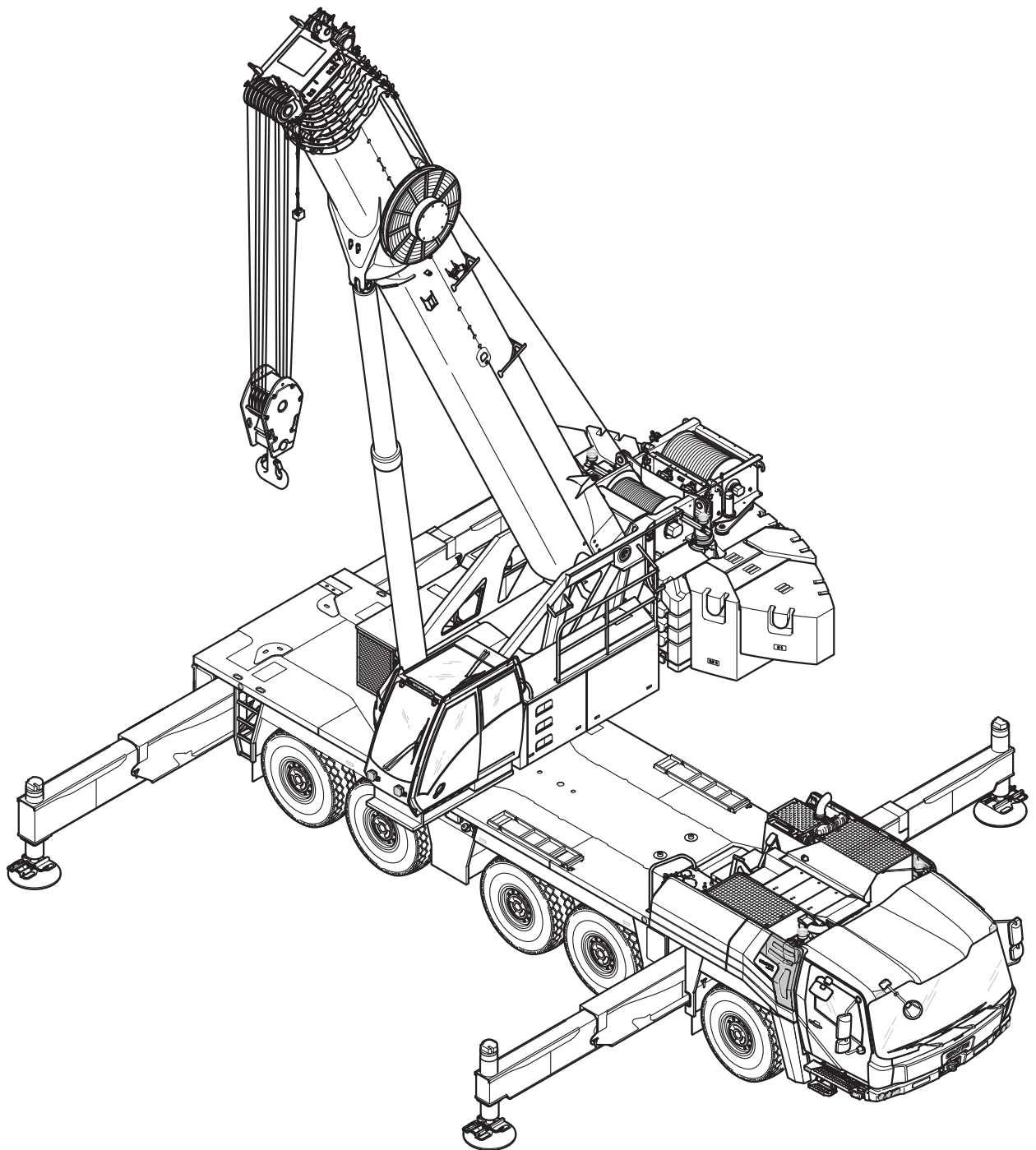


# Grove GMK 5250L

## Operating Instructions



3 302 633 en

27.09.2017

Grove

Manitowoc

National Crane

Potain

**Manitowoc**

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27.09.2017

# 1

## Reduction of slewing speed – can be switched on and off

In addition to the specifications in the *lifting capacity table* and *operating manual* supplied, the automatic reduction of the slewing speed can be switched off under certain conditions.

### 1.1

#### Important notes

These additional pages describe only this special function. Also observe all specifications and safety instructions in the *Operating Instructions* and *lifting capacity table* supplied.



#### **Risk of accidents due to excessive slewing speed!**

Observe the specified maximum permissible slewing speeds. This prevents the truck crane from being subjected to excessive dynamic loads, which can lead to damage to crane sections and the truck crane overturning. Always slow down and accelerate the slewing movement slowly and avoid swinging loads.

When reduction is switched off, you as crane operator are responsible for a slewing speed that is suitable the current loading case.

#### **With reduction switched on**

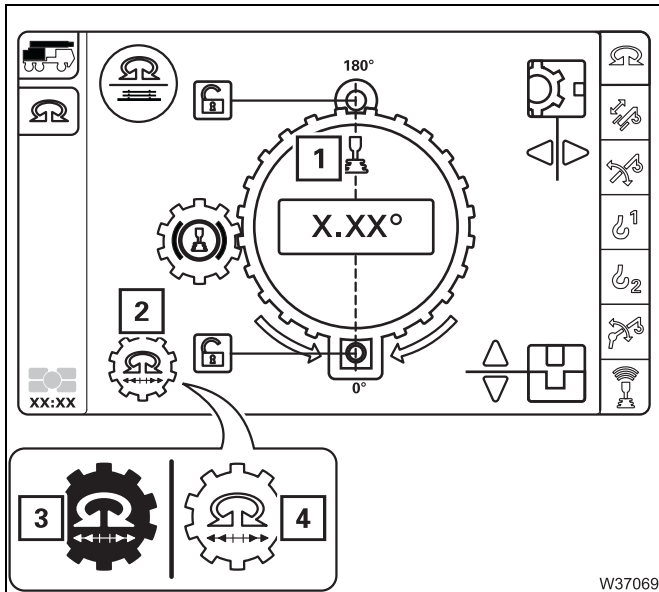
Depending on the degree of utilisation and the working radius, the slewing speeds are automatically reduced to the maximum permissible levels listed in the *lifting capacity table* under the comments on slewing speed.

#### **With reduction switched off**

If the maximum slewing speeds listed in the supplied *lifting capacity table* are exceeded, the buzzer tone sounds and a warning symbol is displayed. The slewing speed is not reduced.

## 1.2 Operation

### 1.2.1 Additional and modified operating elements



#### In the *Superstructure lock* menu

1 The display switches to this position – was previously at position (2)

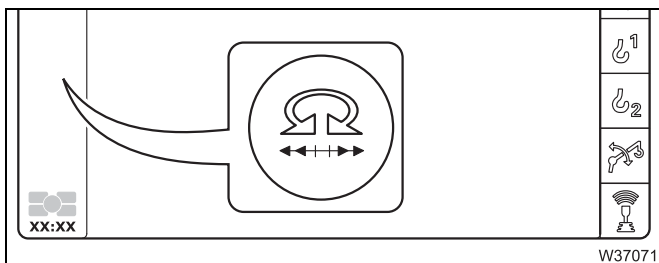
#### – Operation

2 Slewing speed reduction on/off

#### – Display

3 Reduction on – **green**

4 Reduction off – **grey**



#### Menu-independent displays

Warning messages on the *RCL* display

– **Blue:** Reduction on

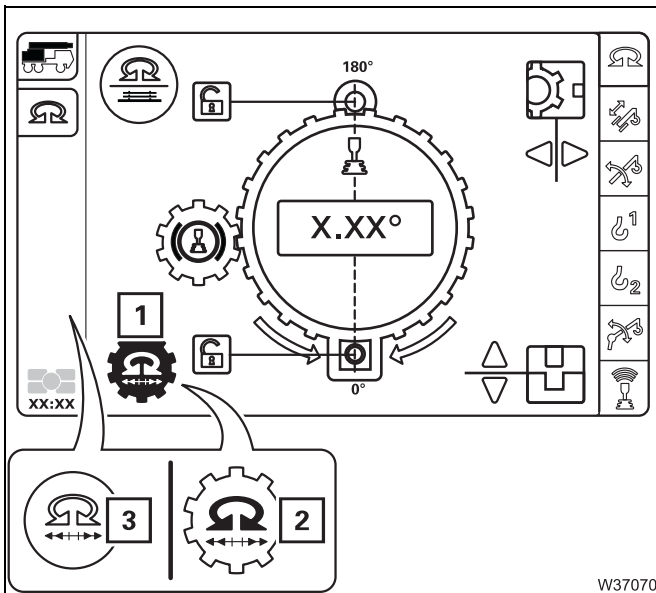
– **Red:** Maximum permissible slewing speed exceeded

## 1.2.2

## Switching reduction off and on



The reduction of the slewing speed is switched on with the ignition.



### Switching reduction off

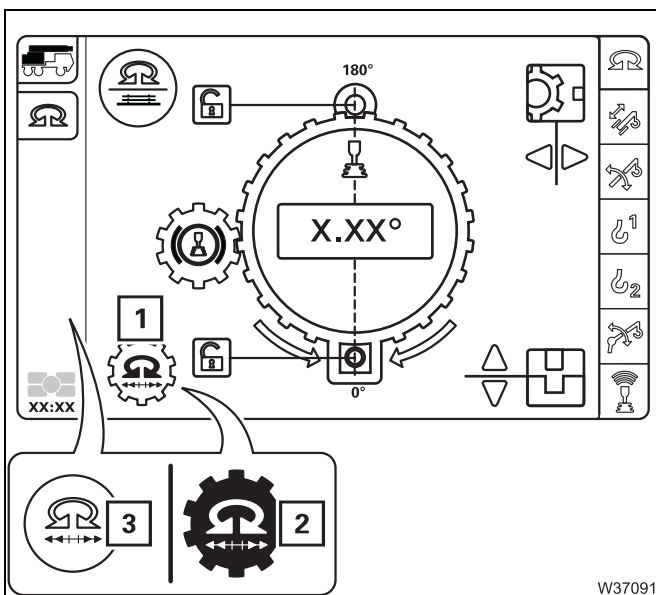
You can only switch off the reduction if the slewing range type *Standard* has been entered.

- Select and confirm the symbol (2).
  - Display symbol (1) – **green**.
  - Warning message display (3) – **blue**.
 The slewing speed is not reduced automatically.

If the maximum permissible slewing speed is exceeded, the buzzer tone sounds once and the warning message (3) is displayed – **red**.



The entered limitations for the power unit speed of the slewing gear are still valid and the continuous speed reductions due to the working range limiter are still active.



### Switching reduction on

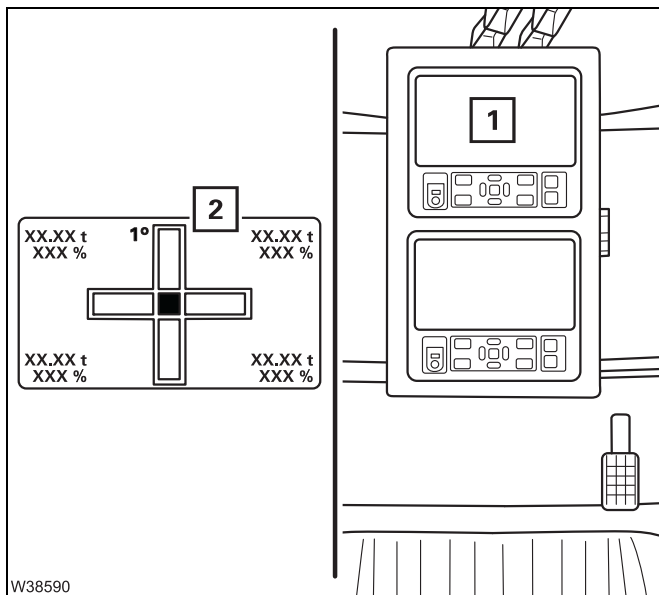
- Select and confirm the symbol (2).
  - Symbol (1) – **grey** displayed.
  - The warning message (3) disappears.
 The slewing speed is reduced automatically.

The reduction is automatically switched on when you enter the slewing range type *MAXbase*.

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## Outrigger spans

### Overview metres (feet) / per cent



The display *RCL* (1) shows the outrigger spans in metres (feet).

The control units (2) indicate the outrigger spans in per cent.

The percentage values in the enclosed *lifting capacity table* and the enclosed *operating instructions* deviate from the percentage values actually displayed on the control units (2) as they are based on different principles.

These additional pages give an overview for different crane types of what per cent you have to move the outrigger beams on the control units in order to obtain the desired outrigger span.



Depending on the operating instructions supplied, the outrigger spans are given as the overall width or additionally as an individual width.

GMK5250L / GMK5200-1 / GMK5180-1			
Length specifications		Percentages	
Overall widths	Individual widths	Control unit	Lifting capacity table
7.800 m (25.6 ft)	3.900 m (12.8 ft)	100%	100%
6.854 m (22.4 ft)	3.427 m (11.2 ft)	81%	83%
5.910 m (19.4 ft)	2.955 m (9.7 ft)	63%	66%
4.310 m (14.2 ft)	2.155 m (7.1 ft)	31%	50%
2.710 m (8.8 ft)	1.355 m (4.4 ft)	0%	0%



<b>GMK5150/GMK5150L</b>			
<b>Length specifications</b>		<b>Percentages</b>	
<b>Overall widths</b>	<b>Individual widths</b>	<b>Control unit</b>	<b>Lifting capacity table</b>
7.600 m (24.9 ft)	3.800 m (12.5 ft)	100%	100%
6.700 m (22.0 ft)	3.350 m (11.0 ft)	83%	83%
5.900 m (19.4 ft)	2.950 m (9.7 ft)	61%	66%
5.100 m (16.7 ft)	2.550 m (8.4 ft)	51%	50%
2.500 m (8.2 ft)	1.250 m (4.1 ft)	0%	0%

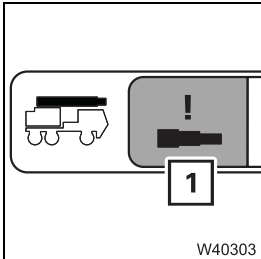
<b>GMK4100L-1</b>			
<b>Length specifications</b>		<b>Percentages</b>	
<b>Overall widths</b>	<b>Individual widths</b>	<b>Control unit</b>	<b>Lifting capacity table</b>
7.200 m (23.6 ft)	3.600 m (11.8 ft)	100%	100%
6.250 m (20.6 ft)	3.125 m (10.3 ft)	81%	80%
5.300 m (17.4 ft)	2.650 m (8.7 ft)	61%	60%
3.800 m (12.4 ft)	1.900 m (6.2 ft)	31%	40%
2.340 m (7.6 ft)	1.170 m (3.8 ft)	0%	0%

<b>GMK3060</b>			
<b>Length specifications</b>		<b>Percentages</b>	
<b>Overall widths</b>	<b>Individual widths</b>	<b>Control unit</b>	<b>Lifting capacity table</b>
6.20 m (20.3 ft)	3.10 (10.2 ft)	100%	None
4.40 m (14.4 ft)	2.20 (7.2 ft)	51%	
2.32 m (7.6 ft)	1.16 (3.8 ft)	0%	



## Telescoping emergency programme

### Return run of the telescoping cylinder



In the *Operating manual* supplied, it is noted that special care must be taken when telescoping in the emergency programme (1), as no automatic monitoring takes place.

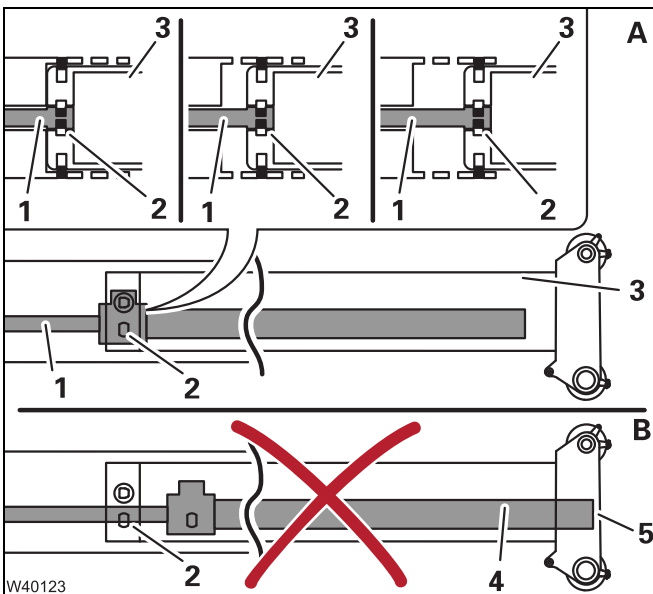
If you move the telescoping cylinder without a telescopic section (return run), please also note all the information in these additional pages.



#### Risk of damage during return run of the telescopic cylinder!

Always stop extending once the locking point on the outermost telescopic section has been reached.

This prevents damage to the boom system through a collision between the telescoping cylinder and the main boom head.



(A) – These specifications apply to the outermost telescopic section (3) – on all fixed lengths.

- Always stop extending the telescopic cylinder (1) once the locking point (2) on the outermost telescopic section (3) has been reached.

**There is no automatic shutdown.**

(B) – If you move too far past the locking point (2), the cylinder tube (4) will hit the main boom head (5) at the front.

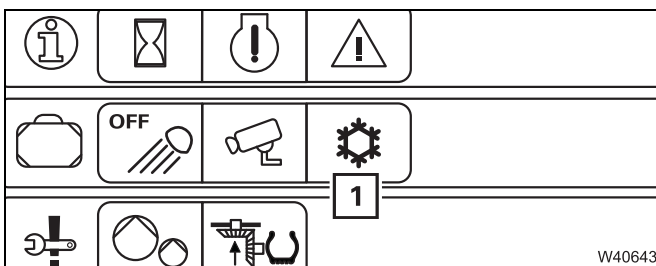
This can lead to damage which makes telescoping the main boom no longer possible.

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## Crane cab heating and air-conditioning system

### Operation from the driver's cab

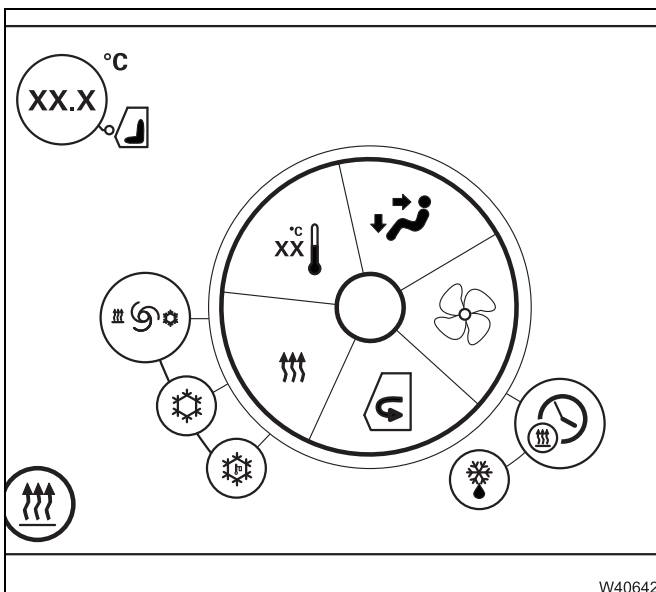
In addition to the information given in the *operating instructions* supplied, the heating system and air-conditioning system in the crane cab can also be operated from the driver's cab. This enables, for example, the crane cab to be preheated while driving.



#### Additional operating elements

In the *Various controls* menu group – only in newer program versions.

- 1 Crane cab heating/air-conditioning system menu



#### Operation

The *Crane cab heating/air-conditioning system* menu is identical to the menu in the crane cab.

It is operated in the same way as in the crane cab and is described in the supplied *operating manual*.

After switching on the ignition in the driver's cab, the heating system and air-conditioning system in the crane cab must always be switched off.

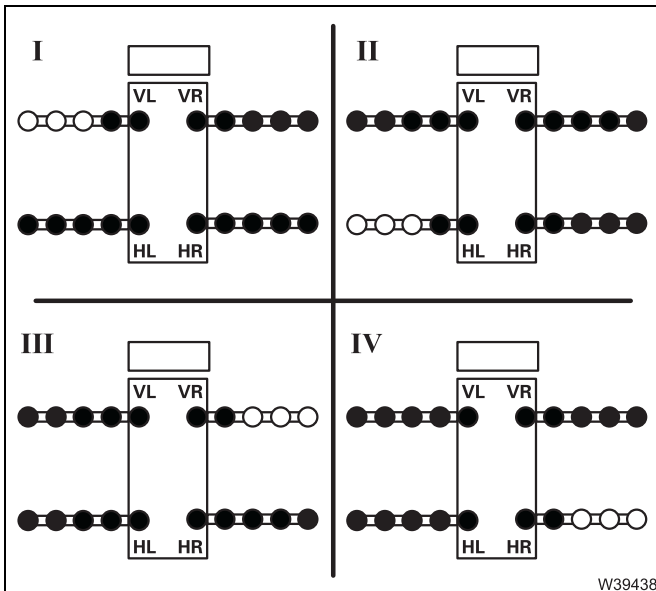
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## MAXbase Additional outrigger spans

In addition to the information in the supplied *Operating manual* there are lifting capacity tables for further outrigger spans. These additional pages only show the additional outrigger spans.

### Outrigger span type *Three / One*

Three outrigger beams are extended the same distance and one outrigger beam has a smaller outrigger span.



### GMK5180-1 / GMK5200-1 / GMK5250L

– One outrigger span smaller – Left

	FR	FL	RR	RL
<b>I</b>	3.900 m (12.8 ft)	2.155 m (7.1 ft)	3.900 m (12.8 ft)	3.900 m (12.8 ft)
<b>II</b>	3.900 m (12.8 ft)	3.900 m (12.8 ft)	3.900 m (12.8 ft)	2.155 m (7.1 ft)

– One outrigger span smaller – Right

	FR	FL	RR	RL
<b>III</b>	2.155 m (7.1 ft)	3.900 m (12.8 ft)	3.900 m (12.8 ft)	3.900 m (12.8 ft)
<b>IV</b>	3.900 m (12.8 ft)	3.900 m (12.8 ft)	2.155 m (7.1 ft)	3.900 m (12.8 ft)

There are no separate lifting capacity tables for this type. The lifting capacities for the type *One outrigger span smaller – left* are enabled in a correspondingly mirrored slewing range; *Supplied operating manual*.

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- 1 Overview**
- 2 Basic safety instructions**
- 3 Operating elements for driving**
- 4 Starting the engine for driving / switching it off**
- 5 Driving**
- 6 Driving modes and rigging for on-road driving**
- 7 Malfunctions in driving mode**
- 8 Operating elements for crane operation**
- 9 Starting/switching off the engine – for crane operation**
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- 11 Rigging work**
- 12 Driving with a rigged truck crane**
- 13 Transportation**
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# 1

## Overview

### 1.1

#### Accidents

In the case of an accident, contact the relevant branch office of **Manitowoc Crane Care** in the country in which you are working and specify your crane type and serial number.

Adhere to the requirements regarding the obligation to report accidents prevalent in the country in which you are working and inform the supervisory authorities responsible for that particular type of accident (e.g. material damage, injuries to persons).

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## 1.2

## Branch offices

### 1.2.1

### Manitowoc Crane Care

If you need help or support with the operation on your truck crane, you can contact our branches at the following addresses **Manitowoc Crane Care**:

*<http://www.manitowoccranes.com>*

### 1.2.2

### Dealer list

Visit the following address for a global list of dealers:

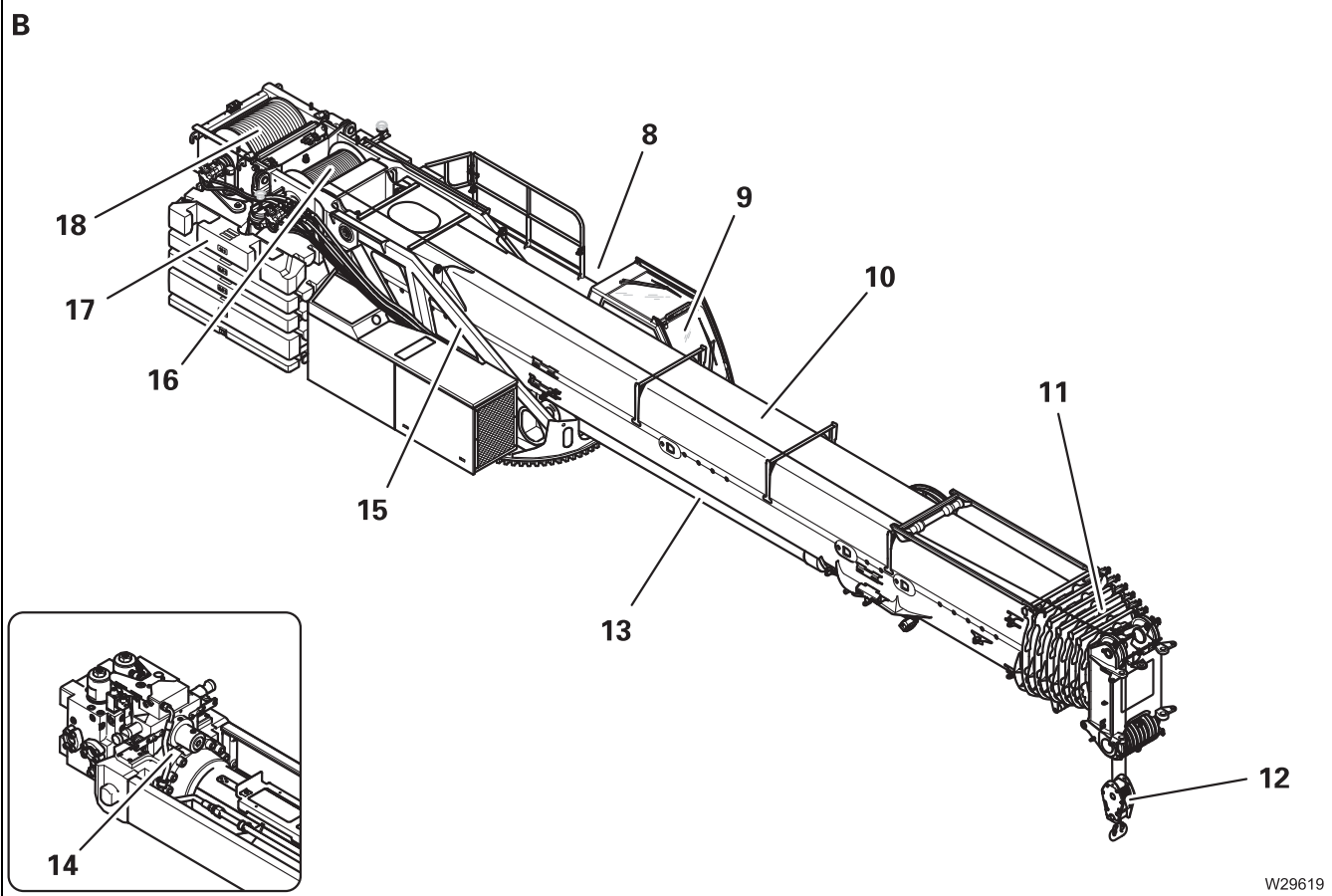
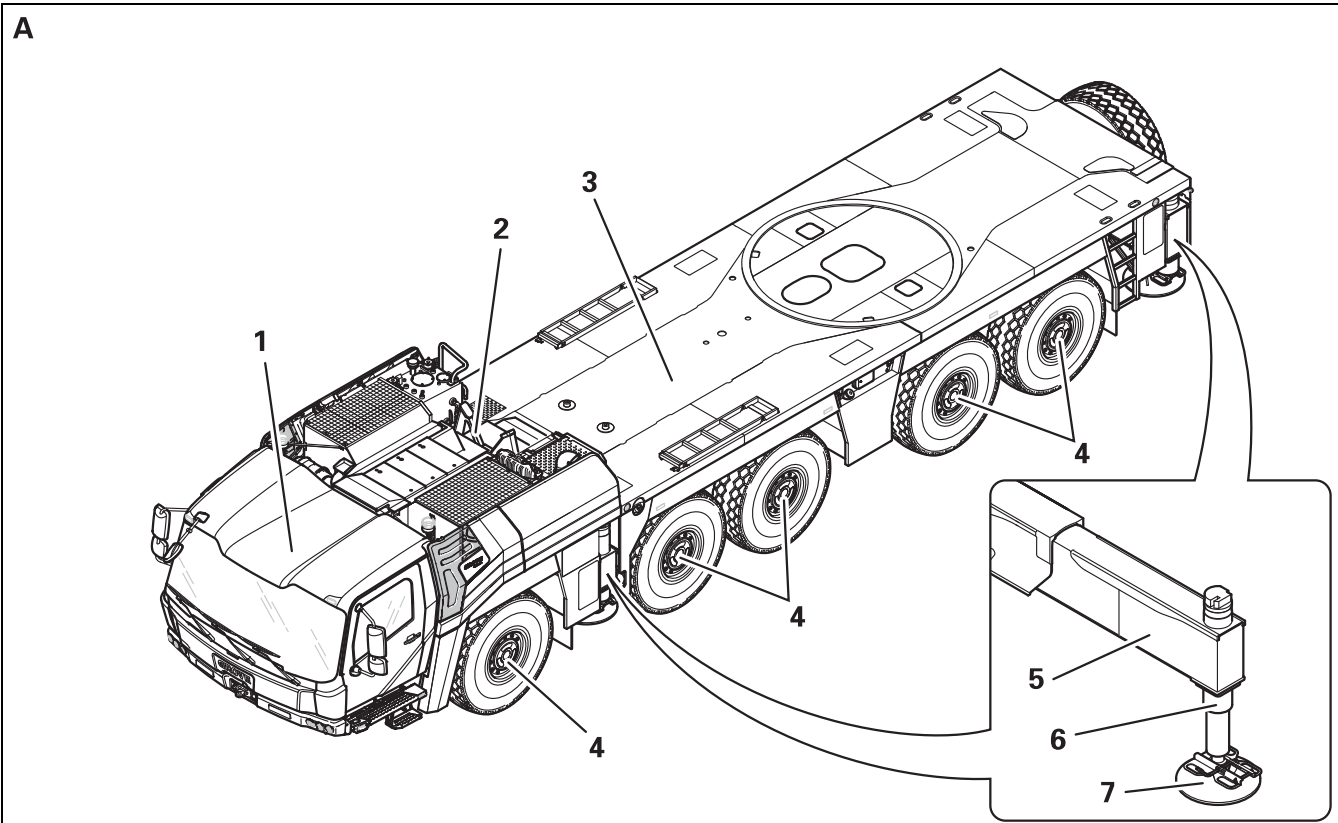
*<http://www.manitowoccranes.com>*

## 1.3

## Warranty specifications

Please see the separately enclosed warranty certificate for information.

# 1.4 Terms used



W29619

27.09.2017

**(A) – Carrier**

- 1 Driver's cab
- 2 Boom rests
- 3 Counterweight platform
- 4 Axle lines
- 5 Outrigger beams
- 6 Outrigger cylinders
- 7 Outrigger pads

**(B) – Superstructure**

- 8 Slewing gear
- 9 Crane cab
- 10 Main boom with telescoping mechanism
- 11 Telescopic sections
- 12 Hook block
- 13 Derricking cylinder, derricking gear
- 14 Telescoping cylinder
- 15 Turntable
- 16 Main hoist
- 17 Counterweight
- 18 Auxiliary hoist<sup>1)</sup>

<sup>1)</sup> Additional equipment

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## 1.5

### Technical data

#### GROVE crane GMK5250L

Permissible temperature range: -25 °C to +40 °C (-13 °F to +104 °F)

Crane designation: Truck crane to ISO 4306, parts 1 and 2

Crane classification: Crane class A1 to ISO 4301, Part 2

The crane is designed to crane class A1 (as defined in ISO standard 4301 - 2). This relates to the engineering design (specification of quality) and is not a guarantee in the sense of § 443 BGB (German Federal Law).

### 1.5.1

#### Maximum lifting capacity (DIN/ISO/EN)

**Max. load bearing capacity:** 180 t<sup>1)</sup> (394,000 lbs)  
250 t<sup>2)</sup> (600,000 lbs) 0° to the rear

#### Max. load moment

– Within the 360° slewing range: 698.5 tm (63.5 t x 11 m)

### 1.5.2

#### Maximum lifting capacity (ASME B 30.5)

**Max. load bearing capacity:** 180t (394,000 lbs)  
250 t<sup>2)</sup> (600,000 lbs) 0° to the rear

#### Max. load moment


– Within the 360° slewing range: 698.5 tm (63.5 t x 11 m)

1) With additional equipment

2) With special equipment (no currently available)





## Dimensions

All dimensions relate to on-road mode;  *Driving modes*, p. 6 - 1.

Length without auxiliary hoist:	15.29 m (50.2 ft)
<b>A</b> Height:	At on-road level:
– 385/95 R25	3.94 m (12.9 ft)
– 445/95 R25	3.99 m (13.1 ft)
– 525/80 R25	3.99 m (13.1 ft)
Max. level change	-130/+170 mm (-5.1/+6.7 in)
<b>B</b> Width:	
– 385/95 R25	2.97 m (9.7 ft)
– 445/95 R25	2.97 m (9.7 ft)
– 525/80 R25	3.07 m (10.1 ft)
Angle of negotiable banks:	At on-road level (385/95 R25)
front:	approx. 16°
rear:	approx. 8°

## Weight and axle loads


For equipment with the specified axle loads in on-road mode;  *Driving modes*, p. 6 - 1.

Dimensions and weights of the parts which have to be transported on separate vehicles when driving on the road;  p. 1 - 10.

Total weight:	depending on driving mode 60 t (132,277 lbs)
Axle loads:	depending on driving mode 12 t (26,500 lbs)

## 1.5.4

### Dimensions and weights of removable parts

This section contains the dimensions and weights of the parts which can be removed for on-road driving;  *Driving modes*, p. 6 - 1.

#### Spare wheel

Designation	Length x width x height in m (ft)	Weight in kg (lbs)
Spare wheel 385/95 R 25	1.36 x 1.36 x 0.40 (4.45 x 4.45 x 1.30)	245 (540)
Spare wheel 445/95 R 25	1.50 x 1.50 x 0.45 (4.95 x 4.95 x 1.50)	310 (685)
Spare wheel 525/80 R 25	1.50 x 1.50 x 0.53 (4.95 x 4.95 x 1.74)	355 (785)

#### Outrigger

Designation	Length x width x height in m (ft)	Weight in kg (lbs)
Plastic outrigger pad diameter	0.60 x 0.18 (1.97 x 0.59)	38 (84)
Front outrigger <sup>1)</sup> , complete per packet	2.95 x 0.32 x 1.05 (9.68 x 1.05 x 3.44)	1,000 (2,205)
Rear outrigger <sup>1)</sup> , complete, per packet	2.98 x 0.37 x 1.06 (9.78 x 1.21 x 3.48)	1,250 (2,756)

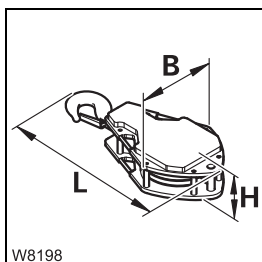
<sup>1)</sup> Consists of two sets



## Main boom

Designation	Length x width x height in m (ft)	Weight in kg (lbs)
Complete main boom	13.85 x 1.50 x 2.00 (45.44 x 4.9 x 6.6)	21,000 (46,300)

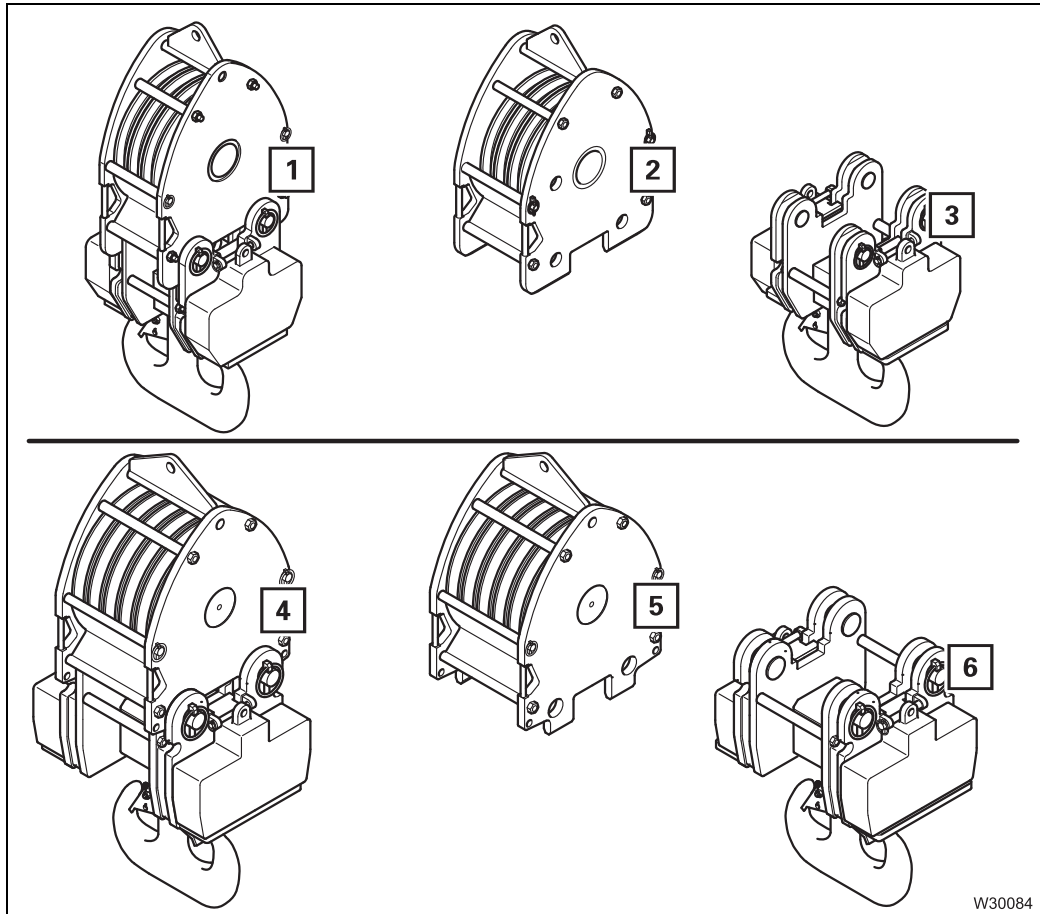
## Hook blocks and hook tackle



Designation	Length x width x height (L) x (W) x (H) in m (ft)	Weight in kg (lbs)
Double hook, 9 sheaves	2.30 x 0.95 x 0.75 (7.55 x 3.12 x 2.46)	2,400 (5,290)
Double hook, 7 sheaves	2.00 x 0.85 x 0.75 (6.56 x 2.79 x 2.46)	1,750 (3,858)
Double hook, 5 sheaves	1.85 x 0.65 x 0.75 (6.07 x 2.13 x 2.46)	1,650 (3,638)
Double hook, 3 sheaves	1.75 x 0.40 x 0.75 (5.74 x 1.31 x 2.46)	950 (2,094)
Single hook, 1 sheave	1.50 x 0.25 x 0.75 (4.95 x 0.82 x 2.46)	600 (1,323)
Hook tackle	0.91 x 0.45 x 0.45 (3.00 x 1.48 x 1.48)	300 (660)



**Hook blocks, split**



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<b>Dimensions (m) (ft) and weights (kg) (lbs)</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>	<b>(6)</b>
<b>Length</b>	1.98 (6.50)	0.90 (2.95)	1.20 (3.94)	1.98 (6.50)	0.90 (2.95)	1.30 (4.27)
<b>Width</b>	0.70 (2.30)	0.70 (2.30)	0.70 (2.30)	0.70 (2.30)	0.70 (2.30)	0.70 (2.30)
<b>Height</b>	0.76 (2.49)	0.32 (1.05)	0.76 (2.49)	0.76 (2.49)	0.45 (1.48)	0.76 (2.49)
<b>Weight in kg</b>	960 (2,116)	275 (606)	685 (1,510)	1,600 (3,527)	465 (1,025)	1,135 (2,502)

Lifting capacity of the hook blocks; ■■■► p. 11 - 113.

### Auxiliary hoist

Designation	Length x width x height in m (ft)	Weight in kg (lbs)
Complete auxiliary hoist	1.15 x 1.90 x 0.80 (3.77 x 6.23 x 2.62)	2,000 (4,410)
Rigging frame	1.43 x 2.17 x 0.55 (4.69 x 7.12 x 1.80)	352 (776)

### Counterweight sections

Designation	Length x width x height in m (ft)	Weight in kg <sup>1)</sup> (lbs)
7 t base plate	2.99 x 2.37 x 1.25 (9.81 x 7.78 x 4.10)	7,000 (15,432)
9.5 t plates, each	2.99 x 2.40 x 0.29 (9.81 x 7.87 x 0.95)	9,500 (20,950)
9.5 t section with cutouts	2.99 x 2.40 x 0.29 (9.81 x 7.87 x 0.95)	9,500 (20,950)
4.75 t plates (left and right), each	1.05 x 2.37 x 0.41 (3.44 x 7.78 x 1.35)	4,750 (10,472)
4.75 t plate (middle)	1.33 x 2.31 x 0.33 (4.36 x 7.58 x 1.08)	4,750 (10,472)
each 5 t block	1.41 x 1.22 x 0.79 (4.63 x 4.00 x 2.59)	5,000 (11,023)
10 t block, each	1.97 x 0.97 x 1.30 (6.46 x 3.18 x 4.27)	10,000 (22,046)

<sup>1)</sup> There may be deviations of up to  $\pm 3\%$  due to the manufacturing procedure.

The stability of the crane rigged with the counterweight sections delivered has been tested.

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## 1.5.5

### Carrier

#### Engine

Mercedes-Benz:	OM 471 LA
Engine emissions:	97/68/EC Level 4 (TIER 4 Final/Euromot 4)
Power:	390 kW (530 PS) at 1,700 rpm (80/1269 - 89/491 EWG, – including all modifications)
Fuel tank:	1 x approx. 400 l (105 gal) and 1 x approx. 300 l (79 gal)
AdBlue tank:	approx. 40 l (10.6 gal)

#### Transmission

Mercedes G280 (VIAB); 16 forward gears and 2 reverse gears; with integrated retarder

#### Transfer case

Kessler VG 2600

#### Axle lines

##### **Drive: 10 x 6 x 10**

- 1st axle line: Steered axle line
- 2nd axle line: Steered and driven axle line
- 3rd axle line: Steered axle line
- 4th axle line: Steered and driven axle line (steering can be switched on)
- 5th axle line: Steered and driven axle line

##### **Drive: 10 x 8 x 10**

- 1st axle line: Steered axle line
- 2nd axle line: Steered and driven axle line
- 3rd axle line: Steered and driven axle line (drive can be activated)
- 4th axle line: Steered and driven axle line (steering can be switched on)
- 5th axle line: Steered and driven axle line

#### Steering

Dual-circuit hydraulic steering with engine-independent emergency steering pump



**Tyres** 10 x 385/95 R 25 on disc wheels 9.50-25/1.7  
10 x 445/95 R 25<sup>1)</sup> on disc wheels 11.00-25/1.7  
10 x 525/80 R 25<sup>1)</sup> on disc wheels 17.00-25/1.7

<sup>1)</sup> Additional equipment

Torque for wheel nuts: 650 Nm (480 lbf ft).

Tyre pressure with cold tyres for axle loads up to max. 12 t

385/95 R25 <sup>2)</sup> :	10 bar (145 psi)
445/95 R25:	9 bar (131 psi)
525/80 R25:	7 bar (102 psi)
<sup>2)</sup> Michelin X-Crane	9 bar (131 psi)

**Electrical system**


Alternator:	28 V/150 A
Batteries:	2, each of 12 V/170 Ah
Voltage:	24 V

**Tool**

1 tool kit in tool box,  
wheel chocks (number according to national regulations)

**Towing coupling**

Front towing coupling:	100 kN (22,480 lbf) permissible tension <sup>1)</sup>
Rear tow lug:	75 kN (16,860 lbf) permissible tension <sup>1)</sup>

<sup>1)</sup> Only permissible at certain tension angles;  p. 5 - 57

**Driving speeds**

At an engine speed of 1,700 rpm

<b>Forwards:</b>	max. 85.0 km/h (52.8 mph)
<b>Reverse:</b>	approx. 7 km/h (4.3 mph) depending on the tyres

**Climbing ability**

Transport weight 60 t (132,277 lbs)

Drive	Climbing ability in %	
	385/95 R25 tyres	525/80 R25 tyres 445/95 R25 tyres
<b>10 x 6 x 10</b>	approx. 38	approx. 35

## Outrigger

Design:	4-point telescoping outrigger system
Control system:	Can be controlled from both sides on the carrier and individually from the crane cab
Outrigger spans:	8.950x 7.800 m (29.4 x 25.6 ft) 8.950 x 6.854 m (29.4 x 22.4 ft) 8.950 x 5.910 m (29.4 x 19.4 ft) 8.950 x 4.310 m (29.4 x 14.2 ft) 8.950 x 2.710 m (29.4 x 8.8 ft)
Outrigger pads:	Diameter: 600 mm (23.6 in) Surface: 2,827 cm <sup>2</sup> (438 in <sup>2</sup> )
Stroke of supporting cylinders:	600 mm (23.6 in)
Maximum outrigger pressure:	front: 78 t (171,960 lbs) rear: 106 t (233,690 lbs)
Inclination indicator:	On the hand-held control, in the crane cab, on the <i>outrigger</i> control units.
Outrigger pressure display:	In the outriggers, integrated with a display in the crane cab and on the <i>outrigger</i> control units depending on design.

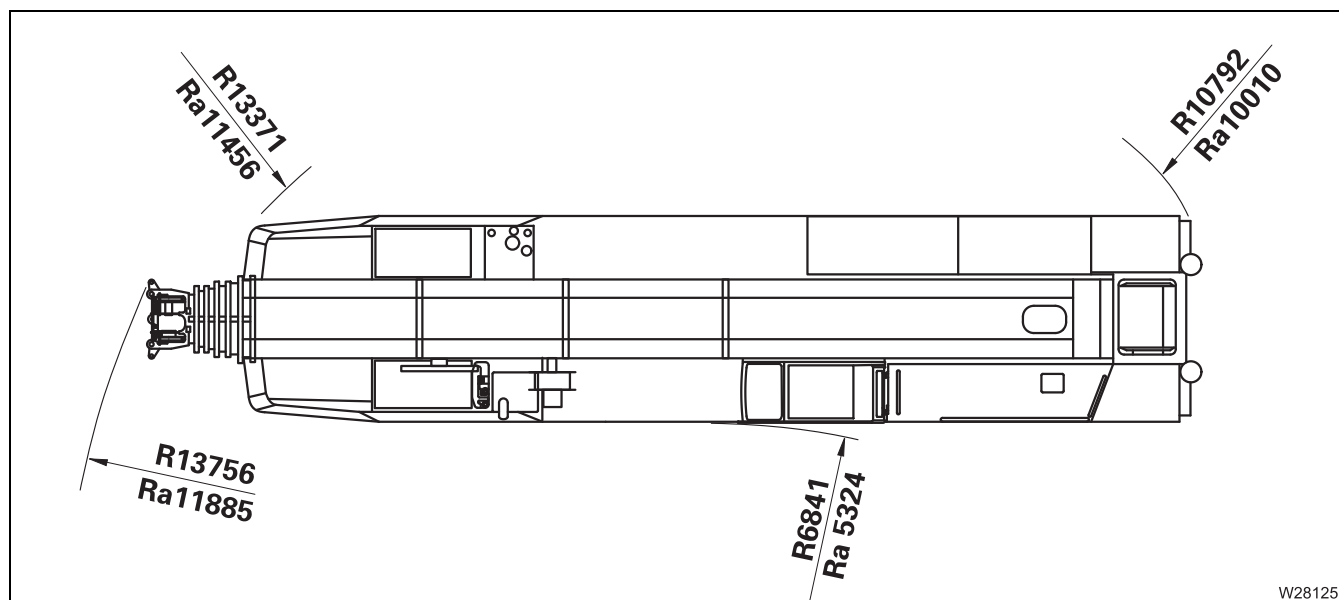


**Turning radii**

All dimensions in the illustration are in mm.

**R** = values for normal steering mode

**Ra** = values for all-wheel steering





## 1.5.6

### Superstructure

#### Main hoist

Drum diameter:	458 mm (18 in) (rope centre to rope centre)
Rope diameter:	22 mm (0.87 in)
Rope length:	330 m (1,082 ft)
Rope pull:	93.5 kN (23,380 lbf)
Power unit group:	M 5 (to ISO 4301 - 2)
Load spectrum:	L 1
Factor of the load spectrum	$K_m = 0.125$
Theoretical service life:	$D = 3,200$ h

#### Auxiliary hoist

Drum diameter:	458 mm (18 in) (rope centre to rope centre)
Rope diameter:	22 mm (0.87 in)
Rope length:	330 m (1,082 ft)
Rope pull:	93.5 kN (23,380 lbf)
Power unit group:	M 5 (to ISO 4301 - 2)
Load spectrum:	L 1
Factor of the load spectrum	$K_m = 0.125$
Theoretical service life:	$D = 3,200$ h

#### Slewing gear

Make:	Siebenhaar
Type:	01 DD
Power unit group	M2 (to ISO 4301 - 2)



### Derricking gear


Cylinder:	Differential cylinder
Adjusting angle (main boom):	-1.5° to + 82° from horizontal position
Power unit group	M2 (to ISO 4301 - 2)

### Main boom

Main boom lengths:	13.3 m to 70.0 m (43.5 ft to 229.7 ft)
Main boom head:	7 sheaves or 10 sheaves <sup>1)</sup>
Cylinder:	One single-level telescoping cylinder with locking/unlocking mechanism
Power unit group	M 1 (to ISO 4301 - 2)
Telescoping mechanism:	

<sup>1)</sup> Additional equipment

### Lattice extension

As additional equipment;  *Operating Instructions Lattice Extension.*

**Operating speeds**      The specified operating speeds only apply to an engine speed of about 1,190 rpm without load.

Main hoist:              Rope speed when lifting and lowering  
Normal speed:      Maximum 60 m/min (197 ft/min)  
High-speed mode:      Maximum 120 m/min (394 ft/min)

Auxiliary hoist:      Rope speed when lifting and lowering  
Normal speed:      Maximum 60 m/min (197 ft/min)  
High-speed mode:      Maximum 120 m/min (394 ft/min)

Slewing gear:          0 to 1.3 revolutions per minute

Telescoping mechanism:      Extending from 13.3 m to 70.0 m (43.5 ft to 229.7 ft)  
  
approx. 530 s      In automatic mode during uninterrupted locking and telescoping processes

Derricking gear:      Derricking between - 1.5° and 82°  
Normal speed:      Raising the boom: approx. 142 s  
High-speed mode:      Raising the boom: approx. 68 s

**Noise emission**      Emission sound pressure level at the workplace

At the crane cab seat:      71 dB (A)

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## 1.6

### Documentation supplied

The precise number of documents supplied depends on the rigging mode of the truck crane. The following documents are included in delivery:

– **Operating Instructions**

Contains information on driving and crane operation.

– **Lattice extension operating manual**

Is only supplied when the truck crane is equipped with a lattice extension or other parts for extending the main boom (e.g. auxiliary single-sheave boom top and heavy load lattice extension).

– **Operating manual for additional equipment**

This is only supplied when the truck crane is supplied with additional equipment which is not described in the operating manual for driving and crane operation.

– **Documents from other manufacturers**

Original documentation for parts not manufactured by **Manitowoc Crane Group Germany GmbH**, such as the engine and central lubrication system, as well as the tachograph, auxiliary heaters, radio and, where appropriate, other additional equipment.

– **Maintenance manual**

Contains solely information on maintenance work and contains no instructions for repair work.

– **Safety manual**

Provides information on the safe operation of the truck crane.

– **Circuit diagrams**

Circuit diagrams for the electrical systems, hydraulic systems and pneumatic systems are supplied.

– **Lifting capacity table**

Information on the lifting capacity when the truck crane is in different rigging modes.



– **Outrigger pressure table**

Information on the outrigger pressure when the truck crane is in different rigging modes.


– **Spare parts list**

For procurement of spare parts. Information about the position and quantity of plating.

## 1.6.1

### Questions on documentation

Consult your dealer if you have questions on the documentation supplied for your truck crane.

You can find your responsible dealer here:  *Dealer list*, p. 1 - 3.

You can also send questions in either German or English directly to:

Email: [whv-techpublications@manitowoc.com](mailto:whv-techpublications@manitowoc.com)

For repeat orders for documentation, please contact our EMEA service.

## 1.7

### Notes on the operating manual

This operating manual is not a training manual for prospective crane operators! All descriptions are written explicitly for crane operators who have been trained to operate truck cranes!

This operating manual is designed as a reference manual. It provides either a brief or a detailed explanation to the crane operator, based on his prior knowledge, of the individual operating steps and procedures.

### 1.7.1

#### What do the symbols used mean?

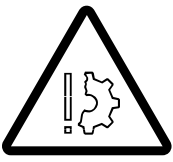
The following designations and symbols are used in the operating manual and in the maintenance manual to highlight particularly important information.

The vertical line to the left of the hazards and warnings indicates that: This text, regardless of its length, relates to the warning symbol.

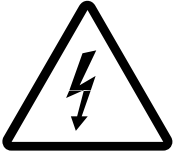


This symbol indicates hazards related to the described operation, which can endanger persons. The type of danger (e.g. danger to life, risk of injury or risk of crushing) usually precedes the warning.





This symbol indicates dangers which represent a hazard to objects, e.g. damage to the truck crane or other parts which are located within the working range.



This symbol alerts you to situations where there is a risk of receiving an electric shock.



This symbol is to remind you that you are working with substances which pose a risk to the environment. Take particular care. For further information on handling substances that are harmful to the environment;  
▣▣▣► *Maintenance Manual*, chapter on *Safety and environmental protection*.



The hand with the pointing finger indicates passages that contain additional instructions and tips regarding truck crane operation.



This symbol indicates that the topic is continued on the next page. Turn to the next page!

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Horizontal lines always indicate the start or the end of an example. The text used for examples is in a different font.

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## 1.7.2

### How is the operating manual structured?

#### Division

- The chapters **1** to **7** contain a description of how to drive the truck crane.
- The chapters **8** to **15** contain a description of crane operation.

The complete operating manual must always be carried in the truck crane. The basic safety instructions, and those for crane operation are only provided in **Chapter 2**. Please read these safety instructions and observe them.

#### Structure of the chapters

Chapters **3** and **8** are structured according to the product, and give an overview of all operating elements on the truck crane. You will find cross-references to the associated brief descriptions, and from there, to further chapters.

Chapters **4** to **7** and **9** to **14** describe procedures, and are therefore structured relative to these operations. For more extensive processes, the description is given with **checklist** and **operating instructions**.

- The checklists show the procedure in the required sequence, e.g. for rigging work. From there, cross-references take you to the corresponding operation descriptions.
- The operation descriptions describe the work in detail, including the required **warnings and safety instructions**.  
You are obliged to read these sections before using the truck crane for the first time **and** if you are still unsure about how to operate the truck crane.



#### **Risk of accidents when only referring to the checklists during operation!**

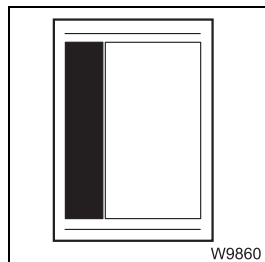
The checklists and operating instructions should always be regarded as a single unit for the comprehensive description of the rigging. It is only safe to operate the truck crane by referring to the checklists when you are familiar with all the dangers which may occur, and are confident in completing the necessary steps as described in the relevant operating instructions.

If in doubt, always first read the section which is referred to in the checklist.



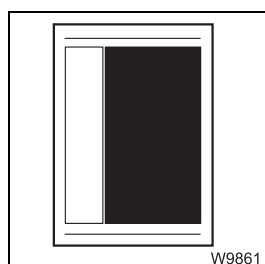
## Structure of the pages

Each page in the operating manual is divided into a wide text column and a narrow column.



The **narrow column** contains various pieces of information:

- Chapter and section numbers,
- Headings of the subsections,
- Information and warning symbols,
- Images with individual operating elements with parts of the truck crane or with pictograms.



Different methods of emphasis are used in the **text column**:

- When a section is preceded by a hyphen (as in this section, for example), you will find a list.
- When a section is preceded by a bullet, you will be required to take concrete action, e.g.
  - Shift the transmission to neutral.
- *Italics* are used to highlight the following type of text passages:
  - Designations of operating elements and switching states, e.g. *Automatic* or *Manual*.
  - Headings of sections to which a reference is made.
  - The names of other documents to which a reference is made.

### 1.7.3

## How do I find the information I need?

The operating manual contains the following guides for orientation.

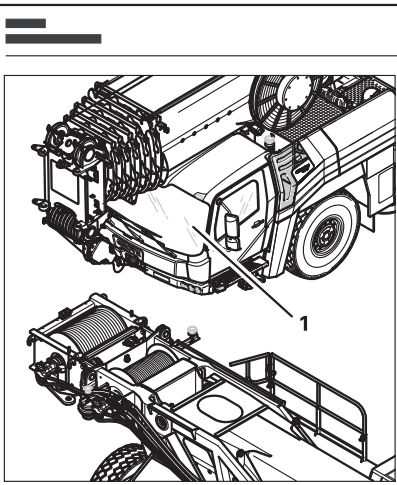



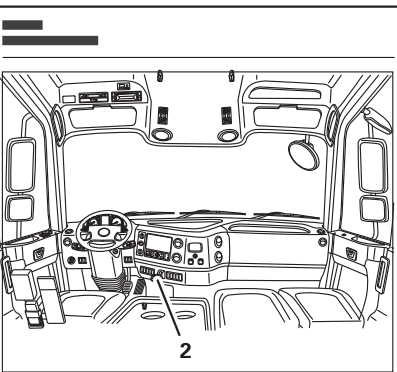

















- The **Contents** lists all chapters in the operating instructions.
- The **Table of contents** provides an overview of the topics.
- The **Index** in chapter **15** gives an alphabetic list of keywords and search terms with a reference to the relevant page in the operating manual.
- Cross-references are labelled with an arrow (▮▮▮▮▶) and refer to other pages in the operating instructions. These pages contain more detailed information, or information that relates to the topic in question. Furthermore, you can use the cross-references to systematically familiarize yourself with general to specific information on the truck crane or look up the functioning of individual elements.

The following pages give an example of how to use the cross-references.



**Cross-references example**

The illustrations and texts in this section are only an example and may differ from the conditions on your truck crane.

<p style="text-align: center;"><b>A</b></p>  <p>1  ⇒ S. 3 - 4</p> <p>3-2  </p>	<p style="text-align: center;"><b>B</b></p>  <p>2  ⇒ S. 3 - 57</p> <p>3-4  </p>
<p style="text-align: center;"><b>C</b></p>  <p>1  </p> <p>2  </p> <p>3  </p> <p>4  </p> <p>⇒ S. 5 - 87</p> <p>3-57  </p>	<p style="text-align: center;"><b>D</b></p>  <p>5-87  </p>

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The parking brake is used as an example to show how the cross-references guide you through the operating manual.

- A** In this example, the general overview is shown on page 3 - 2.  
The driver's cab is labelled as number **1**. The related table contains a cross-reference in the form
- 1 Driver's cab** ▣▣▣▣▶ p. 3 - 4
- B** Page 3 - 4 shows an interior view of the driver's cab.  
The parking brake is labelled as number **2**. The related table contains a cross-reference in the form
- 2 Parking brake** ▣▣▣▣▶ p. 3 - 57
- C** Page 3 - 57 gives a brief description of all the functions of the parking brake.  
If further information is available, the brief description contains a cross-reference, e.g.
- 4 Test position for towing a trailer:** – Pull the lever down until it locks into place  
– Press in the lever and pull it further backwards  
The parking brake for the trailer is released;  
▣▣▣▣▶ p. 5 - 87.
- D** Follow the cross-reference to pages 5 - 87. Here, the test position of the parking brake when towing a trailer is described in detail, with all requirements and safety instructions.  
There may be additional cross-references here, such as to related pages in the chapter *Malfunctions*.
-

## 1.7.4

### What information is available for operations planning?

Extensive information is required for operations planning in order to guarantee safe, smooth and efficient operation of the truck crane:

The operating manual contains

- Dimensions and weights of the truck crane; ■■■▶ p. 1 - 8,
- Driving modes permitted on public roads; ■■■▶ p. 6 - 1,
- Dimensions and weights of removable equipment; ■■■▶ p. 1 - 10,
- Turning radii; ■■■▶ p. 1 - 18,
- The permissible outrigger spans for the *Standard* slewing range type; ■■■▶ p. 11 - 28,
- The permissible outrigger spans for the *MAXbase* slewing range type; ■■■▶ p. 11 - 32,
- The size of the outrigger pads; ■■■▶ p. 1 - 17.

**1.8****Conversion table for US measuring units**

The following conversion factors will help you convert from metric to US units when the truck crane is used in countries that use US units of measurement and vice versa.

<b>Converting from</b>	<b>in</b>	<b>Multiply by</b>
mm	in	0.03937
in	mm	25.4
m	ft	3.28084
ft	m	0.30479
m <sup>2</sup>	ft <sup>2</sup>	10.76391
cm <sup>2</sup>	in <sup>2</sup>	0.155
cm <sup>3</sup>	in <sup>3</sup>	0.061
l	gal (US)	0.264178
kg	lbs	2.204622
lbs	kg	0.45359
t	lbs	2,204.622
lbs	t	0.0004536
kN	lbf	224.809
daN/cm <sup>2</sup>	lbf/in <sup>2</sup>	14.50378
lbf/in <sup>2</sup>	daN/cm <sup>2</sup>	0.06895
bar	psi	14.50378
psi	bar	0.06895
m/s	ft/s	3.28084
km/h or km	mph or mi	0.62137
mph or mi	km/h or km	1.60935
Nm	lbf ft	0.7375
°C	°F	1.8 x °C+32
°F	°C	(°F-32)/1.8
t/m <sup>2</sup>	lbs/ft <sup>2</sup>	204.8
m <sup>2</sup> /t	ft <sup>2</sup> /lbs	0.04882

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## 1.9

## Training – Information

For the EMEA area (**E**urope, **M**iddle **E**ast, **A**frica), **Manitowoc Crane Group Germany GmbH** offers comprehensive training for crane types GMK and GTK.

Our training centre is located in a maritime environment, on Germany's North Sea coast at Wilhelmshaven. It is there where we train our qualified service personnel and provide you, as the customer (or sales and marketing employee), with a training programme specific to your target group.

Knowledge of crane technology, components and systems used, crane functions and measures for the prevention of accidents that is acquired from the training is tailored to each target group and designed for safe, time-saving operation of your crane or else consolidates your specialist know-how of sales, marketing and service.

Our range of training programmes includes more than 20 different courses. Take advantage of our services:

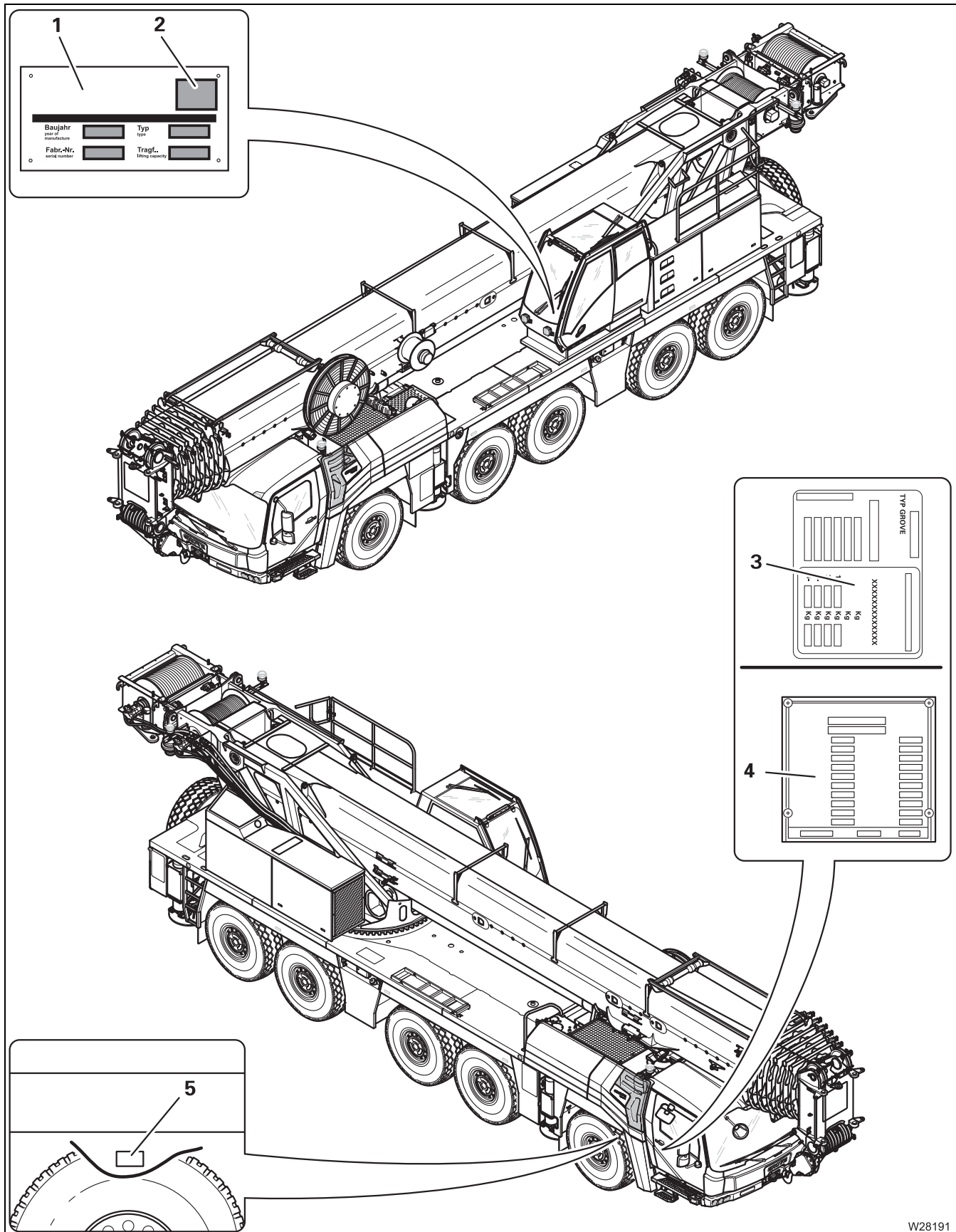
- Training for prevention of accidents and crane operation.
- Crane technology training.
- Training tailored to your needs and level of experience, for different levels of difficulty from beginner to specialist.
- Theoretical and practical training, on simulators and on (your) crane.
- Training in the vicinity of GMK and GTK production.
- Training courses with the duration required by the individual; from two days to several weeks.
- Our coaches can also visit you to provide you with training on your own crane.

Have us design a suitable training programme for you today. We would be pleased to advise you!, your **Training Center Wilhelmshaven**.

Our contact information and an overview of our current training courses can be found online at:

*[http://training.manitowoccranes.com/MCG\\_CARE/Services/EN/Training.asp](http://training.manitowoccranes.com/MCG_CARE/Services/EN/Training.asp)*

# 1.10 Identification



The following plates and numbers are attached to the truck crane for identification purposes:

- 1** Serial number and crane type
- 2** The CE mark, only with truck cranes that are delivered in member countries of the EU.
- 3** The serial number of the driver's cab
- 4** The chassis number and crane type
- 5** The chassis number in front of the first axle line in the frame.

The location of the identification numbers on removable rigging parts (e.g. counterweights, lattice extension) is described in the corresponding chapters or in the relevant operating manual provided.

# 1.11 EC Declaration of Conformity



On initial delivery, operators of truck cranes receive a Declaration of Conformity as a supplement to the delivery protocol. An illustration of the Declaration of Conformity is shown below.

The enclosed Declaration of Conformity is valid only if the truck crane complies with all of the guidelines and standards specified in the EC Declaration of Conformity. This applies in particular to the programming and function of the overload protection. Only then does the truck crane receive a CE mark upon delivery.

The Declaration of Conformity shall become invalid and the CE mark must be removed if any modifications that do not comply with the specified guidelines and standards are made to the crane.

Please refer to the additional information provided on the EC Declaration of Conformity supplied.

# 2

## Basic safety instructions



Notes on the warnings used;  *What do the symbols used mean?*, p. 1 - 25.

### 2.1


#### Intended use

The GMK5250L truck crane is constructed in accordance with the latest technology and the recognised safety regulations. Nevertheless, the operator or third parties can still be endangered and the crane or other property put at risk while using it.

The truck crane may only be modified with the consent of **Manitowoc Crane Group Germany GmbH**.

The GMK5250L truck crane may be used only when it is in perfect technical condition and for its intended purpose and with due attention paid to safe operation and possible hazards.

Any malfunctions that could impair safety must be eliminated immediately.

The GMK5250L truck crane may only be operated without the corresponding special equipment within the permitted temperature range;  *Technical data*, p. 1 - 7.

The GMK5250L truck crane is designed solely for lifting loads which are within the permitted GMK5250L lifting capacities. The load must be slung as prescribed to a hook block which is positioned vertically over the load prior to lifting.

**Intended use** also includes

- observing the entire crane documentation, consisting of the operating manual(s), the lifting capacity table, the outrigger pressure table and the safety manual
- adhering to the inspection and maintenance requirements specified in the maintenance manual.

The GMK5250L may only be operated with parts of equipment which have been approved by **Manitowoc Crane Group Germany GmbH** and which are labelled with the serial number of the GMK5250L.

The manufacturer is not liable for any damage caused by improper or unauthorized use of the GMK5250L truck crane. The user shall take on full responsibility for any such use.

## 2.1.1

### Improper use

**Manitowoc Crane Group Germany GmbH** is not liable for damage resulting from improper or unauthorized use of the GMK5250L truck crane. The user shall take on full responsibility for any such use.

Improper use includes:

- Transporting loads on the carrier.
- Pushing, pulling or lifting loads with the level adjustment system, outrigger beams or outrigger cylinders.
- Pushing or pulling loads or lifting them off the ground using the slewing gear, derricking gear or telescoping mechanism.
- Pulling off fixed objects with the crane.
- Ramming and pulling of sheet-pile walls, sheet piles, beams etc.,
- Two-hook operation with the boom extension and two-hook operation on the main boom head without additional equipment.
- Setting RCL codes that do not correspond to the actual rigging mode.,
- Working with an overridden RCL or overridden lifting limit switch,
- After RCL shutdown, increasing the working radius by pulling the raised load at an angle (e.g. with a chain hoist).
- Misuse of the outrigger pressure display as a safety function to prevent the crane from overturning (outrigger pressure higher than 0 t).
- On-road driving in an unauthorised driving mode (axle load, dimension),
- Moving the rigged crane in an impermissible driving mode.
- Using equipment that is not permitted for the crane.
- Transporting people in any way using the lifting tackle, on the load, or in the crane cab while driving.
- Transporting passengers outside the driver's cab.
- Loading and unloading work, i.e. continuous operation without a sufficiently long break.
- Use for any kind of sport or recreation event, especially for bungee jumping.

## 2.2

### Organisational measures

The operating manual and the lifting capacity table should be kept in the truck crane for immediate access at all times, and must not be removed from the truck crane. You must have read and understood the operation and safety instructions in this operating manual and comply with them when working.

In addition to the operating manual and the lifting capacity table, observe all general, statutory and otherwise applicable regulations concerning accident prevention and environmental protection. You must have read and understood these and observe them when operating the crane and driving.

They could include:

- How to deal with hazardous materials,
- The wearing of personal protective equipment,
- Road traffic regulations and
- all applicable regulations concerning the operation of a crane.

Make sure that persons who will work on the truck crane are provided with the required information prior to starting operations. Instruct your personnel (e.g. banksmen, slingers, rigging personnel) accordingly.

Make sure the maintenance personnel have the necessary expertise for safe crane operation. Make sure the maintenance personnel have access to the operating manual.

Only qualified or trained personnel may carry out work on the truck crane. Responsibilities regarding the operation of the crane, rigging, maintenance and repair work must be clearly defined.

Make sure only authorised personnel carry out work on the truck crane.

Do not leave long hair untied and do not wear loose clothing or jewellery (including rings) during work. They could get caught or pulled in and cause injuries.

Use your personal protective gear whenever necessary or prescribed.

Observe all safety instructions and warnings on the truck crane.

Keep all safety instructions and warnings on the truck crane in a legible condition.



Observe the operational organisation at the site. Report your arrival to site management. Ask for the personnel authorised to instruct you.

Find out where the fire extinguishers are and how to operate them at every site.

Note the fire alarm and fire fighting facilities.

Should the operating behaviour of the truck crane change in such a manner that safety is impaired or if you are in doubt about the operational safety of the truck crane, stop the truck crane immediately and inform the responsible departments or persons.

Do not make any changes to the programmable control systems (e.g. the RCL).

Do not modify or retrofit the truck crane without the consent of the manufacturer if such changes would affect the safety. This also applies to:

- the installation of safety devices,
- the adjustment of safety devices and valves.

All welding work (especially on load carrying members) may only be performed by properly qualified personnel with the prior permission of **Manitowoc Crane Group Germany GmbH**.

To avoid damage, especially to electronic parts, there are certain measures you must take before doing any welding work. You should therefore, always consult **Manitowoc Crane Care** before performing any welding work.

Make sure that the prescribed intervals and the intervals specified in the operation and maintenance manual for periodic inspections, tests and maintenance work are adhered to.

Replace the hydraulic hose lines or have them replaced at the prescribed intervals even if there are no noticeable defects regarding safety.

Be sure to follow the instructions in the maintenance manual relating to corrosion protection of the hydraulic cylinders.

Spare parts must fulfil the technical requirements defined by the manufacturer. Genuine spare parts always meet these requirements.



Appropriate servicing equipment is absolutely necessary in order to carry out maintenance work.

Observe national regulations that apply to transport when loading the truck crane. Also observe the additional safety measures prescribed by the forwarder (e.g. shipping or railway company).

Monitor the work of personnel, at least occasionally, and make sure they work in accordance with the operating instructions in a safe and conscientious manner.

## 2.3

### Personnel qualifications

This operating manual is not a training manual for prospective crane operators!

All descriptions are written explicitly for crane operators who have been trained to operate truck cranes.

Personnel in training may only operate the truck crane under supervision.

Only reliable personnel may operate or carry out work on the truck crane.

As a crane operator you must fulfil a number of requirements:

- You must possess a driving licence for this type of vehicle that is valid in the country in which you are working.
- You must have general knowledge of crane operation and any qualifications that may be required by the country in which you are working.
- You must be familiar with and understand the operating instructions.
- You must be familiar with and understand the accident prevention regulations.
- You must fulfil all physical and mental requirements for truck crane operation, e.g. perfect sight and hearing and the ability to react quickly.

Please also refer to the section in the *Safety manual* titled *You as driver and crane operator*.



Only experienced personnel who are familiar with the valid accident prevention regulations are authorised to sling loads and instruct the crane operator.

Your responsibilities as a crane operator (including those concerning traffic requirements) must be clearly defined. You must be in a position to refuse instructions given to you by third parties that violate the safety regulations.

Only trained personnel with special knowledge and experience in the fields of hydraulics, pneumatics and electrical equipment and electronics may carry out maintenance work on the truck crane.

**Manitowoc Crane Group Germany GmbH** conducts general and type-specific crane operator courses and technical courses.

## 2.4

### Safety instructions for driving the truck crane

Walk around and inspect the truck crane before you start the vehicle. Check the condition of the truck crane carefully using the checklists in the operating manual. Do not assume everything is in working order simply because it was in working order at the end of the last shift.

Check that all covers and safety devices are fitted properly and that they are in good condition before starting the vehicle.

Use the appropriate access aids when checking overhead crane parts. Do not use parts of the crane as access aids.

If necessary, remove any ice and snow from the truck crane before commencing driving.

Keep all handles, steps, step treads and ladders free of dirt, snow and ice.

Keep all electric and hydraulic connections free of dirt. Check the connecting points for dust, foreign bodies and moisture before installation. This also applies to protective caps and bridging plugs.

After a lightning strike, always have the truck crane checked by **Manitowoc Crane Care** before you drive the truck crane – even if you do not notice any impairment to its function. Electronic components may be damaged by a lightning strike and may fail unexpectedly, either immediately or during later operation.

Check all operating and control elements in the driver's cab before starting the engine.

After starting the engine, take note of all the lights and control elements.

After driving, secure the truck crane against unauthorised use.

## 2.5

### Safety instructions for crane operation

Carefully select a safe site for the truck crane, where you can work safely.

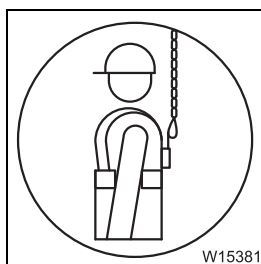
Walk around the truck crane and inspect it before beginning crane operation. Check the condition of the truck crane carefully using the checklists in the operating manual. Do not assume everything is in working order simply because it was in working order at the end of the last shift.

Check daily that all covers and safety devices are fitted properly and are in good condition before crane operation.

Check the safety devices (RCL, lifting limit switch, dead man's switch, emergency stop switches) every day before you start work.

Use the appropriate access aids when carrying out overhead rigging or maintenance work. Do not use parts of the crane as access aids.

Walk on only those parts of the truck crane which are equipped with appropriate step grids and railings and therefore guarantee safety. Use a suitable safety harness when walking on other surfaces – this also applies to sanded surfaces.



All locations designed for fastening a fall prevention safety system are marked with a symbol.

Always use a ladder for work above head height.



If necessary, remove any ice and snow from the truck crane before commencing crane operation.

Keep all handles, steps, step treads and ladders free of dirt, snow and ice.

Keep all electric and hydraulic connections free of dirt. Check the connecting points for dust, foreign bodies and moisture before installation. This also applies to protective caps and bridging plugs.

Check all operating and control elements in the crane cab before starting the engine.

After starting the engine, take note of all the lights and control elements.

Make sure that there are no unauthorised people in the vicinity of or on the truck crane during rigging work or crane operation. Cordon off the danger area clearly and mark the area as such.

When lifting a load, balance out the increase in working radius caused by flexure of the boom by raising the boom, so that the load is lifted vertically and does not drag, injure helpers or topple into the hoist rope (e.g. from a vehicle or scaffolding). Inform any banksmen and helpers about this issue as well.

Support the truck crane with the outrigger span required for the currently rigged counterweight before turning the superstructure.

Always level the truck crane before operating the crane.

Only use parts of equipment (counterweight sections, lattice extension) that belong to your truck crane. Both the truck crane and the equipment must have the same serial number.

Lifting loads simultaneously with two cranes is particularly dangerous. Carry out this type of work with special care.

Always set the load down when there is a break in work, and never leave the truck crane whilst a load is raised.

Whenever you leave the truck crane, secure it against unauthorised use.

After a lightning strike, always have the truck crane checked by **Manitowoc Crane Care** before you operate the truck crane – even if you do not notice any impairment to its function. Electronic components may be damaged by a lightning strike and may fail unexpectedly, either immediately or during later operation.

Crane operation carried out in the vicinity of live electrical cables as well as oil, gas or other supply lines is dangerous and requires that special safety measures be taken. Observe the instructions in the section titled *Crane operation under special operating conditions* in the *Safety manual* and the respective national regulations.

Testing the truck crane by lifting an excessively heavy load (overload testing) is prohibited. This presents the danger of hidden damage that can lead to severe accidents during subsequent crane operation. If locally applicable national regulations require the truck crane to be tested by lifting an excessively heavy load (overload test), always first consult **Manitowoc Crane Care**.

## 2.6

### Instructions on transporting persons

The truck crane is intended for lifting loads. Transporting persons is considered improper use of the truck crane.

It is prohibited to:

- transport persons in any way with the lifting tackle or on the load.
- transport persons outside the driver's cab.
- transport persons on the lattice extensions or boom extensions.
- use the truck crane for any kind of sport or recreation event, especially for “bungee” jumping.
- directly attach equipment for lifting persons on a luffing jib.
- transport persons with the truck crane when another, less dangerous method of transporting persons is possible.

In addition to the provisions of in this section, always also observe the legal requirements and guidelines for transporting persons applicable in the country in which you are working.

Further information on transporting persons can be found under the address: <http://fem-eur.com>.

#### Equipment for lifting persons

When lifting persons, only use equipment for lifting persons that comply with the requirements specified in the standards and regulations applicable in the country in which you are working.

The equipment for lifting persons must be fastened and secured as prescribed.

The prescribed personal protection equipment must be available and used (safety harnesses, etc.).

#### Personnel

Only authorised and properly qualified personnel are permitted to transport persons.

The crane operator must comply with the specifications of the manufacturer and the restrictions with regard to the lifting accessories (hooks, lifting gear, equipment for lifting persons, etc.).

The crane operator must have knowledge of and meet the requirements of the relevant legal regulations and standards (e.g. the BGR 159 in Germany or the ASME B30 in the USA).

The crane operator must have the necessary knowledge for operating the truck crane and the equipment used for lifting persons.

The crane operator and the persons to be transported must be made aware of all the known dangers involved when transporting persons.

## Operation

Operations planning for transporting persons must be carried out with special care. If official registration is required in the country in which you are working, this must be done with the relevant authorities in good time.

The truck crane must be rigged as prescribed and be level.

Before transporting persons, the crane operator must make sure that the safety devices and emergency operation functions are in perfect working order.

Before transporting persons, the crane operator must make sure that the lifting limit switch is **not** overridden.

The *operating manual* and the *lifting capacity table* must be stored in the crane cab and within easy reach of the crane operator.

All crane movements must be performed slowly and with extreme care.

The crane operator is not allowed to leave the crane cab until the equipment for lifting persons has been set down and the person transported has left it.

The crane operator must take care that the degree of utilisation does not exceed 50% during operation.

The number of reeved rope lines must be selected such that the load on the hoist rope does not exceed 50% of the rope pull. At the same time, the total weight of the lifted load must be considered, consisting of the weights of the hook block, the lifting gear and the equipment for lifting persons including the maximum payload.

When transporting persons, the crane operator must maintain the safe distances from overhead power lines applicable in the country in which he is working. The distances are normally greater than the distances for lifting loads specified in the section *Safe distance from overhead power lines*.



The person being transported must be in radio contact with the crane operator.

When used for transporting persons, the truck crane must not be used for other tasks.

The crane operator is not permitted to exceed the maximum permissible wind speeds and wind loads for transporting persons applicable in the country in which he is working. These values are normally lower than those for lifting loads specified in the *lifting capacity table*.

When the equipment for lifting persons is being used and is in a stationary position, then the slewing gear, hoist, derricking gear and telescoping mechanism must be secured against accidental use by being switched off.

### **Truck crane**

The truck crane must be equipped (e.g. with hydraulic emergency operation) so that the equipment for lifting persons can be set down and the persons being transported can safely leave it even if there is a failure of the drive or crane controls.

The hook holding the lifting gear for the equipment for lifting persons must be fitted with a lockable latch that completely seals the hook opening.

The truck crane must be serviced as prescribed, regularly inspected and repaired, if required. All safety stickers must be affixed in their appropriate places and be legible.



# 3

## Operating elements for driving

All operating elements for crane operation are described in Chapter 8.

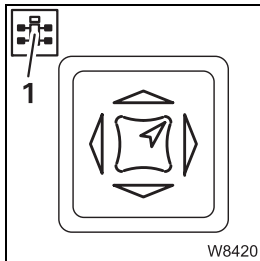
### 3.1

### Overview of the operating elements

This section shows the position and designation of the operating elements for driving. This also includes display elements such as lights or displays.

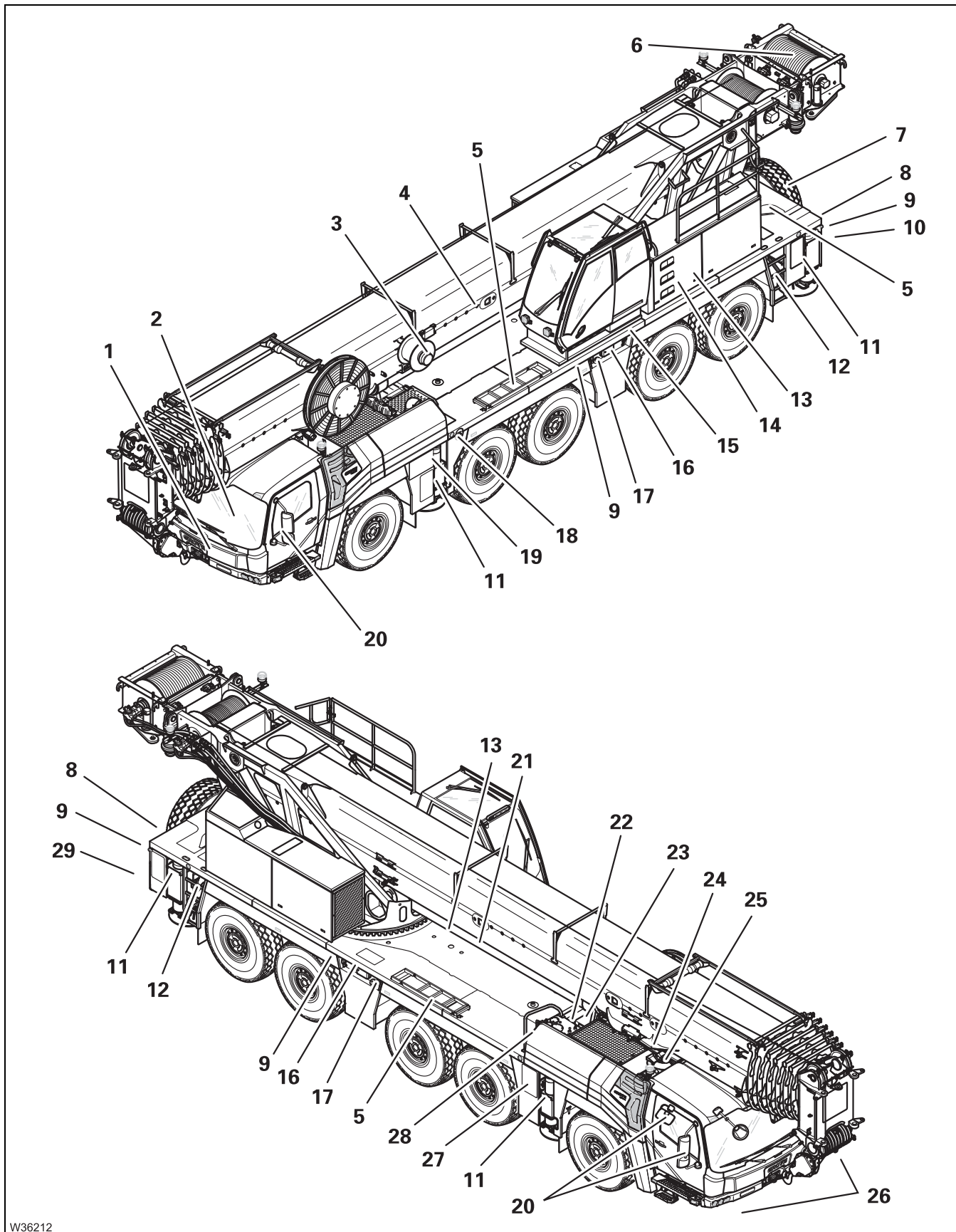


Operating elements available only with additional equipment are designated accordingly. These designations are made in this section only and are not repeated in the following sections.



Some figures show details from a different perspective than the general overview. The perspective is indicated in these figures by the symbol (1).

### 3.1.1 Exterior of the truck crane



W36212

27.09.2017

1	Front flap	➡ p. 3 - 80
2	Driver's cab	➡ p. 3 - 6
3	Hose drum <sup>2)</sup>	
4	Rigging the main boom <sup>1)</sup>	➡ p. 6 - 15
5	Ladders	➡ p. 4 - 5
6	Rigging the auxiliary hoist	➡ p. 6 - 55
7	Spare wheel <sup>1)</sup>	➡ p. 1 - 10
	Hook block storage <sup>1)</sup>	➡ p. 11 - 97
8	Chock <sup>1)</sup>	➡ p. 5 - 46
9	BirdView system 270° – camera <sup>1)</sup>	➡ p. 3 - 57
10	APS connection/interface (Auxiliary Power Supply) <sup>1), 3)</sup>	
11	Outrigger	
	– Operation	➡ p. 11 - 37
	– Lighting	➡ p. 3 - 70
	– Installing/removing the outrigger beams	➡ p. 6 - 35
12	Fixed ladders	➡ p. 4 - 4
13	Switching on boom pre-tensioning <sup>1)</sup>	➡ p. 6 - 14
	Switching off boom pre-tensioning <sup>1)</sup>	➡ p. 11 - 19
14	Switching on the slewing gear freewheel <sup>1)</sup>	➡ p. 6 - 12
	Switching off the slewing gear freewheel <sup>1)</sup>	➡ p. 11 - 18
15	Stair tread, retractable/extendable	➡ p. 11 - 141
16	Outrigger control units <sup>1)</sup>	➡ p. 3 - 40
	Emergency stop switch	➡ p. 4 - 22
	Sockets for hand-held control	➡ p. 3 - 41
17	Standard fuel tank	➡ p. 4 - 7
	Dual fuel tank <sup>1)</sup>	➡ p. 4 - 8
18	Adblue tank (DEF-Tank) <sup>4)</sup>	➡ p. 4 - 9

<sup>1)</sup> Additional equipment

<sup>2)</sup> ➡ *Operating Instructions Lattice Extension*

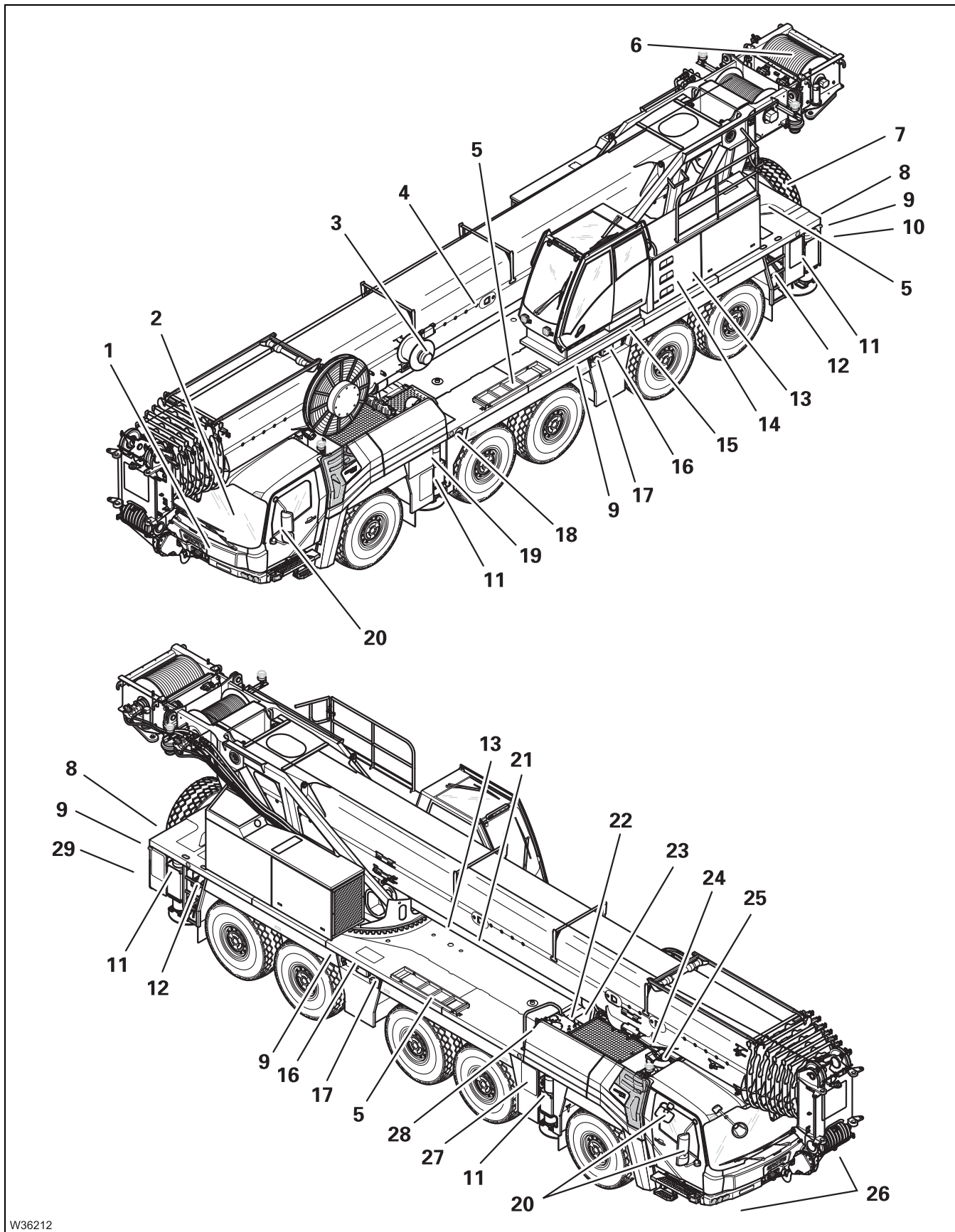
<sup>3)</sup> ➡ *Separate operating instructions*

<sup>4)</sup> DEF (**D**iesel **E**xhaust **F**luid), operating fluid for exhaust gas aftertreatment e.g. *AdBlue*.

For *AdBlue* there are registered trademarks of Kruse GmbH & Co KG, BASF SE and the German Association of the Automotive Industry.



Operating elements for driving  
3.1 Overview of the operating elements



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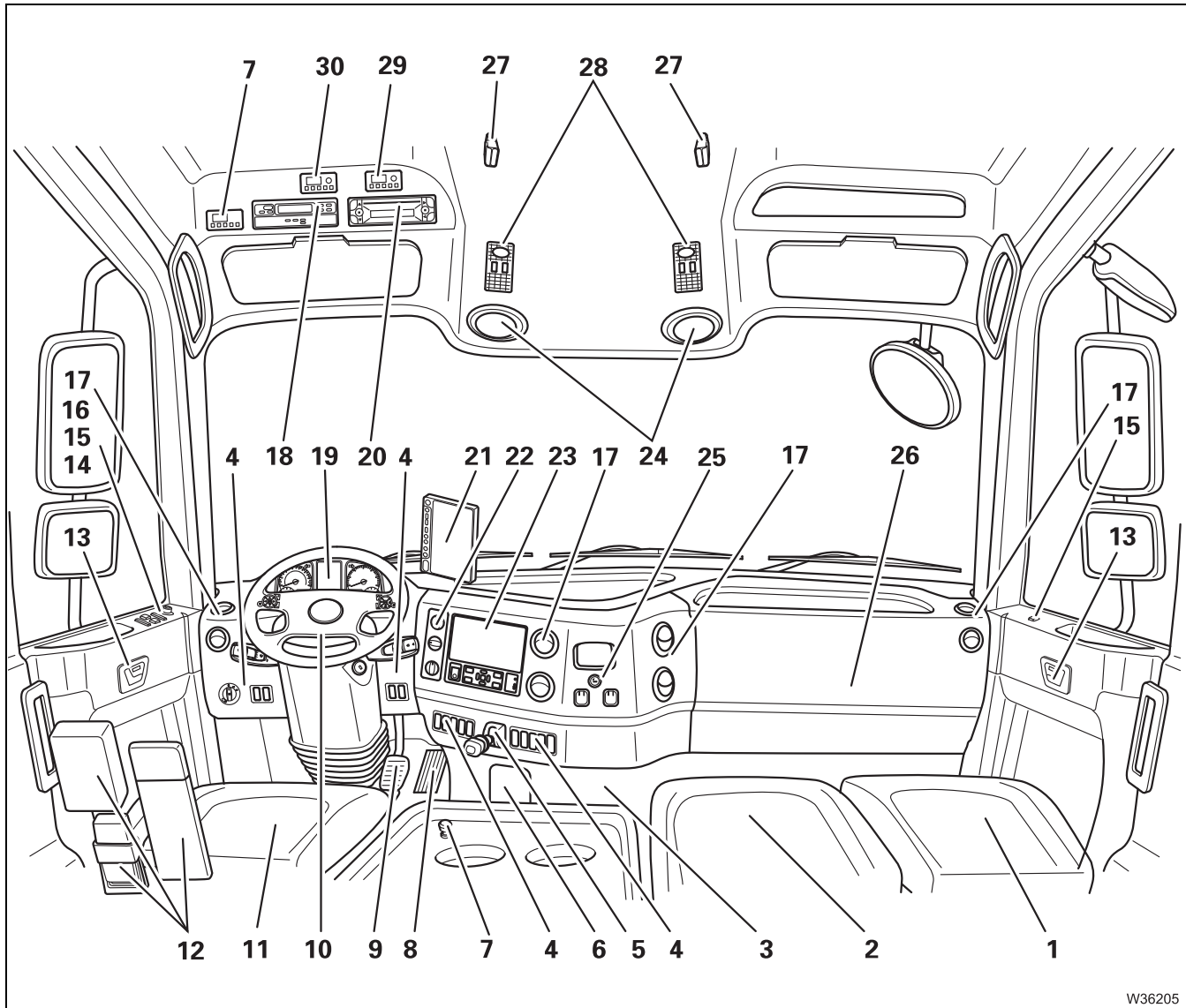
27.09.2017

<b>19</b>	External starting socket <sup>1)</sup>	▶▶▶▶ p. 7 - 25
	Connection for battery charger <sup>1)</sup>	▶▶▶▶ p. 7 - 25
<b>20</b>	Adjusting the mirrors	▶▶▶▶ p. 5 - 7
<b>21</b>	Switching on the boom floating position <sup>1)</sup>	▶▶▶▶ p. 6 - 13
	Switching off the boom floating position <sup>1)</sup>	▶▶▶▶ p. 11 - 17
<b>22</b>	Hydraulic oil cooler, second cooler <sup>1)</sup>	
<b>23</b>	Valves on hydraulic tank	▶▶▶▶ p. 4 - 10
<b>24</b>	Engine	▶▶▶▶ p. 4 - 1
<b>25</b>	Air intake inhibitor <sup>1)</sup>	▶▶▶▶ p. 4 - 23
<b>26</b>	Warning plates for vehicle width <sup>1)</sup>	▶▶▶▶ p. 5 - 9
<b>27</b>	Filler connection for the compressed air system	▶▶▶▶ p. 7 - 27
	Tyre inflator connection	▶▶▶▶ p. 7 - 34
<b>28</b>	Hydraulic emergency operation <sup>1)</sup>	▶▶▶▶ p. 14 - 47
<b>29</b>	Reverse camera <sup>1)</sup>	▶▶▶▶ p. 3 - 56

<sup>1)</sup> Additional equipment

### 3.1.2 Driver's cab

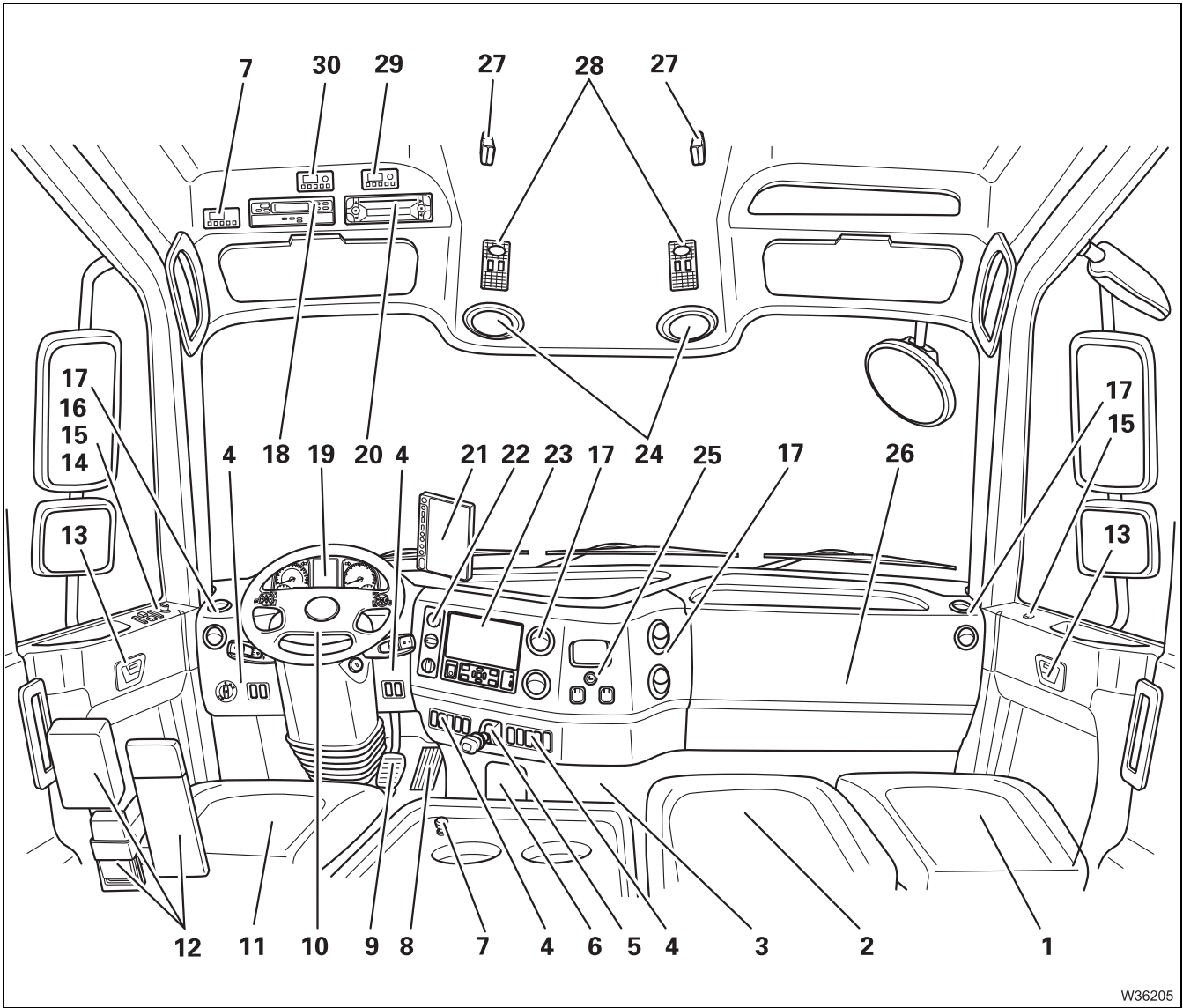
#### Overview



<b>1</b>	Passenger's seat	▣▣▣▣▶ p. 5 - 13
<b>2</b>	Storage or 2nd passenger seat <sup>1)</sup>	
<b>3</b>	Fire extinguisher	
<b>4</b>	Instrument panel, left/right	▣▣▣▣▶ p. 3 - 13
<b>5</b>	Parking brake	▣▣▣▣▶ p. 3 - 62
<b>6</b>	Diagnostics	▣▣▣▣▶ p. 3 - 75
	Hydraulic emergency operation on/off <sup>1)</sup>	▣▣▣▣▶ p. 14 - 47
<b>7</b>	Auxiliary water heater <sup>1)</sup>	▣▣▣▣▶ p. 3 - 21
<b>8</b>	Accelerator	▣▣▣▣▶ p. 5 - 44
<b>9</b>	Service brake	▣▣▣▣▶ p. 5 - 33
<b>10</b>	Steering column/steering wheel	▣▣▣▣▶ p. 3 - 11
<b>11</b>	Driver's seat	▣▣▣▣▶ p. 5 - 12
<b>12</b>	Behind driver's seat	
	– Warning triangle <sup>1)</sup>	
	– First-aid kit <sup>1)</sup>	
	– Warning lamp, warning vest <sup>1)</sup>	
<b>13</b>	To open/lock door	▣▣▣▣▶ p. 3 - 79
<b>14</b>	Separate steering	▣▣▣▣▶ p. 3 - 66
<b>15</b>	Window winder	▣▣▣▣▶ p. 3 - 78
<b>16</b>	– Adjusting the mirrors	▣▣▣▣▶ p. 5 - 7
	– Mirror heating	▣▣▣▣▶ p. 5 - 8
<b>17</b>	Adjusting the air vents	▣▣▣▣▶ p. 5 - 64
<b>18</b>	Tachograph or cover	▣▣▣▣▶ p. 3 - 19
<b>19</b>	Instrument panel, middle	▣▣▣▣▶ p. 3 - 14

<sup>1)</sup> Additional equipment





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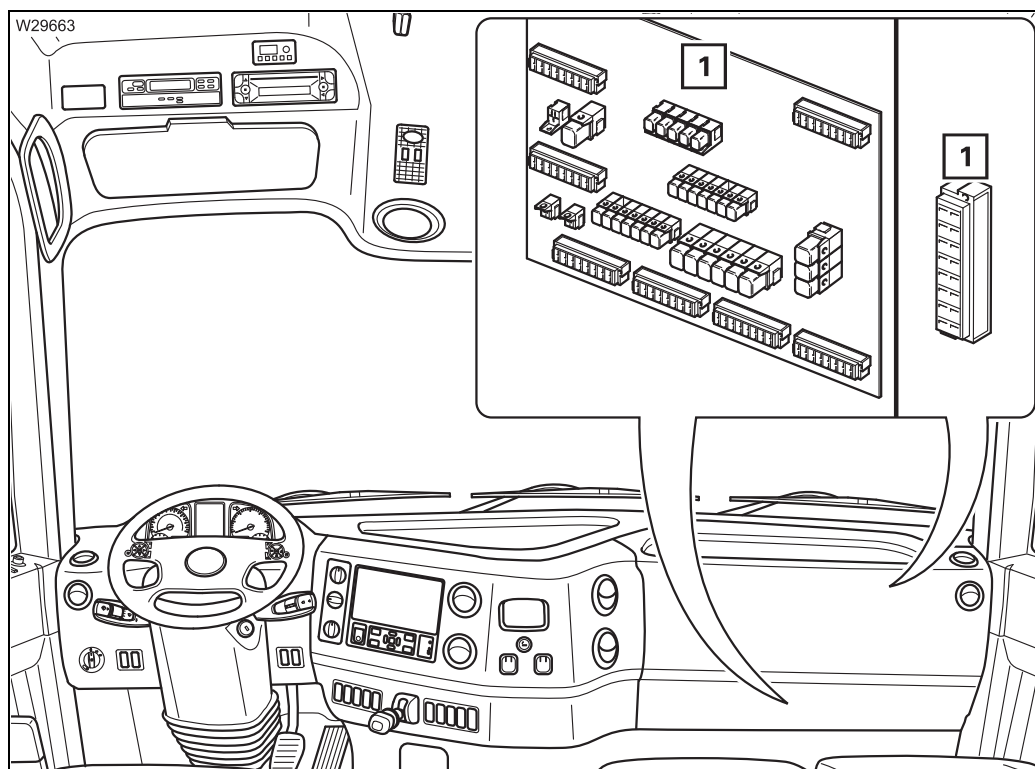
<b>20</b>	Radio <sup>1), 2)</sup>	
<b>21</b>	BirdView-System 270°- monitor <sup>1)</sup>	▣▣▣▣▶ p. 3 - 57
<b>22</b>	Heating/Air-conditioning system <sup>1)</sup>	▣▣▣▣▶ p. 3 - 20
<b>23</b>	CCS control unit	▣▣▣▣▶ p. 3 - 24
	Reverse camera monitor	▣▣▣▣▶ p. 3 - 56
<b>24</b>	Loudspeakers	
<b>25</b>	Sockets 12 V/24 V	▣▣▣▣▶ p. 3 - 50
	Cigarette lighter	
	Ashtray	
<b>26</b>	Behind the cover	▣▣▣▣▶ p. 3 - 10
<b>27</b>	Fastening for the folding berth <sup>1)</sup>	▣▣▣▣▶ p. 5 - 48
<b>28</b>	Cab lighting	▣▣▣▣▶ p. 3 - 71
<b>29</b>	Battery heater <sup>2)</sup>	
<b>30</b>	Auxiliary air heater <sup>1)</sup>	▣▣▣▣▶ p. 3 - 23

<sup>1)</sup> Additional equipment

<sup>2)</sup> ▣▣▣▣▶ *Separate operating instructions*



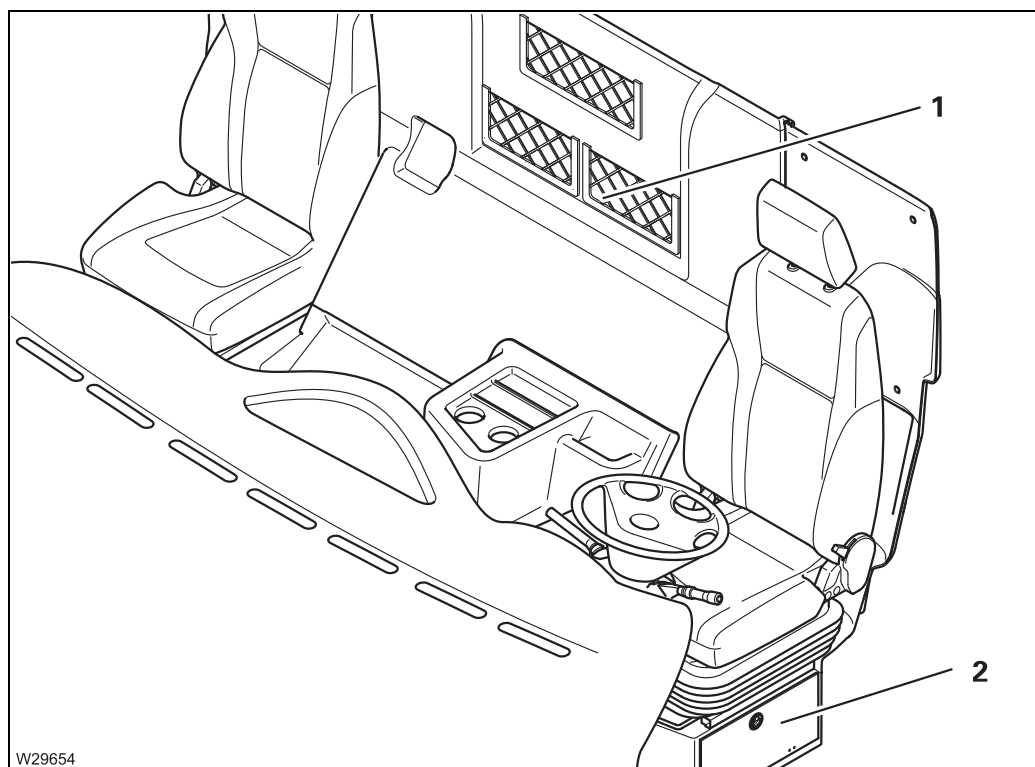
### Behind the cover



1 Fuses

➔ p. 7 - 37

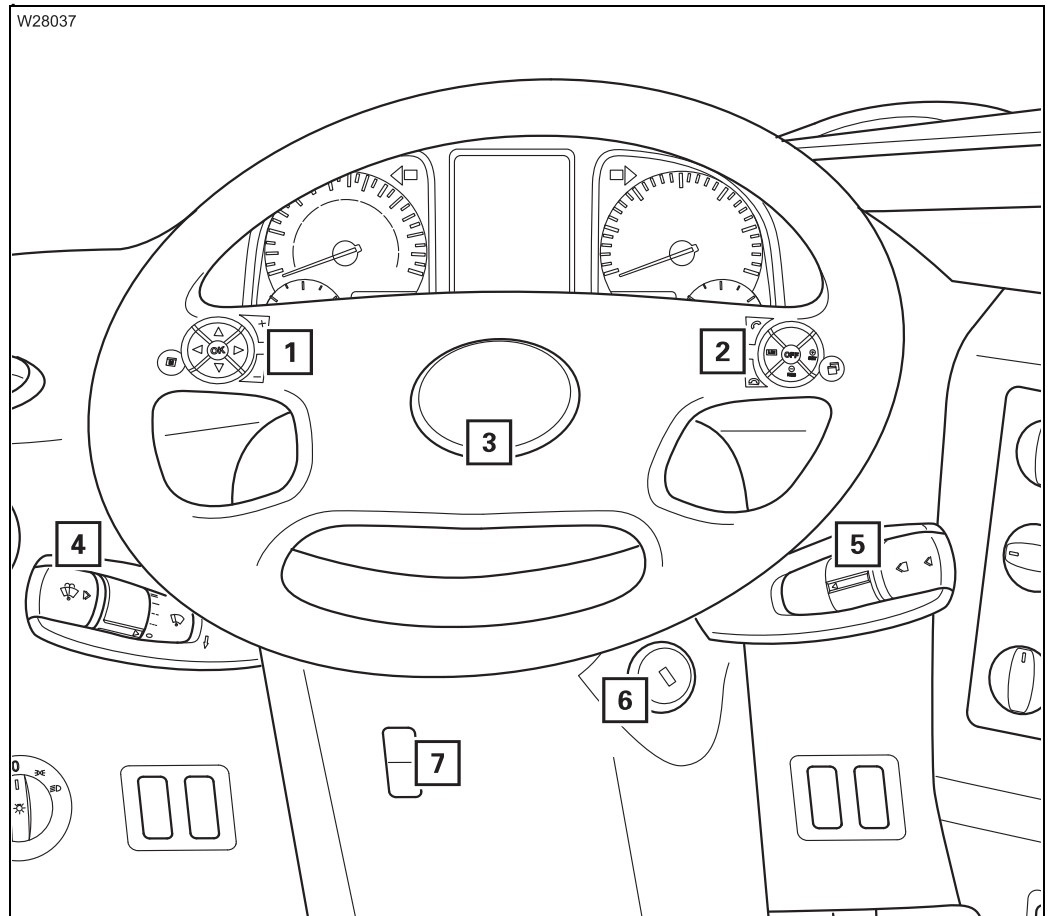
### In the rear of the driver's cab



- 1 Spare key, radio accessories
- 2 Storage compartment (e.g. for hand-held control, battery charger)

### 3.1.3

## Steering column/steering wheel



- 1** Operating the on-board computer ➔ p. 3 - 76
- 2** Operation:
  - Set idling speed ➔ p. 3 - 46
  - Setting the Tempomat ➔ p. 3 - 47
  - Setting the Temposet ➔ p. 3 - 47
  - Hands-free unit<sup>1)</sup>
- 3** Horn
- 4** Headlight flasher/full beam headlight ➔ p. 3 - 68  
Turn signal indicator/wiper-washing system ➔ p. 3 - 68
- 5** - Transmission operating elements ➔ p. 3 - 17
  - Engine retarder/transmission retarder ➔ p. 3 - 61
- 6** Ignition lock ➔ p. 3 - 46
- 7** Steering column adjustment ➔ p. 5 - 14

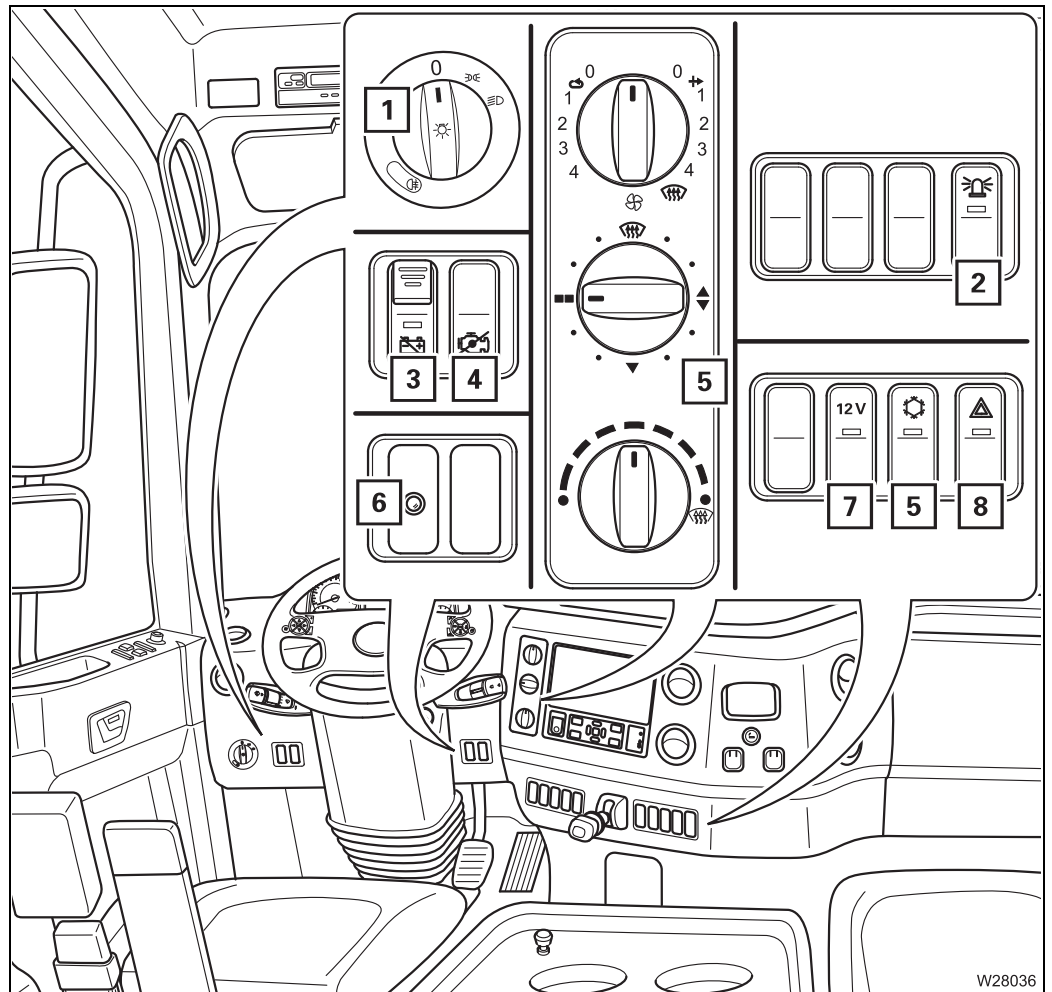
<sup>1)</sup> Suitable radio required

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### 3.1.4

## Instrument panel

Left/right

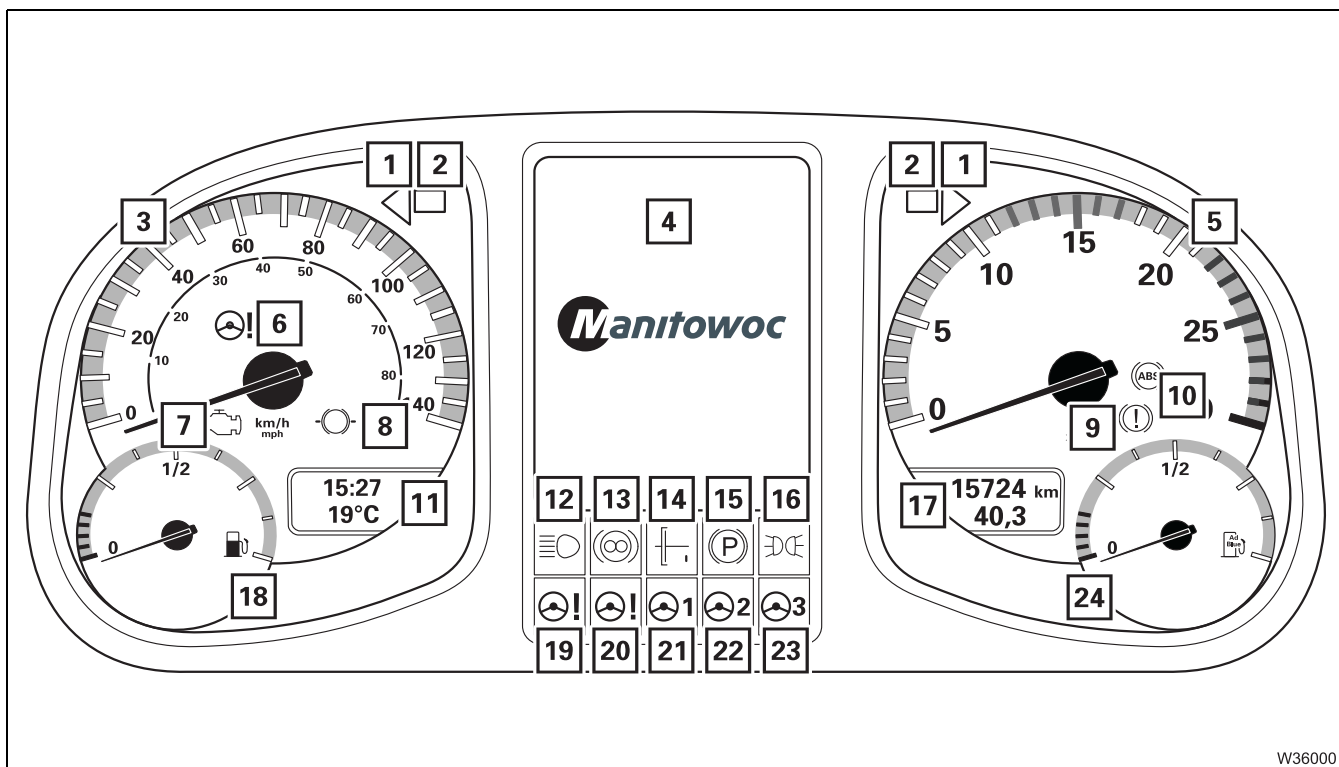


- |  |             |
|--|-------------|
| <b>1</b> Lighting on/off                               | ➡ p. 3 - 69 |
| <b>2</b> Rotating beacons on/off                       | ➡ p. 3 - 70 |
| <b>3</b> Battery master switch                         | ➡ p. 4 - 11 |
| <b>4</b> Override torque reduction                     | ➡ p. 5 - 45 |
| <b>5</b> Heating/Air-conditioning system <sup>1)</sup> | ➡ p. 3 - 20 |
| <b>6</b> Dual tank check monitor <sup>1)</sup>         | ➡ p. 4 - 8  |
| <b>7</b> Power sockets on/off                          |             |
| <b>8</b> Hazard warning system on/off                  | ➡ p. 3 - 69 |

<sup>1)</sup> Additional equipment



**Middle**



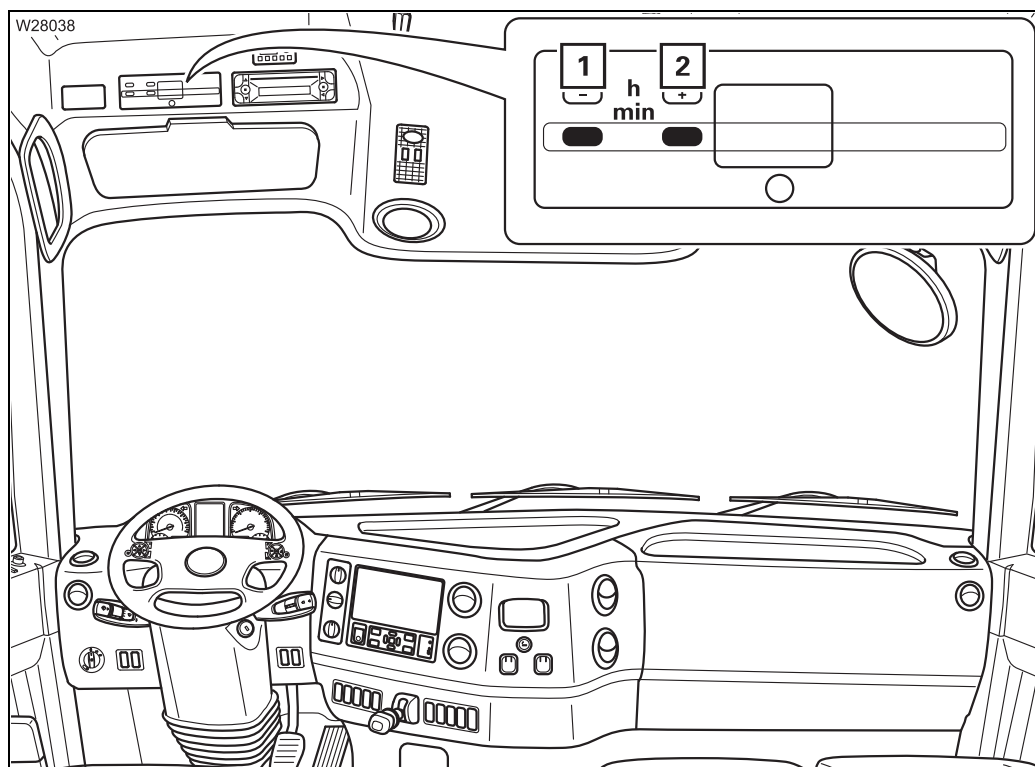
W36000

<b>1</b>	Indicator lamp for turn signal indicator	➡ p. 3 - 69
<b>2</b>	Indicator lamp for trailer turn signal indicator <sup>1)</sup>	➡ p. 3 - 69
<b>3</b>	Speedometer	➡ p. 3 - 74
<b>4</b>	On-board computer	➡ p. 3 - 18
<b>5</b>	Tachometer	➡ p. 3 - 47
<b>6</b>	Power steering malfunction	
<b>7</b>	Engine malfunction	➡ p. 7 - 17
<b>8</b>	Engine speed too high warning	➡ p. 3 - 47
<b>9</b>	Brake malfunction	➡ p. 3 - 61
<b>10</b>	ABS warning	
<b>11</b>	Display	
	– Time	➡ p. 3 - 77
	– Outdoor air temperature	➡ p. 3 - 77
<b>12</b>	Headlight – full beam indicator lamp	➡ p. 3 - 68
<b>13</b>	Retarder display	➡ p. 3 - 61
<b>14</b>	Clutch indicator	➡ p. 3 - 54
<b>15</b>	Parking brake indicator lamp	➡ p. 3 - 62
<b>16</b>	Parking light indicator	➡ p. 3 - 69
<b>17</b>	Kilometre counter	➡ p. 3 - 74
<b>18</b>	Fuel level display	➡ p. 4 - 7
<b>19</b>	Steering malfunction	➡ p. 3 - 64
<b>20</b>	Steering warning lamp	➡ p. 3 - 64
<b>21</b>	Steering circuit 1 malfunction	➡ p. 3 - 64
<b>22</b>	Steering circuit 2 malfunction	➡ p. 3 - 64
<b>23</b>	Steering circuit 3 malfunction	➡ p. 3 - 64
<b>24</b>	AdBlue (DEF) level indicator	➡ p. 4 - 9

<sup>1)</sup> Additional equipment



**On-board computer time correction**



1 Time correction -:

➡ p. 3 - 76

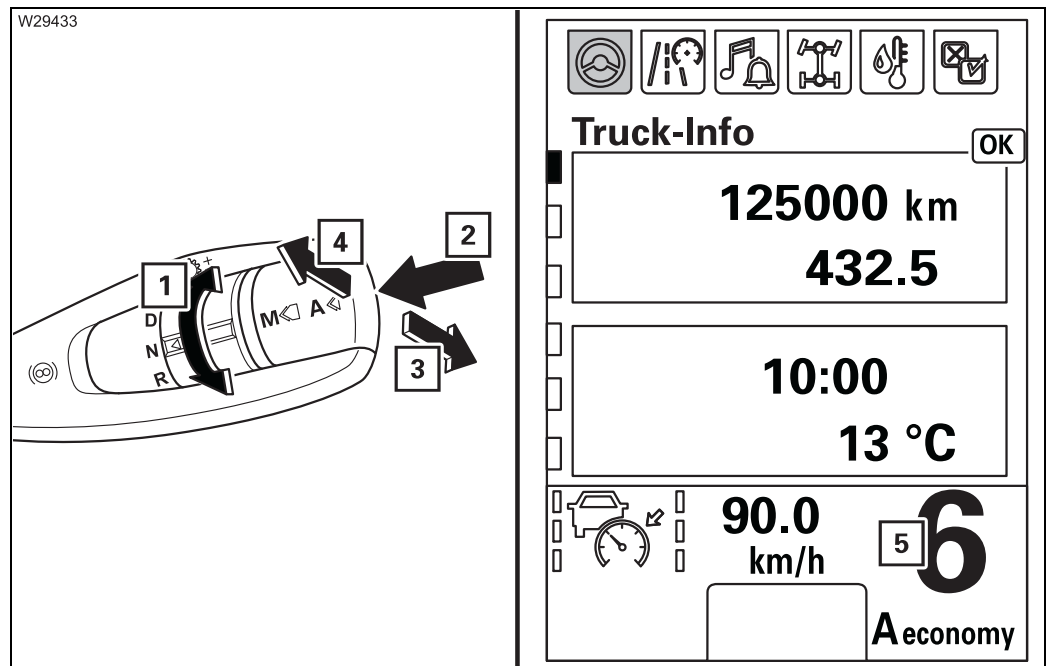
2 Time correction +:

➡ p. 3 - 76



### 3.1.5

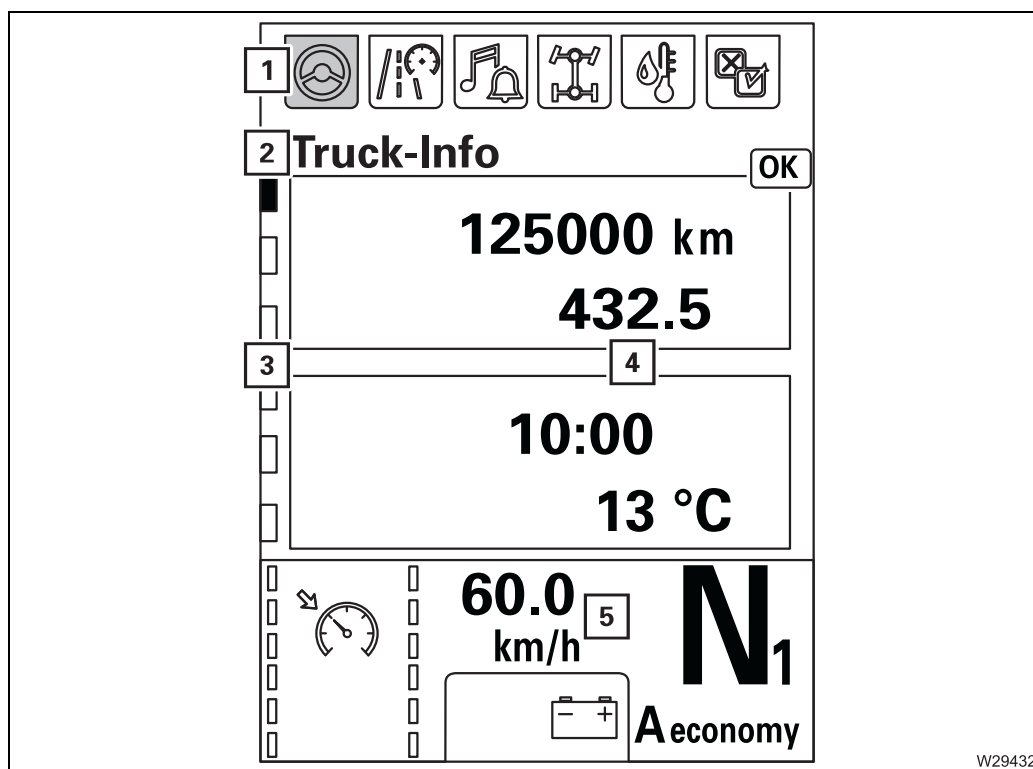
## Transmission operating elements



- |   |                                 |                |
|---|---------------------------------|----------------|
| 1 | Selecting the driving direction | ▣▣▣▣ p. 3 - 53 |
| 2 | Changing the operating mode     | ▣▣▣▣ p. 3 - 53 |
| 3 | Shift down, manual              | ▣▣▣▣ p. 3 - 53 |
| 4 | Shift up, manual                | ▣▣▣▣ p. 3 - 53 |
| 5 | Gear indicator                  | ▣▣▣▣ p. 3 - 53 |

### 3.1.6

## On-board computer

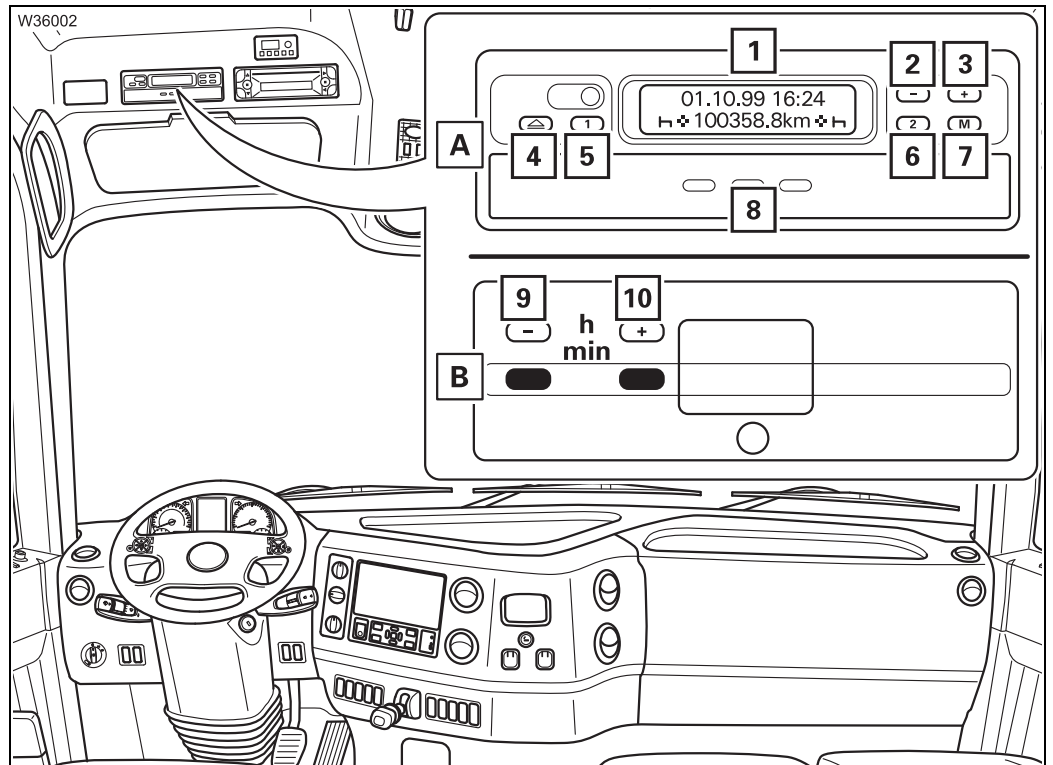


- |                       |             |
|-----------------------|-------------|
| 1 Main menu display   | ➡ p. 3 - 76 |
| 2 Display menu – Name | ➡ p. 3 - 76 |
| 3 Submenu display     | ➡ p. 3 - 76 |
| 4 Display area        | ➡ p. 3 - 76 |
| 5 Display information | ➡ p. 3 - 76 |

<sup>1)</sup> Additional equipment

### 3.1.7

## Tachograph



### (A) – Tachograph<sup>1)</sup>

- |                                     |             |
|-------------------------------------|-------------|
| 1 Display                           | ➡ p. 5 - 20 |
| 2 Time correction –:                | ➡ p. 3 - 74 |
| 3 Time correction +:                | ➡ p. 3 - 74 |
| 4 Opening the drawer                | ➡ p. 5 - 18 |
| 5 Setting the time group – driver 1 | ➡ p. 5 - 19 |
| 6 Setting the time group – driver 2 | ➡ p. 5 - 19 |
| 7 Tachograph                        | ➡ p. 3 - 74 |
| 8 Drawer                            | ➡ p. 5 - 18 |

### (B) – Cover<sup>1)</sup>

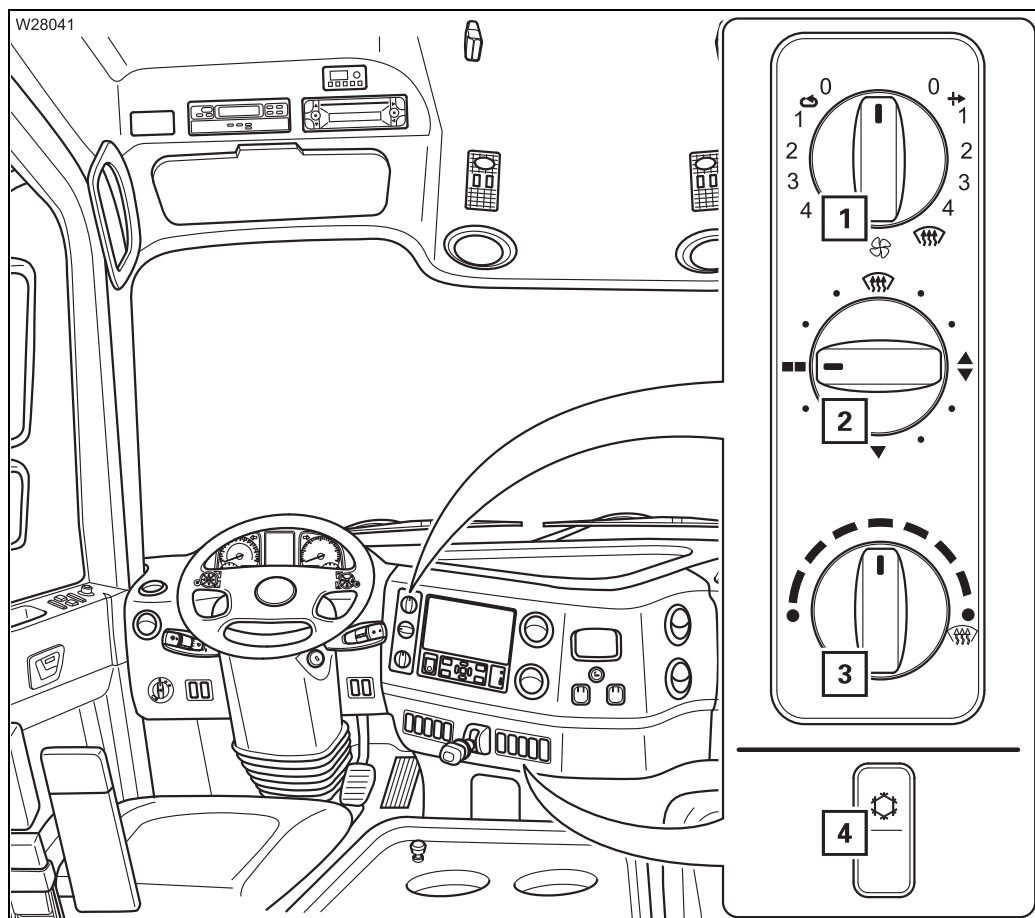
- |                       |             |
|-----------------------|-------------|
| 9 Time correction –:  | ➡ p. 3 - 74 |
| 10 Time correction +: | ➡ p. 3 - 74 |

<sup>1)</sup> (A) or (B) present, depending on the version

### 3.1.8

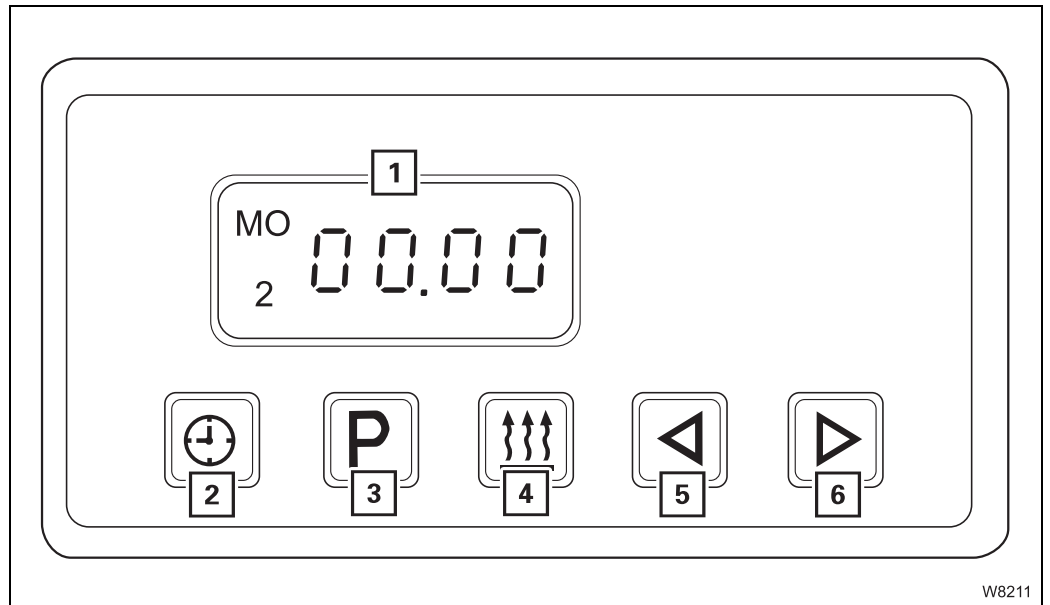
## Heating/Air-conditioning system

### Standard heating system



- |   |   |             |
|---|---|-------------|
| 1 | Setting the blower/fresh air/recirculated air | ➡ p. 5 - 63 |
| 2 | Air distribution                              | ➡ p. 5 - 64 |
| 3 | Setting the temperature                       | ➡ p. 5 - 63 |
| 4 | Air-conditioning system                       | ➡ p. 5 - 66 |

## Auxiliary water heating system

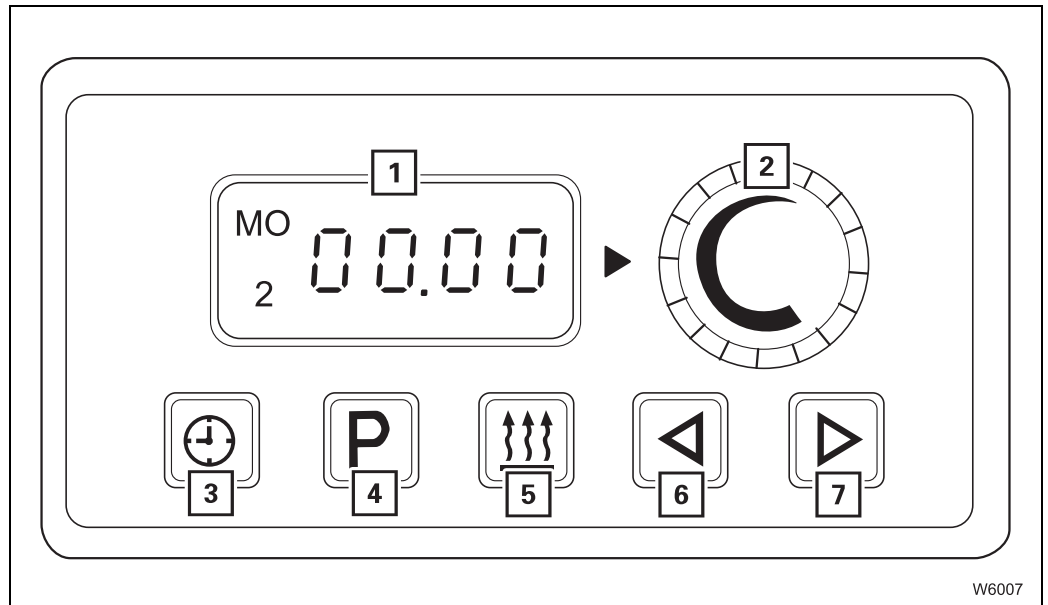


- |  |                 |
|--|-----------------|
| <b>1</b> Heating display                           | ▣▣▣▣▶ p. 5 - 71 |
| <b>2</b> Setting time and weekday                  | ▣▣▣▣▶ p. 5 - 71 |
| <b>3</b> – Saving automatic heating start          | ▣▣▣▣▶ p. 5 - 72 |
| – Switching the automatic heating start on and off | ▣▣▣▣▶ p. 5 - 73 |
| <b>4</b> – Switching on the auxiliary heater       | ▣▣▣▣▶ p. 5 - 70 |
| – Switching off the auxiliary heater               | ▣▣▣▣▶ p. 5 - 71 |
| <b>5</b> Input –                                   | ▣▣▣▣▶ p. 5 - 71 |
| <b>6</b> Input +                                   | ▣▣▣▣▶ p. 5 - 71 |



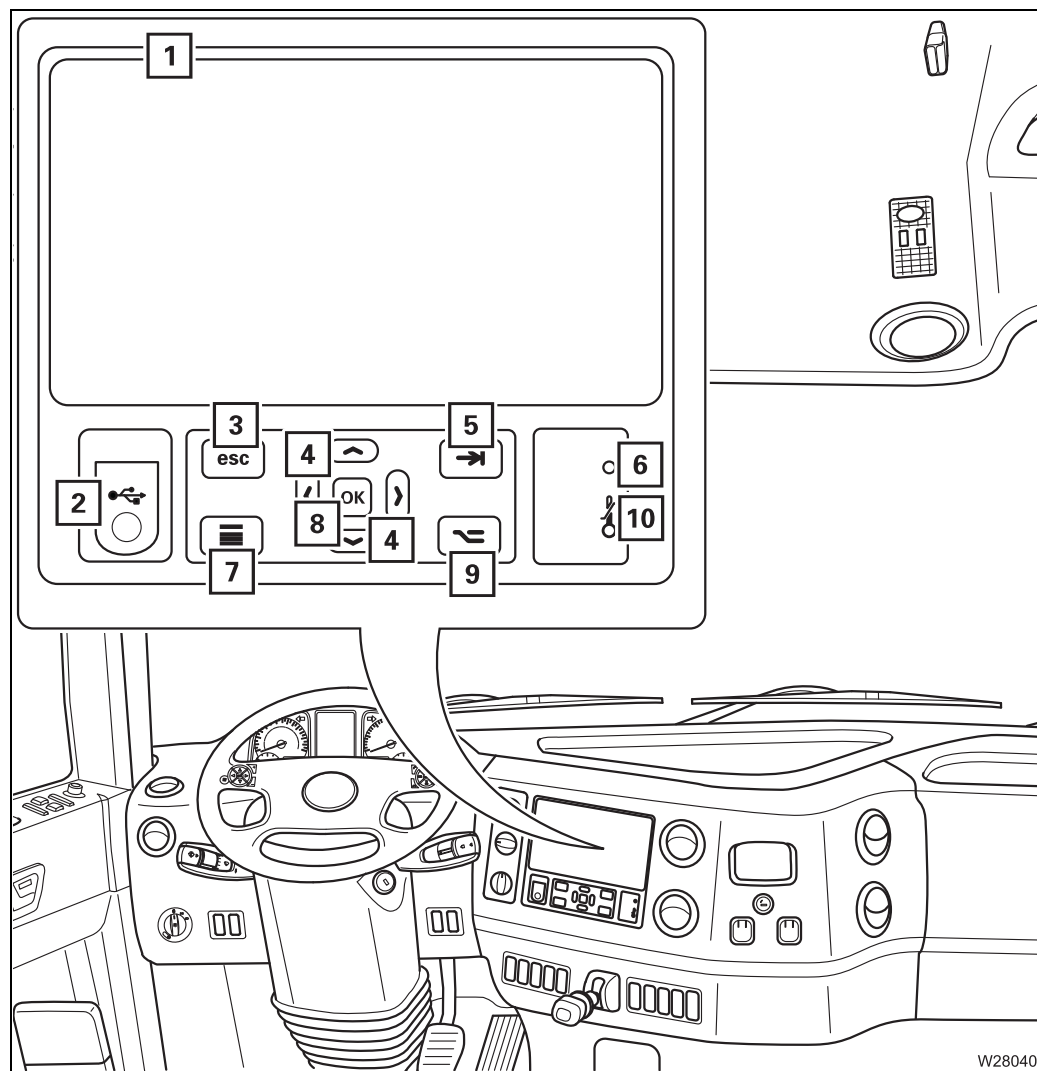
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## Auxiliary air heater



- |                                      |                |
|--------------------------------------|----------------|
| <b>1</b> Heating display             | ▣▣▣▣ p. 5 - 75 |
| <b>2</b> Temperature                 | ▣▣▣▣ p. 5 - 76 |
| <b>3</b> Setting the time/day        | ▣▣▣▣ p. 5 - 76 |
| <b>4</b> – Storing the heating start | ▣▣▣▣ p. 5 - 76 |
| – Switching heating start on/off     | ▣▣▣▣ p. 5 - 76 |
| <b>5</b> – Switching on              | ▣▣▣▣ p. 5 - 75 |
| – Switching off                      | ▣▣▣▣ p. 5 - 76 |
| <b>6</b> Input –                     | ▣▣▣▣ p. 5 - 76 |
| <b>7</b> Input +                     | ▣▣▣▣ p. 5 - 76 |

### 3.1.9 CCS control unit

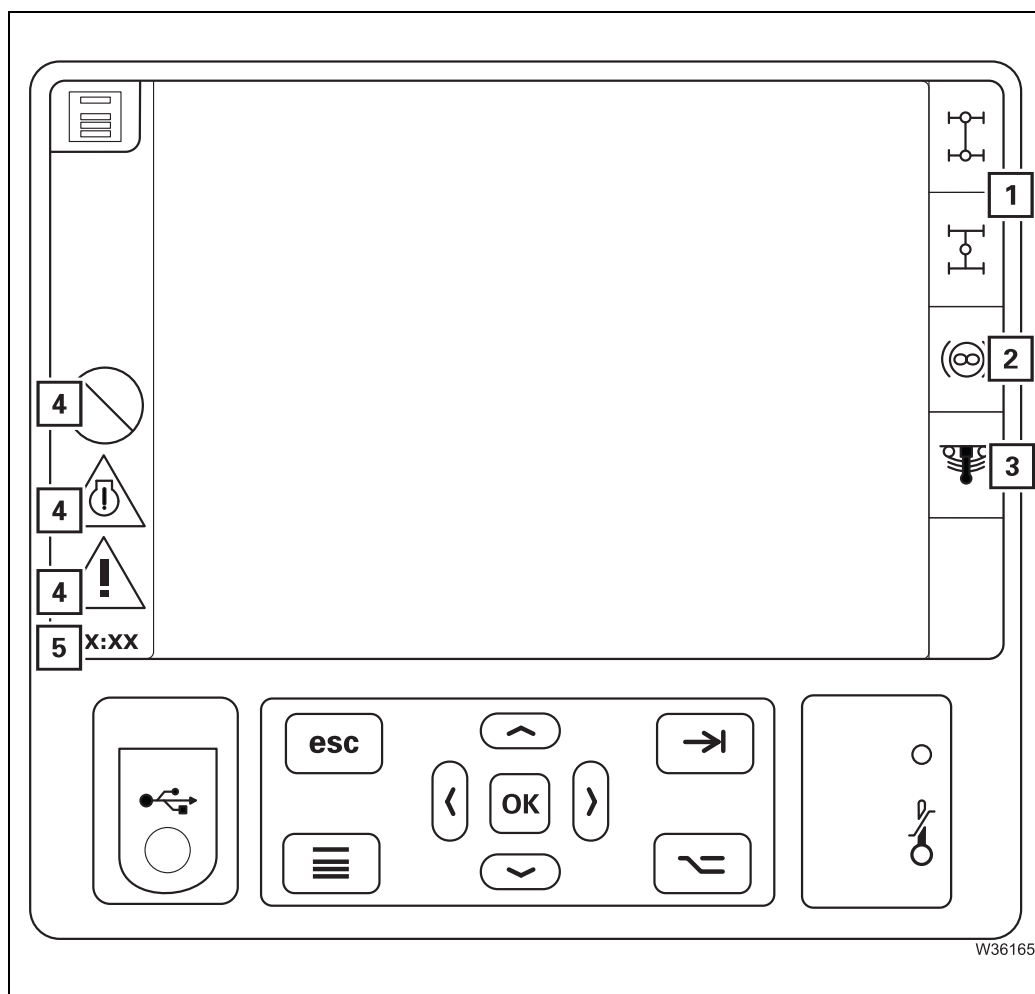




<b>1</b>	CCS display	▣▣▣▣▶	p. 3 - 51
	Overview start menu	▣▣▣▣▶	p. 3 - 27
<b>2</b>	Service/diagnostics connection <sup>1)</sup>	▣▣▣▣▶	p. 3 - 75
<b>3</b>	Exiting the menu/input mode	▣▣▣▣▶	p. 3 - 52
<b>4</b>	Menu control – Select	▣▣▣▣▶	p. 3 - 51
<b>5</b>	No function		
<b>6</b>	Sensor brightness	▣▣▣▣▶	p. 3 - 52
<b>7</b>	Overview menu groups – Operation	▣▣▣▣▶	p. 3 - 52
	Overview menu groups – Overview	▣▣▣▣▶	p. 3 - 28
<b>8</b>	Menu control – Activate / confirm	▣▣▣▣▶	p. 3 - 51
<b>9</b>	No function		
<b>10</b>	Display temperature warning display	▣▣▣▣▶	p. 3 - 52

<sup>1)</sup> For Service personnel only, not suitable for external devices, e.g. mobile phone

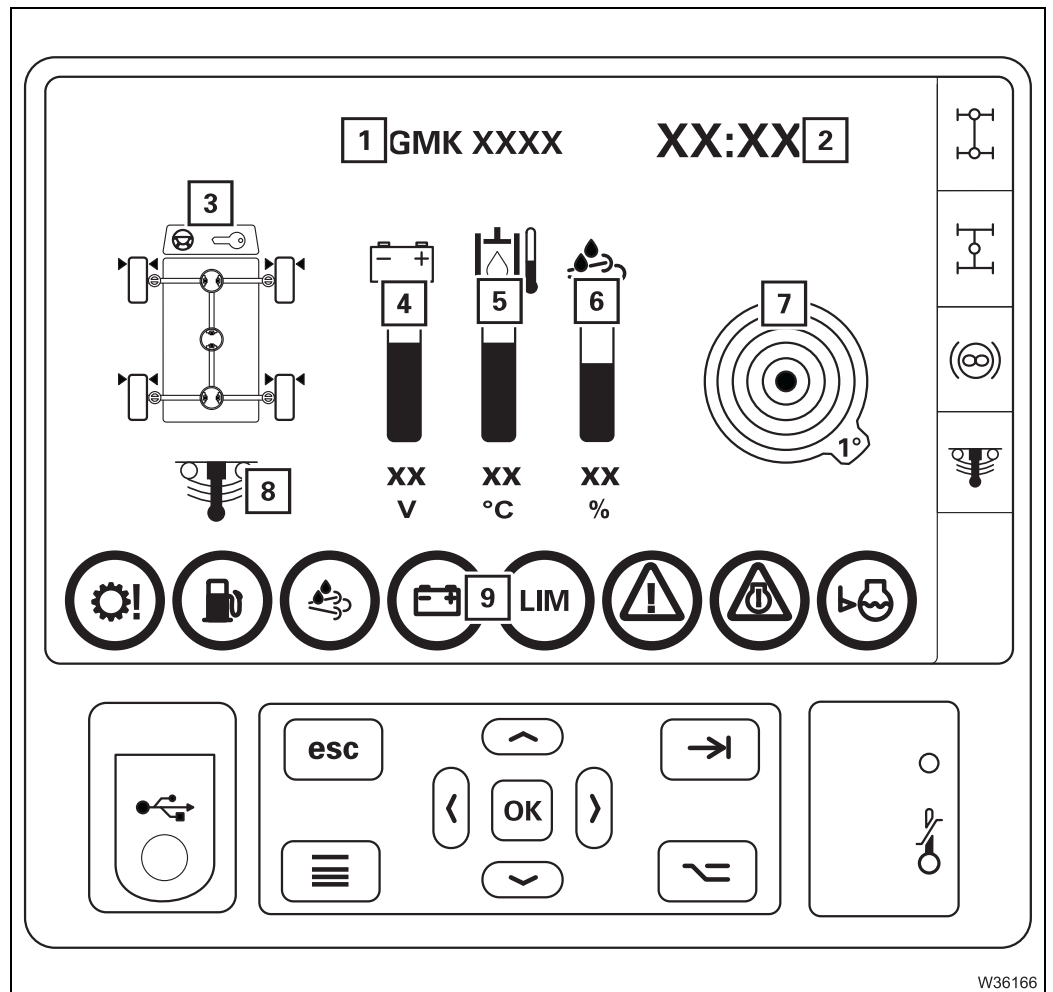
### 3.1.10 CCS – menu-dependent displays



- |   |   |                |
|---|---|----------------|
| 1 | Transverse differential locks display       | ▣▣▣▣ p. 3 - 59 |
|   | Longitudinal differential lock display      | ▣▣▣▣ p. 3 - 60 |
| 2 | Display of retarder function on/off         | ▣▣▣▣ p. 5 - 43 |
| 3 | Suspension on/off display                   | ▣▣▣▣ p. 3 - 31 |
| 4 | Display area for error and warning messages | ▣▣▣▣ p. 7 - 11 |
| 5 | Display time                                | ▣▣▣▣ p. 3 - 34 |

### 3.1.11

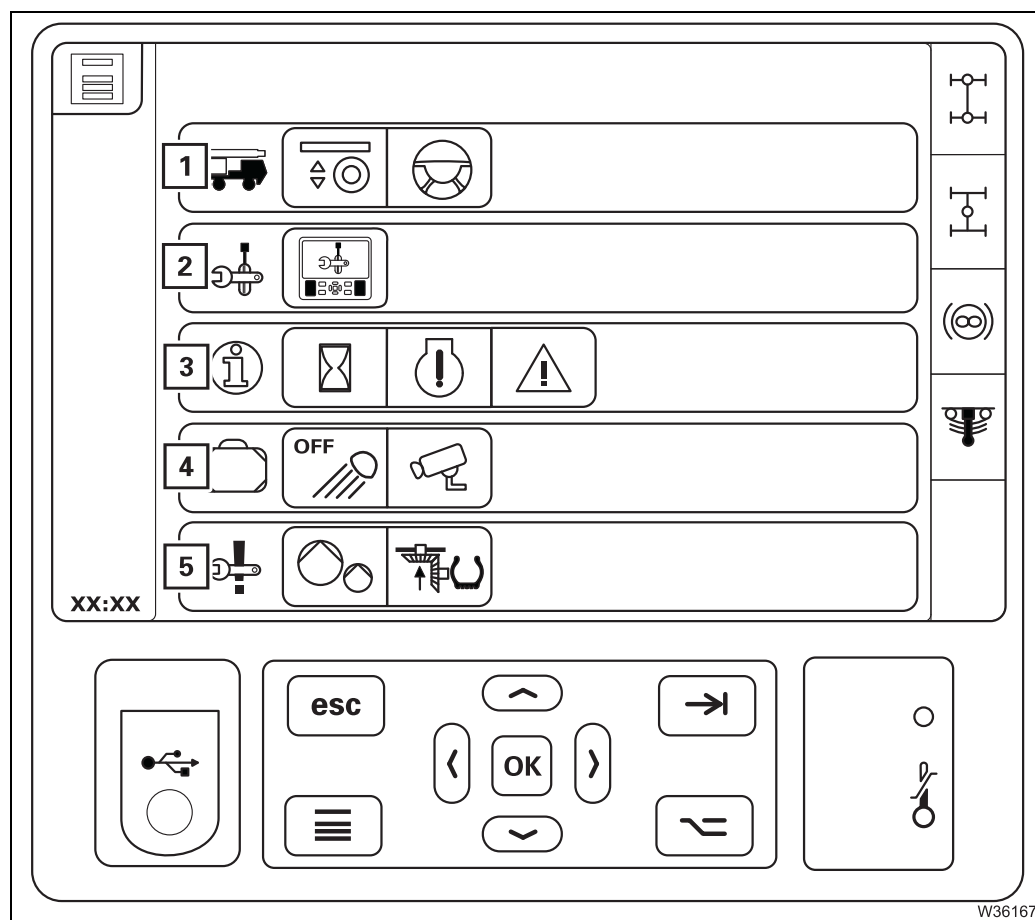
### CCS – Start menu



W36166

- 1 Display of crane type
- 2 Display time ▮▮▮▮ p. 3 - 34
- 3 Display of transverse and longitudinal differential locks on/off ▮▮▮▮ p. 3 - 32
- 4 Voltage monitoring display ▮▮▮▮ p. 4 - 16
- 5 Hydraulic oil temperature display ▮▮▮▮ p. 4 - 16
- 6 AdBlue (DEF) filling level indicator ▮▮▮▮ p. 4 - 16
- 7 Current inclination display ▮▮▮▮ p. 3 - 73
- 8 Suspension display ▮▮▮▮ p. 3 - 31
- 9 Display area for error and warning messages ▮▮▮▮ p. 7 - 11

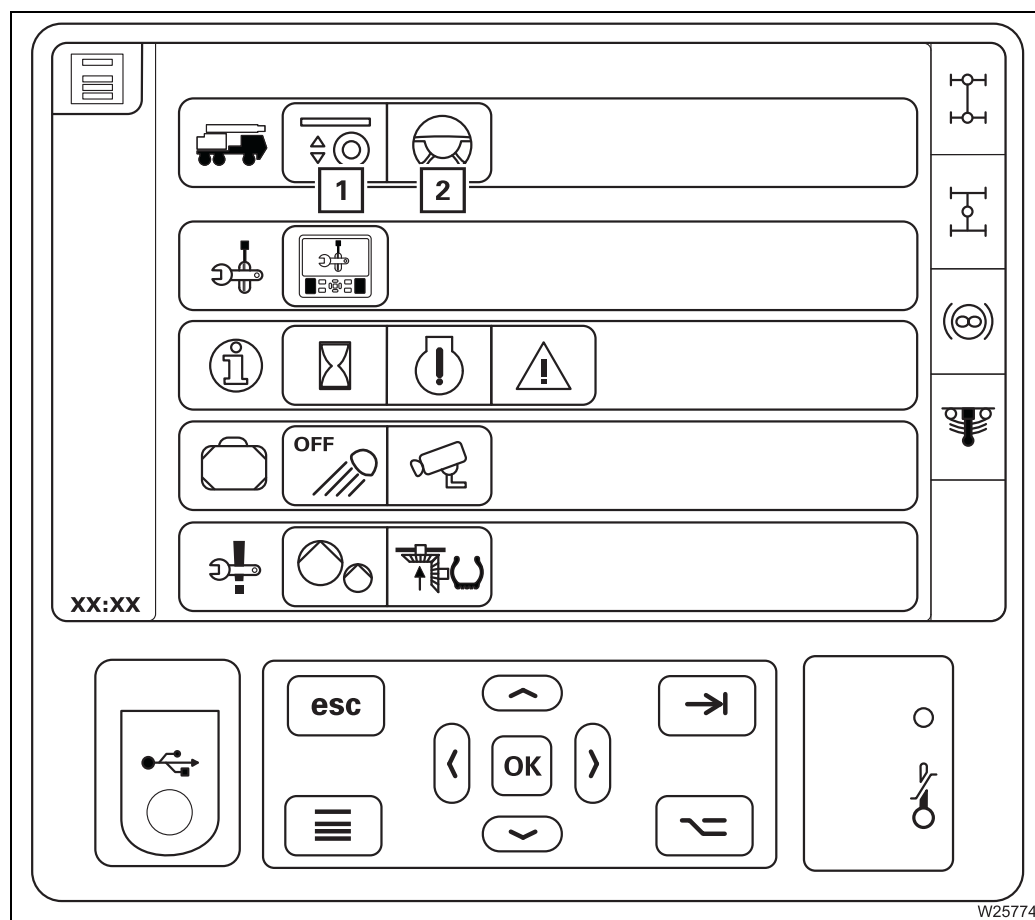
### 3.1.12 CCS – Overview menu groups



- 1 Carrier menu group** ▣▶ p. 3 - 30
  - Suspension/ level adjustment menu
  - Driving menu
- 2 Settings menu group** ▣▶ p. 3 - 33
  - Set display brightness and date/time menu
- 3 Information menu group** ▣▶ p. 3 - 35
  - Operating hours menu
  - Engine/transmission error menu
  - Crane operation error menu
- 4 Various controls menu group** ▣▶ p. 3 - 39
  - Spotlights on rear of carrier on/off
  - Reverse camera on/off<sup>1)</sup>
- 5 Emergency operations menu group** ▣▶ p. 3 - 39
  - Hydraulic emergency operation on/off
  - Towing mode on/off

<sup>1)</sup> Additional equipment

### 3.1.13 Carrier menu group



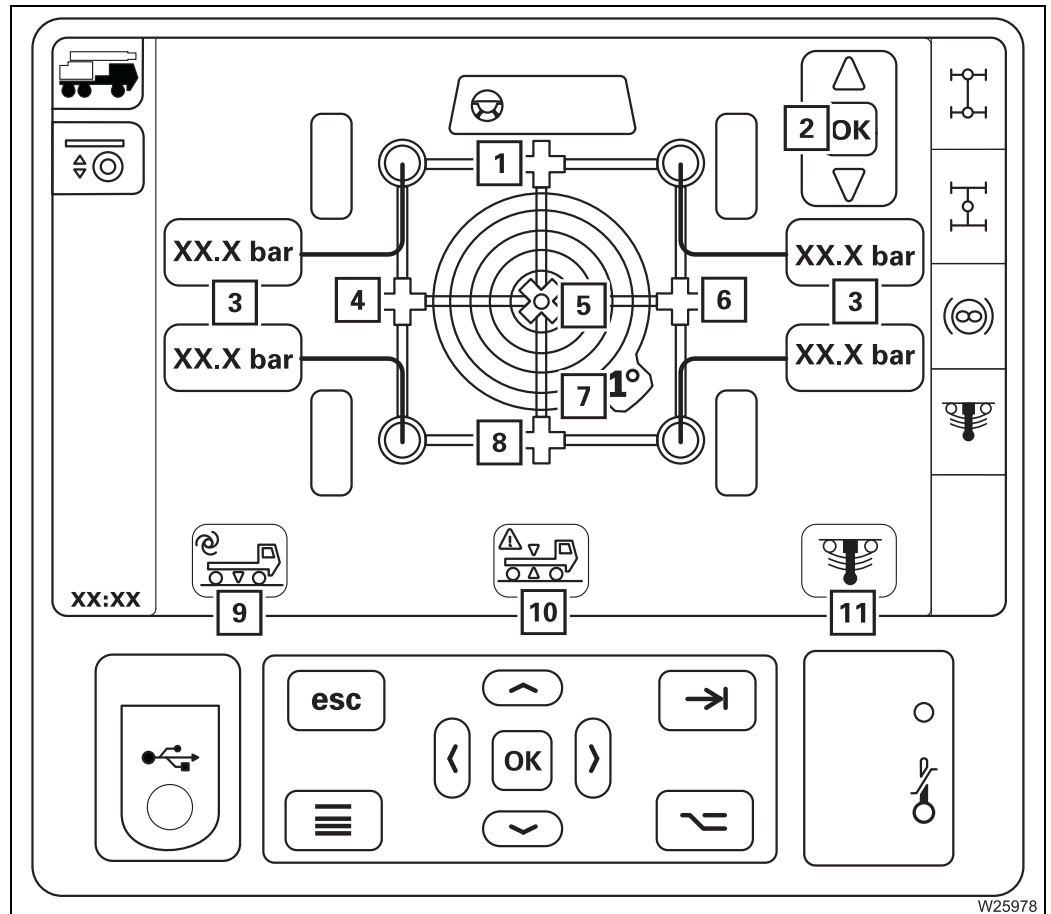
1 Suspension/ level adjustment menu

➡ p. 3 - 31

2 Driving menu

➡ p. 3 - 32

### Suspension/ level adjustment menu

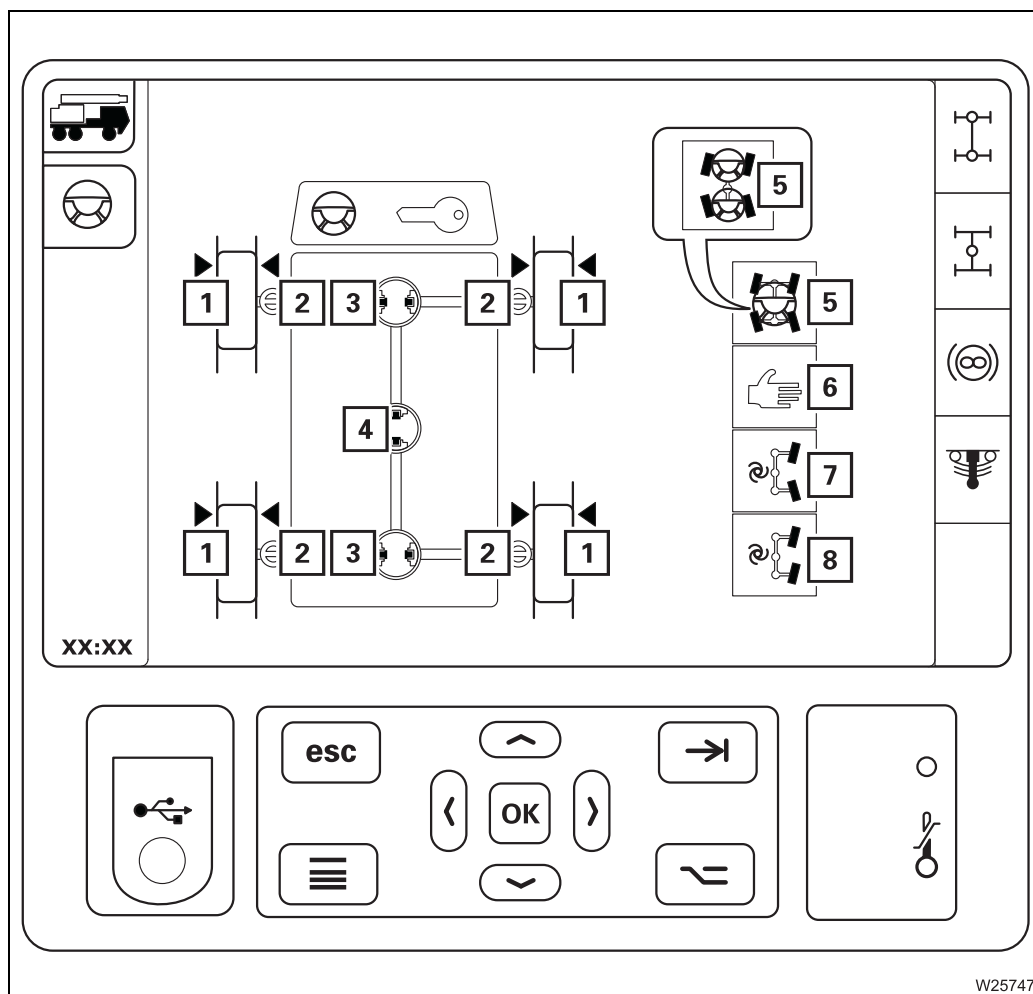


W25978

- |                                      |                 |
|--------------------------------------|-----------------|
| <b>1</b> Front level pre-selection   | ▮▮▮▮▶ p. 3 - 72 |
| <b>2</b> Lowering/raising the level  | ▮▮▮▮▶ p. 3 - 72 |
| <b>3</b> Current inclination display | ▮▮▮▮▶ p. 3 - 67 |
| <b>4</b> Left level pre-selection    | ▮▮▮▮▶ p. 3 - 72 |
| <b>5</b> Overall level pre-selection | ▮▮▮▮▶ p. 3 - 72 |
| <b>6</b> Right level pre-selection   | ▮▮▮▮▶ p. 3 - 72 |
| <b>7</b> Current inclination display | ▮▮▮▮▶ p. 3 - 73 |
| <b>8</b> Rear level pre-selection    | ▮▮▮▮▶ p. 3 - 72 |
| <b>9</b> Setting the on-road level   | ▮▮▮▮▶ p. 3 - 73 |
| <b>10</b> Vehicle level display      | ▮▮▮▮▶ p. 3 - 72 |
| <b>11</b> Suspension display         | ▮▮▮▮▶ p. 3 - 67 |
| Suspension on/off                    | ▮▮▮▮▶ p. 3 - 67 |



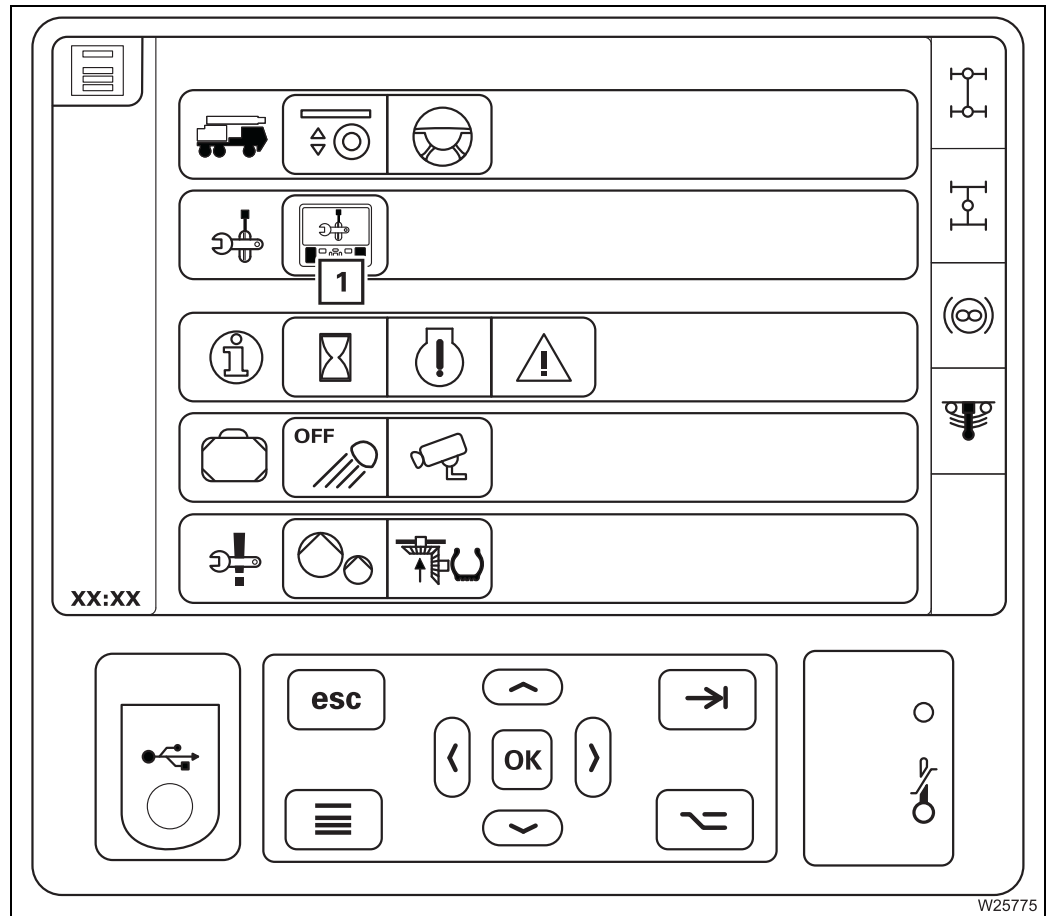
## Driving menu



- |   |                |
|---|----------------|
| <b>1</b> Current wheel position display                           | ▣▣▣▣ p. 3 - 66 |
| <b>2</b> Steering locking status display                          | ▣▣▣▣ p. 3 - 66 |
| <b>3</b> Transverse differential locks display                    | ▣▣▣▣ p. 3 - 59 |
| Transverse differential locks on/off                              | ▣▣▣▣ p. 3 - 59 |
| <b>4</b> Longitudinal differential lock display                   | ▣▣▣▣ p. 3 - 60 |
| Longitudinal differential lock on/off                             | ▣▣▣▣ p. 3 - 60 |
| <b>5</b> Normal steering mode/separate steering display           | ▣▣▣▣ p. 3 - 64 |
| <b>6</b> Display for manual separate steering                     | ▣▣▣▣ p. 3 - 64 |
| Manual separate steering on/off                                   | ▣▣▣▣ p. 3 - 65 |
| <b>7</b> Display for separate steering for driving around corners |                |
| Automatic separate steering for driving around corners on/off     | ▣▣▣▣ p. 3 - 65 |
| <b>8</b> Display for separate steering for crab travel mode       |                |
| Separate steering for crab travel mode Automatic on/off           | ▣▣▣▣ p. 3 - 65 |



### 3.1.14 Settings menu group

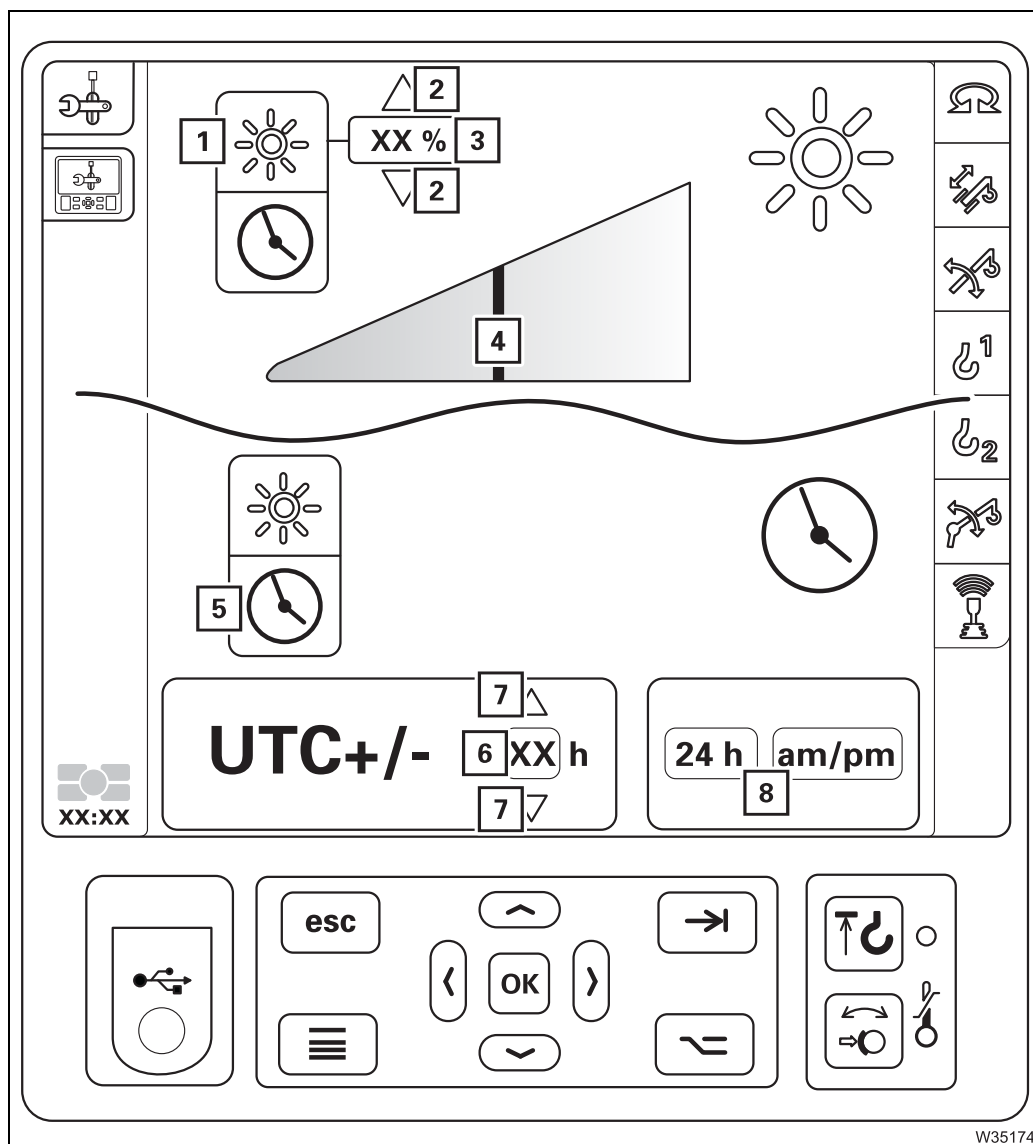


1 Set display brightness and date/time menu

➡ p. 3 - 34



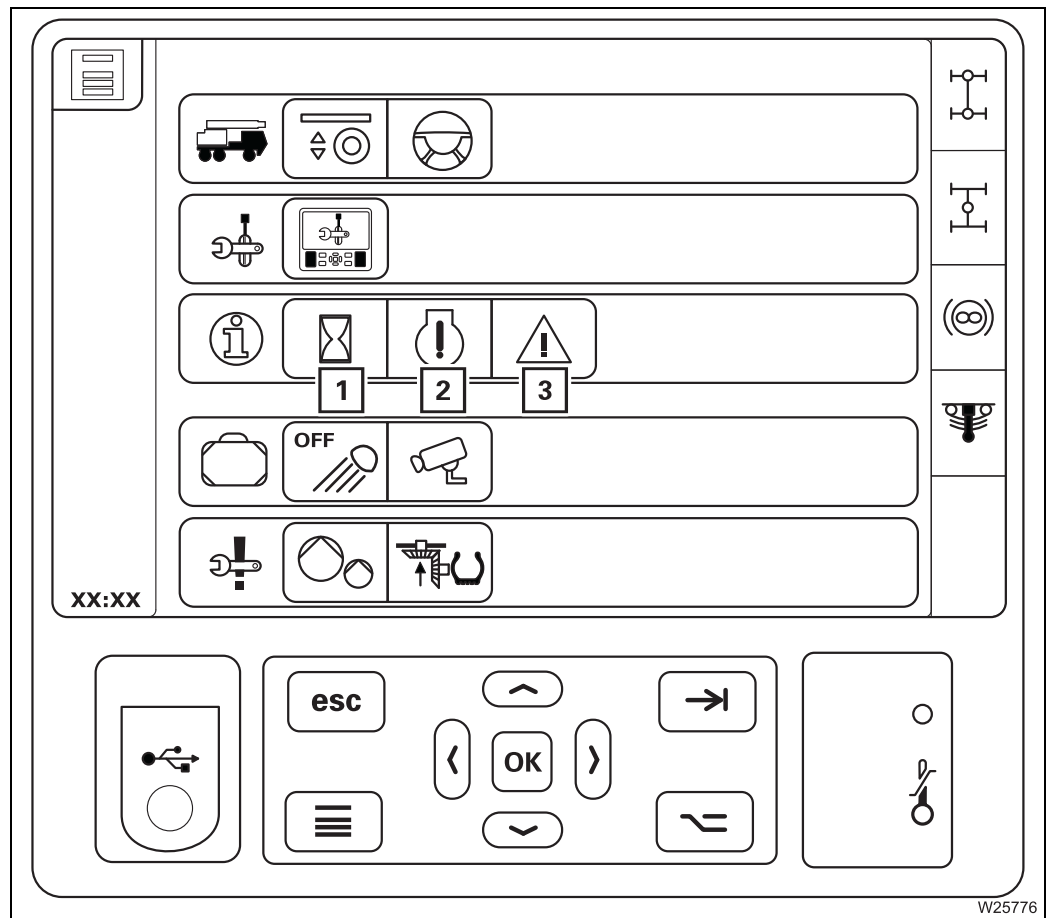
**Set display brightness and date/time menu**



W35174

- |   |                 |
|---|-----------------|
| <b>1</b> Selection setting the display brightness | ▣▣▣▣▶ p. 4 - 13 |
| <b>2</b> Increasing/reducing the value            | ▣▣▣▣▶ p. 4 - 13 |
| <b>3</b> Display in percentage                    | ▣▣▣▣▶ p. 4 - 13 |
| <b>4</b> Brightness display                       | ▣▣▣▣▶ p. 4 - 13 |
| <b>5</b> Adjust time selection                    | ▣▣▣▣▶ p. 5 - 22 |
| <b>6</b> Setting the time                         | ▣▣▣▣▶ p. 5 - 22 |
| <b>7</b> Increasing/reducing the value            | ▣▣▣▣▶ p. 5 - 22 |
| <b>8</b> Switching the display type               | ▣▣▣▣▶ p. 5 - 22 |

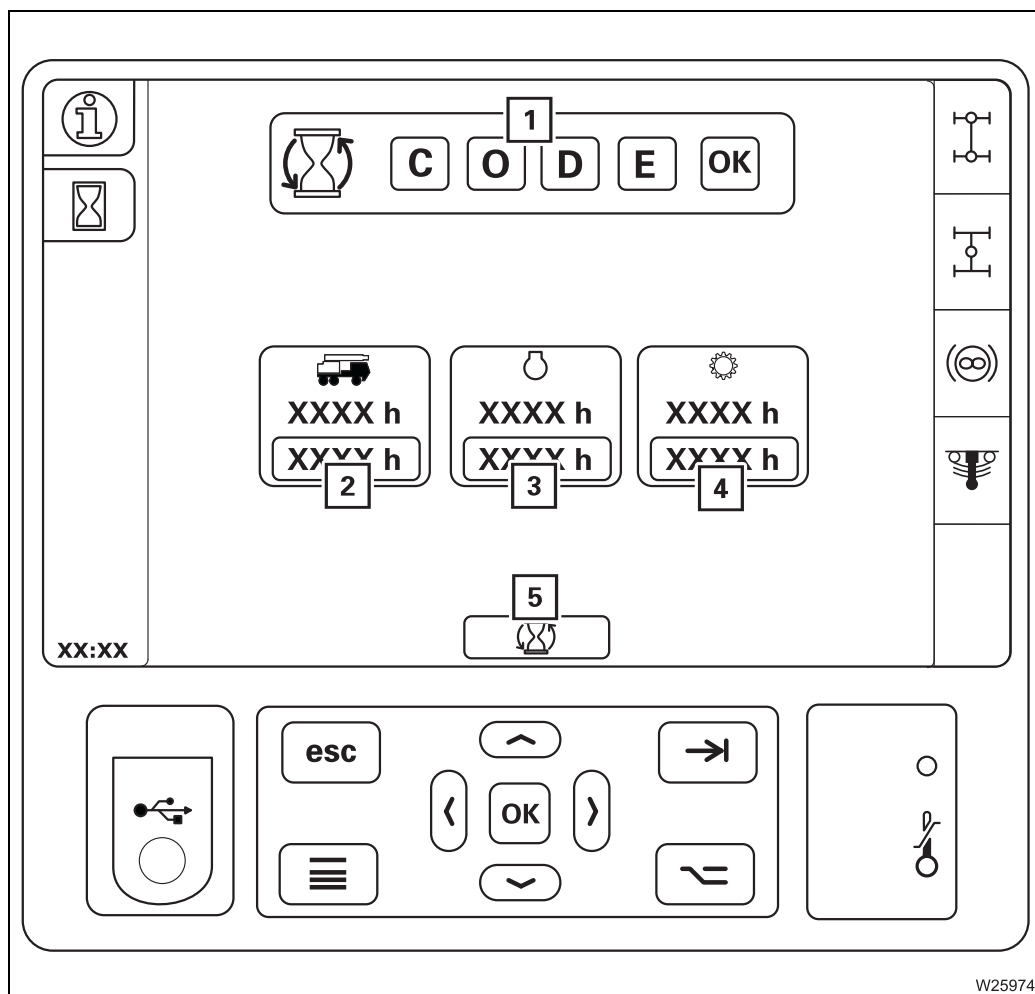
### 3.1.15 Information menu group



- 1 Operating hours menu ▶▶▶▶▶ p. 3 - 36
- 2 Engine/transmission error menu ▶▶▶▶▶ p. 3 - 37
- 3 Crane operation error menu ▶▶▶▶▶ p. 3 - 38



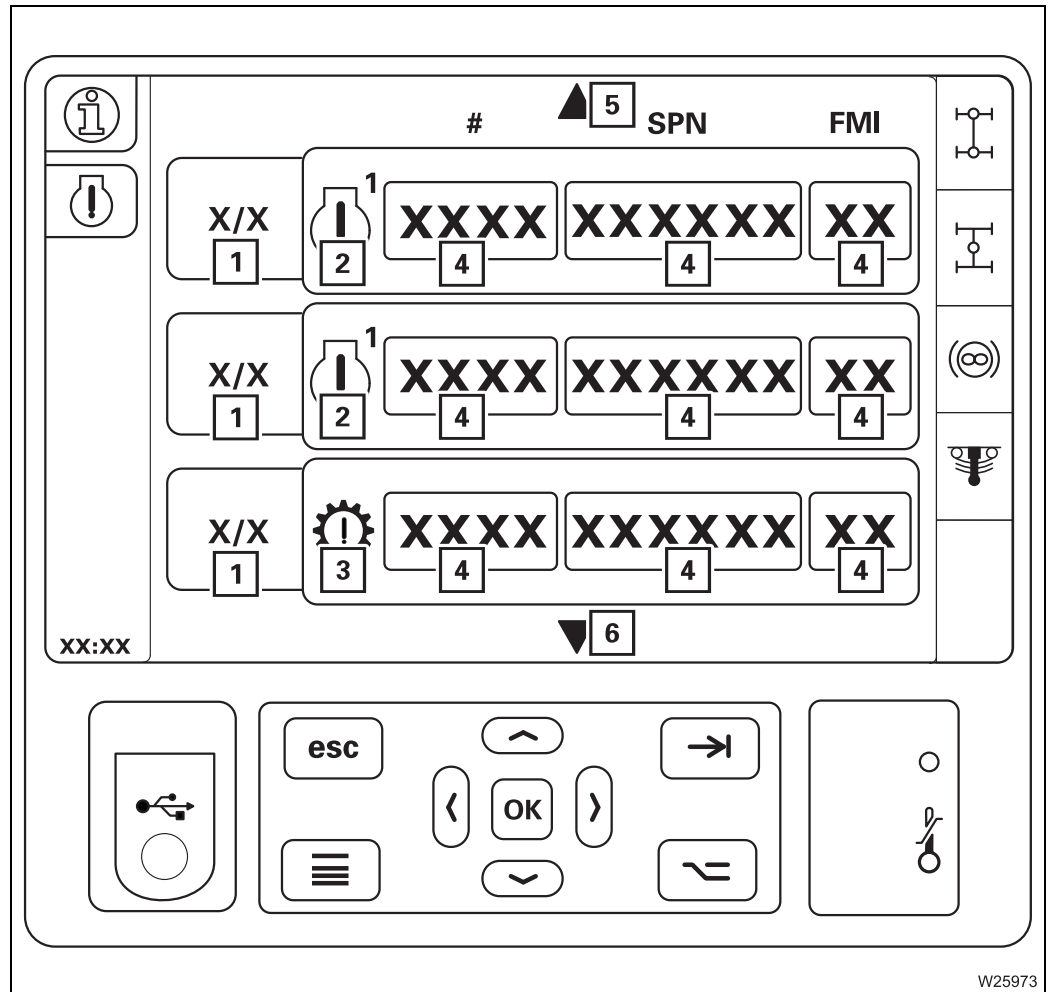
## Operating hours menu



- 1 Keycode input
- 2 Carrier
- 3 Engine
- 4 Transmission
- 5 Selection all

▶▶▶ p. 5 - 23

### Engine/transmission error menu



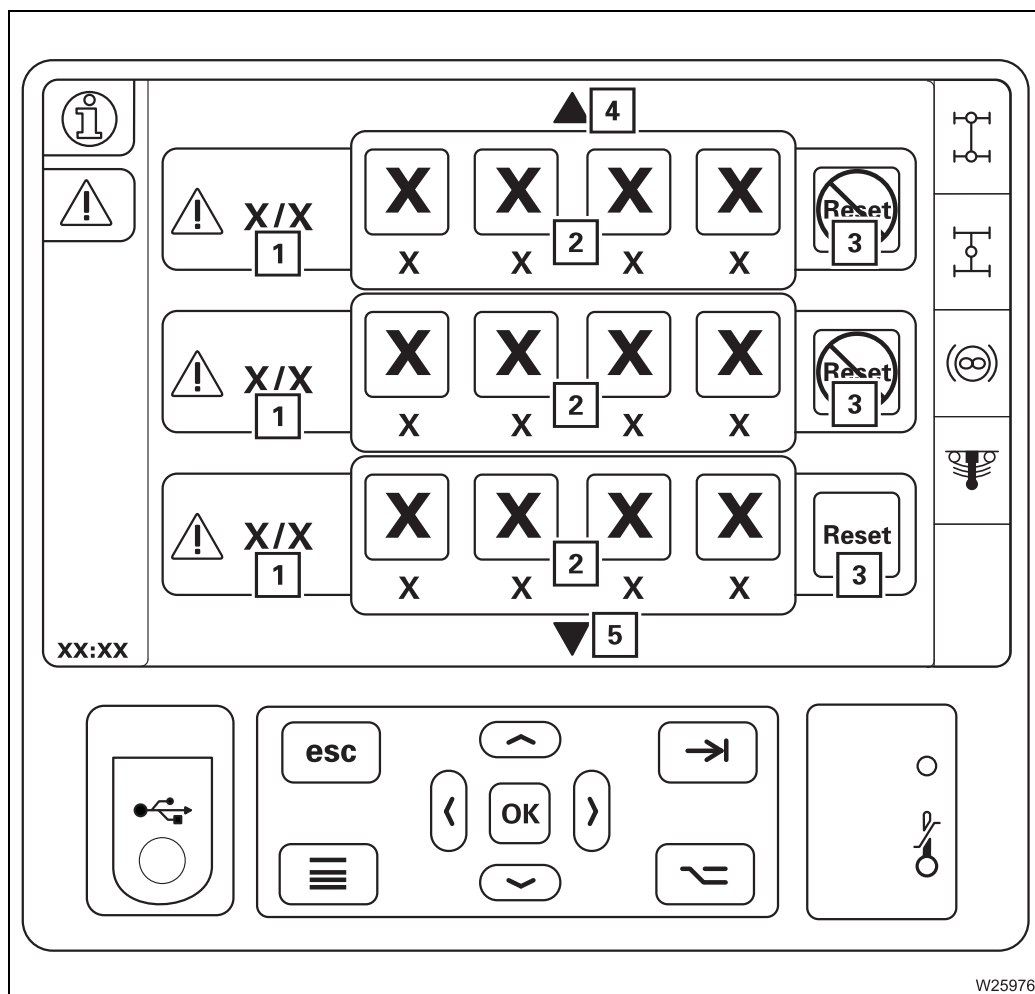
W25973

- 1 Display of error / total errors
- 2 Engine symbol display
- 3 Transmission symbol display
- 4 Error code display
- 5 Previous error
- 6 Next error

▶▶▶▶▶ p. 7 - 15



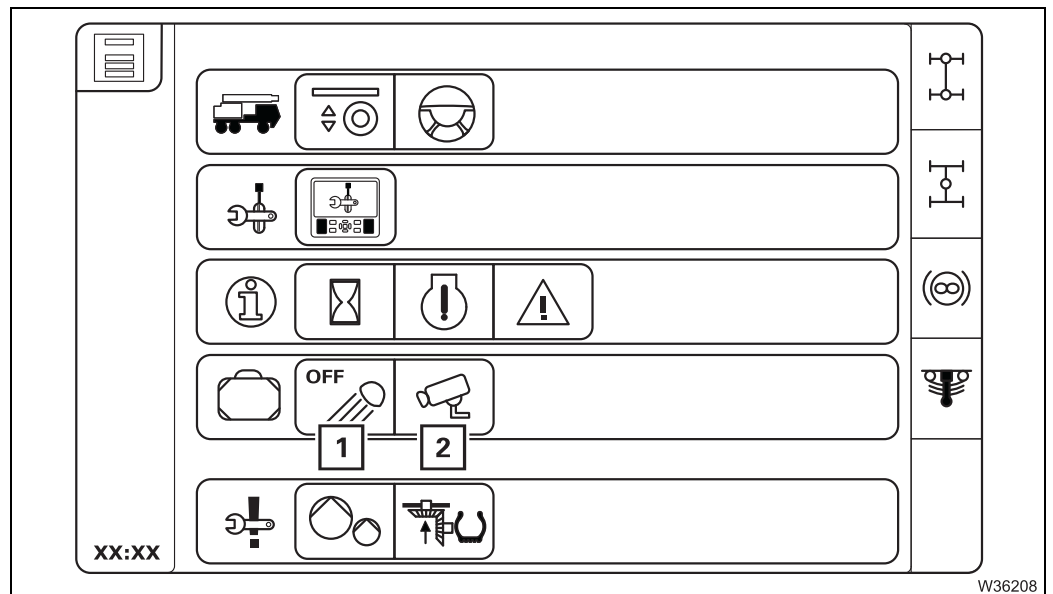
## Crane operation error menu



- 1 Current errors/total errors display
- 2 Error code
- 3 Deleting errors
- 4 Previous error
- 5 Next error

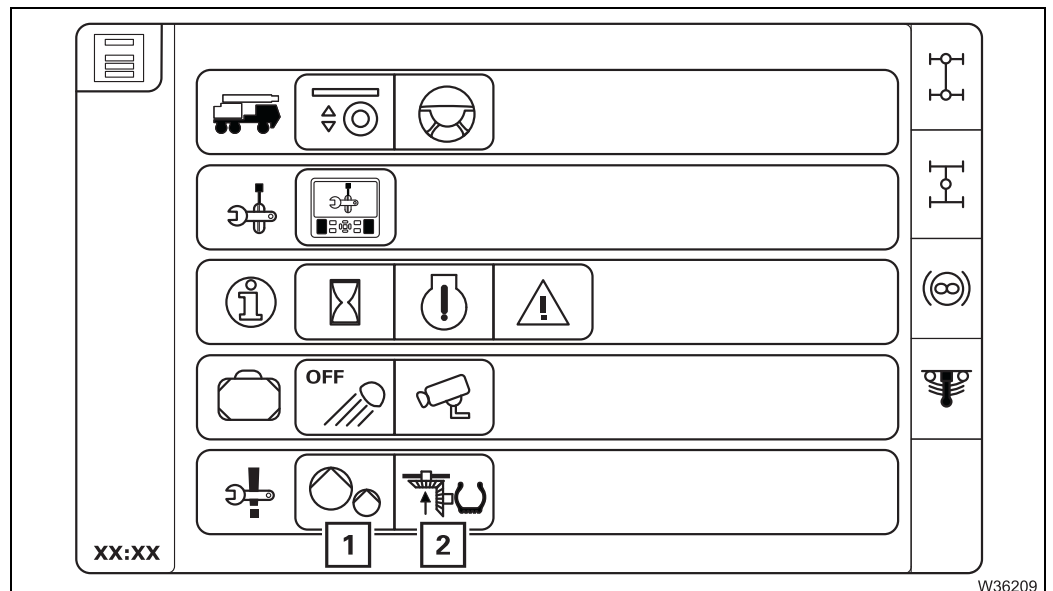
Since this menu is required for crane operation, it is described in the chapter *Operating elements for crane operation; ■■■► Crane operation error menu, p. 8 - 69.*

### 3.1.16 Various controls menu group



- 1 Spotlights on rear of carrier on/off ▣▣▣▣ p. 3 - 70
- 2 Reverse camera on/off ▣▣▣▣ p. 3 - 56

### 3.1.17 Emergency operations menu group

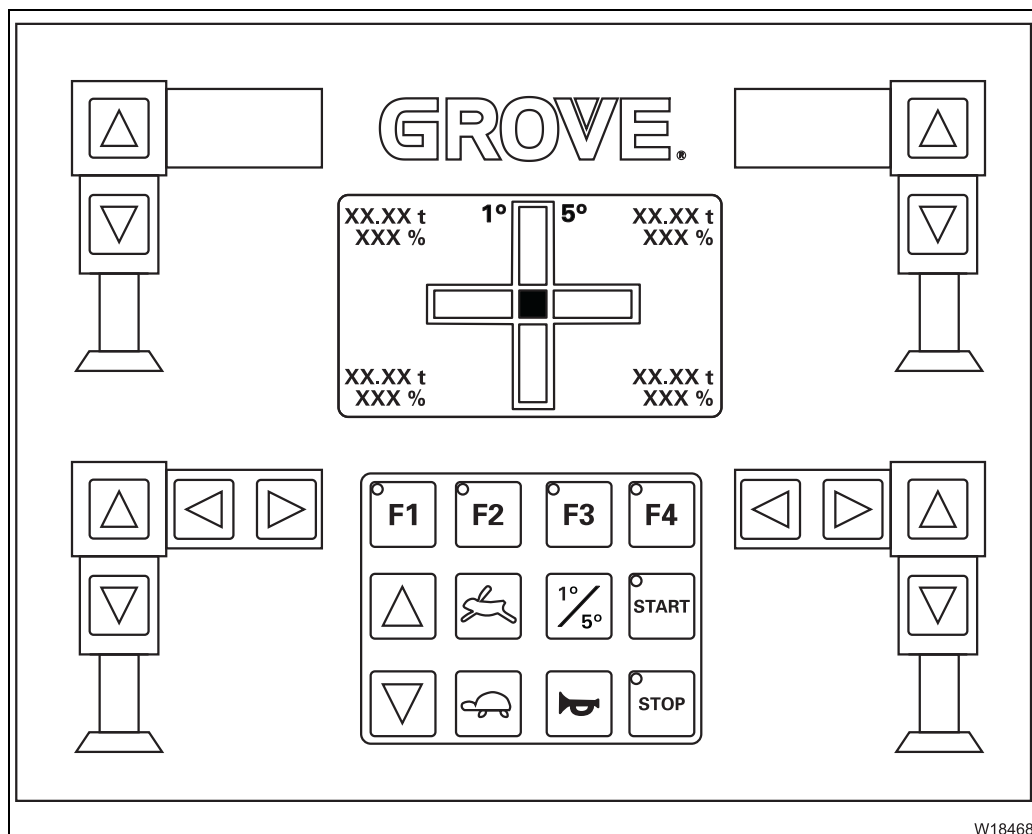


- 1 Hydraulic emergency operation on/off ▣▣▣▣ p. 14 - 54
- 2 Towing mode on/off ▣▣▣▣ p. 7 - 27

27.09.2017

### 3.1.18

## Outrigger control units

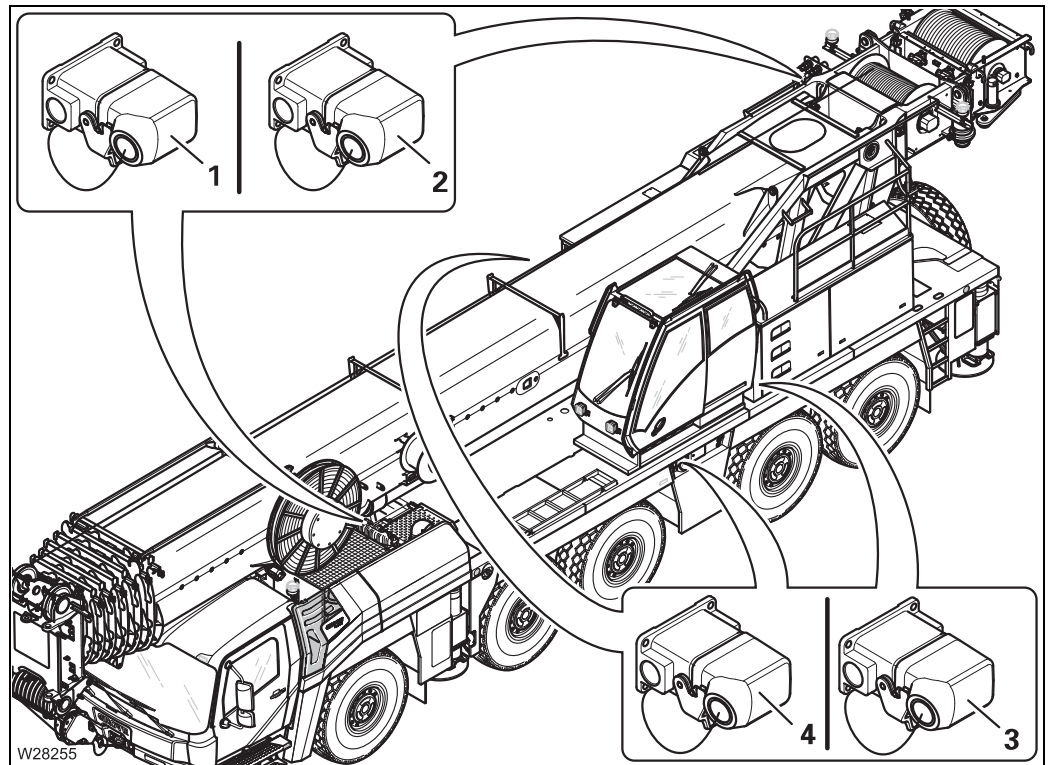


Contains operating elements for crane operation; ■■■► *Outrigger control units*, p. 8 - 79.



### 3.1.19

## Sockets for hand-held control



There are sockets (4) on the carrier and sockets (1) to (3) on the superstructure for the hand-held controls supplied.

The hand-held controls contain the operating elements for the outrigger, the inclination indicator, for rigging work and for driving the power units in case of emergency.

Since these operating elements are required for crane operation, they are described in section *Operating elements for crane operation*; ■■■► *Hand-held controls*, p. 8 - 77.

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## 3.2

## Brief description of the operating elements



### **Risk of accidents through operating error!**

This section is not a complete operating manual. It only provides a general overview of the functionality of the operating elements.

Before using the operating elements for the first time, read through the following chapters and the safety instructions listed there.



This section does not contain all the requirements that must be fulfilled for several operating elements to be active.

If some operating elements do not work, first read the following chapters referred to at the respective places before contacting **Manitowoc Crane Care**.

### 3.2.1

## Definition of direction information

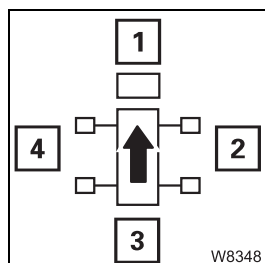
### Basic rule

Direction information always depends on whether the carrier or the superstructure is being operated.

#### On the carrier

The driver's cab is always at the front, which means that:

- |          |          |
|----------|----------|
| 1: Front | 2: Right |
| 3: Rear  | 4: Left  |



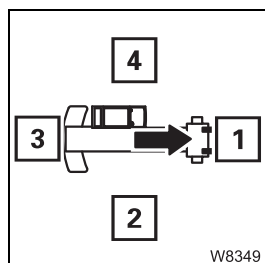
**Forwards** always means with driver's cab leading.

**Backwards** always means the rear lights on the carrier are to the front.

#### On the superstructure

The main boom head is always at the front, which means that:

- |          |          |
|----------|----------|
| 1: Front | 2: Right |
| 3: Rear  | 4: Left  |

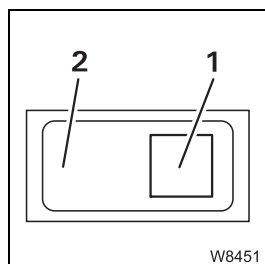


### Switches and buttons

For switches and buttons, the terms **bottom** and **top** are used.

Regardless of the fitting position (vertical, horizontal, diagonal, perpendicular or turned), the following always applies:

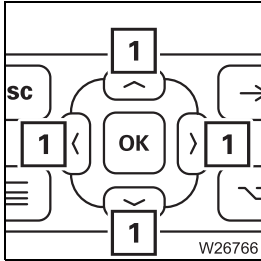
- **Down:** press in at (1) – next to the symbol
- **Up:** press in at (2) – opposite the symbol



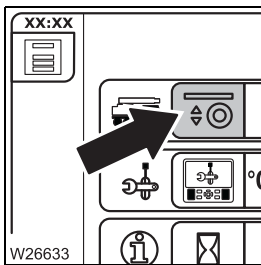
### 3.2.2

## General rules for buttons and symbols on the display

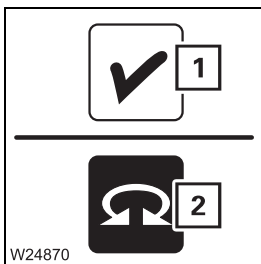
The symbols shown as an example are not present on all crane types.  
The following rules apply in all menus:



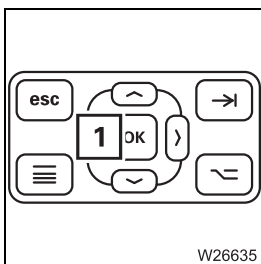
- A menu can only be opened when the corresponding symbol has been selected with the direction buttons (1).



- A selected menu is marked in colour and can be opened.



- In these operating instructions, we always refer to colours in terms of e.g. “The symbol is **red**”.  
regardless of whether the background (1) of a symbol is **red** or only parts (2) of a symbol are **red**. This applies to all symbols and all colours.

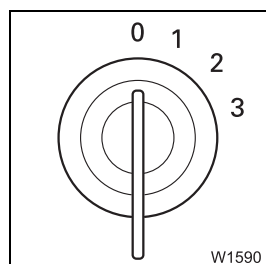


- If the instruction given in this section is to “Press the button once...”, for instance, this always refers to the button (1). This is the case if a menu is opened or a function is to be carried out.

### 3.2.3

## Engine

### Steering column



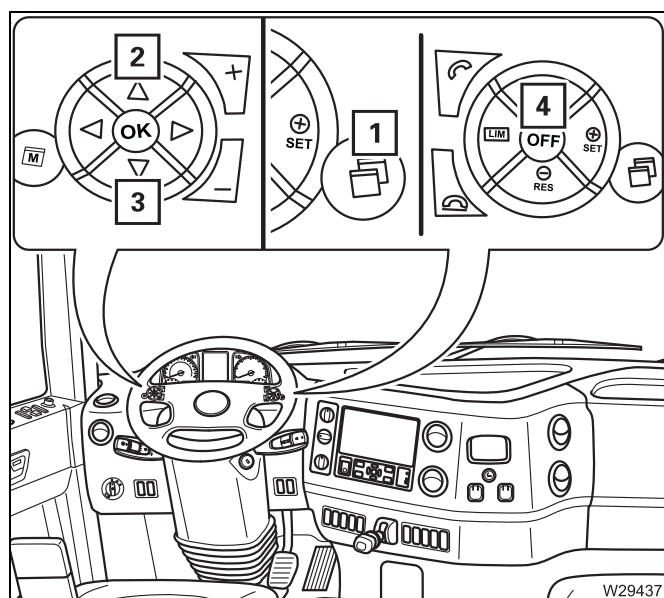
### Ignition lock

- 0 Ignition off, engine off, key can be removed
- 1 Power supply on for:  
Heating system, engine/transmission diagnostics, radio/telephone,  
enabling of steering lock
- 2 Ignition on, driving position, daytime driving light on
- 3 Starting position

▣▣▣▣▶ p. 4 - 11

Lock/unlock steering column   ▣▣▣▣▶ p. 5 - 14

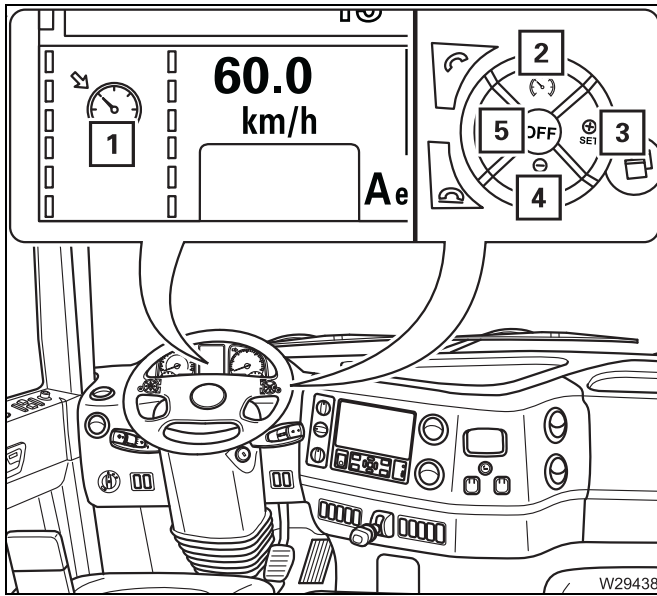
### On the steering wheel



### Set idling speed

The truck crane is stationary.

- 1 Select the *Engine speed* menu
- 2 Increasing the idling speed
- 3 Reduces the idling speed
- 4 Idling speed setting off

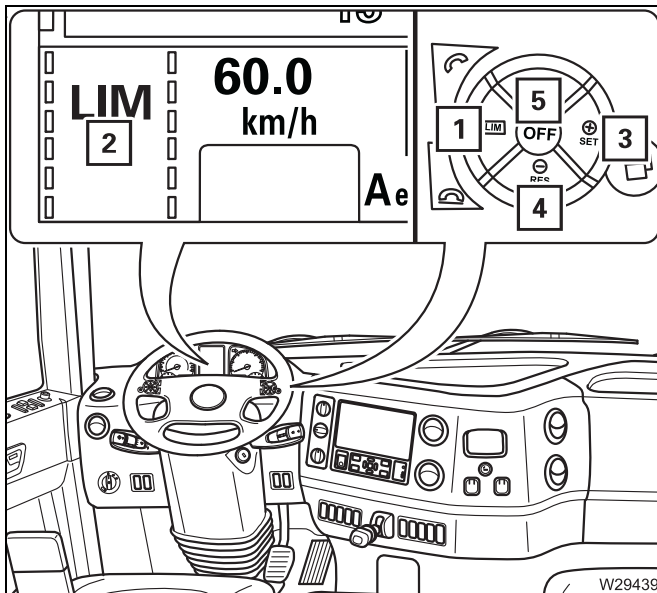


### Setting the Tempomat

The truck crane must be driving at a speed at least 15 km/h (9 mph).

- 2 Select the *Cruise control* menu – symbol (1) is **grey**
- 3 Switches on or increases the speed – symbol (1) is **white**
- 4 Switches on or reduces the speed
- 5 Switching off

▣▣▣▣▶ p. 5 - 39



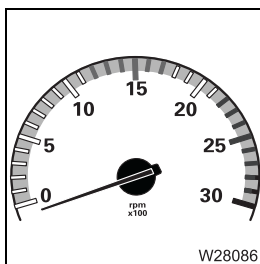
### Setting the Temposet

The truck crane must be driving at a speed at least 15 km/h (9 mph).

- 1 Select *Temposet* – symbol (2) is **grey**
- 3 Switches on or increases the speed limit – symbol (2) is **white**
- 4 Switch off or reduce the speed limit
- 5 Switch *Temposet* off

▣▣▣▣▶ p. 5 - 40

### Instrument panel



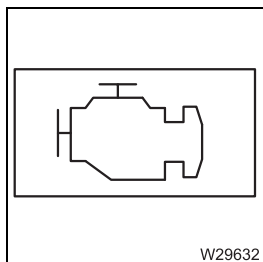
### Tachometer

Display, engine speed in rpm; ▣▣▣▣▶ p. 4 - 19

### 3.2.4

## AdBlue system (DEF)

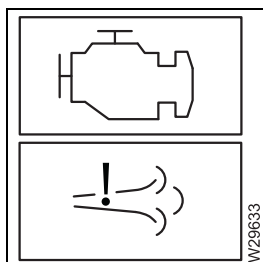
### Instrument panel



#### AdBlue warning

- **Off:** Filling level sufficient, no fault
- **On:** AdBlue system malfunction
- **Flashing:** Adblue tank empty or fault

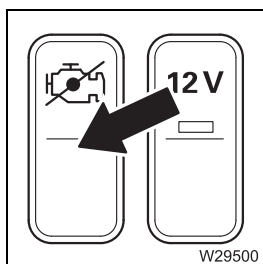
➡ p. 5 - 45



#### Torque reduction indicator

- **Off:** Torque reduction off
- **On:** Torque reduction on
- **Flashing:** Reduction in torque on the next time the engine is started

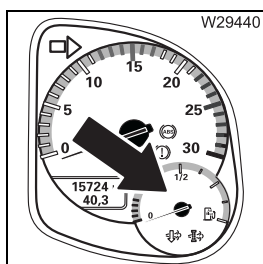
➡ p. 5 - 45



#### Torque reduction override button

- **Press upwards once:** Torque reduction overridden for 30 minutes after 30 minutes
- **Press up again:** Torque reduction overridden for 30 minutes after 30 minutes
- **Press up again:** Torque reduction overridden for 30 minutes

➡ p. 5 - 45

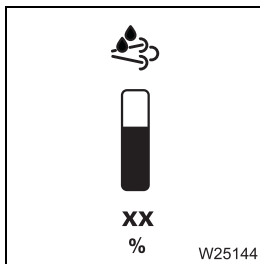


#### Adblue filling level indicator

Shows the current Adblue filling level when the ignition is switched on



## CCS display

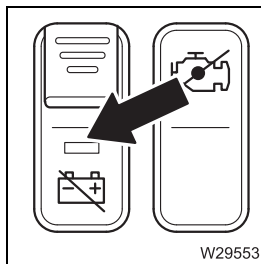


### Adblue filling level monitoring submenu

- **Display**      **Green:** Over 10% – over 4 l (0.9 gal)  
                      **Yellow:** 5 to 10% – 2 to 4 l (0.4 to 0.9 gal)  
                      **Red:**     Below 5% – less than 2 l (0.4 gal)

## 3.2.5

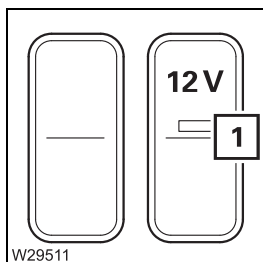
### Battery master switch



- **Switch on:**        Push up
  - **To switch off:**    unlock and then press in downwards
- ➡ p. 4 - 11

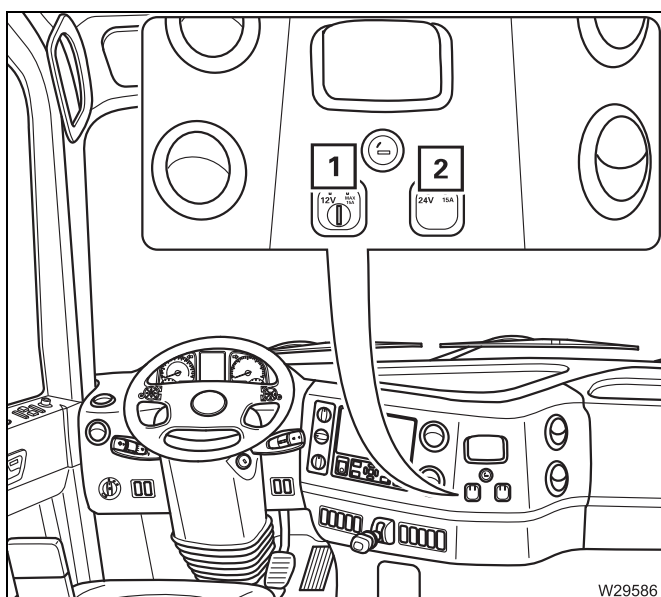
### 3.2.6

## Electrical system



### 12 V power socket on/off

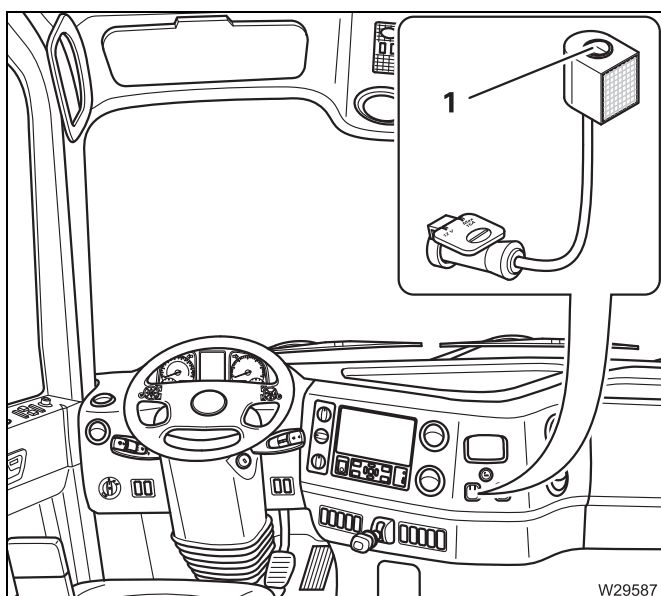
- To switch on: Press switch (1) in at the top
- To switch off: Press switch (1) in at the bottom



### Sockets 12 V/24 V

- 1 Socket 12 V/max. 15 A
- 2 Socket 24 V/max. 15 A

Only connect electrical devices with the matching specification to the sockets.



### Reading lamp 12 V

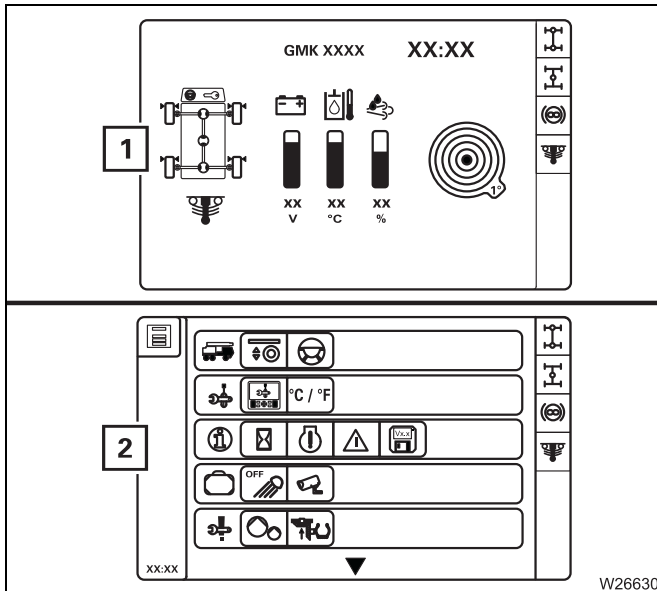
As additional equipment, the truck crane is equipped with a reading lamp.

- If necessary, plug the 12 V reading lamp into the 12 V socket.
- Press the button (1) – lamp on/off.

### 3.2.7

## CCS Crane control

The GMK5250L truck crane is equipped with the **CCS** electronic crane control system (**Crane Control System**). CCS includes a control unit in the driver's cab and several control units (MWSCM and MWCCM) distributed over the superstructure and carrier.



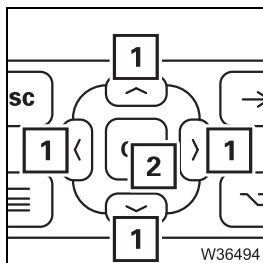
### CCS display

The start menu (1) appears after switching on the ignition.

After pressing a button on the CCS control panel, the overview of the menu groups (2) appears.

A symbol is selected with the arrow buttons in order to call up a menu. The selected symbol is shown in **red**.

The OK button on the control panel is pressed in order to open a menu.



### Menu control

Buttons for selecting, activating and confirming areas on the CCS display.

#### – Select

##### 1 Press

- The selected range is marked.

#### – Activate / confirm

##### 2 Press

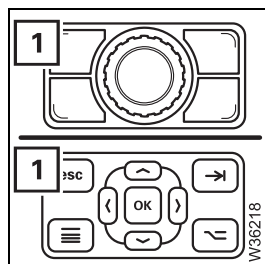
- The marked area is activated.
- The entry is confirmed.

The function of the buttons is different depending on the area.

There are three areas, described in more detail in chapter *Operating elements for crane operation*.

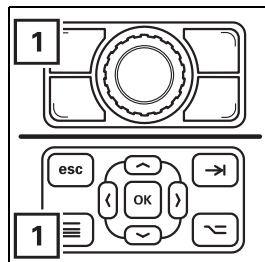
- ▣ In the Menu area, p. 8 - 90
- ▣ In the Input area, p. 8 - 90
- ▣ In the Operating area, p. 8 - 90





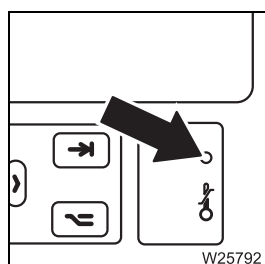
### Exiting the menu/input mode

- 1 Press:**
- The opened menu closes – the menu from the next higher level is opened.
  - Input mode is deactivated.




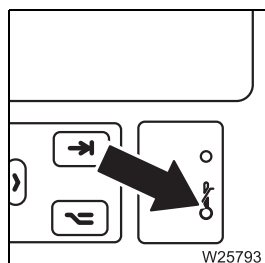
### Overview menu groups

- 1 Press:**
- After the first press  
Menu groups overview display
  - After a subsequent press  
Next/previous group overview



### Sensor for brightness


Registers the brightness of the operating environment. The brightness of all displays is automatically adjusted.  
Manual input;  p. 4 - 13.



### Display temperature warning display

The temperature of the control unit is measured by an internal sensor.

- **blue, flashing:** Temperature too low – display will not be switched on
- **red, lights up:** Temperature too high:
- **red, flashing:** Brightness is reduced
- **yellow, flashing:** Display is switched off
- **red, flashing:** Control unit is switched off

 p. 5 - 37

### 3.2.8

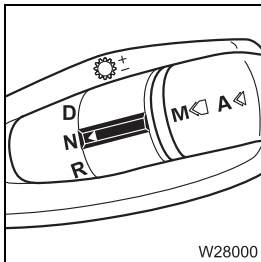
## Transmission

▣▣▣▣▶ *Operating the transmission, p. 5 - 25.*

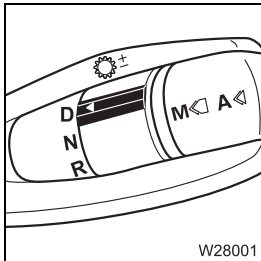
### Transmission control unit

### Selecting the transmission mode

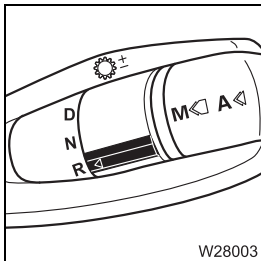
The engine must be running.



– **Position N:** Select neutral – No gear engaged



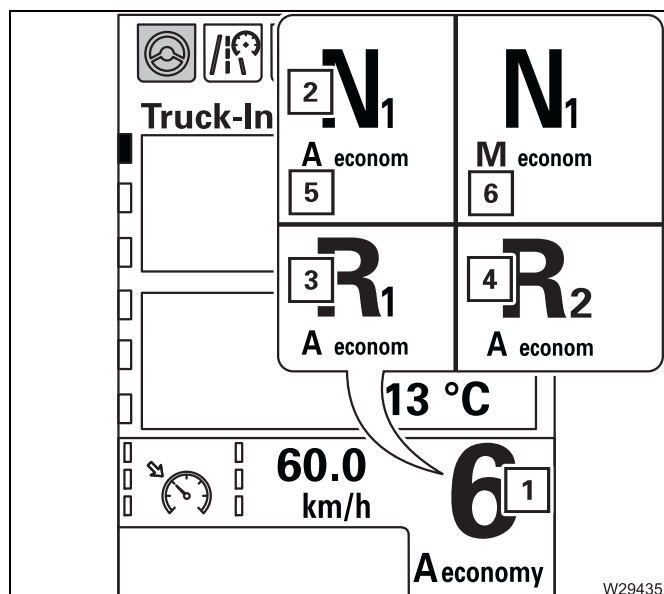
– **Position D:** When at a standstill – Select forwards starting gear  
When driving forwards – Select a suitable gear, clutch engages  
When driving in reverse – Select neutral position



– **Position R:** When at a standstill – Select reverse starting gear  
When driving in reverse – No gear change  
When driving forwards – Select neutral position

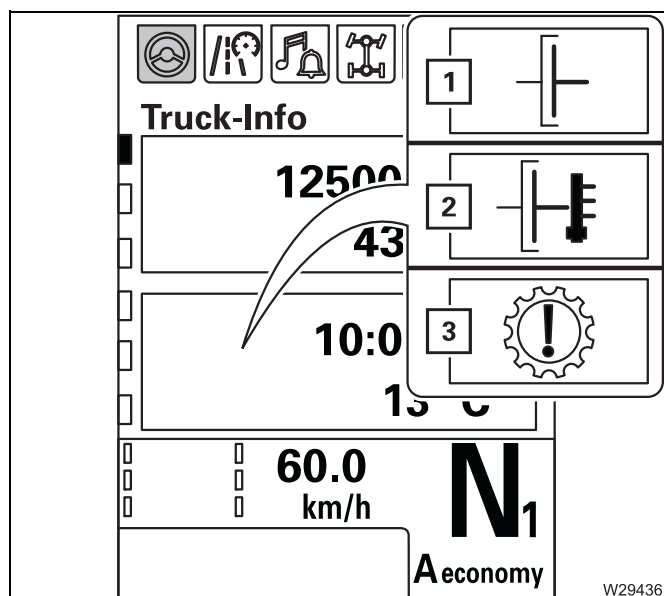


### Driving mode display



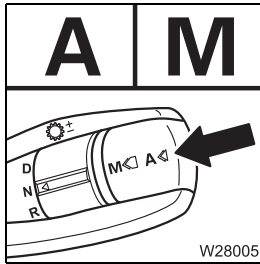
### Transmission display

- 1 Currently engaged gear – forwards (1 to 16), e.g. 6
- 2 Neutral position switched on
- 3 Gear currently engaged – 1st reverse gear
- 4 Gear currently engaged – 2nd reverse gear
- 5 *Automatic* operating mode
- 6 *Manual* operating mode



### Error messages display

- 1 Clutch heavily loaded
- 2 Clutch malfunction
- 3 Gear shift malfunction

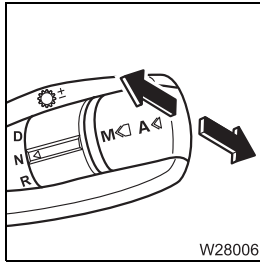


### Shifting lever

The truck crane may be stationary or driving.

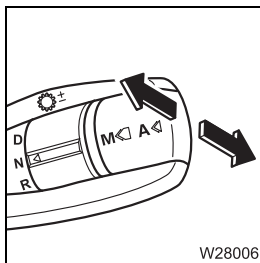
- **Press in once:** Change over between *automatic* and *manual* operating mode – without change of gear

➡ p. 5 - 29



The truck crane is stationary.

- **Push up once:** Shift up starting gear – 1 gear
- **Push down once:** Shift down starting gear – 1 gear

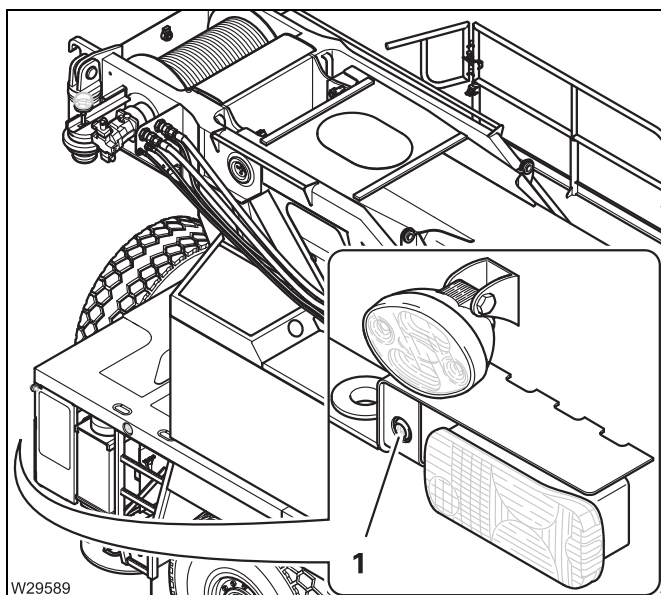


The truck crane is in motion.

- **Push up once:** Shift up – 1 gear  
*Manual* operating mode on
- **Push down once:** Shift down – 1 gear  
*Manual* operating mode on

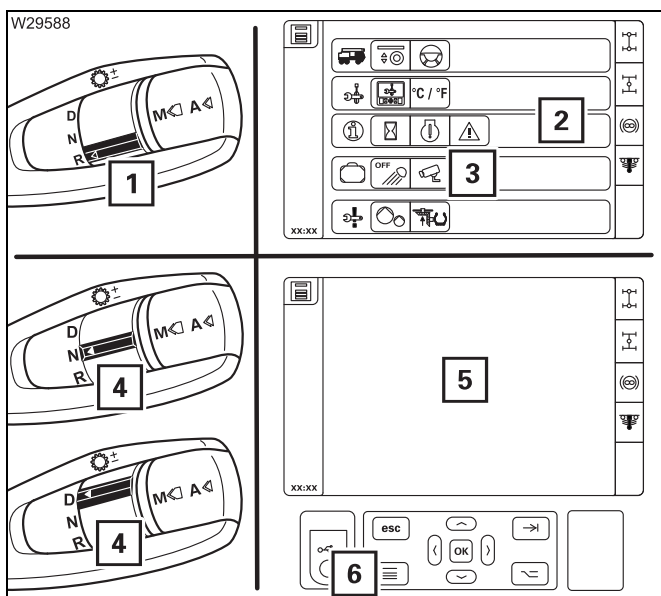
➡ p. 5 - 32

### 3.2.9 Reverse camera



The reverse camera (1) displays the area behind the truck crane on the CCS display in the driver's cab.

- Switch on the spotlight if necessary.



#### Switching on

- Automatically, when reversing (1),
- Manual – select symbol (3) and confirm

The display (5) shows the area behind the truck crane

#### Switching off

- Automatically, when driving forwards or in neutral position (4),
- Manual – press button (6)

The display (2) shows the CCS menu



### 3.2.10

## BirdView system 270°

The BirdView system 270° is a driving assistance system.

The BirdView system 270° does not relieve you of the responsibility for maintaining a sufficient safety clearance or braking in time! Drive with due care and attention! The sole responsibility lies with the crane operator.

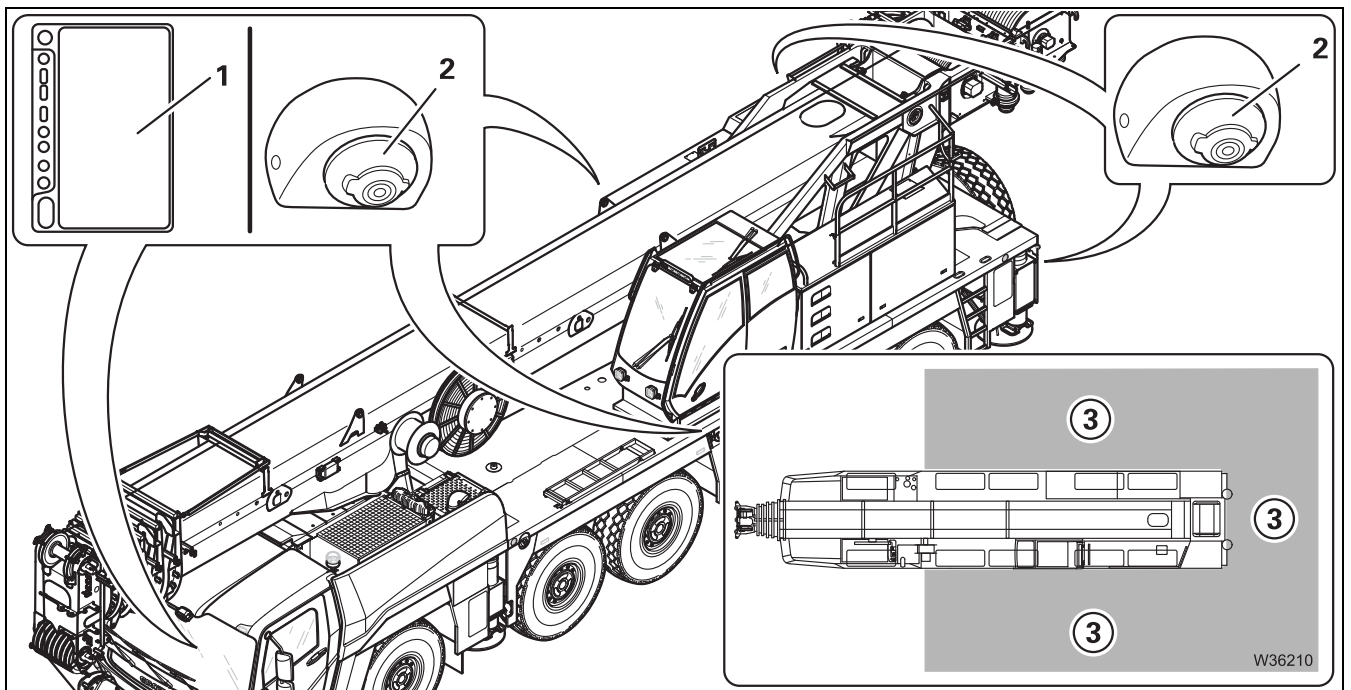
**Manitowoc Crane Group Germany GmbH** explicitly states that no liability is accepted for damage resulting from a failure to observe these instructions.



#### **Risk of damage in driving mode!**

Obstacles in the driving area above the height of the camera are **not** displayed. Always also watch the driving area using the mirrors. This will avoid damage to the truck crane.

The BirdView system 270° shows rear and side views next to the carrier in the driver's cab.



All cameras (2) simultaneous show images on the monitor (1). The monitor (1) shows the area (3) to the rear and side of the carrier.





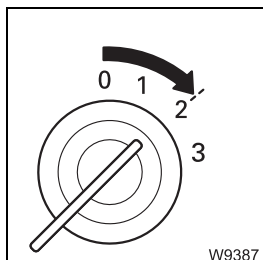
The cameras must not be removed or misadjusted. If a camera is mounted on the storage box then the storage box must not be removed.



There may be no spare wheel installed on the rear of carrier.

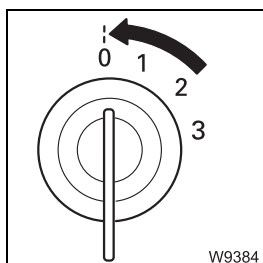
### Switching on

- Switch on the ignition – the monitor shows the area around the truck crane.



### Switching off

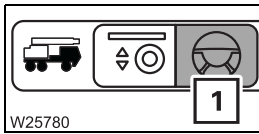
- Switch off the ignition – the monitor switches off.



### 3.2.11

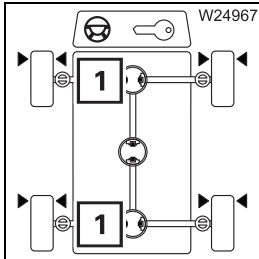
## Final drive

▮▮▮▮▮ *Longitudinal and transverse differential locks, p. 5 - 50*



### Driving menu

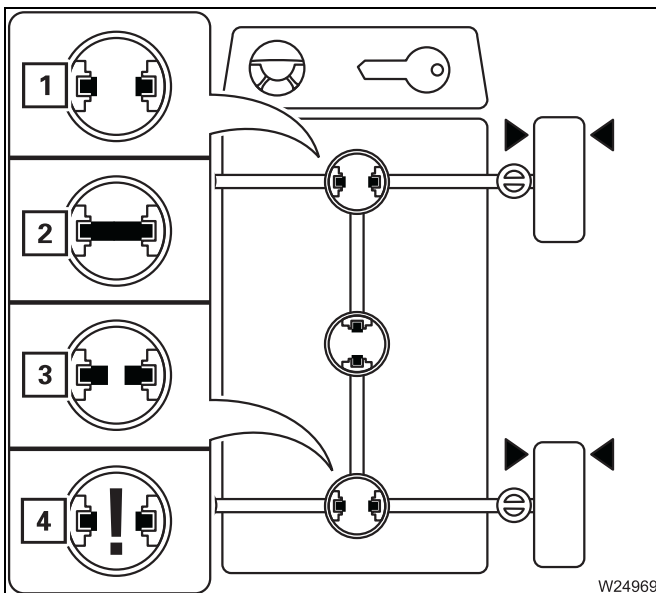
**To open:** Select symbol (1) and confirm – menu is opened



### Transverse differential locks on/off

- **To switch on:** Select symbol (1) and confirm – symbol is **red**
- **To switch off:** Select symbol (1) and confirm – symbol is **green**

When a symbol (1) is selected **both** transverse differential locks are switched on or off.



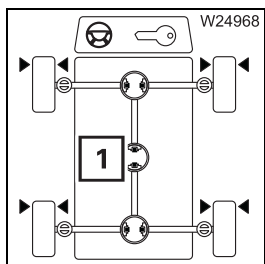
### Transverse differential locks display

The current status is shown using different symbols:

- 1 green** – locks off
- 2 red** – locks on
- 3 yellow** – intermediate position
- 4 violet** – error

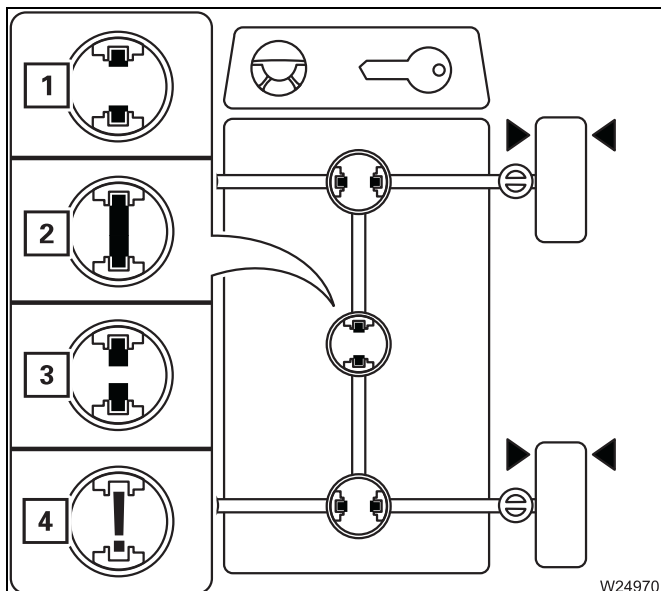
▮▮▮▮▮ p. 5 - 50





### Longitudinal differential lock on/off

- **To switch on:** Select symbol (1) and confirm – symbol is **red**
- **To switch off:** Select symbol (1) and confirm – symbol is **green**



### Longitudinal differential lock display

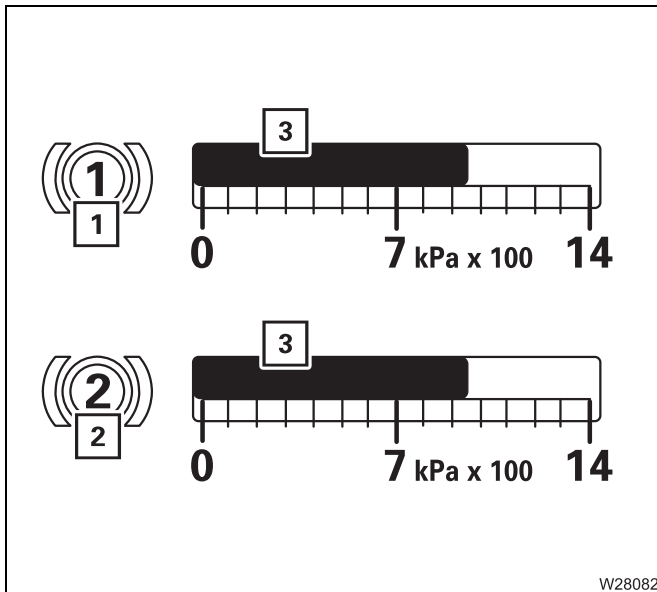
The current status is shown using different symbols:

- 1 green** – lock off
- 2 red** – lock on
- 3 yellow** – intermediate position
- 4 violet** – error

▶▶▶▶▶ p. 5 - 50

### 3.2.12 Brakes

#### Service brake



#### Display of supply pressure in brake circuits

- 1 Current supply pressure in brake circuit 1
- 2 Current supply pressure in brake circuit 2
- 3 **red** – supply pressure insufficient  
**white** – supply pressure sufficient

▶▶▶ p. 5 - 59

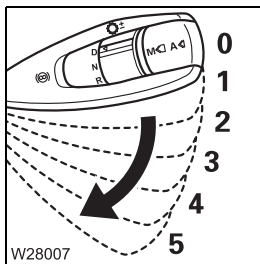
#### Additional brakes

Engine retarder/transmission retarder

▶▶▶ *Additional brakes*, p. 5 - 43

#### Multipurpose switch

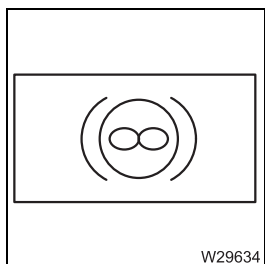
The braking force is the smallest in position (1) and the greatest in position (5).



- |                   |   |
|-------------------|---|
| <b>0 Forward:</b> | Engine retarder and transmission retarder off |
| <b>1 Back:</b>    | Engine retarder                               |
| <b>2 Back:</b>    | Engine retarder                               |
| <b>3 Back:</b>    | Engine retarder                               |
| <b>4 Back:</b>    | Engine retarder and transmission retarder     |
| <b>5 Back:</b>    | Engine retarder and transmission retarder     |



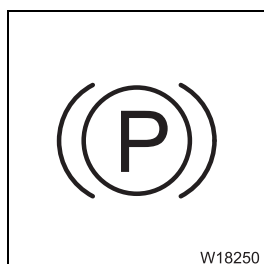
### Instrument panel



#### **Additional brake indicator lamp**

- **On:** Additional brake on
- **Off:** Additional brake off
- **Flashing:**
  - Ignition on – Multipurpose switch not in position **0**
  - Engine is running – retarder power reduced

### Parking brake



#### **Parking brake indicator lamp**

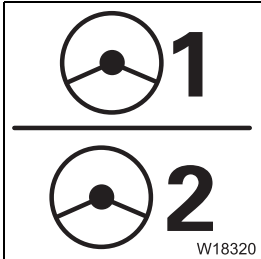
- **On:** Parking brake applied
- **Off:** Parking brake released



**3.2.13 Steering / separate steering**

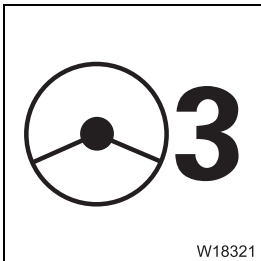
▣▣▣▣▶ *Separate steering*, p. 5 - 59

**Instrument panel**



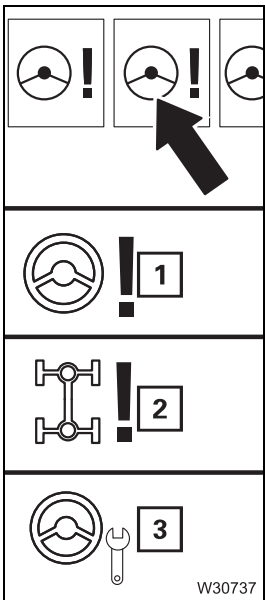
**Steering circuit 1 and 2 warning lamp**

- **On:** Engine off – ignition on  
or  
Engine on – malfunction, stop – check oil loss
  - **Off:** Engine on – no malfunction
- ▣▣▣▣▶ p. 5 - 35



**Emergency steering pump warning lamp**

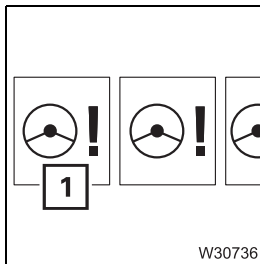
- **On:** approx. 10 km/h (6 mph) not reached  
or  
Steering faulty – stop and check for oil loss
  - **Off:** Emergency steering pump ready to function
- ▣▣▣▣▶ p. 5 - 35



**Error in steering system**

- **On:** Engine off – ignition on:
    - Display symbol (2) – goes out after engine start
    - Display symbol (3) – ignition off/on, symbol goes out
 While driving:
    - Display symbol (1) – 4th and 5th Axle only in the straight running position, driving can continue
  - **Flashing:** After engine start:  
The steering angle of the 4th and 5th axles is not correct, Steer front axle lines – steering angle is adapted
  - **Off:** No error in the steering system
- After engine start; ▣▣▣▣▶ p. 4 - 17  
 While driving; ▣▣▣▣▶ p. 5 - 35






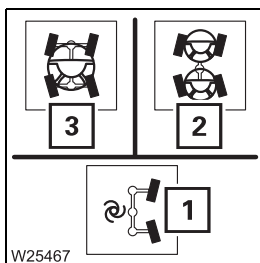
### Steering system warning

- **On:** Steering system faulty – stop immediately, Display symbol (1) – 4th and 5th axle cannot be steered; if it is possible, it can only be steered in straight running position – max 20 km/h (12 mph)
- **Off:** No error in the steering system

After engine start;  p. 4 - 17


While driving;  p. 5 - 35

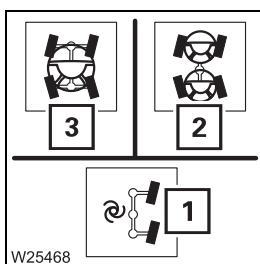
### CCS display



### Automatic separate steering for driving around corners on/off


- **To switch on:** Select symbol (1) and confirm – Symbol (2) is displayed
- **To switch off:** Select symbol (1) and confirm again – Symbol (3) is displayed – Normal steering on

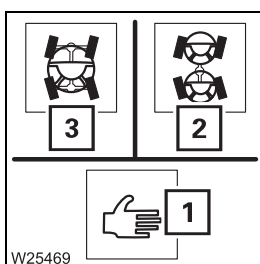
 p. 5 - 59



### Separate steering for crab travel mode Automatic on/off


- **To switch on:** Select symbol (1) and confirm – Symbol (2) is displayed
- **To switch off:** Select symbol (1) and confirm again – Symbol (3) is displayed – Normal steering on

 p. 5 - 59



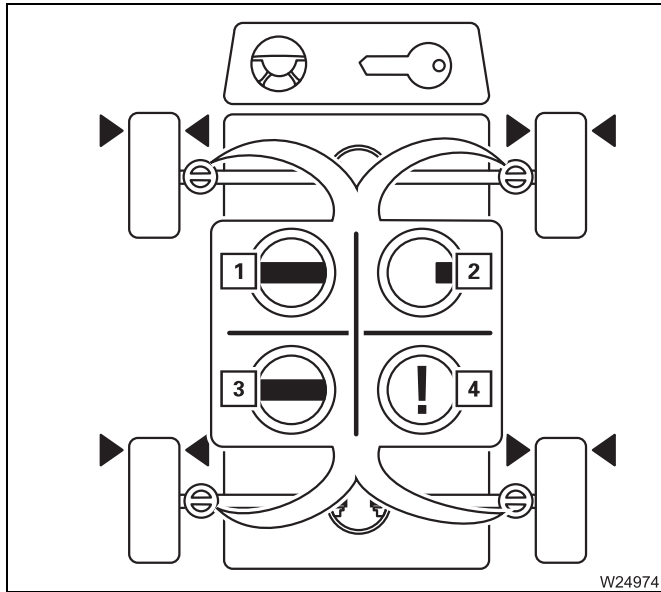
### Manual separate steering on/off

- **To switch on:** Select symbol (1) and confirm – Symbol (2) is displayed
- **To switch off:** Select symbol (1) and confirm again – Symbol (3) is displayed – Normal steering on

 p. 5 - 59

When separate steering is switched on, the speed is limited to approx. 5 km/h (3 mph).

