style-type: none"> <li>The use of a high-pressure cleaner in the engine compartment is prohibited.</li> </ul>	187977

Warning of corrosive battery acid

Shown	Meaning	SEBO no.
	<p>Corrosive battery acid and lead can cause serious injury.</p> <ul style="list-style-type: none"> <li>Maintain a safety distance.</li> </ul>	187988

## Safety instructions

### Warning of danger of explosion!

Shown	Meaning	SEBO no.
	<p>Improper handling of the battery may cause an explosion.</p> <ul style="list-style-type: none"> <li>■ No smoking or open flame.</li> <li>■ Ensure good ventilation when charging the battery externally.</li> </ul>	187989

### Warning of falling load

Shown	Meaning	SEBO no.
	<p>Falling load can cause serious injury or death to persons.</p> <ul style="list-style-type: none"> <li>■ Ensure that no one is under a suspended load.</li> </ul>	187957

### Keep away from danger zones

Shown	Meaning	SEBO no.
	<p>Warning of serious injuries in the danger zone while the machine is in operating mode.</p> <ul style="list-style-type: none"> <li>■ Do not stay in the danger zone.</li> </ul>	187956

### Do not climb

Shown	Meaning	SEBO no.
	<p>Warning of serious injury due to unauthorized use of the access ladder.</p> <ul style="list-style-type: none"> <li>■ Unauthorized access prohibited!</li> </ul>	187958

### Danger of uppercarriage falling

Shown	Meaning	SEBO no.
	<p>Warning against danger of falling on the uppercarriage.</p> <ul style="list-style-type: none"> <li>■ Wear safety harness and safety shoes!</li> </ul>	187946

**Keep off**

Shown	Meaning	SEBO no.
	Warning against falling. <ul style="list-style-type: none"> <li>■ Keep off.</li> </ul>	187987

**Chains on uppercarriage**

Shown	Meaning	SEBO no.
	Warning - danger of falling <ul style="list-style-type: none"> <li>■ Use fall arrest safety harness.</li> </ul>	187986

**Winch rope not attached correctly**

Shown	Meaning	SEBO no.
	The winch rope can cause serious injury if it is not attached correctly. Use the recommended cable wedges to attach the winch rope to the cable drum.	187961

**Warning of rotating machine**

Shown	Meaning	SEBO no.
	A rotating machine can cause death or serious injury. <ul style="list-style-type: none"> <li>■ Do not stay in the danger zone.</li> </ul>	187233

**Lifting point label**

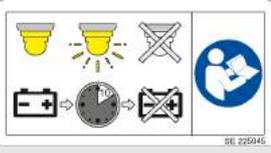
Shown	Meaning	SEBO no.
	Secure attachment <ul style="list-style-type: none"> <li>■ Lift the machine only at the marked points and with suitable slings.</li> </ul>	186792

## Safety instructions

### Coolant

Shown	Meaning	SEBO no.
	Cummins ES Compleat coolant	187998

### Battery disconnect switch label

Shown	Meaning	SEBO no.
	Battery disconnect switch label	225045

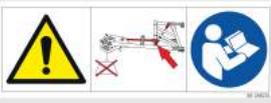
### Cooling system filling

Shown	Meaning	SEBO no.
	Instructions regarding filling the cooling system.	194762

### Operating fluids

Shown	Meaning	SEBO no.
	Shell Gadus S2 OGH 0/00.	187894

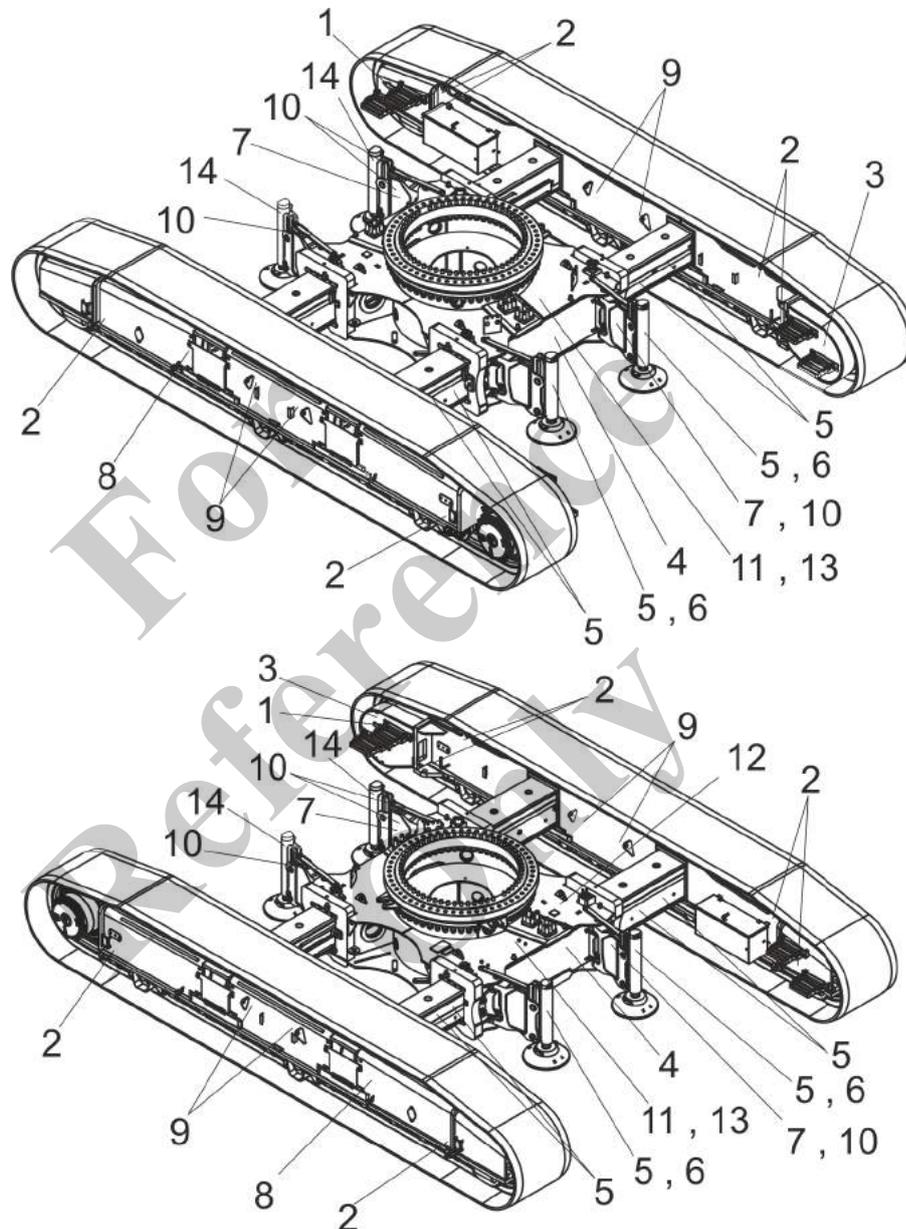
### Heavy-duty jib working position

Shown	Meaning	SEBO no.
	Note on the fitting state of the diagonal tie for load lifting. Note the bolt position!	258233

### 3.4.2 Undercarriage signage

#### 3.4.2.1 Overview diagrams for undercarriage

##### T119/540 undercarriage



- |   |   |    |   |
|---|---|----|---|
| 1 | Direction light                           | 8  | Warning of pressurized sealing caps       |
| 2 | Lashing point label                       | 9  | Lifting point label                       |
| 3 | Transmission oil                          | 10 | Warning sign hatching                     |
| 4 | Danger of crushing on track wheel carrier | 11 | Lubricating grease                        |
| 5 | 50% and 100% arrow                        | 12 | Information on clamping the undercarriage |
| 6 | Danger of crushing feet                   | 13 | Stabilizing cylinder positions            |
| 7 | Danger of crushing hands                  | 14 | Stabilizing cylinders label               |

## Safety instructions

### 3.4.2.2 Warning and safety signs on undercarriage

#### Direction light

Shown	Meaning	SEBO no.
	Direction arrow <ul style="list-style-type: none"> <li>The arrow points toward the front end of the machine.</li> </ul>	146910

#### Lashing point label

Shown	Meaning	SEBO no.
	Label of the point where the machine can be lashed	186793

#### Transmission oil

Shown	Meaning	SEBO no.
	Transmission oil	-

#### Danger of crushing on track wheel carrier

Shown	Meaning	SEBO no.
	Single telescopic track wheel carriers can cause serious crushing. <ul style="list-style-type: none"> <li>Do not stay in the danger zone.</li> </ul>	187942

50% and 100% arrow

Shown	Meaning	SEBO no.
	<p>Signifies 50% or 100% mark with undercarriage retracted</p>	<p>187964</p>

Danger of crushing feet

Shown	Meaning	SEBO no.
	<p>Warning: extendable outrigger</p> <ul style="list-style-type: none"> <li>■ Maintain a safety distance.</li> </ul>	<p>187940</p>

## Safety instructions

### Danger of crushing hands

Shown	Meaning	SEBO no.
	Warning against danger of crushing hands <ul style="list-style-type: none"> <li>■ Maintain a safety distance.</li> </ul>	193837

### Warning of pressurized sealing caps

Shown	Meaning	SEBO no.
	Pressurized sealing caps can cause serious injury. <ul style="list-style-type: none"> <li>■ Maintain a safety distance.</li> <li>■ Wear safety glasses and protective gloves.</li> </ul>	187944

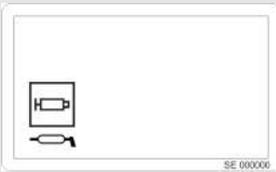
### Lifting point label

Shown	Meaning	SEBO no.
	Secure attachment <ul style="list-style-type: none"> <li>■ Lift the machine only at the marked points and with suitable slings.</li> </ul>	186792

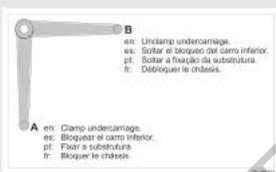
### Warning sign hatching

Shown	Meaning	SEBO no.
	Danger area label <ul style="list-style-type: none"> <li>■ Pay special attention to danger areas.</li> <li>■ Maintain a safety distance.</li> </ul>	187969

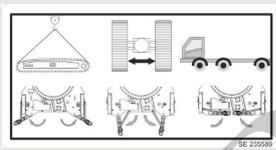
**Lubricating grease**

Shown	Meaning	SEBO no.
	Lubricating grease	-

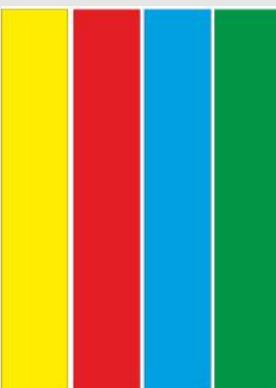
**Information on clamping the under-carriage**

Shown	Meaning	SEBO no.
	Ball valve selector lever position for clamping the undercarriage	194103

**Stabilizing cylinder positions**

Shown	Meaning	SEBO no.
	Stabilizing cylinder positions <ul style="list-style-type: none"> <li>■ Folded out: Track wheel carrier setup</li> <li>■ Middle position: Change track width</li> <li>■ Folded in: Transport</li> </ul>	235589

**Stabilizing cylinders label**

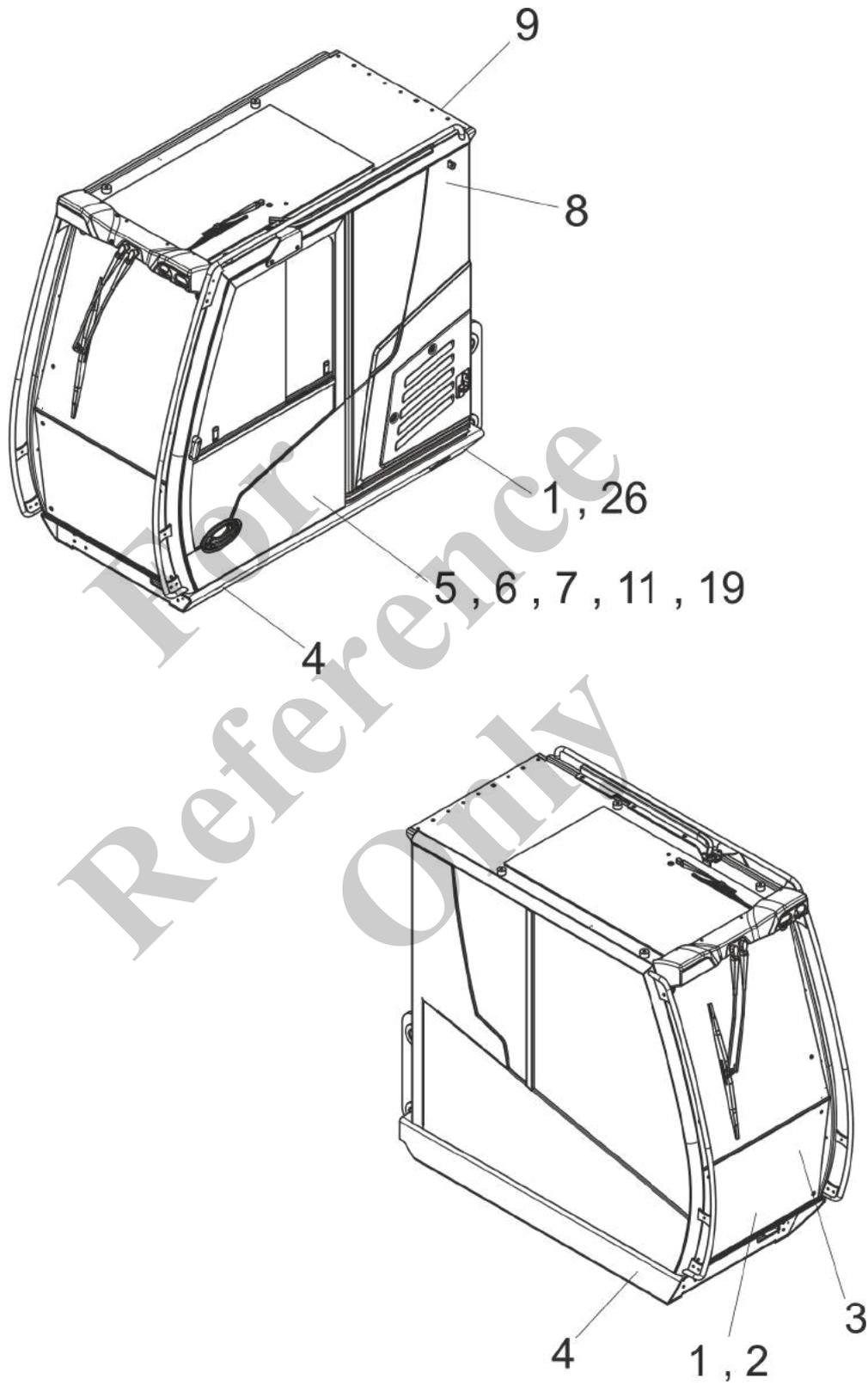
Shown	Meaning	SEBO no.
	To provide assistance, the outrigger cylinders are labeled in the same colors as on the remote control.	247088

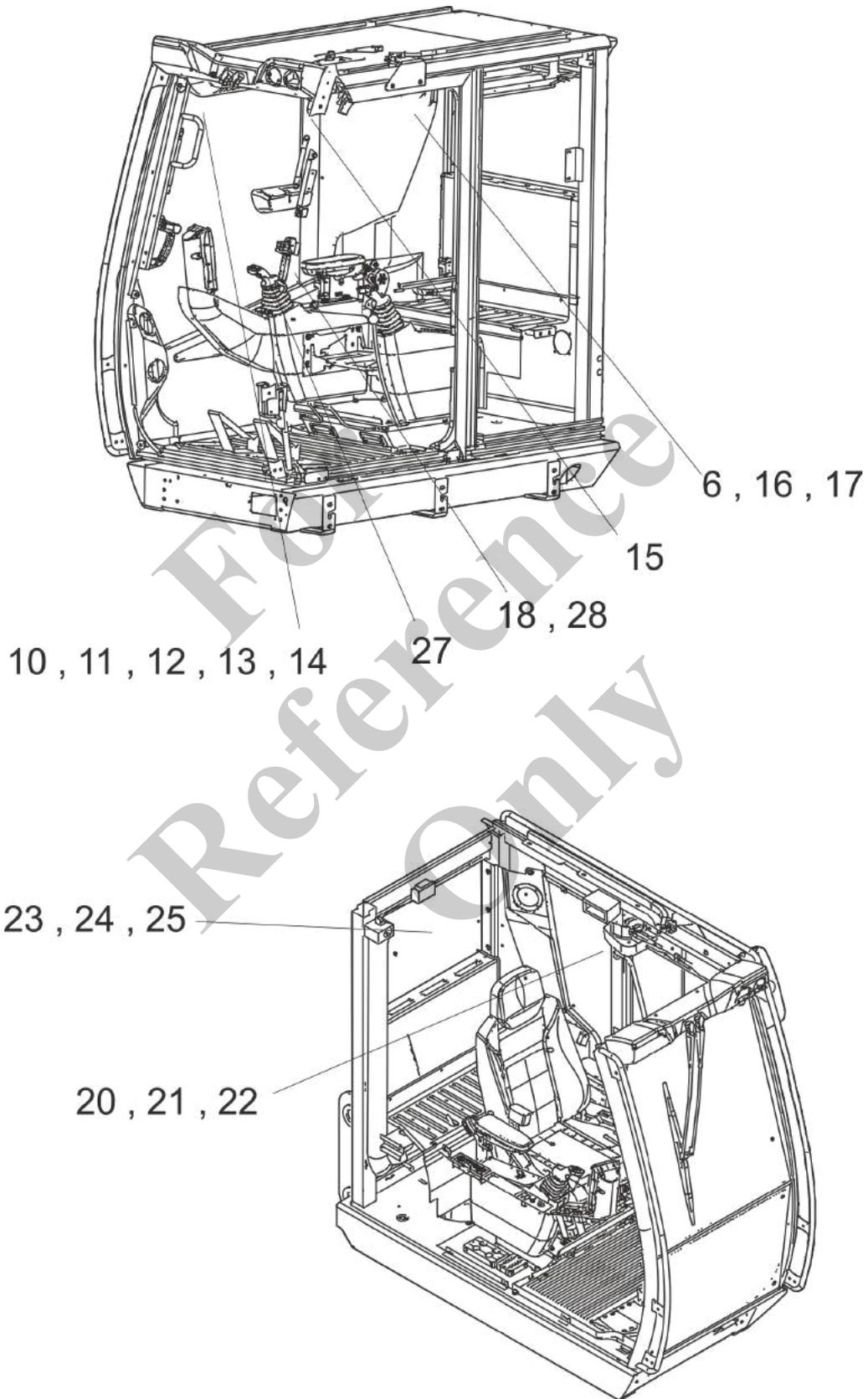
**3.4.3 Cab signage**

**3.4.3.1 Overview diagrams for cab**

**Maxcab cab 2**

*For  
Reference  
Only*





- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1 Warning against collapse</li> <li>2 Warning of falling load</li> <li>3 Warning of lowering cab</li> <li>4 Warning of rotating machine</li> <li>5 Warning against unauthorized setup</li> <li>6 Operation by authorized personnel only</li> <li>7 Warning of electric shock</li> <li>8 Fire extinguisher storage location</li> <li>9 24 V power socket</li> <li>10 Pay attention to the load lift charts and follow the operating instructions</li> <li>11 Suspended load</li> <li>12 Crane falling backward</li> <li>13 Danger of tipping</li> <li>14 Emergency exit</li> </ol> | <ol style="list-style-type: none"> <li>15 Warning against falling out of cab</li> <li>16 Drilling and welding prohibited</li> <li>17 Read the operating manual!</li> <li>18 Danger caused by improper use of the machine</li> <li>19 Crane Star logo</li> <li>20 You must understand the language in which the operating manual is written</li> <li>21 Never leave the machine unattended</li> <li>22 Warning against folding boom</li> <li>23 Sound power level</li> <li>24 Load capacity sticker</li> <li>25 Machine control sticker</li> <li>26 Danger of crushing hands</li> <li>27 Joystick function restricted</li> <li>28 Crane Star</li> </ol> |
|--|--|

### 3.4.3.2 Warning and safety signs for the cab

#### Warning against collapse

Shown	Meaning	SEBO no.
	<p>Danger of falling due to exceeding the maximum load of the walkway per segment.</p> <ul style="list-style-type: none"> <li>■ Do not exceed the maximum load of the walkway.</li> </ul>	187962

#### Warning of falling load

Shown	Meaning	SEBO no.
	<p>Falling load can cause serious injury or death to persons.</p> <ul style="list-style-type: none"> <li>■ Ensure that no one is under a suspended load.</li> </ul>	187957

#### Warning of lowering cab

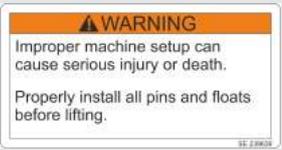
Shown	Meaning	SEBO no.
	<p>Lowering cab can result in crushing. Do not stay in the danger zone.</p>	187973

## Safety instructions

### Warning of rotating machine

Shown	Meaning	SEBO no.
 <p><b>WARNING</b> Crush Hazard Rotating upper structure can cause severe injury. Ensure that no persons are within the danger area during operation.</p>	<p>A rotating machine can cause death or serious injury.</p> <ul style="list-style-type: none"> <li>Do not stay in the danger zone.</li> </ul>	187233

### Warning against unauthorized setup

Shown	Meaning	SEBO no.
 <p><b>WARNING</b> Improper machine setup can cause serious injury or death. Properly install all pins and floats before lifting.</p>	An unauthorized setup can cause serious injury.	239639

### Operation by authorized personnel only

Shown	Meaning	SEBO no.
	Operation by authorized personnel only.	187983

### Warning of electric shock

Shown	Meaning	SEBO no.
 <p><b>DANGER</b> Electrical hazard! Keep all parts of the machine, the rigging and materials being lifted at least 20 feet away from all electrical power lines and equipment. Stay away from the machine if it is being operated near electrical power lines or equipment. Before operating the machine in the vicinity of power lines or equipment notify the competent operator of the line or equipment to be power turned off. This machine is not insulated.</p>	Electrical current from overhead lines can cause serious or fatal injuries. Maintain the safety distance.	239627

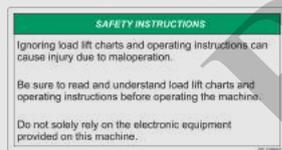
**Fire extinguisher storage location**

Shown	Meaning	SEBO no.
	Fire extinguisher storage location	187974

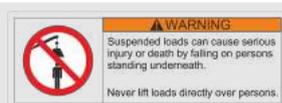
**24 V power socket**

Shown	Meaning	SEBO no.
	24 V socket label	186587

**Pay attention to the load lift charts and follow the operating instructions**

Shown	Meaning	SEBO no.
	Failure to observe load lift charts and operating instructions can result in death or serious injury.	239647

**Suspended load**

Shown	Meaning	SEBO no.
	Suspended loads can cause death or serious injury to personnel below. Never swing suspended loads over personnel.	187953

## Safety instructions

### Crane falling backward

Shown	Meaning	SEBO no.
	Crane falling backward can result in death or serious injury. Only operate crane when properly assembled.	239643

### Danger of tipping

Shown	Meaning	SEBO no.
	Tipping crane can result in death or serious injury. Observe specified safe working loads. Always position crane on level ground. Keep away from danger zones.	239631

### Emergency exit

Shown	Meaning	SEBO no.
	Emergency exit label	187970

### Warning against falling out of cab

Shown	Meaning	SEBO no.
	Warning against falling out of cab. Wear seat belt.	187971

### Drilling and welding prohibited

Shown	Meaning	SEBO no.
	Drilling and welding prohibited.	187949

## Read the operating manual!

Shown	Meaning	SEBO no.
	Warning of serious injury or death from failing to observe operating manual. Keep operating manual inside the machine.	187975

## Danger caused by improper use of the machine

Shown	Meaning	SEBO no.
	Improper use of the machine can cause death or serious injury. For proper use only as described in the manual.	239635

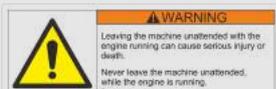
## Crane Star logo

Shown	Meaning	SEBO no.
	Crane Star logo	187881

## You must understand the language in which the operating manual is written

Shown	Meaning	SEBO no.
	If you do not understand the language of the operating manual, you are not allowed to start the machine.	187963

## Never leave the machine unattended

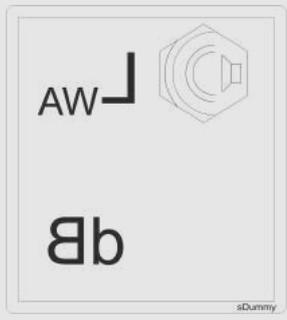
Shown	Meaning	SEBO no.
	Never leave the machine unattended with the engine running.	187979

## Safety instructions

### Warning against folding boom

Shown	Meaning	SEBO no.
	Folding boom extension or boom can cause death or serious injury. Only operate crane when properly assembled. Exercise caution in the danger zone.	187947

### Sound power level

Shown	Meaning	SEBO no.
	Sound power level of the machine	

### Load capacity sticker

Shown	Meaning	SEBO no.
	Load capacity sticker for the machine	

### Machine control sticker

Shown	Meaning	SEBO no.
	Machine control sticker for the machine	

### Danger of crushing hands

Shown	Meaning	SEBO no.
	Warning – lowering cab. Risk of crushing hands and arms.	187972

Joystick function restricted

Shown	Meaning	SEBO no.
	<p>Joystick function is restricted. Note: Holding brakes are disconnected.</p>	<p>200989</p>

Crane Star

Shown	Meaning	SEBO no.
	<p>Crane Star</p>	<p>187877</p>

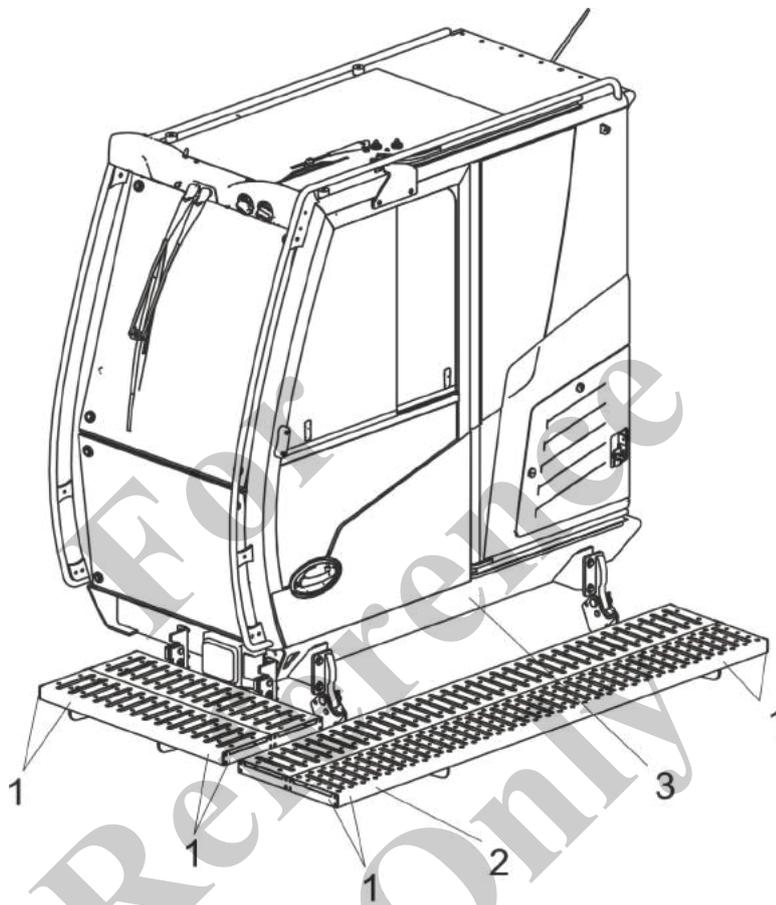
For Reference Only

## Safety instructions

### 3.4.4 Cab step grid signage

#### 3.4.4.1 Overview graphic of the cab platform

##### Maxcab 2 cab platform



- 1 Warning sign hatching
- 2 Warning - danger due to moving machine parts
- 3 Warning against collapse

#### 3.4.4.2 Warning and safety signs for cab adjustment

##### Warning sign hatching

Shown	Meaning	SEBO no.
	Danger area label <ul style="list-style-type: none"><li>■ Pay special attention to danger areas.</li><li>■ Maintain a safety distance.</li></ul>	187969

**Warning - danger due to moving machine parts**

Shown	Meaning	SEBO no.
	Rotating machine can cause death or serious injury. Warning – danger due to contact, crushing, shearing: <ul style="list-style-type: none"> <li>■ Do not stay in the danger zone.</li> </ul>	187993

**Warning against collapse**

Shown	Meaning	SEBO no.
	Danger of falling due to exceeding the maximum load of the walkway per segment. <ul style="list-style-type: none"> <li>■ Do not exceed the maximum load of the walkway.</li> </ul>	187962

**3.5 Personnel**

**3.5.1 Personnel qualifications**

Different groups of people must have different qualifications.

**Specialist**

- Machine operator
- Slinger

A specialist has the technical training and experience necessary to safely operate the machine without assistance in accordance with the applicable standards. They are able to operate, set up, and, to a certain extent, maintain the machine. A specialist is able to recognize and avert potential dangers during the work.

**Instructed personnel**

- Banksman

Instructed personnel are able to perform the tasks assigned to them without assistance after receiving appropriate instruction. They recognize and prevent potential dangers by acting in a proper manner. They are familiar with the necessary protective devices and measures, applicable regulations and accident prevention guidelines.

### 3.5.2 General specifications for personnel

#### General personnel requirements:

- Physical and mental fitness
- Understanding of technical and physical relationships
- Reliable and responsible action
- Ability to learn, implement and apply signals

#### General responsibilities of the staff:

- Compliance with the recognized occupational health and safety rules
- Compliance with the recognized traffic safety rules
- Compliance with company rules
- Visual inspection for obvious machine defects
- Observe the maintenance plan
- Wearing personal protective equipment

The operator is responsible for observing the specifications for personnel.

### 3.5.3 Provisions for the operator

The list below is not exhaustive and includes only the most important points.

#### Responsibilities of the operator:

- Employment of trained and instructed personnel
- Provision of operating manual at the deployment site
- Integration and implementation of operational safety based on the recognized rules for occupational health and safety
- Checking and ensuring the machine is in perfect technical condition
- Regular maintenance and service of the machine
- Inspection by an expert at least once a year
  - After initial startup
  - After significant modifications
- Inspection by an authorized expert every 4 years (annually starting from the 13th year of operation)
  - Power-driven cranes
  - Truck-mounted cranes

Faults that are detected in recurring inspections must be eliminated within a suitable time-frame depending on how serious a safety hazard they pose.

### Using the machine in a different country to normal

You must observe the following points in particular when using the machine in a different country to normal:

- Comply with the safety regulations of the country of use.
- Make sure the operators have the necessary qualifications for the intended work.
- Ensure that the contents of this manual are read and fully understood. If necessary, obtain a manual in the required language from the manufacturer.

### 3.5.4 Specification for service technicians

#### Requirements

- The service technician must have completed officially recognized professional training and must be qualified to carry out the work.
- The service technician must be experienced in this area and must actively engage in further training.
- The service technician must carry out fault diagnosis and repairs on the machine.

#### Obligations

The service technician must carry out the tasks stated in the operating manual and additional technical documents.

The service technician must carry out the machine handover and must ensure that the machine has been properly inspected following completion of all tasks.

The service technician must maintain the machine and provide support to the service organization as a product expert.

### 3.5.5 Personal protective equipment

Personnel should wear personal protective equipment, which will be referenced separately in the individual sections of this manual, while working on and with the machine.

	<p><b>Fall arrest safety harness</b></p> <p>The fall arrest safety harness reduces the danger of injury when falling from a great height.</p> <p>At working heights above 2.00 m, using a safety harness is recommended. At working heights above 3.00 m, using a safety harness is a legal requirement.</p> <p>Hook-in points are marked by the appropriate sign.</p>
	<p><b>Ear protection</b></p> <p>Hearing protection protects against hearing loss due to noise.</p>
	<p><b>Protective goggles</b></p> <p>Safety goggles protect eyes against flying parts and splashing.</p>
	<p><b>Protective gloves</b></p> <p>Protective gloves protect the hands against friction, abrasions, punctures, deep wounds, and hot surfaces.</p>
	<p><b>Hard hat</b></p> <p>Hard hats protect the head against falling objects, swinging loads and collisions with fixed objects.</p>
	<p><b>Safety shoes</b></p> <p>Safety shoes protect feet against crushing, falling parts and slipping on slippery surfaces.</p>
	<p><b>Protective clothing</b></p> <p>Protective clothing is tight-fitting, tear-resistant clothing with tight sleeves and no protruding parts. Protective clothing prevents persons from being pulled into moving machine parts.</p>

### 3.5.6 Hand signals

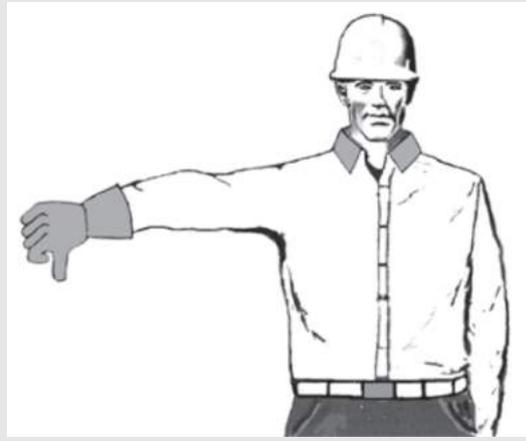
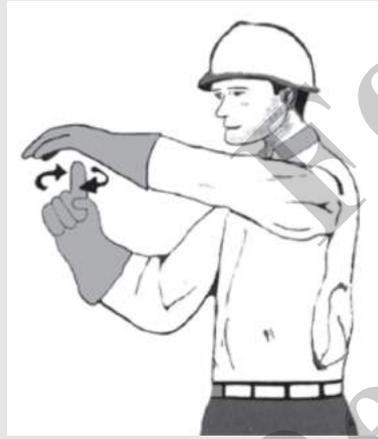
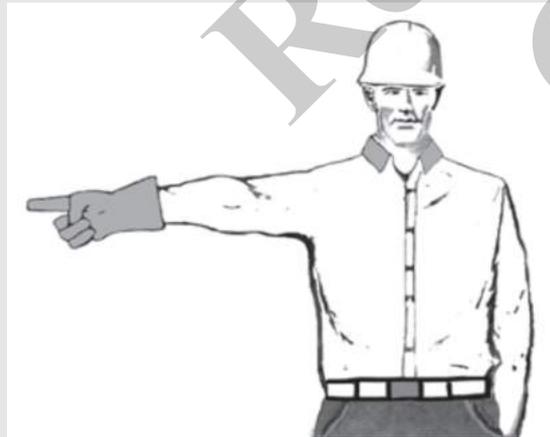
Machine operator and banksman shall communicate using the following hand signals when vision is restricted in the traveling and working range. The banksman gives the necessary signals to ensure safe operation.

**i** *Observe all safety instructions before starting work. Only reliable persons may be used as banksmen. They must receive the necessary training before starting their task. The banksman may not be distracted from this task by other duties. The country-specific guidelines and regulations on the hand signals must be observed.*

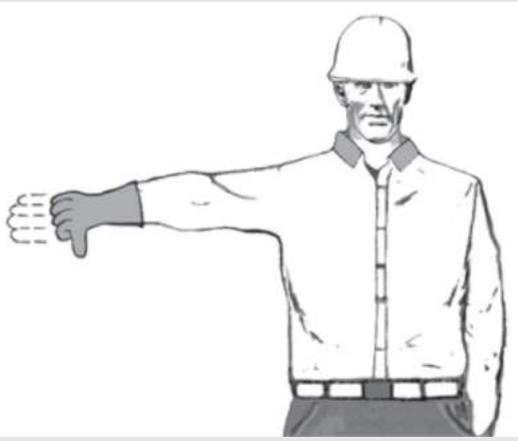
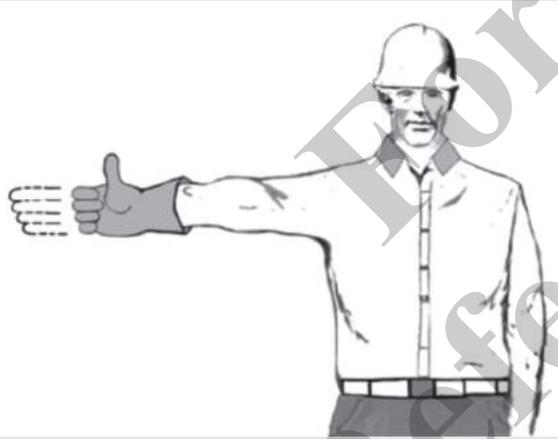
Sign	Meaning
	<p>Lift load (equipment)</p>
	<p>Lower load (equipment)</p>

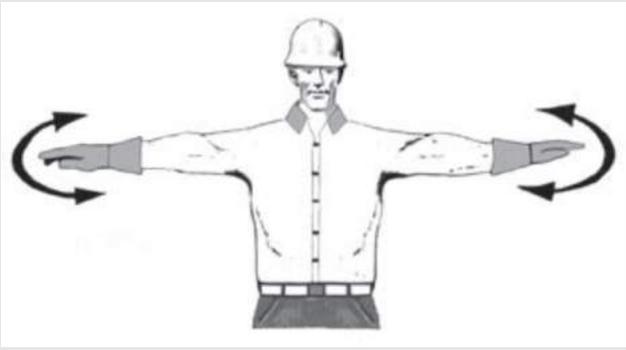
## Safety instructions

Sign	Meaning
	Use main winch
	Use secondary winch
	Lift main boom

Sign	Meaning
	Lower main boom
	Move slowly
	Slewing the uppercarriage

## Safety instructions

Sign	Meaning
	Lower boom and lift load (equipment)
	Lift boom and lower load (equipment)
	Stop

Sign	Meaning
	Emergency Stop
	Process
	Pause

## Safety instructions

Sign	Meaning
	Use both lanes
	Use one lane
	Extending the boom

Sign	Meaning
	<p>Telescope in</p>
	<p>Extending the boom</p>
	<p>Telescope in</p>

### 3.6 Product-specific hazards

#### 3.6.1 Mechanical hazards

##### WARNING

##### Danger of tipping!

- Do not slew the uppercarriage when moving on inclines and ramps.
- Do not slew the uppercarriage on the transport vehicle.
- Check to make sure that the ground is stable with sufficient load-bearing capacity before starting work.
- Comply with the maximum ground pressure specified.
- Note the required operating mode.

There is a risk of the machine tipping if it is positioned or moved on ground that does not have sufficient load-bearing capacity. Slewing the uppercarriage when moving on inclines and ramps may cause the machine to tip. Slewing the uppercarriage on the transport vehicle may cause the machine to tip off it. This can cause injury to persons.

##### WARNING

##### Risk of death or serious injury due to suspended loads.

- Never stand under or in the swinging range of suspended loads.
- Only move loads with supervision.
- Only use approved lifting equipment and slinging gear with sufficient load-bearing capacity.
- Do not use lifting equipment such as ropes and belts that are ripped or frayed.
- Do not place lifting equipment such as ropes and belts on sharp edges and corners, and do not knot or twist them.
- Lower loads to the ground when leaving the work area.

Loads can swing out and fall during hoisting. This can cause death or serious injury.

##### WARNING

##### Risk of wind causing the load to fall!

- Observe the specifications on operation in windy conditions in the technical data.
- Stop working on the machine as soon as the wind speed exceeds the permissible wind speed.

There is a risk of wind causing components to malfunction or the load to swing vigorously. The load may fall as a result. This can cause death or serious injury.

##### WARNING

##### Risk of injury due to falling objects.

- Do not enter the danger zones during normal operation.
- When entering the danger zone for a specific purpose (e.g., during setup), wear a hard hat, safety shoes, and protective clothing.

During operation, material can fall or fly off the machine in an uncontrolled fashion. This can cause death or serious injury.

### WARNING

Risk of injury due to moving parts.

- Do not reach into or tamper with moving machine parts while in operation.
- Never open covers while in operation.
- Observe rundown time: Make sure no parts are moving before opening covers.
- Wear tight-fitting, tear-resistant protective clothing.

Persons can be caught by the machine's moving components. This can cause death or serious injury.

### WARNING

Danger of falling.

- Use step grids and grip handles (three-point support).
- Keep step grids and walkways clean and clear of snow.
- Observe the maximum load of each platform per step grid segment.
- Cracks and damages to the step grids must be repaired immediately.

There is a risk of the machine operator slipping and falling when climbing up on the machine. There is a risk of the machine operator falling when lifting the cab. Step grids may give if overloaded. This can cause serious injury.

### WARNING

Risk of death due to improper handling of winches and ropes.

- Observe country-specific accident prevention regulations.
- Never skip scheduled rope and winch maintenance and inspections. Specifically, always change winch oil as scheduled.
- Avoid moving or stopping loads at high speed, and other improper use.
- During inspections, make sure ropes are lubricated, and check for leaks and damage.
- Adapt maintenance and inspection steps to extreme environmental conditions. Contact the manufacturer's customer service, if necessary.

Improperly handling winches and ropes can cause them to malfunction. There is a risk of an accident occurring. This can cause serious injury.

### WARNING

Risk of injury due to parts entering the cab.

- Reinforce the protection of the cab with a FOPS grille when there is a danger of impacting parts.
- Close the cab door during operation.
- Only use attachment tools for their intended purpose.

If the cab is not sufficiently protected, there is a risk of parts entering the cab from the outside. This can cause serious injury.

### 3.6.2 Electrical hazards

#### DANGER

**Risk of death from electric shock!**

- Work on the electric system may only be performed by experts qualified according to the standards and requirements of the country in which the equipment is operated.
- If there is damage to insulation, disconnect power immediately and arrange for repairs.
- Make sure live parts in electrical systems and equipment are dead before working on them and secure them for the duration of repairs. Follow the five safety rules:
  - Disconnect power.
  - Secure machine against unauthorized restarting.
  - Verify that the system is dead.
  - Ground and short-circuit the system.
  - Provide protection from adjacent live parts.
- Never bypass or disable fuses. When replacing fuses, be sure to use the correct amperage.
- Keep live parts dry. Damp live parts can result in a short-circuit.
- Keep a sufficient distance from overhead power lines and other live cables.

Touching live parts can result in death or serious injury from electric shock. Damage to insulation or individual parts can be fatal.

#### NOTICE

**Machine failure due to lightning strike.**

- Before restarting the machine following a lightning strike, check that the operating and safety controls are functioning properly.

Lightning strike can result in malfunction or total failure of the vehicle electronics.

### 3.6.3 Hazards caused by harmful substances

#### WARNING

**There is a risk of asphyxiation caused by inhaling exhaust gasses.**

- Use an extraction system in areas with poor ventilation.
- Keep the concentration of exhaust gasses to a minimum at all times.

The concentration of exhaust gas in the air can increase if the diesel engine is left running in areas with poor ventilation. This causes a risk of asphyxiation.

### WARNING

#### Risk of injury through incorrect use of batteries!

- Never short-circuit the battery terminals (positive and negative).
- Never expose batteries to moisture or humidity (rain, salt water, liquids). Do not, in any instance, use a moist or wet battery.
- Do not use or store batteries in locations with atmospheres which risk explosion or in which high temperatures could occur.
- Never attempt to repair, modify, convert or disassemble batteries.
- Always make sure that batteries cannot be accessed by unauthorized parties.
- To avoid fire, over-heating, explosions or leakage of batteries, never expose them to serious shock, high weight loads, or other damaging impacts. Leaked fluids can catch alight.
- Following contact between the eyes and leaked fluids, immediately rinse the eyes beneath the eyelid with clear water for at least 15 min. When doing so, direct a gentle stream of water onto the eye and do not rub. Immediately seek medical attention.
- Avoid skin contact with leaked fluids. In the case of accidental skin contact, wash the affected skin area with plenty of water and soap.

If batteries are used incorrectly, there is a risk of them exploding or having harmful fluid leaking from them. The fluid can cause chemical burns to the skin upon contact, and cause blindness through contact with the eyes.

### WARNING

#### Risk to health due to coolants containing glycol!

- Avoid skin contact with coolants.
- Do not eat, drink or smoke when handling coolant. Wash hands before breaks and after use.
- Observe the manufacturer's MSDS for the coolant.
- Wear the personal protective equipment specified in the MSDS when handling coolant.

#### Measures to take following contact with coolant:

- Immediately remove soiled or soaked clothing.
- Rinse the skin with plenty of water for at least 15 minutes following contact.
- Following contact with the eyes, rinse them well with plenty of water for at least 15 minutes and consult your doctor.
- In the event of swallowing, rinse the mouth out with water and drink copious amounts of water. Seek medical help.
- After inhaling aerosols, go into the fresh air.

Coolant contains glycol, which can be seriously harmful to your health when in contact with skin, ingested or inhaled.

### ⚠ CAUTION

- Injury or skin irritation caused by contact with oil
- Follow the MSDS when draining or changing the oil.
- Contact with oil can cause skin disorders and other injuries.

### 3.6.4 Hazards caused by the hydraulic system

#### ⚠ DANGER

Risk of death or serious injury from fluid escaping under high pressure.

- Never open or work on pressurized hydraulic parts.
- Be sure to keep body parts and objects clear of the escaping fluid. Keep persons out of the danger zone.
- Initiate emergency stop immediately. If necessary, take other steps to reduce the pressure and stop the escaping fluid.
- Collect and dispose of escaped fluid properly.
- Have defective parts repaired immediately.

Fluid can escape from defective lines or parts at high pressure. This fluid can sever limbs, resulting in death or serious injury.

#### ⚠ WARNING

Risk of death or serious injury from hydraulic energy.

- Only authorized service partners may perform work on the hydraulic system.
- Make sure the hydraulic system has been fully depressurized before working on it. Make sure the pressure accumulator has been fully depressurized.
- Do not reach into or tamper with moving machine parts while in operation.
- Do not open covers while in operation.
- Wear tight-fitting, tear-resistant protective clothing in the danger zone.

Hydraulically driven moving parts can cause serious injury.

#### ⚠ WARNING

Danger of injury through leaking hydraulic oil!

- Work on the hydraulic system may only be carried out by trained personnel with special knowledge and experience on hydraulics.
- Only carry out maintenance tasks after the hydraulic oil system has cooled down.
- Make sure the hydraulic system has been depressurized before working on it.
- Only open hydraulic lines and threaded unions when fully de-pressurized.
- Wear personal protective equipment.
- Seek immediate medical attention for injuries caused by hydraulic oil.

The hydraulic system is subject to high pressure. Persons in the danger zone can be injured by leaking hydraulic oil.

### 3.6.5 Hazards caused by noise and vibration

**⚠ WARNING**

Risk of injury due to noise.

- As long as it is in compliance with the safety regulations, keep housing, covers, cab doors, and cab windows shut.
- Do not linger in the danger zone.

The noise level in the work area can cause severe hearing damage.

**⚠ WARNING**

High vibration hazard!

- Do not disable the vibration dampers.
- Do not stand in the vibrating area during operation.
- Make sure that the cushioned seat in the cab has been adjusted correctly.

Long-term exposure to high vibrations can result in serious injury and chronic health problems. Vibration dampers isolate the source of vibration from the surrounding area.

### 3.6.6 Hazards caused by heat

**⚠ WARNING**

Risk of injury due to hot operating fluids!

- Always wear heat-resistant protective clothing and gloves when working with hot operating fluids.
- See if operating fluids are hot before handling. If necessary, allow to cool.

Operating fluids can reach high temperatures during operation. Contact with hot operating fluids can result in serious burns.

**⚠ WARNING**

Risk of injury due to hot surfaces.

- Always wear heat-resistant protective clothing and gloves when working near hot surfaces.
- Make sure that all surfaces have cooled down before starting any work.

Part surfaces can reach high temperatures during operation. Contact with hot surfaces can result in serious burns.

### 3.6.7 Danger of fire and explosions

#### **▲ WARNING**

Danger to life from fire and explosion caused by highly inflammable liquids!

- Do not handle near open flame, fire or any source of ignition.
- Take steps to prevent electrostatic discharge.
- Keep appropriate extinguishing agents (fire blanket, fire extinguisher with CO<sub>2</sub>, powder or foam) on hand.
- Take steps to prevent the buildup of flammable vapors in lower-lying or enclosed areas.
- In case of fire, stop working immediately. Leave the danger area and notify the fire department. Stay out until you are told it is safe to return.
- Keep the machine clean. Remove soiling, especially from fuels and lubricants, as soon as possible.
- Have damaged fuel and hydraulic lines replaced. Do not start the machine.

Fluids used and their emissions can form an explosive mixture when in contact with air and, if ignited, can cause death or serious injury.

#### **▲ WARNING**

There is a risk of being burnt due to fuel deflagration when refilling.

- Always park the machine on firm, level ground.
- Only top up when the engine is shut down.
- Check the fuel level before filling the tank.
- When you are filling the tank, make sure that no fuel overflows.
- When refueling from a tanker, make sure not to exceed the maximum filling rate.
- Always supervise the refilling process.

Sparks or open flames in or around the tank filler neck may result in deflagration when refilling. This can cause injury to persons. Leaking fuel can cause persons to be injured and the environment to be harmed.

## 4 Design and function

### 4.1 Design of the machine

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For  
Reference  
Only

### 4.1.1 Overall machine

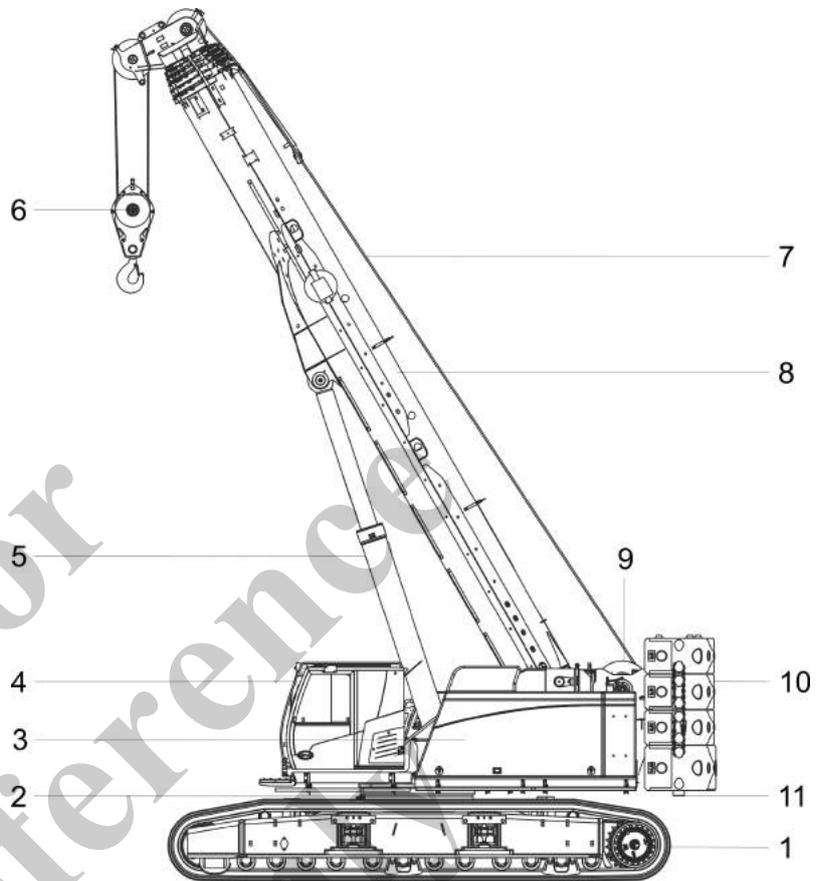


Fig. 3: Components of the machine

- 1 Undercarriage
- 2 Rotary connection
- 3 Uppercarriage
- 4 Cab
- 5 Luffing cylinder
- 6 Bottom hook block
- 7 Hoisting rope
- 8 Boom
- 9 Right Winch 1, Left Winch 2
- 10 Counterweight (ballast)
- 11 Ballast bracket

## 4.1.2 Uppercarriage

### Left side of the uppercarriage

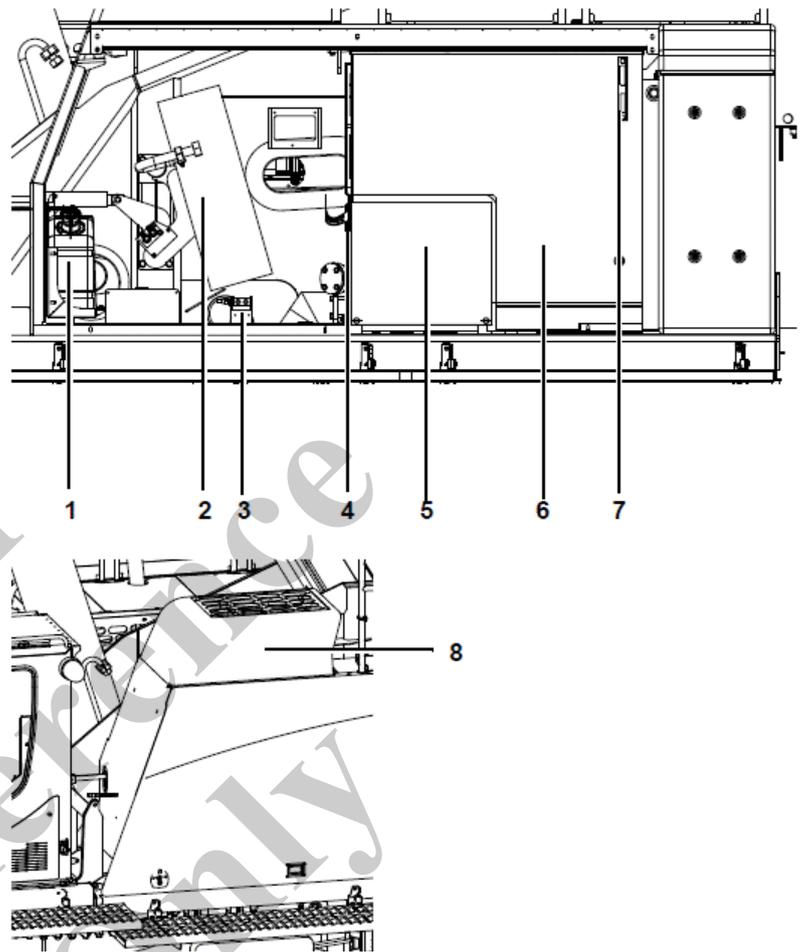


Fig. 4: Service access door, left

- 1 DEF tank
- 2 Control block
- 3 Fuel pump (option)
- 4 Bypass switch - RCL
- 5 Electrical system switch cabinet
- 6 Combination tank
- 7 Hydraulic oil level indicator
- 8 Hydraulic oil cooling system

### Right side of the uppercarriage

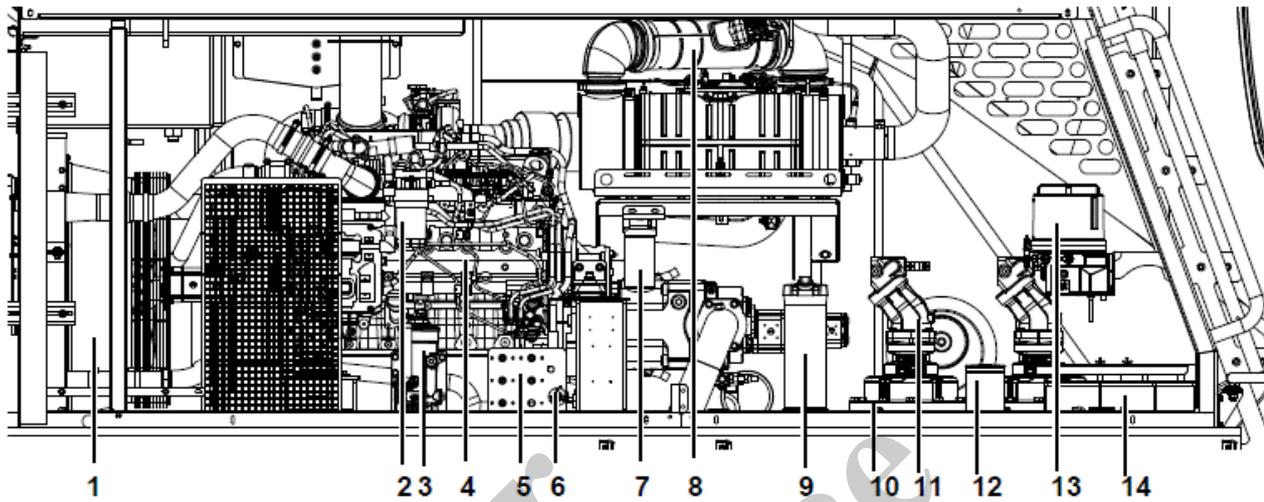


Fig. 5: Service door, right

- |   |                           |    |   |
|---|---------------------------|----|---|
| 1 | Radiator                  | 8  | Exhaust aftertreatment system               |
| 2 | Diesel fine filter        | 9  | HydroClean filter (option)                  |
| 3 | Diesel pre-filter         | 10 | Lubricating nipple bar                      |
| 4 | Drive engine              | 11 | Slewing gear box                            |
| 5 | Fuses                     | 12 | Slewing ring pinion lubricant pump (option) |
| 6 | Battery disconnect switch | 13 | Central lubrication system (option)         |
| 7 | Engine oil filter         | 14 | Batteries                                   |

### 4.1.3 Undercarriage

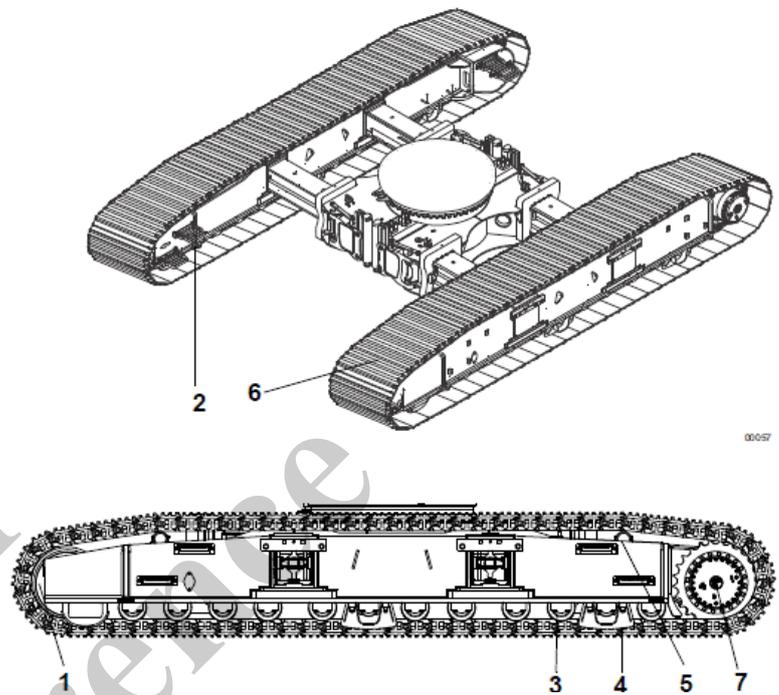
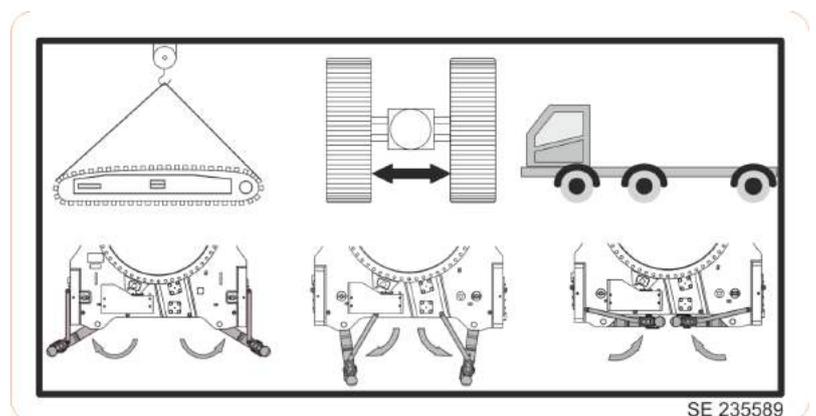


Fig. 6: Components of the undercarriage

- 1 Idler (forward direction of travel)
- 2 Access ladder, folding
- 3 Track roller
- 4 Chain guide
- 5 Carrier roller
- 6 Crawler track
- 7 Drive wheel (reverse direction of travel)

### 4.1.4 Abstützylinder



There are three positions of the outrigger cylinders:

## Design and function

Position	Operating scenario
Outrigger cylinders folded out	Installing/removing track wheel carriers
Outrigger cylinders in center position	Changing the track width
Outrigger cylinders folded in	Transport or operation

### 4.1.5 Outrigger pad

#### Storing the outrigger pads

The following options are available for storing the outrigger pads:

- Center bridge
- On the inside and outside of the track wheel carrier

Storage location	For the...	Advantages
Center bridge	Transport	<ul style="list-style-type: none"> <li>■ The track wheel carriers are transported on a separate transport vehicle.</li> <li>■ The outrigger pads are transported with the machine and are available for unloading the machine.</li> </ul>
On the inside and outside of the track wheel carrier	Operation on the construction site	<ul style="list-style-type: none"> <li>■ The machine is stabilized on the construction site, for example to change the track width. The track wheel carriers remain dismantled.</li> <li>■ The outrigger pads can be accessed.</li> </ul>

## 4.1.6 Counterweight

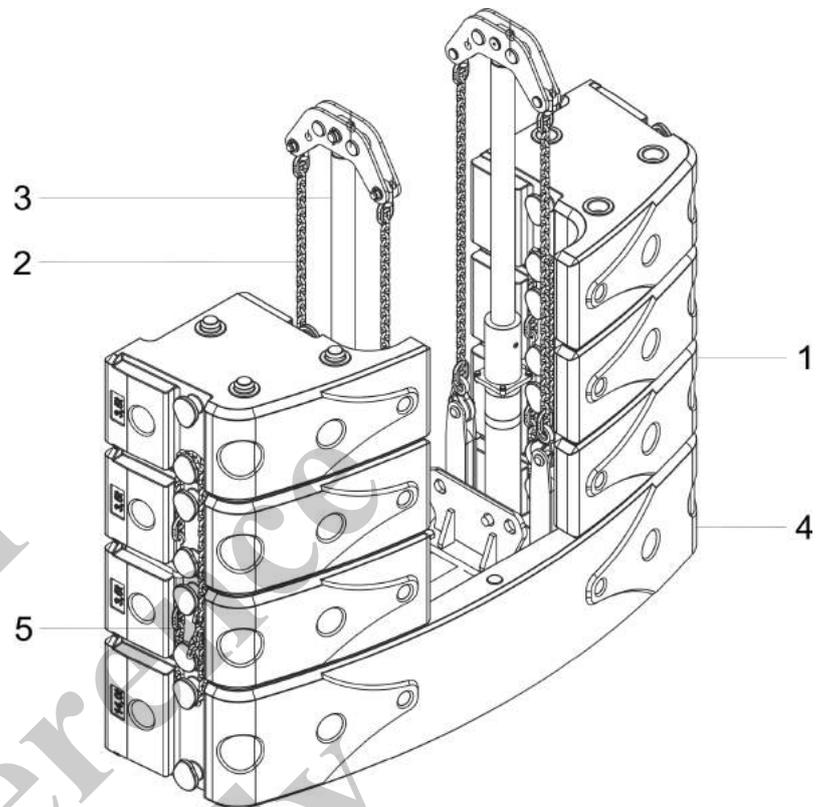


Fig. 7: Components of the counterweight

- 1 Ballast blocks (6x)
- 2 Ballasting cylinder chain (4x)
- 3 Ballasting cylinder (2x)
- 4 Ballast bracket
- 5 Ballasting chains (2x)

4.1.7 Cab

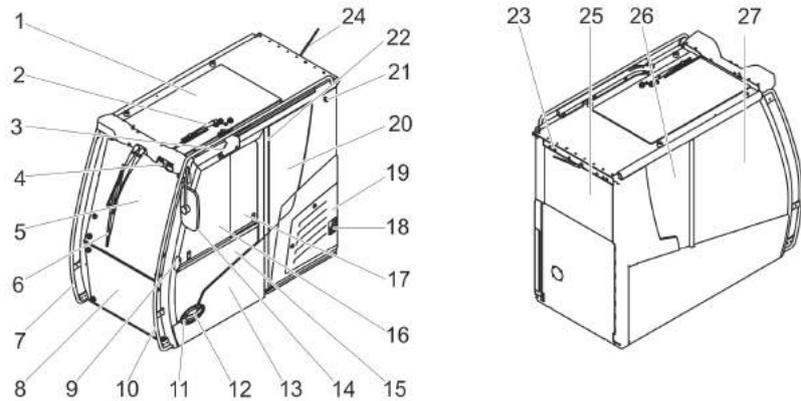


Fig. 8: Maxcab cab 2

- 1 Skylight
- 2 Windshield wiper
- 3 Roller truck
- 4 Work lighting
- 5 Upper windshield
- 6 Windshield wiper, upper windshield
- 7 Right grip handle
- 8 Lower windshield
- 9 Outer handle
- 10 Left grip handle
- 11 Door lock
- 12 Door handle
- 13 Cab door
- 14 Rearview mirror
- 15 Below door window
- 16 In front of door window
- 17 Behind door window
- 18 Below door hinge
- 19 Air conditioning evaporator cover
- 20 Side window left side
- 21 Above door hinge
- 22 Door switch
- 23 24 volt power socket
- 24 Antenna
- 25 Rear Window
- 26 Right rear side window panel
- 27 Right front side window panel

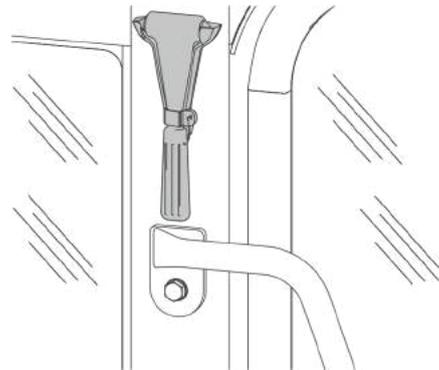


Fig. 9: Emergency hammer in the cab

The emergency hammer is located between the cab door and the left side window panel.

**4.1.8 Boom**  
Pin boom

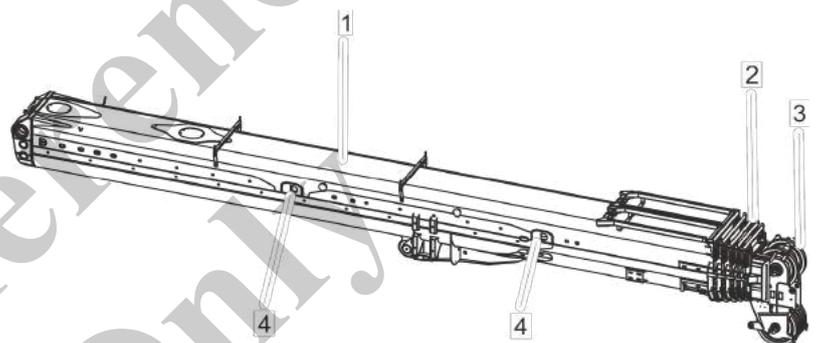


Fig. 10: Pin boom components

- 1 Basic body
- 2 Telescopic thrusters (T1) - (T5)
- 3 Pulley head
- 4 Locking bolt

The pin boom consists of a basic body and five telescopic thrusters. The first telescopic thruster (T1) is mounted to the basic body. The numbers of the further telescopic thrusters are counted up accordingly.

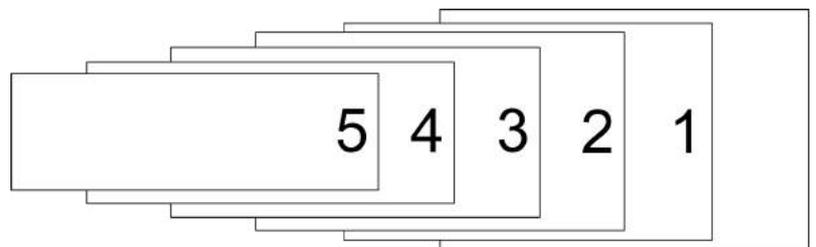


Fig. 11: Telescopic thrusters T1 to T5

### Secure locking unit

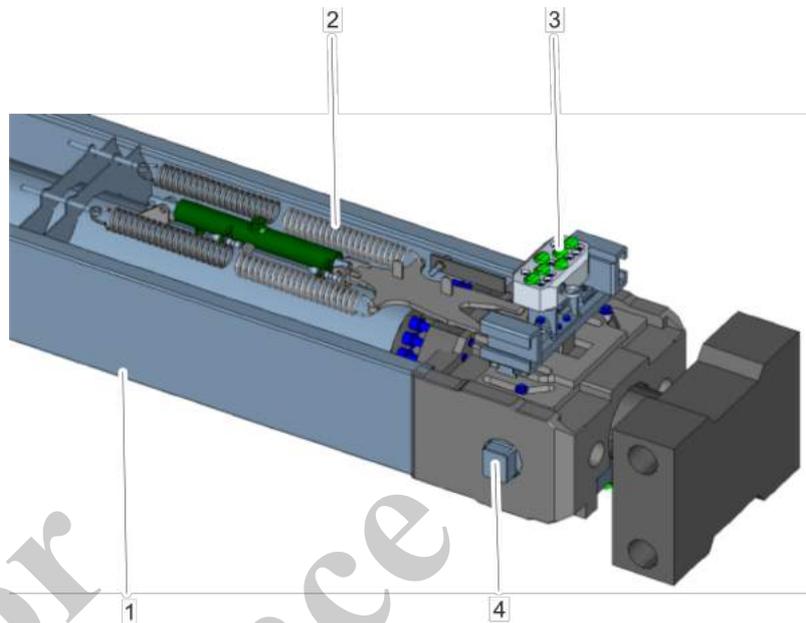


Fig. 12: Components of the secure locking unit

- 1 Telescopic cylinder
- 2 Retaining springs
- 3 Sensors
- 4 Locking bolt

### 4.1.9 Fly boom with fly boom extension

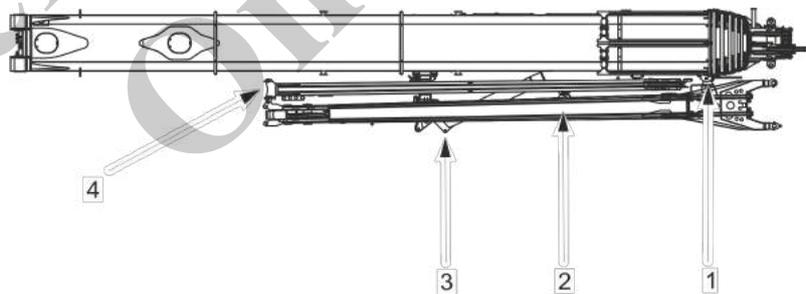


Fig. 13: Fly boom with fly boom extension

- 1 Pivot
- 2 Fly boom
- 3 Ramp
- 4 Fly jib extension

4.1.10 Auxiliary jib

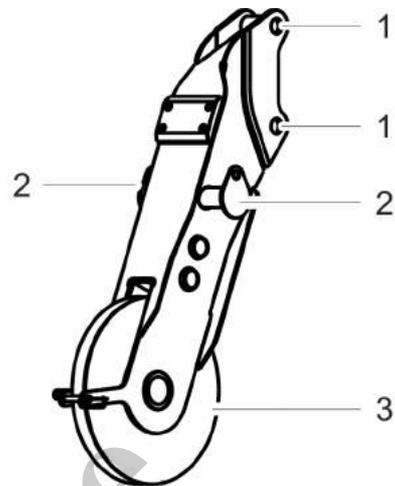


Fig. 14: Auxiliary jib

- 1 Bolting point
- 2 Lifting point
- 3 sheave

4.1.11 Heavy-duty jib

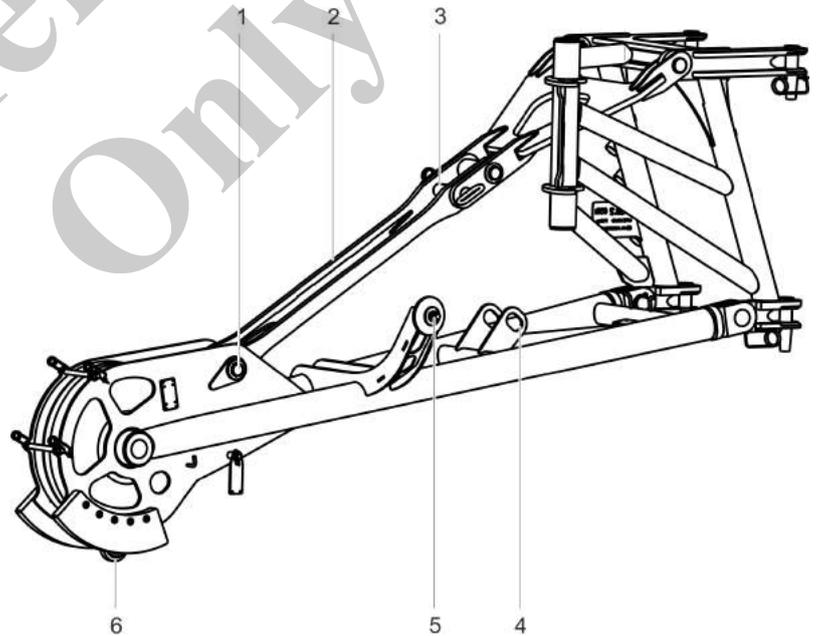
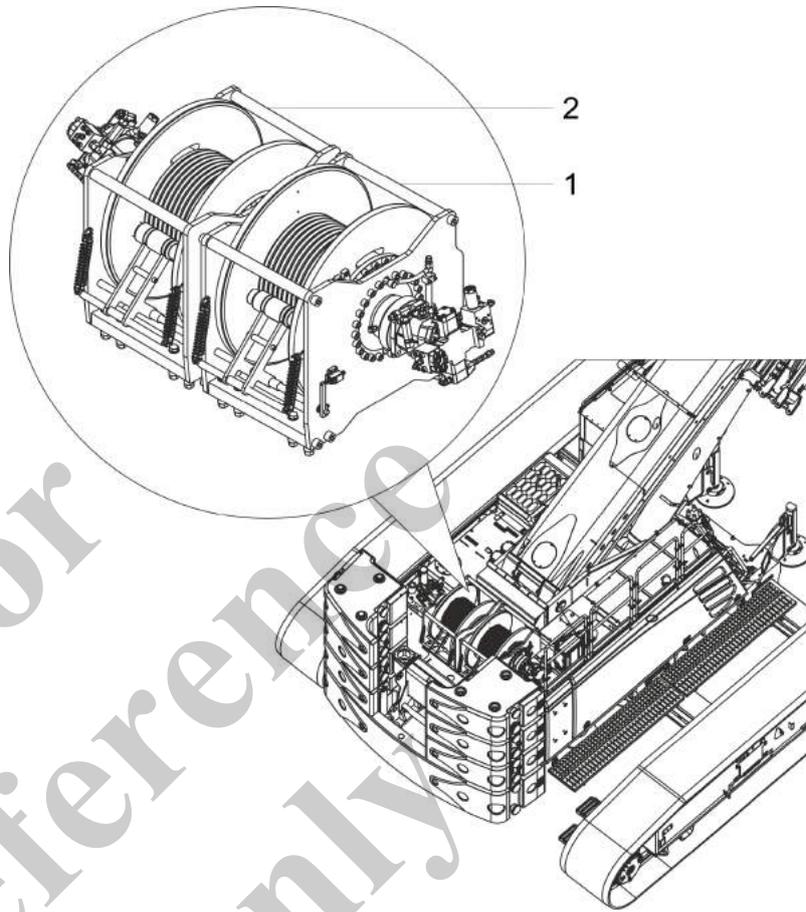


Fig. 15: Heavy-duty jib

- 1 Lifting point (changing the position of the diagonal tie)
- 2 Diagonal tie
- 3 Bolt, lifting point (assembly)
- 4 Fastening strap for the diagonal tie in the park position
- 5 Fastening on the boom
- 6 eye

4.1.12 Winch



- 1 Winch 1
- 2 Winch 2

Table 1: Operation without attachments

Pulley head	Hoisting rope up
Main boom	Winch 1 or winch 2

At the pulley head of the main boom, either the hoisting rope of winch 1 or the hoisting rope of 2 can be reeved.

Table 2: Operation with attachments

Pulley head	Hoisting rope up
Main boom	Winch 2
Fly boom	Winch 1
Fly jib extension	Winch 1
Auxiliary jib	Winch 1
Heavy-duty jib	Winch 1

The hoisting rope of winch 1 is reeved into the pulley head of the attachment. The hoisting rope of winch 2 is reeved into the pulley head of the main boom.

## 4.2 Function description

### 4.2.1 Load moment limitation

The RCL gives the operator information needed to operate the machine within the operating ranges specified by the manufacturer.

The operator's experience, prudence and judgment are required to ensure safe operation of the RCL.

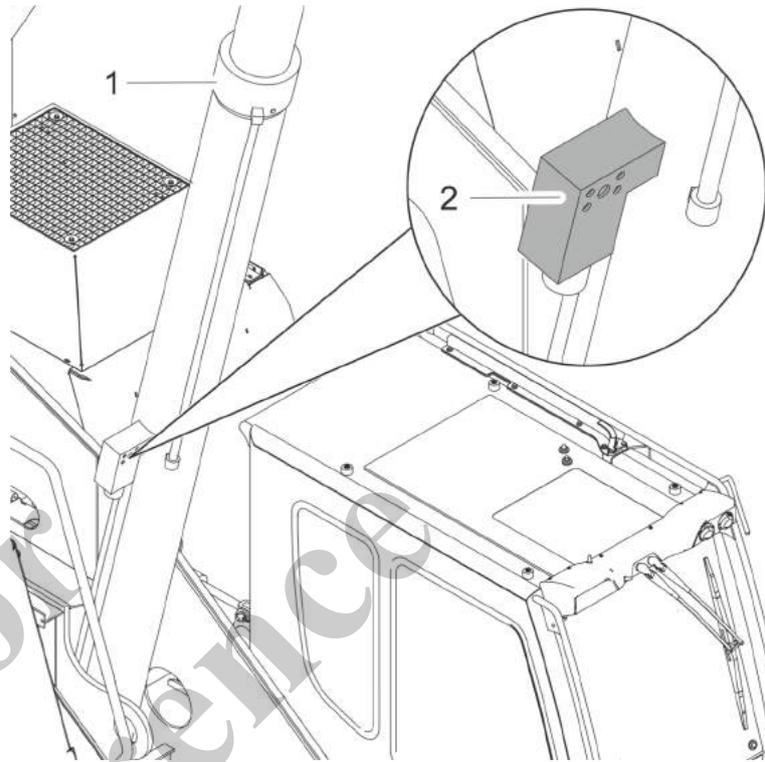
Using sensors, the RCL monitors machine functions and continuously provides the performance data of the machine to the operator. This data changes continuously as the machine moves. When the machine approaches the maximum load rating, the RCL warns the operator via a warning tone and a visual signal.

If the machine reaches the inadmissible area of operation, any machine movements which increase the machine load moment are shut down. In order to unload the machine after the RCL is tripped, the **Lower loads** and **Retract telescopic boom** movements can still be executed.

#### Components of the LML

- Pressure sensors on the luffing cylinder
- Length and angle indicator, cable drum on the boom
- Lifting limit switch on the boom's pulley head or on a attachment
- Rope end limiter on the winch

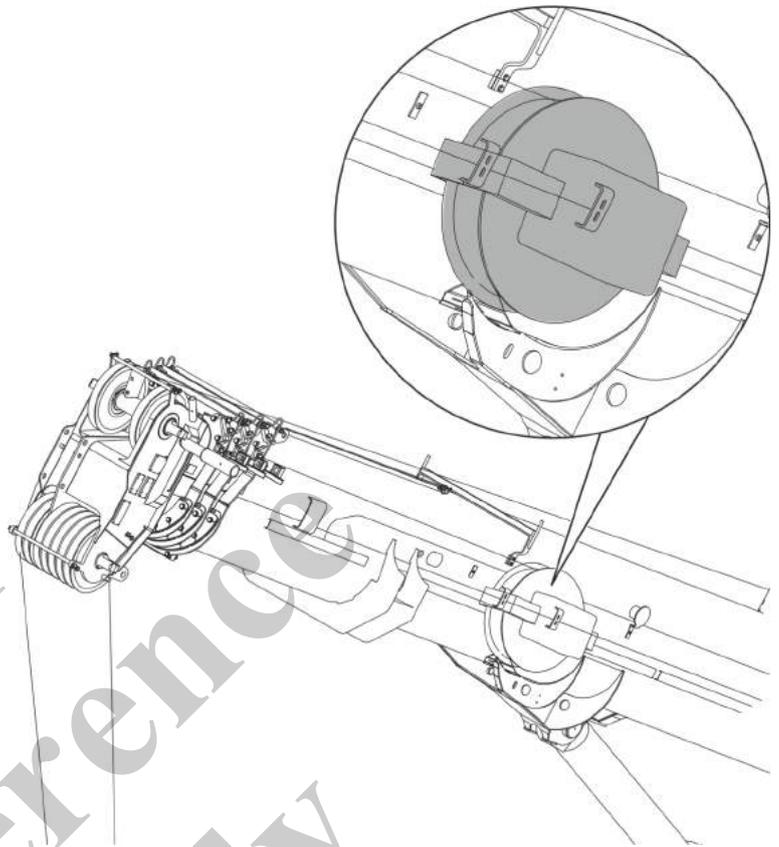
### Pressure sensors on the luffing cylinder



- 1 Pressure sensor
- 2 Luffing cylinder

The pressure sensors are installed on the piston side and the rod side of the luffing cylinder. They absorb the pressure in the cylinder and convert it into an electrical signal. The electrical signal is transmitted to the actuating device of the load moment limitation and the corresponding information is output on the SENCON.

**Length and angle indicator, cable drum**

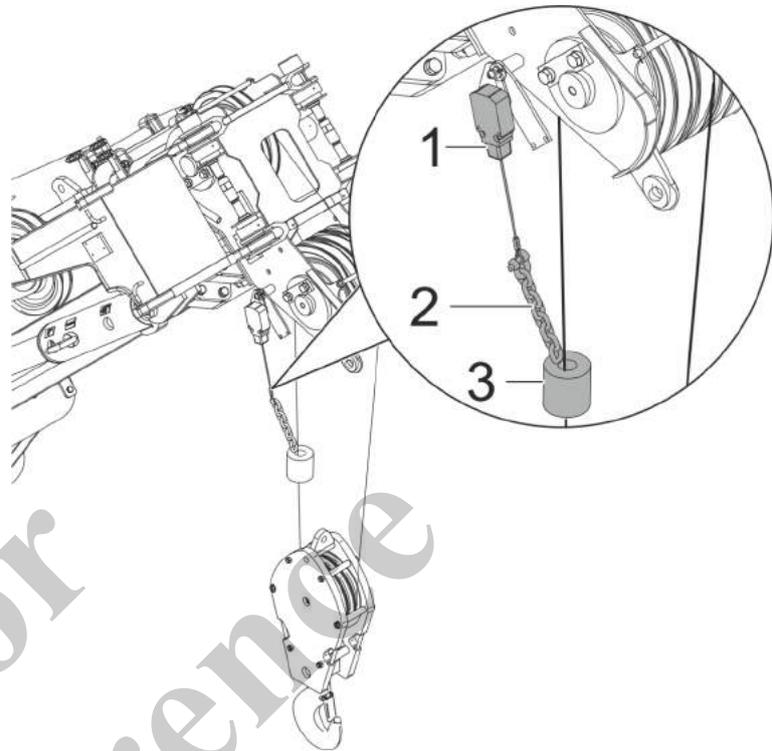


A data cable is secured to the pulley head of the boom. The data cable length on the cable drum changes as the boom is retracted or extended. The length indicator uses a signal to transmit the boom length change to the LMB control device.

Lifting or lowering the boom changes the position of the angle indicator. The angle indicator uses a signal to transmit the boom angle change (relative to the horizontal) to the LMB control device.

**Lifting limit switch**

The lifting limit switch limits the lifting height and prevents the hook from colliding with the pulley head.



- 1 Lifting limit switch
- 2 Chain
- 3 Weight

The lifting limit switch can be mounted on the following components:

- Pulley head of the boom
- Pulley head of the fly boom
- Pulley head of the fly jib extension
- Pulley head of the auxiliary jib
- Pulley head of the heavy-duty jib

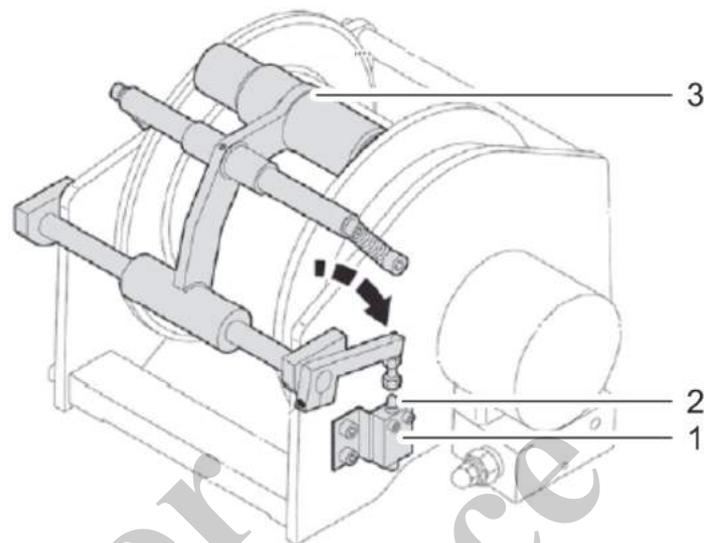
The lifting limit switch is connected to a weight with a chain. The weight keeps the lifting limit switch contact closed. When the hook reaches the highest permissible position, the weight on the chain is lifted and the lifting limit switch contact is opened.

A signal is transmitted to the control device of the load moment limitation via the longitudinal and angle indicator. The **lift loads, lower boom, and extend boom** functions are deactivated. Messages are issued on the SENCON and optical warning signals light up on the LML traffic light.



*The length of the chain depends on the speed of the hook and the system shutdown response time.*

## Rope end limiter



- 1 Rope end limiter
- 2 Contact switch

- 3 Tensioner pulley

The rope end limiter can be used to set the maximum unwinding length of the rope. When the maximum unwinding length is reached, the tension roller is pressed against the drum. A lever actuates the contact switch of the rope end limiter. The [Winch down] function is automatically switched off.

### 4.2.2 Boom



*Content for this chapter/section will follow in the next version of the operating manual.*

### 4.2.3 Exhaust aftertreatment system

#### Components and mode of operation

The exhaust aftertreatment reduces the level of pollutants in the exhaust gas. Depending on the emissions level of the engine, the following components are available:

- Oxidation catalytic converter:  
The oxidation catalytic converter reduces the level of carbon monoxide (CO) and hydrocarbons (HC) in the exhaust gas.
- Particulate filter:  
The particulate filter removes soot from the exhaust gas.
- Selective catalytic reduction (SCR):  
The injection of DEF into the exhaust pipe and the subsequent chemical reaction reduces the level of nitrogen oxides (NO<sub>x</sub>) in the exhaust gas.

### Load status of the exhaust after-treatment system

Undesired substances deposit in the exhaust aftertreatment system:

- Soot particles collect in the particulate filter.
- Residual urea collects in the exhaust aftertreatment system.

The depletion level refers to the quantity of deposited soot particles in the diesel particulate filter and the residual urea in the exhaust aftertreatment system.

### Exhaust aftertreatment system regeneration

The deposits in the exhaust aftertreatment system are removed:

- Soot particles in the particulate filter are burned due to increased exhaust gas temperatures.
- Residual urea in the exhaust aftertreatment system is broken down due to increased exhaust temperatures.

The required increase in the exhaust temperature is achieved by increasing the engine speed.

### Carrying out regeneration during work operation

Regeneration becomes necessary when the load level of the exhaust aftertreatment system has exceeded a certain value. The following options are possible:

- automatic regeneration  
The engine control automatically increases the engine speed. The hydraulic pump setting is automatically adjusted so that the operating pressure in the hydraulic system does not change.
- regeneration during operation  
The machine operator increases the engine speed to regenerate the exhaust aftertreatment system during normal operation.  
This option is provided to let the machine operator independently set the time of regeneration.

Both options require that regeneration has not been suppressed.

### Suppressing regeneration

Under certain circumstances, an automatic increase of the engine speed and the exhaust temperature can be undesirable:

- Precision work at constant speed
- Work in an environment in which too high exhaust temperatures are dangerous

In a case such as this, automatic exhaust aftertreatment system regeneration can be suppressed for a limited period of time.

After operation, regeneration must be permitted again.

### Initiating regeneration manually

Under certain circumstances, the load level can become too high for regeneration during operation.

- Engine power is reduced.  
The engine speed can neither be increased by means of the accelerator pedal nor by raising the idle speed.
- The machine control requests manual regeneration.
- The machine operator must park the machine safely.
- The machine operator must manually initiate regeneration.
- Normal operation is not possible during manually initiated regeneration.

For  
Reference  
Only

## 5 Control and display elements, operating modes

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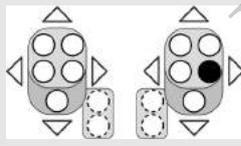
## 5.1 Warning signals and fault indications

### 5.1.1 Acoustic warning signals

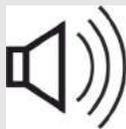
#### LML traffic light intermittent horn

	Acoustic signal
	<p>The warning signal sounds when the machine has reached its maximum load rating.</p>

#### Horn

	Function
	<p>The horn is triggered. An acoustic signal will sound. The horn is activated</p> <ul style="list-style-type: none"> <li>■ before engine start.</li> <li>■ to warn persons in the machine danger zone.</li> </ul>

#### Intermittent horn

	Acoustic signal
	<p>The intermittent horn sounds</p> <ul style="list-style-type: none"> <li>■ when reversing with 0° uppercarriage position.</li> <li>■ when traveling forward with 180° uppercarriage position.</li> <li>■ when slewing the uppercarriage (option).</li> </ul>

### 5.1.2 Optical warning signals

#### RCL light

The LML traffic light displays the current load capacity and the machine's permissible load torque and warns the machine operator when the machine reaches its maximum load rating.



#### Normal operation

	Green (1)	Yellow (2)	Red (3) LML traffic light intermittent horn (4)
	Capacity utilization < 90%	$90\% \leq \text{capacity utilization} \leq 100\%$	Capacity utilization > 100% Intermittent horn sounds: can be switched off after 5 s Load-increasing functions are switched off Data recording activated

#### LML bypassed with key switch and push button in the cab

	Red (3), flashing LML traffic light intermittent horn (4)
	No load torque monitoring Intermittent horn sounds: permanent signal, cannot be switched off Data recording activated

### 5.1.3 Fault indications

#### Optical warning signals

Fault indications indicate irregularities of the machine and are displayed in the machine control.

#### Further notes

↪ *Table 12 “Overview of engine notifications” on page 540*

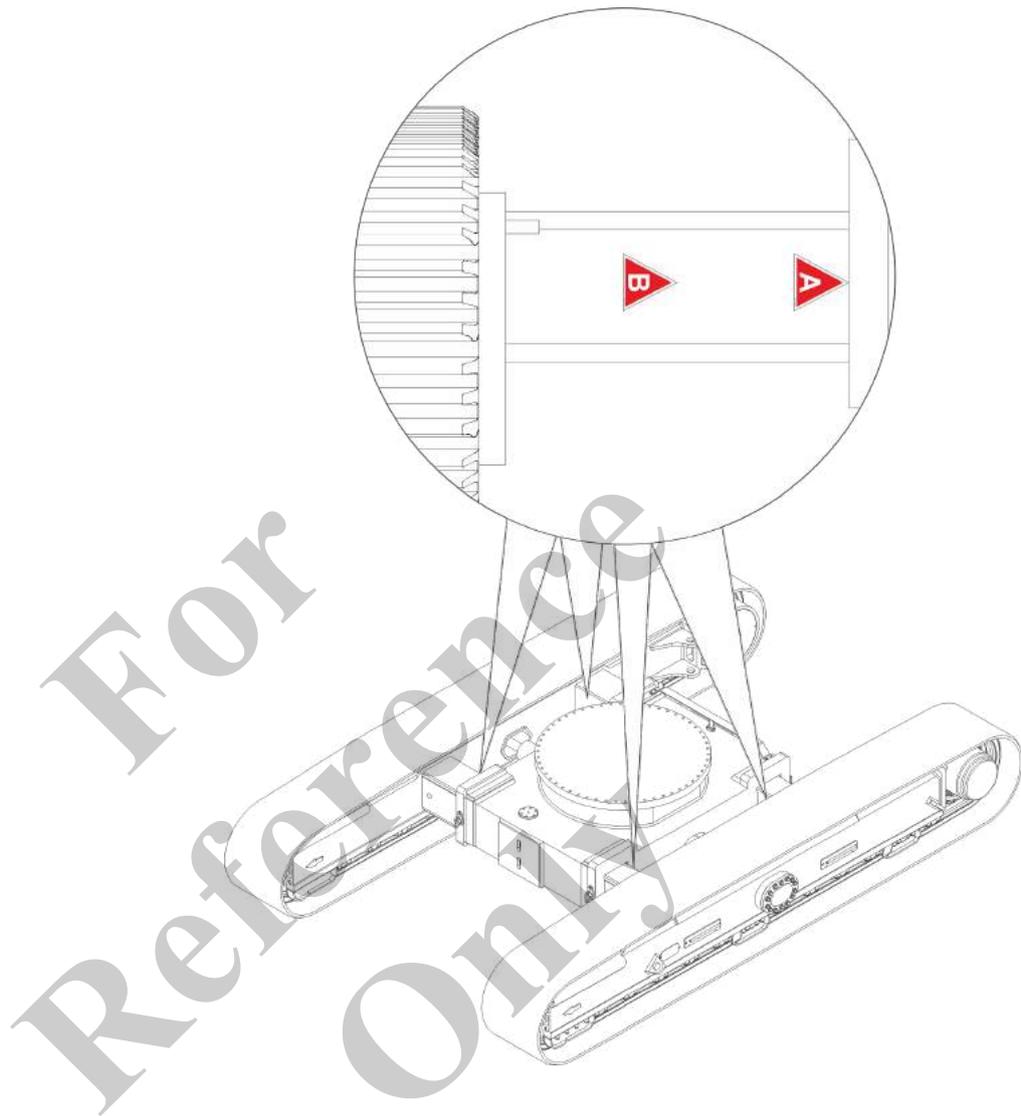
## 5.2 Control and display elements

### 5.2.1 Undercarriage control and display elements

#### Direction light

	Arrow in the direction of travel
	The arrow on the crawler track indicates the direction of travel with 0° uppercarriage position.

### Track width marking



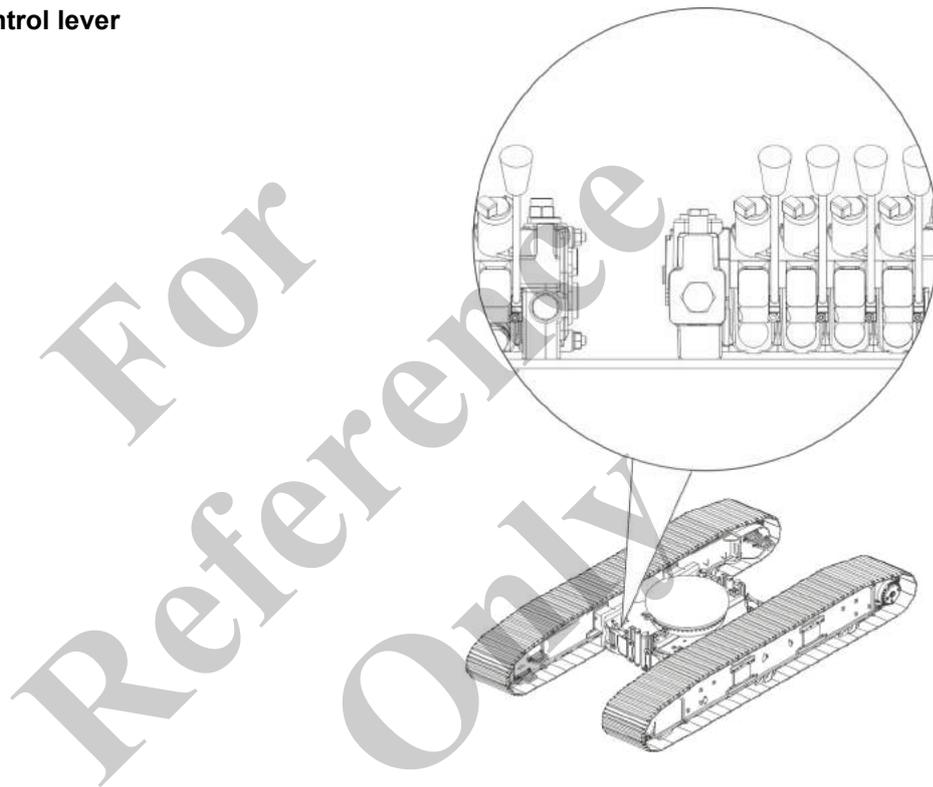
### Track width marking – track width A

	<b>Arrow points to the middle bridge</b>
	The maximum track width is set.

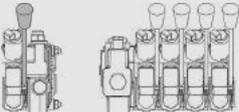
Track width marking – track width  
B

<b>Arrow points to the middle bridge</b>	
	The medium track width is set.

Emergency control lever

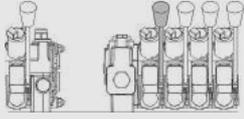


Emergency control: setting the track width

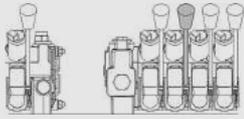
	<b>Pull lever toward you</b>	<b>Push lever away from you</b>
	The track width is increased.	The track width is decreased.

## Control and display elements, operating modes

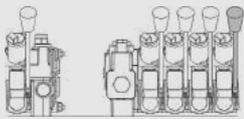
### Emergency control: right front out-rigger cylinder

	Pull lever toward you	Push lever away from you
	The outrigger cylinder is extended.	The outrigger cylinder is retracted.

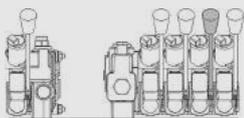
### Emergency control: right rear out-rigger cylinder

	Pull lever toward you	Push lever away from you
	The outrigger cylinder is extended.	The outrigger cylinder is retracted.

### Emergency control: left front out-rigger cylinder

	Pull lever toward you	Push lever away from you
	The outrigger cylinder is extended.	The outrigger cylinder is retracted.

### Emergency control: left rear out-rigger cylinder

	Pull lever toward you	Push lever away from you
	The outrigger cylinder is extended.	The outrigger cylinder is retracted.

### 5.2.2 Uppercarriage control and display elements

#### 5.2.2.1 Uppercarriage right

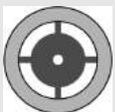
##### Battery disconnect switch

	Lights up	Flashes (approximately 10 minutes)	Off
	The electrical system of the machine is connected to the battery.	<p>The disconnection of the machine's electrical system from the battery is prepared.</p> <p>The engine operating data are saved.</p> <p>The DEF in the lines is pumped into the tank.</p>	The electrical system of the machine is disconnected from the battery.

#### 5.2.2.2 Uppercarriage left

##### 5.2.2.2.1 Combination tank

##### Diesel tank sight glass

	Fill level
	Indicates the fill level in the diesel tank.

##### Hydraulic tank sight glass

	Fill level
	Indicates the fill level in the hydraulic tank.

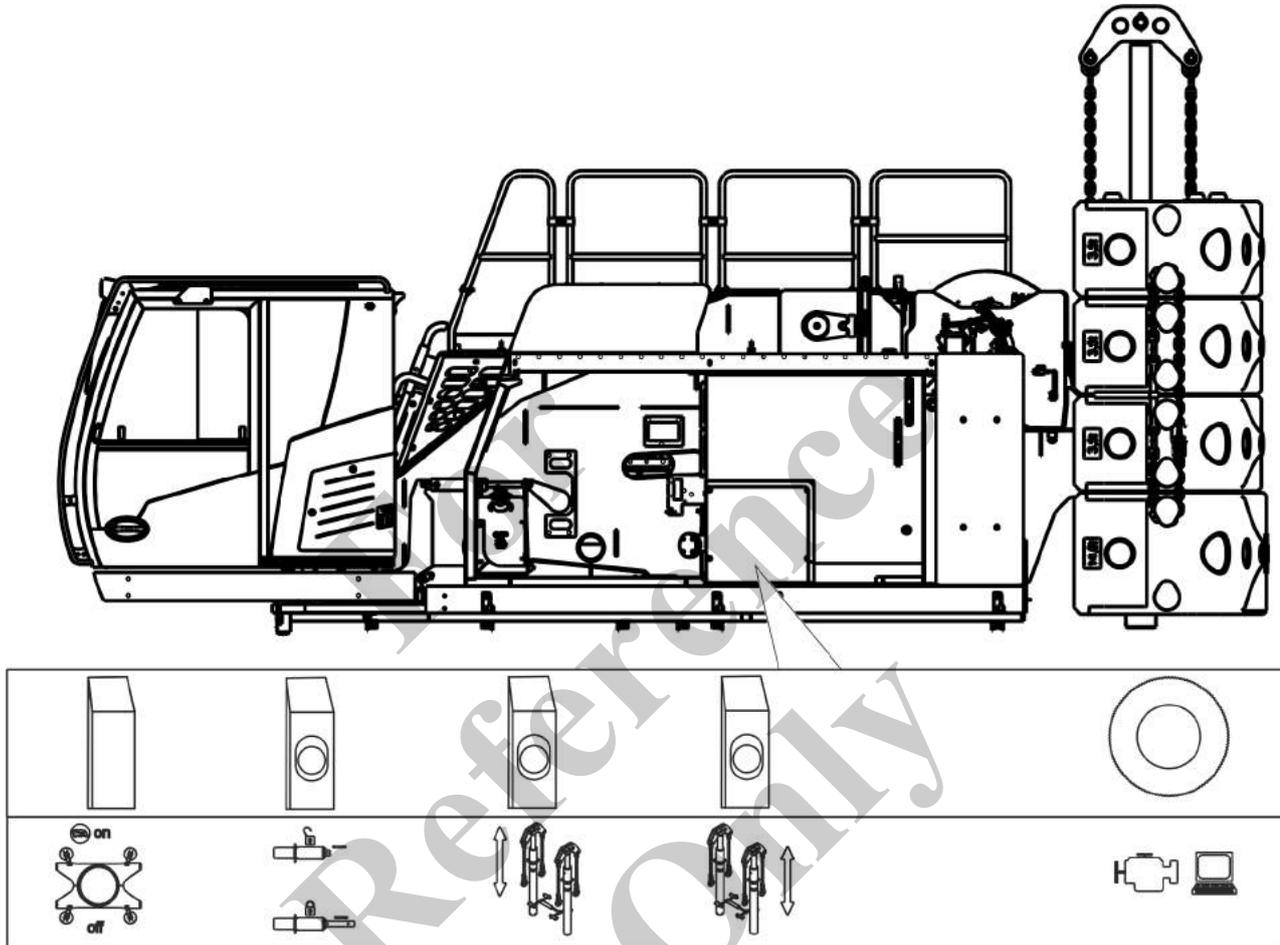
##### Hydraulic tank level indicator

	Fill level
	Indicates the fill level in the hydraulic tank.

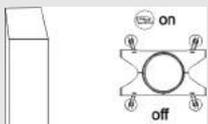
## Control and display elements, operating modes

### 5.2.2.2.2 Electrical system switch cabinet

Overview: emergency control and diagnostic plug connection

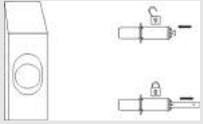


### Activate/deactivate emergency control

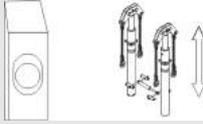
	<b>Fold up the cover Press lever upward</b>	<b>Fold the cover down or Press lever downward</b>
	<p>The emergency control is activated.</p> <p>The following functions can be performed:</p> <ul style="list-style-type: none"> <li>■ Unlock/lock counterweight emergency control</li> <li>■ Extend/retract ballasting cylinder emergency control</li> <li>■ Stabilize machine emergency control</li> <li>■ Set track width emergency control</li> </ul>	<p>The emergency control is deactivated.</p>

## Control and display elements, operating modes

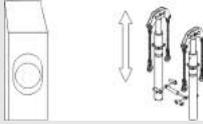
### Emergency control: Bolt/unbolt counterweight

	Push and hold the lever up	Push and hold the lever down
	The counterweight is unbolted.	The counterweight is bolted.

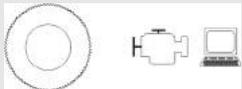
### Emergency control: extend/retract left ballasting cylinder

	Push and hold the lever up	Push and hold the lever down
	The left ballasting cylinder is extended.	The left ballasting cylinder is retracted.

### Emergency control: extend/retract right ballasting cylinder

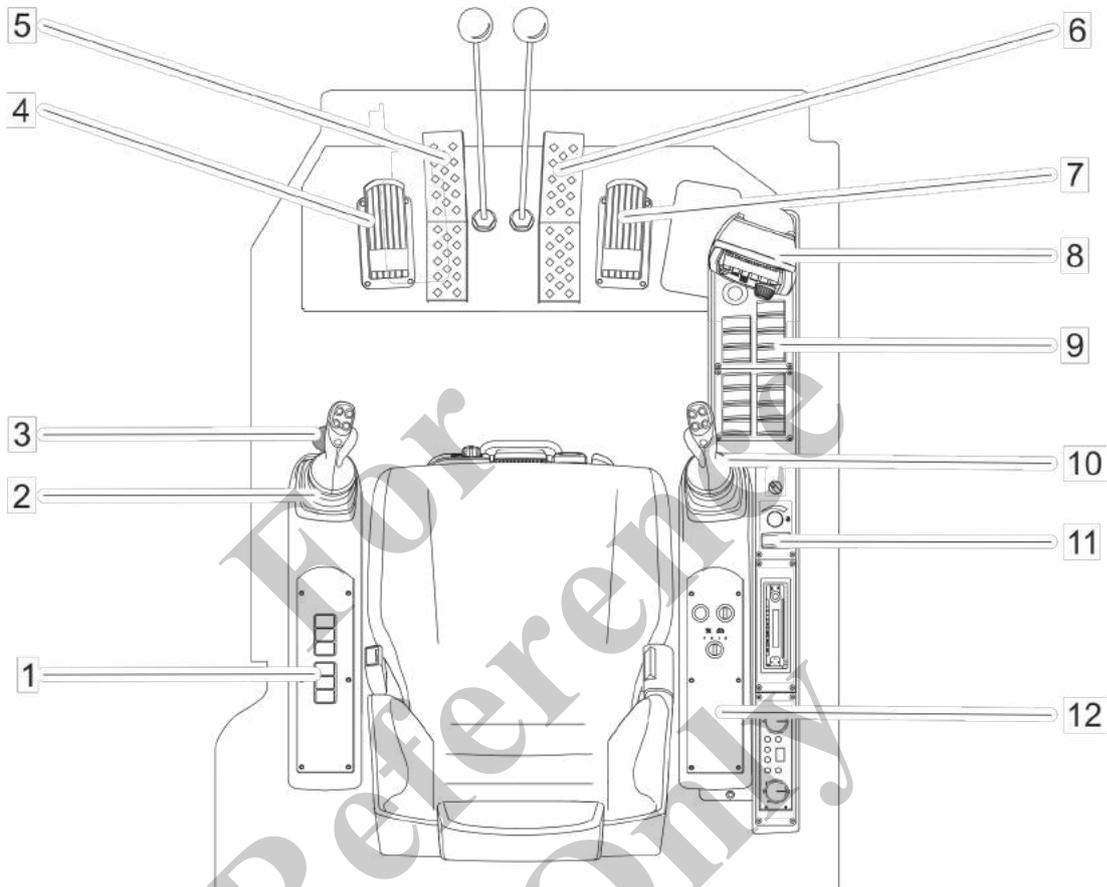
	Push and hold the lever up	Push and hold the lever down
	The right ballasting cylinder is extended.	The right ballasting cylinder is retracted.

### Diagnostics plug connection

	Bush
	Connect the diagnostics plug to read out the engine data/faults.

### 5.2.3 Cab control and display elements

Overview of the controls inside the cab



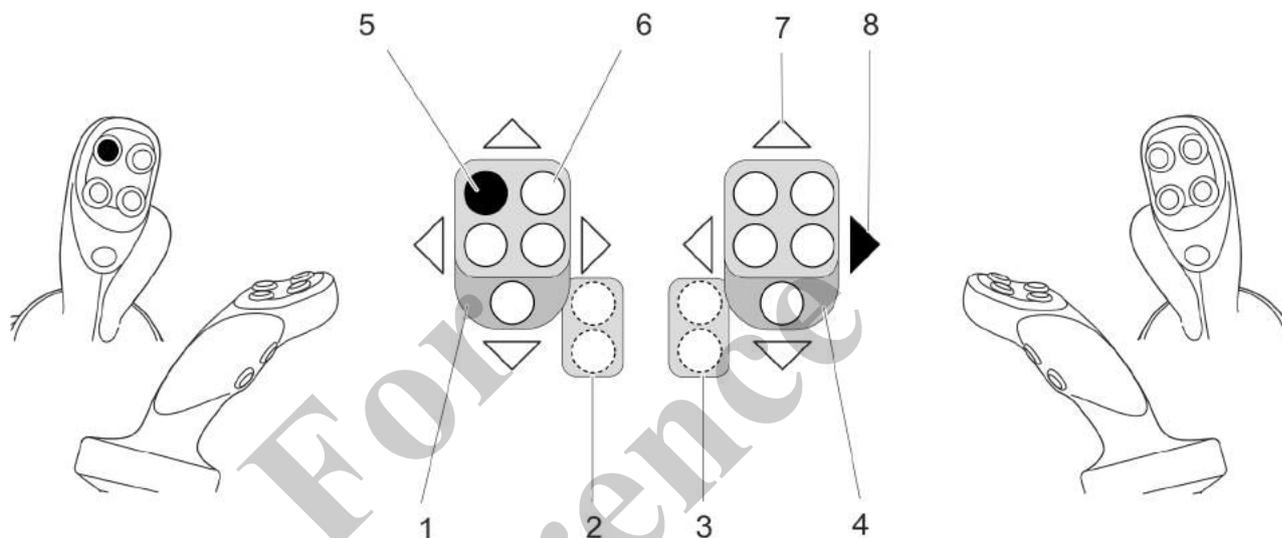
- |  |  |
|--|--|
| 1 Left-hand control panel next to the seat       | 7 Drive engine speed adjustment              |
| 2 Left joystick                                  | 8 SENCON                                     |
| 3 Safety lever                                   | 9 Right front control panel                  |
| 4 Positioning slewing gear brake                 | 10 Right joystick                            |
| 5 Left crawler track drive pedal and hand lever  | 11 Outer right control panel                 |
| 6 Right crawler track drive pedal and hand lever | 12 Right-hand control panel next to the seat |

### 5.2.3.1 Joystick

#### Depiction of buttons and movement directions

The function descriptions in these instructions schematically depict the button position or movement. The schematics always depict both joysticks with all buttons and movement directions.

Buttons and movement directions are shown in white. The respective button or movement direction described is marked in black.



- 1 Left joystick
- 2 Handle on left-hand joystick
- 3 Handle on right-hand joystick
- 4 Right joystick

- 5 Button, marked in black
- 6 Button, white
- 7 Joystick movement direction: white
- 8 Joystick movement direction: marked in black

The left and right-hand joystick feature a total of six buttons and one movement indication:

- four buttons on the top of the joystick,
- two buttons on the back of the joystick, on the ergonomic handle,
- one movement indicator in the middle of the joystick.

Each joystick can be tilted in four directions.

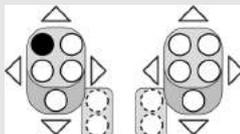
Different functions are assigned to the buttons and movement directions. The joystick **standard assignment** is described below:

- Winch 1 is operated with the right joystick.
- Winch 2 is operated with the left joystick.

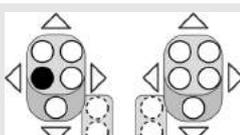
The assignment of the joysticks for winch 1 and winch 2 can be swapped using the *[winch 1/winch 2changeover]* switch.

## Control and display elements, operating modes

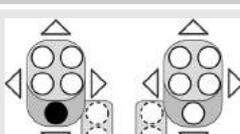
### Swing park brake

	Press button
	<p>The swing park brake is activated.</p> <p>The swing park brake is deactivated.</p>

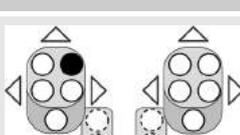
### Not used

	Press button
	<p>No function</p>

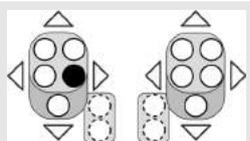
### Motion indicator winch 2

	Motion indicator vibrates	Motion indicator does not vibrate
	<p>The rope on winch 2 is being wound up or unwound.</p>	<p>The rope on winch 2 is not being wound up or unwound.</p>

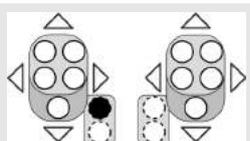
### Slewing gear freewheeling

	Press button [Positioning slewing gear brake] pedal fully depressed
  	<p>This engages/disengages the slewing gear freewheel.</p>

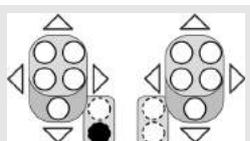
### Not used

	Press button
	No function

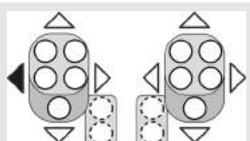
### Slewing speed changeover

	Press button
	Switches between reduced uppercarriage slewing speed and custom set uppercarriage slewing speed.

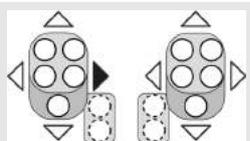
### Fold the fly boom / heavy-duty jib in / out

	While holding the joystick in position [ <i>Retract telescope</i> ], press the button.	Press button again.
	<p>The telescopic cylinder is pressurized. The boom remains in its position.</p> <p>The holding function is enabled.</p> <p>Folding the fly boom or heavy-duty jib against the boom is made easier.</p>	The holding function is disabled.

### Slew left

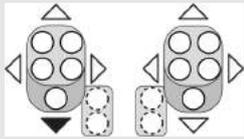
	Tilt the joystick
	The uppercarriage is slewed to the left.

### Slew right

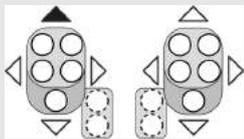
	Tilt the joystick
	The uppercarriage is slewed to the right.

## Control and display elements, operating modes

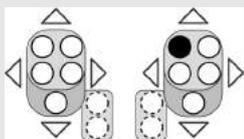
### Lift winch 2

	<b>Tilt the joystick</b>	
	The rope on winch 2 is wound up.	The hook is raised.

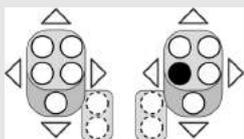
### Lower winch 2

	<b>Tilt the joystick</b>	
	The rope on winch 2 is unwound.	The hook is lowered.

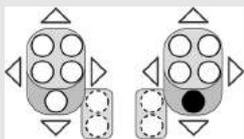
### Not used

	<b>Press button</b>	
	No function	

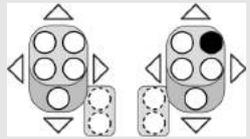
### Not used

	<b>Press button</b>	
	No function	

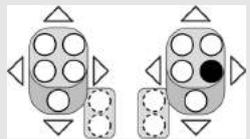
### Motion indicator winch 1

	<b>Motion indicator vibrates</b>	<b>Motion indicator does not vibrate</b>
	The rope on winch 1 is being wound up or unwound.	The rope on winch 1 is not being wound up or unwound.

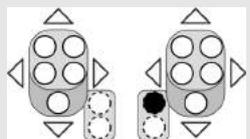
### Not used

	Press button
	No function

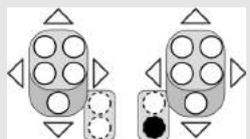
### Horn

	Press button
	<p>The horn is triggered.</p> <p>An acoustic signal will sound.</p>

### Winch movement indicator on/off

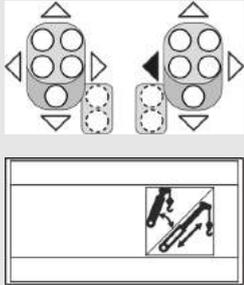
	Press button
	<p>Switches vibration for [<i>winch motion indicator on/off</i>] on or off for both joysticks.</p> <p>The function can only be activated or deactivated for both joysticks simultaneously.</p>

### Not used

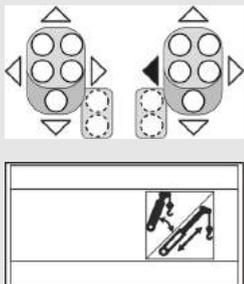
	Press button
	No function

## Control and display elements, operating modes

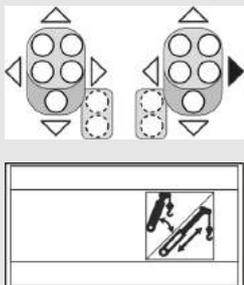
### Lifting the boom

	<b>[Luffing down-up / Telescope in - out changeover] switch in right switch position</b> <b>Tilt the joystick</b>
	The boom is raised.

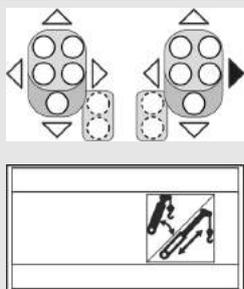
### Retract telescope

	<b>[Luffing down-up / Telescope in - out changeover] switch in right switch position</b> <b>Tilt the joystick</b>
	The telescopic thrusters/secure locking unit are retracted.

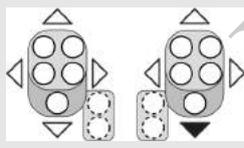
### Lowering the boom

	<b>[Luffing down-up / Telescope in - out changeover] switch in right switch position</b> <b>Tilt the joystick</b>
	The boom is lowered.

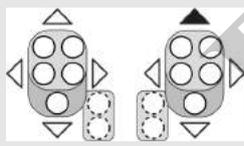
## Extend telescope

	<p><b>[Luffing down-up / Telescope in - out changeover] switch in right switch position</b></p> <p><b>Tilt the joystick</b></p>
	<p>The telescopic thrusters/secure locking unit are extended.</p>

## Lift winch 1

	<p><b>Tilt the joystick</b></p>
	<p>The rope on winch 1 is wound up.</p> <p>The hook is raised.</p>

## Lower winch 1

	<p><b>Tilt the joystick</b></p>
	<p>The rope on winch 1 is unwound.</p> <p>The hook is lowered.</p>

### 5.2.3.2 Pedals and levers

#### Safety lever

	Safety lever engaged	Safety lever pushed in direction of travel
	<p>All hydraulic functions are unavailable.</p> <p>Work movements cannot be performed.</p> <p>The slewing gear brake is engaged.</p>	<p>All hydraulic functions are available.</p> <p>All work movements can be performed.</p>

## Control and display elements, operating modes

### Positioning slewing gear brake

	Slewing gear freewheeling enabled Pedal not depressed	Slewing gear freewheeling enabled Pedal depressed
	Uppercarriage slewing will not be stopped.	Uppercarriage slewing will be stopped.

**i** If the slewing gear freewheel is deactivated, uppercarriage slewing will be stopped hydraulically.

### Drive engine speed adjustment

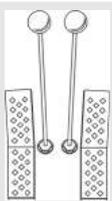
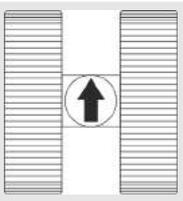
	Pedal depressed	Release depressed pedal	Pedal not depressed
	The engine speed is increased.	The engine speed decreases.	The engine runs at idle speed.

### Drive pedals and hand levers

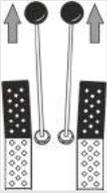
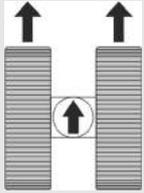
The drive pedal and the hand lever are interconnected. When the drive pedal moves, the hand lever moves, too, and vice versa.

If the uppercarriage is in 180° position, the drive operations described below take place in the opposite direction.

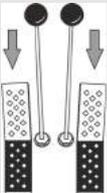
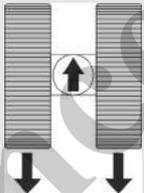
### Stopping the machine

Movement of hand levers/pedals	Movement with uppercarriage position 0°
 Release both hand levers/pedals.	 The machine stops.

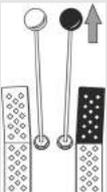
### Travel forward in a straight line

Movement of hand levers/pedals	Movement with uppercarriage position 0°
 <p>Move both hand levers/pedals in the direction of travel.</p>	 <p>The machine travels forward in a straight line.</p>

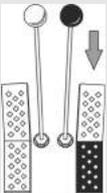
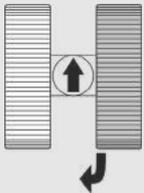
### Travel in reverse in a straight line

Movement of hand levers/pedals	Movement with uppercarriage position 0°
 <p>Move both hand levers/pedals against the direction of travel.</p>	 <p>The machine travels in reverse in a straight line.</p>

### Travel forward to the left

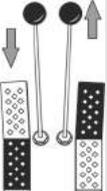
Movement of hand levers/pedals	Movement with uppercarriage position 0°
 <p>Release the left hand lever/left pedal. Move the right hand lever/pedal in the direction of travel.</p>	 <p>The machine travels forward to the left.</p>

### Travel in reverse to the left

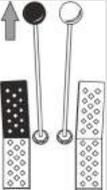
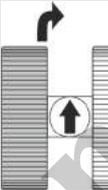
Movement of hand levers/pedals	Movement with uppercarriage position 0°
 <p>Release the left hand lever/left pedal. Move the right hand lever/pedal against the direction of travel.</p>	 <p>The machine travels in reverse to the left.</p>

## Control and display elements, operating modes

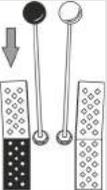
### Turn left on the spot

Movement of hand levers/pedals	Movement with uppercarriage position 0°
 <p>Move the left hand lever/pedal against the direction of travel. Move the right hand lever/pedal in the direction of travel.</p>	 <p>The machine turns left on the spot.</p>

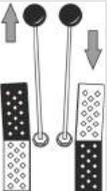
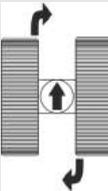
### Travel forward to the right

Movement of hand levers/pedals	Movement with uppercarriage position 0°
 <p>Move the left hand lever/pedal in the direction of travel. Release the right hand lever/pedal.</p>	 <p>The machine travels forward to the right.</p>

### Travel in reverse to the right

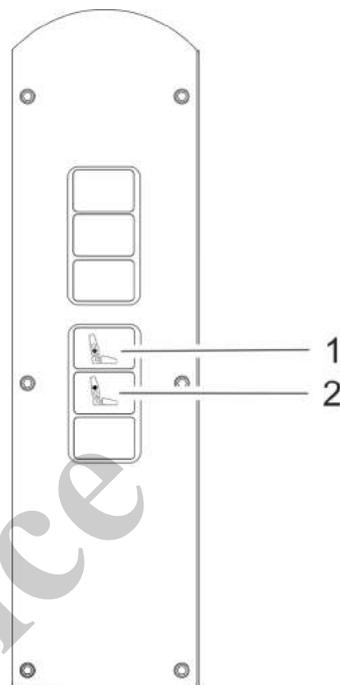
Movement of hand levers/pedals	Movement with uppercarriage position 0°
 <p>Move the left hand lever/pedal against the direction of travel. Release the right hand lever/pedal.</p>	 <p>The machine travels in reverse to the right.</p>

### Turn right on the spot

Movement of hand levers/pedals	Movement with uppercarriage position 0°
 <p>Move the left hand lever/pedal in the direction of travel. Move the right hand lever/pedal against the direction of travel.</p>	 <p>The machine turns right on the spot.</p>

5.2.3.3 Left-hand control panel

Left-hand control panel next to the seat



- 1 Lower lumbar support
- 2 Upper lumbar support

Lower lumbar support

	Switch position up	Switch position down
	The curvature of the lower lumbar support is increased.	The curvature of the lower lumbar support is reduced.

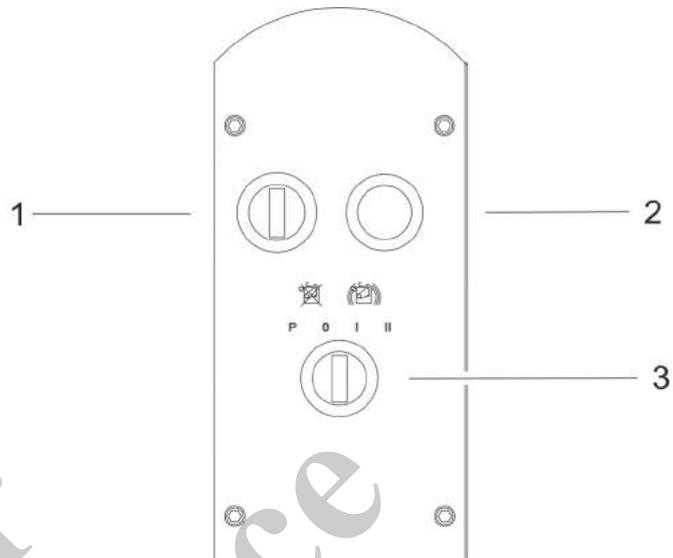
Upper lumbar support

	Switch position up	Switch position down
	The curvature of the upper lumbar support is increased.	The curvature of the upper lumbar support is reduced.

## Control and display elements, operating modes

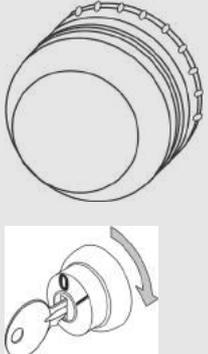
### 5.2.3.4 Right-hand control panel

Right-hand control panel next to the seat



- 1 LML bypass key switch
- 2 LML bypass push-button
- 3 Ignition switch

LML bypass key switch and push button

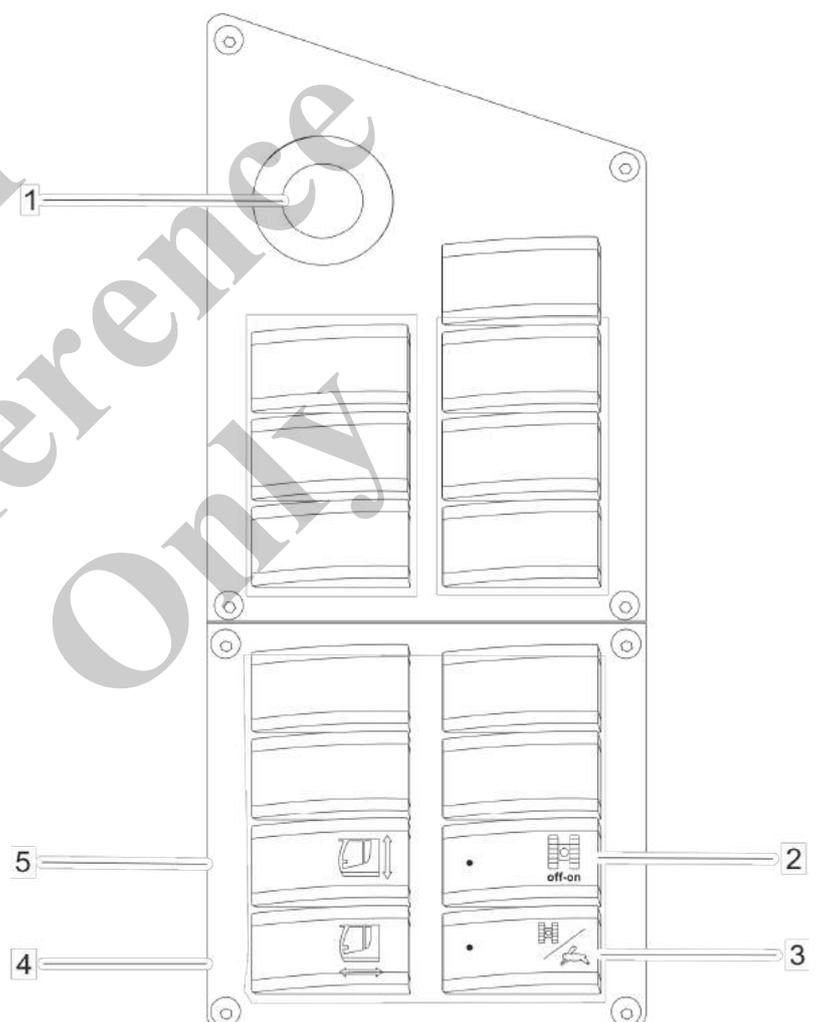
	[LML bypass] push button pressed and [LML bypass] key switch held in [I] position	[LML bypass] push button not pressed and/or [LML bypass] key switch released
	<p>The LML is bypassed. The speed of crane control functions is not limited.</p>	<p>The load moment limitation is activated.</p>

## Control and display elements, operating modes

### Ignition switch

	Position [P]	Position [0]	Position [I]	Position [II]
<p><b>P 0 I II</b></p>	<p>With fuel pump (option): The machine can be refueled using the fuel pump.</p> <p>Without fuel pump: no function</p>	<p>The ignition is off.</p> <p>No power supply is applied.</p> <p>The control and display elements are non-functional.</p>	<p>The ignition is switched on.</p> <p>Power supply is applied.</p> <p>Electric functions are available.</p>	<p>The engine is started.</p> <p>The engine is running.</p> <p>Electric and hydraulic functions are available.</p>

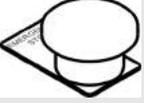
### Right front control panel



- 1 Emergency stop
- 2 Activate drive mode
- 3 Drive slow - fast
- 4 Tilting the cab
- 5 Lift/lower cab (option)

## Control and display elements, operating modes

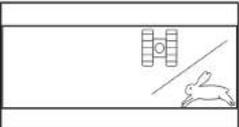
### Emergency stop

	Pull switch	Press switch
	The machine is ready for operation.	The engine and all machine movements are stopped.

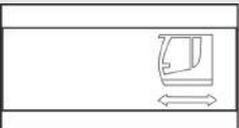
### Activate drive mode

	Switch position left	Switch position right
	The machine cannot be moved.	The machine can be moved.

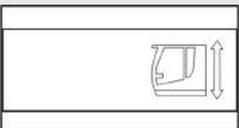
### Drive slow - fast

	Switch position left	Switch position right
	Lower speed and higher tractive force are set. More sensitive driving is possible.	Higher speed and lower tractive force are set.

