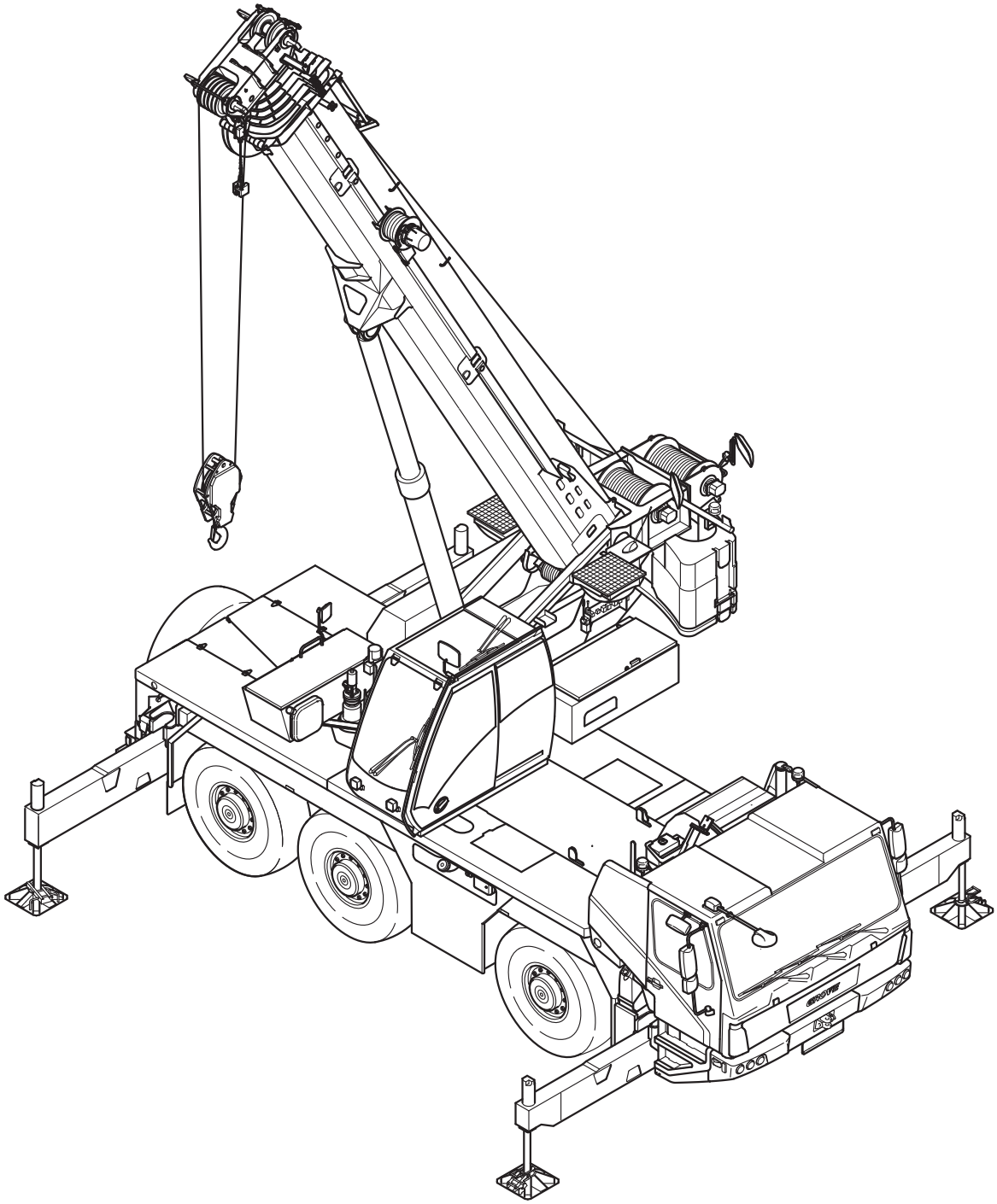
GROVE GMK3060

Operating manual



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Important note

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The operating manual consists of the following chapters:

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1 Overview

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2 Basic safety instructions

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3 Operating elements for driving

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4 Starting/stopping the engine – for driving

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5 Driving mode

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6 Driving modes

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7 Transport

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8 Malfunctions in driving mode

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9 Operating elements for crane operation

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10 Starting/switching off the engine – for crane operation

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11 Crane operation

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12 Rigging work

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13 Driving with a rigged truck crane

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14 Malfunctions during crane operation

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15 Index

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1 Overview

1.1 Accidents

In the event 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.

Observe 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 (for example, 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

You can also scan the following QR code.

1.2.2 Dealer list

Visit the following address for a global list of dealers:

http://www.manitowoccranes.com

You can also scan the following QR code.

1.3 Warranty specifications

Please see the separately enclosed warranty certificate for information.

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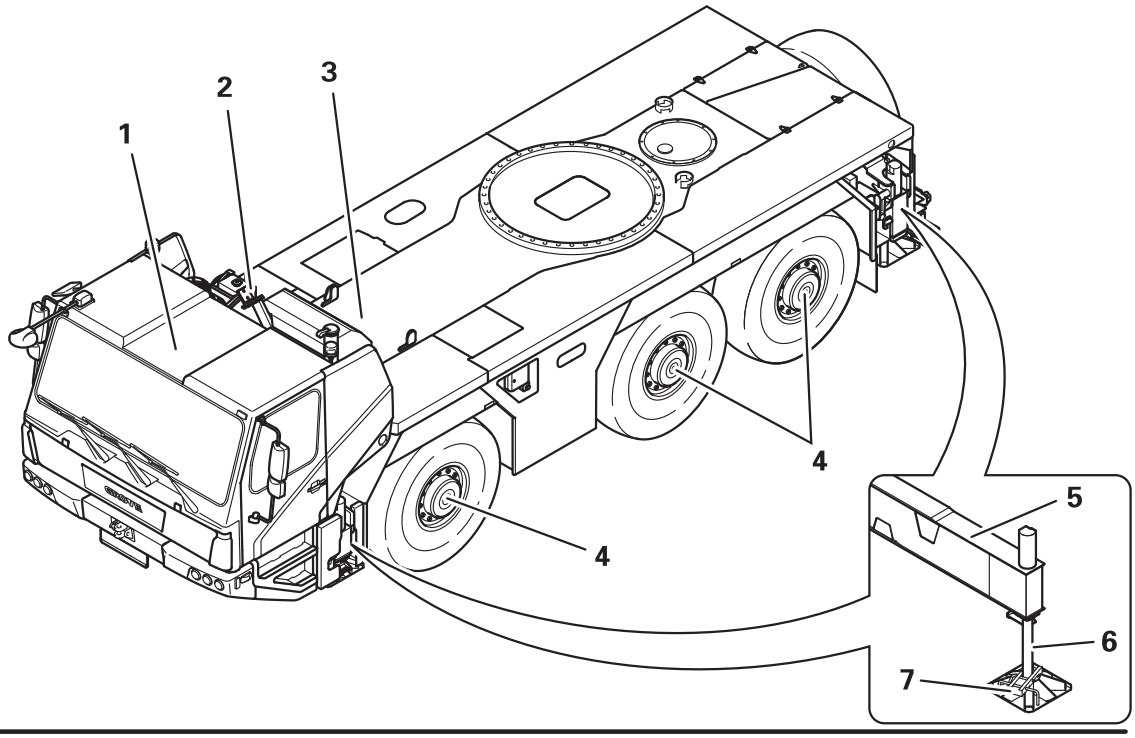
1.4 Terms used

A



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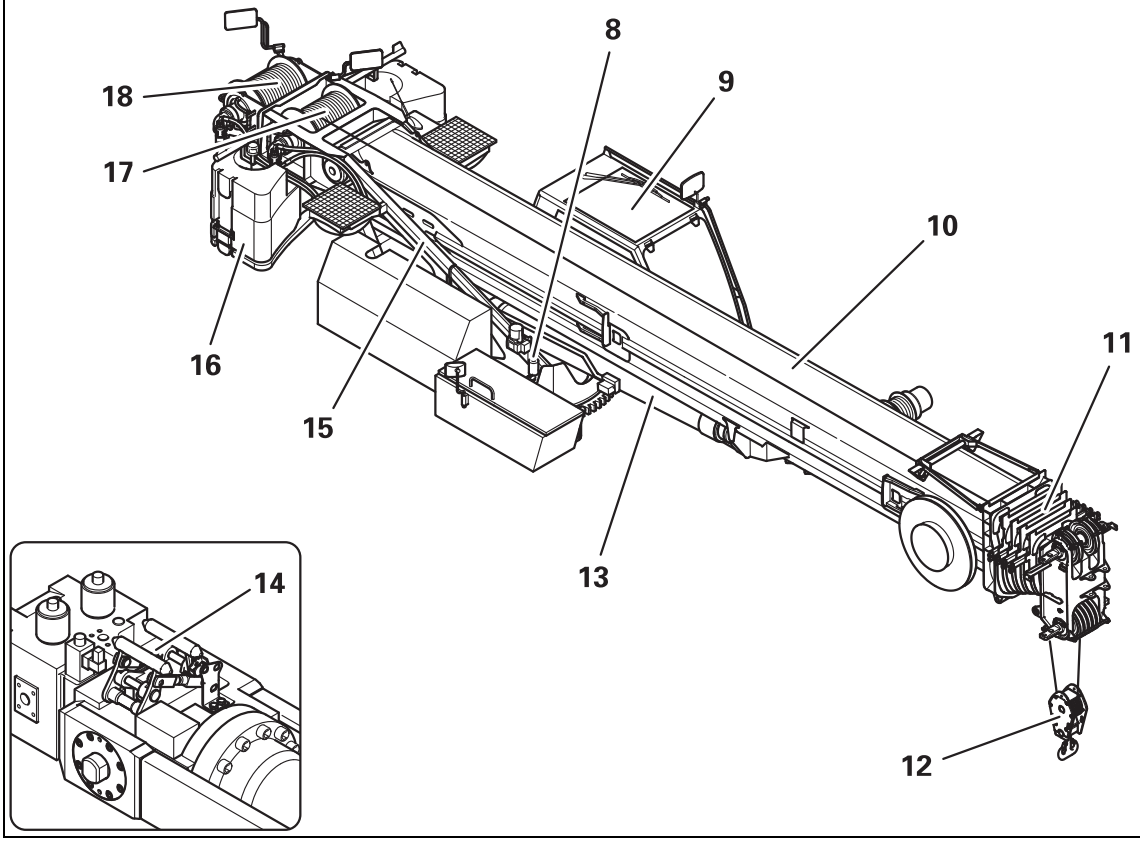

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(A) – Carrier

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 Counterweight

17 Main hoist

18 Auxiliary hoist[1)]

[1)] Additional equipment

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1.5 Technical data

GROVE Crane GMK3060

Permissible temperature range:	-25 °C to +40 °C (-13 °F to +104 °F)
Crane designation:	Truck crane as per DIN 15 001, Part 1
Crane application:	Service crane as per DIN 15 001, Part 2
Crane classification:	Hoist class H1 to DIN 15 018, Part 1 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 (ASME B 30.5)

Max. load bearing capacity

– Within the 360° slewing range:[1)]	45.5 t (100,310 lbs)
– 0° to the rear:[1)]	55 t (120,000 lbs)
– 0° to the rear:[2)]	60 t (132,200 lbs)

Max. load moment

– 0° to the rear:	173 tm (37.6 t x 4.6 m) 1,245,000 lbft (83,000 x 15 ft)

[1)] With additional equipment

[2)] With special equipment (no currently available)

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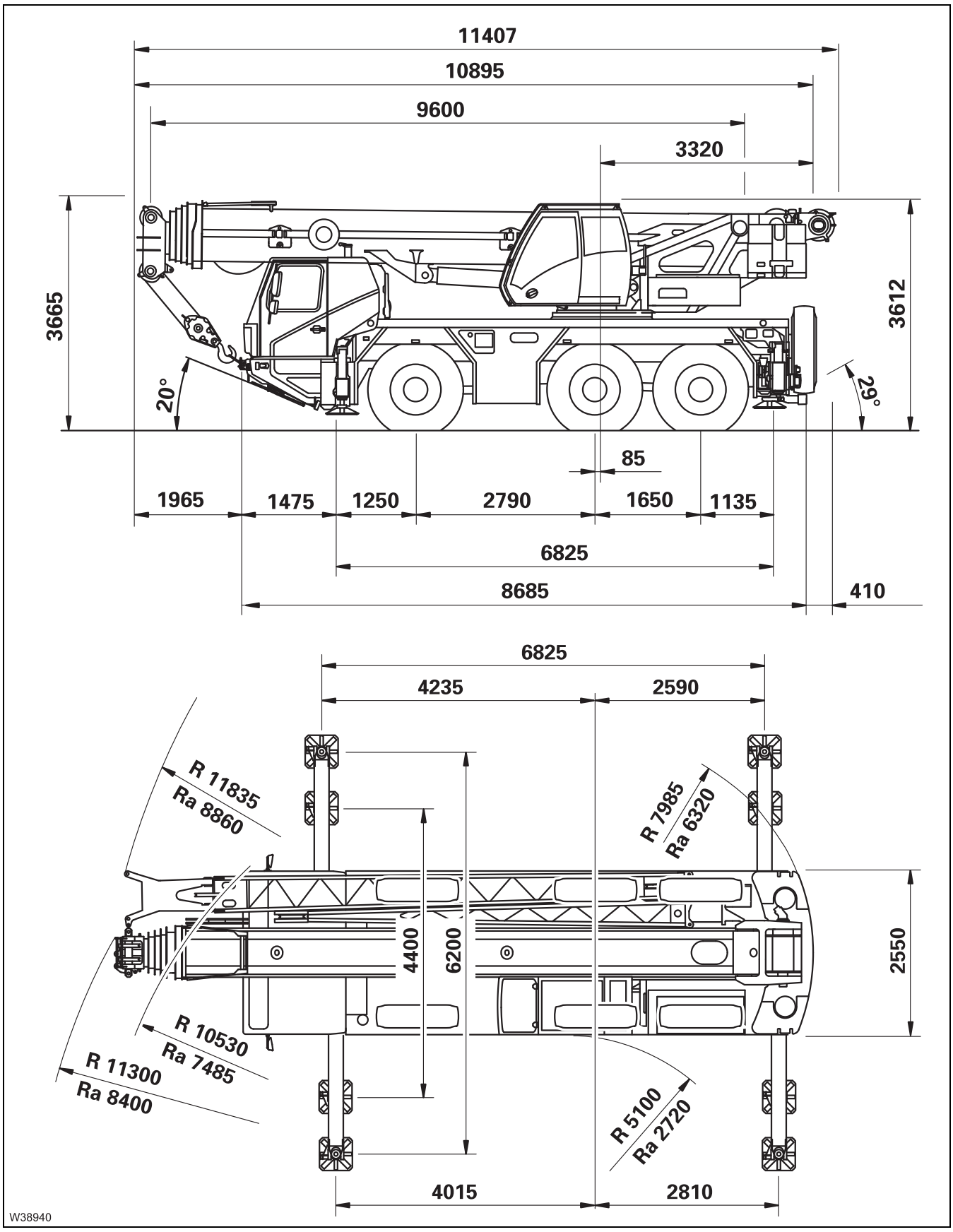
1.5.2 Dimensions and weights of the truck crane, axle loads

All dimensions in the illustration are in mm.



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Dimensions

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

	Length without auxiliary hoist:	10.90 m (35.8 ft)
	Length with auxiliary hoist:	11.41 m (37.5 ft)
A	Height:	At on-road level:
	– 385/95 R25	3.67 m (12 ft)
	– 445/95 R25; 525/80 R25	3.73 m (12.2 ft)
	Max. level change	-130/+170 mm (-5.1/+6.7 in)
B	Width:	
	– 385/95 R25; 445/95 R25	2.55 m (8.4 ft)
	– 525/80 R25	2.75 m (9.0 ft)
C	Angle of negotiable banks:	At on-road level (385/95 R25)
	Front:	approx. 20°
	Rear:	approx. 29°

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 36 t (158,730 lbs)
Axle loads:	Depending on driving mode 12 t (26,500 lbs)
Axle loads:[1)]	24 t (53,000 lbs) in operating position, free-standing

[1)] The axle loads given relate to driving with a rigged truck crane and the maximum load that may be lifted according to *Lifting capacity table*.

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1.5.3 Dimensions and weights of removable parts

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

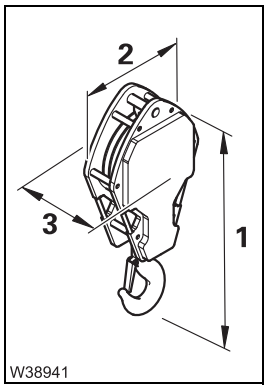
Spare wheel

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)	332 (732)
Spare wheel 525/80 R 25	1.50 x 1.50 x 0.53 (4.92 x 4.92 x 1.74)	362 (798)

Outriggers

Designation	Diameter x Height in m (ft)	Weight in kg (lbs)
Steel outrigger pads, front, each	0.51 x 0.51 x 0.20 (1.67 x 1.67 x 0.66)	36 (80)

Hook blocks



Designation	(1) x (2) x (3) in m (ft)	Weight in kg (lbs)
Single or double hook, 5 sheaves	1.50 x 0.55 x 0.40 (4.90 x 1.80 x 1.30)	550 (1,215)
Single or double hook, 3 sheaves	1.40 x 0.55 x 0.30 (4.60 x 1.80 x 1.00)	360 (795)
Single hook, 1 sheave	1.35 x 0.55 x 0.25 (4.45 x 1.80 x 0.82)	210 (465)
Hook tackle	0.90 x 0.35 x 0.35 (2.95 x 1.15 x 1.15)	100 (220)

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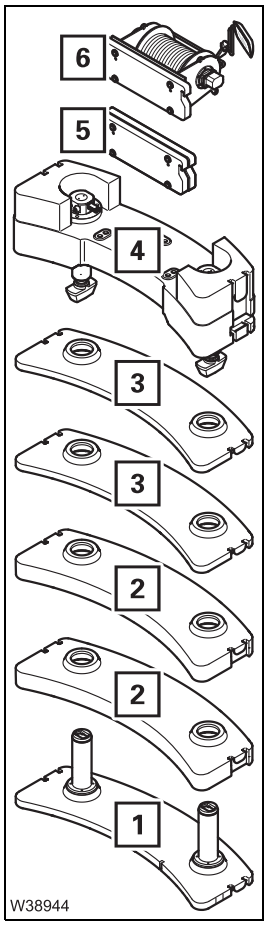
Counterweight sections

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

Counterweight – version A



Item	Designation	Length x width x height in m (ft)	Weight in kg[1)] (lbs)
1	1 t base plate	0.96 x 2.55 x 0.57 (3.15 x 8.40 x 1.87)	1,050 (2,315)
2	2 t section	0.96 x 2.55 x 0.25 (3.15 x 8.40 x 0.82	2,100 (4,630)
3	1 t section	0.96 x 2.55 x 0.20 (3.15 x 8.40 x 0.65)	1,050 (2,315)
4	5.6 t section	Fixed on the turntable	
5 **6**	0.5 t section (2x) or Auxiliary hoist with 0.5 t section		

1) There may be deviations of up to ± 3% due to the manufacturing procedure.

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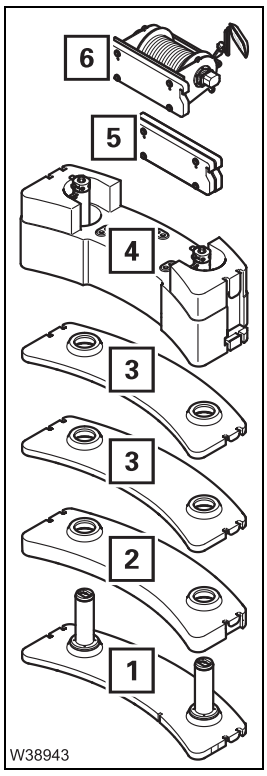
Counterweight – version B



Item	Designation	Length x width x height in m (ft)	Weight in kg[1] (lbs)
1	1 t base plate	0.96 x 2.55 x 0.40 (3.15 x 8.40 x 1.35)	1,050 (2,315)
2	2 t section	0.96 x 2.55 x 0.25 (3.15 x 8.40 x 0.82	2,100 (4,630)
3	1 t section	0.96 x 2.55 x 0.20 (3.15 x 8.40 x 0.65)	1,050 (2,315)
4	7.6 t section	Fixed on the turntable	
5 **6**	0.5 t section (2x) or Auxiliary hoist with 0.5 t section		

1) There may be deviations of up to ± 3% due to the manufacturing procedure.

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1.5.4 Carrier

Engine

Cummins:	QSL 9[2)]
Engine emissions:	97/68/EC level 4 (TIER 4 Final/Euromot 4)
Power:	261 kW (350 PS) at 2,100 rpm (ECE R 120)
Fuel tank[1)]:	approx. 400 l (105.6 gal)
AdBlue (DEF) tank	approx. 40 l (10.6 gal)

[1)] For additional equipment with a dual tank: approx. 267 l (70.5 gal) + 133 l (35 gal)

[2)] For more information; ➠ *Notes on the engine*, p. 1 - 35.

transmission

ZF-AS Tronic automated transmission system 12 AS 2302, 12 forward gears, 2 reverse gears.

Transfer case

Kessler VG 2600, 1-stage

Axle lines

Drive:	**6 x 4 x 6**
1st axle line:	Steered axle line
2nd axle line:	Steered and driven axle line
3rd axle line:	Steered and driven axle line, steering can be switched on

Drive:	**6 x 6 x 6[1)]**
1st axle line:	Steered and driven axle line, drive can be activated
2nd axle line:	Steered and driven axle line
3rd axle line:	Steered and driven axle line, steering can be switched on

[1)] Additional equipment

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Steering

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

Tyres

6 x 385/95 R 25 on disc wheels 9.50-25/1.7
6 x 445/95 R 25[1)] on disc wheels 11.00-25/1.7
6 x 525/80 R 25[1)] on disc wheels 17.00-25/1.7

[1)] Additional equipment

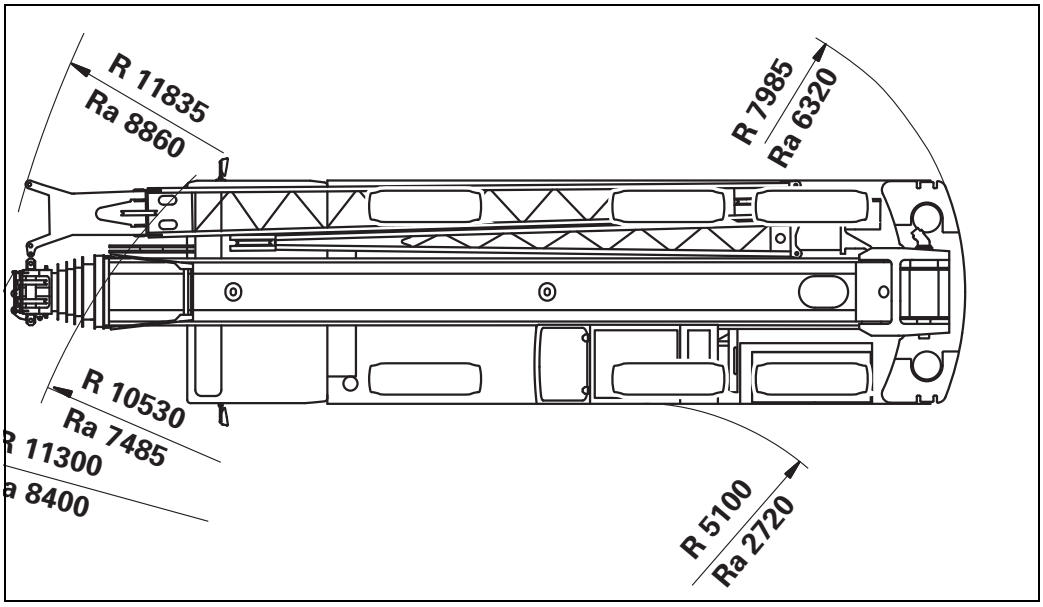
Torque for wheel nuts: 650 Nm (480 lbf ft).
Tyre pressure; ➠ *Maintenance manual*.

Turning radii

All dimensions in the illustration are in mm.

R = values for normal steering mode

Ra = values for all-wheel steering



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Outriggers

Design:	4-point telescoping outrigger system
Control system:	Can be controlled from both sides on the carrier and individually from the crane cab
Outrigger span (standard):	6.825 x 6.200 m (22.4 x 20.3 ft) 6.825 x 4.400 m (22.4 x 14.4 ft) 6.825 x 2.320 m (22.4 x 7.6 ft)
Outrigger span (MAXbase):	*Enabled outrigger spans*, p. 12 - 22
Outrigger pads:	Size: 500 x 500 mm (19.7 x 19.7 in) Area: 2,500 cm^2 (387.5 in^2)
Stroke of supporting cylinders:	500 mm (19.7 in)
Maximum outrigger pressure:	Front: 28.0 t (61,720 lbs) Rear: 36.0 t (79,366 lbs)
Inclination indicator:	In the crane cab, at the *Outrigger* control units.
Outrigger pressure display[1)]:	In the outriggers, integrated with a display in the crane cab and on the *Outrigger* control units, depending on design.

[1)] Additional equipment

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Electrical system

Alternator:	28 V/100 A
Batteries:	2 each of 12 V/180 Ah
Voltage:	24 V

Tool

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

Towing couplings

Front towing coupling:	100 kN (22,480 lbf) permissible tension[1)]
Rear tow lug:	75 kN (16,860 lbf) permissible tension[1)]

[1)] Only permissible at certain tension angles; ➠ p. 5 - 63

Driving speeds

At an engine speed of 1,700 rpm

Forwards:	max. 80.0 km/h (49.7 mph)
Reverse:	about 6 km/h (3.7 mph) depending on the tyres

Climbing ability

Transport weight 36 t (79,370 lbs)

Drive	Climbing ability with tyres		
	385/95 R25	445/95 R25	525/80 R25
6 x 4 x 6 or 6 x 6 x 6	61%	54%	54%

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1.5.5 Superstructure

Main hoist

Drum diameter:	300 mm (11.81 in) (rope centre to rope centre)
Rope diameter:	16 mm (0.63 in)
Rope length:	170 m (558 ft)
Rope pull:	185 m (607 ft)
Power unit group:	50.0 kN/line (11,240 lbf)
Load spectrum:	L 1
Load spectrum factor:	Km = 0.125
Theoretical service life:	D = 3,200 h

Auxiliary hoist

Drum diameter:	300 mm (11.81 in) (rope centre to rope centre)
Rope diameter:	16 mm (0.63 in)
Rope length:	170 m (558 ft)
Rope pull:	185 m (607 ft)
Power unit group:	50.0 kN/line (11,240 lbf)
Load spectrum:	L 1
Load spectrum factor:	Km = 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):	-2.7° to + 82° from horizontal position
Power unit group:	M2 (to ISO 4301 - 2)

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Main boom

Main boom lengths:	9.6 m to 42.9 m (31.5 ft to 140.7 ft)
Main boom head:	5 sheaves 6 sheaves[1)]
Cylinder:	One single-level telescoping cylinder with locking/unlocking mechanism
Power unit group Telescoping mechanism:	M 1 (to ISO 4301 - 2)

[1)] Additional equipment

Lattice extension As additional equipment; ➠ *Lattice extension operating manual*.

Operating speeds The specified operating speeds only apply to an engine speed of approx. 1,500 rpm/1850 rpm without a load.

Main hoist:	Rope speed when lifting		
	Normal speed:	maximum 65 m/min (213 ft/min)	
	High-speed mode:	maximum 125 m/min (410 ft/min)	
Auxiliary hoist:	Rope speed when lifting		
	Normal speed:	maximum 65 m/min (213 ft/min)	
	High-speed mode:	maximum 125 m/min (410 ft/min)	
Slewing gear:	0 to 2.5 revolutions per minute (without load)		
Telescoping mechanism:	extend from 0 -0 - 0 - 0 - 0 to 100 - 100 - 100 - 100 - 100		
	approx. 300s	In automatic mode during uninterrupted locking and telescoping processes	
Derricking gear:	Derricking between - 2.7° and 82°		
	Normal speed:	Raising:	approx. 60 s
	High-speed mode:	Raising:	approx. 30 s

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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 Manual

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 (for example, 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.

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– **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

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

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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 (for example, danger to life, risk of injury or risk of crushing) usually precedes the warning.

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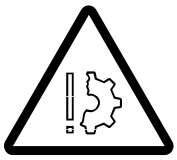
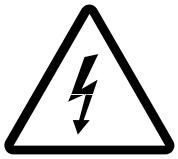


This symbol indicates dangers which represent a hazard to objects, for example, damage to the truck crane or other parts which are located within the working range.



This symbol warns you about situations where there is a danger of electric shock.

This symbol is to remind you that you are working with substances which pose a risk to the environment. Exercise special caution. Further information on handling substances that are harmful to the environment; ➠ *Maintenance manual*, Chapter *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. So turn the page!

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 **8** contain a description of how to drive the truck crane.

– Chapters **9** to **15** contain a description of crane operation.

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

Structure of the chapters

Chapters **3** and **9** are structured in relation 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 **8** and **10** to **14** describe procedures, and are therefore structured in relation to these operations. For more extensive processes, the description is given with **checklists** and **operating instructions**.

– The checklists show the procedure in the required sequence, for example, 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.

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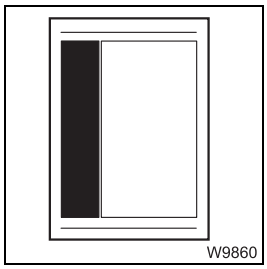
Structure of the pages

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



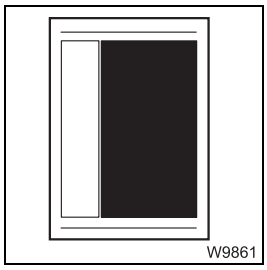
The **narrow column** contains various pieces of information:

– 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, for example,

  • shift the transmission to neutral.

– The following text passages are highlighted in *italics*:

  – Designations of operating elements and switching states, such as 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.

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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.

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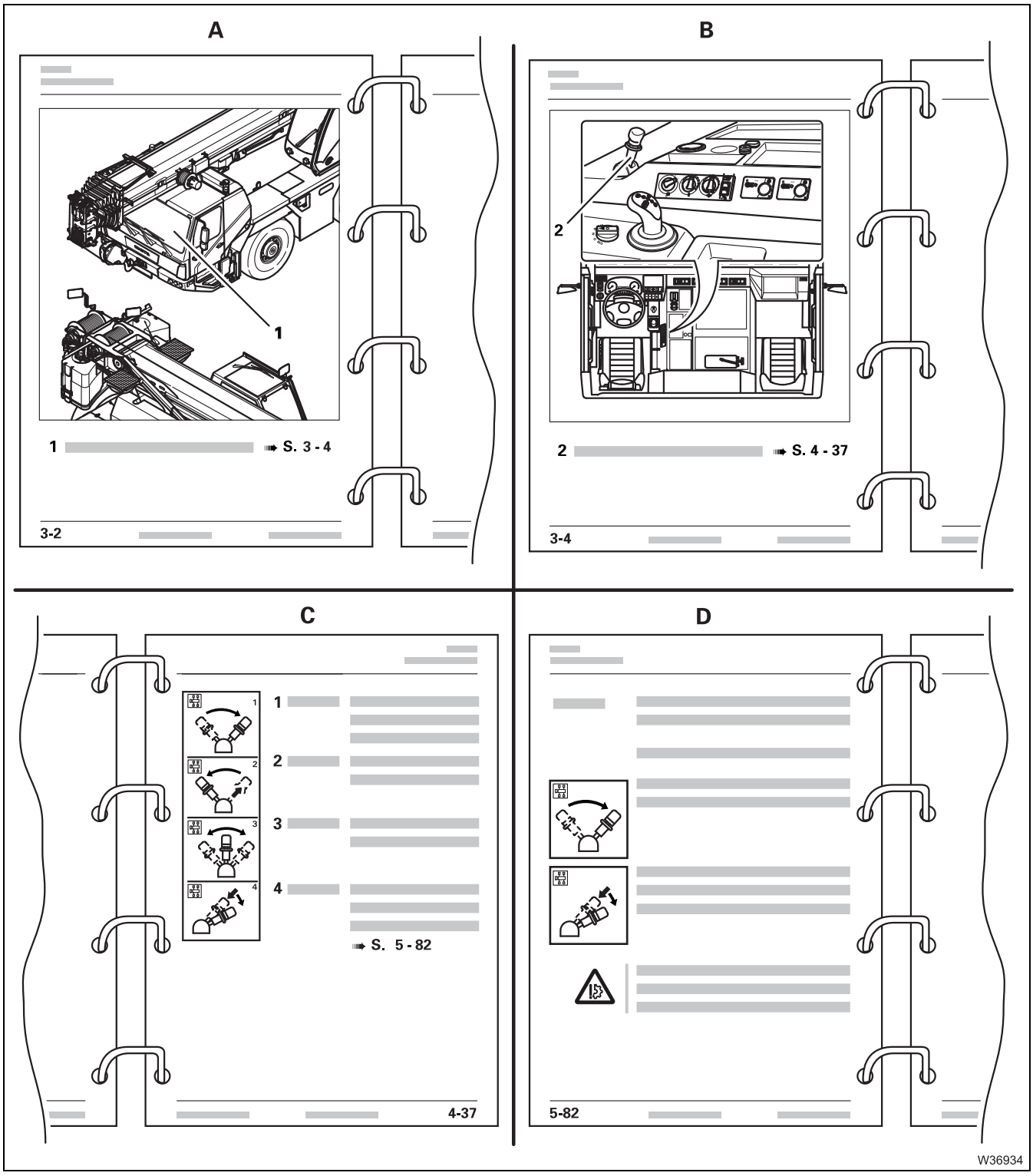
Cross-references example

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



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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 Pages 3 – 4 show 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 - 52

C Pages 3 – 52 give a brief description of all the functions of the parking brake. If further information is available, the brief description contains a cross-reference, for example,

4 Test position for towing a trailer:	– Pull the lever down until it locks into place – Press in the lever and pull it further downwards The parking brake for the trailer is released; ➠ p. 5 - 90.

D Follow the cross-reference to pages 5 - 90. 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*.

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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 - 14

– The permissible outrigger spans for the *Standard* slewing range type; ➠ p. 12 - 18,

– The permissible outrigger spans for the *MAXbase* slewing range type; ➠ p. 12 - 22,

– The size of the outrigger pads; ➠ p. 1 - 15

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1.8 Conversion table for US measuring units

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

Converting from	in	Multiply by
mm	in	0.03937
in	mm	25.4
m	ft	3.28084
ft	m	0.30479
m^2	ft^2	10.76391
cm^2	in^2	0.155
cm^3	in^3	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^2	lbf/in^2	14.50378
lbf/in^2	daN/cm^2	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^2	lbs/ft^2	204.8
m^2/t	ft^2/lbs	0.04882

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1.9 Training – Information

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

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 Centre 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

You can also scan the following QR code.

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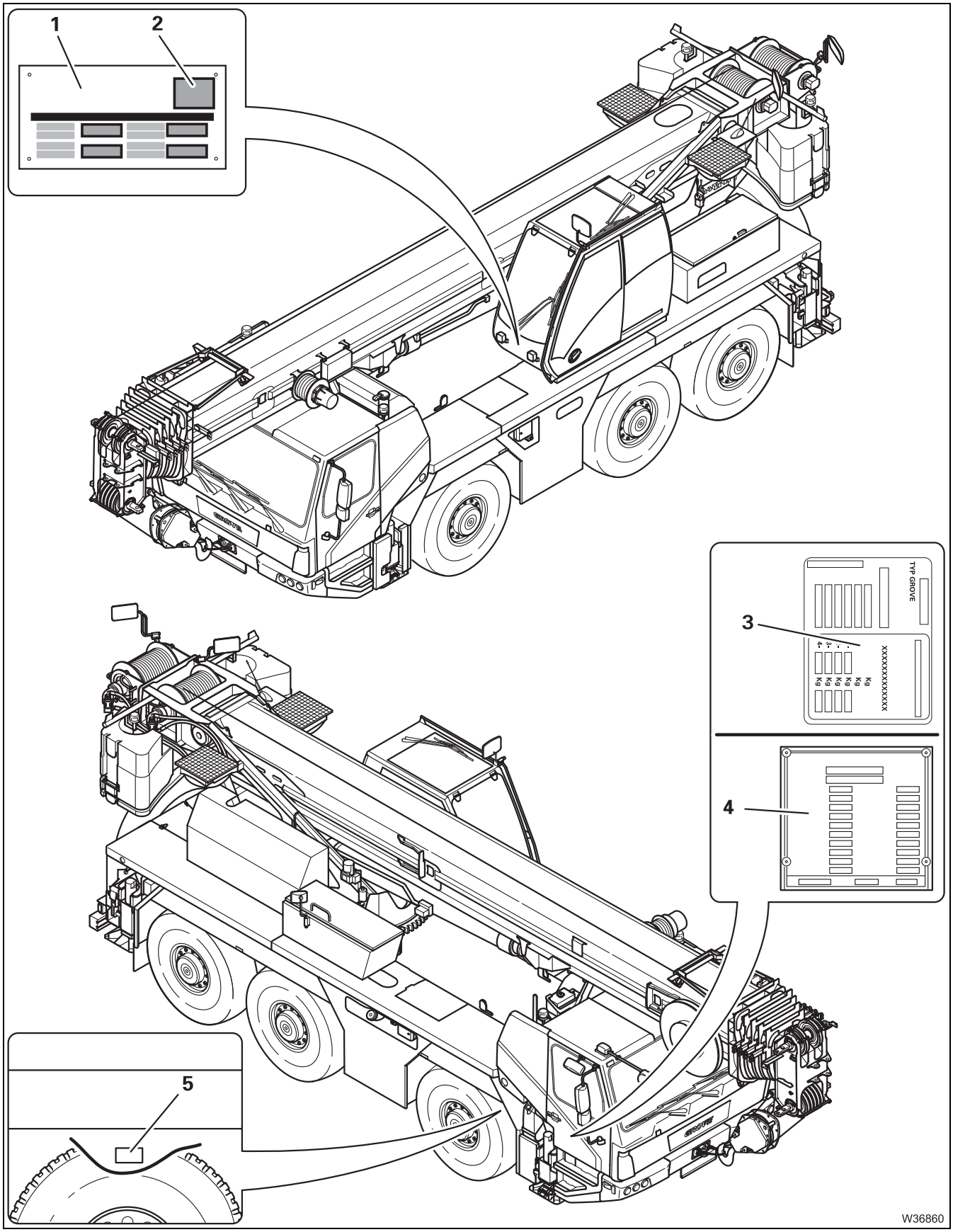
1.10 Identification



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

1 Serial number and crane type

2 the CE mark, which is only applicable for truck cranes whose equipment and configuration complies with the guidelines and standards specified in the supplied EC Declaration of Conformity.

3 Driver's cab serial number (at the strut of the door access)

4 Chassis number and crane type (at the passenger's seat)

5 Chassis number (front of the first axle line in the frame)

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

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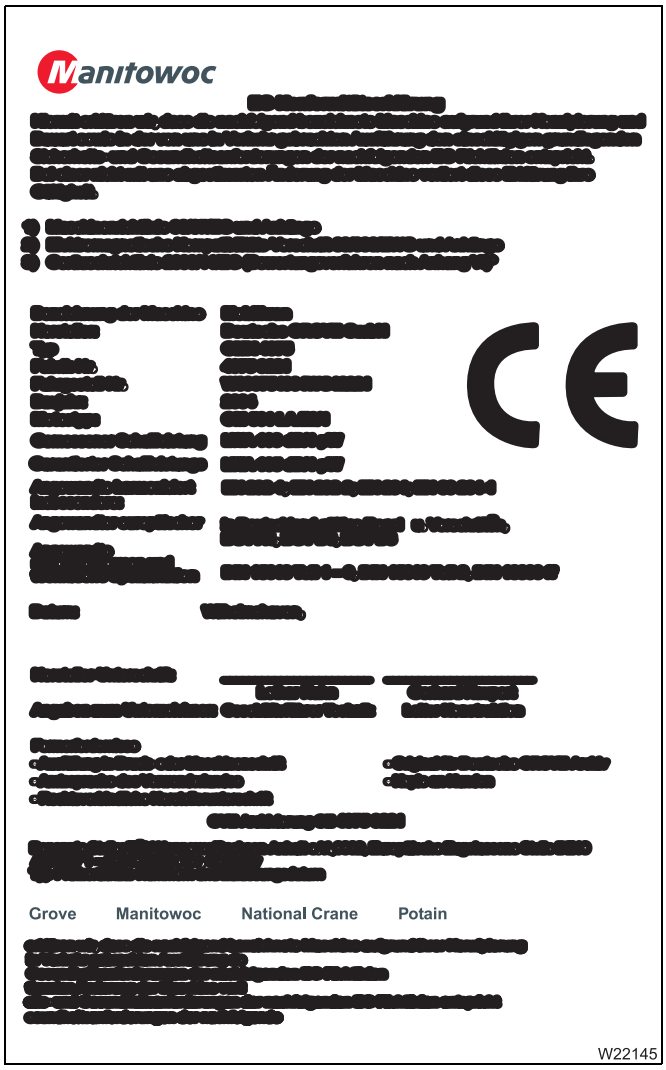
1.11 EC Declaration of Conformity



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.

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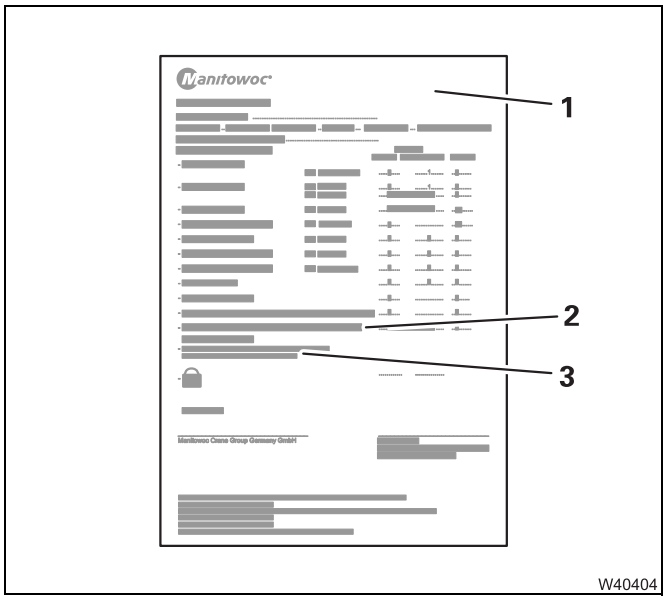
1.12 Notes on the engine

1.12.1 Information on the engine



A delivery receipt (**1**) is supplied with the documentation.

This contains information on the engine type (**2**) and engine number (**3**).

You need this information for e.g. ordering spare parts.

You can contact the engine manufacturer at the following address:

https://parts.cummins.com

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2 Basic safety instructions

Notes on the warnings used; ➠ *What do the symbols used mean?*, p. 1 - 21.

2.1 Intended use

The GMK3060 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 be modified only with the consent of **Manitowoc Crane Group Germany GmbH**.

The GMK3060 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 GMK3060 truck crane may only be operated without the corresponding special equipment within the permitted temperature range;
➠ *Technical data*, p. 1 - 7.

The GMK3060 truck crane is designed solely for lifting loads which are within the permitted GMK3060 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 GMK3060 may only be operated with parts of equipment that have been approved by **Manitowoc Crane Group Germany GmbH** and which are labelled with the serial number of the GMK3060.

The manufacturer is not liable for any damage caused by improper or unauthorized use of the GMK3060 truck crane. The user alone bears the risk.

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2.1.1 Improper use

Die **Manitowoc Crane Group Germany GmbH** is not liable for damage resulting from improper or unauthorized use of the GMK3060 truck crane. The user alone bears the risk.

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 impermissible 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 corresponding break
- Use for any kind of sport or recreation event, especially for bungee jumping.

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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 truck 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. These could get caught or pulled into the unit and result in injury.

Use your personal protective equipment 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.

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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 additional units to the truck crane without the consent of the manufacturer if such changes would affect the safety. This also applies to:

– Installation of safety devices

– Adjustment of safety devices and valves

All welding work (especially on load carrying members) may only be performed by qualified professional personnel with the prior written 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 carrying out 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 no safety defects are noticeable.

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.