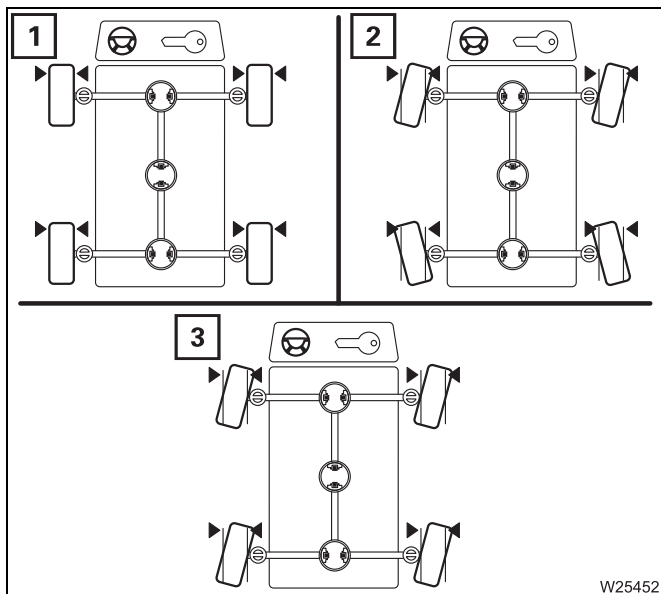




### Steering locking status display

The current status is shown using different symbols:

- 1 **green** – locked
- 2 **red** – unlocked
- 3 **yellow** – intermediate position
- 4 Error

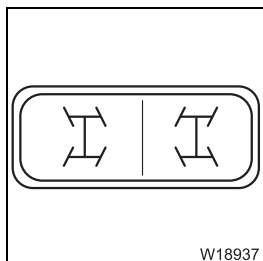


### Current wheel position display

The current status is shown using different symbols:

- 1 Straight ahead
- 2 Driving on a curved path
- 3 Crab travel mode

### Driver's door



### Separate steering

The separate steering is switched on.

Press button and hold

- **To the left:** 4th and 5th axle line – turn to the left
- **To the right:** 4th and 5th axle line – turn to the right

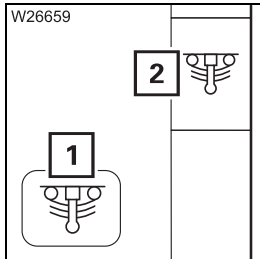
➡ p. 5 - 60

### 3.2.14

## Suspension

▣▣▣▣ ➔ *Switching the suspension on/off, p. 5 - 15.*

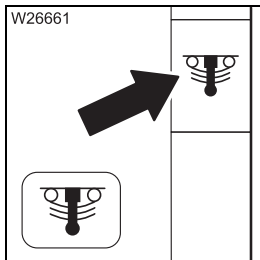
### CCS display



#### Suspension on/off

- **Switch on:** Select symbol (1) and confirm – Symbol (2) **green** (on-road driving)
- **Switching off** Select symbol (1) and confirm – Symbol (2) **red** (crane operation)

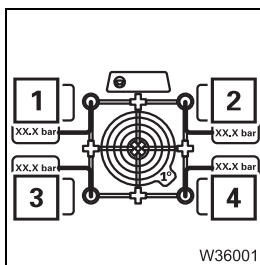
▣▣▣▣ ➔ p. 5 - 15



#### Suspension display

- **Red:** Suspension off – blocked for crane operation
- **Green:** Suspension on – enabled for on-road driving

▣▣▣▣ ➔ p. 5 - 15

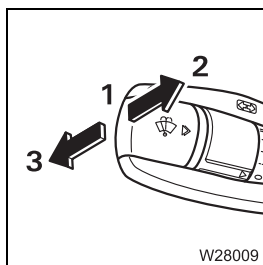


#### Suspension operation pressure gauge

- 1 Suspension pressure for 1st and 2nd axle line to the left
- 2 Suspension pressure for 1st and 2nd axle line to the right
- 3 Suspension pressure for 3rd to 5th axle line to the left
- 4 Suspension pressure for 3rd to 5th axle line to the right

### 3.2.15 Lighting/windscreen wipers/horn

#### Steering column



Multipurpose switch

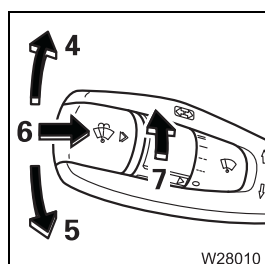
#### Headlight flasher/full beam headlight

**1 Parking light/headlight:** Mid-position

**2 Flash the headlights:** Upwards

The parking light/headlight must be switched on:

**3 Headlight – full-beam:** Down – latches into place



#### Turn signal indicator/wiper-washing system

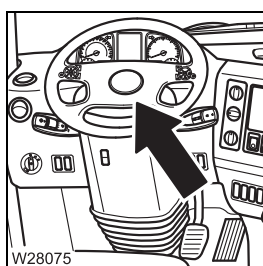
**4 Right turn signal indicator:** Forwards

**5 Left turn signal indicator:** Backwards

**6 Windscreen wiper/washing system:** Press

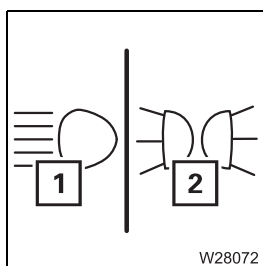
**7 Windscreen wiper:** rotate:  
 – Off,  
 – Interval – slow  
 – Interval – fast  
 – Continuous wiping – slow  
 – Continuous wiping – fast

#### Steering wheel



#### Horn

#### Instrument panel

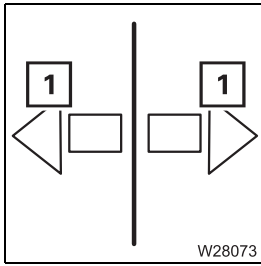


#### Headlight – full beam indicator lamp

**1 – On:** Headlight – full beam on

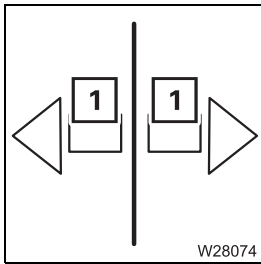
**– Off:** Headlight – full beam off

**2 – Lights up** Headlight flash



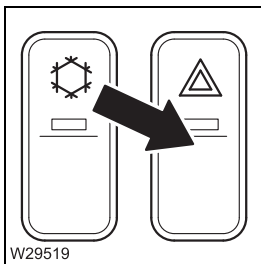
### Indicator lamp for turn signal indicator

- 1 - Flashing:** Turn signal indicator on
- Off:** Turn signal indicator off, or turn signal indicator on and filament lamp faulty



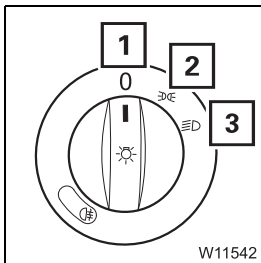
### Indicator lamp for trailer turn signal indicator

- 1 - Flashing:** Turn signal indicator on and trailer electrically connected
- Flashes once:** Turn signal indicator on and trailer not electrically connected
- Off:** Turn signal indicator off



### Hazard warning system on/off

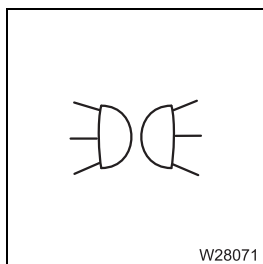
- To switch on:** Press downwards – light in the switch flashes
- To switch off:** Press in above – gone out



### Lighting on/off

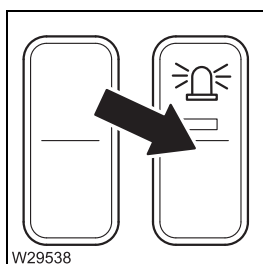
- 1 Light off**
- 2 Parking light on** Instrument lighting on
- 3 Headlight on** Full beam can be switched on using the multipurpose switch, daytime driving light off





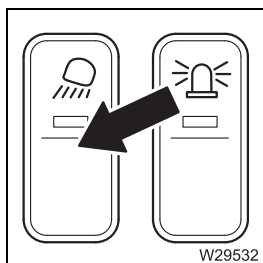
### Headlight check

- **On:** Headlight on
- **Off:** Headlight off



### Rotating beacons on/off

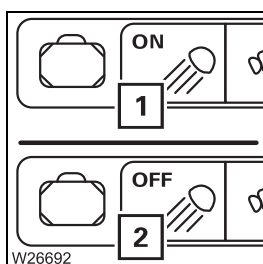
- **To switch on:** Push up
- **To switch off:** Push down



### Outrigger lighting on/off

- **To switch on:** Push up
- **To switch off:** Press down – position for driving on road

## CCS display

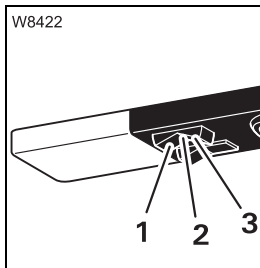


### Spotlights on rear of carrier on/off

- **To switch on:** Select and confirm symbol (2).
- **To switch off:** Select and confirm symbol (1).

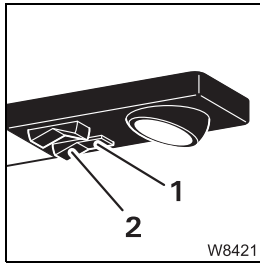
## Roof

The lamps on the driver's and passenger side are identical.



### Cab lighting

- 1 Always on
- 2 Always off
- 3 On/off via door contact

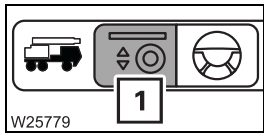


### Reading lamp

- 1 On
- 2 Off

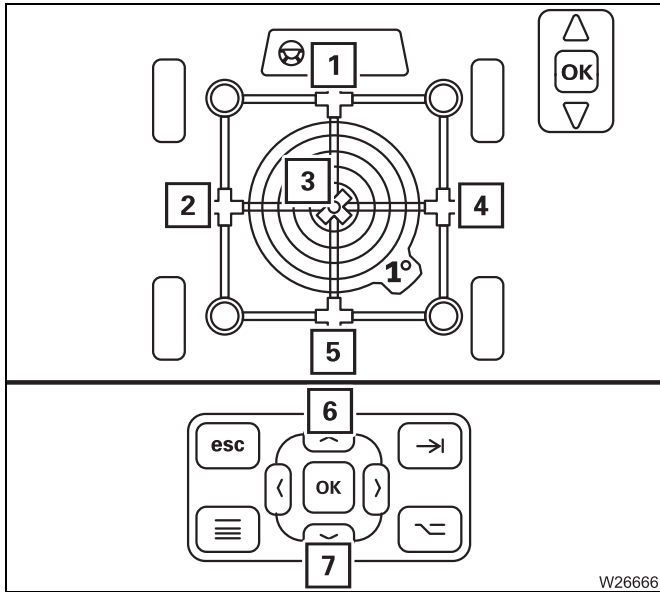
### 3.2.16 Level adjustment system

Operating the level adjustment system, p. 5 - 52.



#### Suspension/level adjustment menu

- To open: Select symbol (1) and confirm – menu is opened



#### Lift/lower preselection level

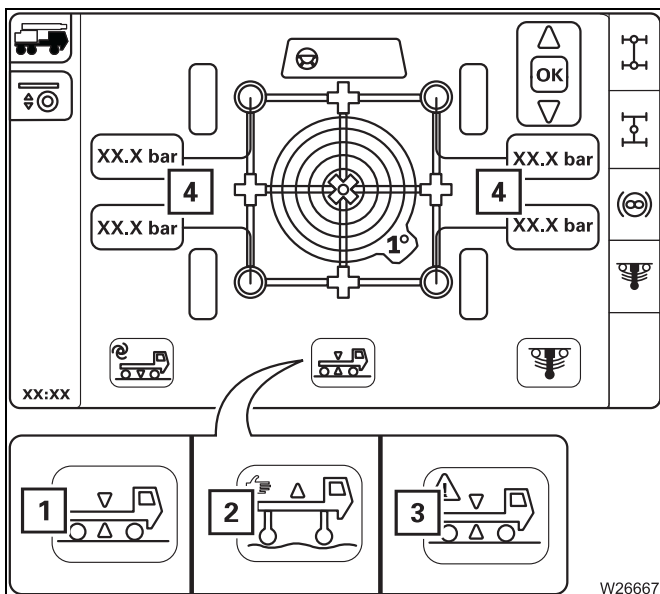
The suspension is switched on. Select and confirm the corresponding symbol.

- 2 Left level
- 1 Front level
- 4 Right level
- 5 Rear level
- 3 Overall level

#### Level change

- 6 Raise the level
- 7 Lower the level

Movement stops after the button is released and when an end position is reached.



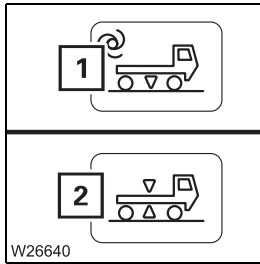
#### Vehicle level display

The current status is shown using different symbols:

- 1 On-road driving level
- 2 Off-road driving level
- 3 Error
- 4 Operation pressure in the suspension struts

Operating the level adjustment system, p. 5 - 52



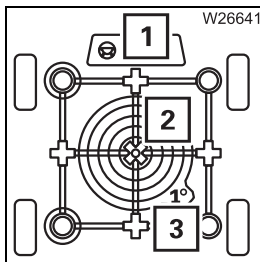


### Setting the on-road level

The suspension is switched on.

- 1 Select and confirm – level is changed until the on-road driving level is reached.
- 2 On-road driving level reached

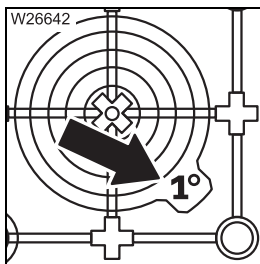
➡ p. 5 - 53



### Current inclination display

- 1 Directional indicator
- 2 Inclination indicator
- 3 Measuring range display

➡ p. 5 - 54



### Switching over the measuring range

The current measuring range 1° or 5° is displayed – changeover automatic

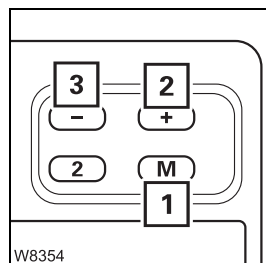
➡ p. 5 - 54

### 3.2.17

## Tachograph/speedometer

▣▣▣▣▶ *Setting the tachograph, p. 5 - 17.*

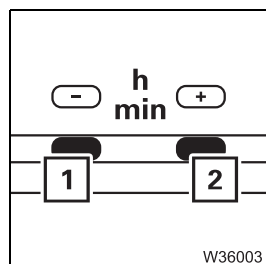
### Tachograph



Time correction occurs for both the Tachograph and on-board computer

- 1 Open the time menu:** Press the button – the time correction menu opens
- 2 Time correction +:** Press the button – the time is increased
- 3 Time correction –:** Press the button – the time is decreased

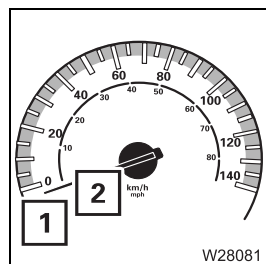
### Cover



Time correction

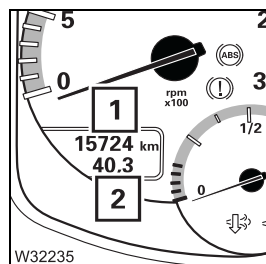
- 1 Time correction +:** Press the button – the time is increased
- 2 Time correction –:** Press the button – the time is decreased

### Speedometer



### Speed indicator

- 1** Indicates the speed in km/h
- 2** Indicates the speed in mph

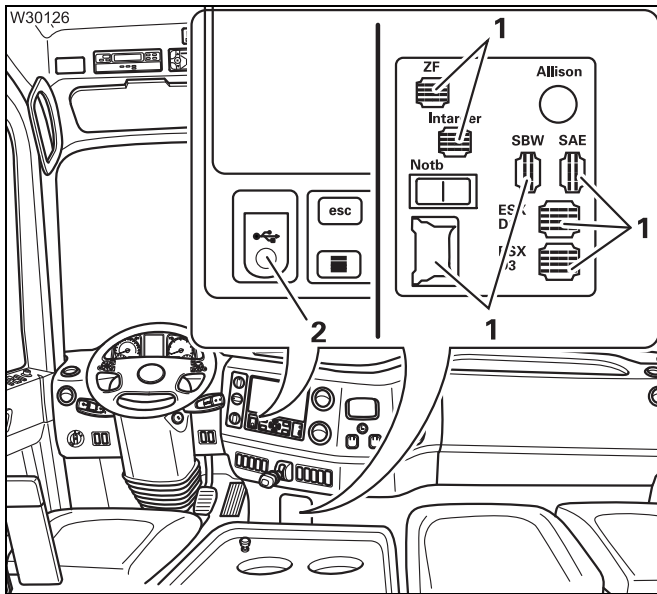


### Kilometre counter

The ignition must be switched on.

- 1** Overall distance travelled in kilometres – value after the decimal point:  
1 = 100 m
- 2** Daily distance travelled in kilometres – value after the decimal point:  
1 = 100 m

### 3.2.18 Diagnostics



The diagnostics connections (1) may only be operated by service staff from the engine and transmission manufacturer, or by **Manitowoc Crane Care**.

Additional diagnostic and service connections are present on the CCS control unit (2).

- Do not connect external devices, e.g. a mobile phone, to the connection (2)!

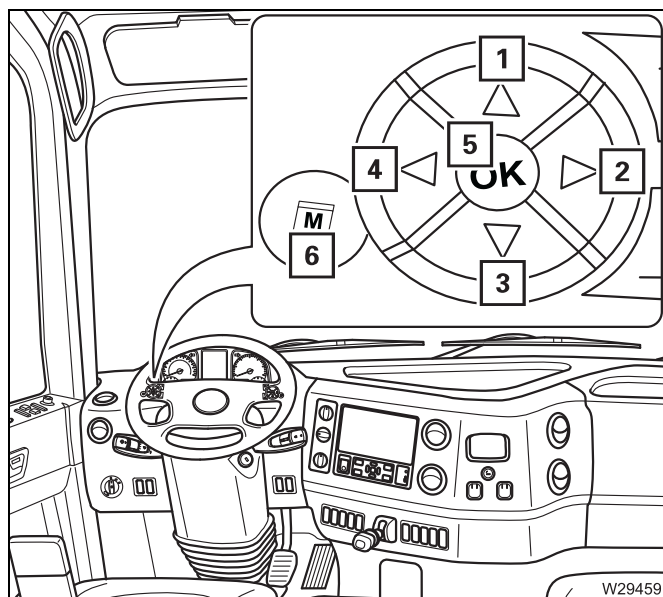


#### **Risk of damage to the crane control system!**

Do not connect external devices to the diagnostic connections. This prevents severe malfunctions in the crane control system.

### 3.2.19 On-board computer

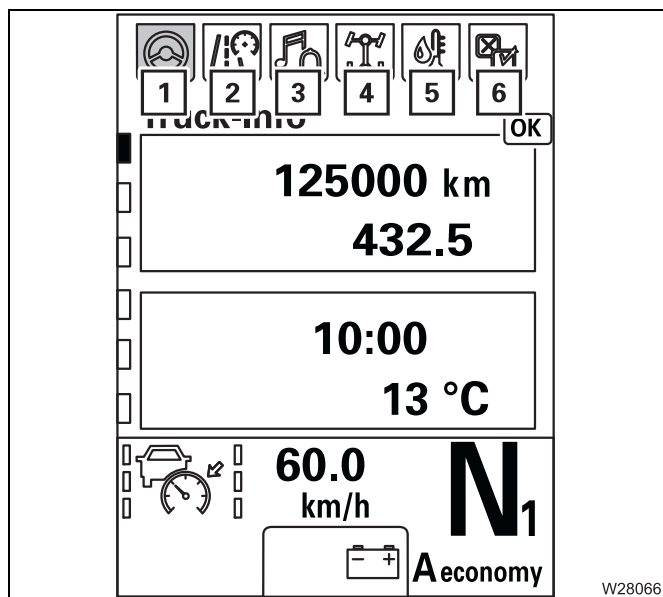
Click [here](#) for more information on the on-board computer menus.



#### Operating the on-board computer

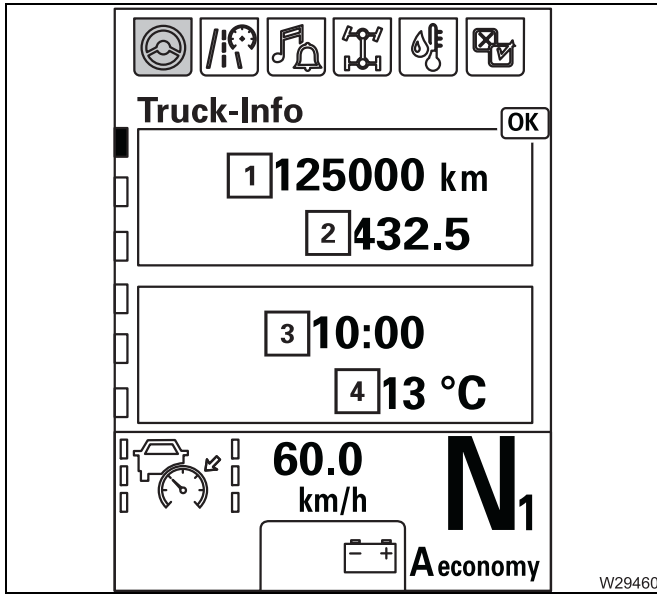
On the steering wheel:

- 1 Previous menu window, menu entry upwards
- 2 Next main menu, select next entry, increase or reset value
- 3 Next menu window, one menu entry downwards
- 4 Previous main menu, select previous entry, reduce value
- 5 Open and close data entry window, acknowledge messages
- 6 Save/display menu window



#### Main menu display

- 1 Tour data
- 2 Driving
- 3 Audio and communication
- 4 Operation and maintenance
- 5 Monitoring and information
- 6 Settings



### Four data menu

- 1 Total mileage
- 2 Daily mileage
- 3 Time
- 4 Outside temperature

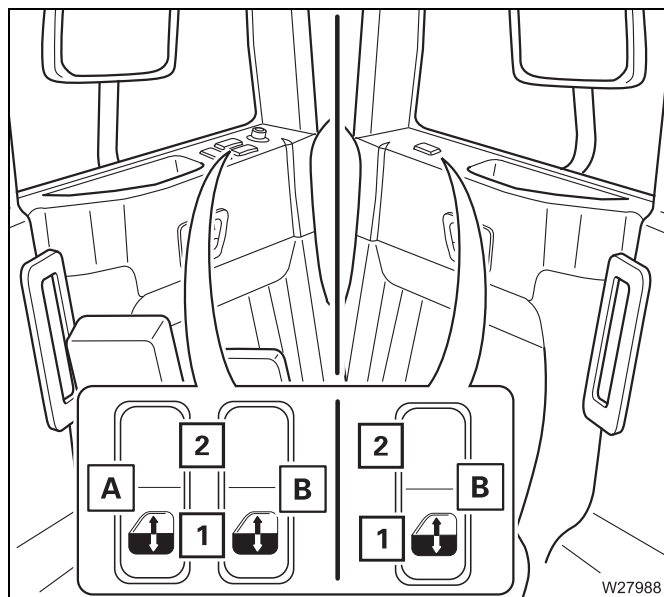
### 3.2.20

## Windows, doors, keys

### Window winder



The windows stop moving when the window winders encounter resistance.



#### Button assignment

- A Window winder, driver's door
- B Window winder, passenger door
- 1 To open the window
- 2 To close the window

Movement stops after the button is released and when an end position is reached.

#### Jog function

Press button (1) briefly – the window opens all the way to the end position.

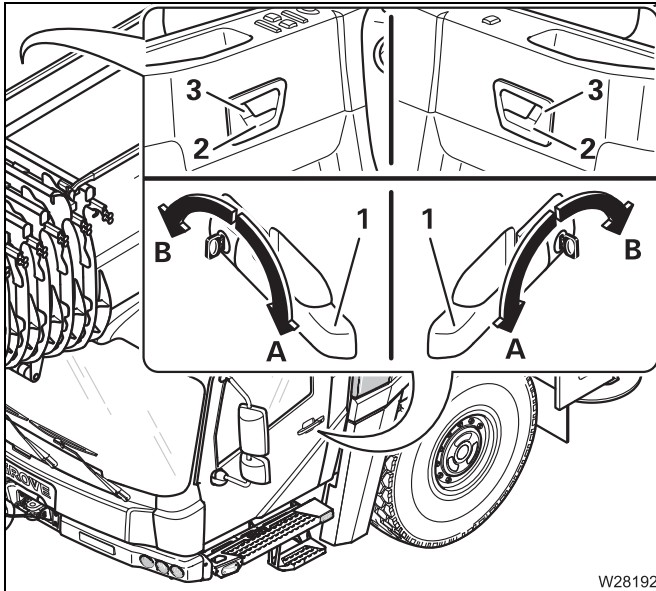
Press button (2) briefly – the window closes all the way to the end position.

## Doors

The same key is used for the driver's and passenger door.



Always take the ignition key with you before closing the door from outside with the handle pressed in (2). Once closed in this manner, the door can only be opened again using the ignition key.



### Locking

- Turn the key towards **B**, or
- Press in the handle (3)

### Unlocking

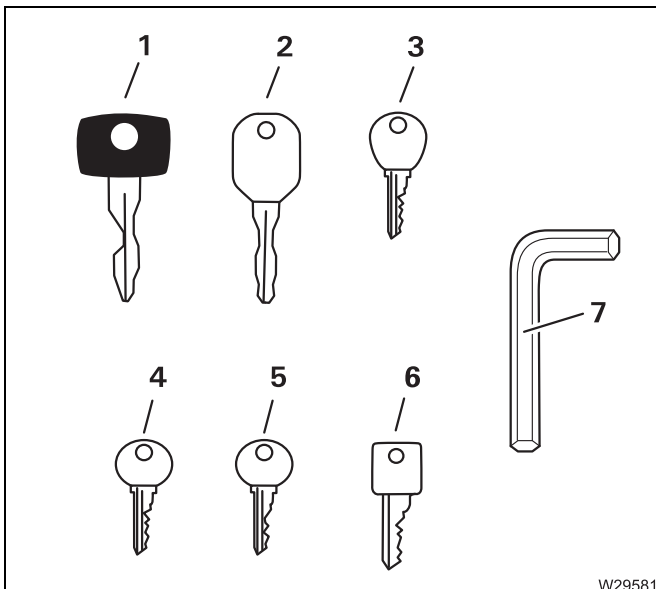
- Turn the key towards **A**, or
- Pull the handle (3)

### Opening

- Pull the handle (1) or
- Pull the handle (2)

## Keys

Different keys are supplied.



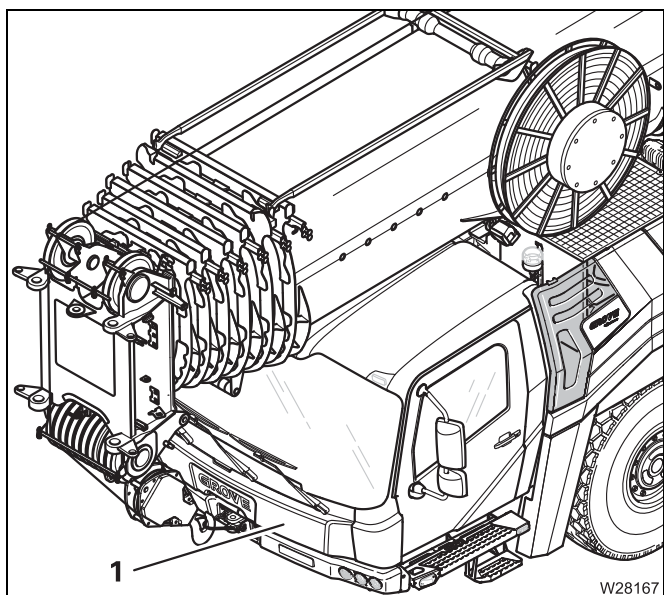
- 1 Door locks/ignition lock of driver's cab
- 2 Fuel tank<sup>1) 2)</sup>
- 3 Control units for outriggers<sup>1)</sup>
- 4 Windscreen washing system reservoir
- 5 Boom floating position lock<sup>1)</sup>
- 6 Slewing gear freewheel lock
- 7 Covers

<sup>1)</sup> Additional equipment

<sup>2)</sup> Depending on equipment, key (1) or (3)

### 3.2.21

## Front flap



### Opening

- Move the front flap (1) up as far as it will go, holding it by the upper edge.

The front flap is held in the open position.

### Closing

- Press the front flap (1) down, holding it by the upper edge.
- Press the front flap against the driver's cab on both sides until you can hear it latch into place.



# 4

## Starting the engine for driving / switching it off

### 4.1

### Starting the engine from the driver's cab

This section describes how to start the engine from within the driver's cab. You can also start the engine using the hand-held control, or from the crane cab; ■■■► *Starting the engine for driving for rigging work*, p. 11 - 23.

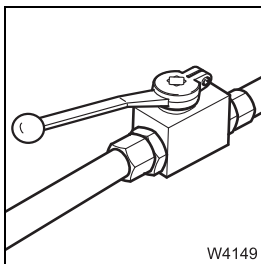
#### 4.1.1

#### CHECKLIST: Starting the engine

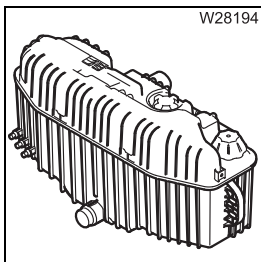


This checklist is not a complete operating manual. There are accompanying instructions, which are indicated by cross-references.

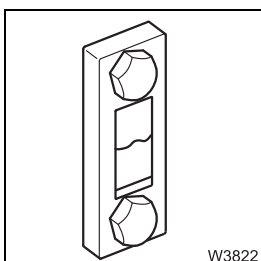
**Observe the warnings and safety instructions there!**



1. Check that the valves on the hydraulic tank are open; ■■■► p. 4 - 10.

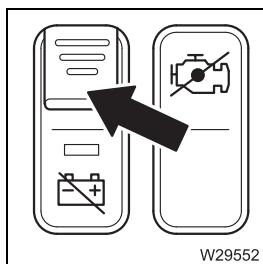


2. Check the coolant level in the engine; ■■■► *Maintenance Manual*.

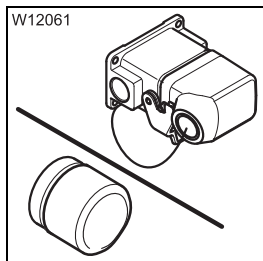


3. Check the oil level in the hydraulic system; ■■■► *Maintenance Manual*.



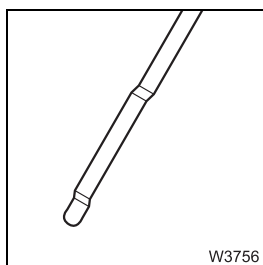


4. Switch on the battery master switch; p. 4 - 11.

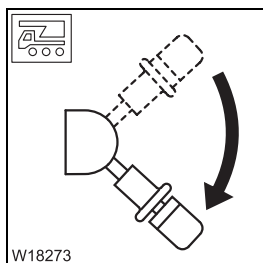


5. Check that

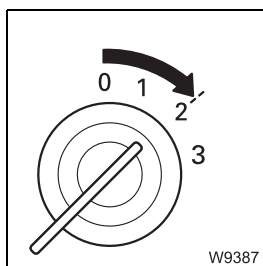
- The bridging plugs are inserted in the sockets for hand-held control; p. 9 - 4.
- All emergency stop switches have been reset; p. 4 - 22.



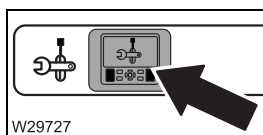
6. Check the oil level in the engine and transmission; *Maintenance Manual*.



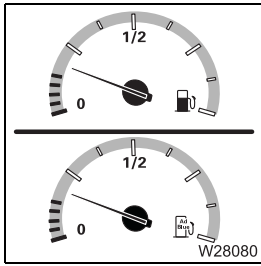
7. Check that the parking brake is engaged.





8. Switch on the ignition and check the instruments and displays; p. 4 - 11.

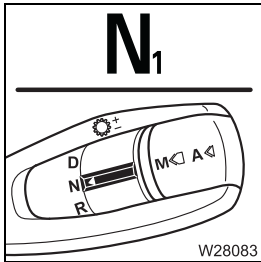



9. Adjust the brightness of the CCS display if necessary; p. 4 - 13.

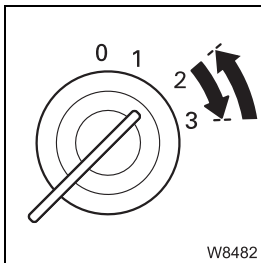



**10. Check the consumable reserve;**

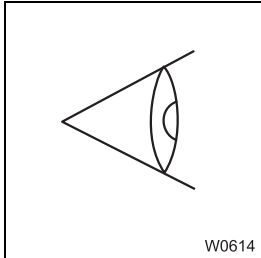
-  *Standard tank*, p. 4 - 7,
-  *AdBlue*, p. 4 - 9.



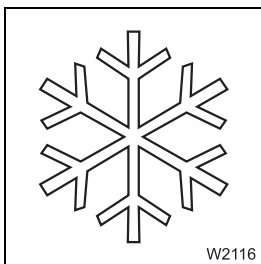
**11. Switch the transmission to the neutral position;  p. 5 - 26.**




**12. Start the engine;  p. 4 - 14.**



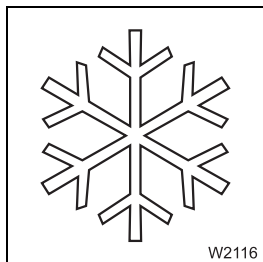
**13. Conduct the necessary checks after starting the engine;  p. 4 - 16.**






**14. In the event of low outside temperatures;  *CHECKLIST: At low temperatures*, p. 4 - 4.**

### 4.1.2

## CHECKLIST: At low temperatures



You must also observe the following points when operating the truck crane at low outside temperatures:

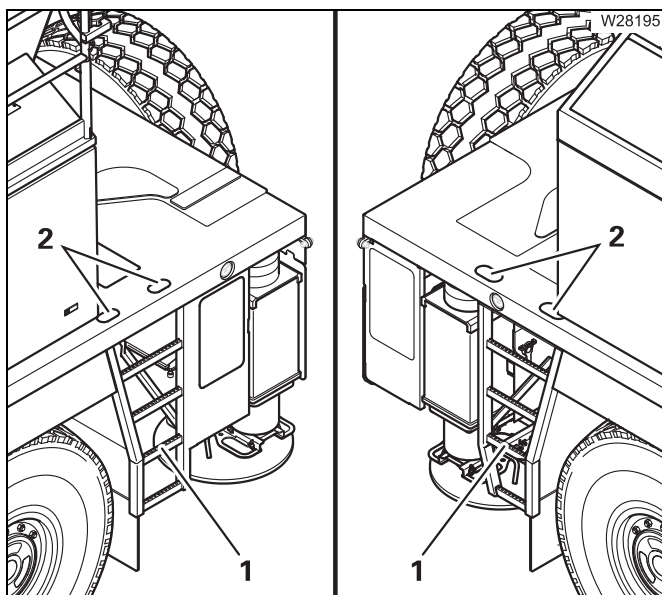
1. The fuel and engine oil must be suited for use in the outside temperature in question;  *Separate engine operating instructions, provided by the manufacturer.*
2. The engine coolant must contain sufficient antifreeze;  *Separate engine operating instructions, provided by the manufacturer.*
3. The windscreen washing system must contain sufficient antifreeze;  *Maintenance Manual.*

### 4.1.3

## Ladders and fixed ladders

### Fixed ladders

The access ladders are fixed in position.



The access ladders (1) have hand holes (2).

## Ladders

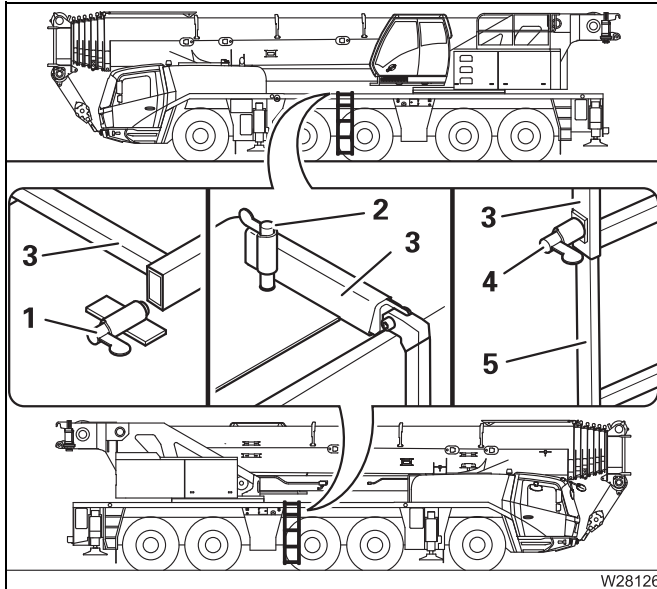
There are different ladders on the truck crane.



### Risk posed by ladders falling down!

Always secure the ladders before driving. This prevents the ladders from falling down while driving and endangering other vehicles.

There are fold-out access ladders on the right-hand and left-hand side.

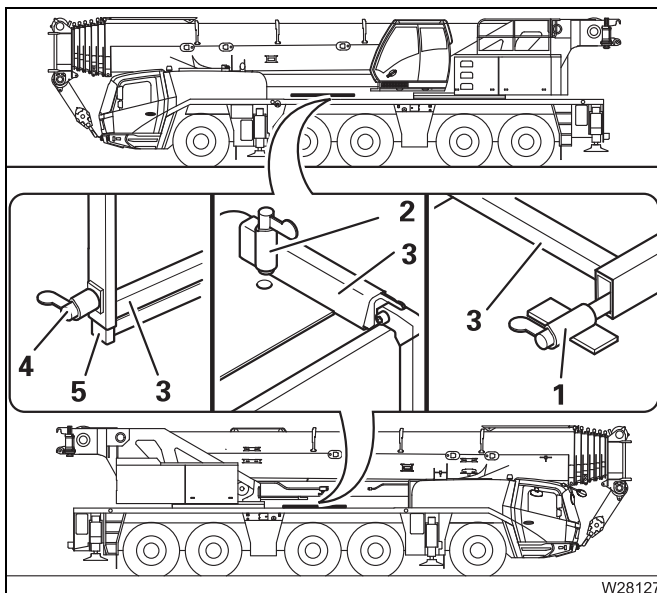


### Folding out

- Unlock the spring latch (1).
- Turn the ladder (3) outwards and fold it down.
- Secure this with the spring latch (2).

If necessary, you can pull out an additional step (5) from the ladder.

- Unlock the spring latch (4) and pull out the step (5).

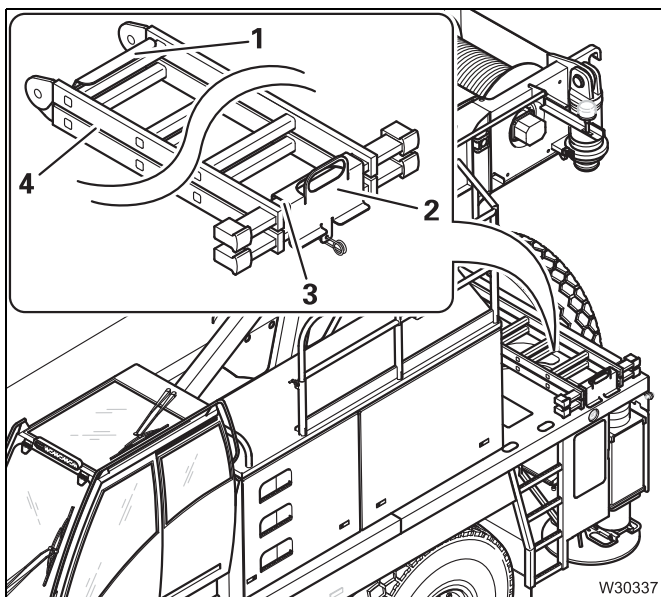


### Folding in

- Unlock the spring latch (4) and slide in the step (5).
- Unlock the spring latch (2) and pivot the ladder (3) onto the carrier.
- Secure this with the spring latch (1).



There is an additional ladder on the carrier.




You can fold the ladder (1) out and in.

#### Securing for driving

- Push the ladder (4) under the clamp (1).
- Place the clamp (2) over the rungs (3).
- Secure the clamp (2) from below with a retaining pin or a lock.

#### 4.1.4

### Filling up

Only use permissible consumables;  *Separate engine operating instructions, provided by the manufacturer.*



#### **Danger of fire due to flammable gases!**

Switch off the engine, the heater and all additional heaters before refuelling.



#### **Risk of accidents if the tank is not closed!**

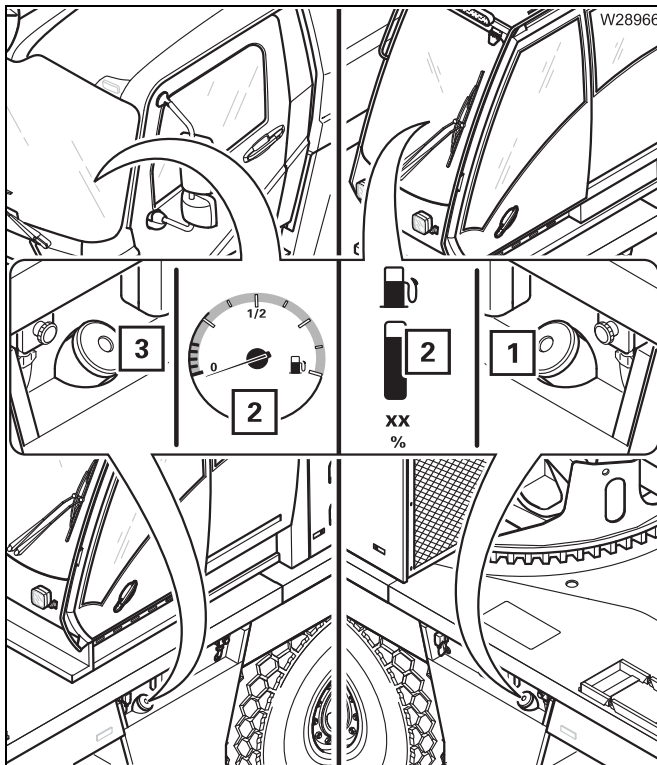
Close the tank each time you have refilled it.  
In this way you can prevent other vehicles from being endangered by the cap falling off or consumables escaping.



#### **Risk of damage to the engine and catalytic converter!**

Unauthorised consumables can damage the engine and catalytic converter and void the warranty. Only use consumables approved by the engine manufacturer.


### Standard tank



The display (2) shows the total fuel level in the tank (1) and (3).

The fuel tanks can be refuelled via a filler neck.

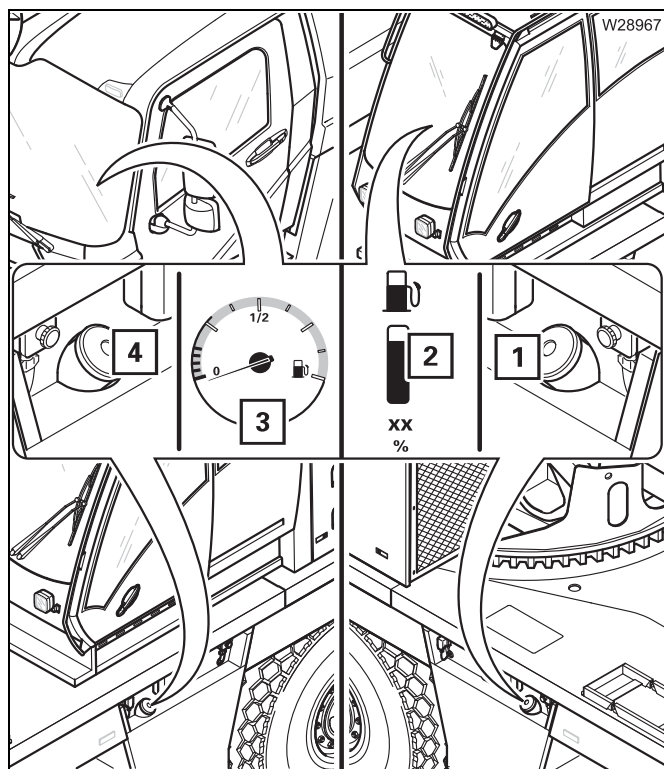
- Always open both filler necks when refuelling.
- Refuel in due time and close the tanks (1) and (3) with the cap. Leave sufficient space for the fuel to expand.

Also fill the tank for the crane operator's cab heating system;  *Fuel tank auxiliary heater, p. 10 - 5.*



## Dual tank

The dual tank system makes it possible to operate the truck crane in driving mode and crane operation mode with different types of fuel, provided this complies with the local regulations in the country in which you are working.



The fuel tank (1) is filled with the fuel for crane operation – display (2).

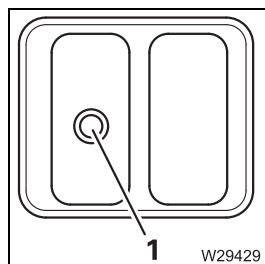
The fuel tank (4) is filled with the fuel for driving operation – display (3).

- Open the filler neck to refuel.
- Fill with the correct fuel in good time, and close the tank correctly. Leave sufficient space for the fuel to expand.

## Switching over the fuel supply

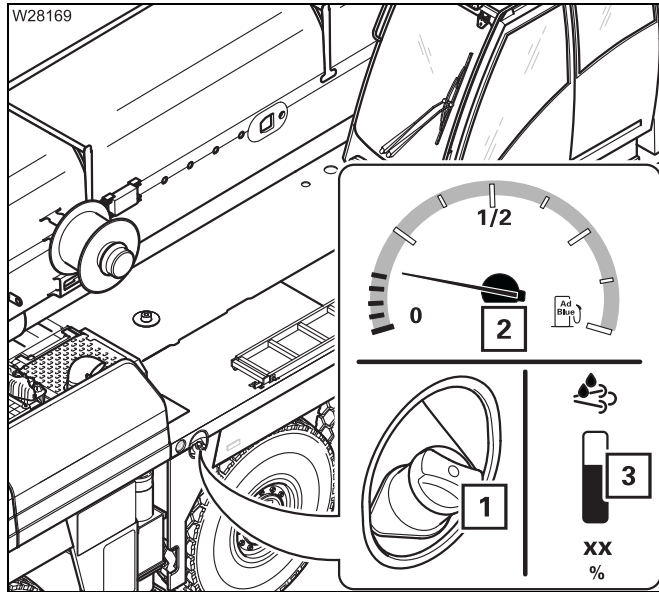
When fitted with the dual tank system, the fuel supply is automatically switched over when you start the motor from the crane cab.

- The Dual tank indicator lamp (1) is off when the fuel tank is in use.
- The Dual tank indicator lamp (1) is illuminated when the crane fuel tank is in use.





## AdBlue




The displays (2) and (3) indicate the current filling level.

The level indicator (3) changes colour depending on the fill level:

- Green:** Over 10% – over 4 l (0.9 gal)
- Yellow:** 5 to 10% – 2 to 4 l (0.4 to 0.9 gal)
- Red:** Below 5% – less than 2 l (0.4 gal)

- Refill the *AdBlue* tank (1) in good time and close it using the cap.

When the *AdBlue* tank is used up, the engine control system will reduce the motor torque. You can override this torque reduction;  *Override torque reduction*, p. 5 - 45.



### **Risk of injury from ammonia vapours!**

Ammonia vapours can escape if the *AdBlue* tank is opened at high outside temperatures. Ammonia vapours can irritate mucous membranes, skin and eyes.

Ensure that there is adequate fresh air supply and do not breathe in the escaping ammonia vapours.



### **Risk of damage to painted or aluminium surfaces!**

*AdBlue* can cause corrosion of these surfaces. Clean up spilled *AdBlue* with water immediately.



In order to comply with exhaust emission regulations, the truck crane may only be driven with *AdBlue*. Driving without *AdBlue* will invalidate the truck crane's licence for use on public roads and you are no longer permitted to drive on public roads.

## 4.1.5

### Checks before starting the engine

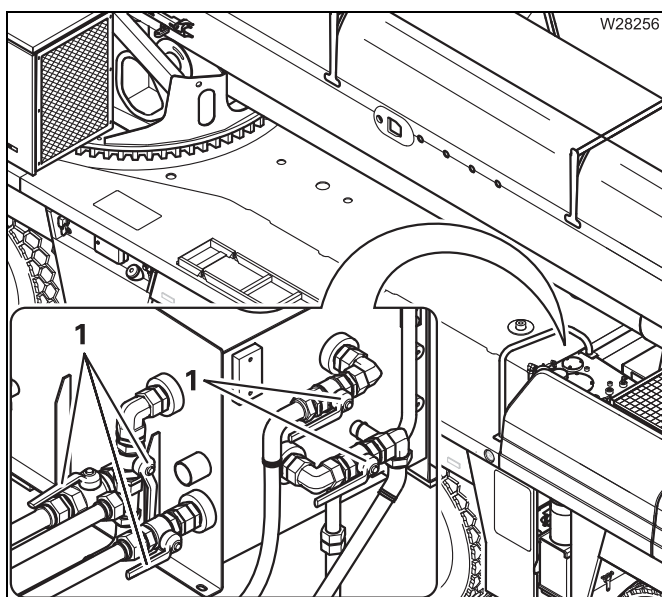
#### At the hydraulic tank

Before you start the engine, all valves on the hydraulic tank must be open.



#### **Risk of damage to the hydraulic pumps!**

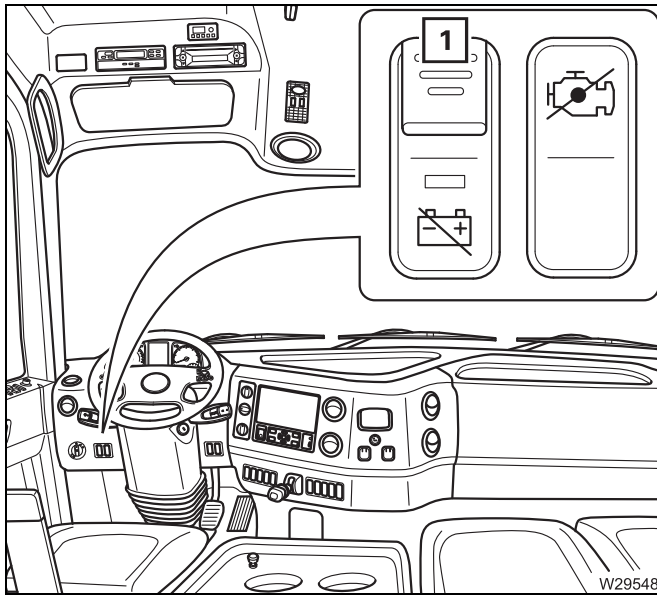
You may only start the engine when all the valves on the hydraulic tank are open!



- Check that the valves are open – lever (1) parallel to the line.
- Open all the closed valves.


### Battery master switch

You can only start the engine when the battery master switch is switched on.



- Switch on the battery master switch (1).


### Checking the hand-held control

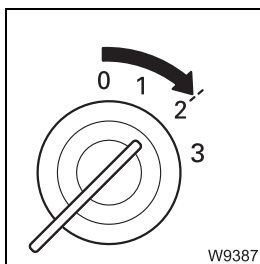
Check that the hand-held control has been removed, and that bridging plugs for the hand-held control are inserted into all sockets;  p. 3 - 41.

## 4.1.6

### Switch on the ignition



The ignition can only be switched on if the bridging plugs have been inserted in all sockets for the hand-held control;  *Sockets for hand-held control*, p. 3 - 41.



- Insert the ignition key into the ignition lock and turn the key to position 2.

After the ignition has been switched on:

- the CCS control unit is switched, but the start menu is not displayed until
- a lamp test has been performed,
- the switching states have been checked.



Do not start the engine until the start menu appears on the CCS control unit.

## 4.1.7 Lamp test/equalisation of the switching states

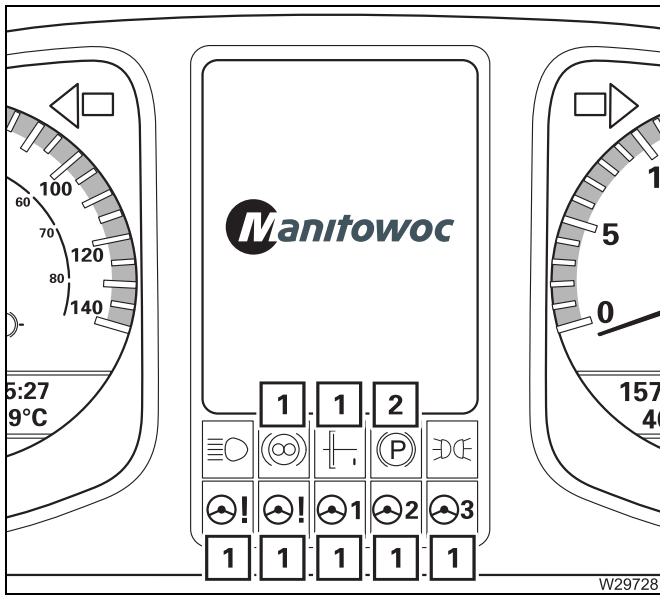
### Lamp test

After the ignition has been switched on, a lamp test is performed.



#### Risk of accidents due to faulty lamps!

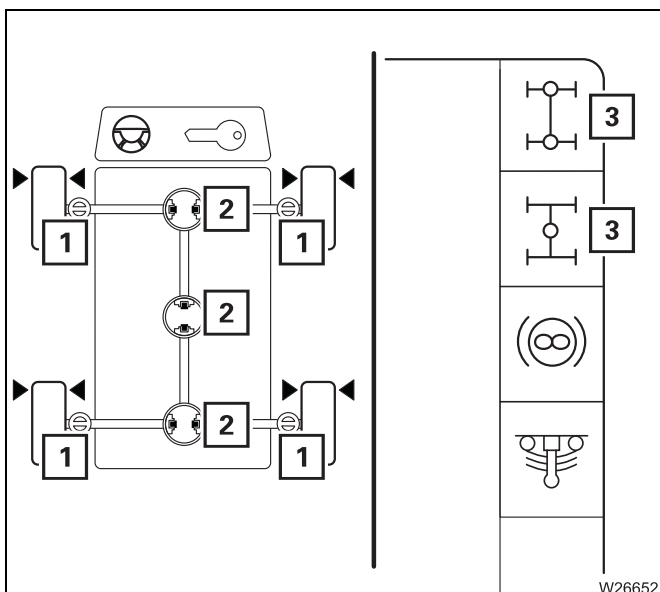
The lamps that are used to provide warnings and information during operation light up for control purposes whenever the ignition is switched on. Always perform the following lamp tests and immediately replace faulty lamps or have them replaced! In this way, you will avoid accidents and damage that occur when malfunctions are not identified in time.



- Check that the lamps (1) light up briefly, if they are present. If the specified time is insufficient, switch on the ignition again.
- If necessary, engage the parking brake and check that the lamp (2) lights up continuously.

### Equalisation of switching conditions

When the ignition is switched on, the switching states of the differential locks and the separate steering are compared.



The state last saved is retrieved.

The corresponding symbols (3) are shown and the electronics system triggers the switching operations.

The displays (1) and (2) show the current switching states.

If the display (3) does not show the symbol that corresponds to the switching process, you must actuate the steering, or drive slowly forwards and backwards, so that the locking processes are performed mechanically.

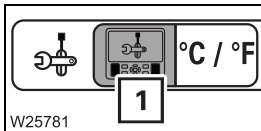
### 4.1.8

## Display – setting the brightness

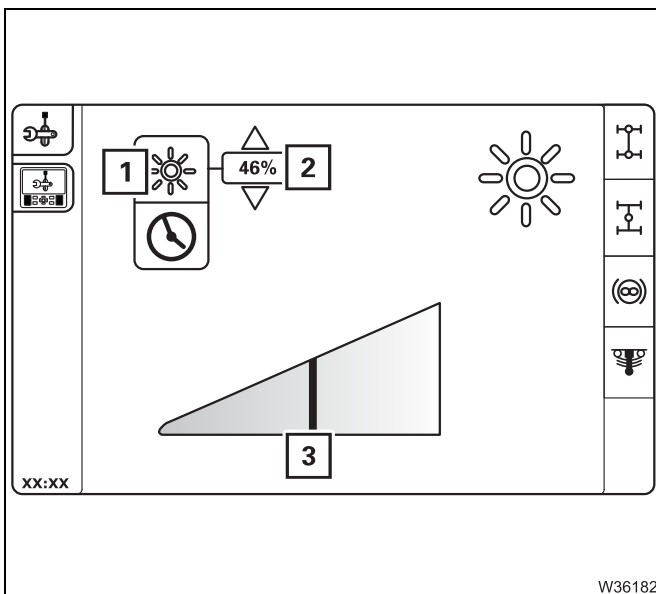
The brightness of the displays is regulated automatically by the CCS, depending on the ambient brightness. You can set a minimum degree of brightness manually, which is always observed when the brightness is regulated.



Depending on the program version, the brightness of the headlight is reduced to 40% regardless of the minimum brightness setting, but can be increased again manually at any time.



- Open the *Settings* menu (1).



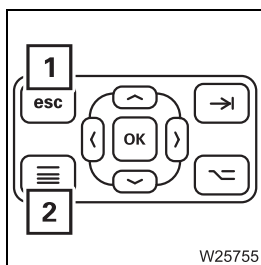
- Select and confirm the symbol (1).
- Set the desired brightness on the display (2).
- Confirm the selection.

The brightness of the display changes while setting and you can view the set value (0 to 100%) on the display (2) or (3).

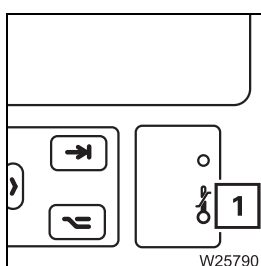
The brightness set here is the minimum value for automatic regulation.



There is no automatic regulation if you set the brightness to 100%. The displays then always show maximum brightness.



You can cancel the entry at any time using buttons (1) or (2). The settings are then reset.



If the temperature on the display is too high, the brightness is reduced automatically – lamp (1) lights up.

When the temperature falls, the specified brightness is restored – lamp (1) goes out.

### 4.1.9 Start the engine

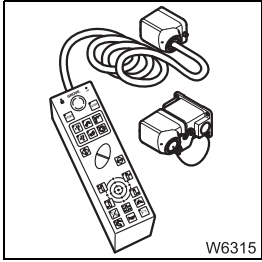


This section describes only how to start the engine from the driver's cab. You can also start the engine:

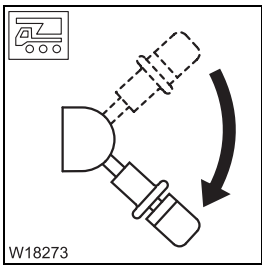
- Starting with the hand-held control; p. 11 - 23,
- or from the outrigger controls; p. 11 - 23.

Refer to the separate operating instructions provided by the engine manufacturer for the operation of the engine. The engine can only be started if:

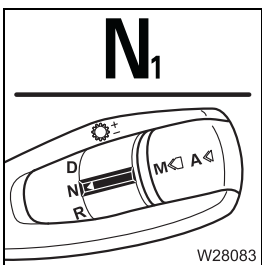
- The bridging plugs have been inserted in all sockets of the carrier and superstructure for the hand-held control; p. 3 - 41.



- The lamp (1) has gone out (superstructure ignition off).

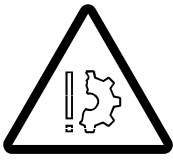


- Check that the vehicle parking brake is locked.  
If the brake is engaged, the parking brake lever will point downwards.



- Switch the transmission to neutral position **N**; p. 5 - 26.  
Only in this shift position can the engine be started.

This section relates to starting a warm and cold engine.



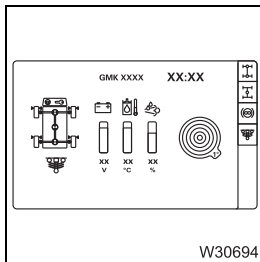
**Danger of explosion when using starter fuel!**

The engine may never be started with the aid of starter fuel. Starter fuel sprayed into the suction unit can ignite.

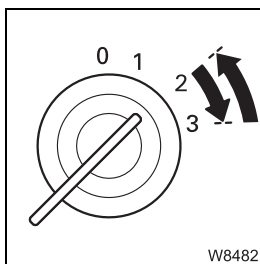


**Risk of malfunctions in the carrier electronics!**

Always wait until the start menu is displayed before starting the engine. This prevents malfunctions in the electronics and corresponding error messages in the subsequent driving operation.




- Wait until the start menu is displayed before switching on the ignition.



- Do not press the accelerator.
- Turn the ignition key to position **3** and hold it there until the engine starts.
- Let go of the ignition key after the engine starts.

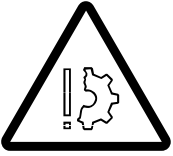
If the engine does not start, release the ignition key after approx. 15 seconds and wait one minute before trying again.



If the engine does not start after multiple attempts;  *Malfunctions on the engine, p. 7 - 17.*

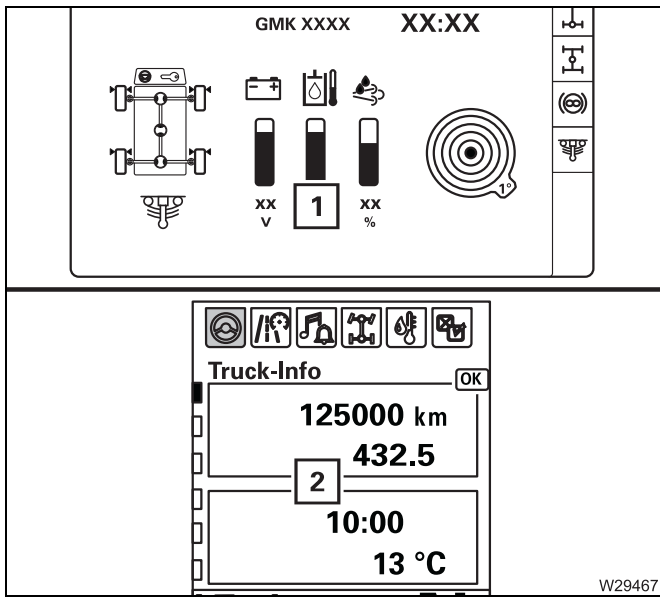
## 4.1.10 Inspections after starting the engine

### Start menu and on-board computer

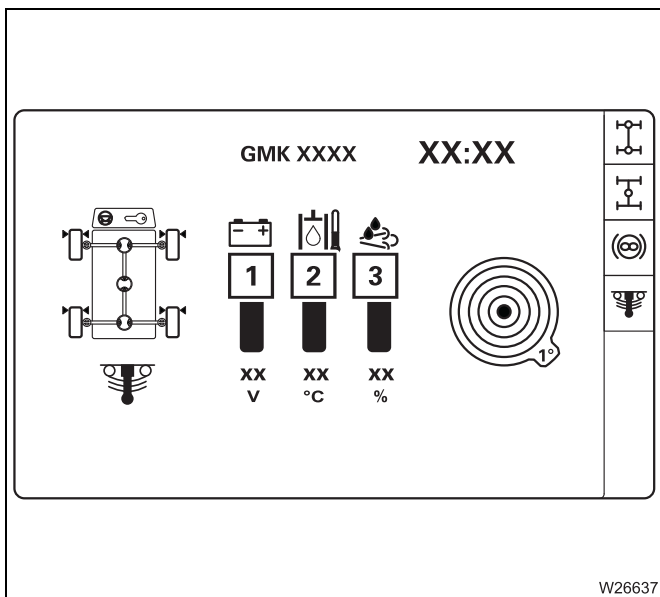


#### Risk of damage to the engine!

If a symbol is displayed in the display area (1) or the on-board computer display (2) and the warning buzzer sounds then switch off the engine immediately. Failure to do this can cause severe damage to the engine.



- Check if the display area of the main menu (1) or the on-board computer display (2) shows any **red** symbols
  - Display area (1) – when a symbol is **red**;
    - ▣▣▣▣ Malfunctions on the engine, p. 7 - 17.
  - On-board computer display (2) – when a warning message or symbol is shown;
    - ▣▣▣▣ Warning and malfunction messages on the on-board computer display, p. 7 - 7.



- Also check the following displays

- 1 Voltage in volts
- 2 Hydraulic oil temperature in °C (°F)
- 3 DEF supply in per cent

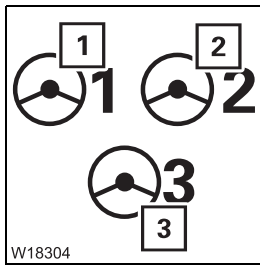
The colour of the bar below the values indicates in which area the value can be found.

- Green:** Value OK.
- Yellow:** Limit value almost reached
- Red:** Limit value exceeded (or dropped below) – warning message;
  - ▣▣▣▣ p. 7 - 11.



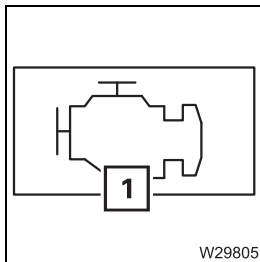
## Instrument panel

Several lamps must go out on the instrument panel when the engine is running.

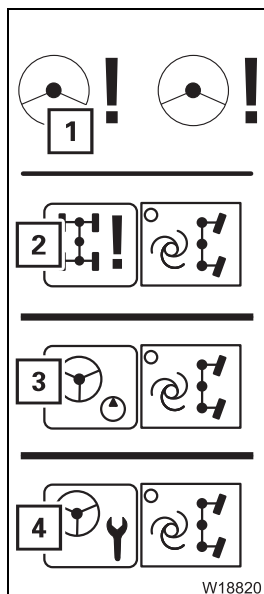


- Check that the lamps (1) and (2) go out.  
If one or both lamps are lit, refer to the information in section *Immediately after you start to move*; p. 5 - 35.

Lamp (3) goes out only when the vehicle starts moving.



- **Stop the engine immediately** if the lamp (1) is lit. Pay attention to other messages in the on-board computer display.



- Check that the lamp (1) goes out.

– If the lamp (1) is lit:

The *Driving* menu shows a symbol.

When the symbol (2) is displayed: The oil supply for the steering is still being built up. If the symbol has not yet gone out, contact

**Manitowoc Crane Care**

When the symbol (3) is displayed: Service mode on.

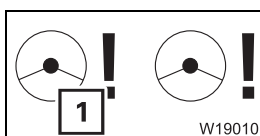
Briefly switch the ignition off and then on again. If the symbol is still shown, contact

**Manitowoc Crane Care.**

When the symbol (4) is displayed: The 4th and 5th axle lines are brought into the straight running position, as far as is possible, and can no longer be steered.

It is possible to steer the 1st to 2nd axle lines.

Arrange for the error to be rectified.

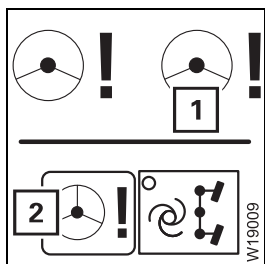


– If the lamp (1) flashes:

The steering angle of the 4th and 5th The axle line relative to the 1st to 2nd axle lines.

- Steer using the steering wheel – the steering angle is automatically offset, and the lamp (1) goes out.





- Check that the lamp (1) goes out.

If the lamp (1) **is lit** the symbol (2) is shown. The steering system has failed. You must not under any circumstances drive the truck crane. Contact **Manitowoc Crane Care** and arrange for the error to be rectified.



**Risk of accidents because the truck crane cannot be steered!**

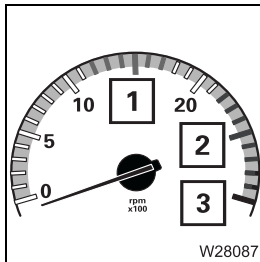
Under no circumstances may you drive the truck crane when the red lamp (1) is lit. The truck crane can no longer be steered safely.

When driving, the 4th and 5th axles may move uncontrollably, which can cause a serious accident even at low speeds.

## 4.1.11

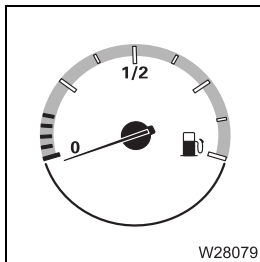
## Monitoring elements

### Instrument panel



### Tachometer

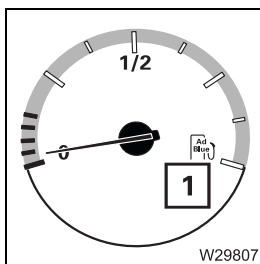
- 1 Green:** Economic consumption
- 2 Yellow:** Engine brake active
- 3 Red:** Engine speed too high – danger;  
▮▮▮▮▮ Checks when driving downhill, p. 5 - 42



### Fuel level display

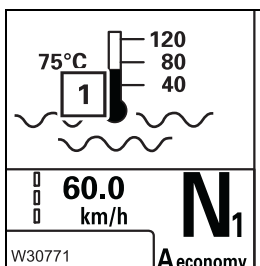
Never run the fuel tank completely dry; always refuel in time; ▮▮▮▮▮ p. 4 - 7.

If the fuel tank is almost empty, air can be sucked in and the fuel system must then be bled; ▮▮▮▮▮ *Maintenance Manual*.



### Adblue filling level indicator

- 1 Lights up:** Adblue tank empty  
▮▮▮▮▮ p. 4 - 9



### Coolant temperature display – in the on-board computer display

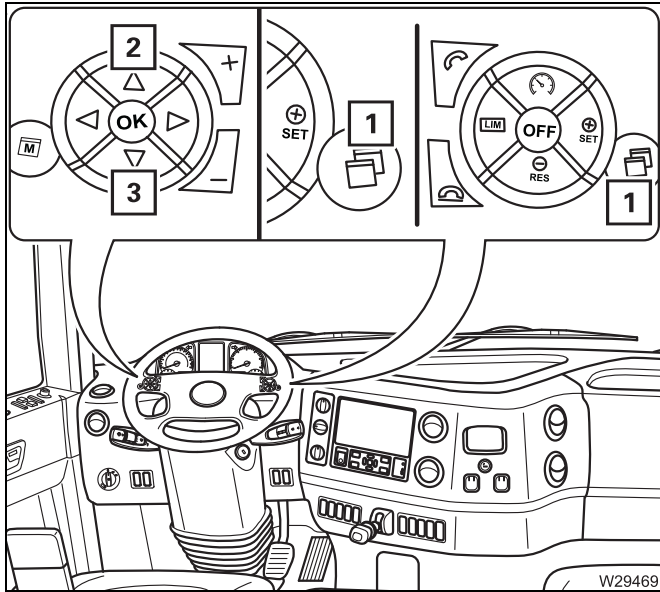
- 1 Coolant temperature display in degrees Celsius**  
In the event of malfunctions; ▮▮▮▮▮ p. 7 - 17

### 4.1.12 Set idling speed

After the engine is started, the idling speed is regulated automatically. If necessary, you can adjust the idling speed manually.

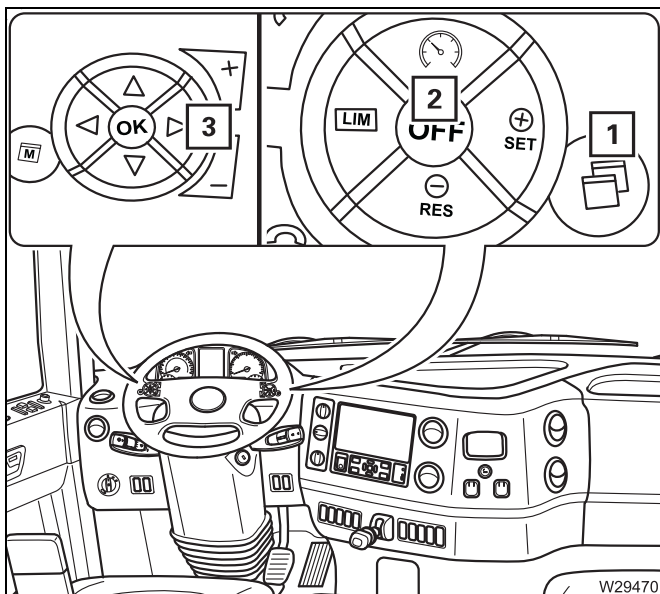


You can only set the idling speed when the truck crane is stationary.



#### Increasing/reducing the idling speed

- Press the button (1) repeatedly until *Engine speed* is shown in the on-board computer display.
- Increase or decrease the speed stepwise using the buttons (2) or (3). The engine speed is increased/reduced by 20 rpm.  
After approx. 3 seconds the setting is automatically saved.



#### Switching off the idling speed change

- Press the button (1) repeatedly until *Engine speed* is shown in the on-board computer display.
- Press the button (3).  
or
- Press the button (2).  
or
- Accelerate over 20 km/h (12 mph).

## 4.2

## Switching off the engine

### 4.2.1

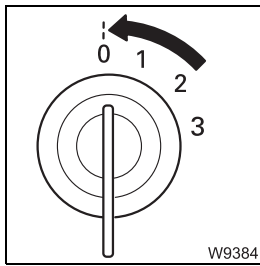
### On the ignition lock/with hand-held control/on the outrigger control units



**Risk of accidents because the truck crane cannot be steered!**

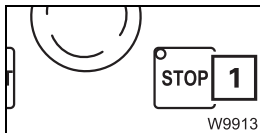
Switch the engine off only once the truck crane has come to a standstill. If you remove the ignition key, the steering will lock and you will lose control of the moving truck crane.

If the temperature of the coolant is very high, let the engine run on for another one or two minutes at increased idling speed.



**If the hand-held control is not connected:**

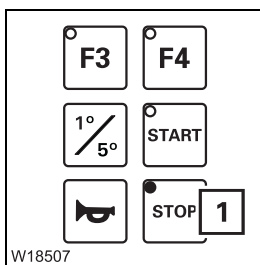
- Turn the ignition key to position **0** – the engine will stop.



**If the hand-held control is connected:**

- Press the button **(1)** – the engine will switch off.

It is not possible to switch off the engine with the ignition lock



**On the outrigger control units, if the hand-held control is not connected:**

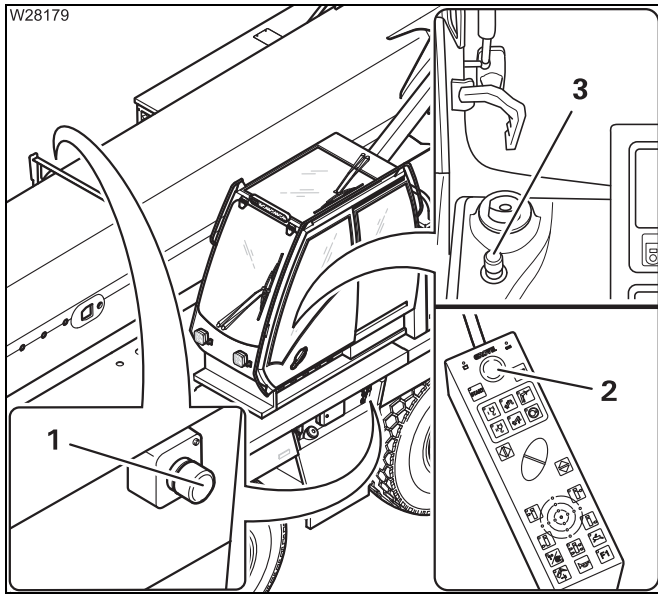
- Press the button **(1)** – the engine will switch off.

**After turning off**

If you want to park the truck crane; p. 5 - 46.

## 4.2.2

### With emergency stop switches



#### Emergency stop switch

Four emergency stop switches are provided for emergencies:

- 1 On the carrier
- 2 On the hand-held control
- 3 In the crane cab

- Press an emergency stop switch (1), (2) or (3). The switch latches.

The engine shuts down.



If an air intake inhibitor is present, this is then triggered.

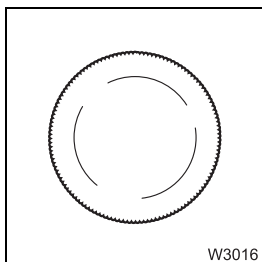
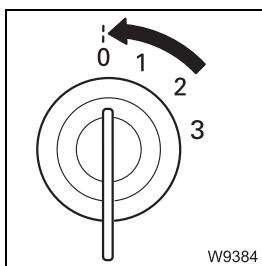


Do not operate the emergency stop switch to switch the engine off in normal operation. Only operate the emergency stop switch in an emergency situation.


#### Resetting the emergency stop switch

You can restart the engine only after you have reset the emergency stop switch.

- Switch off the ignition.



- Turn the actuated emergency stop switch until it disengages again.

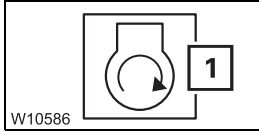
If an air intake inhibitor is present, this must be loosened;  *Releasing the air intake inhibitor*, p. 4 - 23.

## 4.3

### Air intake inhibitor

If the air intake inhibitor is triggered, a flap in the air intake line will close and the engine will stop running. The air intake inhibitor is triggered,

- if an emergency stop switch is actuated or
- when the maximum permissible engine speed is exceeded. In this case, the symbol (1) becomes **red** – at the *Warning* display and in the *Warning* submenu. The symbol stays red until the ignition has been switched off.

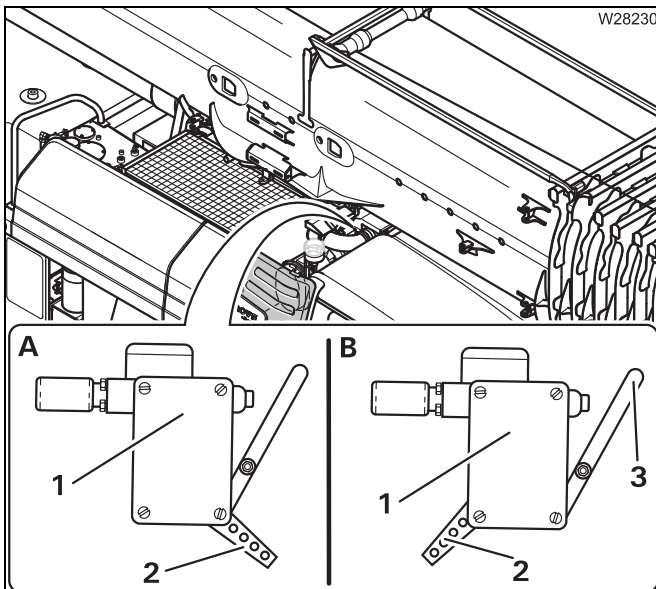


The engine can be restarted only after the air intake inhibitor has been released.

#### Releasing the air intake inhibitor

The following requirements must be met in order to release the air intake inhibitor:

- The ignition must be switched off.
- The emergency stop switch must be reset.



The indicator (2) shows the current state of the air intake inhibitor (1).

- (A) – The indicator (2) is in the *closed* position.
- (B) – Turn the indicator (2) clockwise until it engages in the *released* position.

You can close the air intake inhibitor manually with the lever (3).

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# 5

## Driving

### 5.1

### Before driving

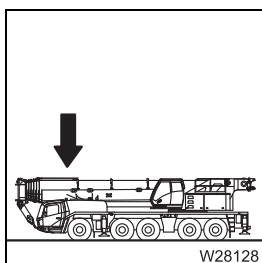
#### 5.1.1

#### CHECKLIST: Checks before on-road driving




This checklist is not a complete operating manual. There are accompanying instructions, which are indicated by cross-references.

**Observe the warnings and safety instructions there!**

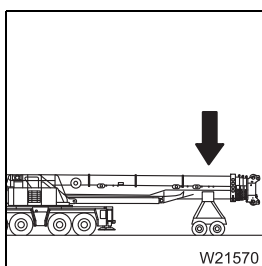


#### 1. If the boom is on the boom rest







- All telescopic sections are interlocked; the telescoping cylinder is locked with telescopic section I.
- The slewing gear is switched off;  p. 10 - 119.



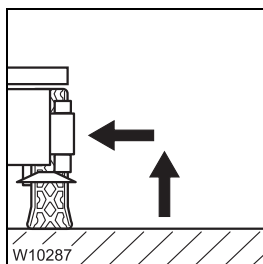
#### 2. The symbol goes out (if present); p. 5 - 9.



#### 3. When the main boom is resting on a dolly

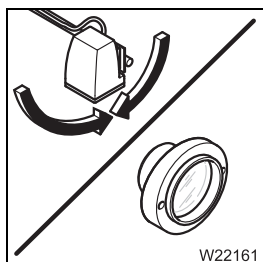
- All telescopic sections must be locked together.
- The slewing gear is switched off;  p. 10 - 119.
- The boom floating position is switched on;  p. 6 - 13.
- The slewing gear freewheel must be switched on;  p. 6 - 12.
- The boom pre-tensioning may be switched on;  p. 6 - 14.
- The houselock may be switched off;  p. 10 - 17.
- The superstructure is unlocked;  p. 10 - 15.





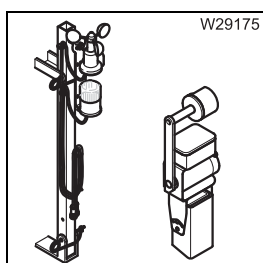
**4. On the outrigger**

- All outrigger beams must be fully retracted and secured to prevent extension; ■■■▶ p. 11 - 42.
- The outrigger pads must be in the driving position; ■■■▶ p. 11 - 51.



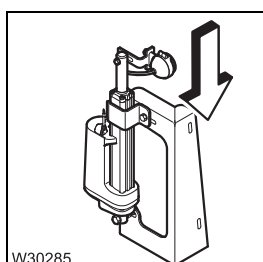
**5. The spotlight must be pivoted downwards (if present); ■■■▶ p. 10 - 127.**

The lighting on the outrigger must be switched off; ■■■▶ p. 3 - 70.



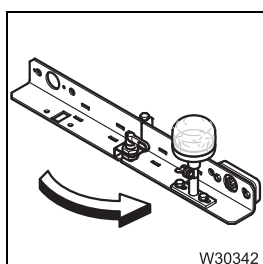
**6. Anemometer, air traffic control light and camera system must be removed:**

- ▶ *Anemometer and air traffic control light*, p. 11 - 126,
- ▶ *Camera on main boom*, p. 11 - 137.

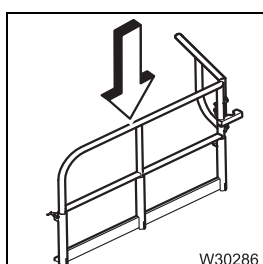


**7. The camera at the hoists is retracted;**

■■■▶ *Camera on the hoists*, p. 11 - 139.

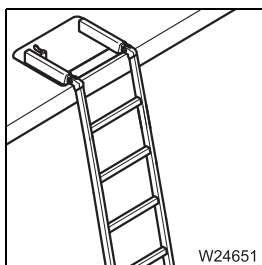


**8. The lighting carriers on the superstructure are folded out; ■■■▶ *Folding the lighting carrier in/out*, p. 11 - 130.**



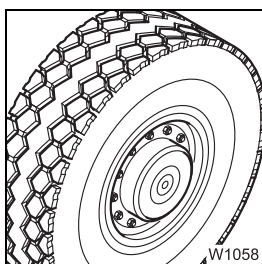
**9. Slide in the handrails on the turntable, depending on the equipment fitted;**

■■■▶ *Railings on the turntable*, p. 11 - 129.



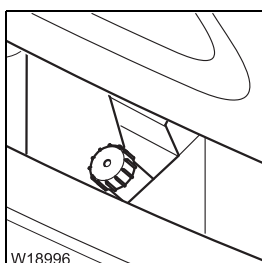
**10. Fold in all ladders and retract extend all stair treads;**

- ▣▣▣▣ *Ladders*, p. 4 - 5,
- ▣▣▣▣ *Step at the crane cab*, p. 11 - 141.

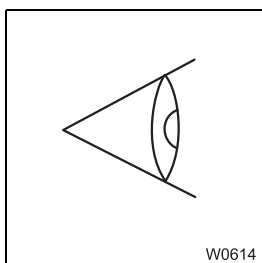


**11. Check the tyres:**

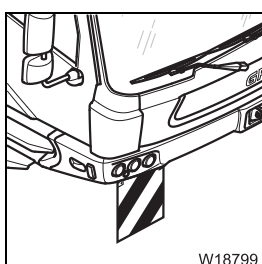
- Tyre pressure when tyres are cold in on-road mode; ▣▣▣▣ p. 1 - 16.
- Other checks; ▣▣▣▣ *Maintenance Manual*.



**12. Windscreen washing system – check filling level; ▣▣▣▣ *Maintenance Manual*.**

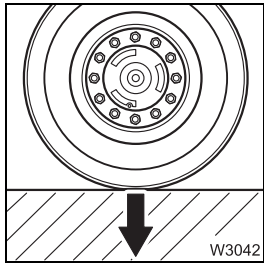


**13. Carry out an inspection of the truck crane, looking out in particular for any leaking fluids (oil, fuel or water).**

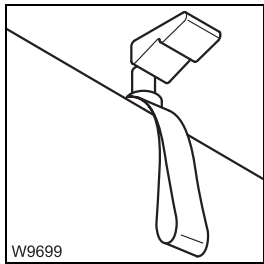


**14. The warning signs for marking the vehicle width are folded down (only for vehicle widths of over 2.75 m (9.0 ft));**  
Vehicle width; ▣▣▣▣ p. 1 - 8,  
Warning signs; ▣▣▣▣ p. 5 - 7.



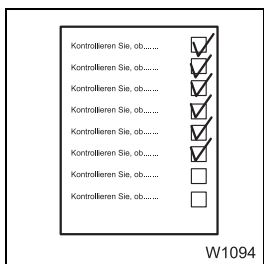


- 15.** The detachable equipment parts must be stripped down so that they fulfil the regulations of the country in which you are working as regards permissible weights and axle loads, lengths, widths, height, etc. For a driving mode with a maximum axle load of 12 t (26,500 lbs);  
 ■■■▶ *Driving modes*, p. 6 - 1.

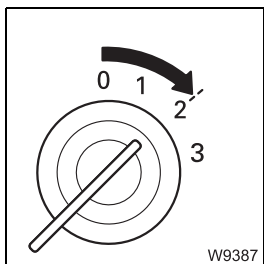


- 16.** The fold-up berth must be folded up and secured; ■■■▶ p. 5 - 48.

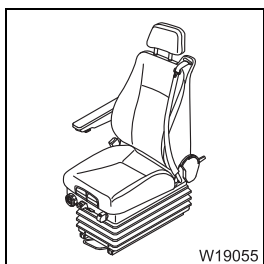
- 17.** All additional parts which may be transported must be secured against falling down.



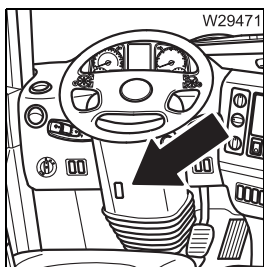
- 18.** Carry out all activities and inspections required for starting the engine;  
 ■■■▶ *CHECKLIST: Starting the engine*, p. 4 - 1.



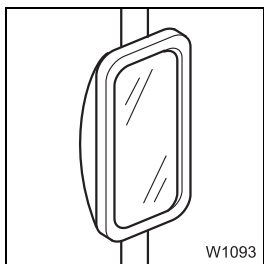
- 19.** Switch on the ignition; ■■■▶ p. 4 - 11.



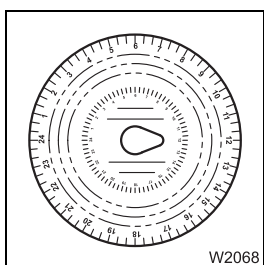
- 20.** Adjust the driver's seat; ■■■▶ p. 5 - 12.



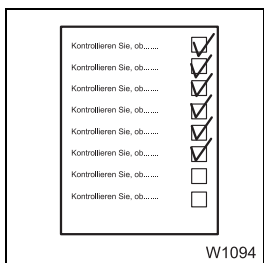
21. Adjust the steering column; p. 5 - 14.



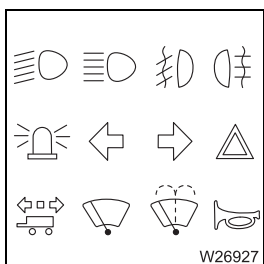
22. Adjust the mirrors; p. 5 - 7.



23. Set the tachograph, insert the diagram sheet; p. 5 - 17.

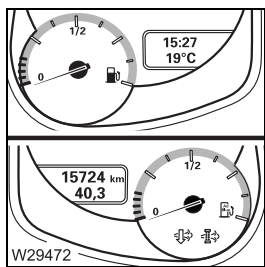


24. Start the engine and carry out all checks; *Inspections after starting the engine*, p. 4 - 16.



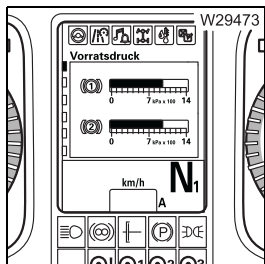
25. Check the electrical system; p. 5 - 7.





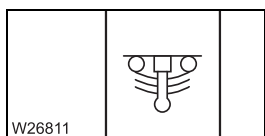
**26. Check the consumable reserve;**

- *Standard tank*, p. 4 - 7,
- *AdBlue*, p. 4 - 9.

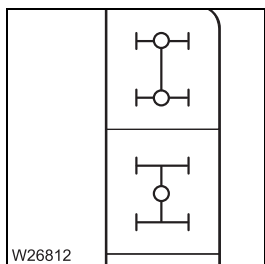


**27. Check the compressed air and brake systems; p. 5 - 10.**

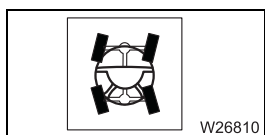
**28. Check that all switching states for on-road driving are set, and that the corresponding symbols are shown:**



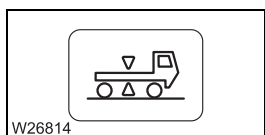
- Suspension switched on; p. 5 - 16,



- Longitudinal and transverse differential locks switched off; p. 5 - 50,



- Separate steering switched off – the symbol for on-road driving is shown; p. 5 - 62,



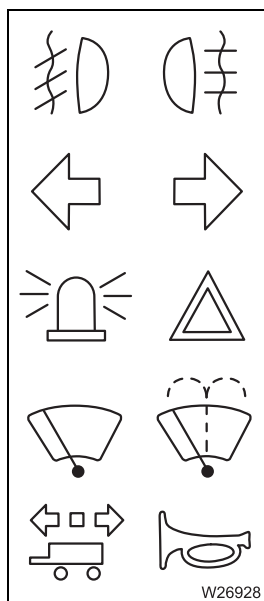
- On-road level is set; p. 5 - 53.

Establish the switching states for on-road driving if necessary.

## 5.1.2

### Check the condition of the truck crane

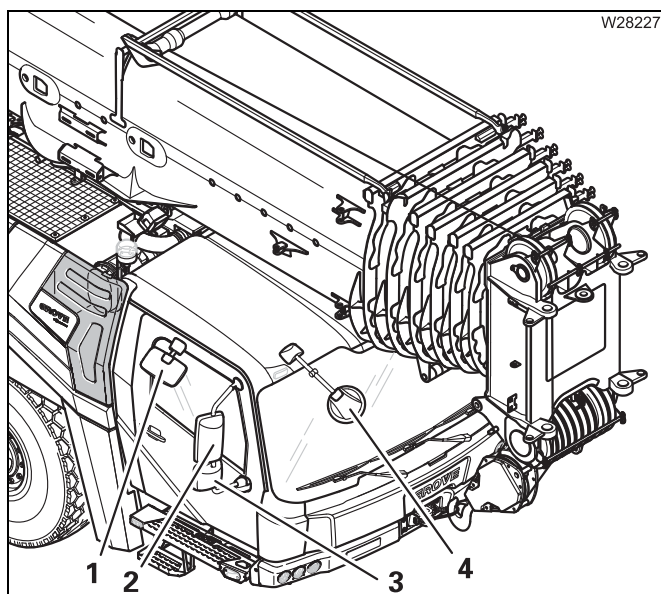
#### Electrical system



- Check the following functions and arrange for faulty parts to be repaired:
  - Parking light/headlight, rotating beacons, fog tail light, side marker lights,
  - Hazard warning system,
  - Brake lights,
  - Reversing lamp/buzzer,
  - Full-beam headlight,
  - Turn signal indicators,
  - Windscreen wipers,
  - Windscreen washing system,
  - Horn.

#### Adjusting the mirrors

Adjust all the mirrors to suit your sitting position.

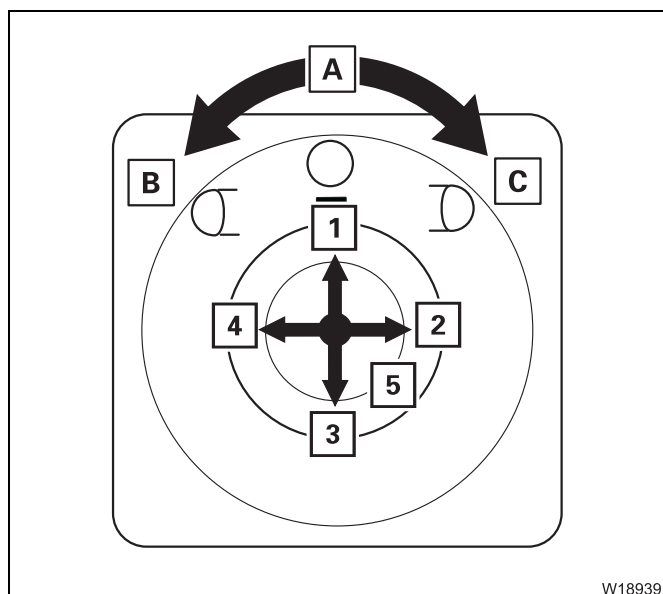


#### Manual adjustment

- Manually adjust the mirrors (1), (3) and (4).

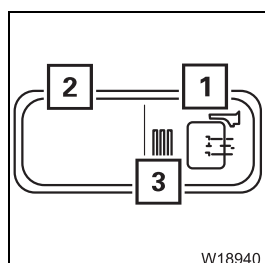
The mirrors (2) are adjusted electrically on both sides.





### Electrical adjustment

- Turn the button to position
  - A** Neutral position
  - B** Mirror on the driver's side or
  - C** Mirror on the passenger side.
- Press the button (**5**) – the mirror moves.:
  - 1** Up
  - 2** Right
  - 3** Down
  - 4** Left



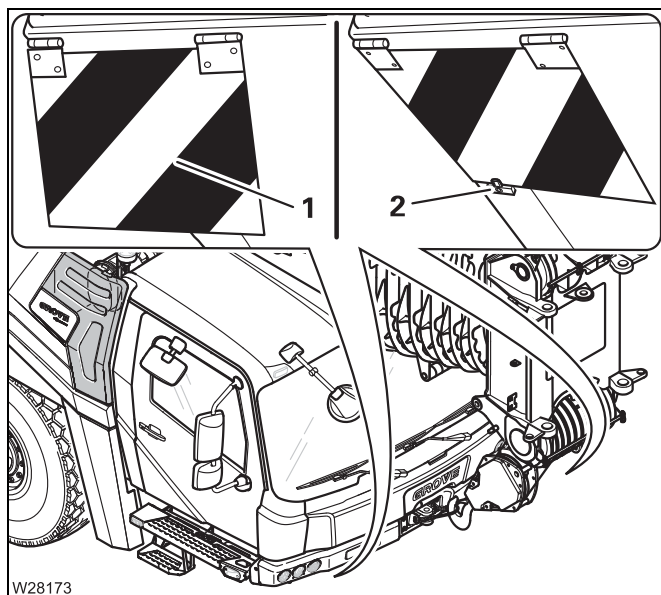
### Mirror heating

- 1 To switch on:** Press button once – lamp (**3**) turns on
- 2 To switch off:** Press button once – lamp (**3**) turns off



### Warning plates for vehicle width


Depending on the vehicle width, fold-up warning plates are fitted below the driver's cab.



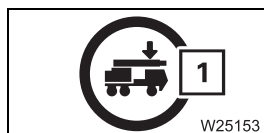
The warning plates (1) must be folded down to indicate the vehicle width during on-road driving.

For off-road driving, the warning plates can be folded up and fastened with the locking bar (2).

### Displaying vehicle height

The vehicle height given at on-road driving level is only maintained when the main boom is resting in the boom rest;  p. 1 - 8.

- Open the start menu.



With additional equipment the position of the main boom in the boom rest is monitored.

- Check that the symbol (1) is shown.
- When the symbol (1) is shown, derrick the main boom out until the symbol (1) disappears.



#### **Risk of accidents by exceeding total permissible height!**

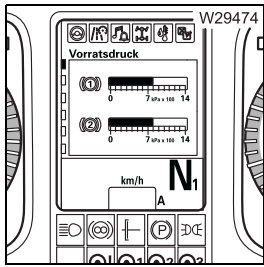
Check that the symbol is displayed.

Otherwise the indicated total height will also be exceeded at on-road level.



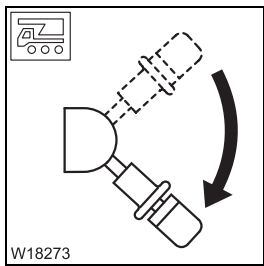
## Supply pressure

The brake system and some consumers (e.g. differential locks, driver's seat, etc.) require sufficient supply pressure in order function properly.



- Check that the supply pressure is approx. 8 bar (116 psi).

If the supply pressure is too low, such as after repairs, you can build it up as follows.



### Building up supply pressure

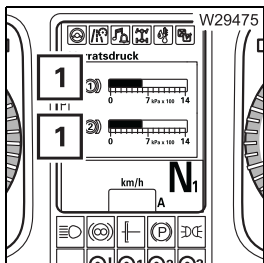
- Check that the parking brake is applied.



### Risk of accidents due to the truck crane moving unintentionally!

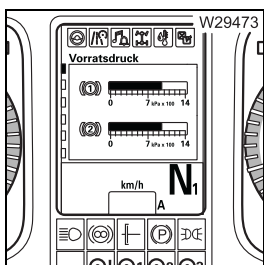
Make sure that the lever is pointing down before building up the supply pressure.

This prevents the parking brake from releasing as soon as sufficient pressure is available and the truck crane moving unintentionally.



- Allow the engine to run. The supply pressure builds up and you can speed up this process by pressing the accelerator.

The light (1) turns off once the supply pressure reaches approx. 5.5 bar (80 psi).

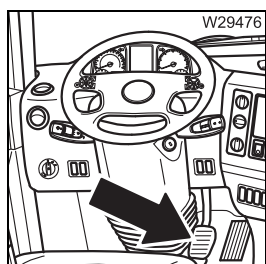


- Refill the supply pressure until
  - approx. 8 bar (116 psi) is reached **and**
  - a valve audibly discharges pressure.

There is now sufficient supply pressure.

## Parking brake

Check the function of the parking brake.



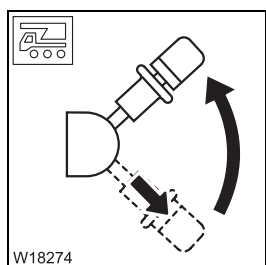
- Activate the service brake.



### **Risk of accidents due to the truck crane moving unintentionally!**

Always apply the service brake before releasing the parking brake.

This prevents the truck crane from rolling in an uncontrolled manner when the parking brake is released.



- Release the parking brake.




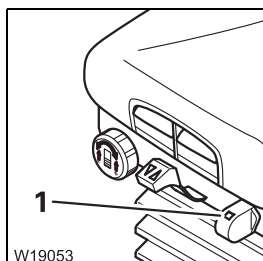
When the supply pressure is sufficient, the parking brake is released and the lamp (1) goes out.

### 5.1.3 Adjusting the seats and steering column

#### Driver's seat

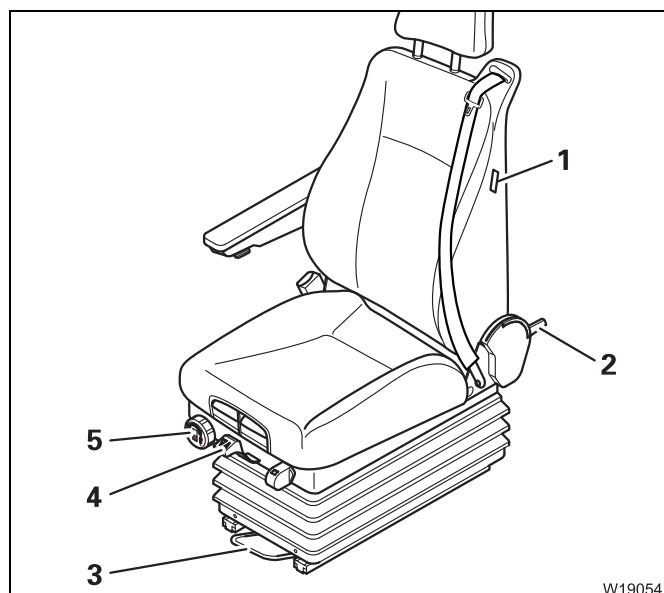
The seat height and lumbar support are adjusted pneumatically. You can only make these adjustments when:

- the switch (1) on the driver's seat is switched off (not pressed in),
- sufficient air pressure is available in the secondary consumer circuit.  
You may have to build up supply pressure;  p. 5 - 10.



- Sit on the driver's seat; the seat will rise to the last position set.

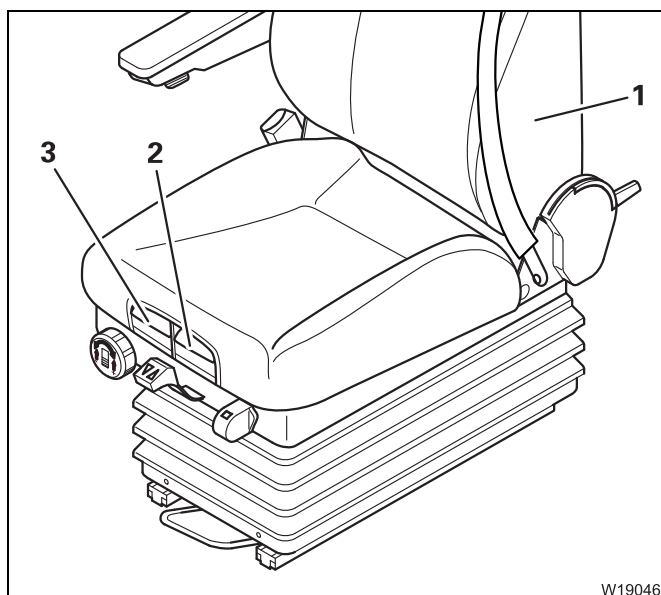
You can make adjustments to suit your body size and shape.



#### Settings for body size

- 1 Seat heating on/off<sup>1)</sup>
- 2 Back rest – angle
- 3 Seat – longitudinal adjustment
- 4 Seat – height
- 5 Adjust suspension stiffness to body weight

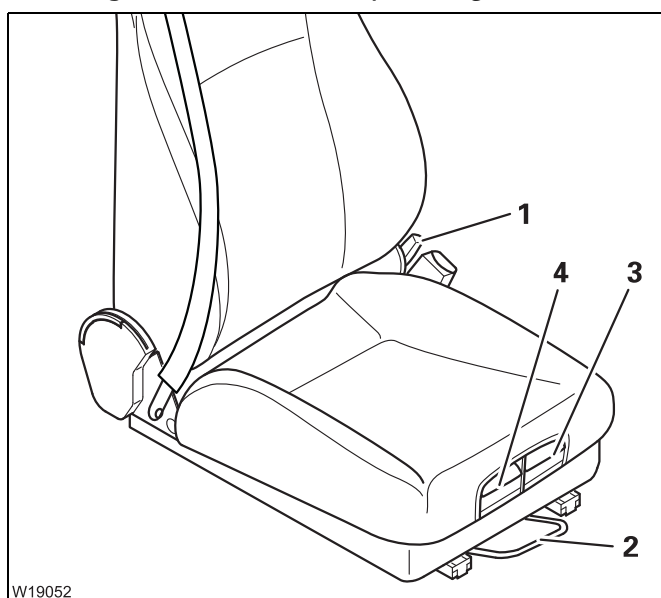
<sup>1)</sup> Additional equipment



### Settings for body shape

- 1 Lumbar area support
- 2 Seat cushion – longitudinal adjustment
- 3 Seat cushion – angle

**Passenger's seat** The passenger's seat is adjusted mechanically.



- 1 Back rest – angle
- 2 Seat longitudinal adjustment
- 3 Seat cushion – longitudinal adjustment
- 4 Seat cushion – angle



## Steering column adjustment


The steering column is unlocked pneumatically.

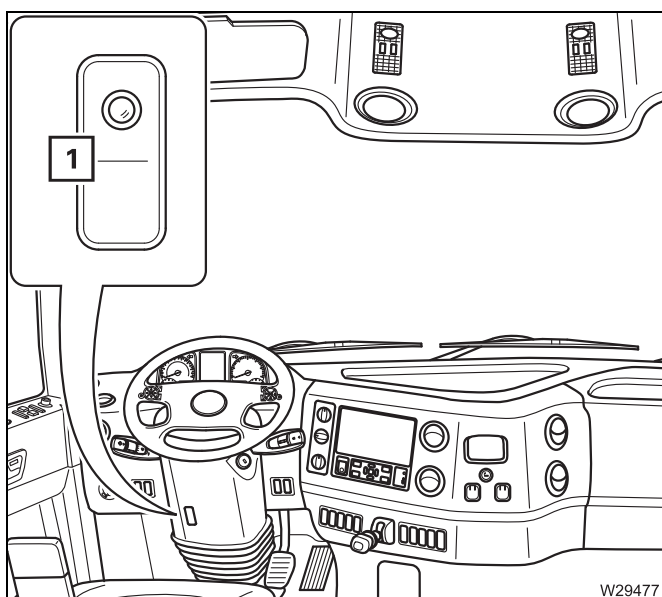


### **Risk of accidents by unlocked steering column!**

Always stop the truck crane before you unlock the steering column.  
Once the steering column is unlocked you can no longer steer safely.



The steering column is only unlocked when sufficient supply pressure is available;  *Building up supply pressure*, p. 5 - 10.

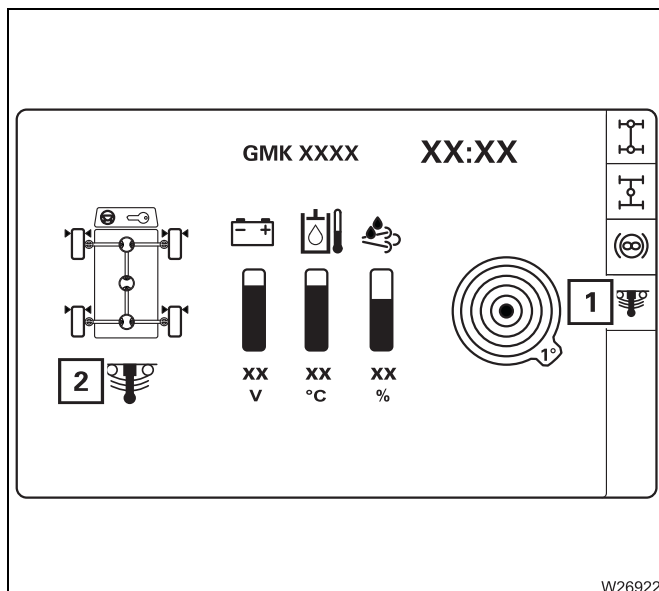


- Push the button (1) down once. The steering column is unlocked for approx. 6 seconds.
- Move the steering column into the desired position.
- Press the button (1) up once.  
Or wait until the steering column locks automatically (after approx. 6 seconds).

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## 5.1.4 Switching the suspension on/off

The suspension is switched off whenever the ignition is switched off.  
The suspension must be switched on for on-road driving.



The current switching state of the suspension is shown on the display (1) in all menus and also in the main menu (2).

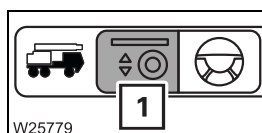
Symbol (1) or (2)

- Green:** Suspension is switched on
- Red:** Suspension is switched off
- Violet:** Error

To switch the suspension on and off, you must open the *Suspension/level adjustment* menu.

### Open menu

You can open the menu only when the truck crane is stationary, or when the current speed is below approx. 5 km/h (3 mph).



- Open the *Suspension/level adjustment* menu (1).



### Switching the suspension on

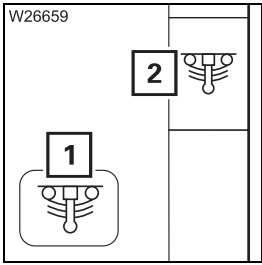
The suspension cylinders are enabled when the suspension is switched on. This state must be established for on-road driving.



#### **Danger of overturning when switching on the suspension!**

Do not switch the suspension on unless the truck crane has been rigged for on-road driving and the main boom has been set down.

If the rigged truck crane was standing on its wheels the suspension struts would be suddenly pushed together when the suspension was switched on, causing them to be damaged and possibly causing the truck crane to overturn.



- Select and confirm the symbol (1).

When the suspension is switched on, the symbol (2) is **green**.

If the symbol (2) remains **red** then:

- the supply pressure may be too low. In this case, the suspension would only be switched when sufficient supply pressure has built up;   
    ▮▮▮▮ *Building up supply pressure*, p. 5 - 10,  
    or
- the axle loads are unevenly distributed after actuating the axle raising system;   
    ▮▮▮▮ p. 12 - 9.

### Switching off the suspension

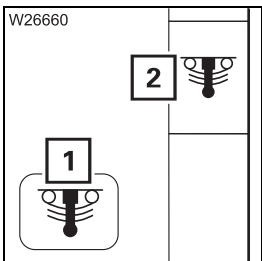
When the suspension is switched off, the suspension cylinders are locked. This state is intended only for crane operation.



#### **Risk of damage to the axle lines!**

Always switch the suspension on for on-road driving.

The axle lines may become damaged and the steering behaviour may change if the suspension is switched off.



- Select and confirm the symbol (1).

When the suspension is switched off, the symbol (2) is **red**.



## 5.1.5 Setting the tachograph

Diagram sheets (24-hour discs) can be inserted into the tachograph for two drivers simultaneously.

As a crane operator, you are obligated to set each activity on the tachograph.



This section only describes the basic operation of the tachograph (inserting diagram sheets, setting time groups, operating errors).

**Before operation, also note the information in the tachograph manufacturer's separate operating manual.**

There you will find detailed information (marking the diagram sheets, malfunctions, etc.).



### **Risk of damage to the tachograph drawer!**

Open the tachograph drawer only to insert or remove diagram sheets and do not use the opened drawer as a shelf or surface (e.g. to mark the diagram sheets). This prevents contamination and damage.

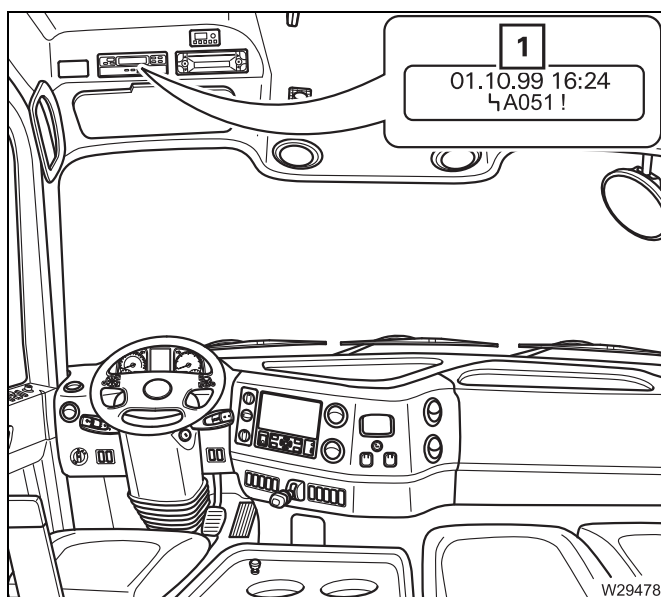
### **Prerequisites**


To set the tachograph, the following requirements must be met:

- The ignition is switched on,
- The truck crane is stationary,
- No error message is displayed.

### **In the event of malfunctions**

Check that a malfunction has occurred.

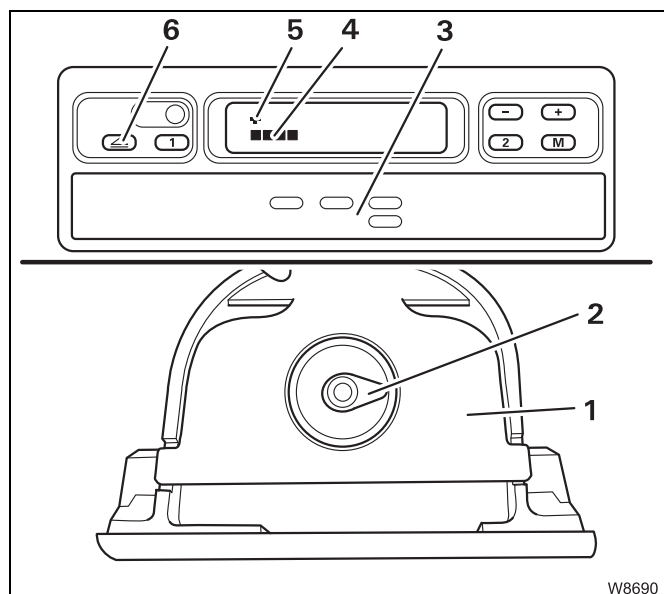


If a malfunction has occurred, the *Tachograph* display (1) shows an error message;  *Separate operating instructions* of the tachograph manufacturer.



## Setting the tachograph

To set the tachograph, you must first open the drawer and check the time setting. You can then insert the diagram sheets and set the time groups.



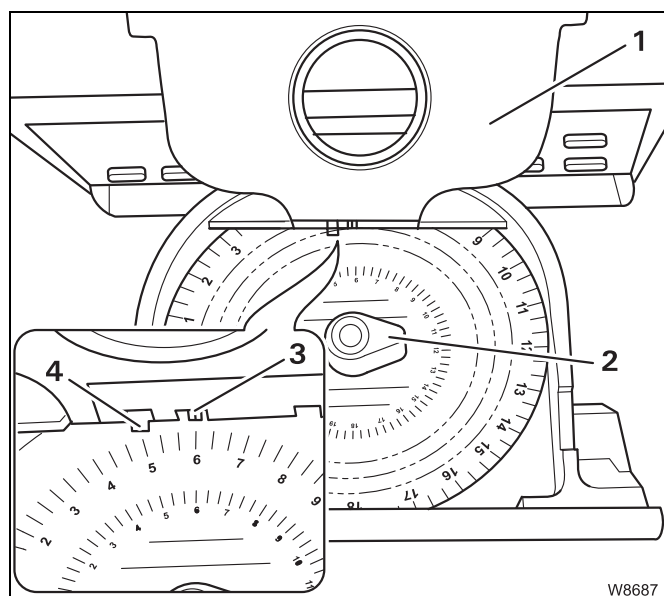
### Opening the drawer

- Press the button (6) once.

First the symbol (5) and the running bar (4) appear, then the drawer (3) opens.

- Pull out the drawer (3) as far as it will go.

The diagram sheet mounting (2) and an isolating plate (1) are in the drawer.



### Checking the time setting

- First check the time setting for the diagram sheet mounting (2), fold the isolating plate (1) upwards to do this.
- Insert a diagram sheet. Make sure that the diagram sheet is under the spring (4).
- Check whether the diagram sheet's time scale on the marking (3) is showing the current time.

### Correcting the time

- Take all the diagram sheets out of the diagram sheet mounting.
- Close the drawer.  
The time setting is corrected automatically.
- Open the drawer and insert the required diagram sheets.

## Inserting diagram sheets

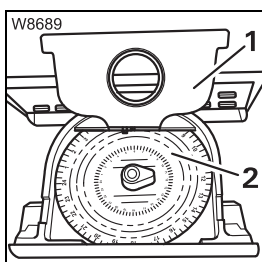


Only insert diagram sheets that are properly marked.  
The diagram sheets are always inserted with the front facing upwards.



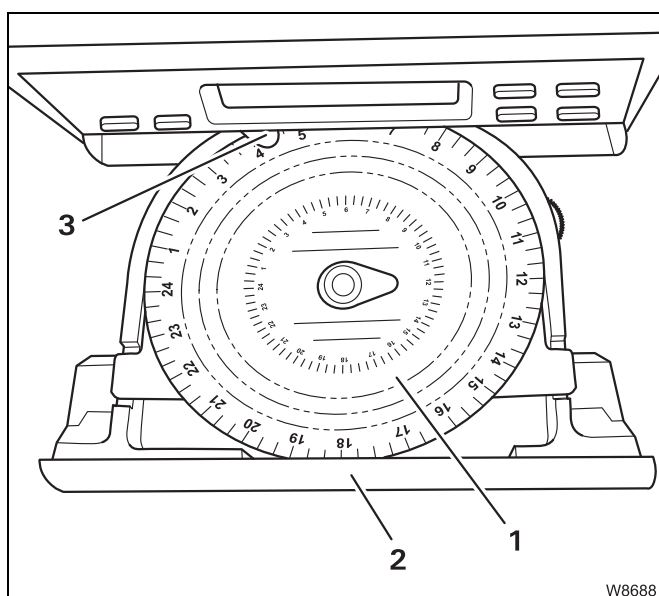
### Risk of malfunctions in the electronics!

If a diagram sheet has been damaged by being marked several times, this might cause malfunctions in the electronics. Always insert the plastic diagram sheet supplied should you not need to use the tachograph.



With **2-driver operation** a diagram sheet (2) for driver 2 must be placed below the isolating plate (1):

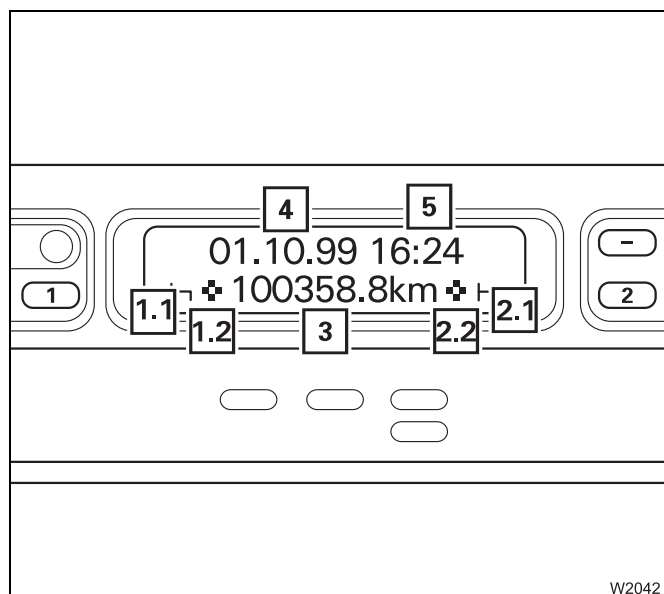
- After checking the time, leave the diagram sheet (2) where it is.
- After checking the time, insert the diagram sheet (2).



- Fold the isolating plate downwards.
- Put the diagram sheet (1) for driver 1 on the isolating plate.
- Take care that the diagram sheet is under the holder (3).
- Push the drawer (2) back in until it engages.

For **single-driver operation**, the diagram sheet mounting under the isolating plate is empty and only the diagram sheet (1) for driver 1 is inserted.

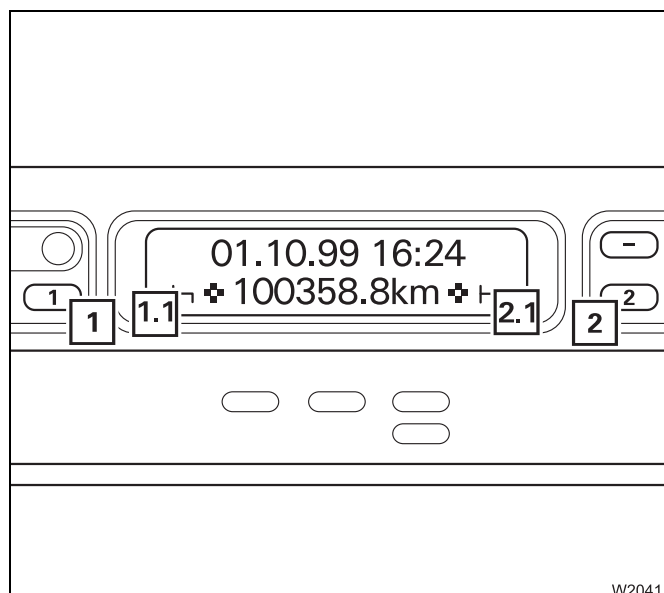




### Display

If there is no malfunction, the *Tachograph* display now shows the basic display:

- Date (4) and time (5)
- Driver 1 time group (1.1)
- Driver 1 diagram sheet inserted (1.2)
- Total kilometres of the truck crane (3)
- Driver 2 time group (2.1)
- Driver 2 diagram sheet inserted (2.2)



### Setting the time groups

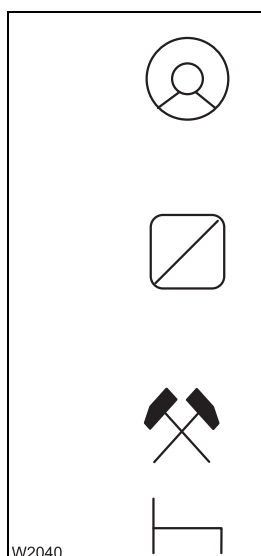
Set the time group for driver 1 using the button (1).

The set time group is shown by the symbol (1.1).

Set the time group for driver 2 using the button (2).

The set time group is shown by the symbol (2.1).

The different time groups are shown with the following symbols:



**Driving times:** As soon as the vehicle starts to move, the tachograph automatically switches to the symbol for driver 1 driving time. If two diagram sheets are inserted, the tachograph automatically switches to stand-by time for 2-driver operation.

**Working hours:** For all other work, the same activities apply as for stand-by time. When setting the working hours and stand-by time, observe the applicable local regulations for the country in which you are working.

**Stand-by time:** Periods of presence at the truck crane, e.g. crane operation, maintenance work, passenger time, etc.

**Breaks and periods of rest:** These times are prescribed by law and must be observed.

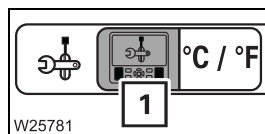


If the drivers swap during **2-driver operation** the diagram sheets in the trip recorder also have to be changed. The driving time is always recorded on the diagram sheet which is on the isolating plate (driver 1).

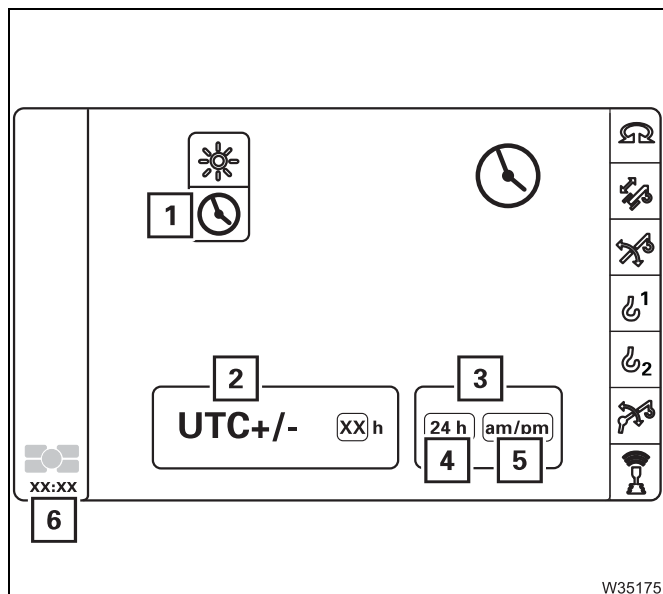


In **single-driver operation**, the symbol for resting must always be set for driver 2 otherwise an error message will appear.

## 5.1.6 Setting the time



- Open the *Set display brightness and date/time* menu (1).



- Select and confirm the symbol (1).

### Setting the time

- Select and confirm the symbol (2).
- Select the current time – as a deviation from the UTC time.
- Confirm the selection. The newly set time is shown on the display (6).

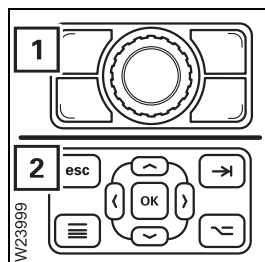
### Switching the display type

- Select and confirm the display (3).
- Select the symbol for the desired display type.

4 24 hours

5 12 hours AM/PM

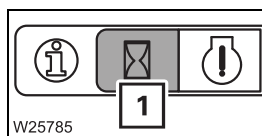
Confirm the selection, the selected display type becomes orange.



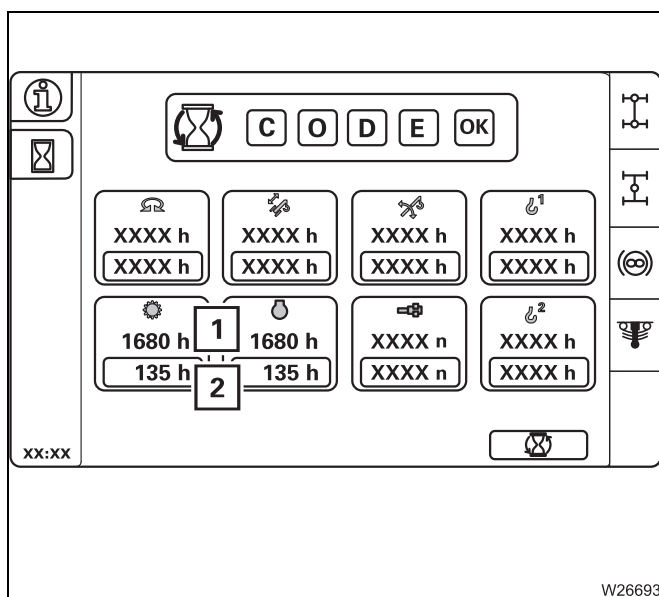
You can **Cancel** the input at any time. Press button (1) or (2).  
None of the values will be changed.

## 5.1.7 Displaying and resetting operating hours

You can view the total operating hours for all power units in the *Operating hours* menu. You can also delete the recorded operating hours. The total operating hours cannot be deleted.



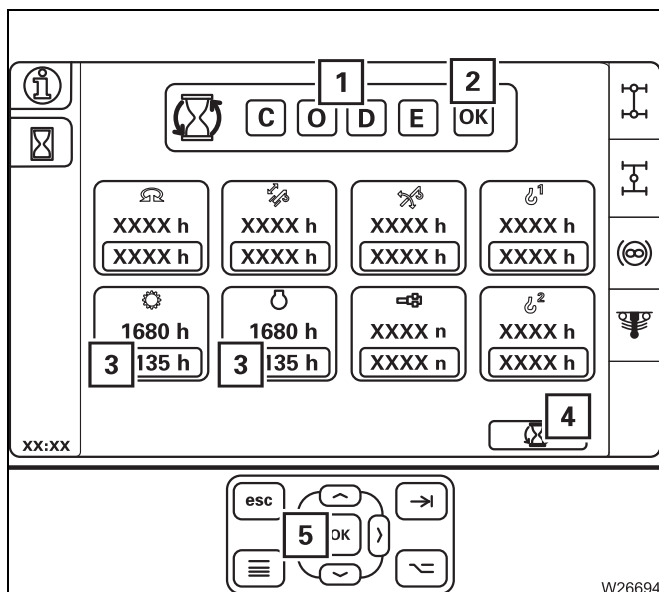
- Open the *Operating hours* menu (1).



### Displays

The operating hours are recorded as follows:

- The value (1) indicates the total operating hours, e.g. 1,680 hours,
- The value (2) shows the operating hours, which can be reset.



### Reset

The displayed operating hours (3) can be reset.

- Enter the keycode in the fields (1) and confirm with (2).

You can perform the following actions for power units:

- select individually (3),
- select all (4).
- Reset the selected operating hours with button (5).

Blank page



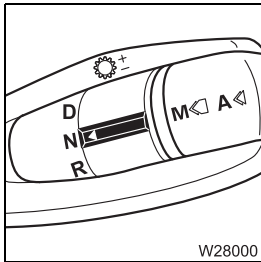
## 5.2

## Operating the transmission

The transmission automatically controls all gear changes. Despite this, gears can be changed manually at any time.

### 5.2.1

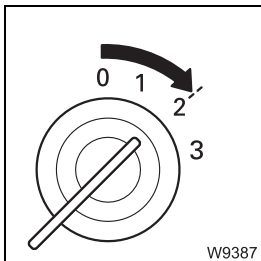
### Switching on



When the ignition is switched off, the transmission must always be in the neutral position.

- Shift to position **N**.

If you switch on the ignition in positions **D** or **R**, malfunctions may occur.



- Switch on the ignition.

The electronic gear system is switched on, and a warning buzzer sounds for several seconds.

## 5.2.2 Switching the transmission to the neutral position

You can switch the transmission to neutral position at any time.



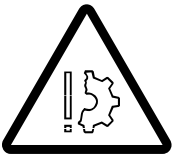
### **Risk of accidents when switching while driving!**

If you switch the transmission to neutral position while driving, the drive line will be interrupted. As a result you will no longer be able to accelerate the truck crane, for instance when trying to avoid an obstacle, and the engine retarder will have no effect.



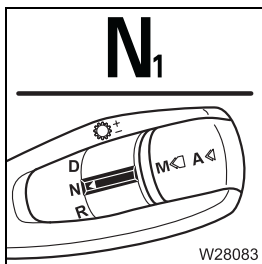
### **Risk of accidents due to the truck crane rolling away!**

Always apply the parking brake or the service brake before you switch to the neutral position. This prevents the truck crane from rolling away unintentionally.



### **Risk of damage to the transmission!**

When stationary for a longer period (e.g. in a traffic jam or at a level crossing), always switch the gear to **N**. This avoids excessive wear on the transmission components.



- Shift to position **N**.


The neutral position is switched on when the entry **N** appears.

Switch the transmission to neutral position to start the engine. The engine may only be started in this position.

## 5.2.3

### Selecting the direction of travel and starting gear

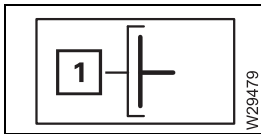
#### Selecting the driving direction


Before driving at temperatures below -20 °C (-4 °F);  p. 5 - 34.

The following requirements must be met before selecting the driving direction:

- The truck crane is stationary,
- The parking brake must be engaged,
- The accelerator is not operated.

- Start the engine;  p. 4 - 14.



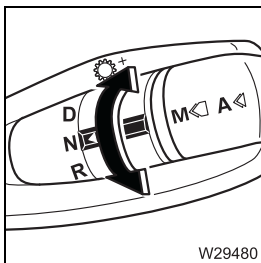
If the supply pressure is insufficient for shifting the transmission, the display will show the symbol (1). A corresponding message is also displayed. If necessary, wait until the supply pressure has built up, and the message disappears;  *Building up supply pressure*, p. 5 - 10.

- Release the accelerator.

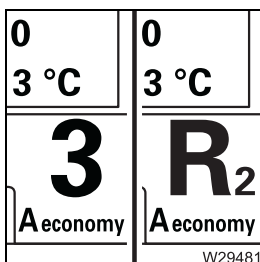


#### Risk of accidents from uncontrolled starting!

When you press the accelerator, the clutch is engaged immediately after the start-up gear is (automatically) selected, and the truck crane will start to move.



- In order to
  - For **forward travel** in position **D**.
  - for **reverse travel** in position **R**. An acoustic signal sounds if additional equipment is present.

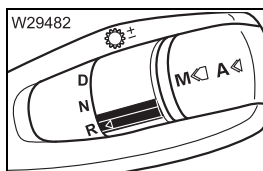


The *Automatic* operating mode is now selected. An appropriate starting gear is selected and displayed:

- For forward travel, e.g. 3rd gear,
- For reverse travel, e.g. 2nd gear.

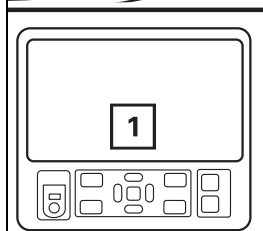
The clutch is not engaged (only when you press the accelerator).



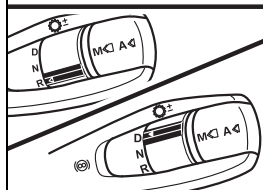


### For reverse travel

The reverse camera is switched on.



The display (1) shows the area behind the truck crane.



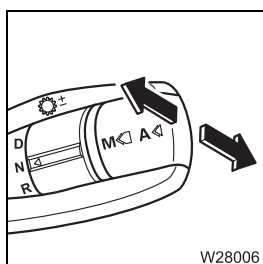
When you exit the transmission mode **R**, the camera is switched off and the display (1) shows the CCS menu.

### Selecting the starting gear



You can also change the gear that is automatically selected on starting.

Only change the gear selected on starting if it is absolutely necessary to do so. Starting in a gear that is too high causes premature clutch wear.



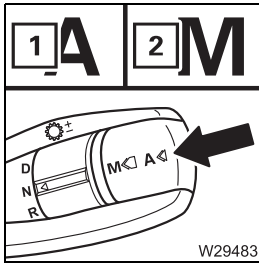
- Pull the gearshift lever upwards once.  
The starting gear is shifted up by one gear.
- Press the gearshift lever downwards once.  
The starting gear is shifted down by one gear.

The altered starting gear is shown on the display.

By changing the starting gear, you also change the transmission over to *Manual* operating mode at the same time. For on-road driving, you should switch over to *Automatic* operating mode.

## 5.2.4

### Changing the operating mode

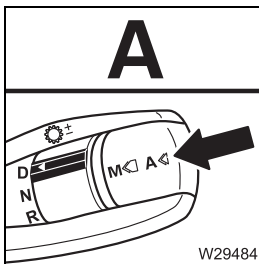


The display shows which operating mode is switched on.

- Symbol (1) – *Automatic* operating mode on.
- Symbol (2) – *Manual* operating mode on.

It is possible to switch between the operating modes whilst the vehicle is stationary or whilst on the move.

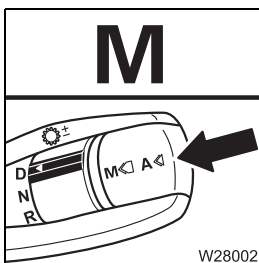
#### Changing to automatic mode



The *Automatic* operating mode is intended for on-road driving.

- Press the gearshift lever in once.
- The transmission switches to the *Automatic* operating mode.
- When at a standstill, a suitable starting gear is engaged.
  - While driving, the gears are changed automatically, depending on the load.

#### Change-over to manual mode



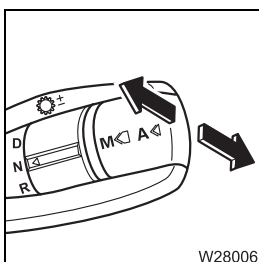
The *Manual* operating mode is intended for off-road driving with load conditions changing at short notice.

You can change over either with a gear change or without a gear change.

#### Changing over without gear change

- Press the gearshift lever in once.

The transmission remains in the currently selected gear and is now in *Manual* operating mode.



#### Changing over with gear change

- Push or pull the gearshift lever down or up once.

The transmission upshifts one gear (or downshifts one gear) and is now in *Manual* operating mode.

## 5.2.5 Starting



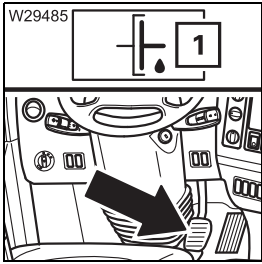
### Risk posed by unexpected rolling!

Also apply the parking brake before starting on sloping ground. The gear will be engaged only once you depress the accelerator. This can lead to the truck crane starting to move (perhaps backwards) whilst you are moving your foot from the brake pedal to the accelerator.

To **start moving** you must do the following:

- shift into a gear,
- press the accelerator,
- release the parking brake

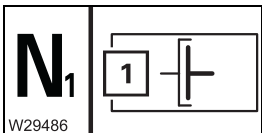
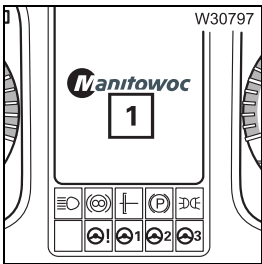
When starting, the wet clutch is filled with oil and the truck crane starts driving. After starting the indicator lamp goes out (1) and the driving force is then transmitted via the dry clutch.



### Warning when starting

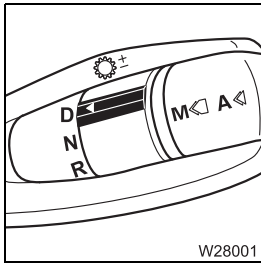
When the load during starting is so large that it would cause the clutch to overheat, a warning buzzer sounds. A corresponding messages is also shown on the display of the on-board computer (1).

- In this event immediately take your foot off the accelerator and apply the service brake.
- Switch to the neutral position **N** and leave the engine running until the clutch has cooled down and the symbol (1) is no longer shown on the display.
- Select a lower starting gear.
- Start to move again.



## 5.2.6

### Driving and changing gears



- When driving, always leave the switch in the position for the current driving direction, e.g. in position **D** for forward travel.

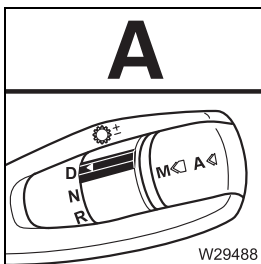


#### **Risk of accidents due to changing transmission direction whilst driving!**

If whilst driving in one direction you select a gear for the opposite direction, the transmission shifts into the neutral position. In this position, you cannot accelerate the truck crane, even in an emergency, and the engine retarder does not work.

#### **In automatic operating mode**

In this operating mode, the transmission changes to the gear suitable for the current load, engine speed and position of the accelerator.



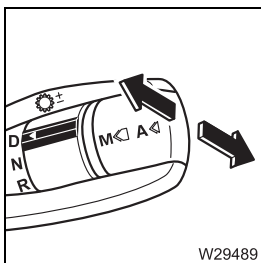
#### **Automatic upshifting**

You can influence upshifting by using the accelerator.

- Pressing the accelerator slightly: Upshifting at low engine speed
- Pressing the accelerator harder: Upshifting at high engine speed

#### **Automatic downshifting**

- When you slow down the truck crane by braking, the transmission shifts down when the appropriate engine speed is reached.
- If you fully depress the accelerator full (kick down), the transmission first shifts to a lower gear. After that, it will shift to a higher gear only once a higher engine speed has been reached, so as to achieve maximum acceleration.



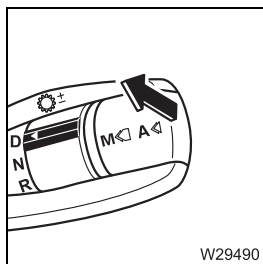
If you execute a manual gear change using the gearshift lever, you simultaneously switch to *Manual* operating mode.

The transmission will only perform an automatic shift after you have switched to *Automatic* operating mode (push in the gearshift lever once).



### In manual operating mode

In this operating mode, the transmission only shifts when you actuate the gearshift lever.

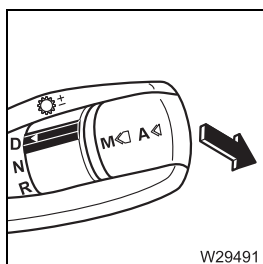


#### Manual upshifting

To upshift, you must pull the gearshift lever upwards briefly:

- Upshifting one gear: Push up once
- Upshifting two gears: Briefly push upwards twice
- Upshifting three gears: Briefly push upwards three times

The newly engaged gear will be shown in the display.



#### Manual downshifting

To downshift, you must press the gearshift lever downwards briefly:

- Shift one gear down: Push downwards once
- Shift two gears down: Briefly push downwards twice
- Shift three gears down: Briefly push downwards three times

The newly engaged gear will be shown in the display.

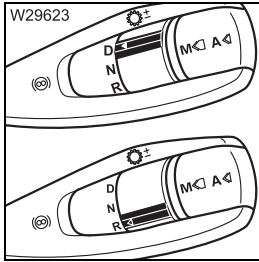


If you initiate a gear change which would cause the maximum permitted engine speed to be exceeded, the transmission does not shift. In that case, slow the truck crane down until a permissible engine speed is reached, and downshift again.



## 5.2.7

### Changing the driving direction



- Stop the truck crane.
- Shift to the position for the opposite direction.  
At a standstill, you can shift two levels in succession immediately.  
You do not need to wait for the intermediate position **N** to appear.

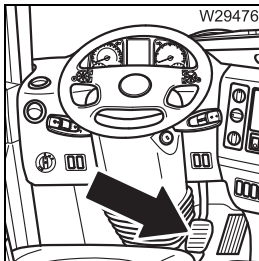
The newly engaged gear will be shown in the display.



Up to a speed of approx. 30 km/h, you can also pre-select a reverse gear or forward gear when driving. The gear is switched when the truck crane comes to a stop. The shifting operation is complete when the display shows the selected gear.

## 5.2.8

### Stopping



- In order to stop, remove your foot from the accelerator and actuate the brake pedal.

The transmission declutches shortly before the vehicle comes to a halt. The current gear remains engaged.

#### Stopping for a long period of time

If you stop for more than 1 to 2 minutes with the engine running, you need to perform the following to protect the clutch:

- Apply the parking brake and
- shift the transmission to neutral.

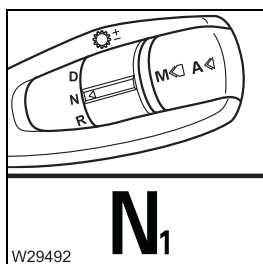
## 5.2.9

### On the roller type dynamometer



#### **Danger of unexpectedly moving off rollers!**

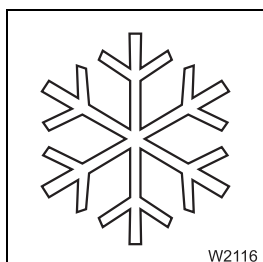
Always shift to the neutral position on the roller type dynamometer. In position **D** or **R**, a suitable gear is engaged for the speed. The engine braking power is applied against the rollers and the truck crane can drive out of them.



- Always switch to neutral position after driving onto a roller type dynamometer.

## 5.2.10

### Preheating transmission



When the outside temperature is between  $-20\text{ }^{\circ}\text{C}$  and  $-25\text{ }^{\circ}\text{C}$  ( $-4\text{ }^{\circ}\text{F}$  and  $-13\text{ }^{\circ}\text{F}$ ), the gear oil must be preheated before you start driving the truck crane.

Let the engine run at idling speed for at least 10 minutes before you start driving.

## 5.3

## Driving and parking off the truck crane



### Risk of accidents because the truck crane cannot be steered!

Never switch off the ignition or remove the ignition key while the truck crane is moving!

This precaution prevents the steering from locking and consequent loss of control of the moving truck crane.



### Risk of accident when the ignition is switched off!

Never switch off the ignition while driving.

After switching off the ignition the 4th and 5th axle lines are brought into forward alignment and can no longer be moved.

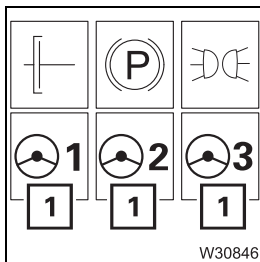
This changes the turning radius of the truck crane.

### 5.3.1

### Checks while driving

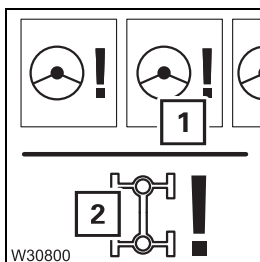
#### Immediately after you start to move

- Check the service and parking brakes for correct functioning immediately after starting out.



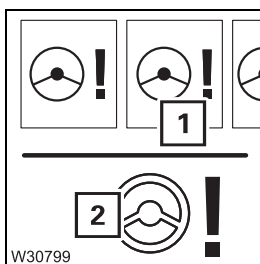
- Check the lamps (1).

At speeds above 10 km/h (6 mph) **all** the lamps must go out. If a lamp does not go out, this indicates a malfunction in the steering.



- The lamp (1) lights up when an error is detected in the steering system – the symbol (2) is shown. The 4th and 5th axles are brought into the straight running position and can no longer be steered. It is possible to continue driving. Steering is now only possible with the 1st and 2nd axle lines – the turning radius increases accordingly.

- Have the error rectified as soon as possible.



- The lamp (1) lights up when a serious fault is detected in the steering system – the symbol (2) is shown. The 4th and 5th axle lines can no longer be steered in a controlled manner.

- Stop the vehicle as soon as possible. Briefly switch the ignition off then on again. If the lamp is still lit, contact **Manitowoc Crane Care**.





**Risk of accidents because the truck crane cannot be steered!**

Stop as quickly as possible if the red lamp lights up.

When driving, the 4th and 5th axles may move uncontrollably, which can cause a serious accident even at low speeds.



**Risk of accidents if the steering circuits fail!**

If one or all of the symbols are red, stop the truck crane immediately and switch off the engine.

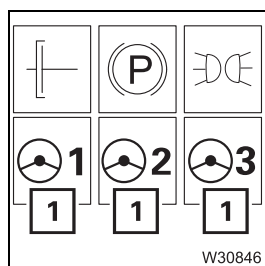
Check whether oil has been lost. Depending on the size of a leak, the oil supply in a steering circuit may be lost within 2 minutes.

**If oil has escaped**

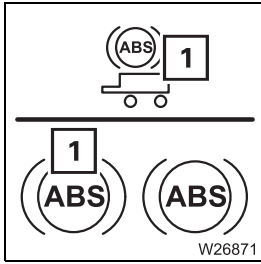
- Warn any vehicles on the road behind you.
- Do not continue driving. Contact **Manitowoc Crane Care**.

**If no oil has escaped**

- Start the engine.
- If all 3 lamps (1) light up:
  - Switch the engine off. Contact **Manitowoc Crane Care**.
- If **at most** 2 lamps (1) light up:
  - Drive at a speed greater than approx. 10 km/h (6 mph).
  - If only one lamp is still lit, drive **slowly** to the next repair shop. The steering may be sluggish.
  - If two lamps are still lit, stop immediately. Contact **Manitowoc Crane Care**.



➡ *Malfunctions of the steering, p. 7 - 22*

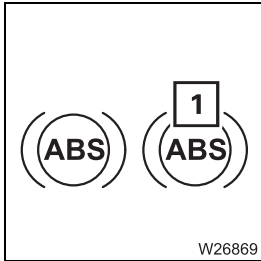


### Lamps for the ABS system

- Check the lamps (1).

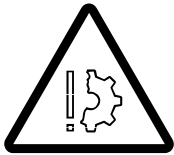
At speeds of above 6 km/h (4 mph), the lamps (1) **must** go out. Then the **Anti Blocking System (ABS)** is operational and the wheels are prevented from being blocked when you brake.

If a lamp does not go out, the corresponding ABS system is faulty, and the wheels will no longer be prevented from blocking. The full braking force is retained; *Malfunctions of the service brake, p. 7 - 21.*



If the lamp (1) lights up, then the braking operation is supported by the ABS system.

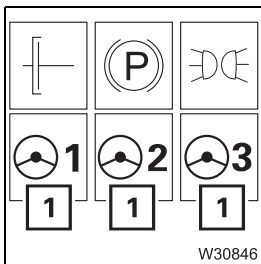
### While driving



- Observe all warning messages.

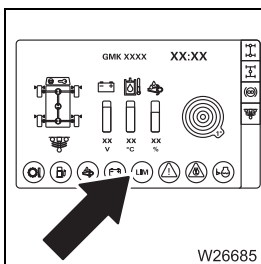
#### Risk of damage if warning messages are disregarded!

Once a warning message appears (on the *CCS display* or *combination instrument display*), always promptly observe all information in the section titled *Warning messages on the CCS display*, and take the appropriate corrective measures. This prevents these malfunctions causing defects in the truck crane.



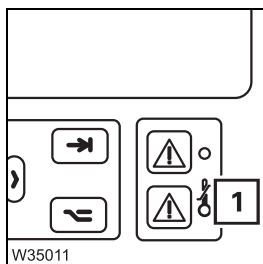
#### On the instrument panel / On the CCS control unit

- If one of the lamps (1) which has already been checked lights up again, refer to the information in the previous section.

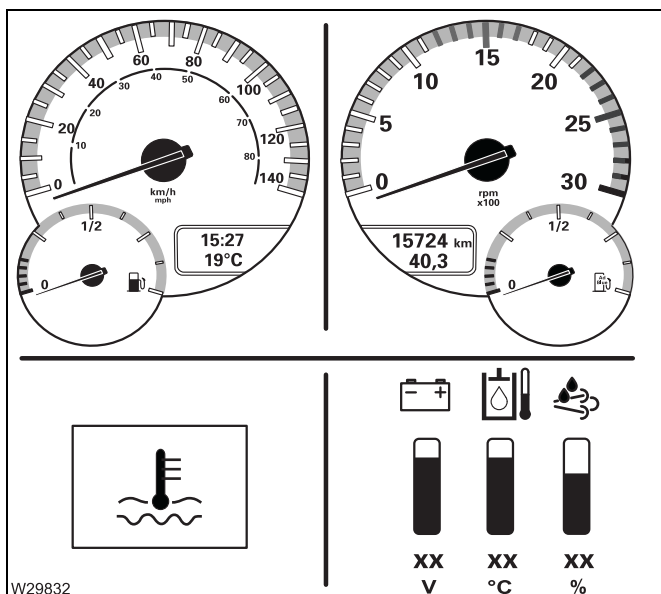


- If the CCS display shows a warning message (1); *Warning messages on the CCS display, p. 7 - 11.*





- The brightness is reduced automatically if the temperature at the display is too high. Do not cover the sensors (1) and keep them clean to avoid contamination that can affect the brightness adjustment.



- Also pay attention to the monitoring elements for:

- Fuel level and AdBlue (DEF) level,
- engine speed,
- coolant temperature and hydraulic oil temperature,

▣▣▣▣ *Monitoring elements, p. 4 - 19.*

## 5.3.2

### Cruise control

Cruise control enables you to drive at a constant speed without pressing the accelerator.

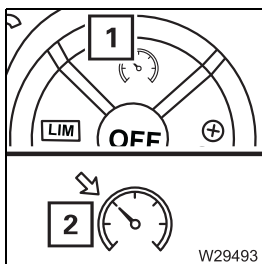


#### **Risk of accidents due to carelessness!**

Be ready to brake at all times when cruise control is switched on!  
Switch cruise control on only if the traffic situation permits a constant speed.

#### **Switching on**

You can switch on cruise control only at speeds above 15 km/h (9 mph).

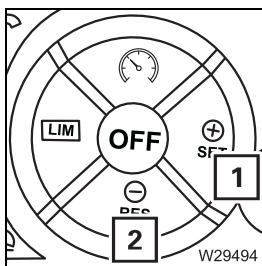


- Press the button (1) once.

Cruise control is switched on. The symbol (2) is displayed in the Driving display.

The current speed is maintained.

You can exceed this speed with the accelerator. After the accelerator is released, cruise control reverts to the set speed.



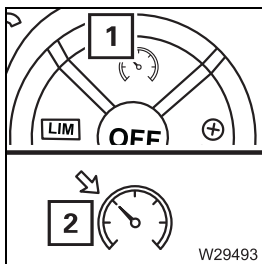
#### **Increasing/reducing the speed**

- Increase with (1)
- Reduce with (2)

- Press the corresponding button until the desired speed is reached  
or
- Press the corresponding button once. The speed will increase/decrease by 0.5 km/ (0.3 mph).

The set speed is maintained.

#### **Switching off**



- Press the button (1) once. The cruise control is now switched off. The symbol (2) goes out in the Driving display.

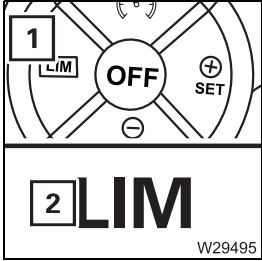
Cruise control is also switched off,

- when the service brake is applied,
- when speed falls below 10 km/h (6 mph),
- when the Tempset function is switched on,
- when the ignition is switched off.

### 5.3.3 Temposet

You can use Temposet to limit the maximum speed.

#### Switching on



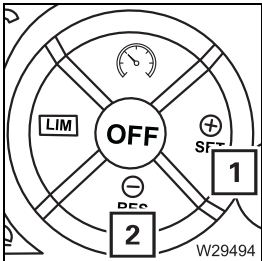
You can switch on Temposet only at speeds greater than 15 km/h (9 mph).

- Press the button (1) once.

Temposet is now switched on. The symbol (2) is displayed in the Driving display.

The current speed is taken as the maximum speed.

You can exceed the speed by pressing the accelerator as far down as it will go (kick-down). The Temposet limits the speed again only once you release the accelerator and press it again.

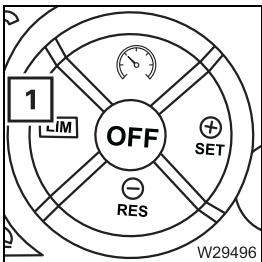


#### Increasing/reducing the maximum speed

- Increase with (1)
- Reduce with (2)

- Press the corresponding button until the desired speed is reached  
or
- Press the corresponding button once. The speed will increase/decrease by 1.0 km/h (0.6 mph)

#### Switching off



- Press the button (1) once.

The Temposet is now switched off.



### 5.3.4

## Driving downhill



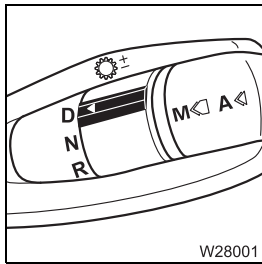
### Risk of accidents when driving in neutral position!

Never switch into neutral position whilst driving.

In neutral position, the truck crane may accelerate and the engine retarder is ineffective.

### Starting

The engine must be running.



To **start moving forwards** you must do the following:

- shift into **D** position,
- Release the parking and service brakes,
- Apply the accelerator if you wish to accelerate,
- Do not apply the accelerator if you wish to brake with the engine.

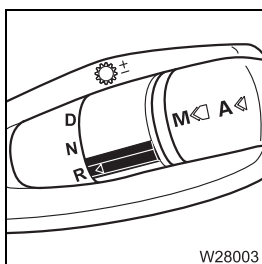


If the truck crane starts to move forwards in neutral position you can still switch to position **D**. A gear appropriate to the speed is engaged and the engine brake power is effective.



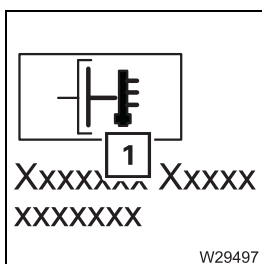
### Danger when starting to reverse!

When starting to reverse, always keep the truck crane stationary with the parking brake until the transmission clutch is engaged. If the truck crane starts to roll away before this (when changing from brake pedal to accelerator), no gear will be engaged, and you can stop the truck crane only by braking.



To **start reversing** you must do the following:

- Shift into **R** position,
- apply the parking brake,
- press the accelerator,
- release the parking brake after the clutch has engaged.



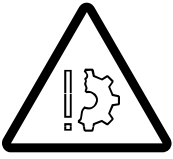
If the symbol (1) with a message is shown when starting:

- Shift to a lower gear,  
or
- end the starting operation.



**Checks when driving downhill**

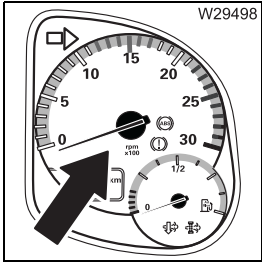
While driving, the engine speed may not exceed 2,300 rpm. The engine speed is not limited automatically.



**Risk of damage due to excessive engine speed!**

If the maximum permissible engine speed is reached, shift up to a higher gear or slow the truck crane down.

This prevents damage to the engine or transmission.



- Check the current engine speed on the tachometer while driving.
- Brake the truck crane before the speed exceeds 2,300 rpm.



**Risk of damage from resonance vibrations!**

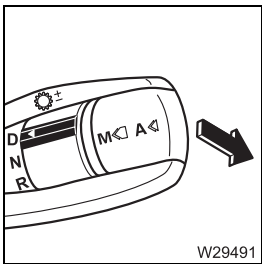
Always maintain a speed below 85 km/h (53 mph). Stop the truck crane promptly.

When driving downhill, you can also slow down the truck crane as follows, in addition to using the service brake:

- by shifting down; ||||► p. 5 - 42,
- with the engine retarder; ||||► p. 5 - 43,
- with the transmission retarder; ||||► p. 5 - 43.

**Downshifting**

To increase the braking force of the engine, you can select a lower gear.



- Press the gearshift lever downwards once.

*Manual* operating mode is switched on, and if possible, one gear is shifted down.

If you initiate a gear change which would cause the maximum permitted engine speed to be exceeded, the transmission does not shift.

In that case, slow the truck crane down until a permissible engine speed is reached, and downshift again.

## Additional brakes

### Engine retarder

The truck crane has an engine flap brake which it uses as an engine retarder. The engine retarder only becomes effective at an engine speed of 950 rpm and can be used up to a maximum speed of 2,300 rpm.



#### **Risk of accidents from unexpected acceleration!**

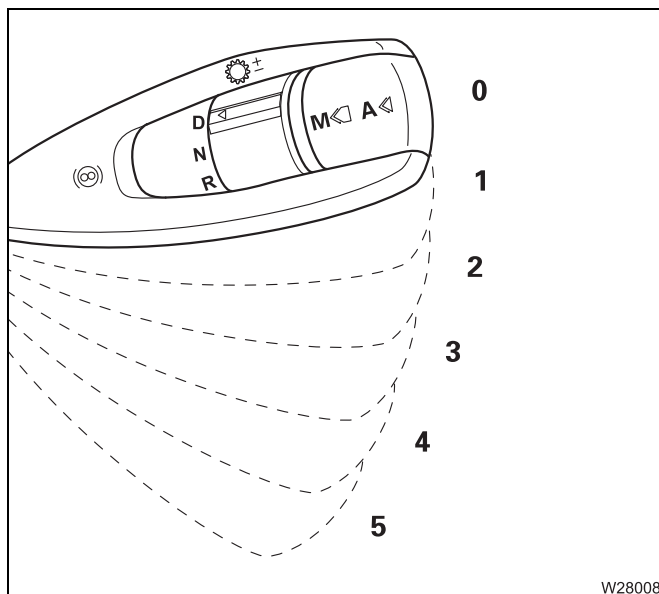
Maintain sufficient distance when the engine retarder is switched on. The effectiveness of the engine retarder is interrupted during gear shifting. This may cause the truck crane to accelerate briefly.

### Transmission retarder

The braking force of the transmission retarder depends on the speed. The higher the speed, the higher the brake power.



For long downhill stretches, we recommend that you use level **2**. When the transmission retarder is switched on, you cannot regulate the speed with the accelerator.



#### **Switching on the additional brakes**

- Pull the switch back to the required level (latch into place briefly at each level).

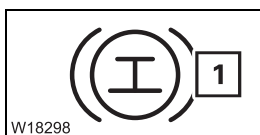
- 1 Only engine retarder
- 2 Only engine retarder
- 3 Only engine retarder

Connection to the retarder power:

- 4 Engine retarder and transmission retarder
- 5 Engine retarder and transmission retarder

#### **Switching off the additional brakes**

- Press the switch upwards to level **0**.



When the additional brake is switched on, the lamp (1) lights up.

### 5.3.5

## Driving uphill

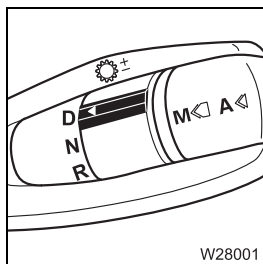
### Starting

The engine must be running.



#### **Danger of the truck crane starting to roll away unexpectedly!**


When starting to move forwards, always keep the truck crane stationary with the parking brake until the transmission is engaged. If the truck crane starts to roll away before this (when changing from brake pedal to accelerator), no gear will be engaged, and you can stop the truck crane only by braking.



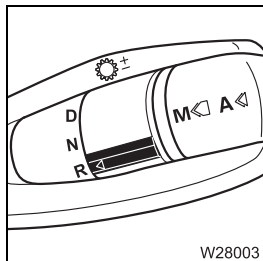
To **start moving forwards** you must do the following:

- shift into **D** position,
- apply the parking brake,
- press the accelerator,
- release the parking brake after the clutch has engaged.



Pay attention to any messages appearing on the on-board computer display when starting driving;  p. 7 - 7.

- Follow the instructions that are displayed and perform the specified measures in good time.



To **start reversing** you must do the following:

- Shift into position **R**,
- Release the parking and service brakes,
- Apply the accelerator if you wish to accelerate,
- Do not apply the accelerator if you wish to brake with the engine.

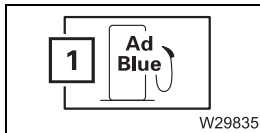
### Driving

On certain gradients, the transmission may switch continuously back and forth between two gears. In this event, either release the accelerator slightly or downshift by one gear.

### 5.3.6 Override torque reduction

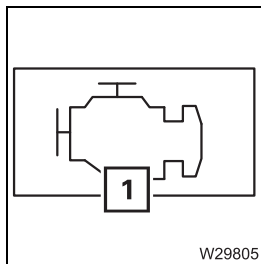
When the Adblue (DEF) supply is empty, the torque reduction is activated via the engine control system.

You can override torque reduction up to 3 times.



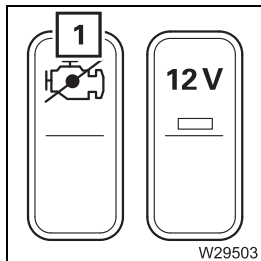
– If the level in the *AdBlue* tank falls to the reserve level, then the symbol (1) is displayed.

- Immediately fill up with *AdBlue*;  *AdBlue*, p. 4 - 9.



– If the *AdBlue* tank is empty, the lamp (1) will flash.

The engine torque is reduced the next time the engine is started.

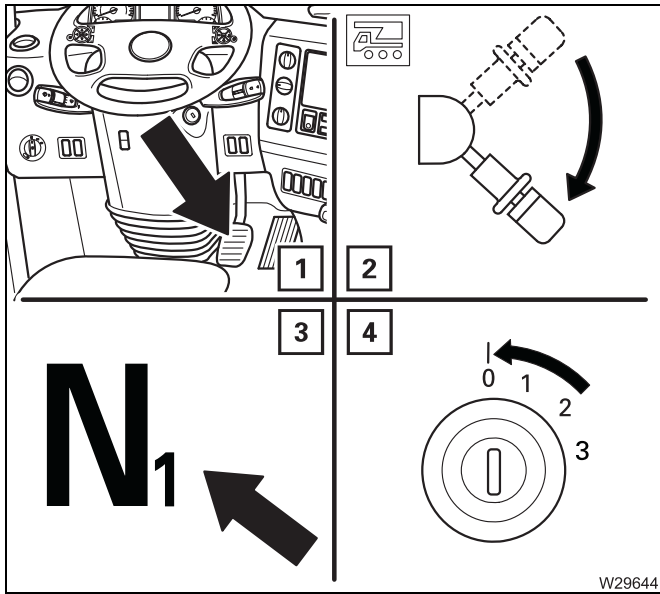


The engine torque is reduced.

- Push the button (1) upwards to override the torque reduction.

You can override torque reduction up to 3 times.

### 5.3.7 Switching the truck crane off



To switch the truck crane off, you must:

1. Stop the truck crane
2. Apply the parking brake
3. Switch to neutral position; p. 5 - 26
4. Turn off the engine; p. 4 - 21

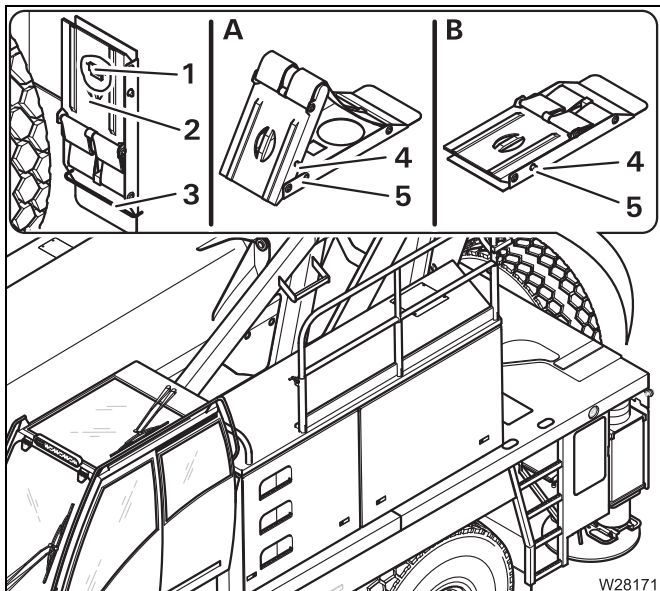
Secure it against rolling away



The number of wheel chocks supplied varies according to country.

**Risk of accidents due to the truck crane moving unintentionally!**

On uphill and downhill gradients secure the truck crane using wheel chocks in addition to the parking brake.



**Transport at the rear of the carrier**

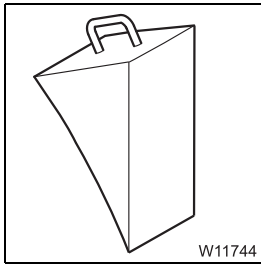
- Push the chock (2) behind the bracket (3) and hang it on the holder (1).

**(A) – Folding out**

- Push the locking bar (4) through the bore (5).  
The chock unfolds by spring force.

**(B) – Folding up**

- Push the chock together until the locking bar (4) engages in the bore (5).

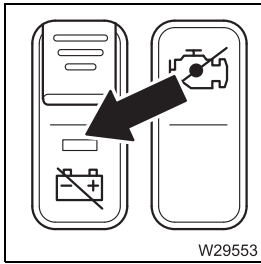


Using additional equipment, other chocks can be transported on the rear of the truck crane.

- Switch off all current consumers, e.g. auxiliary heaters.
- Switch the engine off.



In order to prevent malfunctions, you should switch the battery master switch off only when the engine has been switched off.



- Switch off the battery master switch – press down.

### Securing the truck crane against unauthorised use

- Secure the truck crane against unauthorised use by:
  - Stowing away the hand-held control in the crane cab or in the driver's cab,
  - Removing the ignition key and
  - Locking the driver's cab and the crane cab.



### **Danger due to unauthorised use!**

Always stow away the hand-held control in the crane cab or in the driver's cab before leaving the truck crane and lock the doors.

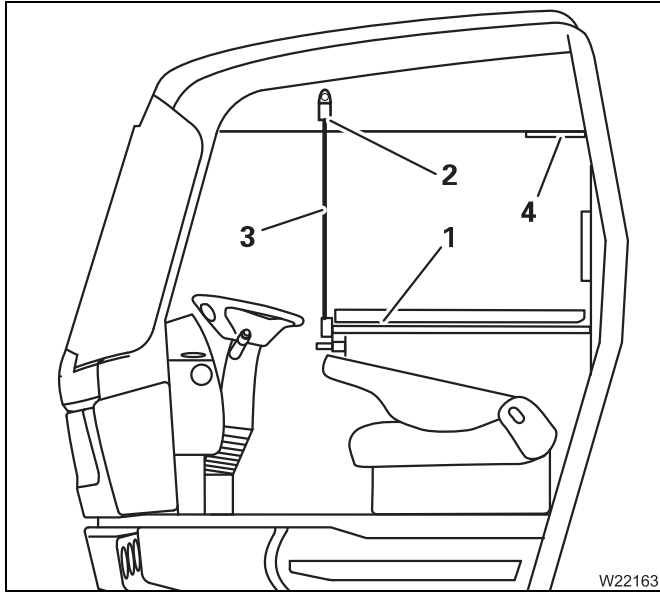
This way you can prevent unauthorised persons from starting the engine with the hand-held control.

**5.3.8****Folding berth**

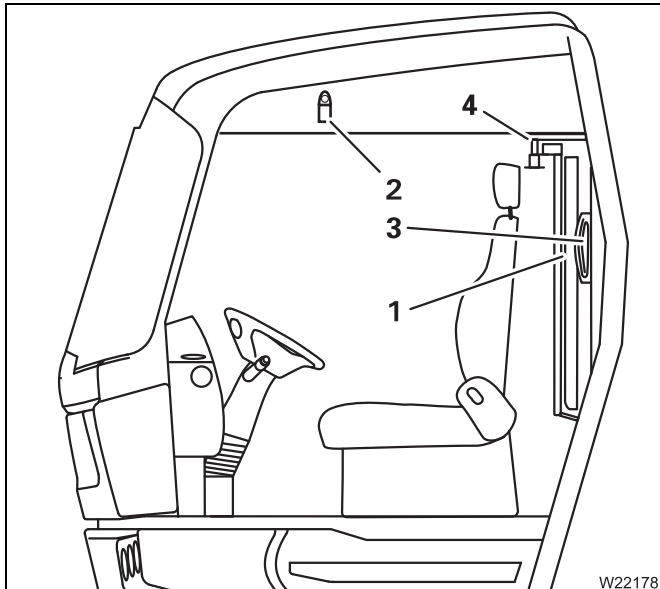
The berth must always be folded up for driving.

**Risk of accidents due to the berth folding down!**

Check that the locking bar has engaged and put up the back rest of the seats before driving. This prevents the berth from folding down when braking, resulting in uncontrolled manoeuvres due to fright.

**Folding down**

- Place the steering column forwards, upright;
  - ▣▣▣▣▶ *Steering column adjustment*, p. 5 - 14.
- Move the seats to their lowest position:
  - ▣▣▣▣▶ *Driver's seat*, p. 5 - 12;
  - ▣▣▣▣▶ *Passenger's seat*, p. 5 - 13.
- Remove the neck-rests from the seats and tilt the back rests of the seats forwards.
- Release the berth (1) from the retainer (4) and fold it downwards
- Fasten both belts (3) in the retainers (2).

**Folding up**

- Release the belts (3) from the retainers (2) and place them on the berth.
- Fold up the berth (1) and fasten it in the retainer (4).
- Put up the back rests of the seats and fasten the neck-rests.
- Bring the seats and the steering column into the desired position:
  - ▣▣▣▣▶ *Driver's seat*, p. 5 - 12;
  - ▣▣▣▣▶ *Passenger's seat*, p. 5 - 13;
  - ▣▣▣▣▶ *Steering column adjustment*, p. 5 - 14.



## 5.4

### Off-road driving

This section describes adjustments, connections and procedures for adapting the vehicle handling to off-road conditions.

#### Adjustments to the transmission

If you drive continuously for short periods of time with different loads or on a slippery surface, the transmission may switch gears too late or too early. In this event you can make the following adjustments:

- Shift to a lower starting gear; ■■■▶ p. 5 - 27.
- Select the *Manual* operating mode. This way you will be able to drive carefully and shift gears on time; ■■■▶ *Changing the operating mode*, p. 5 - 29.

#### Connections

If the adjustments to the transmission are insufficient on their own, you can additionally connect the following one after the other:

- Then switch on the **longitudinal differential lock**; ■■■▶ p. 5 - 50.
- Then switch on the **transverse differential lock**; ■■■▶ p. 5 - 50.

#### Changing the vehicle level

You can also adapt the truck crane to the off-road inclination using the level adjustment system, or lift and lower the truck crane; ■■■▶ p. 5 - 52.

#### Rocking the vehicle free and towing

If the truck crane is stuck in terrain; ■■■▶ *Freeing an immobilized truck crane*, p. 5 - 56.

## 5.4.1 Longitudinal and transverse differential locks

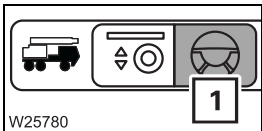
- The longitudinal differential locks prevent individual axle lines from spinning when driving on a slippery surface. With the 10 x 8 x 10 drive, the 3rd axle line is switched on and off together with the longitudinal differential locks.
- The transverse differential locks prevent individual wheels from spinning when driving on a slippery surface.



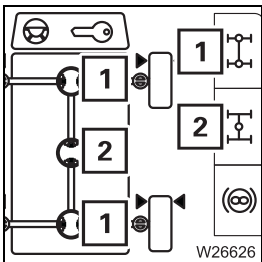
### Risk of damage to the differential locks!

Leave the transverse differential locks switched on only for as long as necessary. Always switch off the transverse differential locks before driving on a hard surface!

For switching on and off, the current speed needs to be under approx. 5 km/h (3 mph).

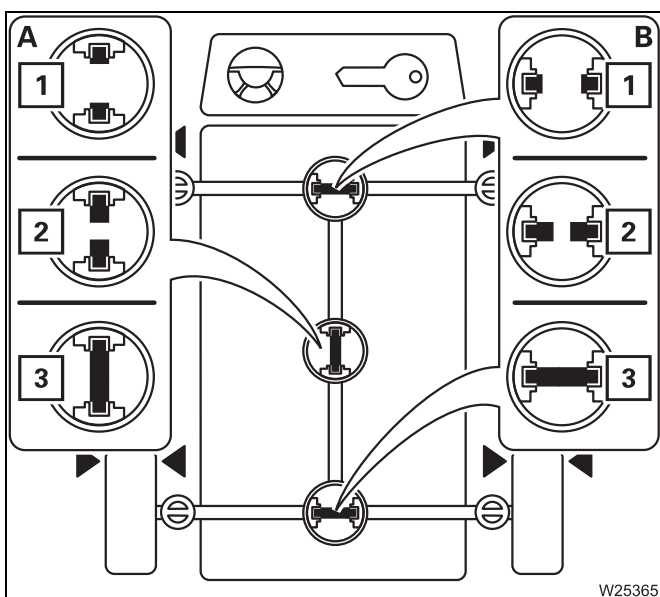


- Open the *Driving* menu (1).



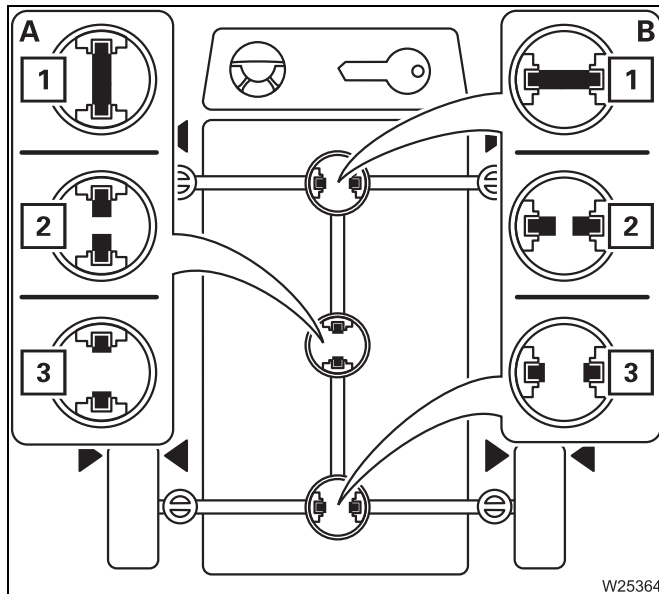
- Stop the truck crane.
- Straighten the steering.

The symbols (1) and (2) indicate the current switching state and have the same colour.



### Switching on

- Select and confirm the symbol (1) for the
  - Longitudinal differential locks (A) or
  - Transverse differential locks (B).
- Start moving slowly – display:
  - First symbol (2) – **yellow**, then symbol (3) – **red**, differential locks on.



### Switching off

- Select and confirm the symbol (1) for the
  - Longitudinal differential locks (A) or
  - Transverse differential locks (B).

Display:

- First symbol (2) – **yellow**, then symbol (3) – **green**, differential locks off.

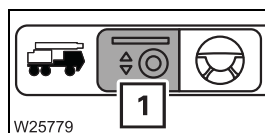
If symbol (3) is not **green** then drive back and forth slowly.

## 5.4.2 Operating the level adjustment system

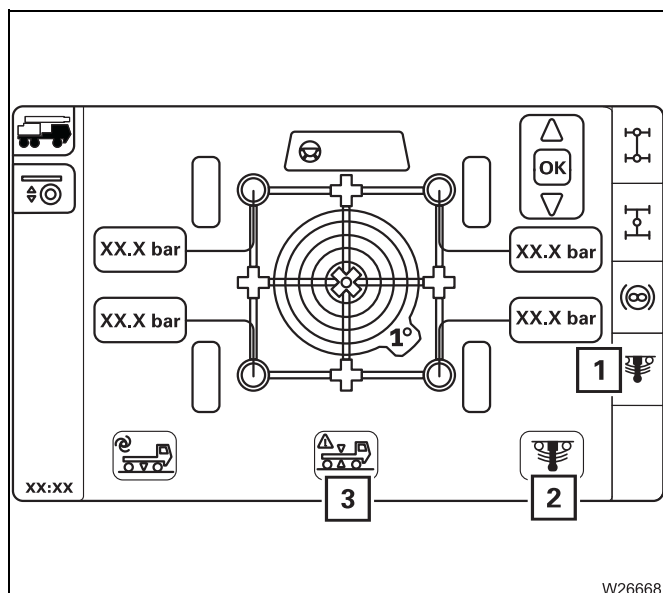
You can use the level adjustment system to set the on-road driving level, change the overall level and incline the truck crane.

### Open menu

You can only open the *Level adjustment system* menu when the current speed is less than approx. 5 km/h (3 mph).



- Open the *Suspension/level adjustment* menu (1).



- Check that the symbol (1) is **green** (suspension on).
- If the symbol (1) is **red** then select and confirm the symbol (2) to switch the suspension on.

When the suspension has been switched on, you can:

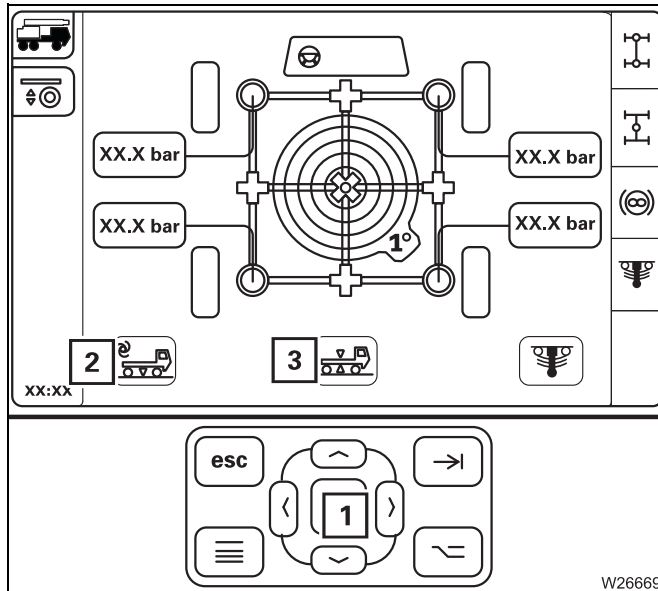
- Set the on-road driving level,
- Pre-select the suspension struts and change the vehicle level.

If the error symbol (3) is shown during level adjustment, contact **Manitowoc Crane Care**.

### Setting the on-road level

For on-road driving, you must always set the on-road level in order to adhere to the specified overall height.

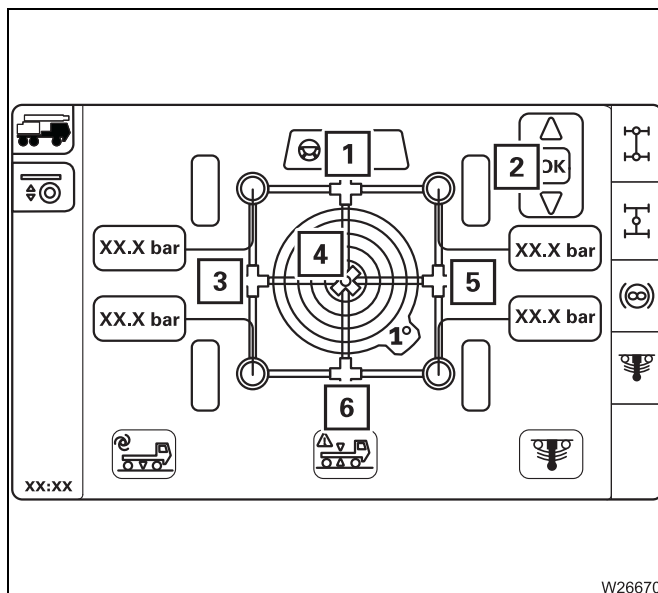
- Park the truck crane on a level surface.
- Straighten the steering.



- Select the symbol (2) – symbol is **orange**.
- Press the button (1) until the symbol (3) is displayed – on-road level has been reached.

### Pre-selecting suspension struts

You can pre-select the suspension struts for five different level changes.



#### – For a uniform level change

- 4 Overall level – all suspension struts

#### – For inclination

- 1 Front level – suspension strut for the 1st to the 3rd axle line
- 3 Left level – all suspension struts on the left
- 5 Right level – all suspension struts on the right
- 6 Rear level – suspension struts for the 4th and 5th axle line

- Select and confirm the desired symbol – the symbol turns **orange** and the symbol (2) is also displayed.



## Changing the vehicle level

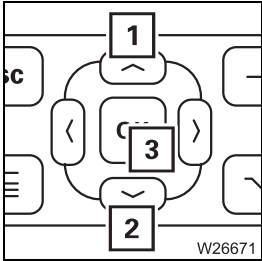


You can extend or retract the pre-selected suspension struts to change the vehicle level.

### **Risk of accidents by exceeding total permissible height!**

Always bring the truck crane to on-road level before driving on roads after changing the level.

If the truck crane is on a higher level, then the specified overall height will be exceeded.



### **Raise the level**

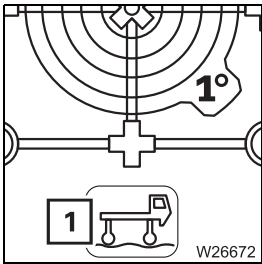
- Press the button (1).  
The pre-selected suspension struts extend.

### **Lower the level**

- Press the button (2).  
The pre-selected suspension struts retract.

The level is continuously changed until you release the button or the end position is reached.

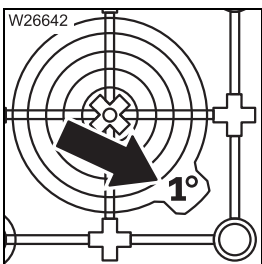
- Press the button (3) to confirm the selection.



During the entire procedure, the symbol for the current state is shown, e.g. after the truck crane is inclined, the symbol (1) – *No on-road level* is shown.

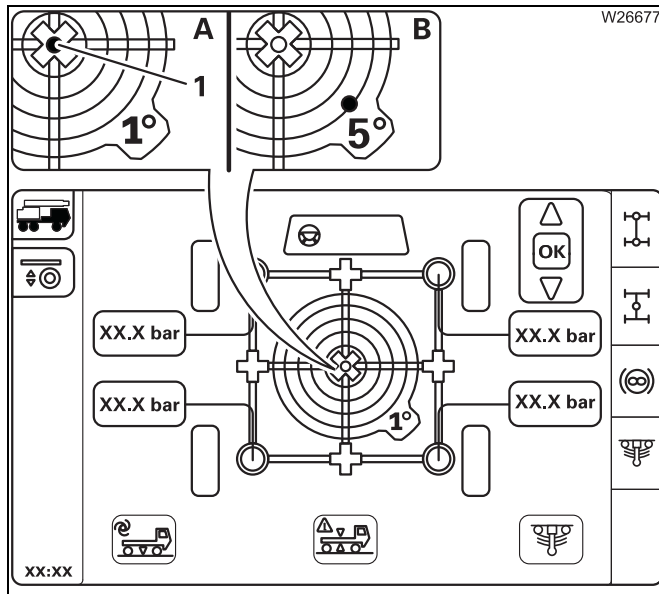
## Viewing the current inclination

The inclination indicator shows the current alignment.



### **Switching over the measuring range**

The measuring range is automatically switched between 1° and 5°.

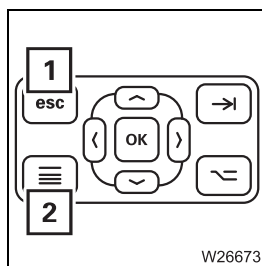


(A) – When the truck crane is level the marking (1) is in the middle.

(B) – In this example, the carrier would be standing higher to the rear on the right hand side.

### Exiting the menu

You can exit the *Suspension/Level adjustment system* menu at any time.



- Press the button (1) once.

The Start menu opens.

or

- Press the button (2) once.

The next highest menu is opened.

The *Suspension/Level adjustment system* menu automatically closes as soon as the current speed rises above approx. 5 km/h (3 mph).

### 5.4.3

## Freeing an immobilized truck crane

### Rocking the truck crane free

If the truck crane is stuck in terrain, you can try to free it by driving back and forth (rocking it free):

If you are trying to rock the crane free, you should switch on the transverse differential locks and the longitudinal differential lock.

- Switch to transmission mode **D** or **R**.
- Select a smaller starting gear with the gearshift lever.
- Start driving as far as you can as high as possible.
- Release the accelerator. The transmission declutches disengage.
- Let the truck crane roll in the opposite direction as far as it will go.
- Start driving, again to the highest point.
- Repeat driving and letting the truck crane roll back until it has rocked itself free.

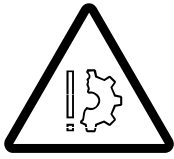


It is not helpful to switch between transmission mode **D** and **R**, as switching to **R** is only performed when the truck crane is stationary – and takes a few seconds. You would not be able to take advantage of the momentum generated by the change of direction.



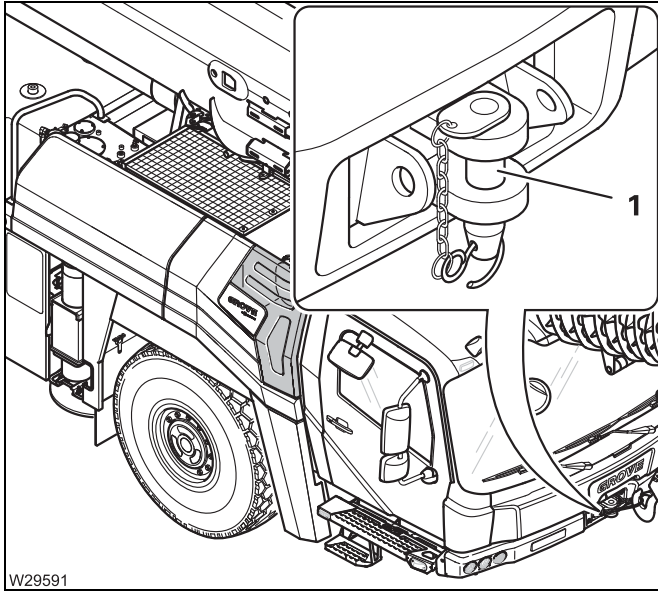
### Towing free to the front

- Fasten a steel rope to the front towbar coupling.



#### Risk of damage to the chassis!

Only tow the truck crane free while observing the procedure given for the pulling direction.  
Pulling out the truck crane jerkily or at an angle may damage the chassis.



The front towbar coupling (1) is designed for a maximum tensile force of 100 kN (approx. 10 t) (22,480 lbf (approx. 22,050 lbs)) when:

- The direction of pull runs forward along the longitudinal axis or at an angle of 45° to the right or left of the longitudinal axis
- The direction of pull runs along the longitudinal axle towards the rear without diverting up or down.

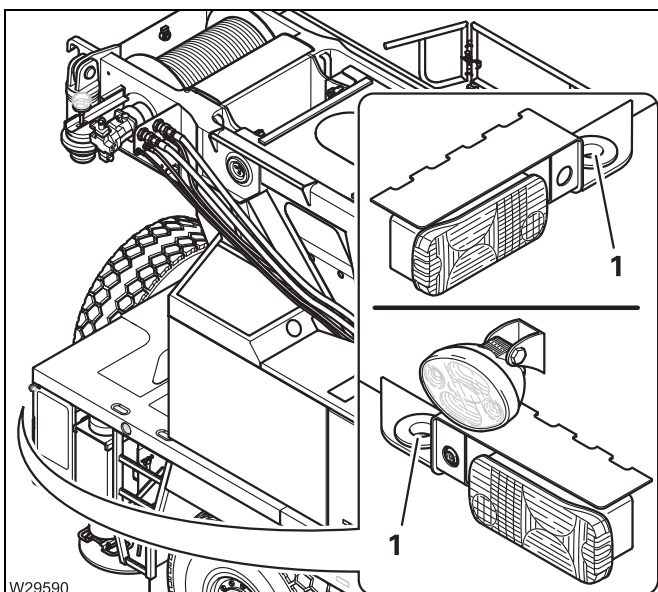
### Towing free in reverse gear

- Fasten a steel rope to one of the towing eyes on the rear chassis wall using a shackle.



#### Risk of damage to the chassis!

Only tow the truck crane free while observing the procedure given for the pulling direction. Otherwise the chassis may be damaged or the towing eyes may be torn off or bend.



The towing eyes (1) on the vehicle tail are designed for a maximum tensile force of 75 kN (approx. 7.5 t) (16,860 lbf (approx. 16,530 lbs)), when:

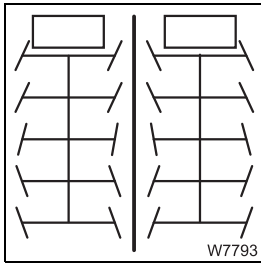
- The direction of pull runs along the level of the longitudinal axis
- The direction of pull runs along the longitudinal axle towards the rear without diverting up or down.

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## 5.5

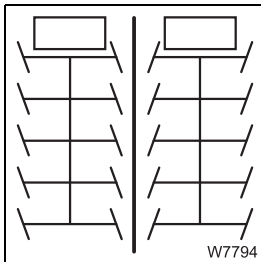
### Separate steering

There are two steering modes with separate steering.



#### - Driving around corners:

When the separate steering is switched on, the steering angle is larger than for normal steering mode – the turning circle is smaller.



#### - Crab travel mode:

When the separate steering is switched on, the truck crane drives sideways if you turn the wheels of the front and rear axle lines in the same direction.

### 5.5.1

#### Switching to separate steering

Always switch to separate steering when

- driving with the truck crane rigged or
- steering at low speed.

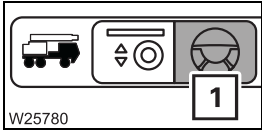


#### **Risk of accidents when driving on-road with unlocked steering!**

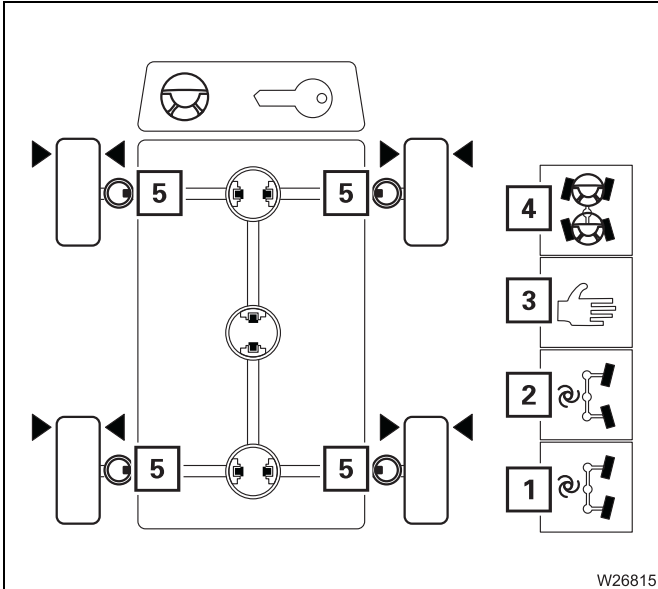
After driving with separate steering, change over immediately to normal steering mode. The locking status for normal steering mode is only restored once the on-road driving symbol is displayed.

You can only change over to separate steering when the current speed is below approx. 5 km/h (3 mph).





- Open the *Driving* menu (1).



- Select and confirm the symbol for the desired steering mode.

- 1 Crab travel mode, 4th and 5th axle line steered automatically
- 2 driving around corners, 4th and 5th axle line steered automatically
- 3 Manual, 4th and 5th axle line is steered manually for driving around corners/crab travel mode

- The symbol (4) is displayed – separate steering switched on.
- The symbols (5) are **red** – steering unlocked.

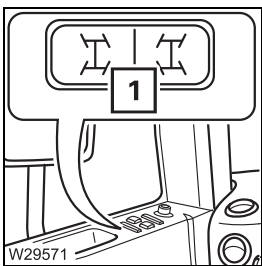


When separate steering is switched on, the speed is limited to approx. 20 km/h (12 mph).



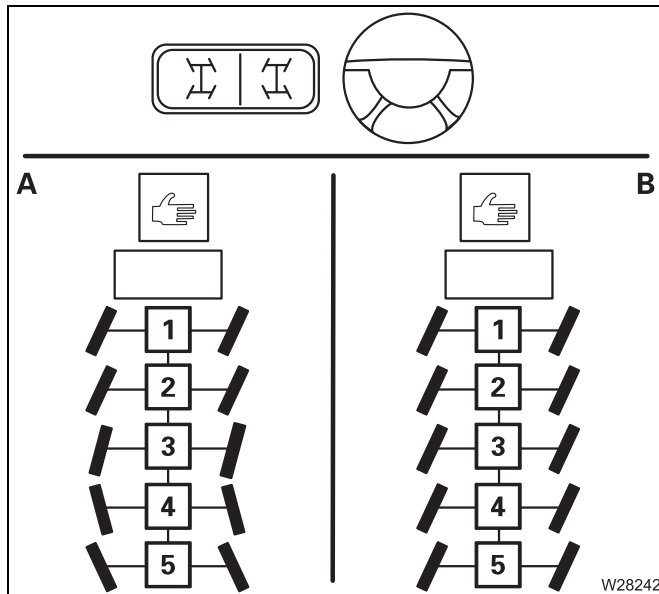
If the error symbol is displayed, contact **Manitowoc Crane Care**.

### Manual



- Steer the 1st to 3rd axle lines with the steering wheel.
- Steer the 4th and 5th axle lines with the button (1).
  - **To turn to the left:**
    - Push the button to the left.
  - **To turn to the right:**
    - Push the button to the right.

The axle lines are steered as long as you keep the button pressed or until an end position is reached.



**(A) – For driving around corners**

- Steer the 5th axle line opposite to the 1st to 3rd axle lines.

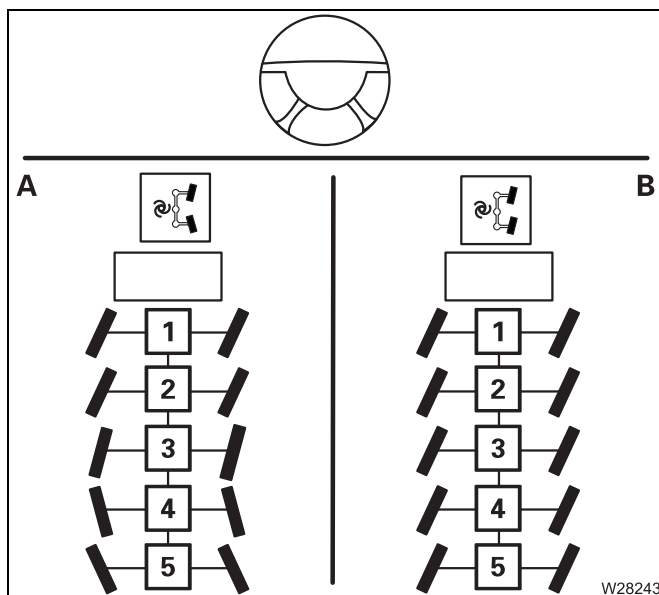
The 4th axle line is steered to suit the turning radius.

**(B) – For crab travel mode**

- Steer the 5th axle line in the same direction as the 1st to 3rd axle line.

**Automatically**

- Steer the 1st axle lines with the steering wheel.



**(A) – when driving around corners**

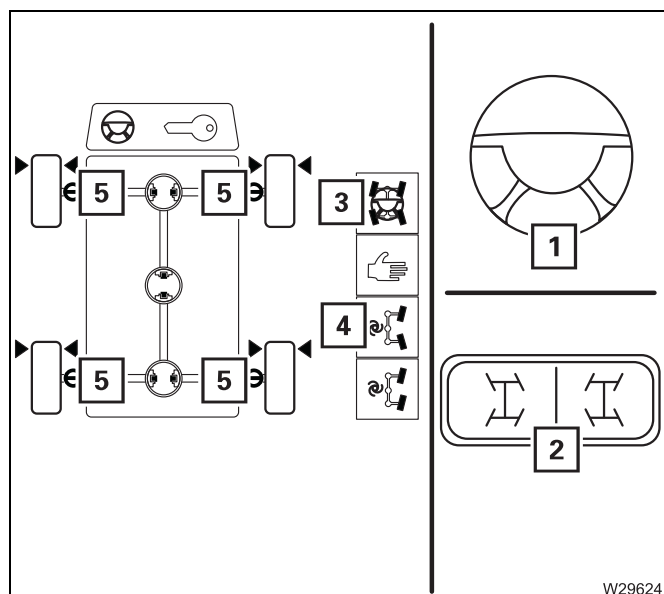
The 4th and 5th axle lines are steered out in line with the turning radius, against the steering angle on the 1st to 3rd axle lines.

**(B) – For crab travel mode**

The 4th and 5th axle lines in the same direction as the 1st to 3rd axle lines.



Switching off the separate steering is possible during standstill and while travelling, up to a speed of approx. 5 km/h (3 mph).



### Switching to normal steering mode

- Turn the wheels to the *Straight ahead* position – current wheel position is displayed.
- Select and confirm the symbol (4) – symbol is **white**.


The symbol (3) is also displayed.

After the switchover to normal steering mode the symbols (5) turn **green** – steering locked.

If the symbols (5) are **yellow**:

Steer using the button (2) or the steering wheel (1) until the symbols (5) become **green**.



If the error symbol is displayed, contact **Manitowoc Crane Care**;  p. 7 - 22.

## 5.6

## Heating and air-conditioning system

### 5.6.1

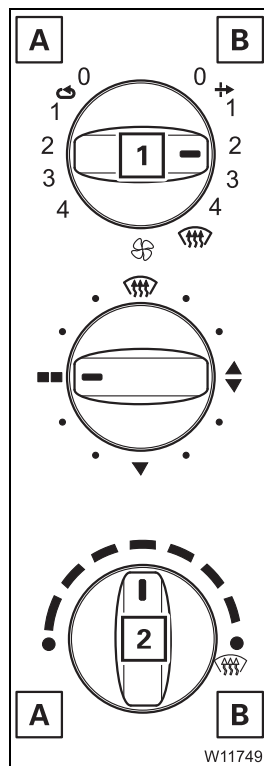
### Standard heating system

#### Switching on

- Start the engine. Heating is only available when the engine is running.

#### Heating

You must set the blower and the temperature.



#### Setting the blower/fresh air/recirculated air

You can regulate the air volume with the switch (1) for:

- A** Recirculated air – air is sucked in from the driver's cab. Change to fresh air often to ensure that oxygen is supplied.
- B** Fresh air – outer air is sucked in.

- Turn the switch (1) to the desired level 1 to 4, Recommended – level 2.

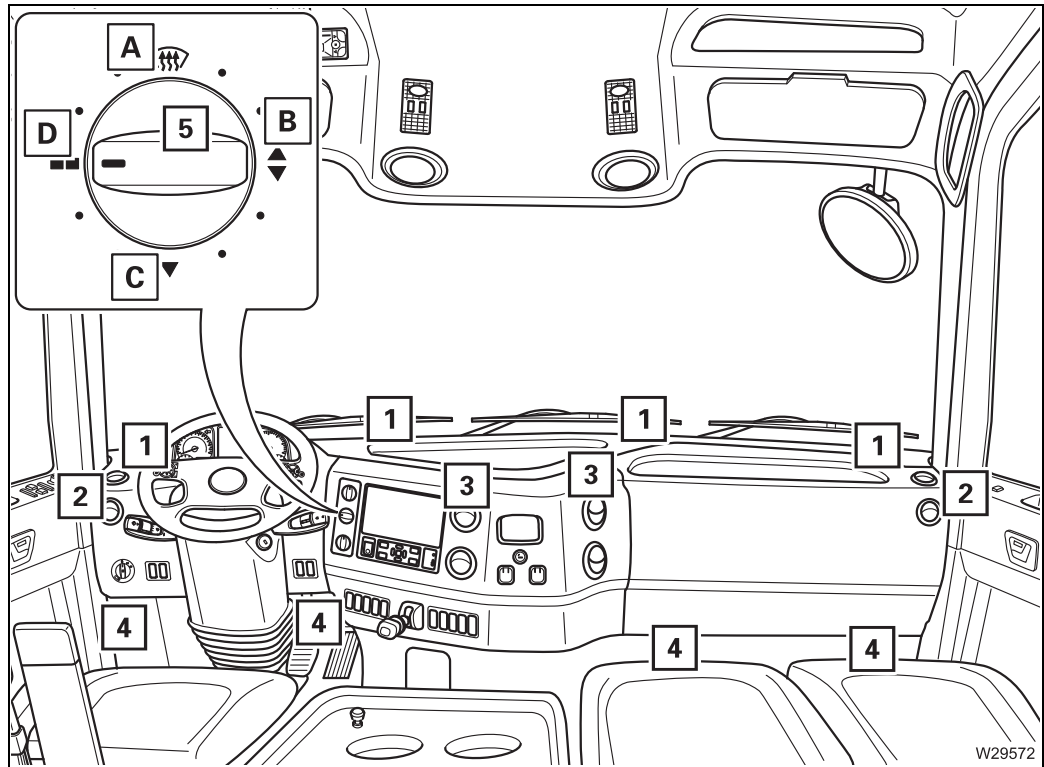
#### Setting the temperature

- Turn the switch (2) to the desired position
  - A** Colder
  - B** Warmer
- Press the switch (2) several times in succession at least once a month in order to prevent malfunctions.



## Air distribution

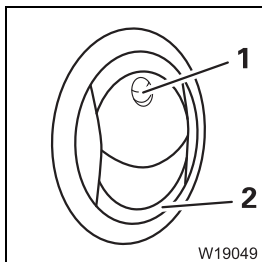
You can direct the air to flow out of various air vents.



- Turn the switch (5) to the position for the required air vents.

- A** Air vents (1), (2) – front windscreen, side
- B** Air vents (1) to (4)
- C** Air vents (2), (3), (4) – side, centre, below
- D** Air vents (2), (3) – side, centre

You can adjust air vents (2) and (3).



### Adjusting the air vents

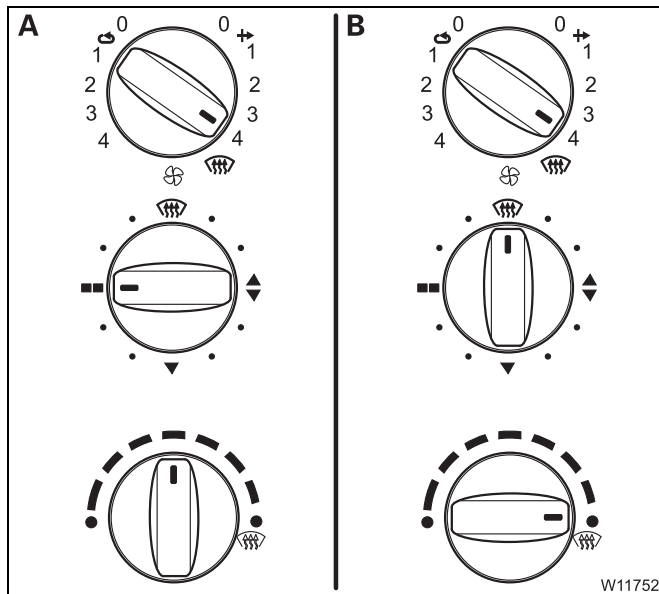
- 1** – To open: Press in and position lengthwise
- To close: Position crosswise
- To direct the air flow: In intermediate position
- 2** – To direct the air flow: Slewing



## Examples

This section only contains examples of the settings.

Always adjust the setting to the current conditions (warm, cold, damp).



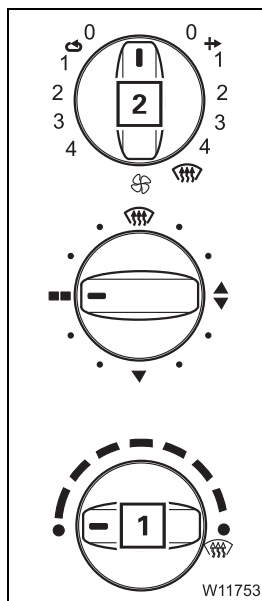
### (A) – Ventilate

- Turn the switches to the positions shown.
- If necessary, open the air vents for the side and centre.

### (B) – Defrosting the windscreen

- Turn the switches to the positions shown.
- Close the air vents for the side and centre.

## Switching off



### Switching off the heating system

- Turn the switch (1) as far as it will go in a counter-clockwise direction, to *Cold*.

### Switching off the ventilation

- Turn the switch (2) to the level 0.

## 5.6.2 Air-conditioning system

You can cool the driver's cab and dry the air using the air-conditioning system.

### Information

Do not cool the air too much.

The difference between the outside temperature and the inside temperature should be at the most 10 °C to 14 °C (18 °F to 25 °F).

If the cooling is too severe, you may frequently feel physically uncomfortable, albeit mostly only after you leave the cool environment.

Avoid having cold air blowing directly on to your body.

When using recirculated air, you should switch over to fresh air mode to ensure a fresh supply of oxygen at the same time. Adjust the cooling output to your actual needs:


If the truck crane has been exposed to strong sunlight for a long period of time, for example, the air-conditioning system should initially be operated at the highest blower level with the engine running.

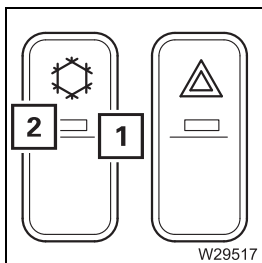
The door or at least the windows should be left open for a short while to thoroughly air the cab. The cooling-down procedure can be accelerated by increasing the engine speed.

If the air-conditioning system is operated continuously, close the windows and doors to ensure sufficient cooling.

Once the inside temperature has reached the desired temperature, set the fan to a lower level.

### Switching on/off

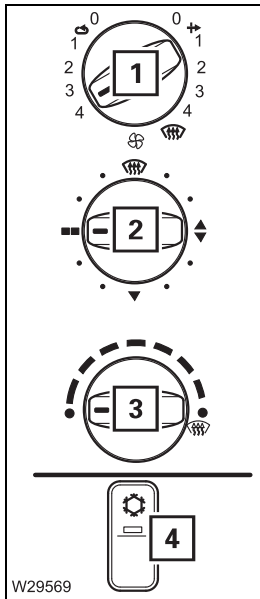
- Start the engine. The air-conditioning system operates only when the engine is running
- Switch off the auxiliary heater;  p. 5 - 71.




- **To switch on:**
  - Press the button (1) in at the top – The lamp (2) lights up.
- **To switch off:**
  - Press the button (1) in at the bottom – The lamp (2) goes out.

## Cooling

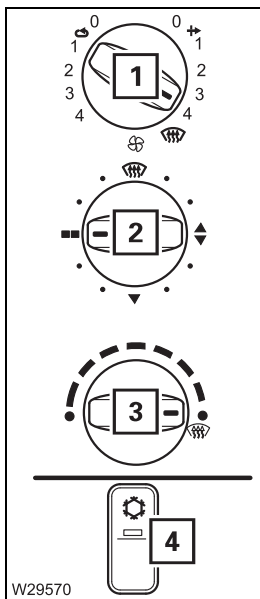
The illustration shows only a sample setting. Always adjust the setting to the current conditions.




- Switch the air-conditioning system on – the lamp (4) lights up.
- Turn the switch (3) as far as it will go, to *Cold*.
- Turn the switch (1) to the desired level – with recalculated air, you will be able to cool more quickly, but no oxygen is fed in.
- Set the air distribution with switch (2) – open the air vents if necessary;  p. 5 - 64.

## Drying

You can dry the air in the driver's cab.



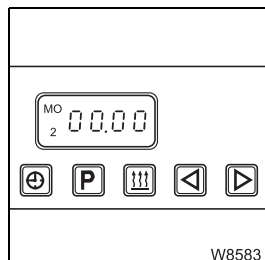
- Switch the air-conditioning system on – the lamp (4) lights up.
- Turn the switch (3) as far as it will go, to *Warm*.
- Turn the switch (1) to the desired level – adjust the fresh air/recalculated air setting to the current conditions (humidity and temperature of the outside air).
- Set the air distribution with switch (2) – open the air vents if necessary;  p. 5 - 64.

When drying, the air-conditioning system and the heating system work against each other. After drying, switch off the device that you do not require.

### 5.6.3 Auxiliary water heater



The batteries will be drained if you operate the auxiliary heating system with the engine switched off. You must recharge the batteries at shorter intervals if you use the auxiliary heater frequently!

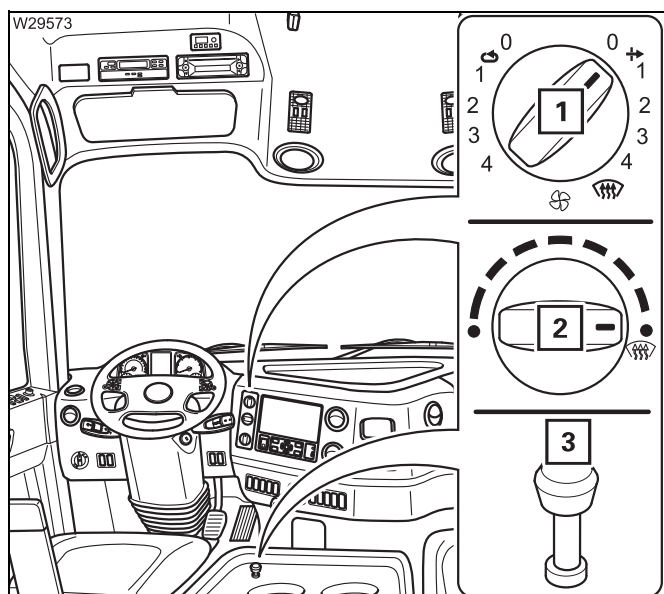


You can use the auxiliary water heater to:

- Preheat just the engine or
- preheat the engine and driver's cab simultaneously.

#### Preheating the engine

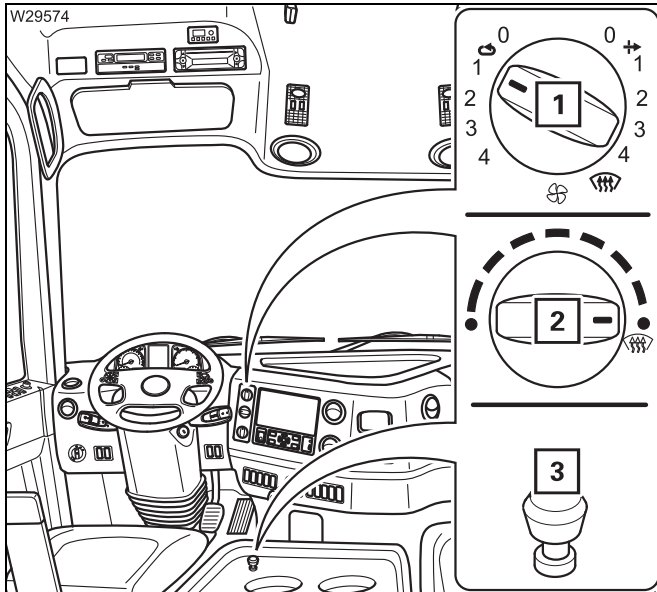
If only the engine is to be preheated, adjust the heating system as follows:




- Switch (2) to the *warm* position.
- Switch (1) to *Fan off* position.
- Knob (3) pulled.

### Preheating the driver's cab

Adjust the heating system as follows if the driver's cab is to be preheated in addition to the engine:



- Switch (2) to the *warm* position.
- Switch (1) on the *recirculated air* symbol, level 1.
- Open the air vents;  p. 5 - 64.
- Knob (3) pressed.

If you heat the driver's cab at the same time, the amount of time required to preheat the engine will increase significantly.



### Switching on the auxiliary heater

- Check whether the auxiliary heater is allowed to be operated at the current site of the truck crane before switching it on. Find out whether there are any possible sources of danger that could result in an explosion.



#### **Risk of explosion when operating the auxiliary heater!**

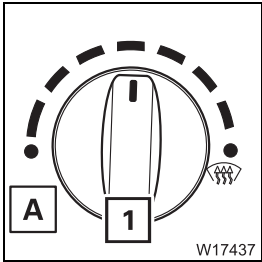
The auxiliary heater is not allowed to be operated:

- at service stations and tank farms,
- at places where flammable gases or vapours can be found or formed (e.g. at places where fuel is stored and in chemical factories),
- at places where explosive dust can be found or formed (e.g. carbon dust, wood dust and grain dust).



#### **Danger of suffocation when operating the auxiliary heater!**


Do not operate the auxiliary heater in closed spaces (e.g. a garage).



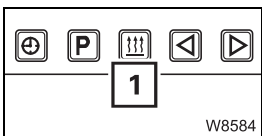
- Turn the switch (1) to the required temperature.

If the switch (1) is turned as far as possible (A) (cold), the auxiliary heater is not switched on.



This section describes how to switch on manually. The auxiliary heater can also be switched on automatically;  *Saving automatic heating start*, p. 5 - 72.

- Switch on the ignition;  *Switch on the ignition*, p. 4 - 11.



- Press the button (1) once.


The auxiliary heater switches itself on and the insert lights up.

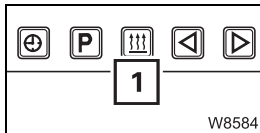
The auxiliary heater only supports the heating capacity of the standard heating system as long as the engine is cold. If the engine is warm, the heater is switched off. However, the pump for the auxiliary heater continues to run until you switch the auxiliary heater off.



Always switch the auxiliary heater off if you switch off the truck crane whilst the battery master switch is switched on. In this way, you prevent the auxiliary heater from restarting and the batteries from running down after the engine has cooled down.


### Switching off the auxiliary heater

This section only describes how to switch off the heater manually. The auxiliary heater is switched off again after a certain heating period if it was switched on automatically. You can set this heating period;  *Setting the heating period*, p. 5 - 73.



- **To switch off**, press the button (1) once. The auxiliary heater is switched off immediately.



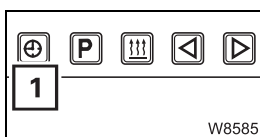
If you turn off the ignition while the auxiliary heater is in operation, the auxiliary heater continues to run for a certain period of time. You can set this remaining time;  *Air-conditioning system*, p. 5 - 66.

### Setting time and weekday

Always set the current time and current day of the week. These settings are required for the correct activation point of the automatic heating start.



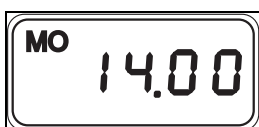
If the power supply is interrupted, all symbols in the display will flash and you must set the time and day again.



- Press the button (1) for longer than 2 seconds. The displayed time flashes, e.g. 10.00.



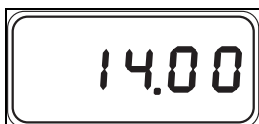
- Set the current time on the flashing display, e.g. 14.00.



- Wait for 5 seconds. The new time is saved and then the weekday flashes, e.g. **MO** for Monday.



- Set the current day of the week on the flashing display.




After 5 seconds, the display stops flashing and the current time is displayed. The weekday goes out.

The time and weekday have now been set.



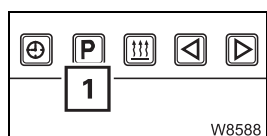
### Saving automatic heating start

Heating is started automatically on schedule only if the time and the day of the week have been correctly set;  p. 5 - 71.

You can set three different automatic heating starts – up to seven days in advance.



If you call up values in order to change them during the following setting process, they flash for 5 seconds. The entry must be made within this period. The value stops flashing after 5 seconds and is saved as the new value.



- To retrieve a storage location, press the button (1) once.

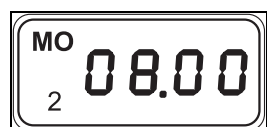


The following flash:

- the retrieved storage location, e. g. 2 and
- the last saved heating start, e.g. 06.00.



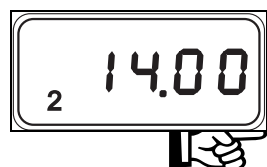
- Set the time for the desired heating start, e.g. 8.00.



Wait for approx. 5 seconds until the weekday for the heating start flashes, e.g. **MO** for Monday.




- Set the day of the week for the desired heating start.



Wait for approx. 5 seconds until the current time is displayed, e. g. 14.00. Now, the new heating start has been saved and switched on.

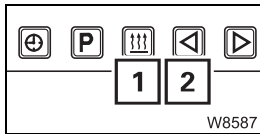
If you wish to store one or two more heating starts, retrieve a new storage location using the **P** button and repeat the procedure.

After you have saved the heating start, you can also set the heating period;  *Setting the heating period*, p. 5 - 73.



### Setting the heating period

After an automatic start, the auxiliary heater switches itself off as soon as the set heating period has elapsed.  
The heating period applies to all saved heating starts.



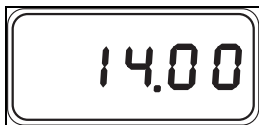
- Switch off the auxiliary heater using the button (1).
- Press the button (2) for longer than 3 seconds.



The last set heating period, e.g. 27 minutes, now flashes for 5 seconds in the display field.



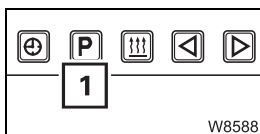
- Set the desired heating period on the flashing display. You can set a heating duration of 10 to 120 minutes.



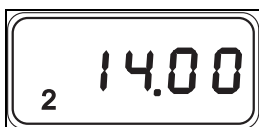
Wait for approx. 5 seconds until the current time is displayed, e. g. 14.00.  
A new heating period has now been set.

### Switching the automatic heating start on and off

To switch on an automatic heating start, you must retrieve the corresponding storage location.

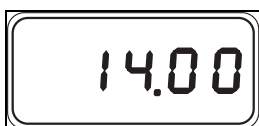


- To retrieve a storage location, press the button (1) once.



The display field flashes for 5 seconds and a storage location is shown (e.g. 2). The heating start at this storage location is now switched on.

To switch on a different heating start, press the **P** button repeatedly until the desired storage location is displayed. This heating start is switched on as soon as the display stops flashing.

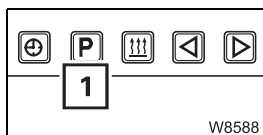


To switch off the automatic heating start, press the **P** button repeatedly until no storage location is displayed any longer.

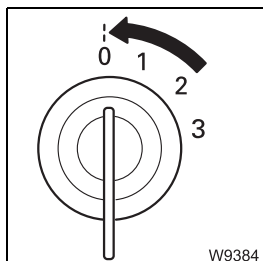


### Setting the remaining time

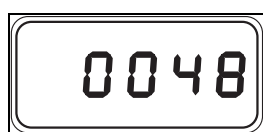
If the ignition is turned off while the auxiliary heater is running, the auxiliary heater continues to run for the remaining time.



- Switch on the auxiliary heater using the button (1).



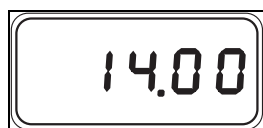
- Switch off the ignition.



The auxiliary heater continues to run and the residual run time set last flashes, e.g. 48 minutes.



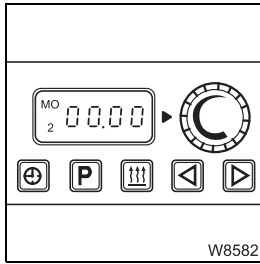
- Set the desired remaining time on the flashing display. You can set a remaining time of 1 to 120 minutes.



- Wait for 5 seconds until the current time is displayed. The remaining time is now set.

## 5.6.4

### Auxiliary air heater



You can use the auxiliary air heating to preheat the driver's cab or provide additional heating.



The batteries will be drained if you operate the auxiliary heater with the engine switched off. You must recharge the batteries at shorter intervals if you use the auxiliary heater frequently!

#### Switching on

To switch the auxiliary heater on and off, you can:

- Switch the auxiliary heater on and off manually; the ignition must be switched on for this.
- or set an automatic heating start and heating period with the timer;  
    ▮▮▮▮ *Other functions*, p. 5 - 76.
- Before switching on the heating system, check whether it is allowed to be operated at the current location of the truck crane. Find out whether there are any possible sources of danger that could result in an explosion.



#### **Risk of explosion when operating the heating system!**

The heating system may not be operated:

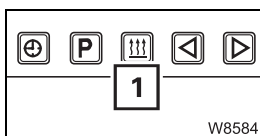
- at service stations and tank farms,
- at places where flammable gases or vapours can be found or formed (e.g. at places where fuel is stored and in chemical factories),
- at places where explosive dust can be found or formed (e.g. carbon dust, wood dust and grain dust).



#### **Risk of suffocation when operating the heating system!**

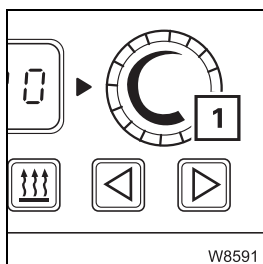
Do not operate the heating system or the heating system with the timer in enclosed rooms (e.g. garages).

- Switch on the ignition; ▮▮▮▮ *Switch on the ignition*, p. 4 - 11.
- Press the button (1) once.  
    The auxiliary heater switches on automatically – the control field lights up.



### Temperature

You can preselect a temperature for the driver's cab. The preselected temperature is automatically set and maintained.



#### Increasing the temperature:

- Turn the switch (1) clockwise.

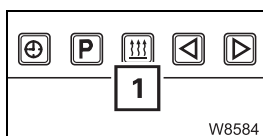
#### Reducing the temperature:

- Turn the switch (1) anti-clockwise.

The higher the selected temperature is, the faster the fan of the auxiliary heater runs.

### Switching off






You can switch off the auxiliary heater manually at any time.



- Press the button (1) once. The auxiliary heater is switched off immediately.

### Other functions

The auxiliary air heater has the same functions as the auxiliary water heater.

- Setting the time/day  p. 5 - 71
- Storing the heating start  p. 5 - 72
- Switching heating start on/off  p. 5 - 73
- Setting the heating period  p. 5 - 73
- Setting the remaining time  p. 5 - 74

## 5.7

### Towing a trailer

When towing a trailer, a towbar coupling is fitted to the back of the carrier.

Please observe the permissible trailer load of your truck crane.



#### **Risk of accidents by trailer moving unintentionally!**

Before coupling or uncoupling the trailer, it must be secured with the trailer parking brake as well as with chocks to prevent it from rolling away. Ensure that it is still possible to swivel the front axle of the trailer.



Before coupling the trailer, adjust the towbar to the height of the towbar coupling.



#### **Risk of accidents when coupling the trailer!**

No one may stand between the truck crane and the trailer when coupling the two vehicles.



#### **Risk of accidents from unexpected acceleration!**

When you move slowly towards the trailer, the transmission automatically shifts into manoeuvring mode. If the warning buzzer sounds, release the accelerator **immediately**.

If you do not release the accelerator, the electronics will couple automatically within a few seconds. The truck crane could accelerate unexpectedly and people might be crushed between the trailer and the truck crane.



Please observe the relevant national regulations regarding coupling and uncoupling of the trailer.

#### **Effects on the axle loads**

Observe the effects on the axle loads when towing a trailer. The axle loads of your truck crane change in the following manner when operating with central axle trailers:

- For every 100 kg (220 lbs) of drawbar load, the axle loads on the 1st and 2nd axle lines are reduced by 36 kg (80 lbs) each.
- For every 100 kg (220 lbs) of drawbar load, the axle loads on the 3rd to 5th axle lines are reduced by 43 kg (95 lbs) each.



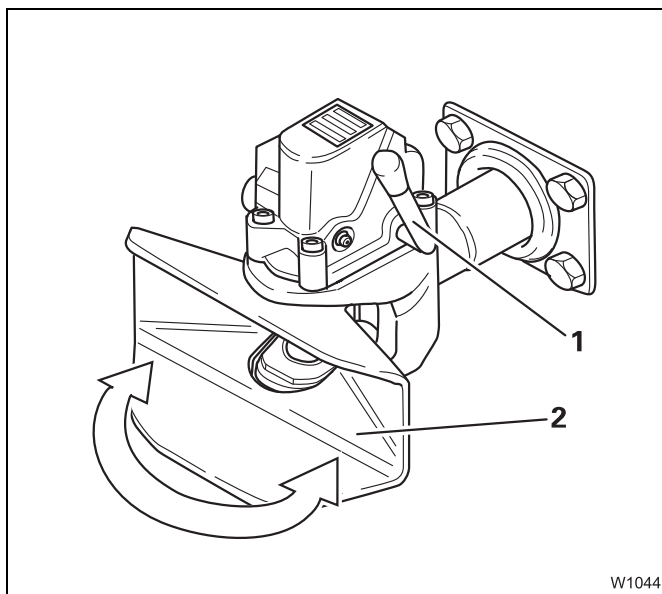
## Coupling the trailer



### **Risk of injury when the automatic closing device is triggered!**

Do not put your hand into the coupling jaw when the towbar coupling is open.

This may activate the automatic closing device, causing the cotter pin to move down with great force, seriously injuring your hand.

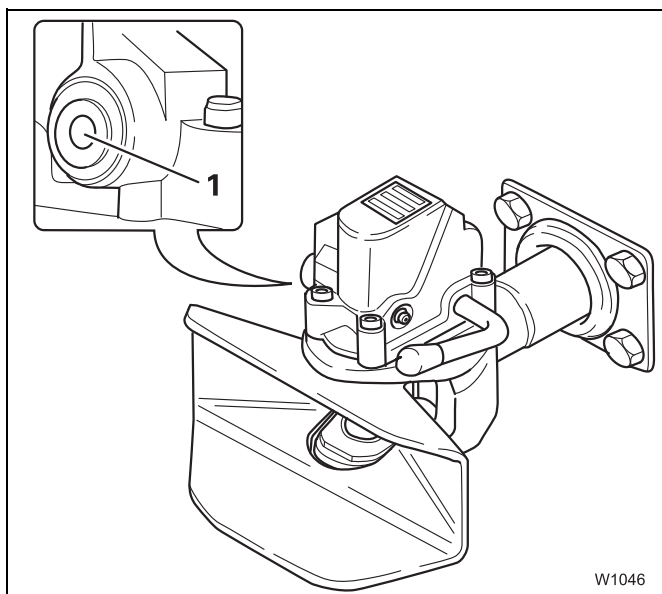


- Open the towbar coupling. Push the lever (1) up until it latches into place.
- Check that the coupling jaw (2) is stable. It may not be allowed to move to the left or the right when the towbar coupling is open.
- Carefully drive the truck crane backwards so that the towbar of the trailer is pushed into the coupling jaw.

The towbar coupling closes automatically, and the lever (1) swings downwards.



Make sure you check the prescribed condition of the coupling after each coupling procedure.



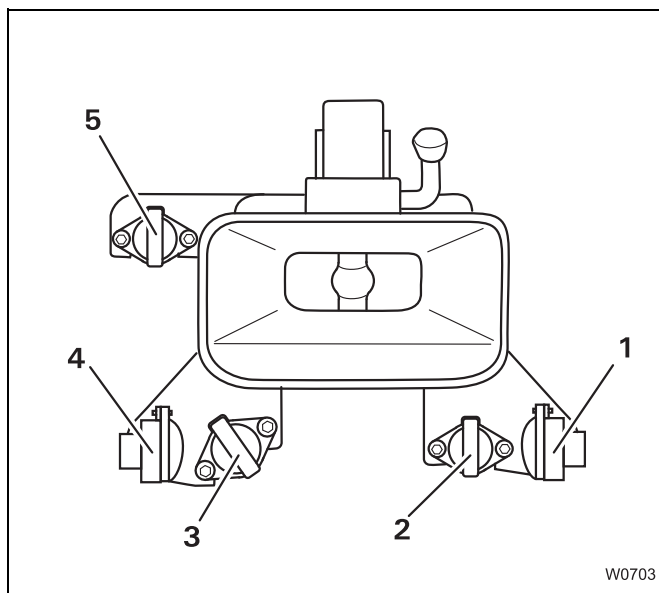
The pin (1) may no longer protrude from the guide bushing after the coupling procedure.



**Risk of accidents if the trailer is coupled improperly!**

If the pin is protruding from the guide bushing, the trailer is not coupled properly and could become disengaged from the towbar coupling while driving.

**Connecting the supply lines**



- Insert the plug of the trailer's electrical system into the socket (5).
  - If necessary, insert the ABS connection cable into the socket (3).
  - First connect the hose of the brake pipe to the yellow coupling head (4).
  - Then connect the hose of the supply line to the red coupling head (1).
- Socket (2) is designed for special equipment.



**Risk of accidents if the hoses are too short or installed improperly!**

The hose lines may not come off even when driving around corners. When connecting the hoses, make sure they are long enough and have enough clearance.

- Check the function of the trailer lighting.
- Test the service brake and parking brake immediately after setting off.

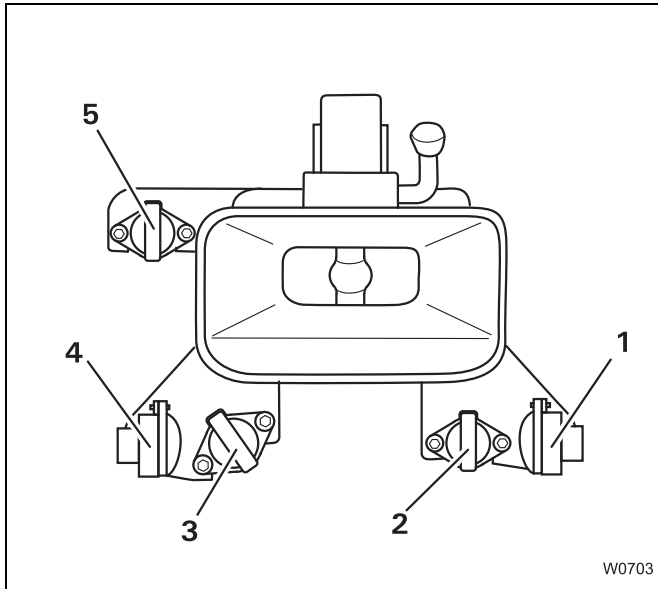


## Removing supply lines



### **Risk of accidents due to trailer moving unintentionally!**

Always first remove the hose from the supply line so that the trailer is braked. This prevents the trailer from moving when you remove the brake hose.



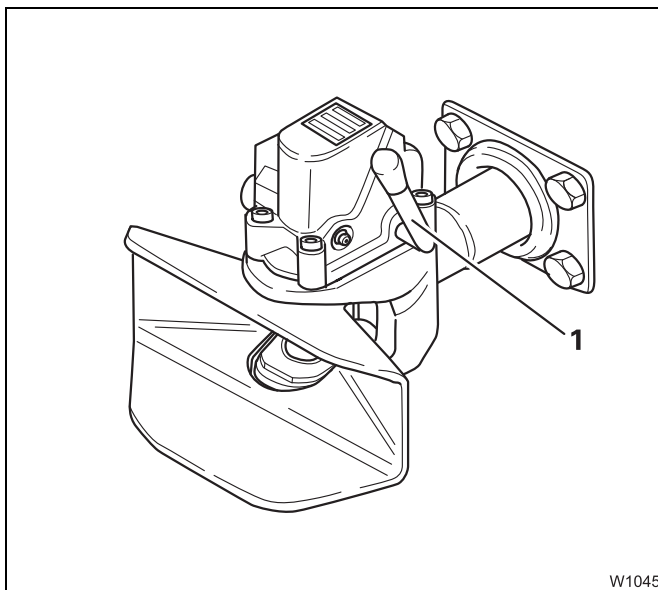
- Proceed as follows:
  - First disconnect the hose of the supply line from the red coupling head (1) – red. Now the trailer is braked.
  - Then disconnect the hose of the brake pipe from the yellow coupling head (4) – yellow.
- Remove the plug (5) of the trailer electrical system from the socket.
- If necessary, remove the plugs (2) and (3) from the sockets (ABS and special fittings).

## Uncoupling the trailer



### **Risk of injury when the automatic closing device is triggered!**

Never put your hand into the coupling jaw when the towbar coupling is open. This prevents the coupling from closing automatically, and the cotter pin causing serious injury to your hand.



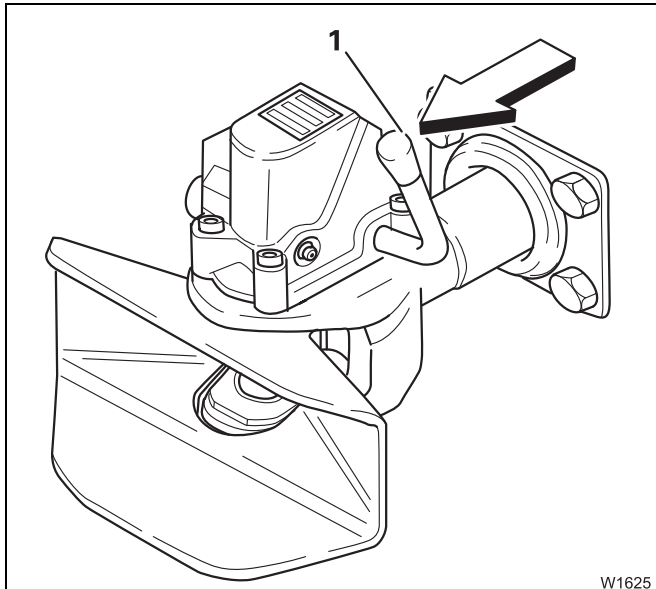
- Use the trailer service brake and chocks as prescribed to prevent the trailer from rolling.
- Open the towbar coupling. Push the lever (1) up until it latches into place.
- Drive the truck crane carefully away from the trailer.





**Risk of injury when manually closing the towbar coupling!**

When closing, the lever moves down with great force in the direction of the coupling jaw. Start the closing process only by moving the lever briefly in the direction of the coupling jaw with the ball of your hand. If you hold the lever and move it down, it may carry your hand with it and crush it.



If no trailer is connected, you must close the towbar coupling by hand. Proceed as follows:

- Hammer the lever (1) briefly in the direction of the coupling jaw (observe the arrow).

The lever swings downwards and the towbar coupling is closed.



**Risk of injury when the automatic closing device is triggered!**

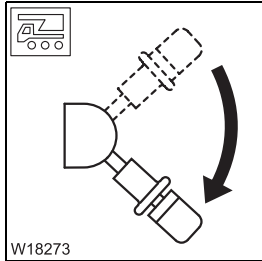
Always close the coupling if no trailer is connected. This prevents people from being injured by the automatic closing device being activated unintentionally.



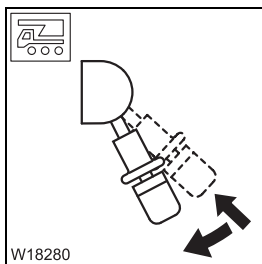
## Checking the braking force

When a trailer is coupled and connected, you can check whether the braking force of the truck crane alone is sufficient for braking the truck crane and the trailer on uphill or downhill roads (e.g. when a brake hose has burst).

To check this, you can release the parking brake of the trailer on its own.



- Apply the parking brake.



- Press the lever in and pull it further down.  
As long as you hold the lever in this position, the parking brake on the trailer is released – the parking brake on the truck crane remains applied.

This allows you to check whether the braking force of the parking brake on the truck crane alone is sufficient to brake the truck crane and the trailer.

- Let go of the lever. The lever latches into position and the parking brake of the trailer is applied.







### **Risk of accident from truck crane moving unintentionally!**

When parking on downhill or uphill gradients, always secure the truck crane and trailer against rolling away with wheel chocks in addition to the parking brake. Even the parking brake result was positive. Observe the corresponding regulations in your country when doing this.

# 6

## Driving modes and rigging for on-road driving

This chapter contains:

- Tables with driving modes of the GMK5250L, in which the maximum axle load is 12 t (26,500 lbs);  p. 6 - 3.
- Rigging work required in order to set down the main boom on a dolly;  p. 6 - 11.
- Installation/removal of the main boom;  p. 6 - 15.
- Installation/removal of the auxiliary hoist;  p. 6 - 55.

### 6.1

## Driving modes

### Information on the axle loads

The GMK5250L truck crane is designed for driving with maximum axle loads of 12 t (26,500 lbs). **Manitowoc Crane Group Germany GmbH** notes that driving with an axle load exceeding 12 t (26,500 lbs) the brake system can overheat and the braking deceleration required by the EU partial type-approval cannot be ensured.

If country-specific regulations allow the truck crane to be driven with axle loads greater than 12 t (26,500 lbs), the crane driver/crane operator bears the sole responsibility for driving in this condition and for any subsequent damage. This also applies to damage due to premature wear.



#### **Risk of accidents from increased braking distance**

When driving with axle loads in excess of 12 t (26,500 lbs), the braking deceleration required by the EU partial type-approval cannot be met. Please bear in mind that the braking distance of the truck crane will be increased.



#### **Risk of damage from premature wear**

Premature wear of parts under particular strain (brake system, steering, tyres, wheels, suspension, drive shafts) cannot be ruled out even if the axle loads only briefly exceed 12 t (26,500 lbs).

### 6.1.1

## How to use the tables

The tables consist of two parts:

- The driving mode of your truck crane is specified in the top part, next to **Equipment**. Find out which driving mode applies to your truck crane. Each truck crane has one driving mode only.
- The required rigging mode for this driving mode and the accessories you are allowed to transport are specified in the lower section, next to **Rigging mode**.

---

### Example of how to use the table:

Your truck crane is delivered with 385/95 R 25 tyres, aluminium rims, the 10 x 8 x10 drive and a towbar.

In this case, the driving mode in the upper part, in addition to the equipment, is **5**.

According to the specifications in the lower part, in addition to rigging mode,

- the hook tackle must be hung on the bumper,
  - the hose drum with attached parts must be mounted on the swing-away lattice,
  - the storage compartment with 200 kg accessories must not be mounted at the rear.
-

## 6.1.2

### Tables for a maximum axle load of 12 t (26,500 lbs)



This section only shows some standard driving modes. For further information on additional or individual driving modes, please contact **Manitowoc Crane Care**.



If you remove indicated parts from the truck crane in driving mode, then the total weight decreases but can be distributed in such a way that the front or rear axle loads are over 12 t (26,500 lbs).



The following applies to all driving modes:  
The counterweight is completely unrigged.

Also be aware of the effects on the axle loads when towing a trailer;  
▮▮▮ p. 5 - 77.

For tyres  
385/95 R25

		Driving mode					
		1	2	3	4	5	6
Equipment	385/95 R 25 tyres	✓	✓	✓	✓	✓	✓
	Steel rims	✓	✓	✓			
	Aluminium rims				✓	✓	✓
	Drive 10 x 6 x 10	✓		✓	✓		✓
	Drive 10 x 8 x 10		✓			✓	
	Towbar coupling		✓			✓	
Rigging mode	Hook tackle attached to the bumper	●	●	●	●	●	●
	Hose drum and brackets for swing-away lattice	●	●	●	●	●	●
	Storage compartment on the rear with 200 kg accessories	●		●	●		●



**For tyres**  
**445/95 R25**  
**525/80 R 25**

		Driving mode							
		1	2	3	4	5	6	7	8
<b>Equipment</b>	445/95 R 25 tyres	✓	✓	✓	✓	✓	✓		
	525/80 R 25 tyres							✓	✓
	Steel rims	✓	✓	✓				✓	
	Aluminium rims				✓	✓	✓		✓
	Drive 10 x 6 x 10	✓	✓	✓	✓	✓	✓	✓	✓
<b>Rigging mode</b>	Spare wheel (steel rim) 445/95 R 25 on the rear			●					
	Spare wheel (aluminium rim) 445/95 R 25 on the rear						●		
	Spare wheel (aluminium rim) 525/80 R 25 on the rear								●
	Hook tackle attached to the bumper	●			●				
	Hose drum and brackets for swing-away lattice	●	●	●	●	●	●	●	
	Storage compartment on the rear with 200 kg accessories	●	●		●	●			

### 6.1.3

## Maximum permitted speeds with an axle load of over 12 t (26,500 lbs)

Should your national regulations allow driving with axle loads over 12 t (26,500 lbs), you may under no circumstances exceed the maximum permitted speed given here.



### Risk of accidents from overloading tyres

Never exceed the maximum permitted speed which is given for the current axle load and tyre size.

This prevents the tyres from becoming overloaded and bursting.

The maximum permissible speed depends on the size of the tyres and the axle load. The following values only apply to the given tyre pressure, and are maximum values. Also note the information provided by the tyre manufacturer regarding the maximum permitted load duration.

Tyre size/ Tyre pressure in bar (psi)	Current Axle load in t (lbs)	Maximum permissible speed In km/h (mph)
<b>385/95 R 25<sup>1)</sup> / 10 (145.0)</b>	Up to 13.5 (29,800)	58 (36)
	Up to 14.5 (32,000)	45 (28)
	Up to 15.5 (34,200)	32 (20)
	Up to 16.5 (36,400)	22 (14)
<b>445/95 R 25 / 9 (130.5) 525/80 R 25 / 7 (101.5)</b>	Up to 13.5 (29,800)	65 (40)
	Up to 14.5 (32,000)	65 (40)
	Up to 15.5 (34,200)	65 (40)
	Up to 16.5 (36,400)	58 (36)
<sup>1)</sup> Michelin X-Crane 9 bar (130.5 psi)		

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## 6.2

## Weighing the truck crane

### Weighing error

The most precise method for determining the total weight of the GMK5250L is to use calibrated scales of appropriate capacity and a weighbridge on which all the wheels of the truck crane can stand at the same time.

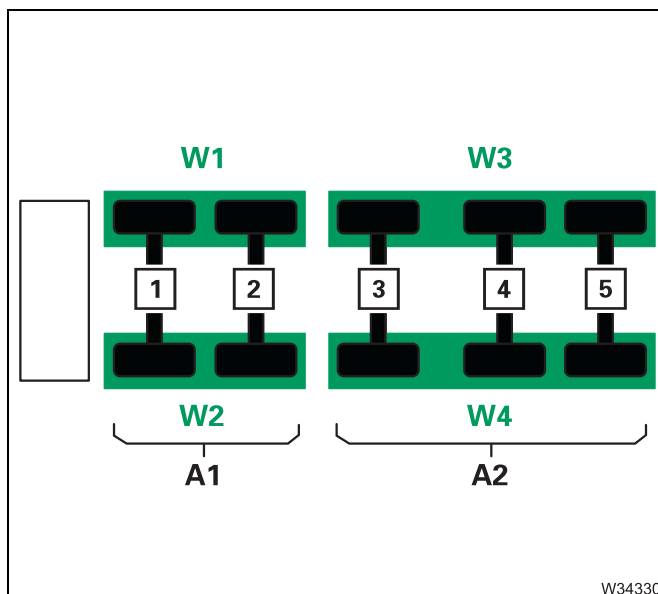
All other weighing procedures are subject to various factors which can lead to weighing errors. This Operating Instructions describes a procedure by which the greatest number of sources of weighing errors can be avoided. Also observe all the instructions provided by the manufacturer of the scales.



### Defective measurement of the axle loads and total weight.

When determining the axle loads and total weight, **do not** use individual dial scales. If individual dial scales are used to weigh a truck crane, this will lead to incorrect, unreliable measurement results.

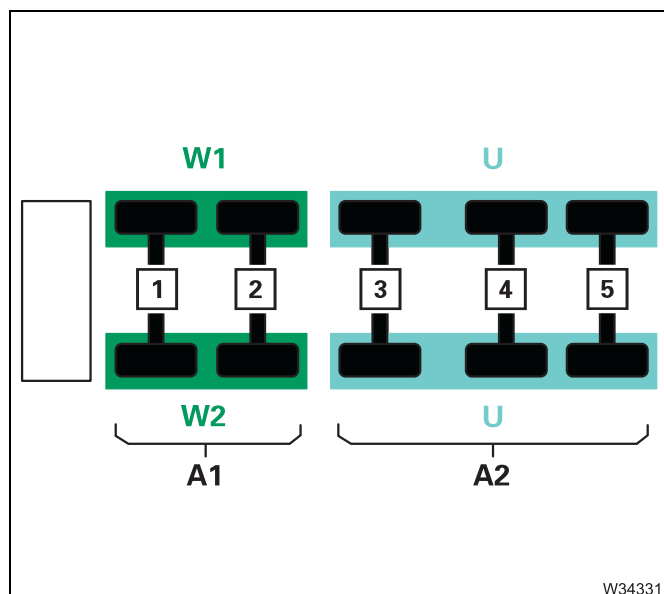
If multiple individual scales are used, allowance must be made for the fact that the axle groups are hydraulically coupled. For this purpose, you will need wheel load scales of sufficient capacity and size.



### - Determining the total weight

The weights of all the axle groups belonging to the crane must be recorded at the same time in a single weighing procedure. In addition, only one set of scales may be used per axle group on each side of the vehicle. The GMK5250L has two coupled axle groups (A1 to A2) and you will require four wheel load scales (W1 to W4).

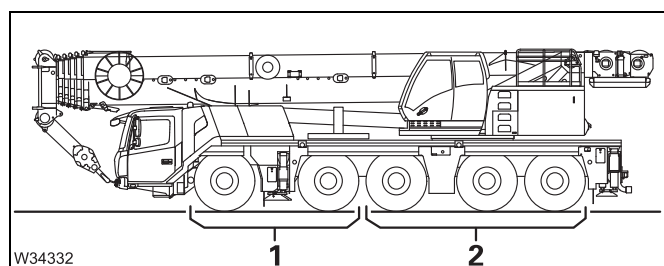




### - Determining the axle loads

All the axle lines belonging to an axle group must always be weighed. In addition, all the wheels must be on the same level. If for instance only the axle group **A1** is to be weighed, then the axle groups **A2** must be equalised on a support plate **U** which has the same height as the scales **W1** and **W2**.

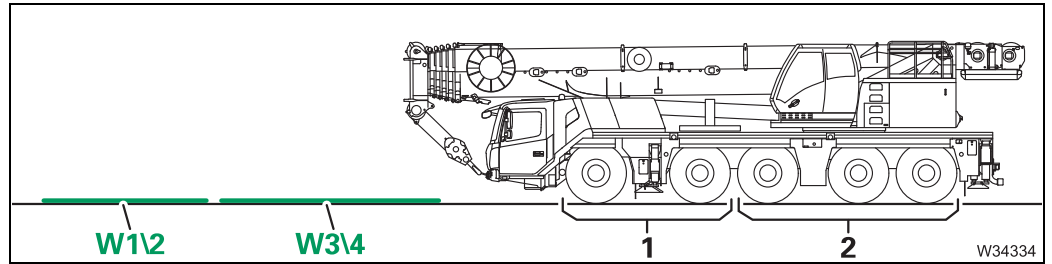
### Axle groups



### GMK5250L

- Axle group 1 1st + 2nd axle line
- Axle group 2 3rd + 4th + 5th axle line

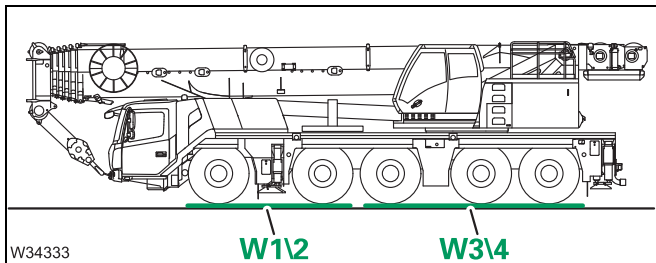
## Weighing procedure



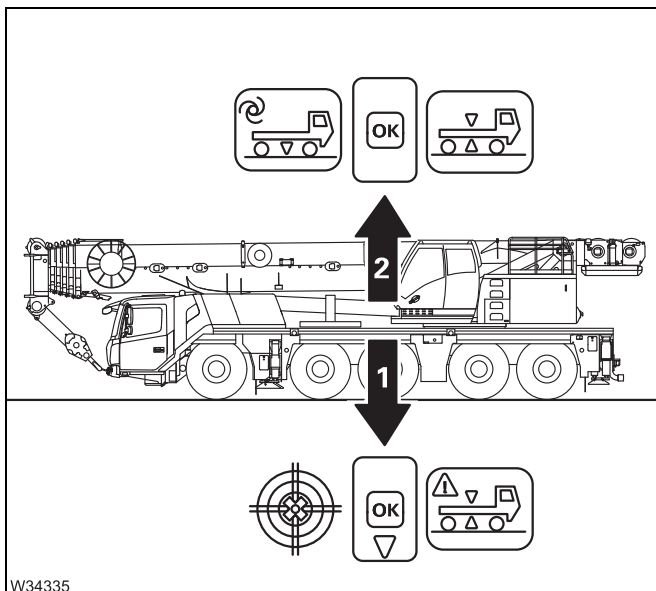
Perform the weighing procedure only with the crane truck standing on solid and horizontal ground. All scales must be at the same height.