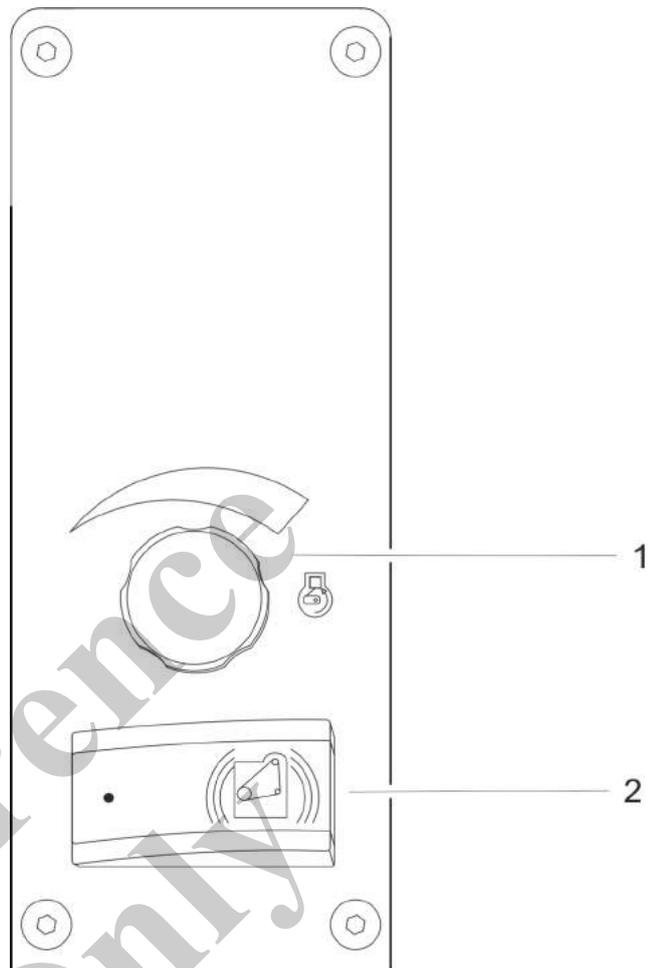
### Tilting the cab

	Switch position left	Switch position Center	Switch position right
	The cab incline increases.	The cab does not move	The cab incline decreases.

### Lift/lower cab (option)

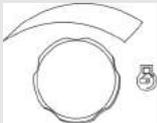
	Switch position left	Switch position Center	Switch position right
	The cab moves up.	The cab does not move	The cab moves down.

Outer right control panel



- 1 Hand throttle potentiometer
- 2 Engine start

Hand throttle

	Turn to the left	Turn to the right
	The engine speed is decreased.	The speed is increased.

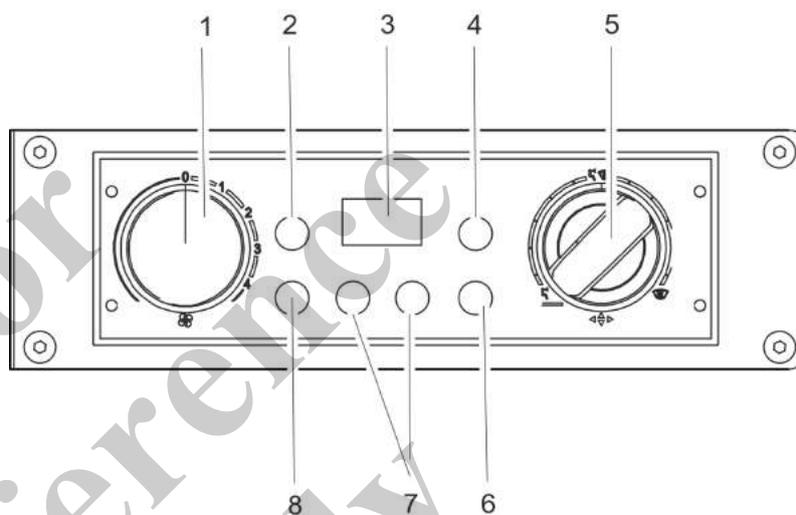
Engine start

	Press button on the right (at least 2 seconds)	Press button on the right (at least 2 seconds)
	The engine is started.	The engine is stopped.

### Radio

**i** For more information, please refer to the manufacturer's operating manual. The manufacturer's operating manual is located inside the cab.

### Air conditioning system

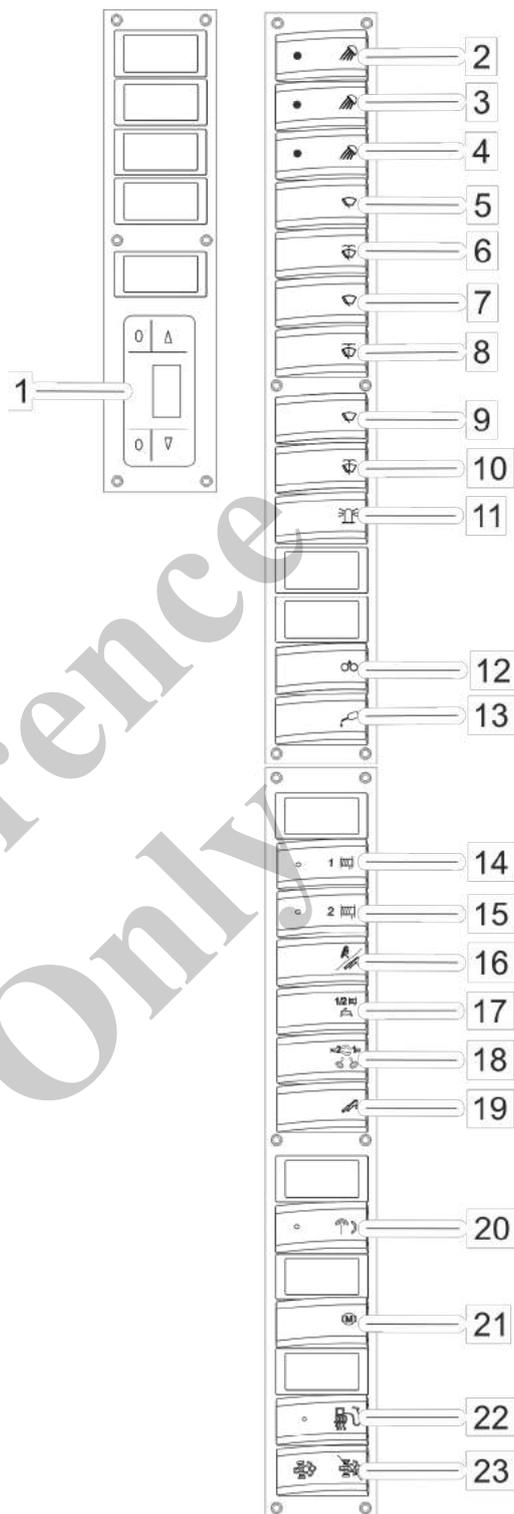


- 1 Blower speed selector switch
- 2 Recirculating air mode
- 3 Temperature display (°C or °F)
- 4 Outside air mode
- 5 Air diffusion selector switch
- 6 Air conditioning system on/off
- 7 Temperature regulator
- 8 Outside temperature display

5.2.3.5 Roof control panel

For  
Reference  
Only

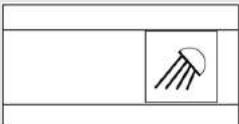
Roof control panel



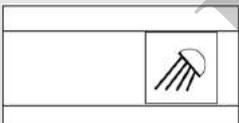
- 1 Auxiliary heating system
- 2 Roof work lighting
- 3 Telescopic boom working light
- 4 Working lights, uppercarriage
- 5 Windshield wiper

- 6 Windshield washer system
- 7 Roof panel wiper
- 8 Roof panel washer system
- 9 Lower windshield wiper (option)
- 10 Lower windshield washer system (option)
- 11 Beacon, cab
- 12 Slewing ring lubrication (option)
- 13 Central lubrication system (option)
- 14 Activate winch 1
- 15 Activate winch 2
- 16 Changeover Luffing down - up/Telescopic boom in - out
- 17 Rapid motion Winch 1/2
- 18 Switching winch 1 / winch 2
- 19 Telescopic cylinder activation
- 20 Manual/remote radio control (option)
- 21 Release hydraulic power unit (option)
- 22 Diesel filter heater
- 23 DEF bypass / regen switch

### Roof work lighting

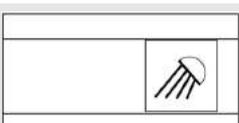
	Switch position left	Switch position right
	The work lights on the cab are switched off.	The work lights on the cab are switched on.

### Telescopic boom work lighting

	Switch position left	Switch position right
	The work light on the telescopic boom at the front are switched off.	The work light on the telescopic boom at the front are switched on.

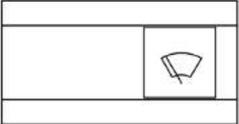
**i** *The description includes controls or machine configurations that are not available in all countries of operation.*

### Working lights, uppercarriage

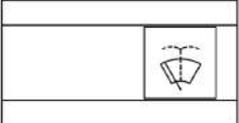
	Switch position left	Switch position right
	The work lights on the uppercarriage are switched off.	The work lights on the uppercarriage are switched on.

## Control and display elements, operating modes

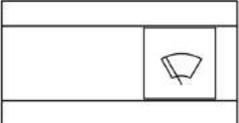
### Windshield wiper

	Switch position left	Switch position right
	The windshield wiper for the windshield is switched off.	The windshield wipers on the windshield are switched on.

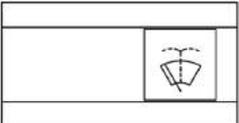
### Windshield washer system

	Switch position left	Switch position right
	The windshield washer system for the windshield is switched off.	The windshield washer system for the windshield is switched on.

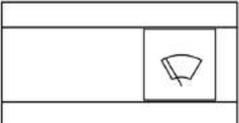
### Roof panel wiper

	Switch position left	Switch position Center	Switch position right
	The windshield wiper on the glass roof panel is switched off.	The windshield wiper for the glass roof panel is working at low speed.	The windshield wiper for the glass roof panel is working at high speed.

### Roof panel washer system

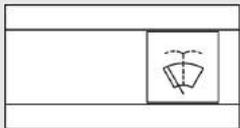
	Switch position left	Switch position right
	The washer system on the glass roof panel is switched off.	The washer system on the glass roof panel is switched on.

### Lower windshield wiper (option)

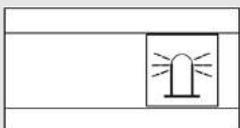
	Switch position left	Switch position Center	Switch position right
	The windshield wiper for the windshield is switched off.	The windshield wiper for the windshield is working at low speed.	The windshield wiper for the windshield is working at high speed.

## Control and display elements, operating modes

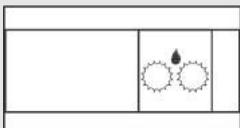
### Lower windshield washer system (option)

	Switch position left	Switch position right
	The windshield washer system for the windshield is switched off.	The windshield washer system for the windshield is switched on.

### Beacon, cab

	Switch position left	Switch position right
	The rotating beacon is switched off.	The rotating beacon is switched on.

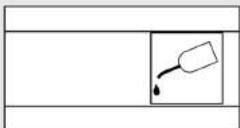
### Slewing ring lubrication

	Switch position left	Switch position right
	Slewing ring lubrication is switched off.	Slewing ring lubrication is triggered manually. The slewing ring lubrication is active as long as the switch is pressed.

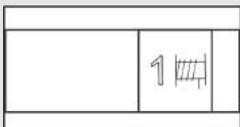


*The description includes controls or machine configurations that are not available in all countries of operation.*

### Uppercarriage central lubrication (option)

	Switch position left	Switch position right
	Lubrication is started automatically at a certain point in time. The lubrication cycle is pre-set at the factory.	The lubrication process is started immediately. The switch must be pressed for at least 2 seconds.

### Activate winch 1

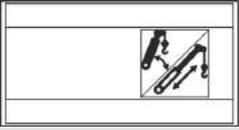
	Switch position left	Switch position right
	Winch 1 is not activated. The hoisting rope on winch 1 cannot be wound up or unwound.	Winch 1 is activated. The hoisting rope on winch 1 can be wound up or unwound.

## Control and display elements, operating modes

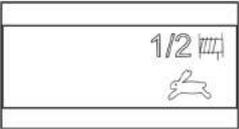
### Activate winch 2

	Switch position left	Switch position right
	Winch 2 is not activated. The hoisting rope on winch 2 cannot be wound up or unwound.	Winch 2 is activated. The hoisting rope on winch 2 can be wound up or unwound.

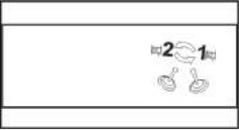
### Switching Luffing down-up/Telescope in-out

	Switch position left	Switch position right
	The [ <i>Luffing down - up</i> ] function is activated. Lifting and lowering of the boom is possible.	The [ <i>Telescope in-out</i> ] function is activated. Retracting and extending of the boom is possible.

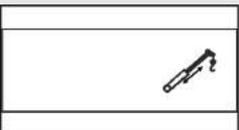
### Rapid motion Winch 1/2

	Switch position left	Switch position right
	Rapid traverse is deactivated for winch 1/2.	Rapid traverse is activated for winch 1/2. The winch coils the hoist rope at a rapid speed. The hook moves at a rapid speed.

### Switching winch 1 / winch 2

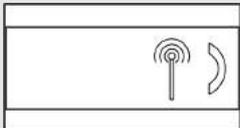
	Switch position left	Switch position right
	Winch 1 is operated with the right joystick. Winch 2 is operated with the left joystick.	Winch 2 is operated with the right joystick. Winch 1 is operated with the left joystick.

### Telescopic cylinder activation

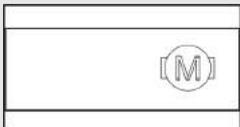
	Switch position left	Switch position right
	The telescopic cylinder is not activated. The telescopic cylinder cannot be moved. Retracting and extending the telescopic thrusters/secure locking unit is not possible.	The telescopic cylinder is activated. The telescopic cylinder can be moved. Retracting and extending the telescopic thrusters/secure locking unit is possible.

## Control and display elements, operating modes

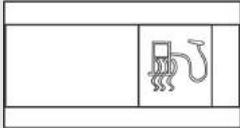
### Manual/remote radio control (option)

	Switch position left	Switch position right
	Manual control is activated. The crane movements are performed using the controls inside the cab	Remote radio control is activated. The crane movements are performed using the remote radio control.

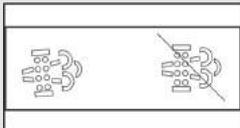
### Release hydraulic power unit (option)

	Switch position left	Switch position right
	It is not possible to use the hydraulic power unit.	The hydraulic power unit has been released for use.

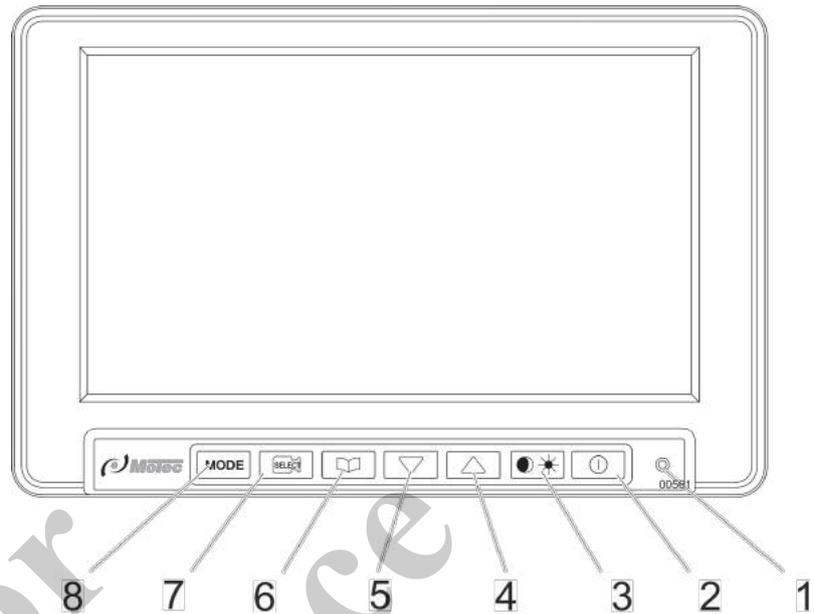
### Diesel filter heater

	Switch position left	Switch position right
	The diesel filter heating is switched off.	The diesel filter heating is switched on.

### DEF bypass / regen switch

	Switch position left	Switch position Center	Switch position right
	Exhaust aftertreatment system regeneration is triggered manually.	Automatic exhaust aftertreatment system regeneration is permitted.	Automatic exhaust aftertreatment system regeneration is suppressed.

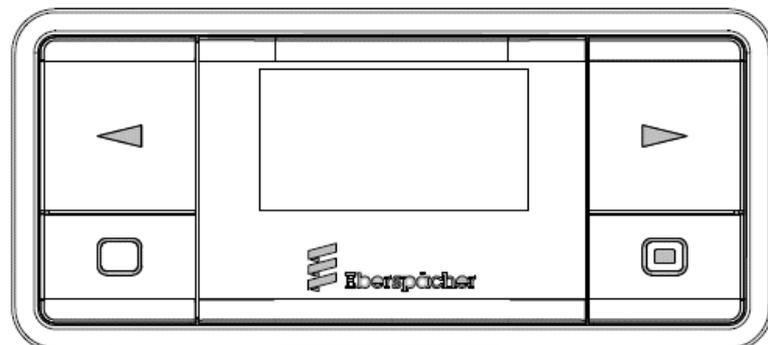
### Camera system



- 1 Operating display
- 2 Display on/off button
- 3 Day/night button
- 4 Plus button
- 5 Minus button
- 6 Menu button
- 7 Camera select button
- 8 Presentation mode button

<b>Camera 1</b>	For viewing the machine when reversing
<b>Camera 2</b>	For the right side of the machine
<b>Camera 3</b>	For the winches
<b>Camera 4</b>	Not used

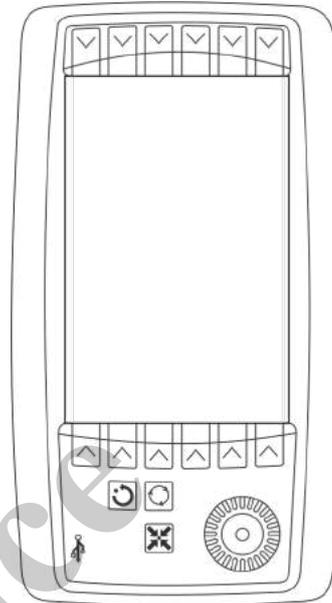
### Auxiliary heating system (option)



For more information, please refer to the manufacturer's operating manual.

### 5.2.3.6 Operating console – working range limitation

#### Operating console – working range limitation



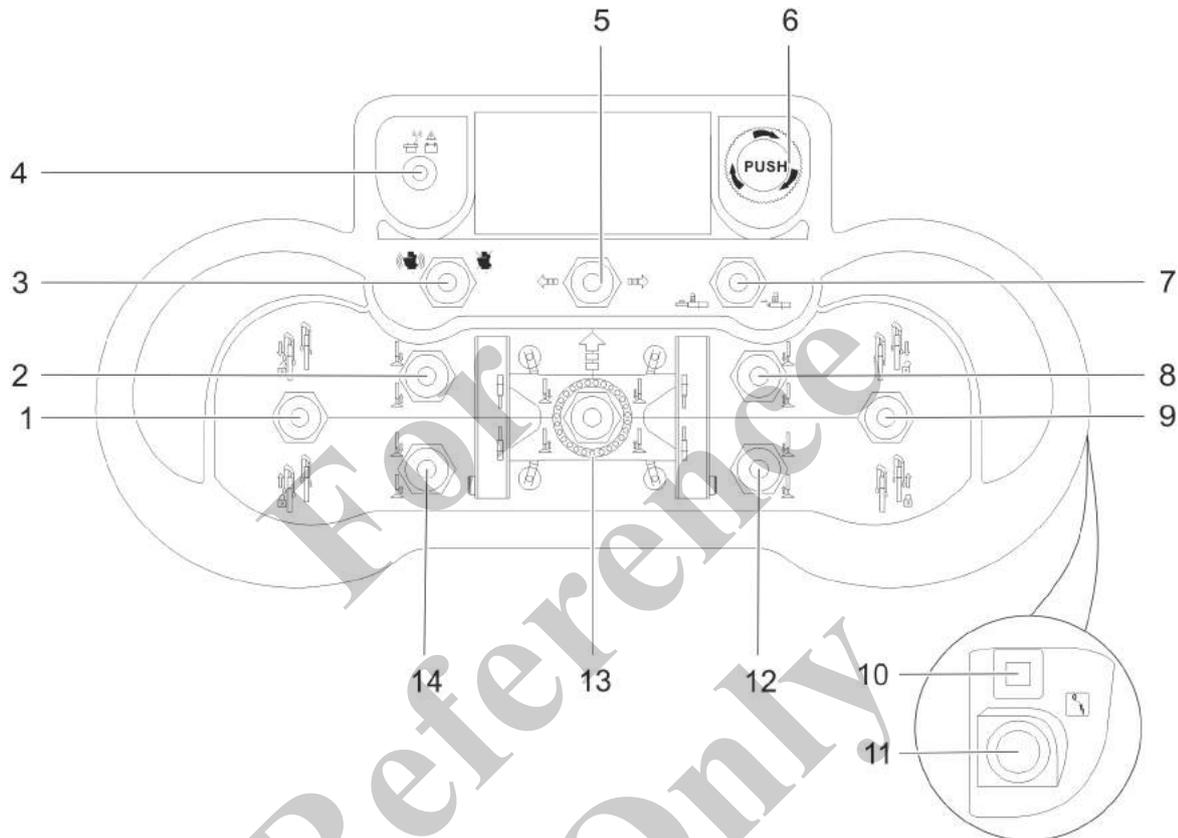
The working range limitation is controlled by the *[Working range limitation]* control console in the cab and has the following functions:

- Rocking angle: limits the upper and lower boom angle
- Height: limits the max. height of the pulley head
- Radius: limits the inner and outer working radius
- Pivot angle: limits the slewing angle of the uppercarriage in both directions

### 5.2.4 Remote radio controls

#### 5.2.4.1 Remote radio control - setup

Control elements of the setup  
remote radio control



- |   |   |    |  |
|---|---|----|--|
| 1 | Extend/retract left ballasting cylinder | 8  | Extend/retract right front outrigger     |
| 2 | Extend/retract left front outrigger     | 9  | Extend/retract right ballasting cylinder |
| 3 | Start/stop the drive engine             | 10 | Horn/release remote radio control        |
| 4 | Operating indicator LED                 | 11 | Switch remote radio control on/off       |
| 5 | Decrease/increase track width           | 12 | Extend/retract right rear outrigger      |
| 6 | Emergency stop switch                   | 13 | Extend/retract all outrigger cylinders   |
| 7 | Lock/unlock counterweight               | 14 | Extend/retract left rear outrigger       |

#### Horn/release remote radio control

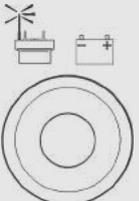
	Press the push button
	<p>The horn sounds.</p> <p>The remote radio control is activated.</p> <p>The engine can be started.</p>

## Control and display elements, operating modes

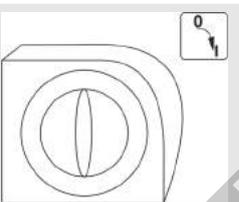
### Emergency stop

	Press switch	Pull switch
	The engine and all machine movements are stopped.	The machine is ready for operation. The remote radio control is not activated.

### Operating display

	LED green	Yellow LED, flashing	Red LED
	The remote radio control is ready for use.	The battery state of charge is low.	There is a fault: <ul style="list-style-type: none"> <li>■ Battery empty</li> <li>■ No radio connection to the machine</li> </ul>

### Switch remote radio control on/off

	Turn rotary switch to position [0]	Turn rotary switch to position [I]
	The remote radio control is deactivated.	The remote radio control is activated. A brief signal tone sounds.

### Start/stop the drive engine

	Push lever to the left	Push lever to the right
	Starts the drive engine during normal operation.	Stops the drive engine during normal operation.

### Extend/retract left front outrigger cylinder

	Push and hold the lever up	Push and hold the lever down
	The left front outrigger cylinder is extended.	The left front outrigger cylinder is retracted.

## Control and display elements, operating modes

### Extend/retract right front outrigger cylinder

	Push and hold the lever up	Push and hold the lever down
	The right front outrigger cylinder is extended.	The right front outrigger cylinder is retracted.

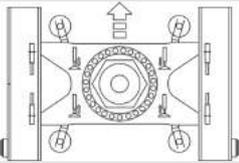
### Extend/retract left rear outrigger cylinder

	Push and hold the lever up	Push and hold the lever down
	The left rear outrigger cylinder is extended.	The left rear outrigger cylinder is retracted.

### Extend/retract right rear outrigger cylinder

	Push and hold the lever up	Push and hold the lever down
	The right rear outrigger cylinder is extended.	The right rear outrigger cylinder is retracted.

### Extend/retract all outrigger cylinders

	Push and hold the lever up	Push and hold the lever down
	All outrigger cylinders are extended.	All outrigger cylinders are retracted.

### Decrease/increase track width

	Push lever to the left	Push lever to the right
	The track width is decreased.	The track width is increased.

## Control and display elements, operating modes

### Extend/retract left ballasting cylinder

	Push and hold the lever up	Push and hold the lever down
	The left ballasting cylinder is retracted.	The left ballasting cylinder is extended.

### Extend/retract right ballasting cylinder

	Push and hold the lever up	Push and hold the lever down
	The right ballasting cylinder is retracted.	The right ballasting cylinder is extended.

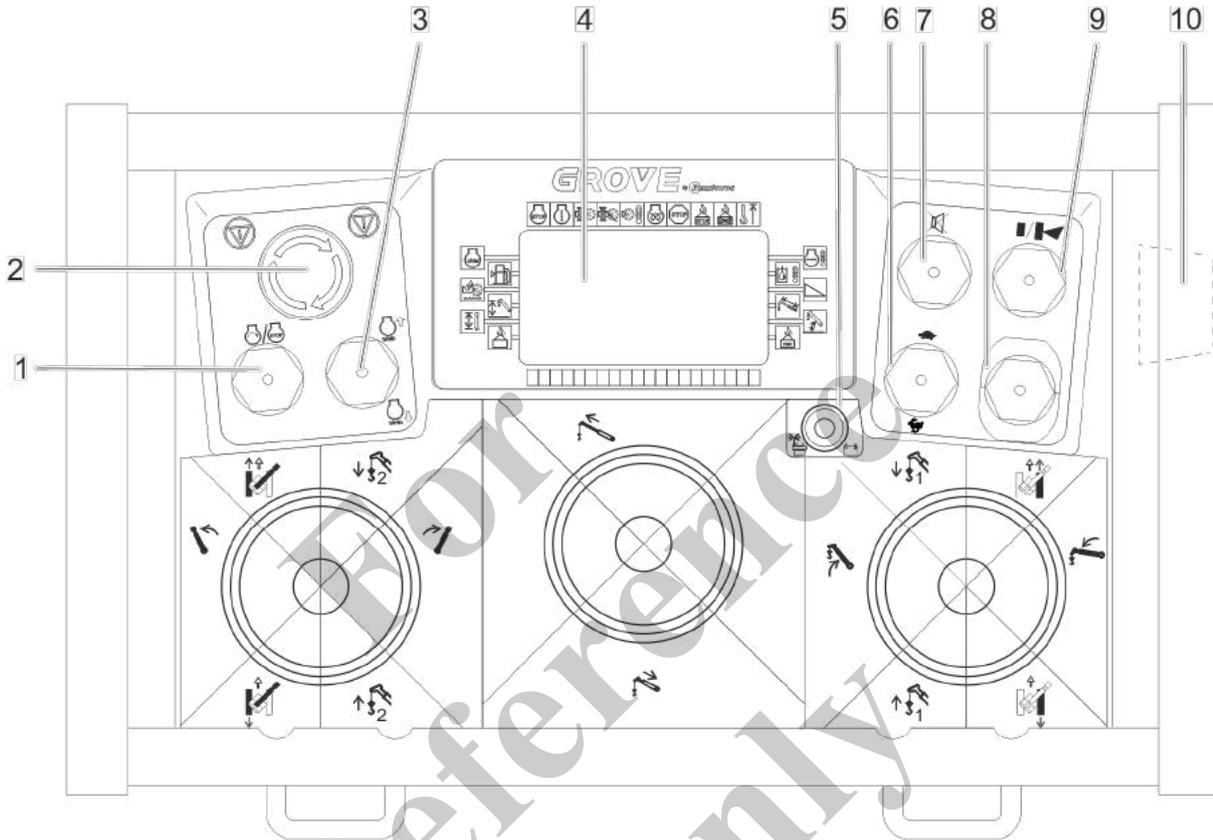
### Lock/unlock counterweight

	Push lever to the left	Push lever to the right
	The locking bolts for securing the counterweight are extended.	<p>The locking bolts for securing the counterweight are retracted.</p> <p>The counterweight locking mechanism is released.</p>

## Control and display elements, operating modes

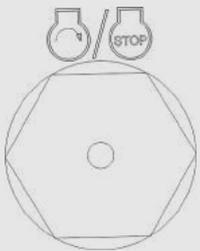
### 5.2.4.2 Remote radio control (option)

#### Control elements of the remote radio control (option)



- |                               |   |
|-------------------------------|---|
| 1 Start/stop the drive engine | 6 Crane working speed slow/fast                 |
| 2 Emergency stop              | 7 Load moment limitation audible signals on/off |
| 3 Increase/reduce speed       | 8 Changeover crane mode/drive mode              |
| 4 Display                     | 9 Horn/release remote radio control             |
| 5 Operating indicator LED     | 10 Remote radio control on/off                  |

#### Start/stop the drive engine

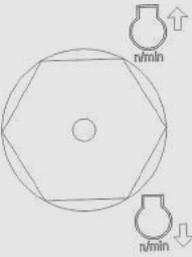
	Press the push button
	Starts or stops the drive engine during normal operation.

## Control and display elements, operating modes

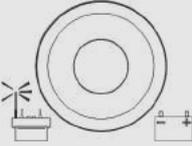
### Emergency stop

	Pull switch	Press switch
	The machine is ready for operation.	The engine and all machine movements are stopped.

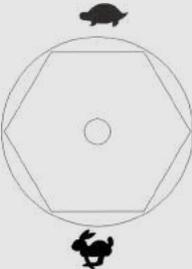
### Increase/reduce speed

	Press lever upward	Press lever downward
	<p>The speed is increased by one stage.</p> <ul style="list-style-type: none"> <li>■ Idling speed</li> <li>■ Stage 1</li> <li>■ Stage 2</li> <li>■ Stage 3</li> <li>■ Stage 4 (maximum engine speed)</li> </ul> <p>Push and hold the lever: maximum speed is set.</p>	<p>The speed is decreased by one stage.</p> <ul style="list-style-type: none"> <li>■ Stage 4 (maximum engine speed)</li> <li>■ Stage 3</li> <li>■ Stage 2</li> <li>■ Stage 1</li> <li>■ Idling speed</li> </ul> <p>Push and hold the lever: idle speed is set.</p>

### Operating display

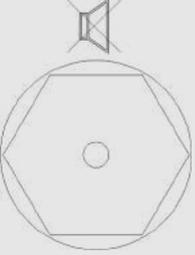
	LED green	Yellow LED, flashing	Red LED
	The remote radio control is ready for use.	The battery state of charge is low.	<p>There is a fault:</p> <ul style="list-style-type: none"> <li>■ Battery empty</li> <li>■ No radio connection to the machine</li> </ul>

### Crane working speed slow/fast

	Press lever upward	Press lever downward
	Slow crane working speed is set.	Fast crane working speed is set.

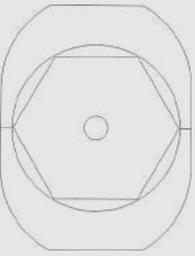
## Control and display elements, operating modes

### Load moment limitation audible signals on/off

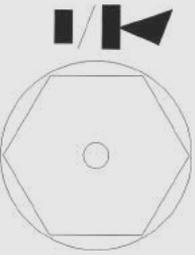
	<b>Press the push button</b>
	<p>The load moment limitation audible signals are switched on. Press the button again to switch off the load moment limitation audible signals.</p>

### Changeover crane mode/drive mode

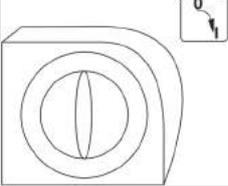
The remote radio control joystick can be used to control both drive operation functions (icon on green background) and crane operation functions (icon on blue background).

	<b>Pull lever up and press upward</b>	<b>Pull lever up and press downward</b>
	<p>Drive mode is switched on. All crane movements are deactivated. The joystick functions for drive operation can be performed. The joystick functions for drive operation are identified by icons on a green background.</p>	<p>Crane operation is switched on. All drive movements are deactivated. The joystick functions for crane operation can be performed. The joystick functions for crane operation are identified by icons on a blue background.</p>

### Horn/release remote radio control

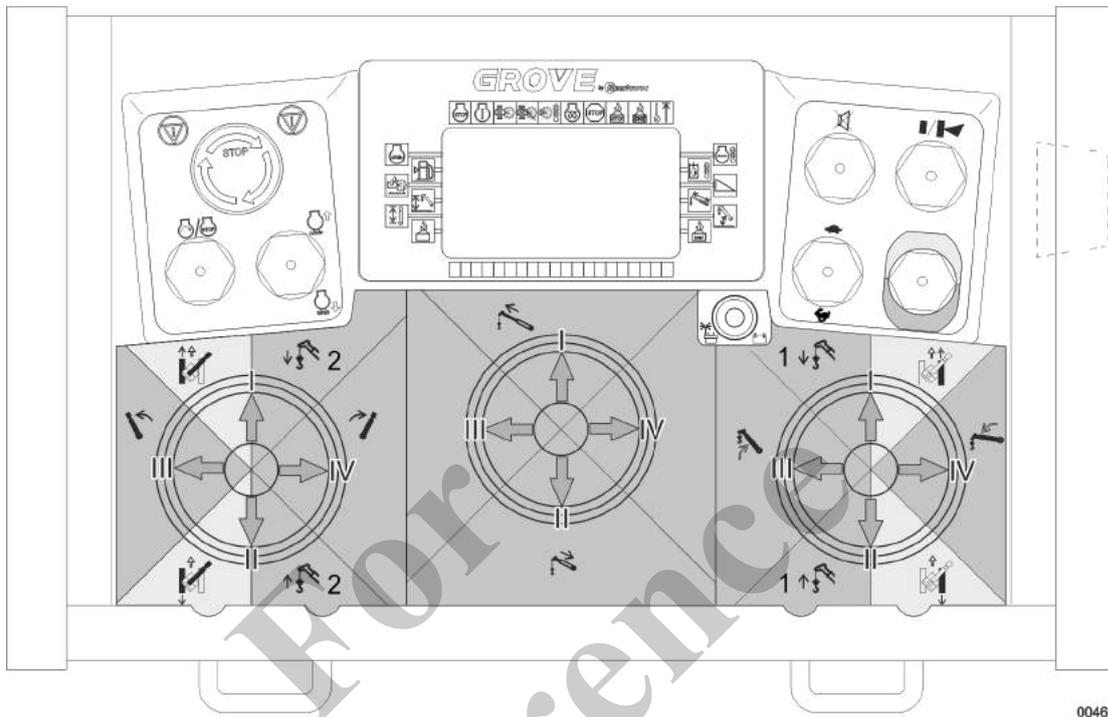
	<b>Press the push button</b>
	<p>The horn sounds. The remote radio control is activated.</p>

Switch remote radio control on/off

	Turn rotary switch to position [0]	Turn rotary switch to position [I]
	<p>The remote radio control is switched off.</p>	<p>The remote radio control is switched on.                      A brief signal tone sounds.                      The self-test routine is executed.                      A second signal tone sounds and the operating indicator flashes.                      The remote radio control is ready for use.</p>

For Reference Only

## Joystick assignment

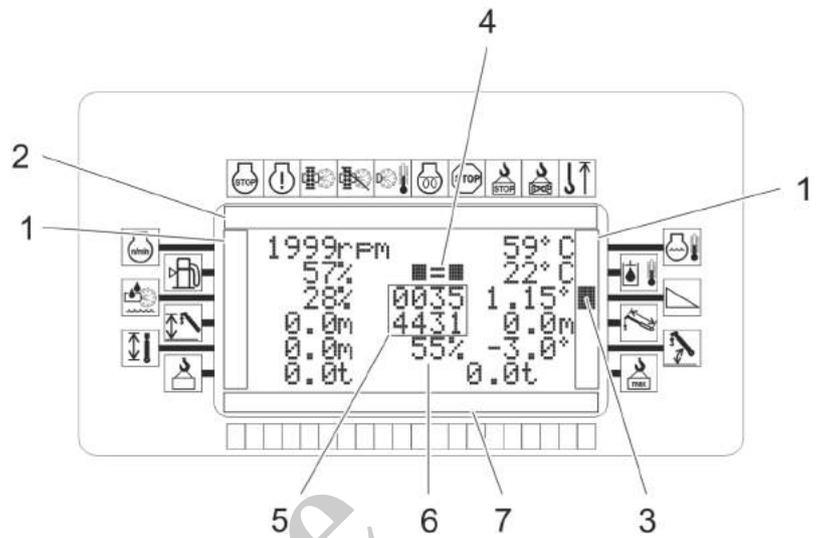


00462

Left joystick		Center joystick		Right joystick	
I	Lower winch 2 Drive left crawler forward	I	Extend boom	I	Lower winch 1 Drive right crawler forward
II	Lift winch 2 Drive left crawler backward	II	Retract boom	II	Lift winch 1 Drive right crawler backward
III	Slew uppercarriage left	III	—	III	Lifting the boom
IV	Slew uppercarriage right	IV	—	IV	Lowering the boom

**i** The [Changeover telescope/winch 2] and [Changeover winch 1/winch 2] switches on the control panel in the cab are non-functional when the remote radio control is in use.

### Machine data display



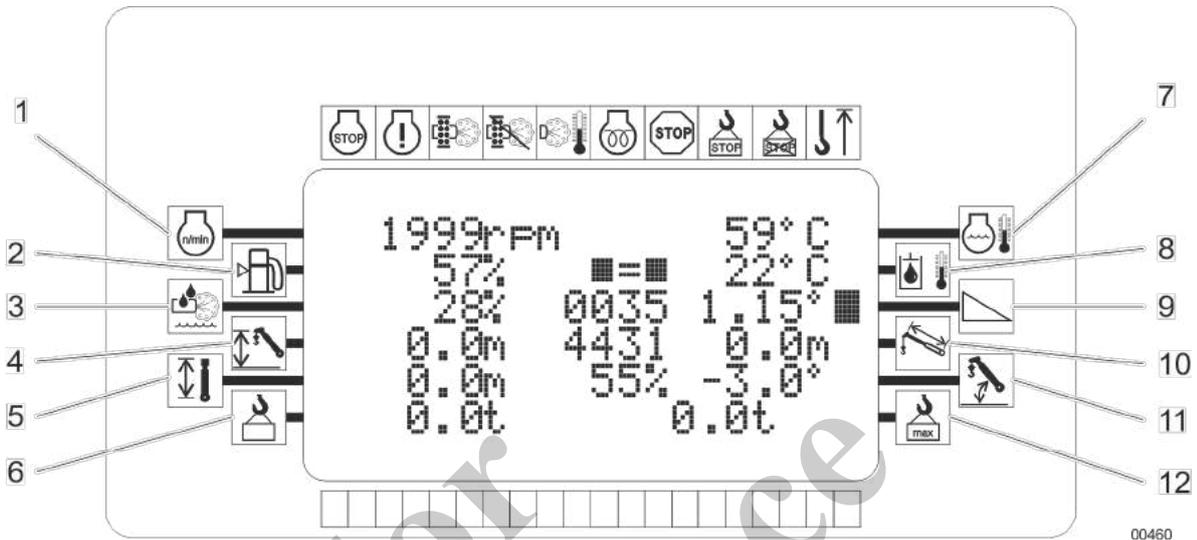
- 1 Status display of the operating status
- 2 Notification and warning messages
- 3 Warning indicator
- 4 Track width monitoring
- 5 Current operating mode code
- 6 Actual load capacity
- 7 Load capacity scale

For Reference Only

## Control and display elements, operating modes

### Operation parameters

If machine values are outside of normal tolerances, a rectangular warning indicator appears under the appropriate icon.

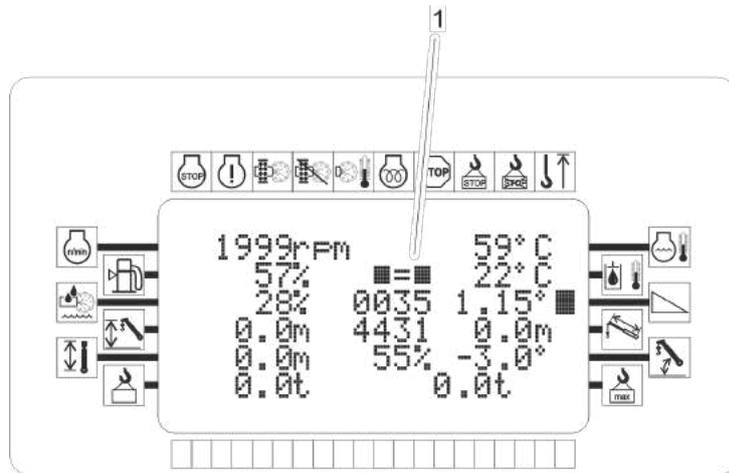


Item	Operation parameters	Display	Meaning
1	Drive engine speed	The current engine speed is displayed.	
2	Fuel level	No warning	The fuel level is sufficient.
			The fuel level is low.
			The fuel level is very low.
3	DEF level	No warning	The DEF level is normal.
			DEFlevel is low
			The DEF level is very low.
4	Boom height	The current boom height is displayed.	
5	Working radius	The current working radius is displayed.	
6	Actual load	The current actual load is displayed.	
7	Coolant temperature	No warning	The coolant temperature is normal.

## Control and display elements, operating modes

Item	Operation parameters	Display	Meaning
			The coolant temperature is increased.
			The coolant temperature is too high.
8	Hydraulic oil temperature	No warning	The hydraulic oil temperature is normal.
			The hydraulic oil temperature is increased.
			The hydraulic oil temperature is too high.
9	Machine inclination	No warning	Machine inclination permitted for the selected operating mode.
			Machine inclination not permitted for the selected operating mode.
10	Boom length	The current boom length is displayed.	
11	Boom angle	The current boom angle is displayed.	
12	Maximum lifting capacity	The maximum load capacity is displayed.	

## Track width monitoring



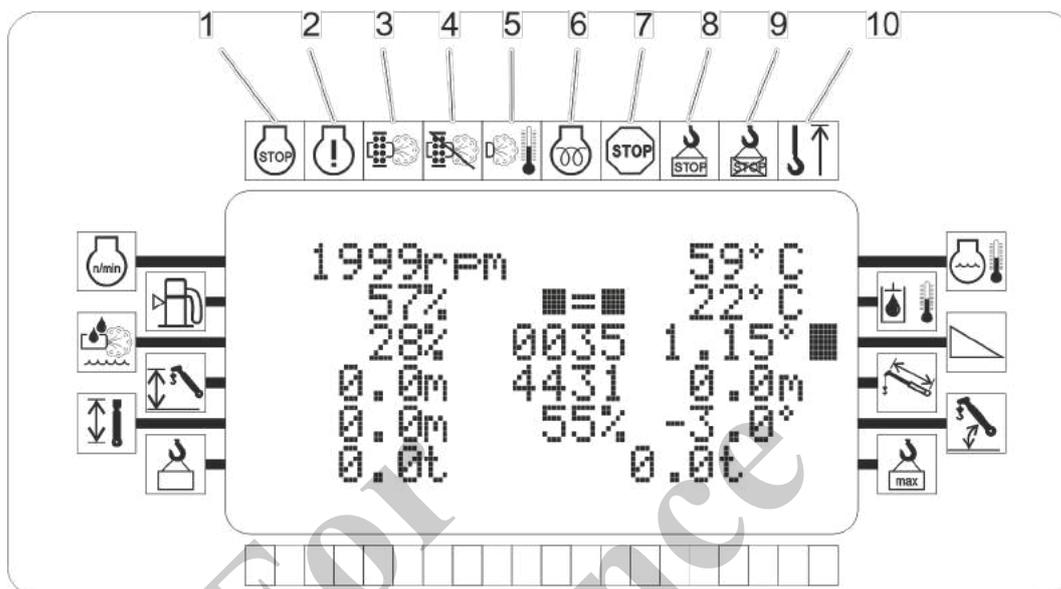
00460

Display	Description
	Track width permitted for the selected operating mode.
	Track width not permitted for the selected operating mode.

## Control and display elements, operating modes

### Notification and warning messages

If machine values are outside of normal tolerances, a rectangular warning indicator appears under the appropriate icon.



00461

Item		Display	Meaning
1	Serious engine fault	No warning	The drive engine is working properly.
			Warning of serious drive engine fault
2	Drive engine fault	No warning	The drive engine is working properly.
			Warning of drive engine fault
3	Load status of exhaust aftertreatment system	No warning	Automatic cleaning of the exhaust aftertreatment system is switched on.
			The depletion level of the exhaust aftertreatment system is normal.
			The depletion level of the exhaust aftertreatment system is high.
4	Automatic cleaning of the exhaust aftertreatment system sup-	No warning	Automatic cleaning of the exhaust aftertreatment system is active.

## Control and display elements, operating modes

Item		Display	Meaning
	pressed.		Automatic cleaning of the exhaust after-treatment system is suppressed.
5	Exhaust temperature	No warning	Exhaust temperature is normal.
			Exhaust temperature is high. Exhaust aftertreatment system regeneration is active.
6	Preheating	No warning	The drive engine is ready to start.
			The drive engine is pre-glowing.
7	Fault, overall machine	No warning	The machine is operating normally.
			There is a machine fault.
			There is a serious machine fault.
8	Lifting capacity warning	No warning	The load is normal.
			The load capacity is about to be exceeded.
			The load capacity has been exceeded.
9	LML bypassed	No warning	The overload warning device is active.
			The overload warning device is bypassed.
10	Lifting limit switch	No warning	The lifting limit switch has not been tripped.
			The lifting limit switch has been tripped.

### 5.3 SENCON diagnostics and control system - control and display elements, display images

#### 5.3.1 The SENCON operating concept

The SENCON is the digital diagnostic and control system of the machine.

It displays the machine status, energy consumption and capacity utilization as well as faults and malfunctions of machine and engine. The machine operator enters the operating parameters pertaining to the current setup of the machine.

The SENCON user interface is structured according to a uniform principle. The only exception to this principle is the "Diagnostics" menu.

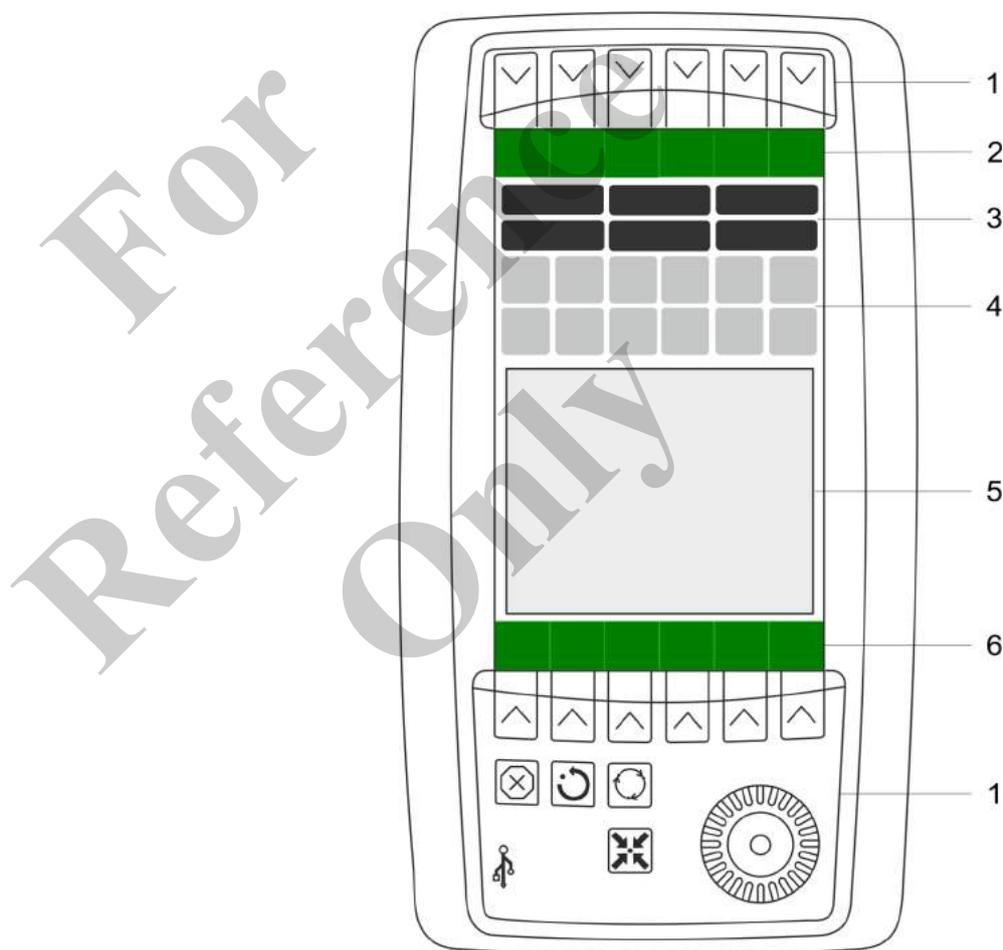


Fig. 16: Main areas of the SENCON user interface

- 1 Control elements
- 2 Toolbar with quick-select icons
- 3 Display elements
- 4 Warning and information symbols
- 5 Main menu or menu page
- 6 Toolbar with menu icons or quick-select icons

## Control and display elements, operating modes

### Control elements

The controls are mechanical switching elements. The machine operator uses the controls to navigate between menu pages, select a menu or value, or cancel an operation. On several menu pages, some of the controls are also available as touchscreen elements providing the same functions.

### Toolbar with quick-select icons



Quick-action icons can be activated and deactivated in the toolbar using the quick-select buttons. Pressing the quick-select buttons makes the functions immediately available or deselects them respectively.

### Display elements

The display elements provide current values on energy consumption and operating states.

### Warning and information symbols

The warning and information symbols reflect the current status of the machine and notify the machine operator of overload and error conditions or malfunctions.

### Menu page

Calling a menu opens a menu page. A menu can include multiple menu pages. The menu pages are numbered. The number of the opened page and the total number of all menu pages are displayed.

### Toolbar with menu icons and quick-select icons



In the “*main menu*”, the toolbar contains the menu icons. On the menu pages of the respective menu, the toolbar displays the quick-select icons. The menu icons and quick-select icons are selected using the quick-select buttons.

### “*Diagnostics*” menu

The “*Diagnostics*” menu differs from the other menus in its screen display.

The “*Diagnostics*” menu lists the fault history.

The fault conditions can uniquely be identified by the SPN codes or FMI codes. These are required by the service partner for troubleshooting.

## 5.3.2 Colors and meaning of the symbols

Information symbols, warning symbols, display elements and the various icons on the menu pages indicate by their color code

- whether the machine is in a safe or critical operating state
- whether a function is available or activated.

The symbols and displays on the menu pages can

- change their color
- Flashing
- change their appearance

### Information symbols and displays

The symbols and displays can appear in different colors: The colors have the following meaning:

- Gray: Operating status is within normal range.
- Orange: Operating status is within normal range.
  - Take corrective action soon.
- Red: Operating status has exceeded normal range.
  - Put the machine into a safe state as soon as possible.
  - Take corrective action immediately.
  - Only operate the machine when the error has been corrected.

**i**

*If a parameter field contains the value **EEEE**, an error has occurred. Faults can only be corrected by personnel authorized by the manufacturer. If a parameter field contains the value **----**, the value is not available.*

### Menu symbols and quick-select symbols

Menu symbols and quick-select symbols can appear in different colors. The colors have the following meaning:

- Gray: The function is not enabled or not available.
- Gray: The function is enabled or available.

## 5.3.3 Control elements

### Quick-select button

	Press button
	<ul style="list-style-type: none"> <li>■ A menu opens.</li> <li>■ A quick-select icon is activated or deactivated.</li> </ul>

### Not used

	Press button
	No function

## Control and display elements, operating modes

### Esc

	Press button	Tap on touch element	
		Green	
	Cancel action. <ul style="list-style-type: none"> <li>■ Deactivate the selection of a value.</li> <li>■ Go back to the corresponding menu page.</li> </ul>	—	
	—		Cancel action. Go back to the corresponding menu page.

### SET

	Press button	Tap on touch element	
		Grey	Green
	Confirm the set values.	—	—
	—	The function is cannot be selected.	Confirm the set values.

### HOME

	Press button
	Return to the main menu.

### SCROLL wheel

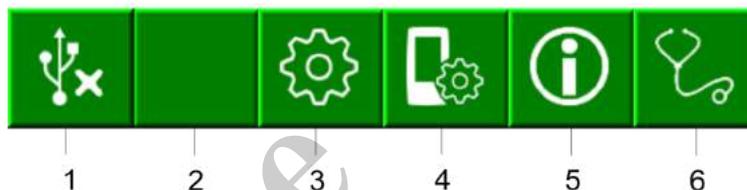
	Turn to the left	Turn to the right	Press
	Decreases the counter index of the menu page. Decreases a value. Navigates between adjustment options. Scrolls in lists.	Increases the counter index of the menu page. Increases a value. Navigates between adjustment options. Scrolls in lists.	Selects a configuration item.

### USB connection

	<b>Connect USB</b>
	Connects to external devices for diagnostic or configuration purposes via USB. Only to be used by personnel authorized by the manufacturer.

### 5.3.4 Menu icons

#### Overview of menu icons



- 1 Eject USB
- 2 Not used
- 3 Setup
- 4 Device settings
- 5 Info
- 6 Diagnostics

#### USB stick connected to the device

	<b>Green</b>
	A USB stick is connected to the device and ready for operation. Eject the USB stick by pressing the quick-select button. The symbol goes out.

#### Setup

	<b>Green</b>
	<p>Operating parameters, functions, configuration of functions</p> <ul style="list-style-type: none"> <li>■ “<i>Setup Configuration</i>” menu page: operating parameters of the LML for the desired mode</li> <li>■ “<i>Setup</i>” menu page: set up the counterweight; machine inclination</li> <li>■ “<i>Speed</i>” menu page: speeds of crane control functions</li> <li>■ “<i>Characteristics</i>” menu page: response behavior of crane control functions</li> <li>■ “<i>Pin Boom</i>” menu page: retracting and extending of the boom</li> </ul>

## Control and display elements, operating modes

### Device settings

	Green
	<p>Individual configurations of the device</p> <ul style="list-style-type: none"><li>■ <i>“Language settings”</i> menu page: language</li><li>■ <i>“Brightness”</i> menu page: brightness of display illumination and buttons</li><li>■ <i>“Date and time”</i> menu page: date and time</li><li>■ <i>“Unit system”</i> menu page: units</li></ul> <p>For personnel authorized by manufacturer:</p> <ul style="list-style-type: none"><li>■ <i>“USB”</i> menu page: diagnostics and configuration</li><li>■ <i>“Request access”</i>: diagnostics and configuration</li></ul>

### Info

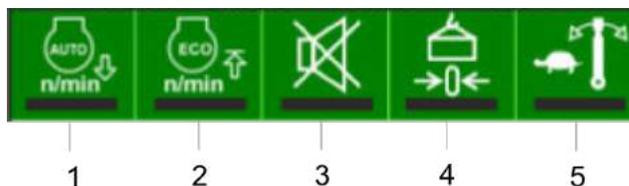
	Green
	<p>Information about the machine, software, and user</p> <ul style="list-style-type: none"><li>■ <i>“General information”</i> menu page: information about the machine and software</li><li>■ <i>“Drive engine”</i> menu page: speed ranges of the engine</li><li>■ <i>“Winch”</i> menu page: winch line pull</li></ul> <p>For personnel authorized by manufacturer:</p> <ul style="list-style-type: none"><li>■ <i>“Registration information”</i> menu page: information about the user and authorization level</li></ul>

### Diagnostics

	Green
	<p>Displays the fault history and fault descriptions.</p> <ul style="list-style-type: none"><li>■ <i>“Active Faults Engine”</i> menu page: current drive engine faults</li><li>■ <i>“Previous Faults Engine”</i> menu page: previous faults of the overall machine</li><li>■ <i>“Active Faults RCL”</i> menu page: current faults of the LML</li><li>■ <i>“Active Faults Machine”</i> menu page: current faults of the overall machine</li><li>■ <i>“Network”</i> menu page: condition and operating status of the machine's sensors and actuators</li><li>■ <i>“Input Vector CanOpen”</i> menu page: sensor and actuator input signals from the machine to the SENCON</li><li>■ <i>“Output Vector”</i> menu page: output signals from the SENCON to the machine control devices</li></ul>

## 5.3.5 Quick-select icons

### Overview of quick-select icons



- 1 Automatic idle
- 2 EcoMode
- 3 Audible warning device
- 4 Tare load
- 5 Uppercarriage slewing speed

### Automatic idle

	Yellow bar	Black bar
	Operation at reduced engine speed is activated. The engine is automatically switched off during inactivity.	Operation at the engine speed currently set is activated. The engine continues to run during inactivity.

### EcoMode

	Yellow bar	Black bar
	Engine power is reduced. Fuel consumption is lower.	The maximum engine power is available.

### Audible warning device

	Yellow bar	Black bar
	The audible warning device is switched on. A warning signal sounds when an impermissible operating state is reached or when specific crane control functions are initiated.	The audible warning device is switched off. The warning signal is suppressed. A fault is indicated by a relevant information symbol.

### Tare load

	Yellow bar	Black bar
	The actual load is set to zero. The [Tare load] function is deactivated automatically as soon as the boom is moved.	The function is inactive.

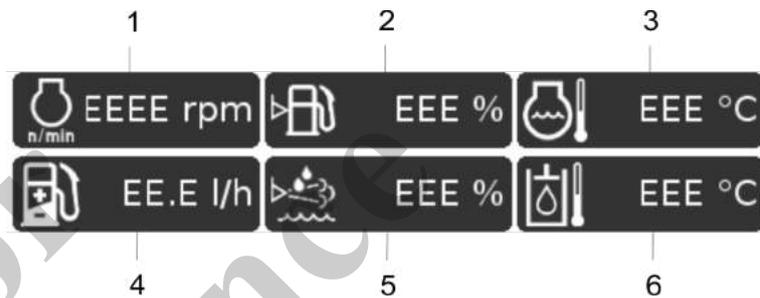
## Control and display elements, operating modes

### Uppercarriage slewing speed

	Yellow bar	Black bar
	The uppercarriage slewing speed is reduced.	The uppercarriage slewing speed corresponds to the individual setting.

### 5.3.6 Display elements

#### Overview of display elements



- 1 Engine speed
- 2 Diesel fuel level
- 3 Coolant temperature
- 4 Fuel consumption
- 5 DEF level
- 6 Hydraulic oil temperature

#### Engine speed

	Black
	The current engine speed is displayed.

#### Diesel fuel level

	Grey	Orange	Red
	The diesel fuel level is above 15%.	The diesel fuel level is between 5% and 15%.	The diesel fuel level is below 5%.

#### Coolant temperature

	Grey	Orange	Red
	The coolant temperature is in the permissible range.	The coolant temperature is about to exceed the permissible range.	The coolant temperature is too high.

## Control and display elements, operating modes

### Fuel consumption

	Black
	The current fuel consumption is displayed.

### DEF level

	Grey	Orange	Red
	The DEF level is above 10%.	The DEF level is between 5% and 10%. An acoustic signal will sound.	The DEF level is below 5%. An acoustic signal will sound.

### Hydraulic oil temperature

	Grey	Orange	Red
	The hydraulic oil temperature is below 80 °C.	The hydraulic oil temperature is between 80 °C and 85 °C.	The hydraulic oil temperature is above 85 °C.

### 5.3.7 Warning and information symbols

#### Number fields in warning and information symbols

The number fields in the upper, right-hand corner of the information and warning symbols display the current number of status and warning notifications requiring acknowledgment.

	Number field gray	Number field red
	There are no unacknowledged status and warning notifications.	There are unacknowledged status and warning notifications.

### Engine fault (serious)

	Grey	Red
	The engine is working properly.	A serious engine fault has occurred. An error message is shown.

## Control and display elements, operating modes

### Engine faults

	Grey	Red
	The engine is working properly.	An engine fault has occurred.

### Load status of the exhaust after-treatment system

	Grey	Orange	Flashing orange
	The load status is normal.	The load status is high. Regeneration can be carried out.	The load status is high. Regeneration must be carried out.
	—	Regeneration is suppressed.	—
	—	—	The load status is very high. The output of the diesel engine is reduced.
	—	—	Manual regeneration is required.

### Exhaust temperature

	Grey	Orange
	Exhaust temperature is normal.	Exhaust temperature is high. Exhaust aftertreatment system regeneration is encouraged.

### DEF quality

	Grey	Orange
	The DEF quality is normal.	The DEF quality is poor.

## Control and display elements, operating modes

### Engine preheating

	Grey	Orange
	The engine is ready to start. The preheating process is complete.	The engine is preheating.

### Machine fault display

	Grey	Orange	Red
	There are no faults.	A note is displayed.	—
	—	There is a medium fault. An acoustic signal (single tone) will sound.	—
	—	—	There is a serious fault. An acoustic signal (continuous tone) will sound.

### Load moment limitation

	Grey	Orange	Red
	The load moment is in the permissible range.	The load moment is about to be exceeded. An error message is shown.	The maximum permissible load moment has been exceeded. An error message is shown.

### Load capacity

	Grey	Orange	Red
	The load is in the permissible range.	The load capacity is about to be exceeded.	The maximum permissible load capacity has been exceeded. An acoustic signal will sound.
	—	—	No load torque monitoring The LML is bypassed.

## Control and display elements, operating modes

### Lifting limit switch

	Grey	Red
	The lift height is in the permissible range.	The maximum permissible lift height has been exceeded. The <b>lift loads, lower boom, extend boom</b> functions are deactivated
	—	The lift limit switch is bypassed. There will be no distance monitoring between the load hook and the pulley head.

### Emergency stop

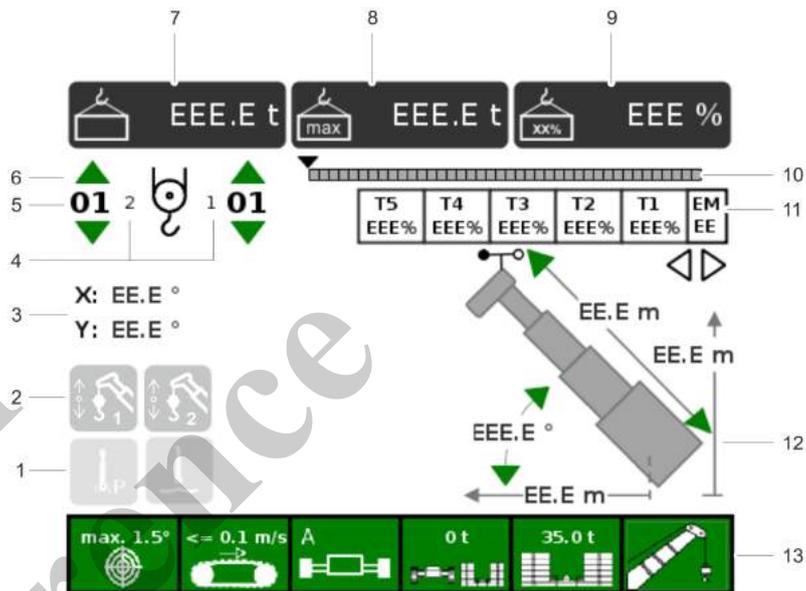
	Grey	Red
	The emergency stop is not actuated. All machine functions are available.	The emergency stop is actuated. The engine and all machine movements have been stopped.

### Battery charge level

	Grey	Red
	Battery charging.	The battery power supply is interrupted. The battery is drained.

## 5.3.8 Main menu

The “main menu” provides the machine operator with all relevant data when picking up a load, moving the load and moving the machine. Values in the permissible range, limit range or critical range are identified by different colors.



- 1 Slewing gear brake, slewing gear freewheeling
- 2 Allocation of winches and joysticks
- 3 Machine inclination in the x direction and y direction
- 4 Winch number
- 5 Reeving number
- 6 Movement direction of winches
- 7 Actual load
- 8 Maximum lifting capacity
- 9 Current load capacity
- 10 Load capacity scale
- 11 Pin boom display
- 12 Working diagram
- 13 Currently set operation parameters

### 5.3.8.1 Display elements

#### Actual load

	Grey	Red
	The actual load for the configured setup status is in the permissible range.	The actual load for the configured setup status exceeds the maximum load capacity.
	The actual load has been tared and is in the permissible range.	The actual load has been tared and exceeds the maximum load capacity.

## Control and display elements, operating modes

### Maximum load capacity in tons

	Black
	The maximum load capacity for the adjusted setup state in tons is displayed.

### Load capacity as a percentage

	Black
	The relative load in relation to the maximum load capacity for the adjusted set setup state is displayed.

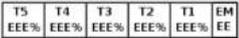
### Movement direction of winches

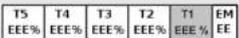
	Direction of movement display green	Direction of movement display gray	Direction of movement display red
	<p>It is permitted to move the hook in the indicated direction of movement.</p> <p>The hook is moving in the indicated direction of movement.</p>	The hook is not moving in the indicated direction of movement.	It is not possible to move the hook in the indicated direction of movement.

### Load capacity scale

	Green range	Yellow range	Red range
	The load is in the permissible range.	<p>The load capacity value is &gt; 90%.</p> <p>The load is in the critical range.</p>	The maximum permissible load capacity has been exceeded.

### Pin boom display

	Display
	<p>The current position of each of the telescopic thrusters is displayed in (%).</p> <p>The currently set extension mode is displayed.</p>

	white	Grey	Black
	The telescopic thruster is locked.	The secure locking unit is near a securing position in the lower boom section.	The secure locking unit is secured in the relevant telescopic thruster.

## Control and display elements, operating modes

### Machine inclination

	X: EE.E °	Y: EE.E °
X: EE.E ° Y: EE.E °	The machine inclination is indicated in the positive or negative x direction.	The machine inclination is indicated in the positive or negative y direction.

### 5.3.8.2 Information symbols

#### Allocation of winches and joysticks

	Green
	Winch 2 is operated with the left joystick. Winch 1 is operated with the right joystick. This allocation is the default assignment for the joysticks.
	Winch 1 is operated with the left joystick. Winch 2 is operated with the right joystick.

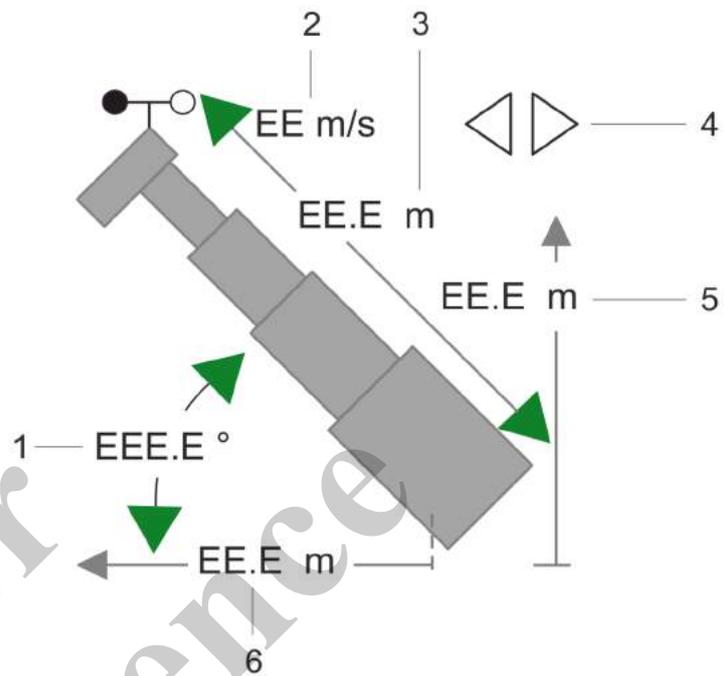
#### Swing park brake

	Grey	Green
	The swing park brake is disengaged. Slewing the uppercarriage is possible.	The swing park brake is actuated. Slewing the uppercarriage is not possible.

#### Slewing gear freewheeling

	Grey	Green
	The slewing gear freewheel is disengaged. The uppercarriage remains stationary once the joystick that has been moved is released.	The slewing gear freewheel is engaged. The uppercarriage continues to slew, without the speed being reduced, once the joystick that has been moved is released.
	—	Slewing gear freewheel not available. The uppercarriage inclination is more than 0.6°.

## 5.3.8.3 Working diagram

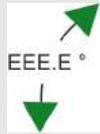


- 1 Boom angle
- 2 Wind speed (option)
- 3 Boom length
- 4 Secure locking unit motion indicator
- 5 Boom height
- 6 Working radius

### Directions of movement of work equipment

	Gray arrows	Green arrows	Red arrows
	The value is not available. The work equipment cannot be moved.	The values are in the permissible range. The work equipment can be moved.	The limit switch is engaged. The work equipment cannot be moved.
	—	—	The limit switch is bypassed. The work equipment can be moved.

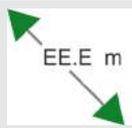
## Boom angle

	Display
	The current boom angle is displayed.

## Wind speed (option)

	Display
	The current wind speed is displayed.

## Boom length

	Display
	The current boom length is displayed.

## Secure locking unit motion indicator

			
The secure locking unit extends.	The secure locking unit retracts.	The secure locking unit does not move.	

## Boom height

	Display
	The current boom height is displayed.

## Working radius

	Display
	The current working radius is displayed.

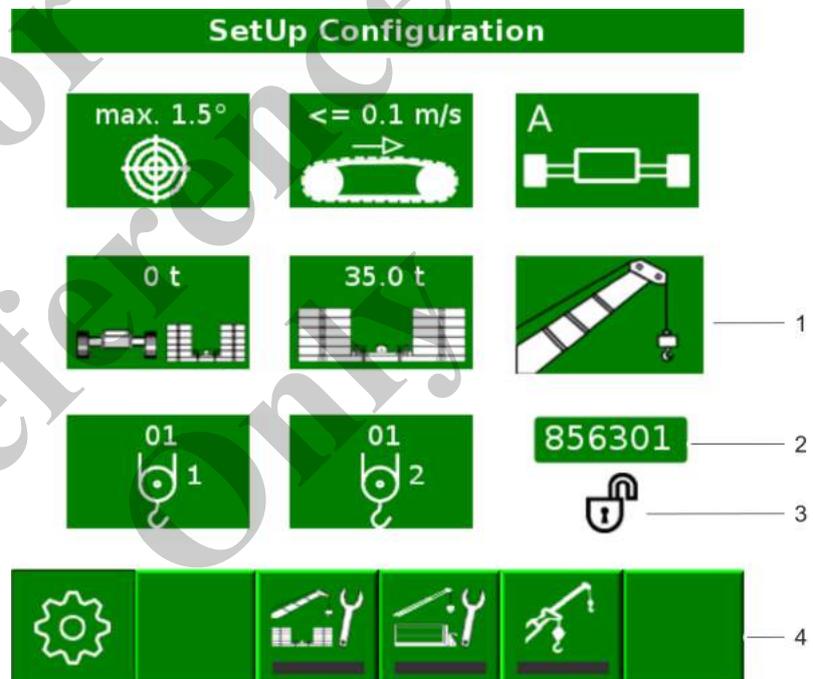
### 5.3.9 “Setup” menu

The **Setup** menu features the following menu pages:

- Setup status
- Setup
- Speed
- Characteristics
- Pin boom

#### 5.3.9.1 “Setup Configuration” menu page

On the “*Setup Configuration*” menu page, the operational parameters of the load moment limitation are adapted to the desired operating mode. The “*Setup Configuration*” menu page automatically appears after the ignition is turned on and the SENCON starts.



- 1 Operation parameters for setup
- 2 Config code
- 3 Load change lock
- 4 Menu icons/quick-select icons

#### 5.3.9.1.1 Operation parameters

##### Machine inclination

The following settings can be made:

### Machine inclination 0.3°

	<b>Green</b>
	A maximum machine inclination of 0.3° is set.

### Machine inclination 1.5°

	<b>Green</b>
	A maximum machine inclination of 1.5° is set.

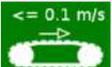
### Machine inclination 4.0° (option)

	<b>Green</b>
	A maximum machine inclination of 4.0° is set.

### Stationary/pick and carry work (option)

The following settings can be made:

#### Stationary work

	<b>Green</b>
	The "Stationary work" mode is set. A travel speed of up to 0.1 m/s is permissible.

#### Pick and carry (option)

	<b>Green</b>
	The (optional) "Pick & Carry" mode is set. A travel speed of up to 0.4 m/s is permissible.

### Track width

The following settings can be made:

#### Track width A

	<b>Green</b>
	The maximum track width is set.

## Control and display elements, operating modes

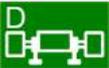
### Track width B

	<b>Green</b>
	The medium track width is set.

### Track width C

	<b>Green</b>
	The minimum track width is set.

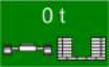
### Track width D

	<b>Green</b>
	The machine is supported by outrigger cylinders.

### Undercarriage ballast

The following settings can be made:

#### Undercarriage ballast 0 t

	<b>Green</b>
	An undercarriage ballast of 0 t is set.

### Counterweight

The following settings can be made:

#### Counterweight, 0 t

	<b>Green</b>
	A counterweight of 0 t is set. The machine is not equipped with ballast.

#### Counterweight, 21.3 t

	<b>Green</b>
	A counterweight of 21.3 t is set. The machine is partially equipped with ballast.

### Counterweight, 35.3 t

	<b>Green</b>
	A counterweight of 35.3 t is set. The machine is fully equipped with ballast.

### Attachments, setup type

The following settings can be made:

#### Boom

	<b>Green</b>
	The work is carried out with the main boom. No attachments are set up.

#### Auxiliary jib

	<b>Green</b>
	The auxiliary jib is set up.

#### Fly boom 0°

	<b>Green</b>
	The fly boom is set up. The fly boom angle is set to 0°.

#### Fly boom 20°

	<b>Green</b>
	The fly boom is set up. The fly boom angle is set to 20°.

#### Fly boom 40°

	<b>Green</b>
	The fly boom is set up. The fly boom angle is set to 40°.

## Control and display elements, operating modes

### Fly boom extension 0°

	<b>Green</b>
	The fly boom extension is set up. The fly boom extension angle is set to 0°.

### Fly boom extension 20°

	<b>Green</b>
	The fly boom extension is set up. The fly boom extension angle is set to 20°.

### Fly boom extension 40°

	<b>Green</b>
	The fly boom extension is set up. The fly boom extension angle is set to 40°.

### Heavy-duty jib 0°

	<b>Green</b>
	The heavy-duty jib is set up. The heavy-duty jib angle is set to 0°.

### Boom with elevating work platform

	<b>Green</b>
	The boom with elevating work platform is set up.

### Fly boom with elevating work platform

	<b>Green</b>
	The fly boom or fly boom extension with elevating work platform is set up.

### Setup ballast

	<b>Green</b>
	The [Setup ballast] operation parameter is set.

### Setup attachment

	<b>Green</b>
	The [Setup attachment] operation parameter is set.

### Winch reeving

#### Winch reeving for winch 1

	<b>Green</b>
	Configure the winch reeving for winch 1.

#### Winch reeving for winch 2

	<b>Green</b>
	Configure the winch reeving for winch 2.

#### 5.3.9.1.2 Display elements

##### Config code

	<b>Green</b>	<b>Flashing green</b>	<b>Red</b>
<b>156301</b>	The config code is valid and confirmed.	The config code is being processed and has not yet been confirmed.	The operation parameters that are currently set do not generate a valid config code.  "-----" is shown instead of a numerical value.  The display is flashing.

## Control and display elements, operating modes

### Load change lock

	Lock opened	Lock closed
	The load change lock is not active.	The load change lock is active. The LML operation parameters cannot be changed if the actual load is greater than the load defined for the load change lock.

### 5.3.9.1.3 Quick-select icons

#### Setup ballast

	Yellow bar	Black bar
	The <b>Setup ballast</b> setup mode with preset operation parameters is activated. The minimum limit value of the working radius is restricted.	The <b>Setup ballast</b> setup mode with preset operation parameters is deactivated. The operation parameters can be changed.

#### Setup attachment

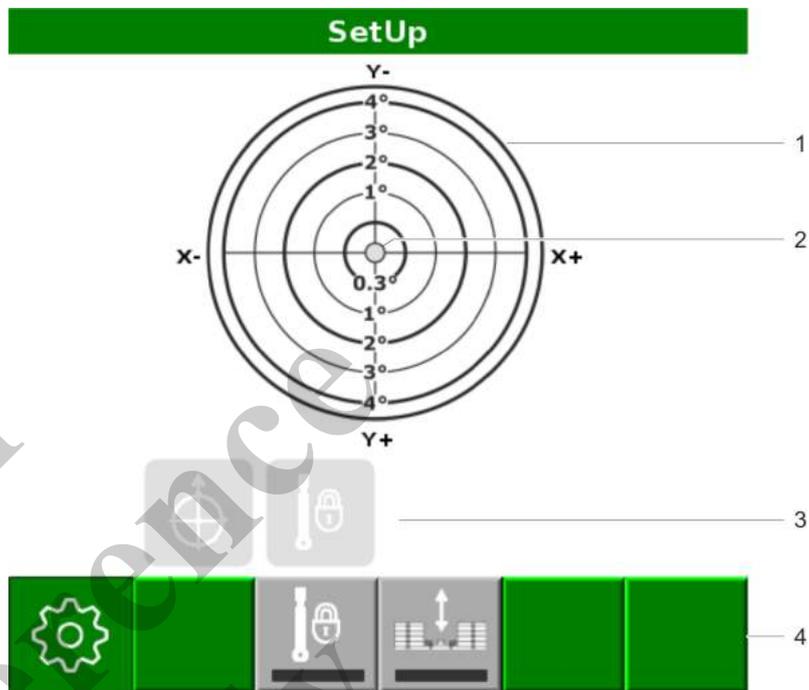
	Yellow bar	Black bar
	The <b>Setup attachment</b> setup mode with preset operation parameters is activated.	The <b>Setup attachment</b> setup mode with preset operation parameters is deactivated. The operation parameters can be changed.

#### Tilt-up panel lifting

	Yellow bar	Black bar
	The <b>Tilt-Up Panel Lifting</b> working mode is activated. The load capacity of the machine is limited to double-reeving as a maximum.	The <b>Tilt-Up Panel Lifting</b> working mode is deactivated. Two-hook operation is not permitted.

## 5.3.9.2 "Setup" menu page

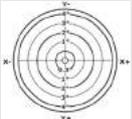
The "Setup" menu page contains functions needed for attaching the counterweight. It also displays the machine inclination using an electronic level.



- 1 Electronic level
- 2 Machine inclination
- 3 Information symbols
- 4 Menu icons/quick-select icons

### 5.3.9.2.1 Display elements

#### Electronic level

	X-	Y-	X+	Y+
	Machine inclination: To the right	Machine inclination: To the rear	Machine inclination: To the left	Machine inclination: To the front

## Control and display elements, operating modes

### 5.3.9.2.2 Information symbols

#### Uppercarriage at 0°

	Grey	Green
	Uppercarriage is not at 0°.	Uppercarriage is at 0°.

#### Uppercarriage locking mechanism

	Grey	Green
	Uppercarriage is unlocked.	Uppercarriage is locked.

### 5.3.9.2.3 Quick-select icons

#### Uppercarriage locking mechanism

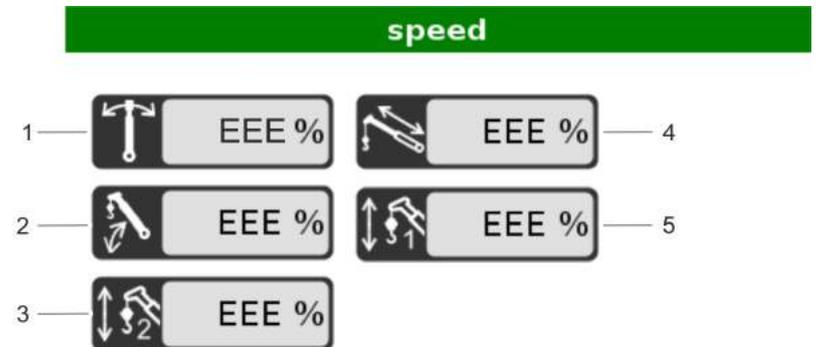
	Yellow bar	Black bar
	Uppercarriage is locked.	Uppercarriage is unlocked.

#### Ballasting mode

	Yellow bar	Black bar
	The ballasting mode is activated. The Setup remote radio control is used to control the machine during certain setup procedures.	The ballasting mode is deactivated. The machine is controlled using the controls in the cab.

## 5.3.9.3 “Speed” menu page

The “Speed” menu page is used to the speed of the respective work function.



- 1 Uppercarriage slewing speed
- 2 Raise/lower boom speed
- 3 Raise/lower winch 2 speed
- 4 Extend/retract telescope speed
- 5 Raise/lower winch 1 speed

### Uppercarriage slewing speed

	0% to 100%
	Set the speed for the [Slew uppcarriage] crane control function.

### Raise/lower boom speed

	0% to 100%
	Set the speed for the [Raise boom]/[Lower boom] crane control function.

## Control and display elements, operating modes

### Raise/lower winch 2 speed

	0% to 100%
 100 %	Set the speed for the [Raise winch 2]/[Lower winch 2] crane control function.

### Extend/retract telescope speed

	0% to 100%
 100 %	Set the speed for the [Extend telescope]/[Retract telescope] crane control function.

### Raise/lower winch 1 speed

	0% to 100%
 100 %	Set the speed for the [Raise winch 1]/[Lower winch 1] crane control function.

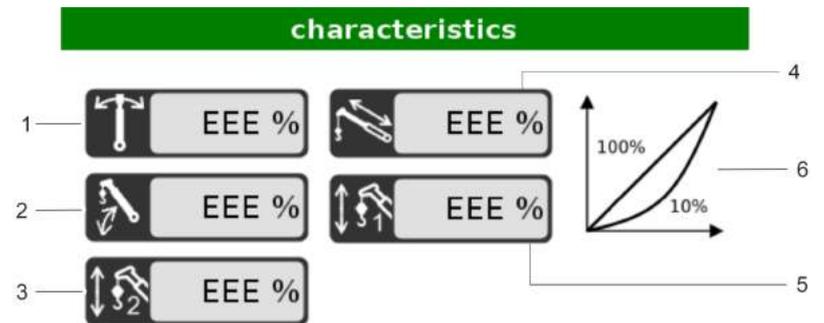
#### 5.3.9.3.1 Menu icons

##### Reset

	Green
	<ul style="list-style-type: none"><li>■ Reset the entered value or</li><li>■ acknowledge an error in the “Diagnostics” menu.</li></ul>

#### 5.3.9.4 “Characteristics” menu page

The “Characteristics” menu page is used to set the response behavior for the respective work functions. The values in % correspond to the relative increase in speed for the same joystick deflection.



- 1 Slew uppercarriage response behavior
- 2 Raise/lower boom response behavior
- 3 Raise/lower winch 2 response behavior
- 4 Extend/retract telescope response behavior
- 5 Raise/lower winch 1 response behavior
- 6 diagram

**Slew uppercarriage response behavior**

	0% to 100%
 100 %	Set the response behavior for the <i>[Slew uppercarriage]</i> crane control function.

**Raise/lower boom response behavior**

	0% to 100%
 100 %	Set the response behavior for the <i>[Raise boom]/[Lower boom]</i> crane control function.

## Control and display elements, operating modes

### Raise/lower winch 2 response behavior

	0% to 100%
 	Set the response behavior for the <i>[Raise winch 2]/[Lower winch 2]</i> crane control function.

### Extend/retract telescope response behavior

	0% to 100%
 	Set the response behavior for the <i>[Extend telescope]/ [Retract telescope]</i> crane control function.

### Raise/lower winch 1 response behavior

	0% to 100%
 	Set the response behavior for the <i>[Raise winch 1]/[Lower winch 1]</i> crane control function.

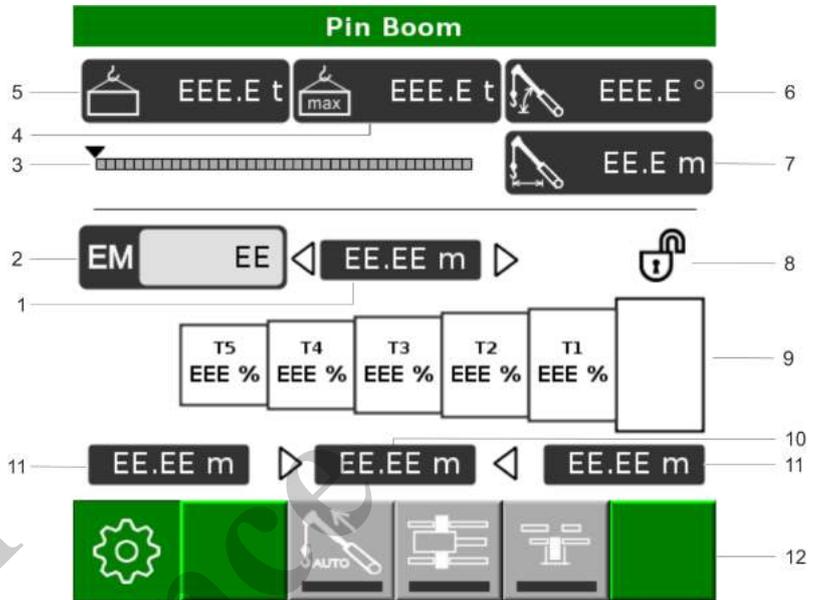
#### 5.3.9.4.1 Menu icons

##### Reset

	<b>Green</b>
	<ul style="list-style-type: none"><li>■ Reset the entered value or</li><li>■ acknowledge an error in the “<i>Diagnostics</i>” menu.</li></ul>

5.3.9.5 "Pin boom" menu page

Pin boom



- 1 Secure locking unit motion indicator, current boom length display
- 2 Extension mode
- 3 Load capacity scale
- 4 Maximum load capacity in tons
- 5 Actual load
- 6 Boom angle
- 7 Working radius
- 8 Load change lock
- 9 Telescopic thruster position indicator
- 10 Secure locking unit position indicator, current secure locking unit stroke display
- 11 Previous/next possible bolt position
- 12 Menu symbols/quick-select buttons

5.3.9.5.1 Display elements

Secure locking unit motion indicator

	Display
	Indicates the current boom length.

	The secure locking unit extends.	The secure locking unit retracts.	The secure locking unit does not move.

## Control and display elements, operating modes

### Extension mode (EM)



*This display element only appears during semi-automatic operation.*

	Green	Grey
	The extension mode is selected and can be changed.	The currently set extension mode is displayed.

### Load capacity scale

	Green range	Yellow range	Red range
	The load is in the permissible range.	The load capacity value is > 90%. The load is in the critical range.	The maximum permissible load capacity has been exceeded.

### Maximum load capacity in tons

	Black
	The maximum load capacity for the adjusted setup state in tons is displayed.

### Actual load

	Grey	Red
	The actual load for the configured setup status is in the permissible range.	The actual load for the configured setup status exceeds the maximum load capacity.
	The actual load has been tared and is in the permissible range.	The actual load has been tared and exceeds the maximum load capacity.

### Boom angle

	Black
	The current boom angle is displayed.

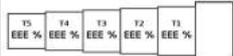
### Working radius

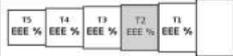
	<b>Black</b>
	The current working radius is displayed.

### Load change lock

	<b>Lock opened</b>	<b>Lock closed</b>
	The load change lock is not active.	The load change lock is active. The LML operation parameters cannot be changed if the actual load is greater than the load defined for the load change lock.

### Telescopic thruster position indicator

	<b>Display</b>
	The current position of each of the telescopic thrusters is displayed in (%).

	<b>white</b>	<b>Grey</b>	<b>Black</b>
	The telescopic thruster is locked.	The secure locking unit is near a securing position in the lower boom section.	The secure locking unit is secured in the relevant telescopic thruster.

## Control and display elements, operating modes

### Secure locking unit position indicator

	Display
	Indicates the current stroke of the secure locking unit.

				
	The secure locking unit is positioned far from the securing position.	The secure locking unit is positioned too deep to be secured.  The secure locking unit needs to be extended further in order to be secured.	The secure locking unit is positioned too high to be secured.  The secure locking unit needs to be retracted further in order to be secured.	The securing position is reached.

### Observe operating manual

	Grey	Orange
	—	Prompts users to read the operating manual because using the function without knowledge of the mode of operation may cause damage to the machine.

### 5.3.9.5.2 Quick-select icons

#### Telescoping mode

	Yellow bar	Black bar
	Semi-automatic telescoping mode (standard mode) is selected.  The locking and unlocking processes are initiated automatically. Stopping at an intermediate position is possible.	Manual telescoping mode (emergency operation) is selected.  The locking and unlocking processes are initiated manually.

### Securing of secure locking unit

	Yellow bar	Flashing yellow bar	Black bar
	<p>The secure locking unit is secured.</p> <p>The secure locking unit is connected to the relevant telescopic thruster.</p>	<p>The securing process is activated, but not yet complete.</p>	<p>The secure locking unit is unfastened.</p> <p>The secure locking unit is not connected to a telescopic thruster.</p>

### Locking of telescopic thruster

	Yellow bar	Flashing yellow bar	Black bar
	<p>The telescopic thruster is unlocked.</p>	<p>The locking process is activated, but not yet complete.</p>	<p>The telescopic thruster is locked.</p>

## 5.3.10 “Device settings” menu

### 5.3.10.1 “Language” menu page

#### Language

The “Language settings” menu page is used to set the language for the screen texts.

- 1 New > New language
- 2 Current > Current language
- 3 Available languages

### 5.3.10.2 “Brightness” menu page

The “*Brightness*” menu page is used to set the brightness for the display illumination and the buttons.

- 1 Display
- 2 Buttons

#### Brightness

	black	White
	The brightness for display illumination and buttons is high.	The brightness for display illumination and buttons is low.

### 5.3.10.3 “Date and time” menu page

The “*Date and time*” menu page is used to set the date and time.

- 1 Time setting
- 2 Date setting
- 3 Time format 12/24 h
- 4 Set time
- 5 Date format
- 6 Set date

### Date

Setting the date	
	Set the current date and date format: <ul style="list-style-type: none"> <li><input type="checkbox"/> yyyy-mm-dd</li> <li><input type="checkbox"/> mm/dd/yyyy</li> <li><input type="checkbox"/> dd.mm.yyyy</li> </ul>

### Time

Setting the time	
	Set the current time and time format: <ul style="list-style-type: none"> <li><input type="checkbox"/> 24h</li> <li><input type="checkbox"/> 12h</li> </ul>

#### 5.3.10.4 “Units” menu page

The “Units” menu page is used to set the displayed units.

- 1 Temperature unit setting
- 2 Pressure unit setting
- 3 Weight unit setting
- 4 Length unit setting
- 5 Volume unit setting

### Temperature units

Select temperature unit	
	Set the unit for the temperature display: <ul style="list-style-type: none"> <li><input type="checkbox"/> °C</li> <li><input type="checkbox"/> °F</li> </ul>

## Control and display elements, operating modes

### Pressure units

Set the pressure unit	
	Set the unit for the pressure display: <ul style="list-style-type: none"><li><input type="checkbox"/> bar</li><li><input type="checkbox"/> psi</li></ul>

### Weight units

Set the weight unit	
	Set the unit for the load display: <ul style="list-style-type: none"><li><input type="checkbox"/> t</li><li><input type="checkbox"/> l.t. (UK)</li><li><input type="checkbox"/> s.t. (US)</li><li><input type="checkbox"/> lb</li></ul>

### Length units

Set the length unit	
	Set the unit for the length display: <ul style="list-style-type: none"><li><input type="checkbox"/> m</li><li><input type="checkbox"/> ft</li></ul>

### Volume units

Set the volume unit	
	Set the unit for the volume display: <ul style="list-style-type: none"><li><input type="checkbox"/> l</li><li><input type="checkbox"/> gal (UK)</li><li><input type="checkbox"/> gal (US)</li></ul>

### 5.3.10.5 “USB” menu page

The “USB” menu page can only be used by manufacturer-authorized personnel for diagnostics and configuration purposes.

### 5.3.10.6 “Request access” menu page

The “Request access” menu page can be used for diagnostics and configuration purposes.

For  
Reference  
Only

### 5.3.11 “General information” menu

#### 5.3.11.1 “General information” menu page

The “General information” menu page displays general information about the machine and the SENCON.

- 1 Machine number
- 2 SENCON serial number
- 3 Software version

#### 5.3.11.2 “Registration information” menu page

The “Registration information” menu page can only be used by manufacturer-authorized personnel for diagnostics and configuration purposes.

### 5.3.11.3 “Drive engine” menu page

The “Drive engine” menu page measures how long the diesel engine is operated within a speed range. The values measured in the speed ranges are displayed in a histogram. The measurement starts at the time of the initial startup of the machine and cannot be reset.

Speed ranges are shown as a percentage of total operation. In the example, the diesel engine was operated 25% of the overall operating time with a speed from 751 to 850 rpm and 75% of the overall operating time with 851 to 1490 rpm.

1 Total diesel engine operating hours

#### 5.3.11.3.1 Display elements

##### Operating hours

Display	
 0.00 h	Displays the overall operating hours.

### 5.3.11.4 “Winch” menu page

The “Winch” menu page measures how long each winch is operated within a line pull range. The measurement starts at the time of the initial startup of the machine and cannot be reset.

Line pull ranges are shown as a percentage of total operation. The example shows that winch 1 was operated at a line pull of 2.5 t to 12.5 t (2.7 US tons to 13.7 US tons) for 25% of the overall operating time and 12.5 t to 25 t (13.7 US tons to 27.5 US tons) for 75% of the overall operating time.

Line pull is shown in decitons. Accordingly, a value of **125** on the X-axis corresponds to a line pull of 12.5 t (13.7 US tons).

1 Total winch operating hours

#### 5.3.11.4.1 Display elements

##### Operating hours

	Display
 0.00 h	Displays the overall operating hours.

### 5.3.12 “Diagnostics” menu

The “Active Faults Engine”, “Active Faults RCL” and “Active Faults Machine” diagnostic menus display current machine statuses and faults.

The menu pages list the SPN and FMI error codes. These error codes allow users to uniquely identify the machine fault.

- SPN error code: display of sensor or actuator that generates the message
- FMI error code: error code for an SPN code

Some fault messages can be resolved by the operator. Troubleshooting measures can be found in the overview of status messages.

If the error message is not in the overview, it must be sent to your service partner. Be sure to include the SPN code and FMI code with the error message. This information allows the Service Partner to diagnose the fault and take appropriate measures.

- 1 Icon, orange or red depending on severity of error
- 2 OC (Occurrence Count): frequency of fault
- 3 SPN code (Suspect Parameter Number)
- 4 FMI code (Failure Mode Indicator)
- 5 Brief description of SPN code
- 6 Brief description of FMI code

Fig. 17: Sample fault message

**i** Arrows in the “Diagnostics” menu page indicate that not all pending errors can be displayed. Scroll through the list using the SCROLL wheel.

### 5.3.12.1 “Active Faults Engine” menu page

The “Active Faults Engine” window displays all the engine faults that have occurred.



For Reference Only

5.3.12.2 “Active Faults RCL” menu page

Active Faults RCL

The “Active Faults RCL” menu page displays the pending load moment limitation faults.

For  
Reference  
Only

### 5.3.12.3 “Active Faults Machine” menu page

#### Active Faults Machine

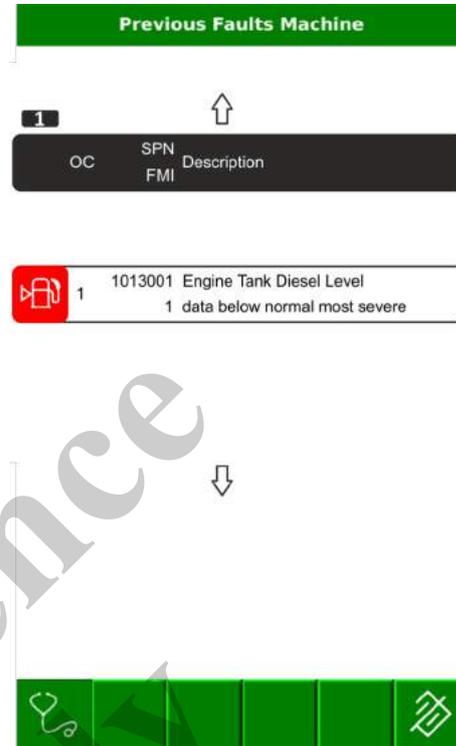
The “Active Faults Machine” menu page displays the pending faults for the overall machine.

For  
Reference  
Only

## 5.3.12.4 “Previous Faults Machine” menu page

### Previous faults machine

The “Previous Faults Machine” displays the previous faults of the overall machine.



### 5.3.12.4.1 Menu icons

#### Reset

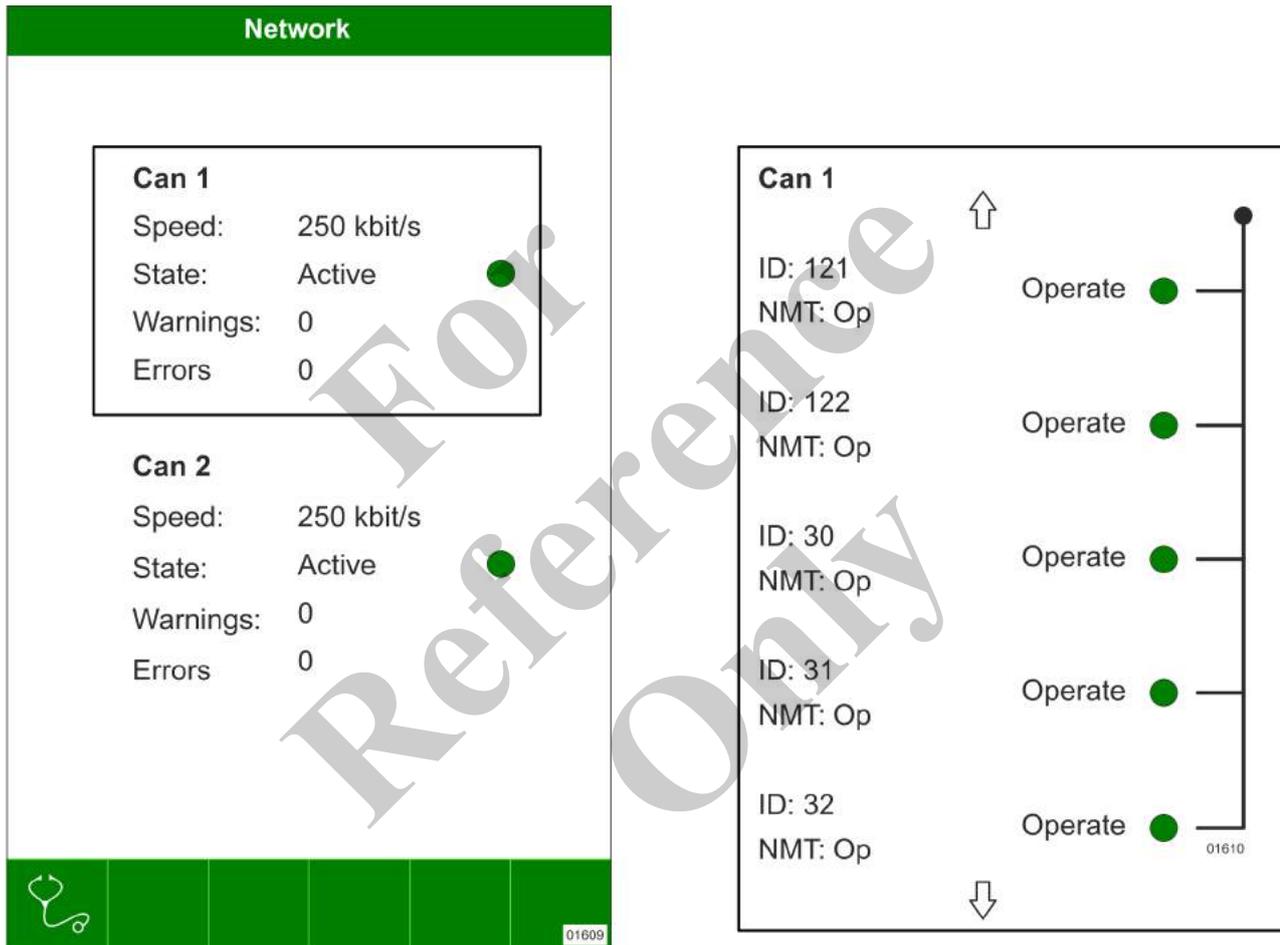
Green	
	<ul style="list-style-type: none"> <li>Reset the entered value or</li> <li>acknowledge an error in the “Diagnostics” menu.</li> </ul>

### 5.3.12.5 “Network” menu page

#### Network

The “Network” menu page displays the condition and operating status of the sensors and actuators on the machine. Two CAN bus systems are used to connect the sensors and actuators to the SENCON:

- **Can 1** is the connection to the machine functions. Here is the status of the individual and network nodes is shown.
- **Can 2** is the connection to the diesel engine functions.



### 5.3.12.6 “Input Vector CanOpen” menu page

#### Incoming signals

The “Input Vector CanOpen” menu page displays the signals sent to the SENCON by the sensors and actuators on the machine. The “Input Vector CanOpen” menu page can be used by manufacturer-authorized service personnel for diagnostic purposes.



*Depending on the type of sensor or actuator, the actual and target values are output in mA, V, or as the logical values 1 or 0. Values outside the defined range can indicate a sensor/actuator fault.*

For  
Reference  
Only

- 1 Sensor/actuator signal value
- 2 Operating state symbol
- 3 Sensor/actuator output value
- 4 Sensor/actuator description
- 5 Sensor/actuator operating state description

### 5.3.12.7 “Output Vector” menu page

#### Transmitting signals

The “Output Vector” menu page displays the output signals that the SENCON sends to the other control device of the machine. The “Output Vector” menu page can be used by manufacturer-authorized service personnel for diagnostic purposes.



*Depending on their intended purpose, sensors can transmit data as digital values, as voltage, or as amperage. Values outside the defined range can indicate a sensor/actuator fault.*

For  
Reference  
Only

- 1 Actual output signal value in mA
- 2 Output signal symbol
- 3 Target value in mA
- 4 Output description
- 5 Output state description

## 5.4 Operating the SENCON diagnostics and control system

In the following chapters, screenshots of the user interface illustrate the steps to operate the SENCON. The values shown in the menu pages are examples and may differ from the actual application.

### 5.4.1 Overview of the most important operating and display elements

#### SCROLL wheel

	Turn to the left	Turn to the right	Press
	Decreases the counter index of the menu page. Decreases a value. Navigates between adjustment options. Scrolls in lists.	Increases the counter index of the menu page. Increases a value. Navigates between adjustment options. Scrolls in lists.	Selects a configuration item.

#### SET

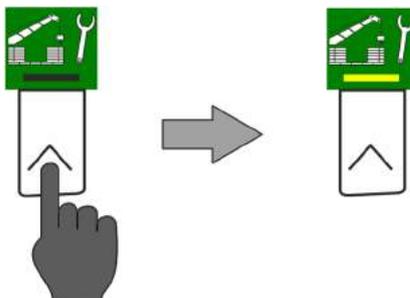
	Press button	Tap on touch element	
		Grey	Green
	Confirm the set values.	—	—
	—	The function is cannot be selected.	Confirm the set values.

#### Quick-select button

	Press button
	<ul style="list-style-type: none"> <li>■ A menu opens.</li> <li>■ A quick-select icon is activated or deactivated.</li> </ul>

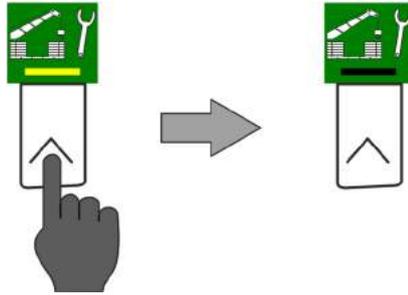
### 5.4.2 Enabling/disabling the quick-select icons

#### Activating the quick-select symbol



## Control and display elements, operating modes

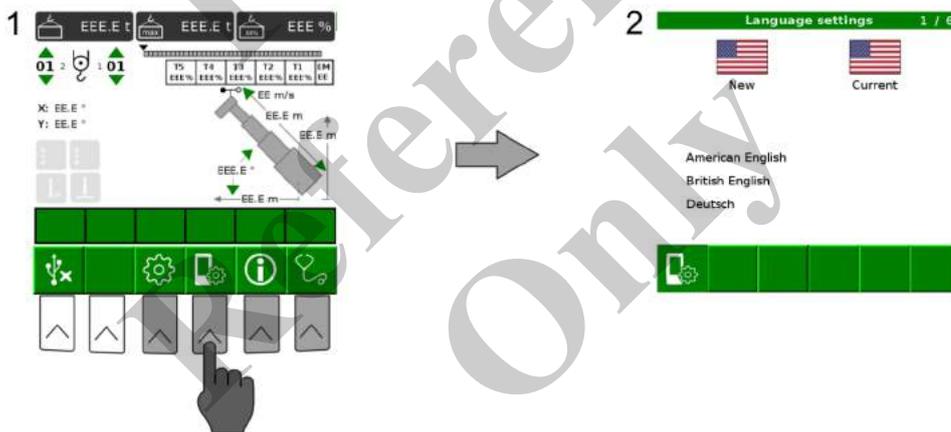
### Deactivating the quick-select icon



**i** Switching off the ignition also deactivates the quick-select icon. The values are reset to the last valid setting.

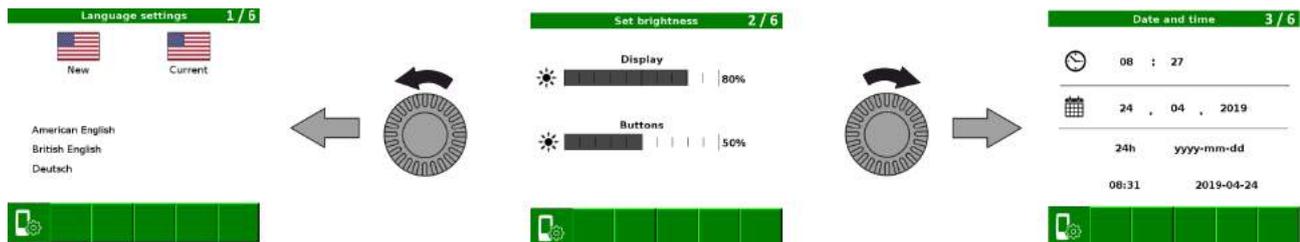
### 5.4.3 Selecting a menu

Requirement:  
The main menu is open.



### 5.4.4 Navigating between menu pages

Requirement:  
No values are selected on the menu page.



### 5.4.5 Return to the main menu

#### HOME

	Press button
	Return to the main menu.

### 5.4.6 Cancelling an action

#### Esc

	Press button	Tap on touch element
		<b>Green</b>
	Cancel action. <ul style="list-style-type: none"> <li>■ Deactivate the selection of a value.</li> <li>■ Go back to the corresponding menu page.</li> </ul>	—
	—	Cancel action. Go back to the corresponding menu page.

### 5.4.7 Setting operating parameters

Requirement:

The "Setup Configuration" menu page is open.

## Control and display elements, operating modes

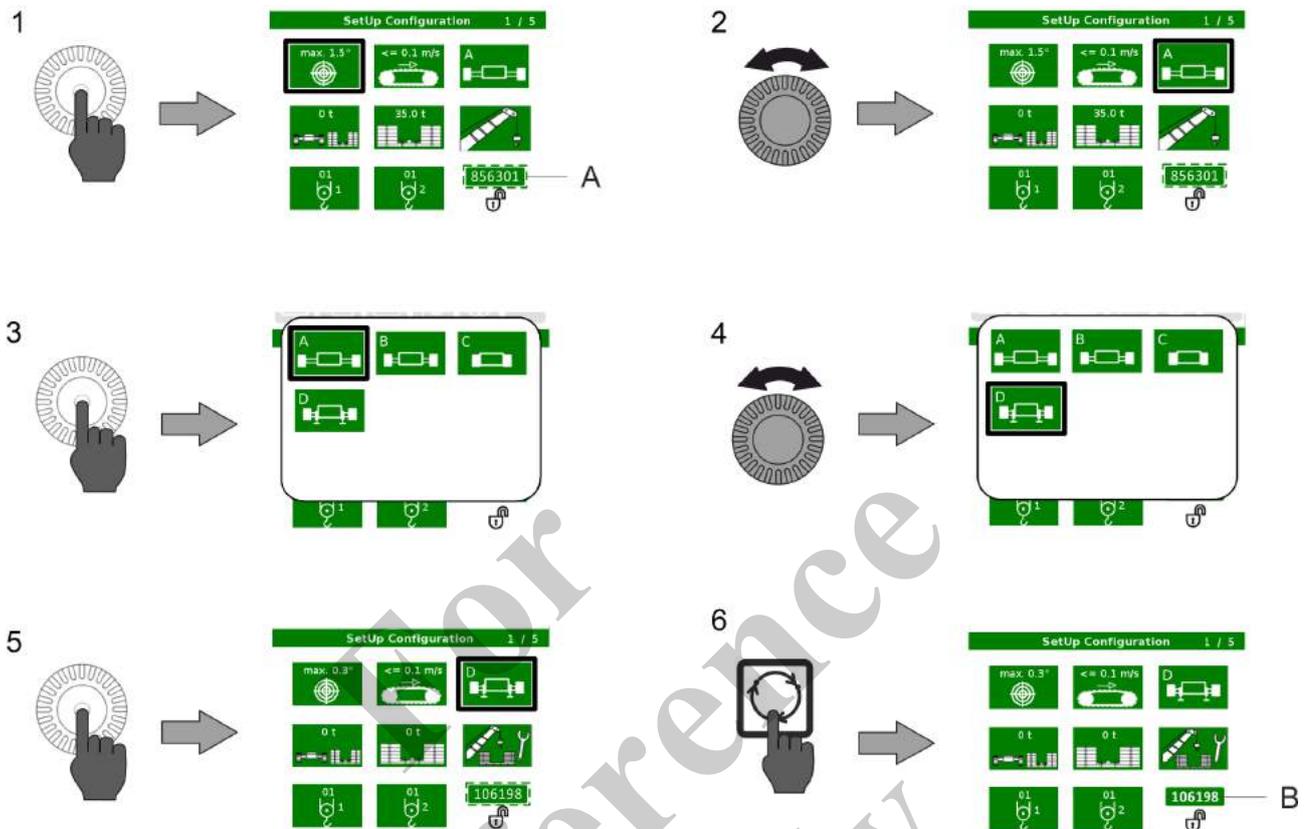


Fig. 18: Setting the operating parameter based on the example of "Track width"

A flashing green

B GREEN

### Config code

	Green	Flashing green	Red
156301	The config code is valid and confirmed.	The config code is being processed and has not yet been confirmed.	The operation parameters that are currently set do not generate a valid config code. "-----" is shown instead of a numerical value. The display is flashing.

### 5.4.8 Confirming setup status

The setup state must be confirmed via a pop-up window following each change that affects the LML.

Confirmation is required

- after the system has started up.
- after the operating parameters have been changed and the setup code has been confirmed using [SET].
- after a quick-select button has been selected.
- after a switch has been activated.

### Action ok



### Cancelling an action



### 5.4.9 Setting values

There are various ways to go about setting a value.

## Control and display elements, operating modes

### Procedure 1

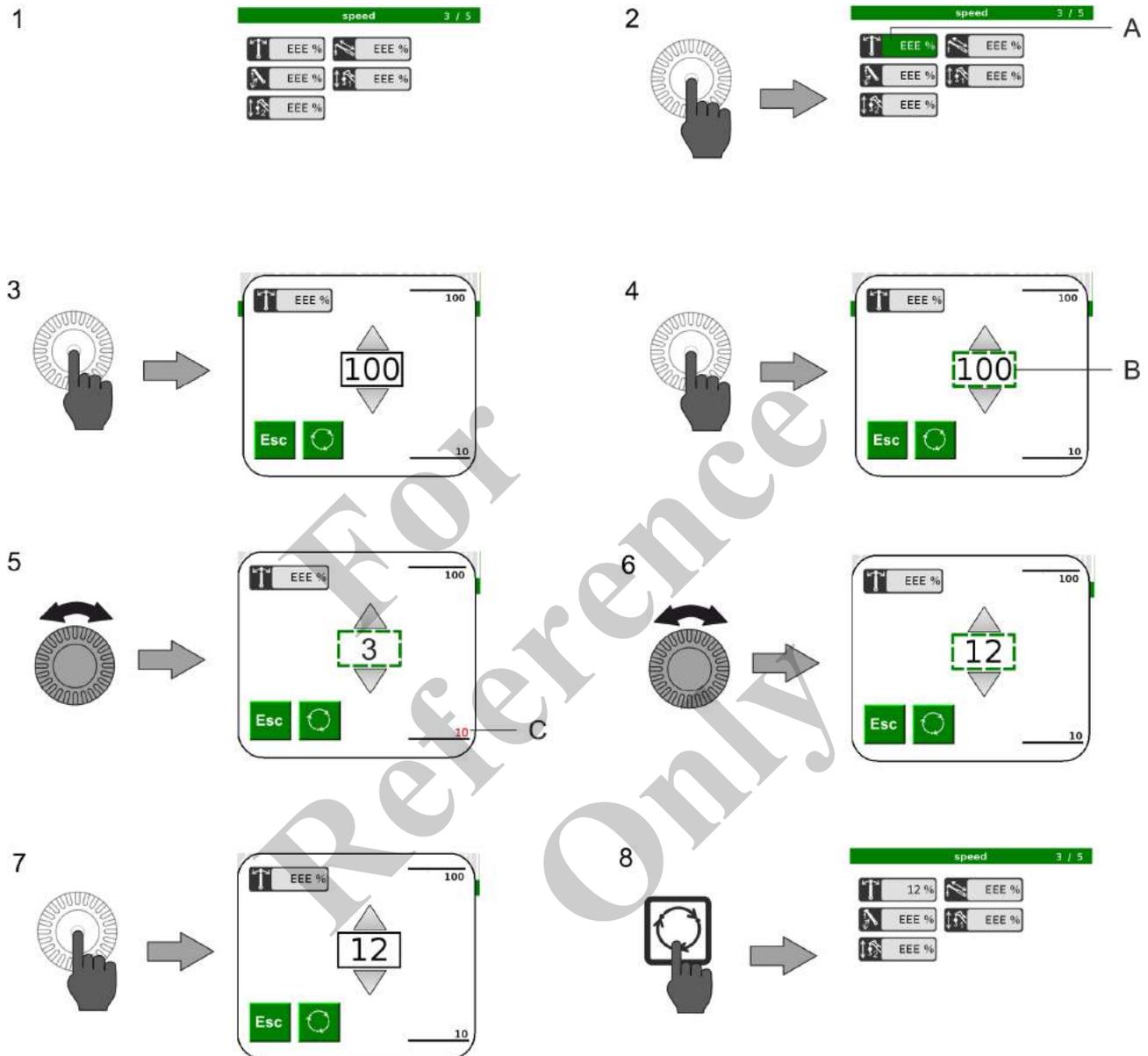


Fig. 19: Setting the value using the "Changing the uppercarriage slewing speed" example

A GREEN  
B flashing green

C red



The currently set value cannot be adopted by pressing [SET] if the value is outside the specified working range. The respective limit value is shown in red.

Procedure 2

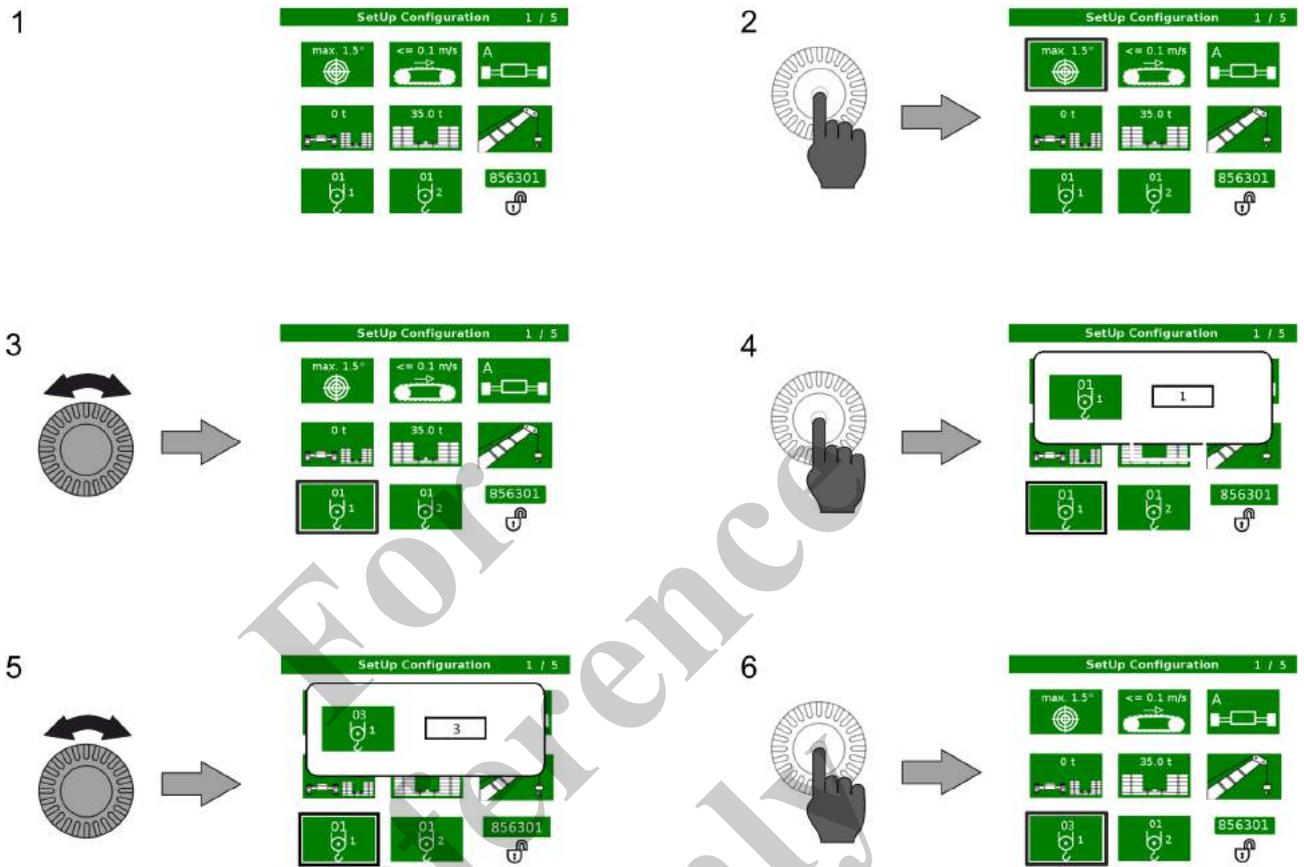


Fig. 20: Setting a value based on the example of "Winch reeving for winch 1"

## Control and display elements, operating modes

### Procedure 3

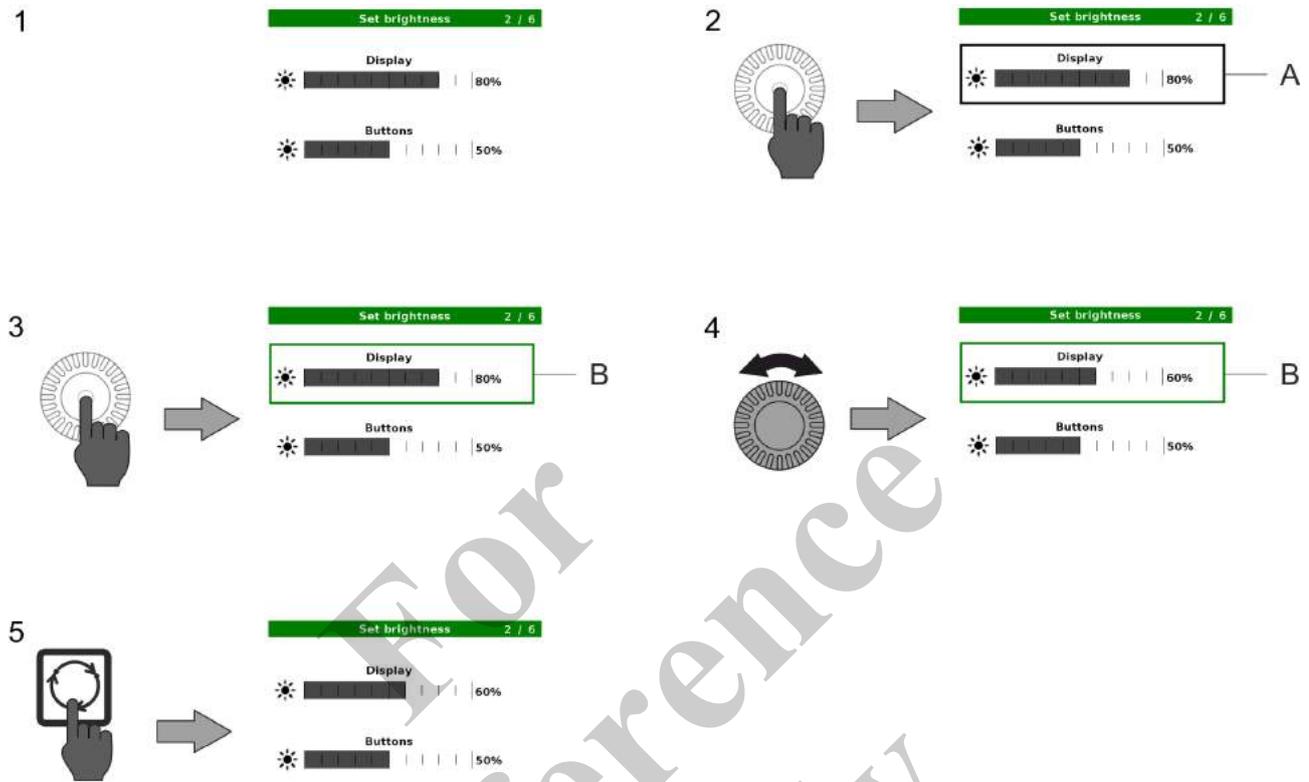


Fig. 21: Setting a value based on the example of "Change display brightness"

A black

B GREEN

## 5.4.10 Resetting a fault message

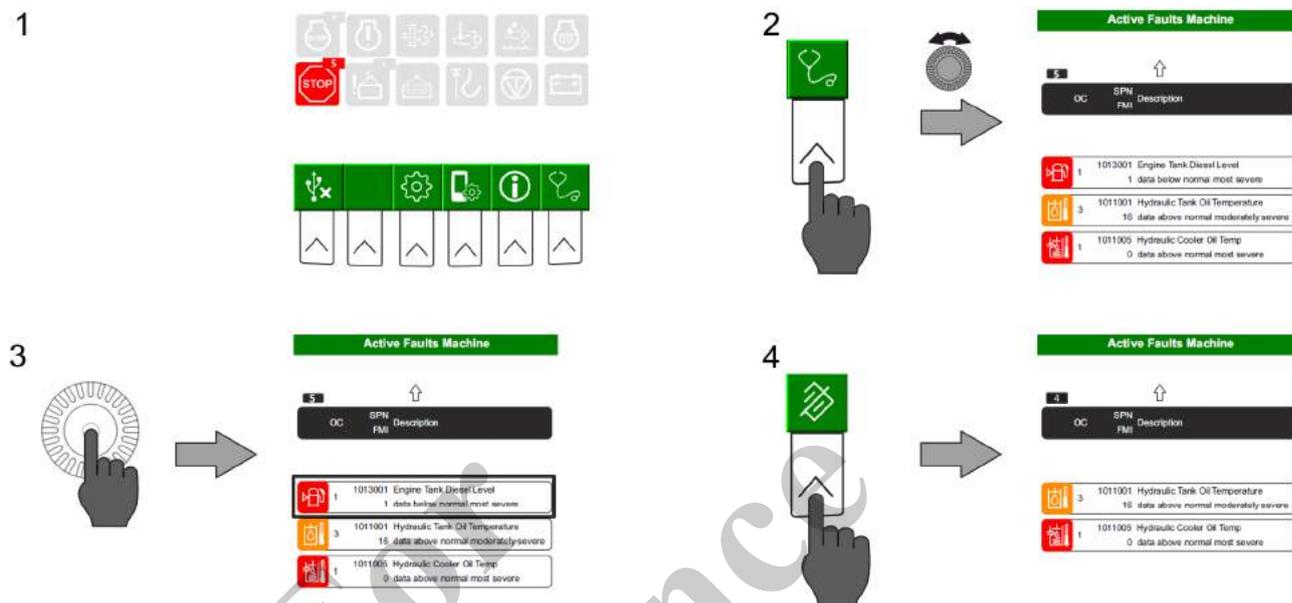


Fig. 22: Resetting a fault message using the "Active Faults Machine" example

**i** When a new fault message occurs, the acknowledged fault message will be displayed again, unless the fault has been corrected in the meantime.

## 5.5 Operating modes

There are various machine operating states for which a valid operating mode has to be set.

- Traveling
- Setup mode
- Work mode

### 5.5.1 Traveling

In travel mode, the machine is moved between the transport vehicle, construction sites, and work sites at zero load. The machine can be moved with maximum, medium, or minimum track width, as well as with or without counterweight, subject to compliance with specific conditions.

No specific operating mode is selected to move the machine between the transport vehicle, construction sites, and work sites. The machine parameters are not monitored.

#### Further notes

🔗 Chapter 7.13.1 "Work site and tracks" on page 463

🔗 Chapter 7.13.2.1.1 "Conditions for moving the machine in travel mode" on page 464

### 5.5.2 Setup mode

In setup mode, various components are assembled or dismantled on the machine for transport purposes or a change of application.

A valid setup mode must be configured to set up the machine.

### 5.5.3 Work mode

In working mode, the machine moves loads in an operating area on a construction site or moves the load between individual construction sites or operating areas. Moving the machine with loads between individual construction sites or operating areas is governed by country-specific regulations and is not permitted in every country of operation.

A valid working mode must be configured to use the machine in working mode.

### 5.5.4 Setting an operating mode

To set up the machine or carry out various tasks with the machine, an operating mode must be configured on SENCON. The set operating mode is used to monitor the setup or work process of the machine and to inform the user when limit values have been reached or if it is no longer possible to work safely.

#### 5.5.4.1 Setting a setup mode

A valid setup mode is required when changing the status of the machine (when ballasting or adding attachments, for example).

The setup mode can be set either by selecting individual operating parameters or by pressing the corresponding quick-select button.

Once setup work is complete, the individual operating parameters must be adapted to reflect the current setup of the machine.

The following setup modes are available:

- Setup ballast
- Setup attachment

##### 5.5.4.1.1 Setting Setup ballast

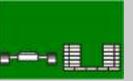
The **Setup ballast** setup mode is used for

- Setting up the traveling gears
- Installing/removing the hoisting rope
- Reeving the hoisting rope
- Mounting/removing the ballast blocks

## Control and display elements, operating modes

### Setting Setup ballast via operating parameters

For the **Setup ballast** setup mode, the following operating parameters must be configured on the SENCON "Setup configuration" menu page.

Symbol for operating parameters							
Setting	0.3°	<=0.1 m/s	D	0 t	0 t	Setup ballast	according to current setup status of the machine

### Setting Setup ballast using the quick-select button

The quick-select button can be used to configure the **Setup ballast** setup mode on the SENCON "Setup configuration" menu page.

#### Setup ballast

	Yellow bar	Black bar
	<p>The <b>Setup ballast</b> setup mode with preset operation parameters is activated.</p> <p>The minimum limit value of the working radius is restricted.</p>	<p>The <b>Setup ballast</b> setup mode with preset operation parameters is deactivated.</p> <p>The operation parameters can be changed.</p>

Data	Value	Unit
Minimum limit value of the working radius	5.0	m
Minimum limit value of the working radius	16.4	ft

#### 5.5.4.1.2 Setting Setup attachment

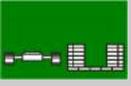
The **Setup attachment** setup mode is used for

- Installing/removing the ballast bracket and the individual ballast blocks
- Setting up the attachments
- Lubricating the boom

## Control and display elements, operating modes

### Setting Setup attachment via operating parameters

For the **Setup attachment** setup mode, the following operating parameters must be configured on the SENCON "Setup configuration" menu page.

Symbol for operating parameters							
Setting	0.3°	≤0.1 m/s	A	0 t	35.3 t	Setup attachment	according to current setup status of the machine

### Setting Setup attachment using the quick-select button

The quick-select button can be used to configure the **Setup attachment** setup mode on the SENCON "Setup configuration" menu page.

#### Setup attachment

	Yellow bar	Black bar
	The <b>Setup attachment</b> setup mode with preset operation parameters is activated.	The <b>Setup attachment</b> setup mode with preset operation parameters is deactivated. The operation parameters can be changed.

**i** The [Setup attachment] quick-select button can only be activated if the [Maximum track width] and [Maximum counterweight] operating parameters have been selected.

#### 5.5.4.2 Setting a working mode

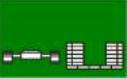
A valid operating mode is required for the task being undertaken (moving the load, for example).

The operating mode is set by selecting the individual operating parameters. The individual operating parameters must reflect the current setup of the machine.

There is an operating mode for the various setup statuses of the machine.

The following operating parameters must be configured on the SENCON "Setup configuration" menu page for the operating mode.

## Control and display elements, operating modes

Symbol for operating parameters							
Setting	according to current setup status of the machine	according to the current application	according to current setup status of the machine	0 t	according to current setup status of the machine	according to current setup status of the machine: boom or attachment	according to current setup status of the machine

### 5.5.4.2.1 Setting Tilt-Up Panel Lifting

The **Tilt-Up Panel Lifting** working mode is used in two-hook operation. In two-hook operation, the load is simultaneously lifted with the boom and an attachment.

Two-hook operation is permitted with the following attachments:

- Auxiliary jib
- Fly boom
- Fly boom with fly boom extension
- Heavy-duty jib

#### Setting Tilt-Up Panel Lifting using the quick-select button

The quick-select button can be used to configure the **Tilt-Up Panel Lifting** setup mode on the SENCON "Setup configuration" menu page.

#### Tilt-up panel lifting

	Yellow bar	Black bar
	<p>The <b>Tilt-Up Panel Lifting</b> working mode is activated.</p> <p>The load capacity of the machine is limited to double-reeving as a maximum.</p>	<p>The <b>Tilt-Up Panel Lifting</b> working mode is deactivated.</p> <p>Two-hook operation is not permitted.</p>

## 6 Start-up and setup

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### 6.1 Notices

The following section describes the specific actions to be performed when commissioning the machine or setting it up. It is assumed that any person performing such tasks has the basic knowledge of how to operate the machine.

Before performing any tasks associated with the commissioning and setting-up of the machine, the machine operator must have read and understood the information provided in section "Operation".

In this section, no further reference is made to content provided in section "Operation".

Further notes

🔗 Chapter 7 "Operation" on page 408

## 6.2 Safety instructions regarding setup

### **⚠ DANGER**

**Falling machine or accessories from incorrect lifting**

- Ensure that the sling gear has sufficient load-bearing capacity and is not damaged.
- Only attach the machine and all accessory parts at the defined lifting points.

If the machine or accessories are lifted incorrectly, the load could fall. This can cause serious injury.

### **⚠ WARNING**

**Risk of injury in the slewing range!**

- Only banksmen or slingers are allowed in the slewing range.
- Keep in constant contact with all persons involved!

In the slewing range of the machine, persons can be struck and fatally injured by falling loads at any time and unexpectedly.

### **⚠ WARNING**

**Danger of falling.**

- Do not climb onto the boom or the attachments.
- Do not climb onto equipment parts (for example, boom sections, ballast parts) hanging from a crane.
- Use secure climbing equipment when bolting the attachments.
- Depending on the work height, use a ladder in accordance with the applicable standards and regulations.