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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 (for example, 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 about working with cranes and the qualifications required in the country in which you are working.

– You must be familiar with and understand the operating instructions.

– You must be familiar with and have understood the accident prevention regulations.

– You must fulfil all physical and mental requirements for truck crane operation; for example, 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*.

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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 truck crane.

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.

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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.

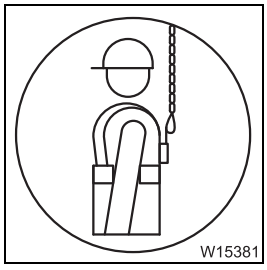
Check daily that all covers and safety devices are fitted properly and are in good condition before crane operation.

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.

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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 hazardous. Carry out this type of work with special caution.

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

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

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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 precautionary measures be taken. Please 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**.

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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.).

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The crane operator must have knowledge of and meet the requirements of the relevant legal regulations and standards (e.g. the DGUV 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 in the crane cab and in 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 *Safe distance from overhead power lines* section.

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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.

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3 Operating elements for driving

All operating elements for crane operation are described in Chapter 9.

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.

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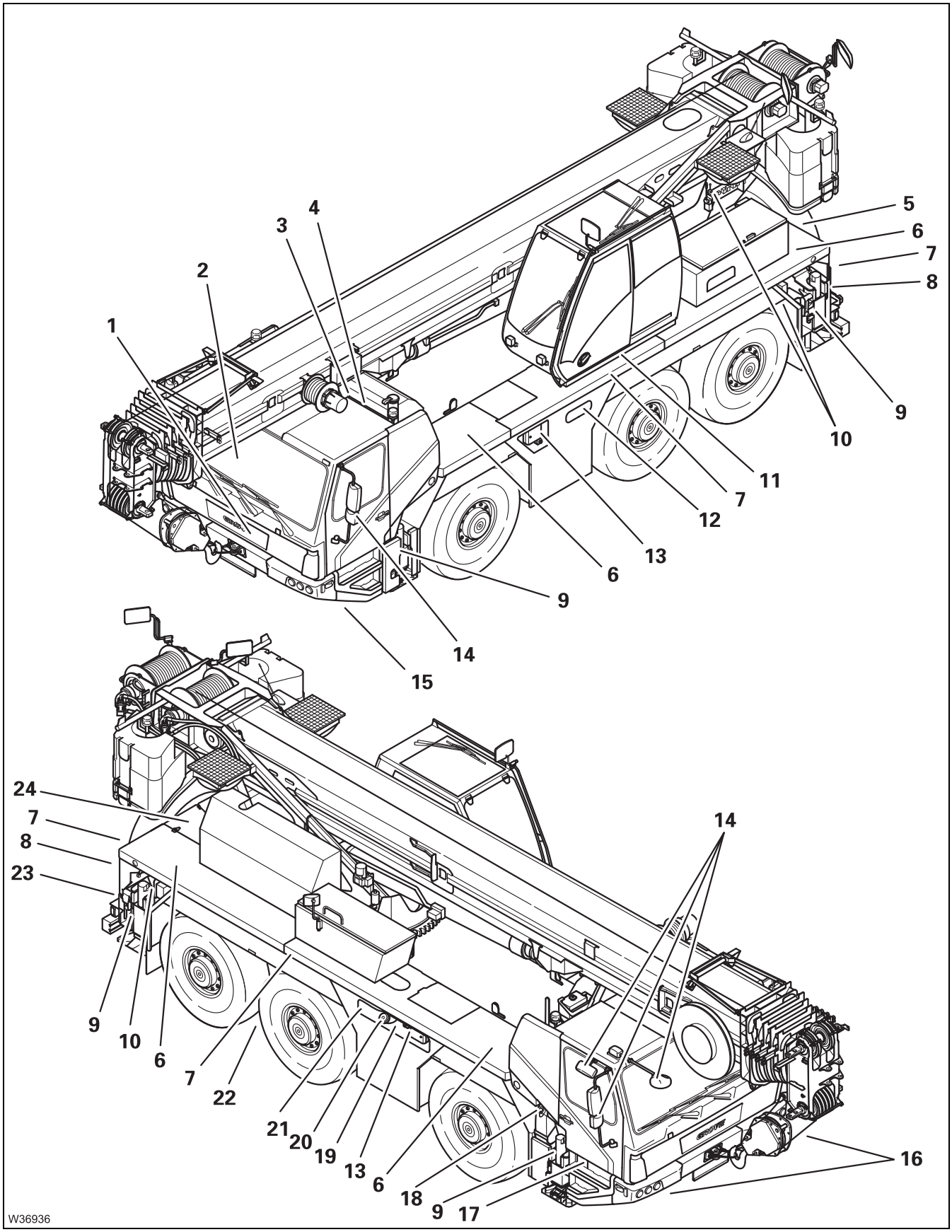
3.1.1 On the outside of the truck crane



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1 Front flap ➠ p. 3 - 75

2 Driver's cab – Overview ➠ p. 3 - 4

3 Engine ➠ p. 4 - 1

4 Air intake inhibitor[1)] ➠ p. 4 - 21

5
- Spare wheel[1)] ➠ p. 8 - 33
- Towbar coupling[1)] ➠ p. 5 - 81
- Third brake light – At the rear of carrier/storage compartment[1)] ➠ p. 5 - 11
- Third brake light – At the spare wheel clamp[1)] ➠ p. 8 - 34

6 Hook-on ladders, Swing-out ladders ➠ p. 3 - 77

7 BirdView system 270° – Camera[1)] ➠ p. 3 - 57

8 Chocks[1)] ➠ p. 5 - 52

9 Outriggers
- Operation ➠ p. 12 - 27
- Lighting[1)] ➠ p. 12 - 30

10
- Hydraulic emergency operation with the hand pump ➠ p. 14 - 51
- Hydraulic emergency operation as per DGUV[1)] ➠ p. 14 - 57

11 Step at the crane cab Extendable/retractable ➠ p. 12 - 112

12 Compressed-air supply ➠ p. 8 - 29

13
- Outrigger control units ➠ p. 3 - 38
- Emergency stop switch ➠ p. 4 - 20
- Externally starting the truck crane[1)] ➠ p. 8 - 27

14 Adjusting the mirrors[1)] ➠ p. 5 - 6

15 Folding ladder ➠ p. 3 - 77

16 Warning plates for vehicle width[1)] ➠ p. 5 - 8

17 Driver's cab tilt mechanism ➠ p. 8 - 40

18 AdBlue (DEF) tank[2)] ➠ p. 4 - 7

19
- Battery master switch ➠ p. 4 - 9
- Battery charger[1)] ➠ p. 8 - 28

20
- Fuel tank ➠ p. 4 - 5
- Dual- tank[1)] ➠ p. 4 - 6

21 Inflating the tyres yourself ➠ p. 8 - 37

22 Shut-off valves at the hydraulic tank ➠ p. 4 - 8

23
- Reverse camera[1)] ➠ p. 3 - 56
- Reversing lamp[1)]

24 Storage compartment

[1)] Additional equipment

[2)] DEF (**D**iesel **E**xhaust **F**luid),
Consumable for exhaust gas emission control, e.g. *AdBlue*.

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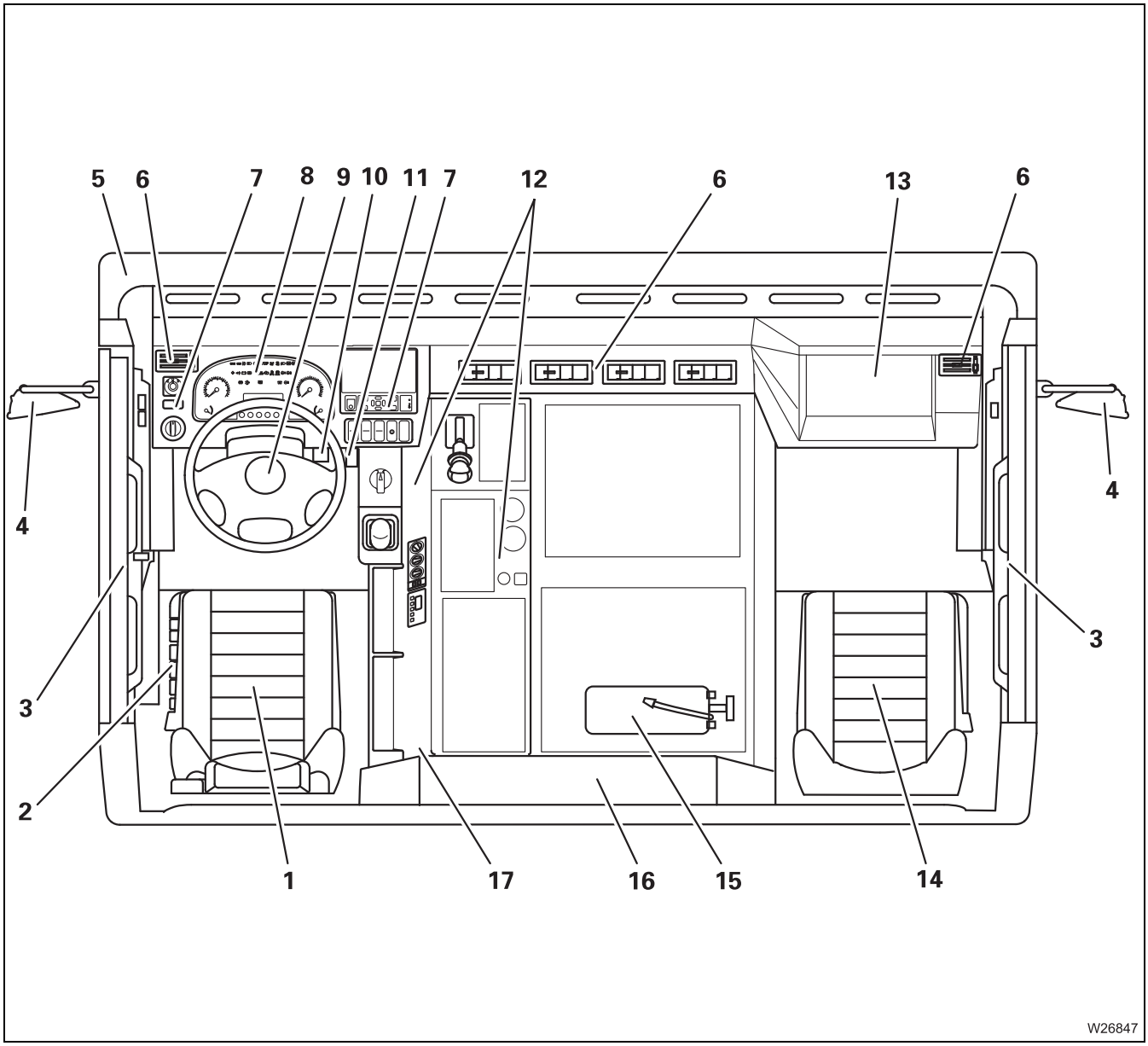
3.1.2 Driver's cab – Overview

Overview



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1 Adjusting the driver's seat ➠ p. 5 - 12

2 Storage compartment ➠ p. 5 - 15

3 Overview of doors ➠ p. 3 - 9

4 – Adjusting the mirrors ➠ p. 5 - 6
– Mirror heating ➠ p. 5 - 7

5 Front overview ➠ p. 3 - 6

6 Adjusting the air vents ➠ p. 5 - 70

7 Instrument panel, Left/right ➠ p. 3 - 11

8 Instrument panel, Middle ➠ p. 3 - 12

9 Steering column/steering wheel ➠ p. 3 - 10

10 Service brake ➠ p. 3 - 60

11 Accelerator ➠ p. 5 - 44

12 Side overview ➠ p. 3 - 7

13 Rest

14 Adjusting the passenger seat ➠ p. 5 - 14

15 Fire extinguisher**1)**

16 Rear overview ➠ p. 3 - 8

17 Fold-up berth**1)** ➠ p. 5 - 54

1) Additional equipment

2) ➠ *Maintenance manual*

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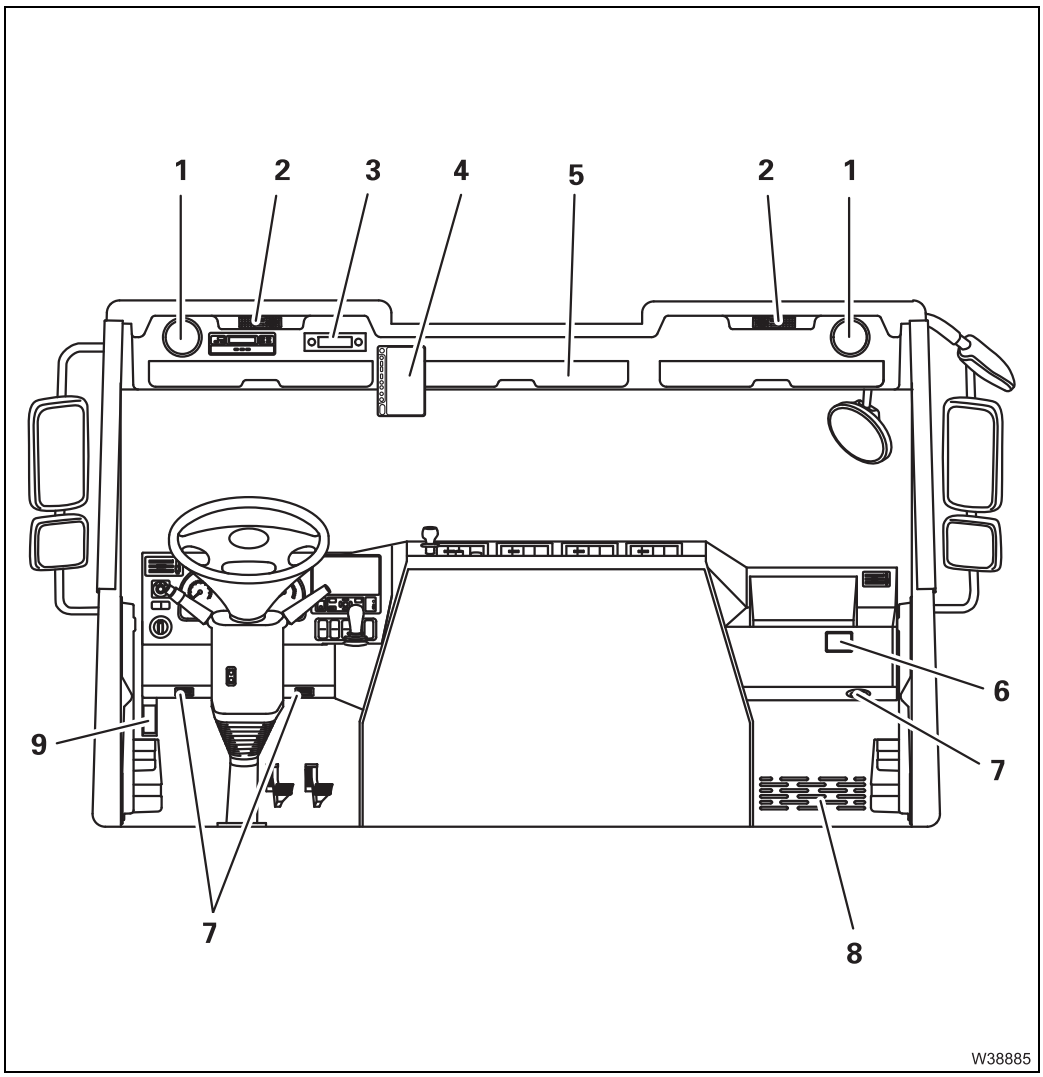
Front overview



1 Loudspeaker[1)]
2 Cab lighting ➠ p. 3 - 71
3 Radio/USB [1), 2)] ➠ p. 5 - 80
4 BirdView system 270° – Monitor[1)] ➠ p. 3 - 57
5 Sun visor
6 Ashtray
7 Adjusting the air vents ➠ p. 5 - 70
8 Air intake opening ➠ p. 5 - 69
9 Front flap – Unlock ➠ p. 3 - 75

[1)] Additional equipment

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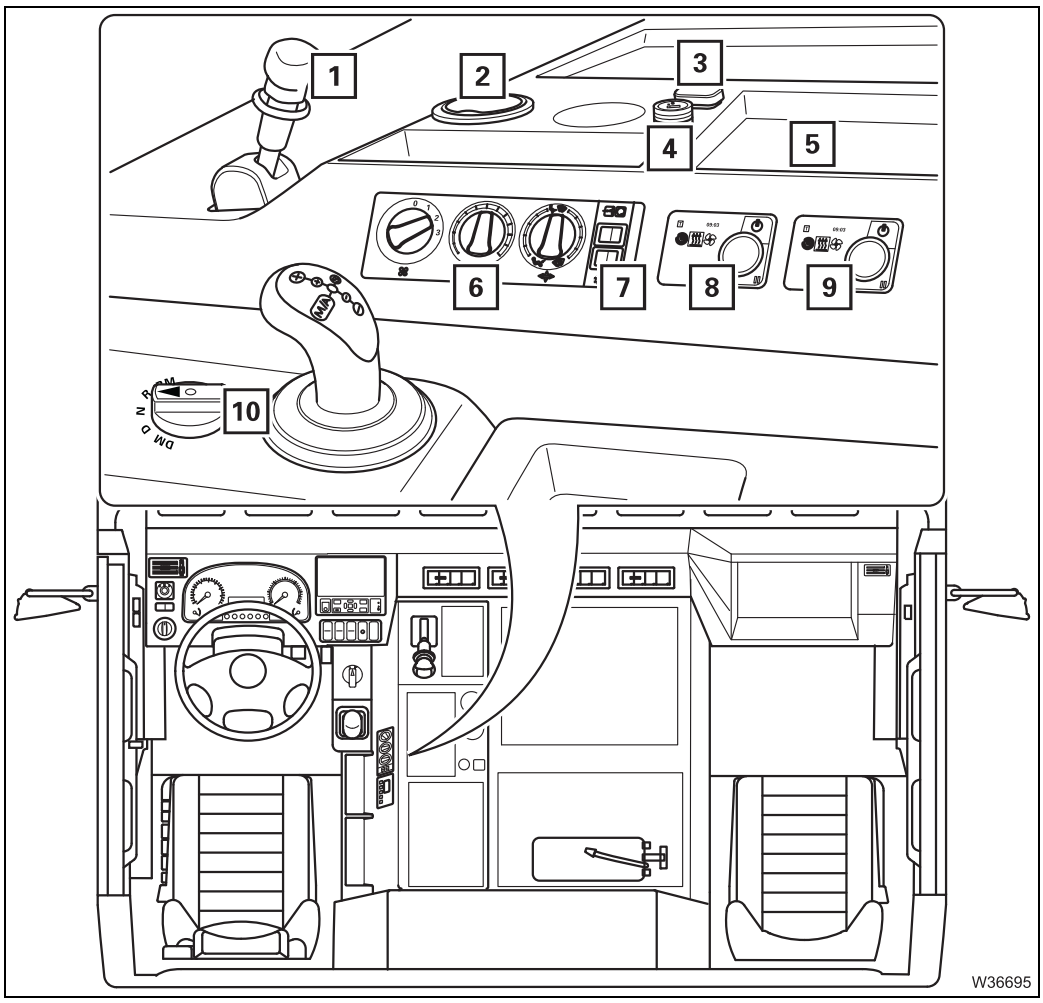
Side overview



1 Parking brake ➠ p. 3 - 62

2 Ashtray

3 Sockets 12 V ➠ p. 3 - 49

4 Cigarette lighter

5 Rest ➠ p. 3 - 18

6 Standard heating system ➠ p. 3 - 19

7 Air-conditioning system[1)] ➠ p. 3 - 19

8 – Auxiliary water heating system[1)] ➠ p. 3 - 20
– Auxiliary water heating system with the low temperature package[1), 2)]

9 Battery heater[1) 2)]

10 Transmission operating elements ➠ p. 3 - 17

[1)] Additional equipment

[2)] Component of the low temperature package; ➠ *Separate operating manual*

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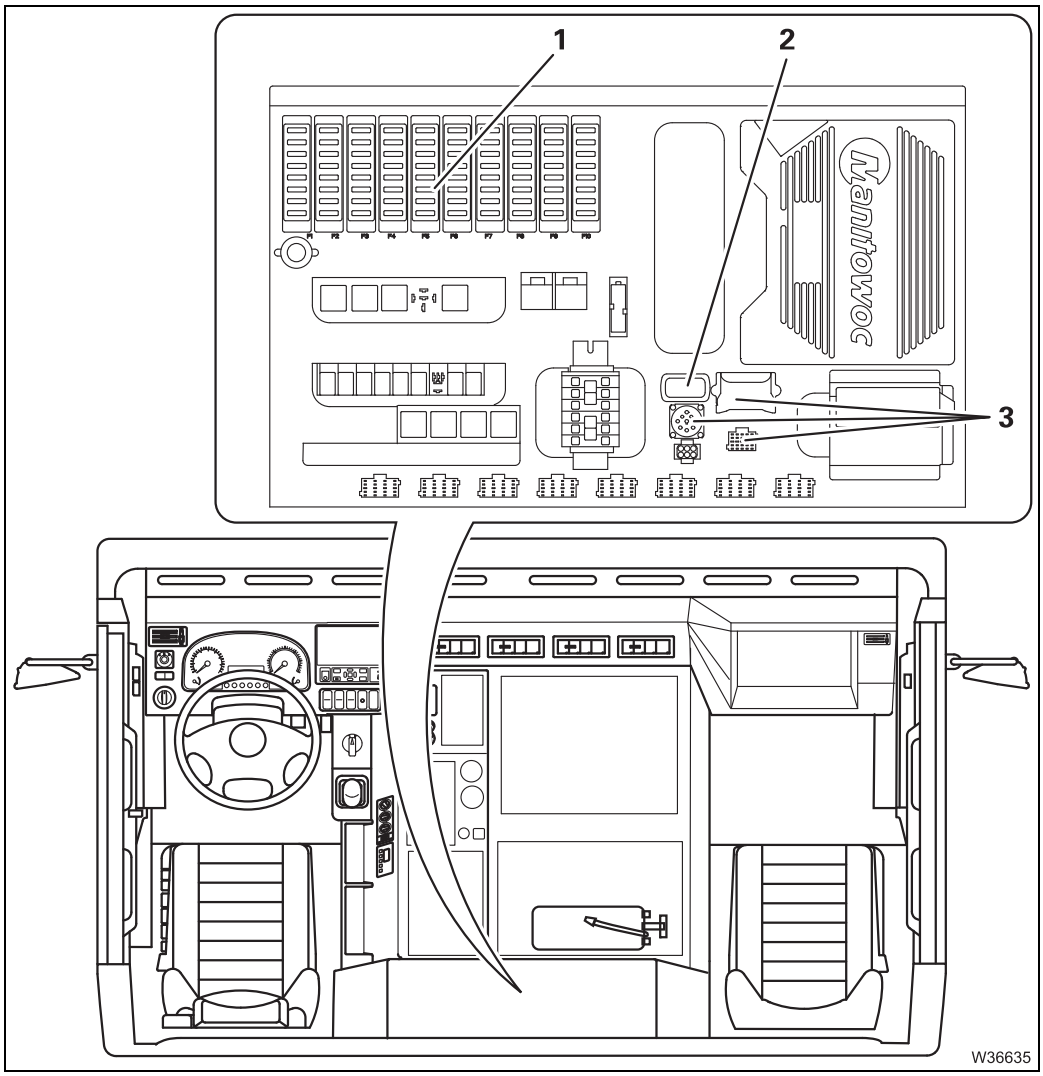
Rear overview Behind the cover



1 Fuses on the carrier ➠ p. 8 - 43

2 Switching emergency operation on/off[1)] ➠ p. 14 - 70

3 Diagnostics ➠ p. 3 - 75

[1)] Additional equipment

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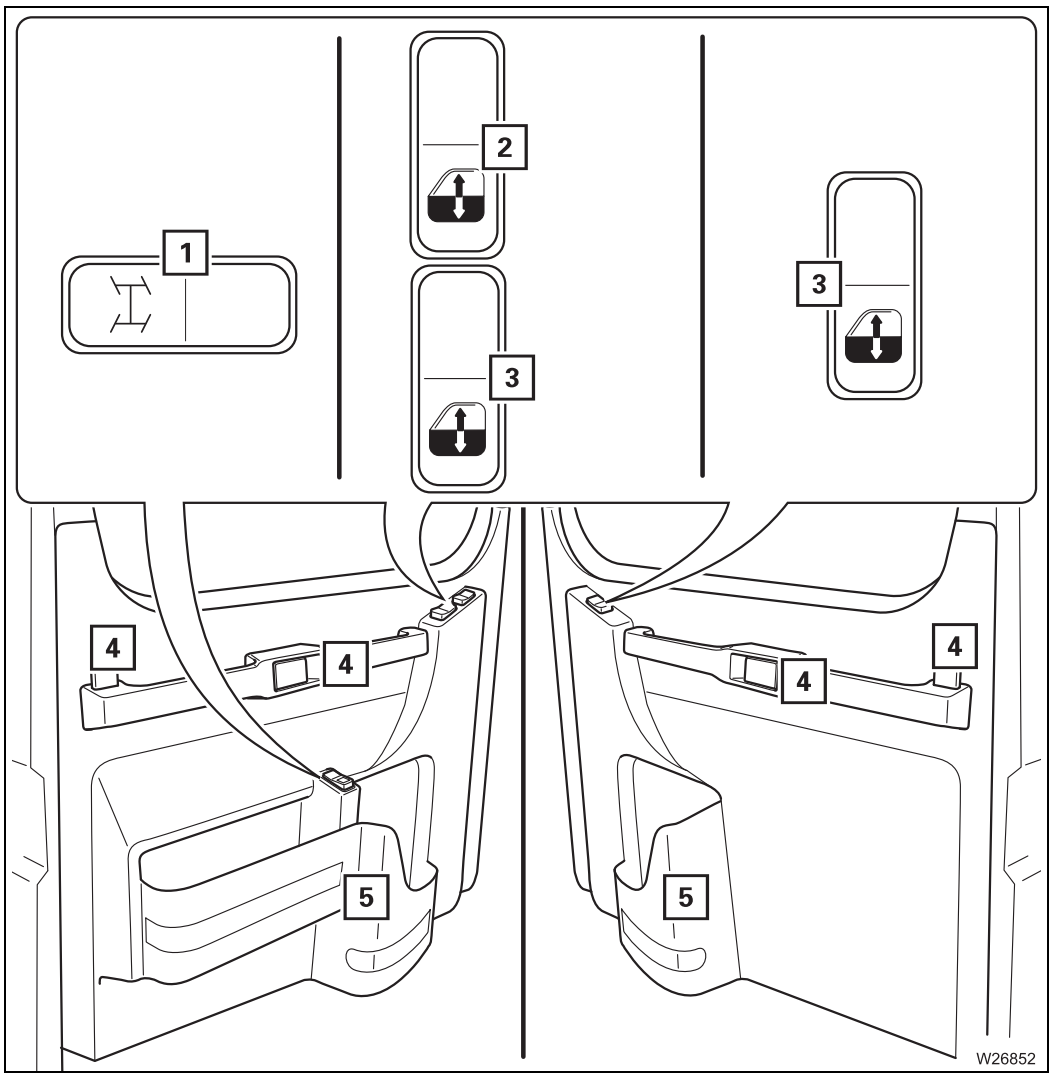
Overview of doors



1 Separate steering p. 3 - 63
2 Window winder – Driver's door p. 3 - 76
3 Window winder – Passenger door p. 3 - 76
4 Locking/unlocking the door p. 3 - 76
5 Rest

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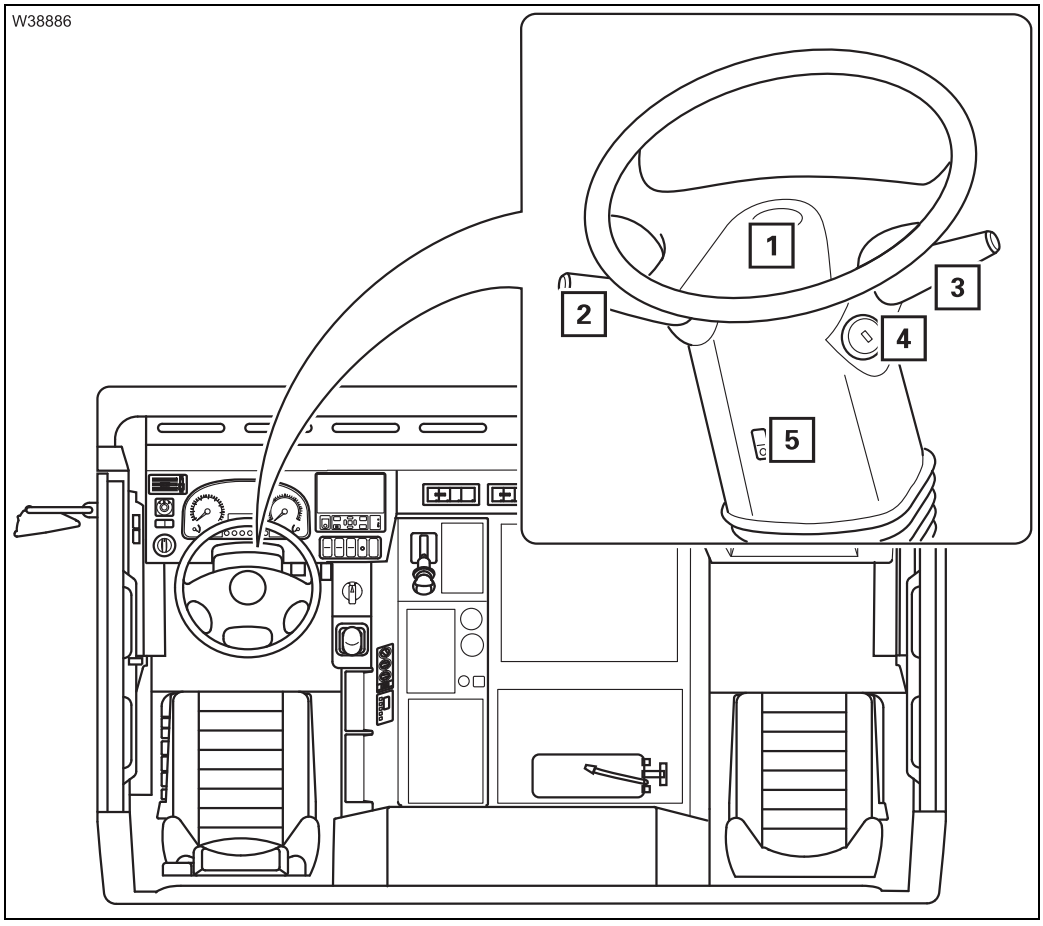
3.1.3 Steering column/steering wheel



1 Steering wheel

2 Horn/headlight flasher/headlight – full beam p. 3 - 68
Turn signal indicator/wiper-washing system p. 3 - 68

3 – Cruise control p. 3 - 42
– Engine retarder/transmission retarder[1)] p. 3 - 61

4 Ignition lock p. 3 - 42

5 Adjusting the steering column p. 5 - 15

[1)] Additional equipment

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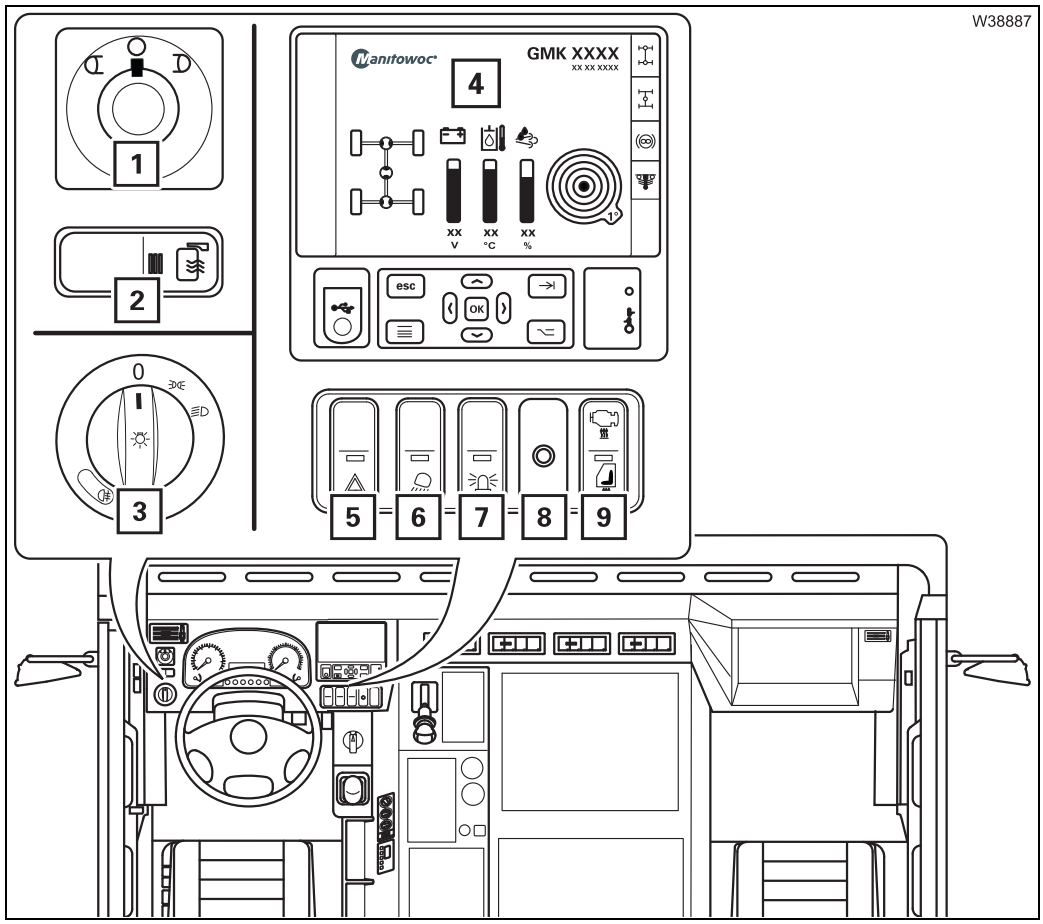
3.1.4 Instrument panel

Left/right



1 Adjusting the mirrors ➠ p. 5 - 6

2 Mirror heating ➠ p. 5 - 7

3 Lighting on/off ➠ p. 3 - 70

4 – CCS control unit ➠ p. 3 - 21
– Reversing camera monitor ➠ p. 3 - 56

5 Hazard warning system on/off ➠ p. 3 - 70

6 Spotlights on rear of carrier on/off[1)] ➠ p. 3 - 71

7 Rotating beacon on/off ➠ p. 3 - 71

8 Dual tank display[1)] ➠ p. 4 - 6

9 Engine/driver's cab preheating preselection[1), 2)]

[1)] Additional equipment – The arrangement of the switches may vary

[2)] Component of the low temperature package; ➠ *Separate operating manual*

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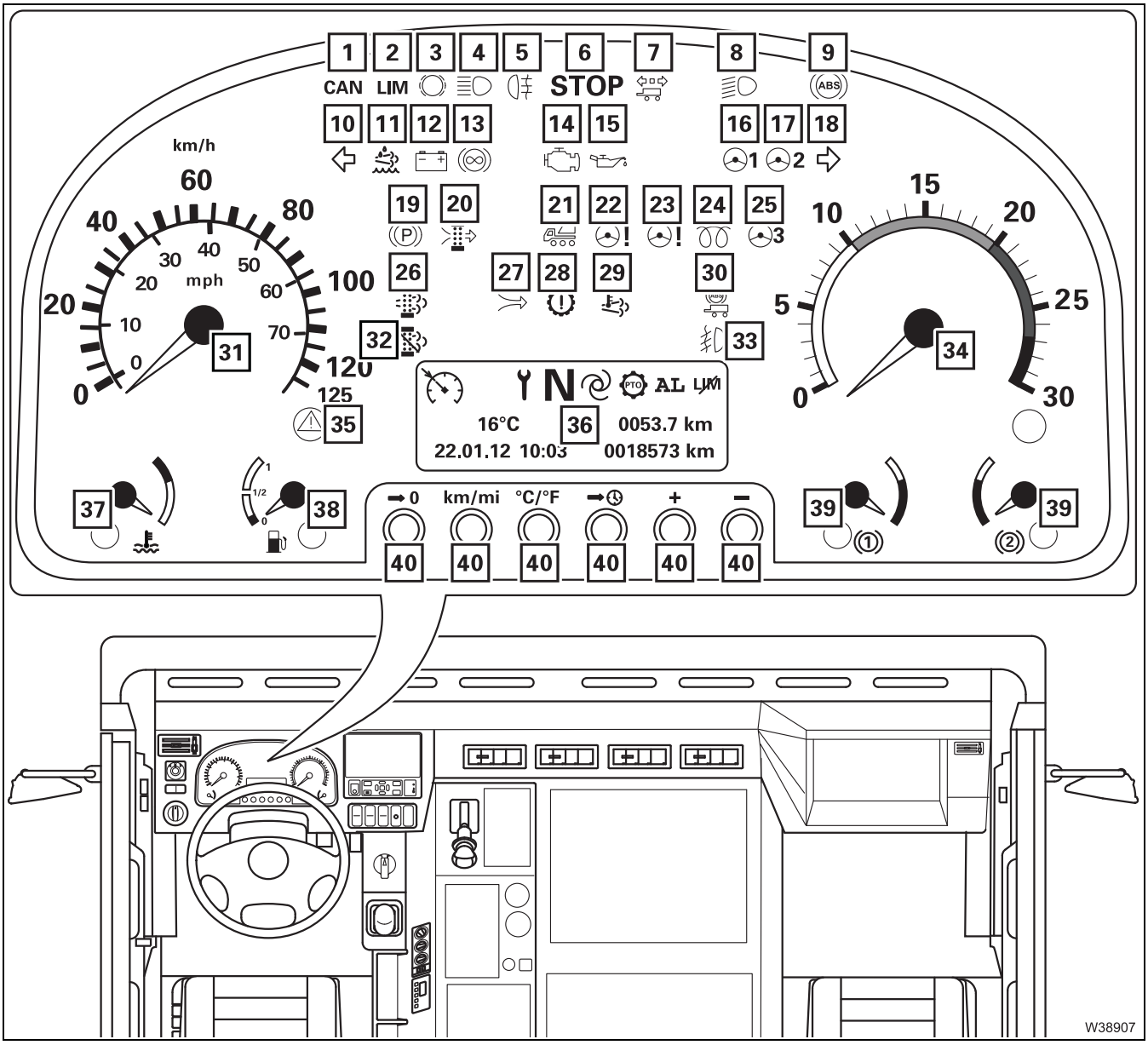
Middle



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1	CAN bus malfunction	➠ p. 8 - 4
2	Torque reduction indicator display[1)]	➠ p. 3 - 45
3	No function	
4	Full beam headlight indicator lamp	➠ p. 3 - 69
5	Fog tail light indicator lamp	➠ p. 3 - 69
6	Engine malfunction warning	➠ p. 8 - 4
7	Indicator lamp for trailer turn signal indicator[1)]	➠ p. 3 - 69
8	Headlight check	➠ p. 3 - 68
9	ABS warning	➠ p. 8 - 7
10	Indicator lamp for turn signal indicator	➠ p. 3 - 69
11	AdBlue warning	➠ p. 8 - 6
12	Carrier voltage too low	➠ p. 8 - 5
13	No function	
14	Engine malfunction early warning	➠ p. 8 - 4
15	Oil pressure too low	➠ p. 8 - 5
16	Steering circuit 1 warning	➠ p. 3 - 63
17	Steering circuit 2 warning	➠ p. 3 - 63
18	Indicator lamp for turn signal indicator	➠ p. 3 - 69
19	Parking brake indicator lamp	➠ p. 3 - 62
20	Replace the air filter[2)]	➠ p. 8 - 7

1) Additional equipment

2) ➠ *Maintenance manual*

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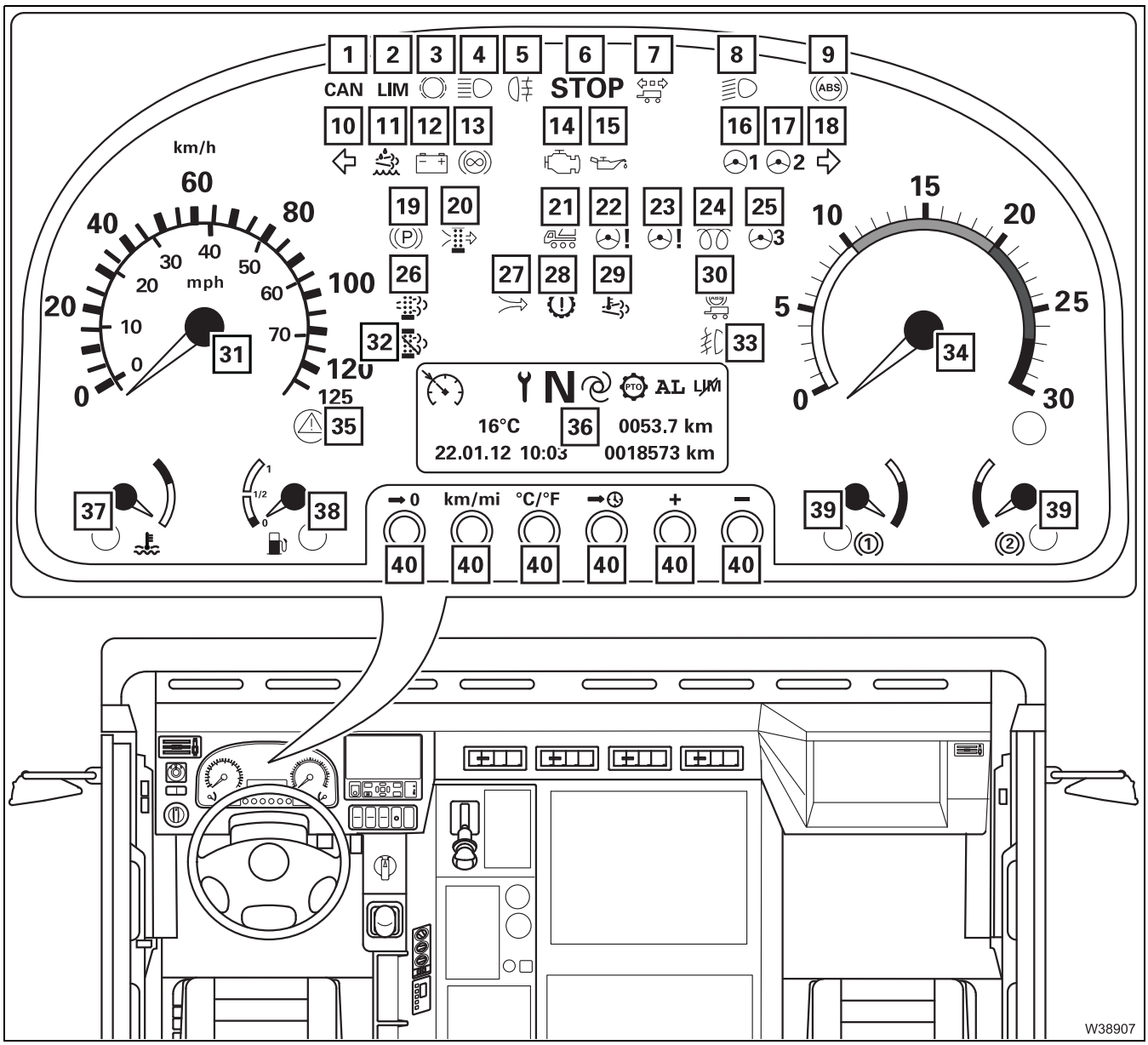
1
2
3
4
5
6
7
8
9
CAN
LIM
STOP
ABS
10
11
12
13
14
15
16
17
18
1
2
km/h
60
40
80
20
100
0
120
mph
30
40
50
20
60
10
70
0
125
19
20
21
22
23
24
25
3
26
27
28
29
30
32
33
15
10
20
5
25
0
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34
35
N
AL
LIM
16°C
36
0053.7 km
22.01.12 10:03
0018573 km
37
38
1
1/2
0
0
km/mi
°C/°F
+
−
39
39
40
40
40
40
40
40
W38907