- Position the scales **W1** to **W4** (or the necessary support plate) directly in front of the truck crane, so that the distances between the scales are exactly the same as the distances between the axle groups **1** and **2**.

In the next step, drive at only a very low speed without any steering movements, and brake only very gently.



- Drive the truck crane on to the scales **W1** to **W4** (or on to the necessary support plates), so that the axle groups stand centrally on the scales.
- **Do not** apply the parking brake.



- If the truck crane has to be braked while changing the level, only use the service brake very gently.
- (1) – Use the level adjustment system to lower the truck crane to its lowest position;  p. 5 - 52.
- (2) – Use the **Automatic function** to set the level for on-road driving. If you move the axle groups individually the weighing result will be falsified.
- Read the scales and make a note of the results.



## Evaluation

In the example shown you receive four weighing results. Assume you had made a note of the values listed here.

Passenger side:  $W1 = 10 \text{ t}, W3 = 12 \text{ t}$

Driver's side:  $W2 = 10 \text{ t}, W4 = 12 \text{ t}$

These values allow you to determine the total weight of the truck crane and the axle loads for the individual axle lines.

### For the total weight

- Add together the six results.

Passenger side:  $W1 + W3 = 10 \text{ t} + 12 \text{ t} = 22 \text{ t}$

Driver's side:  $W2 + W4 = 10 \text{ t} + 12 \text{ t} = 22 \text{ t}$

**Total weight = 44 t**

### For the axle loads of individual axle lines

- You must determine the weight of the associated axle group and divide it by the number of axle lines.
- Determine the weight of the axle group

The axle group 2 was weighed with the scales W3 and W4.

- Add the weighing results.

Passenger side:  $W3 = 12 \text{ t}$

Driver's side:  $W4 = 12 \text{ t}$

**Weight of axle group 2 = 24 t**

- Determine the axle load of the 2nd axle line.

Axle group 2 has 3 axle lines.

- Divide the weight of the axle group by the number of axles.

$$\text{Axle load} = \frac{\text{Weight of axle group 2}}{\text{Number of axle lines}} = \frac{24 \text{ t}}{3} = 8 \text{ t}$$




## 6.3

### Rigging work for driving with a dolly

To reduce the axle loads to the specifications applicable in the country in which you are working, you can set the main boom onto a dolly when driving.

For this purpose, the truck crane must be fitted with a slewing gear free-wheel, boom floating position and if necessary, with a boom pre-tensioning device.


Before driving with the dolly, you must:

- Switch on the slewing gear freewheel;  p. 6 - 12,
- Switch on the boom floating position;  p. 6 - 13,
- Switch on boom pre-tensioning, if necessary;  p. 6 - 14.

### 6.3.1

## Switching on the slewing gear freewheel

When the main boom is set down on a dolly, the superstructure must be able to slew when driving around corners. You must switch on the slewing gear freewheel for this purpose.

- If a houselock is fitted, switch it off;  *Switching off the houselock*, p. 10 - 19.




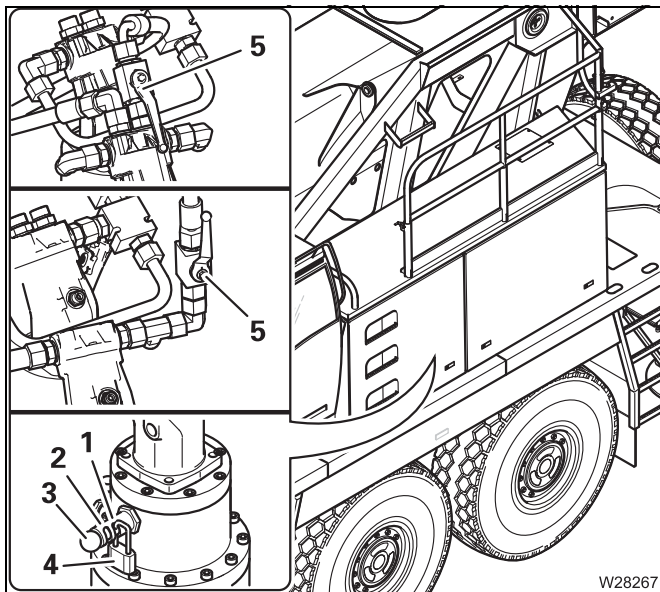
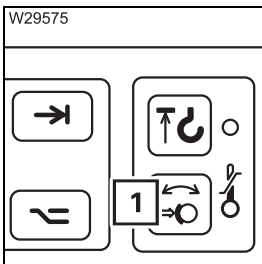
### Risk of accidents from the houselock being switched on

Always switch off the houselock before setting down the main boom on the dolly. Otherwise the superstructure will be unable to slew when driving around corners.

- Place the boom on the dolly as described in section *Switching on the boom floating position*, p. 6 - 13.

### Prerequisites


- The engine must be running.
- The slewing gear brake must be released, the lamp (1) must have gone out;  *Releasing the slewing gear brake*, p. 10 - 118.



### Switching on

- Remove the lock (4) from the bore (2).
- Push the pin (3) inward as far as it will go.
- Secure the pin with the lock in the bore (1) and remove the key.
- Fit and secure the pin (3) on the other slewing gear in the same way.
- Open the valve (5) – the slewing gear freewheel is switched on.



Switching off the slewing gear freewheel;  p. 11 - 18.

## 6.3.2

### Switching on the boom floating position

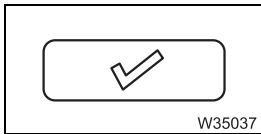
If the main boom has been placed on a dolly, the boom floating position must be switched on so that the main boom can move up and down.



#### **Risk of accidents from the boom floating position being switched off**

Always switch on the boom floating position when the main boom is on a dolly.

This prevents the full weight of the dolly briefly becoming suspended from the main boom on uneven ground, the axle loads from rising suddenly, or the truck crane from tipping when driving around corners.



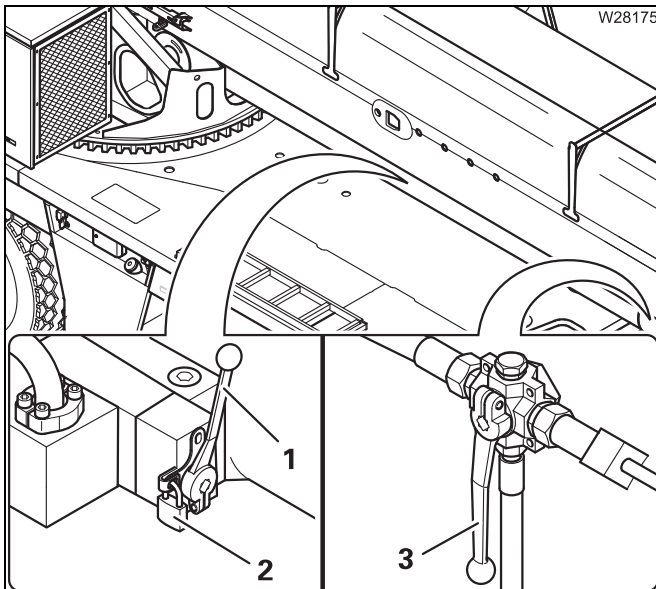
- Confirm the current rigging mode.
- Fully retract the main boom.
- Raise the main boom to a permitted angle within the working range.
- Turn the superstructure to the  $0^\circ$  to the rear working position and place the main boom on a dolly.



#### **Risk of accidents if the main boom falls down!**

You may only switch the boom to the floating position once the main boom has already been set down on the dolly.

This prevents the raised main boom from dropping down.



- Remove the lock (2).
- Switch over valve I – lever (1) upwards.
- Secure the lever (1) with the padlock (2).
- Switch the valve IV over – lever (3) points forwards.

The boom floating position is now switched on.

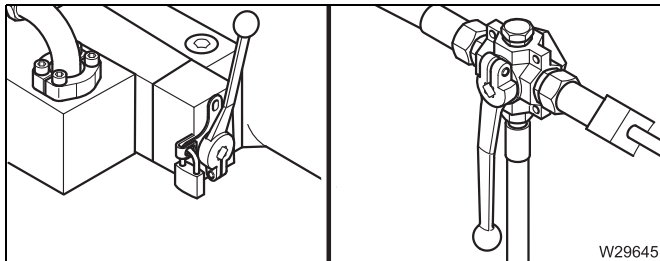


Switching off the boom floating position; p. 11 - 17.

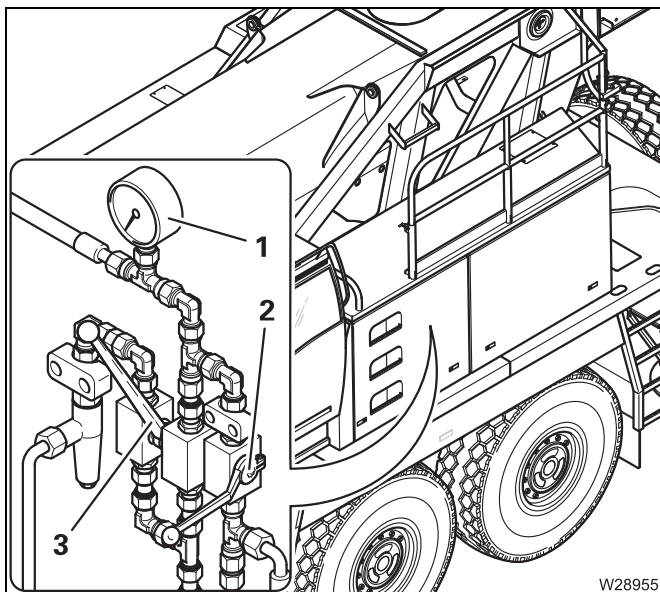
### 6.3.3

## Switching on boom pre-tensioning

If the main boom has been set down on a dolly, you can change the axle loads on the rear axle lines by switching on the boom pre-tensioning.



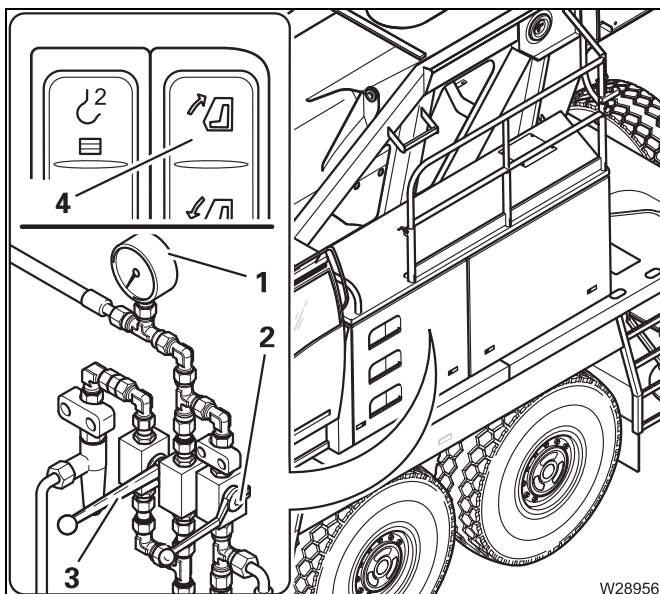
- Switch on the boom floating position;  
▮▮▮▶ p. 6 - 13.



The valves II and III are located underneath the pressure gauge (1).

- Close the valve II – the lever (2) is horizontal.
- Open the valve III – the lever (3) points upward.

You can now fill the pressure accumulator.



- Press button (4) in.  
The pressure accumulator is now filled.
- Fill up the pressure accumulator until the pressure stops rising on the pressure gauge (1).

- Close the valve III – lever (3) points down.

The valve II stays closed – lever (2) is horizontal.

Now the boom pre-tensioning is switched on.



## 6.4

### Rigging the main boom

This section applies only to truck crane which are fitted with the pulling devices for removing/mounting the main boom.

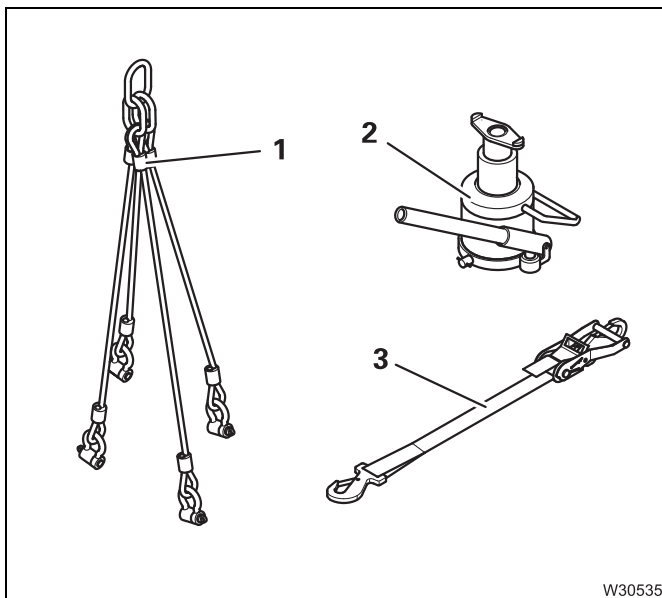


#### **Risk of accident when removing/installing the main boom without pulling devices**

Only remove or install the main boom if the truck crane is equipped with the factory-installed pulling devices and with the necessary accessories. Without this factory-installed pulling device, the main boom may only be removed by **Manitowoc Crane Care**.

#### **Additional equipment required**

In addition to the pulling devices, you also need the following accessories:



- a tightening belt (3),
  - a lifting device (2),
  - lifting gear (1),
- as well as
- an auxiliary crane with sufficient lifting capacity,
  - a separate vehicle with sufficient load bearing capacity and loading area.

Transport dimensions and weight;  
▶▶▶▶▶ p. 1 - 10.

## 6.4.1

### CHECKLIST: Removing the main boom



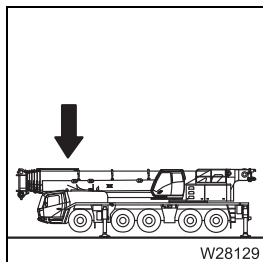
This checklist is not a complete operating manual. There are accompanying instructions, which are indicated by cross-references.

**Observe the warnings and safety instructions specified there!**

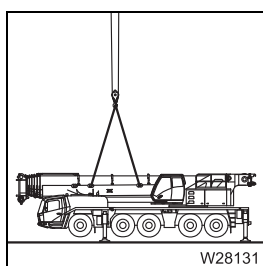
#### Prerequisites

- The auxiliary hoist has been unrigged.
- The counterweight is unrigged.
- All lattice extensions have been removed.
- All telescopic sections are fully retracted and locked.
- The hook block has been unreeved and the hoist rope has been reeled on the drum up to the main hoist.
- The superstructure is slewed to the front.
- The truck crane is supported by an outrigger span of at least 8.950 x 2.710 m (29.4 x 8.8 ft).

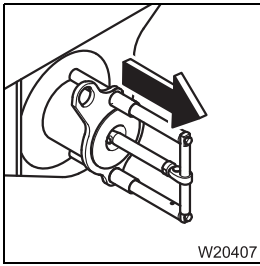
#### Checklist



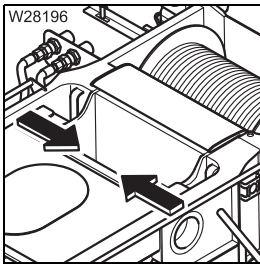
1. Lower the main boom on the boom rest and disconnect the hydraulic/ electrical connections; p. 6 - 29.



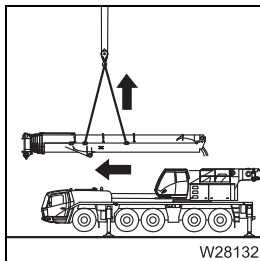
2. Sling the main boom to an auxiliary crane; p. 6 - 20.



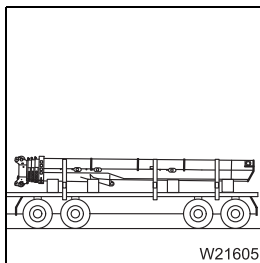
- 3. On the derricking cylinder head axle:**
- Take the load off of the head pin
  - Release the head pin
  - Pull the head pins out;
- ➡ p. 6 - 23.



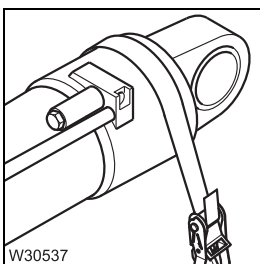
- 4. On the boom pivot pin:**
- Open the hydraulic circuit,
  - unlock the pulling device,
  - retract the pivot pin;
- ➡ p. 6 - 26.



- 5. Raise the main boom from the turntable; ➡ p. 6 - 31.**



- 6. Put the main boom on the separate vehicle and secure for transport; ➡ p. 6 - 33.**



- 7. Secure the derricking cylinder with a tightening belt.**

## 6.4.2

### CHECKLIST: installing the main boom



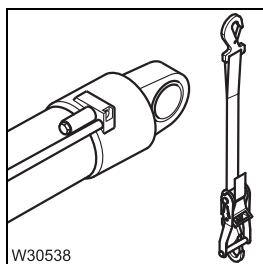
This checklist is not a complete operating manual. There are accompanying instructions, which are indicated by cross-references.

**Observe the warnings and safety instructions specified there!**

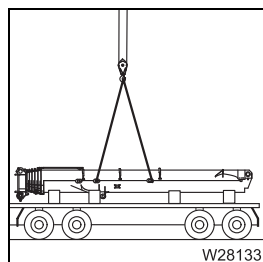
#### Prerequisites

The truck crane is supported by an outrigger span of at least 8.950 x 2.710 m (29.4 x 8.8 ft).

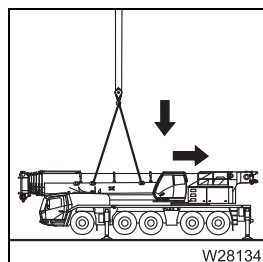
#### Checklist



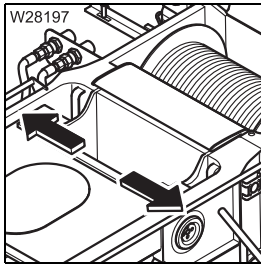
1. Remove the tightening belt from the derricking cylinder.



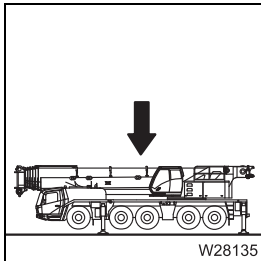
2. Sling the main boom to an auxiliary crane; p. 6 - 20.



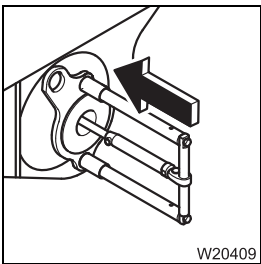
3. Lift the main boom into the turntable and align the connecting points; p. 6 - 32.



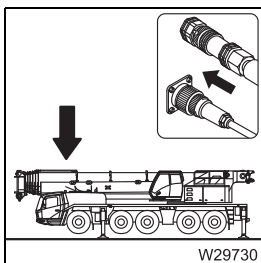
4. On the boom pivot pin:
- Open the hydraulic circuit,
  - Extend the pivot pin,
  - Securing the pulling device,
  - Close the hydraulic circuit,
- ➡ p. 6 - 26.



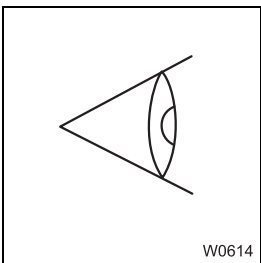
5. Set down the main boom in the boom rest with the auxiliary crane and remove the lifting gear.



6. On the derricking cylinder head:
- Level the derricking cylinder,
  - Fit the head pin
  - Secure the head pin;
- ➡ p. 6 - 23.




7. Establish the hydraulic and electrical connections; ➡ p. 6 - 29.



8. Carry out the checks with the main boom set down; ➡ p. 6 - 34.

### 6.4.3

## Slinging the main boom

Slings are fitted to the main boom when rigging and it is lifted with an auxiliary crane. Note the equipment necessary for this;  p. 6 - 15.

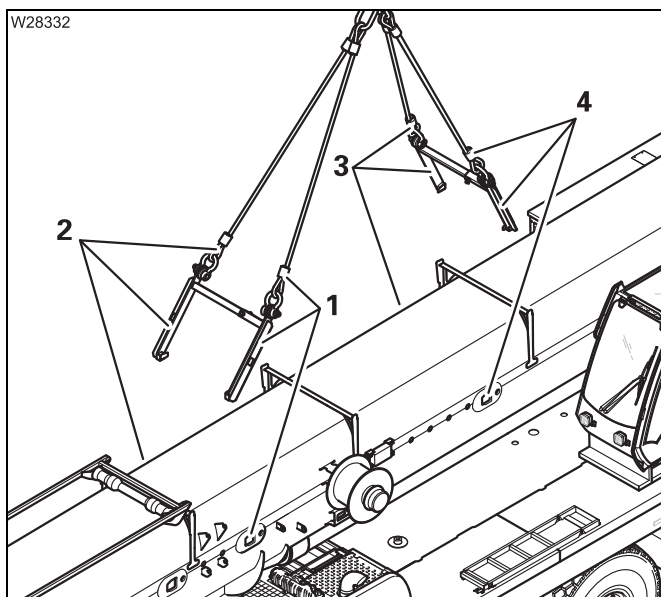


### Risk of accidents due to incorrect procedure!

Only use the lifting gear included in the delivery and proceed as described in the following section.

### Marking

The lifting gear is labelled.

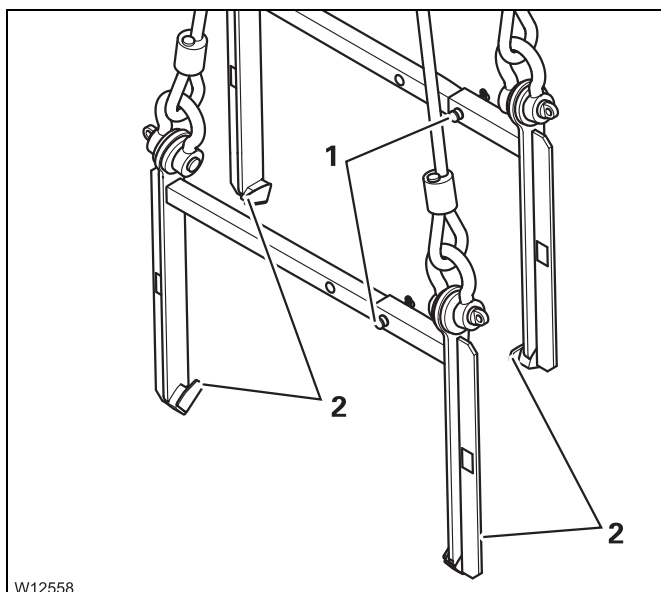


Only connect the parts of the lifting gear that have the same marking.

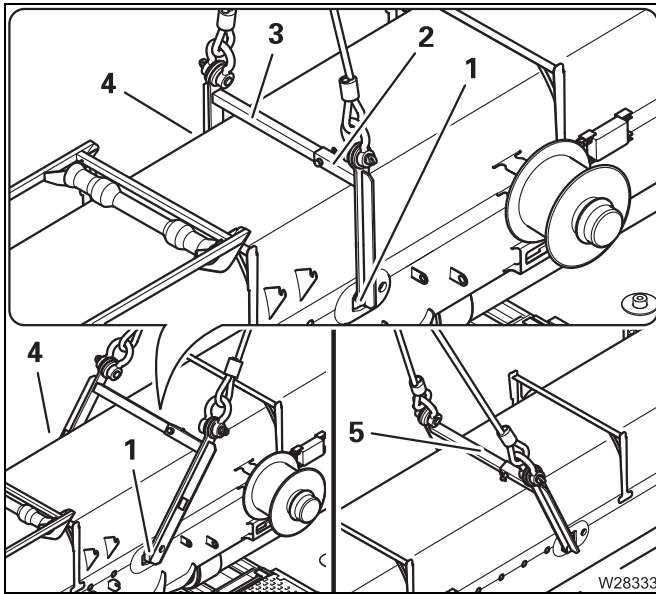
Only fasten the lifting gear to the slinging points intended for this purpose. The markings are of following significance:

- 1 FL – Front left
- 2 FR – Front right
- 3 BR – Rear right
- 4 BL – Rear left

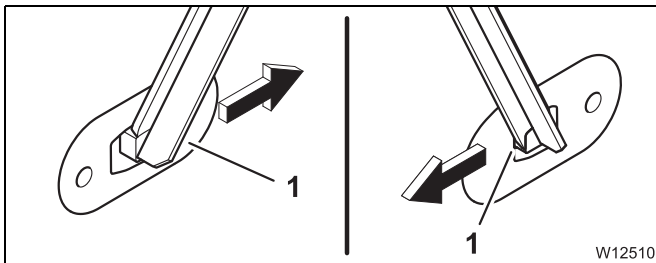
### Installing the lifting gear



- If the installation is correct, the load-bearing equipment (2) of both brackets point to each other.
- Lock both brackets in the wide position. Secure the pins (1) using the retaining pins.
- Install the front bracket first. It hangs on longer ropes, which makes installing the back bracket easier.

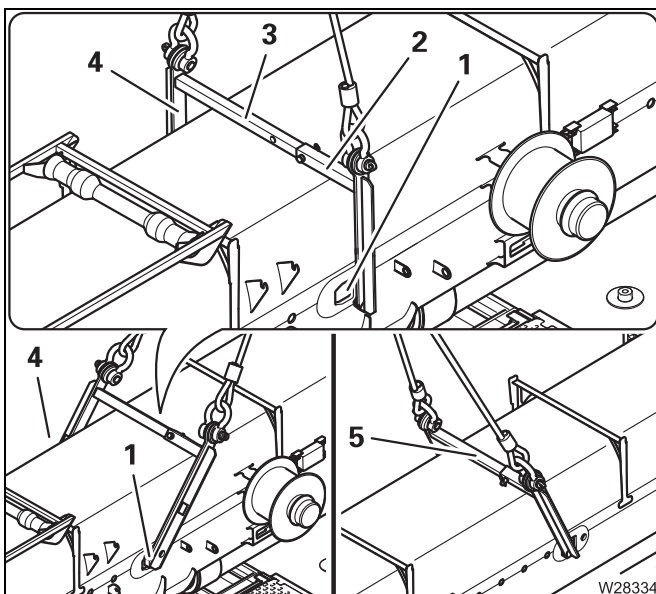


- Insert the bracket (3) into the slinging point (1). Pull the pin (2).
- Insert the bracket into the slinging point (4).
- Secure the bracket with the pin (2) and the retaining pin.
- Pull the bracket to the centre – the bracket must rest on the slinging point on both sides.
- Install the bracket (5) in the same manner.



- Before lifting, make sure the brackets on both sides are resting on the slinging point (1).

### Removing the lifting gear



- Remove the pin (2) and pull the bracket (3) out of the slinging point (4).
- Secure the bracket with the pin (2) and the retaining pin.
- Pull the bracket out of the slinging point (1).
- Remove the bracket (5) in the same manner.
- Remove the brackets.

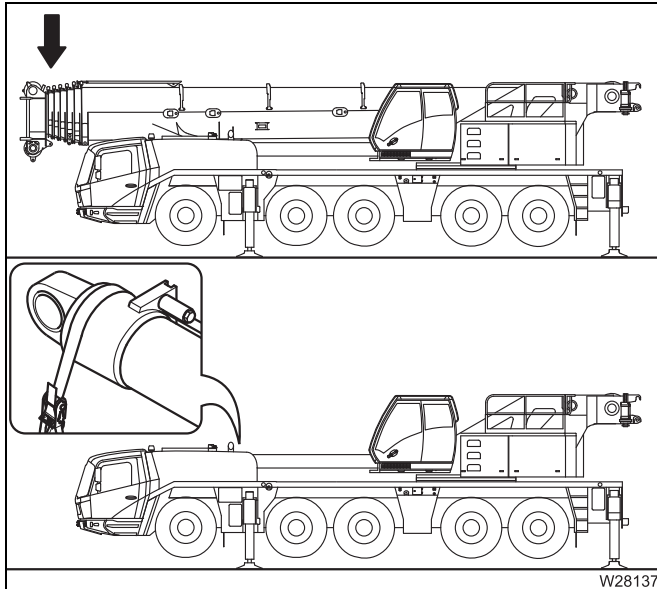
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### 6.4.4

## Retracting/fitting the derricking cylinder head pin

The derricking cylinder head axle is retracted and fitted with a pulling device.



You must lower the main boom onto the main boom rest before pulling off the head pin.

When the main boom is unrigged then the derricking cylinder is fastened to the main boom rest and secured using a tightening belt.

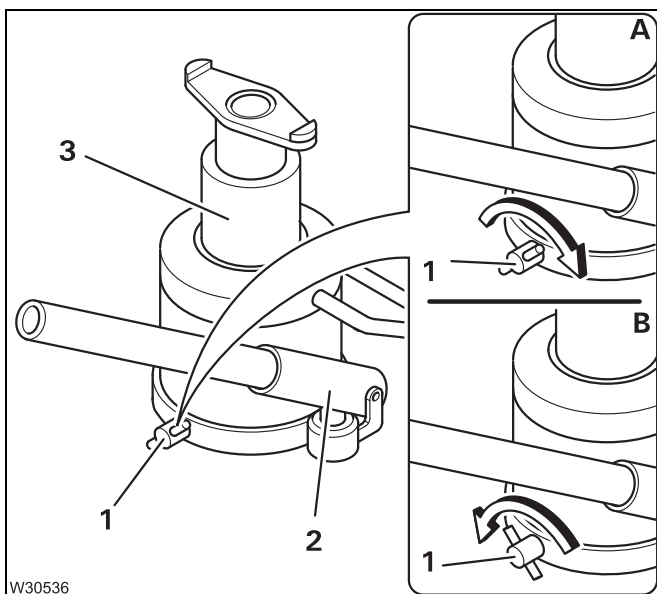
### Operating the lifting device



A lifting device is needed in order to relieve and level the derricking cylinder.

#### Danger from using unsuitable lifting device

Have the lifting device serviced in time before the maintenance interval specified on the label expires.



- Attach the lever to the holder (2).

(A) – Raise

- Close the drain plug (1) and pump the lever. The piston rod (3) extends.

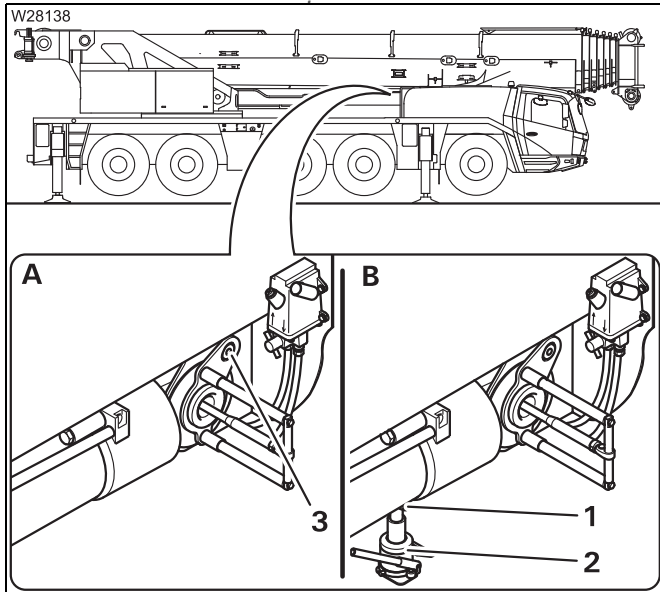
(B) – Lowering

- Slowly open the drain plug (1). The piston rod (3) retracts.



**Pulling the derricking cylinder head axle**

After you have pulled the head pin, you can no longer derrick the main boom.



**(A) – Releasing the head pin**

- Loosen the bolt (3) and remove the disc.

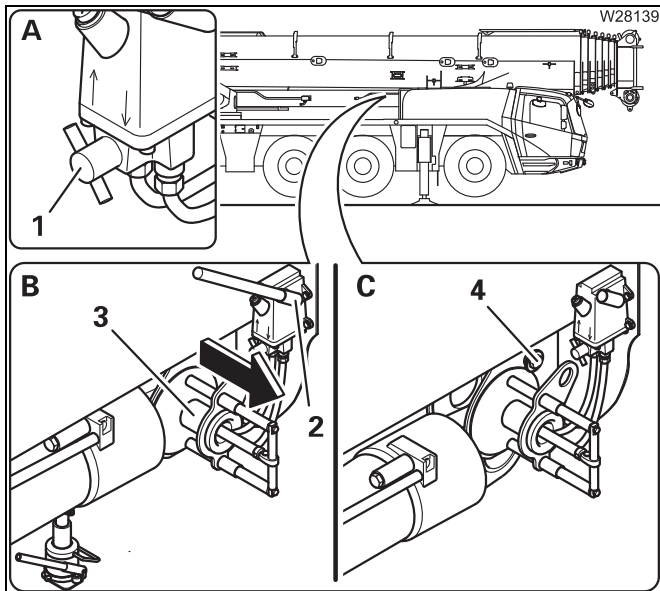
**(B) – Relieving the head pin**

- Place the lifting device (2) underneath the front middle of the derricking cylinder.
- Carry out the *Raise* movement until the bracket (1) is resting firmly on the derricking cylinder.



**Risk of accident from falling derricking cylinder!**

Always take the load off of the derricking cylinder using the lifting device before retracting the head pin. This prevents the derricking cylinder from falling down, injuring people or being damaged when the bolts are undone.



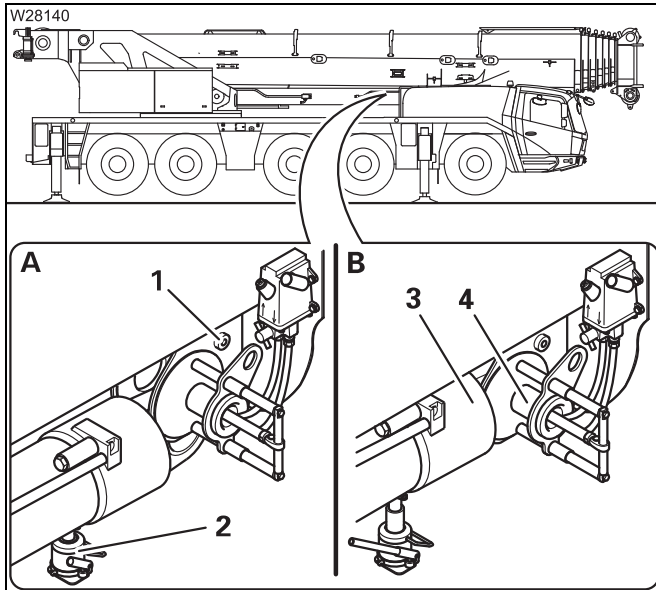
**Pulling out the head pin**

- (A) – Turn the switch (1) to the *Pull* position.
- (B) – Insert the lever into the clamp (2).
- Pump until the head pin (3) is completely drawn out.
- Carry out the *Lower* movement until the derricking cylinder lies in the main boom rest.
- (C) – Fasten the disc with the bolt (4).
- Stow away the lever and the lifting device.

- Secure the derricking cylinder with the tightening belt.

### Fitting the derricking cylinder head axle

- Check to see if the tightening belt of the derricking cylinder is taken off.



### Aligning the derricking cylinder

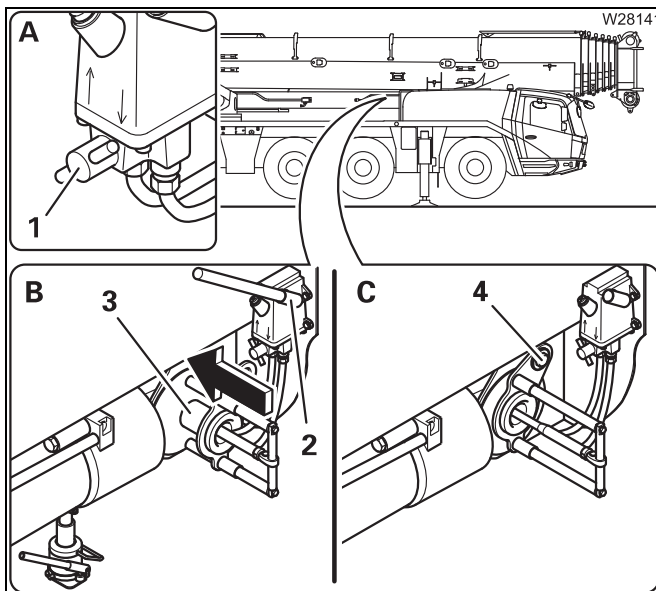
- (A) – Remove the bolt (1) and remove the disc.
- Place the lifting device (2) underneath the middle of the derricking cylinder.
- (B) – Carry out the *Raise*, movement until the head pin (4) aligned with the bearing in the derricking cylinder (3).



### Risk of damage to the bearings in the derricking cylinder head

Make sure that the bearings in the derricking cylinder are aligned with the head pin before fitting the head pin.

This prevents the head pin from damaging the bearing.



### Fitting the head pin

- (A) – Turn the switch (1) to the *Insert* position.
- (B) – Insert the lever into the clamp (2).
- Pump until the head pin (3) is inserted as far as possible.

### Securing the head pin

- (C) – Fasten the disc with the bolt (4).
- Stow away the lever and the lifting device so that it is safe to drive on the road.

## 6.4.5

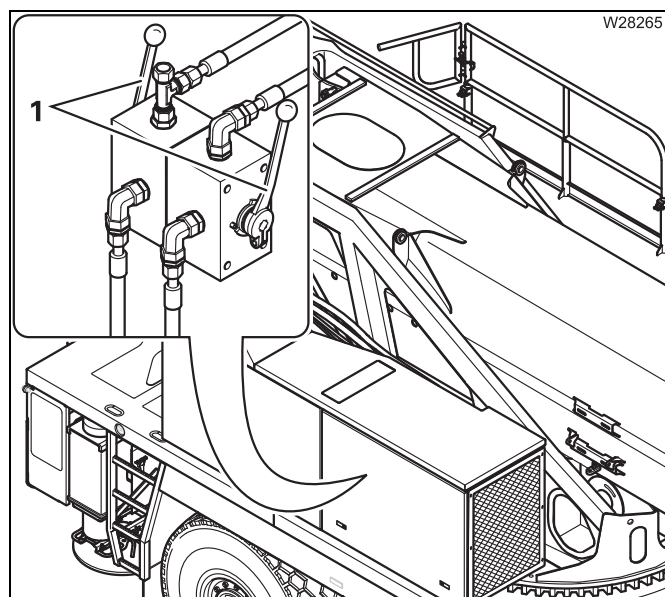
### Retracting/extending the boom pivot pin

The boom pivot pin is retracted and extended with a hydraulic pulling device.

#### Before retracting

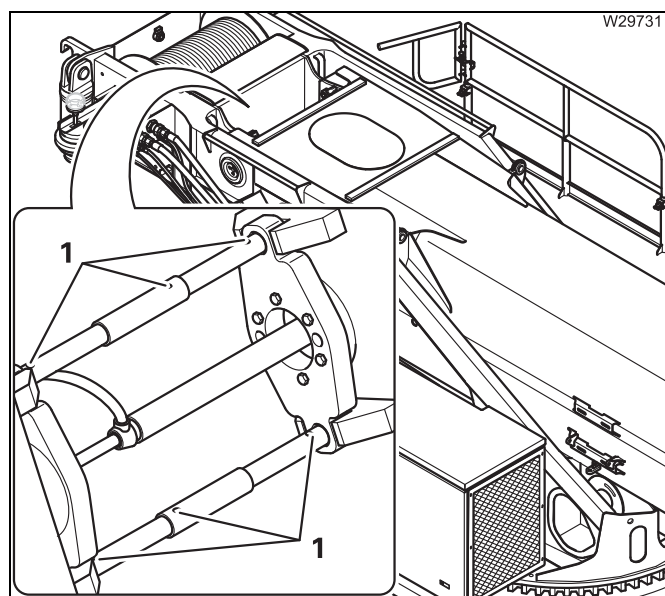
Before retracting the boom pivot pin you must:

- Open the hydraulic circuit,
- Unlock the pulling device.



#### Opening the hydraulic circuit

- Open valves (1) – Position **upwards**.



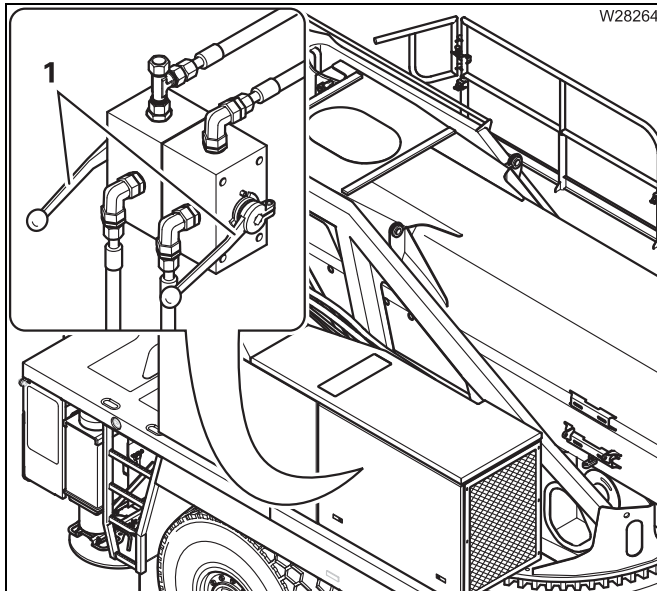
#### Unlocking the pulling device

- Release the retaining pins and pull out the bolt (1).

### After extending

After extending the boom pivot pin you must:

- close the hydraulic circuit,
- secure the pulling device.



### Closing the hydraulic circuit

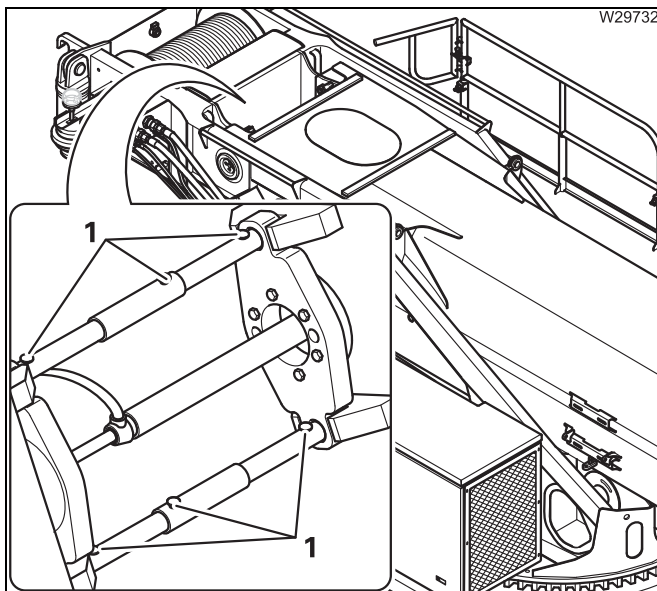
- Close the valves (1) – position **horizontal**.



### Risk of accidents from falling main boom!

Always secure the pulling device with the pins.

This prevents the boom pivot pin from retracting by itself and the main boom from falling and injuring people.



### Securing the pulling device

- Insert the pins (1) and secure them with the retaining pins.



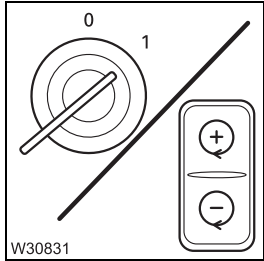
### Retracting/ extending the pivot pin



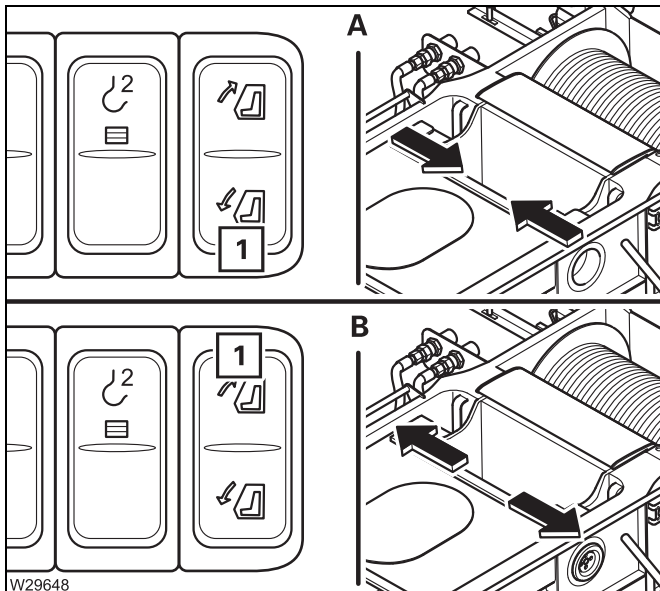
#### **Risk of damage to the main boom!**

Before **retracting**, the main boom must be slung and all other sling gear must be tightened.

Before **extending**, the bearing points on the turntable must be aligned with the boom pivot pin.



- Start the engine.

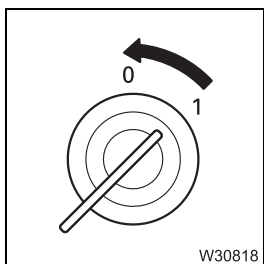


#### **(A) – Retracting**

- Press the button (1) in at the bottom. The pivot pin is retracted.

#### **(B) – Extending**

- Press the button (1) in at the top. The pivot pin is extended.
- Secure the pulling device; p. 6 - 27.



- Switch the engine off.

## 6.4.6

### Disconnecting/connecting hydraulics/electrical

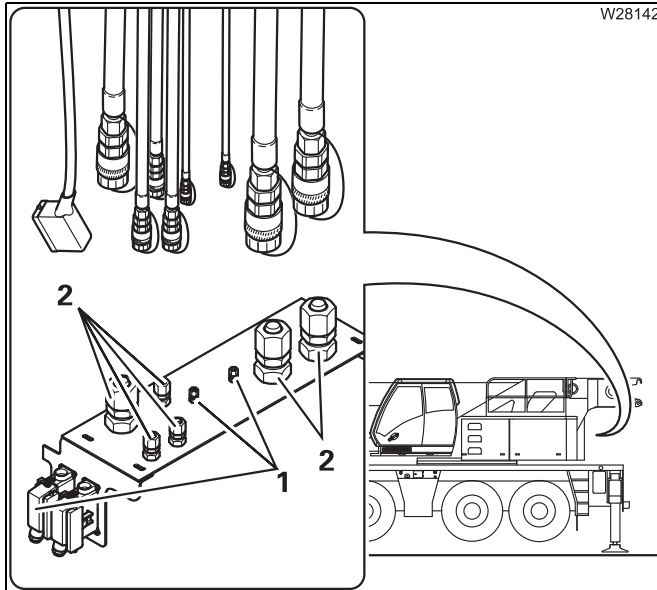
#### Disconnecting

The number of hoses/cables depends on how the truck crane is equipped.



#### **Risk of malfunction in the superstructure electronics!**

Always turn off the ignition in the crane cab before you establish or separate the electrical connection. This prevents malfunctions in the electronics and corresponding error messages in the subsequent crane operation.



- Remove the hoses (2) from the ports.
- Remove the plugs (1) from the sockets.
- Insert the bridging plugs.
- Close all hoses, connections, plugs and sockets.
- If necessary, secure all the hoses/cables so that they do not swing loose when the main boom is raised.



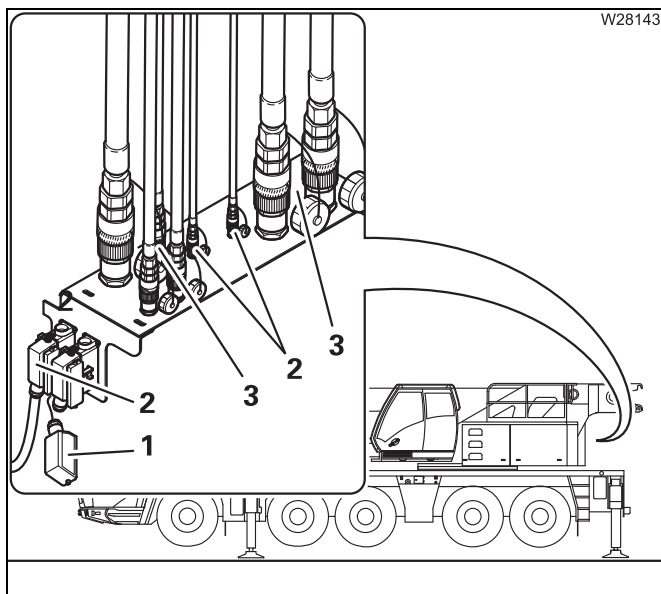
## Connecting

The number of hoses/cables depends on how the truck crane is equipped.



### **Risk of malfunction in the superstructure electronics!**

Always turn off the ignition in the crane cab before you establish or separate the electrical connection. This prevents malfunctions in the electronics and corresponding error messages in the subsequent crane operation.







- Remove the bridging plugs (1).
- Connect the plugs (2) to the sockets.  
The assignment is given by the number of poles and the shape of the plug.
- Connect all hoses (3).  
The assignment is given by the size and colour designations.
- Lay the hoses/cables so that they will not be damaged.



## 6.4.7

### Lifting the main boom off/on the turntable

- The main boom is slung;  p. 6 - 20.
- The hydraulic/electrical connections are disconnected;  p. 6 - 29.
- The boom pivot pin is retracted;  p. 6 - 26.
- The derricking cylinder is separated from the main boom;  p. 6 - 23.

#### Lifting from the turntable

- Align the auxiliary crane in such a way that the main boom can be raised vertically without swinging.



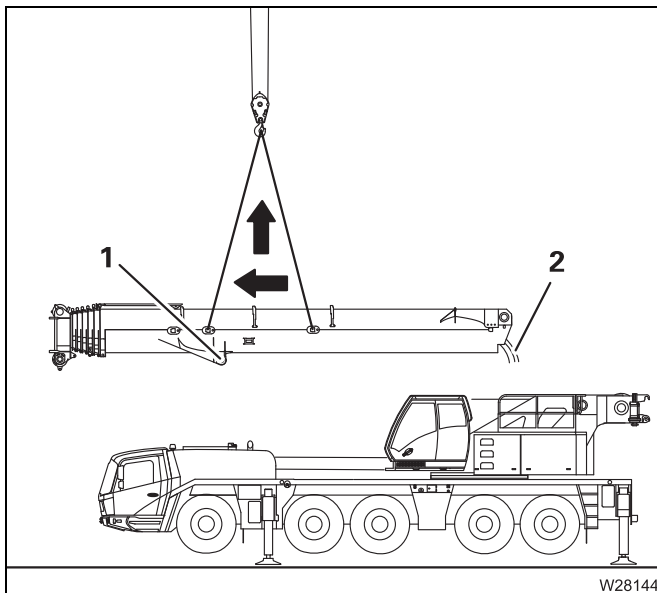
#### Risk of damage to driver's cab!

Lift the main boom far enough to ensure that the pivot point of the derricking cylinder does not damage the driver's cab.



#### Danger of hands and arms being crushed.

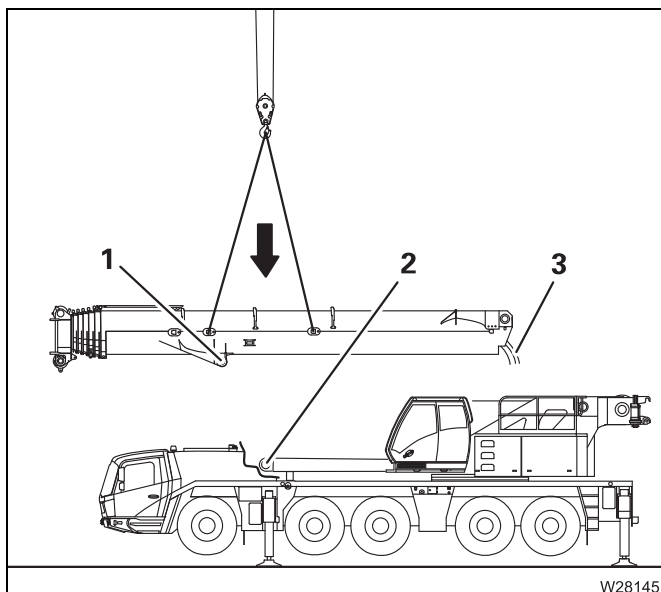
Whilst rigging the crane, maintain sufficient distance from the main boom and do not reach in between the connecting points. This will prevent you from being crushed between the turntable and the main boom.



- Lift the main boom forwards and upwards from the turntable. Make sure that:
  - The connection lines (2) do not hang loose,
  - The pivot point (1) is higher than the driver's cab.



### Lifting on to the turntable



- Lift the main boom backwards and downwards on to the turntable. Make sure that:
  - The connection lines (3) do not hang loose,
  - The pivot point (1) is higher than the driver's cab,
  - The pivot point (1) is located forwards of the derricking cylinder (2),
  - The connecting points are not tilted.

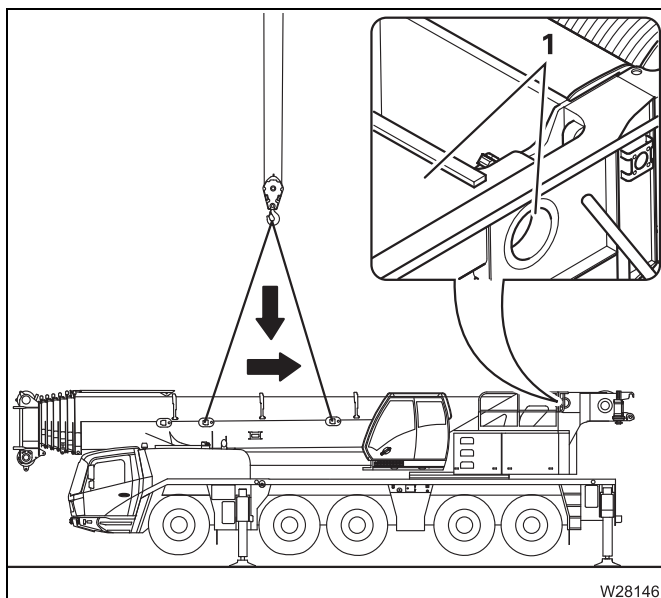
### 6.4.8

### Aligning the connecting points



#### Risk of damage to the turntable and the connection lines

Make sure that the connection lines are located within the turntable and that the main boom does not swing when you raise it for insertion into the turntable.




#### Aligning the connecting points

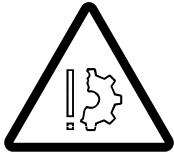
- Lay the hoses into the turntable in such a way that they are not damaged during alignment.
- Align the main boom so that the boom pivot pin is aligned with the bearing points (1) in the turntable.
- Hold the main boom in this position until the pivot pin is pushed in.

## 6.4.9

### Transporting the main boom

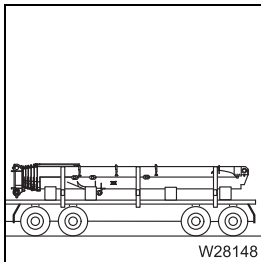
Transport the main boom only on a separate vehicle which is of sufficient size and has sufficient lifting capacity.

Transport dimensions and weight;  *Operating Instructions*.



#### **Risk of damage to the main boom!**

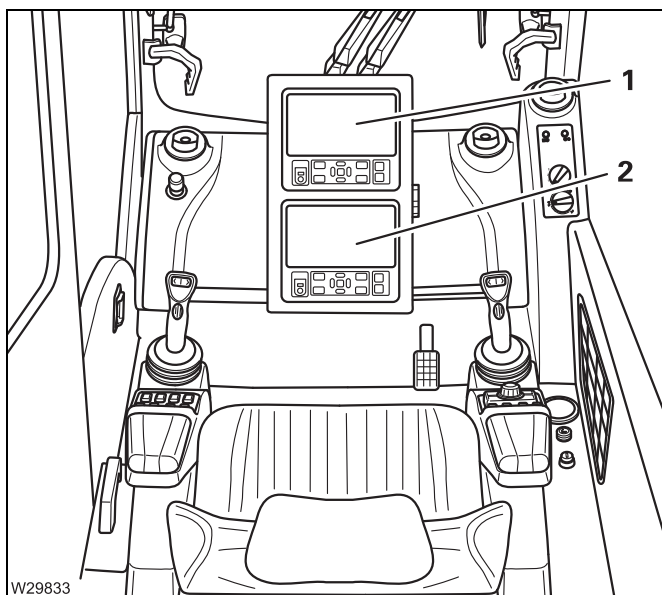
Always place the main boom onto a suitable packing. If you lay the main boom on its side, add-on parts will be damaged.



- Always place the main boom onto a suitable packing!
- Secure the main boom against slipping using the holding ropes.
- Load the main boom in such a way that other road users are not put at risk.
- Load the transport vehicle in such a way that the weight is evenly distributed.
- Secure the connection lines so that they will not slip and be damaged during transport.
- Keep the connecting points free of contamination.

### 6.4.10

## Inspections after main boom mounting



- Switch on the ignition.
- Check if the *RCL* (1) or *CCS* (2) control unit shows an error message.
- If an error message is displayed, check that all electrical connections are established;  
    ▶▶▶ p. 6 - 29.

The following requirements must be met for the subsequent inspection:

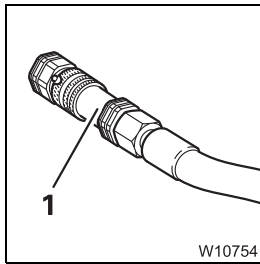
- The truck crane is on outriggers.
  - The main boom must be resting in the boom rest.
  - The current rigging mode is shown on the *RCL* display.
- 
- Telescope the telescopic section approx. 1 m out and back in.
  - Retract the telescoping cylinder into another telescopic section and mechanically lock it there.
  - Check to see if the hydraulic connections in the turntable are sealed.



Before operating for the first time, carry out the movement *Incline lattice extension* with the hydraulically derricking lattice extension and check if the corresponding connections in the turntable are sealed.

## 6.5

## Installing/removing the outrigger beams



To rig the outrigger beams, the outriggers must be fitted with hydraulic connections (1) which can be separated.

During rigging, each outrigger beam is removed and mounted as a complete "package", consisting of inner and outer outrigger beams, cylinders and add-on parts.




### **Risk of truck crane overturning if not properly supported!**

Loads may only be lifted when the truck crane is supported by all the outriggers.

For this reason, always use an auxiliary crane to lift the outrigger beams.

You will require the following equipment with a sufficient load bearing capacity:

- For the front outrigger beam – an auxiliary crane,
- For the rear outrigger beam – an auxiliary crane or RCL programming with the outrigger span 5.287 m x 7.800 / 2.500 m for rigging using the truck crane,
- Suitable lifting gear and guide ropes,
- A chain hoist,
- A separate vehicle.

Dimensions and weights of the outrigger beams;  p. 1 - 10.

## 6.5.1

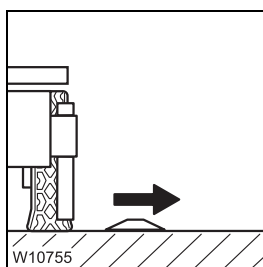
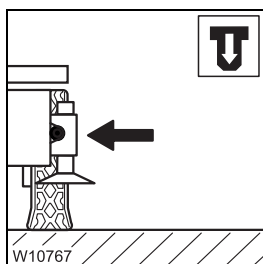
### CHECKLIST: Removing the outrigger beams



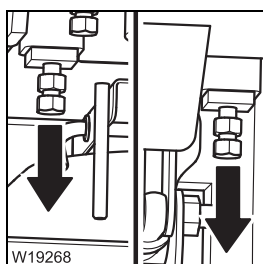
This checklist is not a complete operating manual. There are accompanying instructions, which are indicated by cross-references.

**Observe the warnings and safety instructions there!**

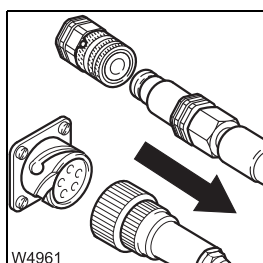
1. Preparing the truck crane
  - For removal using an auxiliary crane; p. 6 - 40.
  - For removal using the truck crane; p. 6 - 41.
2. Label the outrigger beams, retract, release and bolt them to each other; p. 6 - 40.



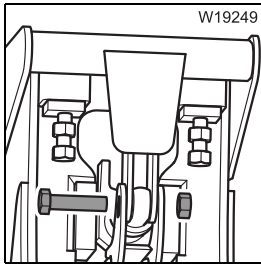
3. If necessary remove outrigger pad; p. 6 - 43.




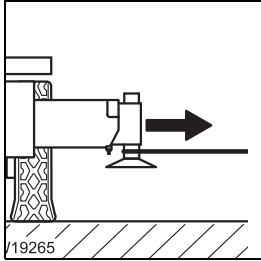
4. Unscrew the spacer; p. 6 - 47.




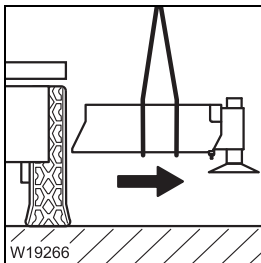
5. – Disconnect the hydraulic connections; p. 6 - 45.  
– Separate the electrical connection if necessary; p. 6 - 46.





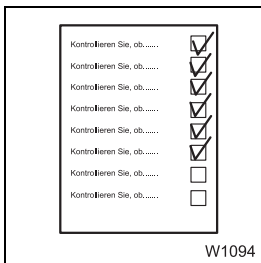
6. Release the connection to the support box;  p. 6 - 49.



7. Sling the outrigger beam and pull it out of the outrigger box until it reaches the centre of gravity;  p. 6 - 49.



8. – Sling the outrigger beams in the centre of gravity and pull them out of the outrigger box.
- Lift the outrigger beams onto the separate vehicle.
  - Attach the connecting elements on the outrigger box.
-  *Extending outrigger beam*, p. 6 - 49
-  *Transporting the outrigger beams*, p. 6 - 53



9. Remove all necessary outrigger beams in the same way in accordance with this checklist.

## 6.5.2

### CHECKLIST: Installing the outrigger beams

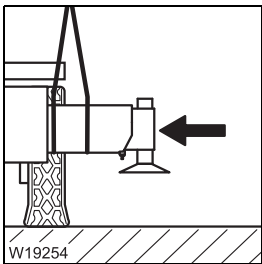


This checklist is not a complete operating manual. There are accompanying instructions, which are indicated by cross-references.

**Observe the warnings and safety instructions there!**

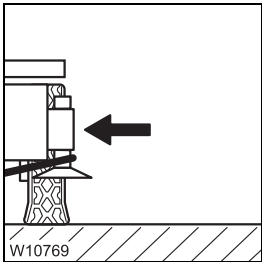
**1. Preparing the truck crane**

- For installation using an auxiliary crane; ||||▶ p. 6 - 40.
- For installation using the truck crane; ||||▶ p. 6 - 41.

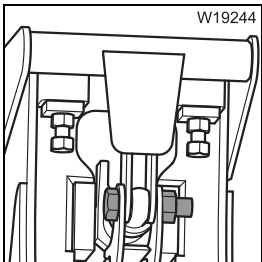


- 2.** – Remove the connection elements from the outrigger box.
- Sling the outrigger beams at their centre of gravity.
  - Lift the outrigger beams into the outrigger boxes and remove the lifting gear.

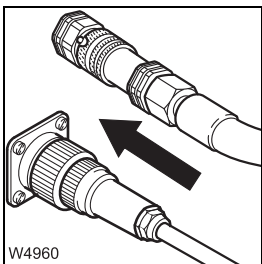
||||▶ *Inserting the outrigger beam*, p. 6 - 51



- 3.** Sling the outrigger beams and pull into the outrigger boxes until the connection points align; ||||▶ p. 6 - 51.

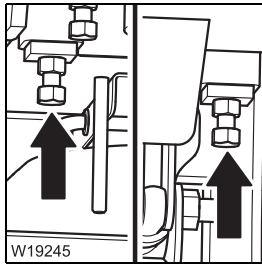


- 4.** Establish the connection to the support box; ||||▶ p. 6 - 49.

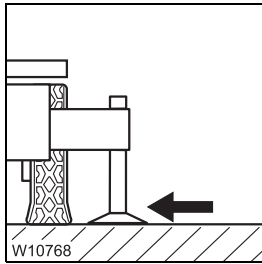


- 5.** – Establish the hydraulic connections; ||||▶ p. 6 - 45.
- Establish the electrical connection if necessary; ||||▶ p. 6 - 46.

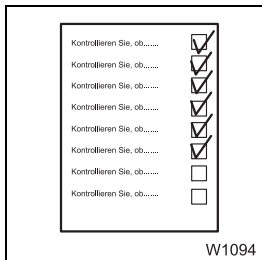




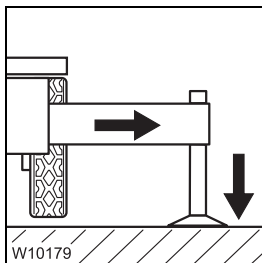
6. Screw in the spacers; p. 6 - 47.



7. If necessary put outrigger pads into position; p. 6 - 43.

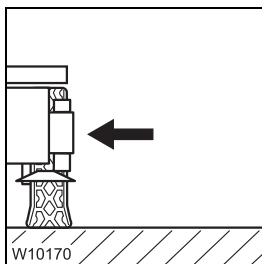


8. Mount all necessary outrigger beams in the same way in accordance with this checklist.



9. If the truck crane is at the site:

Extend the outrigger beams to the necessary outrigger span, secure them and stabilize the truck crane.



10. If the truck crane still has to be driven to the site:

Fully retract and secure the outrigger beams.

*Extending/retracting outrigger beams*, p. 11 - 45.

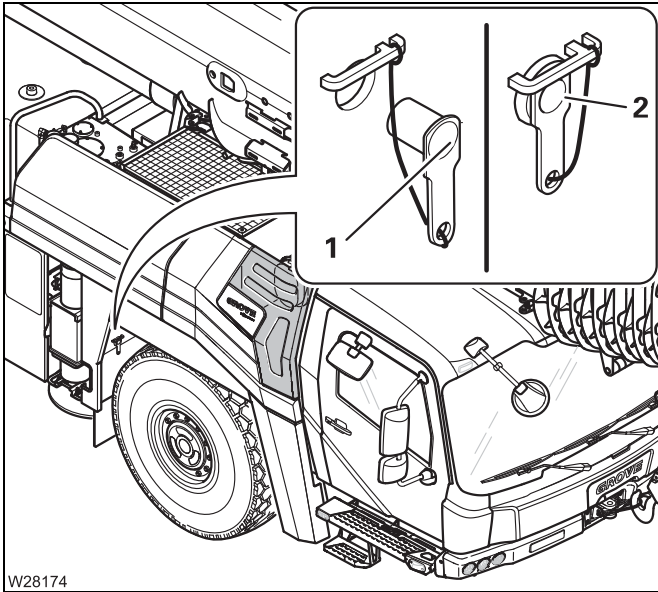
### 6.5.3

## Preparations – for removal

### Labelling the outrigger beams

Each outrigger beam is designed for just one installation point. If, for example, you remove the outrigger beam on the rear left hand side, you must mount the same outrigger beam on the rear left hand side again.

- Before you remove all outrigger beams for the first time, label them with the correct installation point and if necessary, also with the serial number of the truck crane.



### Release the outrigger beams

All outrigger beams are retracted.

- Pull out the pin (1).

### Lock the outrigger beams together

- Insert the pins (2).

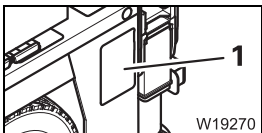
### 6.5.4

## Preparations – for installation/removal using the auxiliary crane

### Prerequisites

The following requirements must be met before mounting/removing the outrigger beams:

- All rigging work which involves slewing the superstructure has been completed.
- The parking brake is engaged.
- The truck crane has been levelled with the level adjustment system;  
    ▣▣▣▶ p. 5 - 52.
- The corresponding covers have been removed (1).



- The suspension is switched off (blocked), and the symbol (1) is red;  
    ▣▣▣▶ p. 5 - 15.

## 6.5.5

### Preparations – for installation/removal using the truck crane

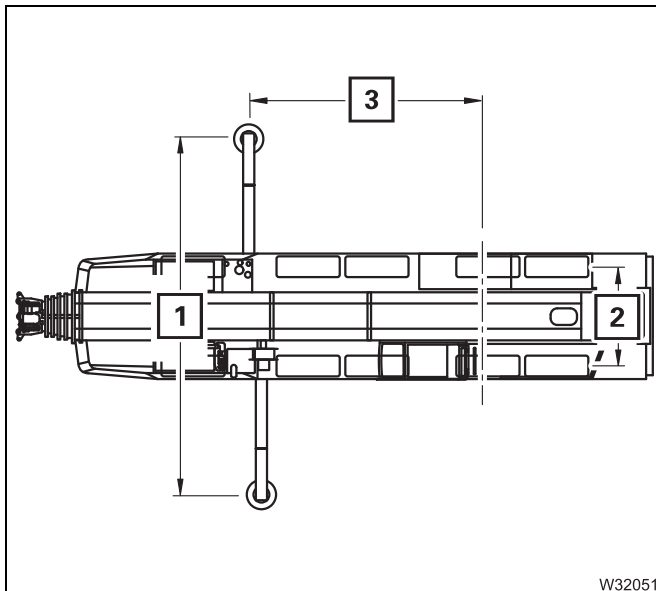
With an appropriately programmed RCL, you can carry out removal/installation of the **rear** outrigger beams in the same way as described in the operating instructions supplied and use the truck crane instead of an auxiliary crane to pull out/insert the outrigger beams.

#### Prerequisites

- The outrigger span 5.287 m x 7.800 / 2.500 m (17.3 ft x 25.6 / 8.2 ft) is enabled by the RCL (RCL codes 1066, 1006, 1076 can be confirmed).
- The counterweight is completely unrigged.
- The main boom must be fully retracted.
- The main boom must be resting in the boom rest.
- The truck crane is standing on the wheels.
- The tyre pressure corresponds at least to the values listed in the *operating manual*.
- The the rear outrigger is retracted.
- The truck crane must be standing on a level, flat surface.

#### Special outrigger span

Outrigger span 5.287 m x 7.800 / 2.500 m (17.3 ft x 25.6 / 8.2 ft).



#### Overview


The truck crane rests on the outrigger at the front – outrigger span **1** = 7.800 m (25.6 ft).

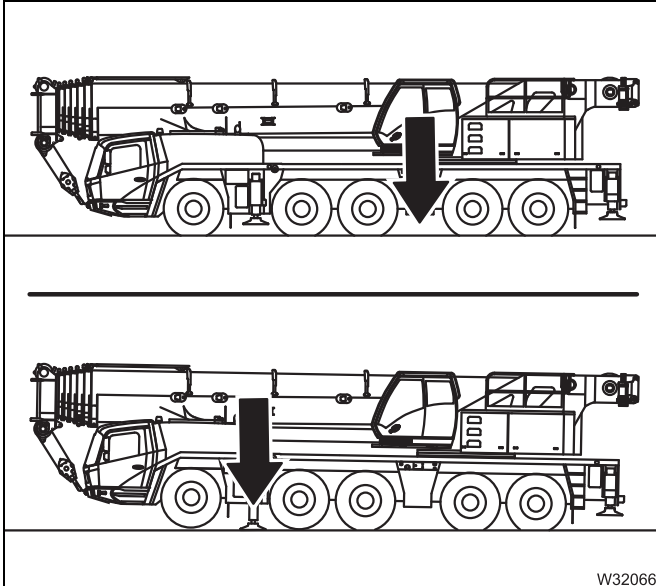
The truck crane rests on wheels at the rear – outrigger span **2** = 2.500 m (8.2 ft).


This results in an outrigger length of **3** = 5.287 m (17.3 ft).



### Rigging the outrigger span

- Observe all information on selection of the location and determining the required load-bearing area before rigging the outrigger span;  *Selecting the suitable site*, p. 11 - 9.



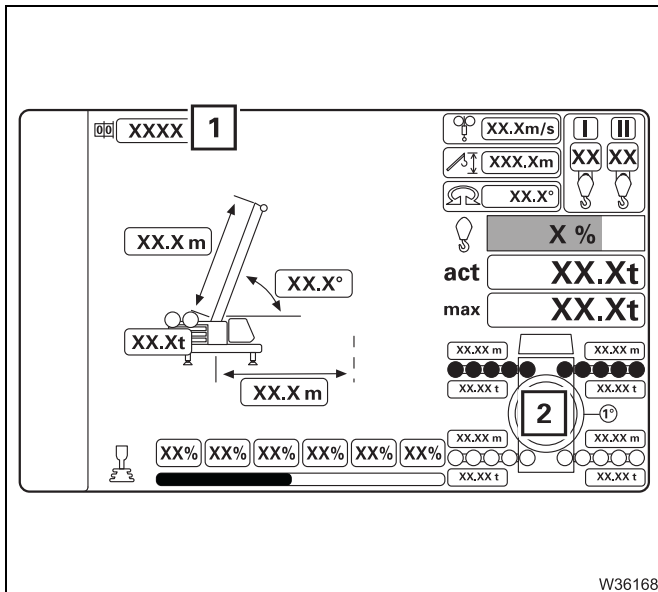
- Using the level adjustment system, lower the truck crane to the lowest position – end position.
- Extend the front outrigger beams to a span of 7.800 m (17.3 ft) and secure them;  *Setting the spans*, p. 11 - 42.
- Switch off the suspension.
- Extend the front outrigger cylinder until the wheels of the 1st axle line no longer touches the ground and is raised a maximum of 1 cm (0.4 in).

W32066

### Enter rigging mode

When a special outrigger span is rigged, three different RCL codes (1) are required.

- **RCL code 1066**  
For raising and setting down the main boom in the 180° position.
- **RCL code 1006**  
For slewing the superstructure in the 360° range.
- **RCL code 1076**  
For removal/installation of the outrigger beams in the slewing range  $\pm 90^\circ$  (to the rear).



W36168

After entering the RCL code, the display (2) shows the front individual width 3.90 m (12.8 ft) and the rear individual width 0.00 m.

## 6.5.6

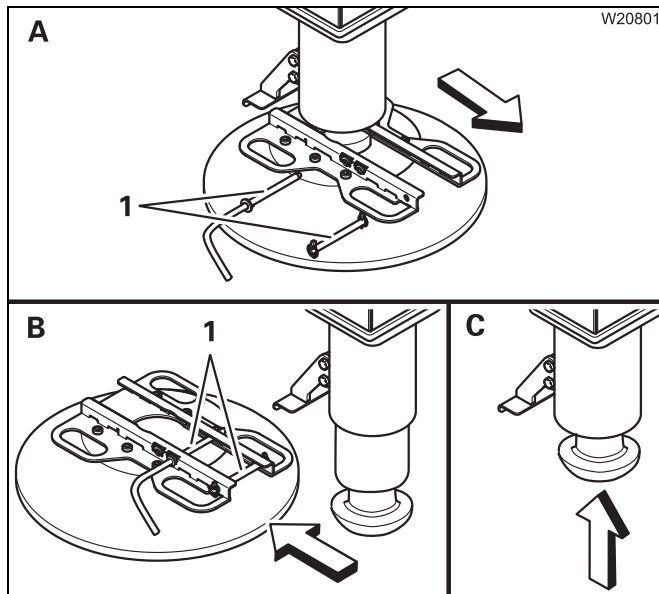
### Removing/attaching outrigger pads

You only need remove the outrigger pads if the outrigger beams are to be transported lying on their side.

For transportation in a suitable holding frame, the outrigger beams can be set down on the outrigger pad.

#### Removing the outrigger pads

Handling is easier if you remove the outrigger pad before removing the outrigger beams.

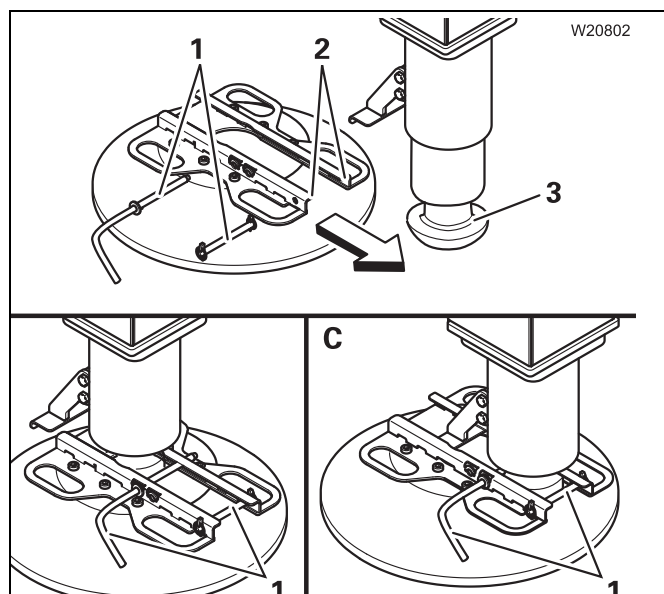


- **(A)** – Move the outrigger pad into the operating position.
- Remove the pins **(1)**.
- Extend the outrigger cylinder until the outrigger pad just touches the ground but is not yet under strain.
- **(B)** – Pull the outrigger pad off the outrigger cylinder.
- Insert the pins **(1)** and secure them.
- **(C)** – Fully retract the outrigger cylinder.
- Remove the other outrigger pads in the same way.

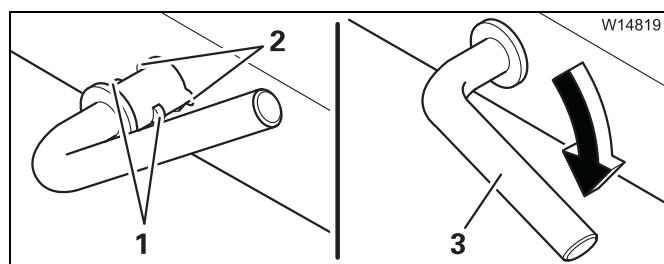


### Attaching the outrigger pads

After mounting the outrigger beam, you must attach the outrigger pad.



- **(A)** – Remove the pin **(1)**.
- Extend the outrigger cylinder far enough so that the bearing surface **(3)** is below the guide **(2)**.
- Push the outrigger pad onto the outrigger cylinder.
- Move the outrigger pad into required position.
  - On site, move it to the working position **(B)**.
  - If you need to drive to the site, in driving position **(C)**.
- Insert the pins **(1)** and secure them.



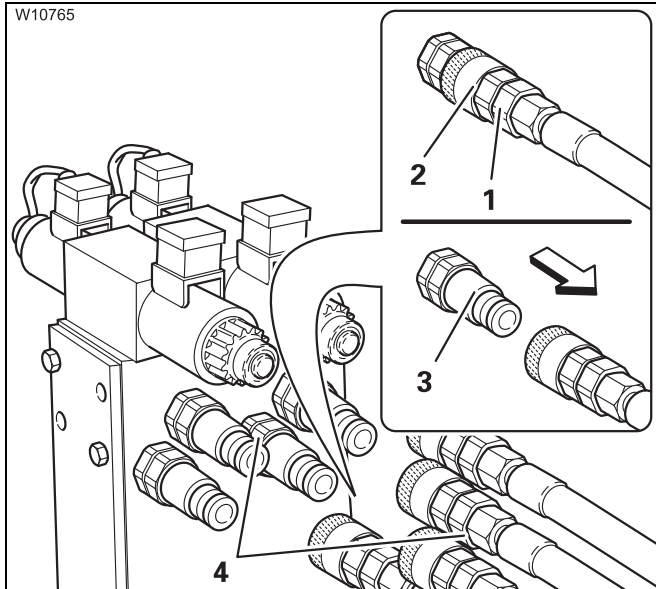
### Securing pin

- Plug the pin with the peg **(1)** through the cutout **(2)**.
- Turn the grip **(3)** downward.

## 6.5.7

### Disconnecting/establishing hydraulic connection

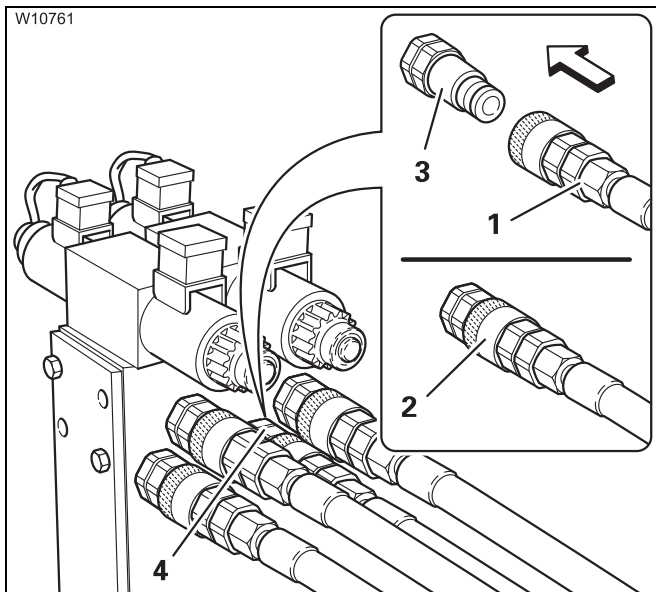
There is a valve block on each outrigger beam. The position of the valve block may differ from the drawings, depending on the outrigger beam.



#### Disconnecting a connection

Always disconnect all connections (4).

- Hold the hose (1) firmly.
- Pull the lock (2) against the stop. The hose is pushed out of the connection (3).
- Seal all connecting points.



#### Establishing a connection

Always establish all connections (4).  
The assignment is specified by colour designations.

- Insert the hose (1) into the connection (3).
- The lock (2) engages.

## 6.5.8

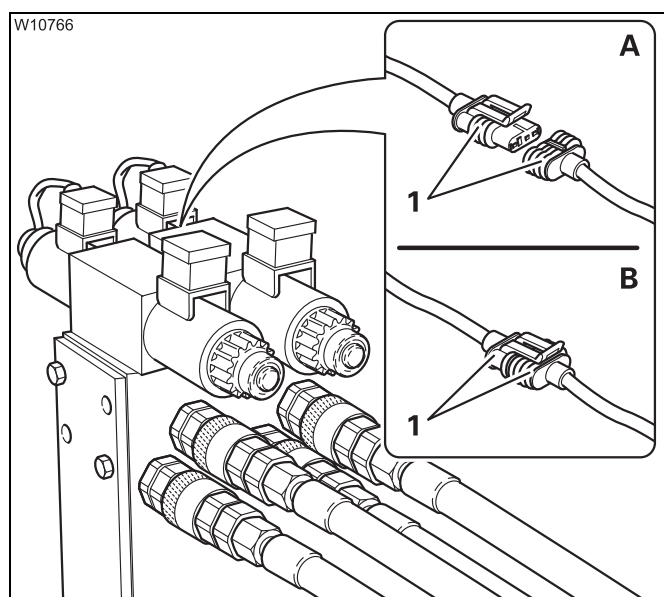
### Disconnecting/establishing the electrical connection

The electrical connection is only present on truck cranes equipped with an outrigger pressure display or outrigger span monitoring system.



#### **Risk of malfunctions in the electronic system!**

Always turn off the ignition before you disconnect or establish the electrical connection. This prevents malfunctions and corresponding error messages in the subsequent crane operation.




#### **(A) – Disconnecting**

- Pull the plugs (1) apart. Protect the plugs against dirt and moisture.

#### **(B) – Connecting**

- Connect the plugs (1) together.
- Protect the separating points against dirt and moisture.



Some error messages can occur after disconnecting the electrical connections;  *Note on error messages with removed outrigger beams, p. 6 - 54.*



## 6.5.9

### Unscrewing/screwing in the spacers

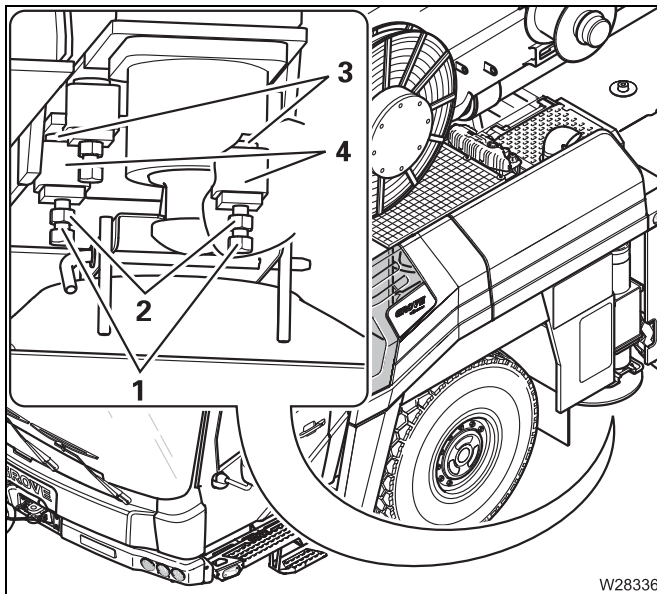
There are two spacers for each outrigger beam

- In the outrigger box
- In the outrigger beam on the opposite side.

The illustrations show as an example the spacers for the outrigger beams on the front left hand side.

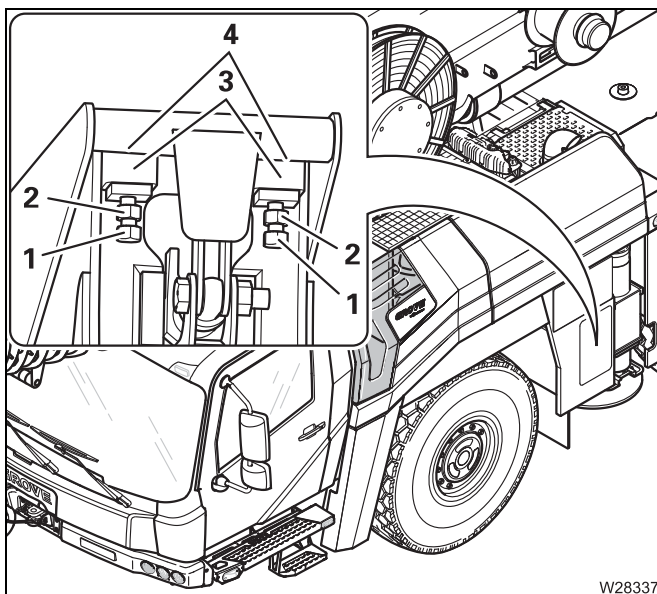
#### Unscrewing

Before you pull out the outrigger beams, you must unscrew the spacers.



#### At the outrigger box

- Loosen the nuts (2).
- Unscrew the bolts (1) until the spacers (3) are screwed into the outrigger box (4) completely.



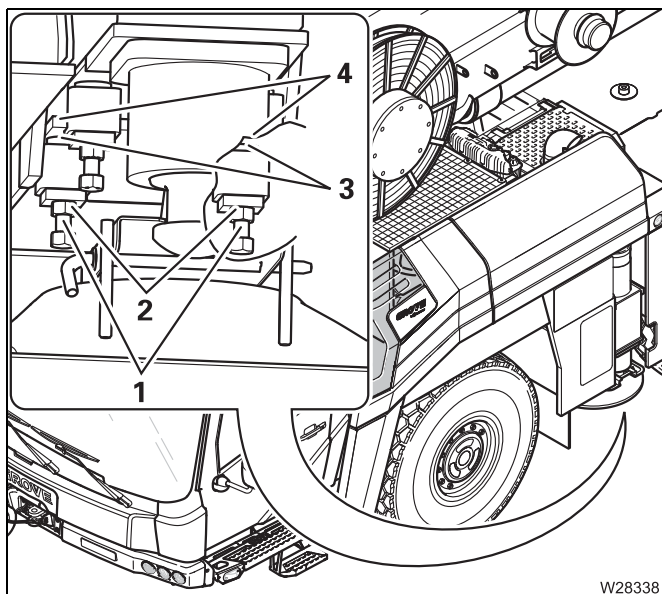
#### At the outrigger beam

- Loosen the nuts (2).
- Unscrew the bolts (1) until the spacers (3) are screwed into the outrigger box (4) completely.



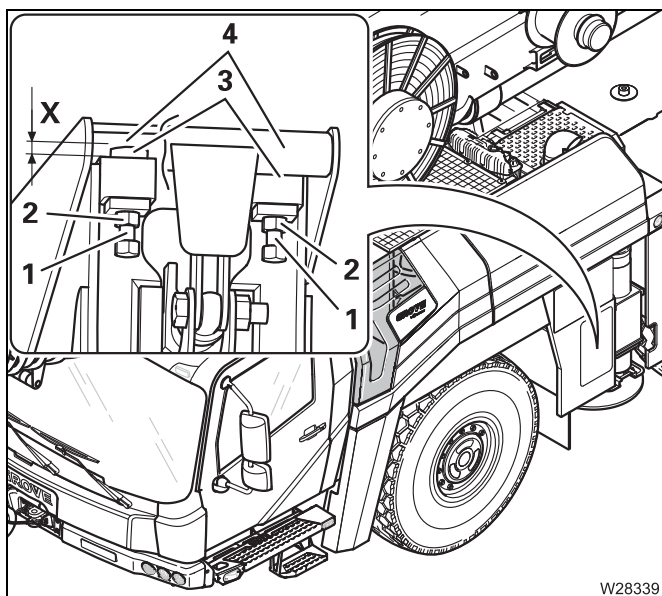
### Screwing in

Before you retract/extend an outrigger beam after mounting, you must screw in the spacers.



#### At the outrigger box

- Screw in the screws (1) as far as possible until the spacers (3) are touching the outrigger beam (4) at the top.
- Ensure that the outrigger beam is aligned horizontally.
- Lock the screws in place with the nuts (2).



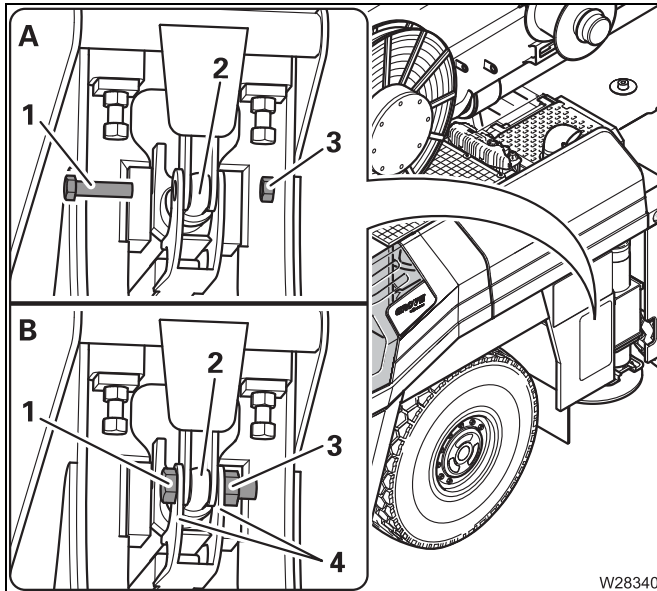
#### At the outrigger beam

- Screw in the bolts (1),
  - Until the spacers (3) lie on top on the outrigger box (4) **and**
  - Until the distance (X) to the outrigger box (4) is an even 4 mm over the entire width.
- Lock the screws in place with the nuts (2).

### 6.5.10

## Disconnecting/establishing the connections to the outrigger box

The illustrations show as an example the connecting points for the outrigger beam on the rear right hand side.



### (A) – Disconnecting

- Remove the nuts (3).
- Remove the bolts (1) from the connecting points (2).


### (B) – Connecting

- Fasten the bolts (1) with the nuts (3) in the connecting points (2) just tight enough that the attachment plates (4) still have lateral play.

### 6.5.11

## Extending/retracting the outrigger beam

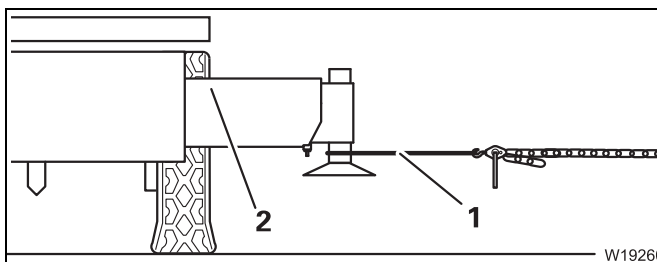
### Extending outrigger beam

- Check that the outrigger beams are released and are secured between each other;  Preparations – for installation/removal using the truck crane, p. 6 - 41.



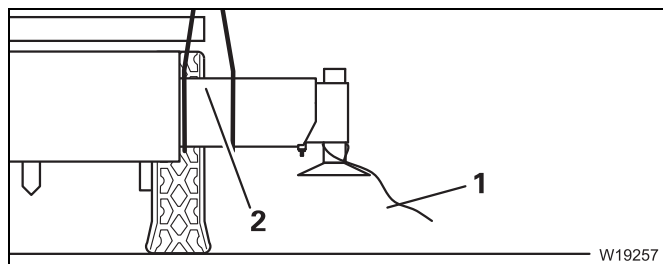
### Risk of damage to hydraulic lines!

Ensure that the hydraulic lines on the outrigger beam do not remain hanging on the outrigger box and become damaged.

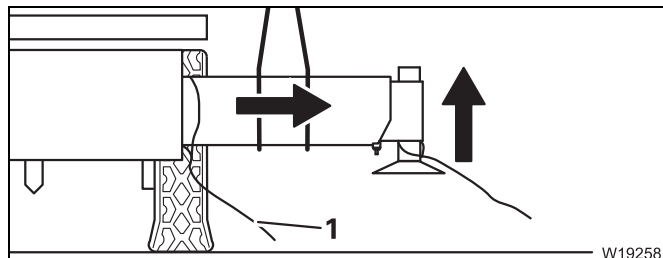


- Fasten the lifting gear (1) and a chain hoist.
- Pull the outrigger beam out so far that the centre of gravity (2) is accessible.





- Using the auxiliary crane, sling the outrigger beam in the centre of gravity (2).
  - Remove the chain hoist and lifting gear.
- Fasten a guide rope (1).

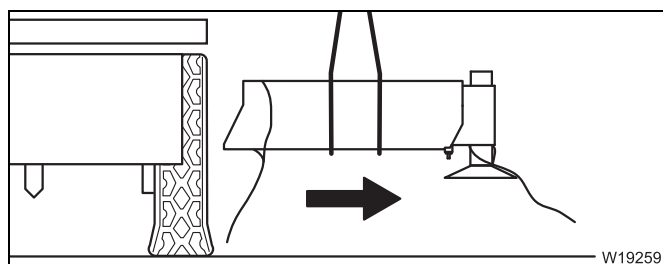


- Lift the outrigger beam slightly to ease the load.
- Lift the outrigger beam almost completely out of the outrigger box.
- Fasten another guide rope (1).

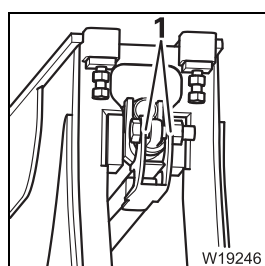


**Risk of being crushed by the swinging outrigger beam!**

Secure the outrigger beam with the guide ropes as it is lifted out of the outrigger box.  
Keep a suitable distance to avoid injuring yourself or others on the swinging outrigger beam.



- Lift the outrigger beam out of the outrigger box.
- Lift the outrigger beam onto a separate vehicle; see p. 6 - 53.



- Fasten the connecting elements to the connecting points (1) of the supports.

### Inserting the outrigger beam

- Only insert the outrigger beam at the correct installation point. Note the information on the label.



#### **Risk of being crushed by the swinging outrigger beam!**

Do not guide the outrigger beam with your hands when inserting it. Always use guide ropes and keep a suitable distance. This will prevent limbs from being crushed between the outrigger box and the outrigger beam.



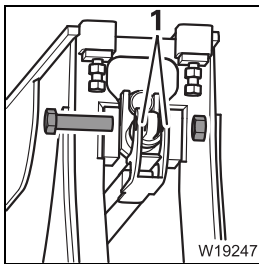
#### **Risk of damage to hydraulic lines!**

Ensure that the hydraulic lines on the outrigger beam do not remain hanging on the outrigger box and become damaged.

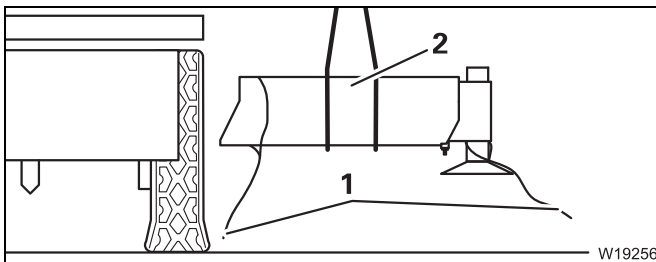


#### **Risk of damage to the spacers!**

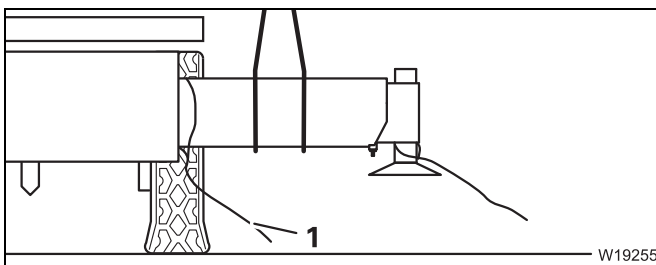
Check that all spacers have been screwed in completely. This prevents the spacers from remaining hanging in the outrigger box and becoming damaged.



- Remove the connecting elements from the connecting points (1) of the supports.

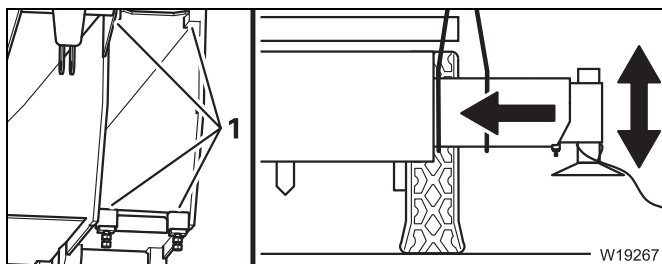


- Sling the outrigger beam at the centre of gravity (2).
- Fasten two guide ropes (1).

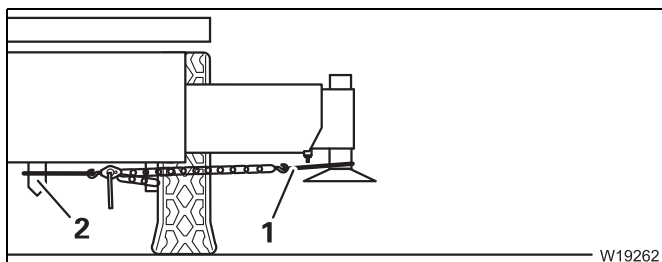


- Set the outrigger beam in the outrigger box.
- Remove the guide rope (1).

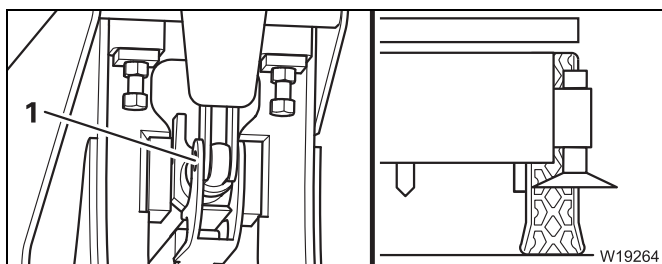




- Lift the outrigger beam as far as possible into the outrigger box. Correct the height so that it does not remain hanging on the edges (1).




- Remove the lifting gear from the centre of gravity.
- Fasten the lifting gear (1) and a chain hoist.
- Fasten the chain hoist with a suitable mounting device on the bore hole (2).

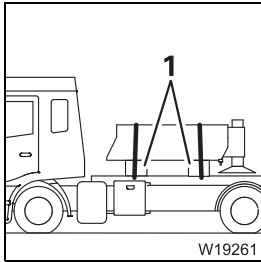


- Pull the outrigger beam in so far until the connecting points (1) align.
- Remove the chain hoist and lifting gear.

## 6.5.12

### Transporting the outrigger beams

- For transportation, be sure to use a separate vehicle with sufficient load bearing capacity. Transport dimensions and weight;  p. 1 - 10.
- Load the separate vehicle in such a way that the weight is evenly distributed.
- Load the outrigger beam so that it that does not endanger other traffic.



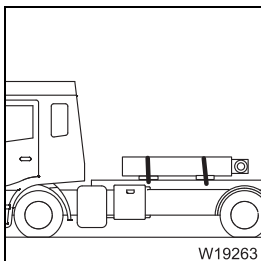
#### When the outrigger pads are mounted

- Place the outrigger beam onto a suitable fixture (1).
- Secure the outrigger beam from slipping.



#### Risk of damage to the outrigger beams and outrigger pads!

When outrigger pads are mounted, always use a device to set them down. If you lay the outrigger beams onto the side, connections may tilt and become damaged.



#### When the outrigger pads are dismantled:

- Lay the outrigger beam onto the side.
- Secure the outrigger beam from slipping.
- Lay the outrigger pads onto the separate vehicle and secure them for transportation.

### 6.5.13

#### Note on error messages with removed outrigger beams

After removing the outrigger beams the error messages listed here occur.

5801.7.33.2	5809.7.32.96	5801.7.33.98
5803.7.32.2	5807.7.32.96	5803.7.32.98

The error messages indicate only that the electrical connection between the outrigger beams and the crane control is disconnected. They have no further effect on the crane operation and driving operation.

##### **In crane operation**

After an RCL code (1006, 1066, 1076) for rigging the outrigger beams has been entered, the error messages are automatically deactivated.

##### **In driving operation**

The error messages are displayed in the driver's cab on the CCS display until the outrigger beams are reinstalled.




## 6.6

### Rigging the auxiliary hoist

You need the following equipment:



- suitable lifting gear and guide ropes with sufficient bearing capacity,
- a separate vehicle,
- if necessary, a rigging frame for rigging counterweight combinations up to max. 21 t.


Transport dimensions and weights;  p. 1 - 10.

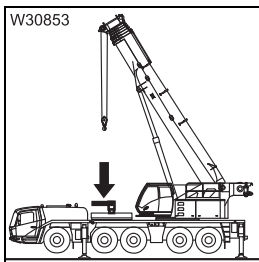
### 6.6.1


#### CHECKLIST: Installing the auxiliary hoist

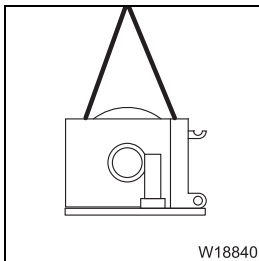
##### Prerequisites

- The truck crane is supported with the required outrigger span as specified in the *lifting capacity table*;  p. 11 - 28.
- The 50 t counterweight combination is resting on the counterweight platform;  p. 11 - 76,  
or for a maximum of 21 t counterweight:


1. Sling and position the rigging frame;  p. 6 - 59.

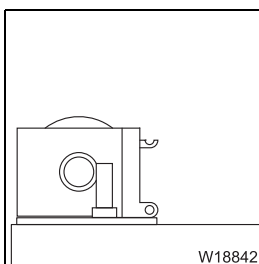


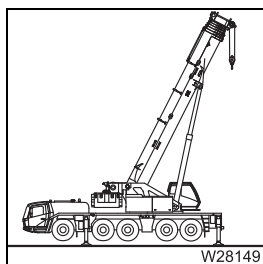
2. Sling the auxiliary hoist at the centre of gravity;  p. 6 - 59.



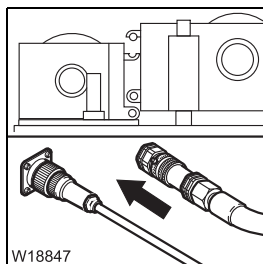
3. Lower the auxiliary hoist to:

- the counterweight combination  
or
- the rigging frame;  p. 6 - 60.

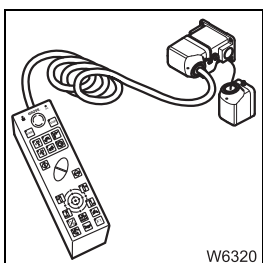




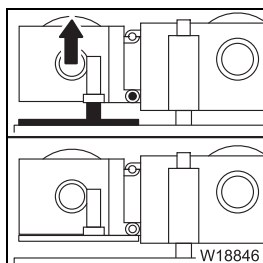
4. Slew the superstructure to the  $0^\circ$  to the rear position;  
    ▣▣▣▣▣ *Slewing with the rigged counterweight*, p. 11 - 93,  
    ▣▣▣▣▣ *Current slewing angle display*, p. 10 - 50.



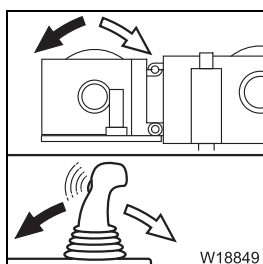
5. – Establish the hydraulic connections; ▣▣▣▣▣ p. 6 - 61.  
    – Make the electrical connection; ▣▣▣▣▣ p. 6 - 62.



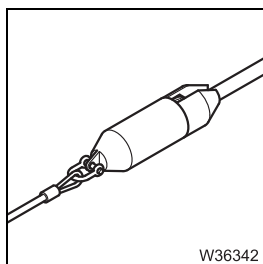
6. Connect the hand-held control on the back right at the turntable;  
    ▣▣▣▣▣ *Connecting/disconnecting the hand-held control*, p. 11 - 21.



7. Creating the connection to the turntable:  
    – Lifting the auxiliary hoist; ▣▣▣▣▣ p. 6 - 60.  
    – Establishing the connection to the turntable; ▣▣▣▣▣ p. 6 - 63.  
    – Lift the lifting frame; ▣▣▣▣▣ p. 6 - 63.



8. Check that the auxiliary hoist is functioning properly; ▣▣▣▣▣ p. 6 - 68.



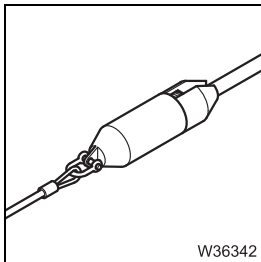
9. – Fit the hoist rope, using the rigging aid if necessary; ▣▣▣▣▣ p. 6 - 69.  
    – Reeve the hoist rope; ▣▣▣▣▣ p. 11 - 104.

## 6.6.2

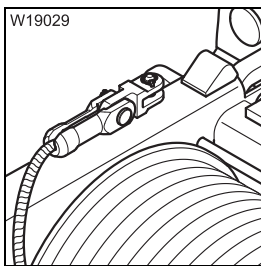
### CHECKLIST: Removing the auxiliary hoist

#### Prerequisites

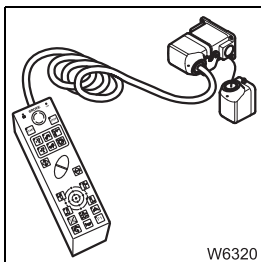
- The truck crane is supported with the required outrigger span as specified in the *lifting capacity table*; ■■■▶ p. 11 - 28.
- The superstructure is slewed to the rear.
- The 50 t counterweight combination is resting on the counterweight platform; ■■■▶ p. 11 - 76,
- The hoist rope is unreeved.



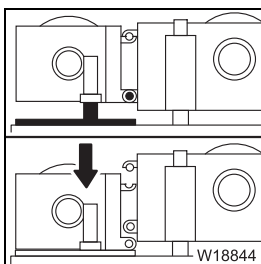
1. Wind on the auxiliary hoist rope, using the rigging aid if necessary; ■■■▶ p. 6 - 69.



2. – Secure the hoist rope; ■■■▶ p. 6 - 66.

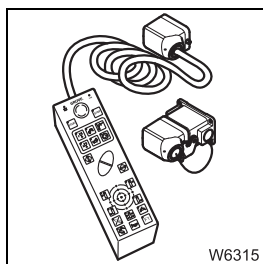



3. Connect the hand-held control on the back right at the turntable; ■■■▶ *Connecting/disconnecting the hand-held control*, p. 11 - 21.

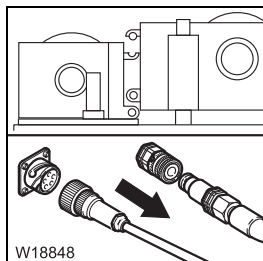




4. Removing the connection to the turntable:
  - Lower the lifting frame; ■■■▶ p. 6 - 65.
  - Remove the connection to the turntable; ■■■▶ p. 6 - 63.
  - Lower the auxiliary hoist; ■■■▶ p. 6 - 65.

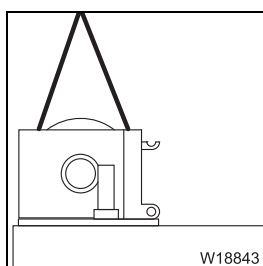





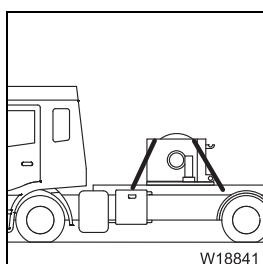
5. If necessary, disconnect the hand-held control and stow it away;  *Connecting/disconnecting the hand-held control*, p. 11 - 21.




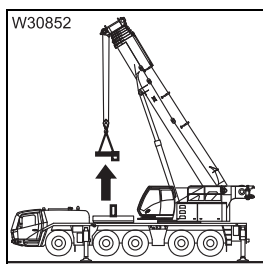
6. – Disconnect the hydraulic connections;  p. 6 - 61.  
– Disconnect the electrical connection;  p. 6 - 62.




7. – Sling the auxiliary hoist at the centre of gravity;  p. 6 - 63.



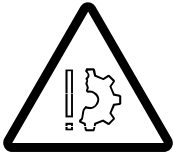
8. Lift the auxiliary hoist onto the separate vehicle and prepare it for transportation;  p. 6 - 67.



9. If necessary, sling and lift the rigging frame;  p. 6 - 59.

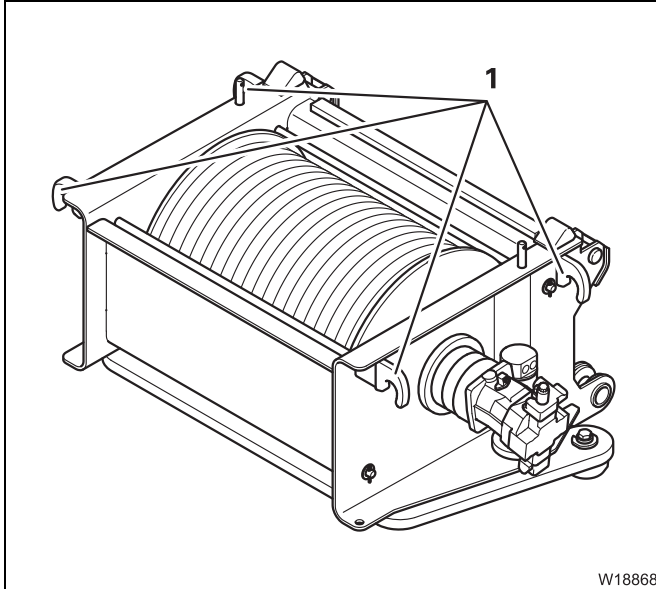
### 6.6.3

## Slinging the auxiliary hoist



### Risk of damage to the auxiliary hoist and truck crane

Only sling the auxiliary hoist onto the slinging points provided. Always use lifting gear with a sufficient lifting capacity.



- Sling the auxiliary hoist at the slinging points (1).

Use lifting gear with the same length, so that the auxiliary hoist hangs in the centre of distribution.

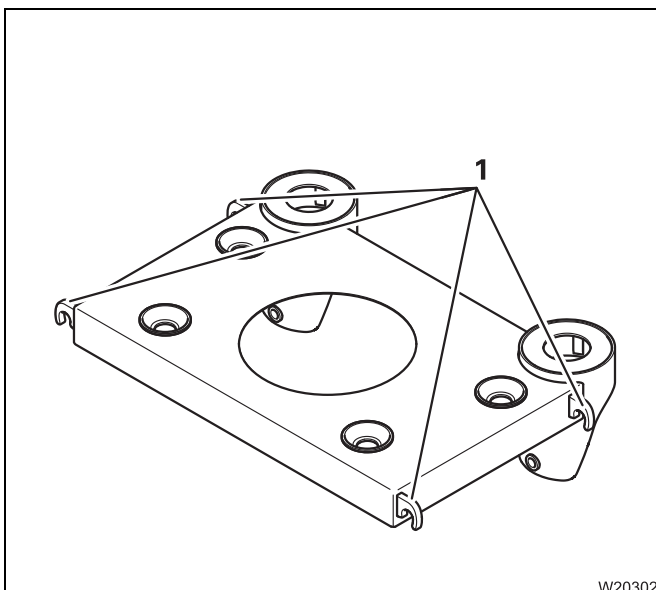
### 6.6.4

## Slinging the rigging frame



### Risk of damage to the rigging frame and truck crane!

Only sling the rigging frame at the slinging points provided. The slinging points are only designed for hoisting the rigging frame. Always use lifting gear with a sufficient lifting capacity.



- Sling the rigging frame only at the slinging points (1).

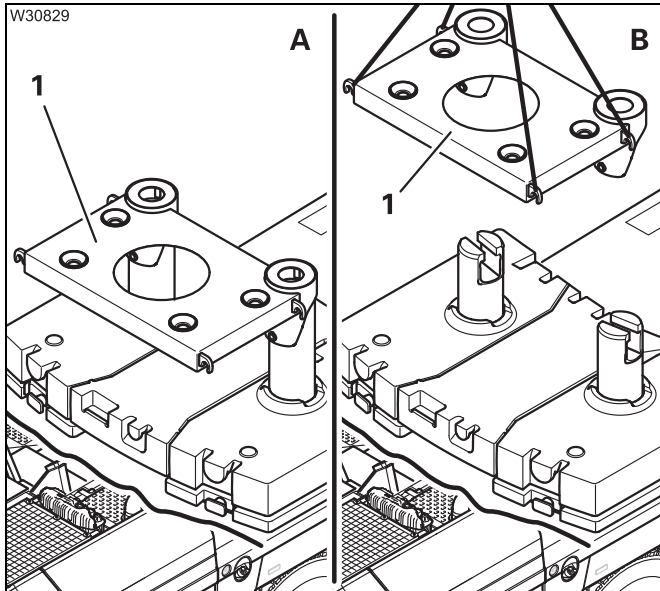
The slinging points (1) are only designed for the own weight of the rigging frame.

Use lifting gear of the same lengths, so that the rigging frame hangs in the centre of gravity.

## 6.6.5 Lowering/raising the rigging frame

### Prerequisite

- A minimum of the 7 t base plate lies on the counterweight platform,
- A maximum counterweight combination of 21 t lies on the counterweight platform.



### (A) – Setting down

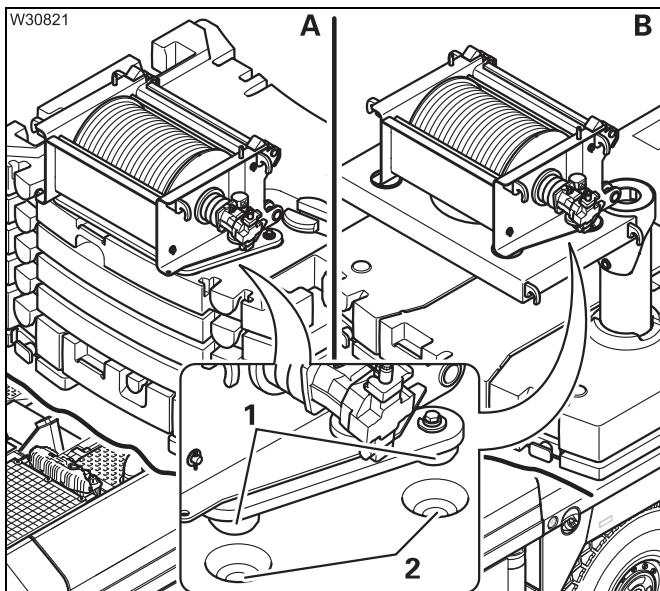
- Lift the rigging frame (1) onto the counterweight combination.

### (B) – Lifting

The auxiliary hoist must be removed.

- Sling the rigging frame (1).
- Lift the rigging frame (1) from the counterweight combination.

## 6.6.6 Placing the auxiliary hoist on the counterweight combination



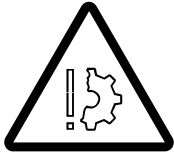
- Lift the auxiliary hoist
- (A) onto the counterweight combination  
or
- (B) onto the rigging frame.

The pins (1) must fit into the mountings (2).

- Remove the lifting gear.
- Establish the connections to the turntable:
  - ■■■▶ Establishing/disconnecting the hydraulic connection, p. 6 - 61,
  - ■■■▶ Establishing/disconnecting the electrical connection, p. 6 - 62,
  - ■■■▶ Creating the connection to the turntable, p. 6 - 63.

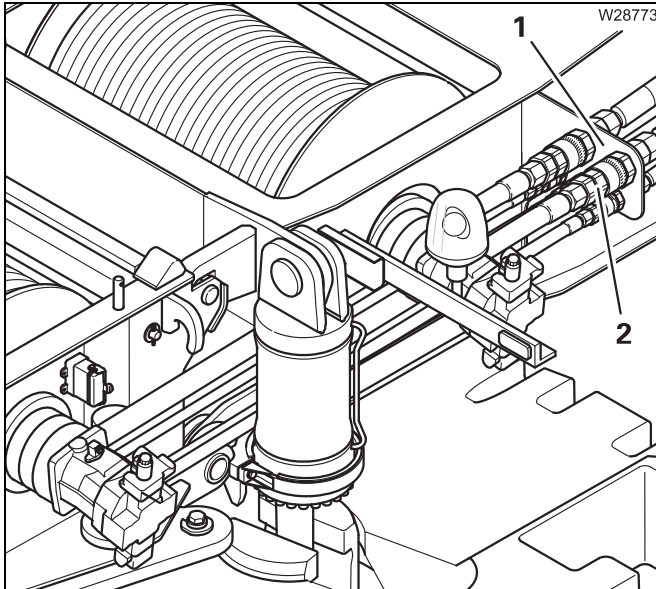
## 6.6.7

### Establishing/disconnecting the hydraulic connection



#### Risk of damage to hydraulic lines!

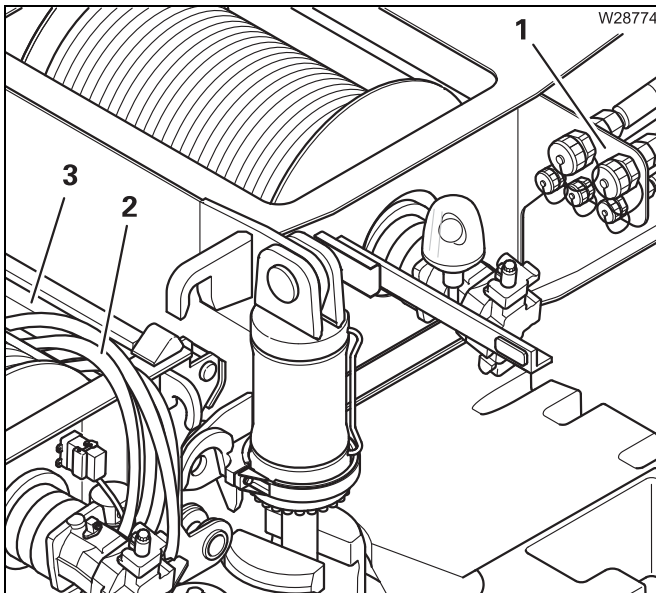
Lay the hydraulic hoses so that they will not be damaged during rigging and crane operation.



#### Establishing a connection

The assignment is given by the size and colour designations.

- Connect the hoses (2) to the connections (1).

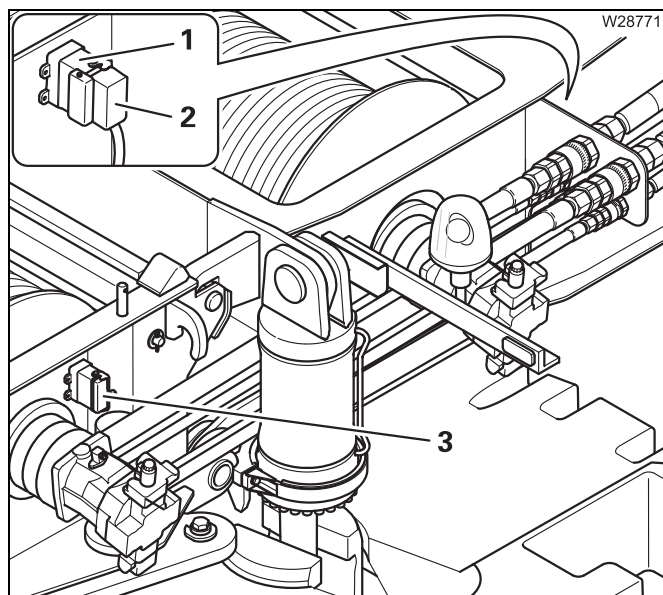


#### Disconnecting a connection

- Remove the hoses (2) from the connections (1).
- Close all the hoses and connections with the protective caps.
- Insert the hoses into the hoist frame (3).

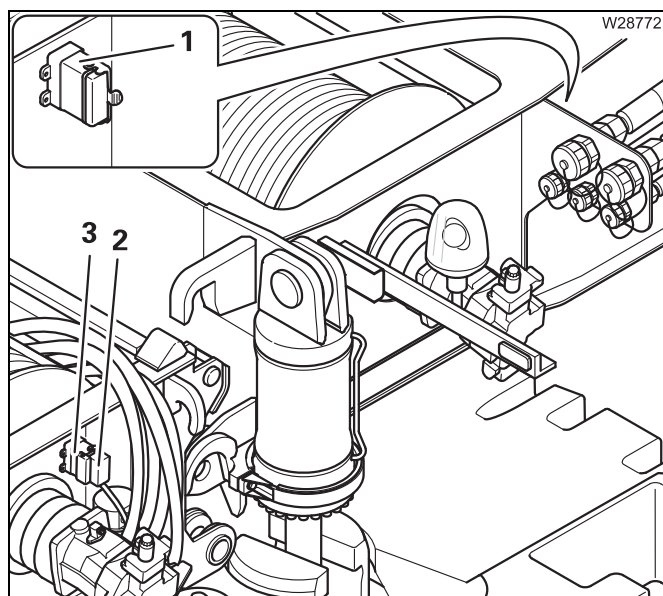
### 6.6.8

## Establishing/disconnecting the electrical connection



### Establishing a connection

- Remove the plug (2) from the dummy socket (3) and plug it into the socket (1).
- Close the dummy socket (3).



### Disconnecting a connection

- Remove the plug (2) from the dummy socket (1) and plug it into the socket (3).
- Close the socket (1).



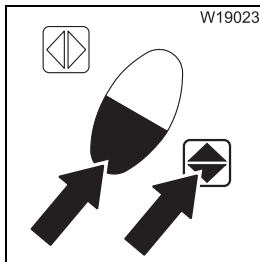
## 6.6.9

### Creating the connection to the turntable



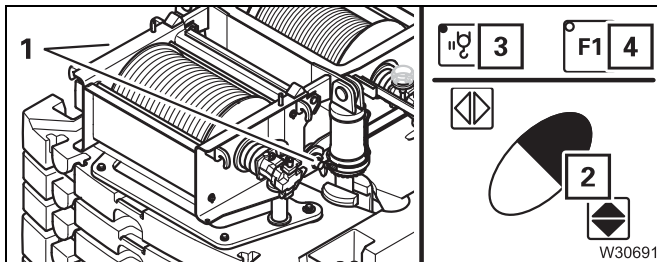
#### **Risk of being crushed when rigging the auxiliary hoist!**

Make sure that you or any helpers keep all parts of the body a sufficient distance away from the auxiliary hoist when rigging the auxiliary hoist. Remove all objects in the rigging range that could become jammed or crushed.



The respective button combination required is shown in black.

#### **Establishing a connection**



#### **Lifting the auxiliary hoist**

- Press the buttons (3) and (4).

Press the button (2) until the locking points (1) align.

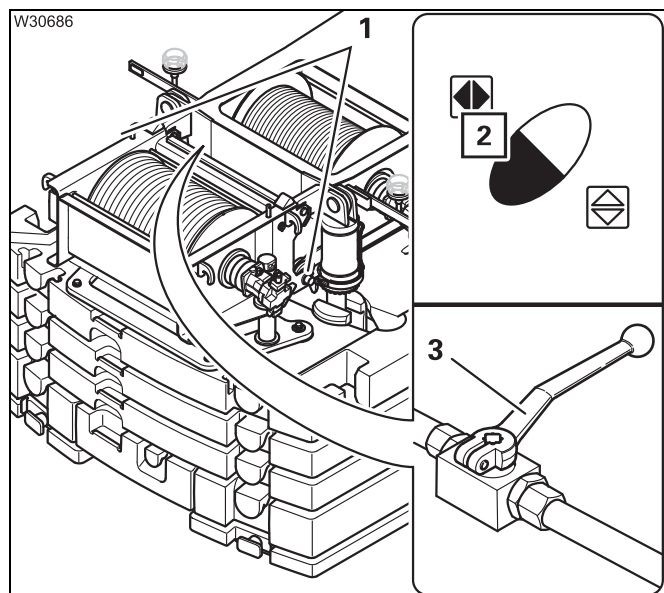




**Risk of accident when the safety valve is open!**

Always close the safety valve when the auxiliary hoist is locked to the turntable.!

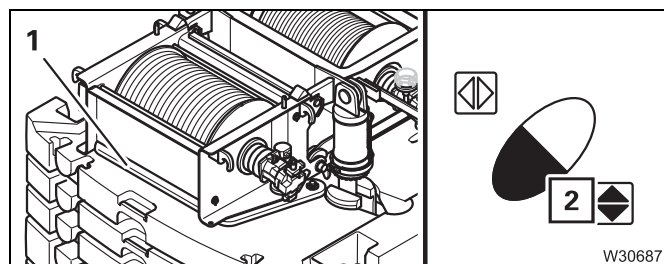
This prevents the auxiliary hoist from falling down due to unintentional actuation of the locking cylinders.



**Extending the locking cylinders**

- Press the button (2) until the locking cylinders (1) are fully extended.

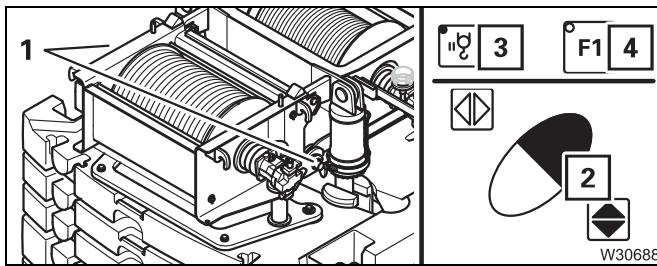
- Close the safety valve (3) – lever at right angles to the line.



**Lifting the lifting frame**

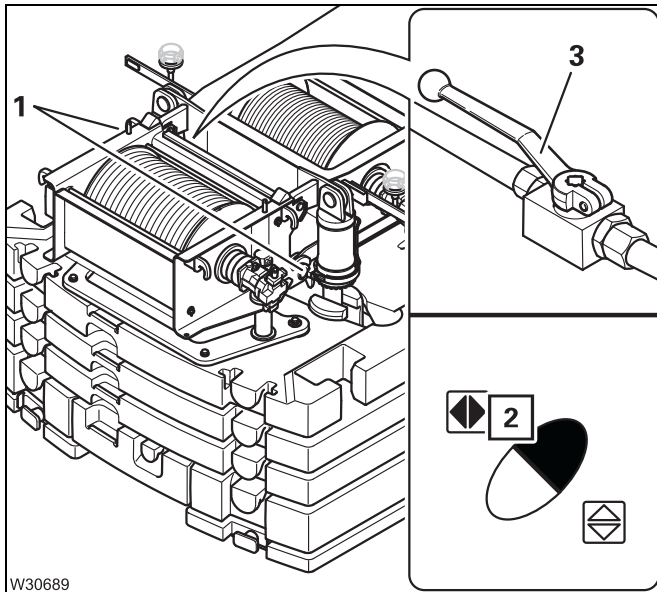
- Press the buttons (2) until the lifting frame (1) is fully retracted.

### Disconnecting a connection



### Lowering the lifting frame

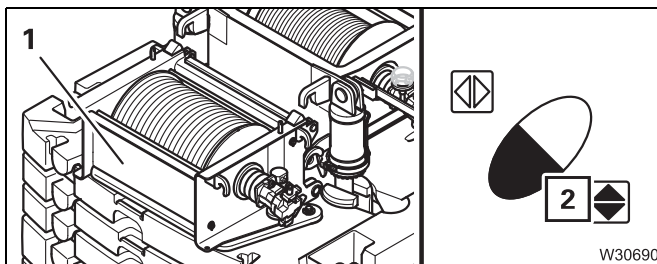
- Press the buttons (3) and (4).
- Press the buttons (2) until the locking points (1) are relieved.



### Retracting the locking cylinders

- Open the safety valve (3) – lever parallel with the line.

- Press the button (2) until the locking cylinders (1) are fully extended.



### Lowering the auxiliary hoist

- Press the button (2) until the auxiliary hoist (1) is completely lowered.

### 6.6.10

## Securing the hoist rope

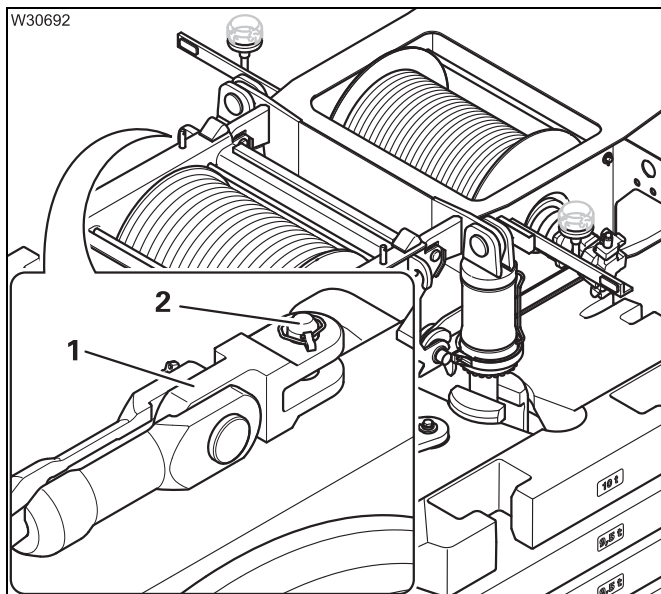
If you have wound up the hoist rope, you must secure it prior to removal.



### **Risk of accident from damaged auxiliary hoist rope!**


Always secure the hoist rope prior to removal.

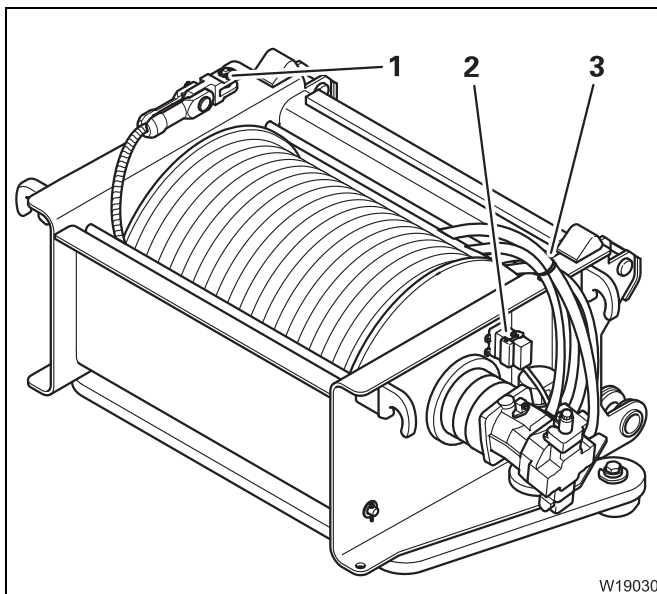
This prevents the hoist rope from being damaged and being overloaded during crane operation.



- Attach the rope end fitting (1) to the clamp (2).
- Always secure the rope end fitting with a linchpin.

### 6.6.11 Transporting the auxiliary hoist

- For transportation, be sure to use a separate vehicle with sufficient load bearing capacity. Transport dimensions and weight;  p. 1 - 10.
- Load the separate vehicle in such a way that the weight is evenly distributed.
- Transport and secure the auxiliary hoist in such a way that traffic is not put at risk.



- Lift the auxiliary hoist onto the separate vehicle and remove the lifting gear.
- Secure the hoses, e.g. on the slinging point (3).
- The plug (2) must be inserted in the dummy socket.
- The hoist rope is secured on the clamp (1).

## 6.6.12 Check that the auxiliary hoist is functioning properly

**Slewing direction** Check the slewing direction before laying on the hoist rope.



### Risk of accidents due to incorrect slewing direction

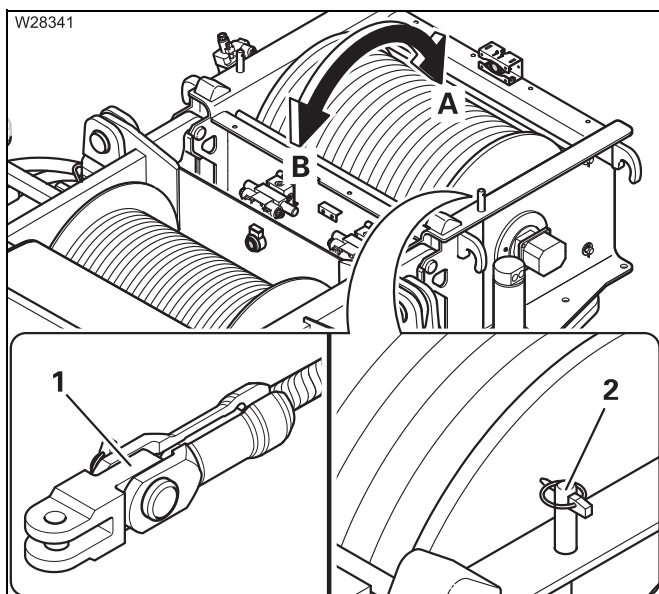
Check after each installation that the slewing direction is correct. This prevents accidents caused by the hoist rope winding up unexpectedly when it is applied.



### Danger due to slack rope!

Only drive the auxiliary hoist briefly and at the lowest speed. This prevents slack rope from being created, or the rope end fitting being pulled into the hoisting gear frame.

Ask someone to observe the slewing direction for you, or stand next to the auxiliary hoist and use the hand-held control.

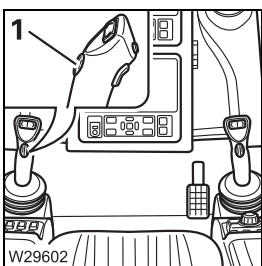


- Remove the rope end fitting (1) from the clamp (2).
- Slowly perform the *Lift* and *Lower* movements – stop the movement as soon as the hoist drum turns.
- Check that the slewing direction is correct:
  - A Lifting
  - B Lowering

### If the slewing direction is incorrect

- Check whether the hydraulic hoses have been mistakenly connected; p. 6 - 61.

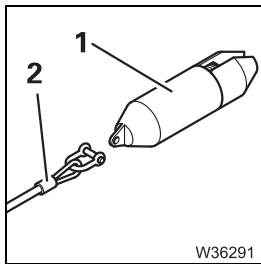
**Slewing indicator** Check the function of the slewing indicator when applying the hoist rope.



- You must feel a pulse on the slewing indicator (1) when the auxiliary hoist is rotating.
- If no pulse is present, contact **Manitowoc Crane Care**.

### 6.6.13

## Rigging aid for the hoist rope



Depending on the version, a rigging aid for the hoist rope is provided with the auxiliary hoist.

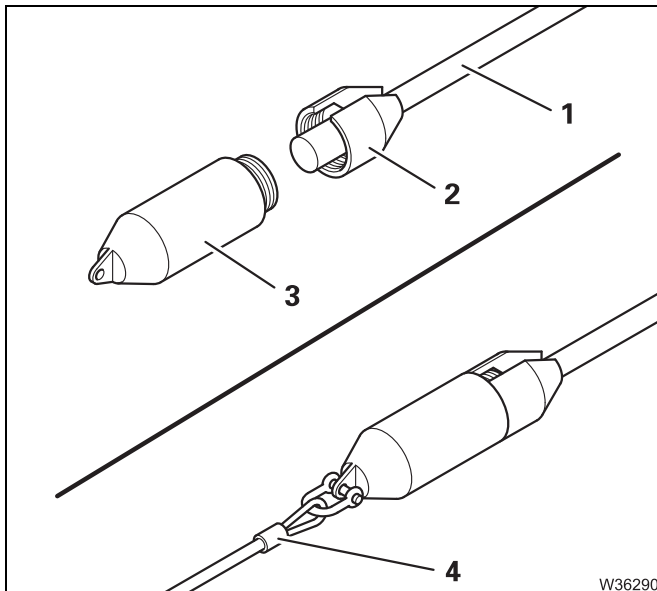
### Scope of delivery

- 1 Connector, two parts
- 2 Rope



### Risk of damage to the hoist rope!

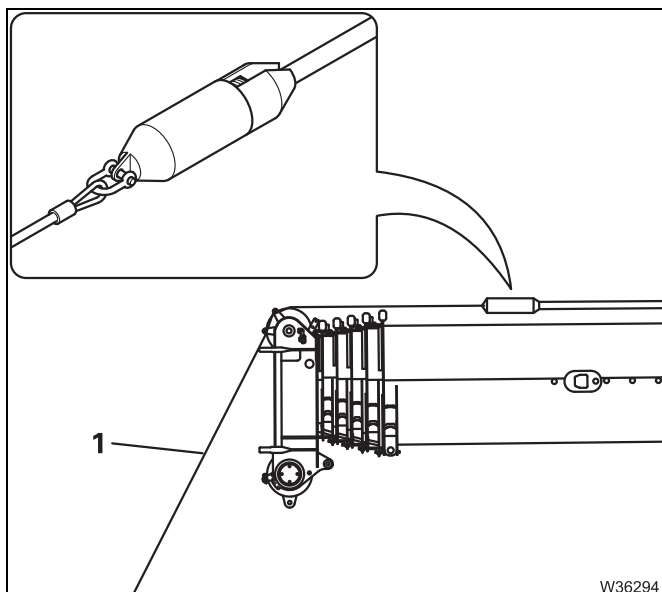
Always rig the hoist rope with the rigging aid. This prevents slack rope. Rope loops will form, which can cause the load to slip and damage the hoist rope.



### Establishing a connection

- Place the end of the hoist rope (1) in part (2) of the connector.
- Screw part (2) and (3) of the connector together.
- Attach the rope (4) to the connector.





### Rigging the hoist rope

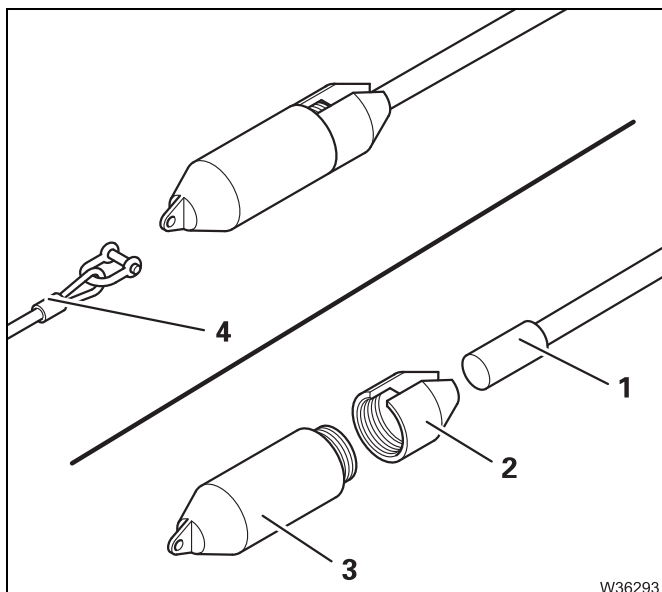
The rigging aid is connected to the hoist rope.

#### – When rigging

- Guide the rope (1) over the main boom and over the upper head sheave.
- Slowly unreel the hoist rope.
- Use the rope (1) to keep the hoist rope tensioned so that no slack rope occurs.

#### – When unrigging

- Slowly reel in the hoist rope.
- Use the rope (1) to keep the hoist rope tensioned so that no slack rope occurs.



### Disconnecting a connection

- Remove the rope (4).
- Disconnect part (2) and (3) of the connector and remove the hoist rope (1).
- Store the rigging aid so that it is safe for transport, under the passenger's seat if possible.

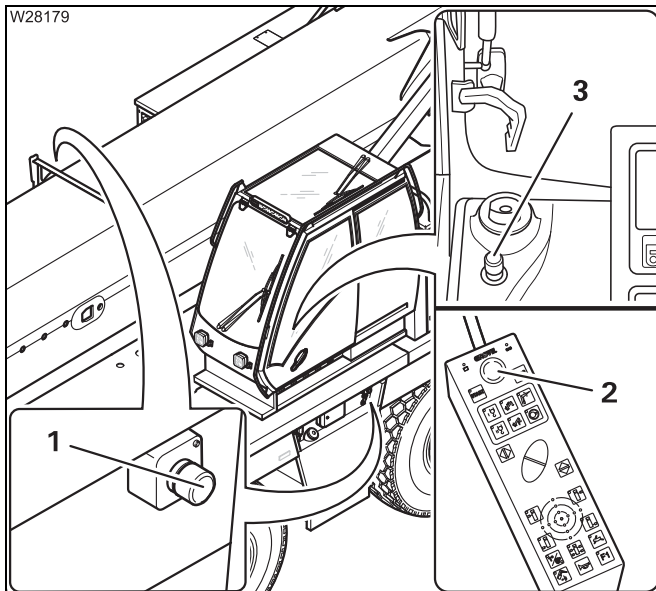


# 7

## Malfunctions in driving mode

### 7.1

### Emergency stop switch



Four emergency stop switches are provided for emergencies:

- 1 On the carrier
- 2 On the hand-held control
- 3 In the crane cab

- Press an emergency stop switch (1), (2) or (3). The switch latches.

The engine shuts down.

After activating an emergency stop switch;

➡ *Resetting the emergency stop switch, p. 4 - 22.*



The battery master switch cannot be used as an emergency stop switch for the engine. The engine continues to run after the battery master switch has been switched off.

## 7.2

## Procedure during malfunctions

### 7.2.1

### What to do when a malfunction occurs in road traffic

If the truck crane can no longer be driven due to an accident or another malfunction, observe the following.

- Keep calm!
- Stop the truck crane! Observe the traffic behind you!
- Stop at a place safe for you and for the traffic behind you!



#### **Risk of accidents due to poor visibility!**

If possible, do not stop in a tunnel or directly after a curve.

- Secure the truck crane in compliance with the legal regulations applicable in the country in which you are working.



#### **Risk of accidents during repair work in danger areas!**

In hazard areas (e.g. tunnels, intersections, motorway bridges), even simple repairs can be dangerous.


When in a hazard area, carry out only the repair work required to leave the danger area.

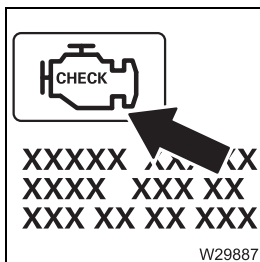
If you are unable to repair the damage yourself, notify **Manitowoc Crane Care** or have the truck crane towed;  *Towing away the truck crane*, p. 7 - 27.

## 7.2.2

### Procedure during engine malfunctions

In the event of engine malfunctions, the electronic system will try to establish a secure operating condition with the remaining functions.

A text message is also displayed in addition to a symbol on the on-board computer display;  *Warning and malfunction messages on the on-board computer display, p. 7 - 7.*



#### Engine malfunction

One or more systems have a malfunction:

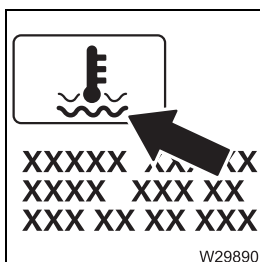
- Engine
  - Engine cooling system
  - engine control
  - Fuel system
- Drive on until you have a chance to stop.
  - Stop immediately and switch the engine off.



#### Risk of damage to the engine!

Switch off the engine immediately the truck crane has come to a stop. Do not by any means restart the engine. This will prevent serious damage to the engine.

- If necessary, note the error messages and contact **Manitowoc Crane Care** or a qualified specialist workshop.



The coolant temperature is too high – the motor output is automatically reduced.

- Reduce speed.
- Drive on until you have a chance to stop.
- Stop immediately and switch the engine off.


### 7.2.3

## Procedure during transmission malfunctions

If the transmission malfunctions, the electronic system will try to establish a secure operating condition with the remaining functions.



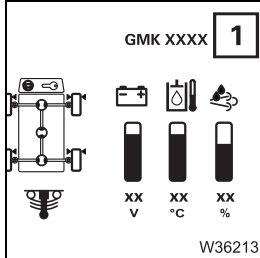
Even if the transmission still shifts, always notify **Manitowoc Crane Care**. This avoid situations where another small error could lead to transmission failure.

A text message is also displayed in addition to a symbol on the on-board computer display;  *Warning and malfunction messages on the on-board computer display, p. 7 - 7.*

## 7.3

## Warning and error messages

### Program version



- Always note down the number of the program version and the serial number after a malfunction occurs before notifying **Manitowoc Crane Care**.

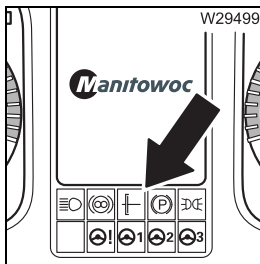
The serial number (1) is shown in the Start menu.

The program version is displayed in the crane cab;  p. 14 - 3.

### 7.3.1

### Warning or malfunction messages on the instrument panel

#### Meaning of the lamps



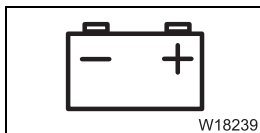
The colour of the lamps indicates whether a warning or malfunction message is active in the corresponding area.

- Lamp goes out – no message.
- Lamp is **red** – warning message.
  - Stop the truck crane immediately, taking into account the traffic situation, and identify the cause!
- Lamp is **orange** – malfunction message.
  - Identify the cause at the next opportunity.

If a symbol is displayed in **red** perform the following checks.



**Risk of damage if warning or malfunction messages are not heeded!**  
Observe the following information promptly and take the appropriate corrective measures if a warning or malfunction message appears. This prevents these malfunctions causing defects in the truck crane.




#### Battery charge indicator warning

The voltage in the carrier electrical system is too high or too low.  
Current voltage display;  *Monitoring elements*, p. 4 - 19.






#### Steering circuit 1 or 2 warning

Malfunction in steering circuit 1 or 2 – check for loss of oil;  *Malfunctions of the steering*, p. 7 - 22.




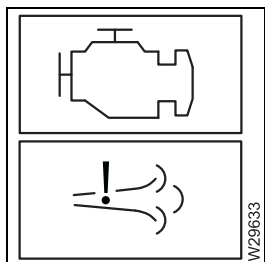
#### Steering circuit 3 warning (emergency steering pump)

Malfunction in steering circuit 3 – check for loss of oil;  *Malfunctions of the steering*, p. 7 - 22.




#### Malfunction in steering circuit 1 or 2

The 4th and 5th Axles were centred and are no longer steerable,  *Malfunctions of the steering*, p. 7 - 22.



#### AdBlue (DEF) system

- Also check the control elements for the Adblue (DEF) system;

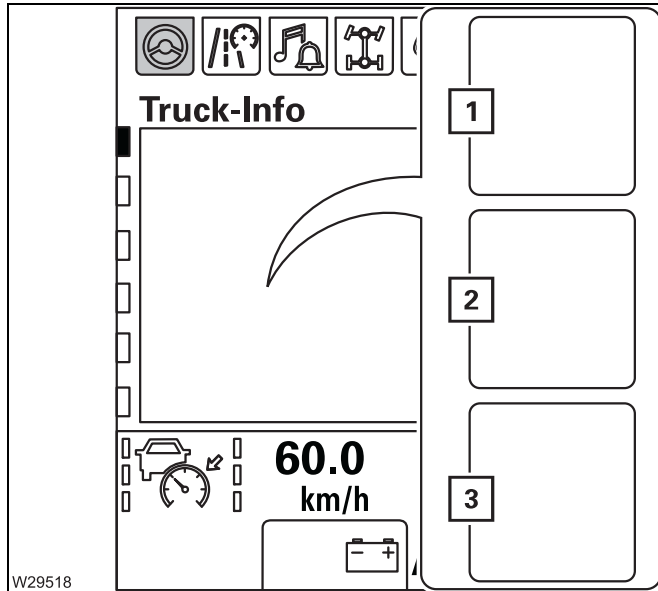
 *Faults on the Adblue (DEF) system*, p. 7 - 19.

## 7.3.2

# Warning and malfunction messages on the on-board computer display

### Messages

Messages are shown automatically. There are three types of message.



#### - Warning message

Display (1) **red**, additional text and symbols.

- Stop as quickly as possible, taking account of the traffic situation.

#### - Fault message

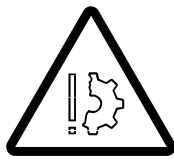
Display (2) **yellow**, additional text and symbols.

- Check the cause when you next stop, or stop if the text requests you to do so.

#### - Information

Display (3) **grey**, additional text and symbols.

- Pay attention to the messages. You can continue driving.

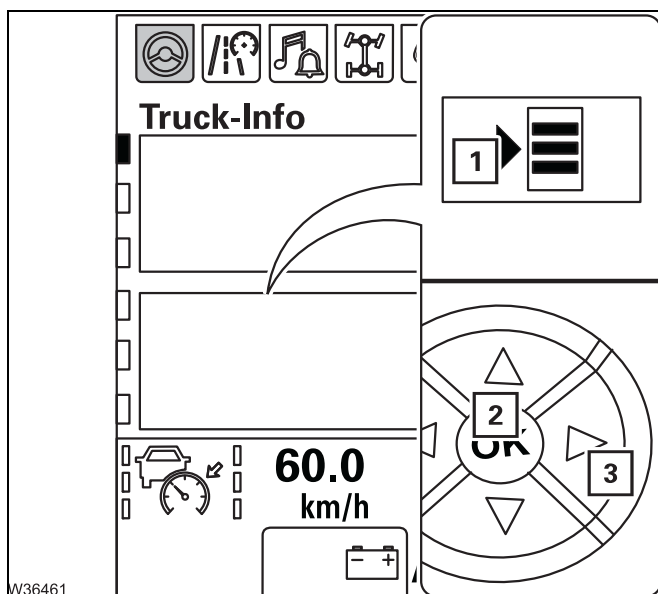


#### **Risk of damage if messages are disregarded!**

For all messages, always take note of the text shown.

Follow the requests to stop immediately, taking the traffic situation into account. Complete the remedial measures shown, and described here, in good time.

This prevents errors and minor damage leading to more serious problems.



#### **Message elements**

Messages consist of text and symbols/abbreviations.

When the symbol (1) is shown, you can display additional text by pressing the button (3).

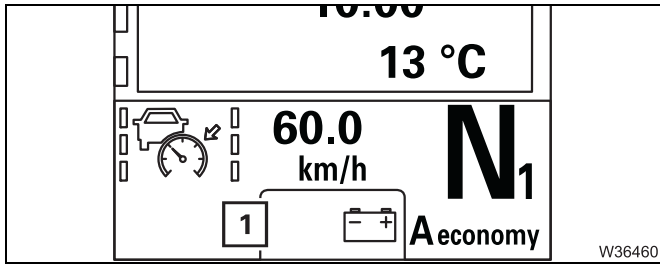
Follow the instructions that are displayed and perform the specified measures in good time.

#### **Acknowledging a message**

Press (2) once – the message disappears.

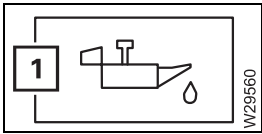


## Symbols



In addition to the messages, symbols are shown on the display (1) of the on-board computer.

### Symbols for engine/brake



– Oil pressure too low

A warning buzzer sounds and the lamp (1) lights up – the oil pressure is too low.

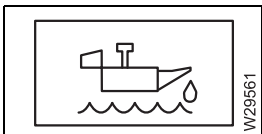
- Stop the truck crane as quickly as possible while observing the traffic situation and switch off the engine.
- Check the oil level; *Maintenance Manual*.
- Add oil if necessary. If the error message persists, contact **Manitowoc Crane Care**.



#### **Risk of damage to the engine if the oil pressure drops!**

Switch off the engine as soon as possible and look for the cause if the lamp lights up or the warning buzzer sounds!

Never restart the engine before you have found the cause and eliminated the problem!.



– Oil level too low

The oil level is far too low.

- Stop the truck crane as quickly as possible while observing the traffic situation and switch off the engine.

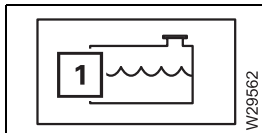
#### **If oil has escaped**

- Warn any vehicles on the road behind you.
- Do not continue driving. Contact **Manitowoc Crane Care**.

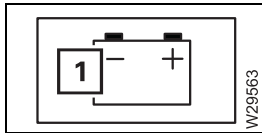
#### **If no oil has escaped**

- Correct the oil level: *Maintenance Manual*.



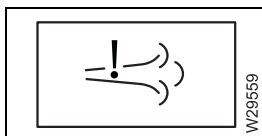


- Coolant level too low
- Immediately top up the coolant so that the engine does not overheat;   
    ▶▶▶ *Maintenance Manual*.

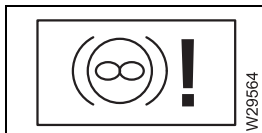


- Carrier voltage too low
- Stop the truck crane as quickly as possible while observing the traffic situation and switch off the engine.

Current voltage display; ▶▶▶ p. 4 - 16.

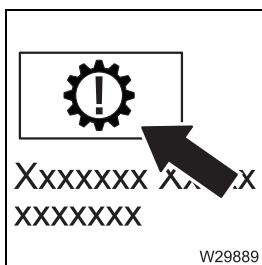


- Adblue (DEF) filling level empty
- or
- AdBlue (DEF) system malfunction



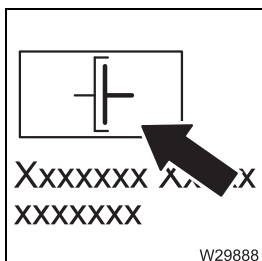
- Engine retarder malfunction
- The braking behaviour can change.
- Stop the truck crane as quickly as possible while observing the traffic situation and switch off the engine.
  - Have the engine retarder immediately checked and repaired by a specialist workshop.

### Transmission symbols



The gear shifting has a malfunction – driving can continue with restrictions.

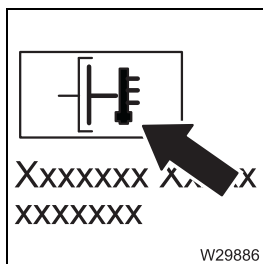
- If necessary, note the error messages and contact **Manitowoc Crane Care** or a qualified specialist workshop.



The clutch has a malfunction – driving can continue with restrictions.

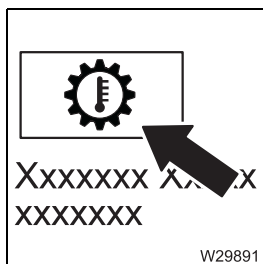
- If necessary, note the error messages and contact **Manitowoc Crane Care** or a qualified specialist workshop.





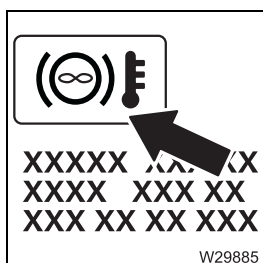
The maximum permissible operating temperature of the clutch has been reached.

- Shift to a lower gear for manoeuvring or starting.
- Or
- stop the manoeuvring or starting procedure.



The oil temperature of the fluid coupling is too high.

- Shift to a lower gear – the engine speed increases and the dry clutch closes.

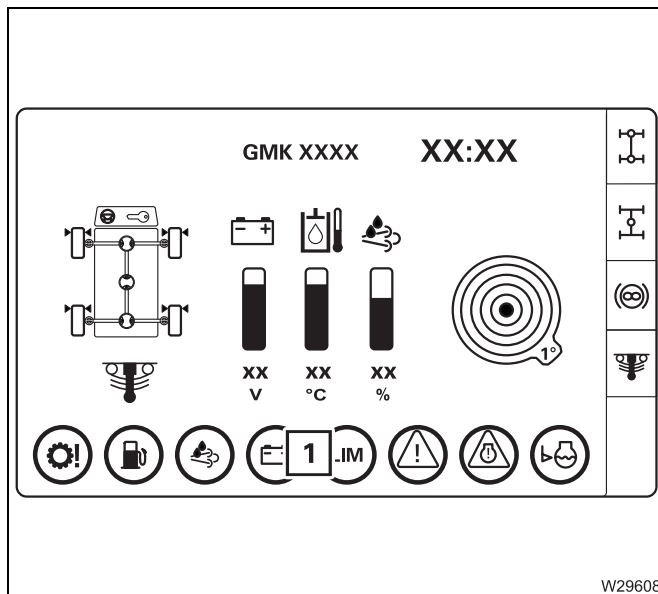


The oil temperature of the retarder is too high.

Shift to a lower gear – the engine speed increases and the engine braking effect increases.

### 7.3.3

## Warning messages on the CCS display



A warning message indicates that certain values do not correspond to a target value  
When CCS detects a fault then the display area (1) shows an error or warning symbol.

### Meaning of the symbols

The colour of the symbols indicates whether a warning or malfunction message is active in the corresponding area.

- Symbol **yellow** – malfunction.
- Symbol **red** – warning message.
- **no** symbol – no malfunction or warning message.

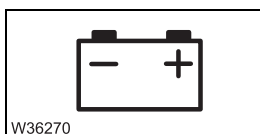
If a symbol is displayed in **red** or **yellow**, perform the following checks.




### Risk of damage if warning messages are disregarded!

Observe the following information in good time and take the appropriate remedial measures if a warning message appears. This prevents these malfunctions causing defects in the truck crane.

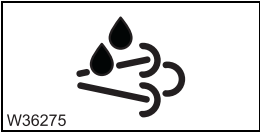
### Symbols in the display area



### Voltage monitoring

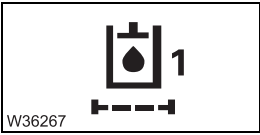
The voltage in the carrier electrical system is too high or too low.  
Current voltage display;  p. 4 - 16.





### AdBlue (DEF) – Filling level

AdBlue (DEF) – top up the reservoir; p. 4 - 9.



### Replace the hydraulic oil filter

- Replace the corresponding hydraulic oil filter as quickly as possible; *Maintenance Manual*.



### Hydraulic oil too hot

The hydraulic oil temperature is higher than 80 °C (176 °F).

Current temperature display; p. 4 - 16.

Possible cause and solution; p. 7 - 23.

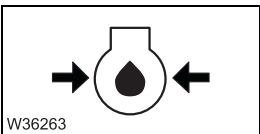


### Danger of overheating!

There is a fault if the hydraulic oil temperature exceeds 80 °C (176 °F).

Stop the truck crane as soon as possible and try to find the cause.

Stop the truck crane immediately and turn off the vehicle engine if the temperature of the hydraulic oil rises to over 100 °C (212 °F)!



### Oil pressure too low

A warning buzzer sounds at the same time.

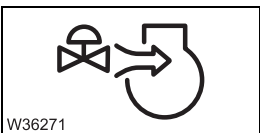
- Stop the truck crane as quickly as possible while observing the traffic situation and switch off the engine.
- Check the oil level; *Maintenance Manual*.



### Risk of damage to the engine if the oil pressure drops!

Switch off the engine as soon as possible and look for the cause if the lamp lights up or the warning buzzer sounds!

Never restart the engine before you have found the cause and eliminated the problem!



### Air intake inhibitor triggered

The air intake inhibitor was triggered because the maximum permissible engine speed was exceeded. It is only possible to start the engine after the air intake inhibitor has been released manually; *Releasing the air intake inhibitor*, p. 4 - 23.



### Coolant level too low

Immediately top up the coolant so that the engine does not overheat;  
▣▣▣▣ *Maintenance Manual*.



### Coolant too hot

The engine coolant is hotter than approx. 110 °C.  
Current temperature display; ▣▣▣▣ p. 9 - 6.  
Possible cause and solution; ▣▣▣▣ p. 7 - 17.



### Transmission retarder too hot

The retarder in the transmission is not working. When the transmission retarder has cooled down, the symbol reverts to grey and the transmission retarder is ready to function again.



### Transmission oil too hot

- Stop the truck crane as soon as possible and try to find the cause;  
▣▣▣▣ *Malfunctions in the transmission*, p. 7 - 20.



### Transmission error

- Stop the truck crane as soon as possible and try to find the cause;  
▣▣▣▣ *Malfunctions in the transmission*, p. 7 - 20.



### Permissible engine speed exceeded

- Brake the truck crane.



### Change the engine oil filter

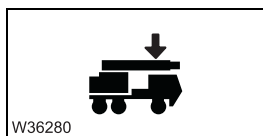
- Replace the engine oil filter as soon as possible; ▣▣▣▣ *Maintenance Manual*.




### Change the steering circuit oil filter

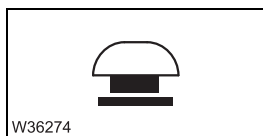
- Replace the steering circuit oil filter as soon as possible; ▣▣▣▣ *Maintenance Manual*.





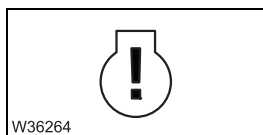
#### **Main boom not set down**

The main boom has not been set down in the boom rest, the permissible street driving height is **not** adhered to;  *Displaying vehicle height*, p. 5 - 9.




#### **Emergency stop switch actuated**

 *Resetting the emergency stop switch*, p. 4 - 22



#### **Engine malfunction**

- Open the *Engine errors* menu;  p. 7 - 15.

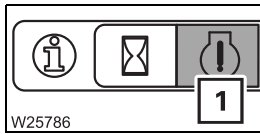


#### **CAN bus malfunction**

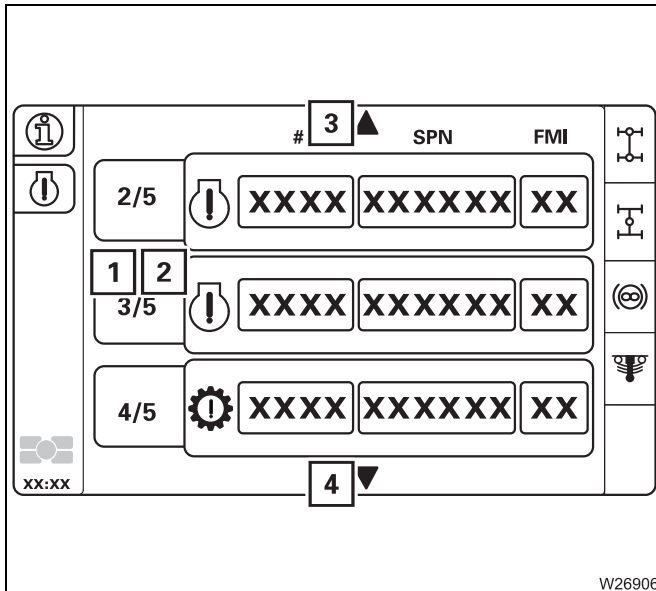
- Switch off the ignition and wait about 15 seconds, then switch it on again.  
If the malfunction is still present, contact **Manitowoc Crane Care**.

## 7.3.4 Engine/transmission error messages

### Open menu



- Open the *Errors* menu (1).



### Display of error / total errors

Display (2) shows the error total, and display (1) shows which error is displayed.

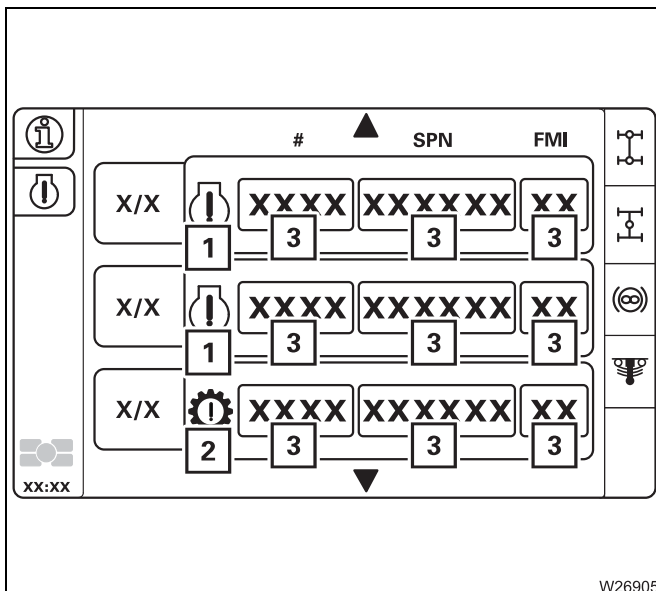
**3/5**, for example, means:

- The error **3** is shown,
- There is a total of **5** errors.

### Displaying errors

- Select and acknowledge the symbol (3) or (4) to show any additional errors.

- 3** Next error
- 4** Previous error



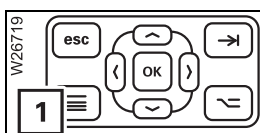
### Error message display

For each error the display shows:

- the error code (3),
- The symbols for the faulty components:
  - 1** Engine
  - 2** Transmission

- Always note the error code before contacting **Manitowoc Crane Care**.

### Exiting the menu



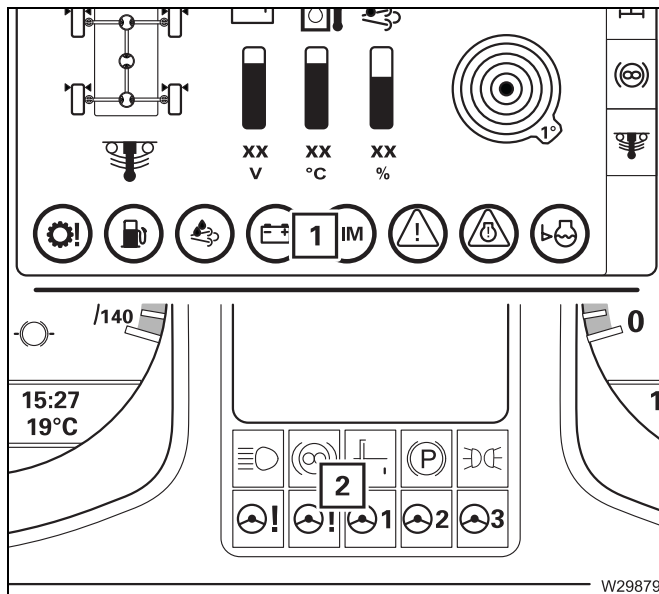
You can exit the *Engine errors* menu at any time.

- Press the button (1) once.  
The next highest menu is opened.

Blank page



## 7.4 Troubleshooting



This section does not include all malfunctions.

- If a warning is shown in the display (1);  
 p. 7 - 11.
- If the lamp on the instrument panel (2) lights up; p. 4 - 16.

### 7.4.1 Malfunctions on the engine







In addition to this information; *Separate engine operating instructions, provided by the manufacturer.*

Malfunction	Cause	Remedy
<b>Engine does not start – Starter does not turn</b>	Battery master switch is switched off	Switch on the battery master switch;  p. 4 - 11
	Switch the ignition off	<i>Switch on the ignition,</i> p. 4 - 11
	Transmission not in neutral position	<i>Switching the transmission to the neutral position,</i> p. 5 - 26
	Parking brake released	Apply the parking brake; p. 3 - 62
	Fuse F1/5 blown	Replace blown fuses; p. 7 - 38
	Bridging plug for the hand-held control not inserted	Insert bridging plug; p. 11 - 22
	Emergency stop switch pressed	Reset emergency stop switch; p. 4 - 22



Malfunction	Cause	Remedy
<b>Engine does not start – Starter turns</b>	Batteries insufficiently charged	Charge the batteries; ■■■► <i>Maintenance Manual</i>
	Fuel tank empty	1. Refuel; ■■■► p. 4 - 7
		2. Bleed the fuel system; ■■■► <i>Maintenance Manual</i> ■■■► <i>Separate engine operating instructions, provided by the manufacturer</i>
	Air intake inhibitor closed	■■■► <i>Releasing the air intake inhibitor, p. 4 - 23</i>
Fuse F4/6 blown	Replace blown fuses; ■■■► p. 7 - 38	
<b>The truck crane cannot exceed 20 km/h (12 mph)</b>	A locking procedure is not yet completed	Lock the differential locks or steering
<b>Coolant temperature too high</b>	Coolant level too low	Top up coolant; ■■■► <i>Maintenance Manual</i>
	Oil level in the transmission too low	Check the oil level; ■■■► <i>Maintenance Manual</i>
	Outer surface of heat exchanger dirty	Clean the heat exchanger
	V-belt of coolant pump at engine loose	Tighten V-belt; ■■■► <i>Separate engine operating instructions, provided by the manufacturer</i>
<b>Engine cannot be switched off using the ignition key</b>	Malfunction in the electronics	Turn off the engine with the emergency-stop device; ■■■► p. 7 - 1
<b>Motor brake (engine retarder) cannot be switched on</b>	Fuse F4/1 blown	Replace blown fuses; ■■■► p. 7 - 38
<b>Engine/transmission diagnostics plug not working</b>	Fuse F1/2, F4/7 blown	Replace blown fuses; ■■■► p. 7 - 38
<b>The engine performance is reduced</b>	The coolant is too hot or another malfunction. The engine is not switched off in order to drive on to the next place where it is possible to stop	Coolant too hot: Wait until the coolant has cooled down – the performance will increase again  Other malfunctions: <b>Manitowoc Crane Care</b> must be notified

## 7.4.2 Faults on the Adblue (DEF) system

Malfunction		Cause	Remedy
	<ul style="list-style-type: none"> <li>- <b>Lights up</b></li> <li>- <b>Flashes</b></li> </ul>	<ul style="list-style-type: none"> <li>Adblue (DEF) level in tank at reserve level</li> <li>Adblue (DEF) tank empty</li> </ul>	Refill Adblue (DEF) tank;  p. 4 - 9
 	<ul style="list-style-type: none"> <li>- <b>Light up</b></li> </ul>	<ul style="list-style-type: none"> <li>- Adblue (DEF) tank sensor faulty</li> <li>- Error in the Adblue (DEF) dosing unit</li> <li>- Adblue (DEF) lines blocked</li> <li>- Temperature sensor faulty</li> <li>- Cable break in Adblue (DEF) system</li> <li>- Exhaust gas sensor faulty</li> </ul>	Have the exhaust system checked by <b>Manitowoc Crane Care</b> , an authorised GROVE retailer or an authorised specialised repair shop.







### 7.4.3

### Malfunctions in the transmission

	Malfunction	Cause	Remedy
	<b>Transmission only shifts up to second gear</b>	Transmission oil too hot	▣▣▣▣➔ <i>On the transmission,</i> p. 7 - 28
		Gear oil colder than approx. -7 °C (20 °F)	Wait until gear oil temperature rises
	<b>Transmission is not upshifting at speeds over approx. 20 km/h (12 mph)</b>	A locking procedure is not yet completed	Lock the differential locks
	<b>Transmission not shifting</b>	Retarder switched on	▣▣▣▣➔ <i>Switching off the additional brakes,</i> p. 5 - 43
	<b>The transmission does not respond to the controls</b>	Fuse F1/6 blown	Replace blown fuses; ▣▣▣▣➔ p. 7 - 37
		Transmission cannot shift down as otherwise the maximum permissible engine speed would be exceeded.	Braking the truck crane
	<b>Driving display indicates a malfunction</b>	The electronic gear system has detected a malfunction	▣▣▣▣➔ <i>Procedure during transmission malfunctions,</i> p. 7 - 4
		Engine started before the start menu is displayed	Do not start the engine until the start menu is displayed
	<b>Transmission diagnostics plug not working</b>	Fuse F1/2, F4/7 blown	Replace blown fuses; ▣▣▣▣➔ p. 7 - 37

**7.4.4**

**Malfunctions of the service brake**

Malfunction		Cause	Remedy
	<b>Lights up while driving or does not go out after the engine is started</b>	The air pressure in one of the two circuits has fallen below 5.5 bar (80 psi)	The vehicle can be driven slowly to the next repair shop
		The air pressure in both circuits has fallen below 5.5 bar (80 psi)	<ol style="list-style-type: none"> <li>1. Top up the compressed-air supply on the filler connection;  p. 7 - 27</li> <li>2. Tow the truck crane with the tow-rod;  p. 7 - 27</li> </ol>
 	<b>Parking brake unable to be released</b> - Does not go out  - Off	Supply pressure too low	 <i>Building up supply pressure,</i> p. 5 - 10

## 7.4.5 Malfunctions of the steering

	Malfunction	Cause	Remedy
	<b>Steering wheel hard to turn, grating noises when steering</b>	Oil level in the hydraulic oil tank too low	Check the hydraulic oil level; <i>Maintenance Manual</i> .
	<b>Symbol  or  is red</b>	Oil level in the hydraulic oil tank too low	Stop and check whether oil has run out <i>If oil has escaped</i> , p. 5 - 36 <i>If no oil has escaped</i> , p. 5 - 36
		Steering circuit has failed, e. g. pump faulty	
	<b>Symbols  and  are red</b>	Both steering circuits have failed	The truck crane cannot be driven any further, since it can no longer be steered!
	<b>Separate steering cannot be activated</b>	Current speed over approx. 5 km/h (3 mph)	Slow down or stop the truck crane
	<b>Separate steering cannot be switched off</b>	Current speed over approx. 5 km/h (3 mph)	
	<b>Separate steering not working</b>	Fuse F7/1, F7/2 or F7/3 blown	Replace blown fuses; p. 7 - 38
	<b>Separate steering not working and the CCS display shows an error message</b>	CCS malfunction	Note the error code ( p. 7 - 11) and notify <b>Manitowoc Crane Care</b>

## 7.4.6 Malfunctions of the differential locks

	Malfunction	Cause	Remedy
	<b>Differential locks cannot be switched on</b>	Current speed over approx. 5 km/h (3 mph)	Slow down or stop the truck crane
		Drive train under tension	Slowly drive truck crane back and forth, ■■■▶ p. 5 - 50
		Compressed air system insufficiently filled	■■■▶ <i>Building up supply pressure</i> , p. 5 - 10
		Fuses F2/1, F4/6, F5/4, F5/7 blown	Replace blown fuses; ■■■▶ p. 7 - 38
	<b>Differential locks cannot be switched off</b>	Current speed over approx. 5 km/h (3 mph)	Slow down or stop the truck crane
		Drive train under tension	Slowly drive truck crane back and forth, ■■■▶ p. 5 - 50
	<b>Error symbol is displayed</b>	CCS malfunction	Note the error code (■■■▶ p. 7 - 11) and notify <b>Manitowoc Crane Care</b>

## 7.4.7 Malfunctions in the hydraulic system/hydraulic oil cooler

Malfunction	Cause	Remedy
<b>Hydraulic oil temperature above 80 °C, fan in the hydraulic oil cooler is running</b>	Hydraulic system under extreme strain and ambient temperature very high	Stop the truck crane while taking the traffic situation into account and run the engine until the oil has cooled down
<b>Hydraulic oil temperature above 80 °C, fan in the hydraulic oil cooler is not running</b>	Fuse F1/3 blown	Stop the truck crane while taking the traffic situation into account, and replace the blown fuse; ■■■▶ p. 7 - 38.
	Defective temperature sensor in the hydraulic system (error message is displayed)	Have the temperature sensor replaced

### 7.4.8 Malfunctions on the suspension

Malfunction	Cause	Remedy
<b>Suspension cannot be activated</b>	Current speed over approx. 5 km/h (3 mph)	Slow down or stop the truck crane
	Compressed air system insufficiently filled	▣▣▣▣▶ <i>Building up supply pressure</i> , p. 5 - 10
	Axle loads not evenly set	Use the <i>Raise axle</i> function to set the axle loads evenly, ▣▣▣▣▶ p. 12 - 9
<b>Suspension cannot be switched on or off</b>	Fuses F1/5, F2/1, F4/6, F5/4 blown	Replace blown fuses; ▣▣▣▣▶ p. 7 - 38
<b>Error symbol is displayed</b>	CCS malfunction	Note the error code (▣▣▣▣▶ p. 7 - 11) and notify <b>Manitowoc Crane Care</b>

### 7.4.9 Malfunctions of the level adjustment system

Malfunction	Cause	Remedy
<b>Level adjustment system not working</b>	Suspension is switched off	▣▣▣▣▶ <i>Switching the suspension on</i> , p. 5 - 16
	Fuses F1/5, F2/1, F4/6, F5/4 blown	Replace blown fuses; ▣▣▣▣▶ p. 7 - 38
<b>Error symbol is displayed</b>	CCS malfunction	Note the error code (▣▣▣▣▶ p. 7 - 11) and notify <b>Manitowoc Crane Care</b>

### 7.4.10 Malfunction in the CCS control unit

Malfunction	Cause	Remedy
<b>CCS control unit does not function</b>	Fuse F1/4 blown	Replace blown fuses; ▣▣▣▣▶ p. 7 - 38
<b>CCS display is dark – LED flashes blue</b>	Ambient temperature too low	Heat the crane cab
<b>CCS display is dark – LED flashes yellow</b>	Ambient temperature too high	Cool the crane cab

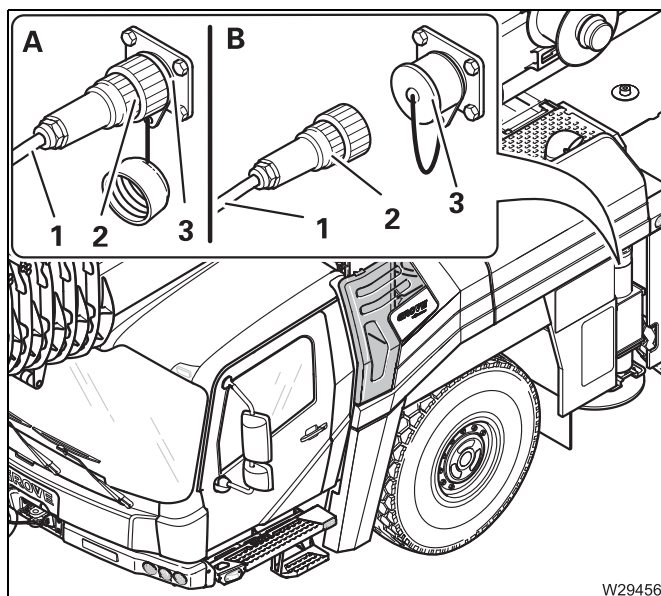


## 7.5

## Emergency operation and breakdown assistance

### 7.5.1

### Externally starting the truck crane



- Start the engine of the auxiliary vehicle.
- **(A)** – Connect the cable **(1)** to the auxiliary vehicle's power supply (24 V).
- Insert the plug **(2)** into the socket **(3)**.
- Start the truck crane engine.
- **(B)** – Pull out the plug **(2)**.
- Close the socket **(3)**.
- Remove the cable **(1)** from the auxiliary vehicle.

The socket **(3)** can also be used as a power source for another vehicle (with a 24 V on-board network).

## 7.5.2

### Battery charger

#### Prerequisites

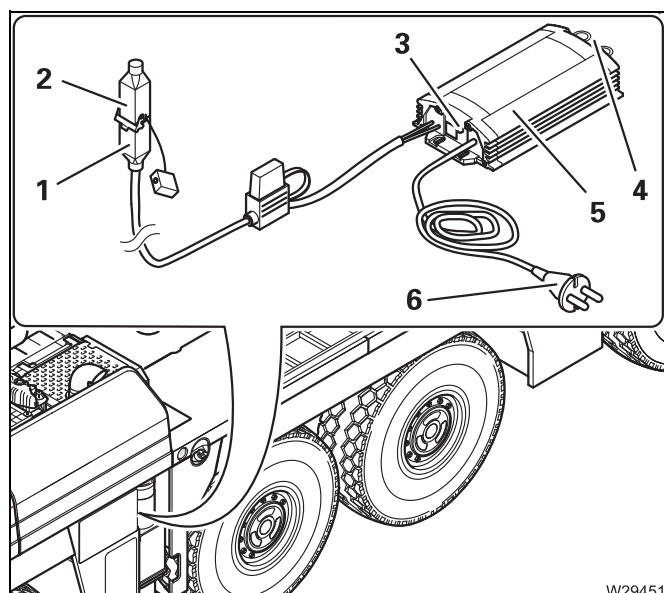
- The engine must not be running and must be secured against unauthorised use,
- An external 230 V mains power supply must be available at the location,
- The location must be well ventilated and protected against moisture.



#### Risk of explosion when operating the battery charger!

The battery charger may not be operated:

- at service stations and tank farms,
- at places where flammable gases or vapours can be found or formed (e.g. at places where fuel is stored and in chemical factories),
- at places where explosive dust can be found or formed (e.g. carbon dust, wood dust and grain dust).



#### Connecting

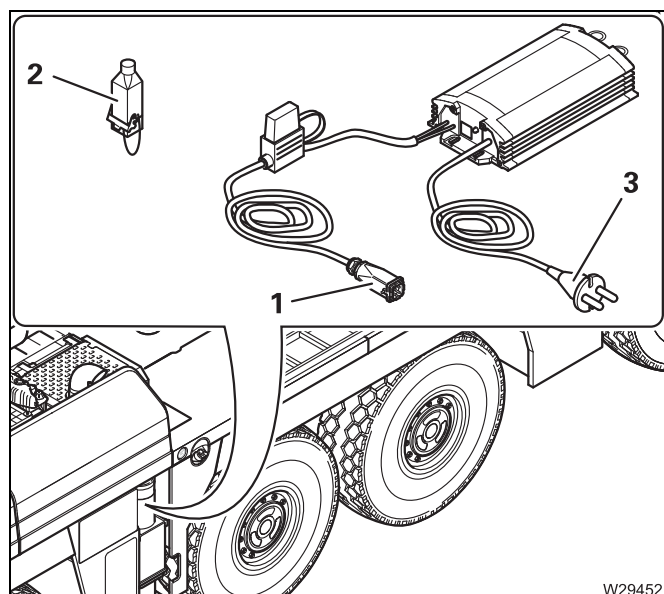
- Insert the plug (1) into the socket (2).
- Place the battery charger (5) in a protected place where you can see the indicator lamp (3).

The battery charger can be suspended from the ring eyes (4).

- Insert the plug (6) into the socket on the mains supply 230 V at the location.

The battery charger switches on. The lamp (3) on the battery charger indicates the status:

- **Flashing:** The battery is being charged
- **lights up:** Charging complete



#### Disconnecting

- Pull the plug (3) out of the socket.
- Pull the plug (1) from the socket (2).
- Close the socket (2).
- Stow the battery charger.

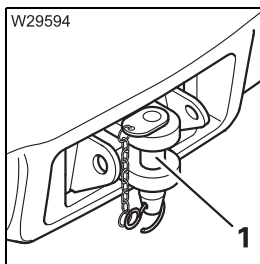
### 7.5.3

## Towing away the truck crane

### Important information

Observe the following if the truck crane has to be towed away:

- The truck crane may only be towed away with a tow-rod. Attach the tow-rod to the tow-rod coupling on the front bumper.
- Be sure to observe the statutory regulations of the country in which you are working concerning the overall length of the towing and towed vehicle, including tow-rod.
- If the engine, steering and service brake still work, you can tow the truck crane with a lorry.
- The wheels of the 4th and 5th axle lines must be in the forward position. If the wheels can no longer be steered into the forward position, notify **Manitowoc Crane Care** prior to towing.
- If the engine, steering or service brake no longer function properly, the truck crane must be towed with a special breakdown truck.



The front towing coupling is designed for a maximum tractive force of 10 t (22,000 lbs). Tensile force may be applied only forwards or at an angle of 45° to both sides of the longitudinal axis of the truck crane.

### In the case of engine/transmission damage

The following information only applies to towing the truck crane out of the immediate hazard area in the event of damage to the engine or transmission.



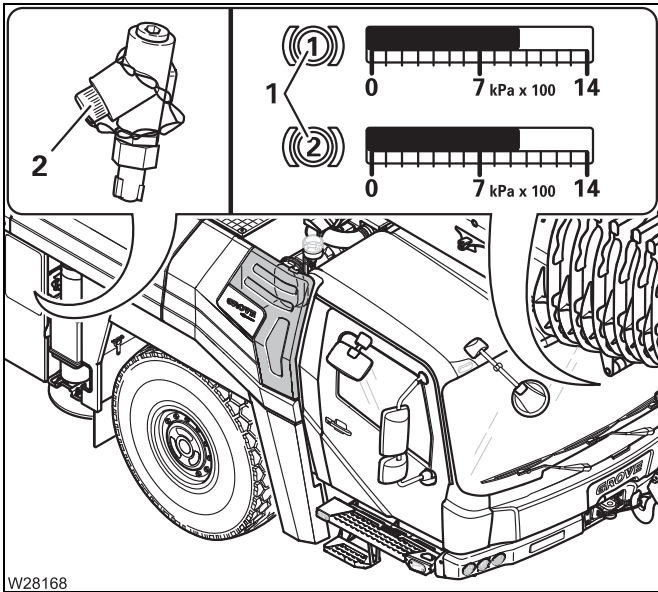
### **Risk of accidents and damage when towing the truck crane long distances!**

Tow the truck crane at a maximum speed of 10 km/h (6 mph) and over a distance of max. 1 km (0.62 mi). Additional measures must be taken for longer distances, contact **Manitowoc Crane Care**.

### **Compressed-air supply**

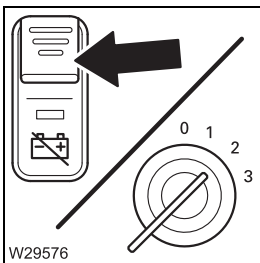
If the engine fails, the truck crane must be supplied with compressed air by the tractor-vehicle so that the brake system is still operable.





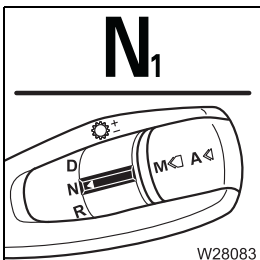
- Connect the filler connection (2) with the *Supply* coupling head of the towing vehicle.

A supply pressure of at least 6 bar (87 psi) must be displayed and the lamps (1) must not light up in the driver's cab when towing.



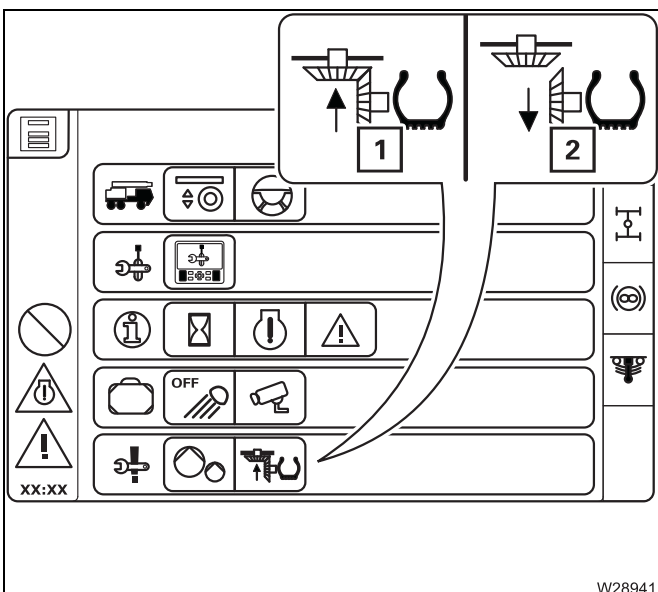
**Electric power supply**

- Switch on the battery master switch.
- Switch on the ignition.



**On the transmission**

- Switch the transmission to neutral position **N**.



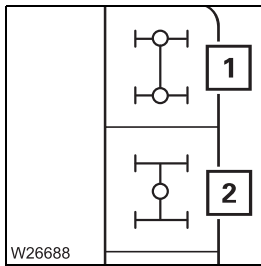
- If necessary, open the *Overview menu groups* menu.

**Switching on towing mode**

- Select and confirm the symbol (1) – Symbol (2) is displayed. Towing mode is switched on.

**Switching off towing mode**

- Select and confirm the symbol (2) – Symbol (1) is displayed. Towing mode is switched off.

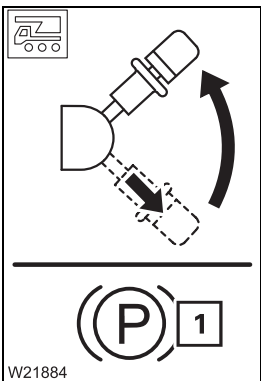


### Axle drives

- Switch off all differential locks.

The symbols (1) and (2) must be **green**,

- Transverse differential locks p. 5 - 50,
- Longitudinal differential lock; p. 5 - 50.



### Parking brake

- Release the parking brake.  
The lamp (1) must go out.

If the lamp (1) continues to light up, the supply pressure may be too low. Let the engine of the truck crane or towing vehicle run on the compressed-air supply until the supply pressure has been built up; *Building up supply pressure*, p. 5 - 10.

If the lamp (1) fails to go out, the parking brake has been damaged, contact **Manitowoc Crane Care**.



### Risk of accidents due to faulty brakes!

If the service brake system has been damaged, you may only tow the truck crane from the immediate hazard area after consulting **Manitowoc Crane Care**.

### Towing the truck crane out of the danger area

Once you have made all the adjustments as described in this section, you can tow the truck crane away from the hazard area.

- Ensure that the tractor-vehicle accelerates only slowly.



### Risk of damage to the chassis!

Starting jerkily or quickly can damage the chassis!



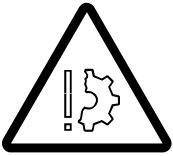
- Remember that the steering will be sluggish.  
If the engine fails, only the emergency steering pump will be available, which supports the steering only from a speed of at least 2 km/h (1.2 mph).



**Risk of accidents due to sluggish steering!**

At speeds less than 2 km/h (1.2 mph) the truck crane is barely steerable.

- Tow the truck crane at a **maximum of 10 km/h** (6 mph).
- Ensure that the towing distance does not exceed **1 km** (0.62 mi).



**Risk of accidents and damage when towing the truck crane long distances!**

Tow the truck crane at a maximum speed of 10 km/h (6 mph) and over a distance of max. 1 km (0.62 mi). Additional measures must be taken for longer distances, contact **Manitowoc Crane Care**.

**Tow starting**

It is **not** possible for the truck crane to start towing for transmission reasons.

**7.5.4**

**Wheel change**

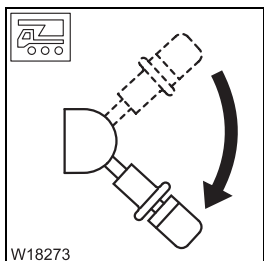
- If a puncture occurs while driving, stop the truck crane, taking the following traffic into account, and secure the truck crane as outlined in the applicable legal stipulations of the country in which you are working.
- Select as flat a place as possible to change the wheel.



**Risk of accidents due to a wheel falling over!**

If you temporarily lean a wheel against the truck crane while changing it, secure it with a rope to prevent it falling over!

Move the outriggers only when no wheel is leaning against the truck crane.



- Apply the parking brake.

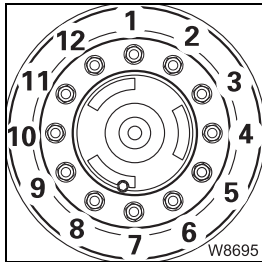
## Removing a damaged wheel



- Switch off the suspension; p. 5 - 16.
- Raise the truck crane with the outriggers until the wheel to be changed just barely leaves the ground.

### Risk of accidents due to a wheel falling over!

When unscrewing the final lug nuts, the wheel can slip off the hub and fall toward you. Secure the wheel and step back quickly if the wheel begins to tip.



- Remove the wheel nuts (1) to (12) and remove the damaged wheel.
- Secure the wheel against falling over if you set it down temporarily.

## On the spare wheel holder

When changing a wheel, you must remove the spare wheel from the spare wheel holder and mount the damaged wheel on to the spare wheel holder. You can use a chain hoist or the truck crane to lift the wheel.

- If you lift the wheel with the truck crane, then:
  - Support the truck crane and
  - Enter and confirm the current rigging mode.



### Danger of overturning if the truck crane is free-standing!

Always support the truck crane on outriggers before rotating the superstructure. The free-standing truck crane will tip when slewing.



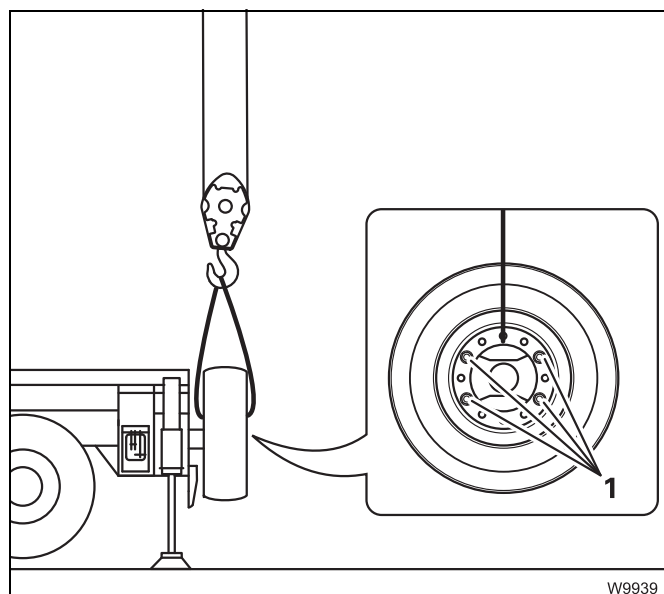
### Risk of overturning while slewing!

Always check before slewing whether slewing is permitted in the truck crane's current rigging mode (counterweight, outrigger span, working radius).

Correct the rigging mode if necessary; *Slewing with the rigged counterweight*, p. 11 - 93.

- Lift the spare wheel using only lifting gear with sufficient load bearing capacity; *Spare wheel*, p. 1 - 10.





### Removing a wheel

- Loosen the nuts (**1**).
- Lift the spare wheel off the spare wheel holder.
- Secure the spare wheel against falling over if you put it down temporarily.

### Mounting a wheel

- Lift the wheel on to the spare wheel holder.
- Fasten the wheel with the nuts (**1**) and tighten the nuts to 500 Nm (370 lbf ft).

### Mounting a wheel

- Check that the bearing surfaces of the wheel rim and hub are clean (no paint, grease or oil).
- Lightly grease the wheel studs.



#### Risk of accidents!

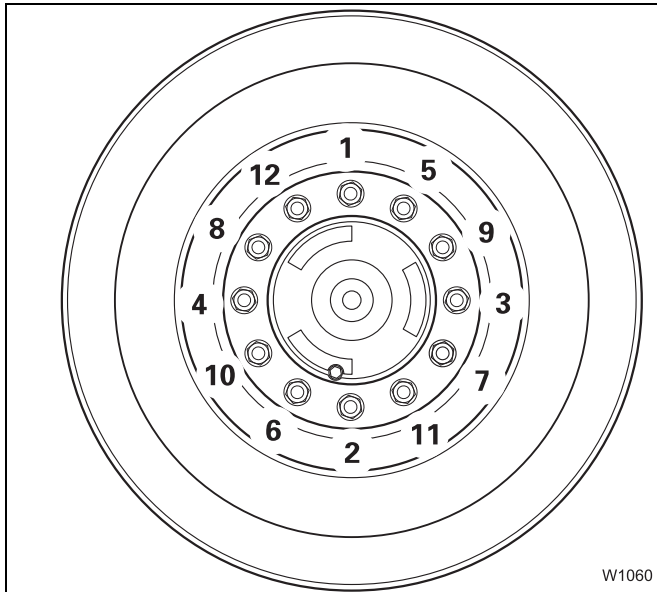
Check the wheel rim, tyres, lug nuts and wheel studs for damage before mounting the spare wheel.

Damaged parts may not be mounted!

Mount only the original wheel as listed in the spare parts list or a permitted wheel of the same size and load bearing capacity!

- Place the wheel at the hub in an upright position.
- Extend or retract the outrigger cylinders until the holes in the wheel rims are in line with the wheel studs.
- Push the wheel on to the wheel studs. Make sure the threads of the wheel studs are not damaged.






- Tighten the wheel nuts (1) and (2) finger-tight to secure the wheel.
- Tighten the remaining wheel nuts finger-tight.
- Always tighten the wheel nuts in the order (1) to (12).
  - Tighten all wheel nuts first to 200 Nm (150 lbf ft).
  - Then all wheel nuts to 400 Nm (300 lbf ft).
  - Finally tighten all wheel nuts to 650 Nm (480 lbf ft).

Tighten all wheel nuts after 50 km (30 mi) and 150 km (90 mi) once more to 650 Nm (480 lbf ft).

## 7.5.5

### Inflating the tyres yourself

In an emergency, if an appropriate filling hose is available you can inflate the tyres using the compressed air system of the truck crane. The tyres can be inflated up to a maximum pressure of about 8 bar (116 psi). This pressure might not correspond to the prescribed tyre pressure, depending on the tyres;  *Tyres*, p. 1 - 16.



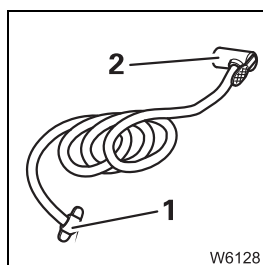
#### **Risk of accidents due to excessive tyre pressure!**

If the maximum pressure is above the specified tyre pressure, then do not inflate the tyres to more than the specified pressure.

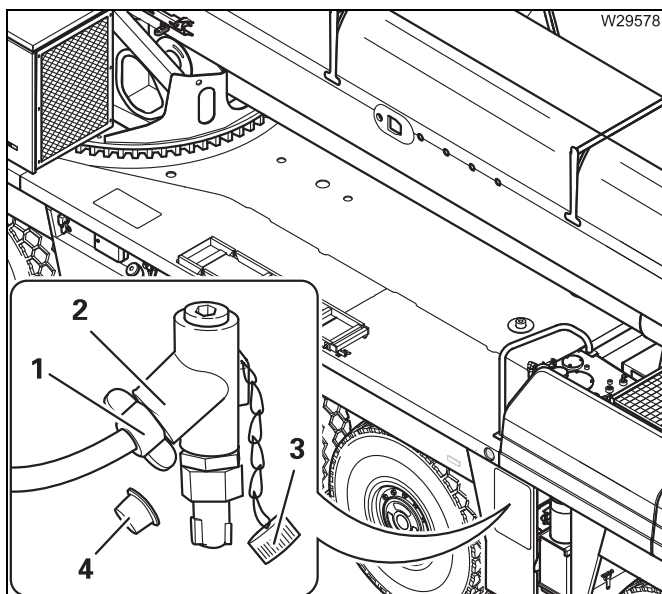
This prevents the tyres becoming damaged and bursting while driving.

After you have inflated the tyres yourself, always drive directly to a service station or repair shop and adjust the tyre pressure.

The filling hose has a tyre inflator connection (2) and a connection (1).



#### **Connecting the filling hose**

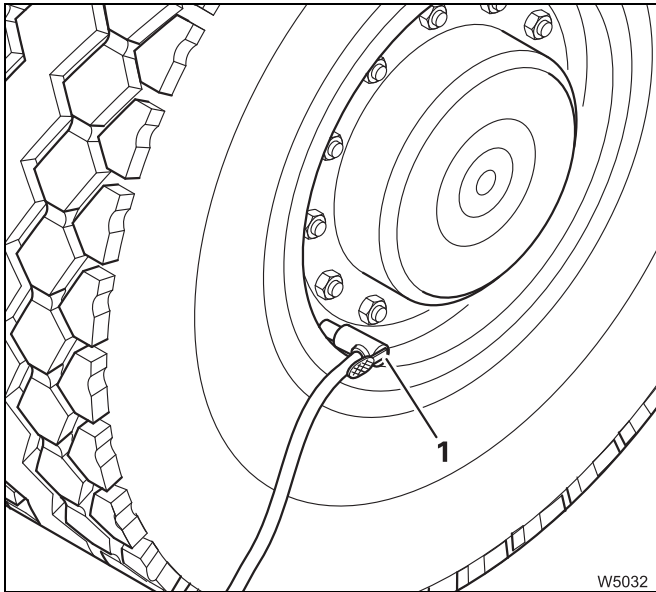



- Remove the caps (3) and (4).
- Fasten the connection (1) to the filler connection (2).

You can now inflate the tyres.

### Inflating the tyres

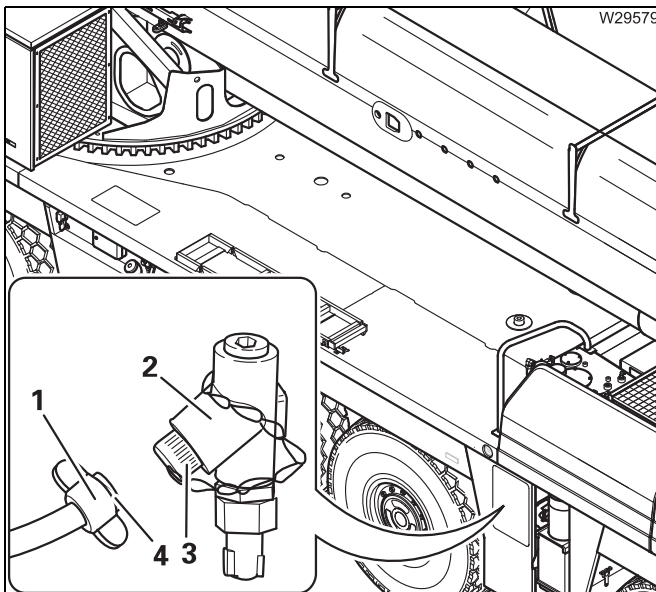
The maximum operation pressure of the compressed air system of 8 bar (116 psi) can only be reached with the engine running.



- Start the engine;  p. 4 - 14.
- Fasten the tyre connection (1) to the tyre valve.
- Press the button on the tyre connection and inflate the tyre.
- Disconnect the tyre connection (1) from the tyre valve.

### Remove the filling hose

Before driving, you must remove the filling hose from the filler connection.



- Remove the connection (1) from the filler connection (2).
- Close the filler connection and the connection with the caps (3) and (4).
- Stow the filling hose away.
- Drive to a service station or repair shop and adjust the tyre pressure.



#### **Risk of damage to the compressed air system!**

Always close the filler connection with the cap.

This prevents damage to the compressed air system and contamination of it.

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## 7.6

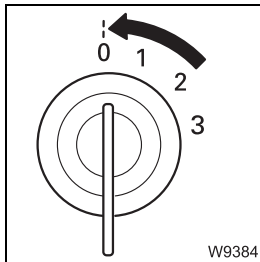
## Fuses

The fuses are divided into groups and are at various points on the carrier:

- In the driver's cab,
- In the battery box.

### Information on replacing fuses

The positions of the fuses, their designations and which functions are protected by the respective fuses are shown in the following sections.



- Switch off the ignition whenever a fuse has to be replaced.



#### **Risk of damage if the ignition is switched on!**

Switch off the ignition whenever a fuse has to be replaced. This prevents the new fuse being blown immediately by the increased starting current after being installed.



#### **Risk of damage by overloading!**

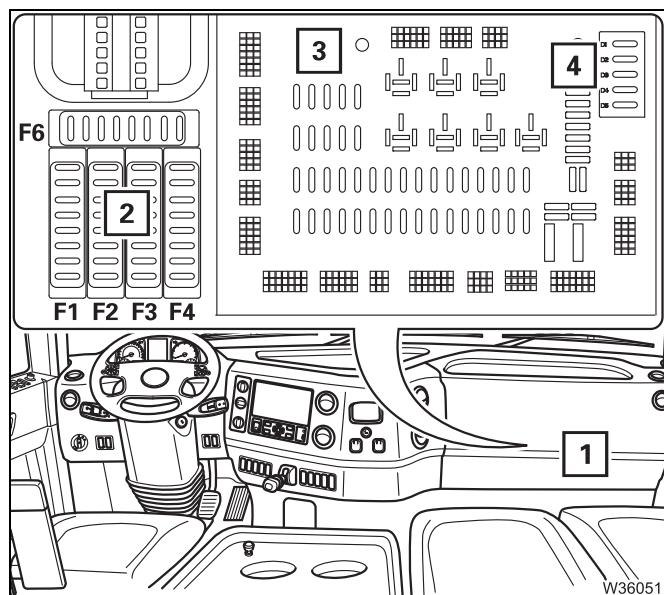
Replace blown fuses only with new fuses of the same amperage. This prevents parts being overloaded and damaged or the fuse being immediately blown again.

If a fuse with the same amperage fails again once the ignition is switched on, then notify **Manitowoc Crane Care**.



#### **Risk of fire!**

Never repair a blown fuse with other electrically conductive materials.

**7.6.1****Fuses in the driver's cab**

- Remove the cover (1).
- 2 Fuse groups F1 to F4, F6
- 3 Other fuses
- 4 Reserve fuses

The following sections show the designations of the individual fuses, including their amperage and functions.

**Group F1**

The fuses are labelled with the numbers.

- Observe the instructions regarding fuse changes; ► p. 7 - 37.

Designation	Amperage (A)	Function
F1/1	15	UB2 CCM 11
F1/2	15	UB1 CCM 11
F1/3	5	Hand-held control
F1/4	5	CCS control unit
F1/5	–	Unassigned
F1/6	10	ABS trailer
F1/7	15	Auxiliary water heater
F1/8	15	Auxiliary air heater

### Group F2

Designation	Amperage (A)	Function
F2/1	15	UB1 IOL 32
F2/2	15	UB1 IOL 32
F2/3	15	UB2 IOL 32
F2/4	15	UB2 IOL 32
F2/5	15	UB1 IOL 33
F2/6	15	UB1 IOL 33
F2/7	15	UB2 IOL 33
F2/8	15	UB2 IOL 33

### Group F3

Designation	Amperage (A)	Function
F3/1	20	UB ESX 4
F3/2	2	UB ESX 4
F3/3	20	UB ESX 5
F3/4	2	UB ESX 5
F3/5	5	Air-conditioning system fan
F3/6	5	CCS control unit
F3/7	5	UE CCM 11
F3/8	5	UE IOL 32/33

### Group F4

Designation	Amperage (A)	Function
F4/1	15	ABS trailer
F4/2	10	Heating time switch Rotating beacons
F4/3	5	Control module CCM 11 Vehicle height monitoring system
F4/4	5	Power supply Air intake inhibitor Reverse camera
F4/5	5	Power supply relay Outrigger control units
F4/6	2	ESX 4 sensors
F4/7	2	ESX 5 sensors
F4/8	2	Power supply



### Group F6

Designation	Amperage (A)	Function
F6/1	10	Left low-beam headlight
F6/2	10	Right low-beam headlight
F6/3	2	XSM 08
F6/4	–	Unassigned
F6/5	–	Unassigned
F6/6	–	Unassigned
F6/7	–	Unassigned
F6/8	–	Unassigned

### Other fuses

Designation	Amperage (A)	Function
F1	15	ABS control unit
F2	10	Diagnostics
F3	15	Suspended operators seat, CAN BUS power supply
F4	10	Loudspeaker system, power supply for ESX3 control unit
F5	15	Steering air intake inhibitor
F6	10	Crane cab heating, engine electronic system (ADM, SCR)
F7	20	Compressed air system emergency operation, ESX 3 control unit
F8	25	Transmission retarder
F9	10	Mirror adjustment
F10	20	Trailer brake lights
F11	15	Superstructure drive monitoring
F12	20	Engine control unit, tachograph
F13	25	Drive control



<b>Designation</b>	<b>Amperage (A)</b>	<b>Function</b>
F14	10	Driver's cab interface, left-hand side marker lights and parking light
F15	15	Transmission control right-hand side marker lights <sup>1)</sup> and parking light
F16		marker light and tail lamps, left-hand instrument lighting
F17	15	Right-hand marker light and tail lamps
F18	20	Seat heating, fan motor, left headlight, BirdView system 270°
F19	25	Hands-free unit <sup>1)</sup> , right headlight, full beam indicator lamp
F20	25	Headlight, left
F21		Headlight, right

## 7.6.2

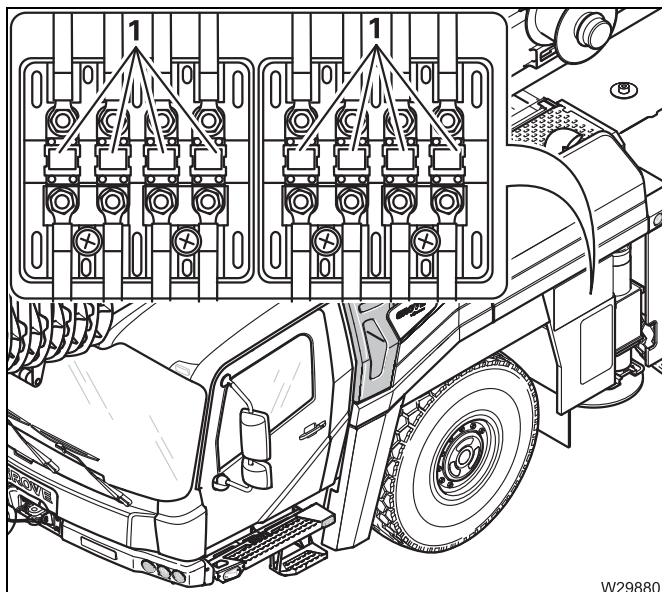
### Fuses in the battery box

Fuses F7 to F15 are contained in the battery box.




#### **Danger from lead and lead compounds on batteries!**

Battery poles, battery terminals and parts of the battery itself contain lead and lead compounds. Wash your hands after working on these parts or in these areas!



- Open the battery box.

The fuses (1) are in a terminal box next to the batteries.

- Remove the lid from the terminal box.
- Observe the instructions regarding fuse changes;  p. 7 - 37.

Designation	Amperage (A)	Function
F7	50	Driver's cab
F8	–	Unassigned
F9	25	Superstructure
F10	25	Steering
F11	50	Superstructure
F12	10	Superstructure
F13	25	Unassigned
F14	25	Crane cab
F15	175	Heating/air-conditioning system <sup>1)</sup> crane cab

# 8

## Operating elements for crane operation

All operating elements for driving are described in Chapter 3.

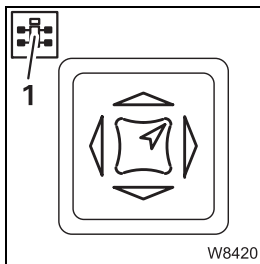
### 8.1

### Overview of the operating elements

This section shows the position and designations of the operating elements for crane operation. This also includes display elements such as lights or displays.

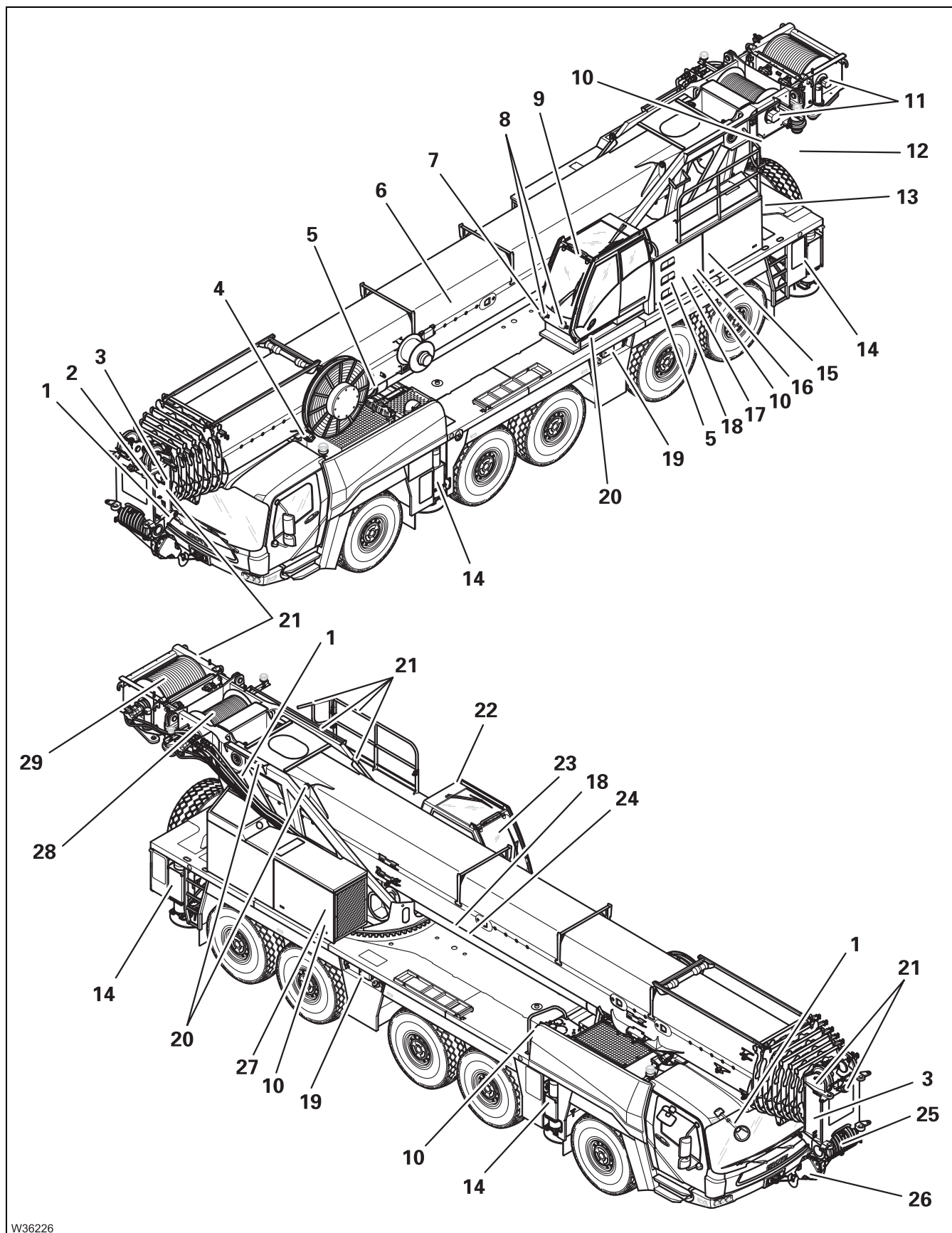


Operating elements available only with additional equipment are designated accordingly. These designations are made in this section only and are not repeated in the following sections.



Some figures show details from a different perspective than the general overview. The perspective is indicated in these figures by the symbol (1).

### 8.1.1 Exterior of the truck crane



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<b>1</b>	– Camera on main boom <sup>1)</sup>	➡ p. 11 - 137
	– Camera on the hoists	➡ p. 11 - 139
	– Camera on the driver's cab <sup>1)</sup>	➡ p. 11 - 139
<b>2</b>	Anemometer and air traffic control light <sup>1)</sup>	➡ p. 11 - 126
<b>3</b>	Lifting limit switch – function	➡ p. 10 - 82
	Lifting limit switch – rigging	➡ p. 11 - 120
<b>4</b>	Socket for hand-held control	➡ p. 8 - 77
<b>5</b>	Sleuable spotlight <sup>1)</sup>	➡ p. 10 - 127
<b>6</b>	Rigging the main boom <sup>1)</sup>	➡ p. 6 - 15
<b>7</b>	RCL override – Version A <sup>3)</sup>	
	– Key-operated switch for overriding the RCL in an emergency	➡ p. 8 - 137
	RCL override – Version B <sup>3)</sup>	
	– No function	➡ p. 8 - 138
<b>8</b>	Spotlights <sup>1)</sup>	➡ p. 8 - 8
<b>9</b>	Status display RCL	➡ p. 10 - 63
<b>10</b>	Hydraulic emergency operation	➡ p. 14 - 47
	Hydraulic emergency operation as per BGR 159 <sup>1)</sup>	➡ p. 14 - 51
<b>11</b>	Lowering limit switch	➡ p. 10 - 84
<b>12</b>	Counterweight, removed	➡ p. 11 - 67
<b>13</b>	Shut-off valves on the superstructure hydraulics	➡ p. 9 - 3
<b>14</b>	Outrigger	
	– Operation	➡ p. 11 - 37
	– Lighting	➡ p. 3 - 70
	– Installing/removing the outrigger beams	➡ p. 6 - 35
<b>15</b>	– Fuel tank auxiliary heater	➡ p. 10 - 5
	– Storage compartment for anemometer	➡ p. 11 - 126
<b>16</b>	Drive unit <sup>2)</sup>	
<b>17</b>	Slewing gear	
	– Operation	➡ p. 10 - 115
	– Turntable lock	➡ p. 8 - 124
	– Switching on the slewing gear freewheel <sup>1)</sup>	➡ p. 6 - 12
	– Switching off the slewing gear freewheel	➡ p. 11 - 18

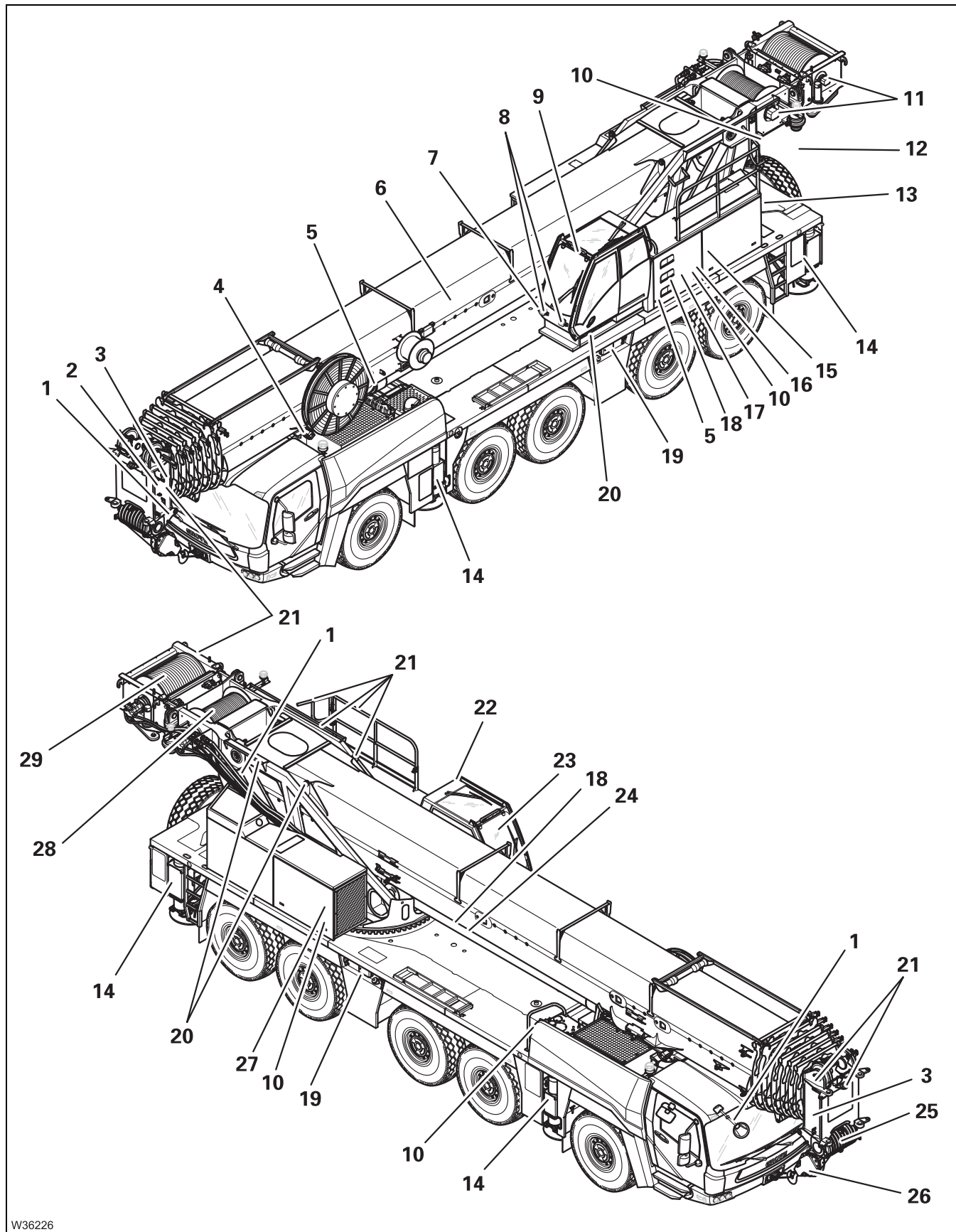
<sup>1)</sup> Additional equipment

<sup>2)</sup> ➡ *Maintenance Manual*

<sup>3)</sup> Version A or version B active depending on RCL programming



Operating elements for crane operation  
 8.1 Overview of the operating elements



W36226

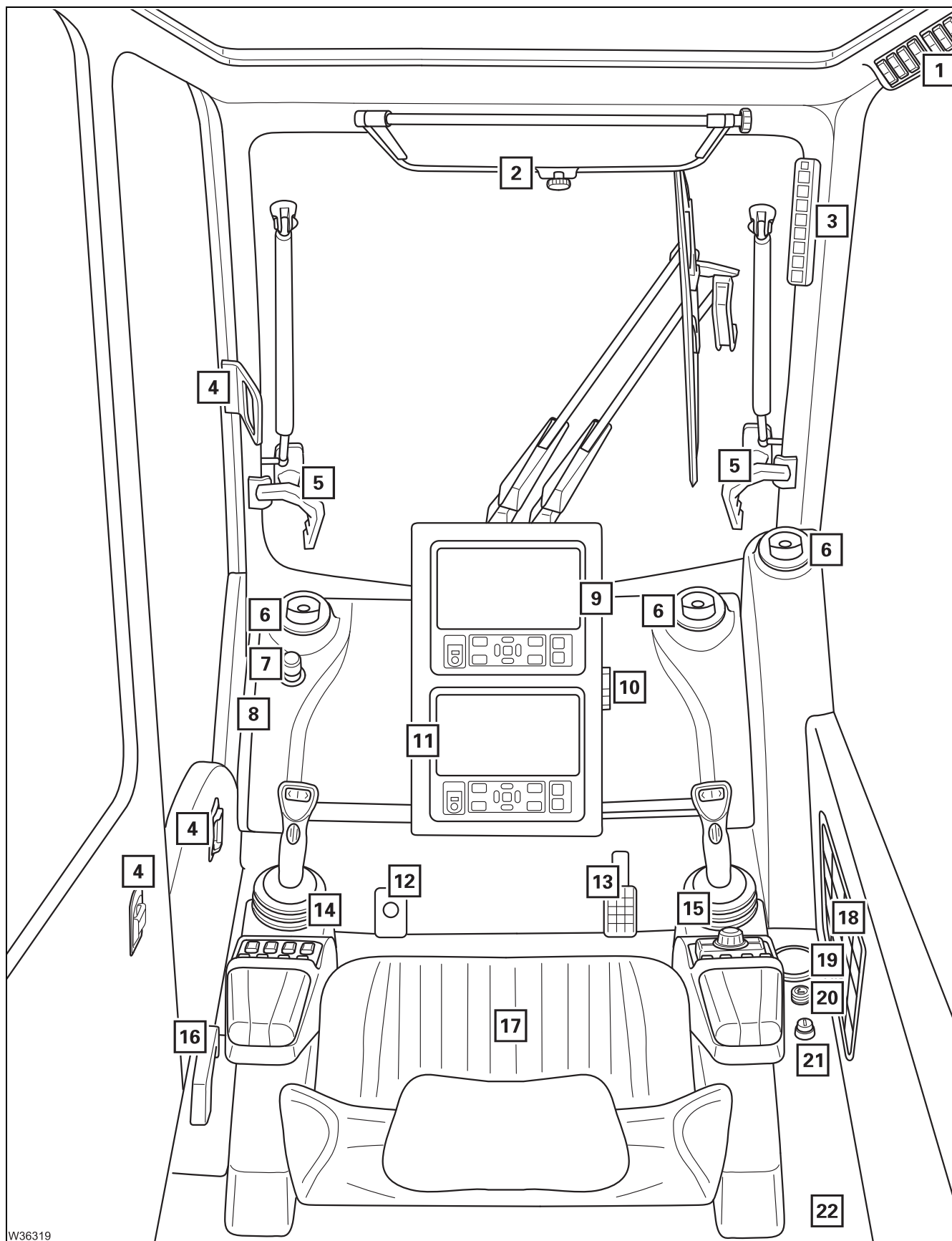
27.09.2017

<b>18</b>	Switching on boom pre-tensioning <sup>1)</sup>	➡ p. 6 - 14
	Switching off boom pre-tensioning <sup>1)</sup>	➡ p. 11 - 19
<b>19</b>	Outrigger	
	– Control units <sup>1)</sup>	➡ p. 8 - 79
	– Control units for raising the axles	➡ p. 8 - 79
	– Emergency stop switch	➡ p. 14 - 1
	– Socket for hand-held control	➡ p. 8 - 77
<b>20</b>	Stair tread, retractable/extendable	➡ p. 11 - 141
<b>21</b>	Railings on the turntable	➡ p. 11 - 129
	Safety harness on the main boom <sup>1)</sup>	➡ p. 11 - 131
	Slings points for personal protective equipment	➡ p. 11 - 136
<b>22</b>	CraneSTAR system	➡ p. 10 - 154
<b>23</b>	Crane cab	➡ p. 8 - 6
<b>24</b>	Switching on the boom floating position <sup>1)</sup>	➡ p. 6 - 13
	Switching off the boom floating position <sup>1)</sup>	➡ p. 11 - 17
<b>25</b>	Reeving and unreeving the hoist rope	➡ p. 11 - 104
<b>26</b>	Hook block	➡ p. 11 - 95
	Separable hook block <sup>1)</sup>	
<b>27</b>	Hydraulic oil cooler, second cooler <sup>1)</sup>	
<b>28</b>	Main hoist	➡ p. 8 - 109
<b>29</b>	Auxiliary hoist <sup>1)</sup>	➡ p. 8 - 111

<sup>1)</sup> Additional equipment

<sup>2)</sup> ➡ *Maintenance Manual*

## 8.1.2 Crane cab



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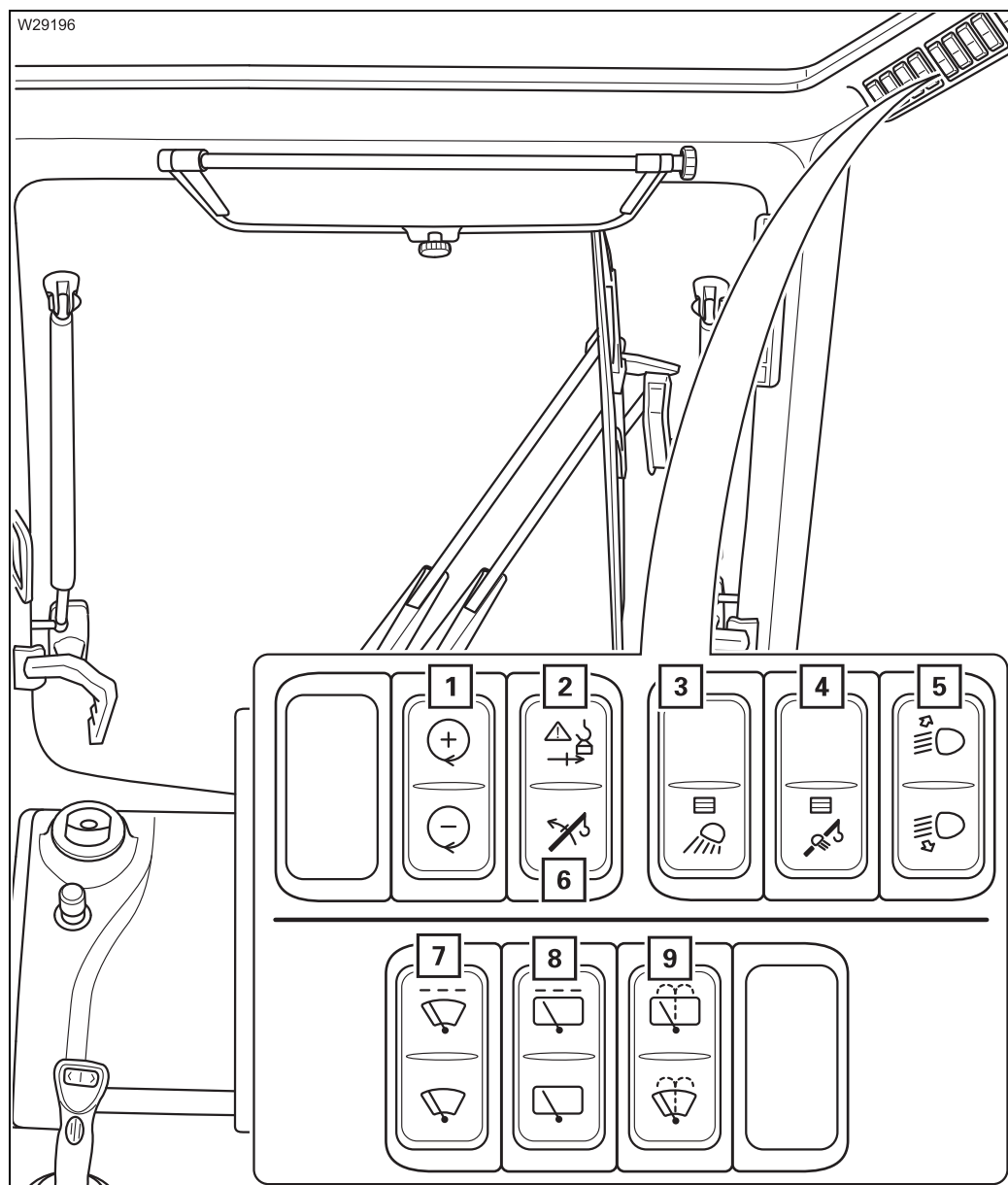
1 Side panel	▣▣▣▣▶ p. 8 - 8
2 Sun visor	
3 Degree of utilisation display <sup>1)</sup>	▣▣▣▣▶ p. 10 - 51
4 Door unlocking mechanism	▣▣▣▣▶ p. 8 - 148
5 Lock/unlock windows	▣▣▣▣▶ p. 8 - 147
6 Air vents	▣▣▣▣▶ p. 10 - 148
7 Emergency stop switch	▣▣▣▣▶ p. 8 - 93
8 Windscreen washing system tank <sup>2)</sup>	
9 RCL control unit ( <b>R</b> ated- <b>C</b> apacity- <b>L</b> imiter)	▣▣▣▣▶ p. 8 - 72
10 Adjusting the front panel	▣▣▣▣▶ p. 10 - 9
11 CCS control unit	▣▣▣▣▶ p. 8 - 16
12 Slewing gear freewheel	▣▣▣▣▶ p. 8 - 113
13 Accelerator	
14 Left-hand control panel	▣▣▣▣▶ p. 8 - 12
15 Right-hand control panel	▣▣▣▣▶ p. 8 - 13
16 Handle	
17 Crane cab seat with Seat contact switch	▣▣▣▣▶ p. 10 - 8 ▣▣▣▣▶ p. 8 - 88
18 Rest	
19 Ashtray	
20 Cigarette lighter (24 volts)	
21 Ignition lock	▣▣▣▣▶ p. 8 - 85
22 Crane cab, rear	▣▣▣▣▶ p. 8 - 10

1) Additional equipment

2) ▣▣▣▣▶ *Maintenance Manual*



Side panel



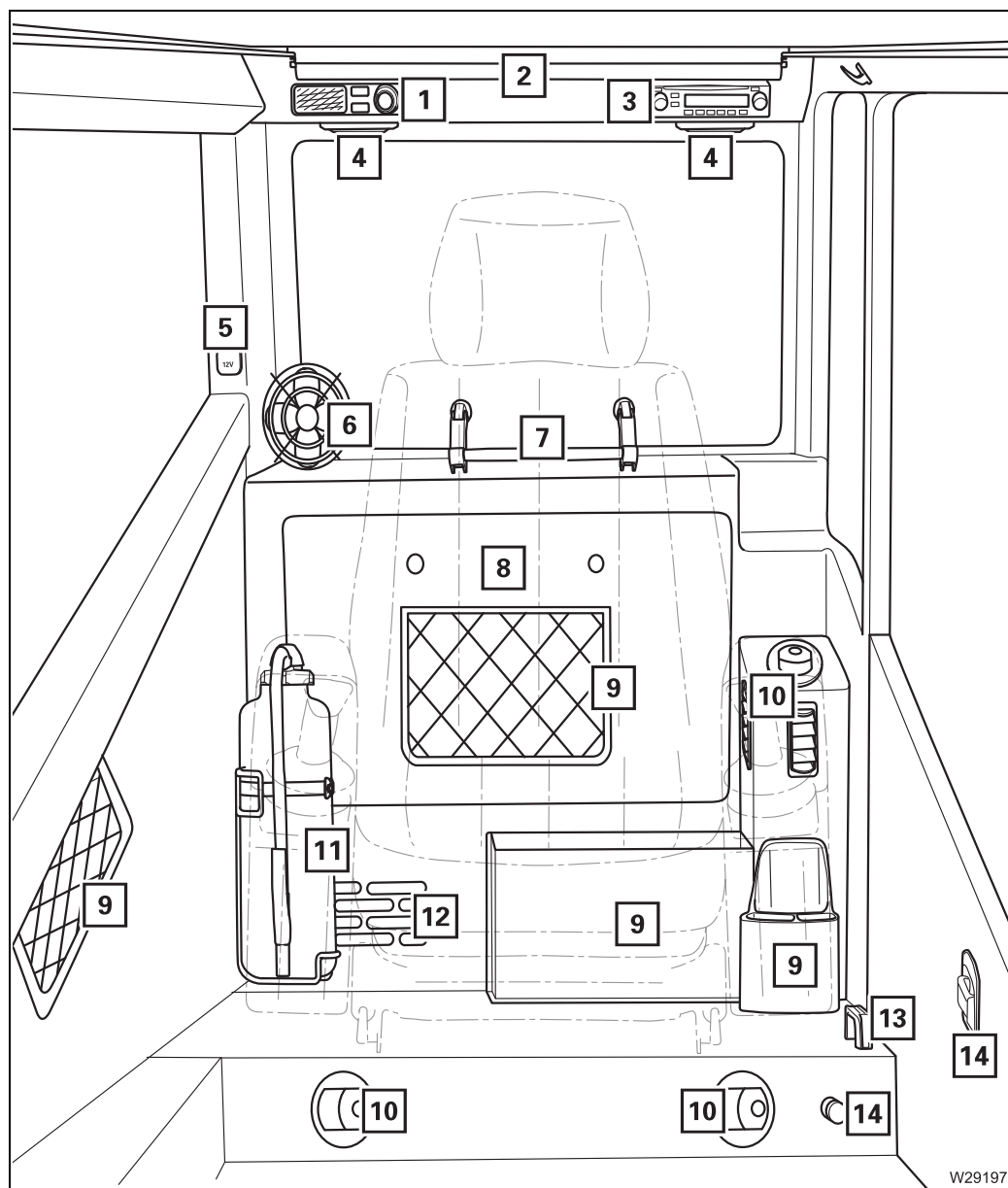
<b>1</b> – Start the engine	➡ p. 8 - 85
– Set idling speed	➡ p. 8 - 85
<b>2</b> RCL override – Version A <sup>2)</sup>	
– RCL override	➡ p. 8 - 137
RCL override – Version B <sup>2)</sup>	
– Overriding the RCL in an emergency	➡ p. 8 - 138
<b>3</b> Spotlight on/off	➡ p. 8 - 140
<b>4</b> Slewable spotlights on/off <sup>1)</sup>	➡ p. 8 - 140
<b>5</b> Swing spotlights <sup>1)</sup>	➡ p. 8 - 140
<b>6</b> RCL override – Version A <sup>2)</sup>	
– Raise enable button after RCL shutdown	➡ p. 8 - 137
RCL override – Version B <sup>2)</sup>	
– No function	➡ p. 8 - 138
<b>7</b> Windscreen wiper on/off	➡ p. 8 - 141
<b>8</b> Roof window wiper on/off	➡ p. 8 - 141
<b>9</b> Windscreen washing system	➡ p. 8 - 141

1) Additional equipment

2) Version A or version B active depending on RCL programming



**Crane cab, rear**

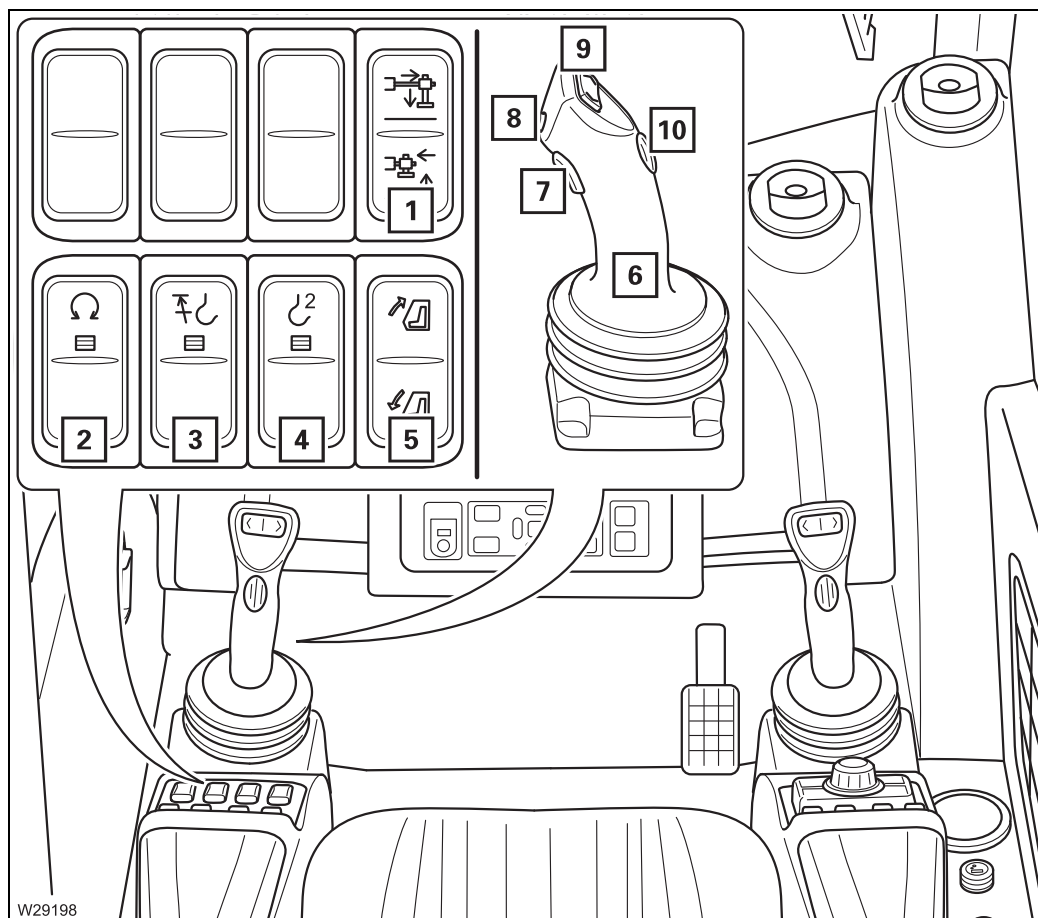


- |           |                                 |                  |
|-----------|---------------------------------|------------------|
| <b>1</b>  | Cab lighting                    | ▣▣▣▣ p. 8 - 140  |
| <b>2</b>  | Sun roller blind                |                  |
| <b>3</b>  | Radio-CD/USB <sup>1), 3)</sup>  |                  |
| <b>4</b>  | Loudspeakers                    |                  |
| <b>5</b>  | Socket (12 V)                   |                  |
| <b>6</b>  | Fan with switch <sup>1)</sup>   |                  |
| <b>7</b>  | Rear window                     | ▣▣▣▣ p. 8 - 147  |
| <b>8</b>  | Cover for:                      |                  |
|           | – Fuses                         | ▣▣▣▣ p. 14 - 63  |
|           | – Diagnostics                   | ▣▣▣▣ p. 8 - 150  |
|           | – CraneSTAR <sup>1)</sup>       | ▣▣▣▣ p. 10 - 154 |
| <b>9</b>  | Rest                            |                  |
| <b>10</b> | Air vents                       | ▣▣▣▣ p. 10 - 148 |
| <b>11</b> | Fire extinguisher <sup>2)</sup> |                  |
| <b>12</b> | Air vents                       | ▣▣▣▣ p. 10 - 148 |
| <b>13</b> | Handle                          |                  |
| <b>14</b> | Door unlocking mechanism        | ▣▣▣▣ p. 8 - 148  |
- 
- |           |   |
|-----------|---|
| <b>1)</b> | Additional equipment                        |
| <b>2)</b> | ▣▣▣▣ <i>Maintenance Manual</i>              |
| <b>3)</b> | ▣▣▣▣ <i>Separate operating instructions</i> |

### 8.1.3

## Control panels

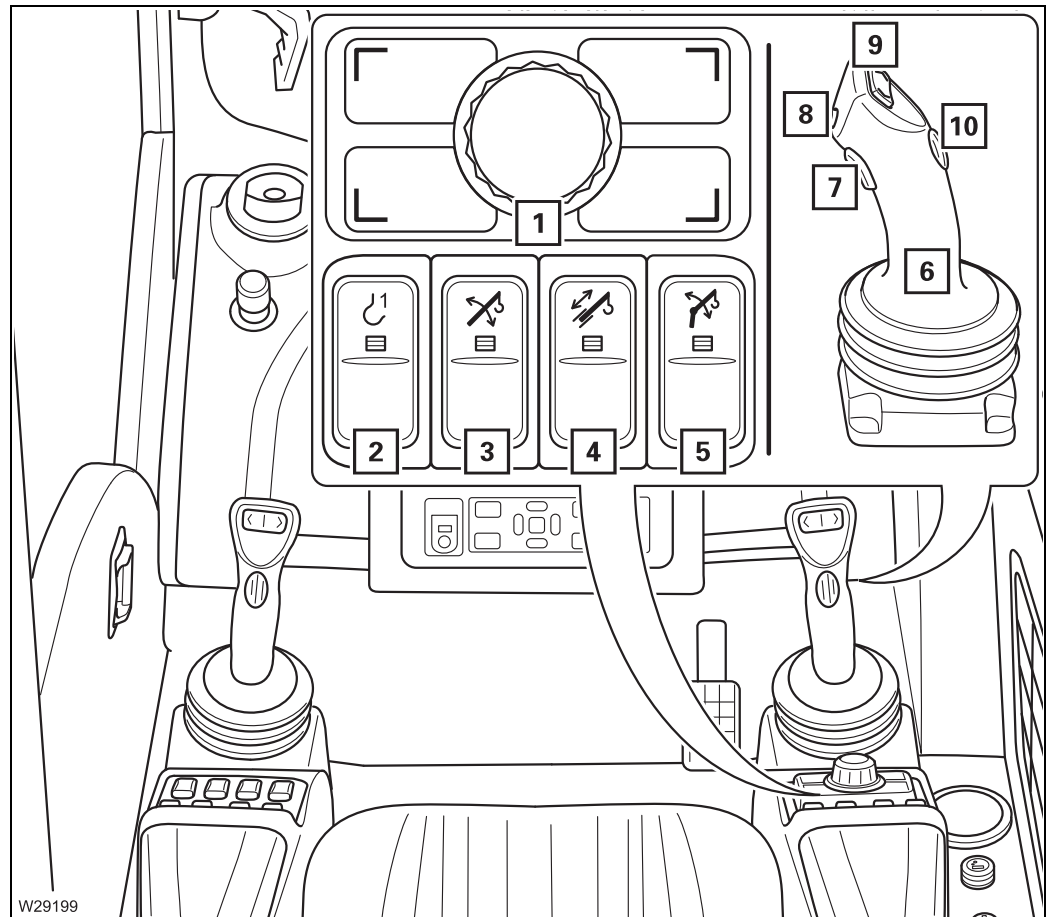
Left



- |  |                  |
|--|------------------|
| <b>1</b> Moving the outrigger  | ▣▣▣▣ p. 8 - 97   |
| <b>2</b> Slewing gear on/off   | ▣▣▣▣ p. 8 - 113  |
| <b>3</b> Lifting limit switch override   | ▣▣▣▣ p. 8 - 110  |
| <b>4</b> Auxiliary hoist <sup>1)</sup> on/off                                    | ▣▣▣▣ p. 10 - 79  |
| <b>5</b> Inclining the crane cab   | ▣▣▣▣ p. 8 - 123  |
| <b>6</b> Left-hand control lever (configuration varies depending on the version) | ▣▣▣▣ p. 8 - 14   |
| <b>7</b> Dead man's switch   | ▣▣▣▣ p. 8 - 88   |
| <b>8</b> Slewing gear freewheel  | ▣▣▣▣ p. 8 - 113  |
| <b>9</b> Depending on which function is activated, button for:                   |                  |
| – Derricking gear high-speed mode  | ▣▣▣▣ p. 8 - 116  |
| – Telescoping mechanism on/off   |                  |
| – Switch on Economy Mode   | ▣▣▣▣ p. 10 - 124 |
| <b>10</b> Auxiliary hoist slewing indicator                                      | ▣▣▣▣ p. 10 - 76  |

1) Additional equipment

Right



W29199

- |  |              |
|--|--------------|
| <b>1</b> Jog dial (rotary push button)                               | ➡ p. 8 - 89  |
| <b>2</b> Main hoist on/off   | ➡ p. 8 - 109 |
| <b>3</b> Derricking gear on/off                                      | ➡ p. 8 - 115 |
| <b>4</b> Telescoping mechanism on/off                                | ➡ p. 8 - 117 |
| <b>5</b> Derrick lattice extension on/off <sup>1), 2)</sup>          |              |
| <b>6</b> Right-hand control lever (configuration depends on version) | ➡ p. 8 - 14  |
| <b>7</b> Dead man's switch   | ➡ p. 8 - 88  |
| <b>8</b> Horn button   |              |
| <b>9</b> Hoist high-speed mode on/off                                | ➡ p. 8 - 109 |
| <b>10</b> Main hoist slewing indicator                               | ➡ p. 10 - 76 |

1) Additional equipment

2) ➡ *Operating Instructions Lattice Extension*

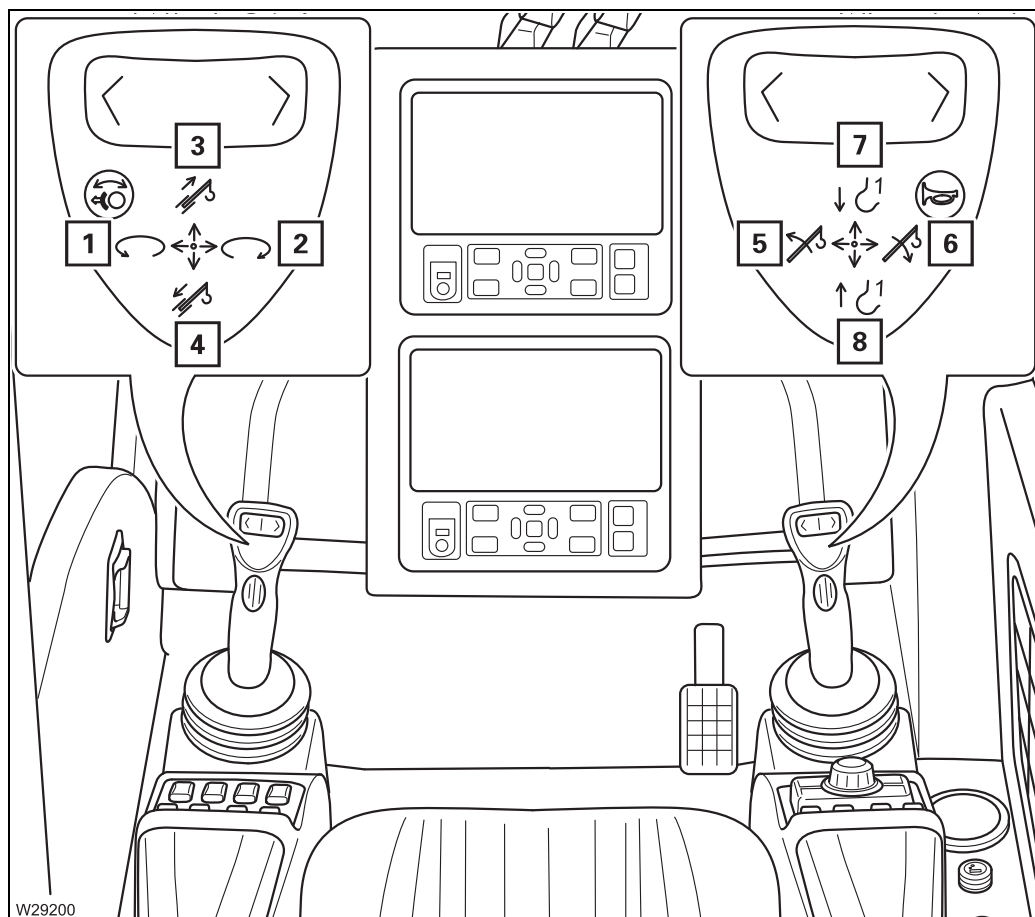
## 8.1.4

### Control lever configuration

The truck crane can be equipped with two different control lever configurations. The current configuration of the control levers is indicated by symbols on the control levers.