### **⚠ WARNING**

**Risk of crushing due to unintended machine movement when starting the engine!**

If the joystick or drive pedal is operated at the same time the engine is started, persons can be injured due to unintended machine movement.

- The safety lever has been pulled back. All hydraulic work functions and the drive function are locked.
- Only push the safety lever in the direction of travel after the engine has started.

### **⚠ CAUTION**

**Danger of electric shock!**

- The machine must only be connected by qualified experts (electricians).

Contact with live parts or electrostatically charged housing parts.

### NOTICE

Machine damage possible due to improper repairs or commissioning

Machine damage may occur if the manufacturer's specifications are not observed when carrying out commissioning or repair work, including on individual parts of the machine.

- Only service technicians are permitted to carry out work on the machine.
- Make sure that the service technician is aware of the section on repairs in the operating manual.

## 6.3 Inspecting and preparing the installation location

### 6.3.1 Prerequisites

Observe the following for machine usage planning:

- Observe the regulations of the country of use.
- Check the conditions of the operational environment.

#### Further notes

↪ Chapter 2.6 "Technical data" on page 17

### 6.3.2 Installation location, work site

#### 6.3.2.1 Work site usage

The operator must carry out the following checks for the machine usage planning:

- Conformity of the intended operation with the machine's technical data.
- Effects of external conditions on the operation at the work site.
- Fitness for use of all machine parts.
- Requirement of specific safety measures or equipment due to specific hazards on site, such as
  - Toxic gas
  - Overhead power lines
  - Pits
  - High-voltage lines
  - Ground wires
- Marking of all danger zones at the work site

#### Further notes

↪ Chapter 7.13.1 "Work site and tracks" on page 463

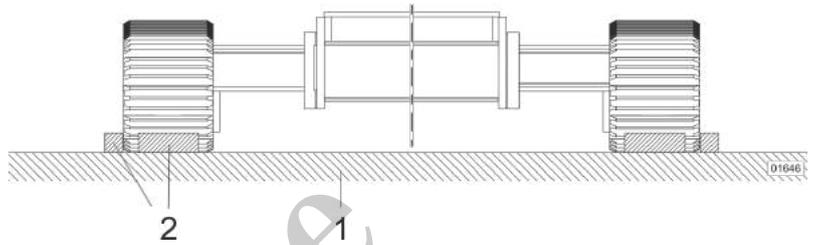
#### 6.3.2.2 Pontoon operation

##### Safety instructions

- Only operate the machine on a pontoon after first consulting with your Service Partner.
- Prevent the machine from slipping on the pontoon.

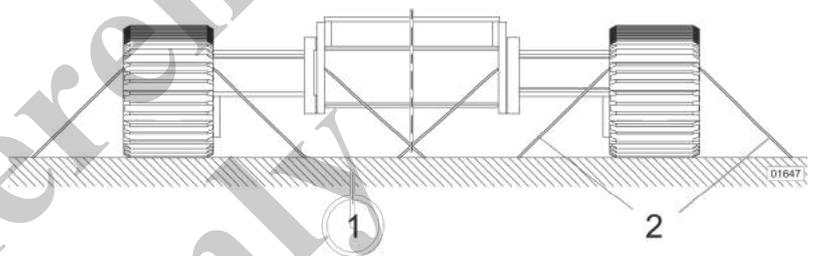
- All safe working loads only apply for free hanging loads and for the specified wind speeds.
- Traveling with a load is **not** permitted.
- The pontoon must have sufficient load capacity and sufficient dimensions. This is the responsibility of the machine owner.

### Securing the machine against slippage



- 1 Pontoon level
- 2 Stops

1. → Fasten stable stops on the pontoon.



- 1 Pontoon level
- 2 Lashing chains

2. → Lash the machine to the tethering points on the undercarriage.

### Usage scenarios on the pontoon and the resulting operation requirements

## Start-up and setup

Position of pontoon	Additional work operation requirements for the machine
<ul style="list-style-type: none"> <li>■ Supported</li> <li>■ In horizontal position</li> </ul>	<ul style="list-style-type: none"> <li>■ The standard load lift charts without inclination are valid.</li> </ul>
<ul style="list-style-type: none"> <li>■ Supported</li> <li>■ Inclined to max. 4°</li> </ul>	<ul style="list-style-type: none"> <li>■ Apply the optional load lift charts for the corresponding inclination angle.</li> <li>■ Use the winch reeving from the standard load lift charts.</li> <li>■ If necessary, prepare the control of the machine for this use as well (e.g. switching off the slewing gear or using a heeling scale). This can be carried out optionally. Contact the manufacturer's customer service beforehand.</li> </ul>
<ul style="list-style-type: none"> <li>■ Not supported</li> <li><b>No or little swell</b> (e. g. inland waters)</li> </ul>	<ul style="list-style-type: none"> <li>■ Apply the optional load lift charts for the corresponding inclination angle.</li> <li>■ Use the winch reeving from the standard load lift charts.</li> <li>■ If necessary, prepare the control of the machine for this use as well (e.g. switching off the slewing gear or using a heeling scale). This can be carried out optionally. Contact the manufacturer's customer service beforehand.</li> </ul>
<ul style="list-style-type: none"> <li>■ Not supported</li> <li><b>High swell</b> (e. g. during offshore use)</li> </ul>	<ul style="list-style-type: none"> <li>■ For this use special offshore standards may perhaps have to be complied with.</li> <li>■ Specific load lift charts are applicable.</li> <li>■ Standard load lift charts do not apply.</li> <li>■ Coordinate this use with the manufacturer beforehand.</li> </ul>

## 6.4 Procedure when the maximum permissible wind speed has been reached

### Safety instructions

#### **WARNING**

**Danger of severe structural damage on the boom if the limit values of the permissible wind speeds are exceeded.**

- **Do not exceed the specified limit values of the permissible wind speeds.**
- **When operating the crane, the displayed wind speed must always be compared with the permissible wind speed.**
- **Operate the crane safely within the limit values specified below.**

**If the limit values of the permissible winds speeds are exceeded, severe to fatal injuries can occur.**

**NOTICE**

Danger of severe structural damage on the boom if the limit values of the permissible wind speeds are exceeded.

- Do not exceed the specified limit values of the permissible wind speeds.
- When operating the crane, the displayed wind speed must always be compared with the permissible wind speed.
- Operate the crane safely within the limit values specified below.

If the limit values of the permissible wind speeds are exceeded, severe structural damage to the boom can occur.

**Measure wind speed**

The wind speed is measured at the highest position of the machine using the anemometer (option).

→ Read off the wind speed in the “main menu” of the SENCON.

**i** Gusts of wind must be taken into account when determining wind speeds.

**Further notes**

↪ Chapter 2.6.6.3 “Permissible maximum wind speeds” on page 58

**6.4.1 Procedure when the maximum permissible wind speed has been reached out of operation**

**i** Carry out the necessary safety measures before the preset limit values are reached.

The machine has not picked up any load.

1. → Retract the boom fully.
2. → Lower the boom completely.
3. → Turn off the machine.

**Further notes**

↪ Chapter 2.6.6.3 “Permissible maximum wind speeds” on page 58

↪ Chapter 7.17.1 “Parking the machine” on page 512

**6.4.2 Procedure when the maximum permissible wind speed has been reached in operation**

**i** Carry out the necessary safety measures before the preset limit values are reached.



*The actual wind sail area of the load is unknown. Therefore, applying judgement and experience, the operator must keep the effects of the wind on the lifted load within limits.*

1. → Place down the attached load.
2. → Position the boom at 70°.
3. → Turn off the machine.

### Further notes

↪ *Chapter 2.6.6.3 “Permissible maximum wind speeds” on page 58*

↪ *Chapter 7.17.1 “Parking the machine” on page 512*

## 6.5 Unloading the machine after transport

### Further notes

↪ *Chapter 9.7 “Unloading the machine” on page 628*

For  
Reference  
Only

## 6.6 Preparing the machine for operation

6.6.1	Folding in/out steps.....	255
6.6.2	Folding the walkways.....	257
6.6.3	Folding the railing.....	259
6.6.4	Retracting/extending the railing extension.....	263
6.6.5	Establishing a power supply for the lifting limit switch on the boom.....	265
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6.6.8	Attaching the hoist rope.....	290
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### 6.6.1 Folding in/out steps

#### Safety instructions

**▲ WARNING**

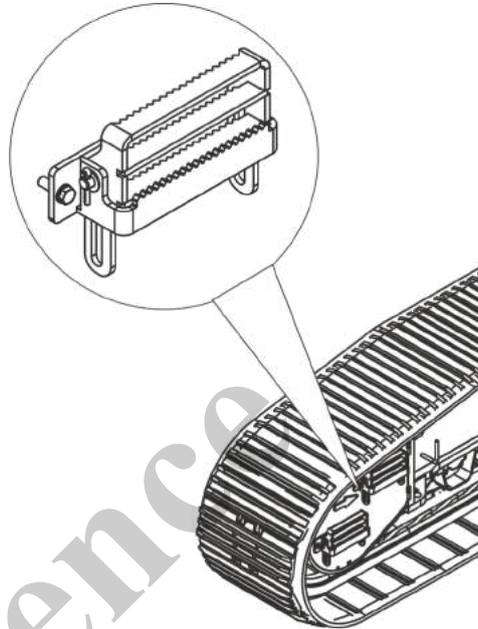
**Risk of injury due to slippery surface.**

- Clean the steps immediately of mud, oil, lubricating grease or snow.
- Always wear shoes that meet the requirements specified in the applicable accident prevention regulations in the country where the machine is operated.

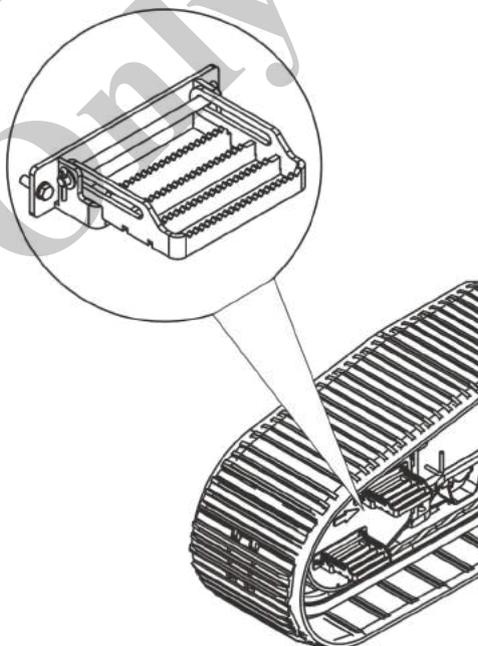
**Persons can slip on dirty steps and injury themselves.**

### Folding out a step

There are steps on the inside of the track wheel carriers on both sides of the machine. These steps must be folded out while working.

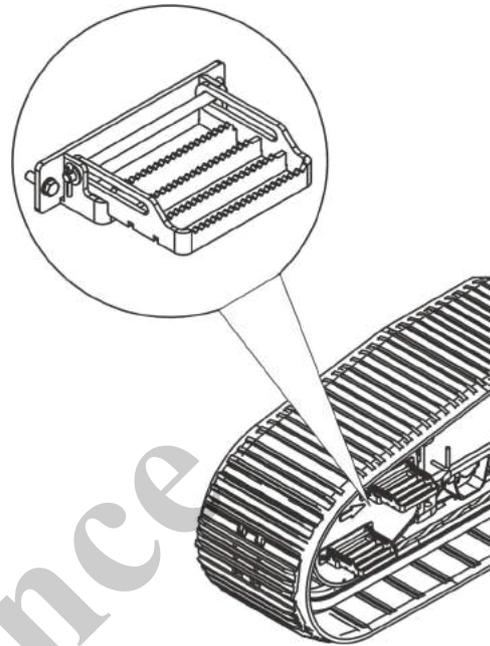


1. ➤ Pull the folded-in step upward.
2. ➤ Tilt the step by 90°.

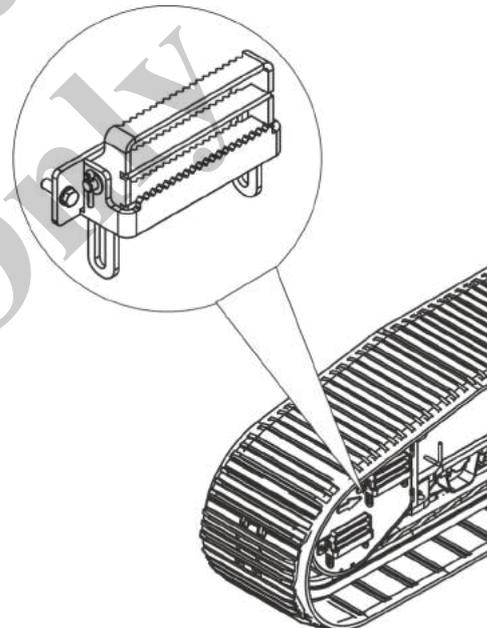


3. ➤ Slowly lower the step until it is fully horizontal.  
⇒ The step is folded out.

## Stowing a step



1. → Lift up the folded-out step.



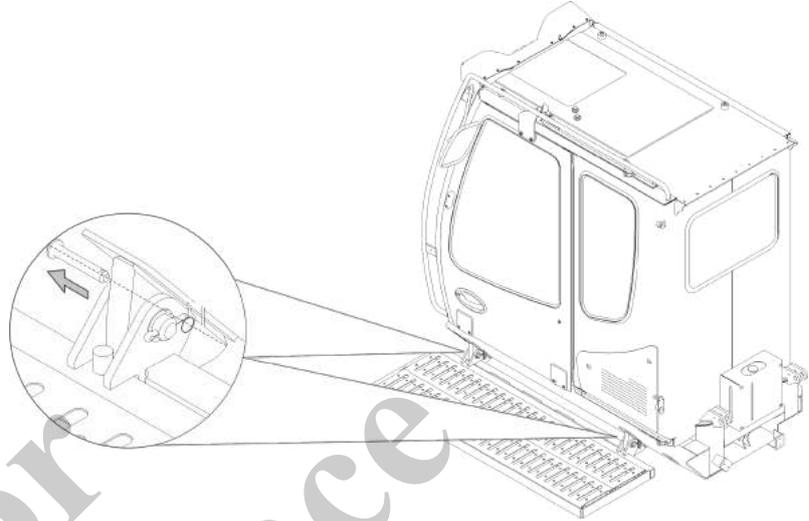
2. → Pull the step upward and then lower it.  
⇒ The step is now stowed.

### 6.6.2 Folding the walkways

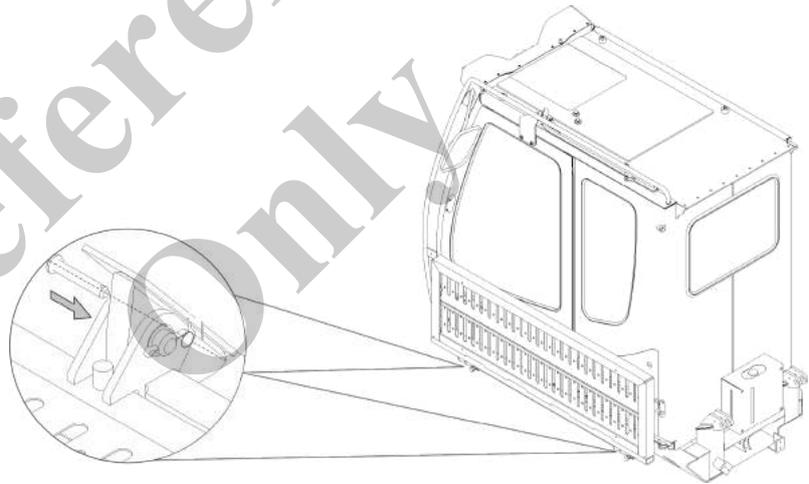
The walkways at the cab and the uppercarriage can be folded away for transport.

### Folding up the walkway

1. ➤ Remove the locking pin from the bolt in the walkway bracket.



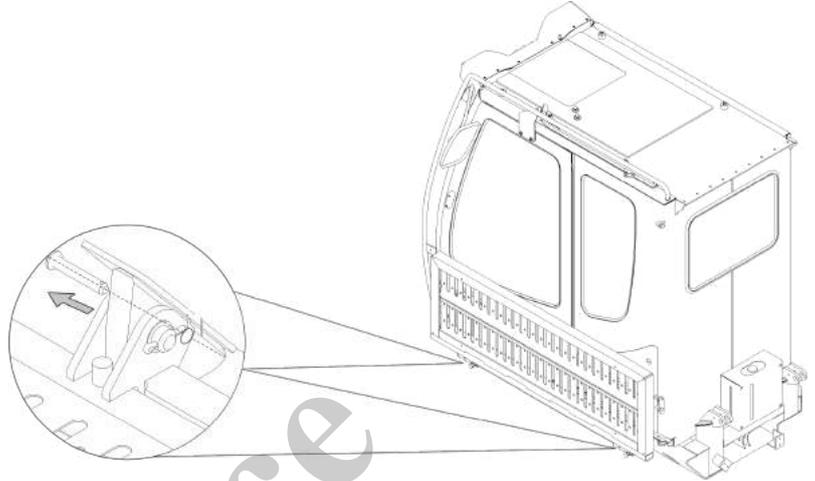
2. ➤ Pull out the bolt.
3. ➤ Fold the walkway up by 90°.



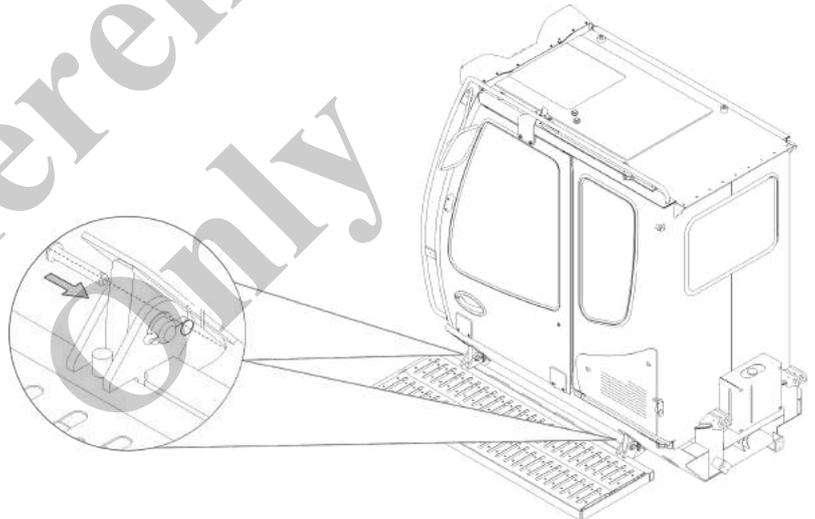
4. ➤ Secure the walkway in vertical position with the bolt.
5. ➤ Secure the bolt with the locking pin.

### Folding down the walkway

1. → Remove the locking pin from the bolt in the walkway bracket.



2. → Pull out the bolt.
3. → Fold the walkway down 90°.

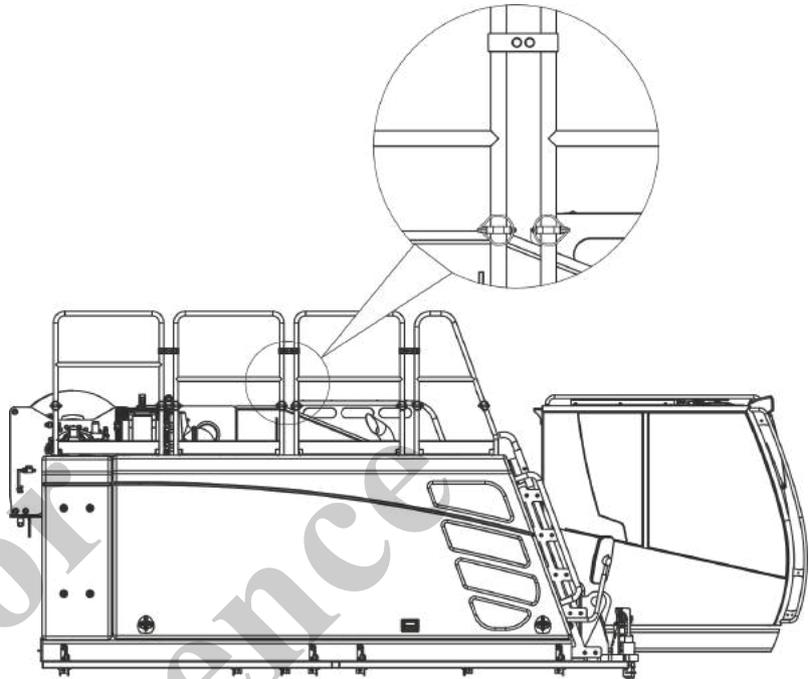


4. → Secure the walkway in horizontal position with the bolt.
5. → Secure the bolt with the locking pin.

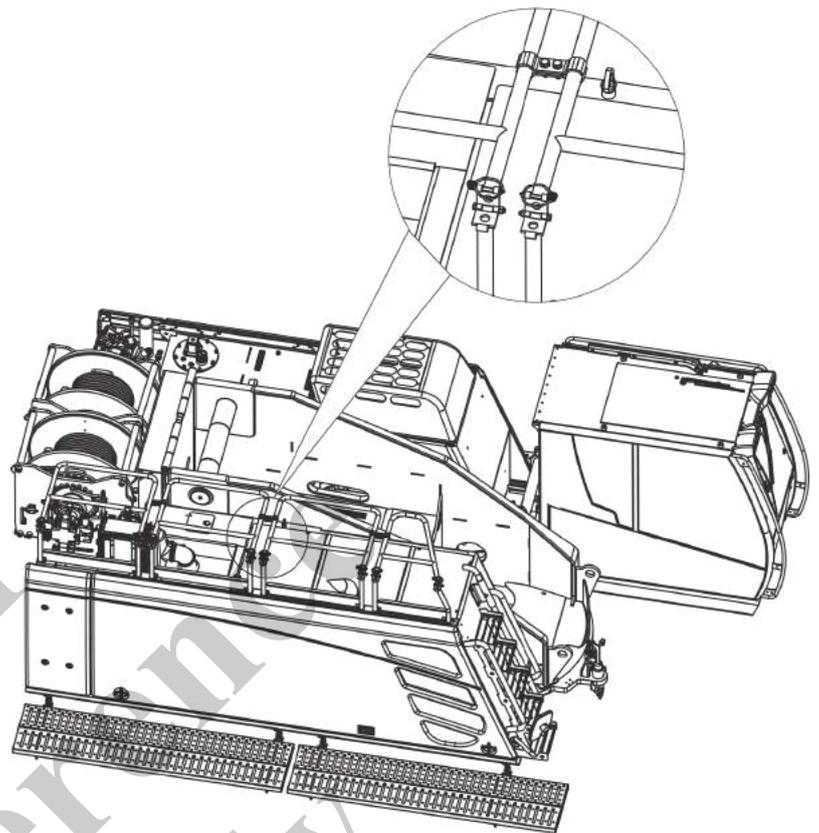
### 6.6.3 Folding the railing

The railing on the uppercarriage can be folded away for transport.

### Folding in the railing



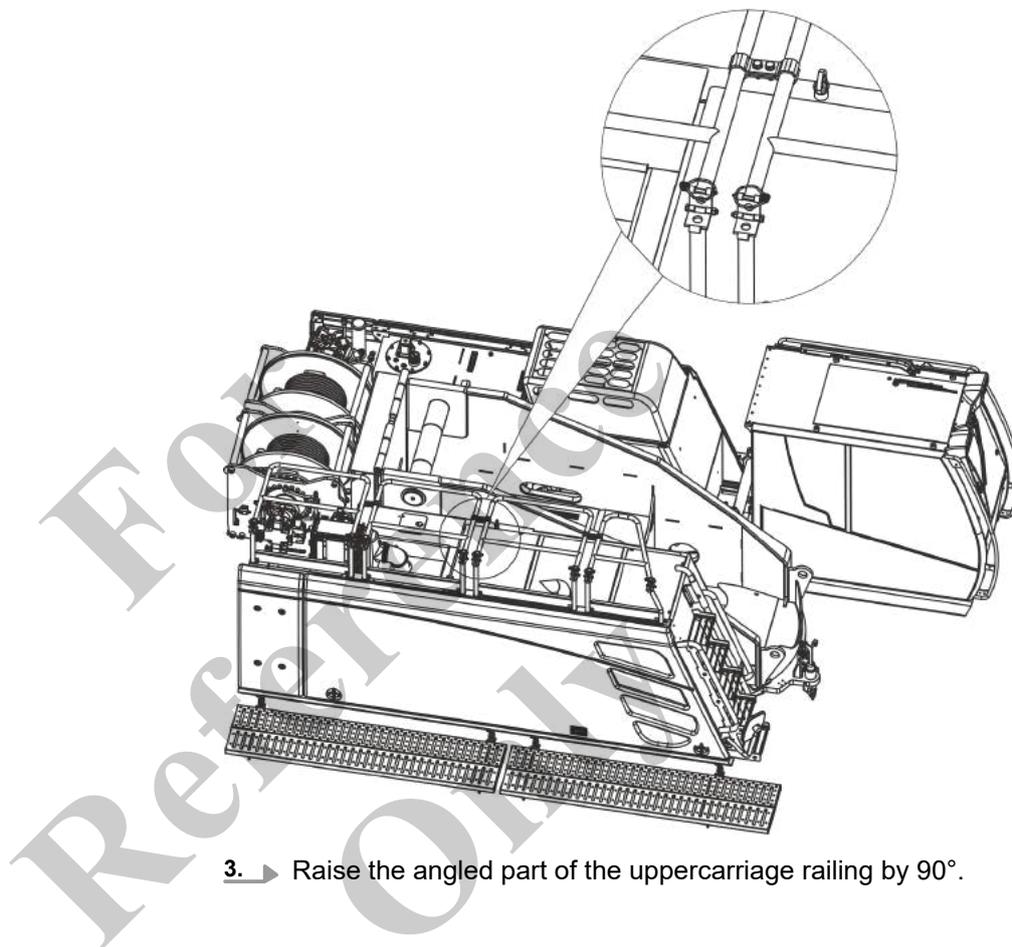
1. → Remove the safety pins from the bolts of the hinge at the uppercarriage railing.
2. → Remove the bolts of the hinge of the uppercarriage railing.



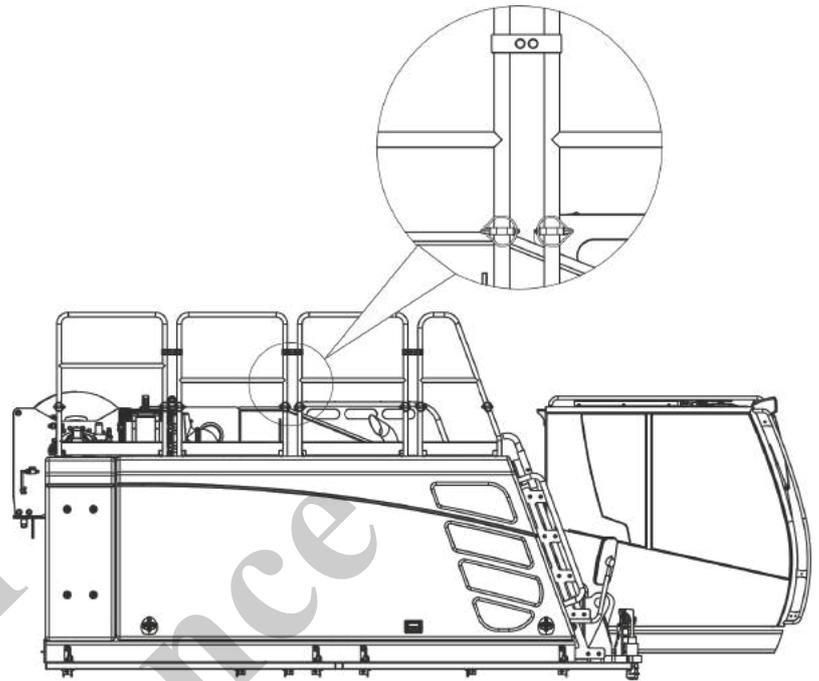
3. → Fold in the upper part of the uppercarriage railing by 90°.
4. → Insert the bolts into the hinges of the uppercarriage railing.
5. → Secure the bolts with the safety pins.

### Unfolding the railing

1. ➤ Remove the safety pins from the bolts of the hinge at the uppercarriage railing.
2. ➤ Remove the bolts of the hinge of the uppercarriage railing.



3. ➤ Raise the angled part of the uppercarriage railing by 90°.



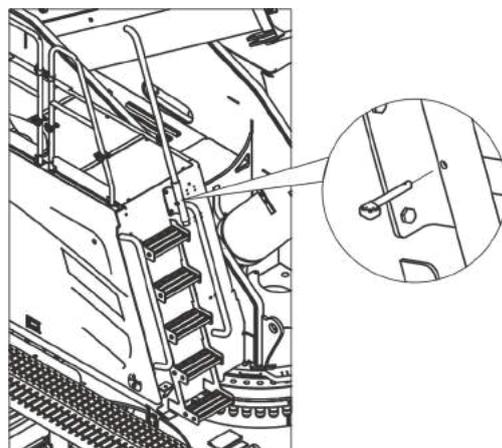
4. → Insert the bolts into the hinges of the uppercarriage railing.
5. → Secure the bolts with the safety pins.

#### 6.6.4 Retracting/extending the railing extension

The railing extension of the access to the roof of the uppercarriage is retracted for transport.

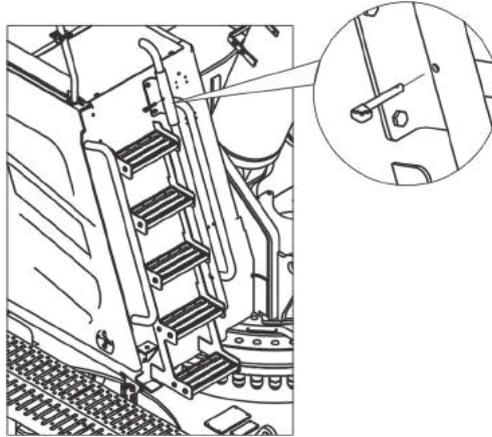
The railing extension of the access to the roof of the uppercarriage is extended during operation.

##### Retracting the railing extension



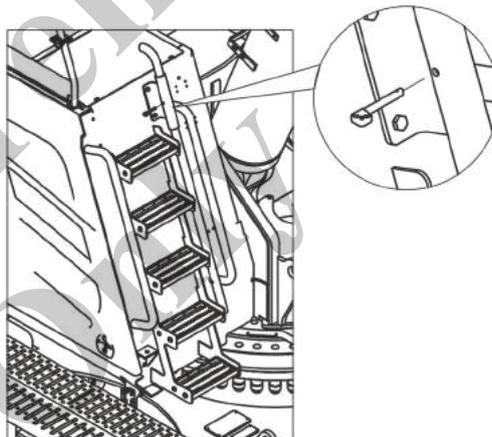
1. → Release the strike of the railing extension.

2. ▶ Retract the railing extension.

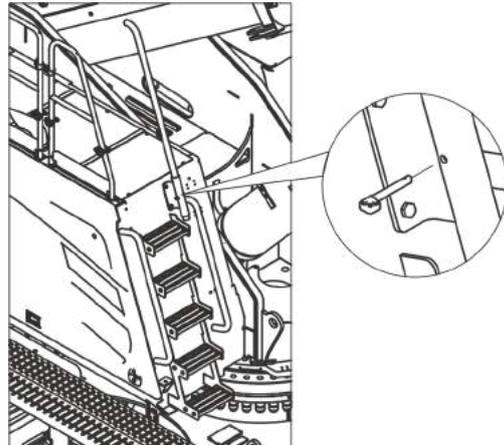


3. ▶ Attach the strike of the railing in the upper position and secure it.

### Extending the railing extension



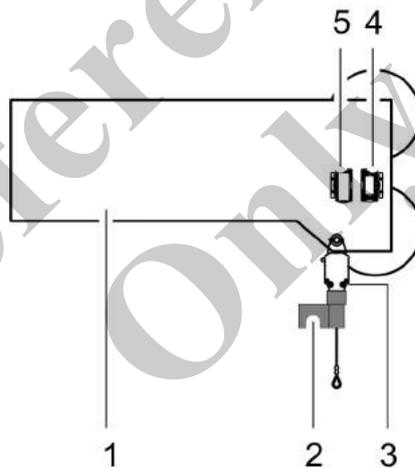
1. ▶ Remove the strike of the railing extension.
2. ▶ Pull out the railing extension.



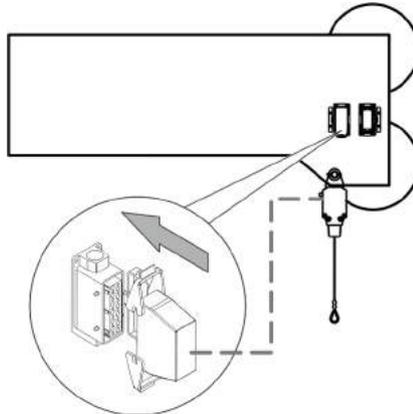
3. → Attach the strike of the railing in the lower position and secure it.

### 6.6.5 Establishing a power supply for the lifting limit switch on the boom

#### Overview



- 1 Boom
- 2 Bypass flag
- 3 Lifting limit switch on boom
- 4 Parking socket
- 5 Power socket



### 6.6.6 Start the machine

1. → Set up the energy supply.
2. → Enter the machine.
3. → Turn on the machine.

#### Further notes

- ↪ Chapter 7.3 “Setting up the energy supply” on page 412
- ↪ Chapter 7.6 “Enter the machine” on page 419
- ↪ Chapter 7.7 “Switching on the machine” on page 431

### 6.6.7 Setting the track width

#### **WARNING**

**Risk of crushing and shearing when changing the track width!**

- Make sure that the motion area of the machine is cleared of all persons.

**Risk of injury to any person in the motion area of the machine during track adjustment.**

#### **NOTICE**

**Damage to the machine due to improper mounting of the bolts**

- Never drive in obstructed bolts with hammers or mallets.
- Increase or decrease the track width until the bolt can be mounted properly.

**Undercarriage and bolts are damaged due to improper bolt insertion.**

#### **NOTICE**

**Risk of damage to the machine by not removing the cover plates from the cross members.**

- Remove the cover plates before reducing the track width and place them in the toolbox.

6.6.7.1 Locking the uppercarriage

Requirement:

- The engine is switched on.
- The SENCON is ready for operation.
- The safety lever is pushed forward.
- The uppercarriage is in 0° position.

➔ Press the *[Unlock/lock uppercarriage]* quick-select button.

⇒ The *[Unlock/lock uppercarriage]* status display shows a yellow bar.

The *[uppercarriage locking]* icon on the SENCON start screen is gray.

Uppercarriage locking mechanism

	Grey	Green
	Uppercarriage is unlocked.	Uppercarriage is locked.

Uppercarriage locking mechanism

	Yellow bar	Black bar
	Uppercarriage is locked.	Uppercarriage is unlocked.

6.6.7.2 Setting the extension mode, boom length, and boom angle

To change the track width, a specific extension must be set and the boom must be extended to a predefined length.

The boom must be lowered to the specified angle.

6.6.7.2.1 Setting the extension mode and boom length

Extension mode and boom length for changing the track width

Data	Value	Unit
Extension mode	EM5	
Boom length	24.1	m
Boom length	79.1	ft

Requirement:

- The boom angle is  $> 60^\circ$ .

1. → Open the “Pin boom” menu page.
2. → Set the specified extension mode on the SENCON.
3. → Tilt the joystick in the [Extend telescope] or [Retract telescope] direction.

Extend or retract the boom until it has reached the predefined length.



*If two functions are assigned on the joystick, the relevant switch must be in the correct position in order to carry out the respective function.*

### Further notes

↪ Chapter 7.15.2 “Retracting/extending the boom” on page 481

#### 6.6.7.2.2 Setting the boom angle

Boom angle for changing the track width

Data	Value	Unit
Boom angle	13	°

- Tilt the joystick in [Lower boom] direction.

Lower the boom until it has reached the predefined length.

#### 6.6.7.2.3 Overview of the most important operating and display elements

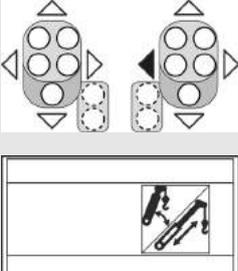
Extension mode (EM)



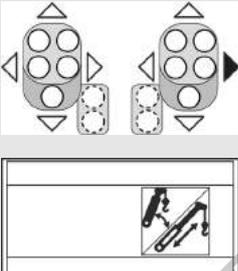
*This display element only appears during semi-automatic operation.*

	Green	Grey
	The extension mode is selected and can be changed.	The currently set extension mode is displayed.

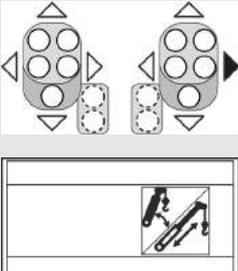
**Lifting the boom**

	<p><b>[Luffing down-up / Telescope in - out changeover] switch in right switch position</b></p> <p><b>Tilt the joystick</b></p>
	<p>The boom is raised.</p>

**Lowering the boom**

	<p><b>[Luffing down-up / Telescope in - out changeover] switch in right switch position</b></p> <p><b>Tilt the joystick</b></p>
	<p>The boom is lowered.</p>

**Extend telescope**

	<p><b>[Luffing down-up / Telescope in - out changeover] switch in right switch position</b></p> <p><b>Tilt the joystick</b></p>
	<p>The telescopic thrusters/secure locking unit are extended.</p>

### 6.6.7.3 Stabilizing the machine to change the track width

#### ⚠ WARNING

Risk of tipping by slewing the uppercarriage with the machine supported

- Slew the uppercarriage into the direction of travel before stabilizing the machine.
- Stabilize the machine only when the uppercarriage is locked.

When the machine is stabilized by the stroke mechanism in order to adjust the track, its lateral stability is reduced. Slewing the uppercarriage may cause the machine to tip.

#### ⚠ WARNING

Risk of crushing when lifting the boom while the machine is stabilized

- Set the specified boom position for the corresponding ballast rating before stabilizing the machine.
- Do not change the boom setting while the machine is stabilized.

If the machine is stabilized by the lifting device in order to adjust the track, the lifting device may become damaged by adjusting the boom.

#### NOTICE

Machine damage due to overloading of the outrigger cylinders!

- Do not move work equipment while the machine is stabilized.

When work implements are moved while the machine is stabilized, the outrigger cylinders can be overloaded. This may cause damage to the ground and to the outrigger cylinders.

#### NOTICE

Danger of material damage if used on unsuitable ground.

- Only perform the tasks on solid, level ground with sufficient soil strength
- Observe the permissible ground pressure.
- Position the machine on level ground with sufficient load-bearing capacity and stabilize the machine.
- Use suitable outrigger pads.

The machine may suffer damage if positioned or used on unsuitable ground with insufficient soil strength.

#### Pressure exerted on the ground by the stabilized machine

When stabilized, the fully ballasted machine exerts a maximum pressure on the ground via the outrigger pads.

Data	Value	Unit
Diameter of outrigger pad	550.0	mm
Diameter of outrigger pad	21.6	in
Maximum pressure exerted by each outrigger pad	15.1	kg/cm <sup>2</sup>

Data	Value	Unit
Maximum pressure exerted by each outrigger pad	214.8	psi

If the load-bearing capacity of the ground is insufficient, a suitable support must also be used to reduce the ground pressure.

Supporting the machine to change the track width is necessary when:

- The machine is equipped with ballast.
- The machine is unballasted and on ground with insufficient load-bearing capacity.

### 6.6.7.3.1 Activating ballasting mode

1. → Open the "Setup" menu page on the SENCON.
2. → Press the [Ballasting mode] quick-select button.
  - ⇒ The status indicator of the quick-select icon lights up yellow.

The engine is switched off.

The Setup remote radio control is used to control the machine during setup.

#### Ballasting mode

Yellow bar	Black bar
<p>The ballasting mode is activated.</p> <p>The Setup remote radio control is used to control the machine during certain setup procedures.</p>	<p>The ballasting mode is deactivated.</p> <p>The machine is controlled using the controls in the cab.</p>

### 6.6.7.3.2 Folding out the outrigger

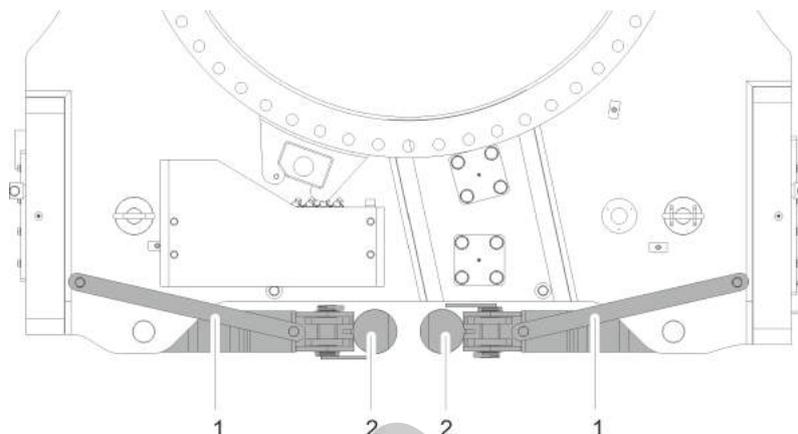
**⚠ WARNING**

**Risk of crushing when swinging the outrigger out or in!**

- Ensure all personnel is outside the danger zone.
- Indicate the danger through visual and audible warning signals.

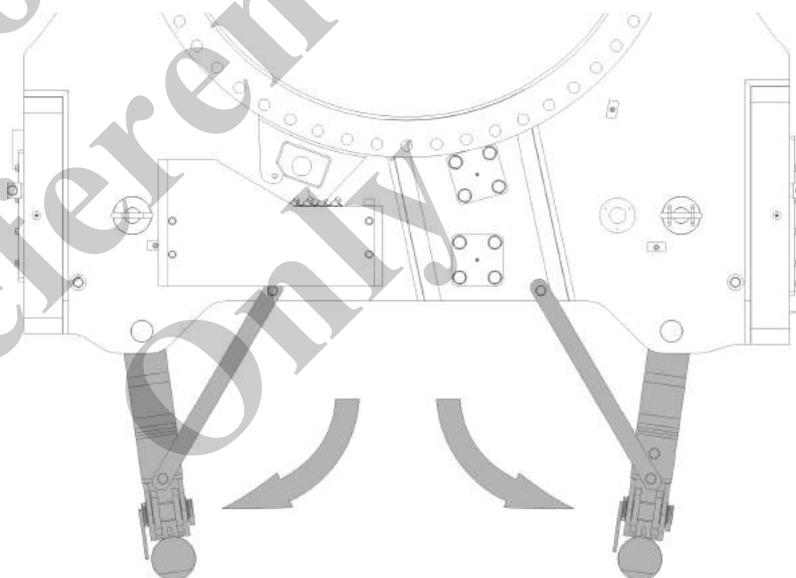
**People within the range of motion may be crushed and seriously injured.**

### Unfolding the outrigger cylinders into the center position



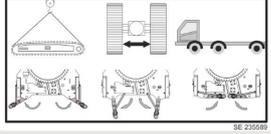
- 1 Locking bar
- 2 Stabilizing cylinders

1. ➤ Remove the locking bar of a outrigger cylinder.



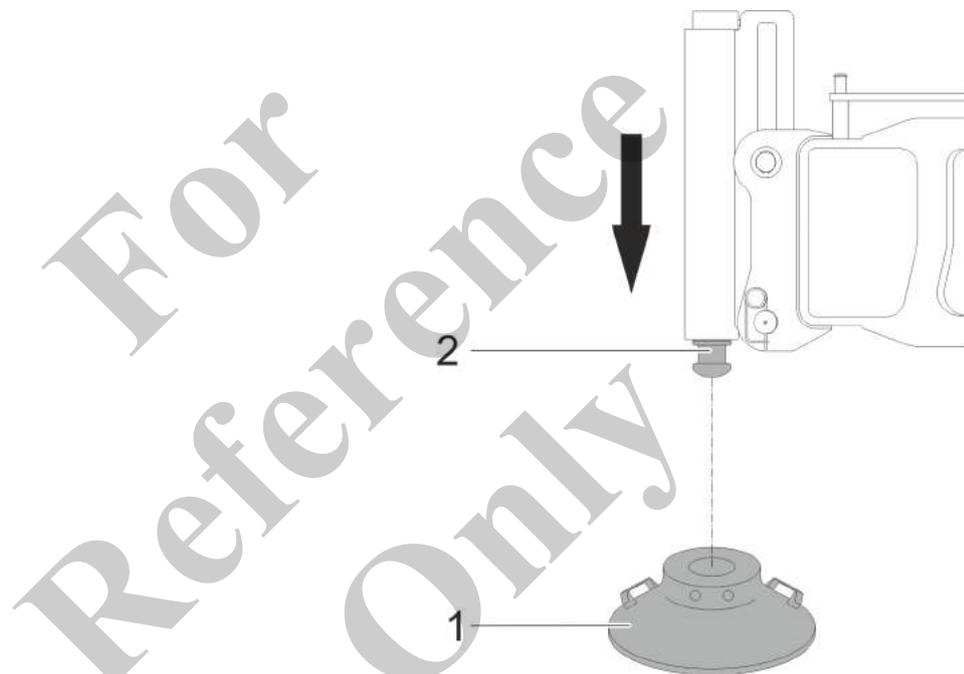
- 2. ➤ Unfold the outrigger cylinders into the center position.
- 3. ➤ Secure the unfolded outrigger cylinders with the locking bar.
- 4. ➤ Repeat these steps to unfold and secure the remaining outrigger cylinders.

**Stabilizing cylinder positions**

Shown	Meaning	SEBO no.
	<p>Stabilizing cylinder positions</p> <ul style="list-style-type: none"> <li>■ Folded out: Track wheel carrier setup</li> <li>■ Middle position: Change track width</li> <li>■ Folded in: Transport</li> </ul>	<p>235589</p>

**Positioning the outrigger pads**

1. → Remove the outrigger pads from their storage location.



- 1 Outrigger pad
- 2 Stabilizing cylinders

2. → Position the outrigger pads vertically underneath the outrigger cylinders.

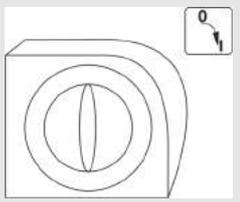
**6.6.7.3.3 Switching on the Setup remote radio control**

Preconditions:

## Start-up and setup

- The safety lever has been pulled back.
  - The machine operator has stepped out of the machine.
1. ➤ Turn the rotary switch [*Switch remote radio control on/off*] on the remote radio control to position [*I*].
  2. ➤ Press the push button [*Horn/release remote radio control*] on the remote radio control.
    - ⇒ The remote radio control is ready for use.
- The engine can be started via the remote radio control.

### Switch remote radio control on/off

	Turn rotary switch to position [ <i>0</i> ]	Turn rotary switch to position [ <i>I</i> ]
	The remote radio control is deactivated.	The remote radio control is activated. A brief signal tone sounds.

### Horn/release remote radio control

	Press the push button
	The horn sounds. The remote radio control is activated. The engine can be started.

#### 6.6.7.3.4 Mounting the outrigger pad

**⚠ WARNING**

**Risk of accidents from outrigger cylinders moving incorrectly on the stroke mechanism**

- Observe the uppercarriage position of the machine.
- Take note of the colored marking on the outrigger cylinders and the remote radio control.

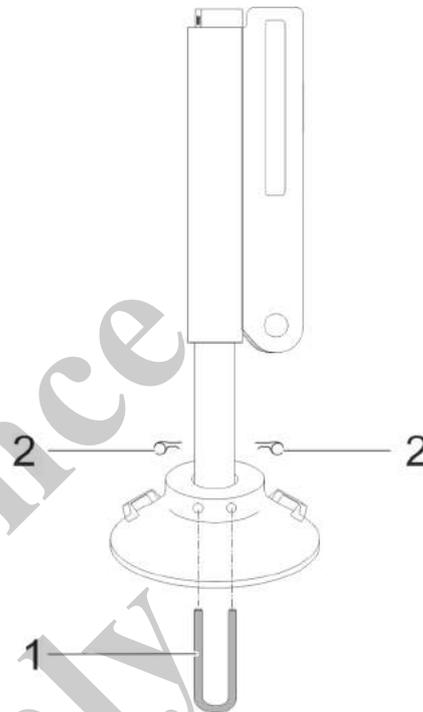
**When using the Setup remote radio control, the wrong outrigger cylinders may move.**

#### Mounting the outrigger pad

Requirement:

Ensure that you can see the moving outrigger cylinder.

1. → Tilt and hold upward the *[Extend/retract rear left outrigger cylinder]* lever until the outrigger cylinder is fully extended and has reached the outrigger pad support.



- 1 Locking bracket
- 2 Spring washers

2. → Push the locking brackets through the outrigger pads.
3. → Secure the locking brackets with spring washers.
4. → Repeat these steps to mount the remaining outrigger pads.

**Extend/retract left rear outrigger cylinder**

	Push and hold the lever up	Push and hold the lever down
	The left rear outrigger cylinder is extended.	The left rear outrigger cylinder is retracted.

**Extend/retract right rear outrigger cylinder**

	Push and hold the lever up	Push and hold the lever down
	The right rear outrigger cylinder is extended.	The right rear outrigger cylinder is retracted.

## Start-up and setup

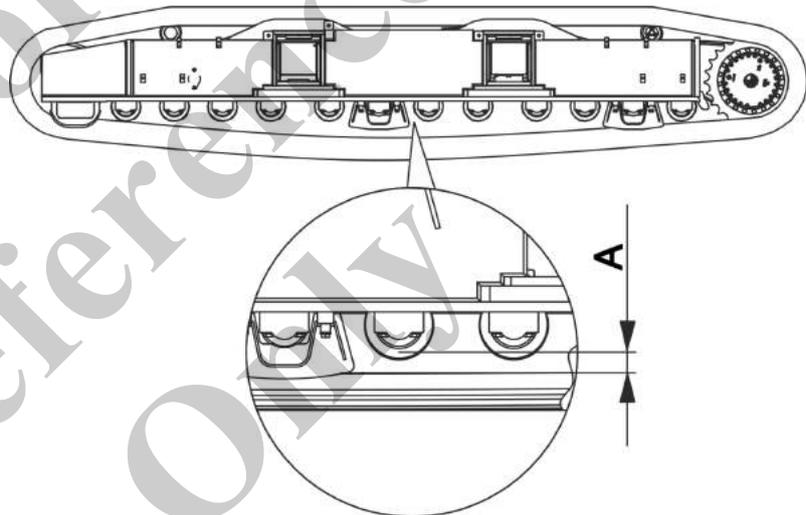
### Extend/retract left front outrigger cylinder

	Push and hold the lever up	Push and hold the lever down
	The left front outrigger cylinder is extended.	The left front outrigger cylinder is retracted.

### Extend/retract right front outrigger cylinder

	Push and hold the lever up	Push and hold the lever down
	The right front outrigger cylinder is extended.	The right front outrigger cylinder is retracted.

### Relieving the track wheel chain

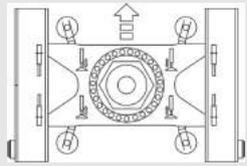


Data	Value	Unit
A	30	mm
A	1.2	in

→ Tilt and hold upward the [Extend/retract all outrigger cylinders] lever until the required distance between the track wheel chain and the track wheels is reached.

⇒ The tension is released from the track wheel chain.

**Extend/retract all outrigger cylinders**

	Push and hold the lever up	Push and hold the lever down
	All outrigger cylinders are extended.	All outrigger cylinders are retracted.

**Extend/retract left rear outrigger cylinder**

	Push and hold the lever up	Push and hold the lever down
	The left rear outrigger cylinder is extended.	The left rear outrigger cylinder is retracted.

**Extend/retract right rear outrigger cylinder**

	Push and hold the lever up	Push and hold the lever down
	The right rear outrigger cylinder is extended.	The right rear outrigger cylinder is retracted.

**Extend/retract left front outrigger cylinder**

	Push and hold the lever up	Push and hold the lever down
	The left front outrigger cylinder is extended.	The left front outrigger cylinder is retracted.

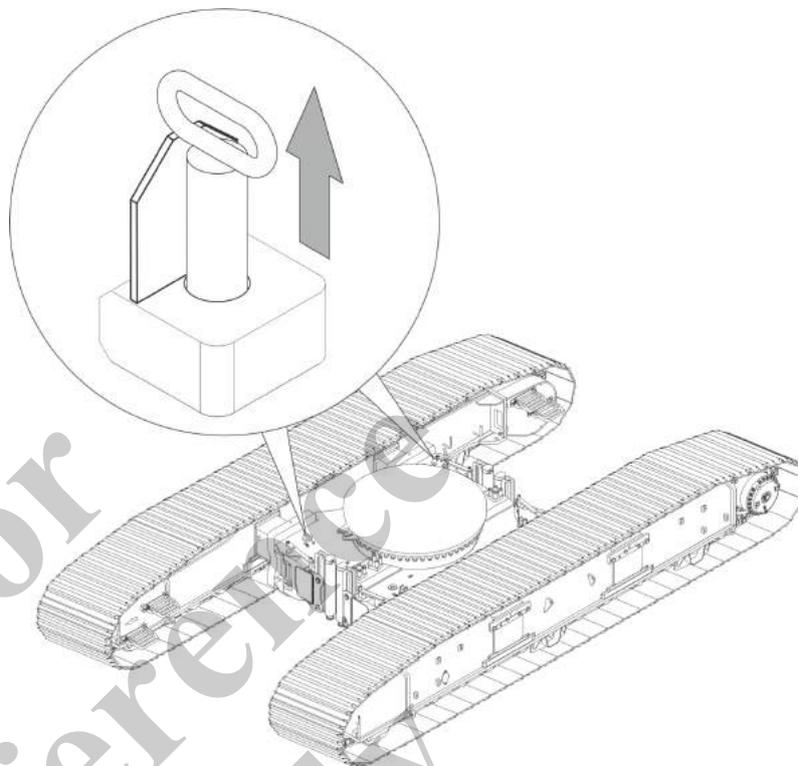
**Extend/retract right front outrigger cylinder**

	Push and hold the lever up	Push and hold the lever down
	The right front outrigger cylinder is extended.	The right front outrigger cylinder is retracted.

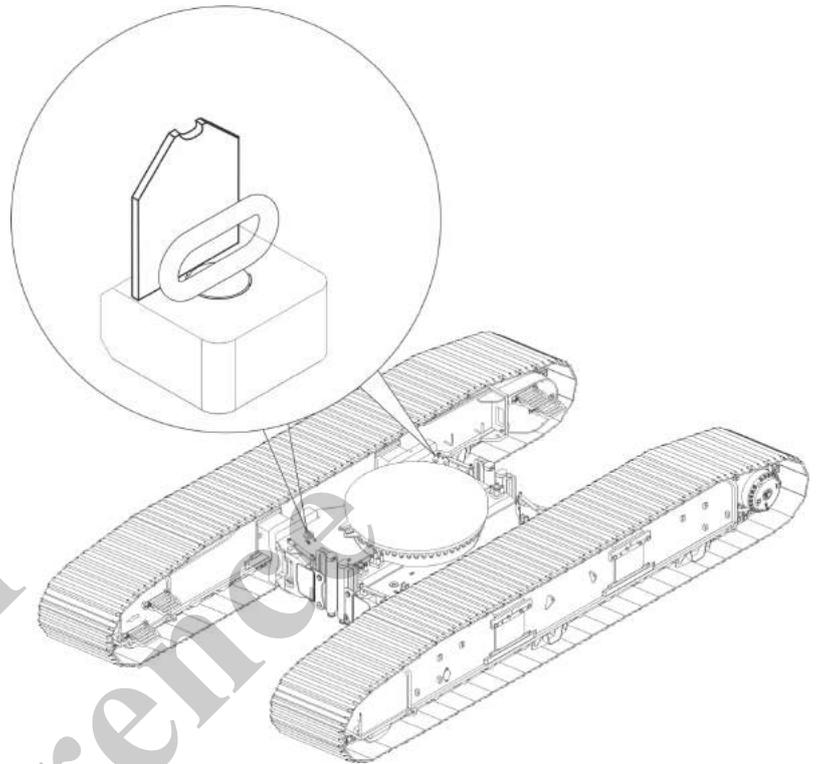
**6.6.7.4 Increasing the track width**

Requirement:

- The tension is released from the track wheel chain.
- The cover plates have been removed from the cross members.



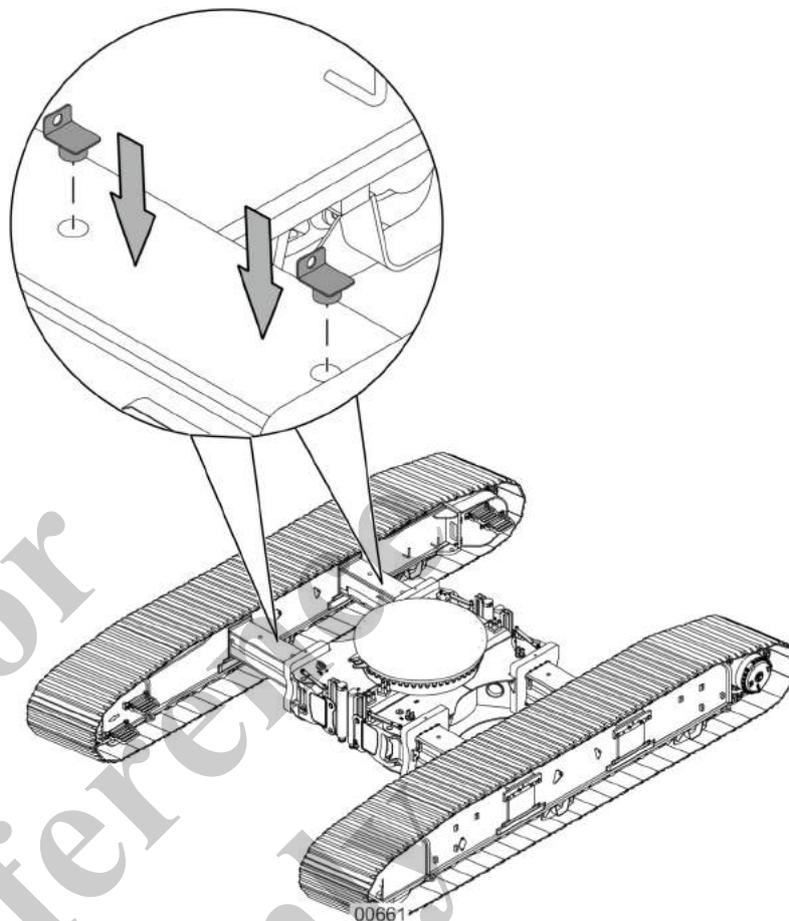
1. Pull up the bolts of the right track wheel carrier on the middle bridge.  
Secure the handle of each bolt in its holder.
3. On the remote radio control, tilt lever [*Increase/reduce track*] to the right until the right-hand track wheel carrier has reached the required track width.  
⇒ The track width marking arrow for the respective track width points to the middle bridge.



4. → Fully insert the bolts of the right track wheel carrier.

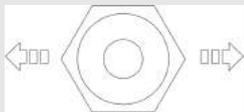
If the bolt cannot be fully inserted into the bore, leave the bolt in the bore. Slightly increase or decrease the track width until the bolt falls into the bore.

⇒ The track wheel carrier is secured.

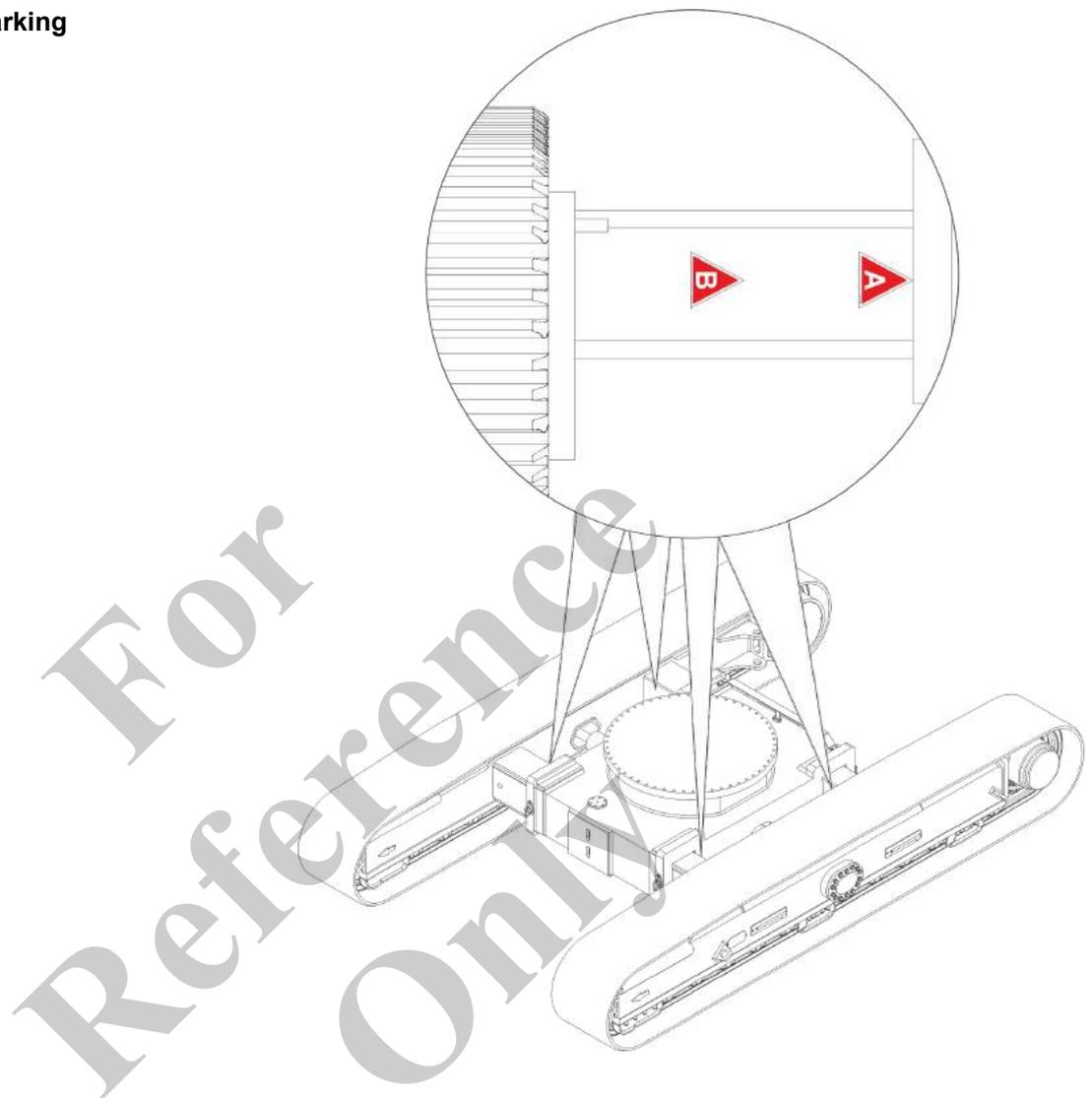


5. → Insert the cover plates into the bores of the cross members.
6. → Repeat these steps to increase the track width of the left track wheel carrier.

**Decrease/increase track width**

	<b>Push lever to the left</b>	<b>Push lever to the right</b>
	The track width is decreased.	The track width is increased.

Track width marking



Track width marking – track width  
A

	<b>Arrow points to the middle bridge</b>
	The maximum track width is set.

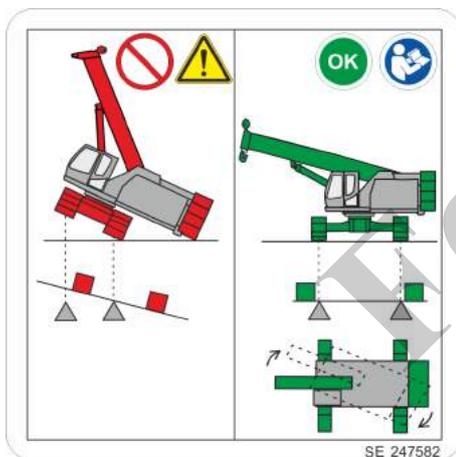
## Start-up and setup

### Track width marking – track width

B

Arrow points to the middle bridge	
	The medium track width is set.

#### 6.6.7.5 Decreasing the track width



**⚠ DANGER**

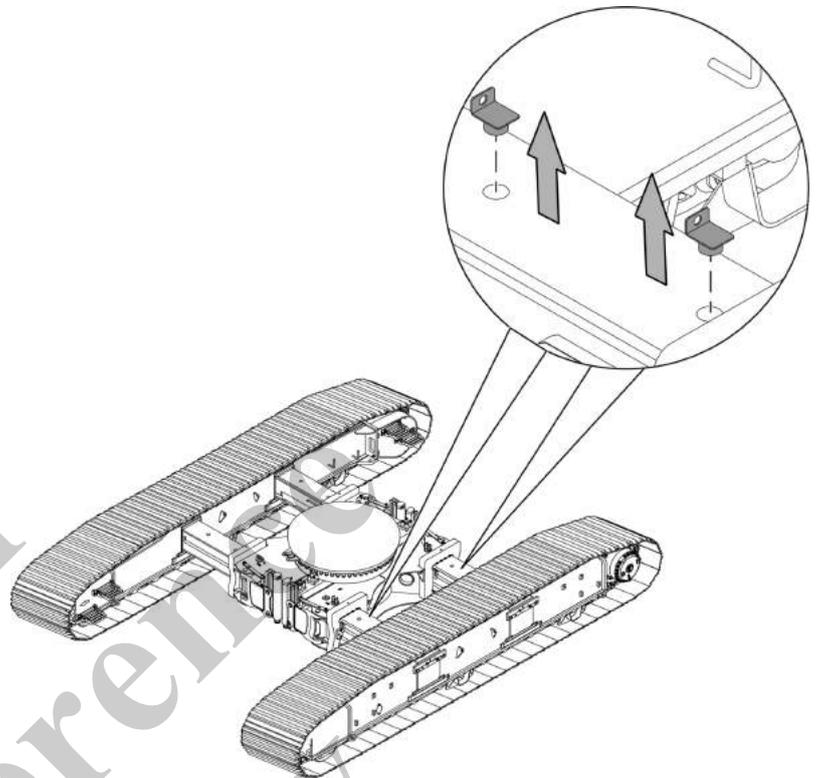
**Danger of tipping when slewing the uppercarriage with reduced track width**

Slewing the uppercarriage with maximum counterweight and reduced track width of the crawlers can cause the machine to tip over. This can cause death or serious injury.

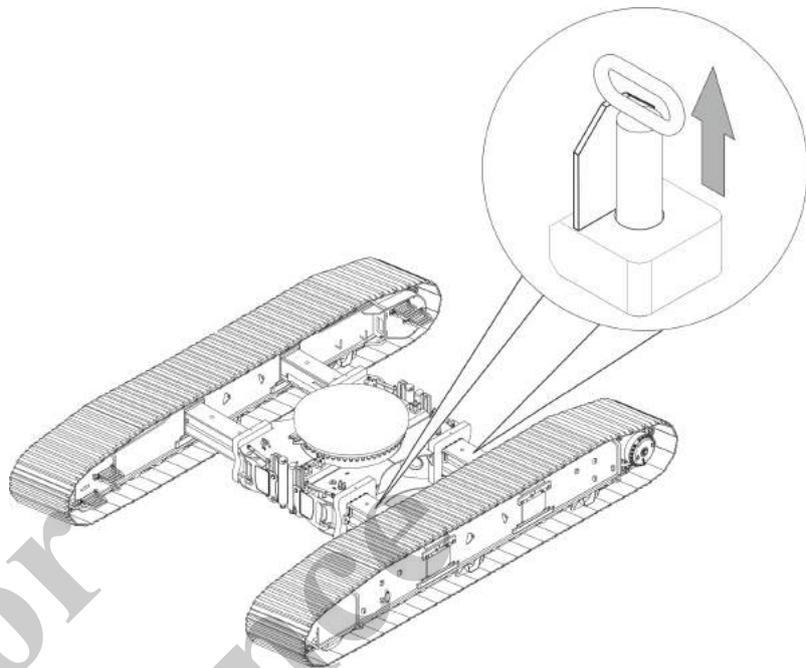
- In work mode, when performing maintenance on or setting up the machine with full counterweight, never work with the minimum track width.
- Move the uppercarriage into the 0° position and engage the slewing gear brake before reducing the track width.
- Do not slew the uppercarriage while retracting.
- Follow the instructions for reducing the track width.
- Follow the instructions for loading and unloading.

Requirement:

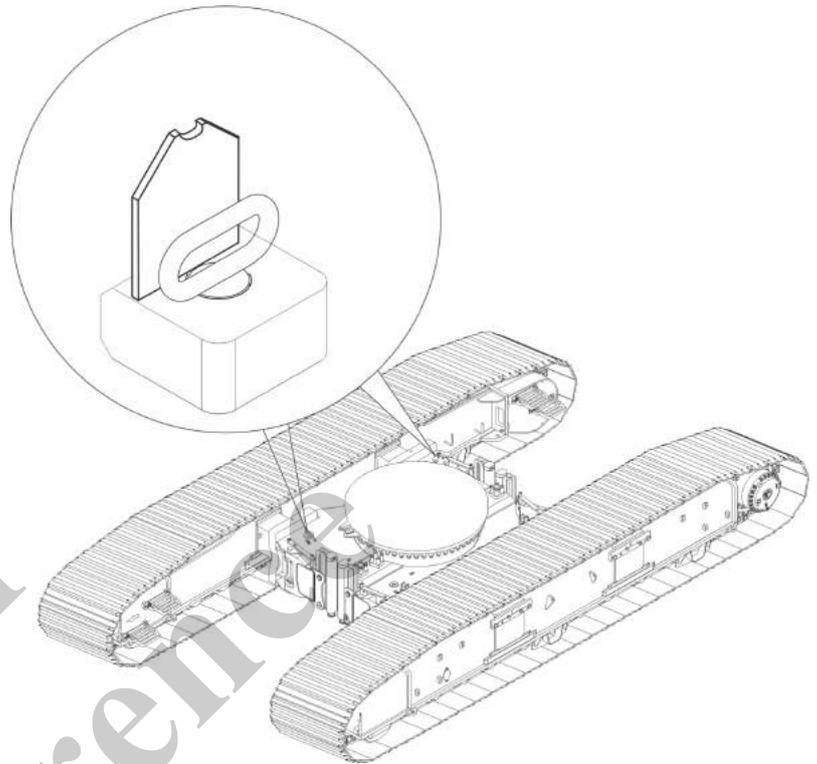
- The tension is released from the track wheel chain.



1. Remove the cover plates from the bores of the cross members.



2. → Pull up the bolts of the left track wheel carrier on the middle bridge.  
Secure the handle of each bolt in its holder.
3. → Tilt the lever [*Increase/reduce track*] on the remote radio control to the left until the left-hand track wheel carrier has reached the required track width.
  - ⇒ The track width marking arrow for the middle track width points to the middle bridge or the track wheel carrier reaches the stop.



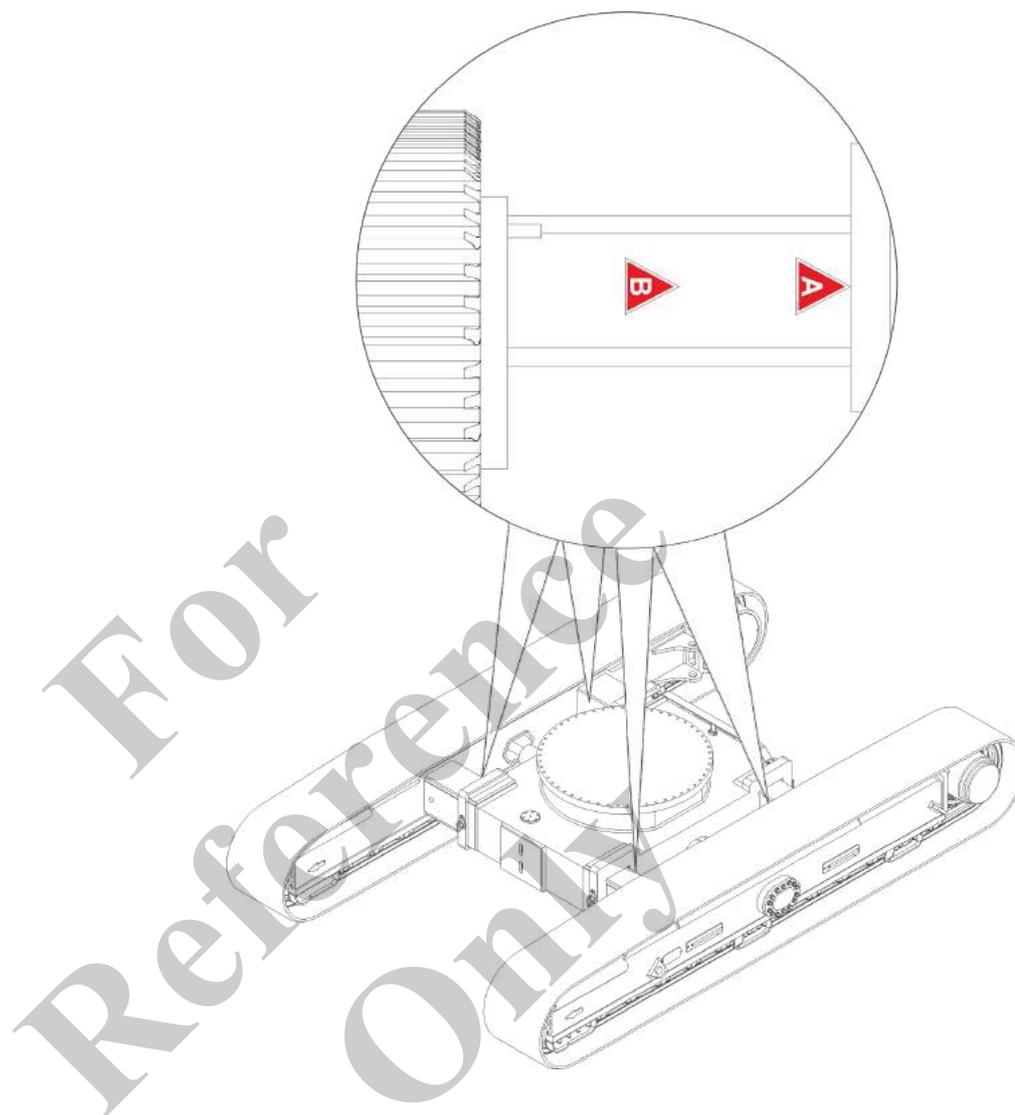
- 4.** Fully insert the bolts of the left track wheel carrier.  
 If the bolt cannot be fully inserted into the bore, leave the bolt in the bore. Slightly increase or decrease the track width until the bolt falls into the bore.  
 ⇒ The track wheel carrier is secured.
- 5.** For the middle track width: Insert the cover plates into the bores of the cross members.
- 6.** Repeat these steps to decrease the track width of the right track wheel carrier.

**Decrease/increase track width**

	<b>Push lever to the left</b>	<b>Push lever to the right</b>
	The track width is decreased.	The track width is increased.

## Start-up and setup

### Track width marking



### Track width marking – track width

A

Arrow points to the middle bridge



The maximum track width is set.

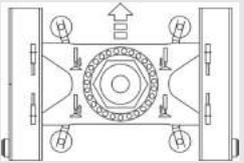
Track width marking – track width  
B

<b>Arrow points to the middle bridge</b>	
	The medium track width is set.

6.6.7.6 Placing the machine on the track wheel carriers

- Tilt and hold downward the *[Extend/retract all outrigger cylinders]* lever until the machine rests completely on the track wheel carriers.

Extend/retract all outrigger cylinders

	<b>Push and hold the lever up</b>	<b>Push and hold the lever down</b>
	All outrigger cylinders are extended.	All outrigger cylinders are retracted.

For Reference Only

### 6.6.7.6.1 Dismantling outrigger pads

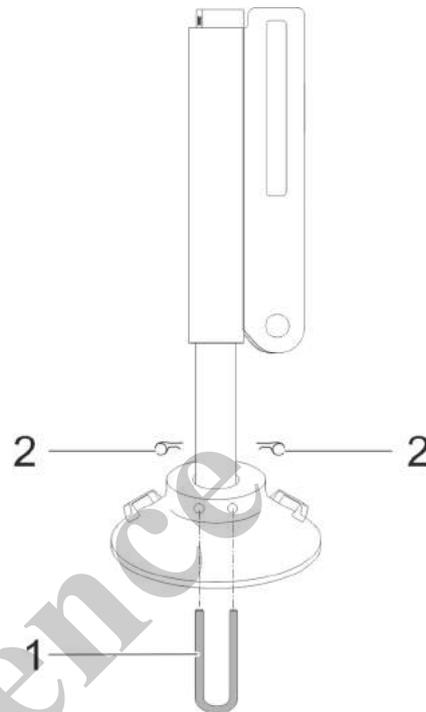


Fig. 23: Example illustration

- 1 Locking bracket
- 2 Spring washers

1. ➤ Tilt the [Extend/retract left rear outrigger cylinder] lever downward. Only retract the outrigger cylinder until the outrigger pad can be removed.
2. ➤ Remove the locking bracket and the spring washers.
3. ➤ Remove the outrigger pad.
4. ➤ Completely retract the outrigger cylinder.
5. ➤ Repeat these steps to remove the remaining outrigger pads.

#### Extend/retract left rear outrigger cylinder

	Push and hold the lever up	Push and hold the lever down
	The left rear outrigger cylinder is extended.	The left rear outrigger cylinder is retracted.

**Extend/retract right rear outrigger cylinder**

	Push and hold the lever up	Push and hold the lever down
	The right rear outrigger cylinder is extended.	The right rear outrigger cylinder is retracted.

**Extend/retract left front outrigger cylinder**

	Push and hold the lever up	Push and hold the lever down
	The left front outrigger cylinder is extended.	The left front outrigger cylinder is retracted.

**Extend/retract right front outrigger cylinder**

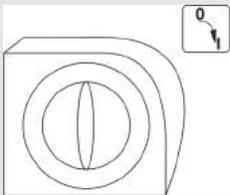
	Push and hold the lever up	Push and hold the lever down
	The right front outrigger cylinder is extended.	The right front outrigger cylinder is retracted.

**6.6.7.7 Switching off the Setup remote radio control**

Requirement:

- The engine is switched off.
- Turn the rotary switch *[Switch remote radio control on/off]* on the remote radio control to position *[0]*.
  - ⇒ The remote radio control is off.

**Switch remote radio control on/off**

	Turn rotary switch to position <i>[0]</i>	Turn rotary switch to position <i>[I]</i>
	The remote radio control is deactivated.	The remote radio control is activated. A brief signal tone sounds.

**6.6.7.8 Disabling ballasting mode**

The information symbol *[Emergency stop]* on the SENCON is red.

## Start-up and setup

The engine cannot be started from the cab with the ignition key or the push button.

1. ➤ Open the "Setup" menu page on the SENCON.
2. ➤ Press the [Ballasting mode] quick-select button on the SENCON.
  - ⇒ The status indicator for the quick-select button is black.
  - The ballasting mode is switched off.
  - The machine is controlled using the controls in the cab.
  - The engine can be started from the machine.

### Emergency stop

	Grey	Red
	The emergency stop is not actuated. All machine functions are available.	The emergency stop is actuated. The engine and all machine movements have been stopped.

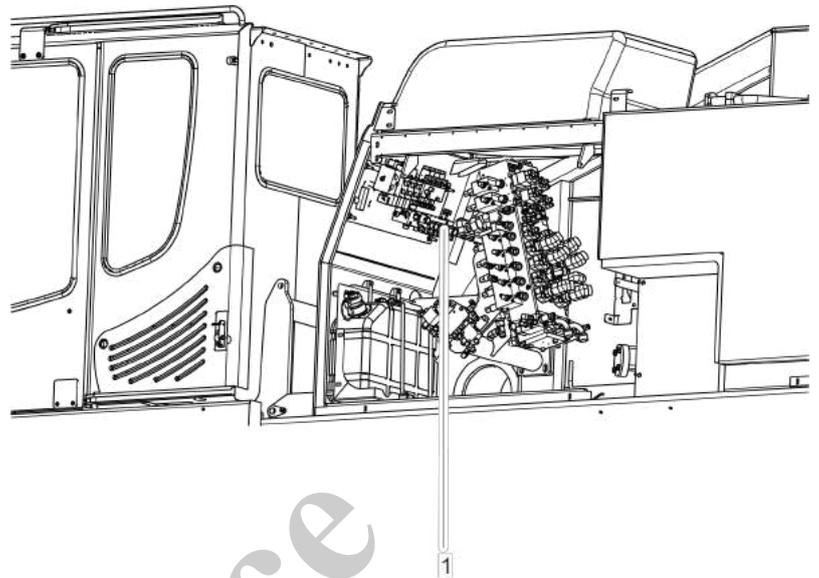
### Ballasting mode

	Yellow bar	Black bar
	The ballasting mode is activated. The Setup remote radio control is used to control the machine during certain setup procedures.	The ballasting mode is deactivated. The machine is controlled using the controls in the cab.

## 6.6.8 Attaching the hoist rope

### 6.6.8.1 Attaching the winch brake

The winch brake is not attached when the machine is delivered. Attach the winch brake before initial start-up.



1 Winch brake sockets

1. → Open the service access door of the uppercarriage.
  2. → Connect the green plug of the winch brake to the green socket.
  3. → Connect the red plug of the winch brake to the red socket.
- ⇒ The winch brake will then be ready for operation.

### 6.6.8.2 Reeving diagram

Reeving options for main boom pulley head

Table 3: Load hook, maximum load-bearing capacity: 15 t, rope diameter: 26 mm

<p>1 strands, 12.5 t</p>			

## Start-up and setup

Table 4: 1-roll bottom hook block, max. load-bearing capacity: 40 t, rope diameter: 26 mm

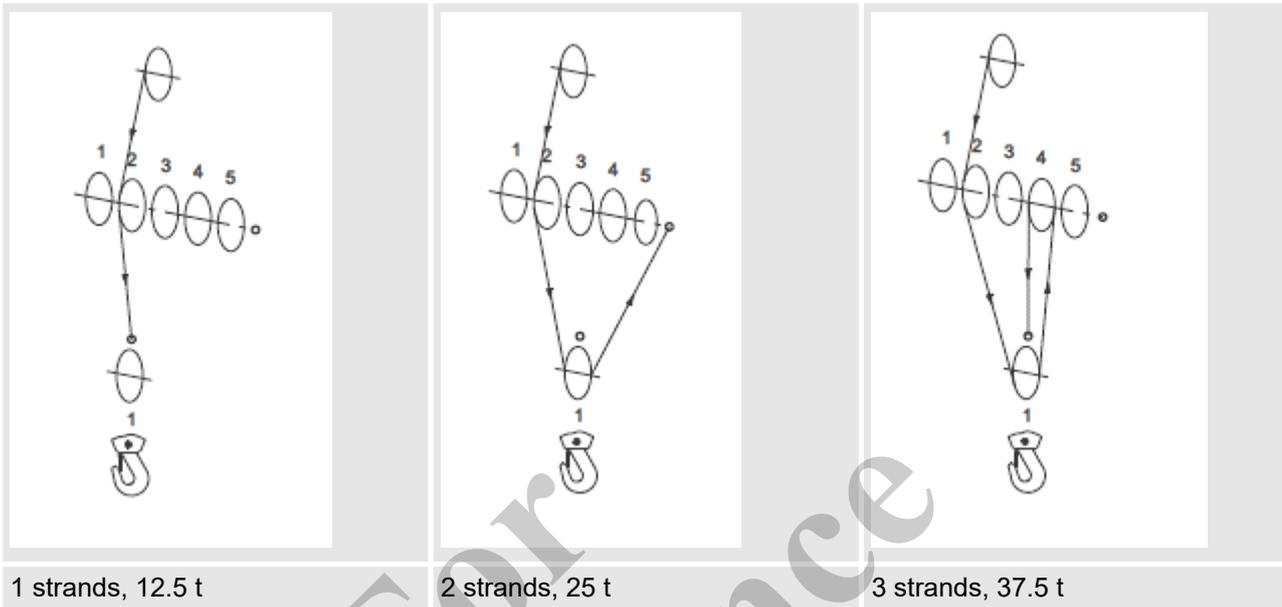
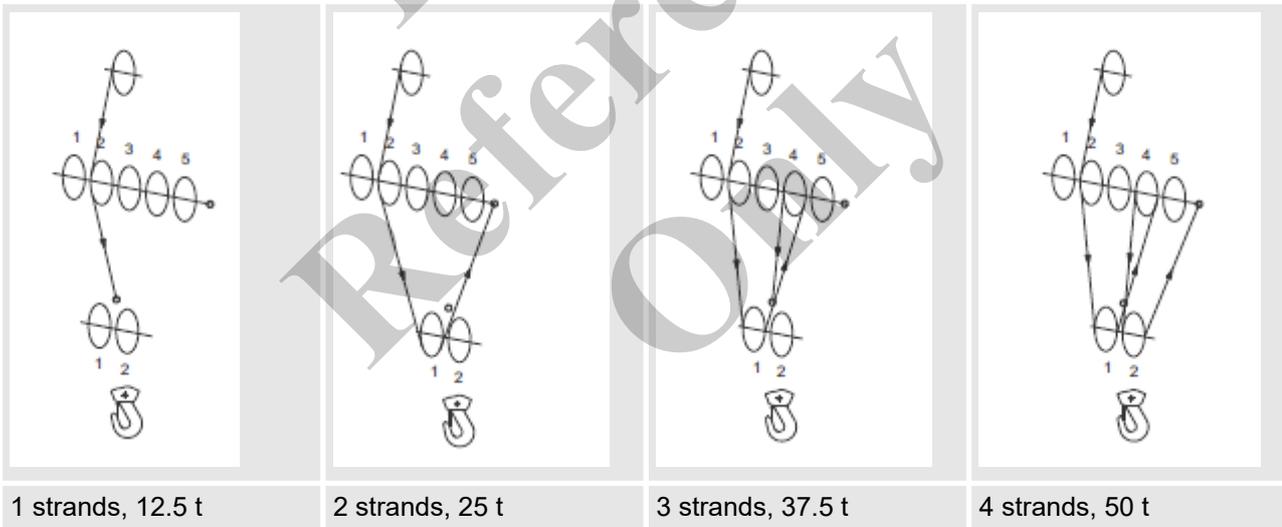


Table 5: 2-roll bottom hook block, load-bearing capacity: 60 t, rope diameter: 26 mm



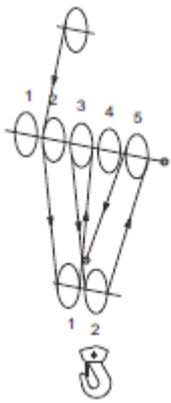
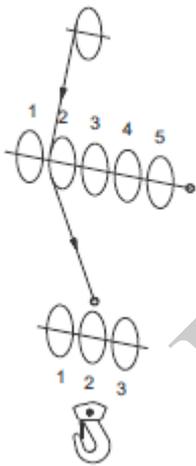
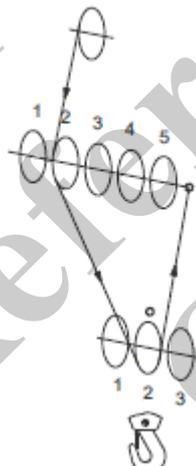
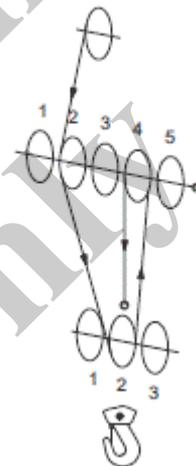
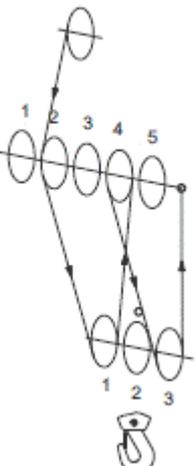
			
<p>5 strands, 60 t</p>			

Table 6: 3-roll bottom hook block, max. load-bearing capacity: 80 t, rope diameter: 26 mm

			
<p>1 strands, 12.5 t</p>	<p>2 strands, 25 t</p>	<p>3 strands, 37.5 t</p>	<p>4 strands, 50 t</p>

## Start-up and setup

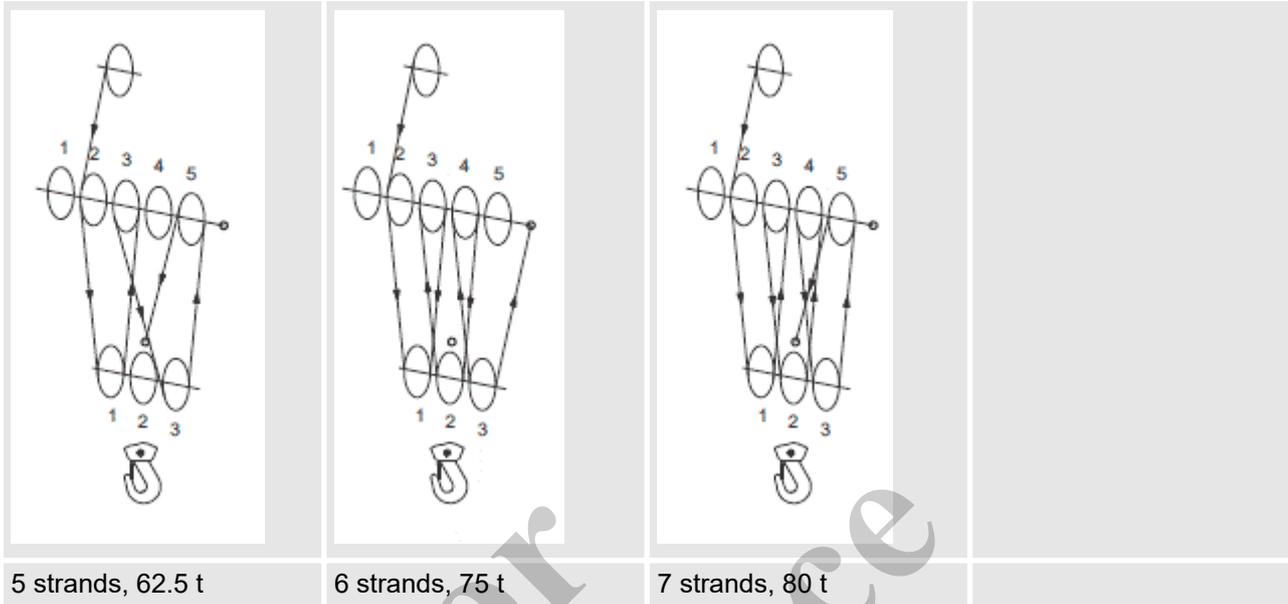
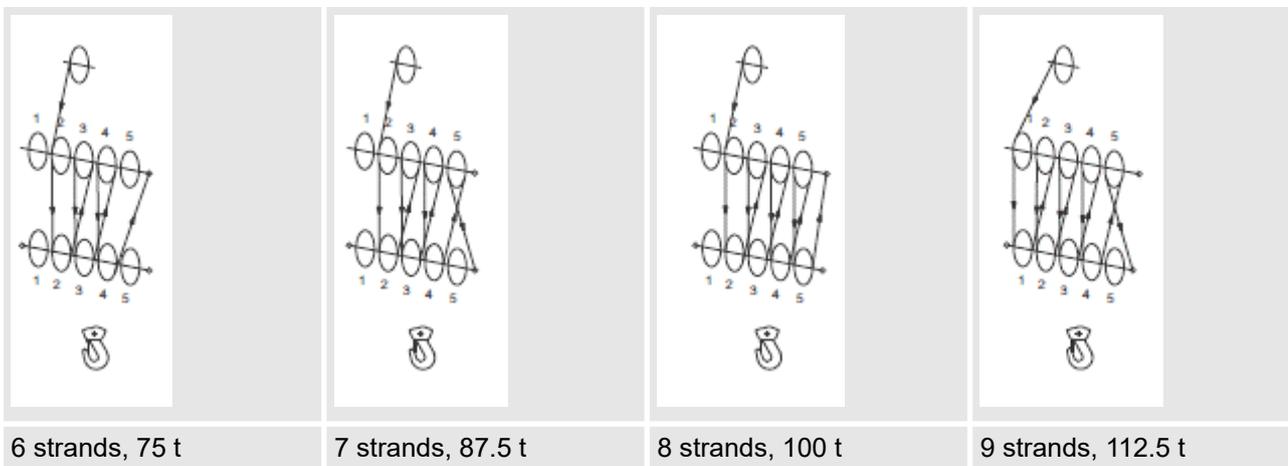
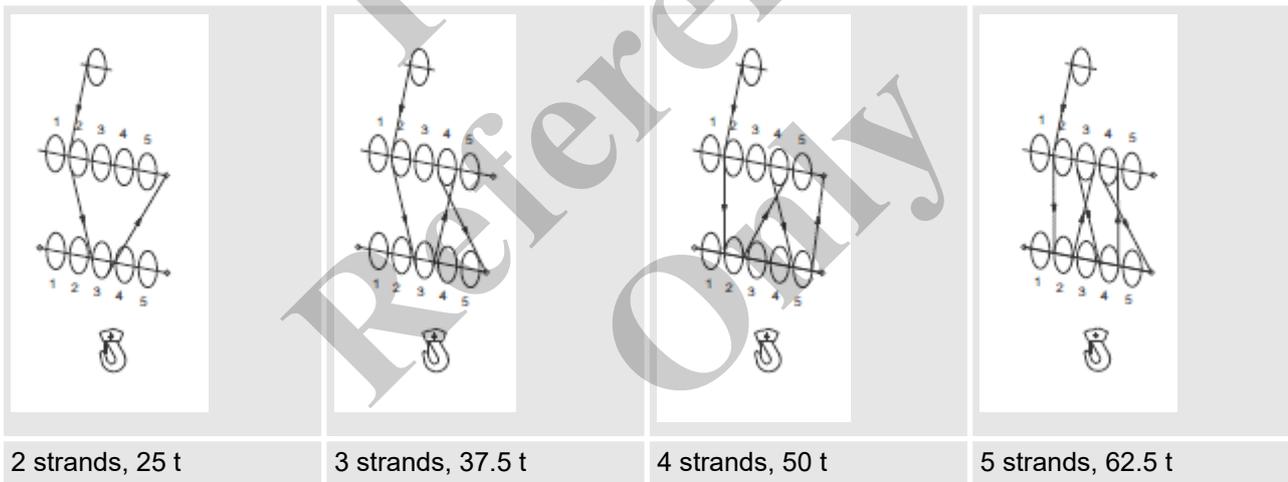
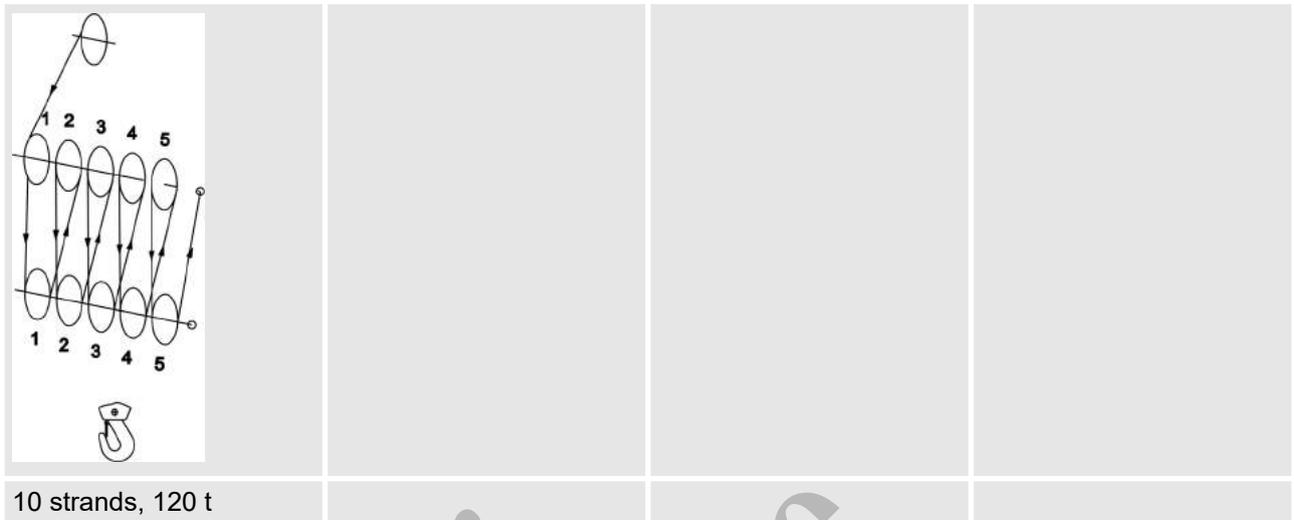


Table 7: 5-roll bottom hook block, max. load-bearing capacity: 120 t, rope diameter: 26 mm





### 6.6.8.3 Coiling up the winch hoist rope

**⚠ WARNING**

**Risk of death due to improper handling of winches and ropes.**

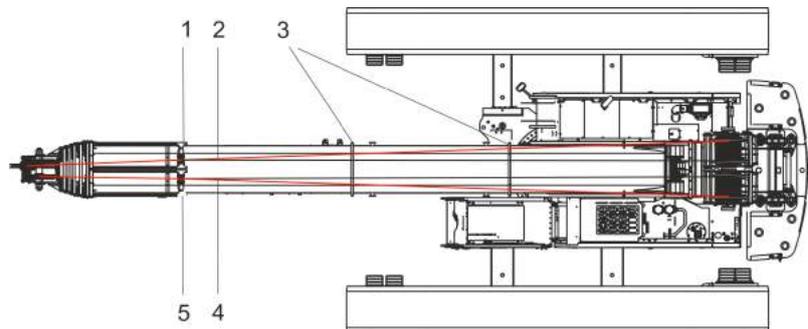
- Observe country-specific accident prevention regulations.
- Never skip scheduled rope and winch maintenance and inspections. Specifically, always change winch oil as scheduled.
- Avoid moving or stopping loads at high speed, and other improper use.
- During inspections, make sure ropes are lubricated, and check for leaks and damage.
- Adapt maintenance and inspection steps to extreme environmental conditions. Contact the manufacturer's customer service, if necessary.

**Improperly handling winches and ropes can cause them to malfunction. There is a risk of an accident occurring. This can cause serious injury.**

#### Personnel

- Machine operator
- Instructed personnel

## Start-up and setup



- 1 Rope grab for hoisting rope on winch 1
- 2 Hoisting rope on winch 1
- 3 Contact strips
- 4 Hoisting rope on winch 2
- 5 Rope grab for hoisting rope on winch 2

Requirement:

- The boom is fully lowered.

1. ➤ Set the **Setup ballast** setup mode using the quick-select button on the SENCON.
2. ➤ Push the *[Release Winch 1]* switch to the right.
3. ➤ Tilt the joystick in the *[Lower winch 1]* direction.

While uncoiling the hoisting rope from the winch, have the rope pulled by an assistant or a rope-pulling device along the boom and over the contact strips to the rope grab.

Always keep the hoist rope taut when uncoiling it from the winch.

Uncoil the hoisting rope from winch 2 in the same way, using the corresponding controls.

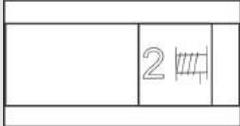
### Setup ballast

	Yellow bar	Black bar
	The <b>Setup ballast</b> setup mode with preset operation parameters is activated. The minimum limit value of the working radius is restricted.	The <b>Setup ballast</b> setup mode with preset operation parameters is deactivated. The operation parameters can be changed.

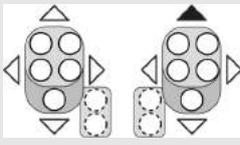
### Activate winch 1

	Switch position left	Switch position right
	Winch 1 is not activated. The hoisting rope on winch 1 cannot be wound up or unwound.	Winch 1 is activated. The hoisting rope on winch 1 can be wound up or unwound.

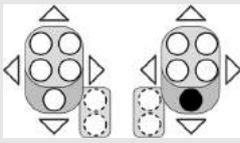
**Activate winch 2**

	<b>Switch position left</b>	<b>Switch position right</b>
	Winch 2 is not activated. The hoisting rope on winch 2 cannot be wound up or unwound.	Winch 2 is activated. The hoisting rope on winch 2 can be wound up or unwound.

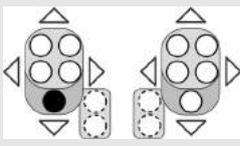
**Lower winch 1**

	<b>Tilt the joystick</b>
	The rope on winch 1 is unwound. The hook is lowered.

**Motion indicator winch 1**

	<b>Motion indicator vibrates</b>	<b>Motion indicator does not vibrate</b>
	The rope on winch 1 is being wound up or unwound.	The rope on winch 1 is not being wound up or unwound.

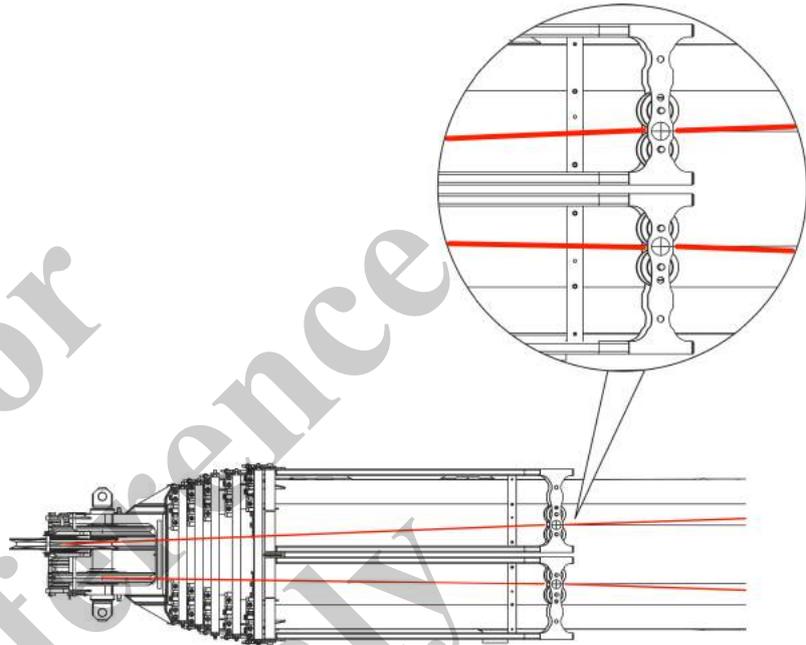
**Motion indicator winch 2**

	<b>Motion indicator vibrates</b>	<b>Motion indicator does not vibrate</b>
	The rope on winch 2 is being wound up or unwound.	The rope on winch 2 is not being wound up or unwound.

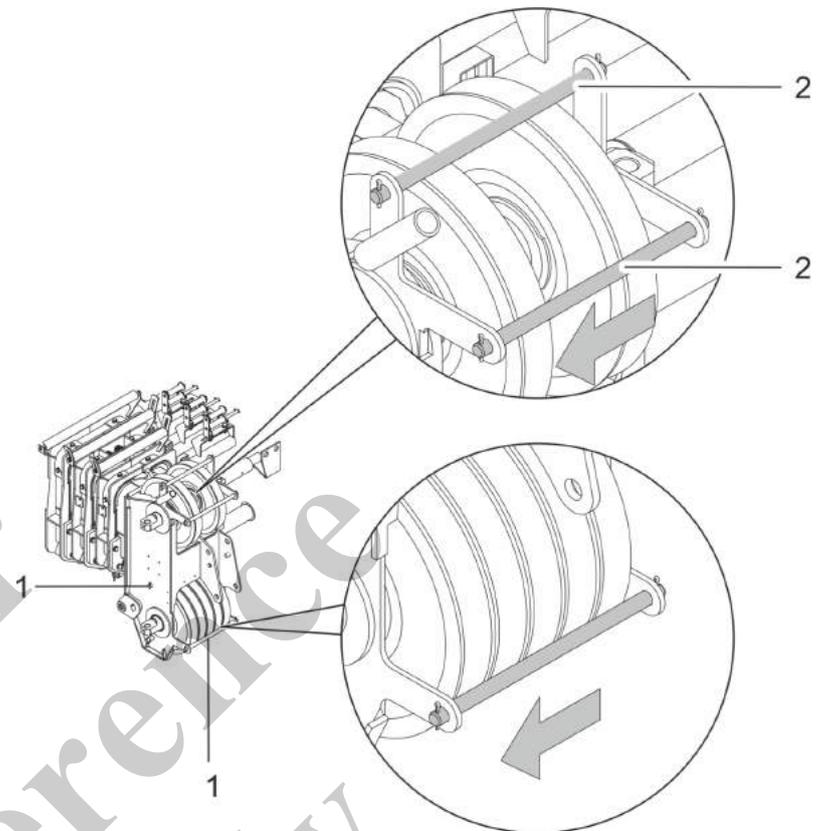
### 6.6.8.4 Reeving the hoist rope

#### Reeving the hoisting cable in the pulley head

- The **Setup ballast** setup mode is set using the quick-select button on the SENCON.
- The boom is fully lowered.
- The hoisting rope is located forward of the rope grab.



1. Guide the hoisting rope through both of the corresponding rope grab sheaves.



- 1 Jump-off guard at lower pulley head
- 2 Jump-off guard at upper pulley head

2. → Release the retaining springs of the jump-off guards at the pulley head.
3. → Remove all jump-off guards at the pulley head.

**i** Reeving the hoisting rope with attachments

- Guide the hoisting rope over the mounted deflection sheave on the main boom to the pulley head of the attachment.  
(applicable to fly boom without/with fly boom extension and heavy-duty jib)
- Pay attention to the allocation of the hoisting ropes for the main boom and attachments.

4. → Continue to wind the hoisting rope from the winch until enough rope is available for reeving between the pulley head and bottom hook block.
5. → Reeve the hoist rope according to the reeving plan.
6. → Mount all jump-off guards at the pulley head.
7. → Secure the jump-off guards at the pulley head with the safety pins.

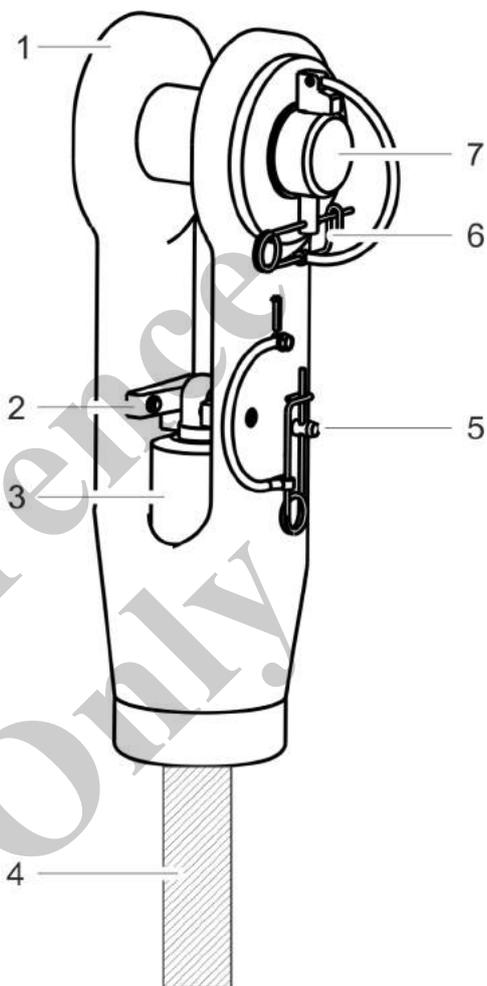


The rope on the boom does not run upward to the corresponding pulley head in a completely straight line, but bends slightly in the rope grab.

### Further notes

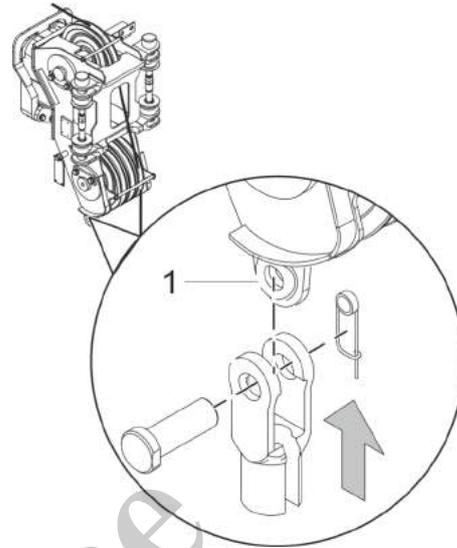
↪ Chapter 6.6.8.2 “Reeving diagram” on page 291

### Anchoring the hoisting rope



- 1 Pouch socket
- 2 Securing plate
- 3 Locking clamp
- 4 Rope
- 5 Locking pin with retaining spring
- 6 Retaining spring
- 7 Pin

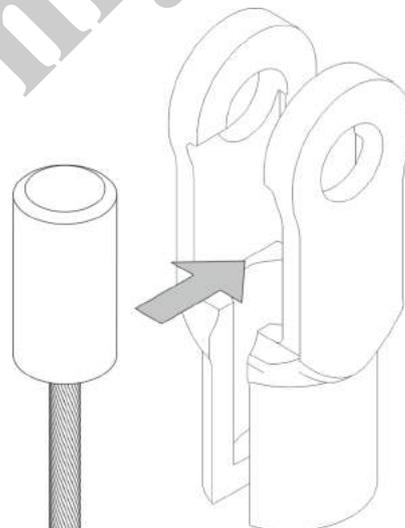
1. ➔ Remove the pouch socket from the accessories box.
2. ➔ Remove the retaining spring from the bolt.



1. Rope end point
3. → Secure the pouch socket to the rope end point with the bolt.  
Secure the bolt with the retaining spring.

*i* The rope end point is located on the pulley head or bottom hook block, depending on the reeving.

4. → Remove the retaining spring from the locking pin.  
Remove the locking pin from the pouch socket.
5. → Flip the locking plate up.



6. → Hook the locking clamp into the pouch socket.
7. → Flip the locking plate down.
8. → Attach the locking pin to the pouch socket.

### Mounting the lifting limit switch weight

#### NOTICE

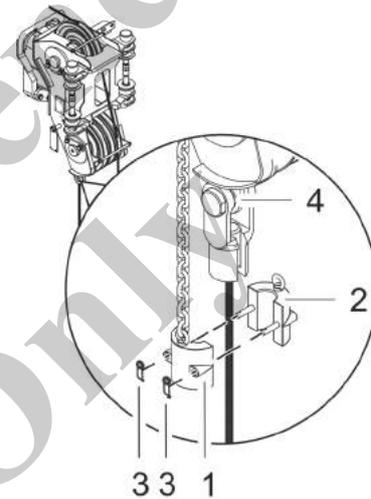
**Damage due to improperly mounted lifting limit switch weight!**

- Do not shorten the chain for the lifting limit switch weight.
- Attach the lifting limit switch weight to the part of the hoist rope that is attached to the rope end point.

If the lifting limit switch weight is mounted improperly, the bottom hook block can be pulled against the pulley head. This can cause material damage.

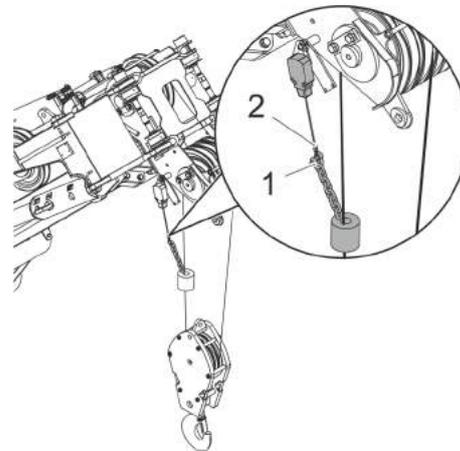
The lifting limit switch weight is used when operating the machine with the following components:

- Fly boom
- Fly boom with fly boom extension
- Heavy-duty jib
- Auxiliary jib
- Reeving: 1 strand



- 1, 2 Halves of the lifting limit switch weight
- 3 Retaining spring
- 4 Rope end point

1. ➔ Place both halves of the lifting limit switch weight around the strand of the hoisting rope attached to the rope end point.
2. ➔ Secure the two halves of the lifting limit switch weight with retaining springs.



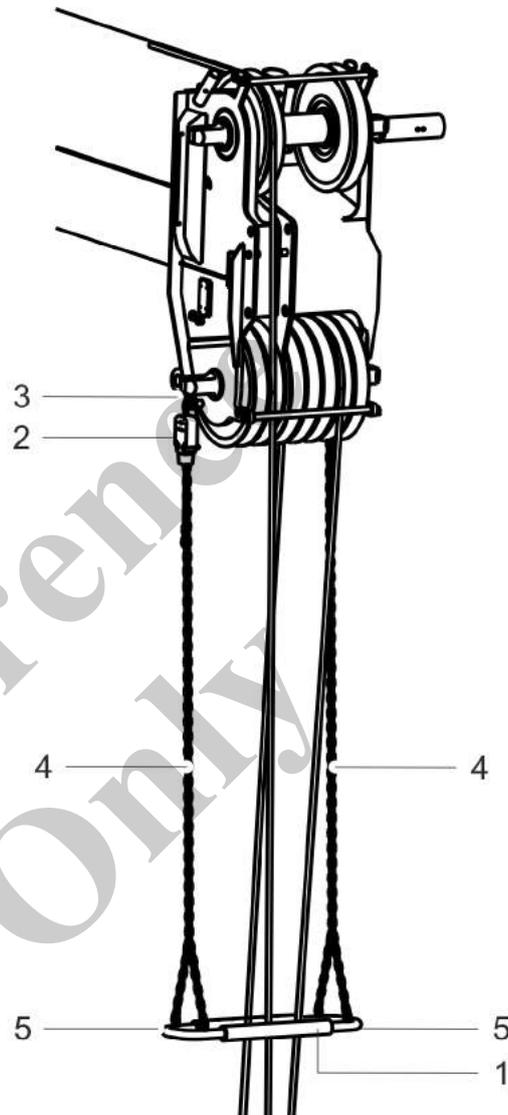
- 1 Lifting limit switch weight chain
- 2 Lifting limit switch rope
3. → Attach the chain of the lifting limit switch weight to the rope of the lifting limit switch.

For Reference Only

### Mounting the lifting limit switch bracket

The lifting limit switch bracket is used when operating the machine with the following components:

- Bottom hook block
- Reeving: multiple strands



- 1 Lifting limit switch bracket
- 2 Lifting limit switch
- 3 Bore in pulley head
- 4 Chains of the lifting limit switch bracket
- 5 Side brackets

1. ➤ Mount the chains of the lifting limit switch bracket and the lifting limit switch in the bores in the pulley head.
2. ➤ Attach the rope on the lifting limit switch to the chain of the lifting limit switch bracket.
3. ➤ Remove the side brackets of the lifting limit switch bracket.

4. → Route the hoisting rope through the rope conduit of the lifting limit switch bracket.
5. → Mount the side brackets of the lifting limit switch bracket.

### 6.6.9 Ballasting the machine

**⚠ DANGER**

**Falling machine or accessories from incorrect lifting**

- Ensure that the sling gear has sufficient load-bearing capacity and is not damaged.
- Only attach the machine and all accessory parts at the defined lifting points.

If the machine or accessories are lifted incorrectly, the load could fall. This can cause serious injury.

**⚠ WARNING**

**Risk of injury due to improperly placed ballast blocks.**

When slewing the uppercarriage, ballast blocks that are not placed correctly on top of each other strike obstructions or persons. Persons will be injured and material damage occurs.

- Make sure all ballast blocks are seated properly.
- Check that the ballast blocks are secured in the correct position and are firmly in place.

**⚠ WARNING**

**Danger of accident by locking bolts coming loose!**

- Secure the locking bolt with an additional mechanical locking mechanism.
- Perform a daily visual inspection of the locking mechanism and locking bolts.

Locking bolts may become loose when the system is de-energized. The counterweight is no longer bolted to the uppercarriage and may fall down. This can result in the machine overturning. This can cause serious injury.

- Eye contact between crane operator and banksman must be ensured.
- The machine must only be equipped with ballast when it is placed on the ground.
- Ballast must only be applied with the machine set to the maximum track width.
- Ensure all personnel is outside the danger zone during the ballasting procedure.
- Do not stand on or under the counterweight.

## Start-up and setup

### 6.6.9.1 Preparing the counterweight for mounting

**⚠ WARNING**

**Dropping load when stacking counterweights!**

- Only use the suspension gear provided with the machine and the designated lifting points.

**A suspension gear of insufficient load rating or lifting at insufficient lifting points may cause to load to drop. This can cause death or serious injury.**

Depending on the application, the machine can be fully or partially ballasted.

#### Full ballasting

The following components are required for full ballasting of the machine:

Data	Value	Unit
Ballast bracket	1	Quantity
Ballast stone	6	Quantity
Safety chain	4	Quantity

#### Partial ballasting

The following components are required for partial ballasting of the machine:

Data	Value	Unit
Ballast bracket	1	Quantity
Ballast stone	2	Quantity
Safety chain	2	Quantity
Chain extension	2	Quantity

#### 6.6.9.1.1 Pre-assembling the counterweight on the floor

##### Tools

- Transport vehicle
- Wooden beams
- Suspension gear and shackles

Pre-assemble the counterweight on the floor for full or partial ballasting.

Requirement:

- The machine is on firm and level ground.
  - The maximum track width is set.
  - The suspension gear is mounted onto the hook.
1. ➔ Set the **Setup ballast** setup mode using the [Setup ballast] quick-select button.
  2. ➔ Park the transport vehicle with the ballast bracket and the ballast blocks parallel to the machine.

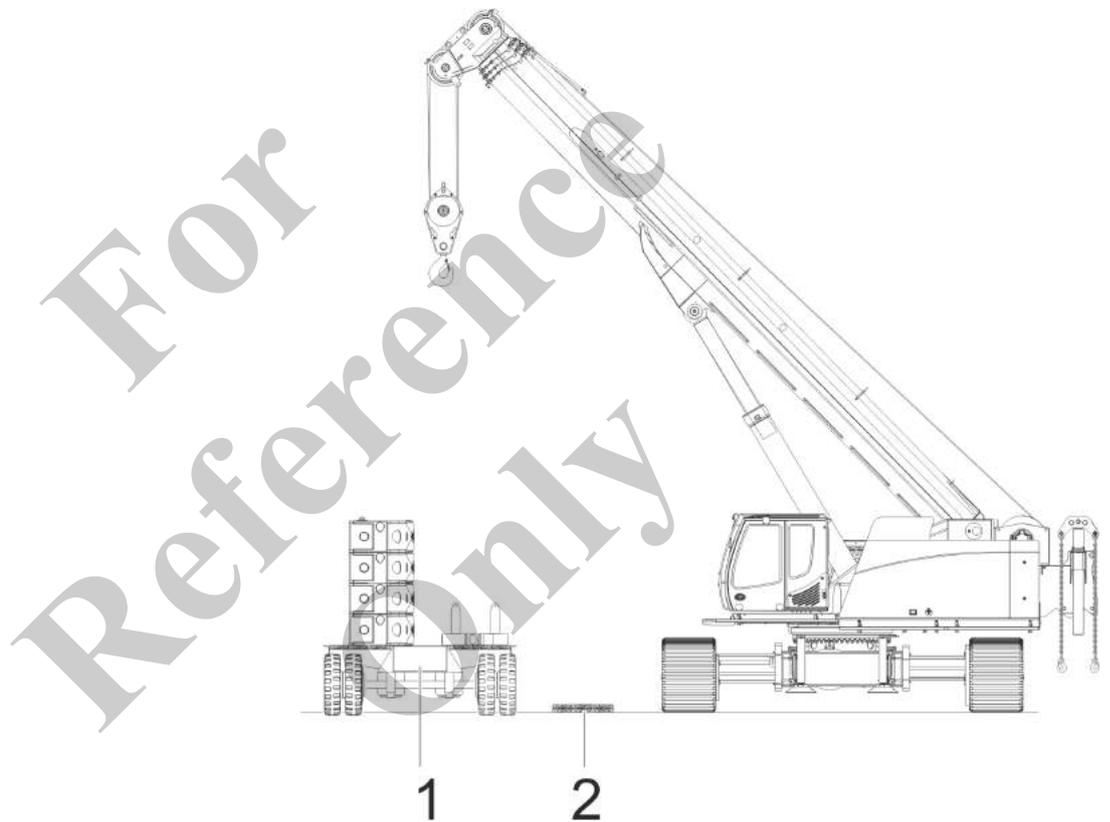


Fig. 24: Exemplary representation

- 1 Transport vehicle
- 2 Wooden beams

3. ➔ Prepare suitable wooden beams as a support for the counterweight alongside the transport vehicle.
4. ➔ Attach the suspension gear to the lifting points on the ballast bracket.

The suspension gear must not be twisted and must be the same length on both sides.

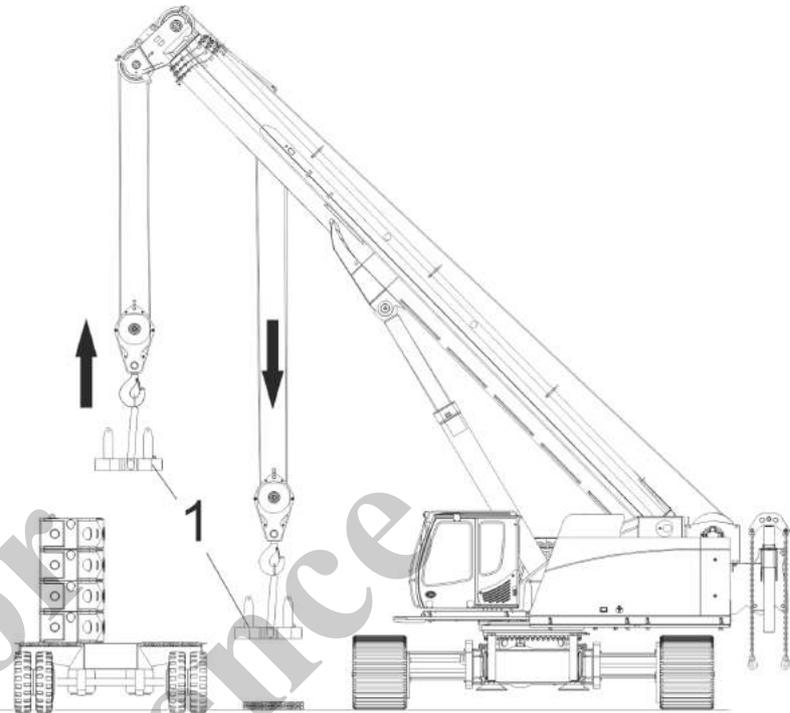


Fig. 25: Exemplary representation

1 Ballast bracket

5. → Lift the ballast bracket off the transport vehicle. Place the ballast bracket onto the wooden beams.
6. → Attach the top ballast block to the lifting points.
7. → Lift the top ballast block off the transport vehicle. Place the ballast block in the right position on the ballast bracket.
8. → Repeat these steps to mount the remaining ballast blocks onto the ballast bracket.

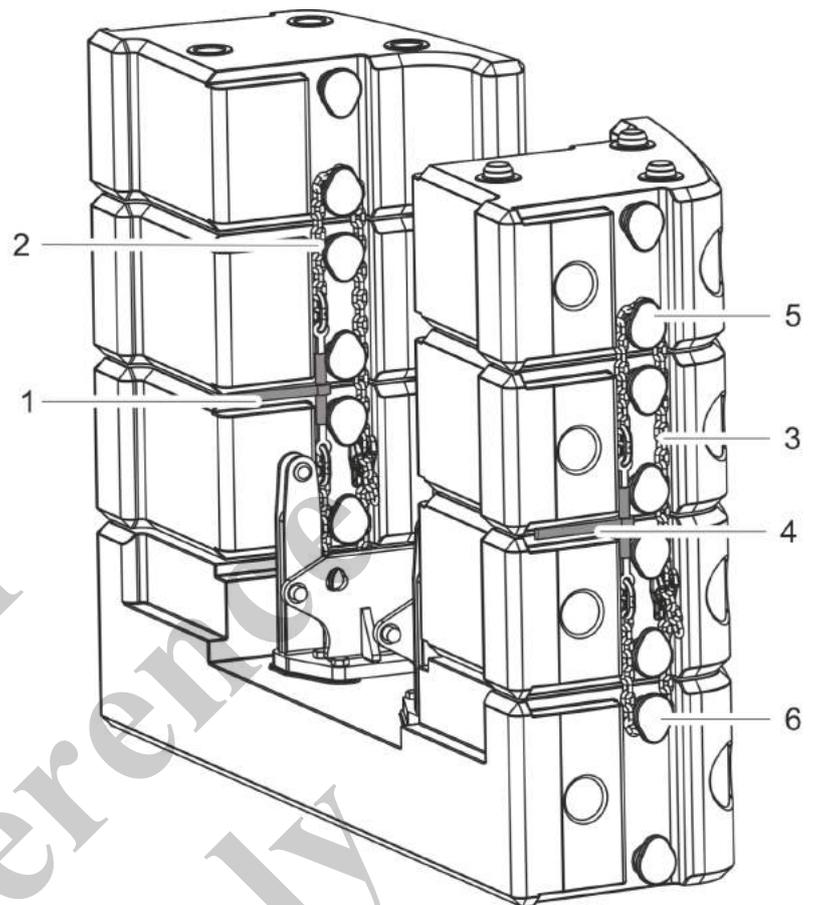
The protrusions and recesses on the top and bottom faces of the ballast blocks must be aligned precisely.

### 6.6.9.1.2 Securing the counterweight for full ballasting

#### Mounting the safety chain on the inner and outer side

Four safety chains are mounted to secure the counterweight:

- One safety chain on each outer side
- One safety chain on each inner side



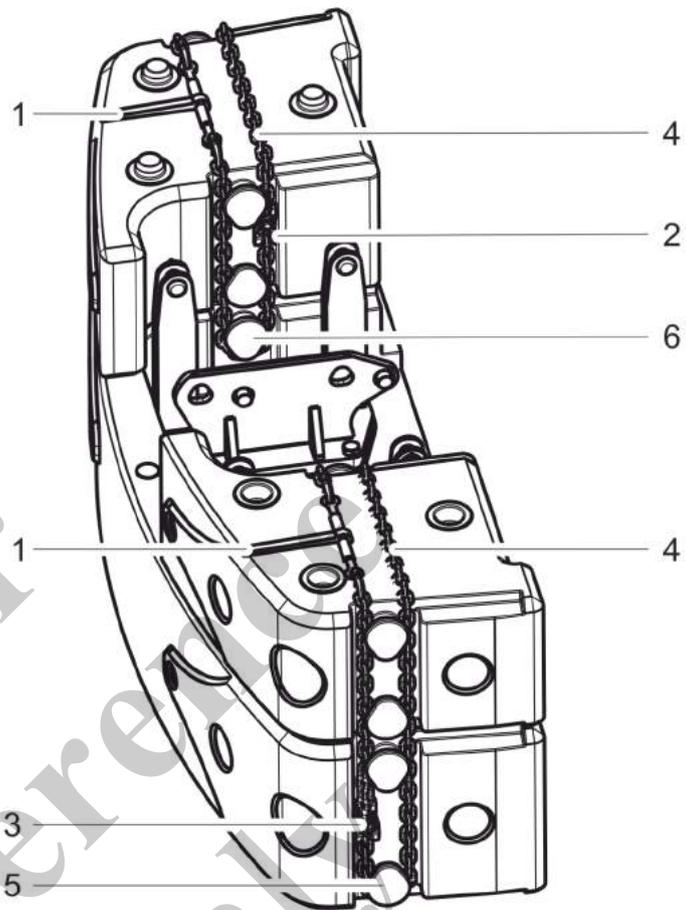
- 1 Safety chain turnbuckle on the inner side
- 2 Safety chain on the inner side
- 3 Safety chain on the outer side
- 4 Safety chain turnbuckle on the outer side
- 5 Holder for safety chain (top ballast block)
- 6 Holder for safety chain (ballast bracket)

The counterweight is pre-assembled on the floor.

1. ➔ Route the safety chain around the holder on the ballast bracket and the top ballast block.
2. ➔ Turn the turnbuckle handle until the safety chain is tensioned.
3. ➔ Place the turnbuckle handle in the groove between the ballast blocks.
4. ➔ Repeat these steps to mount the remaining safety chains.
  - ⇒ The counterweight is secured.

#### 6.6.9.1.3 Securing the counterweight for partial ballasting

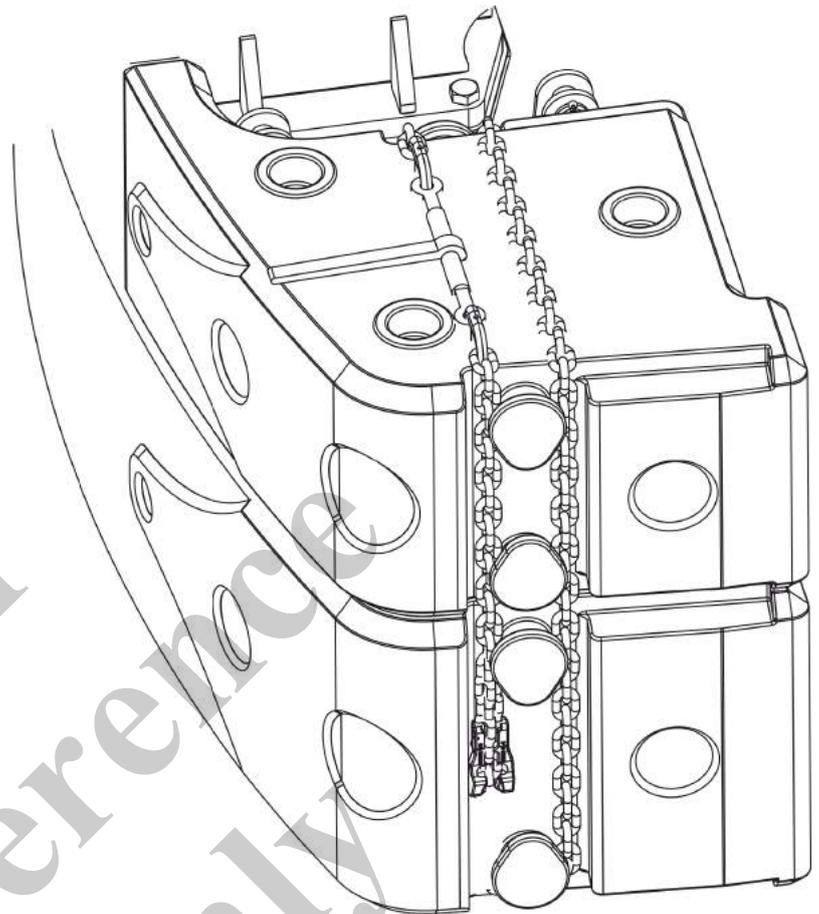
A chain extension is required to secure the counterweight in the case of partial ballasting. The chain extension is provided in the tool box at the track wheel carriers.