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21 Superstructure ignition indicator lamp ➠ p. 3 - 44
22 No function
23 No function
24 Flame start system indicator lamp[1)] ➠ p. 3 - 43
25 Steering circuit 3 warning ➠ p. 3 - 63
26 Exhaust system cleaning required ➠ p. 3 - 45
27 Air intake inhibitor triggered ➠ p. 8 - 7
28 Transmission malfunction ➠ p. 8 - 4
29 Exhaust system temperature too high ➠ p. 8 - 6
30 Trailer ABS warning ➠ p. 8 - 7
31 Speedometer ➠ p. 3 - 74
32 Exhaust system cleaning disabled ➠ p. 3 - 45
33 Fog light indicator lamp[1)] ➠ p. 3 - 69
34 Tachometer ➠ p. 3 - 43
35 Tachograph malfunction ➠ p. 5 - 18
36 Driving mode display – Displays ➠ p. 3 - 16
37 Coolant temperature display ➠ p. 3 - 43
38 Fuel level display ➠ p. 3 - 43
39 Display of supply pressure in brake circuits ➠ p. 3 - 60
40 Driving mode display – Operation ➠ p. 3 - 16

1) Additional equipment
2) ➠ *Maintenance manual*

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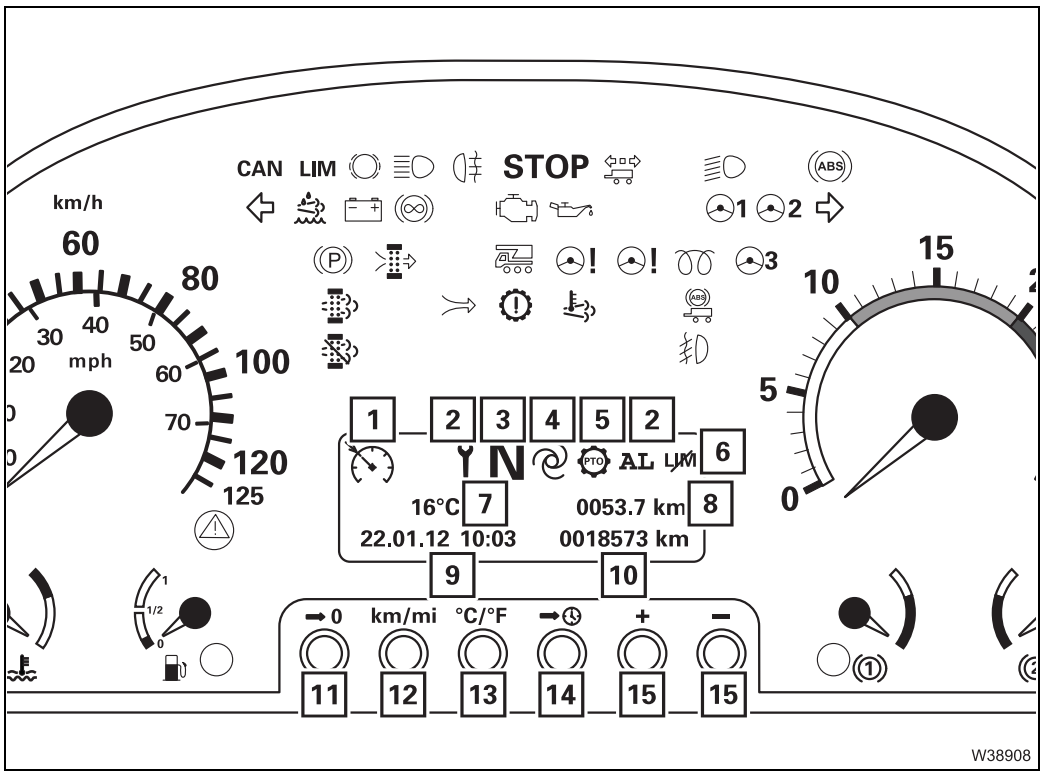
Driving mode display



1	Cruise control display	➠ p. 3 - 44
2	Error messages display	➠ p. 3 - 55
3	Transmission display	➠ p. 3 - 55
4	Operating mode display	➠ p. 3 - 55
5	Crane operation activated	➠ p. 3 - 44
6	Torque reduction display override[1)]	➠ p. 3 - 45
7	Outside air temperature display	➠ p. 5 - 24
8	Daily mileage counter	➠ p. 5 - 24
9	Time/date – Display	➠ p. 5 - 24
10	Kilometre counter	➠ p. 5 - 24
11	Reset daily kilometre counter	➠ p. 5 - 24
12	Switch between km/mi	➠ p. 5 - 24
13	Switching between temperature units (°C/°F)	➠ p. 5 - 24
14	Time/date – Select	➠ p. 5 - 24
15	Time/date – Adjust	➠ p. 5 - 24
	Instrument lighting	➠ p. 5 - 24

[1)] Additional equipment

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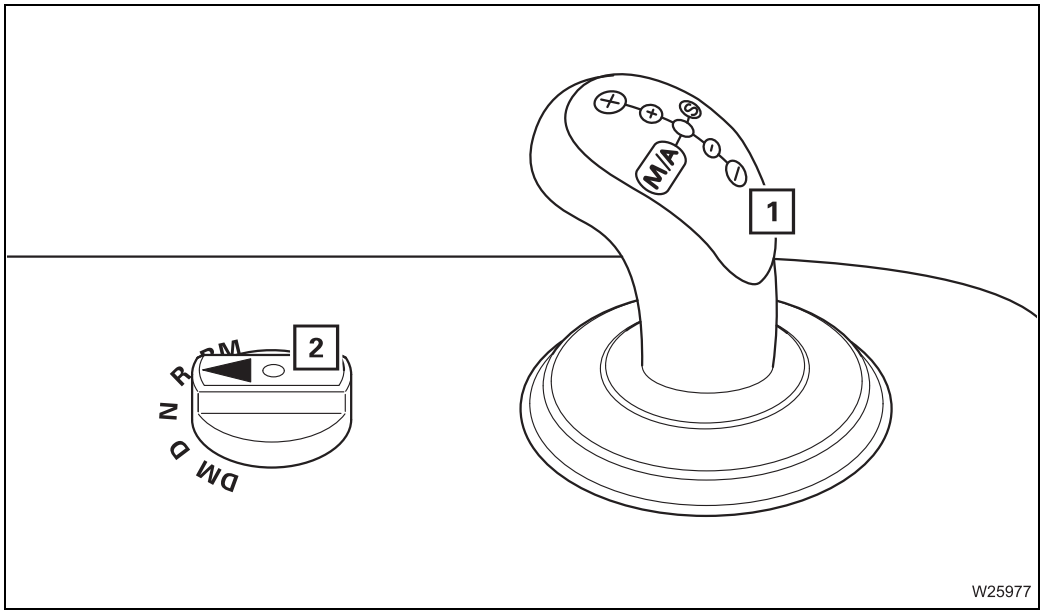
3.1.5 Transmission operating elements



1 Gearshift lever p. 3 - 54

2 Selecting the transmission mode p. 3 - 52
Reverse camera p. 3 - 56

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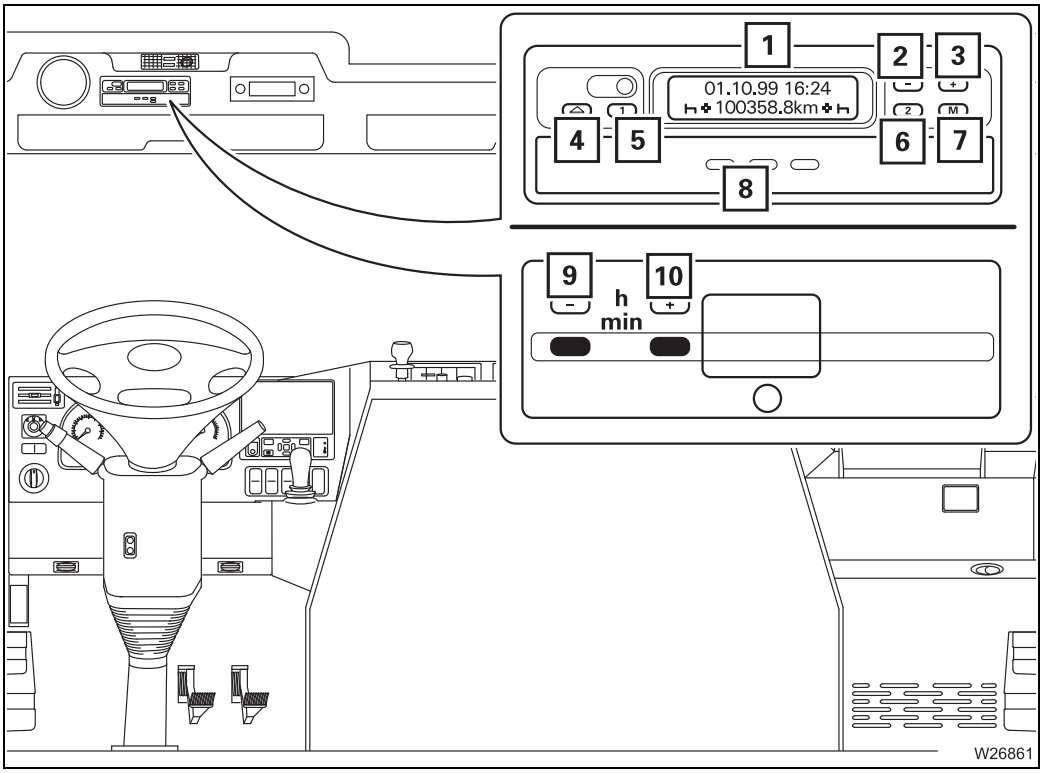
3.1.6 Tachograph



(A) – Tachograph[1)] ➠ p. 5 - 18

- **1** Display ➠ p. 5 - 21
- **2** Time correction −: ➠ p. 3 - 74
- **3** Time correction +: ➠ p. 3 - 74
- **4** Opening the drawer ➠ p. 5 - 19
- **5** Setting the time group – driver 1 ➠ p. 5 - 20
- **6** Setting the time group – driver 2 ➠ p. 5 - 20
- **7** Correction of time ➠ p. 3 - 74
- **8** Drawer ➠ p. 5 - 19

(B) – Cover[1)]

- **9** Time correction −: ➠ p. 3 - 74
- **10** Time correction +: ➠ p. 3 - 74

[1)] (**A**) or (**B**) present, depending on the version

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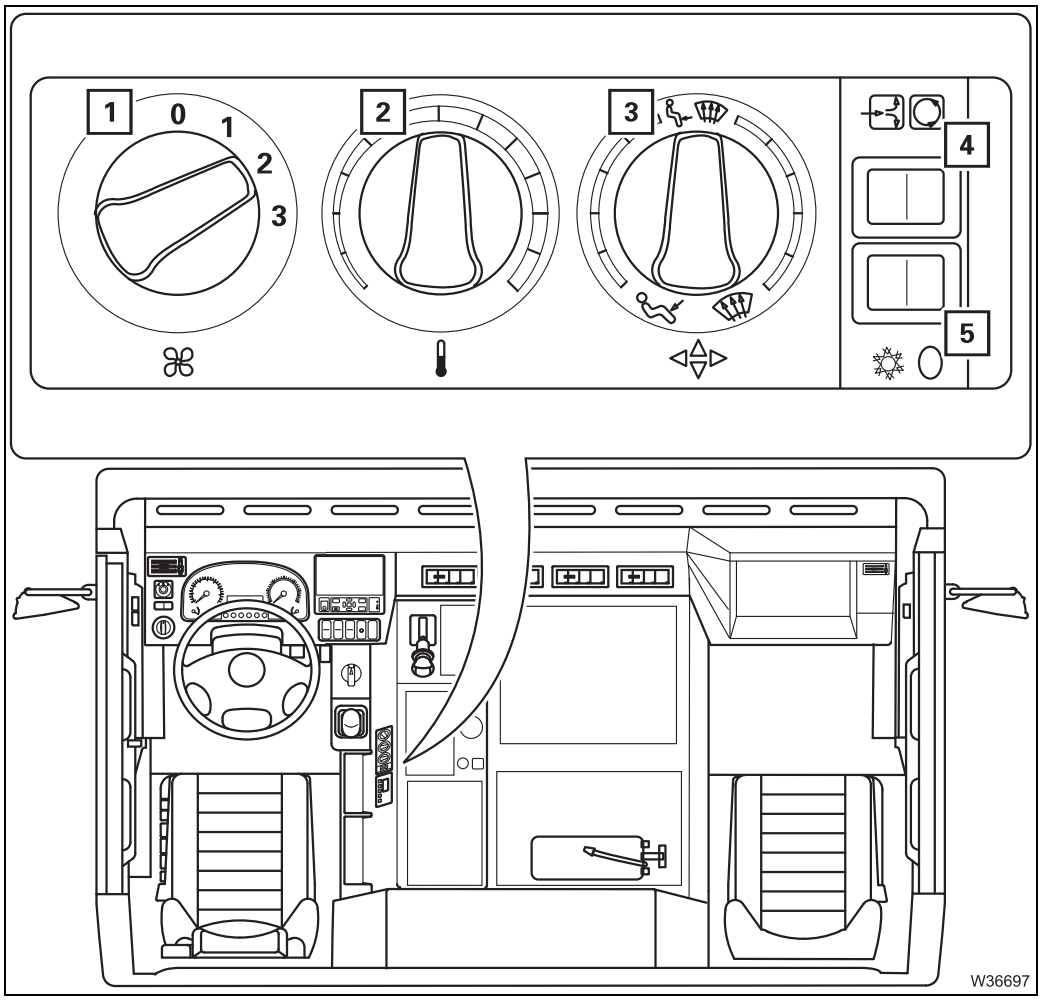
3.1.7 Heating and air-conditioning system

Standard heating system



1 Setting the fan ➠ p. 5 - 69
2 Air distribution ➠ p. 5 - 70
3 Setting the temperature ➠ p. 5 - 69
4 Setting recirculated/fresh air ➠ p. 5 - 69
5 Air-conditioning system ➠ p. 5 - 72

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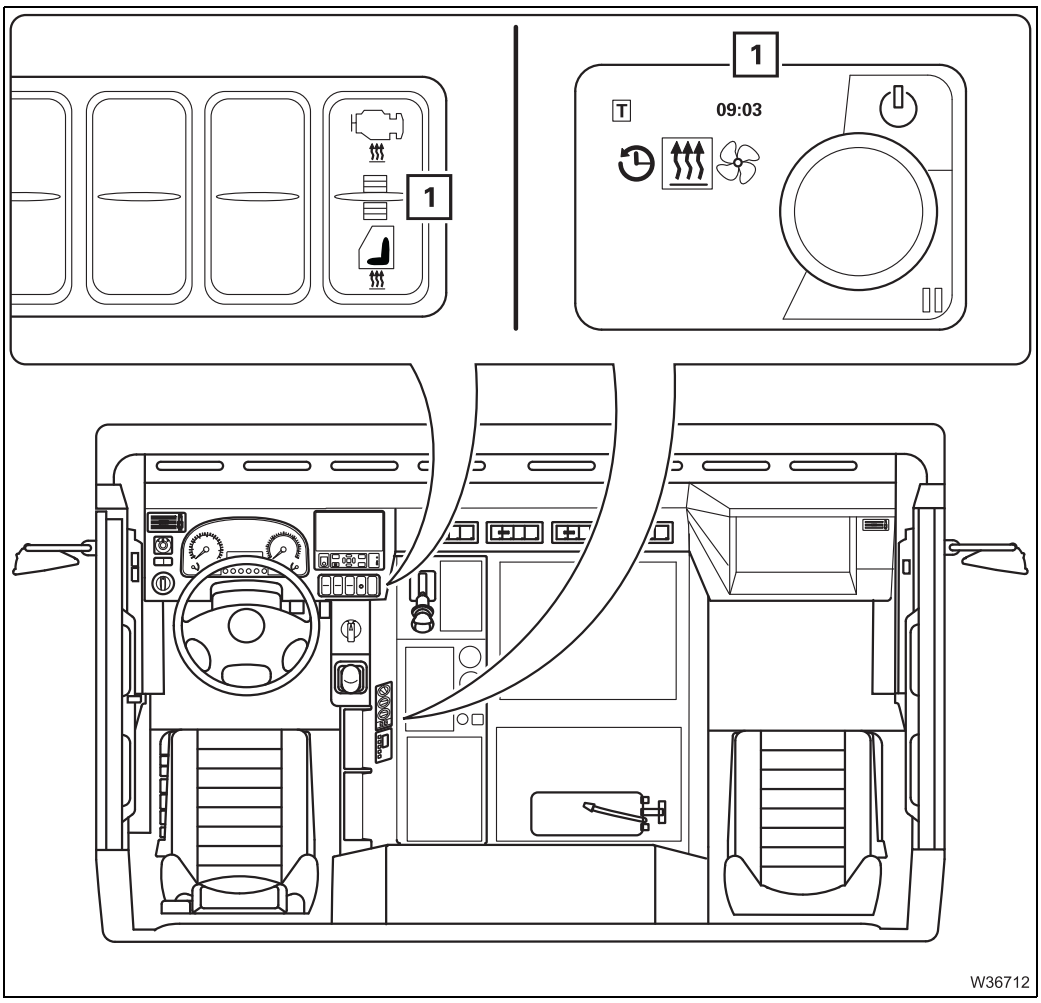
Auxiliary water heating system



1 Auxiliary water heating system p. 5 - 74
- – Preheating the engine p. 5 - 74
- – Preheating the driver's cab p. 5 - 75

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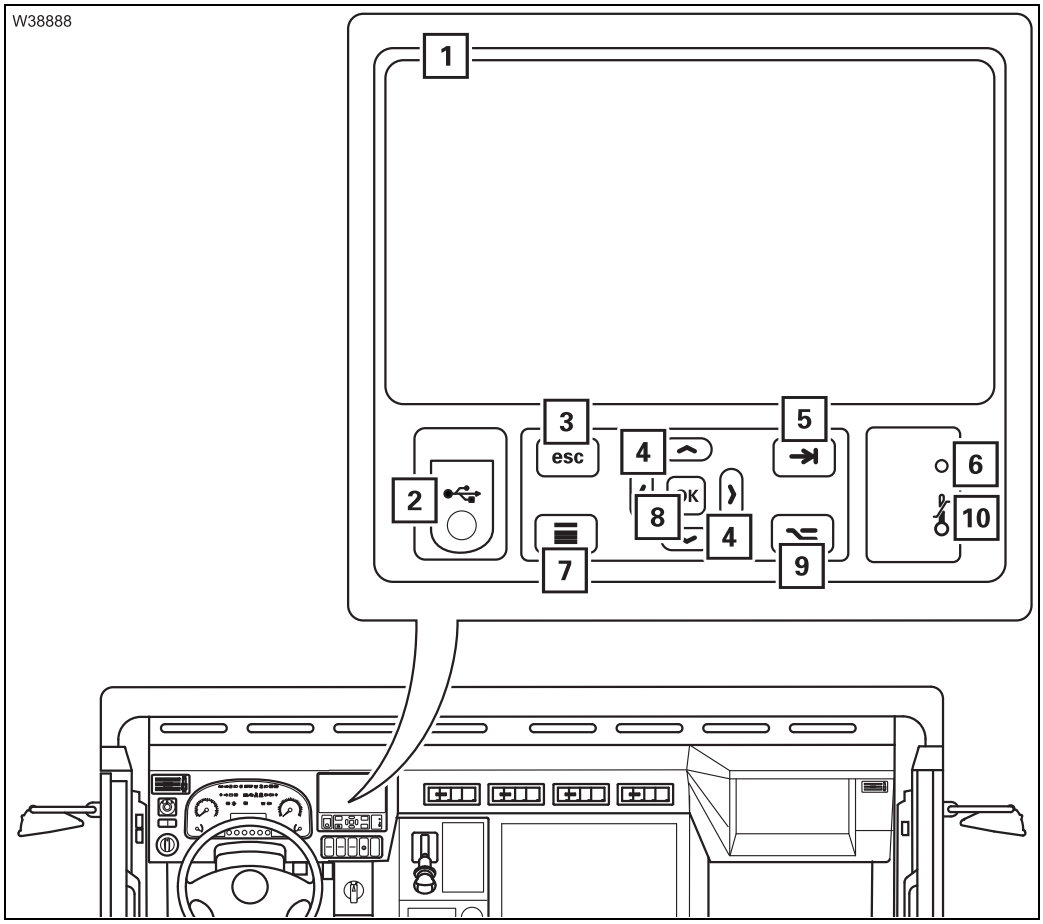
3.1.8 CCS control unit



1	*CCS* display	➠ p. 3 - 50
	– Menu-independent displays	➠ p. 3 - 22
	– Overview start menu	➠ p. 3 - 23
2	Service/diagnostics connection[1)]	➠ p. 3 - 75
3	Exiting the menu/input mode	➠ p. 3 - 50
4	Selector buttons	➠ p. 3 - 50
5	Selecting / deselecting favourites	➠ p. 3 - 52
6	Sensor – no function	➠ p. 3 - 51
7	Overview menu groups – Operation	➠ p. 3 - 51
	Overview menu groups – Overview	➠ p. 3 - 24
8	Input confirmation	➠ p. 3 - 50
9	No function	
10	Display temperature warning display	➠ p. 3 - 51

[1)] For Service personnel only, not suitable for external devices, e.g. mobile phone

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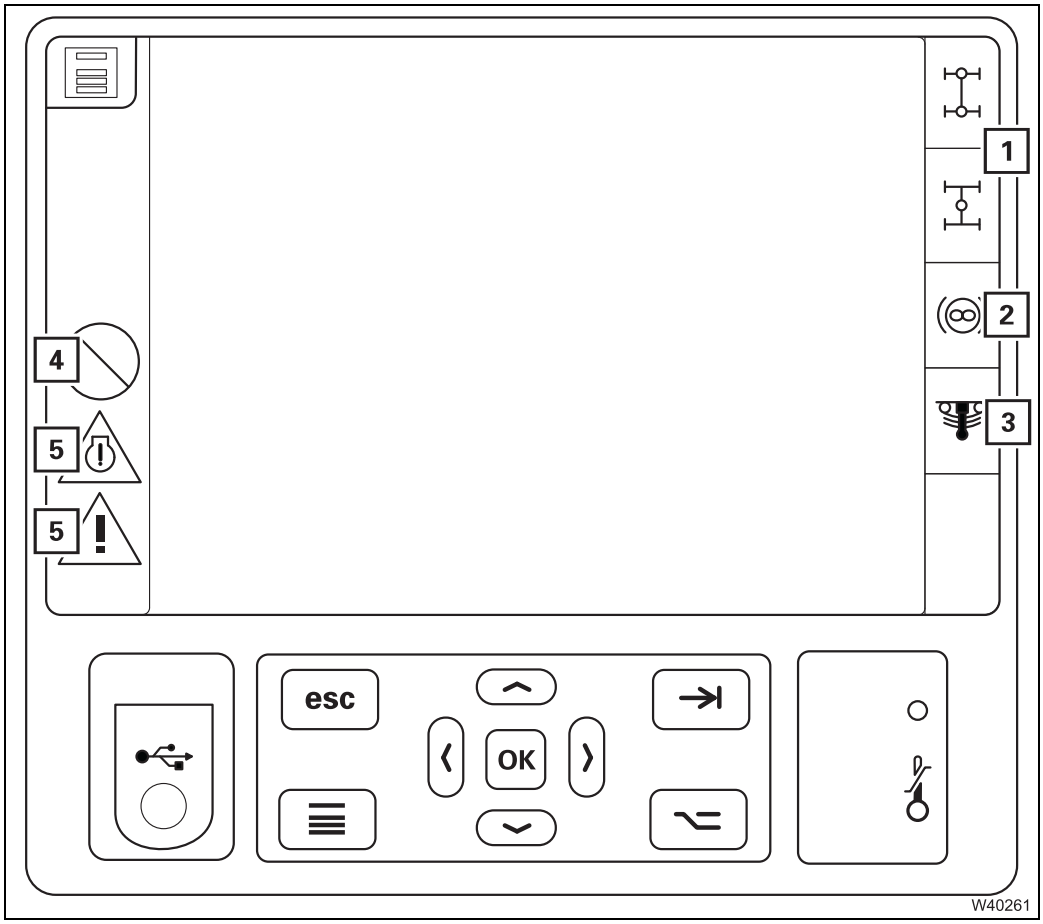
3.1.9 CCS – menu-independent displays



1 Transverse differential locks display p. 3 - 58
Longitudinal differential lock display p. 3 - 58

2 Display of retarder function on/off p. 5 - 43

3 Suspension display p. 3 - 67

4 Display range warning messages p. 8 - 10

5 Error messages display area p. 8 - 16

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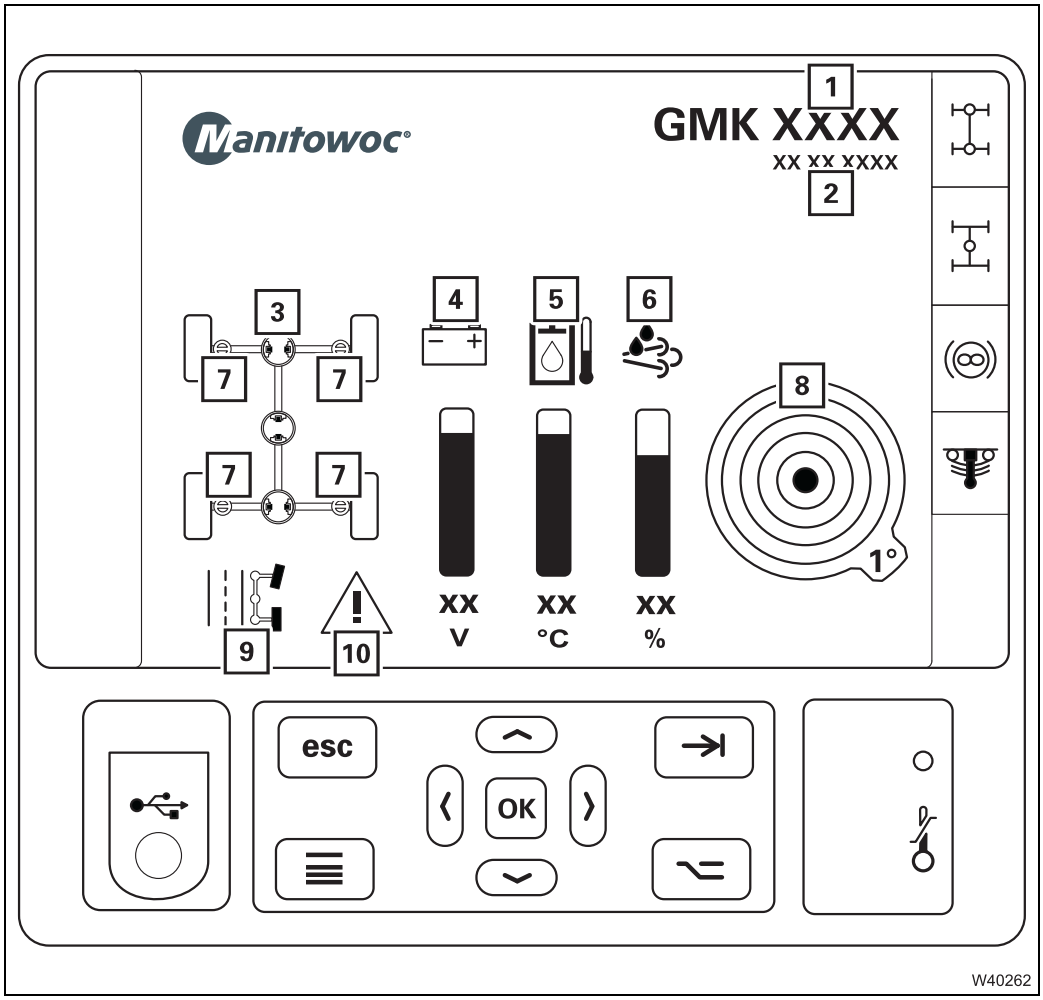
3.1.10 CCS – Start menu



1 Display of crane type

2 Serial number display

3 Display of transverse and longitudinal differential locks on/off p. 3 - 28

4 Voltage monitoring display p. 4 - 15

5 Hydraulic oil temperature display p. 4 - 15

6 AdBlue (DEF) tank level display p. 3 - 46

7 Steering locking status display p. 3 - 64

8 Current inclination display p. 3 - 73

9 Steering mode switched on display p. 3 - 64

10 Error in steering system p. 3 - 66

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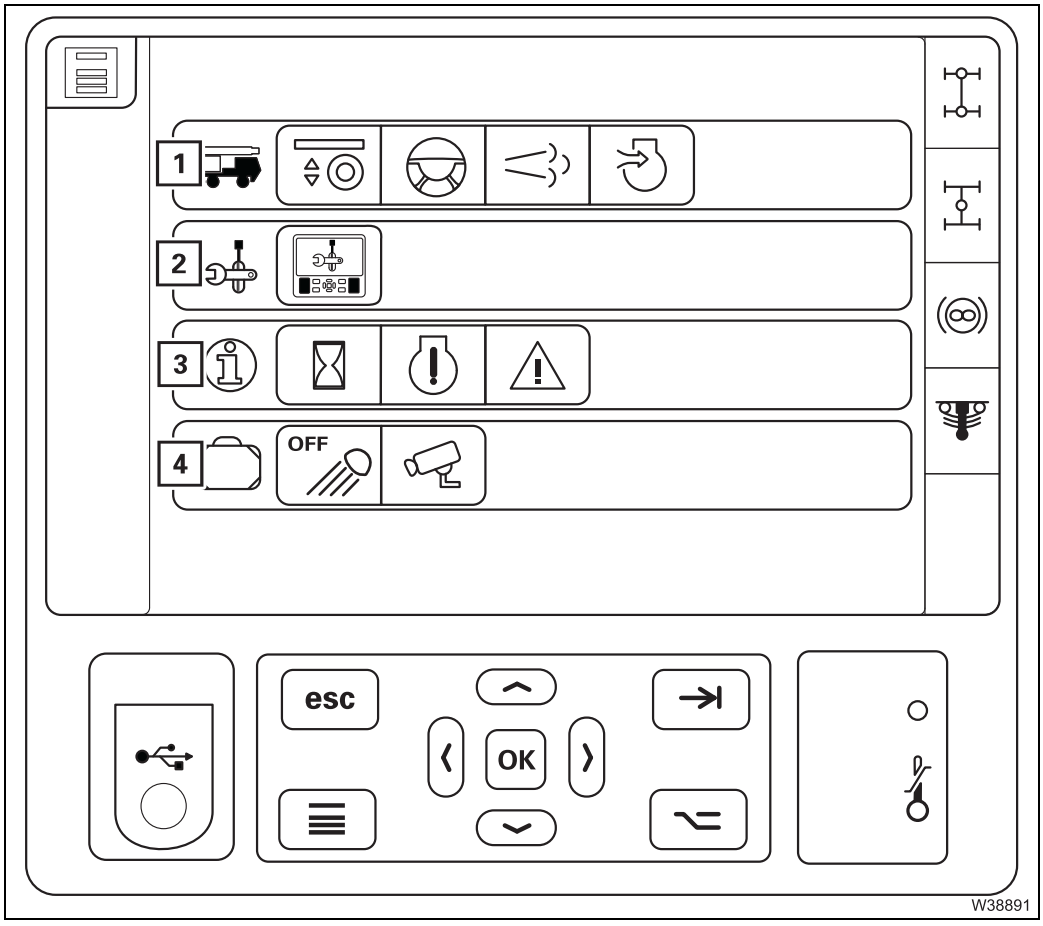
3.1.11 CCS – Overview of menu groups



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1 Carrier menu group ➠ p. 3 - 26

- Suspension/level adjustment menu
- Driving menu
- Exhaust system menu
- Air intake inhibitor menu

2 Settings menu group ➠ p. 3 - 31

- Set display brightness menu

3 Information menu group ➠ p. 3 - 33

- Operating hours menu
- Engine/transmission error menu
- Crane operation error menu

4 Various controls menu group ➠ p. 3 - 37

- Outrigger lighting on/off[1)]
- Reverse camera on/off[1)] **1)**

1) Additional equipment

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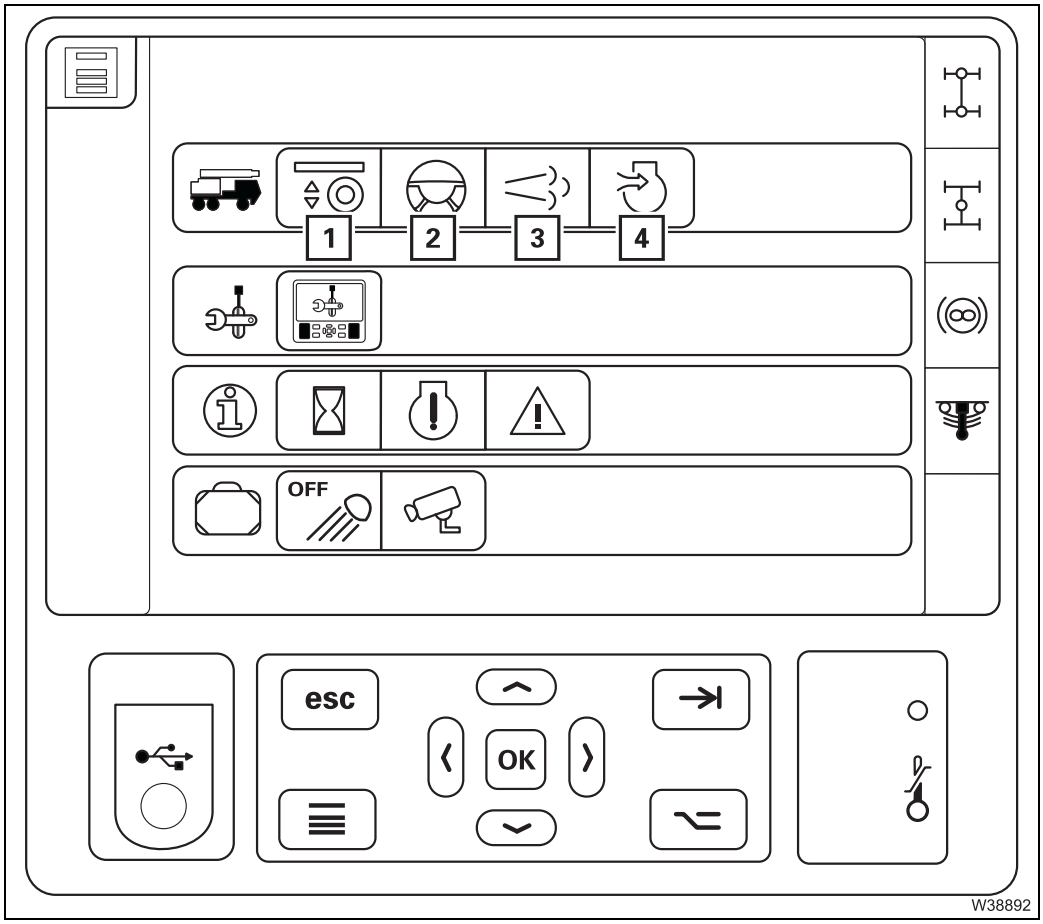
3.1.12 Carrier menu group



1 Suspension/level adjustment menu p. 3 - 27
2 Driving menu p. 3 - 28
3 Exhaust system menu p. 3 - 28
4 Air intake inhibitor menu p. 3 - 28

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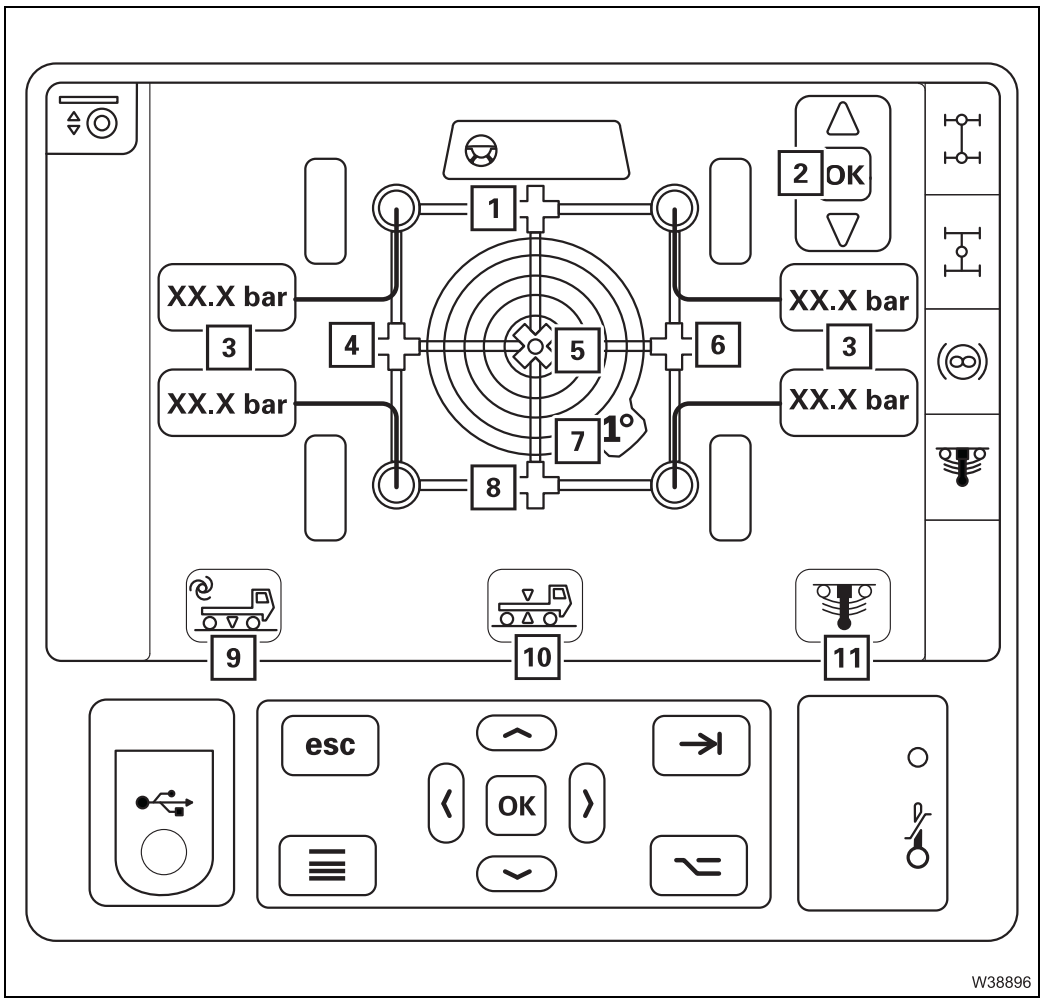
Suspension/level adjustment menu



1 Front level pre-selection p. 3 - 72
2 Level adjustment system enabled display p. 3 - 72
3 Suspension operation pressure gauge p. 3 - 67
4 Left level pre-selection p. 3 - 72
5 Overall level pre-selection p. 3 - 72
6 Right level pre-selection p. 3 - 72
7 Current inclination display p. 3 - 73
8 Rear level pre-selection p. 3 - 72
9 Setting the on-road level p. 3 - 73
10 Vehicle level display p. 3 - 73
11 Suspension on/off p. 3 - 67

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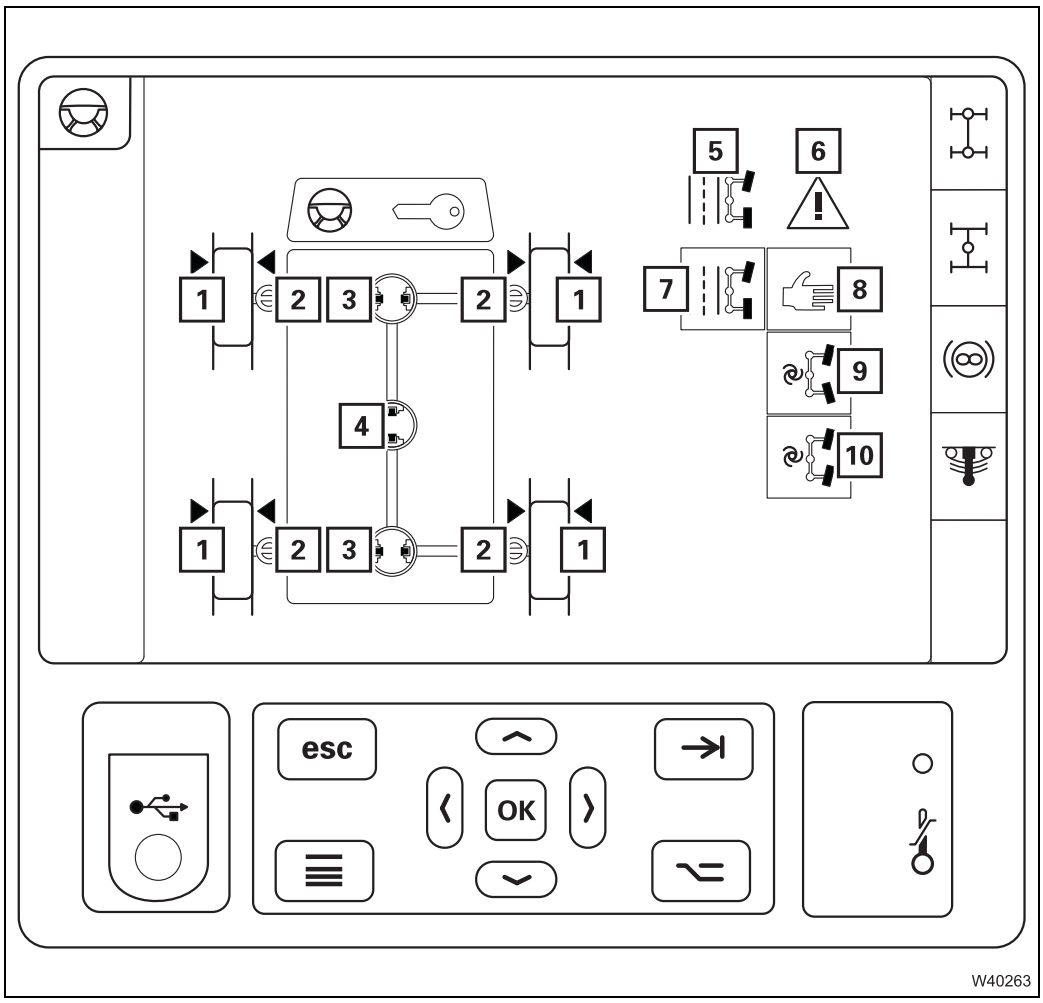
Driving menu



1 Current wheel position display p. 3 - 66

2 Steering locking status display p. 3 - 64

3 – Transverse differential locks display p. 3 - 59
– Transverse differential locks on/off p. 3 - 59

4 – Longitudinal differential lock display p. 3 - 59
– Longitudinal differential lock on/off p. 3 - 59