#### Version 1

In version 1, the left control lever is configured with the *Telescope* function.



#### Left control lever

- 1 Slew to the left
- 2 Slew to the right
- 3 Extending
- 4 Retracting

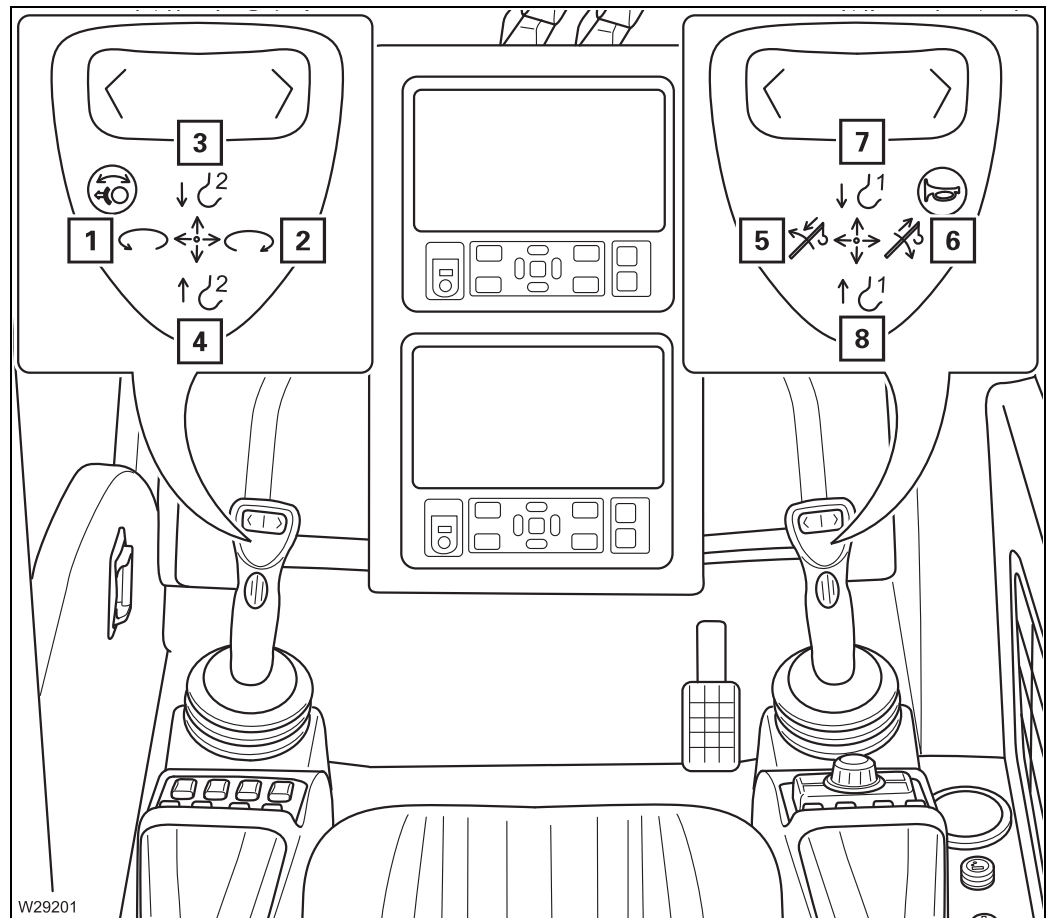
#### Right control lever

- 5 Raising
- 6 Lower
- 7 Lower the main hoist
- 8 Lift the main hoist



**Version 2**

In version 2, the right control lever is assigned the *Telescope* function.



**Left control lever**

- 1 Slew to the left
- 2 Slew to the right
- 3 Lower auxiliary hoist<sup>1)</sup>
- 4 Raise auxiliary hoist<sup>1)</sup>

**Right control lever**

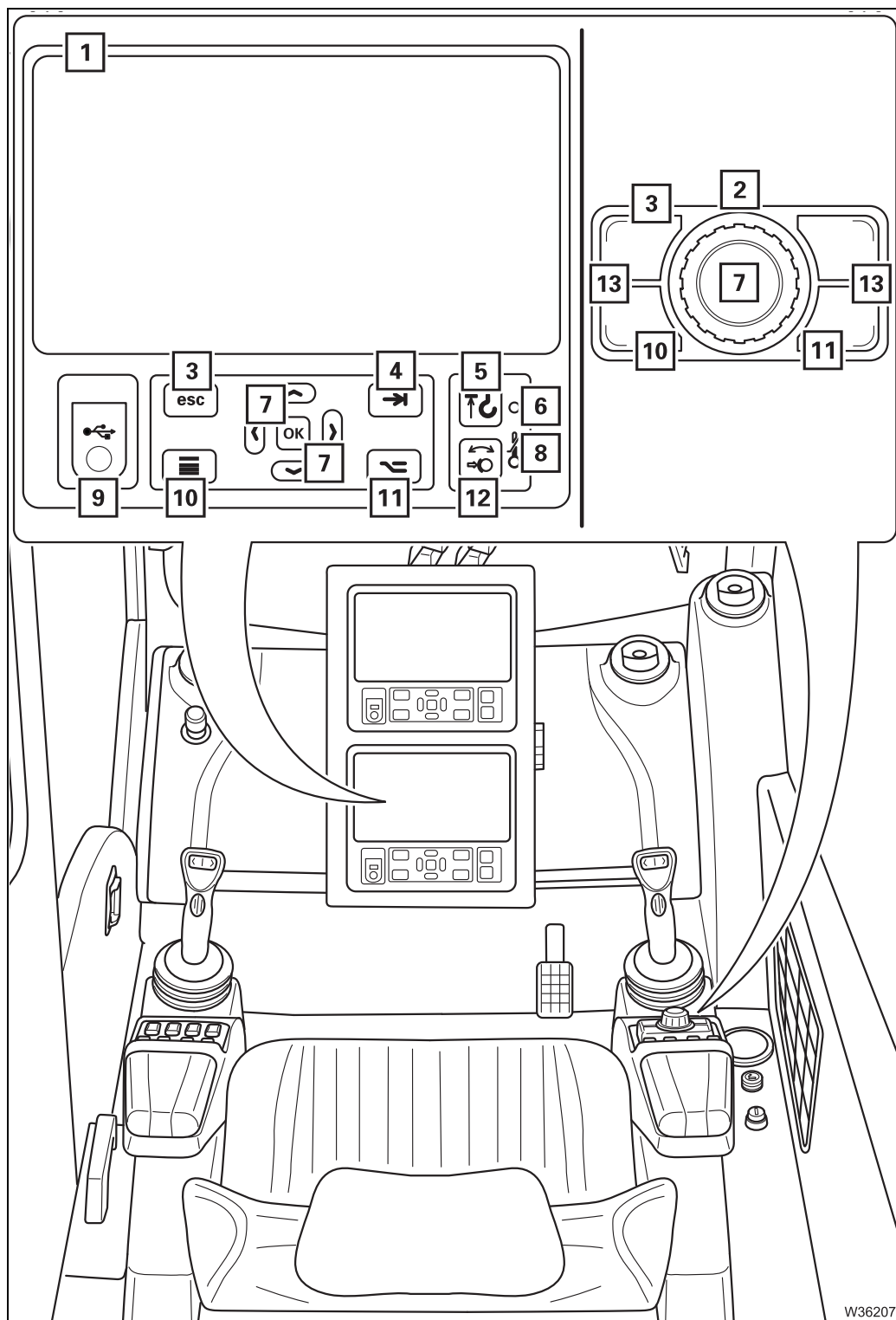
- 5 Raise/retract<sup>2)</sup>
- 6 Lower/extend<sup>2)</sup>
- 7 Lower the main hoist
- 8 Lift the main hoist

<sup>1)</sup> Additional equipment

<sup>2)</sup> Derrick the lattice extension;  *Operating Instructions Lattice Extension*

**8.1.5**

*CCS control unit*

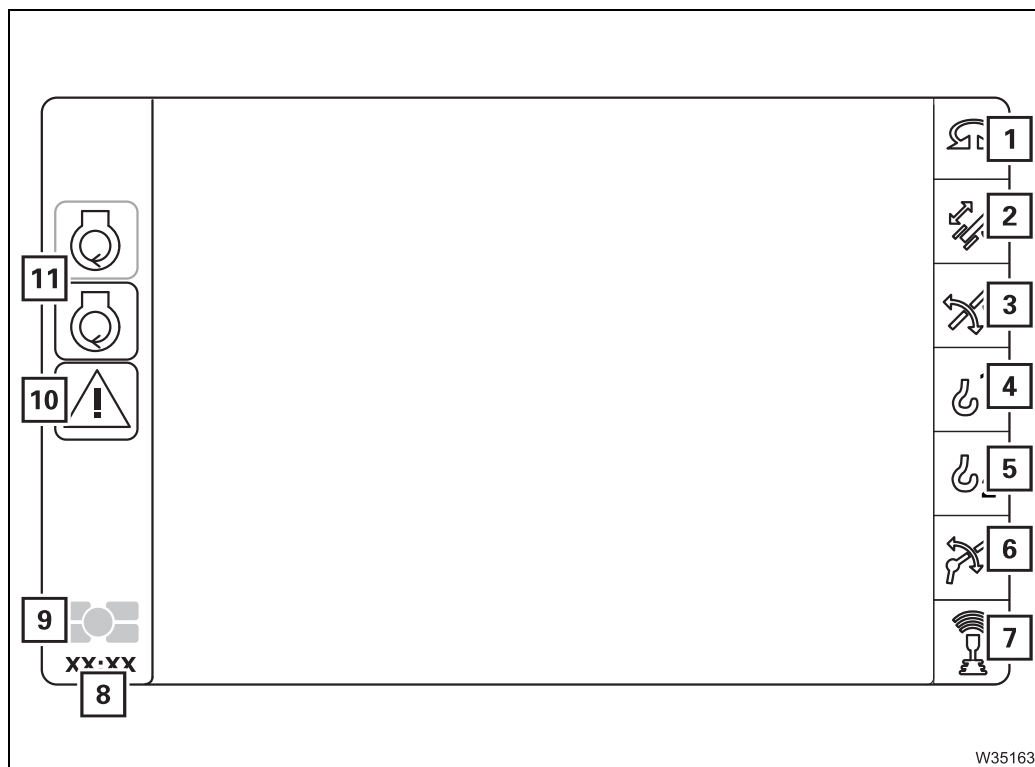


<b>1</b> CCS display	▣▣▣▣▶ p. 8 - 89
Overview start menu	▣▣▣▣▶ p. 8 - 19
<b>2</b> Jog dial	
<b>3</b> Exiting the menu/input mode	▣▣▣▣▶ p. 8 - 92
<b>4</b> no function	
<b>5</b> Warning for lifting limit switch shutdown	▣▣▣▣▶ p. 8 - 110
<b>6</b> Sensor for brightness	▣▣▣▣▶ p. 8 - 92
<b>7</b> Menu control	▣▣▣▣▶ p. 8 - 89
Select / activate / confirm	
<b>8</b> Display temperature warning display	▣▣▣▣▶ p. 8 - 93
<b>9</b> Service/diagnostics connection <sup>1)</sup>	▣▣▣▣▶ p. 8 - 150
<b>10</b> Overview menu groups – Operation	▣▣▣▣▶ p. 8 - 92
Overview menu groups – Overview	▣▣▣▣▶ p. 8 - 22
<b>11</b> Switch off RCL buzzer	▣▣▣▣▶ p. 8 - 92
<b>12</b> Slewing gear brake applied/released display	▣▣▣▣▶ p. 8 - 114
<b>13</b> Function only in the menu Outrigger	▣▣▣▣▶ p. 8 - 29

<sup>1)</sup> For Service personnel only, not suitable for external devices, e.g. mobile phone

## 8.1.6

### CCS – menu-dependent displays



- |   |       |            |
|---|-------|------------|
| 1 Slewing gear  | ▣▣▣▣▶ | p. 8 - 113 |
| 2 Telescoping mechanism                               | ▣▣▣▣▶ | p. 8 - 117 |
| 3 Derricking gear                                     | ▣▣▣▣▶ | p. 8 - 115 |
| 4 Main hoist  | ▣▣▣▣▶ | p. 8 - 109 |
| 5 Auxiliary hoist <sup>1)</sup>                       | ▣▣▣▣▶ | p. 8 - 111 |
| 6 Lattice extension derricking gear <sup>1), 2)</sup> |       |            |
| 7 Remote control display <sup>3)</sup>                |       |            |
| 8 Display time  |       |            |
| 9 Jog dial display                                    | ▣▣▣▣▶ | p. 8 - 92  |
| 10 Error display                                      | ▣▣▣▣▶ | p. 14 - 7  |
| 11 Warning messages display                           | ▣▣▣▣▶ | p. 14 - 3  |

1) Additional equipment

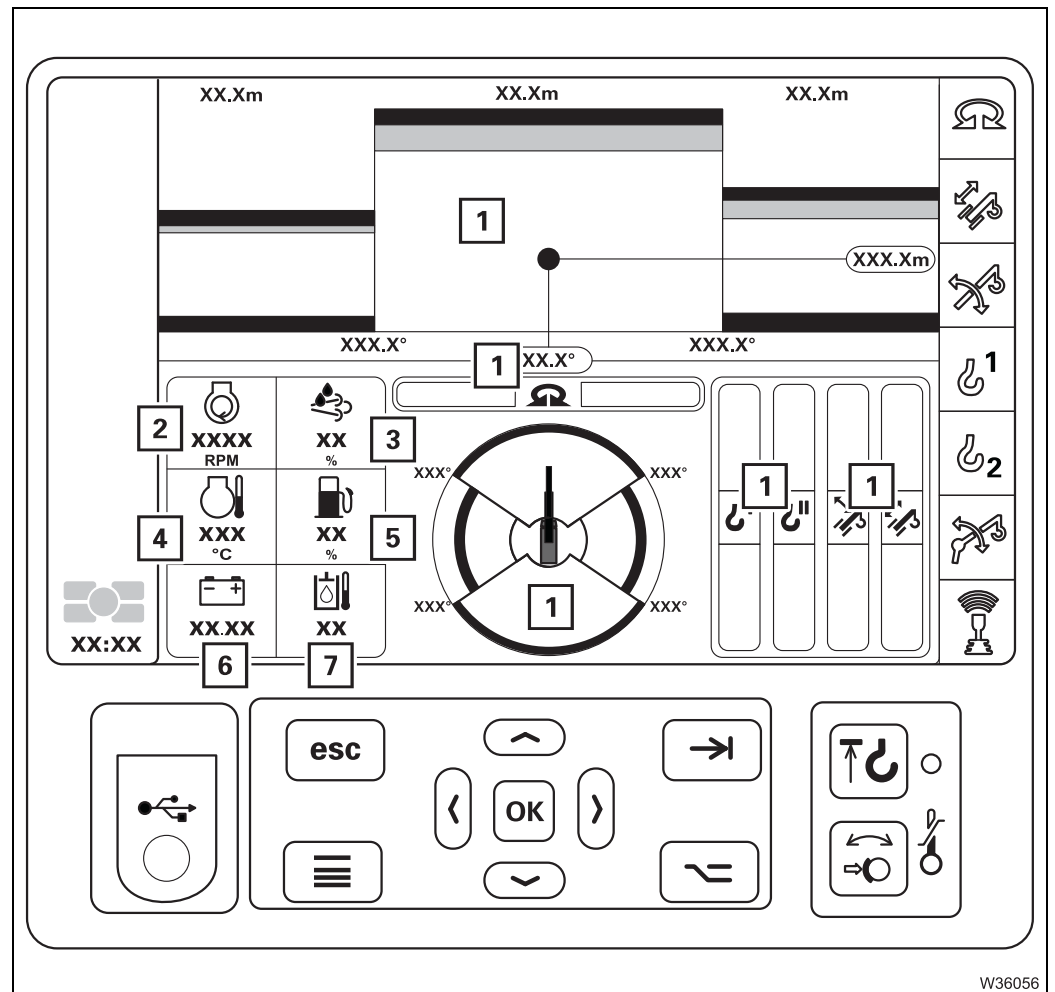
2) ▣▣▣▣▶ *Operating Instructions Lattice Extension*

3) ▣▣▣▣▶ *Remote control operating manual*

## 8.1.7

### CCS – Start menu

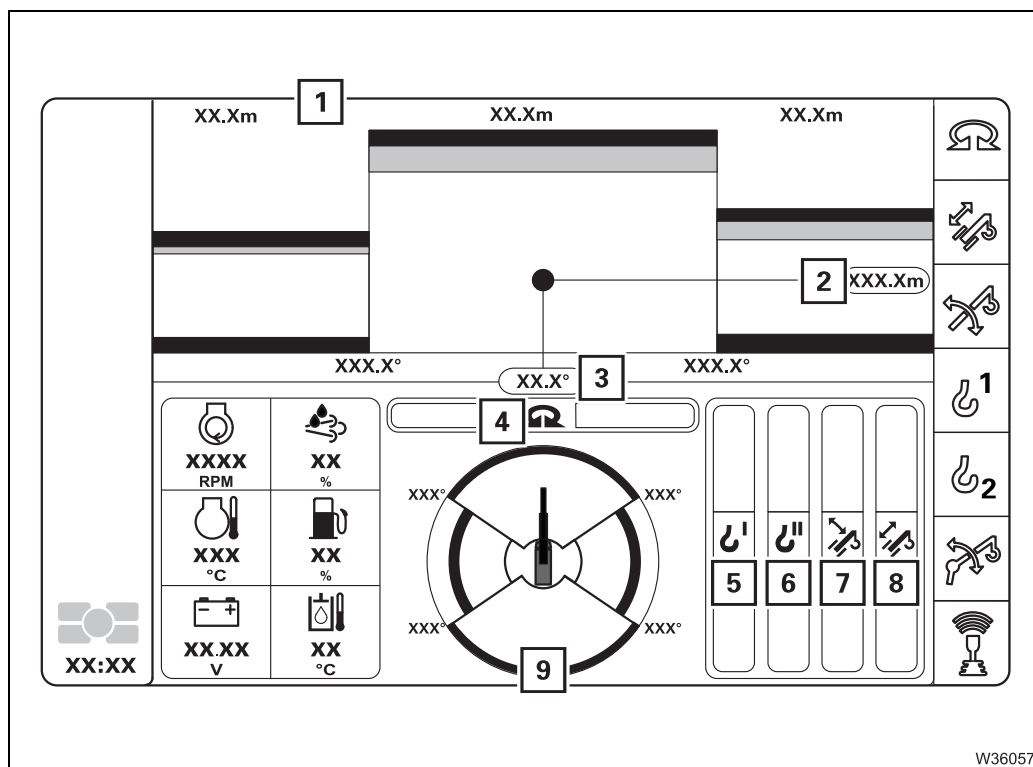
The Start menu shows the key measured values.



- |  |             |
|--|-------------|
| 1 RCL display                          | ➡ p. 8 - 20 |
| 2 Engine speed display                 | ➡ p. 9 - 6  |
| 3 AdBlue (DEF) filling level indicator | ➡ p. 9 - 2  |
| 4 Coolant temperature display          | ➡ p. 9 - 6  |
| 5 Fuel level display                   | ➡ p. 9 - 2  |
| 6 Voltage monitoring display           | ➡ p. 9 - 6  |
| 7 Hydraulic oil temperature display    | ➡ p. 9 - 6  |



## RCL display

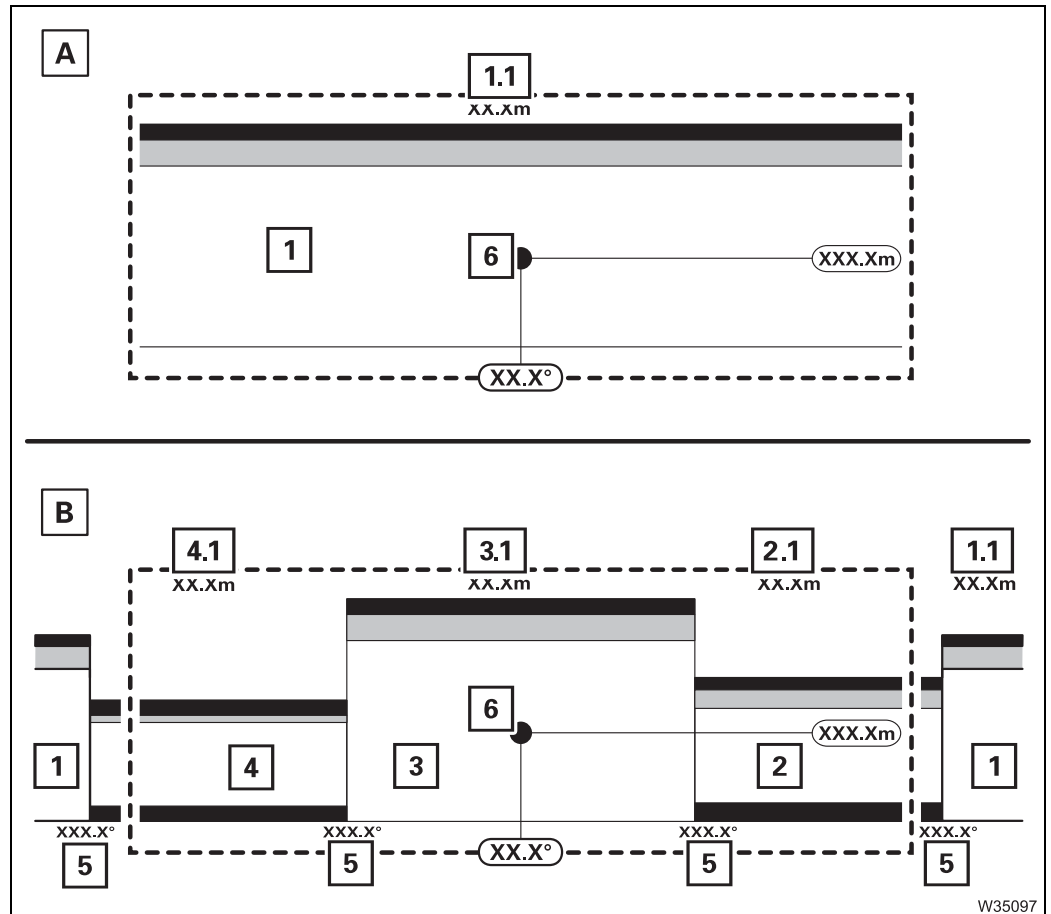


W36057

- |  |                 |
|--|-----------------|
| <b>1</b> Slewing ranges/working radii display                              | ▮▮▮▮ p. 8 - 21  |
| <b>2</b> Current working radius display                                    | ▮▮▮▮ p. 8 - 128 |
| <b>3</b> Current slewing angle display                                     | ▮▮▮▮ p. 8 - 128 |
| <b>4</b> Maximum permissible speed display – Slewing gear                  | ▮▮▮▮ p. 8 - 129 |
| <b>5</b> Maximum permissible speed display – Main hoist                    | ▮▮▮▮ p. 8 - 129 |
| <b>6</b> Maximum permissible speed display – Auxiliary hoist <sup>1)</sup> | ▮▮▮▮ p. 8 - 129 |
| <b>7</b> Maximum permissible speed display – Derricking gear               | ▮▮▮▮ p. 8 - 129 |
| <b>8</b> Maximum permissible speed display – Telescoping mechanism         | ▮▮▮▮ p. 8 - 129 |
| <b>9</b> Slewing ranges display  | ▮▮▮▮ p. 8 - 129 |

<sup>1)</sup> Additional equipment

**Slewing ranges/  
working radii  
display**



**A** For the *Standard* slewing range type  
**B** For the *MAXbase* slewing range type

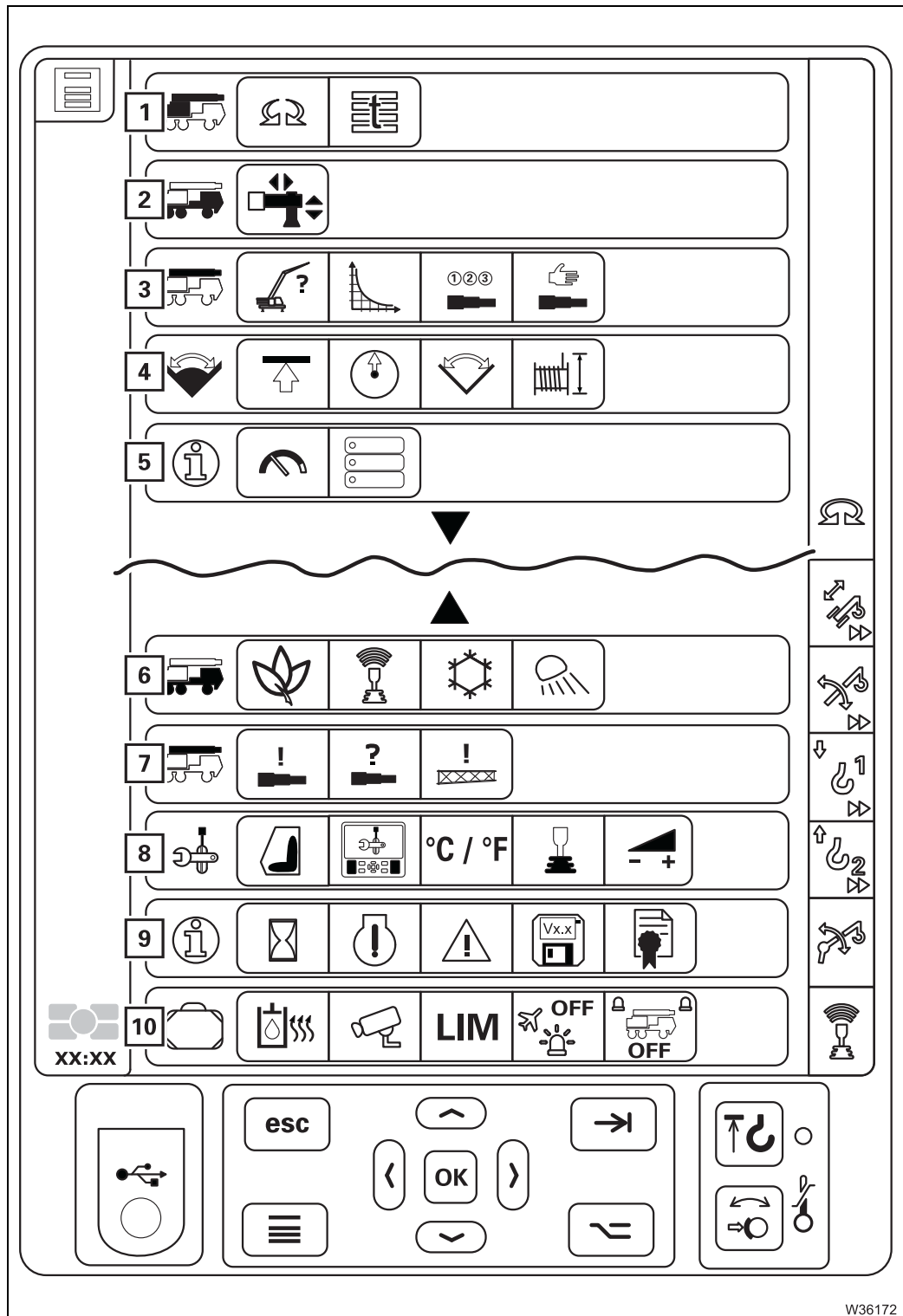
**Display of current slewing range divisions**

- 1 Slewing range 1 ▣▣▣▣ p. 8 - 127
- 2 Slewing range 2 ▣▣▣▣ p. 8 - 127
- 3 Slewing range 3 ▣▣▣▣ p. 8 - 127
- 4 Slewing range 4 ▣▣▣▣ p. 8 - 127
- 5 Display of current slewing range limits ▣▣▣▣ p. 8 - 127
- 6 Current position display ▣▣▣▣ p. 8 - 128

**Maximum permissible working radius display**

- 1.1 In slewing range 1 ▣▣▣▣ p. 8 - 128
- 2.1 In slewing range 2 ▣▣▣▣ p. 8 - 128
- 3.1 In slewing range 3 ▣▣▣▣ p. 8 - 128
- 4.1 In slewing range 4 ▣▣▣▣ p. 8 - 128

**8.1.8** CCS – Overview menu groups

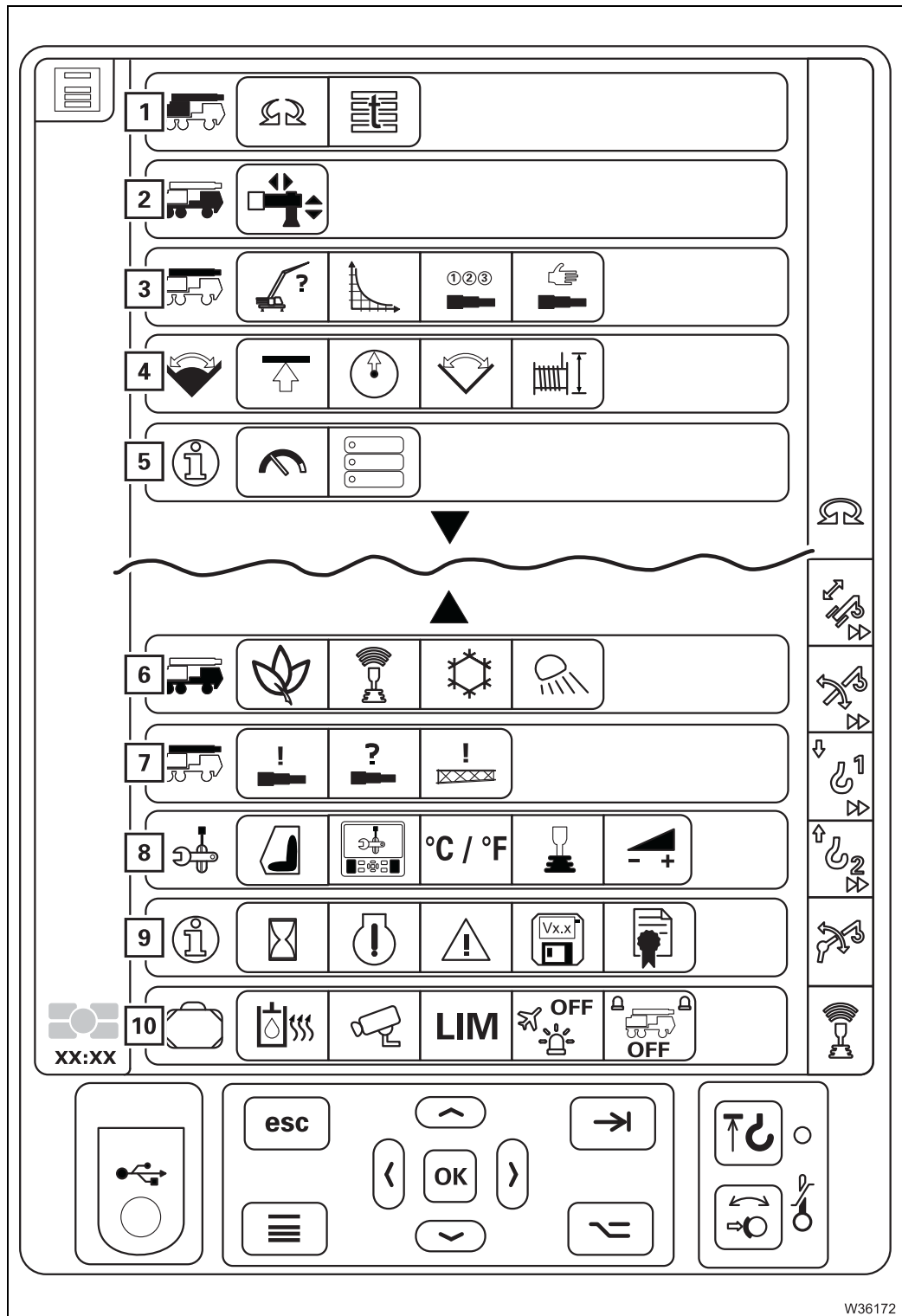




- 1 Superstructure menu group** ▶▶▶▶ p. 8 - 26
  - Superstructure lock sub-menu
  - Counterweight menu
- 2 Outrigger menu group** ▶▶▶▶ p. 8 - 29
  - Outrigger cylinders menu
  - Outrigger menu
- 3 RCL/Telescoping menu group** ▶▶▶▶ p. 8 - 33
  - Enter rigging mode/telescope status menu
  - Lifting capacity tables menu
  - Telescoping semi-automation menu
  - Manual telescoping menu
- 4 Working range limiter menu group** ▶▶▶▶ p. 8 - 43
  - Overall height menu
  - Working radius menu
  - Slewing angle menu
  - Hoist rope travel limitation menu
- 5 Information 1 menu group** ▶▶▶▶ p. 8 - 48
  - Hydraulic pressure and fuel consumption menu
  - Datalogger menu
- 6 Heating/Engine/Additional equipment menu group** ▶▶▶▶ p. 8 - 51
  - Economy menu
  - Remote control menu<sup>1)</sup>
  - Heating/air-conditioning menu
  - Spotlights menu<sup>1)</sup>
- 7 Telescoping emergency program menu group** ▶▶▶▶ p. 8 - 56
  - Telescoping emergency program menu
  - Unknown telescoping menu
  - Swinging the swing-away lattice emergency operation menu<sup>1)</sup>

1) Additional equipment





W36172

**8 Settings menu group**

▣▣▣▣▶ p. 8 - 60

- Crane cab menu
- Set display brightness and date/time menu
- Switch units menu
- Set control lever characteristic curve menu
- Power unit speeds menu

**9 Information 2 menu group**

▣▣▣▣▶ p. 8 - 66

- Operating hours menu
- Engine/transmission error menu
- Crane operation error menu
- Program version menu
- Disclaimer menu

**10 Operation of various controls**

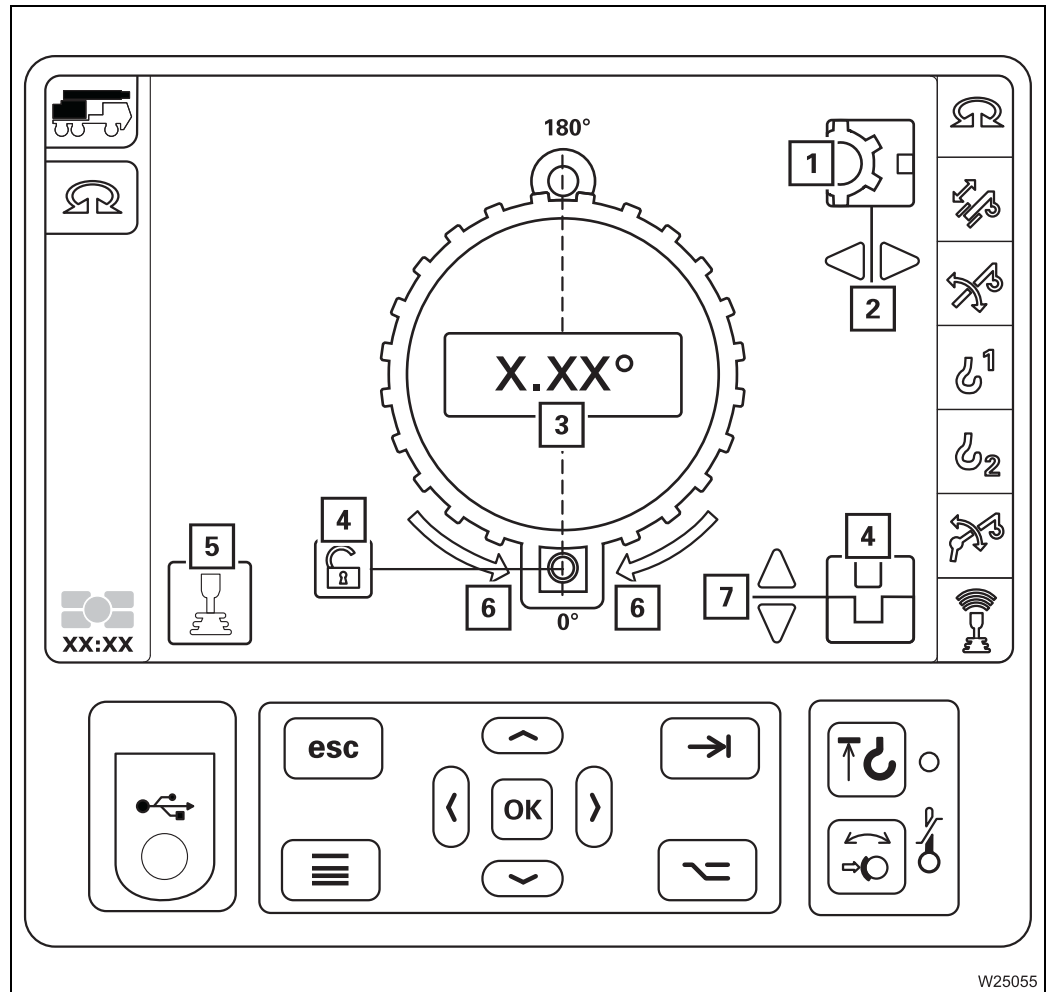
▣▣▣▣▶ p. 8 - 71

- Preheating the hydraulic oil
- Camera on/off
- Override torque reduction
- Air traffic control light on/off
- Switching the rotating beacon on/off

1) Additional equipment



### Superstructure lock sub-menu



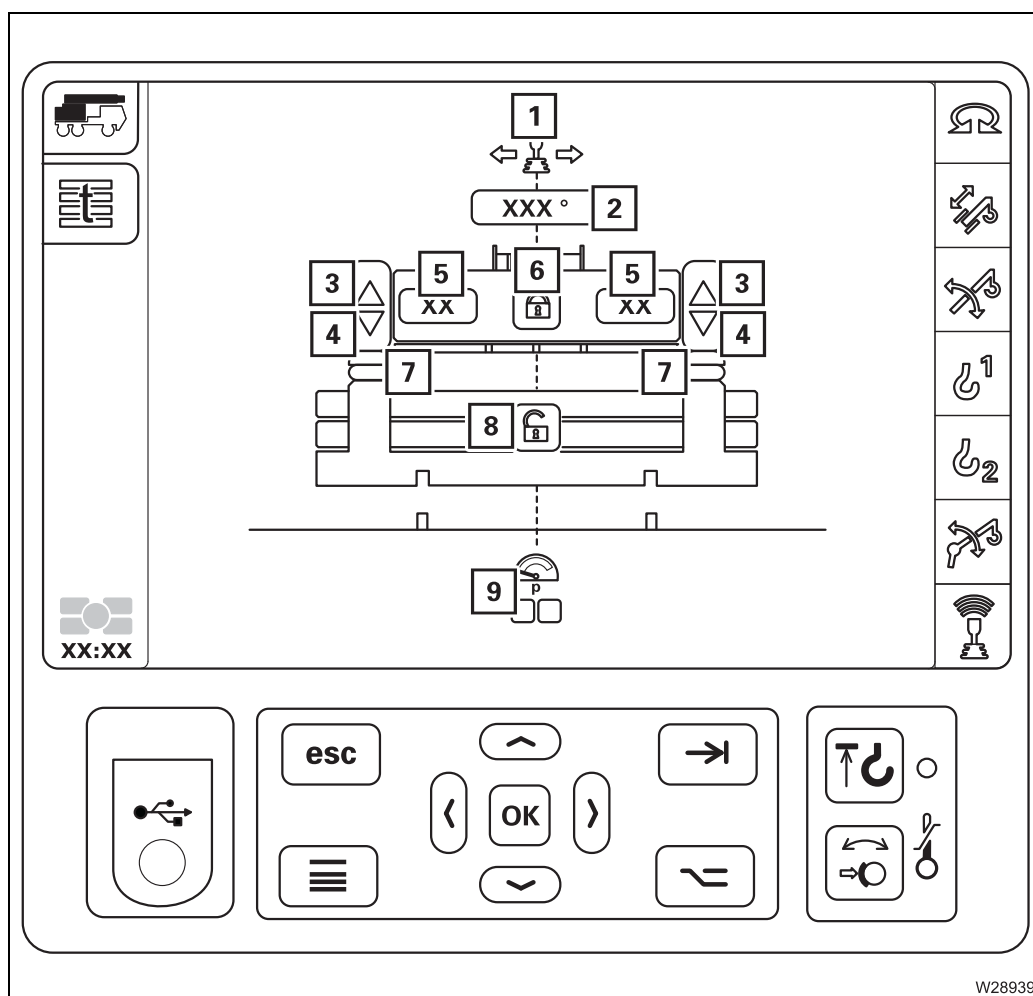
W25055

- |  |              |
|--|--------------|
| 1 House lock locking status displays <sup>1)</sup> | ➡ p. 8 - 125 |
| 2 Houselock on/off <sup>1)</sup>                   | ➡ p. 8 - 125 |
| 3 Current slewing angle display <sup>1)</sup>      | ➡ p. 8 - 125 |
| 4 Turntable locking status display                 | ➡ p. 8 - 124 |
| 5 Slewing request                                  |              |
| 6 Display of slewing direction to 0°/180°          | ➡ p. 8 - 125 |
| 7 Locking/unlocking turntable                      | ➡ p. 8 - 124 |

<sup>1)</sup> Additional equipment



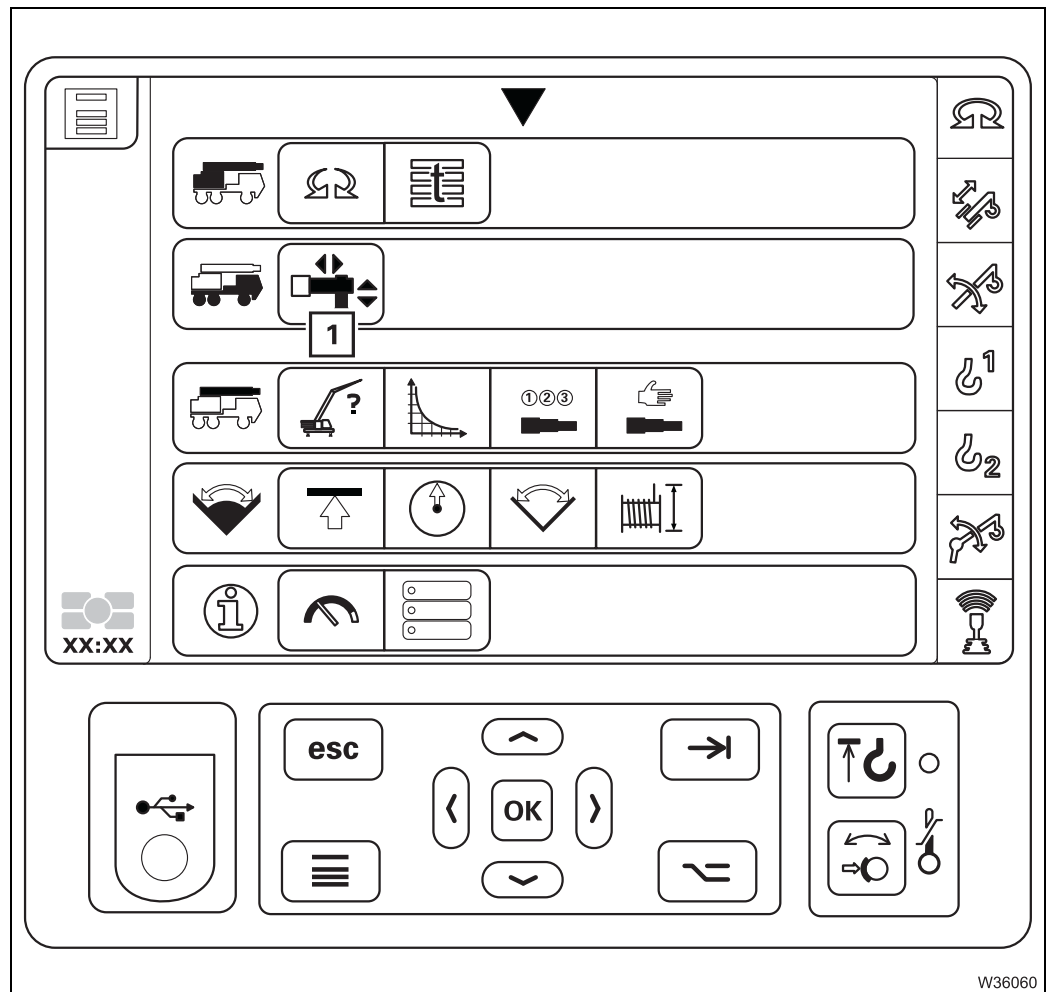
## Counterweight menu



W28939

- |  |                 |
|--|-----------------|
| <b>1</b> Display of slewing direction for automatic mode | ▣▣▣▣ p. 8 - 105 |
| <b>2</b> Current slewing angle display                   | ▣▣▣▣ p. 8 - 108 |
| <b>3</b> Retracting the lifting cylinders                | ▣▣▣▣ p. 8 - 107 |
| <b>4</b> Extending the lifting cylinders                 | ▣▣▣▣ p. 8 - 107 |
| <b>5</b> Lifting cylinder position percentage indicator  | ▣▣▣▣ p. 8 - 107 |
| <b>6</b> Automatic mode rigging                          | ▣▣▣▣ p. 8 - 106 |
| <b>7</b> Lifting cylinder position display               | ▣▣▣▣ p. 8 - 107 |
| <b>8</b> Automatic mode unrigging                        | ▣▣▣▣ p. 8 - 106 |
| <b>9</b> Pre-tensioning pressure display                 | ▣▣▣▣ p. 8 - 107 |

## 8.1.10 Outrigger menu group



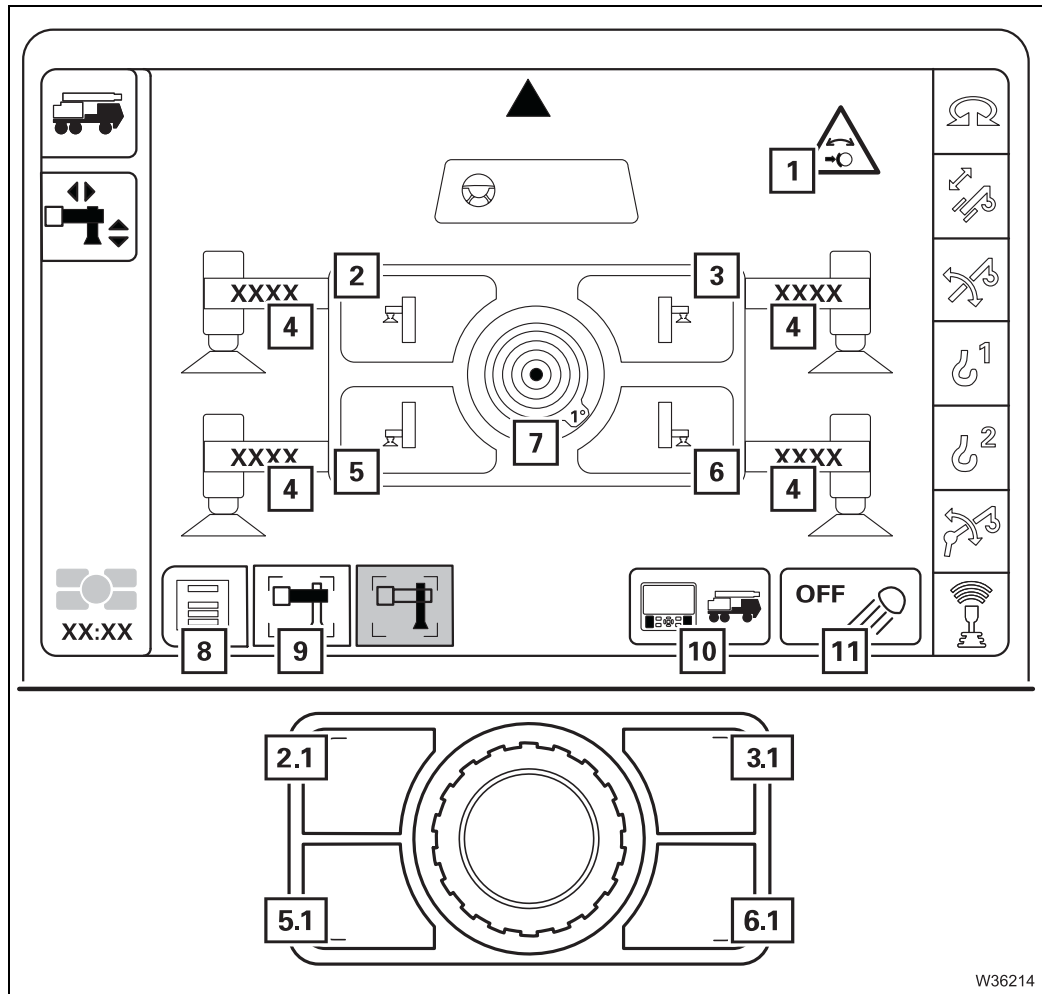
**1** Outrigger cylinders menu  
Outrigger menu

▣▣▣▣ p. 8 - 30

▣▣▣▣ p. 8 - 32



### Outrigger cylinders menu



W36214

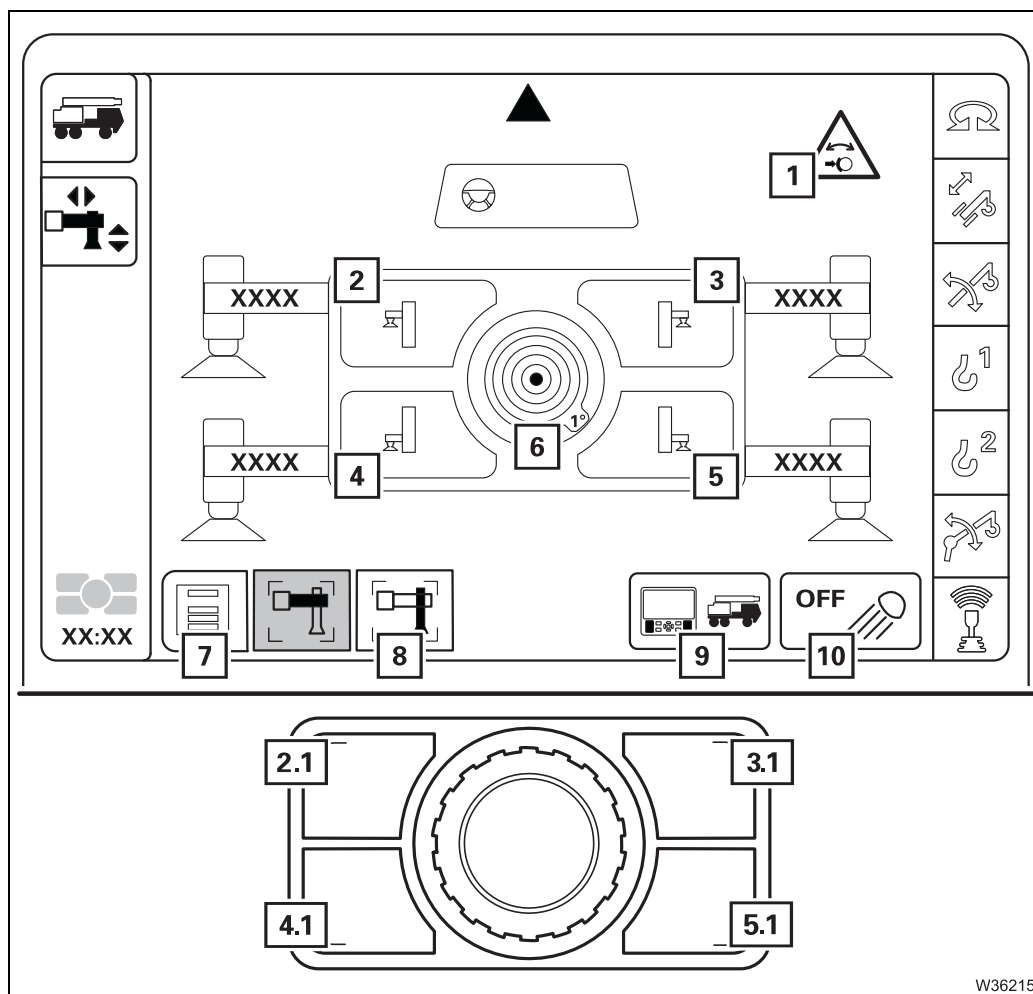


<b>1</b>	<b>Slewing gear/movements locked display</b>	▣▣▣▣ p. 8 - 96
<b>2</b>	<b>Pre-select front left outrigger cylinder display</b>	▣▣▣▣ p. 8 - 97
<b>2.1</b>	<b>Pre-select front left outrigger cylinder</b>	▣▣▣▣ p. 8 - 97
<b>3</b>	<b>Pre-select front right outrigger cylinder display</b>	▣▣▣▣ p. 8 - 97
<b>3.1</b>	<b>Pre-select front right outrigger cylinder</b>	▣▣▣▣ p. 8 - 97
<b>4</b>	<b>Outrigger pressure display<sup>1)</sup></b>	▣▣▣▣ p. 11 - 65
<b>5</b>	<b>Pre-select rear left outrigger cylinder display</b>	▣▣▣▣ p. 8 - 97
<b>5.1</b>	<b>Pre-select rear left outrigger cylinder</b>	▣▣▣▣ p. 8 - 97
<b>6</b>	<b>Pre-select rear right outrigger display</b>	▣▣▣▣ p. 8 - 97
<b>6.1</b>	<b>Pre-select rear right outrigger</b>	▣▣▣▣ p. 8 - 97
<b>7</b>	<b>Current inclination display</b>	▣▣▣▣ p. 8 - 103
<b>8</b>	<b>Exiting the menu</b>	▣▣▣▣ p. 8 - 97
<b>9</b>	<b>Switching to the Outrigger menu</b>	▣▣▣▣ p. 8 - 97
<b>10</b>	<b>Outrigger control units on/off</b>	▣▣▣▣ p. 8 - 97
<b>11</b>	<b>Outrigger lighting on/off</b>	▣▣▣▣ p. 8 - 96

<sup>1)</sup> Additional equipment

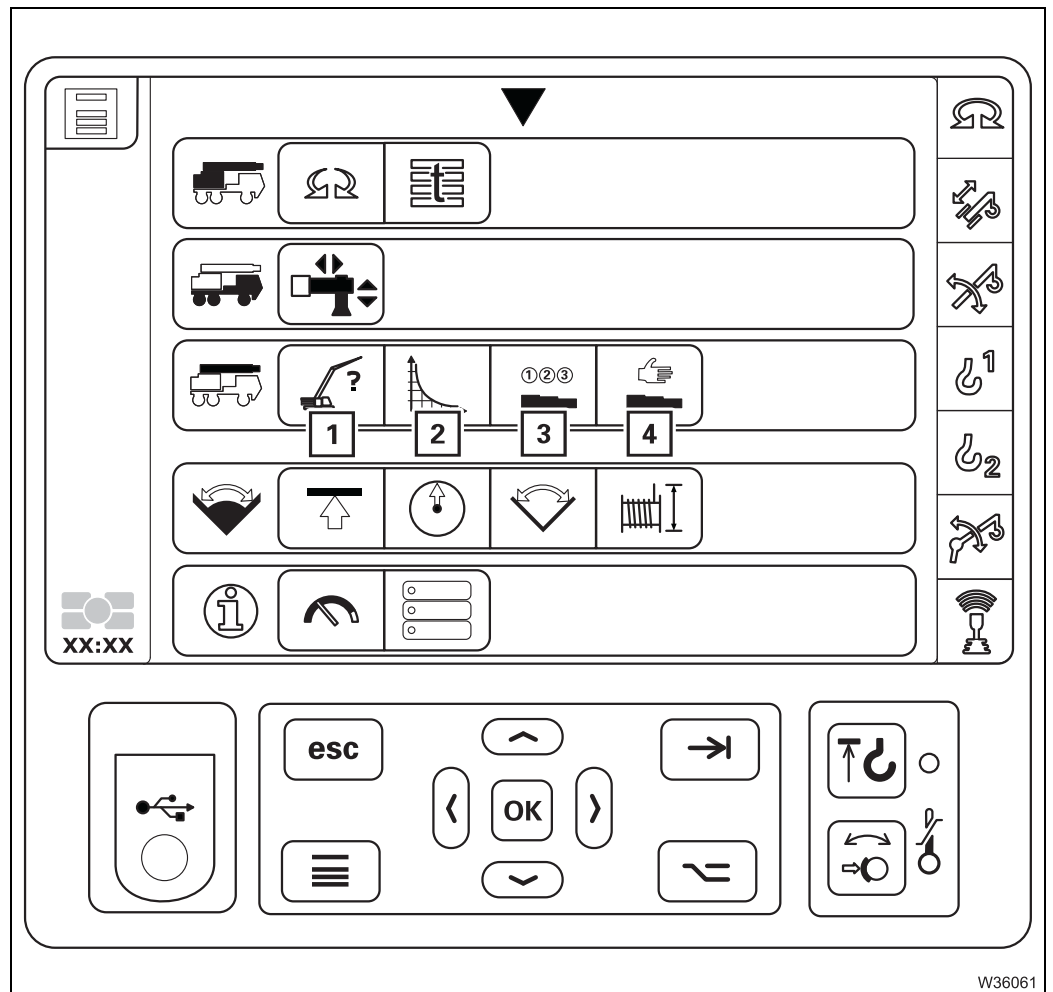


## Outrigger menu



- |     |   |              |
|-----|---|--------------|
| 1   | Slewing gear/movements locked display     | ➡ p. 8 - 96  |
| 2   | Pre-select front left outrigger display   | ➡ p. 8 - 97  |
| 2.1 | Pre-select front left outrigger           | ➡ p. 8 - 97  |
| 3   | Pre-select front right outrigger display  | ➡ p. 8 - 97  |
| 3.1 | Pre-select front right outrigger          | ➡ p. 8 - 97  |
| 4   | Pre-select rear left outrigger display    | ➡ p. 8 - 97  |
| 4.1 | Pre-select rear left outrigger            | ➡ p. 8 - 97  |
| 5   | Pre-select rear right outrigger display   | ➡ p. 8 - 97  |
| 5.1 | Pre-select rear right outrigger           | ➡ p. 8 - 97  |
| 6   | Current inclination display               | ➡ p. 8 - 103 |
| 7   | Exiting the menu                          | ➡ p. 8 - 97  |
| 8   | Switching to the Outrigger cylinders menu | ➡ p. 8 - 97  |
| 9   | Outrigger control units on/off            | ➡ p. 8 - 97  |
| 10  | Outrigger lighting on/off                 | ➡ p. 8 - 96  |

## 8.1.11 RCL/Telescoping menu group

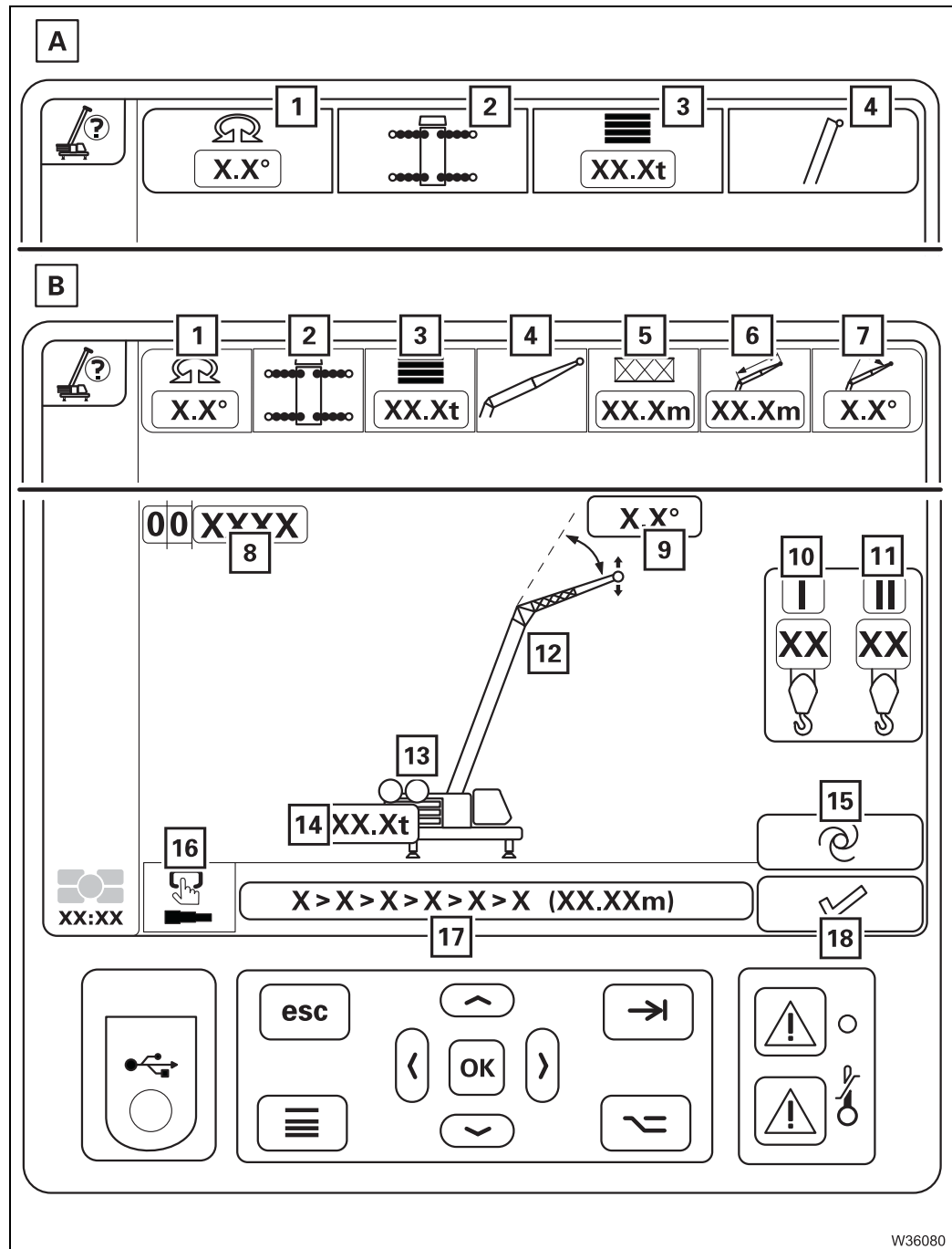


- |   |       |           |
|---|-------|-----------|
| <b>1</b> Enter rigging mode/telescope status menu | ▣▣▣▣▶ | p. 8 - 34 |
| <b>2</b> Lifting capacity tables menu             | ▣▣▣▣▶ | p. 8 - 40 |
| <b>3</b> Telescoping semi-automation menu         | ▣▣▣▣▶ | p. 8 - 41 |
| <b>4</b> Manual telescoping menu                  | ▣▣▣▣▶ | p. 8 - 42 |



**Enter rigging mode/telescope status menu**

– For the *Standard slewing range type*



W36080

**A** For boom system *main boom*

**B** For boom system *lattice extension*

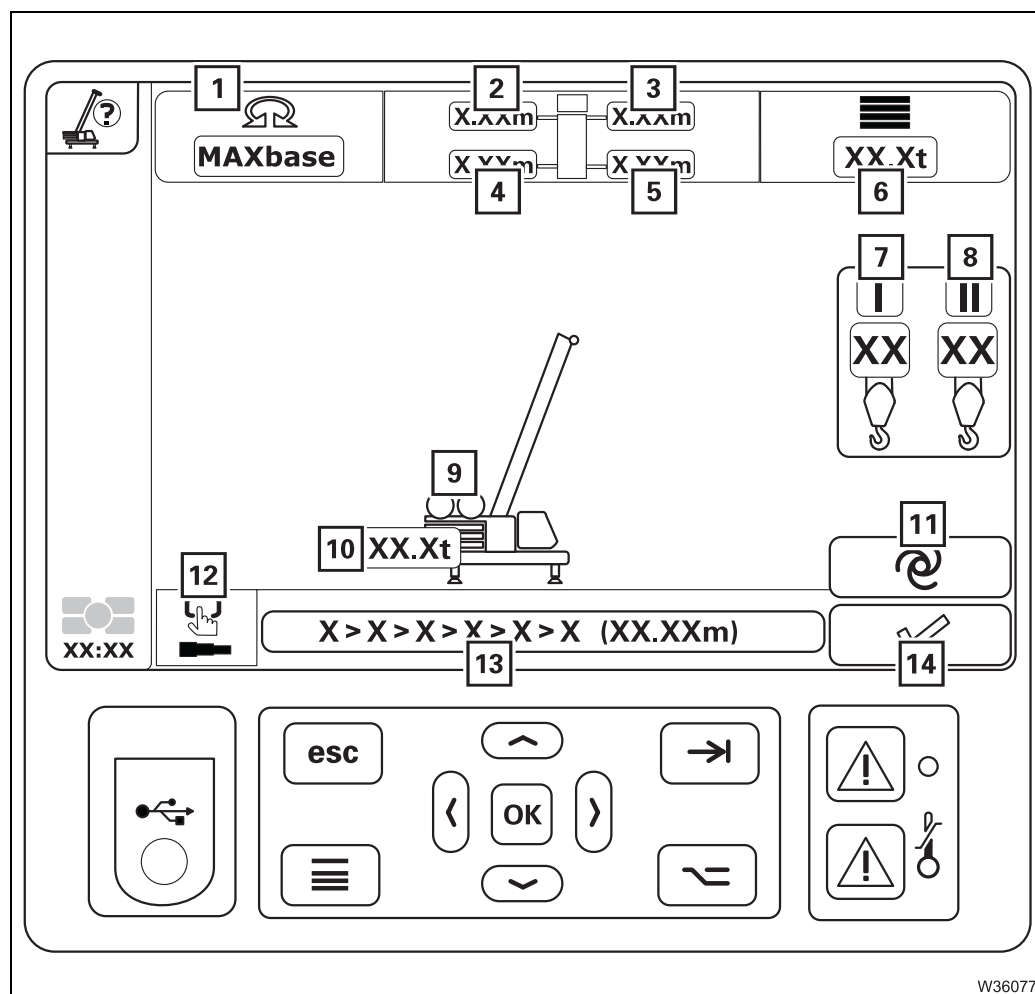


Depending on the version, the top view (2) is shown rotated by 180°. The representation occurs in the same manner as in the RCL *Monitoring* menu; p. 8 - 74.

<b>1</b>	Enter slewing range	▶▶▶▶▶ p. 8 - 130
<b>2</b>	Enter outrigger span	▶▶▶▶▶ p. 8 - 133
	Outrigger span monitoring display	▶▶▶▶▶ p. 8 - 134
<b>3</b>	Enter counterweight	▶▶▶▶▶ p. 8 - 130
<b>4</b>	Boom system entry	▶▶▶▶▶ p. 8 - 132
<b>5</b>	Input lattice extension – the length before the angle <sup>1)</sup>	▶▶▶▶▶ p. 8 - 132
<b>6</b>	Input lattice extension – the length after the angle <sup>1)</sup>	▶▶▶▶▶ p. 8 - 132
<b>7</b>	Input lattice extension – angle <sup>1),2)</sup>	▶▶▶▶▶ p. 8 - 132
<b>8</b>	Enter RCL code	▶▶▶▶▶ p. 8 - 134
<b>9</b>	Angle of the lattice extension display <sup>1),2)</sup>	▶▶▶▶▶ p. 8 - 132
<b>10</b>	Enter reeving – Main hoist	▶▶▶▶▶ p. 8 - 131
<b>11</b>	Enter reeving – Auxiliary hoist	▶▶▶▶▶ p. 8 - 131
<b>12</b>	Boom system display	▶▶▶▶▶ p. 8 - 132
<b>13</b>	Reeving input mode display	▶▶▶▶▶ p. 8 - 131
<b>14</b>	Counterweight display	▶▶▶▶▶ p. 8 - 130
<b>15</b>	Accept the measured outrigger span	▶▶▶▶▶ p. 8 - 133
<b>16</b>	Pre-selection telescoping menu	▶▶▶▶▶ p. 8 - 38
<b>17</b>	Preselected telescoping display	▶▶▶▶▶ p. 8 - 131
<b>18</b>	Confirming the rigging mode	▶▶▶▶▶ p. 8 - 131
1)	Additional equipment	
2)	Display only with an inclinable lattice extension	



- For the *MAXbase* slewing range type <sup>1)</sup>



<sup>1)</sup> Additional equipment



Depending on the version, the top view (2) to (5) is shown rotated by 180°. The representation occurs in the same manner as in the *RCL Monitoring* menu; p. 8 - 74.

<b>1</b>	Enter slewing range	▶▶▶▶▶ p. 8 - 130
<b>2</b>	Input front left outrigger span	▶▶▶▶▶ p. 8 - 133
<b>3</b>	Input front right outrigger span	▶▶▶▶▶ p. 8 - 133
<b>4</b>	Input rear left outrigger width	▶▶▶▶▶ p. 8 - 133
<b>5</b>	Input rear right outrigger width	▶▶▶▶▶ p. 8 - 133
<b>2 to 5</b>	Outrigger span monitoring display	▶▶▶▶▶ p. 8 - 133
<b>6</b>	Enter counterweight	▶▶▶▶▶ p. 8 - 130
<b>7</b>	Enter reeving – Main hoist	▶▶▶▶▶ p. 8 - 131
<b>8</b>	Enter reeving – Auxiliary hoist	▶▶▶▶▶ p. 8 - 131
<b>9</b>	Reeving input mode display	▶▶▶▶▶ p. 8 - 131
<b>10</b>	Counterweight display	▶▶▶▶▶ p. 8 - 130
<b>11</b>	Accept the measured outrigger span	▶▶▶▶▶ p. 8 - 133
<b>12</b>	Pre-selection telescoping menu	▶▶▶▶▶ p. 8 - 38
<b>13</b>	Preselected telescoping display	▶▶▶▶▶ p. 8 - 131
<b>14</b>	Confirming the rigging mode	▶▶▶▶▶ p. 8 - 131

**Pre-selection  
telescoping menu**

⚡ [t]	⌚ [m]	☆	🔧 [m]	T1	T2	T3	T4	T5	T6
X.X	X.X	X	X.X	X	X	X	X	X	X
X.X	X.X	X	X.X	X	X	X	X	X	X
X.X	X.X	X	X.X	X	X	X	X	X	X
<b>6.1</b>	<b>6.2</b>	<b>6.3</b>	<b>6.4</b>	X	X	X	X	X	X
35.0	10.0	2.5	18.3	0	53	0	0	0	0
X.X	X.X	X	X.X	X	X	X	X	X	X
X.X	X.X	X	X.X	X	X	X	X	X	X
X.X	X.X	X	X.X	X	X	X	X	X	X
X.X	X.X	X	X.X	X	X	X	X	X	X

Control Panel Buttons: **esc**, **OK**, **^**, **~**, **>**, **<**, **⏏**, **⏏** (with warning icons)

W36128



Enter desired parameter

- 1 Input load ▶▶▶▶▶ p. 8 - 135
- 2 Input working radius ▶▶▶▶▶ p. 8 - 135
- 3 Input main boom length ▶▶▶▶▶ p. 8 - 135
- 4 Input slewing range<sup>1)</sup> ▶▶▶▶▶ p. 8 - 135

Pre-selection telescoping

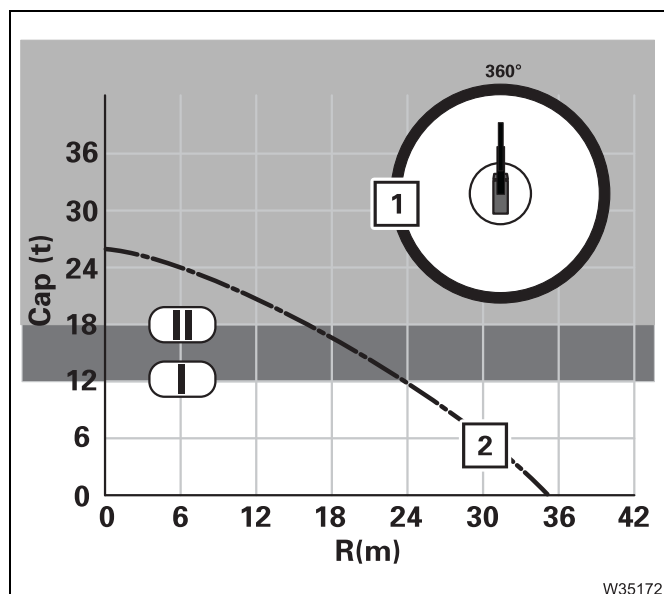
- 5 Sort values ▶▶▶▶▶ p. 8 - 135
- 6 Selectable telescoping display ▶▶▶▶▶ p. 8 - 135
  - 6.1 Associated maximum load ▶▶▶▶▶ p. 8 - 135
  - 6.2 Associated maximum working radius ▶▶▶▶▶ p. 8 - 135
  - 6.3 Associated telescoping duration ▶▶▶▶▶ p. 8 - 135
  - 6.4 Associated main boom length ▶▶▶▶▶ p. 8 - 135
- 7 Overview of the table lengths

<sup>1)</sup> Display only with the *MAXbase slewing range type*



**Lifting capacity tables menu**

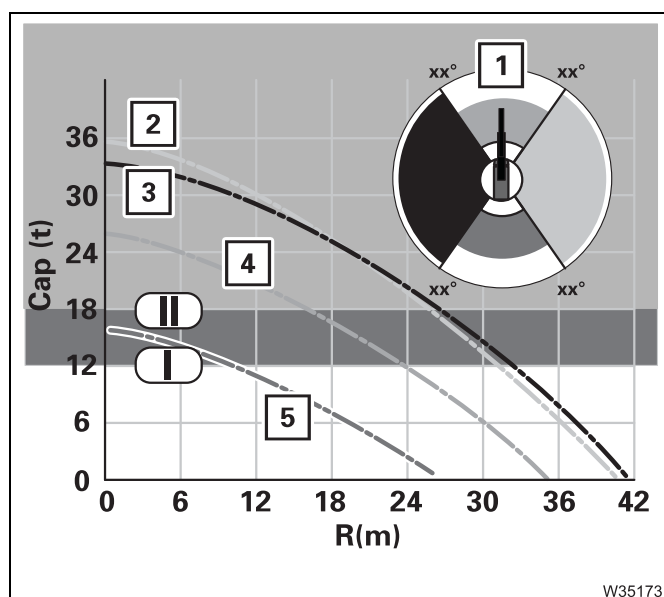
▣▣▣▣ ➔ *Displaying the lifting capacity tables, p. 10 - 59*



- **For the *Standard slewing range type***

- 1 Slewing range display
- 2 Permissible working range display
- I Main hoist display  
Limitation due to reeving
- II Auxiliary hoist display  
Limitation due to reeving

▣▣▣▣ ➔ p. 10 - 59

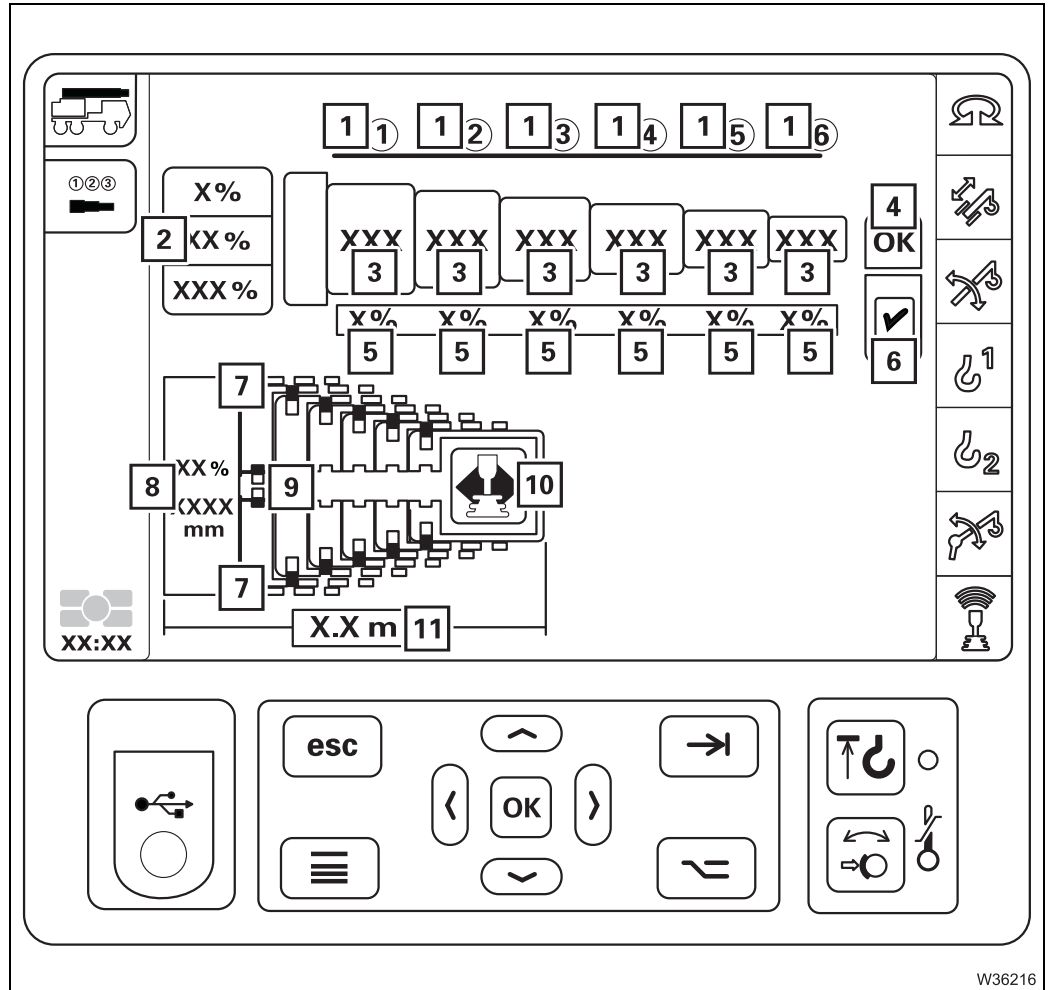


- **For the *MAXbase slewing range type***

- 1 Slewing ranges display  
- Four slewing ranges, marked in colour
- 2 Permissible working range display
- 3 - A coloured curve for each slewing range
- 4 range
- 5
- I Main hoist display  
Limitation due to reeving
- II Auxiliary hoist display  
Limitation due to reeving

▣▣▣▣ ➔ p. 10 - 61

**Telescoping semi-automation menu**

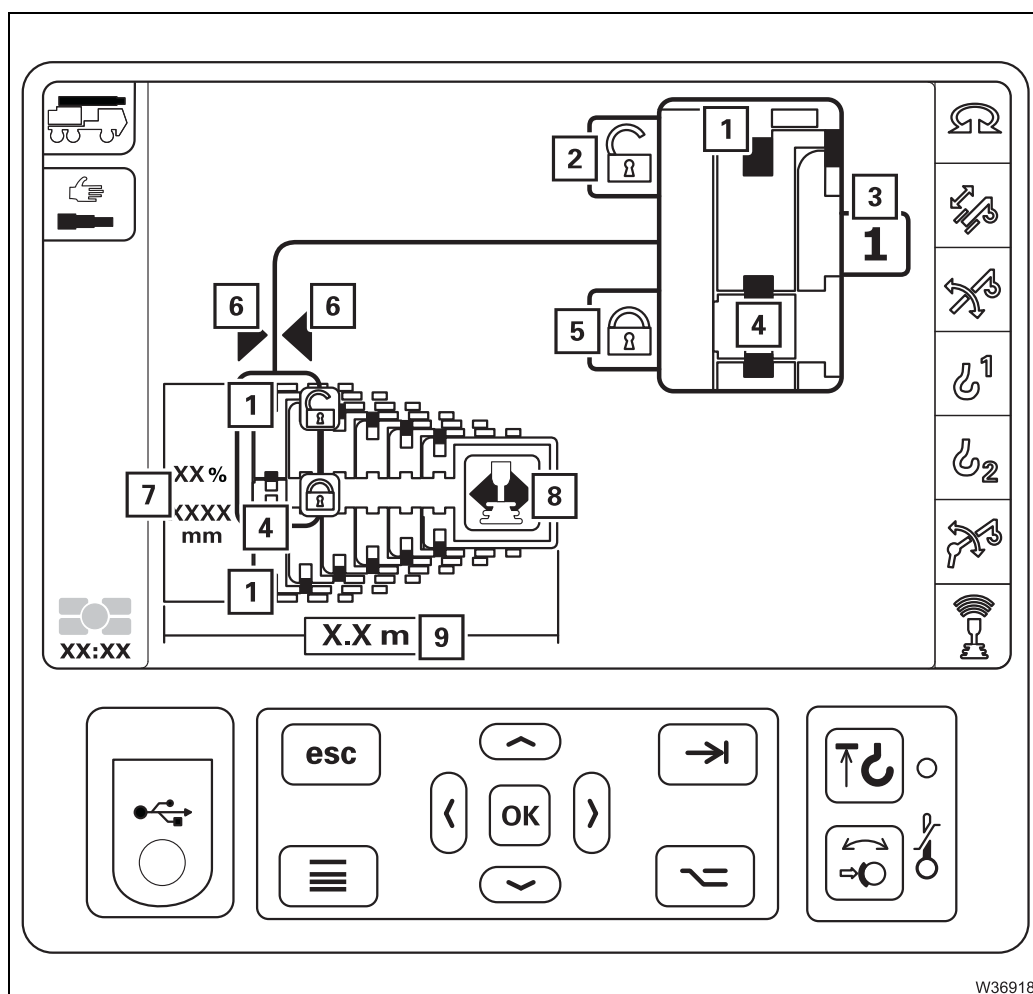


W36216

- |   |       |            |
|---|-------|------------|
| <b>1</b> Telescopic sections display  | ▬▬▬▬▶ | p. 8 - 118 |
| <b>2</b> Pre-selection for all telescopic sections                          | ▬▬▬▬▶ | p. 8 - 119 |
| <b>3</b> Pre-selection individual telescopic sections                       | ▬▬▬▬▶ | p. 8 - 119 |
| <b>4</b> Confirm pre-selection  | ▬▬▬▬▶ | p. 8 - 119 |
| <b>5</b> Current telescope status display                                   | ▬▬▬▬▶ | p. 8 - 119 |
| <b>6</b> Telescoping permitted display<br>Telescoping not permitted display | ▬▬▬▬▶ | p. 8 - 119 |
| <b>7</b> Locking status telescopic section display                          | ▬▬▬▬▶ | p. 8 - 118 |
| <b>8</b> Telescoping cylinder length display                                | ▬▬▬▬▶ | p. 8 - 121 |
| <b>9</b> Locking status telescoping cylinder display                        | ▬▬▬▬▶ | p. 8 - 118 |
| <b>10</b> Teleautomation direction display                                  | ▬▬▬▬▶ | p. 8 - 119 |
| <b>11</b> Main boom length display  | ▬▬▬▬▶ | p. 8 - 121 |



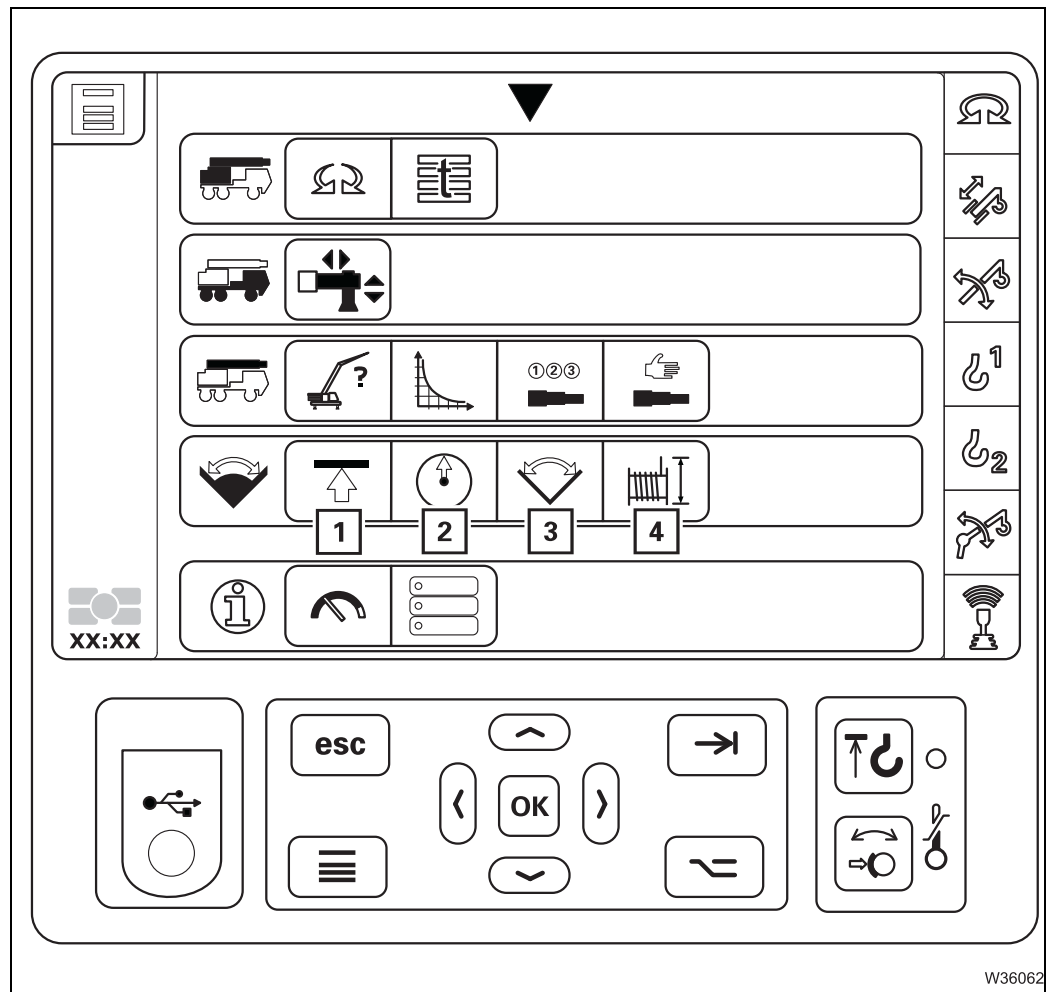
## Manual telescoping menu



W36918

- |   |                 |
|---|-----------------|
| <b>1</b> Locking status telescopic section display              | ▮▮▮▮ p. 8 - 121 |
| <b>2</b> Symbol lock/release telescopic section                 | ▮▮▮▮ p. 8 - 121 |
| <b>3</b> Telescoping cylinder in the telescopic section display | ▮▮▮▮ p. 8 - 122 |
| <b>4</b> Locking status telescoping cylinder display            | ▮▮▮▮ p. 8 - 120 |
| <b>5</b> Lock/unlock telescoping cylinder                       | ▮▮▮▮ p. 8 - 120 |
| <b>6</b> Locking point display                                  | ▮▮▮▮ p. 8 - 120 |
| <b>7</b> Telescoping cylinder length display                    | ▮▮▮▮ p. 8 - 121 |
| <b>8</b> Telescoping direction display                          | ▮▮▮▮ p. 8 - 122 |
| <b>9</b> Main boom length display                               | ▮▮▮▮ p. 8 - 121 |

## 8.1.12 Working range limiter menu group

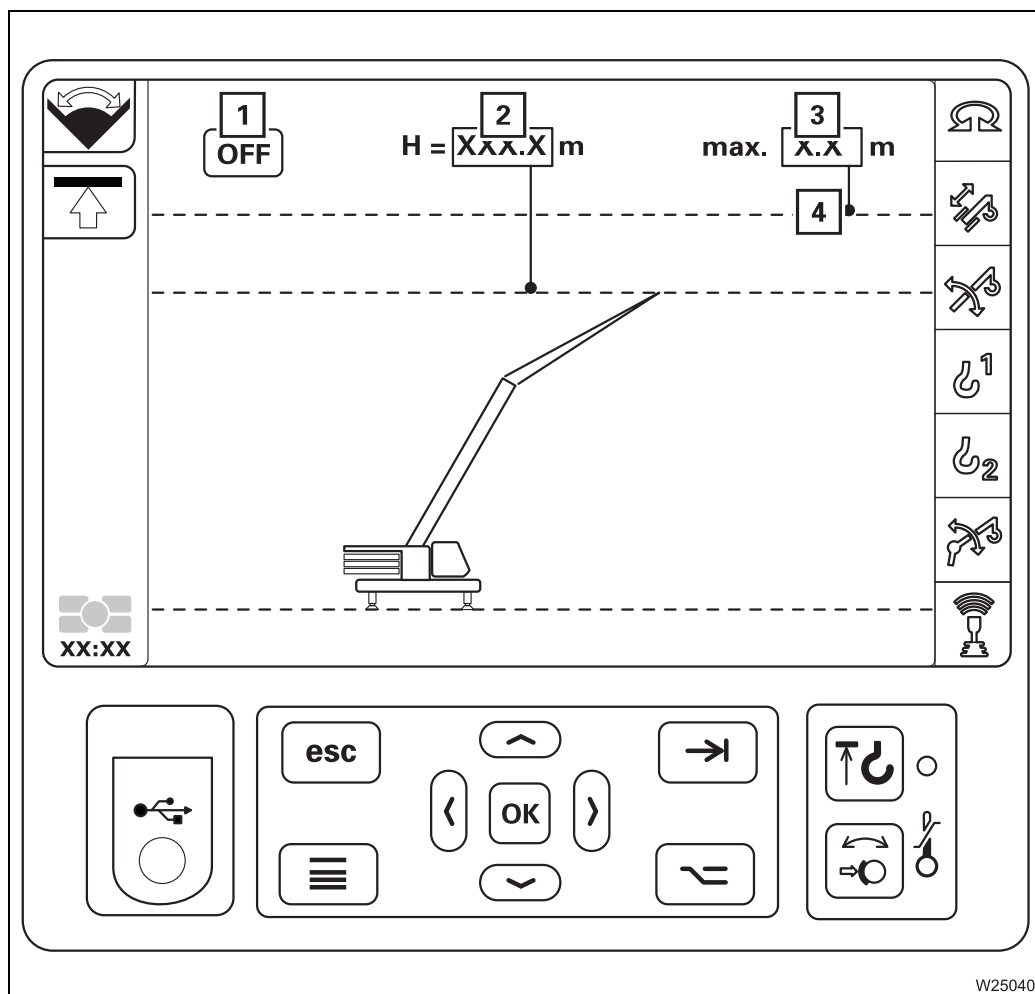


W36062

- |  |                |
|--|----------------|
| <b>1</b> Overall height menu               | ▣▣▣▣ p. 8 - 44 |
| <b>2</b> Working radius menu               | ▣▣▣▣ p. 8 - 45 |
| <b>3</b> Slewing angle menu                | ▣▣▣▣ p. 8 - 46 |
| <b>4</b> Hoist rope travel limitation menu | ▣▣▣▣ p. 8 - 47 |

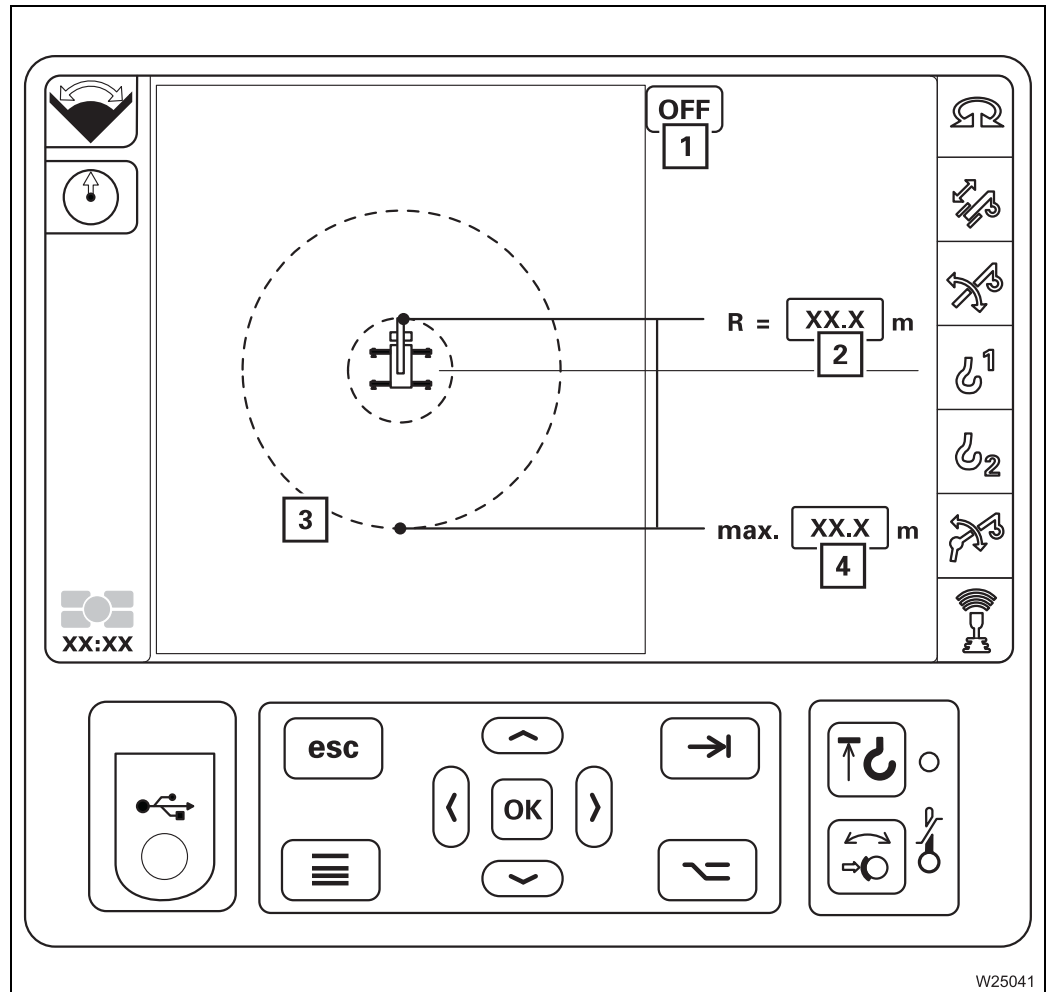


## Overall height menu



- |   |                                      |                 |
|---|--------------------------------------|-----------------|
| 1 | Switching monitoring function on/off | ▣▣▣ p. 10 - 142 |
| 2 | Apply current overall height         | ▣▣▣ p. 10 - 136 |
| 3 | Input maximum overall height         | ▣▣▣ p. 10 - 140 |
| 4 | Maximum overall height display       | ▣▣▣ p. 10 - 136 |

## Working radius menu

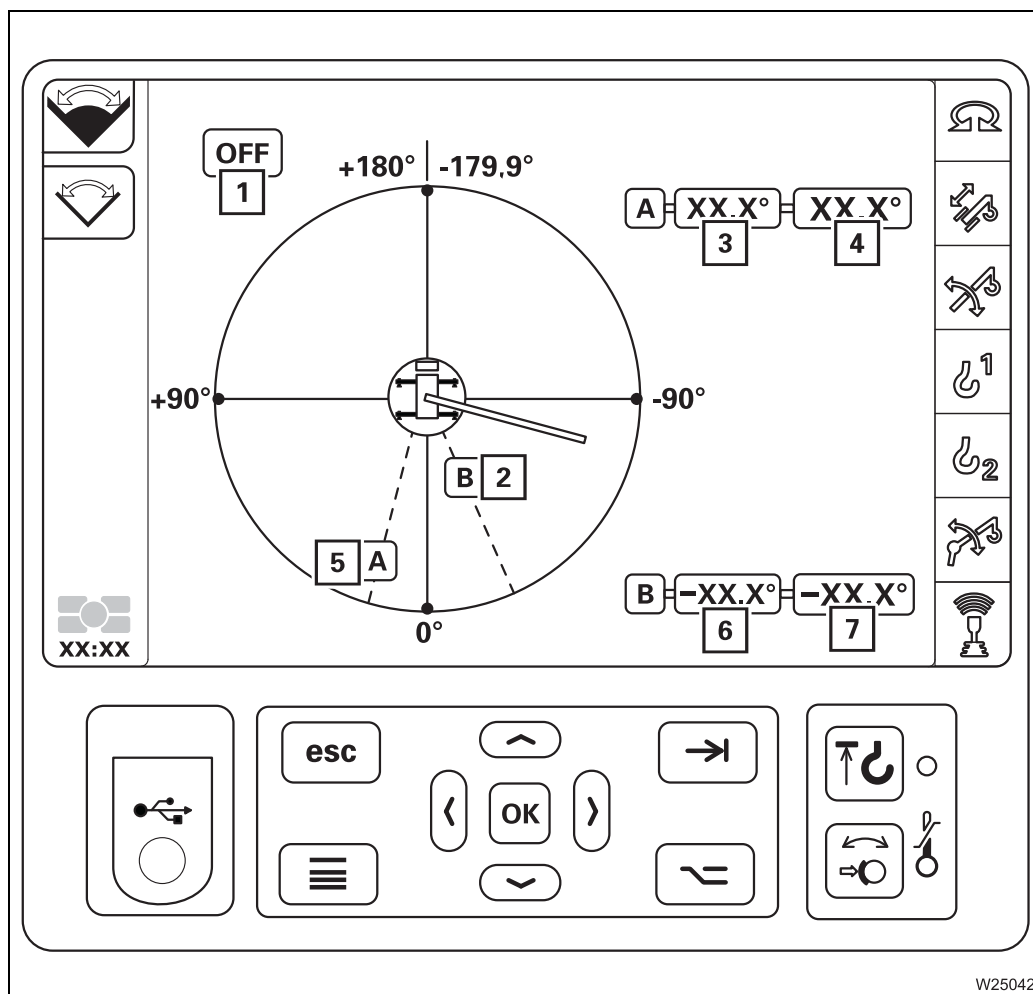


W25041

- |          |                                      |                  |
|----------|--------------------------------------|------------------|
| <b>1</b> | Switching monitoring function on/off | ▮▮▮▮ p. 10 - 142 |
| <b>2</b> | Current working radius display       | ▮▮▮▮ p. 10 - 137 |
| <b>3</b> | Maximum working radius display       | ▮▮▮▮ p. 10 - 140 |
| <b>4</b> | Input maximum working radius         | ▮▮▮▮ p. 10 - 140 |



## Slewing angle menu

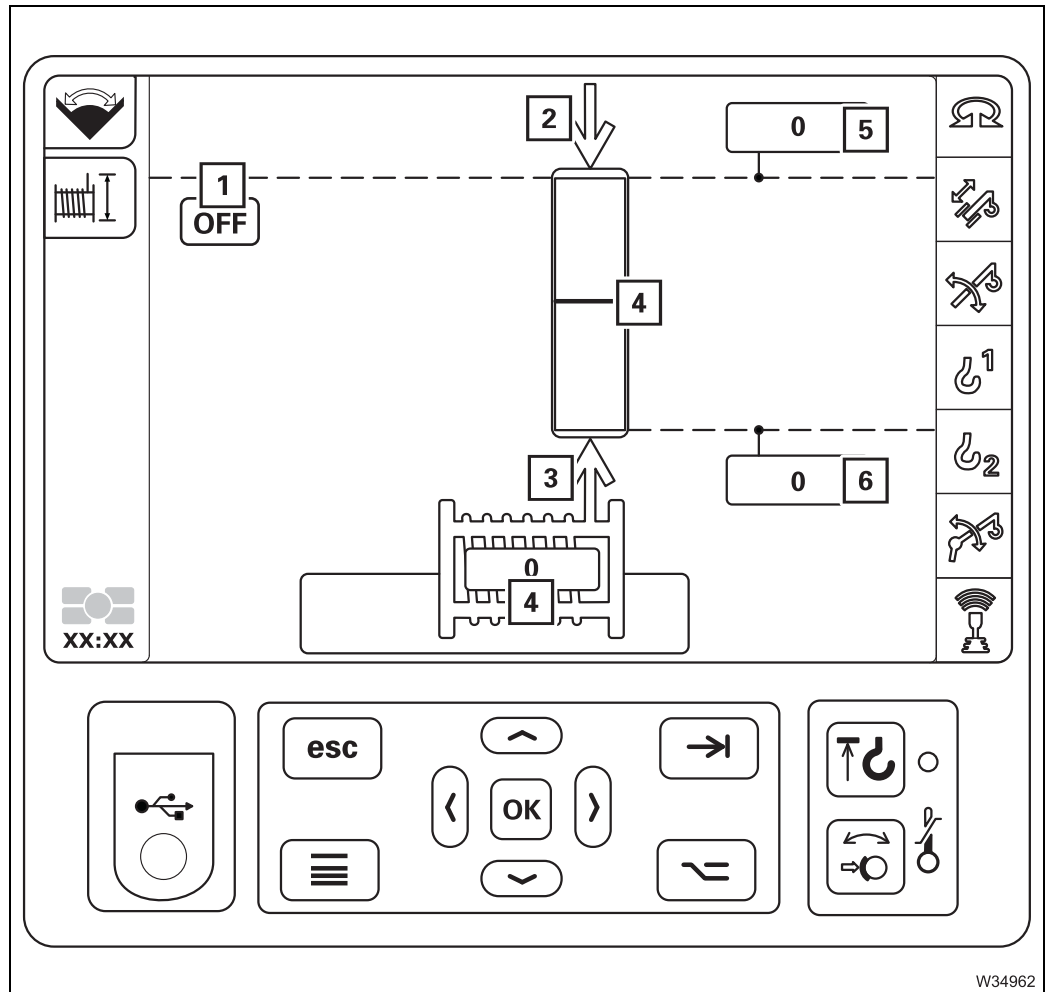


W25042

- |   |                                      |                  |
|---|--------------------------------------|------------------|
| 1 | Switching monitoring function on/off | ▣▣▣▣ p. 10 - 142 |
| 2 | Maximum slewing angle A display      | ▣▣▣▣ p. 10 - 135 |
| 3 | Current slewing angle A display      | ▣▣▣▣ p. 10 - 135 |
| 4 | Input maximum slewing angle A        | ▣▣▣▣ p. 10 - 138 |
| 5 | Maximum slewing angle B display      | ▣▣▣▣ p. 10 - 135 |
| 6 | Current slewing angle B display      | ▣▣▣▣ p. 10 - 135 |
| 7 | Input maximum slewing angle B        | ▣▣▣▣ p. 10 - 138 |

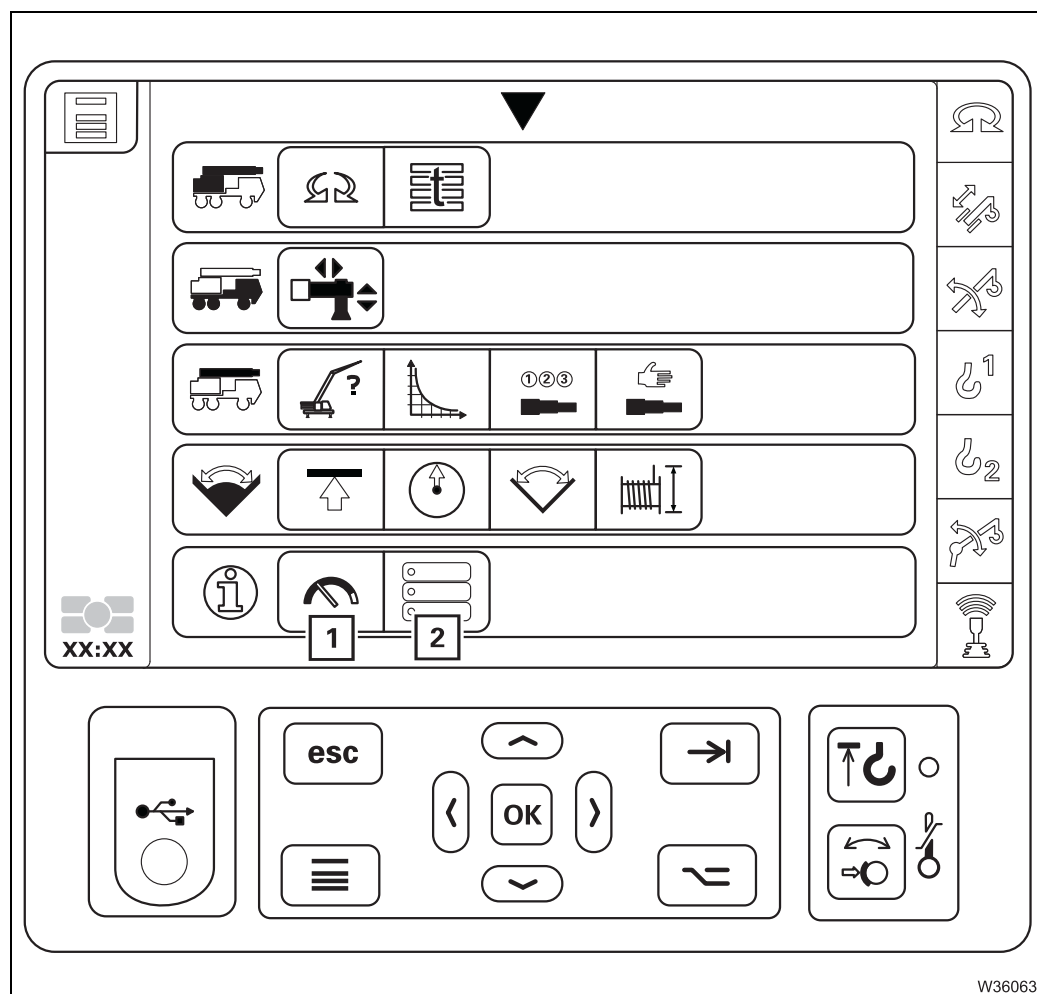


### Hoist rope travel limitation menu



- |          |  |                  |
|----------|--|------------------|
| <b>1</b> | Switching monitoring function on/off         | ▣▣▣▣ p. 10 - 142 |
| <b>2</b> | Input confirmation display, top              | ▣▣▣▣ p. 10 - 138 |
| <b>3</b> | Input confirmation display, bottom           | ▣▣▣▣ p. 10 - 138 |
| <b>4</b> | Current hoist rope position display          | ▣▣▣▣ p. 10 - 138 |
| <b>5</b> | - Hoist rope travel limitation input, top    | ▣▣▣▣ p. 10 - 138 |
|          | - Upper Hoist rope travel limitation display | ▣▣▣▣ p. 10 - 135 |
| <b>6</b> | - Hoist rope travel limitation input, bottom | ▣▣▣▣ p. 10 - 138 |
|          | - Hoist rope travel limitation input, bottom | ▣▣▣▣ p. 10 - 135 |

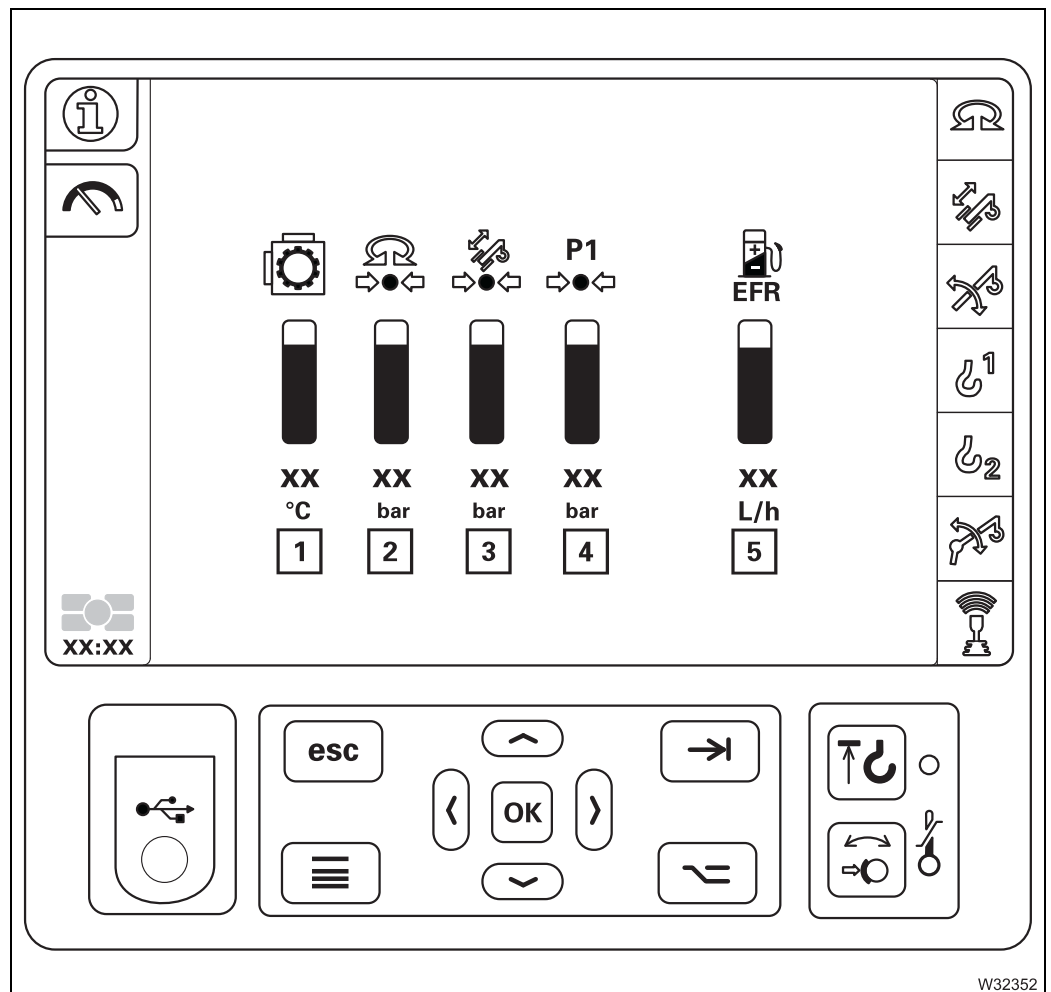
### 8.1.13 Information 1 menu group



W36063

- 1 Hydraulic pressure and fuel consumption menu      ■■■▶ p. 8 - 49
- 2 Datalogger menu      ■■■▶ p. 8 - 50

**Hydraulic pressure  
and fuel  
consumption  
menu**



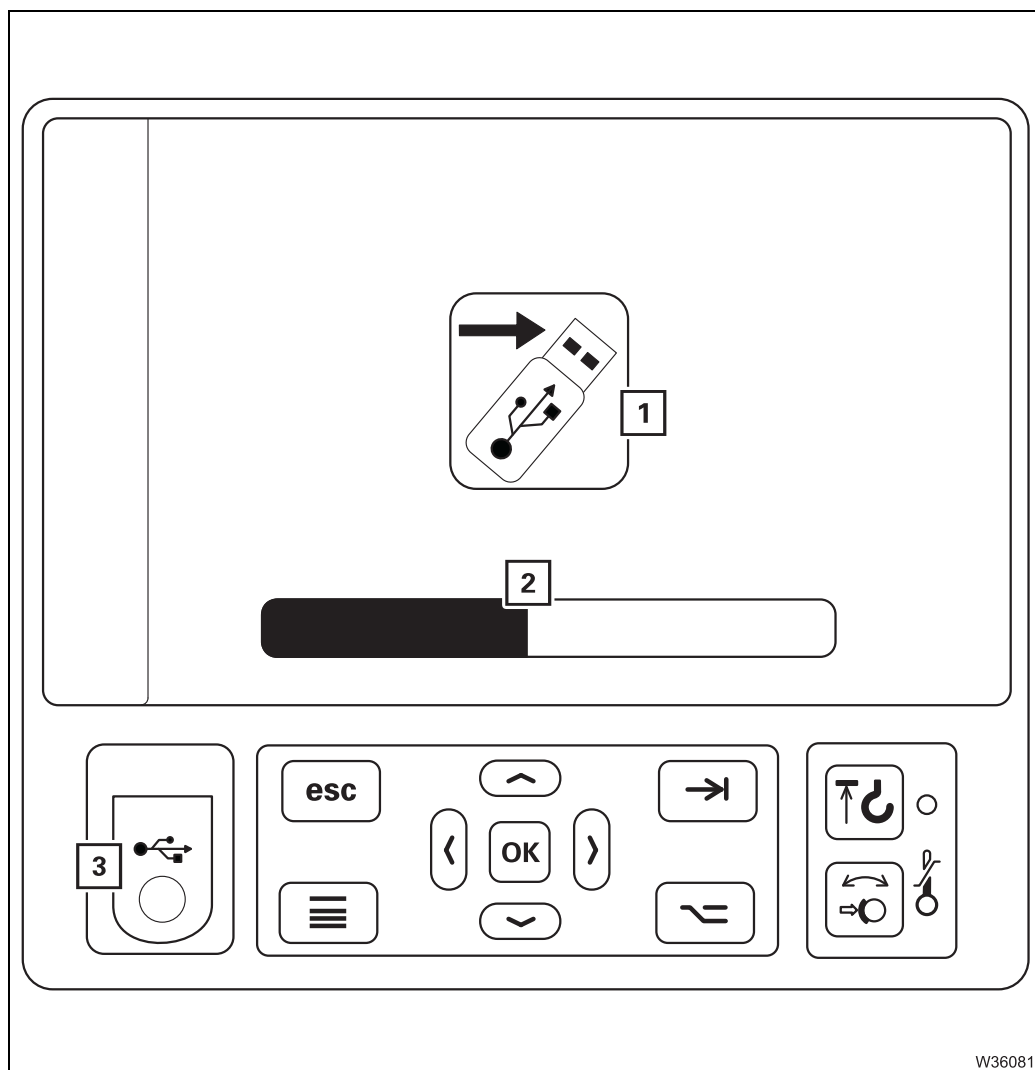
W32352

- |   |   |                 |
|---|---|-----------------|
| 1 | Angle gear temperature display                          | ▣▣▣▣ p. 8 - 123 |
| 2 | Slewing gear hydraulic circuit pressure display         | ▣▣▣▣ p. 8 - 123 |
| 3 | Telescoping cylinder pressure display                   | ▣▣▣▣ p. 8 - 123 |
| 4 | Hydraulic circuit pressure display                      | ▣▣▣▣ p. 8 - 123 |
| 5 | Display of consumption in litres per hour <sup>1)</sup> |                 |

<sup>1)</sup> Additional equipment

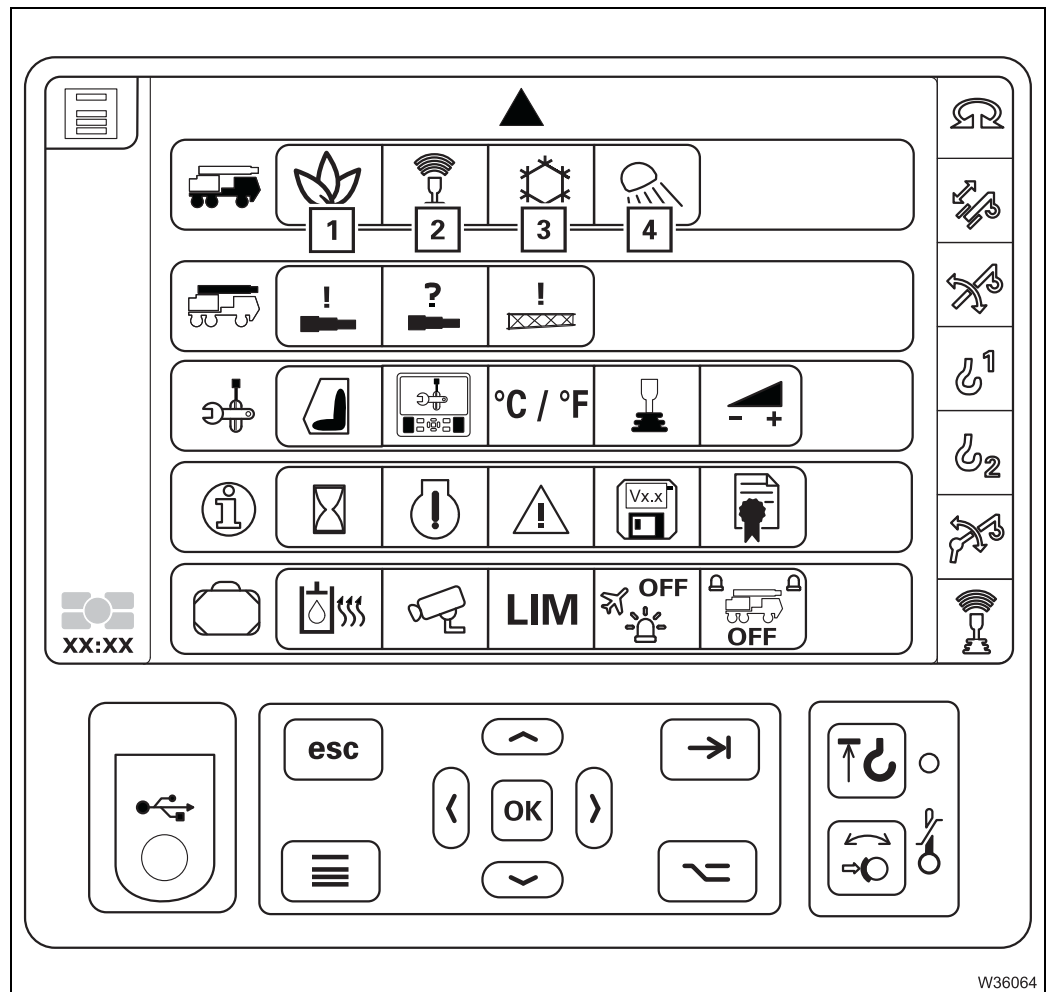


## Datalogger menu



- |                                  |                  |
|----------------------------------|------------------|
| 1 Export data                    | ▣▣▣▣▶ p. 8 - 136 |
| 2 Display of export progress     | ▣▣▣▣▶ p. 8 - 136 |
| 3 USB connection for data export | ▣▣▣▣▶ p. 8 - 136 |

## 8.1.14 Heating/Engine/Additional equipment menu group

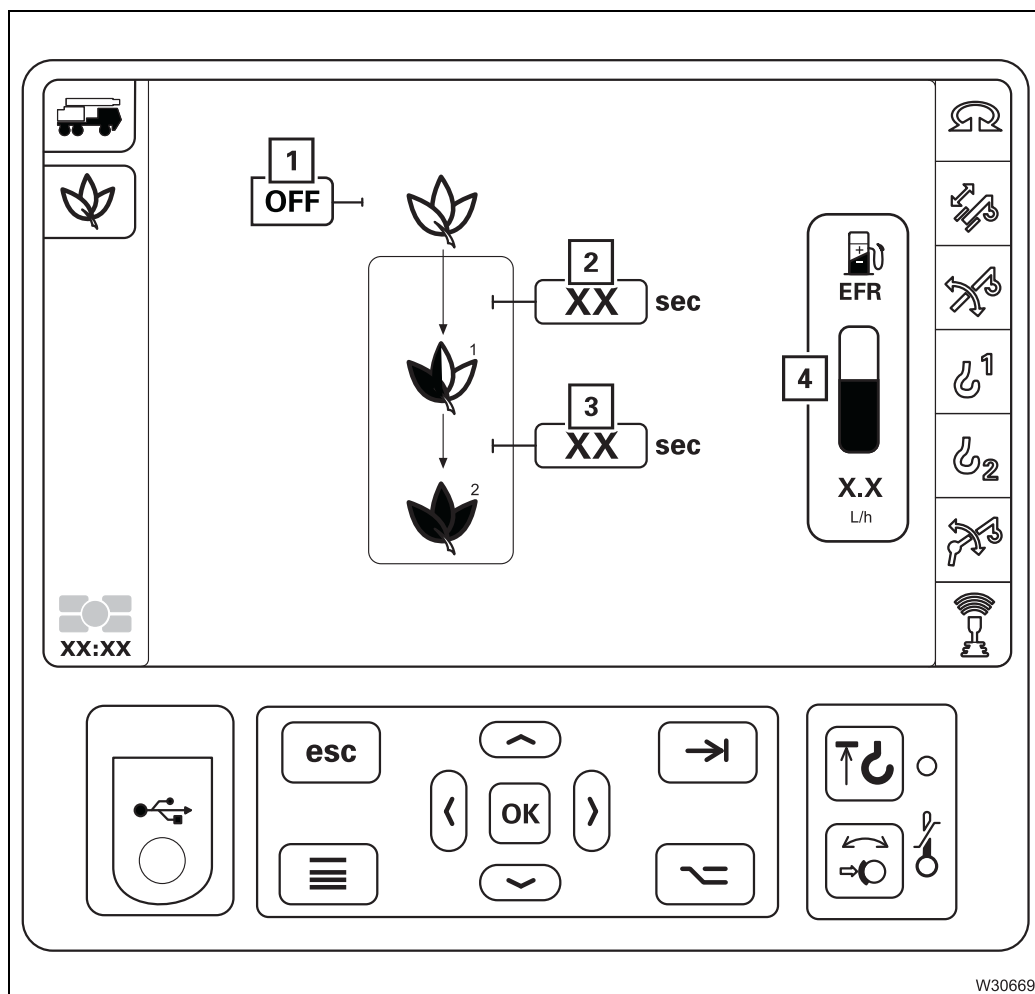


W36064

- |  |                |
|--|----------------|
| <b>1</b> Economy menu                  | ▣▣▣▣ p. 8 - 52 |
| <b>2</b> Remote control menu           | ▣▣▣▣ p. 8 - 53 |
| <b>3</b> Heating/air-conditioning menu | ▣▣▣▣ p. 8 - 54 |
| <b>4</b> Spotlights menu               | ▣▣▣▣ p. 8 - 55 |

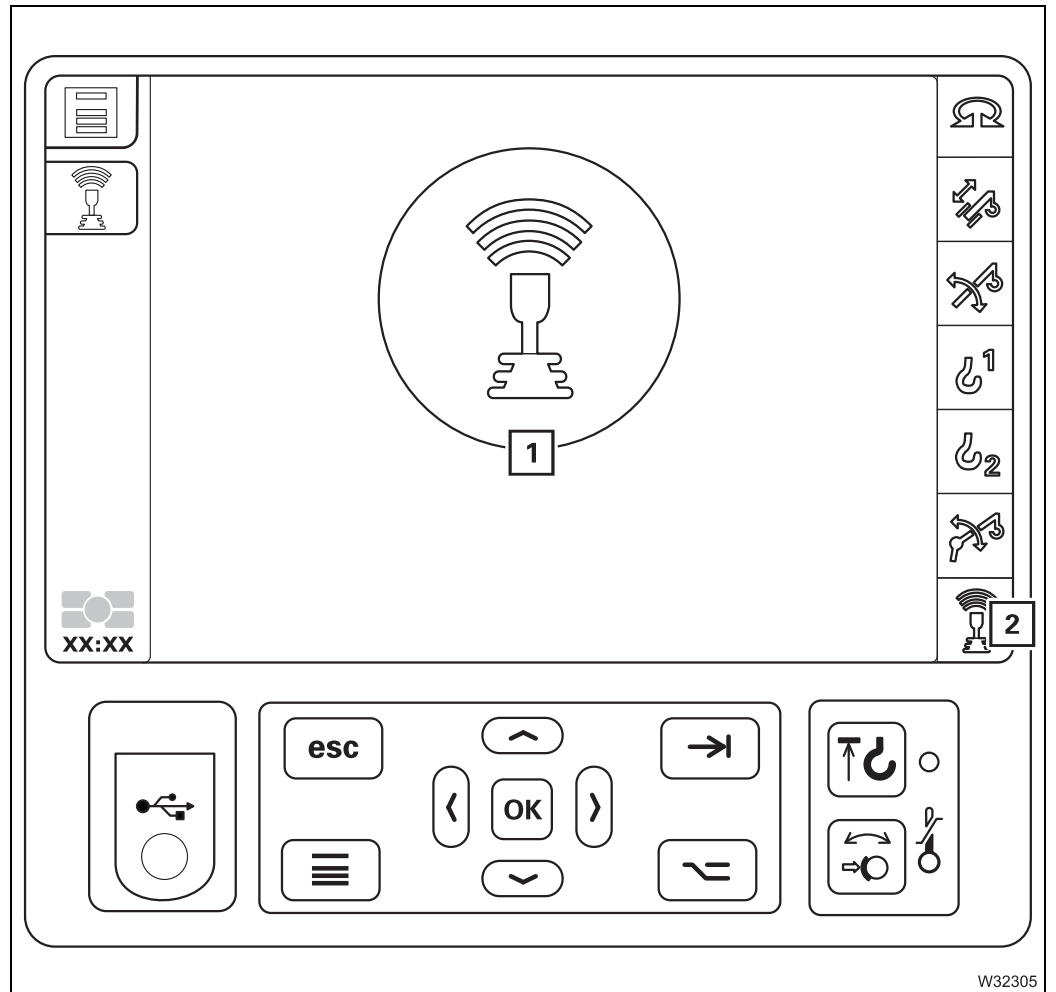


## Economy menu



- |   |                                   |             |
|---|-----------------------------------|-------------|
| 1 | Switching off Economy mode on/off | ➡ p. 8 - 86 |
| 2 | Setting interval I                | ➡ p. 8 - 86 |
| 3 | Setting interval II               | ➡ p. 8 - 86 |
| 4 | Average consumption display       | ➡ p. 8 - 86 |

## Remote control menu



W32305

**1** Remote control menu

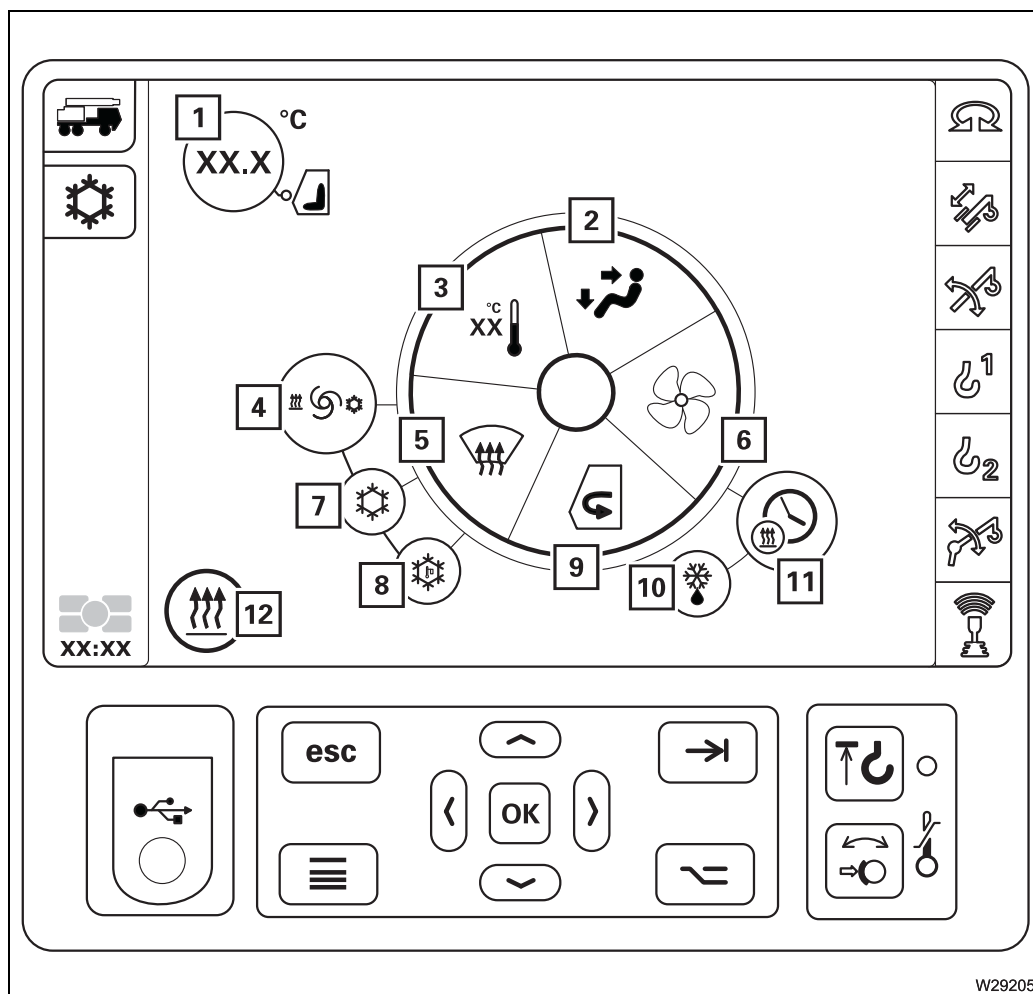
▣▣▣▣ p. 8 - 126

**2** Remote control display

▣▣▣▣ p. 8 - 126



## Heating/air-conditioning menu



W29205

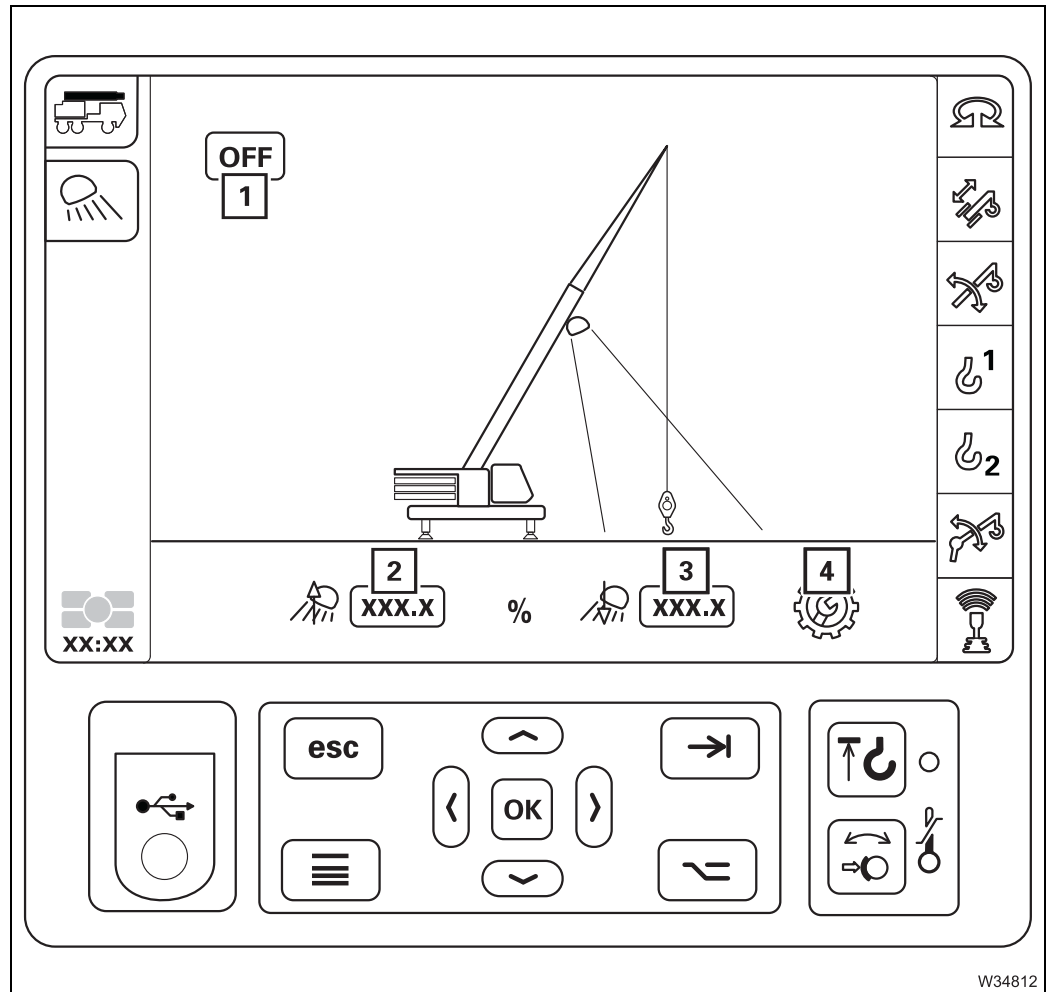
- |                                     |                  |
|-------------------------------------|------------------|
| 1 Outdoor temperature display       | ▣▣▣▣ p. 10 - 147 |
| 2 Setting the air distribution      | ▣▣▣▣ p. 10 - 148 |
| 3 Setting the temperature           | ▣▣▣▣ p. 10 - 147 |
| 4 Automatic air-conditioning system | ▣▣▣▣ p. 10 - 150 |
| 5 Defrosting the windscreen         | ▣▣▣▣ p. 10 - 147 |
| 6 Setting the fan                   | ▣▣▣▣ p. 10 - 147 |
| 7 Air-conditioning system on/off    | ▣▣▣▣ p. 10 - 149 |
| 8 Cooling, maximum                  | ▣▣▣▣ p. 10 - 150 |
| 9 Recirculated air mode             | ▣▣▣▣ p. 10 - 147 |
| 10 Frost Guard <sup>1) 2)</sup>     |                  |
| 11 Setting the auxiliary heating    | ▣▣▣▣ p. 10 - 151 |
| 12 Heating on display               | ▣▣▣▣ p. 10 - 147 |

1) Additional equipment

2) ▣▣▣▣ *Separate operating instructions*



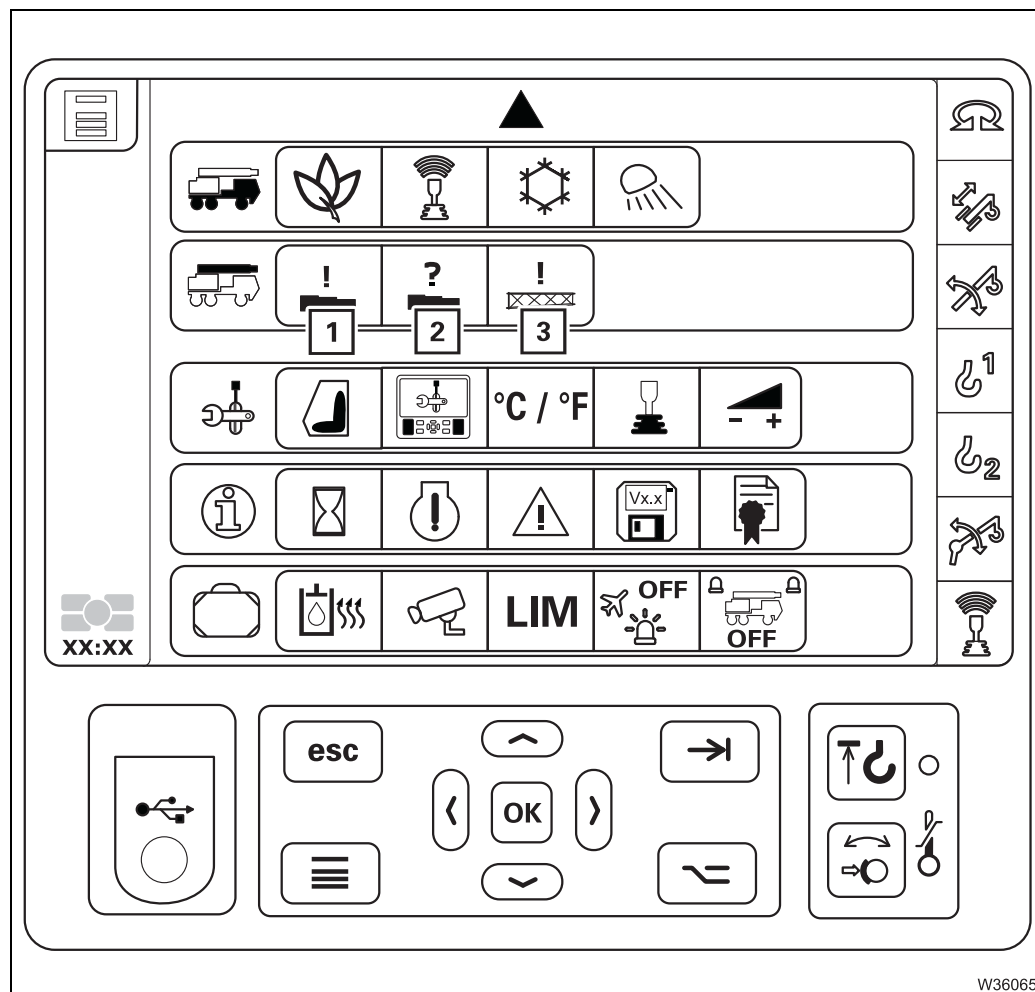
## Spotlights menu



- |  |                 |
|--|-----------------|
| <b>1</b> Switching automatic spotlights on/off | ▣▣▣▣ p. 8 - 140 |
| <b>2</b> Increase the slewing speed            | ▣▣▣▣ p. 8 - 140 |
| <b>3</b> Reduce the slewing speed              | ▣▣▣▣ p. 8 - 140 |
| <b>4</b> Opening/closing the Settings submenu  | ▣▣▣▣ p. 8 - 140 |

## 8.1.15

### Telescoping emergency program menu group

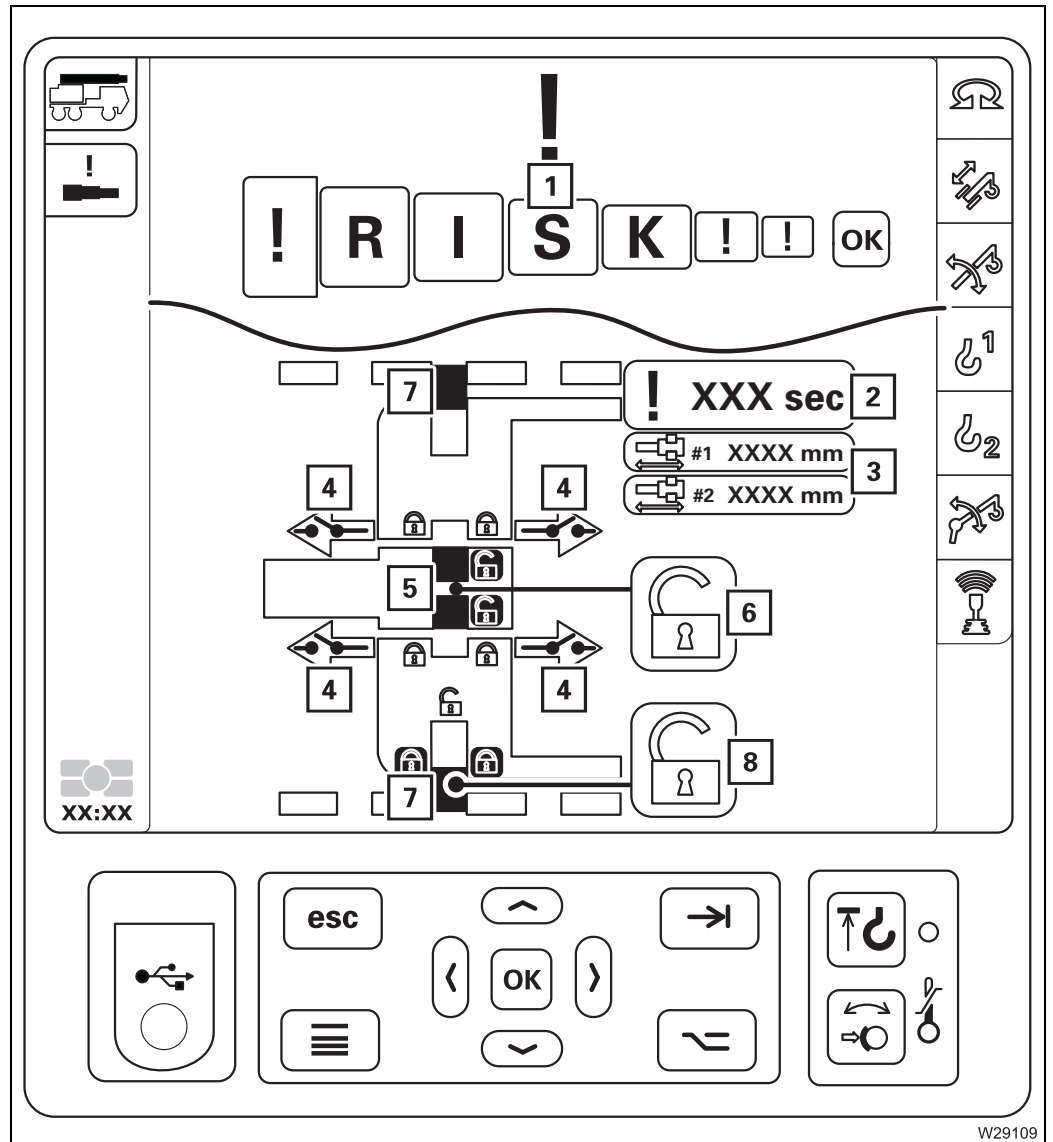


W36065

- 1 Telescoping emergency program menu ▶▶▶ p. 8 - 57
- 2 Unknown telescoping menu ▶▶▶ p. 8 - 58
- 3 Swinging the swing-away lattice emergency operation menu ▶▶▶ p. 8 - 59

1) Additional equipment

**Telescoping  
emergency  
program menu**

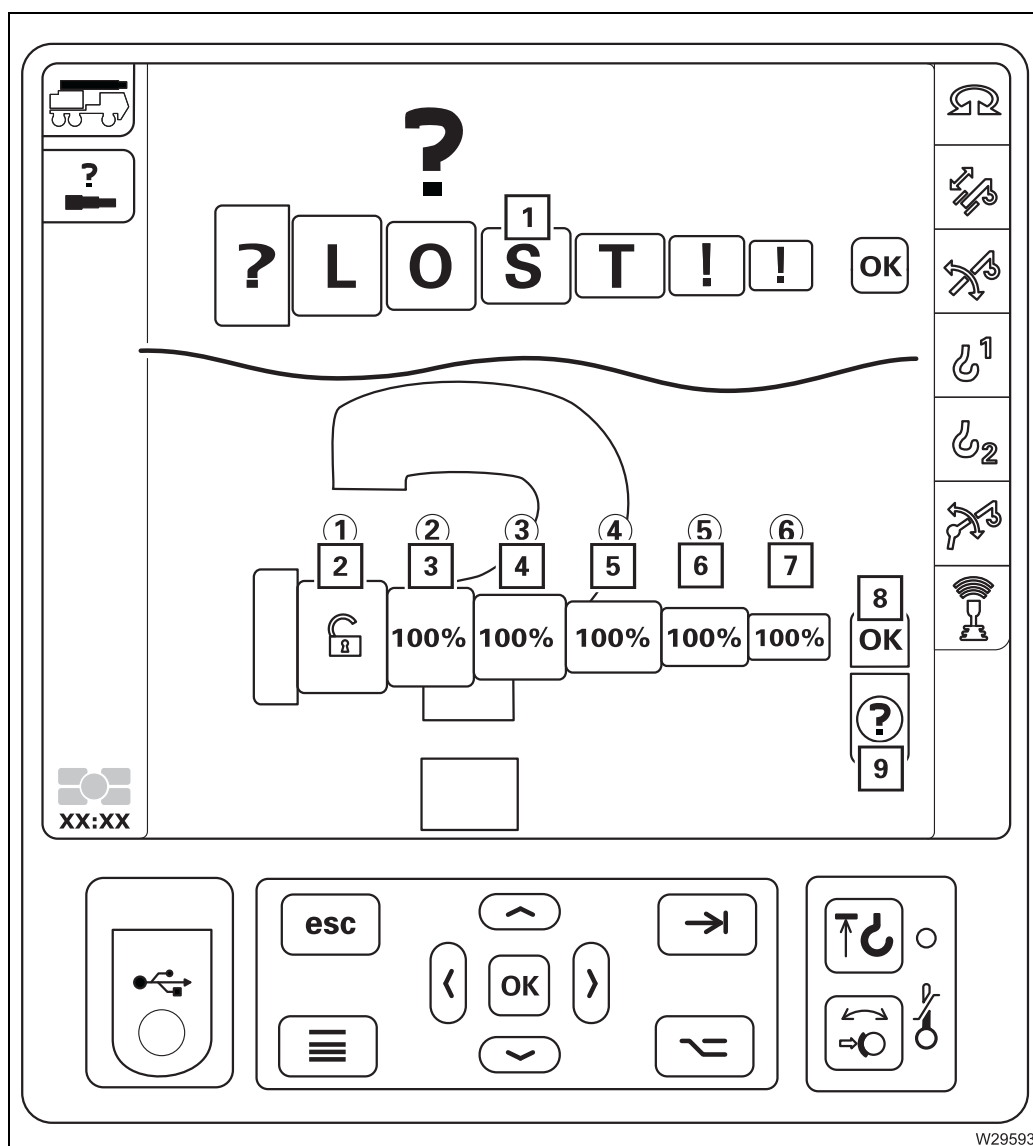


W29109

- |   |                  |
|---|------------------|
| 1 Input access code emergency program         | ▣▣▣▣▶ p. 14 - 29 |
| 2 Remaining time emergency program display    | ▣▣▣▣▶ p. 14 - 29 |
| 3 Telescoping cylinder length display         | ▣▣▣▣▶ p. 14 - 29 |
| 4 Proximity switch display                    | ▣▣▣▣▶ p. 14 - 29 |
| 5 Locking status telescoping cylinder display | ▣▣▣▣▶ p. 14 - 29 |
| 6 Symbol lock/release telescoping cylinder    | ▣▣▣▣▶ p. 14 - 29 |
| 7 Locking status telescopic section display   | ▣▣▣▣▶ p. 14 - 29 |
| 8 Symbol lock/release telescopic section      | ▣▣▣▣▶ p. 14 - 29 |

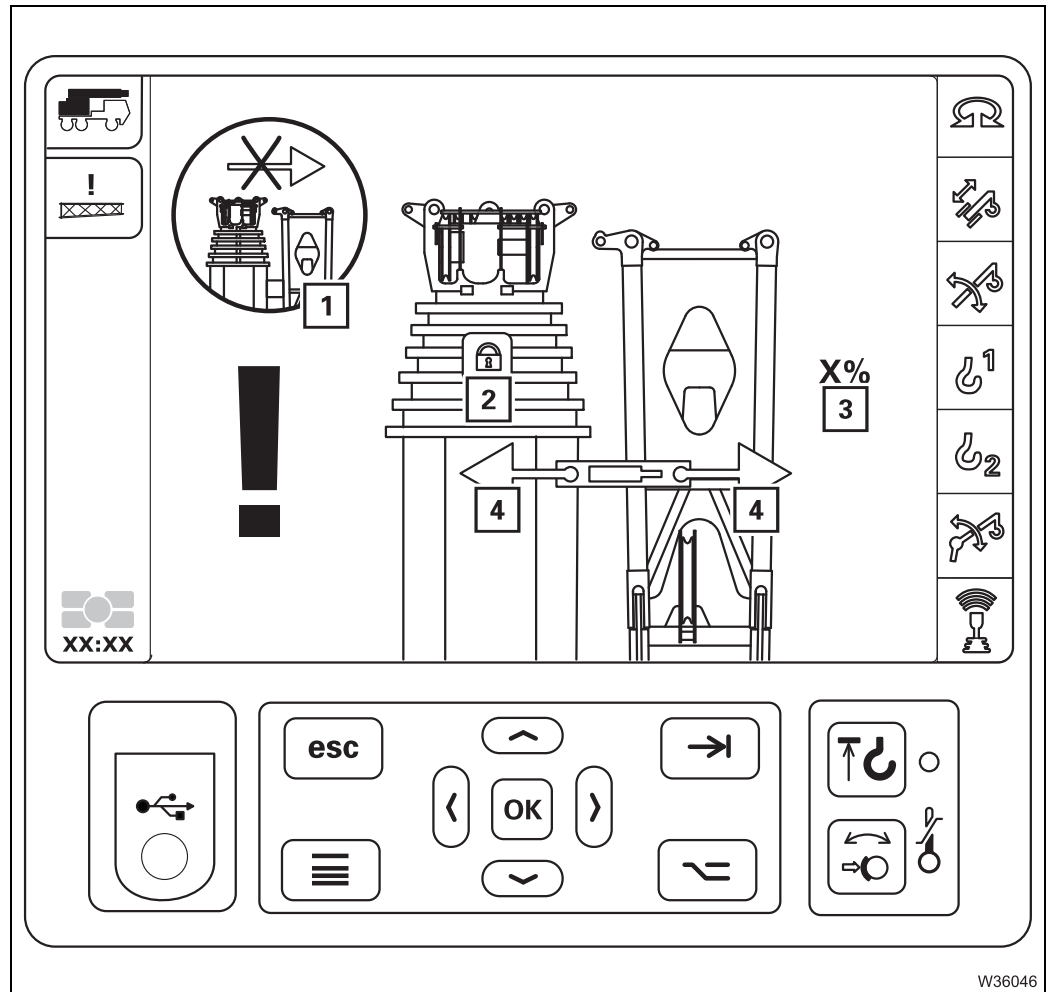


## Unknown telescoping menu



- |   |   |                 |
|---|---|-----------------|
| 1 | Input access code unknown telescoping       | ▣▣▣▣ p. 14 - 39 |
| 2 | Input for telescopic section 1              | ▣▣▣▣ p. 14 - 39 |
| 3 | Input for telescopic section 2              | ▣▣▣▣ p. 14 - 39 |
| 4 | Input for telescopic section 3              | ▣▣▣▣ p. 14 - 39 |
| 5 | Input for telescopic section 4              | ▣▣▣▣ p. 14 - 39 |
| 6 | Input for telescopic section 5              | ▣▣▣▣ p. 14 - 39 |
| 7 | Input for telescopic section 6              | ▣▣▣▣ p. 14 - 39 |
| 8 | Input confirmation                          | ▣▣▣▣ p. 14 - 39 |
| 9 | Telescoping permitted/not permitted display | ▣▣▣▣ p. 14 - 39 |

**Swinging the  
swing-away  
lattice emergency  
operation menu**

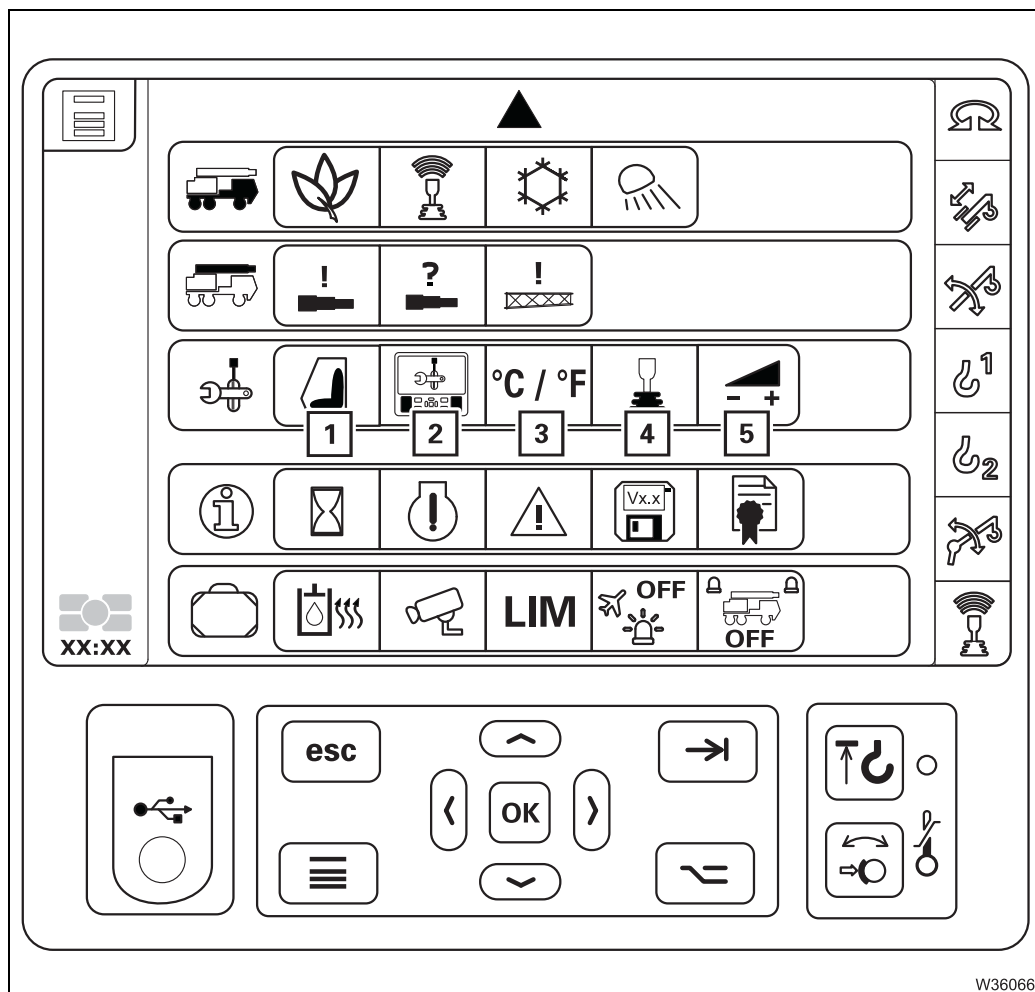


W36046

- 1 Locked automatic slewing warning message
  - 2 Enable/disable telescoping
  - 3 Telescoping cylinder length display
  - 4 Extending/retracting the swivel ram
- ▣► *Operating Instructions Lattice Extension*

## 8.1.16

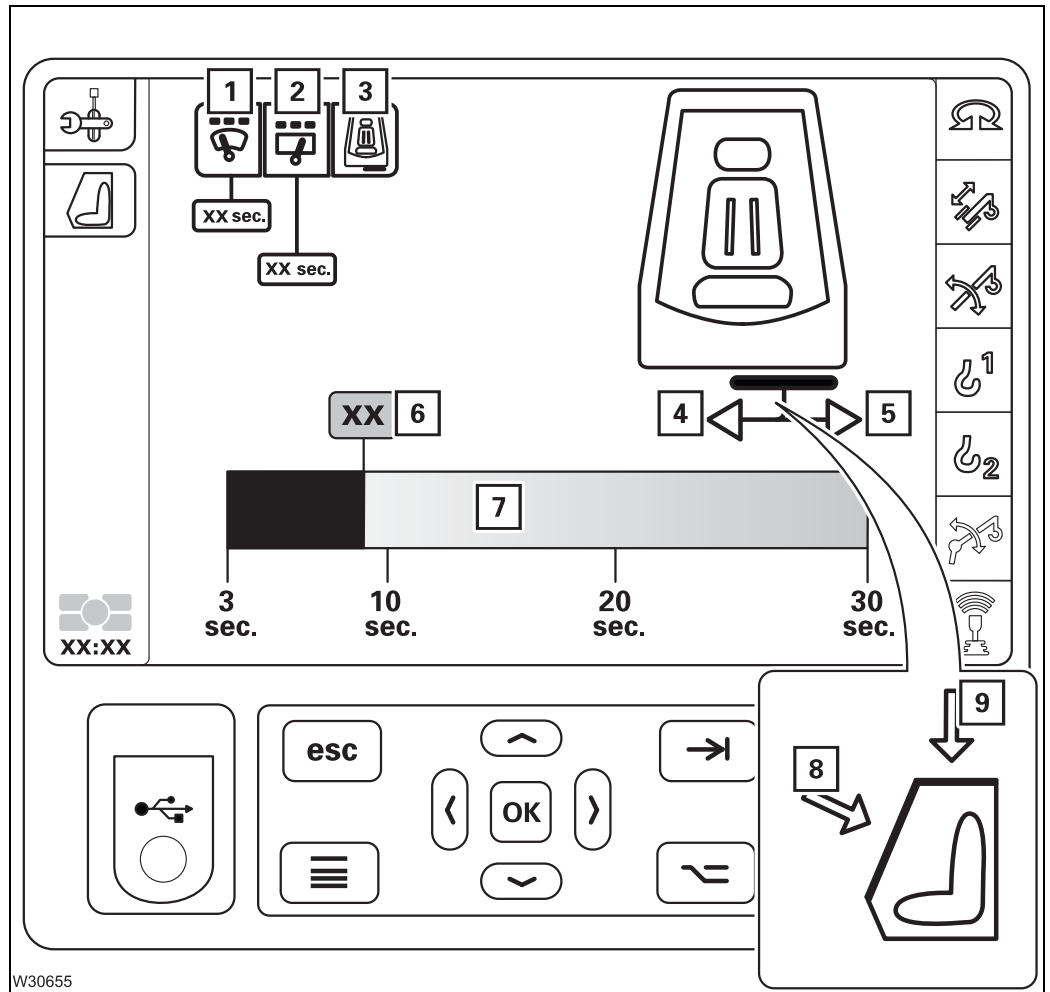
### Settings menu group



- |   |                 |
|---|-----------------|
| 1 Crane cab menu                              | ▣▣▣▣▶ p. 8 - 61 |
| 2 Set display brightness and date/time menu   | ▣▣▣▣▶ p. 8 - 62 |
| 3 Switch units menu                           | ▣▣▣▣▶ p. 8 - 63 |
| 4 Set control lever characteristic curve menu | ▣▣▣▣▶ p. 8 - 64 |
| 5 Power unit speeds menu                      | ▣▣▣▣▶ p. 8 - 65 |

1) Additional equipment

## Crane cab menu



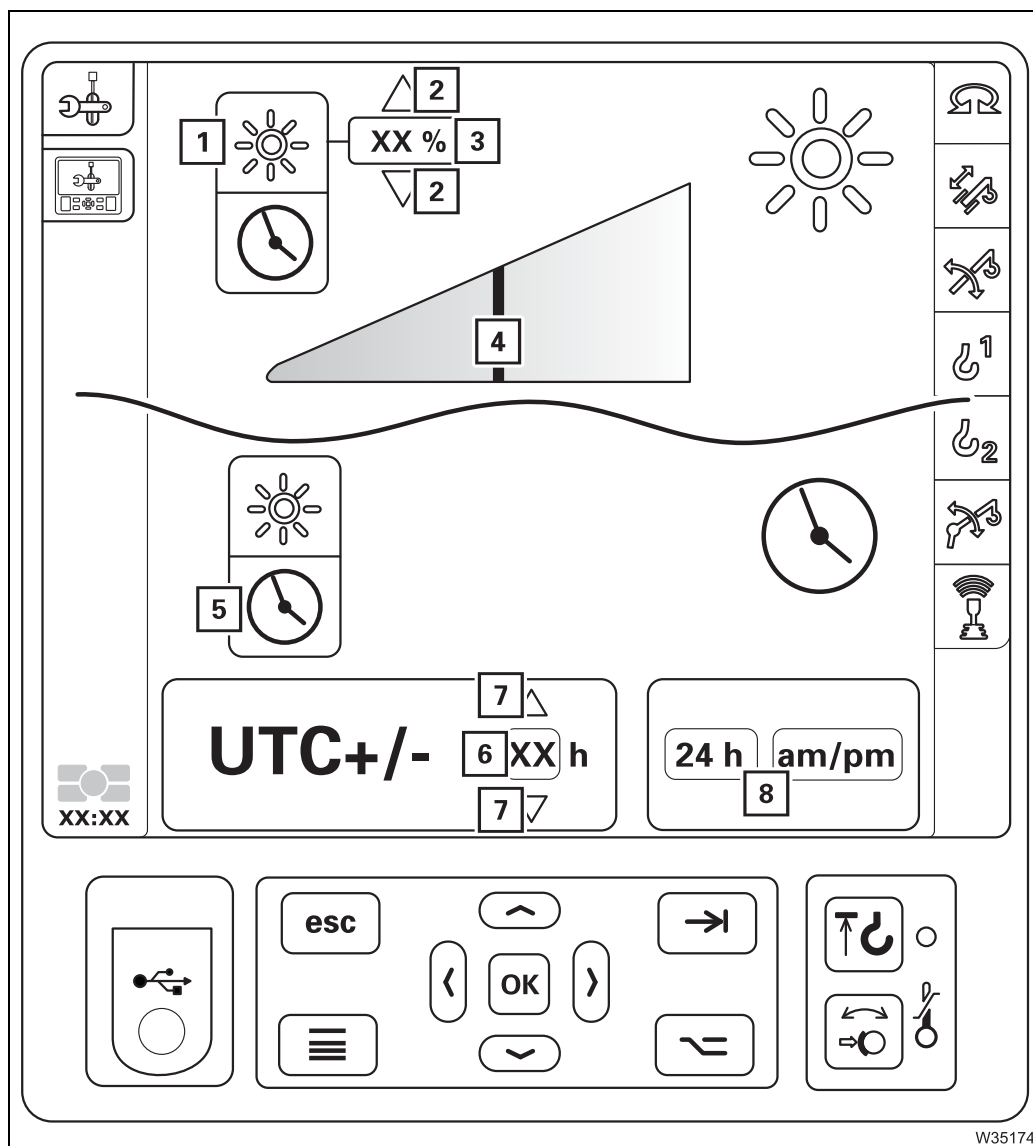
W30655

- |          |   |                  |
|----------|---|------------------|
| <b>1</b> | Windscreen interval duration selection/display  | ▣▣▣▣ p. 8 - 142  |
| <b>2</b> | Selection/display of skylight interval duration | ▣▣▣▣ p. 8 - 142  |
| <b>3</b> | Retract/extend step selection                   | ▣▣▣▣ p. 11 - 141 |
| <b>4</b> | Retract step                                    | ▣▣▣▣ p. 11 - 141 |
| <b>5</b> | Extend step                                     | ▣▣▣▣ p. 11 - 141 |
| <b>6</b> | Adjust interval selection                       | ▣▣▣▣ p. 8 - 142  |
| <b>7</b> | Adjust interval display                         | ▣▣▣▣ p. 8 - 142  |
| <b>8</b> | Windscreen selected display                     | ▣▣▣▣ p. 8 - 142  |
| <b>9</b> | Skylight selected display                       | ▣▣▣▣ p. 8 - 142  |



**Set display brightness and date/time menu**

This is operated in the same way as in the driver's cab.

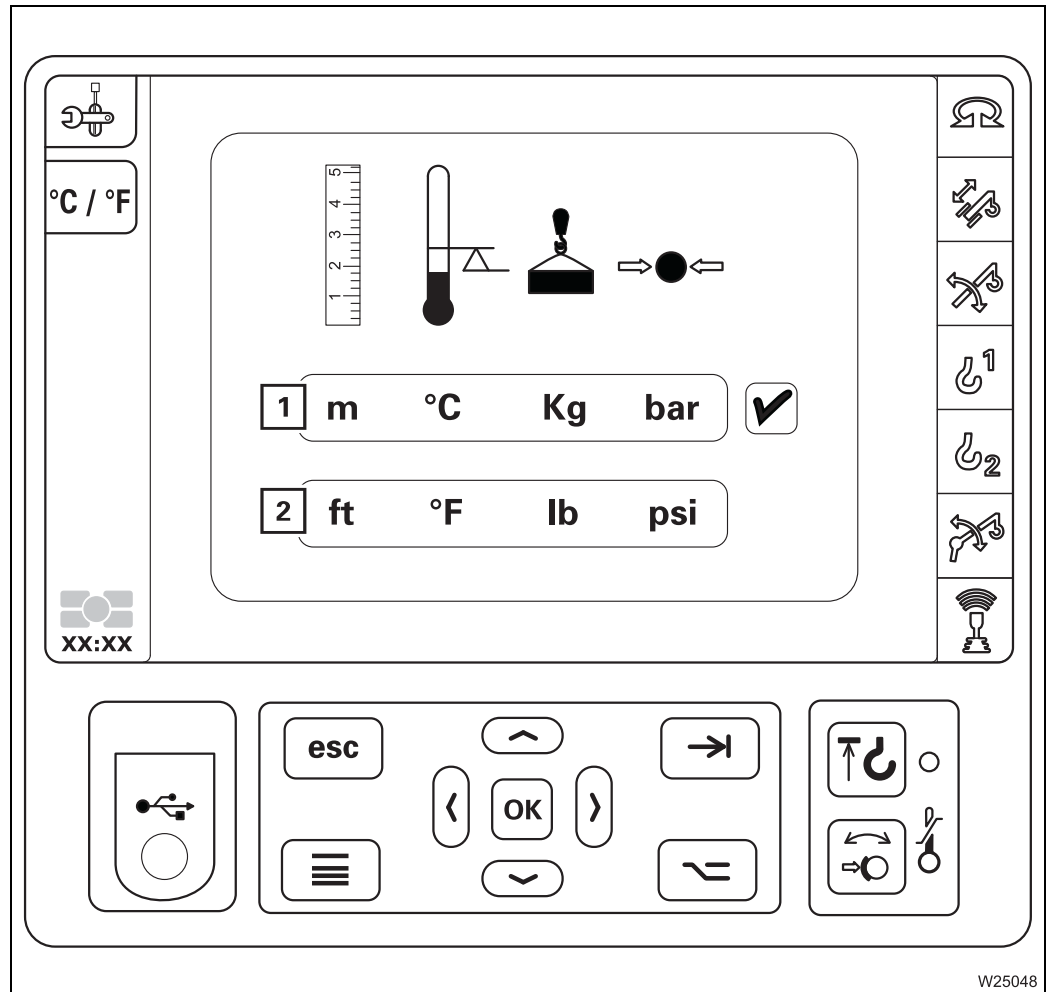


W35174

- |          |  |             |
|----------|--|-------------|
| <b>1</b> | Selection setting the display brightness | ➡ p. 4 - 13 |
| <b>2</b> | Increasing/reducing the value            | ➡ p. 4 - 13 |
| <b>3</b> | Display in percentage                    | ➡ p. 4 - 13 |
| <b>4</b> | Brightness display                       | ➡ p. 4 - 13 |
| <b>5</b> | Adjust time selection                    | ➡ p. 5 - 22 |
| <b>6</b> | Setting the time                         | ➡ p. 5 - 22 |
| <b>7</b> | Increasing/reducing the value            | ➡ p. 5 - 22 |
| <b>8</b> | Switching the display type               | ➡ p. 5 - 22 |



## Switch units menu



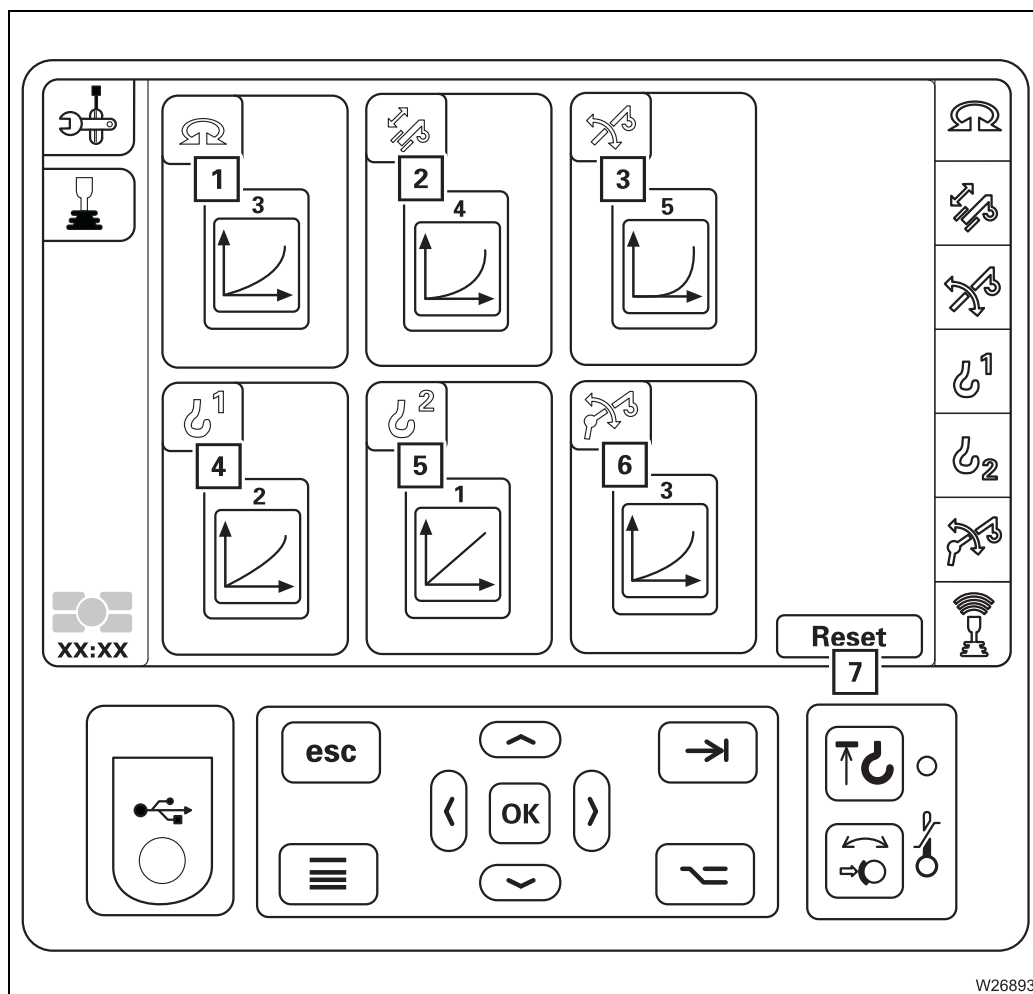
- 1 Display units in:
  - Metres
  - Degrees Celsius
  - Kilograms
  - Bar

➡ p. 10 - 125

- 2 Display units in:
  - Feet
  - Degrees Fahrenheit
  - lbs
  - Psi



**Set control lever  
characteristic  
curve menu**

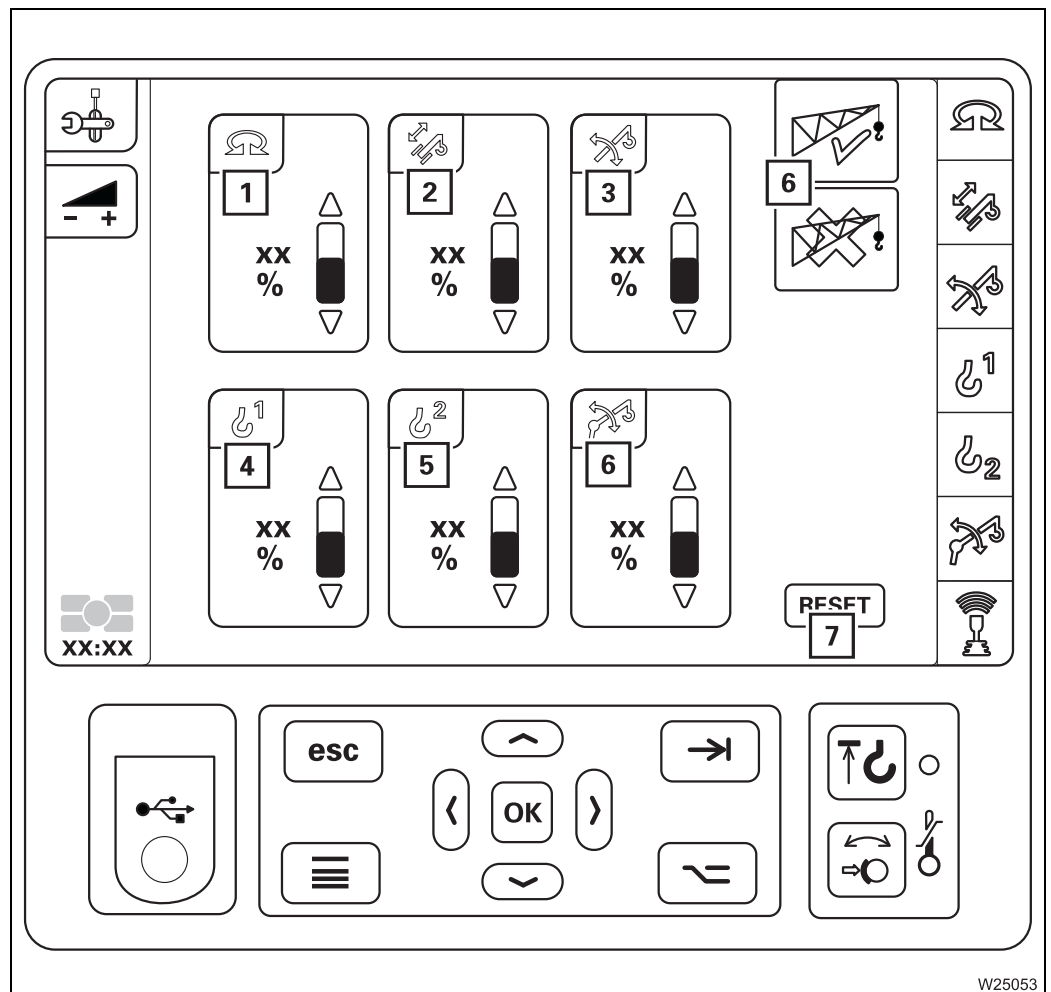


- 1 Characteristic curve slewing gear
- 2 Characteristic curve telescoping mechanism
- 3 Characteristic curve derricking gear
- 4 Characteristic curve main hoist
- 5 Auxiliary hoist<sup>1)</sup> characteristic curve
- 6 Lattice extension<sup>1)</sup> characteristic curve
- 7 Setting Reset characteristic curve

▣ p. 10 - 126

<sup>1)</sup> Additional equipment

## Power unit speeds menu



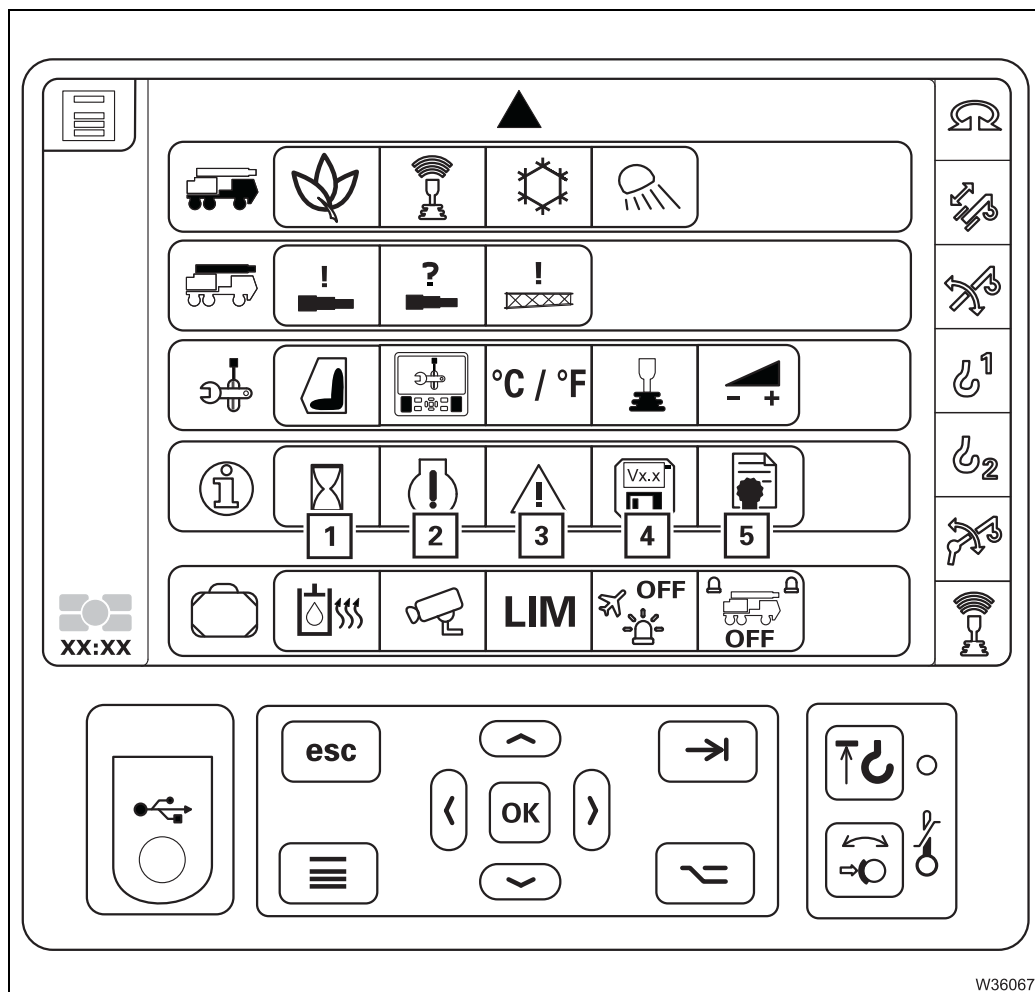
- 1 Enter slewing gear speed
- 2 Enter telescoping mechanism speed
- 3 Enter derricking gear speed
- 4 Enter speed – main hoist
- 5 Enter speed – auxiliary hoist<sup>1)</sup>
- 6 Enter speed for lattice extension derricking gear<sup>1)</sup>
- 7 Reset power unit speed settings

▮▮▮▮▶ p. 10 - 123

<sup>1)</sup> Additional equipment

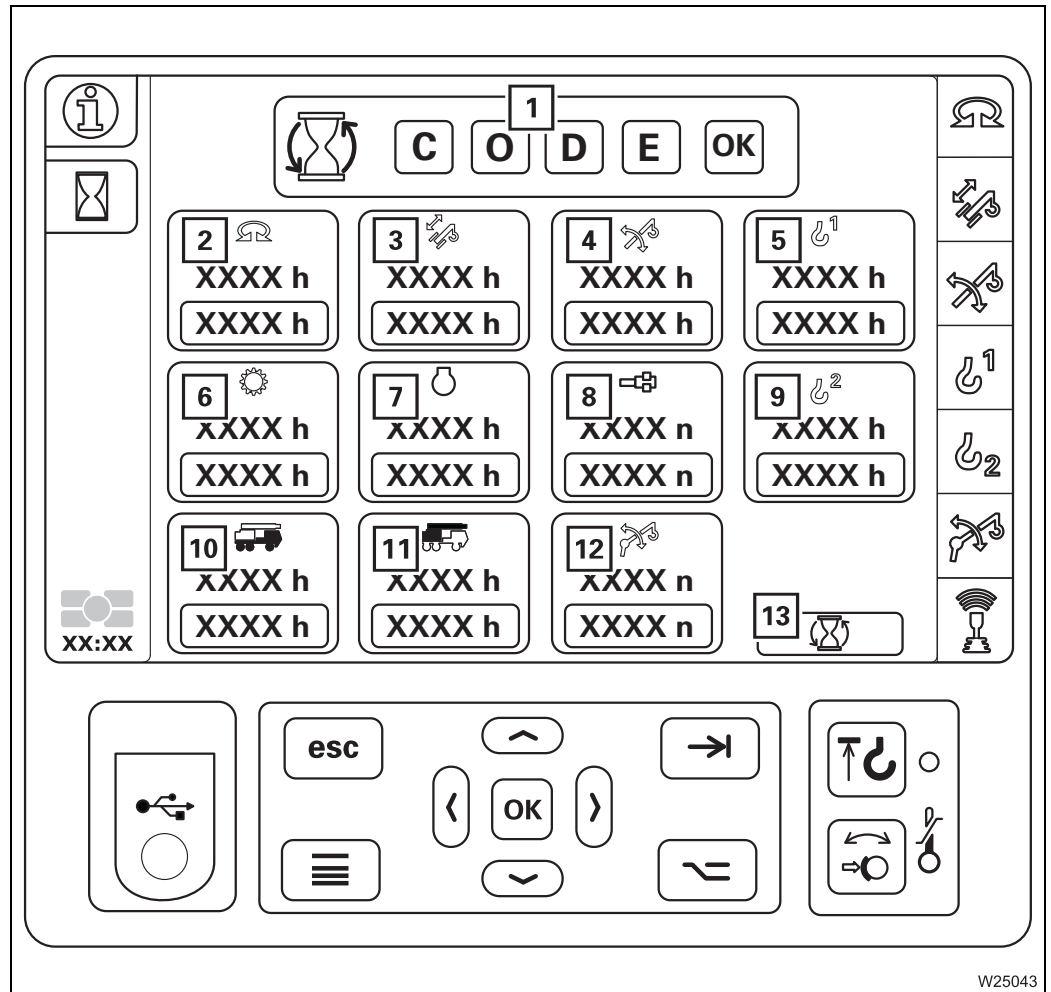
**8.1.17**

**Information 2 menu group**



- |                                  |                  |
|----------------------------------|------------------|
| 1 Operating hours menu           | ▮▮▮▮▶ p. 8 - 67  |
| 2 Engine/transmission error menu | ▮▮▮▮▶ p. 8 - 68  |
| 3 Crane operation error menu     | ▮▮▮▮▶ p. 8 - 69  |
| 4 Program version menu           | ▮▮▮▮▶ p. 8 - 70  |
| 5 Disclaimer menu                | ▮▮▮▮▶ p. 8 - 150 |

## Operating hours menu



W25043

- 1 Keycode entry and confirmation
- 2 Slewing gear
- 3 Telescoping mechanism
- 4 Derricking gear
- 5 Main hoist
- 6 Transmission
- 7 Engine
- 8 Locking system
- 9 Auxiliary hoist
- 10 Carrier
- 11 Superstructure
- 12 Lattice extension- luffing jib<sup>1)</sup>
- 13 Selection all

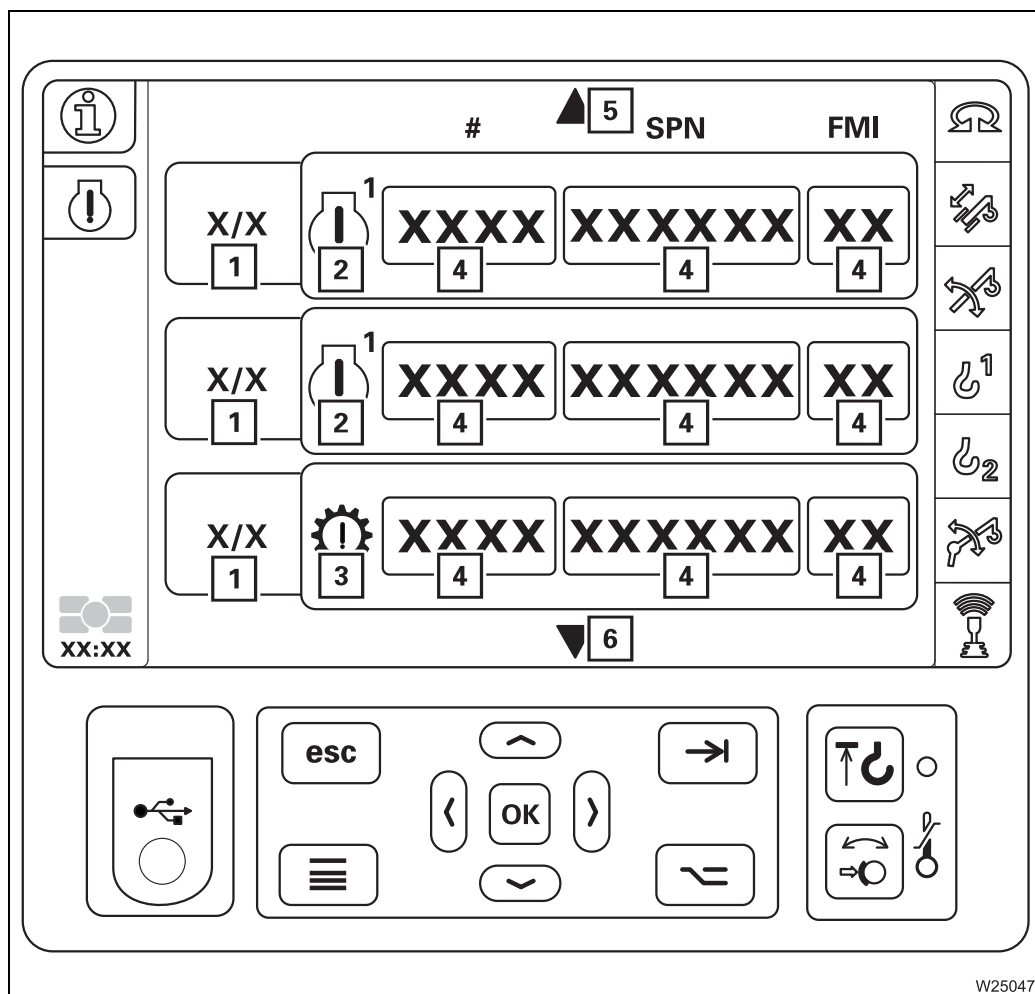
➡ p. 10 - 130

<sup>1)</sup> Additional equipment



**Engine/transmission error menu**

This is operated in the same way as in the driver's cab.

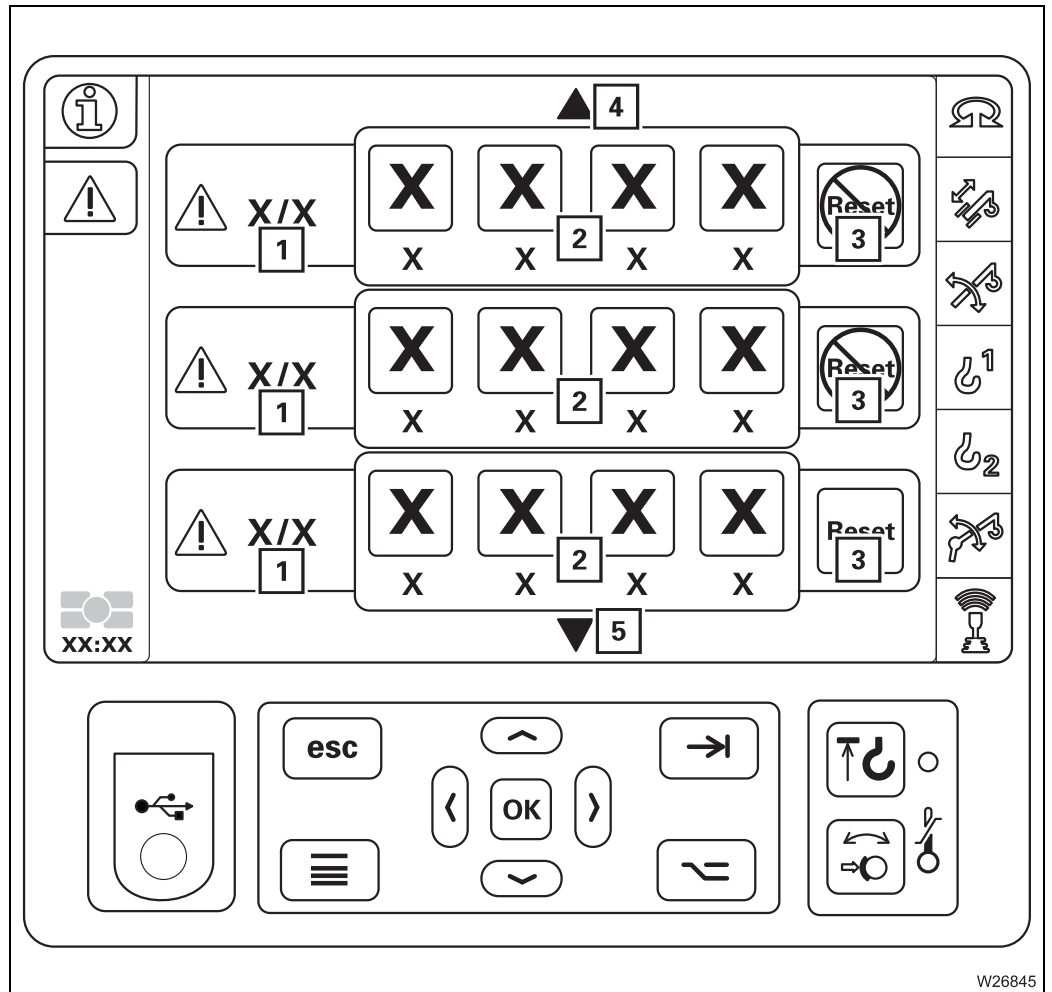


W25047

- 1 Display of error / total errors
- 2 Engine symbol display
- 3 Transmission symbol display
- 4 Error code display
- 5 Previous error
- 6 Next error

▶▶▶▶▶ p. 7 - 15

### Crane operation error menu



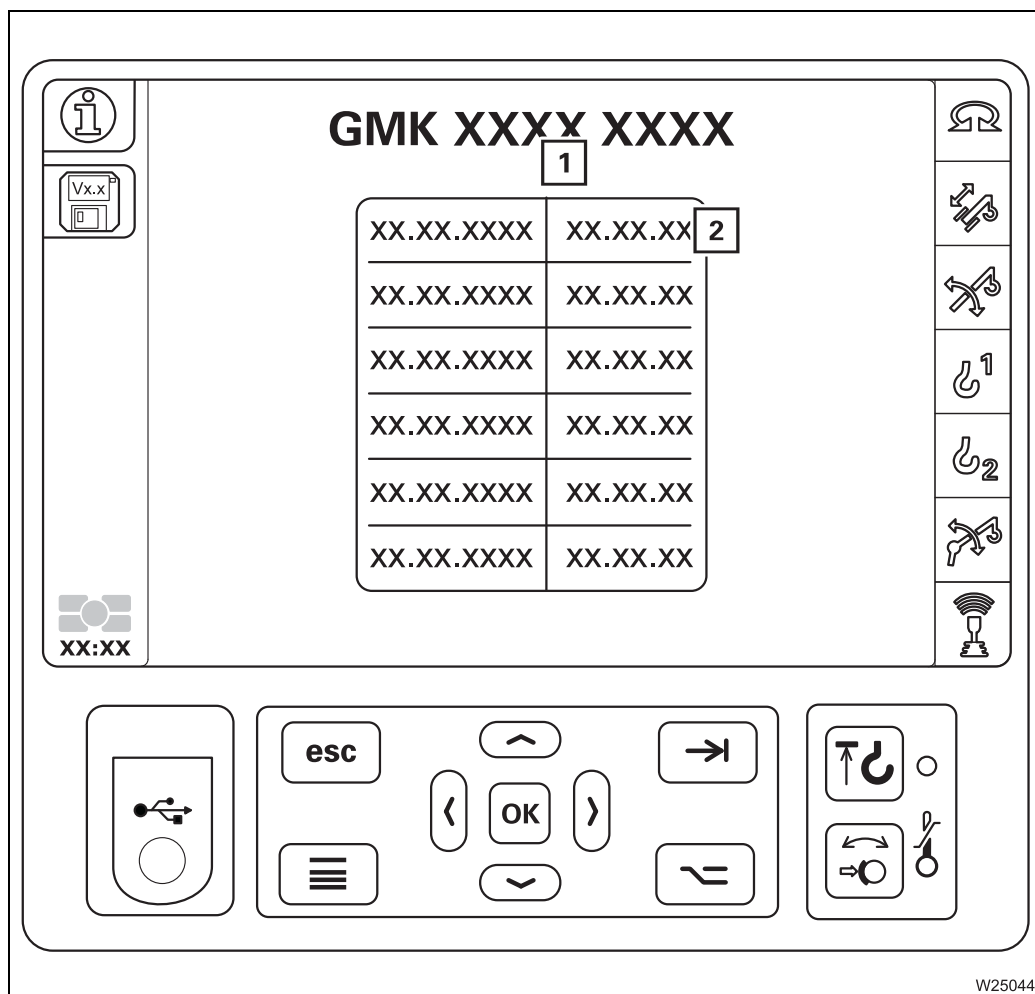
W26845

- 1 Display of error / total errors
- 2 Error message display
- 3 Acknowledge the error
- 4 Previous error
- 5 Next error

➡ p. 14 - 7



**Program version menu**



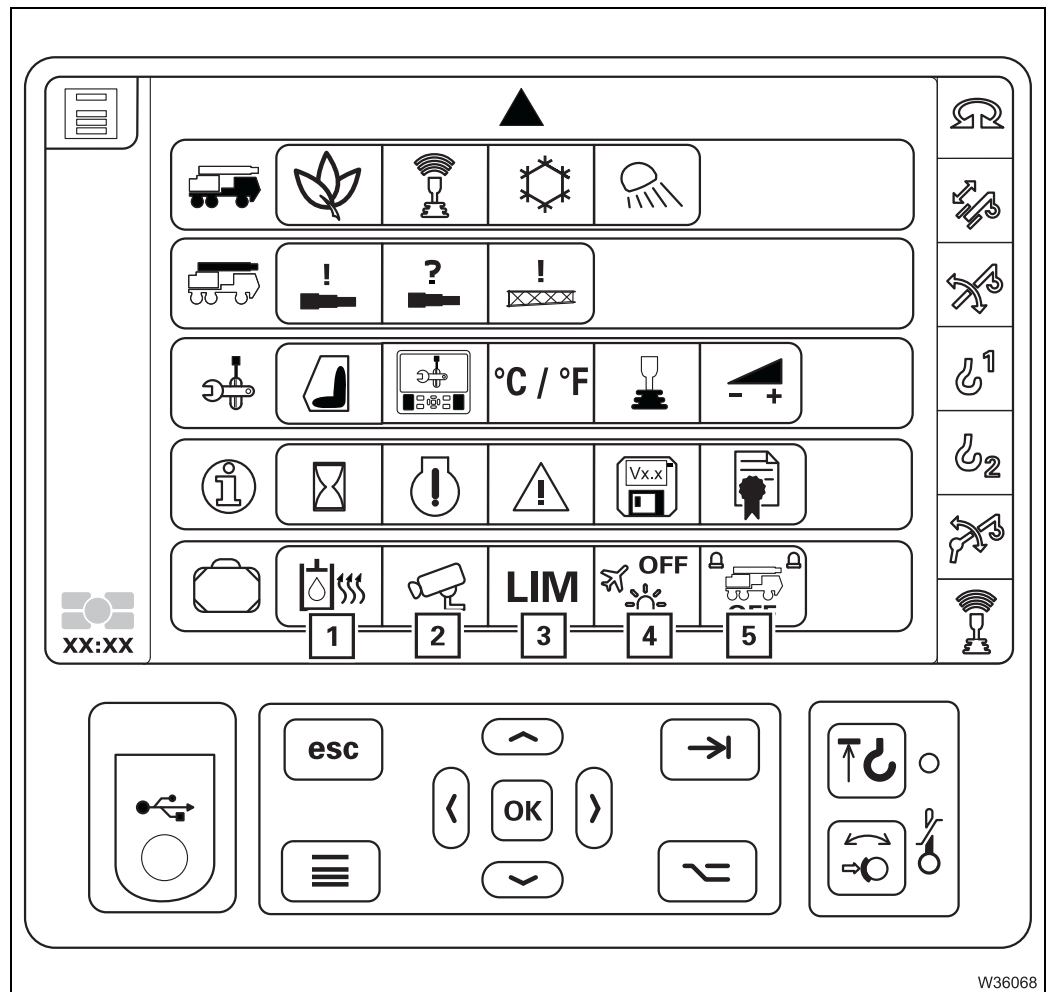
W25044

- 1** Serial number display
- 2** Program version display

- ▣ p. 14 - 3
- ▣ p. 14 - 3



## 8.1.18 Operation of various controls

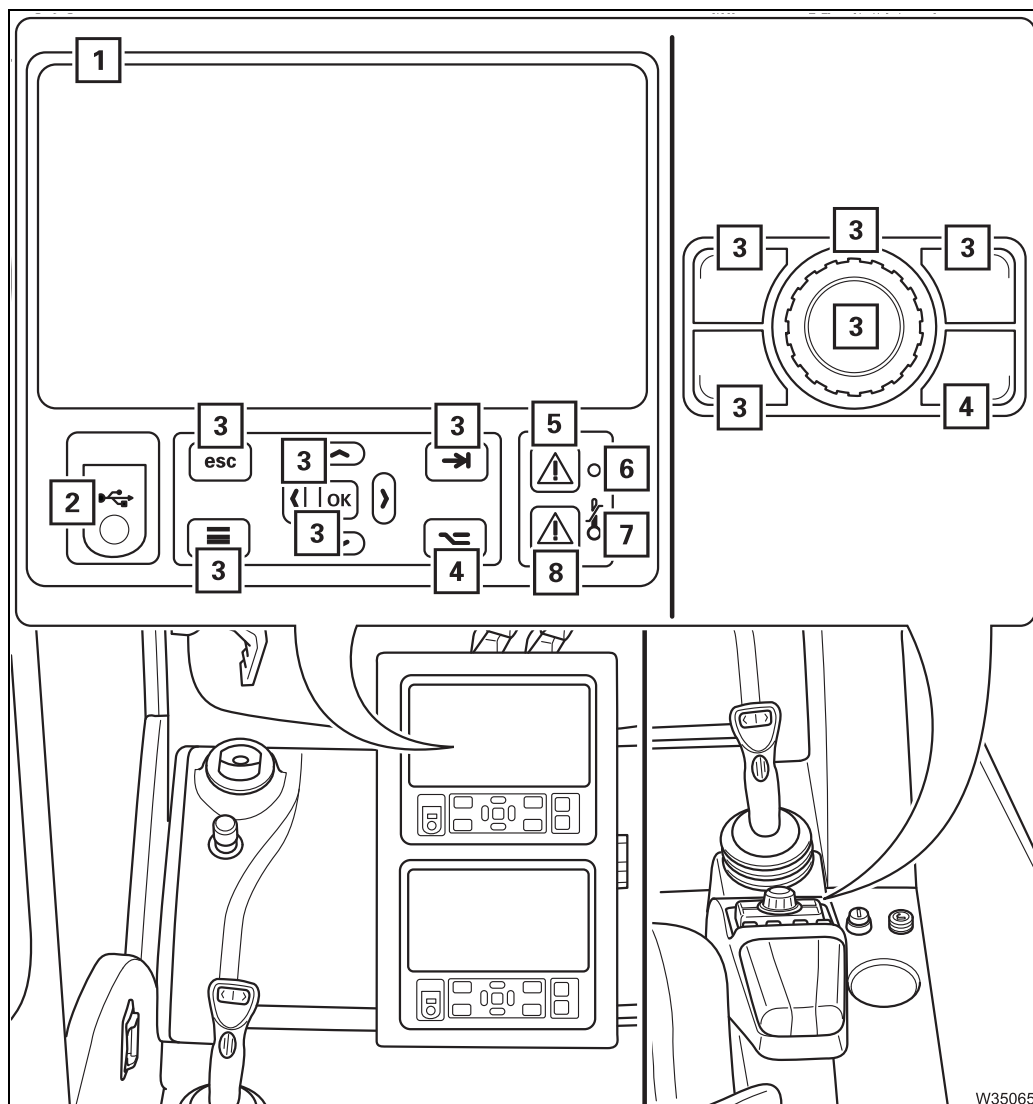


W36068

- |  |               |
|--|---------------|
| 1 Preheating the hydraulic oil         | ➡ p. 8 - 123  |
| 2 Camera on/off                        | ➡ p. 11 - 140 |
| 3 Override torque reduction            | ➡ p. 10 - 129 |
| 4 Air traffic control light on/off     | ➡ p. 11 - 127 |
| 5 Switching the rotating beacon on/off | ➡ p. 8 - 139  |

**8.1.19**

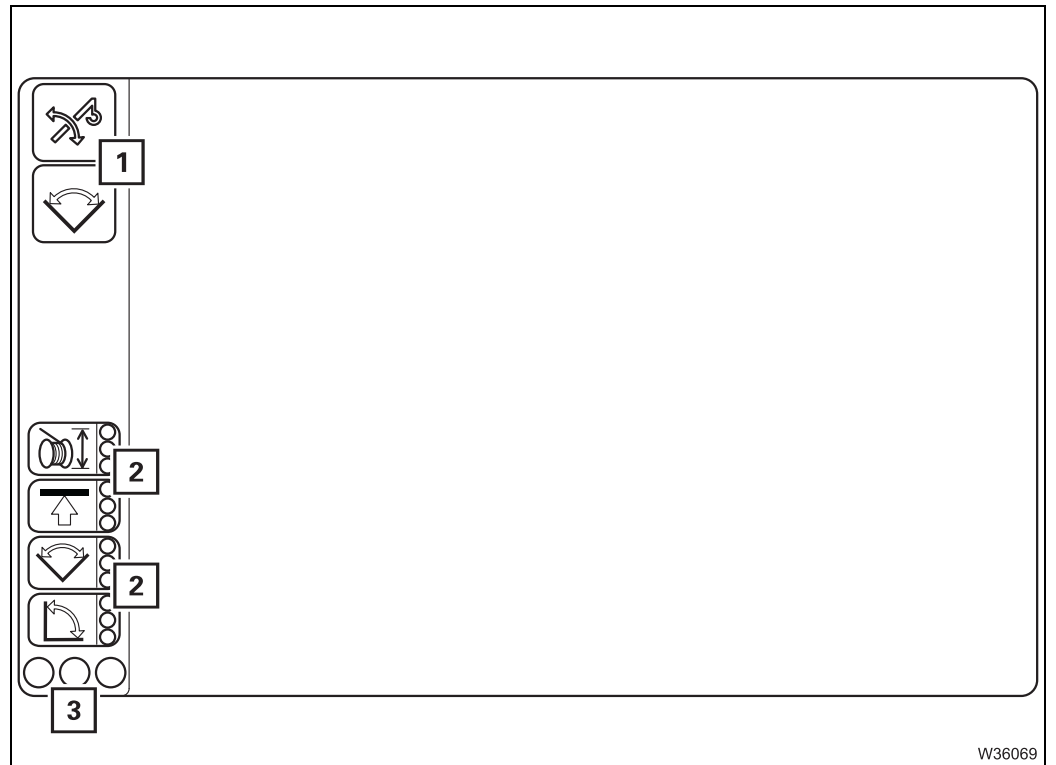
**On the RCL control unit**



- 1 RCL display
- 2 USB connection for data export ➡ p. 8 - 136
- 3 No function
- 4 Switch off RCL buzzer ➡ p. 8 - 92
- 5 RCL early warning ➡ p. 10 - 57
- 6 Sensor brightness ➡ p. 8 - 92
- 7 RCL shutdown ➡ p. 10 - 58
- 8 Display temperature warning display ➡ p. 8 - 93

## 8.1.20

### Menu-independent displays



1 Warning messages display

▣ p. 14 - 9

2 Working range limiter displays

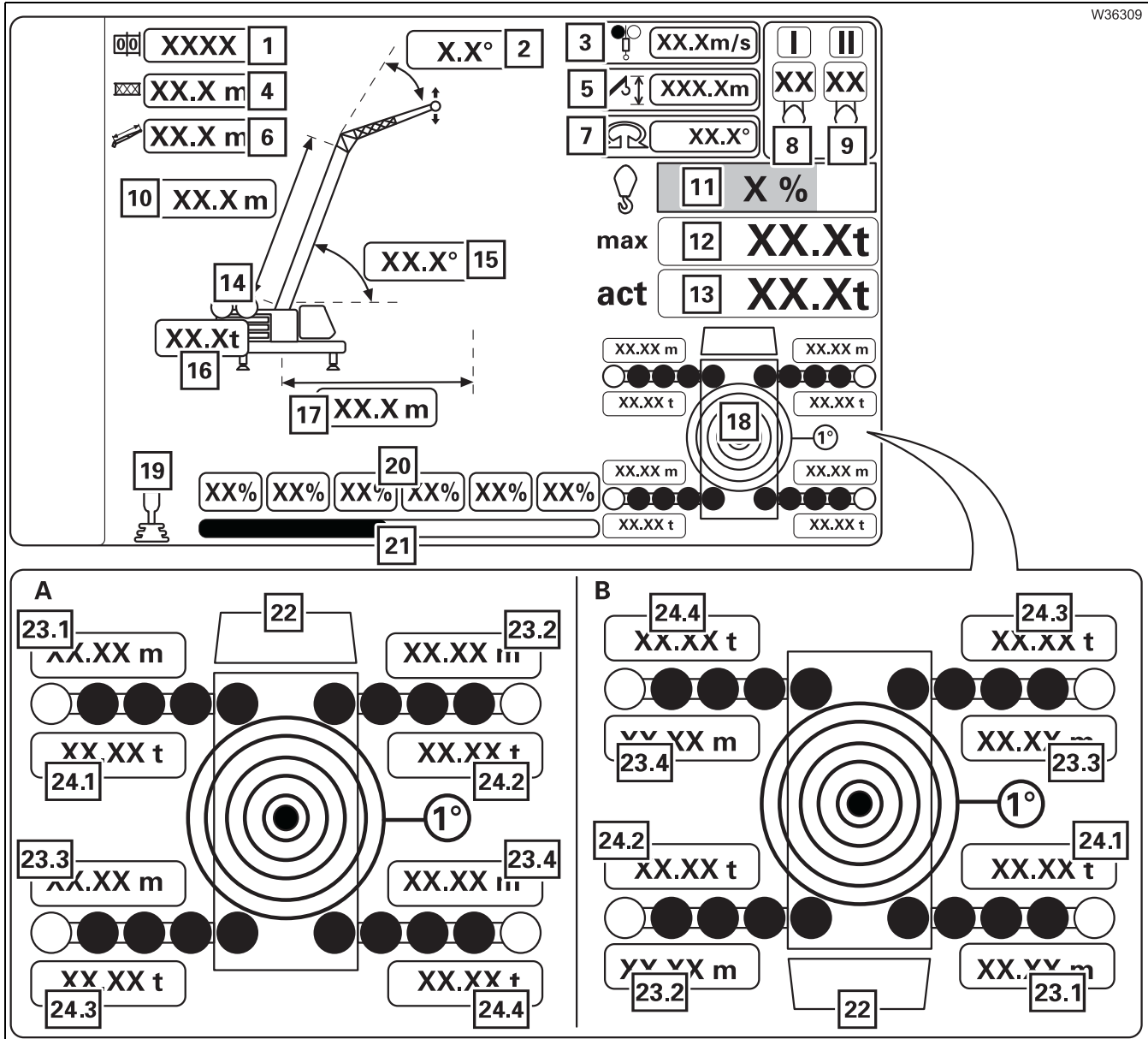
▣ p. 10 - 132

3 RCL status display

▣ p. 10 - 51

## 8.1.21 RCL – Menus

### Monitoring menu



Depending on the version, the top view in view **A** is shown, or is shown rotated by 180° in view **B**. This operating manual shows view **A** in the subsequent illustrations.


1 Display RCL code <sup>2)</sup>	➡ p. 10 - 45
2 Current lattice extension inclination display <sup>1),2)</sup>	➡ p. 10 - 50
Lattice extension display – angle <sup>1),2)</sup>	➡ p. 10 - 46
3 Current wind speed display	➡ p. 10 - 52
4 Lattice extension display – length before the angle <sup>1),2)</sup>	➡ p. 10 - 46
5 Current overall height display	➡ p. 10 - 49
6 Lattice extension display – length after the angle <sup>1),2)</sup>	➡ p. 10 - 46
7 Current slewing angle display	➡ p. 10 - 50
8 Main hoist reeving display	➡ p. 10 - 47
9 Auxiliary hoist reeving display	➡ p. 10 - 47
10 Display of current main boom length	➡ p. 10 - 49
11 Current degree of utilization display	➡ p. 10 - 51
12 Maximum load display	➡ p. 10 - 51
13 Display of the currently raised load	➡ p. 10 - 50
14 Display of reeving used	➡ p. 10 - 47
15 Status display for current main boom angle	➡ p. 10 - 50
16 Counterweight display	➡ p. 10 - 45
17 Current working radius display	➡ p. 10 - 49
18 Current inclination display	➡ p. 8 - 103
19 Telescoping direction display	➡ p. 10 - 52
20 Current telescope status display	➡ p. 10 - 51
21 Telescoping cylinder position display	➡ p. 10 - 52
22 Outrigger span display	➡ p. 10 - 45
23.1 Front left individual width	➡ p. 10 - 45
23.2 Front right individual width	➡ p. 10 - 45
23.3 Rear left individual width	➡ p. 10 - 45
23.4 Rear right individual width	➡ p. 10 - 45
24.1 Front left outrigger pressure	➡ p. 8 - 104
24.2 Front right outrigger pressure	➡ p. 8 - 104
24.3 Rear left outrigger pressure	➡ p. 8 - 104
24.4 Rear right outrigger pressure	➡ p. 8 - 104

1) Additional equipment

2) Display only with the *Standard slewing range type*



**Lifting capacity  
tables menu**

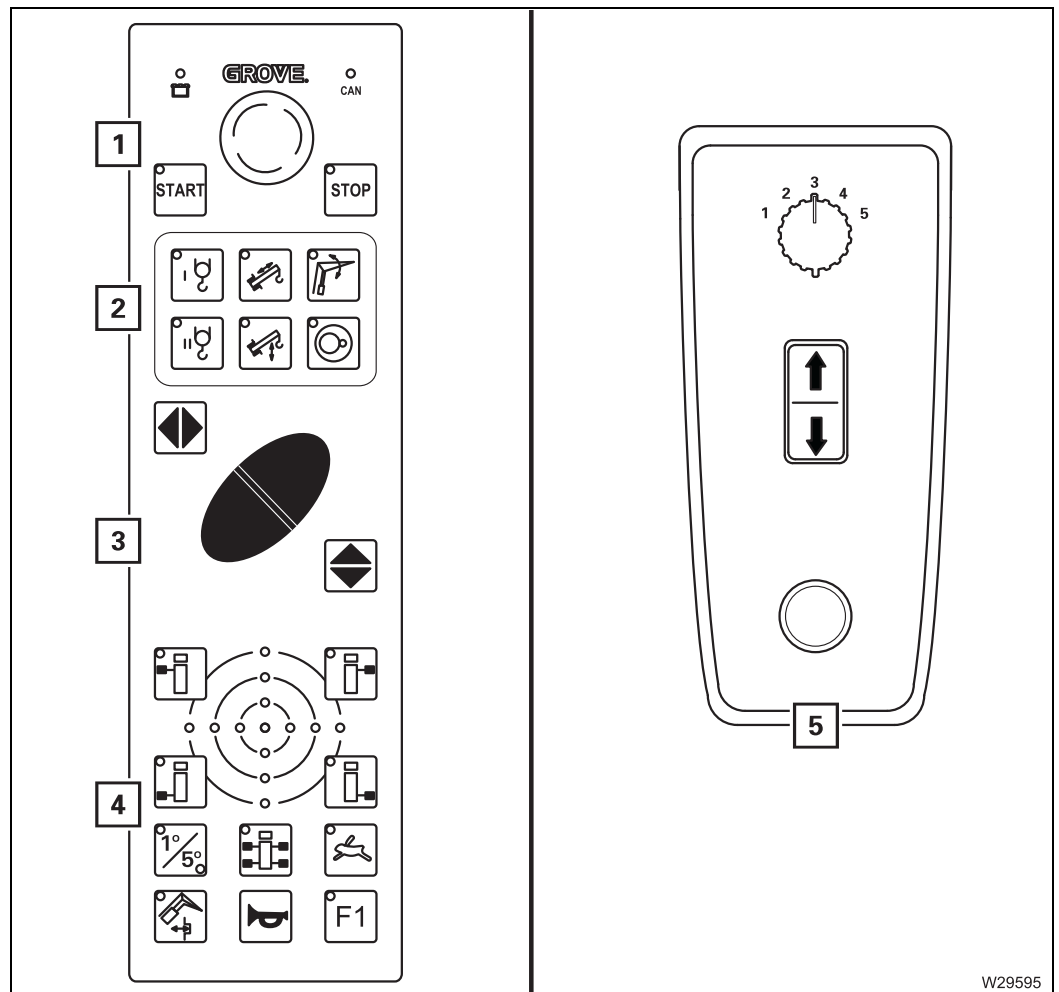
The same menu is displayed as shown on the CCS display;  p. 8 - 40.



Either the *Monitoring* menu or the *Lifting capacity table* menu is displayed.  
The display occurs automatically.

## 8.1.22

### Hand-held controls



W29595

- |   |                  |
|---|------------------|
| 1 Engine control panel                        | ▣▣▣▣▶ p. 8 - 144 |
| 2 Pre-select emergency operation              | ▣▣▣▣▶ p. 8 - 145 |
| 3 Function buttons                            | ▣▣▣▣▶ p. 8 - 145 |
| 4 Outriggers control panel                    | ▣▣▣▣▶ p. 8 - 78  |
| 5 Rigging lattice extension <sup>1), 2)</sup> |                  |

1) Additional equipment

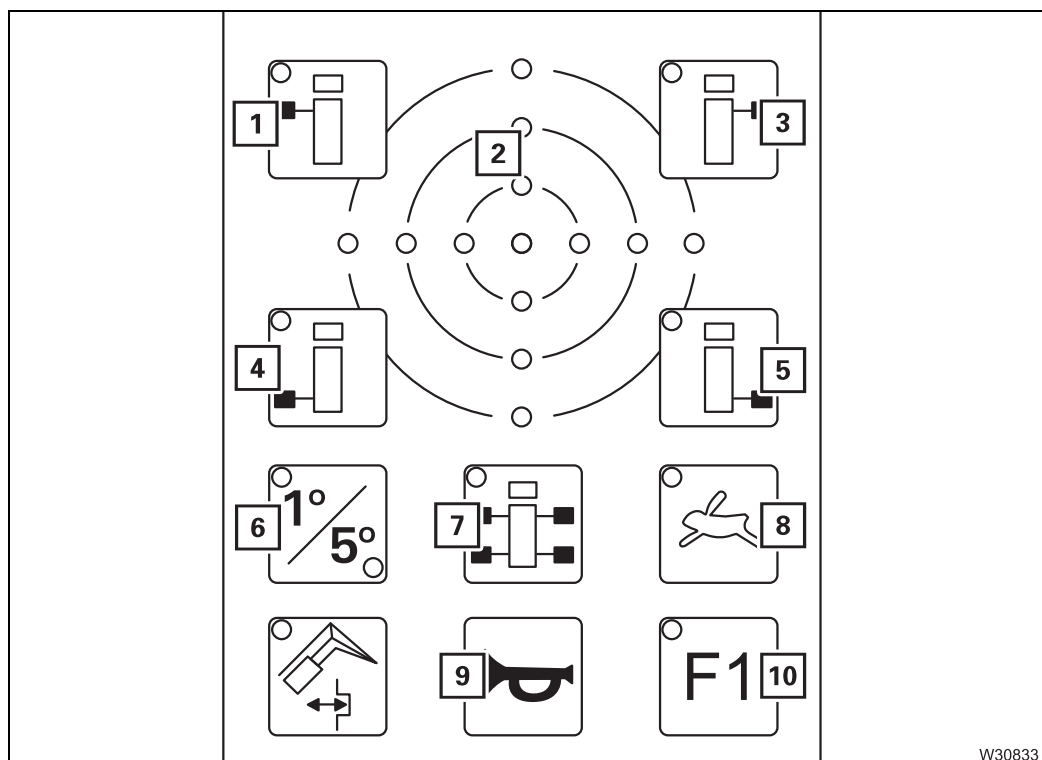
2) ▣▣▣▣▶ *Operating Instructions Lattice Extension*



Required connections for the different movements; ▣▣▣▣▶ p. 8 - 143.



**Outriggers control panel**



W30833

- |  |                  |
|--|------------------|
| <b>1</b> Front left outrigger                    | ▣▣▣▣▶ p. 8 - 94  |
| <b>2</b> Current inclination display             | ▣▣▣▣▶ p. 8 - 103 |
| <b>3</b> Front right outrigger                   | ▣▣▣▣▶ p. 8 - 94  |
| <b>4</b> Rear left outrigger                     | ▣▣▣▣▶ p. 8 - 94  |
| <b>5</b> Rear right outrigger                    | ▣▣▣▣▶ p. 8 - 94  |
| <b>6</b> Switch over measuring range             | ▣▣▣▣▶ p. 8 - 103 |
| <b>7</b> – Pre-select all supporting cylinders   | ▣▣▣▣▶ p. 8 - 94  |
| – Pre-select automatic alignment                 | ▣▣▣▣▶ p. 8 - 94  |
| – (as additional function F1)                    |                  |
| <b>8</b> Pre-select high-speed/normal speed mode | ▣▣▣▣▶ p. 8 - 95  |
| <b>9</b> Horn                                    | ▣▣▣▣▶ p. 8 - 144 |
| <b>10</b> Additional function F1 on              | ▣▣▣▣▶ p. 8 - 94  |

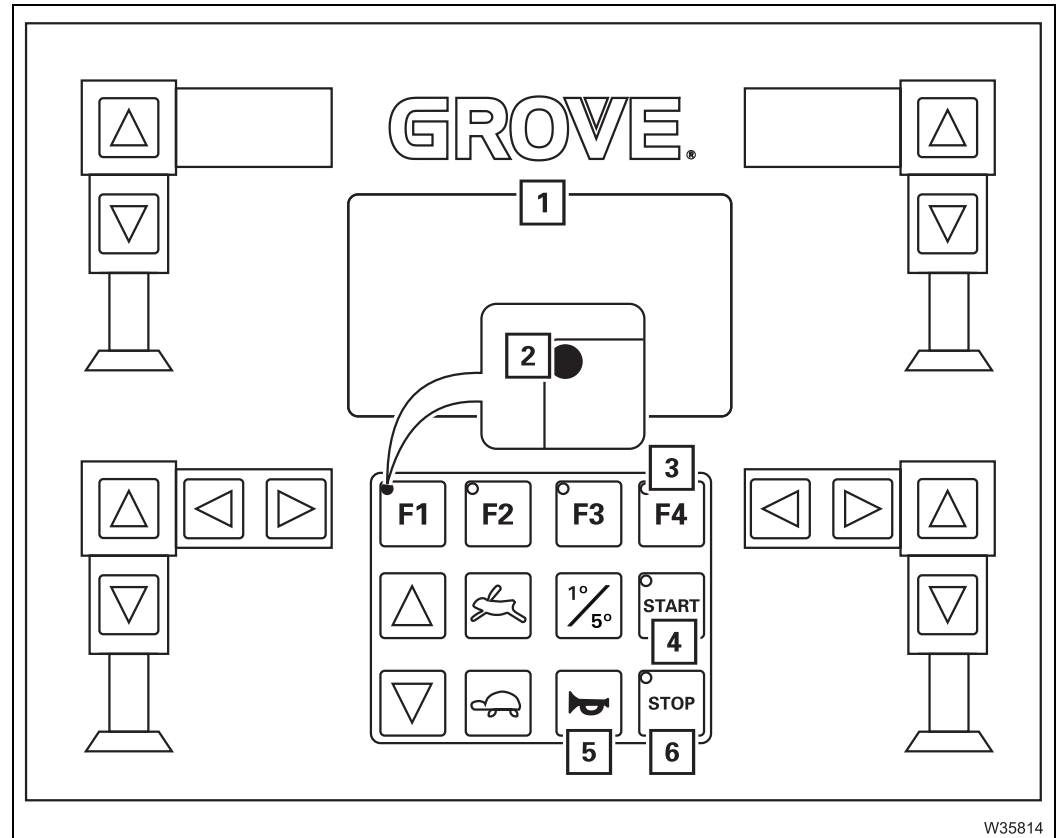


## 8.1.23

### Outrigger control units

#### Menu-independent buttons

This function of the illustrated buttons is the same in all the menus. This function of the other buttons depends on the opened menu.

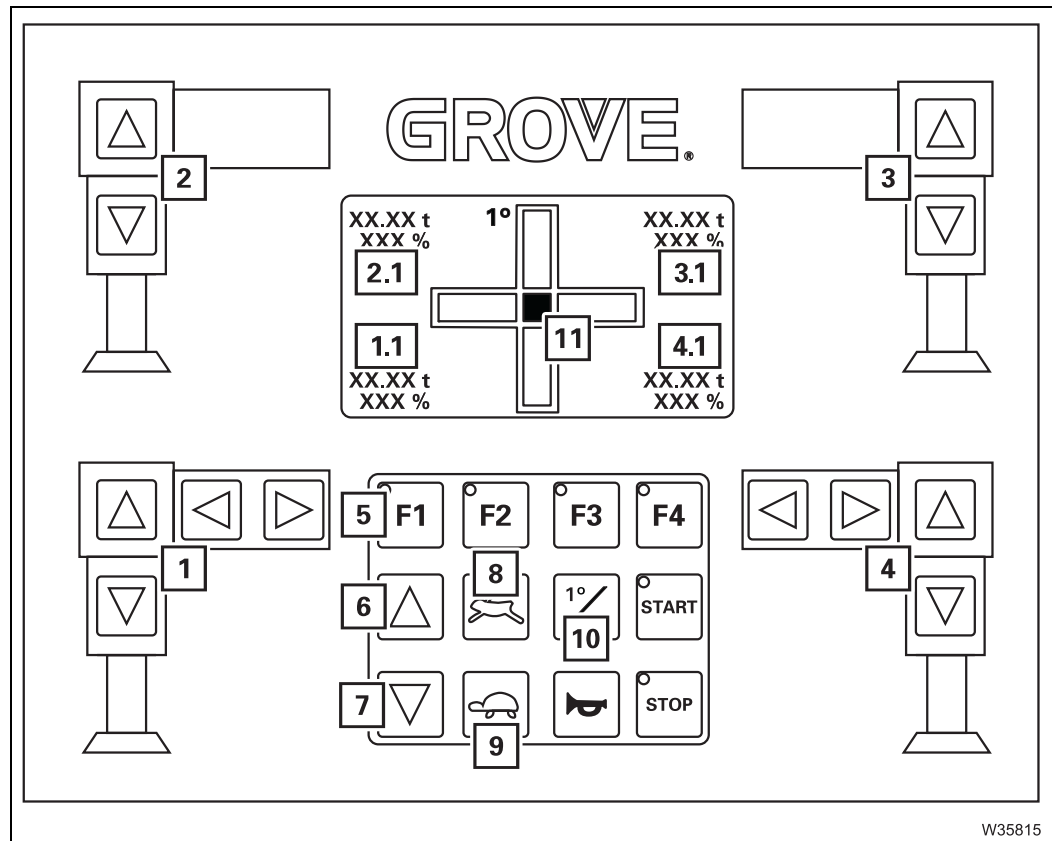


W35814

- |   |                   |       |           |
|---|-------------------|-------|-----------|
| 1 | Outrigger display | ▣▣▣▣▶ | p. 8 - 98 |
| 2 | Searchlights      | ▣▣▣▣▶ | p. 8 - 98 |
| 3 | Menu selection    | ▣▣▣▣▶ | p. 8 - 99 |
|   | – Outrigger menu  | ▣▣▣▣▶ | p. 8 - 80 |
|   | – Raise axle menu | ▣▣▣▣▶ | p. 8 - 82 |
| 4 | Engine START      |       |           |
| 5 | Horn              |       |           |
| 6 | Engine STOP       |       |           |



**Outrigger menu**





**Opposite** means: on the side of the carrier opposite to the operator when looking at the control unit.

**Left and right** mean: to the left or the right of the control unit.

### Outrigger

- |   |   |                  |
|---|---|------------------|
| 1 | Operating the left-hand outrigger                 | ▣▣▣▣▶ p. 8 - 99  |
| 2 | Operate left outrigger, opposite                  | ▣▣▣▣▶ p. 8 - 99  |
| 3 | Operate right outrigger, opposite                 | ▣▣▣▣▶ p. 8 - 100 |
| 4 | Operating the right-hand outrigger                | ▣▣▣▣▶ p. 8 - 100 |
| 5 | Additional function F1                            |                  |
| 6 | Retracting all supporting cylinders               | ▣▣▣▣▶ p. 8 - 100 |
| 7 | Extending all supporting cylinders                | ▣▣▣▣▶ p. 8 - 100 |
| 8 | Pre-select high-speed mode                        | ▣▣▣▣▶ p. 8 - 99  |
| 9 | – Pre-select normal mode                          | ▣▣▣▣▶ p. 8 - 99  |
|   | – Automatic alignment – as additional function F1 | ▣▣▣▣▶ p. 8 - 100 |

### Outrigger pressure display

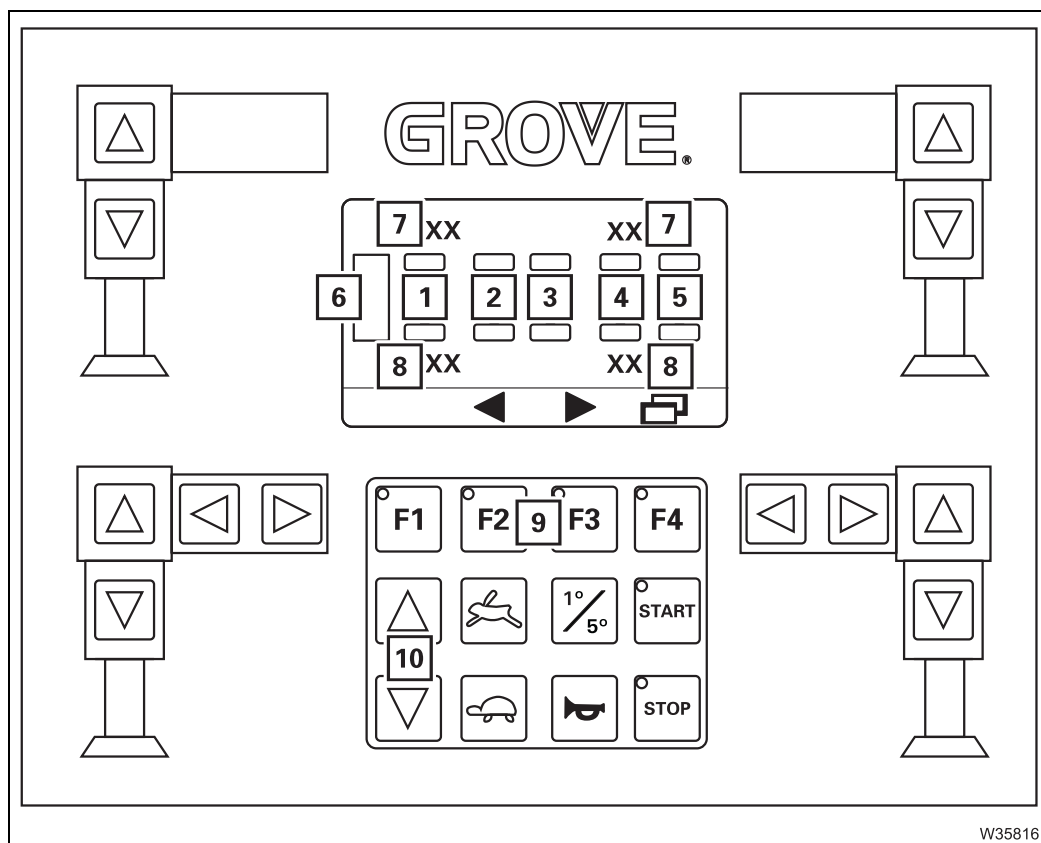
- |     |   |                  |
|-----|---|------------------|
| 1.1 | Left-hand outrigger pressure display            | ▣▣▣▣▶ p. 8 - 104 |
| 2.1 | Left-hand outrigger pressure display, opposite  | ▣▣▣▣▶ p. 8 - 104 |
| 3.1 | Right-hand outrigger pressure display, opposite | ▣▣▣▣▶ p. 8 - 104 |
| 4.1 | Right-hand outrigger pressure display           | ▣▣▣▣▶ p. 8 - 104 |

### Inclination indicator

- |    |                             |                  |
|----|-----------------------------|------------------|
| 10 | Switch over measuring range | ▣▣▣▣▶ p. 8 - 103 |
| 11 | Current inclination display | ▣▣▣▣▶ p. 8 - 103 |



## Raise axle menu



W35816

- |               |                                     |                  |
|---------------|-------------------------------------|------------------|
| <b>1 to 5</b> | Pre-selection display               | ▣▣▣▣▶ p. 8 - 101 |
| <b>6</b>      | Directional indicator               |                  |
| <b>7</b>      | Wheel load display, opposite        | ▣▣▣▣▶ p. 8 - 102 |
| <b>8</b>      | Wheel load display, operator's side | ▣▣▣▣▶ p. 8 - 102 |
| <b>9</b>      | Pre-selecting wheels                | ▣▣▣▣▶ p. 8 - 101 |
| <b>10</b>     | Lifting/lowering wheels             | ▣▣▣▣▶ p. 8 - 102 |

## 8.2

## Brief description of the operating elements



### Risk of accidents through operating error!

This section is not a complete operating manual. It only provides a general overview of the functionality of the operating elements.

Before using the operating elements for the first time, read through the following chapters and the safety instructions listed there.

This section does not contain all the requirements that must be fulfilled for several operating elements to be active.

If some operating elements do not work, first read the following chapters referred to at the respective places before contacting **Manitowoc Crane Care**.

### 8.2.1

### Definition of direction information

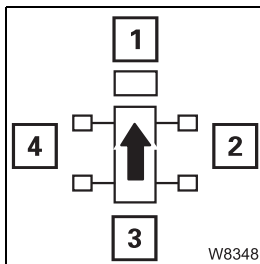
#### Basic rule

Direction information always depends on whether the carrier or the superstructure is being operated.

#### On the carrier

The driver's cab is always at the front, which means that:

- |          |          |
|----------|----------|
| 1: front | 2: Right |
| 3: rear  | 4: Left  |



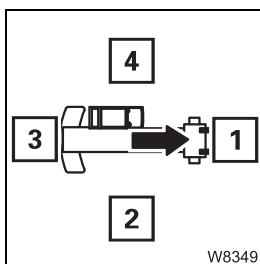
**Forwards** always means with driver's cab leading,

**Backwards** always means the rear lights on the carrier are to the front.

#### On the superstructure

The main boom head is always at the front, which means that:

- |          |          |
|----------|----------|
| 1: front | 2: Right |
| 3: rear  | 4: Left  |

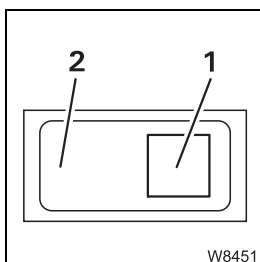


#### Switches

For switches and buttons, the terms **bottom** and **top** are used.

Regardless of the fitting position (vertical, horizontal, diagonal, perpendicular or turned), the following always applies:

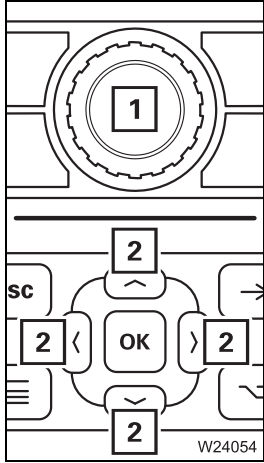
- **Down:** press in at (1) – next to the symbol
- **Up:** press in at (2) – opposite the symbol



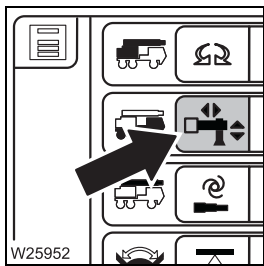
**8.2.2**

**General rules for buttons and symbols on the display**

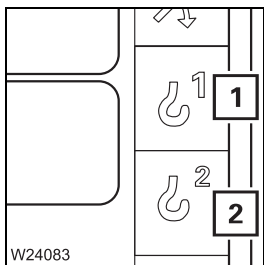
The symbols shown as an example are not present on all crane types. The following rules apply in all menus:



- A menu can only be opened if the relevant symbol has been selected with the jog dial (1) or direction buttons (2).

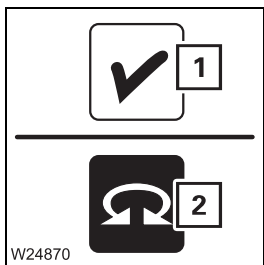


- A selected menu is marked in colour and can be opened.

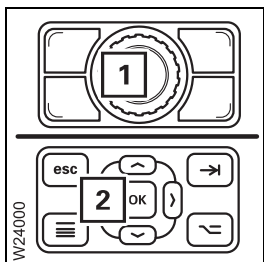


- Symbols can be shown in different colours. The colour of the symbol indicates the current switching state of the relevant power unit.

- 1 Red:** e.g. main hoist – off
- 2 Green:** e.g. auxiliary hoist – on



- In these operating instructions, we always refer to colours in terms of e.g. "The symbol is **red**". regardless of whether the background (2) of a symbol is red or only parts (1) of a symbol are **red**. This applies to all symbols and all colours.



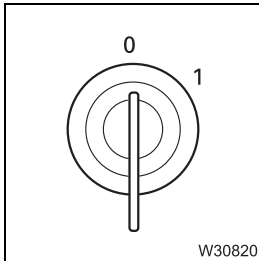
If the instruction given in this section is to "Press the button once...", for instance, this always refers to the button (1) or (2). This is the case if a menu is opened or a function is to be carried out.

## 8.2.3

## Engine

### Side panel

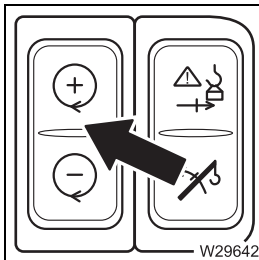
▣▣▣▣ Start the engine, p. 9 - 5.



### Ignition lock

- 0 Ignition off, engine off, key can be removed
- 1 Ignition on and power supply on for:  
instrument lighting, CCS, engine control system, RCL

▣▣▣▣ p. 9 - 5



### Start the engine

- The engine must be off:

- **Press upwards once:** Engine starts,  
Idling speed = standard

### Set idling speed

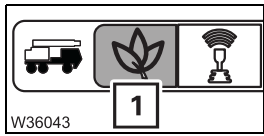
- The engine is running:

- **Press up:** Increasing the idling speed
- **Press down:** Decrease idling speed,  
engine cutout after approx. 6 seconds.

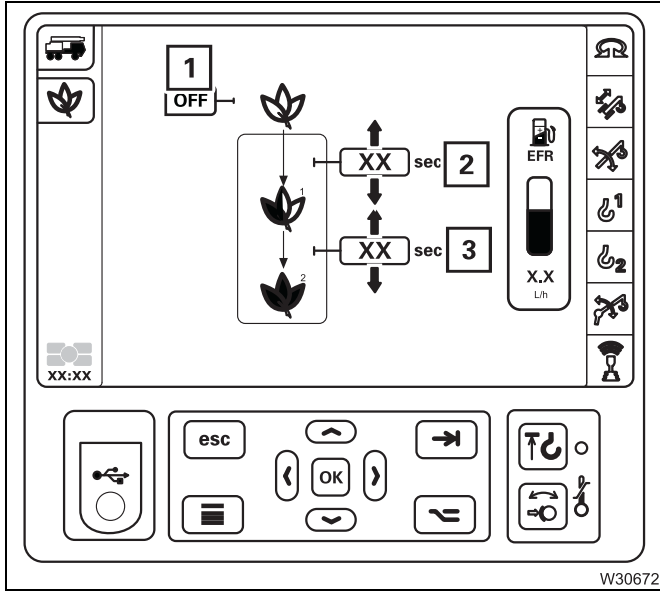
▣▣▣▣ p. 9 - 7



## Economy menu



- To open: Select and confirm symbol (1).



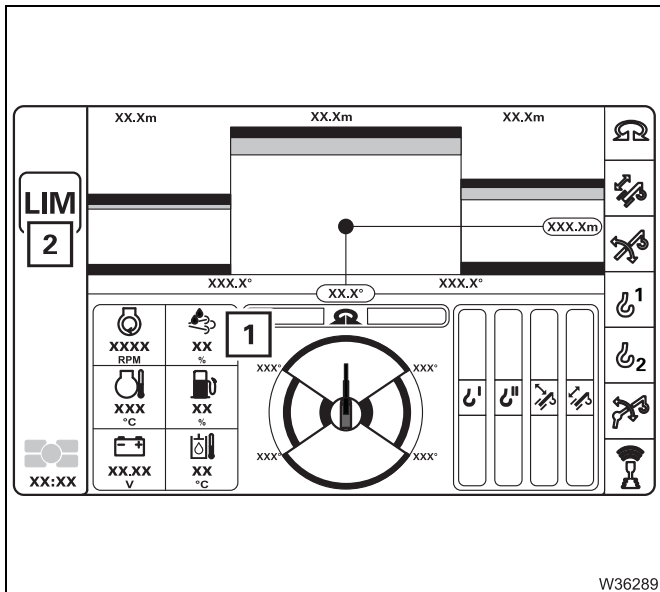
Select symbol and confirm for:

- 1 Switching off Economy mode on/off
- 2 Set interval 1
- 3 Set interval 2

▣▣▣▣ p. 10 - 124

## 8.2.4 AdBlue (DEF) system

### CCS display



### AdBlue (DEF) warning

- 1 - Green: - AdBlue (DEF) Filling level sufficient
- Yellow: - Adblue (DEF) tank almost empty; ▣▣▣▣ *AdBlue*, p. 4 - 9
- Red: - Adblue (DEF) tank empty - symbol (2) displayed

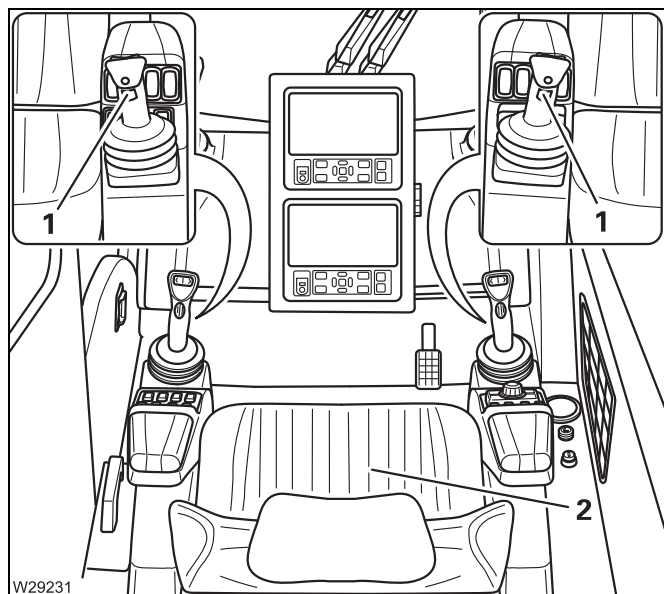




## 8.2.5

### Seat contact switch and dead man's switch

The seat contact switch and the dead man's switch are safety devices for releasing crane functions.



#### Enabling crane functions

- Sit down – seat contact switch (2) on
- or
- Press at least one dead man's switch (1)

#### Safety function on

- Get off seat – seat contact switch off
- and
- Both dead man's switches (1) not pressed

All operating elements for crane functions in the crane cab are locked.

Any crane movements are slowed down to standstill within 3 seconds and then locked.

#### Crane cab seat – version 2

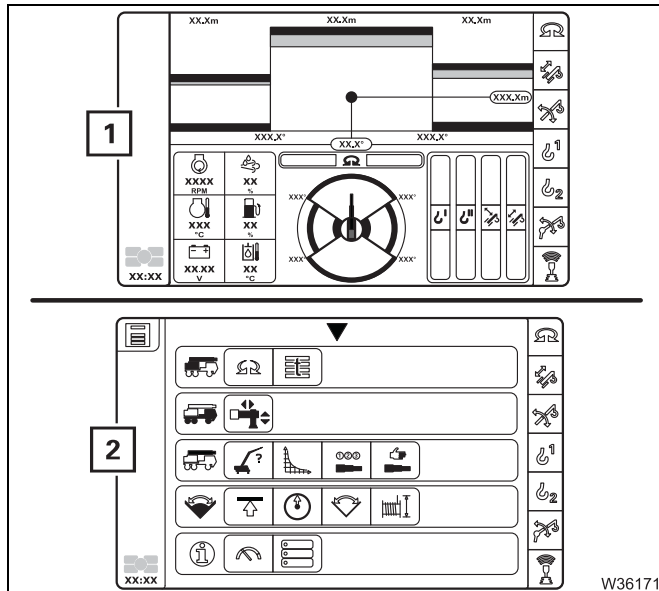
The seat contact switch is very sensitive. It is recommended that you also press the dead man's switch in order to avoid unintentional shutdown.

▣▣▣▣▶ *Seat contact switch*, p. 10 - 12

## 8.2.6

### CCS Crane control

The GMK5250L truck crane is equipped with the **CCS** crane control system. The crane control system consists of a monitor and control unit in the driver's cab and the crane cab. An additional control unit is located in the right control panel of the crane cab.



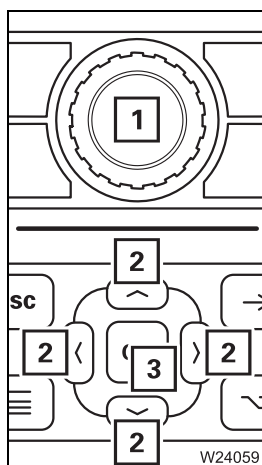
#### CCS display

The start menu (1) appears after switching on the ignition.

After pressing a button on the jog dial or CCS control panel, the overview of the menu groups (2) appears.

A symbol is selected with the jog dial or the selection buttons on the CCS control panel to call up a menu. A selected symbol is shown in **red**.

A menu is opened by pressing the jog dial or the OK button on the control panel.



#### Menu control

Buttons for selecting, activating and confirming areas on the CCS display.

##### - Select

**1 Turn** or **2 Press**

- The selected range is marked.

##### - Activate / confirm

**1 Press** or **3 Press**

- The marked area is activated.  
- The entry is confirmed.

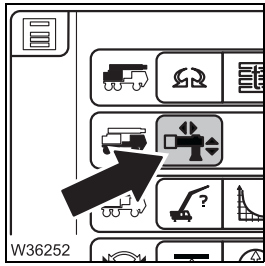
The function of the buttons is different depending on the area. There are three areas.

▣ In the Menu area, p. 8 - 90

▣ In the Input area, p. 8 - 90

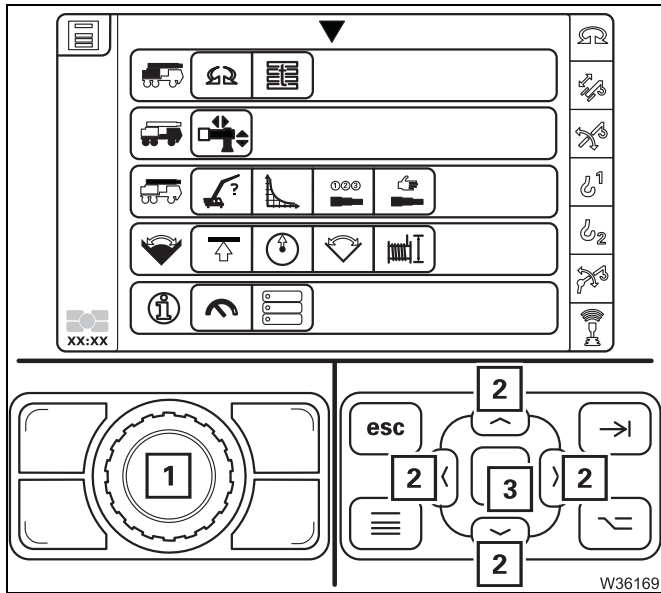
▣ In the Operating area, p. 8 - 90





**In the Menu area**

- For selecting and opening menus.  
 One symbol is always selected.



Select a menu

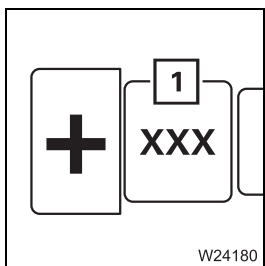
- 1 Turn** or **2 Press**

- The next symbol is marked.

Open menu

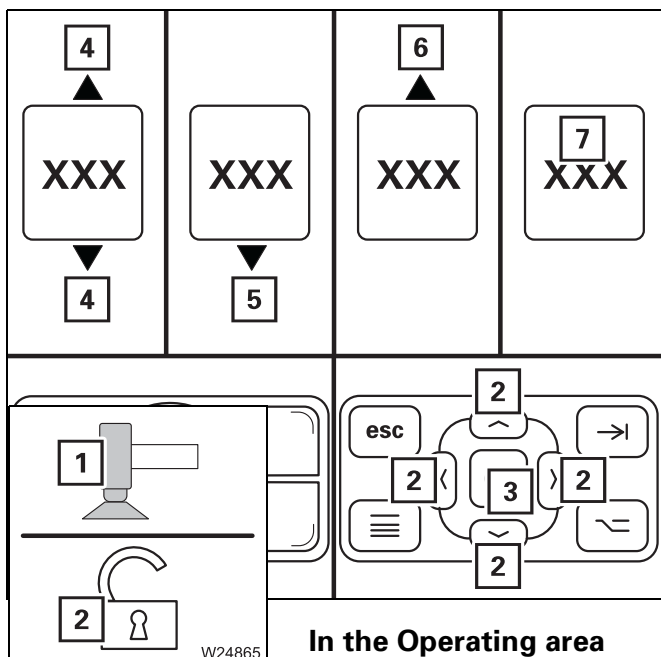
- 1 Press** or **3 Press**

- The corresponding menu is opened.



**In the Input area**

- For selecting and confirming values.  
 A field (1) with numbers or letters is marked.



Select a value

- 1 Slewing<sup>1)</sup>** or **2 Press**

**4** Value can be reduced/increased

**5** Highest value achieved

**6** Lowest value achieved

<sup>1)</sup> Holding pressed and turning results in a quick value change.

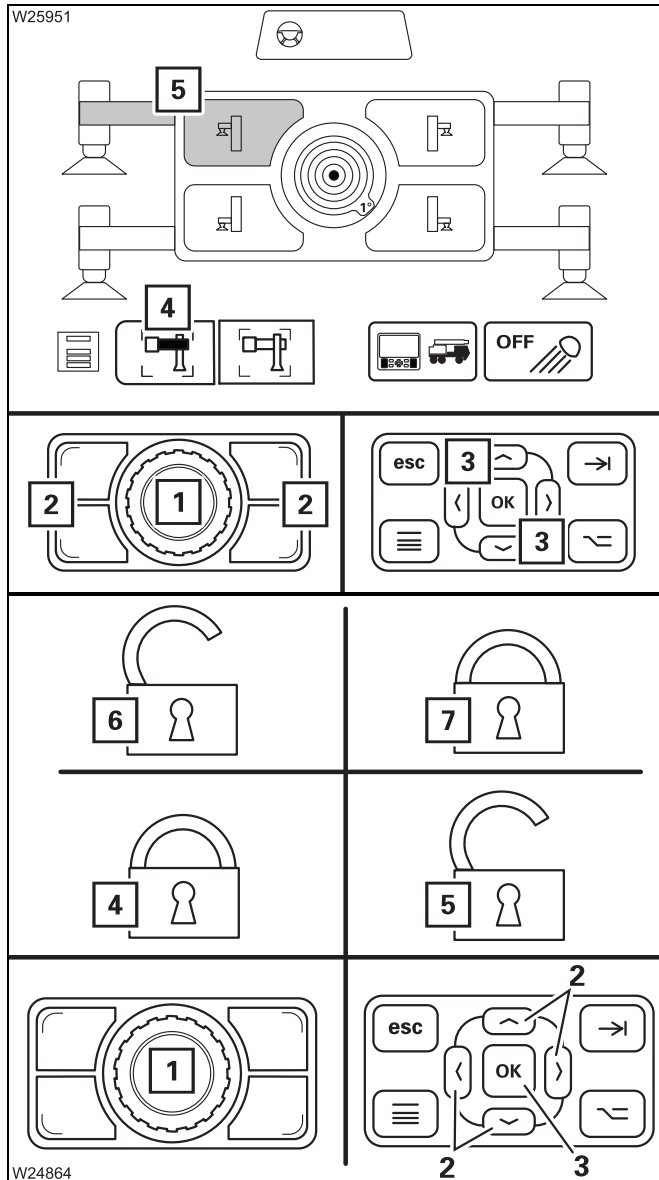
Confirm value

- 1 Press** or **3 Press**

- Displayed value (7) is adopted – input mode off.

**In the Operating area**

- For carrying out movements during rigging.  
The required element is marked e.g. outrigger cylinder (1).
- For turning on/off and switching  
A symbol for a status is marked, e.g. symbol (2).



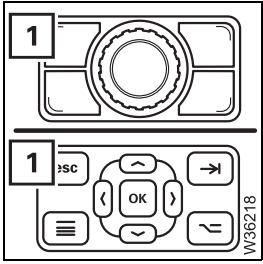
#### Executing a movement

- Select function  
**3 Press** or **1 Turn**
  - The marked function (4) or (5) is selected.
- Move function  
**2 Press**
  - The selected function is carried out.

#### Turning on/off and switching

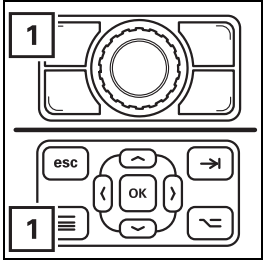
- Selecting status  
**2 Press** or **1 Turn**
  - The marked state (4) or (6) is selected.
- Switch on state  
**1 Press** or **3 Press**
  - The selected state (5) or (7) is established.