- 1 Turnbuckle
- 2 Chain shortener on the inner side
- 3 Chain shortener on the outer side
- 4 Chain extension
- 5 Holder for safety chain on the outer side (ballast bracket)
- 6 Holder for safety chain on the inner side (ballast bracket)

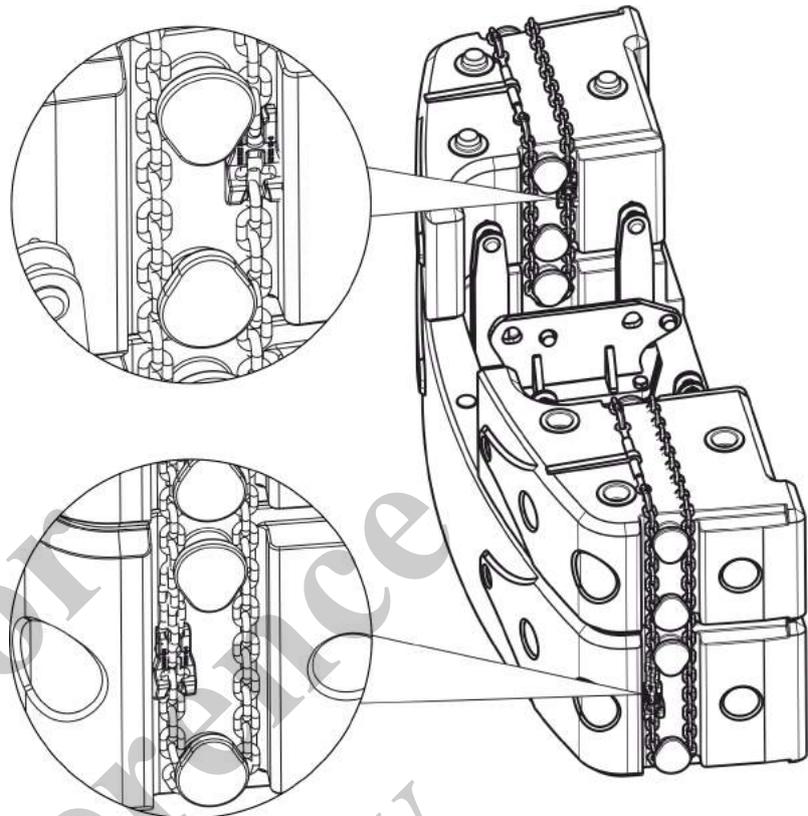
**1.** → Turn the turnbuckle handle.

⇒ The chain is tensioned.



2. → Route the chain over the front face of the counterweight and over the ballast blocks. The turnbuckle is located on the top in the center of the ballast block.

Place the chain extension on the rear face of the counterweight and over the ballast blocks.



*Fig. 26: Position of the chain shortener on the outer side and on the inner side of the ballast blocks*

- 3.** → Check the position and alignment of the chain shorteners.  
Route the chain extension around the holder on the outer side of the ballast bracket. Connect the chain with the chain shortener.  
Connect chain and chain extension on the outer side so that 5 chain links of the chain extension project.
- 4.** → Route the chain extension around the holder on the inner side of the ballast bracket. Connect the chain with the chain shortener.  
Connect chain and chain extension on the inner side so that 6 chain links of the chain extension project.
- 5.** → Turn the turnbuckle handle until the safety chain is tensioned.
- 6.** → Repeat these steps to mount the safety chain on the other side.  
⇒ The counterweight is secured.

### 6.6.9.1.4 Setting the extension mode and boom length

In order to set up the counterweight with the **Setup ballast** setup mode, a specific extension length must be set and the boom must be extended to a predefined length.

**Extension mode and boom length for setting up the counterweight**

Data	Value	Unit
Extension mode	EM1	
Boom length	19.9	m
Boom length	65.3	ft

Requirement:

- The boom angle is > 60°.

1. → Open the "Pin boom" menu page.
2. → Set the specified extension mode on the SENCON.
3. → Tilt the joystick in the [Extend telescope] or [Retract telescope] direction.

Extend or retract the boom until it has reached the predefined length.



*If two functions are assigned on the joystick, the relevant switch must be in the correct position in order to carry out the respective function.*

**Further notes**

↪ Chapter 7.15.2 "Retracting/extending the boom" on page 481

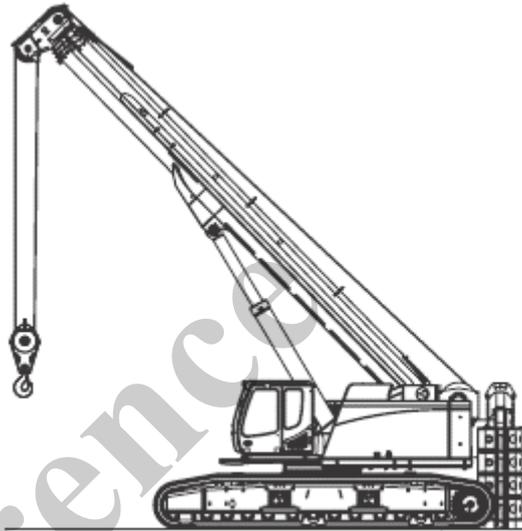
**6.6.9.1.5 Moving the machine to the counterweight**

**Personnel**

- Machine operator
- Banksman

Requirement:

- The predefined extension mode and the boom length for setting up the counterweight has been set.
- The ballasting cylinders are fully extended.
- The banksman is standing on the rear side of the counterweight.



→ With the help of the banksman and rear-view camera, move the machine backward towards the counterweight.

### 6.6.9.2 Activating ballasting mode

1. → Open the "Setup" menu page on the SENCON.
2. → Press the [Ballasting mode] quick-select button.
  - ⇒ The status indicator of the quick-select icon lights up yellow.

The engine is switched off.

The Setup remote radio control is used to control the machine during setup.

### Ballasting mode

	Yellow bar	Black bar
	The ballasting mode is activated. The Setup remote radio control is used to control the machine during certain setup procedures.	The ballasting mode is deactivated. The machine is controlled using the controls in the cab.

### 6.6.9.3 Switching on the Setup remote radio control

Preconditions:

- The safety lever has been pulled back.
- The machine operator has stepped out of the machine.

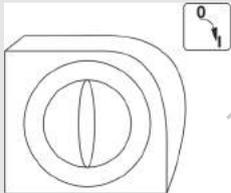
1. → Turn the rotary switch [*Switch remote radio control on/off*] on the remote radio control to position [*I*].

2. → Press the push button [*Horn/release remote radio control*] on the remote radio control.

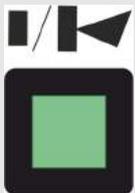
⇒ The remote radio control is ready for use.

The engine can be started via the remote radio control.

#### Switch remote radio control on/off

	Turn rotary switch to position [ <i>0</i> ]	Turn rotary switch to position [ <i>I</i> ]
	The remote radio control is deactivated.	The remote radio control is activated. A brief signal tone sounds.

#### Horn/release remote radio control

	Press the push button
	The horn sounds. The remote radio control is activated. The engine can be started.

### 6.6.9.4 Mounting the counterweight on the uppercarriage

#### 6.6.9.4.1 Retracting the ballasting cylinders

Requirement:

- The ballasting cylinders are extended.

1. → Tilt the [*Extend/retract right ballasting cylinder*] and [*Extend/retract left ballasting cylinder*] levers upward on the Setup remote radio control.

2. → Fully retract the ballasting cylinders.

## Start-up and setup

### Extend/retract left ballasting cylinder

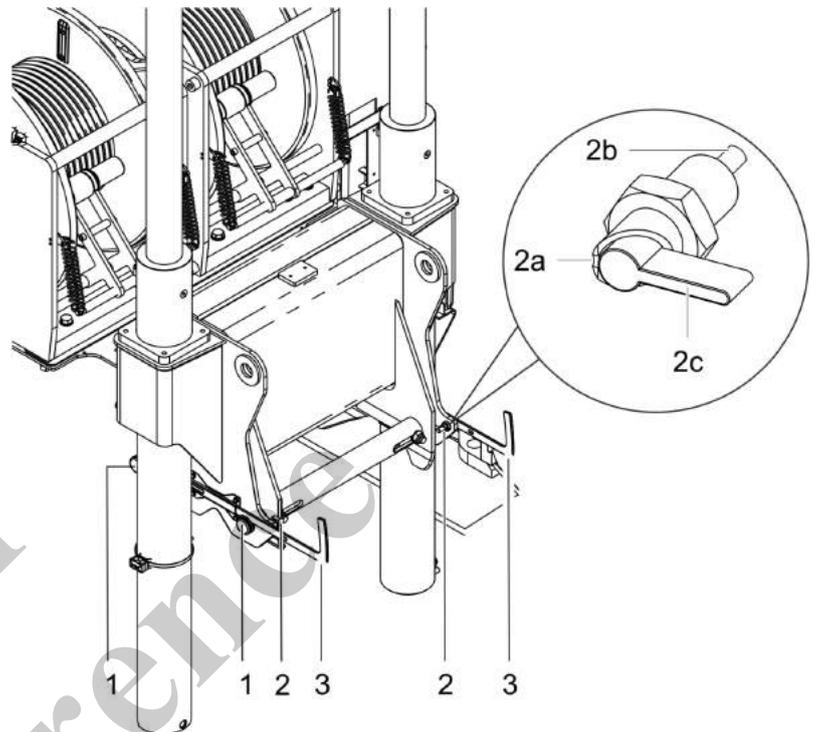
	Push and hold the lever up	Push and hold the lever down
	The left ballasting cylinder is retracted.	The left ballasting cylinder is extended.

### Extend/retract right ballasting cylinder

	Push and hold the lever up	Push and hold the lever down
	The right ballasting cylinder is retracted.	The right ballasting cylinder is extended.

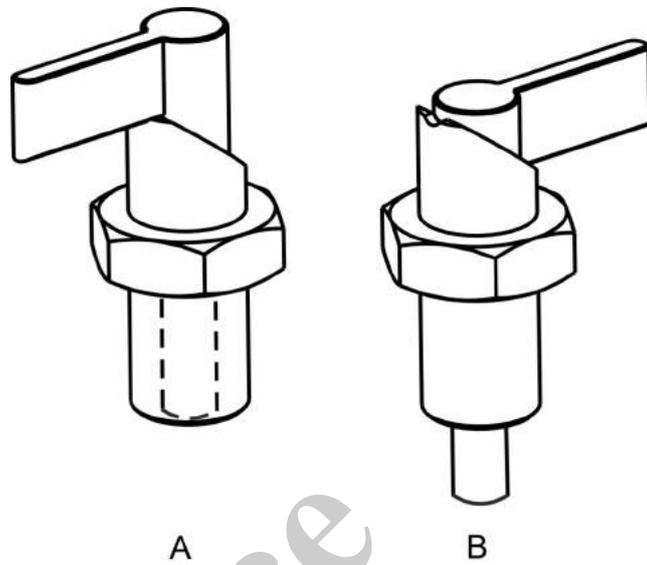
For Reference Only

6.6.9.4.2 Releasing the locking mechanism



- 1 Locking bolt
- 2 Latching bolt
- 2a Latching notch
- 2b Plunger pin
- 2c Latching bolt lever
- 3 Locking lever

### Positions of the latching bolt

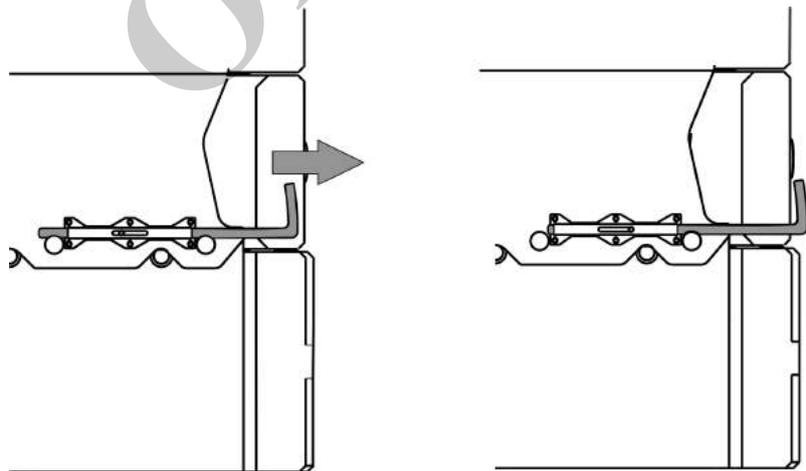


- A Latching bolt lever in the latching notch: The plunger pin is drawn in.  
B Latching bolt lever out of the latching notch: The plunger pin is released.

### Tools

- Ladder

1. Secure the latching bolt lever in the latching notch.
  - ⇒ The plunger pin is drawn in.
  - The locking lever is released and can be moved.



2. Pull out the locking lever as far as it will go.
  - ⇒ The locking lever extends beyond the ballast blocks.

3. → Pull the latching bolt lever out of the latching notch. Rotate the latching bolt lever by 180° and let go of it.
  - ⇒ The plunger pin is released.

#### 6.6.9.4.3 Lifting the counterweight with the ballast cylinders

Requirement:

- Uppercarriage is at 0°.

1. → Fasten the ballasting cylinder chains to the lifting points on the ballast bracket.
2. → Tilt and hold downward the *[Extend/retract right ballasting cylinder]* and *[Extend/retract left ballasting cylinder]* levers at the same time on the Setup remote radio control.
  - ⇒ The ballasting cylinders are extended.
3. → Lift the counterweight up to the stop.

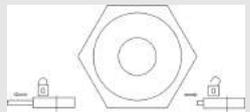
#### 6.6.9.4.4 Bolting the counterweight to the uppercarriage

Tools

- Ladder

1. → Tilt the *[Lock/unlock counterweight]* lever on the Setup remote radio control to the left.
  - ⇒ The locking bolts are extended.  
The counterweight is bolted to the uppercarriage.
2. → Perform a visual inspection:
  - All locking bolts are extended.
  - The counterweight is secured.

#### Lock/unlock counterweight

	Push lever to the left	Push lever to the right
	The locking bolts for securing the counterweight are extended.	The locking bolts for securing the counterweight are retracted.  The counterweight locking mechanism is released.

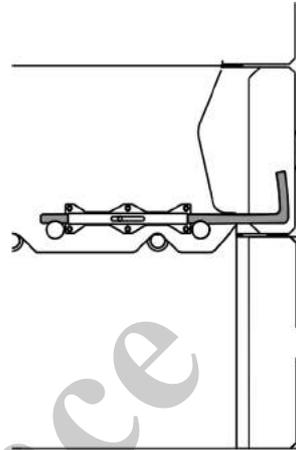
#### 6.6.9.4.5 Lock counterweight

Tools

- Ladder

The locking bolts must be secured by pushing in the locking lever.

1. → Insert the locking lever in the direction of travel until the plunger pin audibly engages.



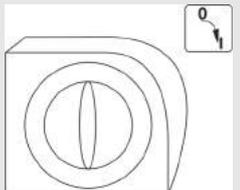
2. → Perform a visual inspection:  
The locking lever does not extend beyond the ballast blocks.
3. → Perform a functional check:  
Pull the locking lever.
  - ⇒ The locking lever does not move. The locking lever is secured.
  - The counterweight is locked.

### 6.6.9.5 Switching off the Setup remote radio control

Requirement:

- The engine is switched off.
- Turn the rotary switch *[Switch remote radio control on/off]* on the remote radio control to position *[0]*.
  - ⇒ The remote radio control is off.

### Switch remote radio control on/off

	Turn rotary switch to position <i>[0]</i>	Turn rotary switch to position <i>[1]</i>
	The remote radio control is deactivated.	The remote radio control is activated. A brief signal tone sounds.

6.6.9.6 Disabling ballasting mode

The information symbol [*Emergency stop*] on the SENCON is red.

The engine cannot be started from the cab with the ignition key or the push button.

1. → Open the “*Setup*” menu page on the SENCON.
2. → Press the [*Ballasting mode*] quick-select button on the SENCON.

⇒ The status indicator for the quick-select button is black.

The ballasting mode is switched off.

The machine is controlled using the controls in the cab.

The engine can be started from the machine.

**Emergency stop**

	Grey	Red
	The emergency stop is not actuated. All machine functions are available.	The emergency stop is actuated. The engine and all machine movements have been stopped.

**Ballasting mode**

	Yellow bar	Black bar
	The ballasting mode is activated. The Setup remote radio control is used to control the machine during certain setup procedures.	The ballasting mode is deactivated. The machine is controlled using the controls in the cab.

## 6.7 Setting up

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### 6.7.1 Lower the boom completely

In work mode, the boom can only be lowered to a certain angle. The boom has to be lowered completely for the setup operations.

#### NOTICE

**Risk of machine damage due to improper operation of the load hook when the limit shutdown is bypassed**

- When the lifting limit switch is bypassed, lift the load hook slowly.
- Maintain the specified safety distance between the load hook and the pulley head.
- When the load hook is resting on the ground, do not continue lowering the hook.

When the boom limit shutdown is bypassed, the load hook hits the pulley head. This can cause severe damage to the machine. The rope is damaged if the joystick is tilted further in the *[Lower hook]* direction when the load hook is resting on the ground.

**Safety distance of the load hook when the limit shutdown is bypassed**

Data	Value	Unit
Safety distance between the load hook and pulley head	1	m
Safety distance between the load hook and pulley head	3.3	ft

1. ➔ Tilt and hold the joystick in *[Lower boom]* direction until the boom cannot be lowered any more.

⇒ The boom is lowered to the maximum in work mode.

2. → Open the “*Setup*” menu page on the SENCON.  
Configure the **Setup attachment** setup mode  
or  
press the [*Setup attachment*] quick-select button.  
⇒ The limit shutdown of the boom is bypassed. The boom can be lowered further.
3. → Carefully tilt the joystick in [*Lower boom*] direction until the boom has reached the desired position.

### 6.7.2 Mounting the deflection sheave

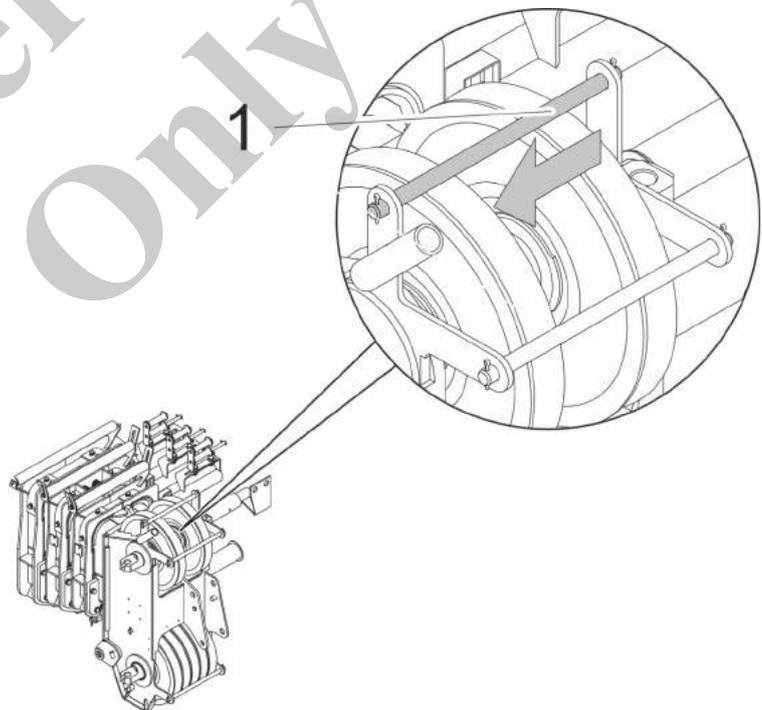
The deflection sheave must be mounted for any tasks with attachments.

#### Tools

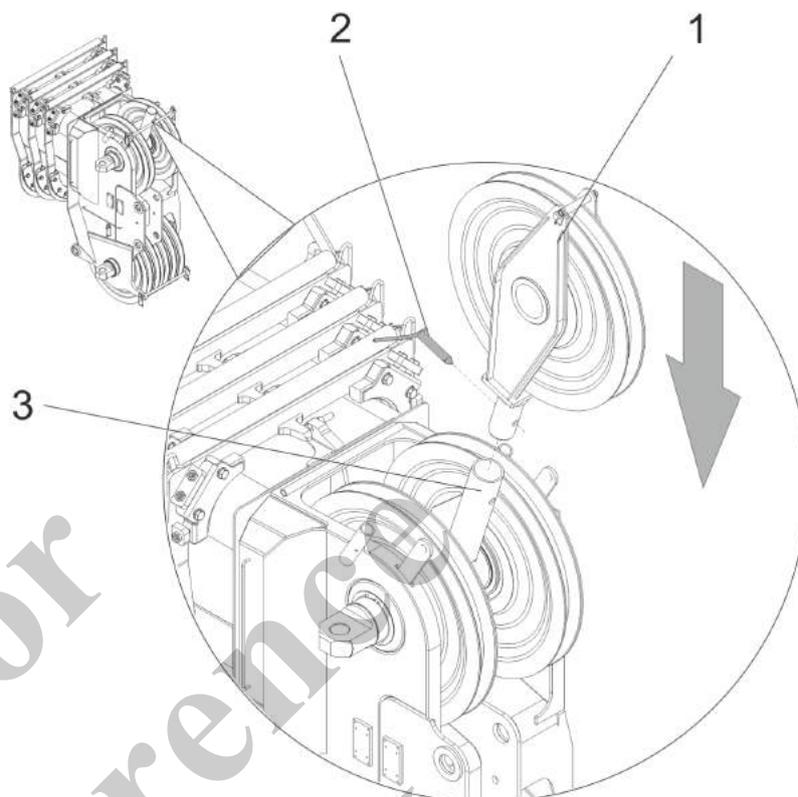
- Ladder

#### Requirement:

- The boom is fully retracted.
- The boom is fully lowered.



1. → Release the jump-off guard at the upper pulley head and pull it out.



- 1 Deflection sheave
  - 2 Pin
  - 3 Bracket at the boom
2. → Push the tube of the deflection sheave into the bracket at the boom.
3. → Secure the deflection sheave with the bolt.

### 6.7.3 Enabling/disabling the holding function

#### 6.7.3.1 Enabling the holding function

The holding function is used for folding the following attachments into the working position or into the transport position:

- Fly boom (with fly boom extension)
- Heavy-duty jib

Requirement:

- The boom is fully retracted.
  - The secure locking unit is fully retracted.
- The telescopic thruster T1 has a gray background in the following displays on the SENCON:
- [Secure locking unit position indicator] on the “Pin boom” menu page
  - [Pin boom display] in the “main menu”
1. ➔ Keeping the joystick lever tilted in direction [Retract telescope], press button [Fold fly boom/heavy-duty jib in/out] on the joystick.
    - ⇒ The holding function is enabled.
  2. ➔ Re-adjust the height of the boom if necessary.
    - i** If two functions are assigned on the joystick, the relevant switch must be in the correct position in order to carry out the respective function.

Tilt the joystick in the [Lift boom] or [Lower boom] direction.

      - ⇒ The holding function remains enabled.

### 6.7.3.2 Disabling the holding function

Requirement:

The holding function is enabled.

- ➔ Press button [Fold fly boom/heavy-duty jib in/out] on the joystick.
  - ⇒ The holding function is disabled.

Other options for disabling the holding function:

- extending the boom
- pulling the safety lever

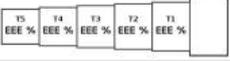
### 6.7.3.3 Overview of the most important operating and display elements

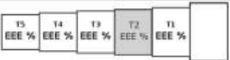
#### Pin boom display

	Display															
<table border="1"> <tr> <td>T5</td> <td>T4</td> <td>T3</td> <td>T2</td> <td>T1</td> <td>EM</td> </tr> <tr> <td>EEE%</td> <td>EEE%</td> <td>EEE%</td> <td>EEE%</td> <td>EEE%</td> <td>EE</td> </tr> </table>	T5	T4	T3	T2	T1	EM	EEE%	EEE%	EEE%	EEE%	EEE%	EE	The current position of each of the telescopic thrusters is displayed in (%). The currently set extension mode is displayed.			
T5	T4	T3	T2	T1	EM											
EEE%	EEE%	EEE%	EEE%	EEE%	EE											
	white	Grey	Black													
<table border="1"> <tr> <td>T5</td> <td>T4</td> <td>T3</td> <td>T2</td> <td>T1</td> <td>EM</td> </tr> <tr> <td>EEE%</td> <td>EEE%</td> <td>EEE%</td> <td>EEE%</td> <td>EEE%</td> <td>EE</td> </tr> </table>	T5	T4	T3	T2	T1	EM	EEE%	EEE%	EEE%	EEE%	EEE%	EE	The telescopic thruster is locked.	The secure locking unit is near a securing position in the lower boom section.	The secure locking unit is secured in the relevant telescopic thruster.	
T5	T4	T3	T2	T1	EM											
EEE%	EEE%	EEE%	EEE%	EEE%	EE											

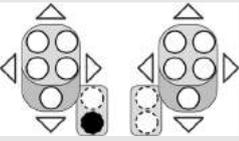
## Start-up and setup

### Telescopic thruster position indicator

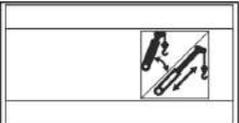
	Display
	The current position of each of the telescopic thrusters is displayed in (%).

	white	Grey	Black
	The telescopic thruster is locked.	The secure locking unit is near a securing position in the lower boom section.	The secure locking unit is secured in the relevant telescopic thruster.

### Fold the fly boom / heavy-duty jib in / out

	While holding the joystick in position [Retract telescope], press the button.	Press button again.
	<p>The telescopic cylinder is pressurized. The boom remains in its position.</p> <p>The holding function is enabled.</p> <p>Folding the fly boom or heavy-duty jib against the boom is made easier.</p>	The holding function is disabled.

### Switching Luffing down-up/Telescope in-out

	Switch position left	Switch position right
	<p>The [Luffing down - up] function is activated.</p> <p>Lifting and lowering of the boom is possible.</p>	<p>The [Telescope in-out] function is activated.</p> <p>Retracting and extending of the boom is possible.</p>

## 6.7.4 Setting up the fly boom

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### Safety instructions

**⚠ WARNING**

**Risk of crushing and shearing from dropping fly boom!**

- Observe the assembly sequence when bolting the fly boom.

**An incorrect bolting sequence cause the fly boom to drop.**

**⚠ WARNING**

**Danger of falling.**

- Do not climb onto the boom or the attachments.
- Do not climb onto equipment parts (for example, boom sections, ballast parts) hanging from a crane.
- Use secure climbing equipment when bolting the attachments.
- Depending on the work height, use a ladder in accordance with the applicable standards and regulations.

**⚠ WARNING**

**Risk of death from swinging fly boom.**

The unsecured fly boom can swing out at high speed and severely injure anybody in its swing range.

- Ensure that no one remains in the swing range except for the operators.
- Check the bolting on the basic body is correct prior to setup.
- Set the main boom in a horizontal position during the setup process.
- Secure a rope, which can be used to fold down and guide the tip by hand, to the head of the fly boom.
- Observe the prescribed sequence when setting the angle.

No other crane actions may be carried out while setting up. We recommend exiting the cabin after setting the operating mode.



*If the holding function is enabled, the safety lever must remain pushed in the direction of travel.*

### Space requirements for setting up

Folding in the fly boom requires sufficient space on the right-hand side of the machine.

Data	Value	Unit
Swing clearance of the fly boom	12	m
Swing clearance of the fly boom	39.4	ft

### 6.7.4.1 Safe storage location for plugs, cables, and bolts

#### Safe storage location for bolts

Removed bolts can be secured in a holder on the fly boom extension until they are ready to be reused.

**Safe storage location for plugs and cables**

Plugs that are not used are plugged into the parking sockets on each component and the corresponding cables are wound on the brackets.

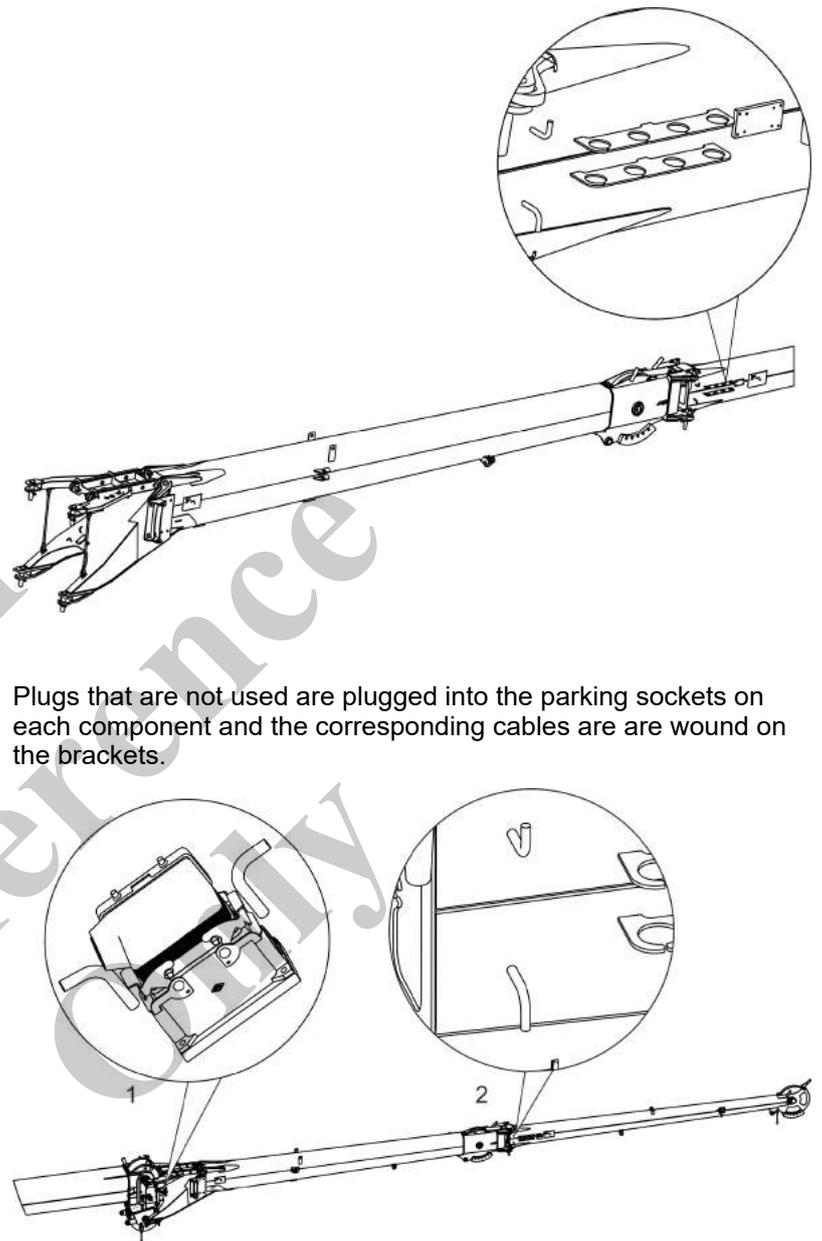


Fig. 27: Example illustration

- 1 Parking socket with area for winding cables
- 2 Area for winding cables

**6.7.4.2 Setting the operating mode**

1. ➔ Open menu page “*Setup status*” on the SENCON.
2. ➔ Configure the **Setup attachment** setup mode.

**Further notes**

🔗 Chapter 5.5.4.1.2 “*Setting Setup attachment*” on page 245

### 6.7.4.3 Assemble fly boom

**⚠ WARNING**

**Danger of falling.**

- Do not climb onto the boom or the attachments.
- Do not climb onto equipment parts (for example, boom sections, ballast parts) hanging from a crane.
- Use secure climbing equipment when bolting the attachments.
- Depending on the work height, use a ladder in accordance with the applicable standards and regulations.

**Personnel**

- Machine operator
- Slinger

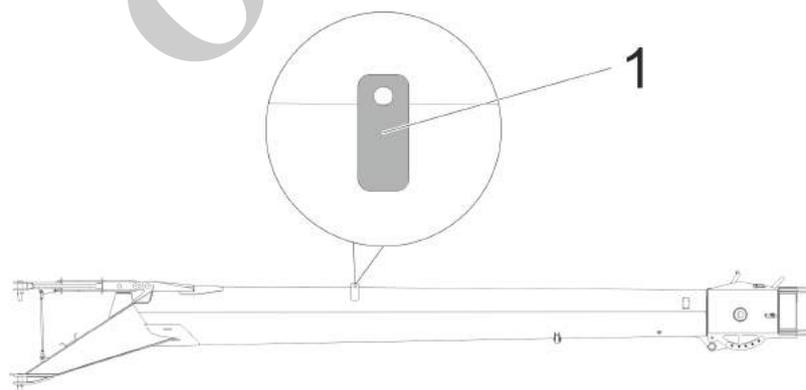
**Tools**

- Auxiliary crane
- Ladder
- Lifting equipment

**Requirement:**

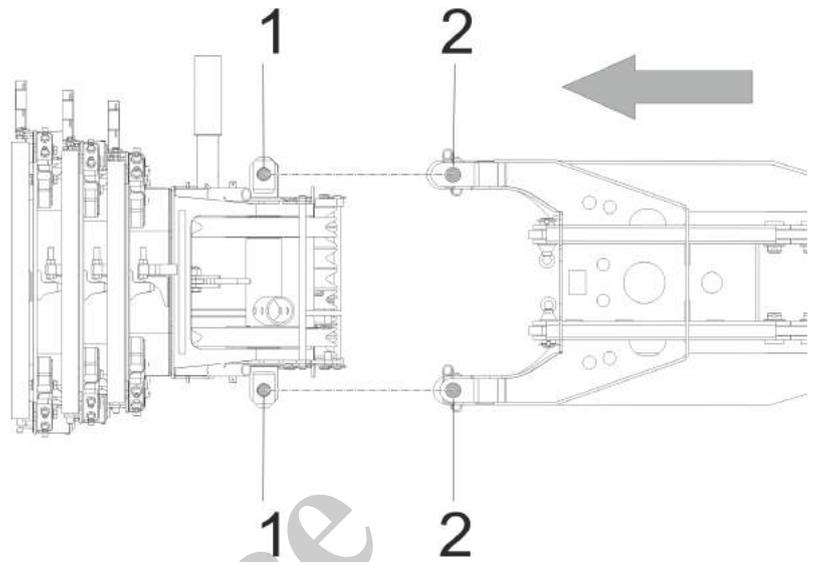
- Uppercarriage is at 0°.
- The boom is fully retracted.
- The boom is lowered to 0°.
- The hoisting rope is unreeved.
- The deflection sheave is mounted on the boom.
- The **Setup attachment** setup mode is set on the SENCON.

**Lifting the fly boom to the boom's pulley head**



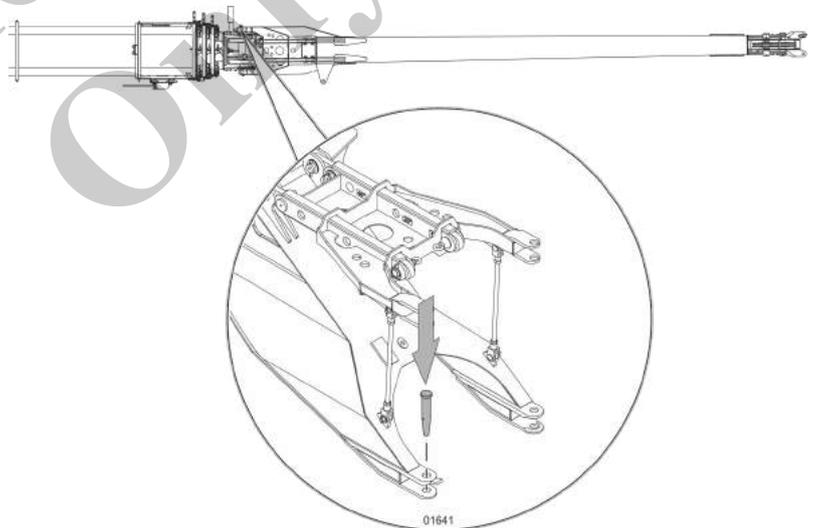
**1 Fly boom lifting point**

- 1.** Attach suitable hoisting gear to the fly boom at its lifting points to an auxiliary crane.
- 2.** Lift the fly boom to the boom's pulley head using the auxiliary crane.



- 1 Boom holes
- 2 Fly boom holes
- 3. → Align the fly boom with the boom's pulley head.  
The holes of the fly boom must line up with those of the boom.

**Bolting the fly boom at the left bottom**

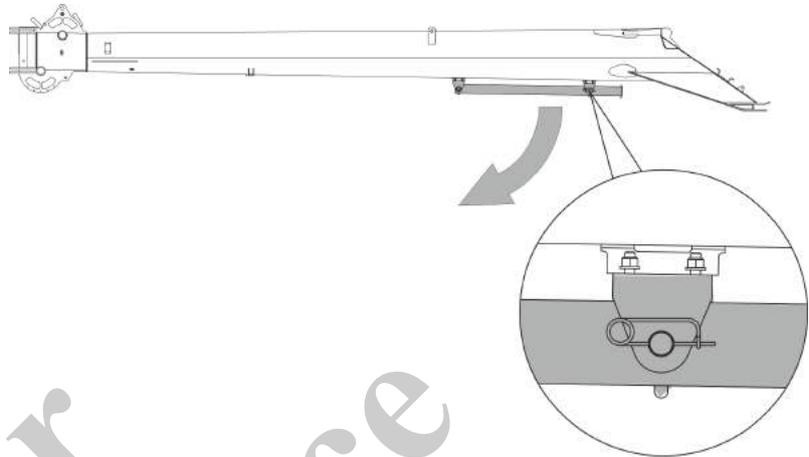


- 1. → Mount and secure the bottom left bolt between the fly boom and the boom.
- 2. → Insert the bolt in the top left as far as it will go.

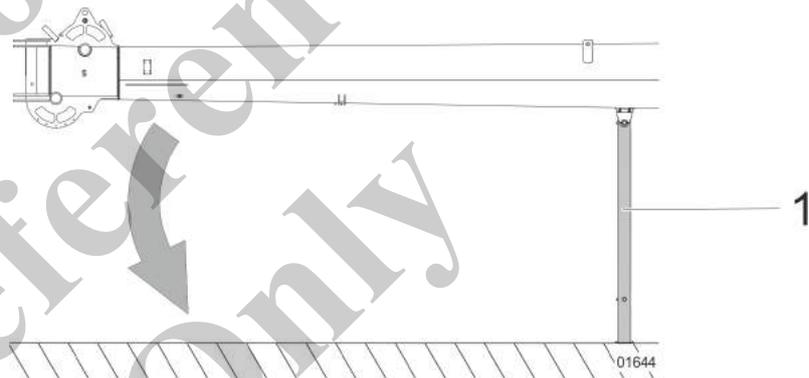
## Start-up and setup

### Folding out the support on the fly boom

1. ➤ Remove the retaining spring and the bolt.



2. ➤ Unfold the support on the bottom of the fly boom.

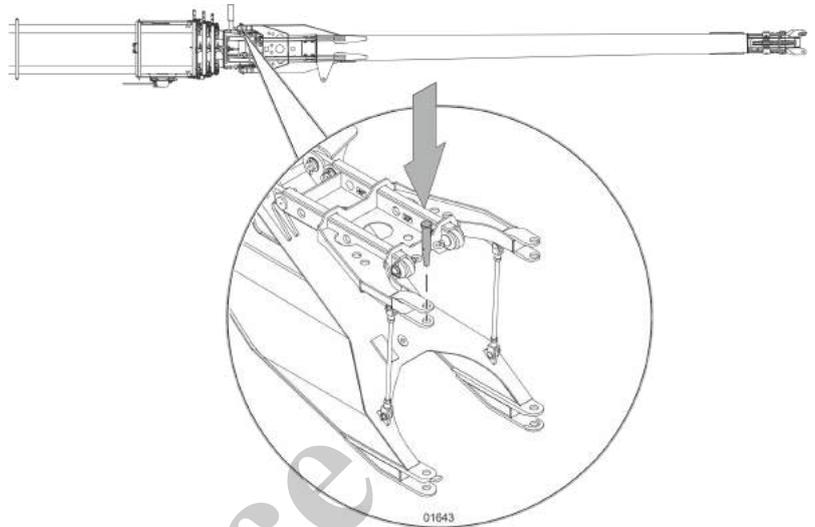


- 1 Support

3. ➤ Tilt the joystick in *[Lower boom]* direction.

⇒ The boom is lowered. The support contacts the ground.

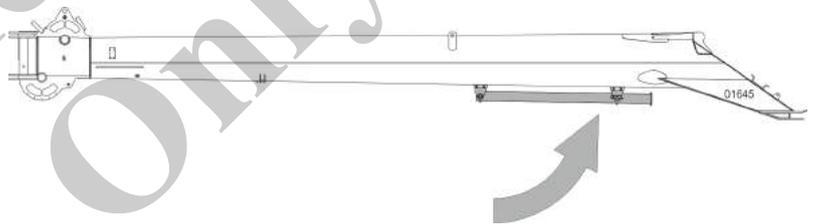
**Bolting the fly boom at the left top**



- ➔ Fully insert and secure the top left bolt between the fly boom and the boom.
- ⇒ The fly boom is bolted to the boom on the left-hand side.

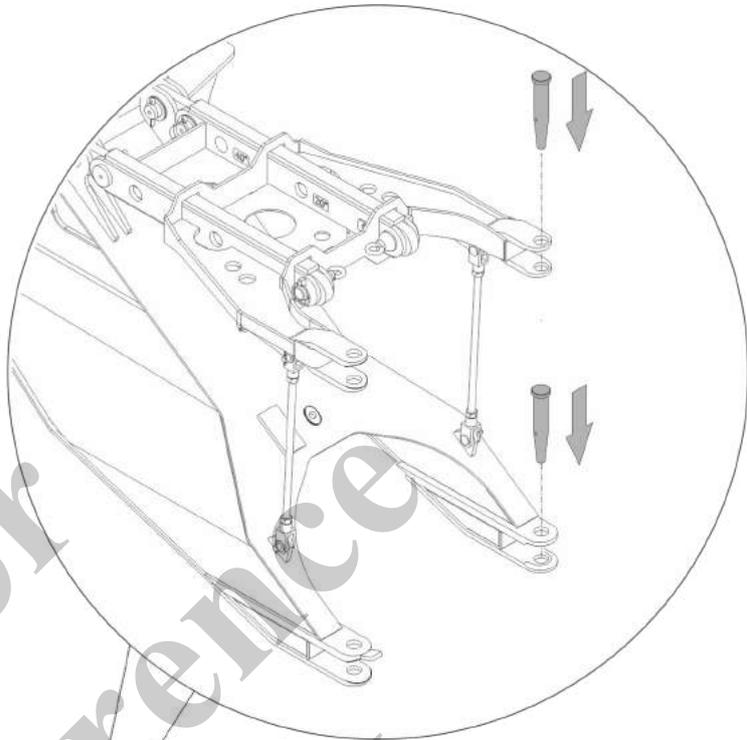
**Folding in the support**

1. ➔ Tilt the joystick in *[Raise boom]* direction until the support can be folded up.



2. ➔ Stow the support.
3. ➔ Use the bolt and the retaining spring to secure the support on the fly boom.

### Bolting the fly boom on the right



00167

→ Mount and secure the bolts between the fly boom and the boom on the right-hand side.

⇒ The fly boom is mounted on the boom.

### Removing the lifting equipment

1. → Remove the lifting equipment.
2. → Move the auxiliary crane out of the work area.

#### 6.7.4.4 Mounting the fly boom extension

**⚠ WARNING**

**Danger of falling.**

- Do not climb onto the boom or the attachments.
- Do not climb onto equipment parts (for example, boom sections, ballast parts) hanging from a crane.
- Use secure climbing equipment when bolting the attachments.
- Depending on the work height, use a ladder in accordance with the applicable standards and regulations.

### Personnel

- Machine operator
- Slinger

### Tools

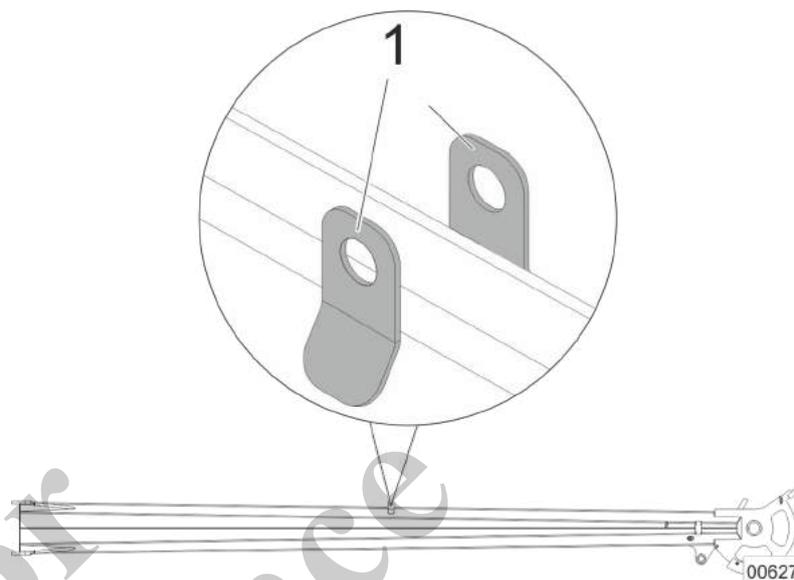
- Auxiliary crane
- Ladder
- Lifting equipment

#### Requirement:

- The fly boom is mounted on the boom.
- Uppercarriage is at 0°.
- The boom is fully retracted.
- The boom is lowered to 0°.
- The hoisting rope is unreeved.
- The deflection sheave is mounted on the boom.
- The **Setup attachment** setup mode is set on the SENCON.

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Reference  
Only

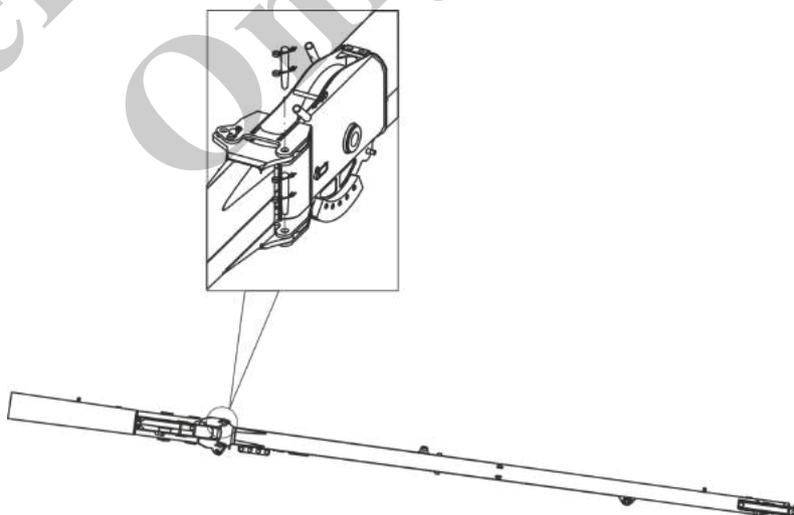
### Mounting the fly boom extension



#### 1 Fly boom extension lifting points

1. → Attach suitable hoisting gear to the fly boom extension at its lifting points to an auxiliary crane.
2. → Lift the fly boom extension to the fly boom's pulley head.
3. → Align the fly boom extension with the fly boom.

The holes of the fly boom must line up with those of the fly boom extension.



4. → Mount and secure the bolts between the fly boom extension and fly boom on the left and right-hand side.  
⇒ The fly boom extension is mounted on the fly boom.

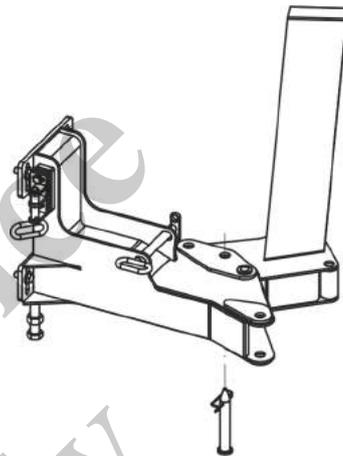
**Removing the lifting equipment**

1. → Remove the lifting equipment.
2. → Move the auxiliary crane out of the work area.

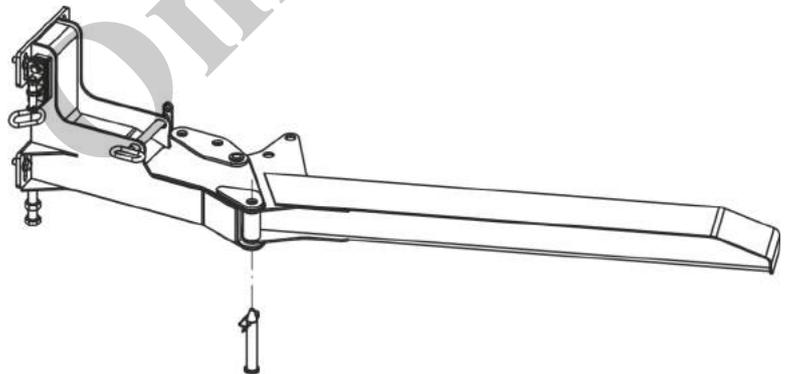
**6.7.4.5 Folding the pilot ramp**

**6.7.4.5.1 Folding out the ramp**

Always fold out the pilot ramp before folding the fly boom (with fly boom extension) into the transport or working position.



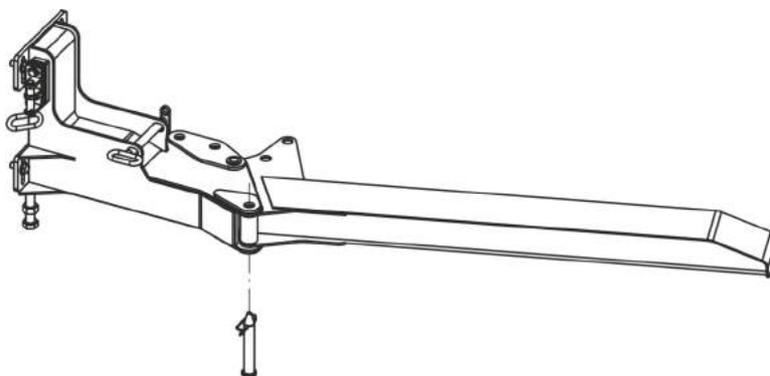
1. → Release the bolt connection at the ramp.
2. → Fold out the ramp.



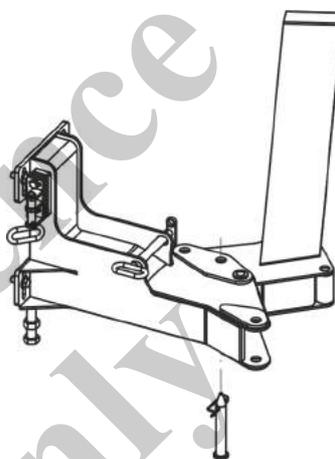
3. → Secure the unfolded ramp with the bolt and spring cotter pin.

**6.7.4.5.2 Folding in the ramp**

Always fold in the pilot ramp after folding the fly boom (with fly boom extension) into the transport or working position.



1. → Release the bolt connection at the ramp.
2. → Fold in the ramp.



3. → Secure the folded-in ramp with the bolt and spring cotter pin.

6.7.4.6 Folding the fly boom with fly boom extension into transport position

**⚠ WARNING**

**Danger of falling.**

- Do not climb onto the boom or the attachments.
- Do not climb onto equipment parts (for example, boom sections, ballast parts) hanging from a crane.
- Use secure climbing equipment when bolting the attachments.
- Depending on the work height, use a ladder in accordance with the applicable standards and regulations.

**Space requirements for setting up**

Folding in the fly boom requires sufficient space on the right-hand side of the machine.

Data	Value	Unit
Swing clearance of the fly boom	12	m
Swing clearance of the fly boom	39.4	ft

**Personnel**

- Machine operator
- Instructed personnel

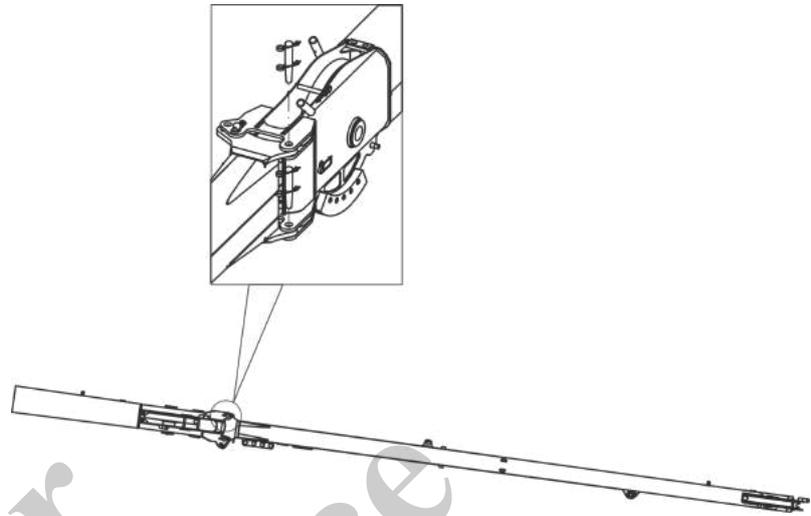
**Tools**

- Ladder
- Rope

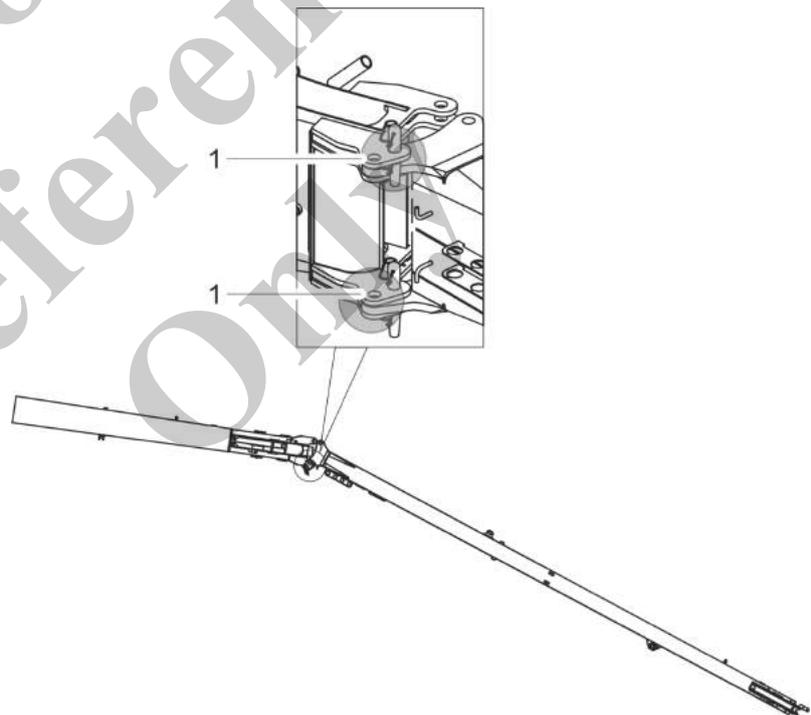
**Requirement:**

- Uppercarriage is at 0°.
- The boom is fully retracted.
- The boom is lowered to 0°.
- The hoisting rope is unreeved.
- The deflection sheave is mounted on the boom.
- The **Setup attachment** setup mode is set on the SENCON.
- The holding function is enabled.
- The safety lever is pushed in direction of travel.
- The pilot ramp is folded out.

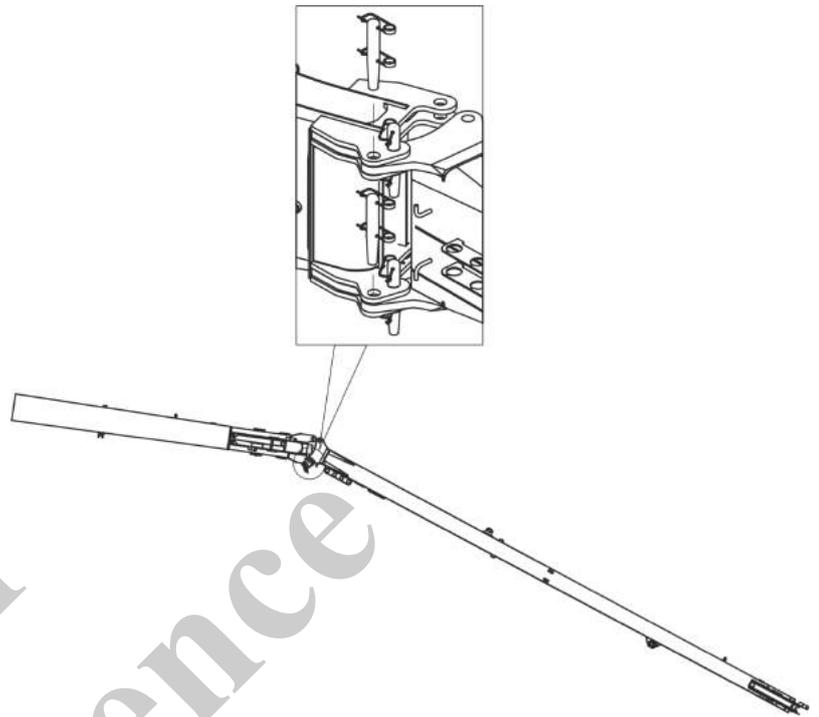
### Folding in the fly boom extension



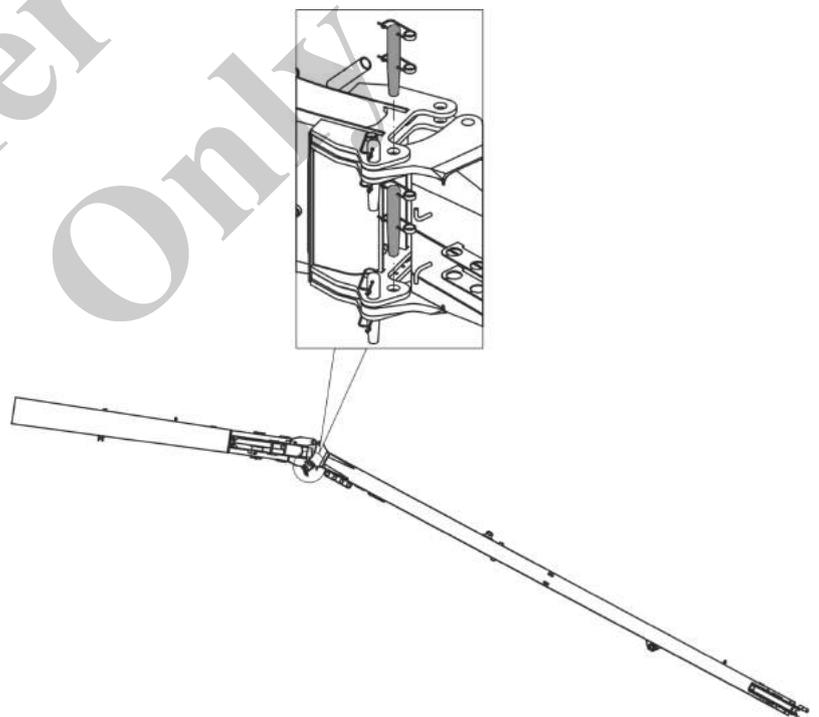
1. → Remove the bolts between the fly boom extension and fly boom on the left-hand side.



- 1 Pivot
2. → Pull in the fly boom extension with a rope until it reaches the fly boom's pivot point.

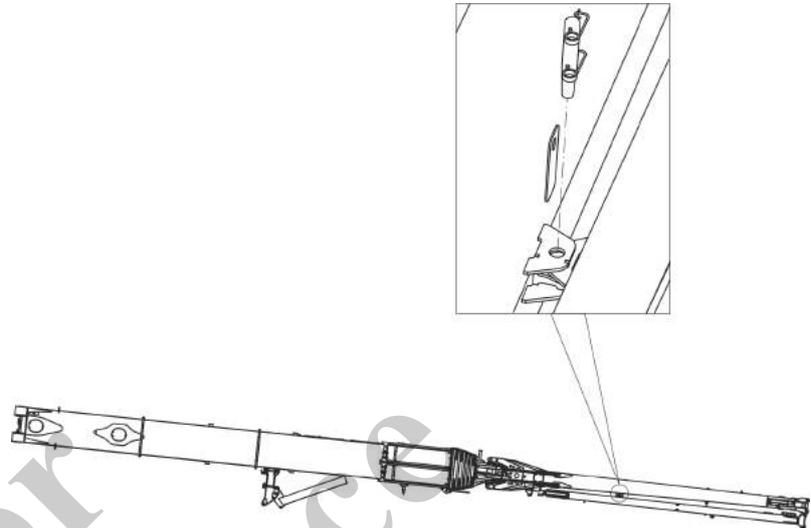


- 3.** → Mount and secure the bolts at the pivot point.



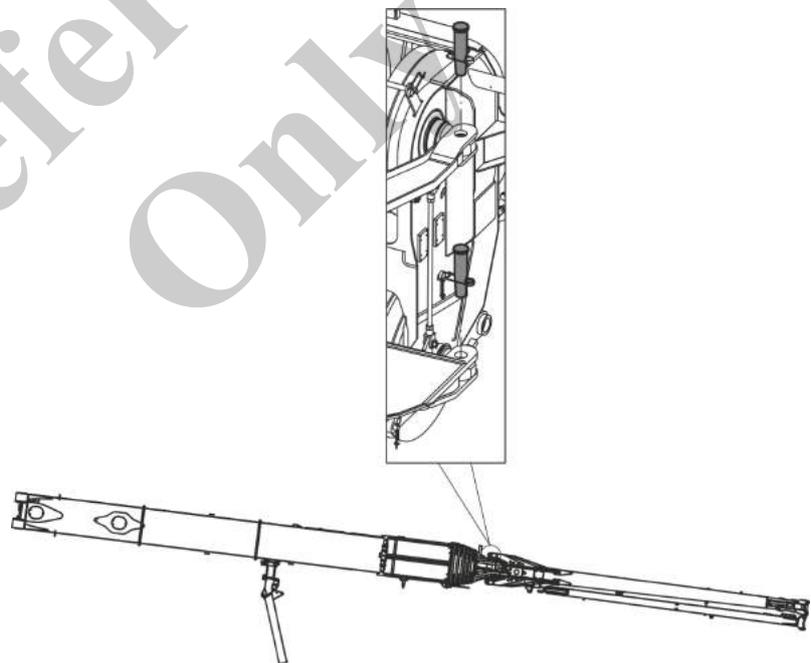
- 4.** → Remove the bolts on the right-hand side.  
**5.** → Fold in the fly boom extension all the way.

### Securing the fly boom extension to the fly boom

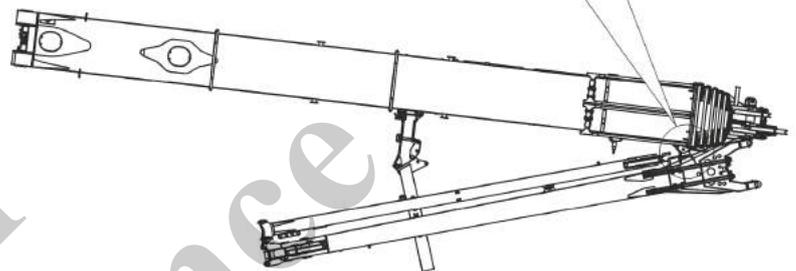
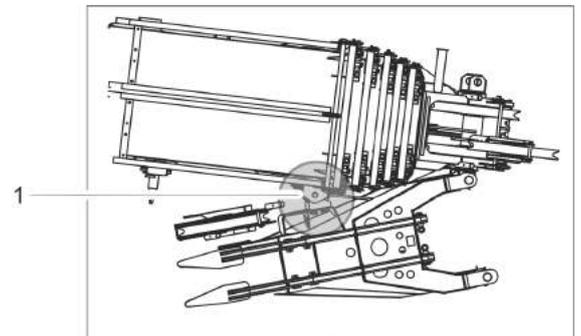


Secure the fly boom extension to the fly boom using the bolt.

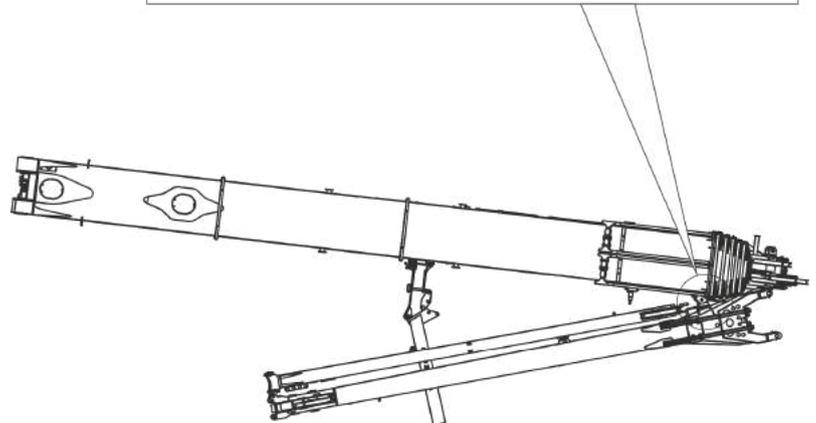
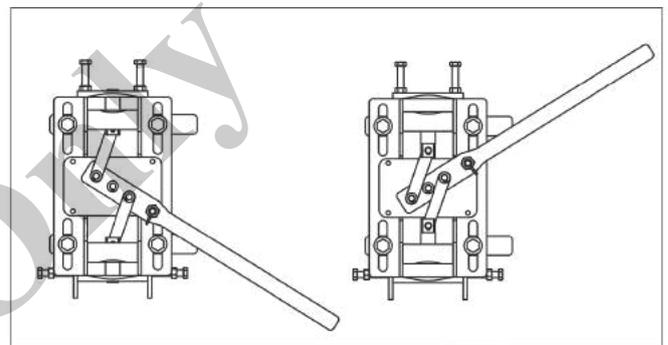
### Folding in the fly boom with fly boom extension



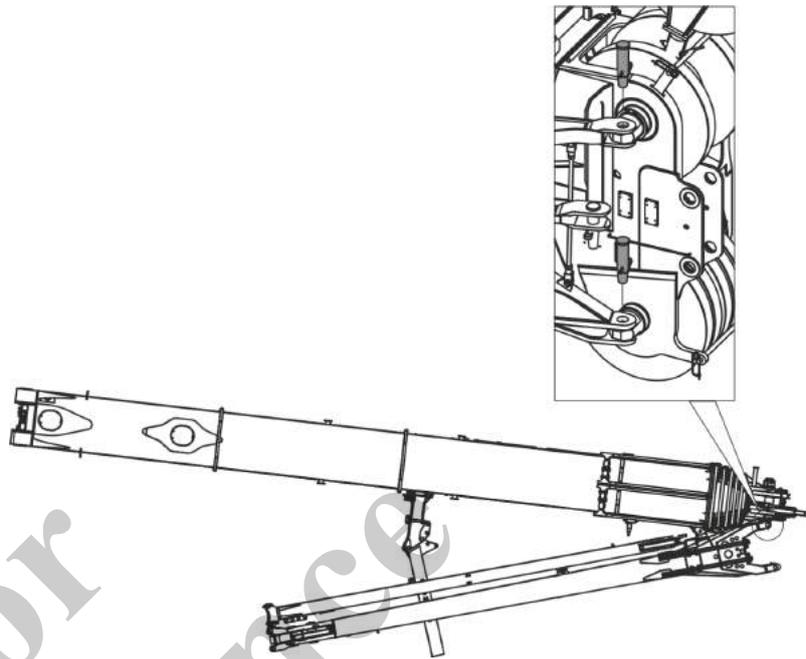
1. Remove the bolts between the fly boom and the boom on the left-hand side.



- 1 Pivot
2. → Pull in the fly boom with fly boom extension with a rope until it reaches the boom's pivot point.

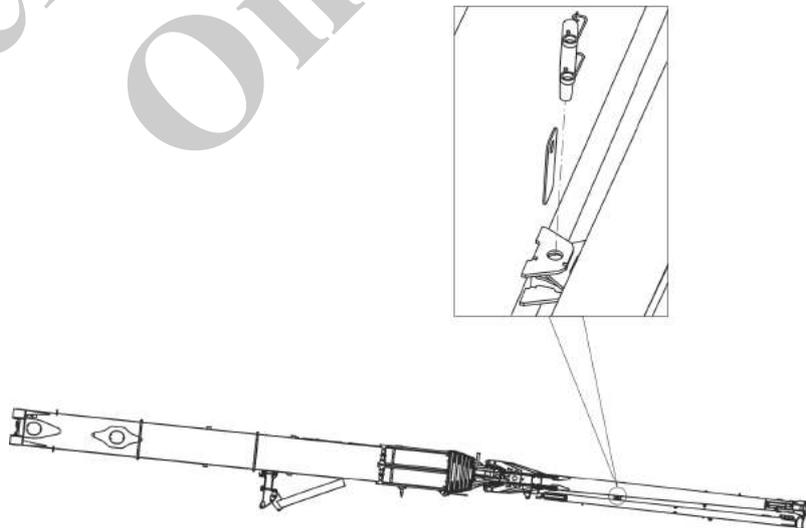


3. → Push the lever of the bearing block on the boom downward.  
 ⇒ The bolts at the pivot point are mounted.



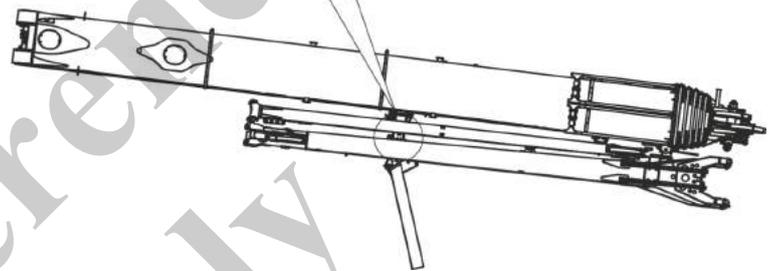
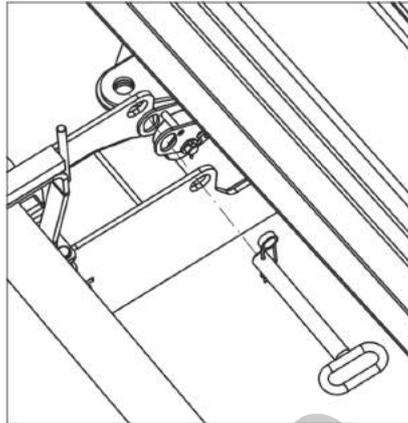
4. → Remove the bolts between the fly boom and the boom on the right-hand side.
5. → Pull the fly boom with the fly boom extension over the pilot ramp and fold it fully in.

**Securing the fly boom extension to the fly boom**



- Secure the fly boom extension to the fly boom using the bolt.

Securing the fly boom to the pilot ramp



→ Mount and secure the bolt between the fly boom and the pilot ramp.

### 6.7.4.7 Folding the fly boom with fly boom extension into the working position

**⚠ WARNING**

**Danger of falling.**

- Do not climb onto the boom or the attachments.
- Do not climb onto equipment parts (for example, boom sections, ballast parts) hanging from a crane.
- Use secure climbing equipment when bolting the attachments.
- Depending on the work height, use a ladder in accordance with the applicable standards and regulations.

#### Space requirements for setting up

Folding in the fly boom requires sufficient space on the right-hand side of the machine.

Data	Value	Unit
Swing clearance of the fly boom	12	m
Swing clearance of the fly boom	39.4	ft

#### Personnel

- Machine operator
- Instructed personnel

#### Tools

- Ladder
- Rope

Requirement:

- Uppercarriage is at 0°.
- The boom is fully retracted.
- The boom is lowered to 0°.
- The hoisting rope is unreeved.
- The deflection sheave is mounted on the boom.
- The **Setup attachment** setup mode is set on the SENCON.
- The holding function is enabled.
  - The safety lever is pushed in direction of travel.
- The pilot ramp is folded out.

**⚠ WARNING**

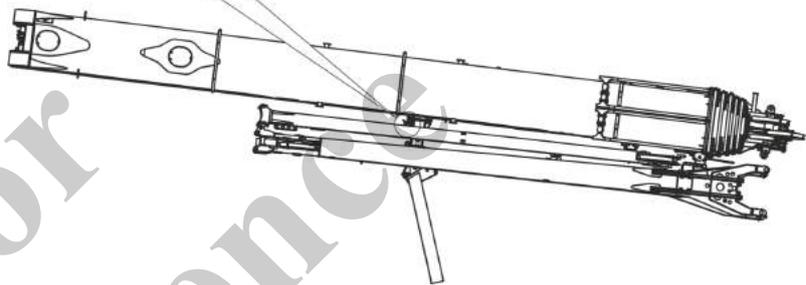
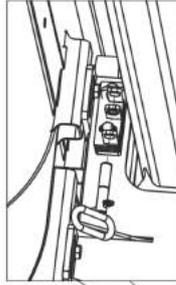
**Risk of death from swinging fly boom.**

The unsecured fly boom can swing out at high speed and severely injure anybody in its swing range.

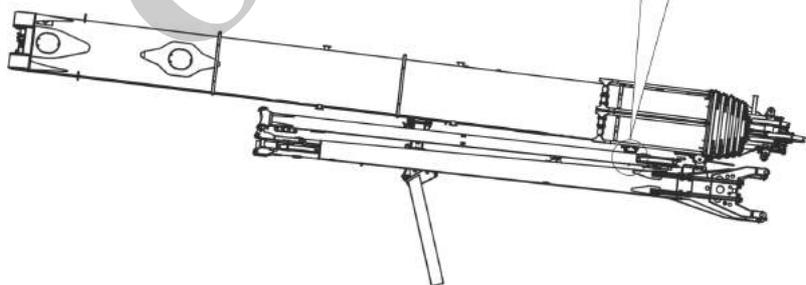
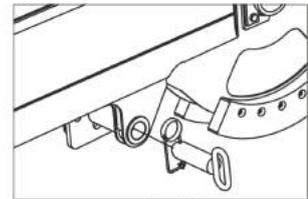
- Ensure that no one remains in the swing range except for the operators.
- Check the bolting on the basic body is correct prior to setup.
- Set the main boom in a horizontal position during the setup process.
- Secure a rope, which can be used to fold down and guide the tip by hand, to the head of the fly boom.
- Observe the prescribed sequence when setting the angle.

For  
Reference  
Only

### Releasing the fly boom with fly boom extension from the boom

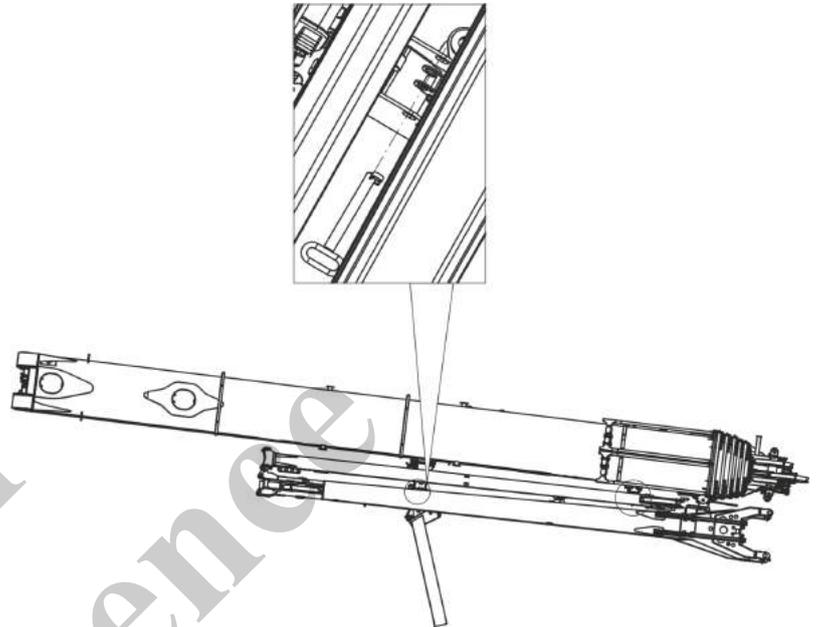


1. → Remove the bolt between the fly boom extension and the boom.



2. → Remove the bolt between the fly boom extension and the boom.

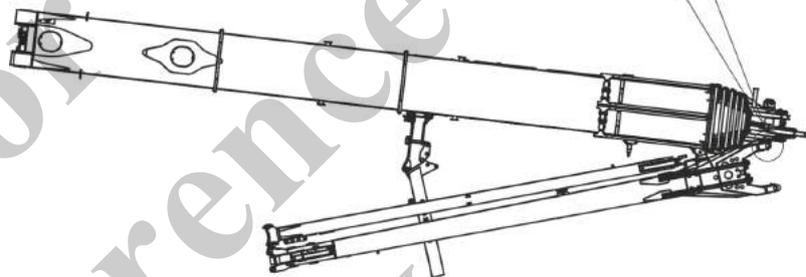
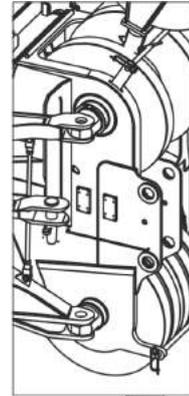
Releasing the fly boom with fly boom extension from the pilot ramp



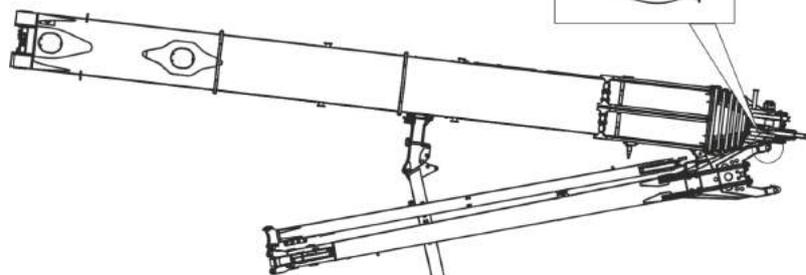
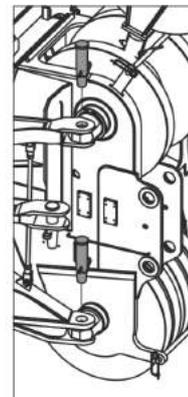
Remove the bolt between the fly boom and the pilot ramp.

For Reference Only

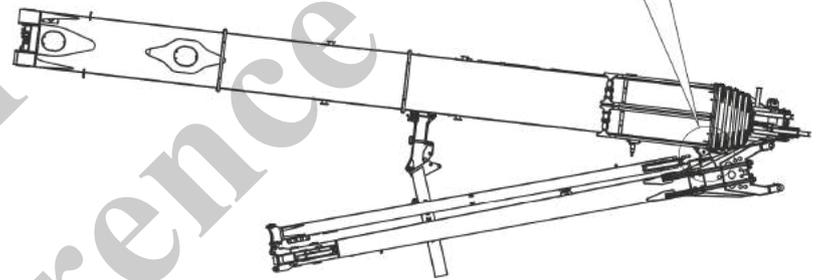
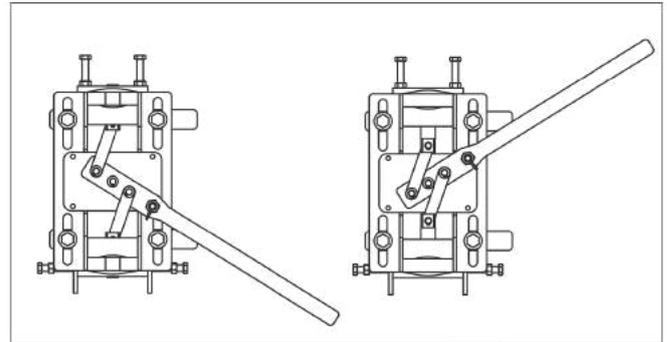
### Folding out the fly boom with fly boom extension



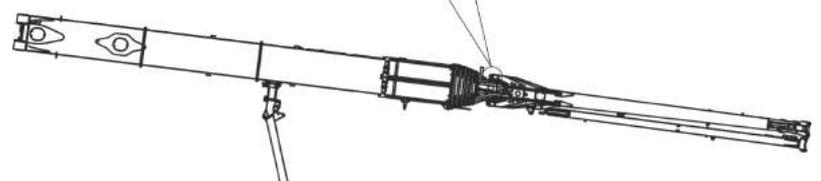
1. → Using a rope, pull the fly boom with fly boom extension over the pilot ramp until it reaches the boom's bolting point.



2. → Mount and secure the bolts between the fly boom and the boom on the right-hand side.

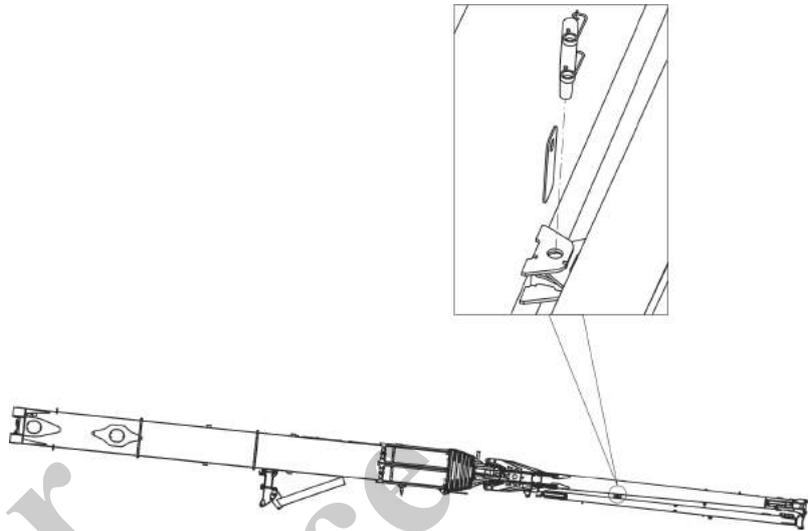


3. → Push the lever of the bearing block on the boom upward.  
⇒ The bolts at the pivot point are removed.
4. → Completely fold out the fly boom with fly boom extension using the rope.

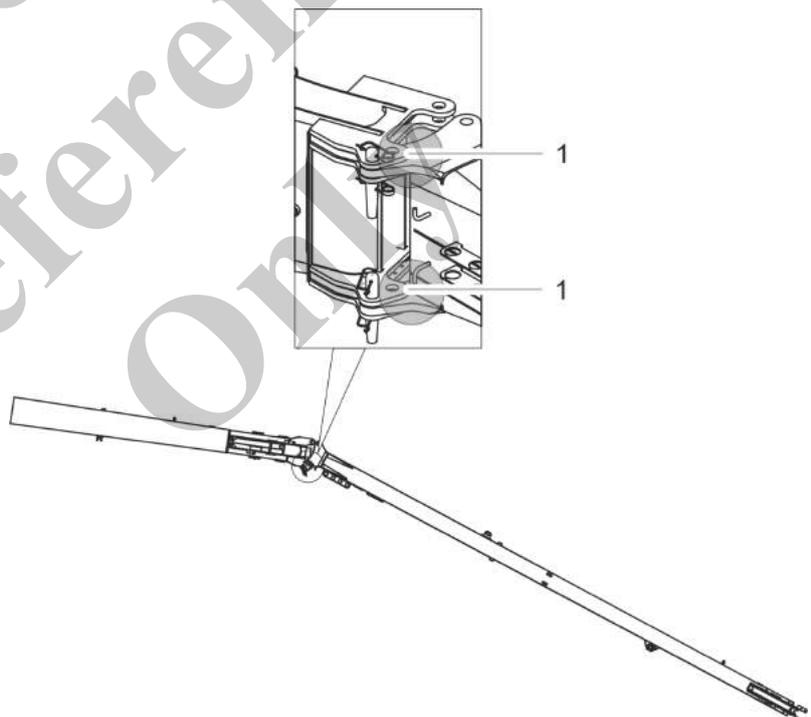


5. → Mount and secure the bolts between the fly boom and the boom on the left-hand side.

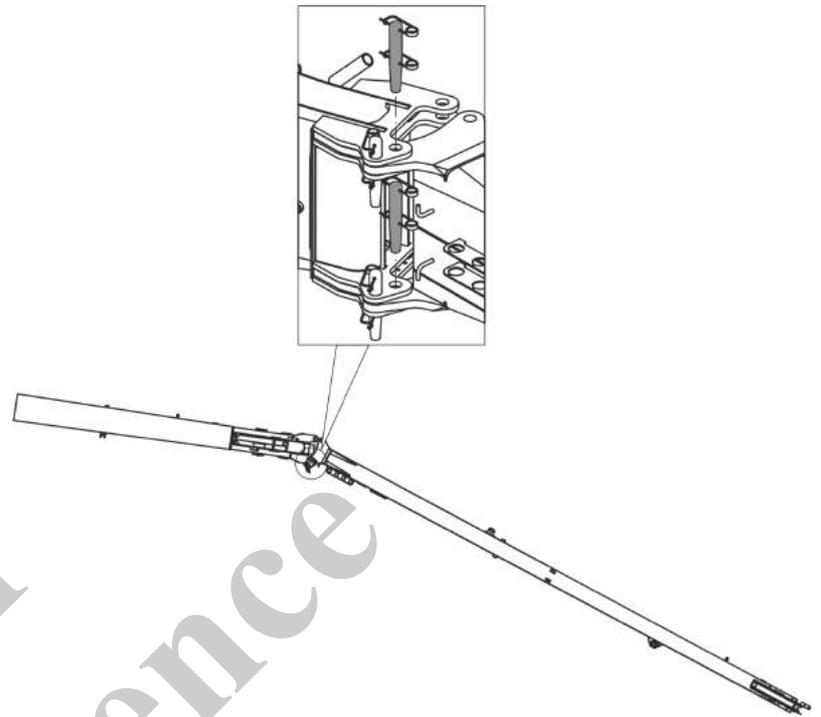
### Folding out the fly boom extension



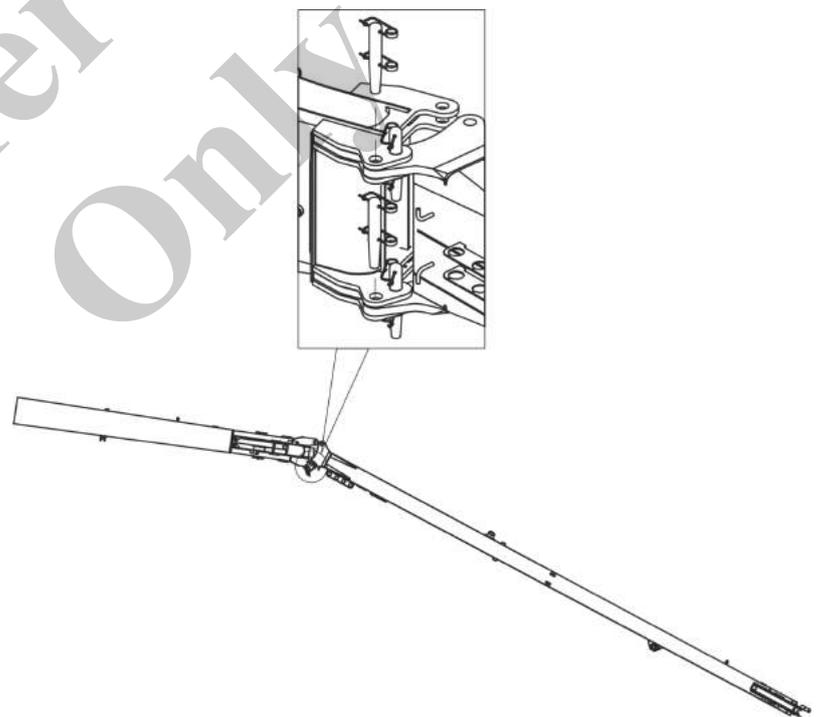
1. → Remove the bolt between the fly boom and the fly boom extension.



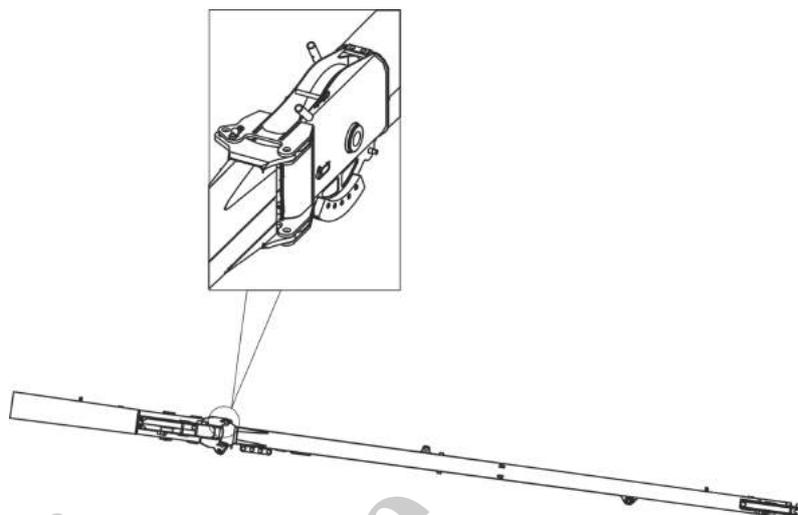
- 1 Bolt position next to the pivot point
2. → Fold out the fly boom extension until the bolts can be fitted next to the pivot point.



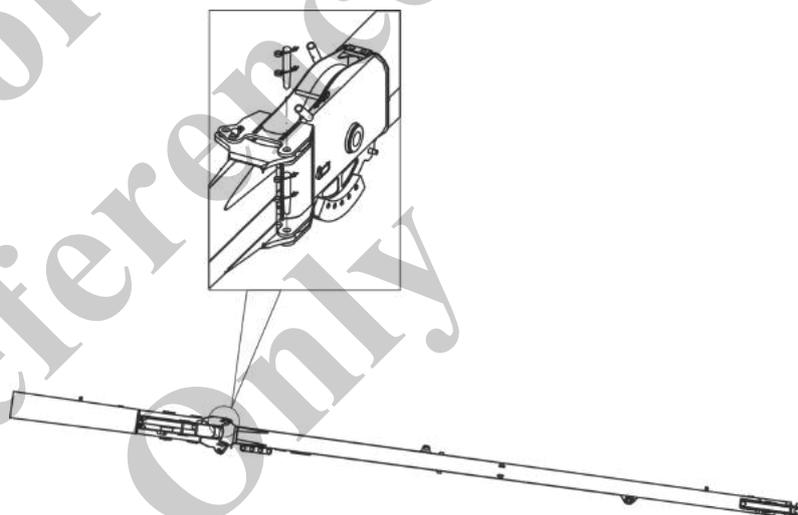
3. → Mount and secure the bolts next to the pivot point.



4. → Remove the bolts at the pivot point.



5. → Completely fold out the fly boom extension.



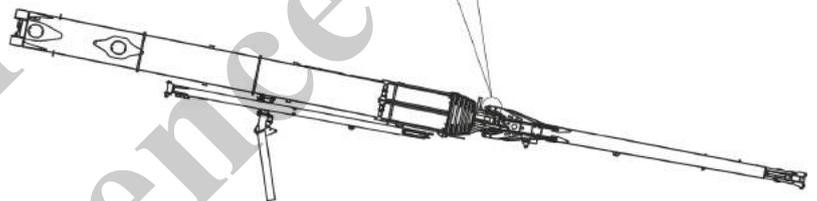
6. → Mount and secure the bolts between the fly boom extension and fly boom on the left-hand side.

### 6.7.4.8 Folding the fly boom with folded-in fly boom extension into transport position

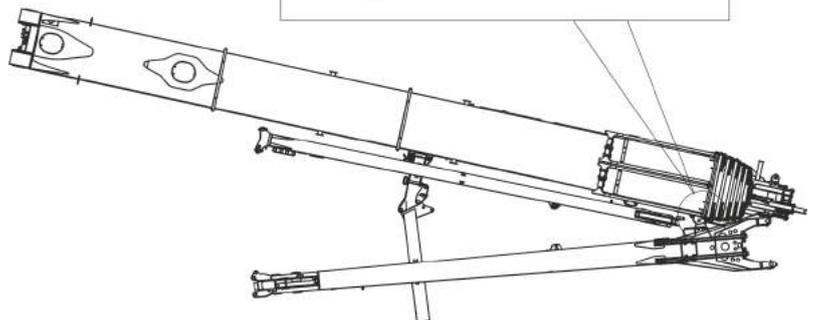
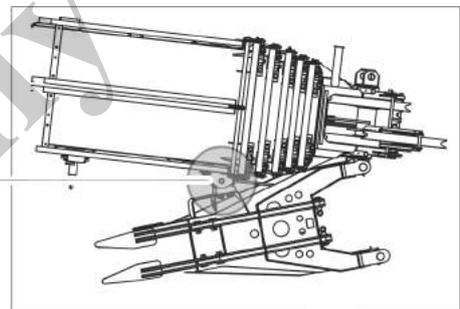
Requirement:

- Uppercarriage is at 0°.
- The boom is fully retracted.
- The boom is lowered to 0°.
- The hoisting rope is unreeved.
- The deflection sheave is mounted on the boom.
- The **Setup attachment** setup mode is set on the SENCON.
- The holding function is enabled.  
The safety lever is pushed in direction of travel.
- The pilot ramp is folded out.

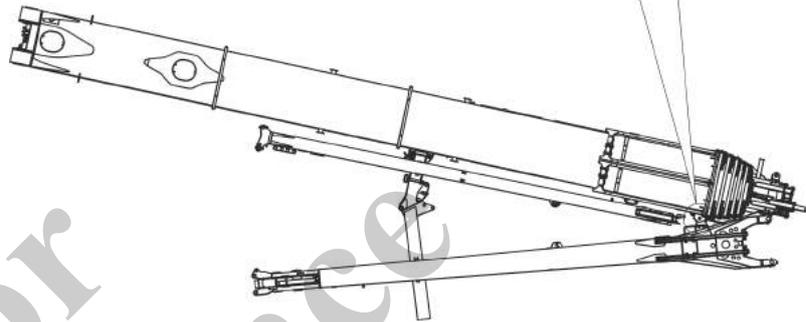
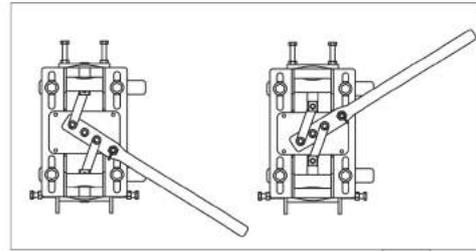
Fold in the fly boom



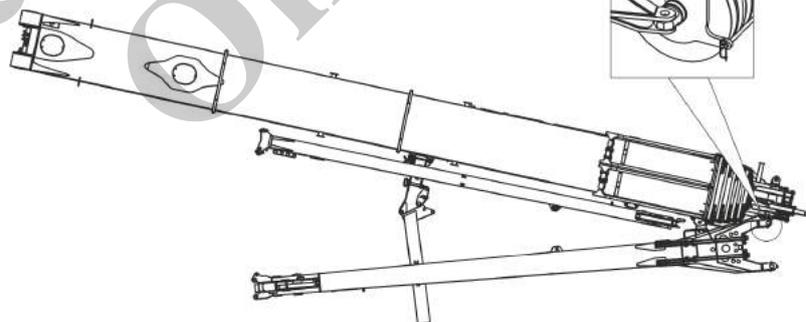
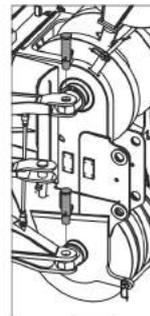
1. → Remove the bolts between the fly boom and the boom on the left-hand side.



- 1 Bolt position on the pivot point
2. → Pull in the fly boom with a rope until it reaches the boom's pivot point.

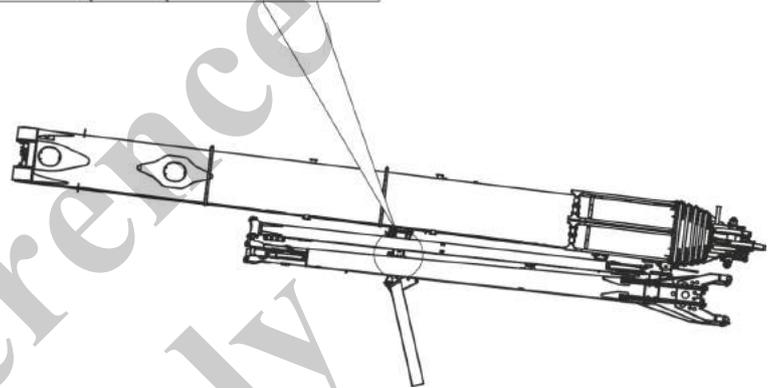
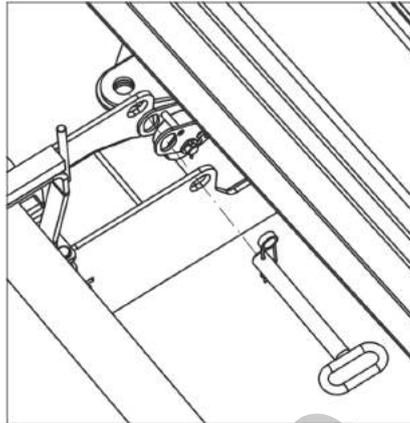


- 3.** → Push the lever of the bearing block on the boom downward.  
⇒ The bolts at the pivot point are mounted.



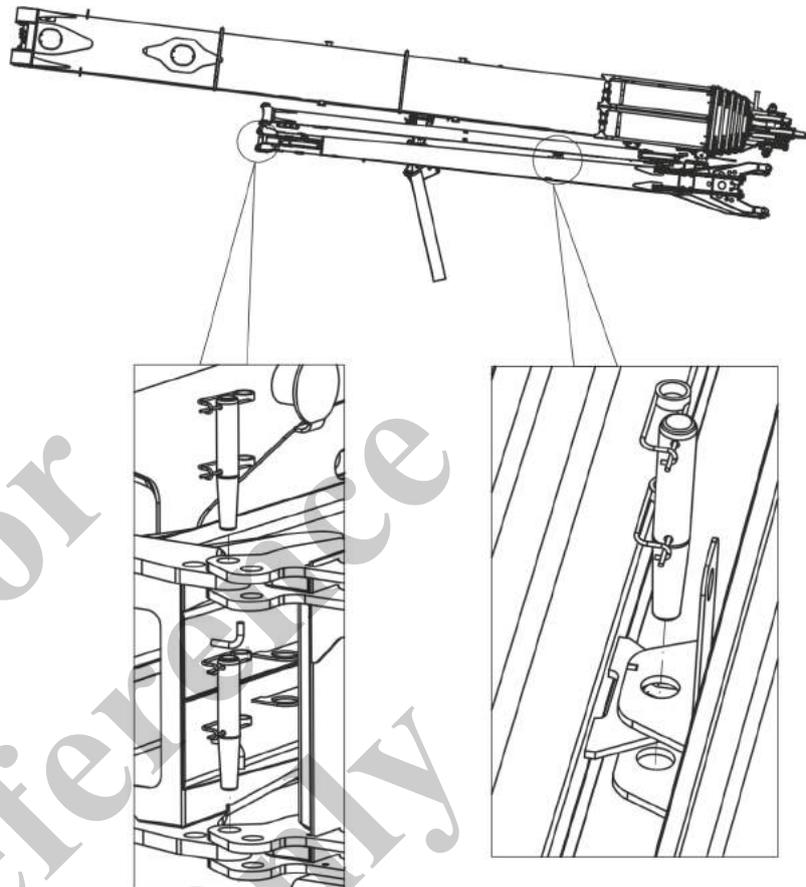
- 4.** → Remove the bolts between the fly boom and the boom on the right-hand side.  
**5.** → Pull the fly boom over the pilot ramp and fold it fully in.

Securing the fly boom to the pilot ramp



→ Mount and secure the bolt between the fly boom and the pilot ramp.

### Connecting the fly boom with the fly boom extension



Mount and secure the bolts between the fly boom extension and fly boom.

#### 6.7.4.9 Folding the fly boom with folded-in fly boom extension into operating position

**⚠ WARNING**

**Risk of death from swinging fly boom.**

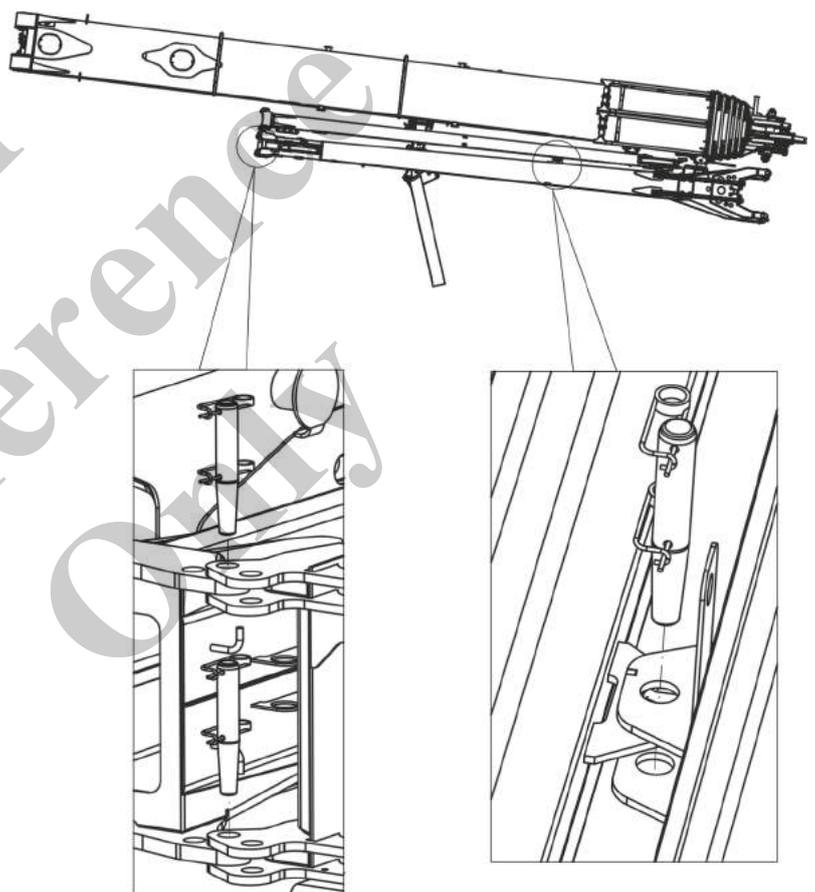
The unsecured fly boom can swing out at high speed and severely injure anybody in its swing range.

- Ensure that no one remains in the swing range except for the operators.
- Check the bolting on the basic body is correct prior to setup.
- Set the main boom in a horizontal position during the setup process.
- Secure a rope, which can be used to fold down and guide the tip by hand, to the head of the fly boom.
- Observe the prescribed sequence when setting the angle.

Requirement:

- Uppercarriage is at 0°.
- The boom is fully retracted.
- The boom is lowered to 0°.
- The hoisting rope is unreeved.
- The deflection sheave is mounted on the boom.
- The **Setup attachment** setup mode is set on the SENCON.
- The holding function is enabled.  
The safety lever is pushed in direction of travel.
- The pilot ramp is folded out.

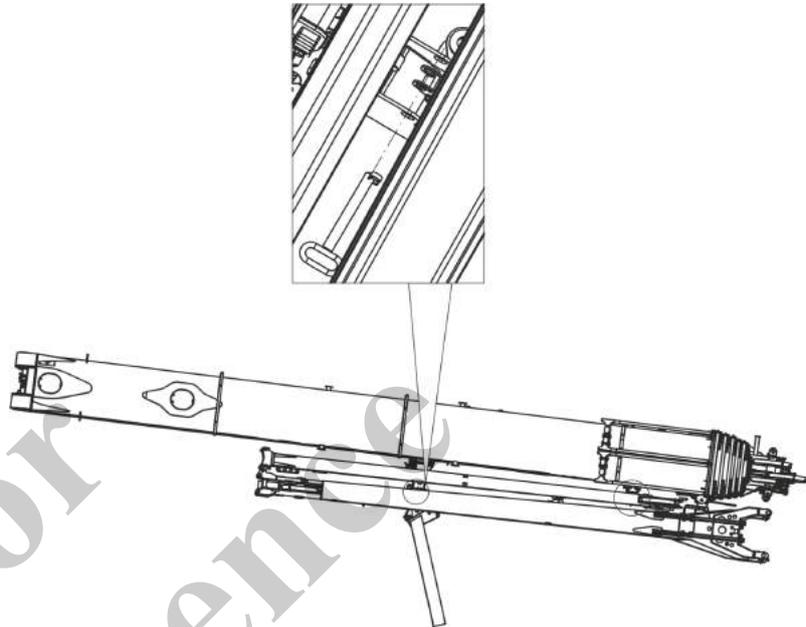
### Releasing the fly boom from the fly boom extension



- Release the bolt between the fly boom extension and the fly boom.

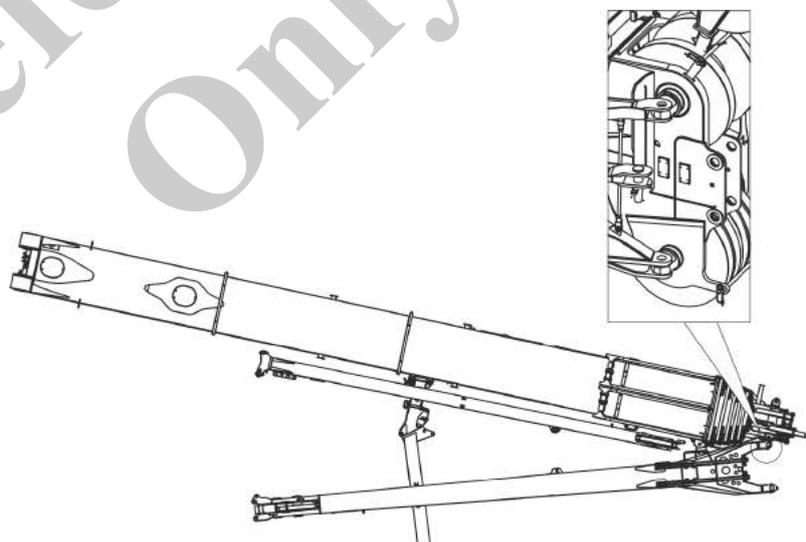
## Start-up and setup

### Releasing the fly boom with fly boom extension from the pilot ramp

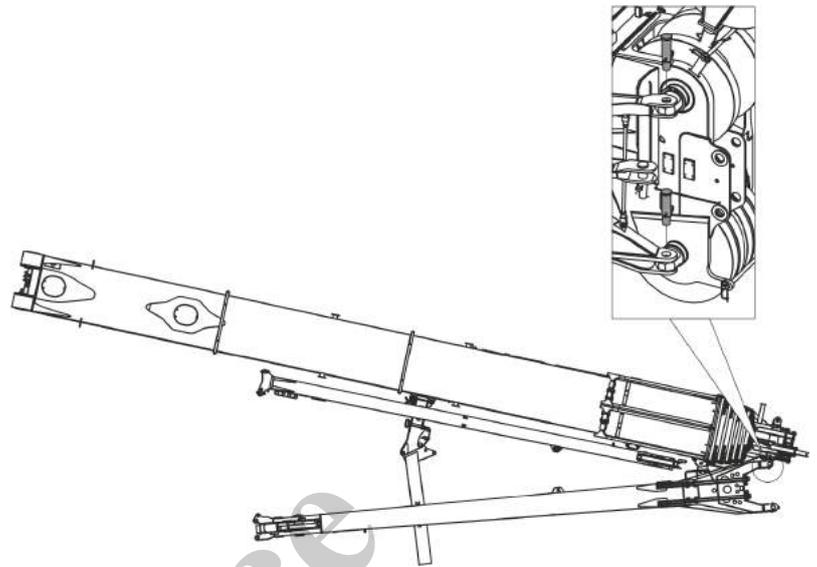


→ Remove the bolt between the fly boom and the pilot ramp.

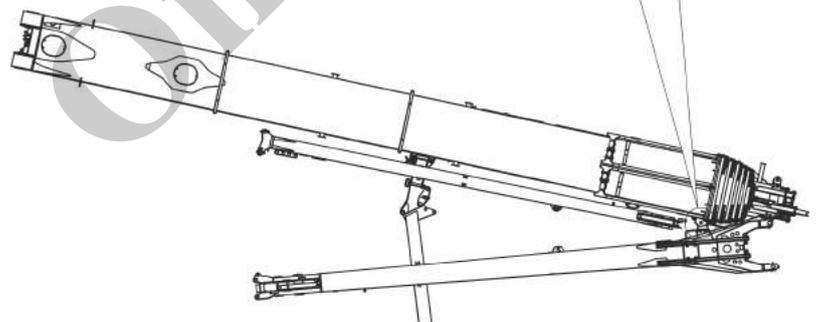
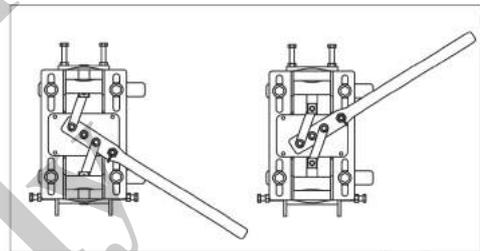
### Unfold the fly boom



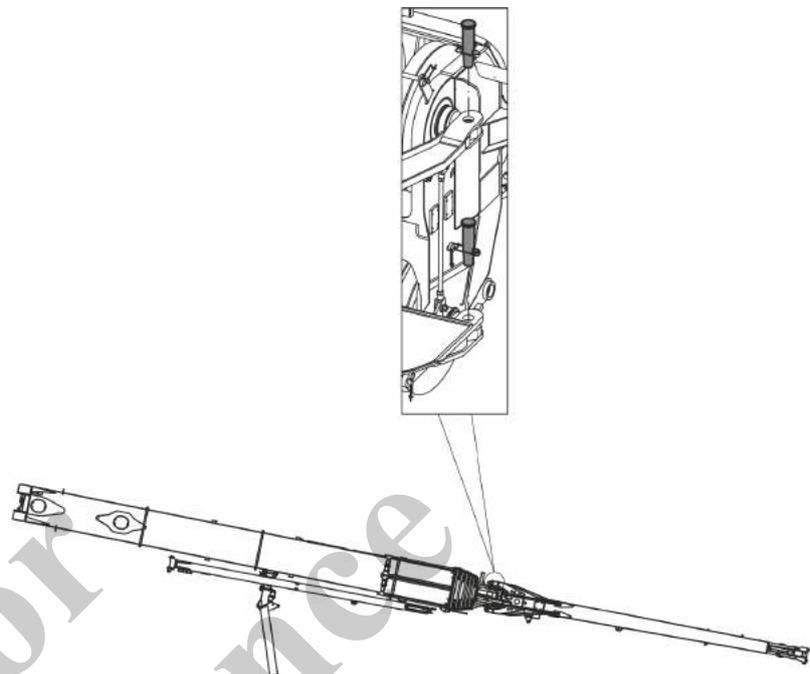
1. → Using a rope, pull the fly boom over the pilot ramp until it reaches the bolting point on the pulley head.



2. → Mount and secure the bolts between the fly boom and the boom on the right-hand side.



3. → Push the lever of the bearing block on the boom upward.  
 ⇒ The bolts at the pivot point are removed.
4. → Completely fold out the fly boom using the rope.



5. → Mount and secure the bolts between the fly boom and the boom on the left-hand side.

### 6.7.4.10 Folding the fly boom into transport position

**⚠ WARNING**

**Danger of falling.**

- Do not climb onto the boom or the attachments.
- Do not climb onto equipment parts (for example, boom sections, ballast parts) hanging from a crane.
- Use secure climbing equipment when bolting the attachments.
- Depending on the work height, use a ladder in accordance with the applicable standards and regulations.

### Space requirements for setting up

Folding in the fly boom requires sufficient space on the right-hand side of the machine.

Data	Value	Unit
Swing clearance of the fly boom	12	m
Swing clearance of the fly boom	39.4	ft

### Personnel

- Machine operator
- Instructed personnel

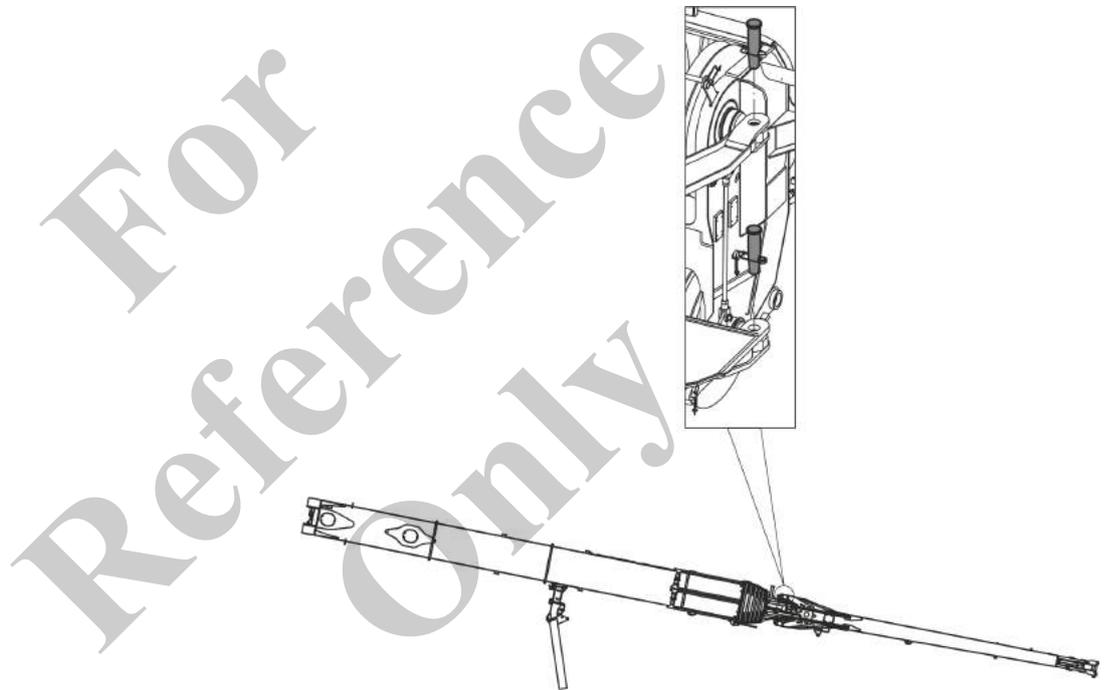
### Tools

- Ladder
- Rope

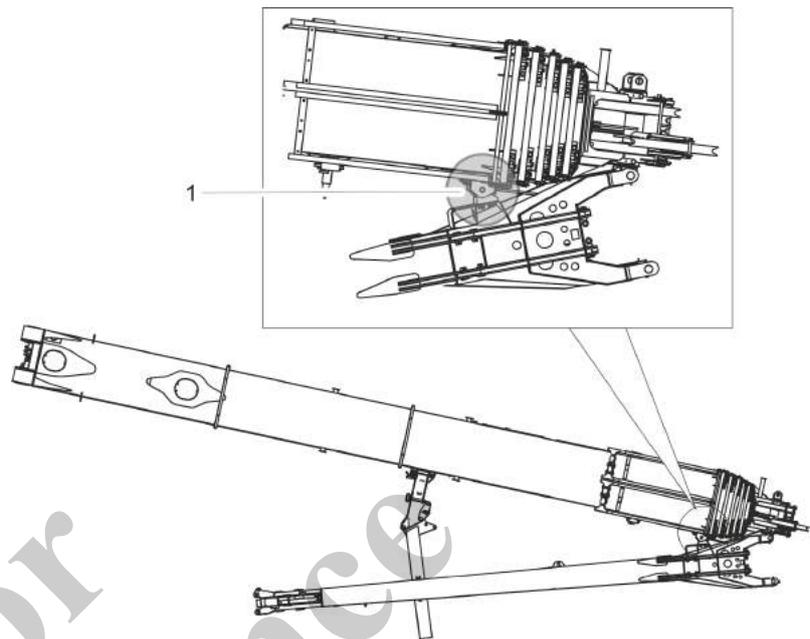
### Requirement:

- Uppercarriage is at 0°.
- The boom is fully retracted.
- The boom is lowered to 0°.
- The hoisting rope is unreeved.
- The deflection sheave is mounted on the boom.
- The **Setup attachment** setup mode is set on the SENCON.
- The holding function is enabled.  
The safety lever is pushed in direction of travel.
- The pilot ramp is folded out.

### Fold in the fly boom

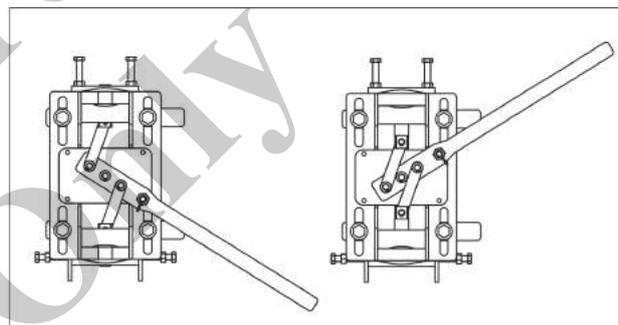


1. → Remove the bolts between the fly boom and the boom on the left-hand side.

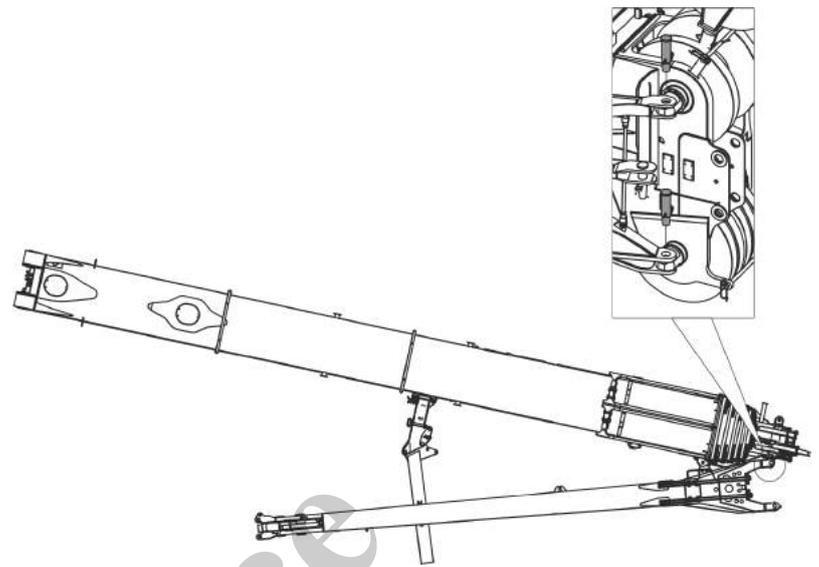


1 Pivot

2. → Pull in the fly boom with a rope until it reaches the boom's pivot point.

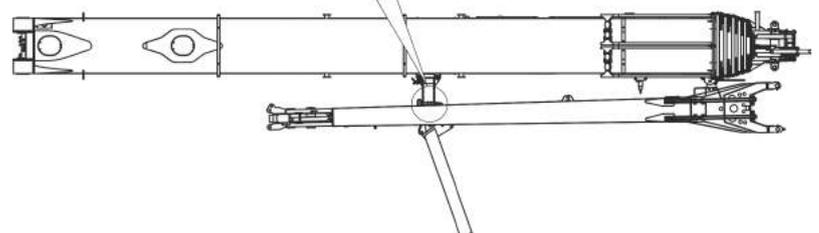
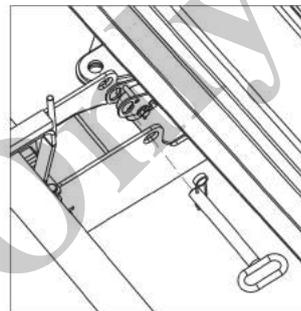


3. → Push the lever of the bearing block on the boom downward.  
⇒ The bolts at the pivot point are mounted.



4. → Remove the bolts between the fly boom and the boom on the right-hand side.
5. → Pull the fly boom over the pilot ramp and fold it fully in.

**Securing the fly boom to the pilot ramp**



- Mount and secure the bolt between the fly boom and the pilot ramp.

### 6.7.4.11 Deploying the fly boom

#### ⚠ WARNING

#### Danger of falling.

- Do not climb onto the boom or the attachments.
- Do not climb onto equipment parts (for example, boom sections, ballast parts) hanging from a crane.
- Use secure climbing equipment when bolting the attachments.
- Depending on the work height, use a ladder in accordance with the applicable standards and regulations.

#### ⚠ WARNING

#### Risk of death from swinging fly boom.

The unsecured fly boom can swing out at high speed and severely injure anybody in its swing range.

- Ensure that no one remains in the swing range except for the operators.
- Check the bolting on the basic body is correct prior to setup.
- Set the main boom in a horizontal position during the setup process.
- Secure a rope, which can be used to fold down and guide the tip by hand, to the head of the fly boom.
- Observe the prescribed sequence when setting the angle.

#### Space requirements for setting up

Folding in the fly boom requires sufficient space on the right-hand side of the machine.

Data	Value	Unit
Swing clearance of the fly boom	12	m
Swing clearance of the fly boom	39.4	ft

#### Personnel

- Machine operator
- Instructed personnel

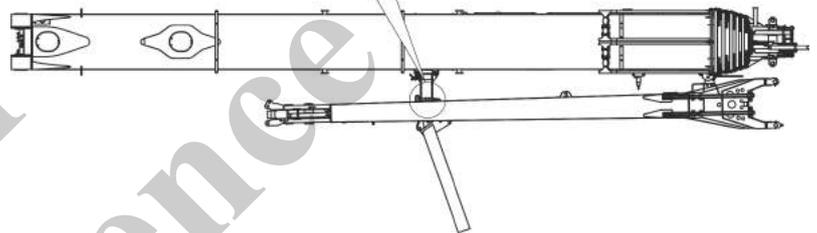
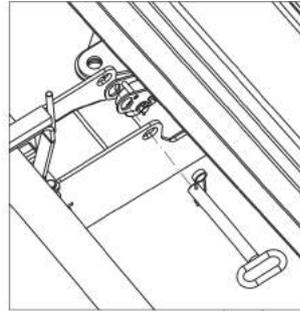
#### Tools

- Ladder
- Rope

#### Requirement:

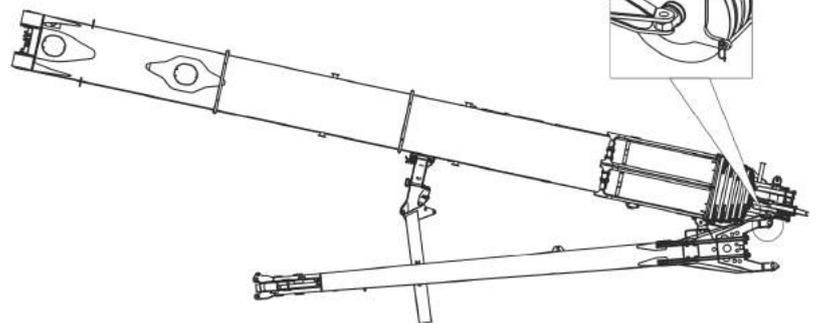
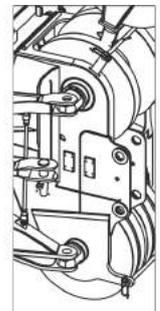
- Uppercarriage is at 0°.
- The boom is fully retracted.
- The boom is lowered to 0°.
- The hoisting rope is unreeved.
- The deflection sheave is mounted on the boom.
- The **Setup attachment** setup mode is set on the SENCON.
- The holding function is enabled.
  - The safety lever is pushed in direction of travel.
- The pilot ramp is folded out.

**Releasing the fly boom from the pilot ramp**

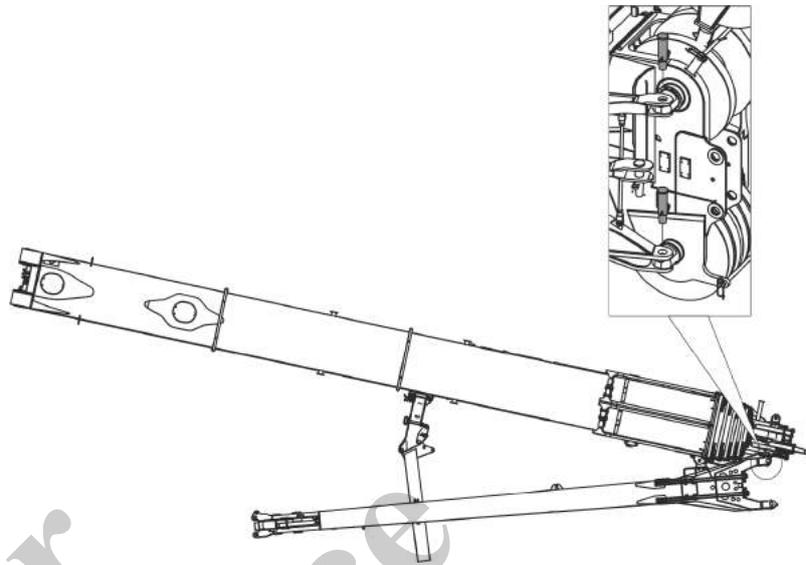


Remove the bolt between the fly boom and the pilot ramp.

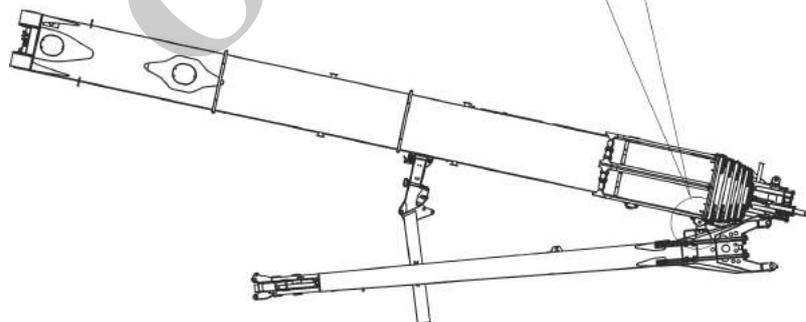
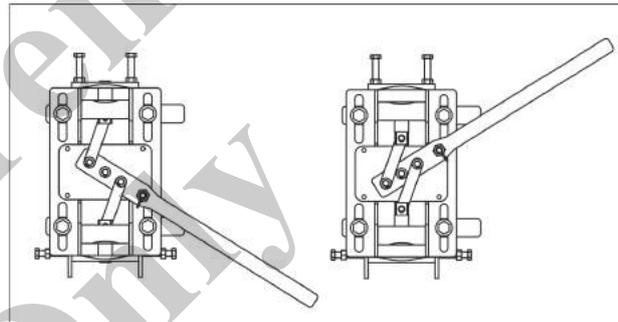
**Unfold the fly boom**



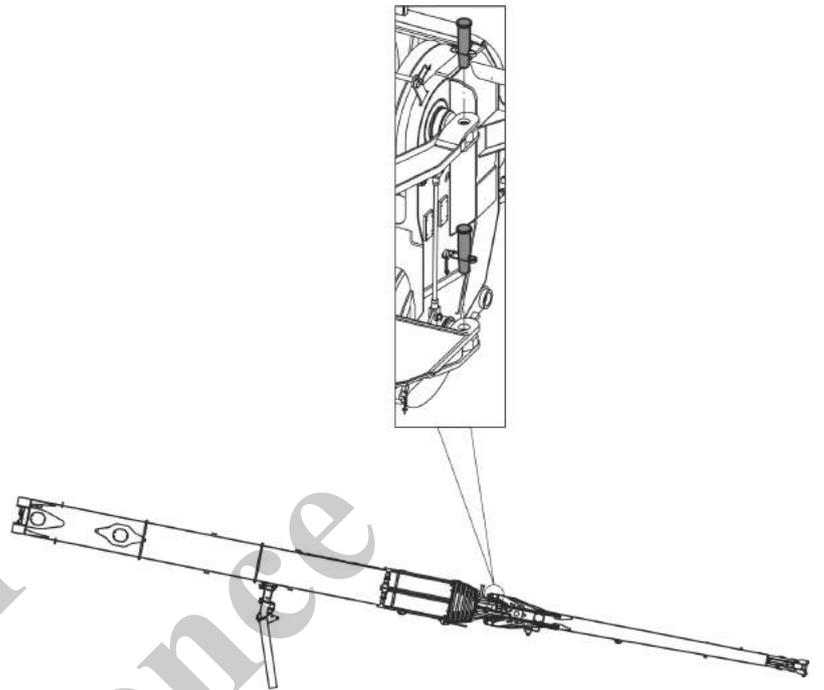
1. → Using a rope, pull the fly boom over the pilot ramp until it reaches the boom's bolting point.



2. ➤ Mount and secure the bolts between the fly boom and the boom on the right-hand side.



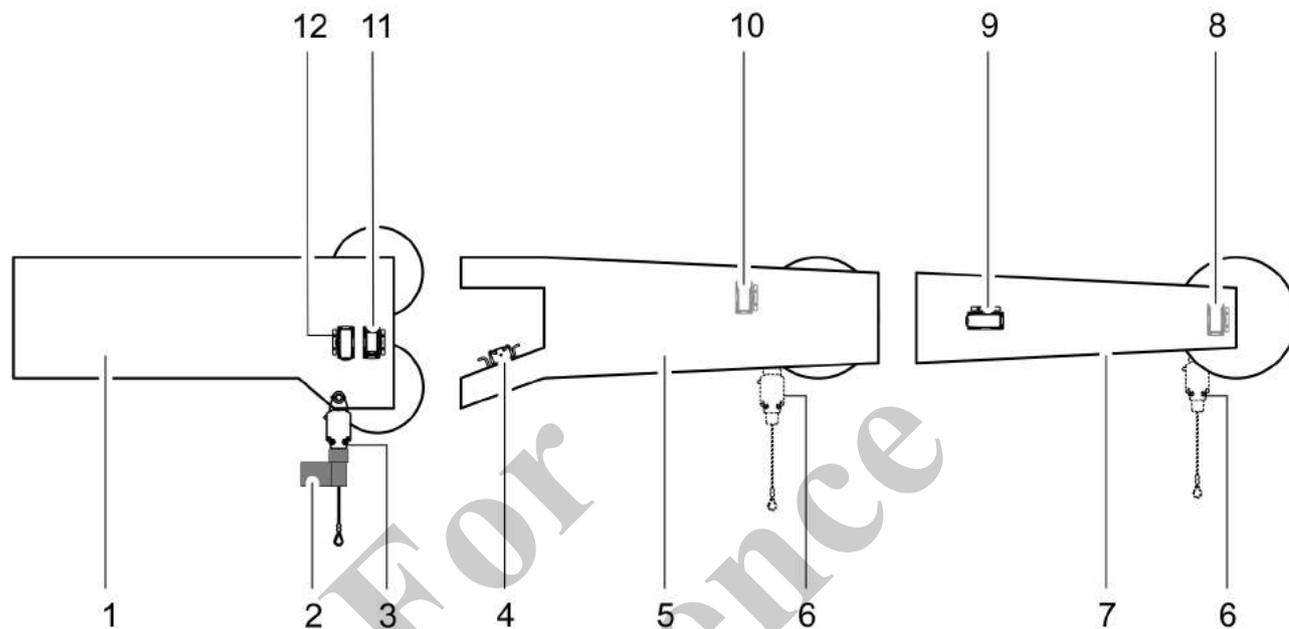
3. ➤ Push the lever of the bearing block on the boom upward.  
⇒ The bolts at the pivot point are removed.
4. ➤ Completely fold out the fly boom using the rope.



5. → Mount and secure the bolts between the fly boom and the boom on the left-hand side.