5 Steering mode switched on display p. 3 - 64

6 Error in steering system p. 3 - 66

7 Normal steering mode/on-road driving on p. 3 - 65

8 Manual separate steering on p. 3 - 65

9 Automatic separate steering driving around corners on p. 3 - 65

10 Automatic separate steering for crab travel mode on p. 3 - 65

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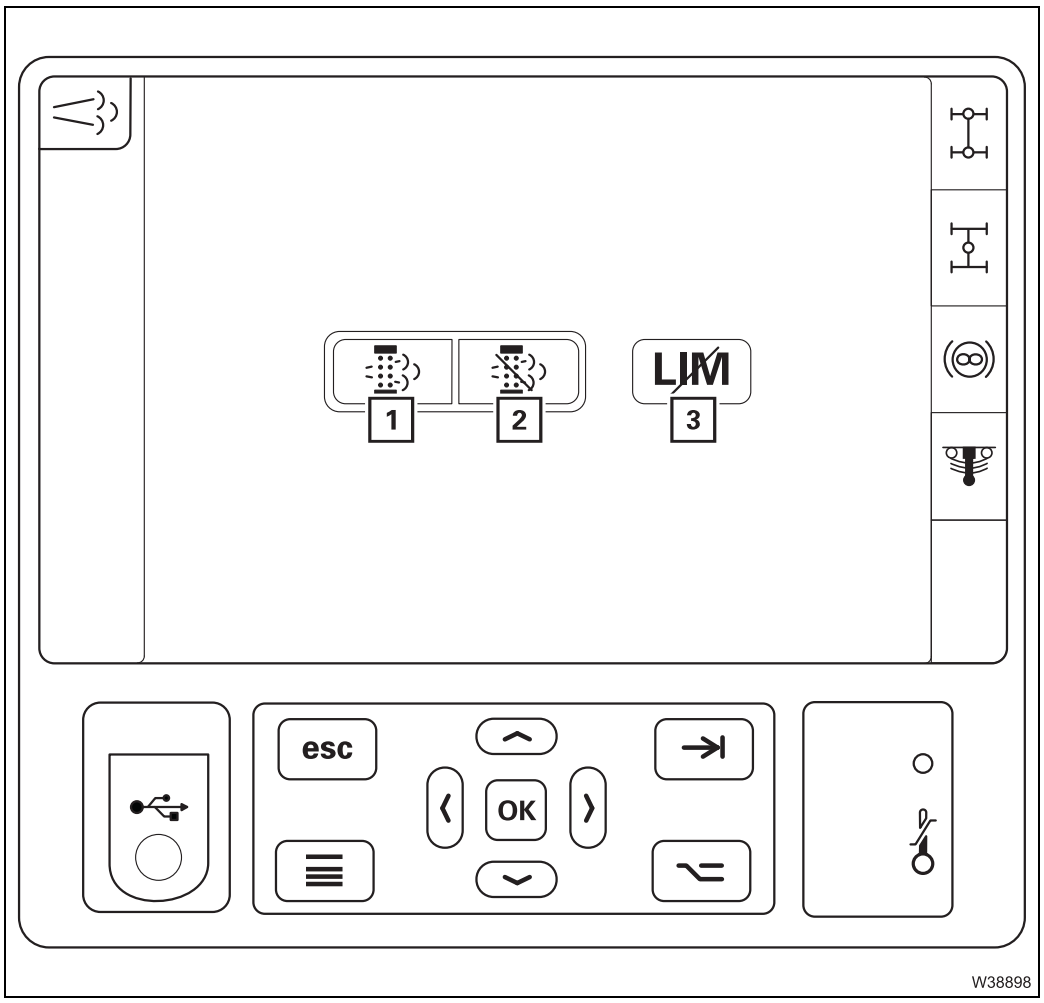
Exhaust system menu



1 Manually start exhaust system cleaning p. 3 - 47

2 Disable exhaust system cleaning p. 3 - 47

3 Overriding torque reduction[1)] p. 3 - 46

1) Additional equipment

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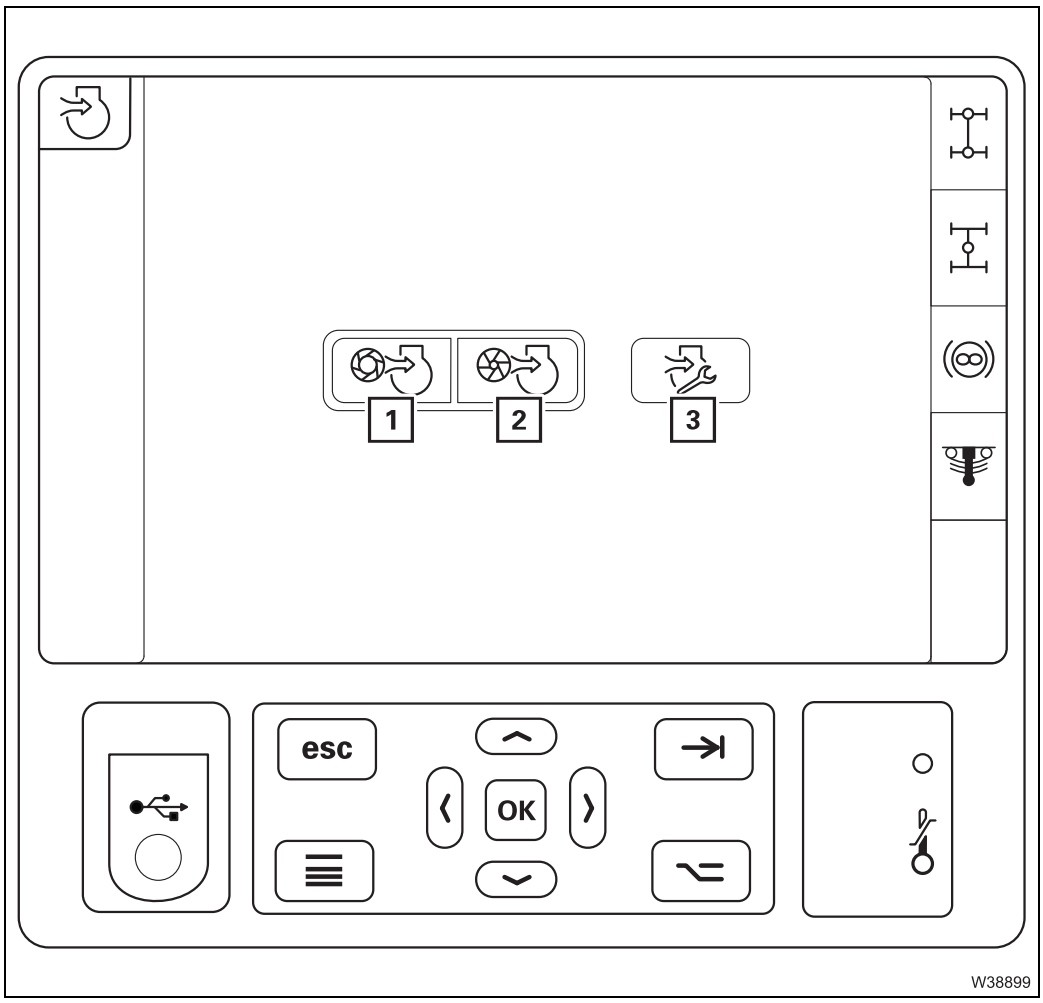
Air intake inhibitor menu



1 Opening the air intake inhibitor p. 3 - 47

2 Closing the air intake inhibitor[1)]

3 Air intake inhibitor maintenance[1)]

[1)] Only for checking functionality; *Maintenance manual*

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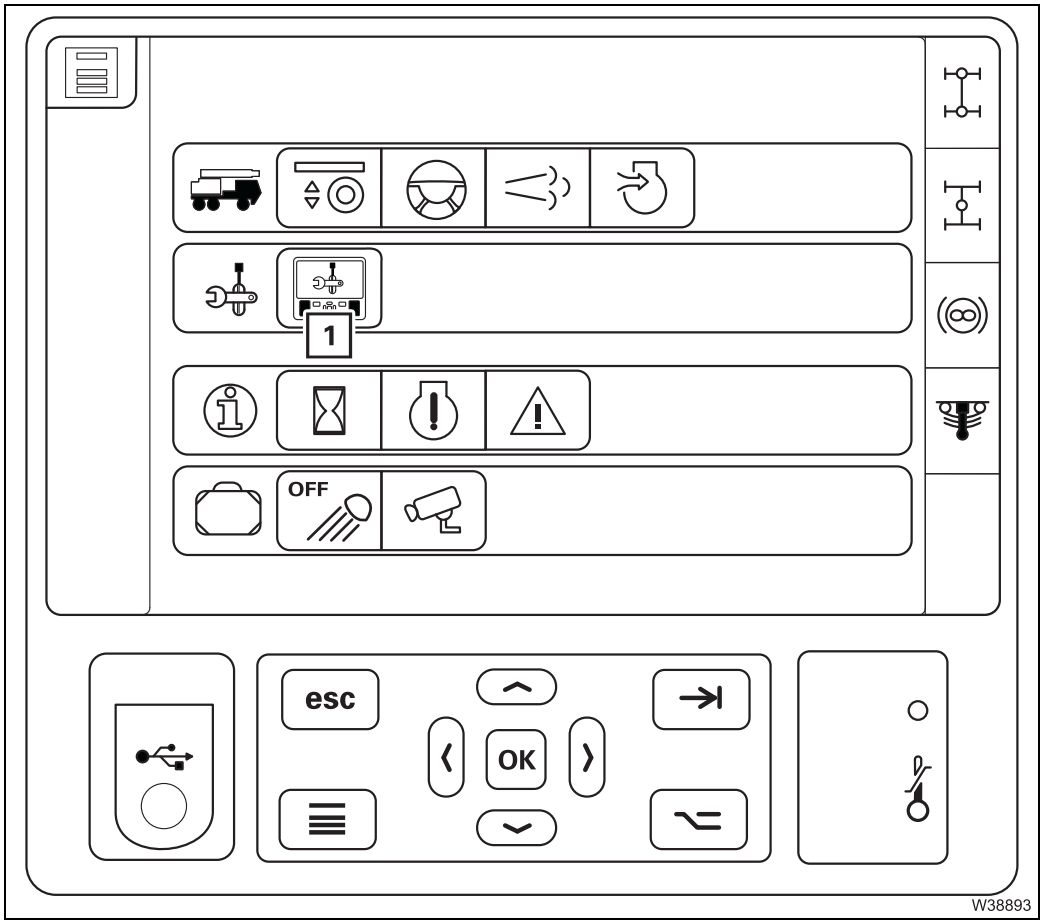
3.1.13 Settings menu group



1 Set display brightness menu p. 3 - 32

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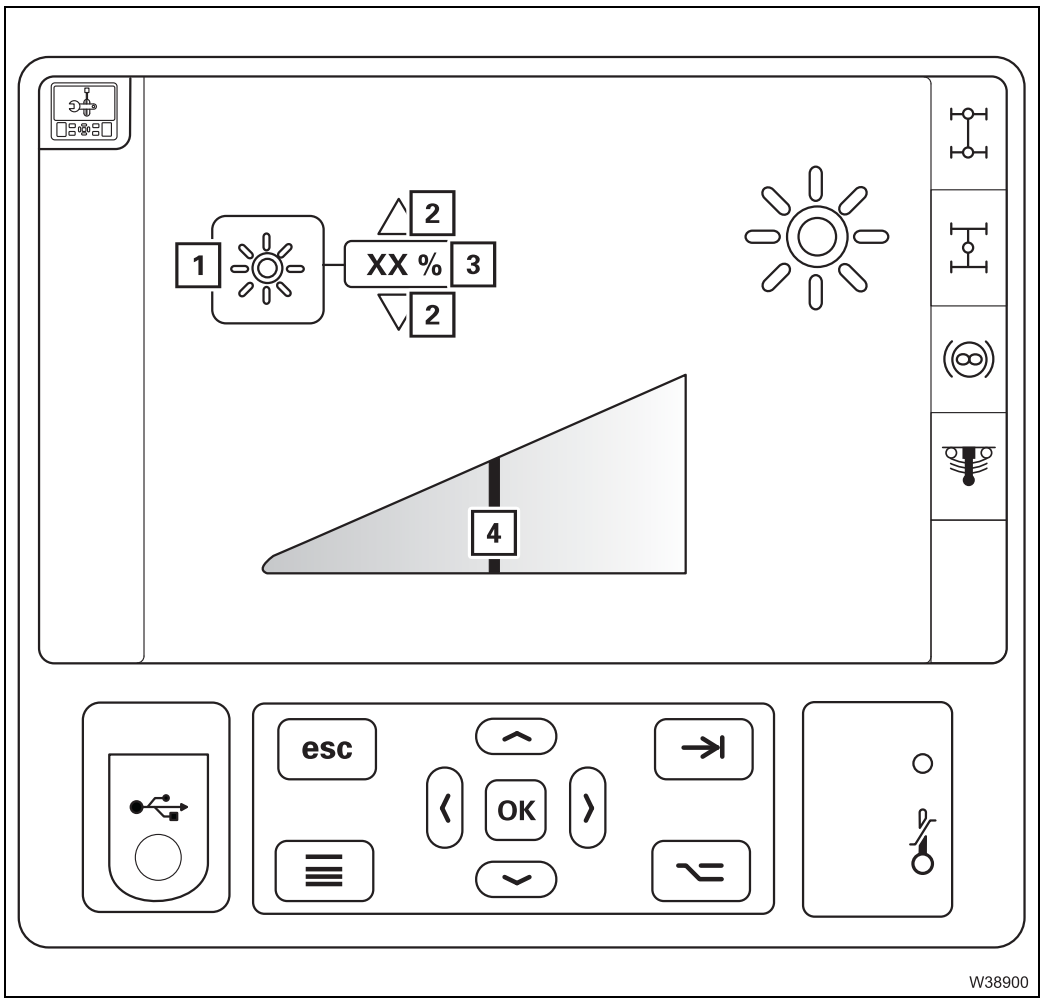
Set display brightness menu



1 Selection setting the display brightness p. 4 - 11

2 Increasing/reducing the value p. 4 - 11

3 Display in percent p. 4 - 11

4 Display brightness p. 4 - 11

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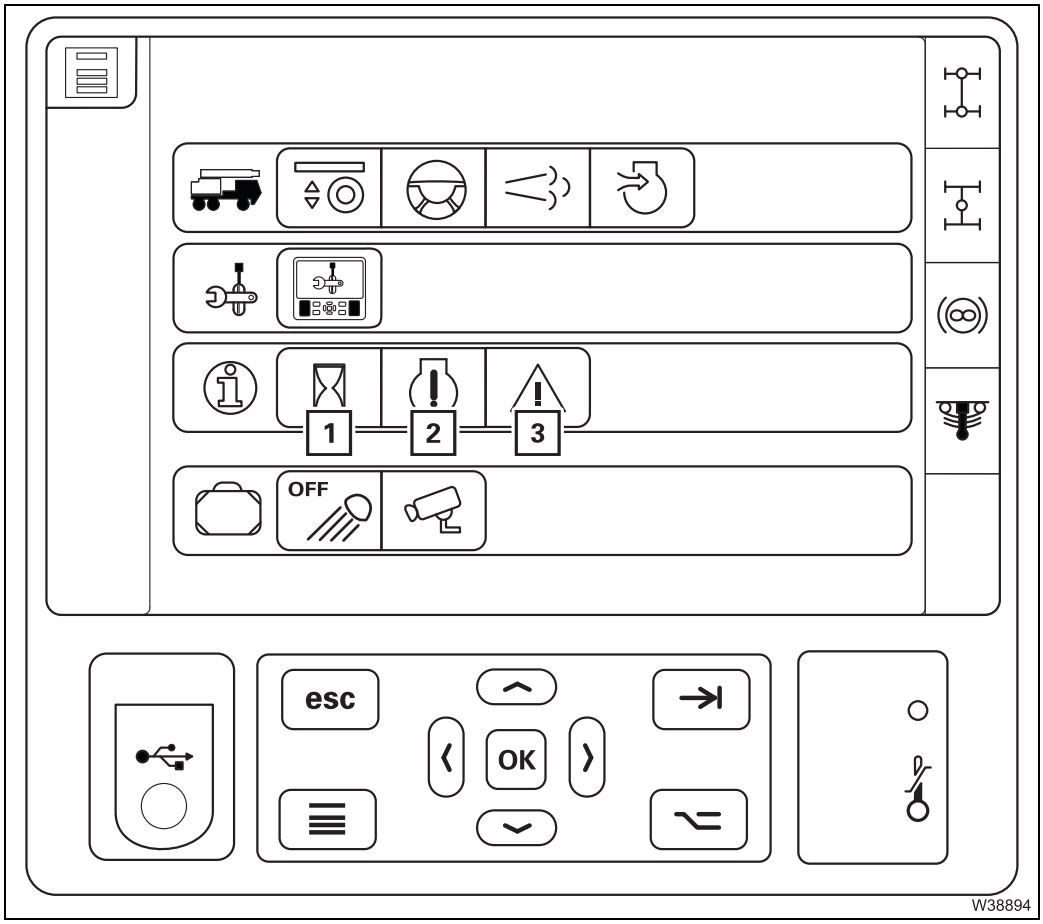
3.1.14 Information menu group



1 Operating hours menu p. 3 - 34

2 Engine/transmission error menu p. 3 - 35

3 Crane operation error menu p. 3 - 36

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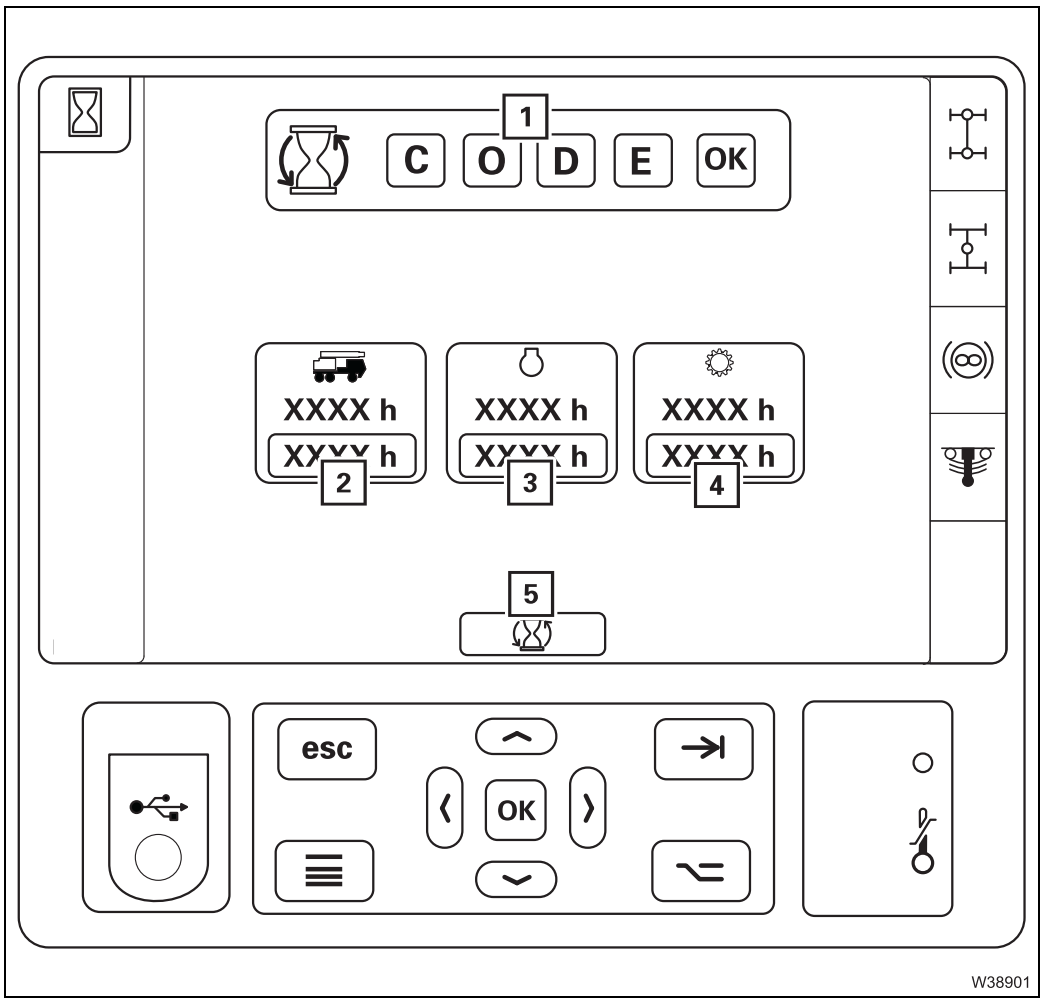
Operating hours menu



1 Keycode input p. 5 - 23
2 Carrier p. 5 - 23
3 Engine p. 5 - 23
4 Transmission p. 5 - 23
5 Selection all p. 5 - 23

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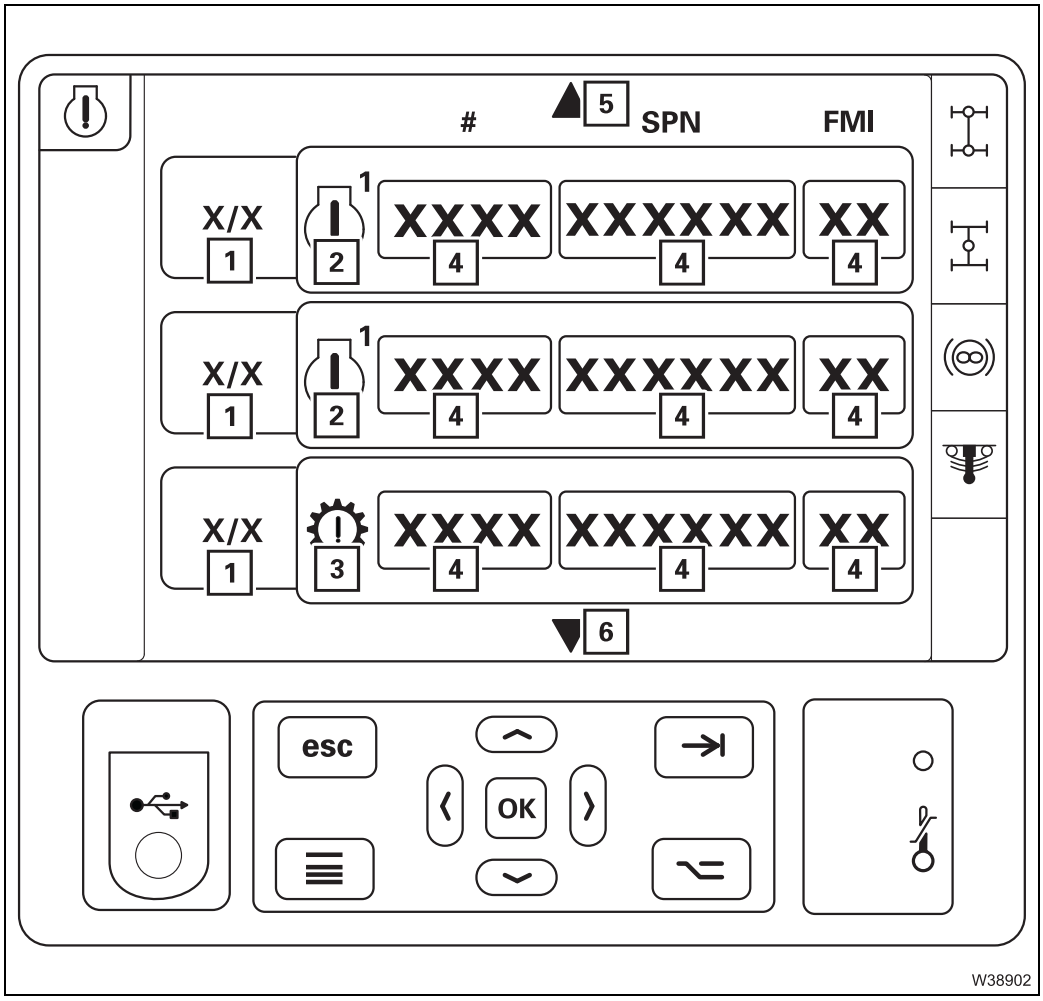
Engine/transmission error menu



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. 8 - 16

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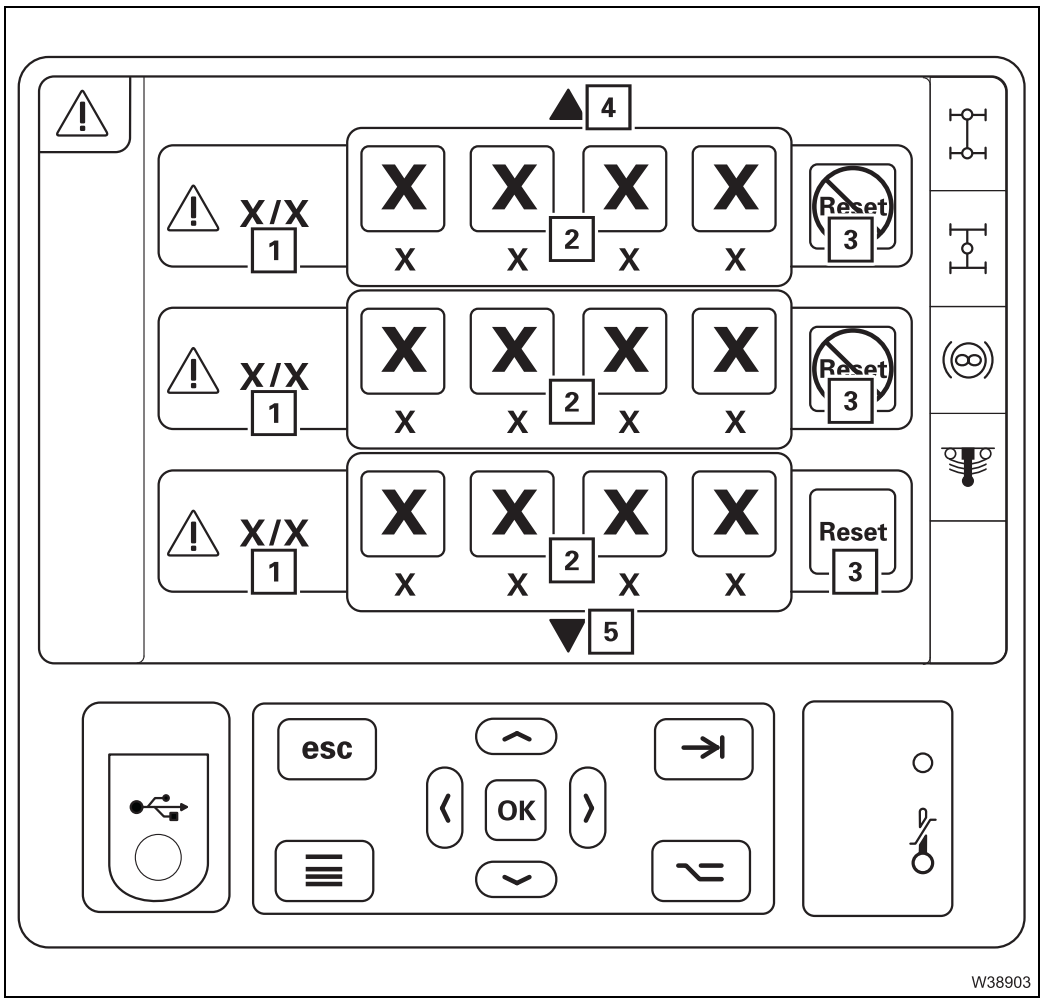
Crane operation error menu



1 Current errors/total errors display

2 Error code

3 Deleting errors p. 8 - 16

4 Next error

5 Previous error

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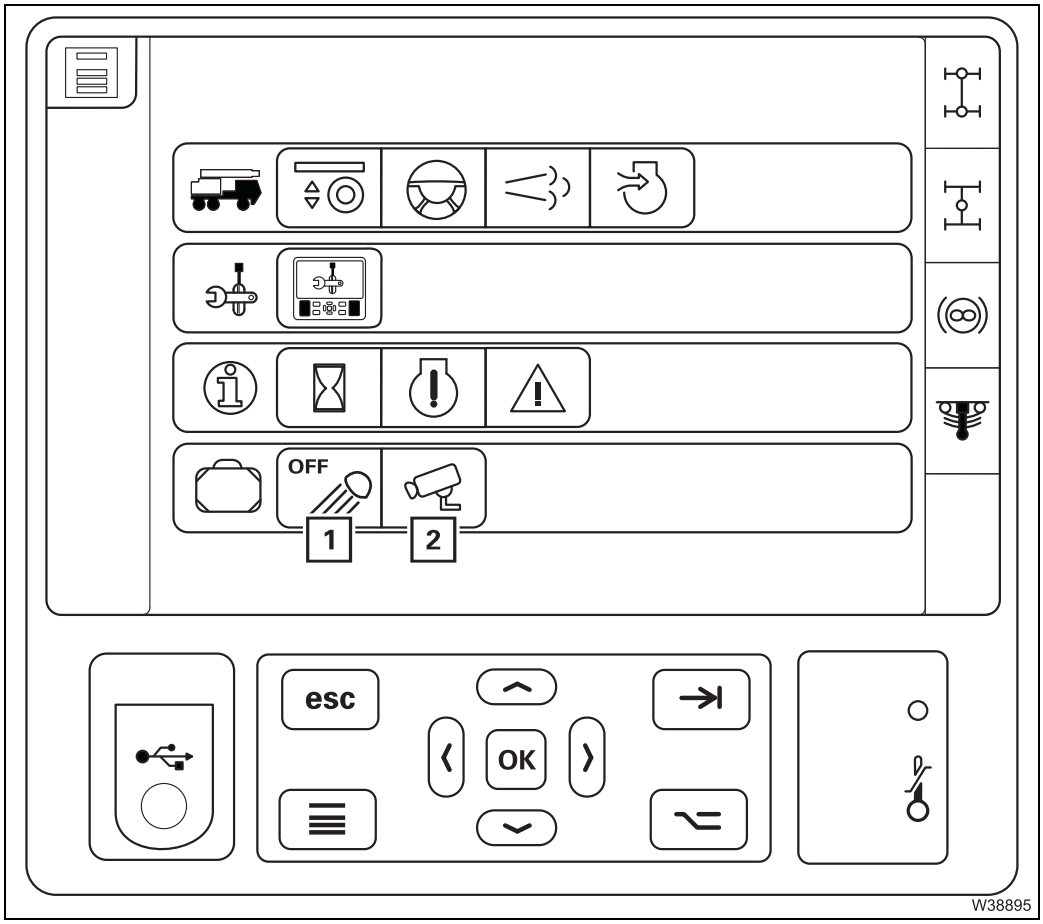
3.1.15 Various controls menu group



1 Outrigger lighting on/off[1)] p. 3 - 71

2 Reverse camera on/off[1)] p. 3 - 56

[1)] Additional equipment

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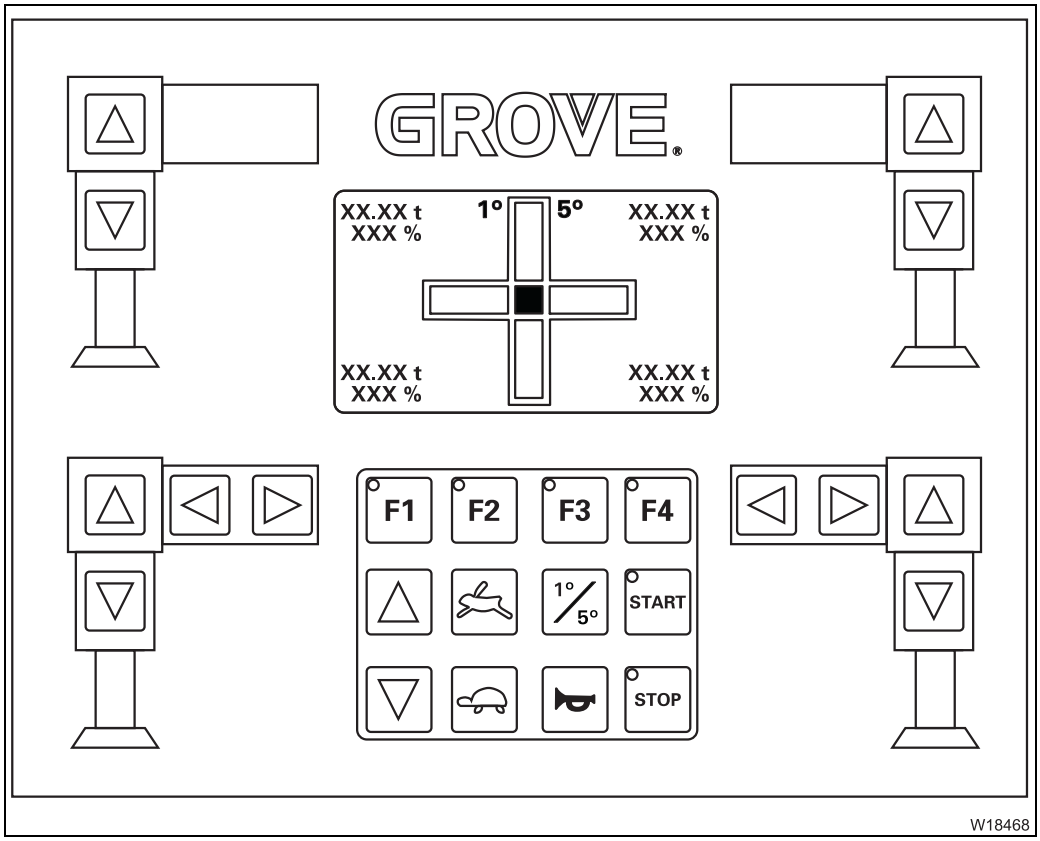
3.1.16 Outrigger control units



Contains operating elements for crane operation; ➠ *Outrigger control units*, p. 9 - 83.

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3.2 Brief description of the operating elements

Risk of accident by 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 chapters referred to at the respective places before contacting **Manitowoc Crane Care**.

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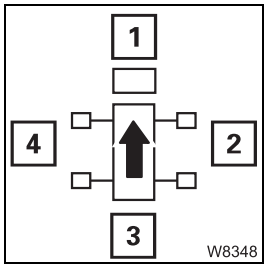
3.2.1 Definition of direction information

Basic rule

Directions always depend on whether the carrier or the superstructure is being operated.

On the carrier

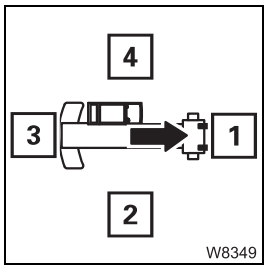


The driver's cab is always at the front, which means that:

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

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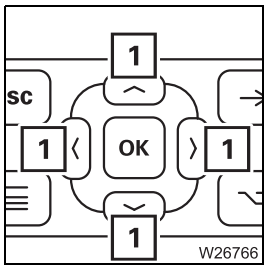
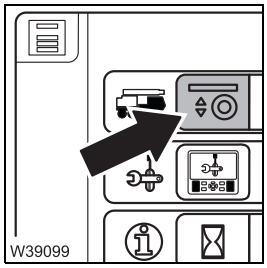
3.2.2 General rules for buttons and symbols on the display

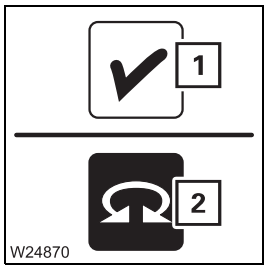
The symbols shown as an example are not present on all crane types.
The following rules apply in all menus:



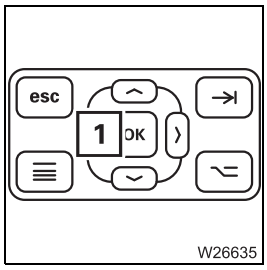
– A menu can only be opened when the corresponding symbol has been selected with the direction buttons (**1**).



– 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 whether 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.

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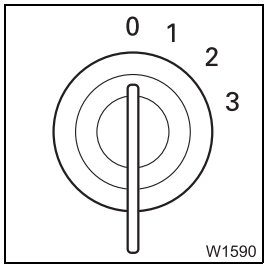
3.2.3 Engine

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

3 Starting position

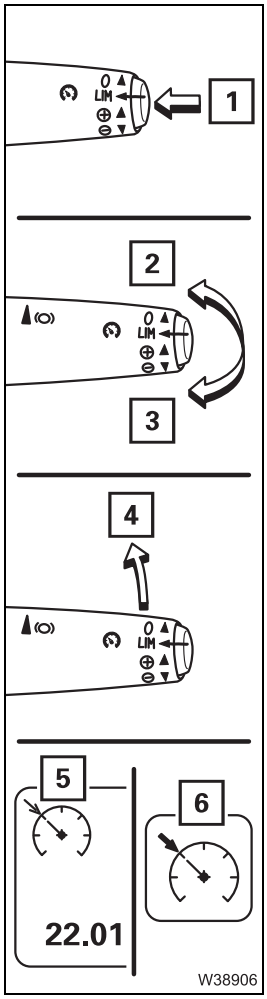
➠ p. 4 - 9

Lock/unlock steering column ➠ p. 5 - 15

Multipurpose switch

Cruise control

➠ *Cruise control*, p. 5 - 39



1 Press once: Cruise control pre-selection on
– Symbol (**5**) displayed
– Symbol (**6**) grey – functions (**2**) to (**4**) active

The truck crane drives at a speed of at least 15 km/h (9 mph).

2 Up:
– Cruise control is preselected:
  – Cruise control on – symbol (**6**) is black
  – Current speed = target value
– Cruise control switched on:
  Increase the speed

3 Down:
– Cruise control is preselected:
  – Cruise control on – symbol (**6**) is black
  – Current speed = target value
– Cruise control switched on:
  To decrease speed

4 Forward:
– 1x: Cruise control off
  – The symbol (**6**) is grey
  – Pre-selection on
– 2x: Pre-selection off
  – The symbols (**5**) and (**6**) are hidden

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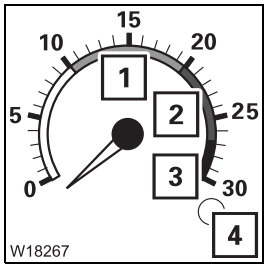
Instrument panel

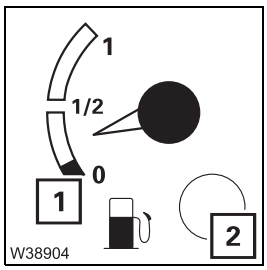
Description of further lamps and symbols for warning and malfunction messages;
➠ *Warning and malfunction messages on the instrument panel*, p. 8 - 3.
➠ *Warning messages on the CCS display*, p. 8 - 10



Tachometer

Display of engine speed i min^{-1} (rpm)

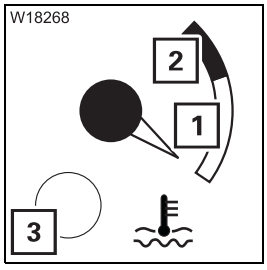
1	**Green:**	Economic consumption
2	**Yellow:**	Engine brake active
3	**Red:**	Lamp (**4**) flashes Engine speed too high – brake the truck crane; Warning message on the *CCS;* display ➠ p. 8 - 14



Fuel level display

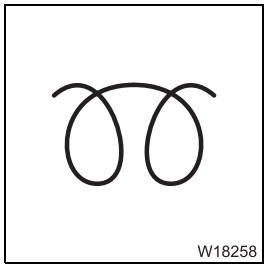
Never run the fuel tank completely empty

1	**Red:**	Refuel! ➠ p. 4 - 5
2	**Flashing:**	Fuel tank almost empty Warning message on the *CCS;* display ➠ p. 8 - 13



Coolant temperature display

1	**White:**	Coolant temperature normal
2	**Red:**	Coolant temperature too high
3	**Lights up:**	Warning – coolant temperature too high Warning on the *CCS* display; ➠ p. 8 - 14



Flame start system indicator lamp

–	**Lights up:**	Engine not ready to start – is being warmed up
–	**Gone out:**	Engine is ready to start

➠ p. 4 - 12

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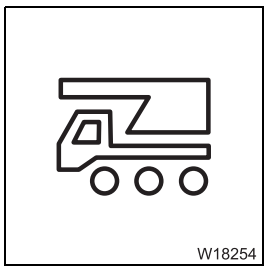
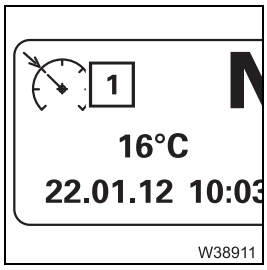


Superstructure ignition indicator lamp

– **Lights up:** Ignition in the crane cab on, engine for driving cannot be started

– **Gone out:** Ignition in the crane cab off, engine for driving can be started

p. 4 - 12



Cruise control display

On the *Driving* display

1 – **Displayed:** Cruise control pre-selection on

– **Hidden:** Cruise control pre-selection on

p. 5 - 39

Crane operation activated

On the *Driving* display
Feedback from the electronics indicating that the truck crane is in crane mode. The symbol is hidden in driving mode.

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3.2.4 AdBlue (DEF) system/Exhaust gas emission control system

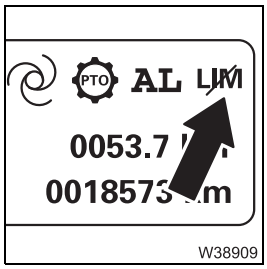
Instrument panel

Description of further lamps for warning and malfunction messages;
➠ *Warning and malfunction messages on the instrument panel*, p. 8 - 3.

Torque reduction indicator display

- **Lights up:** Torque reduced
- **Gone out:** Torque not reduced

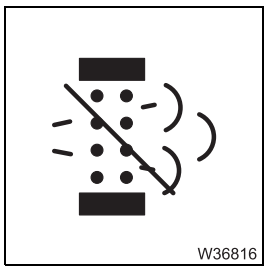
➠ *Overriding torque reduction*, p. 5 - 48



Torque reduction display override

On the *Driving* display
The ignition is switched on or the engine is running

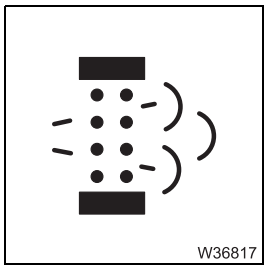
- **Lights up:** Torque reduction overridden
- **Gone out:** Torque reduction not overridden



Exhaust system cleaning disabled

- **Lights up:** Cleaning disabled
- **Gone out:** Enable automatic and manual cleaning

➠ *Cleaning the exhaust system*, p. 5 - 49



Exhaust system cleaning required

- **Lights up:** Cleaning required
- **Flashing:** Cleaning procedure running
- **Gone out:** Cleaning not required

➠ *Cleaning the exhaust system*, p. 5 - 49

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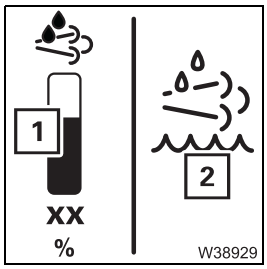
***CCS* display**

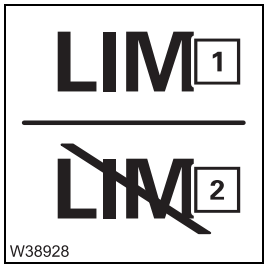
Description of further symbols for warning and malfunction messages;
➠ *Warning messages on the CCS display*, p. 8 - 10.



AdBlue (DEF) tank level display

1 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)
  Refill the AdBlue (DEF) tank! ➠ p. 4 - 7

2 Lights up: AdBlue (DEF) tank empty; ➠ p. 8 - 12



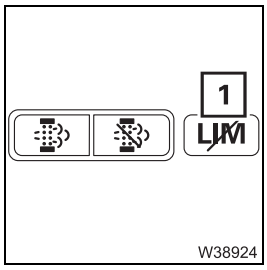
Torque reduction indicator display

For the menu-independent displays

1 Torque reduction active

2 Torque reduction overridden

➠ *Overriding torque reduction*, p. 5 - 48



Overriding torque reduction

The torque reduction is active

1 – Select and confirm:
- – Symbol (**1**) green
- – Torque reduction overridden

after 30 minutes:
- – The symbol (**1**) is grey
- – Torque reduced

The system can be overridden three times, after this the function is deactivated until the next time the engine is restarted;
➠ *Overriding torque reduction*, p. 5 - 48

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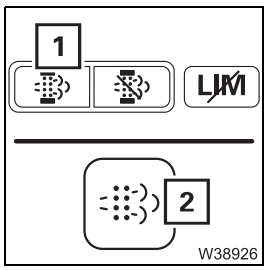


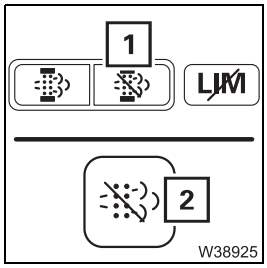
Manually start exhaust system cleaning

The engine must be running.

1 – Select and confirm:
- Symbol (**1**) green
- Cleaning procedure running
- The symbol (**2**) flashes during cleaning

After cleaning
- The symbol (**1**) is grey
- Symbol (**2**) hidden

➠ *Cleaning the exhaust system*, p. 5 - 49



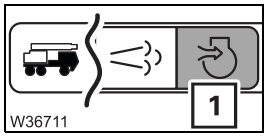
Disable exhaust system cleaning

1 – (Grey) Select and confirm:
- Symbol (**1**) green
- Exhaust system cleaning disabled
- Symbol (**2**) displayed

– (Green) Select and confirm:
- The symbol (**1**) is grey
- Exhaust system cleaning enabled
- Symbol (**2**) hidden

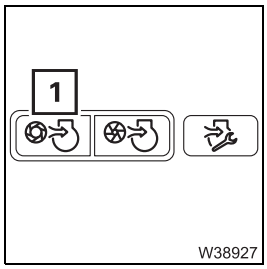
➠ *Cleaning the exhaust system*, p. 5 - 49

3.2.5 Air intake inhibitor



Air intake inhibitor menu

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



Opening the air intake inhibitor

The air intake inhibitor has been automatically triggered.