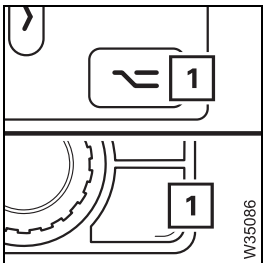
### Exiting the menu/input mode

- 1 Press:**
- The opened menu closes – the menu from the next higher level is opened
  - Input mode is deactivated.



### Overview menu groups

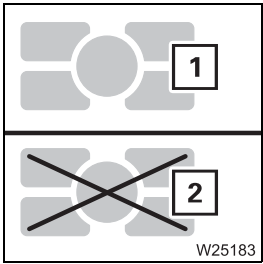
- 1 Press:**
- After the first press  
Menu groups overview display
  - After a subsequent press  
Next/previous group overview



### Switch off RCL buzzer

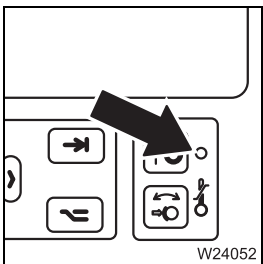
In some cases not active until after 5 seconds

- **Press once:** Buzzer is switched off



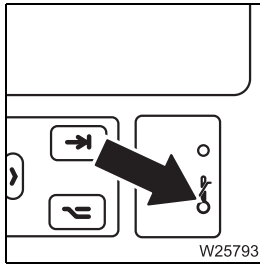
### Jog dial display

- 1 Jog Dial OK
- 2 Jog Dial not working  
Communication fault or error (error display)



### Sensor for brightness

Registers the brightness of the operating environment. The brightness of all displays is automatically adjusted; *Brightness of the displays*, p. 10 - 30.

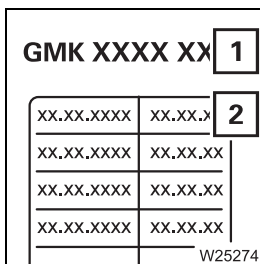


### Display temperature warning display

The temperature of the control unit is measured by an internal sensor.

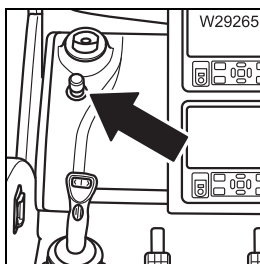
- **blue, flashing:** Temperature too low – display will not be switched on  
Temperature too high:
- **red, lights up:** Brightness is reduced
- **yellow, flashing:** Display is switched off
- **red, flashing:** Control unit is switched off

▣▣▣▣ Temperature on the display, p. 10 - 31



### Serial number and programme version display

- 1 Truck crane serial number
- 2 Current program version of the crane control – always include in the event of a malfunction; ▣▣▣▣ p. 14 - 3

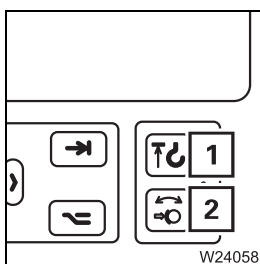


### Emergency stop switch

May only be used in an emergency.

- **Press:** Engine off – crane functions stop immediately.  
Switch latches
- **Turn engaged switch:** Switch returns to initial position – crane functions released

▣▣▣▣ p. 9 - 10



### Other

- 1 Lifting limit switch warning; ▣▣▣▣ p. 8 - 110
- 2 Slewing gear brake indicator lamp; ▣▣▣▣ p. 8 - 114

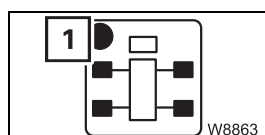
## 8.2.7

### Outrigger – hand-held control

▣▣▣▣▶ *Extending/retracting outrigger beams*, p. 11 - 45

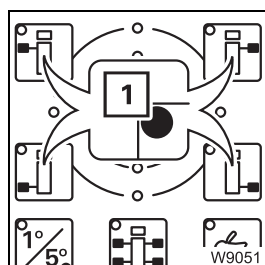
▣▣▣▣▶ *Extending/retracting supporting cylinders*, p. 11 - 53

All directional information refers to the carrier; ▣▣▣▣▶ p. 8 - 83.



#### Pre-select all supporting cylinders

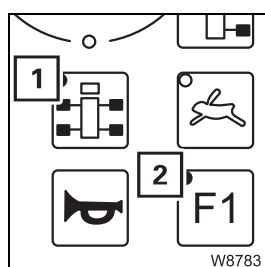
- **Pre-select:** Press button once – lamp (1) lights up – pre-selection on  
After 10 seconds – lamp (1) goes out – pre-selection off



The following functions are pre-selected in the same way:

- **Front left outrigger**
- **Front right outrigger**
- **Rear left outrigger**
- **Rear right outrigger**

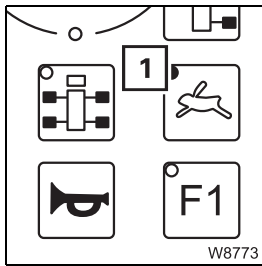
As long as the lamp (1) is on, you can pre-select additional outriggers



#### Pre-select automatic alignment

- **Pre-select:** Press **F1** button once, press **2** button once,  
Lamps (1) and (2) light up – pre-selection on  
After 10 seconds – lamps go out – pre-selection off



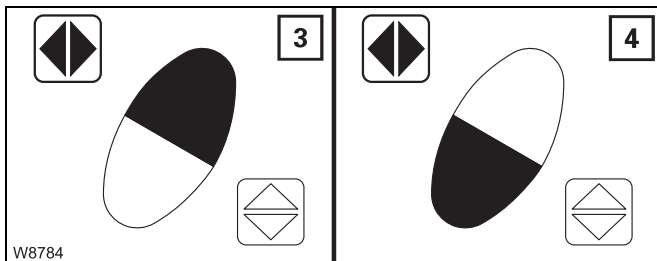


### Pre-select high-speed/normal speed mode

- **Pre-select:**
  - Press button once – lamp (1) lights up – High-speed mode pre-selection on
  - Press button once – lamp (1) goes out – Normal speed pre-selection on

### Function buttons

There are four button combinations to execute the pre-selected functions. Actuated buttons are shown in black:



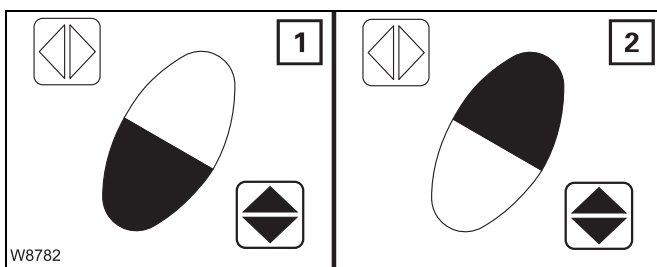
### Outrigger beams

Only outrigger beams on the same side are pre-selected.

**3** Extend

**4** Retract

▣▣▣▣▶ p. 11 - 47



### Outrigger cylinders

**1** Extend

Automatic alignment

**2** Retract

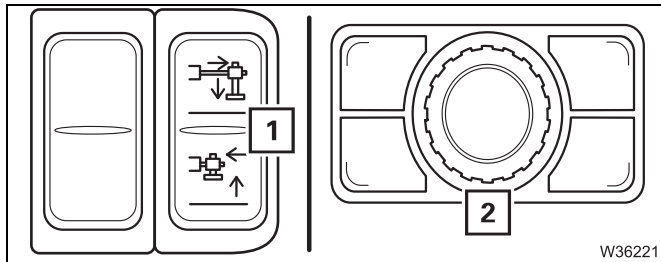
▣▣▣▣▶ p. 11 - 55

## 8.2.8 Outrigger – crane cab

- ▣▣▣▣▶ *Extending/retracting outrigger beams*, p. 11 - 45
- ▣▣▣▣▶ *Extending/retracting supporting cylinders*, p. 11 - 53

The display fields must be switched on for crane operation – in the driver's cab, in the *Settings* submenu on the *CCS* display.

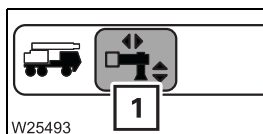
### Control panels



Short description on the *CCS display*

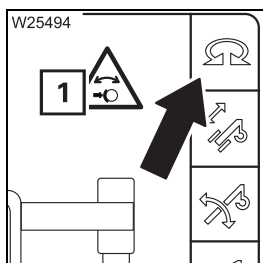
- 1** Left – Moving the outrigger;  
 ▣▣▣▣▶ p. 8 - 97
- 2** Right – Outrigger pre-selection;  
 ▣▣▣▣▶ p. 8 - 97

### CCS display



#### Outrigger menu

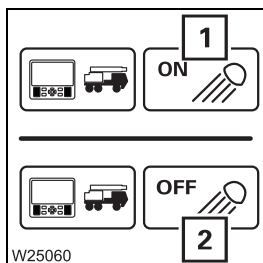
- **To open:** Select and confirm symbol (1)



#### Slewing gear/movements locked display

- **Red:** Slewing gear switched off
- **Green:** Slewing gear switched on – outrigger movement disabled – symbol (1) is displayed

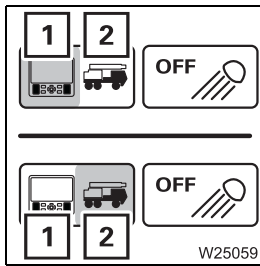
▣▣▣▣▶ p. 11 - 41



#### Outrigger lighting on/off

- **To switch on:** Select and confirm symbol (2)
- **To switch off:** Select and confirm symbol (1)

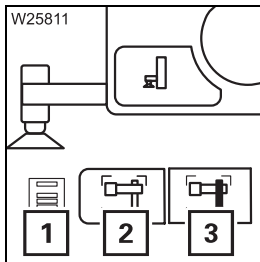
▣▣▣▣▶ p. 11 - 41



### Outrigger control units on/off

- **To switch on:** Select symbol (2) and confirm – symbol (1) is **grey**
- **To switch off:** Select symbol (1) and confirm – symbol (2) is **grey**

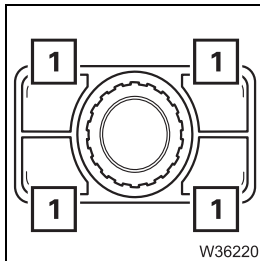
☞ p. 11 - 41



### Switch over/exit the menu

☞ Select symbol and confirm – symbol is green

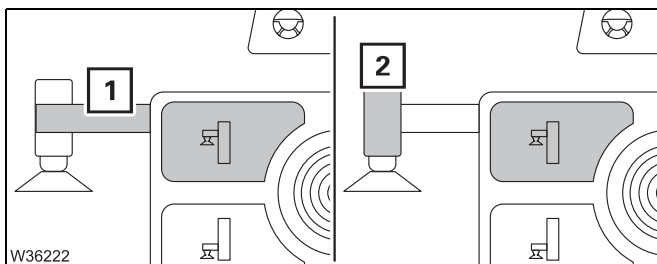
- 1 **Exiting the menu:**
- 2 **Outrigger menu**
- 3 **Outrigger cylinders menu**



### Outrigger pre-selection

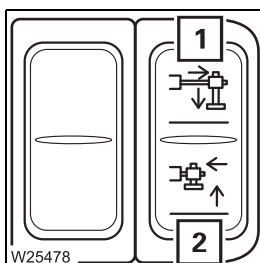
The associated outrigger cylinder or outrigger beam is pre-selected, depending on the menu that is open.

- **Pre-selection on:** Press the required button (1)
- **Pre-selection off:** Release the button



### Outrigger pre-selection display

- 1 Outrigger beam pre-selection display
  - 2 Outrigger cylinder pre-selection display
- **Orange:** Pre-selection on
  - **Blue:** Pre-selection off



### Moving the outrigger

An outrigger cylinder or outrigger beam is pre-selected.

- 1 **Extend:** Press up the button
- 2 **Retract:** Press down the button

The movement stops after the button is released or when an end position is reached.

## 8.2.9

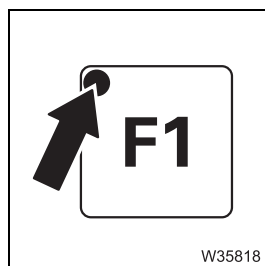
### Outrigger – control units

- ▣▣▣▣▶ *Extending/retracting outrigger beams*, p. 11 - 45
- ▣▣▣▣▶ *Extending/retracting supporting cylinders*, p. 11 - 53

All directional information refers to the carrier; ▣▣▣▣▶ p. 8 - 83.

#### General information

The function of the general elements is independent of the menu shown on the *Outrigger* display.

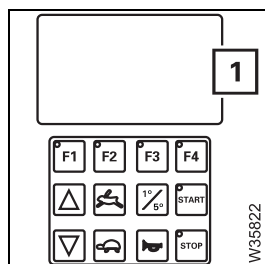


#### Searchlights

Light up when the ignition is on.

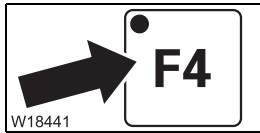
- **Display field lighting off:** Ignition on and no button activated yet or no button activated within the last 10 seconds
- **Display field lighting on:** Press any button

▣▣▣▣▶ p. 11 - 46



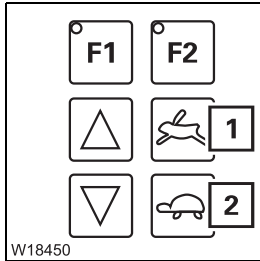
#### Outrigger display

- Display:** To display the *outrigger* and *Raise axle* menus. Some of the buttons under the display can have different functions depending on the menu displayed.



### Menu selection

**Selection:** Press the button – the next menu is shown on the *Outrigger* display

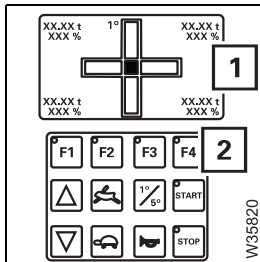


### Pre-select high-speed/normal speed mode

- 1 Pre-select:** Press button – high-speed mode pre-selection on
- 2 Pre-select:** Press button – normal speed pre-selection on

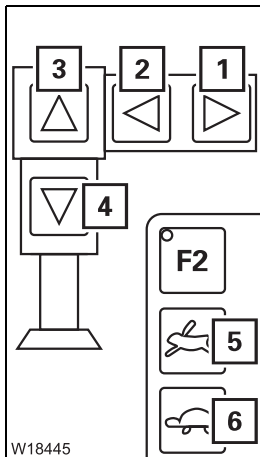
### Outrigger menu

The operating elements for the outriggers are only active when the *Outrigger* menu is open.



### Outrigger menu

– **To open:** Press button (2) repeatedly until display (1) appears.



### Operating the left outriggers (next to control unit)

Button (5) or (6) is pressed.

- 1 Retract:** Press button – outrigger beam retracts<sup>1)</sup>
- 2 Extend:** Press button – outrigger beam extends<sup>1)</sup>
- 3 Retract:** Press button – outrigger cylinder retracts
- 4 Extend:** Press button – outrigger cylinder extends

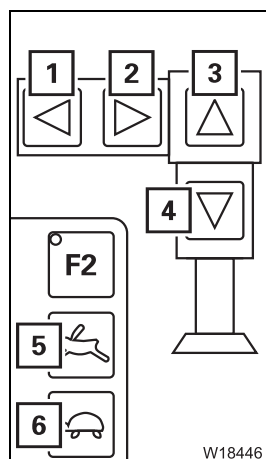
<sup>1)</sup> only on operator's side

Outrigger beams; p. 11 - 46

Supporting cylinders; p. 11 - 54

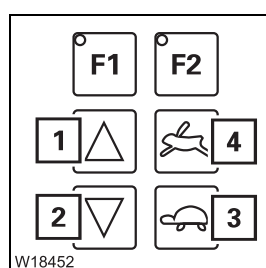
Movement stops after the button is released, and when an end position is reached.





### Operating the right outriggers (next to control unit)

Operation is the same as on the button unit for *Outriggers next to the control unit*.

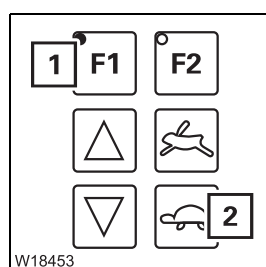


### Extending/retracting all supporting cylinders

Button (3) or (4) is pressed.

- 1 Retract:** Press button – all outrigger cylinders retract
- 2 Extend:** Press button – all outrigger cylinders extend

Movement stops after the button is released, and when an end position is reached; |||▶ p. 11 - 54.



### – Automatic alignment

Press button (1) and button (2) together –  
 Truck crane is levelled horizontally

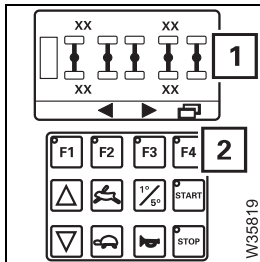
The process stops as soon as the truck crane is levelled horizontally or the button is released

|||▶ p. 11 - 61

## 8.2.10

### Raise axle

Operating the axle raising system, p. 11 - 63

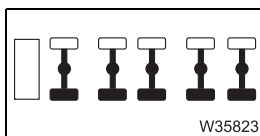


#### Raise axle menu

The suspension is switched off (locked).

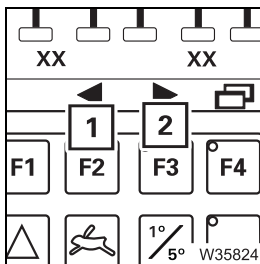
– **To open:** Press button (2) repeatedly until display (1) appears.

The operating elements for raising the axles are only active when the *Raise axle* menu is open.



#### Pre-selection display

Pre-selected wheels are black, e.g. all wheels on the operator's side.

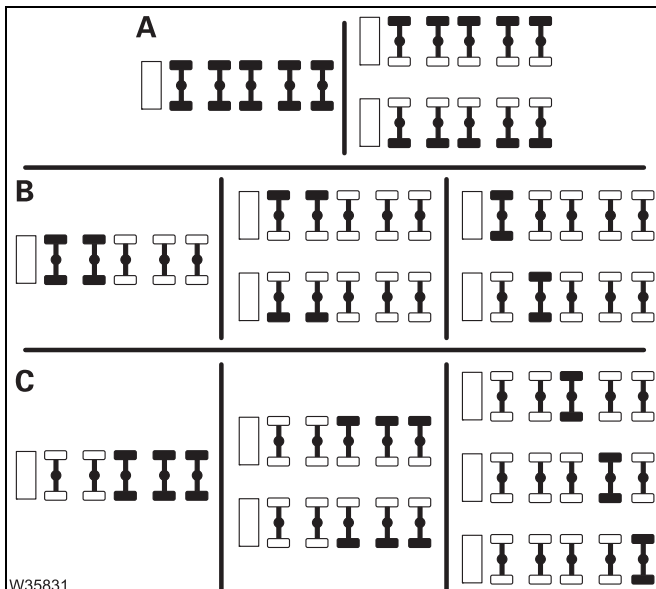


#### Pre-selecting wheels

Only pre-defined wheel groups can be selected.

**1 Forwards:** Press button once – next wheel group

**2 Back:** Press button once – previous wheel group



#### Selectable wheel groups

##### A All wheel groups

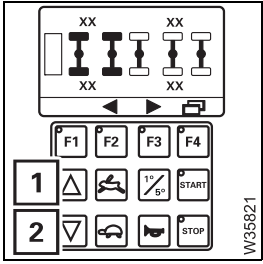
- All wheels
- Opposing wheels
- Operator side wheels

##### B/C Front/rear wheel group

##### Rear wheel group

- All wheels
- Opposing wheels
- Operator side wheels
- Individual axle lines



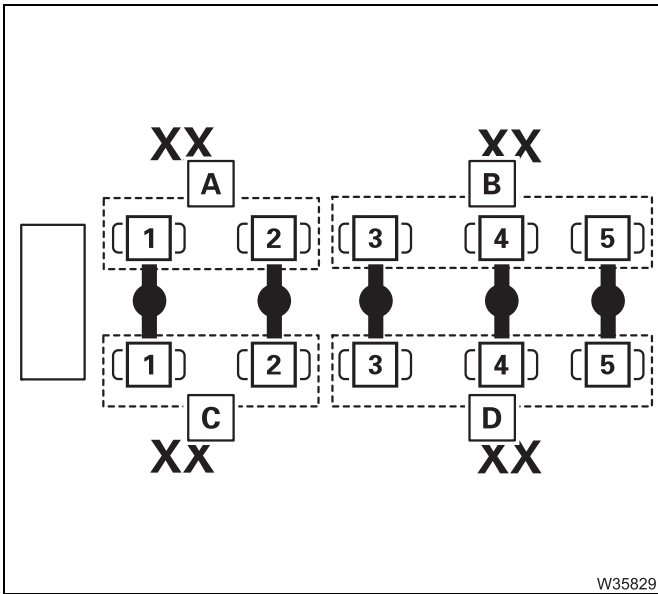


### Lifting/lowering wheels

The axle load on the pre-selected wheels lies in the permissible range.  
 The horn sounds when a button is pressed.

- 1 Raise:** Press the button – the selected axles are raised and the truck crane is lowered
- 2 Lower:** Press the button – the selected axles are lowered and the truck crane is raised

The movement stops after the button is released or the maximum permissible wheel load is exceeded.



### Wheel load display

The displays (A) to (D) show the sum of the wheel loads for the associated wheels.

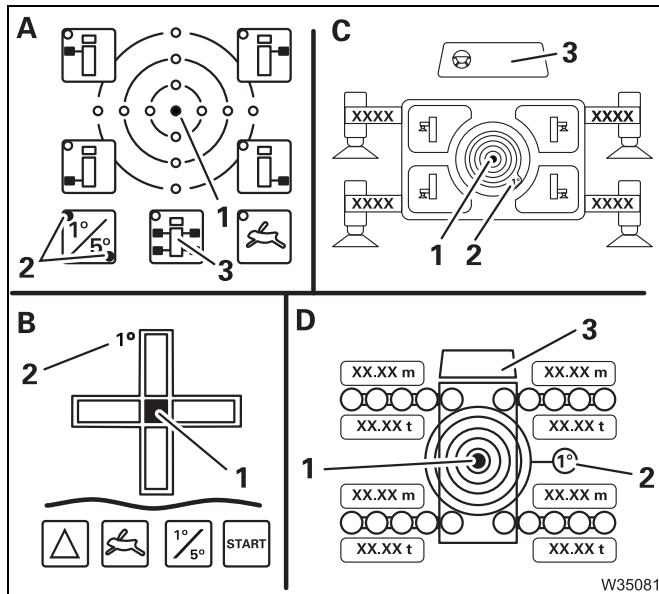
- **Opposite the operator side**
  - A** Wheel load of the wheels A1 + A2
  - B** Wheel load of the wheels B3 + B4 + B5
- **operator's side**
  - C** Wheel load of the wheels C1 + C2
  - D** Wheel load of the wheels D3 + D4 + D5

The display is in tons or kilopounds, depending on the setting – (1 Kilopound = 1,000 lbs).



## 8.2.11 Inclination indicators

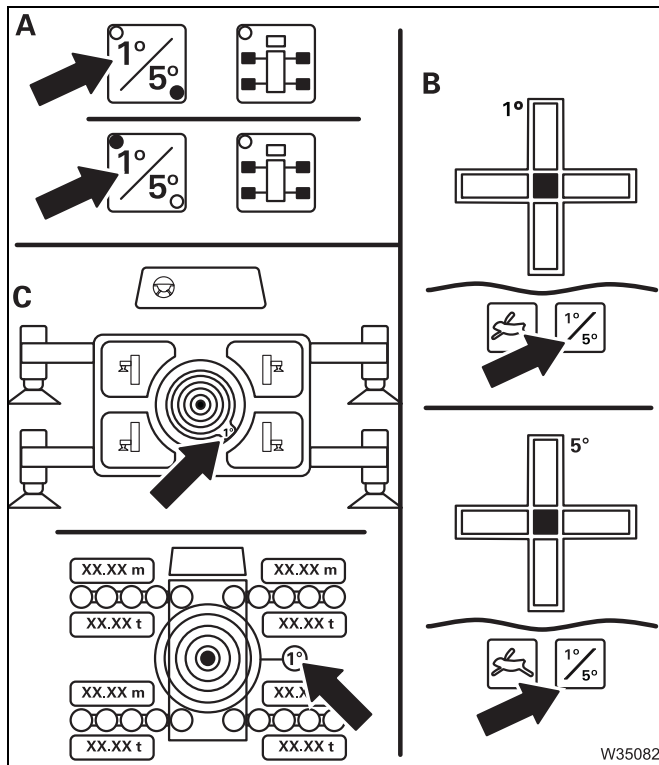
▣▣▣▣ ▣ Inclination indicators, p. 11 - 58



### Current inclination display

- A On the hand-held control
- B On the *outrigger control units*
- C In the *Outrigger menu*
- D In the Monitoring menu

- 1 Inclination indicator
- 2 Measuring range display
- 3 Directional indicator



### Switch over measuring range

- A On the hand-held control  
Press button once – lamp for current measuring range 1° or 5° lights up
- B On the *outrigger control units*  
Press button once – the current measuring range 1° or 5° is shown
- C In the *Outrigger* and *Monitoring* menus – automatically switched over

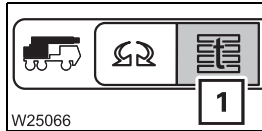


## 8.2.14

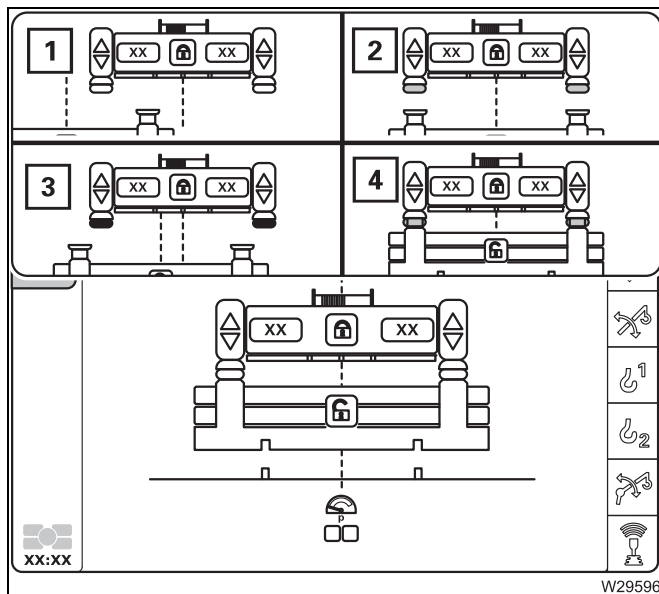
## Counterweight menu

### Counterweight submenu

- ▣▣▣▣ *Rigging/unrigging the counterweight*, p. 11 - 67,
- ▣▣▣▣ *Counterweight hoist unit*, p. 11 - 85.



– **To open:** Select and confirm symbol (1)



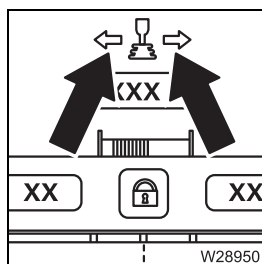
### Rigging position display

1 white – not in the rigging range

In the rigging range, the following rigging positions are displayed.

- 2 green – move the lifting cylinder position
- 3 red – intermediate position, lifting cylinder movements blocked
- 4 green – lift/lower the counterweight position (0° position)

▣▣▣▣ p. 11 - 87

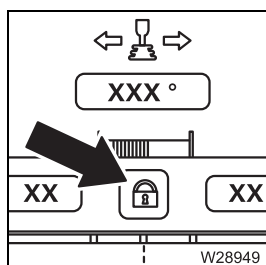


### Display of slewing direction for automatic mode

Automatic mode is switched on.

- **Arrow is displayed:** Move control lever for slewing gear in direction of arrow – automatic mode is executed





### Automatic mode rigging

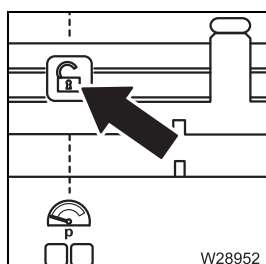
- **Display**      **Yellow:** Recognition that the counterweight is rigged
- Flashing:** Automatic mode on
- Grey**      Automatic mode cancelled or  
   No recognition that counterweight is rigged

The superstructure is within the rigging range, the slewing gear is switched on and the lifting cylinders are retracted

- **Switch on:**      Select symbol and confirm – symbol flashes yellow
  - **To execute:**      Move control lever for slewing gear, automatically:
    - Slewing in position *Move lifting cylinders*
    - Extend lifting cylinders,
- move the control lever for slewing gear in indicated direction, automatically:
- Turn to position *Lift/lower counterweight*,
  - Lift counterweight,
  - Pre-tension counterweight.

Automatic mode ends – symbol yellow

▣▣▣▣▶ p. 11 - 87



### Automatic mode unrigging

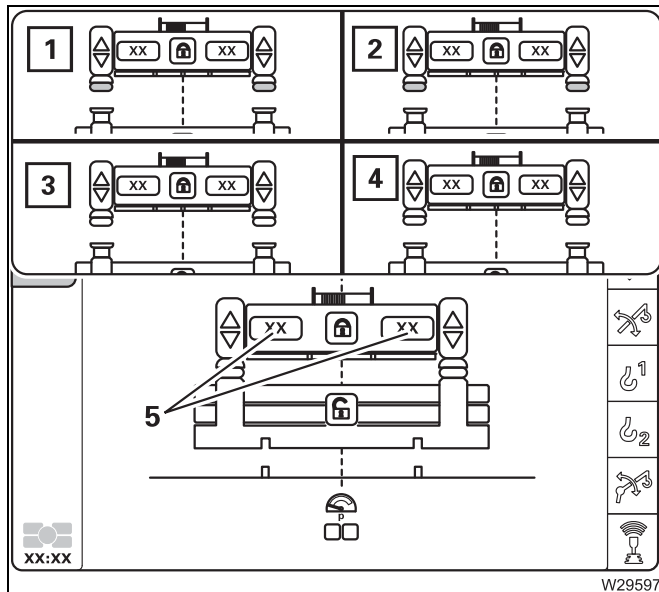
- **Display**      **Yellow:** Recognition that the counterweight is unrigged
- Flashing:** Automatic mode on
- Grey**      Automatic mode cancelled or  
   no recognition that the counterweight is unrigged

The superstructure is within the rigging range and the slewing gear is switched on

- **Switch on:**      Select symbol and confirm – symbol flashes yellow
  - **To execute:**      Move control lever for slewing gear, automatically:
    - Turn to position *Lift/lower counterweight*,
    - Lower the counterweight,
- move the control lever for slewing gear in indicated direction, automatically:
- Turn to position *Move lifting cylinder*,
  - Retract the lifting cylinders,

Automatic mode ends – symbol yellow

▣▣▣▣▶ p. 11 - 89

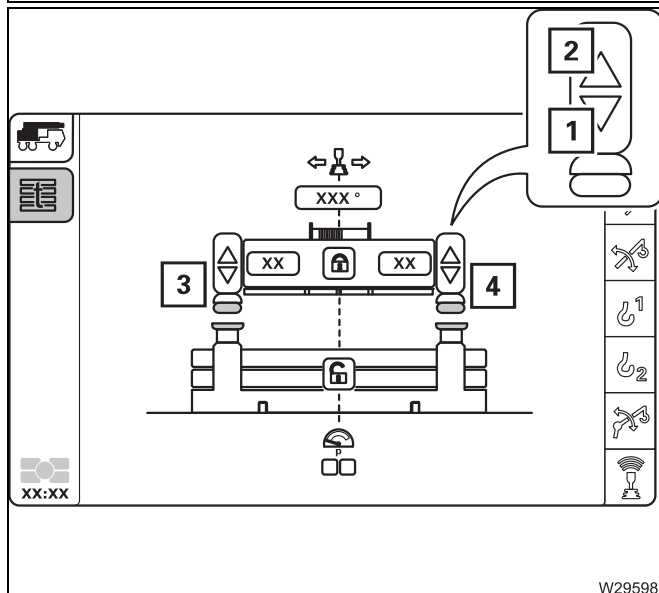


### Lifting cylinder position display

The current position of the counterweight lifting cylinders is shown by different symbols:

- 1 green – extended
- 2 green – retracted
- 3 yellow – intermediate position
- 4 violet – error
- 5 Extended length in percent (%)

▣▣▣▣ p. 11 - 86



### Extending/retracting the lifting cylinders

#### 1 Extend:

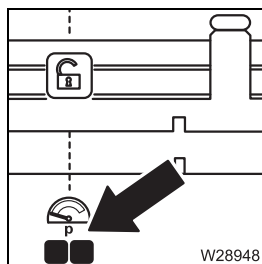
- Display (3) and (4) yellow

Select symbol and confirm – slewing is disabled after extending

#### 2 Retract:

Select symbol and confirm – after reaching the end position, the counterweight is pre-tensioned

The movement stops after the button is released and when an end position is reached ▣▣▣▣ p. 11 - 86.

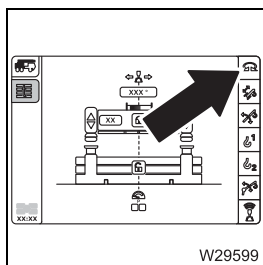


### Pre-tensioning pressure display


- Green: Pre-tensioning pressure reached
- Red: Pre-tensioning pressure too low – pre-tension the counterweight

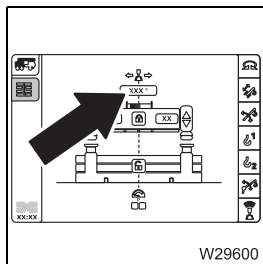
▣▣▣▣ p. 11 - 87






### Slewing gear display

Identical to the display in the *Slewing gear/House lock submenu*;  p. 8 - 113.



### Current slewing angle display

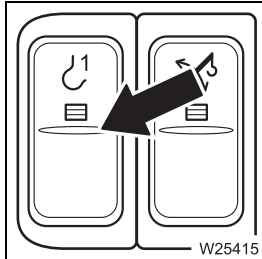
Identical to the display in the *Slewing gear/House lock submenu*;  p. 8 - 124.

## 8.2.15

### Main hoist

▣▣▣▣ *Main hoist*, p. 10 - 75.

#### Control panels

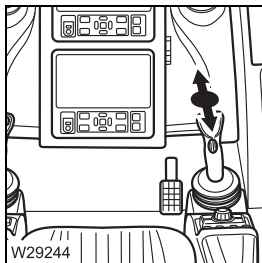


#### Main hoist on/off

There is a lamp in the button.

- **Press once:**      - Lamp bright – main hoist on
- Lamp dim – main hoist off

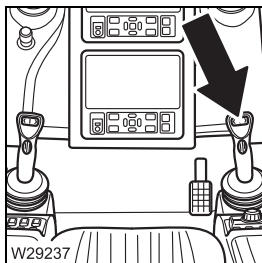
▣▣▣▣ p. 10 - 76



#### Right control lever

- **Back:**                Lifting
- **Forward:**          Lowering

▣▣▣▣ p. 10 - 76



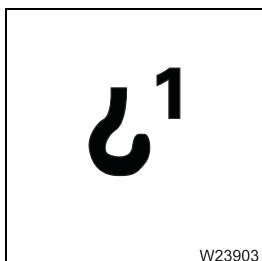
#### Hoist high-speed mode on/off

The parking brake must be applied.

- **Left:**                        High-speed mode on, off when released
- **Once to the right:**      High-speed mode on – continuous operation
- **Once to right**              High-speed mode off
- or once to left:**

▣▣▣▣ p. 10 - 114

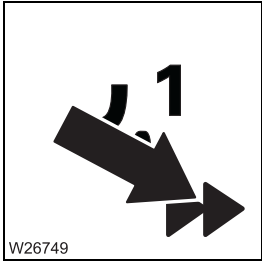
#### CCS display



#### Power units display

- **Green:**      Main hoist on
- **Red:**        Main hoist off

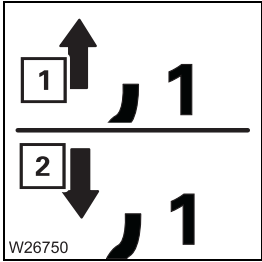




### High speed monitoring for the hoist

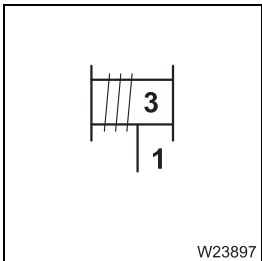
- **On:** High-speed mode on
- **Off:** High-speed mode off

▣▣▣▣▶ p. 10 - 114



### Lift/lower the hoist display

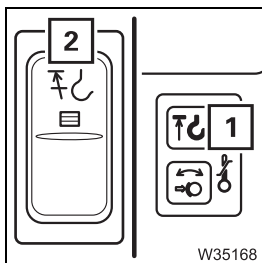
- **Symbol (1):** Raise
- **Symbol (2):** Lower



### Warning for lowering limit switch shutdown

- **Red:** Lowering limit switch triggered – main hoist stop
- **Grey:** Lowering limit switch not triggered

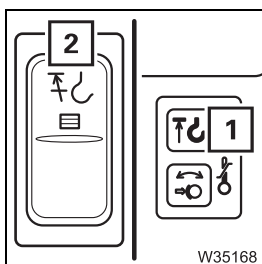
▣▣▣▣▶ p. 10 - 82



### Warning for lifting limit switch shutdown

- 1 - On:** Lifting limit switch triggered – movements which increase the load moment stops
- 1 - Flashing:** Button (2) pressed
- 1 - Off:** Lifting limit switch not triggered and not bridged

▣▣▣▣▶ p. 10 - 82



### Lifting limit switch override

- 2 - Press:** Shutdown functions of the lifting limit switch bridged
  - Lamp (1) flashes
  - Buzzer tone sounds
  - Enable crane movements (move the control lever to the initial position if necessary)
- 2 - Release:** Shutdown functions of the lifting limit switch not bridged

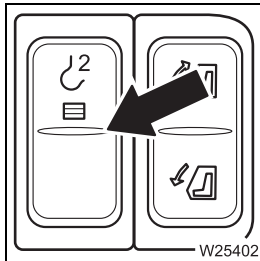


## 8.2.16

### Auxiliary hoist

▣▣▣▣ *Auxiliary hoist*, p. 10 - 79.

#### Control panels

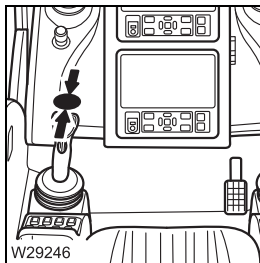


#### Auxiliary hoist on/off

There is a lamp in the button.

- **Press once:**
  - Lamp bright – auxiliary hoist on
  - Lamp dim – auxiliary hoist off

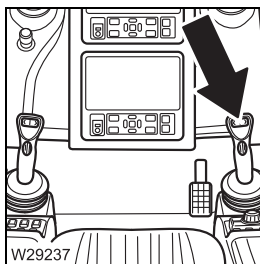
▣▣▣▣ p. 10 - 79



#### Left control lever

- **Back:** Lifting
- **Forward:** Lowering

▣▣▣▣ p. 10 - 80



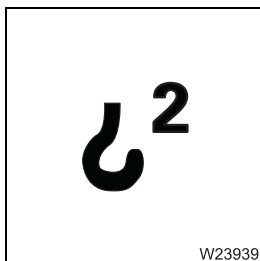
#### Hoist high-speed mode on/off

The parking brake must be applied.

- **Left:** High-speed mode on, off when released
- **Once to the right:** High-speed mode on – continuous operation
- **Once to right or once to left:** High-speed mode off

▣▣▣▣ p. 10 - 114

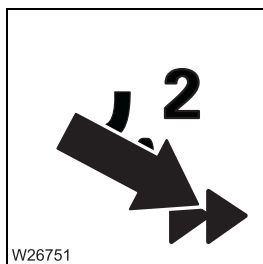
#### CCS display



#### Power units display

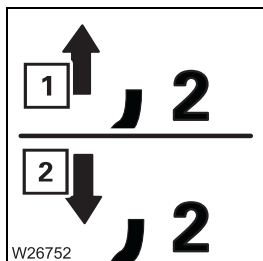
- **Green:** Auxiliary hoist on
- **Red:** Auxiliary hoist off





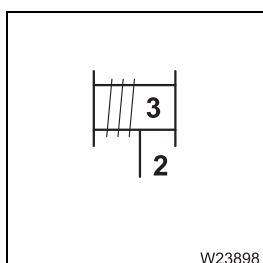
### High speed monitoring for the hoists

- **On:** High-speed mode on
  - **Off:** High-speed mode off
- ▣▣▣▣▶ p. 10 - 114



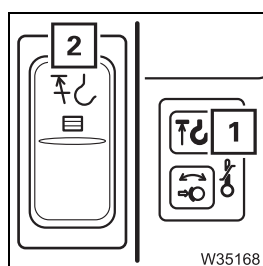
### Lift/lower the hoist display

- **Symbol (1):** Raise
  - **Symbol (2):** Lower
- ▣▣▣▣▶ p. 10 - 114



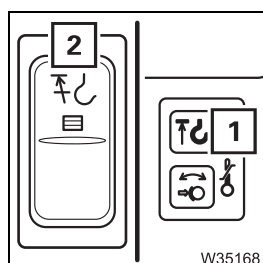
### Warning for lowering limit switch shutdown

- **Red:** Lowering limit switch triggered – auxiliary hoist stop
  - **Grey:** Lowering limit switch not triggered
- ▣▣▣▣▶ p. 10 - 82



### Warning for lifting limit switch shutdown

- 1 - On:** Lifting limit switch triggered – movements which increase the load moment stops
  - 1 - Flashing:** Button (2) pressed
  - 1 - Off:** Lifting limit switch not triggered and not bridged
- ▣▣▣▣▶ p. 10 - 82



### Lifting limit switch override

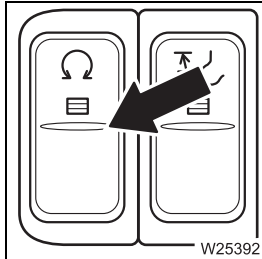
- 2 - Press:** Shutdown functions of the lifting limit switch bridged
  - Lamp (1) flashes
  - Buzzer tone sounds
  - Enable crane movements (move the control lever to the initial position if necessary)
- 2 - Release:** Shutdown functions of the lifting limit switch not bridged

## 8.2.17

### Slewing gear

▣▣▣▣▶ *Slewing gear*, p. 10 - 115.

#### Control panels

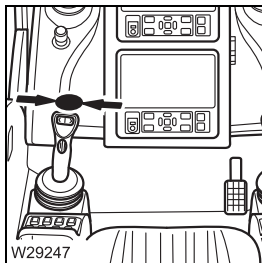


#### Slewing gear on/off

There is a lamp in the button.

- **Press once:**
  - Lamp bright – slewing gear on,  
Slewing gear brake released
  - Lamp dim – slewing gear off  
Slewing gear brake applied

▣▣▣▣▶ p. 10 - 115



#### Left control lever

- **To the left:** Slew to the left
- **To the right:** Slew to the right

▣▣▣▣▶ p. 10 - 116



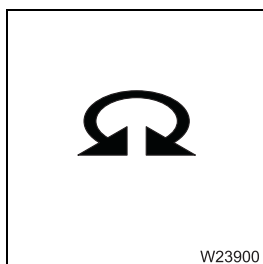
#### Slewing gear freewheel

- Slewing gear is switched on.
- The control lever (2) is in the initial position.
- **To switch on:** Press button (3) or (4) – slewing gear brake released, lamp (1) goes out
- **To switch off:** Release button – slewing gear brake applied, lamp (1) lights up

▣▣▣▣▶ p. 10 - 119

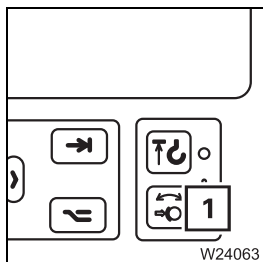


### *CCS display*



#### **Power units display**

- **Green:** Slewing gear on
- **Red:** Slewing gear off



#### **Slewing gear brake applied/released display**

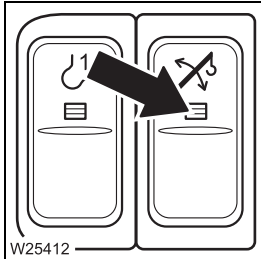
- 1 On:** Slewing gear brake applied
  - 1 Off:** Slewing gear brake released
- ▣▶ p. 10 - 115

## 8.2.18

### Derricking gear

▣▣▣▣ ▸ *Derricking gear*, p. 10 - 85.

#### Control panels

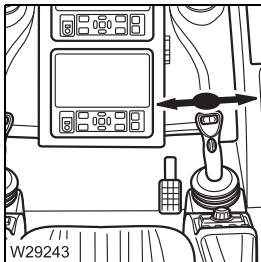


#### Derricking gear on/off

There is a lamp in the button.

- **Press once:** - Lamp bright – derricking gear on,  
Power units with the same control lever configuration  
off
- Lamp dim – derricking gear off

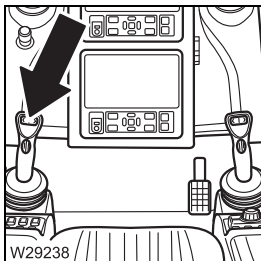
▣▣▣▣ ▸ p. 10 - 85



#### Right control lever

- **To the left:** Raise – lift main boom
- **To the right:** Lower – lower main boom

▣▣▣▣ ▸ p. 10 - 86



#### Derricking gear/telescoping mechanism high-speed mode on/off

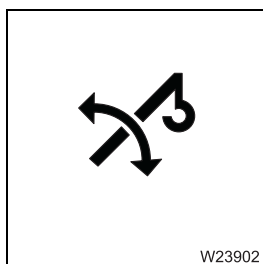
The parking brake must be applied.

- **Left:** High-speed mode on, off when released
- **Once to the right:** High-speed mode on – continuous operation
- **Once to the right or  
once to the left:** High-speed mode off

▣▣▣▣ ▸ p. 10 - 113

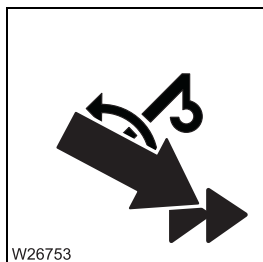


### CCS display



#### Power units display

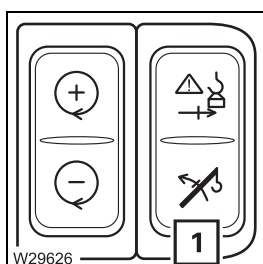
- **Green:** Derricking gear on
- **Red:** Derricking gear off



#### High-speed mode inspection derricking gear

- **On:** High-speed mode on
  - **Off:** High-speed mode off
- ▣▣▣▣ p. 10 - 113

### Side panel



#### Raise enable button after RCL shutdown

RCL override – version A; ▣▣▣▣ p. 8 - 137.

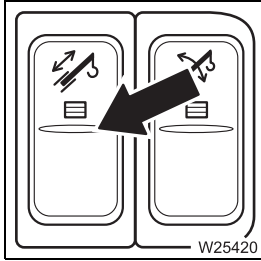
RCL override – version B; ▣▣▣▣ p. 8 - 138.

## 8.2.19

### Telescoping mechanism

#### Control panels

▣▣▣▣▶ *Telescoping mechanism*, p. 10 - 89.

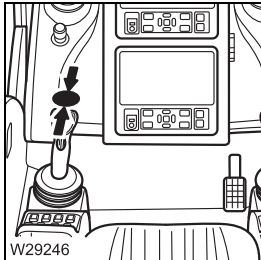


#### Telescoping mechanism on/off

There is a lamp in the button.

- **Press once:** – Lamp bright – telescoping mechanism on, Power units with the same control lever configuration off
- Lamp dim – telescoping mechanism off

▣▣▣▣▶ p. 10 - 97



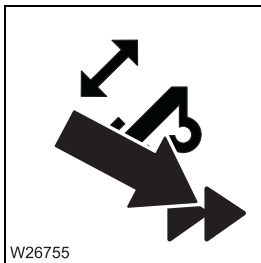
#### Left control lever

Control lever configuration – version 1

- **Back:** Retracting
- **Forward:** Extending

▣▣▣▣▶ p. 10 - 97

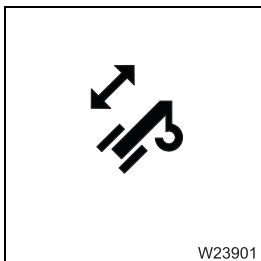
#### CCS display



#### Telescoping mechanism high-speed mode inspection

- **On:** High-speed mode on
- **Off:** High-speed mode off

▣▣▣▣▶ p. 10 - 113

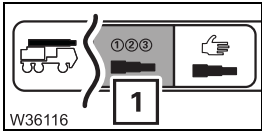


#### Power units display

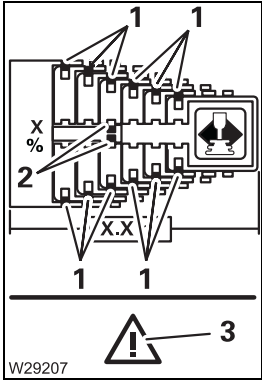
- **Green:** Telescoping mechanism on
- **Red:** Telescoping mechanism off



### Telescoping semi-automation menu



**To open:** Select symbol (1) and confirm – menu is opened



#### Telescope diagram display

Current relation of the telescopic sections to each other – section of top view.

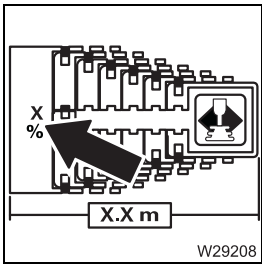
#### Locking pin

- 1 On the telescopic section
- 2 On the telescoping cylinder
- 3 Error

#### Display 1 and 2

- **Green:** Locked
- **Yellow:** Intermediate position
- **Red:** Unlocked

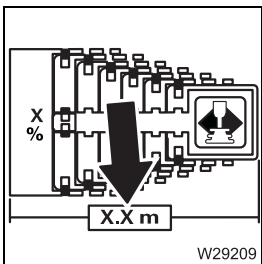
▶▶▶ p. 10 - 101



#### Telescoping cylinder length display

- **Display:** Current extended length of the telescoping cylinder
- **Unit of measurement:** Displayed depending on setting, mm (millimetres) or percent (%)

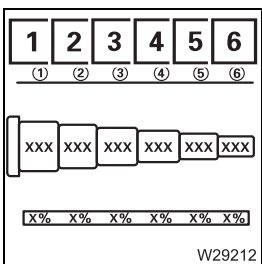
▶▶▶ p. 10 - 110



#### Main boom length display

- **Display:** Current extended length of the main boom
- **Unit of measurement:** Displayed depending on setting, m (meters) or ft (feet)

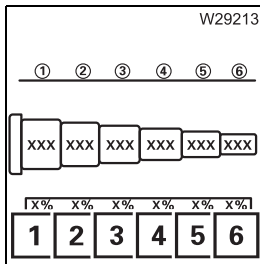
▶▶▶ p. 10 - 110



#### Telescopic sections display

1 - 6 Display for telescopic sections 1 to 6

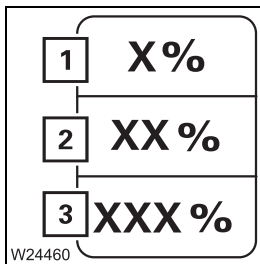




### Current telescope status display

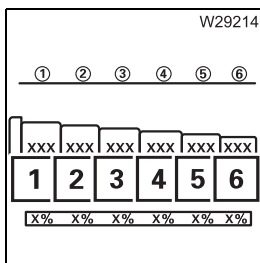
Extended length of the telescopic sections in percentage

1 - 6 Display for telescopic sections 1 to 6



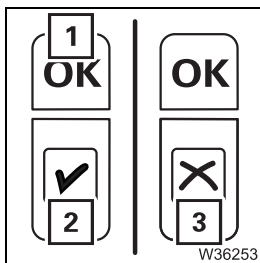
### Pre-selection for all telescopic sections

- 1 Pre-selection telescoping 0%
- 2 Pre-selection telescoping 50%
- 3 Pre-selection telescoping 100%



### Pre-selection individual telescopic sections

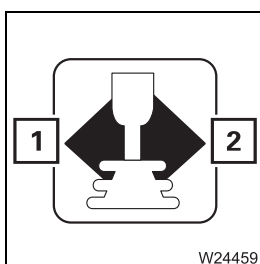
1 - 6 Display for telescopic sections 1 to 6



### Confirm pre-selection

- 1 Confirm pre-selected telescoping
- 2 Telescoping permitted display
- 3 Telescoping not permitted display

➡ p. 10 - 110



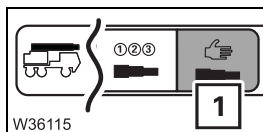
### Teleautomation direction display

- 1 Start telescoping full automation with *Retract*
- 2 Start telescoping full automation with *Extend*

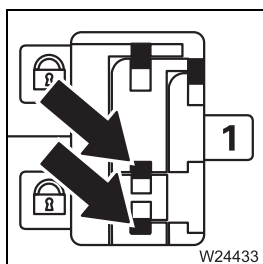
➡ p. 10 - 110



## Manual telescoping menu

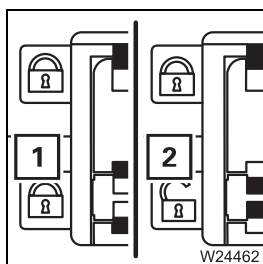


**To open:** Select symbol (1) and confirm – menu is opened



### Telescoping cylinder locked/released

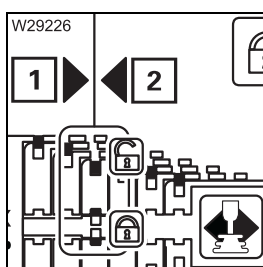
- **Display**     **Yellow:**     Locking pins intermediate position
- Green:**        Telescoping cylinder locked
- Red:**            Telescoping cylinder unlocked



### Lock/unlock telescoping cylinder

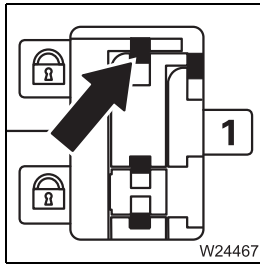
- **To lock:**        - Telescopic section locked:  
                              Select symbol (1) and confirm – telescoping cylinder is locked
- **To unlock:**    - Telescopic section locked:  
                              Select symbol (2) and confirm – telescoping cylinder is unlocked

▶▶▶ p. 10 - 102



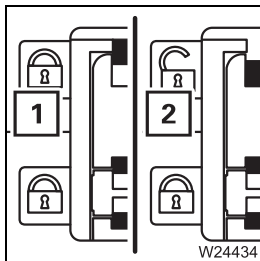
### Locking point display

- 1 Extend telescoping cylinder
- 2 Retract telescoping cylinder



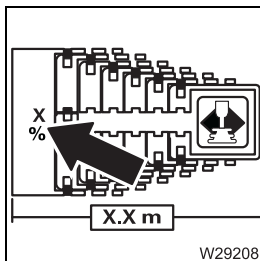
### Lock/release telescopic section

- **Display**      **Yellow:**            Locking pins intermediate position
- Green:**             Telescopic section locked
- Red:**                Telescopic section unlocked



- **To lock:**        - The telescoping cylinder is locked:  
                          Select symbol (2) and confirm – telescopic section locked
- **To unlock:**    - The telescoping cylinder is locked:  
                          Select symbol (1) and confirm – telescopic section is  
                          unlocked

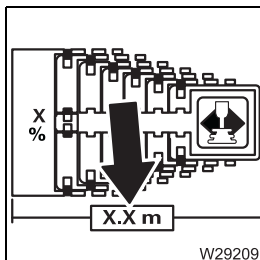
➡ p. 10 - 106



### Telescoping cylinder length display

- **Display:**                    Current extended length of the telescoping cylinder
- **Unit of measurement:**    Displayed depending on setting, mm (millimetres) or  
    percent (%)

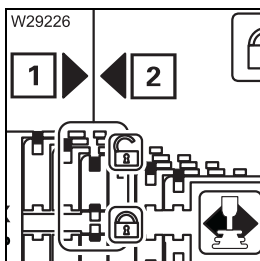
➡ p. 10 - 100



### Main boom length display

- **Display:**                    Current extended length of the main boom
- **Unit of measurement:**    Displayed depending on setting, m (meters) or  
    ft (feet)

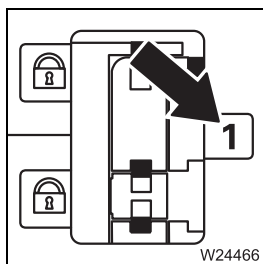
➡ p. 10 - 100



### Locking point display

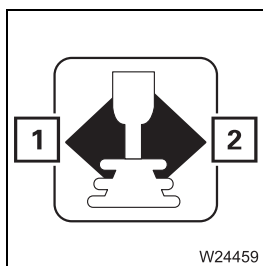
- 1 Extend telescoping cylinder
- 2 Retract telescoping cylinder





### Telescoping cylinder in the telescopic section display

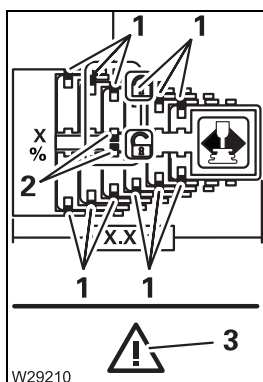
Displayed telescopic section, e.g. telescopic section 1



### Telescoping direction display

- 1 Start with *Retract*
- 2 Start with *Extend*

▮▮▮▮▶ p. 10 - 110



### Telescope diagram display

Current relation of the telescopic sections to each other – section of top view.

#### Locking pin

- 1 On the telescopic section
- 2 On the telescoping cylinder
- 3 Error

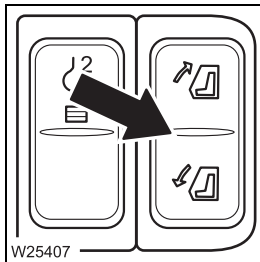
▮▮▮▮▶ p. 10 - 101

#### Display 1 and 2

- **Green:** Locked
- **Yellow:** Intermediate position
- **Red:** Unlocked

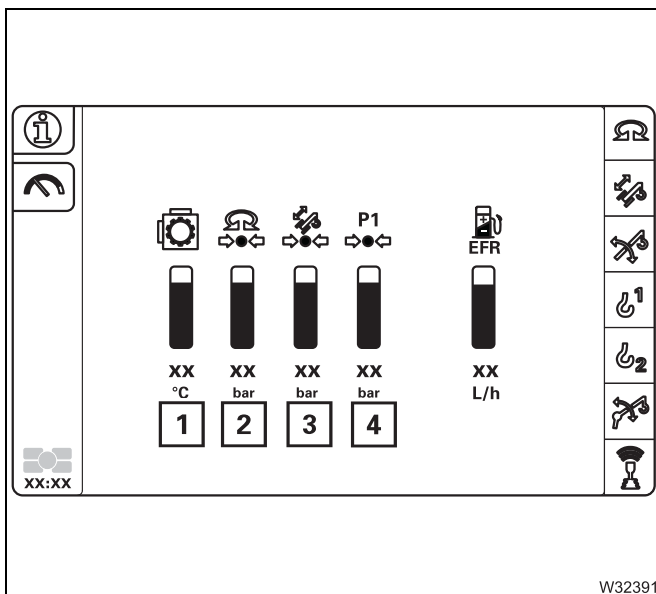
## 8.2.20

### Hydraulic system



#### Inclining the crane cab

- **Press down:** incline to the front
  - **Press up:** incline to the rear
- ▮▮▮▮▶ p. 10 - 121

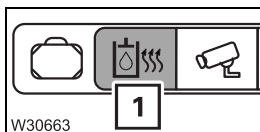


#### In Information menu

- 1 Angle gear oil temperature

Current pressure in bar for movements of:

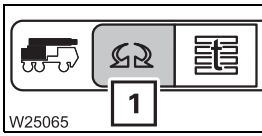
- 2 Slewing gear
- 3 Telescoping mechanism
- 4 – Hoist
  - Derricking gear
  - Counterweight hoist unit
  - Inclining the crane cab
  - Locking units



#### Preheating the hydraulic oil

- **To switch on:** Select symbol (1) and confirm – symbol is **red**
  - **To switch off:** Select symbol (1) and confirm – symbol is **grey**
- ▮▮▮▮▶ p. 10 - 14

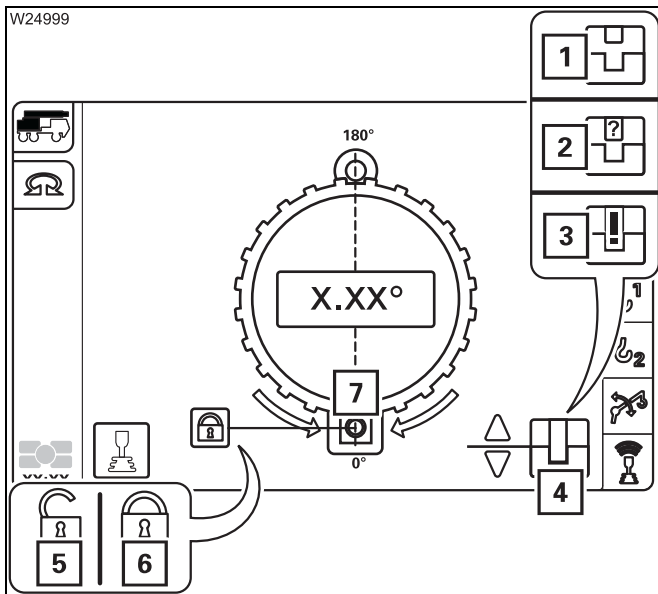
## 8.2.21 Superstructure lock/house lock menu



- **To open:** Select symbol (1) and confirm – menu is opened

### Superstructure lock

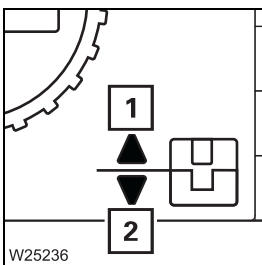
☛ Locking/unlocking the superstructure, p. 10 - 15.



### Locking status displays

The current position of the locking pin is shown by different symbols:

- 1 and 7** red – unlocked
  - 2 and 7** yellow – intermediate position
  - 3 and 7** violet – error
  - 4 and 7** green – locked
- and
- 5** Unlocked
  - 6** Locked
- ☛ p. 10 - 16

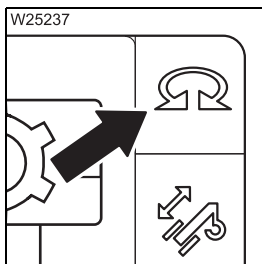


### Locking/unlocking the turntable

The superstructure is in the 0° or 180° position.

- To unlock:** Symbol (1) – locking pins retract
- To lock:** Symbol (2) – locking pins extend

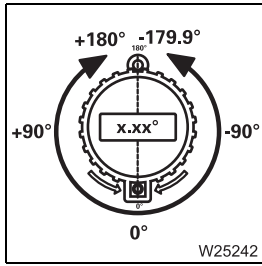
☛ p. 10 - 16



### Slewing gear display

- **Green:** Slewing gear switched on
- **Red:** Slewing gear switched off

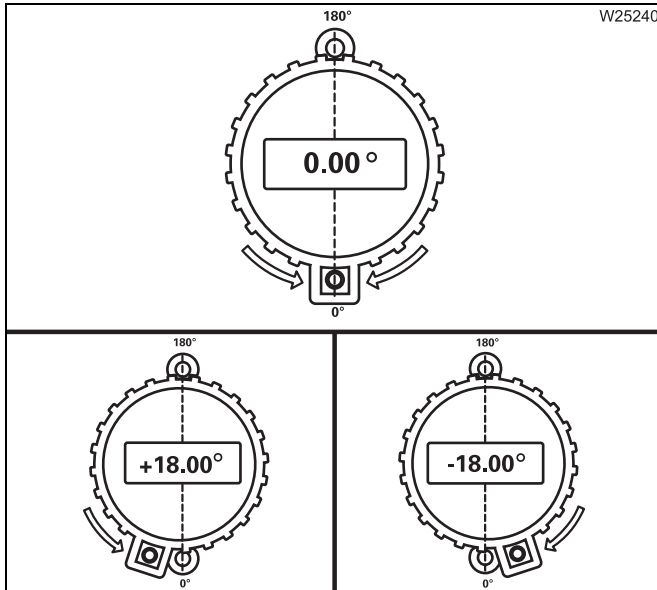
☛ p. 10 - 17



### Current slewing angle display

- 0°:** Position  $0^\circ$  to the rear – locking point
- 180°:** Position  $180^\circ$  to the front – locking point
- + 0.1 to +180.0°:** Turned to the right from  $0^\circ$
- 0.1 to -179.9°:** Turned to the left from  $0^\circ$

▣▣▣▣ p. 10 - 115



### Directional indicator

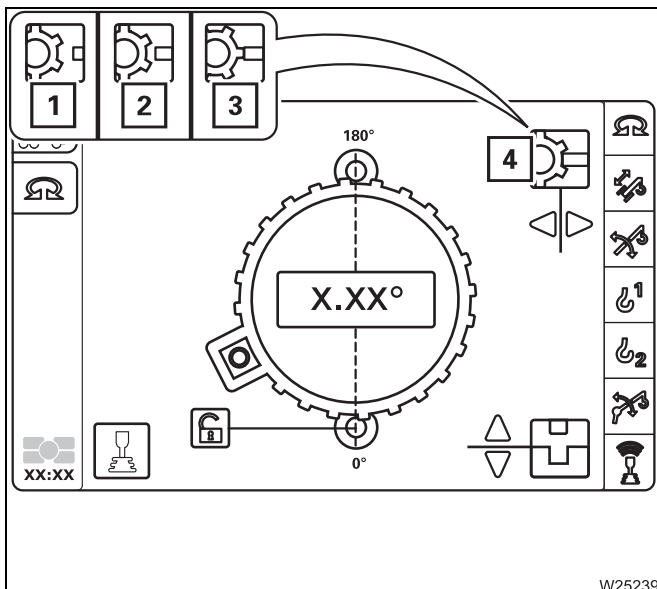
Current position  $\pm 20^\circ$  in front of the locking point.

- **Both arrows:** locking point reached
- **One arrow:** direction of arrow = turning direction towards the locking point

▣▣▣▣ p. 10 - 15

### Houselock

▣▣▣▣ Switching the houselock on/off, p. 10 - 17.



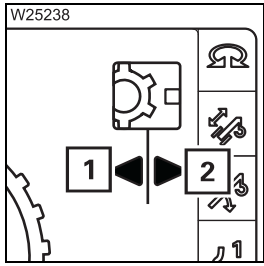
### Locking status displays

The current position of the locking pin is shown by different symbols:

- 1** Unlocked
- 2** Intermediate position
- 3** Blocked, locking pin in front of a tooth
- 4** Locked

▣▣▣▣ p. 10 - 17





### House lock on/off

**To switch on:** Symbol (1) – Pin extends

**To switch off:** Symbol (2) – Pin retracts

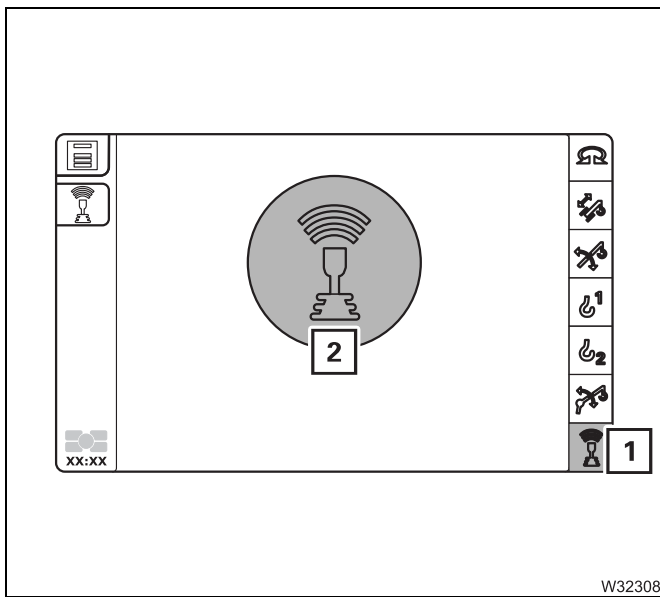
▬▬▬▬▶ p. 10 - 17

## 8.2.22

### Remote control



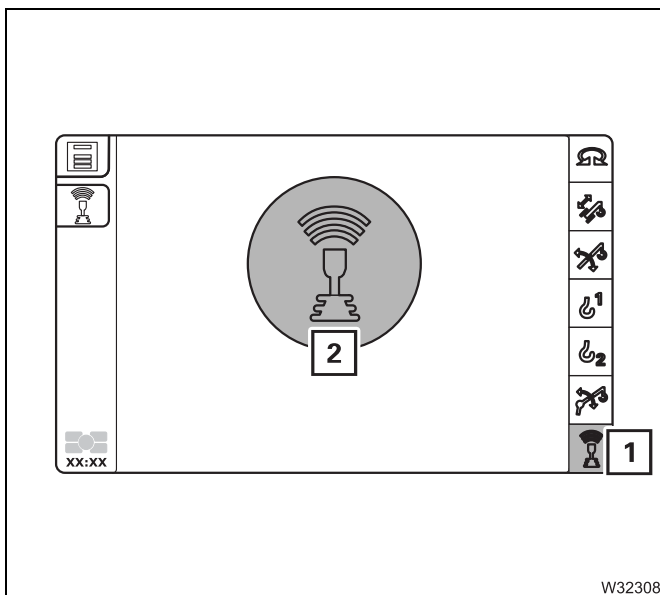
Operating with the remote control is only enabled for the *Standard* slewing range type.



### Remote control menu

- 1 – Orange:**  
Remote control connected
- 1 – Green:**  
Remote control switched on.  
CCS operation from the cab is blocked.  
Symbol (2) is shown green on all menus.
- 1 – Off:**  
Remote control deactivated

For more information; ▬▬▬▬▶ *Separate operating instructions*



### Remote control display

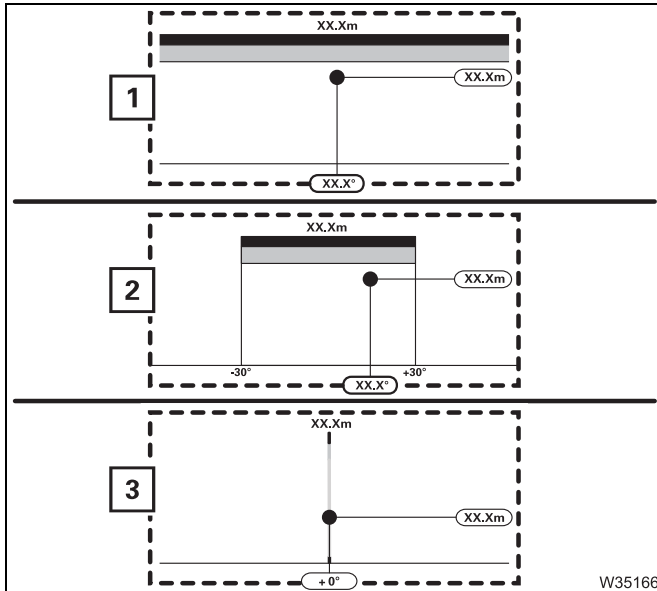
- 1 – Green:**  
Remote control switched on.  
CCS operation from the cab is blocked.  
Symbol (2) is shown on all menus.
- 1 – Off:**  
Remote control deactivated

For more information; ▬▬▬▬▶ *Separate operating instructions*



## 8.2.23 Rated capacity limiter (RCL)

CCS display In the Start menu

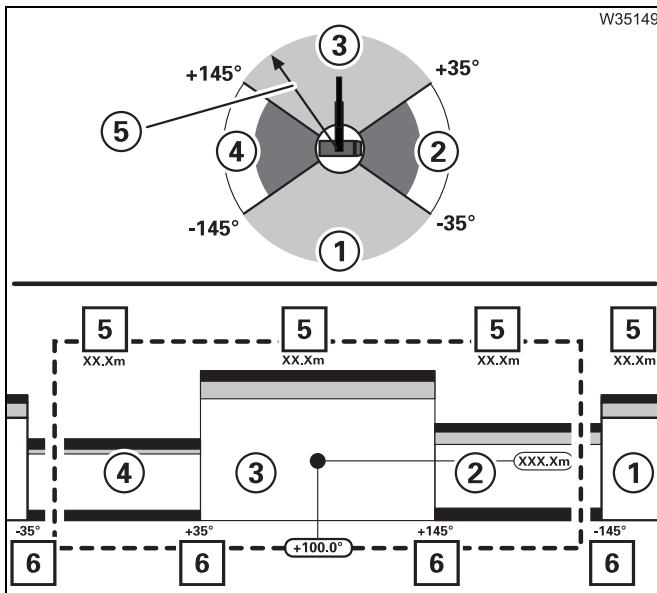


**For the Standard slewing range type**

Only one slewing range is displayed

- 1 360° slewing range
- 2 Restricted slewing range, e.g.  $\pm 30^\circ$
- 3 Working position, e.g.  $0^\circ$  to the rear

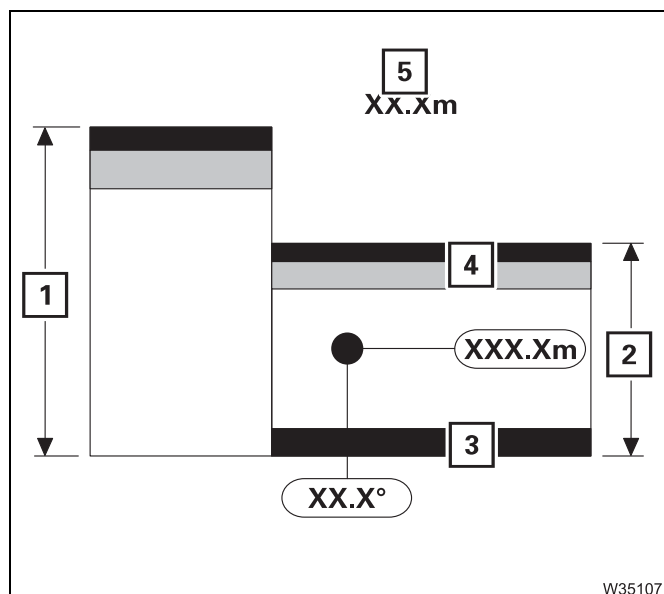
The displays for working radius, current slewing angle and current position are identical to the displays for the *MAXbase* slewing range type.



**For the MAXbase slewing range type**

- **Slewing ranges/working radii display**  
Represents the defined slewing ranges and corresponding respective maximum permissible operating radii ⑤ for the confirmed rigging mode as a diagram.
- **Display of current slewing range divisions**  
Shows the currently defined slewing ranges ① to ④ as pillars ① to ④. The pillar width represents the angular range.
- **Display of current slewing range limits**  
Shows the currently defined slewing range limits (6) in degrees.  
For example  $-35^\circ / +35^\circ / +145^\circ / -145^\circ$ .

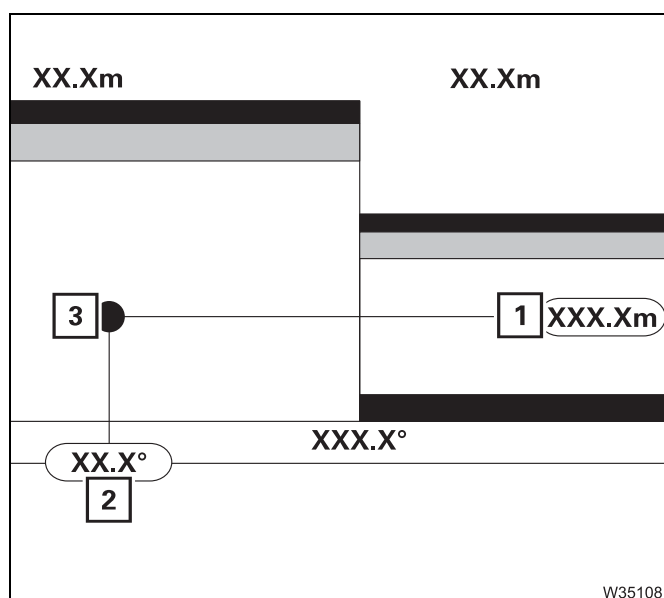




### Maximum permissible working radius display

Shows the maximum permissible working radius (5) for each slewing range.

- 1 Display area – always corresponds to the largest maximum working radius (5)
- 2 Maximum permissible working radius in the corresponding slewing range with the currently lifted load
- 3 White – limit region for minimum permissible working radius (display only with active limitation)
- 4 Red/yellow – limit region for maximum permissible working radius



### Current working radius display

- 1 Display occurs in the same manner as in the *Monitoring submenu*; see p. 10 - 49.

### Current slewing angle display

- 2 Display occurs in the same manner as in the *Monitoring submenu*; see p. 10 - 50.

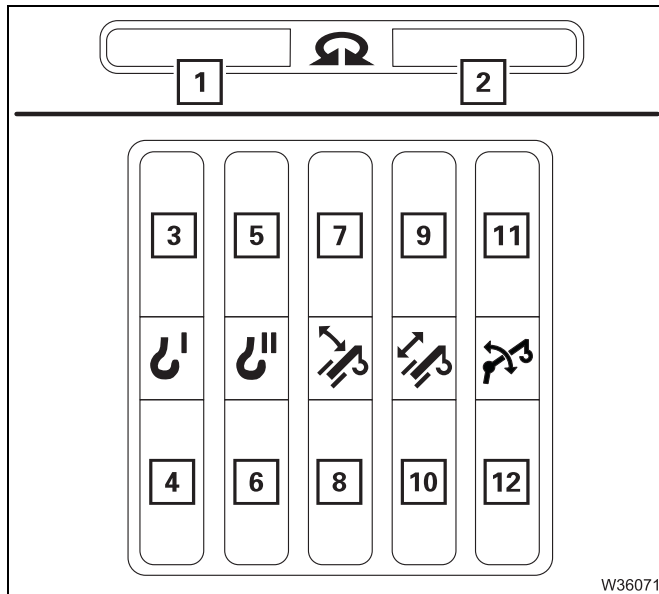
### Current position display

- 3 Shows the current position of the boom head in the slewing range and working radius range.

- When slewing  
The display (3) remains at the current position. The chart moves a corresponding distance to the right or left.
- When telescoping or derricking  
The diagram remains at the current position. The display (3) moves a corresponding distance up or down.

▣▣▣▣ *Standard slewing range type*, p. 10 - 53

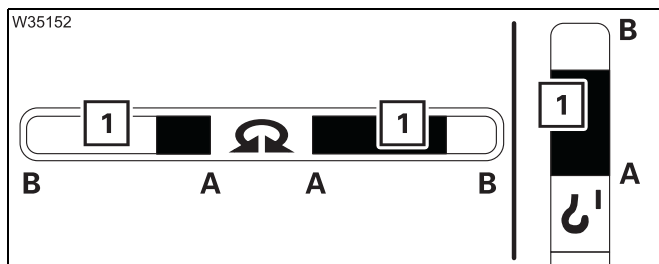
▣▣▣▣ *MAXbase slewing range type*, p. 10 - 55



### Maximum permissible speed display

Separate displays are provided for each direction of movement.

- 1 Slew to the left
- 2 Slew to the right
- 3 Lower the main hoist
- 4 Lift the main hoist
- 5 Lower the auxiliary hoist
- 6 Lifting the auxiliary hoist
- 7 Lower
- 8 Raising
- 9 Extending
- 10 Retracting
- 11 Lower the lattice extension
- 12 Raise the lattice extension

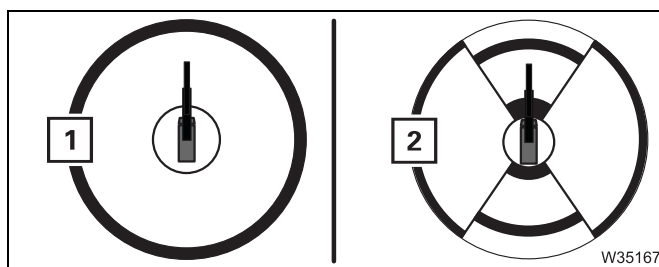


A bar (1) shows the maximum permissible speed – scale from 0% (A) to 100% (B).

The colour of the bar (1) changes.

- Red:** 0% to 10%
- Yellow:** 11% to 25%
- Green:** 26% to 100%

On the CCS display, p. 10 - 53



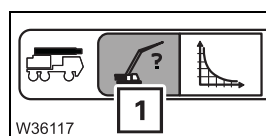
### Slewing ranges display

The function is identical to the display in the *Lifting capacity table* menu.

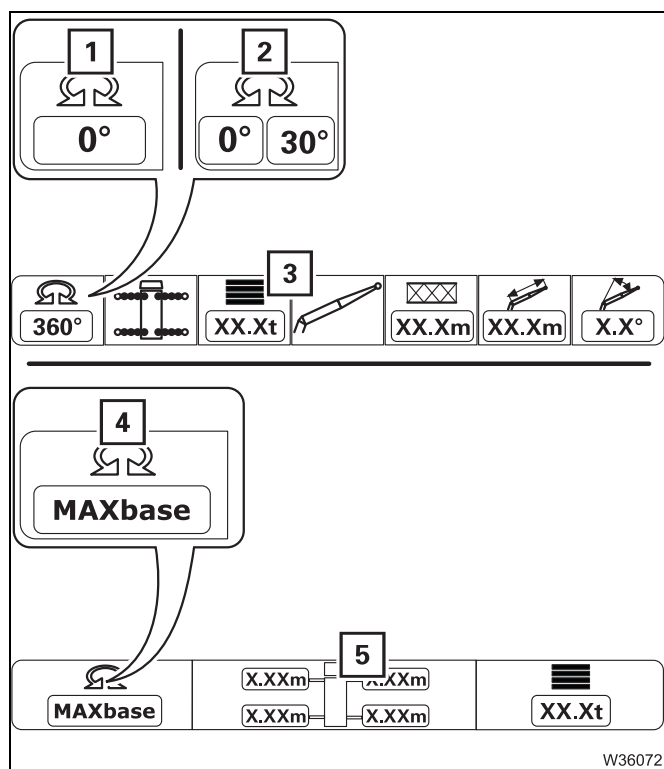
- 1 For the *Standard slewing range type*;  
p. 10 - 60
- 2 For the *MAXbase slewing range type*;  
p. 10 - 61



In the *Enter rigging mode/telescope status menu*



Select and confirm the symbol (1) – the menu opens, and opens automatically after *Ignition on*



### Enter slewing range

In input mode

Select slewing range symbol and confirm

#### – For the *Standard slewing range type*

- 1 Display for a slewing range of 360° or for working position<sup>1)</sup>, e.g. 0° to the front
- 2 Display for restricted slewing range, e.g. 0° ± 30°

– After confirmation: Menu display (3)

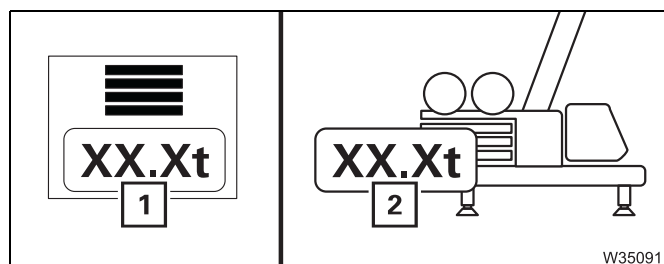
1) To accept, switch off the slewing gear

#### – For the *MAXbase slewing range type*

4 MAXbase

– After confirmation: Menu display (5)

Enter rigging mode, p. 10 - 32



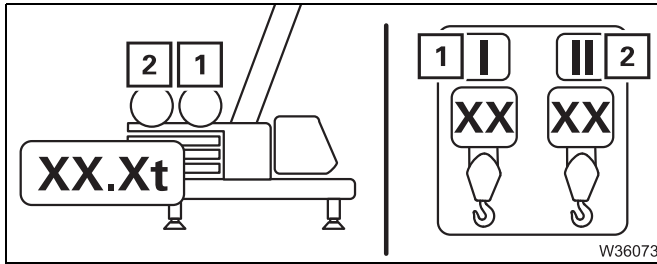
### Enter counterweight

#### Counterweight display

1 In input mode – select and confirm counterweight

2 Shows the current entry

Enter rigging mode, p. 10 - 32



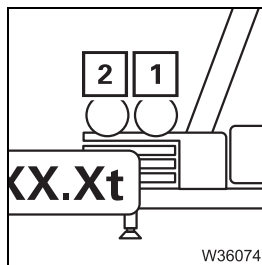
### Reeving input mode display

- 1 Main hoist
- 2 Auxiliary hoist

**Orange:** on

**Grey:** off

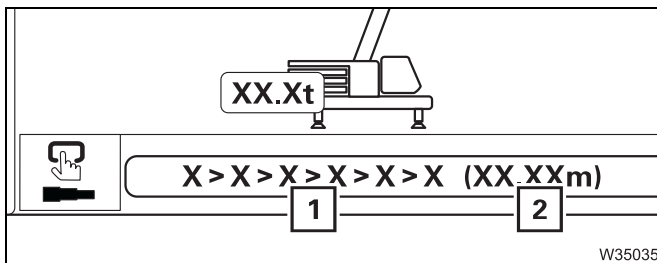
Enter rigging mode, p. 10 - 32



### Enter reeving

- 1 Main hoist  
In input mode – select and confirm current reeving
- 2 Auxiliary hoist – functions as with (1)

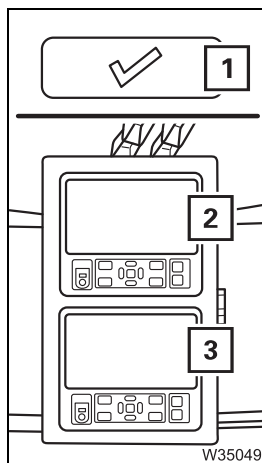
Enter rigging mode, p. 10 - 32



### Preselected telescoping display

- 1 Telescope status display in percentage (%)
- 2 Preselected main boom length (1) in metres (m) or in feet (ft)

Enter rigging mode, p. 10 - 32

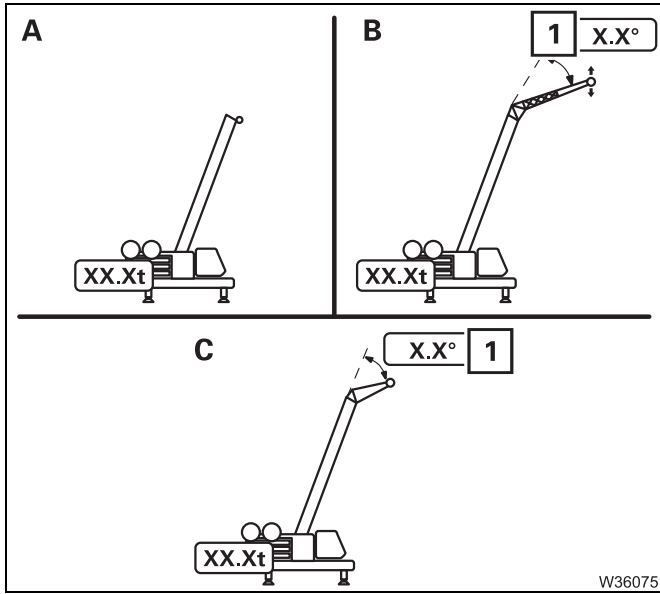


### Confirming the rigging mode

- 1 – **Orange:** Select and confirm
  - Rigging mode and preselected telescope status are adopted – lifting capacity table is confirmed
  - Display (2) – *Monitoring* menu on
  - Display (3) – *Start menu* on
- **Grey:** MAXbase only – no selection possible  
Measured outrigger width ≠ of required width

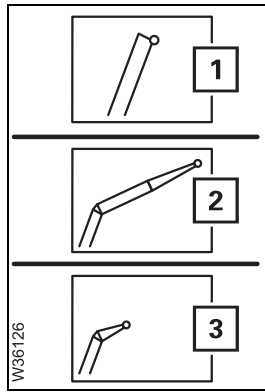
Enter rigging mode, p. 10 - 32





**Boom system display**

- A** Main boom display
- B** Lattice extension display
- C** Heavy load lattice extension display
- 1** Angle of the lattice extension display (for inclinable lattice extension)

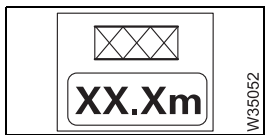


**Boom system entry**

For the *Standard slewing range type only*.

In input mode – select and confirm the boom system

- 1** Main boom
- 2** Lattice extension/boom extension
- 3** Heavy load lattice extension



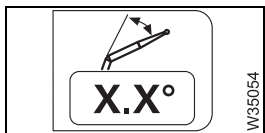
**Input lattice extension – the length before the angle**

In input mode – select and confirm length.



**Input lattice extension – the length after the angle**

In input mode – select and confirm length.



**Input lattice extension – angle**

Only for manually inclinable lattice extensions

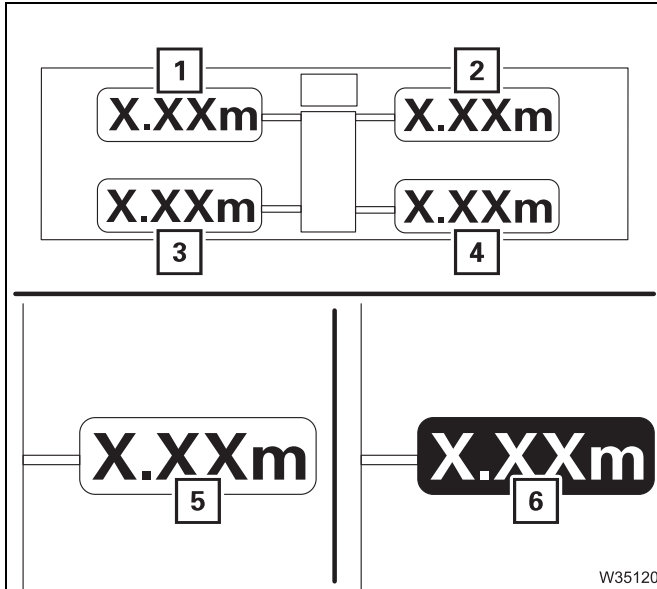
In input mode – select and confirm the angle.

Enter rigging mode, p. 10 - 32



### Accept the measured outrigger span

Select and confirm – the outrigger span provided by the outrigger width monitoring is adopted and shown on the *Enter outrigger span* display;  
 ■■■► *Confirm the rigging mode and lifting capacity table, p. 10 - 41.*



### Enter outrigger span (MAXbase)

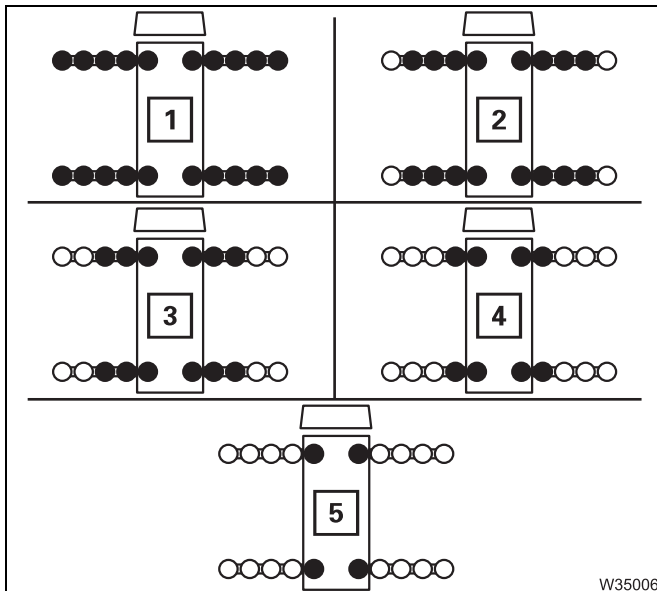
The values are entered individually for outrigger beams (1) to (4).

In input mode – select and confirm the individual widths.

### Outrigger span monitoring display (MAXbase)

- 5 Measured outrigger width = required width
- 6 Measured outrigger width  $\neq$  of required width

■■■► *Enter rigging mode, p. 10 - 32*



### Enter outrigger span (Standard)

The selection occurs simultaneously for all outrigger beams – selected outrigger widths are orange.

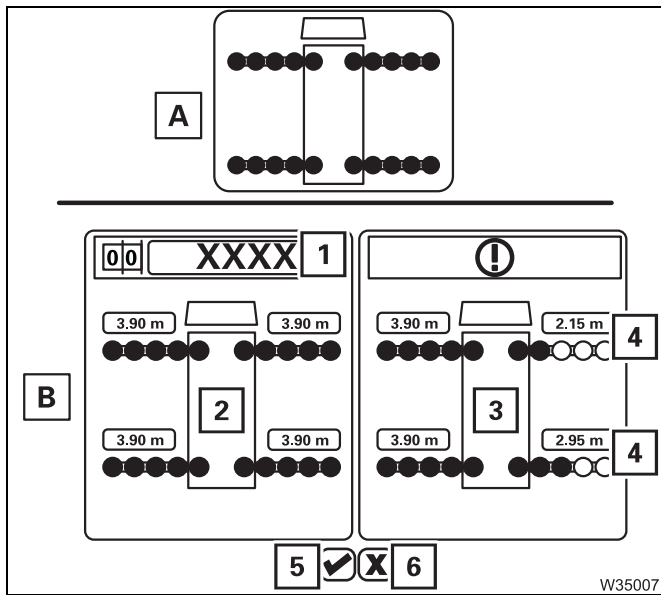
In input mode – select and confirm the outrigger span

- 1 8.950 x 7.800 m (29.4 x 25.6 ft)
- 2 8.950 x 6.854 m (29.4 x 22.4 ft)
- 3 8.950 x 5.910 m (29.4 x 19.4 ft)
- 4 8.950 x 4.310 m (29.4 x 14.2 ft)
- 5 8.950 x 2.710 m (29.4 x 8.8 ft)

For the special outrigger span of 5.287 m x 7.800 / 2.500 m (17.3 ft x 25.6 / 8.2 ft) the symbol (1) is displayed after entering the RCL code.

■■■► *Enter rigging mode, p. 10 - 32*



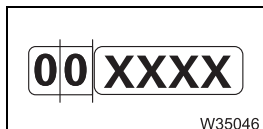


### Outrigger span monitoring display (standard)

Query after confirming the rigging mode.

- A** Measured outrigger width = required width
- B** Measured outrigger span  $\neq$  of required span (query menu)
  - 2** Required outrigger width – for RCL code (1)
  - 3** Measured outrigger width
  - 4** Outrigger width not OK for RCL Code (1) – red
  - 5** Confirmation  
 Rigged outrigger span = outrigger span (2),  
 Crane operation enabled
  - 6** Confirmation  
 Rigged outrigger span  $\neq$  outrigger span (2)  
 Crane operation not enabled

Enter rigging mode, p. 10 - 32



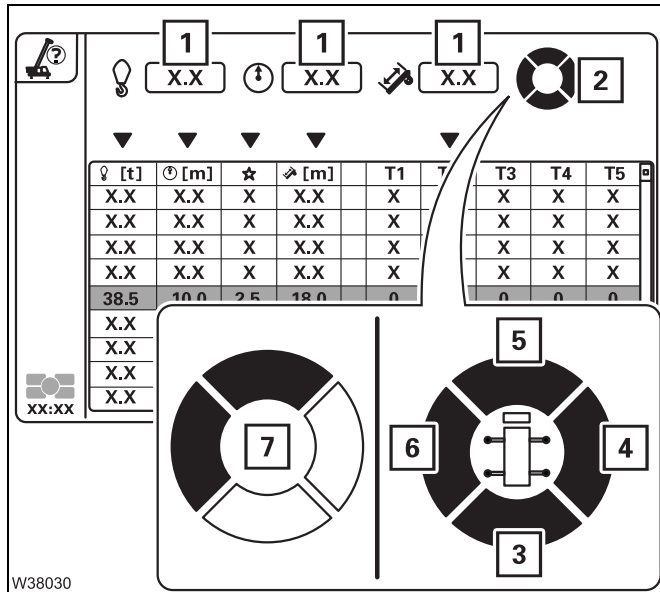
### Enter RCL code

In input mode – select and confirm the RCL code.  
 The corresponding rigging mode is displayed; Enter rigging mode, p. 10 - 40.



In the *Pre-selection telescoping* menu

▣▣▣▣ *Pre-selecting telescoping*, p. 10 - 40

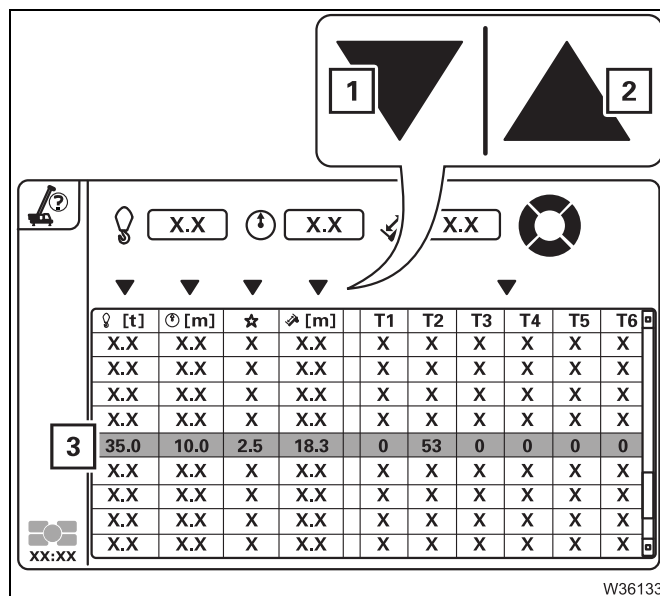


### Enter desired parameter

In input mode – select and confirm parameters (1), (2).

- 1 Selection of numerical values
- 2 Selection by marking the segments – marked segments are black
- 3 Backwards
- 4 To the right
- 5 Forwards
- 6 To the left
- 7 Example for selecting the slewing range to the front and to the left

The corresponding table is displayed.



### Pre-selection telescoping

Table sorted by columns – select and confirm the desired symbol.

- 1 Descending sorting
- 2 Ascending sorting

Preselect the telescope status – select and confirm the desired line, e.g. line (3).

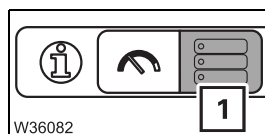
- The *Pre-selection telescoping* menu closes
- The *Enter rigging mode/telescope status* menu opens

▣▣▣▣ *Pre-selecting telescoping*, p. 10 - 40

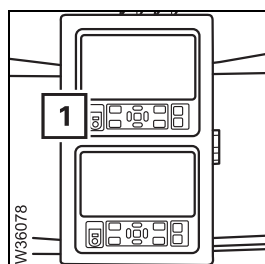


In the *Datalogger menu*

▣▣▣▣ ➔ *Datalogger*, p. 10 - 68

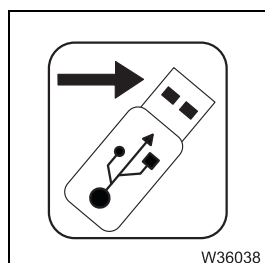


- **To open:** Select and confirm symbol (1)



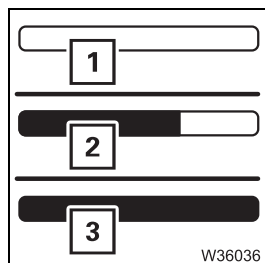
### USB connection for data export

1 Connect the USB stick – the symbol for the export is activated



### Export data

Can only be selected when a USB stick is connected to the *RCL* control unit.  
Starts the data export to the USB stick.



### Display of export progress

- 1 0% exported
- 2 75% exported
- 3 100% exported

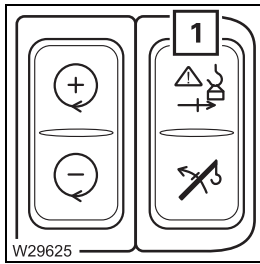
### Display RCL

There are no short descriptions for these displays.

- In the *Lifting capacity tables menu*;
  - ▣▣▣▣ ➔ *Displaying the lifting capacity tables*, p. 10 - 59
- In the *Monitoring menu*
  - ▣▣▣▣ ➔ *Checks before operating the crane*, p. 10 - 45,
  - ▣▣▣▣ ➔ *Displays during crane operation*, p. 10 - 49.


### RCL override – version A

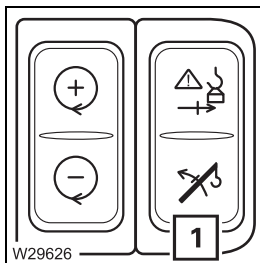
This version only applies to RCL programming as per EN 13000.  
For other RCL programming;  p. 8 - 138.



#### RCL override

- 1 Press once:** RCL shutdown overridden – crane functions enabled up to 110% utilisation
- Crane functions can be started within the next 10 seconds
  - Speed of movements increasing load moment max. 15%

 RCL override – version A, p. 10 - 63



#### Raise enable button after RCL shutdown


##### – Switch on function

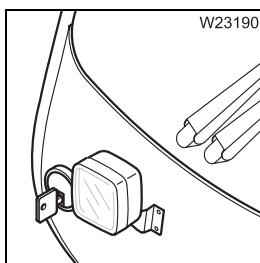
Only active if the current degree of utilisation is greater than 100% – crane movements blocked.

- 1 Press once:** Release the raise function to the permitted working range.  
If the degree of utilisation is less than 100% – release of the blocked crane movements.


##### – Switch off function

- **Degree of utilisation less than 100%** Function switched off automatically.
- **Degree of utilisation greater than 100%** Press button in at the bottom once.

 RCL override – version A, p. 10 - 63




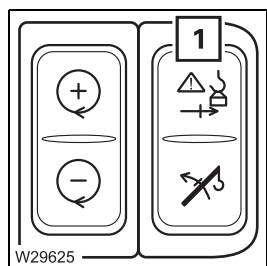
#### Key-operated switch for overriding the RCL in an emergency

- **Once to the right or to the left:** RCL shutdown overridden for 30 minutes – Crane functions enabled;  p. 10 - 66




**RCL override –  
version B**

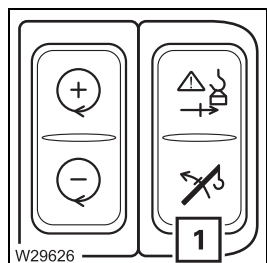
This point only applies to RCL programming deviating from EN 13000.  
For RCL programming in accordance with EN 13000;  p. 8 - 137.



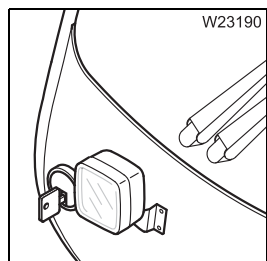
**Overriding the RCL in an emergency**

- 1 – Press once:**
- RCL* shutdown overridden – crane functions enabled
  - Crane functions can be started within the next 10 seconds.
  - Speed of movements increasing load moment max. 15%.

 *RCL override – version B*, p. 10 - 67



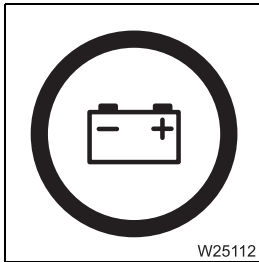
**No function**



**No function**

## 8.2.24

### Electrical system



#### Voltage warning lamp

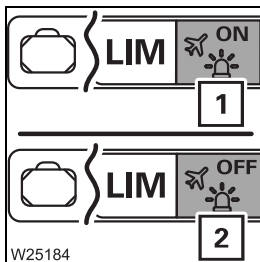
- **Display symbol:** Engine on – power failure – switch off engine
- **Off:** Engine on – no malfunction

▮▮▮▮▶ p. 9 - 6

## 8.2.25

### Lighting, windscreen wiper/washing system

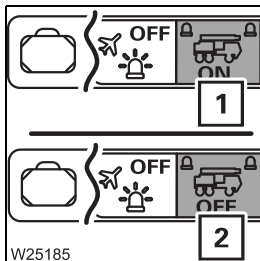
#### Lighting



#### Air traffic control light on/off

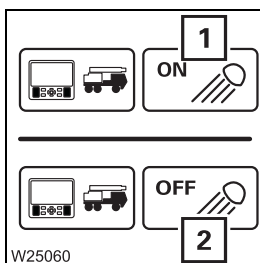
- **To switch on:** Select symbol (1) and confirm – symbol *ON* is displayed
- **To switch off:** Select symbol (2) and confirm – symbol *OFF* is displayed

▮▮▮▮▶ p. 11 - 126



#### Rotating beacons on/off

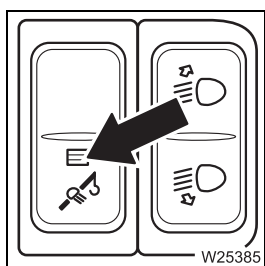
- **To switch on:** Select symbol (1) and confirm – symbol *ON* is displayed
- **To switch off:** Select symbol (2) and confirm – symbol *OFF* is displayed



#### Outrigger lighting on/off

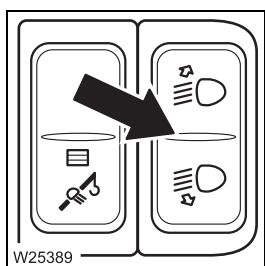
- **To switch on:** Select symbol (1) and confirm – symbol *ON* is displayed
- **To switch off:** Select symbol (2) and confirm – symbol *OFF* is displayed





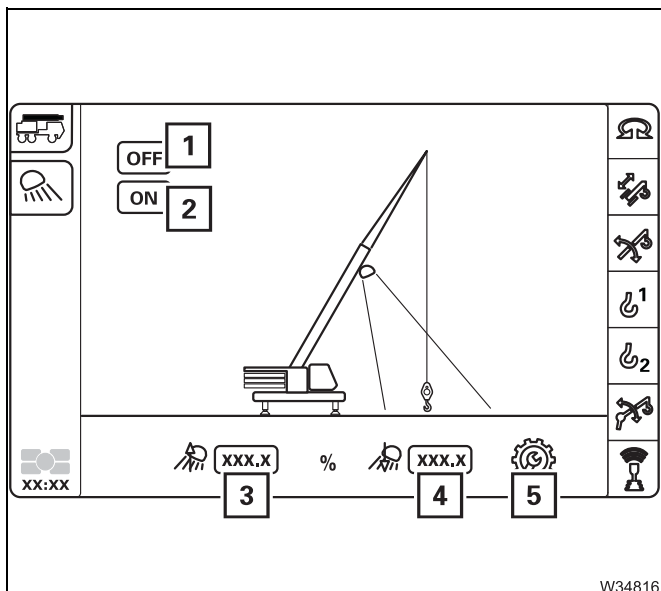
### Slewable spotlight on/off

- **To switch on:** Push down – lamp in the button on
  - **To switch off:** Push up – lamp in the button off
- ▮▮▮▮ p. 10 - 127



### Slew slewable spotlight

- **Down:** Push down
  - **Up:** Push up
- ▮▮▮▮ p. 10 - 127

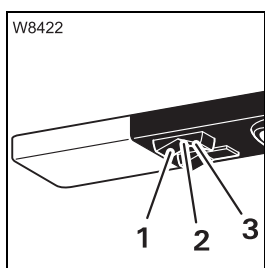


### Automatic spotlights

The spotlights are switched on.

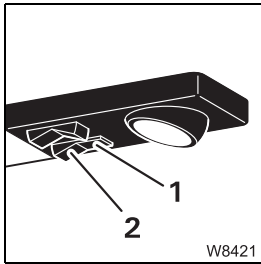
- 1 Switch on – symbol (2) displayed
- 2 Switch off – symbol (1) displayed
- 3 Increase the slewing speed
- 4 Reduce the slewing speed
- 5 Submenu  
Opening/closing the Speed submenu

▮▮▮▮ p. 10 - 127



### Cab lighting

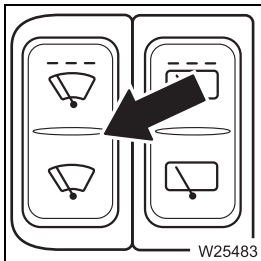
- 1 Always on
- 2 Always off
- 3 On/off via door contact



### Reading lamp

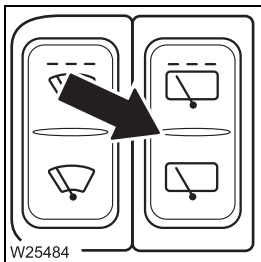
- 1 On
- 2 Off

### Windscreen wiper/washing system



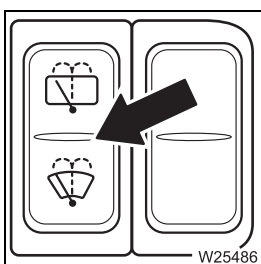
### Windscreen wiper on/off

- **Off:** mid-position
- **Interval:** Push up – wiper goes to end position
- **Continuous operation:** Push down



### Roof window wiper on/off

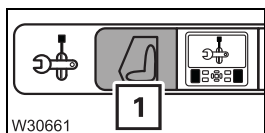
- **Off:** mid-position
- **Interval:** Push up – wiper goes to end position
- **Continuous operation:** Push down



### Windscreen washing system

- **Windscreen:** Push down
  - **Skylight:** Push up
- No additional wiping function is performed

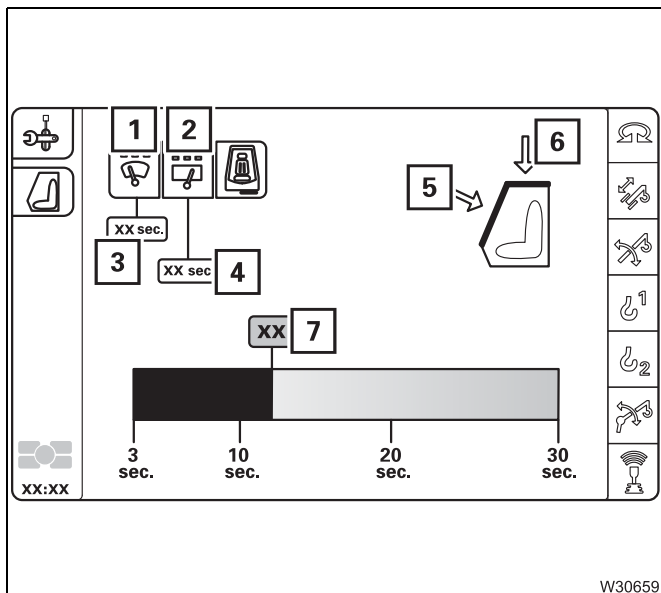




W30661

### Crane cab menu

**To open:** Select symbol (1) and confirm – menu is opened



W30659

### Adjusting the wiper stroke interval

- 1 Windscreen wiper selection, display (5)
- 2 Skylight wiper selection, display (6)
- 7 Changing the interval duration

Wiper interval in seconds for

- 3 Windscreen wiper
- 4 Roof window wiper

▮▮▮▮▶ p. 10 - 122



## 8.2.26

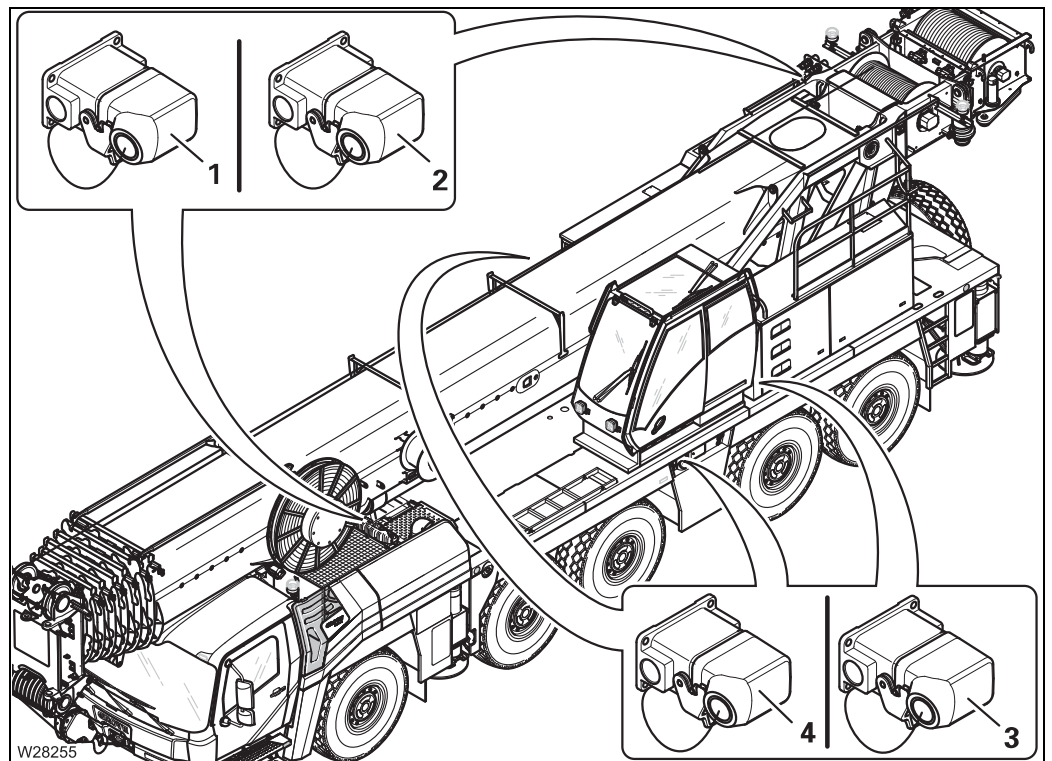
### Hand-held control

#### Sockets for hand-held control

The following applies to all sockets:

- Pull plug: Engine off – ignition off
- Insert plug: Ignition on

▣ p. 11 - 21



The hand-held control is only active when it is connected to the sockets (1) to (4).

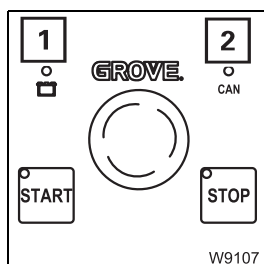
Released operations	
<b>1</b>	<ul style="list-style-type: none"> <li>– Emergency operation for crane movements (except for telescoping mechanism)</li> <li>– Derrick lattice extension<sup>1)</sup></li> </ul>
<b>2</b>	– Rig auxiliary hoist <sup>1)</sup>
<b>3</b>	– Emergency operation for crane movements
<b>4</b>	– Operation of the outriggers

<sup>1)</sup> Additional equipment



## Engine control panel

▶▶▶ Starting the engine – with the hand-held control, p. 9 - 8

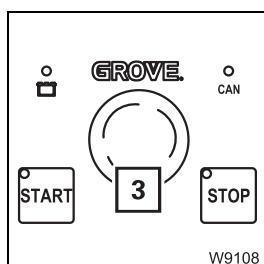


### 1 Voltage monitoring

- On: Ignition on
- Off: Switch the ignition off

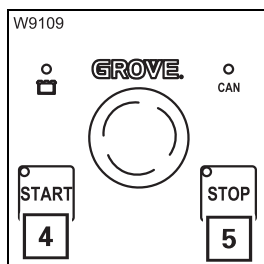
### 2 CAN monitoring

- On: Hand-held control connected – no malfunction – goes out after 20 seconds
- Flashing: **Hand-held control connected – malfunction**



### 3 Emergency stop switch

- May only be used in an emergency
- Press: Engine off – crane functions stop immediately, Switch latches
  - Turn engaged switch: Switch returns to initial position – crane functions released



### 4 Engine START

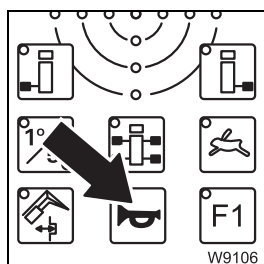
- Press once: Engine on

### 5 Engine STOP

- Press once: Engine off

## Horn

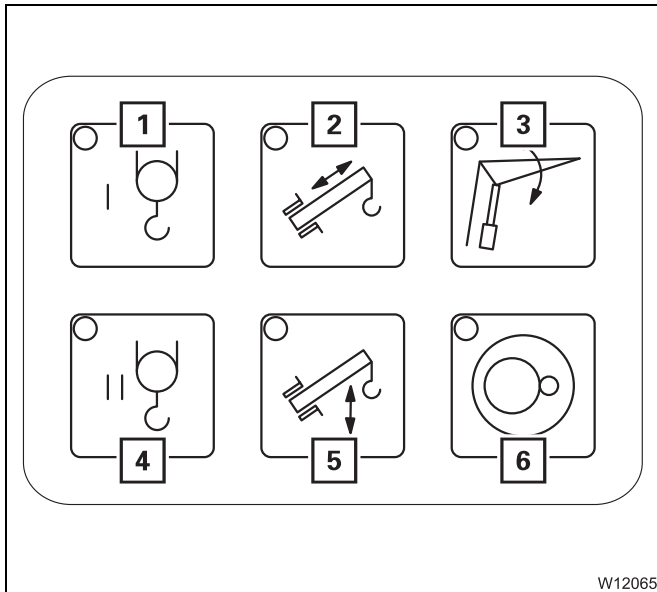
The ignition must be switched on.



- Press once:
  - Hand-held control on the superstructure socket – superstructure horn on
  - Hand-held control on the carrier socket – carrier horn on

## Outriggers control panel

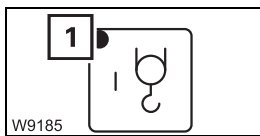
Brief description;  *Outriggers control panel*, p. 8 - 78.



### Pre-select emergency operation

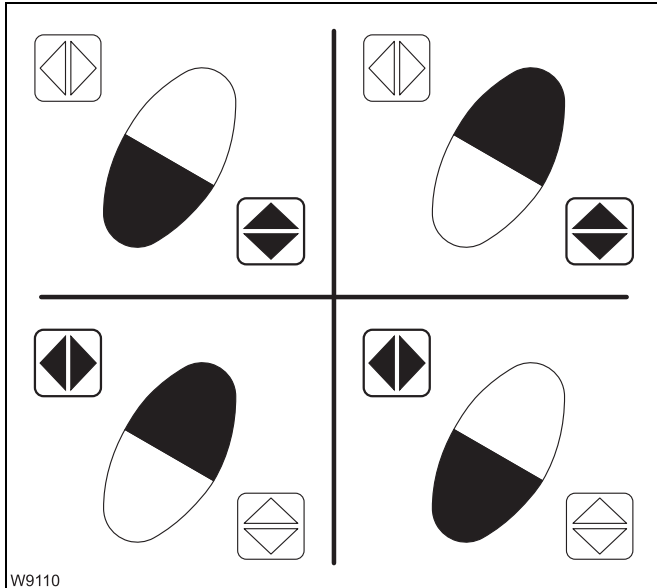
- 1 Main hoist
- 2 Telescoping mechanism
- 3 Derrick lattice extension<sup>1)</sup>
- 4 Auxiliary hoist
- 5 Derricking gear
- 6 Slewing gear

<sup>1)</sup> Lattice extension – luffable



The operation is the same for all buttons

- **Pre-select:** Press button once – lamp (1) lights up – pre-selection on until another pre-selection is made



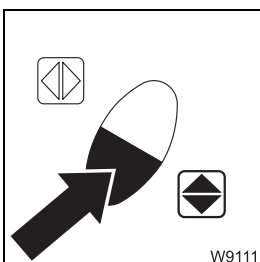
### Function buttons

The operations are not monitored by the RCL.  
There are four button combinations; engaged buttons are shown in black:

- **Pre-selected function on**  
Press the required button combination.

- **Pre-selected function off**  
Release one or both the buttons.

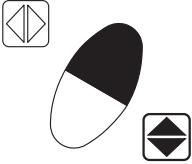
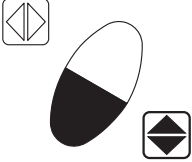
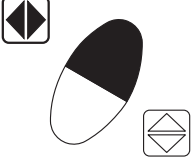
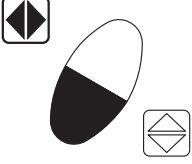
Press a non-assigned button combination – pre-selection off.



- **Faster movement:**
- **Slower movement:**

Increase pressure on button  
Decrease pressure on button



Button combination	Pre-selected power unit				
	Telescoping mechanism	Derricking gear	Slewing gear	Hoists	Lattice extension
 W3851	None	from the cabin	None	Lower	from the cabin
 W3850	Retract	Raise	None	Raise	Raise
 W3849	None	None	Slew to the right	None	None
 W3848	None	None	slew to left	None	None

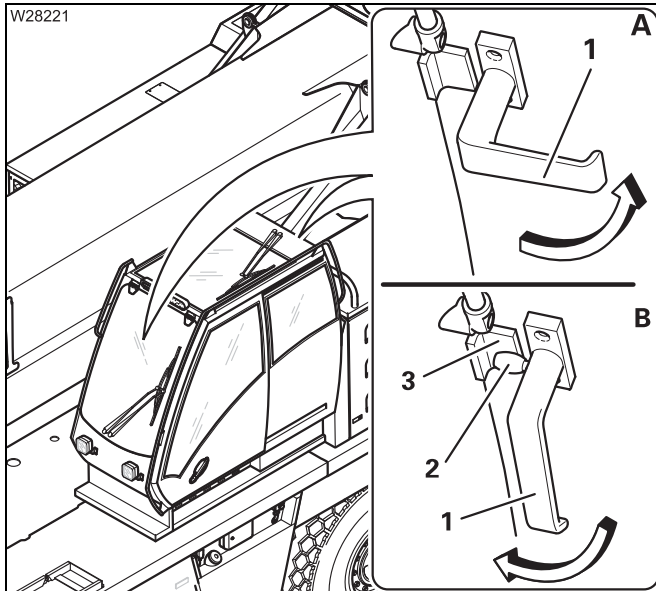
Emergency operation with the hand-held control, p. 14 - 41

## 8.2.27

### Windows, doors, keys

#### Windows

The handles on the windscreen and the rear window have the same function.



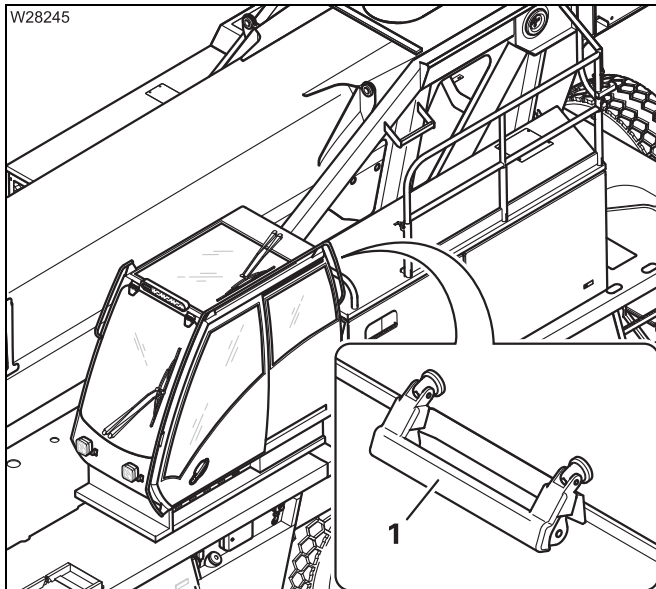
#### Open window (A)

- Turn both handles (1) inward.
- Push the window forward.

#### Close window (B)

- Pull the window closed.
- Turn both handles down – pegs (2) located behind the clamp (3).

#### Rear window



#### Opening

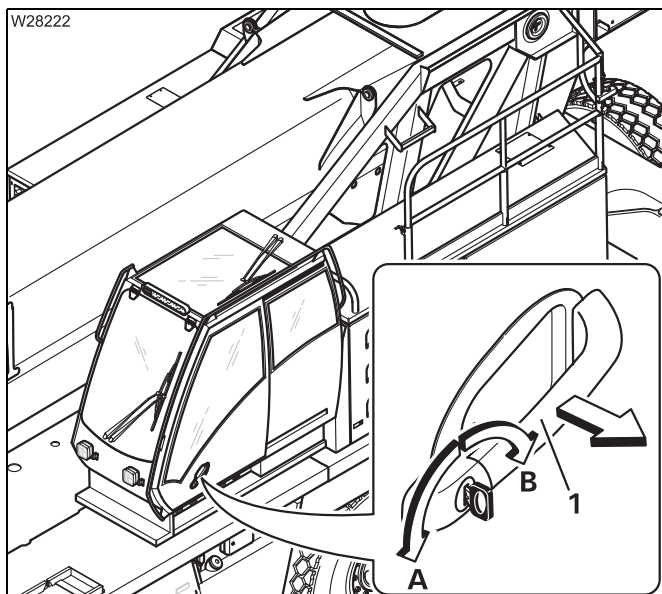
- Raise the handle (1).
- Push window outwards.

#### Closing

- Pull in window.
- Push down the handle (1).



## Crane cab door



### From outside

#### Unlocking

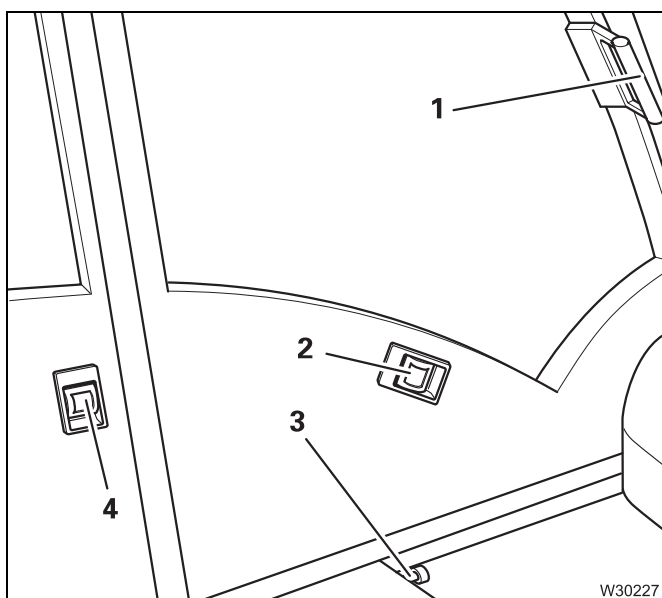
- Turn the key in direction **A**.

#### Locking

- Turn the key in direction **B**.

#### Open/close

- Pull the handle (**1**).
- Slide the door.



### From inside

#### - Closing

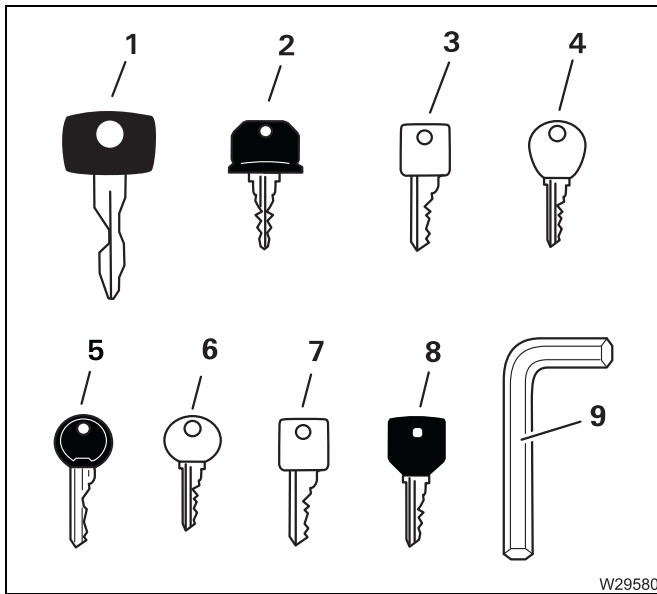
- Pull unlocking lever (**3**) or (**4**) (depending on the equipment), push door forwards by handle (**1**) – engages.  
Locking from inside not possible.

#### - Opening

- Pull unlocking lever (**2**), push door back by handle (**1**) – latches.

## Keys

Different keys are supplied.

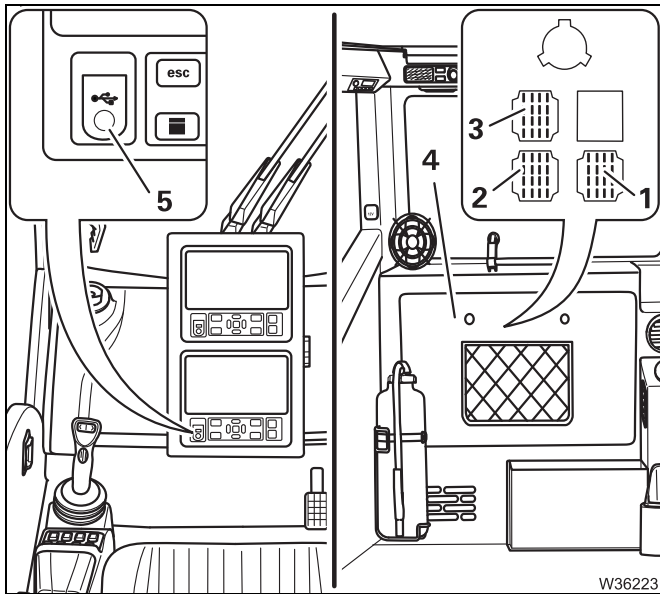


- 1 Crane cab door lock
- 2 Crane cab ignition lock
- 3 Storage compartment<sup>1)</sup>
- 4 Control units for outriggers<sup>1)</sup>
- 5 Windscreen washing system reservoir
- 6 Boom floating position lock<sup>1)</sup>
- 7 Slewing gear freewheel lock<sup>1)</sup>
- 8 Key-operated override switch
- 9 Covers

<sup>1)</sup> Additional equipment

## 8.2.28 Diagnostics

The diagnostics connections may only be operated by the service personnel.

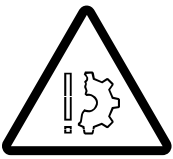


The following connections are below the cover (4).

- 1 CCS diagnostics – (serial interface)
- 2 CCS diagnostics – CAN bus
- 3 RCL diagnostics

Additional diagnostic and service connections are present on the CCS control unit (5).

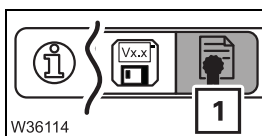
- Do not connect external devices, e.g. a mobile phone, to these connections!



### **Risk of damage to the crane control system!**

Do not connect external devices to the diagnostic connections. This prevents severe malfunctions in the crane control system.

## 8.2.29 Other



### **Disclaimer menu**

- **To open:** Select and confirm symbol (1). The warranty waiver text is shown on the display.



# 9

## Starting/switching off the engine – for crane operation

You must start the engine from the crane cab for crane operation. If the engine has been started from the carrier, then you must shut it down in the carrier and switch off the ignition before crane operation.

All the power units required for crane operation are only released when you start the engine from the crane cab.

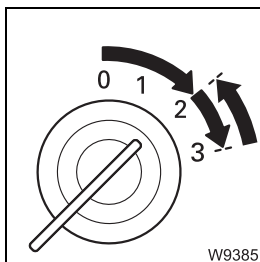
The procedure depends on whether you:

- start the (cold) engine for the first time in the day,
- start the engine from the crane cab; ■■■▶ p. 9 - 5,
- start the engine with the hand-held control; ■■■▶ p. 9 - 8.

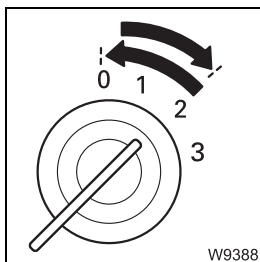
### 9.1

## When starting the engine for the first time in the day

The first start of the day should always be made from the **driver's cab**, as all the displays for monitoring the engine can only be accessed there.



- Carry out all the required tasks and checks for starting the engine; ■■■▶ *CHECKLIST: Starting the engine*, p. 4 - 1.
- Start the engine from the driver's cab and perform all the necessary checks; ■■■▶ *Inspections after starting the engine*, p. 9 - 6.



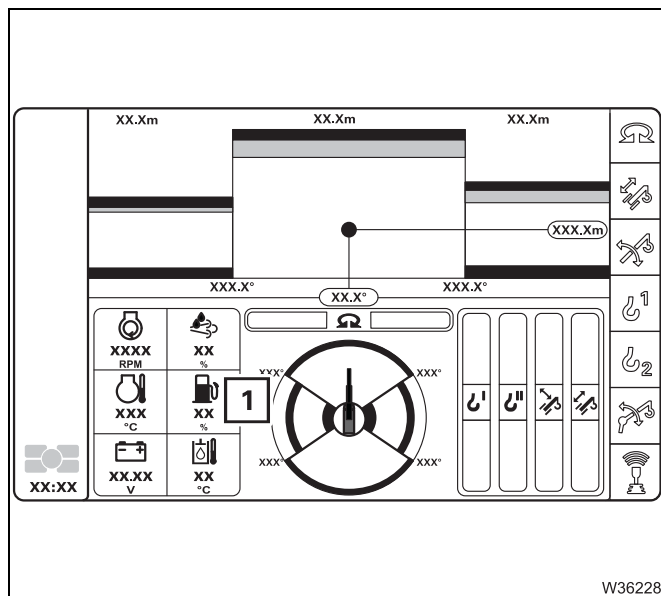
- Switch the engine off and switch off the ignition.

## 9.1.1 Checking the fuel level and AdBlue (DEF) level

- Check the fuel level, and the AdBlue (DEF) level if necessary, before starting the engine.

After switching on the ignition the display shows the start menu.

### Fuel



The display (1) indicates the current filling level in percent.

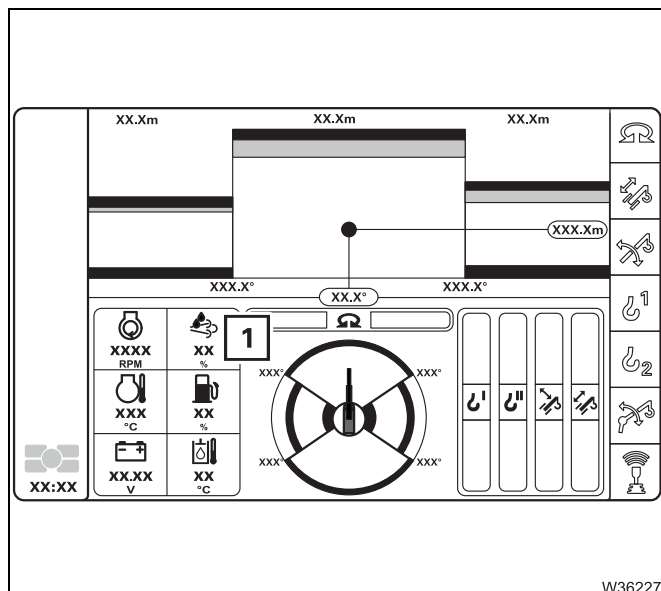
With a standard tank, 100% corresponds to approx. 700 l (184 gal).

▮▮▮▮▮ *Dual tank*, p. 4 - 8

The display changes colour depending on the filling level:

- Green:** over 10% (over 70 l) (18.4 gal)
- Yellow:** 5 to 10% (35 to 70 l) (9.2 to 18.4 gal)
- Red:** below 5% (less than 35 l) (9.2 gal)

### AdBlue (DEF)



The display (1) indicates the current filling level in percent.

100% corresponds to approx. 40 l (10.6 gal).

The display changes colour depending on the filling level:

- Green:** over 10% (over 4 l) (1.1 gal)
- Yellow:** 5 to 10% (2 to 4 l) (0.53 to 1.1 gal)
- Red:** below 5% (less than 2 l) (0.53 gal)

## 9.1.2

### Checks before starting the engine

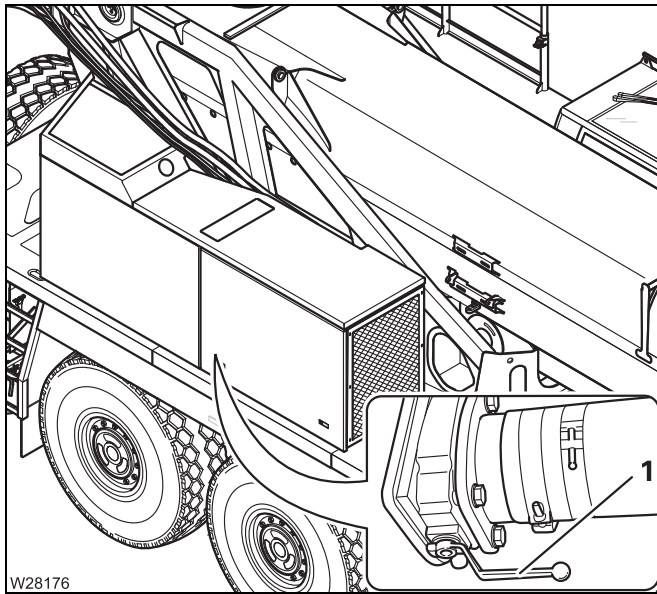
#### At the hydraulic tank

The valve on the hydraulic tank must be open before starting the engine.



#### Risk of damage to the hydraulic pumps!

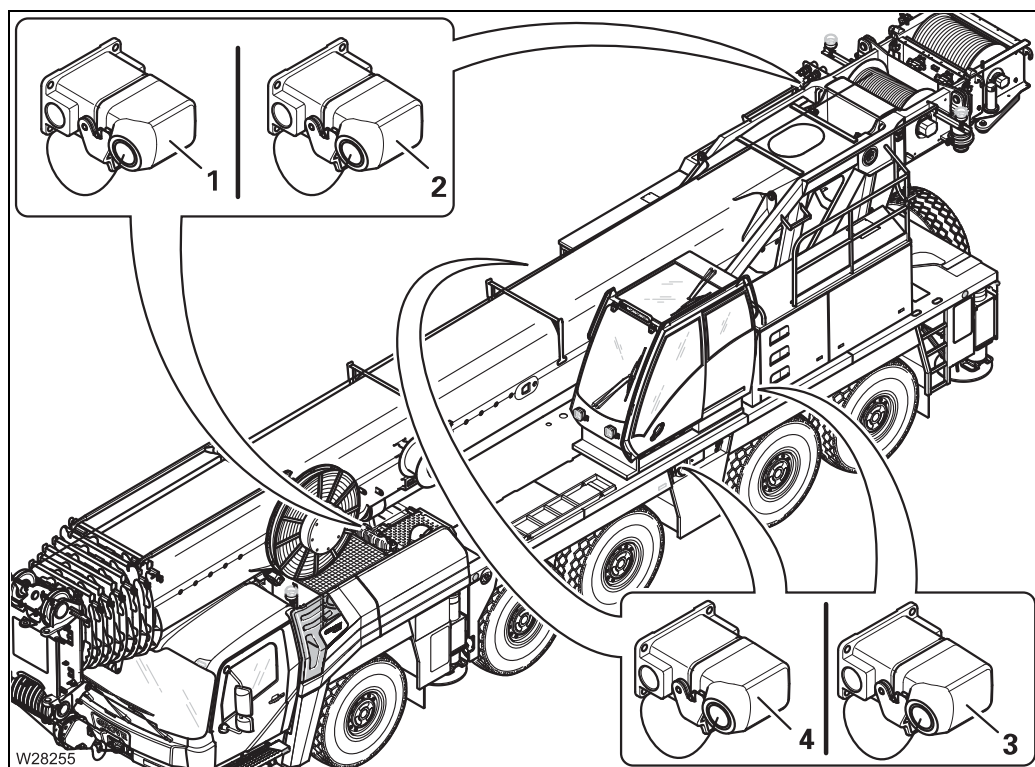
You may only start the engine when the valve on the hydraulic tank is open!



- Check that the valve is open – lever (1) parallel to the pipe.
- Open the closed valve.



### Checking the hand-held control



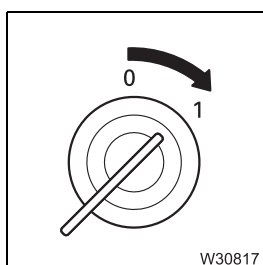
The hand-held control must be removed for crane operation from the crane cab.

- Check whether bridging plugs (1) to (4) are inserted in all the sockets;   
    ▶▶▶ p. 11 - 22.

You can start the engine from the crane cab, but if the hand-held control is connected, the operating elements for crane operation are disabled.

### 9.1.3

### Switch on the ignition



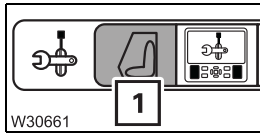
- Insert the ignition key into the ignition lock and turn the key to position 1. After switching on the ignition the switching states are checked.




DO not start the engine until the CCS display shows a menu (usually the *Enter rigging mode* menu).

### 9.1.4

## Display – setting the brightness



- Open the *Settings* menu (1).

This is operated in the same way as in the driver's cab;  p. 4 - 13.

### 9.1.5

## Start the engine

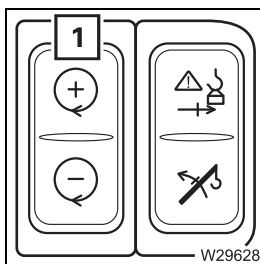
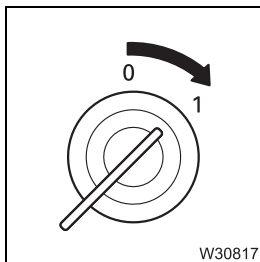
This section relates to starting a warm and cold engine.



### **Danger of explosion when using starter fuel!**

The engine may never be started with the aid of starter fuel. Starter fuel sprayed into the suction unit can ignite.

- Do not press the accelerator.
- Turn the ignition key to position 1.





- Press the button (1) in at the top.
- Let go of the button after the engine starts.

After starting, the idling speed corresponds to the standard value.

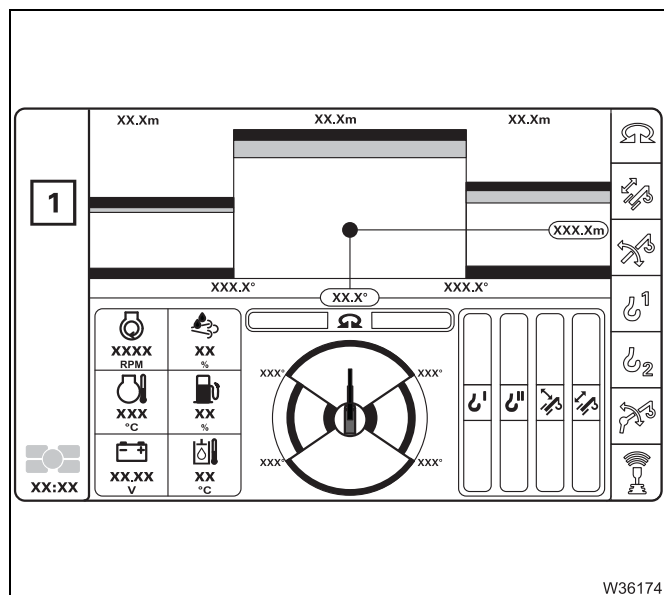
If the engine does not start, release the ignition key after approx. 15 seconds and wait one minute before trying again.



To set the idling speed;  p. 9 - 7.

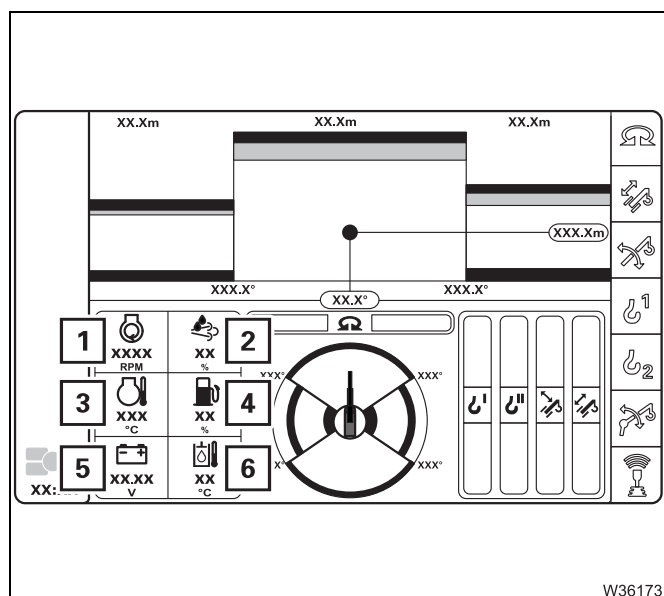
If the engine does not start after multiple attempts;  *Malfunctions on the engine*, p. 7 - 17.

## 9.1.6 Inspections after starting the engine



- Check the display (1) on the CCS control unit immediately after starting the engine.

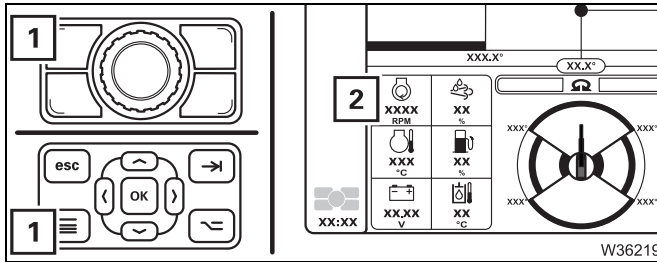
When a symbol is displayed in the display area (1); Malfunctions on the engine, p. 7 - 17.



- Also check the displays
  - 1 Engine speed display in rpm
  - 2 Adblue (DEF) filling level indicator in percent
  - 3 Coolant temperature display in °C (°F)
  - 4 Fuel level display in percent
  - 5 Voltage monitoring display in Volts
  - 6 Hydraulic oil temperature display in °C (°F)

## 9.1.7

### Set idling speed



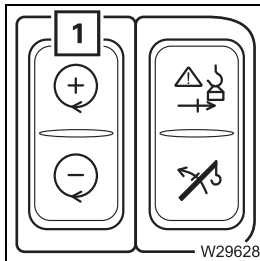
- Start the engine; p. 9 - 5.
- Open the start menu – button (1).

The display (2) shows the current engine speed

You can increase the idling speed for crane operation.

Release the accelerator in order to be able to view the settings below the current engine speed.

#### Increasing the idling speed

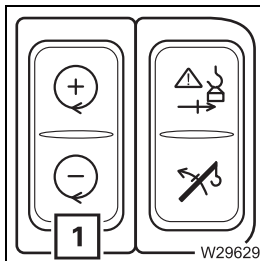


- Press the button (1) in **at the top**.  
The idling speed increases continuously until you release the button or the maximum value is reached.

Or

- Press the button in **at the top** once.  
The idling speed is increased by one step.

#### Reduces the idling speed

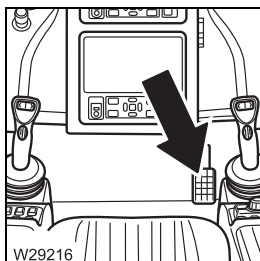


- Press the button (1) in **at the bottom** once.  
The idling speed is reduced by one step.

Or

- Press the button (1) in **at the bottom** and hold it pressed.
  - After about 3 seconds the idling speed will be at the standard value.
  - After a further approx. 3 seconds, the engine will switch off.  
The engine cannot be restarted until approx. 7 seconds have elapsed.

#### Exceeding idling speed



You can exceed the idling speed at any time using the accelerator.


Once you release the accelerator the engine speed reduces to the pre-set idling speed.

## 9.2


## Starting the engine – with the hand-held control

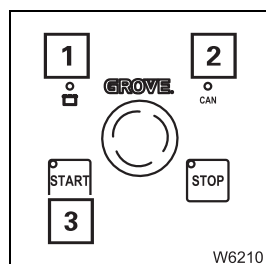
### Prerequisites

You can only start the engine, if:


- The bridging plug is inserted in all unneeded sockets;  p. 9 - 4 and
- The ignition in the driver's cab is switched off.

### Start the engine

All checks required before starting the engine must be carried out;  p. 4 - 1.



- Wait until the lamps (1) and (2) light up.

If the lamp (2) does not light up or flash after about 20 seconds, there is a malfunction;  p. 14 - 21.

Press the button (3) once – the engine will start.



If the hand-held control is connected to the superstructure, you cannot drive the power units from the crane cab.



## 9.3

## Switching off the engine

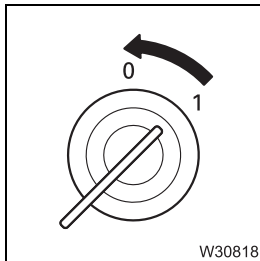
### 9.3.1

### During normal operation, with the ignition lock / with the hand-held control



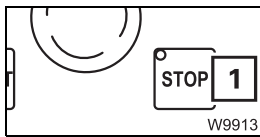
#### **Risk of accidents due to suspended loads!**

Never switch off the engine whilst a load is suspended. You must have the control levers at hand in order to intervene at any time.  
Always set down the load before you leave the crane cab.



#### **If the hand-held control is not connected:**

- Turn the ignition key to position **0** – the engine will stop.



#### **If the hand-held control is connected:**

- Press the button (**1**) once – the engine will switch off.

It is not possible to switch off the engine with the ignition lock

#### **After turning off**

Observe the notes in the appropriate sections;

- ▣▣▣▣▶ *In case of short work breaks, p. 10 - 145,*
- ▣▣▣▣▶ *In case of work breaks of more than 8 hours, p. 10 - 146.*

### 9.3.2

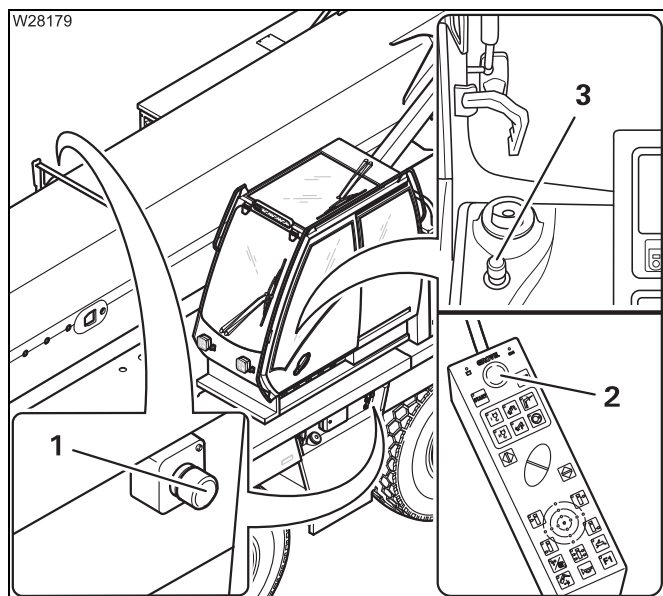
## In emergencies, with the emergency stop switches



### Risk of overloading if used improperly!

Use the emergency stop switches only in an emergency, i.e. if the crane functions no longer respond to the control levers.

Stopping crane movements suddenly may cause the truck crane to become overloaded under unfavourable conditions.



Four emergency stop switches are provided for emergencies:

- 1 On the carrier
- 2 On the hand-held control
- 3 In the crane cab

- Press an emergency stop switch (1), (2) or (3). The switch latches.

The engine shuts down.

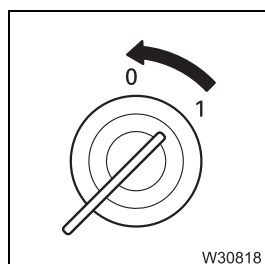


If an air intake inhibitor is present, this is then triggered.

### Resetting the emergency stop switch

You can restart the engine only after you have reset the emergency stop switch.

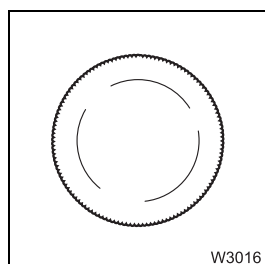
- Switch off the ignition.



- Turn the actuated emergency stop switch until it disengages again.

If an air intake inhibitor is present, this must be loosened;

▣▣▣▣ *Releasing the air intake inhibitor, p. 4 - 23.*



# 10 Crane operation

## 10.1 Before operating the crane

### 10.1.1 CHECKLIST: Checks before operating the crane



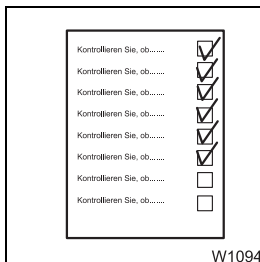
This checklist is not a complete operating manual. There are accompanying instructions, which are indicated by cross-references.

**Observe the warnings and safety instructions there.**

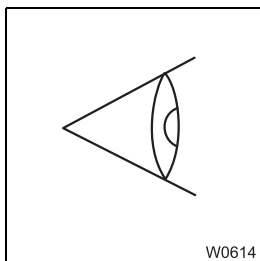


This checklist only applies to working with a rigged truck crane (supported and rigged with counterweight). If the truck crane is not yet rigged;

▣▣▣▣ *CHECKLIST: Rigging*, p. 11 - 1.

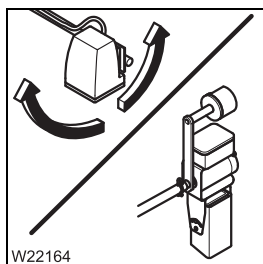




1. The truck crane has been rigged for the operation to be carried out as described in the *CHECKLIST: Rigging*; ▣▣▣▣ p. 11 - 1.

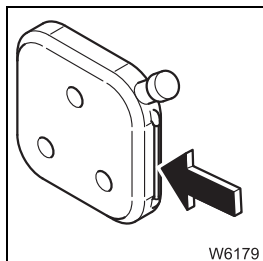



2. Carry out an inspection of the truck crane, looking out in particular for any leaking fluids (oil, fuel or water).

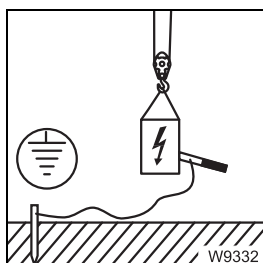




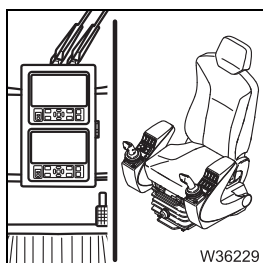
3. – Switch on the cameras for crane operation;  p. 11 - 137.  
– Adjust the slewable spotlights if necessary;  p. 10 - 127.





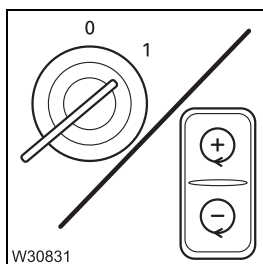
4. Crane cab heater – check the fuel level;  p. 10 - 5.




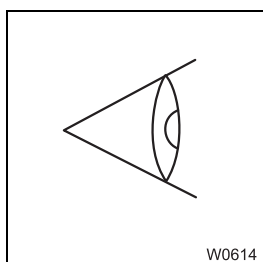
5. Earth the load, if necessary;  p. 10 - 13.




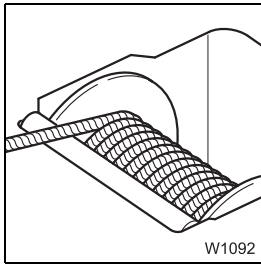
6. Adjust crane cab seat and front panel;  
 *Crane cab seat*, p. 10 - 8,  
 *Front panel*, p. 10 - 9.



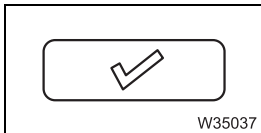
7. Start the engine for crane operation;  p. 9 - 5.



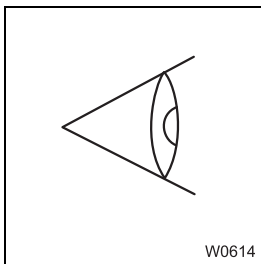
8. Check
  - RCL,
  - lifting limit switch,
  - seat contact switch and dead man's switch,
  - emergency stop switch,for correct operation. Have faulty units repaired;  p. 10 - 10.



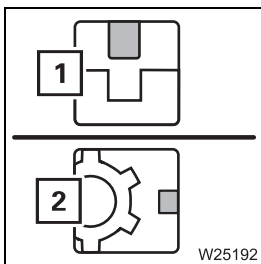
9. Check the position of the hoist ropes; ■■■▶ p. 10 - 6.



10. Compare current rigging mode with the *RCL* display – enter and confirm current rigging mode, if necessary; ■■■▶ p. 10 - 30.

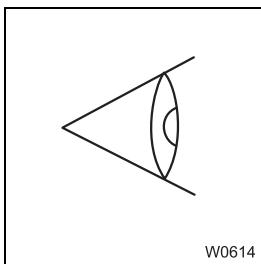


11. Check the telescope status; ■■■▶ *Checks before starting work*, p. 10 - 96.



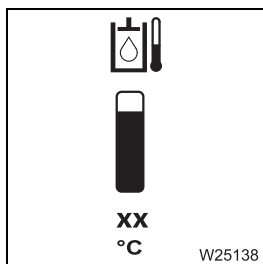
12. – Switch off the slewing gear for 0° and 180° working positions – symbol (1) **red**; ■■■▶ p. 10 - 119.


– Switch off houselock for other working positions – symbol (2) is **red**; ■■■▶ p. 10 - 19.

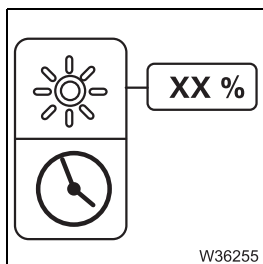


13. Check the electrical system for correct operation; ■■■▶ p. 10 - 7.






**14.** Check hydraulic oil temperature, preheat if necessary;  p. 10 - 14.



**15.** Adjust the brightness of the CCS display as required;  p. 9 - 5.



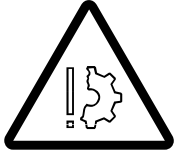
Additional information on inspections during crane operation, on permissible working positions and on how to operate the individual power units;  *Crane operation with main boom*, p. 10 - 73.

## 10.1.2

### Check the condition of the truck crane

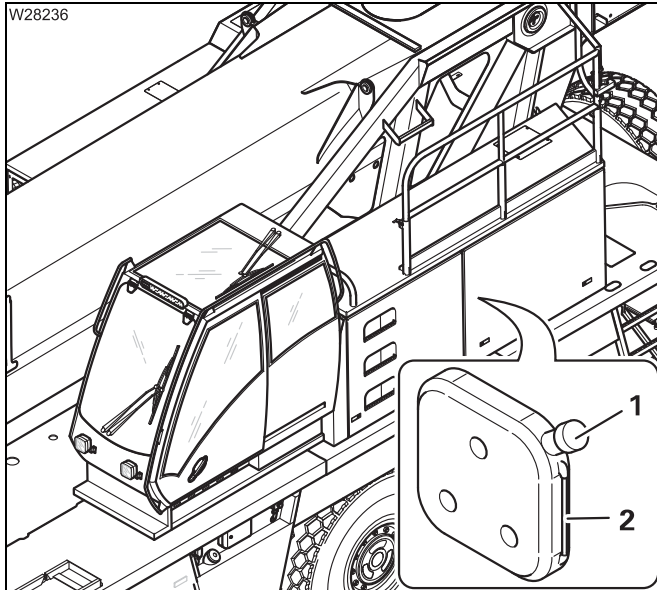
#### Fuel tank auxiliary heater

Use the same fuel as for the engine or use EL heating oil for refuelling.



#### **Danger of fire due to flammable gases!**

Turn off the engine and heating systems before refuelling.



- The display (2) shows the fuel level in the tank (1).
- Refuel in due time and seal the tank (1) with the cap.

#### Visual inspection

Walk around the truck crane and look out in particular for leaking oil, fuel or coolant.



#### **Danger if the crane cannot be unrigged!**

If oil is lost, you may no longer be able to move the crane. Not even in emergency mode.



#### **Risk of environmental damage due to leaking consumables!**

Immediately repair or have repaired oil, fuel and coolant leakages. This prevents oil or fuel from seeping into the ground or polluting waters.

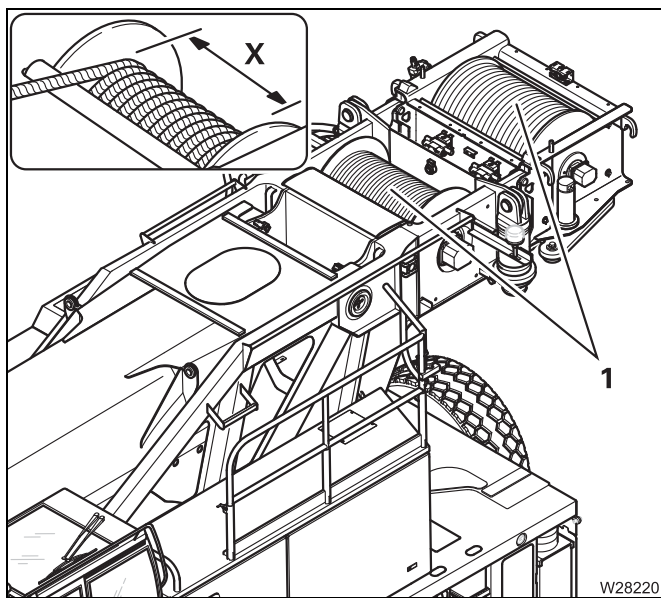


### Checking the position of the hoist ropes



#### Risk of crushing due to turning rope drum!

Keep away from the rope drum while it is turning.  
This will prevent your limbs from being drawn in or crushed.



- Always check the entire length of the winding of the ropes (1).
- Slowly perform the *Lower* movement until the rope has moved over a complete width (X) of the rope drum.
  - The rope must be evenly wound.
  - The rope turns on the drum must be evenly spaced at a distance of 0 to 2 mm (0 to 0.08 in).
  - The cross-over points must be at an angle of approx. 180° to each other.

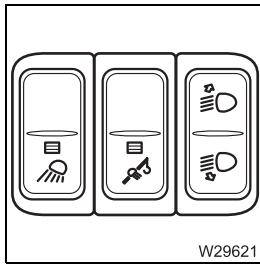


The top rope lines are laid over the next lower rope lines at the cross-over points.

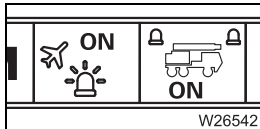


### Checking the electrical system

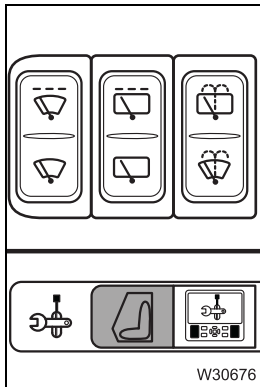
- Check the following functions and have faulty parts repaired.



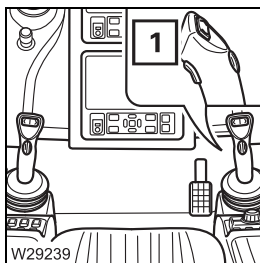
- Spotlights,



- Air traffic control light, rotating beacons



- Windscreen wipers, windscreen washing system,



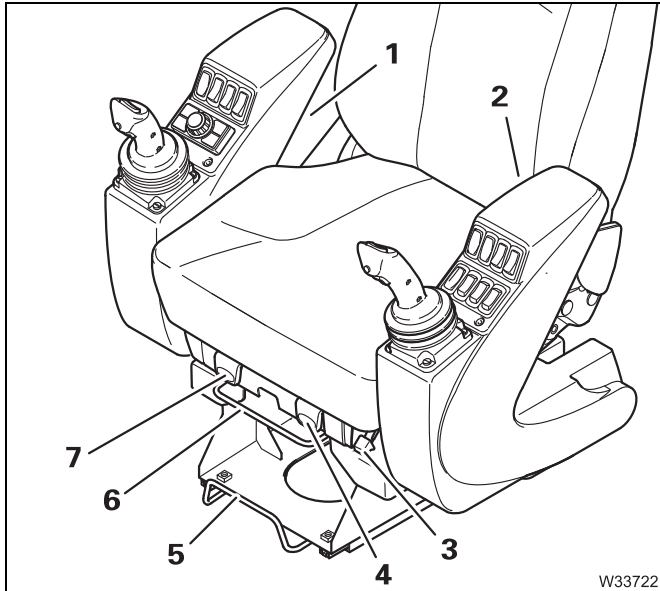
- Horn.

### 10.1.3

## Adjusting the crane cab seat and front control panel

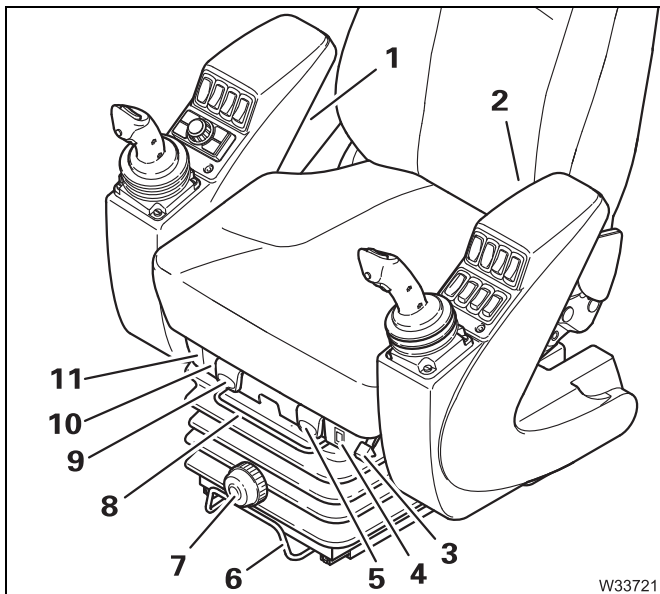
### Crane cab seat

You can adjust the crane cab seat to your height.



#### Version 1

- 1 Control panel right – height
- 2 Control panel left – height
- 3 Back rest – angle
- 4 Seat – height
- 5 Seat – longitudinal adjustment, With control panels
- 6 Seat – longitudinal adjustment, Without control panels
- 7 Seat cushion – angle



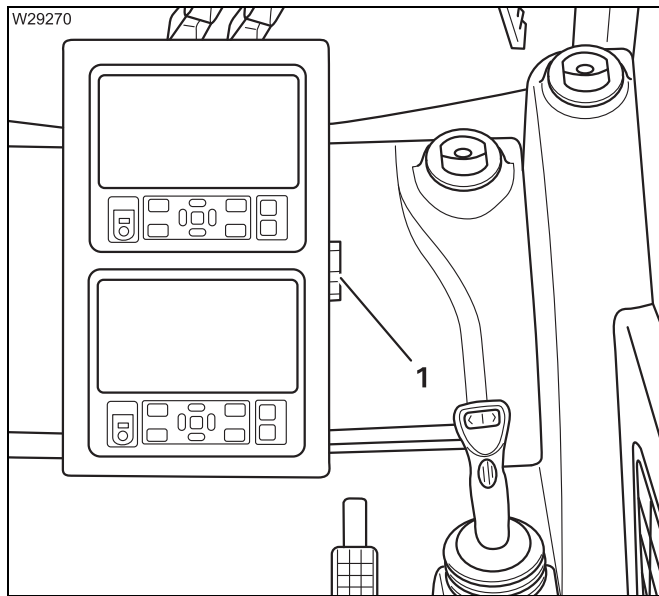
#### Version 2

- 1 Control panel right – height
- 2 Control panel left – height
- 3 Back rest – angle
- 4 Seat heating<sup>1)</sup> on/off
- 5 Seat – height<sup>1)</sup>
- 6 Seat – longitudinal adjustment, With control panels
- 7 Adjust suspension stiffness to body weight
- 8 Seat – longitudinal adjustment, Without control panels
- 9 Seat cushion – angle
- 10 Upper lumbar area support
- 11 Lower lumbar area support

<sup>1)</sup> Requirement – ignition is on

## Front panel

You can adjust the height and inclination.



- Release the handle **(1)** – anti-clockwise.
- Adjust the front panel to suit your requirements.
- Turn the handle **(1)** firmly – clockwise.

### 10.1.4

## Checking the safety equipment



### Risk of accidents when working with faulty safety devices!

It is prohibited to operate the crane with safety devices that are faulty, overridden or out of service!

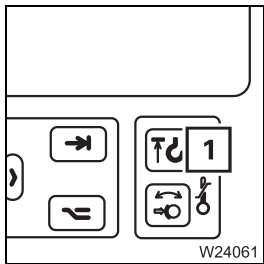
Have faulty safety devices repaired immediately by **Manitowoc Crane Care**.

### Rated capacity limiter

- Switch on the rated capacity limiter (RCL), do all of the checks and enter the current rigging mode; Switch on the RCL.
- The RCL is working correctly at this point in time if no error message is pending and if crane movements have been enabled.

If the RCL is not working correctly, do not start crane operation but rather notify **Manitowoc Crane Care**.

### Lifting limit switch



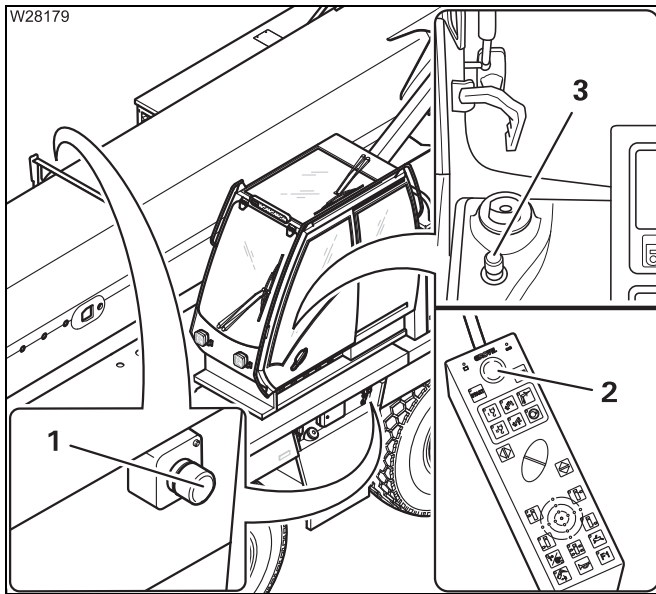
- Raise the main boom until the hook block is lifted off the ground.
- Slowly perform the *Raise* movement until the hook block lifts the lifting limit switch weight.
- Now check that the *Raise* movement is switched off and the lamp (1) lights up.
- Check that the *Lower* and *Extend* movements are also switched off.

The lifting limit switch is working correctly at this point in time if the lamp (1) lights up and the movements *Raise*, *Lower* and *Extend* are switched off.

If the lift limit switch is not working correctly, do not start crane operation but notify **Manitowoc Crane Care**.

### Emergency stop switch

- Set down the load and let go of both control levers.



- Press the emergency stop switch (3) so that it engages.
- Check whether the engine stops.
- Turn the emergency stop switch until it disengages again.
- Release the air intake inhibitor if required;  
    ▣▣▣▣▶ *Air intake inhibitor*, p. 4 - 23.
- Repeat the checks with the emergency stop switches (1) and (2).

If the emergency off switch is not working correctly, do not start crane operation but notify **Manitowoc Crane Care**.



### Seat contact switch



This check is carried out together with the dead man's switch.

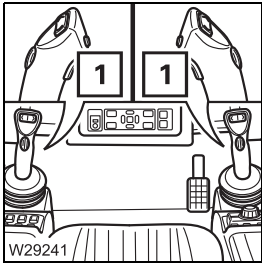
#### **Danger of accident if the seat contact switch is faulty!**

Always stand inside the crane cab when you do this check.

If you stand next to the crane cab, you may be pushed off the carrier if the superstructure slews as a result of a faulty dead man's switch.

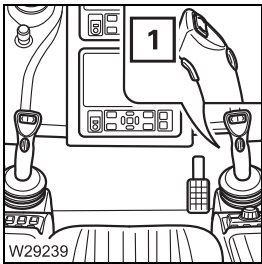
#### **Checks during standstill**

- Do not sit down on the crane cab seat.
- Do not press any dead man's switch (1).
- Move the control levers one after the other for all the crane movements and check whether all the crane movements are switched off.

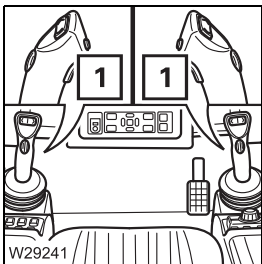


#### **Inspection during operation**

- Dead man's switch
  - Do not sit down on the crane cab seat.
  - Press the right dead man's switch (1) and slowly lift the hook block.
  - With the control lever actuated, let go of the right dead man's switch and check whether the crane movement comes to a standstill within approx. 3 seconds.
  - Repeat the check with the dead man's switch on the left control lever.



- Seat contact switch
  - Do not press any dead man's switch (1).
  - Sit down on the crane cab seat and slowly lift the hook block.
  - With the control lever actuated, stand up and check whether the crane movement comes to a standstill within approx. 3 seconds.

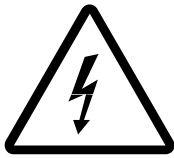


If the dead man's switch system is not working correctly, do not start crane operation but notify **Manitowoc Crane Care**.

## 10.1.5

### Earthing the load

Even if the truck crane is already earthed (▶ p. 11 - 13), the load may become charged with static electricity. For example, if a hook block with synthetic sheaves or non-conducting sling gear is used.

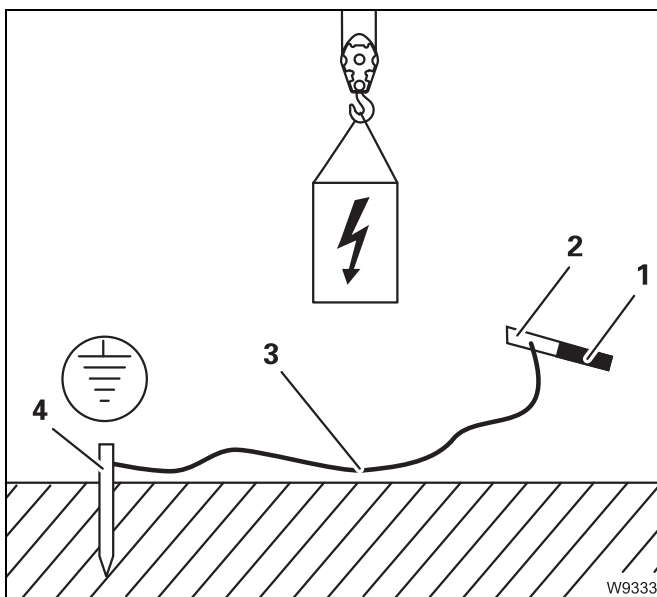


#### Risk of accidents due to electric shock!

Always earth the load before operating the crane

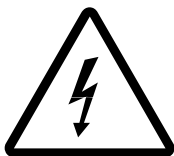
- near strong transmitters (radio transmitters, radio stations, etc.),
- near high-frequency switchgear substations,
- if a thunderstorm is forecast.

If the load is charged with static electricity, you must always earth the load before touching it.



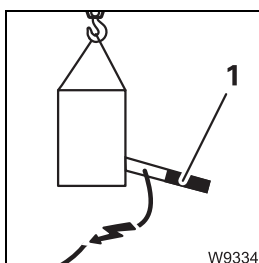
Use electrically conducting material for earthing.

- Hammer a metal rod (4) (length approx. 2.0 m (6.6 ft)) at least 1.5 m (5 ft) deep into the ground.
- For better conductivity, dampen the soil around the metal rod (4).
- Clamp an insulated cable (3) to the metal rod (4) (cross-section of at least 16 mm<sup>2</sup> (0.025 in<sup>2</sup>)).
- Clamp the other end of the cable (3) to a metal rod (2) with an insulated handle (1).



#### Risk of accidents due to electric shock!

Ensure that the connections between the cable and the metal rods are electrically conductive. When earthing, hold the metal rod only by the insulated handle and keep a sufficient distance to the metal rod in the ground.



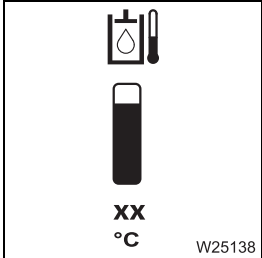
- Hold the metal rod firmly by its insulated handle (1).
- To earth, touch the load with the metal rod.

## 10.1.6

### Preheating the hydraulic oil



It may take some time for the solenoid valves to be switched or the power units may be started abruptly if the oil is cold.



The current hydraulic oil temperature is displayed in the start menu.

For crane operation with loads and without speed limitation, the hydraulic oil temperature must be at 10 °C (50 °F).

If the temperatures fall below 10 °C (50 °F), proceed as follows:

– **From 10 °C to 0 °C (50 °F to 32 °F)**

You can carry out crane movements with loads only at normal speed, at average engine speed and at average operating speed.

– **From 0 °C to -15 °C (32 °F to 5 °F)**

To preheat, only carry out crane movements **without a load**. Only operate at normal speed, at medium engine speed and medium working speed.

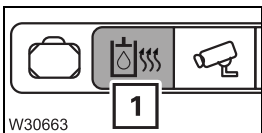
– **Below -15 °C (5 °F)**

You must preheat the hydraulic oil before carrying out crane movements.

#### Prerequisites

- The engine for crane operation is running,
- The seat contact switch or a dead man's switch is actuated,
- The hydraulic oil temperature is no greater than 30 °C (86 °F)

#### Preheating



- Select and confirm the symbol (1) – symbol is **red**.

The engine speed is increased, the hydraulic fluid is preheated until reaching a temperature of 30 °C (**86 °F**).

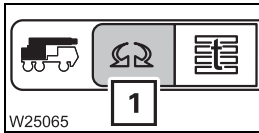


## 10.1.7 Locking/unlocking the superstructure

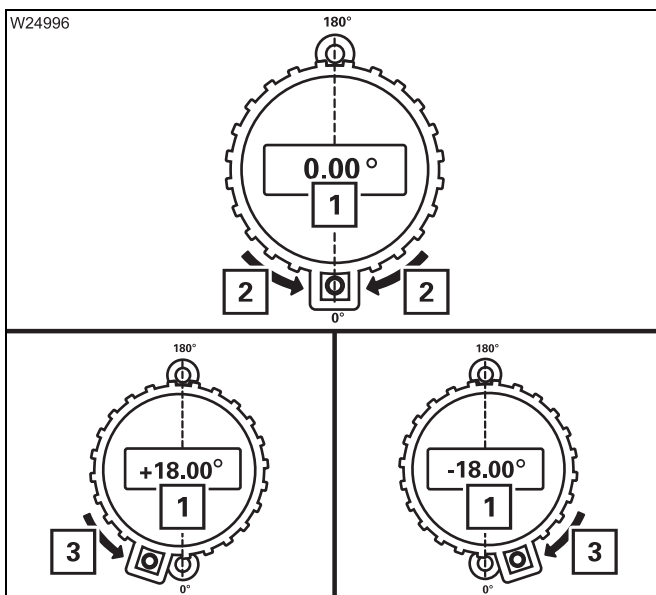
To lock, a pin can extend on the turntable and engage in two locking points on the carrier.

### Locking points

The locking points are at 0° and at 180 °C.



- Open the *Superstructure lock* menu (1).



The display (1) will show the current superstructure position.

- Slew to the locking point at 0° or 180°.

The display (1) shows positive and negative values. For an overview; p. 10 - 117.

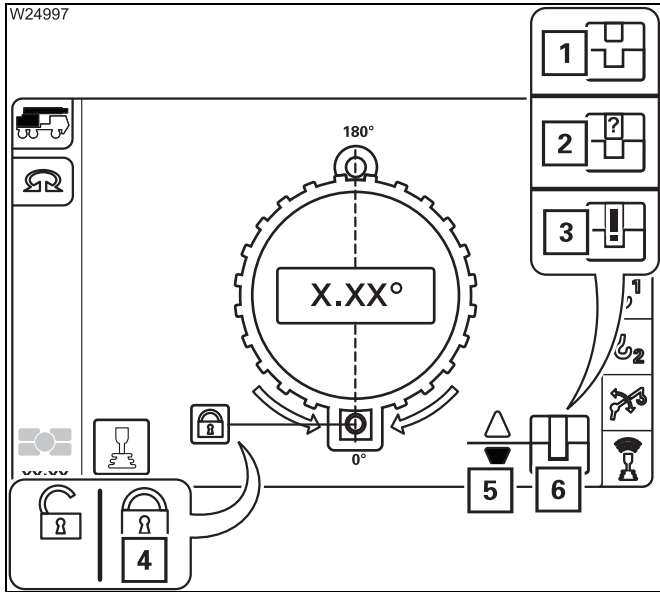
At the locking point, both arrows (2) are shown.

In the range of  $\pm 20^\circ$  around the locking point, an arrow (3) indicates the slewing direction that leads to the locking point.



### Locking the superstructure

The superstructure needs to be at one of the locking points (0° or 180°).



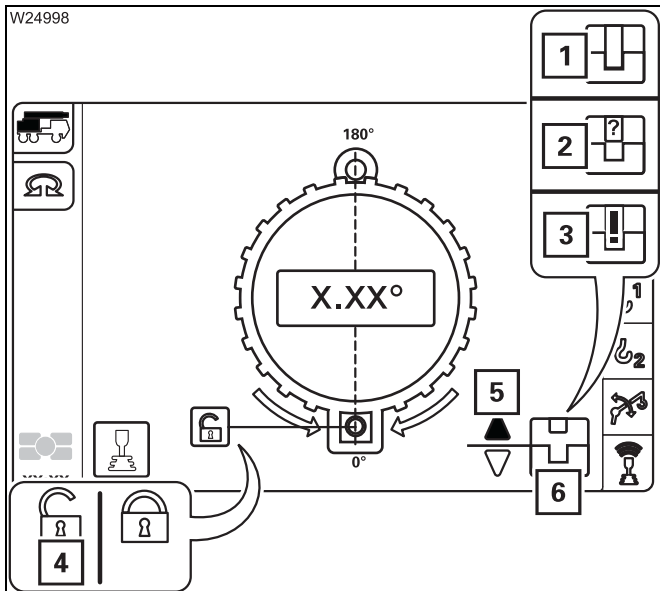
- Select the symbol (5).
- Press the button until the symbol (4) is displayed – *Superstructure locked*.

The display changes from symbol (1) to symbol (2) and shows symbol (6) when the superstructure is locked.

If the error symbol (3) is displayed, contact **Manitowoc Crane Care**.

### Unlocking the superstructure

The RCL shutdown procedure will be triggered and slewing disabled if you unlock the superstructure when an RCL code for 0° to the rear has been entered. To acknowledge the shutdown procedure, you must either lock the superstructure or set down the load and enter an RCL code for a working range of 360°.



- Select the symbol (5).
- Press the button until the symbol (4) is displayed – *Superstructure unlocked*.

The display changes from symbol (1) to symbol (2) and shows symbol (6) when the superstructure is unlocked.

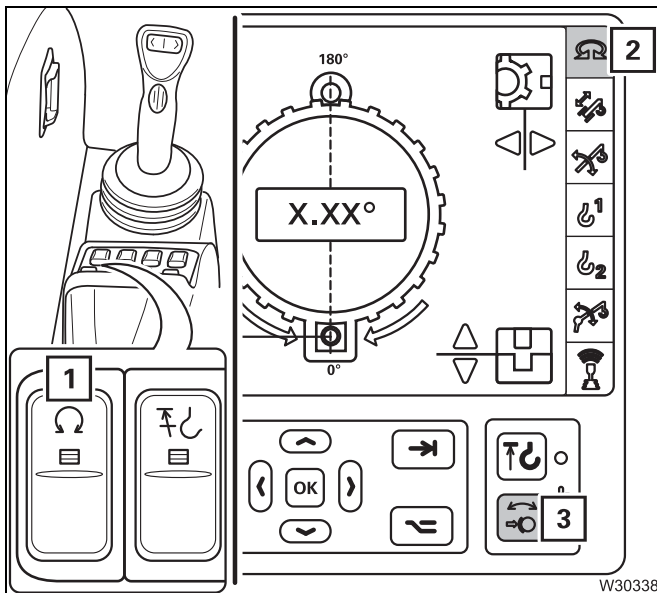
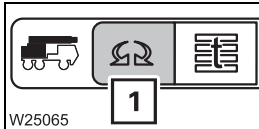
If the error symbol (3) is displayed, contact **Manitowoc Crane Care**.

## 10.1.8 Switching the houselock on/off

If the truck crane is equipped with a houselock, the turntable can be locked in the entire slewing range. For locking, a pin extends and blocks the slewing gear.

### Switching on the houselock

- Slew the superstructure to the position in which it is to be locked and then stop the slewing movement.
- Open the *Superstructure lock* menu (1).



### Switching off the slewing gear

The slewing gear brake must be engaged when operating the houselock.

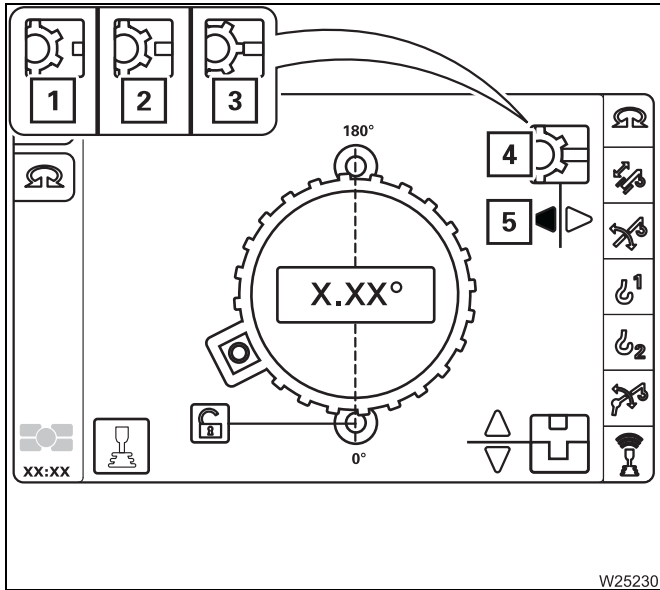
- Press the button (1) once.
- The slewing gear will be switched off and the slewing gear brake applied.
- Symbol (2) is **red**.
  - Lamp (3) lights up.



### Risk of damage during slewing!

Always switch off the slewing gear before you operate the houselock. The system will be damaged if the superstructure is slewed during the locking procedure.





### Switching on the houselock

- Select the symbol (5).
- Press the button until the symbol (4) is displayed – *Houselock switched on.*

The display first shows the symbol (1), then (2) and then shows the symbol (4) when the houselock is switched on.

If the symbol (3) is displayed:

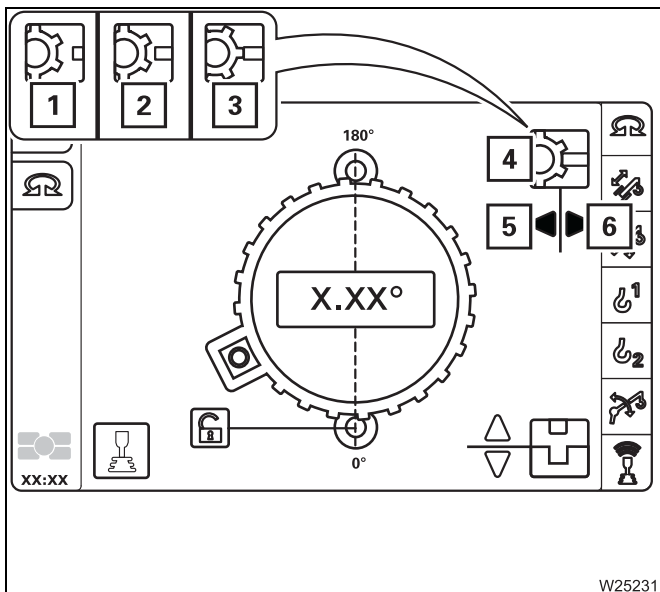
- Let go of the button.

The lock is blocked and you need to correct the position of the superstructure as follows.



### Risk of damage due to slewing with blocked lock!

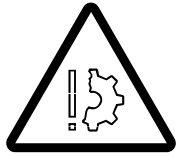
Before slewing ensure that the houselock is switched off. Otherwise the system will be damaged during slewing.



- Select the symbol (6).
- Press the button until the symbol (1) is displayed – *Houselock switched off.*
- Apply the slewing gear brake.
- Switch on the slewing gear and slew the superstructure a little further (minimally).
- Switch off the slewing gear.
- Select the symbol (5).
- Press the button until the symbol (4) is displayed – *Houselock switched on.*
- If symbol (3) is still shown, you must again correct the position of the superstructure.

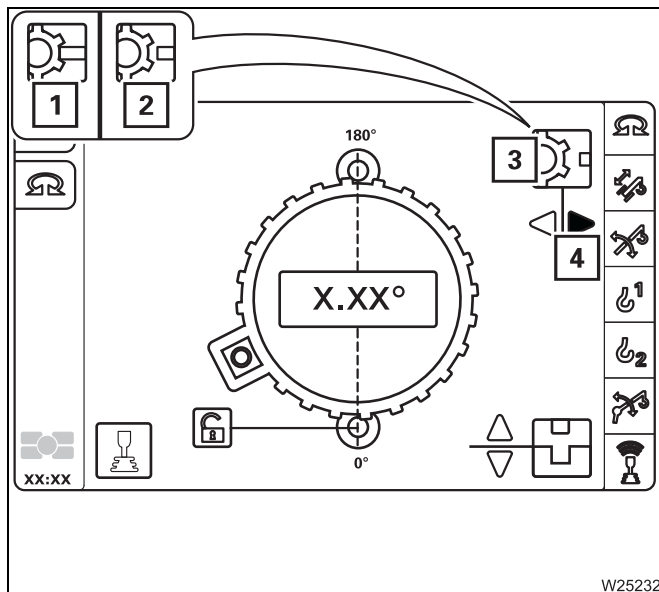
### Switching off the houselock

- Check that the slewing gear is switched off, and switch it off if necessary;  
    ▶ *Switching off the slewing gear*, p. 10 - 17.



#### **Risk of damage during slewing!**

Always switch off the slewing gear before you operate the houselock. The system will be damaged if the superstructure is slewed during the locking procedure.




- Select the symbol (4).
- Press the button until the symbol (3) is displayed – *Houselock switched off*.

The display first shows the symbol (1), then symbol (2) in the intermediate position and then symbol (3) when the houselock is switched off.

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## 10.2

### Standard slewing range type



The *MAXbase* slewing range type is available in the case of additional equipment;  *MAXbase slewing range type*, p. 10 - 23.

The *Standard* slewing range type is always available. The supplied lifting capacity tables with symmetrical outrigger spans apply. These lifting capacity tables are also supplied in printed form with the truck crane.


### 10.2.1

#### Permissible slewing ranges and working positions


##### 360° slewing range

- Support the truck crane with the outrigger span required according to the *Lifting capacity table*.
- Enter an RCL code for the 360° slewing range according to the *Lifting capacity table*;  *Enter rigging mode*, p. 10 - 32
- Rig a counterweight combination that is no larger than that permitted for the rigged outrigger span. Slewing with a rigged counterweight is not permitted with all outrigger spans;  *Slewing with the rigged counterweight*, p. 11 - 93.

##### Working position 0° to the rear

- Support the truck crane with the outrigger span required according to the *Lifting capacity table*.
- Slew the superstructure to the rear into the 0° position.
- Enter an RCL code for the *0° to the rear* according to *Lifting capacity table*;  *Enter rigging mode*, p. 10 - 32.  
RCL accepts this code only when the superstructure is in the 0° position.



All slewing operations are disabled if an RCL code is entered for the *0° to the rear* working position. An RCL shutdown is triggered by unlocking the turntable. To acknowledge this shutdown, if slewing is permissible with the rigged counterweight ( p. 11 - 93), set down the load and enter a rigging mode for the 360° slewing range.

##### 180° to the front rigging position

The same lifting capacity tables apply to this position as to the 360° slewing range.

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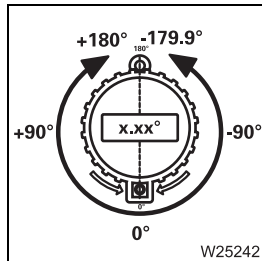


## 10.3

### MAXbase slewing range type

This slewing range type is available in addition to the *Standard* slewing range type; see *Standard slewing range type*, p. 10 - 21. You must decide between the two slewing range types when entering the rigging mode.

Lifting capacity tables with different, variable outrigger spans are available for the *MAXbase* slewing range type. These additional lifting capacity tables are supplied in digital form with the truck crane and can be shown as a diagram on the display in the crane cab.

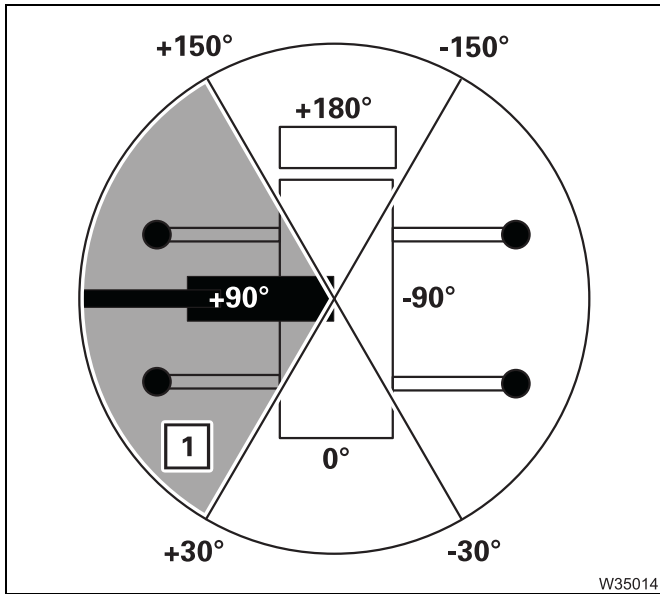


The designation of the slewing angle always relates to the starting point 0° to the rear. A full turn out of this working position is divided into two semi-circles.

- When slewing **clockwise** the slewing angle is displayed as a **positive** value (0° to +180.0°).
- When slewing **anticlockwise** the slewing angle is displayed as a **negative** value (0° to -179.9°).

### 10.3.1 Specifications in the lifting capacity tables

The specified lifting capacities are only enabled for specific slewing ranges.



The *lifting capacity table* contains a direction specification for the enabled slewing range, which is assigned to a superstructure position.

Positional reference	Superstructure position
Backwards	0°
To the right	-90°
Forwards	+180°
To the left	+90°

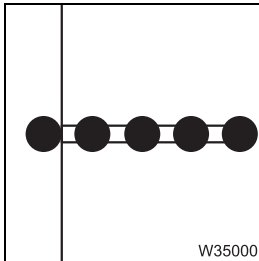
This superstructure position is the starting point for the enabled slewing range. A complete turn is always divided in four slewing ranges. The size of the slewing range is defined via an angular region around the starting point, e.g.  $\pm 60^\circ$  for the slewing range (1). This results in the enabled slewing range (1) between the slewing angles of  $+30^\circ$  to  $+150^\circ$ .

The size of the enabled slewing range depends on the rigged outrigger span. The smallest respective individual width of an outrigger beam is taken into account.

**10.3.2**

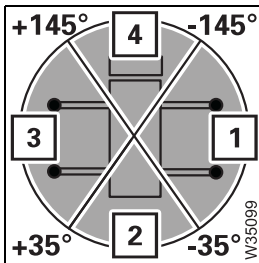
**Enabled slewing ranges**

The enabled angular ranges around the starting point are specified in the *lifting capacity table*. This section provides an overview of where the enabled slewing ranges begin and end for each slewing angle.

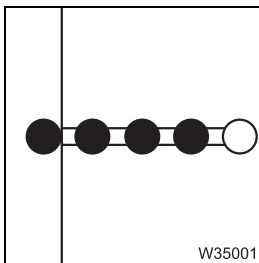


**Smallest individual width 3.900 m (12.8 ft)**

This case applies only to a symmetrical outrigger span with a span of 7.800 m (25.6 ft).

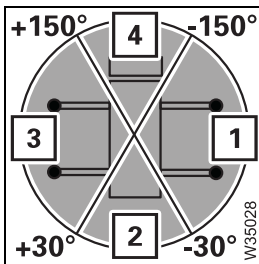


	Positional reference	Angular range	Enabled slewing range
1	To the right	$\pm 55^\circ$	$-145^\circ$ to $-35^\circ$
2	Backwards	$\pm 35^\circ$	$-35^\circ$ to $+35^\circ$
3	To the left	$\pm 55^\circ$	$+35^\circ$ to $+145^\circ$
4	Forwards	$\pm 35^\circ$	$+145^\circ$ to $-145^\circ$



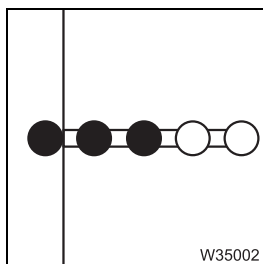
**Smallest individual width 3.427 m (11.2 ft)**

This case applies when one or more outrigger beams is extended to a span of 3.427 m (11.2 ft) and all other outrigger beams are extended to larger spans.



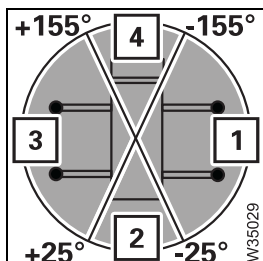
	Positional reference	Angular range	Enabled slewing range
1	To the right	$\pm 60^\circ$	$-150^\circ$ to $-30^\circ$
2	Backwards	$\pm 30^\circ$	$-30^\circ$ to $+30^\circ$
3	To the left	$\pm 60^\circ$	$+30^\circ$ to $+150^\circ$
4	Forwards	$\pm 30^\circ$	$+150^\circ$ to $-150^\circ$



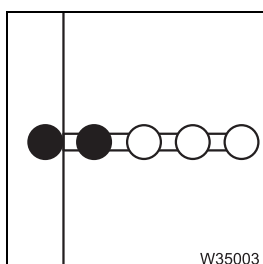


**Smallest individual width 2.955 m (9.7 ft)**

This case applies when one or more outrigger beams is extended to a span of 2.955 m (9.7 ft) and all other outrigger beams are extended to larger spans.

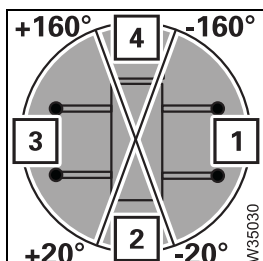


	Positional reference	Angular range	Enabled slewing range
1	To the right	$\pm 65^\circ$	$-155^\circ$ to $-25^\circ$
2	Backwards	$\pm 25^\circ$	$-25^\circ$ to $+25^\circ$
3	To the left	$\pm 65^\circ$	$+25^\circ$ to $+155^\circ$
4	Forwards	$\pm 25^\circ$	$+155^\circ$ to $-155^\circ$

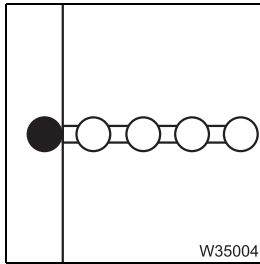


**Smallest individual width 2.155 m (7.1 ft)**

This case applies when one or more outrigger beams is extended to a span of 2.155 m (7.1 ft) and all other outrigger beams are extended to larger spans.

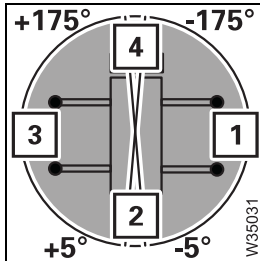


	Positional reference	Angular range	Enabled slewing range
1	To the right	$\pm 70^\circ$	$-160^\circ$ to $-20^\circ$
2	Backwards	$\pm 20^\circ$	$-20^\circ$ to $+20^\circ$
3	To the left	$\pm 70^\circ$	$+20^\circ$ to $+160^\circ$
4	Forwards	$\pm 20^\circ$	$+160^\circ$ to $-160^\circ$



**Smallest individual width 1.355 m (4.4 ft)**

This case applies when one outrigger beam is extended to a span of 1.355 m (4.4 ft) and all other outrigger beams are extended to larger spans.

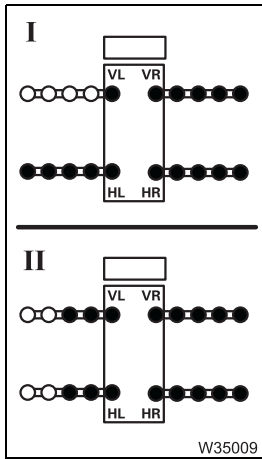


	Positional reference	Angular range	Enabled slewing range
1	To the right	$\pm 85^\circ$	$-175^\circ$ to $-5^\circ$
2	Backwards	$\pm 5^\circ$	$-5^\circ$ to $+5^\circ$
3	To the left	$\pm 85^\circ$	$+5^\circ$ to $+175^\circ$
4	Forwards	$\pm 5^\circ$	$+175^\circ$ to $-175^\circ$

### 10.3.3

## Lifting capacities and slewing ranges for outrigger spans without separate lifting capacity tables

In the case of outrigger spans where the opposing outrigger beams at the right and left sides are extended to different lengths, *lifting capacity tables* are only available for combinations where the outrigger span at the right side is greater than at the left side. This applies to two types of outrigger spans.



#### Outrigger span type *Three / One*

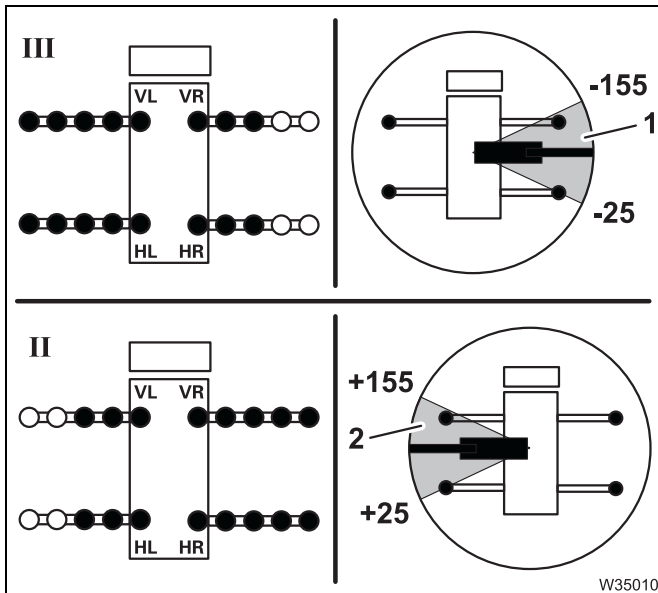
Lifting capacity tables are only provided for the combination *One outrigger beam retracted – left*, e.g. for the outrigger span (I).

#### Outrigger span type *Right / left*

Lifting capacity tables are only provided for the combination *Right greater than left*, e.g. for the outrigger span (II).

When the truck crane is on outrigger beams with a mirrored outrigger span then the same lifting capacities are enabled in the correspondingly mirrored slewing range.

### Example



Assuming that the truck crane is on outrigger beams with the outrigger span (III) and a load is to be lifted in the slewing range *To the right* (1).

Since the outrigger span at the left side is greater than at the right side, the *lifting capacity table* for the mirrored outrigger span (II) with the mirrored slewing range *To the left* (2) must be used.

The loads specified for the slewing range (2) are enabled in the slewing range (1) for the outrigger span (III).

## 10.4

### Operation of the rated capacity limiter

The rated capacity limiter is abbreviated to RCL (**R**ated-**C**apacity-**L**imiter) in these operating instructions.

If the truck crane's current rigging mode is registered properly, the RCL will prevent the permissible lifting capacity from being exceeded and the truck crane from being overloaded.



#### **Risk of accidents due to an incorrectly set RCL!**

Ensure that the current rigging mode is correctly entered Before starting crane operation. Incorrect entries will give you a false sense of security. This may result in the truck crane overloading and causing an accident!

The current rigging mode is registered via

- Measurements,
- acquired via manual entry.

acquired via measurements	Acquired via manual entry
<ul style="list-style-type: none"> <li>– Main boom length</li> <li>– Main boom angle</li> <li>– Current load</li> <li>– Lattice extension angle<sup>1)</sup></li> <li>– Outrigger span</li> </ul>	<ul style="list-style-type: none"> <li>– Counterweight</li> <li>– Length of lattice extension</li> <li>– Angle of the lattice extension<sup>2)</sup></li> <li>– Reeving</li> </ul>

<sup>1)</sup> Lattice extension – luffable

<sup>2)</sup> Lattice extension – can be angled

During operation of the crane, a visual and acoustic early warning is issued before the load limit is reached and then the functions are shut down that would lead into the overload range.



#### **Risk of accidents due to overridden or faulty RCL!**

The RCL must never be overridden.

It is prohibited to work if the RCL is switched off, overridden, out of service or faulty!



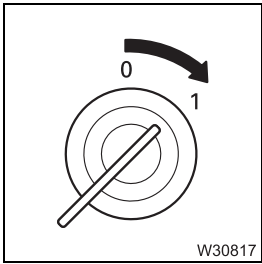
#### **Danger of overturning in two-hook operation!**

The rated capacity limiter only ensures safety for single hook operation!

Two-hook operation is not permitted.

## 10.4.1 Switch on the RCL

### Switching on



The RCL is switched on together with the ignition.

- Switch on the ignition.

A test programme runs after switching on the ignition.

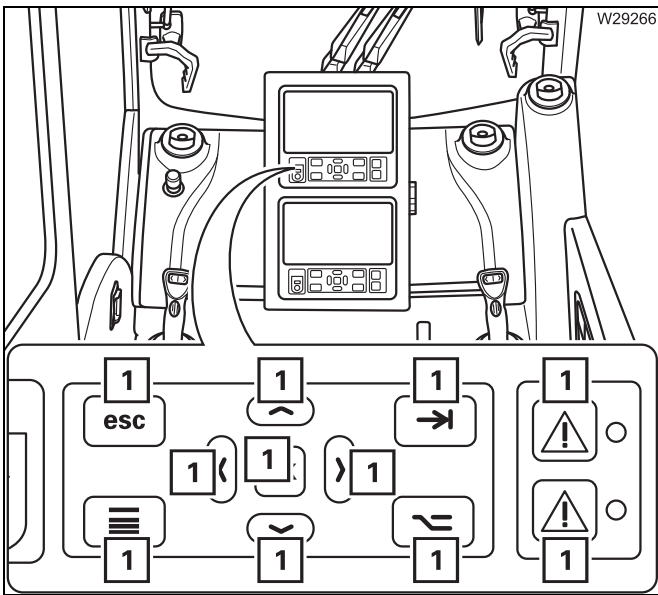
- Check whether you can hear a buzzer tone.



#### Risk of accidents if the safety devices are faulty!

If the lamps or buzzer fail, notify **Manitowoc Crane Care** and have the error corrected.

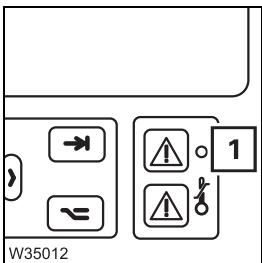
In the meantime, pay particular attention to the lamps in the event of a failure of the buzzer tone and vice versa.



### Lamp test

- Check that the lamps (1) light up after turning on the ignition.

If one or more lamps do not light up, contact **Manitowoc Crane Care**.



### Brightness of the displays

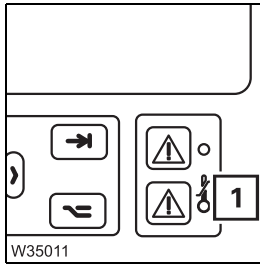
The brightness of the *CCS* and *RCL* is adjusted automatically.

Do not cover the sensors (1) and keep them clean to avoid contamination that can affect the brightness adjustment.

You can set a common minimum brightness for both displays at the *CCS* control unit. This is operated in the same way as in the driver's cab;

▮▮▮▮ p. 4 - 13.

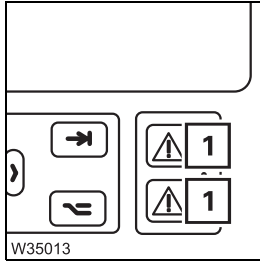




### Temperature on the display

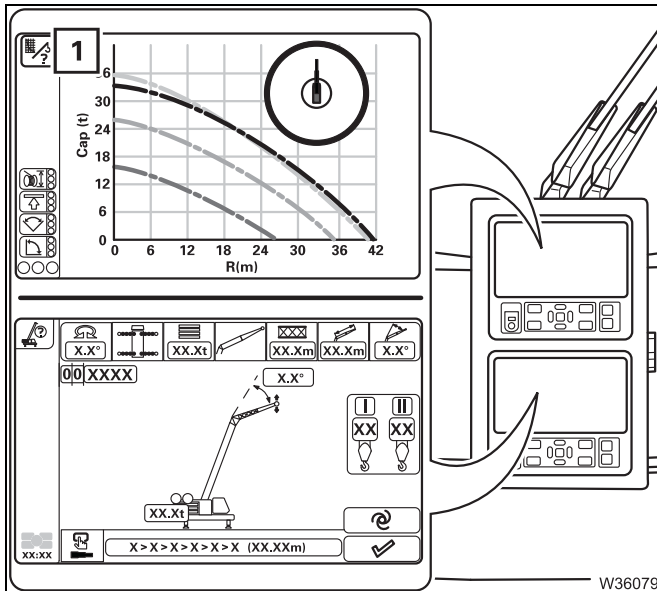
The brightness is reduced automatically if the temperature at the display is too high.

Do not cover the sensors (1) and keep them clean to avoid contamination that can affect the brightness adjustment.



### After completing the test program

- The lamps (1) light up.
- All power units are disabled.



The *CCS* display shows the last confirmed rigging mode and the *RCL* display shows the corresponding lifting capacity table.

The symbol (1) indicates that a rigging mode has not been confirmed.

If the current rigging mode is displayed, then you can confirm the rigging mode;  
 ■■■► p. 10 - 41.

If the current rigging mode is not displayed, then you must enter the current rigging mode;  
 ■■■► p. 10 - 32.

## 10.4.2 Enter rigging mode

### Notes on Input

You can enter the rigging mode for various different purposes.

#### – Entry for crane operation

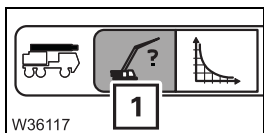
You enter the current rigging mode, select a telescope status according to the lifting capacity table and confirm the rigging mode to enable the crane functions.

#### – Entry for operations planning

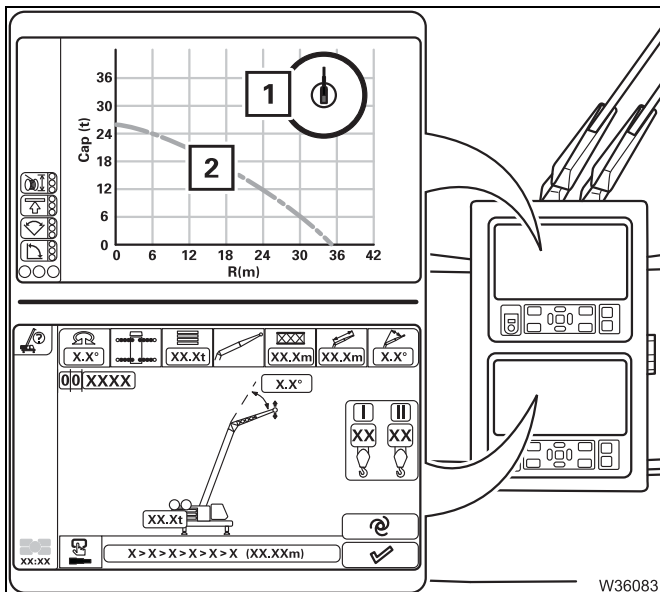
You enter a possible rigging mode to check the lifting capacities, slewing ranges and telescoping that are enabled with this rigging mode.



You can only change the rigging mode when all crane movements have stopped – control lever in the initial position.



- If necessary, open the *Enter rigging mode/telescope status* menu (1) on the CCS display.



The RCL display shows the *Lifting capacity table* menu.

The CCS shows the *Enter rigging mode/telescope status* for the last rigging mode entered.

The rigging mode is entered at the CCS display – after each change, the RCL display shows the corresponding lifting capacity table (2) and the enabled slewing range (1).

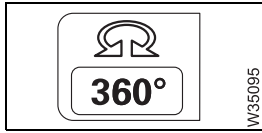
The input options and the displays are based on the confirmed slewing range type.

First enter the slewing range type;

▮▮▮▮ p. 10 - 33.

## Enter the slewing range type

Possible types are the *Standard* slewing range type and, with the corresponding equipment, the *MAXbase* slewing range type. Different lifting capacity tables apply depending on the entered slewing range type and these then influence further input of the rigging mode.




### - *Standard slewing range type*

The standard lifting capacity tables provided in printed form with the truck crane apply. All rigging modes listed there can be entered.

- The rigging mode can be specified via entry of the reeving and RCL code or via the individual components.
- In the case of individual components, the outriggers are always entered as complete outrigger span.
- In the case of individual components, the slewing range is entered according to the *lifting capacity table*.



An overview of all enabled Standard outrigger spans is provided in the section *Outriggers*;  *Supplied operating manual*.




### - *MAXbase slewing range type*

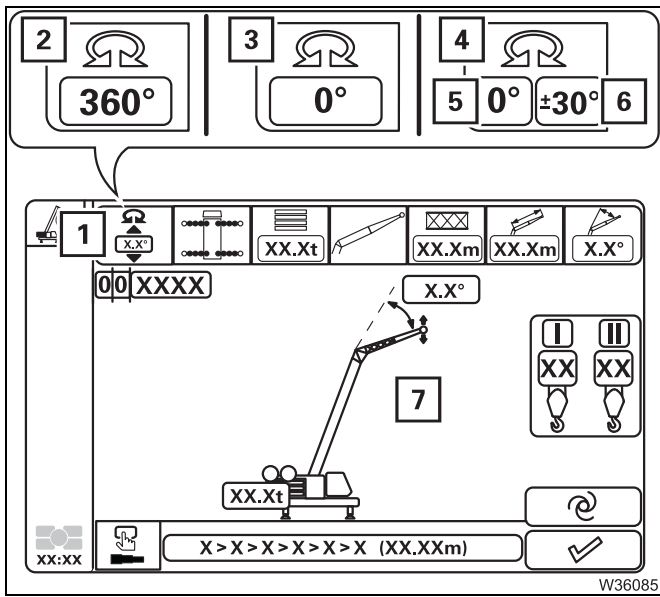
The MAXbase tables apply, which are only provided in digital form due to the wide diversity of configurations. All rigging modes listed there can be entered.

- The rigging mode is entered via the individual components.
- The outriggers are entered as individual widths for each outrigger beam.
- The enabled slewing range is displayed, divided into four areas with different lifting capacities.



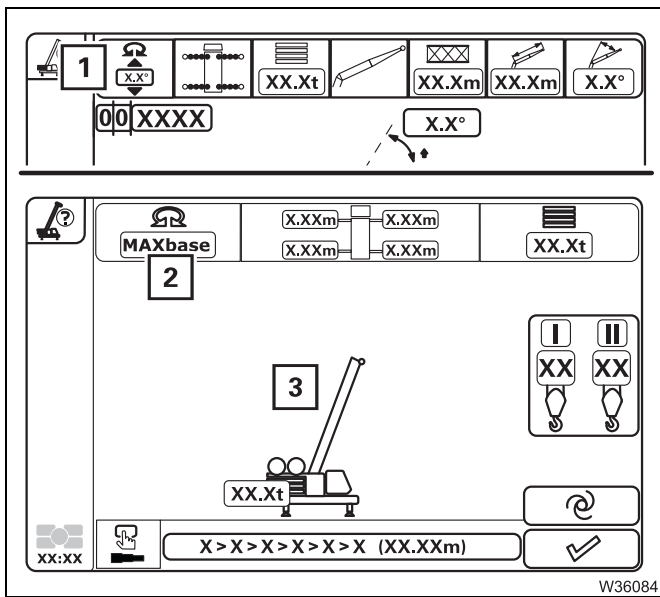
An overview of all enabled MAXbase outrigger spans is provided in the section *Outriggers*;  *Supplied operating manual*.





**For the Standard slewing range type**

- Select and confirm the display (1).
- Select and confirm the symbol for the desired slewing range.
  - 2 360° slewing range
  - 3 Working position 0° to the rear
  - 4 Limited slewing range
    - 5 Working position – e.g. 0° to the rear
    - 6 Slewing range, e.g. ±30°
- After confirming, the menu (7) is displayed for further rigging mode entry.
  - Entry via RCL code; ■■■▶ p. 10 - 40.
  - Entry via individual components; ■■■▶ p. 10 - 34.



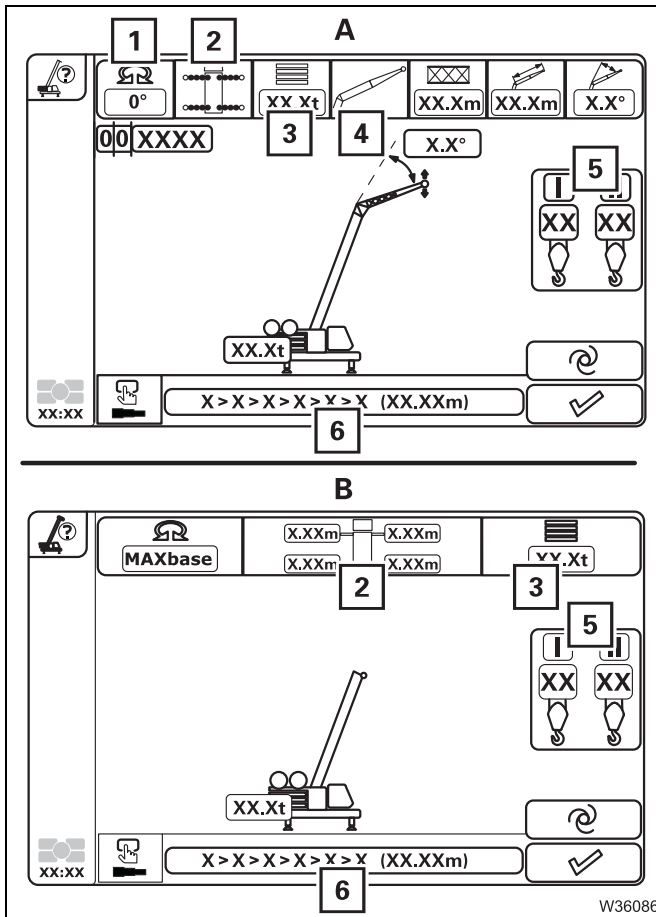
**For the MAXbase slewing range type**

- Select and confirm the display (1).
- Select and confirm the symbol (2).
- After confirming, the menu (3) is displayed for further rigging mode entry.
 

Enter the rigging mode; ■■■▶ p. 10 - 34.

**Entering individual components**

Only enabled rigging modes can be selected. For this reason, the selection possibilities for the individual components are based on the already entered and confirmed components.



The displayed menu depends on the slewing range type.

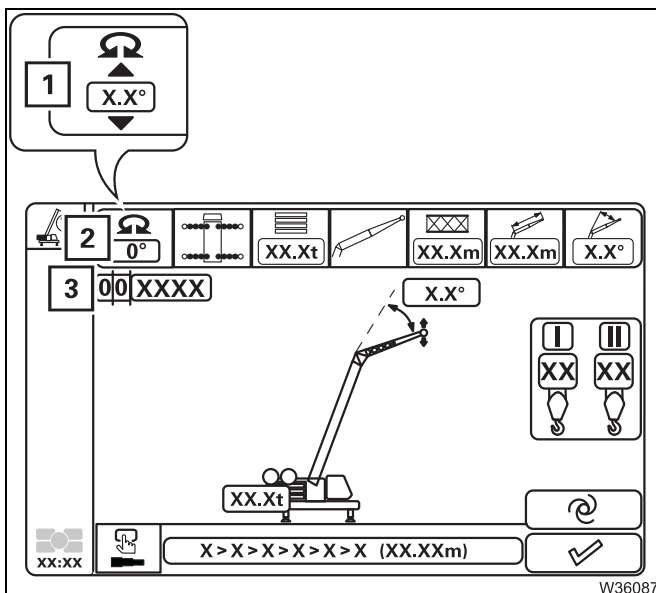
**A** Menu for *Standard*

**B** Menu for *MAXbase*

The selection is not restricted when you adhere to this sequence when entering the data.

- 1 Slewing range– only with the *Standard* slewing range type
- 2 Outrigger span – can also be adopted from the outrigger width monitoring
- 3 Counterweight
- 4 Boom system – only with the *Standard* slewing range type
- 5 Reeving

After entering the rigging mode you can preselect a telescope status (6) and then conform the rigging mode together with the display lifting capacity table.



### Slewing range

- Select and confirm the display (1).
- Select the required slewing range (2), e.g. working position 0° to the rear.
- Confirm the selection. The corresponding RCL code (3) is displayed.

You can only confirm rigging modes for slewing ranges other than 360°,

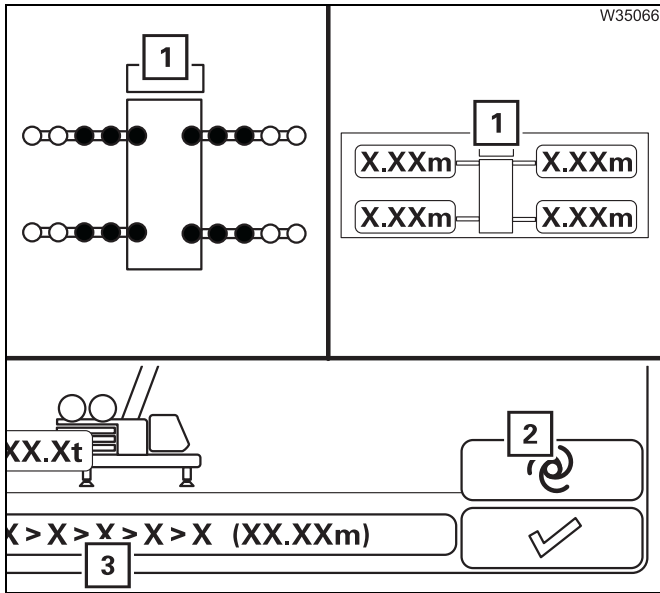
- When the selected working position is reached and the slewing gear is switched off.
- When the superstructure is in the selected slewing range.

If necessary, first enter the 360° slewing range and slew the superstructure into the required position.



### Outrigger span

You can adopt the outrigger span provided by the outrigger width monitoring or manually enter the outrigger span.



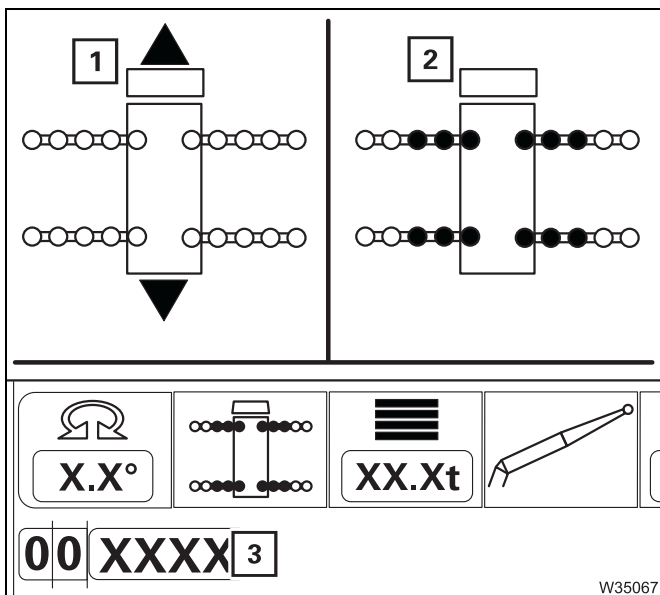
#### Adopt the outrigger span

- Select and confirm the symbol (2).

The outrigger span provided by the outrigger width monitoring is adopted and shown on the current display (1).

At the same time, the current telescoping is adopted and shown on the display (3).

- Always check that the currently rigged outrigger span is displayed before confirming the rigging mode.



#### Enter outrigger span (Standard)

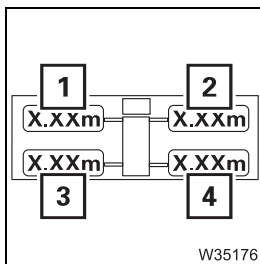
- Select and confirm the display (1).
- Select the rigged outrigger span, e.g. symbol (2) for 8.950 x 5.910 m (22.4 x 19.4 ft).
- Confirm the selection.  
 The selection and the corresponding RCL code (3) are displayed.

If the outrigger span provided by the outrigger width monitoring deviates from the entered value then a query is displayed after confirming the rigging mode; see p. 10 - 42.

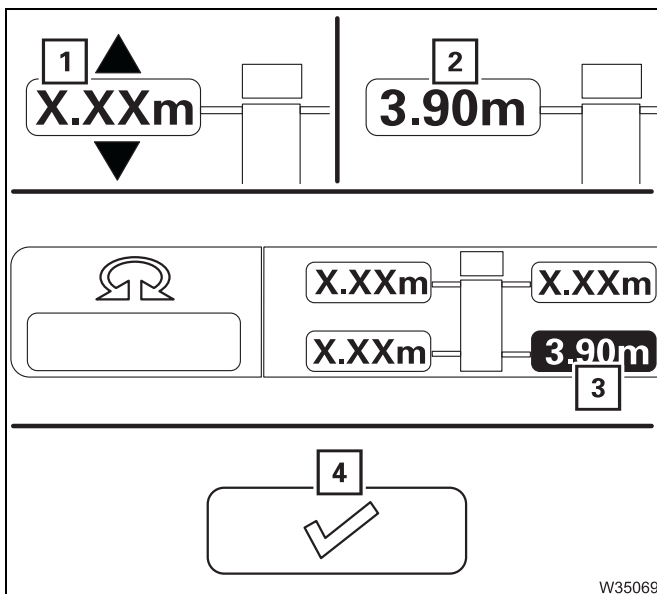
### Enter outrigger span (MAXbase)

The outrigger spans are entered as individual widths. If the *lifting capacity table* specifies an overall width then select the associated individual width.

Overall width	Individual width
7.800 m (25.6 ft)	3.900 m (12.8 ft)
6.854 m (22.4 ft)	3.427 m (11.2 ft)
5.910 m (19.4 ft)	2.955 m (9.7 ft)
4.310 m (14.2 ft)	2.155 m (7.1 ft)
2.710 m (8.8 ft)	1.355 m (4.4 ft)



If changing an outrigger width would result in an impermissible outrigger span, then the selection is disabled for this outrigger beam. If necessary, you must re-enter the outrigger widths in the sequence (1) to (4).



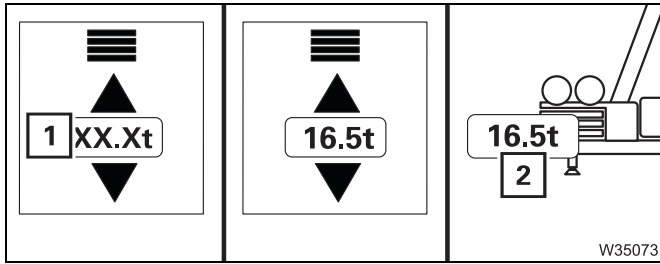
- Select and confirm the display (1) for the desired outrigger beam.
- Select the rigged individual width (2), e. g. 3.900 m (12.8 ft).
- Confirm the selection.

If the outrigger span measured by the outrigger width monitoring differs from the entered value then the value (3) is displayed in red.

The symbol (4) becomes grey – the rigging mode cannot be adopted.

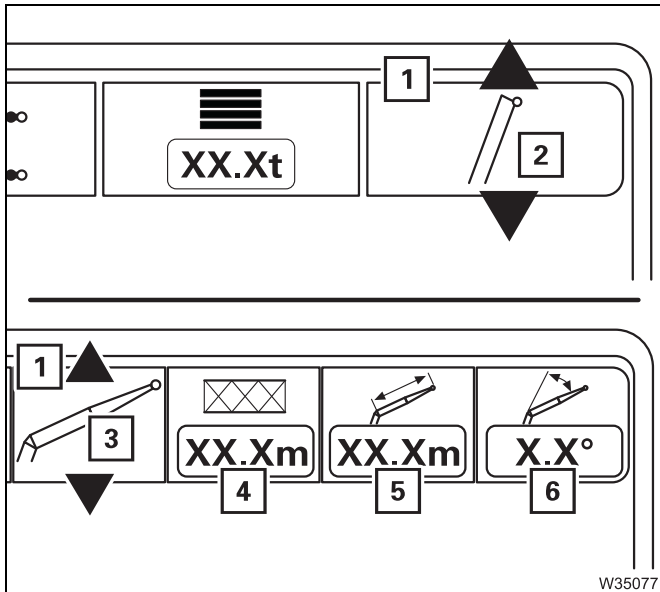
- In this case, rig the necessary outrigger span.





### Counterweight

- Select and confirm the display (1).
- Select the rigged counterweight combination, e.g. 16.5 t.
- Confirm the selection.  
The display (2) shows the entered counterweight combination.



### Boom system

For the *Standard slewing range type only*.

- Select and confirm the display (1).
- Select the symbol for the rigged boom system.
  - 2 Main boom
  - 3 Lattice extension
- Confirm the selection.  
When selecting *lattice extension* additional displays (4) to (6) are shown – selection and confirmation is performed in the same manner as with display (1).

#### – Display (4)

- Select and confirm the current length (Z) before the angle.

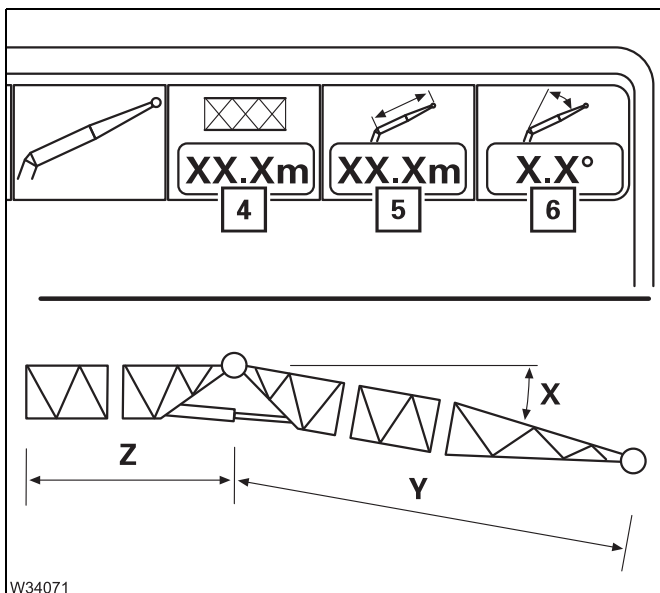
#### – Display (5)

- Select and confirm the current length (Y) after the angle.

#### – Display (6)

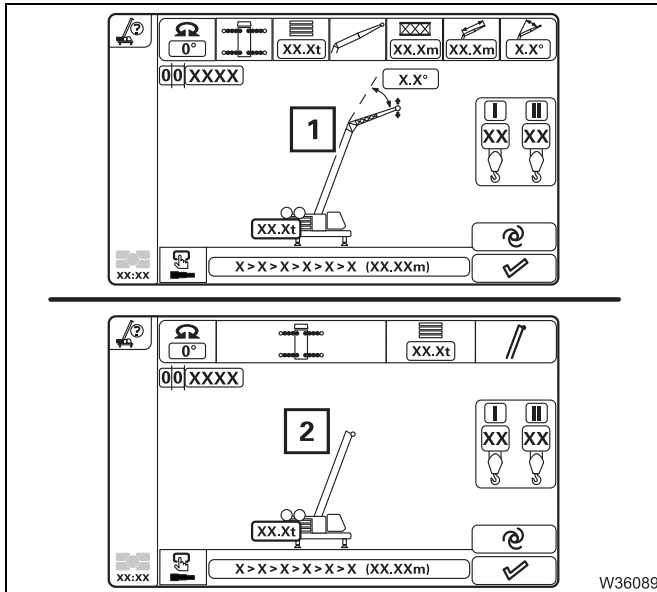
Only for inclinable lattice extensions.

- Select and confirm the currently rigged angle (X).

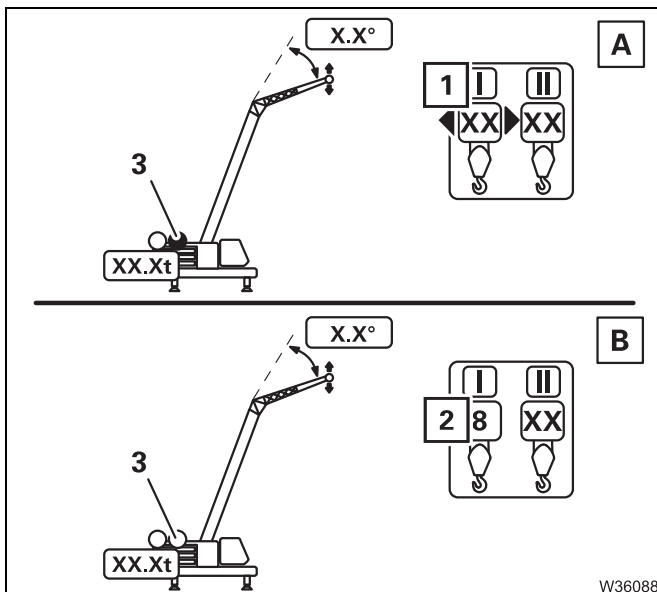


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The confirmed boom system (1) or (2) is displayed.



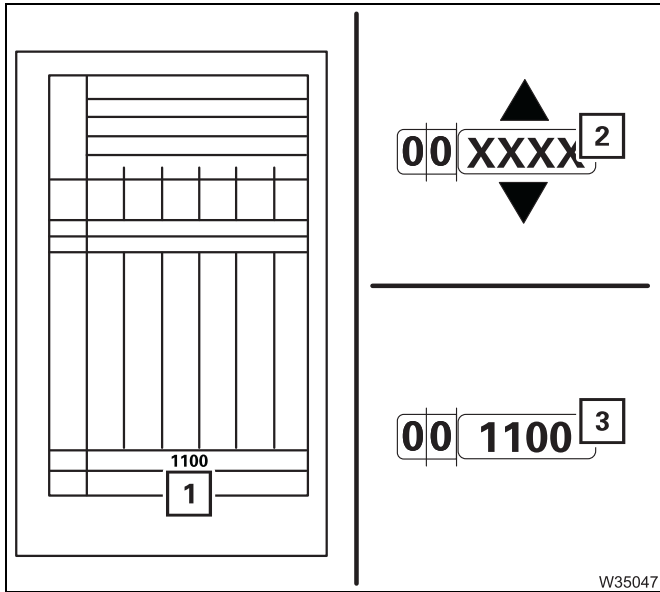
### Reeving

- (A) – Select and confirm the display for the hoist to be used for lifting the load, e.g. display (1) for the main hoist – symbol (3) is orange.
- (B) – Select the currently rigged reeving (2), e.g. 8-fall.
- Confirm the selection – symbol (3) is grey.



**Entering the RCL code**

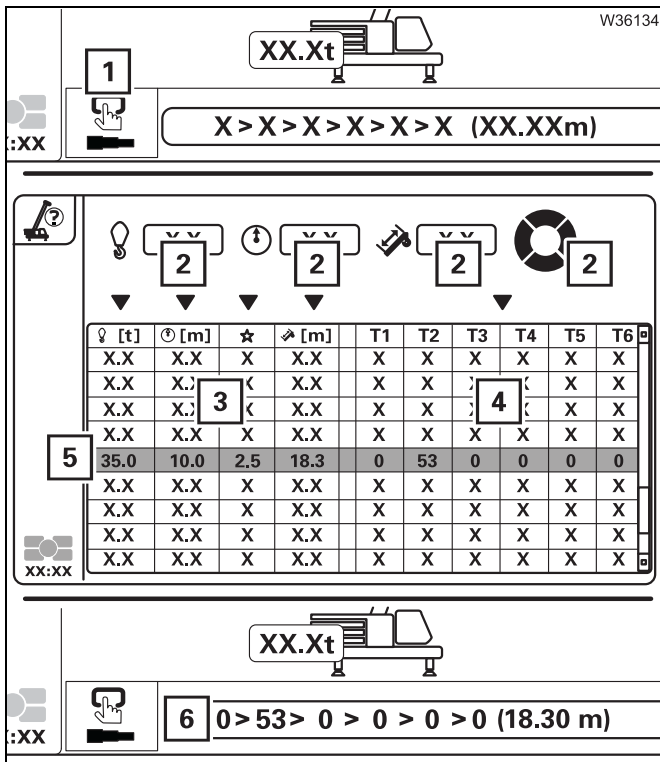
You must enter the RCL code for the rigging mode according to the *lifting capacity table*.



- Refer to the *lifting capacity table* for the current rigging mode. The corresponding RCL code (1) is specified at the bottom of the table (e.g. 1100).
- Select and confirm the symbol (2).
- Select the necessary RCL code (3), e.g. 1100.
- Confirm the selection.

The other displays will show the corresponding rigging mode.

**10.4.3 Pre-selecting telescoping**



- First enter the current rigging mode.
- Select and confirm the symbol (1).  
The *Pre-selection telescoping* menu opens.
- Enter the desired parameter (2); see p. 8 - 38.  
The table shows all permissible telescoping (4) and the associated parameter (3) for the entered rigging mode and entered parameter.

- Select and confirm the line with the desired telescope status, e.g. line (5).


The *Enter rigging mode/telescope status* menu opens – the preselected telescope status (6) is displayed.

## 10.4.4

### Confirm the rigging mode and lifting capacity table

You must confirm the rigging mode together with the display lifting capacity table before commencing crane operation. Some parts of the procedure are different, depending on the entered slewing range type.

#### Standard slewing range type

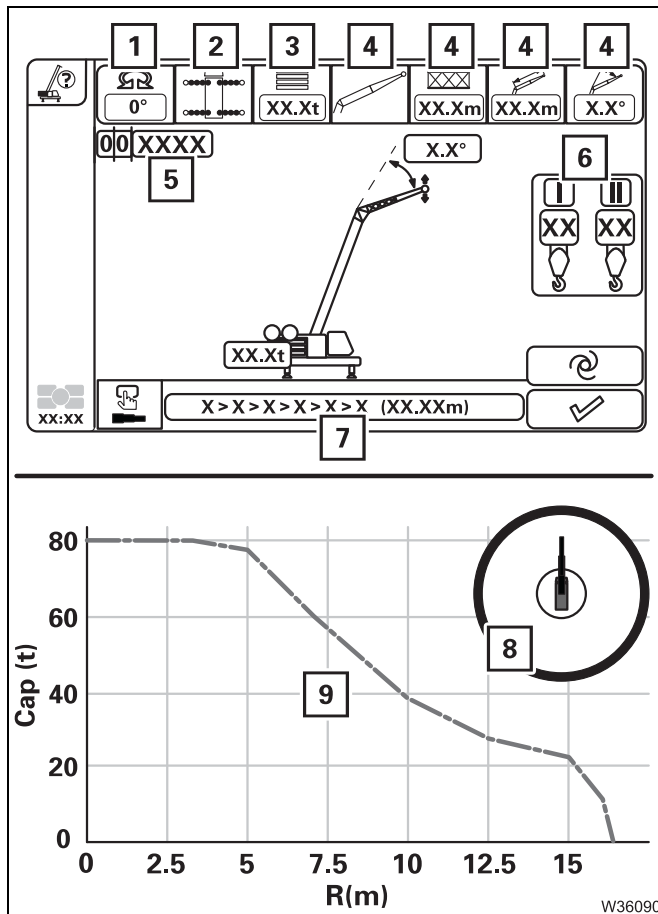
If the *MAXbase* slewing range type has been entered;  p. 10 - 43.

- Check that the current rigging mode of the truck crane corresponds to the displayed rigging mode.



#### Risk of accidents due to an incorrectly set RCL!

If the current rigging mode varies from the displayed rigging mode, the maximum load displayed by the *RCL* will not correspond to the actually permissible lifting capacity according to the *lifting capacity table*. Overloading and accidents will certainly be the result.



- Check:

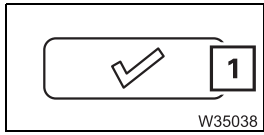
- 1 The slewing range for the planned job
- 2 The rigged outrigger span
- 3 The rigged counterweight
- 4 The rigged boom system
- 6 The number of reeved hoist rope lines

- Correct any incorrectly entered rigging modes if necessary.

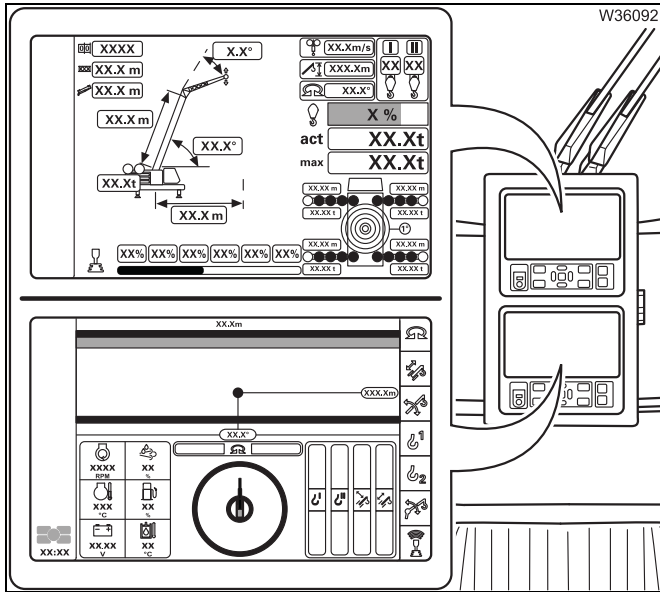
The displayed lifting capacity table (9) applies to the RCL code (5) in the corresponding slewing range (8) and for the preselected telescope status (7).

If the actual rigging mode is displayed correctly and the planned operation can be performed within the displayed working range (8) then you can confirm the rigging mode.





- Select and confirm the symbol (1).



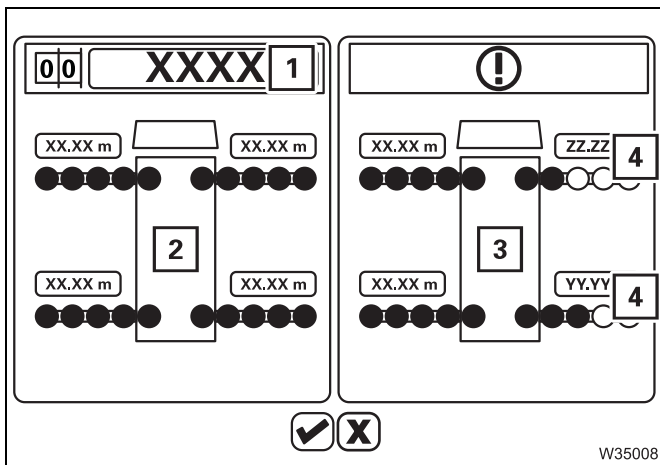
**If the rigging mode is permissible**

The rigging mode is accepted together with the display lifting capacity table.

The RCL display shows the *Monitoring* menu.

The CCS display shows the *Start* menu.

The crane movements are released if there is no error; Checks before operating the crane, p. 10 - 45.



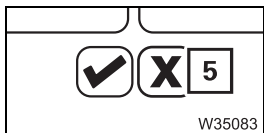
**If a deviation in the outrigger span is detected**

A query menu opens.

The display (2) shows the outrigger span corresponding to the RCL code (1).

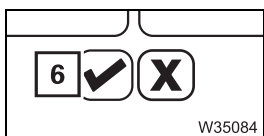
The display (3) shows the acquired outrigger span – deviating outrigger widths (4) are red.

- Check the currently rigged outrigger span.



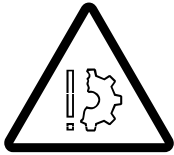
**– If an incorrect outrigger span is rigged**

- Select and confirm the symbol (5) – the menu closes and the rigging mode is not adopted.
- Rig the required outrigger span.



**– If the necessary outrigger span is rigged**

- Select and confirm the symbol (6). The rigging mode is accepted.
- Have the outrigger width monitoring checked after finishing operations.



**Risk of accident due to incorrectly supported truck crane!**

A shutdown is not initiated as standard when an outrigger span monitoring error message is issued. When an error message is displayed, compare the rigged outrigger span with the required outrigger span and rig the required outrigger span.

This prevents the truck crane from tilting due to an inadequate outrigger span.

**MAXbase slewing range type**

If the *Standard* slewing range type has been entered; p. 10 - 41.

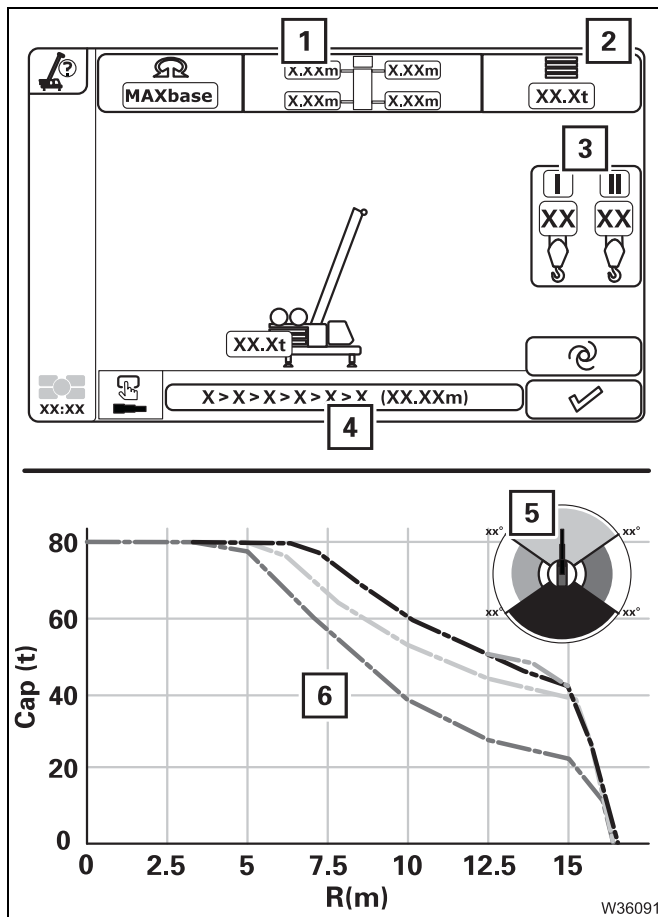
- Check that the current rigging mode of the truck crane corresponds to the displayed rigging mode.



**Risk of accidents due to an incorrectly set RCL!**

If the current rigging mode varies from the displayed rigging mode, the maximum load displayed by the *RCL* will not correspond to the actually permissible lifting capacity according to the *lifting capacity table*.

Overloading and accidents will certainly be the result.



- Check:

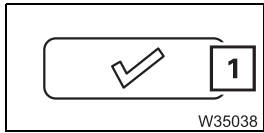
- 1 The rigged outrigger span
- 2 The rigged counterweight
- 3 The number of reeved hoist rope lines

- Correct any incorrectly entered rigging modes if necessary.

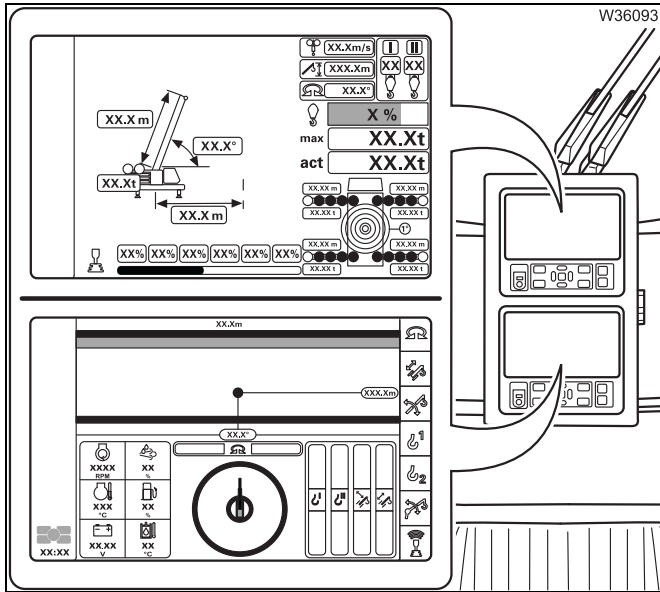
The displayed lifting capacity tables apply to the preselected telescope status (4) in the respectively corresponding slewing ranges (5).

If the current rigging mode is displayed and the planned operations lie within the displayed operating ranges (6), then you can confirm the rigging mode.





- Select and confirm the symbol (1).



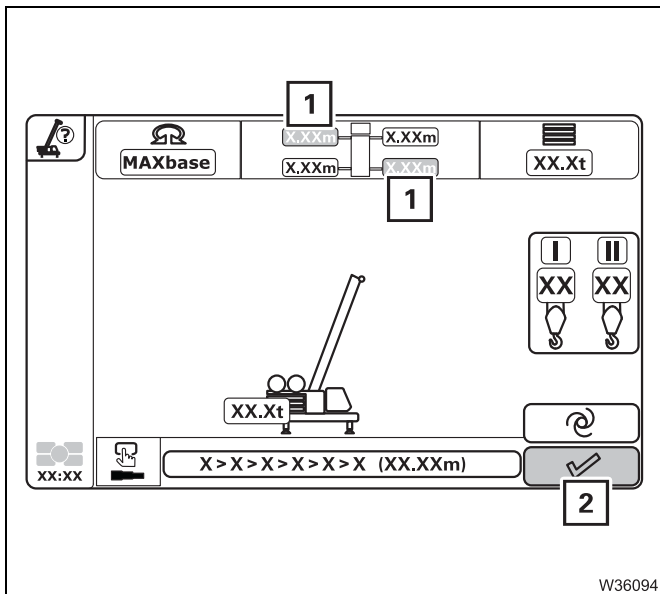
**If the rigging mode is permissible**

The rigging mode is accepted together with the display lifting capacity table.