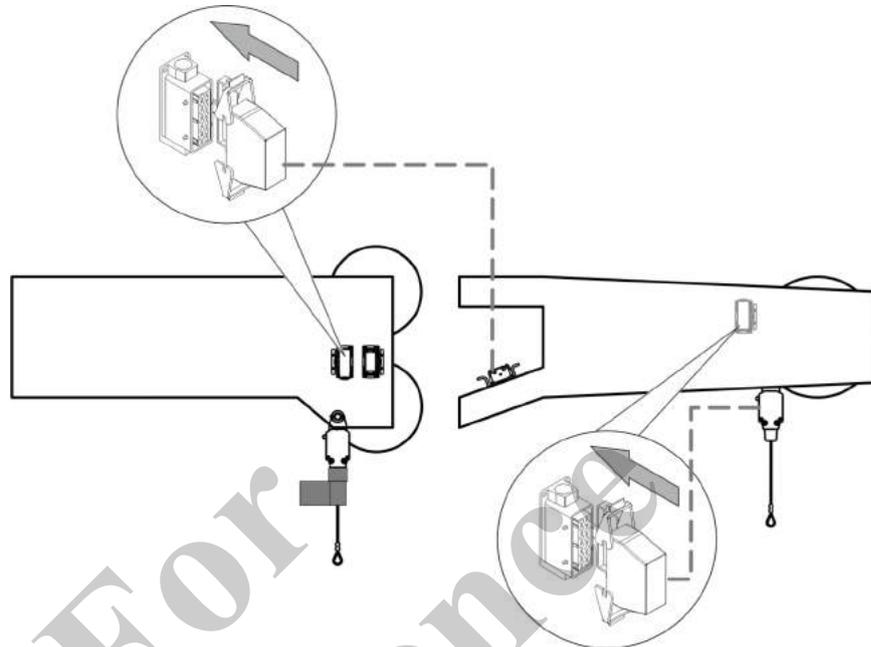
### 6.7.4.12 Establishing a power supply for the lifting limit switch

#### Overview



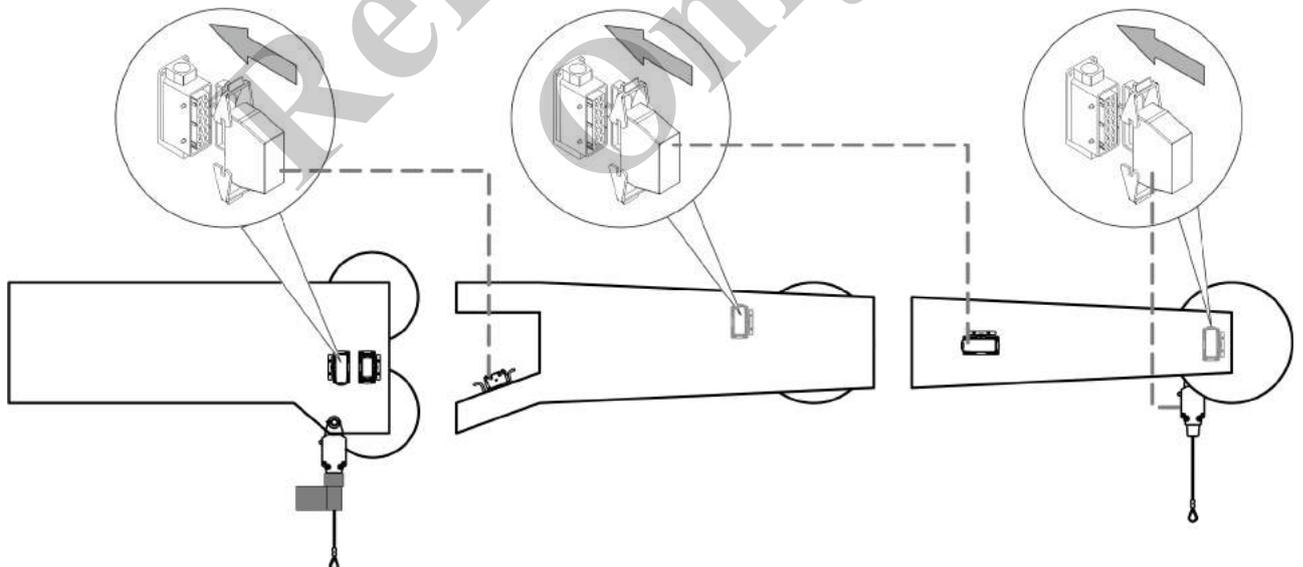
- |   |                     |
|---|---------------------|
| 1 Boom  | 7 Fly jib extension |
| 2 Bypass flag   | 8 Power socket      |
| 3 Lifting limit switch on boom                            | 9 Parking socket    |
| 4 Parking socket  | 10 Power socket     |
| 5 Fly boom  | 11 Parking socket   |
| 6 Lifting limit switch for fly boom or fly boom extension | 12 Power socket     |

6.7.4.12.1 Establishing a power supply for the lifting limit switch on the fly boom



**i** Plug plugs which are not being used into the parking socket.

6.7.4.12.2 Establishing a power supply for the lifting limit switch on the fly boom extension



**i** Plug plugs which are not being used into the parking socket.

### 6.7.4.13 Reeving the hoist rope

#### Further notes

↪ *Chapter 6.6.8 “Attaching the hoist rope” on page 290*

For  
Reference  
Only

**6.7.4.14 Folding the fly boom (with fly boom extension) into various angled positions**

The fly boom can be folded into various angled positions both with and without the fly boom extension.

**6.7.4.14.1 Setting the extension mode and boom length**

In order to adjust the offset angle with the **Setup attachment** setup mode, a specific extension must be set and the boom must be extended to a predefined length.

**Extension mode and boom length for adjusting the offset angle**

Data	Value	Unit
Extension mode	EM1	
Boom length	23.6	m
Boom length	77.4	ft

Requirement:

- The boom angle is > 60°.

1. → Open the "Pin boom" menu page.
2. → Set the specified extension mode on the SENCON.
3. → Tilt the joystick in the [Extend telescope] or [Retract telescope] direction.

Extend or retract the boom until it has reached the predefined length.



*If two functions are assigned on the joystick, the relevant switch must be in the correct position in order to carry out the respective function.*

**Further notes**

↪ Chapter 7.15.2 "Retracting/extending the boom" on page 481

**6.7.4.14.2 Folding the fly boom (with fly boom extension) into various angled positions**

**Tools**

Suitable support

Data	Value	Unit
Minimum support length	600	mm
Minimum support length	23.6	in

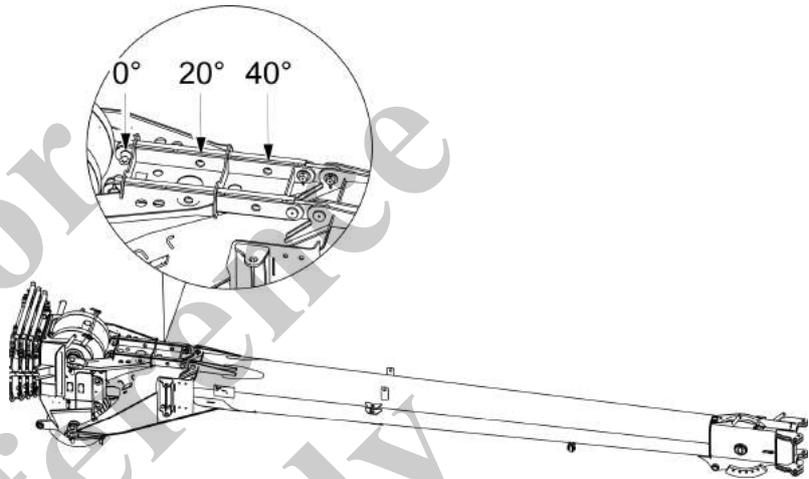
When adjusting the angle, the fly boom slides over the support with the pulley head.

### Requirement:

- The fly boom (with fly boom extension) is folded into the working position.
- The **Setup attachment** setup mode is set on the SENCON.
- The predefined extension mode and the boom length for setting up the attachments has been set.

1. ➤ Tilt the joystick in [*Lower boom*] direction.

Lower the boom until the pulley head of the fly boom or of the fly boom extension rests on a suitable support on the ground.



2. ➤ Remove the bolts from the holes of the current angle position.

3. ➤ Mount and secure the bolts in the new angle position.

The bolts must be mounted in the holes for the same angle position.

4. ➤ Depending on the new angle position, slowly tilt the joystick in the [*Lift boom*] or [*Lower boom*] direction.

Do not push the fly boom into the ground.

⇒ The pulley head of the fly boom or of the fly boom extension slides over the support.

Fold the fly boom (with fly boom extension) into the desired angle position.



### 6.7.4.14.3 Overview of the most important operating and display elements

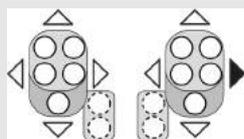
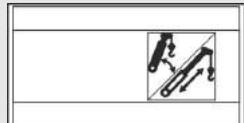
#### Extension mode (EM)



*This display element only appears during semi-automatic operation.*

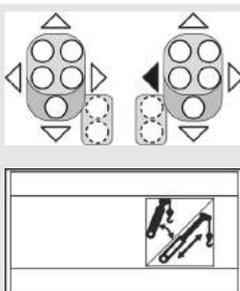
	Green	Grey
	The extension mode is selected and can be changed.	The currently set extension mode is displayed.

#### Extend telescope

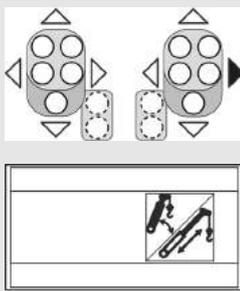
	<p><b>[Luffing down-up / Telescope in - out changeover] switch in right switch position</b></p> <p><b>Tilt the joystick</b></p>
	<p>The telescopic thrusters/secure locking unit are extended.</p>
	

## Start-up and setup

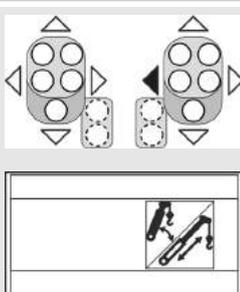
### Retract telescope

	<b>[Luffing down-up / Telescope in - out changeover] switch in right switch position</b> <b>Tilt the joystick</b>
	The telescopic thrusters/secure locking unit are retracted.

### Lowering the boom

	<b>[Luffing down-up / Telescope in - out changeover] switch in right switch position</b> <b>Tilt the joystick</b>
	The boom is lowered.

### Lifting the boom

	<b>[Luffing down-up / Telescope in - out changeover] switch in right switch position</b> <b>Tilt the joystick</b>
	The boom is raised.

6.7.4.15 Removing the fly boom extension

**⚠ WARNING**

**Danger of falling.**

- Do not climb onto the boom or the attachments.
- Do not climb onto equipment parts (for example, boom sections, ballast parts) hanging from a crane.
- Use secure climbing equipment when bolting the attachments.
- Depending on the work height, use a ladder in accordance with the applicable standards and regulations.



*Disassembly*

*The machine is disassembled in reverse assembly order. Detailed information on assembly can be found in the corresponding chapters.*

6.7.4.16 Disassembling the fly boom



*Disassembly*

*The machine is disassembled in reverse assembly order. Detailed information on assembly can be found in the corresponding chapters.*

6.7.5 Setting up the auxiliary jib

6.7.5.1	Mounting the auxiliary jib.....	377
6.7.5.2	Establishing a power supply for the lifting limit switch on the auxiliary jib.....	381
6.7.5.3	Reeving the hoist rope.....	381
6.7.5.4	Dismounting the auxiliary jib.....	382

6.7.5.1 Mounting the auxiliary jib

**⚠ WARNING**

**Danger of falling.**

- Do not climb onto the boom or the attachments.
- Do not climb onto equipment parts (for example, boom sections, ballast parts) hanging from a crane.
- Use secure climbing equipment when bolting the attachments.
- Depending on the work height, use a ladder in accordance with the applicable standards and regulations.

No other crane actions may be carried out while setting up. We recommend exiting the cabin after setting the operating mode.

**Personnel**

- Machine operator
- Slinger

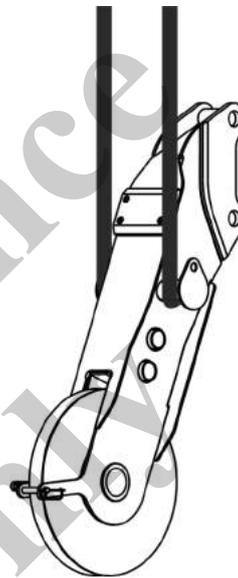
## Start-up and setup

### Tools

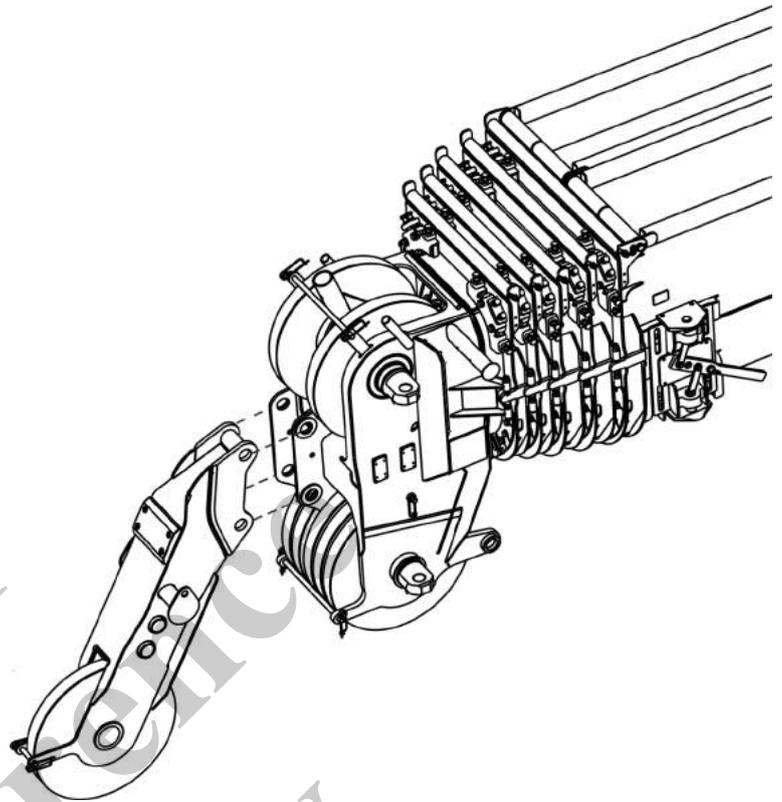
- Auxiliary crane
- Ladder
- Lifting equipment

### Requirement:

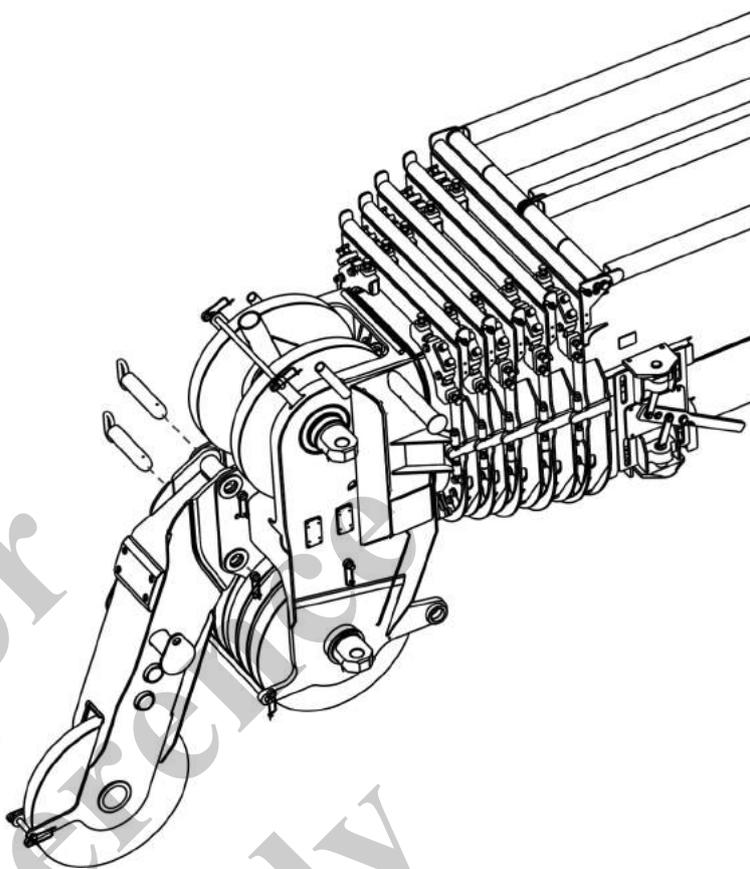
- Uppercarriage is at 0°.
- The boom is fully retracted.
- The boom is lowered to 0°.
- The hoisting rope is unreeved.
- The **Setup attachment** setup mode is set on the SENCON.



1. → Attach the auxiliary jib at its lifting points to an auxiliary crane using suitable hoisting gear.



2. Lift the auxiliary jib to the boom's pulley head using the auxiliary crane.



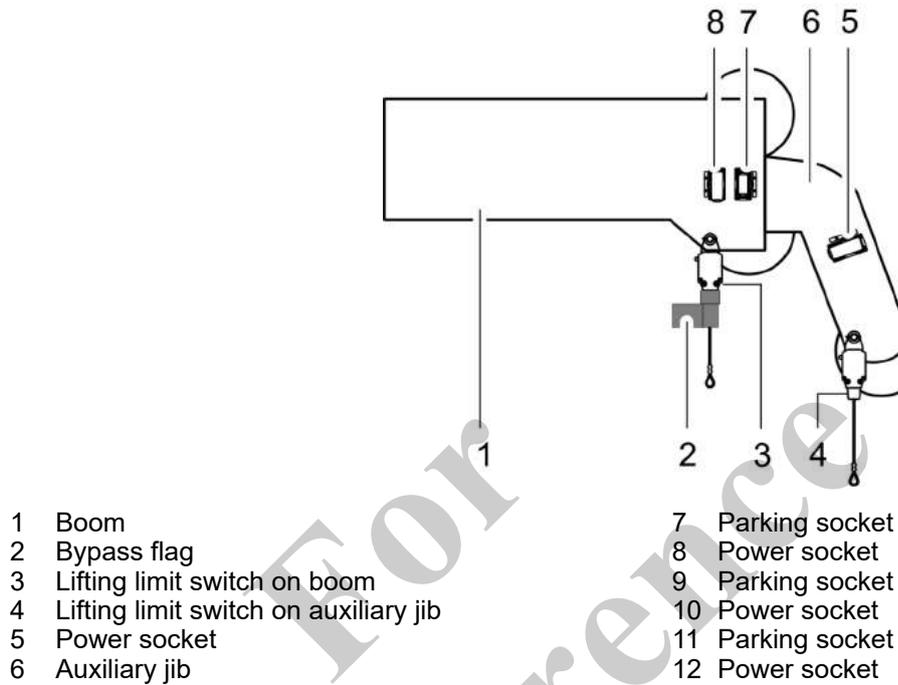
3. ➤ Mount and secure the bolts between the auxiliary jib and the boom.

### Removing the lifting equipment

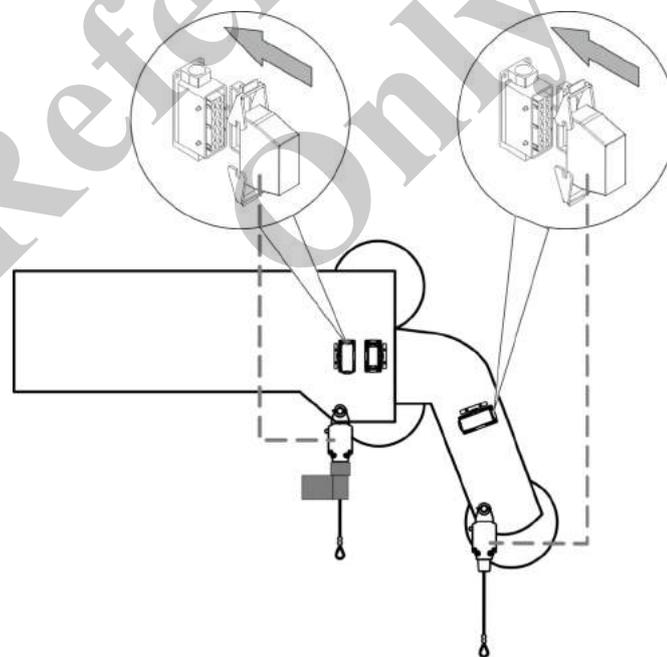
1. ➤ Remove the lifting equipment.
2. ➤ Move the auxiliary crane out of the work area.

6.7.5.2 Establishing a power supply for the lifting limit switch on the auxiliary jib

Overview



- |   |                   |
|---|-------------------|
| 1 Boom                                  | 7 Parking socket  |
| 2 Bypass flag                           | 8 Power socket    |
| 3 Lifting limit switch on boom          | 9 Parking socket  |
| 4 Lifting limit switch on auxiliary jib | 10 Power socket   |
| 5 Power socket                          | 11 Parking socket |
| 6 Auxiliary jib                         | 12 Power socket   |



6.7.5.3 Reeving the hoist rope

Further notes

↳ Chapter 6.6.8 “Attaching the hoist rope” on page 290

### 6.7.5.4 Dismounting the auxiliary jib

**⚠ WARNING**

**Danger of falling.**

- Do not climb onto the boom or the attachments.
- Do not climb onto equipment parts (for example, boom sections, ballast parts) hanging from a crane.
- Use secure climbing equipment when bolting the attachments.
- Depending on the work height, use a ladder in accordance with the applicable standards and regulations.

**Personnel**

- Machine operator
- Slinger

**Tools**

- Auxiliary crane
- Ladder
- Lifting equipment



**Disassembly**

The machine is disassembled in reverse assembly order. Detailed information on assembly can be found in the corresponding chapters.

### 6.7.6 Setting up the heavy-duty jib

6.7.6.1	Overview: Park and working position of the diagonal tie.....	382
6.7.6.2	Safe storage location for plugs, cables, and bolts.....	383
6.7.6.3	Mounting the heavy-duty jib.....	384
6.7.6.4	Folding the heavy-duty jib in transport position..	387
6.7.6.5	Folding the heavy-duty jib in its working position	395
6.7.6.6	Establishing a power supply for the lifting limit switch on the heavy-duty jib.....	402
6.7.6.7	Reeving the hoist rope.....	403
6.7.6.8	Removing the heavy-duty jib.....	403

#### 6.7.6.1 Overview: Park and working position of the diagonal tie

The diagonal tie is moved into the park position to fold it to the side of the boom.

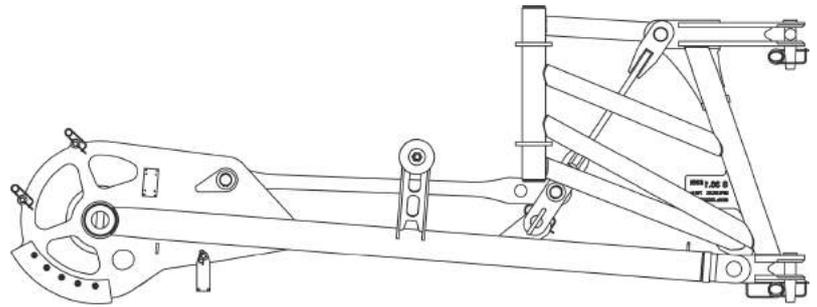


Fig. 28: Diagonal tie in the park position

The diagonal tie is moved into the working position for operating the machine.

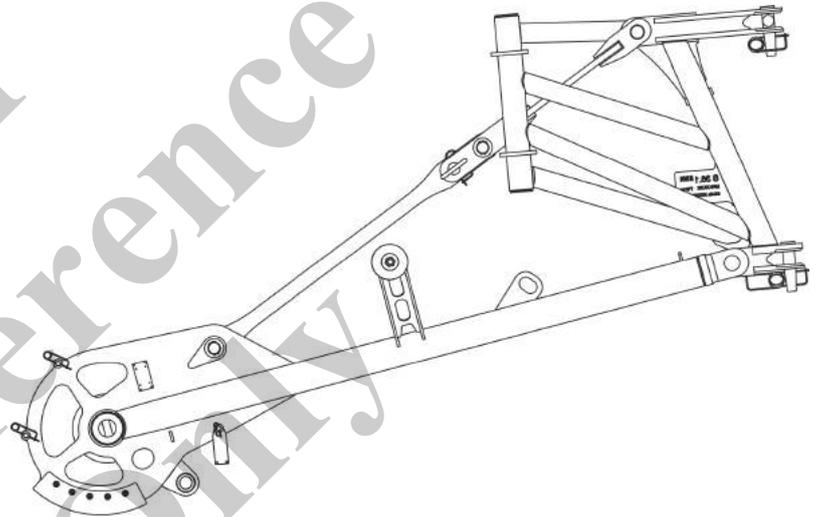


Fig. 29: Diagonal tie in the working position

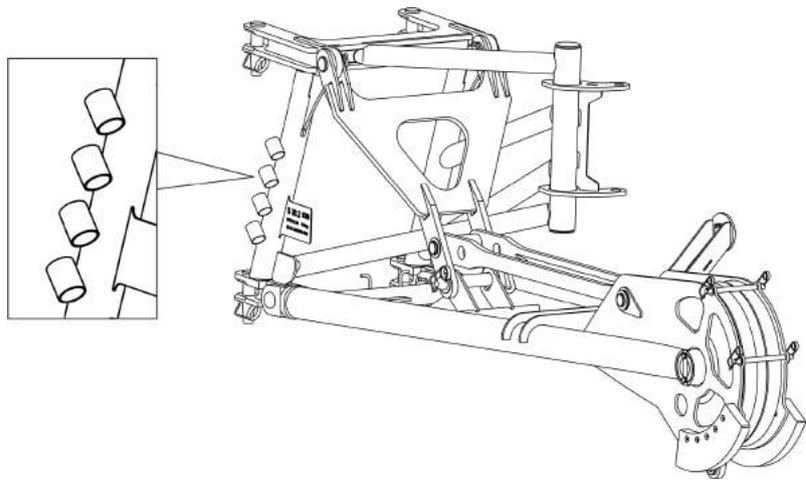
**Further notes**

☞ Chapter 4.1.11 “Heavy-duty jib” on page 125

**6.7.6.2 Safe storage location for plugs, cables, and bolts**

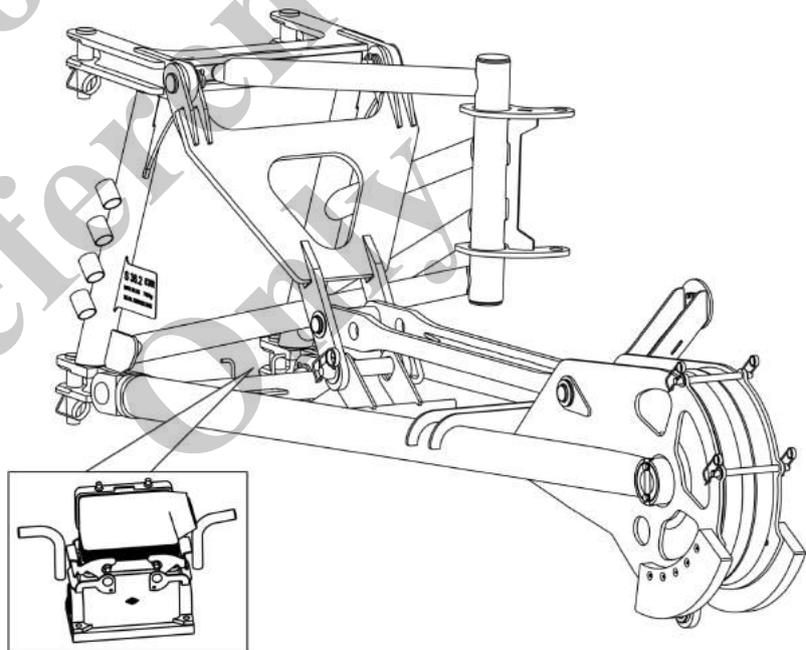
**Safe storage location for bolts**

Removed bolts can be secured in the holders on the heavy-duty jib until they are ready to be reused.



### Safe storage location for plugs and cables

Plugs that are not used are plugged into the parking sockets on each component and the corresponding cables are wound on the brackets.



### 6.7.6.3 Mounting the heavy-duty jib

#### **⚠ WARNING**

#### **Danger of falling.**

- Do not climb onto the boom or the attachments.
- Do not climb onto equipment parts (for example, boom sections, ballast parts) hanging from a crane.
- Use secure climbing equipment when bolting the attachments.
- Depending on the work height, use a ladder in accordance with the applicable standards and regulations.

### Personnel

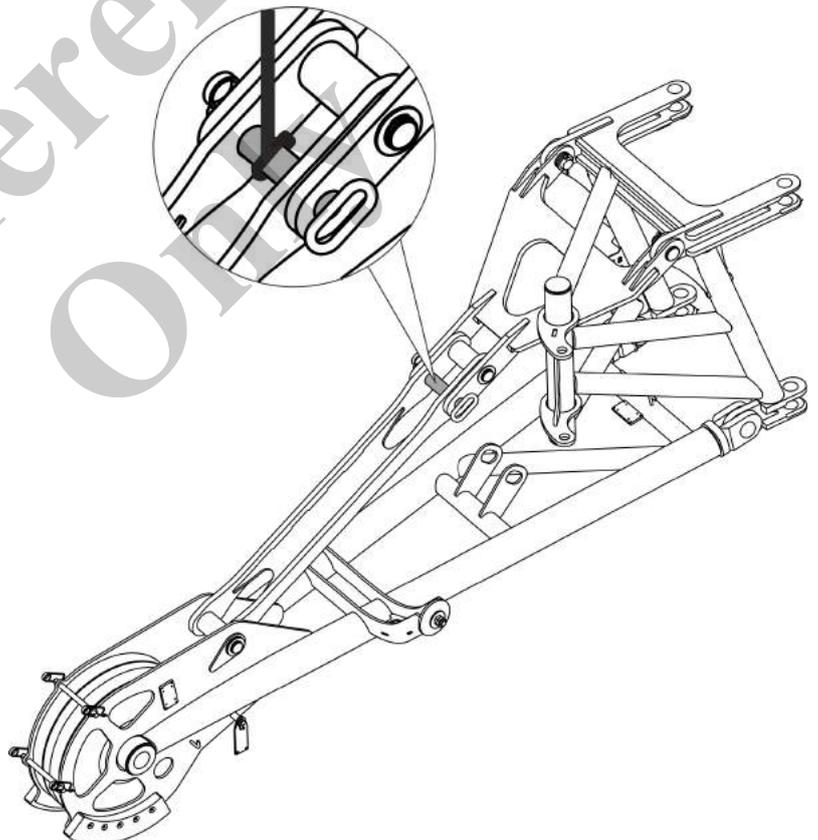
- Machine operator
- Slinger

### Tools

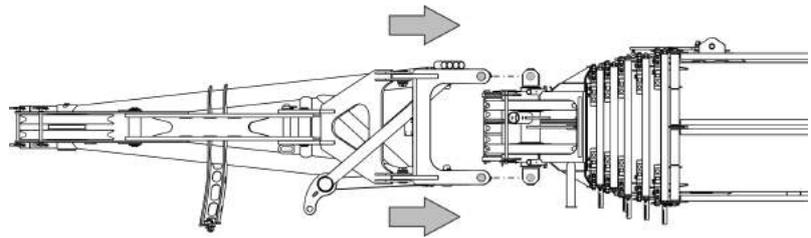
- Auxiliary crane
- Ladder
- Lifting equipment

#### Requirement:

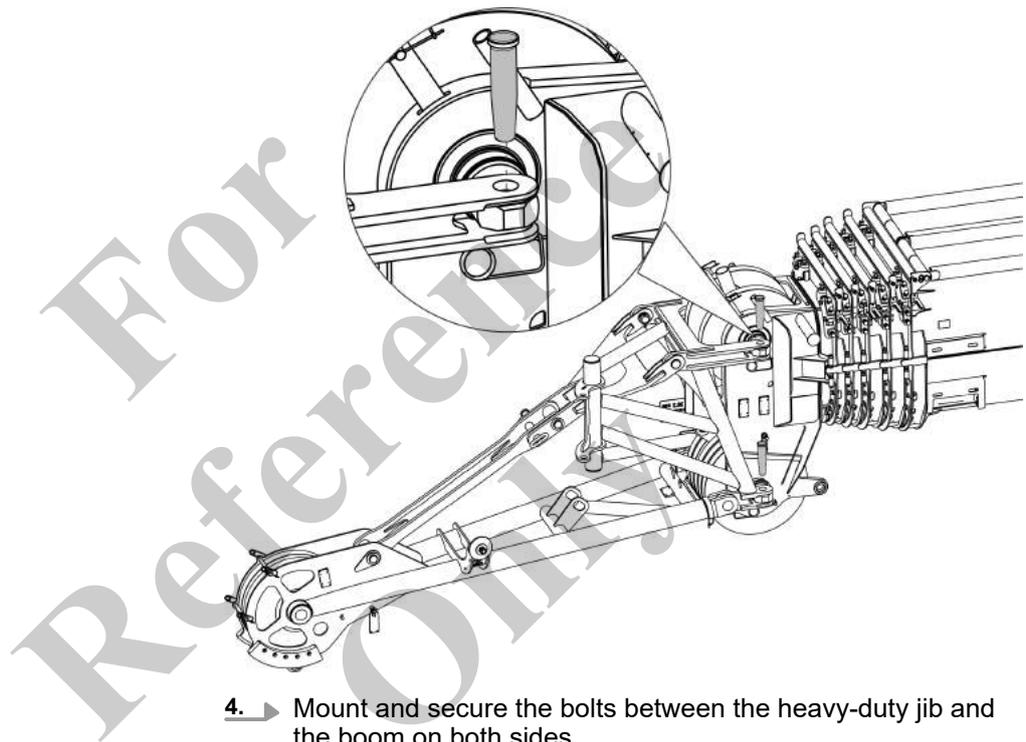
- Uppercarriage is at 0°.
- The boom is fully retracted.
- The boom is lowered to 0°.
- The hoisting rope is unreeved.
- The deflection sheave is mounted on the boom.
- The **Setup attachment** setup mode is set on the SENCON.
- The diagonal tie of the heavy-duty jib is in the working position.
- The bolts at the connection points to the boom have been removed.



1. ➔ Attach suitable hoisting gear to the heavy-duty jib at the lifting point to an auxiliary crane.
2. ➔ Using the auxiliary crane, lift the heavy-duty jib to the boom's pulley head.



3. → Align the heavy-duty jib with the boom's pulley head.  
The holes of the heavy-duty jib must line up with those of the boom.



4. → Mount and secure the bolts between the heavy-duty jib and the boom on both sides.  
⇒ The heavy-duty jib is mounted onto the boom.

### Removing the lifting equipment

1. → Remove the lifting equipment.
2. → Move the auxiliary crane out of the work area.

#### 6.7.6.4 Folding the heavy-duty jib in transport position

**⚠ WARNING****Danger of falling.**

- Do not climb onto the boom or the attachments.
- Do not climb onto equipment parts (for example, boom sections, ballast parts) hanging from a crane.
- Use secure climbing equipment when bolting the attachments.
- Depending on the work height, use a ladder in accordance with the applicable standards and regulations.

**Personnel**

- Machine operator
- Instructed personnel

##### 6.7.6.4.1 Moving the diagonal tie into the park position

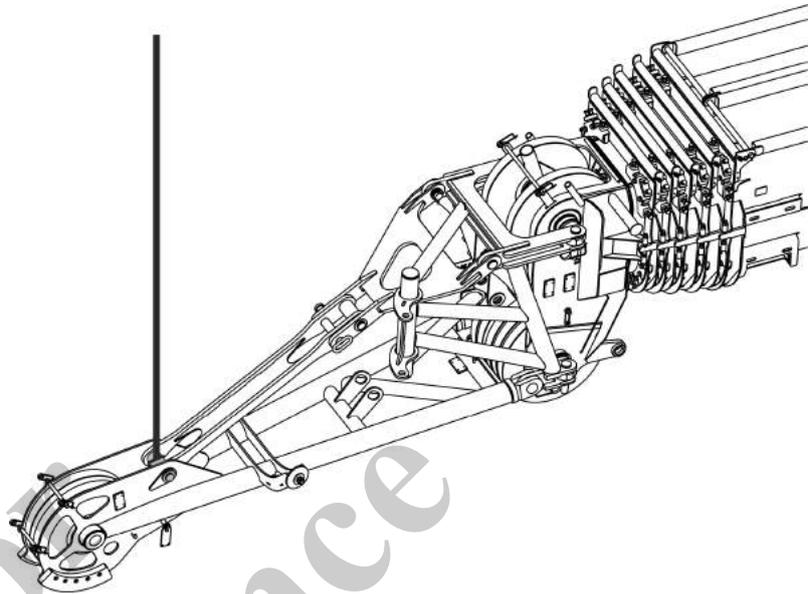
There are two ways to move the diagonal tie into the park or working position in order to fold the heavy-duty jib:

- With the auxiliary crane
- With a suitable support

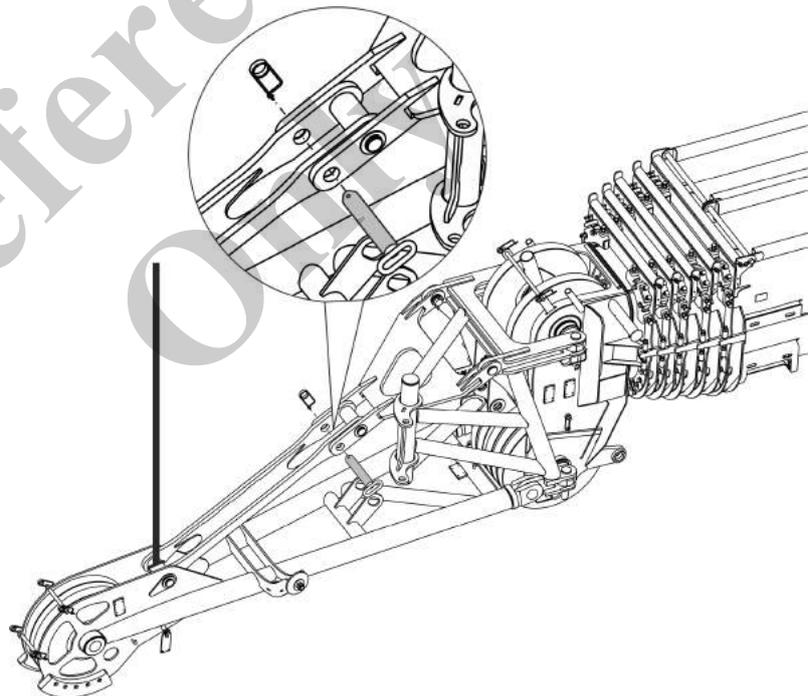
**Requirement:**

- Uppercarriage is at 0°.
- The boom is fully retracted.
- The boom is fully lowered.
- The hoisting rope is unreeved.
- The **Setup attachment** setup mode is set on the SENCON.

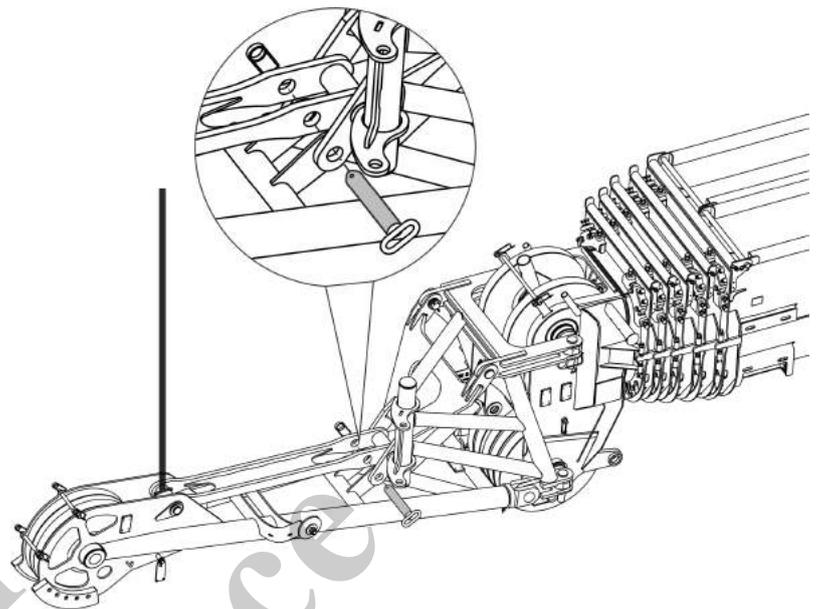
### With the auxiliary crane



1. → Attach suitable hoisting gear to the heavy-duty jib at the lifting point to an auxiliary crane.



2. → Use the auxiliary crane to lift the diagonal tie until the bolt can be removed.
3. → Remove the bolt.



4. → Continue lifting the diagonal tie with the auxiliary crane until the diagonal tie is in the park position.
5. → Mount and secure the bolt.

With a suitable support

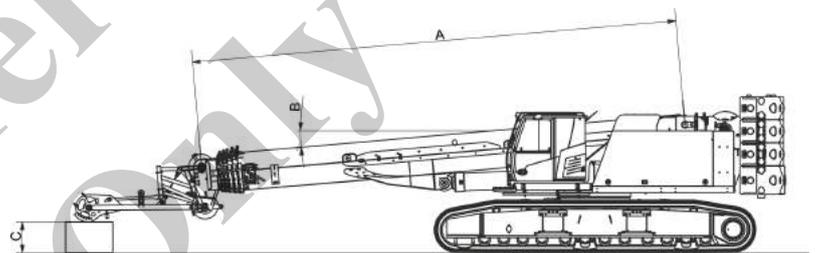
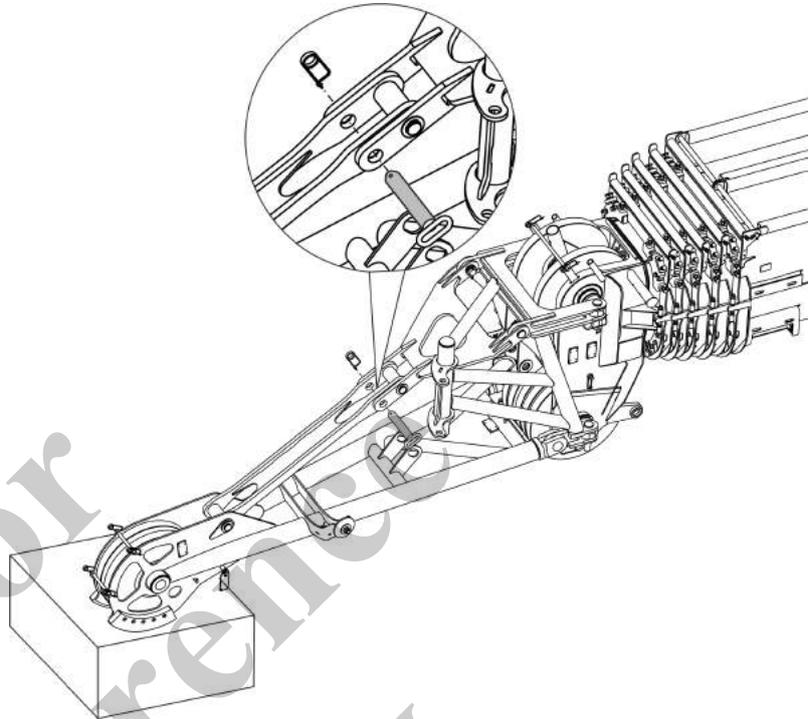


Fig. 30: Heavy-duty jib deposited on the support

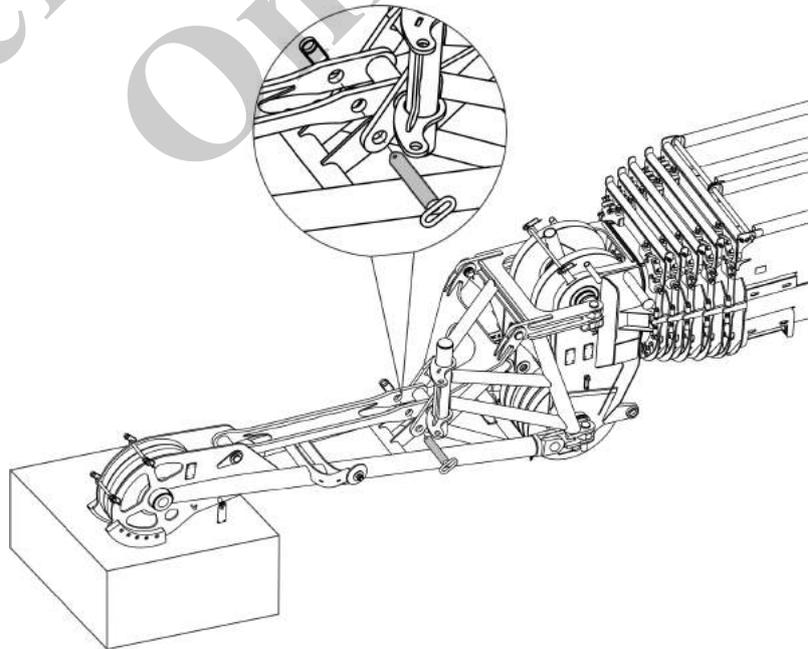
The specified values are recommended dimensions for level surfaces.

Data	Value	Unit
A	12291	mm
A	483.9	in
B	-4.9	°
C	780	mm
C	30.7	in

1. ➤ Tilt the joystick in the [Lower boom] direction until the heavy-duty jib rests on the prepared support.



2. ➤ Continue tilting the joystick in the [Lower boom] direction until the bolt can be removed.
3. ➤ Remove the bolt.



4. ➤ Continue tilting the joystick in the [Lower boom] direction until the diagonal tie is in the park position.

5. → Mount and secure the bolt.

#### 6.7.6.4.2 Folding in the heavy-duty jib

##### Tools

- Ladder
- Rope

##### Requirement:

- Uppercarriage is at 0°.
- The boom is fully retracted.
- The boom is lowered to 0°.
- The hoisting rope is unreeved.
- The **Setup attachment** setup mode is set on the SENCON.
- The holding function is enabled.  
The safety lever is pushed in direction of travel.

##### Further notes

↪ Chapter 6.7.3 “Enabling/disabling the holding function” on page 324

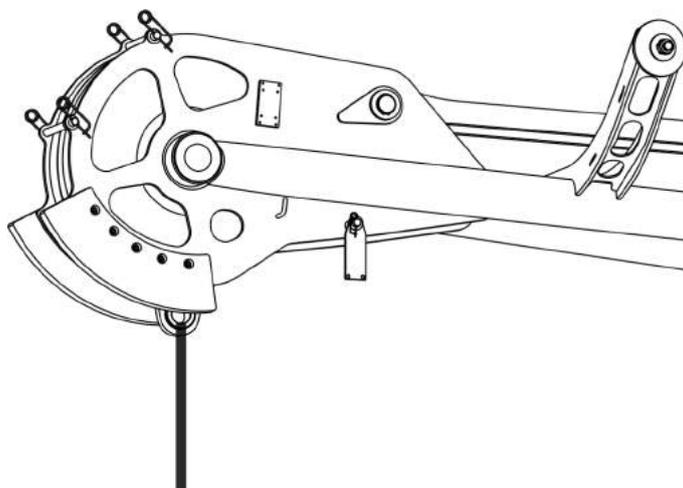
##### Disconnecting the power supply for the lifting limit switch

1. → Disconnect the power supply for the lifting limit switch on the heavy-duty jib.
2. → Establish a power supply for the lifting limit switch on the boom.

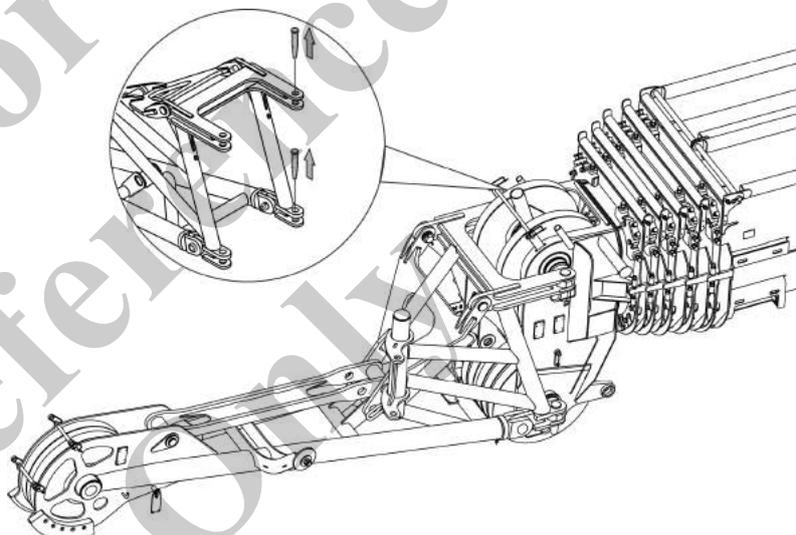
##### Further notes

↪ Chapter 6.7.6.6 “Establishing a power supply for the lifting limit switch on the heavy-duty jib” on page 402

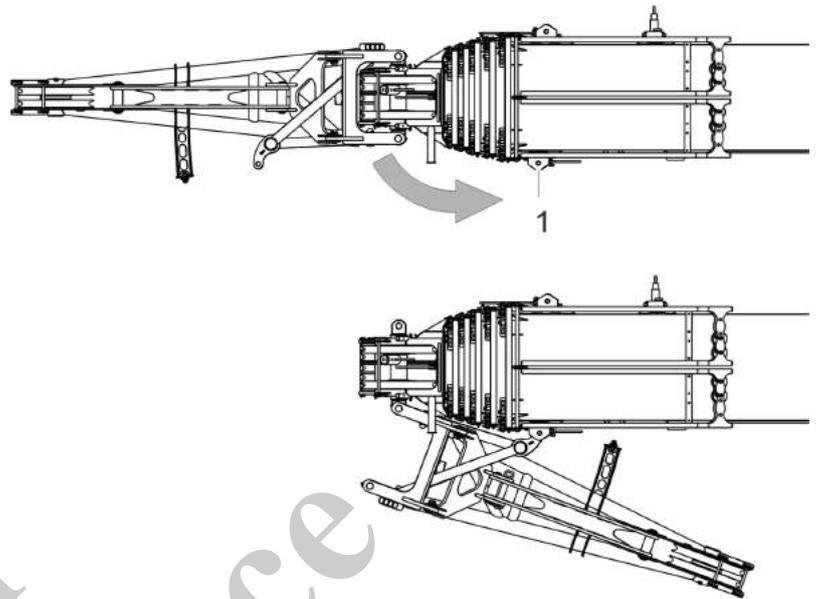
↪ Chapter 6.6.5 “Establishing a power supply for the lifting limit switch on the boom” on page 265



1. Attach a rope to the eye of the heavy-duty jib.

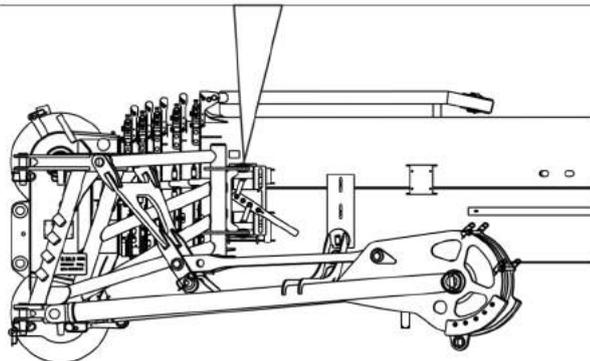
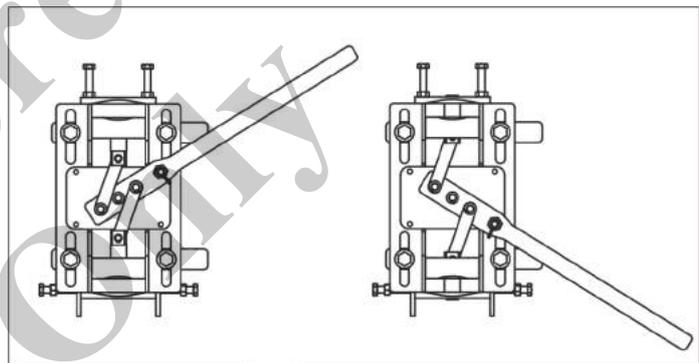


2. Remove the bolts between the heavy-duty jib and the boom on the right-hand side.

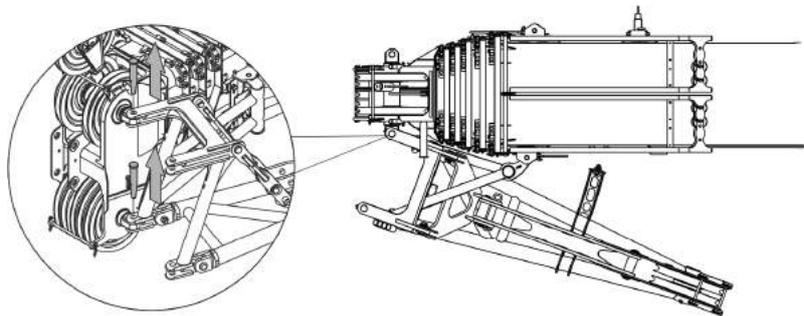


1 Pivot

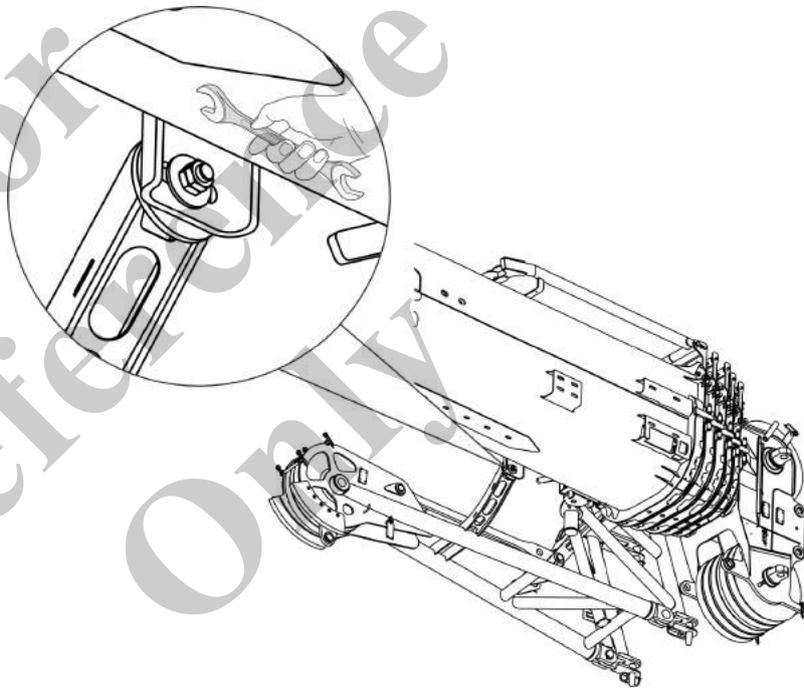
3. → Using a rope, pull the heavy-duty jib around until it reaches the boom's pivot point.



4. → Push the lever of the bearing block on the boom downward.  
 ⇨ The bolts at the pivot point are mounted.



5. ➤ Remove the bolts between the heavy-duty jib and the boom on the left-hand side.
6. ➤ Using a rope, pull the heavy-duty jib around until it reaches the boom's fastening point.



7. ➤ Connect the heavy-duty jib on the boom with a washer and the hex nuts.  
Secure the heavy-jib on the boom by locking the hex nuts.  
⇒ The heavy-duty jib is folded in and secured to the boom.
8. ➤ Remove the rope from the eye at the heavy-duty jib.

## 6.7.6.5 Folding the heavy-duty jib in its working position

**⚠ WARNING****Danger of falling.**

- Do not climb onto the boom or the attachments.
- Do not climb onto equipment parts (for example, boom sections, ballast parts) hanging from a crane.
- Use secure climbing equipment when bolting the attachments.
- Depending on the work height, use a ladder in accordance with the applicable standards and regulations.

**Personnel**

- Machine operator
- Instructed personnel

## 6.7.6.5.1 Unfolding the heavy-duty jib

**Tools**

- Ladder
- Rope

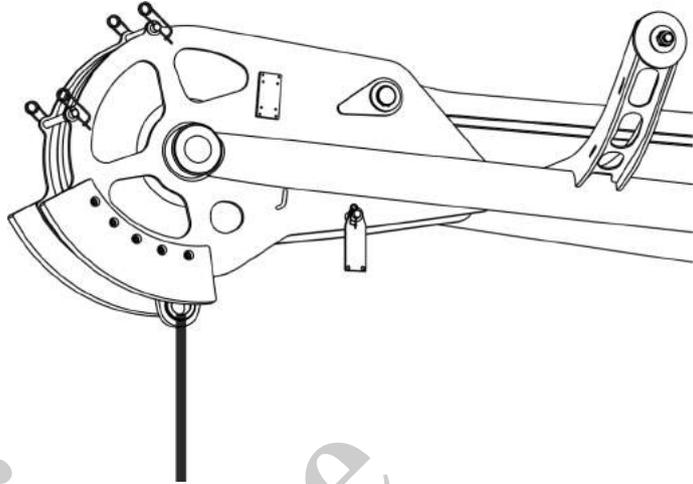
**Requirement:**

- Uppercarriage is at 0°.
- The boom is fully retracted.
- The boom is lowered to 0°.
- The hoisting rope is unreeved.
- The **Setup attachment** setup mode is set on the SENCON.
- The holding function is enabled.  
The safety lever is pushed in direction of travel.

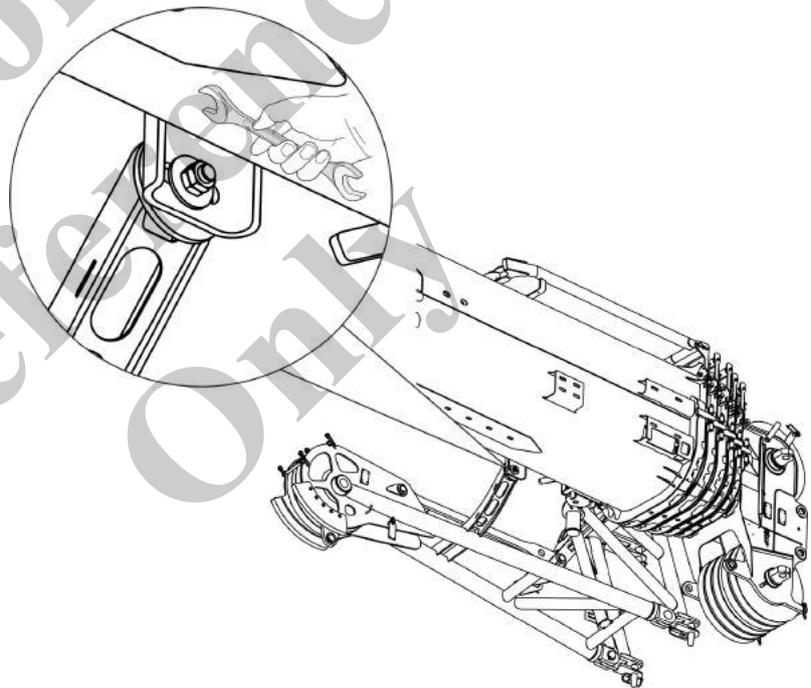
**Further notes**

🔗 Chapter 6.7.3 "Enabling/disabling the holding function" on page 324

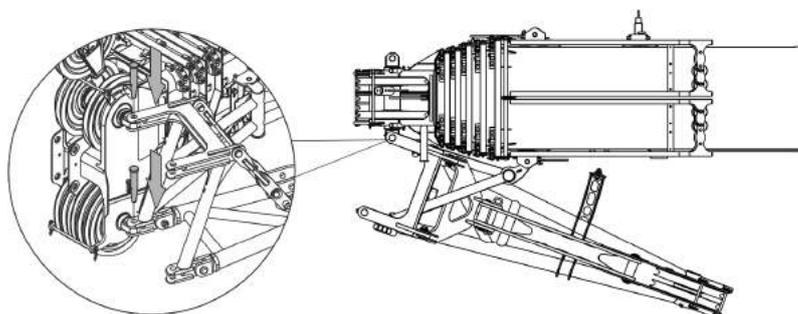
The heavy-duty jib is folded in and secured to the boom.



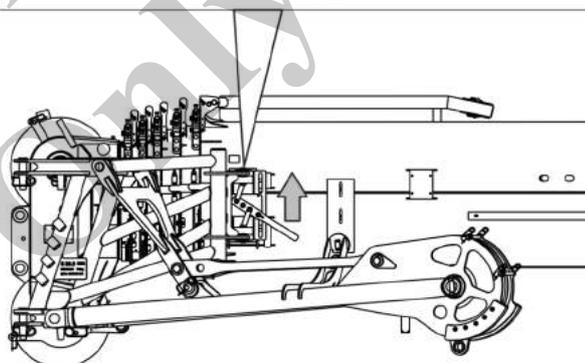
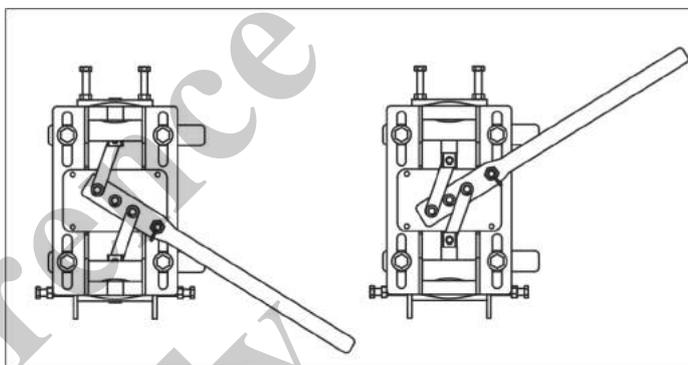
1. Attach a rope to the eye of the heavy-duty jib.



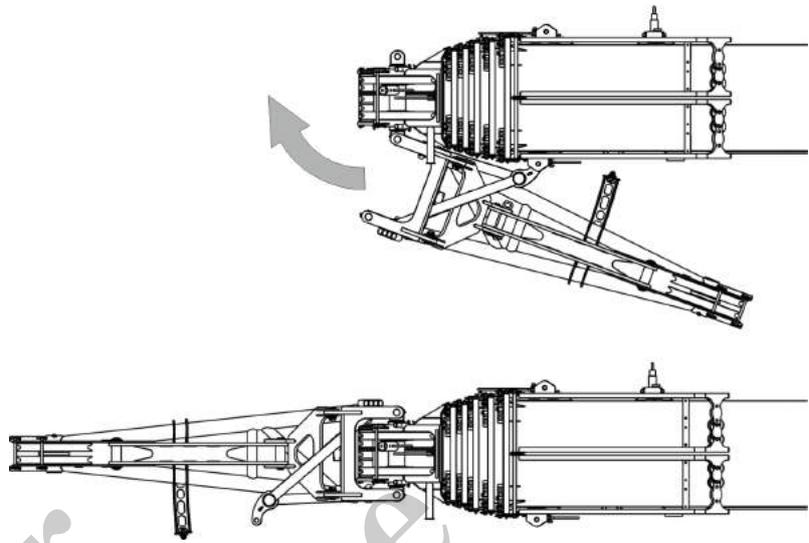
2. Release the heavy-duty jib from the boom.  
Remove the hex nuts and the washer.  
⇒ The heavy-duty jib can be folded out.



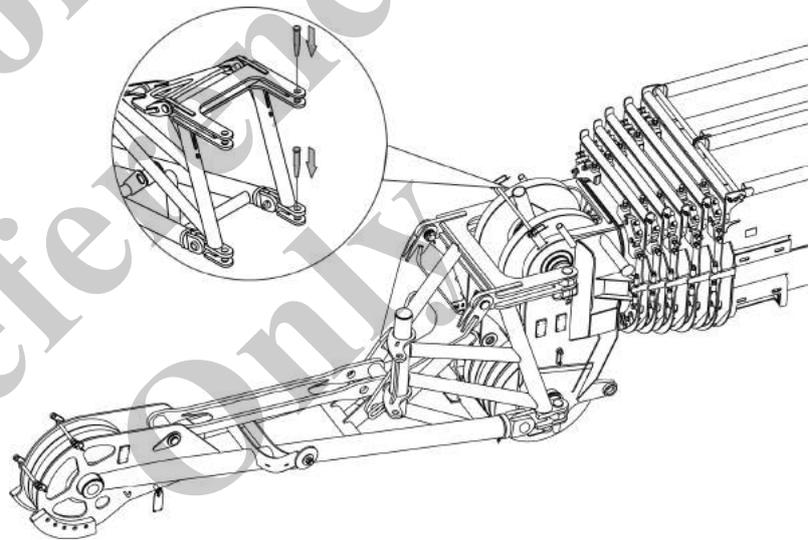
3. → Using a rope, pull the heavy-duty jib around until it reaches the boom's bolting point.
4. → Mount and secure the bolts between the heavy-duty jib and the boom on the left-hand side.



5. → Push the lever of the bearing block on the boom upward.  
⇒ The bolts at the pivot point are removed.



6. ▶ Completely fold out the heavy-duty jib using the rope.



7. ▶ Mount and secure the bolts between the heavy-duty jib and the boom on the right-hand side.

⇒ The heavy-duty jib is mounted onto the boom. The diagonal tie is in the park position.

8. ▶ Remove the rope from the eye at the heavy-duty jib.

### 6.7.6.5.2 Moving the diagonal tie into the working position

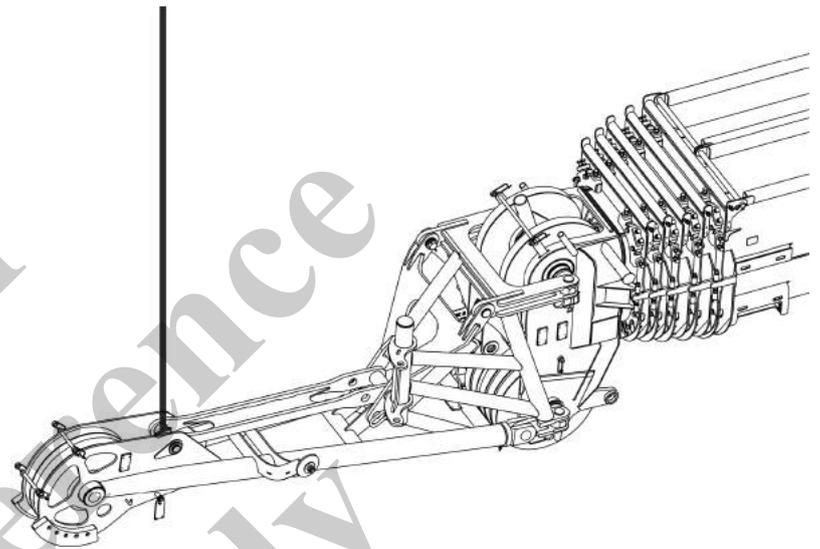
There are two ways to move the diagonal tie into the park or working position in order to fold the heavy-duty jib:

- With the auxiliary crane
- With a suitable support

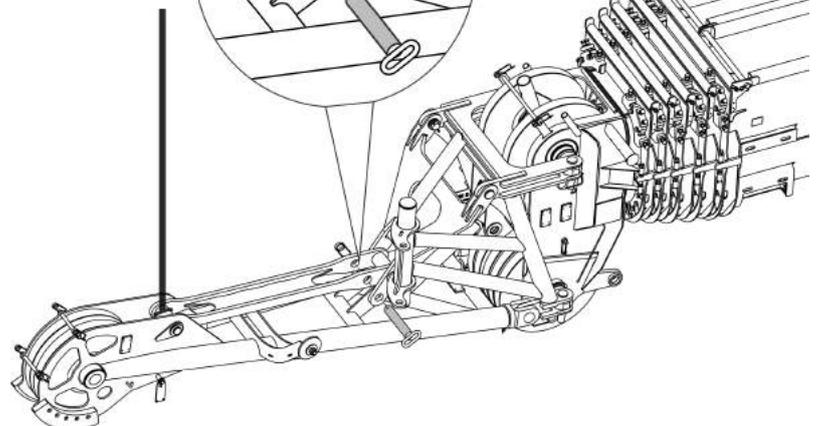
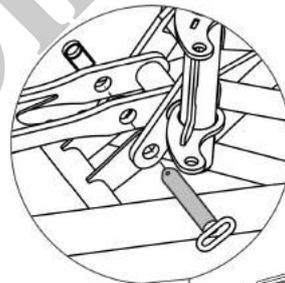
Requirement:

- Uppercarriage is at 0°.
- The boom is fully retracted.
- The boom is fully lowered.
- The hoisting rope is unreeved.
- The **Setup attachment** setup mode is set on the SENCON.

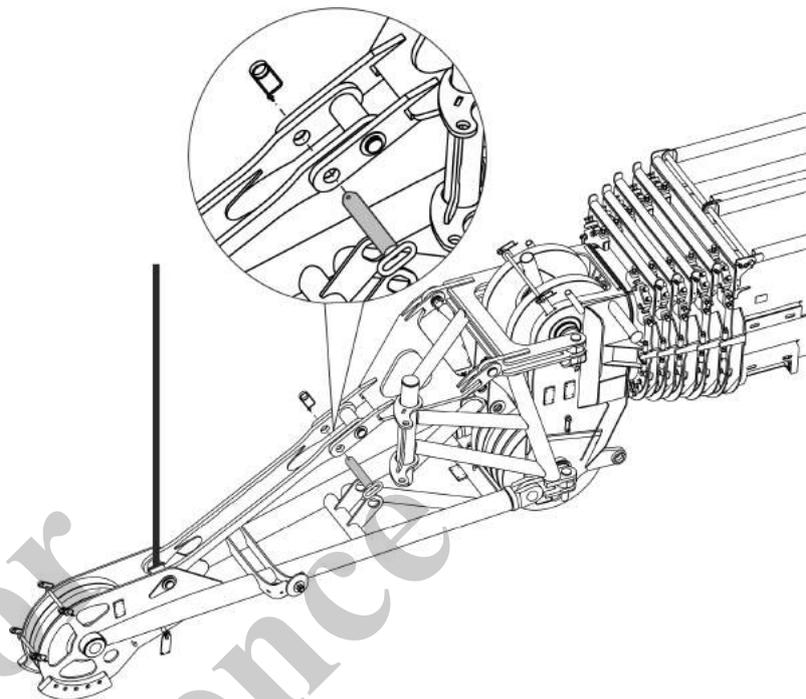
**With the auxiliary crane**



1. → Attach suitable hoisting gear to the heavy-duty jib at the lifting point to an auxiliary crane.

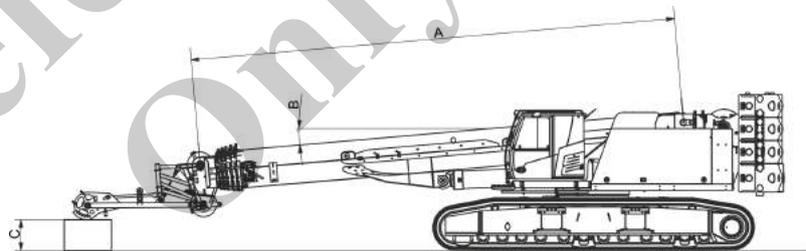


2. → Use the auxiliary crane to lift the diagonal tie until the bolt can be removed.
3. → Remove the bolt.



4. → Lower the auxiliary crane until the diagonal tie is in the working position.
5. → Mount the bolt.

**With a suitable support**

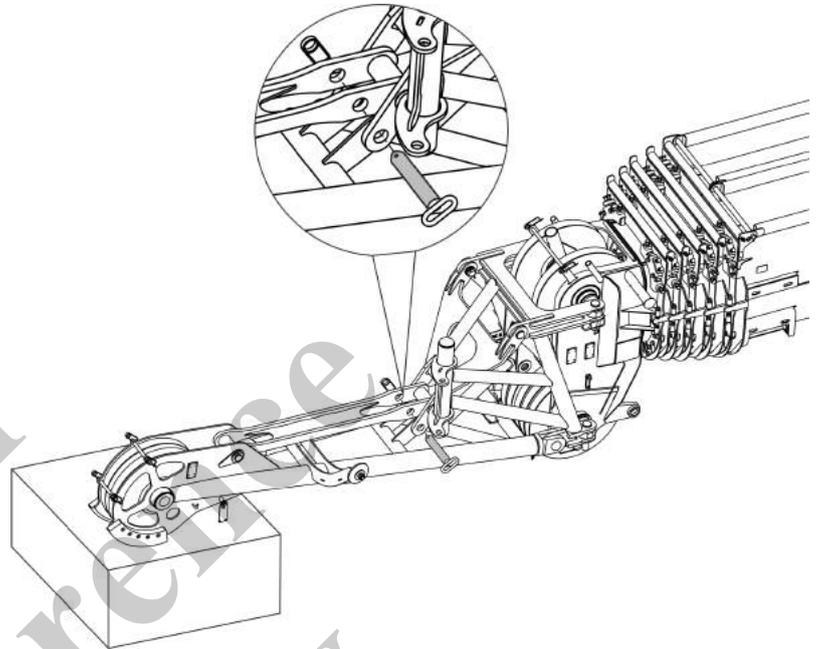


*Fig. 31: Heavy-duty jib deposited on the support*

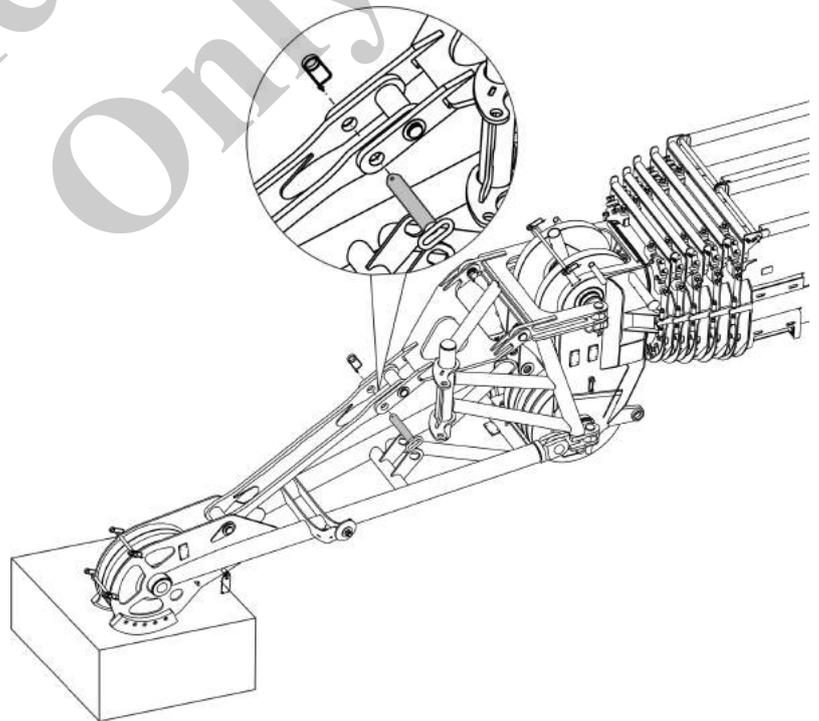
The specified values are recommended dimensions for level surfaces.

Data	Value	Unit
A	12291	mm
A	483.9	in
B	-4.9	°
C	780	mm
C	30.7	in

1. → Tilt the joystick in the [*Lower boom*] direction until the heavy-duty jib rests on the prepared support.
2. → Continue tilting the joystick in the [*Lower boom*] direction until the bolt can be removed.



3. → Remove the bolt.

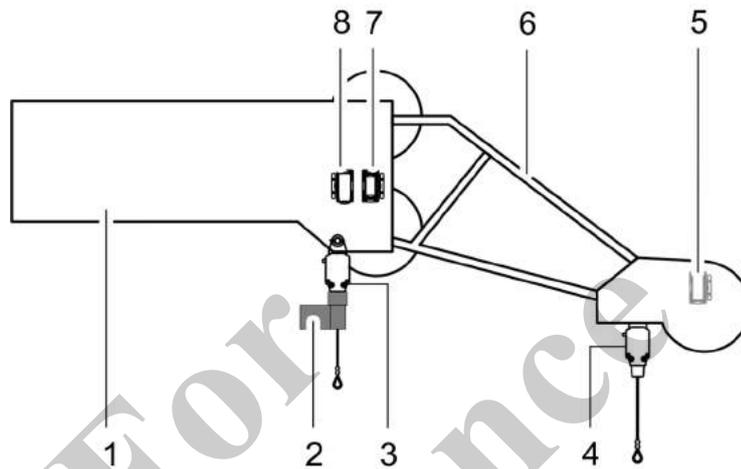


4. → Tilt the joystick in the [*Raise boom*] direction until the diagonal tie is in the working position.

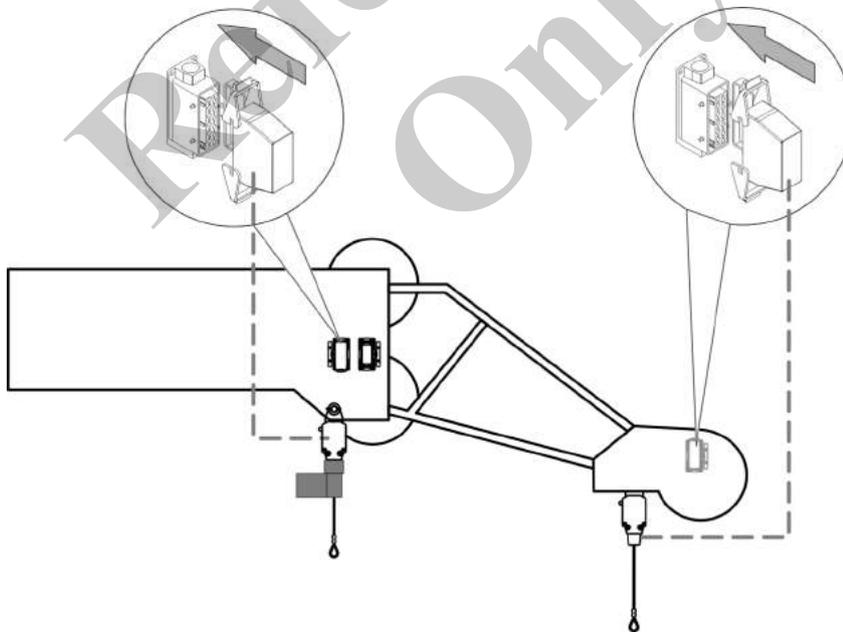
5. → Mount the bolt.

### 6.7.6.6 Establishing a power supply for the lifting limit switch on the heavy-duty jib

#### Overview



- |  |                  |
|--|------------------|
| 1 Boom                                   | 5 Power socket   |
| 2 Bypass flag                            | 6 Heavy-duty jib |
| 3 Lifting limit switch on boom           | 7 Parking socket |
| 4 Lifting limit switch on heavy-duty jib | 8 Power socket   |



### 6.7.6.7 Reeving the hoist rope

#### Further notes

🔗 Chapter 6.6.8 “Attaching the hoist rope” on page 290

### 6.7.6.8 Removing the heavy-duty jib

**⚠️ WARNING**

**Danger of falling.**

- Do not climb onto the boom or the attachments.
- Do not climb onto equipment parts (for example, boom sections, ballast parts) hanging from a crane.
- Use secure climbing equipment when bolting the attachments.
- Depending on the work height, use a ladder in accordance with the applicable standards and regulations.



*Disassembly*

*The machine is disassembled in reverse assembly order. Detailed information on assembly can be found in the corresponding chapters.*

### 6.7.7 Removing the ballast

**⚠️ DANGER**

**Falling machine or accessories from incorrect lifting**

- Ensure that the sling gear has sufficient load-bearing capacity and is not damaged.
- Only attach the machine and all accessory parts at the defined lifting points.

If the machine or accessories are lifted incorrectly, the load could fall. This can cause serious injury.

**⚠️ WARNING**

**Risk of injury due to improperly placed ballast blocks.**

When slewing the uppercarriage, ballast blocks that are not placed correctly on top of each other strike obstructions or persons. Persons will be injured and material damage occurs.

- Make sure all ballast blocks are seated properly.
- Check that the ballast blocks are secured in the correct position and are firmly in place.

### ⚠ WARNING

#### Danger of accident by locking bolts coming loose!

- Secure the locking bolt with an additional mechanical locking mechanism.
- Perform a daily visual inspection of the locking mechanism and locking bolts.

Locking bolts may become loose when the system is de-energized. The counterweight is no longer bolted to the uppercarriage and may fall down. This can result in the machine overturning. This can cause serious injury.

### ⚠ WARNING

#### Dropping load when stacking counterweights!

- Only use the suspension gear provided with the machine and the designated lifting points.

A suspension gear of insufficient load rating or lifting at insufficient lifting points may cause to load to drop. This can cause death or serious injury.

- Eye contact between crane operator and banksman must be ensured.
- The machine must only be equipped with ballast when it is placed on the ground.
- Ballast must only be applied with the machine set to the maximum track width.
- Ensure all personnel is outside the danger zone during the ballasting procedure.
- Do not stand on or under the counterweight.

#### *i* Disassembly

*The machine is disassembled in reverse assembly order. Detailed information on assembly can be found in the corresponding chapters.*

1. ➤ Set the extension mode and boom length.
2. ➤ Set the **Setup ballast** setup mode using the [*Setup ballast*] quick-select button.
3. ➤ Position the timbers under the ballast bracket.
4. ➤ Activate the ballasting mode.
5. ➤ Activate the remote radio control.
6. ➤ Check that:
  - The ballasting cylinder chains are fastened to the lifting points on the ballast bracket.
  - The ballasting cylinders are fully extended.
7. ➤ Release the locking mechanism.
8. ➤ Loosen the bolting on the counterweight.

9. ➤ Lower the counterweight with the ballasting cylinders to the ground.
10. ➤ Disable the remote radio control.
11. ➤ Remove the ballasting cylinder chains from the lifting points on the ballast bracket. Link the chains together. Extend the ballasting cylinders.
  - ⇒ The chain hooks are at the same height as the slewing ring.
12. ➤ Disable the ballasting mode.
13. ➤ Move the machine away from the counterweight.
14. ➤ Remove the safety chains.
15. ➤ Rest the ballast blocks and the ballast bracket one at a time onto the transport vehicle or on a suitable support on the ground.
16. ➤ Push in the locking lever.
17. ➤ Fully extend the ballasting cylinders.

**Further notes**

🔗 *Chapter 6.6.9 "Ballasting the machine" on page 305*

**6.7.8 Partially ballasting the machine**

Requirement:

- The maximum track width is set.
- The suspension gear is mounted onto the hook.
- The counterweight is removed from the uppercarriage.

1. ➤ Park the machine parallel to the counterweight.
2. ➤ Set the extension mode and boom length.
3. ➤ Release all the securing chains on the counterweight.
4. ➤ Set the **Setup ballast** setup mode using the *[Setup ballast]* quick-select button.
5. ➤ Attach the top ballast block to the lifting points.
  - The suspension gear must not be twisted and must be the same length on both sides.
6. ➤ Lift the ballast block off the counterweight.
  - Rest the ballast block on the transport vehicle or on a suitable support on the ground.
7. ➤ Repeat these steps to remove the ballast blocks that are not required for partial ballasting from the counterweight.
8. ➤ Activate the ballasting mode.
9. ➤ Secure the counterweight for partial ballasting with the safety chains.

10. ▶ Switch on the Setup remote radio control.
11. ▶ Mount the counterweight on the uppercarriage.
12. ▶ Switch off the Setup remote radio control.
13. ▶ Disable the ballasting mode.

### Further notes

↪ Chapter 6.6.9 "Ballasting the machine" on page 305

## 6.7.9 Removing the hoist rope



### Disassembly

The machine is disassembled in reverse assembly order. Detailed information on assembly can be found in the corresponding chapters.

### Further notes

↪ Chapter 6.6.8 "Attaching the hoist rope" on page 290

## 6.8 Checks and acceptance criteria

Every day before start-up, the machine's safety must be verified in accordance with the following criteria:

### Obligations of the machine operator

- Familiarize yourself with the machine and its equipment.
- Only execute tasks for which you are trained and that are in your work area.

### Visual check of machine

- The stability of the machine is ensured.
- The machine is horizontally aligned.
- The locking bolts of the counterweight are in locked position.
- All protective covers and warning labels in place on the machine and complete.
- The running gear is undamaged.
- The boom sections are undamaged.
- The V-belts are undamaged and tensioned.
- All screw connections - particularly on the cab - are undamaged and tight.
- All cab fastening and connection elements are undamaged and tight.
- The lateral service doors on the uppercarriage are closed.
- The machine cleaned to the extent that there are no danger points due to contamination (danger of slipping, falling, poor visibility).
- All windows clean and free of ice and snow.
- All necessary maintenance tasks been performed according to the maintenance schedule.

### Tests at the machine

#### Fill levels:

- Fuel
- Engine oil
- DEF
- Hydraulic oil
- Coolant in engine radiator
- Lubricant for crane winch
- Lubricant for slewing gear
- Refrigerant for air conditioning system

#### Function tests:

- Winches
- Safety devices
  - Brake
  - Indicating and warning displays
  - Signaling equipment
  - Lighting equipment
- Lifting limit switch
- Boom end limitation
- Load moment limitation
- Emergency stop switch

### Prerequisites for operation

- The operating and environmental conditions are known.
- The weight of the load is known.
- The correct counterweight (ballast) is attached.
- The machine and sling devices are appropriate for the loads to be attached.
- The danger points (power lines, pits, etc.) on the work site are marked and secured.
- An experienced banksman is available, if required.
- All persons have cleared the danger zone.

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### 7.1 Safety instructions for operation

#### **▲ WARNING**

**Risk of injury in the slewing range!**

- Only banksmen or slingers are allowed in the slewing range.
- Keep in constant contact with all persons involved!

In the slewing range of the machine, persons can be struck and fatally injured by falling loads at any time and unexpectedly.

#### **▲ WARNING**

**Machine is tilting on unsustainable surface!**

- Before starting work, check the surface for strength and load-bearing capacity.
- Only position the machine on a level surface.
- Keep the maximum allowable ground pressure.

People can be crushed by the falling machine.

#### **▲ WARNING**

**Danger of crushing and impact from loss of stability**

- Check to make sure that the ground has sufficient load-bearing capacity before use.

Always wear safety belts or safety gear.

When driving on unsuitable ground, the machine may become unstable and injure the machine operator.

#### **▲ WARNING**

**There is a risk of tipping when the maximum load capacity is exceeded!**

- Before extending the boom, adjust the applicable operating parameters in the SENCON to reflect the current setup of the machine.
- Observe the load moment limitation.

If the load is lifted too far or the boom is extended too far on inclined ground, the maximum load capacity will be exceeded. This may cause the machine to fall over and cause serious or fatal injuries to persons.

#### **▲ WARNING**

**Risk of wind causing the load to fall!**

- Observe the specifications on operation in windy conditions in the technical data.
- Stop working on the machine as soon as the wind speed exceeds the permissible wind speed.

There is a risk of wind causing components to malfunction or the load to swing vigorously. The load may fall as a result. This can cause death or serious injury.

#### **▲ WARNING**

**Danger due to blocked emergency exit!**

- Do not block the emergency exit.

If the emergency exit is blocked, the cabin cannot be left in an emergency.

**⚠ WARNING**

**Risk of electric shocks and burns by touching live parts!**  
**When working on live parts, touching the part involves the risk of an electric shock.**

- Before starting work on electric lines or other live parts, disconnect the power supply.
- Observe the general guidelines for working with electrical system.

**NOTICE**

**In the event of a power outage, the settings on the SENCON will not be saved.**

## 7.2 Starting up daily operation

### Safety instructions

**⚠ WARNING**

**Risk of injury due to uninspected machine.**

- Perform routine inspections of the machine according to the maintenance schedule before start-up.
- Do not operate the machine if a defect has been discovered.

**Failure to properly perform routine maintenance can result in unexpected functioning. This can cause serious injury.**

### 7.2.1 General maintenance work

#### Daily inspections

→ Carry out the following inspections every day:

- Visually inspect the machine for defects according to the checklist.
- Check the machine's safety equipment for completeness and proper mounting.
- Check the soil strength and machine stability.

#### Daily maintenance tasks

1. → Check the maintenance plan for due maintenance tasks.
2. → Perform daily maintenance tasks as per the maintenance plan.

## 7.3 Setting up the energy supply

Open the service access door.

1. ➤ Release the locking mechanisms of the service access door with the ignition key and unlock with the lever.
2. ➤ Open service access door with the handle.

⇒ **▲ WARNING! Danger of falling.**

- **Carefully open service access door.**

**The service access door opens by means of a gas spring. The operator may be pushed off the walkway by the opening service access door and be injured.**

The service access door opens.

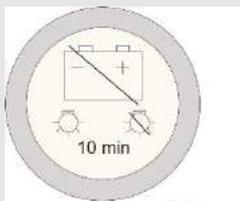
Switching on the battery disconnect switch

- Press the battery disconnect switch.
- ⇒ The battery disconnect switch lights up.

Closing the service access door

1. ➤ Close the service door.
2. ➤ Engage the locking mechanisms of the service access door with the lever and lock with the ignition key.

Battery disconnect switch

	Lights up	Flashes (approximately 10 minutes)	Off
	The electrical system of the machine is connected to the battery.	<p>The disconnection of the machine's electrical system from the battery is prepared.</p> <p>The engine operating data are saved.</p> <p>The DEF in the lines is pumped into the tank.</p>	The electrical system of the machine is disconnected from the battery.

## 7.4 Filling up with fuel

**⚠ WARNING**

Risk of damage to health and the environment from escaping fuel.

- Smoking or handling open flames is strictly prohibited.
- Park the machine only on a firm and level ground.
- Only top up when the engine is shut down.
- Determine the tank level prior to refueling.
- Always ensure that no fuel overflows when refueling.
- When refueling from a tanker, ensure that the maximum filling rate of 120 l/min. (32 US gpm) is not exceeded.
- Always supervise the refilling process.

Contact with fuel can be seriously harmful your health. Fuel seeping into the soil or bodies of water will harm the environment.

The machine can be refueled in two ways:

- Manually
- Using a fuel pump (option)



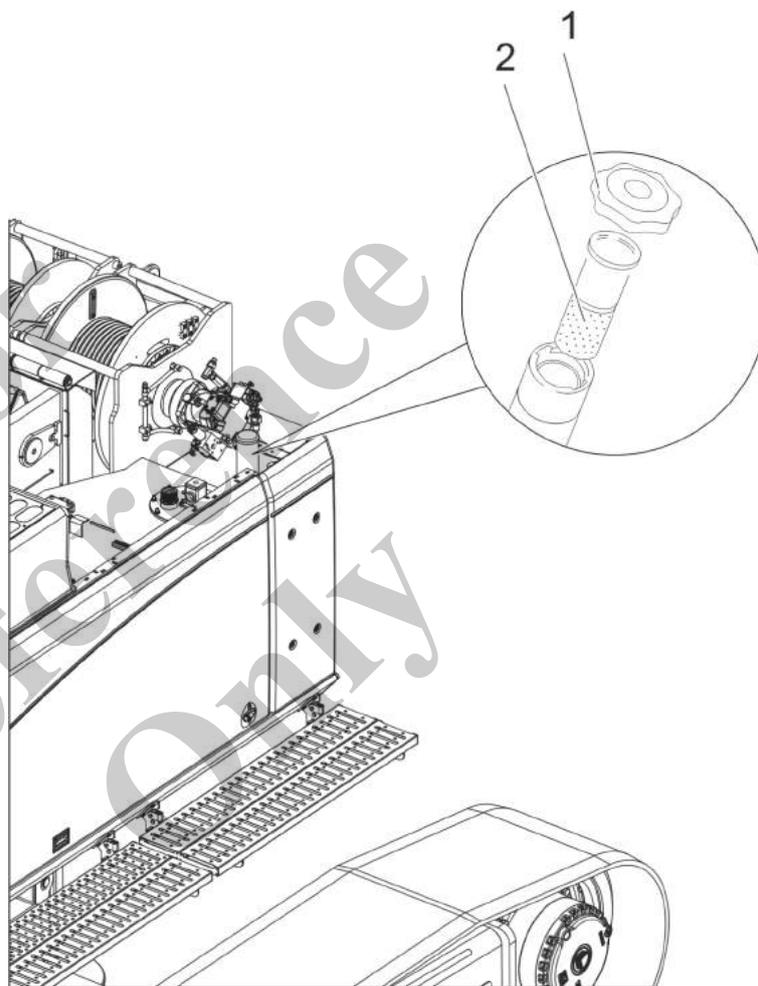
*Observe the information on the fuel system in the engine manufacturer's operating manual.*

### 7.4.1 Manually filling up with fuel

Preconditions:

- Attached loads are placed on the ground.
- The boom is lowered.
- The drive engine is switched off.

1. ➤ Use the walkways to climb up to the fuel filler neck.



- 1 Cover, lockable
- 2 Wide-mesh screen

2. ➤ Open the cap of the filler neck.

3. ➤ Clean the strainer.

4. ➤ Insert a funnel into the fuel filler neck.

5. ➤ Carefully pour the fuel in through the funnel.

6. ➤ Close the lid.

## 7.4.2 Filling up using the fuel pump (option)

### Enable fuel pump

Preconditions:

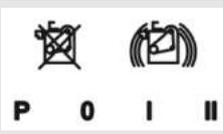
- Attached loads are placed on the ground.
- The boom is lowered.
- The drive engine is switched off.

1. → Turn ignition button to position [P].

⇒ The fuel pump is enabled.

2. → Exit the cab.

### Ignition switch

	Position [P]	Position [0]	Position [I]	Position [II]
 <p>P 0 I II</p>	<p>With fuel pump (option): The machine can be refueled using the fuel pump.</p> <p>Without fuel pump: no function</p>	<p>The ignition is off.</p> <p>No power supply is applied.</p> <p>The control and display elements are non-functional.</p>	<p>The ignition is switched on.</p> <p>Power supply is applied.</p> <p>Electric functions are available.</p>	<p>The engine is started.</p> <p>The engine is running.</p> <p>Electric and hydraulic functions are available.</p>

### Open the service access door.

1. → Release the locking mechanisms of the service access door with the ignition key and unlock with the lever.

2. → Open service access door with the handle.

⇒ **▲ WARNING! Danger of falling.**

– **Carefully open service access door.**

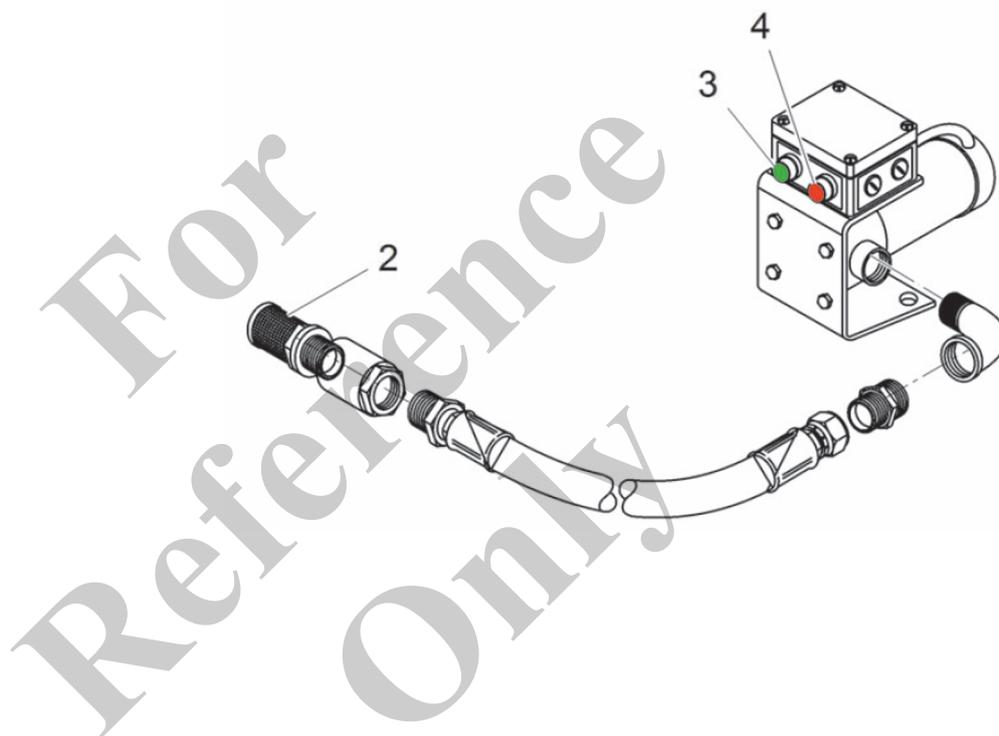
**The service access door opens by means of a gas spring. The operator may be pushed off the walkway by the opening service access door and be injured.**

The service access door opens.

### Filling up using the fuel pump

**i** During the refueling process the fuel tank can be deformed and damaged due to excess pressure. Always open the filler neck cover before refueling.

1. ➤ Open the cap of the filler neck.  
⇒ Air can escape from the fuel tank.
2. ➤ Remove the refueling hose from its bracket.
3. ➤ Insert the refueling hose into the external fuel tank.



- 2 Refueling hose
- 3 Green button: Start fuel pump
- 4 Red button: Stop fuel pump

4. → Press the green button.

⇒ **NOTICE! Risk of damage to fuel pump due to air suction and dry running!**

- Continuously supervise the refilling process.
- Do not exceed the max. suction height of 3 m (9 ft).
- Do not let the fuel pump run dry for more than 30 seconds.
- If the pump runs dry: Switch off the fuel pump manually by pressing the red button.

**Letting the pump run dry can cause damage.**

The fuel pump is switched on.

Refueling begins.

The fuel pump switches off automatically as soon as the tank is full.

5. → If the fuel pump switched off automatically, remove the refueling hose from the external fuel tank.

*i* The refueling hose must be fully discharged.

6. → Place the refueling hose back in its bracket on the uppercarriage.

7. → Close the filler neck with the sealing cover.

#### Closing the service access door

1. → Close the service door.

2. → Engage the locking mechanisms of the service access door with the lever and lock with the ignition key.

#### Turning off the refueling pump

1. → Enter the cab.

2. → Turn ignition key to position [0].

## 7.5 Refilling DEF

### NOTICE

**Risk of machine damage from contact with DEF**

**DEF can damage machine parts, especially hoses and cables, beyond repair.**

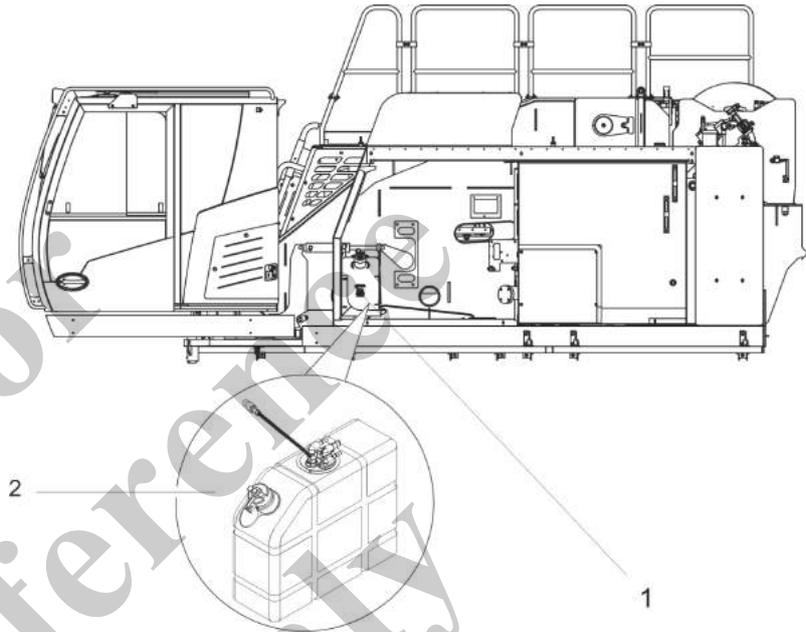
- Do not pour DEF on hoses or cables.
- Immediately remove any spilled DEF.
- Have damaged hoses or cables replaced before starting up the machine.



DEF can be filled in up to a minimum ambient temperature of  $-11^{\circ}\text{C}$  ( $12.2^{\circ}\text{F}$ ). At temperatures below  $-11^{\circ}\text{C}$  ( $12.2^{\circ}\text{F}$ ) the DEF will crystallize.

Preconditions:

- The machine is turned off.
- The machine is on firm and level ground.



- 1 DEF tank
- 2 Cap

1. → Check the DEF tank for exterior soiling and spilled DEF. Clean as needed.
2. → Carefully open the sealing cover of the DEF tank.
3. → Pour new DEF into the DEF tank.
4. → Close the sealing cover.

### Further notes

↪ "DEF level" on page 433

## 7.6 Enter the machine

### Safety instructions

**⚠ WARNING**

**Risk of falling or impact when climbing onto and down from the machine!**

- Position the uppercarriage relative to the undercarriage so that safe entry/exit is ensured via the steps.
- Use handles, access ladders, and walkways when climbing up on and down from the machine.
- Keep the access ladders and walkways clean and clear of dirt, snow, and ice.

**There is a risk of the operator slipping and falling when climbing up on down from the machine. If the uppercarriage is in an unfavorable position in relation to the undercarriage, the operator may get injured.**

### Safety measures and rules of conduct

- Enter and exit machine only when stationary and after the cab has been lowered completely - never - during any motion.
- Do not carry any objects when climbing up or down. Lift equipment items onto the machine with a rope or hoist.
- Do not use operating elements in the cab as grip handles.

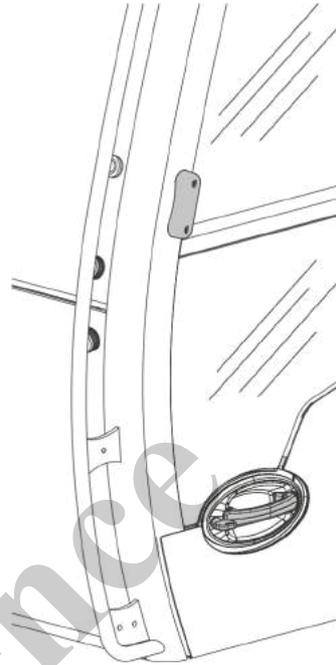
### 7.6.1 Climbing up to the cab

Handles, access ladders, and walkways are attached to the machine for climbing on and climbing off.

1. → Use the access ladder and crawler track to climb onto the walkway.
2. → Grab the cab grip handle when unlocking the door.

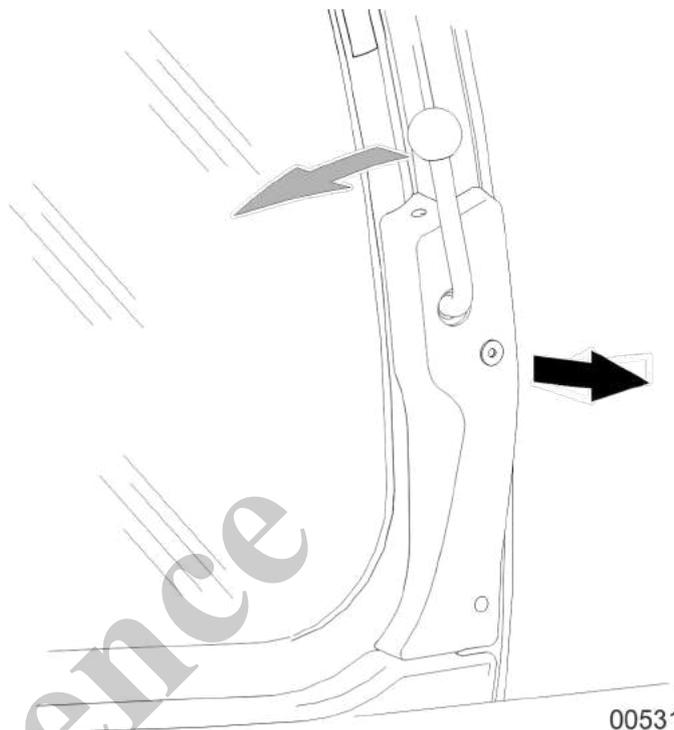
### 7.6.2 Opening/closing the cab door

Open the cab door from the outside



1. → Unlock the cab door with the ignition key.
2. → Pull the door handle.
3. → Pull the cab door backwards until it locks into place.

**Closing the cab door from the inside**



1. → Pull the lever backward.
2. → Push the cab door forward until it locks into place.

**7.6.3 Adjusting the driver seat**

**Safety instructions**

**⚠ CAUTION**

**Damage to health due to improperly adjusted driver seat!**

- **Adjust the driver seat before starting up the machine or when switching operators.**

**An improperly adjusted driver seat compromises the operator's sitting position and comfort. This can result in adverse health effects.**

- The driver seat must be adjusted so that the operator can always reach the pedals even when the road surface is poor.
- Do not adjust the driver seat when in drive or work mode.
- Always only adjust one function at a time.
- Do not use the driver seat as a climbing aid.
- Do not place any objects on the driver seat.
- Do not cover the driver seat.

The machine is equipped with an air-suspended driver seat that can be adjusted to the operator's individual requirements.

### Adjusting the operator weight and seat height

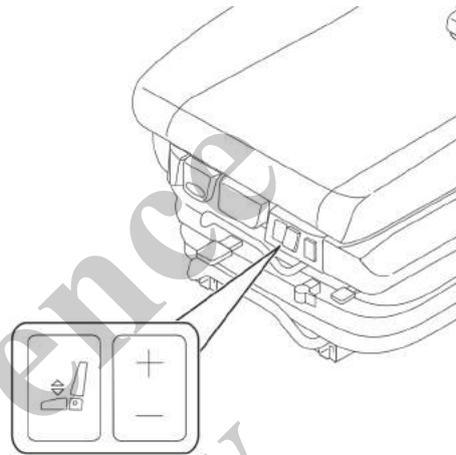
The driver seat is suitable for an operator weight of up to 150 kg (330.7 lbs).

The operator weight must not be set so low that the seat can hit the bottom when bumps occur.

Requirement:

- The ignition is switched on.

1. ➤ Put the full weight of your body on the seat.



2. ➤ Push the switch down or up to set the desired seat height and the desired operator weight.

### Adjusting the shock absorbance

The shock absorption of the driver seat can be infinitely adjusted to the conditions of the road surface or the terrain.

1 Driver seat shock absorption lever

1. ➤ To increase the damping force, pull the [driver seat shock absorption] lever up.

2. ➤ To decrease the damping force, push the [driver seat shock absorption] lever down.

**Adjusting the position of the seat surface**

The position of the seat surface can be adjusted lengthwise.

1 Seat cushion position lever

1. → Move the [*seat cushion position*] lever up and push the seat cushion back or forward.

2. → Release the lever.

⇒ The seat cushion audibly engages.

The seat cushion position does not move any longer.

**Adjusting the position of the driver seat lengthwise**

The position of the driver seat can be adjusted lengthwise.

1 Driver seat length adjuster handle

1. → Pull the [*driver seat length adjuster*] handle up and push the driver seat back or forwards.

2. → Release the handle.

⇒ The driver seat audibly engages.

The driver seat does not move any longer.

### Adjusting the inclination of the seat surface

#### 1 Seat cushion inclination lever

1. ▶ Pull the [*seat cushion inclination*] lever up.
2. ▶ Adjust the desired inclination by increasing or decreasing your weight on the front or back of the seat cushion.
3. ▶ Release the lever.

⇒ The seat cushion audibly engages.

The seat inclination no longer changes.

### Adjusting the position of the driver seat lengthwise with the control panels

The position of the driver seat can be adjusted lengthwise together with the control panels.

#### 1 Handle for driver seat length adjustment with control panels

1. ▶ Pull the handle for [*driver seat length adjustment with brackets*] up and push the driver seat back or forwards together with the control panels.
2. ▶ Release the handle.

⇒ The driver seat with the control panels audibly engages.

The driver seat and the control panels do not move any longer.

### Adjusting the inclination of the arm rests

#### 1 Arm rest inclination handwheel

**1.** → Turn the *[arm rest inclination]* handwheel outward.

⇒ The arm rest is raised.

**2.** → Turn the *[arm rest inclination]* handwheel inward.

⇒ The arm rest is lowered.

**i** *The arm rests can be folded back if necessary.*

### Adjusting the inclination of the backrest

- 1 Backrest inclination lever
  1. ▶ Pull the [*backrest inclination*] lever up.
  2. ▶ Adjust the desired inclination by increasing or decreasing your weight on the backrest.
  3. ▶ Release the lever.
    - ⇒ The backrest audibly engages.
    - The backrest does not move any longer.

**Adjusting the height of the headrest**

1 Headrest

1. → Pull the headrest up or down until the desired height is reached.

⇒ The headrest must noticeably engage in the individual notches.

2. → To remove the headrest, pull the headrest out over the last notch.

**Adjusting the lumbar supports**

The height and strength of the curvature of the lumbar supports can be individually adjusted.

Requirement:

■ The ignition key is in position [I].

1. → Push the [lower lumbar support] and [upper lumbar support] switches up to increase the curvature of the lumbar supports.

2. → Push the [lower lumbar support] and [upper lumbar support] switches down to reduce the curvature of the lumbar supports.

**Upper lumbar support**

	Switch position up	Switch position down
	The curvature of the upper lumbar support is increased.	The curvature of the upper lumbar support is reduced.

## Operation

### Lower lumbar support

	Switch position up	Switch position down
	The curvature of the lower lumbar support is increased.	The curvature of the lower lumbar support is reduced.

### Switching the seat heater on and off

Requirement:

- The ignition key is in position [I].

#### 1 Seat heater switch

1. → Press the [seat heater] switch down into position [I].  
⇒ The seat heater is switched on.
2. → Press the [seat heater] switch up into position [0].  
⇒ The seat heater is switched off.

**Switching the horizontal suspension on and off**

The horizontal suspension can absorb shocks in the direction of travel.

1 Horizontal suspension lever

1. → Move the *[horizontal suspension]* lever into position *[1]*.

⇒ The horizontal suspension is switched on.

2. → Move the *[horizontal suspension]* lever into position *[0]*.

3. → Push the driver seat back until the *[horizontal suspension]* lever audibly engages in position *[0]*.

⇒ The horizontal suspension is switched off.

The horizontal suspension does not move any longer.

**7.6.4 Fastening the seat belt**

**⚠ WARNING**

**Insufficient fuse of the machine operator during operation**

- Fasten the seat belt.
- Close the cab door.

**Risk of injury due to falling out of the cab during operation**

**⚠ WARNING**

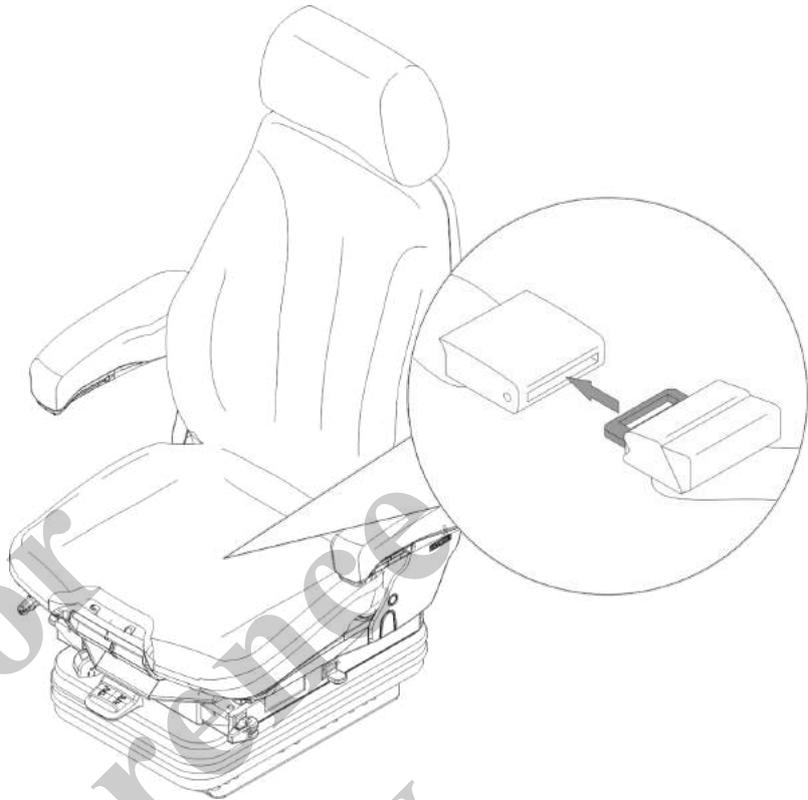
**Risk of injury due to defective seat belt**

- Check belt for signs of wear before machine start-up.
- Replace a belt immediately if damaged.

**Collisions or sudden machine movements can throw personnel against parts of the cab, resulting in injury.**

The machine is equipped with a lap belt. The belt must be worn during travel and work mode.

### Fastening the seat belt



1. Grab the belt by the metal tongue and guide it at a small distance over the hip to the buckle.
  - i* Make sure that the belt strap is not twisted.
2. Insert the metal tongue into the belt buckle.
  - The belt buckle clicks into place.

### 7.6.5 Adjusting the rearview mirror

#### Safety instructions

**▲ WARNING**

**Risk of injury due to restricted view when reversing!**

- The mirrors enable you to monitor the work area.
- Use the reversing camera to monitor the work area.
- Observe the reversing alarm.

In certain situations, the driving area cannot be seen while reversing.



*The individual settings of the rearview mirror must be made when commissioning the machine and every time the operator changes.*

1. ➔ Ensure unobstructed view. Clean the rear-view mirror as necessary.
2. ➔ Adjust the rearview mirror. The work area behind the machine must be easily visible from the operator's seat position.

## 7.7 Switching on the machine

**⚠ WARNING**

**Risk of injury due to sudden machine movement or unintentional start-up.**

- Do not leave the machine unattended with the engine running.
- Park the machine on secure ground.
- Move the machine away from the edge of any trenches or pits.
- Lower attached loads and the boom to the ground.
- Engage the slewing gear brake.
- Turn off the machine and secure it against unauthorized restart.

**Sudden machine movements or unintentional machine start-up can result in death or serious injury for persons on or near the machine.**

**⚠ WARNING**

**Risk of injury inside machine hazard area!**

- The operator must ensure no one is in the hazard area before putting the machine into operation.
- Keep a safe distance from the danger zone.
- The operator should warn persons of any hazards.
  - Shut down the machine if persons do not leave the danger zone despite this warning.
- Only the operator should be in the cab while the machine is in operation.
- If the operator's view is restricted while driving and working, the operator must be guided.
- Cordon off the area between solid structures and the work area of the machine.

**Persons in the danger zone can be crushed by the machine while it is in operation or struck by falling parts. This can result in serious injury or even death.**

### 7.7.1 Preparing for machine start-up

1. ➔ Ensure all personnel is outside the danger zone.
2. ➔ Secure loose items in the cab, such as tools or other accessories.
3. ➔ Make sure all control levers are in neutral position.

### 7.7.1.1 Starting up the system

1. ▶ Turn the ignition key to *[I]* position.
  - ⇒ The system is booted.

The loading screen is displayed on the SENCON during booting.
2. ▶ The “*Setup Configuration*” menu page displays the setup configuration that was set last.

The *[Tare load]* quick-select icon is greyed out.

The rest of the quick-select icons in the toolbar are green.

  - ⇒ SENCON has booted.
3. ▶ Press the *[SET]* button to confirm the most recent operating parameter settings.
4. ▶ Wait approximately two minutes until load moment limitation (LML) is ready for operation.

The *[Tare load]* quick-select icon is green.

  - ⇒ LML is ready for operation.

A pop-up window for confirming the setup state is displayed.
5. ▶ Press the *[SET]* button to confirm the setup status.
  - ⇒ The system is ready for operation.

### 7.7.1.2 Checking messages in the SENCON

1. ▶ Check warning and information symbols on the SENCON start screen for status messages and warning messages.
2. ▶ Rectify the displayed faults.
3. ▶ Reset the rectified faults.

### 7.7.1.3 Checking fill levels

#### 7.7.1.3.1 Checking the diesel fuel level

Requirement:

- The ignition key is in position *[I]*.
  - The SENCON is ready for operation.
1. ▶ Read out the fuel tank fill level on the *[Diesel fuel level]* indicator on the SENCON.
  2. ▶ If the *[Diesel fuel level]* icon is orange or red
    - refuel the machine.

**Diesel fuel level**

	Grey	Orange	Red
	The diesel fuel level is above 15%.	The diesel fuel level is between 5% and 15%.	The diesel fuel level is below 5%.

**7.7.1.3.2 Check DEF fill level**

Requirement:

- The ignition key is in position [I].
- The SENCON is ready for operation.

1. → Read out the DEF tank fill level on the [DEF-fill level] indicator on the SENCON.

2. → If the [DEF-fill level] icon is orange or red
- refill the DEF tank.

**DEF level**

	Grey	Orange	Red
	The DEF level is above 10%.	The DEF level is between 5% and 10%. An acoustic signal will sound.	The DEF level is below 5%. An acoustic signal will sound.

**7.7.2 Starting the engine**

**Safety instructions**

**⚠ WARNING**

There is a risk of asphyxiation caused by inhaling exhaust gasses.

- Use an extraction system in areas with poor ventilation.
- Keep the concentration of exhaust gasses to a minimum at all times.

The concentration of exhaust gas in the air can increase if the diesel engine is left running in areas with poor ventilation. This causes a risk of asphyxiation.

## Operation

### WARNING

Risk of crushing due to unintended machine movement when starting the engine!

If the joystick or drive pedal is operated at the same time the engine is started, persons can be injured due to unintended machine movement.

- The safety lever has been pulled back. All hydraulic work functions and the drive function are locked.
- Only push the safety lever in the direction of travel after the engine has started.

After switching on the ignition, the engine can be started in two ways:

- using the ignition key
- using the *[Engine start]* switch

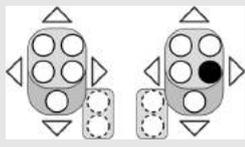
### Starting the engine using the ignition key

Requirement:

- The ignition key is in position *[I]*.
1.  Press the *[horn]* button on the joystick.
  2.  Turn the ignition key to position *[II]*.

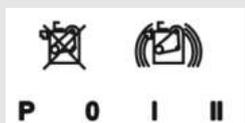
### Horn

#### Press button



The horn is triggered.  
An acoustic signal will sound.

### Ignition switch

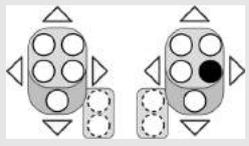
	Position <i>[P]</i>	Position <i>[0]</i>	Position <i>[I]</i>	Position <i>[II]</i>
	With fuel pump (option): The machine can be refueled using the fuel pump.  Without fuel pump: no function	The ignition is off. No power supply is applied.  The control and display elements are non-functional.	The ignition is switched on. Power supply is applied.  Electric functions are available.	The engine is started. The engine is running.  Electric and hydraulic functions are available.

### Starting the engine using the *[Engine start]* switch

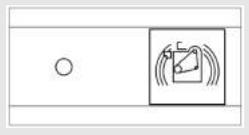
Requirement:

- The ignition key is in position [I].
  - 1. ➔ Press the [horn] button on the joystick.
  - 2. ➔ Press the [Engine start] switch to the right.
- ⇒ The engine is started.

**Horn**

	<b>Press button</b>
	The horn is triggered. An acoustic signal will sound.

**Engine start**

	<b>Press button on the right (at least 2 seconds)</b>	<b>Press button on the right (at least 2 seconds)</b>
	The engine is started.	The engine is stopped.

**Restarting the temporarily shut-down engine using the [Engine start] switch**

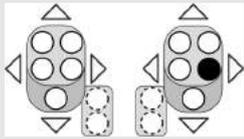
The [Engine start] switch is used to restart the engine if the engine was stopped temporarily through the [Engine start] switch or the automatic idle system.

Requirement:

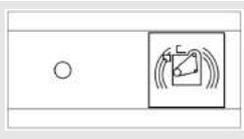
- The ignition key is in position [I] or [II].
  - The engine was stopped by the automatic idle system or
  - The engine was stopped with the [Engine start] switch.
1. ➔ Press the [horn] button on the joystick.
  2. ➔ Press the [Engine start] switch to the right.
- ⇒ The engine is started.

## Operation

### Horn

	Press button
	The horn is triggered. An acoustic signal will sound.

### Engine start

	Press button on the right (at least 2 seconds)	Press button on the right (at least 2 seconds)
	The engine is started.	The engine is stopped.

### 7.7.3 Turning on the diesel filter heating

The diesel filter heating can be used for pre-warming of the diesel filter at low temperatures. If the coolant temperature drops below 5 °C (41 °F), the manufacturer recommends switching on the diesel filter heater.

#### Turning on the diesel filter heating

Requirement:

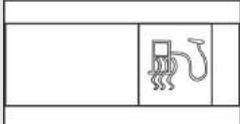
- The *[Coolant temperature]* display on the SENCON indicates that the coolant temperature is too low.
- ➔ Turn the *[Diesel filter heating]* to the right.
  - ⇒ The *[Exhaust temperature]* information symbol lights up orange until the fuel has reached its operating temperature.

#### Switching off the diesel filter heater

Requirement:

- The *[Exhaust temperature]* information symbol is gray.
- ➔ Turn the *[Diesel filter heating]* to the left.

**Diesel filter heater**

	Switch position left	Switch position right
	The diesel filter heating is switched off.	The diesel filter heating is switched on.

**Coolant temperature**

	Grey	Orange	Red
	The coolant temperature is in the permissible range.	The coolant temperature is about to exceed the permissible range.	The coolant temperature is too high.

**Exhaust temperature**

	Grey	Orange
	Exhaust temperature is normal.	Exhaust temperature is high. Exhaust aftertreatment system regeneration is active.

**7.7.4 Setting engine speed**

**Hand throttle**

	Turn to the left	Turn to the right
	The engine speed is decreased.	The speed is increased.

**Increasing the engine speed**

→ Turn the hand throttle to the right.

**Reducing the engine speed**

→ Turn the hand throttle to the left.

### 7.7.5 Activating automatic idle

#### Automatic idle

	Yellow bar	Black bar
	Operation at reduced engine speed is activated. The engine is automatically switched off during inactivity.	Operation at the engine speed currently set is activated. The engine continues to run during inactivity.

Automatic idle automatically lowers the engine speed during work pauses or turns it off. This saves fuel and protects the environment.

→ Press the *[automatic idle]* quick-select icon on the SENCON.

### 7.7.6 Activating EcoMode

#### EcoMode

	Yellow bar	Black bar
	Engine power is reduced. Fuel consumption is lower.	The maximum engine power is available.

“EcoMode” reduces the maximum engine speed. This saves fuel and protects the environment.

→ Press the *[EcoMode]* quick-select icon on the SENCON.

### 7.7.7 Warm-up the machine

#### Safety instructions

**⚠ WARNING**

**Risk of injury due to insufficient machine warm-up.**

- Observe the warm-up period.

Operating the machine without allowing sufficient time for warm-up can damage the diesel engine and other components. Machine functions will be adversely affected. This can result in injury.

The machine must be warmed up until the operating fluids have reached the required temperatures. Additional warm-up time may be required at ambient temperatures below 0 °C (32 °F). If the hydraulic system is still slow to respond after the warm-up period, work for an additional 15 minutes at reduced speed.

1. → Read out the “coolant temperature” indicator on the SENCON.
2. → Read out the “hydraulic oil temperature” indicator on the SENCON.
3. → Allow the engine to run at idle for 3 minutes after starting.
4. → Gradually increase the diesel engine speed up to the nominal speed without load.
5. → Continue warming up the engine until the following temperature values are displayed on the SENCON:
  - Hydraulic oil: 40° C (104° F)
  - Coolant: 35 °C (95 °F)
 ⇒ The machine can be operated at full engine speed.

**Coolant temperature**

	Grey	Orange	Red
	The coolant temperature is in the permissible range.	The coolant temperature is about to exceed the permissible range.	The coolant temperature is too high.

**Hydraulic oil temperature**

	Grey	Orange	Red
	The hydraulic oil temperature is below 80 °C.	The hydraulic oil temperature is between 80 °C and 85 °C.	The hydraulic oil temperature is above 85 °C.

**7.8 Checking functions**

1. → Check that the safety equipment is complete and properly mounted.  
Protective devices include engine hatches, doors, protective gratings, cladding, fire extinguishers and first-aid kits.
2. → Check the emergency stop switch for functionality.
3. → Check the LML traffic light for functionality.
4. → Check the horn for functionality.
5. → Start all lifting limit switches and check for shutdown.

## Operation

### Emergency stop

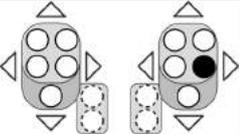
	Pull switch	Press switch
	The machine is ready for operation.	The engine and all machine movements are stopped.

### RCL light

The LML traffic light displays the current load capacity and the machine's permissible load torque and warns the machine operator when the machine reaches its maximum load rating.



### Horn

	Function
	<p>The horn is triggered. An acoustic signal will sound. The horn is activated</p> <ul style="list-style-type: none"><li>■ before engine start.</li><li>■ to warn persons in the machine danger zone.</li></ul>

## 7.9 Using the remote radio control (option)

### Safety instructions

**⚠ WARNING**

**Risk of injury from operating control elements incorrectly when using remote radio controls!**

- **When using remote radio controls, lock the control stations or control elements which are not in use.**

**If the machine is subject to remote radio control, control elements may be operated incorrectly. This can cause injury to persons.**

**⚠ WARNING**

**Risk of accidents from outrigger cylinders moving incorrectly on the stroke mechanism**

- Observe the uppercarriage position of the machine.
- Take note of the colored marking on the outrigger cylinders and the remote radio control.

**When using the Setup remote radio control, the wrong outrigger cylinders may move.**

Using the remote radio control (option), the machine operator can also perform the major drive and work functions from outside the cab.

The major machine data, operating parameters, notification and warning messages are shown on the remote radio control display.

**i** All other chapters in this manual describe the execution of drive and work functions using the controls in the cab.

### 7.9.1 Switching on remote radio control (option)

Requirement:

- The ignition key is in position [I].
- 1. → Press the [Manual/remote radio control] switch to the right.
  - ⇒ The machine switches from manual to remote radio control.
  - The engine is switched off.
- 2. → Exit the cab.
- 3. → Turn the rotary switch [Switch remote radio control on/off] on the remote radio control to position [I].
- 4. → Press the [Horn/release remote radio control] push button on the remote radio control.

The remote radio control is ready for use.

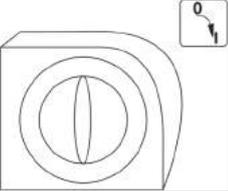
The engine can be started via the remote radio control.

#### Manual/remote radio control (option)

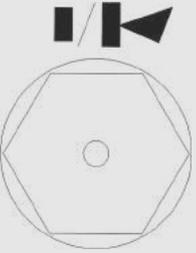
	Switch position left	Switch position right
	Manual control is activated. The crane movements are performed using the controls inside the cab	Remote radio control is activated. The crane movements are performed using the remote radio control.

## Operation

### Switch remote radio control on/off

	Turn rotary switch to position [0]	Turn rotary switch to position [I]
	The remote radio control is switched off.	The remote radio control is switched on. A brief signal tone sounds. The self-test routine is executed. A second signal tone sounds and the operating indicator flashes. The remote radio control is ready for use.

### Horn/release remote radio control

	Press the push button
	The horn sounds. The remote radio control is activated.

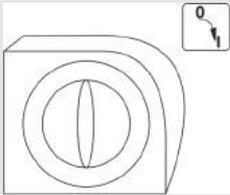
### 7.9.2 Switching off remote radio control (option)

Requirement:

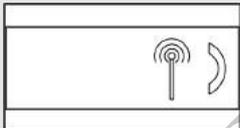
- The engine is switched off.

1. → Turn the rotary switch [*Switch remote radio control on/off*] on the remote radio control to position [0].
  - ⇒ The remote radio control is off.
2. → Enter the cab.
3. → Press the [*Manual/remote radio control*] switch to the left.
  - ⇒ The machine switches from remote radio control to manual control.  
The engine can be started from the cab.

**Switch remote radio control on/off**

	Turn rotary switch to position [0]	Turn rotary switch to position [I]
	<p>The remote radio control is switched off.</p>	<p>The remote radio control is switched on. A brief signal tone sounds. The self-test routine is executed. A second signal tone sounds and the operating indicator flashes. The remote radio control is ready for use.</p>

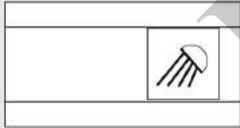
**Manual/remote radio control (option)**

	Switch position left	Switch position right
	<p>Manual control is activated. The crane movements are performed using the controls inside the cab</p>	<p>Remote radio control is activated. The crane movements are performed using the remote radio control.</p>

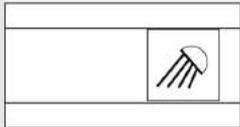
**7.10 Switching machine lighting on/off**

**7.10.1 Switching work light on/off**

**Roof work lighting**

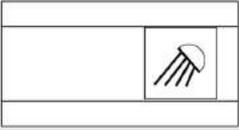
	Switch position left	Switch position right
	<p>The work lights on the cab are switched off.</p>	<p>The work lights on the cab are switched on.</p>

**Working lights, uppercarriage**

	Switch position left	Switch position right
	<p>The work lights on the uppercarriage are switched off.</p>	<p>The work lights on the uppercarriage are switched on.</p>

## Operation

### Telescopic boom work lighting

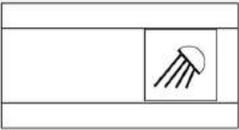
	Switch position left	Switch position right
	The work light on the telescopic boom at the front are switched off.	The work light on the telescopic boom at the front are switched on.



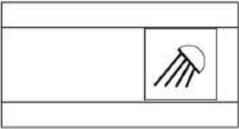
*The description includes controls or machine configurations that are not available in all countries of operation.*

### Switching on work light

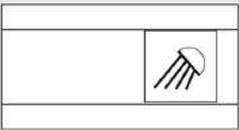
#### Roof work lighting

	Switch position left	Switch position right
	The work lights on the cab are switched off.	The work lights on the cab are switched on.

#### Working lights, uppercarriage

	Switch position left	Switch position right
	The work lights on the uppercarriage are switched off.	The work lights on the uppercarriage are switched on.

### Telescopic boom work lighting

	Switch position left	Switch position right
	The work light on the telescopic boom at the front are switched off.	The work light on the telescopic boom at the front are switched on.



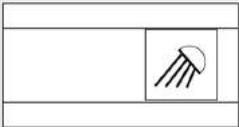
*The description includes controls or machine configurations that are not available in all countries of operation.*

**Switching off the work light**

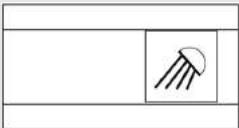
**Roof work lighting**

	Switch position left	Switch position right
	The work lights on the cab are switched off.	The work lights on the cab are switched on.

**Working lights, uppercarriage**

	Switch position left	Switch position right
	The work lights on the uppercarriage are switched off.	The work lights on the uppercarriage are switched on.

**Telescopic boom work lighting**

	Switch position left	Switch position right
	The work light on the telescopic boom at the front are switched off.	The work light on the telescopic boom at the front are switched on.



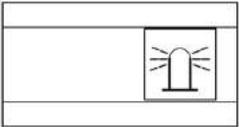
*The description includes controls or machine configurations that are not available in all countries of operation.*

Requirement:

- The ignition key is in position [I].

**7.10.2 Switching the rotating beacon on/off**

**Beacon, cab**

	Switch position left	Switch position right
	The rotating beacon is switched off.	The rotating beacon is switched on.

### Switching the cab rotating beacon on/off

Requirement:

- The ignition key is in position [I].
- ➔ Push the [cab rotating beacon] switch to the right.

### Switching the cab rotating beacon off

- ➔ Push the [cab rotating beacon] switch to the left.

## 7.11 Moving the cab

### Safety instructions

#### ⚠ WARNING

**Risk of crushing and injury in the area below the cab!**

- Persons have to stay clear of the area below, behind, or next to the cab.

The area below the lifted cab is not visible to the crane operator. This results in a risk of trapping and injury.

#### ⚠ WARNING

**Risk of falling in case of opened, lifted cab!**

- Only lift the cab in closed condition!
- Observe the audible warning signal.

If the the cab lifted and opened, the crane operator may fall down from the cab.

#### ⚠ CAUTION

**Risk of injury due to collision between cab and machine!**

- Avoid machine movements while the cab is being lifted or lowered.

Simultaneous movement of cab and machine can cause injuries.