1 – Select and confirm: Symbol (**1**) green – air intake inhibitor opened – the engine can be started

➠ *Opening the air intake inhibitor*, p. 4 - 21

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Blank page

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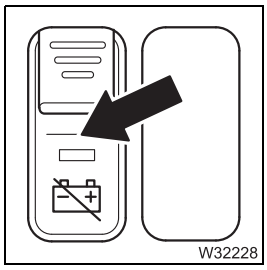
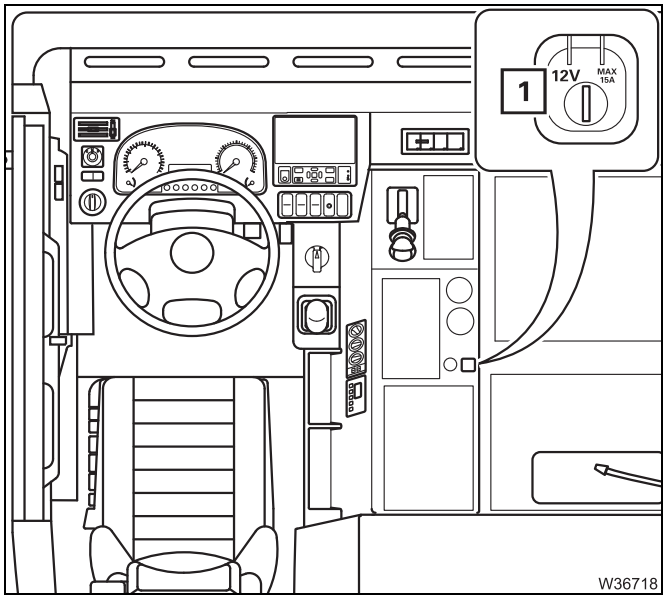
3.2.6 Battery master switch



– **Switch on:** Press in at the top
– **Switch off:** Unlock and then press in downwards

p. 4 - 9

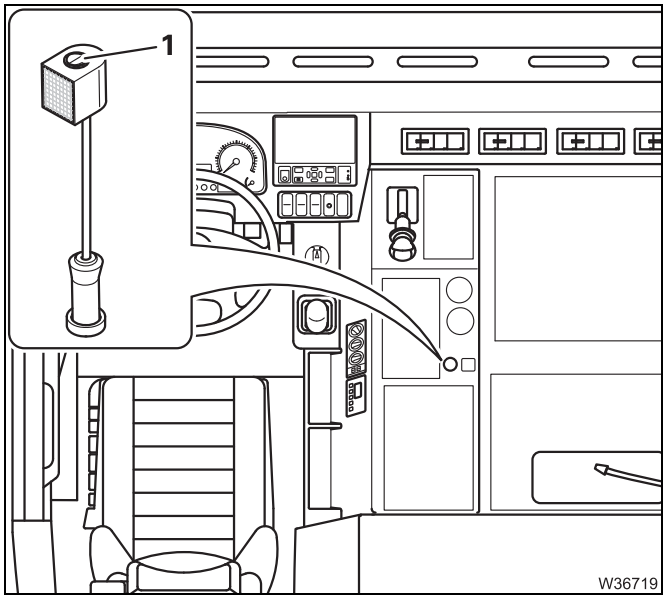
3.2.7 Electrical system



Sockets 12 V

1 Socket 12 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.

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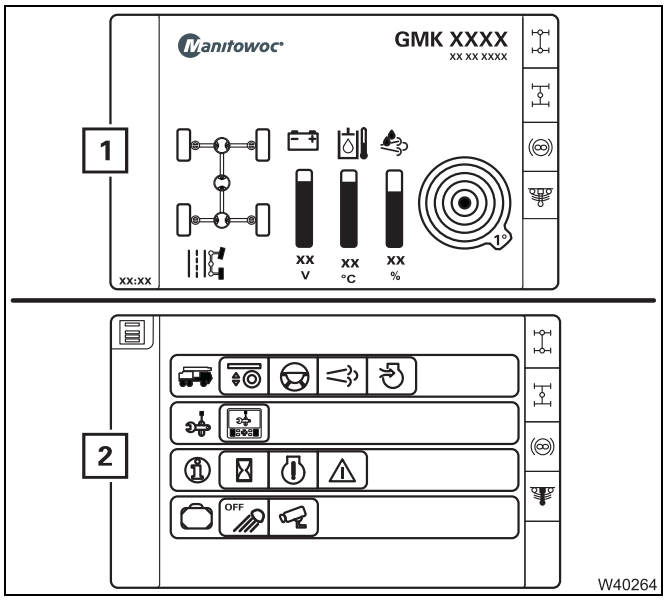
3.2.8 Crane control CCS

The GMK3060 truck crane is equipped with the **CCS** electronic crane control system (**C**rane **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.



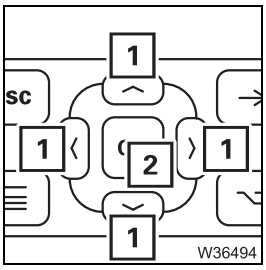
CCS display

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

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 range 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. 9 - 94
In the Input area, p. 9 - 94
In the Operating area, p. 9 - 95

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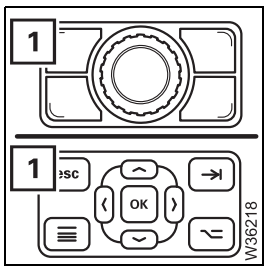
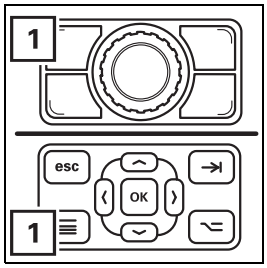


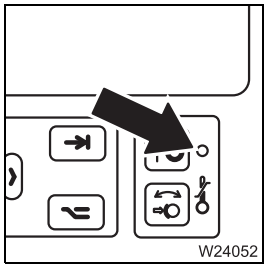
Exiting the menu/input mode

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



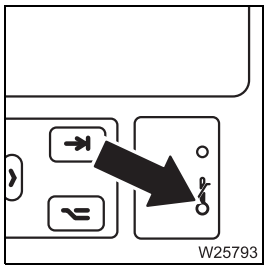
Overview menu groups

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



Sensor – no function

Display – setting the brightness, p. 4 - 11.



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

p. 4 - 11

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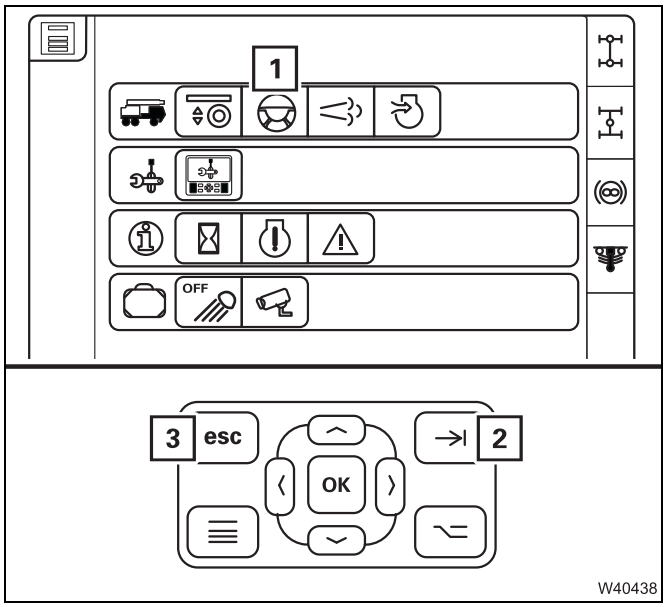
Selecting / deselecting favourites

Several symbols can be selected as favourites. The cursor jumps directly from favourite to favourite when scrolling through the menu groups.



Select

A symbol is selected, such as symbol (**1**).

2 Press

The symbol is marked as a favourite.

Deselect

– Individually
The favourites symbol is selected.

2 Press

The favourites selection is cancelled.

– All
Any desired symbol is selected.

2 + 3 Press

All favourite selections are removed.

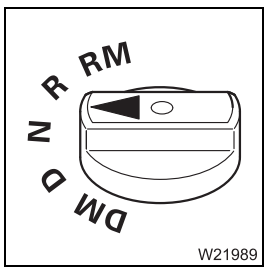
3.2.9 Transmission

➠ *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

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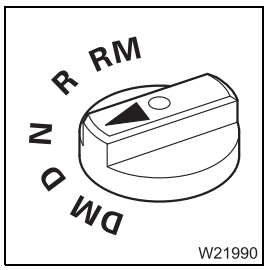
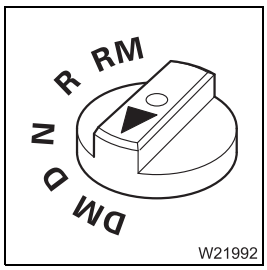
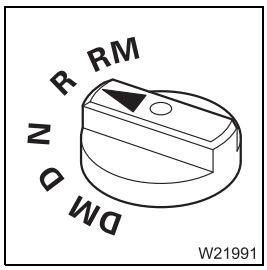


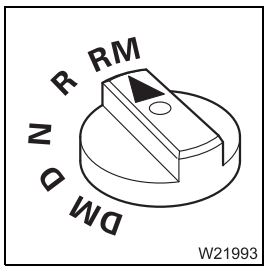
– **Position D:** When at a standstill – Select forwards starting gear
When driving forwards – Select a suitable gear, clutch engages
When driving in reverse – Select neutral



– **DM position:** When at a standstill – Forwards starting gear engaged in manoeuvring mode
When driving forwards – Transmission in neutral position, clutch open
When driving in reverse – Select neutral



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



– **RM position:** When at a standstill – Reverse starting gear engaged in manoeuvring mode
When driving in reverse – Transmission in neutral position, clutch open
When driving forwards – Select neutral

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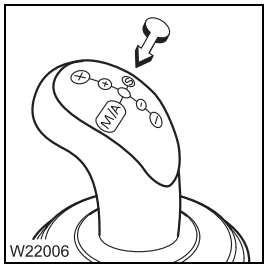
Gearshift lever



The truck crane may be stationary or driving.

– **Once to the left:** Change over between *automatic* and *manual* operating mode – without change of gear

➠ p. 5 - 29

The truck crane must be stationary.

– **Push forwards once:** Shift up starting gear – 1 gear

– **Push to the rear once:** Shift down starting gear – 1 gear

The truck crane moves.

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

– **Push to the rear once:** Shift down – 1 gear
Manual operating mode on

➠ p. 5 - 32

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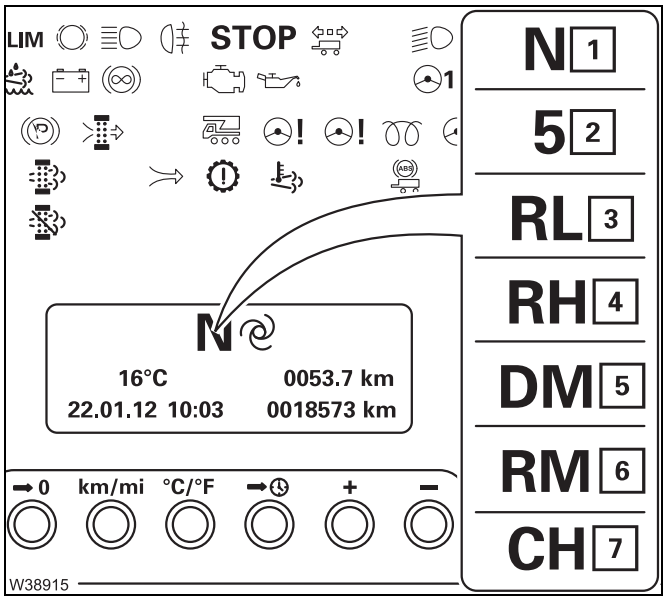
Driving mode display



Transmission display

1 Neutral position switched on

2 Currently engaged gear – forwards (1 to 12), e.g. 5

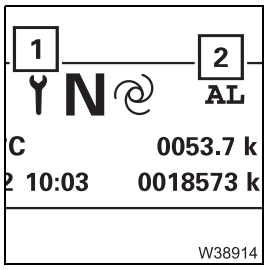
3 Gear currently engaged – 1st reverse gear

4 Gear currently engaged – 2nd reverse gear

5 Manoeuvring mode – forwards

6 Manoeuvring mode – reverse

7 Electronic gear system check

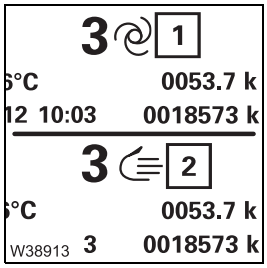


– Error messages display

1 Other malfunction

2 Error messages entry

➠ *Warning messages on the driving mode display*, p. 8 - 8



Operating mode display

1 *Automatic* operating mode

2 *Manual* operating mode

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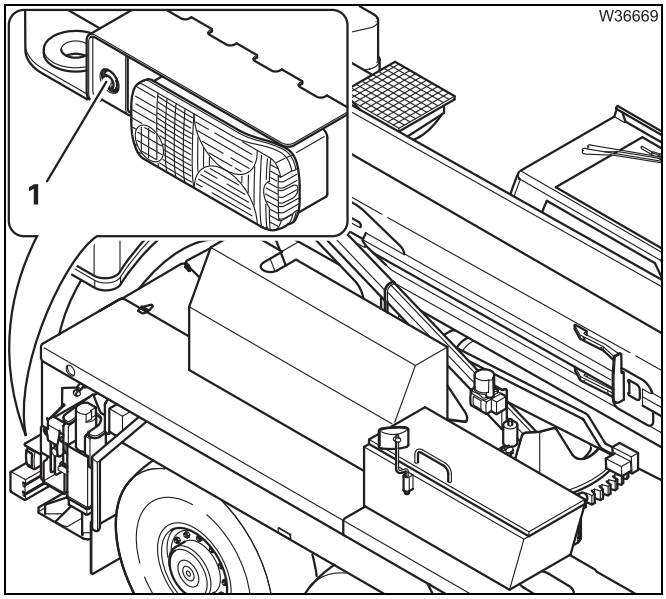
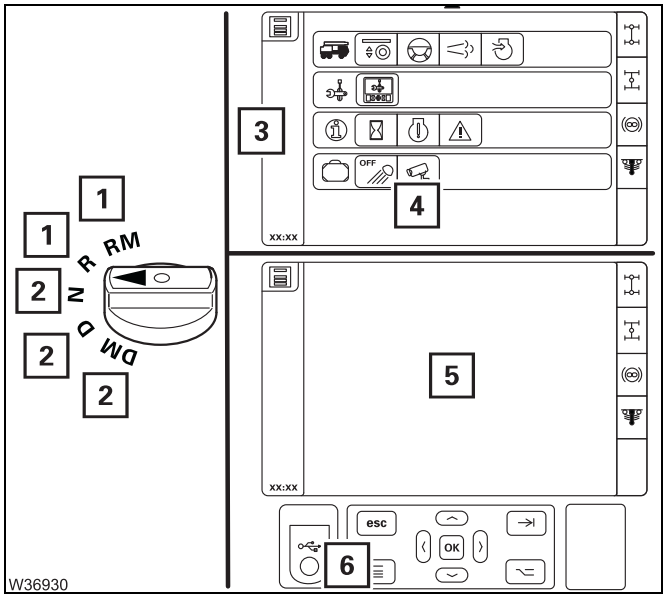
3.2.10 Reverse camera



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



Switch on

– Automatically, when reversing (**1**),

– Manual – select and confirm symbol (**4**)

The display (**3**) shows (**5**) – the area behind the truck crane

Switch off

– Automatically, when driving forwards or in neutral position (**2**),

– Manual – press button (**6**)

The display (**3**) shows the CCS menu

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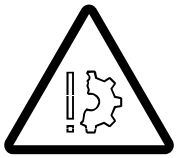
3.2.11 BirdView system 270°

The BirdView system 270° is a driving assistance system.

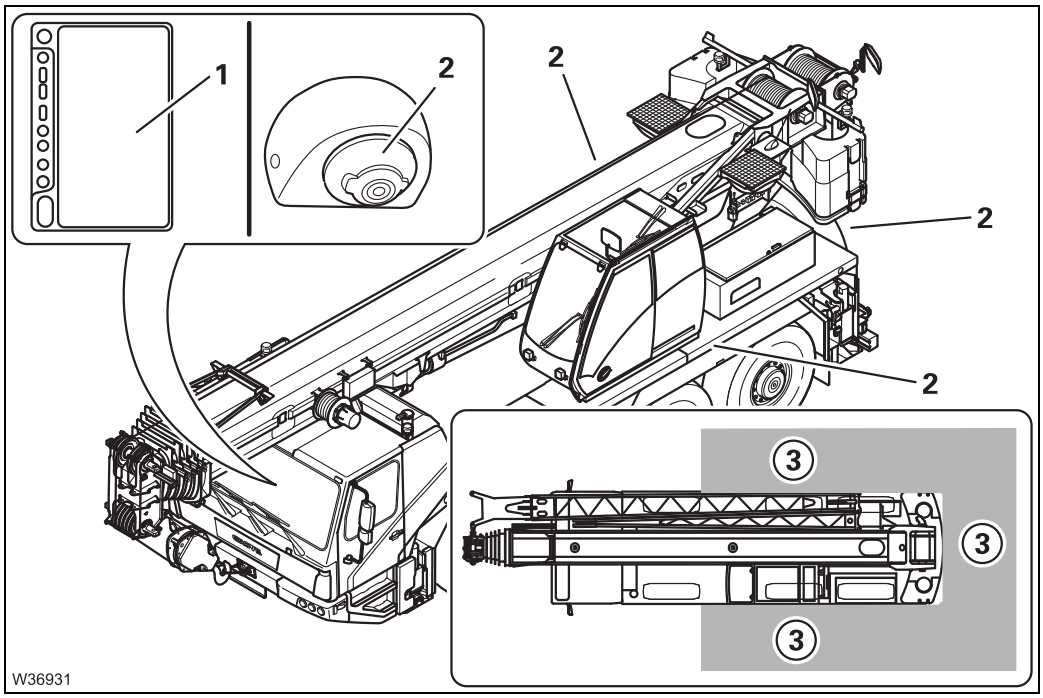
The BirdView system 270° does not relieve you of the responsibility for maintaining a sufficient safe distance or braking in time! Drive with due care and attention! The sole responsibility lies with the crane operator.

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.

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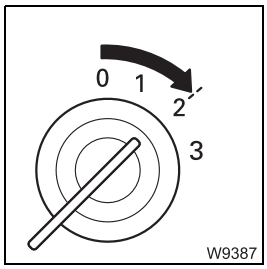
The cameras must not be removed or misadjusted. If a camera is mounted on the storage box then the storage box must not be removed.

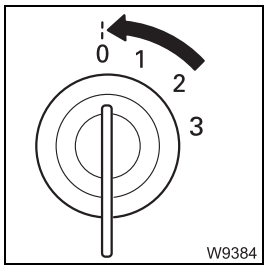
There may be no spare wheel installed on the rear of carrier.

Switch on



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

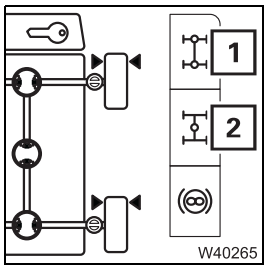
Switch off



- Switch off the ignition – the monitor switches off.

3.2.12 Final drive

Longitudinal and transverse differential locks, p. 5 - 56



1 Transverse differential locks display

2 Longitudinal differential lock display

The following applies to both displays:

– **Green:** Locks off

– **Red:** Locks on

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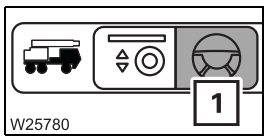
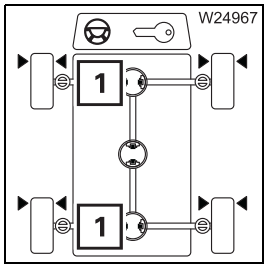


Driving menu

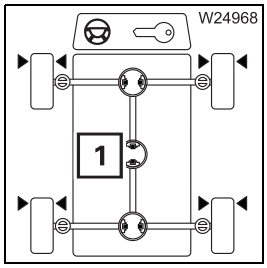
– **Opening:** Select symbol (**1**) and confirm – menu is opened



Transverse differential locks on/off

– **Switch on:** Select symbol (**1**) and confirm – symbol is **red**
– **Switch off:** Select symbol (**1**) and confirm – symbol is **green**

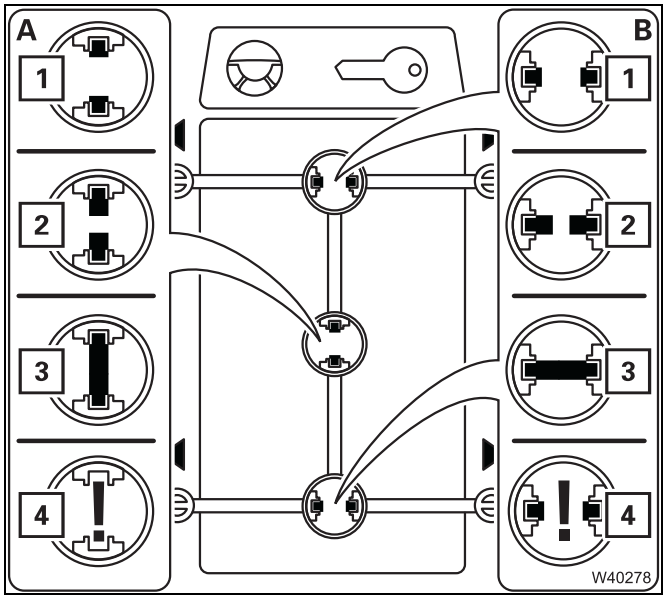
When a symbol (**1**) is selected **all** transverse differential locks are switched on or off.



Longitudinal differential lock on/off

– **Switch on:** Select symbol (**1**) and confirm – symbol is **red**
– **Switch off:** Select symbol (**1**) and confirm – symbol is **green**

With the 6 x 6 x 6 drive, at the same time, the 1st axle line on/off



(A) – longitudinal differential lock display

(B) – transverse differential lock display

The current status is shown using different symbols.

1 **Green** – locks off
2 **Yellow** – intermediate position
3 **Red** – locks on
4 **Violet** – error

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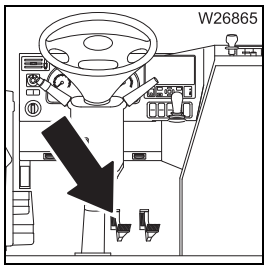
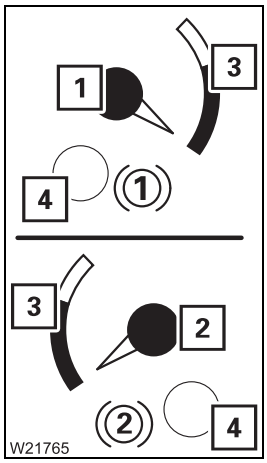
3.2.13 Brakes

Service brake



The braking force can be continuously adjusted with the pedal.



Display of supply pressure in brake circuits

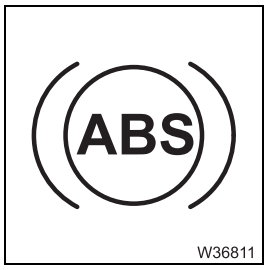
1 Current supply pressure in brake circuit 1

2 Current supply pressure in brake circuit 2

3 **Red** – supply pressure insufficient
White – supply pressure sufficient

4 **– Lights up:** Supply pressure below approx. 5 bar (73 psi)
– Gone out: Supply pressure above 5 bar (73 psi)

➠ p. 5 - 9



ABS warning

– Lights up:
– While driving
ABS controls the braking operation
– After starting the engine
ABS system defective; ➠ p. 8 - 7

– Gone out: ABS does not control the braking operation

➠ p. 5 - 37

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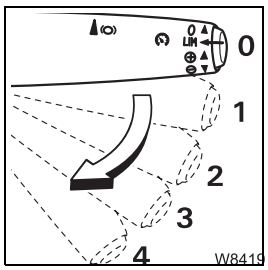
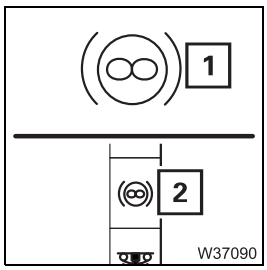
additional brakes Engine retarder/transmission retarder
➠ *Additional brakes*, p. 5 - 43

Multipurpose switch

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



0 Forward: Engine retarder and transmission retarder off
1 Back: 25% brake power
2 Back: 50% brake power
3 Back: 75% brake power
4 Back: 100% brake power

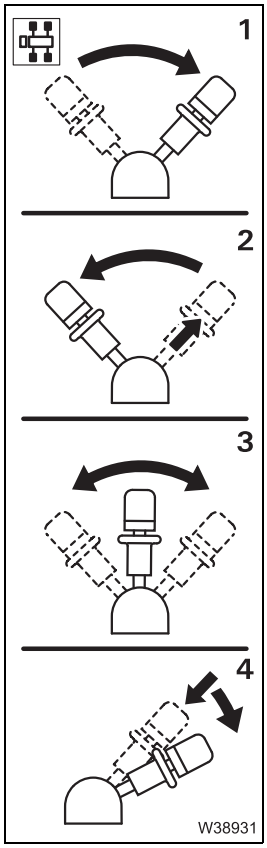


Instrument panel (1) / CCS display (2)

Additional brake indicator lamp

– **Lights up:** Additional brake on
– **Gone out:** Additional brake off

Parking brake

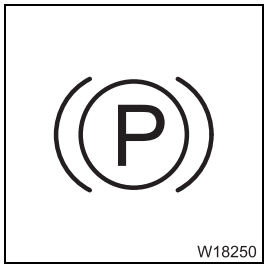


1 To engage the parking brake: Pull the lever back until it locks into place

2 To release the parking brake: Lift the lever and push to the front until it latches into place

3 To operate as an auxiliary brake: Shift the lever to intermediate position
The braking force is increased continuously by moving the lever from the front to the rear.

4 Test position for towing a trailer:
– Pull the lever back until it locks into place
– Press in the lever and pull it further backwards
The parking brake for the trailer is released;
⇛ p. 5 - 86.



Parking brake indicator lamp

– **Lights up:** Parking brake applied
– **Gone out:** Parking brake released

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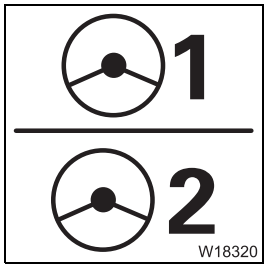
3.2.14 Steering/separate steering

➠ *Separate steering*, p. 5 - 65

Instrument panel



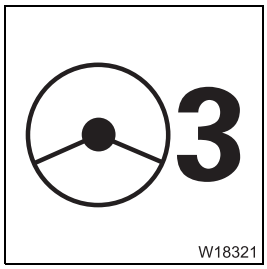
Steering circuit 1 warning

Steering circuit 2 warning

– **Lights up:** Engine off – ignition on
or
Engine on – malfunction, stop – check oil loss

– **Gone out:** Engine on – no malfunction

➠ p. 8 - 5



Steering circuit 3 warning

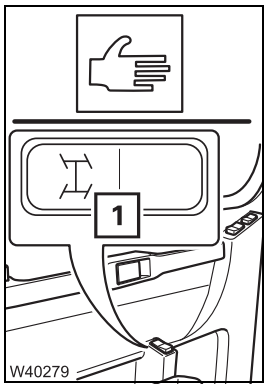
(emergency steering pump)

– **Lights up:** about 10 km/h (6 mph) not reached
or
Steering malfunction – stop and check for oil loss

– **Gone out:** Emergency steering pump ready to function

➠ p. 8 - 5

Driver's door



Separate steering

The *Manual* separate steering is switched on.

1st axle line with the steering wheel.

Press and hold button (**1**)

– **To the left:** 2nd and 3rd axle lines – turn to the left

– **To the right:** 2nd and 3rd axle lines – turn to the right

➠ p. 5 - 67

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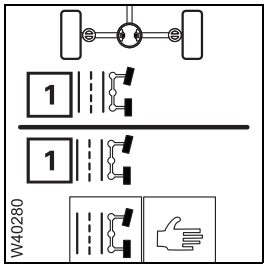
CCS display

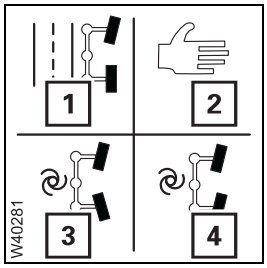


Steering mode switched on display

The display (**1**) is shown in the *Driving* menu and the *Start menu*.

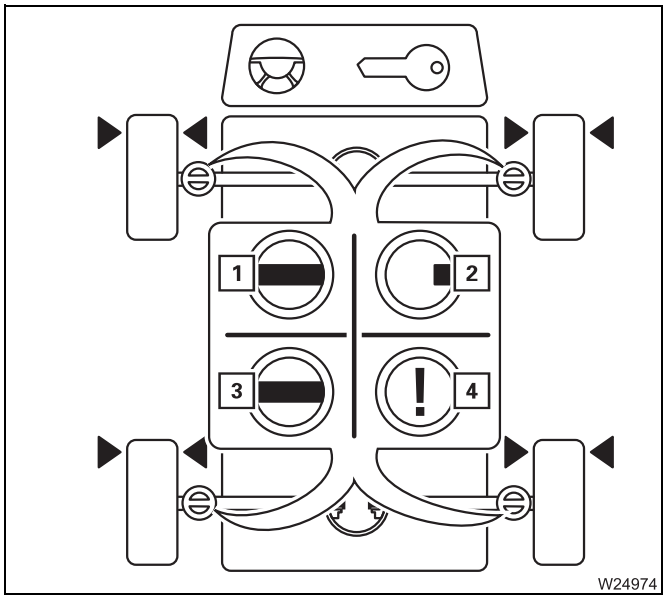
Shows the symbol for the currently selected steering mode.

The switching procedure for the selected steering mode has been initiated.



Selected steering mode	Gear change
1 Normal steering mode – on-road driving	Locking the steering
2 Separate steering – manual	Unlock steering
3 Separate steering – driving around corners	Unlock steering
4 Separate steering – crab travel mode	Unlock steering

The current switching status is displayed on the *Steering locking status* display.



Steering locking status display

Indicates whether the switching procedure for the selected steering mode has been completed.

1 **Green** – locked

2 **Red** – unlocked

3 **Yellow** – intermediate position

4 Error

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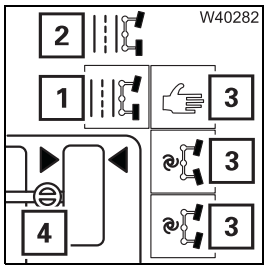
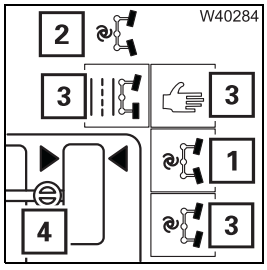


Normal steering mode/on-road driving on

– **Switch on:** Select symbol (**1**) and confirm – Symbol (**2**) is displayed
Displays (**4**) **green** – normal steering on

– **Switch off:** Select a different steering mode – symbol (**3**)
Displays (**4**) **red** – normal steering off

➠ p. 5 - 66

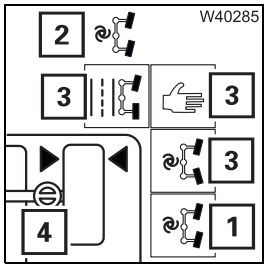


Automatic separate steering driving around corners on

– **Switch on:** Select symbol (**1**) and confirm – Symbol (**2**) is displayed
Displays (**4**) **red** – driving around corners on

– **Switch off:** Select a different steering mode – symbol (**3**)

➠ p. 5 - 66

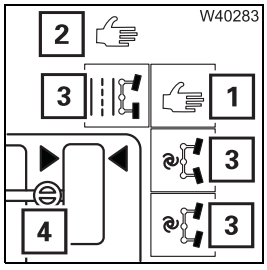


Automatic separate steering for crab travel mode on

– **Switch on:** Select symbol (**1**) and confirm – Symbol (**2**) is displayed
Displays (**4**) **red** – crab travel mode on

– **Switch off:** Select a different steering mode – symbol (**3**)

➠ p. 5 - 66



Manual separate steering on

– **Switch on:** Select symbol (**1**) and confirm – Symbol (**2**) is displayed
Displays (**4**) **red** – manual on

– **Switch off:** Select a different steering mode – symbol (**3**)

➠ p. 5 - 66

When separate steering is switched on, the speed is limited.

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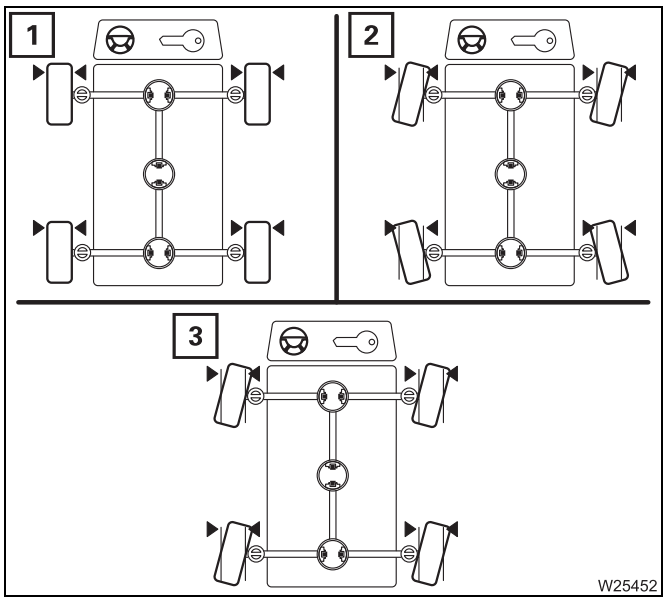


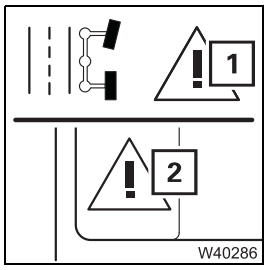
Current wheel position display

The current status is shown using different symbols:

1 Straight ahead

2 Driving around corners

3 Crab travel mode



Error in steering system

1 Error message in the steering system detected – additional display of symbol (**2**)
➠ p. 8 - 16

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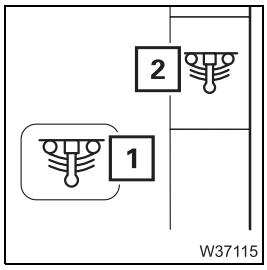
3.2.15 Suspension

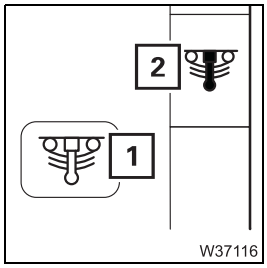
CCS display



Suspension display

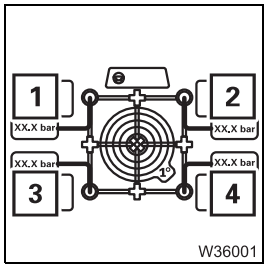
Suspension on/off

– **Switch on:** Select symbol (**1**) and confirm – Symbol (**2**) **green**
Suspension on – enabled for on-road driving



– **Switch off** Select symbol (**1**) and confirm – Symbol (**2**) **red**
Suspension off – blocked for crane operation

➠ p. 5 - 16



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

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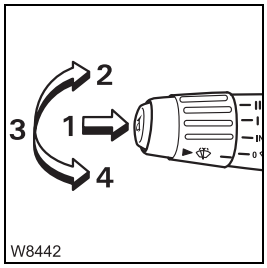
3.2.16 Lighting/windscreen wipers/horn

Steering column Multipurpose switch

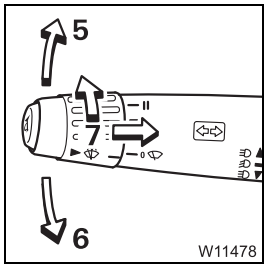


Horn/headlight flasher/headlight – full beam

1	**Horn:**	Press the button
2	**Flash the headlights:**	Upwards

The parking light/headlight must be switched on:

3	**Parking light/headlight:**	Middle position
4	**Headlight – full-beam:**	Down – latches into place

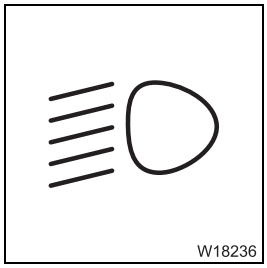


Turn signal indicator/wiper-washing system

5	**Right turn signal indicator:**	Forwards
6	**Left turn signal indicator:**	Backwards
7	**Windscreen wiper/washing system:**	Press
7	**Windscreen wiper:**	Turn – off (0), intermittent, slow, fast

7 Adjusting the wiper stroke interval:
- Switch on intermittent
- Switch off after the first wipe (0)
- Wait for the required time (maximum 20 seconds)
- Switch on the interval – required time = pause between wipes

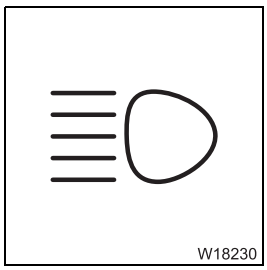
Instrument panel



Headlight check

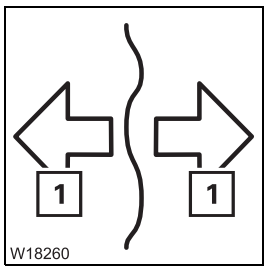
–	**Lights up:**	Headlight – full beam on
–	**Gone out:**	Headlight – full beam off

13.12.2018



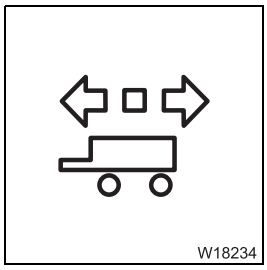
Full beam headlight indicator lamp

– **Lights up:** Headlight – full beam on
– **Gone out:** Headlight – full beam off



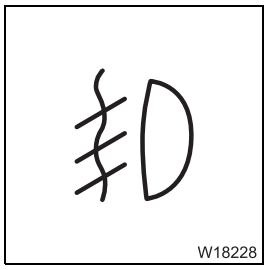
Indicator lamp for turn signal indicator

1 – **Flashing:** Turn signal indicator on
– **Gone out:** Turn signal indicator off, or turn signal indicator on and filament lamp faulty



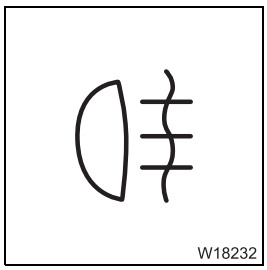
Indicator lamp for trailer turn signal indicator

1 – **Flashing:** Turn signal indicator on and trailer electrically connected
– **Flashes once:** Turn signal indicator on and trailer not electrically connected
– **Gone out:** Turn signal indicator off



Fog light indicator lamp

– **Lights up:** Fog light on
– **Gone out:** Fog light off



Fog tail light indicator lamp

– **Lights up:** Fog tail light on
– **Gone out:** Fog tail light off

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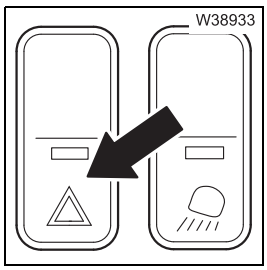
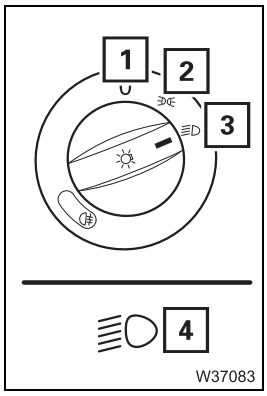


Hazard warning system on/off

- **Switch on:** Press downwards – light in the switch flashes
- **Switch off:** Press in at the top – gone out



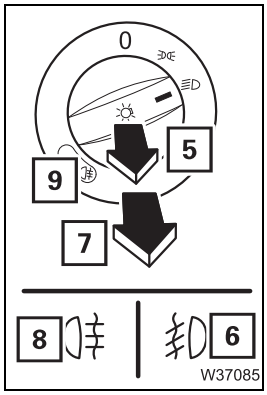
Lighting on/off

– Parking light/headlight

1 Light off

2 Parking light on Instrument lighting on

3 Headlight on The lamp (**4**) lights up, daytime driving light off
Full beam can be switched on using the multipurpose switch



– Fog light /fog tail light

The headlight or parking light is switched on

5 Fog light on – The lamp (**6**) lights up

7 Fog tail light on – Lamps (**8**) and (**9**) light up

Press the switch in to switch off

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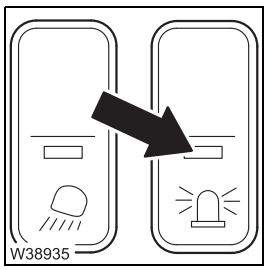
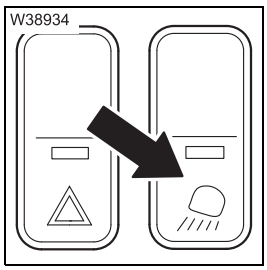


Rotating beacon on/off

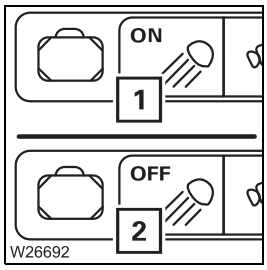
- **Switch on:** Press in at the top – lamp in the switch lights up
- **Switch off:** Press in at the bottom – light in the switch goes out



Spotlights on rear of carrier on/off

- **Switch on:** Push in at the bottom
- **Switch off:** press upwards – position for driving on the road

***CCS* display**



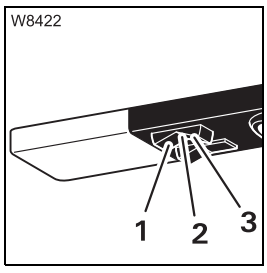
Outrigger lighting on/off

- **Switch on:** Select and confirm symbol (**1**)
- **Switch off:** Select and confirm symbol (**2**)

p. 12 - 30

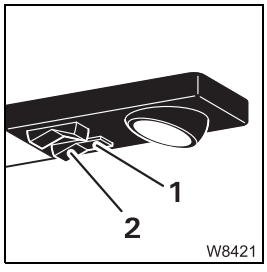
Roof

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



Cab lighting

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



Reading lamp

1 On
2 Off

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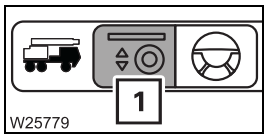
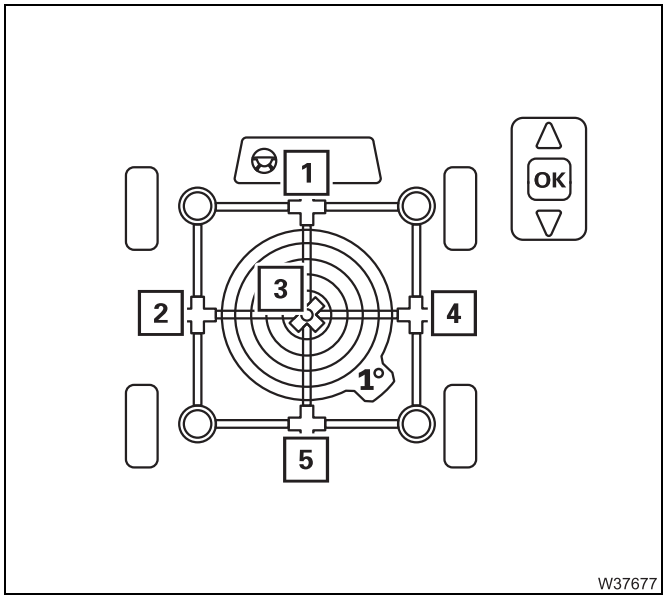
3.2.17 Level adjustment system

➠ *Operating the level adjustment system*, p. 5 - 58.