The RCL display shows the *Monitoring* menu.

The CCS display shows the *Start* menu.

The crane movements are released if there is no error; Checks before operating the crane, p. 10 - 45.



**If a deviation in the outrigger span is detected**

The symbol (2) is grey.

The rigging mode cannot be conformed, crane operation is not enabled.

If the value for an outrigger width is red then a deviating outrigger span has been detected, e.g. for the values (1).

- Rig the required outrigger spans.



## 10.4.5

## Checks before operating the crane

### Monitoring menu

Crane operation is only enabled when the *Monitoring* menu is open.

The menu is opened and exited automatically only, as a reaction to commands on the CCS display.

- After confirming a permissible rigging mode, the *Monitoring* menu opens;  p. 10 - 41.
- After opening the *Enter rigging mode/telescope status* menu, the *Monitoring* menu is exited and the *RCL* display opens the *Lifting capacity table*;  p. 10 - 32.

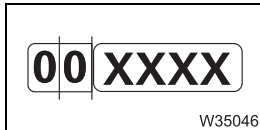
### Checking the rigging mode



#### Risk of accidents due to an incorrectly set RCL!

If the current rigging mode varies from the displayed rigging mode, the maximum load displayed by the *RCL* will not correspond to the actually permissible lifting capacity according to the *lifting capacity table*. Overloading and accidents will certainly be the result.

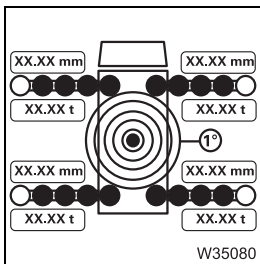
- Check that the displays listed here show the current rigging mode and correct the rigging mode if necessary.



#### Display RCL code

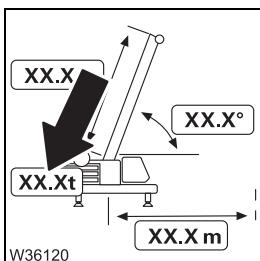
For the *Standard* slewing range type only.

Shows the RCL code corresponding to the confirmed rigging mode according to the *lifting capacity table*.



#### Outrigger span display

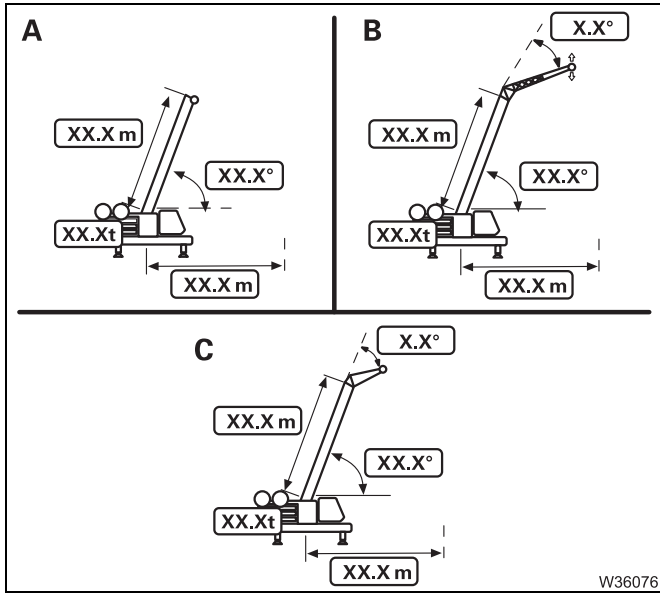
- Numerical values – show the individual widths of the outrigger beams for the confirmed rigging mode, in metres (m) or feet (ft).
- Visual display – shows the required outrigger span in **orange**. For the *Standard* slewing range type only – the display is **red** when the outrigger span provided by the outrigger width monitoring deviates from the required outrigger span.



#### Counterweight display

Shows the required counterweight combination in tons (t) for the confirmed rigging mode.





**Boom system display**

Shows the boom system corresponding to the confirmed rigging mode.

- A** Main boom
- B** Swing-away lattice extension<sup>1)</sup> / boom extension<sup>1)</sup>
- C** Heavy load lattice extension<sup>1)</sup>

<sup>1)</sup> For the *Standard slewing range type* only. The lattice extension must be electrically connected.



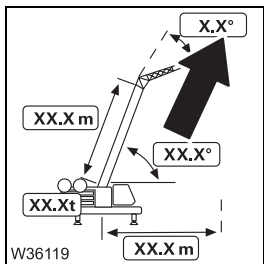
**Lattice extension display – length before the angle**

Shows the required length of lattice extension before the angle according to the confirmed rigging mode – in metres (m) or feet (ft).



**Lattice extension display – length after the angle**

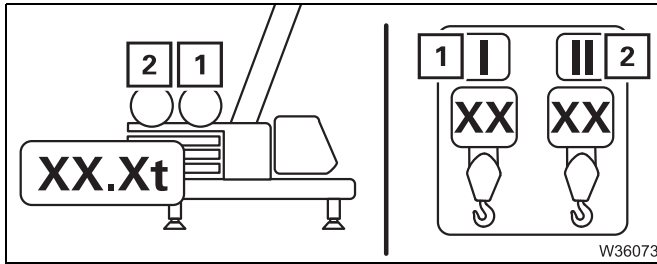
Shows the required length of lattice extension after the angle according to the confirmed rigging mode – in metres (m) or feet (ft).



**Lattice extension display – angle**

Only for manually inclinable lattice extensions  
 Shows the required angle of the lattice extension for the confirmed rigging mode.





### Display of reeving used

- 1 Main hoist
- 2 Auxiliary hoist

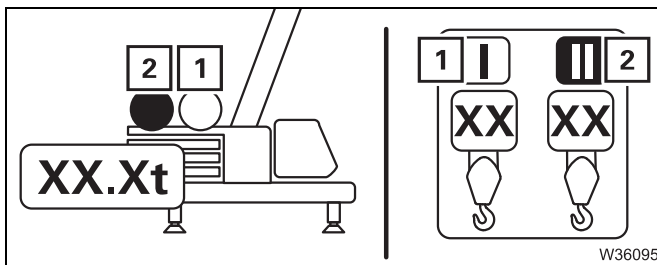
**Orange:** Used <sup>1)</sup>

**Grey:** Not used

<sup>1)</sup> The value on the *Maximum load* display applies to this reeving.  
You may need to switch over the display if necessary; see p. 10 - 47.

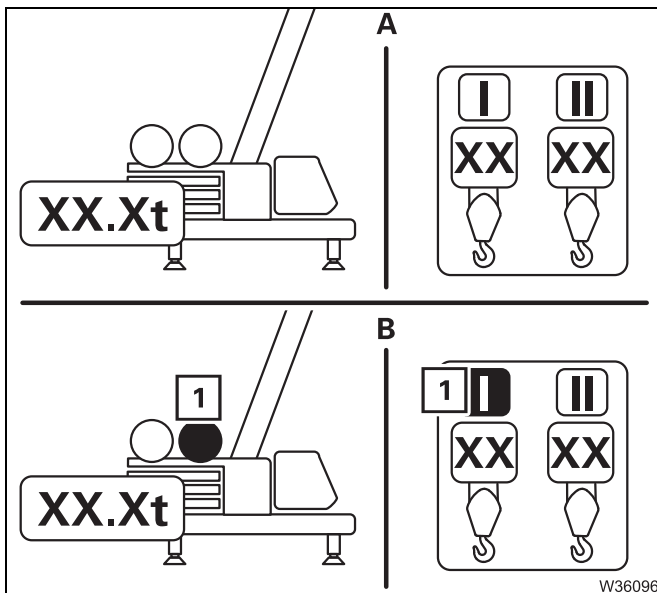
### Hoist checks

You must check that the RCL uses the correct reeving data.  
The RCL always uses the reeving data for the first hoist to be switched on.



- Check the symbol (1) or (2) for the hoist with which you wish to lift the load. The symbol must be **orange**.

If the symbol is **grey**, e.g. the symbol (1) for the main hoist, then you must switch over the display.



### Switching over the display

- (A) – Switch off both hoists – both symbols become grey.
- (B) – Switch on the hoist with which you wish to lift the load. The corresponding symbol becomes **orange**, e.g. the symbol (1) for the main hoist.





**Risk of accidents due to incorrectly entered reeving!**

Check the displayed reeving after each switch over and enter the current reeving if necessary.

In this way, you prevent the RCL from making calculations based on an incorrect reeving value and the truck crane from becoming overloaded or from overturning.

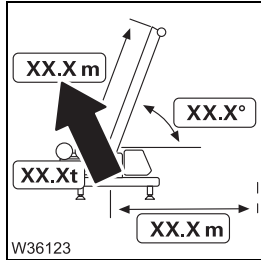
If you wish to also lift a load with the other hoist during subsequent crane operation then you must first switch over the display appropriately.

## 10.4.6

### Displays during crane operation

Various different information is shown on the *RCL* display and *CCS* display. This section describes only the displays that change during crane operation.

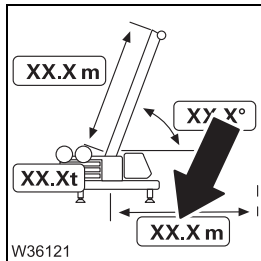
#### On the *RCL* display



All displays are shown in the *Monitoring* menu.

#### Display of current main boom length

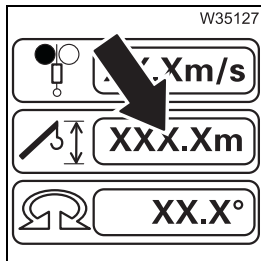
Shows the current main boom length in metres (m) or feet (ft).



#### Current working radius display

Shows the current working radius = horizontal distance between the turntable axis and hook block axis in metres (m) or feet (ft).

The displayed value is calculated on the basis of the telescoping and the main boom or lattice extension angle.

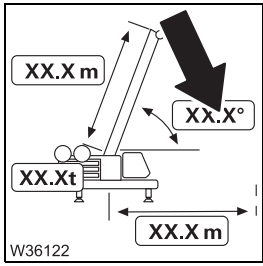


#### Current overall height display

Overall height = vertical distance between the lower edge of the outrigger pad and the highest point of the main boom or lattice extension. The displayed value applies to fully extended outrigger cylinders on the largest outrigger span.

The value is displayed either in metres (m) or in feet (ft), depending on the setting.

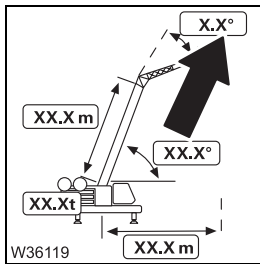




**Status display for current main boom angle**

Shows the current main boom angle in relation to the horizontal. Angles below the horizontal are displayed with a minus sign, e.g. - 3°. A luffing jib is connected.

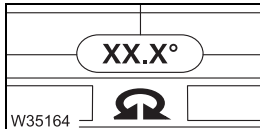
Shows the current angle between the lattice extension and main boom in degrees (°).



**Current lattice extension inclination display**

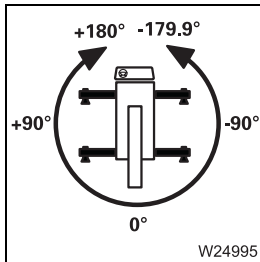
A luffing jib is connected.

Shows the current angle between the lattice extension and main boom in degrees (°).

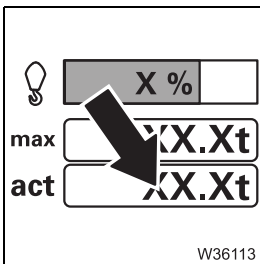


**Current slewing angle display**

Shows the angle of the current superstructure position.



- 180° means that the superstructure is slewed to the front.
- 0 means that the superstructure is slewed to the rear.  
A full turn out of this working position is divided into two semicircles.
- When slewing **clockwise** the slewing angle is displayed as a **positive** value (0° to +180.0°).
- When slewing **anticlockwise** the slewing angle is displayed as a **negative** value (0° to -179.9°).



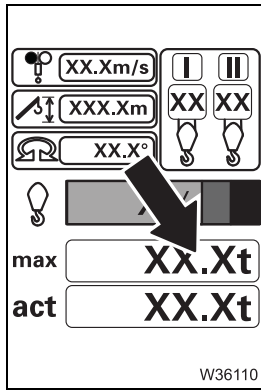
**Display of the currently raised load**

Shows the sum of the payload + lifting gear + hook block + reeved hoist rope, that would not be required for lifting the load.

Accuracy of the display: ± 5% of the actual load

Values are displayed in tons (t) or in kilopounds (klbs).

Example: 55.2 klbs is equal to 55,200 lbs.

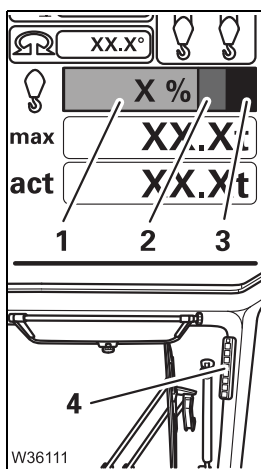


### Maximum load display

Shows the maximum load that can be lifted in the current rigging mode with the current working radius.

Values are displayed in tons (t) or in pounds (lbs) – for the confirmed rigging mode.

The corresponding symbol (I) or (II) flashes when the lifting capacity is reduced due to the entered reeving.



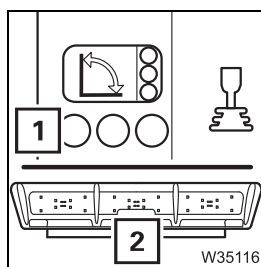
### Current degree of utilization display

The degree of utilisation shows the weight of the current load as a percentage of the maximum possible load. (degree of utilisation =  $100 \times \text{current load} / \text{maximum load}$ ).

The display has three coloured regions.

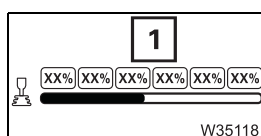
- 1 Green:** 0 - 90%
- 2 Yellow:** approx. 90 - 100% – early warning
- 3 Red:** greater than 100% – shutdown

Depending on the equipment, the degree of utilisation is shown on a display (4) with coloured lamps.



### RCL status display

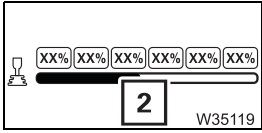
The green, yellow and red displays (1) are identical to the status displays (2) on the outside of the truck crane.



### Current telescope status display

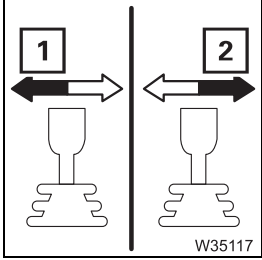
The display (1) shows the current telescoping – from left to right for telescopic sections I to VI. When the display is **orange** then the telescoping cylinder head is in this telescopic section.





### Telescoping cylinder position display

The bar (2) shows the telescoping length of the telescoping cylinder – the total bar length corresponds to 100%.



### Telescoping direction display

The display is only active when telescoping with teleautomation and shows the direction in which you must move the control lever for each respective telescoping direction.

- 1 Start with *Retract*
- 2 Start with *Extend*

▣▣▣▣ ➔ *Supplied operating manual*



### Current wind speed display

Shows the current wind speed in metres per second (m/sec) or miles per hour (mph). The display flashes in colour in the vicinity of the maximum permissible value ( $v_{max}$ ).

**Yellow:** approx. 90 - 100% of  $v_{max}$  reached

**Red:**  $v_{max}$  exceeded

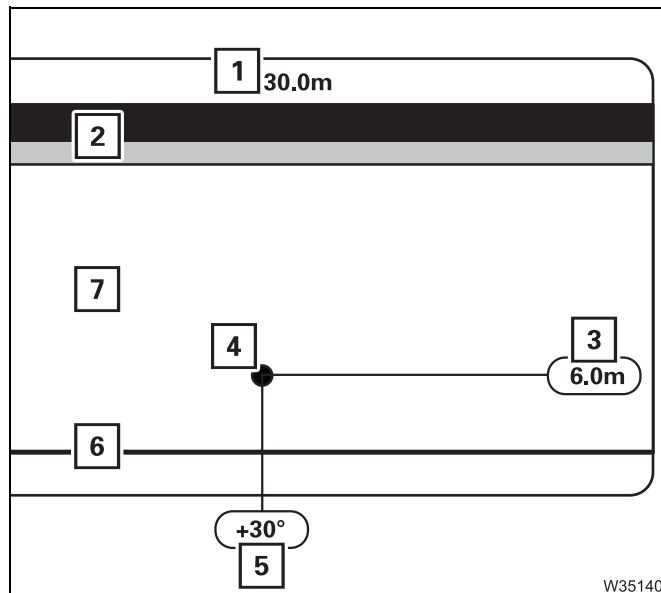
**On the CCS display**

After confirming a permissible rigging mode, the *Start menu* opens automatically.

**Standard slewing range type**

If the *MAXbase* slewing range type has been entered; |||▶ p. 10 - 55.

The RCL display differs according to the confirmed slewing range.



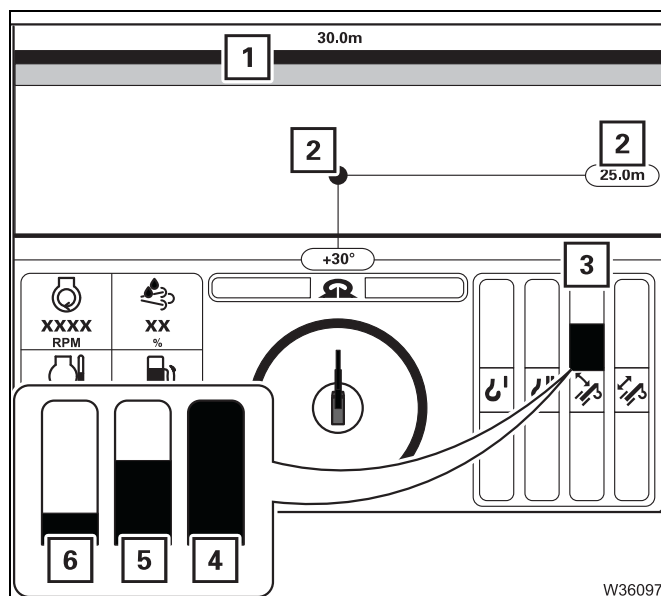
**360° slewing range**

The diagram (7) covers the entire width. The height of the diagram corresponds to the maximum permissible working radius (1), e.g. 30 m (100 ft).

The current position of the boom head is shown using the symbol (4) and defined by two displays.

- 3 Current working radius, e.g. 6 m (20 ft)
- 5 Current slewing angle, e. g. +30°

The shutdown ranges for the maximum working radius (2) and – if active – for the minimum working radius (6) are shown in colour.



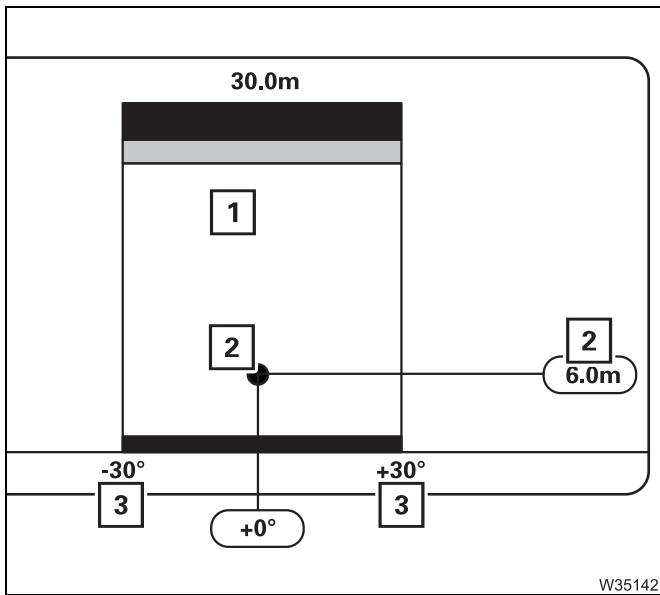
– When telescoping or derricking

The displays (2) move up and down to show the current working radius, e.g. 25 m (20 ft).

In a shutdown range (1) the movement towards the shutdown limit is continually reduced until reaching a standstill. The corresponding display (3) shows the current speed reduction, e.g. for lowering the boom.

- 4 Green: 26% to 100%
- 5 Yellow: 11% to 25%
- 6 Red: 0% to 10%





### Limited slewing range

The diagram (1) shows the enabled slewing range and the slewing range limits (3), e.g.  $+30^\circ$  and  $-30^\circ$ .

- When telescoping or derricking

The diagram (1) remains at the current position. The displays (2) move up or down.

Movements leading towards a shutdown limit are reduced in the same manner as with the  $360^\circ$  slewing range; p. 10 - 53.

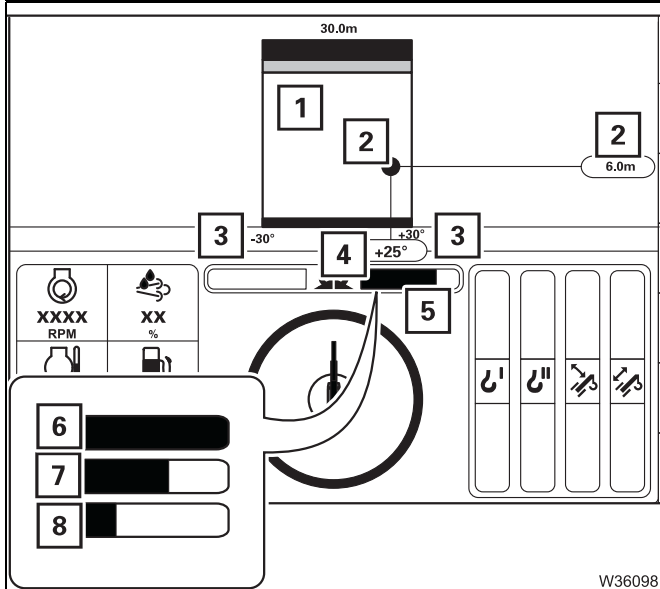
- When slewing

The displays (2) and (4) remain at the current position. The diagram (1) and the displays (3) move to the left or right.

Immediately before the slewing range limits (3), the movement leading towards a shutdown limit is continuously reduced until reaching a standstill.

The corresponding display (5) shows the current speed reduction, e.g. for slewing to the right.

- 6 Green:** 26% to 100%
- 7 Yellow:** 11% to 25%
- 8 Red:** 0% to 10%

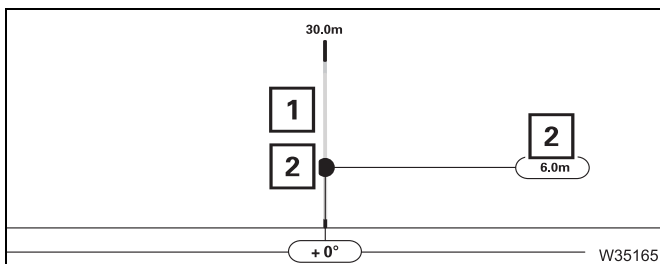


### Working position

The diagram (1) shows the working range, e.g.  $0^\circ$  to the rear.

- When telescoping or derricking

The diagram (1) remains at the current position. The displays (2) move up or down.



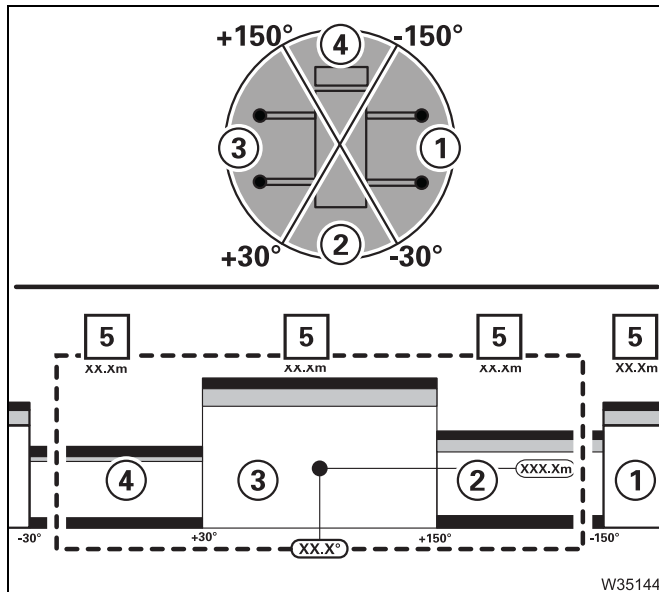
Movements leading towards a shutdown limit are reduced in the same manner as with the slewing ranges.

- Slewing is disabled.



### MAXbase slewing range type

If the *Standard* slewing range type has been entered;  p. 10 - 53.



### Display of the slewing ranges

The RCL display represents the four enabled slewing ranges ① to ④ in a diagram with four regions.

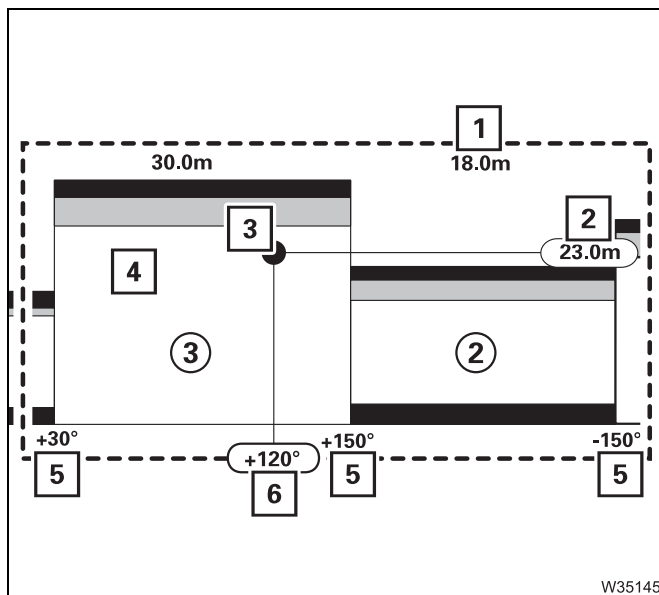
The maximum permissible working radius (5) is shown for each region.

Assume that the confirmed lifting capacity table applies to the angular ranges

–  $\pm 60^\circ$  to the left/right

–  $\pm 30^\circ$  to the front/rear

According to the definition for the slewing angle display ( $0^\circ$  to the rear) the slewing range limits would be  $-30^\circ/+30^\circ/+150^\circ$  and  $-150^\circ$ .




The RCL display shows an angular range of approx.  $200^\circ$ . The range of the diagram is always in the middle corresponding to the current slewing angle (6), e.g. the range ③ for  $120^\circ$ .

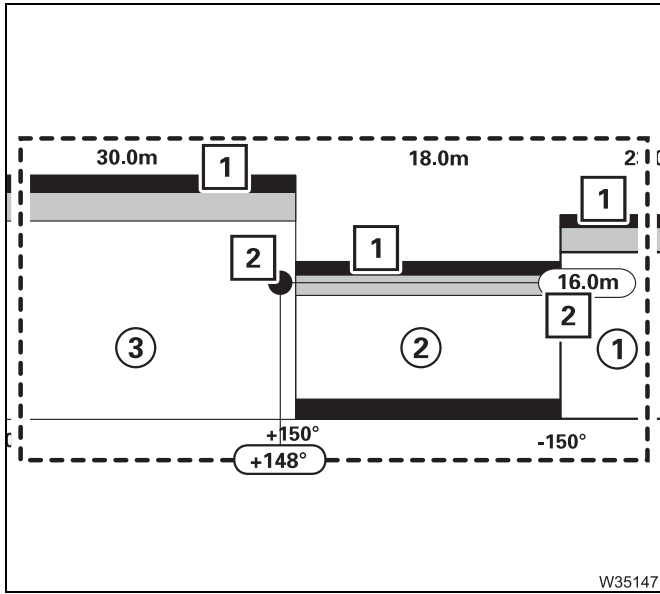
– When slewing

The displays (2), (3) and (6) remain at the current position. The diagram (4) and the displays (5) move to the left or right.

If the slewing movement would lead into a slewing range (1) in which the maximum permissible working radius is smaller than the current working radius (2), then the movement is continuously reduced until reaching a standstill.

The speed reduction occurs in the same manner as with the Standard slewing range type;  p. 10 - 54.





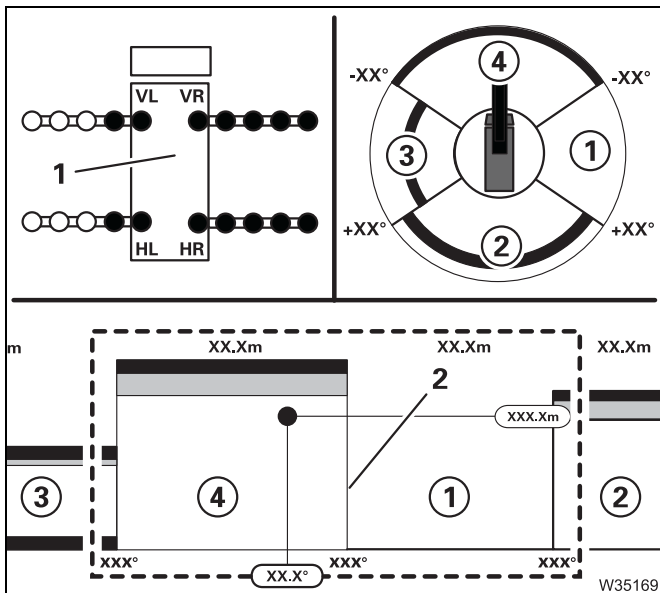
To enable the slewing movement, you must reduce the working radius correspondingly, e.g. to 16 m (52.5 ft) for slewing into slewing range ②.

– When telescoping or derricking

The diagram remains at the current position. The displays (2) move a corresponding distance up or down.

In a shutdown range (1) a movement towards the shutdown limit is continually reduced until reaching a standstill.

The speed reduction occurs in the same manner as with the Standard slewing range type; see p. 10 - 54.



### Special case – disabled range

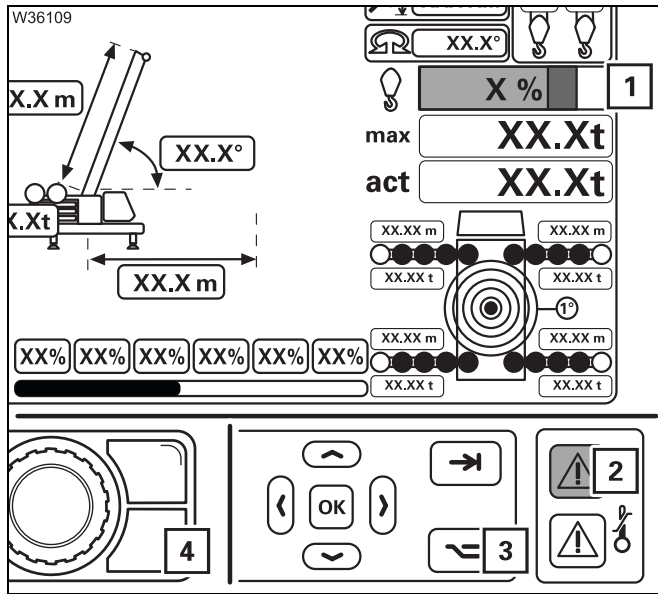
A slewing range can be disabled in certain cases.

If e.g. an outrigger span (1) is rigged and operations are to be performed at the right side, with large counterweight combinations, a small working radius and a small load it is possible for the stability towards the rear to become endangered within the slewing range ①.

The range ① in the diagram would then be empty and slewing out of range ④ would be stopped at the range limit (2).

In this case you can increase the working radius – assuming this is permitted by the enabled working range and the external conditions. If the required stability is then present, the slewing range ① is enabled and displayed.

## 10.4.7 RCL early warning



If about 90% of the maximum permissible load is exceeded, an RCL early warning will be issued.


- An intermittent buzzer tone sounds. After five seconds, you can switch off the buzzer tone using button (3) or (4).
- Lamp (2) lights up.
- The display (1) is in the yellow range.



If the current crane continues to move in the same direction, there will be an RCL shutdown.

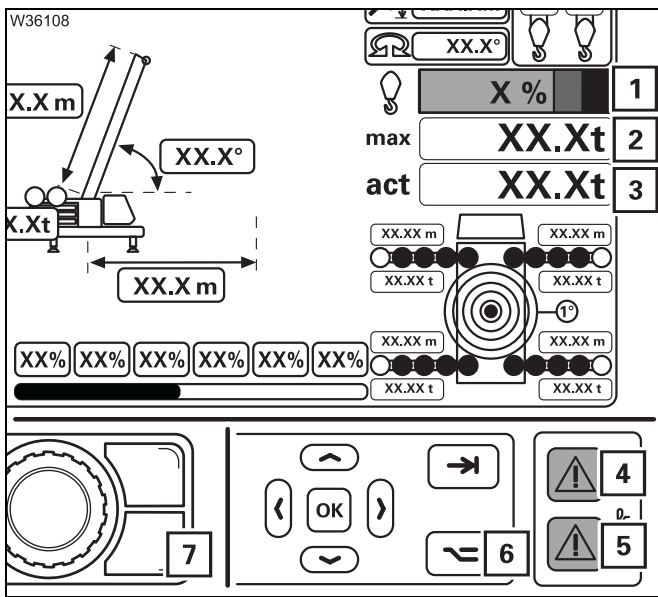
## 10.4.8 RCL shutdown

There are different types of RCL shutdowns

- shutdown due to overload,
- Shutdown due to an error;  p. 14 - 7.

### Shutdown due to overload

If approx. 100% of the maximum permissible load is exceeded, shutdown will occur due to overload.



- All crane movements which increase the load moment will be switched off.
- A continuous buzzer tone will sound. After five seconds, you can switch off the buzzer tone using button (6) or (7).
- Lamps (4) and (5) light up.
- The display (1) is in the red range.
- The value on display (3) is equal to or greater than the value on display (2).

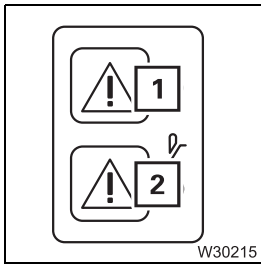
### Cancelling a shutdown

- Turn off the buzzer tone if necessary.
- Leave the shutdown range by moving the crane according to the following table.

Switched off crane movements	Permitted crane movements
Lift loads	Lower loads
Lower the main boom	Raising the main boom <sup>1)</sup>
Extend the main boom	Retracting the main boom <sup>1)</sup>
Slew to the left	Slew to the right
Slew to the right	Slew to the left
Lower the lattice extension	Raise the lattice extension



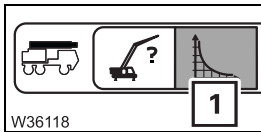
<sup>1)</sup> In some cases, the RCL will also switch off these movements. In this case, leave the shutdown range through other enabled movements. If this is not possible, set down the load.



The crane movements are released when you have left the shutdown area – lamps (1) and (2) go out.

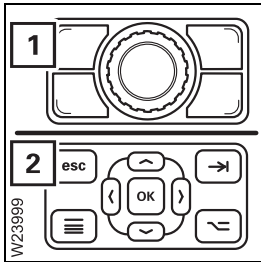
### 10.4.9

## Displaying the lifting capacity tables



### Open menu

- Open the *lifting capacity table* menu (1) on the CCS control unit.

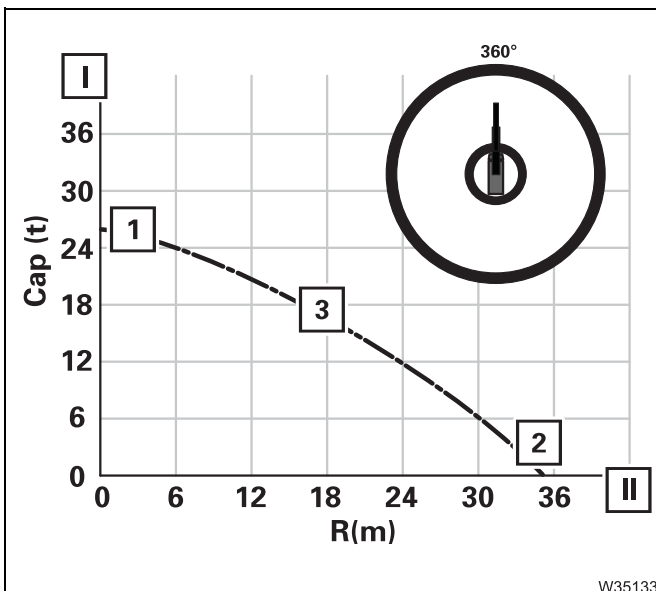


### Exiting the menu

- Press the button (1) or press the button (2) on the CCS control unit once – the Start menu opens.

### Standard slewing range type

If the *MAXbase* slewing range type has been entered; p. 10 - 61.



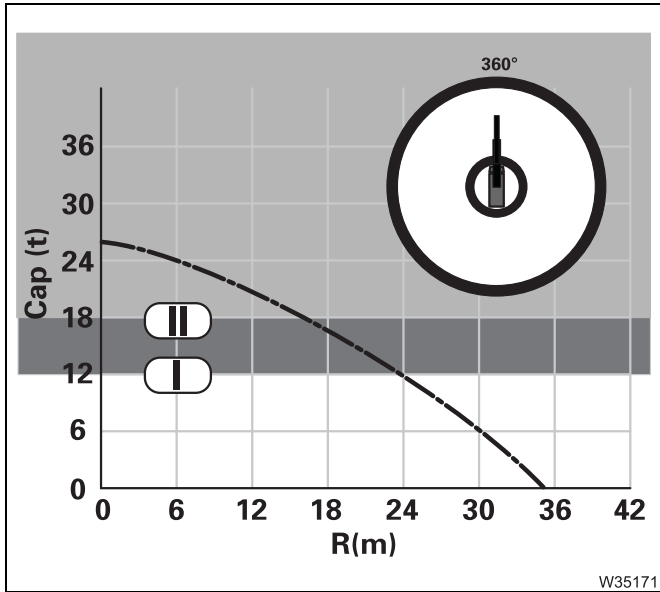
### Permissible working range display

The curve (3) applies to the displayed RCL code and the displayed telescope status.

- I Lifting capacity axis – in tons (t) or in kilopounds (klbs)
- II Working radius axis – in metres (m) or feet (ft)

The working range ends at the maximum possible working radius (2). Reduction of the working radius increases the enabled load along the curve (3) up to the maximum possible load (1).

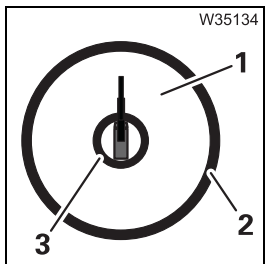




**Limitation due to reeving**

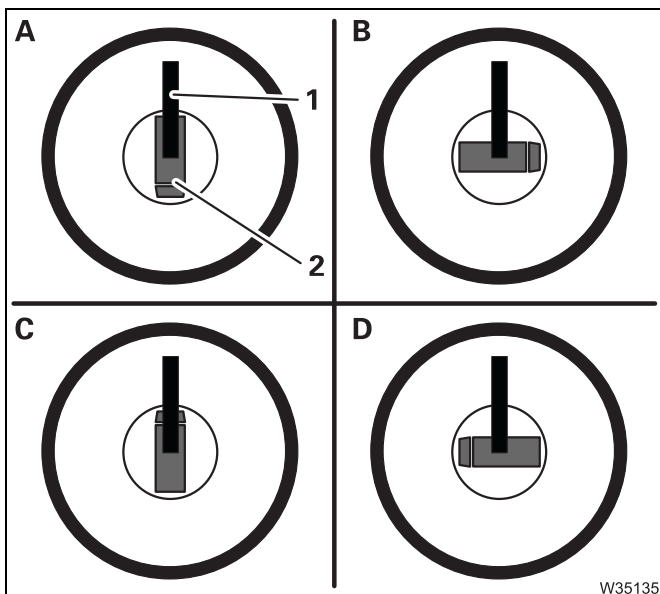
If the maximum load is limited due to the confirmed reeving then the disabled range is marked.

- I Display for main hoist, e.g. maximum load 12 t
- II Display for auxiliary hoist, e.g. maximum load 18 t



**Slewing range display**

- 1 Coloured: Enabled slewing range
- 2 Yellow/Red: Shutdown range for maximum working radius
- 3 White: Shutdown range for minimum working radius – display only when the lifting capacity table specifies a limitation




**When slewing**

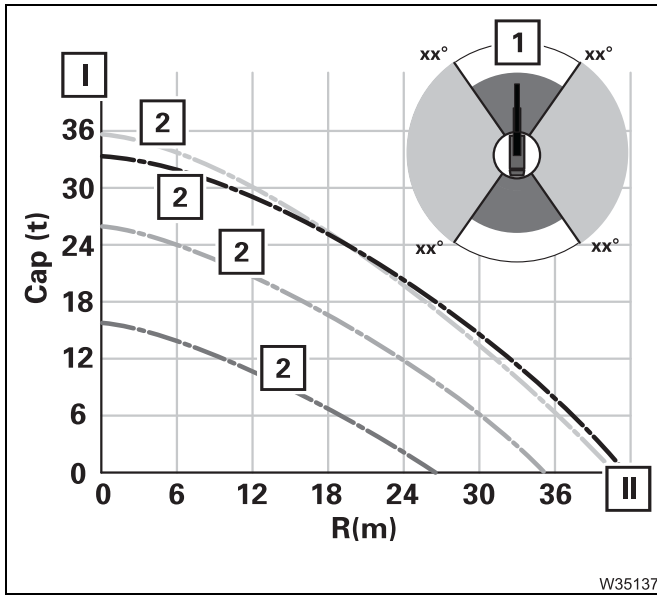
The symbol (1) for the superstructure always points upwards and does not move.

The symbol (2) for the carrier rotates to the position corresponding to the slewing angle.

Examples

- A Current slewing angle 0°
- B Current slewing angle +90°
- C Current slewing angle 180°
- D Current slewing angle -90°

**MAXbase slewing range type** If the *Standard* slewing range type has been entered;  p. 10 - 59.

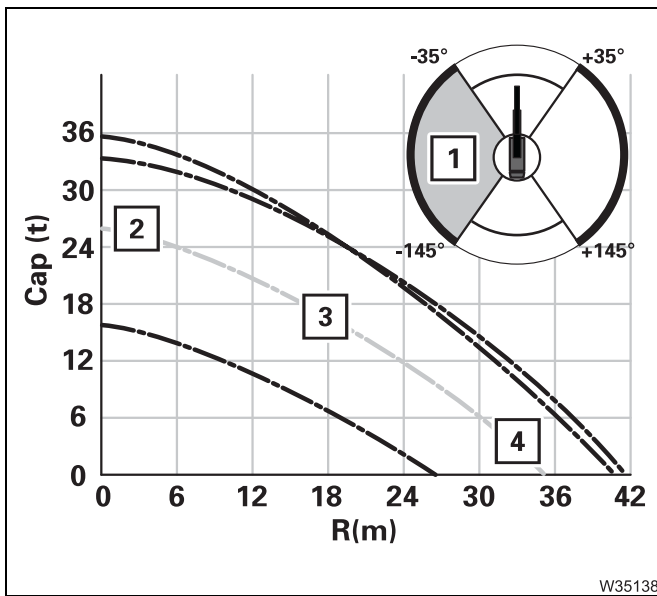


**Permissible working range display**

The displays apply to the confirmed rigging mode.

- 1 Slewing range display – four slewing ranges, marked in colour
- 2 Display of permissible working ranges – a coloured curve for each slewing range

- I Lifting capacity axis – in tons (t) or in kilopounds (klbs)
- II Working radius axis – in metres (m) or feet (ft)




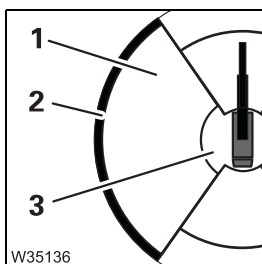
Example of a permissible working range

Assume that the slewing range (1) lies between -35° and -145°.

The corresponding curve has the same colour e.g. the curve (3).

The working range in slewing range (1) ends at the maximum possible working radius (4). Reduction of the working radius increases the enabled load along the curve (3) up to the maximum possible load (2).

There has to be enough reeving for this load. The speed reduction due to reeving occurs in the same manner as with the *Standard* slewing range type;  p. 10 - 60.

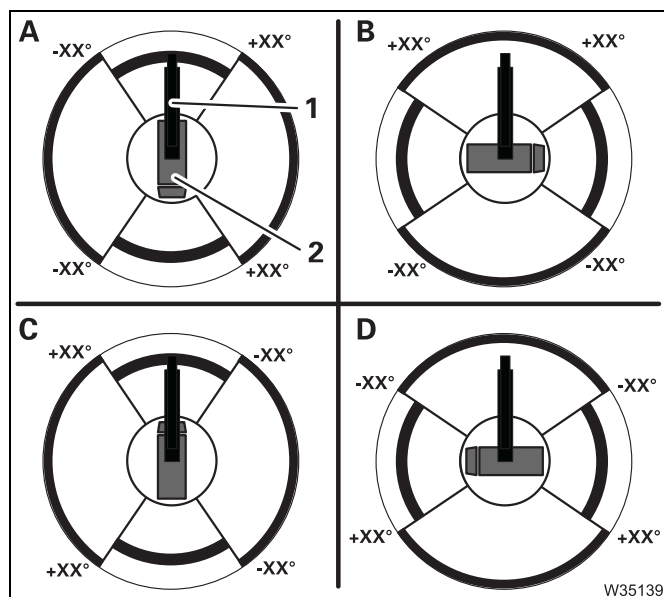


**Slewing ranges display**

The display is same in all four slewing ranges.

- 1 Coloured: Enabled slewing range, e.g. blue
- 2 Yellow/Red: Shutdown range for maximum working radius
- 3 White: Shutdown range for minimum working radius – display only when the lifting capacity table specifies a limitation





### When slewing

The symbol (1) for the superstructure always points upwards and does not move.

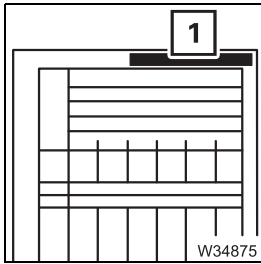
The symbol (2) for the carrier rotates together with the display of the slewing range division to the position corresponding to the slewing angle.

### Examples

- A Current slewing angle  $0^\circ$
- B Current slewing angle  $+90^\circ$
- C Current slewing angle  $+180^\circ$
- D Current slewing angle  $-90^\circ$



## 10.4.10 RCL override – version A



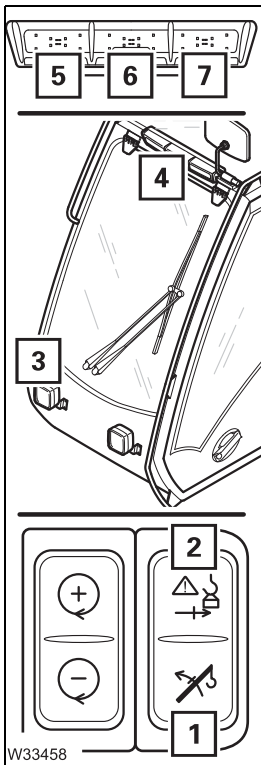
This section applies only when the supplied *lifting capacity table* contains the entry *EN 13000* in the header (1).

In the case of other entries; *RCL override – version B*, p. 10 - 67.

If the RCL is overridden, the crane operation is not monitored and the switched off crane movements are enabled again. Once the RCL is switched off, there are three options for overriding.

- **During rigging**, you can override the RCL shutdown or the lifting limit switch for rigging work; *When rigging*, p. 10 - 64.
- **You can leave the shutdown area** by enabling the raise boom function; *To raise the boom*, p. 10 - 65.
- **In an emergency** you can override the RCL shutdown completely; *In emergencies*, p. 10 - 66.

### Overview status display




The lamps (5) to (7) of the status display (4) light up or flash depending on the RCL degree of utilisation and button confirmations.

Switch pressed	Degree of utilisation		
	0 - 90%	approx. 90 - 100%	Greater than 100%
No switch (normal operation)	Display (5) <b>green</b>	Display (6) <b>yellow</b>	Display (7) <b>red</b>
Button (2) Overriding for rigging	Display (5) <b>green</b>	Display (6) <b>yellow</b>	Display (6) <b>yellow, flashing</b>
Button (1) Raising	Display (5) <b>green</b>	Display (6) <b>yellow</b>	Display (5) <b>green, flashing</b>
Key-operated switch (3) RCL override in case of emergency	Display (7) <b>red, flashing</b>	Display (7) <b>red, flashing</b>	Display (7) <b>red, flashing</b>



### When rigging

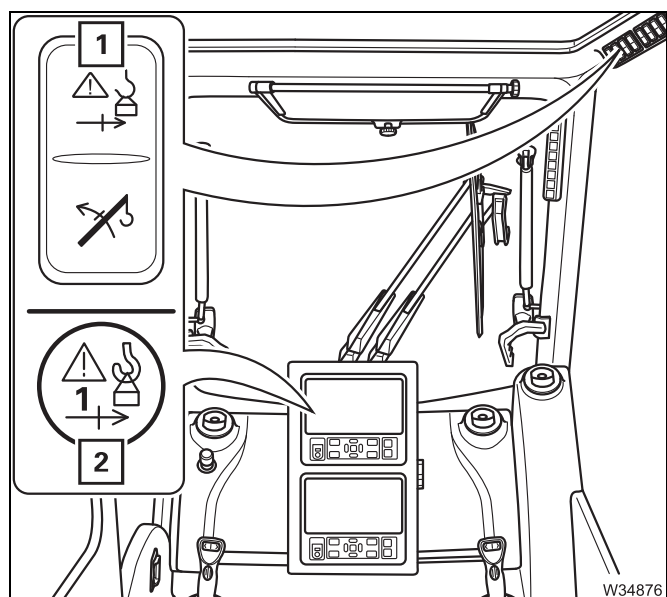
For rigging work, you can:

- override the lifting limit switch;  p. 10 - 83  
or
- override the RCL and thus enable a degree of utilisation of up to 110%.



#### **Risk of accidents if the RCL is overridden!**

It is not permitted to work with an overridden RCL!  
Use this type of override only for rigging.



#### **RCL override**

- Press the button (1) once – the information message (2) is displayed.
- Now a degree of utilisation of up to 110% is enabled.
- If you do not trigger a control lever movement within 10 seconds after the override, you must press the button (1) again.
- The speed of the movements which increase the load moment is reduced to 15%.

#### **Cancelling the override**

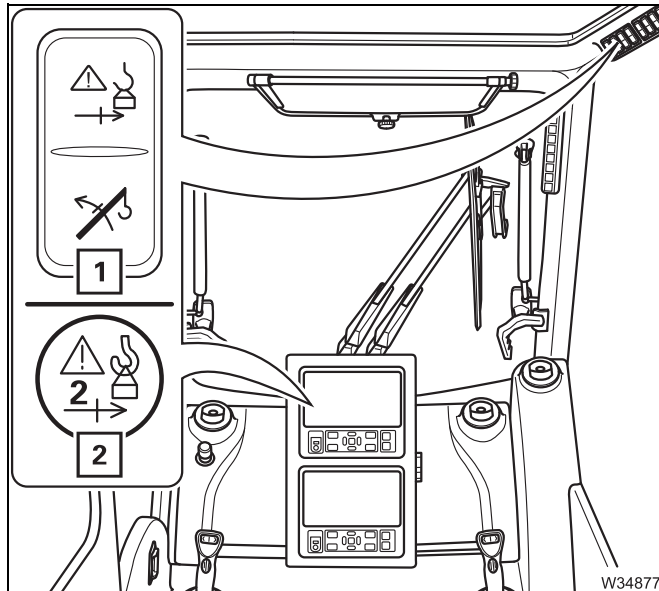
The override will be cancelled when you:

- press button (1) again, or
- do not activate the control lever for 10 seconds, or
- switch off the ignition.

**To raise the boom** You can release the raise boom function for derricking again within the permitted working range.



This function is only active if the current degree of utilisation lies above 100% and the crane movements are switched off.



### Raise main boom

- Press the button (1) once – the information message (2) is displayed.
  - Raising is enabled.
  - The speed will then be reduced to 50%.
- Raise the main boom until the degree of utilisation is less than 100%.
  - The crane movements will then be enabled again.
  - The button (1) has no function.



The raising of the main boom will be shut down if the main boom angle is too great. Then all you can do is set the load down.

### Switch off function

- For degree of utilisation above 100%

The function will be switched off if you:

  - press button (1) again, or
  - switch off the ignition.
- For degree of utilisation below 100%

The function is switched off automatically.



### In emergencies

During this type of override, the complete shutdown of the RCL is cancelled and no monitoring takes place.

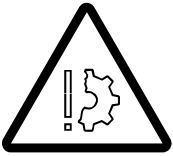


#### **Risk of accidents due to overridden or faulty RCL!**

It is not permitted to work with an overridden or faulty RCL!

Set down the load immediately and stop operating the crane if the RCL is faulty!

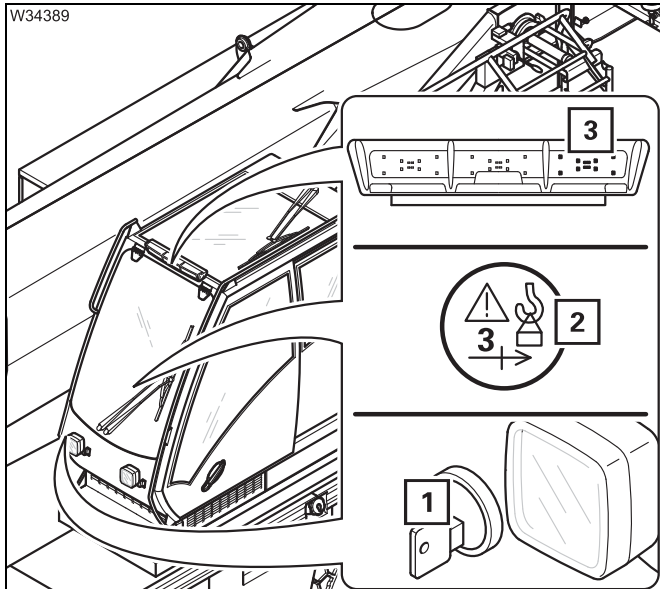
You may only override the RCL if it becomes absolutely necessary in the event of an emergency. This is to put the truck crane into a safe state in the event of a malfunction. In this case, do not perform any movements that would increase the load moment.



#### **Risk of accidents due to unintentional override!**

The key must not remain in the key-operated switch while the crane is operating!

This prevents the RCL from overriding unintentionally.



### labelling a shutdown

- Insert the key into the key-operated switch (1).
- Turn the key to the left or right once. The status display (2) flashes red. The information display (2) appears.
  - All crane movements are enabled for 30 minutes.
  - The power unit speeds are reduced to 15%.
  - At a degree of utilisation over 110% the warning signal will sound.

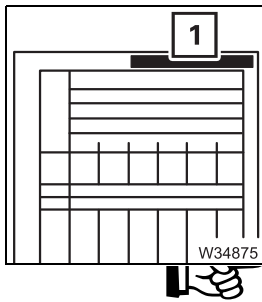
### labelling the override

The override will be cancelled when you:

- Switch off the ignition
- Press the key-operated switch again.

The override will automatically be cancelled 30 minutes after the key-operated switch has been pressed.

## 10.4.11 RCL override – version B



This section applies only when the supplied *lifting capacity tables* contain an entry other than *EN 13000* in the header (1), e.g. the entry *ASME*.

For standard *EN 13000*; *RCL override – version A*, p. 10 - 63.

The information in this section only applies when the *Standard* slewing range type is activated. When the *MAXbase* slewing range type is active, the system automatically switches to RCL override Version A; p. 10 - 63.

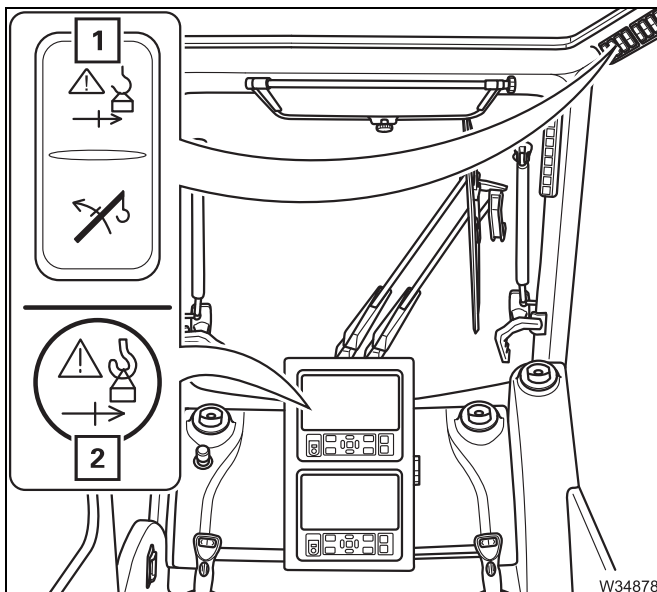


### Risk of accidents due to overridden or faulty RCL!

It is not permitted to work with an overridden or faulty RCL!

Set down the load immediately and stop operating the crane if the RCL is faulty!

You may override the RCL only if it becomes absolutely necessary to do so in the event of an emergency. This is to put the truck crane into a safe state in the event of a malfunction. In this case, do not perform any movements that would increase the load moment.



### RCL override

- Press the button (1) once – the information message (2) is displayed.
  - The crane movements are enabled.
  - If you do not trigger a control lever movement within 10 seconds after the override, you must press the button (1) again.
  - The speed of the movements which increase the load moment is reduced to 15%.

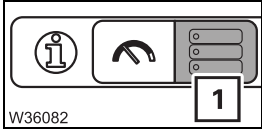
### Cancelling the override

The override will be cancelled when you:

- press button (1) again, or
  - do not activate the control lever for 10 seconds, or
- switch off the ignition.

## 10.4.12 Datalogger

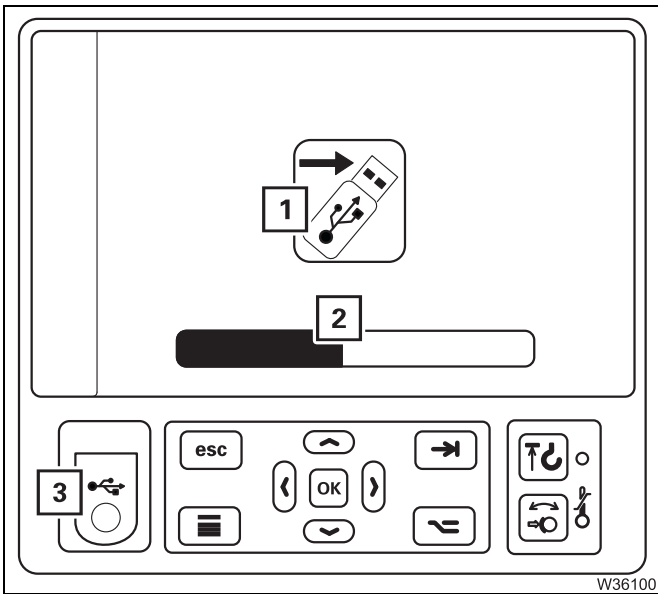
You can export data from the CCS crane control system to a USB stick and display this on a PC using the *CraneEvaluation* program supplied.



- Open the *Data logger* menu (1).

### Export data

You require a USB Stick (USB 2.0 / FAT32 file system / approx. 500 MB free capacity is recommended).



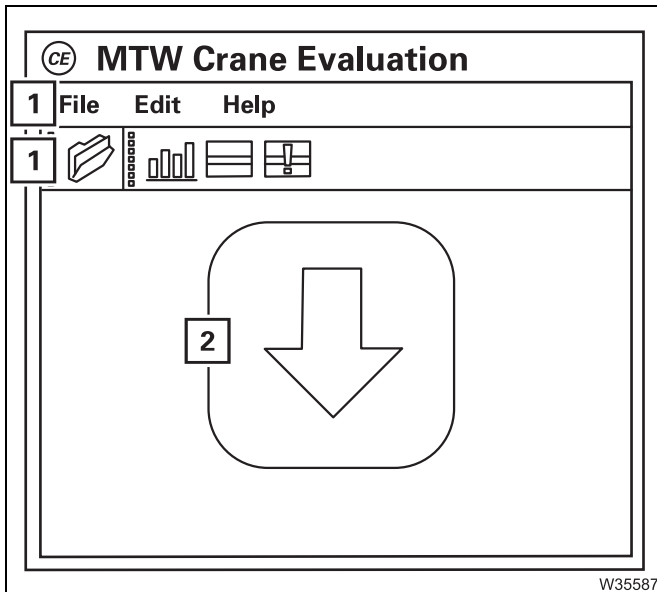
### Export data

- Plug the USB stick into the connection (3) on the *RCL control unit*. The symbol (1) is activated.
- Select and confirm the symbol (1). The display (2) shows the export progress.

All exported files are named with the serial number, start time and end time. Files with various different suffixes are exported.

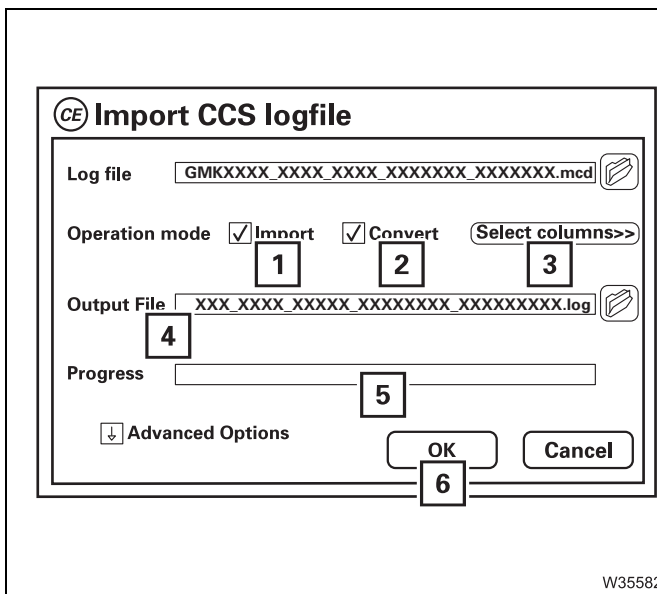
<b>xxx.mcd</b>	Contains all exported data – can only be opened with the <i>CraneEvaluation</i> program.
<b>xxxCraneFault.csv</b>	Contains all exported error messages – can be opened (e.g.) with Excel.

**Display the data** You need the *CraneEvaluation* program in order to display the exported data. The installation program is located in the *CraneEvaluation* folder on the Owner's USB stick supplied.



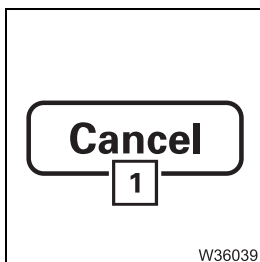
**Import data**

- Start the *CraneEvaluation* program.
- Drag the file **xxx.mcd** onto the symbol (2) or open the file via a command (1).



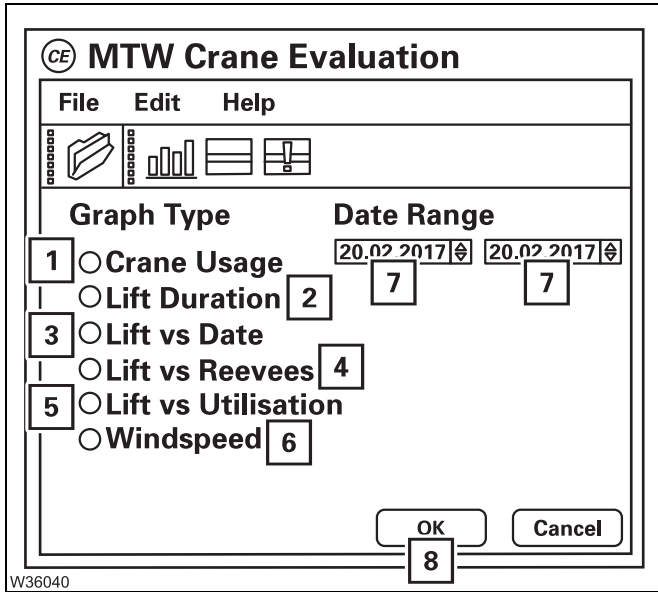
An Import window with various settings is displayed.

- 1 *Import* – the data is imported for display in the program.
  - 2 *Convert* – the data is saved in a log file that can be opened with (e.g.) Excel.
  - 3 *Select Columns* – with the default setting, all available data is imported. The menu allows individual selection.
  - 4 *Output File* – Storage location for the log file
- Confirm the selection via the symbol (6) – the display (5) shows the import progress.



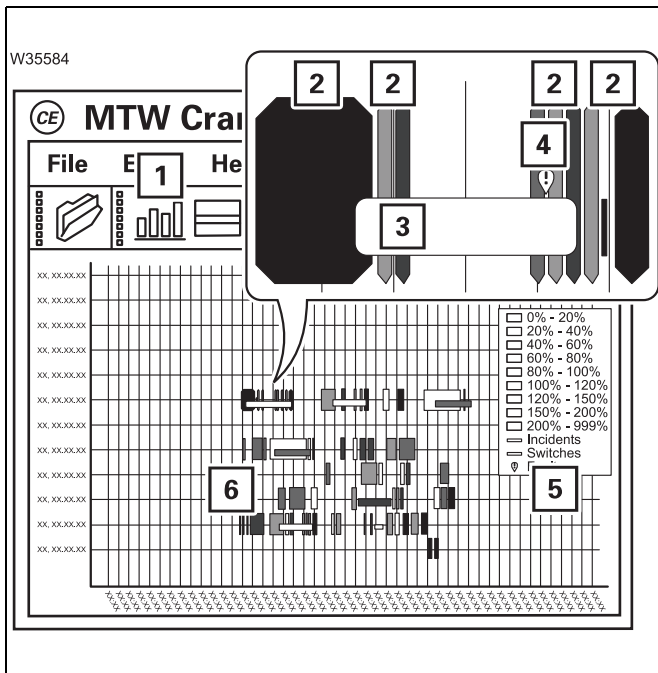
A graphical selection window opens. If you do not wish to select a graph, you can simply close the window – symbol (1); ➡ *Displaying tables*, p. 10 - 71.





### Displaying the graphic

- Select the desired period (7) and desired graphic.
  - 1 Crane use (offers the greatest variety of information)
  - 2 Lifting duration per utilisation area
  - 3 Number of lifts per day
  - 4 Number of lifts per reeving
  - 5 Number of lifts per utilisation area
  - 6 Wind speed for each day
- Confirm the selection via the symbol (8).



The selected graphic is displayed, e.g. the *Crane use* graphic.

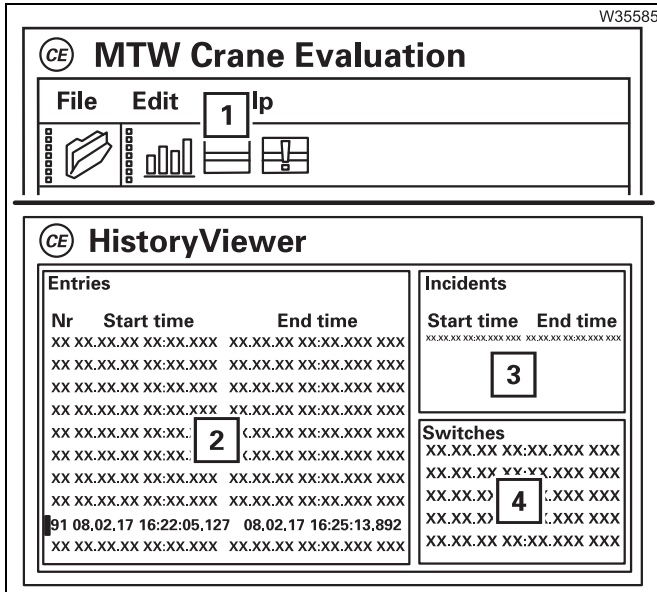
All lifts are shown as bars (2) – coloured according to the utilisation area. Events and actuates switches are shown as narrow, framed bars (3). Errors are shown as symbols (4).

The legend (5) defines the assignments of the colours and symbols. You can hide and reveal symbols in the graphic by clicking in the legend.

Clicking with the left mouse button provides more details (6) on an element.

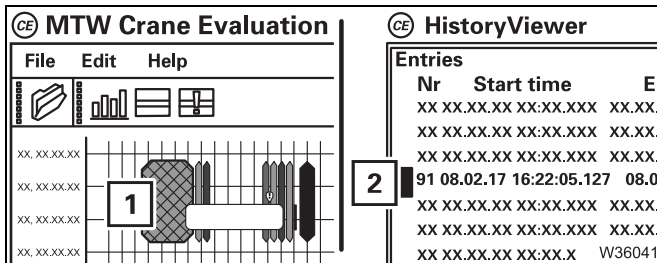
Use the symbol (1) to open the graphic selection window.





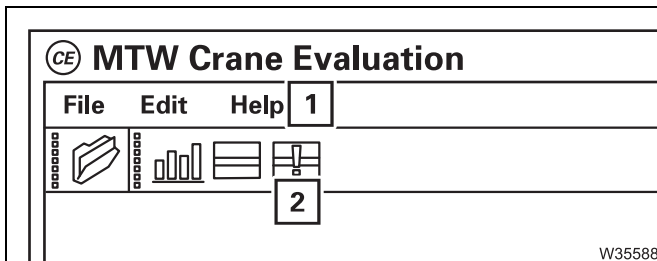
### Displaying tables

- Select the symbol (1) – a table is displayed.
- 2 List with all lifts
- 3 List with all events
- 4 List with all actuated switches



When the *Crane use* graphic is also open, an element is displayed and marked in the respective other window when clicked.

- 1 Graphical marking
- 2 Tabular marking



### Display the error list

- Select the symbol (2) – a table showing all imported errors is displayed.

### Other

Select the command (1) for further information.

Blank page

## 10.5

## Crane operation with main boom

### 10.5.1

### Checks during crane operation

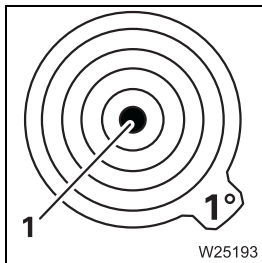
#### Horizontal alignment

During crane operation, the truck crane may tilt if the ground gives way due to varying loads.



#### Risk of accidents if the truck crane is not level!

The RCL calculates the working radius from the length and angle of the main boom. The actual working radius changes and there is a danger of the crane overturning if the truck crane is not level!



- Check the horizontal alignment of the truck crane during crane operation on the display (1); p. 11 - 58.

Due to deformation of the frame, the horizontal alignment can change by up to 2° when the superstructure is turned from the 0° or 180° position. If the truck crane does not return to the horizontal position after being turned back to the 0° or 180° position, you must immediately determine the cause and eliminate it and, if necessary, realign the crane. Observe the position of the superstructure when doing so; *Levelling the truck crane on outriggers*, p. 11 - 58.

#### Safe distances

During crane operation, always ensure that the truck crane and the load are at a sufficiently large distance to objects and persons. Pay particular attention to objects that pose a direct danger (e.g. gas containers or scaffolding).

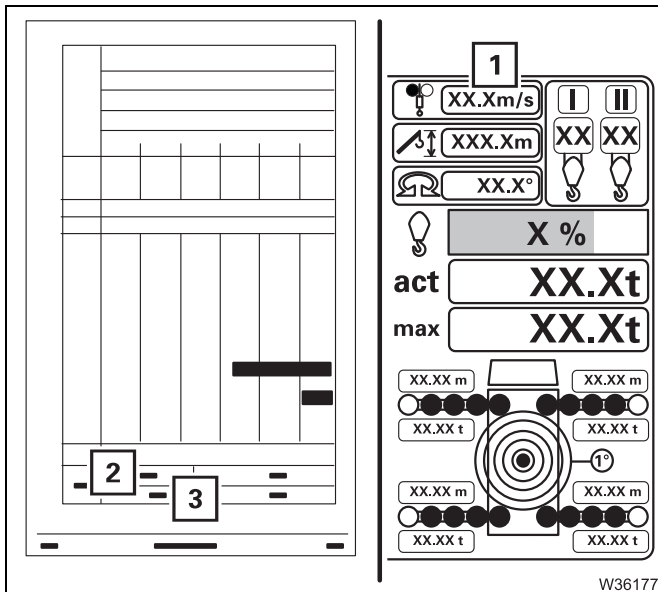
Keep a safe distance away from electrical lines; *Safe distance from overhead power lines*, p. 11 - 14.



**Checking  
the wind speed**

Strong winds can result in the truck crane becoming overloaded.

- Prior to and during crane operation, check whether the current wind speed is lower than the maximum permissible wind speed.



The display (1) shows the current wind speed.

The maximum permissible wind speed (2) or the reduced wind speed (3) specified in the *lifting capacity table* applies to the confirmed rigging mode.

The display (1) flashes in colour in the vicinity of the maximum permissible value  $v_{max}$  (2) or (3).

- **Yellow:** approx. 90 - 100% of  $v_{max}$  reached
- **Red:**  $v_{max}$  exceeded

If an anemometer is not available, or in the event of a fault, you can find out which speeds are forecast by contacting the relevant weather stations.

The *lifting capacity table* contains an overview of the wind strengths, wind speeds and their effects.

**If the maximum permitted wind speed is exceeded**

An automatic shutdown does not occur if the maximum permissible wind speed is exceeded.

- Immediately cease crane operation.
- Put the truck crane into the rigging mode specified for the current wind speed in the *lifting capacity table*.



**Risk of accidents due to excessively high wind speeds!**

If the current wind speed is higher than the maximum permissible wind speed, cease crane operation immediately and set up the corresponding rigging mode.

This will prevent the truck crane from overturning due to overload.

## 10.5.2

### Main hoist

You can reeve the hoist rope of the main hoist on the main boom or on the lattice extension.



#### **Risk of accidents from accidentally operating a hoist!**

Always switch off the hoist that is not in use!

Never operate the hoist if the hook block is unreeled and the hoist rope is completely wound onto the drum.

- The rope will slacken in the course of the *Lower* movement. Rope loops will form, which can cause the load to slip and damage the hoist rope.
- The switch-off point of the lowering limit switch shifts in the course of the *Raise* movement. The lowering limit switch will lose its function as a safety device.



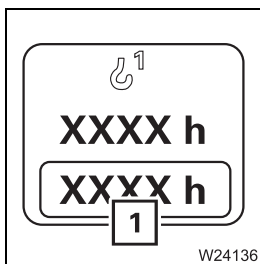
#### **Risk of accidents when raising loads at an angle!**


Loads can cause the main boom to bend, resulting in the hoist rope no longer being aligned in a vertical position. Compensate for the bend by lowering the boom so that the load will be lifted vertically. In this way, you can prevent the load from dragging and helpers from being injured. Inform all helpers about this issue.



#### **Danger due to slack rope!**

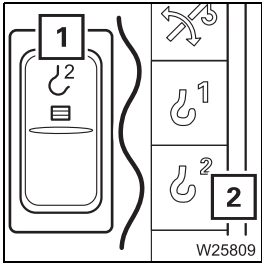
Only use hook blocks and sling gear of the minimum weight prescribed in the *Lifting capacity table* depending on the reeving and boom length. This prevents slack rope developing at large heights when lifting without a load. This can result in the load slipping during subsequent lifting procedures.



You can display the operating hours (1) of the hoist;  p. 10 - 130.

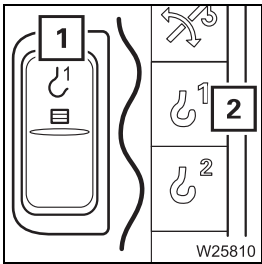


### Switching on the main hoist

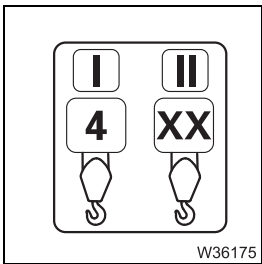


After the ignition is switched on, all of the power units will be switched off and the lamps in the corresponding buttons will light up only dimly.

- Check whether the auxiliary hoist is switched off and therefore secured against unintentional operation.
  - The lamp in button (1) should light up only dimly.
  - Symbol (2) must be **red**.



- Press the button (1) once.
  - The lamp in button (1) lights up brightly.
  - Symbol (2) is **green** when the main hoist is switched on.



- Check that the current reeving of the main hoist is displayed, e.g. 4. Correct the reeving if necessary; p. 10 - 39.

### Lifting and lowering

You can adjust the sensitivity of the control levers to suit the operating conditions; *Setting the characteristic curves for the control levers*, p. 10 - 126.



#### Risk of accidents due to gaps in monitoring!

Operation of the hoist will only be monitored fully if:

- the lifting limit switch is correctly installed; p. 11 - 120,
- the lifting limit switch is not overridden; p. 10 - 82,
- the lowering limit switch is correctly set; p. 10 - 82.




#### Risk of accidents due to suspended loads!

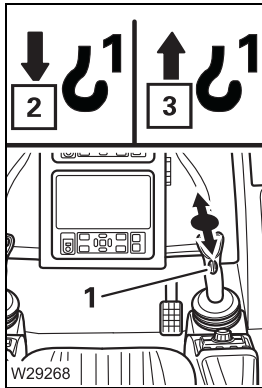
Never switch off the engine whilst a load is suspended. You must have the control levers at hand in order to intervene at any time.

Always set down the load before you leave the crane cab.

### Maximum permissible hoist rope speed

The maximum permissible hoist rope speed is limited automatically depending on the degree of utilisation of the lifting capacity. The scale of the limitation is specified in the supplied lifting capacity table.

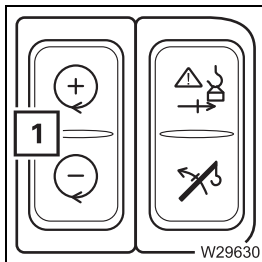
The current speed reduction is displayed in the start menu;  *RCL display*, p. 8 - 20.




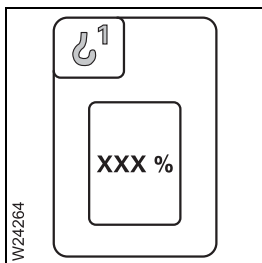
- Raise:** Pull the control lever to the rear – symbol **(3)** is displayed.
- Lowering:** Pull the control lever to the front – symbol **(2)** is displayed.


When the hoist drum is turning, you will notice a pulse on the slewing indicator **(1)**.

You can regulate the speed by moving the control lever and changing the engine speed with the accelerator.

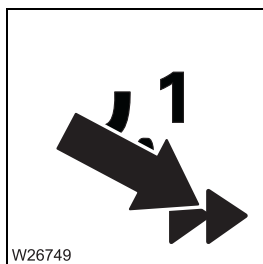



You can adjust the desired engine speed (idling speed) with button **(1)**;  p. 9 - 7.



You can limit the maximum hoist speed;  p. 10 - 123.

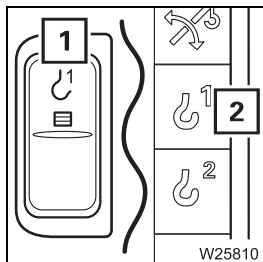




You can switch on the high-speed mode for a higher speed;  p. 10 - 113.

### Switching off the main hoist

If you no longer require the main hoist, you should switch it off to avoid unintentional use.



- Press the button (1) once.
  - The lamp in the button (1) lights up dimly.
  - Symbol (2) is **red** when the main hoist is switched off.



### 10.5.3

## Auxiliary hoist



### Risk of accidents when operating the auxiliary hoist!

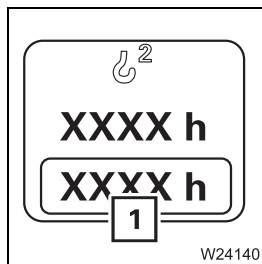
Read and observe all of the safety instructions in the section *Main hoist*, p. 10 - 75 before operating the auxiliary hoist.

All safety instructions for the operation of the main hoist also apply to the auxiliary hoist, along with the information in this section.



### Risk of accidents due to a damaged hoist rope!

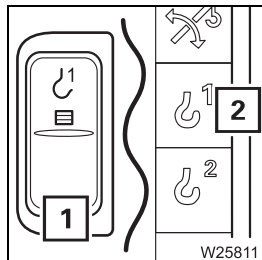
If you reeve the auxiliary hoist rope in addition to the main hoist rope, make sure the hoist ropes do not rub against each other and that the auxiliary hoist rope does not touch the rotating flanged wheel of the main hoist during subsequent operation.



You can display the operating hours (1) of the hoist; p. 10 - 130.

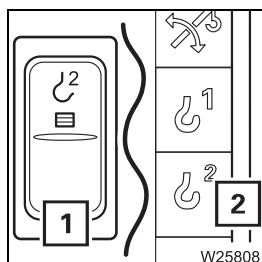
### Switching on the auxiliary hoist

After the ignition is switched on, all of the power units will be switched off and the lamps in the corresponding buttons will light up only dimly.



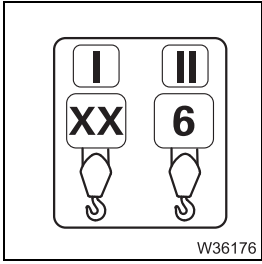
- Check whether the main hoist is switched off and therefore secured against unintentional operation.

- The lamp in button (1) should light up only dimly.
- Symbol (2) must be **red**.



- Press the button (1) once.
  - The lamp in button (1) lights up brightly.
  - Symbol (2) is **green** when the auxiliary hoist is switched on.





- Check whether the current reeving of the auxiliary hoist is displayed, e.g. **6**. Correct the reeving if necessary; p. 10 - 39.

### Lifting and lowering

You can adjust the sensitivity of the control levers to suit the operating conditions; *Setting the characteristic curves for the control levers*, p. 10 - 126.



#### Risk of accidents due to gaps in monitoring!

Operation of the hoist will only be monitored fully if:

- the lifting limit switch is correctly rigged; p. 11 - 120,
- the lifting limit switch is not overridden; p. 10 - 82,
- the lowering limit switch is correctly set; p. 10 - 82.



#### Risk of accidents due to suspended loads!

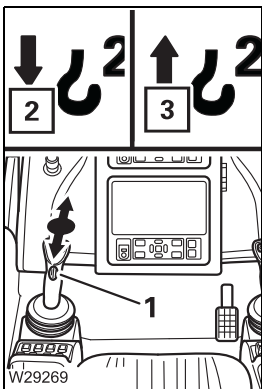
Never switch off the engine whilst a load is suspended. You must have the control levers at hand in order to intervene at any time.

Always set down the load before you leave the crane cab.

### Maximum permissible hoist rope speed

The maximum permissible hoist rope speed is limited automatically depending on the degree of utilisation of the lifting capacity. The scale of the limitation is specified in the supplied lifting capacity table.

The current speed reduction is displayed in the start menu; *RCL display*, p. 8 - 20.

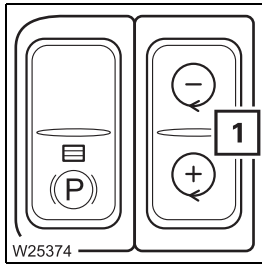


**Raise:** Pull the control lever to the rear – symbol **(3)** is displayed.

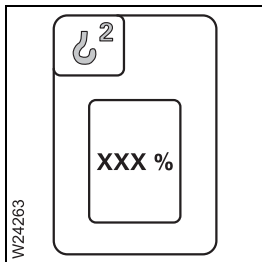
**Lowering:** Pull the control lever to the front – symbol **(2)** is displayed.

When the hoist drum is turning, you will notice a pulse on the slewing indicator **(1)**.

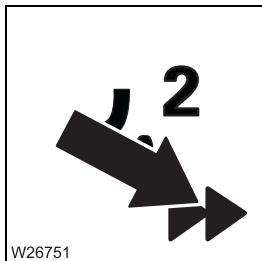
You can regulate the speed by moving the control lever and changing the engine speed with the accelerator.



You can adjust the desired engine speed (idling speed) with button (1);  
➡ p. 9 - 7.



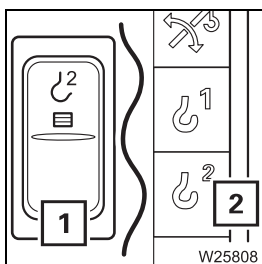
You can limit the maximum hoist speed; ➡ p. 10 - 123.



You can switch on the high-speed mode for a higher speed; ➡ p. 10 - 113.

### Switching off the auxiliary hoist

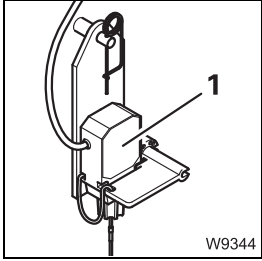
If the auxiliary hoist is not required, it should be switched off to avoid unintentional use.



- Press the button (1) once.
  - The lamp in the button (1) lights up dimly.
  - Symbol (2) is red when the auxiliary hoist is switched off.

## 10.5.4 Lifting limit switch and lowering limit switch

**Lifting limit switch** To install/remove the lifting limit switch;  p. 11 - 120.



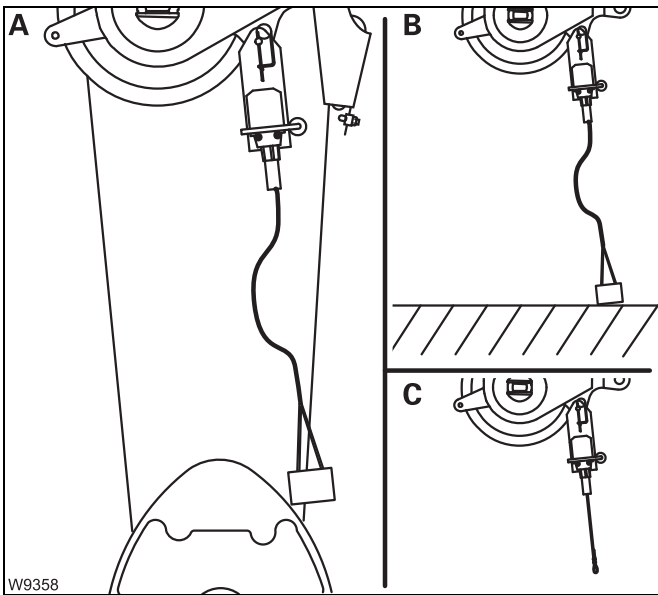
The lifting limit switch (1) prevents the hook block from being lifted up to the main boom head and damaging it.

The lifting limit switch only works if it has been unlocked;  p. 11 - 125.



### Risk of accidents due to intentionally triggering the lifting limit switch!

Always complete the hoisting operation (and extending) before raising the lifting limit switch weight. If the lifting limit switch is lifted at too great a speed, the hook block may swing into the main boom head and damage the head sheaves and the hoist rope.



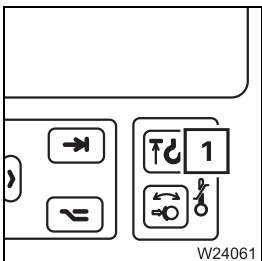
The lifting limit switch will be triggered if:

(A) – the hook block raises the lifting limit switch weight or

(B) – the lifting limit switch weight touches the ground upon lowering or

(C) – the lifting limit switch weight is not attached.

The lifting limit switch will not trigger if it is locked.



The lamp (1) will light up if the lifting limit switch has been triggered. At the same time, all movements which would increase the load moment will be switched off – *Lift, Lower, Extend* and *Derrick lattice extension* if necessary.

To cancel the shutdown, leave the shutdown range by performing a different crane movement or by setting down the load.

### Lifting limit switch override

When overriding, the shutdown of the lifting limit switch is cancelled and the crane operation is no longer completely monitored.



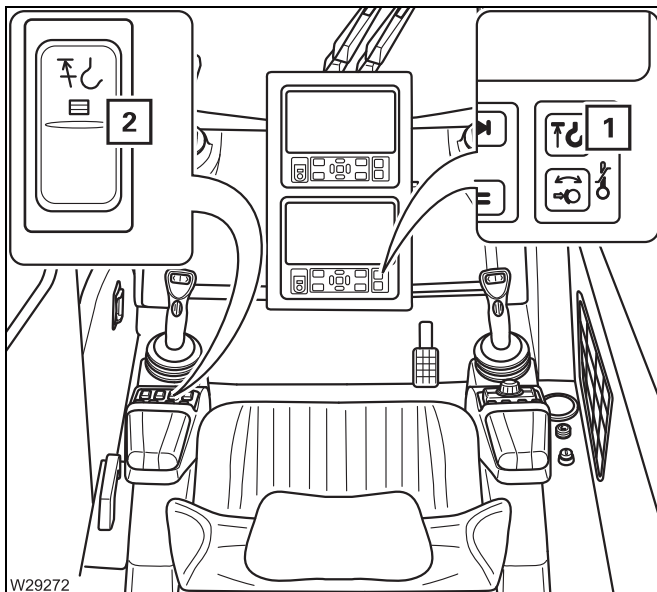
#### Risk of accidents if the lifting limit switch is overridden!

You may override the lifting limit switch only if this is specified in the operating instructions for carrying out maintenance or rigging work. With the lifting limit switch overridden, you may drive only at the minimum speed and without a load.



#### Risk of accidents due to gaps in monitoring!

If the lifting limit switch is overridden, crane operation is no longer completely monitored. When hoisting the lifting limit switch weight, the crane movement will be stopped once. After moving the control lever again, the crane movement will again be enabled and will not be switched off again.



- Press the button (2)
  - Lamp (1) flashes.
  - A buzzer tone sounds.

If the lifting limit switch is triggered now, the crane movement is stopped **once**.

The stopped crane movement is enabled again if you bring the control lever to zero position and then move it again.

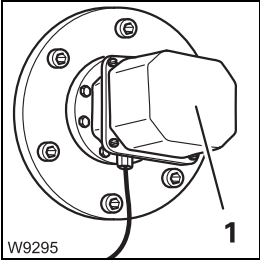
This crane movement will now not be stopped again.

#### labelling the override


- Release the button (2) or leave the shutdown range.
  - The lamp (1) goes out.
  - The buzzer tone is switched off.



## Lowering limit switch



The lowering limit switch (1) prevents the hoist rope from being reeled completely off the drum.

The lowering limit switch works only if the switch-off point is set correctly (e.g. after changing a hoist rope);  *Maintenance Manual*.



### **Risk of accidents due to incorrect setting or intended triggering!**

Prior to operating the crane, ensure that the lowering limit switch is set correctly and always complete the lowering operation before the lowering limit switch is triggered.

This prevents the hoist rope from becoming damaged due to complete unreeling or switching off at high speeds, and the load being dropped as a result.



### **Risk of accidents from incorrect setting of the lowering limit switch!**

Always re-adjust the lowering limit switch if you unreel hoist rope from the stationary rope drum. The lowering limit switch does not record the number of these winds.

This prevents the lowering limit switch from switching off too late or not switching off at all, the hoist rope from being damaged and the from load being dropped.

## 10.5.5

### Derricking gear

You can raise and lower the main boom.

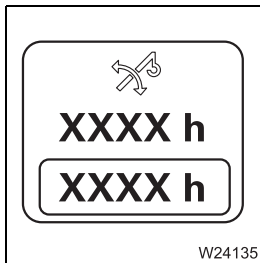
Depending on the size of the load and the rigging mode, the RCL will switch off the lowering process of the boom as soon as leaving the working area specified in the *Lifting capacity table*.



#### **Danger of overturning when lifting loads!**

It is prohibited to lift loads by raising the boom, since the RCL does not monitor this procedure!

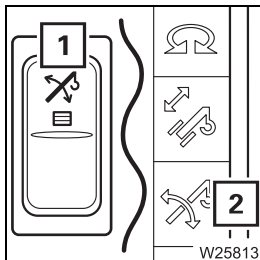
Raising the boom is a movement that reduces the load moment and that is not switched off by the RCL. However, raising the boom is the movement which can cause the truck crane to overturn if the load lifted is too heavy.



You can display the operating hours of the derricking gear; p. 10 - 130.

#### **Switching on the derricking gear**

After the ignition is switched on, all of the power units will be switched off and the lamps in the corresponding buttons will light up only dimly.



- Press the button (1) once.
  - The lamp in button (1) lights up brightly.
  - Symbol (2) is **green** when the derricking gear is switched on.

If the control lever is assigned more than one function, all other power units which are assigned the same control lever movement are switched off; *Control lever configuration*, p. 8 - 14.


#### **Maximum permissible derricking speed**

The maximum permissible derricking speed is limited automatically depending on the system length. The scale of the limitation is specified in the supplied lifting capacity table.

The current speed reduction is displayed in the start menu; *RCL display*, p. 8 - 20.



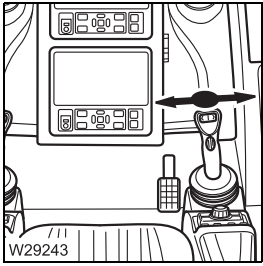
## Raising and lowering

You can adjust the sensitivity of the control levers to suit the operating conditions;  *Setting the characteristic curves for the control levers*, p. 10 - 126.



### Risk of accident due to unexpected crane movements!

If assigned more than one function, check that the *Derricking* control lever function is switched on before you move the control lever for derricking. This prevents accidents due to unexpected crane movements.



**Lowering the boom:**

Push the control lever to the right – the main boom is lowered.

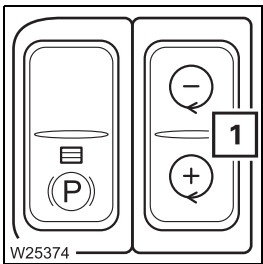
**Raising the boom:**


Push the control lever to the left – the main boom is raised.

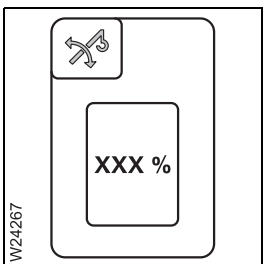
You can regulate the speed by moving the control lever and changing the engine speed with the accelerator.




The maximum derricking speed will automatically be reduced as the system length is increased. If you now reduce the working radius (e.g. by retracting the telescoping), the derricking speed will automatically be increased again.

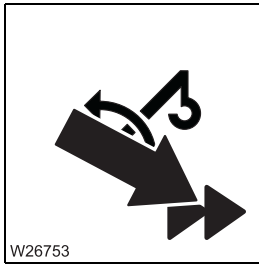


You can adjust the desired engine speed (idling speed) with button (1);  p. 9 - 7.



You can limit the maximum derricking speed;  p. 10 - 123.

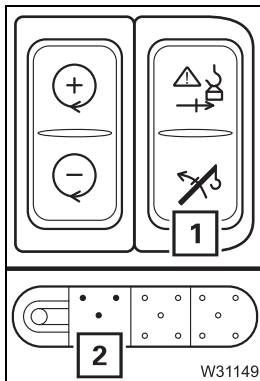




You can switch on the high-speed mode for a higher speed; p. 10 - 113.

### Re-enable raising function

If the RCL has switched off the raising function due to an overload, you can re-enable the raising function with button (1). The speed will then be reduced to 50%.



- Press the button (1) up once.
- Use the control lever to raise the main boom.

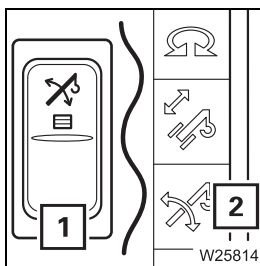
The status display (2) will flash **green**.



The raising of the main boom will be shut down if the main boom angle is too great. Then all you can do is set the load down.

### Switching off the derricking gear

If the derricking gear is not required, it should be switched off to avoid unintentional use.

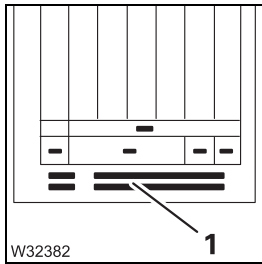


- Press the button (1) once.
  - The lamp in the button (1) lights up dimly.
  - Symbol (2) is **red** when the derricking gear is switched off.

If the control lever is assigned more than one function, the derricking gear will also be switched off if you switch on another power unit which is assigned to the same control lever movement; *Control lever configuration*, p. 8 - 14.



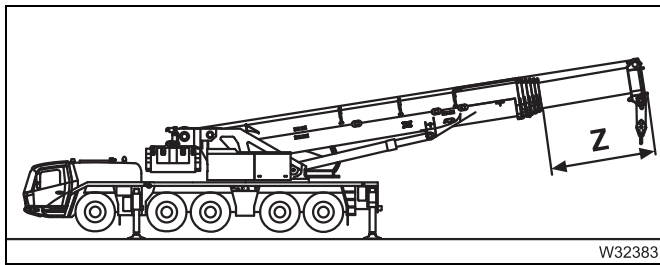
**Lowering the main boom to a horizontal position**



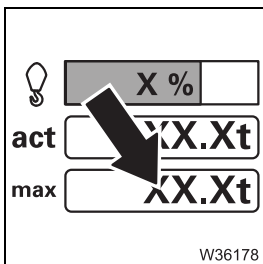
The main boom can be set down by referring to the working curves within the working range specified in the *lifting capacity tables*.

These additional pages supplement the information (1) in the *lifting capacity tables* supplied for the main boom intermediate lengths.


To prevent any overloading of the derricking cylinder, the derricking cylinder pressure is also monitored here.



In area (Z) of the main boom intermediate lengths it can be the case, particularly with main boom angles below 15°, that loads specified in the *lifting capacity table* are not reached for shorter main boom lengths.



In this case the RCL shows the reduced maximum load bearing capacity on the *Maximum load* display.

The RCL continuously calculates this value while taking the derricking cylinder pressure into account. If the current load is too big, the RCL shuts down;  p. 10 - 58.

## 10.5.6

### Telescoping mechanism

A telescoping process requires locking and unlocking processes in the main boom. You can telescope the main boom in different ways.

– **Manual telescoping**

For manual telescoping, you must initiate all locking and unlocking processes at the right time.

– **Telescoping with semi-automaton**

When telescoping with semi-automation, you enter a telescoping value and CCS controls all the locking and unlocking processes automatically. You may then need to manually telescope to an intermediate length.

– **Telescoping with pre-selection**

When telescoping with pre-selection, you can enter several parameters for lifting the load and the CCS suggests corresponding telescoping that you can use as the starting point for semi-automatic teleautomation. Telescoping with pre-selection has no independently selectable menu. The parameters are entered when entering the rigging mode at the RCL and the telescope status displays are in the RCL *Monitoring* menu.

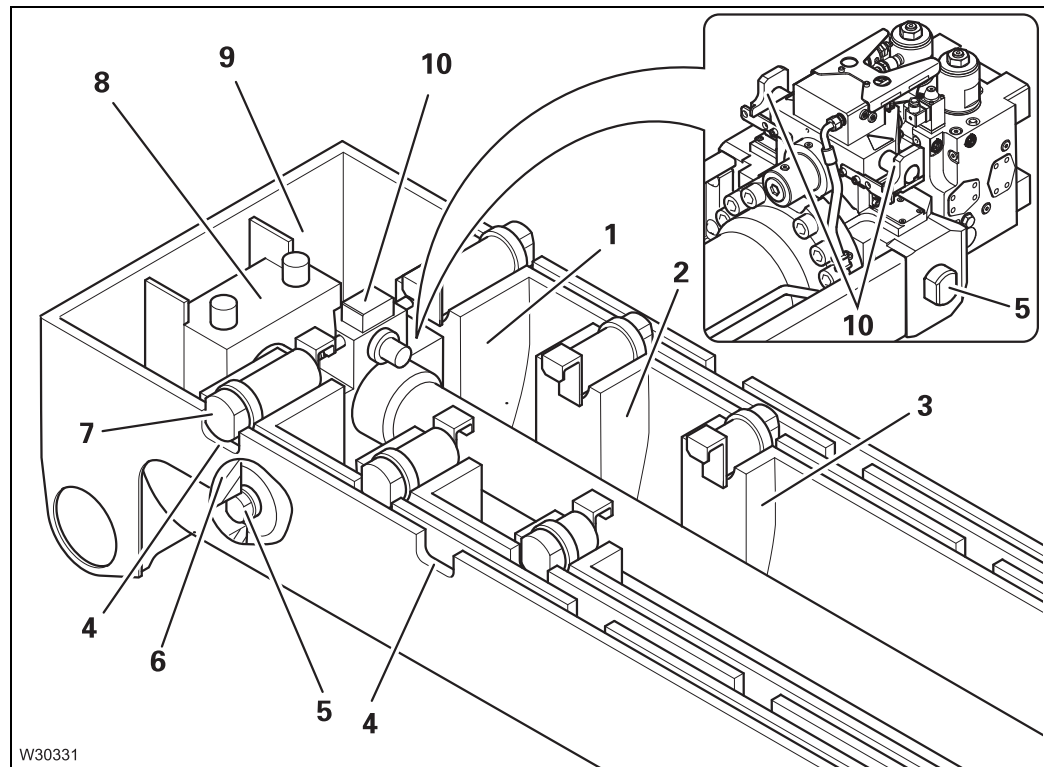
This is operated using the control lever. The control unit *CCS still forms part of the operation*. Here you initiate processes, receive feedback and can monitor the telescoping process.

The *CCS* display shows various sectional views of the main boom. To make you familiar with these representations more quickly, the following section begins with an overview of the telescoping mechanism and a telescoping process.



## Overview

This illustration shows the completely retracted main boom with the basic section (9) and the first three telescopic sections I to III (1) to (3).



Each telescopic section is equipped with two locking pins (7) which are extended by spring force.

The locking pins (7) are pushed into the cutouts (4) of the telescopic section above at the locking points – the telescopic section is locked.

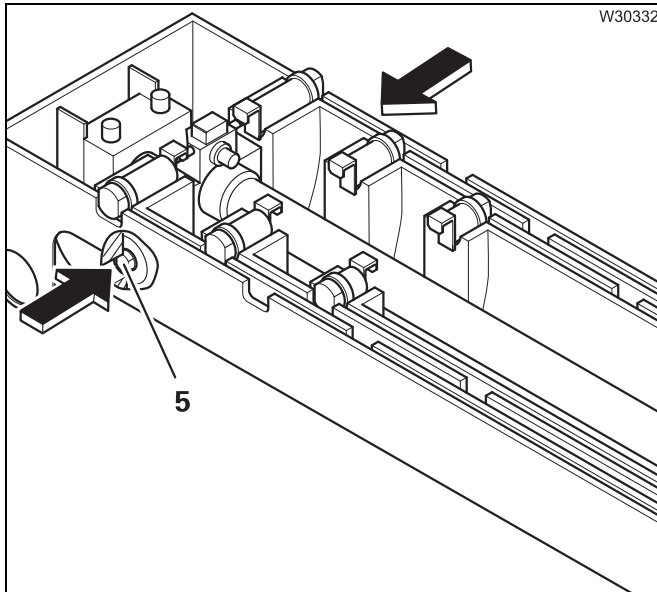
The telescoping cylinder is attached to the basic section (9) via the piston rod (8). The telescoping cylinder has two locking pins (5) at the bottom and a mechanism at the top (10).

When the telescoping cylinder is positioned at a locking point:

- The locking pins (5) can be extended into the cutouts (6) – the telescoping cylinder is locked.
- The mechanism (10) engages into the locking pins (7) and can retract them – the telescopic section is unlocked.

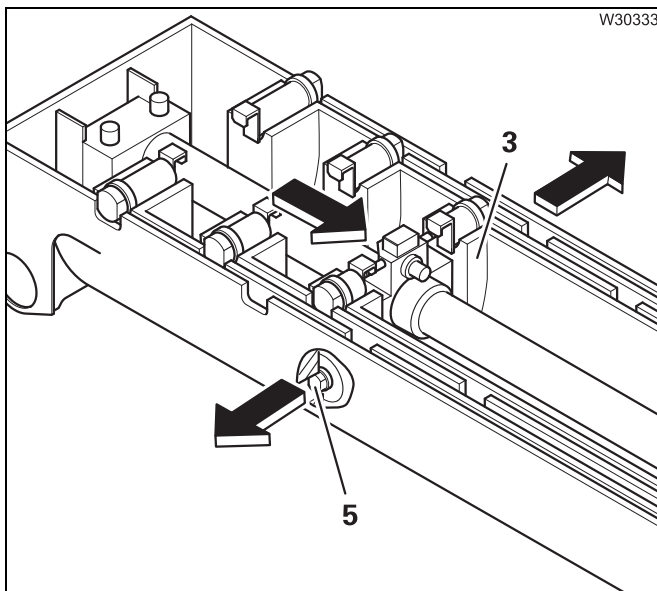
## Telescoping process

This state should be the starting point for a telescoping process. A telescoping process consists of 4 steps:



### 1. Unlocking the telescoping cylinder

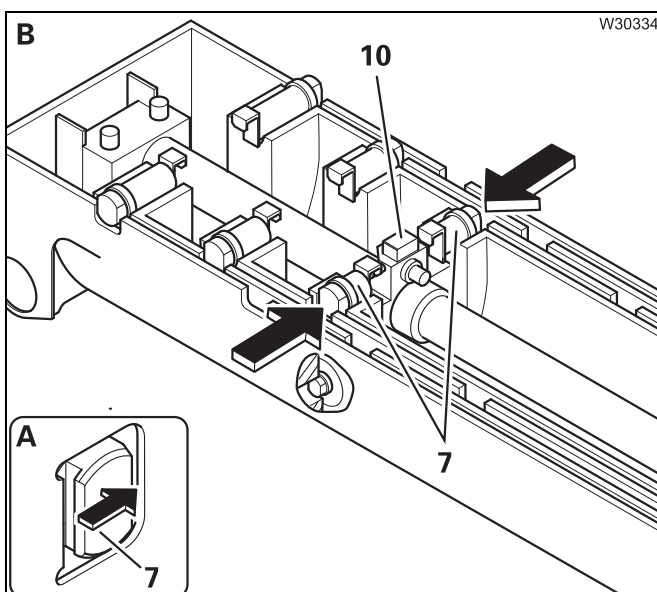
The locking pins (5) retract – the telescoping cylinder is unlocked.



### 2. Moving and locking the telescoping cylinder

The telescoping cylinder moves into the section to be telescoped, e.g. telescopic section III (3).

The locking pins (5) extend – the telescoping cylinder is locked.

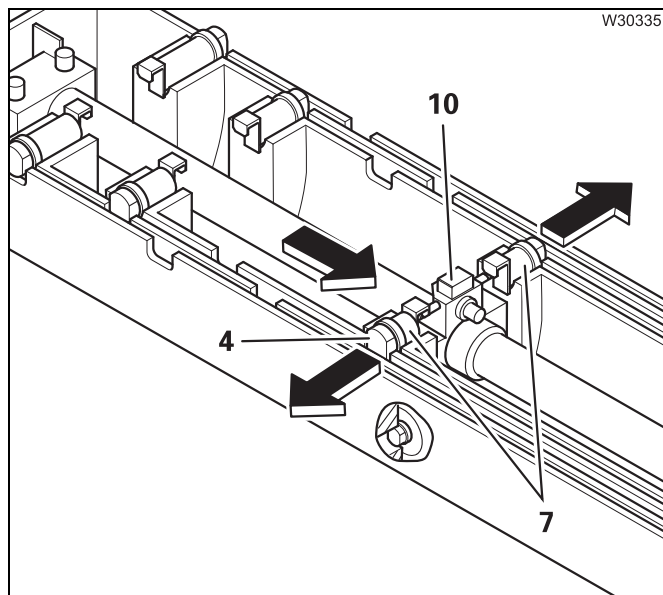


### 3. Unlocking the telescopic section

(A) – The telescoping cylinder extends until the locking pins (7) are clear.

(B) – The mechanism (10) retracts the locking pins (7) – the telescopic section is unlocked.

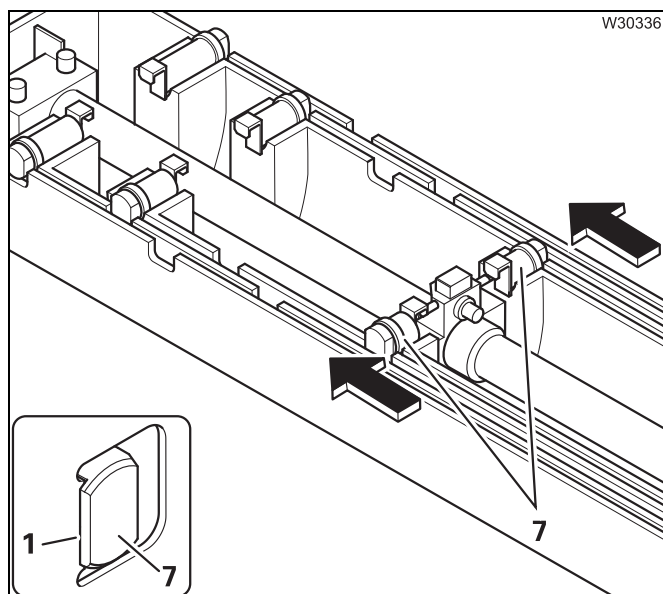




#### 4. Telescoping, locking and setting down a telescopic section

The telescoping cylinder pushes the telescopic section to a locking point.

The weight is taken off the mechanism (10).  
The locking pins (7) extend into the cutouts (4).



The telescopic section is automatically set down.

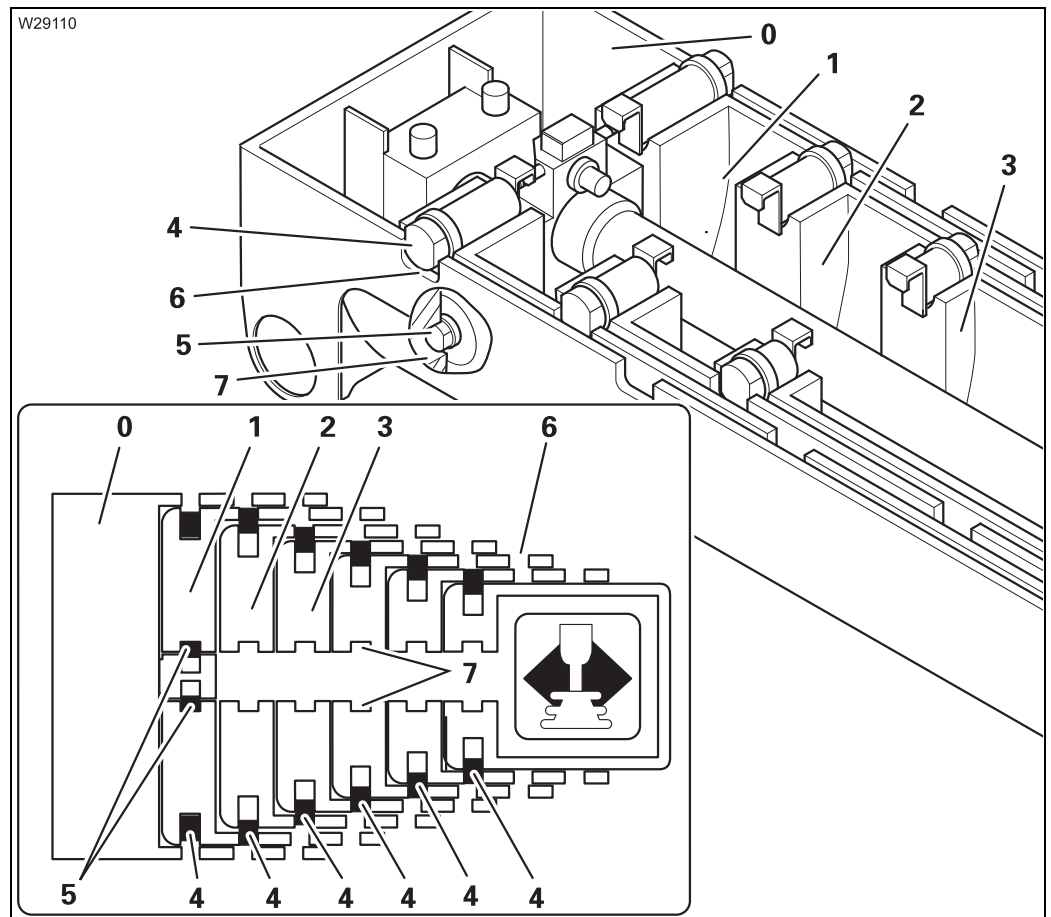
The telescoping cylinder retracts until the locking pins (7) are positioned on the above telescopic section (1).

The weight of the load is now on the telescopic sections and not on the telescoping cylinder.

**Assignment for display**

The CCS display shows a sectional view of the main boom in the menus.

The following elements are displayed:



- 0 Basic section
- 1 Telescopic section I
- 2 Telescopic section II
- 3 Telescopic section III
- 4 Locking pin on the telescopic section
- 5 Locking pins on the telescoping cylinder
- 6 Cutouts, external
- 7 Cutouts, internal



**Fixed length,  
intermediate  
length, telescoping  
length**

There are lifting capacity tables for main boom fixed lengths, main boom intermediate lengths and main boom telescoping lengths.

The lengths are automatically detected by the RCL, and the corresponding lifting capacities according to the *lifting capacity table* are enabled and displayed automatically.

**Main boom fixed length**

Main boom fixed lengths have the greatest lifting capacities. A main boom fixed length is reached if:

- All telescopic sections are locked to a fixed length
- All telescopic sections are set down.

**Main boom intermediate length**

A main boom intermediate length is reached if not all telescopic sections are locked to fixed lengths.

Extend the main boom to the required length before hoisting the load!

You cannot telescope the boom with the specified lifting capacities for main boom intermediate lengths.

**Main boom telescoping length**

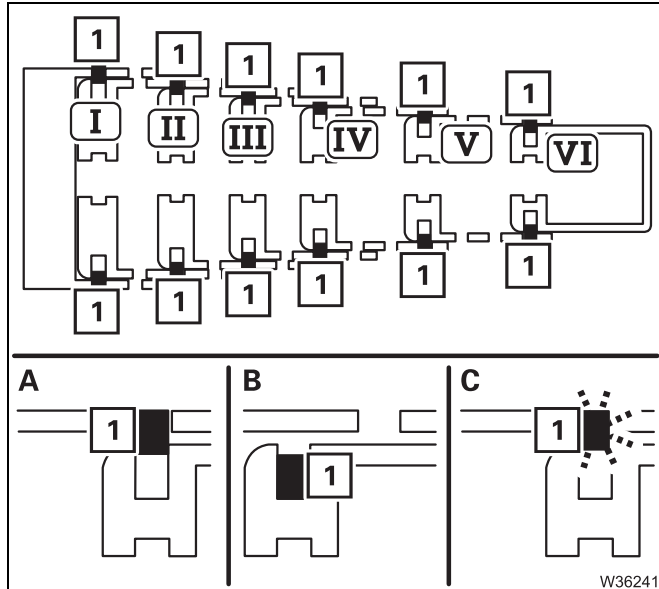
The main boom is at a telescoping length if it is extended to an intermediate length and may be telescoped with the current load. The size of the load that can be telescoped depends on the angle of inclination and on the degree of lubrication of the main boom.



## Telescoping

The position of the telescopic sections, i.e. which telescopic section is extended to what extent, is referred to as telescoping.

The CCS display shows main boom fixed lengths and main boom intermediate/telescoping lengths in different ways.



### Fixed lengths

Telescopic section I	0 - 56 - 89 - 100
Telescopic section II	0 - 53 - 89 - 100
Telescopic section III	0 - 52 - 89 - 100
Telescopic section IV	0 - 52 - 92 - 100
Telescopic section V	0 - 47 - 92 - 100
Telescopic section VI	0 - 47 - 92 - 100

(A) – The locking pins (1) are **green**.

### Intermediate lengths/telescoping lengths

(B) – The locking pins (1) are **black**.

or

(C) – The locking pins (1) are **flashing**.  
Telescopic section at fixed length and  
– unlocked or  
– locked and not set down.

## Telescoping sequence

The telescopic sections can only be telescoped individually, one after the other.

When **Extending** you must always extend the telescopic section with the highest numbering first, then the telescopic section with the next lower numbering, etc. (e.g. IV, III, II, I).

The telescopic sections are always **retracted** in the reverse order of extending.



### Checks before starting work

#### Checking the current telescope status

When the ignition is turned on, CCS registers the displayed telescoping status from the current status of the telescoping mechanism and the previously saved locking and unlocking procedures.

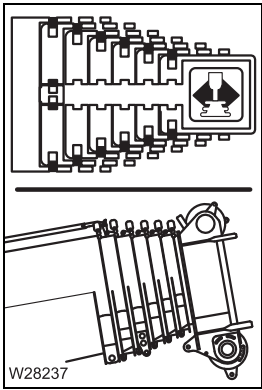
**Normally**, CCS detects differences between the current and the displayed telescoping and displays the corresponding error message; **▮▮▮▮** *Malfunctions in the telescoping mechanism*, p. 14 - 17.

If a **malfunction** results in values being deleted, CCS can no longer calculate the current telescoping and will not issue an error message.



#### Risk of damage to the telescoping mechanism!

Before the first telescoping, always check whether the CCS display is showing the current telescoping. This prevents the telescoping mechanism from being damaged when telescoping.



- Before the first telescoping, compare the telescoping indicated on the CCS display with the current telescoping.

If the current telescope status is not correctly displayed, enter the current telescope status; **▮▮▮▮** *Current telescoping*, p. 10 - 101.

#### Checks for folded swing-away lattice

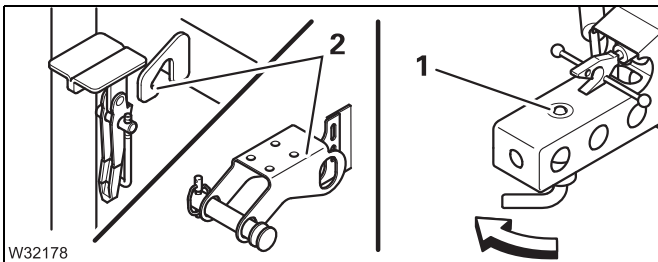
The swing-away lattice slews automatically when telescoping.



#### Risk of damage with a folded swing-away lattice!

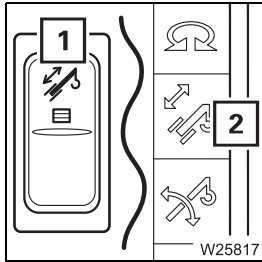
Ensure that all connections specified here have been separated and unlocked before extending.

This prevents the swing-away lattice from failing to swinging and a connection from being damaged.




- Check that the driver (1) is unlocked and that the connection (2) is separated; **▮▮▮▮** *Operating Instructions Lattice Extension*.

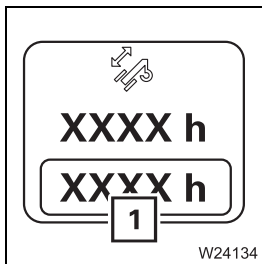
### Switching on the telescoping mechanism



After the ignition is switched on, all of the power units will be switched off and the lamps in the corresponding buttons will light up only dimly.

- Press the button (1) once.
  - The lamp in button (1) lights up brightly.
  - The symbol (2) is **green** when the telescoping mechanism is switched on.




If the control lever is assigned more than one function, all other power units which are assigned the same control lever movement are switched off;  *Control lever configuration*, p. 8 - 14.




You can display the operating hours (1) of the telescoping mechanism;  p. 10 - 130.

### Function of the control lever

This section only describes the function of the control lever. Before telescoping, a number of prerequisites need to be fulfilled as well.

- Before manual telescoping;  p. 10 - 100.
- Before telescoping with teleautomation;  p. 10 - 110.
- Before telescoping with a folded swing-away lattice;  p. 10 - 96.

You can adjust the sensitivity of the control levers to suit the operating conditions;  *Setting the characteristic curves for the control levers*, p. 10 - 126.



#### **Risk of accident due to unexpected crane movements!**



In the case of multiple configuration, check whether the control lever *Telescoping* function is switched on before you move the control lever for telescoping.

This prevents accidents caused by unexpected derricking!

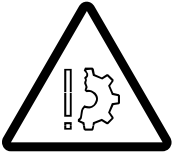


#### **Risk of accidents due to gaps in monitoring!**

Boom extension will only be monitored completely if

- the lifting limit switch is correctly rigged;  p. 11 - 120,
- the lifting limit switch is not overridden;  p. 10 - 82.





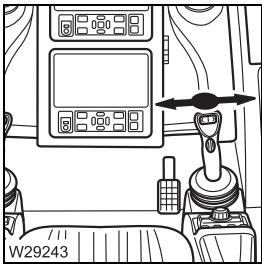
**Risk of damage to the hoist rope!**

The rope can become slack if the hook block touches the ground during retraction operations. Rope loops will form, which can cause the load to slip and damage the hoist rope.

The distance between the hook block and the boom head changes during telescoping. Ensure that the hook block does not trigger the lifting limit switch or touch the ground.

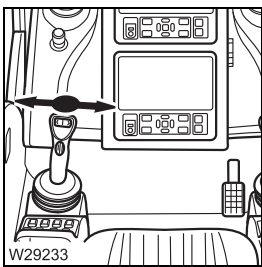
- Additionally carry out the following movements
  - The *Lower hoist* movement when extending and
  - the *Raise hoist* movement when retracting.

The control lever movements for telescoping vary depending on the configuration.



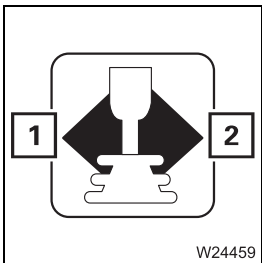
– **With telescoping assigned to the right-hand lever**

- To extend:**           • Push the control lever to the right.
- To retract:**         • Push the control lever to the left.



– **With telescoping assigned to the left-hand lever**

- To extend:**           • Push the control lever forwards.
- To retract:**         • Pull the control lever backwards.

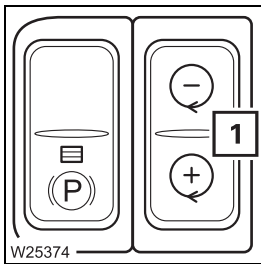


Telescoping will only start if the arrow (1) or (2) for the selected telescoping direction is **green**.

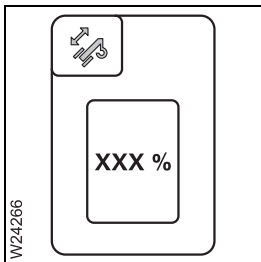
You can regulate the speed by moving the control lever and changing the engine speed with the accelerator.



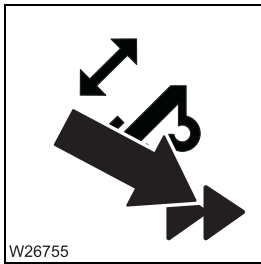
With certain telescoping states, the RCL will switch telescoping off, e.g. when you leave the telescoping lengths or when the working range limit has been reached; *RCL shutdown*, p. 10 - 58.



You can adjust the desired engine speed (idling speed) with button (1); p. 4 - 20.

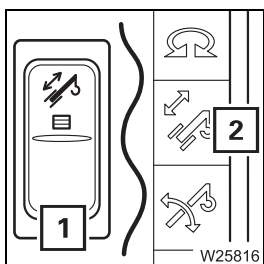


You can limit the maximum telescoping speed in the *Power unit speeds* menu; p. 10 - 123.



You can switch on the high-speed mode for a higher speed; p. 10 - 113.

### Switching off the telescoping mechanism



If the telescoping mechanism is not required, it should be switched off to avoid unintentional use.

- Press the button (1) once.
  - The lamp in the button (1) lights up dimly.
  - The symbol (2) **red** if the telescoping mechanism is switched off.







If the control lever is assigned more than one function, the derricking gear will also be switched off if you switch on another power unit which is assigned to the same control lever movement; *Control lever configuration*, p. 8 - 14.




## Manual telescoping

To telescope manually, you must initiate all locking and unlocking processes. The locking and unlocking processes are carried out automatically.

The following sections describe the operating procedures

- Checking the initial position,
- Unlock the telescoping cylinder;  p. 10 - 102,
- Move the telescoping cylinder (without telescopic section);  p. 10 - 104,
- Lock the telescoping cylinder;  p. 10 - 105,
- Unlock telescopic section;  p. 10 - 106,
- Telescope the telescopic section;  p. 10 - 107,
- Lock the telescopic section;  p. 10 - 108.



The operating order depends on the current initial position. For an overview of a telescoping process example;  p. 10 - 90.

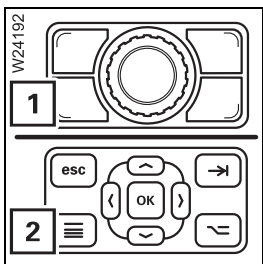


The lengths given in the following illustrations are purely sample values, and may differ from the current display.

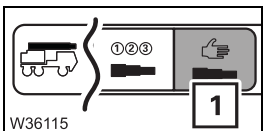
## Checking the initial position

Before telescoping, you must check the following statuses:

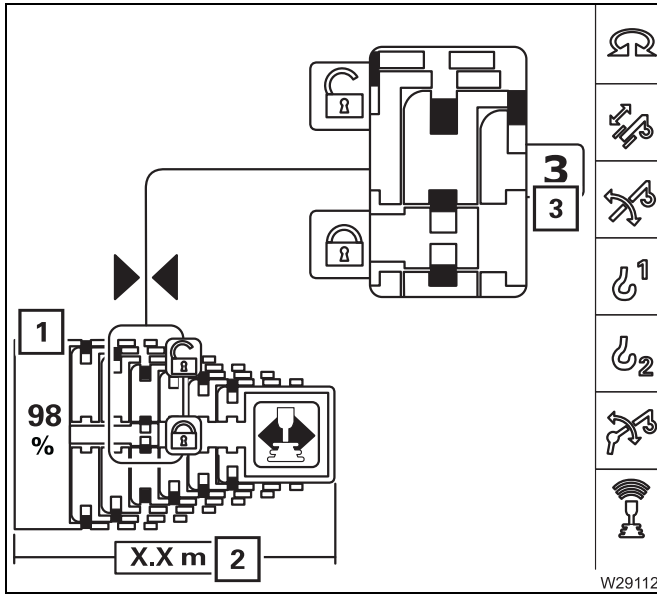
- **the current telescoping,**
- **the position of the telescoping cylinder,**
- **the position of the locking pins.**



- If necessary, open the *Menu group overview* menu and press the button (1) or (2) once.



- Open the *Manual telescoping* menu (1).

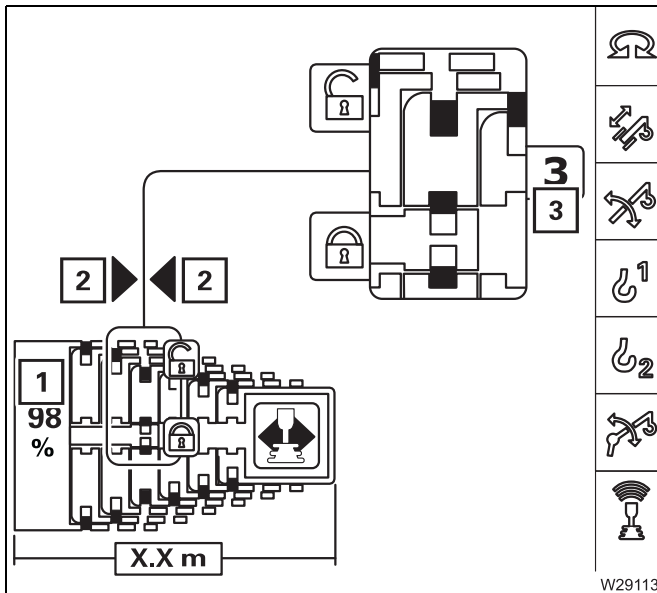


### Current telescoping

The display (1) shows how far the telescoping cylinder is extended, e.g. 98%.

The display (2) shows the current main boom length.

The display (3) shows the corresponding telescopic section, e.g. telescopic section 3.



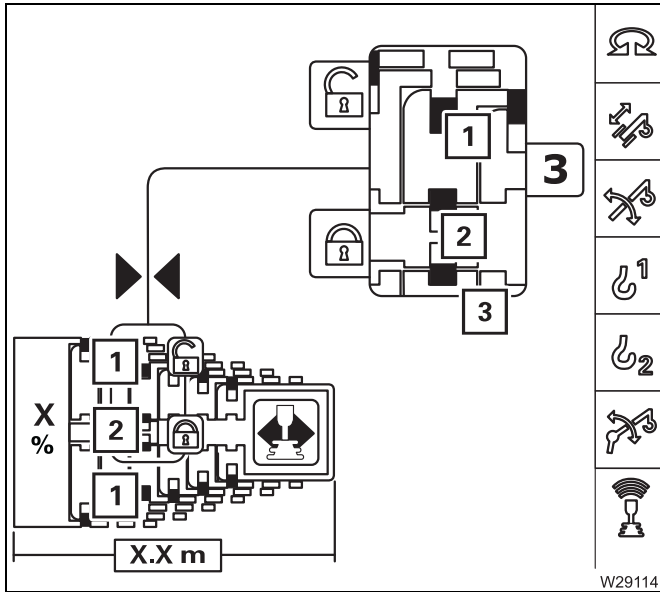
### Position of the telescoping cylinder

The display (1) shows how far the telescoping cylinder is extended, e.g. 98%.

If the telescoping cylinder is near a locking point:

- The display (3) shows the corresponding telescopic section, e.g. telescopic section 3.
- The display (2) shows one or two arrows, depending on the distance to the locking point.





### Position of the locking pins

The current positions of the locking pins are:

- 1 On the telescopic section
- 2 On the telescopic cylinder

The area (3) shows an enlarged cut-out.

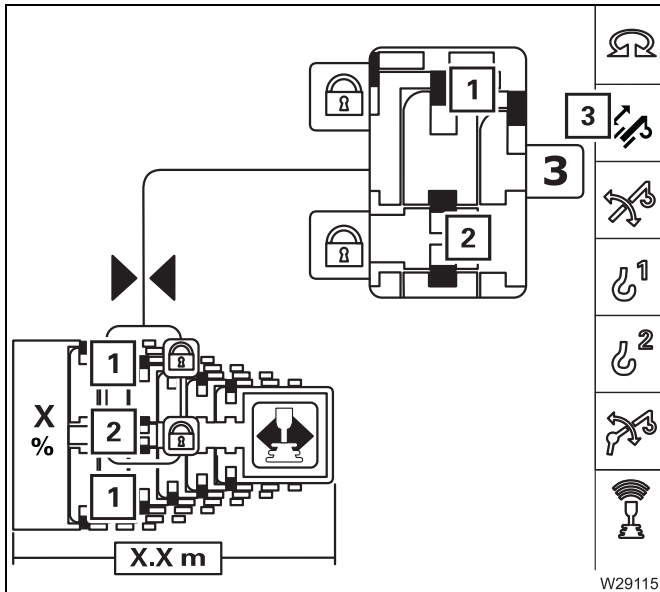
The current settings are shown in different colours.

- **Red:** Unlocked
- **Green:** Locked
- **Yellow:** Intermediate position

### Unlocking the telescopic cylinder

Unlocking the telescopic cylinder is required for the telescopic cylinder to be moved separately (without telescopic section).

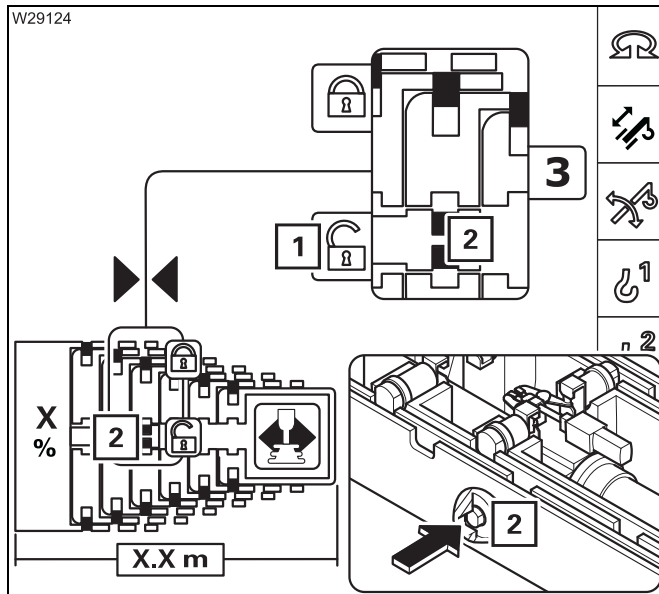
The telescopic cylinder and the telescopic section cannot be unlocked simultaneously.



### Prerequisites

- Telescopic mechanism on – symbol (3) **green**
- Telescopic cylinder locked – symbol (2) **green**
- Telescopic section locked – symbol (1) **green**





### Unlocking

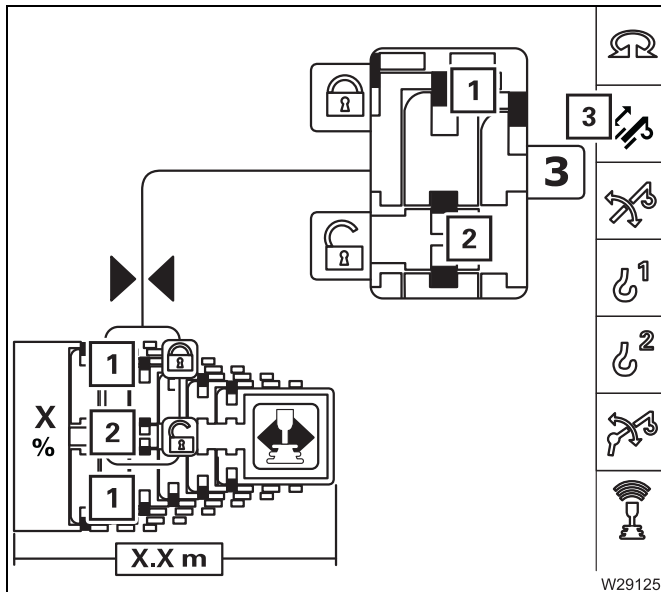
- Select the symbol (1).

Confirm the selection – the locking pins (2) will retract.

- **Yellow:** Intermediate position
- **Red:** Unlocked

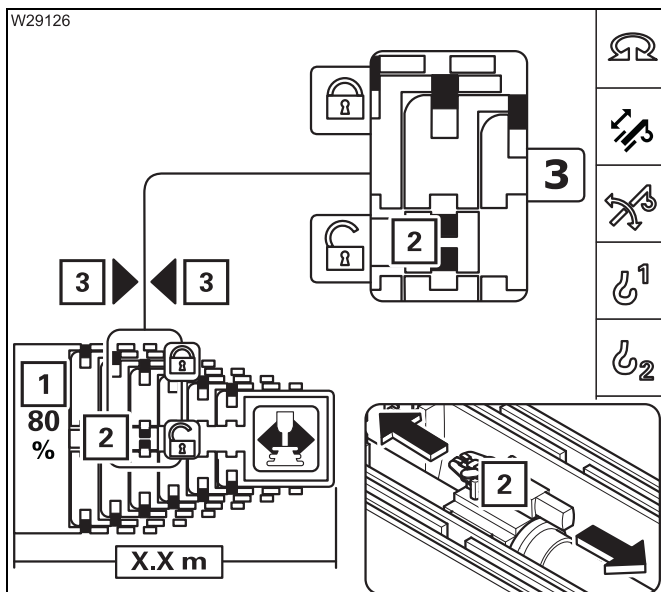


### Extending/retracting the telescoping cylinder



#### Prerequisites

- Telescoping mechanism on – symbol (3) **green**
- Telescopic section locked – symbol (1) **green**
- Telescoping cylinder unlocked – symbol (2) **red**



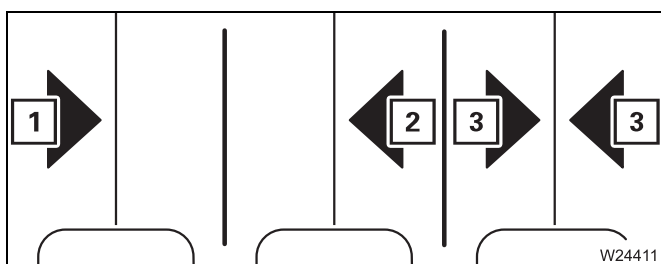
#### Extending/retracting

- Move the control lever in the corresponding telescoping direction:
  - **Extend:** Extending
  - **Retract:** Retracting

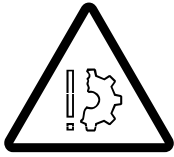
The telescoping cylinder (2) extends/retracts.

The display (1) shows the currently extended length, e.g. 80%.

Near a locking point, the symbols (3) show:



- The direction of travel to the locking point:
  - 1 Extending
  - 2 Retracting
  - 3 At the locking point



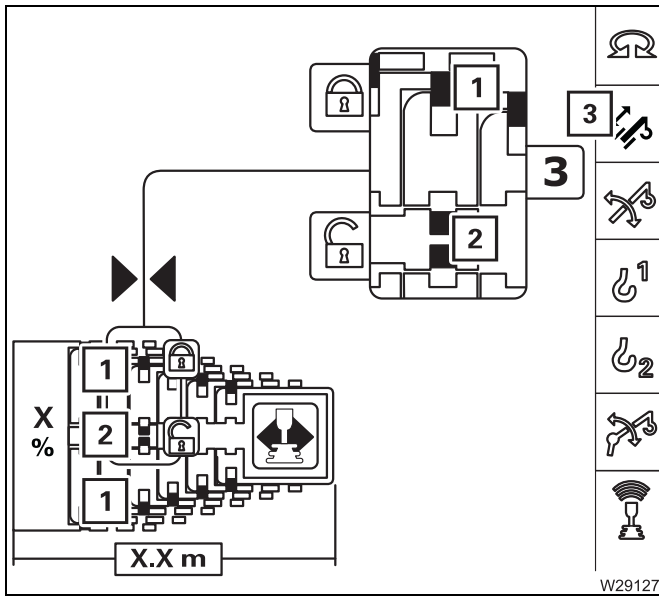
**Risk of damage to the boom system!**

If extending and retracting several times does not lead to the lock being released, you must not telescope any further against the stop.

If removing the load does not cause the lock to be released, you must lock the telescoping cylinder (▶▶▶ p. 10 - 105) and then restart unlocking.

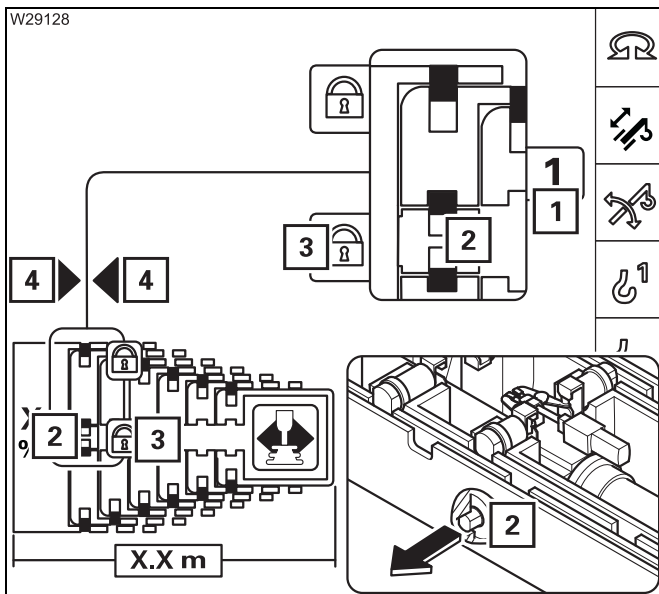
**Lock telescoping cylinder**

The telescoping cylinder must be locked to a telescopic section so that the telescopic section can be telescoped.



**Prerequisites**

- Telescoping mechanism on – symbol (3) **green**
- Telescopic section locked – symbol (1) **green**
- Telescoping cylinder unlocked – symbol (2) **red**



**Locking**

- Move the telescoping cylinder to the desired locking point, e. g. to telescopic section 1.

Wait until the display:

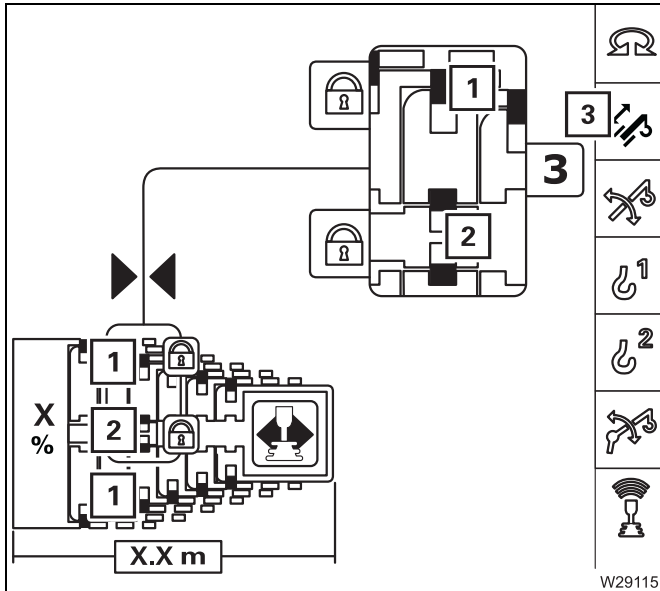
- shows the desired telescopic section (1) and
- the symbols (4) are shown.
- Select the symbol (3).
- Confirm the selection – the locking pins (2) will extend – symbol (2) **green**.



**Unlocking the telescopic section**

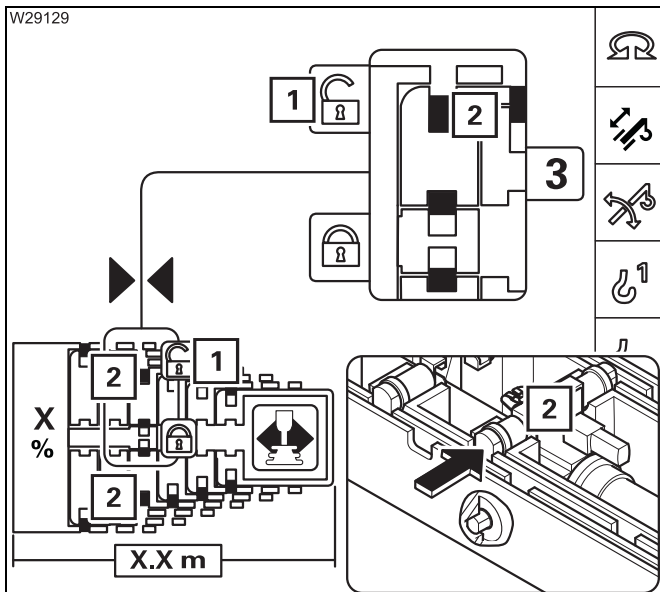
Unlocking a telescopic section is required for the telescopic section to be telescoped.

The telescoping cylinder and the telescopic section cannot be unlocked simultaneously.



**Prerequisites**

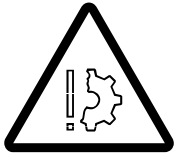
- Telescoping mechanism on – symbol (3) **green**
- Telescopic section locked – symbol (1) **green**
- Telescoping cylinder locked – symbol (2) **green**



**Unlocking**

- Select the symbol (1).
- Confirm the selection – the locking pins will retract. Symbol (2) **red**.

If symbol (2) is not **red** after approx. 10 seconds, this means that the locking pins are under load. To relieve the load, carefully retract and extend a little.



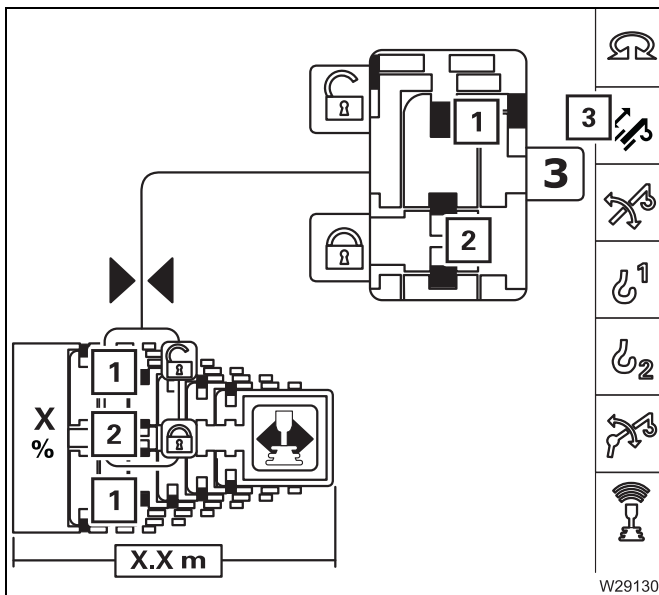
**Risk of damage to the boom system!**

If extending and retracting several times does not lead to the lock being released, you must not telescope any further against the stop.

If removing the load does not cause unlocking, you must lock the telescopic section (▮▮▮ p. 10 - 108) and restart unlocking.

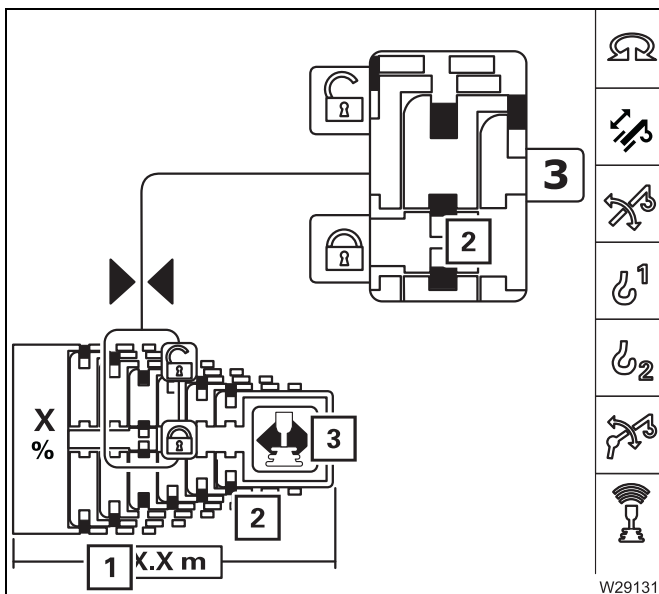
**Telescoping the telescopic section**

You can telescope the telescopic section once it is unlocked.



**Prerequisites**

- Telescoping mechanism on – symbol (3) green
- Telescoping cylinder locked – symbol (2) green
- Telescopic section unlocked – symbol (1) red



**Telescoping**

If the requirements for telescoping are met, the symbol (3) flashes.

- Move the control lever in the desired telescoping direction.

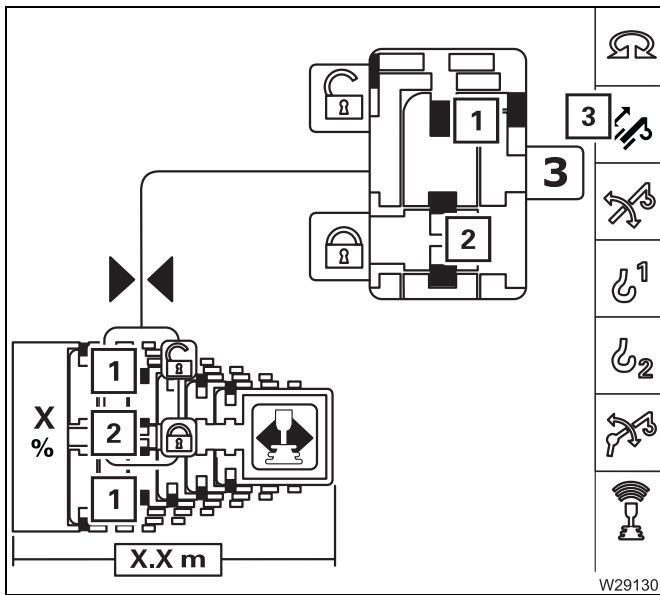
The display (1) shows the current extended length (telescoping in metres).

The current telescope diagram on the display (2) will change continually.



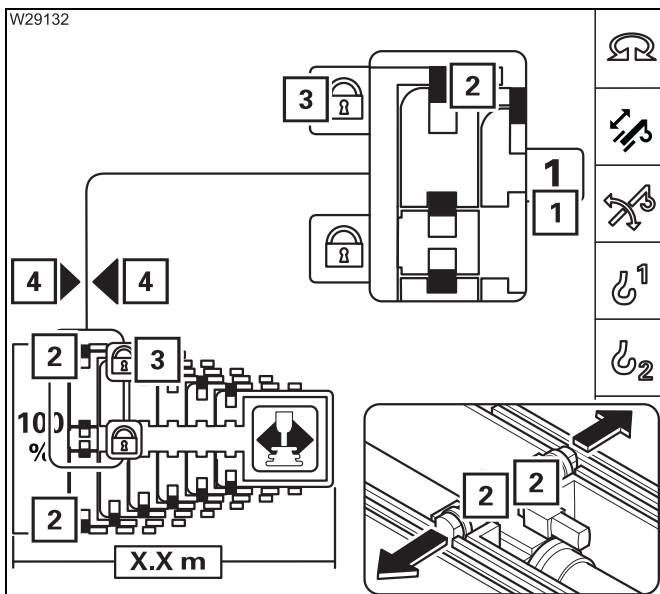
**Locking the telescopic section**

Every telescopic section can be locked at the fixed lengths – fixed lengths;  
 p. 10 - 94.



**Prerequisites**

- Telescoping mechanism on – symbol (3) **green**
- Telescopic section unlocked – symbol (1) **red**
- Telescoping cylinder locked – symbol (2) **green.**



**Locking**

- Telescope to the desired fixed length, e. g. telescopic section (1) 1 to 100%.
- If the symbol (4) is displayed, the telescopic section must be locked.
- Select the symbol (3).
  - Confirm the selection – the locking pins will extend – symbol (2) **green.**

## Before on-road driving

### Locking the telescopic section for on-road driving

Once you have retracted the main boom for on-road driving, you must by all means lock the telescoping cylinder in telescopic section I, so that the axle loads are in accordance with the values in the *Driving mode* table;

▣▣▣▣ *Driving modes*, p. 6 - 1.

If telescopic section I was the last telescopic section to be retracted, you can select locking directly.

If another telescopic section was retracted last, you must do the following before selecting locking:

- Unlock the telescoping cylinder; ▣▣▣▣ p. 10 - 102,
- Move the telescoping cylinder into telescopic section I; ▣▣▣▣ p. 10 - 104 and
- Lock the telescoping cylinder; ▣▣▣▣ p. 10 - 105.

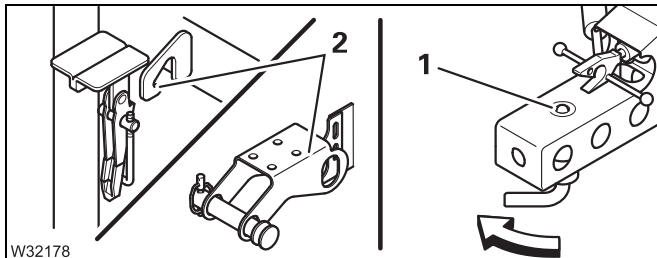
### Checks for folded swing-away lattice

You must establish all connections that were separate for telescoping.



**There is a risk of damage to the lattice extension and the main boom!**

Make sure that the transport condition has been established before driving with a folded swing-away lattice. This prevents damage to the swing-away lattice or main boom.



W32178

- Lock the driver (1) and establish the connection (2).
  - Check the transport condition.
- ▣▣▣▣ *Operating Instructions Lattice Extension*.



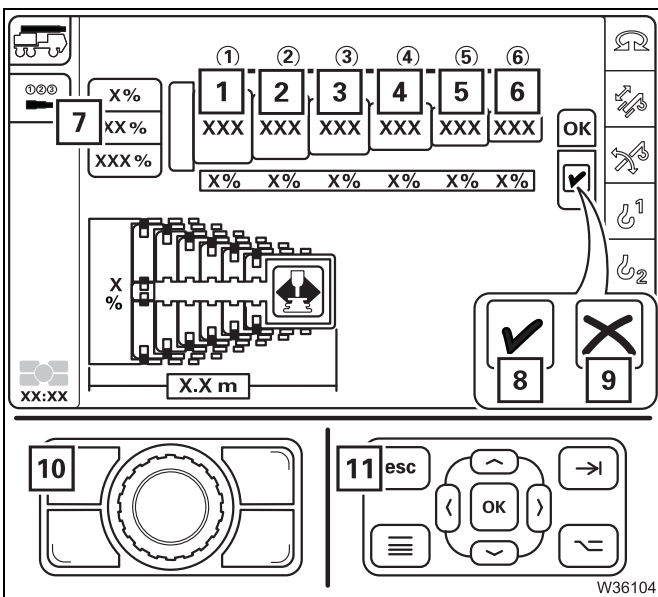
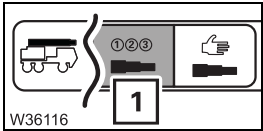
**Telescoping with semi-automaton**

When telescoping with semi-automation, you enter the desired fixed lengths and then move the control lever in the required direction. Switching between the telescopic sections is carried out automatically by CCS.



If the desired telescoping status is not a fixed length, you can first telescope to the next closest fixed length with the semi-automation and then telescope further to the desired length manually.

- Switch on the telescoping mechanism; see p. 10 - 89.
- Open the *Telescoping semi-automation* menu (1).



**Entering the telescoping status**

You can cancel the input at any time – press button (10) or (11) once.

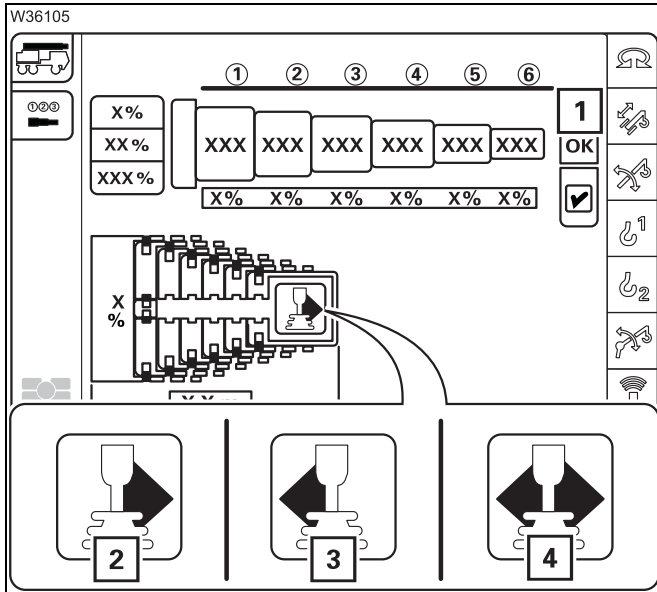
Entry for all telescopic sections

- Select and confirm the desired value (7).

Entry for individual telescopic sections

- Select and confirm the desired value (1) to (6).
- Display symbol (9) – telescoping **not permitted** – enter a new value.
- Display symbol (8) – telescoping permitted – the entry can be confirmed.



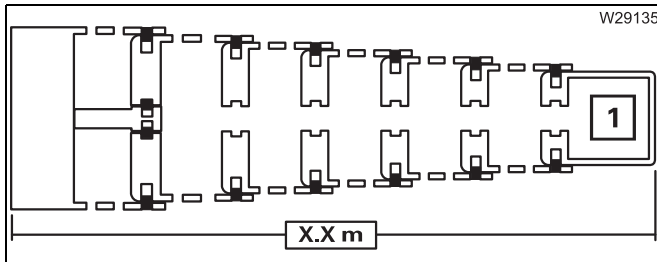


### Confirm the entry

- Select and confirm the symbol (1).

### Telescoping

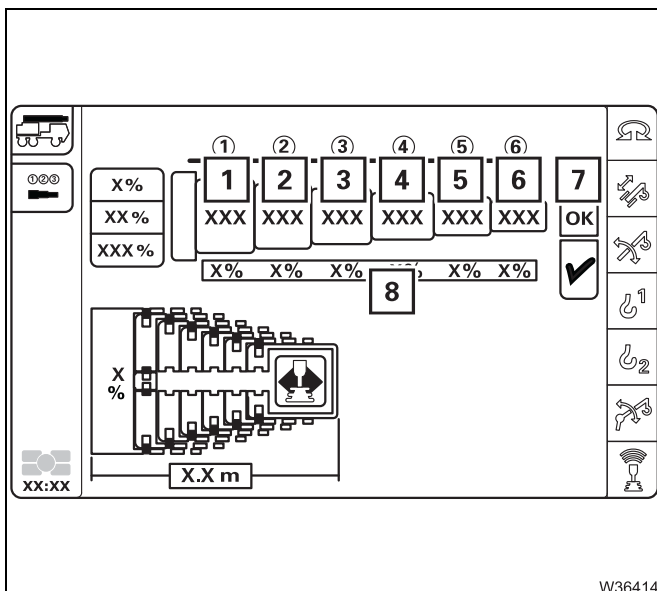
- Move the control lever for the displayed telescoping direction.
- 2 Extending
  - 3 Retracting
  - 4 Display in the case of return runs (without a telescopic section)



### End telescoping semi-automation

The teleautomation will stop when the entered telescope status is reached – symbol (1) goes out.

- Move the control lever to its initial position – teleautomation off.



### Cancel telescoping semi-automation

- Release the control lever.

If the telescopic sections are at a fixed length, the current telescoping can be entered as the telescoping destination.

The display (8) shows the current telescoping:

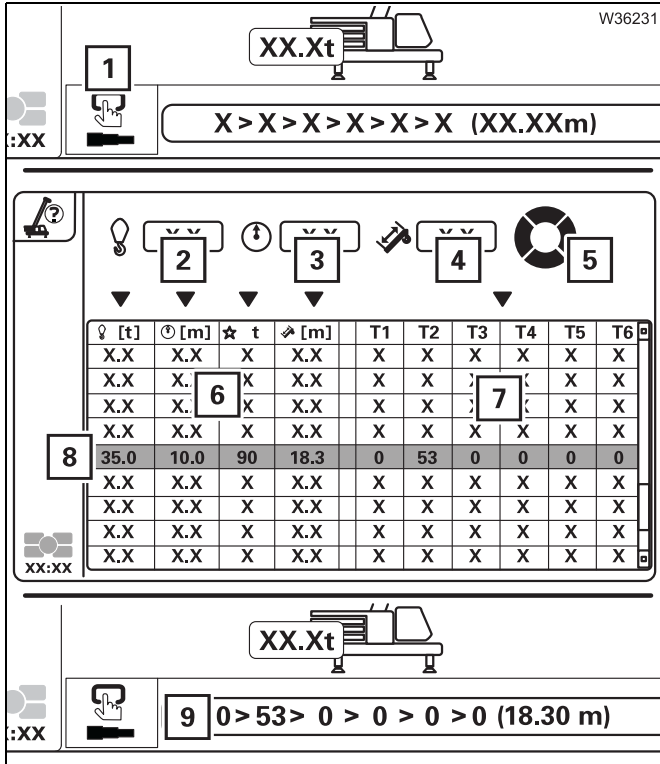
- **Red:** Unlocked
- **Green:** Fixed length and locked

- Enter the current telescoping (1) to (6) and confirm the selection with (7).



**Telescoping with pre-selection**

No additional telescoping menu needs to be opened for this type of telescoping operation. All displays are shown in the *Monitoring* RCL menu. Pre-selection of the telescope status has already been performed when entering the rigging mode at the RCL; *Pre-selecting telescoping*, p. 10 - 40.



**Pre-selection – Overview**

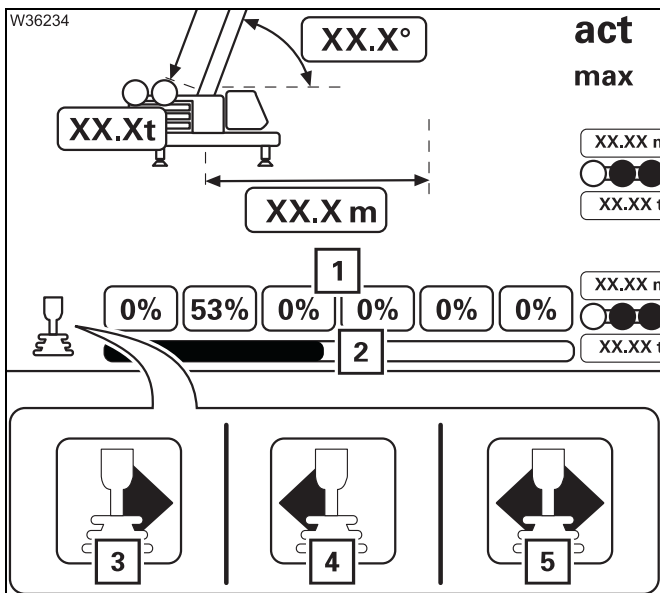
The menu is opened with the symbol (1).

Four parameters can be entered for the loading case.

- 2 Load weight
- 3 Working radius
- 4 Main boom length
- 5 Slewing range – MAXbase only

The table shows all permissible telescoping (6) and the associated parameter (7) for the entered rigging mode.

A preselected telescope status (8) is shown on the display (9) after confirmation.



After confirming the rigging mode, the display (1) in the *Monitoring* menu shows the pre-selection.

**Telescoping**

- Switch on the telescoping mechanism.
  - Move the control lever for the displayed telescoping direction.
- 3 Extending
  - 4 Retracting
  - 5 Display in the case of return runs (without a telescopic section)

The display (2) shows the current position of the telescoping cylinder.

## 10.5.7

### High-speed mode



The slewing gear cannot be operated in high-speed mode.



You can switch on the high-speed mode for a higher speed.

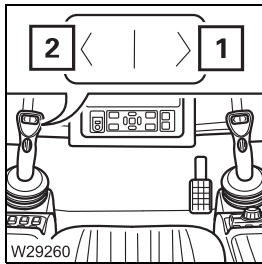
#### **Risk of accidents due to the suddenly accelerating movement!**

Reduce the engine speed before starting high-speed mode.

This will prevent movements from becoming excessively accelerated, which may result in the truck crane starting to sway and overturning.

#### **Derricking gear telescoping mechanism**

High-speed mode is always switched on and off for the derricking gear and the telescoping mechanism at the same time.

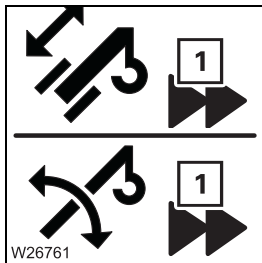


#### **To switch on briefly**

- Press the button at the left on – for (1).  
High-speed mode will be active until you release the button.

#### **Continuous operation**

- Press the button at the right on – for (2).  
High-speed mode will be enabled until you press the button again.



The symbol (1) indicates the current status:

- **On:** High-speed mode switched on
- **Off:** High-speed mode switched off



During lowering of the boom, high-speed mode only supports the start-up of the derricking procedure from steep boom positions; it does not increase the derricking speed.

High-speed mode is disabled for raising when performing operations with the lattice extension.



## Hoists

High-speed mode is always switched on and off simultaneously for the main hoist and the auxiliary hoist.



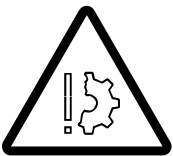
### Risk of accidents due to overloading!

Make sure the lifted load is no more than 50% of the maximum load according to the *Lifting capacity table* (maximum degree of utilisation of 50%) before operating the hoists in high-speed mode.



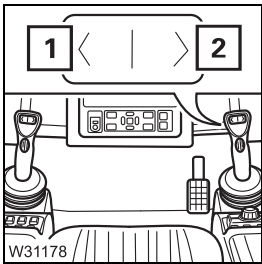
### Danger of slack rope with a lightweight hook block!

If you switch on high-speed mode at high speeds, a light hook block will not be able to keep the hoist rope taut if it is hoisted up high with a small number of reevings and a large boom length.



### Danger of slack rope with large number of reevings

If you switch on high-speed mode with a large number of reevings and without a load, slack rope may form because the hook block is lowered too slowly due to the high degree of friction.

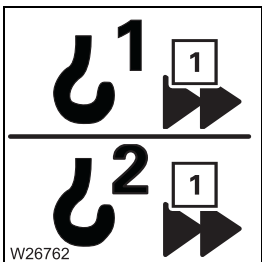


### To switch on briefly

- Press the button at the left on – for (1).  
High-speed mode will be active until you release the button.

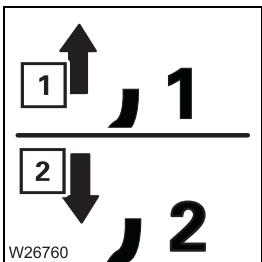
### Continuous operation

- Press the button at the right on – for (2).  
High-speed mode will be enabled until you press the button again.



The symbol (1) indicates the current status:

- On: High-speed mode switched on
- Off: High-speed mode switched off



The symbols show the direction of rotation of the hoist:

- 1 Lifting the hoist
- 2 Lowering the hoist



The speed of the hoists will only be significantly increased by switching to high-speed mode if you have deflected the control lever by more than 70%.

## 10.5.8

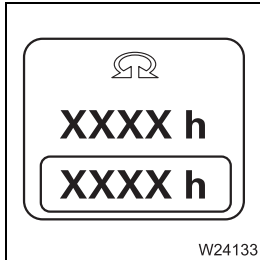
### Slewing gear



#### **Danger of overturning when slewing with a rigged counterweight!**

Always check before slewing whether slewing is permitted in the truck crane's current rigging mode (counterweight, outrigger span, working radius).

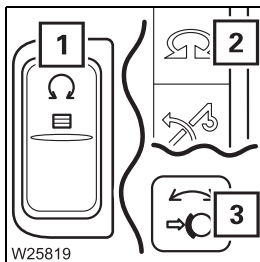
Correct the rigging mode if necessary; *Slewing with the rigged counterweight*, p. 11 - 93.



You can display the operating hours of the slewing gear; p. 10 - 130.

#### **Switching on the slewing gear**

After the ignition is switched on, all of the power units will be switched off and the lamps in the corresponding buttons will light up only dimly.



- Press the button (1) once.
  - The lamp in button (1) lights up brightly.
  - Symbol (2) is **green** if the slewing gear is switched on.
  - The slewing gear brake will be released – lamp (3) will go out.





If a rigging mode has been entered for the working position  $0^\circ$  to the rear, an RCL shutdown will occur after switching on the slewing gear, and slewing will be disabled. To acknowledge this shutdown, you must either switch off the slewing gear or set down the load and enter a rigging mode for the  $360^\circ$  working range.



## Slewing

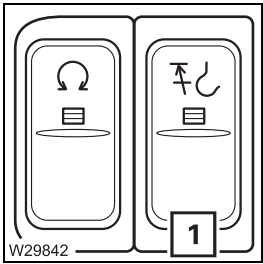
The following requirements must be fulfilled before slewing:

- The superstructure is unlocked;  p. 10 - 15.
- Slewing is permissible with the current rigging mode;  p. 11 - 93.
- The current rigging mode is shown on the *RCL* display.

If slewing is not permissible with the current rigging mode, the slewing gear will be locked.

## Releasing locked slewing gear

You can unlock the slewing gear if it has been locked.



- Press and hold the button (1) – the slewing gear is unlocked. The speed is reduced to 10%.



### **Risk of tipping over after confirming an incorrect rigging mode!**

Before slewing, always check that the current rigging mode is shown on the *RCL* display.

This prevents slewing operations from being enabled within the impermissible ranges, which would cause the truck crane to overturn.



### **Risk of crushing during slewing!**


Before slewing, operate the horn and ensure there are no persons in the slewing range.

This prevents persons from getting crushed between the superstructure and the carrier or between the superstructure and other parts.




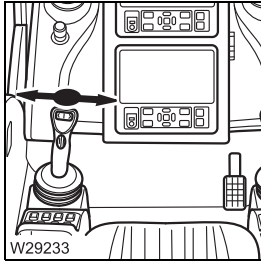
### **Risk of the main boom buckling!**

Do not accelerate the slewing speed to such a degree that the load starts swinging.

You can adjust the sensitivity of the control levers to suit the operating conditions;  *Setting the characteristic curves for the control levers*, p. 10 - 126.

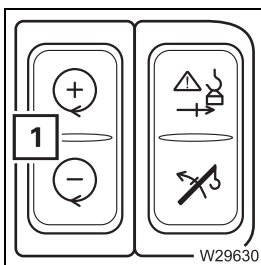
### Maximum permitted slewing speed


The maximum permissible slewing speed is limited automatically depending on the working radius and degree of utilisation of the lifting capacity. The scale of the limitation is specified in the supplied lifting capacity table. The current speed reduction is displayed in the start menu;  p. 8 - 19.

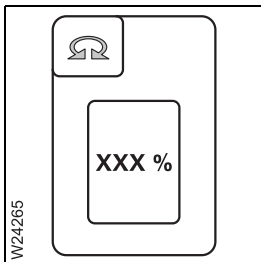



- Slewing to the left:** • Push the control lever to the left.  
**Slewing to the right:** • Push the control lever to the right.

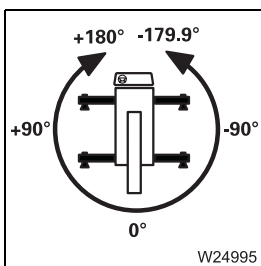
You can regulate the speed by moving the control lever and changing the engine speed with the accelerator.



You can adjust the desired engine speed (idling speed) with button (1);  p. 9 - 7.



You can limit the maximum slewing speed (1);  p. 10 - 123.

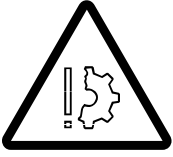


0 means that the superstructure is slewed to the rear.

- Angles in the **right semi-circle** are displayed as **positive** values (0° to +180°).
- Angles in the **left semi-circle** are displayed as **negative** values (0° to - 179.9°).



### Braking the slewing movement



You may only brake the slewing movement with the slewing gear brake.

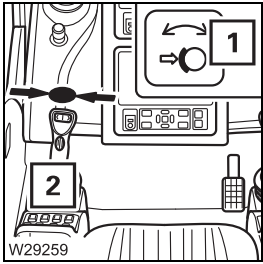
#### Risk of the main boom buckling!

On no account switch the slewing gear off to brake it; only switch the slewing gear off when the superstructure has stopped rotating.

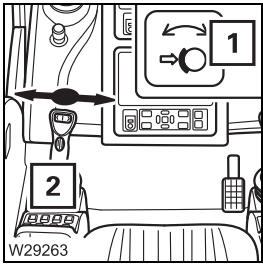
#### With the control lever

- Move control lever (2) towards its initial position – the slewing movement will be braked.

At the initial position, the slewing movement will be stopped. At the same time the slewing gear brake will be applied, and lamp (1) will light up.



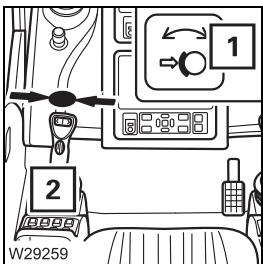
### Releasing the slewing gear brake



The slewing gear brake will be released as soon as you deflect the control lever (2).

Lamp (1) will extinguish if the slewing gear brake has been released.

### Applying the slewing gear brake



The slewing gear brake is engaged when you switch off the slewing gear; see p. 10 - 119.

The slewing gear brake will also engage if control lever (2) is in its initial position.

The lamp (1) will light up if the slewing gear brake has been applied.



### Slewing gear freewheel

The slewing gear freewheel is required if the slewing gear needs to be slewed by means of external forces, e.g. when operating with two cranes.



- Switch on the slewing gear.
- Shift the control lever (2) to its initial position.
- Press button (3) or (4).  
The slewing gear brake will be released – lamp (1) will not light up.

### Switching off the slewing gear

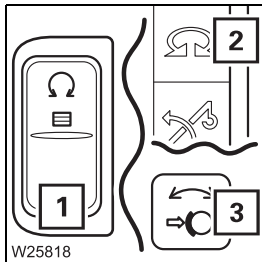
If the slewing gear is not required, it should be switched off to avoid unintentional use.



#### **Risk of damage to the main boom!**

Brake the slewing movement down to a standstill before you switch off the slewing gear. The slewing gear brake is automatically applied when the slewing gear is switched off.

This prevents excessive lateral forces from affecting the main boom due to heavy deceleration or swinging loads.



- Press the button (1) once.
  - The lamp in the button (1) lights up dimly.
  - Symbol (2) is **red** if the slewing gear is switched off.
  - The slewing gear brake is applied – lamp (3) lights up.

### 10.5.9

### Possible movement combinations

- The main hoist, telescoping mechanism, derricking gear and slewing gear can be operated in almost any combination simultaneously. Restrictions are specified for the respective power units.
- The auxiliary power units – Superstructure lock, tilt crane cab, counter-weight lifting unit – cannot be operated with the *Telescoping out* movement. Moving the auxiliary power units in combination with other power units can result in reductions of speed.
- Lattice extension derricking gear  
The lattice extension derricking gear cannot be operated in combination with the *Telescoping out* movement.



Certain movement combinations can reduce the speed in high-speed mode.

## 10.6

### Settings and displays for crane operation

This section only describes settings and displays needed during crane operation. Operating elements that can be assigned to other procedures are described with the corresponding procedures.

#### 10.6.1

#### Inclining the crane cab

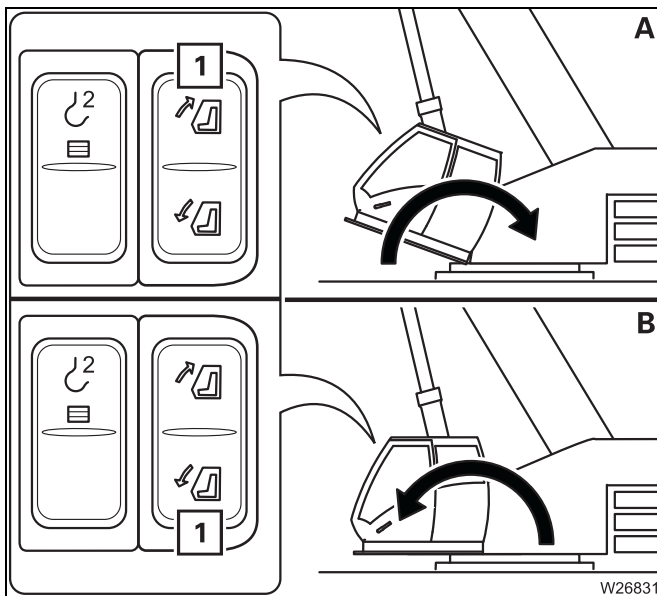
With the appropriate equipment, you can incline the crane cab to the rear in order to attain a better sitting position when working at great heights.



**Risk of accidents due to objects overturning in the crane cab!**

Close the crane cab door before inclining and remove all loose objects (e.g. bottles) from the crane cab.

This prevents objects from tipping over, the crane cab door opening by itself, and unintended operational accidents caused by fright.



**(A) – Incline to the rear**

- Close the crane cab door.
- Press the button (1) in at the top.

**(B) – Incline to the front**

- Close the crane cab door.
- Press the button (1) in at the bottom.

The crane cab will tilt as long as you hold the button down or until its end position is reached.

## 10.6.2 Set idling speed

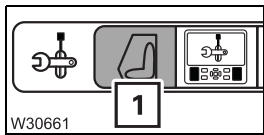
▣▣▣▣▶ *Set idling speed*, p. 9 - 7.

## 10.6.3 Adjusting the wiper stroke interval of the windscreen wiper

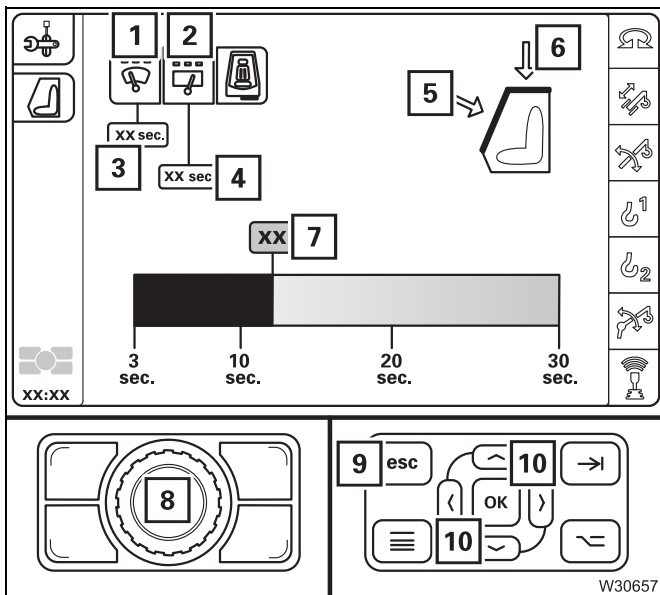
You can set a value between 3 and 30 seconds for the front and roof window wiper stroke interval.



The higher the selected value is, the longer the pauses between the strokes of the wiper are.



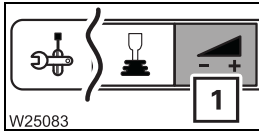
- Open the *Crane cab* menu (1).



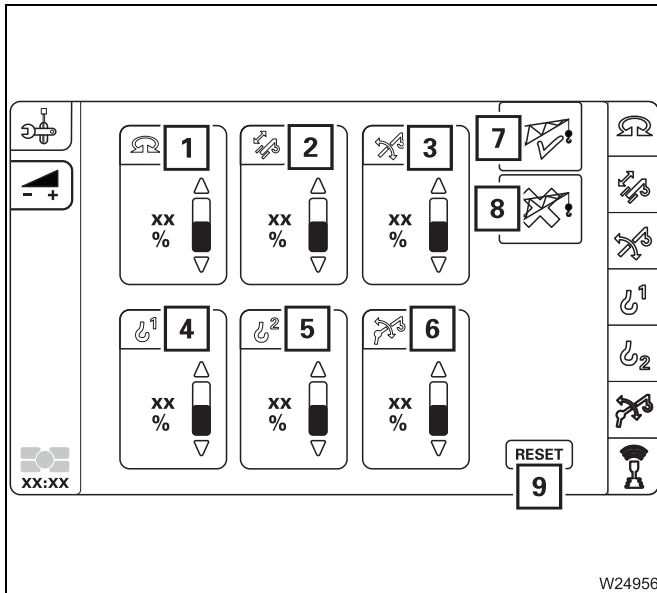
- The displays show the current values.
  - 3 Interval for windscreen wiper
  - 4 Interval for roof window wiper
- Select and confirm the symbol:
  - 1 For the windscreen wiper – Symbol (5) displayed
  - 2 For the roof window wiper – Symbol (6) displayed
- Select and confirm the symbol (7).  
Symbol is **orange** – input on.  
To cancel the input – press button (9) once.
- Change the value using buttons (8) or (10).
- Confirm the changed value.

## 10.6.4 Limiting the power unit speeds

You can enter what percentage of the maximum speed should be enabled for each power unit.



- Open the *Power unit speeds* menu (1).



The values below the symbols (1) to (6) indicate the currently set power unit speeds.

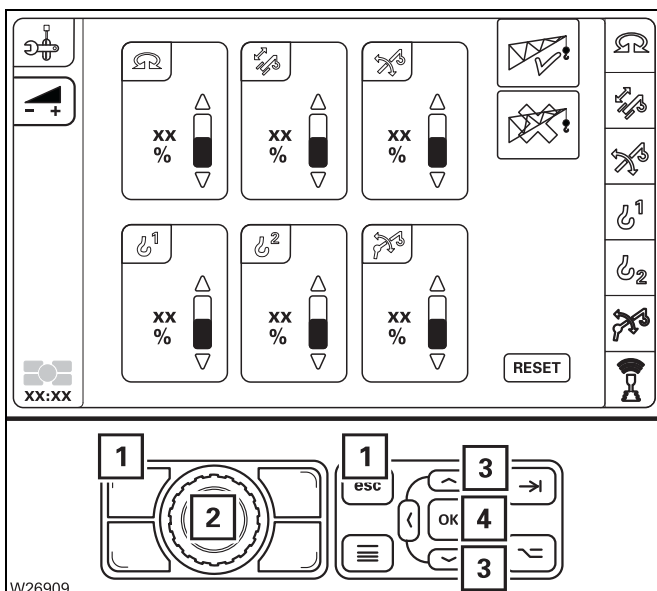
The values for the slewing gear (1) and derricking gear (3) only apply if they are lower than the automatically limited values. The automatically limited values are not displayed.

The symbol (5) is only active when the auxiliary hoist is connected.

With the preselection symbol for:

- 7 Operation **with** the lattice extension
- 8 Operation **without** the lattice extension

Symbol (9) resets all values without prior selection.



### Changing values


- Select and confirm the symbol for the relevant power unit – symbol **red**.
- Change the value using switch (2) or the buttons (3).

To cancel the input – press button (1) once.

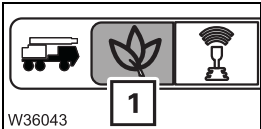
- Confirm the changed values – press switch (2) or button (4) once. The changed values for the power unit are applied.

## 10.6.5 Setting/switching on Economy mode

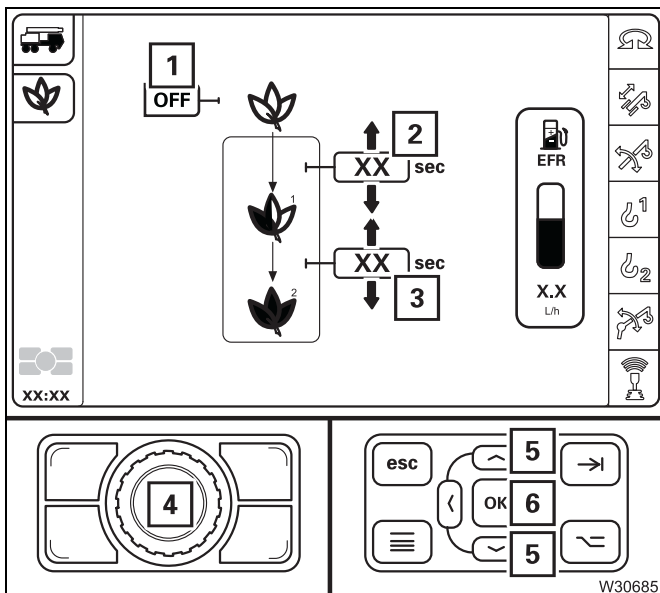
If you do not move the control lever during crane operation then the engine speed is reduced in 2 steps. You can adjust the time interval between the steps.

You can also manually switch on the *Economy Mode*;  p. 10 - 124.

### Automatically



- Open the *Economy* menu (1).



### Switching on

- Select and confirm the symbol (1) – symbol is red.

### Setting

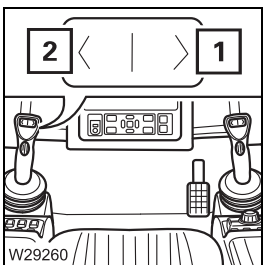
- Select and confirm the symbol (2) or (3). Change the value using switch (4) or the buttons (5).

You can set a period from 10 seconds to 10 minutes.

- Confirm the changed values – press switch (4) or button (6) once.

The engine speed is reduced during the set time intervals.

### Manual



- Press and hold the button (1) – for 3 seconds.

The engine speed is reduced and the superstructure drive is switched off.

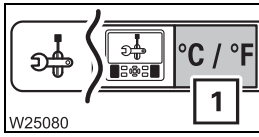
To end the Economy mode you can either:

- press the accelerator pedal,
- move a control lever,
- press the button (2),
- switch on a power unit.

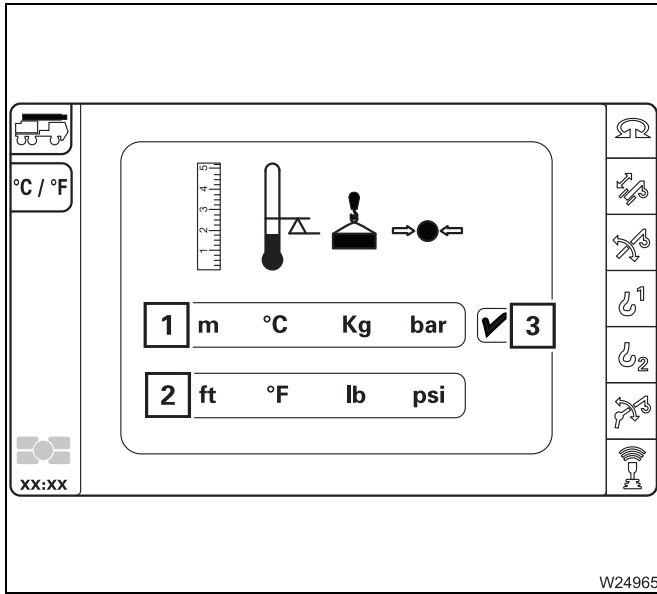
This applies to both the automatic mode and manual mode.

## 10.6.6 Switching units of measure

You can display the crane control values in metric units or US units.



- Open the *Switch units* menu (1).



- Select and confirm the symbol:

- 1 To display metric units
- 2 To display US units

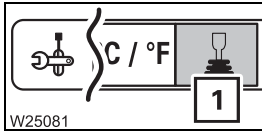
The symbol (3) shows the respective confirmed selection.

## 10.6.7

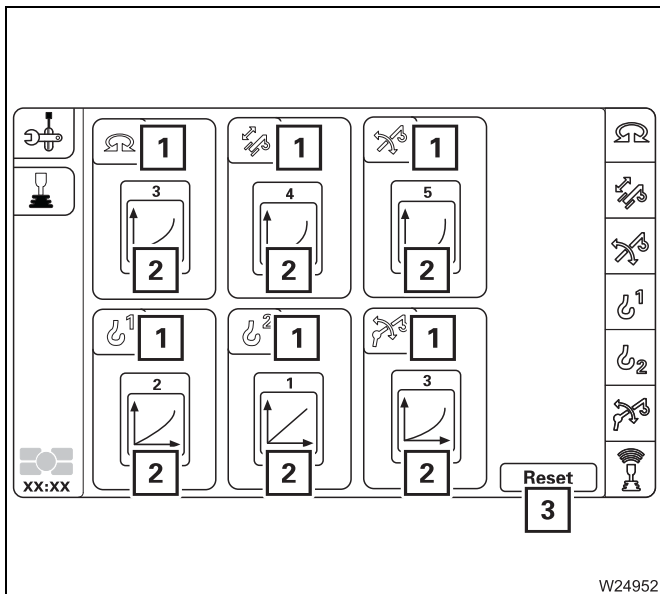
### Setting the characteristic curves for the control levers

The control lever characteristic curve determines how high the power unit speed should be for a particular control lever movement.

You can assign different control lever characteristic curves to the power units.



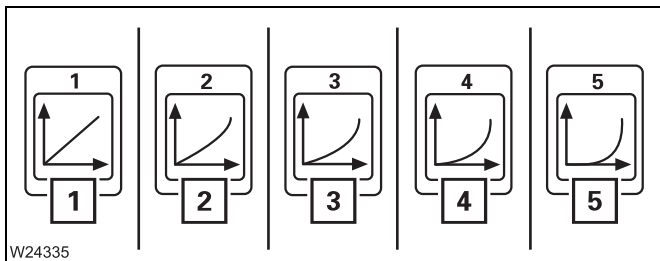
- Open the *Settings* menu (1).



The symbols (2) show the set characteristic curves of the power units (1).

- Select the power unit for which you would like to change the characteristic curve.
- Set the desired characteristic curve.

Select and confirm symbol (3) to reset all power units to characteristic curve 1.



There are five characteristic curves:

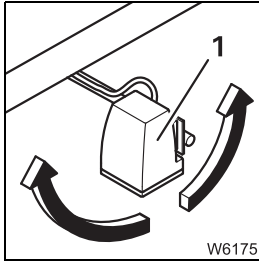
The higher the number of the characteristic curve (1) to (5), the further the control lever must be moved to get a clear increase in speed.

With characteristic curve (5), you can work particularly sensitively with the control lever.

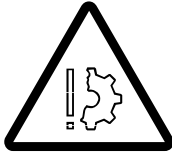


## 10.6.8

### Using the slewable spotlights



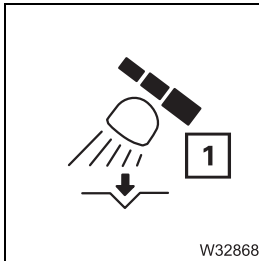
With the relevant equipment, the slewable spotlights (1) are located on the main boom. They are controlled from the crane cab.



#### **Risk of damage to the slewable spotlights!**

Make allowances for the position of the slewable spotlights before setting down the main boom.

This is prevent a collision between the working spotlights and the engine cover.



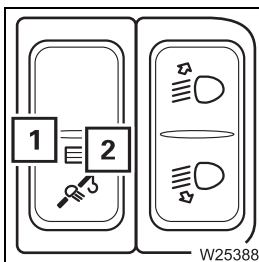
If when the main boom is being set down the symbol (1) is displayed:

- Slew the working spotlights until the symbol (1) goes out.



#### **Risk of accidents due to dazzling during on-road driving!**

When driving on the road, always direct the spotlight in such a way that the reflector points downwards. In this way, you can prevent yourself and other drivers from being dazzled and causing accidents.



#### **Switching on**

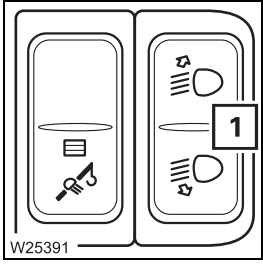
- Push the switch (1) in at the bottom – the lamp (2) lights up.

#### **Switching off**

- Push the switch (1) in at the top – the lamp (2) goes out.



## Manually swinging



### Swing upwards

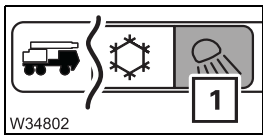
- Press the button (1) in at the top.

### Turn downwards

- Press the button (1) in at the bottom.

The direction of the spotlights will be adjusted until you let go of the button or they reach their end position.

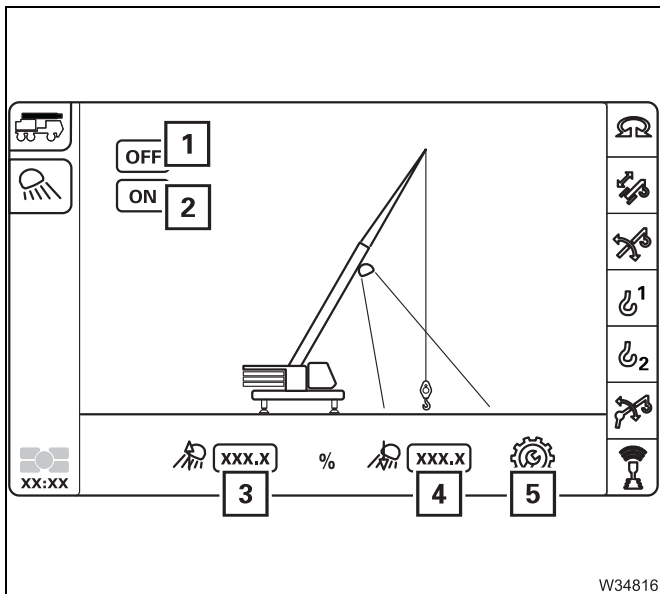
The automatic load tracking can be switched on via the *Spotlights* menu.



- Open the *Spotlight* menu (1).
- 

## Automatic load tracking

The pivoting spotlights must be manually aligned onto the load. You can then switch on the automatic load tracking. The spotlights automatically follow the load. You can adjusting the pivoting speed of the spotlights.



- Switch on the automatic load tracking – symbol (2).

You can adjust the pivoting speed:

- Open the submenu (5).

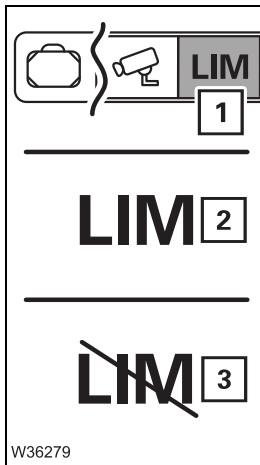
Speed can be

- increased with (3),
- decreased with (4).

Switch off the automatic load tracking – symbol (1).

## 10.6.9

### Override torque reduction



If the engine torque has been reduced then the symbol (2) is shown in the start menu.

You can override the torque reduction function for a limited time while working with the crane.

- Select and confirm the symbol (1) – symbol (3) appears.

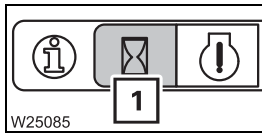
The torque reduction function is overridden for 30 minutes. After 30 minutes the torque is automatically reduced again.

You can override this reduction three times. The torque is reduced continuously with each override – starting at 80% down to 20%.

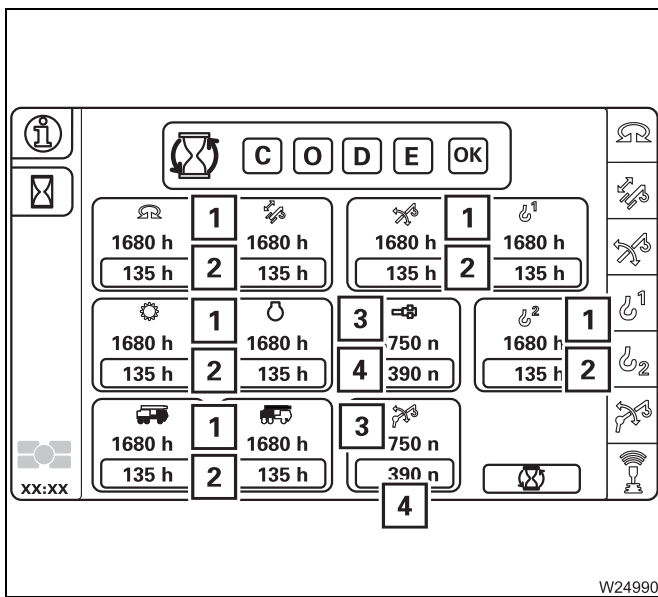
After the third override the symbol (1) will become inactive until the engine is restarted.

## 10.6.10 Displaying the operating hours

You can view the total operating hours for all power units in the *Operating hours* menu. You can also delete the recorded operating hours. The total operating hours cannot be deleted.



- Open the *Operating hours* menu (1).



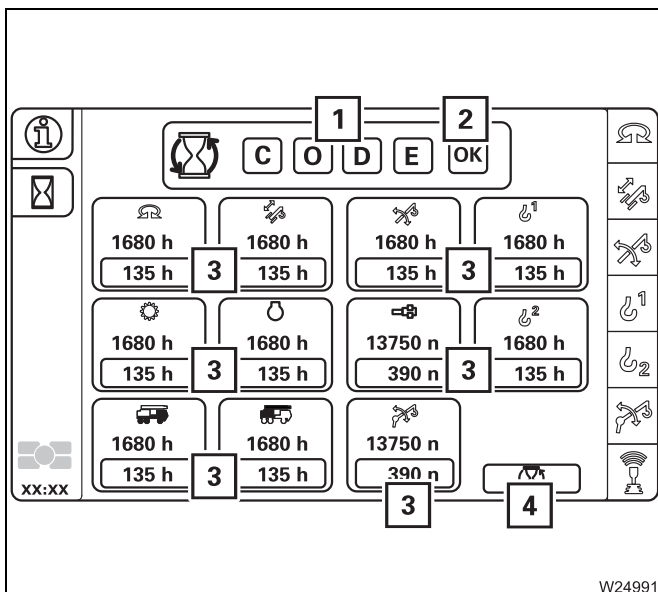
### Displays

The operating hours are recorded as follows:

- The value (1) indicates the total operating hours, e.g. 1,680 hours.
- The value (2) shows the operating hours, which can be reset.

**Exception:** The value below the symbol (3) indicates how often the cycle *Unlock telescopic section* has been operated, e.g. 13,750 times.

The value (4) shows the cycles; this can be reset.



### Reset

The displayed operating hours/cycles (3) can be reset.

- Enter the keycode in the fields (1) and confirm with (2).

You can perform the following actions for power units:

- select individually (3),
- select all (4).
- Reset the selected operating hours with button (5) or (6).

## 10.7

### Working range limiter

You can set and monitor three different limits in the working range limiter menus:

- a maximum overall height,
- a maximum working radius,
- a maximum slewing angle,
- a limited rope travel.

The monitoring of the programmed limits can be switched on and off separately.



#### **Risk of accidents due to situations which cannot be monitored!**

The working range limiter only serves as an additional safety device. Brake the crane movement before contact with the obstacle becomes imminent. Do not deliberately move into the shutdown range. You, the crane operator, are still responsible for monitoring the working range, so that you can react appropriately if situations arise which cannot be monitored electronically.



#### **Risk of accidents due to limits set too low!**

When entering the limit values, bear in mind that, even after switching off the engine, movements can still occur that would bring the load into the shutdown area, e.g. due to the load swinging or the boom bending. For this reason, always enter the limit values with sufficient safety margin from the object.



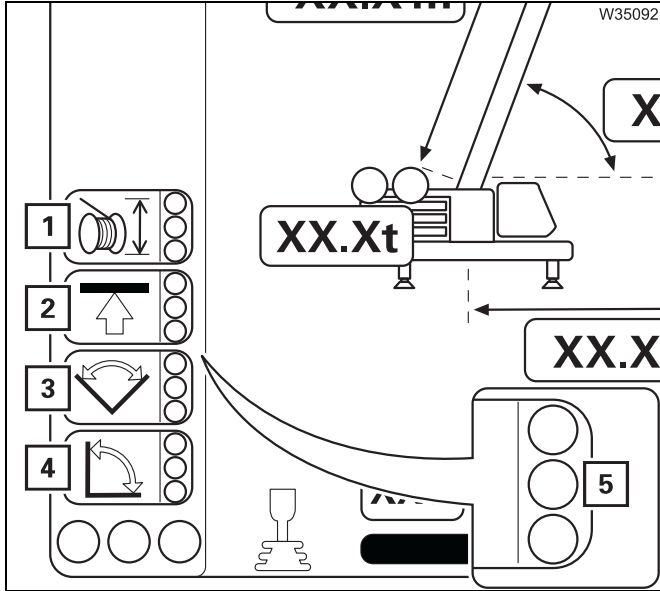
#### **Risk of accident due to insufficient safe distances!**

Always observe all safety distances in accordance with the national legal regulations (e.g. concerning overhead power lines) even if the working range limiter is switched on.

## 10.7.1 Viewing current settings

### On the RCL display

The displays show monitoring and speed limitations that are switched on.

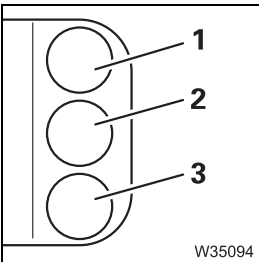


### Working range limiter displays

The corresponding symbol is shown when a monitoring system is switched on.

- 1 Hoist rope travel limitation monitoring
- 2 Overall height monitoring
- 3 Slewing angle monitoring
- 4 Working radius monitoring

The display shows (5) if the power unit speed has been reduced.



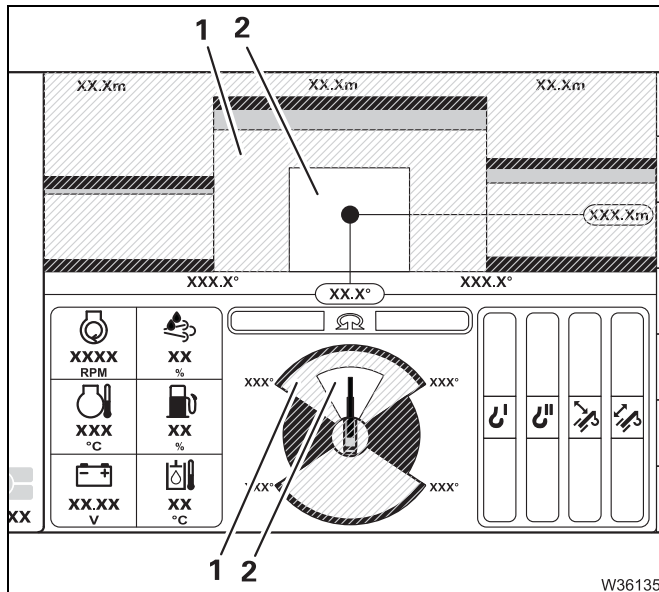
There are three displays.

- 1 **Red:** Movement disabled
- 2 **Yellow:** Speed reduced<sup>1)</sup>
- 3 **Green:** Speed not reduced

1) The maximum enabled power unit speed depends on the distance to the limit value.

**In the CCS  
Start menu**

The RCL shows the limited working range for the *slewing angle* and *working radius* monitoring systems.

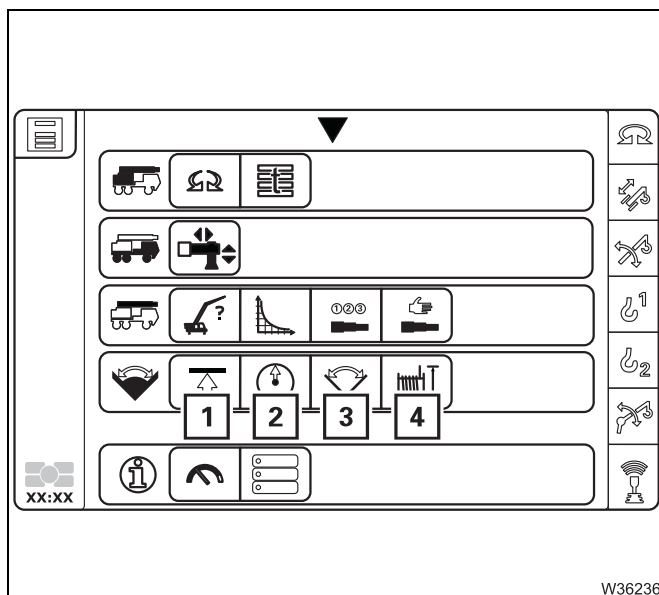


Display examples for switched-on *slewing angle* and *working radius* monitoring systems.

- 1 Permissible working range according to the *lifting capacity table* – shown darkened
- 2 Limited working range – shown lightened

**10.7.2**

**Opening the working range limiter menu**

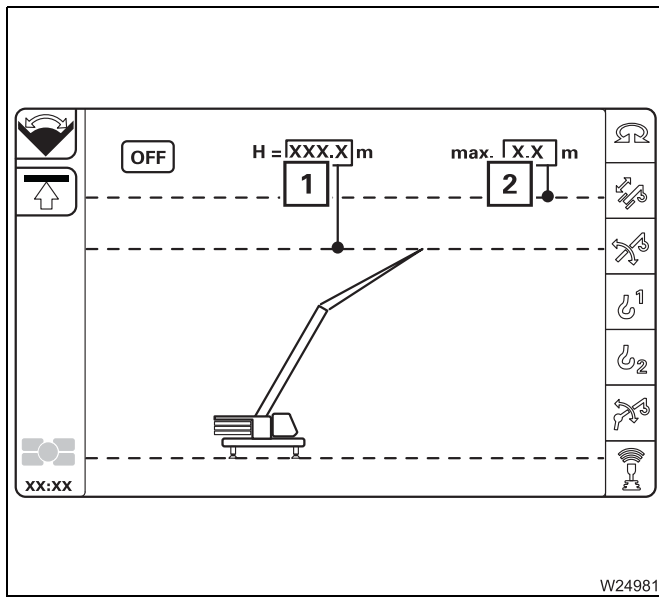


- Open the *Menu groups overview* menu if necessary and select the corresponding symbol (1) to (4).

The corresponding *Working range limiter* menu opens.



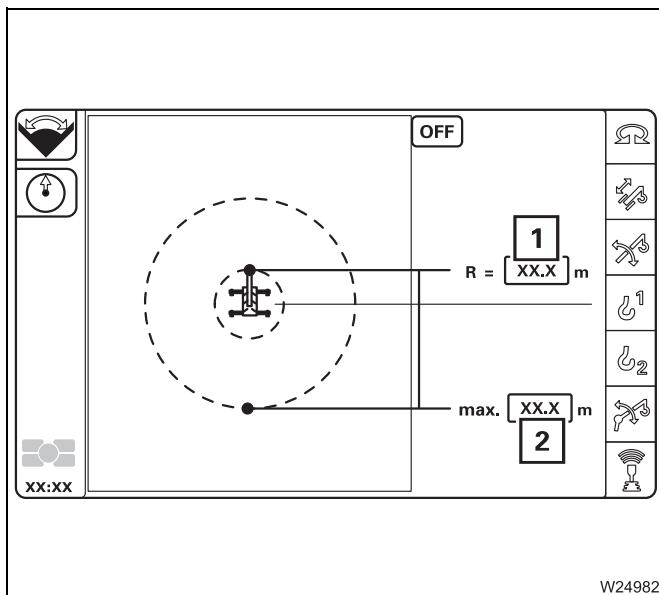
The working range limiter values are displayed graphically and numerically.



### Limit values/current values for height

The symbols show values for:

- 1 Current overall height
- 2 Permissible overall height

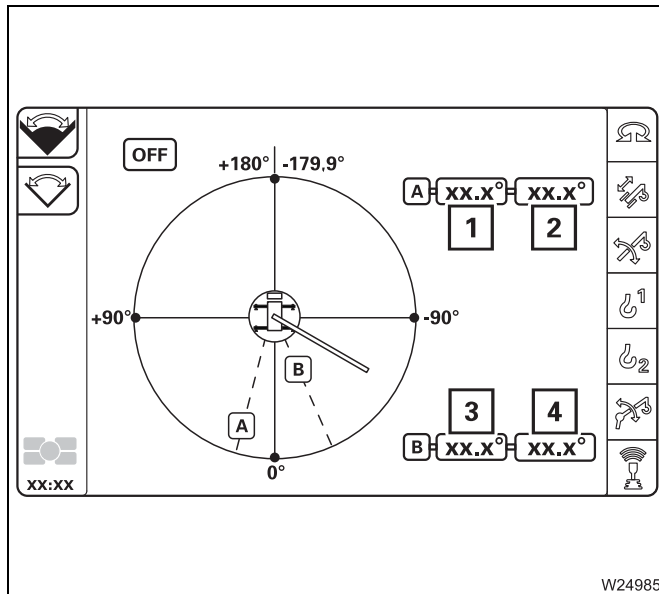


### Limit values/current values for working radius

The symbols show values for

- 1 current working radius
- 2 permissible working radius

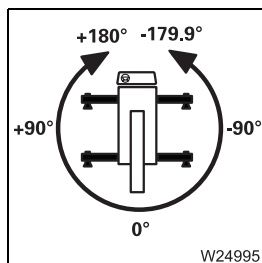




### Limit values/current values for slewing angle

The symbols show values for

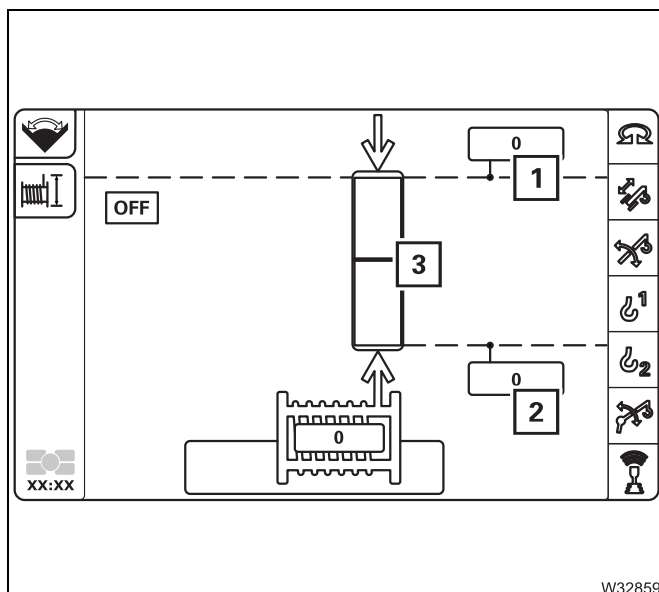
- 1 current slewing angle A
- 2 permissible slewing angle A
- 3 current slewing angle B
- 4 permissible slewing angle B



### The following applies to the slewing angle display:

0 means that the superstructure is slewed to the rear.

- Angles in the **right semi-circle** are displayed as **positive** values (0° to +180°).
- Angles in the **left semi-circle** are displayed as **negative** values (0° to -179.9°).



### Hoist rope limit values

The symbols show

- 1 Hoist rope travel limitation top
- 2 Hoist rope travel limitation bottom
- 3 Current position

The displayed values are purely numeric values from the rotary encoder and can be positive or negative. The values have no relationship to the actual hook height and are only used for limit value acquisition during the current lift.



### 10.7.3

## Entering limit values

This section describes how to enter unknown limit values by moving to the shutdown points.

You can enter known limit values directly; *Entering limit values manually*, p. 10 - 140.

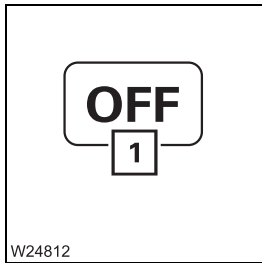


#### Risk of accidents due to limits set too low!

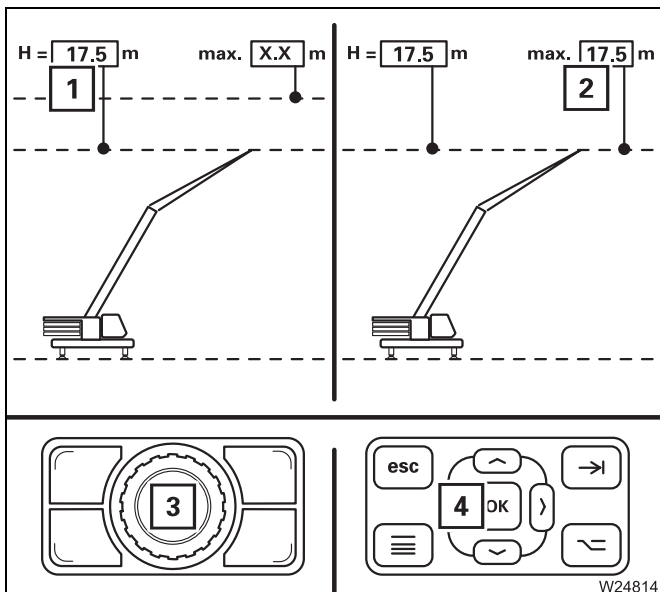
When entering the limit values, bear in mind that, even after switching off the engine, movements can still occur that would bring the load into the shutdown area, e.g. due to the load swinging or the boom bending. For this reason, always enter the limit values with sufficient safety margin from the object.

#### When entering the values:

The monitoring must be switched off – symbol (1) is red; p. 10 - 142.



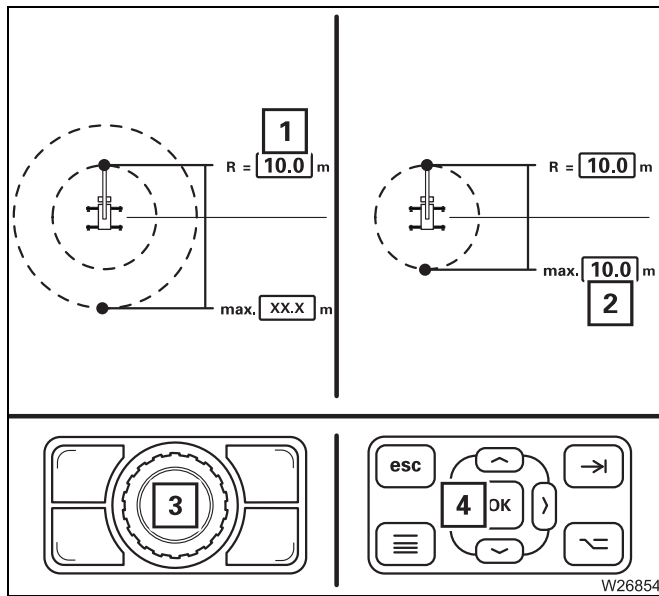
#### Overall height



- Move the main boom head to just before the shutdown point without a load, e.g. up to 17.5 m – value (1).
- Press the button (3) or (4) once.
  - The current value (1) will be accepted as the limit value (2).

Switch on monitoring; p. 10 - 142

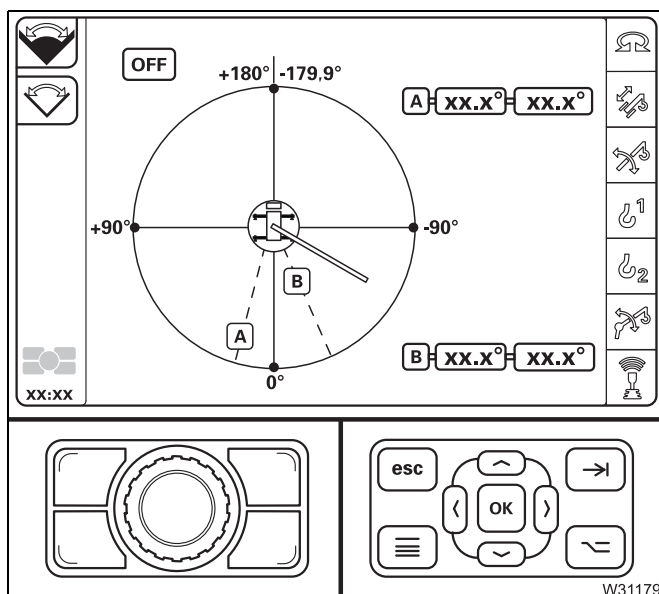
## Working radius



- Move the main boom head to just before the shutdown point without a load, e.g. up to 10.0 m – value (1).
- Press the button (3) or (4) once.
  - The current value (1) will be accepted as the limit value (2).

Switch on monitoring; p. 10 - 142

## Slewing angle

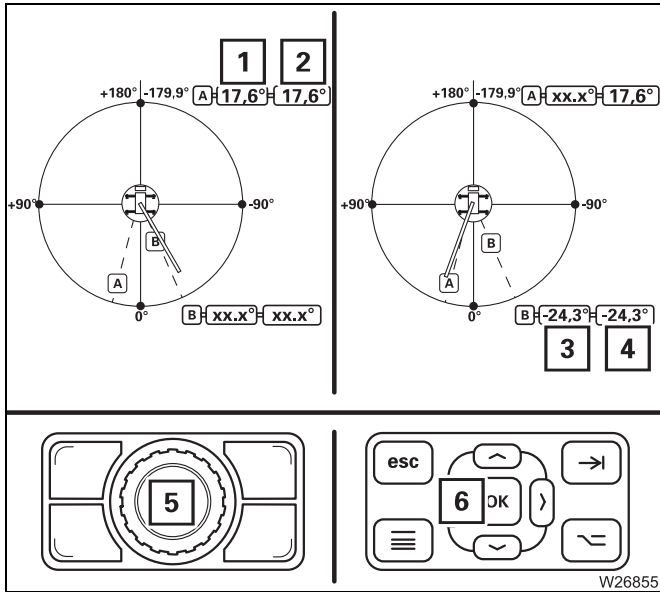


### Display of the slewing angles

- The slewing angle **A** limits slewing to the right.
- The slewing angle **B** limits slewing to the left.

Switch on monitoring; p. 10 - 142





### Entering the permissible slewing range

You must enter the slewing angles **A** and **B** separately.

#### Slewing angle **A**

- Slew the main boom to the shutdown point from the right, e.g. value (1).
- Press the button (5) or (6) once.
  - The current value (1) will be accepted as the limit value (2).

#### Slewing angle **B**

- Slew the main boom to the shutdown point from the left, e.g. value (3).
- Press the button (5) or (6) once.
  - The current value (3) will be accepted as the limit value (4).

Switch on monitoring; p. 10 - 142

### Hoist rope travel limitation

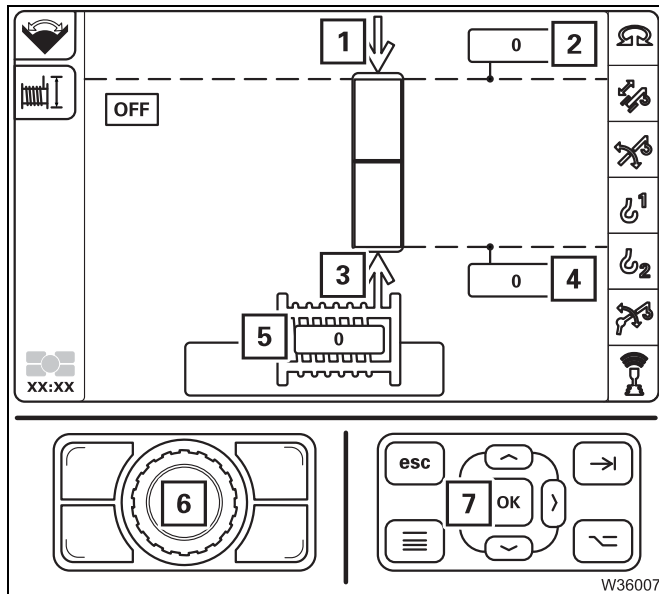
The values for the hoist rope limitation may not be entered until the telescope status and the boom position for the application have been rigged.

If you change the telescope status or boom position after entering values for hoist rope limitation, then the *RCL* display will show an error message; *Warning and error messages*, p. 14 - 3.



#### **Risk of accidents due to the hoist rope travel limitation being switched off!**

Always set the telescope status and the boom position for crane operation before setting hoist rope travel limitation. In this way you prevent an interruption of crane operation due to shutdown.



### Limiting lifting

- Lift the load to the necessary height. Select the symbol (1).
- Press the button (6) or (7) once. The current numerical value (5) is set at the symbol (2) as the upper limit value, symbol (1) confirms the entry.

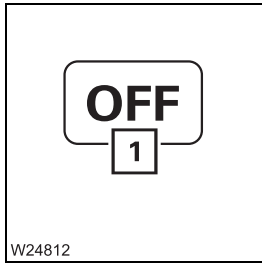
### Limiting lowering

- Lower the load to the necessary height. Select the symbol (4).
- Press the button (6) or (7) once. The current numerical value (5) is set at the symbol (4) as the lower limit value, symbol (3) confirms the entry.

Switch on monitoring;  p. 10 - 142

## 10.7.4

## Entering limit values manually

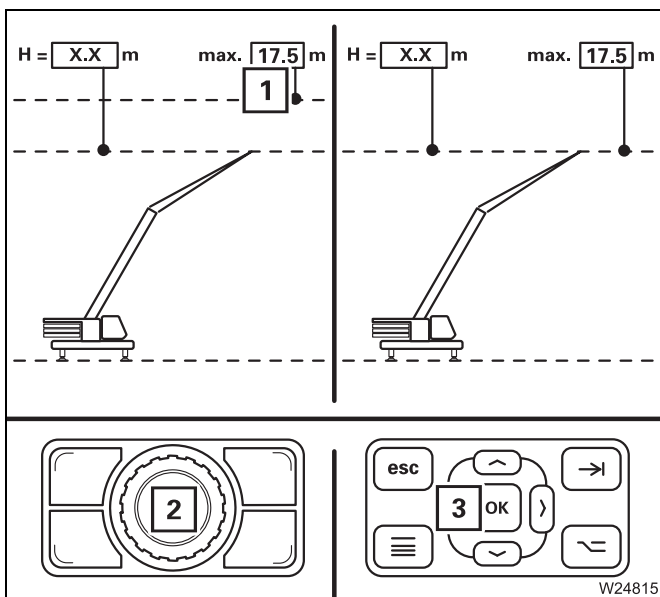


### When entering the values:

The monitoring must be switched off – symbol (1) is red; Switching monitoring functions on/off, p. 10 - 142.

### Limit values

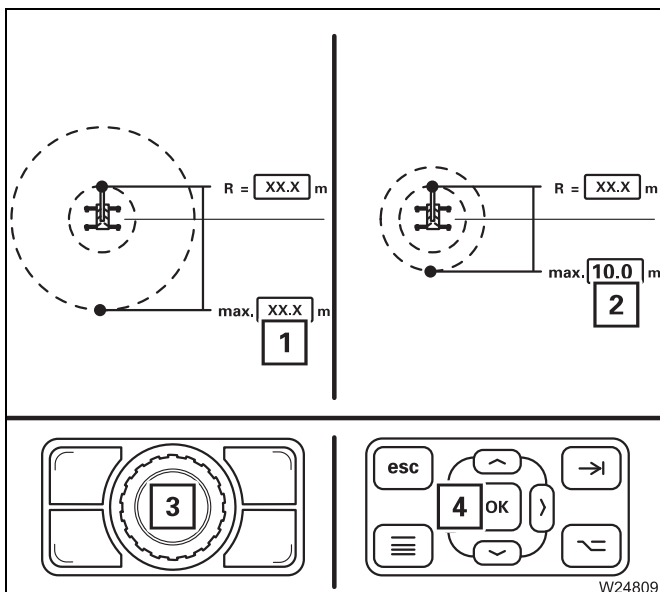
The limit values for the overall height, the working radius, and the slewing angle are entered in the same way.



### – For the overall height

- Select and confirm the symbol (1) – symbol is red.
- Set the limit value, e.g. 17.5 m and confirm with button (2) or (3). The value is adopted.

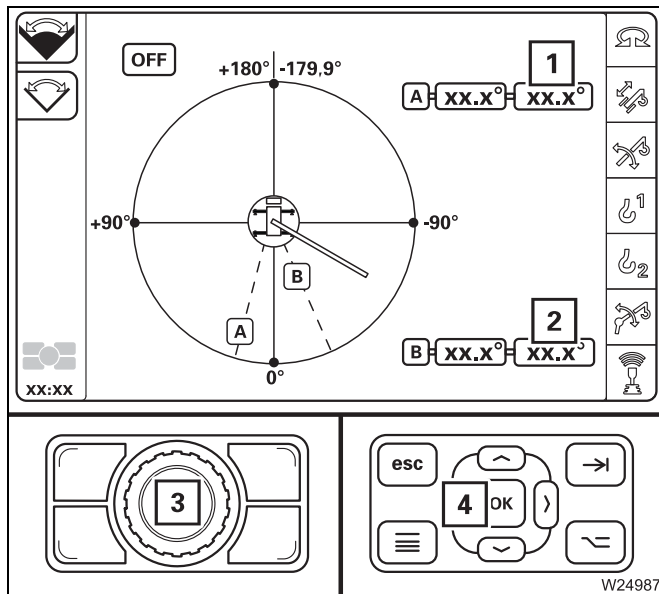
Switch on monitoring; p. 10 - 142



### – For working radius

- Select and confirm the symbol (1) – symbol is red.
- Set the limit value, e.g. 10.0 m and confirm with button (2) or (3). The value is adopted.

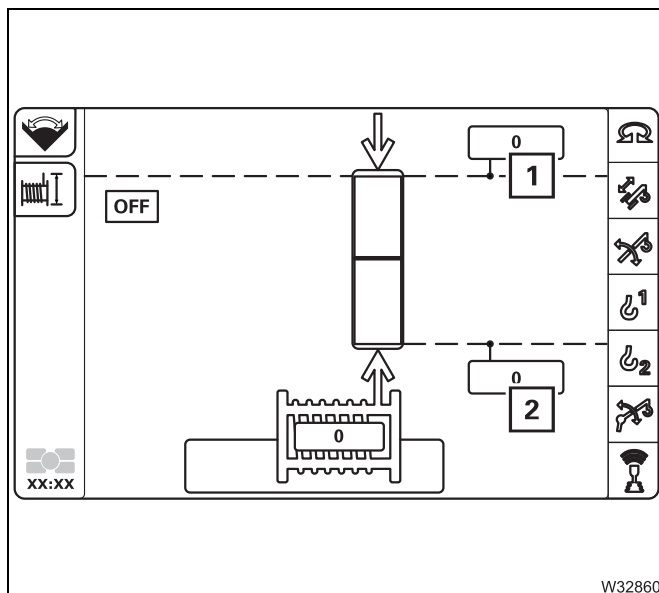
Switch on monitoring; p. 10 - 142



**– For slewing angles**

- Set the respective limit value and confirm with button (3) or (4). The value is adopted.
- The symbol (1) for the slewing angle A – symbol is red,
- The symbol (2) for the slewing angle B – symbol is red.

Switch on monitoring; p. 10 - 142



**– For the hoist rope travel**

For hoist rope travel limitation the values (1) and (2) cannot be entered manually.

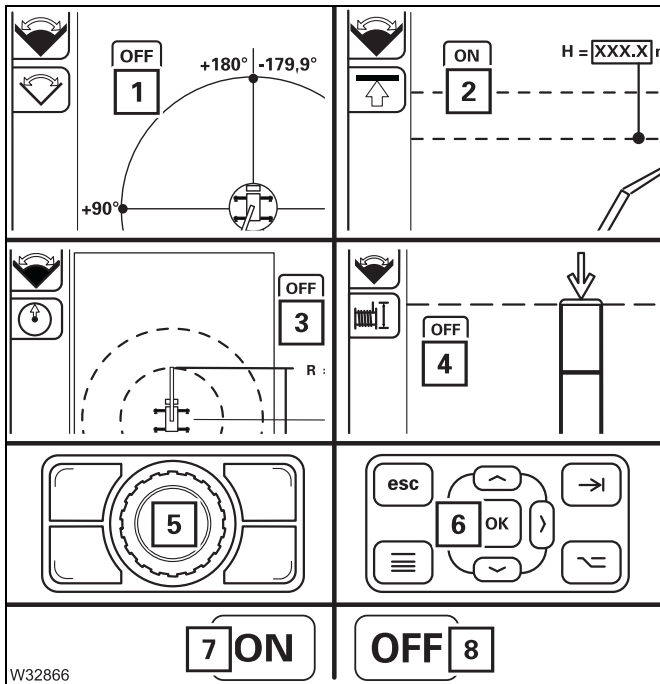
## 10.7.5

### Switching monitoring functions on/off

After turning on the ignition, all monitoring functions that were on before the ignition was switched off are switched on.



When monitoring is switched on, the movement towards the shutdown limit is continually reduced until reaching a standstill. The currently enabled speed range is displayed visually; p. 10 - 132.

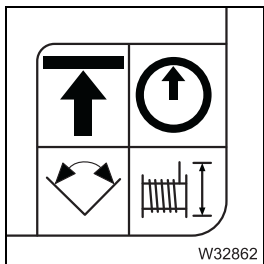


Select the symbol for switching the desired monitoring on/off.

- 1 Slewing angle
- 2 Overall height
- 3 Working radius
- 4 Hoist rope travel limitation

- 7 Switch on
- 8 Switching off

- Confirm the selection with button (5) or (6).



#### Monitoring display switched on/off

**Symbol red:** Monitoring switched on

**Symbol grey:** Monitoring switched off



#### Danger of accident due to incorrectly set limit values!

After switching on the monitoring function, slowly approach all limits and check that the system switches off in time.

If necessary, enter new values with larger safety distances.







## 10.7.6

### Shutdown by working range limiter

If a limit value is reached, RCL shutdown will occur. All movements that would go closer to the limit value will be disabled. Shutdown will remain active even if you switch off the monitoring function.

The RCL display also shows an information symbol. You must leave the shutdown area in order to enable the movement.

RCL display	Shutdown point reached for	Disabled movements
	Overall height	<ul style="list-style-type: none"> <li>- Raising</li> <li>- Extending</li> <li>- Lowering the hoist</li> <li>- Derricking the lattice extension</li> </ul>
	Working radius	<ul style="list-style-type: none"> <li>- Lower</li> <li>- Extending</li> <li>- Lifting the hoist</li> <li>- Derricking the lattice extension</li> </ul>
	Slewing angle <b>A</b>	- Slew to the left
	Slewing angle <b>B</b>	- Slew to the right
	Rope travel limitation Lifting	- Lifting
	Rope travel limitation Lowering	- Lowering



#### Risk of accidents due to overriding shutdown procedures!

Override RCL only if it is absolutely necessary and you have a clear view of the hazard area. Bear in mind that, due to the boom bending for example, the overall height is increased if you set down the load.

If you override the RCL, the shutdown will be overridden and all movements enabled.

Blank page

## 10.8

## Work break

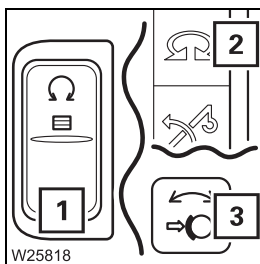
### 10.8.1

### In case of short work breaks

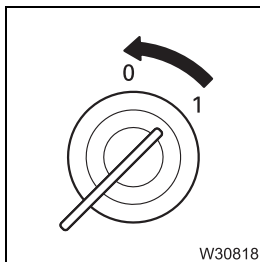


#### Risk of accidents due to suspended loads!

Never switch off the engine whilst a load is suspended. You must have the control levers at hand in order to intervene at any time.  
Always set down the load before you leave the crane cab.



- Switch off the slewing gear.
  - The lamp in the button (1) must be dimly lit.
  - The symbol (2) is **red** – slewing gear switched off.
  - Lamp (3) must light up – slewing gear brake applied.



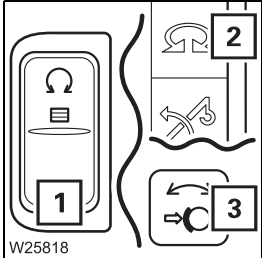
Switch the engine off, turn the ignition key to position **0** and remove it.

Ensure that no unauthorised persons can operate the truck crane;  
➡ *To secure the truck crane, p. 10 - 146.*

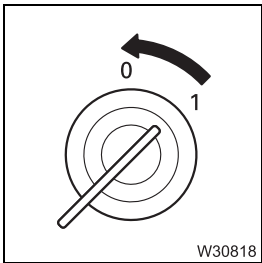
## 10.8.2

### In case of work breaks of more than 8 hours

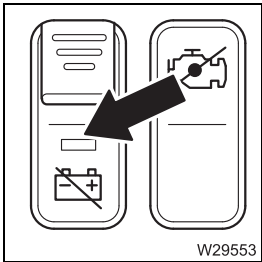
- Retract all telescopic sections.
- Lower the main boom.



- Switch off the slewing gear.
  - The lamp in the button (1) must be dimly lit.
  - The symbol (2) is **red** – slewing gear switched off.
  - Lamp (3) must light up – slewing gear brake applied.



- Switch the engine off, turn the ignition key to position **0** and remove it.
- Switch off all current consumers.



- Switch off the battery master switch. This will not interrupt the run-down period of the heater.

#### To secure the truck crane

- Secure the truck crane against unauthorised use by:
  - stowing away the hand-held control in the crane cab,
  - Removing the ignition key and
  - locking the crane cab.

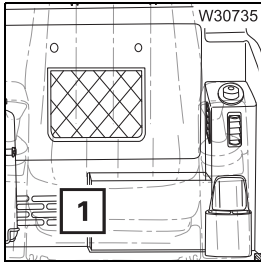


#### **Danger due to unauthorised use!**

Always lock the hand-held controller before you leave the truck crane. This way you can prevent unauthorised persons from starting the engine with the hand-held control.

## 10.9

## Heating and air-conditioning system



- Do not cover the grille (1).  
Air is sucked in through the grille.

### 10.9.1

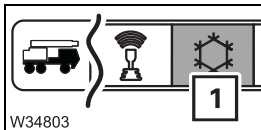
### Standard heating system

#### Switching on



- Switch on the ignition or start the engine.

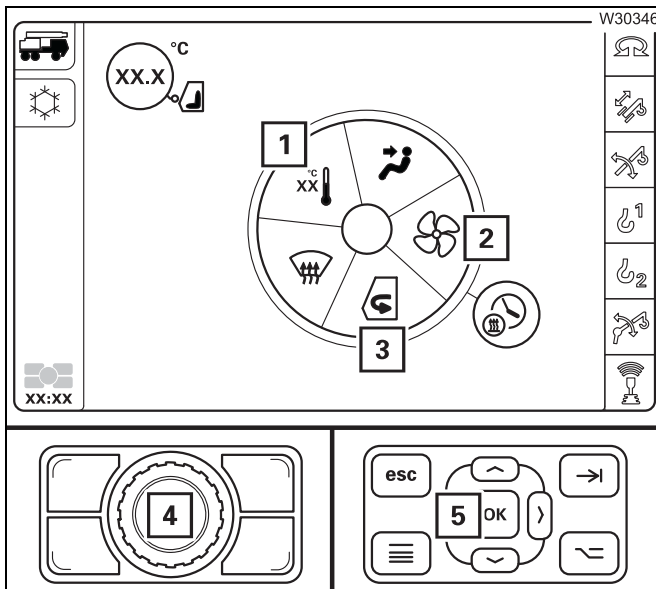
The batteries will run down if you operate the heater with the engine switched off. You must recharge the batteries at shorter intervals if you use the auxiliary heater frequently when the engine is not running!



- Open the *Heating* menu (1).

#### Heating

You must set the fan, fresh air/recirculated air and the temperature.



#### Setting the temperature

- Select and confirm the symbol (1) – symbol is red.

#### Setting the fan

- Select and confirm the symbol (2) – symbol is red.

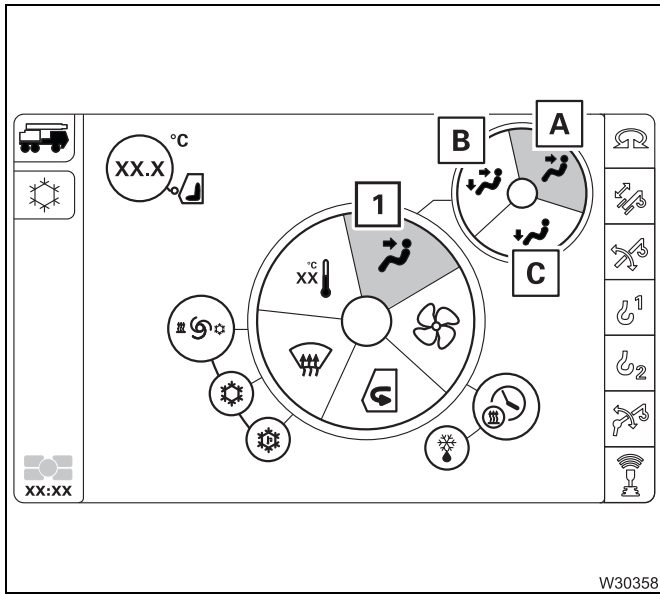
#### Fresh air/recirculated air

- Select and confirm the symbol (3) – symbol is red.
- Change and confirm the respective values using the controls (4) or (5).



### Setting the air distribution

You can direct the air to flow out of various air vents.



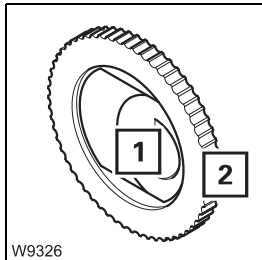
- Select the corresponding symbol (1) for the desired air vents.

- A Top only
- B Top and bottom
- C Bottom only



#### **Danger of overheating!**

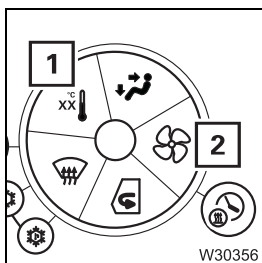
Never close all air vents when the heating is switched on. This prevents the heating system from overheating!



#### **Adjusting the air vents**

- |                             |                                  |
|-----------------------------|----------------------------------|
| 1 – To open:                | Press in and position lengthwise |
| – To close:                 | Position crosswise               |
| – To direct the air flow:   | In intermediate position         |
| 2 – To direct the air flow: | Slewing                          |

### Switching off



#### **Switching off the heating system**

- Reduce the temperature – symbol (1).

#### **Switching off the ventilation**

- Switch off the ventilation – symbol (2).

## 10.9.2 Air-conditioning system

You can use the air-conditioning system to cool and dry the air in the crane cab.

### Information

Do not cool the air in the crane cab too much. The difference between the outside temperature and the inside temperature should be at the most 10 °C to 14 °C (50 °F to 57.2 °F). If the cooling is too severe, you may frequently feel physically uncomfortable, albeit mostly only after you leave the cool environment.

Avoid having cold air blowing directly on to your body.

If the truck crane has been exposed to strong sunlight for a long period of time, for example, the air-conditioning system should initially be operated at the highest blower level with the engine running.

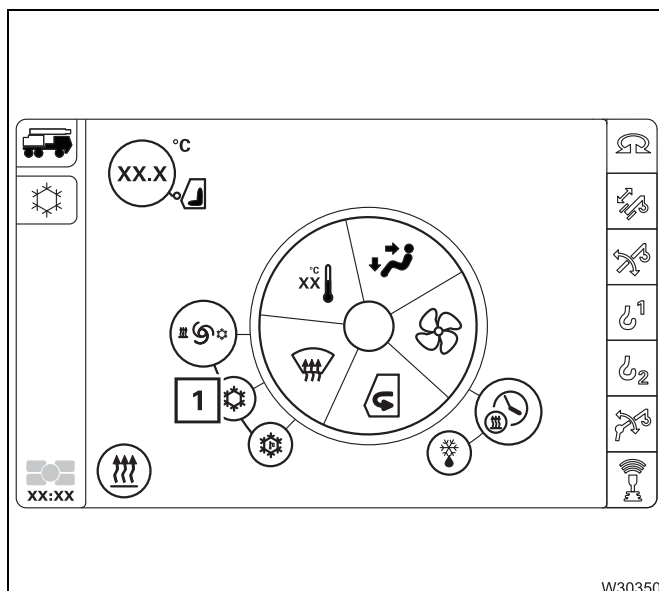
The door or at least the windows should be left open for a short while to thoroughly air the cab.

If the air-conditioning system is operated continuously, close the windows and doors to ensure sufficient cooling.

Once the inside temperature has reached the desired temperature, set the fan to a lower level.

### Switching on/off

- Start the engine. The air-conditioning operates only when the engine is running.



### Switching on

- Select and confirm the symbol (1) – Symbol **red**

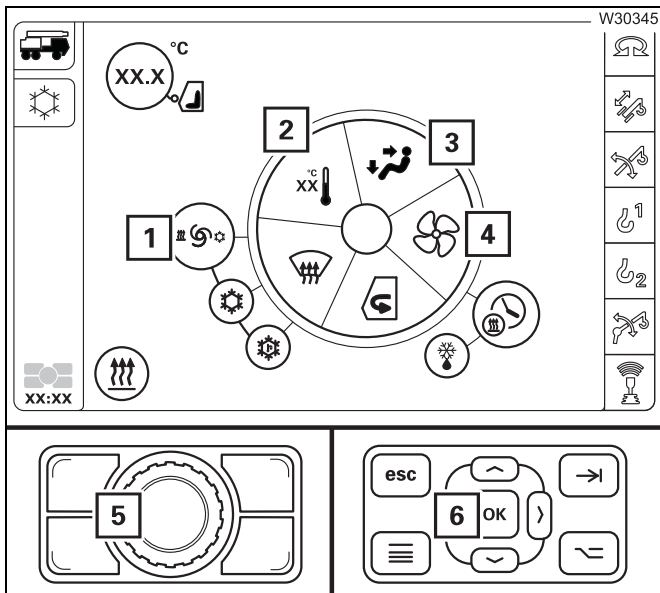
### Switching off

- Select and confirm the symbol (1) again – Symbol **grey**



**Cooling,  
 automatic**

The illustration shows only a sample setting. Always adjust the setting to the current conditions.

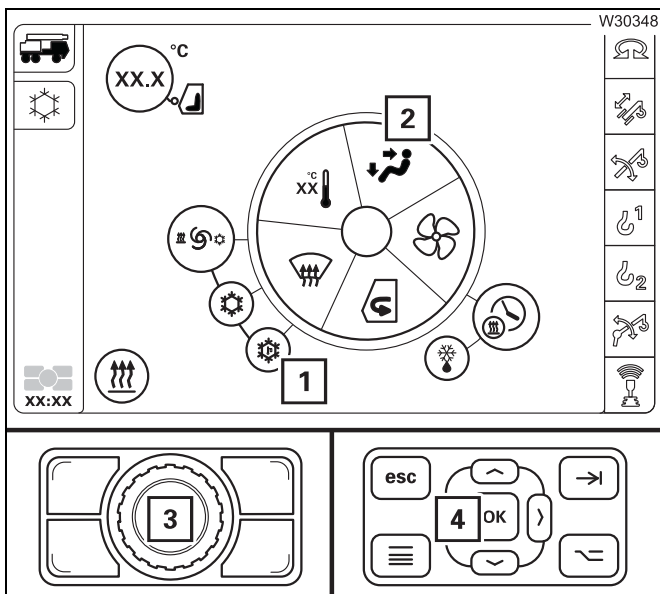


- Select and confirm the symbol (1)  
 – Symbol **red**.
- Set the desired temperature – Symbol (2).
- Open the air vents if necessary.
- Change and confirm the respective values using the controls (5) or (6).

The air distribution (3) and fan level (4) are set automatically.

**Cooling,  
 maximum**

You can also manually cool the crane cab without regulation. The air-conditioning operates at maximum power and at the highest fan level.



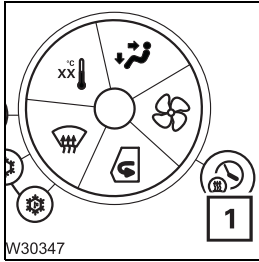
- Select and confirm the symbol (1)  
 – Symbol **red**.
- Open the air vents if necessary.
- Change and confirm the respective values using the controls (3) or (4).

The air distribution (2) is set automatically.



### 10.9.3

## Auxiliary heater



You can use the auxiliary air heater to preheat the crane cab.



The batteries will be drained if you operate the auxiliary heater with the engine switched off. You must recharge the batteries at shorter intervals if you use the auxiliary heater frequently!

### Switching on

You can set an automatic start time and duration for the heating, over several days; *Setting the heating start/heating duration*, p. 10 - 152.

- Before switching on the heating system, check whether it is allowed to be operated at the current location of the truck crane. Find out whether there are any possible sources of danger that could result in an explosion.



#### **Risk of explosion when operating the heating system!**

The heating system may not be operated:

- at service stations and tank farms,
- at places where flammable gases or vapours can be found or formed (e.g. at places where fuel is stored and in chemical factories),
- at places where explosive dust can be found or formed (e.g. carbon dust, wood dust and grain dust).

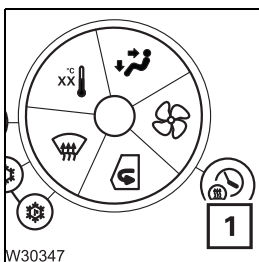


#### **Risk of suffocation when operating the heating system!**

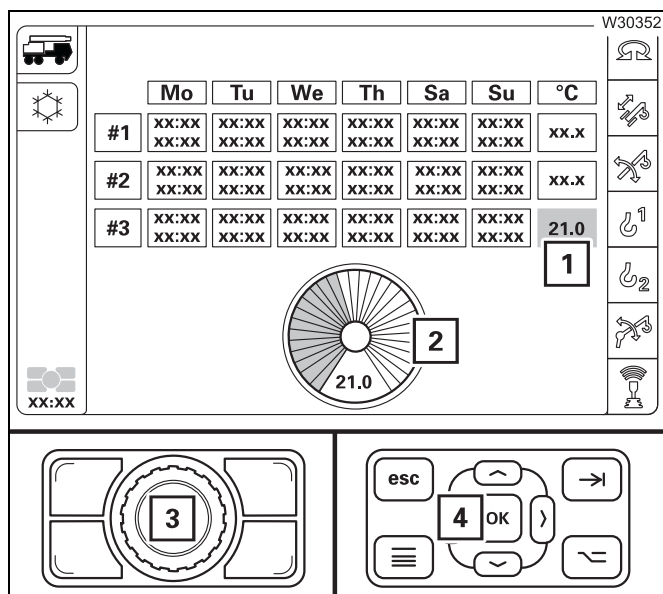
Do not operate the heating system or the heating system with the timer in enclosed rooms (e.g. garages).

The engine in the carrier is switched off and the ignition in the driver's cab is switched off; *Switching off the engine*, p. 4 - 21.

- Switch on the ignition in the crane cab; *Switch on the ignition*, p. 9 - 4.
- Select and confirm the symbol (1) – the submenu opens.

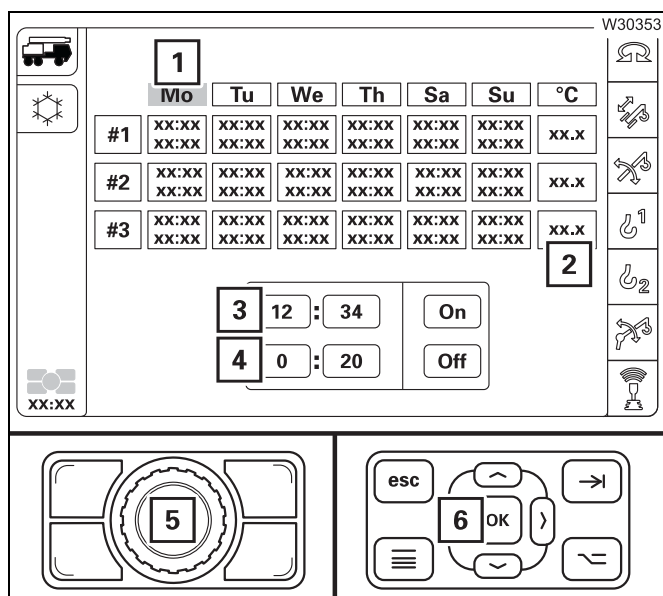


## Setting the temperature



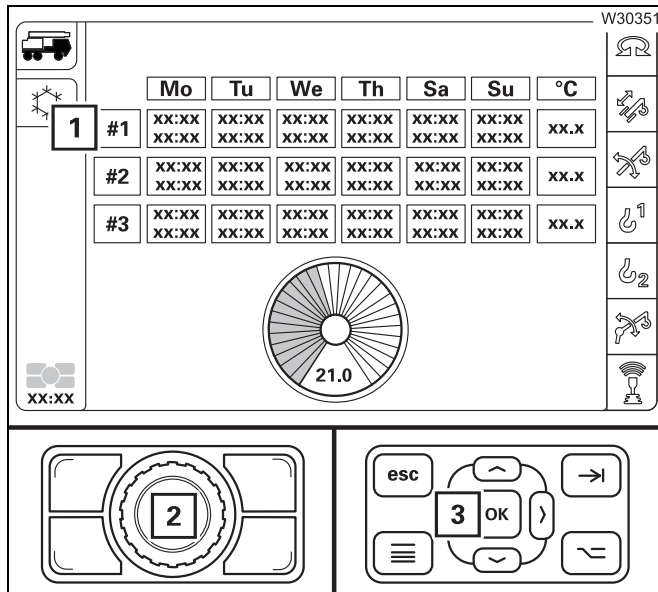
- Select the symbol (1).
- Set the desired temperature – Symbol (2).
- Change and confirm the respective values using the controls (3) or (4).

## Setting the heating start/ heating duration



- Select a weekday – symbol (1).
- Set the starting time for the heating – Symbol (3). You can set up to three starting times.
- Set the desired heating duration – Symbol (4). You can set a maximum heating duration of 2 hours.
- Set the desired temperature – Symbol (2).
- Change and confirm the respective values using the controls (5) or (6).

## Switching heating start on/off



### Switching on

- Select a storage location (e.g. #1) – symbol **(1) red**. You can also selected other storage locations.

The auxiliary heating now starts at the times stored in the corresponding column.

### Switching off

- Select a storage location (e.g. #1) – symbol **(1) grey**. You can also selected other storage locations.
- Change and confirm the respective values using the controls **(3)** or **(4)**.

## 10.10 CraneSTAR system

### 10.10.1 Overview

Your truck crane is equipped with the CraneSTAR system.

The CraneSTAR system is used to transmit crane data via mobile phone, thus allowing remote diagnostics and localisation of the truck crane.

The CraneSTAR system works automatically, no controls must be operated. This section shows only the location of the associated components.

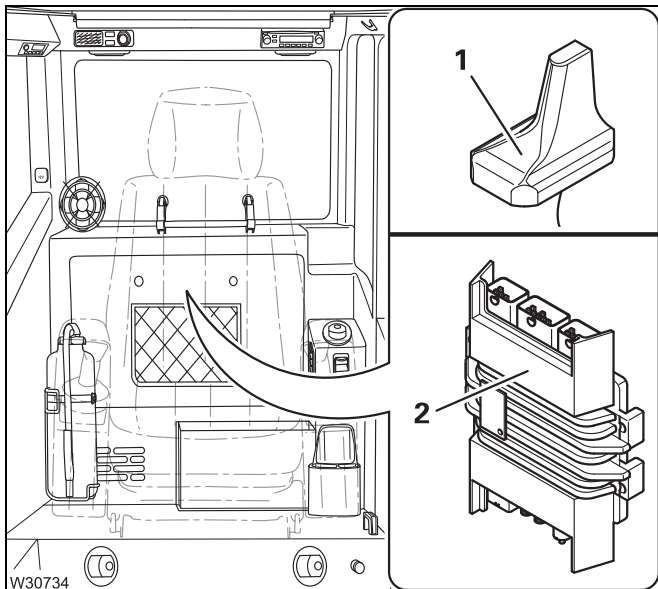
The CraneSTAR system will be activated only at the request of the crane operator.