### 7.11.1 Tilting the cab

The cab can be tilted backward. This enables the operator to adjust the working position to the requirements of the job. Although the boom is being operated at steep angles, the operator will still have a good view of the load.

### Increasing the cab tilt

Requirement:

- The engine is switched on.
- The SENCON is ready for operation.

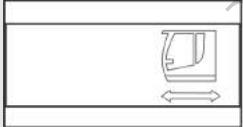
- The valid operation parameters for the setup status have been set on the SENCON.
  - The safety lever is pushed forward.
- Press the [Tilt cab] switch to the left and keep it pressed.

### Decreasing the cab tilt

Requirement:

- The engine is switched on.
  - The SENCON is ready for operation.
  - The valid operation parameters for the setup status have been set on the SENCON.
  - The safety lever is pushed forward.
- Press the [Tilt cab] switch to the right and keep it pressed.

### Tilting the cab

	Switch position left	Switch position Center	Switch position right
	The cab incline increases.	The cab does not move	The cab incline decreases.

## 7.12 Moving the uppercarriage

### Safety instructions

**⚠ WARNING**

**Risk of death due to moving parts in the work area of the machine.**

- Ensure that no one is in the work area during the machines operation.
- In case if danger, give warning signals for people.
- Stop all work immediately if unauthorized persons are in the danger zone.

**Persons in the work area of the machine will be caught and injured by moving machine parts.**

**NOTICE**

**Risk of damage to machine when slewing and stopping the uppercarriage suddenly.**

- Stop uppercarriage slewing slowly.
- Slowly begin uppercarriage slewing from a standstill.
- Slew the uppercarriage gradually.

**Slewing or stopping the uppercarriage suddenly places severe mechanical stress on the machine, which can result in damage.**

### 7.12.1 Unlocking the uppercarriage

#### NOTICE

Risk of damage to the uppercarriage locking mechanism if the uppercarriage is not completely unlocked

- After unlocking in the SENCON, check that the locking bolt has been retracted.
- If the locking bolt is not completely retracted, carefully slew the uppercarriage a few degrees and repeat the unlocking process in the SENCON.

If the locking bolt is not fully retracted while unlocking, subsequent slewing of the uppercarriage can damage the uppercarriage locking mechanism.

Requirement:

- The engine is switched on.
- The SENCON is ready for operation.
- The safety lever is pushed forward.

→ Press the *[Unlock/lock uppercarriage]* quick-select button.

⇒ Uppercarriage is unlocked.

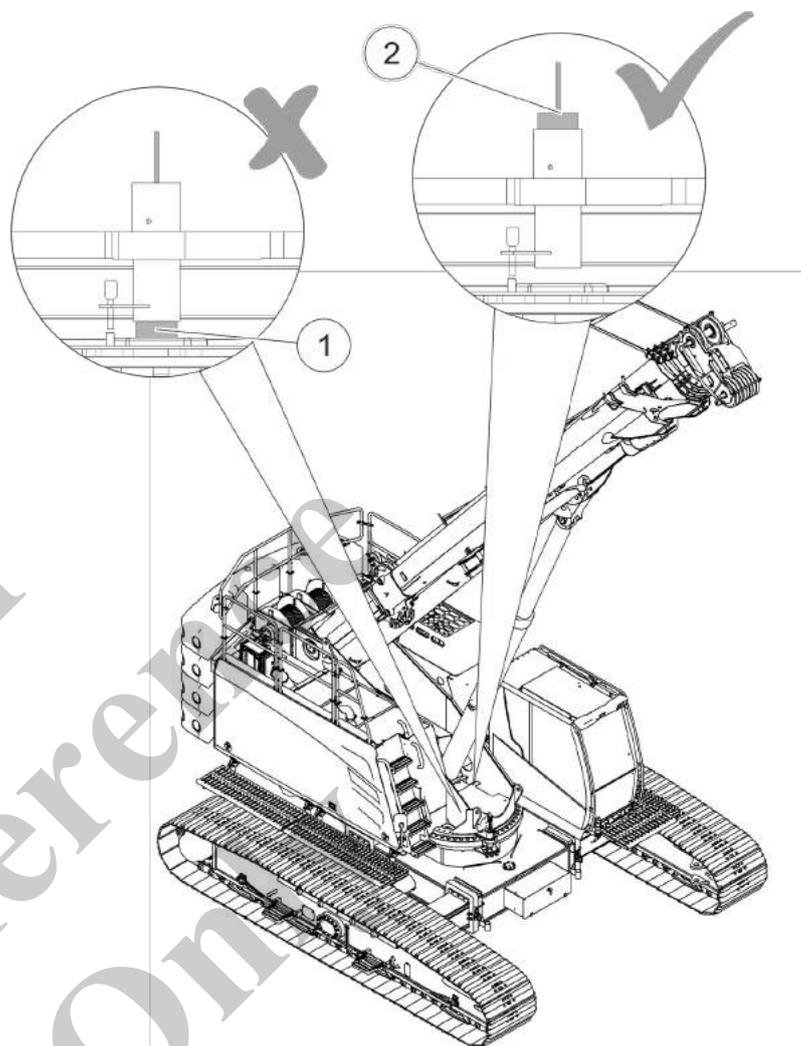
The *[Unlock/lock uppercarriage]* status display shows a black bar.

The *[uppercarriage locking]* icon on the SENCON start screen is green.

#### Checking uppercarriage unlocking

Requirement:

- The uppercarriage has been unlocked using the *[Unlock/lock uppercarriage]* quick-select button.



- 1 Locking bolt, retracted
- 2 Locking bolt, extended

1. → Check the locking bolt position on the uppercarriage slewing gear and make sure the locking bolt has been retracted.
2. → If the locking bolt is not completely retracted, carefully slew the uppercarriage a few degrees and repeat the unlocking process in the SENCON.

**Uppercarriage locking mechanism**

	Grey	Green
	Uppercarriage is unlocked.	Uppercarriage is locked.

## Operation

### Uppercarriage locking mechanism

	Yellow bar	Black bar
	Uppercarriage is locked.	Uppercarriage is unlocked.

### 7.12.2 Setting the uppercarriage slewing speed

The uppercarriage slewing speed depends on:

- the engine speed
- the joystick movement

#### Setting the reduced uppercarriage slewing speed

Requirement:

- The engine is switched on.
- The SENCON is ready for operation.
- The safety lever is pushed forward.

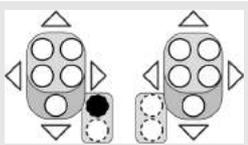
→ Press the [Uppercarriage slewing speed] quick-select button in the SENCON.

⇒ The status display shows a black bar: operation at a custom set uppercarriage slewing speed.

The status field shows a yellow bar: operation at a reduced uppercarriage slewing speed.

**i** *Reduced slewing speed must be used when the fly boom is attached.*

#### Slewing speed changeover

	Press button
	Switches between reduced uppercarriage slewing speed and custom set uppercarriage slewing speed.

#### Uppercarriage slewing speed

	Yellow bar	Black bar
	The uppercarriage slewing speed is reduced.	The uppercarriage slewing speed corresponds to the individual setting.

### Uppercarriage slewing speed

	Yellow bar	Black bar
	The uppercarriage slewing speed is reduced.	The uppercarriage slewing speed corresponds to the individual setting.

### Setting a custom uppercarriage slewing speed

Requirement:

- The engine is switched on.
- The SENCON is ready for operation.
- The safety lever is pushed forward.

1. → Press the *[Uppercarriage slewing speed]* quick-select button in the SENCON.
  - ⇒ The status display shows a black bar: operation at a custom set uppercarriage slewing speed.
2. → Open the “Speed” menu page in the SENCON.
3. → Adjust the *[Uppercarriage slewing speed]* setting value to the respective working conditions.
4. → Set the desired uppercarriage slewing speed in %.

### Uppercarriage slewing speed

	0% to 100%
	Set the speed for the <i>[Slew uppercarriage]</i> crane control function.

### 7.12.3 Release slewing gear brake

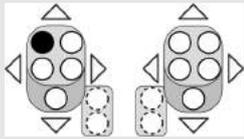
Requirement:

- The engine is switched on.
- The SENCON is ready for operation.
- The safety lever is pushed forward.

- Press the *[Activate / deactivate slewing gear brake]* button on the joystick.
  - ⇒ The *[slewing gear brake]* information symbol on the SENCON is gray.

## Operation

### Swing park brake

	Press button
	<p>The swing park brake is activated.</p> <p>The swing park brake is deactivated.</p>

### Swing park brake

	Grey	Green
	<p>The swing park brake is disengaged.</p> <p>Slewing the uppercarriage is possible.</p>	<p>The swing park brake is actuated.</p> <p>Slewing the uppercarriage is not possible.</p>

## 7.12.4 Slewing the uppercarriage

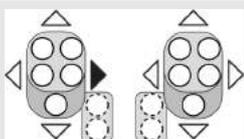
### 7.12.4.1 Slewing the uppercarriage with slewing gear freewheel deactivated

Requirement:

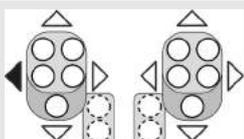
- The engine is switched on.
- The SENCON is ready for operation.
- The safety lever is pushed forward.
- The swing park brake is disengaged.
- The slewing gear freewheel is disengaged.

→ Tilt the joystick in the desired direction.

### Slew right

	Tilt the joystick
	<p>The uppercarriage is slewed to the right.</p>

### Slew left

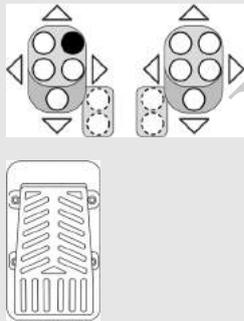
	Tilt the joystick
	<p>The uppercarriage is slewed to the left.</p>

7.12.4.2 Activate / deactivate the slewing gear freewheel

Positioning slewing gear brake

	Slewing gear freewheeling enabled Pedal not depressed	Slewing gear freewheeling enabled Pedal depressed
	Uppercarriage slewing will not be stopped.	Uppercarriage slewing will be stopped.

Slewing gear freewheeling

	Press button [Positioning slewing gear brake] pedal fully depressed
	This engages/disengages the slewing gear freewheel.

Slewing gear freewheeling

	Grey	Green
	The slewing gear freewheel is disengaged. The uppercarriage remains stationary once the joystick that has been moved is released.	The slewing gear freewheel is engaged. The uppercarriage continues to slew, without the speed being reduced, once the joystick that has been moved is released.
	—	Slewing gear freewheel not available. The uppercarriage inclination is more than 0.6°.

The slewing gear freewheel protects the slewing gear from excessive strain. This occurs, for example, when swinging loads.



The slewing gear freewheel is **not** suitable for work where space is limited.

## Operation

### Engaging slewing gear freewheel

Requirement:

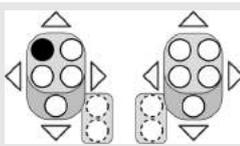
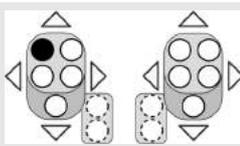
- The engine is switched on.
- The SENCON is ready for operation.
- The safety lever is pushed forward.

1. ➔ Step on the positioning slewing gear brake and hold it down.
2. ➔ Press the *[Activate/deactivate slewing gear freewheel]* button on the joystick.

⇒ The *[slewing gear freewheel]* information symbol on the SENCON lights up green.

**i** *At an uppercarriage inclination of more than 0.6°, the slewing gear freewheel cannot be activated. The [slewing gear freewheel not available] information symbol on the SENCON is green.*

### Swing park brake

	Press button
	The swing park brake is activated.
	The swing park brake is deactivated.

### Swing park brake

	Grey	Green
	The swing park brake is disengaged. Slewing the uppercarriage is possible.	The swing park brake is actuated. Slewing the uppercarriage is not possible.

### Securing the uppercarriage against unintended slewing with activated slewing freewheel

➔ Press the *[Activate / deactivate slewing gear brake]* button on the joystick.

**i** *Unintended slewing of the uppercarriage with activated slewing gear freewheel is prevented by the actuated slewing gear brake.*

⇒ The *[slewing gear brake]* information symbol on the SENCON lights up green.

**Deactivate the slewing gear free-wheel**

1. ➔ Step on the positioning slewing gear brake and hold it down.
2. ➔ Press the *[Activate/deactivate slewing gear freewheel]* button on the joystick.
  - ⇒ The *[slewing gear freewheel]* information symbol on the SENCON is gray.

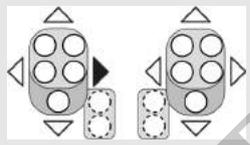
**7.12.4.3 Turn uppercarriage with activated slewing freewheel**

Requirement:

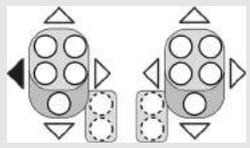
- The engine is switched on.
- The SENCON is ready for operation.
- The safety lever is pushed forward.
- The swing park brake is disengaged.
- This engages the slewing gear freewheel.

1. ➔ Tilt the joystick in the direction *[slewing left]*.
2. ➔ Tilt the joystick in the direction *[slewing right]*.

**Slew right**

	<b>Tilt the joystick</b>
	The uppercarriage is slewed to the right.

**Slew left**

	<b>Tilt the joystick</b>
	The uppercarriage is slewed to the left.

## Operation

### 7.12.4.4 Decelerating the uppercarriage slewing

Stepping on the positioning slewing gear brake deliberately stops uppercarriage slewing.

1. ➤ Release the joysticks in neutral position.
2. ➤ Step on the positioning slewing gear brake.
3. ➤ To amplify brake operation, gently push the joystick against the current slewing direction.

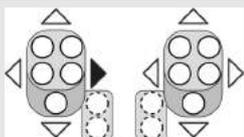


*If the safety lever is pulled while the uppercarriage is slewing, the slewing motion is decelerated to a standstill. The uppercarriage stops abruptly. The swing park brake is activated. Only use the safety lever in an emergency to stop the uppercarriage!*

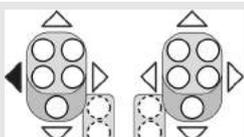
#### Positioning slewing gear brake

	Slewing gear freewheeling enabled Pedal not depressed	Slewing gear freewheeling enabled Pedal depressed
	Uppercarriage slewing will not be stopped.	Uppercarriage slewing will be stopped.

#### Slew right

	Tilt the joystick
	The uppercarriage is slewed to the right.

#### Slew left

	Tilt the joystick
	The uppercarriage is slewed to the left.

### 7.12.4.5 Stopping the uppercarriage slewing

The actuated slewing gear brake prevents the uppercarriage from slewing.

The slewing gear brake is actuated in the following ways:

- Automatically
  - With the uppercarriage at a standstill and inactive slewing gear freewheel
  - By pulling the safety lever
  - By switching off the engine
- Manually
  - Using the joystick

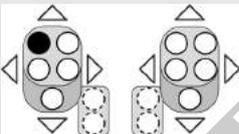
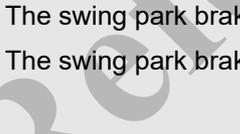
**Activating the slewing gear brake manually**

Requirement:

- The engine is switched on.
- The SENCON is ready for operation.
- The safety lever is pushed forward.

- Press the *[Activate / deactivate slewing gear brake]* button on the joystick.
  - ⇒ The *[slewing gear brake]* information symbol on the SENCON lights up green.

**Swing park brake**

	Press button
	The swing park brake is activated.
	The swing park brake is deactivated.

**Swing park brake**

	Grey	Green
	The swing park brake is disengaged. Slewing the uppercarriage is possible.	The swing park brake is actuated. Slewing the uppercarriage is not possible.

**7.12.4.6 Locking the uppercarriage**

Requirement:

- The engine is switched on.
- The SENCON is ready for operation.

## Operation

- The safety lever is pushed forward.
  - The uppercarriage is in 0° position.
- ➔ Press the *[Unlock/lock uppercarriage]* quick-select button.
- ⇒ The *[Unlock/lock uppercarriage]* status display shows a yellow bar.
- The *[uppercarriage locking]* icon on the SENCON start screen is gray.

### Uppercarriage locking mechanism

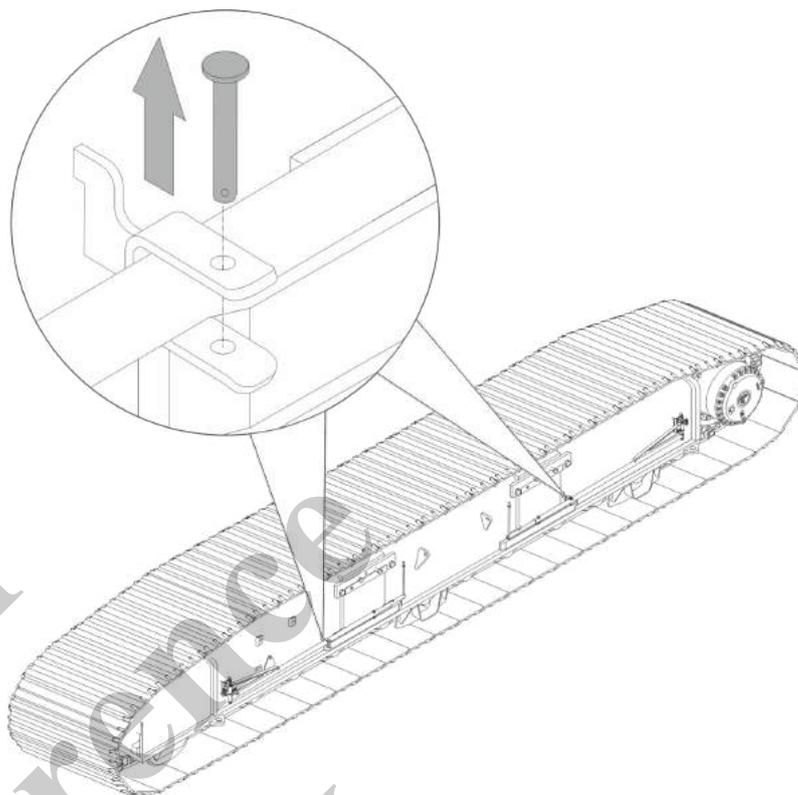
	Grey	Green
	Uppercarriage is unlocked.	Uppercarriage is locked.

### Uppercarriage locking mechanism

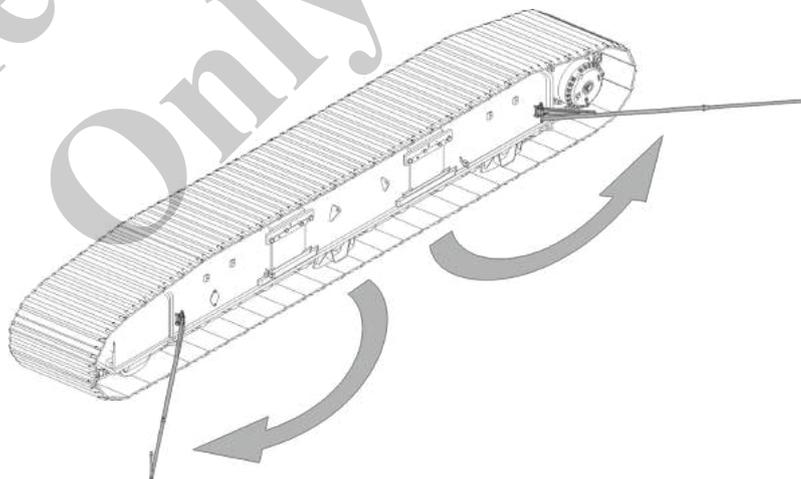
	Yellow bar	Black bar
	Uppercarriage is locked.	Uppercarriage is unlocked.

### 7.12.5 Set up the swing barrier protection (option)

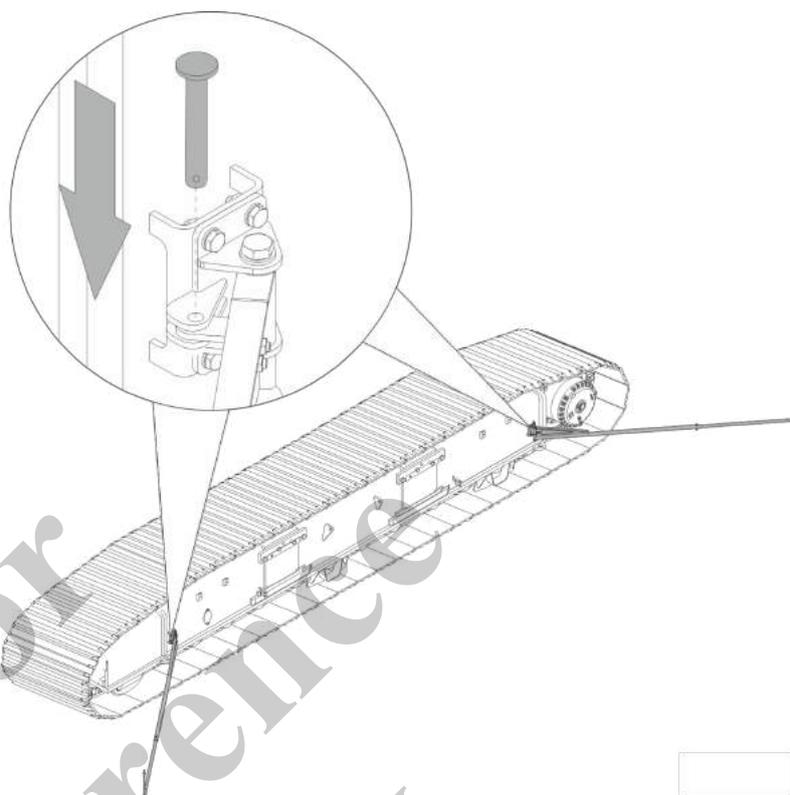
The swing barrier protection indicates the swing range of the uppercarriage in work mode. During work mode, all persons must stay clear of the swing range.



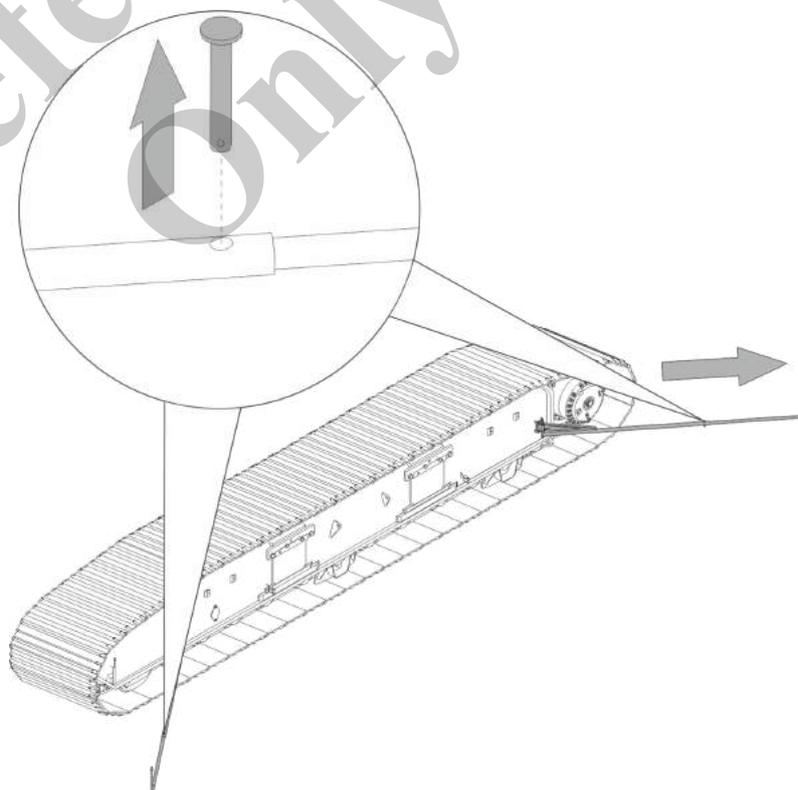
1. → Pull out the locking bolt of the swing barrier protection.



2. → Completely fold out the swing barrier protection.

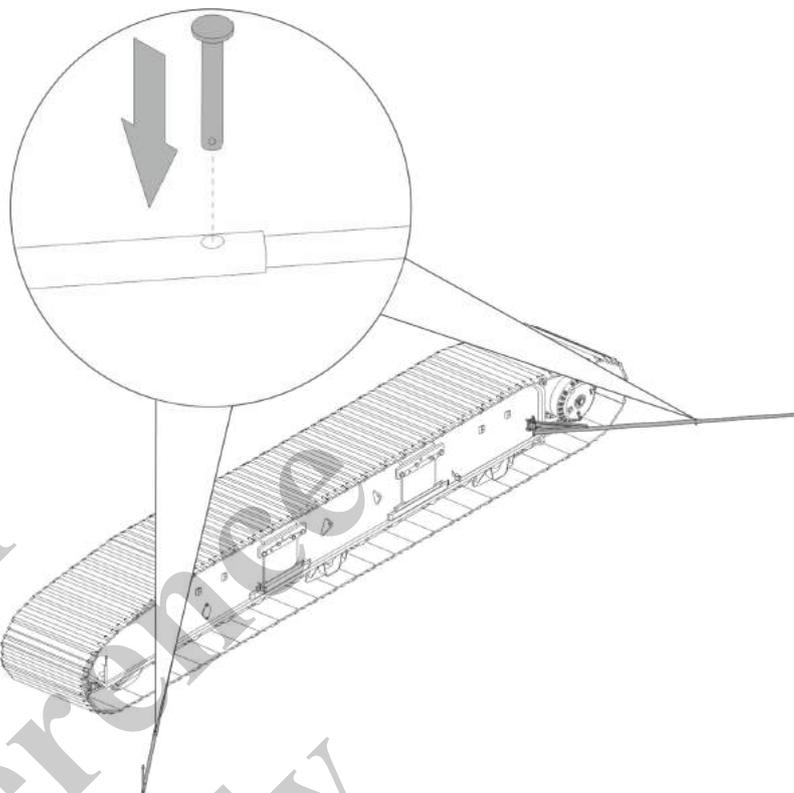


3. Insert and secure the locking bolts in at the position shown.



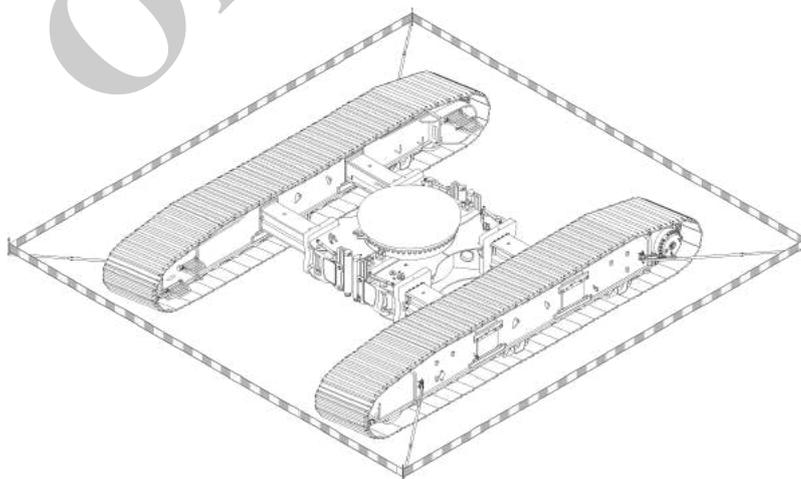
4. Pull out the bolts of the swing barrier protection.

5. → Pull out the swing barrier protection to its full length.



6. → Insert and secure the bolts of the swing barrier protection at the position shown.

7. → Unfold and pull out the swing barrier protection on the second track wheel carrier in the same manner.



8. → Attach the barrier tape at the ends of the swing barrier protection.

### 7.13 Moving the machine

#### DANGER

Risk of electric shocks and burns when working near live cables!

- Keep a sufficient distance from overhead power lines and other live cables.

If machine components come into direct contact with the cable, there is a risk of an electric shock that could seriously or fatally injure the machine operator. When working near cables carrying hazardous voltage, an electric arc could develop between the machine and the cable. The electric voltage could injure the machine operator.

#### WARNING

Danger of crushing and impact from loss of stability

- Check to make sure that the ground has sufficient load-bearing capacity before use.

Always wear safety belts or safety gear.

When driving on unsuitable ground, the machine may become unstable and injure the machine operator.

#### WARNING

Risk of injury due to restricted view when reversing!

- The mirrors enable you to monitor the work area.
- Use the reversing camera to monitor the work area.
- Observe the reversing alarm.

In certain situations, the driving area cannot be seen while reversing.

#### WARNING

Machine is tilting on unsustainable surface!

- Before starting work, check the surface for strength and load-bearing capacity.
- Keep the maximum allowable ground pressure.

People can be crushed by the falling machine.

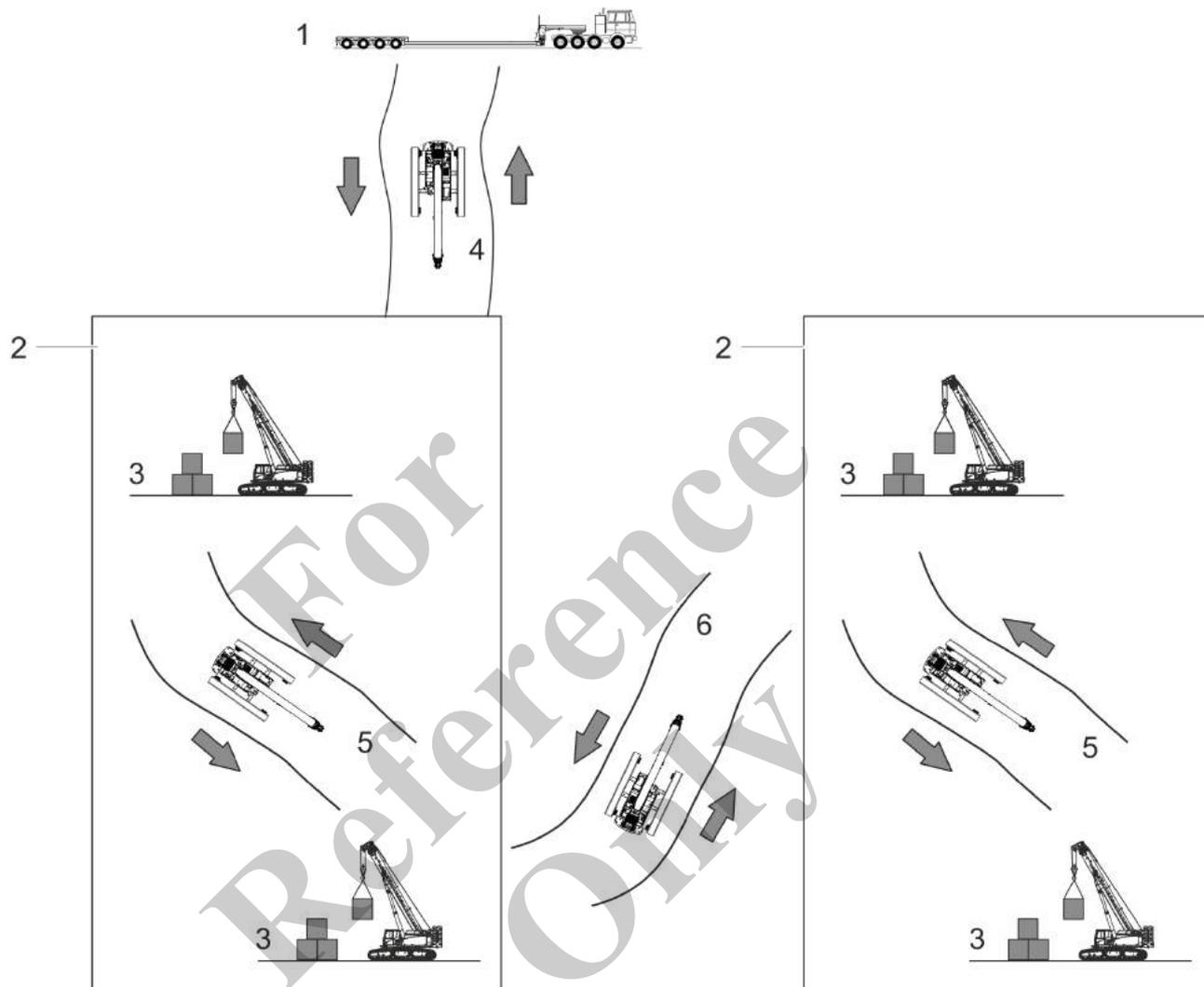
#### NOTICE

Risk of damage to crawler tracks and running gear components due to driving over elevations and depressions!

- Only drive on level, smooth routes and roads without elevated or recessed obstacles.
- Observe the max. ground pressure.

When traveling over elevated or recessed obstacles such as railroad tracks, crawler tracks and running gear components can be damaged.

### 7.13.1 Work site and tracks



- 1 Transport vehicle
- 2 Construction site
- 3 Work site within one construction site
- 4 Travel route between the transport vehicle and construction site
- 5 Travel route between work sites within one construction site
- 6 Travel route between two construction sites

The machine is brought to the construction site on a transport vehicle. Once the machine has been unloaded and commissioned, it is moved to the area of the construction site in which it is to be deployed via a road.

It is put to work as intended in this area of the site and will complete a variety of tasks.

The machine can be moved to a different area of the same construction site, or to another construction site, via a road.

### 7.13.2 Moving the machine on tracks

The machine can be moved between the transport vehicle, construction sites and work sites on tracks

- without load in travel mode
- or
- with load in work mode with the **Pick and Carry** working mode.

#### 7.13.2.1 Moving the machine in travel mode

The maximum driving speed is permitted.

The machine is moved with the middle or maximum track width. If the environmental conditions are unfavorable, e.g., if routes are constricted or there are structural limitations, the machine can be moved with the minimum track width when the conditions for travel mode are met.

##### 7.13.2.1.1 Conditions for moving the machine in travel mode

###### General conditions for travel mode

The following conditions must be met before and during travel.

- Observe all general conditions for operating the machine.
- Move the machine without lifting the load.
- The bottom hook block is secured on the lifting straps of the uppercarriage.
- The uppercarriage position is 0°.

Exception: The uppercarriage may only be slewed with restricted visibility if the environmental conditions are unfavorable.

- The boom angle is 20°.
- The boom is fully retracted.
- Negotiate corners with as wide a radius as possible.
- Do not drive over crests and bumps.

###### Additional conditions for travel mode in case of inclines and ramps

The following conditions must additionally be met before and during travel when moving on inclines and ramps.

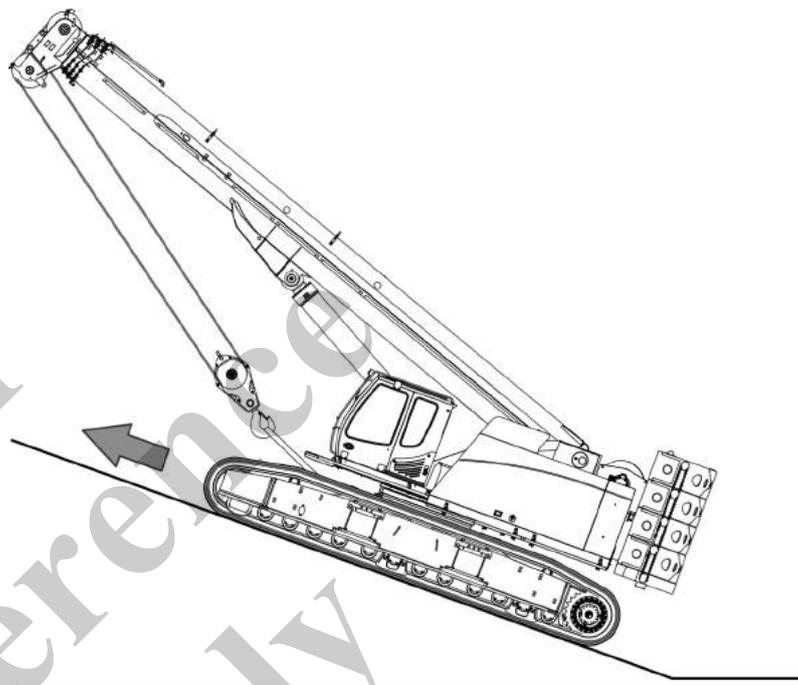
- The maximum slope of inclines and ramps is 20°.
- Uppercarriage is locked.
- Recommendation: The maximum track width is set.  
Only drive straight onto inclines or ramps with a minimum track width.
- Do not move across the slope. Move up the slope in the direction of travel.
- Move the machine at a low speed. The *[Drive slow – fast]* switch is pressed to the left.
- In case of mounted counterweight: Make sure the ballast is secure.

**⚠ WARNING**

**Danger of tipping!**

- Lock the uppercarriage.

Slewing the uppercarriage when moving on inclines and ramps may cause the machine to tip and injure people.



*Fig. 32: Example representation: Moving on inclines and ramps in travel mode*

**7.13.2.1.2 Securing the bottom hook block from swinging**

**NOTICE**

**Risk of damage to the machine due to bottom hook block swinging while driving**

- Secure the bottom hook block.

If the bottom hook block begins swinging while driving, machine components may be damaged.

**NOTICE**

**Risk of damage to machine due to too much tension in hoist rope**

- Slowly and carefully tension the hoist rope.

If the hoist rope tension is too high when securing the bottom hook block, machine components may be damaged.

**Personnel**

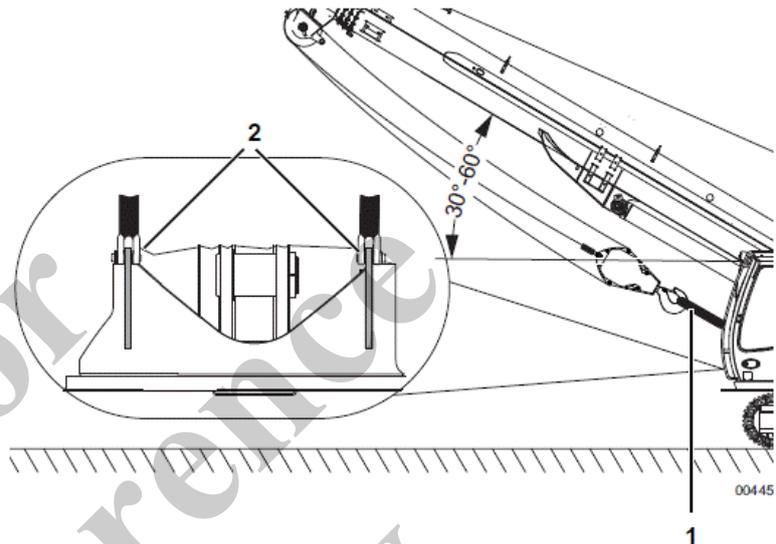
- Machine operator
- Instructed personnel

### Tools

- Suitable load lifting equipment

#### Requirement:

- The slewing gear brake is activated.
- Track width A or B is set.
- The boom is fully retracted.



1 Load lifting equipment

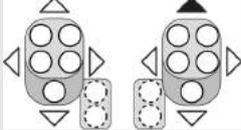
2 Lifting eyelets on the uppercarriage

1. ➤ Tilt the joystick in *[Raise boom]* direction until the boom is fully raised.
2. ➤ Tilt the joystick in *[Lower winch 1]* direction until the bottom hook block is hanging at cab level.
3. ➤ Use suitable load lifting equipment to attach the hook to the lifting eyelets on the uppercarriage and secure it to prevent swinging.
4. ➤ Slowly tilt the joystick in *[Raise winch 1]* direction until the hoisting rope is slightly taut.
5. ➤ Tilt the joystick in *[Lower boom]* direction. Move the boom to a position between 30° and 60°.
6. ➤ Adjust the tension of the hoisting rope if necessary. Slowly tilt the joystick in *[Raise winch 1]* direction until the hoisting rope is slightly taut.

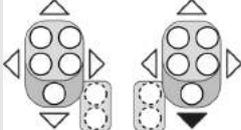
### Overview

The most important operating and display elements for carrying out the described instructions are:

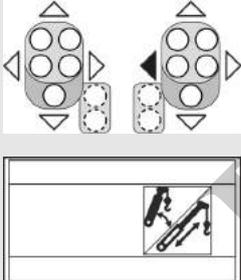
**Lower winch 1**

	<p><b>Tilt the joystick</b></p>
	<p>The rope on winch 1 is unwound. The hook is lowered.</p>

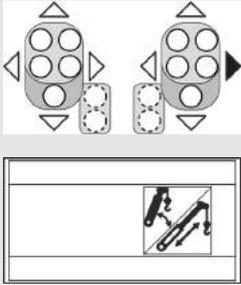
**Lift winch 1**

	<p><b>Tilt the joystick</b></p>
	<p>The rope on winch 1 is wound up. The hook is raised.</p>

**Lifting the boom**

	<p><b>[Luffing down-up / Telescope in - out changeover] switch in right switch position</b></p> <p><b>Tilt the joystick</b></p>
	<p>The boom is raised.</p>

**Lowering the boom**

	<p><b>[Luffing down-up / Telescope in - out changeover] switch in right switch position</b></p> <p><b>Tilt the joystick</b></p>
	<p>The boom is lowered.</p>

### 7.13.2.1.3 Moving the machine in travel mode

#### DANGER

Risk of tipping of the machine at full/partial ballast with minimum track width

- Move the uppercarriage to 0° position  
or
- raise the boom angle to max. 20°.

If the fully/partially ballasted machine is driven with minimum track width, the machine can tip over. This can cause death or serious injury.

#### DANGER

Danger of tipping when slewing the uppercarriage

Slewing the uppercarriage when the machine is at full or partial ballast with minimum track width can cause the machine to tip over. This can cause death or serious injury.

- Raise the boom to maximum 20°.

#### WARNING

Risk of accident from starting in the wrong direction

- Before moving off, ascertain the direction of travel, the direction of steering, and the uppercarriage position and move the machine accordingly.
- Drive slowly and carefully.

Setting the uppercarriage position to 180° inverts the direction of travel and the direction of steering. If the machine is incorrectly moved against the expected direction of travel, this can lead to accidents. This can cause injury to persons.

#### CAUTION

Machine tipping due to shift in center of gravity

- Familiarize yourself with the conditions for travel mode.
- Do not perform any crane movements while driving.

Crushed or struck when performing additional movements and work with the machine during travel mode.

Preconditions:

- The track width is set.
- The bottom hook block is secured on the uppercarriage.

1.  Push the *[Release travel mode]* switch to the right.
2.  Set the desired travel mode via the *[Drive fast - slow]* switch.
3.  Depress the pedals or tilt the levers to move the machine as desired.

#### Further notes

 Chapter 7.12.4.6 “Locking the uppercarriage” on page 457

 Chapter 6.6.7 “Setting the track width” on page 266

**7.13.2.2 Moving the machine in work mode in the Pick & Carry working mode**

**i** *The description includes controls or machine configurations that are not available in all countries of operation.*

**7.13.2.2.1 Working mode: Pick & Carry**

The machine is moved with the load up to the maximum permitted speed.

Data	Value	Unit
Maximum driving speed: Pick & Carry	0.4	m/s
Maximum driving speed: Pick & Carry	0.8	mph

**7.13.2.2.2 Conditions for moving the machine in the Pick & Carry working mode**

- Observe all general conditions for operating the machine.
- The machine is set up according to the requirements for the critical section of the track.
- The uppercarriage position is 0°.
- Uppercarriage is locked.
- The slewing gear brake is engaged.
- Move the load close to the ground.
- Have at least two people control the load using ropes.
- Do not perform any additional crane movements, such as moving the boom.
- Keep the pendular movement of the load as low as possible.
- Negotiate corners with as wide a radius as possible.

**7.13.2.2.3 Setting the Pick & Carry working mode in the SENCON**

**Determining the operating mode**

For distances with varying track conditions,

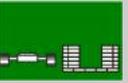
- select the operating mode that accommodates the most critical section of the track
- or
- switch the operating mode manually for each individual track section.

**i** *The setup status of the machine must be appropriate for the conditions of the travel route. If no load lift chart is available for the current setup status of the machine, the machine will not be monitored by the control.*

**Operation parameters to be set**

The following operating parameters must be configured on the SENCON "Setup configuration" menu page for the **Pick & Carry** operating mode.

The setup code shows a valid operating mode.

Symbol for operating parameters							
Value to be applied	All selectable values	$\leq 0.4$ m/s	All selectable values	0 t	All selectable values	according to current setup status of the machine: boom or attachment	according to current setup status of the machine



The valid load lift charts in the SENCON for a machine with incline of up to 4° are optionally available from the manufacturer.

#### 7.13.2.2.4 Moving the machine with the Pick & Carry working mode

##### **▲ WARNING**

There is a risk of tipping when the maximum load capacity is exceeded!

- Before extending the boom, adjust the applicable operating parameters in the SENCON to reflect the current setup of the machine.
- Observe the load moment limitation.

If the load is lifted too far or the boom is extended too far on inclined ground, the maximum load capacity will be exceeded. This may cause the machine to fall over and cause serious or fatal injuries to persons.

##### **▲ WARNING**

Danger of crushing, impact, and tipping from a swinging load!

- Keep loads as close as possible to the ground when moving.
- Only operate the machine at the slowest speed.
- Negotiate corners with as wide a radius as possible.
- Do not perform any additional crane motions when moving.
- Have at least two people control the load using ropes.

The load may start to swing as a result of excessive acceleration or deceleration, or abrupt steering movements. This may cause the load to break the cab window or the crane may fall over and injure the machine operator or other persons.

**⚠ WARNING****Risk of accident from starting in the wrong direction**

- Before moving off, ascertain the direction of travel, the direction of steering, and the uppercarriage position and move the machine accordingly.
- Drive slowly and carefully.

Setting the uppercarriage position to 180° inverts the direction of travel and the direction of steering. If the machine is incorrectly moved against the expected direction of travel, this can lead to accidents. This can cause injury to persons.

1. → Push the *[Release travel mode]* switch to the right.
2. → Set the desired travel mode via the *[Drive fast - slow]* switch.
3. → Depress the pedals or tilt the levers to move the machine as desired.

#### 7.13.2.2.5 Moving the machine without the Pick & Carry working mode

The machine can be moved with a load on tracks, without the Pick & Carry working mode. If the Pick & Carry working mode is not set in the SENCON, control monitoring will only be performed for the machine for the currently set **Stationary work** working mode.

- Observe country-specific regulations on moving machines with a load.
- Machine parameters are only monitored by the SENCON for the **Stationary work** working mode.
- It is the operator's responsibility to specify the permissible load capacity.
- The load moment limitation applies for the lifting capacities in the **Stationary work** working mode.
- Note the additional risks due to a lack of machine monitoring for the **Stationary work** working mode.
- The valid working mode for **Stationary work** must be configured on the SENCON according to the current equipment status.

The manufacturer does not recommend moving the machine without the Pick & Carry working mode.

#### Calculating the permissible load capacity

The calculation recommendation is only valid for machines at an incline up to 1.5°.

Variable	Definition of variables
x	Load capacity value from the load lift chart for the machine at an incline of 1.5°
y	10% of x
z	Permitted load capacity value

1. Determine x.
2. Calculate y.
3. Calculate z based on the applicable case:

Case 1: y > 1.0 t	Case 2: y < 1.0 t
z = x-y	z = x-1.0 t

⇒ The permissible load capacity value t has been calculated.

**i** If the machine is in work mode and the machine is at an incline of over 1.5° without control monitoring, contact the manufacturer.

Moving the machine in work mode without the Pick & Carry working mode is performed in the same way as moving the machine in work mode with the Pick & Carry working mode.

## 7.13.3 Moving the machine at the work site

Moving the machine **with a load** at a work site is only permitted in work mode with the **Stationary work** working mode.

### 7.13.3.1 Working mode: Stationary work

The machine is moved with the load up to the maximum permitted speed.

Data	Value	Unit
Maximum driving speed: Stationary work	0.1	m/s
Maximum driving speed: Stationary work	0.22	mph

**7.13.3.2 Conditions for moving the machine in the Stationary work working mode**

- Observe all general conditions for operating the machine.
- Keep the pendular movement of the load as low as possible.
- Negotiate corners with as wide a radius as possible.

**7.13.3.3 Setting the Stationary work working mode in the SENCON**

**Operation parameters to be set**

The following operating parameters must be configured on the SENCON "Setup configuration" menu page for the **Stationary work** operating mode.

The setup code shows a valid operating mode.

Symbol for operating parameters							
Value to be applied	All selectable values	0 km/h	All selectable values	0 t	All selectable values	according to current setup status of the machine: boom or attachment	according to current setup status of the machine

**7.13.3.4 Moving the machine in the Stationary work working mode**



**WARNING**

**Danger of tipping over due to moving at an incline!**

- Observe the load lift charts in accordance with the machine inclination.
- Put the machine in a safe state.

Lifting and lowering loads at an incline can make the machine tip over or damage the machine.



**WARNING**

**There is a risk of tipping when the maximum load capacity is exceeded!**

- Before extending the boom, adjust the applicable operating parameters in the SENCON to reflect the current setup of the machine.
- Observe the load moment limitation.

If the load is lifted too far or the boom is extended too far on inclined ground, the maximum load capacity will be exceeded. This may cause the machine to fall over and cause serious or fatal injuries to persons.

**⚠ WARNING**

**Risk of accident from starting in the wrong direction**

- Before moving off, ascertain the direction of travel, the direction of steering, and the uppercarriage position and move the machine accordingly.
- Drive slowly and carefully.

Setting the uppercarriage position to 180° inverts the direction of travel and the direction of steering. If the machine is incorrectly moved against the expected direction of travel, this can lead to accidents. This can cause injury to persons.

1. ➔ Push the *[Release travel mode]* switch to the right.
2. ➔ Set the desired travel mode via the *[Drive fast - slow]* switch.
3. ➔ Depress the pedals or tilt the levers to move the machine as desired.

### 7.13.4 Stopping the machine

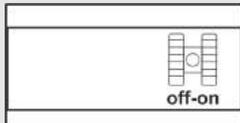
- ➔ Release both drive pedals.  
or  
release both hand levers.  
⇒ The machine stops.

### 7.13.5 Overview: Control elements for moving the machine

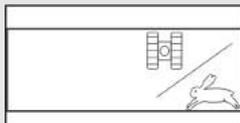
**Overview**

The most important operating and display elements for carrying out the described instructions are:

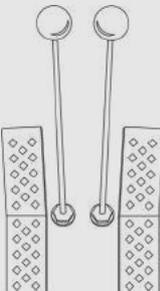
**Activate drive mode**

	Switch position left	Switch position right
	The machine cannot be moved.	The machine can be moved.

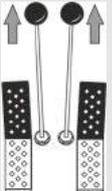
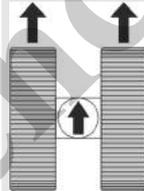
**Drive slow - fast**

	Switch position left	Switch position right
	Lower speed and higher tractive force are set. More sensitive driving is possible.	Higher speed and lower tractive force are set.

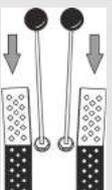
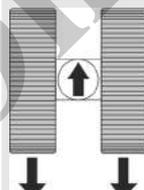
**Drive pedal with hand lever**

	Left hand lever/pedal	Right hand lever/pedal
	The drive pedal and the hand lever are interconnected. When the drive pedal moves, the hand lever moves, too, and vice versa.	The drive pedal and the hand lever are interconnected. When the drive pedal moves, the hand lever moves, too, and vice versa.

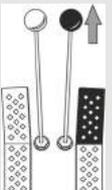
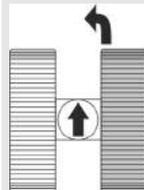
**Travel forward in a straight line**

Movement of hand levers/pedals	Movement with uppercarriage position 0°
 Move both hand levers/pedals in the direction of travel.	 The machine travels forward in a straight line.

**Travel in reverse in a straight line**

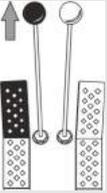
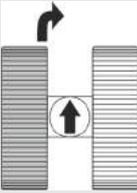
Movement of hand levers/pedals	Movement with uppercarriage position 0°
 Move both hand levers/pedals against the direction of travel.	 The machine travels in reverse in a straight line.

**Travel forward to the left**

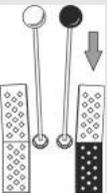
Movement of hand levers/pedals	Movement with uppercarriage position 0°
 Release the left hand lever/left pedal. Move the right hand lever/pedal in the direction of travel.	 The machine travels forward to the left.

## Operation

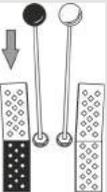
### Travel forward to the right

Movement of hand levers/pedals	Movement with uppercarriage position 0°
 <p>Move the left hand lever/pedal in the direction of travel. Release the right hand lever/pedal.</p>	 <p>The machine travels forward to the right.</p>

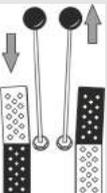
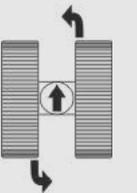
### Travel in reverse to the left

Movement of hand levers/pedals	Movement with uppercarriage position 0°
 <p>Release the left hand lever/left pedal. Move the right hand lever/pedal against the direction of travel.</p>	 <p>The machine travels in reverse to the left.</p>

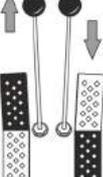
### Travel in reverse to the right

Movement of hand levers/pedals	Movement with uppercarriage position 0°
 <p>Move the left hand lever/pedal against the direction of travel. Release the right hand lever/pedal.</p>	 <p>The machine travels in reverse to the right.</p>

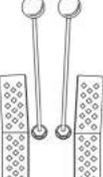
### Turn left on the spot

Movement of hand levers/pedals	Movement with uppercarriage position 0°
 <p>Move the left hand lever/pedal against the direction of travel. Move the right hand lever/pedal in the direction of travel.</p>	 <p>The machine turns left on the spot.</p>

### Turn right on the spot

Movement of hand levers/pedals	Movement with uppercarriage position 0°
 <p>Move the left hand lever/pedal in the direction of travel. Move the right hand lever/pedal against the direction of travel.</p>	 <p>The machine turns right on the spot.</p>

### Stopping the machine

Movement of hand levers/pedals	Movement with uppercarriage position 0°
 <p>Release both hand levers/pedals.</p>	 <p>The machine stops.</p>

## 7.14 Setting up the machine at the work site

**⚠ WARNING**

**Machine is tilting on unsustainable surface!**

- Before starting work, check the surface for strength and load-bearing capacity.
- Keep the maximum allowable ground pressure.

**People can be crushed by the falling machine.**

1. → Make sure the ground conditions are viable for the maximum machine load.
2. → Move the machine back from the edge of the excavations.
3. → Position the machine on ground that is solid, level, and safe.

## 7.15 Move the load

**⚠ DANGER**

**Risk of death or serious injury due to suspended loads.**

- Always lower the load when work is interrupted.
- Do not leave the cab until the load has been set down.

**Persons on or next to the machine will be injured due to uncontrolled load movements.**

### **⚠ DANGER**

Risk of electric shocks and burns when working near live cables!

- Keep a sufficient distance from overhead power lines and other live cables.

If machine components come into direct contact with the cable, there is a risk of an electric shock that could seriously or fatally injure the machine operator. When working near cables carrying hazardous voltage, an electric arc could develop between the machine and the cable. The electric voltage could injure the machine operator.

### **⚠ WARNING**

There is a risk of tipping when the maximum load capacity is exceeded!

- Before extending the boom, adjust the applicable operating parameters in the SENCON to reflect the current setup of the machine.
- Observe the load moment limitation.

If the load is lifted too far or the boom is extended too far on inclined ground, the maximum load capacity will be exceeded. This may cause the machine to fall over and cause serious or fatal injuries to persons.

### **⚠ WARNING**

Danger of tipping over due to moving at an incline!

- Observe the load lift charts in accordance with the machine inclination.
- Put the machine in a safe state.

Lifting and lowering loads at an incline can make the machine tip over or damage the machine.

### **⚠ WARNING**

Unsuitable lifting tackle

- Only use lifting tackle designed and approved for the load and the area of application.
- Check the condition of the lifting tackle before work.

Danger of injury due to falling of the load and possible tilting of the machine

### **⚠ WARNING**

Risk of load crashing because rope is unwound too far

- Subtract the weight of the sling gear from the maximum load capacity.
- The rope drum must have at least three windings left.
- Adjust the rope end limit switch correctly.

When the load is lowered into an abyss (e.g., into a shaft or from the top of a bridge), the maximum load can be exceeded due to the additional load constituted by the rope. This is not detected by the LML.

**⚠ WARNING**

**Risk of wind causing the load to fall!**

- Observe the specifications on operation in windy conditions in the technical data.
- Stop working on the machine as soon as the wind speed exceeds the permissible wind speed.

There is a risk of wind causing components to malfunction or the load to swing vigorously. The load may fall as a result. This can cause death or serious injury.

**⚠ WARNING**

**Risk of load crashing and machine damage due to incorrect load moment limitation entries!**

- Check the rope reeving.
- Check the entries in the load moment limitation.
- Select the appropriate operating mode.

The rope may be overloaded if the actual rope reeving number does not match the entry in the load moment limitation.

**⚠ WARNING**

**Risk of death when permissible safe working loads and operating parameters of the load moment limitation are not observed!**

- Do not bypass the LML.
- Always select the appropriate LML program.

If the permitted load capacities and operating parameters of the LML are not observed, serious personal damage, including death, is possible.

**⚠ WARNING**

**Danger of tipping**

- Emergency freefall can be activated manually. This bypasses the emergency stop and the main energy supply

When operating the crane on a ship loading or unloading another ship, waves can cause the hook to get caught on the ship.

- Check the cable exit protection before each use.
- Make sure the rope has no slack.
- At low ambient temperatures, run the hoisting gear slowly to ensure that the stiff rope coils properly.

Data	Value	Unit
Low ambient temperature	<0	°C
Low ambient temperature	<32	°F

## 7.15.1 Raising and lowering the boom

**⚠ WARNING**

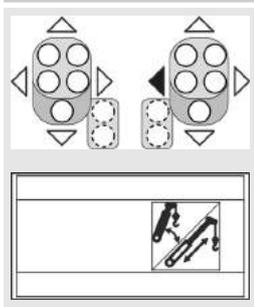
**Danger of personal injury and danger of machine damage due to abrupt raising and lowering of the boom!**

- Raise and lower the boom slowly and in a controlled manner.

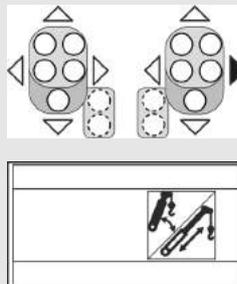
**Abrupt movements of the boom can result in component failure or cause the machine to tip.**

1. ➤ Open the "Speed" menu page in the SENCON.
2. ➤ Adjust the [Raise/lower boom speed] setting value to the respective working conditions.
3. ➤ Tilt the joystick in [Raise boom] direction.
  - ⇒ The boom is raised. The boom raising speed depends on the speed of the diesel engine and the deflection of the joystick.
4. ➤ Tilt the joystick in [Lower boom] direction.
  - ⇒ The boom is lowered. The boom lowering speed depends on the speed of the diesel engine and the deflection of the joystick.

### Lifting the boom

	<p>[Luffing down-up / Telescope in - out changeover] switch in right switch position</p> <p>Tilt the joystick</p>
	<p>The boom is raised.</p>

Lowering the boom

	<p><b>[Luffing down-up / Telescope in - out changeover] switch in right switch position</b></p> <p><b>Tilt the joystick</b></p>
	<p>The boom is lowered.</p>

Raise/lower boom speed

	<p><b>0% to 100%</b></p>
	<p>Set the speed for the <i>[Raise boom]/[Lower boom]</i> crane control function.</p>

7.15.2 Retracting/extending the boom

**⚠ DANGER**

**Risk of electric shocks and burns when working near live cables!**

- Keep a sufficient distance from overhead power lines and other live cables.

If machine components come into direct contact with the cable, there is a risk of an electric shock that could seriously or fatally injure the machine operator. When working near cables carrying hazardous voltage, an electric arc could develop between the machine and the cable. The electric voltage could injure the machine operator.

**⚠ WARNING**

**Risk of crushing and collision by extending and retracting the boom too far**

- Before extending the boom, select the correct operating mode.
- Observe the load moment limitation.

Extending the boom too far will cause the load to be lifted too far or cause the maximum lifting capacity to be exceeded. This can cause the load to fall thereby resulting in serious injury to persons.



*Retracting and extending the boom in an EM with 50% extension for a prolonged period can cause the control to switch to fault mode. Further notes: ↪ Chapter 7.20.2.6.1 “Extending and retracting the boom in EM with 50% extension” on page 564*

Requirement:

- The machine and the SENCON are ready for operation.
- The valid operation parameters for the current setup status are set.
- The boom angle is  $> 60^\circ$ .

1. ➤ Determine the working radius, boom length, and load capacity for the application at hand.
2. ➤ Use the calculated values to determine the appropriate extension mode from the load lift chart.
3. ➤ Set the determined extension mode on the “Pin boom” menu page on the SENCON.
4. ➤ Push the *[Activate telescopic cylinder]* switch to the right.
5. ➤ Push the *[Luffing down-up / Telescope in - out changeover]* switch to the right.

⇒ The joystick function for retracting/extending the boom is activated.

6. ➤ Tilt the joystick in the *[Extend telescope]* direction and hold it there to increase the boom length.

Tilt the joystick in the *[Retract telescope]* direction and hold it there to decrease the boom length.

⇒ The boom is extended or retracted, depending on the joystick deflection.

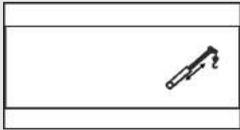
***i** In certain cases, the boom moves in reverse first before moving in the activated direction. This is a normal semiautomatic response to establish the desired configuration of telescopic thrusters. Continue to hold the joystick in a deflected position and do not cancel the process.*

The telescopic thrusters are secured/released and unlocked/locked automatically according to the set extension mode.

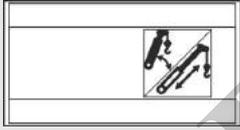
***i** When a locking position is reached, the next possible configuration of the telescopic thrusters appears for 3 seconds as a [%] value in the *[Telescopic thruster position indicator]*.*

7. → Move the joystick to the neutral position once the desired boom length has been reached.
    - ⇒ With the telescopic thruster locked, the status indicator of the *[Locking bolt]* quick-select icon is black. The applicable values for a bolted load from the load lift chart are stored in the SENCON automatically.
- If the telescopic thruster is between locking positions, it remains unlocked. The status indicator of the *[Locking bolt]* quick-select icon lights up yellow. The applicable values for an unbolted load from the load lift chart are stored in the SENCON automatically.

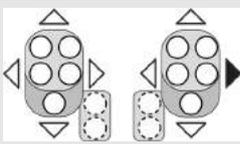
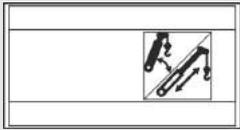
### Telescopic cylinder activation

	Switch position left	Switch position right
	<p>The telescopic cylinder is not activated.</p> <p>The telescopic cylinder cannot be moved. Retracting and extending the telescopic thrusters/secure locking unit is not possible.</p>	<p>The telescopic cylinder is activated.</p> <p>The telescopic cylinder can be moved. Retracting and extending the telescopic thrusters/secure locking unit is possible.</p>

### Switching Luffing down-up/Telescope in-out

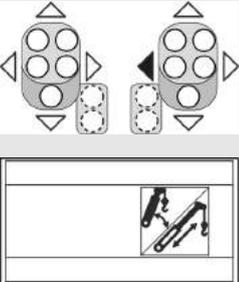
	Switch position left	Switch position right
	<p>The <i>[Luffing down - up]</i> function is activated.</p> <p>Lifting and lowering of the boom is possible.</p>	<p>The <i>[Telescope in-out]</i> function is activated.</p> <p>Retracting and extending of the boom is possible.</p>

### Extend telescope

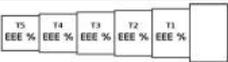
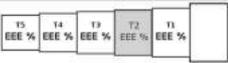
	<p><b><i>[Luffing down-up / Telescope in - out changeover]</i> switch in right switch position</b></p> <p><b>Tilt the joystick</b></p>
	<p>The telescopic thrusters/secure locking unit are extended.</p>
	

## Operation

### Retract telescope

	<b>[Luffing down-up / Telescope in - out changeover] switch in right switch position</b>
	<b>Tilt the joystick</b>
	The telescopic thrusters/secure locking unit are retracted.

### Telescopic thruster position indicator

	<b>Display</b>		
	The current position of each of the telescopic thrusters is displayed in (%).		
	<b>white</b>	<b>Grey</b>	<b>Black</b>
	The telescopic thruster is locked.	The secure locking unit is near a securing position in the lower boom section.	The secure locking unit is secured in the relevant telescopic thruster.

### Locking of telescopic thruster

	<b>Yellow bar</b>	<b>Flashing yellow bar</b>	<b>Black bar</b>
	The telescopic thruster is unlocked.	The locking process is activated, but not yet complete.	The telescopic thruster is locked.

### Extend/retract telescope speed

	<b>0% to 100%</b>
	Set the speed for the [Extend telescope]/ [Retract telescope] crane control function.

### 7.15.3 Retracting/extending the boom in emergency operation

In exceptional cases or emergency situations (e.g., SENCON deadlock), the machine operator must retract or extend the boom in manual telescoping mode. The sensors must be in working order.

**NOTICE**

**There is a risk of damage to machinery if the boom is moved in manual telescoping mode**

- **Change to semiautomatic telescoping mode (standard operation) immediately after eliminating the fault.**
- **Use the manual telescoping mode only for retracting the boom if possible.**
- **The following are not permissible in manual mode:**
  - **Load lifting**
  - **Working with a load**
  - **Random extension and retraction of the boom.**

**Moving the boom in manual telescoping mode can cause damage to machinery.**

#### Telescoping mode

	Yellow bar	Black bar
	<p>Semi-automatic telescoping mode (standard mode) is selected.</p> <p>The locking and unlocking processes are initiated automatically. Stopping at an intermediate position is possible.</p>	<p>Manual telescoping mode (emergency operation) is selected.</p> <p>The locking and unlocking processes are initiated manually.</p>

#### Selecting manual telescoping mode

Requirement:

- The machine and the SENCON are ready for operation.
- The valid operation parameters for the current setup status are set.
- The boom angle is > 60°.

1. ➔ Open the “Pin boom” menu page on the SENCON.

2. ➔ Press the [Telescoping mode] quick-select button.

⇒ A popup menu page opens on the display.

The machine operator is prompted to read the operating manual and familiarize themselves with the functions of manual telescoping mode.

## Operation

3. ➤ Press the *[Set]* button.

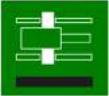
⇒ The machine operator confirms they have read and understood the operating manual.

The pop-up menu page closes.

The status indicator of the *[Telescoping mode]* quick-select icon turns black.

Manual telescoping mode is active.

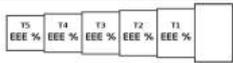
### Securing of secure locking unit

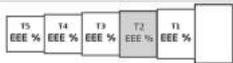
	Yellow bar	Flashing yellow bar	Black bar
	<p>The secure locking unit is secured.</p> <p>The secure locking unit is connected to the relevant telescopic thruster.</p>	<p>The securing process is activated, but not yet complete.</p>	<p>The secure locking unit is unfastened.</p> <p>The secure locking unit is not connected to a telescopic thruster.</p>

### Locking of telescopic thruster

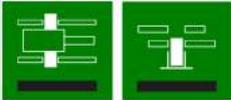
	Yellow bar	Flashing yellow bar	Black bar
	<p>The telescopic thruster is unlocked.</p>	<p>The locking process is activated, but not yet complete.</p>	<p>The telescopic thruster is locked.</p>

### Telescopic thruster position indicator

	Display
	<p>The current position of each of the telescopic thrusters is displayed in (%).</p>

	white	Grey	Black
	<p>The telescopic thruster is locked.</p>	<p>The secure locking unit is near a securing position in the lower boom section.</p>	<p>The secure locking unit is secured in the relevant telescopic thruster.</p>

### Status: "locked and not secured"

	<b>[Securing of secure locking unit] black</b>	<b>[Locking mechanism of telescopic thruster] black</b>
	<p>The secure locking unit is not secured and can be moved in the boom.</p>	<p>The telescopic thruster is locked and cannot be moved.</p> <p>The values in the [Telescopic thruster position indicator] show 0%, approx. 50%, or 100%.</p>

**Status: "locked and secured"**

	<b>[Securing of secure locking unit] yellow</b>	<b>[Locking mechanism of telescopic thruster] black</b>
	<p>The secure locking unit is secured in the telescopic thruster and cannot be moved.</p> <p>The telescopic thruster with the secured secure locking unit has a gray background on the [Telescopic thruster position indicator].</p>	<p>The telescopic thruster is locked and cannot be moved.</p> <p>The values in the [Telescopic thruster position indicator] show 0%, approx. 50%, or 100%.</p>

**Status: "secured and not locked"**

	<b>[Securing of secure locking unit] yellow</b>	<b>[Locking mechanism of telescopic thruster] yellow</b>
	<p>The secure locking unit is secured in the telescopic thruster and cannot be moved.</p> <p>The telescopic thruster with the secured secure locking unit has a gray background on the [Telescopic thruster position indicator].</p>	<p>The telescopic thruster is not locked and can be moved.</p>

**Determining the status of the telescopic thrusters**

The "Pin boom" menu page is displayed on the SENCON.

➔ Determine the status of the telescopic thrusters.

**i** **Secured telescopic thruster**  
*In the case of a telescopic thruster with the status "secured and not locked", see "Determining the next possible locking position" for information on how to proceed.*

### Determining the securing position to approach on the secure locking unit

1. → Determine the locked telescopic thruster closest to the basic body in the [*Telescopic thruster position indicator*].
2. → Read out the current position in [%] from the [*Telescopic thruster position indicator*] for the locked telescopic thruster that is closest to the basic body.
3. → Refer to the table to establish the securing position on the secure locking unit.

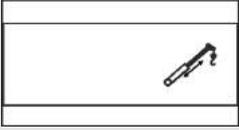
Table 8: Securing positions on the secure locking unit

Tele-scopic thruster	Actual securing position in (%)	Securing position in [m]	Securing position in (ft)
1	0	0.02	0.66
	50	4.10	13.45
	100	8.21	26.94
2	0	0.32	1.05
	48	4.12	13.52
	100	8.56	28.08
3	0	0.63	2.07
	54	4.76	15.62
	100	8.70	28.54
4	0	0.89	2.92
	52	4.57	14.99
	100	8.73	28.64
5	0	1.15	3.77
	58	5.07	16.63
	100	8.75	28.71

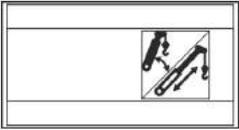
The values have a tolerance range of +/- 0.02 m (+/- 0.07 ft).

The securing position of the secure locking unit may be overshoot by a maximum of 0.05 m (0.16 ft).

**Telescopic cylinder activation**

	Switch position left	Switch position right
	<p>The telescopic cylinder is not activated.</p> <p>The telescopic cylinder cannot be moved. Retracting and extending the telescopic thrusters/secure locking unit is not possible.</p>	<p>The telescopic cylinder is activated.</p> <p>The telescopic cylinder can be moved. Retracting and extending the telescopic thrusters/secure locking unit is possible.</p>

**Switching Luffing down-up/Telescope in-out**

	Switch position left	Switch position right
	<p>The [<i>Luffing down - up</i>] function is activated.</p> <p>Lifting and lowering of the boom is possible.</p>	<p>The [<i>Telescope in-out</i>] function is activated.</p> <p>Retracting and extending of the boom is possible.</p>

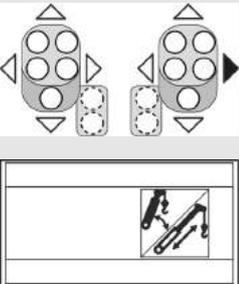
**Secure locking unit position indicator**

	Display
	Indicates the current stroke of the secure locking unit.

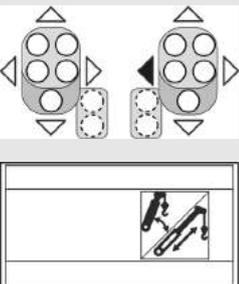
				
	<p>The secure locking unit is positioned far from the securing position.</p>	<p>The secure locking unit is positioned too deep to be secured.</p> <p>The secure locking unit needs to be extended further in order to be secured.</p>	<p>The secure locking unit is positioned too high to be secured.</p> <p>The secure locking unit needs to be retracted further in order to be secured.</p>	<p>The securing position is reached.</p>

## Operation

### Extend telescope

	<b>[Luffing down-up / Telescope in - out changeover] switch in right switch position</b> <b>Tilt the joystick</b>
	The telescopic thrusters/secure locking unit are extended.

### Retract telescope

	<b>[Luffing down-up / Telescope in - out changeover] switch in right switch position</b> <b>Tilt the joystick</b>
	The telescopic thrusters/secure locking unit are retracted.

### Moving the secure locking unit toward a telescopic thruster

1. ➤ Push the *[Activate telescopic cylinder]* switch to the right.
2. ➤ Push the *[Luffing down-up / Telescope in - out changeover]* switch to the right.
  - ⇒ The joystick function for retracting/extending the boom is activated.
3. ➤ Determine the current position of the secure locking unit using the *[Secure locking unit position indicator]*.

4. → Tilt the joystick in the *[Extend telescope]* or *[Retract telescope]* direction, depending on the securing position that is to be approached, and hold it there.

⇒ The secure locking unit extends or retracts.

The current position of the secure locking unit is displayed in the *[Secure locking unit position indicator]*.

The telescopic thruster has a gray background on the *[Telescopic thruster position indicator]*. The secure locking unit is near the securing position.

5. → Decrease the deflection on the joystick a little.

⇒ Move to the securing position at reduced speed.

When both *[Secure locking unit position indicator]* arrows are black, the securing position on the secure locking unit has been reached.

#### Securing the secure locking unit on the telescopic thruster

- Press the *[Securing secure locking unit]* quick-select button.

⇒ The securing process starts. The status indicator for the *[Securing secure locking unit]* quick-select button flashes.

The status indicator for the *[Securing secure locking unit]* quick-select button lights up yellow. The secure locking unit is secured.

#### Unlocking telescopic thruster

1. → Refer to the table to establish the unlocking position of the secured telescopic thruster.

2. → Slowly tilt the joystick in the *[Extend telescope]* direction until the unlocking position is reached.

3. → Press the *[Telescopic thruster locking]* quick-select button.

⇒ The unlocking process starts. The status indicator for the *[Telescopic thruster locking]* quick-select button flashes.

The status indicator for the *[Telescopic thruster locking]* quick-select button lights up yellow. The telescopic thruster is unlocked.

Table 9: Unlocking/locking positions of the telescopic thrusters

Tele-scopic thruster	Actual unlocking/locking position in (%)	Unlocking/locking position in [m]	Unlocking/locking position in [ft]
1	50	4.14	13.58
	100	8.24	27.03
2	48	4.15	13.62
	100	8.59	28.18
3	54	4.79	15.72
	100	8.73	28.64
4	52	4.60	15.09
	100	8.76	28.74
5	58	5.10	16.73
	100	8.78	28.81

The values have a tolerance range of +/- 0.02 m (+/- 0.07 ft).

The unlocking/locking position of the telescopic thrusters may be overshoot by a maximum of 0.05 m (0.16 ft).

## Determining the next possible locking position

The next possible locking position of the secured telescopic thruster is as follows:

- **0 %:** Move the telescopic thruster as far as the stop.
- **50% or 100%:** Refer to the table to establish the locking position of the secured telescopic thruster.

## Moving the telescopic thruster into the locking position

1. ➔ Tilt the joystick in the *[Extend telescope]* or *[Retract telescope]* direction, depending on the locking position that is to be approached, and hold it there.

⇒ The telescopic thruster extends or retracts.

The current position of the telescopic thruster is displayed in the *[Secure locking unit position indicator]*.

2. ➔ Move the joystick to the neutral position once the value for the determined locking position has been reached.

**Locking telescopic thruster**

- ➔ Press the *[Telescopic thruster locking]* quick-select button.
  - ⇒ The locking process starts. The status indicator for the *[Telescopic thruster locking]* quick-select button flashes.  
The status indicator for the *[Telescopic thruster locking]* quick-select button is black. The telescopic thruster is locked.

**Unlocking SVI**

1. ➔ Slowly tilt the joystick in the *[Extend telescope]* direction until both arrows of the *[Secure locking unit position indicator]* are black.
  - ⇒ The safety bolt can be released.
2. ➔ Press the *[Securing secure locking unit]* quick-select button.
  - ⇒ The unfastening process starts. The status indicator for the *[Securing secure locking unit]* quick-select button flashes.  
The status indicator for the *[Securing secure locking unit]* quick-select button is black. The secure locking unit has been unfastened from the telescopic thruster.

**7.15.4 Move attachment tool**

**7.15.4.1 Setting the hook speed**

The hook speed depends on the speed of the engine and the deflection of the joystick.

1. ➔ Open the "Speed" menu page in the SENCON.
2. ➔ Adjust the *[Raise/lower winch 1 speed]* and *[Raise/lower winch 2 speed]* setting values to the respective working conditions.

**Raise/lower winch 1 speed**

	<b>0% to 100%</b>
	100 % Set the speed for the <i>[Raise winch 1]/[Lower winch 1]</i> crane control function.

**Raise/lower winch 2 speed**

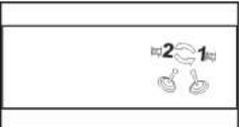
	<b>0% to 100%</b>
	100 % Set the speed for the <i>[Raise winch 2]/[Lower winch 2]</i> crane control function.

## Operation

### 7.15.4.2 Switching the winch control

It is possible to switch the joystick assignment for the winches by changing the switch position.

#### Switching winch 1 / winch 2

	Switch position left	Switch position right
	Winch 1 is operated with the right joystick. Winch 2 is operated with the left joystick.	Winch 2 is operated with the right joystick. Winch 1 is operated with the left joystick.

The SENCON displays which winches are assigned to the joystick.

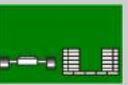
#### Allocation of winches and joysticks

	Green
	Winch 2 is operated with the left joystick. Winch 1 is operated with the right joystick. This allocation is the default assignment for the joysticks.
	Winch 1 is operated with the left joystick. Winch 2 is operated with the right joystick.

### 7.15.4.3 Moving the load with a winch

#### 7.15.4.3.1 Setting the operating mode

##### Operation parameters to be set

Symbol for operating parameters							
Value to be applied	All selectable values	$\leq 0.1$ m/s	A or B	0 t	All selectable values	according to current setup status	Hook with load: according to current setup status

If two hooks are reeved, the value [0] is set for an unloaded hook.

#### Further notes

↪ Chapter 7.15.4.3.2 "Configuring the winch reeving with two hooks installed" on page 495

**7.15.4.3.2 Configuring the winch reeving with two hooks installed**

Configuring the right winch reeving for the hook with a load and the hook without a load prevents the LML from limiting the lifting capacity to the smaller number of strands and shutting down.

1. → Open the “*Setup Configuration*” menu in the SENCON.
2. → Determine the winch reeving for the load situation from the load lift chart.
3. → Set the number of strands for the winch with the loaded hook in accordance with the load lift chart.
4. → Set the number of strands for the winch with the unloaded hook to [0].

Once the ignition is switched off, the strand count is reset to the initial value.

**Winch reeving for winch 1**

	<b>Green</b>
	Configure the winch reeving for winch 1.

**Winch reeving for winch 2**

	<b>Green</b>
	Configure the winch reeving for winch 2.

**7.15.4.3.3 Tracking the hook without a load**

**Two reeved hooks**

The unloaded hook must be tracked when the boom is moved. This prevents the hook from being pulled into the lifting limit switch or hitting the ground.

**7.15.4.3.4 Raising and lowering the load with a winch**

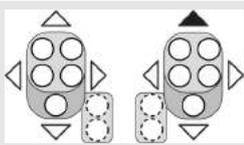
Preconditions:

## Operation

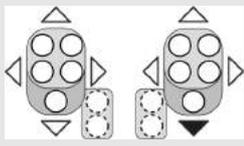
- The extension mode is set for the application at hand.
  - The operation parameters for the current setup status of the machine are set on the SENCON.
  - With two reeved hooks:
    - The winch reeving is set for both winches according to the specifications.
    - Attach the load to the hook for which the reeving is higher than [0] on the SENCON.
- ➔ Tilt the joystick for lifting or lowering the hook in the appropriate direction.

With two reeved hooks, track the unloaded hook. Tilt the joystick for lifting or lowering the unloaded hook in the appropriate direction.

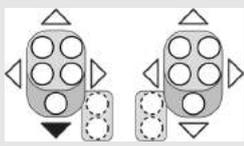
### Lower winch 1

	Tilt the joystick
	The rope on winch 1 is unwound. The hook is lowered.

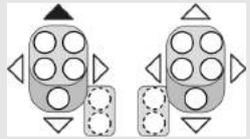
### Lift winch 1

	Tilt the joystick
	The rope on winch 1 is wound up. The hook is raised.

### Lift winch 2

	Tilt the joystick
	The rope on winch 2 is wound up. The hook is raised.

Lower winch 2

	<b>Tilt the joystick</b>
	<p>The rope on winch 2 is unwound. The hook is lowered.</p>

7.15.4.4 Moving the load with two winches

**Safety instructions for Tilt-Up Panel Lifting**

Requirements and recommendations regarding operation and use of Grove Cranes are stated on decals and in the Operator and Safety Handbook and other manuals provided with each specific model machine. Using the subject crane to perform tilt-up panel lifting with two hoist lines poses new and different hazards than does normal lifting use.

Therefore, the following additional precautions must be taken if it is necessary for the crane to be used to perform Tilt-Up Panel Lifting using a crane equipped with two winches:

- The crane must be set up and operated in accordance with Grove's instructions in the Operator and Safety Handbook, Load Capacity Chart, and decals affixed to the crane.
- The wire rope from winch 2 shall be reeved over the main boom nose, which is double-reeved.
- The wire rope from winch 1 shall be reeved over the auxiliary boom nose, which is single-reeved.
- The load shall be connected with the main hoist line connected to the end closest to crane and the auxiliary hoist line connected to the end farthest from the crane.
- The anti-two block system shall be installed and inspected to confirm that it is active to monitor both hoist lines.
- The LML winch selection shall be set to winch 2 and double-reeved.
- The wire rope and sheaves shall be inspected prior to and following the lifting operations for damage or abrasion.
- The total gross load shall not exceed 80% of the standard load chart. The operator shall be responsible to control this as the LML does not have a feature to set reduced lifting limits.
- The auxiliary hoist line shall be considered part of the deducts to determine net allowable load.
- The panel shall be lifted so that the hoist lines are in line with the crane.
- The load shall be controlled to prevent rotation of the load and to ensure the load stays in line with the boom.
- The load must be balanced with the auxiliary: load line not taking more than half the load at any time during the lift. The LML will not be providing coverage for the line pull of the auxiliary hoist line.

- The effect of wind loads on the crane and panel shall be taken into consideration. Operations shall be halted if the wind can cause a loss of control in handling the load.
- The main hoist line shall be used to raise the panel into the vertical position.

Ensure that all personnel working on and around the crane are properly trained and thoroughly familiar with operational functions of the crane and safe operating and work practices. Personnel should be thoroughly familiar with regulations and standards governing cranes and their operation. Work practices may vary slightly between government regulations, industry standards, local and job-site rules and employer policies so a thorough knowledge of and compliance with all relevant work rules is necessary.

### Further notes

↳ Chapter 2.6.1.8 "Winch" on page 22

### Personnel

- Machine operator
- Slinger

#### 7.15.4.4.1 Setting the operating mode

##### Operation parameters to be set for Tilt-Up Panel Lifting

Symbol for operating parameters							
Value to be applied	All selectable values	$\leq 0.1$ m/s	All selectable values	0 t	All selectable values	HA	Winch 1: 01 Winch 2: 02

#### Requirement:

- Winch 1 is single-reeved.
- Winch 2 is double-reeved.
- The [Activate winch 1] switch is in the right switch position.
- The [Activate winch 2] switch is in the left switch position.
- The extension mode is set for the application at hand.

1. ➤ Push the [Activate winch 2] switch to the right.
  - ⇒ Winch 2 is activated.
2. ➤ Confirm the setup status.
3. ➤ Set the operating parameters.
4. ➤ Push the [Tilt-Up Panel Lifting] quick-select button.
  - ⇒ The status indicator of the quick-select icon lights up yellow.
5. ➤ Confirm the setup status.

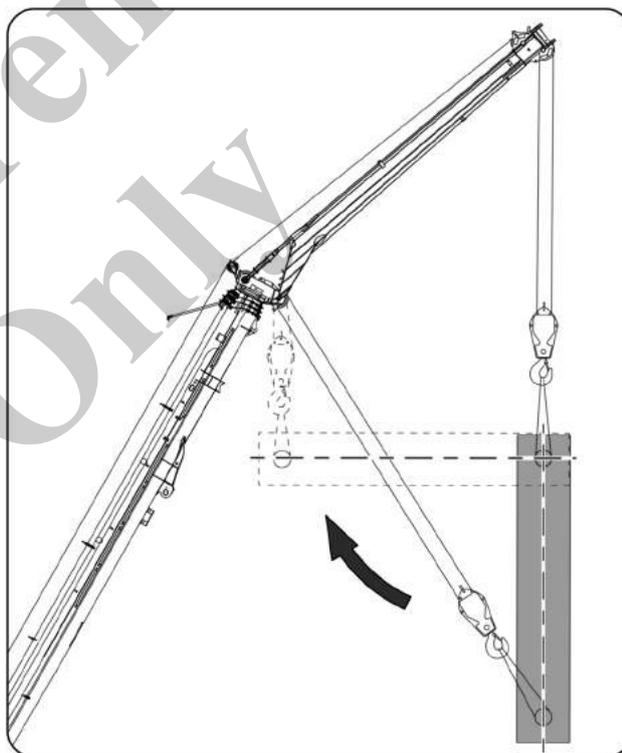
**Tilt-up panel lifting**

	Yellow bar	Black bar
	<p>The <b>Tilt-Up Panel Lifting</b> working mode is activated.</p> <p>The load capacity of the machine is limited to double-reeving as a maximum.</p>	<p>The <b>Tilt-Up Panel Lifting</b> working mode is deactivated.</p> <p>Two-hook operation is not permitted.</p>

**7.15.4.4.2 Moving the load horizontally with two winches**

Requirement:

- The extension mode is set for the application at hand.
- The operation parameters for Tilt-Up Panel Lifting have been set on the SENCON.
- The status indicator of the [Tilt-Up Panel Lifting] quick-select icon lights up yellow.



- The load and its center of gravity are known.
- The load is suspended vertically.
  - The upper attachment point on the load is fastened to the rope of the attachment.  
The rope of the attachment carries the entire weight of the load.
  - The lower attachment point on the load is fastened to the rope of the boom.  
The rope of the boom is not bearing any weight.
- The rope of the boom must be lightly tensioned so that the rope does not drag.



*Observe the set allocation of the winches to the joysticks.*

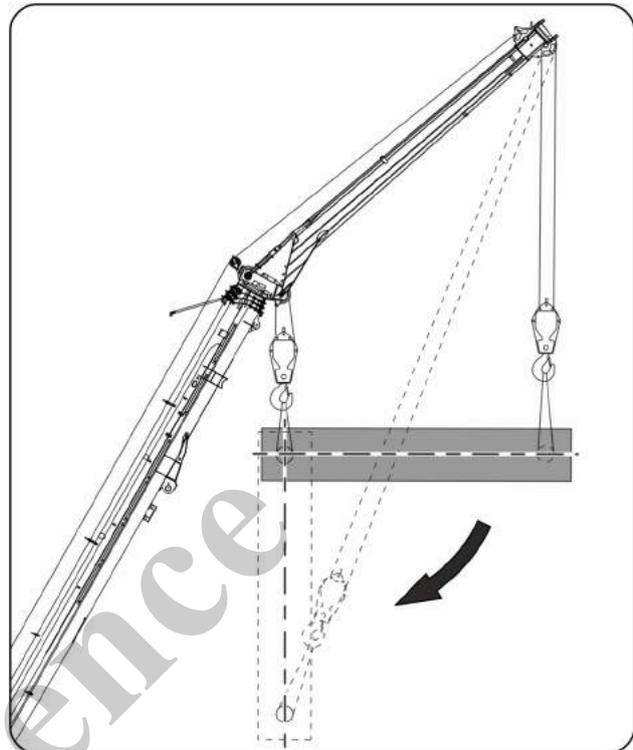
1. ➤ Tilt the joystick in the *[Raise winch 2]* direction until the load is at the horizontal position.
2. ➤ Tilt the joysticks simultaneously in the *[Lower winch 1]* and *[Lower winch 2]* direction.
  - ⇒ The load is lowered.

The load is horizontal during the entire lowering process.

### 7.15.4.4.3 Moving the load vertically with two winches

Requirement:

- The extension mode is set for the application at hand.
- The operation parameters for Tilt-Up Panel Lifting have been set on the SENCON.
- The status indicator of the *[Tilt-Up Panel Lifting]* quick-select icon lights up yellow.



- The load and its center of gravity are known.
- The load is suspended horizontally.
- The weight of the load is equally distributed across the rope of the boom and the attachment.

*Observe the set allocation of the winches to the joysticks.*

1. → Tilt the joystick in [Lower winch 1] direction until the load is hanging perpendicularly.

Make sure the rope has no slack on the attachment.

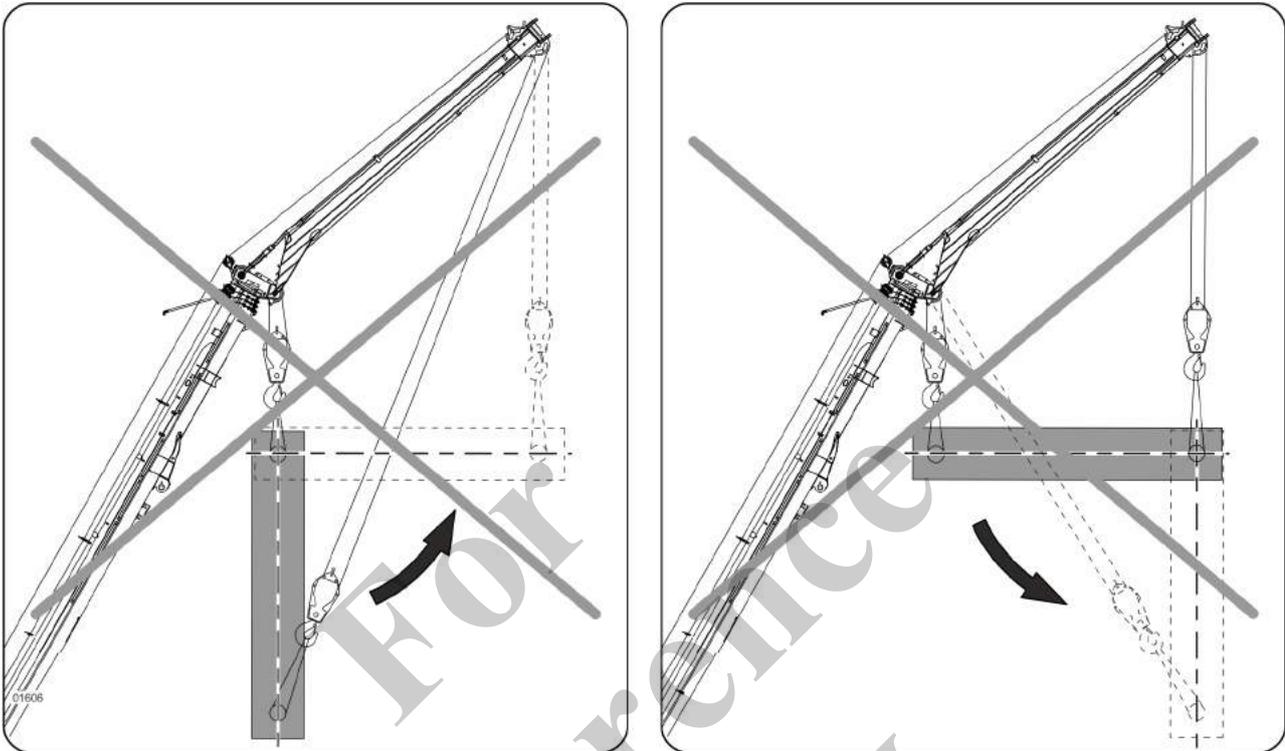
2. → Tilt the joysticks simultaneously in the [Lower winch 1] and [Lower winch 2] direction.

⇒ The load is lowered.

The rope on winch 1 is tracked.

## Operation

### 7.15.4.4.4 Impermissible operating methods with two winches

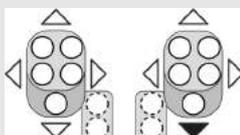


With these operating methods, the load is oriented away from the machine. The load moment will increase. As a result, the machine can become overloaded and tip over.

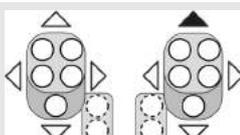
These operating modes are not permissible.

### 7.15.4.4.5 Overview of the most important operating and display elements

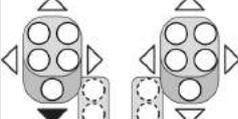
#### Lift winch 1

	<b>Tilt the joystick</b>
	The rope on winch 1 is wound up. The hook is raised.

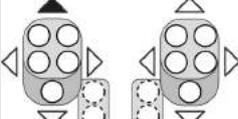
#### Lower winch 1

	<b>Tilt the joystick</b>
	The rope on winch 1 is unwound. The hook is lowered.

**Lift winch 2**

	<b>Tilt the joystick</b>
	<p>The rope on winch 2 is wound up. The hook is raised.</p>

**Lower winch 2**

	<b>Tilt the joystick</b>
	<p>The rope on winch 2 is unwound. The hook is lowered.</p>

**7.15.5 Limiting the operating range**

**Safety instructions**

**⚠ WARNING**

Risk of death when exceeding configured work area. Rapid machine movements when using a configured working range may cause the machine to exceed this range. This can cause death or serious injury. The machine or nearby structures may be damaged.

- Keep an extra safe distance from persons, machinery and structures near the configured work area.
- Move the machine slowly and carefully.

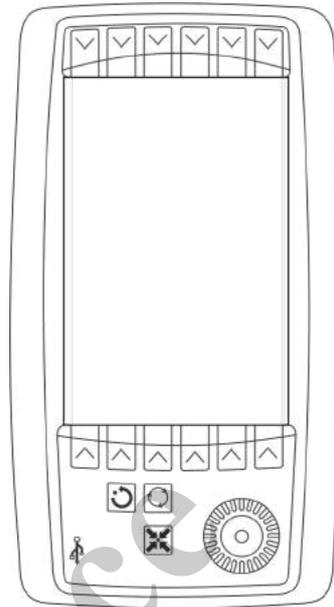
**NOTICE**

Risk of damage to machine and surroundings from failure to observe limits!

If the outermost point of the machine exceeds the configured limit value, the machine may collide with objects in the work area. This can cause serious property damage.

- Always base the height limit on the highest point (1).
- Before starting work, make sure the configured limit value ensures enough space from the obstacle.

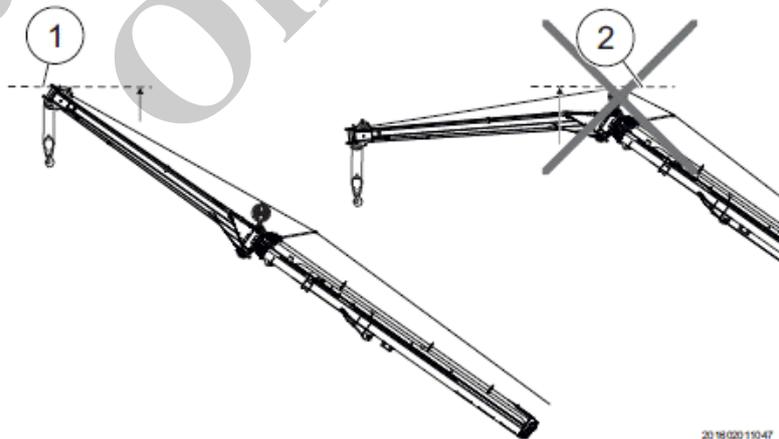
### Operating console – working range limitation



The working range limitation is controlled by the [Working range limitation] control console in the cab and has the following functions:

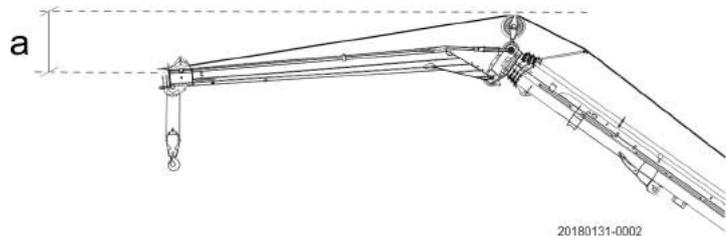
- Rocking angle: limits the upper and lower boom angle
- Height: limits the max. height of the pulley head
- Radius: limits the inner and outer working radius
- Pivot angle: limits the slewing angle of the uppercarriage in both directions

### During operation with an angled tip



- 1 Pulley head
- 2 Boom configuration

When operating with an angled tip, the safe distance of the height limit can be set to a value of 1 m (3.3 ft) below the actual obstacle value.



a Safe distance: 1 m (3.3 ft)

**i** Observe the manufacturer's instructions for operating the [Working range limitation] control console.

### 7.15.6 Bringing the machine out of overload

If the machine comes into an overload condition during operation, the load-increasing functions are deactivated.

Load-increasing functions are:

- Extend boom
- Lifting the boom
- Lowering the boom
- Lifting the hook
- Slewing the uppercarriage with machine inclination  $>0.6^\circ$

The LML traffic light warns the machine operator about the overload situation with an audible and visual warning signal. An acoustic warning signal as well as visual warning and information symbols are issued on the SENCON.

The machine operator must bring the machine out of overload as quickly as possible.

#### 7.15.6.1 Bringing the machine out of overload by bypassing the LML

**⚠ DANGER**

**Danger of tipping when LML is bypassed**

- Only bypass the LML in an emergency or in the event of component failure.
- Use the bypassing function only to bring the machine out of overload. Put the machine in a safe state immediately.
- Do not perform any other work during bypassing.

**If the LML is bypassed and the operation is continued, the machine can tip over. There is danger to the life of the machine operator and persons in the vicinity of the machine.**

The permissible load capacity has been exceeded.

The following warning symbols are displayed on SENCON:

## Operation

- [Load moment limitation] lights up red.
  - [Load capacity] lights up red.
  - [Machine fault display] lights up red.
1. ➤ Turn and hold the [LML bypass] key switch in position [I].
  2. ➤ Press and hold the [LML bypass] push button.
    - ⇒ The overload warning device is bypassed until either the key switch or the push button is released.
      - All functions are enabled.
      - All limit switches are bypassed.
      - No shutdown occurs if the maximum load moment is reached.
      - No shutdown occurs if the radius limit is reached.
      - No shutdown occurs in the event of faults/errors.
  3. ➤ Bring the machine out of overload and into a safe state.

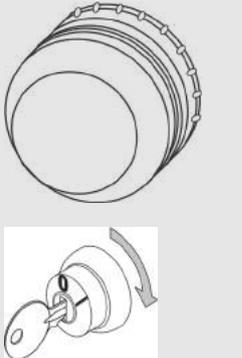


*If the machine operator activates the bypass without overloading, an acoustic warning signal sounds.*

### LML bypassed with key switch and push button in the cab

	<b>Red (3), flashing</b> <b>LML traffic light intermittent horn (4)</b>
	No load torque monitoring Intermittent horn sounds: permanent signal, cannot be switched off Data recording activated

**LML bypass key switch and push button**

	[LML bypass] push button pressed and [LML bypass] key switch held in [I] position	[LML bypass] push button not pressed and/or [LML bypass] key switch released
	<p>The LML is bypassed. The speed of crane control functions is not limited.</p>	<p>The load moment limitation is activated.</p>

**7.16 Regenerating the exhaust aftertreatment system**

**Safety instructions**

**⚠ WARNING**

**Risk of fire from hot surfaces and high exhaust temperatures**  
Exhaust aftertreatment system regeneration causes high temperatures in the exhaust system.

- Always keep a sufficient distance from combustible materials during the regeneration of the exhaust aftertreatment system.
- Allow the exhaust system to cool with the engine running after the regeneration of the exhaust aftertreatment system.

**7.16.1 Carrying out regeneration during work operation**

**Permitting regeneration**

➔ Move the [Exhaust aftertreatment system regeneration] switch into the center position.

⇒ Regeneration is permitted.

The engine control starts regeneration automatically as required:

- The engine speed is increased and is then reduced again once regeneration ends.
- The exhaust temperature increases during regeneration.

## Carrying out regeneration by increasing the engine speed

Requirement:

- The load status is high.
- The [Load status of exhaust aftertreatment system] information symbol lights up orange.

1. ➤ Increase engine speed.

⇒ The exhaust temperature increases.

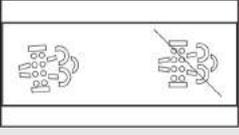
Regeneration is complete when the [Load status of exhaust aftertreatment system] information symbol appears in gray.

2. ➤ After regeneration has ended, reduce the engine speed again.

3. ➤ Allow the exhaust system to cool for 5–10 minutes with the engine running.

⇒ The exhaust temperature is normal if the [Exhaust temperature] information symbol appears in gray.

## DEF bypass / regen switch

	Switch position left	Switch position Center	Switch position right
	Exhaust aftertreatment system regeneration is triggered manually.	Automatic exhaust aftertreatment system regeneration is permitted.	Automatic exhaust aftertreatment system regeneration is suppressed.

## Load status of the exhaust aftertreatment system

	Grey	Orange	Flashing orange
	The load status is normal.	The load status is high. Regeneration can be carried out.	The load status is high. Regeneration must be carried out.
	—	Regeneration is suppressed.	—
	—	—	The load status is very high. The output of the diesel engine is reduced.
	—	—	Manual regeneration is required.

### 7.16.2 Suppressing regeneration

1. → Move the [Exhaust aftertreatment system regeneration] switch to the right.

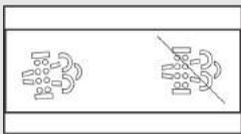
⇒ Regeneration is not initiated during operation.

The “Load status of the exhaust aftertreatment system” symbol is shown in orange with a strikethrough.

**i** If regeneration is suppressed, the load status of the exhaust aftertreatment system is not visible.

2. → Permit regeneration again after operation.

#### DEF bypass / regen switch

	Switch position left	Switch position Center	Switch position right
	Exhaust aftertreatment system regeneration is triggered manually.	Automatic exhaust aftertreatment system regeneration is permitted.	Automatic exhaust aftertreatment system regeneration is suppressed.

#### Load status of the exhaust aftertreatment system

	Grey	Orange	Flashing orange
	The load status is normal.	The load status is high. Regeneration can be carried out.	The load status is high. Regeneration must be carried out.
	—	Regeneration is suppressed.	—
	—	—	The load status is very high. The output of the diesel engine is reduced.
	—	—	Manual regeneration is required.

### 7.16.3 Initiating regeneration manually

Preconditions:

- The machine control requests manual regeneration.  
The *[Load status of the exhaust aftertreatment system]* and *[Exhaust temperature]* information symbols flash.
- The machine is safely parked.
- The load is set down.
- If a grapple is installed:  
The grapple is closed.

For running the regeneration process, the machine performs the "Close grapple" action, which will undesirably cause an open grapple to be closed.

- The automatic idle stop is deactivated.
1. → Start the machine and allow the diesel engine to idle for 5–10 minutes.
  2. → Press the *[Exhaust aftertreatment system regeneration]* button to the left.
    - ⇒ Regeneration is carried out.
      - The engine speed increases.
      - The exhaust temperature increases.
  3. → Wait for regeneration to end.
    - ⇒ After regeneration, the following happens:
      - The *[Load status of the exhaust aftertreatment system]* information symbol is shown in gray again.
      - The motor runs at idling speed.
      - The exhaust gas and surfaces of the exhaust system have an increased temperature.
  4. → Allow the exhaust system to cool for 5–10 minutes with the engine running after regeneration.
    - ⇒ The exhaust temperature is normal if the *[Exhaust temperature]* information symbol appears in gray.

#### Aborting manual regeneration

Manually initiated exhaust aftertreatment system regeneration can be canceled by taking one of the following actions:

- ■ Suppress exhaust aftertreatment system regeneration.
- Actuate the emergency stop switch.
- Turn off the engine with the ignition key.

(The *[Engine start]* button is deactivated during manually initiated regeneration.)

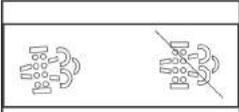
**Load status of the exhaust after-treatment system**

	Grey	Orange	Flashing orange
	The load status is normal.	The load status is high. Regeneration can be carried out.	The load status is high. Regeneration must be carried out.
	—	Regeneration is suppressed.	—
	—	—	The load status is very high. The output of the diesel engine is reduced.
	—	—	Manual regeneration is required.

**Exhaust temperature**

	Grey	Orange
	Exhaust temperature is normal.	Exhaust temperature is high. Exhaust aftertreatment system regeneration is active.

**DEF bypass / regen switch**

	Switch position left	Switch position Center	Switch position right
	Exhaust aftertreatment system regeneration is triggered manually.	Automatic exhaust after-treatment system regeneration is permitted.	Automatic exhaust after-treatment system regeneration is suppressed.

## 7.17 Switching off the machine

### 7.17.1 Parking the machine

#### Safety instructions

**⚠ WARNING**

**Risk of injury due to machine tipping over and moving uncontrollably.**

- Only drive up or down slopes.
- Only park the machine on flat, solid, and sufficiently load-bearing ground.

**Driving the undercarriage along a slope or parking on a slope can cause unplanned movement or the machine to tip over. As a result, persons in the danger zone could be seriously injured.**

1. ▶ Park the machine on level, solid ground.
2. ▶ Align the uppercarriage with the undercarriage.
3. ▶ Lower attached loads.
4. ▶ Position the boom at boom angle.
  - The boom angle is available in the allowed wind speed table.
5. ▶ Completely lower the cab.
6. ▶ Put the cab to 0° position.
7. ▶ Apply the slewing gear brake.
8. ▶ Close the windows.
9. ▶ Pull the safety lever toward the driver seat.

#### Ignition switch

	Position [P]	Position [0]	Position [I]	Position [II]
<p><b>P 0 I II</b></p>	<p>With fuel pump (option): The machine can be refueled using the fuel pump.</p> <p>Without fuel pump: no function</p>	<p>The ignition is off.</p> <p>No power supply is applied.</p> <p>The control and display elements are non-functional.</p>	<p>The ignition is switched on.</p> <p>Power supply is applied.</p> <p>Electric functions are available.</p>	<p>The engine is started.</p> <p>The engine is running.</p> <p>Electric and hydraulic functions are available.</p>

Safety lever

	Safety lever engaged	Safety lever pushed in direction of travel
	All hydraulic functions are unavailable. Work movements cannot be performed. The slewing gear brake is engaged.	All hydraulic functions are available. All work movements can be performed.

7.17.2 Switch off engine

Safety instructions

**NOTICE**

**Risk of diesel engine and cooling system damage due to skipping cool-down.**

- Let the engine cool down before shutting it off.

**Switching off the engine without allowing to cool down first can cause heat accumulation and overheating of engine parts. Failure to follow these instructions can cause increased wear to the engine and cooling system.**

**i**

*Consumers may keep running when the ignition is shut off. Some consumers may keep running after the ignition has been shut off. They are switched off automatically after a short period of time.*

**i**

*If the machine is switched off you must wait for at least 15 seconds before a restart.*

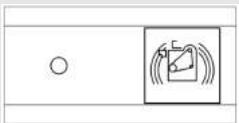
**Switching off the engine with the [Engine start] button**

The [Engine start] is used to switch the engine off temporarily during operation, e.g. when pausing work.

Requirement:

- The safety lever has been pulled back.
- ➔ Press the [Engine start] button to the right for 2 seconds.
  - ⇒ The engine is off.
  - The ignition is on.
  - The SENCON is ready for operation.

Engine start

	Press button on the right (at least 2 seconds)	Press button on the right (at least 2 seconds)
	The engine is started.	The engine is stopped.

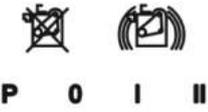
## Turn off the engine with the ignition key.

The engine is switched off in order to shut down the machine safely.

Requirement:

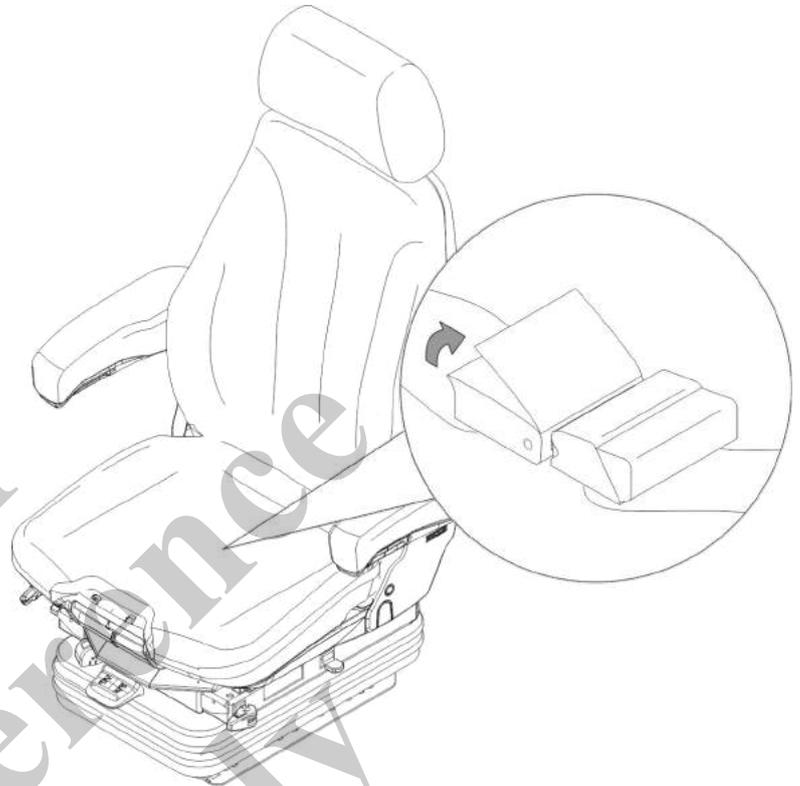
- The safety lever has been pulled back.
  - Automatic idle is deactivated.
  - The ignition key is in position [III].
1. → Lower the engine speed to 50% of the nominal speed using the hand throttle.
  2. → Let engine run for approximately 5 – 10 minutes.
  3. → Set the idle speed.
  4. → Turn the ignition key to [I] position.
    - ⇒ The engine is switched off.
    - The ignition is on.
    - The SENCON is ready for operation.
  5. → Turn ignition key to position [0].
    - ⇒ The ignition is off.
    - The SENCON is off.

## Ignition switch

	Position [P]	Position [0]	Position [I]	Position [II]
 <p><b>P 0 I II</b></p>	<p>With fuel pump (option): The machine can be refueled using the fuel pump.</p> <p>Without fuel pump: no function</p>	<p>The ignition is off.</p> <p>No power supply is applied.</p> <p>The control and display elements are non-functional.</p>	<p>The ignition is switched on.</p> <p>Power supply is applied.</p> <p>Electric functions are available.</p>	<p>The engine is started.</p> <p>The engine is running.</p> <p>Electric and hydraulic functions are available.</p>

## 7.18 Climbing out of the machine

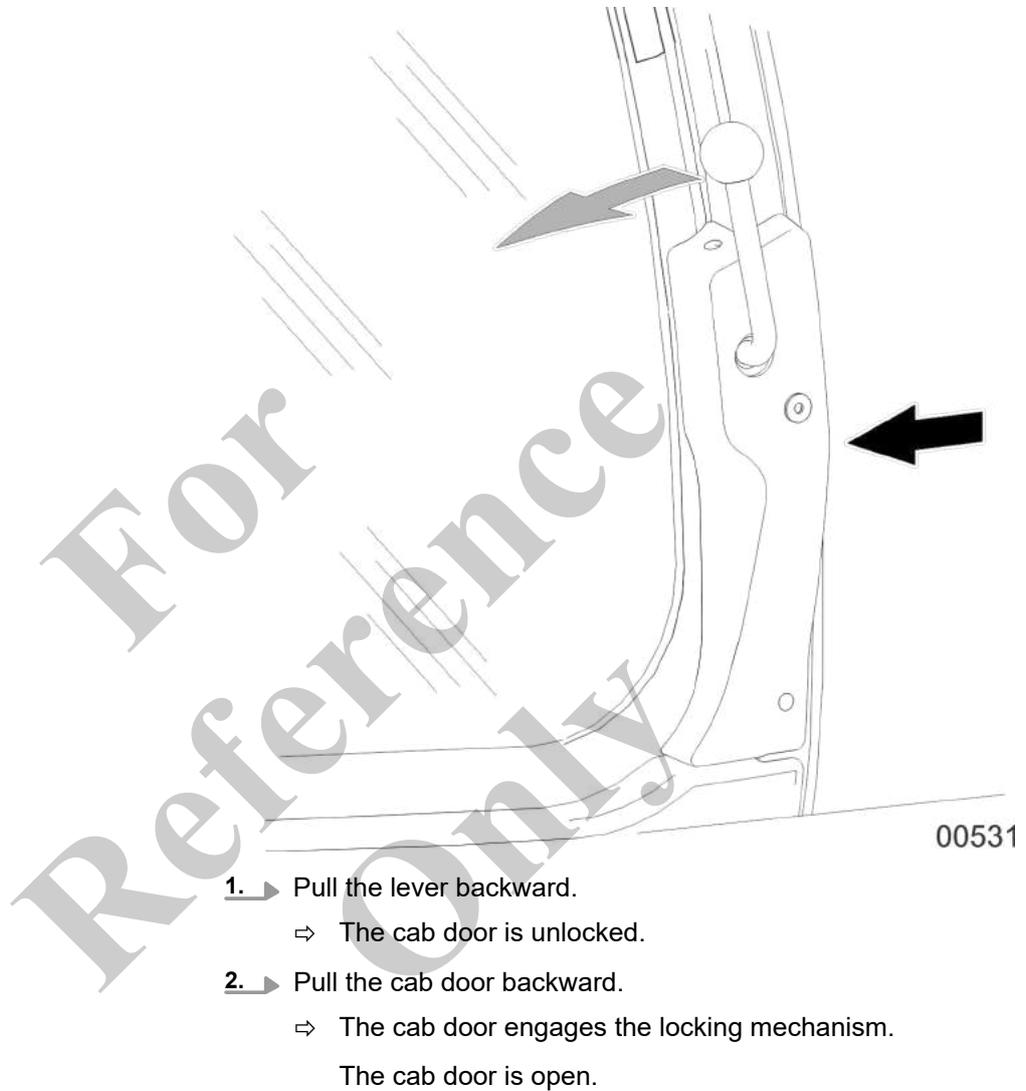
### 7.18.1 Opening the seat belt



- Lift up the metal cover of the belt buckle.  
⇒ The metal tongue releases from the belt buckle.  
The seat belt is open.

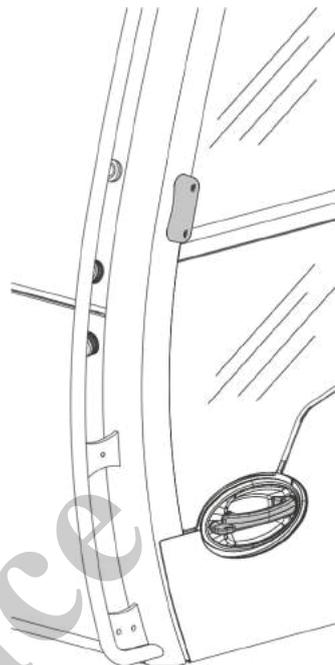
### 7.18.2 Opening/closing the cab door

Opening the cab door from the inside



1. → Pull the lever backward.  
⇒ The cab door is unlocked.
2. → Pull the cab door backward.  
⇒ The cab door engages the locking mechanism.  
The cab door is open.

Close the cab door from the outside



1. → Pull the door handle.
  - ⇒ The cab door locking mechanism is released.
2. → Push the cab door forward until it audibly locks into place.
  - ⇒ The cab door is engaged.
3. → Lock the cab door with the ignition key.
  - ⇒ The cab door is locked.

### 7.18.3 Leaving the machine

Safety instructions

**▲ WARNING**

**Risk of falling or impact when climbing onto and down from the machine!**

- Position the uppercarriage relative to the undercarriage so that safe entry/exit is ensured via the steps.
- Use handles, access ladders, and walkways when climbing up on and down from the machine.
- Keep the access ladders and walkways clean and clear of dirt, snow, and ice.

There is a risk of the operator slipping and falling when climbing up on down from the machine. If the uppercarriage is in an unfavorable position in relation to the undercarriage, the operator may get injured.

### **⚠ WARNING**

#### **Risk of injury from falling.**

- Only use the designated steps and handles.
- Clean soiled steps before use.
- Do not carry any objects by hand when climbing up or down.
- Always face the machine.
- Always make sure you have at least three points of contact with the steps and handles when climbing up or down. Two hands and one foot, or two feet and one hand must remain in contact with the steps and handles at all times.

**If the steps and grip handles are not used properly or are soiled when climbing on or climbing off the machine, there is danger of injury.**

Handles, access ladders, and walkways are attached to the machine for climbing on and climbing off.

- Climb down from the walkway to the crawler track and access ladders and off the machine.

### **7.18.4 Disconnecting the energy supply**

If the machine is idle for an extended period or for long transport distances, the machine's electrical system must be isolated from the battery using the battery disconnect switch.

### **NOTICE**

#### **Danger - machine damage!**

- **Leave the battery disconnect switch switched on when the engine is running or other electrical consumers are switched on.**

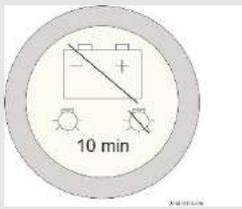
**If the battery disconnect switch is switched off while the machine is still in operation, the electrical system of the machine and its controller will be damaged.**

1. → Open the service access door on the uppercarriage:
  - Unlock the two locking mechanisms of the service access door with the ignition key.
  - Release the two locking mechanisms with the lever.
  - Open service access door with the handle.
  - ⇒ The service access door lifts. This process is supported by a gas spring.
2. → Press the battery disconnect switch.
  - ⇒ The battery disconnect switch flashes.

After 10 minutes, the battery disconnect switch lighting goes out.

3. → Close the service door on the uppercarriage:
  - Push down the service access door until it engages in closed position.
  - Engage the two locking mechanisms of the service access door with the lever.
  - Lock the two locking mechanisms with the ignition key.

**Battery disconnect switch**

	Lights up	Flashes (approximately 10 minutes)	Off
	<p>The electrical system of the machine is connected to the battery.</p>	<p>The disconnection of the machine's electrical system from the battery is prepared.</p> <p>The engine operating data are saved.</p> <p>The DEF in the lines is pumped into the tank.</p>	<p>The electrical system of the machine is disconnected from the battery.</p>

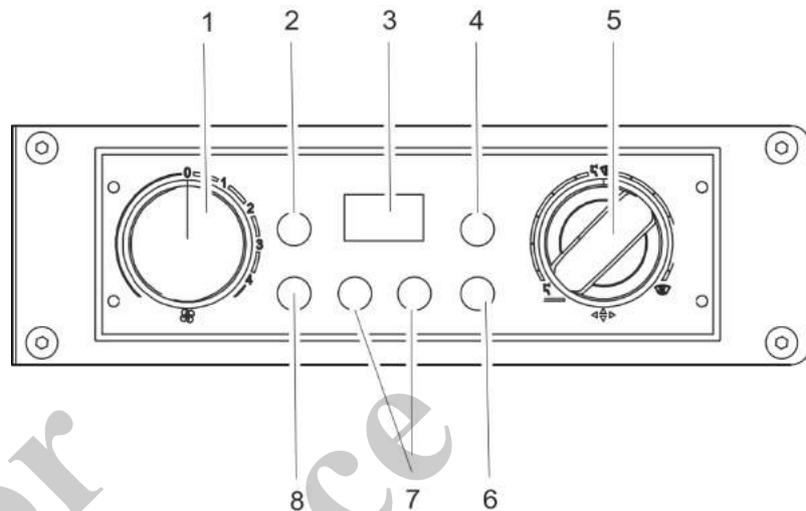
**7.18.5 Secure machine**

- Secure the machine after parking it:
  - lights
  - warning triangle
  - chocks

## 7.19 General settings

### 7.19.1 Setting the air conditioning system

#### Air conditioning system



- 1 Blower speed selector switch
- 2 Recirculating air mode
- 3 Temperature display (°C or °F)
- 4 Outside air mode
- 5 Air diffusion selector switch
- 6 Air conditioning system on/off
- 7 Temperature regulator
- 8 Outside temperature display

The machine is equipped with an automatic air conditioning system that permits precise heating or cooling. The automatic air-conditioning control can be operated with fresh air or recirculating air.

*Switch on the automatic air conditioning on a regular basis. This will significantly help in ensuring the system's functionality. Switch on the automatic air conditioning system once a month for at least 30 minutes at maximum blower speed, keeping the cab windows and doors open during the process.*

#### Switching on the air conditioning system in ambient air mode

Requirement:

- The ignition key is in position [I].
- 1. ➤ Open the air inlet vents in the cab.
- 2. ➤ Switch on the blower with the [Blower speed] selector switch.
- 3. ➤ Close the cab doors and cab windows and keep closed.
- 4. ➤ Set the desired temperature using the [temperature control] button.
  - ⇒ The automatic air conditioning system regulates the cab inside temperature in relation to the outside temperature.
- 5. ➤ Set the air distribution of the blower via the [air diffuser selector switch].

6. → Switch cooling mode on or off with the *[air conditioning on/off]* button.

### Switching recirculating air mode on and off

In recirculating air mode, the air inside the cab is recirculated and only little fresh air is drawn in from outside. As a result, the air inside the cab is heated up faster and a higher end temperature is reached.



*Do not switch on the "Recirculating air mode" for more than 15 minutes. Extended recirculation mode significantly impairs the air quality inside the cab. Ensure sufficient fresh air supply.*

Prerequisites: The air conditioning system is switched on. The temperature settings have been selected.

1. → Push the *[Recirculating air mode]* button to switch on recirculating air mode.
2. → Switch on the blower with the *[Blower speed]* selector switch.
3. → Set the air distribution of the blower via the *[air diffuser selector switch]*.
4. → Push the *[Recirculating air mode]* button once more to switch off recirculating air mode.
  - ⇒ The air conditioning system will run in ambient air mode with the selected temperature settings.

### Changing the unit in the temperature display

1. → Press the *[Ambient temperature display]* switch for more than 5 seconds.
  - ⇒ The temperature display switches from °C to °F.
2. → Press the *[Ambient temperature display]* switch for more than 5 seconds again.
  - ⇒ The temperature display switches from °F to °C.

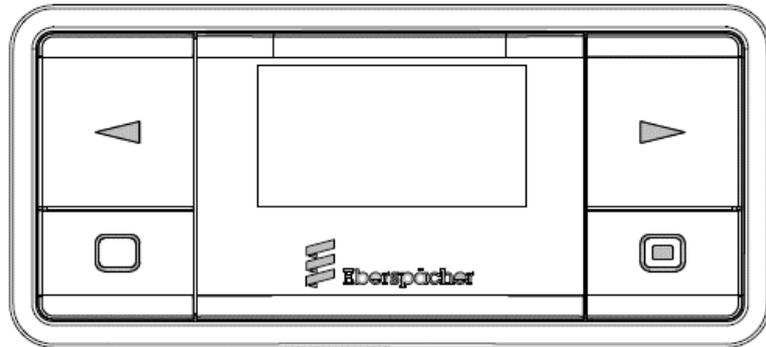
## 7.19.2 Setting the auxiliary heating system (option)

The machine can be equipped with an engine-independent water heater for engine-heating and cab-pre-heating, as well as with a hydraulic tank and battery heater.

The electric water heater is pre-set in the factory and is regulated via the air conditioning automation.



*Operation of the water heating device can decrease the battery capacity.*



Observe the manufacturer's operating manual.

### 7.19.3 Setting the radio

The radio and speakers are located behind the driver seat below the cab roof.

The radio is found on the right control panel beside the driver seat.



For more information, please refer to the manufacturer's operating manual. The manufacturer's operating manual is located inside the cab.

### 7.19.4 Operating the camera system

#### Safety instructions

#### WARNING

**Risk of injury due to restricted view when reversing!**

- The mirrors enable you to monitor the work area.
- Use the reversing camera to monitor the work area.
- Observe the reversing alarm.

**In certain situations, the driving area cannot be seen while reversing.**

**⚠ WARNING**

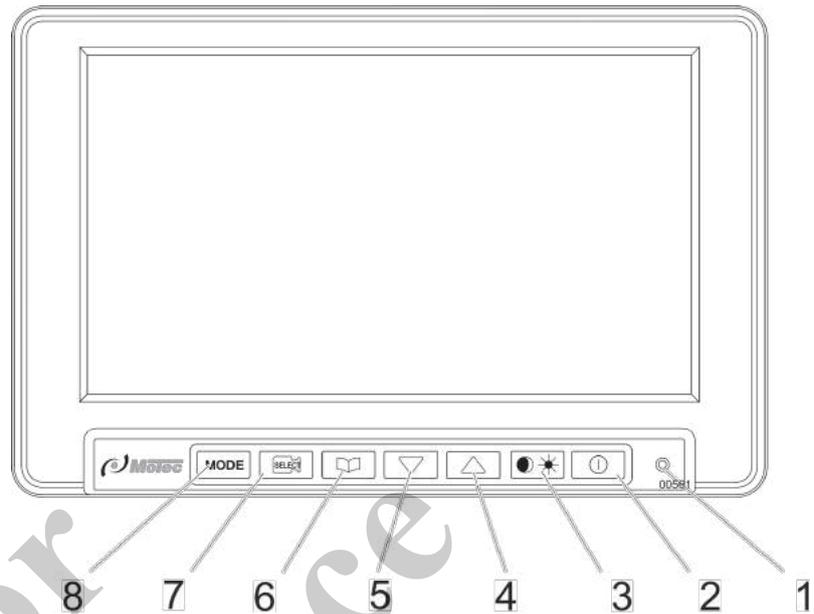
Risk of injury due to restricted view.

- - Improperly set up cameras
- Distorted feed
- No feed
- Automatically alternating feed
- Make sure the camera system is working and configured properly before starting up the machine or changing operators.
- Only operate the camera system in "TIMER OFF" mode.
- Clean dirty camera lenses.
- Machines with a non-functional camera system may only be operated with the assistance of a banksman.

The camera system is only an aid and does not release the operator from exercising due caution. A faulty camera system can result in serious injury. A faulty camera system may be caused by the following:

For  
Reference  
Only

## Camera system



- 1 Operating display
- 2 Display on/off button
- 3 Day/night button
- 4 Plus button
- 5 Minus button
- 6 Menu button
- 7 Camera select button
- 8 Presentation mode button

<b>Camera 1</b>	For viewing the machine when reversing
<b>Camera 2</b>	For the right side of the machine
<b>Camera 3</b>	For the winches
<b>Camera 4</b>	Not used

The machine is equipped with a camera system that allows the operator to remotely view the areas next to and behind the machine.

**Switch on the display**

Requirement:

- The ignition key is in position [I].

Requirement:

00560

⇒ The camera image is shown on the display, the [Operating display] LED lights up.

2. → Swivel the display so that the image is easily recognizable.

3. → If the camera image is not displayed, switch on the monitor with the [Display on/off] button.

**Day/night switch**

1. → Press the [Day/night] button.

⇒ In "Night" mode, the camera image displayed is darker.

2. → Press the [Day/night] button again.

⇒ In "Day" mode, the camera image displayed is brighter.

**Presentation mode**

Up to four cameras can be installed on the machine. Use the [Display mode] button to switch between the following display modes:

- Single image
- Split image
- Image split into three sections
- Image split into four sections

→ Use the [Display mode] button to select the desired mode.

### Camera selection

In “*single image*” display mode and in “*split image*” mode, the cameras can be selected with the [*Camera selection*] button.

- ➔ Select the desired camera display with the [*Camera display*] button.
  - In single image mode you can choose between cameras 1, 2, 3, and 4.
  - In split image mode you can choose between cameras 1/2, 2/3, 3/4, 4/1, 1/3 and 2/4.

### Menu settings

- ➔ Press the [*Menu*] button.
  - ⇒ The menu selection appears on the monitor.
    - “*BRIGHTNESS*”
    - “*CONTRAST*”
    - “*COLOR*”
    - “*STANDARD*”
    - “*LANGUAGE*”
    - “*MIRRORING*”
    - “*VIDEO*”
    - “*POC ON / OFF*”
    - “*TIMER ON / OFF*”
    - “*TIMER SETUP*”
    - “*FINISH*”

### Select language

1. ➔ Press the [*Menu*] button.
  - ⇒ The menu selection appears on the monitor.
2. ➔ Navigate to the “*LANGUAGE*” menu item using the [*Plus*]/ [*Minus*] buttons.
3. ➔ Press the [*Menu*] button.
  - ⇒ The language selection appears on the monitor.
4. ➔ Use the [*Plus*]/ [*Minus*] buttons to select the desired language.
5. ➔ Press the [*Menu*] button.
  - ⇒ The selected language is marked with a .
6. ➔ Navigate to the “*EXIT*” menu item using the [*Plus*]/ [*Minus*] buttons.
7. ➔ Press the [*Menu*] button to exit the menu item.

### Selecting the power-on mode

In the "POC ON" mode, the display is switched on and off via the ignition switch.

In "POC OFF" mode and with the ignition switched off, the display can be switched on and off using the *[Display on/off]* button.

1.  Press the *[Menu]* button.  
⇒ The menu selection appears on the monitor.
2.  Navigate to the "POC" menu item using the *[Plus]/[Minus]* buttons.
3.  Press the *[Menu]* button to switch between "POC OFF" and "POC ON".
4.  Navigate to the "EXIT" menu item using the *[Plus]/[Minus]* buttons.
5.  Press the *[Menu]* button to exit the menu item.

### Setting brightness

1.  Press the *[Menu]* button.  
⇒ The menu selection appears on the display.
2.  Use the *[Plus]/[Minus]* buttons to navigate to the "BRIGHTNESS" menu item.
3.  Press the *[Menu]* button.  
⇒ The current settings appear on the display.
4.  Set the desired brightness with the *[Plus]/[Minus]* buttons.
5.  Press the *[Menu]* button to exit the menu item.

### Set the contrast

1.  Press the *[Menu]* button.  
⇒ The menu selection appears on the display.
2.  Navigate to the "CONTRAST" menu item using the *[Plus]/[Minus]* buttons.
3.  Press the *[Menu]* button.  
⇒ The current settings appear on the display.
4.  Set the desired contrast with the *[Plus]/[Minus]* buttons.
5.  Press the *[Menu]* button to exit the menu item.

### Set the color saturation

1. **▶** Press the *[Menu]* button.  
⇒ The menu selection appears on the display.
2. **▶** Navigate to the “COLOR” menu item using the *[Plus]/[Minus]* buttons.
3. **▶** Press the *[Menu]* button.  
⇒ The current settings appear on the display.
4. **▶** Set the desired color saturation with the *[Plus]/[Minus]* buttons.
5. **▶** Press the *[Menu]* button to exit the menu item.

### Reset settings

1. **▶** Press the *[Menu]* button.  
⇒ The menu selection appears on the display.
2. **▶** Navigate to the “STANDARD” menu item using the *[Plus]/[Minus]* buttons.
3. **▶** Press the *[Menu]* button.  
⇒ The factory settings are reapplied.
4. **▶** Navigate to the “EXIT” menu item using the *[Plus]/[Minus]* buttons.
5. **▶** Press the *[Menu]* button to exit the menu item.