Suspension/level adjustment menu

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



Lift/lower pre-selection level

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

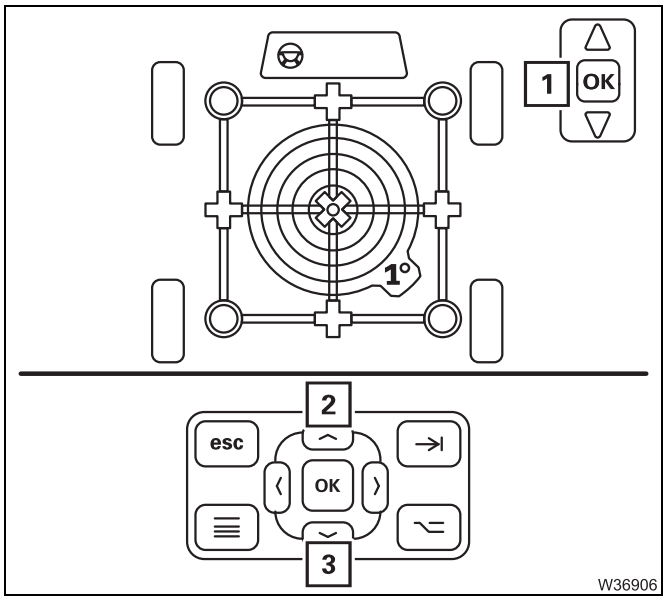
2 Left level pre-selection

1 Front level pre-selection

4 Right level pre-selection

5 Rear level pre-selection

3 Overall level pre-selection



Level adjustment system enabled display

1 – Displayed
Level pre-selection on,
buttons (**2**) and (**3**) active.

– Hidden
Level pre-selection off,
buttons (**2**) and (**3**) not active.

Level change

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

2 Raise the level

3 Lowering the level

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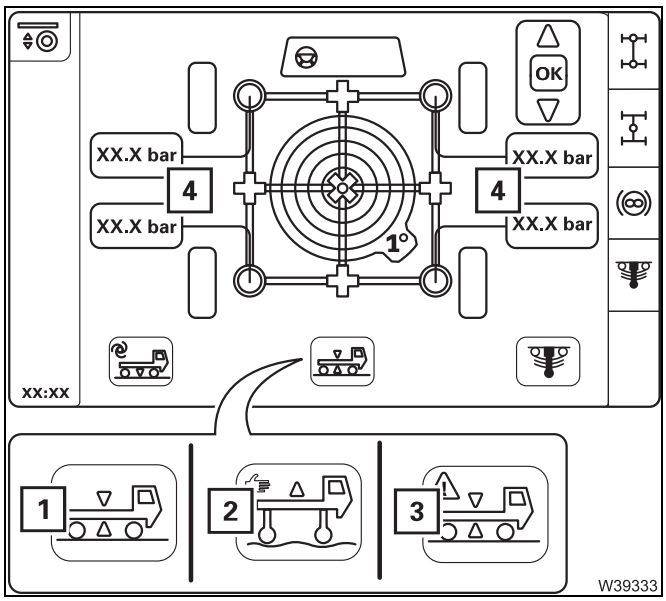


Vehicle level display

The current status is shown using different symbols.

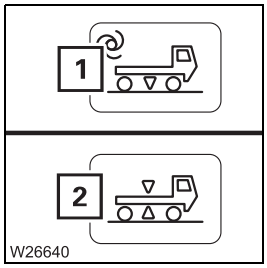
1 On-road level

2 Not at on-road level

3 Error

4 Operation pressure in the suspension struts

p. 5 - 58



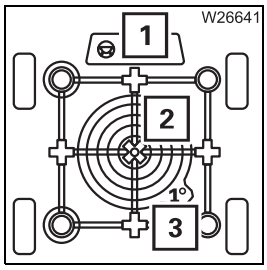
Setting the on-road level

The suspension is switched on.

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

2 On-road level reached

p. 5 - 59



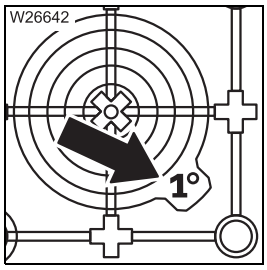
Current inclination display

1 Directional indicator

2 Inclination indicator

3 Measuring range display

p. 5 - 61



Switching over the measuring range

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

p. 5 - 61

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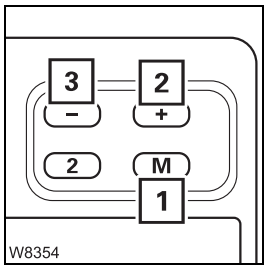
3.2.18 Tachograph/speedometer

Setting the tachograph, p. 5 - 18.

Tachograph

Time correction



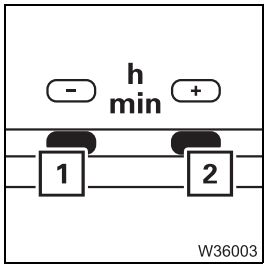
1 Open the time menu: Press the button – the time correction menu opens

2 Time correction +: Press the button – the time is increased

3 Time correction – : Press the button – the time is decreased

Cover

Time correction

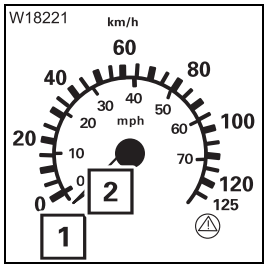


1 Time correction +: Press the button – the time is increased

2 Time correction – : Press the button – the time is decreased

Speedometer

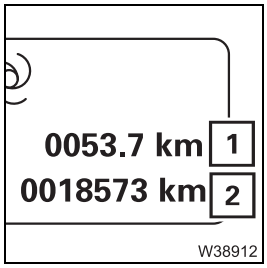
Displays the speed and the route:



Speed indicator

1 Indicates the speed in km/h

2 Indicates the speed in mph



Kilometre counter

The ignition must be switched on.

1 Daily distance travelled in kilometres – value after the decimal point: 1 = 100 m; p. 5 - 24

2 Overall distance travelled in kilometres – no value after the decimal point

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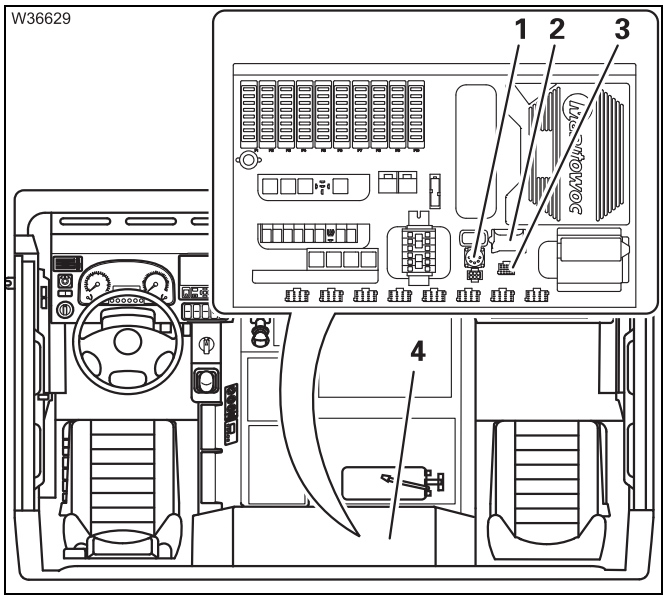
3.2.19 Diagnostics

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



Under the covering (**4**)

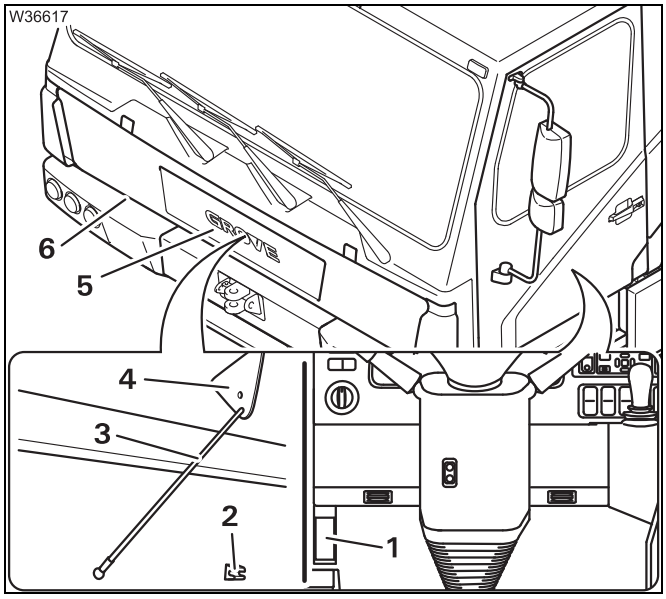
1 Carrier electronics diagnostics

2 Transmission diagnostics

3 Engine diagnostics

3.2.20 Front flap

The front flap has two locks. For securing, one of the two locks can only be released from the driver's cab.



Opening

– To release, pull the lever (**1**),

– Press the lever **(6**) to the right and fold the front flap (**5**) up,

– Fold up the support (**3**) and attach to the holder (**4**).

Closing

– Lift the front flap (**5**).

– Pull the support (**3**) from the holder (**4**) and secure it in the holder (**2**)

– Fold down the front flap,

– Press the front flap against the driver's cab until you can hear it latch into place.

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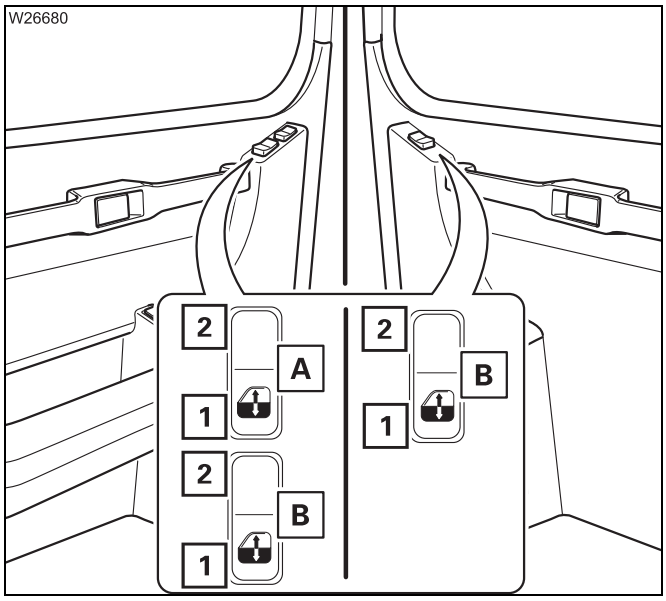
3.2.21 Windows and doors

Window winder

Risk of crushing when closing the windows!
If the window winders encounter resistance, they do not stop but keep on moving at reduced power.



Button assignment

A Window winder, driver's door

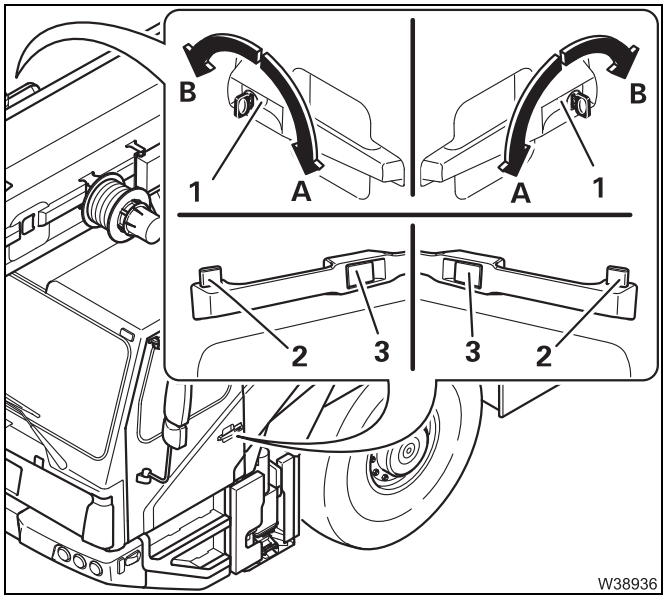
B Window winder, passenger door

1 To open the window

2 To close the window

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

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



Locking
- To close the door
- Turn the key towards **B**, or
- Push down the knob (**2**)

Unlocking
- Turn the key towards **A**, or
- Push up the knob (**2**)

Opening
- Pull the handle (**1**) or
- Pull the handle (**3**)

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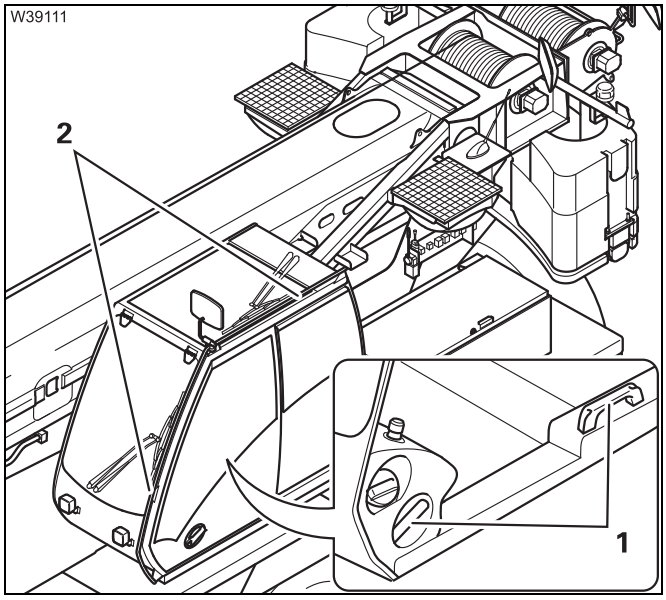
3.2.22 Access ladders and ladders

Different handles and ladders are on the truck crane depending on the version.

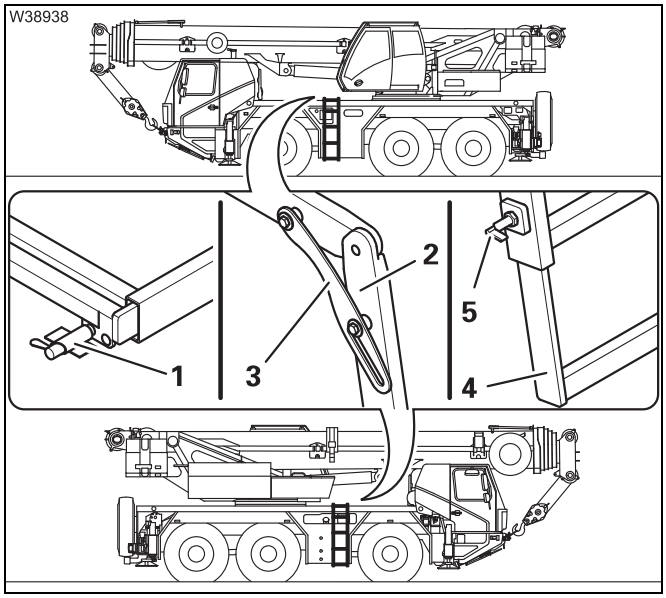
Hazard due to unsecured ladders!
Always secure the ladders before driving. The prevents the ladders falling down or folding out whilst driving and thus endangering other vehicles.



. **Handles**

– When the crane cab door is open, you can reach the handle (**1**).

– The handle (**2**) is located on the outside of the crane cab.



Swing-out ladders

– Folding out

- Release the spring latch (**1**).
- Swing the ladder (**2**) outwards and fold downwards – locking bar (**3**) engages.
- If need be – release the spring latch (**3**) and pull out another access ladder (**4**).

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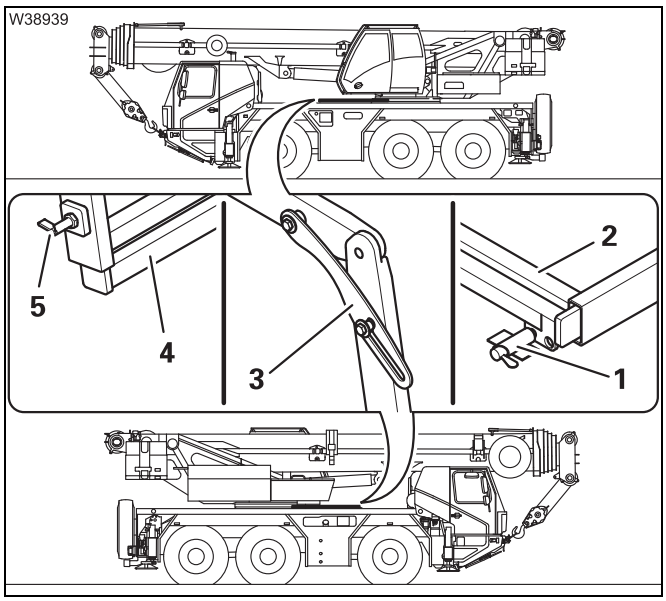
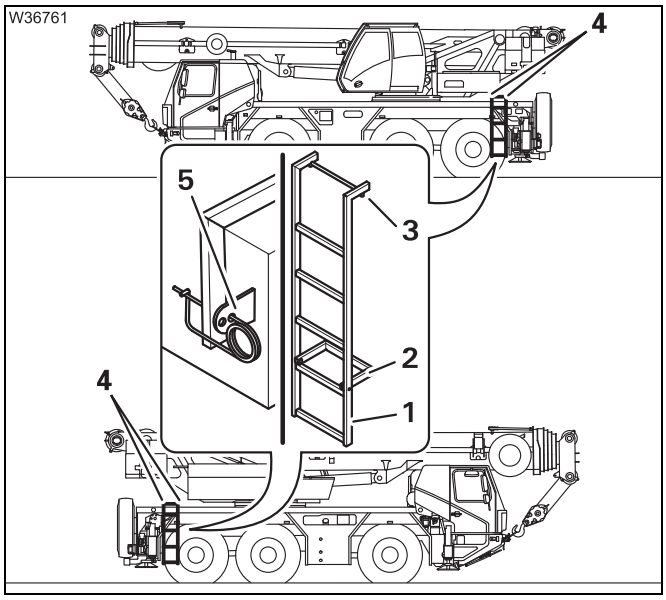


– Folding in

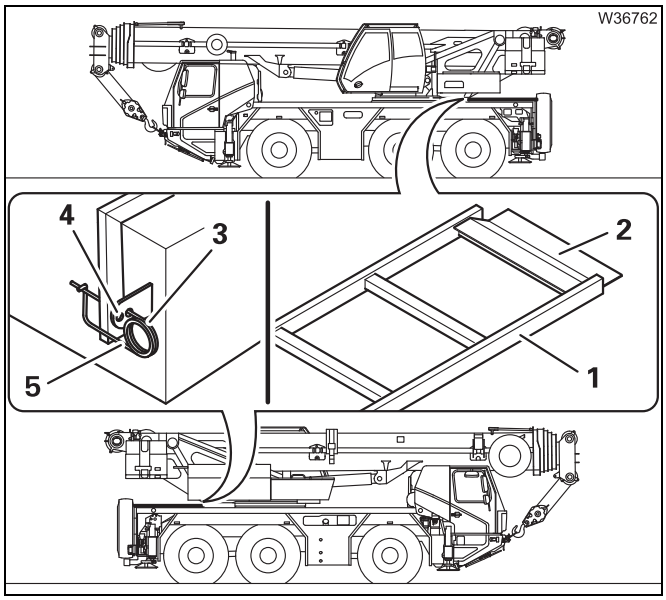
- Release the spring latch (**3**) and push in the access ladder (**4**).
- Lift the locking bar (**3**) for releasing and fold the ladder (**2**) upwards.
- Swing the ladder (**2**) on the carrier.
- Secure the ladder (**2**) with the spring latch (**1**).



Hook-on ladders

– For the use

- Release the ladder from the holder (**5**) and remove from the carrier.
- Hang the ladder (**1**) in the bores (**4**) – insert the pegs (**3**) into the bores all the way to the end stop.
- Fold out the spacer (**2**).



– For driving

- Push the ladder (**1**) with the lowest rung below the angle bracket (**2**).
- Secure the ladder on the holder (**5**) using the retaining pin (**3**).
- If necessary, secure the ladder with a padlock at the bore (**4**).

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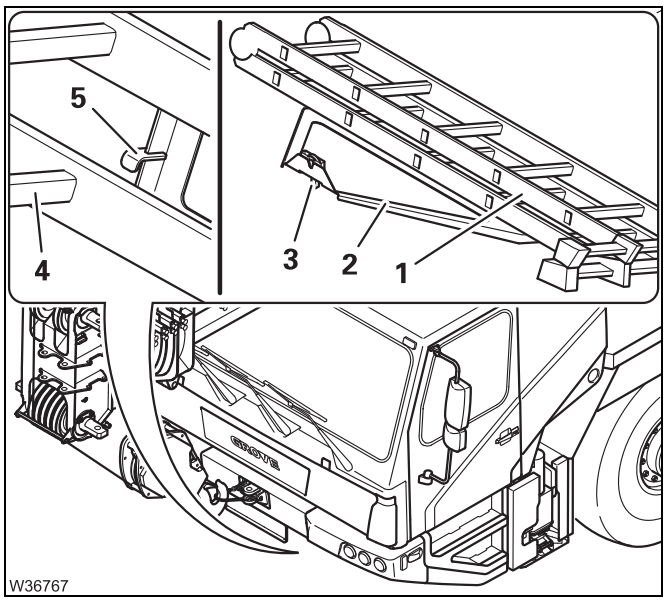
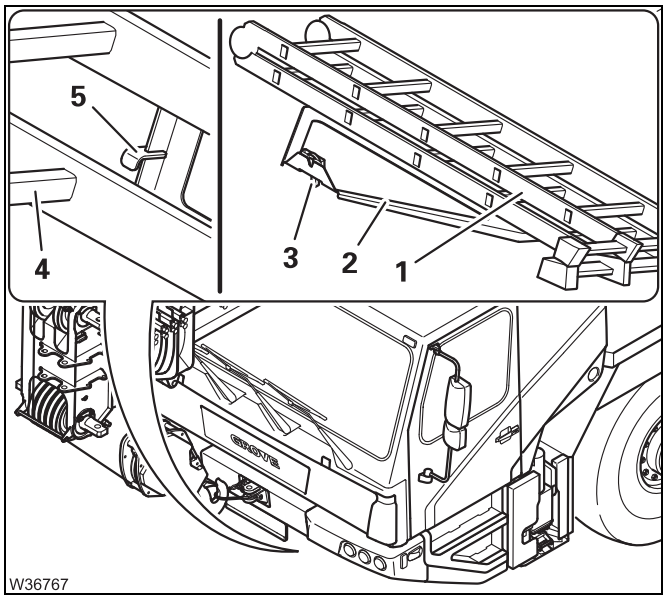


Folding ladder

– For the use

Ladder (**1**) – to erect and fold out.

- Hold the clamp (**2**) and open the lock (**3**).
- Fold down the clamp (**2**).
- Pull the ladder forwards until the rung (**4**) is positioned in front of the bracket (**5**).
- Take out the ladder.
- Fold the clamp (**2**) upwards until it engages.



– For driving/crane operation

- Fold together the ladder (**1**).
- Place the ladder in the centre of the clamp (**2**).
- Push the ladder back so that the holder (**5**) engages on a rung (**4**).
- Fold the clamp (**2**) upwards until it engages.
- Always secure the holder (**2**) before driving, even if no ladder is being transported.

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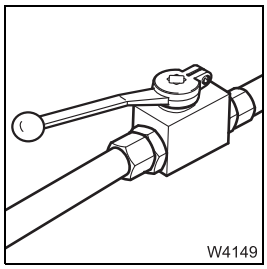
4 Starting/stopping the engine – for driving

4.1 Starting the engine – from the driver's cab

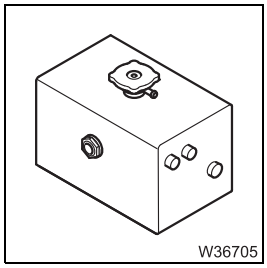
This section describes how to start the engine from within the driver's cab. You can also start the engine from the outrigger control units; ➠ p. 4 - 17.

4.1.1 CHECKLIST: Starting the engine

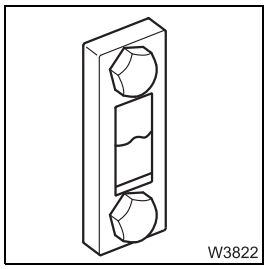
This checklist is not a complete operating manual. There are accompanying operating instructions which are indicated by cross-references.
Observe the warnings and safety instructions there!



1. Check that the valves on the hydraulic tank are open; ➠ p. 4 - 8.



2. Check the coolant level in the engine; ➠ *Maintenance manual*.



3. Check the oil level in the hydraulic system; ➠ *Maintenance manual*.

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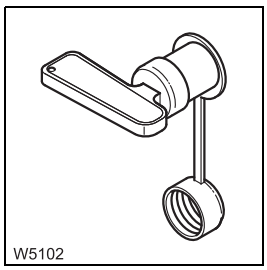
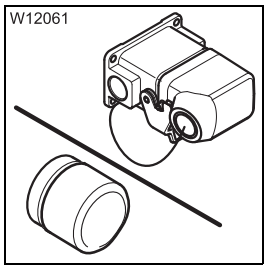
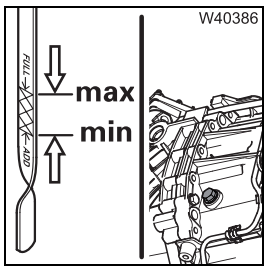


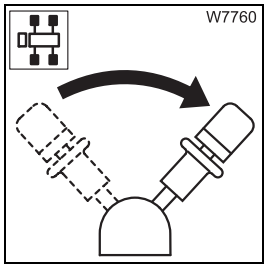
4. Switch on the battery master switch; ➠ p. 4 - 9.



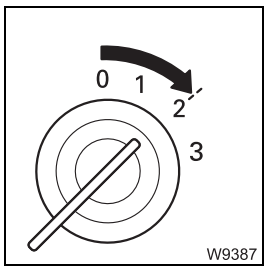
5. – Check that all emergency stop switches have been reset; ➠ p. 4 - 20.
– Check that the bridging plugs are inserted into all sockets for hand-held controls; ➠ p. 14 - 43.



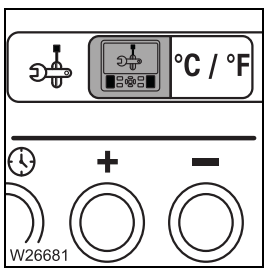
6. Check the oil level in the engine and gearbox; ➠ *Maintenance manual*.



7. Check that the parking brake is engaged.



8. Switch on the ignition and check the instruments and displays; ➠ p. 4 - 9.



9. If necessary, set the brightness
– On the *CCS* display; ➠ p. 4 - 11
– Instrument lighting; ➠ p. 5 - 24.

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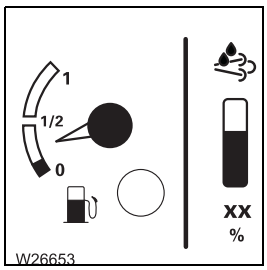
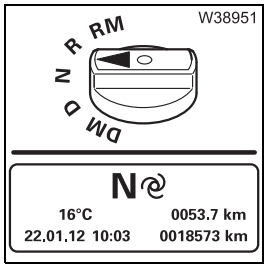


10. Check the fluid supply:

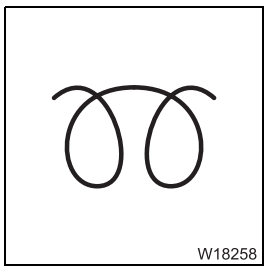
– *Fuel tank*, p. 4 - 5,

– *AdBlue (DEF) tank*, p. 4 - 7

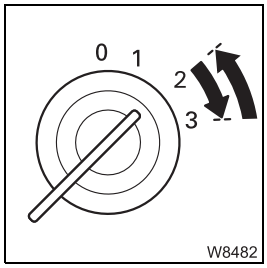
– *Crane cab heater fuel tank*, p. 11 - 5



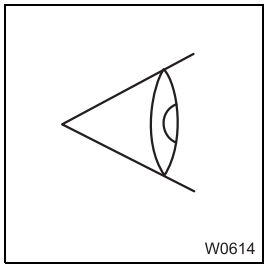
11. Switch the transmission to the neutral position; p. 5 - 26.



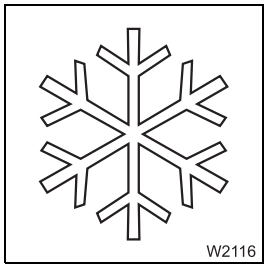
12. If the truck crane has a flame start system, wait until the lamp goes out; p. 4 - 14.



13. Start the engine; p. 4 - 12.



14. Perform the necessary checks after starting the engine; p. 4 - 15.



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

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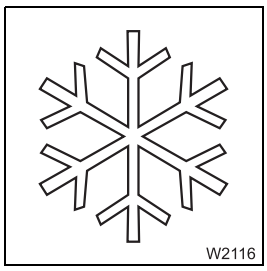
4.1.2 CHECKLIST: At low temperatures



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

1. The fuel and engine oil must be suitable for use at the respective outside temperature; ➠ *Separate engine manufacturer's operating manual*.
2. The engine coolant must contain sufficient antifreeze; ➠ *Separate engine manufacturer's operating manual*.
3. The windscreen washing system must contain sufficient antifreeze; ➠ *Maintenance manual*.

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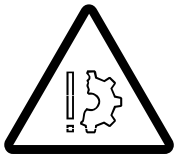
4.1.3 Refuelling

Fuel tank

Use only permitted consumables; ➠ *Separate engine manufacturer's operating manual*.

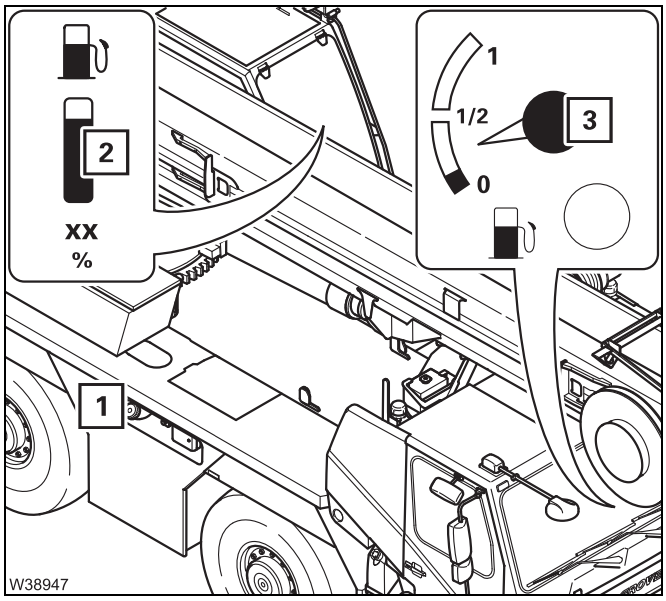
Danger of fire due to inflammable gases!
Switch off the engine, the heater and all additional heaters before refuelling.

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.

- Align the truck crane horizontally with the level adjustment system;
  ➠ *Operating the level adjustment system*, p. 5 - 58.



standard tank

The display (**2**) in the crane cab and the display (**3**) in the driver's cab show the fuel level in the tank

- Fill in the fuel through the filler neck (**1**) in good time. Leave sufficient space for the fuel to expand.
- Close the filler neck (**1**) each time you have refuelled.

Also fill the tank for the crane cab heating system;
➠ *Crane cab heater fuel tank*, p. 11 - 5.

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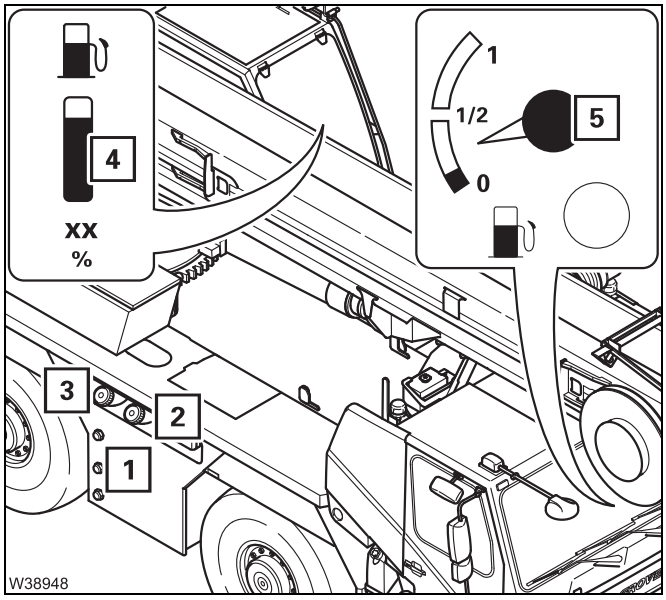
Dual- tank

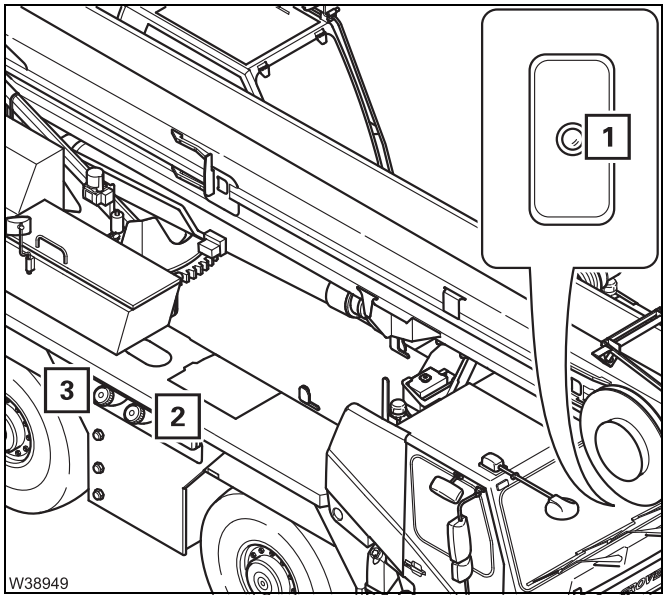
The dual tank system makes it possible to operate the truck crane in driving mode and crane operation mode with different types of fuel, provided this complies with the local regulations in the country in which you are working.



The fuel tank (**2**) contains fuel for driving operation – displays (**4**) and (**5**).

The fuel tank (**3**) contains fuel for crane operation – display (**1**).

- When refuelling, open filler necks (**2**) or (**3**).
- Refill the corresponding fuel tank in good time. Leave sufficient space for the fuel to expand.
- Close both tanks with the caps.



Switching over the fuel supply

The fuel supply is automatically switched over depending on whether you start the motor from the driver's cab or the crane cab.

The lamp (**1**) shows which fuel tank is being used

– **Lamp lights up**
  Crane operation – fuel tank (**3**)

– **Lamp goes out**
  Driving – Fuel tank (**2**)

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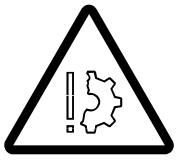
AdBlue (DEF) tank

AdBlue is a consumable for exhaust gas treatment. For AdBlue, there are registered trademarks of Kruse GmbH & Co KG, BASF SE and the German Association of the Automotive Industry.
Use only permitted consumables; ➠ *Separate engine manufacturer's operating manual*.

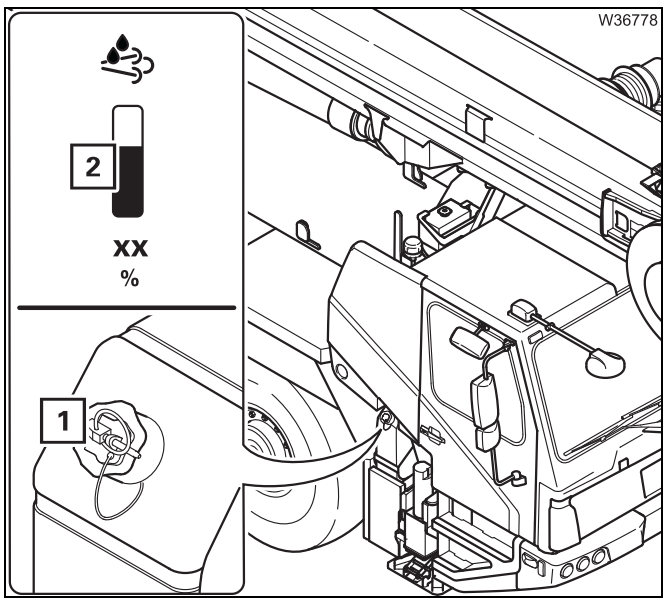
Risk of accidents if the tank is not closed!
Close the tank each time you have refilled it.
In this way you can prevent other vehicles from being endangered by the cap falling off or consumables escaping.

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.

Risk of injury from ammonia vapours!
Ammonia vapours can escape if the AdBlue (DEF) 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 (DEF) can cause corrosion of these surfaces. Clean up spilled AdBlue (DEF) with water immediately.



The display (**2**) in the *Start menu* shows the current filling level.

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

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If the AdBlue (DEF) tank is empty, a warning will be output and the engine torque will be reduced; ➠ *Overriding torque reduction*, p. 5 - 48.

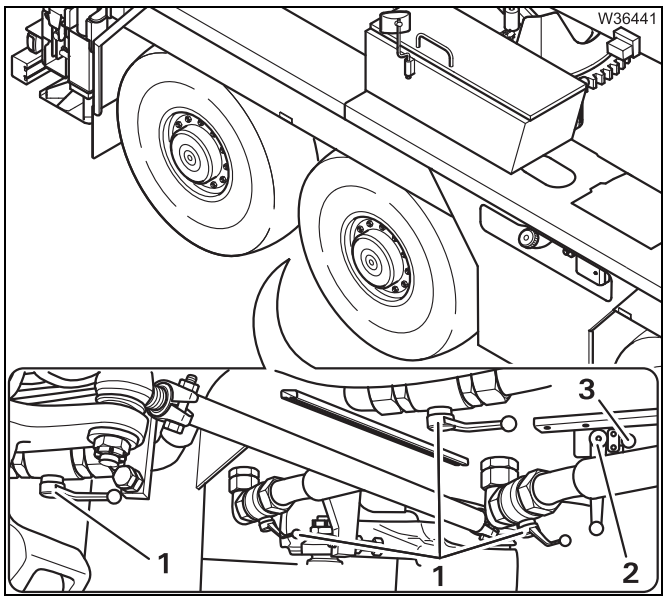
In order to comply with exhaust emission regulations, the truck crane may be driven only with AdBlue (DEF). Driving without AdBlue (DEF) will invalidate the licence for using the truck crane on public roads, so you may no longer drive it on public roads.

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



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

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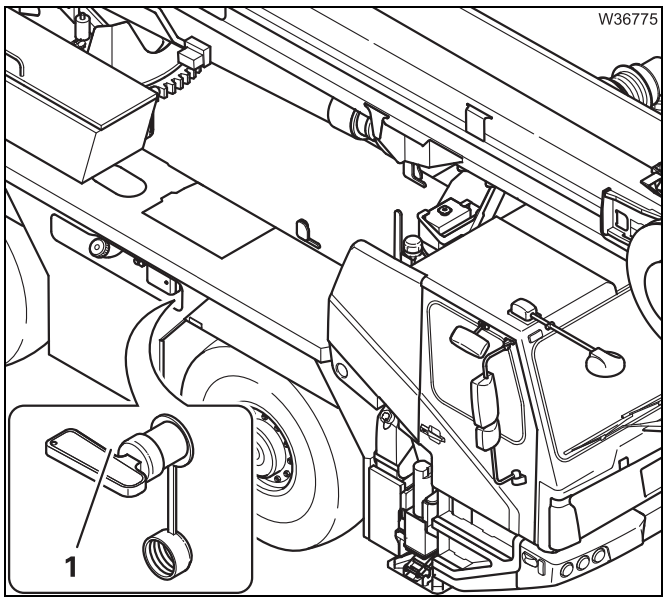
Battery master switch

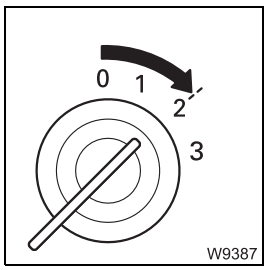
You can only start the engine when the battery master switch is switched on.



- Switch on the battery master switch (**1**).

The battery master switch is switched on if you are unable to pull off the selector handle.

4.1.5 Switching the ignition on



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

After switching on the ignition, a lamp test is performed and switching states are aligned.

Do not start the engine until the main menu is displayed.

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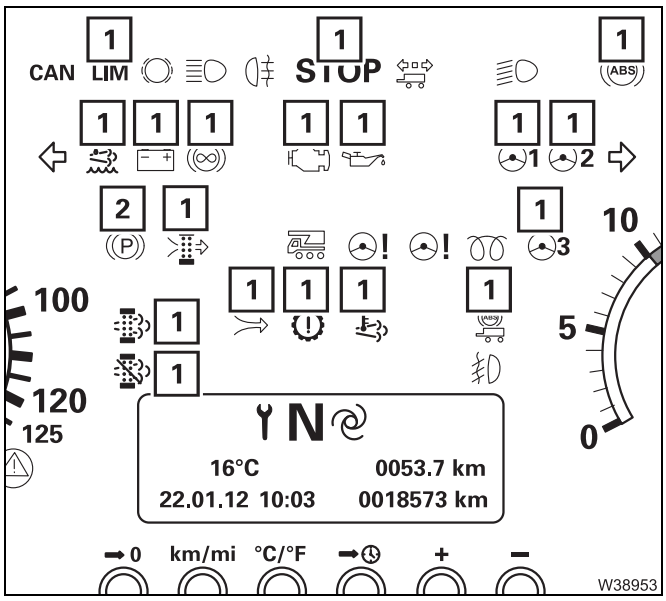
4.1.6 Lamp test/comparison of the switching states

Lamp test

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

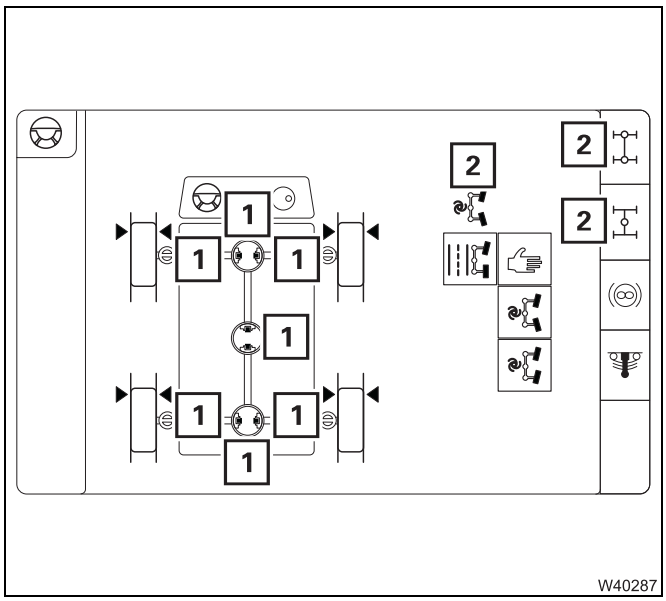
Risk of accident from faulty lamps!
The lamps that are used to provide warnings and information during operation light up for control purposes whenever the ignition is switched on. Always perform the following lamp tests and immediately replace faulty lamps or have them replaced!
In this way, you will 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.

Comparison of the switching states

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



The switching procedures for the last stored states are selected.

The symbols (**1**) and (**2**) show the selected states.

If a symbol (**1**) shows an intermediate position (yellow), you must actuate the steering, or drive slowly forwards and backwards, so that the locking processes are completed mechanically.

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4.1.7 Display – setting the brightness

The brightness of the display can also be adjusted manually.

In the driver's cab

You can set two brightness values.

– A value when the headlight is switched on.

– A value when the headlight is switched on.

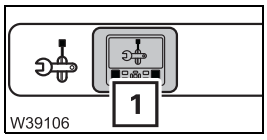
The configured brightness is switched over when the headlight is switched on and off.

In the crane cab

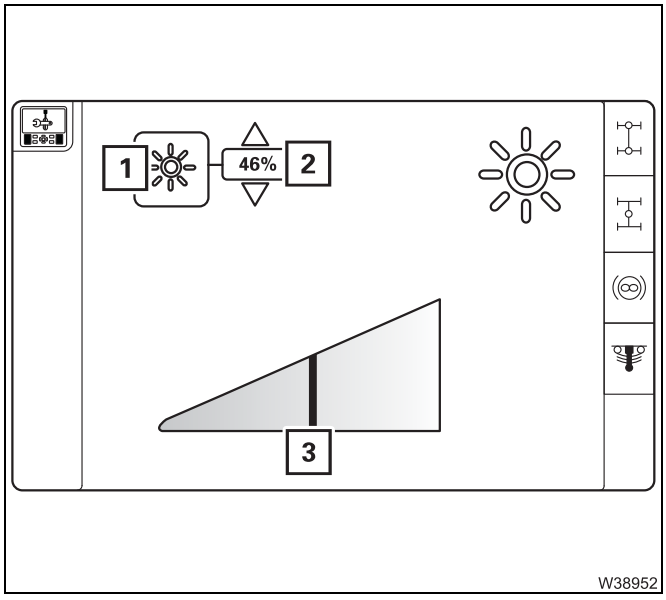
You can set a common brightness for the *CCS* and the *RCL* displays.