Information on viewing the transmitted data in the Internet can be found in the separate *CraneSTAR Operating instructions* and at:

[www.cranestar.net](http://www.cranestar.net) – here, you will find all the information about activating the CraneSTAR system.

### 10.10.2 Position of the components

The CraneSTAR system includes an antenna and a *TCU* control unit (Telematic Control Unit = data transfer control unit).



The antenna (1) is a combined GSM/GPS antenna for transmission via mobile phone (GSM) and for receiving positioning data (GPS).

The antenna is connected to the *TCU* (2) control unit.

In the case of a malfunction; ►►► p. 14 - 23.

# 11

## Rigging work

If the truck crane on the site has already been rigged, proceed according to the *CHECKLIST: Checks before operating the crane*, p. 10 - 1.

### 11.1

## Rigging work checklists for crane operation with the main boom

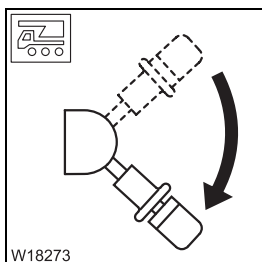


This checklist is not a complete operating manual. There are accompanying instructions, which are indicated by cross-references.

**Observe the warnings and safety instructions there!**

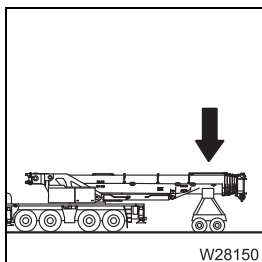
### 11.1.1

## CHECKLIST: Rigging



1. Choose a suitable site; ■■■▶ *Selecting the suitable site*, p. 11 - 9.

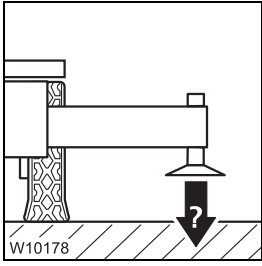
2. Check that the parking brake is applied – if necessary, apply the parking brake.



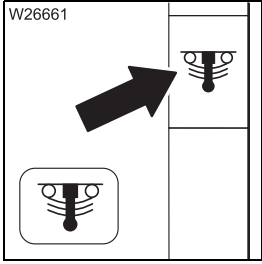
3. If the main boom is resting on a dolly:

- Switch off the boom floating position; ■■■▶ p. 11 - 17,
- Switch off the slewing gear freewheel; ■■■▶ p. 11 - 18,
- If necessary, switch off boom pre-tensioning; ■■■▶ p. 11 - 19.

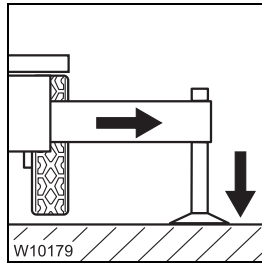




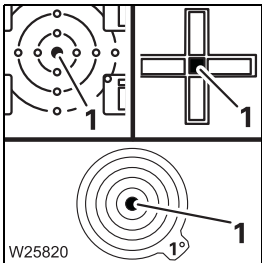
4. Check whether the ground will support the maximum occurring outrigger pressures; *Determining the required load-bearing area*, p. 11 - 9.



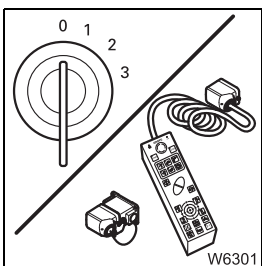
5. Switch off (lock) the suspension.  
The symbol must be **red** (suspension off); p. 5 - 16.



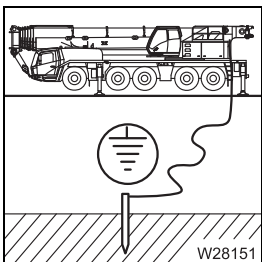
6. Support the truck crane with the outrigger span required for the job according to the *Lifting capacity table* and raise until none of the wheels is touching the ground; *Outrigger operation*, p. 11 - 37.



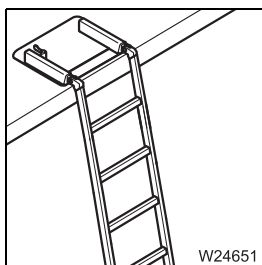
7. Align the truck crane horizontally.  
The lamp (1) lights up in the measuring range 1°; p. 11 - 58.



8. Turn off the engine and remove the hand-held control;  
 *Starting/turning off the engine with the hand-held control*, p. 11 - 23,  
 *Disconnecting the hand-held control*, p. 11 - 22.

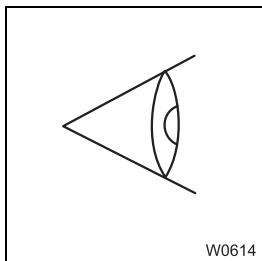


9. Earth the truck crane, if necessary; *Earthing the truck crane*, p. 11 - 13.

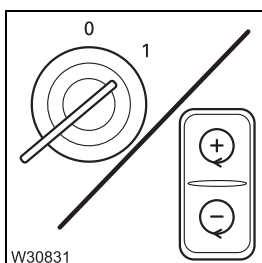


**10. Fold out all ladders and extend all stair treads;**

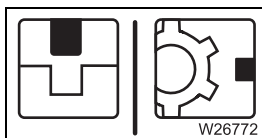
- ▣▣▣▣▶ *Ladders*, p. 4 - 5,
- ▣▣▣▣▶ *Step at the crane cab*, p. 11 - 141.



**11. Inspect the truck crane, while looking out in particular for any leaking fluids (oil, fuel or water).**

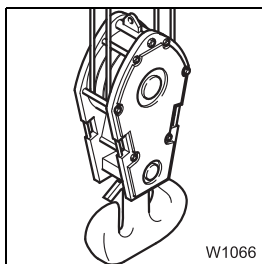


**12. Start the engine for crane operation; ▣▣▣▣▶ p. 9 - 5.**



**13. If necessary, switch off the houselock and unlock the superstructure;**

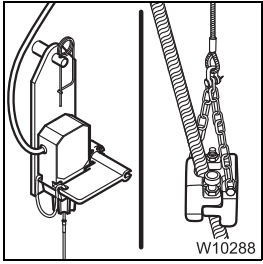
- ▣▣▣▣▶ *Switching off the houselock*, p. 10 - 19,
- ▣▣▣▣▶ *Unlocking the superstructure*, p. 10 - 16



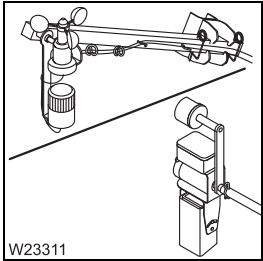
**14. Pick up the hook block and reeve the hoist rope again, if necessary;**

- ▣▣▣▣▶ *Hook block on a separate vehicle*, p. 11 - 99,
- ▣▣▣▣▶ *Hook block on the bumper*, p. 11 - 95,
- ▣▣▣▣▶ *Reeving and unreeving the hoist rope*, p. 11 - 104.

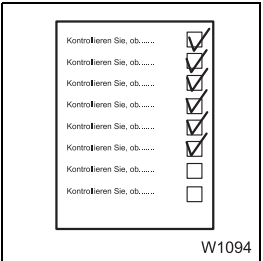




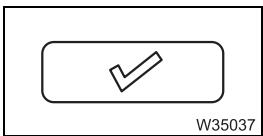
15. Install the lifting limit switch; ||||► p. 11 - 120.



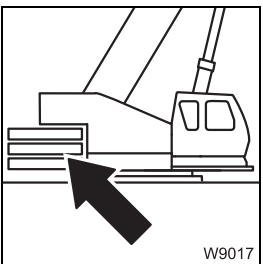
16. Install anemometer, air traffic control light and camera on main boom;  
 ||||► *Anemometer and air traffic control light*, p. 11 - 126,  
 ||||► *Camera on main boom*, p. 11 - 137.



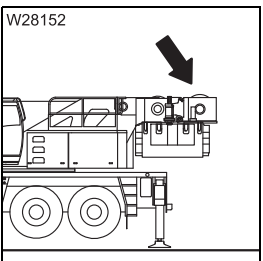
17. Perform all the required checks prior to crane operation;  
 ||||► *CHECKLIST: Checks before operating the crane*, p. 10 - 1.



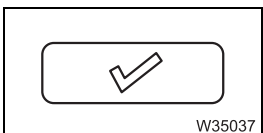
18. Enter and confirm the current rigging mode; ||||► p. 10 - 32.



19. With the RCL adjusted accordingly, rig the counterweight combination required for the operation according to *Lifting capacity table*;  
 ||||► *CHECKLIST: Rigging the counterweight*, p. 11 - 74.



20. If required, mount the auxiliary hoist; ||||► *CHECKLIST: Installing the auxiliary hoist*, p. 6 - 55.



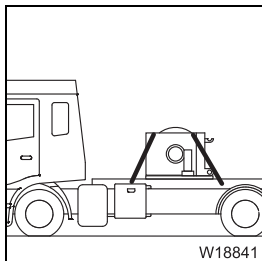
21. Enter the current rigging mode with the new rigged counterweight combination at the RCL display; ||||► p. 10 - 32.



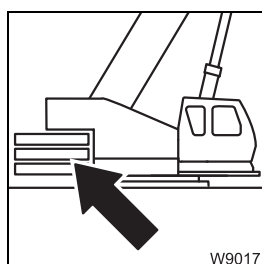
**11.1.2****CHECKLIST: Unrigging**

This checklist is not a complete operating manual. There are accompanying instructions, which are indicated by cross-references.

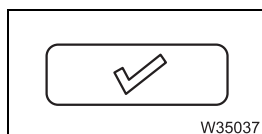
**Observe the warnings and safety instructions there!**



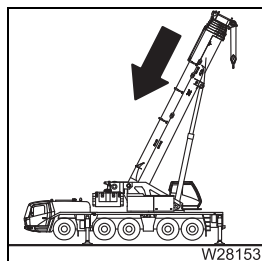
1. If required, remove the auxiliary hoist; ■■■► *CHECKLIST: Removing the auxiliary hoist, p. 6 - 57.*



2. With the RCL set correspondingly, unrig the counterweight; ■■■► *CHECKLIST: Unrigging the counterweight, p. 11 - 75.*

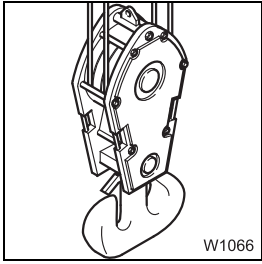


3. Enter the current rigging mode with the new rigged counterweight combination at the RCL display; ■■■► p. 10 - 32.



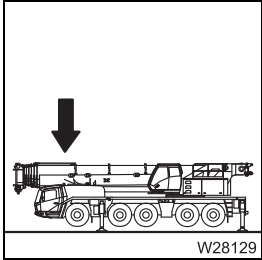
4. Retract main boom, lock telescopic sections and lock telescoping cylinder with telescopic section I for on-road driving; ■■■► *Before on-road driving, p. 10 - 109.*





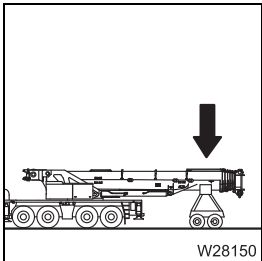
**5. Depending on transport:**

- Attach the hook block to the bumper; ■■■▶ p. 11 - 96 or
- Set down the hook block and unreeve the hoist rope;
  - ▶ *Setting down the hook block*, p. 11 - 100,
  - ▶ *Unreeving hoist rope*, p. 11 - 111.



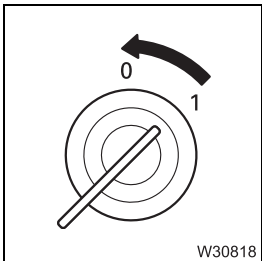
**6. For on-road driving without a dolly:**

- Turn the superstructure to the 180° position to the front with the RCL adjusted accordingly,
- Place the main boom on the boom rest.

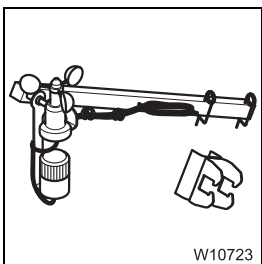


**7. For on-road driving with a dolly:**

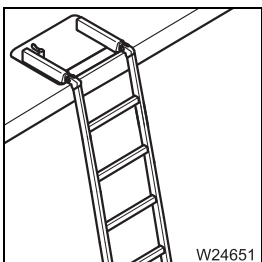
- Set down the superstructure on a dolly with the RCL adjusted accordingly and switch on the boom floating position; ■■■▶ p. 6 - 13,
- Switch on the slewing gear freewheel; ■■■▶ p. 6 - 12,
- If necessary, switch on the boom pre-tensioning; ■■■▶ p. 6 - 14,
- Switch off the houselock; ■■■▶ p. 10 - 17.



**8. Switch off the engine for crane operation; ■■■▶ p. 9 - 9.**

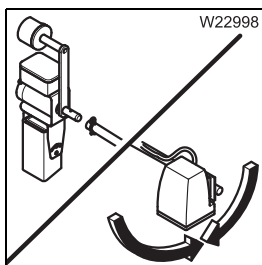


**9. Remove the anemometer and the air traffic control light; ■■■▶ p. 11 - 126.**



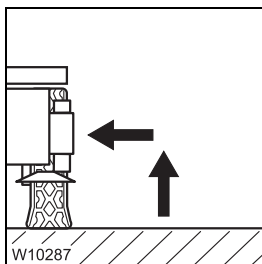
**10. Fold in all ladders and retract extend all stair treads;**

- ▶ *Ladders*, p. 4 - 5,
- ▶ *Step at the crane cab*, p. 11 - 141.

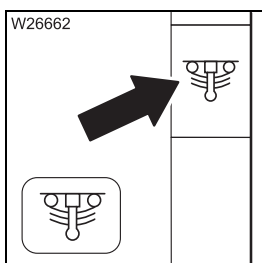


**11. Remove camera on main boom;**  
 ■■■▶ *Camera on main boom, p. 11 - 137.*

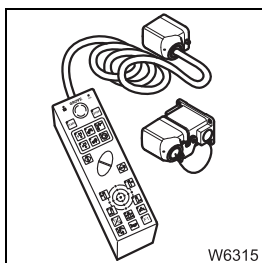
Lower the slewable spotlights; ■■■▶ *Using the slewable spotlights, p. 10 - 127.*



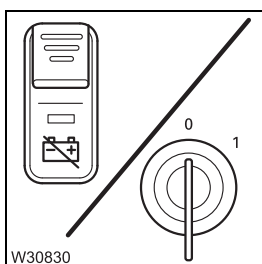
**12. Retract the outriggers;** ■■■▶ *CHECKLIST: Retracting the outriggers, p. 11 - 39.*



**13. Activate the suspension (release locking).**  
 The symbol must be **green** (suspension on); ■■■▶ p. 5 - 16.



**14. Turn off the engine and, if necessary, remove the hand-held control and stow it away in the driver's cab;** ■■■▶ *Disconnecting the hand-held control, p. 11 - 22.*








**15. If the truck crane is no longer being used;** ■■■▶ *In case of work breaks of more than 8 hours, p. 10 - 146.*

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## 11.2

### Selecting the suitable site

Choose the position of your truck crane at the site with care. Observe the following aspects:

- Check that the ground has sufficient load bearing capacity. You may need to enlarge the ground bearing area;  p. 11 - 9.
- Observe the required safe distances from slopes and pits;  p. 11 - 12.
- Earth the truck crane if there is a danger of it being charged with static electricity;  p. 11 - 13.
- Keep a safe distance away from electrical lines;  p. 11 - 13.
- Choose the site such that the unevenness of the ground can be compensated for by adjusting the outrigger cylinders. Maximum hoist of the outrigger cylinders;  p. 1 - 17.
- Choose a location where it is possible to keep the working radius to a minimum and where no obstacles are within the slewing range of the crane.

### 11.2.1

#### Determining the required load-bearing area

The stability of the truck crane depends in the first instance on the load bearing capacity of the ground. The load bearing capacity of the ground and the occurring outrigger pressure determine the load-bearing area required for the operation.

$$\text{Load-bearing area (m}^2\text{)} = \frac{\text{Outrigger pressure (t)}}{\text{Load bearing capacity of the ground } \left(\frac{\text{t}}{\text{m}^2}\right)}$$

#### Outrigger pressure

- Determine the outrigger pressure for the operation planned using the *Outrigger pressure table*.



**Load bearing capacity of the ground**

- Find the load bearing capacity of the ground using the table.

<b>APPROXIMATE VALUES FOR THE LOAD BEARING CAPACITY OF THE GROUND</b>		<b>Load bearing capacity t/m<sup>2</sup> (lbs/ft<sup>2</sup>)</b>
Backfilled, not artificially compacted ground:		0 to 10 (0 to 2,050)
Natural, apparently undisturbed ground:		
Mud, peat, marsh		0
Non-cohesive ground which is sufficiently firm:	Fine to medium sand	15 (3,070)
	Coarse sand to gravel	20 (4,100)
Cohesive soil:	mushy	0
	soft	4 (820)
	stiff	10 (2,050)
	half firm	20 (4,100)
	hard	40 (8,200)
Rock with minimal fissures in sound, unweathered condition and with favourable strata:	In closed sequence of beds	150 (30,700)
	In massive or columnar formation	300 (61,400)



If you are unsure about the load bearing capacity of the ground, have the ground tested.

### Load-bearing area

- Now calculate the required load-bearing area.
- Check that the surface of the outrigger pad (▮▮▮▮ p. 1 - 17) is larger than the calculated ground bearing area. If the surface of the outrigger pad is smaller, you will need to enlarge the load-bearing area.



#### **Danger of overturning if the load-bearing area is too small!**

Ensure that the actual load-bearing area is at least as large as specified in the table.

This prevents the ground giving way and the truck crane overturning.

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Example for calculating the required load-bearing area:

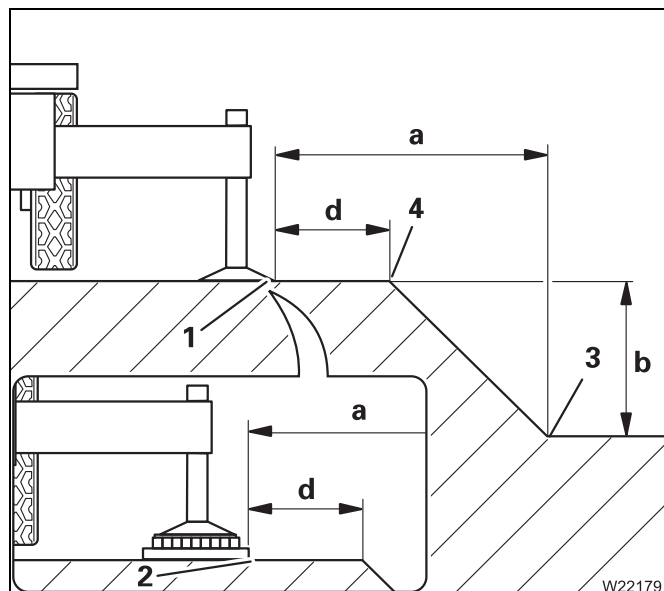
If the outrigger pressure is 25 t and the ground has a bearing capacity of 40 t/m<sup>2</sup>. Then the required load-bearing area for this supporting cylinder is 0.625 m<sup>2</sup> (= 6,250 cm<sup>2</sup>).

If the outrigger pad has a surface of 2,000 cm<sup>2</sup>, you would need to enlarge the load-bearing area by placing packing under the outrigger pads; ▮▮▮▮ p. 11 - 52.

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## 11.2.2 Safe distance from slopes and pits

Erect the crane at a safe distance from slopes and pits. The distance also depends on the type of ground if the slopes and pits are not supported.



### As a rule of thumb:

If you are working on *non-cohesive or filled-in* ground, the safety distance (**a**) must be twice as large as the pit depth (**b**).

$$a = 2 \times b$$

If you are working on *cohesive, undisturbed* ground, the safe distance (**a**) must be as great as the depth of the pit (**b**).

$$a = 1 \times b$$

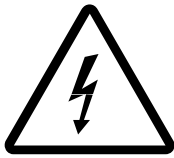
The safe distance is measured from the base of the pit (**3**).

**In addition to this**, the safe distance (**d**) between the outrigger pads (**1**) or support material (**2**) and the pit border (**4**) must always be greater than 2.00 m (6.6 ft).



### 11.2.3 Earthing the truck crane

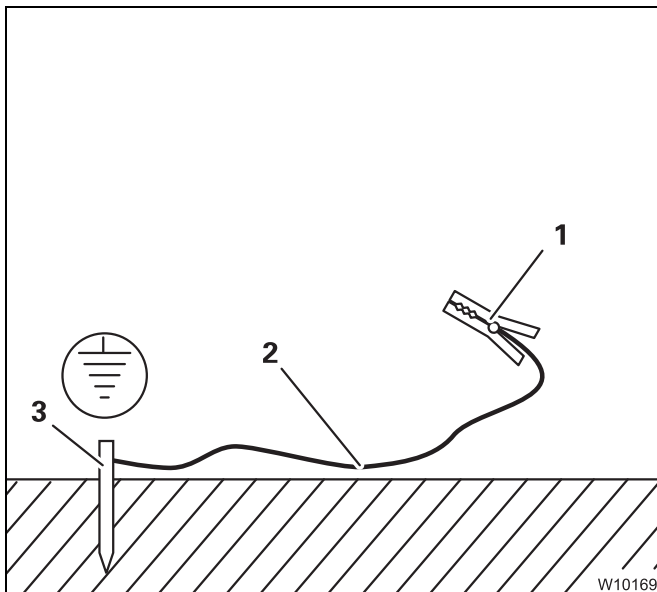
The truck crane may become charged with static electricity. This may occur especially when using outrigger pads made of plastic or when the outrigger pads are packed with insulating material (e.g. wooden planks).



#### Risk of accidents due to electric shock!

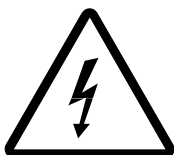
Earth the truck crane before you start to work with it

- near strong transmitters (radio transmitters, radio stations, etc.),
- near high-frequency switchgear substations,
- if a thunderstorm is forecast.



Use electrically conducting material for earthing.

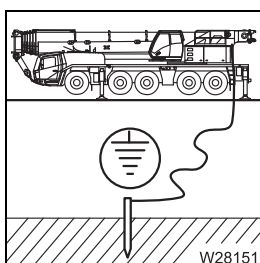
- Hammer a metal rod (3) (length approx. 2.0 m (6.6 ft)) at least 1.5 m (5 ft) into the ground.
- For better conductivity, dampen the soil around the metal rod (3).
- Clamp an insulated cable (2) to the metal rod (3) (cross-section of at least 16 mm<sup>2</sup> (0.025 in<sup>2</sup>)).
- Connect the free end of the cable using a clamp (1).



#### Risk of accidents due to electric shock!

Ensure that the connections between the cable and the clamp are electrically conductive.

Do not attach the clamp to parts that are bolted on, such as valves, cover plates or similar parts.

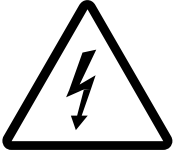


- Attach the clamp to the main boom or the superstructure.

## 11.2.4

### Safe distance from overhead power lines

Always observe the regulations in the country in which you are working when working in the vicinity of overhead power lines.

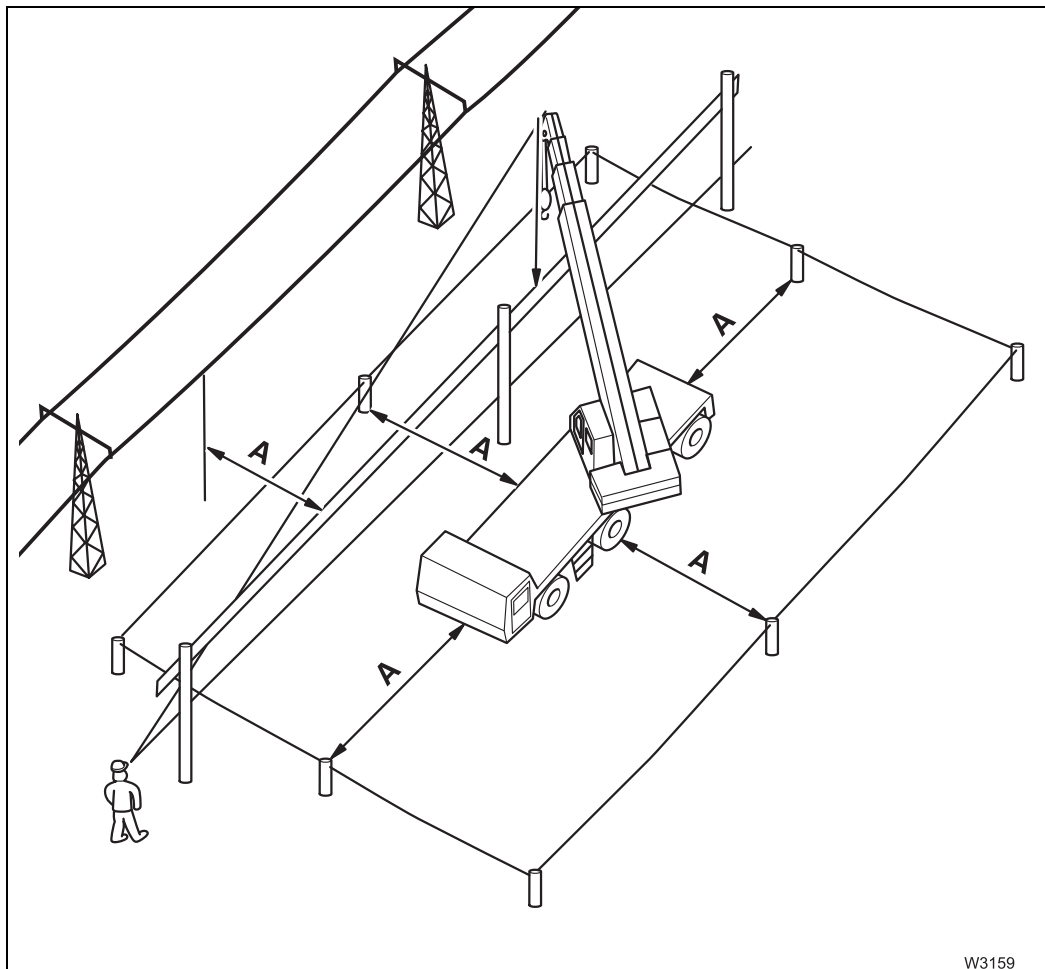


#### **Risk of accidents due to electric shock!**

The truck crane is not insulated.

If the truck crane, its equipment, its load/lifting tackle or the guide ropes touch an overhead power line this will cause serious injury or even death.

- If there are overhead power lines within the working range of the truck crane, have these overhead power lines de-energised if possible.



If it is not possible to switch off the overhead power lines, you must at least observe the prescribed safe distance (**A**).

Different safe distances are recommended by the respective national regulations:

**For example, according to DIN VDE 0105**

Voltage	Safe distance (A)
up to 1,000 V	1 m (3.3 ft)
over 1,000 V to 110,000 V	3 m (9.8 ft)
over 110,000 V to 220,000 V	4 m (13.1 ft)
over 220,000 V to 380,000 V	5 m (16.4 ft)

**For example as per ASME B 30.5 (USA)**

Voltage	Safe distance (A)
up to 50,000 V	3.05 m (10 ft)
from 50,000 V to 200,000 V	4.60 m (15 ft)
over 200,000 V to 350,000 V	6.10 m (20 ft)
over 350,000 V to 500,000 V	7.62 m (25 ft)
over 500,000 V to 750,000 V	10.67 m (35 ft)
over 750,000 V to 1,000,000V	13.72 m (45 ft)

- Erect an obstacle at the minimum safe distance (**A**) from the overhead power line. This will keep the equipment of the truck crane and load/lifting tackle away from the power line. Make allowance for the possibility the load or the cable may swing.
- Cordon off the area around the truck crane at the safe distance (**A**). This increases the safety area in case the power line is touched.
- Have banksmen in visual or radio contact with you; check that you are observing the safe distance (**A**).
- If the load has to be guided, use only guide ropes of non-conductive material.

**If you do touch the overhead power cable:**




- Keep calm!
- Do not leave the crane cab!
- Tell anyone standing outside not to touch the truck crane, the load or the lifting tackle!
- Move the main boom out of the hazard area!

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## 11.3

### Rigging work after driving with a dolly

If the main boom is resting on a dolly whilst the truck crane is being driven, you must perform the following before working with the crane:

- Switch off the slewing gear freewheel;  p. 11 - 18,
- Switch off the boom floating position;  p. 11 - 17,
- If necessary switch off the boom pre-tensioning;  p. 11 - 19.

### 11.3.1

#### Switching off the boom floating position

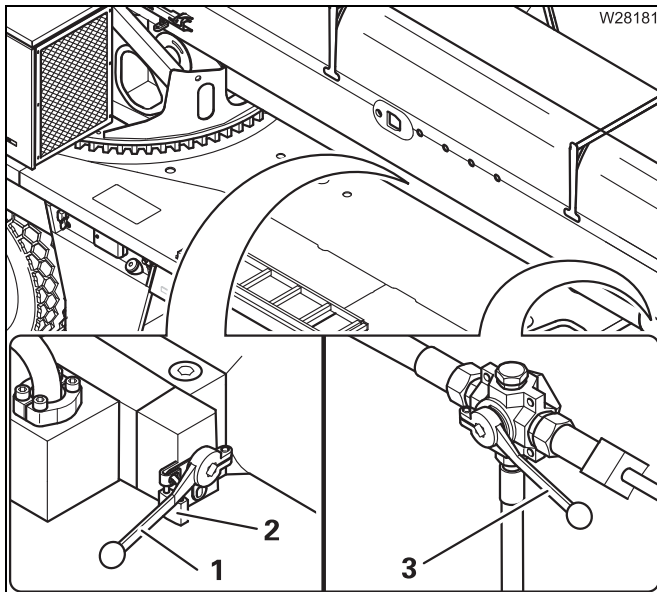
You must switch off the boom floating position before you raise the main boom off the dolly.



**Risk of accidents if the main boom falls down!**

Always secure the lever with the padlock after switching off the boom floating position.

This prevents the raised main boom falling down when the lever is actuated.



- Remove the lock (2).
- Switch over valve I – lever (1) horizontal and pointing outward.
- Secure the lever (1) with the padlock (2).
- Switch the valve IV over – lever (3) points forwards.

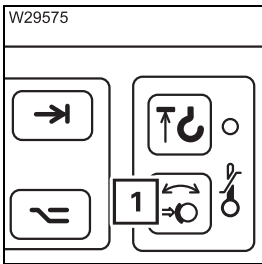
The boom floating position is now switched off.

**11.3.2****Switching off the slewing gear freewheel**

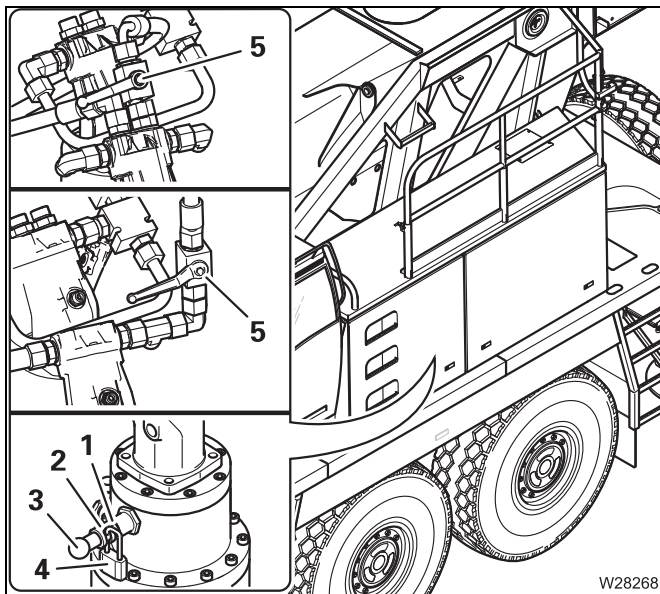
If the slewing gear freewheel is switched on, switch it off prior to working with the crane.

**Risk of accidents with the slewing gear freewheel switched on!**

Switch off the slewing gear freewheel before working with the crane. If it is not switched off, the slewing gear brake does not work and you cannot stop slewing movements in time.

**Prerequisites**

- The engine for crane operation is running.
- The slewing gear brake must be released, the lamp (1) must have gone out; *Releasing the slewing gear brake*, p. 10 - 118.

**Switching off**

- Remove the lock (4) from the bore (1).
- Pull the pin (3) out as far as possible.
- Secure the pin with the lock in the bore (2) and remove the key.
- Pull and secure the pin (3) on the other slewing gears in the same way.
- Close the valve (5) – the slewing gear freewheel is switched off.

**Before slewing**

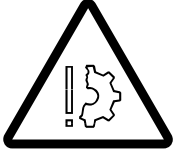
Support the truck crane with the necessary outrigger span, enter the corresponding rigging mode and derrick the main boom to an angle permissible within the working range.

### 11.3.3

## Switching off boom pre-tensioning

You must switch off the boom pre-tensioning before you raise the main boom off the dolly.

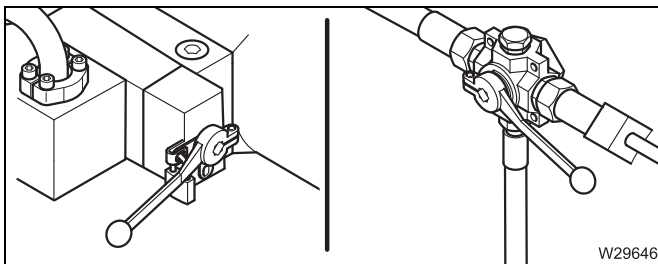
To switch off boom pre-tensioning, you must bring the valves I to IV into the required positions, which will empty the pressure accumulator.



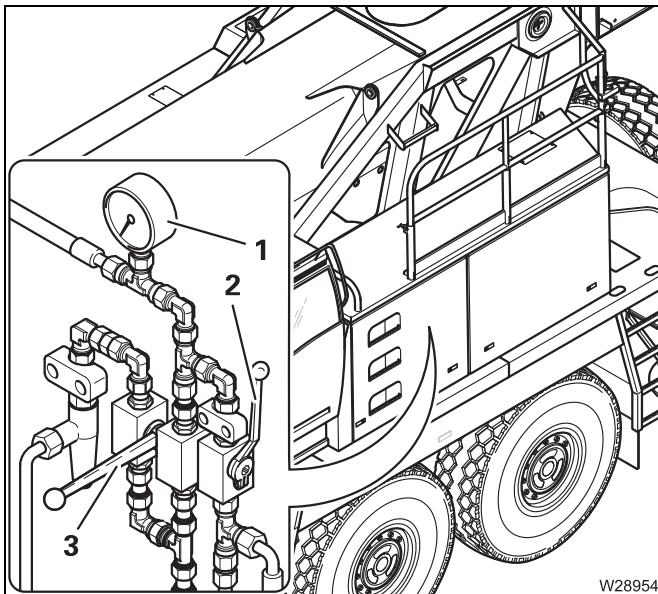
### **Danger of the hydraulic oil overheating!**

Always switch the valve IV over (lever in horizontal position) before operating the crane.

This prevents the pressure in the hydraulic circuit rising and the hydraulic oil exceeding the permissible temperature of 80 °C (176 °F).



- Switch off the boom floating position;  
    ▣▣▣▣ p. 11 - 17.



The valves II and III are located underneath the pressure gauge (1).

- Open valve II – the lever (2) is vertical.

The pressure accumulator is emptied. The pressure on the pressure gauge (1) must drop to 0 bar (0 psi).

Valve III stays closed – the lever (3) points downwards.

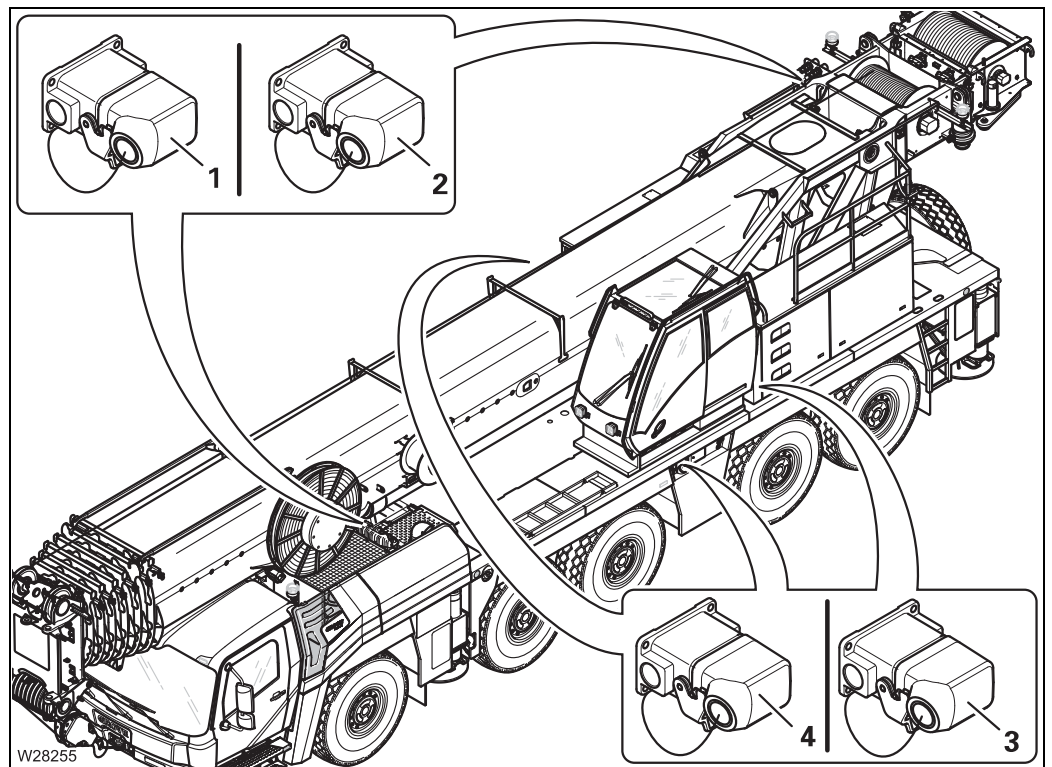
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# 11.4

## Connecting/disconnecting the hand-held control

### Functionality of the sockets

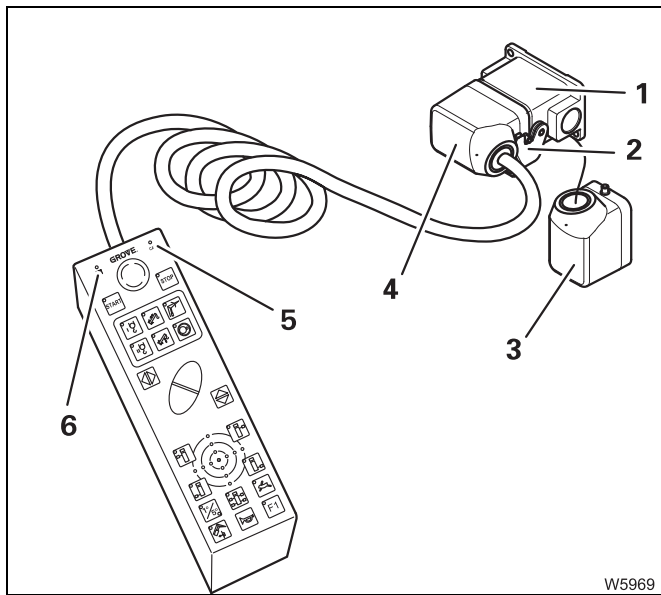


Socket	Released operations
1	- Emergency operation with hand-held control
2	- Rigging the auxiliary hoist
3	- Emergency operation with hand-held control
4	- Engine and supports



Switch off the engine. Pulling a bridging plug will shut the engine off, but this action is only designed for emergencies. The ignition can be switched on or off.





### Connecting the hand-held control

- Open the cap (2) and pull the bridging plug (3) out of the socket (1).
- Insert the plug (4) into the socket (1) and secure it with the cap (2).
- After approx. 20 seconds, the lamps (5) and (6) light up – the ignition is now switched on.

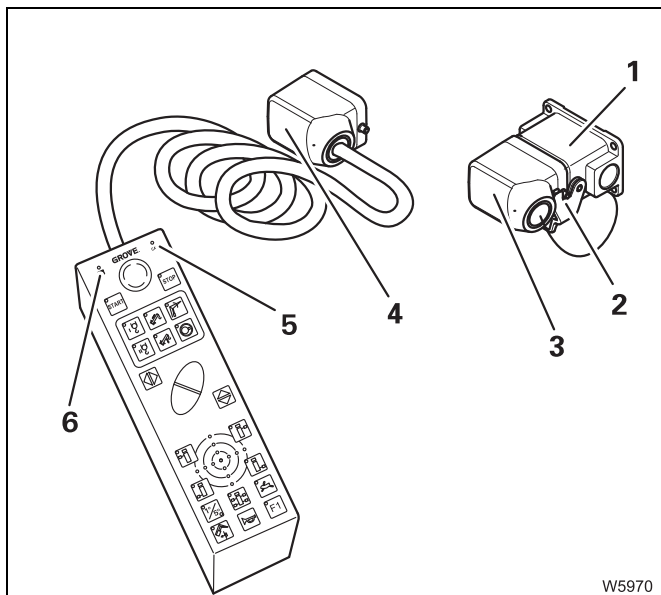
There is a malfunction if the lamp (5) does not light up or if it flashed; ■■■► p. 14 - 21.



### Danger due to unauthorised use!

Always stow the hand-held control in the driver's cab or in the crane cab before you leave the crane, and lock the doors.

This way you can prevent unauthorised persons starting the engine.



### Disconnecting the hand-held control

- Open the cap (2).
- Pull the plug (4) out of the socket (1) – the lamps (5) and (6) go out.
- Insert the bridging plug (3) into the socket (1) and secure it with the cap (2).

The ignition is switched off, unless it is switched on at an ignition lock.

## 11.5

### Starting the engine for driving for rigging work

The engine for driving must be running for rigging work, e.g., to move the outriggers. You can start the engine for driving:

- With the hand-held control,
- From the control units of the outriggers.



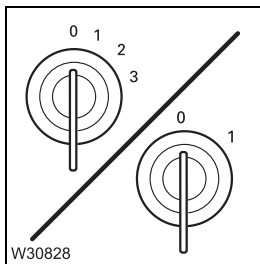
You can generally start the engine only if a bridging plug is inserted in all sockets not required.

### 11.5.1


#### Starting/turning off the engine with the hand-held control

##### Prerequisites

The following requirements must be met before you can start the engine for driving with the hand-held control:




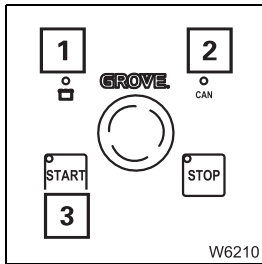
- The ignition is switched off in the crane cab.
- The ignition is switched off in the driver's cab.

- Connect the hand-held control to a socket on the carrier;  p. 11 - 22.




### Start the engine

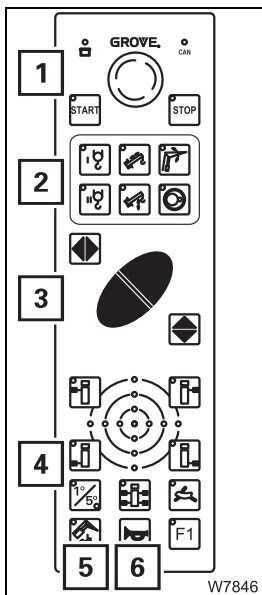
All activities and checks required to start the engine must be carried out before starting the engine;  p. 4 - 1.



- Wait until the lamps (1) and (2) illuminate.

If the lamp (2) does not illuminate or flash after about 20 seconds, there is a malfunction;  p. 14 - 21.

- Press the button (3) once – the engine will start.



The following buttons are now active on the hand-held control:

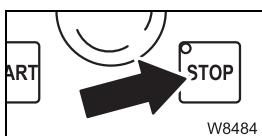
- All buttons on the control panel (1).
- The function buttons (3).
- All buttons on the control panel (4).
- The button (6) for the horn on the carrier.

The button (2) and button (5) are inactive.

The *Outrigger* control units are locked after connection of the hand-held control.

### Switching off the engine

If the engine was started with the hand-held control, you cannot switch off it off at the ignition lock in the driver's cab.

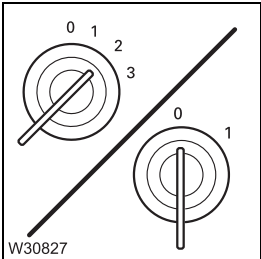


- Press the button (1) once – the engine will switch off.

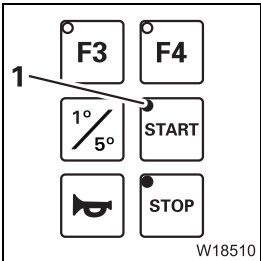
## 11.5.2 Starting/switching off the engine from the outrigger control units

### Prerequisites

The following requirements must be met before you can start the engine for driving from the outrigger control units:



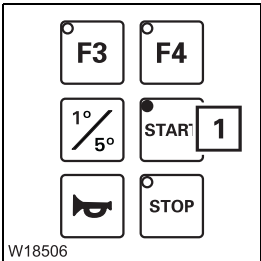
- The ignition in the driver's cab must be switched on.
- The ignition is switched off in the crane cab.



- The lamp in the button (1) lights up.

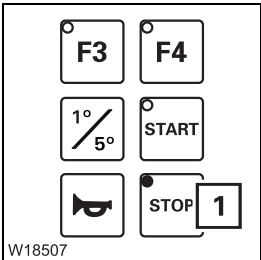
### Start the engine

All activities and checks required to start the engine must be carried out before starting the engine; p. 4 - 1.



- Press the button (3) once – the engine will start.

### Switching off the engine



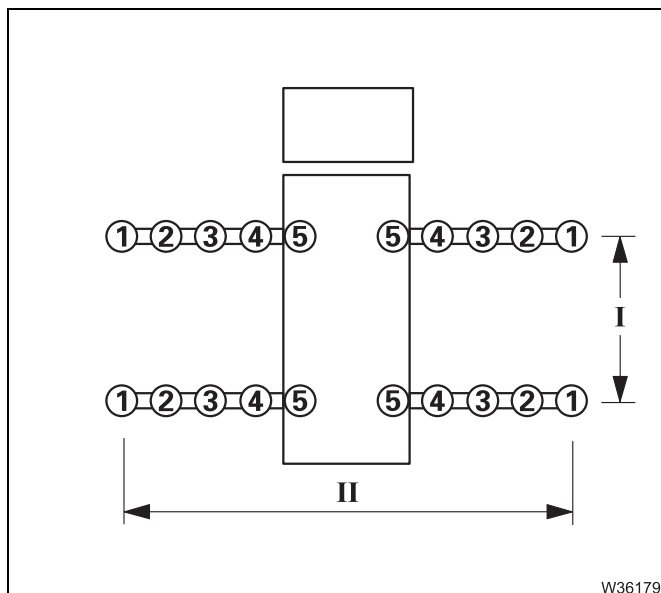
- Press the button (1) once – the engine will switch off.

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**11.6****Slewing range – only with the *Standard slewing range type***

The information in this section applies only to the *Standard* slewing range type. If you wish to operate the truck crane using the *MAXbase* slewing range type; ■■■► p. 11 - 29.

All permissible outrigger spans are symmetrical. All outrigger beams are extended and all outrigger beams are extended to the same outrigger span; ■■■► *Enabled outrigger spans*, p. 11 - 28.

**11.6.1****Representation in the lifting capacity tables**

The outrigger span is always specified in this form in the *Lifting capacity table*.

**Outrigger length xxxx – outrigger width yyyyy**

**– Outrigger length**

The outrigger length (I) has a fixed value of 8.950 m (29.4 ft) and never changes for a fully supported truck crane.

**– Outrigger width**

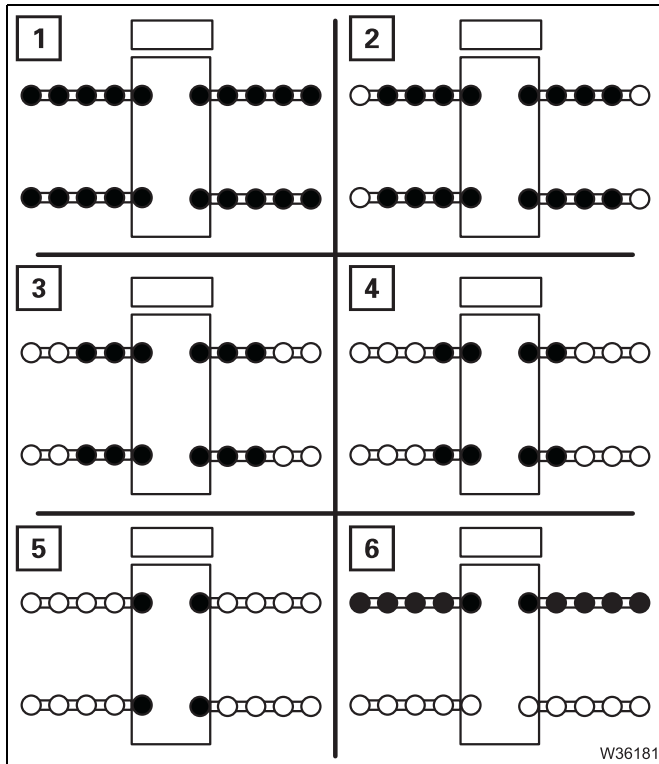
The outrigger span relates to the overall width (II). There are five outrigger spans (1) to (5).

## 11.6.2 Enabled outrigger spans



### Risk of overturning when slewing the superstructure!

With some outrigger spans, slewing is only permissible with certain counterweight combinations and boom positions; *Slewing with the rigged counterweight*, p. 11 - 93.



The tables show the values for permissible outrigger spans with overall widths (1) to (5).

1	8.950 x 7.800 m (29.4 x 25.6 ft)
2	8.950 x 6.854 m (29.4 x 22.4 ft)
3	8.950 x 5.910 m (29.4 x 19.4 ft)
4	8.950 x 4.310 m (29.4 x 14.2 ft)
5	8.950 x 2.710m (29.4 x 8.8 ft)
6	5.287 m x 7.800 / 2.500 m (17.3 ft x 25.6 / 8.2 ft) <sup>1)</sup>

<sup>1)</sup> Special outrigger span (on wheels at the rear), is additionally enabled with the appropriate RCL programming – for removing the rear outrigger beams with the truck crane; p. 6 - 41.

The cover pages of the individual lifting capacity tables provide a brief overview in percent.

Outrigger width	Percent
1	100%
2	83%
3	66%
4	50%
5	0%



## 11.7

### Outriggers – Overview – MAXbase slewing range type

The information in this section applies to the *MAXbase* slewing range type. If you wish to operate the truck crane using the *Standard* slewing range type; **III**► p. 11 - 27.

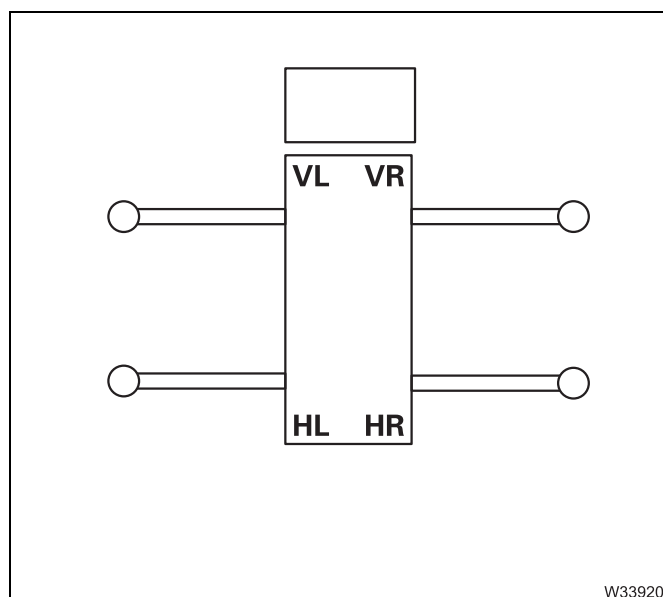
Symmetrical and various variable outrigger spans are enabled. There are several different types of outrigger spans, each with several permissible combinations.

Separate *lifting capacity tables* for the variable outrigger spans are provided in digital form. Observe all the specifications and definitions in these tables before commencing operation.

#### 11.7.1

#### Definitions

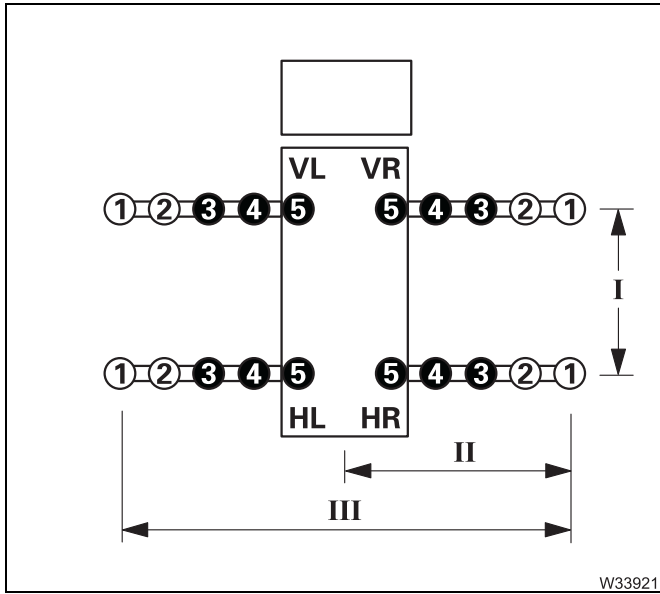
Specific terms and graphical illustrations are used in the description.



#### Designation of the outrigger beams

<b>VL</b>	Front left
<b>VR</b>	Front right
<b>HL</b>	Rear left
<b>HR</b>	Rear right





### Representation of the outrigger spans

#### – Outrigger length

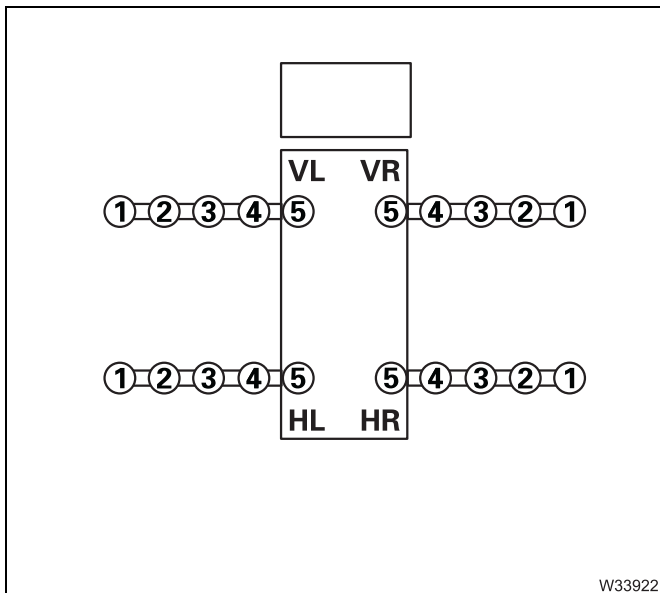
The outrigger length (I) has a fixed value of 8.950 m (29.4 ft) and never changes.

#### – Outrigger width

All possible outrigger spans (1) to (5) are always shown for all outrigger beams.

For defining an outrigger span, the rigged outrigger spans (and all smaller spans) are shown in black and the illustration shows the outrigger widths (3).

The outrigger width is specified as an individual width (II) or overall width (III) depending on the type of the outrigger span.



### Individual widths / Overall widths

The tables show the values for the outrigger widths (1) to (5).

	Individual widths	Overall widths
1	3.900 m (12.8 ft)	7.800 m (25.6 ft)
2	3.427 m (11.2 ft)	6.854 m (22.4 ft)
3	2.955 m (9.7 ft)	5.910 m (19.4 ft)
4	2.155 m (7.1 ft)	4.310 m (14.2 ft)
5	1.355 m (4.4 ft)	2.710 m (8.8 ft)

The individual widths and overall widths are specified in metres (Feet) in the lifting capacity tables.

The cover pages of the individual lifting capacity tables provide a brief overview in percent.

Outrigger width	Percent
1	100%
2	83%
3	66%
4	50%
5	0%

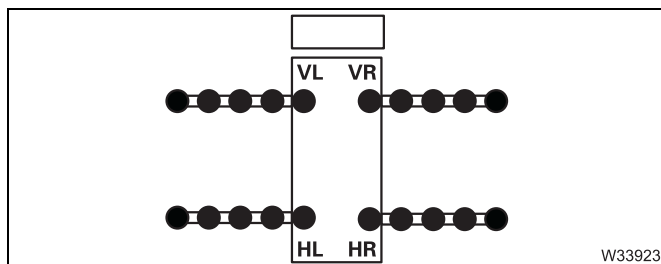
**11.7.2**

**Representation in the lifting capacity tables**

The outrigger span is always specified in this form

**Outrigger length xxxx – outrigger width yyyyy**

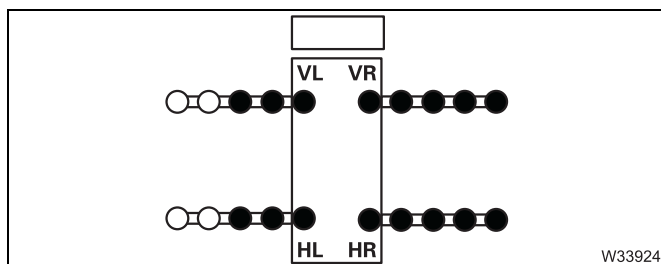
- The value **xxxx** is always 8.950 m (29.4 ft).
- The value **yyyyy** depends on the type of outrigger span. A distinction is made between four types.



**Symmetrical**

The outrigger width is the same for all outrigger beams. The overall width is entered once. For example

**Outrigger width                    7.800 m (25.6 ft)**



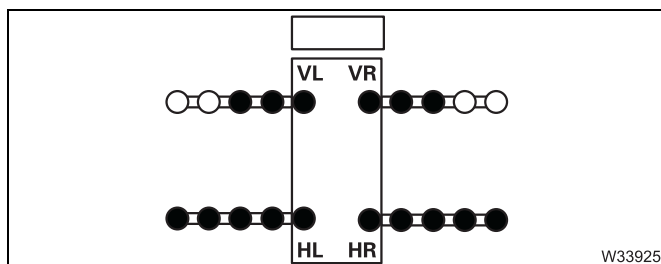
**Right / Left**

The outrigger span is the same at the left side and the same at the right side – but different between the right and left sides.

The individual widths for the front and for the rear are entered. For example

**Front outrigger span            3.900 + 2.955 m  
(12.8 + 9.7 ft)**

**Rear outrigger span            3.900 + 2.955 m  
(12.8 + 9.7 ft)**



**Front / rear**

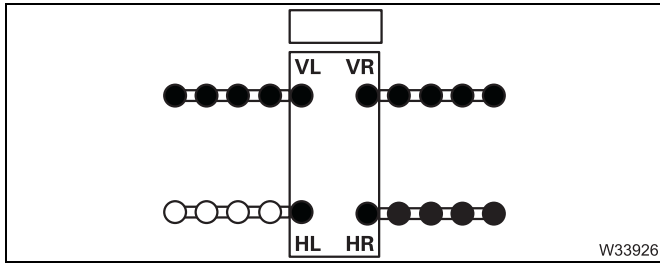
The outrigger width is the same at the front and the same at the rear – but different between the front and rear.

The overall width is entered for the front and for the rear. For example

**Front outrigger span            5.910 m (19.4 ft)**

**Rear outrigger span            7.800 m (25.6 ft)**





### Three / One

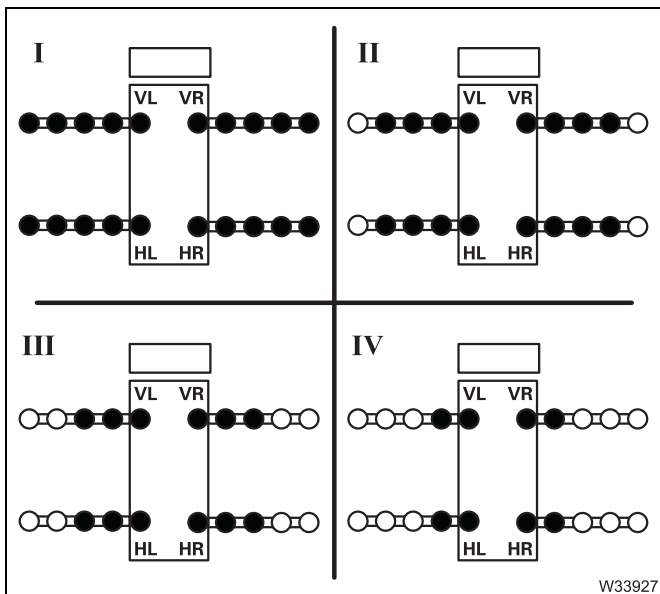
The outrigger width is the same for three outrigger beams and one outrigger beam is fully retracted.

The overall width is entered once and an individual width is entered once. For example

**Front outrigger span**      **7.800 m (25.6 ft)**  
**Rear outrigger span**      **3.900 + 1.355 m**  
    **(12.8 + 4.4 ft)**

## 11.7.3 Enabled outrigger spans

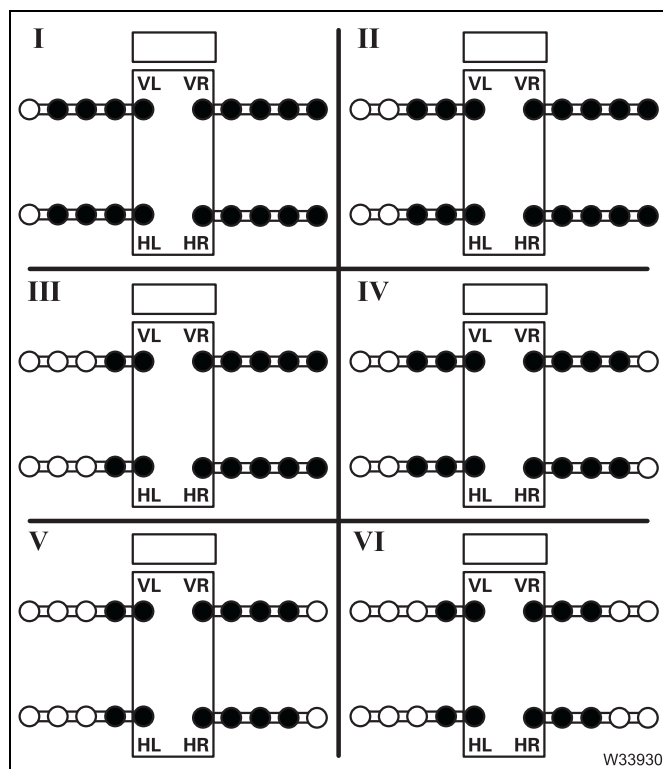
Particular combinations are enabled for each type of outrigger span. This section shows all enabled combinations with the associated individual widths of the outrigger beams.



### Symmetrical

The outrigger width is the same for all outrigger beams. The table shows the permissible combinations.

	FL / FR / RL / RR (front left / front right / rear left / rear right)
<b>I</b>	3.900 m (12.8 ft)
<b>II</b>	3.427 m (11.2 ft)
<b>III</b>	2.955 m (9.7 ft)
<b>IV</b>	2.155 m (7.1 ft)

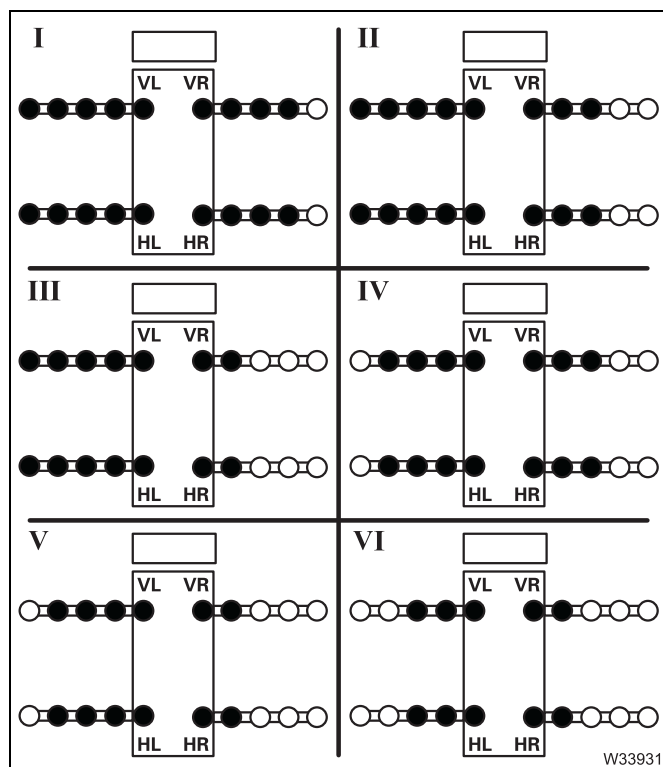


**Right / Left**

**– Right greater than left**

The outrigger width is the same at the left and the same at the right. The table shows the permissible combinations.

	FR / RR	FL / RL
<b>I</b>	3.900 m (12.8 ft)	3.427 m (11.2 ft)
<b>II</b>	3.900 m (12.8 ft)	2.955 m (9.7 ft)
<b>III</b>	3.900 m (12.8 ft)	2.155 m (7.1 ft)
<b>IV</b>	3.427 m (11.2 ft)	2.955 m (9.7 ft)
<b>V</b>	3.427 m (11.2 ft)	2.155 m (7.1 ft)
<b>VI</b>	2.955 m (9.7 ft)	2.155 m (7.1 ft)



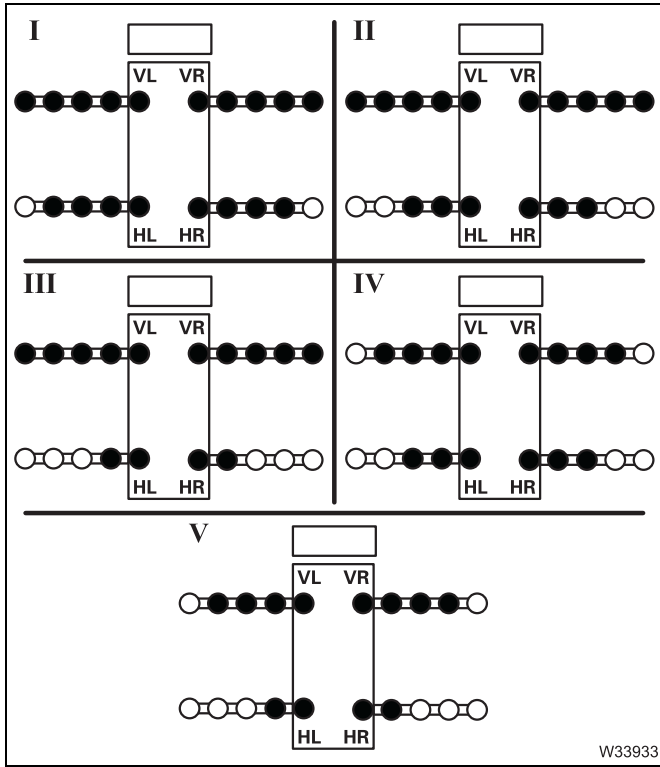
**– Left greater than right**

The outrigger width is the same at the left and the same at the right. The table shows the permissible combinations.

	FR / RR	FL / RL
<b>I</b>	3.427 m (11.2 ft)	3.900 m (12.8 ft)
<b>II</b>	2.955 m (9.7 ft)	3.900 m (12.8 ft)
<b>III</b>	2.155 m (7.1 ft)	3.900 m (12.8 ft)
<b>IV</b>	2.955 m (9.7 ft)	3.427 m (11.2 ft)
<b>V</b>	2.155 m (7.1 ft)	3.427 m (11.2 ft)
<b>VI</b>	2.155 m (7.1 ft)	2.955 m (9.7 ft)

There are no separate lifting capacity tables for this type. The lifting capacities for the *Right greater than left* type are enabled in a correspondingly mirrored slewing range; *Lifting capacities and slewing ranges for outrigger spans without separate lifting capacity tables, p. 10 - 28.*



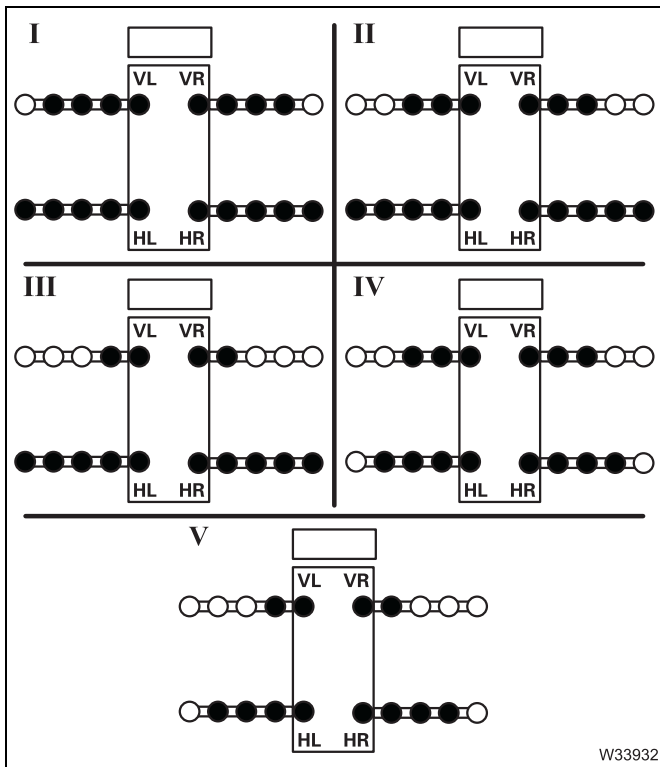


**Front / rear**

**– Front greater than rear**

The front outrigger beams are extended further than the rear outrigger beams. The table shows the permissible combinations.

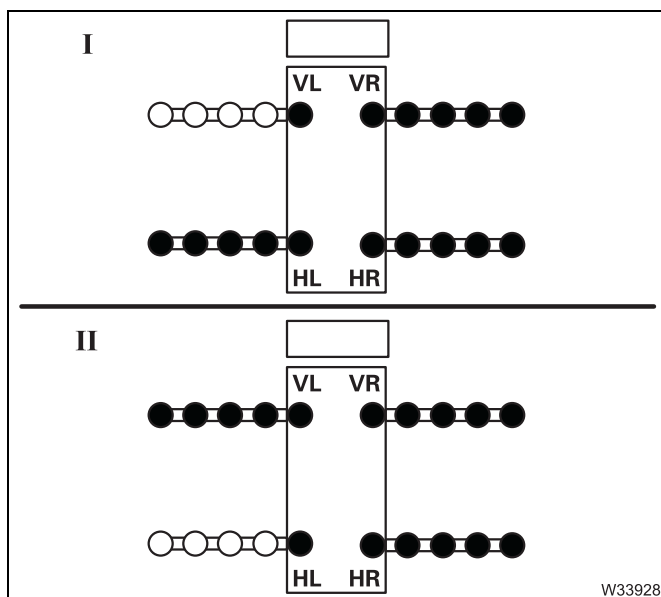
	FR / FL	RR / RL
<b>I</b>	3.900 m (12.8 ft)	3.427 m (11.2 ft)
<b>II</b>	3.900 m (12.8 ft)	2.955 m (9.7 ft)
<b>III</b>	3.900 m (12.8 ft)	2.155 m (7.1 ft)
<b>IV</b>	3.427 m (11.2 ft)	2.955 m (9.7 ft)
<b>V</b>	3.427 m (11.2 ft)	2.155 m (7.1 ft)



**– Rear greater than front**

The rear outrigger beams are extended further than the front outrigger beams. The table shows the permissible combinations.

	FR / FL	RR / RL
<b>I</b>	3.427 m (11.2 ft)	3.900 m (12.8 ft)
<b>II</b>	2.955 m (9.7 ft)	3.900 m (12.8 ft)
<b>III</b>	2.155 m (7.1 ft)	3.900 m (12.8 ft)
<b>IV</b>	2.955 m (9.7 ft)	3.427 m (11.2 ft)
<b>V</b>	2.155 m (7.1 ft)	3.427 m (11.2 ft)

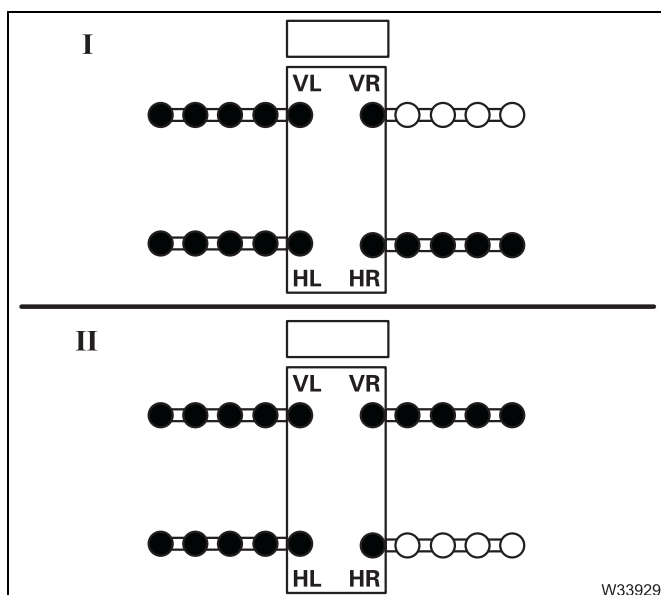


### Three / One

#### – One outrigger beam retracted – left

Three outrigger beams are extended the same distance and one outrigger beam at the left side is retracted. The table shows the permissible combinations.

	VR	VL	HR	HL
I	3.900 m (12.8 ft)	1.355 m (4.4 ft)	3.900 m (12.8 ft)	3.900 m (12.8 ft)
II	3.900 m (12.8 ft)	3.900 m (12.8 ft)	3.900 m (12.8 ft)	1.355 m (4.4 ft)



#### – One outrigger beam retracted – right

Three outrigger beams are extended the same distance and one outrigger beam at the right side is retracted. The table shows the permissible combinations.

	VR	VL	HR	HL
I	1.355 m (4.4 ft)	3.900 m (12.8 ft)	3.900 m (12.8 ft)	3.900 m (12.8 ft)
II	3.900 m (12.8 ft)	3.900 m (12.8 ft)	1.355 m (4.4 ft)	3.900 m (12.8 ft)

There are no separate lifting capacity tables for this type. The lifting capacities for the *One outrigger beam retracted – left* type are enabled in a correspondingly mirrored slewing range; **▣▣▣▣▶** *Lifting capacities and slewing ranges for outrigger spans without separate lifting capacity tables, p. 10 - 28.*

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## 11.8

## Outrigger operation



### Risk of crushing by extending outrigger beams!

You may only activate the outriggers if you yourself or a banksman with whom you are in visual contact have an unobstructed view of their movements.

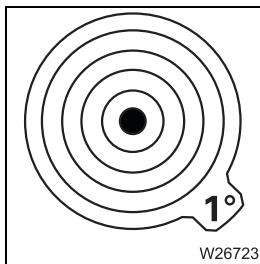
### 11.8.1

### CHECKLIST: Extending the outriggers

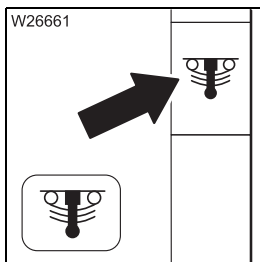


This checklist is not a complete operating manual. There are accompanying instructions, which are indicated by cross-references.

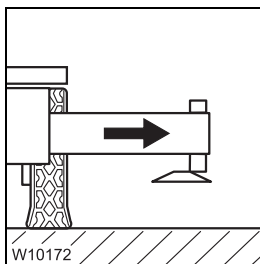
**Observe the warnings and safety instructions there!**



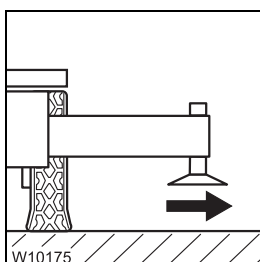
1. Level the truck crane with the level adjustment system and lower it as far as possible; p. 5 - 52.



2. Switch off (lock) the suspension.  
The symbol must be **red** (suspension off); p. 5 - 16.

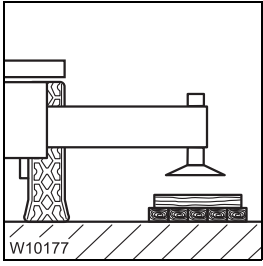


3. Extend all outrigger beams to the required span;
  - For the *Standard* slewing range type; *Enabled outrigger spans*, p. 11 - 28.
  - For the *MAXbase* slewing range type; *Enabled outrigger spans*, p. 11 - 32
  - Setting the spans*, p. 11 - 42,
  - Extending/retracting outrigger beams*, p. 11 - 45.

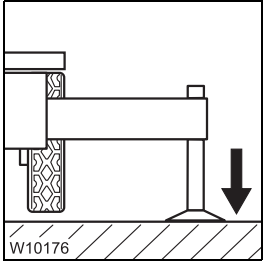


4. Move the outrigger pads into the working position and secure them; p. 11 - 51.

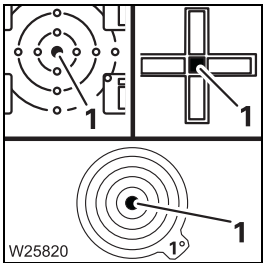




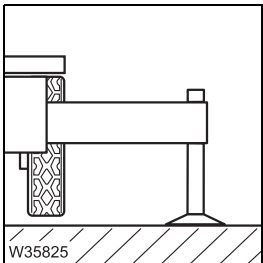
5. Enlarge the ground bearing area if necessary;  
 ■■■► *Determining the required load-bearing area, p. 11 - 9,*  
 ■■■► *Enlarging the load-bearing area, p. 11 - 52.*



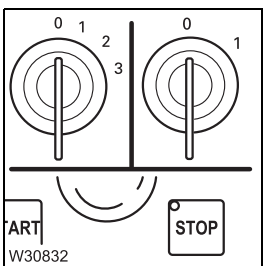
6. Extend the supporting cylinders until none of the wheels is touching the ground;  
 ■■■► *Extending/retracting supporting cylinders, p. 11 - 53.*



7. Level the truck crane with the outriggers.  
 The lamp (1) lights up in the measuring range 1°; ■■■► p. 11 - 58.



8. Check that none of the wheels are touching the ground.  
 Raise the wheels if necessary; ■■■► *Operating the axle raising system, p. 11 - 63.*



9. Switch off the engine;  
 – After operating it with the hand-held control; ■■■► p. 11 - 24,  
 – After operating it from the control units; ■■■► p. 4 - 21,

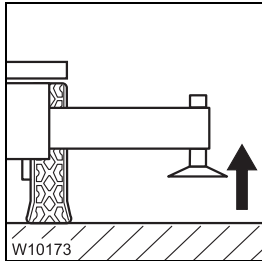
## 11.8.2

### CHECKLIST: Retracting the outriggers

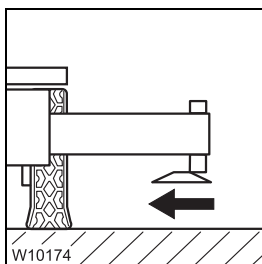


This checklist is not a complete operating manual. There are accompanying instructions, which are indicated by cross-references.

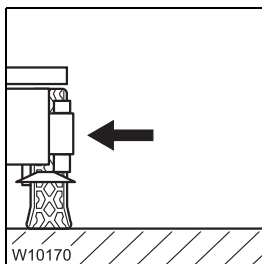
**Observe the warnings and safety instructions there!**



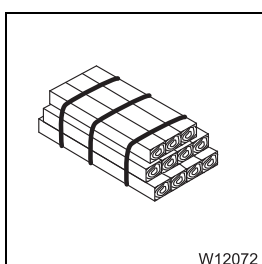
1. Retract the outrigger cylinders as far as possible; p. 11 - 53.



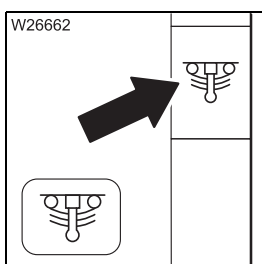
2. Move the outrigger pads into the driving position and secure them;  
 *Moving into driving position*, p. 11 - 51.



3. Fully retract and secure all outrigger beams;  
 *For on-road driving*, p. 11 - 44,  
 *Extending/retracting outrigger beams*, p. 11 - 45.

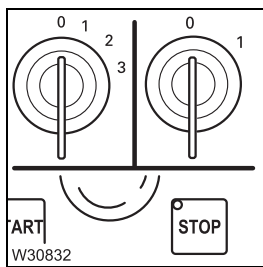


4. Stow away packing material safely, if applicable.





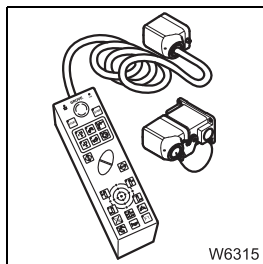
5. Activate the suspension (release locking).  
The symbol must be **green** (suspension on); p. 5 - 16.






**6. Switch off the engine;**

- After operating it from the control units;  p. 4 - 21.
- After operating it from the crane cab or using the hand-held control;  p. 9 - 9.



**7. If necessary, disconnect the hand-held control and stow it away;**

-  p. 11 - 22.

## 11.8.3 Preparing the truck crane

### In the driver's cab

#### Levelling the truck crane

- Align the truck crane horizontally with the level adjustment system;  
 ■■■► *Operating the level adjustment system, p. 5 - 52.*

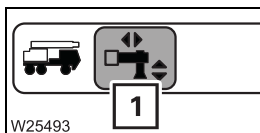
#### Locking the suspension

- Switch off the suspension; ■■■► *Switching the suspension on/off, p. 5 - 15.*

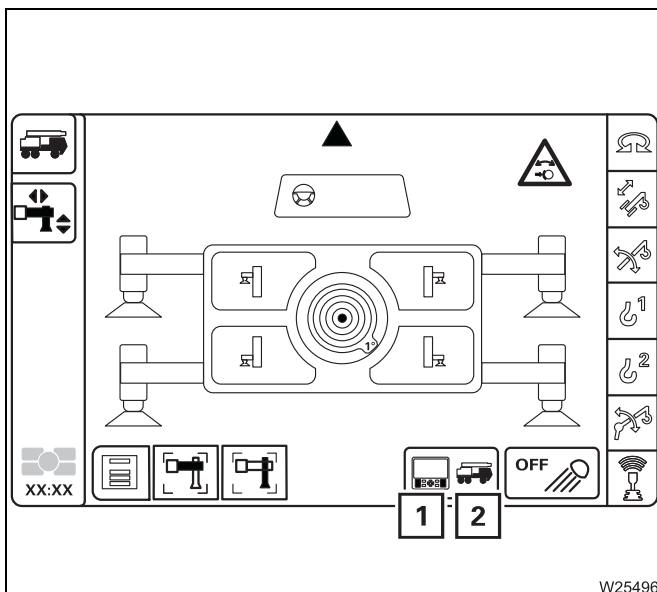
The operating elements for the outriggers are only released if the suspension is switched off. If the suspension is switched off, the wheels are lifted when the crane is put on outriggers.

### Outriggers control units

You can switch the *Outrigger* control units on and off from the crane cab.



- Open the *Outrigger* menu (1) if necessary.



The *Outrigger* menu opens.

The current status is displayed:

- Symbol (1) **red** – Carrier control units off, buttons disabled. Operating the outriggers via the CCS display.
- Symbol (2) **red** – Carrier control units on, operating the outriggers via the CCS display disabled.
- Select confirm the corresponding symbol to switch over.

## 11.8.4

### Setting the spans



**Danger of overturning if the outrigger beams are not correctly extended!**


Extend the outrigger beams only as far as the permissible spans.

Always extend all outriggers to the outrigger spans specified in the *lifting capacity table* for the planned application.

Even when you are only working on one side. Otherwise the rear stability for the rigging mode according to the displayed rigging mode is no longer guaranteed.

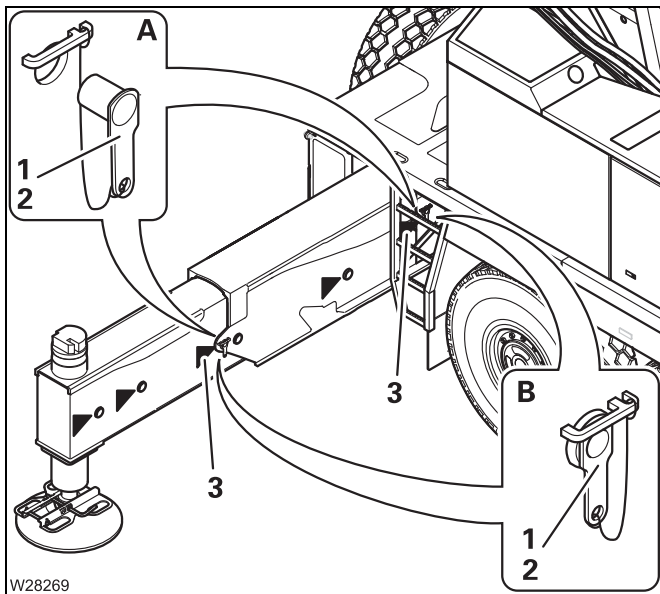


This section describes how to release and secure the outrigger beams, as well as the markings for the outrigger spans.

There are various ways to move the outrigger beams;  *Extending/retracting outrigger beams*, p. 11 - 45.

The illustrations show only the rear right outrigger beam as an example, the procedure is the same for the other outrigger beams.

The procedure is identical for the overall width and associated individual width.



**Total width 7.800 m (25.6 ft)**  
**Individual width 3.900 m (12.8 ft)**

**(A) – Prerequisite**

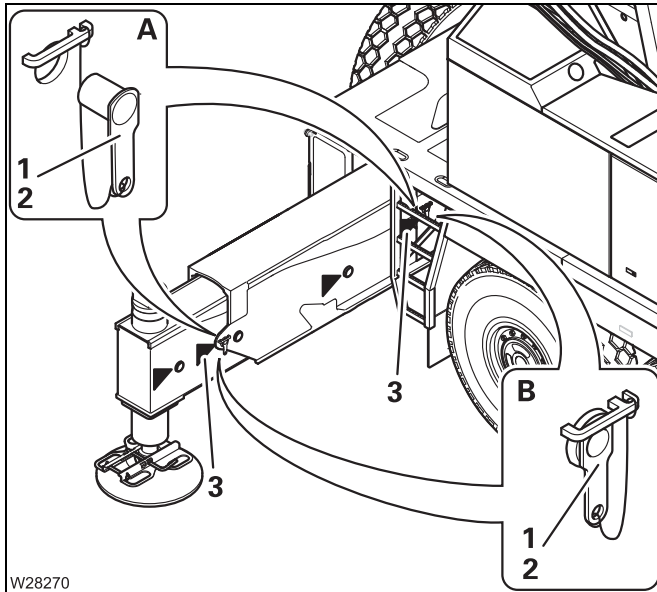
Pins (1) and (2) must be pulled out

**(B) – Setting and securing**

- Extend the outrigger beam up to the marking (3).
- Secure the outrigger beam with the pins (1) and (2).

**For the overall width**

- Set the same outrigger span in the same way at the opposite outrigger beam.



**Total width 6.854 m (22.4 ft)**  
**Individual width 3.427 m (11.2 ft)**

**(A) – Prerequisites**

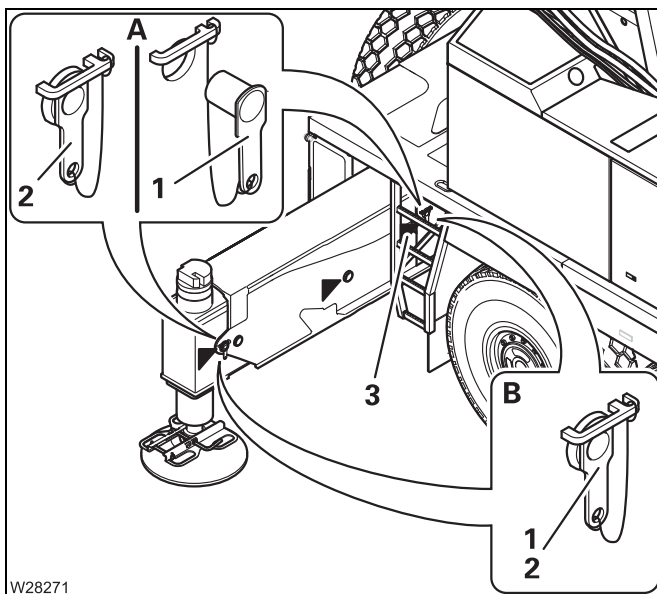
Pins (1) and (2) must be pulled out

**(B) – Setting and securing**

- Extend the outrigger beam up to the marking (3).
- Secure the outrigger beam with the pins (1) and (2).

**For the overall width**

- Set the same outrigger span in the same way at the opposite outrigger beam.



**Total width 5.910 m (19.4 ft)**  
**Individual width 2.955 m (9.7 ft)**

**(A) – Prerequisites**

- Pin (1) must be removed
- Pin (2) must be inserted

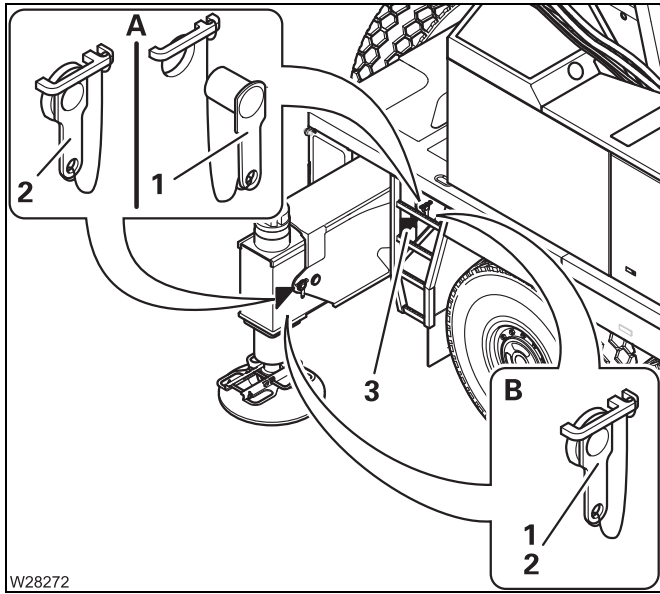
**(B) – Setting and securing**

- Extend the outrigger beam up to the marking (3).
- Secure the outrigger beam with the pin (1).
- The pin (2) remains inserted.

**For the overall width**

- Set the same outrigger span in the same way at the opposite outrigger beam.





**Total width 4.310 m (14.2 ft)**  
**Individual width 2.155 m (7.1 ft)**

**(A) – Prerequisites**

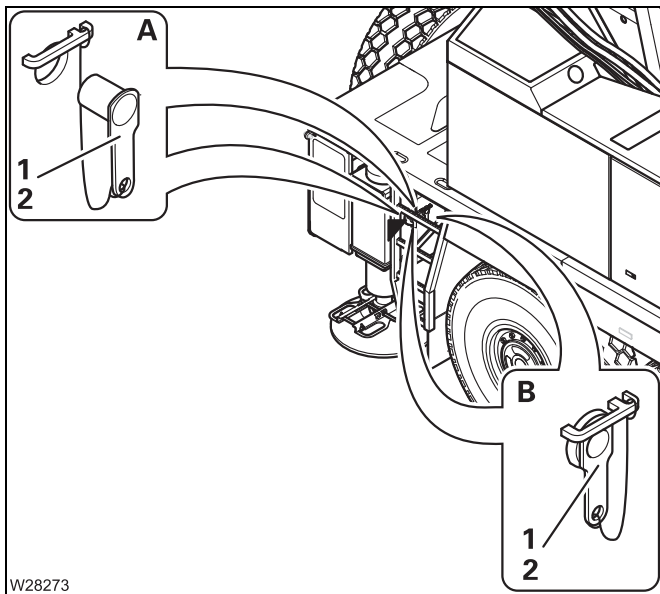
- Pin (1) must be removed
- Pin (2) must be inserted

**(B) – Setting and securing**

- Extend the outrigger beam up to the marking (3).
- Secure the outrigger beam with the pin (1).
- The pin (2) remains inserted.

**For the overall width**

- Set the same outrigger span in the same way at the opposite outrigger beam.



**Total width 2.710 m (8.8 ft)**  
**Single width 1.355 m (4.4 ft)**

**(A) – Prerequisites**

- Pins (1) and (2) must be pulled out

**(B) – Setting and securing**

- Completely retract the outrigger beam.
- Secure the outrigger beam with the pins (1) and (2).

**For the overall width**

- Set the same outrigger span in the same way at the opposite outrigger beam.

**For on-road driving**

- Set an outrigger span of 8.950 x 2.710 m (29.4 x 8.8 ft) on all outrigger beams and secure them.
- Secure all the outrigger pads in the driving position; ►► p. 11 - 51.



**Risk of accident if outriggers/outrigger pads are not secured!**

Always secure all retracted outrigger beams and all outrigger pads in the driving position. Avoid serious accidents caused by outrigger beams/outrigger pads slipping out.



## 11.8.5

### Extending/retracting outrigger beams



#### **Risk of accidents if outrigger beams cannot be seen!**

Cordon off the area where you intend to extend and retract the outrigger beams. Nobody is allowed to be in this area. Observe the moving outrigger beams or have them observed by a banksman who is in visual contact with you.




#### **Danger of overturning if improperly supported!**

Always extend **all** outrigger beams to the required outrigger span required for the specified rigging mode, even if you are only working on one side. Otherwise the rear stability for the rigging mode according to the displayed rigging mode is no longer guaranteed.






#### **Risk of damage to the outriggers!**

Before extending, always check whether the required pins for the desired outrigger span are inserted/removed. Before retracting the outrigger beams, always check whether they have been secured in driving position.

- Check that the pins are inserted/removed as specified in the prerequisites (A) for the desired outrigger span;  p. 11 - 42.

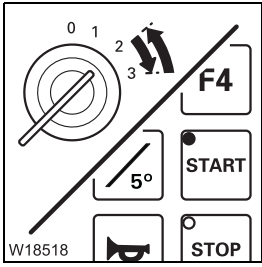
Depending on the rigging, control elements are provided for moving the outrigger beams

- On the *outrigger* control units;  p. 11 - 49,
- On the hand-held control;  p. 11 - 47,
- In the crane cab;  p. 11 - 49.



**From the control units**

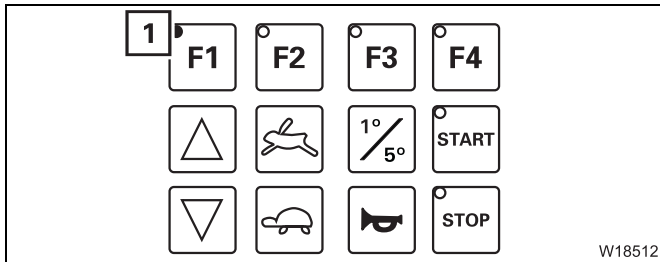
If the hand-held control is connected, the *Outrigger* operating units are inactive.



**Start the engine**

- Remove the hand-held control if necessary, and start the engine from the driver's cab; p. 4 - 14.

You can also start the engine from the control units; p. 11 - 25.



**Switching on the lighting**

Only the lamp (1) lights up after opening the door.

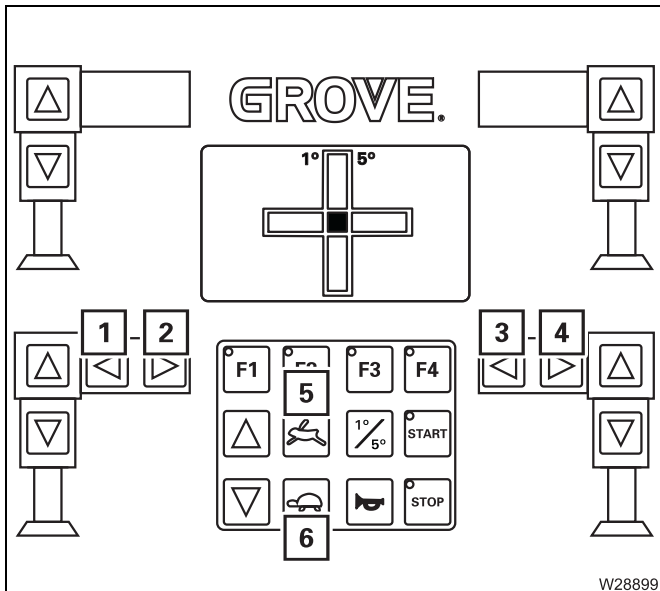
- Press any button.  
The lights are switched on.

**Moving the outrigger beams**



You can only operate the outrigger beams to the left and right of the control unit on the operator's side.

- Observe the safety instructions for operating the outrigger beams; p. 11 - 45.

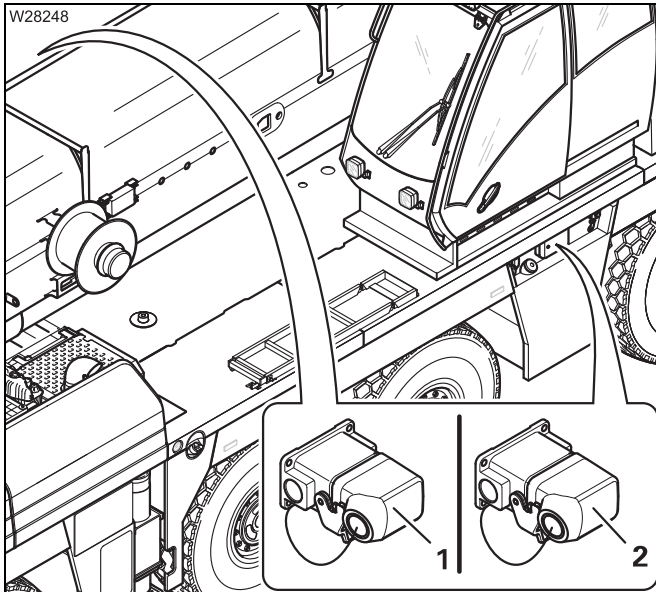


- Press the button
  - 5 For high-speed mode
  - 6 For normal speed.
- Additionally press the button for the desired outrigger beam.
  - 1 Extend left
  - 2 Retract left
  - 3 Retract right
  - 4 Extend right
  - 1 + 4 Extend both
  - 2 + 3 Retract both

The outrigger beams move until you let go of the respective button or until the respective end position has been reached.

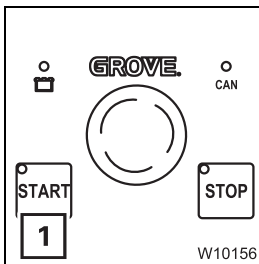
### With the hand-held control

The hand-held control must be connected to the carrier.



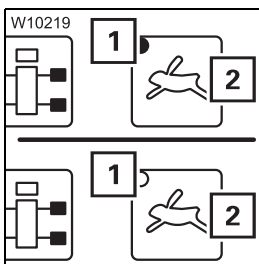
- Connect the hand-held control to the required socket (1) or (2).
  - 1 For the right-hand outrigger beam
  - 2 For the left-hand outrigger beam

Information on connecting; *Connecting the hand-held control*, p. 11 - 22.



### Start the engine

- Press the button (1) – the engine starts; p. 9 - 8.



### Pre-select high-speed mode/normal speed

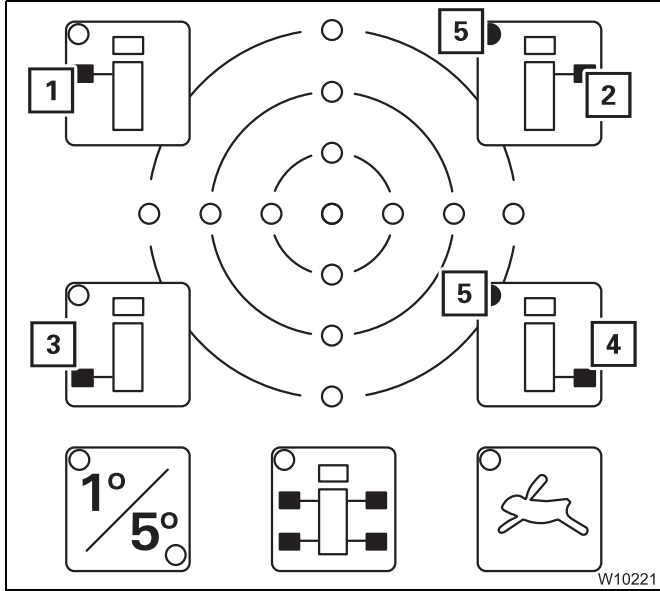
- Press the button (2).
  - Lamp (1) lights up – high-speed mode pre-selected,
  - Lamp (1) goes out – normal speed pre-selected.



### Pre-selecting outriggers



You can only pre-select outriggers on the side to which the hand-held control is connected.



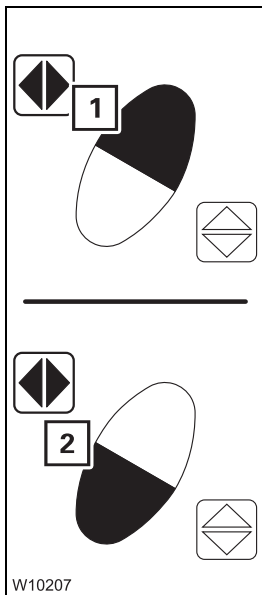
- Press the button for the required outrigger once.

- 1 Front left
- 2 Front right
- 3 Rear left
- 4 Rear right


- 1 + 3 Both on left
- 2 + 4 Both on right

Pre-selection is switched on and the lamp in the corresponding button lights up, e.g. the lamps (5).

The pre-selection is switched off after approx. 10 seconds.



### Extending/retracting outrigger beams

- Observe the safety instructions for operating the outrigger beams;  p. 11 - 45.
- Press the button combination for the desired movement:

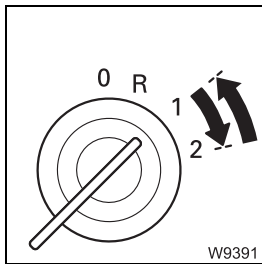
- 1 Extend
- 2 Retract

The pre-selected outriggers move until you let go of the respective button or until the respective end position has been reached.

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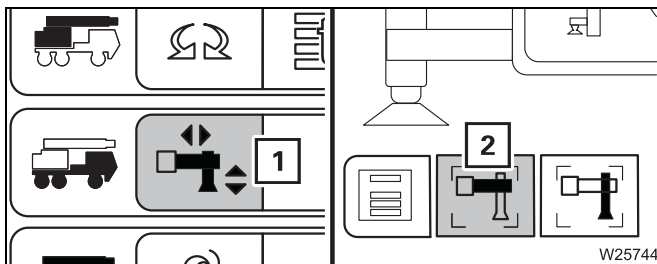
**From the crane cab**

The operating elements are in the *Outriggers* submenu.



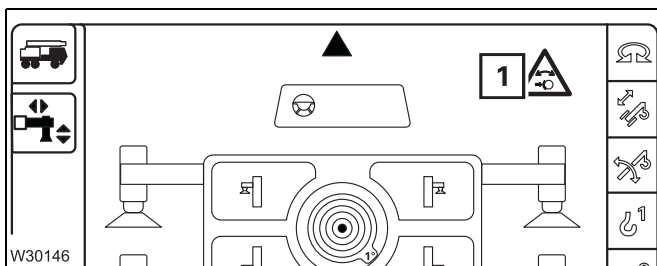
**Start the engine**

- Start the engine from the crane cab; p. 9 - 5.
- Switch off the slewing gear; p. 10 - 115.



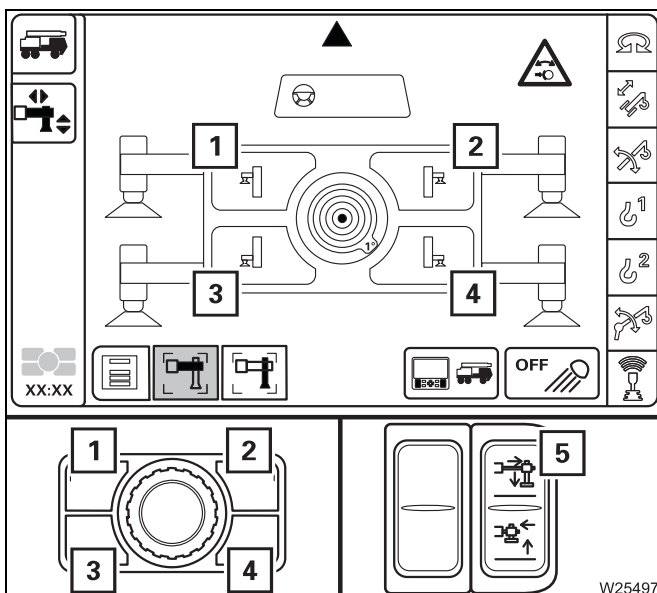
**Open menu**

- Open the *Outrigger* menu (1).
- Select and confirm the symbol (2) – *Move outrigger beams*.



When the turntable is switched on the symbol (1) is displayed and outrigger motion is disabled.

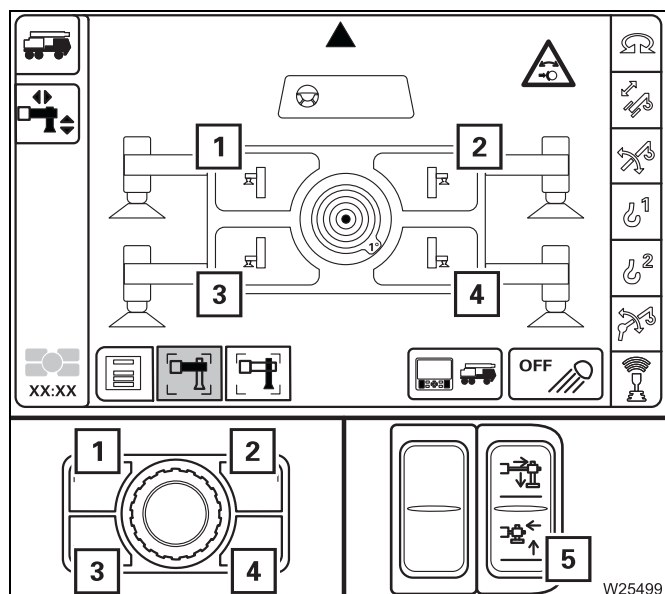
- Switch off the slewing gear – symbol (1) goes out.



**Extend**

- Press the button for the desired outrigger beam.
  - 1 Front left
  - 2 Front right
  - 3 Rear left
  - 4 Rear right
- Press the button (5) in at the top – the selected outrigger beam extends.





### Retract

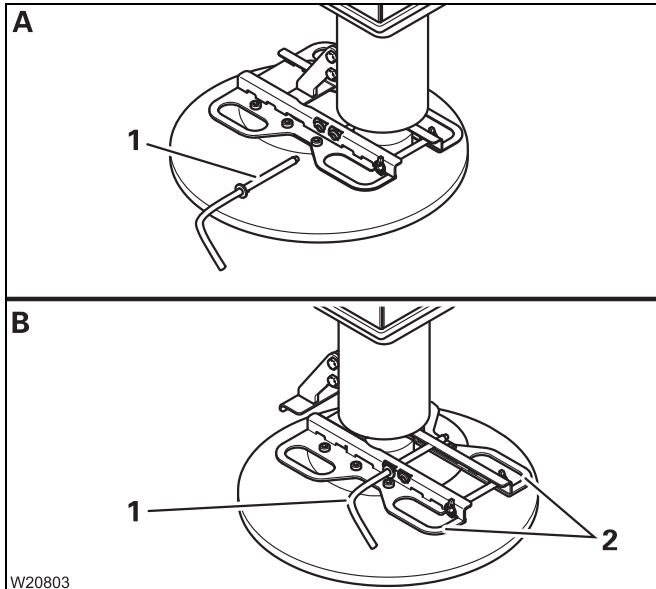
- Press the button for the desired outrigger beam.
  - 1 Front left
  - 2 Front right
  - 3 Rear left
  - 4 Rear right
- Press the button (5) in at the bottom – the selected outrigger beam retracts.

## 11.8.6

### Moving the outrigger pads into working/driving position

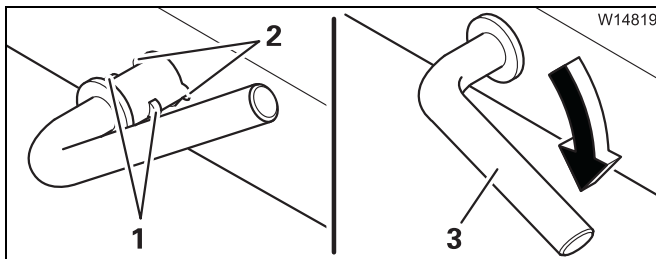


The illustrations show one outrigger pad. The pulling direction of the other outrigger pads may differ from this.



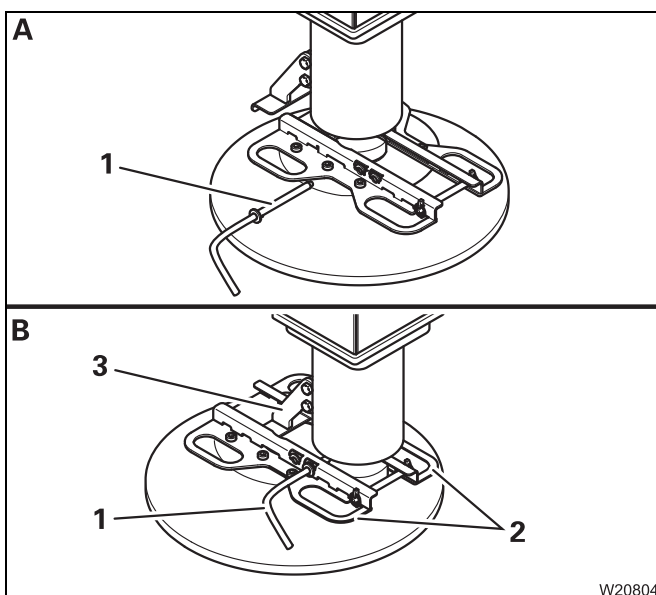
#### Moving them into working position

- (A) – Pull out the pin (1).
- (B) – Pull the outrigger pad outwards by the handles (2).
- Secure the outrigger pad with the pin (1).
- Secure the pin (1).
- Move the other outrigger pads into operating position in the same way.



#### Securing pin

- Plug the pin with the peg (1) through the cutout (2).
- Turn the grip (3) downward.




#### Moving into driving position

- (A) – Pull out the pin (1).
- (B) – Push the outrigger pad by the handles (2) as far as possible back onto the clamp (3).
- Secure the outrigger pad with the pin (1).
- Secure the pin (1).
- Move the other outrigger pads into driving position in the same way.

## 11.8.7

### Enlarging the load-bearing area

If the surface of the outrigger pads is too small, you must enlarge the ground bearing area by packing the outrigger pads;  *Determining the required load-bearing area*, p. 11 - 9.

For packing, use only suitable materials that will withstand the outrigger pressure, e.g. straight hardwood of similar cross-sections or steel plates with welded-on strips that will keep the outrigger pads in position.



#### **Risk of accidents if the packing is insufficient!**

Only use materials of sufficient strength.  
This will prevent the packing giving way and causing the truck crane to tilt and overturn.



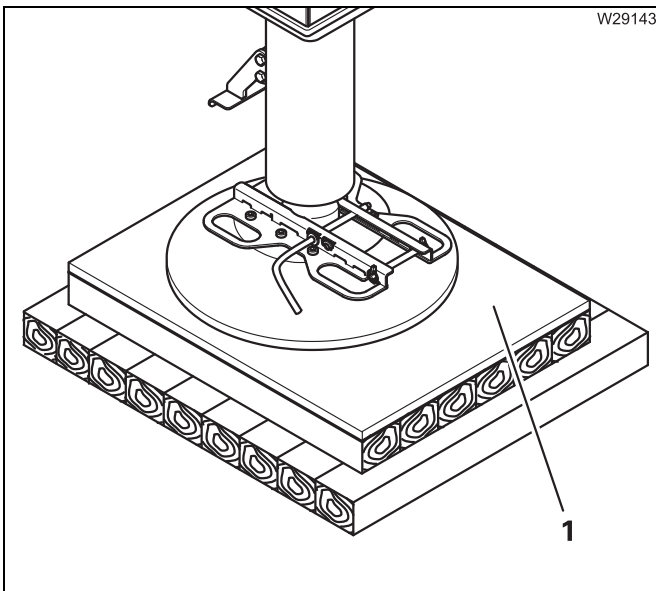
#### **Danger of overturning if the packing or truck crane is at an angle!**

Level the packing and the truck crane.  
This prevents the outrigger pads slipping off the inclined packing and causing the truck crane to overturn.



#### **Risk of damage to the outrigger pads!**

Always place a steel plate of sufficient strength as the uppermost layer of the packing if the truck crane is equipped with plastic outrigger pads. This prevents the outrigger pads from getting damaged due to one-sided pressure.



Level the packing; the outrigger pad must not be at an angle.

Ensure that the outrigger pressure is evenly distributed over the packing:

- The outrigger pad must be positioned in the centre of the packing.
- The outrigger pad must cover all the wooden planks.
- If the packing has several layers, each layer must be placed below the other offset by 90°.
- The packing must lie flat on the ground.

Consult your supervisor if you are in doubt.



If the truck crane is equipped with plastic outrigger pads then the uppermost layer of the packing must be a steel plate (1) of sufficient strength.



## 11.8.8

### Extending/retracting supporting cylinders



**Risk of overturning if the load bearing capacity of the ground is too low!**  
Enlarge the load-bearing area if the ground cannot withstand the resulting outrigger pressure.  
This prevents the ground under the outrigger pad giving way and causing the truck crane to tilt and overturn.



**Risk of accidents if the supporting cylinders are out of sight!**  
No one is allowed to be in the area of the supporting cylinders.  
Observe the moving supporting cylinders or have them observed by a banksman who is in visual contact with you.



**Risk of damage to the supporting cylinders!**  
Move the outriggers as uniformly as possible on all four support points.  
This prevents the supporting cylinders being damaged due to one-sided pressure.






**Risk of damage to the tyres!**  
Before retracting the supporting cylinders, remove any sharp-edged and pointed materials from below the tyres.  
This prevents the tyres being punctured or damaged when the truck crane is lowered.



Do not extend the supporting cylinders to their absolute limit. The supporting cylinders must have a remaining stroke of at least 25 mm (1 in) in order to carry out alignment corrections.

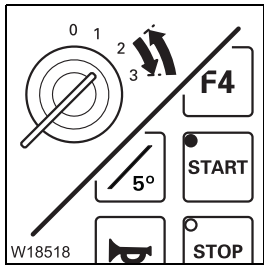
There are various operating elements for moving the outrigger beams

- On the *outrigger* control units;  p. 11 - 54,
- On the hand-held control;  p. 11 - 55,
- In the crane cab;  p. 11 - 56.



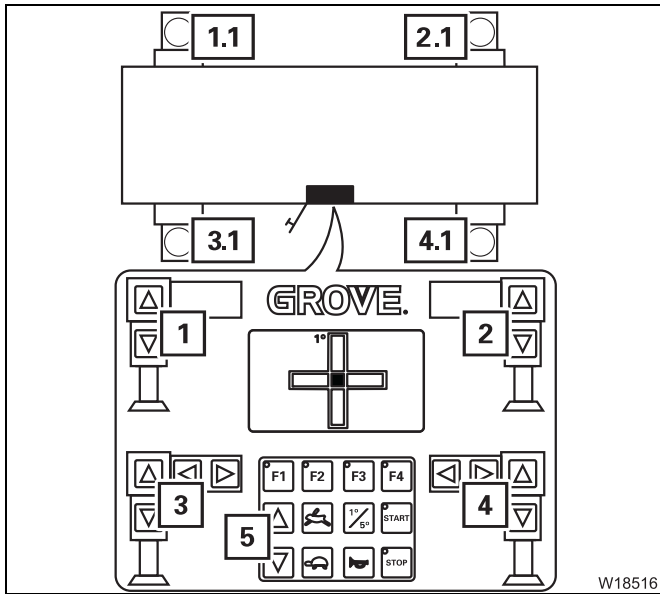
**From the control units**

If the hand-held control is connected, the *Outrigger* operating units are inactive.



**Start the engine**

- Disconnect the hand-held control, if necessary, and start the engine either:
  - From the driver's cab; p. 4 - 14,
  - or
  - from the control units; p. 11 - 25.

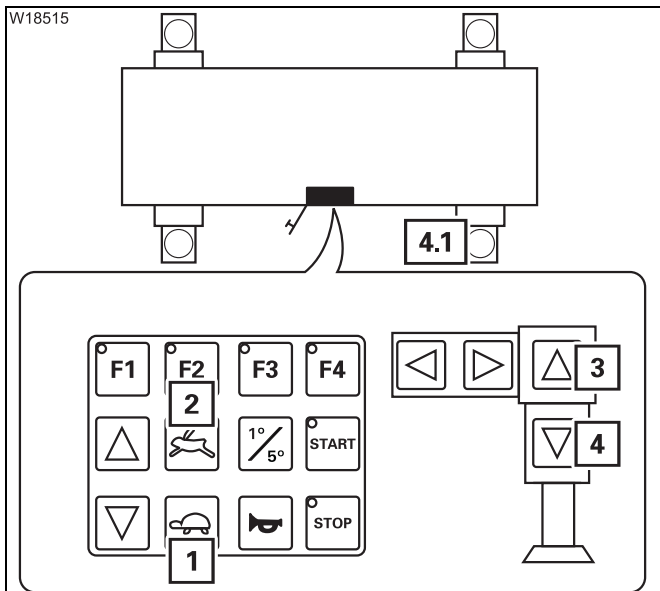


**Moving the supporting cylinders**

Assignment of buttons:

- 1 Supporting cylinder 1.1
- 2 Supporting cylinder 2.1
- 3 Supporting cylinder 3.1
- 4 Supporting cylinder 4.1
- 5 All supporting cylinders (1.1) to (4.1)

- Observe the safety instructions for operating the supporting cylinders; p. 11 - 53.




The operation is the same for all supporting cylinders.

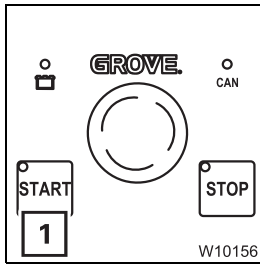
- Press the button
  - 1 For normal speed
  - 2 For high-speed mode.
- Also press the button for the desired supporting cylinder, e.g. for 4.1.
  - 3 For retracting
  - 4 For extending

You can also operate several supporting cylinders at the same time.


The supporting cylinders move until you let go of the respective button or until the respective end position has been reached.

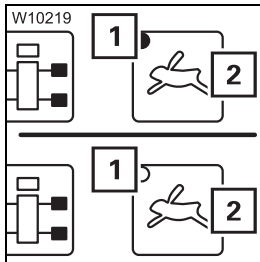
### With the hand-held control

- Connect the hand-held control to any socket on the carrier;  p. 11 - 22.



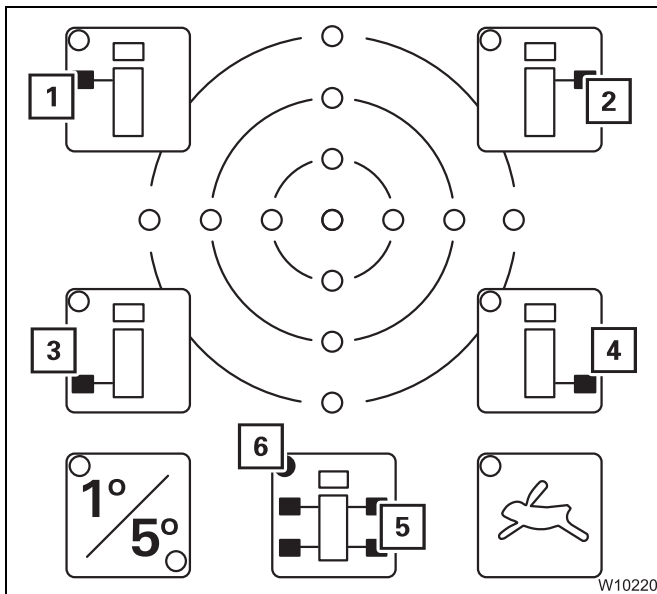
### Start the engine

- Press the button (1) – the engine starts;  p. 9 - 8.



### Pre-select high-speed mode/normal speed

- Press the button (2).
  - Lamp (1) lights up – high-speed mode pre-selected,
  - Lamp (1) goes out – normal speed pre-selected.



### Pre-selecting outriggers

- Press the button for the required outriggers once
  - 1 Front left
  - 2 Front right
  - 3 Rear left
  - 4 Rear right
  - 5 All

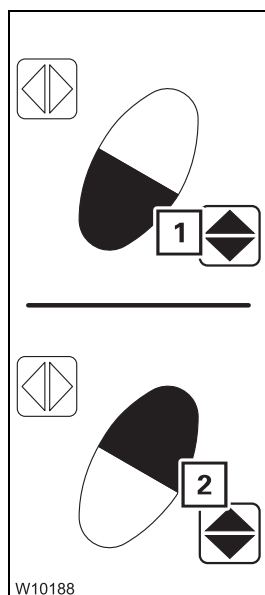
Pre-selection is switched on and the lamp in the corresponding button lights up, e.g. the lamps (6).

The pre-selection is switched off after approx. 10 seconds.



Combinations of the buttons (1) to (4) are also possible, e.g. buttons (1) and (2), in order to lift the truck crane at the front.





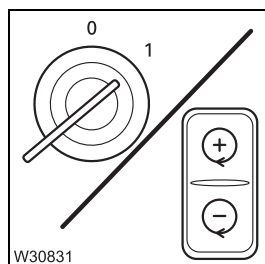
### Extending/retracting supporting cylinders

- Observe the safety instructions for operating the supporting cylinders; p. 11 - 53.
- Press the button combination for the desired movement:
  - 1 Extend
  - 2 Retract

The pre-selected supporting cylinders move until you let go of the respective button or until the respective end position has been reached.

### From the crane cab

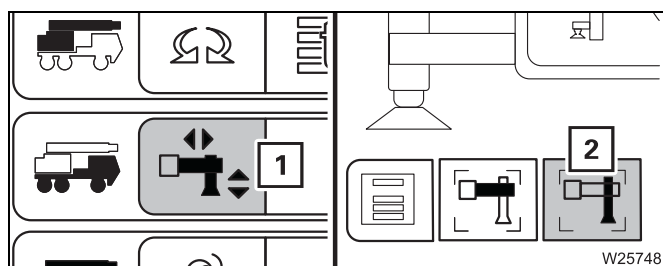
The following operating elements are found in the *Outrigger* menu.



### Start the engine

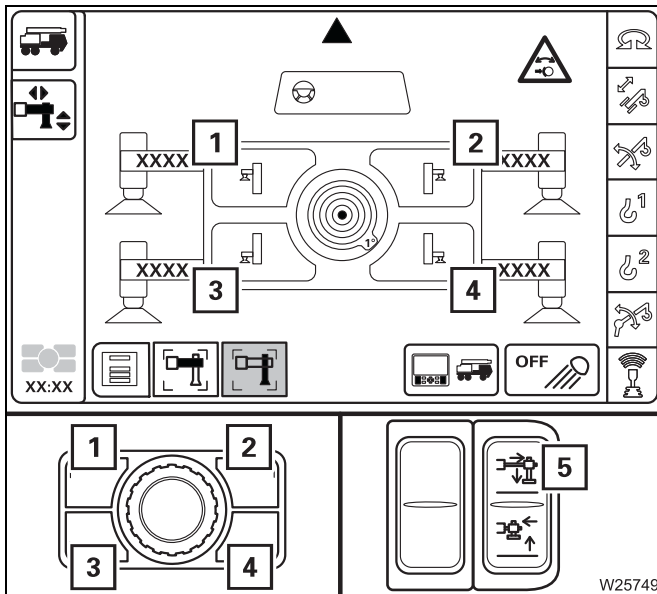
- Start the engine from the crane cab; p. 9 - 5.

- Switch off the slewing gear; p. 10 - 119.



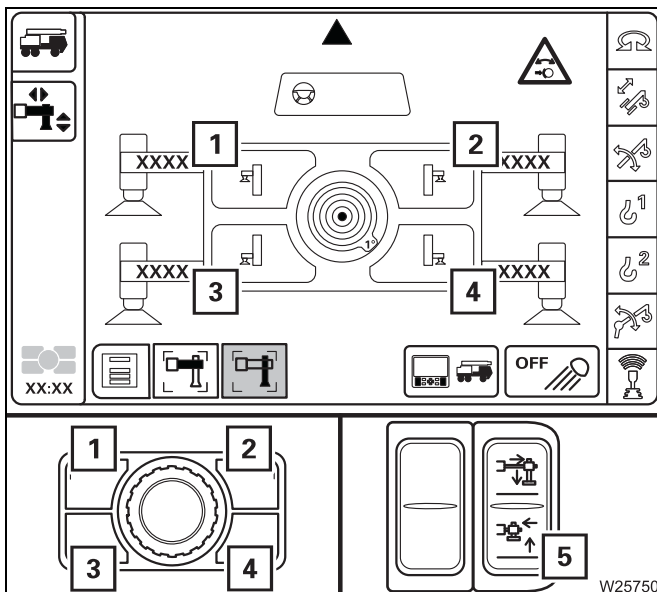
### Open menu

- Open the *Outrigger* menu (1).
- Select and confirm the symbol (2) – *Move outrigger cylinders*.



### Extend

- Press the button for the desired outrigger cylinder.
  - 1 Front left
  - 2 Front right
  - 3 Rear left
  - 4 Rear right
- Press the button (5) in at the top – the selected outrigger beam extends.



### Retract

- Press the button for the desired outrigger cylinder.
  - 1 Front left
  - 2 Front right
  - 3 Rear left
  - 4 Rear right
- Press the button (5) in at the bottom – the selected outrigger beam retracts.

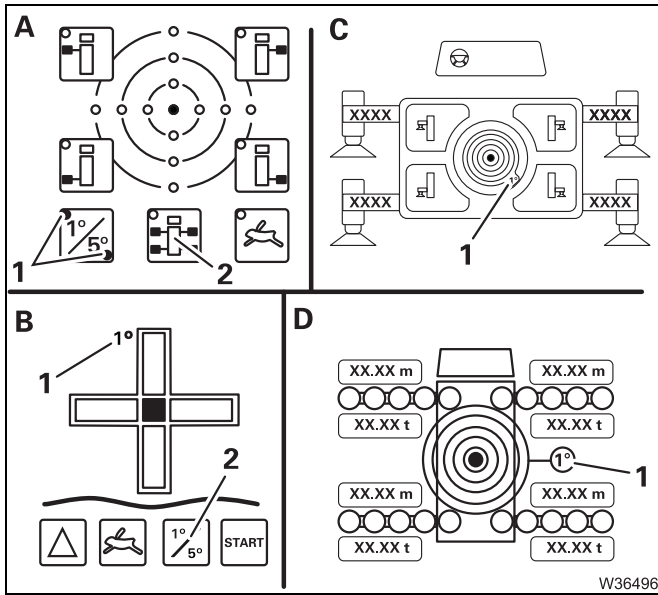
## 11.8.9

### Levelling the truck crane on outriggers

You must level the truck crane before crane operation and possibly correct its horizontal alignment during crane operation.

#### Inclination indicators

After switching on the ignition, various inclination indicators display the current alignment.



- A On the hand-held control
- B On the *outrigger* control units

On the *CCS display*

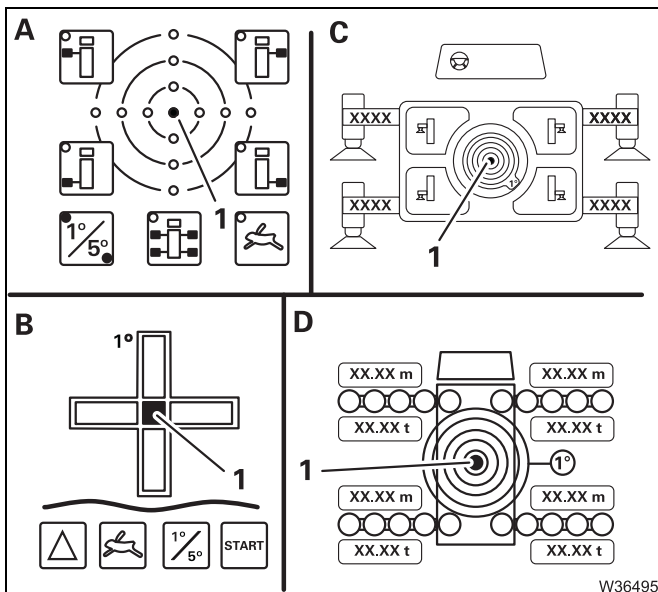
- C In the *Outrigger* menu
- D In the *Monitoring* menu

#### Switching over the measuring range

You can change the measuring range between 1° and 5°.

- Press the button (2) once.  
The current measuring range (1) is displayed.

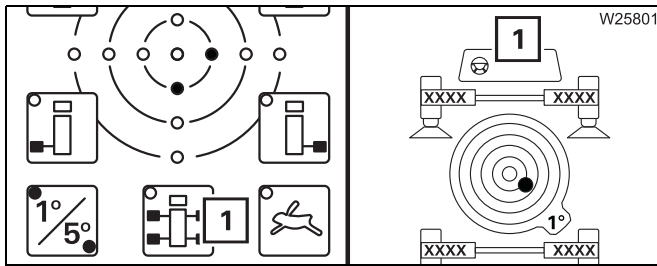
The measuring range is automatically switched in the *Outrigger* menu and the *Monitoring* menu.



#### Read the display

Only the lamp (1) at the centre is on if the truck crane is level.

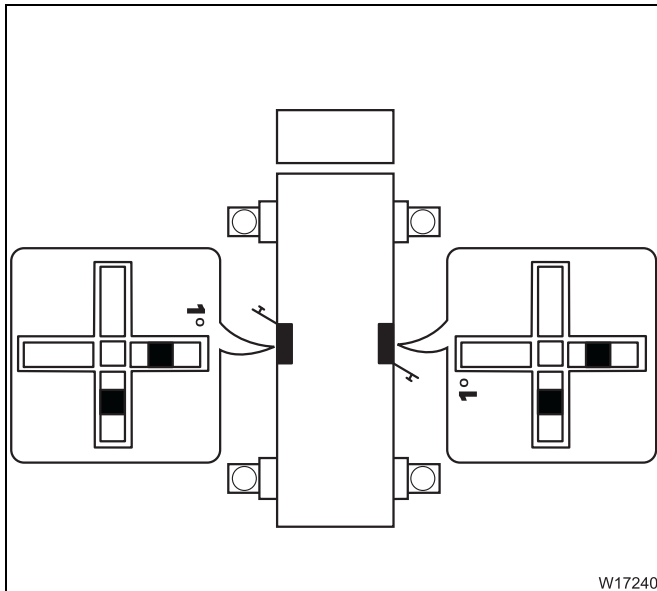
The other lamps show the sides of the truck crane which are higher.



– Manual control/ CCS display

The assignment to the carrier is given by the directional indicator (1).

In this example, the carrier would be standing higher to the rear on the right hand side.



– Outriggers control units

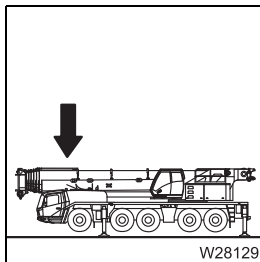
The assignment to the carrier corresponds to the top view.

Due to the position of the control units, the displays on both sides differ.

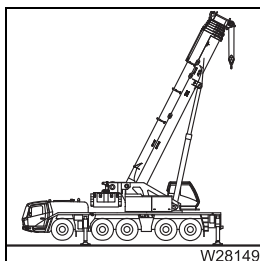
In this example, the carrier would be standing higher to the rear on the right hand side.

**Prerequisites**

The following prerequisites apply to manual and automatic alignment.



The main boom must be resting on the boom rest.



or

- The main boom must be raised **and**
- The load must have been set down **and**
- The superstructure must be in the 0° or 180° position.





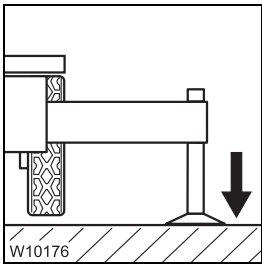
### Risk of overloading the main boom!

Always slew the superstructure to the 0° or 180° position and set down the load before levelling the truck crane.

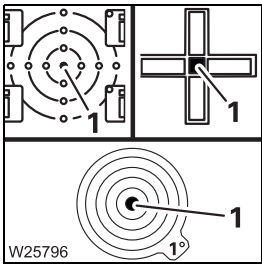
In other positions, the deformation of the carrier will distort the indicated inclination and the truck crane will be at an angle. This could cause the boom to become overloaded during crane operation.

### Manual alignment

- Check that the prerequisites are met; p. 11 - 59.



- Extend all supporting cylinders until none of the wheels is touching the ground.



- Level the truck crane with the supporting cylinders until the lamp (1) is the only one lighting up in the measuring range 1°; p. 11 - 53.
- Only lift the truck crane as far as necessary.

### Checks to be performed after levelling

During levelling, the ground may give way and the packing may slip.



### Risk of accident due to incorrectly supported truck crane!

Perform the following checks each time you have levelled the truck crane and correct any misalignments.

Otherwise the truck crane may overturn even when lifting a load released by the RCL.

- After you have levelled the truck crane, check:
  - whether all the wheels are lifted off the ground,
  - whether the ground under one of the outrigger pads has given way,
  - that the packing is correct for the enlarged load-bearing area.


If slewing is permissible in the current rigging mode:

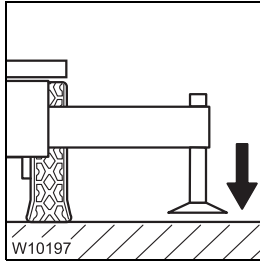
- Slew the superstructure within the permissible slewing range.
- Perform the specified checks again.
- Check the horizontal alignment on the inclination indicator.



## Automatic alignment

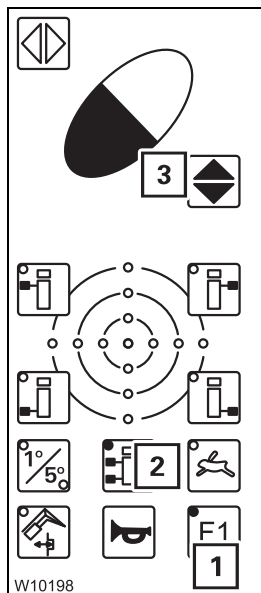
During the automatic alignment procedure, the supporting cylinders are extended **only** to prevent any wheels touching the ground after the alignment.

- Check that the prerequisites are met;  p. 11 - 59.
- Extend the supporting cylinders until the outrigger pads are just above the ground.



## Starting procedure

Depending on the truck crane's equipment, you can start the procedure from the hand-held control and the *Outrigger* control units.



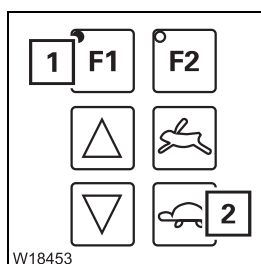
– On the hand-held control

- Press the button (1) once.
- Press the button (2) once.

The lights in the buttons go on.

- Press the button combination (3) for automatic alignment.

The procedure begins.



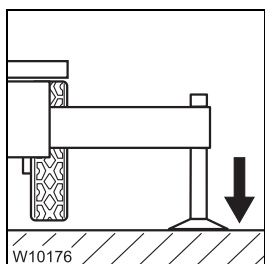
– On the control units

- Press the button (1).
- Additionally, press the button (2).

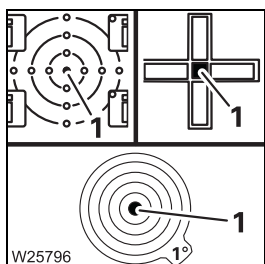
The procedure begins.



### Automatic procedure



1. All the supporting cylinders are extended one after the other until the outrigger pads touch the ground.
2. All the supporting cylinders are extended simultaneously so that none of the wheels is touching the ground any more.



3. The truck crane is automatically levelled horizontally.

This procedure is performed:

- until horizontal alignment is reached, the lamp (1) in the centre is the only one lighting up in measuring range 1° or
- until you let go of a button or
- until horizontal alignment is no longer possible, e.g. when a supporting cylinder is extended as far as possible.



#### **Danger of overturning if the truck crane is not level!**

When CCS ends the automatic alignment procedure, the truck crane is not necessarily level.

Always check the horizontal alignment on the inclination indicator after automatic levelling.

## 11.8.10 Operating the axle raising system

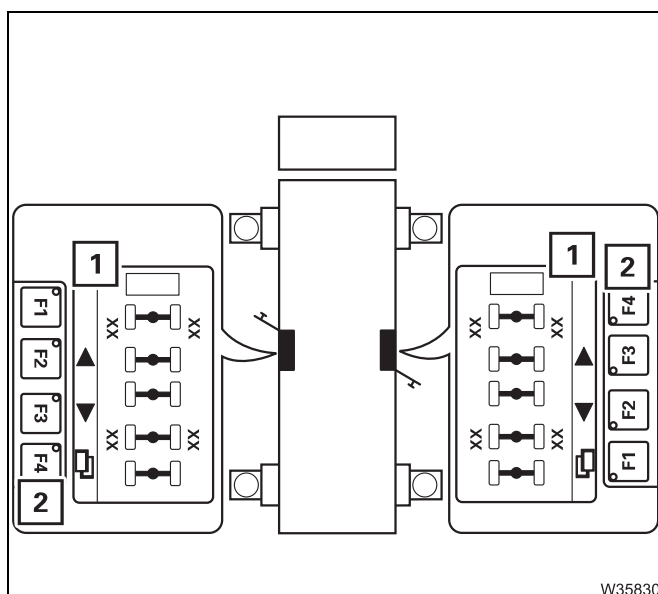
The axle raising system has two functions.

### – Lifting/lowering wheels

When the truck crane is supported on outriggers, you can raise the wheels (e.g. levelling horizontally) or lower the wheels (e.g. for driving with a rigged mobile crane).

### – Aligning the truck crane

When driving with a rigged truck crane, you can level the free-standing truck crane – with a locked suspension, without first supporting the truck crane on outriggers.



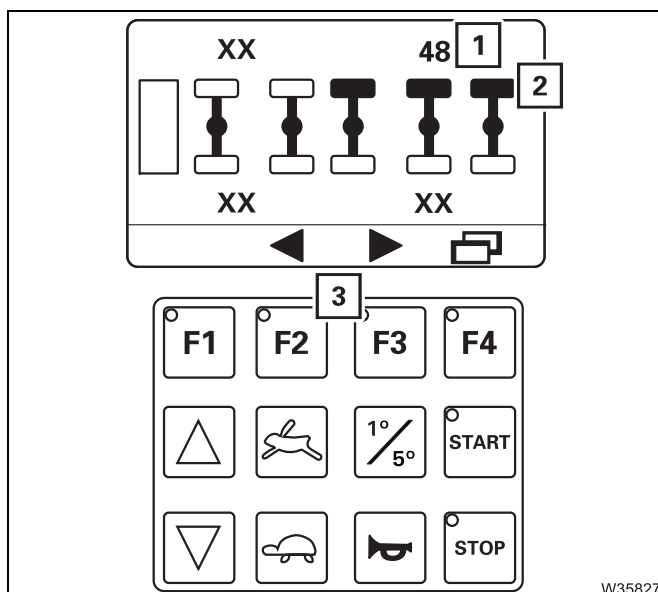
### Open menu

The *Raise axle* menu can only be opened when the suspension is switched off (locked);  
 ■■■ Switching the suspension on/off, p. 5 - 15.

- Press button (2) repeatedly until the *Raise Axle* menu (1) is displayed.

The assignment to the carrier corresponds to the top view.

The operation is same on both sides.

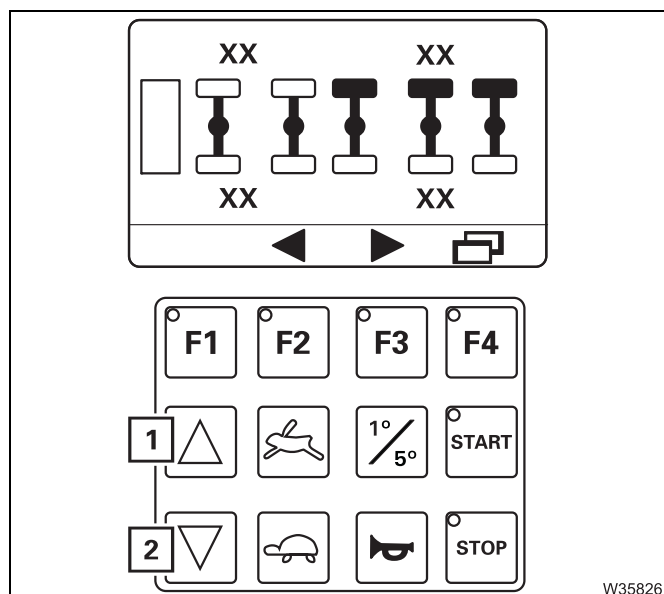


Only certain wheel groups can be selected;  
 ■■■ Selectable wheel groups, p. 8 - 101.

- Use the buttons (3) to select the required wheels – selected wheels (2) are shown in black.

Movements are only enabled when the wheel load per wheel is a maximum of 16 t (35 klbs) – e.g. 48 t (105 klbs) on the display (1) with a pre-selected wheel group (2).





- Press the button for the desired movement.

#### Lifting/lowering wheels

- 1 Lifting wheels
- 2 Lowering wheels

#### Aligning the truck crane

- 1 Lowering the truck crane
- 2 Lifting the truck crane

## 11.8.11 Outrigger pressure display



Especially with asymmetrical outrigger spans, the outrigger pressure displays do not provide useful information on correct alignment. Horizontal alignment is the decisive factor for correctly supporting the truck crane;   
 p. 11 - 58.

After switching on the ignition, the outrigger pressure displays indicate the current outrigger pressure for all supporting cylinders. The set unit (t or klbs) is shown next to the displays.

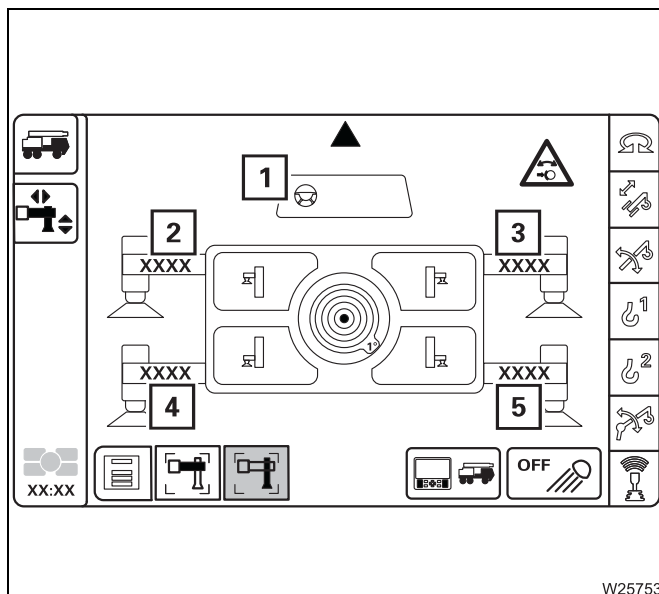


Outrigger cylinders retracted or extended as far as possible will lead to an incorrect outrigger pressure display. The display will show the most accurate reading if the movement performed last was *Extend outrigger cylinders*.



### Risk of accidents when misused!

A displayed outrigger pressure over 0 t does not guarantee protection against overturning or overloading. For this reason, never override the RCL.

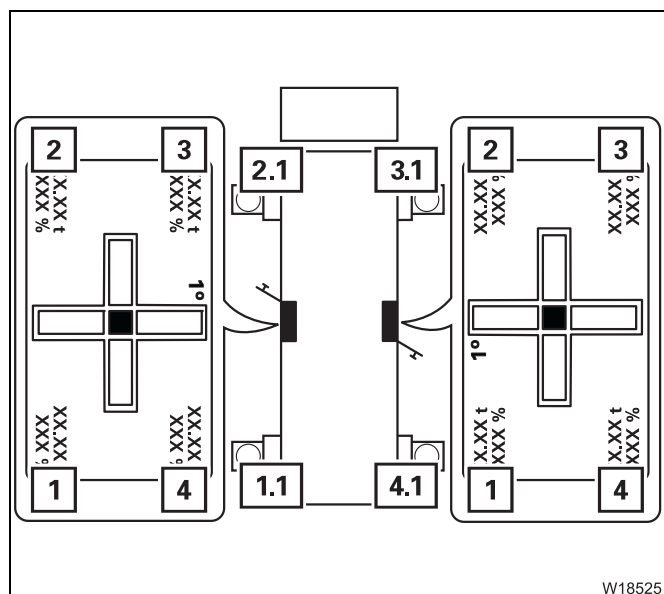


### In the Outriggers submenu

The assignment of the displays to the carrier is given by the directional indicator (1).

- 2 Front left outrigger pressure
- 3 Front right outrigger pressure
- 4 Rear left outrigger pressure
- 5 Rear right outrigger pressure





### On the outrigger control units

The assignment of the displays to the carrier corresponds to the top view.

- 1 Display for the supporting cylinder 1.1
- 2 Display for the supporting cylinder 2.1
- 3 Display for the supporting cylinder 3.1
- 4 Display for the supporting cylinder 4.1

## 11.9

## Rigging/unrigging the counterweight

Depending on the version, the GMK5250L can be rigged with counterweight mass of 7 t (15,432 lbs) to 80.1 t .

### 11.9.1

### Information on rigging

Rigging the counterweight is a challenging task. Only experienced personnel who are familiar with the valid accident prevention regulations are authorised to sling counterweight sections and instruct the crane operator.

When the engine is running for crane operation, the rigging personnel may only climb on the truck crane when the slewing gear is switched off and the slewing gear brake is applied.

The crane operator and rigging personnel must maintain visual contact during the rigging process.

The rigging process for a single counterweight section is described. Proceed in the same manner when rigging other counterweight sections or blocks.

#### When rigging

##### As the crane operator

- Lift the counterweight section onto the counterweight platform as described in the section *Assembling counterweight versions*.
- Now inform the rigging personnel that they can climb on the truck crane.

##### As the rigging personnel

- Do not climb on the truck crane until permitted by the crane operator.
- Position the counterweight if necessary.



**As the crane operator**

- Use only the *Raise/lower hoist* or *Raise/lower derricking gear* movements for *setting down the counterweight*. Execute the movement as slowly as possible.

Notify the rigging personnel if the superstructure need to be slewed for positioning the counterweight.

- Set down the counterweight section.

**As the rigging personnel**

- Remove the lifting gear and set down the ends so that the clearance is clearly visible to the crane operator.
- Leave the slewing range of the counterweight and the load.

**As the crane operator**

- Perform the *Raise hoist* movement at the lowest possible speed until the lifting gear is free.

**When unrigging**

**As the crane operator**

- Lift the lifting gear over the counterweight section.
- Now inform the rigging personnel that they can climb on the truck crane.

**As the rigging personnel**

- Do not climb on the truck crane until permitted by the crane operator.
- Sling the counterweight section at the provided slinging points.

**As the crane operator**

- Wind on the hoist rope until the lifting gear is tensioned – do not continue lifting the counterweight section.

**As the rigging personnel**

- Leave the slewing range of the counterweight and the load.

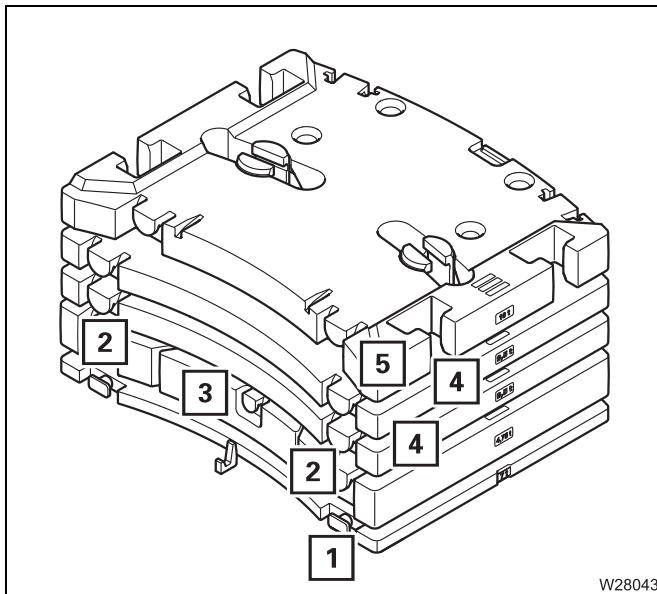
**As the crane operator**

- Lift the counterweight section off the counterweight platform.



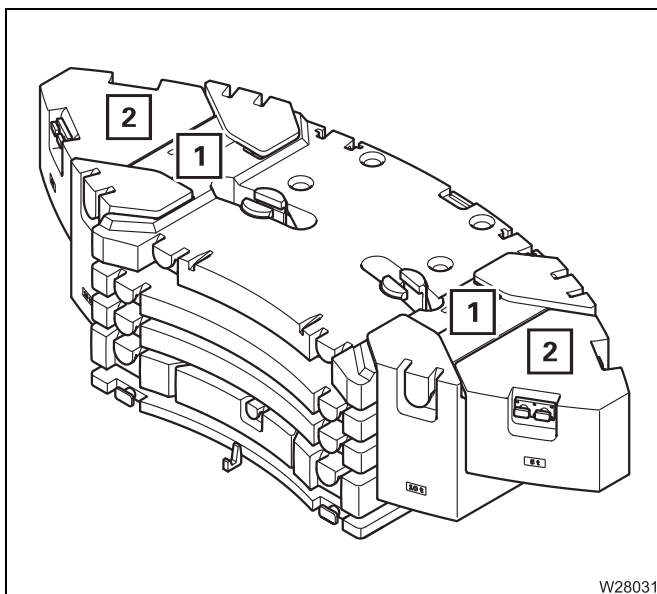
## 11.9.2 Counterweight sections

The counterweight combinations can be comprised of:



### Counterweight 50 t (110,231 lbs)

- One 7 t base plate (1)
- Two 4.75 t counterweight sections (2)
- One 4.5 t counterweight section (3)
- Two 9.5 t counterweight sections (4)
- One 10 t counterweight section with recesses (5)



### Counterweight 80 t

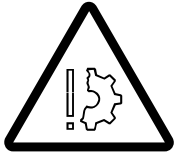
- Two 10 t blocks (1)
- Two 5 t blocks (2)

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### 11.9.3

## Identification

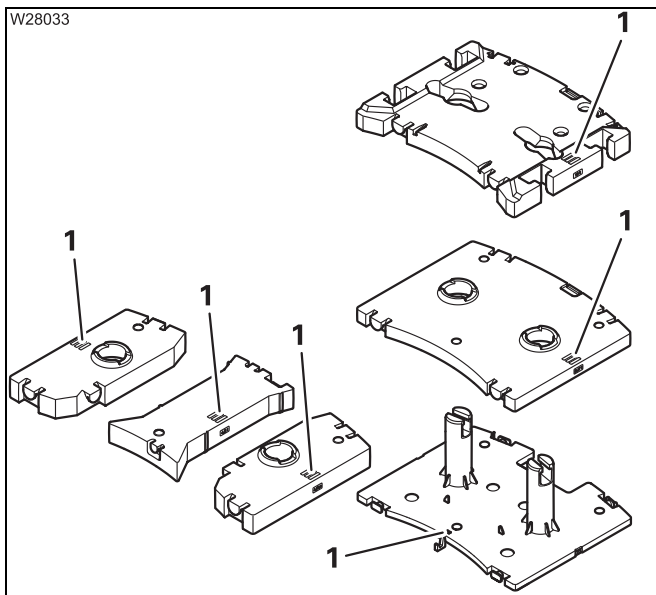
The truck crane and its corresponding counterweight sections are labelled with the same serial number.



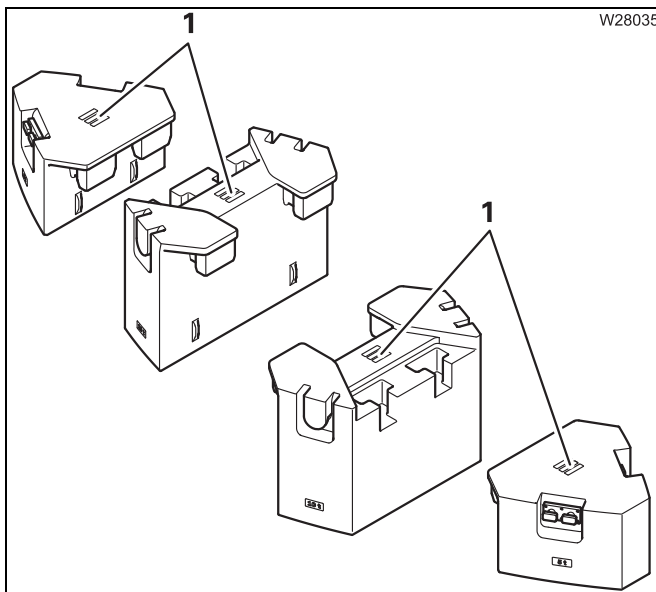
### **Danger if counterweight sections are interchanged!**

Operate the truck crane only with the counterweight sections that belong to it. The truck crane and counterweight sections are labelled with the same serial number.

Other or additional counterweight sections may not be rigged.



The base plate and the counterweight sections are labelled with the serial number (1).



Depending on the version, other counterweight sections, e.g. blocks, are labelled with a serial number (1).

### 11.9.4

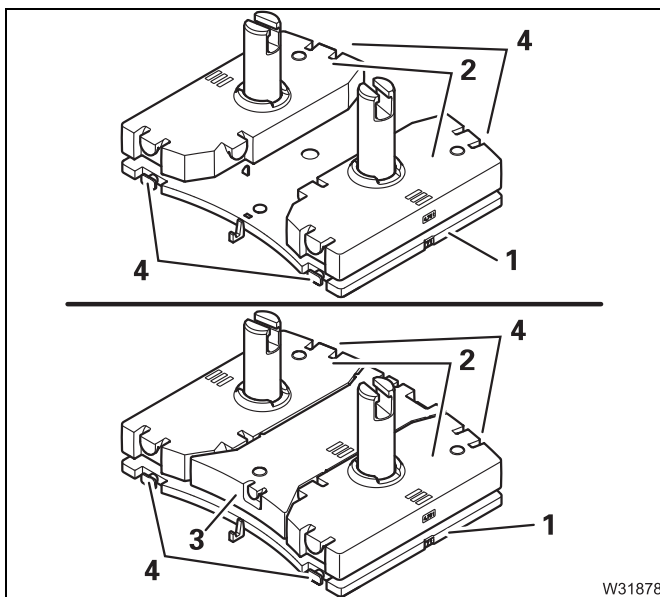
## Slings points on the counterweight sections



### Risk of accidents if used improperly!

Attach the various counterweight sections only to the intended slinging points and use lifting gear of sufficient lifting capacity. Only the slinging points of the base plate are designed for lifting specific counterweight combinations. Always lift the counterweight sections and counterweight blocks one at a time.

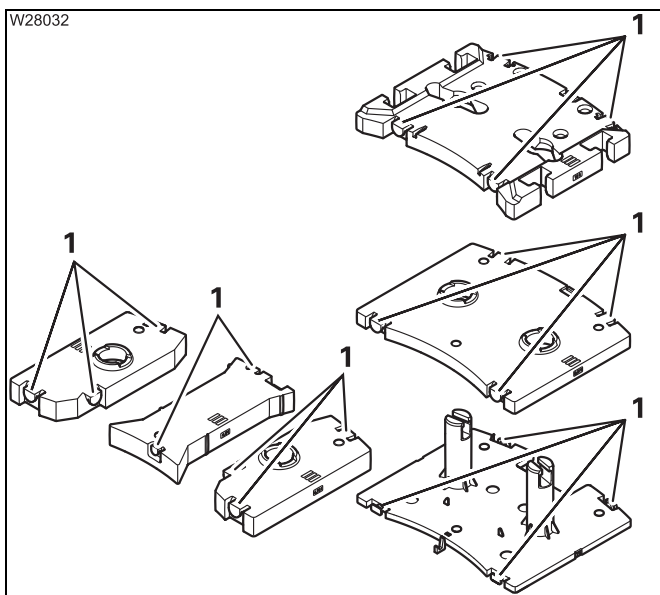
- Only use lifting gear of sufficient load bearing capacity. Weights; Counterweight sections, p. 1 - 13.



### Base plate

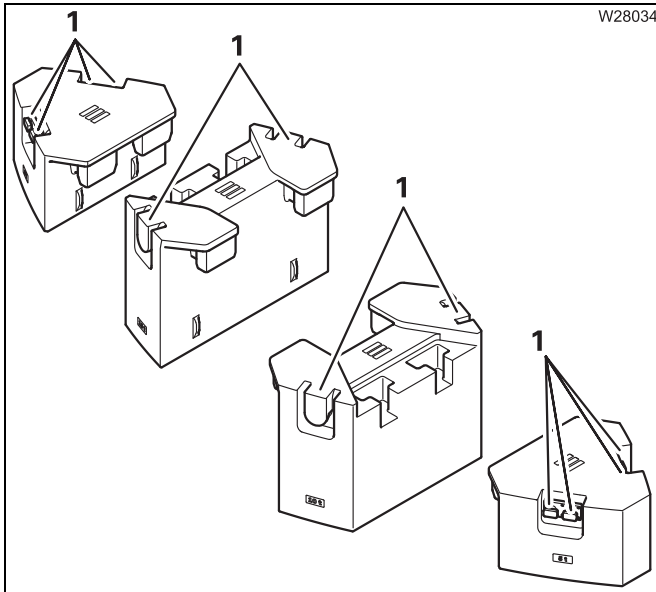
- Sling the base plate (1) at the slinging points (4).

To rig the 16.5 t or 21 t counterweight combination, the counterweight plates (2) and (3) can be lifted together with the base plate.



### Sections

- Attach the counterweight sections at the slinging points (1).



### Blocks

- Sling the blocks at the slinging points (1).

## 11.9.5

### CHECKLIST: Rigging the counterweight



This checklist is not a complete operating manual. There are accompanying instructions, which are indicated by cross-references.

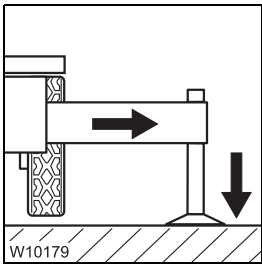
**Observe the warnings and safety instructions there!**



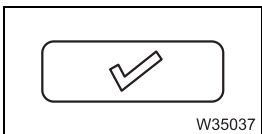
**Danger of overturning when slewing with a rigged counterweight!**

Always check before slewing whether slewing is permitted in the truck crane's current rigging mode (counterweight, outrigger span, working radius).

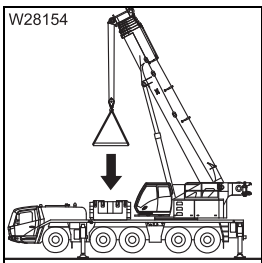
Correct the rigging mode if necessary; *Slewing with the rigged counterweight*, p. 11 - 93.



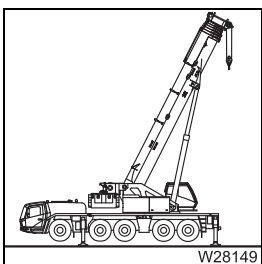
1. The truck crane is stabilised with the outrigger span required for crane work according to the *Lifting capacity table*; *Enabled outrigger spans*, p. 11 - 28.



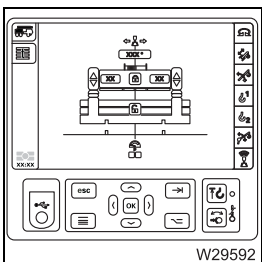
2. Enter and confirm the current rigging mode; p. 10 - 32.



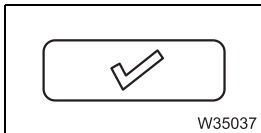
3. Assemble the required combination of counterweights:
  - Lower 7 t base plate on the counterweight platform; p. 11 - 77.
  - *Slinging points on the counterweight sections*, p. 11 - 72
  - *Assembling counterweight versions*, p. 11 - 76



4. Slew the superstructure into the  $0^\circ$  to the rear position and lock;
  - Braking the slewing movement*, p. 10 - 118,
  - Locking/unlocking the superstructure*, p. 10 - 15.



5. - Open the *Counterweight* submenu;
  - Correct the rigging mode, if necessary; p. 11 - 86,
  - Slew the superstructure into the rigging range and lift counterweight to the turntable (automatic) and pre-tension; p. 11 - 88.



6. Enter the current rigging mode with the new rigged counterweight combination at the RCL display; p. 10 - 32.

7. Only switch on the slewing gear if slewing is permissible for the current outrigger span; *Slewing with the rigged counterweight*, p. 11 - 93.

## 11.9.6

### CHECKLIST: Unrigging the counterweight



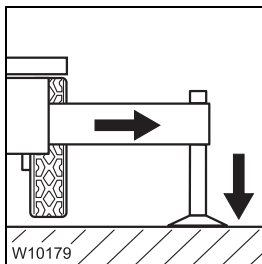
This checklist is not a complete operating manual. There are accompanying instructions, which are indicated by cross-references.

**Observe the warnings and safety instructions there!**

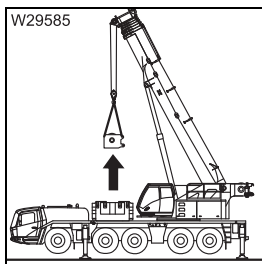


#### **Danger of overturning when slewing with a rigged counterweight!**

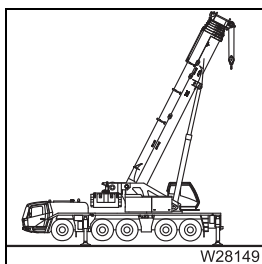
Before slewing with the rigged counterweight, check whether slewing is permissible with the rigged outrigger span; *Slewing with the rigged counterweight*, p. 11 - 93.



1. The truck crane is stabilised with the outrigger span required for crane work according to the *load capacity chart*; *Enabled outrigger spans*, p. 11 - 28.

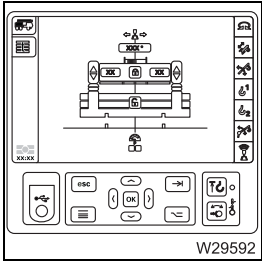


2. If required, remove the auxiliary hoist; *CHECKLIST: Removing the auxiliary hoist*, p. 6 - 57.

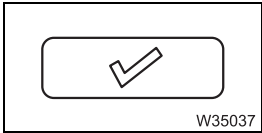


3. Slew the superstructure into the  $0^\circ$  to the rear position and lock;  
 *Braking the slewing movement*, p. 10 - 118,  
 *Locking/unlocking the superstructure*, p. 10 - 15.

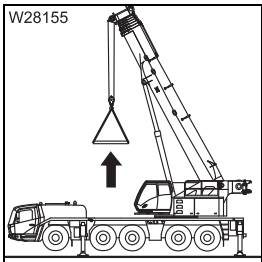




4. – Open the *Counterweight* submenu;
  - Correct the rigging mode, if necessary; p. 11 - 86,
  - Use the automatic system to lower the counterweight on to the counterweight platform; p. 11 - 88.



5. Enter the current rigging mode with the currently rigged counterweight combination; p. 10 - 32.



6. Lift the counterweight sections off the counterweight platform, as required by the respective driving mode;
  - Slinging points on the counterweight sections*, p. 11 - 72,
  - Driving modes*, p. 6 - 1.

### 11.9.7

### Assembling counterweight versions



#### **Danger of overturning when slewing with a rigged counterweight!**

When a counterweight version is rigged, check whether slewing is permitted with the current rigging mode (outrigger span, working radius). Correct the rigging mode if necessary; *Slewing with the rigged counterweight*, p. 11 - 93.



#### **Risk of crushing when setting down the counterweight sections!**

Make sure the helpers keep a sufficient distance away from the counterweight sections with any parts of their body when setting down the counterweight sections.  
Remove all objects that could become jammed or crushed from the counterweight platform!



#### **Risk of crushing when slewing the superstructure!**

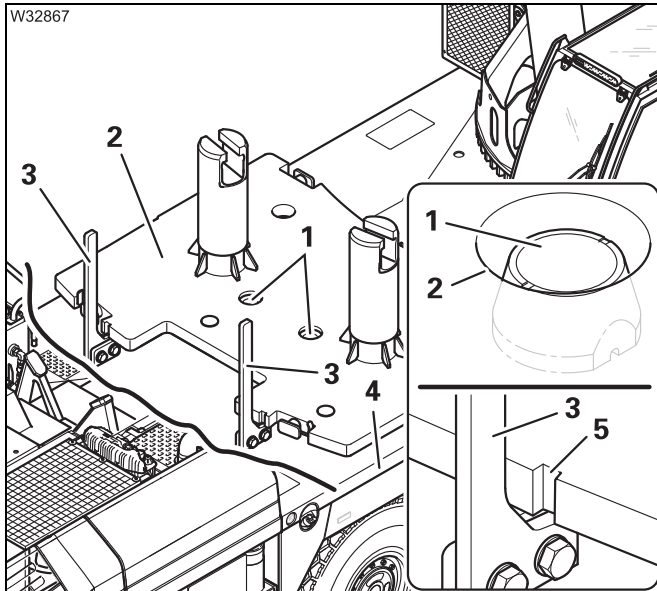
Anyone who climbs onto the carrier using one of the access ladders is within the slewing range of the superstructure.  
Make sure nobody uses the access ladders (e.g. helpers) while you lift a section onto the carrier.





**Risk of accidents due to falling counterweight sections!**

Only attach the counterweight sections to the appropriate slinging points and use lifting gear of sufficient load bearing capacity. The counterweight sections should be lifted only one at a time. The slinging points are not designed for hoisting stacked counterweight sections.



**Set down 7 t (15,432 lbs) base plate**

The linkage (3) is **not** provided as a guide for the counterweight. The linkage serves only as protection for parts that are located behind the driver's cab.

- Place the 7 t base plate (2) so that it fits into the guides (1).  
Between the cutouts (5) and the linkage (3) there is a distance of approx. 30 mm (1.2 in).

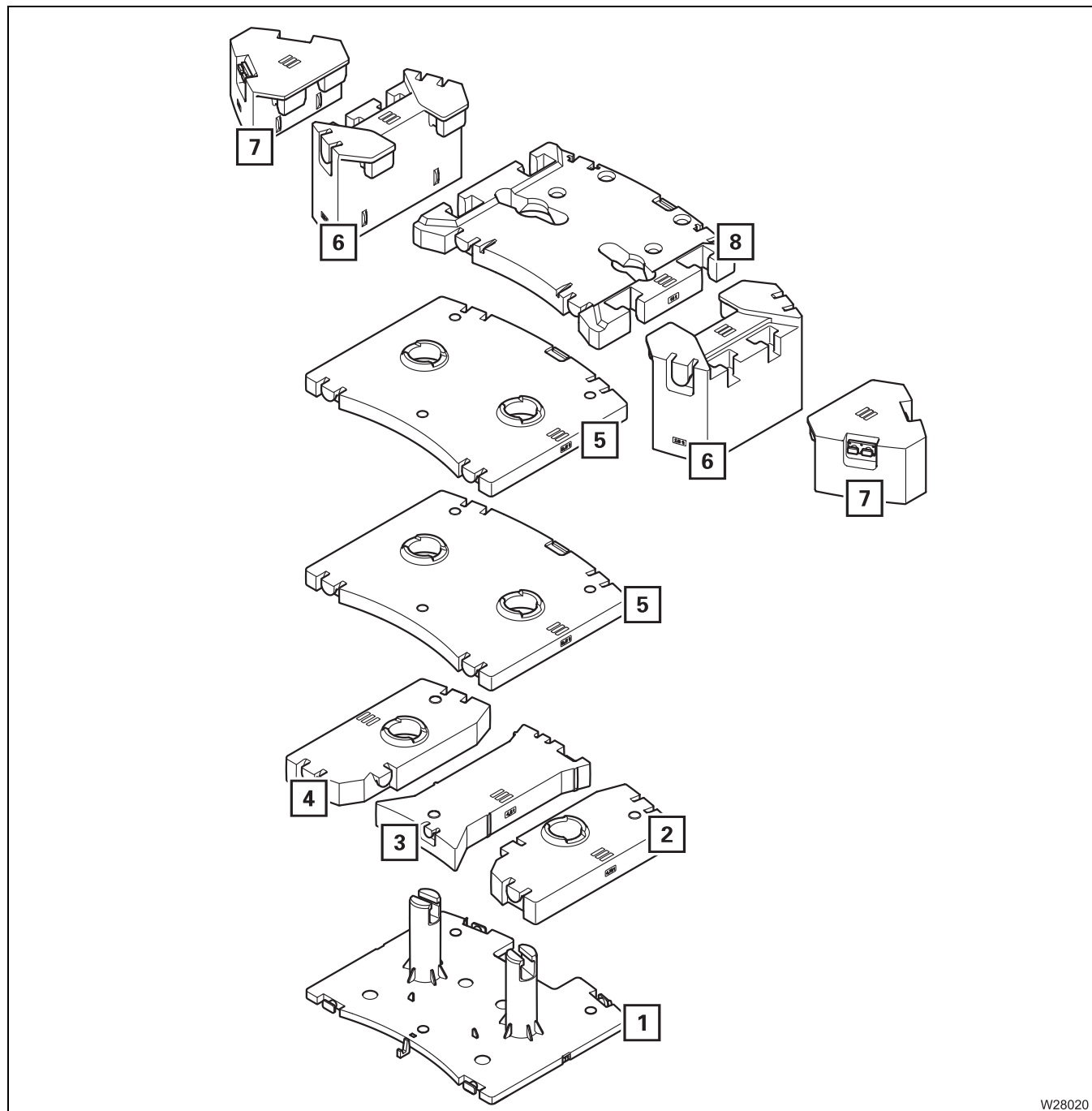
You can use the side (4) of the counterweight platform as a guide for orientation when setting the base plate down in the lateral direction.

For longitudinal orientation we recommend noting the current working radius on a base plate that has been set down correctly.


For larger counterweight combinations, now set additional counterweight sections onto the 7 t base plate.



The illustration and the table show all counterweight sections and all counterweight combinations that can be rigged.



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- The tables specify which counterweight sections are needed for the respective counterweight combination.
- Lift the counterweight sections onto the base plate;  *Slings points on the counterweight sections, p. 11 - 72.*

Counterweight sections	Counterweight combination in t (lbs)					
	0.0	7.0	16.5	21.0	26.0	30.5
	(0)	(15,432)	(36,376)	(46,297)	(57,320)	(67,241)
5.0 t blocks	-	-	-	-	-	-
10.0 t blocks	-	-	-	-	-	-
10.0 t section	-	-	-	-	-	-
9.5 t section	-	-	-	-	5	5
4.5 t section	-	-	-	3	-	3
4.75 t section	-	-	2 + 4	2 + 4	2 + 4	2 + 4
7.0 t base plate	-	1	1	1	1	1

Counterweight sections	Counterweight combination in t (lbs)					
	35.5	40.0	45.5	50.0	70.0	80.0
	78,264	(88,185)	(100,310)	(110,231)	(154,323)	(176,370)
5.0 t blocks	-	-	-	-	-	2 x 7
10.0 t blocks	-	-	-	-	2 x 6	2 x 6
10.0 t section <sup>1)</sup>	-	-	8	8	8	8
9.5 t section	2 x 5	2 x 5	2 x 5	2 x 5	2 x 5	2 x 5
4.5 t section		3	-	3	3	3
4.75 t section	2 + 4	2 + 4	2 + 4	2 + 4	2 + 4	2 + 4
7.0 t base plate	1	1	1	1	1	1

1) 8 must always be on top

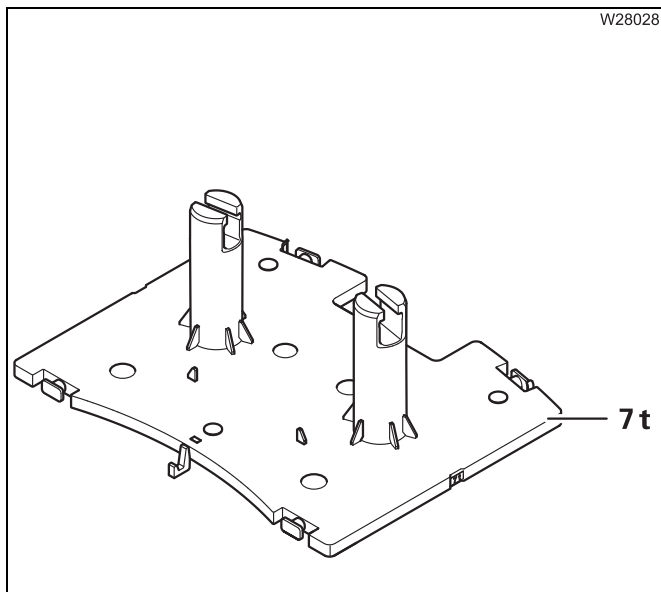


The following counterweight combinations can be combined on the counterweight platform.



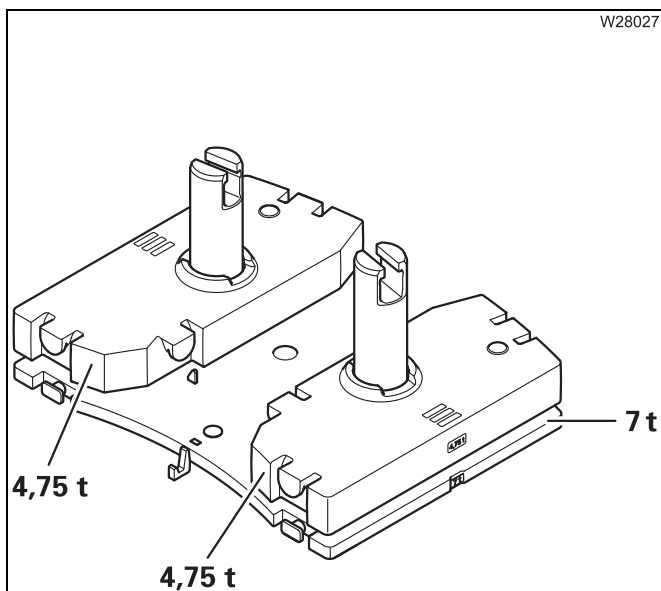
**Risk of accident due to an incorrect counterweight mass!**

Only combine the counterweights in such a manner that the counterweight mass corresponds to the specifications in this section and in the *lifting capacity table*. Other combinations are not permitted.



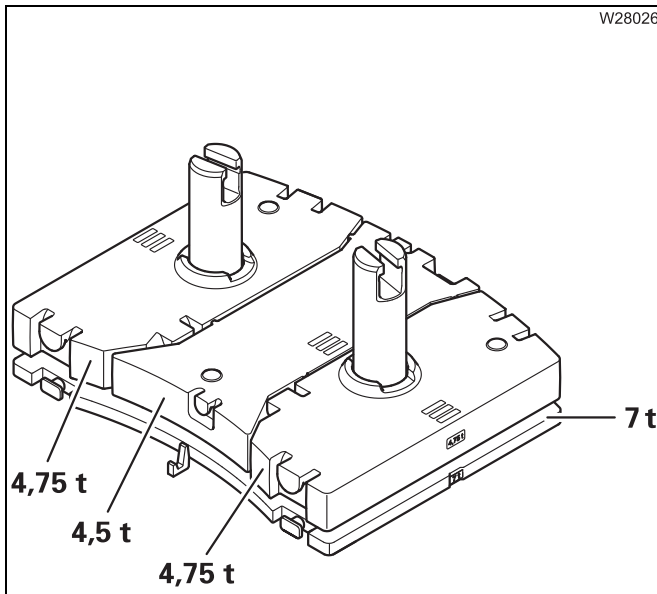
**7 t (15,432 lbs)**

- 7 t base plate



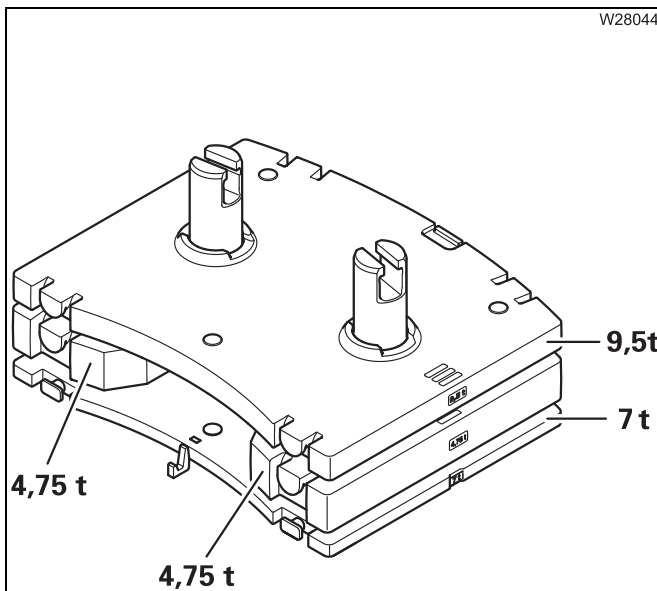
**16.5 t (36,376 lbs)**

- 7 t base plate
- Two 4.75 t sections



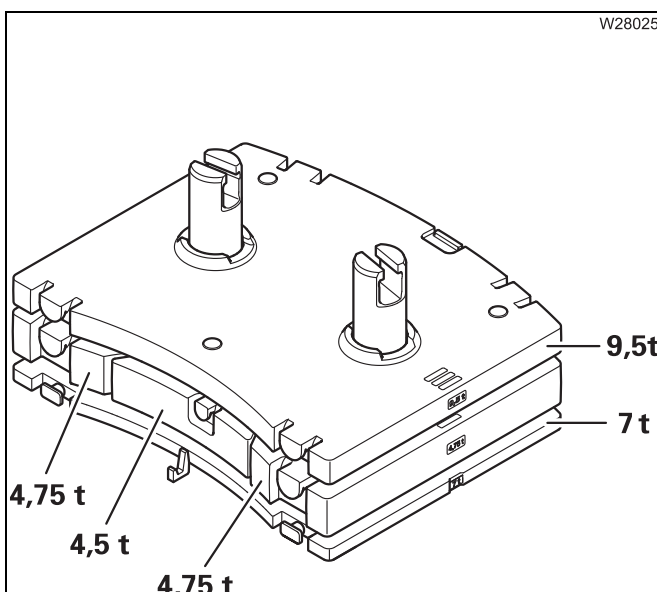
**21 t (46,297 lbs)**

- 7 t base plate
- Two 4.75 t sections
- One 4.5 t section



**26 t (57,320 lbs)**

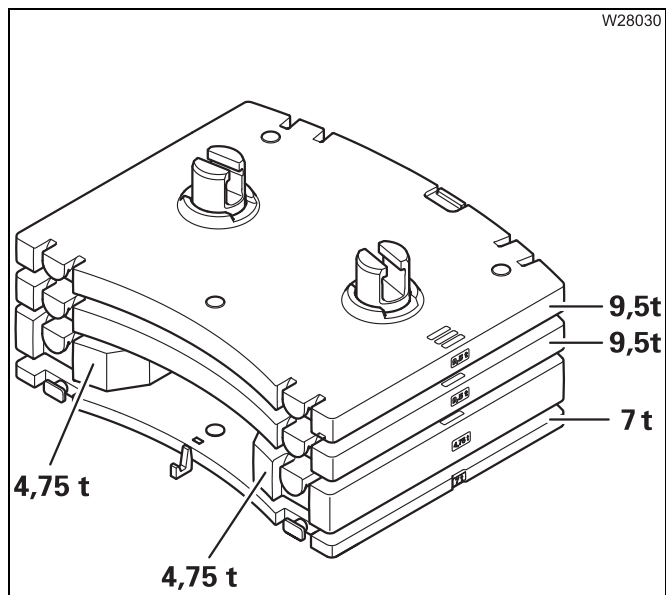
- 7 t base plate
- Two 4.75 t sections
- One 9.5 t section



**30.5 t (67,241 lbs)**

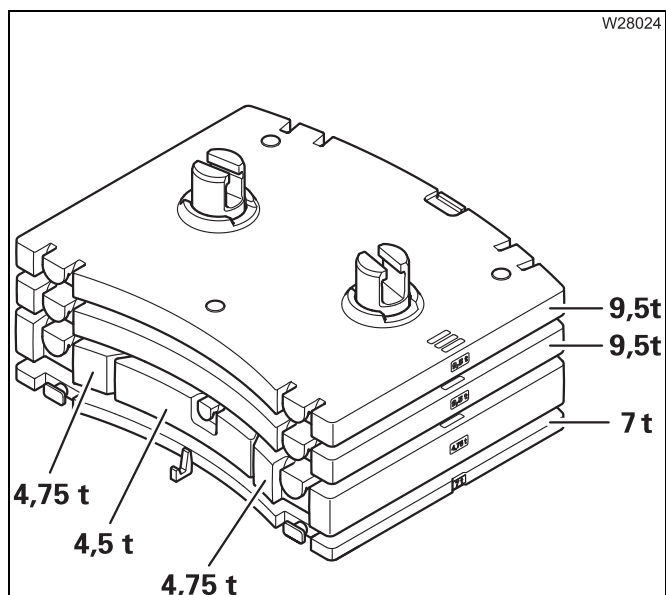
- 7 t base plate
- Two 4.75 t sections
- One 4.5 t section
- One 9.5 t section





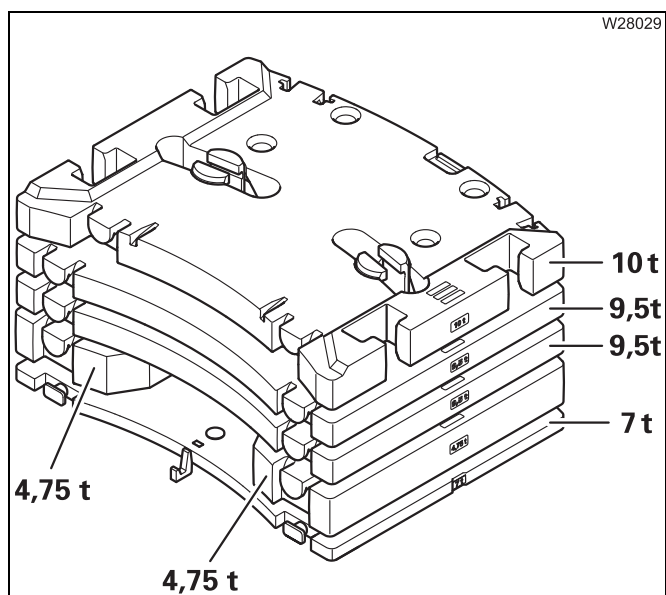
**35.5 t (78,264 lbs)**

- 7 t base plate
- Two 4.75 t sections
- Two 9.5 t sections



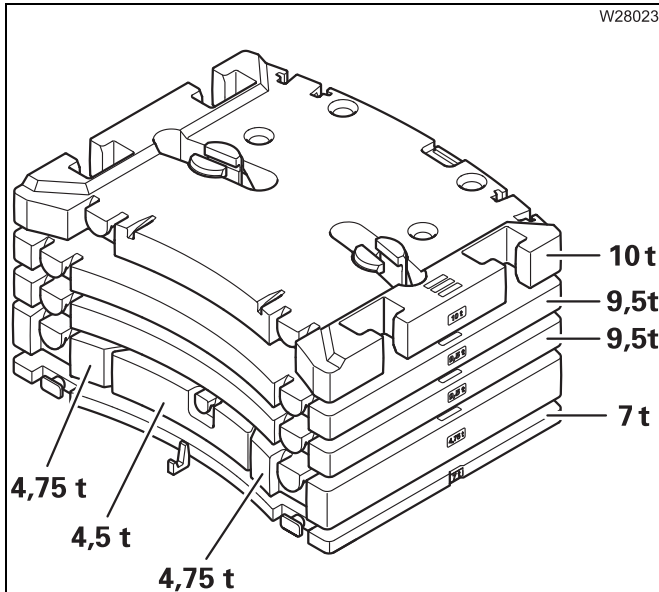
**40 t (88,185 lbs)**

- 7 t base plate
- Two 4.75 t sections
- One 4.5 t section
- Two 9.5 t sections



**45.5 t (100,310 lbs)**

- 7 t base plate
- Two 4.75 t sections
- Two 9.5 t sections
- One 10 t section



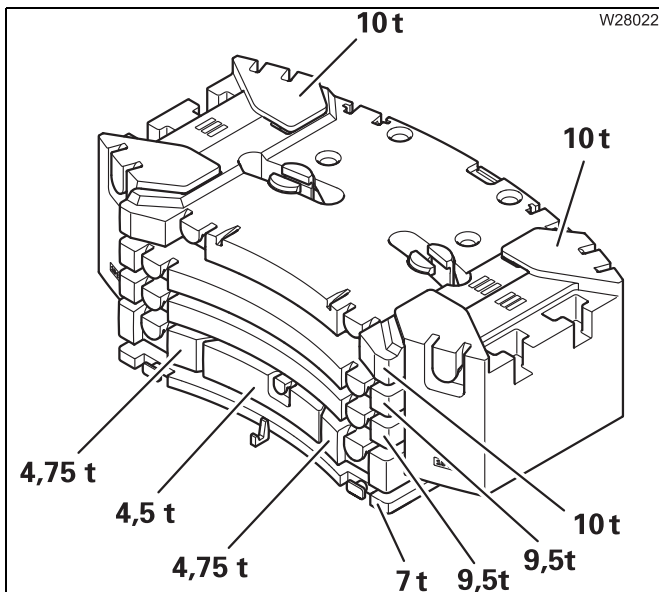
**50 t (110,231 lbs)**

- 7 t base plate
- Two 4.75 t sections
- One 4.5 t section
- Two 9.5 t sections
- One 10 t section



**Risk of overturning if counterweight rigging sequence is incorrect!**

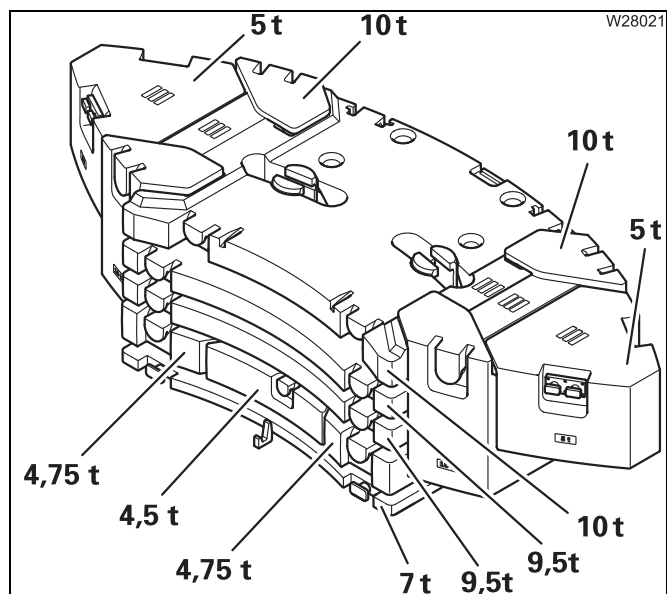
When installing, always attach both 10-t counterweight blocks before you attach a 5-t counterweight block and, during removal, always remove both 5-t counterweight blocks before you remove a 10-t counterweight block. If you attach both blocks on one side first, the entire counterweight will fall off the carrier and may cause injury to you or other persons.



**70 t**

- 7 t base plate
- Two 4.75 t sections
- One 4.5 t section
- Two 9.5 t sections
- One 10 t section
- Two 10 t blocks



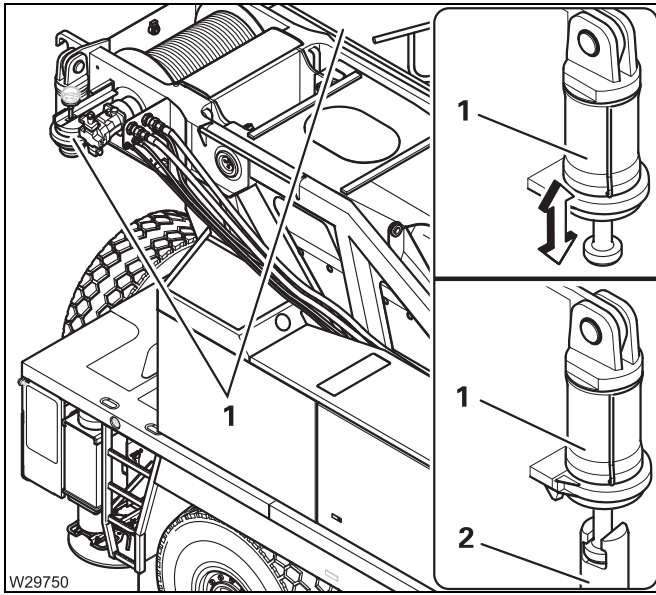


**80 t**

- 7 t base plate
- Two 4.75 t sections
- One 4.5 t section
- Two 9.5 t sections
- One 10 t section
- Two 10 t blocks
- Two 5 t blocks



## 11.9.8 Counterweight hoist unit



The lifting cylinders (1) can be extended and retracted.  
To lift and lower the counterweight, the lifting cylinders are screwed into the 7.0 t base plate (2).

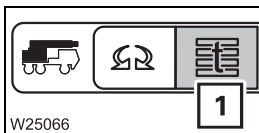


### Risk of crushing when lifting and lowering the counterweight!

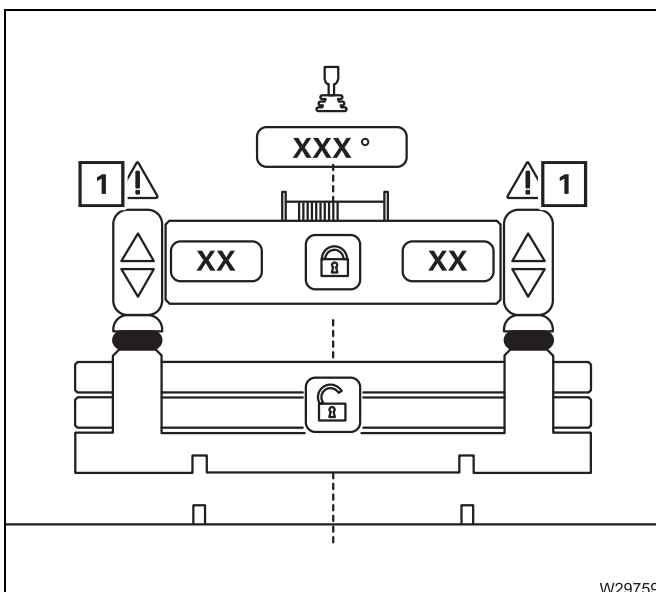
Make sure nobody is on the counterweight platform while the counterweight is being lifted or lowered.

### Counterweight menu

To operate the counterweight hoist unit, you must open the *Counterweight* menu.



- Open the *Counterweight* menu (1).



The *Counterweight* menu opens.

If an error symbol (1) is displayed during subsequent operation, then contact **Manitowoc Crane Care**.



**Extending/  
retracting the  
lifting cylinders**

This section describes how to operate the lifting cylinders manually,  
– for correcting the displayed rigging mode and  
– for pre-charging the counterweight afterwards.

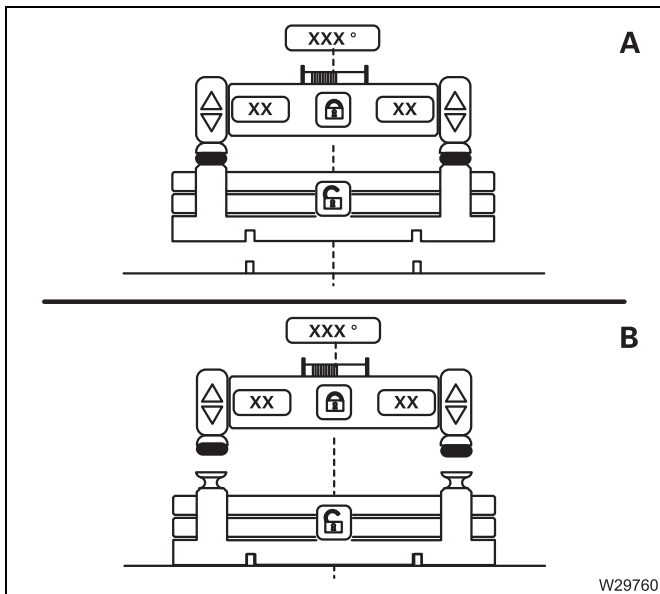


**Risk of damage to the counterweight!**

With the override switch actuated, the functions are always enabled.  
Slew the superstructure only when the lifting cylinders are fully retracted.



Always lift and lower the counterweight in automatic mode, otherwise slewing with extended lifting cylinders will be blocked; *Automatic mode rigging*, p. 11 - 87, *Automatic mode unrigging*, p. 11 - 89.



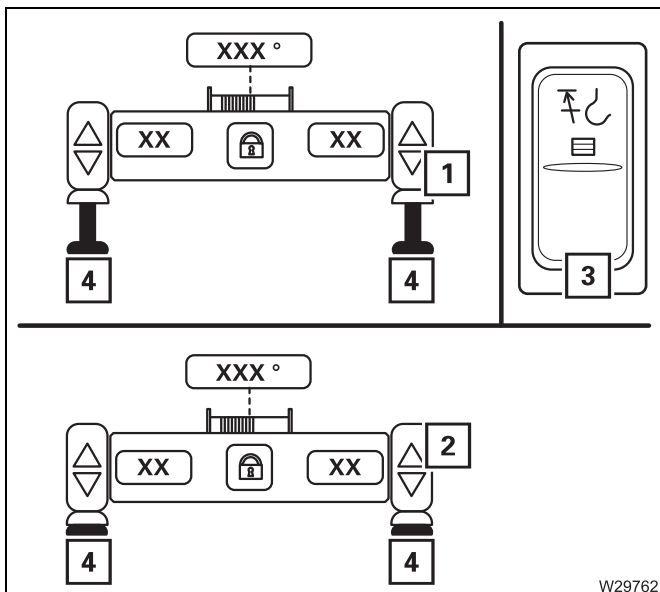
**Correct the rigging mode**

- You can use the automatic mode only if the current rigging mode is displayed.

- A** Counterweight rigged
- B** Counterweight unrigged

If necessary, correct the displayed rigging mode as follows:

- Slew the superstructure out of the rigging range so that the lifting cylinders can be freely extended.

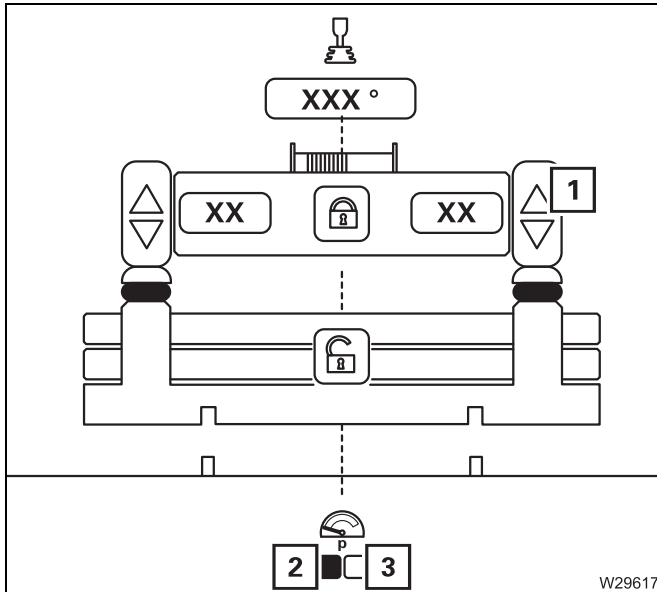


Assuming the symbol (4) is yellow with the counterweight unrigged.

- Press in the override button (3).
- **(A)** Fully extend the lifting cylinders – symbol (1).
- Release the override button (3).
- **(B)** – Fully retract the lifting cylinders – symbol (2).

The symbols (4) become green.

You can now use the automatic mode.



### Pre-tensioning

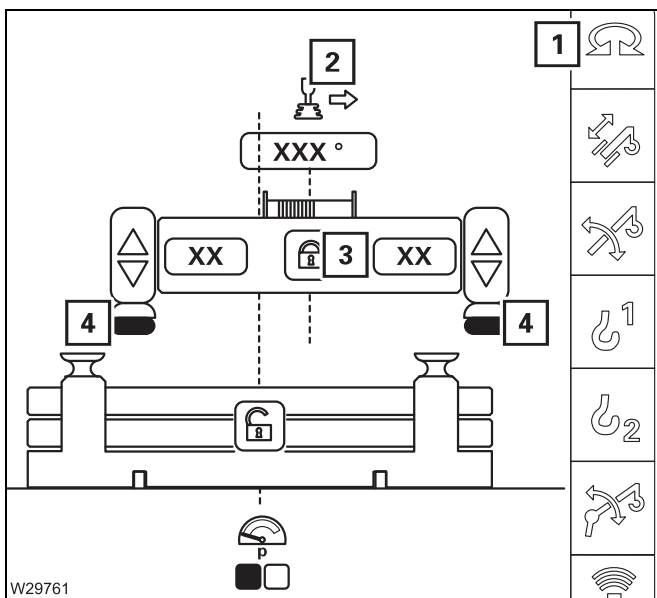
When the symbol (3) is **red**, you must pre-tension the counterweight.

- Select and confirm the symbol (1) until the symbol (2) becomes **green**.

### Automatic mode rigging

While the automatic mode is being executed, you can always

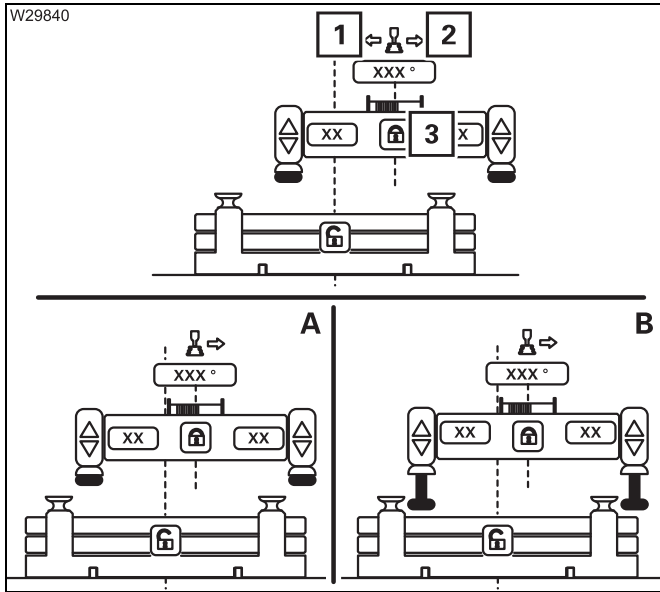
- **Cancel** the automatic mode; *Cancel automatic mode*, p. 11 - 90.
- **Cancel** the automatic mode by letting go of the control lever. After moving the lever in the displayed direction once more, the automatic mode is continued.



### Prerequisites

- The counterweight combination must be assembled.
- The lifting cylinders must be fully retracted – symbol (4) **green**.
- The slewing gear is switched – symbol (1) **green**.
- The superstructure must be in the rigging range:
  - Symbol (3) active,
  - Symbol (2) displayed.



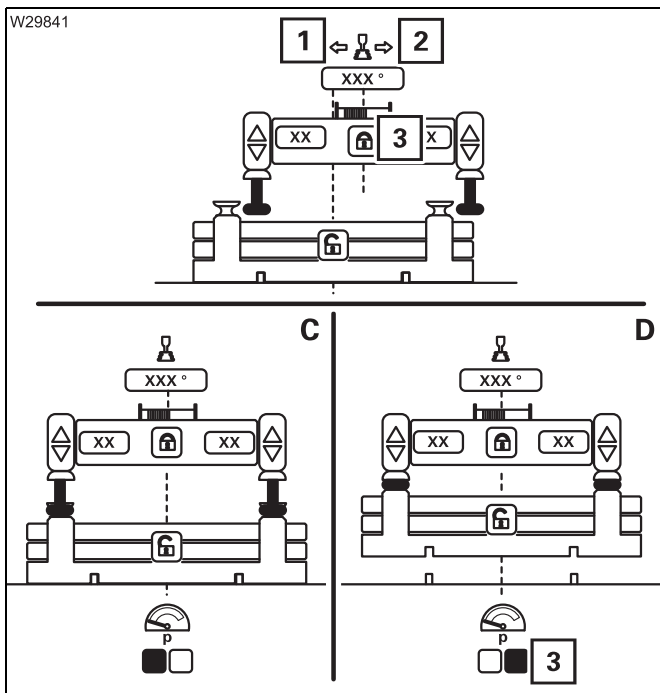


### Switch on automatic mode

- Select and confirm the symbol (3).

### Execute the automatic mode.


- Move the slewing control lever in the displayed direction (1) or (2) – the automatic mode starts.
  - The superstructure turns into position (A).
  - The lifting cylinders extend (B).
- Release the control lever.

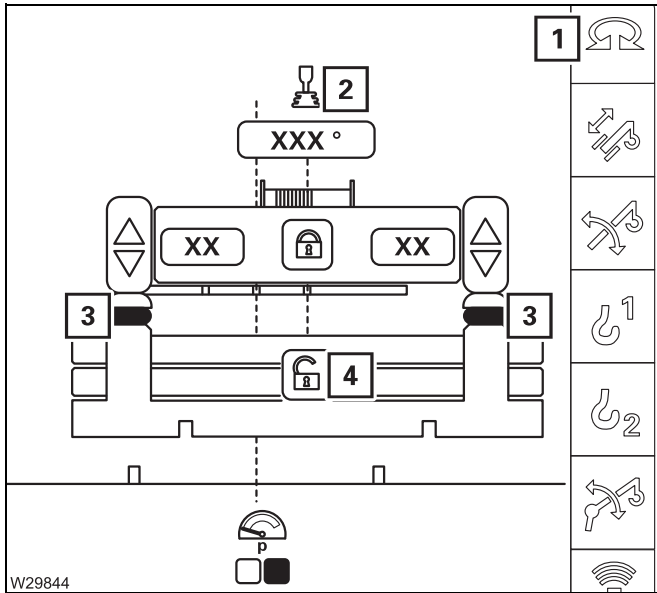


- Move the slewing control lever in the displayed direction (1) or (2) – the automatic mode continues.
  - The superstructure turns into position (C).
  - The lifting cylinders retract (D).
  - The counterweight is pre-tensioned – symbol (3) **green**.
- Release the control lever.

### Automatic mode unrigging

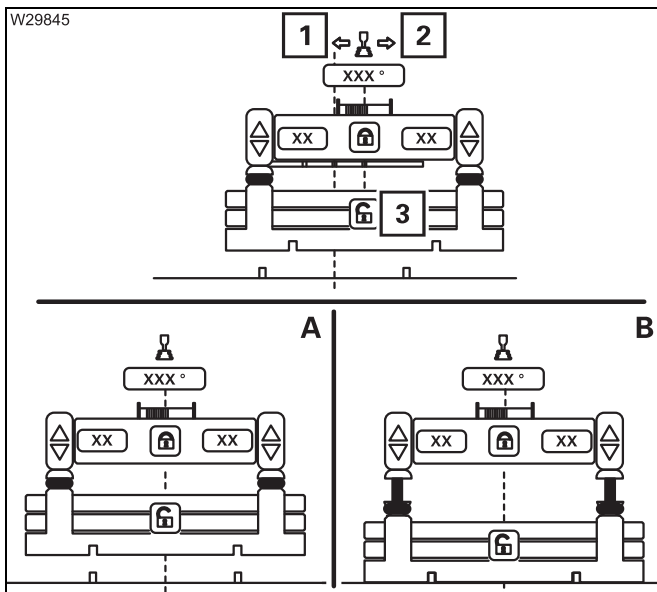
While the automatic mode is being executed, you can always

- **Cancel** the automatic mode;  *Cancel automatic mode*, p. 11 - 90.
- **Cancel** the automatic mode by letting go of the control lever. After moving the lever in the displayed direction once more, the automatic mode is continued.



### Prerequisites

- The lifting cylinders must be fully retracted – symbol (3) **green**.
- The slewing gear is switched – symbol (1) **green**.
- The superstructure must be in the rigging range:
  - Symbol (4) active,
  - Symbol (2) displayed.



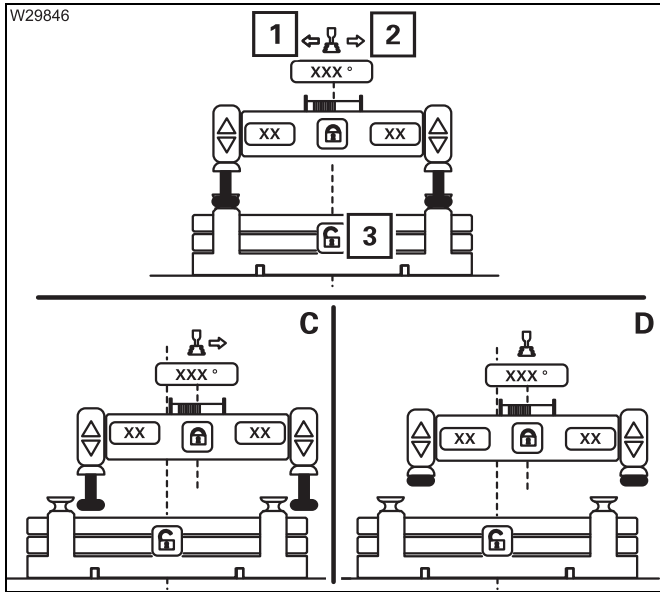
### Switch on automatic mode

- Select and confirm the symbol (3).

### Execute automatic mode

- Move the slewing control lever in the displayed direction (1) or (2) – the automatic mode starts.
  - The superstructure turns into position (A).
  - The lifting cylinders extend (B).
- Release the control lever.

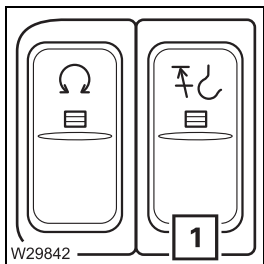




- Move the slewing control lever in the displayed direction (1) or (2) – the automatic mode continues.
  - The superstructure turns into position (C).
  - The lifting cylinders retract (D).
- Release the control lever.

**Cancel automatic mode**

You can cancel the automatic mode any time.

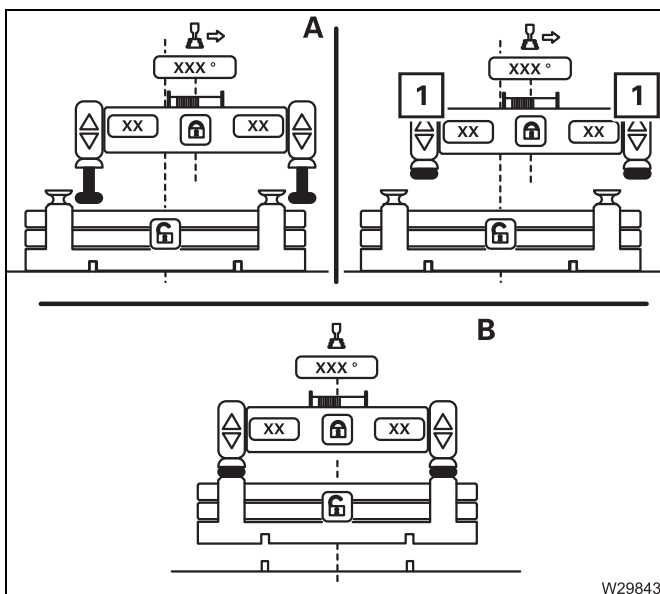


- Press in the override button (1) – the automatic mode is cancelled.



**Risk of damage to the counterweight!**

With the override switch actuated, the functions are always enabled. Slew the superstructure only when the lifting cylinders are fully retracted.



If you have cancelled the automatic operation, then you must:

**In position (A)**

- Fully retract the lifting cylinders – symbol (1).

**In position (B)**

- Turn the superstructure into position (A).
- Fully retract the lifting cylinders – symbol (1).

## 11.9.9

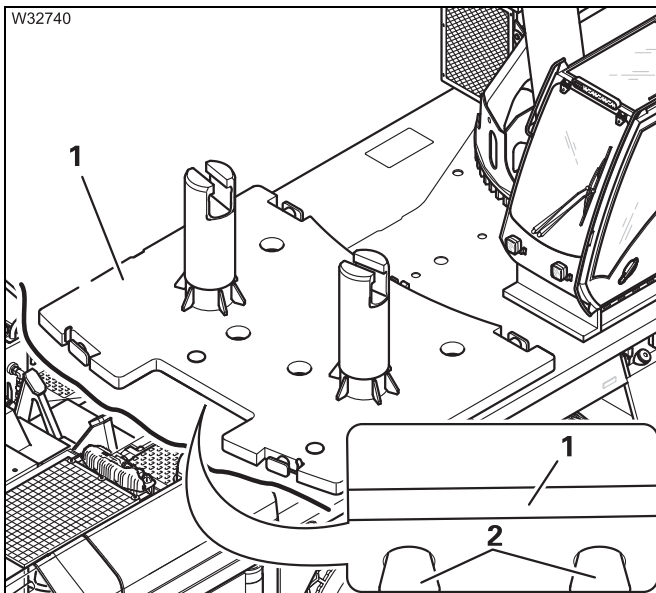
### Setting down counterweight for driving the truck crane

For driving with axle loads of at the most 12 t (26,500 lbs) the counterweight must be completely unrigged;  *Driving modes*, p. 6 - 1.

If the locally applicable regulations in the country of use allow driving with axle loads greater than 12 t (26,500 lbs) then up to 21.2 t (46,738 lbs) of counterweight can be transported on the truck crane. The axle loads are then greater than 12 t (26,500 lbs).



**Risk of accidents due to the counterweight slipping or tipping over!**  
Place only the 7.0 t base plate directly onto the counterweight platform and always fasten the counterweight to the rear storage area with lashing straps. In this way you prevent the counterweight from slipping.



Only the 7.0 t base plate (1) may be set down directly on the counterweight platform.

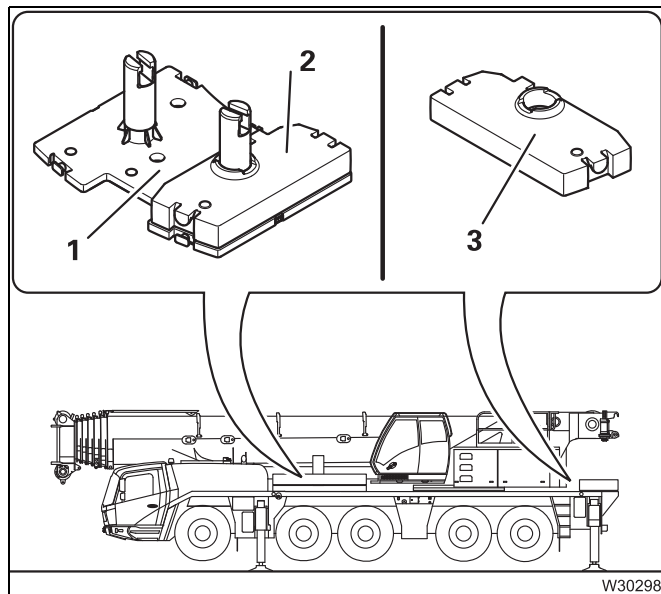
Other sections are not secured by the retaining devices (2) and cannot be set down in a flat position.



**Risk of damage to the derricking cylinder!**  
Always check whether the specifications in this section apply before setting down the main boom. In this way you can prevent the derricking cylinder from being pushed against an incorrectly assembled counterweight combination and becoming damaged.



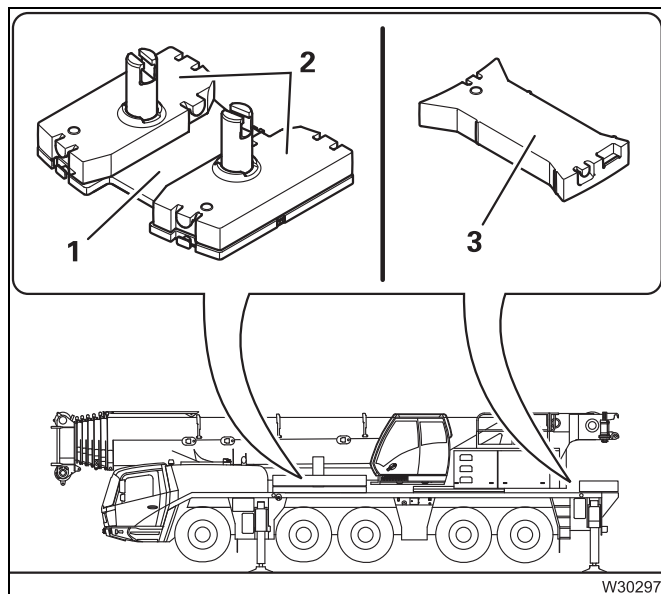
Observe the following points to avoid damage to the derricking cylinder.



**If a lattice extension is folded at the side:**

At most, set down

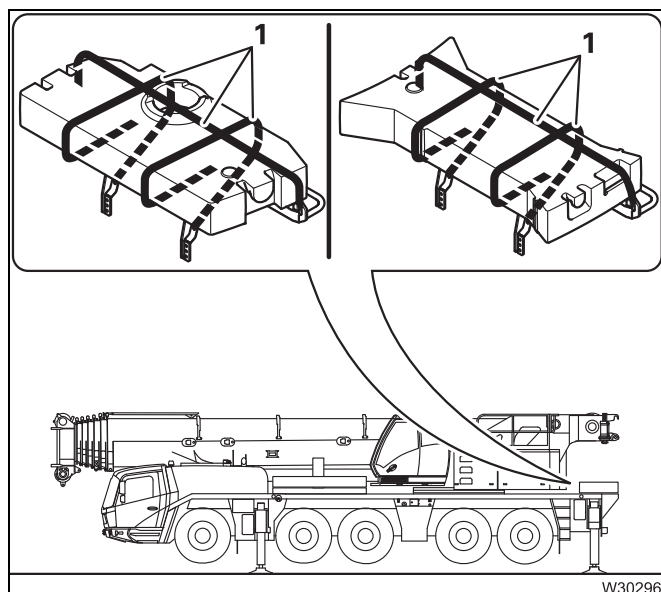
- the 7.0 t base plate (1),
- one 4.75 t section (2),
- one 4.75 t section (3) down.



**If no lattice extension is folded at the side:**

At most, set down

- the 7.0 t base plate (1),
- two 4.75 t sections (2),
- one 4.75 t section (3) down.



**Fasten the counterweight on the rear storage area**

- Fasten the counterweight to the rear storage area with the lashing straps provided (1).



## 11.9.10

### Slewing with the rigged counterweight

Slewing with a rigged counterweight is only permissible when:

- The necessary outrigger span is rigged,
- The current rigging mode is shown on the *RCL* display and
- The permissible working radius according to *Lifting capacity table* is maintained.



#### **Danger of overturning when slewing with an incorrectly set RCL!**

The RCL only disables the slewing operation if you have entered the RCL code correctly and if the RCL is not overridden.


Before slewing, always check that the current rigging mode is shown on the *RCL* display.

This prevents slewing operations from being enabled within the impermissible ranges, which would cause the truck crane to overturn.



#### **Risk of overturning when slewing in emergency operation!**

Crane operations are not monitored by the RCL whilst the hand-held control is connected.!

Various checks are therefore necessary, depending on the active slewing range type, before slewing in emergency operation;  p. 14 - 45.

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## 11.10

## Rigging work on the main boom

### 11.10.1

### Hook block on the bumper

#### Picking up the hook block

Depending on the driving mode, you must pick up the hook block from the front bumper;  *Driving modes*, p. 6 - 1.

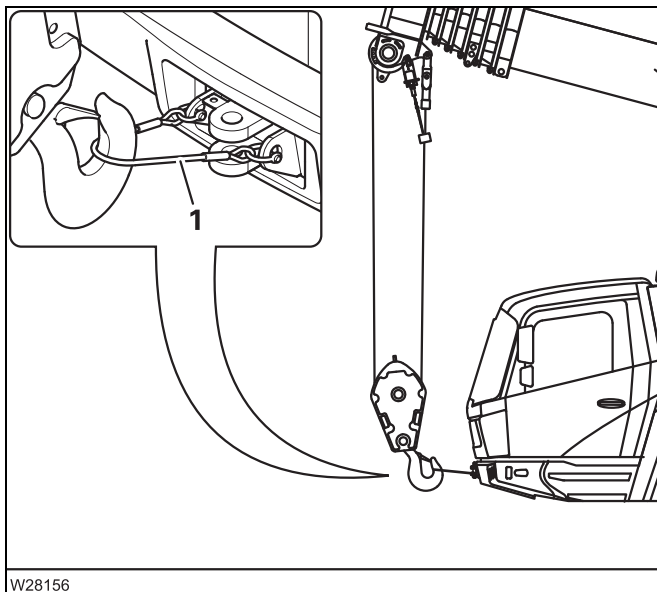
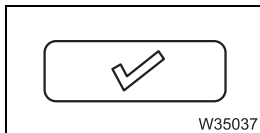


#### **Risk of accidents if the view is obstructed!**

Have someone instruct you when raising the main boom, since the view of the hook block is obstructed. That way you will not raise the boom too far, which would cause the retaining rope to tear.

The main boom must be fully retracted.


- Enter and confirm the current rigging mode.



- Slacken the hoist rope and raise the main boom simultaneously.
- Derrick the main boom until the boom head is in a vertical position above the hook block.
- Disconnect the hook block from the retaining rope (1).



## Attaching the hook block

Depending on the driving mode, you can attach the hook block to the front bumper;  *Driving modes*, p. 6 - 1.



### Risk of accidents if the view is obstructed!

The reeved rope lines obstruct the view of the runway. The number of legally permissible rope lines can vary depending on the country in which you are working. According to EU regulations, the hook block may not be reeved more than 4 times when driving on the road.



### Risk of damage to driver's cab!

Tension the hoist rope tight enough so that the hook block cannot hit the driver's cab while driving.



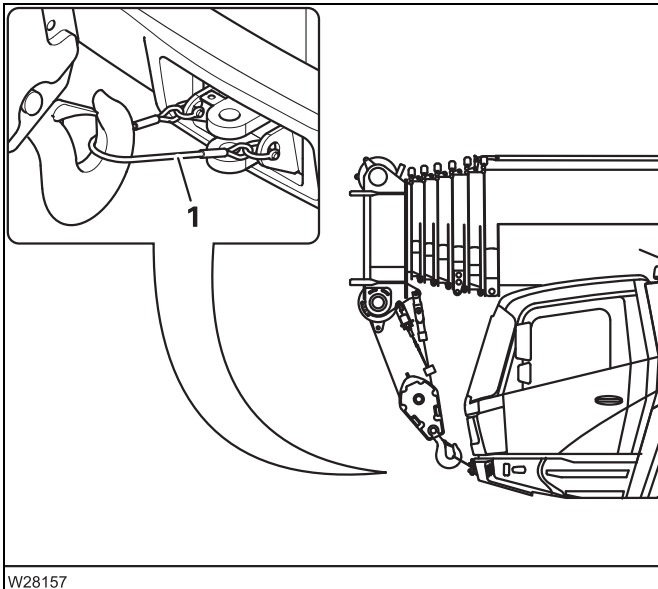
### Risk of accidents from the hook block swinging unexpectedly!

The hook block will suddenly swing **forward** if the retaining rope for the hook block tears when tightening the hoist rope.

Therefore ensure that the banksman or other persons always stand at a safe distance **to the side** of the hook block.




Do not attach the rope end fitting to the front towing coupling! The towing coupling must be free for a tow-rod in emergencies.



- Raise the hook block vertically above the retaining rope (1).
- Lower the hook block and attach the hook block to the retaining rope (1).
- Set down the main boom onto the boom rest and pull the hoist rope tight only to the extent that the hook block is stabilised in its position.



If the lifting limit switch is deactivated while you tighten the hoist rope, you can override the shutdown of the lifting limit switch;  p. 10 - 83.

## 11.10.2 Hook block in the compartment

The hook block or separable hook block, each with 3 or 5 sheaves, can be stored in the compartment for driving.



### Risk of overturning while slewing!

Always check before slewing whether slewing is permitted in the truck crane's current rigging mode. Correct the rigging mode if necessary;  
 ■■■▶ *Slewing with the rigged counterweight*, p. 11 - 93.



### Danger of overturning when slewing with an overridden RCL!

Do not override the RCL before slewing the superstructure.  
 If slewing is not enabled then, for the *Standard* slewing range type enter a rigging mode for the 360° working range or for the *MAXbase* slewing range type enter a working radius for which slewing is enabled.  
 This prevents slewing into impermissible areas and the truck crane tipping over as a result.

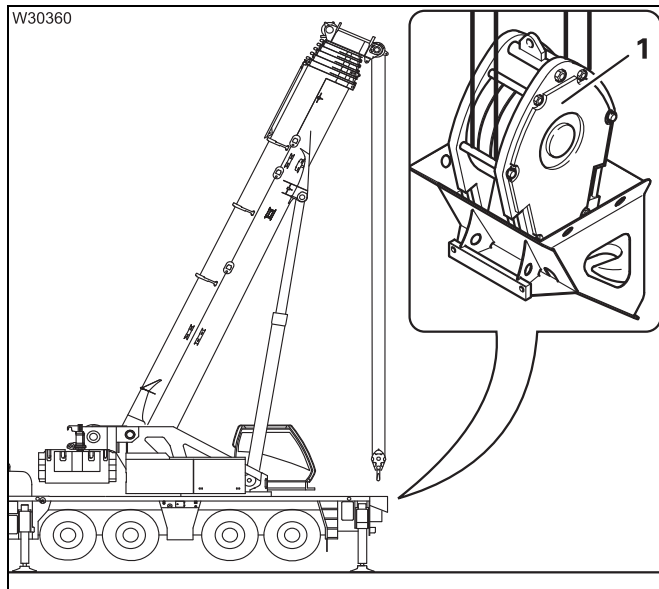


### Risk of damage to the hoist rope!

To prevent slack rope, do not ease down too much hoist rope when picking up and reeving the hook block!  
 Slack rope causes rope loops on the hoist drum, which can result in the load slipping and the hoist rope being damaged!

### Prerequisites

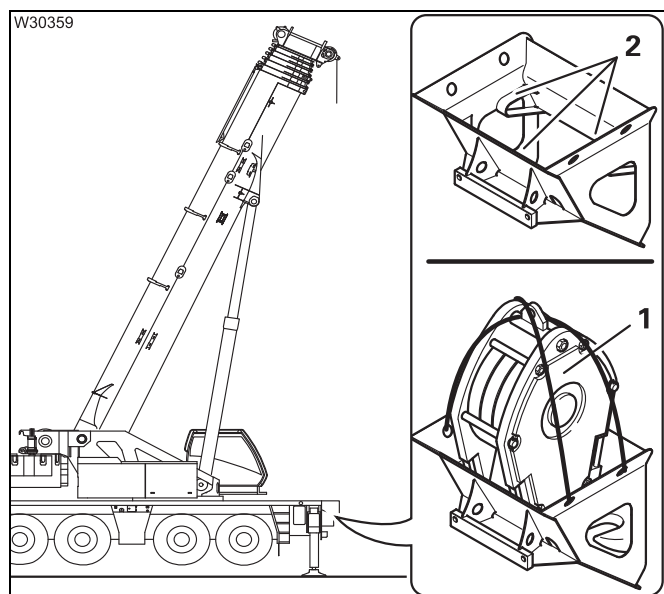
- The superstructure is in the position 0° to the rear.
- The boom head is directly over the hook block.





### Picking up the hook block

- Remove the lashing straps.
- Unreel the hoist rope.
- Hook block:
  - Reeve the hoist rope into the hook block (1);
    - ▶ *Reeving and unreeving the hoist rope*, p. 11 - 104.
- Hook block, separable:
  - Attach the sheave package to the hook;
    - ▶ *Hook block, separable*, p. 11 - 102.
  - Lift the hook block out of the holder.





### Setting down the hook block

- Slacken the hoist rope until the hook block (1) rests on the end stop (2).
- Hook block:
  - Unreeve the hoist rope from the hook block (3);  *Reeving and unreeving the hoist rope*, p. 11 - 104.
- Hook block, separable:
  - Separate the sheave package from the hook;  *Hook block, separable*, p. 11 - 102.
  - Secure the hook block with the lashing straps.

### 11.10.3 Hook block on a separate vehicle



#### **Risk of overturning while slewing!**

Always check before slewing whether slewing is permitted in the truck crane's current rigging mode. Correct the rigging mode if necessary;  
▣▣▣▣▶ *Slewing with the rigged counterweight*, p. 11 - 93.



#### **Danger of overturning when slewing with an overridden RCL!**

Do not override the RCL before slewing the superstructure.  
If slewing is not enabled then, for the *Standard* slewing range type enter a rigging mode for the 360° working range or for the *MAXbase* slewing range type enter a working radius for which slewing is enabled.  
This prevents slewing into impermissible areas and the truck crane tipping over as a result.



#### **Risk of damage to the separate vehicle!**

Raise the hook block from the separate vehicle only when the main boom head is directly above the hook block!  
This prevents the hook block swinging and damaging the separate vehicle.




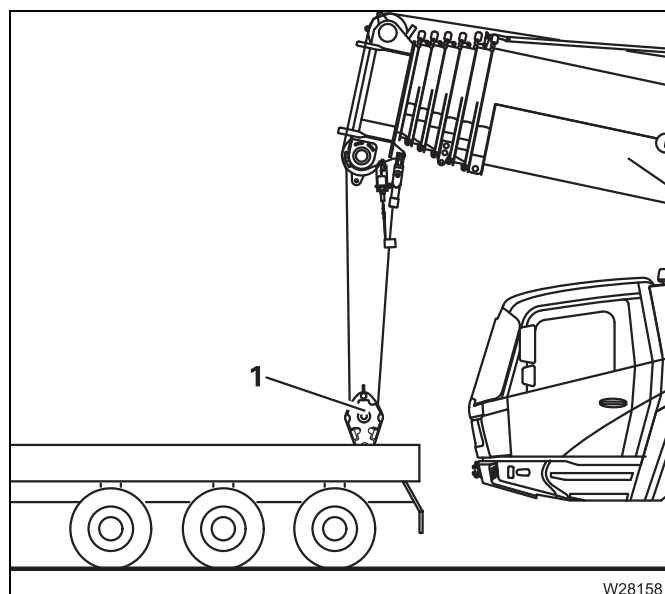
#### **Risk of damage to the hoist rope!**


To prevent slack rope, do not ease down too much hoist rope when picking up and reeving the hook block!  
Slack rope causes rope loops on the hoist drum, which can result in the load slipping and the hoist rope being damaged!




### Picking up the hook block

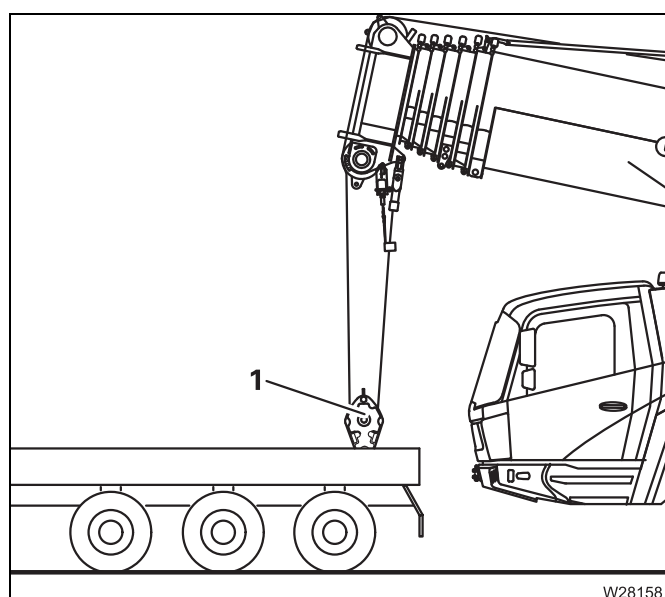
Depending on the driving mode, the hook block can be placed on a separate vehicle;  *Driving modes*, p. 6 - 1.



- If the respective setting has been made in the RCL, slew the superstructure and lower the main boom until the boom head is directly above the hook block (1).
- Unreel the hoist rope.
- Reeve the hoist rope into the hook block (1);  *Reeving and unreeving the hoist rope*, p. 11 - 104.
- Raise the hook block off the separate vehicle.

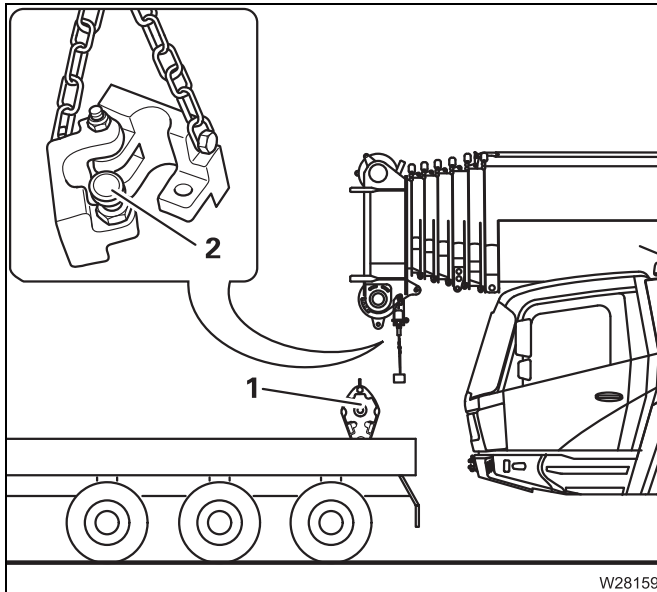
### Setting down the hook block

Depending on the driving mode, the hook block must be placed on a separate vehicle;  *Driving modes*, p. 6 - 1.



- With the RCL set accordingly, fully retract the main boom.
- Raise the hook block until it is approx. 1 m (3.3 ft) below the main boom.
- Lower the main boom and set the hook block (1) down on the separate vehicle.

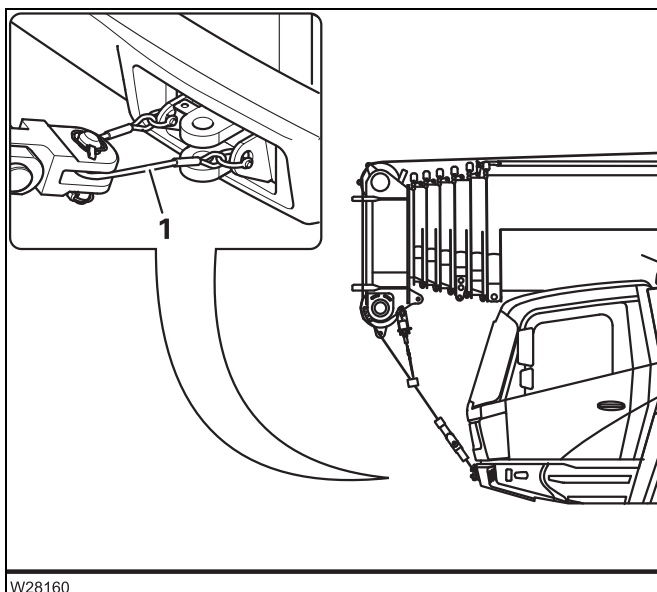




- Detach the lifting limit switch weight (2) from the hoist rope; ►► p. 11 - 123.
- Unreeve the hoist rope; ►► p. 11 - 111.
- Secure the hook block (1) for transport.
- Set down the main boom on the boom rest.

### Fastening the hoist rope to the bumper

Do not attach the rope end fitting to the front towing coupling! The towing coupling must be free for a tow-rod in emergencies.



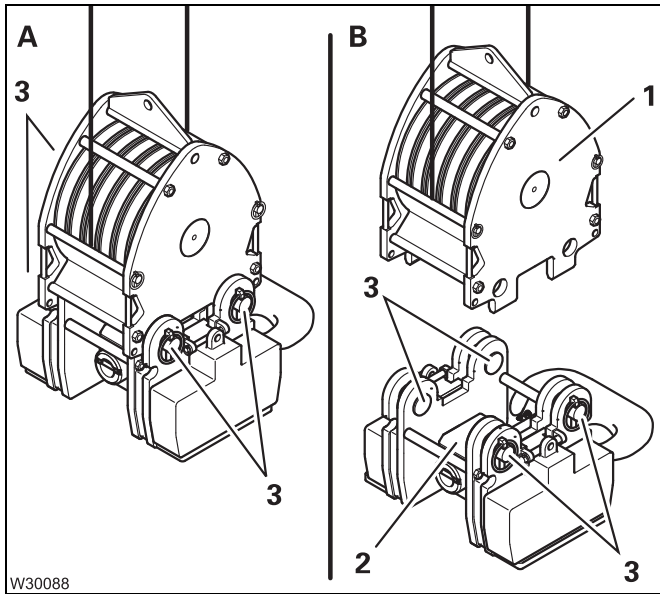
- Attach the rope end fitting to the retaining rope (1).
- Pull the hoist rope slightly taut.
- Fasten the lifting limit switch weight to the hoist rope.

The hoist rope and lifting limit switch weight are now secured for driving.

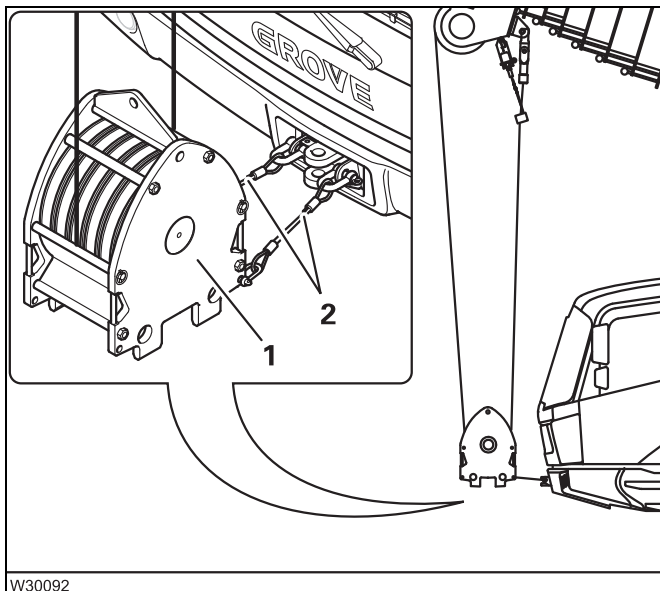
## 11.10.4 Hook block, separable

The hook block can be separated for on-road driving. The block hook remains reeved and can be attached to the bumper. The hook can be transported separately, e.g. on a separate vehicle.

### Rigging for on-road driving



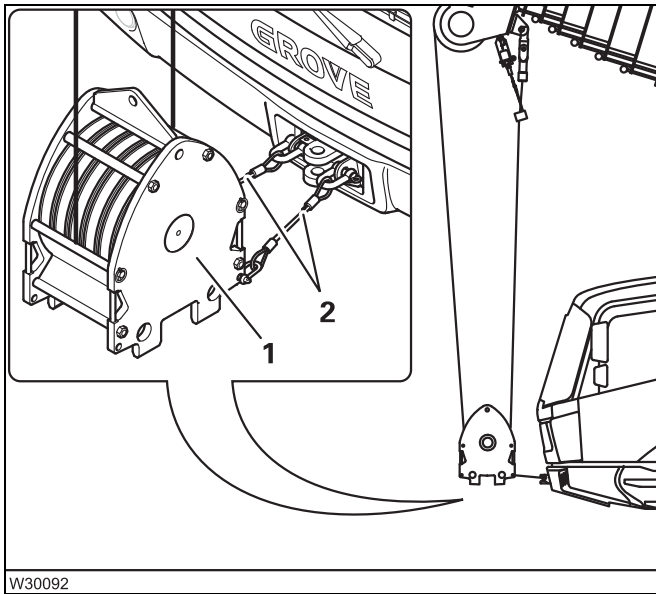
- **(A)** – Remove the retaining pin and pull out the pin (3).
- **(B)** – Raise the block hook (1). Insert the pins (3) and secure them in the hook. Stow away the hook (2) so that it is safe for transportation.



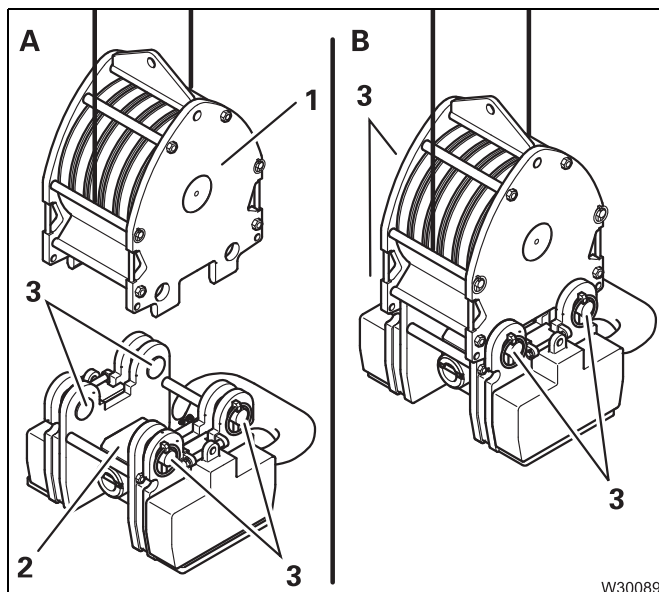
- Raise the block hook (1) vertically above the holding ropes (2).
- Lower the block hook (1) and fasten it using the holding ropes (2).

Set down the main boom onto the boom rest and pull the hoist rope tight only to the extent that the block hook is stabilised in its position.

### Rigging for crane operation




- Slacken the hoist rope and raise the main boom simultaneously.
- Raise the main boom until the boom head is in a vertical position above the block hook (1).
- Detach the block hook from the retaining ropes (2).

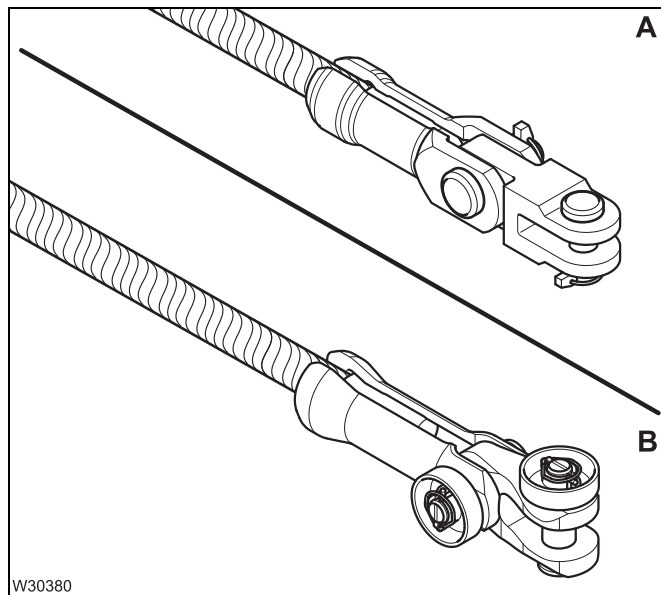


- (A) – Pull the pin (3) out.
- (B) – Raise the hook block (1) above the hook (2) until the connecting points are aligned.
- Insert the pins (3) and secure them with the retaining pins.

## 11.10.5 Reeving and unreeving the hoist rope

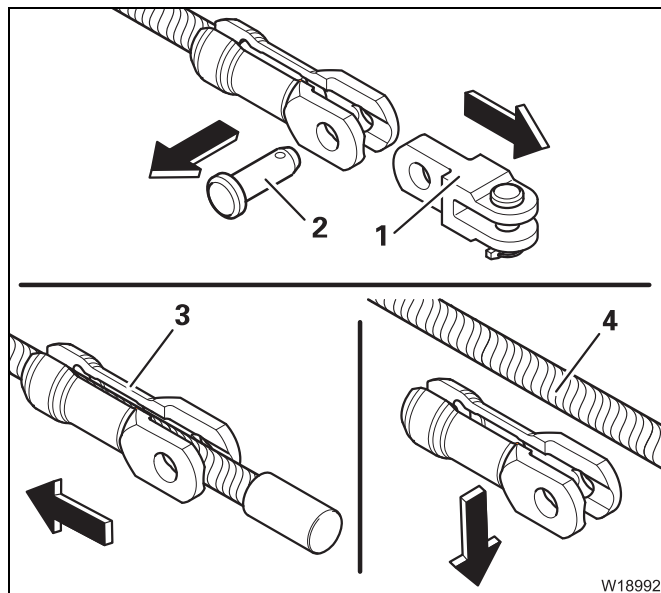
You must reeve a certain number of rope lines, depending on the required load bearing capacity. Four reeved rope lines correspond, for example, to 4-fall reeving;  Possible reeving on the main boom, p. 11 - 113.

To reeve and unreeve the hoisting rope, you must remove the pocket lock. After reeving you must reattach the pocket lock.



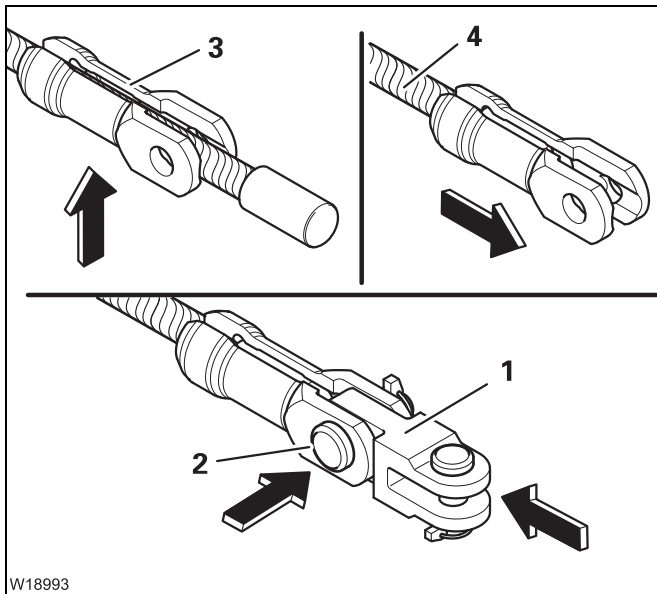
There are **A** or **B** versions.

### Version A



### Removing

- Pull the pin (2) and remove the fork element (1).
- Slide the holder (3) back and remove it from the hoist rope (4).

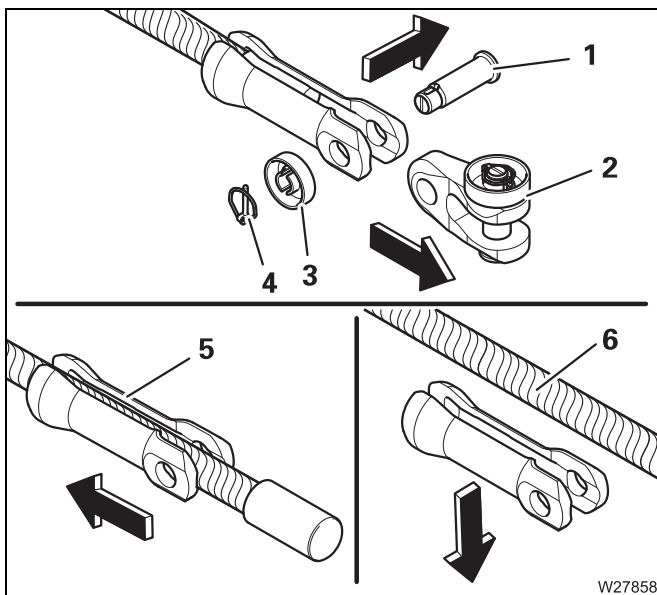


W18993

### Positioning

- Insert the holder (3) and slide it onto the hoist rope (4) as far as it will go.
- Fasten the fork (1) using the pin (2).
- Secure the pin using the linchpin.

### Version B

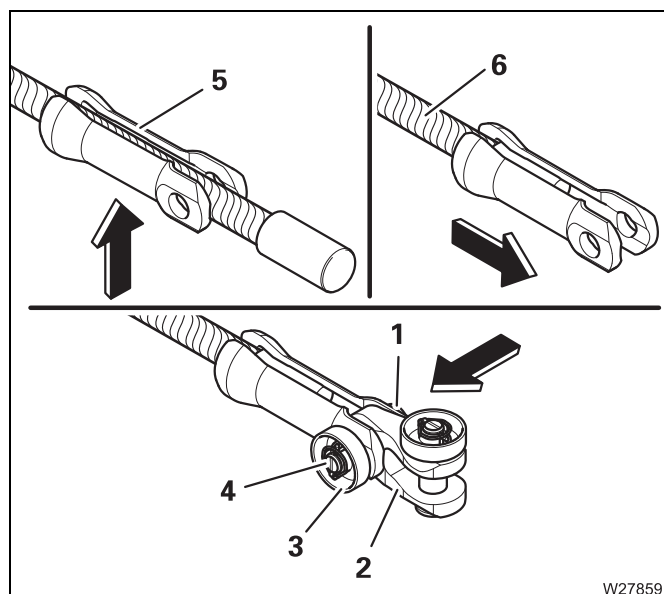


W27858

### Removing

- Remove the linchpin (4).
- Release the locknut (3) and pull out the pin (1). Remove the bracket (2).
- Slide the padlock (5) back and remove it from the hoist rope (6).





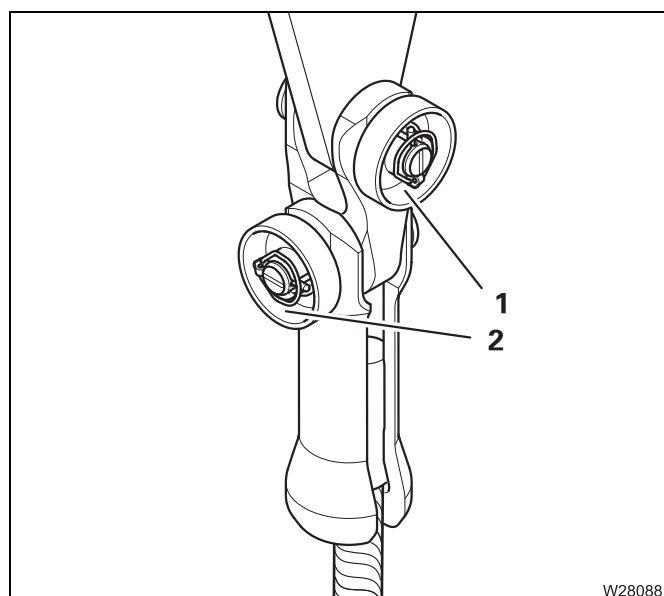
### Positioning

- Insert the padlock (5) and slide it onto the hoist rope as far as it will go (6).
- Fasten the bracket (2) to the padlock (5) using the pin (1).
- Turn the locknut (3) on the pin (1) as far as it will go and then turn by one half turn.
- Insert the linchpin (4).



### Risk of damage to the hoist rope!

Always install the pocket lock as it is described in the following paragraph. This will prevent the hoist rope rubbing against the locknut and being damaged.



### Fastening the pocket lock on the main boom

- Fasten the pocket lock to the fixed point of the main boom in such away that
  - The locknut (1) faces outwardand
  - The locknut (2) faces forward in the driving direction.

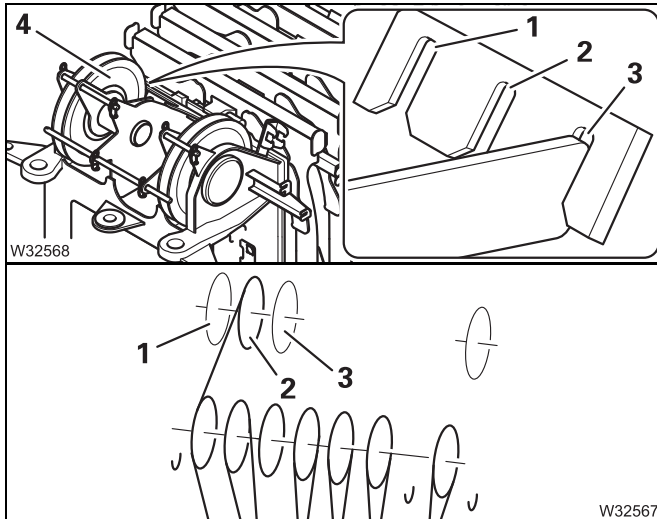
## Reeving the hoist rope

Depending on the version, you can use the rigging aid for fitting the hoist rope if necessary; ►► p. 6 - 69.