### Mirror camera image

1. **▶** Press the *[Menu]* button.  
⇒ The menu selection appears on the display.
2. **▶** Navigate to the “MIRRORING” menu item using the *[Plus]/[Minus]* buttons.
3. **▶** Press the *[Menu]* button.  
⇒ The camera selection appears on the display.
4. **▶** Select the camera to be mirrored with the *[Plus]/[Minus]* buttons.
5. **▶** Press the *[Menu]* button.  
⇒ The mirroring camera is marked with a .
6. **▶** Navigate to the “BACK” menu item using the *[Plus]/[Minus]* buttons.
7. **▶** Press the *[Menu]* button to exit the menu item.

### Set the video system

Use the “*Video system*” setting to set the monitor’s color-transmission system to “*PAL*”, “*NTSC*”, or “*Auto*”.

1. → Press the [*Menu*] button.
  - ⇒ The menu selection appears on the display.
2. → Navigate to the “*VIDEO*” menu item using the [*Plus*]/[*Minus*] buttons.
3. → Press the [*Menu*] button.
  - ⇒ The system selection appears on the display.
4. → Select the desired video system with the [*Plus*]/[*Minus*] buttons.
5. → Press the [*Menu*] button.
  - ⇒ The selected video system is marked with a .
6. → Navigate to the “*BACK*” menu item using the [*Plus*]/[*Minus*] buttons.
7. → Press the [*Menu*] button to exit the menu item.

### Set timer mode

**⚠ WARNING**

**Risk of injury due to incorrectly configured camera system**  
 – Only operate the camera system in “*TIMER OFF*” mode.

**The operator may lose orientation via the camera display due to automatically alternating camera images. This can lead to accidents.**

1. → Press the [*Menu*] button.
  - ⇒ The menu selection appears on the display.
2. → Navigate to the “*TIMER ON/OFF*” menu item using the [*Plus*]/[*Minus*] buttons.
3. → Press the [*Menu*] button to switch between “*TIMER ON*” and “*TIMER OFF*”.
  - ⇒ Select “*TIMER OFF*” mode.
4. → Navigate to the “*EXIT*” menu item using the [*Plus*]/[*Minus*] buttons.
5. → Press the [*Menu*] button to exit the menu item.

### Timer setup



*As the camera system can only be operated in “*TIMER OFF*” mode, no adjustments are necessary in the “*TIMER SETUP*” menu.*

### 7.19.5 Switching the cab lighting on/off

The inside light and spot light are found to the top right inside the cab.

#### Turning the inside light on and off

- 1 Interior light
- 2 Switch

**1.** → Open the cab door.

⇒ The inside light turns on automatically.

**i** *The inside light will only be turned on and off by the cab door if the switch is in position [1].*

**2.** → Close the cab door.

or

Press the rocker switch to position [0].

⇒ The inside light is switched off.

## Turning the reading light on and off

- 1 Switch
- 2 Spotlight

1. → Press the rocker switch to position [I].

⇒ This turns on the reading light.

2. → Press the rocker switch to position [O].

⇒ This turns the spotlight off.

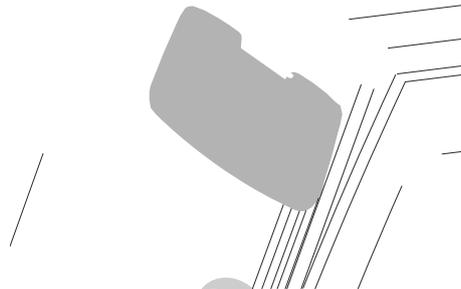


*The beam can be moved by adjusting the reading light.*

### 7.19.6 Fold sun visor

The cab is equipped with a sun visor.

### Fold sun visor



1 Sun visor

1. ▶ If dazzled from the front: Fold the sun visor to position [I].
2. ▶ If dazzled from above: Fold the sun visor to position [II].

### 7.19.7 Moving the roller shade

The cab is equipped with a roller shade.

#### Extending the roller shade

- 1 Roller shade
- 2 Handle

1. ▶ Take the roller shade by the handle and pull out.
2. ▶ Hook the roller shade into position [I].

**Winding up the roller shade**

1. ➔ Take the roller shade by the handle and unhook.
  - ⇒ The roller shade winds up automatically.
2. ➔ Hold the roller shade by the handle until fully wound up to avoid too abrupt winding.

**7.19.8 Opening/closing the windshield**

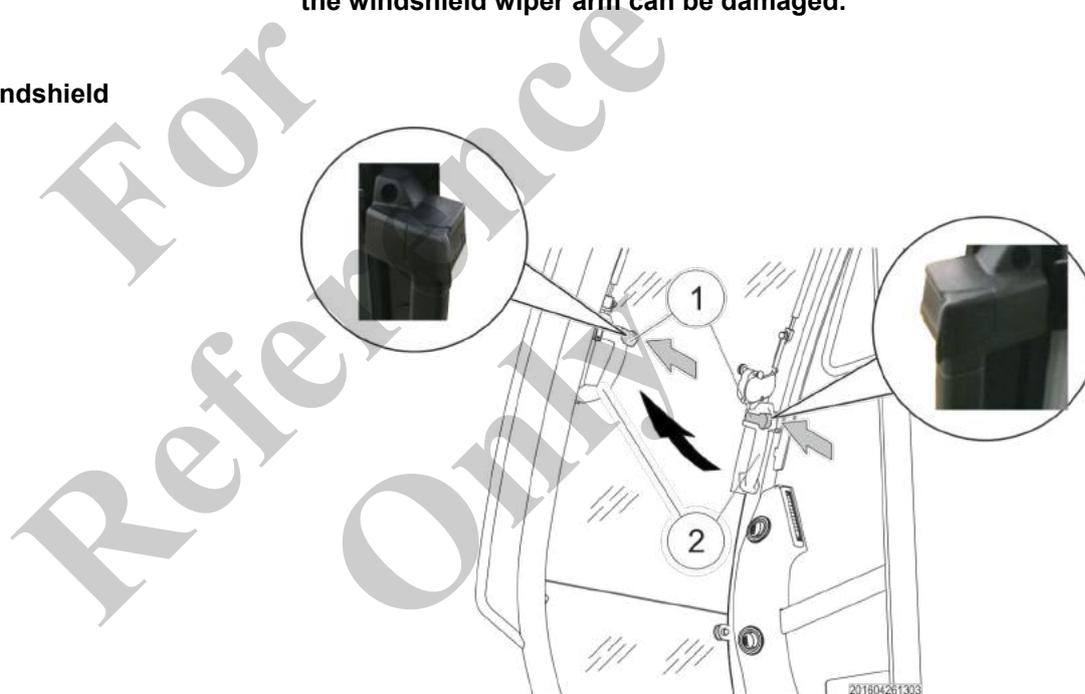
**Safety instructions**

**NOTICE**

**Damage to windshield wiper arm due to incorrect operation. Never activate the windshield wiper with the windshield open.**

**If the windshield wiper is activated with the windshield open, the windshield wiper arm can be damaged.**

**Opening the windshield**



- 1 Locking button
- 2 Handle

1. ➔ Press both locking buttons at the same time.
  - ⇒ The windshield is unlocked.
2. ➔ Push the handles forward.
  - ⇒ The front windshield is open.

### Closing front windshield



- 1 Locking mechanism
- 2 Handle

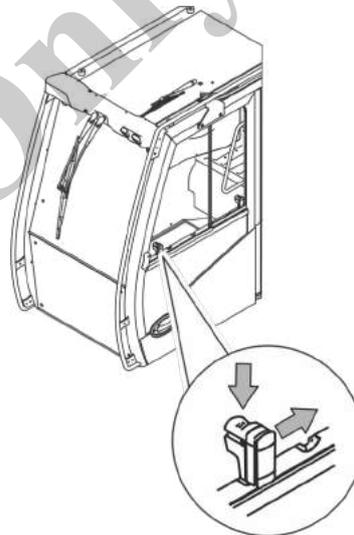
→ Pull the handles towards you.

⇒ The windshield audibly engages in the locking mechanisms on both sides.

### 7.19.9 Opening/closing the door window

#### Opening the door windows

1. → Press door window locking mechanism downwards.



2. → Pull the locking mechanism of the door windows back (as viewed in the direction of travel).

3. → Open the door window.

#### Closing the door window

→ Pull the door window forward.

⇒ The locking mechanism engages.

### 7.19.10 Switching windshield wiper on/off

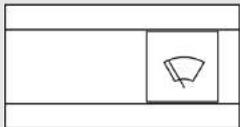
#### Safety instructions

**NOTICE**

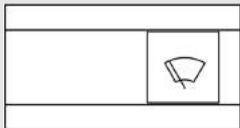
Damage to windshield wiper arm due to incorrect operation.  
Never activate the windshield wiper with the windshield open.

If the windshield wiper is activated with the windshield open, the windshield wiper arm can be damaged.

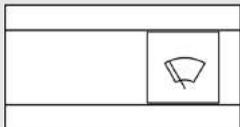
#### Windshield wiper

	Switch position left	Switch position right
	The windshield wiper for the windshield is switched off.	The windshield wipers on the windshield are switched on.

#### Roof panel wiper

	Switch position left	Switch position Center	Switch position right
	The windshield wiper on the glass roof panel is switched off.	The windshield wiper for the glass roof panel is working at low speed.	The windshield wiper for the glass roof panel is working at high speed.

#### Lower windshield wiper (option)

	Switch position left	Switch position Center	Switch position right
	The windshield wiper for the windshield is switched off.	The windshield wiper for the windshield is working at low speed.	The windshield wiper for the windshield is working at high speed.

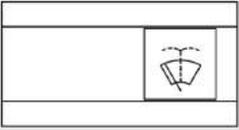
Requirement:

- The ignition key is in position [I].
- 1. ➔ Push the [Windshield wiper] switch to the center position.
  - ⇒ The windshield wiper wipes slowly.
- 2. ➔ Push the [Windshield wiper] switch to the right.
  - ⇒ The windshield wiper wipes quickly.
- 3. ➔ Push the [Windshield wiper] switch to the left.
  - ⇒ The windshield wiper is off.

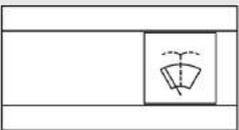
## Operation

### 7.19.11 Switching the windshield washer system on/off

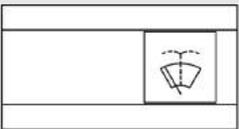
#### Windshield washer system

	Switch position left	Switch position right
	The windshield washer system for the windshield is switched off.	The windshield washer system for the windshield is switched on.

#### Roof panel washer system

	Switch position left	Switch position right
	The washer system on the glass roof panel is switched off.	The washer system on the glass roof panel is switched on.

#### Lower windshield washer system (option)

	Switch position left	Switch position right
	The windshield washer system for the windshield is switched off.	The windshield washer system for the windshield is switched on.

#### Requirement:

- The ignition key is in position [I].

1. ➔ Press and hold the [Windshield wiper] switch.

⇒ The washer fluid is sprayed on the windshield. The windshield wiper wipes a few times.

2. ➔ Release the [Windshield wiper] switch.

⇒ The windshield washer system is off.

## 7.20 Malfunctions

### 7.20.1 Possible malfunctions and faults

All maintenance, inspection and troubleshooting personnel must have the appropriate qualifications for these tasks.

For activities not described in detail, please contact the service partner.

**i** Some errors and status messages are dependent on the configuration and may not be displayed.

7.20.1.1 Overall machine

Table 10: Machine fault display

SENCON symbol	Description	Solution
	Orange Notice	<ul style="list-style-type: none"> <li>■ Check error number in Diagnostics window.</li> <li>■ You can continue working with the machine. Rectify the fault in a timely manner.</li> </ul>
	Orange Medium fault	<ul style="list-style-type: none"> <li>■ Check error number in Diagnostics window.</li> <li>■ Rectify the fault.</li> <li>■ If necessary, contact the service partner.</li> </ul>
	Red Serious fault	<ul style="list-style-type: none"> <li>■ Stop all operations. Check error number in Diagnostics window.</li> <li>■ Shut down the machine.</li> <li>■ Contact the service partner.</li> </ul>

Table 11: Overview of status messages

SENCON symbol	SPN	FMI	Description	Solution
	1011001	15 16	Hydraulic oil temperature too high	<ul style="list-style-type: none"> <li>■ Run diesel engine at idle speed.</li> <li>■ Check cooler for soiling and clean as needed.</li> </ul>
	1011002	0 15 16	Hydraulic return line filter contaminated <b>Acknowledgment required!</b>	<ul style="list-style-type: none"> <li>■ Contact the service partner.</li> </ul>
	1011003	0 15 16	Hydraulic leakage oil filter contaminated <b>Acknowledgment required!</b>	<ul style="list-style-type: none"> <li>■ Contact the service partner.</li> </ul>
	1011004	0 15 16	HydroClean filter contaminated <b>Acknowledgment required!</b>	<ul style="list-style-type: none"> <li>■ Contact the service partner.</li> </ul>
	1011007	17 18	Hydraulic oil level too low <b>Acknowledgment required!</b>	<ul style="list-style-type: none"> <li>■ Park machine in maintenance position immediately.</li> <li>■ Add hydraulic oil.</li> </ul>
	Various codes possible	9	CAN network error	<ul style="list-style-type: none"> <li>■ Contact the service partner.</li> </ul>

### 7.20.1.2 Machine motion

Fault description	Cause	Remedy
The joysticks are not working.	The safety lever has been pulled back.	<ul style="list-style-type: none"> <li>■ Push the safety lever in direction of travel.</li> <li>■ Energize the solenoid coil.</li> <li>■ Check if the solenoid coil switches on (LED).</li> </ul>
	Input/output signals are not available.	<ul style="list-style-type: none"> <li>■ Check the fuses; replace defective fuses.</li> <li>■ Troubleshoot via the “<i>Diagnostics</i>” menu on the SENCON: Check input/output vectors.</li> <li>■ Contact the service partner.</li> </ul>
The crawler track is grinding on the track guide.	The track tension is too low.	<ul style="list-style-type: none"> <li>■ Check the crawler track tension.</li> <li>■ Tension the crawler track.</li> </ul>
	Oil is leaking from the track rollers or carrier rollers.	<ul style="list-style-type: none"> <li>■ Contact the service partner.</li> </ul>
Operation movements are reduced or not possible.	The safety lever has been pulled back.	<ul style="list-style-type: none"> <li>■ Push the safety lever in direction of travel.</li> <li>■ Check if the solenoid coil switches on (LED).</li> </ul>
	The maximum load capacity has been exceeded.	<ul style="list-style-type: none"> <li>■ Check the status of the load moment limitation on the SENCON.</li> <li>■ If required, reduced the machine load moment.</li> </ul>
	The work area limitation is active.	<ul style="list-style-type: none"> <li>■ Shut off the work area limitation or adjust the work area limitation settings.</li> </ul>
	The hydraulic system is working with reduced power.	<ul style="list-style-type: none"> <li>■ Check SENCON for fault messages.</li> <li>■ Increase the diesel engine speed.</li> <li>■ Open the hydraulic stopcock.</li> <li>■ Check the function of the diesel engine.</li> </ul>
	The <b>Setup ballast</b> or <b>Setup Attachment</b> is set.	<ul style="list-style-type: none"> <li>■</li> </ul>
	Malfunction in the hydraulic system.	<ul style="list-style-type: none"> <li>■ Contact the service partner.</li> </ul>
	The hydraulic pump is not working.	<ul style="list-style-type: none"> <li>■ Contact the service partner.</li> </ul>
	The load moment limitation has a fault.	<ul style="list-style-type: none"> <li>■ Check SENCON for fault messages.</li> <li>■ Check the length indicator cable and cable drum on the boom for damage.</li> <li>■ Contact the service partner.</li> </ul>
	The load moment limitation set incorrectly.	<ul style="list-style-type: none"> <li>■ Check the LML values for plausibility.</li> </ul>
The cab cannot be raised.	The hydraulic system is defective.	<ul style="list-style-type: none"> <li>■ Contact the service partner.</li> </ul>

Fault description	Cause	Remedy
The cab is strongly shaking or rocking.	The cab suspension or cab attachment is damaged.	<ul style="list-style-type: none"> <li>■ Check all coupling elements, screws, and bolts of the cab suspension and cab attachment for damage, cracks, and deformation.</li> <li>■ Contact the service partner.</li> </ul>
The cab lowers by itself.	The hydraulic system is defective.	<ul style="list-style-type: none"> <li>■ Contact the service partner.</li> </ul>
The machine does not start.	The engine speed is set too low.	<ul style="list-style-type: none"> <li>■ Increase engine speed.</li> </ul>
	The safety lever has been pulled back.	<ul style="list-style-type: none"> <li>■ Push the safety lever in the direction of travel.</li> </ul>
	Leakage in hydraulic system circuit	<ul style="list-style-type: none"> <li>■ Check the hydraulic connections. Secure loose connections.</li> <li>■ Have leaking hydraulic hoses replaced by the service partner.</li> </ul>
	Hydraulic system defect	<ul style="list-style-type: none"> <li>■ Contact the service partner.</li> </ul>
	The solenoid coils drive forward/backward and are not energized.	<ul style="list-style-type: none"> <li>■ Check if the solenoid coil switches on (LED).</li> </ul>
	The control device is defective.	<ul style="list-style-type: none"> <li>■ Troubleshoot via the “<i>Diagnostics</i>” menu on the SENCON: Check input/output vectors.</li> </ul>
The machine only moves at one speed or too slowly.	The operating temperature too low.	<ul style="list-style-type: none"> <li>■ Run the machine until warm.</li> </ul>
	The diesel filter is dirty.	<ul style="list-style-type: none"> <li>■ Change the diesel filter.</li> </ul>
	Defect in the diesel engine or hydraulic system	<ul style="list-style-type: none"> <li>■ Contact the service partner.</li> </ul>
	The solenoid coil is not energized.	<ul style="list-style-type: none"> <li>■ Check if the solenoid coil switches on (LED).</li> </ul>
The brake power of the travel brake is too weak or uneven.	The hydraulic oil level is too low.	<ul style="list-style-type: none"> <li>■ Add hydraulic oil.</li> <li>■ Check the hydraulic system for leakage points.</li> </ul>
	The hydraulic pressure of the travel brake is too low.	<ul style="list-style-type: none"> <li>■ Contact the service partner.</li> </ul>
	The clutch plates are worn out.	<ul style="list-style-type: none"> <li>■ Check the clutch plates.</li> </ul>
Oil leaks on the slewing gear drive	The connections on the slewing gear gearbox are loose.	Tighten the connections.
The rotary feedthrough is leaking.	The seals are damaged.	Replace the seals.
	The lines are loose.	Tighten the fastening screws on the lines.
Winch 2 is not working.	Winch 2 is not activated.	Push the <i>[Release Winch 2]</i> switch to the right.

## Operation

Fault description	Cause	Remedy
The uppercarriage will not slew.	The machine is overloaded. The slewing gear has been switched off. The total inclination of the machine is $>0.6^\circ$ .	Bring the machine out of overload by reducing the machine utilization. Reduce the machine utilization to below 100%.

### 7.20.1.3 Drive engine

Fault description	Cause	Remedy
Engine does not start	Battery capacity too low	<ul style="list-style-type: none"> <li>■ Check fluid level of batteries.</li> <li>■ Recharge or replace batteries.</li> <li>■ Start machine using auxiliary battery.</li> </ul>
	Shut-off flap on hydraulic tank closed	<ul style="list-style-type: none"> <li>■ Open shut-off flap.</li> </ul>
	Fuel tank empty	<ul style="list-style-type: none"> <li>■ Refuel machine.</li> </ul>
	Emergency stop switch pressed	<ul style="list-style-type: none"> <li>■ Pull out emergency stop switch</li> </ul>
Engine power loss	Intake air flow resistance too high	<ul style="list-style-type: none"> <li>■ Replace filter element of the water separator.</li> </ul>
Machine does not move	Gearbox defective	<ul style="list-style-type: none"> <li>■ Have fault remedied.</li> </ul>
Oil or fuel leaks on the engine	Hose clampings loose	<ul style="list-style-type: none"> <li>■ Fasten hose clampings.</li> </ul>
	Hoses or seals damaged	<ul style="list-style-type: none"> <li>■ Replace hoses or seals.</li> </ul>

Table 12: Overview of engine notifications

SENCOR symbol	SPN	FMI	Description	Solution
	95	16	Fuel filter contaminated	<ul style="list-style-type: none"> <li>■ Replace fuel filter.</li> </ul>
	97	15 16	Water in fuel	<ul style="list-style-type: none"> <li>■ Contact the service partner.</li> </ul>
	100	1 18	Diesel engine oil pressure too low <b>Acknowledgment required!</b>	<ul style="list-style-type: none"> <li>■ Switch off diesel engine immediately.</li> <li>■ Check diesel engine oil level and add engine oil as needed.</li> </ul>
	101	0 15 16	Crankcase pressure too high	<ul style="list-style-type: none"> <li>■ Check crankcase breather line and clean as needed.</li> <li>■ Contact the service partner.</li> </ul>

SENCON symbol	SPN	FMI	Description	Solution
	105	0 15 16 18	Intake manifold temperature too high	<ul style="list-style-type: none"> <li>■ Run diesel engine at idle speed.</li> <li>■ Switch off the diesel engine.</li> <li>■ Let diesel engine cool down.</li> <li>■ Check combination cooler for soiling and fan for functioning, and clean as needed.</li> </ul>
	110	0 15 16 18 31	Coolant temperature too high	<ul style="list-style-type: none"> <li>■ Run diesel engine at idle speed.</li> <li>■ Switch off the diesel engine.</li> <li>■ Let diesel engine cool down.</li> <li>■ Check combination cooler for soiling and clean as needed.</li> </ul>
	111	1 17 18	Coolant level low	<ul style="list-style-type: none"> <li>■ Switch off the diesel engine.</li> <li>■ Let diesel engine cool down.</li> <li>■ Add coolant.</li> </ul>
	174	0 15 16	Fuel temperature too high	<ul style="list-style-type: none"> <li>■ Run diesel engine at idle speed.</li> <li>■ Check fuel level and add fuel as needed.</li> </ul>
	175	16	Diesel engine temperature too high	<ul style="list-style-type: none"> <li>■ Run diesel engine at idle speed.</li> <li>■ Check oil level and add oil as needed.</li> </ul>
	623	31	Engine warning <b>Acknowledgment required!</b>	<ul style="list-style-type: none"> <li>■ Write down all engine warnings.</li> <li>■ Contact the service partner.</li> </ul>
	624	31	Engine warning <b>Acknowledgment required!</b>	<ul style="list-style-type: none"> <li>■ Switch off the diesel engine.</li> <li>■ Write down all engine warnings.</li> <li>■ Contact the service partner.</li> </ul>
	1761	1 17 18	DEF <sup>®</sup> level low	<ul style="list-style-type: none"> <li>■ Add DEF<sup>®</sup>.</li> </ul>
	4096	31		
	3364	1 15 18	DEF <sup>®</sup> quality poor	<ul style="list-style-type: none"> <li>■ Check DEF<sup>®</sup> quality with refractometer.</li> <li>■ Drain the DEF<sup>®</sup> tank.</li> <li>■ Fill in new DEF<sup>®</sup>.</li> </ul>
	4334	18	DEF <sup>®</sup> pressure too low	<ul style="list-style-type: none"> <li>■ Check DEF<sup>®</sup> fill level.</li> <li>■ Check DEF<sup>®</sup> lines.</li> <li>■ Check DEF<sup>®</sup> tank filter.</li> <li>■ Contact the service partner.</li> </ul>

## Operation

SENCON symbol	SPN	FMI	Description	Solution
	5394	5 7	DEF® metering unit is not working.	■ Contact the service partner.
	1013001	17 18	Fuel level too low	■ Refuel machine.
	1014000	15	Air filter contaminated <b>Acknowledgment required!</b>	■ Contact the service partner.
		31	Wait-to-start-light on	■ Start engine once message is no longer displayed.
		1 17 18	Exhaust gas temperature too low <b>Acknowledgment required!</b>	■ Contact the service partner.

### 7.20.1.4 Unusual machine noises

Fault description	Cause	Remedy
Noise from the slewing gear.	Gear rim lubrication insufficient.	■ Lubricate gear rim according to lubrication plan.
Fan constantly runs at top speed.	Fan control is not working.	■ Check that the plug for the fan control is secure. ■ Contact the service partner.
Noises in the hydraulic system.	Hydraulic pump delivers insufficient oil.	■ Check hydraulic oil level and refill oil.
	Hydraulic pump draws in air.	■ Contact the service partner.
	Overpressure valve is defective.	■ Contact the service partner.
	Hydraulic pump suction line is not sealed.	■ Contact the service partner.
Winch emitting noise.	Winch oil level too low.	■ Check winch oil level. ■ If necessary, fill with oil.
	Winch pressure roller not working.	■ Contact the service partner.
Noises when locking and securing the telescopic thrusters (especially telescopic thruster 1) and slow speeds.	Adjustment of the position controller for pin boom control.	■ Contact the service partner.

7.20.1.5 Boom

Fault description	Cause	Remedy
The boom cannot be moved.	The safety lever has been pulled back.	Push the safety lever in direction of travel.
	The telescopic cylinder is not activated for this movement.	Push the <i>[Activate telescopic cylinder]</i> switch to the right.
	The control is in a deadlock.	<ul style="list-style-type: none"> <li>■ Switch to the <i>"Pin boom"</i> menu page.</li> <li>■ Check whether the status indicators for the quick-select icons are flashing.</li> <li>■ Continue after the error description                             <ul style="list-style-type: none"> <li>– "In semi-automatic telescoping mode, the system does not respond and the status indicator for the <i>[Securing secure locking unit]</i> quick-select icon flashes."</li> <li>or</li> <li>– "In semi-automatic telescoping mode, the system does not respond and the status indicator for the <i>[Telescopic thruster locking mechanism]</i> quick-select icon flashes."</li> </ul> </li> </ul>
In semi-automatic telescoping mode, the system does not respond.	The semi-automatic telescoping mode is in search mode.	Activate the function for 15 seconds.
	The control is in a deadlock.	<ul style="list-style-type: none"> <li>■ Switch to the <i>"Pin boom"</i> menu page.</li> <li>■ Check whether the status indicators for the quick-select icons are flashing.</li> <li>■ Continue after the error description                             <ul style="list-style-type: none"> <li>– "In semi-automatic telescoping mode, the system does not respond and the status indicator for the <i>[Securing secure locking unit]</i> quick-select icon flashes."</li> <li>or</li> <li>– "In semi-automatic telescoping mode, the system does not respond and the status indicator for the <i>[Telescopic thruster locking mechanism]</i> quick-select icon flashes."</li> </ul> </li> </ul>
	Defective sensors or cable break. The semi-automatic telescoping mode does not detect the individual telescopic thrusters.	<ul style="list-style-type: none"> <li>■ Set up the maintenance status.</li> <li>■ Replace the affected sensors.</li> </ul>

Fault description	Cause	Remedy
<p>In semi-automatic telescoping mode, the system does not respond.</p>	<p>Defective secure locking unit sensors and/or cable break. The semi-automatic telescoping mode does not find the securing position.</p>	<ul style="list-style-type: none"> <li>■ Switch to the “Pin boom” menu page.</li> <li>■ When activating the lower boom section, check the status indicator of the <i>[Secure locking unit position indicator]</i> arrows. When activating the lower boom section, at least one of the <i>[Secure locking unit position indicator]</i> arrows stays white.</li> <li>■ Set up the maintenance status. Replace the affected sensors.</li> </ul>
	<p>Insufficient pressure in the piston accumulator to activate the secure locking unit</p>	<ul style="list-style-type: none"> <li>■ Set up the maintenance status.</li> <li>■ Determine the cause.</li> <li>■ Continue after the error description: "Insufficient pressure in the piston accumulator to activate the secure locking unit"</li> </ul>
	<p>The length indicator is defective.</p>	<ul style="list-style-type: none"> <li>■ Set up the maintenance status.</li> <li>■ Replace the length indicator.</li> </ul>
	<p>The length indicator rope is torn.</p>	<ul style="list-style-type: none"> <li>■ Set up the maintenance status.</li> <li>■ Replace the length indicator.</li> </ul>
	<p>The end fastening of the length indicator rope has come loose.</p>	<ul style="list-style-type: none"> <li>■ Set up the maintenance status.</li> <li>■ Attach the rope to the secure locking unit.</li> <li>■ Check function.</li> </ul>
<p>In semi-automatic telescoping mode, the system does not respond and the status indicator for the <i>[Telescopic thruster locking mechanism]</i> quick-select icon flashes.</p>	<p>The locking bolt cannot be unlocked.</p>	<ul style="list-style-type: none"> <li>■ Select manual telescoping mode.</li> <li>■ Tilt the joystick in the <i>[Retract telescope]</i> direction until the boom is audibly pressurized.</li> <li>■ Tilt the joystick in the <i>[Extend telescope]</i> direction until the locking position has been reached.  <i>↳ Table 9 “Unlocking/locking positions of the telescopic thrusters” on page 492</i></li> <li>■ Press the <i>[Telescopic thruster locking]</i> quick-select button. <ul style="list-style-type: none"> <li>– Fault rectified: The status indicator for the <i>[Telescopic thruster locking mechanism]</i> quick-select icon is black. Select the semi-automatic telescoping mode.</li> <li>– Fault persists: Repeat the procedure.</li> </ul> </li> </ul>
<p>In semi-automatic telescoping mode, the system does not respond and the status indicator for the <i>[Securing secure locking unit]</i> quick-select icon flashes.</p>	<p>The secure locking unit cannot be unlocked.</p>	<ul style="list-style-type: none"> <li>■ Select manual telescoping mode.</li> <li>■ Tilt the joystick in the <i>[Retract telescope]</i> direction until the boom is audibly pressurized.</li> </ul>

Fault description	Cause	Remedy
In semi-automatic telescoping mode, the system does not respond and the status indicator for the [Securing secure locking unit] quick-select icon flashes.	The secure locking unit cannot be unlocked.	<ul style="list-style-type: none"> <li>■ Tilt the joystick in the [Extend telescope] direction until the boom is extended by 1 to 2 cm.</li> <li>■ Press the [Securing secure locking unit] quick-select button.                             <ul style="list-style-type: none"> <li>– Fault rectified: The status indicator for the [Securing secure locking unit] quick-select icon is black. Select the semi-automatic telescoping mode.</li> <li>– Fault persists: The status indicator for the [Securing secure locking unit] quick-select icon is yellow. Tilt the joystick very slightly in the [Extend telescope] direction until the securing position has been reached.</li> </ul> </li> </ul>
The secure locking unit cannot be moved in manual telescoping mode.	Insufficient pressure in the piston accumulator to activate the secure locking unit	<ul style="list-style-type: none"> <li>■ Set up the maintenance status.</li> <li>■ Determine the cause.</li> <li>■ Continue after the error description: "Insufficient pressure in the piston accumulator to activate the secure locking unit"</li> </ul>
	Cable break	
The secure locking unit can only be switched to the "secured and not locked" status.	Both tension springs are broken or the pre-load/residual pre-load of the tension springs is too low.	<ul style="list-style-type: none"> <li>■ Set up the maintenance status.</li> <li>■ Replace the tension springs.</li> </ul>
Insufficient pressure in the piston accumulator to activate the secure locking unit	No oil or nitrogen in the piston accumulator	<ul style="list-style-type: none"> <li>■ Set up the maintenance status.</li> <li>■ Adding more oil or</li> <li>■ Replace the piston accumulator.</li> </ul>
	The pressure switch is defective.	<ul style="list-style-type: none"> <li>■ Set up the maintenance status.</li> <li>■ Replace the pressure switch.</li> </ul>
	The electric motor is defective or has a short circuit.	<ul style="list-style-type: none"> <li>■ Set up the maintenance status.</li> <li>■ Replace the electric motor.</li> <li>■ Rectify the short circuit.</li> </ul>
The secure locking unit cannot be retracted.	The safety lever has been pulled back.	Push the safety lever in direction of travel.
	The telescopic cylinder is not activated for this movement.	Push the [Activate telescopic cylinder] switch to the right.
	The secure locking unit is secured.	Check the status indicator in the main menu.

Fault description	Cause	Remedy
The secure locking unit cannot be retracted.	The secure locking unit is secured.	<ul style="list-style-type: none"> <li>■ Activate the function for 15 seconds.</li> <li>■ Fault persists:                             <ul style="list-style-type: none"> <li>– Switch to the “Pin boom” menu page.</li> <li>– Check whether the status indicators for the quick-select icons are flashing.</li> <li>– Continue after the error description: "In semi-automatic telescoping mode, the system does not respond and the status indicator for the [Securing secure locking unit] quick-select icon flashes."</li> </ul> </li> </ul>
	The secure locking unit was extended too far and fell out of the guide.	Contact the service technician.

### 7.20.1.6 Heating/air conditioning evaporator

Fault description	Cause	Remedy
Climate control system is not working.	V-belt defective, loose or has come free.	<ul style="list-style-type: none"> <li>■ Check V-belt for correct positioning and tension.</li> <li>■ Have defective or worn-out V-belt replaced by the relevant service.</li> </ul>
	Air conditioning compressor not working.	<ul style="list-style-type: none"> <li>■ Contact the service partner.</li> </ul>
Blower is not working.	Fuse blown or loose.	<p>Make sure the fuse is properly seated and insert it correctly if necessary. Replace defective fuse. – If the defect recurs within a short period of time, this indicates a short-circuit or a blockage. Contact the service partner.</p> <ul style="list-style-type: none"> <li>■ Replace fuse.</li> </ul>
	Contact is loose.	<ul style="list-style-type: none"> <li>■ Check plug is secure.</li> </ul>
	Fan motor defective.	<ul style="list-style-type: none"> <li>■ Contact the service partner.</li> </ul>
Defective control element	Power supply interrupted.	Check the control element. Contact the service partner.
Blower cannot be shut off.	Control element defective.	<ul style="list-style-type: none"> <li>■ Contact the service partner.</li> </ul>
	Short-circuit in cable.	<ul style="list-style-type: none"> <li>■ Contact the service partner.</li> </ul>
Cooling capacity too low.	Air filter is clogged or worn-out.	<ul style="list-style-type: none"> <li>■ Replace filter element.</li> <li>■ Contact air-conditioning technicians.</li> </ul>
	Heat exchanger is contaminated.	<ul style="list-style-type: none"> <li>■ Clean the heat exchanger's cooling fins with pressurized air.</li> </ul>
	Refrigerant level too low.	<ul style="list-style-type: none"> <li>■ Contact air-conditioning technicians.</li> </ul>
No or insufficient heat output.	Heat exchanger contaminated.	<ul style="list-style-type: none"> <li>■ Clean the heat exchanger's cooling fins with pressurized air.</li> </ul>

Fault description	Cause	Remedy
No or insufficient heat output.	Thermostat not working.	■ Contact air-conditioning technicians.
	Air filter clogged.	■ Clean or replace the filter element.
	Air-conditioning control defective.	■ Contact the service partner.
Coolant feed temperature too low	Wait until the diesel engine has warmed up. Vehicle thermostat defective.	Contact the service partner.
Heat exchanger lamellas are contaminated	Check the heat exchanger and clean if necessary. Water lines kinked or crushed.	Check the heat exchanger and clean if necessary. Water lines kinked or crushed - contact your service partner.
Air filter clogged		Clean or replace the filter element.
Resistor defective		Replace the resistor.
Air-conditioning control not working.	Air-conditioning control defective.	Contact the service partner.

### Heat output

Fault description	Cause	Remedy
Blower not working	Fuse defective or loose	■ Check the fuse and insert it correctly, if necessary. Replace defective fuse. If another defect occurs within a short time, it indicates a short-circuit or a blockage. Check the blower for blockages or other defects and rectify the fault.
	Power supply interrupted	■ Check lines for loose contacts or breaks.
	Blower motor defective	■ Replace the blower.
	Defective control element	■ Check control element, replace, if necessary.
Blower cannot be shut off	Short circuit in the cable	■ Rectify short-circuit, install new cable(s) if necessary
Blower working with reduced power	Contacts soiled	■ Clean the plug contact. Proceed carefully to avoid short-circuits.
	Electric line dimensions too small	■ Install recommended cable cross section.
	Heat exchanger contaminated	■ Clean thoroughly and prevent damage that could cause leaks. Attention! Observe the safety instructions.
	Air flow insufficient because air filter is clogged	■ Clean or replace filter.
No heat or insufficient heating output	Coolant feed temperature too low	■ Wait until the vehicle engine is warm
	Vehicle thermostat defective	■ Replace thermostat

## Operation

Fault description	Cause	Remedy
No heat or insufficient heating output	Heat exchanger fins soiled	■ Check heat exchanger and clean if necessary
	Water lines kinked or crushed	■ Rectify cause of fault or install new hose.
	Insufficient water pump pressure	■ No coolant flow through heat exchanger. Install an additional or more powerful pump.
	Insufficient air flow because air filter is clogged	■ Clean or replace filter.
	Resistor defective	■ Replace resistor
	Climate control defective	■ Check and replace if necessary.
Water leaking from device	Hose connection loose	Check hoses and tighten hose clips
	Water hose damaged	■ Install and connect new hose
	Heat exchanger damaged	■ Install an original replacement part and connect. Attention! Observe the safety instructions.
Air flaps stuck	Servomotor defective	■ Replace servomotor
	Foreign object is blocking flap	■ Check flap, remove foreign object.
	Flap deformed	■ Check flap and straighten if necessary.
	Flap bearing is defective	■ Check flap bearing and replace if necessary.
	Control system defective	■ Check control system and replace if necessary.

## Cooling capacity

Fault description	Cause	Remedy
Compressor not working	Interruption in the solenoid coil of the compressor	■ Check the current flow to the clutch.
	V-belt loose or torn	■ Adjust the V-belt tension, replace V-belt.
	V-belt pulley does not turn, even though the magnetic clutch is engaged	■ Check compressor and replace if necessary.
	Compressor clutch slips	■ Repair coupling or replace compressor.
	Control system defective	■ Check control system and replace if necessary.
Evaporator flooding	Expansion valve is stuck in open position, or hangs	■ Replace expansion valve.
Evaporator icing up	Thermostat sensor at the wrong position	■ Reposition sensor.
	Expansion valve, thermostat or collector drier is defective	■ Replace expansion valve, thermostat or collector drier

Fault description	Cause	Remedy
Evaporator clogged	Cooling fins soiled	■ Clean evaporator
Loss of refrigerant	Break in refrigerant line	■ Check all lines for break due to external effects or abrasion
	Leakage in the system	■ Evacuate, fill, check for leaks and repair.
Insufficient cooling output	Air flow insufficient because air filter is clogged	■ Clean or replace filter.
	Relay defective	■ Replace relay.
	Fan passage obstructed	■ Check air channels for obstructions. Rectify fault.
	Outside air-/recirculating air flap set to outside air at higher outside air temperature	■ Set to recirculating air.
	Air flow of liquefier insufficient because cooling fins are soiled	■ Clean the cooling fins.
	Insufficient refrigerant fill level	■ Fill with refrigerant (service engineer).
	Moisture in the system	■ Empty the climate control system, replace the collector drier, evacuate and fill (service engineer).
	Collector drier saturated	■ Empty the climate control system, replace the collector drier, evacuate and fill (service engineer).
System cooling intermittently	Line break, faulty ground connection or loose contacts in the solenoid coil of the compressor	■ Check lines, repair or replace.
	Blower motor defective	■ Replace blower.

### System very noisy

Fault description	Cause	Remedy
System very noisy	V-belt loose or excessively worn	■ Tighten or replace V-belt.
	Clutch noisy	■ Repair clutch.
	The compressor bracket is loose or the internal components of the compressor are worn	■ Repair holder; replace compressor.
	Excessive wear of fan motor	■ Replace blower.
	System overfilled	■ Extract refrigerant until the high-pressure display shows normal value.
	Insufficient refrigerant level in the system	■ Check for leaks; fill system.

## Operation

### 7.20.1.7 Lighting

Fault description	Cause	Remedy
Turn signal system, hazard signal system, or machine lighting not working.	Bulb not working.	■ Change bulb.
	Fuse blown.	■ Change fuse.
	Plug connection loose.	■ Check plug connection is secure and tighten.
	Cable or plug connection not working.	■ Contact the service partner.
	Switch not working.	■ Contact the service partner.

### 7.20.1.8 Remote radio control

Fault description	Cause	Remedy
Remote radio control not working.	Remote radio control battery charge too low. An intermittent tone indicates that the battery is low. The remote radio control is turned off about 30 s after the intermittent tone sounded.	■ Charge batteries.
	Interfering frequencies are disrupting the remote radio control.	■ Resolve the source of the disruption. ■ Restart the remote radio control.
	The uppercarriage cannot be rotated.	■ Disengage the slewing gear brake.
	Remote radio control in the cab is not active.	■ Activate remote radio control in the cab.
	The emergency stop switch has been actuated.	Activate the horn.

### 7.20.1.9 Hydraulic system

Fault description	Cause	Remedy
Oil leaks on the hydraulic system	Hose clampings loose	■ Fasten hose clampings.
	Hoses or seals damaged	■ Replace hoses or seals.
Hydraulic pump not working	Fault in pump circuit	■ Have fault localized and corrected by a hydraulics specialist.
Work equipment malfunctioning or not working	Hydraulic oil level too low	■ Check hydraulic oil level. ■ Add hydraulic oil as needed.
	Hydraulic system leaking	■ Check working cylinder, connections and hoses for leaks. ■ Have the fault corrected by a hydraulics specialist.

Fault description	Cause	Remedy
Work equipment malfunctioning or not working	Fault in one of the working circuits	<ul style="list-style-type: none"> <li>Have the fault corrected by a hydraulics specialist.</li> </ul>
Noises when moving a working cylinder	Cylinder piston rod not lubricated	<ul style="list-style-type: none"> <li>Have fault corrected by a hydraulics specialist.</li> </ul>
No power or low power of the hydraulic system	Hose clampings loose	<ul style="list-style-type: none"> <li>Fasten hose clampings.</li> </ul>
	Hoses or seals damaged	<ul style="list-style-type: none"> <li>Replace hoses or seals.</li> </ul>
	Pressure relief valve opens too soon	<ul style="list-style-type: none"> <li>Have the fault corrected by a hydraulics specialist.</li> </ul>
	Hydraulic pump worn or defective	<ul style="list-style-type: none"> <li>Have pump replaced by a hydraulics specialist.</li> </ul>
Noises in hydraulic system	Hydraulic pump takes in air	<ul style="list-style-type: none"> <li>Have the fault corrected by a hydraulics specialist.</li> </ul>
	Hydraulic pump delivers insufficient oil	<ul style="list-style-type: none"> <li>Check hydraulic oil level.</li> <li>Add hydraulic oil as needed.</li> </ul>
	Pressure relief valve chatters	<ul style="list-style-type: none"> <li>Have the fault corrected by a hydraulics specialist.</li> </ul>

Table 13: Overview of messages for hydraulic system

SENCON symbol	SPN	FMI	Description	Solution
			Orange Hydraulic temperature increased	<ul style="list-style-type: none"> <li>Lower attached loads.</li> <li>Switch off the diesel engine.</li> <li>Turn off electric motor.</li> <li>Check combination cooler for soiling.</li> <li>Check hydraulic oil cooling system for contamination.</li> <li>Clean soiled cooler.</li> </ul>
			Red Hydraulic temperature too high	<ul style="list-style-type: none"> <li>Lower attached loads.</li> <li>Switch off the diesel engine.</li> <li>Turn off electric motor.</li> <li>Check combination cooler for soiling.</li> <li>Check hydraulic oil cooling system for contamination.</li> <li>Clean soiled cooler.</li> </ul>

#### 7.20.1.10 Slewing gear

Fault description	Cause	Remedy
Oil leaks in swing gear box transmission	Loose connections	<ul style="list-style-type: none"> <li>Tighten connections.</li> </ul>

## Operation

Fault description	Cause	Remedy
Rotary feedthrough leaking	Seals damaged	■ Replace seals.
	Lines loose	■ Tighten fastening bolts.
Noise from the slewing gear	Insufficient lubrication on gear rim	■ Lubricate gear rim according to lubrication plan

### 7.20.1.11 Travel gear/undercarriage

Fault description	Cause	Remedy
Oil leaks on the travel gear	Sealing plugs loose	■ Fasten sealing plugs.
	Seals damaged.	■ Replace seals.

### 7.20.1.12 Cab

Fault description	Cause	Remedy
Increased shaking or vibration of cab	Cab suspension or cab attachment damaged	<ul style="list-style-type: none"> <li>■ Check all connection elements, screws and bolts of cab suspension and fastening for damage, cracking or deformation.</li> <li>■ Have damaged parts exchanged immediately by trained and instructed specialist personnel.</li> </ul>

### 7.20.1.13 Load moment limitation

Table 14: Overview of messages for LML

SENCÓN symbol	SPN	FMI	Description	Solution
		Orange	LML error acc. to error number	<ul style="list-style-type: none"> <li>■ Check error number in Diagnostics window.</li> <li>■ Contact the service partner.</li> </ul>

## 7.20.2 Troubleshooting

### 7.20.2.1 Restart system

The system must be restarted if it takes more than 3 minutes to start up. The *[Tare load]* quick-select icon in the SENCÓN toolbar is greyed out.

1. ➤ Turn ignition key to position *[0]*.
  - ⇒ The ignition is off.
2. ➤ Wait a while then restart the system.

After a repeated attempt, the system and LML will not start up.

1. → Turn off the engine.
2. → Disconnect the energy supply.
3. → Turn on the machine.

### 7.20.2.2 Jump starting the engine

If the engine cannot be started due to low battery capacity, it can be jump-started using an external auxiliary battery.

#### Safety instructions when handling batteries

Incorrect use of batteries poses the risk of the batteries exploding or of harmful fluid leaking from the batteries. The fluid can cause chemical burns to the skin upon contact, and cause blindness through contact with the eyes.

- Never short-circuit the battery terminals (positive and negative).
- Never expose batteries to moisture or humidity (rain, salt water, liquids). Do not, in any instance, use a moist or wet battery.
- Do not use or store batteries in locations with atmospheres which risk explosion or in which high temperatures could occur.
- Never attempt to repair, modify, convert or disassemble batteries.
- Always make sure that batteries cannot be accessed by unauthorized parties.
- To avoid fire, over-heating, explosions or leakage of batteries, never expose them to serious shock, high weight loads, or other damaging impacts. Leaked fluids can catch alight.
- If leaking fluid comes into contact with the eye, rinse the eye (including under the eyelid) with clean water for at least 15 minutes. When doing so, direct a gentle stream of water onto the eye and do not rub. Immediately seek medical attention.
- Avoid skin contact with leaked fluids. In the case of accidental skin contact, wash the affected skin area with plenty of water and soap.

**⚠ WARNING**

#### Risk of injury due to exploding battery!

- Do not handle near open flame, fire or any source of ignition.
- Wear safety goggles and protective gloves when working on the battery.
- Do not tilt battery.
- Do not place any tools on the battery.
- Disconnect the battery before starting welding work.
- Do not confuse battery connections.
- Dispose of old batteries as hazardous waste.

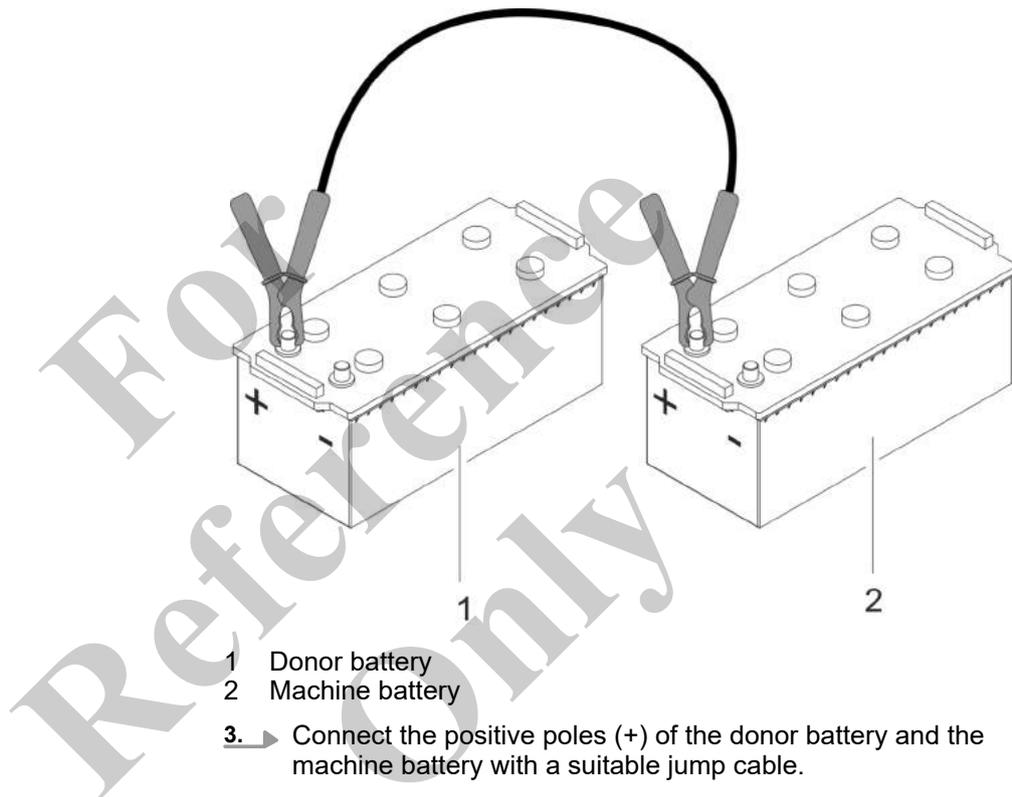
**The battery may explode if overheated. This can cause injuries and chemical burns.**

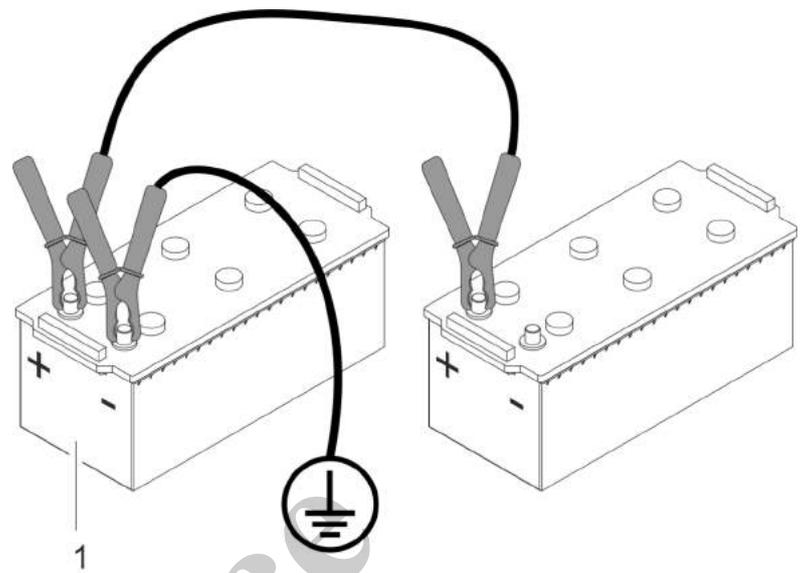
## Operation

The machine is equipped with a 24 volt starting system. The donor battery must have the same voltage.

- Materials:
- Jump cable with minimum cross-section 70 mm<sup>2</sup>
  - Jump cable with minimum cross-section 0.11 sq.in

1. → Turn off the battery disconnect switch.
2. → Remove the battery cover.





1 Donor battery

4. → Using a suitable jump cable, connect the negative pole (-) of the donor battery to the engine block or an unpainted metal part connected to it on the side of the machine.
5. → Start the engine of the donor battery.
6. → Turn on the battery disconnect switch.
7. → If startup works, let the diesel engine run for a few minutes.
8. → Switch off the diesel engine and the battery disconnect switch.
9. → Loosen the jump cable on the negative pole.
10. → Loosen the jump cable on the negative pole.
11. → Replace the battery cover.

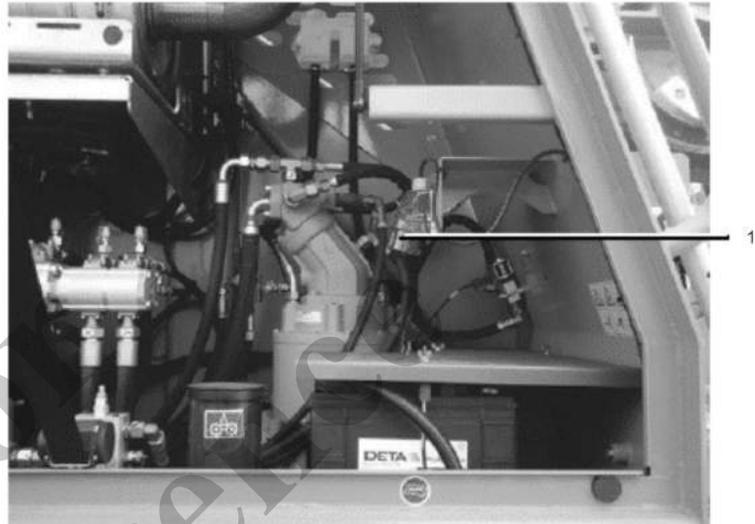
### 7.20.2.3 Working in emergency operation

The hydraulic power unit (option) can be used to complete all movements of the machine in emergency operation should the engine fail.

### Activating the hydraulic power unit for emergency operation

Requirement:

- The ignition key is in position [I].
- The safety lever has been pulled back.



1 480 V power socket on the right-hand side of the uppercarriage

1. ➤ Plug the extension cable into the power socket.  
⇒ The power supply to the emergency pump is established.

***i** A clockwise rotation field is required for the power supply. Use the integrated phase inverter if the hydraulic functions do not react when the emergency pump is activated, in order to change the direction of rotation of the phases if necessary.*

2. ➤ Bypass LML.
3. ➤ Press the [Release hydraulic power unit] switch to the right.  
⇒ The emergency pump is activated.
4. ➤ Push the safety lever in direction of travel.

### Working in emergency operation

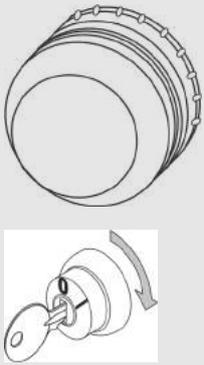
- Proceed slowly and with caution when working in emergency operation.
- The work platform must be in horizontal position at all times. Stop the movement if necessary.
- Activate the [emergency stop] switch in the case of an emergency.

### Ending Emergency Operation

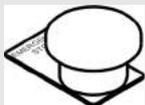
1. ➤ Press the [Release hydraulic power unit] switch to the left.  
⇒ The emergency pump is deactivated.

2. → Remove the extension cable from the 400 V power socket.

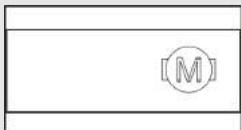
**LML bypass key switch and push button**

	<b>[LML bypass] push button pressed and [LML bypass] key switch held in [I] position</b>	<b>[LML bypass] push button not pressed and/or [LML bypass] key switch released</b>
	<p>The LML is bypassed. The speed of crane control functions is not limited.</p>	<p>The load moment limitation is activated.</p>

**Emergency stop**

	<b>Pull switch</b>	<b>Press switch</b>
	<p>The machine is ready for operation.</p>	<p>The engine and all machine movements are stopped.</p>

**Release hydraulic power unit (option)**

	<b>Switch position left</b>	<b>Switch position right</b>
	<p>It is not possible to use the hydraulic power unit.</p>	<p>The hydraulic power unit has been released for use.</p>

**7.20.2.4 Setting up the machine via emergency control**

The emergency control function can be used to complete the following tasks if the Setup remote radio control is out of order.

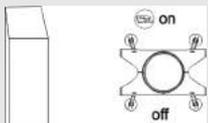
- Bolt/unbolt the counterweight
- Extend/retract the ballasting cylinder

- Stabilize the machine.
- Setting the track width

### 7.20.2.4.1 Activating the emergency control

1. Open service access door.
2. Open the electrical switch cabinet.
3. Activate the emergency control function.

#### Activate/deactivate emergency control

	Fold up the cover Press lever upward	Fold the cover down or Press lever downward
	<p>The emergency control is activated.</p> <p>The following functions can be performed:</p> <ul style="list-style-type: none"> <li>■ Unlock/lock counterweight emergency control</li> <li>■ Extend/retract ballasting cylinder emergency control</li> <li>■ Stabilize machine emergency control</li> <li>■ Set track width emergency control</li> </ul>	<p>The emergency control is deactivated.</p>

### 7.20.2.4.2 Extending/retracting the outrigger cylinders

To use the emergency control function to extend or retract the outrigger cylinders you must comply with the specifications for stabilizing the machine that apply to the relevant application.

#### Further notes

- Chapter 6.6.7 "Setting the track width" on page 266
- Chapter 9.6.2 "Loading the stabilized machine" on page 587
- Chapter 9.7.2 "Unloading the stabilized machine" on page 628

#### Requirement:

- The emergency control is activated.
- The left and right ballasting cylinders are extended.

#### Extending outrigger cylinders via emergency control

- Extend the outriggers in accordance with the specifications for lifting the machine.

**Further notes**

☞ Chapter 9.6.2.1.7 “Lifting the machine” on page 597

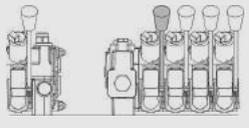
**Retracting outrigger cylinders via emergency control**

➔ Retract the outriggers in accordance with the specifications for lowering the machine.

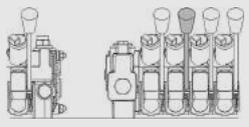
**Further notes**

☞ Chapter 9.6.2.1.7 “Lifting the machine” on page 597

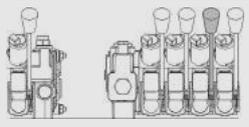
**Emergency control: right front outrigger cylinder**

	<b>Pull lever toward you</b>	<b>Push lever away from you</b>
	The outrigger cylinder is extended.	The outrigger cylinder is retracted.

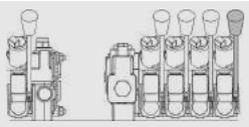
**Emergency control: right rear outrigger cylinder**

	<b>Pull lever toward you</b>	<b>Push lever away from you</b>
	The outrigger cylinder is extended.	The outrigger cylinder is retracted.

**Emergency control: left rear outrigger cylinder**

	<b>Pull lever toward you</b>	<b>Push lever away from you</b>
	The outrigger cylinder is extended.	The outrigger cylinder is retracted.

**Emergency control: left front outrigger cylinder**

	<b>Pull lever toward you</b>	<b>Push lever away from you</b>
	The outrigger cylinder is extended.	The outrigger cylinder is retracted.

## 7.20.2.4.3 Increase/reduce track width

To use the emergency control function to increase or reduce the track width you must comply with the specifications for setting the track width.

### Further notes

↪ Chapter 6.6.7 "Setting the track width" on page 266

Requirement:

- Uppercarriage is locked.
- Extension mode, the boom length, and the boom angle for changing the track width are set.
- The machine has been stabilized ready for the track width to be changed.
- The emergency control is activated.

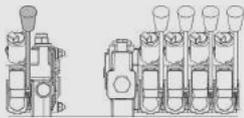
### Increasing the track width

→ Pull the [Emergency control: Set track width] lever toward you until the maximum track width is set.

### Decreasing the track width

→ Push the [Emergency control: Set track width] lever away from you.

### Emergency control: setting the track width

	Pull lever toward you	Push lever away from you
	The track width is increased.	The track width is decreased.

## 7.20.2.4.4 Extending/retracting ballasting cylinders

To use the emergency control function to extend or retract the ballasting cylinders you must comply with the specifications for ballasting the machine that apply to the relevant application.

### Further notes

↪ Chapter 6.6.9 "Ballasting the machine" on page 305

↪ Chapter 6.7.7 "Removing the ballast" on page 403

↪ Chapter 6.7.8 "Partially ballasting the machine" on page 405

**Extending the ballasting cylinders in emergency operation**

Requirement:

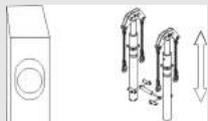
- The emergency control is activated.
- ➔ Tilt and hold up both the  
[Emergency control: Extend/retract left ballasting cylinder] lever and the  
[Emergency control: Extend/retract left ballasting cylinder] lever simultaneously.

**Retracting the ballasting cylinders in emergency operation**

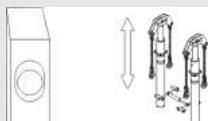
Requirement:

- The emergency control is activated.
- ➔ Tilt and hold down both the  
[Emergency control: Extend/retract left ballasting cylinder] lever and the  
[Emergency control: Extend/retract left ballasting cylinder] lever simultaneously.

**Emergency control: extend/retract left ballasting cylinder**

	Push and hold the lever up	Push and hold the lever down
	The left ballasting cylinder is extended.	The left ballasting cylinder is retracted.

**Emergency control: extend/retract right ballasting cylinder**

	Push and hold the lever up	Push and hold the lever down
	The right ballasting cylinder is extended.	The right ballasting cylinder is retracted.

**7.20.2.4.5 Bolting/unbolting the counterweight**

To bolt or unbolt the counterweight you must comply with the specifications for ballasting the machine.

## Further notes

- ↳ Chapter 6.6.9 "Ballasting the machine" on page 305
- ↳ Chapter 6.7.7 "Removing the ballast" on page 403
- ↳ Chapter 6.7.8 "Partially ballasting the machine" on page 405

### Requirement:

- The emergency control is activated.
- The left and right ballasting cylinders are extended.

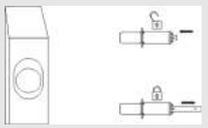
## Bolting the counterweight in emergency operation

- ➔ Keep the [Emergency control: Unbolt/bolt counterweight] lever pushed down.

## Unbolting the counterweight in emergency operation

- ➔ Keep the [Emergency control: Unbolt/Bolt counterweight] lever pushed up.

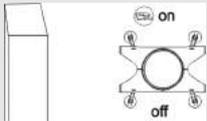
## Emergency control: Bolt/unbolt counterweight

	Push and hold the lever up	Push and hold the lever down
	The counterweight is unbolted.	The counterweight is bolted.

### 7.20.2.4.6 Deactivating emergency control

1. ➔ Deactivate the emergency control function.
2. ➔ Close the electrical switch cabinet.
3. ➔ Close the service door.

**Activate/deactivate emergency control**

	<b>Fold up the cover Press lever upward</b>	<b>Fold the cover down or Press lever downward</b>
	<p>The emergency control is activated.</p> <p>The following functions can be performed:</p> <ul style="list-style-type: none"> <li>■ Unlock/lock counterweight emergency control</li> <li>■ Extend/retract ballasting cylinder emergency control</li> <li>■ Stabilize machine emergency control</li> <li>■ Set track width emergency control</li> </ul>	<p>The emergency control is deactivated.</p>

**7.20.2.5 Machine is switching off unexpectedly**

The machine switches off if the hydraulic oil level is too low.  
The engine has cut out.

1. → Check the warning and information symbols on the SENCON.
  - ⇒ The [Machine fault display] warning symbol lights up red.
2. → Open the "Diagnostics" menu.
  - Go to the "Active Faults Machine" menu page.
  - ⇒ Fault number SPN 1011007 is displayed.
3. → Park the machine in the control position immediately.
4. → Check the hydraulic oil level. Add hydraulic oil.

**Further notes**

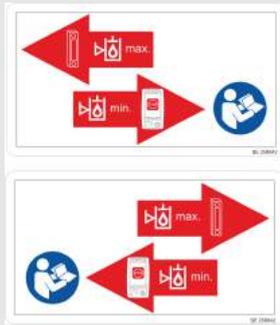
🔗 *Table 11 "Overview of status messages" on page 537*  
Maintenance: Adding hydraulic oil

## Operation

### Machine fault display

	Grey	Orange	Red
	There are no faults.	A note is displayed.	—
	—	There is a medium fault. An acoustic signal (single tone) will sound.	—
	—	—	There is a serious fault. An acoustic signal (continuous tone) will sound.

### Notice on min. and max. hydraulic oil tank fill level

Shown	Meaning	SEBO no.
	<p>Maximum oil level on sight glass:</p> <ul style="list-style-type: none"> <li>■ The oil level must not exceed the upper marking.</li> </ul> <p>Minimum oil level on sight glass:</p> <ul style="list-style-type: none"> <li>■ The oil level is displayed on the SENCON.</li> </ul>	258842

#### 7.20.2.6 Canceling fault mode on the control

##### 7.20.2.6.1 Extending and retracting the boom in EM with 50% extension

The boom has been extended and retracted for a prolonged period in an extension mode with 50% extension (EM2, EM4, EM5, EM6, EM7). As time passes, the machine may no longer be able to find the positions for securing or locking the secure locking unit or the boom and the control will switch to fault mode.

Requirement:

- An EM with 50% extension has been set. The boom has already been extended and retracted in this extension mode for some time.
- The machine has not picked up any load.
- 1. ➔ Select an extension mode in which a telescopic thruster is moved to 100%.
- 2. ➔ Set the new extension mode on the “Pin boom” menu page on the SENCON.
- 3. ➔ Extend the boom.
  - ⇒ Extending a telescopic thruster to 100% fully extends the length indicator on the secure locking unit. The cumulative winding fault is reset.
- 4. ➔ Change the extension mode again if necessary.

### 7.20.2.7 Recovering the boom in an emergency

If malfunctions occur due to the secure locking unit, the boom can no longer be extended or retracted.

Possible malfunctions with the secure locking unit:

- The secure locking unit has got jammed.
- The secure locking unit was extended too far. The secure locking unit fell out of the guide.
- The cylinder of the secure locking unit is defective.

To recover the boom in an emergency, the boom must be lowered and the telescopic thrusters pushed back in as far as possible. The telescopic thrusters can be dismantled in this position.

### Tools

- Suitable auxiliary vehicle, such as wheel loader or forklift
- Timbers
- Hoisting slings
- Screwdriver
- Emergency release screws

An emergency release screw with a specific length is available for each telescopic thruster (T1 to T5) to release it in an emergency.

Data	Value
Emergency release screw for T1	M6 x 280 mm
Emergency release screw for T2	M6 x 250 mm
Emergency release screw for T3	M6 x 220 mm
Emergency release screw for T4	M6 x 170 mm
Emergency release screw for T5	M6 x 150 mm

## Operation

### 7.20.2.7.1 Preparing the machine for recovering the boom in an emergency

1. ▶ Position the uppercarriage based on the current track width and the current ballasting.

	Maximum track width	Medium track width	Minimum track width
<b>Full ballasting</b>	The uppercarriage can stay in its current position.	The uppercarriage can stay in its current position.	-
<b>Partial ballasting</b>	The uppercarriage can stay in its current position.	Slew the uppercarriage into the direction of travel.	-
<b>Without ballasting</b>	The uppercarriage can stay in its current position.	Slew the uppercarriage into the direction of travel.	Slew the uppercarriage into the direction of travel.

2. ▶ Lower the boom completely.

3. ▶ Remove all attachments.

#### Further notes

↪ Chapter 6.7.1 "Lower the boom completely" on page 322

#### Order for pushing back the telescopic thrusters

- Push back the telescopic thrusters fully in the order T5 to T1.
- Start with the smallest telescopic thruster.
- Only ever push back and release in an emergency one telescopic thruster at a time.

### 7.20.2.7.2 Overview: access openings of locking bolts

The telescopic thrusters must be moved to a specific position to release the locking bolts via the access openings. There are two options:

- Extending all telescopic thrusters 50% each.
- Extending all telescopic thrusters 100% each.

If the access openings for the emergency release cannot be reached in this way, contact the service technician.

#### Option 1

Telescopic thrusters T1 to T5 are 50% extended.

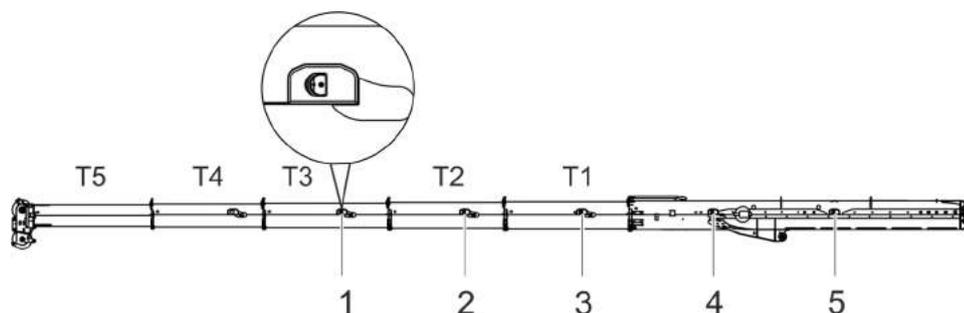


Fig. 33: Access openings: T1 to T5 50% extended

- 1 Access opening 100%: T5 unlocked
- 2 Access opening 100%: T4 unlocked
- 3 Access opening 100%: T3 unlocked
- 4 Access opening 100%: T2 unlocked
- 5 Access opening 50%: T1 unlocked

**Option 2**

Telescopic thrusters T1 to T5 are 100% extended.

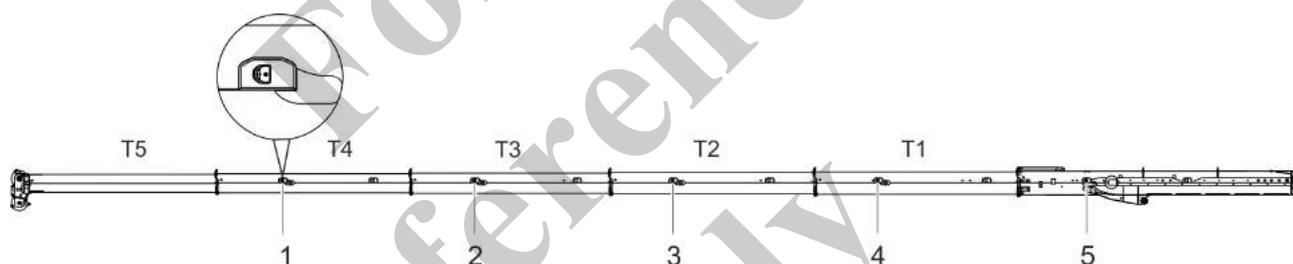


Fig. 34: Access openings: T1 to T5 100% extended

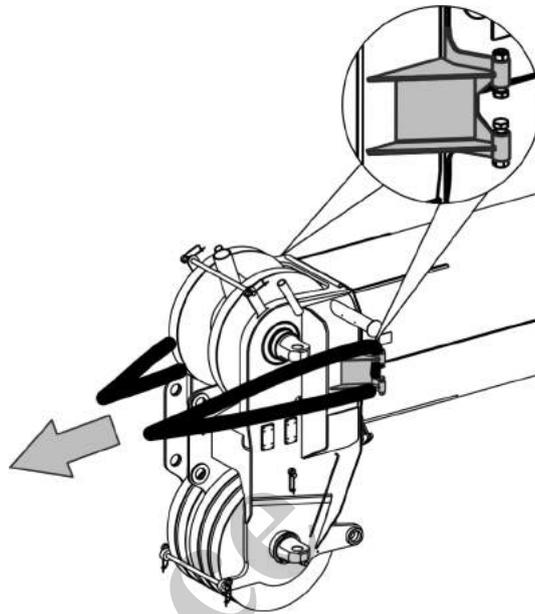
- 1 Access opening 100%: T5 unlocked
- 2 Access opening 100%: T4 unlocked
- 3 Access opening 100%: T3 unlocked
- 4 Access opening 100%: T2 unlocked
- 5 Access opening 100%: T1 unlocked

**7.20.2.7.3 Attaching hoisting slings to the telescopic thruster**

Attach the hoisting slings to the telescopic thruster to be unlocked.

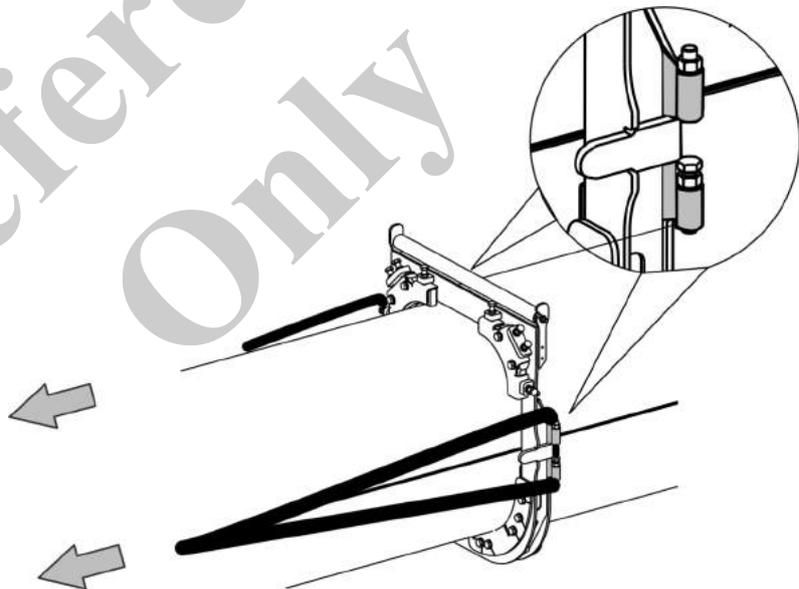
**T5: Attaching the hoisting sling to the anti-twist devices**

Attach the hoisting slings to the anti-twist devices to pull out telescopic thruster T5.



**Option 1 for T4 to T1: Attaching the hoisting sling to the anti-twist devices**

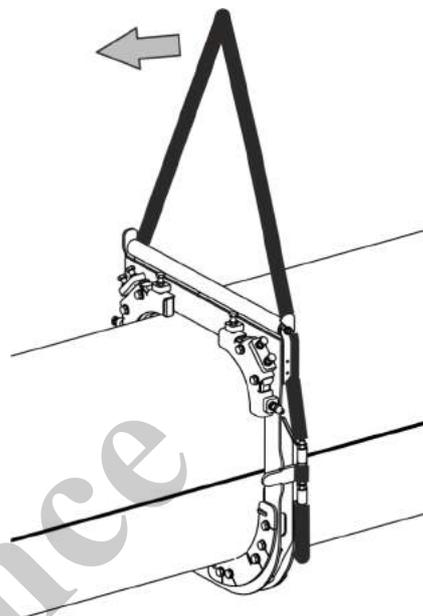
Attach the hoisting slings to the anti-twist devices to pull out telescopic thrusters T4 to T1.



1. ➤ Attach the hoisting slings around the anti-twist devices on the left and right-hand sides.  
Attach the edge guard.
2. ➤ Attach the hoisting slings to the auxiliary vehicle.

**Option 2 for T4 to T1: Attaching the hoisting sling to the collar of the telescopic thruster**

To pull out telescopic thrusters T4 to T1, attach a hoisting sling behind the collar of the telescopic thruster.



1. Attach a hoisting sling behind the collar on the respective telescopic thruster.  
Attach the edge guard.
2. The uppercarriage of the auxiliary vehicle is slewed 90° to the direction of travel.  
Attach the hoisting sling to the auxiliary vehicle.

**7.20.2.7.4 Pulling out the telescopic thruster for emergency release**

**Position of the locking bolts for emergency release**

The locking bolt of the telescopic thruster to be unlocked must be moved into the center of the access opening to enable it to be unlocked.

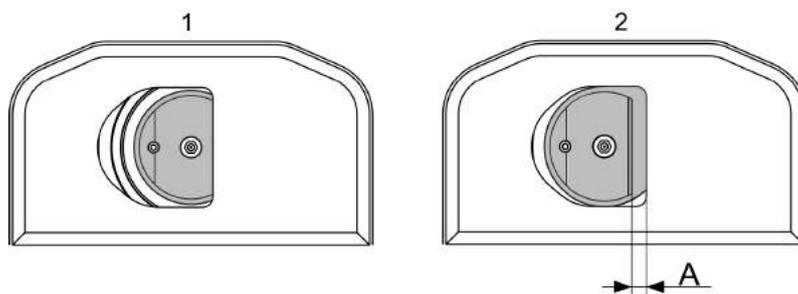


Fig. 35: Positions of the locking bolt in the access opening

- 1 Locking bolt locked
- 2 Locking bolt free for emergency release

## Operation

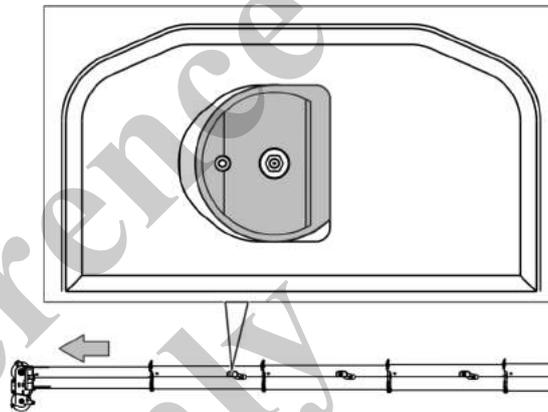
The ideal position for releasing the locking bolt in an emergency is reached when the locking bolt is located centrally in the access opening. Distance A must be reached as a minimum.

Data	Value	Unit
A	30	mm
A	1.2	in

### Pulling out the telescopic thruster for emergency release

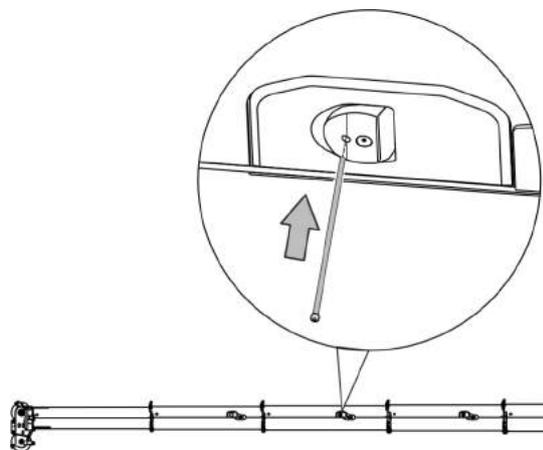
Requirement:

The hoisting slings are attached to the telescopic thruster to be unlocked.

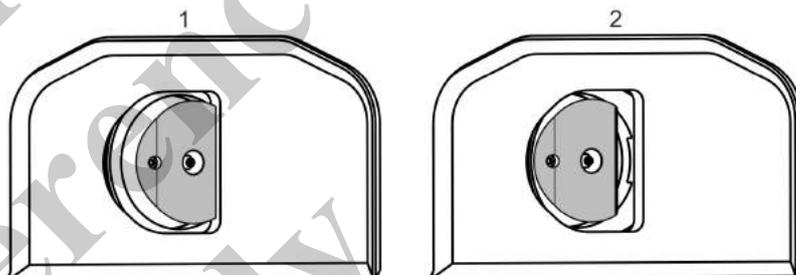


1. Use the auxiliary vehicle and hoisting slings to pull out the telescopic thruster until the locking bolt in the access opening has reached the emergency release position.
2. Use a tool such as a wooden beam to check that the locking bolt can move freely.

7.20.2.7.5 Unlocking the telescopic thruster with the emergency release screw



1. → Screw in the corresponding emergency release screw on the left locking bolt.



- 1 Locking bolt locked  
2 Locking bolt unlocked

2. → **NOTICE! Breakage of emergency release screw when screwing in the locking bolt**
- Screw in the locking bolt by hand.
  - If the locking bolt becomes difficult to screw in, stop the procedure.

**When using a tool such as a cordless screwdriver, power drill, or similar to screw in the locking bolt with the emergency release screw, the emergency release screw may break.**

Screw the locking bolt in completely with the aid of the emergency release screw.

⇒ The locking bolt is unlocked.

3. → Use the emergency release screw to screw in the right locking bolt on the same telescopic thruster in the same way.

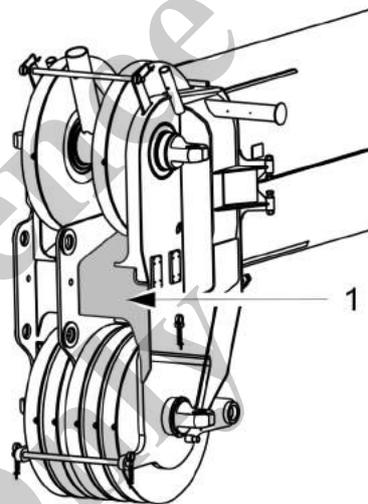
⇒ The telescopic thruster is unlocked. The telescopic thruster can be pushed back.

### Difficulty screwing in the locking bolt using the emergency release screw

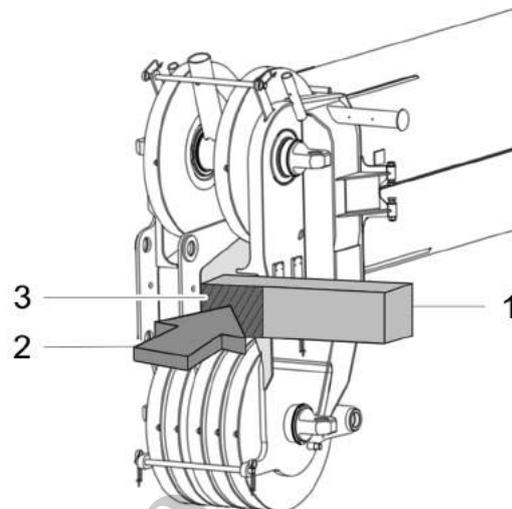
It is difficult to screw in the locking bolt using the emergency release screw.

1. ➤ Stop screwing in the locking bolt.
2. ➤ Pull the locking bolt out again.
3. ➤ Check the position of the locking bolt. Readjust the telescopic thruster. Move the locking bolt into the position for emergency release.

### 7.20.2.7.6 Pushing back a telescopic thruster which has been released in an emergency



- 1 Area for positioning using the auxiliary vehicle



- 1 Suitable tools, such as wooden beams
  - 2 Suitable auxiliary vehicle attachment, such as a lifting fork
  - 3 Area for positioning using the appropriate attachment
1. → Use suitable tools to protect the pulley head from damage.  
Centrally position the auxiliary vehicle attachment at the specified point on the pulley head.
  2. → Carefully insert the telescopic thruster as far as it will go.
    - Attach the source of force for positioning using the auxiliary vehicle in the direction of the boom.
    - The telescopic thruster must not tilt while it is being inserted.

#### 7.20.2.7.7 Pushing back the remaining telescopic thrusters

1. → Attach the hoisting slings to the telescopic thruster.
2. → Pull out the telescopic thruster for emergency release.
3. → Unlock the telescopic thruster with the appropriate emergency release screw.
4. → Push back the telescopic thruster which has been released in an emergency.
5. → Push back the remaining telescopic thrusters in the same way.
  - ⇒ All telescopic thrusters are fully inserted.

#### 7.20.2.7.8 Dismantling the telescopic thruster

- The telescopic thrusters are dismantled by the service technician.
- Contact the service technician.

## Operation

### 7.20.2.8 Exiting the machine in an emergency

#### 7.20.2.8.1 Leaving the cab via the emergency exit

**⚠ WARNING**

**Danger due to blocked emergency exit!**

- Do not block the emergency exit.

**If the emergency exit is blocked, the cabin cannot be left in an emergency.**

If the exit via the cab door is blocked, the operator must exit the machine via the emergency exit in an emergency. The cab window to be used as the emergency exit is indicated with a label.

1. ➤ Hit the bottom edge of the indicated window panel with the emergency hammer. It is easiest to break the window panel at the bottom edge.
2. ➤ Completely break the window panel.
3. ➤ Leave the cab through the opening you have made.

#### Emergency exit

Shown	Meaning	SEBO no.
	Emergency exit label	187970

## 8 Maintenance



*Content for this chapter/section will follow in the next version of the operating manual.*

For  
Reference  
Only

## 9 Transport

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### 9.1 Safety instructions

**⚠ DANGER**

**Falling machine or accessories from incorrect lifting**

- Ensure that the sling gear has sufficient load-bearing capacity and is not damaged.
- Only attach the machine and all accessory parts at the defined lifting points.

If the machine or accessories are lifted incorrectly, the load could fall. This can cause serious injury.

**⚠ WARNING**

**Risk of accident from the machine slipping during transport**

- Ensure that the sling gear has sufficient load-bearing capacity and is not damaged.
- Only attach the machine at the designated lashing points.

If the machine slips during transport, this could cause an accident. A machine slipping can result in injury.

**⚠ WARNING**

**Danger of accident from pivoting uppercarriage**

- Lock the uppercarriage.

During transport, the uppercarriage may pivot in an uncontrolled manner because of inertia forces.

**⚠ WARNING****Risk of injury due to restricted view when reversing!**

- The mirrors enable you to monitor the work area.
- Use the reversing camera to monitor the work area.
- Observe the reversing alarm.

**In certain situations, the driving area cannot be seen while reversing.**



*The respective transport company is always responsible for the transport of machine and accessories.*

Comply with the following instructions when loading, unloading, and transporting the machine:

- Comply with country-specific regulations regarding transport and means of transport.
- Only have authorized personnel execute loading and transport tasks.
- Observe the applicable regulations on securing loads.
- Select a suitable transport vehicle. Take note of the machine's transport dimensions and weight.
- Before transporting, ensure that the route is suitable for the machine to be transported.
- During transport, ensure that the machine does not pose any hazards to other traffic participants.
- Set the load down before loading.
- Attachments, walkways, and access ladders are in the transport position.
- If required, remove the fly boom extension and the fly boom.
- The uppercarriage is locked in the 0° position.
- Ensure that the slewing gear brake is activated.
- Follow the notices for slewing the uppercarriage with reduced track width of the crawlers.
- Only load the machine on flat and sufficiently load-bearing ground.
- Clean the machine's wheels or chains, as well as the undercarriage, of mud, snow, and ice.
- Keep loading area and ramps of the transport vehicle free from mud, snow, and ice.
- Secure all required auxiliary equipment, such as ramp sections or wooden planks, against unintentional movements.
- Safeguard the machine and its working equipment against unintentional movements.
- Ensure that all-round visibility is good.
- Agree hand signals with the banksman and observe them.
- Use the reversing camera when reversing.

### 9.2 Data of the transported goods

#### 9.2.1 Transport dimensions and weights

Further notes

↳ Chapter 2.6 "Technical data" on page 17

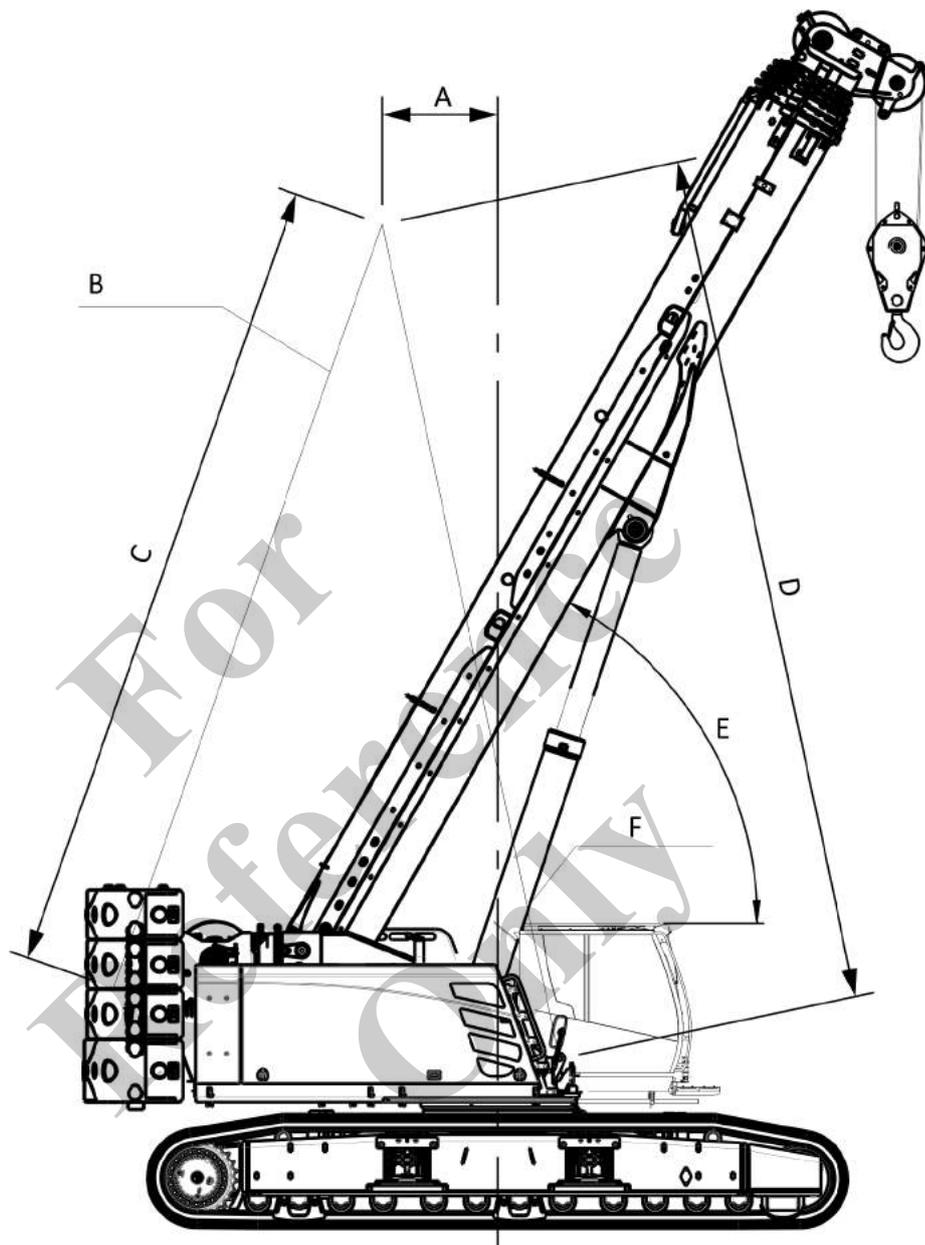
#### 9.2.2 Lifting data

##### 9.2.2.1 Overall machine with counterweight

The lifting data applies to the following machine configuration:

- 2 x winch
- Fly boom SA80.2 with fly boom extension SA70.2
- 80 t hook
- Counterweight, 35 t
- 3-grouser base plates 900 mm

For Reference Only



Data	Value	Unit
A	1350	mm
A	53.1	in
B	2 x 22.2	t
B	2 x 48,942.0	lb
C	9,477.0	mm
C	373.1	in
D	minimum 10,000	mm

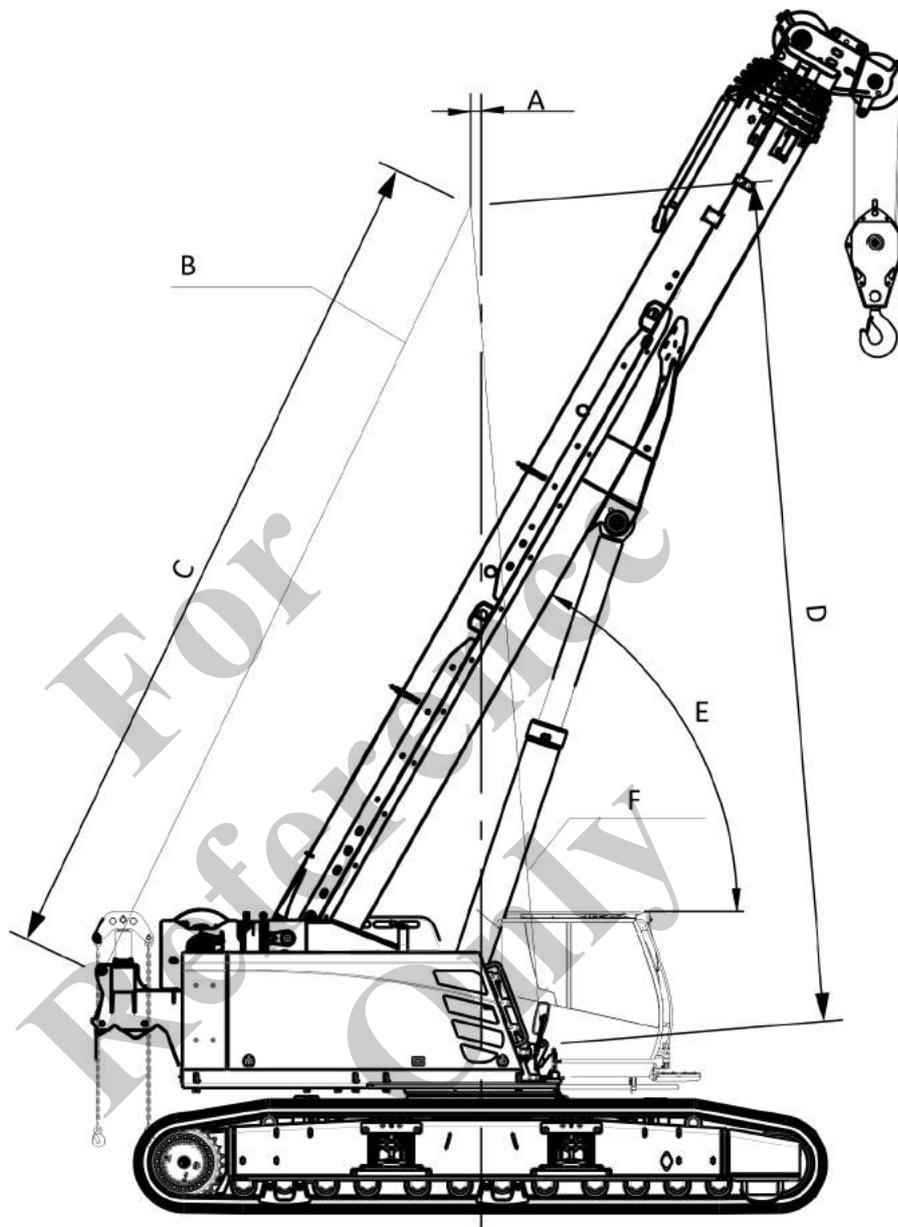
Data	Value	Unit
D	minimum 393.7	in
E	60	°
F	2 x 35.5	t
F	2 x 78,264.0	lb

### 9.2.2.2 Overall machine without counterweight

The lifting data applies to the following machine configuration:

- 2 x winch
- Fly boom SA80.2 with fly boom extension SA70.2
- 80 t hook
- Counterweight, 0 t
- 3-grouser base plates 900 mm

For Reference Only



Data	Value	Unit
A	120	mm
A	4.7	in
B	2 x 6.5	t
B	2 x 14,330.0	lb
C	10,113	mm
C	398.1	in
D	minimum 10,000	mm

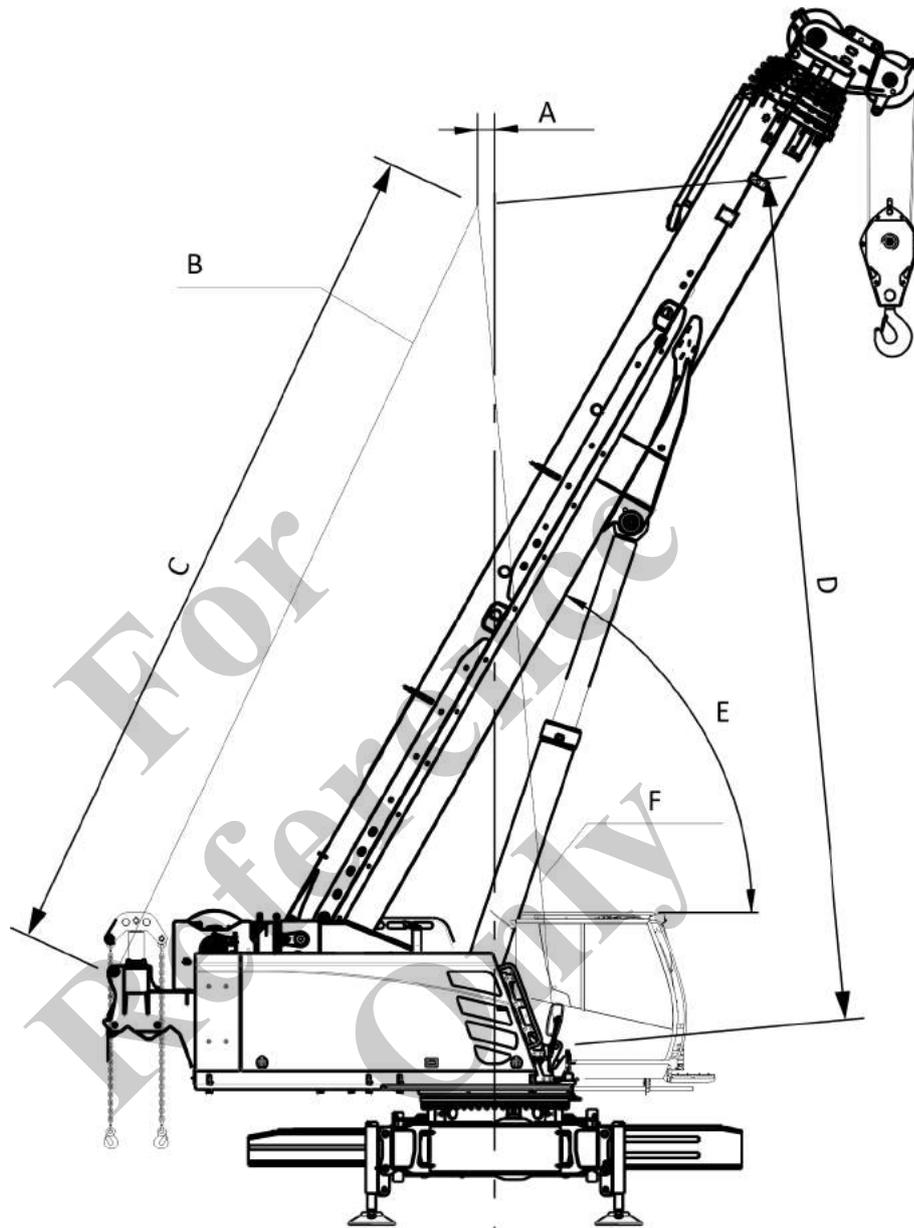
Data	Value	Unit
D	minimum 393.7	in
E	60	°
F	2 x 33.3	t
F	2 x 73,413.0	lb

### 9.2.2.3 Overall machine without counterweight and without track wheels

The lifting data applies to the following machine configuration:

- 2 x winch
- Fly boom SA80.2 with fly boom extension SA70.2
- 80 t hook
- Counterweight, 0 t

For Reference Only



Data	Value	Unit
A	200	mm
A	7.78	in
B	2 x 4.3	t
B	2 x 9,497	lb
C	10,072	mm
C	396.5	in
D	minimum 10,000	mm

Data	Value	Unit
D	minimum 393.7	in
E	60	°
F	2 x 19.8	t
F	2 x 43,651.0	lb

## 9.3 Means of transport

The machine is transported using a suitable transport vehicle.

The following modes of transport are available for loading and unloading the machine onto/from the transport vehicle:

- The machine is stabilized before it is loaded onto the transport vehicle:
  - Without track wheel carriers
  - Without ballasting
- The machine drives onto or off the transport vehicle:
  - With track wheel carriers
  - Without ballasting
- The machine is lifted onto or off the transport vehicle:
  - With or without track wheel carriers
  - With or without ballasting

## 9.4 Climbing up to the cab

### Safety instructions

**▲ WARNING**

#### Danger of falling.

- Use suitable stable ladders to climb up and down.
- Position ladders on level ground.
- Do not carry any objects by hand when climbing up or down.
- Always face the machine.
- Always make sure you have at least three points of contact with the ladder and grip handles when climbing up or down. Two hands and one foot, or two feet and one hand must remain in contact with the ladder steps and the grip handles at all times.

Steps and walkway gratings are folded in or dismantled for transport. Therefore, when climbing into and out of the machine, there is an increased risk of falling and sustaining injuries.

### Personnel

- Machine operator
- Instructed personnel

## Tools

- Ladder

## Entering the cab

1. → Position a ladder at the machine so the cabin door is easy to access.
2. → Unlock the cab door and open it with the handle until it engages in the locking mechanism.
3. → Open the cab door by the handle until the door snaps into the locking mechanism.
4. → Use the grip handle to enter the cab.
5. → Have a second person remove the ladder.

## Closing the cab door from the inside



1. → Pull the lever backward.
2. → Push the cab door forward until it locks into place.

## 9.5 Leaving the machine

### Safety instructions

**⚠ WARNING**

#### Danger of falling.

- Use suitable stable ladders to climb up and down.
- Position ladders on level ground.
- Do not carry any objects by hand when climbing up or down.
- Always face the machine.
- Always make sure you have at least three points of contact with the ladder and grip handles when climbing up or down. Two hands and one foot, or two feet and one hand must remain in contact with the ladder steps and the grip handles at all times.

Steps and walkway gratings are folded in or dismantled for transport. Therefore, when climbing into and out of the machine, there is an increased risk of falling and sustaining injuries.

#### Personnel

- Machine operator
- Instructed personnel

#### Tools

- Ladder

#### Exiting the cab

1. → Have a second person position a ladder at the machine so the ladder is easy to access from the machine's cab door.
2. → Open the cab door.
3. → Use the grip handle to exit the cab.
4. → Lock the cab door.
5. → Remove the ladder.

## 9.6 Loading the machine

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### 9.6.1 Preparing the machine for loading

1. → Clean the machine's track wheel chains of mud, snow, and ice.
2. → Fold all the attachments into the transport position and secure them, or remove them.
3. → Depending on the mode of transport, remove the counterweight.
4. → The uppercarriage is in the 0° or 180° position.
5. → Move the boom into the position required for the specific mode of transport.
6. → Fold in the railing.
7. → Fold up or remove the walkways.

### 9.6.2 Loading the stabilized machine

#### NOTICE

**Machine damage due to overloading of the outrigger cylinders!**

- Do not move work equipment while the machine is stabilized.

**When work implements are moved while the machine is stabilized, the outrigger cylinders can be overloaded. This may cause damage to the ground and to the outrigger cylinders.**

#### NOTICE

**Danger of material damage if used on unsuitable ground.**

- Only perform the tasks on solid, level ground with sufficient soil strength
- Observe the permissible ground pressure.
- Position the machine on level ground with sufficient load-bearing capacity and stabilize the machine.
- Use suitable outrigger pads.

**The machine may suffer damage if positioned or used on unsuitable ground with insufficient soil strength.**

#### Pressure exerted on the ground by the stabilized machine

When stabilized, the fully ballasted machine exerts a maximum pressure on the ground via the outrigger pads.

Data	Value	Unit
Diameter of outrigger pad	550.0	mm
Diameter of outrigger pad	21.6	in
Maximum pressure exerted by each outrigger pad	15.1	kg/cm <sup>2</sup>
Maximum pressure exerted by each outrigger pad	214.8	psi

If the load-bearing capacity of the ground is insufficient, a suitable support must also be used to reduce the ground pressure.

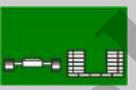
## 9.6.2.1 Stabilize the machine.

Preconditions:

- The maximum track width is set.
- The machine is not ballasted.

### 9.6.2.1.1 Setting the operating mode

Operation parameters to be set

Symbol for operating parameters							
Value to be applied	All selectable values	$\leq 0.1$ m/s	D	0 t	0 t	Setup ballast	according to current setup status of the machine

### 9.6.2.1.2 Activating ballasting mode

1. ➤ Open the "Setup" menu page on the SENCON.
2. ➤ Press the [Ballasting mode] quick-select button.
  - ⇒ The status indicator of the quick-select icon lights up yellow.
  - The engine is switched off.
  - The Setup remote radio control is used to control the machine during setup.

**Ballasting mode**

	<b>Yellow bar</b>	<b>Black bar</b>
	The ballasting mode is activated. The Setup remote radio control is used to control the machine during certain setup procedures.	The ballasting mode is deactivated. The machine is controlled using the controls in the cab.

**9.6.2.1.3 Folding out the outrigger**

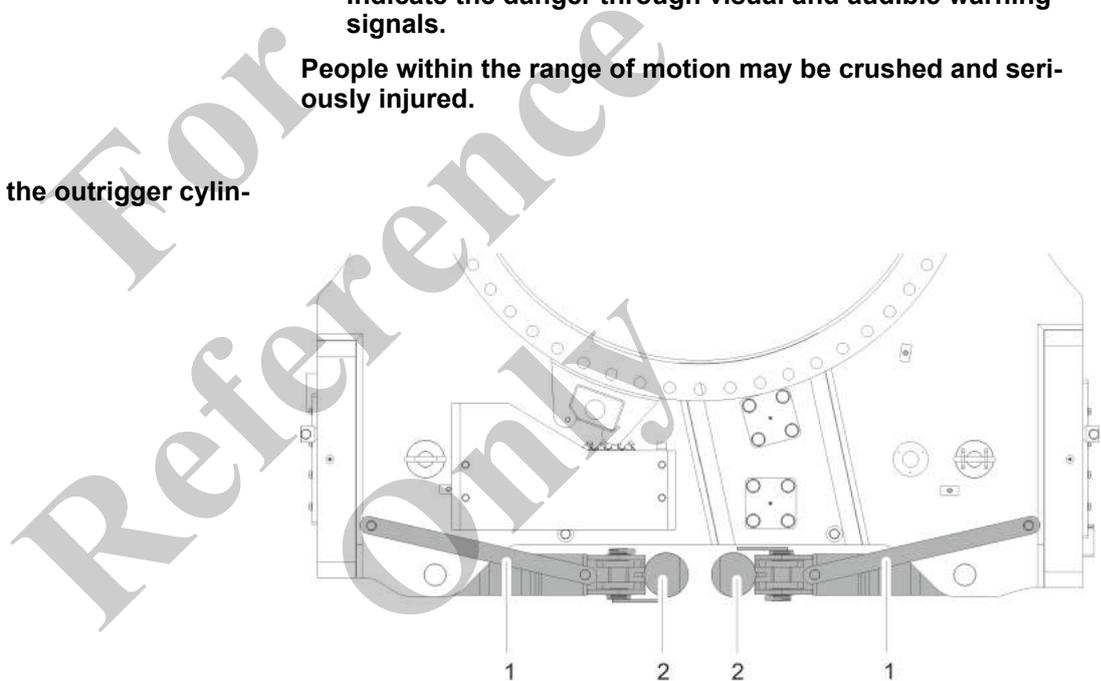
**⚠ WARNING**

**Risk of crushing when swinging the outrigger out or in!**

- Ensure all personnel is outside the danger zone.
- Indicate the danger through visual and audible warning signals.

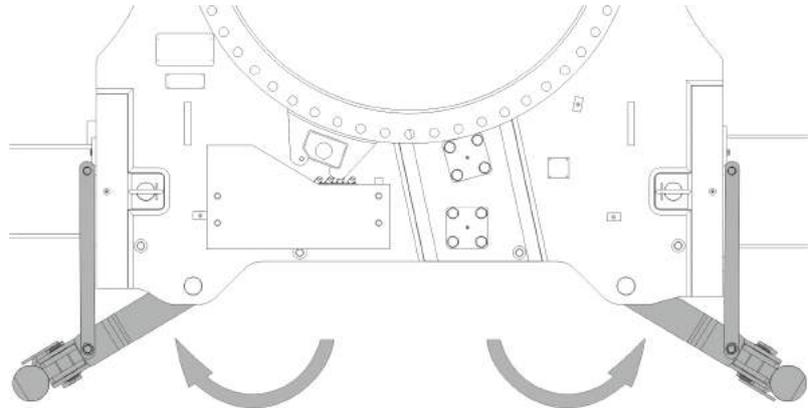
People within the range of motion may be crushed and seriously injured.

**Fully unfolding the outrigger cylinders**



- 1 Locking bar
- 2 Stabilizing cylinders

1. ➔ Remove the locking bar of a outrigger cylinder.



2. ➤ Fully unfold the outrigger cylinders.
3. ➤ Secure the unfolded outrigger cylinders with the locking bar.
4. ➤ Repeat these steps to unfold and secure the remaining outrigger cylinders.

## Stabilizing cylinder positions

Shown	Meaning	SEBO no.
	Stabilizing cylinder positions <ul style="list-style-type: none"> <li>■ Folded out: Track wheel carrier setup</li> <li>■ Middle position: Change track width</li> <li>■ Folded in: Transport</li> </ul>	235589

### 9.6.2.1.4 Switching on the Setup remote radio control

Preconditions:

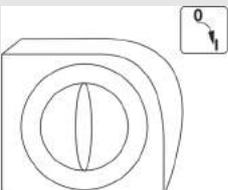
- The safety lever has been pulled back.
  - The machine operator has stepped out of the machine.
1. ➤ Turn the rotary switch [*Switch remote radio control on/off*] on the remote radio control to position [*I*].
  2. ➤ Press the push button [*Horn/release remote radio control*] on the remote radio control.
    - ⇒ The remote radio control is ready for use.

The engine can be started via the remote radio control.

**Horn/release remote radio control**

	<b>Press the push button</b>
	<p>The horn sounds.</p> <p>The remote radio control is activated.</p> <p>The engine can be started.</p>

**Switch remote radio control on/off**

	<b>Turn rotary switch to position [0]</b>	<b>Turn rotary switch to position [I]</b>
	<p>The remote radio control is deactivated.</p>	<p>The remote radio control is activated.</p> <p>A brief signal tone sounds.</p>

**9.6.2.1.5 Mounting the outrigger pad**

**⚠ WARNING**

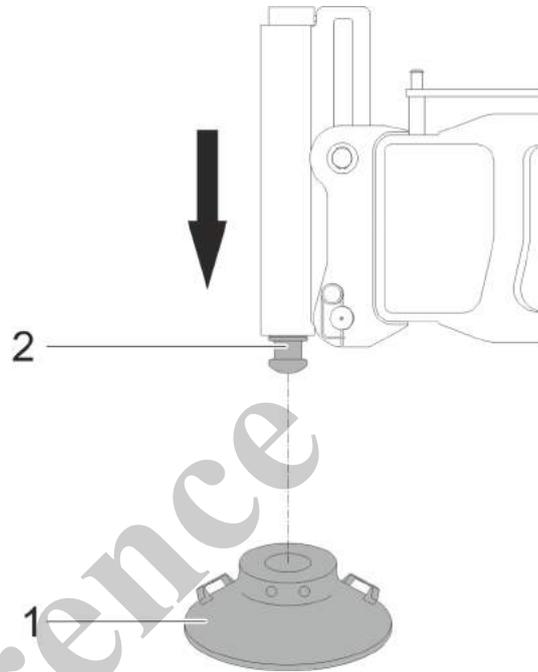
**Risk of accidents from outrigger cylinders moving incorrectly on the stroke mechanism**

- Observe the uppercarriage position of the machine.
- Take note of the colored marking on the outrigger cylinders and the remote radio control.

**When using the Setup remote radio control, the wrong outrigger cylinders may move.**

### Positioning the outrigger pads

1. → Remove the outrigger pads from their storage location.



- 1 Outrigger pad
- 2 Stabilizing cylinders

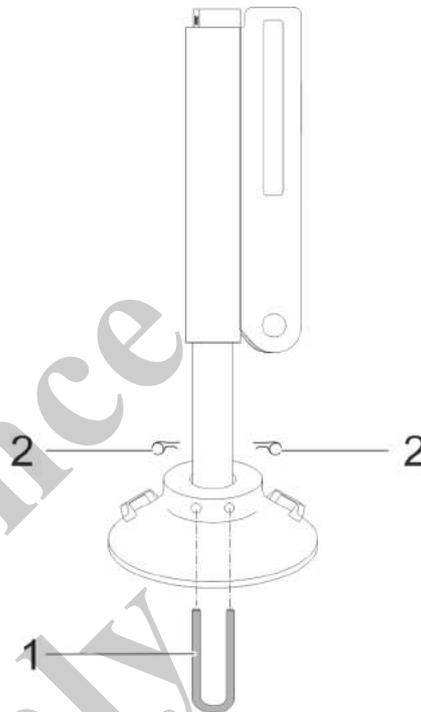
2. → Position the outrigger pads vertically underneath the outrigger cylinders.

### Mounting the outrigger pad

Requirement:

Ensure that you can see the moving outrigger cylinder.

1. → Tilt and hold upward the *[Extend/retract rear left outrigger cylinder]* lever until the outrigger cylinder is fully extended and has reached the outrigger pad support.



- 1 Locking bracket
- 2 Spring washers

2. → Push the locking brackets through the outrigger pads.
3. → Secure the locking brackets with spring washers.
4. → Repeat these steps to mount the remaining outrigger pads.

**Extend/retract left rear outrigger cylinder**

	Push and hold the lever up	Push and hold the lever down
	The left rear outrigger cylinder is extended.	The left rear outrigger cylinder is retracted.

**Extend/retract right rear outrigger cylinder**

	Push and hold the lever up	Push and hold the lever down
	The right rear outrigger cylinder is extended.	The right rear outrigger cylinder is retracted.

## Transport

### Extend/retract left front outrigger cylinder

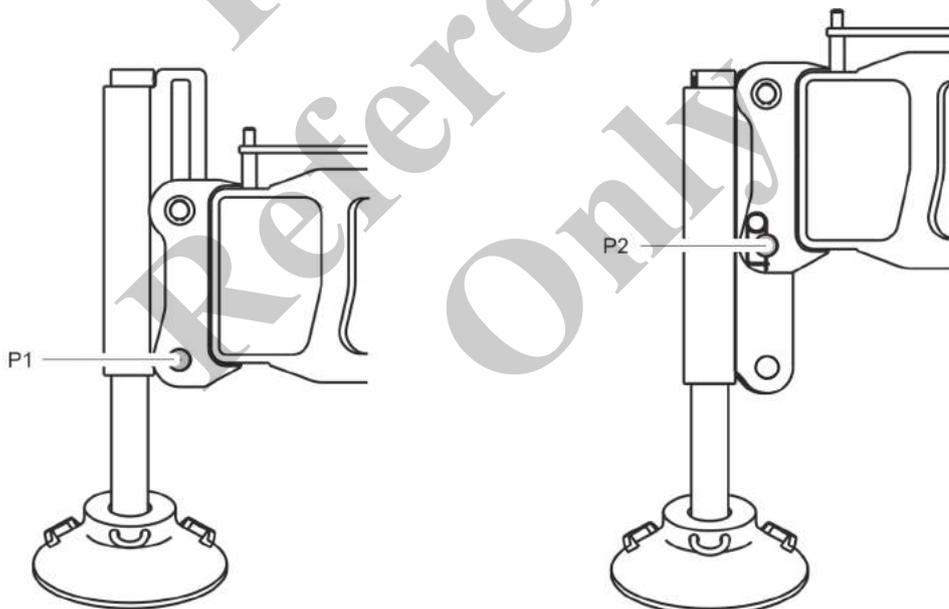
	Push and hold the lever up	Push and hold the lever down
	The left front outrigger cylinder is extended.	The left front outrigger cylinder is retracted.

### Extend/retract right front outrigger cylinder

	Push and hold the lever up	Push and hold the lever down
	The right front outrigger cylinder is extended.	The right front outrigger cylinder is retracted.

#### 9.6.2.1.6 Changing the fastening position of the outrigger cylinders

##### Overview: Fastening positions of the outrigger cylinders



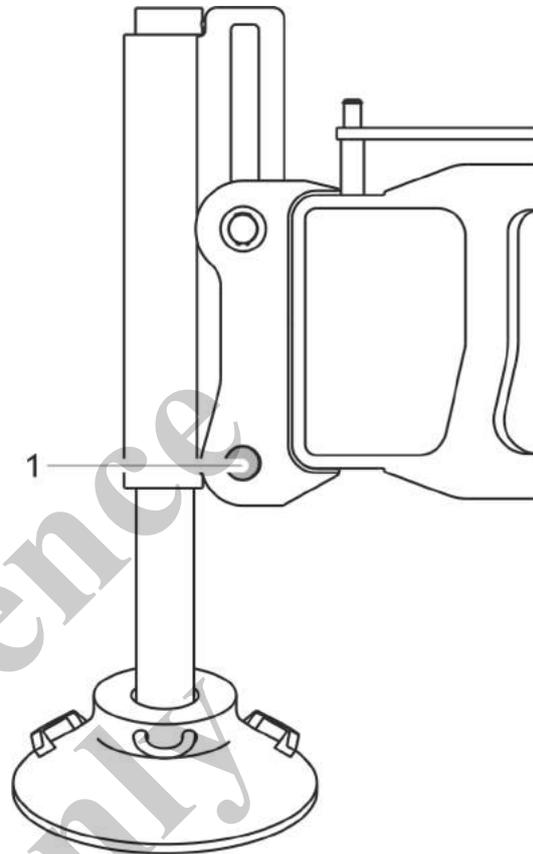
##### Fastening position P1

- The machine is placed on the track wheel carriers
- Folding in or unfolding the outrigger cylinders
- Changing the track width

##### Fastening position P2

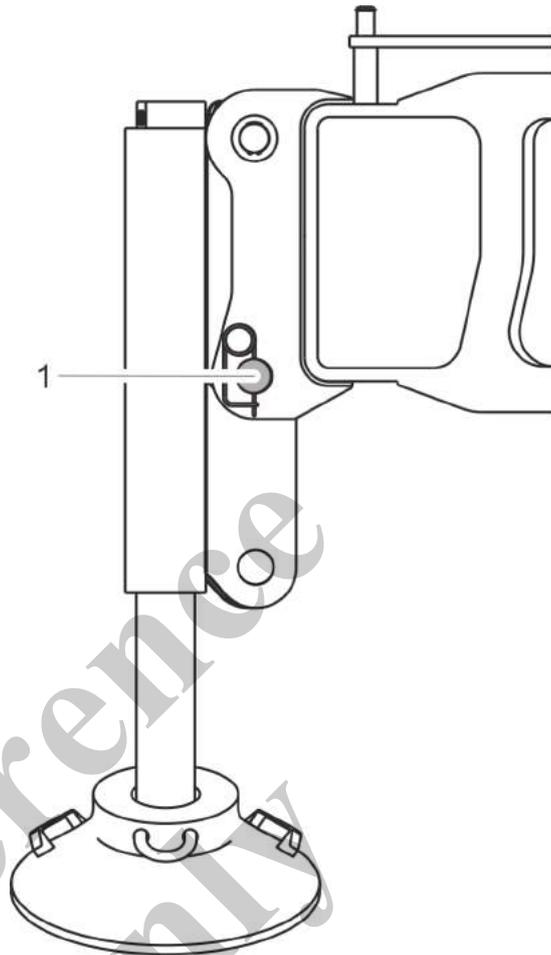
- Installing or removing the track wheel carriers
- Loading or unloading the machine onto/from the transport vehicle

Changing the fastening position of the outrigger cylinders from P1 to P2



1 Bolt in fastening position P1

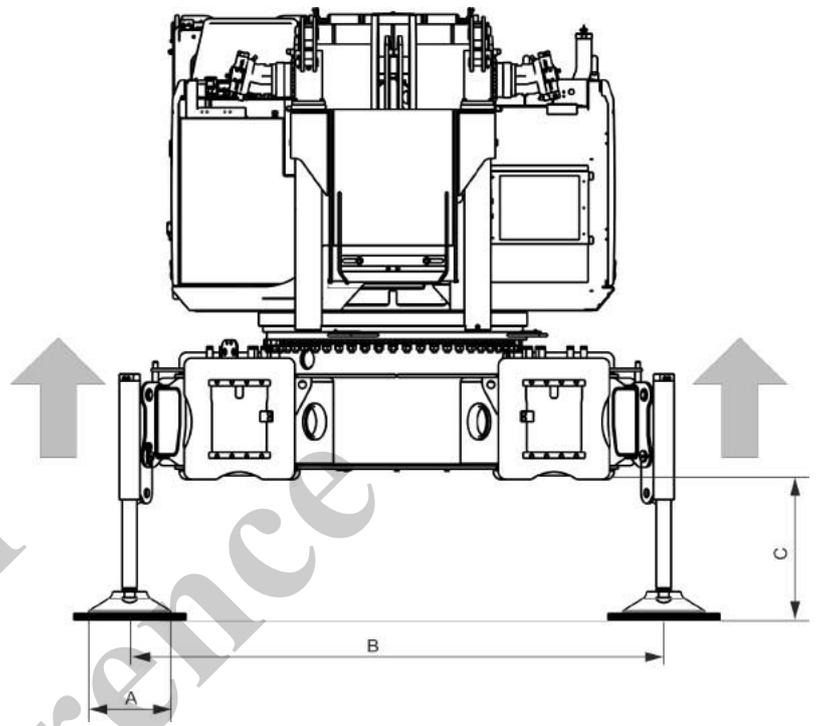
1. → Remove the bolt from fastening position P1.



- 1 Bolt in fastening position P2
2. → Tilt and hold downward the *[Extend/retract rear left outrigger cylinder]* lever until the outrigger cylinder has reached fastening position P2.
3. → Mount and secure the bolt in fastening position P2.
4. → Repeat these steps to change the fastening position of the remaining outrigger cylinders from P1 to P2.

9.6.2.1.7 Lifting the machine

Overview: Lifting height of the outrigger cylinders



Data	Value	Unit
A	550	mm
A	21.6	in
B	3600	mm
B	141.0	in
C: Lifting height for mounting/removing the track wheel carriers	700	mm
C: Lifting height for mounting/removing the track wheel carriers	27.6	in
C: Maximum lifting height for unloading from/loading onto the transport vehicle	953	mm
C: Maximum lifting height for unloading from/loading onto the transport vehicle	37.5	in

➔ Lift the machine to the specified lifting height: Alternately move the outrigger cylinders piece by piece.

Specifications for lifting or lowering the machine

The following combinations are available for supporting or lowering the machine:

- Simultaneously extending or retracting the rear left and rear right outrigger cylinders as well as the front right and front left outrigger cylinders piece by piece  
or
- Simultaneously extending or retracting the rear left and front left outrigger cylinders as well as the rear right and front right outrigger cylinders piece by piece  
or
- Extending or retracting the individual outrigger cylinders piece by piece

The process for supporting the machine is described using examples of possible outrigger cylinder combinations. The same steps must be used to lift the machine with the respective outrigger cylinder control.

Take note of the color markings on the outrigger cylinders and on the setup remote radio control.

1. → Tilt and hold downward the *[Extend/retract rear left outrigger cylinder]* and the *[Extend/retract front left outrigger cylinder]* levers at the same time until the outrigger cylinders are a little retracted.
2. → Tilt and hold downward the *[Extend/retract rear right outrigger cylinder]* and the *[Extend/retract front right outrigger cylinder]* levers at the same time until the right outrigger cylinders are at the same height as the left outrigger cylinders.
3. → Continue retracting alternating cylinders until the machine rests on a suitable support or is placed on the track wheel carriers.

## Stabilizing cylinders label

Shown	Meaning	SEBO no.
	<p>To provide assistance, the outrigger cylinders are labeled in the same colors as on the remote control.</p>	<p>247088</p>

### 9.6.2.2 Switching off the Setup remote radio control

Requirement:

- The engine is switched off.
- Turn the rotary switch [Switch remote radio control on/off] on the remote radio control to position [0].
  - ⇒ The remote radio control is off.

### 9.6.2.3 Preparing to disassemble the track wheel carrier

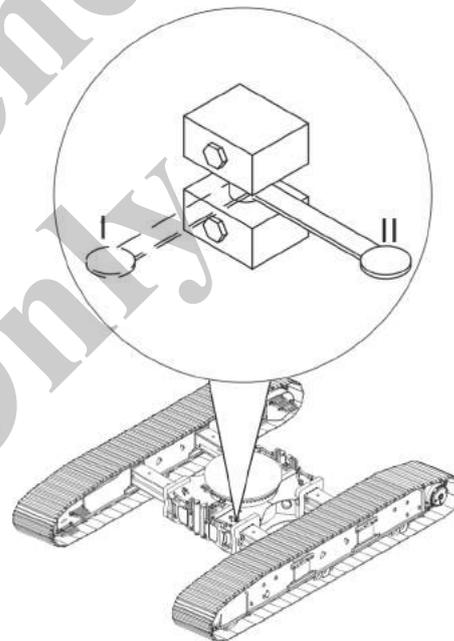
The preparations for disassembly are always carried out only on the track wheel carrier that is being disassembled.

#### 9.6.2.3.1 Disconnecting the hydraulic supply

##### Disabling hydraulic clamping

Requirement:

- The engine is switched off.

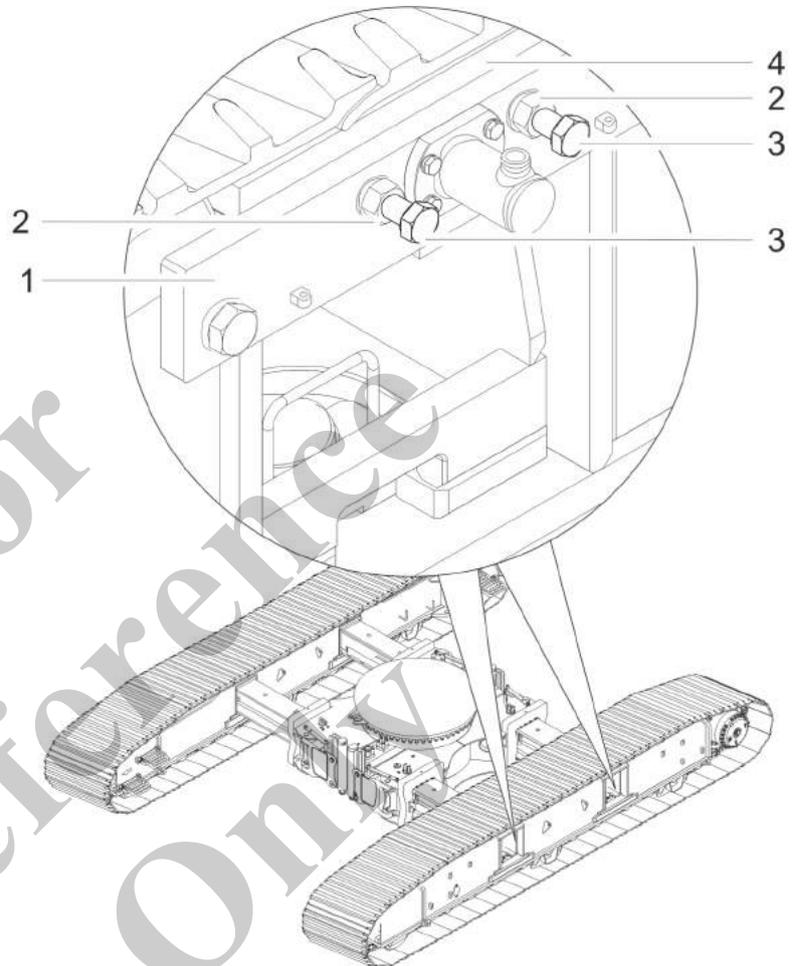


- I Hydraulic clamping enabled
- II Hydraulic clamping disabled

- Place the lever of the hydraulic clamping in position [II].
  - ⇒ Hydraulic clamping is disabled.

### Releasing the wedge

1. ➤ Remove the covers on the attachment shafts of the track wheel carriers.



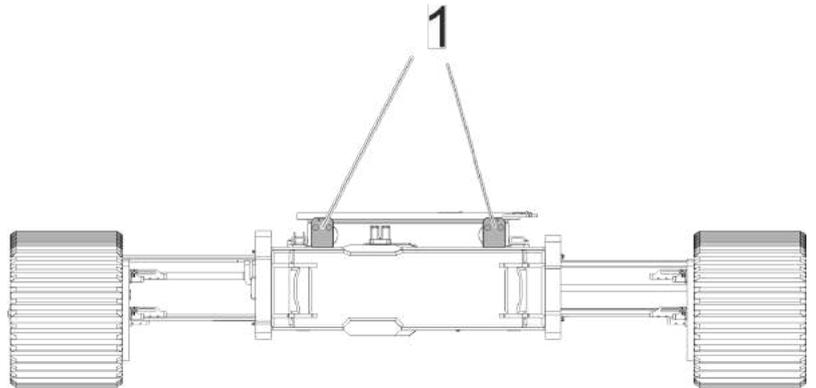
- 1 Plate
- 2 Lock nut
- 3 Bolts
- 4 wedge

2. ➤ Screw the lock nuts to the track wheel carrier plate.

3. ➤ Holding the lock nuts with a wrench, undo the bolts alternately and in increments.

⇒ The wedge is released.

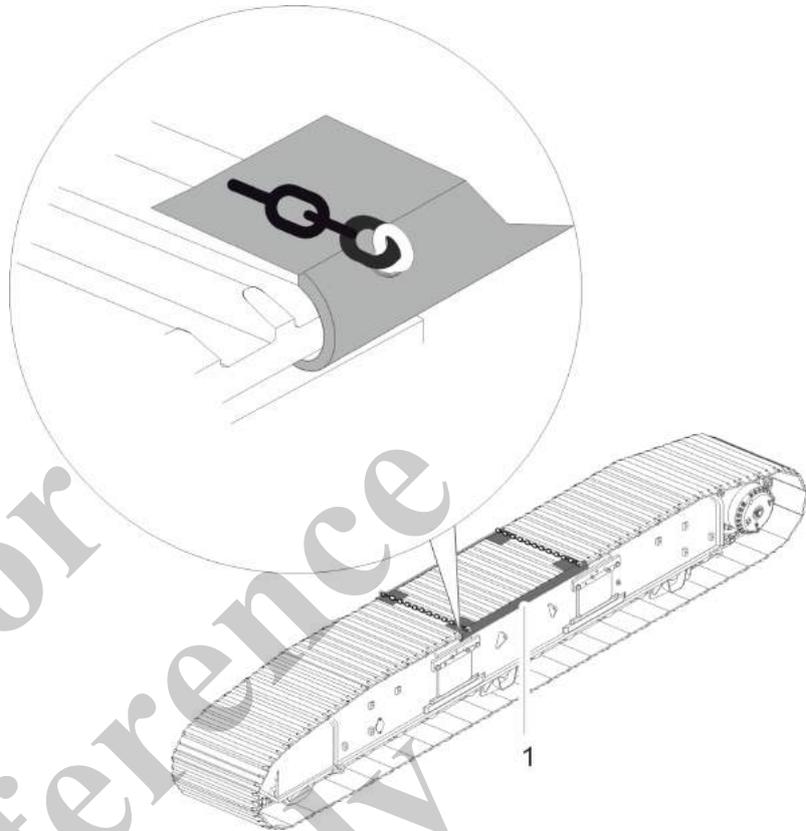
## Removing the hydraulic couplings



*Fig. 36: Overview: Location of the hydraulic connections for the right and left track wheel carrier*

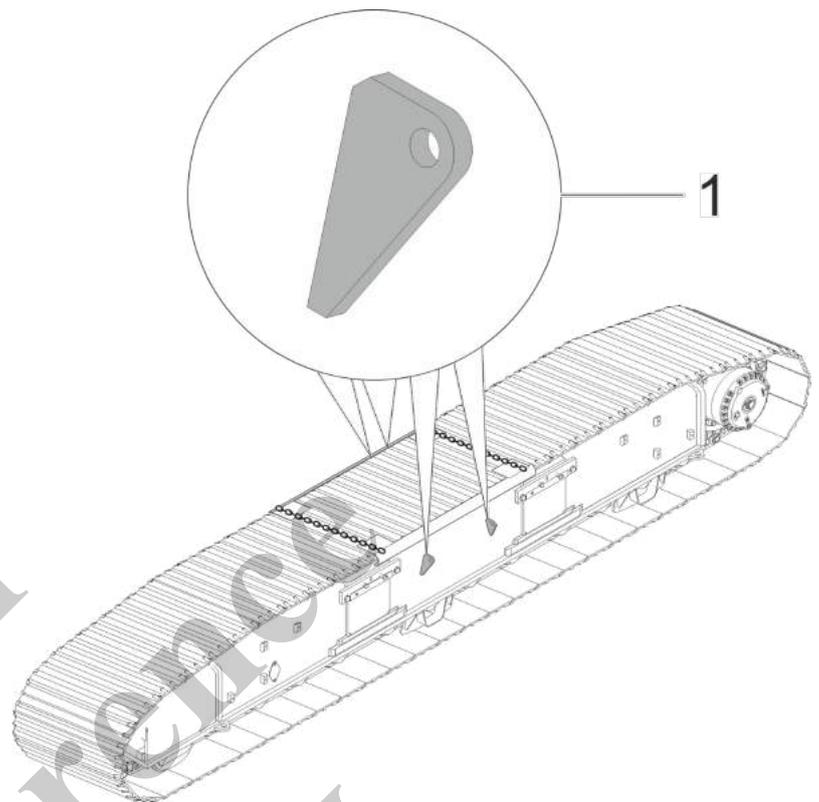
- 1 Hydraulic connections for the travel drive hydraulics and hydraulic clamping, rear side of the undercarriage
1. → Release the quick-change couplings.
2. → Blank the quick-change coupling with the cover.