Adjust brightness

The setting is made in the same manner in the driver's cab and the crane cab.



- Open the *Set display brightness* 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**).

Temperature on the display

If the temperature on the display is too high, the brightness is reduced automatically.

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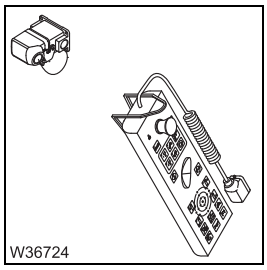
4.1.8 Starting the engine

This section describes only how to start the engine from the driver's cab. You can also start the engine from the outrigger control units; ➠ p. 4 - 17.

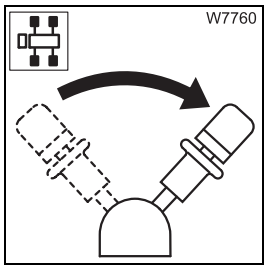
For operating the engine; ➠ *Separate engine manufacturer's operating manual*.

The engine can only be started if:

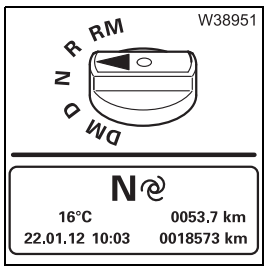


– The bridging plugs have been inserted in all sockets of the superstructure for the hand-held control; ➠ p. 14 - 43.

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



– The parking brake is applied.



– The transmission is in the neutral position **N**; ➠ p. 5 - 26.

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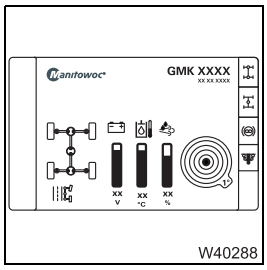
Without flame start system

If the engine is equipped with a flame start system; ➠ *With flame start system*, p. 4 - 14.

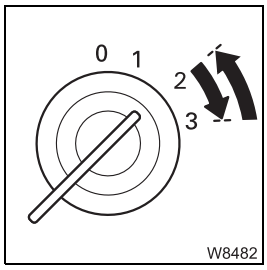
This section pertains to starting a warm and cold engine.

Danger of explosion when using starter fuel!
The engine may never be started with the aid of starter fuel. The starter fuel sprayed into the intake manifold 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.
- Release the ignition key after the engine starts.



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

If the engine does not start after several attempts; ➠ *Engine malfunctions*, p. 8 - 19.

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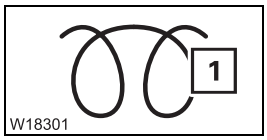
With flame start system

The flame start system warms the suction air of the engine.

This section pertains 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. The starter fuel sprayed into the intake manifold can ignite.

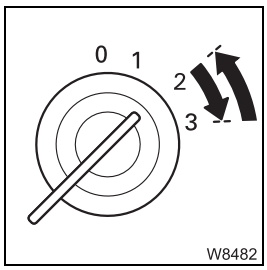
The flame start system is activated each time the ignition is turned on:



– **When the engine is warm**, the lamp (**1**) will light up only briefly (2 to 3 seconds).
– **When the engine is cold**, the lamp (**1**) goes out as soon as the engine is preheated (duration of up to 20 seconds).
Start the engine within the next 30 seconds; otherwise, you must switch on the ignition again and wait until the lamp goes out.

If the lamp (**1**) does not go out, there is a malfunction in the flame start system; ➠ p. 8 - 19.

- Wait until the lamp (**1**) goes out.
- Do not press the accelerator.



- Turn the ignition key to position **3** and hold it there until the engine starts.
- Release the ignition key after the engine starts.
- If the engine does not start, release the ignition key after about 15 seconds and wait one minute before trying again.

If the engine does not start after several attempts; ➠ *Engine malfunctions*, p. 8 - 19.

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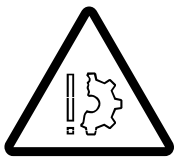
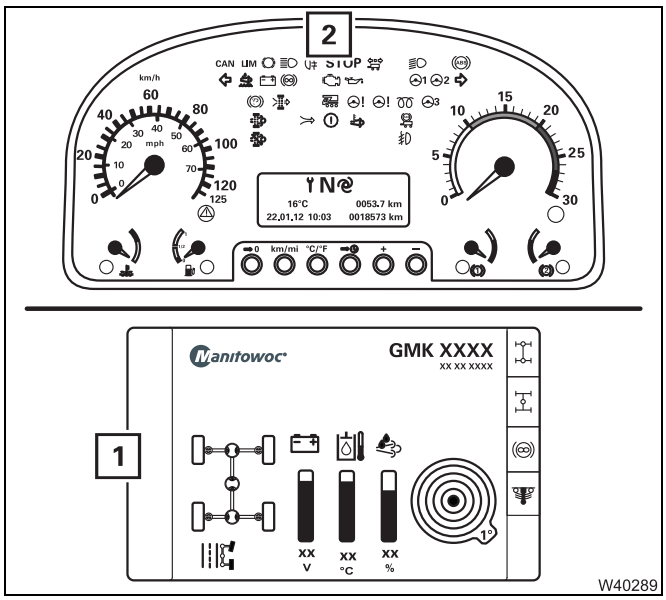
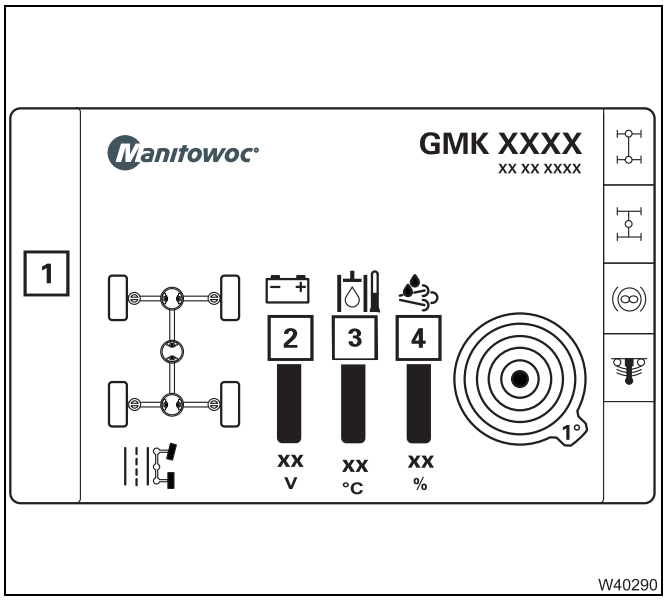
4.1.9 Checks after starting the engine



Risk of damage to the engine!
Observe the symbols and messages in the display area of the start menu and in the centre of the instrument panel. By this means you avoid low oil pressure leading to engine damage.



- Check the symbols in the display area (**1**) and on the instrument panel (**2**) immediately after starting the engine.
- Switch off the engine immediately if a symbol is **red**.
  - Display area (**1**) – when a symbol is **red**; ➠ *Warning messages on the CCS display*, p. 8 - 10.
  - Instrument panel (**2**) – when a lamp is red; ➠ *Warning and malfunction messages on the instrument panel*, p. 8 - 3.



- Also check the following displays
  - **2** Voltage in volts
  - **3** The hydraulic oil temperature in °C (°F)
  - **4** AdBlue (DEF) tank level in percent

The colour of the bar under the value provides additional information.

Green: Value OK

Yellow: Limit value almost reached

Red: Limit value exceeded (or not reached) – warning message in display area (**1**); ➠ p. 8 - 10.

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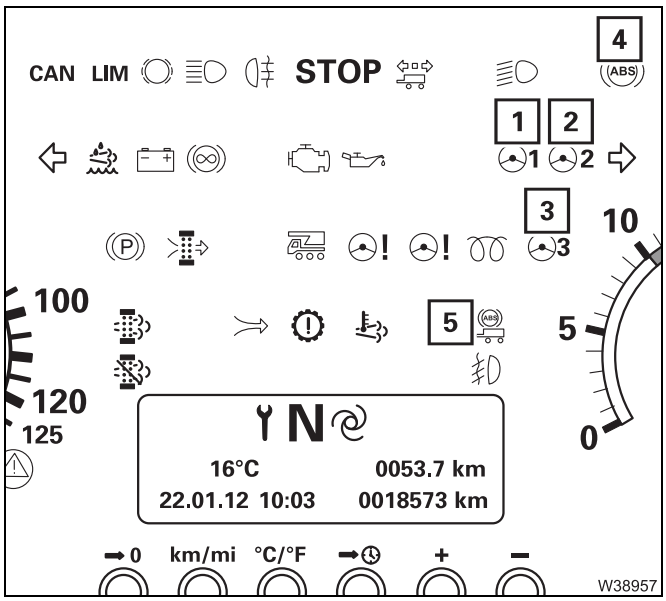

- Check that the lamps (**1**) and (**2**) go out.

  If one or more lamps light up;
  ➠ *Steering*, p. 5 - 38.

  Lamp (**3**) goes out while driving.

- Check that the lamps (**4**) and (**5**) go out.

  If one or more lamps light up;
  ➠ *ABS system*, p. 5 - 37.

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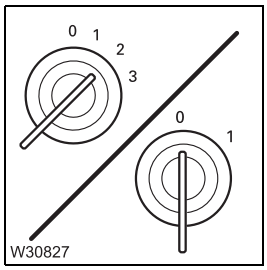
4.2 Starting the engine – at the outrigger control units

You can generally start the engine only if a bridging plug is inserted in all sockets not required; p. 14 - 43.

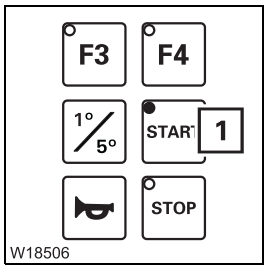
Prerequisites

The following requirements must be met before you can start the engine from the outrigger control units:



– The ignition in the driver's cab must be switched on.

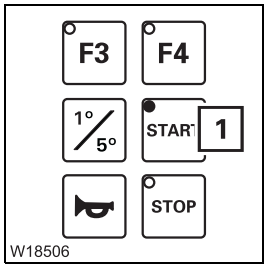
– The ignition in the crane cab must be switched off.



– The lamp (**1**) lights up.

Starting the engine

All activities and inspections required to start the engine must be carried out before starting the engine; p. 4 - 1.



- Press the (**1**) button once – the engine starts.

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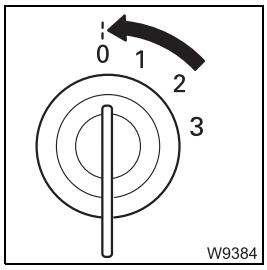
4.3 Switching off the engine

4.3.1 In the driver's cab

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.

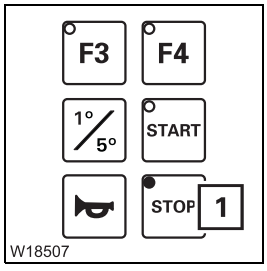


Ignition lock

- Turn the ignition key to position **0** – the engine switches off.

After switching off If you want to park the truck crane; ➠ p. 5 - 52.

4.3.2 On the outrigger control units



- Press the (**1**) button once – the engine switches off.

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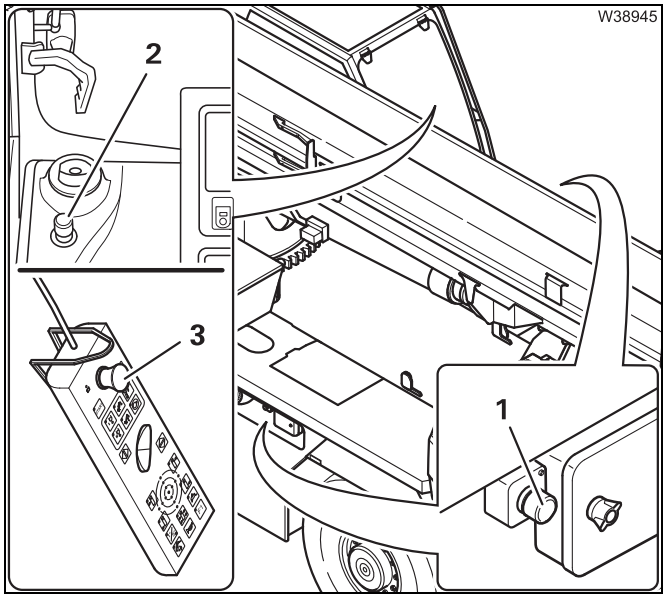
4.3.3 Using the emergency stop switches

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.



Three emergency stop switches are provided for emergency use:

1 At the carrier – always active

2 In the crane cab – always active

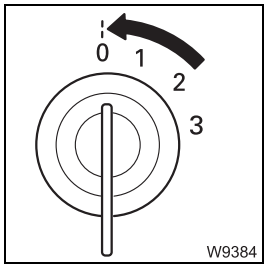
3 Only active for connected hand-held control – in addition to (**1**) and (**2**)

- Press an active emergency stop switch.
  – The switch latches.
  – The engine switches off.

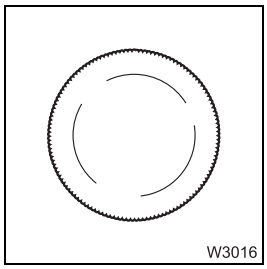
If an air intake inhibitor is present, this is then triggered.

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 air intake inhibitors are fitted, you must open them;
➠ *Opening the air intake inhibitor*, p. 4 - 21.

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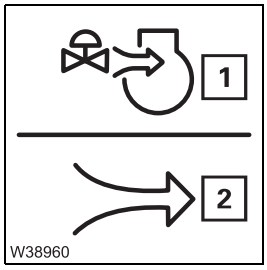
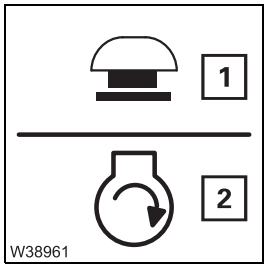
4.4 Air intake inhibitor



If the air intake inhibitor is triggered, a flap in the air intake line will close and the engine will stop running. – symbol (**1**) is displayed, lamp (**2**) lights up.



The air intake inhibitor is triggered

– When an emergency stop switch is actuated – symbol (**1**) displayed.

– When the maximum permissible engine speed is exceeded – symbol (**2**) displayed.
The symbol stays **red** until the ignition has been switched off.

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

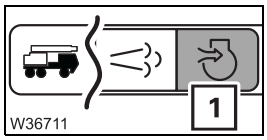
Opening the air intake inhibitor

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

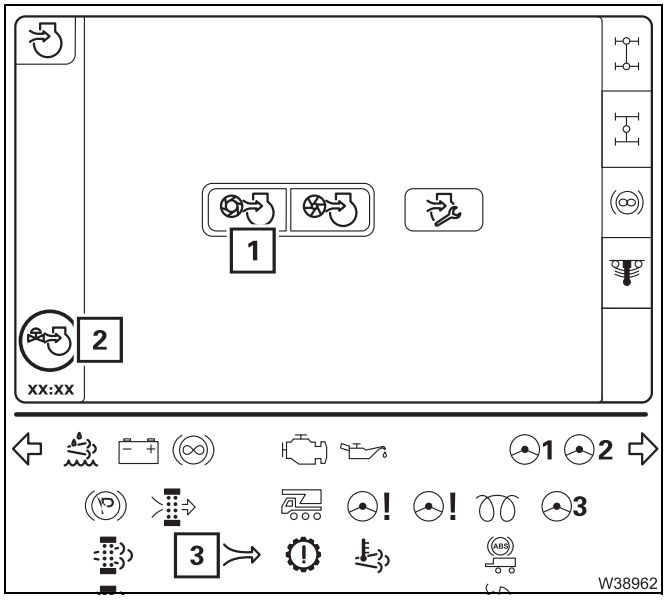
– The ignition must be switched off.

– The emergency stop switch must be reset.

– The engine remains switched off for at least 30 seconds.



- Open the *air intake inhibitor* menu (**1**).



- Select and confirm the symbol (**1**).
  – The air intake inhibitor opens,
  – The symbol (**2**) disappears.
  – The lamp (**3**) goes out.

The engine can now be started again.

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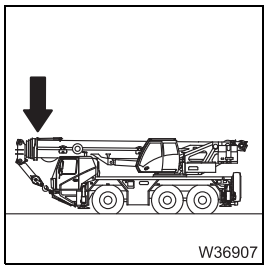
5 Driving mode

5.1 Before driving

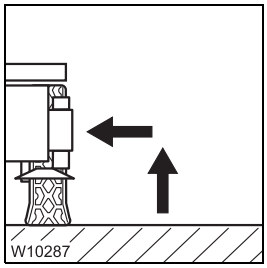
5.1.1 CHECKLIST: checks before on-road driving

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

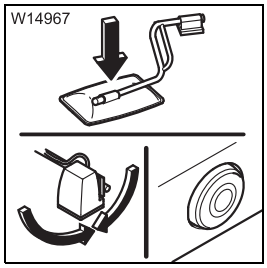
Observe the warnings and safety instructions there!



1. **For on-road driving without a dolly**
   - The counterweight must be unrigged according to the driving mode; ➠ p. 6 - 1, ➠ p. 12 - 51.
   - The main boom must be telescoped for driving mode; ➠ p. 11 - 116.
   - All telescopic sections must be locked together.
   - The slewing gear must be switched off; ➠ p. 11 - 126.
   - The boom must be resting in the boom rest; ➠ *Checking the vehicle height*, p. 5 - 8.



2. On the outriggers
   - All outrigger beams must be fully retracted and secured to prevent extension; ➠ p. 12 - 31.
   - The outrigger pads are in the driving position ➠ p. 12 - 37.



3. – All mirrors for crane operation are folded in/removed; ➠ p. 12 - 105.
   - All spotlights are switched off and swivelled (if possible) so that no other drivers will be blinded by reflection; ➠ p. 11 - 134.
   - The lighting on the outrigger must be switched off; ➠ p. 3 - 37.

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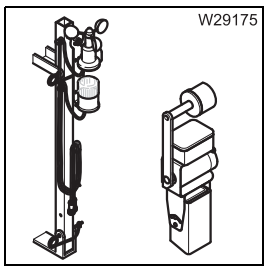
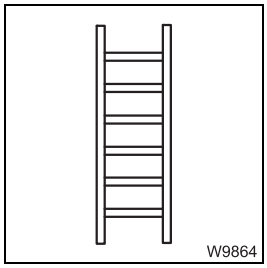


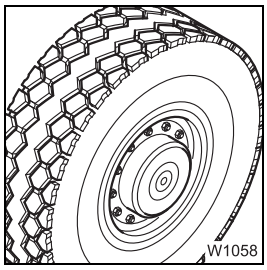
4. Anemometer, air traffic control light and camera system must be removed:

➠ *Anemometer and air traffic control light*, p. 12 - 101,

➠ *Camera on main boom*, p. 12 - 106.



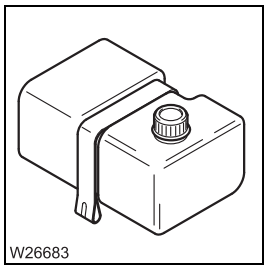
5. All ladders are secured; ➠ p. 3 - 77.



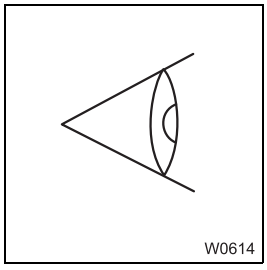
6. Check the tyres:

– Tyre pressure when tyres are cold in on-road mode; ➠ p. 1 - 14.

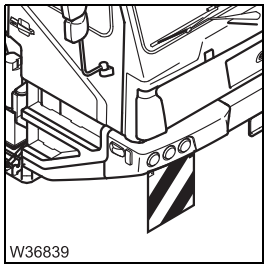
– Other checks; ➠ *Maintenance manual*.



7. Check the level and function of the windscreen washing system;
➠ *Maintenance manual*.



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



9. 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 - 8.

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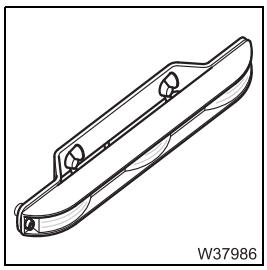
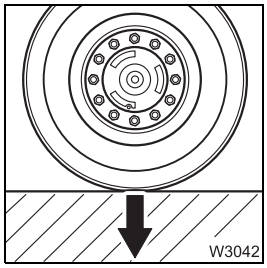
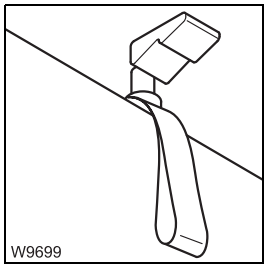


10. If necessary, check that the third brake light is correctly connected;
➠ p. 5 - 11.

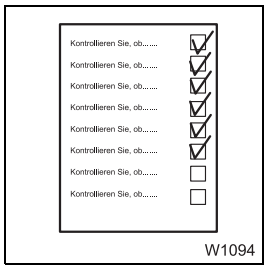


11. The detachable equipment parts must be stripped down so that they fulfil the regulations of the country in which you are working as regards permissible weights and axle loads, lengths, widths, height, etc.
For a driving mode with a maximum axle load of 12 t (26,500 lbs);
➠ *Driving modes*, p. 6 -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

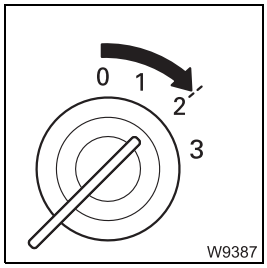


12. The fold-up berth must be folded up and secured; ➠ p. 5 - 54.

13. All additional parts which may be transported must be secured against falling down.



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



15. Switch on the ignition; ➠ p. 4 - 9.

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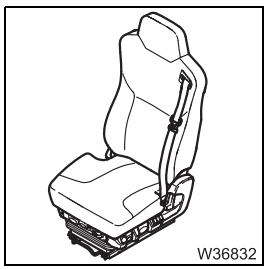
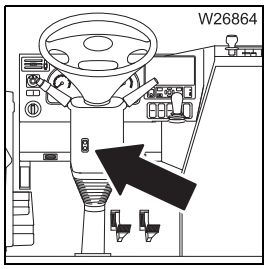
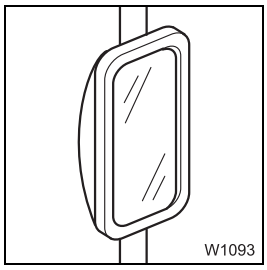


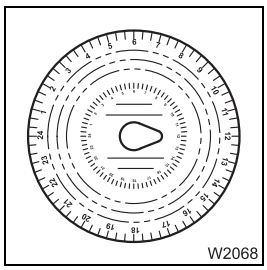
16. Adjust the driver's seat; ➠ p. 5 - 12.



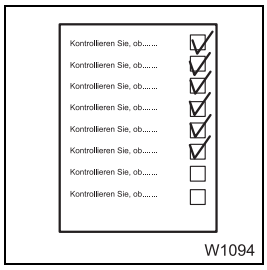
17. Adjust the steering column; ➠ p. 5 - 15.



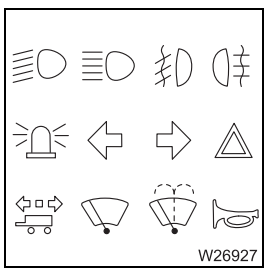
18. Adjust the mirrors; ➠ p. 5 - 6.



19. Set the tachograph, insert the diagram sheet; ➠ p. 5 - 18.



20. Start the engine and carry out all inspections; ➠ *Checks after starting the engine*, p. 4 - 15.



21. Check the electrical system; ➠ p. 5 - 6.

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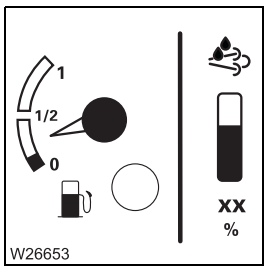
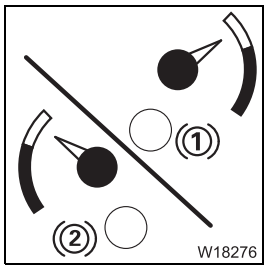


22. Check the fluid supply:

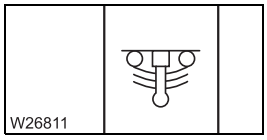
➠ *Fuel tank*, p. 4 - 5,

➠ *AdBlue (DEF) tank*, p. 4 - 7.

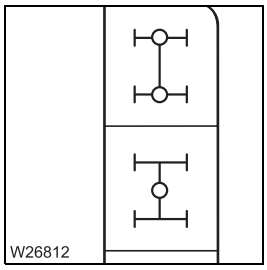


23. Check the compressed air and brake systems; ➠ p. 5 - 9.

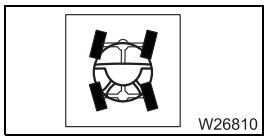
24. Check that all switching states for on-road driving are set, and that the corresponding symbols are shown.



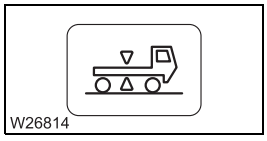
– Suspension switched on; ➠ p. 5 - 17



– Longitudinal and transverse differential locks switched off; ➠ p. 5 - 56



– Separate steering switched off – the symbol for on-road driving is shown; ➠ p. 5 - 68



– On-road level is set; ➠ p. 5 - 59.

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

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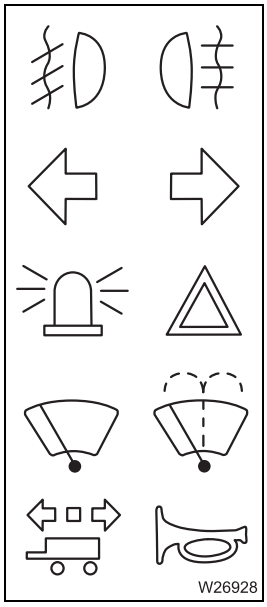
5.1.2 Checking the condition of the truck crane

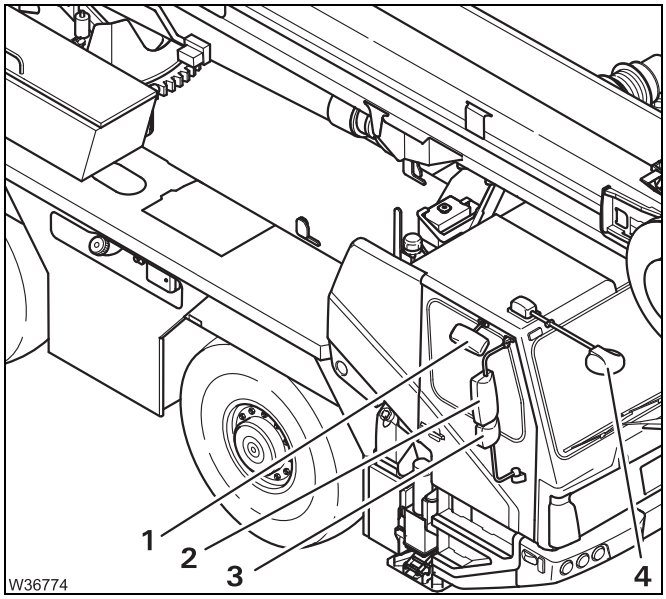
Electrical system



- 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,
  - Headlight – full beam,
  - Turn signal indicator,
  - 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.

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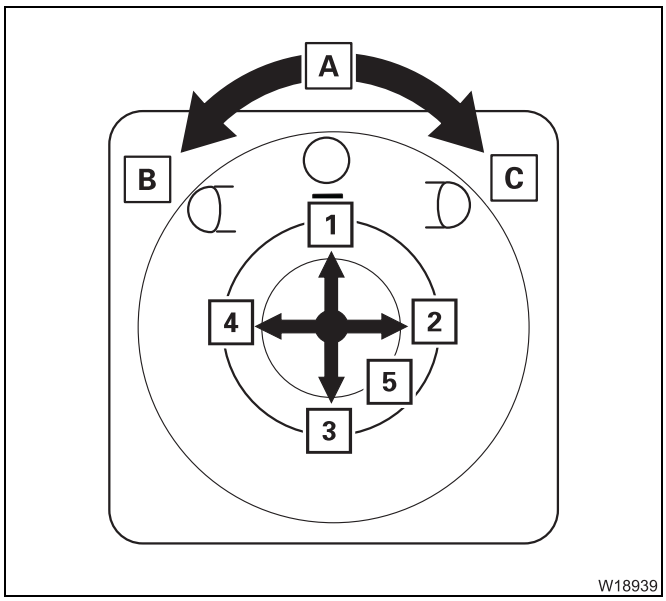
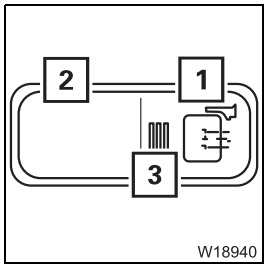


Electrical adjustment

- 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



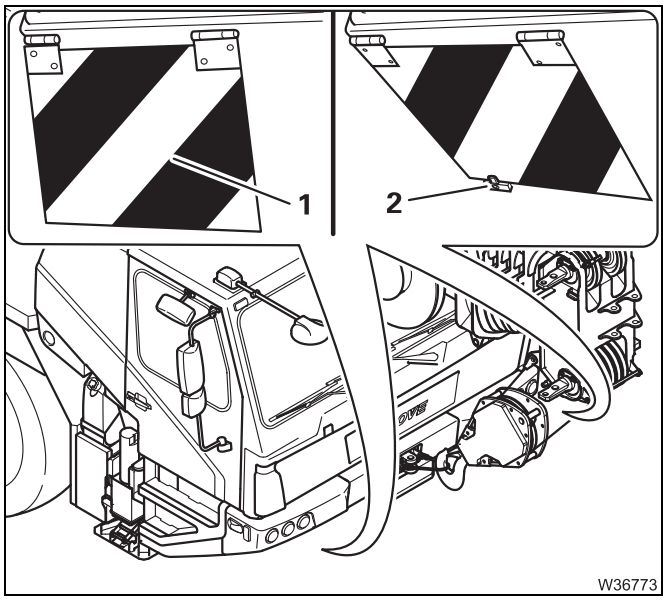
Mirror heating

1 Switch on: Press button once – lamp (**3**) light up

2 Switch off: Press button once – lamp (**3**) goes out

Warning plates for vehicle width

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



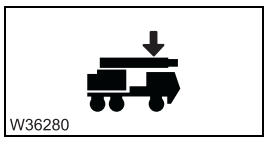
The warning plates (**1**) must be folded down to indicate the vehicle width during on-road driving.

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

Checking the 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.

Risk of accidents by exceeding total permissible height!
Check whether the main boom is resting on the boom rest.
Otherwise the indicated total height will also be exceeded at on-road level.



If the *Vehicle height check* function is present, the position of the main boom in the boom rest is monitored. In this case, a corresponding warning is shown on the *CCS* display if the main boom has not been correctly set down; ➠ p. 8 - 15.

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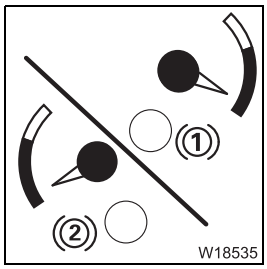
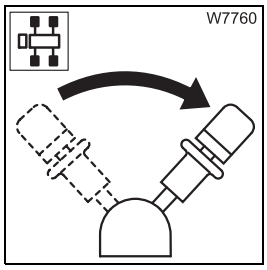
Supply pressure

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 about 8 bar (116 psi).

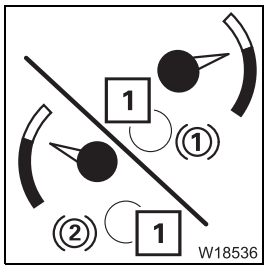
If the supply pressure is too low, such as after repairs, you can build it up as follows.



building supply pressure

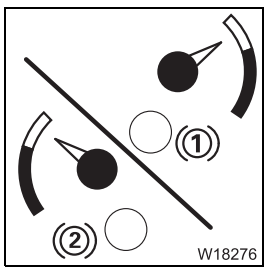
- Check that the parking brake is applied.

Risk of accidents by truck crane moving unintentionally!
Make sure that the lever is pointing to the rear before building up the supply pressure.
This prevents the parking brake releasing as soon as sufficient pressure is available and the truck crane moving unintentionally.



- Allow the engine to keep running. 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 about 5.5 bar (80 psi).



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

There is now sufficient supply pressure.

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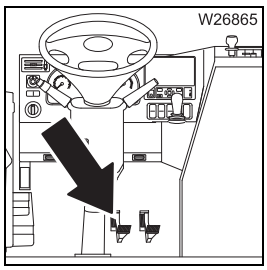
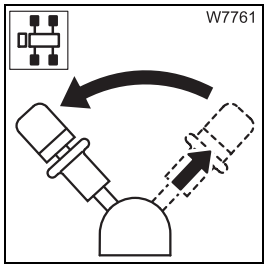
Parking brake

Check the function of the parking brake.



- Apply the service brake.

Risk of accidents by truck crane moving unintentionally!
Always apply the service brake before releasing the parking brake.
This prevents the truck crane 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.

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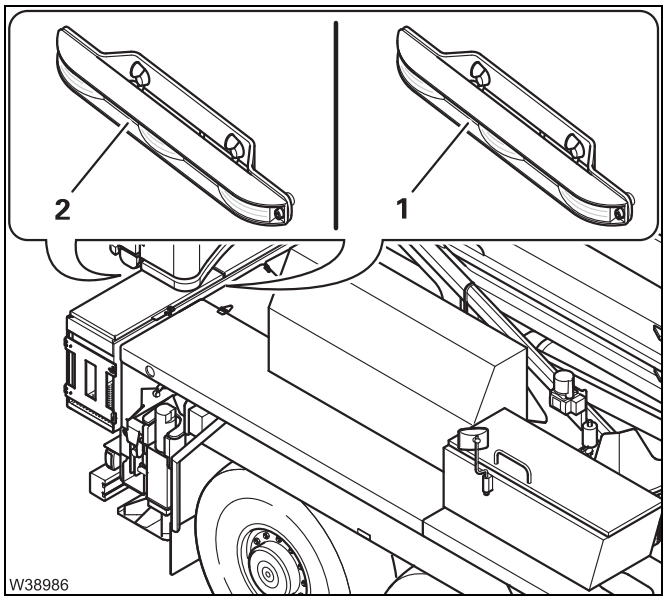
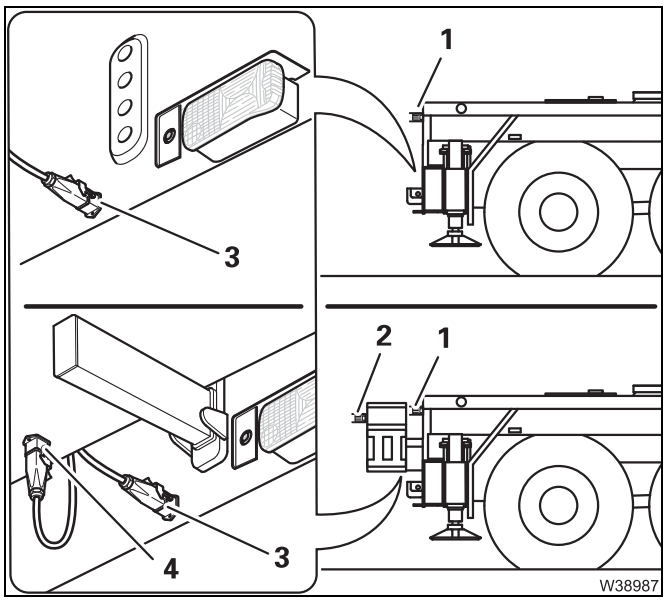
Third brake light If a third brake light is present, then you must check to ensure it is correctly connected.



One brake light (**1**) is at the rear of carrier.

If a storage box is present, then there is another brake light (**2**) there.

Risk of damage to the connecting cables!
Always check before driving whether the plugs are plugged into the required sockets and always disconnect the connecting cables before disassembling the storage compartment.
In this way, you can prevent the connecting cables from loosely hanging down and getting dirty, caught or torn off while driving.
Carry out a function check before driving.



For versions without storage box

For on-road driving, the brake light (**1**) must be connected to the socket (**3**).

For versions without storage box

For on-road driving, the brake light (**2**) must be connected to the socket (**3**).

The plug of the brake light (**1**) must be inserted in the dummy socket (**4**).

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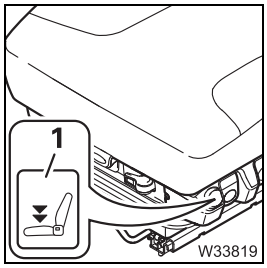
5.1.3 Adjusting the seat and the steering column

Adjusting the driver's seat

Version 1

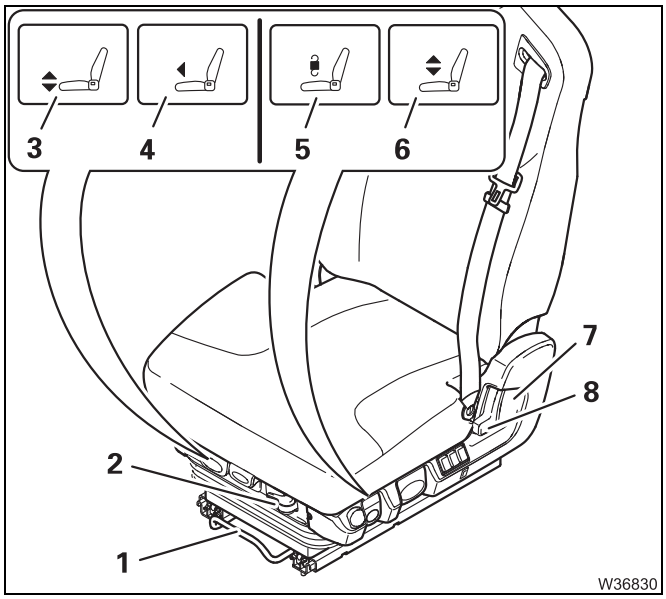
The seat height and lumbar area support are adjusted pneumatically. You can only make these adjustments when:



– 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 the supply pressure; ➠ p. 5 - 9.

• 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 – longitudinal adjustment
2 Horizontal suspension on/off
3 Seat – inclination
4 Seat cushion – longitudinal adjustment
5 Adjust suspension stiffness to body weight
6 Seat – height
7 Back rest – angle
8 Shoulder support

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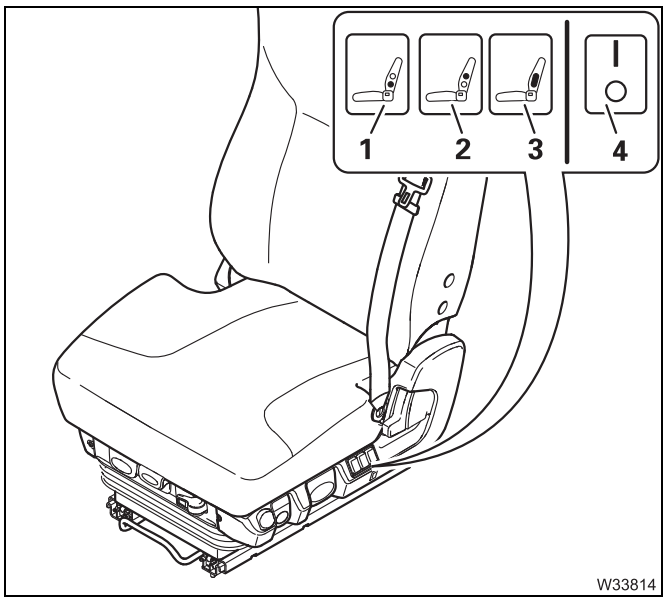


– Settings for body shape

1 Lower lumbar area support

2 Upper lumbar area support

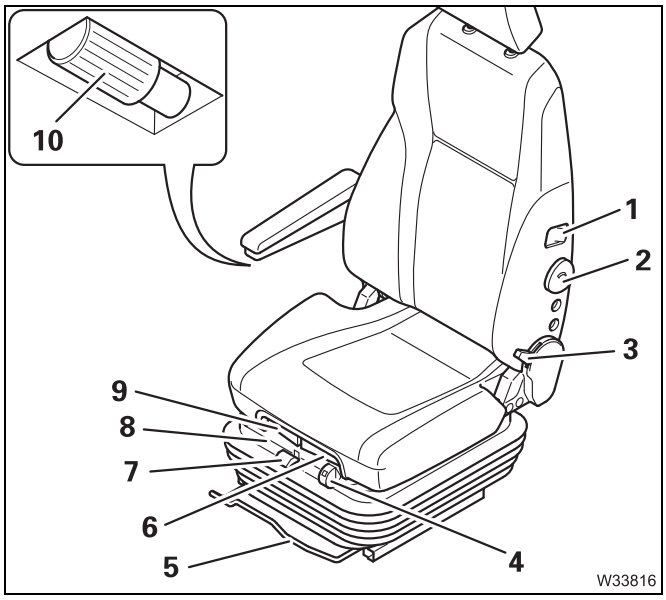
3 Lateral support

4 Seat heating on/off[1)]

1) Additional equipment

The settings are made pneumatically.
The following applies to all buttons:

Empty the air cushion:	Press **–**
Fill the air cushion:	Press **+**



Version 2

1 Seat heating on/off[1)]

2 Back support

3 Back rest – angle

4 Seat height display

5 Seat – longitudinal adjustment

6 Seat cushion – longitudinal adjustment

7 Seat – height

8 Adjust suspension stiffness to body weight[1)]

9 Seat cushion – angle

10 Armrests – inclination[1)]

1) Additional equipment

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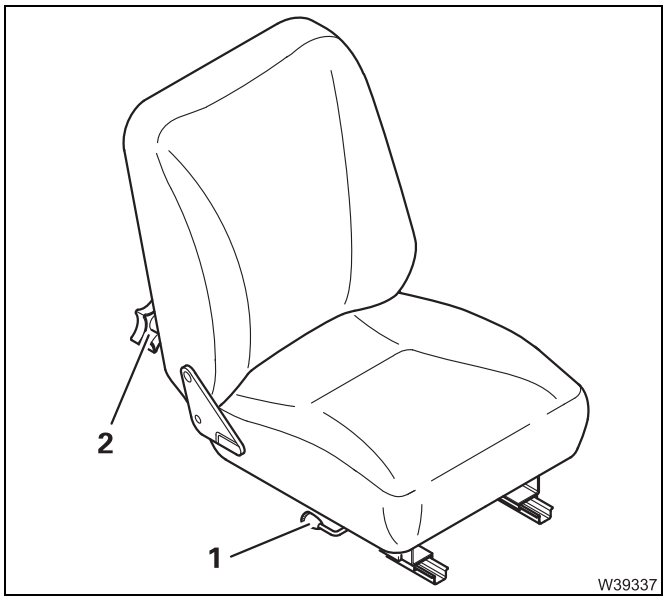
Adjusting the passenger seat

The passenger's seat is adjusted mechanically.



1 Seat longitudinal adjustment

2 Back rest – angle

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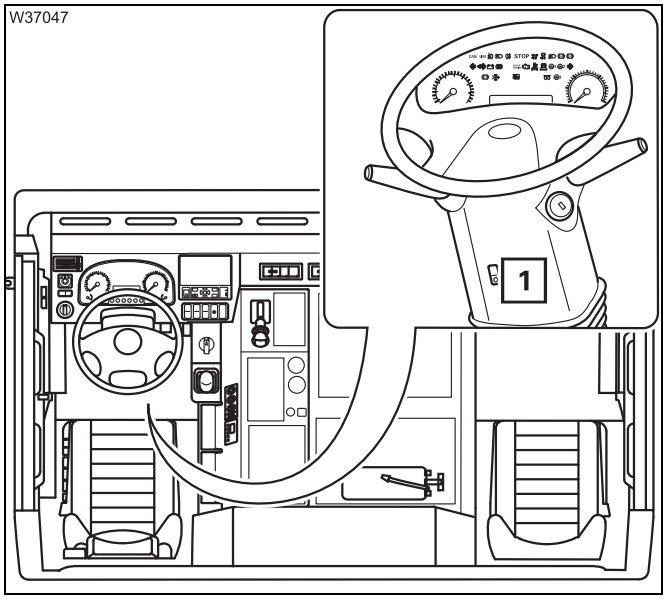
Adjusting the steering column

The steering column is unlocked pneumatically.