### Danger due to slack rope!

Only use hook blocks and sling gear of the minimum weight prescribed in the *Lifting capacity table* depending on the reeving and boom length. This prevents slack rope forming at large heights when lifting without a load. This can result in the load slipping.



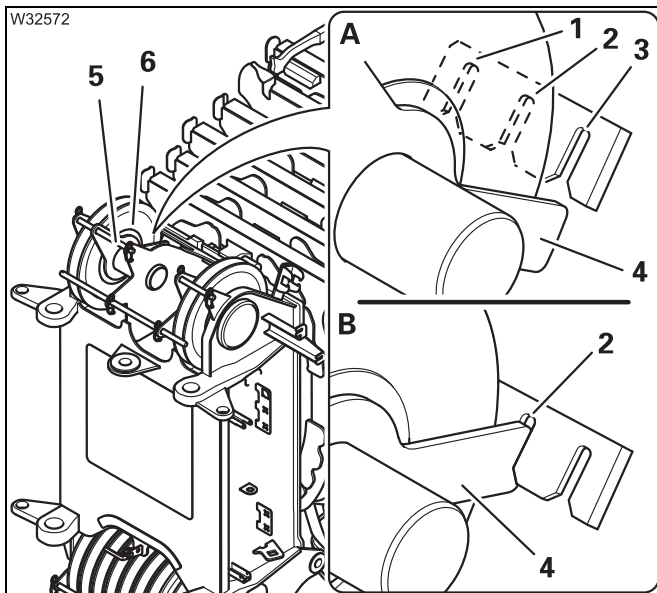
## Adjusting the head sheave

The head sheave (4) can be shifted into three different positions (1), (2) and (3).

The required position depends on the reeving.

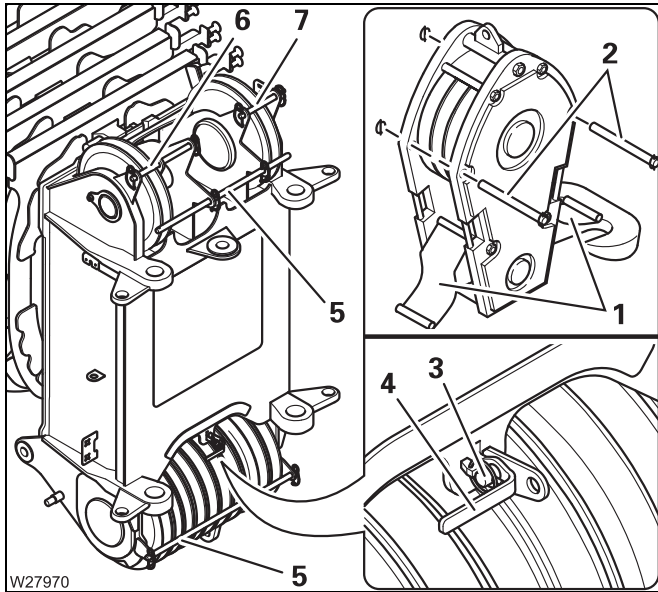
Reeving images show the head sheaves in the positions (1), (2) and (3).

The head sheave must always be shifted into the position via which the hoist rope will run e.g. into position (2); ►► *Possible reeving on the main boom*, p. 11 - 113.



- (A) – Pull the rod (5) out.
- Turn the lever (4) so that it is located below the cutouts (1), (2), (3).
- (B) – Push the head sheave (6) into the required position – e.g. into position (2).
- Turn the lever (4) into the appropriate cutout – e.g. into cutout (2).
- Insert the rod (5) and secure it with the retaining pins.



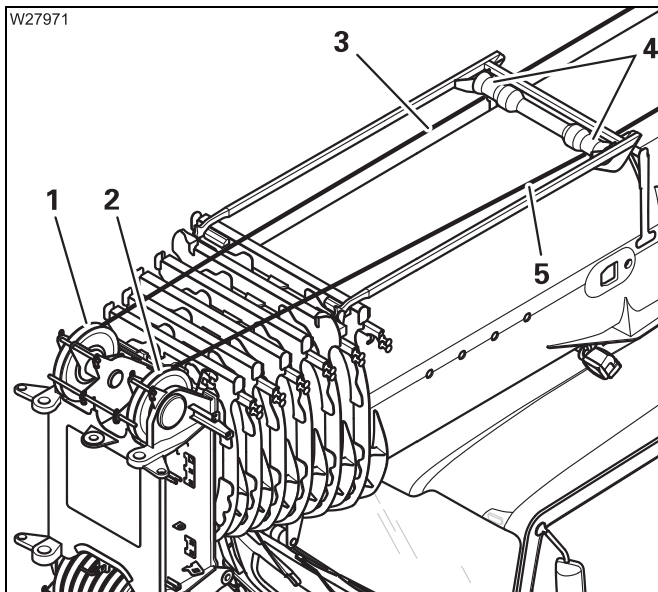


### Opening the hook block

- Pull out the rods (2).
- Fold down the plates (1).

### Fitting the hoist rope

- Pull out the rods (5).
- Pull out the rod (3) and push the bracket (4) to the rear. Insert the rod (3).
- Pull out the rod (6) for the **main hoist rope**.
- Pull out the rod (7) for the **auxiliary hoist rope**.

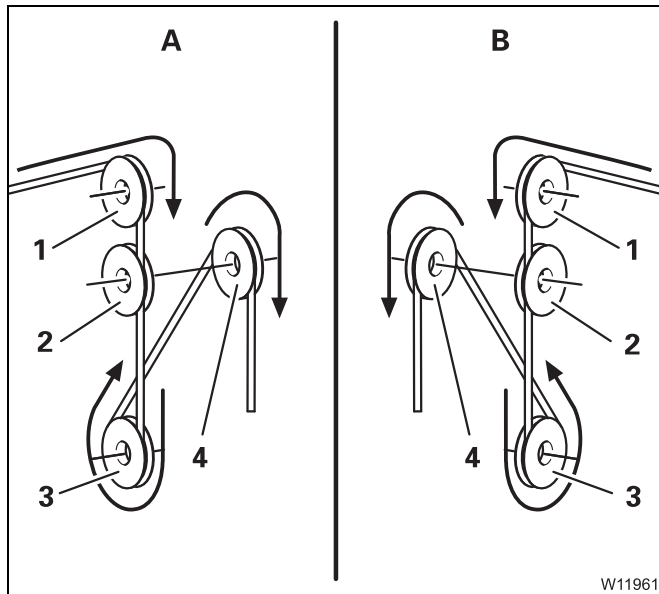


### Rope grab

- Feed the main hoist rope (3) through under the sheave (4).
- Feed the auxiliary hoist rope (5) through under the sheave (4).
- Feed the main hoist rope (3) to the head sheave (1).
- Feed the auxiliary hoist rope (5) to the head sheave (2).

Lay the hoist rope under the sheave (4) also when working with the lattice extension.



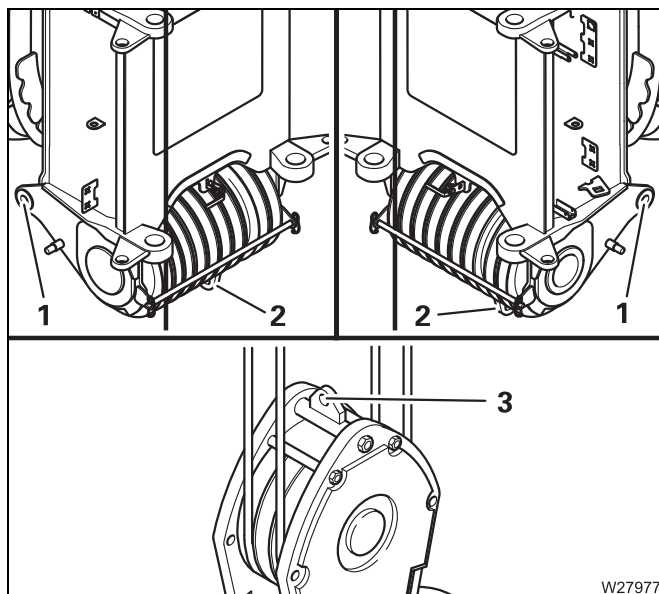


### Reeving the hoist rope

- A** For the main hoist rope
- B** For the auxiliary hoist rope

- Guide the hoist rope over the upper head sheave (1) to the lower head sheave (2).
- Guide the hoist rope from the front around the outer pulley (3) of the hook block, upwards to the main boom head.
- Guide the hoist rope from the rear over the next required head sheave (4), etc.
- Reeve the hoist rope with the required number of lines.

Possible reeving methods; p. 11 - 113.

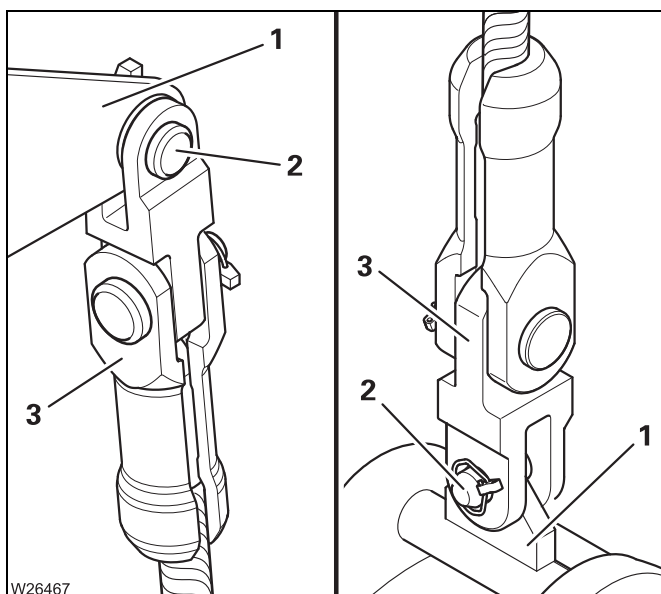


### Fastening the hoist rope

The fixed point used depends on the number of reeved rope lines.

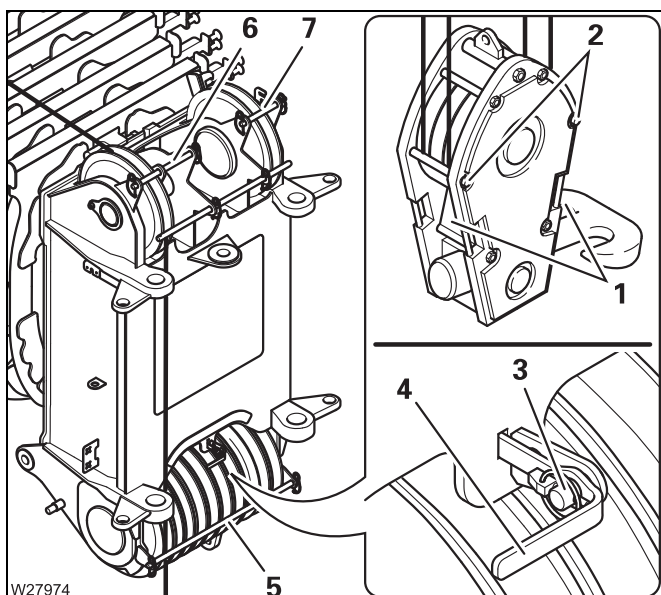
- **Fixed point for an even number of lines**  
The rope end fitting is fastened to a fixed point (1) or (2) for 2-fall, 4-fall, 6-fall reevings, etc.
- **Fixed point for an odd number of lines**  
The rope end fitting is fastened to the fixed point (3) for 1-fall, 3-fall, 5-fall reevings, etc.





### Rope end fitting

- Insert the rope end fitting (3) at the fixed point (1) and secure the pin (2).



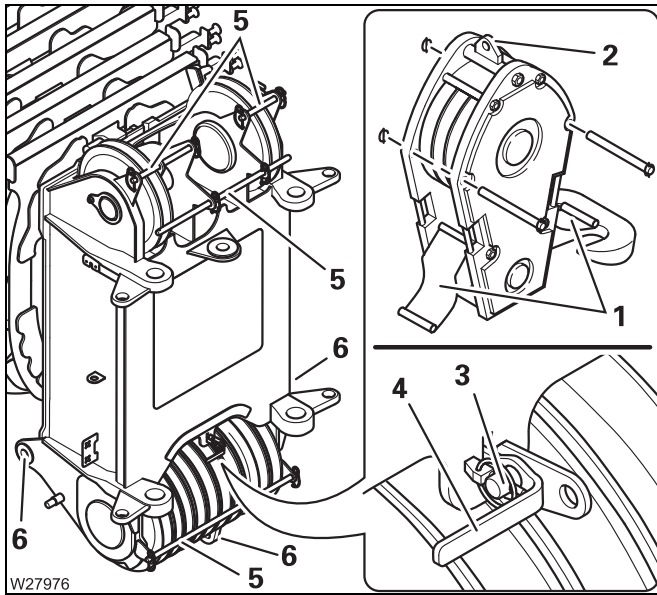
### Securing the hoist rope


- Pull the rod (3) and fold the bracket (4) forwards.
- Insert the rods (3), (5) and (6), (7).
- Secure all rods using the retaining pins.

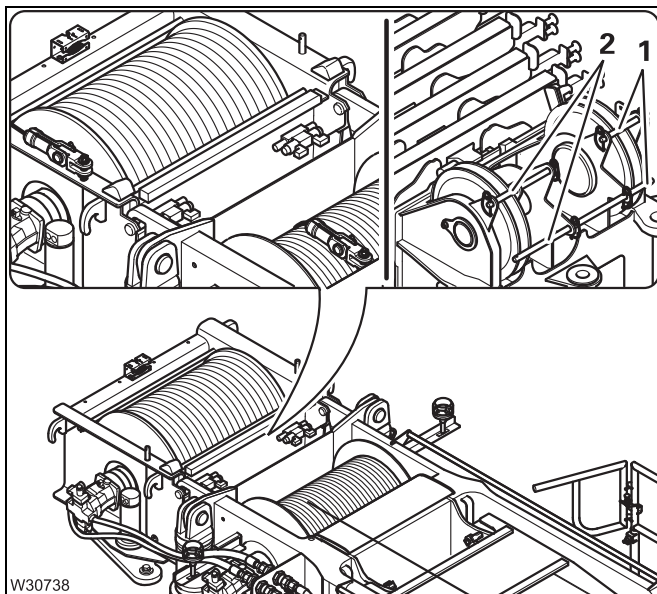
### Closing the hook block

- Fold up the plates (1) on both sides.
- Insert the rods (2) and secure them with the linchpins.


## Unreeving hoist rope



- Pull out the rod (5).
- Remove the retaining pins and pull out the rod (3). Push the bracket (4) to the rear. Insert the rod (3).
- Fold down the plates (1);  p. 11 - 108.
- Remove the rope end fitting from the fixed point (2) or (6).
- Unreeve the hoist rope.



Depending on the driving mode, you can:

- Fasten the hoist rope to the bumper;  
 p. 11 - 101 or
- Pull out the rods (1) and (2) and roll the hoist rope onto the drum.
- Secure the rods (1) and (2) using the retaining pins.

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## 11.10.6 Possible reeving on the main boom


Possible reeving on lattice extensions and the auxiliary single-sheave boom top;  *Operating Instructions Lattice Extension*.

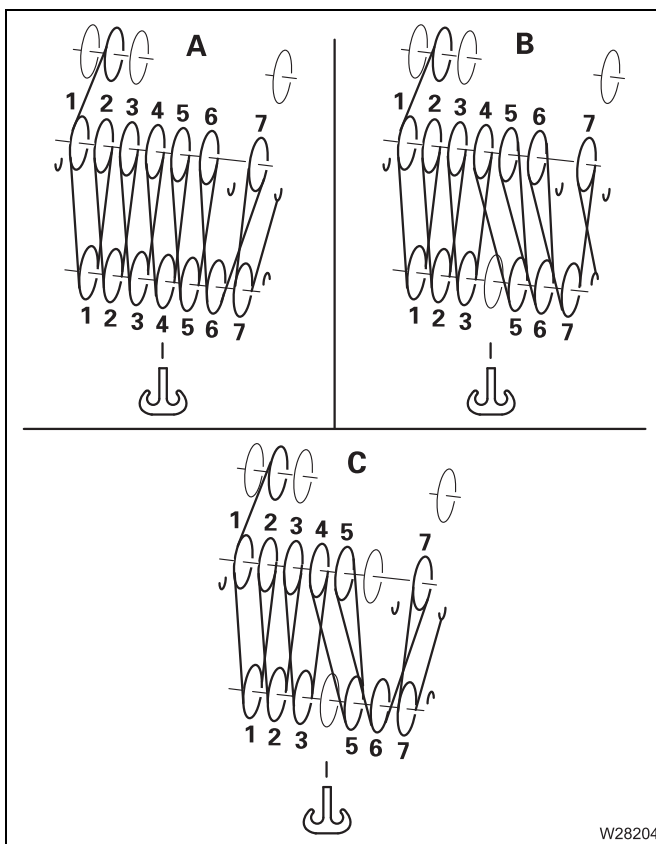


The maximum lifting capacity is specified in the *Lifting capacity table* supplied.

### With 7 head sheaves

If 10 head sheaves are present;  p. 11 - 116.

If 11 head sheaves are present;  p. 11 - 119.



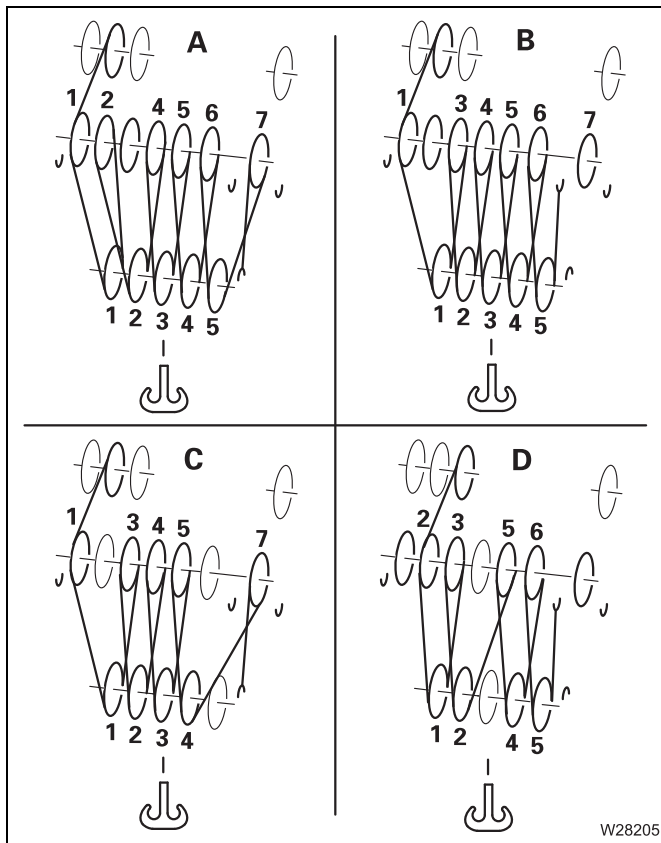
### 7 sheave hook block

#### Reeving

<b>A</b>	14-fall
<b>B</b>	13-fall
<b>C</b>	12-fall



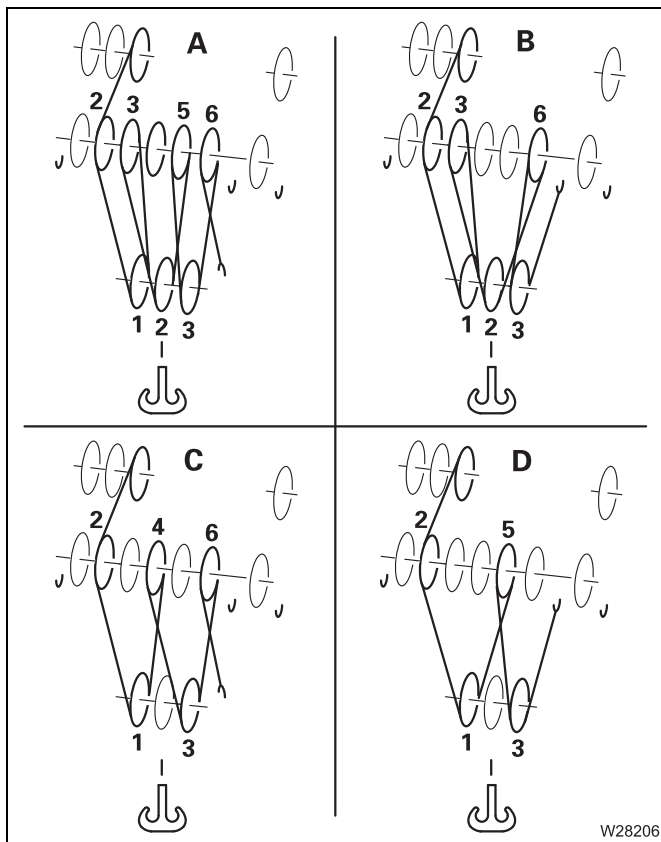
W28204



**5 sheave hook block**

Reeving

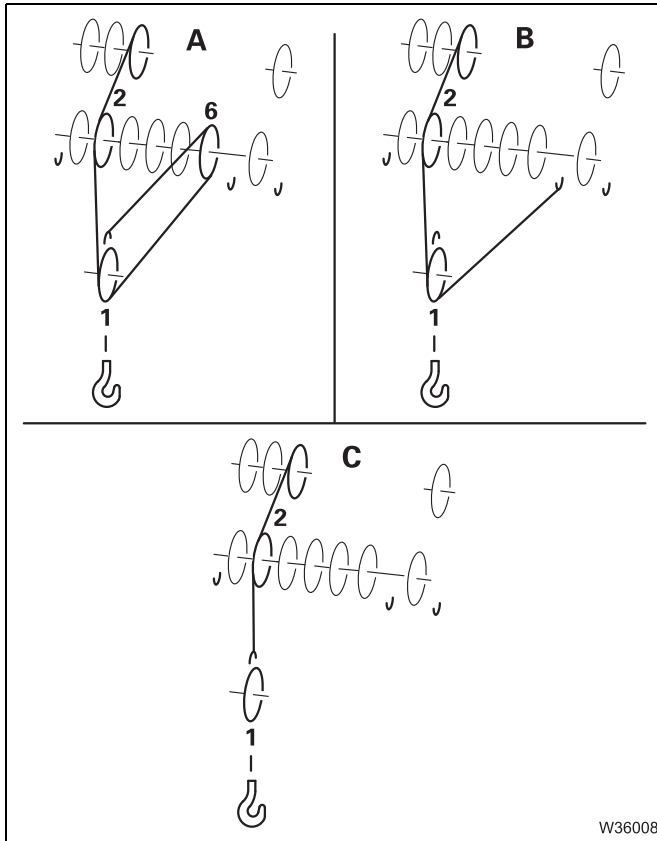
- A** 11-fall
- B** 10-fall
- C** 9-fall
- D** 8-fall



**3 sheave hook block**

Reeving

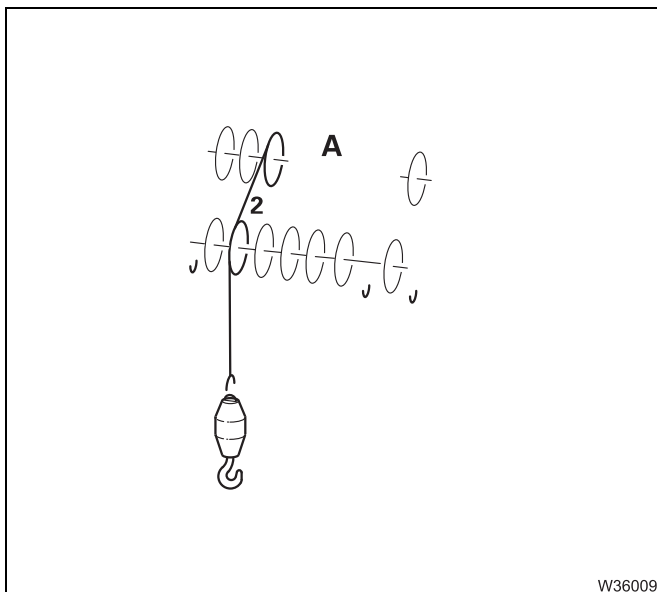
- A** 7-fall
- B** 6-fall
- C** 5-fall
- D** 4-fall



### 1 sheave hook block

Reeving

- A** 3-fall
- B** 2-fall
- C** 1-fall



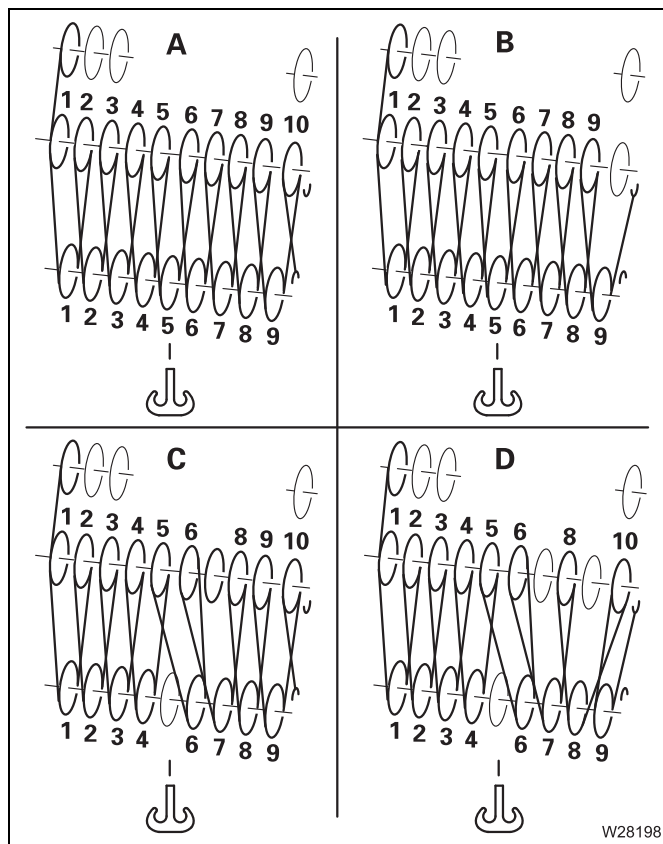
### Hook tackle

Reeving

- A** 1-fall



**With 10 head sheaves**

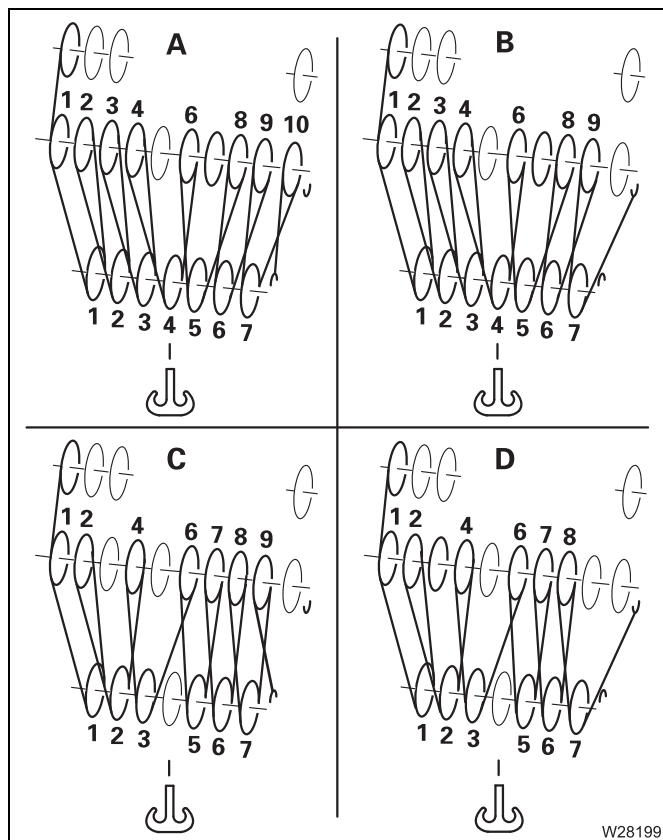


**9 sheave hook block**

Reeving

- A** 19-fall
- B** 18-fall
- C** 17-fall
- D** 16-fall

W28198



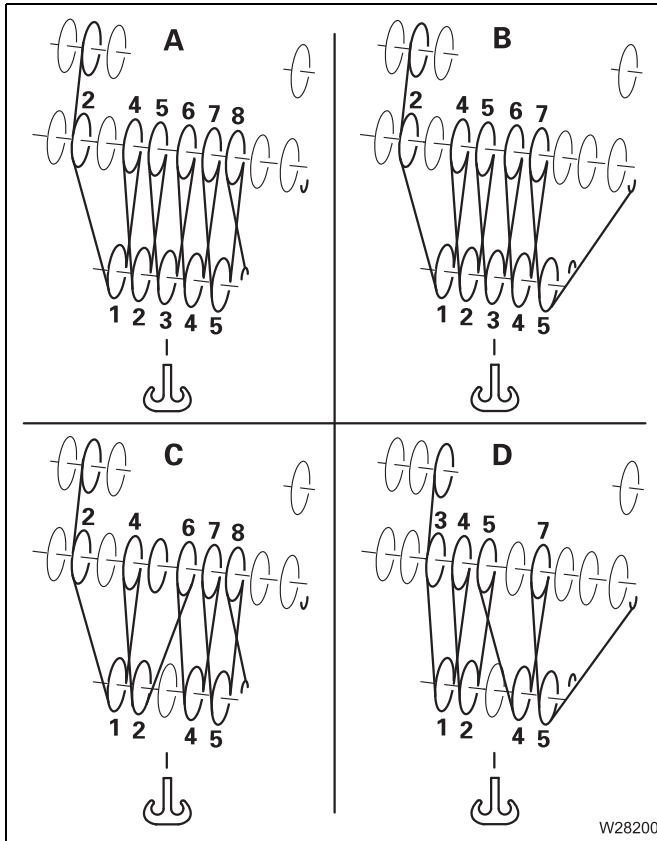
**7 sheave hook block**

Reeving

- A** 15-fall
- B** 14-fall
- C** 13-fall
- D** 12-fall

W28199



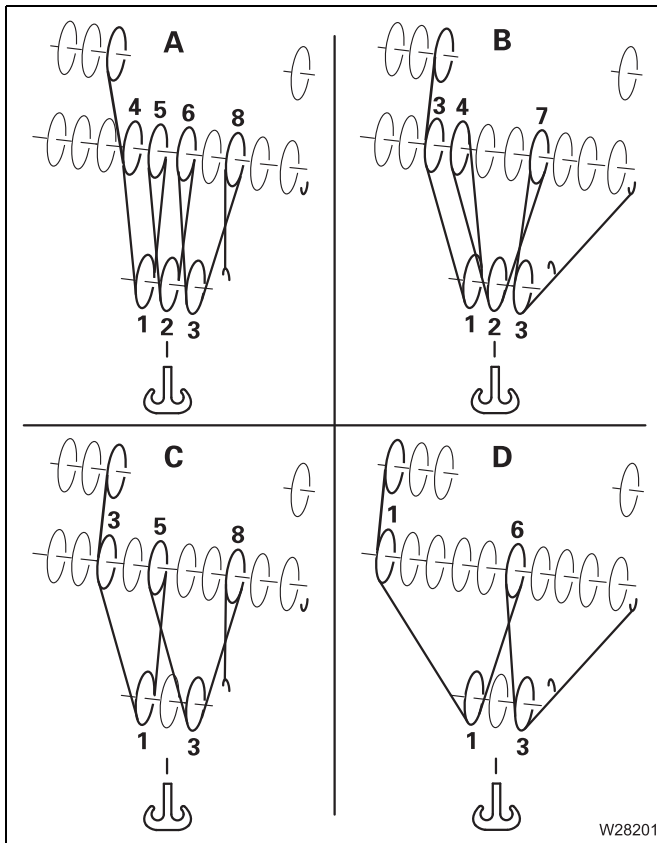


**5 sheave hook block**

Reeving

- A** 11-fall
- B** 10-fall
- C** 9-fall
- D** 8-fall

W28200



**3 sheave hook block**

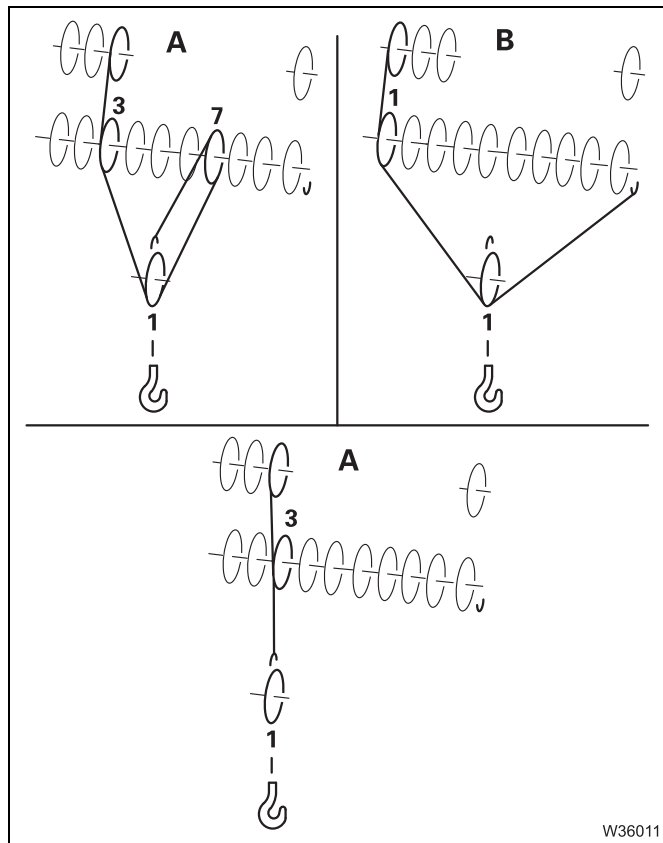
Reeving

- A** 7-fall
- B** 6-fall
- C** 5-fall
- D** 4-fall



W28201

27.09.2017



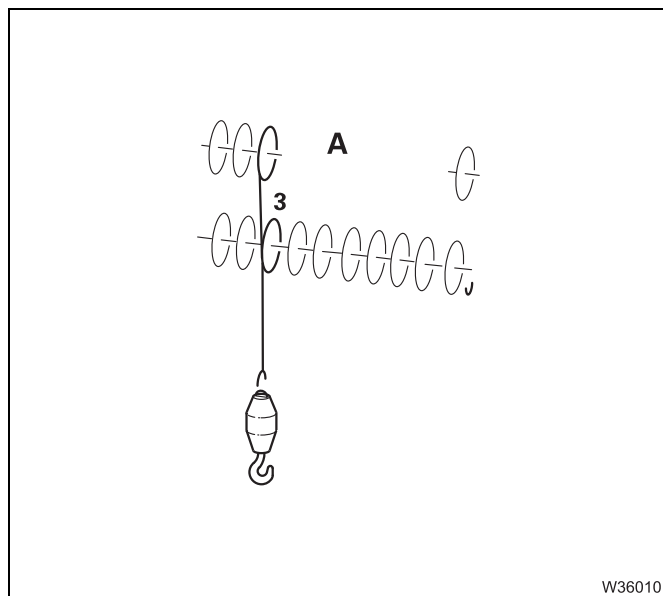
**1 sheave hook block**

Reeving

**A** 3-fall

**B** 2-fall

**C** 1-fall

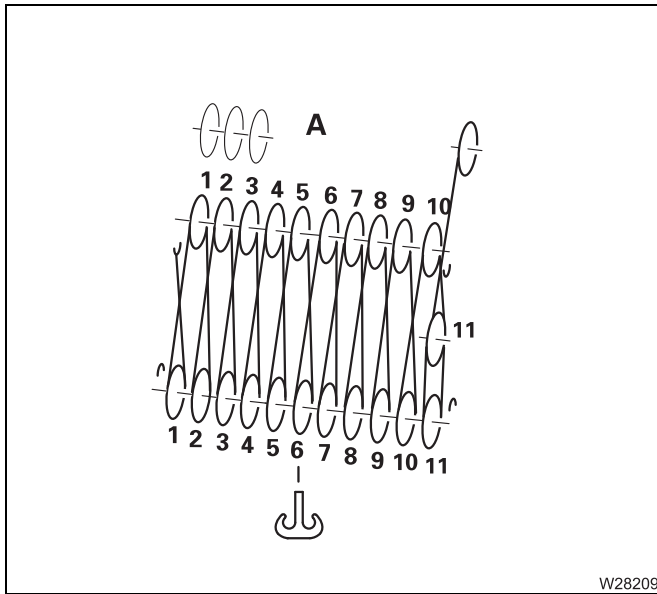


**Hook tackle**

Reeving

**A** 1-fall

**With 11 head sheaves**



**11 sheave hook block<sup>1)</sup>**

Reeving

**A** 22-falls<sup>2)</sup>

- 1) Additional equipment
- 2) only with special equipment

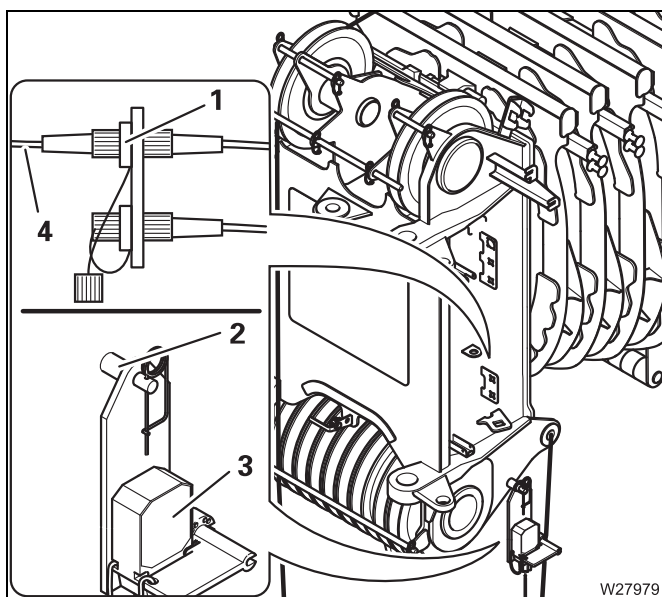
## 11.10.7 Installing/removing the lifting limit switch

For the function of the lifting limit switch;  p. 10 - 10.

For every reeved hoist rope, you must install a lifting limit switch, attach a lifting limit switch weight and place it around the hoist rope.

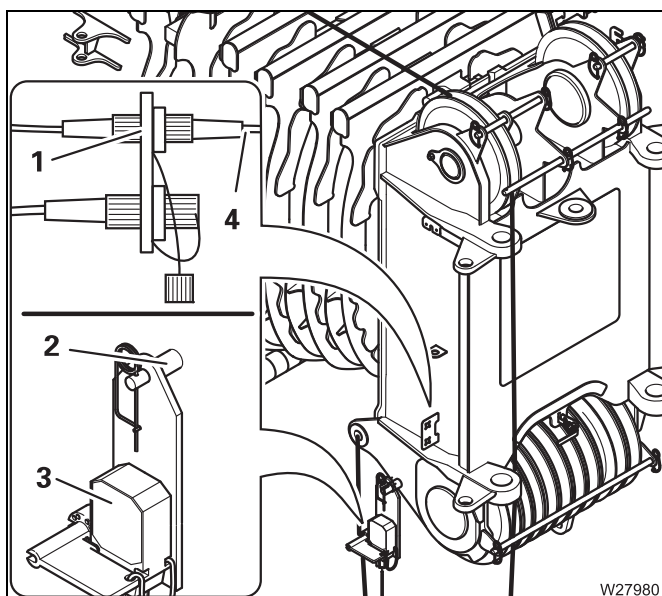
### Installing lifting limit switch

You can attach the lifting limit switch on the right or left side of main boom head. Install the switch on the side that is closer to the last rope line leading upwards. There can also be one lifting limit switch installed on each side.



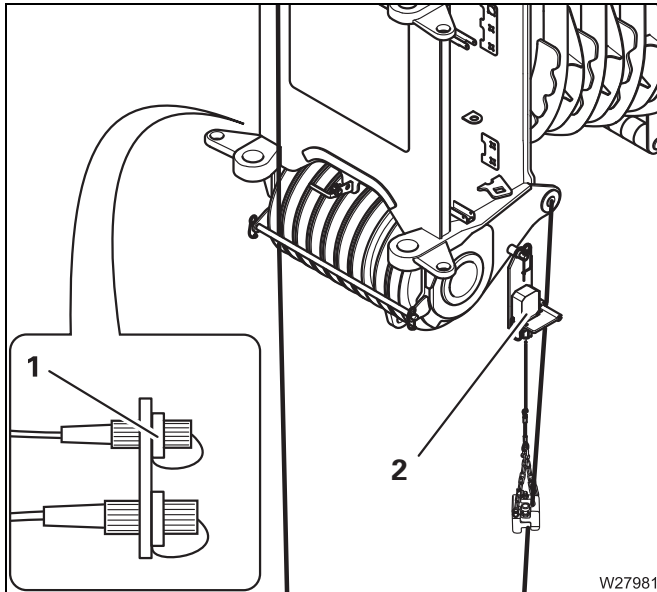
#### On the left side

- Plug the lifting limit switch (3) onto the bracket (2) and secure it with the retaining pin.
- Lay the cable (4) in such a way that it will not be damaged during crane operation and connect it to the socket (1).



#### On the right side

- Plug the lifting limit switch (3) onto the bracket (2) and secure it with the retaining pin.
- Lay the cable (4) in such a way that it will not be damaged during crane operation and connect it to the socket (1).



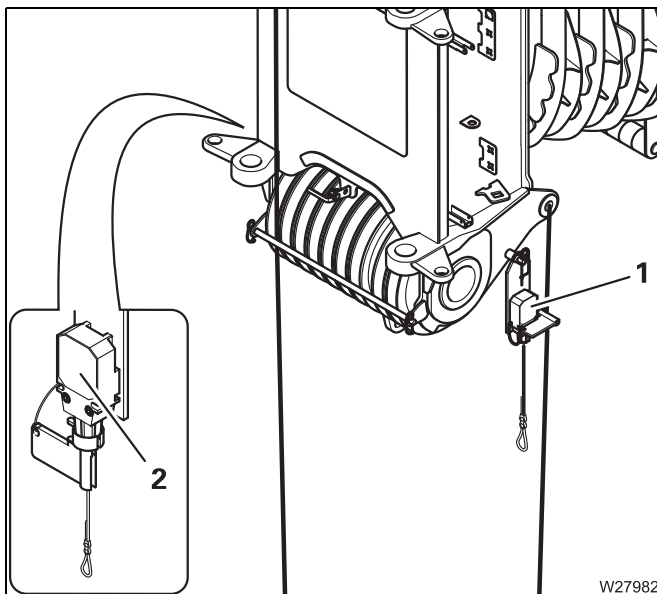
**If only one lifting limit switch has been installed**

- Cover the unused socket with the protective cap (1).
- Check whether the lock on the lifting limit switch (2) is released; *Removing the lock*, p. 11 - 125.



**Risk of damage if the lifting limit switch is locked!**

The lifting limit switch must not be locked. Remove the lock, if necessary. If the lifting limit switch is locked, the hook block could hit the bottom of the main boom head during the lifting procedure, resulting in damage to the hook block, main boom head and hoist rope.



**If two lifting limit switches have been installed**

- Lock the lifting limit switch to which no lifting limit switch weight has been attached.

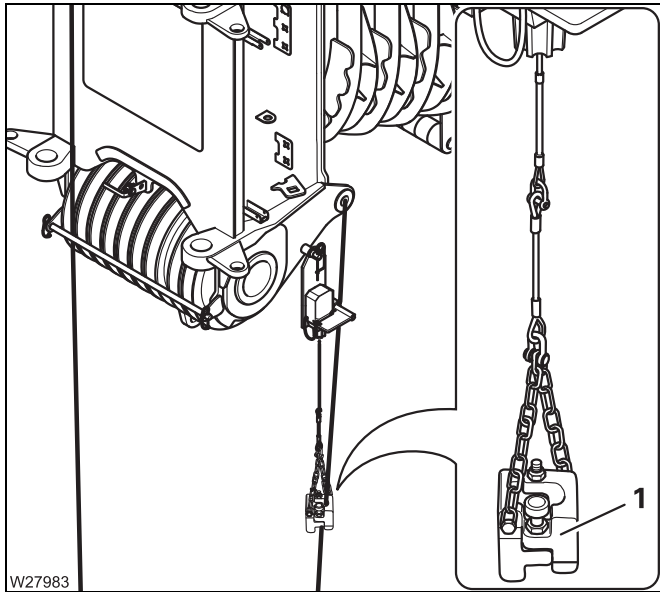
If the lifting limit switch weight has, for example, been attached to the left lifting limit switch (1), you must lock the right lifting limit switch (2); *Locking*, p. 11 - 125.

Otherwise the movements *Raise hosting gear*, *Telescope out* and *Lower the boom* will be locked.



If two hoist ropes are reeved, you must also use two lifting limit switch weights. In this case none of the lifting limit switches must be locked; *Removing the lock*, p. 11 - 125.



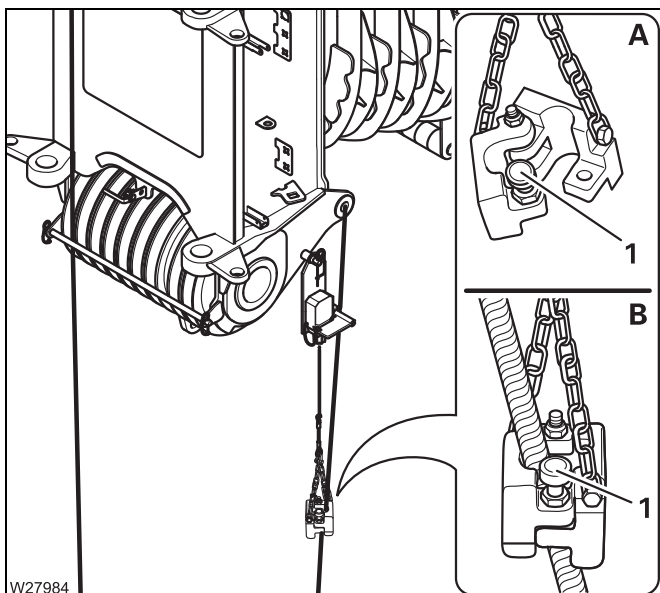


### Attaching the lifting limit switch weight

- Attach the lifting limit switch weight (1).

If two hoist ropes are reeved, you must attach a lifting limit switch weight to each of the two lifting limit switches.

This lifting limit switch must not be locked;  
▣▣▣▣ *Removing the lock*, p. 11 - 125.



### Placing a lifting limit switch weight around the hoist rope

- (A) – Pull the safety pin (1) out and fold the two halves of the weight apart.
- (B) – Place the two halves of the weight around the last rope line leading upwards.
- Pull the safety pin (1) out and fold the two halves of the weight back together.
- Make sure the safety pin locks into place and the two halves of the weight are securely attached to each other.

If two hoist ropes are reeved, you must also place a lifting limit switch weight around the second hoist rope.

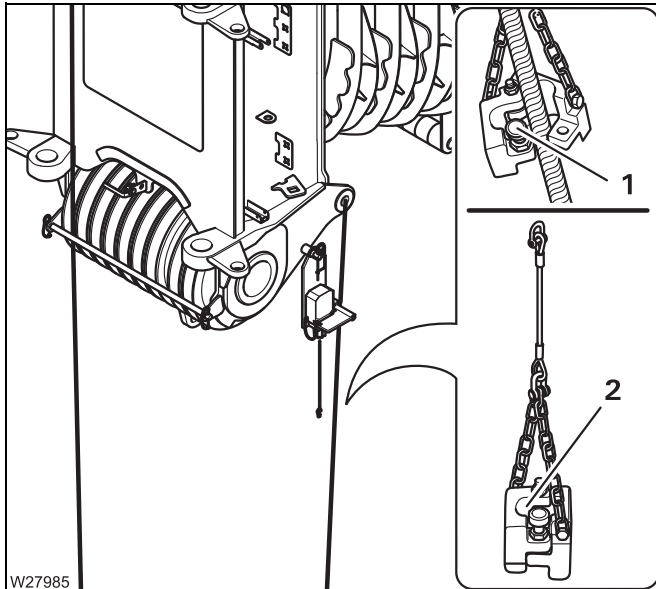


If you place the lifting limit switch weight around the last rope line leading upwards, less rope will run through the lifting limit switch weight, especially if there is a high number of reevings per lifting operation. This rope line will even be at a standstill if the number of rope lines is even. This allows you to reduce the wear of the hoist rope and lifting limit switch weight and prevent unintentional deactivation procedures that may be caused by the running hoist rope lifting the lifting limit switch weight.

## Removing the lifting limit switch

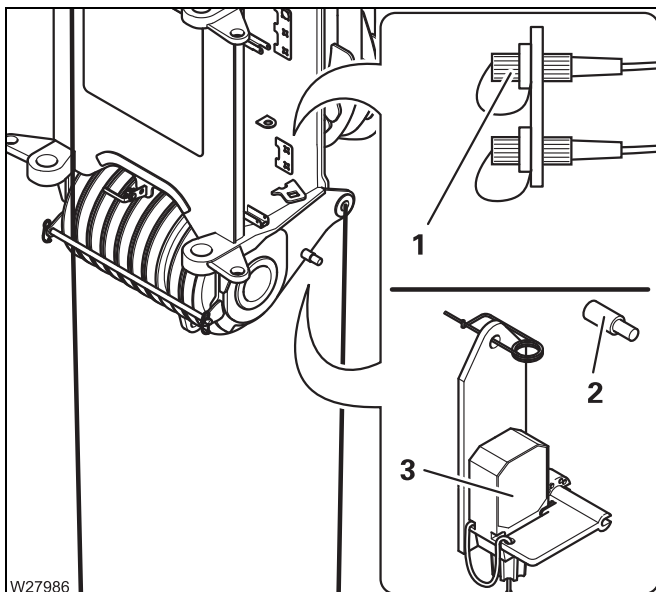
This section describes complete removal.

If the hook block is to be subsequently attached to the bumper, you only need to detach the lifting limit switch weight from the hoist rope in order to be able to unreeve or re-reeve the hoist rope when unrigging. You can place the lifting limit switch weight around the hoist rope again before driving.



### Removing the lifting limit switch weight

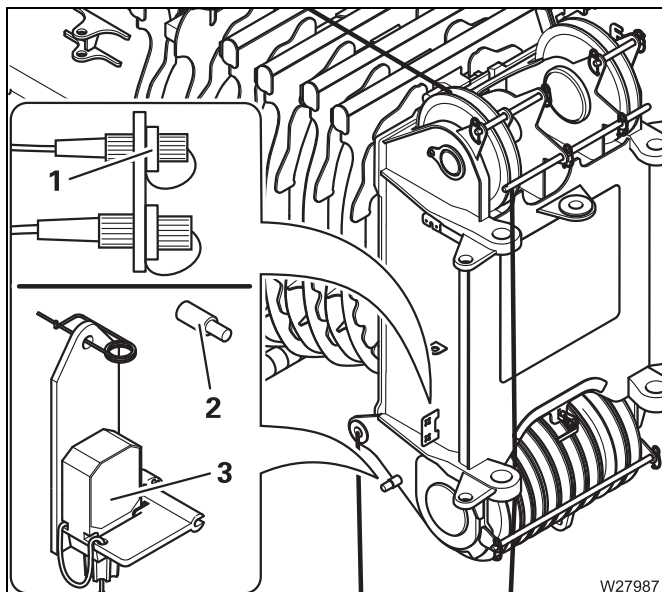
- Pull the safety pin (1) out and fold the two halves of the weight apart.
- Remove the halves of the weight from the rope line.
- Pull the safety pin (1) out, fold the two halves of the weight back together and let the safety pin engage.
- Remove the lifting limit switch weight (2).
- Remove the lifting limit switch weight on the other side too, if necessary.



### Removing the left lifting limit switch

- Pull the plug from the socket and close the socket (1) with the protective cap.
- Remove the lifting limit switch (3) from the bracket (2).
- Fasten the retaining pin on the lifting limit switch.





### Removing the right lifting limit switch

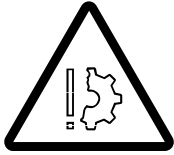
- Pull the plug from the socket (1).
- Remove the plug (3) from the dummy socket (2) and plug it into the socket (1).
- Remove the lifting limit switch (5) from the bracket (4).
- Fasten the retaining pin on the lifting limit switch.



## 11.10.8 Locking/unlocking the lifting limit switch

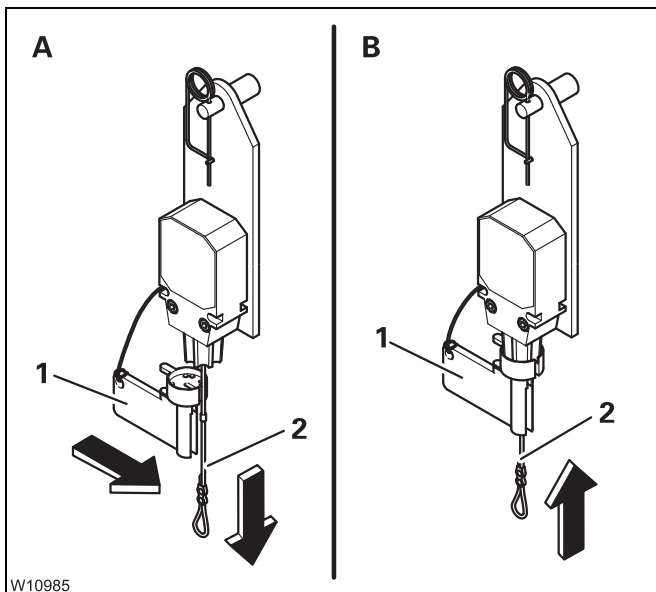
### Locking

If a hoist rope has been reeved and two lifting limit switches are installed, you must lock the lifting limit switch not used in order to enable all crane operations.



#### **Risk of damage if the lifting limit switch is locked!**

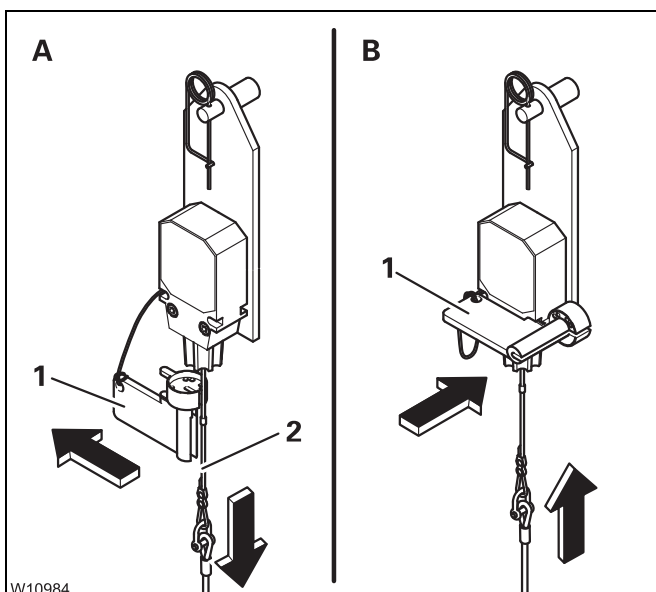
The lifting limit switch to which the lifting limit switch weight is attached may under no circumstances be locked when operating the crane. If the lifting limit switch is locked, release the lock. This prevents the hook block hitting the main boom head, causing damage to the hook block, main boom head and hoist rope.



- Remove the lifting limit switch weight.
- (A) – Remove the cap (1).
- Pull down the rope (2).
- (B) – Secure the rope (2) in this position using the cap (1) – the lifting limit switch is locked and can no longer be triggered.

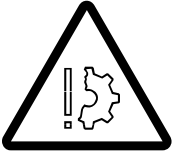
### Removing the lock

You must always release the locking before you place a lifting limit switch weight around the hoist rope.



- (A) – Pull the rope (2) down and take off the cap (1) – the locking is released.
- (B) – Fit the cap (1) onto the lifting limit switch.

## 11.10.9 Anemometer and air traffic control light



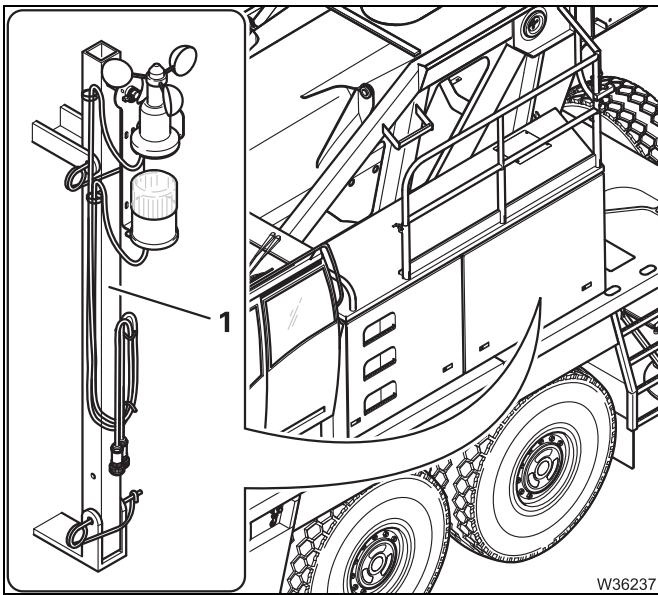
### Risk of damage during on-road driving

Always remove the anemometer and air traffic control light before on-road driving.

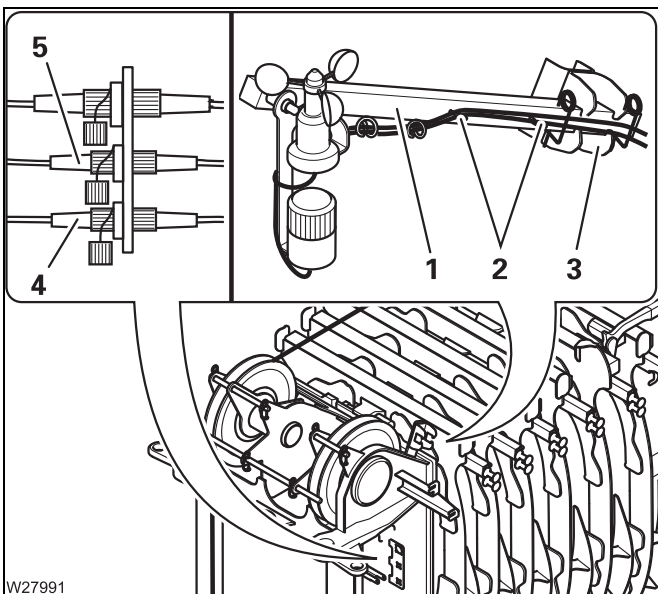
This prevents the specified overall height from being exceeded at on-road level, and the anemometer from being damaged due to unfavourable air currents.

### Installing

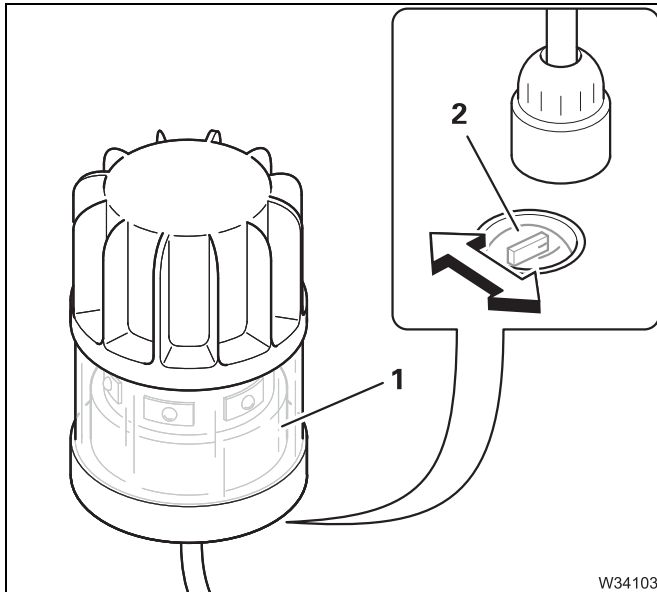
The anemometer and the air traffic control light – if provided – are located on the same rod.



- If necessary, remove the rod from the storage compartment (1).



- Insert the rod (1) into the holder (3) and secure it with the retaining pins.
- Remove the cable from the holders (2) and connect
  - the anemometer to the socket (4),
  - the air traffic control light to the socket (5).
- Lay the cables in such a way that they will not be damaged during crane operation.
- Check that the anemometer is able to swing so that it hangs vertically even when the main boom is raised.

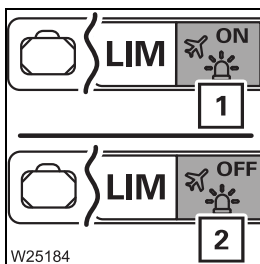


Depending on the additional equipment, the truck crane can be equipped with a switchable air traffic control light.

This air traffic control light (1) has *flashing light* and *constant light* lighting modes.

- Select the desired lighting mode using the switch (2).

### Switching on/off



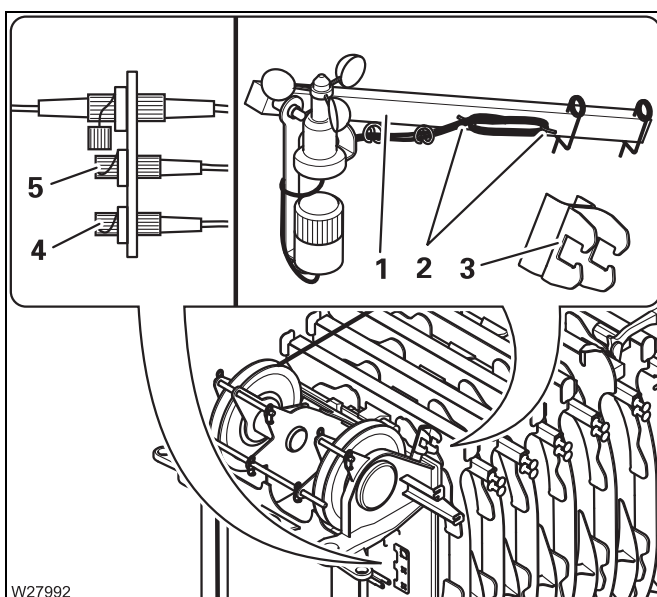
**To switch on:** Select symbol (1) and confirm – symbol *ON* is displayed

**To switch off:** Select symbol (2) and confirm – symbol *OFF* is displayed

### Removing

You must remove the rod with the anemometer/air traffic control light before driving on the road.

- Switch off the air traffic control light.

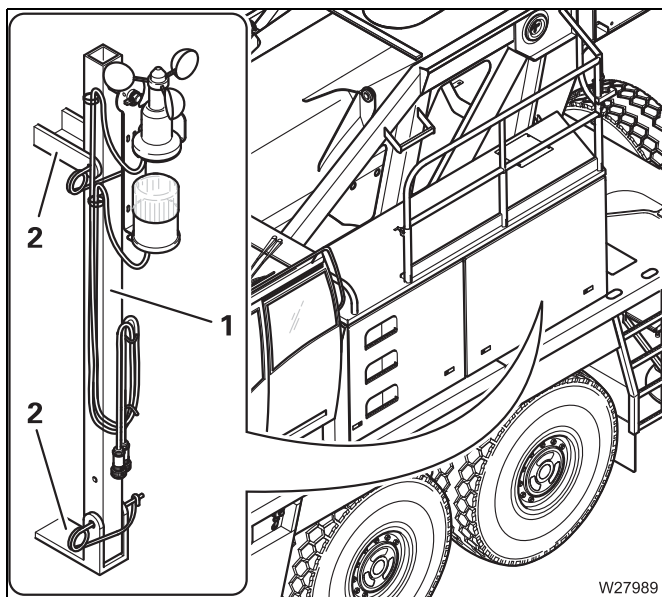


- Remove the plug and close the sockets (4) and (5) with the protective caps.
- Wind the cable on to the holder (2).
- Remove the rod (1) from the holder (3).



**For transport**

The anemometer has been removed.



- Place the rod (1) in the holder (2).
- Secure the rod (1) using the retaining pins.

## 11.11 Other rigging work

### 11.11.1 Railings on the turntable

The turntable is equipped with fixed handrails or extendable/retractable handrails, depending on the version.



#### **Risk of accidents if railings are not pushed out!**

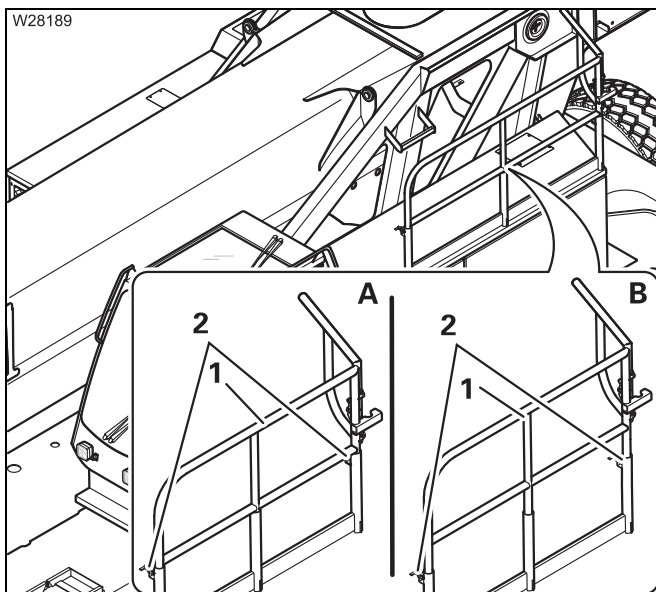
The railings provide protection from falling. Always fold out the railings before moving onto the auxiliary hoist.



#### **Risk of accidents due to exceeding the permissible dimensions!**

Retract the handrails before driving. When the railing is pushed out, the overall height specified for on-road driving is exceeded.

Always extend the handrails when you are working above on the turntable.  
Always retract the handrails before driving.



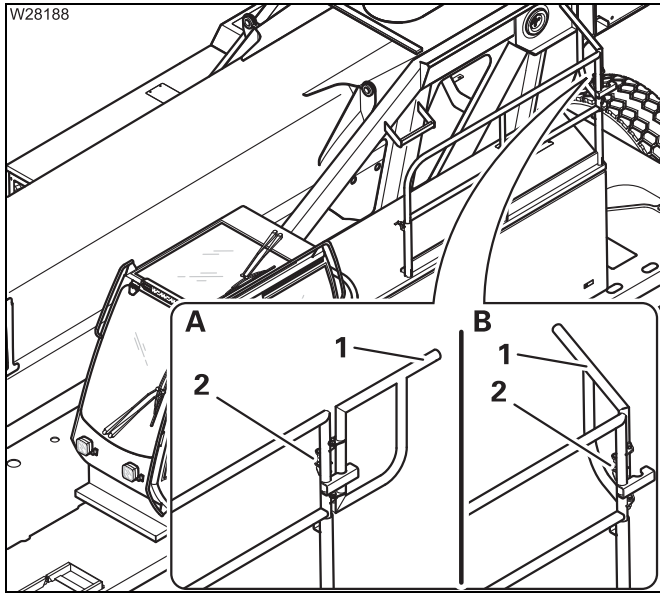
#### **(A) – Sliding out**

- Open the locking bolt (2).
- Extend the handrail (1) upwards until the bolt (2) latches into place.

#### **(B) – Pushing in**

- Open the locking bolt (2).
- Retract the handrail (1) until the bolt (2) latches into place.





**(A) – Folding out**

- Release the locking bar (2) and swing the railing (1) outward until it engages.

**(B) – Folding in**

- Release the locking bar (2) and swing the railing (1) inward until it engages.

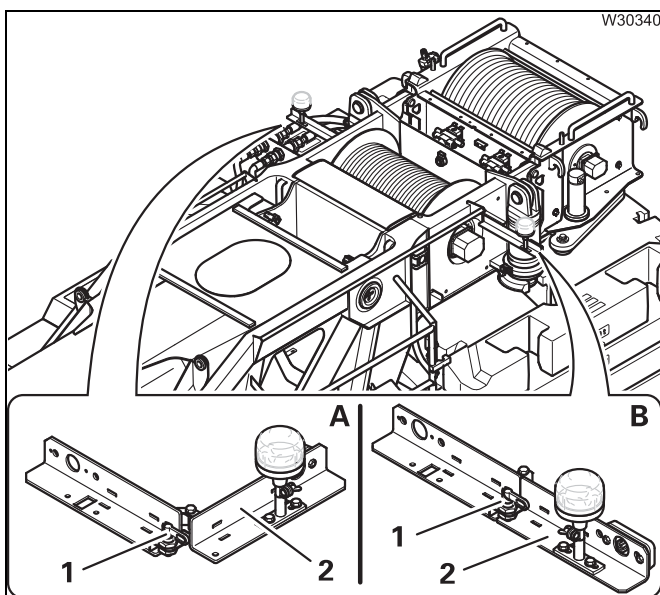
**11.11.2 Folding the lighting carrier in/out**

You can fold in the lighting carrier when performing rigging work on the hoists.



**Risk of accidents due to inadequate lighting!**

Always fold out the lighting carrier for driving and crane operation. This prevents accidents due to inadequate lighting on the superstructure.



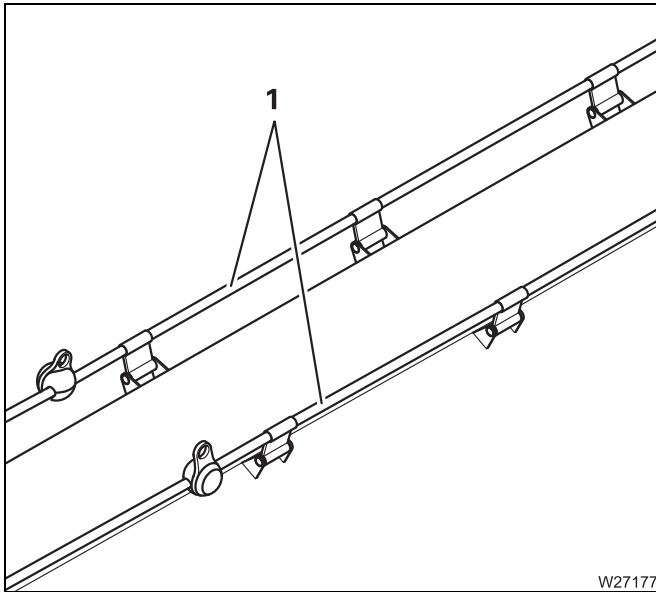
**(A) – Folding in for rigging work**

- Pull the locking bar (1) and fold in the lighting carrier (2).

**(B) – Folding out for driving and crane operation**

- Pull the locking bar (1) and fold out the lighting carrier (2).

### 11.11.3 Safety harness on the main boom



The safety line (1) is fixed securely to the main boom.

The safety line consists of two ropes with spacers and wear pads.

- Always secure yourself with the safety line and your personal protective equipment when you have to step on the main boom, e.g. to rig the rope from the main hoist.



#### **Risk of accidents when stepping!**

Read through the procedure in this section before stepping between the main boom and the stand surface or between the stand surface and the main boom.



#### **Risk of accidents due to unsuitable fall prevention safety system!**

Always secure yourself with a fall prevention safety system that is permissible in the country in which you are working and includes a shoulder, waist and seat belt with a two-point catch belt.

The fall prevention safety system must ensure that you are always secured against falling when you step on the main boom.



#### **Risk of damage to the safety harness!**

Never fasten loads or other objects to the safety harness. This will prevent damage and overload to the safety harness.



### Prerequisites

The safety harness only ensures secure protection from falling if a suitable fall prevention safety system (personal protective equipment) is worn. This fall prevention safety system must be attached to the safety harness on the truck crane.

### Requirements

The fall prevention safety system must correspond to the requirements of the applicable standards and regulations in the country in which you are working. If you are unsure, find out which standards and regulations apply for the country in which you are working.

The fall prevention safety system must consist of:

- a combined shoulder, waist and seat belt,
- a catch belt with two lines for fastening at feet height.

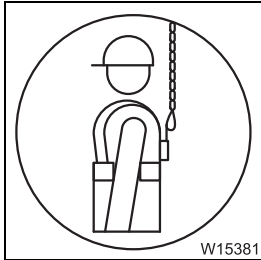


Only one person at a time is allowed to be secured by the safety harness. The weight of the person to be secured must not exceed 140 kg (309 lbs).

If you are unsure about which type of fall prevention safety system is required, please contact **Manitowoc Crane Care**.



## Attaching/detaching fall prevention safety system to/from safety harness



### Attachment

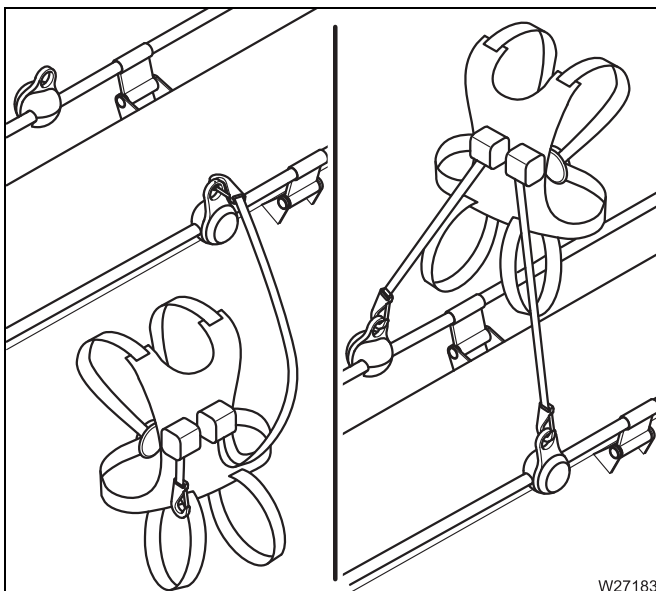
All points designed for fastening a fall prevention safety system are marked with a symbol.

- When stepping, observe the following procedure so that you are always secured.



### Risk of accidents due to incomplete safety system!

Make sure you always attach one line of the fall prevention safety system with the safety harness before stepping onto the main boom. This will prevent falling due to an incomplete safety system.



- Always ascend the truck crane using only the ladders and access ladders provided.
- Make sure you always attach one line of the fall prevention safety system with the safety harness before entering the main boom.
- Attach the second line of the fall prevention safety system with the safety harness once you are located on the main boom.



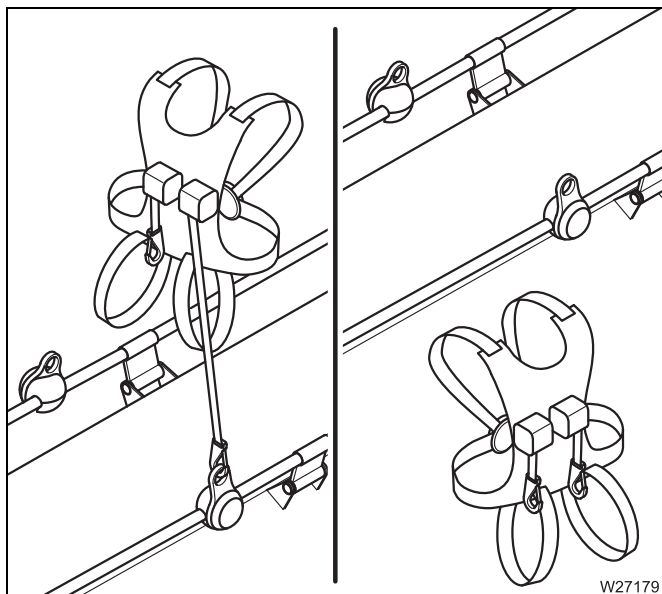
## Disconnecting



### **Risk of accidents due to incomplete safety system!**

Only detach the second line of the catch belt once you have reached a secure position on a ladder or access ladder.  
This will prevent falling due to an incomplete safety system.

When stepping, observe the following procedure so that you are always secured.



- First of all, detach the line that faces away from the ladder or access later.
- You may only detach the second line of the catch belt once you have reached a secure position.
- Always descend from the truck crane using only the ladders and access ladders provided.

### Inspecting/replacing safety harness

The safety harness on the main boom must be inspected for damage at regular intervals.

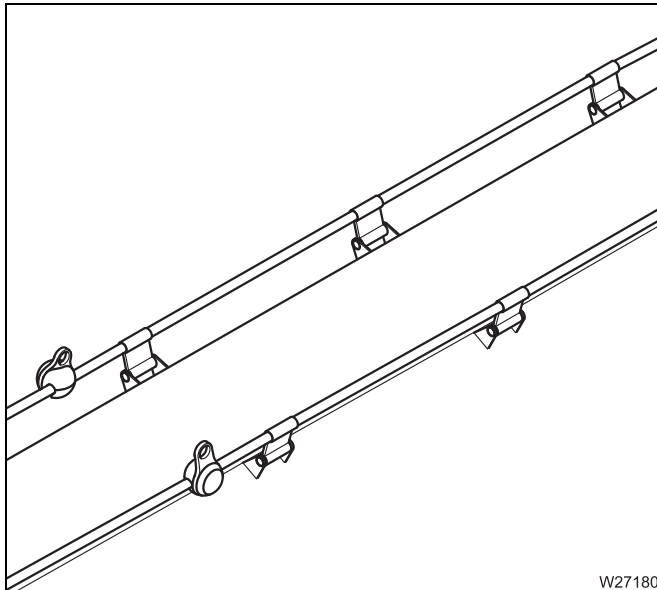


#### **Risk of accidents if inspections are not carried out!**

Make sure the safety harness is inspected regularly.

This will prevent component failure in cases of danger.

A safety harness only ensures protection from falling if it is regularly inspected.



#### **Inspection**

- Check all fastening and connecting parts for damage, wear, mobility and deformations.

#### **Replacement**

Make sure damaged, worn, or deformed fastening or connecting parts are immediately replaced by **Manitowoc Crane Care** or an authorised GROVE dealer or your repair crew.



The safety harness must **always** be replaced completely following stress caused by a fall, even if no damage can be detected.

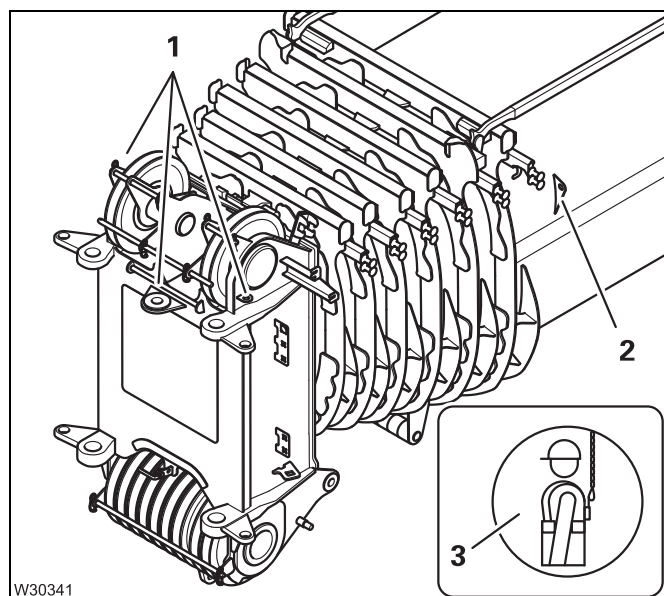


Make sure your personal protective equipment is also regularly inspected. In order to do this, observe the information provided by the manufacturer.

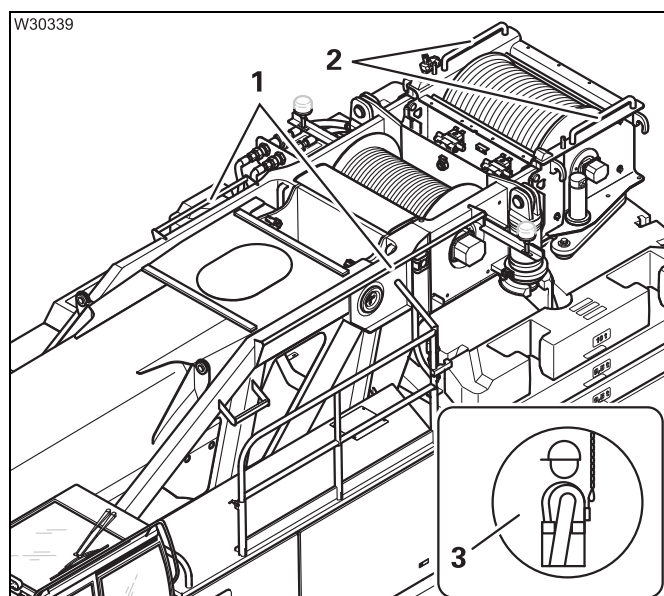
### 11.11.4 Slings points for personal protective equipment

The approved slinging points for personal safety equipment are marked with special labels (3).

- Always secure your personal safety equipment to the attaching points (1) and (2) when performing rigging work on the main boom, turntable or hoists.



On the main boom

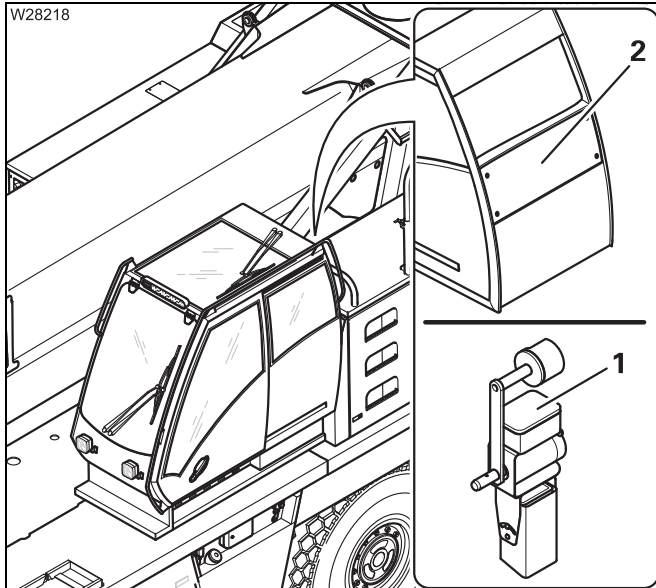


On the turntable and hoists

## 11.11.5 Cameras for crane operation

### Camera on main boom

For crane operation you have to install the camera and switch it on.  
For on-road driving, you have to switch the camera off again and remove it.



The camera (1) may only be installed on a truck crane equipped with the appropriate receiver (2). The camera and receiver are coordinated and identified with the same number on the model plate.

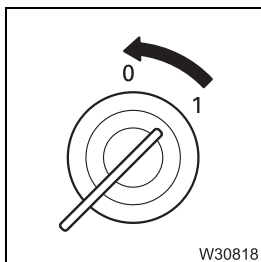
- Before installation, compare the numbers on the model plates.



#### Risk of accidents if the wrong camera is installed!

If you install the wrong camera in your truck crane, you will not see an image.

If your camera is installed in a neighbouring truck crane, you will see the wrong image.



- Switch off the ignition in the crane cab.

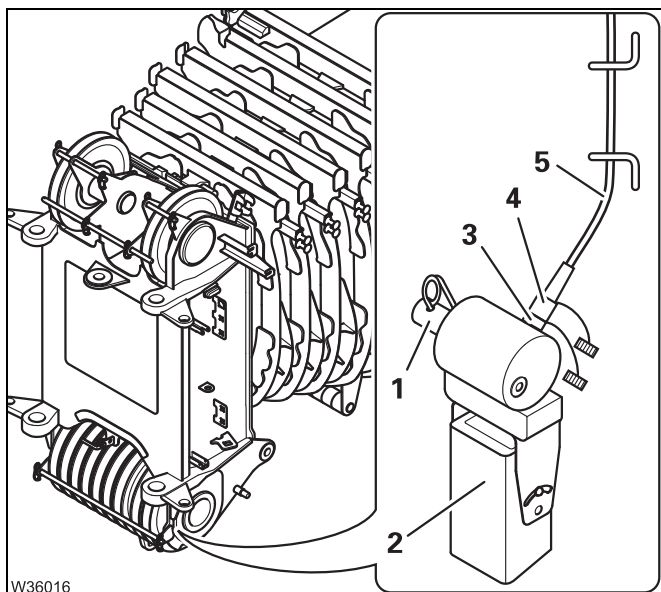


#### Risk of accidents due to a falling camera!

Always use a retaining pin to hold the camera in the clamp.

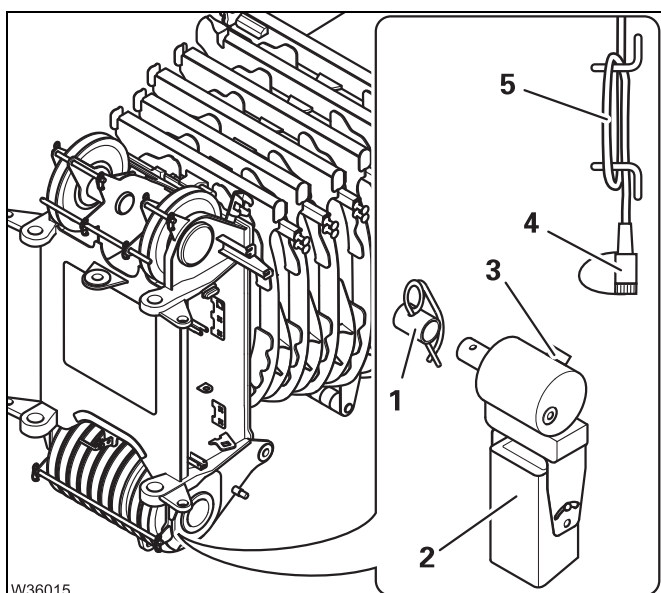
This prevents the camera falling down and injuring someone.





### Installing

- Insert the camera (2) into the clamp (1) and secure it with the retaining pin.
- Insert the plug (4) into the socket (3).
- Lay the cable (5) so that it will not be damaged.



### Removing

- Pull the plug (4) out of the socket (3) and close the socket with the cap.
- Remove the camera (2) from the clamp (1) and insert the retaining pin in the holder (1).
- Wind the cable (5) on to the clamp.

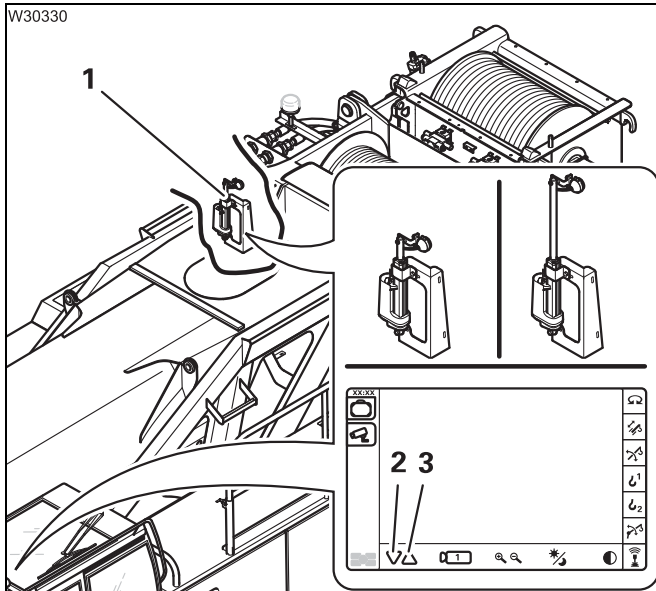
### Camera on the hoists

This section describes the CCS display as the monitor. Depending on the version, a separate monitor may also be present.



#### **Risk of accidents due to exceeding the permissible dimensions!**

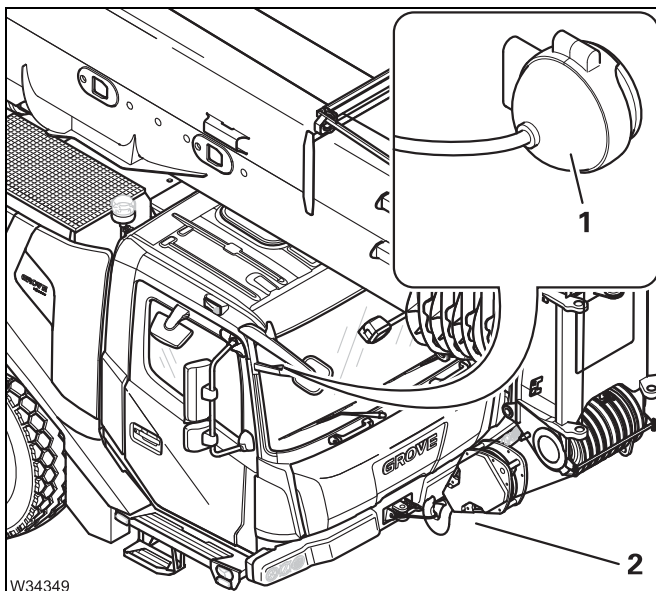
Always retract the camera before driving. When the camera is extended, the overall height specified for on-road driving is exceeded.



A camera (1) transmits an image of the main and auxiliary hoists to the display in the crane cab.

- You must
  - extend for crane operation – symbol (3),
  - retract the camera for driving – symbol (2).

### Camera on the driver's cab



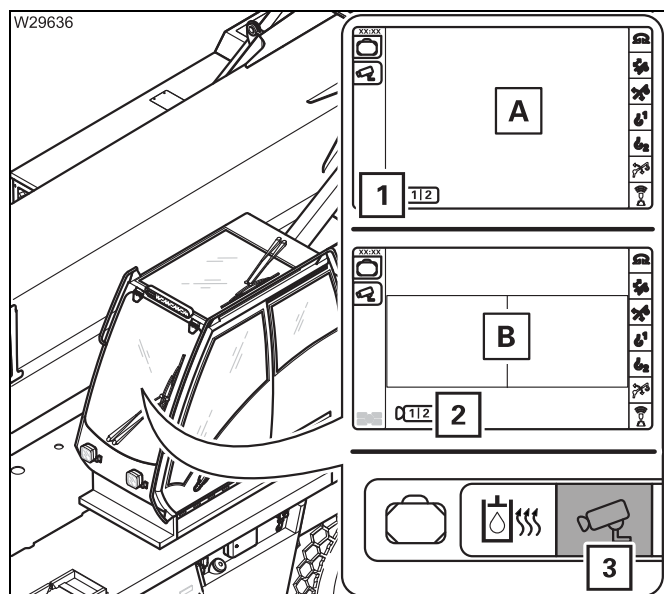
A camera (1) allows viewing of the non-visible area in front of the driver's cab.

Depending on the version, the camera image is shown on the CCS display or a separate monitor.

- Adjust the camera (1) to show the area (2) in front of the bumper on the display or monitor.



## Operating the camera



### Switching on

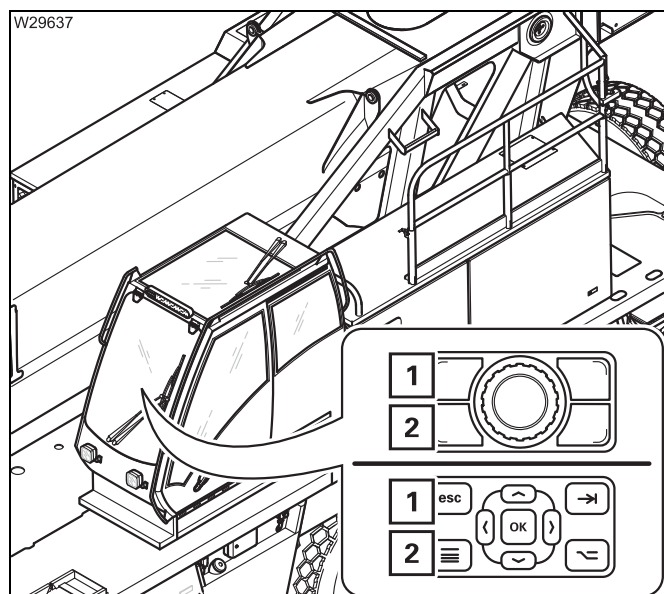
- Switch on the ignition.
- Select and confirm the symbol (3).

The image appears on the display after a few seconds. If an image does not appear; p. 14 - 14.

### Switching the representation

Select and confirm the symbol to change the representation

- 1: Representation A
- 2: Representation B



### Switching off

- Press the button (1) or (2) once.  
The image will disappear.



## 11.11.6 Step at the crane cab

You can control the stair tread via the outrigger control unit or via the *Settings* menu in the crane control system.



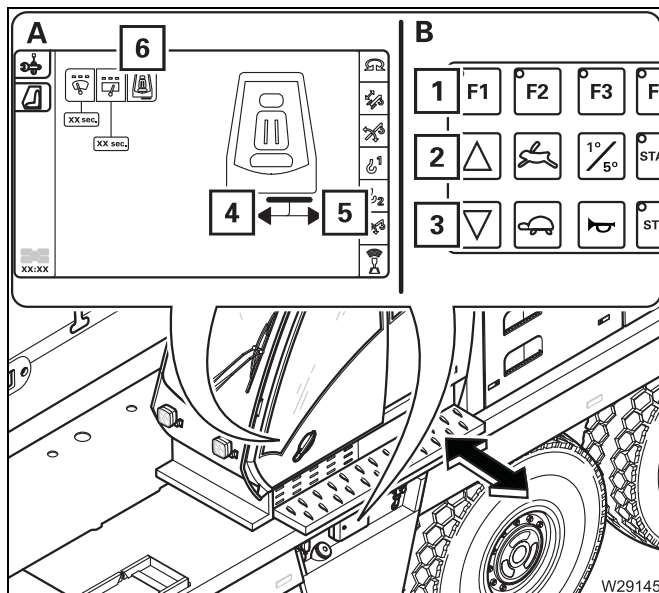
### **Risk of accidents by exceeding the permissible overall width!**

Always retract the step for on-road driving.

When the step is extended, the overall width specified for on-road driving is exceeded.



You can only extend the step at the control unit when you are on the operator side.



### **(A) – In the Crane cab menu**

Select extend/retract step as necessary – (6).

#### **Extend**

- Select and confirm the symbol (5) – the step extends.

#### **Retract**

- Select and confirm the symbol (4) – the step retracts.

### **(B) – At the outrigger control unit**

#### **Extend**

- Press the buttons (1) and (3) – the step extends.


#### **Retract**

- Press the buttons (1) and (2) – the step retracts.

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# 12

## Driving with a rigged truck crane

This section describes driving the truck crane with the counterweight rigged. If a lattice extension is also rigged;  *Operating Instructions Lattice Extension*.



### **Risk of accidents due to partially obstructed view of the truck crane!**

When driving the truck crane, always stay in visual or radio contact with a banksman who can observe the parts you are unable to see, e.g. the raised main boom in the  $0^\circ$  to the rear position.



### **Risk of overturning by slewing the superstructure!**

When driving the rigged truck crane, the slewing gear must be switched off – slewing gear brake engaged.



### **Risk of accidents when driving with a lifted load!**

Driving the truck crane with a load lifted is prohibited. Always set down the load prior to driving the truck crane and secure the hook block so it cannot swing.

## 12.1

### Driving path

The path to be driven must be level. Uneven surfaces cannot be compensated with the level adjustment system.

The entire driving distance must be level. The rigging modes and axle loads specified in this chapter only for driving distances which are free of inclines in longitudinal and lateral direction.

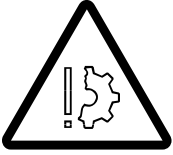
The ground must be stable enough to bear the axle loads.

If the surface pressure of the tyres exceeds the permissible load on the ground, the surface area of the tyres must be increased by packing stable material (e.g. wooden planks).

## 12.2

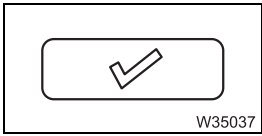
## Permissible rigging modes and axle loads

Depending on the counterweight rigged, you must bring the superstructure and the main boom into certain positions so that the permissible axle loads are not exceeded.



### **Risk of damage to the axle lines!**

Only bring the superstructure and the main boom into the specified positions. This prevents excessive strain on the axle lines.



W35037

- Enter and confirm the current rigging mode of the truck crane.



### **Risk of accidents if the RCL is overridden!**



Always confirm the current rigging mode. The specified positions are within the monitored working ranges.

If the RCL is overridden, the truck crane may overturn even if you move it into the positions specified.

- Bring the superstructure and the main boom into a position that is indicated in the following table for the specified counterweight rigged.
- Tie down the hook block so that it cannot swing around.

### **Axle load table**

The axle loads apply:

- to all permissible tyres;  p. 1 - 16,
- to a reeved 3-sheave hook block;  p. 1 - 11.

Counterweight in t (lbs)	Telescoping I - II - III - IV - V - VI in %	Main Boom Angle in °	Superstruc- ture position <sup>1)</sup>	Axle load <sup>2)</sup> in t (x 1,000 lbs)	
				front	rear
0.0 (0,000)	0 - 0 - 0 - 0 - 0 - 0	0 - 30	front	13.5 (29.7)	13.0 (28.6)
	0 - 0 - 0 - 0 - 0 - 0	80	rear	9.0 (19.8)	15.0 (33.1)
7.0 (15,432)	56 - 0 - 0 - 0 - 0 - 0	30	front	16.5 (36.4)	12.0 (26.5)
	0 - 0 - 0 - 0 - 0 - 0	80	rear	11.0 (24.3)	15.5 (34.2)
16.5 (36,376)	56 - 0 - 0 - 0 - 0 - 0	15 - 35	front	14.5 (34.0)	18.5 (40.8)
	0 - 0 - 0 - 0 - 0 - 0	80	rear	14.5 (34.0)	16.5 (36.4)
21.0 (46,297)	100 - 0 - 0 - 0 - 0 - 0	15 - 30	front	19.5 (43.0)	16.5 (36.4)
	0 - 0 - 0 - 0 - 0 - 0	80	rear	16.0 (35.3)	17.0 (37.5)
26 (57,320)	56 - 53 - 52 - 0 - 0 - 0	30 - 40	front	17.5 (38.6)	19.5 (43.0)
	0 - 0 - 0 - 0 - 0 - 0	70 - 80	rear	18.0 (39.7)	19.0 (41.8)
30.5 (67,241)	56 - 53 - 0 - 0 - 0 - 0	15 - 25	front	15.0 (33.1)	22.0 (48.5)
	0 - 0 - 0 - 0 - 0 - 0	65 - 80	rear	19.5 (43.0)	20.0 (44.1)
35.5 (78,264)	56 - 53 - 52 - 0 - 0 - 0	15	front	17.0 (37.5)	21.0 (46.3)
	0 - 0 - 0 - 0 - 0 - 0	60 - 80	rear	21.5 (52.9)	21.5 (47.4)
40.0 (88,185)	56 - 53 - 52 - 0 - 0 - 0	15	front	15.5 (34.2)	23.5 (51.8)
	0 - 0 - 0 - 0 - 0 - 0	70 - 80	rear	23.0 (50.7)	20.5 (45.2)
45.5 (100,310)	56 - 53 - 52 - 47 - 47 - 0	20	front	17.5 (38.6)	24.0 (52.9)
	0 - 0 - 0 - 0 - 0 - 0	80	rear	21.0 (46.3)	22.0 (48.5)
50.0 (110,231)	56 - 53 - 52 - 47 - 47 - 0	20	front	15.5 (34.2)	27.0 (59.5)
	0 - 0 - 0 - 0 - 0 - 0	60 - 70	rear	24.0 (52.9)	23.0 (50.7)
70.0 (154,323)	not permitted				
	0 - 0 - 0 - 0 - 0 - 0	65	rear	26.5 (58.4)	26.5 (58.4)
80.0 (176,370)	not permitted				
	0 - 0 - 0 - 0 - 0 - 0	40	rear	28.5 (62.8)	28.5 (62.8)

- 1) Rear: Slewing angle display 0°  
Front: Slewing angle display 180°
- 2) Front: Respectively on the 1st and 2nd axle line  
Rear: Respectively on the 3rd, 4th and 5th axle line

## 12.3

## Before driving

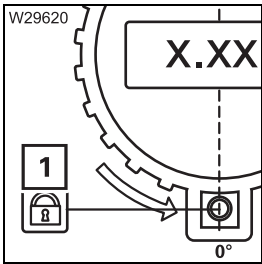
### 12.3.1

### Secure the superstructure against slewing

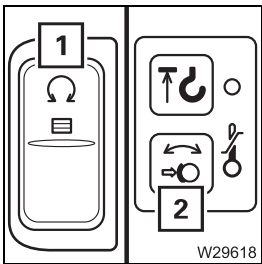


#### **Danger of overturning by the superstructure slewing whilst driving the truck crane!**

Always secure the superstructure before driving the rigged truck crane to prevent it slewing. Slewing the superstructure whilst driving the truck crane increases the risk of overturning!



- Lock the superstructure – Display symbol (1).  
    ▶ Locking/unlocking the superstructure, p. 10 - 15.

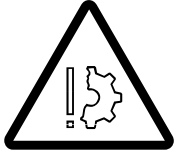


- Switch off the slewing gear so that the slewing gear brake is engaged.
    - The lamp in the button (1) must be dimly lit.
    - The lamp (2) must light up.
- ▶ Switching off the slewing gear, p. 10 - 119.

## 12.3.2

### Checking the tyre pressures and wind speed

- Ensure that all the tyres are at the prescribed pressure levels;  
    ▣▣▣▣▣ *Tyres*, p. 1 - 16.



#### **Risk of damage to the tyres!**

You may only drive the truck crane if the tyres are at the prescribed pressure level.

Never reduce the tyre pressure in order to increase the bearing surface of the tyres!

The same maximum permissible wind speeds for working with the crane apply to driving the truck crane.

- Check the wind speed; ▣▣▣▣▣ p. 10 - 74.




#### **Risk of accidents due to excessively high wind speeds!**

You may not drive the rigged truck crane if the wind speed exceeds the maximum permissible values specified in the *lifting capacity table*. In this case, you must bring the truck crane into a secure state.

### 12.3.3

## Putting the truck crane on the wheels – with Raise axle function

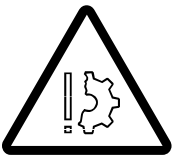


You can also use the outriggers to put the truck crane on the wheels;  p. 12 - 8.



### **Danger of overturning by unevenly retracting the outrigger cylinders!**

Retract the outrigger cylinders evenly! This prevents the truck crane from overturning while retracting individual outrigger cylinders.



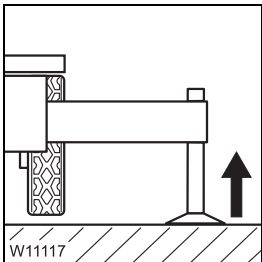
### **Risk of damage to the axle lines!**

Retract the outrigger cylinders evenly! This prevents excessive strain on the axle lines.

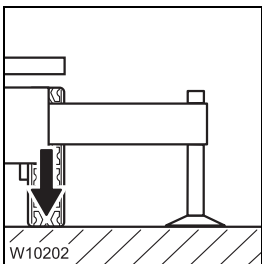


### **Danger of overturning when switching on the suspension!**


You may under no circumstances switch on the suspension while the rigged truck crane is on wheels. Switching on the suspension would cause the suspension struts to be suddenly pressed together and damaged, and the truck crane could overturn.



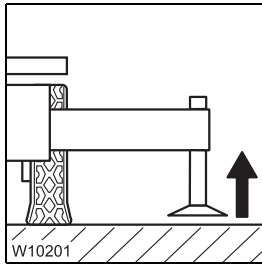
- If necessary, retract the outrigger cylinders until all wheels are just above the ground.



### **Lowering wheels**

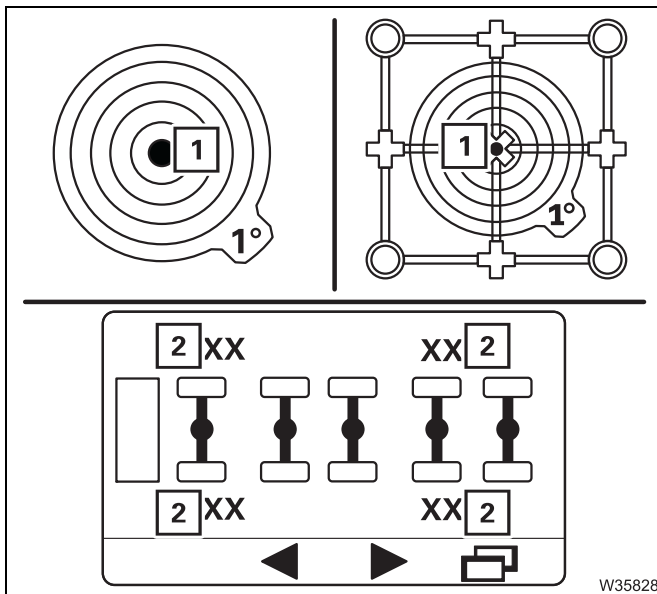
Use the Raise axle function to lower all wheels to the ground;  *Operating the axle raising system*, p. 11 - 63.





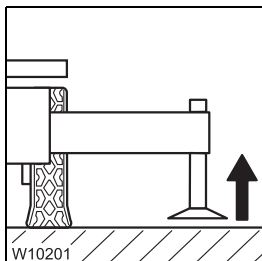
### Aligning the truck crane

- Retract the support cylinders until they do not make contact with the ground during alignment.



- Level the truck crane with the Raise axle function.
  - On the *Current inclination* display, the marking (1) must be in the middle of the 1° measuring range.
  - The displays (2) must show an even axle load.

➡ *Operating the axle raising system, p. 11 - 63.*



### To secure the truck crane

- Retract the outrigger cylinders until the outrigger pads are about 5 to 10 cm (2 to 4 in) above the ground. Leave the outrigger beams extended.




### **Danger of overturning if outriggers are retracted!**

Always leave the outrigger beams extended and the outrigger pads just above the ground to secure the truck crane against overturning.

### 12.3.4

## Putting the truck crane on the wheels – with the outriggers

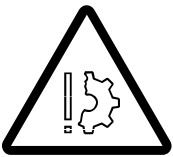


You can also use the raise axle function to put the truck crane on the wheels;  p. 12 - 6.



### **Danger of overturning by unevenly retracting the outrigger cylinders!**

Retract the outrigger cylinders evenly! This prevents the truck crane from overturning while retracting individual outrigger cylinders.



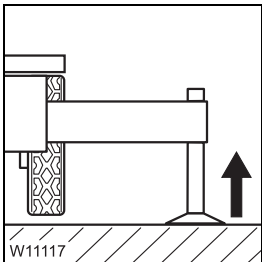
### **Risk of damage to the axle lines!**

Retract the outrigger cylinders evenly! This prevents excessive strain on the axle lines.



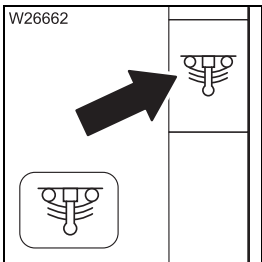
### **Danger of overturning when switching on the suspension!**


You may under no circumstances switch on the suspension while the rigged truck crane is on wheels. Switching on the suspension would cause the suspension struts to be suddenly pressed together and damaged, and the truck crane could overturn.

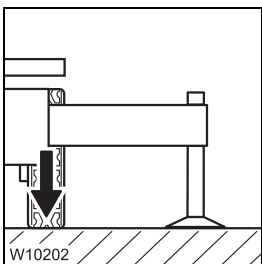


### **Lowering wheels**

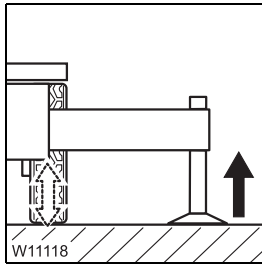
- Retract the supporting cylinders until all wheels are just above the ground.



- Switch on the suspension – the symbol must be **green**;  *Switching the suspension on/off*, p. 5 - 15.

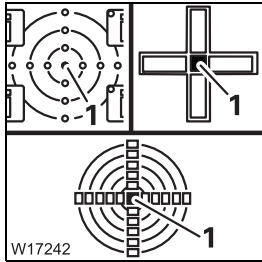


Now lower all wheels to the ground.

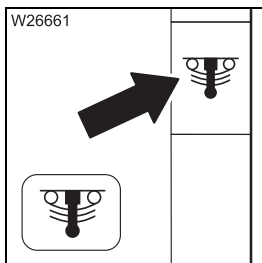


### Levelling the truck crane


- Retract the supporting cylinders evenly. Lower the truck crane only to the extent that the suspension struts still have enough play for alignment.

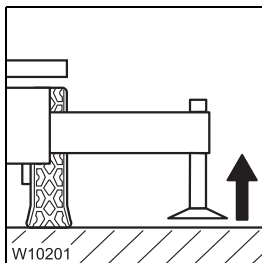


- Level the truck crane with the outriggers until only lamp (1) is illuminated in the measuring range 1°.



### Switching off the suspension

- Switch off the suspension – the symbol must be **red**;  *Switching the suspension on/off*, p. 5 - 15.



### To secure the truck crane

- Retract the outrigger cylinders until the outrigger pads are about 5 to 10 cm (2 to 4 in) above the ground. Leave the outrigger beams extended.



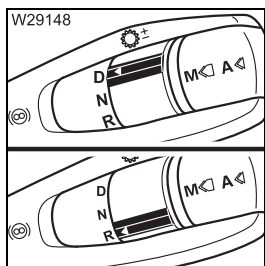
### **Danger of overturning if outriggers are retracted!**

Always leave the outrigger beams extended and the outrigger pads just above the ground to secure the truck crane against overturning.

## 12.3.5


### Gears/connections

#### Transmission



- In order to
  - for **forward travel** in position **D**,
  - for **reverse travel** in position **R**. An acoustic signal sounds if additional equipment is present.

#### Switching on separate steering

When driving the rigged truck crane, the separate steering must be switched on;  *Switching to separate steering*, p. 5 - 59.

## 12.4

### While driving

- Drive only at the lowest possible speed, **maximum 1.5 km/h** (1 mph).
- The turning radius should be as great as possible when driving around corners!
- Steer the truck crane when it is moving, and avoid sudden changes to the steering!



#### Risk of damage to the steering linkage

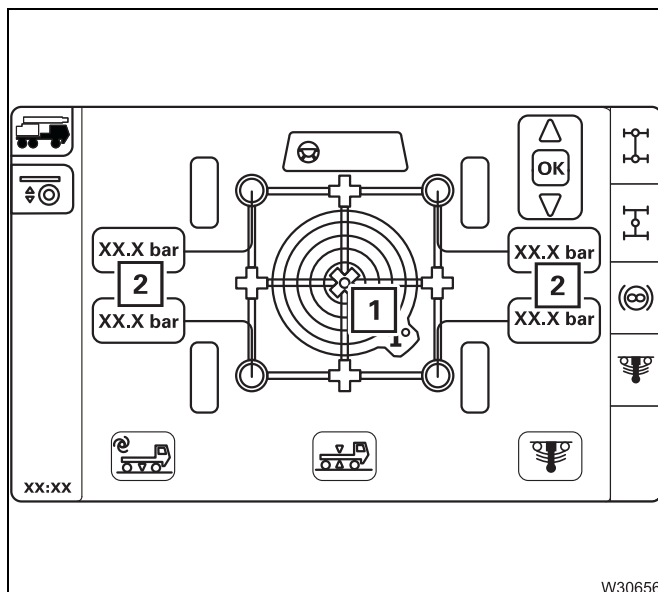
The steering linkage can be damaged if the steering wheel is moved while the vehicle is stationary.



#### Risk of damage to the axle lines!

The suspension struts could be damaged if the maximum permissible operation pressure in the suspension is exceeded.

Always monitor the operation pressure in the suspension when moving the rigged truck crane.



#### Warnings while driving

If a buzzer tone sounds in the driver's cab, stop the truck crane immediately and check whether:

- The permissible lateral tilt (1) of max. 1°  
or
- The suspension operation pressure (2) of 210 bar (3,045 psi) has been exceeded.

In this case, you must level the truck crane again; *Aligning the truck crane*, p. 12 - 7.




#### Danger of overturning by switching on the suspension

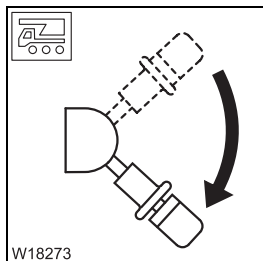
Never attempt to level the crane horizontally using the level adjustment system. The suspension must be deactivated (locked) while the rigged truck crane is on wheels.

Switching on the suspension would cause the suspension cylinders to be suddenly pressed together and damaged, and the truck crane could overturn.

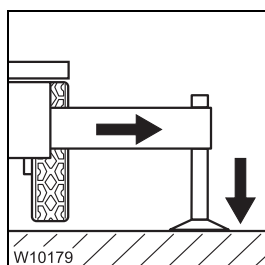
## 12.5


### After driving

- Switch separate steering off after driving;  p. 5 - 62.



- Apply the parking brake.



- Support the truck crane with the outrigger span required for the job according to the *Lifting capacity table* and raise until none of the wheels touches the ground;  *Enabled outrigger spans*, p. 11 - 28.

# 13

## Transportation

Transport should be carried out only by qualified heavy transport companies whose personnel are well-acquainted with loads of these dimensions and weights.

### 13.1

#### Transport with transport vehicle



**Risk of accidents due to improper transport!**

Assign transportation to only qualified companies and ensure that the regulations applicable in the country in which you are working are adhered to.



**Risk of accidents due to improper means of transport!**

Use only suitable lifting gear with sufficient lifting capacity for loading. Use only trailers and vehicles with sufficient loading surface and carrying capacity for transport.



**Risk of accidents due to inadequate information!**

Observe the information in the following sections concerning transport. You can thus prevent unsecured parts from falling or components from being damaged due to improper handling.



**Risk of accidents!**

Using only a suitable ramp of sufficient load bearing capacity. The ramp inclination must not be greater than 15°. If the inclination is too steep, unwanted motion of the vehicle may occur. This can cause the truck crane to tip off the ramp. This can cause serious injuries to yourself and other people.



**Risk of accidents due to falling parts!**

Use only suitable lifting gear with sufficient load bearing capacity and use only the slinging points and lashing points provided.

- Note the dimensions and weight of the truck crane for the transport;  
    ▣▣▣▣ *Dimensions and weights of the truck crane, axle loads, p. 1 - 8.*




## 13.1.1

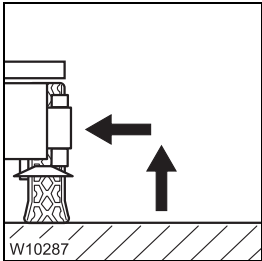
### CHECKLIST: Checks before transport







This checklist is not a complete operating manual. There are accompanying instructions, which are indicated by cross-references.

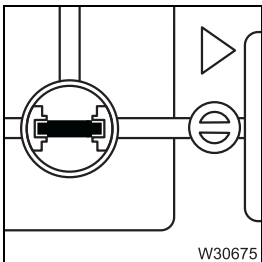
**Observe the warnings and safety instructions there!**

1. – All telescopic sections are interlocked; the telescoping cylinder is locked with telescopic section I.
  - The superstructure is in the position 0° to the rear.
  - The slewing gear is switched off;  p. 8 - 113.
  - The superstructure is locked;  p. 10 - 15.
  - The hoist camera is retracted;  p. 11 - 137.



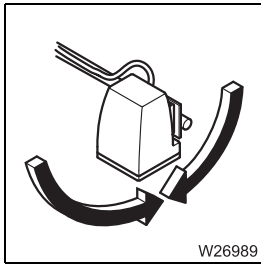
2. On the outrigger
  - All outrigger beams are fully retracted;  p. 11 - 45.
  - The outrigger pads must be in the driving position;  p. 11 - 51.


3. The hook block must be
  - attached to the bumper;  p. 11 - 95,
  - or
  - unreeved;  p. 11 - 104.

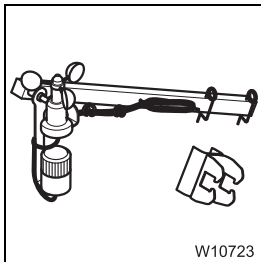



4. The transverse differential locks must be switched on;  p. 5 - 50.

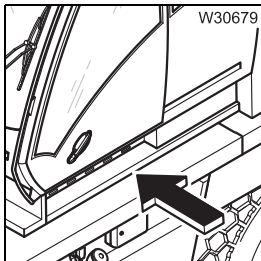





5. The spotlight must be pivoted downwards (if present);  *Slew slewable spotlight*, p. 8 - 140.



6. The anemometer and air traffic control light are removed;  *Anemometer and air traffic control light*, p. 11 - 126.



7. The step at the crane cab must be retracted;  p. 11 - 141.

8. All additional parts which may be transported must be secured against falling down.

### 13.1.2

## Drive the truck crane on to the transport vehicle

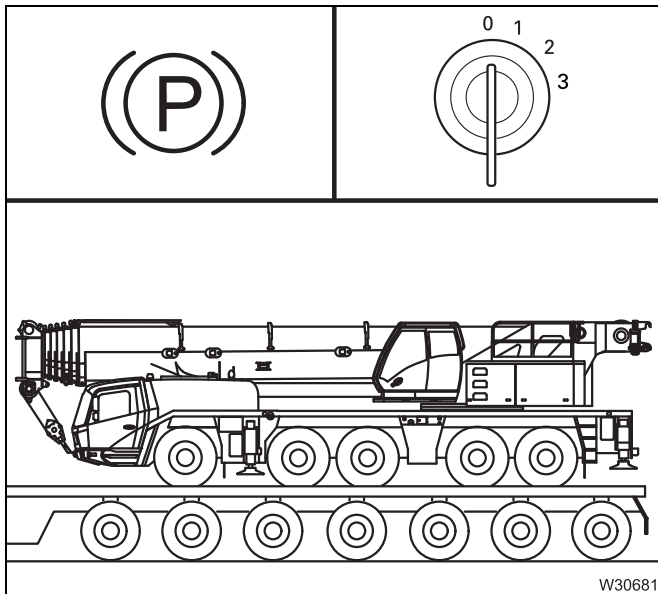


### Risk of accidents due to inadequate field of vision!

Always have a banksman on hand to help when driving onto a transport vehicle.

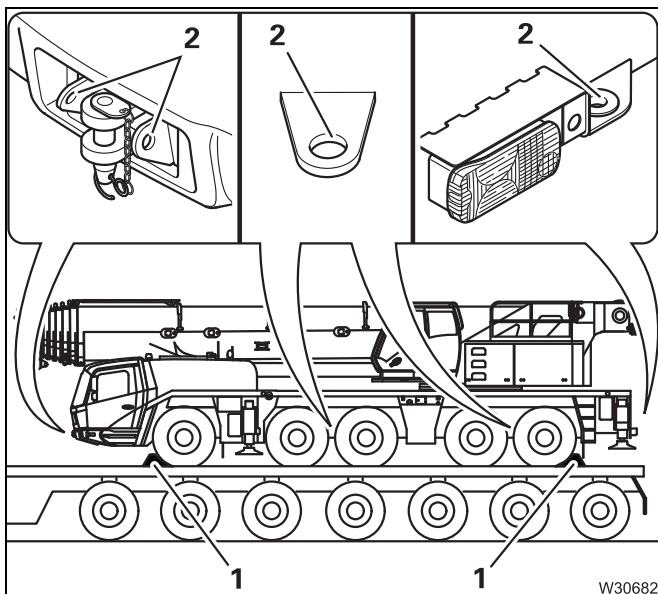
Maintain eye contact or radio contact with the banksman at all times while driving on to the transport vehicle. This helps ensure that you do not drive on to the transport vehicle at an angle, resulting in the truck crane falling off the transport vehicle.

### Driving on



- Drive the truck crane onto the trailer. Apply the parking brake immediately, and switch the engine off.
- Close the door.

### Lashing



- Secure the truck crane with the chocks (1).
- Lash the truck crane down at the slinging points (2). Ensure that no attachments, cables or hoses are damaged in this process.

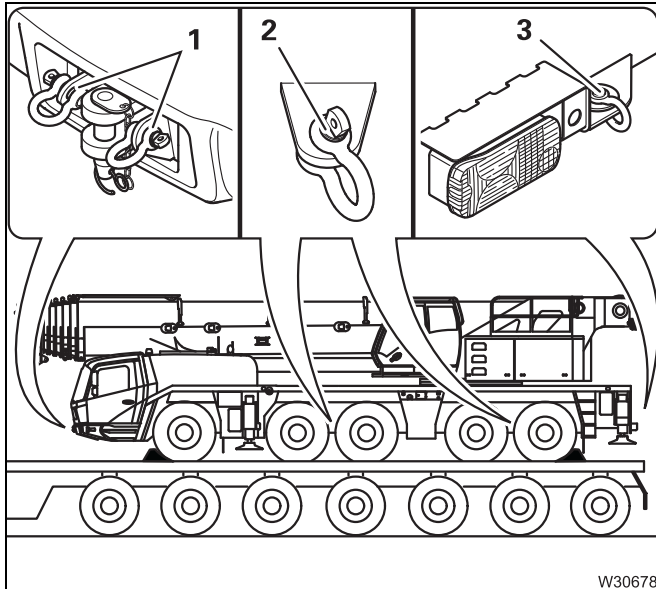
### 13.1.3

### Slinging points



#### **Risk of accidents due to falling parts!**

Use only suitable lifting gear with sufficient load bearing capacity and use only the slinging points provided.



- Fasten the lifting gear to the slinging points (1) at the front and the slinging points (2) and (3) on both sides.

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# 14

## Malfunctions during crane operation

### 14.1

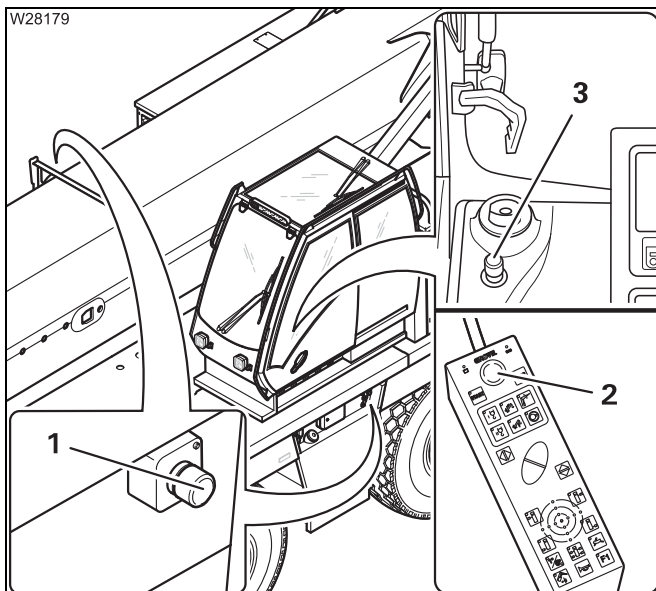
### Emergency stop switch



#### **Risk of overloading if used improperly!**

Press the emergency stop switch only if it is no longer possible to stop the crane movements with the normal operating elements.

The emergency stop switch stops the crane movements suddenly. This may overload the truck crane, e.g. in the event of high working speeds and large working radii.



- Stop all crane movements.

Four emergency stop switches are provided for emergencies:

- 1 On the carrier
- 2 On the hand-held control
- 3 In the crane cab

- Press an emergency stop switch (1), (2) or (3). The switch latches.

The engine shuts down.

After activating an emergency stop switch;

▣▣▣▣ *Resetting the emergency stop switch, p. 4 - 22.*



The battery master switch cannot be used as an emergency stop switch for the engine. The engine continues to run after the battery master switch has been switched off.

## 14.2

### What to do when malfunctions occur during crane operation

Pay attention to the following points if a malfunction occurs:

- Keep calm!



#### **Risk of accidents when carrying out repairs with loads lifted!**

Repairs must not be carried out as long as a load is lifted.

Always try to lower the load before carrying out repairs.

Only properly qualified personnel may perform crane movements with the solenoid valves.

#### **The load can be set down**

- Set down the load. Retract the main boom completely and set it down on the main boom rest.

If it becomes necessary to override the RCL, observe all the information in the RCL override section;

▣▣▣▣▶ *RCL override – version A*, p. 10 - 63,

▣▣▣▣▶ *RCL override – version B*, p. 10 - 67.



#### **Risk of accidents due to overridden or faulty RCL!**

You may only override the RCL if it becomes absolutely necessary in the event of an emergency. This is to put the truck crane into a safe state in the event of a malfunction. In this case, do not perform any movements that would increase the load moment.

If it is no longer possible to operate the crane from the crane cab, you can use the emergency activation, if necessary;

▣▣▣▣▶ *Emergency operation with the hand-held control*, p. 14 - 41,

▣▣▣▣▶ *Hydraulic emergency operation*, p. 14 - 47

- Lock the truck crane to prevent unauthorised use. Remove the ignition key and lock away the hand-held control.
- Inform your supervisor.
- Try to eliminate the malfunction. Contact **Manitowoc Crane Care** if you cannot correct the malfunction.

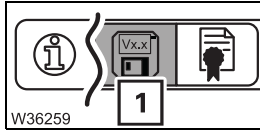
#### **Load cannot be set down**

- Secure the danger area using cordons and warning signs.
- Notify **Manitowoc Crane Care**.

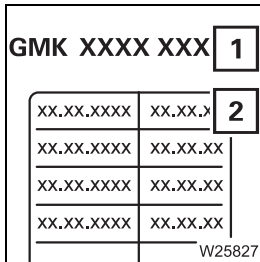
## 14.3 Warning and error messages

### Program version

- Always note down the number of the program version and the serial number after a malfunction occurs before notifying **Manitowoc Crane Care**.

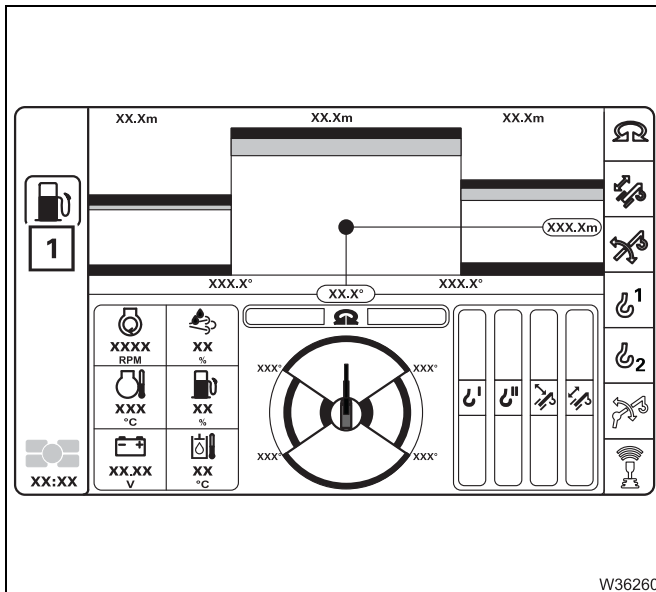


- Open the *Program version* menu (1).



- 1 Serial number display
- 2 Program version display

### 14.3.1 Warning messages on the CCS display



If the CCS detects a malfunction then a symbol is shown in the display area, e.g. the symbol (1).

If several warning messages exist, all of the corresponding symbols are displayed one after the other in consecutive order.



## Meaning of the symbols

The colour of the symbols indicates whether a warning or malfunction message is active in the corresponding area.

- Symbol **yellow** – malfunction.
- Symbol **red** – warning message.
- **No** symbol – no malfunction or warning message.

If a symbol is displayed in **red** or **yellow**, perform the following checks.

Perform the following checks if a symbol is displayed.



### **Risk of damage if warning messages are disregarded!**

Observe the following information in good time and take the appropriate remedial measures if a warning message appears. This prevents these malfunctions causing defects in the truck crane.



### **Collective warning**

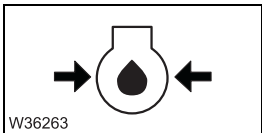
- Set down the load as soon as possible and turn off the engine.



### **CAN bus malfunction**

- Switch off the ignition and wait about 15 seconds, then switch it on again.

If the malfunction is still present, contact **Manitowoc Crane Care**.



### **Engine oil pressure**

- Switch off the engine as quickly as possible.
- Check the engine oil level and top up with oil if necessary;  
    ▶ *Maintenance Manual*.



### **Risk of damage to the engine!**

Switch off the engine as quickly as possible and check the oil level. Restart the engine only when the oil level is correct.

- If the oil level is correct then start the engine from the driver's cab and check the warning messages that are present.





### Filling up

The fuel tank is filled only to a level of approx. 5%.

- Refuel before the fuel is used up; p. 4 - 7.

If the fuel tank is almost empty, air will be sucked in and you will have to bleed the fuel system; *Maintenance Manual*.



### Hydraulic oil too hot

The hydraulic oil is hotter than 80 °C (176 °F).

Current temperature display; p. 9 - 6.

Possible cause and solution; p. 14 - 21.



### Danger of overheating!

There is a fault if the hydraulic oil temperature exceeds 80 °C (176 °F).

Set down the load as soon as possible and try to find the cause.

Set down the load as soon as possible and turn off the engine if the temperature of the hydraulic oil exceeds 100 °C (176 °F)!



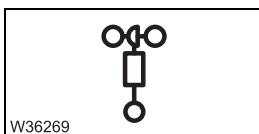
### Replace the hydraulic oil filter

- Replace the corresponding hydraulic oil filter as quickly as possible; *Maintenance Manual*.



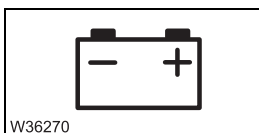
### Slewing gear brake too hot

- Stop crane operation as soon as possible and let the slewing gear brake cool down.



### Anemometer not connected

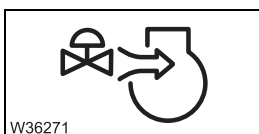
- Electrically connect the anemometer; p. 11 - 126.



### Voltage monitoring

The voltage in the electrical system is too high or too low.

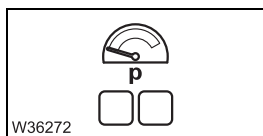
Current voltage display; p. 9 - 6.



### Air intake inhibitor triggered

It is only possible to start the engine after the air intake inhibitor has been released manually; p. 4 - 23.





#### **Pre-tension counterweight**

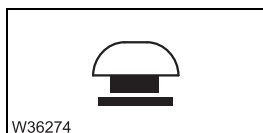
The pre-tensioning pressure is too low.

- Pretension the counterweight; p. 11 - 85.



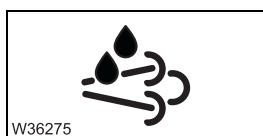
#### **Vehicle brake**

- Stop the truck crane immediately and check the pressure in the brake circuits; p. 5 - 10.



#### **Emergency stop switch actuated**

- Resetting the emergency stop switch, p. 4 - 22.*



This section does not include all messages. Symbols described for driving may also be displayed; *Warning messages on the CCS display, p. 7 - 11.*

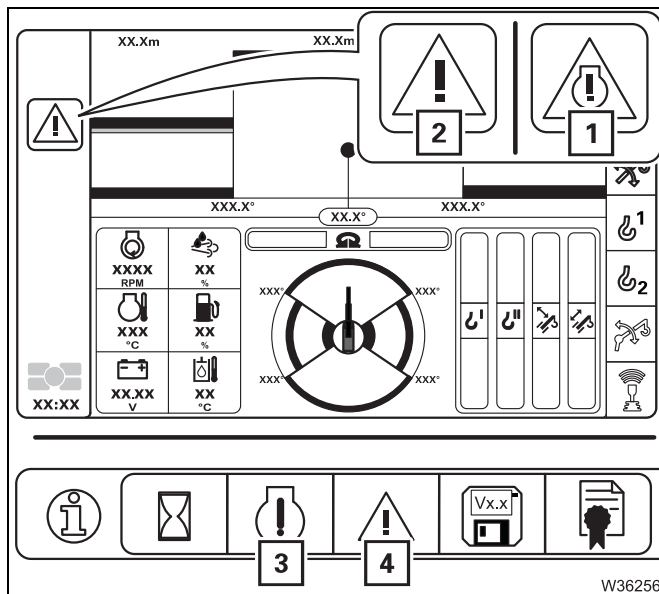
## 14.3.2 Error messages on the CCS Display



### Risk of accidents!

Immediately stop operating the crane if an error message is displayed!  
The crane control may only be repaired by properly qualified personnel.

- Stop all crane movements and bring both control levers into the initial position.



The symbol (1) or (2) flashes when the CCS has detected an error. The symbols flash alternately when both error types are present.

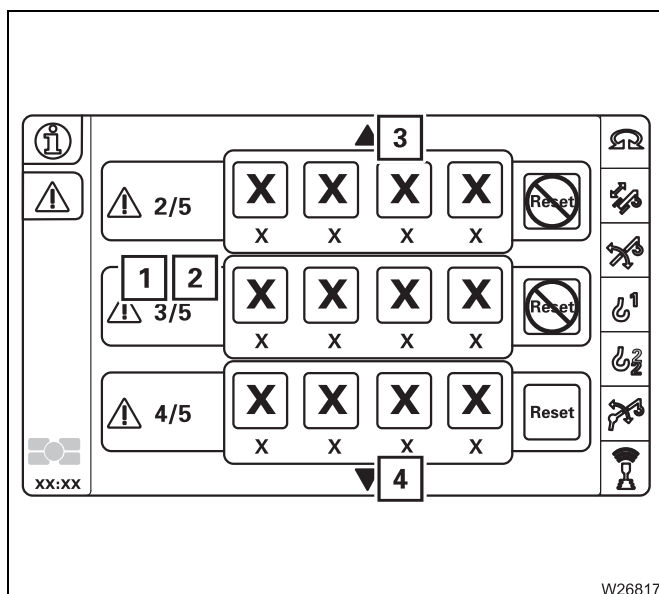
### (1) – Engine error

- Switch off the engine immediately.
- Open the *Engine/transmission error* menu (3). For the subsequent procedure; see p. 7 - 15.

### (2) – Crane operation error

The buzzer tone sounds once.

- Open the *Crane operation error* menu (4).



### Display of error / total errors

Display (2) shows the error total, and display (1) shows which error is displayed.

3/5, for example, means:

- The error 3 is shown,
- there is a total of 5 errors.

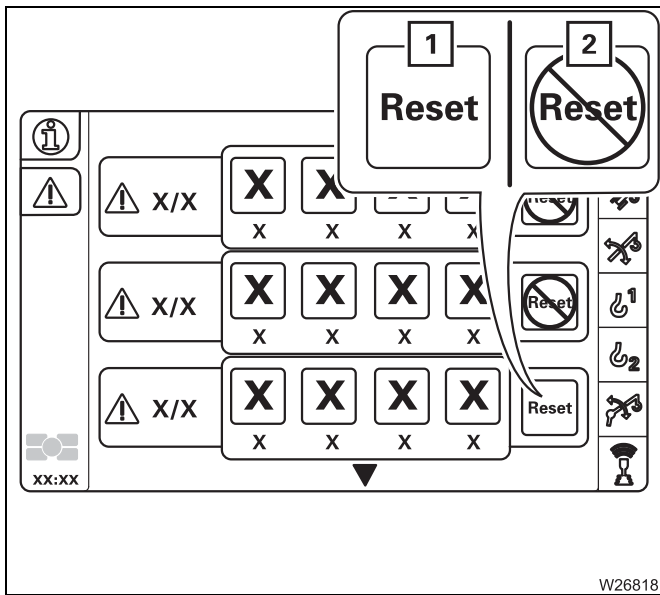
### Displaying errors

- Select and acknowledge the symbol (3) or (4) to show any additional errors.

3 Next error

4 Previous error





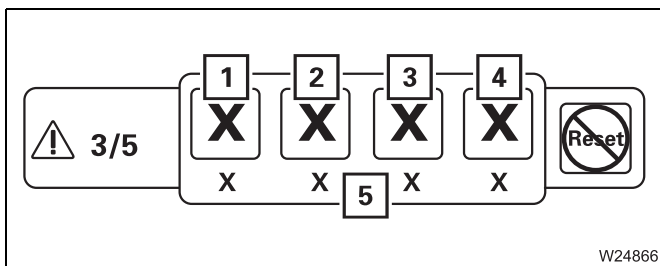
### Acknowledge the error

Display symbol (1) – error can be acknowledged.

Display symbol (2) – error cannot be acknowledged.

- Select and confirm symbol (1) to acknowledge the error.

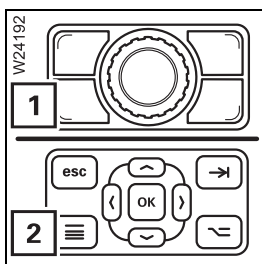
If the error cannot be acknowledged, consult **Manitowoc Crane Care**. First note the serial number and programme version; see p. 14 - 3.



### Error message display

For each error the display shows:

- the error code (5),
- the symbols for
  - 1 the faulty component
  - 2 the error type
  - 3 the control unit which detected the error
  - 4 the index in the error group



### Exiting the menu

You can exit the error menu at any time via button (1) or (2).



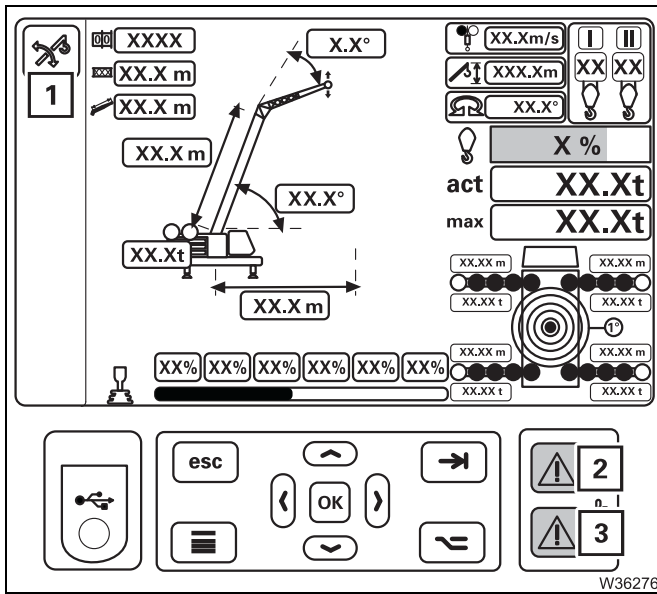
If not all errors have been acknowledged then the symbol (1) is displayed continuously.

When all errors are acknowledged, the symbol (1) goes out.

The buzzer tone sounds once and the symbol (1) flashes when an error occurs.

### 14.3.3

### Warning messages on the RCL display



The buzzer tone sounds once when the RCL detects a malfunction.

Lamps (3) and (4) light up.

A symbol is displayed, e.g. the symbol (1). If several warning messages exist, all of the corresponding symbols are displayed one after the other in consecutive order.

- Perform the following checks if a symbol is displayed.



#### Risk of damage if warning messages are disregarded!

Observe the following information in good time and take the appropriate remedial measures if a warning message appears. This prevents these malfunctions causing defects in the truck crane.

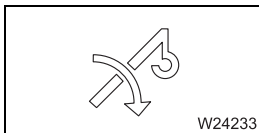


#### Risk of accidents due to overridden or faulty RCL!

Only override the RCL if it becomes absolutely necessary in order to lower the load in the event of an emergency.

Do not carry out any movements which increase the load moment in the event of a faulty or overridden RCL.

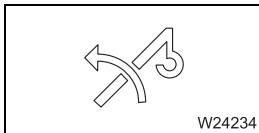
If the RCL is overridden, the crane operations are not monitored and no shutdown procedures are initiated when leaving the working range.



W24233

#### – Main boom angle too small

Raise the main boom; *Derricking gear*, p. 8 - 115.

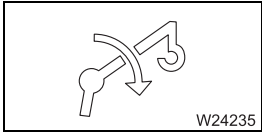


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#### – Main boom angle too large

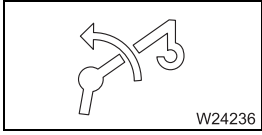
Lower the main boom; *Derricking gear*, p. 8 - 115.





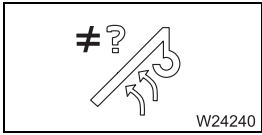
– **Lattice extension angle too small**

Raise the main boom;  *Operating Instructions Lattice Extension.*

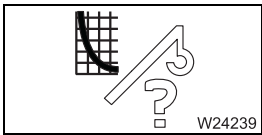


– **Lattice extension angle too large**

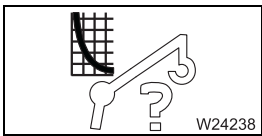
Lower the main boom;



– **Boom angle not measured (different sensor values)**



– **Main boom, load capacity chart not present**



– **Lattice extension, load capacity chart not present**



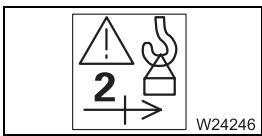
– **RCL override (switch 1) not actuated**



– **RCL override (switch 1) actuated**



– **RCL override (switch 2) not actuated**



– **RCL override (switch 2) actuated**



- **RCL override (switch 3) not actuated**



- **RCL override (switch 3) actuated**

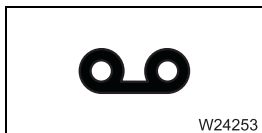


- **RCL override, all switches actuated**



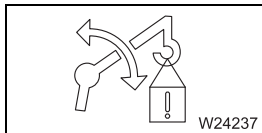
- **Learn-in phase**

Displayed only during maintenance by service personnel

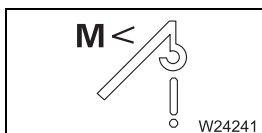


- **Data acquisition**

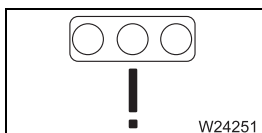
Displayed only during maintenance by service personnel



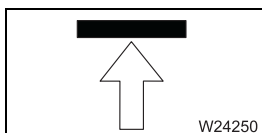
- **Lattice extension, maximum permissible load exceeded**



- **Load too low**

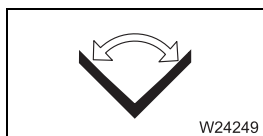


- **RCL error status display**

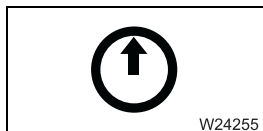


- **Active working range limiter, maximum permissible overall height reached**

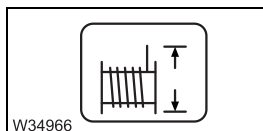




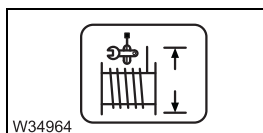
– **Active working range limiter, maximum permissible slewing angle reached**



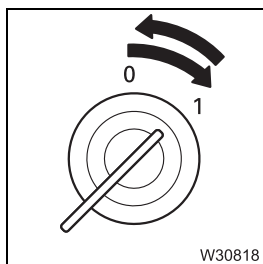
– **Active working range limiter, maximum permissible working radius reached**



– **Hoist rope travel limitation, upper or lower limit reached**



– **Hoist rope travel limitation, working radius or telescope status changed**



If the described measures do not solve the problem, try to remedy the error by switching off the ignition and switching it on again after about 15 seconds.



## 14.4 Finding and eliminating malfunctions

### 14.4.1 Malfunctions on the engine











Observe all specifications in the section *Malfunctions on the engine*; p. 7 - 17.

Malfunction		Cause	Remedy
<b>Engine does not start – Starter does not turn</b>		Driving mode switched on	Switch over to crane operation;  p. 9 - 1
<b>Symbol is red</b>		Engine malfunction	

### 14.4.2 Malfunctions on the main hoist/auxiliary hoist



Malfunction		Cause	Remedy
<b>Main hoist not working or malfunctioning</b>		Hoist off, lamp in button lights up dimly	<i>Switching on the main hoist</i> , p. 10 - 76, <i>Switching on the auxiliary hoist</i> , p. 10 - 79
		Dead man's switch not actuated	Press dead man's switch
		Emergency stop switch engaged	<i>Resetting the emergency stop switch</i> , p. 4 - 22
		Fuse is blown	Replace blown fuse; p. 14 - 63
		Fuse blown on circuit board	Replace blown fuse; p. 14 - 63
		Control unit faulty, error message is displayed	Acknowledge error message once;  p. 14 - 3 – if error persists, notify <b>Manitowoc Crane Care</b>
<b>Only the lifting function works</b>		Lowering limit switch approached	Leave the shutdown range and lift the main hoist





Malfunction		Cause	Remedy
Only the lowering function works		Lifting limit switch approached, lamp lights up	Leave the shutdown range and lower the main hoist
		RCL shutdown, lamp lights up	Leave the shutdown range;  p. 10 - 58
		Fuse is blown	Replace blown fuse;  p. 14 - 63
Lifting, lowering or high-speed mode function not working		Function disabled by CCS	If necessary, acknowledge error once and briefly turn off the ignition – if error persists, notify <b>Manitowoc Crane Care</b>
No lifting function		Fuse is blown	Replace blown fuse;  p. 14 - 63
Lifting or lowering is either not possible at all or only at a low speed		Speed limited	Increase limit;  p. 10 - 123
Lifting or lowering function cannot be deactivated		CCS malfunction	Emergency stop switch;  p. 14 - 1
No response to control lever movements		CCS malfunction for operating elements in the crane cab	Unrig using hand-held control;  p. 14 - 41

### 14.4.3



### Malfunctions in the hoist cameras

Malfunction	Cause	Remedy
No image appears on the monitor after it is switched on.	Fuse on the crane cab blown	Replace the blown fuse;  p. 14 - 63.
	Fuse blown – in camera or monitor.	Check fuses and replace as necessary;  <i>Manufacturer's operating manual.</i>
	Connection between camera and monitor is disconnected.	Check cable connection and notify <b>Manitowoc Crane Care</b> if necessary.



### 14.4.4 Malfunctions in the main boom camera

Malfunction	Cause	Remedy
No image appears on the monitor after it is switched on.	Fuse on the crane cab blown	Replace the blown fuse;  p. 14 - 63.
	Fuse blown – in camera or monitor.	Check fuses and replace as necessary;  <i>Manufacturer's operating manual</i> .
	Radio communication between camera and receiver is interrupted.	Adjust the receiver on the crane cab.
	Connection between receiver and monitor is disconnected.	Check cable connection and notify <b>Manitowoc Crane Care</b> if necessary.






## 14.4.5 Malfunctions on the derricking gear

Malfunction		Cause	Remedy
<b>Derricking gear not working or malfunctioning</b>		Derricking gear off, lamp in button lights up dimly	Switching on the derricking gear; ■■■▶ p. 10 - 85
		Dead man's switch not actuated	Press the dead man's switch.
		Emergency stop switch engaged	■■■▶ <i>Resetting the emergency stop switch</i> , p. 4 - 22
		Fuse is blown	Replace blown fuse; ■■■▶ p. 14 - 63
		Fuse blown on circuit board	Replace blown fuse; ■■■▶ p. 14 - 63
		Control unit faulty, error message is displayed	Acknowledge error message once; ■■■▶ p. 14 - 3 – if error persists, notify <b>Manitowoc Crane Care</b>
<b>Lowering function not working</b>		Lifting limit switch approached, lamp lights up	Leave the shutdown range and lower the auxiliary hoist
		RCL shutdown, lamp lights up	Leave the shutdown range; ■■■▶ p. 10 - 58
		Fuse is blown	Replace blown fuse; ■■■▶ p. 14 - 63
<b>Derricking function not working</b>		Function disabled by CCS	If necessary, acknowledge error once and briefly turn off the ignition – if error persists, notify <b>Manitowoc Crane Care</b>
		Fuse is blown	Replace blown fuse; ■■■▶ p. 14 - 63
<b>Derricking not possible, or only at low speed</b>		Speed limited	Increase limit; ■■■▶ p. 10 - 123
<b>Derricking cannot be switched off</b>		CCS malfunction	Emergency stop switch; ■■■▶ p. 14 - 1
<b>No response to control lever movements</b>		CCS malfunction for operating elements in the crane cab	Unrig using hand-held control; ■■■▶ p. 14 - 41









## 14.4.6 Malfunctions in the telescoping mechanism

Malfunction		Cause	Remedy
<b>Telescoping mechanism not working or malfunctioning</b>		Telescoping mechanism off, lamp in button lights up dimly	▣▣▣▣ <i>Switching on the telescoping mechanism</i> , p. 10 - 97
		Dead man's switch not actuated.	Press dead man's switch
		Emergency stop switch engaged	▣▣▣▣ <i>Resetting the emergency stop switch</i> , p. 9 - 10
		Fuse blown on circuit board	Replace blown fuse; ▣▣▣▣ p. 14 - 63
		Control unit faulty, error message is displayed	Acknowledge error message once; ▣▣▣▣ p. 14 - 3 – if error persists, notify <b>Manitowoc Crane Care</b>
		Fuse is blown	Replace blown fuse; ▣▣▣▣ p. 14 - 63
<b>Telescopic section and telescoping cylinder locking/unlocking function not working</b>		Faulty valve	Note the error code ▣▣▣▣ p. 14 - 3 and notify <b>Manitowoc Crane Care</b>
<b>Extending function not working</b>		Fuse is blown	Replace blown fuse; ▣▣▣▣ p. 14 - 63
		RCL shutdown, lamp lights up	Leave the shutdown range; ▣▣▣▣ p. 10 - 58
		Lifting limit switch approached, lamp lights up	Leave the shutdown range, retract boom
<b>Retracting function not working</b>		Insufficient lubrication	Lubricate main boom; ▣▣▣▣ <i>Maintenance Manual</i>
		Main boom is not steep enough	Leave the shutdown range and raise the boom
<b>Telescopic section cannot be operated by moving the control lever</b>		Telescopic section locked	▣▣▣▣ <i>Unlocking the telescopic section</i> , p. 10 - 106
		Telescoping cylinder unlocked	▣▣▣▣ <i>Lock telescoping cylinder</i> , p. 10 - 105
<b>The telescopic section / telescoping cylinder locking function is not working</b>		Fault in hydraulics/electrical system	Note the error codes and notify <b>Manitowoc Crane Care</b>



<b>Malfunction</b>		<b>Cause</b>	<b>Remedy</b>
<b>Telescoping function not working</b>		Function disabled by CCS	If necessary, acknowledge error once and briefly turn off the ignition – if error persists, notify <b>Manitowoc Crane Care</b>
		Fuse is blown	Replace blown fuse;  p. 14 - 63
<b>Telescoping not possible, or only at low speed</b>		Speed limited	Increase limit;  p. 10 - 123
<b>Telescoping cannot be switched off</b>		CCS malfunction	Emergency stop switch;  p. 14 - 1
<b>The main boom can no longer be telescoped; the telescoping cylinder can no longer be moved</b>		The hydraulic supply is interrupted	Retract the telescopic section by means of mechanical emergency operation;  p. 14 - 26
<b>No response to control lever movements</b>		CCS malfunction for operating elements in the crane cab	Unrig using hand-held control;  p. 14 - 41

## 14.4.7 Malfunctions on the slewing gear

Malfunction		Cause	Remedy
<b>Slewing gear not functioning</b>		Slewing gear off, lamp in button lights up dimly	Switch on the slewing gear;  p. 10 - 115
		Houselock switched on	 <i>Switching the houselock on/off</i> , p. 10 - 17
		Dead man's switch system not engaged.	Press dead man's switch
		Emergency stop switch engaged	 <i>Resetting the emergency stop switch</i> , p. 4 - 22
		Fuse is blown	Replace blown fuse;  p. 14 - 63
		Fuse blown on circuit board	Replace blown fuse;  p. 14 - 63
		Control unit faulty, error message is displayed	Acknowledge error message once;  p. 14 - 3 – if error persists, notify <b>Manitowoc Crane Care</b>
<b>Slewing function not working</b>		Rigging mode for the <i>0° to the rear position</i> confirmed	Confirm rigging mode for a slewing range
		Function disabled by CCS	If necessary, acknowledge error once and briefly turn off the ignition – if error persists, notify <b>Manitowoc Crane Care</b>
		Counterweight lifting cylinder <b>not</b> fully retracted	Retract counterweight lifting cylinder
		Counterweight lifting cylinder <b>not</b> fully retracted – retraction not possible	Press and hold the Override lifting limit switch button – Slewing at slow speed released
<b>Slewing not possible or only at low speed</b>		Speed limited	Increase limit;  p. 10 - 123



Malfunction		Cause	Remedy
<b>Slewing only possible in one direction</b>		Shutdown angle of a limited slewing range reached (additional equipment).	Enter the RCL code for a slewing range of 360° ( <i>Standard</i> ) or reduce the working radius ( <i>MAXbase</i> ) or slew in the opposite direction to leave the shutdown angle
<b>Slewing cannot be switched off</b>		CCS malfunction	Emergency stop switch; ■■■► p. 14 - 1
<b>No response to control lever movements</b>		CCS malfunction for operating elements in the crane cab	Unrig using hand-held control; ■■■► p. 14 - 41


### 14.4.8

### Malfunctions on the counterweight hoist unit

Malfunction		Cause	Remedy
<b>Counterweight hoist unit is not working</b>		Emergency stop switch on	■■■► <i>Resetting the emergency stop switch</i> , p. 4 - 22
		Fuse is blown	Replace blown fuse; ■■■► p. 14 - 63
		Function disabled by CCS	If required, acknowledge error message once and briefly turn off the ignition – it if occurs again, notify <b>Manitowoc Crane Care</b>
<b>Error symbol (!) is displayed</b>		Electronic system has detected an electrical or logical error	
<b>Lifting cylinder extension/retraction function not working</b>		Superstructure in the <i>intermediate position rigging range</i>	Slew to the <i>Move lifting cylinders</i> or <i>Lift/lower counterweight</i> or position ■■■► p. 11 - 85
<b>Extend lifting cylinder not working</b>		Superstructure outside of rigging range	Slew into the rigging range
		Counterweight rigged and <i>Move lifting cylinders</i> position reached	Slew to <i>Lift/lower counterweight</i> position
		Counterweight unrigged and <i>Lift/lower counterweight</i> position reached	Slew to <i>Move lifting cylinders</i> position



### 14.4.9 Malfunctions in the hydraulic system/hydraulic oil cooler

Malfunction		Cause	Remedy
Hydraulic oil temperature above 80 °C (176 °F), fan in the hydraulic oil cooler running		Hydraulic system is heavily loaded	Stop the crane operation and keep the engine running until the oil has cooled down
Hydraulic oil temperature above 80 °C (176 °F), fan in the hydraulic oil cooler not running		The fuse is defective.	Stop crane operation and replace blown fuse; ▶▶▶▶▶ p. 14 - 63
		Faulty temperature sensor in the circuit of the hydraulic system, error message is displayed	Have the temperature sensor replaced
Symbol is displayed		Corresponding hydraulic oil filter soiled	Change hydraulic oil filter; ▶▶▶▶▶ <i>Maintenance Manual</i>

### 14.4.10 Malfunctions when operating with the hand-held control

Malfunction	Cause	Remedy
CAN lamp flashes or stays off after connecting the hand-held control	Some other socket is lacking a bridging plug	Insert bridging plug; ▶▶▶▶▶ p. 11 - 22
	Fuse is blown	Replace blown fuse; ▶▶▶▶▶ p. 14 - 63
Motor will not start	Ignition in the driver's cab switched on	Switch off the ignition in the driver's cab; ▶▶▶▶▶ p. 4 - 21
Pre-selected function cannot be performed	Another function has been pre-selected	Pre-select the desired function
Operation not possible	Malfunction in the control system	<b>Manitowoc Crane Care</b> must be notified

### 14.4.11 Malfunctions when inclining the crane cab

Malfunction	Cause	Remedy
Crane cab inclination function not working	Fuse is blown	Replace blown fuse; ▶▶▶▶▶ p. 14 - 63

### 14.4.12 Malfunctions of the outriggers

Malfunction	Cause	Remedy
<b>Outrigger cylinders and beams can neither be extended nor retracted and the inclination indicator does not work</b>	Driver's cab: Fuses A3F3, A3F13, A3F14 blown	Replace blown fuses; ▣▣▣▣▶ p. 7 - 38.
	Slewing gear switched on	Switch off the slewing gear; ▣▣▣▣▶ p. 10 - 119
<b>When operating with the hand-held control</b>	Driver's cab: Fuse A2F3 blown	Replace the blown fuse; ▣▣▣▣▶ p. 7 - 38.
<b>When operating from the crane cab</b>	Hand-held control connected to the superstructure or a bridging plug not inserted	Disconnect hand-held control or insert bridging plug; ▣▣▣▣▶ p. 11 - 22.
<b>When operating from the control units</b>	Display fields switched off.	Switch on display fields; ▣▣▣▣▶ p. 11 - 41
	Hand-held control connected to the superstructure or a bridging plug not inserted	Disconnect hand-held control or insert bridging plug; ▣▣▣▣▶ p. 11 - 22
<b>None of the specified causes apply</b>	Solenoid valves not working	<b>Manitowoc Crane Care</b> must be notified

### 14.4.13 Malfunctions when raising the axles

Malfunction	Cause	Remedy
<b>The menu cannot be opened</b>	Suspension is switched on	Switching off the suspension; ▣▣▣▣▶ p. 5 - 15
<b>Operating elements not working</b>	<i>Outrigger</i> menu open	Open the <i>Raise axle</i> menu; ▣▣▣▣▶ p. 11 - 63
<b>Operating elements not working</b>	Maximum permissible pressure exceeded	Re-align the truck crane to relieve the load; ▣▣▣▣▶ p. 12 - 7

### 14.4.14 Malfunctions on the CCS/RCL control units

Malfunction	Cause	Remedy
<b>Control unit not working</b>	Power supply not switched on	Switch on the ignition
	Fuse F1/4 blown	Replace blown fuses; ▮▮▮▮▶ p. 14 - 63
<b>Display is dark – LED flashes blue</b>	Ambient temperature too low	Heat the crane cab
<b>Display is dark – LED flashes yellow</b>	Ambient temperature too high	Cool the crane cab
<b>Display weak</b>	Ambient temperature too high – brightness is reduced automatically	The set brightness is restored after cooling

### 14.4.15 Malfunctions on the CraneSTAR system

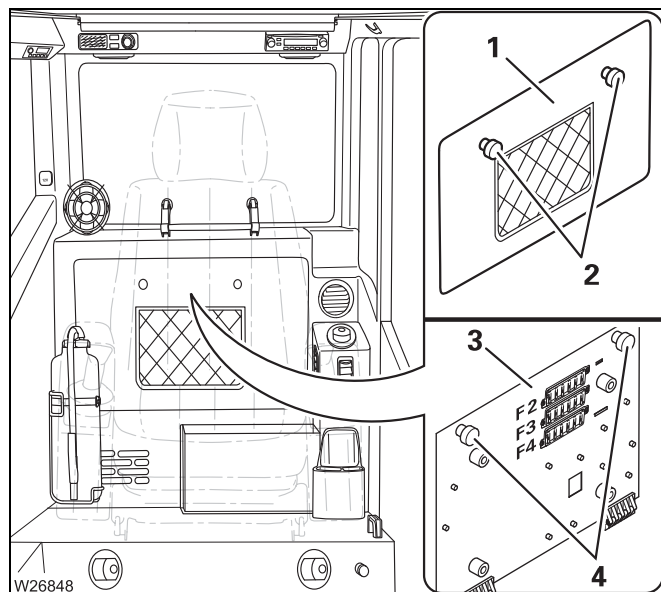
If an error is present, then check the fuses.



**Risk of damage if procedure is incorrect!**

Observe the following notes to avoid malfunctions and damage.

- Switch off the ignition whenever a fuse has to be replaced.
- Replace blown fuses only with new fuses of the same amperage.



**Fuses**

- Loosen the bolts (2) and remove the cover (1).
- Check the associated fuse on the plate (3) and replace it if necessary: ▮▮▮▮▶ *Fuses in the crane cab*, p. 14 - 63.
- Loosen the screws (4) and fold down the plate (3) to the front.

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## 14.5

### Emergency operations and programs

This section contains all the information about possible emergency operations and emergency programs. The following are available:

- mechanical emergency activation for retracting,
- the *Telescoping emergency program* submenu,
- entering the telescoping after an emergency operation and
- operation of the power units with the hand-held control.

## 14.5.1

### Mechanical emergency activation for retracting

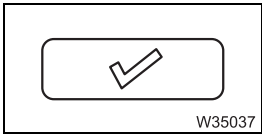
If you can no longer lock and unlock the telescopic sections from within the crane cab because of a malfunction, you can do so manually by performing mechanical emergency activation.

In this case, you need one or two auxiliary cranes.

In the worst case, emergency operation must be performed by properly qualified personnel, because incorrect operation poses the risk of injury and damage to the main boom.

- Always check the following option first.



#### Prior to the emergency activation, check



First check whether it is permitted to lower the main boom to a horizontal position with the current telescope status. Proceed as follows:

- Enter and confirm the current rigging mode of the truck crane. The current rigging mode must be shown on the *RCL* display.
- Lower the main boom.
  - **If the RCL allows the boom to be lowered into a horizontal position**  
You can reach the locking points with a ladder and need only one auxiliary crane to telescope the unlocked telescopic sections.
  - **If the RCL is deactivated prior to reaching the horizontal position**  
In order to reach the locking points, you need an auxiliary crane with licensed passenger transportation and a second auxiliary crane to secure and telescope the unlocked telescopic sections.



If it is possible to lower but there is not sufficient space, you can check whether the truck crane can be driven in the current rigging mode;  p. 12 - 1.  
Operation with the lattice extension;  *Operating Instructions Lattice Extension*.

#### Procedure

The best suitable retracting procedures in your particular case depend on the conditions on site and on the crane functions that are still available.

Select the procedure best suited to your particular case and consult **Manitowoc Crane Care**.

### Mechanical emergency activation

The following requirements must be met before unlocking manually:

- The main boom must be lowered to the horizontal position so that the telescopic section cannot retract by itself.

or

- The telescopic section to be unlocked is secured against retracting by itself by using an auxiliary crane. Telescoping is done with the auxiliary crane.



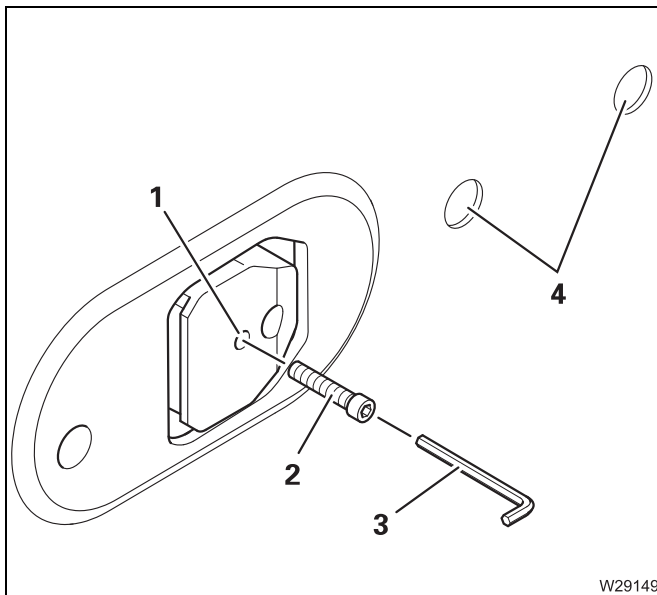
#### **Risk of accidents due to sudden retraction of a telescopic section!**

Before unlocking the telescopic section, secure it against automatic retraction. This prevents the retracting telescopic section severing one of your limbs or the truck crane being damaged or overturned by the telescopic section suddenly retracting.



If the telescoping cylinder is positioned at a locking point, the corresponding telescopic section cannot be locked or unlocked manually.

There are two M8 x 110 bolts for every telescopic section.



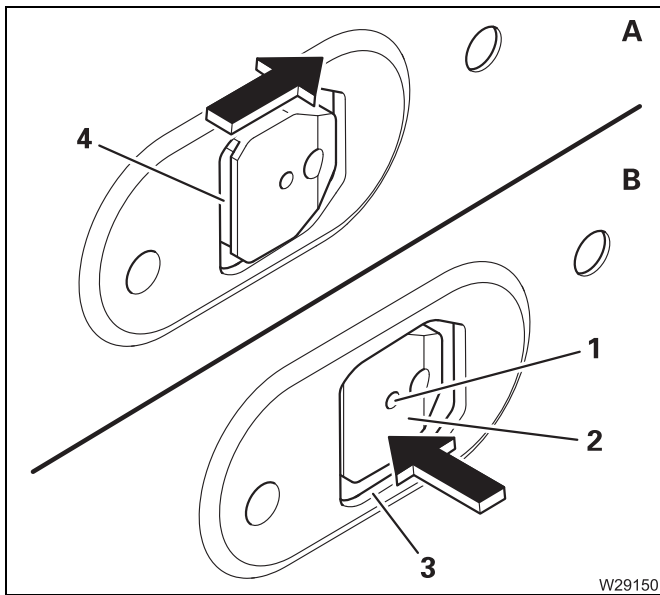
To unlock, bolts (2) are screwed into the locking pins (1).

Pins located further inside are reached through the bores (4).

You will need a suitable socket wrench (3), with one shank being at least 200 mm long.

- To unlock, the bolts are screwed in.
- To lock, the bolts are screwed out.





### Unlocking

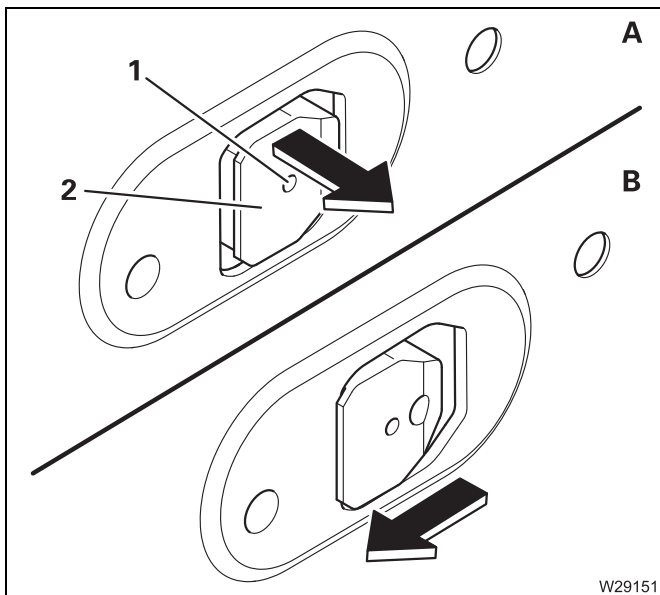
- **(A)** – Extend approx. 35 mm (0.11 ft) so that the cutout **(4)** is accessible.
- **(B)** – Screw a bolt into the hole **(1)**. The locking pins **(2)** must retract behind the telescopic section **(3)**.  
If necessary, give the locking pin **(2)** a slight knock to help this procedure.
- Unlock the other side of the telescopic section as well.



### Risk of damage due to a mechanically released lock!

Under no circumstances may you operate the telescoping cylinder whilst the lock is mechanically released. Screw all bolts out of the holes immediately after finishing the repair work.

This prevents damage to the telescoping cylinder and the locking system.



### Locking the telescopic section

- **(A)** – Retract until the locking pin **(2)** is in the middle of the opening.
- Unscrew the bolt from the hole **(1)** until the locking pin is fully extended.
- Remove the bolt from the bore.
- **(B)** – Retract further until the telescopic section is set down.



## 14.5.2

### Telescoping emergency program

In the event of a malfunction in the telescoping mechanism, you can retract the main boom with the *Telescoping* emergency program.

**The emergency program is not intended for crane operation and is therefore restricted to a certain amount of time.**

- If possible, set down the load before starting the emergency program;  
    ▮▮▮▮ *What to do when malfunctions occur during crane operation, p. 14 - 2.*

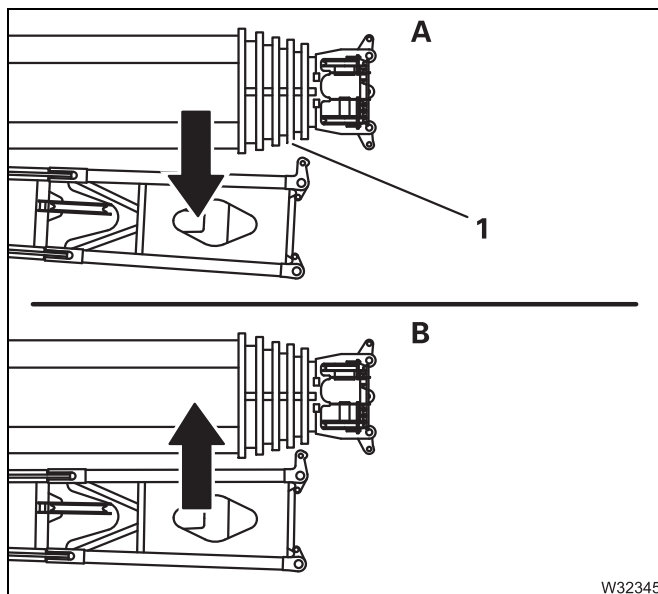
#### Checks before using the emergency program

When the *Telescoping* emergency programme is switched on the swing-away lattice is **not** automatically slewed. Telescoping is always enabled irrespective of the position of the swing-away lattice.



#### Risk of accidents due to the swing-away lattice falling!

Before telescoping, always look on the emergency programme to ensure that the swing-away lattice is turned outwards. This way you will prevent telescoping parts from colliding with the swing-away lattice, brackets from coming off and the swing-away lattice from falling down.



- **(A)** – Before telescoping, use the emergency programme to check whether the swing-away lattice is turned outwards so that the telescoping parts (1) can move past the swing-away lattice.

- **(B)** – If the swing-away lattice is turned towards the main boom, you must turn the swing-away lattice outwards using emergency operation.

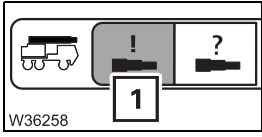
Swinging in emergency operation is described in the *lattice extension* operating manual.



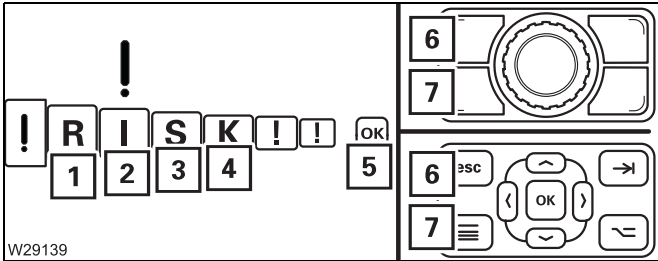
If the crane needs to be driven with the swing-away lattice folded down after telescoping in the emergency programme, you must turn the swing-away lattice towards the main boom using the emergency programme.



### Open the Emergency program submenu



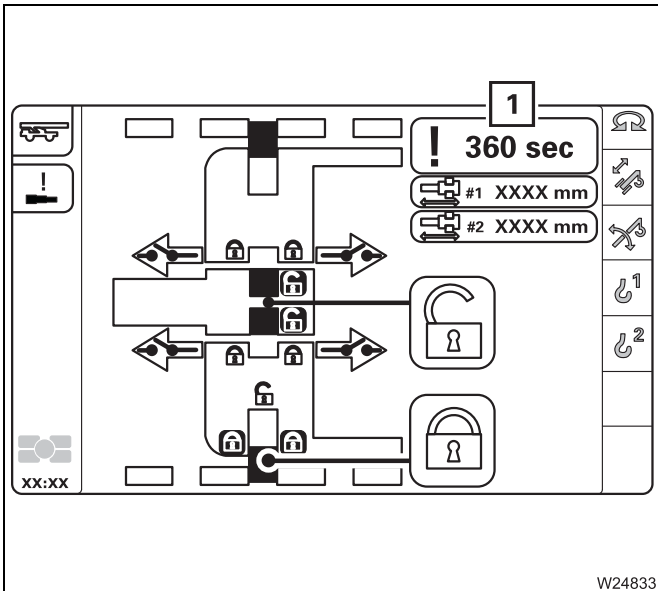
- Select and confirm the symbol (1) – the *Telescoping* emergency program is opened.



- Select and confirm the symbols (1) to (4).
- Confirm the entry with the symbol (5).

You can cancel the entry at any time using button (6) or (7).

Once the correct entry has been made, the *Telescoping* emergency programme is started.



The emergency program has a time limit. The display (1) shows the remaining time for operating the emergency programme.

It runs for approx. 360 seconds.

Within this time, the telescoping mechanism can be operated using the emergency program.

If the time is not sufficient you must restart the emergency program.

**Determining the type of error**

- Check which emergency program procedure is suitable for the current error:



**Risk of damage to the telescoping mechanism!**

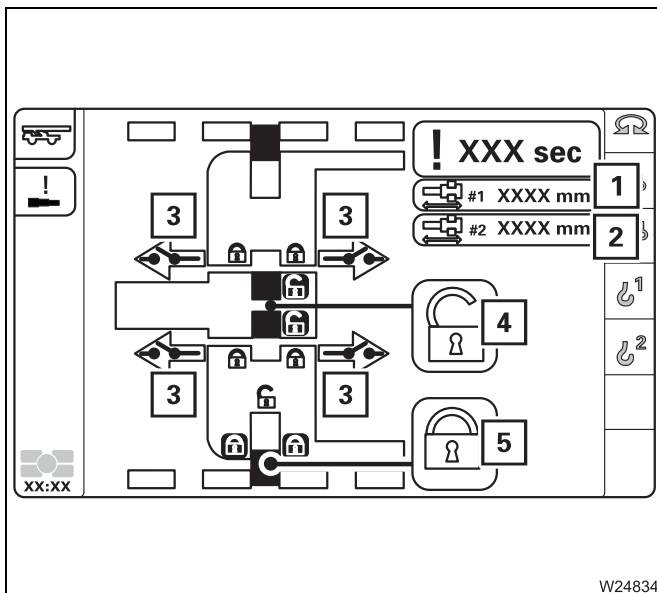
Ensure that you always have an overview of the current status of the telescoping mechanism before you initiate locking or unlocking. In emergency mode, there is no monitoring of prerequisites – the function is performed **immediately** after pressing the button.



**Risk of damage to the telescoping mechanism!**

Never telescope the main boom if errors exist simultaneously in the length indicators of the crane control system *CCS* and the rated capacity limiter *RCL*.

It would then not be possible for you to monitor operations, and components in the main boom could be damaged, or a situation could arise in which the main boom can no longer be extended or retracted.



- If the display (1) shows no value, there is an error on the length indicator of the *CCS* crane control system.
- If the display (2) shows no value, there is an error on the length indicator of the *RCL* rated capacity limiter.
- If no values are shown on displays (1) and (2) you must not start the telescoping process. Contact **Manitowoc Crane Care**.
- If a symbol (3) is **violet**, there is an error at the proximity switch.

The symbols (4) and (5) are active. After selection and confirmation, locking or unlocking is performed **immediately**.





### Risk of damage to the main boom!

Never telescope the main boom if at the same time there is an error at both the length indicator and the proximity switch.

It would then not be possible for you to monitor operations, and components in the main boom could be damaged, or a situation could arise in which the main boom can no longer be extended or retracted.

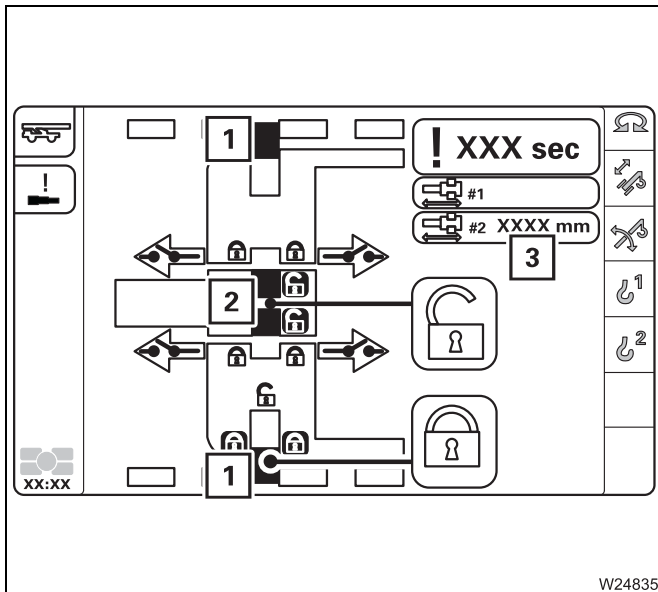


In the *Telescoping* emergency program, all functions for retracting the main boom remain enabled as long as there are no other errors (hydraulic or mechanical).

The speed is restricted to approximately 30% of the maximum speed.

### If there is an error on the length indicator

First register the current status of the telescoping mechanism.



- Check the positions of the locking pins as usual, i.e. at the symbols (1) and (2).
- Check that the display (3) shows the RCL measured value for the extended length of the telescoping cylinder.

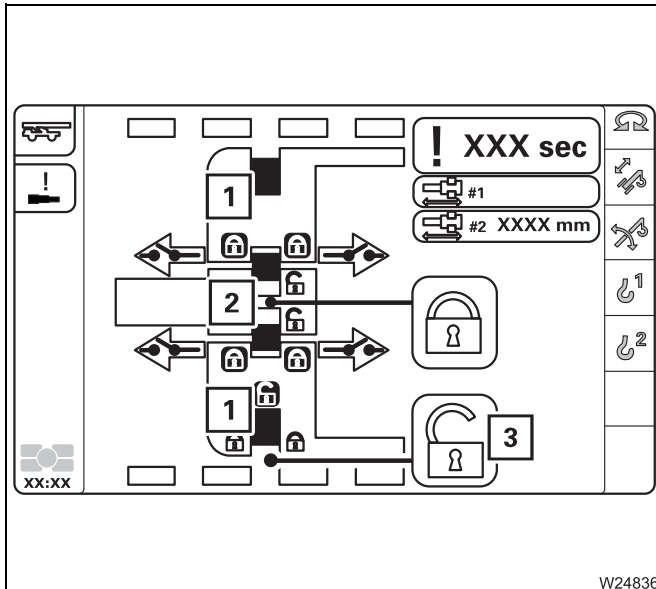
### Inspections prior to telescoping

- Before telescoping, check that the following conditions are met:

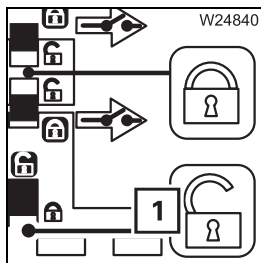


#### **Risk of accidents from sudden retraction of a telescopic section!**

You can select and confirm the symbol for unlocking the telescopic section only a **maximum of 2 times**. If this does not start the unlocking procedure, contact **Manitowoc Crane Care**.



- The telescopic cylinder is at the locking point and is locked, symbols (2) are **green**.
- The telescopic section is unlocked, symbol (3) (**select no more than 2 x**), symbols (1) are **red**.



### Retracting and locking a telescopic section

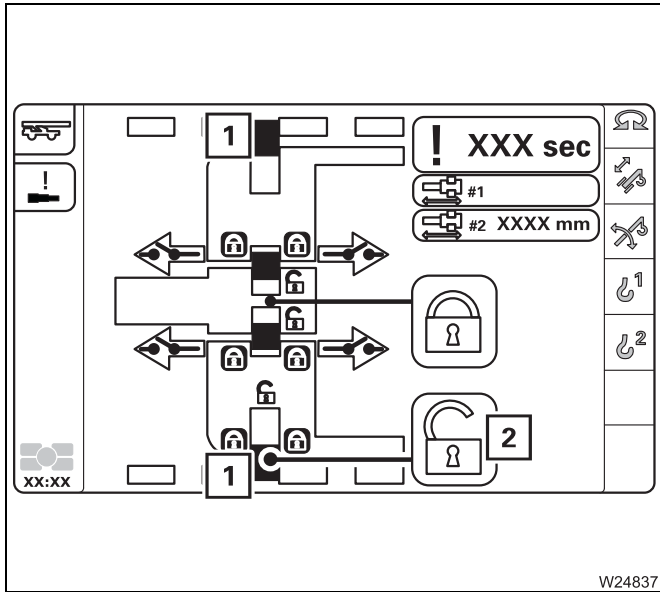
During telescoping you may **not** select Lock. **Under no circumstances** select and confirm the symbol (1).



#### **Risk of damage to the main boom!**

If you select Lock during telescoping, the locking pins on the telescopic section are slid out immediately and they can damage or tear the electrical or hydraulic components in the main boom.



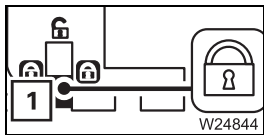


- Retract the telescopic section slowly and as far as possible; Locking points for the telescopic sections, p. 14 - 37.

- Extend to approx. 28 mm (0.09 ft).
- Select and confirm the symbol (2).

The telescopic section is now locked. In the *Locked* position, the locking pins (1) are **green**.

- Set down the telescopic section and retract it as far as it will go.



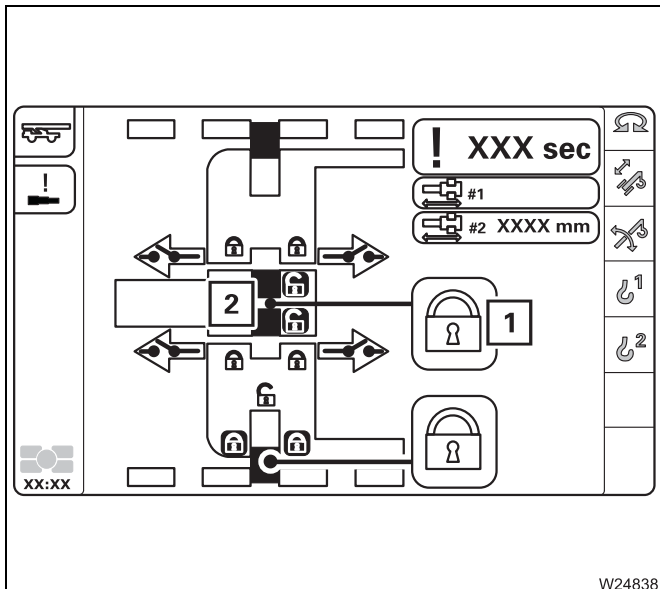
### Unlocking the telescoping cylinder

If the telescopic section (1) is locked, you can now unlock the telescoping cylinder.



### Risk of accidents from sudden retraction of a telescopic section!

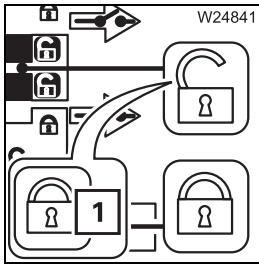
You can select and confirm the symbol for unlocking the telescoping cylinder only a **maximum of 2 times**. If this does not start the unlocking procedure, contact **Manitowoc Crane Care**.



- Select and confirm the symbol (1).

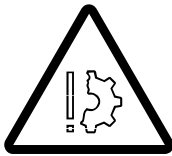
The telescoping cylinder is now unlocked. In the *Unlocked* position, the locking pins (2) are **red**.

You can now move the telescoping cylinder into the next telescopic section; Locking points for the telescoping cylinder, p. 14 - 36.



### Extending and locking the telescoping cylinder

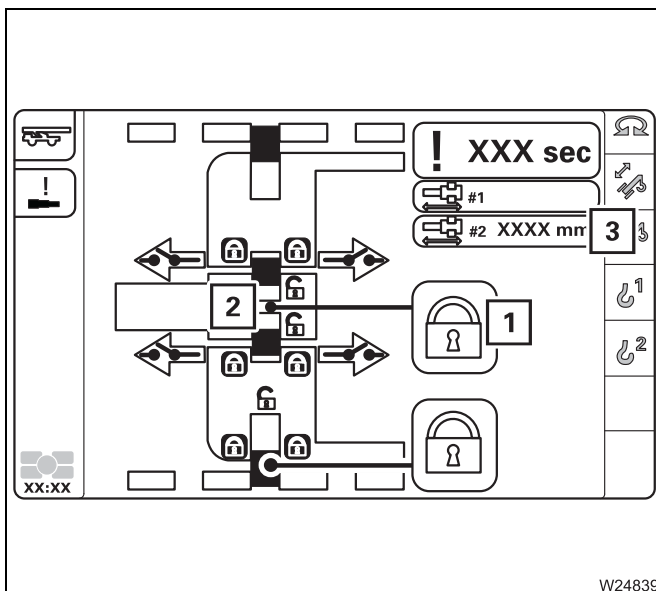
You **may not** select Lock while the telescoping cylinder is retracting or extending. **Under no circumstances** select and confirm the symbol (1).



#### Risk of damage to the main boom!

If you select Lock while the telescoping cylinder is moving, the locking pins on the telescopic section are slid out immediately and they can damage or tear the electrical or hydraulic components in the main boom.

- Slowly move the telescoping cylinder into the next extended telescopic section.



At the locking point:

- The display (3) shows the length for the current locking point; ■■■► p. 14 - 36.

- Select and confirm the symbol (1).

The telescoping cylinder is now locked. In the *Locked* position, the locking pins (2) are **green**.

- You can now retract this telescopic section; ■■■► p. 14 - 33.



**Tables for approaching the locking points**

The extent to which the telescoping cylinder has to be extended in order to reach a locking point depends on whether you want to lock:

- the telescoping cylinder or
- a telescopic section.

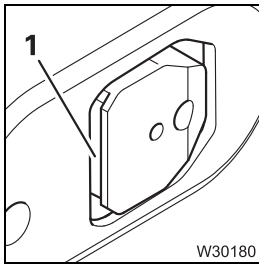
**Locking points for the telescoping cylinder**

The following table shows the extended length for locking the telescoping cylinder.

<b>Table for locking the telescoping cylinder</b>			
<b>Telescopic section</b>	<b>Locking point at fixed length</b>	<b>Extended length of telescoping cylinder</b>	
		<b>in %</b>	<b>in mm (in ft)</b>
<b>Telescopic section I</b>	0	0	(0.00)
	56	5,277	(207.76)
	89	8,400	(330.71)
	100	9,441	(371.69)
<b>Telescopic section II</b>	0	262	10.31
	53	5,284	(208.03)
	89	8,701	(342.56)
	100	9,746	(383.70)
<b>Telescopic section III</b>	0	540	(21.26)
	52	5,484	(215.91)
	89	9,006	(354.56)
	100	10,053	(395.78)
<b>Telescopic section IV</b>	0	819	(32.24)
	52	5,779	(227.51)
	92	9,595	(377.32)
	100	10,357	(407.95)
<b>Telescopic section V</b>	0	1,078	(42.43)
	47	5,534	(217.87)
	92	9,798	(385.74)
	100	10,557	(415.63)
<b>Telescopic section VI</b>	0	1,315	(51.77)
	47	5,662	(222.91)
	92	9,827	(386.88)
	100	10,566	(415.98)



### Locking points for the telescopic sections



The telescopic section must not be set down for locking or unlocking it. The cutout (1) must be clear. That is why you have to extend the telescoping cylinder further than with a return run.

The following table shows the extended length for locking and unlocking the telescopic sections.

Table for locking/unlocking the telescopic sections			
Telescopic section	Locking point at fixed length	Extended length of telescoping cylinder	
		in %	in mm (in ft)
Telescopic section I	0	5	(0.20)
	56	5,282	(207.95)
	89	8,405	(330.90)
	100	9,446	(371.89)
Telescopic section II	0	267	10.51
	53	5,289	(208.23)
	89	8,706	(342.76)
	100	9,751	(383.90)
Telescopic section III	0	545	(21.46)
	52	5,489	(216.10)
	89	9,011	(354.76)
	100	10,058	(395.98)
Telescopic section IV	0	824	(32.44)
	52	5,784	(227.71)
	92	9,600	(377.52)
	100	10,362	(407.95)
Telescopic section V	0	1,083	(42.63)
	47	5,539	(218.07)
	92	9,803	(385.94)
	100	10,562	(415.83)
Telescopic section VI	0	1,320	(51.97)
	47	5,667	(223.11)
	92	9,832	(387.09)
	100	10,571	(416.18)

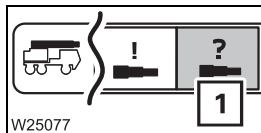
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### 14.5.3 Entering the current telescoping

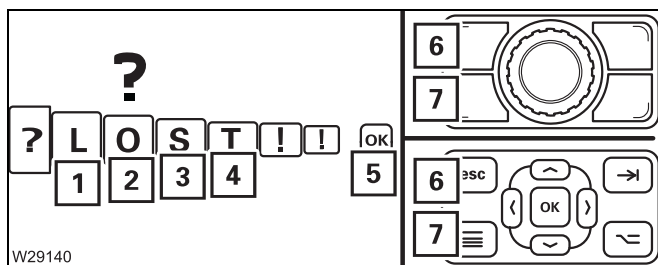
CCS no longer displays the current telescoping,

- if you telescoped in emergency mode, or
- if the power supply was interrupted in the course of saving data.

In these cases, you must enter the current telescoping, e.g. the values from the RCL display.



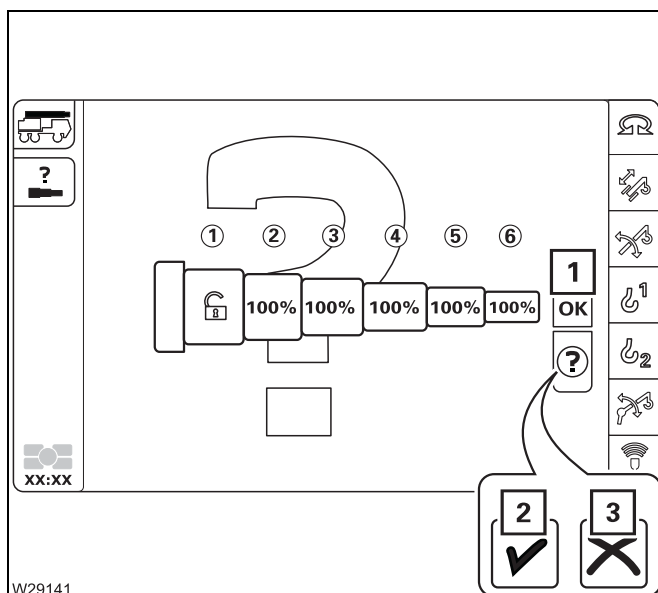
- Select and confirm the symbol (1) – the *Unknown telescoping* emergency program is opened.



- Select and confirm the symbols (1) to (4).
- Confirm the entry with the symbol (5).

You can cancel the entry at any time using button (6) or (7).

Once the entry has been made correctly, the *Unknown telescoping* submenu is opened.



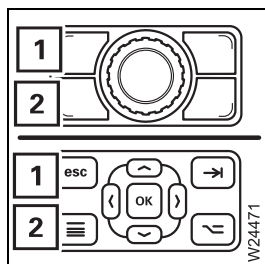
#### Entering set values

- Select and confirm the symbols for telescopic sections 1 to 4 one after another.
- Enter the desired target values for all telescopic sections, e.g. unlocked, 100%, 100%, 100%.
- Confirm the entry with the symbol (1).

Display symbol:

- 2 Permissible value
- 3 Impermissible value





You can cancel the entry at any time using button (1) or (2).



**Risk of damage due to incorrect input!**

Before working with the crane, check whether CCS indicates the current telescoping and correct if this is not the case.

Entering incorrect values causes malfunctions and may result in damage to the telescoping mechanism.

## 14.5.4

### Emergency operation with the hand-held control

If the power units no longer respond to the operating elements in the crane cab, you can operate the power units with the hand-held control.

Operating them with the hand-held control is intended for emergencies only and for bringing the truck crane into a safe state or to shut it down.

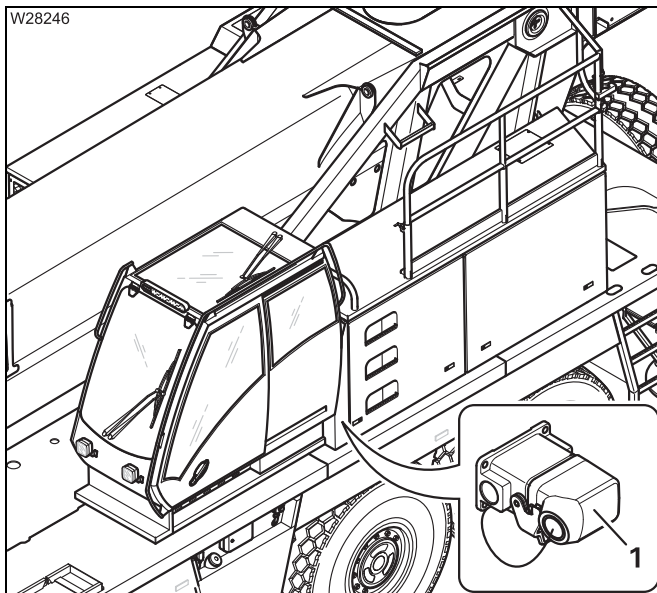


#### **Danger of overturning due to deactivated monitoring function!**

The **RCL is switched off** and the crane operations are not monitored when operating with the hand-held control. If you move into a critical range, the truck crane will overturn.

#### Preparations

You have to connect up the hand-held control and start the engine.

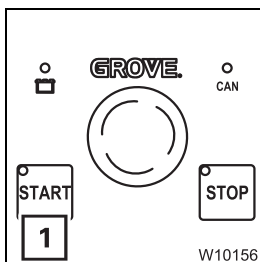


#### **Connect the hand-held control**

- Connect the hand-held control to the connector **(1)**.

All power units can be operated from this connection.

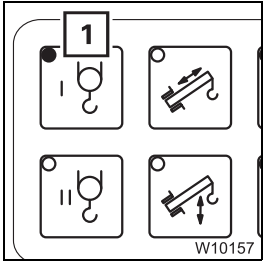
Information on connecting; p. 11 - 22.



#### **Start the engine**

- Press the button **(1)** once – the engine will start; p. 9 - 8.





### Pre-selecting a power unit

- Press the button for the desired power unit once, e.g. the button (1) for the main hoist.

When the function is enabled, the lamp in the button lights up.



With the telescoping mechanism, teleautomation with the goal 0/0/0/0/0/0 is always selected at the same time – fully retract.


The extension function is disabled in emergency mode.

### Operating a power unit

All the safety instructions contained in the sections on the individual power units also apply to operation with the hand-held control.



#### **Danger of overturning when moving into the shutdown ranges!**

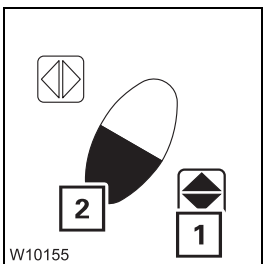
Avoid lowering the boom. If you cannot avoid lowering, try to set down the load beforehand and ensure that the maximum permissible working radius is not exceeded for the rigging mode as specified in the *Lifting capacity table*. Before slewing, always check whether this is permissible in the current rigging mode;  *Slewing with the rigged counterweight*, p. 11 - 93.



#### **Risk of accidents when operating the slewing gear!**

Set down in the crane cab to operate the slewing gear. This prevents you being pushed off the carrier or being crushed by the carrier as a result of slewing.

Lay the connecting cable of the hand-held control so that it will not catch on anything.



- Press the required function buttons one after the other, e.g. for *Lift main hoist*, press button (1) first, and then also button (2).

The further you press button (2), the quicker the movement. The maximum speed is limited to approx. 50% for all power units.

The following table shows all the button combinations. Actuated buttons are shown in black.

Button combination	Pre-selected power unit				
	Telescoping mechanism	Derricking gear	Slewing gear	Hoists	Lattice extension
 W3851	None <sup>1)</sup>	Lower boom	None	Lower	Lower boom
 W3850	Retract	Raise boom	None	Raise	Raise boom
 W3849	None	None	Slew to the right	None	None
 W3848	None	None	Slew to left	None	None

<sup>1)</sup> If the telescoping cylinder is unlocked, it will extend.



**Stopping movements**

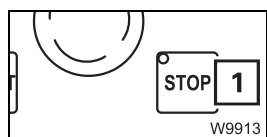
The movement continues until you release the button or the end position is reached.

**Stopping movements in emergencies**

You can stop operations with the *emergency stop switch* if they do not stop by letting go of the function buttons; ■■■▶ p. 9 - 10.

**Switch off the engine**

You can switch off the engine only by using the hand-held control. In this case it is not possible to switch the engine off via the ignition lock.



- Stop all crane movements.
- Press the button (1) – the engine will switch off.



## 14.5.5

### Notes on slewing in emergency operation

For the *Standard* slewing range type



If the *MAXbase* slewing range type is activated; ||||► p. 14 - 46.

Slewing is not monitored by the RCL in emergency operation.

#### **Risk of overturning when slewing in emergency operation!**


Check the table to see if slewing is permitted. Adhere to the enabled working range specified in the *lifting capacity table* and observe the restrictions described.

If you have any doubts, contact **Manitowoc Crane Care**.

		Rigged outrigger span 8.950 x (29.4 x)				
		2.710 m (8.8 ft)	4.310 m (14.2 ft)	5.910 m (19.4 ft)	6.854 m (22.4 ft)	7.800 m 25.6 ft)
<b>Rigged counterweight</b>	0 t (0 lbs)	Slewing permitted <sup>1)</sup>  Slewing not permitted				
	7 t (15,432 lbs)					
	16.5 t (36,376 lbs)					
	21 t (46,297 lbs)					
	26 t (57,320 lbs)					
	30.5 t (67,241 lbs)					
	35.5 t (78,264 lbs)					
	40 t (88,185 lbs)					
	45.5 t (100,310 lbs)					
	50 t (110,231 lbs)					
	70 t (154,323 lbs)					
	80 t (176,370 lbs)					

<sup>1)</sup> Slewing is only permissible when the smallest working radius according to the lifting capacity table is adhered to; ||||► *Lifting capacity table*

**For the *MAXbase* slewing range type**

If the *Standard* slewing range type is activated;  p. 14 - 45.

Slewing is not monitored by the RCL in emergency operation.

Due to the wide variety of possible outrigger spans and the asymmetry, the permissible slewing ranges cannot be representing as simple tables.



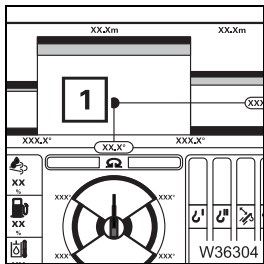
**Risk of overturning when slewing in emergency operation!**

Execute the measures described in this section before slewing and during slewing. Special caution must be exercised with the *MAXbase* slewing range type because several parameters must be monitored simultaneously.

If you have any doubts, contact **Manitowoc Crane Care**.

**When slewing with the hand-held control is unavoidable**

- Refer to the *lifting capacity table* (provided in digital form only) for the slewing ranges applicable to the current rigging mode.
- Note the slewing range divisions and the permissible (maximum and minimum) working radii and lifting capacities for each.



**Checking the *RCL display***

Check that the enabled slewing ranges and working radii specified in the *lifting capacity table* are correctly shown on the RCL display.

- Slew slowly towards a safe range and check that the current position (**1**) changes accordingly.
- Derrick slowly towards a safe range and check that the current position (**1**) changes accordingly.

**– If the RCL display still displays correctly**

You can use the *RCL* display for orientation while slewing and correct the working radius before reaching the slewing range limits.

**– If the RCL does not display correctly**

Slew slowly only and monitor the slewing range limits and working radius based on the values specified in the *lifting capacity table*. You may need to determine the current position via measurements, depending on the availability of the displays (slewing angle/working radius).

## 14.6

## Hydraulic emergency operation

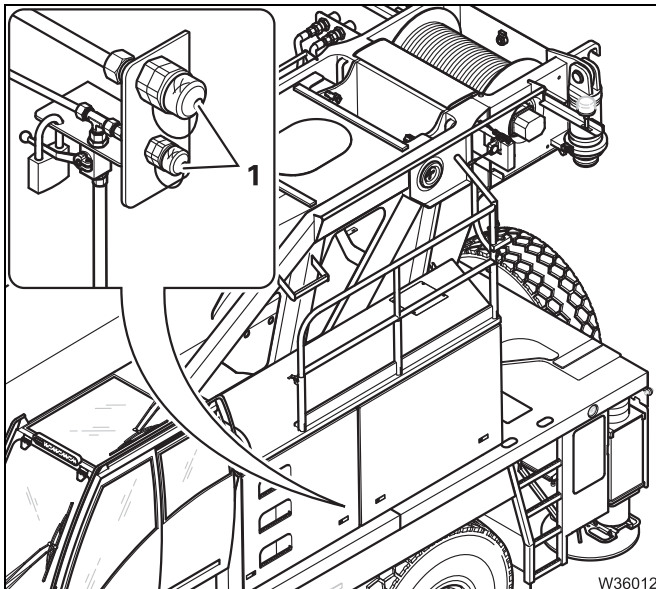


This section only applies to the standard hydraulic emergency operation. If the truck crane is equipped with an hydraulic **emergency operation system to BGR 159**; p. 14 - 51.

### 14.6.1

### Operating principle

The hydraulic emergency operation is intended for lifting the main boom when the engine is defective and allows raising of the boom and lowering of the main hoist.



A hydraulic energy source (nominal pressure 100 bar (1,450 psi)) is connected to the ports (1) to supply the crane's hydraulic system.

Raising is always enabled. Various circuits must be switched for lowering.

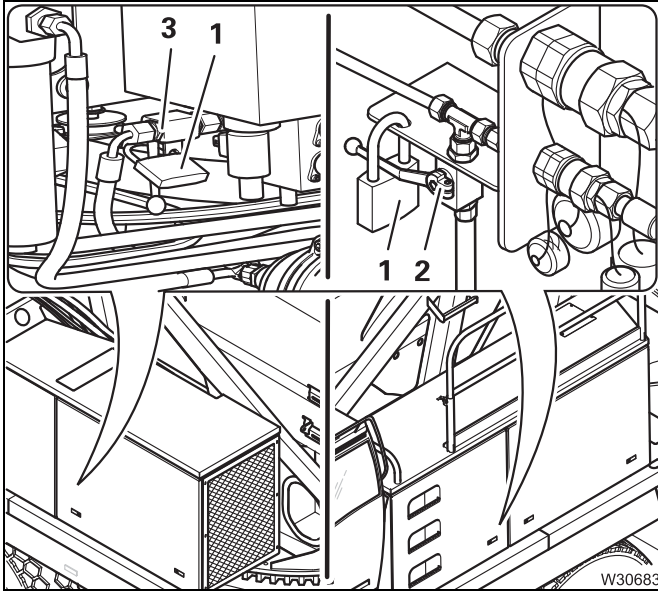
The crane movements occur directly after switching on the energy source.



## 14.6.2 Establishing the hydraulic circuits required

If the *Lower* movement is to be performed in addition to raising the boom after switching on the energy source, then you must switch over the valves and switch a valve to continuous operation.

### Switching over valves



#### For crane operation

Always establish this state immediately after the emergency operation.

- Close the valves (2) and (3). Secure the valves with the locks (1).

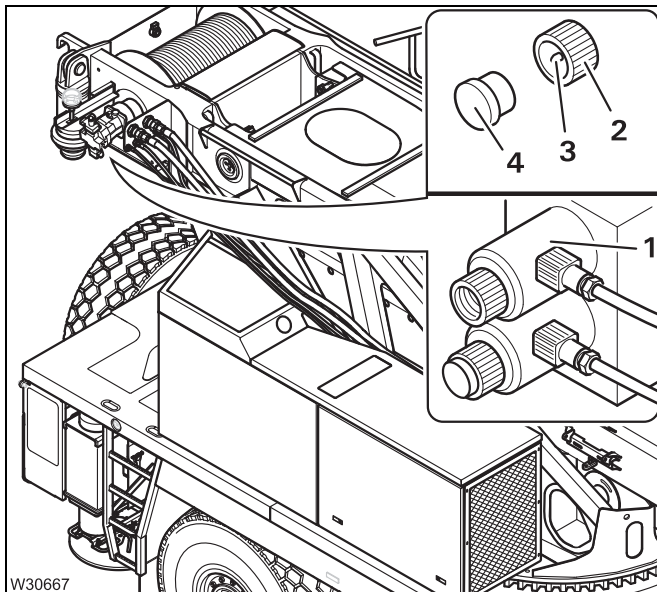
#### For emergency operation

- Remove the locks (1).
- Switch the valves (2) and (3) to the positions for the desired crane movement – as shown in the following table.

Emergency operation for crane movement	Valve opened	Valve closed	Additional switching operations
Raising and lowering the boom	2, 3		Valve Y1104 on continuous operation; ■■■► p. 14 - 49
Raising		2, 3	None

### Switching the continuous operation on and off

After switching over the valves, you must additionally switch one valve to continuous operation.



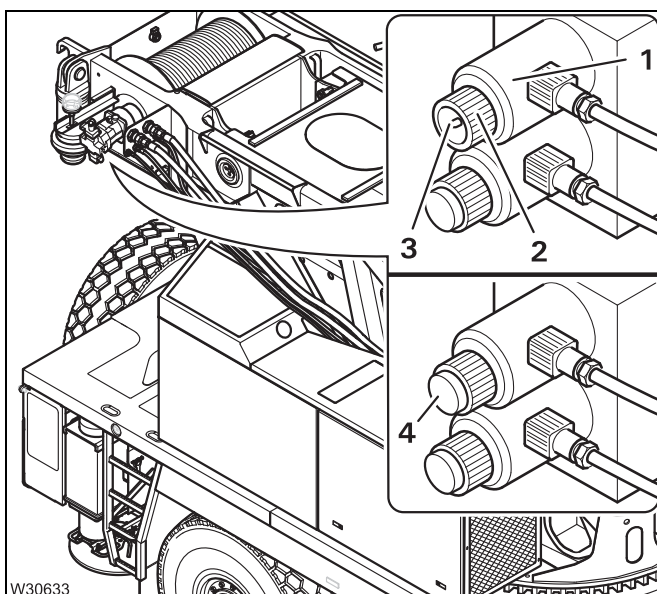
#### Switching on continuous operation

- Unscrew the cap (2) from valve Y1104 – Lowering (1).
- Remove the plug (4).
- Screw the cap with pin (3) on to the valve – continuous operation is now switched on.



#### Danger due to falling loads!

Switch off continuous operation immediately after emergency activation. Check that the pin can be seen on the cap. Thus you prevent loads from falling down immediately after lifting in subsequent crane operation.

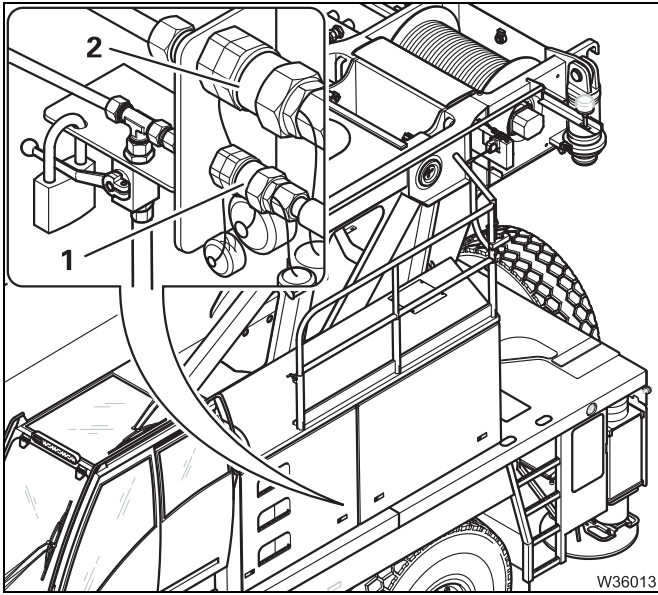


#### Switching off continuous operation

- Unscrew the cap (2) from the valve (1).
- Screw the cap on so that the pin (3) can be seen.

### 14.6.3

## Connecting/disconnecting the energy source



### Connecting

The hoses for the pressure line and suction line are assigned according to the various diameters.

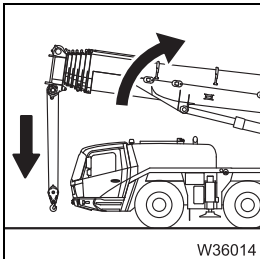
- Connect the air traffic control light to the connection (1).
- Connect the suction line to the fatter connection (2).

### Removing

- Remove the hoses from the connections (1) and (2).
- Seal the connections with the caps.

### 14.6.4

## Performing emergency operation



### Starting crane movements

- Switch on the hydraulic energy source.  
The crane movements are performed according to the switched hydraulic circuits.




### Stopping crane movements

- Switch off the hydraulic energy source.

### 14.6.5

## After emergency operation

You must restore the truck crane to its original state after finishing emergency operation.

- Disconnect the hydraulic energy source;  *Removing*, p. 14 - 50.
- Switch off the continuous operation;  p. 14 - 49.
- Close the valves;  *For crane operation*, p. 14 - 48.

## 14.7

### Hydraulic emergency operation as per BGR 159

With this additional equipment, the truck crane is equipped with a hydraulic emergency bleed valve in accordance with BGR 159 (4.2.8). This allows small loads to be transported in case of emergency, e.g. in the event of an engine failure.



#### **Risk of accidents due to improper use!**

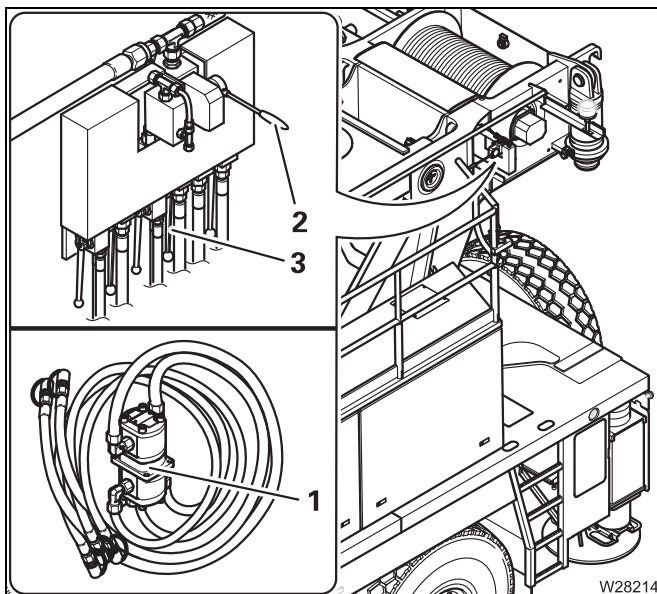
Use hydraulic emergency operation only to transport small loads in emergencies. Have the malfunction rectified as soon as possible. Crane operation in hydraulic emergency operation is prohibited since it is not monitored by the RCL.

### 14.7.1

#### Operating principle of emergency operation BGR 159

The hydraulic emergency operation BGR 159 enables:

- **Emergency operation** of the main hoist, derricking gear, and slewing gear and
- **Emergency supply** of another truck crane that also has a hydraulic emergency operation BGR159.



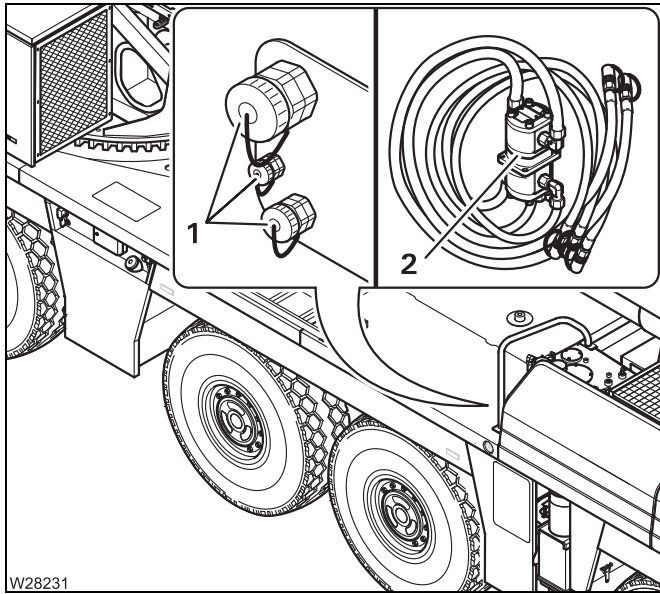
#### **Emergency operation**

A transformer (1) serves as a power source for the crane's hydraulic system. The transformer is powered by the carrier's hydraulic system or by the emergency supply of another truck crane.


The hydraulic circuits are switched via the valves (3).

The control levers (2) are used to control the direction of movement and the speed.





### Emergency supply

When using an emergency supply, the connections (1) feed a transformer (2) that is connected to the hydraulic system of the other crane;  *Emergency supply of another crane*, p. 14 - 62.

## 14.7.2

### Connecting/disconnecting hoses

- Switch the engine off.

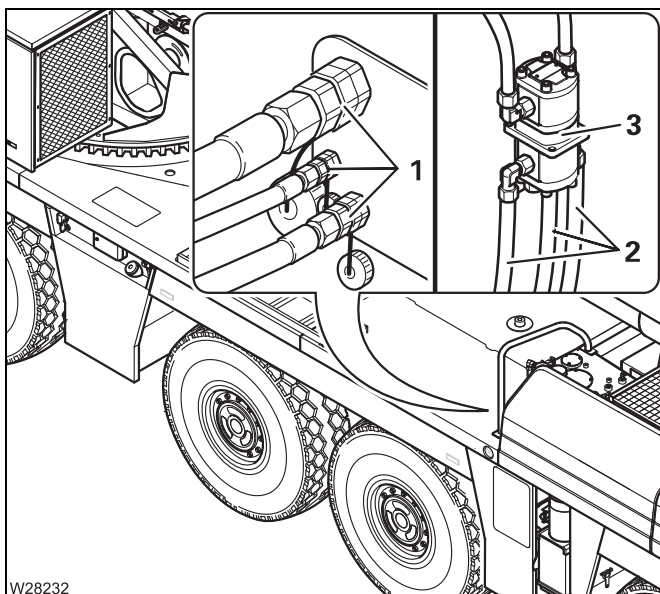


#### Risk of damage to the hoses!

Lay the hoses in such a manner that they can be moved freely, so as to prevent them being crushed or torn or becoming caught during subsequent crane movements.

#### Establishing connections

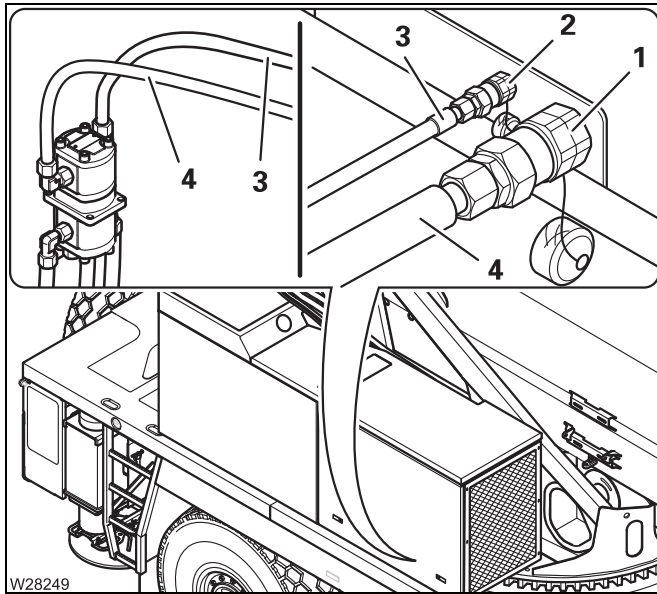
The hoses are assigned according to the various diameters.



#### On the carrier

- Attach the transformer (3) to the superstructure.
- Connect the hoses (2) to the connections (1).



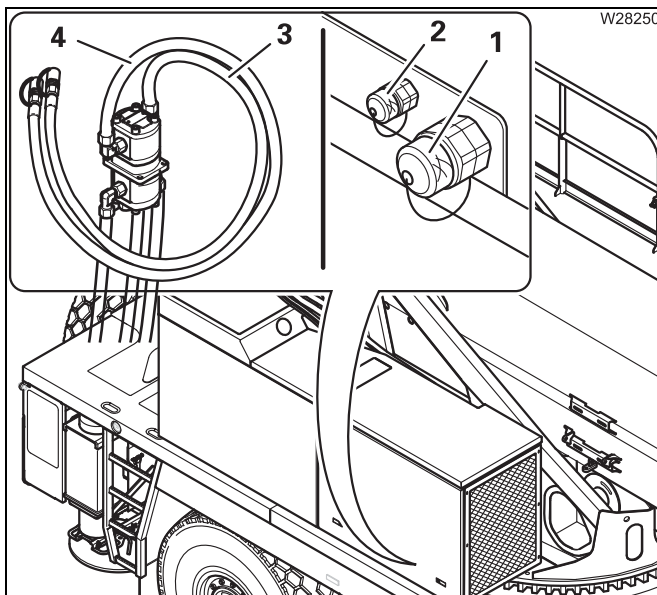


### On the superstructure

- Connect the thicker hose (4) to the connection (1).
- Connect the thicker hose (3) to the connection (2).

### Disconnecting connections

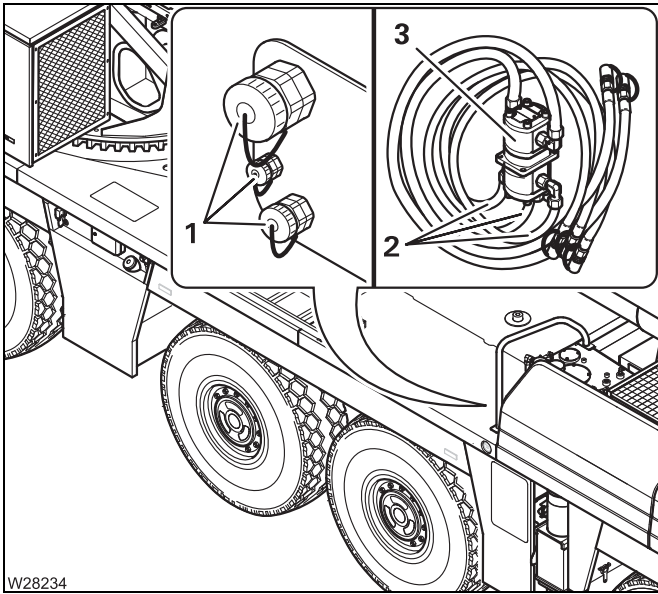
After the emergency operation, you must disconnect the hoses and the transformer.



### On the superstructure

- Remove the hoses (3) and (4) from the connections (1) and (2).
- Close off the hoses and connections with the caps.

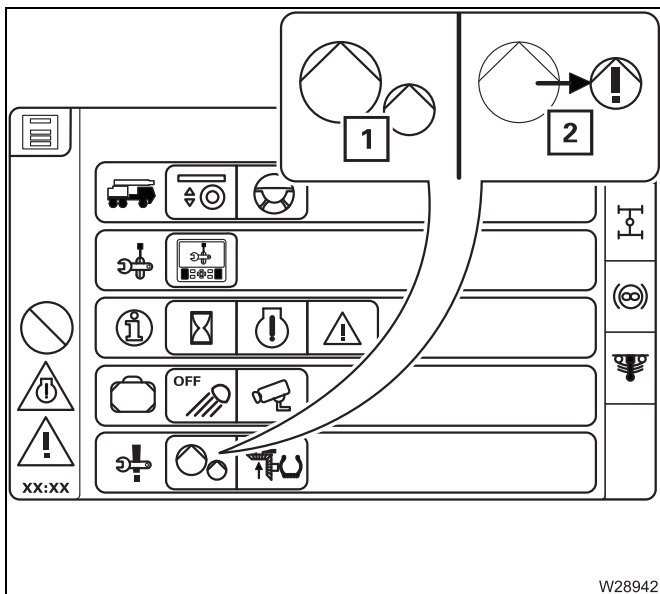




- Remove the hoses (2) from the connections (1).
- Close off the hoses and connections with the caps.
- Remove the transformer (3).

### 14.7.3

### Switching emergency operation on/off



- If necessary, open the *Overview menu groups* menu.

#### Switching on

- Select and confirm the symbol (1) – Symbol (2) is displayed. Emergency operation is switched on.

#### Switching off

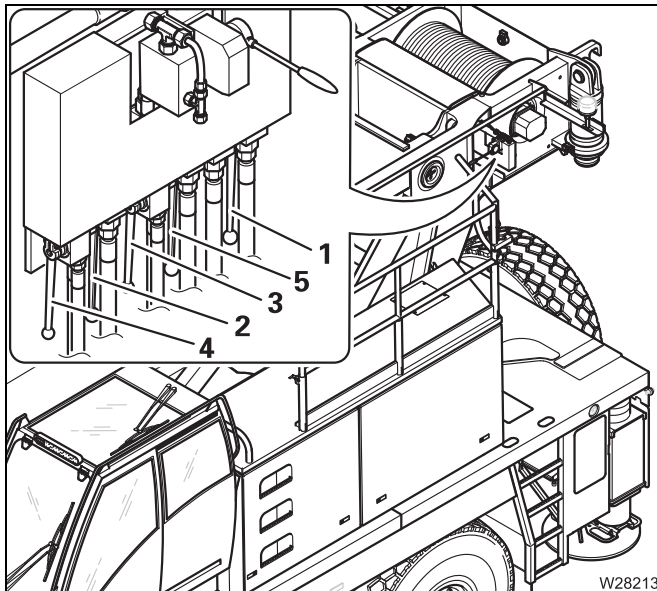
- Select and confirm the symbol (2) – Symbol (1) is displayed. Emergency operation is switched on.

## 14.7.4 Establishing the hydraulic circuits required

You must switch over the necessary valves to establish a hydraulic circuit.

### Switching over valves

The valves **1** to **5** are labelled with their respective numbers.



### For crane operation

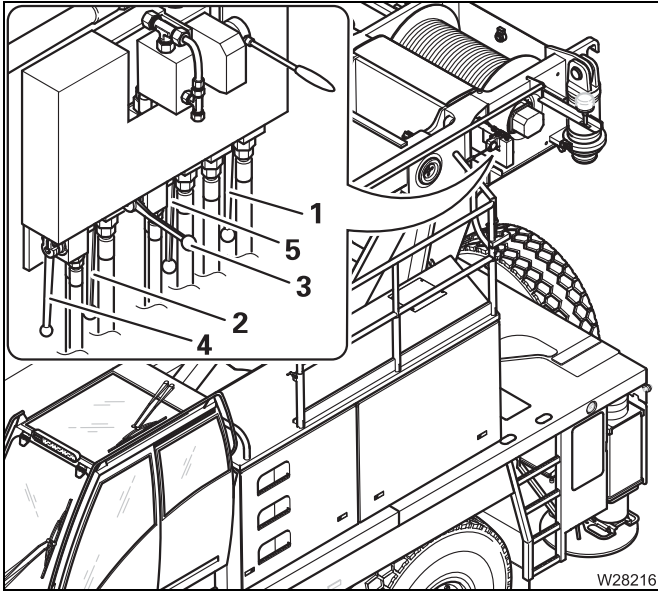
- Switch the valves **1** to **5** **downward**.



### **Danger from mutual interference of the power units!**

For crane operation, always switch **all** the valves **1** to **5** down. This prevents the power units suddenly starting to move.





**For emergency operation**

- If necessary, remove the cover over the valves **1 to 5**.
- Switch the valves **1 to 5** to the positions for the desired crane movement – as shown in the following table.

To raise the boom, for example, you must switch valve **3 upwards**. Valves **1, 2, 4** and **5** must be switched inwards.



**Danger from mutual interference of the power units!**

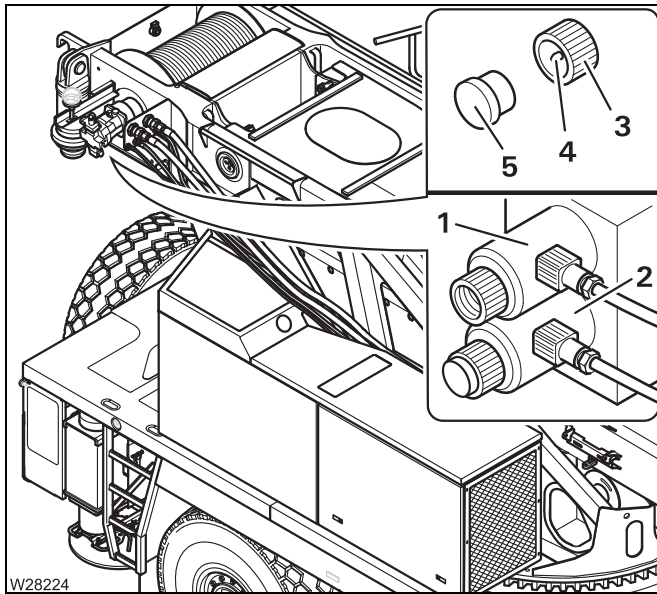
Always only switch valves for **one crane movement** up diagonally at a time. This prevents wrong crane movements being performed and several movements being performed unintentionally at the same time.

Emergency operation for crane movement	Valves diagonally up	Valves diagonally down	Additional switching operations
Lifting	<b>1</b>	<b>2, 3, 4, 5</b>	Valve Y1105 on continuous operation;  p. 14 - 47 Valve 7 closed;  p. 14 - 58
Lowering	<b>1</b>	<b>2, 3, 4, 5</b>	Valve Y1104 on continuous operation;  p. 14 - 47 Valve 7 closed;  p. 14 - 58
Raising	<b>3</b>	<b>1, 2, 4, 5</b>	None
Lower	<b>5</b>	<b>1, 2, 3, 4</b>	None
Slewing to the left or right	<b>2, 4</b>	<b>1, 3, 5</b>	Valve 6 closed;  p. 14 - 58

**For lifting/  
lowering**

After establishing the hydraulic circuits you must also:

- switch one valve permanently on,
- connect one valve to the hoist.



**Switching on continuous operation**

Always switch only **one** valve to continuous operation.

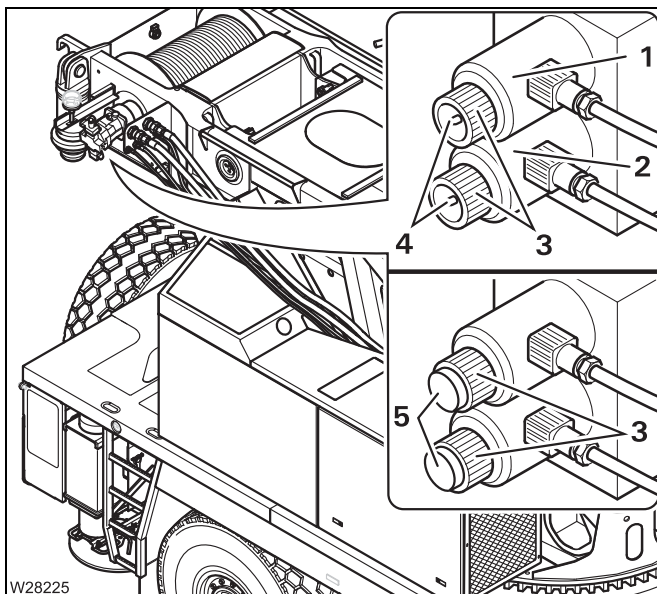
- 1 Valve Y1104 – Lower **or**
- 2 Valve Y1105 – Raise

- Unscrew the cap (3) e.g. from the valve (1).
- Remove the plug (5).
- Screw the cap with pin (4) on to the valve – continuous operation is now switched on.



**Danger due to falling loads!**

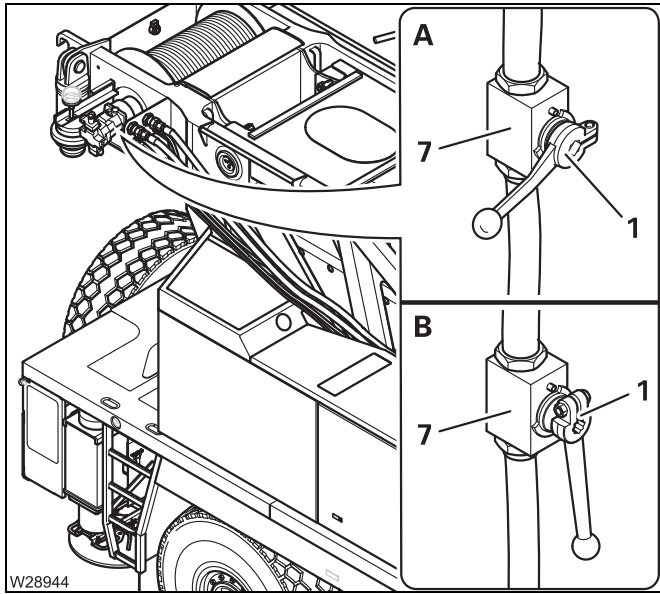
Switch off continuous operation immediately after emergency activation. Check whether the pins can be seen on both caps. Thus you prevent loads from falling down immediately after lifting in subsequent crane operation.



**Switching off continuous operation**

- Unscrew the cap (3) from the actuated valve (1), (2).
- Screw the cap on so that the pin (4) can be seen.
- Insert the plug (5).





**(A) – Emergency operation position**

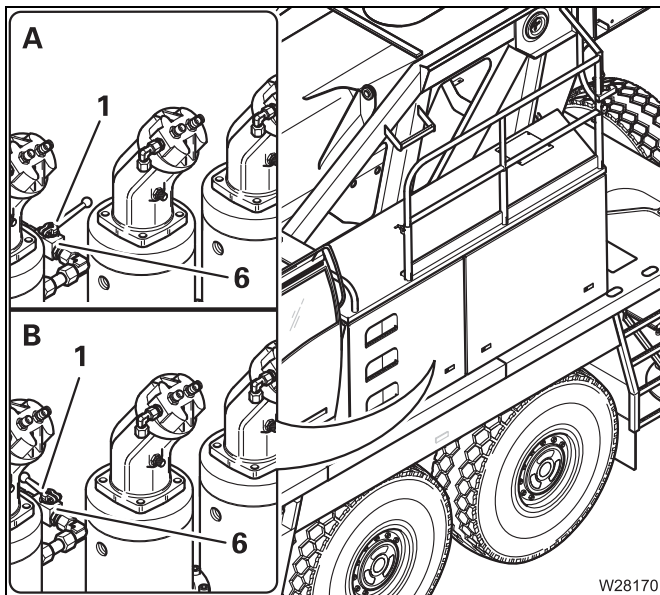
- Close the valve 7 – lever (1) at right angles to the line.

**(B) – Crane operation position**

- Open the valve 7 – lever (1) parallel to the pipe.

**For slewing**

After switching over the valves behind the crane cab, you must additionally close one valve on the slewing gears.



**(A) – Emergency operation position**

- Close the valve 6 – lever (1) at right angles to the line.

**(B) – Crane operation position**

- Open the valve 6 – lever (1) parallel to the pipe.

## 14.7.5

### Performing emergency operation

If the required hydraulic circuit has been established, you can make the corresponding crane movement.



You can control the speed of all power units with the control lever.


#### Slewing

It is not possible to control the slewing movements with the control lever for emergency operation with the same degree of sensitivity as with the control lever in the crane cab.



#### **Risk of overturning when slewing in emergency operation!**

Crane operations are not monitored by the RCL whilst the hand-held control is connected.!

Various checks are therefore necessary, depending on the active slewing range type, before slewing in emergency operation;  p. 14 - 45.



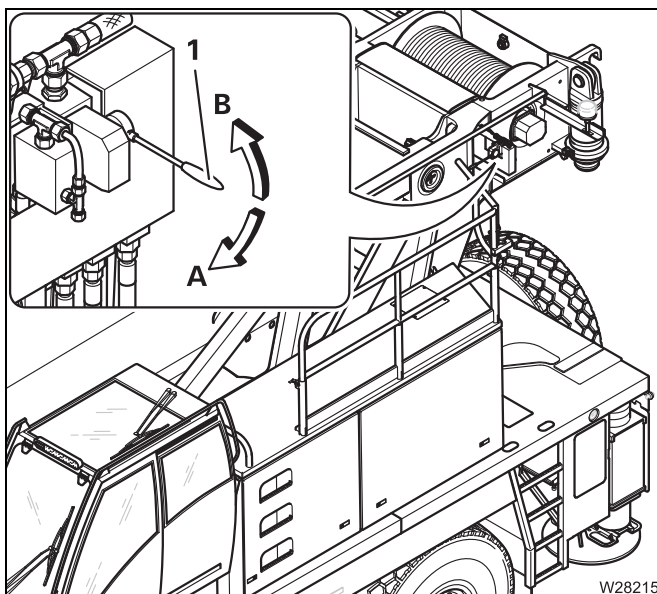
#### **Risk of accidents during slewing!**

Do not stand on the carrier. This prevents you being pushed off the carrier or being crushed by the carrier during slewing.



#### **Risk of damage to the hoses and transformer!**

Make sure the hoses do not get caught and torn off while performing slewing operations.



- Slowly move the control lever (1) in the required direction:

- A:** Slew to the right
- B:** Slew to the left



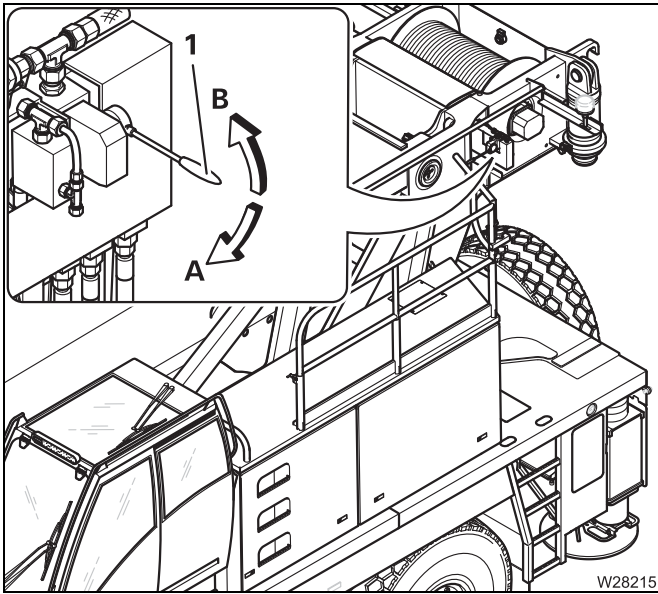
## Derricking

- Determine the maximum permissible working radius for the current rigging mode according to *Lifting capacity table*.



### **Danger of overturning if the working radius is too large when lowering the boom!**

In emergency operation, operations are not shut down by the RCL. This also applies if the RCL displays are still active after switching on the ignition. The truck crane will overturn if you exceed the maximum permissible working radius for the current rigging mode as specified in the *Lifting capacity table*.

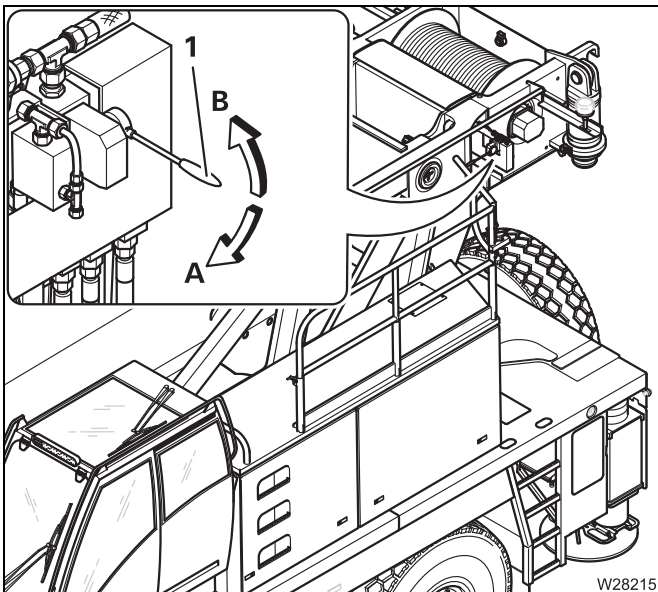


- Observe the maximum permissible working radius specified in the *Lifting capacity table* – by measuring, if necessary.

- Move the control lever (1) in the required direction:

- A:** Lower
- B:** Raising

## Lifting/lowering



- Move the control lever (1) in the required direction:

- A:** Lowering
- B:** Lifting



## 14.7.6

### After emergency operation


You must restore the truck crane to its original state after finishing emergency operation.

#### Switching off emergency operation


- Switch off the engine.

#### Switching over to crane operation


##### After every emergency operation

- Switch valves **1** to **5** to crane operation;  p. 14 - 55.


##### Also after lifting/lowering

- Switch off continuous operation at the valves Y1105 and Y1104;  p. 14 - 57.

##### Also after slewing

- Open the valve **6**;  p. 14 - 58.

#### Disconnecting the hoses

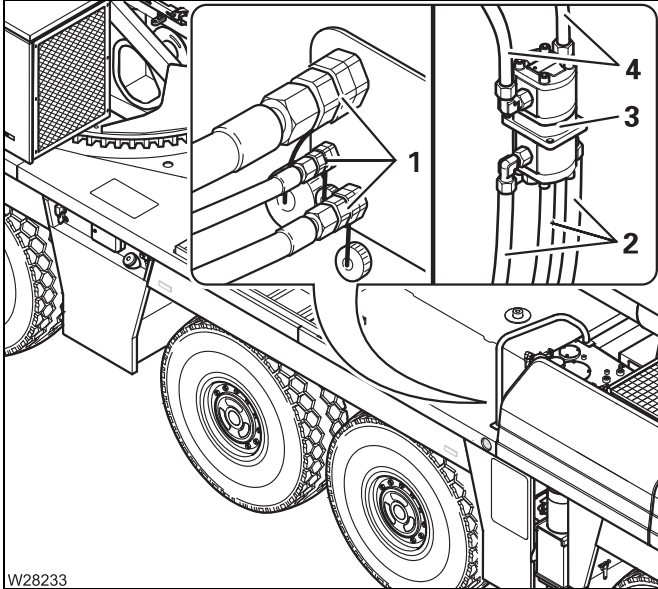
- Disconnect the hoses;  p. 14 - 53.
- Close all the connections and hoses with the caps.
- Remove the transformer.

## 14.7.7

### Emergency supply of another crane

#### For emergency supply

The hoses are assigned according to the various diameters.



#### On the crane to be supplied

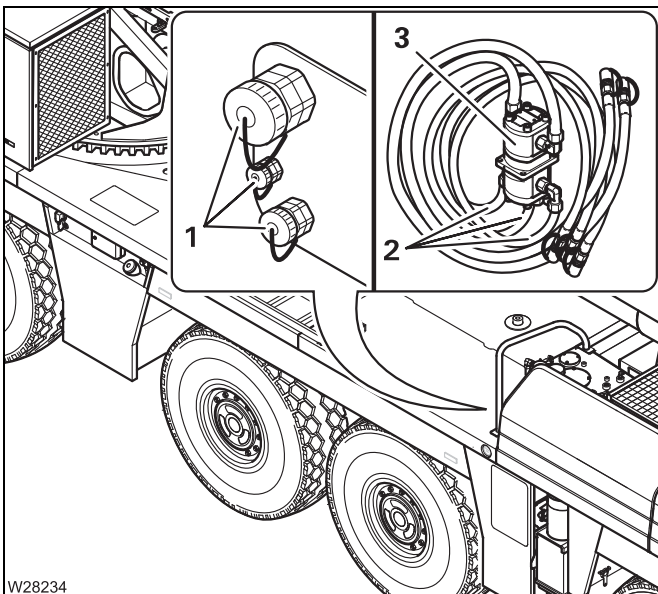
- Attach the transformer (3).
- Connect the hoses (4); *Operating manual of the other crane.*

#### On the GMK5250L

- Switch off the engine for driving.
- Connect the hoses (2) to the connections (1).
- Switch on the hydraulic emergency operation; p. 14 - 54.

#### After emergency supply

- Switch off the hydraulic emergency operation; p. 14 - 54.



#### On the GMK5250L

- Remove the hoses (2) from the connections (1).

#### On the crane that was supplied

- Disconnect the hoses (2).
- Close all the hoses and connections with the caps.
- Remove the transformer (3).

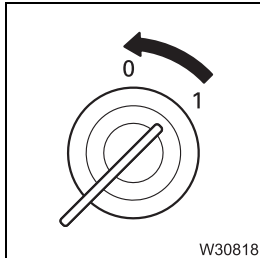
## 14.8

### Fuses in the crane cab

The fuses are located in the crane cab behind the crane cab seat.

#### Information on replacing fuses

The positions of the fuses, their designations and which functions are protected by the respective fuses are shown in the following sections.



- Switch off the ignition whenever a fuse has to be replaced.



#### **Risk of damage if the ignition is switched on!**

Switch off the ignition whenever a fuse has to be replaced. This prevents the new fuse being blown immediately by the increased starting current after being installed.



#### **Risk of damage by overloading!**

Replace blown fuses only with new fuses of the same amperage. This prevents parts being overloaded and damaged or the fuse being immediately blown again.

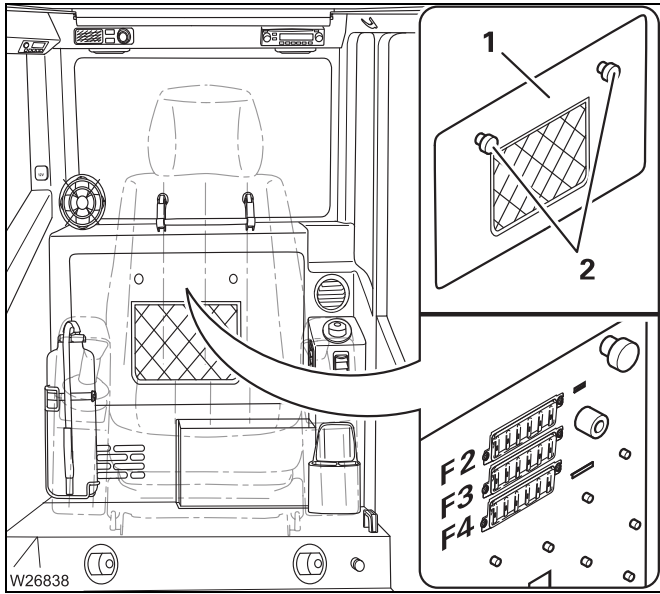
If a fuse with the same amperage fails again once the ignition is switched on, then notify **Manitowoc Crane Care**.



#### **Risk of fire!**

Never repair a blown fuse with other electrically conductive materials.



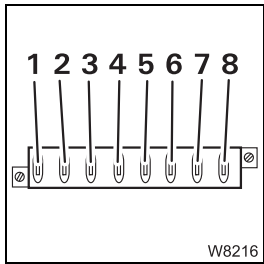


- Loosen the bolts (2) and remove the cover (1).

The fuse groups **F1** to **F8** consist of eight fuses each.

The following tables show the designations of the individual fuses, including their amperage and functions.

- Observe the instructions regarding fuse changes; p. 14 - 63.



The designations 1 to 8 in the tables correspond to their order from left to right (fuse 1 is always the left fuse).

Designation	Amperage (A)	Function
F1/1	15	Control unit UB 1 CCM 10
F1/2	15	Control unit UB 2 CCM 10
F1/3	15	Control unit UB SCM
F1/4	15	Control unit UB IOS 20
F1/5	5	Control unit UB UE IOS 21
F1/6	15	Control unit UB 1 IOS 22
F1/7	15	Control unit UB 2 IOS 22
F1/8	15	Control unit UB 1 IOL 30

Designation	Amperage (A)	Function
F2/1	15	Control unit UB 1 IOL 30
F2/2	15	Control unit UB 2 IOL 30
F2/3	15	Control unit UB 2 IOL 30
F2/4	15	Control unit UB 1 IOL 34
F2/5	15	Control unit UB 2 IOL 34
F2/6	15	Control unit UB 2 IOL 34
F2/7	15	Control unit UB 2 IOL 34
F2/8	–	Unassigned

Designation	Amperage (A)	Function
F3/1	–	Unassigned
F3/2	–	Unassigned
F3/3	–	Unassigned
F3/4	3	Crane cab lighting
F3/5	5	Display
F3/6	5	Hand-held control
F3/7	–	Unassigned
F3/8	–	Unassigned



Designation	Amperage (A)	Function
F4/1	3	Control unit UE IOL 30 Control unit CCM 10 Control units IOS 20 and IOS 22
F4/2	–	Unassigned
F4/3	3	CraneSTAR system
F4/4	10	Radio
F4/5	–	Unassigned
F4/6	–	Unassigned
F4/7	–	Unassigned
F4/8	–	Unassigned

Designation	Amperage (A)	Function
F5/1	3	Control unit CCM 10 Control units IOL 30 and IOS 22 Control unit SCM 15
F5/2	5	Control units 15 IOS 20 and 21
F5/3	3	Display
F5/4	3	Control lever supply
F5/5	5	Control lever supply
F5/6	–	Unassigned
F5/7	–	Unassigned
F5/8	5	Instrument lighting

Designation	Amperage (A)	Function
F6/1	10	Windscreen wiper/washing system
F6/2	15	Cigarette lighter Socket 12 V
F6/3	10	Crane cab spotlight
F6/4	15	Main boom spotlight Spotlight adjustment
F6/5	5	Houselock
F6/6	3	CraneSTAR system
F6/7	3	Remote control
F6/8	5	Camera system

Designation	Amperage (A)	Function
F7/1	3	Rotating beacons
F7/2	5	Diagnostics plug
F7/3	15	Heating control
F7/4	15	Extendable step
F7/5	3	Hoist camera tripod
F7/6	–	Unassigned
F7/7	–	Unassigned
F7/8	–	Unassigned

Designation	Amperage (A)	Function
F8/1	3	VCC perm SCM
F8/2	3	VCC perm SCM 10
F8/3	3	VCC perm SCM IOL 30
F8/4	3	VCC perm SCM IOL 34
F8/5	–	Unassigned
F8/6	–	Unassigned
F8/7	–	Unassigned
F8/8	3	AGND SCM

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# 15

## Index



To avoid making the index unnecessarily long and unclear, we have not included every single element from the instrument panel. These elements, such as switches and buttons, lamps and displays are described and named in detail in the overviews of the Chapter 3 and Chapter 8 *Truck Crane Description*. From there you will be referred to more detailed descriptions of these elements.

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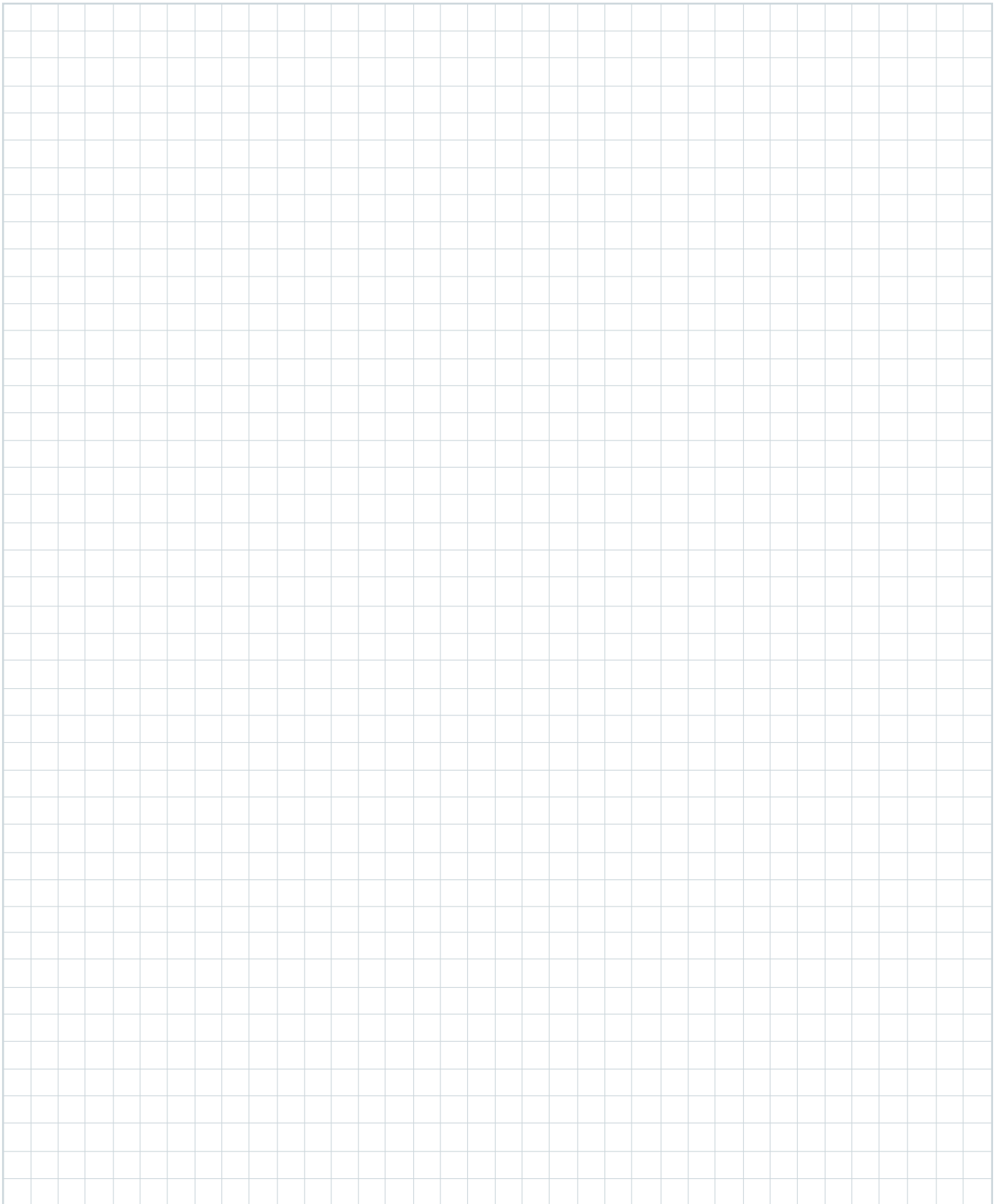
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Grove

Manitowoc

National Crane

Potain



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