9.6.2.3.2 Slings the track wheel carriers



1 Installing

1. → Mount and secure one included edge guard to the crawler track.



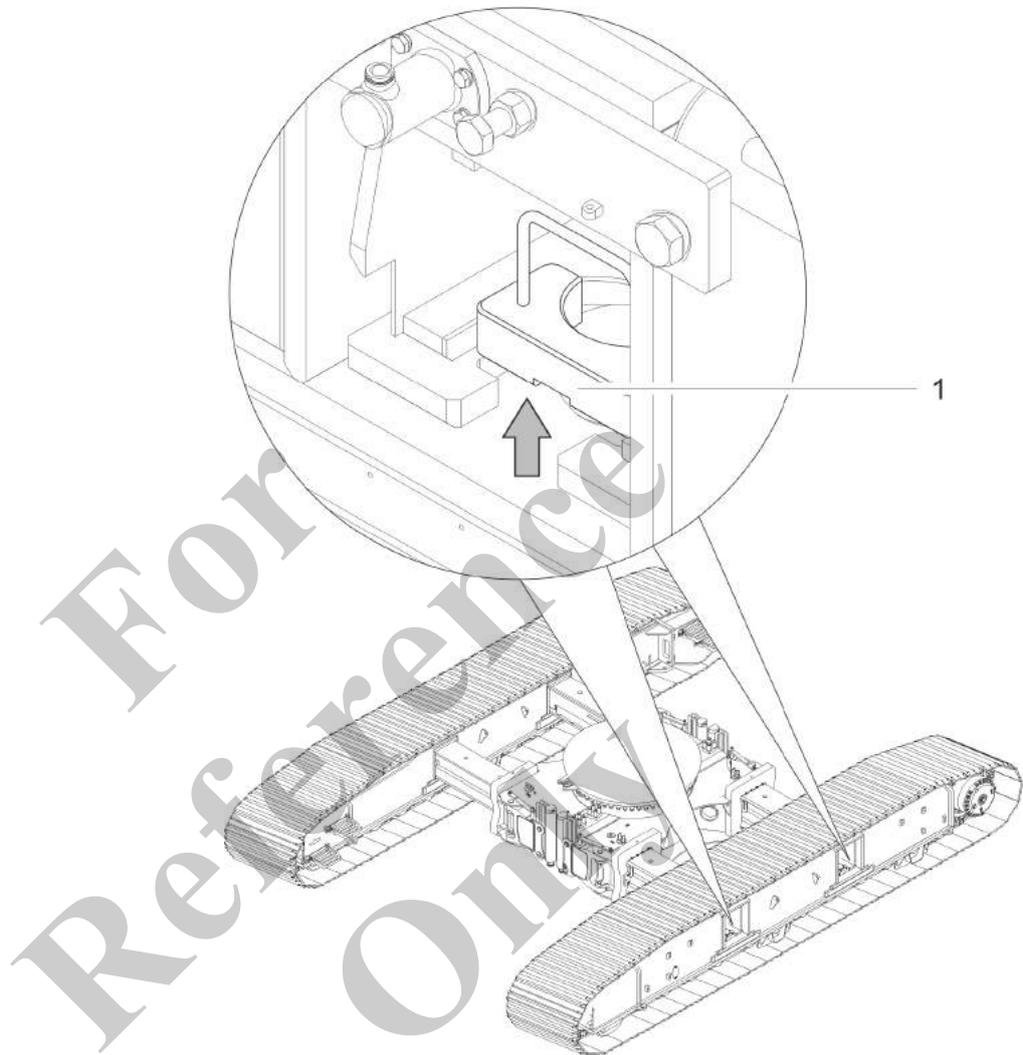
1 Lifting point

2 Use the lifting equipment provided to attach the track wheel carrier to the lifting points.

#### 9.6.2.3.3 Removing the track wheel carrier's mechanical fuse

Requirement:

The track wheel carrier is attached to the lifting points.



**1 Holder**

→ Pull out the holders on the track wheel carrier.

If the wedge clamping holders are seized, they can be freed as follows:

- 1.** → Raise the outrigger cylinders on the side of the machine where the track wheel carrier is being removed.
- 2.** → Retract the cross members on the track wheel carrier to be removed by approx. 20 cm (7.87 ft).
- 3.** → Lower the outrigger cylinders until the cross members are no longer under load. Do not fully lower the track wheel carrier.
- 4.** → Extend the cross members until they are flush against the round steel rod.
- 5.** → Use a hammer and crow bar to loosen the retainers.

6. → Remove the retainers.

#### 9.6.2.4 Disabling ballasting mode

The information symbol [*Emergency stop*] on the SENCON is red.  
The engine cannot be started from the cab with the ignition key or the push button.

1. → Open the “*Setup*” menu page on the SENCON.
2. → Press the [*Ballasting mode*] quick-select button on the SENCON.

⇒ The status indicator for the quick-select button is black.

The ballasting mode is switched off.

The machine is controlled using the controls in the cab.

The engine can be started from the machine.

#### 9.6.2.5 Setting the extension mode and boom length

In order to set up the track wheel carriers with the **Setup ballast** setup mode, a specific extension mode must be set and the boom must be extended to a predefined length.

##### Extension mode and boom length for setting up the track wheel carriers

Data	Value	Unit
Extension mode	EM1	
Boom length	12.3	m
Boom length	40.4	ft

Requirement:

- The boom angle is  $> 60^\circ$ .

1. → Open the “*Pin boom*” menu page.
2. → Set the specified extension mode on the SENCON.
3. → Tilt the joystick in the [*Extend telescope*] or [*Retract telescope*] direction.

Extend or retract the boom until it has reached the predefined length.



**If two functions are assigned on the joystick, the relevant switch must be in the correct position in order to carry out the respective function.**

#### Further notes

↪ Chapter 7.15.2 “Retracting/extending the boom” on page 481

### 9.6.2.6 Removing the track wheel carriers

**⚠ WARNING**

Risk of tipping from track wheel carrier swinging against the outrigger cylinder!

- Guide the track wheel carrier during lifting and keep it clear of the outrigger cylinders.
- There must be no-one under the machine during assembly.

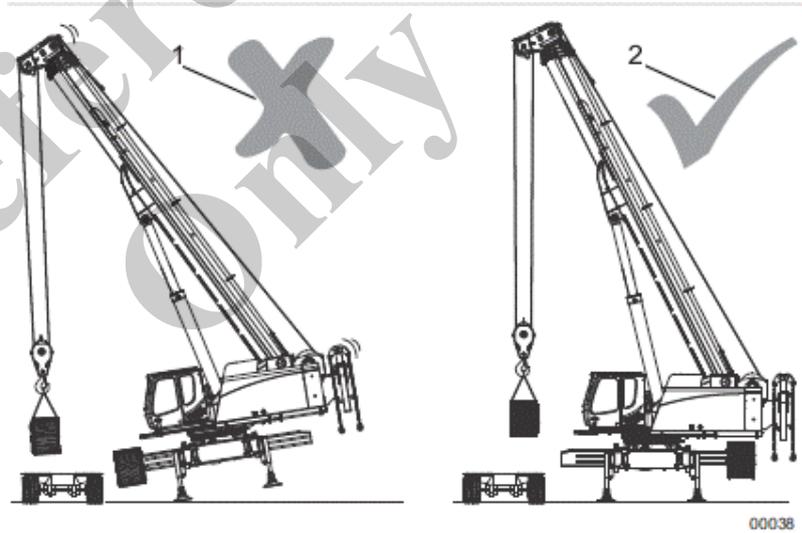
If a track wheel carrier swings against an outrigger during assembly or disassembly, the machine may tip over. This can cause serious injury.

**⚠ WARNING**

Risk of death due to machine tipping over.

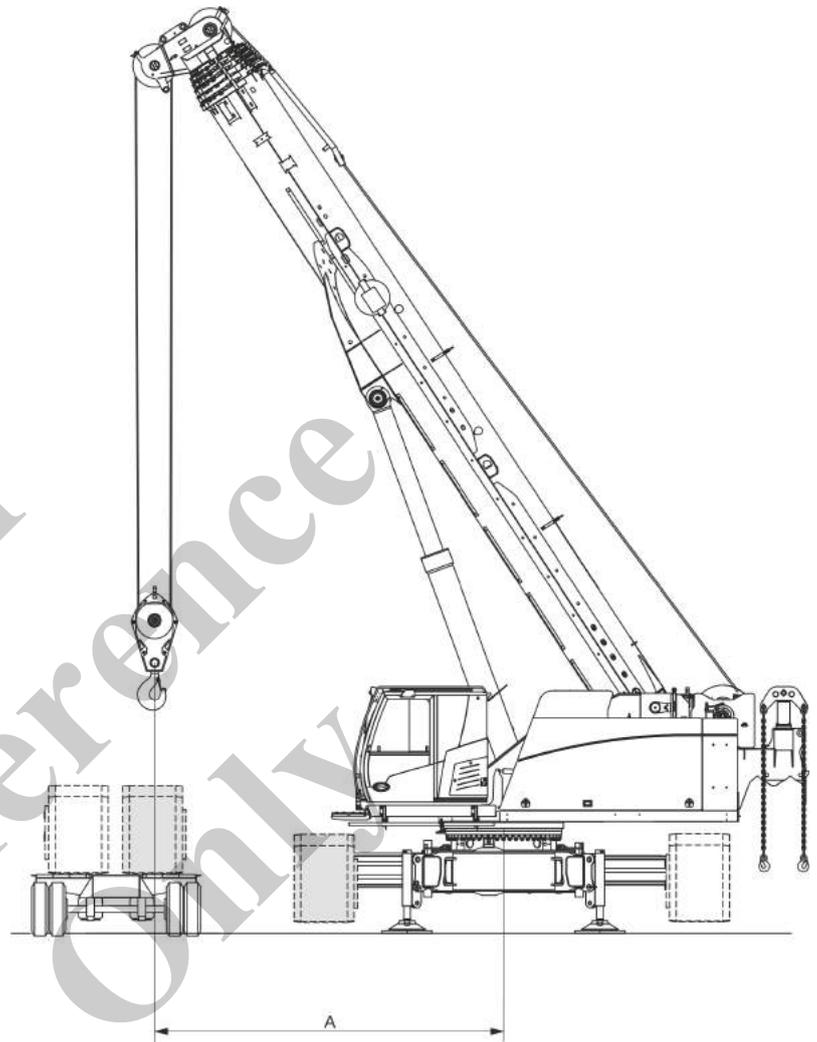
- The transport vehicle is always positioned next to the track wheel carrier that is to be set up. The track wheel carrier is lifted directly onto the transport vehicle or lifted by the transport vehicle directly to the respective cross member.
- Do not slew the uppercarriage when the track wheel carrier is attached to the hook.

The machine may tip if subject to load on one side only during attachment or removal of the track wheel carriers. This can cause death or serious injury.



- 1 Incorrect
- 2 Correct

**Preparing the transport vehicle for the first track wheel carrier**



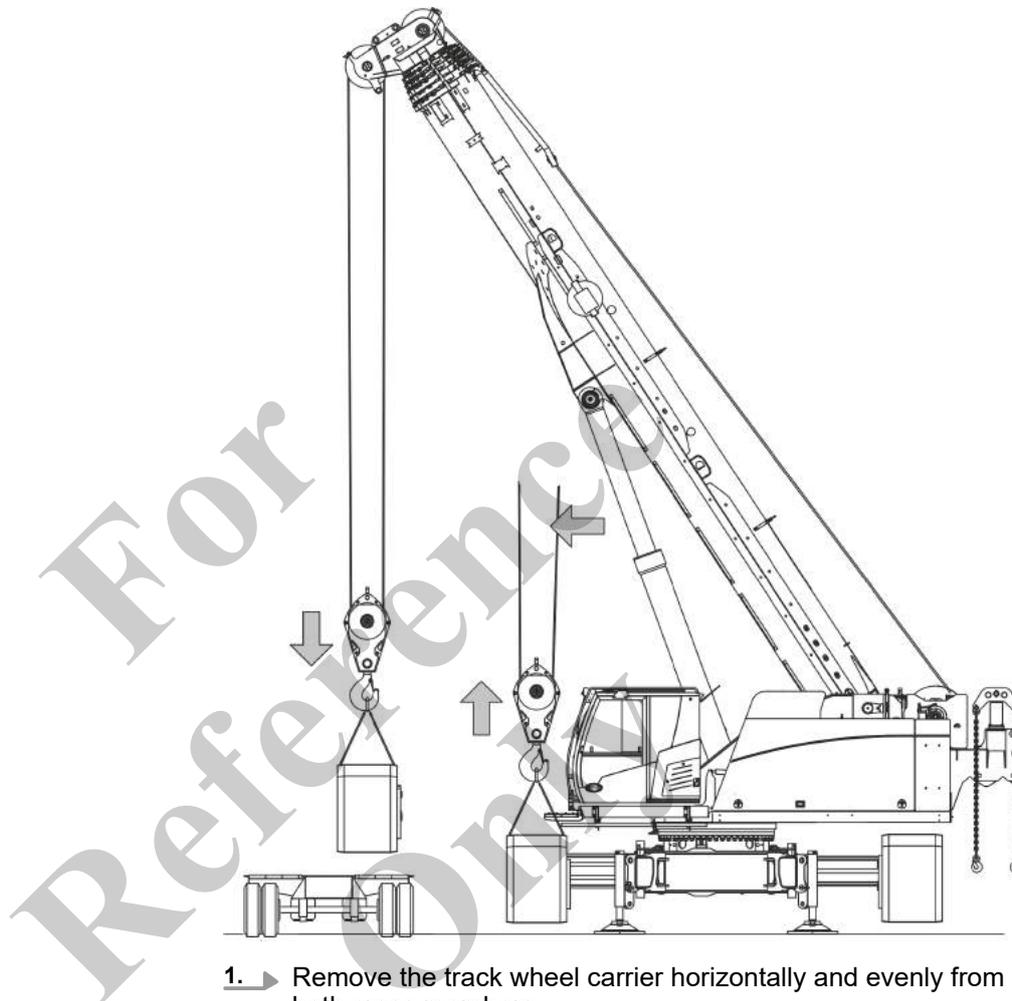
- ➔ Park the transport vehicle for the track wheel carrier at the specified distance next to the machine.
- Park the transport vehicle parallel to the track wheel carrier.

Data	Value	Unit
A	5000	mm
A	196.9	in

**Removing the first track wheel carriers**

Requirement:

- The **Setup ballast** setup mode is set.
- The extension mode and the boom length for setting up the track wheel carriers has been set.



1. ➤ Remove the track wheel carrier horizontally and evenly from both cross members.

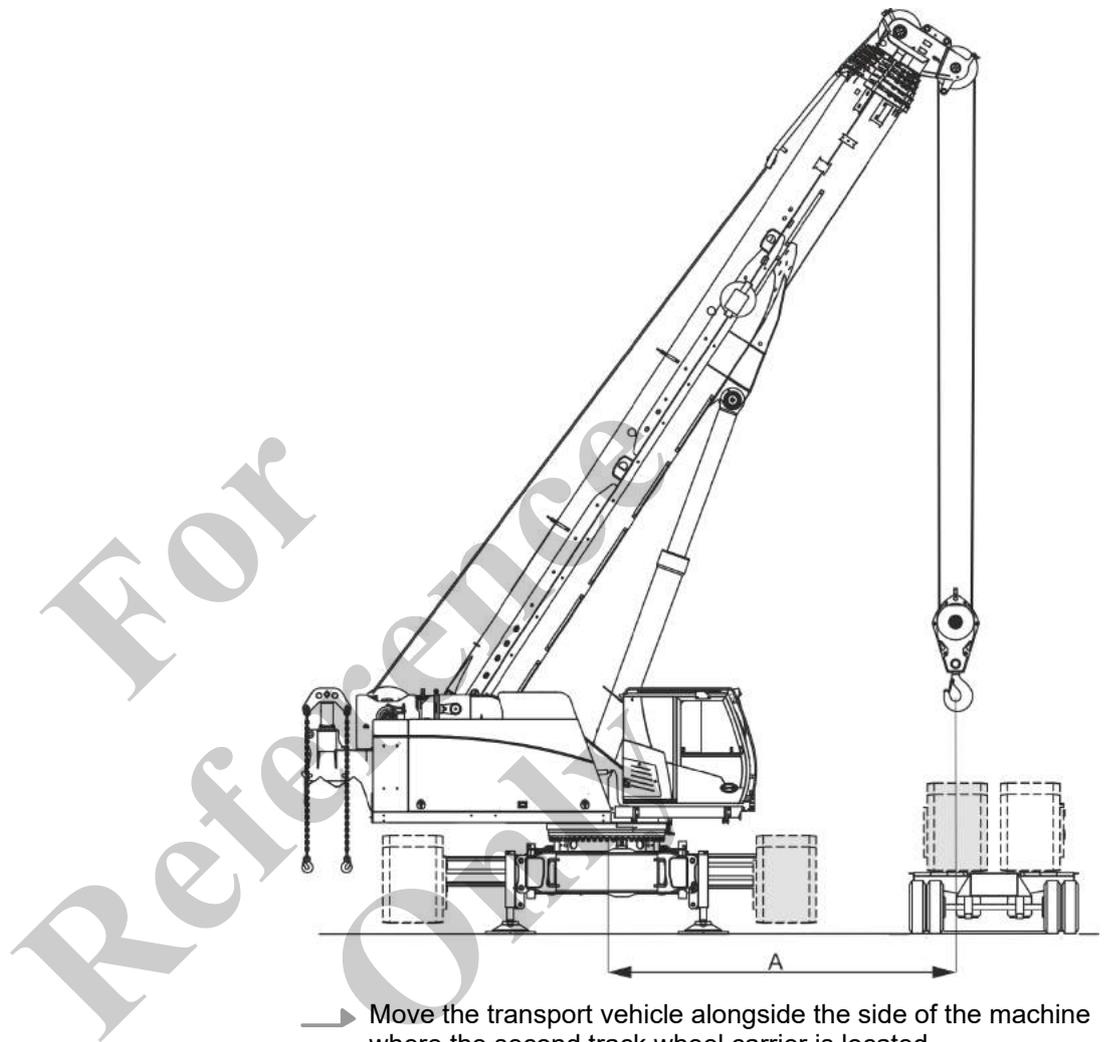
Slightly lower the boom and tighten the hoisting rope. Repeat the process until the track wheel carrier is removed from the cross member.

Ensure that the track wheel carrier does not bend.

⇒ The track wheel carrier is removed from the cross member.

2. ➤ Place the track wheel carrier on the transport vehicle.
3. ➤ Remove the lifting equipment.
4. ➤ Remove the edge guard.

**Preparing the transport vehicle for the second track wheel carrier**



➔ Move the transport vehicle alongside the side of the machine where the second track wheel carrier is located.

It must be possible to place the second track wheel carrier directly onto the transport vehicle, or to remove it from the transport vehicle, without being lifted over the second track wheel carrier.

Park the transport vehicle for the track wheel carrier at the specified distance next to the machine.

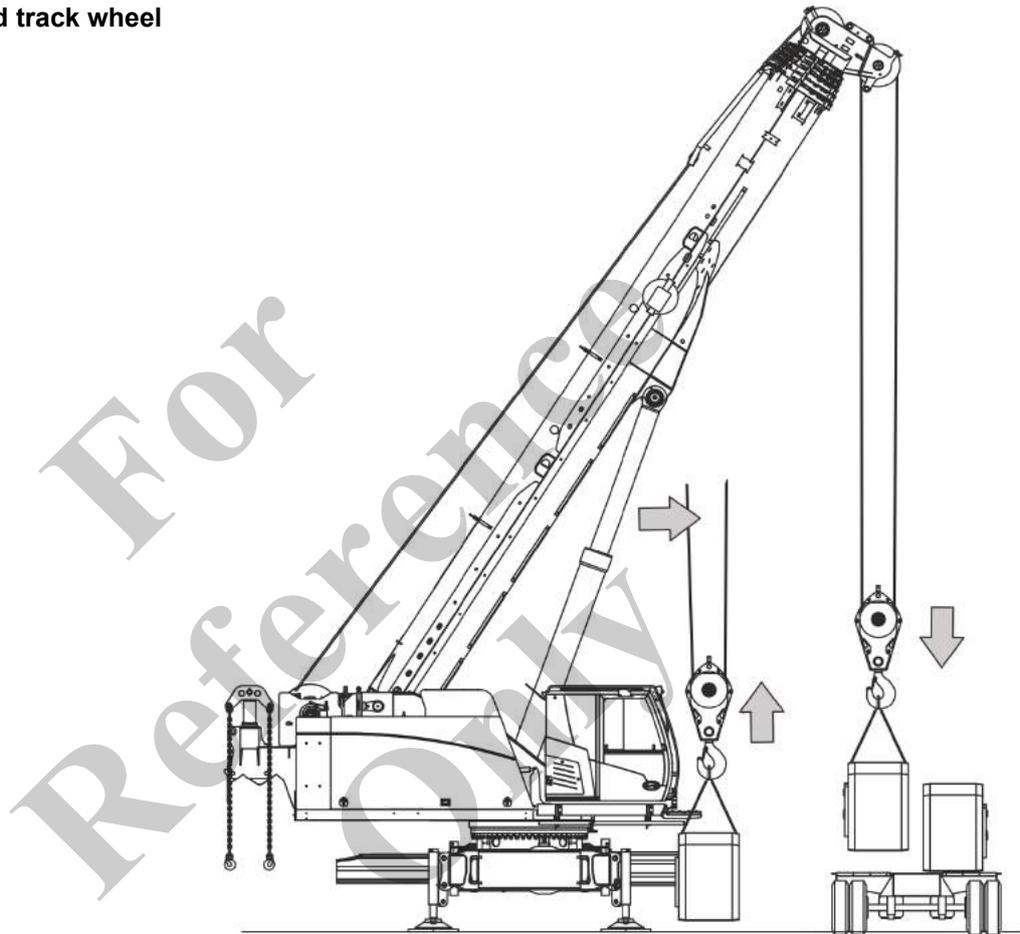
Park the transport vehicle parallel to the track wheel carrier.

Data	Value	Unit
A	5000	mm
A	196.9	in

### Preparing the second track wheel carrier for loading

1. ➤ Disconnect the hydraulic supply.
2. ➤ Remove the track wheel carrier's mechanical fuse.

### Removing the second track wheel carrier



1. ➤ Slew the uppercarriage to the side of the transport vehicle.
2. ➤ Using suitable lifting equipment, attach the track wheel carrier to the lifting points.
3. ➤ Remove the track wheel carrier horizontally and evenly from both cross members.

Slightly lower the boom and tighten the hoisting rope. Repeat the process until the track wheel carrier is removed from the cross member.

Ensure that the track wheel carrier does not bend.

⇒ The track wheel carrier is removed from the cross member.

4. ➤ Place the track wheel carrier on the transport vehicle.
5. ➤ Remove the lifting equipment.

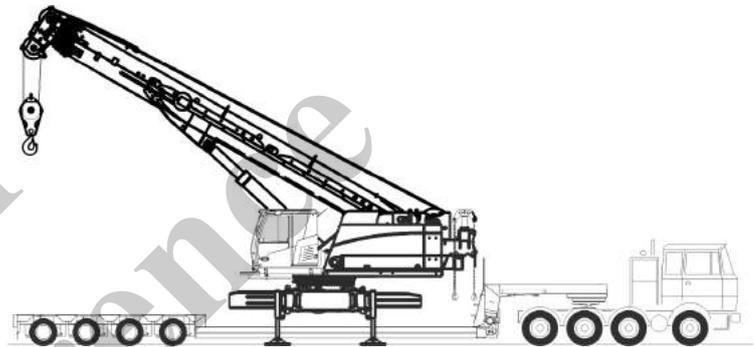
6. → Remove the edge guard.

### 9.6.2.7 Setting the machine down on the transport vehicle

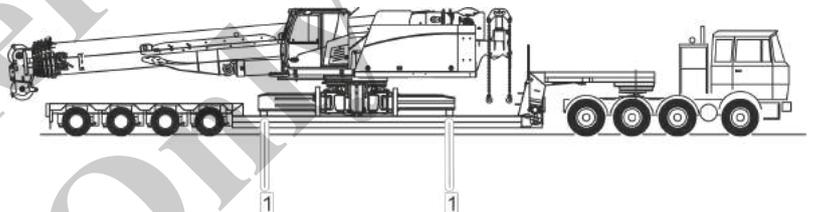
**Tools**

Wood

1. → Lift the boom to at least 30°.
2. → Retract the boom fully.
3. → Lift the machine to the maximum lifting height.



4. → Drive a transport vehicle under the undercarriage.



- 1 Position of the wooden beams
5. → On the cargo bed of the transport vehicle, provide wooden beams to support the cross member.
6. → Activate the ballasting mode.
7. → Switch on and enable the remote radio control.
8. → Place the machine onto the wooden beams. Alternately retract the outrigger cylinders piece by piece.

**Specifications for lifting or lowering the machine**

The following combinations are available for supporting or lowering the machine:

- Simultaneously extending or retracting the rear left and rear right outrigger cylinders as well as the front right and front left outrigger cylinders piece by piece  
or
- Simultaneously extending or retracting the rear left and front left outrigger cylinders as well as the rear right and front right outrigger cylinders piece by piece  
or
- Extending or retracting the individual outrigger cylinders piece by piece

The process for supporting the machine is described using examples of possible outrigger cylinder combinations. The same steps must be used to lift the machine with the respective outrigger cylinder control.

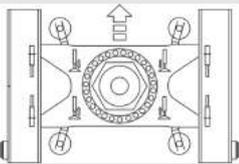
Take note of the color markings on the outrigger cylinders and on the setup remote radio control.

1. → Tilt and hold downward the [Extend/retract rear left outrigger cylinder] and the [Extend/retract front left outrigger cylinder] levers at the same time until the outrigger cylinders are a little retracted.
2. → Tilt and hold downward the [Extend/retract rear right outrigger cylinder] and the [Extend/retract front right outrigger cylinder] levers at the same time until the right outrigger cylinders are at the same height as the left outrigger cylinders.
3. → Continue retracting alternating cylinders until the machine rests on a suitable support or is placed on the track wheel carriers.

## Further notes

- ↪ Chapter 7.15.1 "Raising and lowering the boom" on page 480
- ↪ Chapter 7.15.2 "Retracting/extending the boom" on page 481
- ↪ Chapter 9.6.2.1.7 "Lifting the machine" on page 597

## Extend/retract all outrigger cylinders

	Push and hold the lever up	Push and hold the lever down
	All outrigger cylinders are extended.	All outrigger cylinders are retracted.

**Extend/retract left rear outrigger cylinder**

	<b>Push and hold the lever up</b>	<b>Push and hold the lever down</b>
	The left rear outrigger cylinder is extended.	The left rear outrigger cylinder is retracted.

**Extend/retract right rear outrigger cylinder**

	<b>Push and hold the lever up</b>	<b>Push and hold the lever down</b>
	The right rear outrigger cylinder is extended.	The right rear outrigger cylinder is retracted.

**Extend/retract left front outrigger cylinder**

	<b>Push and hold the lever up</b>	<b>Push and hold the lever down</b>
	The left front outrigger cylinder is extended.	The left front outrigger cylinder is retracted.

**Extend/retract right front outrigger cylinder**

	<b>Push and hold the lever up</b>	<b>Push and hold the lever down</b>
	The right front outrigger cylinder is extended.	The right front outrigger cylinder is retracted.

### 9.6.2.8 Fold in outrigger

#### 9.6.2.8.1 Dismantling outrigger pads

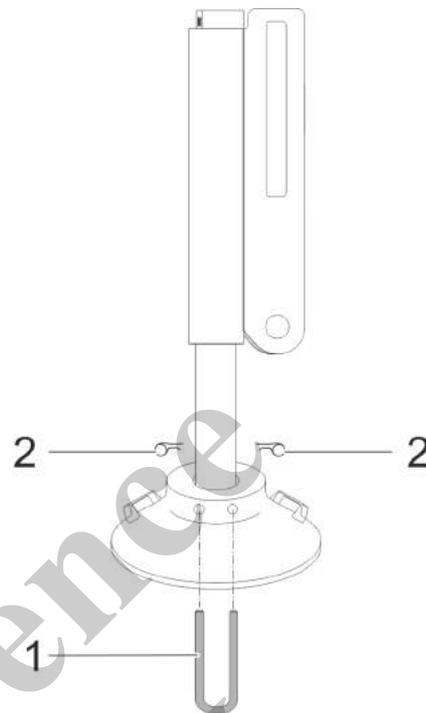


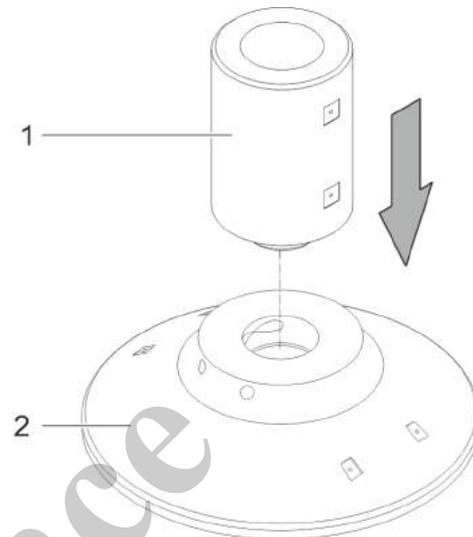
Fig. 37: Example illustration

- 1 Locking bracket
- 2 Spring washers

1. → Tilt the *[Extend/retract left rear outrigger cylinder]* lever downward. Only retract the outrigger cylinder until the outrigger pad can be removed.
2. → Remove the locking bracket and the spring washers.
3. → Remove the outrigger pad.
4. → Completely retract the outrigger cylinder.
5. → Repeat these steps to remove the remaining outrigger pads.

### 9.6.2.8.2 Changing the fastening position of the outrigger cylinder

#### Mounting the adapter

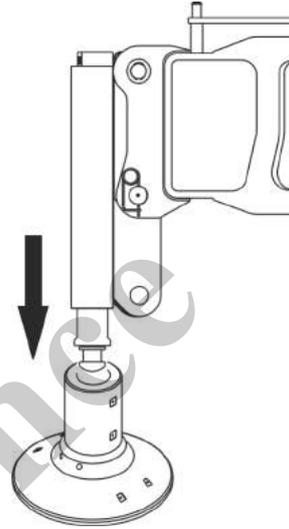


- 1 Adapter
- 2 Outrigger pad

1. Take the adapter out of the tool box.
2. Fit the adapter into the outrigger pad.

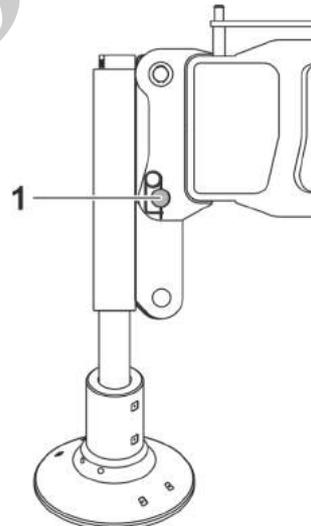
### Lowering the outrigger cylinder in the adapter

- Ensure that you can see the moving outrigger cylinder.
  - Remote radio control for setup is enabled.
1. → Place the outrigger pad with the adapter vertically on the ground under the outrigger cylinder.



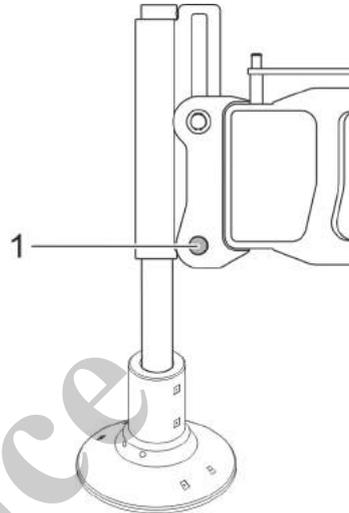
2. → Tilt and hold upward the [Extend/retract rear left outrigger cylinder] lever until the outrigger cylinder is lowered into the adapter.

### Changing the fastening position of the outrigger cylinders from P2 to P1



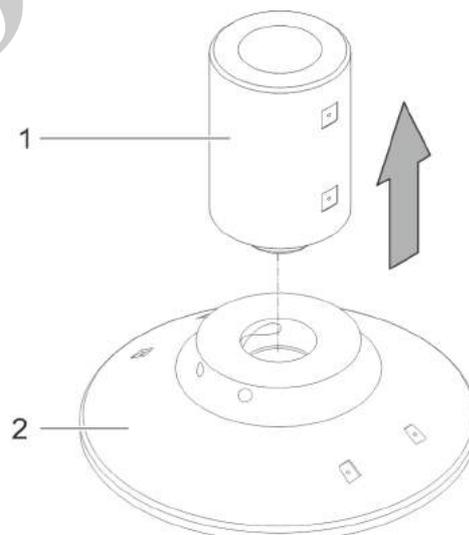
- 1 Bolt in fastening position P2
1. → Remove the bolt from fastening position P2.

2. → Tilt and hold upward the *[Extend/retract rear left outrigger cylinder]* lever on the Setup remote radio control until the outrigger cylinder has reached fastening position P1.



- 1 Bolt in fastening position P1
3. → Mount and secure the bolt in fastening position P1.
4. → Tilt and hold downward the *[Extend/retract rear left outrigger cylinder]* lever until the outrigger cylinder is fully retracted.
5. → Repeat these steps to change the fastening position of the remaining outrigger cylinders from P2 to P1.

### Removing the adapter



- 1 Adapter
- 2 Outrigger pad

→ Remove the adapter from the outrigger pad.

## Transport

### Further notes

🔗 *“Overview: Fastening positions of the outrigger cylinders” on page 594*

🔗 *Chapter 4.1.5 “Outrigger pad” on page 120*

### Extend/retract left rear outrigger cylinder

	Push and hold the lever up	Push and hold the lever down
	The left rear outrigger cylinder is extended.	The left rear outrigger cylinder is retracted.

### Extend/retract right rear outrigger cylinder

	Push and hold the lever up	Push and hold the lever down
	The right rear outrigger cylinder is extended.	The right rear outrigger cylinder is retracted.

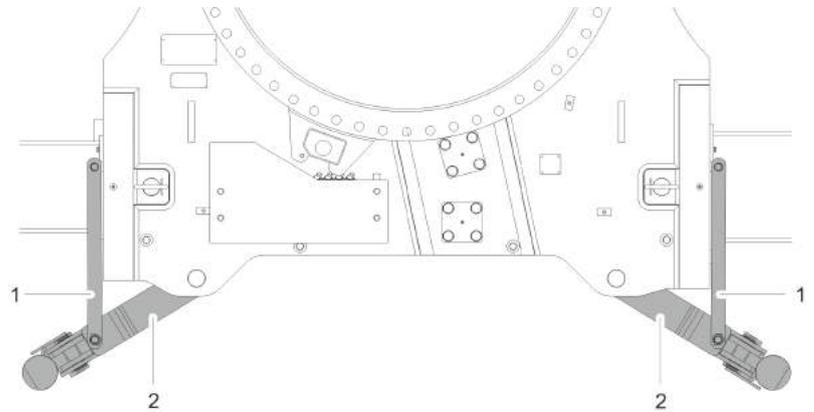
### Extend/retract left front outrigger cylinder

	Push and hold the lever up	Push and hold the lever down
	The left front outrigger cylinder is extended.	The left front outrigger cylinder is retracted.

### Extend/retract right front outrigger cylinder

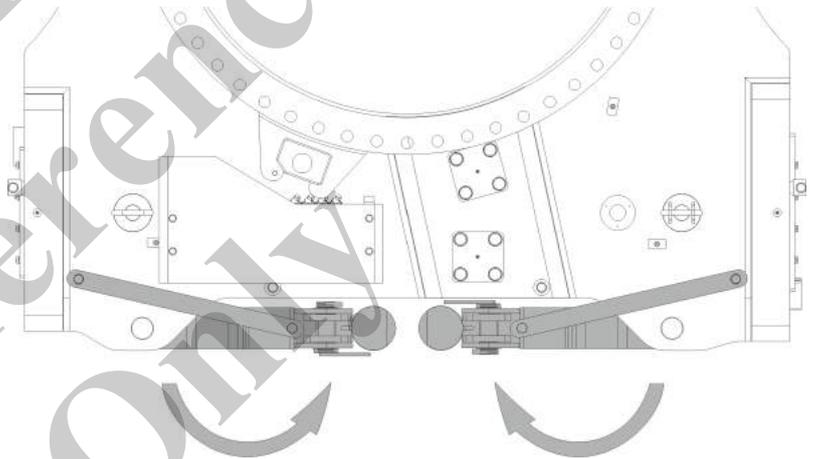
	Push and hold the lever up	Push and hold the lever down
	The right front outrigger cylinder is extended.	The right front outrigger cylinder is retracted.

9.6.2.8.3 Fold in outrigger



- 1 Locking bar
- 2 Stabilizing cylinders

1. → Removing the locking bar of a outrigger cylinder



2. → Completely fold in the outrigger cylinder.

3. → Secure the folded-in outrigger cylinder with the locking bar.

4. → Repeat these steps to fold in and secure the remaining outrigger cylinders.

## 9.6.3 Moving the machine onto the transport vehicle

### **⚠ DANGER**

**Danger of tipping when located on transport vehicle**  
Slewing the uppercarriage on the transport vehicle may cause the machine to tip off the transport vehicle. This can cause death or serious injury.

- On the transport vehicle and during loading and unloading, the uppercarriage must be in 0° position.
- Uppercarriage is locked.
- Unload the machine without changing the direction of the machine:
  - Loading in forward direction - unloading in reverse direction
  - Loading in reverse direction - unloading in forward direction

### **⚠ WARNING**

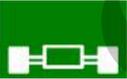
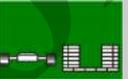
**Risk of accident from starting in the wrong direction**

- Before moving off, ascertain the direction of travel, the direction of steering, and the uppercarriage position and move the machine accordingly.
- Drive slowly and carefully.

Setting the uppercarriage position to 180° inverts the direction of travel and the direction of steering. If the machine is incorrectly moved against the expected direction of travel, this can lead to accidents. This can cause injury to persons.

### 9.6.3.1 Setting the operating mode

#### Operation parameters to be set

Symbol for operating parameters							
Value to be applied	1.5°	≤0.1 m/s	C	0 t	0 t	Main boom	according to current setup status of the machine

### 9.6.3.2 Moving the machine onto the transport vehicle

#### Prerequisite

- The machine is not ballasted.
- Uppercarriage is locked.
- The boom is fully retracted.
- The bottom hook block is secured against swinging on the uppercarriage.
- The boom angle is 20°.

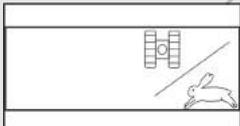
1. ➤ Push the *[Release travel mode]* switch to the right.
2. ➤ Press the *[Drive slow – fast]* switch to the left.

3. ➔ Depress the pedals or tilt the levers to move the machine.
4. ➔ Exercising extreme care, maneuver the machine to the tipping point.  
Do not move the machine while it is tipping.
5. ➔ Drive the machine to the end position at its destination.

**Activate drive mode**

	Switch position left	Switch position right
	The machine cannot be moved.	The machine can be moved.

**Drive slow - fast**

	Switch position left	Switch position right
	Lower speed and higher tractive force are set. More sensitive driving is possible.	Higher speed and lower tractive force are set.

**9.6.4 Lifting the machine onto the transport vehicle**



- Falling machine or accessories from incorrect lifting**
- Only use the suspension gear provided with the machine.
  - Ensure that the sling gear has sufficient load-bearing capacity and is not damaged.
  - Only attach the machine and all accessory parts at the defined lifting points.

If the machine or accessories are lifted incorrectly, the load could fall. This can cause serious injury.

**⚠ WARNING**

**Risk of injury from falling.**

- Use a suitable stable ladder to access the lifting points at the uppercarriage.
- Position the ladder on level ground.
- Always face the machine when climbing onto and down from the machine.
- Always make sure you have at least three points of contact with the ladder and grip handles when climbing up or down. Two hands and one foot, or two feet and one hand must remain in contact with the ladder steps and the grip handles at all times.

Steps and walkway gratings are folded in or dismantled for transport. Therefore, when attaching the machine to the lifting points, there is an increased risk of falling and sustaining injuries.

- Pay attention to the lifting data, weight, and center of gravity of the machine.
- Make sure that no person is at, on or under the machine.
- Do not stand underneath a suspended load.
- Uppercarriage is locked.
- The machine has been prepared for loading.



*The machine can be lifted onto or off the transport vehicle with or without ballast.*

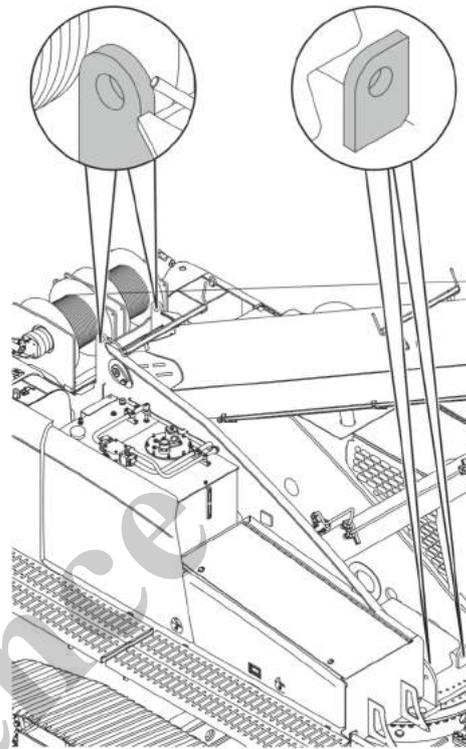
### Tools

- Auxiliary crane
- Ladder

#### 9.6.4.1 Lifting the ballasted machine

Preconditions:

- The counterweight is properly secured with the safety chains.
- The counterweight is locked.

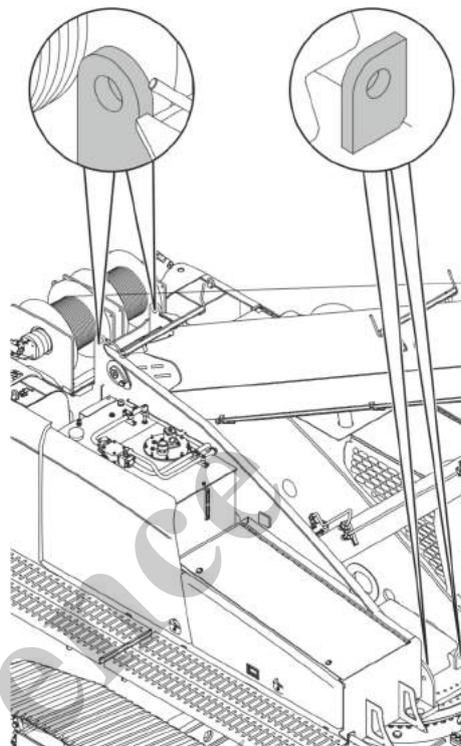


1. → Fasten the sling gear to the lifting points.
2. → Lift the machine.
3. → Set the machine down at its destination.

**Lifting point label**

Shown	Meaning	SEBO no.
	Secure attachment <ul style="list-style-type: none"> <li>■ Lift the machine only at the marked points and with suitable slings.</li> </ul>	186792

## 9.6.4.2 Lifting a machine that is not ballasted



1. ▶ Fasten the sling gear to the lifting points.
2. ▶ Lift the machine.
3. ▶ Set the machine down at its destination.

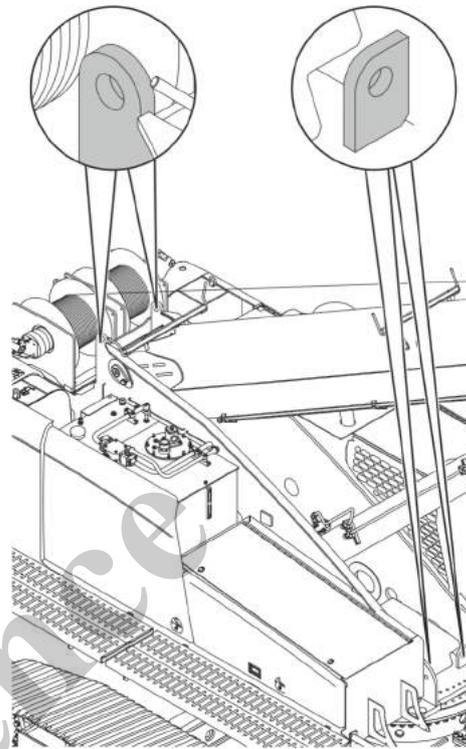
### Lifting point label

Shown	Meaning	SEBO no.
	Secure attachment ■ Lift the machine only at the marked points and with suitable slings.	186792

## 9.6.4.3 Lifting a machine that is not ballasted without track wheel carriers

Preconditions:

- The machine is stabilized or rests on a suitable support.



1. → Fasten the sling gear to the lifting points.
2. → Lift the machine.
3. → Set the machine down at its destination.

**Lifting point label**

Shown	Meaning	SEBO no.
	Secure attachment <ul style="list-style-type: none"> <li>■ Lift the machine only at the marked points and with suitable slings.</li> </ul>	186792

**Further notes**

↪ Chapter 9.2.2 "Lifting data" on page 578

## 9.6.5 Securing the machine for transport

### 9.6.5.1 Moving the boom into transport position

#### NOTICE

Risk of machine damage due to improper operation of the load hook when the limit shutdown is bypassed

- When the lifting limit switch is bypassed, lift the load hook slowly.
- Maintain the specified safety distance between the load hook and the pulley head.
- When the load hook is resting on the ground, do not continue lowering the hook.

When the boom limit shutdown is bypassed, the load hook hits the pulley head. This can cause severe damage to the machine. The rope is damaged if the joystick is tilted further in the [Lower hook] direction when the load hook is resting on the ground.

Safety distance of the load hook when the limit shutdown is bypassed

Data	Value	Unit
Safety distance between the load hook and pulley head	1	m
Safety distance between the load hook and pulley head	3.3	ft

After loading, the machine must be moved into a safe position for transport.

1. → Set the **Setup ballast** setup mode using the quick-select button on the SENCON.
2. → Depending on the transport safeguard, lower the boom as far as possible.
3. → Turn off the machine.

#### Setup ballast

	Yellow bar	Black bar
	The <b>Setup ballast</b> setup mode with preset operation parameters is activated. The minimum limit value of the working radius is restricted.	The <b>Setup ballast</b> setup mode with preset operation parameters is deactivated. The operation parameters can be changed.

9.6.5.2 Installing the transport safety



**Risk of accident from the machine slipping during transport**

- Ensure that the sling gear has sufficient load-bearing capacity and is not damaged.
- Only attach the machine at the designated lashing points.

**If the machine slips during transport, this could cause an accident. A machine slipping can result in injury.**



*The respective transport company is always responsible for the transport of machine and accessories.*

The lashing points on the machine are marked with a symbol.

1. → Secure the machine to the lashing points.
2. → Secure the working equipment against unintentional movements.
3. → Secure all required auxiliary equipment such as ramp sections or timbers.
4. → Secure the load hook.

The lashing points on the load hook are not marked.

If an additional safeguard needs to be attached to the machine, make sure the machine will not be damaged by it.

**Lashing point label**

Shown	Meaning	SEBO no.
	Label of the point where the machine can be lashed	186793

## 9.7 Unloading the machine

9.7.1	Preparing the machine for unloading.....	628
9.7.2	Unloading the stabilized machine.....	628
9.7.3	Moving the machine off the transport vehicle.....	662
9.7.4	Lifting the machine off the transport vehicle.....	663

### 9.7.1 Preparing the machine for unloading

#### 9.7.1.1 Removing the transport safeguard

The lashing points on the machine are marked with a symbol.

1. ➤ Release the transport safeguards from the lashing points.
2. ➤ Release any additional safeguards that have been attached.
3. ➤ Remove chains, ropes, and any other tools required for lashing from the transport vehicle.

#### Lashing point label

Shown	Meaning	SEBO no.
	Label of the point where the machine can be lashed	186793

### 9.7.2 Unloading the stabilized machine

**▲ WARNING**

**Risk of tipping by slewing the uppercarriage with the machine supported**

- Slew the uppercarriage into the direction of travel before stabilizing the machine.
- Stabilize the machine only when the uppercarriage is locked.

When the machine is stabilized by the stroke mechanism in order to adjust the track, its lateral stability is reduced. Slewing the uppercarriage may cause the machine to tip.

**▲ WARNING**

**Risk of crushing when lifting the boom while the machine is stabilized**

- Set the specified boom position for the corresponding ballast rating before stabilizing the machine.
- Do not change the boom setting while the machine is stabilized.

If the machine is stabilized by the lifting device in order to adjust the track, the lifting device may become damaged by adjusting the boom.

**NOTICE**

**Machine damage due to overloading of the outrigger cylinders!**

- Do not move work equipment while the machine is stabilized.

When work implements are moved while the machine is stabilized, the outrigger cylinders can be overloaded. This may cause damage to the ground and to the outrigger cylinders.

**NOTICE**

**Danger of material damage if used on unsuitable ground.**

- Only perform the tasks on solid, level ground with sufficient soil strength
- Observe the permissible ground pressure.
- Position the machine on level ground with sufficient load-bearing capacity and stabilize the machine.
- Use suitable outrigger pads.

The machine may suffer damage if positioned or used on unsuitable ground with insufficient soil strength.

**Pressure exerted on the ground by the stabilized machine**

When stabilized, the fully ballasted machine exerts a maximum pressure on the ground via the outrigger pads.

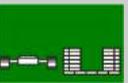
Data	Value	Unit
Diameter of outrigger pad	550.0	mm
Diameter of outrigger pad	21.6	in
Maximum pressure exerted by each outrigger pad	15.1	kg/cm <sup>2</sup>
Maximum pressure exerted by each outrigger pad	214.8	psi

If the load-bearing capacity of the ground is insufficient, a suitable support must also be used to reduce the ground pressure.

**9.7.2.1 Stabilize the machine.**

**9.7.2.1.1 Setting the operating mode**

**Operation parameters to be set**

Symbol for operating parameters							
Value to be applied	All selectable values	<=0.1 m/s	D	0 t	0 t	Setup ballast	according to current setup status of the machine

## 9.7.2.1.2 Activating ballasting mode

1. ➤ Open the “Setup” menu page on the SENCON.
2. ➤ Press the [Ballasting mode] quick-select button.
  - ⇒ The status indicator of the quick-select icon lights up yellow.
  - The engine is switched off.
  - The Setup remote radio control is used to control the machine during setup.

### Ballasting mode

	Yellow bar	Black bar
	The ballasting mode is activated. The Setup remote radio control is used to control the machine during certain setup procedures.	The ballasting mode is deactivated. The machine is controlled using the controls in the cab.

## 9.7.2.1.3 Folding out the outrigger

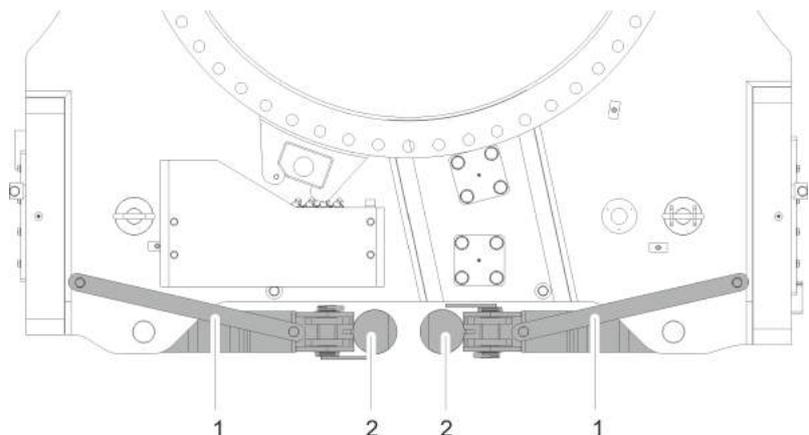
**⚠ WARNING**

**Risk of crushing when swinging the outrigger out or in!**

- Ensure all personnel is outside the danger zone.
- Indicate the danger through visual and audible warning signals.

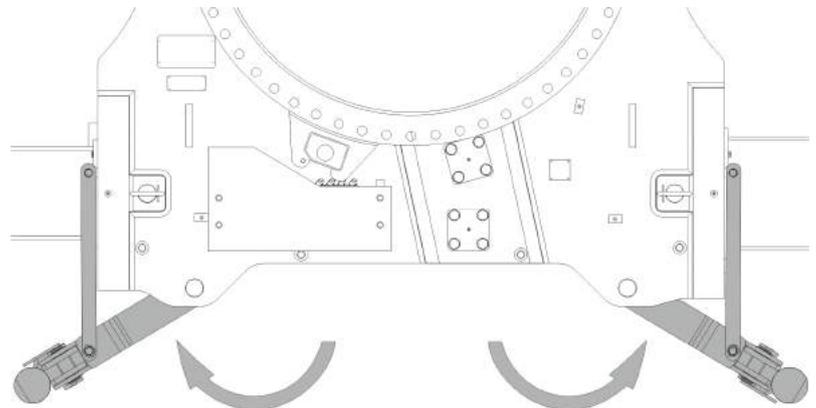
People within the range of motion may be crushed and seriously injured.

### Fully unfolding the outrigger cylinders



- 1 Locking bar
- 2 Stabilizing cylinders

1. ➤ Remove the locking bar of a outrigger cylinder.



2. → Fully unfold the outrigger cylinders.
3. → Secure the unfolded outrigger cylinders with the locking bar.
4. → Repeat these steps to unfold and secure the remaining outrigger cylinders.

### Stabilizing cylinder positions

Shown	Meaning	SEBO no.
	Stabilizing cylinder positions <ul style="list-style-type: none"> <li>■ Folded out: Track wheel carrier setup</li> <li>■ Middle position: Change track width</li> <li>■ Folded in: Transport</li> </ul>	235589

#### 9.7.2.1.4 Switching on the Setup remote radio control

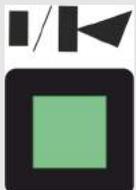
Preconditions:

- The safety lever has been pulled back.
  - The machine operator has stepped out of the machine.
1. → Turn the rotary switch [*Switch remote radio control on/off*] on the remote radio control to position [!].
  2. → Press the push button [*Horn/release remote radio control*] on the remote radio control.
    - ⇒ The remote radio control is ready for use.

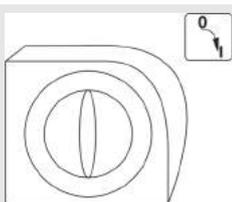
The engine can be started via the remote radio control.

## Transport

### Horn/release remote radio control

	Press the push button
	<p>The horn sounds.</p> <p>The remote radio control is activated.</p> <p>The engine can be started.</p>

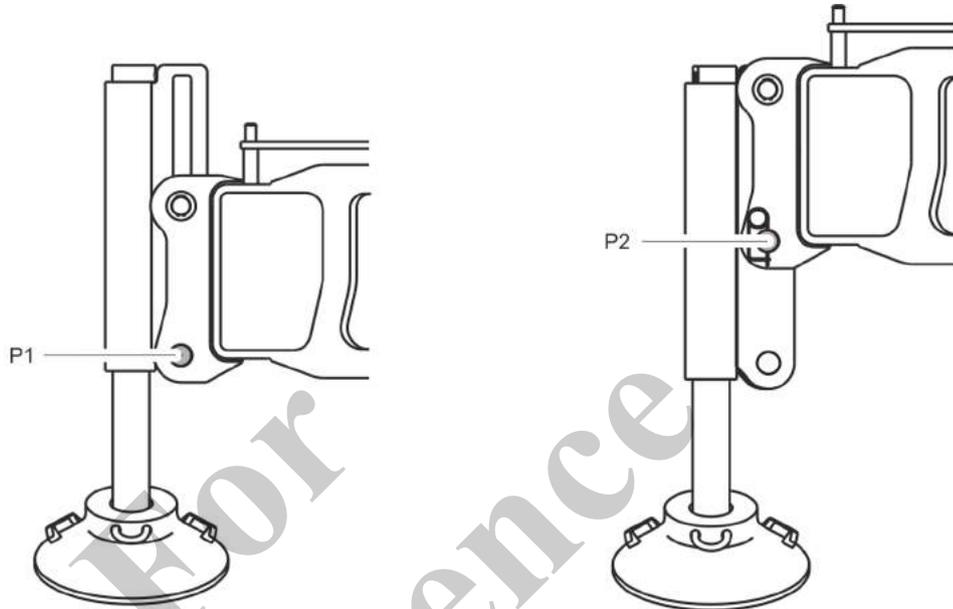
### Switch remote radio control on/off

	Turn rotary switch to position [0]	Turn rotary switch to position [I]
	<p>The remote radio control is deactivated.</p>	<p>The remote radio control is activated.</p> <p>A brief signal tone sounds.</p>

For Reference Only

9.7.2.1.5 Changing the fastening position of the outrigger cylinder

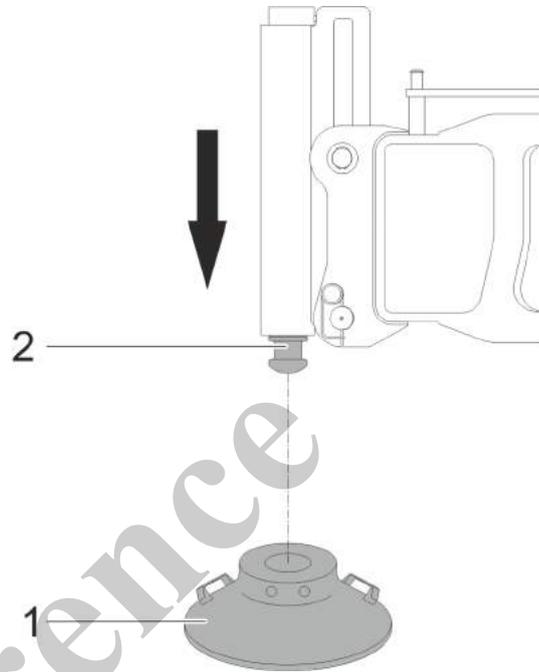
Overview: Fastening positions of the outrigger cylinders



Fastening position P1	Fastening position P2
<ul style="list-style-type: none"> <li>■ The machine is placed on the track wheel carriers</li> <li>■ Folding in or unfolding the outrigger cylinders</li> <li>■ Changing the track width</li> </ul>	<ul style="list-style-type: none"> <li>■ Installing or removing the track wheel carriers</li> <li>■ Loading or unloading the machine onto/from the transport vehicle</li> </ul>

## Positioning the outrigger pads

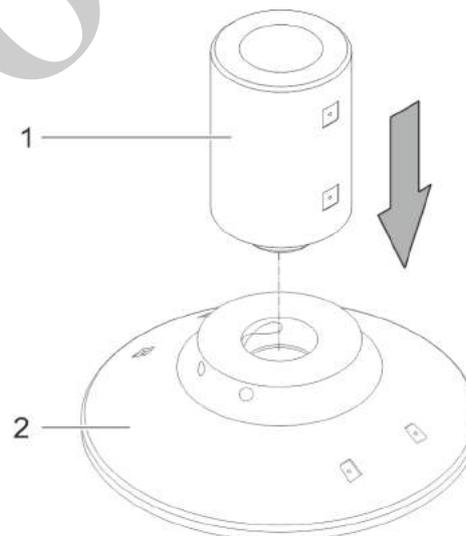
1. ➤ Remove the outrigger pads from their storage location.



- 1 Outrigger pad
- 2 Stabilizing cylinders

2. ➤ Position the outrigger pads vertically underneath the outrigger cylinders.

## Mounting the adapter



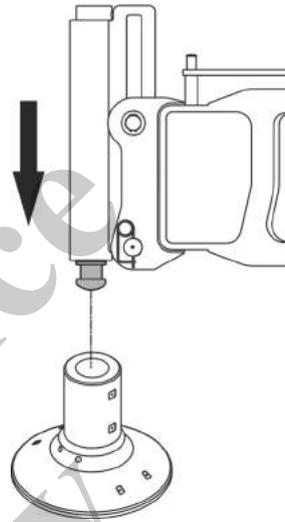
- 1 Adapter
- 2 Outrigger pad

1. ➤ Take the adapter out of the tool box.

2. → Fit the adapter into the outrigger pad.

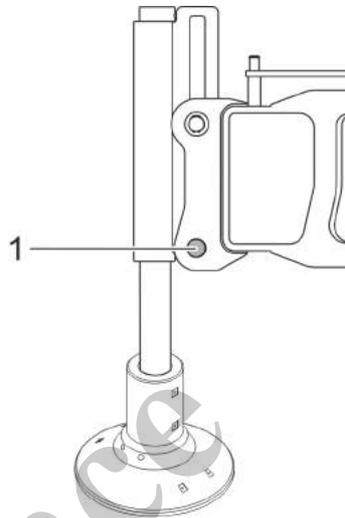
#### Lowering the outrigger cylinder in the adapter

- Ensure that you can see the moving outrigger cylinder.
  - Remote radio control for setup is enabled.
1. → Place the outrigger pad with the adapter vertically on the ground under the outrigger cylinder.



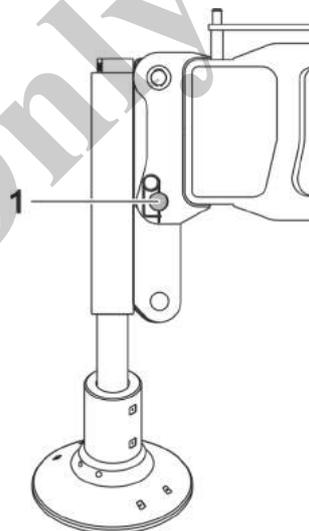
2. → Tilt and hold upward the *[Extend/retract rear left outrigger cylinder]* lever until the outrigger cylinder is lowered into the adapter.

### Changing the fastening position of the outrigger cylinders from P1 to P2



1 Bolt in fastening position P1

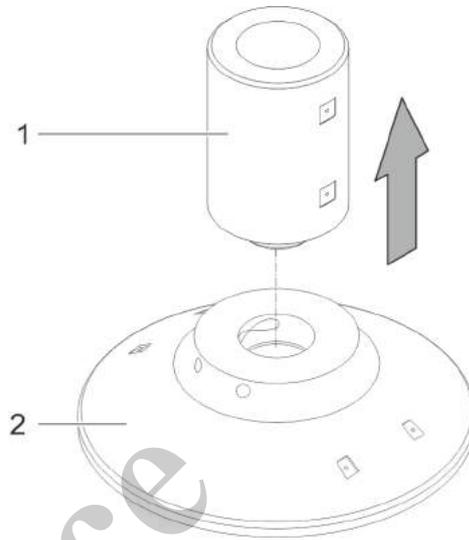
1. ➤ Remove the bolt from fastening position P1.
2. ➤ Tilt and hold downward the *[Extend/retract rear left outrigger cylinder]* lever until the outrigger cylinder has reached fastening position P2.



1 Bolt in fastening position P2

3. ➤ Mount and secure the bolt in fastening position P2.
4. ➤ Tilt and hold downward the *[Extend/retract rear left outrigger cylinder]* lever until the outrigger cylinder is fully retracted.
5. ➤ Repeat these steps to change the fastening position of the remaining outrigger cylinders from P1 to P2.

Removing the adapter



- 1 Adapter
- 2 Outrigger pad

→ Remove the adapter from the outrigger pad.

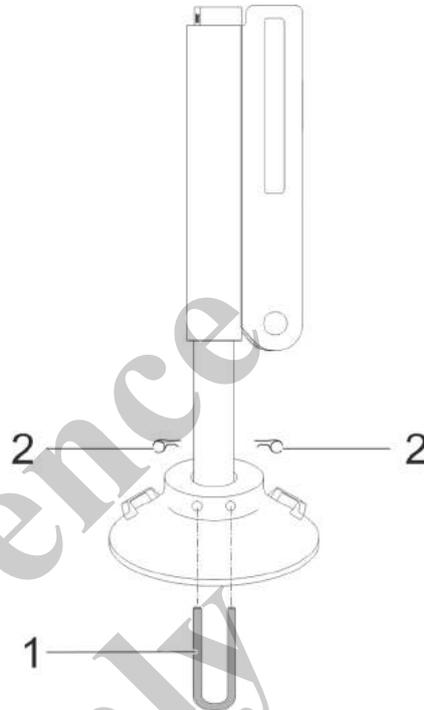
Mounting the outrigger pad

Requirement:

For Reference Only

Ensure that you can see the moving outrigger cylinder.

1. ➤ Tilt and hold upward the *[Extend/retract rear left outrigger cylinder]* lever until the outrigger cylinder is fully extended and has reached the outrigger pad support.



- 1 Locking bracket
  - 2 Spring washers
2. ➤ Push the locking brackets through the outrigger pads.
  3. ➤ Secure the locking brackets with spring washers.
  4. ➤ Repeat these steps to mount the remaining outrigger pads.

## Extend/retract left rear outrigger cylinder

	Push and hold the lever up	Push and hold the lever down
	The left rear outrigger cylinder is extended.	The left rear outrigger cylinder is retracted.

## Extend/retract right rear outrigger cylinder

	Push and hold the lever up	Push and hold the lever down
	The right rear outrigger cylinder is extended.	The right rear outrigger cylinder is retracted.

**Extend/retract left front outrigger cylinder**

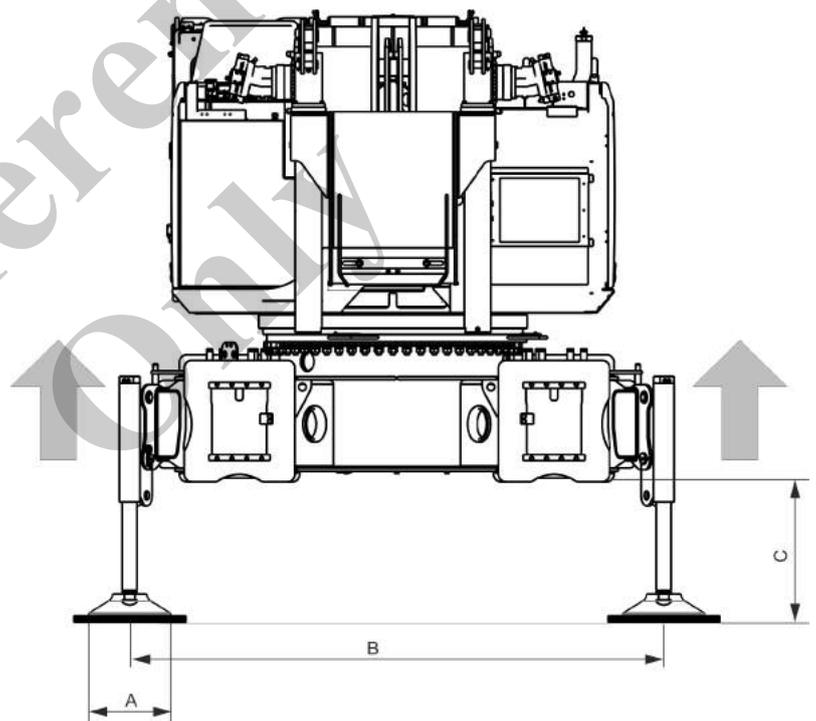
	Push and hold the lever up	Push and hold the lever down
	The left front outrigger cylinder is extended.	The left front outrigger cylinder is retracted.

**Extend/retract right front outrigger cylinder**

	Push and hold the lever up	Push and hold the lever down
	The right front outrigger cylinder is extended.	The right front outrigger cylinder is retracted.

**9.7.2.1.6 Lifting the machine**

**Overview: Lifting height of the outrigger cylinders**



Data	Value	Unit
A	550	mm
A	21.6	in
B	3600	mm
B	141.0	in

Data	Value	Unit
C: Lifting height for mounting/removing the track wheel carriers	700	mm
C: Lifting height for mounting/removing the track wheel carriers	27.6	in
C: Maximum lifting height for unloading from/loading onto the transport vehicle	953	mm
C: Maximum lifting height for unloading from/loading onto the transport vehicle	37.5	in

## Lifting the machine to the maximum lifting height

1. ➤ Lift the boom to at least 30°.
2. ➤ Retract the boom fully.
3. ➤ Lift the machine to the maximum lifting height.

## Specifications for lifting or lowering the machine

The following combinations are available for supporting or lowering the machine:

- Simultaneously extending or retracting the rear left and rear right outrigger cylinders as well as the front right and front left outrigger cylinders piece by piece  
or
- Simultaneously extending or retracting the rear left and front left outrigger cylinders as well as the rear right and front right outrigger cylinders piece by piece  
or
- Extending or retracting the individual outrigger cylinders piece by piece

The process for supporting the machine is described using examples of possible outrigger cylinder combinations. The same steps must be used to lift the machine with the respective outrigger cylinder control.

Take note of the color markings on the outrigger cylinders and on the setup remote radio control.

1. ➤ Tilt and hold downward the *[Extend/retract rear left outrigger cylinder]* and the *[Extend/retract front left outrigger cylinder]* levers at the same time until the outrigger cylinders are a little retracted.
2. ➤ Tilt and hold downward the *[Extend/retract rear right outrigger cylinder]* and the *[Extend/retract front right outrigger cylinder]* levers at the same time until the right outrigger cylinders are at the same height as the left outrigger cylinders.

3. → Continue retracting alternating cylinders until the machine rests on a suitable support or is placed on the track wheel carriers.

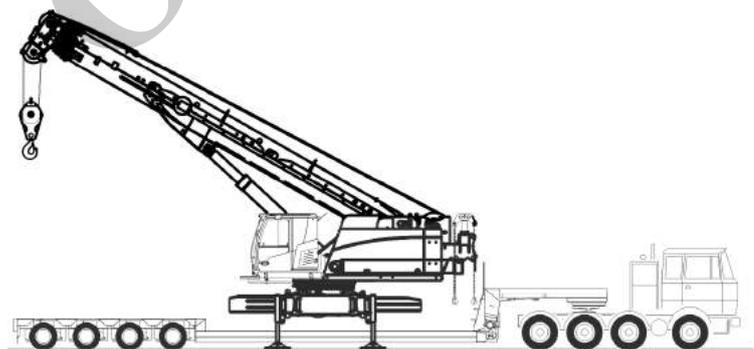
The process for lifting the machine is described using one of the possible outrigger cylinder combinations.

- Lift the machine to the specified lifting height: Alternately move the outrigger cylinders piece by piece.

**Stabilizing cylinders label**

Shown	Meaning	SEBO no.
	<p>To provide assistance, the outrigger cylinders are labeled in the same colors as on the remote control.</p>	<p>247088</p>

**9.7.2.2 Driving the transport vehicle away**



1. → Fully lower the cargo bed of the transport vehicle.
2. → Move the transport vehicle out of the work area.

**9.7.2.3 Preparing to mount the track wheel carrier**

Requirement:

- The outrigger cylinders are fully lowered.
- 1. ➤ Extend the cross members to the maximum track width.
- 2. ➤ Lubricate the friction surfaces on the track wheel carriers and on the cross members.

## Further notes

↪ Chapter 6.6.7.4 “Increasing the track width” on page 277

### 9.7.2.4 Setting the extension mode and boom length

In order to set up the track wheel carriers with the **Setup ballast** setup mode, a specific extension mode must be set and the boom must be extended to a predefined length.

#### Extension mode and boom length for setting up the track wheel carriers

Data	Value	Unit
Extension mode	EM1	
Boom length	12.3	m
Boom length	40.4	ft

#### Requirement:

- The boom angle is  $> 60^\circ$ .
- 1. ➤ Open the “Pin boom” menu page.
- 2. ➤ Set the specified extension mode on the SENCON.
- 3. ➤ Tilt the joystick in the [Extend telescope] or [Retract telescope] direction.  
Extend or retract the boom until it has reached the predefined length.



**If two functions are assigned on the joystick, the relevant switch must be in the correct position in order to carry out the respective function.**

## Further notes

↪ Chapter 7.15.2 “Retracting/extending the boom” on page 481

## 9.7.2.5 Installing the track wheel carrier

**⚠ WARNING**

Risk of tipping from track wheel carrier swinging against the outrigger cylinder!

- Guide the track wheel carrier during lifting and keep it clear of the outrigger cylinders.
- There must be no-one under the machine during assembly.

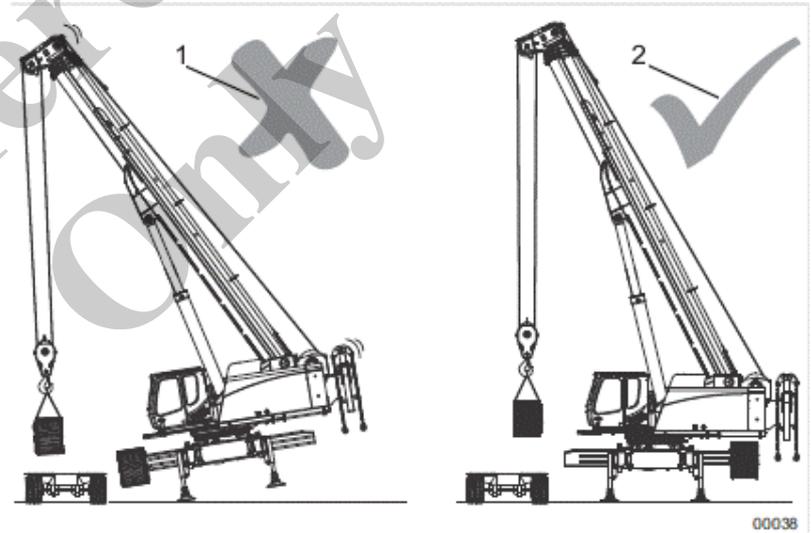
If a track wheel carrier swings against an outrigger during assembly or disassembly, the machine may tip over. This can cause serious injury.

**⚠ WARNING**

Risk of death due to machine tipping over.

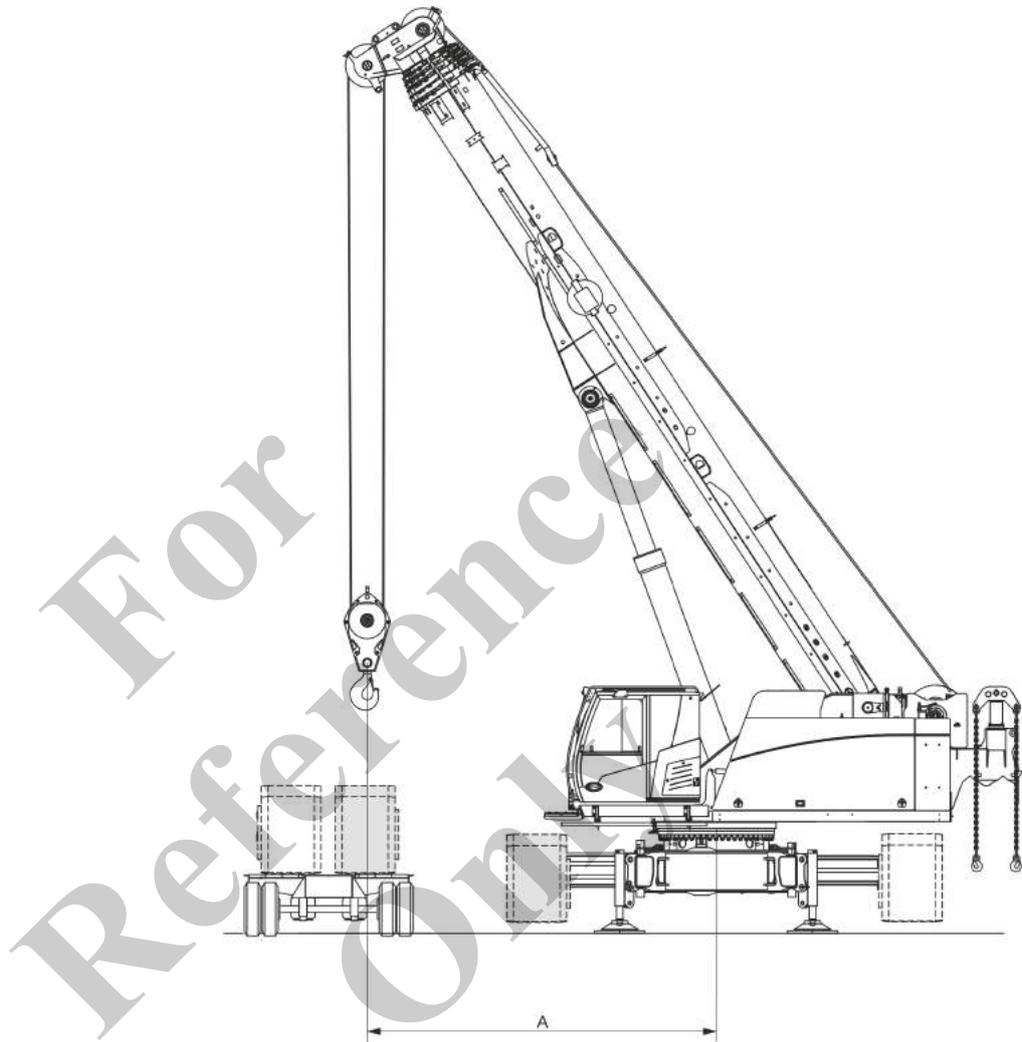
- The transport vehicle is always positioned next to the track wheel carrier that is to be set up. The track wheel carrier is lifted directly onto the transport vehicle or lifted by the transport vehicle directly to the respective cross member.
- Do not slew the uppercarriage when the track wheel carrier is attached to the hook.

The machine may tip if subject to load on one side only during attachment or removal of the track wheel carriers. This can cause death or serious injury.



- 1 Incorrect  
2 Correct

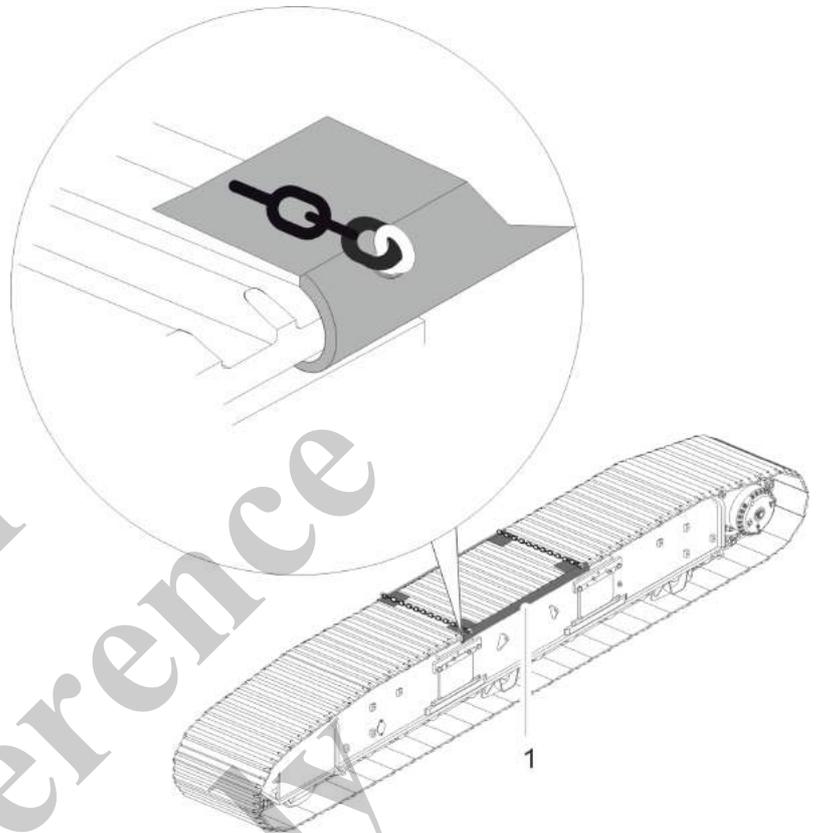
### Preparing the transport vehicle for the first track wheel carrier



- Park the transport vehicle for the track wheel carrier at the specified distance next to the machine.  
Park the transport vehicle parallel to the track wheel carrier.

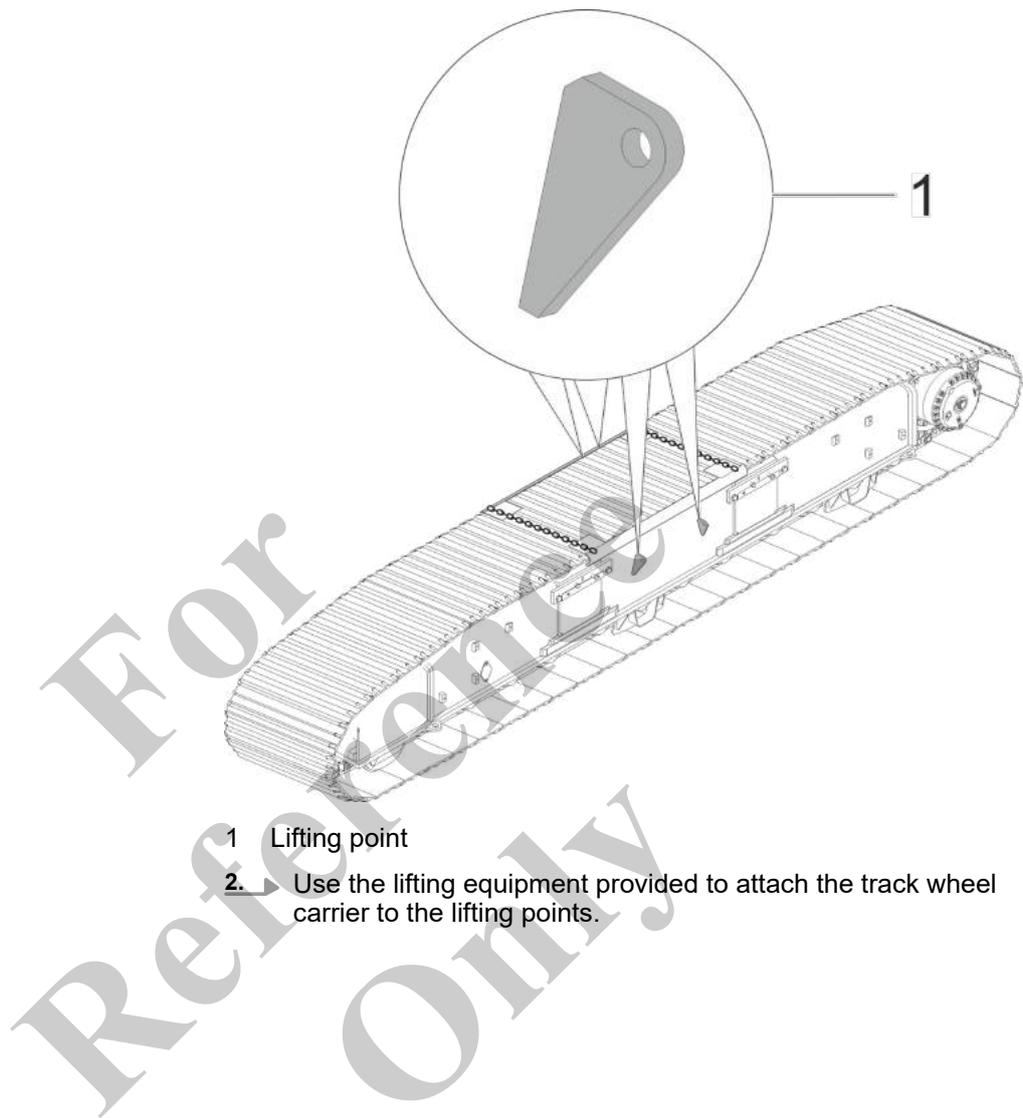
Data	Value	Unit
A	5000	mm
A	196.9	in

## Slinging the track wheel carriers



1 Installing

1. → Mount and secure one included edge guard to the crawler track.



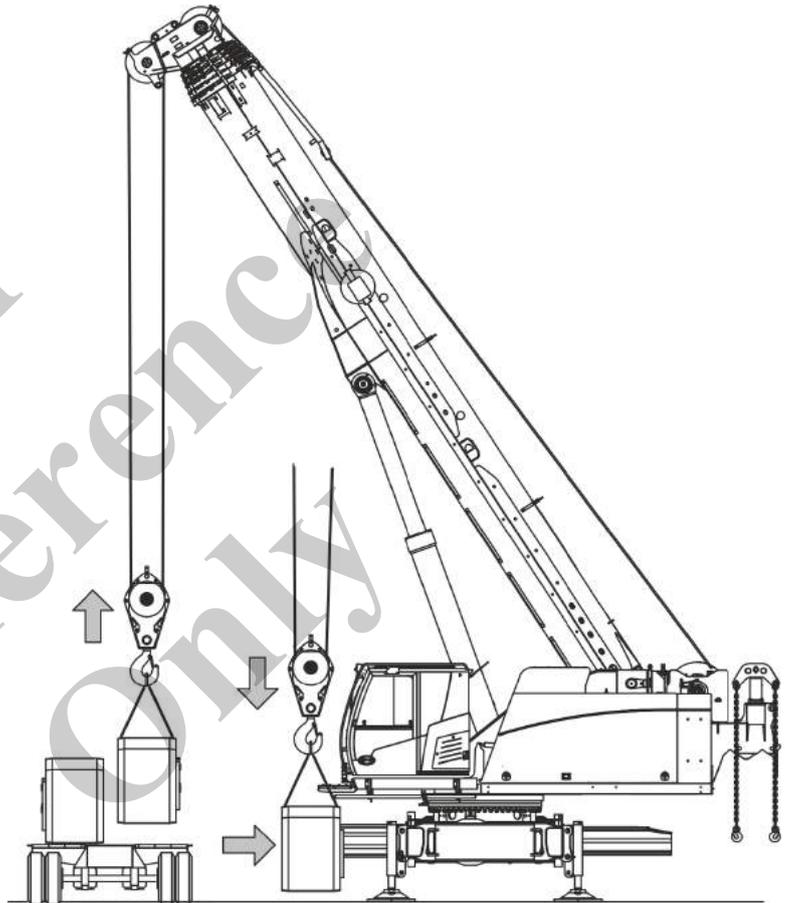
1 Lifting point

2. Use the lifting equipment provided to attach the track wheel carrier to the lifting points.

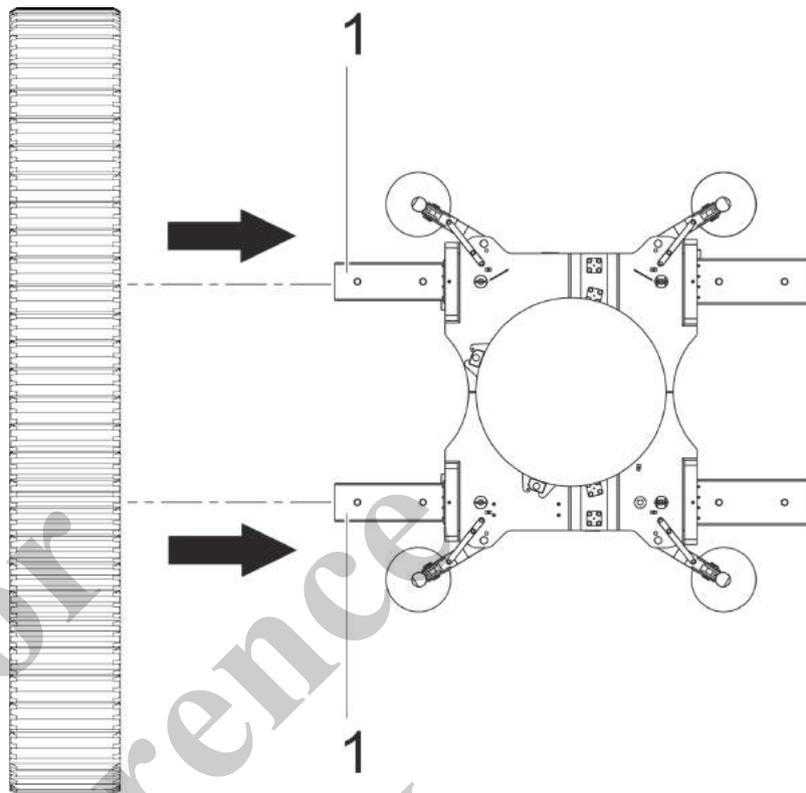
### Installing the first track wheel carrier

#### Requirement:

- The **Setup ballast** setup mode is set.
- The extension mode and the boom length for setting up the track wheel carriers has been set.
- The hydraulic supply for hydraulic clamping and the travel drives is disabled.



1. ➤ Lift the track wheel carrier off the transport vehicle.
2. ➤ Lift the track wheel carrier toward the cross members on the undercarriage.
3. ➤ Align the cross members with the track wheel carrier: Tilt the respective outrigger cylinder lever upward or downward.
  - ⇒ The outrigger cylinder in question is extended or retracted.



1 Cross member

4. Push the track wheel carrier horizontally and evenly onto the cross members.

Slightly lift the boom and uncoil the hoisting rope. Repeat the process until the track wheel carrier rests completely on the cross member.

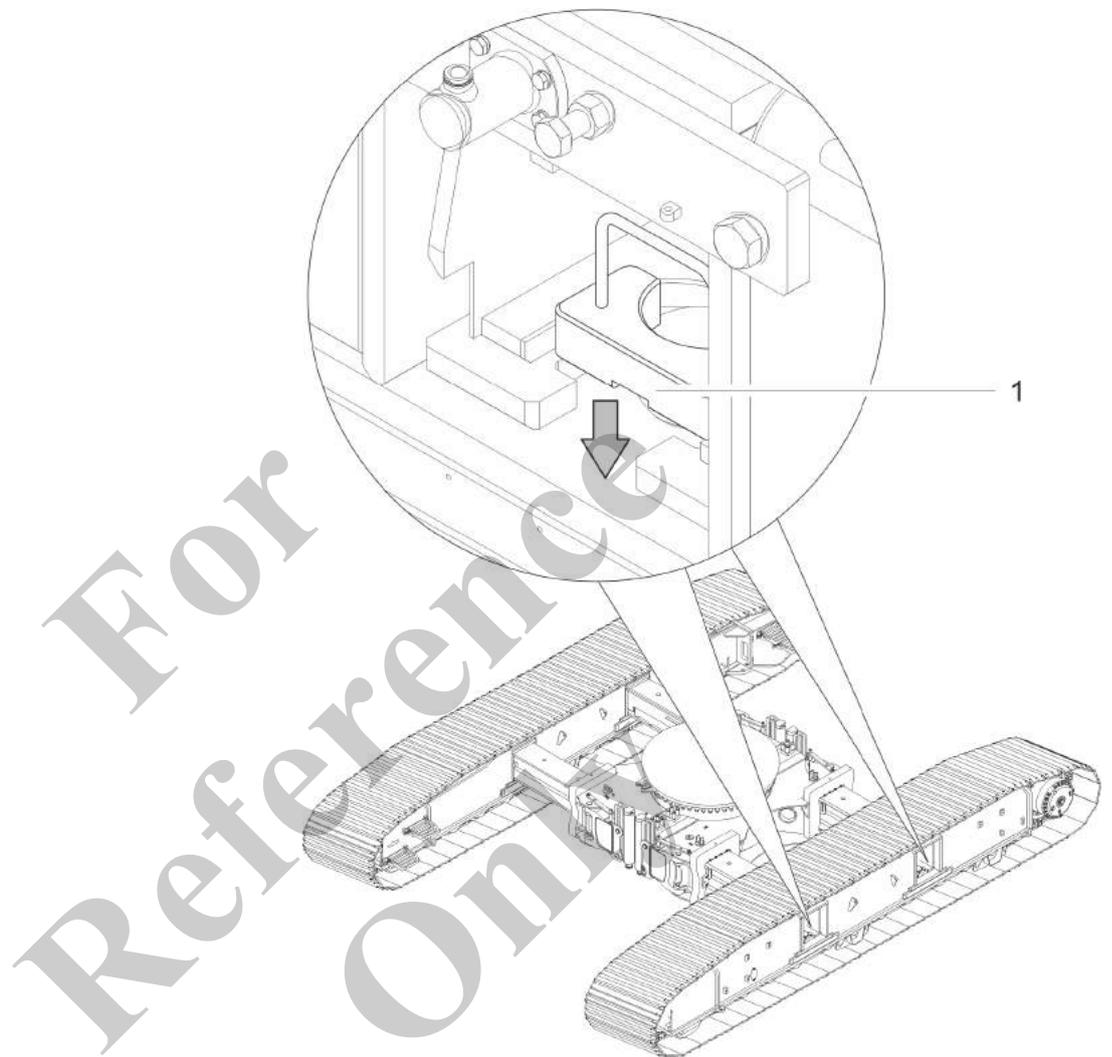
Ensure that the track wheel carrier does not bend.

⇒ The track wheel carrier is mounted to the cross members.

## Mounting the holders

Requirement:

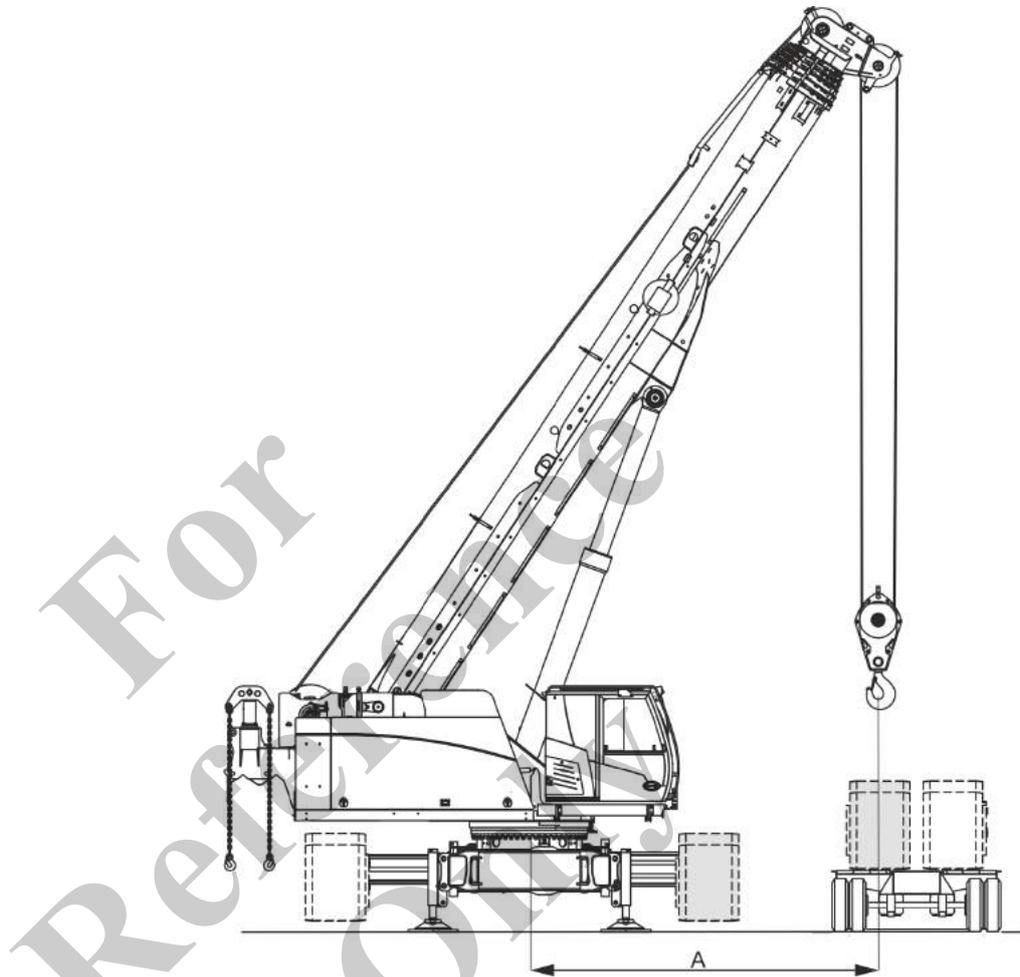
The track wheel carrier is attached to the lifting points.



1 Holder

1. → Mount the holders to the track wheel carrier.
2. → Remove the hoisting gear from the track wheel carrier.
3. → Remove the edge guard.

## Preparing the transport vehicle for the second track wheel carrier



- Move the transport vehicle alongside the side of the machine where the second track wheel carrier is located.

It must be possible to place the second track wheel carrier directly onto the transport vehicle, or to remove it from the transport vehicle, without being lifted over the second track wheel carrier.

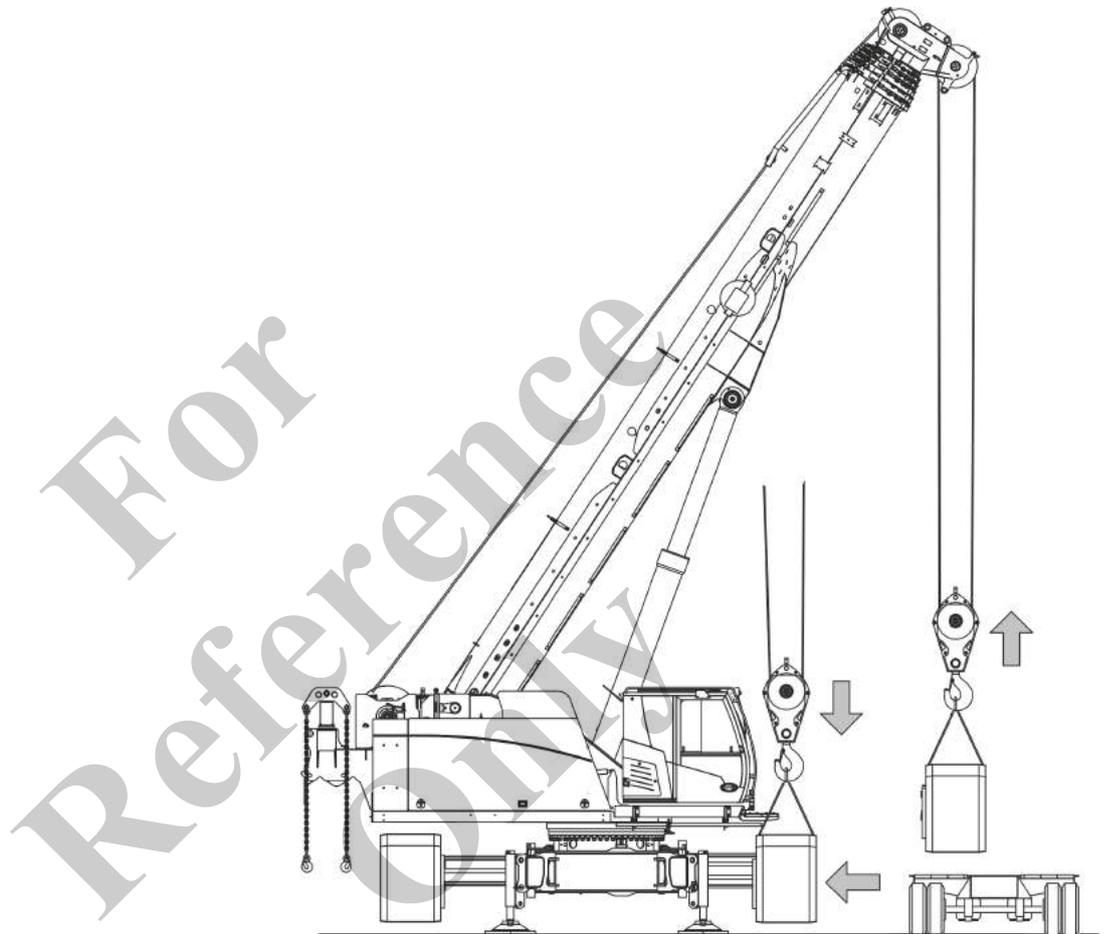
Park the transport vehicle for the track wheel carrier at the specified distance next to the machine.

Park the transport vehicle parallel to the track wheel carrier.

Data	Value	Unit
A	5000	mm
A	196.9	in

### Mounting the second track wheel carrier

1. ➔ Slew the uppercarriage to the side of the transport vehicle.
2. ➔ Using suitable lifting equipment, attach the track wheel carrier to the lifting points.



3. ➔ Lift the track wheel carrier off the transport vehicle.
4. ➔ Lift the track wheel carrier toward the cross members on the undercarriage.
5. ➔ Align the cross members with the track wheel carrier: Tilt the respective outrigger cylinder lever upward or downward.
  - ⇒ The outrigger cylinder in question is extended or retracted.
6. ➔ Push the track wheel carrier horizontally and evenly onto the cross members.

Slightly lift the boom and uncoil the hoisting rope. Repeat the process until the track wheel carrier rests completely on the cross member.

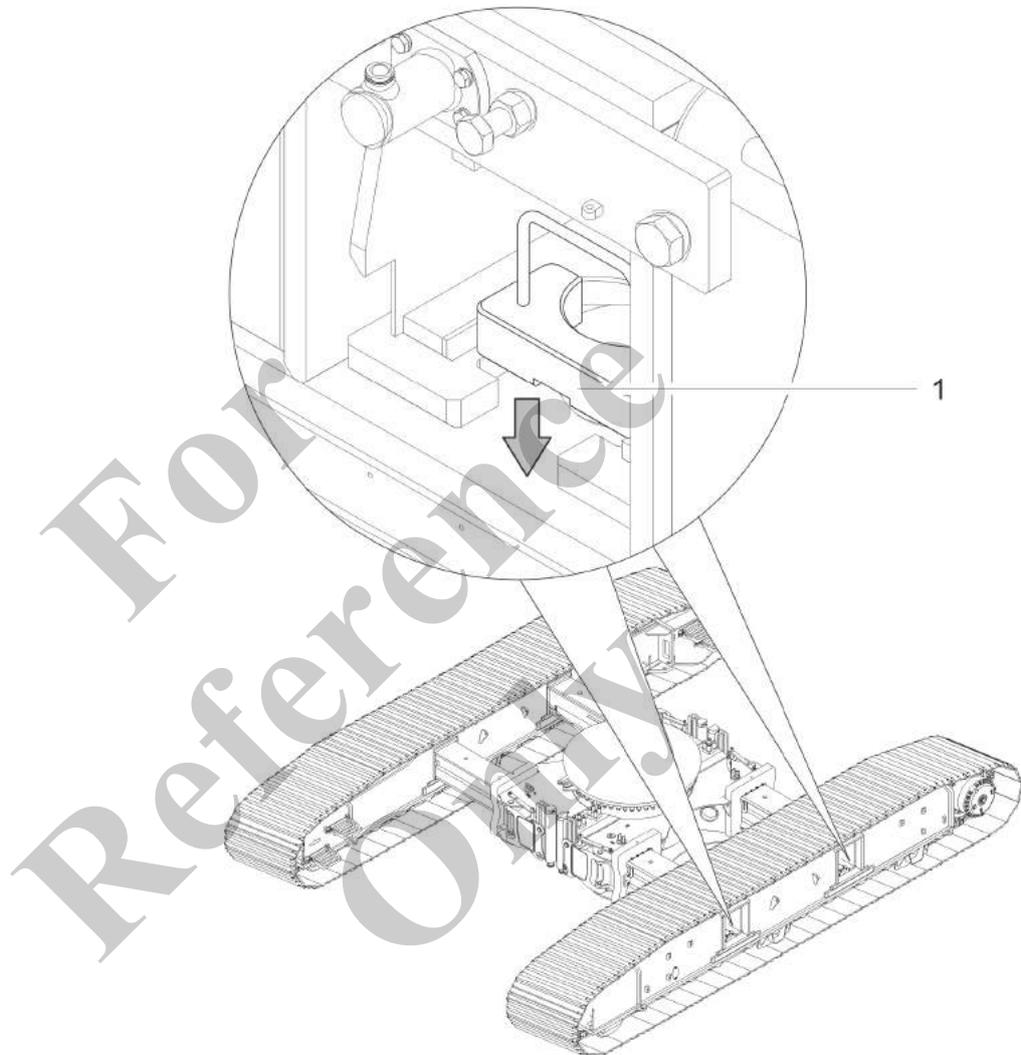
Ensure that the track wheel carrier does not bend.

⇒ The track wheel carrier is mounted to the cross members.

### Mounting the holders

Requirement:

The track wheel carrier is attached to the lifting points.



1 Holder

1. → Mount the holders to the track wheel carrier.
2. → Remove the hoisting gear from the track wheel carrier.
3. → Remove the edge guard.

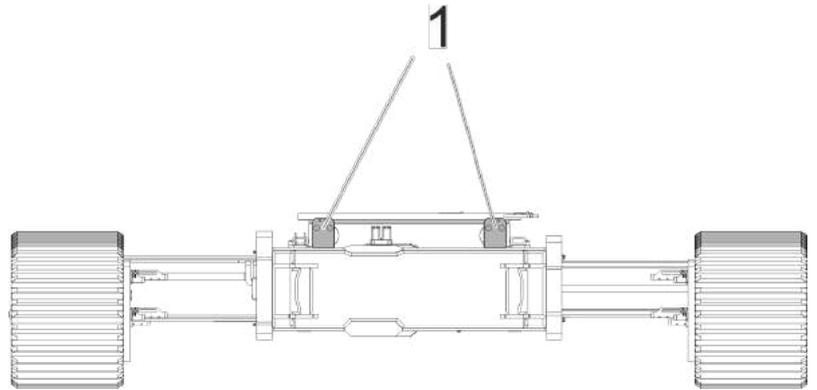
### 9.7.2.6 Establishing the hydraulic supply

#### Connecting the hydraulic couplings

Requirement:

■ The engine is switched off.

1. → Open the covers of the quick-change couplings.

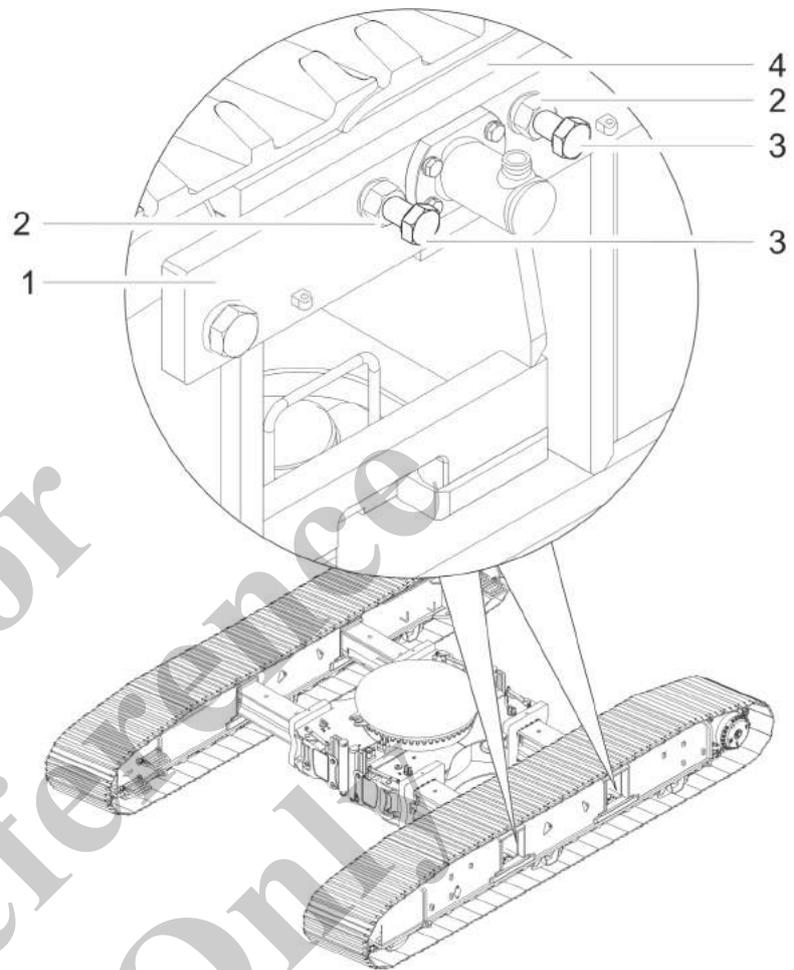


*Fig. 38: Overview: Location of the hydraulic connections for the right and left track wheel carrier*

1 Hydraulic connections for the travel drive hydraulics and hydraulic clamping, rear side of the undercarriage

2. → Connect the quick-change couplings.

### Mounting the wedge



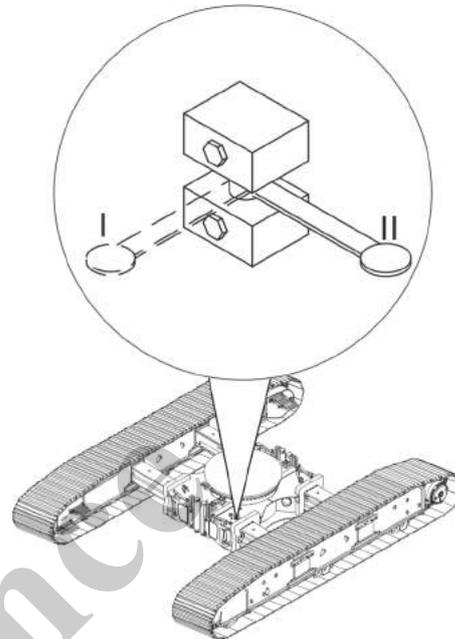
- 1 Plate
- 2 Lock nut
- 3 Bolts
- 4 wedge

1. ➤ Loosen the lock nuts and turn them back against the heads.

The hydraulic clamping does not work when the lock nuts are tightened.

2. ➤ Mount the covers on the attachment shafts of the track wheel carriers.

### Enabling the hydraulic clamping



- I Hydraulic clamping enabled
- II Hydraulic clamping disabled

→ Place the lever of the hydraulic clamping in position [I].  
 ⇨ Hydraulic clamping is enabled.

#### 9.7.2.7 Placing the machine on the track wheel carriers

**⚠ WARNING**

**Risk of accidents from outrigger cylinders moving incorrectly on the stroke mechanism**

- Observe the uppercarriage position of the machine.
- Take note of the colored marking on the outrigger cylinders and the remote radio control.

**When using the Setup remote radio control, the wrong outrigger cylinders may move.**

1. → Lift the boom to at least 30°.
2. → Retract the boom fully.
3. → Activate the ballasting mode.
4. → Switch on and enable the remote radio control.
5. → Place the machine onto the track wheel carriers: Alternately retract the outrigger cylinders piece by piece.

#### Specifications for lifting or lowering the machine

The following combinations are available for supporting or lowering the machine:

- Simultaneously extending or retracting the rear left and rear right outrigger cylinders as well as the front right and front left outrigger cylinders piece by piece  
or
- Simultaneously extending or retracting the rear left and front left outrigger cylinders as well as the rear right and front right outrigger cylinders piece by piece  
or
- Extending or retracting the individual outrigger cylinders piece by piece

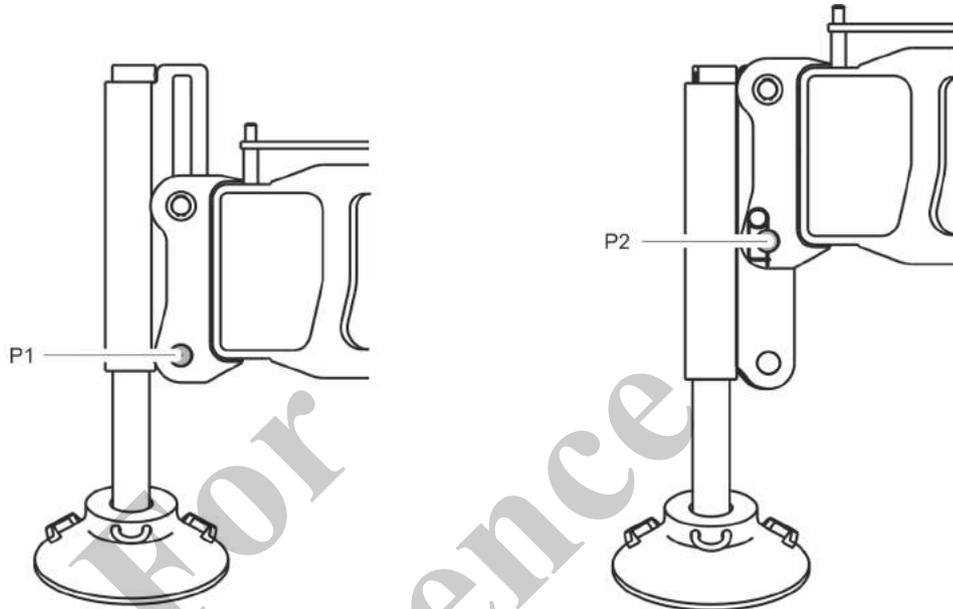
The process for supporting the machine is described using examples of possible outrigger cylinder combinations. The same steps must be used to lift the machine with the respective outrigger cylinder control.

Take note of the color markings on the outrigger cylinders and on the setup remote radio control.

1. → Tilt and hold downward the *[Extend/retract rear left outrigger cylinder]* and the *[Extend/retract front left outrigger cylinder]* levers at the same time until the outrigger cylinders are a little retracted.
2. → Tilt and hold downward the *[Extend/retract rear right outrigger cylinder]* and the *[Extend/retract front right outrigger cylinder]* levers at the same time until the right outrigger cylinders are at the same height as the left outrigger cylinders.
3. → Continue retracting alternating cylinders until the machine rests on a suitable support or is placed on the track wheel carriers.

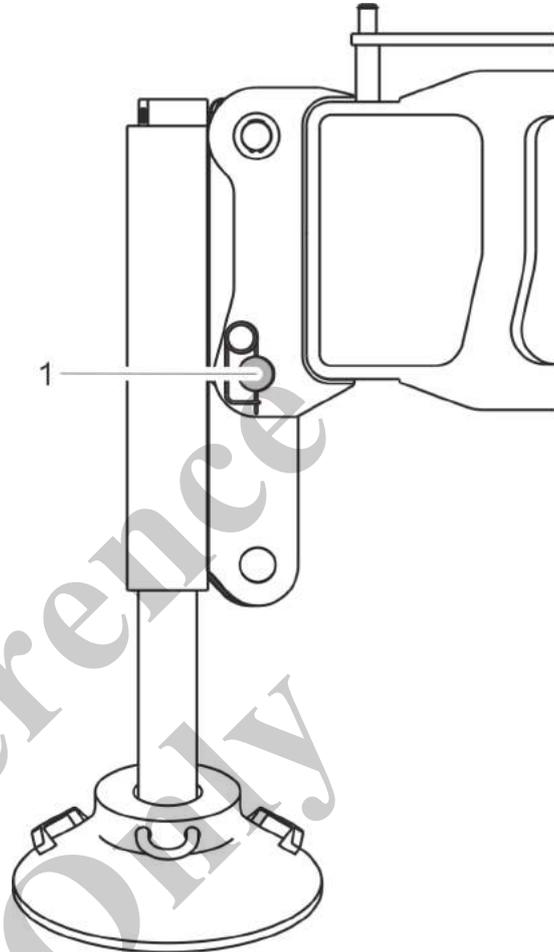
9.7.2.8 Changing the fastening position of the outrigger cylinder

Overview: Fastening positions of the outrigger cylinders



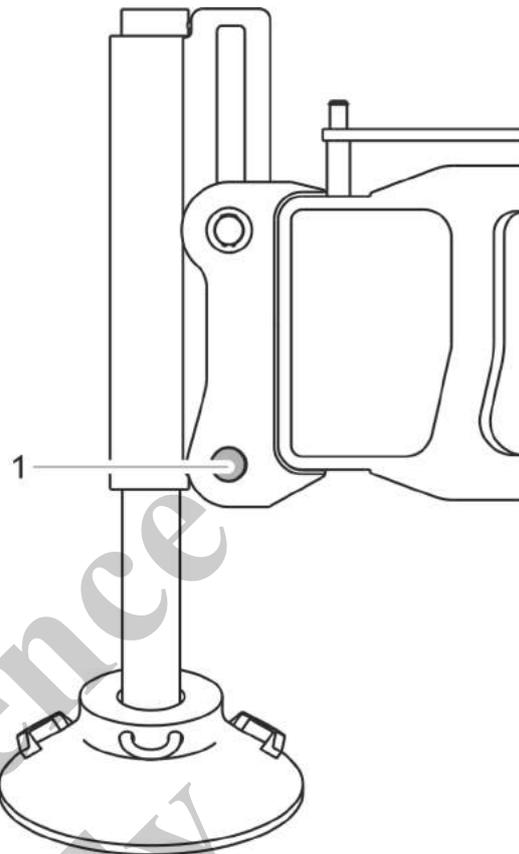
Fastening position P1	Fastening position P2
<ul style="list-style-type: none"> <li>■ The machine is placed on the track wheel carriers</li> <li>■ Folding in or unfolding the outrigger cylinders</li> <li>■ Changing the track width</li> </ul>	<ul style="list-style-type: none"> <li>■ Installing or removing the track wheel carriers</li> <li>■ Loading or unloading the machine onto/from the transport vehicle</li> </ul>

Changing the fastening position of the outrigger cylinders from P2 to P1



1 Bolt in fastening position P2

1. → Remove the bolt from fastening position P2.



- 1 Bolt in fastening position P1
2. → Tilt and hold upward the *[Extend/retract rear left outrigger cylinder]* lever on the Setup remote radio control until the outrigger cylinder has reached fastening position P1.
3. → Mount and secure the bolt in fastening position P1.
4. → Repeat these steps to change the fastening position of the remaining outrigger cylinders from P2 to P1.

### 9.7.2.9 Dismantling outrigger pads

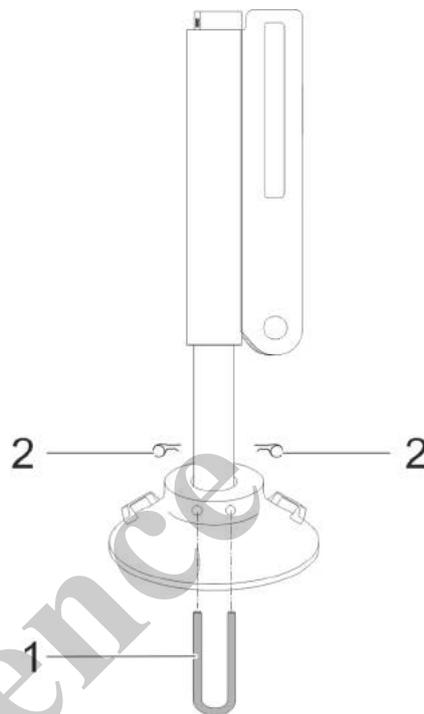
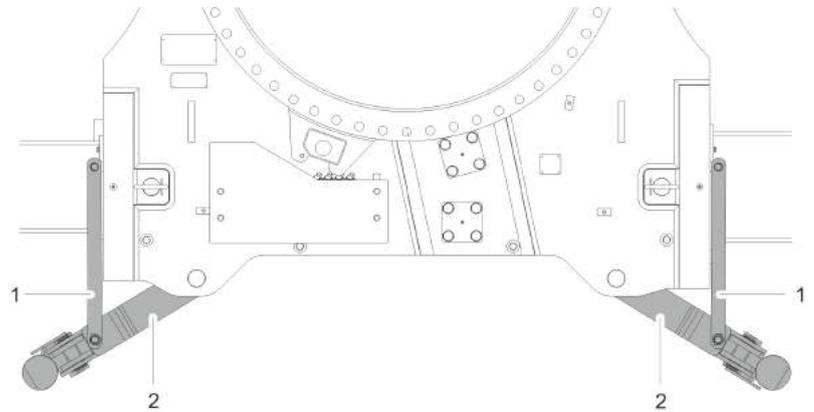


Fig. 39: Example illustration

- 1 Locking bracket
- 2 Spring washers

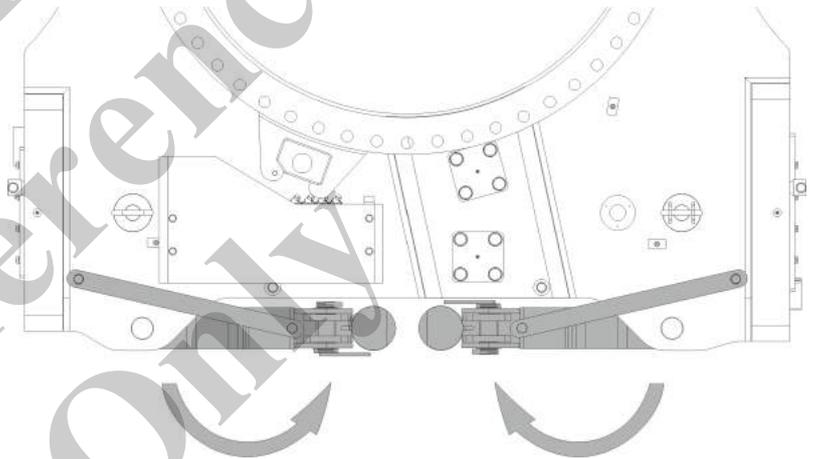
1. ➤ Tilt the [Extend/retract left rear outrigger cylinder] lever downward. Only retract the outrigger cylinder until the outrigger pad can be removed.
2. ➤ Remove the locking bracket and the spring washers.
3. ➤ Remove the outrigger pad.
4. ➤ Completely retract the outrigger cylinder.
5. ➤ Repeat these steps to remove the remaining outrigger pads.

9.7.2.10 Fold in outrigger



- 1 Locking bar
- 2 Stabilizing cylinders

1. → Removing the locking bar of a outrigger cylinder



- 2. → Completely fold in the outrigger cylinder.
- 3. → Secure the folded-in outrigger cylinder with the locking bar.
- 4. → Repeat these steps to fold in and secure the remaining outrigger cylinders.

### 9.7.3 Moving the machine off the transport vehicle

**⚠ DANGER**

Danger of tipping when located on transport vehicle  
Slewing the uppercarriage on the transport vehicle may cause the machine to tip off the transport vehicle. This can cause death or serious injury.

- On the transport vehicle and during loading and unloading, the uppercarriage must be in 0° position.
- Uppercarriage is locked.
- Unload the machine without changing the direction of the machine:
  - Loading in forward direction - unloading in reverse direction
  - Loading in reverse direction - unloading in forward direction

**⚠ WARNING**

Risk of accident from starting in the wrong direction

- Before moving off, ascertain the direction of travel, the direction of steering, and the uppercarriage position and move the machine accordingly.
- Drive slowly and carefully.

Setting the uppercarriage position to 180° inverts the direction of travel and the direction of steering. If the machine is incorrectly moved against the expected direction of travel, this can lead to accidents. This can cause injury to persons.

**NOTICE**

Risk of machine damage when unloaded improperly!

- Use an underlay to mitigate any impact.

Driving the machine off the transport vehicle in an uncontrolled fashion may cause the machine to collide with the ground and damage the ballast suspension.

**NOTICE**

Risk of machine damage due to improper operation of the load hook when the limit shutdown is bypassed

- When the lifting limit switch is bypassed, lift the load hook slowly.
- Maintain the specified safety distance between the load hook and the pulley head.
- When the load hook is resting on the ground, do not continue lowering the hook.

When the boom limit shutdown is bypassed, the load hook hits the pulley head. This can cause severe damage to the machine. The rope is damaged if the joystick is tilted further in the [Lower hook] direction when the load hook is resting on the ground.

Safety distance of the load hook when the limit shutdown is bypassed

Data	Value	Unit
Safety distance between the load hook and pulley head	1	m

Data	Value	Unit
Safety distance between the load hook and pulley head	3.3	ft

**Further notes**

☞ Chapter 9.6.3 “Moving the machine onto the transport vehicle” on page 620

**9.7.4 Lifting the machine off the transport vehicle****⚠ DANGER****Falling machine or accessories from incorrect lifting**

- Only use the suspension gear provided with the machine.
- Ensure that the sling gear has sufficient load-bearing capacity and is not damaged.
- Only attach the machine and all accessory parts at the defined lifting points.

If the machine or accessories are lifted incorrectly, the load could fall. This can cause serious injury.

**⚠ WARNING****Risk of injury from falling.**

- Use a suitable stable ladder to access the lifting points at the uppercarriage.
- Position the ladder on level ground.
- Always face the machine when climbing onto and down from the machine.
- Always make sure you have at least three points of contact with the ladder and grip handles when climbing up or down. Two hands and one foot, or two feet and one hand must remain in contact with the ladder steps and the grip handles at all times.

Steps and walkway gratings are folded in or dismantled for transport. Therefore, when attaching the machine to the lifting points, there is an increased risk of falling and sustaining injuries.

**Further notes**

☞ Chapter 9.6.4 “Lifting the machine onto the transport vehicle” on page 621

## 10 Disposal

**NOTICE**

**Environmental damage due to improper disposal**  
Only have a suitable disposal company dispose of the machine.

**Failure to properly dispose of the machine at the end of its service life can result in environmental harm.**

For  
Reference  
Only

## 11 Appendix

### 11.1 List of abbreviations

Abbreviation	Explanation
LML	Load moment limitation
SENCON	Diagnostics and control system
P&C	Pick & Carry
SVE	Secure locking unit
EM	Extension mode
HA	Main boom
HA-S	Main boom with auxiliary jib
SLS	Heavy-duty jib
SA8	Fly boom (total length 8 m)
SA15	Fly boom with fly boom extension (total length 15 m)

### 11.2 Definition of terms

#### Setup status

The setup status of the machine is defined via

- the track width,
- the counterweight,
- the attachments.

### 11.3 Operating modes table

Specific operating modes can be disabled depending on the machine equipment.

Incline [°]	Track width	UW counter-weight [t]	Rear ballast [t]	Attachment	Offset [°]	Config code
1.5	A	0	35.0	HA-S	0	856331
1.5	A	0	21.0	HA-S	0	856231
1.5	A	0	0	HA-S	0	856131
1.5	B	0	35.0	HA-S	0	855331
1.5	B	0	21.0	HA-S	0	855231
1.5	B	0	0	HA-S	0	855131
1.5	C	0	0	HA-S	0	854131
4.0	A	0	35.0	HA-S	0	356331
4.0	A	0	21.0	HA-S	0	356231

## Appendix

Incline [°]	Track width	UW counter-weight [t]	Rear ballast [t]	Attachment	Offset [°]	Config code
4.0	A	0	0	HA-S	0	356131
4.0	B	0	35.0	HA-S	0	355331
4.0	B	0	21.0	HA-S	0	355231
4.0	B	0	0	HA-S	0	355131
4.0	C	0	0	HA-S	0	354131
0.3	A	0	35.0	HA	0	156301
1.5	A	0	35.0	HA	0	856301
1.5	B	0	35.0	HA	0	855301
1.5	A	0	21.0	HA	0	856201
1.5	A	0	0	HA	0	856101
1.5	B	0	21.0	HA	0	855201
1.5	B	0	0	HA	0	855101
1.5	C	0	0	HA	0	854101
4.0	A	0	35.0	HA	0	356301
4.0	A	0	21.0	HA	0	356201
4.0	A	0	0	HA	0	356101
4.0	B	0	35.0	HA	0	355301
4.0	B	0	21.0	HA	0	355201
4.0	B	0	0	HA	0	355101
4.0	C	0	0	HA	0	354101
0.3	A	0	35.0	Setup attachment	0	156399
0.3	D	0	0	Setup ballast	0	106198
0.3	A	0	35.0	SA15	0	156351
0.3	A	0	35.0	SA15	20	156352
0.3	A	0	35.0	SA15	40	156353
0.3	A	0	35.0	SA8	0	156341
0.3	A	0	35.0	SA8	20	156342
0.3	A	0	35.0	SA8	40	156343
0.3	A	0	35.0	SLS	0	156335
1.5	A	0	35.0	SLS	0	856335
1.5	A	0	21.0	SLS	0	856235
1.5	A	0	0	SLS	0	856135
1.5	B	0	35.0	SLS	0	855335
1.5	B	0	0	SLS	0	855135
4.0	A	0	35.0	SLS	0	356335
4.0	A	0	21.0	SLS	0	356235
4.0	A	0	0	SLS	0	356135
4.0	B	0	35.0	SLS	0	355335

Incline [°]	Track width	UW counter-weight [t]	Rear ballast [t]	Attachment	Offset [°]	Config code
4.0	B	0	21.0	SLS	0	355235
4.0	B	0	0	SLS	0	355135
1.5	B	0	21.0	SLS	0	855235

List of abbreviations	Explanation
HA	Main boom
HA-S	Auxiliary jib
SLS	Heavy-duty jib
SA8	Fly boom 8 m
SA15	Fly boom with fly boom extension 15 m
A	Maximum track width (5.4 m)
B	Medium track width (4.2 m)
C	Minimum track width (3.05 m)
D	Machine supported by outrigger cylinders (2.9 m)

## 11.4 Tightening torques

### 11.4.1 General information

If screws or nuts are changed, only use new or reconditioned parts.  
Screws, nuts and all threads must be clean, dry and free of grease.

There are 2 different tables for tightening torques:

- Standard connections
- Rotary connection

### 11.4.2 Standard connections

In order to avoid a screw connection failure, only phosphate black screws may be used in the following applications:

- Sprocket
- Slewing ring
- Track rollers
- Swing gear box, travel drives and travel gears
- Winch installations
- All the bolts for the following connections:
  - Cab console – Cab
  - Base frame – Cab adjustment
  - Base frame – Engine

## Appendix

Bolt		Tightening torque	
Dimensions	Strength class	Zinc flake coating [Nm]	Black phosphated [Nm]
M6	8.8	6.4	9.4
	10.9	9.4	13.8
	12.9	11	16.1
M8	8.8	15.4	22.8
	10.9	22.7	33.4
	12.9	26.5	39.1
M10	8.8	30	45
	10.9	44.2	65.8
	12.9	51.7	77.5
M12	8.8	52.5	77.5
	10.9	76.7	114.2
	12.9	90	133.3
M14	8.8	83.3	123.3
	10.9	121.7	181.7
	12.9	142.5	212.5
M16	8.8	127.5	191.7
	10.9	186.7	281.7
	12.9	218.3	329.2
M18	8.8	183	274
	10.9	262	391
	12.9	306	458
M20	8.8	257	387
	10.9	365	551
	12.9	428	644
M22	8.8	348	528
	10.9	496	753
	12.9	580	881
M24	8.8	441	665
	10.9	628	947
	12.9	735	1108
M27	8.8	643	980

Bolt		Tightening torque	
Dimensions	Strength class	Zinc flake coating [Nm]	Black phosphated [Nm]
	10.9	917	1395
	12.9	1073	1633
M30	8.8	878	1331
	10.9	1250	1895
	12.9	1463	2218
M33	8.8	1179	1801
	10.9	1679	2565
	12.9	1965	3001
M36	8.8	1521	2315
	10.9	2167	3298
	12.9	2535	3859
M39	8.8	1957	2998
	10.9	2788	4269
	12.9	3262	4995

#### 11.4.3 Rotary connection

Bolt		Tightening torque	
Dimensions	Strength class	Zinc flake coating [Nm]	Black phosphated [Nm]
M33	10.9	<i>Not permissible</i>	2600