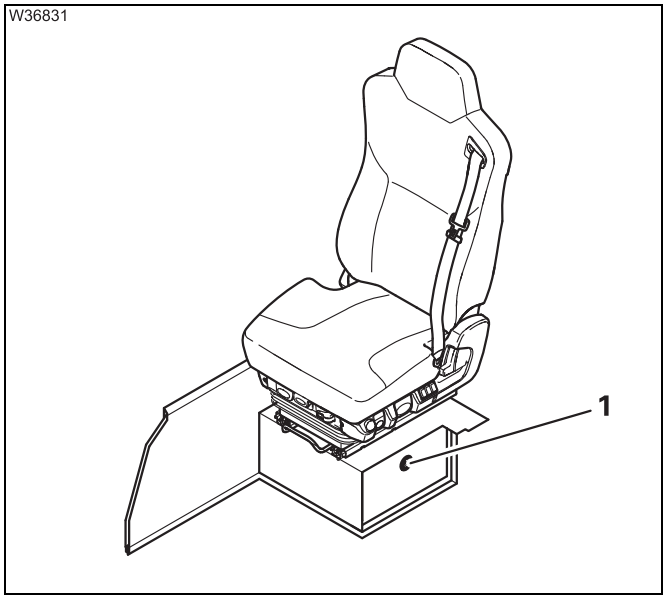
Risk of accidents by unlocked steering column!
Always stop the truck crane before you unlock the steering column.
Once the steering column is unlocked you can no longer steer safely.

The steering column can be unlocked only when sufficient supply pressure has been built up in the secondary consumer circuit; ➠ *building supply pressure*, p. 5 - 9.



- Press the (**1**) button in at the bottom once. The steering column is unlocked for about 6 seconds.
- Move the steering column into the desired position.
- Press the (**1**) button in at the top once. Or wait until the steering column locks automatically (after about 6 seconds).

Storage compartment



Under the driver's seat is a storage compartment for the hand-held control and if necessary the battery charger.

- Use the handle (**1**) for opening and closing the storage compartment.

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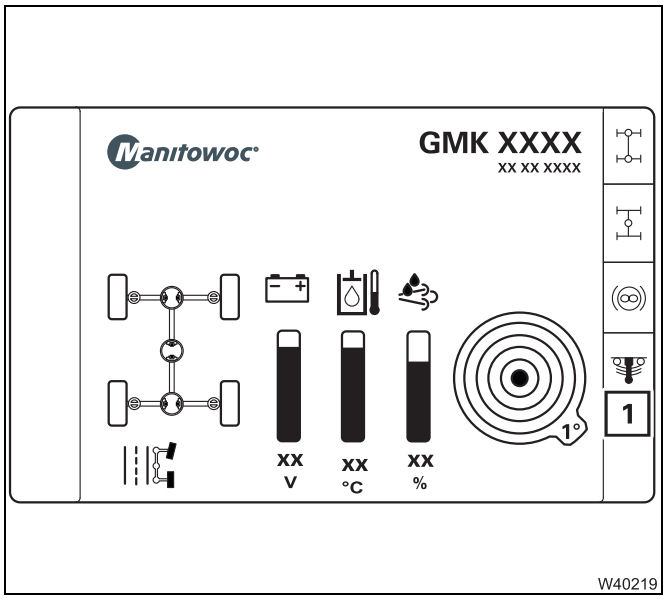
5.1.4 Switching the suspension on/off

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



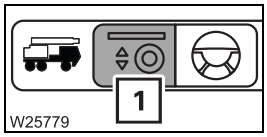
The current switching state of the suspension is shown on the display (**1**) in all the menus.

Symbol green:	Suspension is switched on
Symbol red:	Suspension is switched off
When the symbol is violet:	Error

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

Opening the menu

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



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

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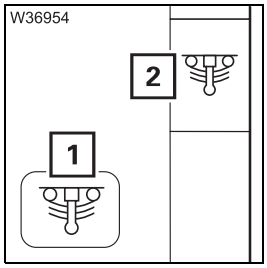
Switching on the suspension

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 will be suddenly pushed together when the suspension was switched on, causing them to be damaged and possibly causing the truck crane to overturn.



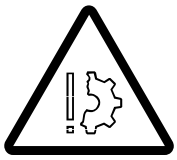
- Select and confirm the symbol (**1**).

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

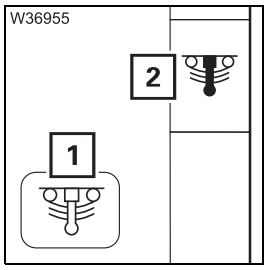
If the (**2**) symbol stays **red**, the supply pressure may be too low. In this case the suspension will only be switched on if sufficient supply pressure is built up;
➠ *building supply pressure*, p. 5 - 9.

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**.

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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.).

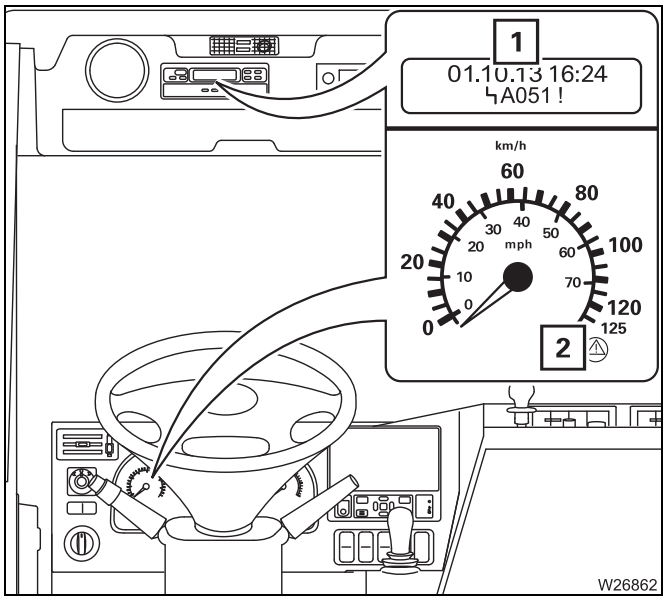
Risk of damage to the tachograph drawer!
Open the tachograph drawer only to insert or remove diagram sheets and do not use the opened drawer as a shelf or surface (e.g. to mark the diagram sheets). This prevents contamination and damage.

Prerequisites

To set the tachograph, the following requirements must be met:
– The ignition is switched on.
– The truck crane must be stationary.
– No error message is displayed.

In the event of malfunctions

Check that a malfunction has occurred.



In the case of a Tachograph malfunction
– lamp (**2**) lights up,
– the display (**1**) shows an error message.

➠ *Separate operating manual* the Tachograph manufacturer.

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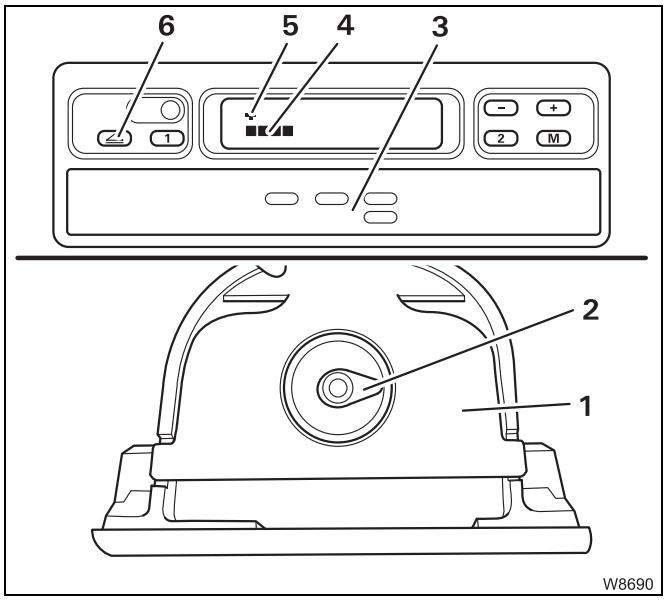
Setting the tachograph

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.



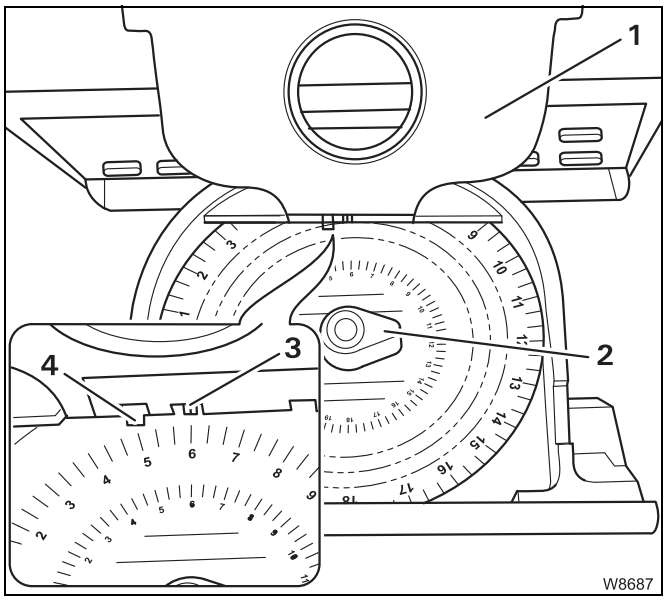
Opening the drawer

- 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.

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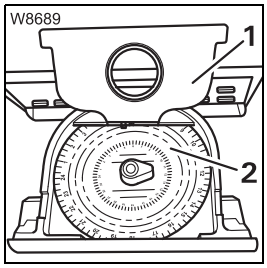
Inserting diagram sheets

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

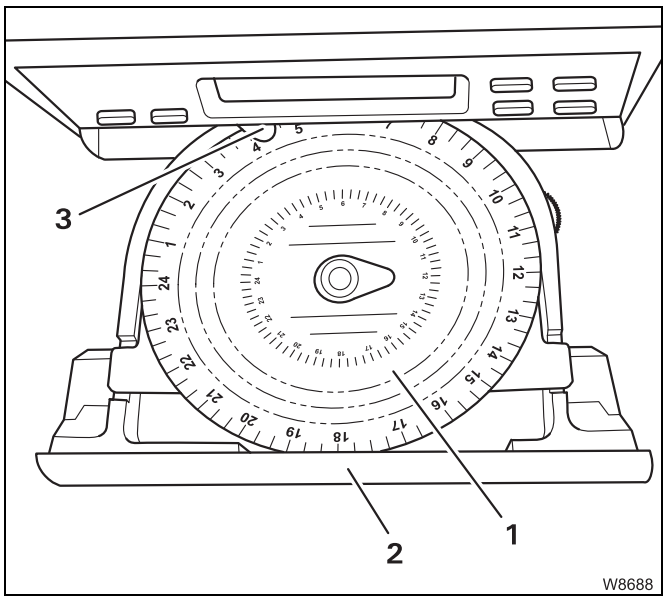
Risk of malfunctions in the electronics!
If a diagram sheet has been damaged by being marked several times, this might cause malfunctions in the electronics. Always insert the plastic diagram sheet supplied should you not need to use the tachograph.



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.

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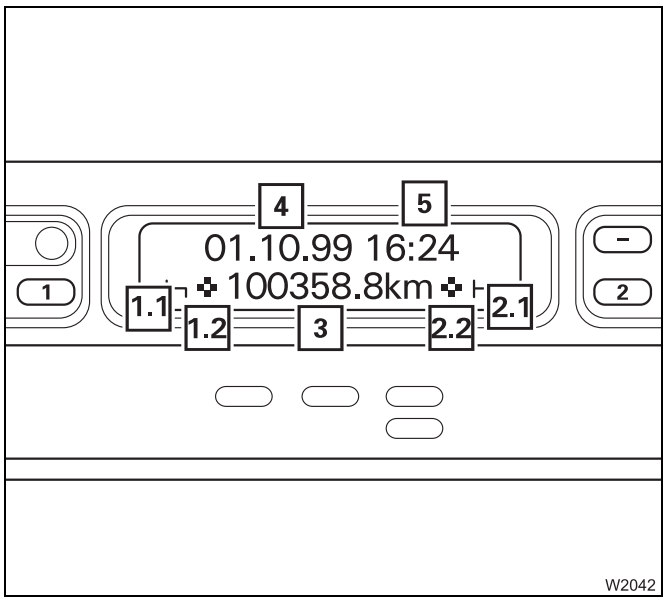
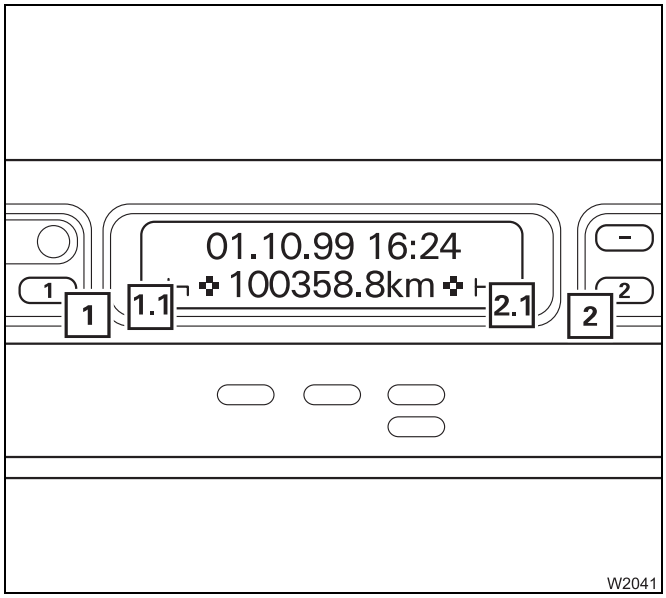


Display

If no malfunction has occurred, 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 time groups

Set the time group for driver 1 using the button (**1**).
The set time group is shown with the symbol (**1.1**).

Set the time group for driver 2 using the button (**2**).
The set time group is shown with the symbol (**2.1**).

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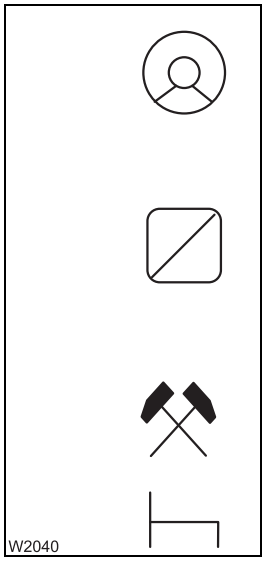
The different time groups are shown with the following symbols:



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

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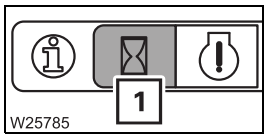
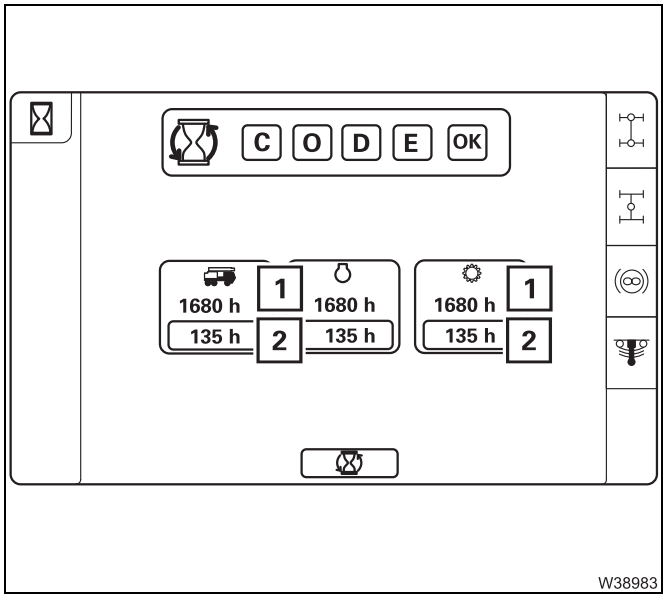
5.1.6 Displaying and resetting operating hours

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**).

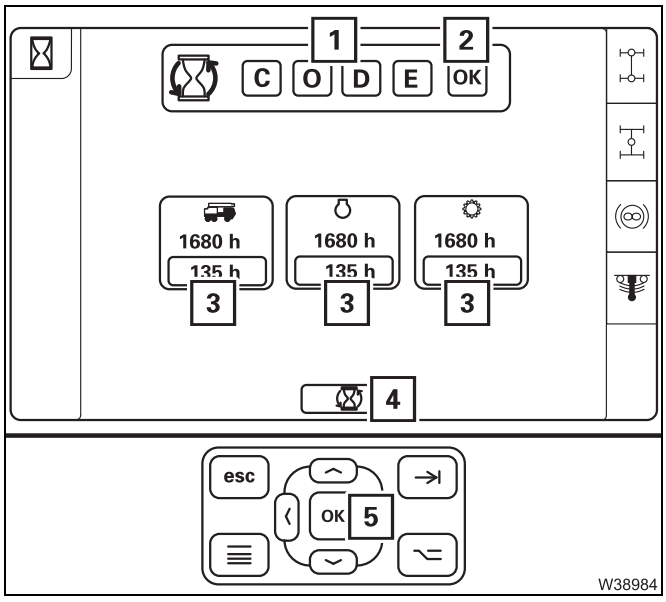


Displays

The operating hours are recorded as follows:

– The value (**1**) indicates the total operating hours, for example, 1,680 hours.

– The value (**2**) shows the operating hours, which can be reset.



Reset

The displayed operating hours (**3**) can be reset.

- Select and confirm the symbols (**1**) one after the other.
- Confirm the entry with the symbol (**2**).

You can select the components
– individually – display (**3**) or

– select all – symbol (**4**).

- Reset the selected operating hours with button (**5**).

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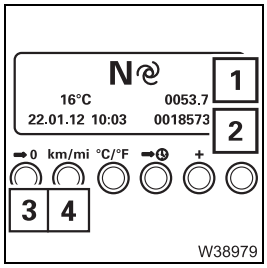
5.1.7 Settings/indicators on the driving mode display

The ignition must be switched on.



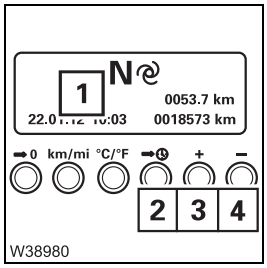
Kilometre counter

1 Daily mileage counter – position after the decimal point: 1 = 100 m (33 ft)

2 Overall route in kilometres

3 Reset daily kilometre counter

4 Switch between km/mi



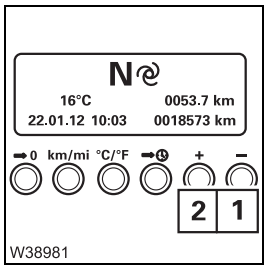
Time/date

1 Time/date

2 Select the day, month, year, hours, minutes

3 Increase the selected unit

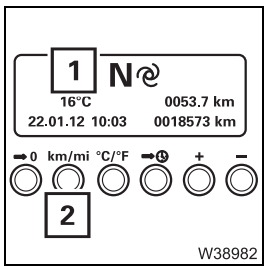
4 Reduce the selected unit



Instrument lighting
The headlight or parking light is switched on.

1 Instrument lighting dimmer

2 Instrument lighting brighter



Outside air temperature display

1 Outside air

2 Switching between temperature units (°C/°F)

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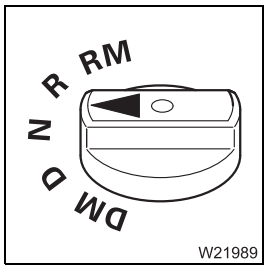
5.2 Operating the transmission

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

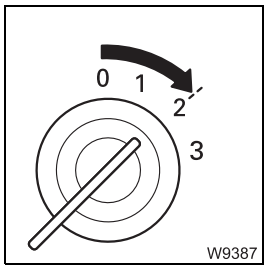
5.2.1 Switching on



The transmission is always in the neutral position when the ignition is switched off.

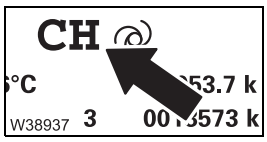
- Shift to position **N**.

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

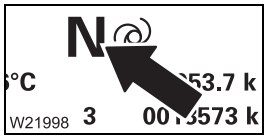


- Switch on the ignition.

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



The electronic gear system conducts a check – **CH** entry.



When the check is completed, the entry **N** appears.

An error message appears if the electronic gear system detects an error;
➠ *Error messages on the CCS display*, p. 8 - 16.

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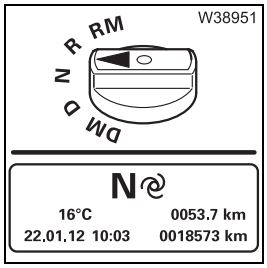
5.2.2 Switching the transmission to the neutral position

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

Risk of accidents when switching on 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 rolling away unintentionally.

Risk of damage to the transmission!
When stationary for a longer period (for example, 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.

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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 - 36.

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

– The truck crane must be stationary.
– The parking brake must be applied.
– the accelerator is not operated.

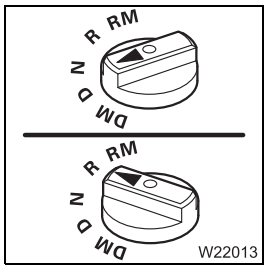
- Start the engine; ➠ p. 4 - 12.

If the supply pressure is insufficient for shifting the transmission, the display will show the entry **AL** (airless).

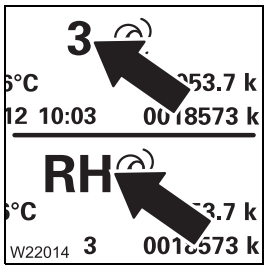
If necessary, wait until the supply pressure has built up and the **AL** entry goes out; ➠ *building supply pressure*, p. 5 - 9.

- Release the accelerator pedal.

Risk of accident from uncontrolled forward motion!
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:
  – drive **forwards**, shift to position **D**.
  – drive **backwards**, shift to position **R**. An acoustic signal is given with additional equipment.



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).

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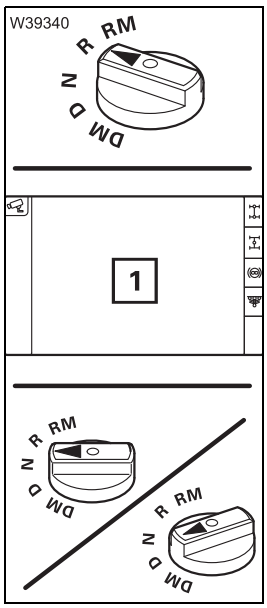

For reverse travel

The reversing camera and the reversing lamp are switched on.

The display (**1**) shows the area behind the truck crane.

When you exit the transmission mode **R**, the reversing lamp and camera are 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 is a gear that is too high causes premature clutch wear.

- Press the gearshift lever forwards once.
  The starting gear is shifted up by one gear.
- Press the gearshift lever backwards 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.

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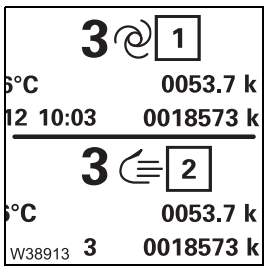
5.2.4 Changing operating mode



The display shows which operating mode is switched on.

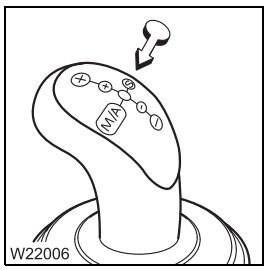
– Symbol (**1**) – *Automatic* operating mode on.

– 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 to the left once.

The transmission switches to the *Automatic* operating mode.

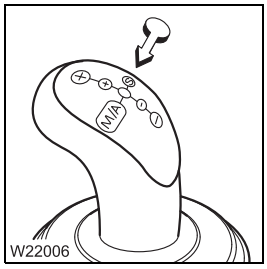
– When at a standstill, a suitable starting gear is engaged.

– While driving, the gears are changed automatically, depending on the load.

Changing to manual mode

The *Manual* operating mode is intended for off-road driving with load conditions changing at short notice.

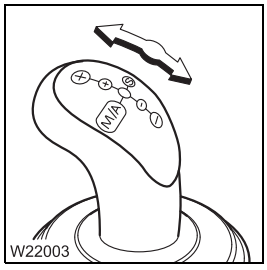
You can change over either with a gear change or without a gear change.



Changing without gear change

- Press the gearshift lever to the left once.

The transmission remains in the currently selected gear and is now in *Manual* operating mode.



Changing with gear change

- Press the switch lever forwards or backwards once.

The transmission upshifts one gear (or downshifts one gear) and is now in *Manual* operating mode.

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5.2.5 Starting

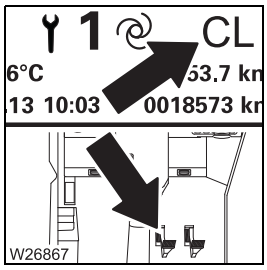
Risk posed by unexpected rolling!
Also apply the parking brake before starting on sloping ground. The gear will be engaged only once you depress the accelerator. This can lead to the truck crane starting to move (perhaps backwards) whilst you are moving your foot from the brake pedal to the accelerator.

To **start moving** you must:

– Apply the parking brake

– Depress the accelerator (now the clutch starts to be engaged)

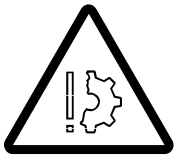
– Release the parking brake after the gear has engaged (motor sound changes).



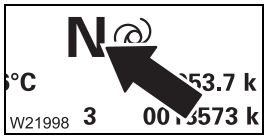
Warning message when starting

When the load on starting is so high that it would cause the clutch to overheat, a warning buzzer sounds. The warning message **CL** is also displayed.

- In this event immediately take your foot off the accelerator and apply the service brake.



Risk of clutch damage!
Always release the accelerator when the **CL** warning is shown. The clutch will become overheated and damaged if you do not stop the starting procedure.



- Switch to the neutral position **N** and leave the vehicle engine running until the clutch has cooled down and the **CL** warning message disappears.
- Select a lower starting gear.
- Start to move again.

If you do not release the accelerator, the gear is engaged automatically within a few seconds. This can cause the engine to be throttled, or the wheels to spin. **Exception:** Gears **1** and **R** are not engaged automatically. Be careful not to allow the clutch to overheat.

In manoeuvring mode, the truck crane responds more sensitively to the accelerator. The gear positions **DM** and **RM** are provided for manoeuvring;
➠ *DM and RM transmission mode*, p. 5 - 34.

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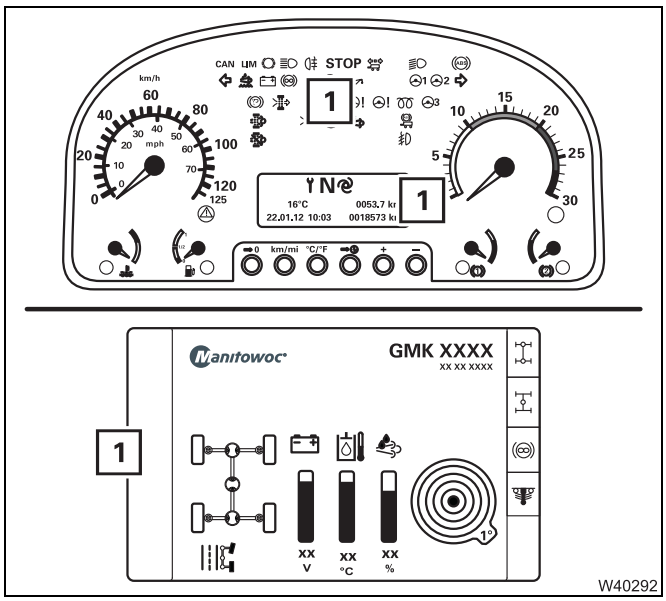


Transmission malfunctions and errors shown on the displays (**1**);

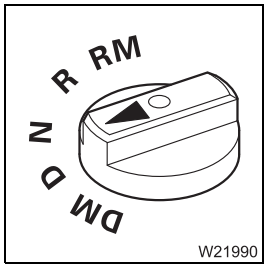
Warning and malfunction messages on the instrument panel, p. 8 - 3,

Warning messages on the driving mode display, p. 8 - 8,

Warning messages on the CCS display, p. 8 - 10,

Error messages on the CCS display, p. 8 - 16.

5.2.6 Driving and changing gears

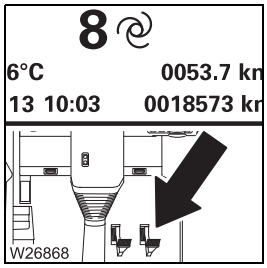


- When driving, always leave the switch in the position for the current driving direction, e.g. in position **D** for forward travel.

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

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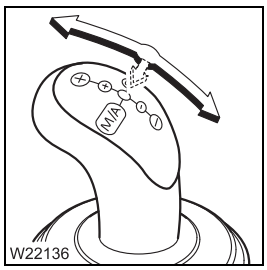
Automatic downshifting

– 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 the gearshift lever to the left 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 forwards once
– Upshifting two gears: Briefly push forwards twice
– Upshifting three gears: Briefly push forwards 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 backwards once
– Shift two gears down: Briefly push backwards twice
– Shift three gears down: Briefly push backwards 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.

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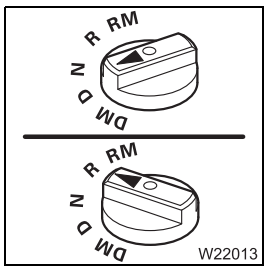
5.2.7 Changing the driving direction

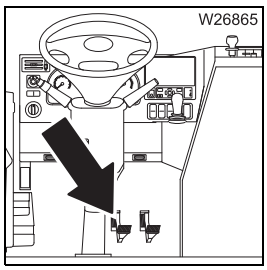


- Stop the truck crane.
- Shift to the position for the opposite direction.
  At a standstill, you can shift two levels in succession immediately.
  You do not need to wait for the intermediate position **N** to appear.

The newly engaged gear will be shown in the display.

The transmission switches to neutral position if you switch between the positions **D** and **R** directly when the truck crane is moving or you are driving it.

5.2.8 Stopping the truck crane



- In order to stop, remove your foot from the accelerator and press 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.

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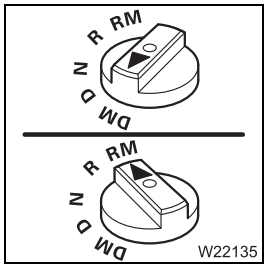
5.2.9 DM and RM transmission mode

The **DM** and **RM** transmission modes are intended for manoeuvring the vehicle without changing gears, e.g. for moving the truck crane while loaded.

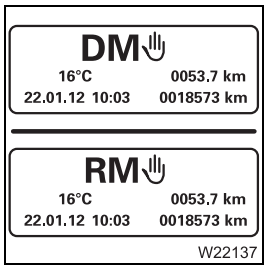
You can limit the maximum speed.

Switching on

- Stop the truck crane and release the accelerator.
- Wait until the engine runs at idling speed.

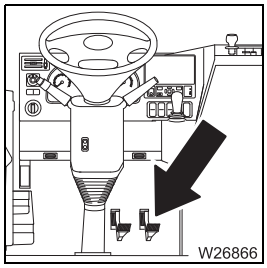


- Shift into **DM** or **RM** position for the required direction of travel.



The appropriate transmission mode is selected and appears on the display.

In the **DM** and **RM** transmission modes
– The transmission does not shift
– Manual gear shifting is not possible.



- Press the accelerator pedal.

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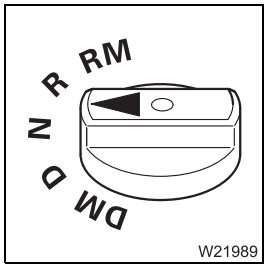
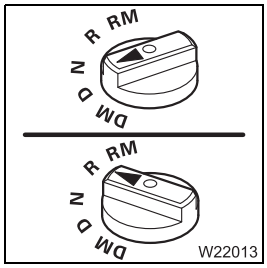
Switching off

- Release the accelerator pedal.
- Stop the truck crane just in case.
- Wait until the engine runs at idling speed.



- Shift to position **N**.



- Shift to position **D** or **R** for the required direction.
  - When the truck crane is stationary, the corresponding starting gear will be engaged.
  - If the truck crane is still moving, a gear appropriate to the speed will be engaged.

The newly engaged gear will be shown in the display.

The transmission mode **DM** or **RM** is switched off, and:
– the transmission shifts automatically,
– manual gear change is possible.

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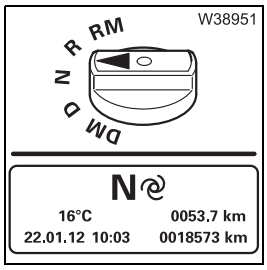
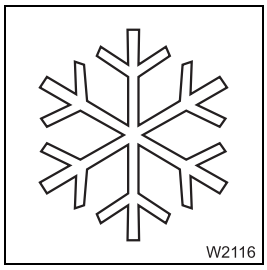
5.2.10 On the roller type dynamometer

Danger of unexpected 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.

5.2.11 Preheating the transmission



When the outside temperature is between -20 °C and -25 °C (-4 °F and -13 °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.

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5.3 Driving and parking the truck crane

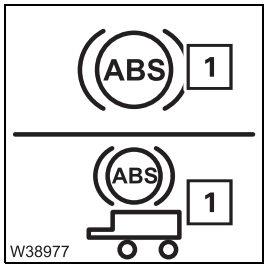
Risk of accidents because the truck crane cannot be steered!
Never switch off the ignition or remove the ignition key while the truck crane is moving!
This precaution prevents the steering locking and consequent loss of control of the moving truck crane.

5.3.1 Checks while driving

Brakes

- Check the service and parking brakes for correct functioning immediately after starting out. Only continue the drive when the brakes are working perfectly.

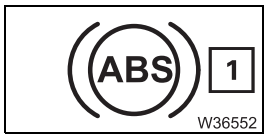
ABS system



- Check the lamps (**1**).

After starting the engine, the lamps (**1**) **must** go out. Then the **A**nti **B**locking **S**ystem (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;
➠ *Service brake malfunctions*, p. 8 - 24.



If the lamp (**1**) lights up, then the braking operation is supported by the ABS system.

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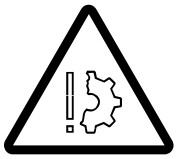
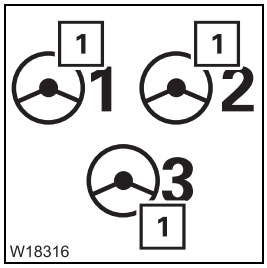
Steering

- Always pay attention to all the indicator lamps and all information in this and subsequent sections.



Risk of accident due to truck crane that cannot be steered and leaking oil!
If a warning message occurs, be sure to follow the instructions in this section and take all the measures specified.
Failure to observe the warning messages can quickly lead to a failure of the steering system and serious accidents.



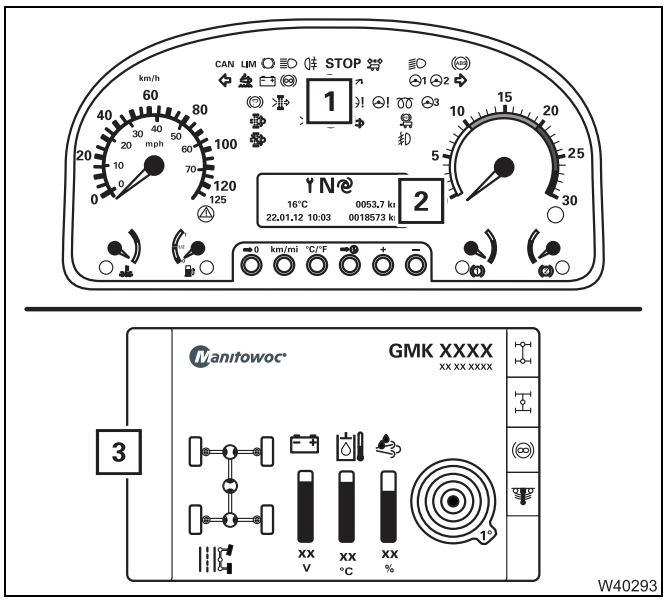
- Check the lamps (**1**) – at speeds over 10 km/h (6 mph), all the lamps must be out.

If one or more lamps is lit (1)
One or more steering circuits have failed.
- Stop as quickly as possible, switch off the motor and perform the required checks; p. 8 - 5.

Warning messages

- Observe all error and warning messages.

Risk of damage if warning messages are not observed!
After the occurrence of warning messages, always observe all information in the corresponding section in good time and take appropriate measures to remedy the situation. This prevents these malfunctions causing defects in the truck crane.



- Observe the warning messages.
  - **1** On the instrument panel; p. 8 - 3
  - **2** On the *Driving* display; p. 8 - 8
  - **3** On the *CCS* display; p. 8 - 10

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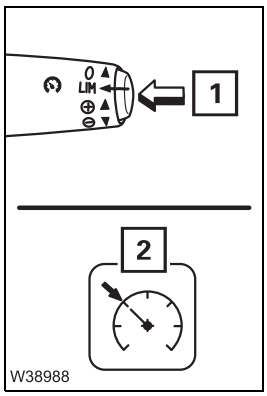
5.3.2 Cruise control

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.

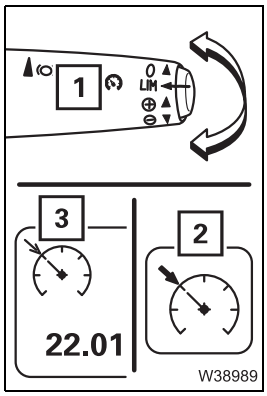
Switching on



Pre-selecting

- Press the button (**1**) once.
  - On the *CCS* display – Symbol (**2**) displayed in grey.
  - Cruise control is preselected.

You can switch on the cruise control only at speeds greater than 15 km/h (9 mph).



Switching on

- Press the switch (**1**) upwards/downwards once
  - On the *CCS* display – Symbol (**2**) displayed in black.
  - On the *CCS* display – Symbol (**3**) displayed.

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.

On downhill slopes, the speed set may be exceeded since cruise control does not brake the truck crane. Switch the cruise control off on downhill slopes.

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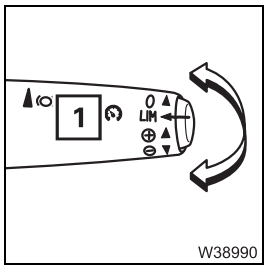


Increasing/reducing the speed

– **Increase:** Press switch (**1**) up
– **Decrease:** Press switch (**1**) down

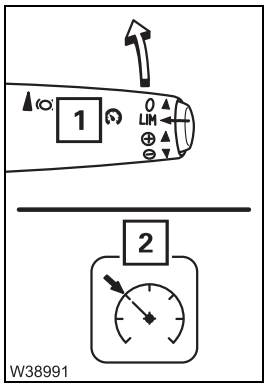
- Press the switch until the desired speed is reached.

  or

- Press the switch once. The speed will change by approx. 0.5 km/h (0.3 mph).

The set speed is maintained.

Switching off



Switching off the Tempomat

- Push the switch (**1**) forwards once.
  – On the *Driving mode* display – Symbol is hidden.
  – On the *CCS* display – Symbol (**2**) displayed in grey.

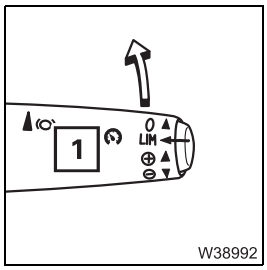
The cruise control is deactivated and you now regulate the speed with the accelerator pedal.

Cruise control is also switched off:

– When the service brake or additional brake is applied

– When speed falls below 10 km/h (6 mph)

– When the ignition is switched off.



Switching off pre-selection

- Push the switch (**1**) forwards once.
  – On the *CCS* display – Symbol is hidden.

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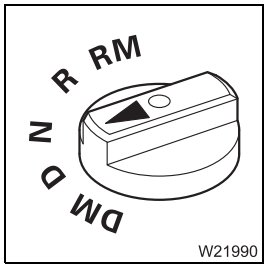
5.3.3 Driving downhill

Risk of accidents when driving in neutral position!
Never switch into neutral position while 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

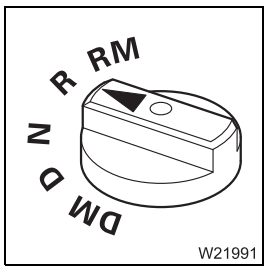
– Release the parking and service brakes

– 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.



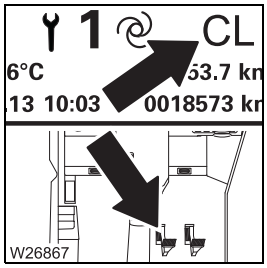
To **start reversing** you must do the following:

– Shift into position **R**

– 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:

- Remove your foot from the accelerator immediately and apply the service brake. For the subsequent procedure; ➠ *Warning message when starting*, p. 5 - 30.

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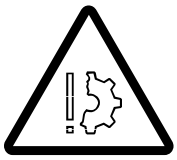
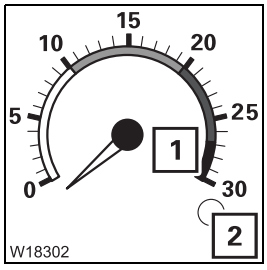
Inspections when driving downhill

While driving, the engine speed may not exceed 2,300 min^{-1} (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 (**1**) while driving. The lamp (**2**) lights up when the maximum permissible engine speed is exceeded.
- Brake the truck crane before the engine 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:

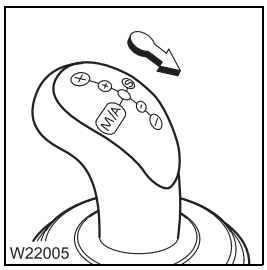
– By shifting down; ➠ p. 5 - 42,

– With the engine retarder; ➠ p. 5 - 43

– With the eddy current retarder; ➠ p. 5 - 43.

Downshifting

To increase the braking force of the engine, you can select a lower gear.



- Pull the gearshift lever backwards 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.

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Additional brakes

Engine retarder

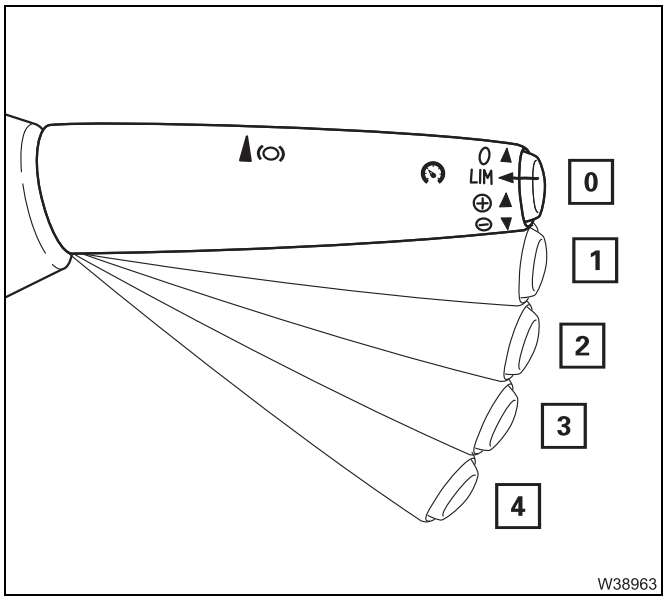
The truck crane has an engine flap brake which it uses as an engine retarder. The engine retarder only becomes effective at an engine speed of 900 rpm and can be used up to a maximum speed of 2,300 rpm.

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 truck crane can also be rigged with a 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.

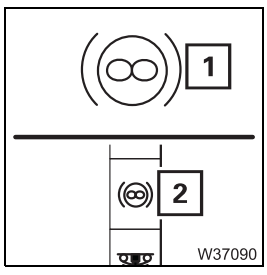


Switching on the additional brakes

- Pull the switch back to the required level (latch into place briefly at each level).
  - **0** Engine retarder and transmission retarder off
  - **1** 25% brake power
  - **2** 50% brake power
  - **3** 75% brake power
  - **4** 100% brake power

Switching off the additional brakes

- Press the switch upwards to level **0**.



The lamp (**1**) lights up and the symbol (**2**) appears in the *CCS* display when the additional brake is switched on.

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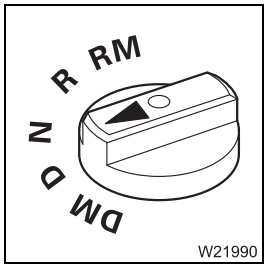
5.3.4 Driving uphill

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.



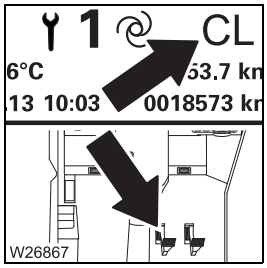
To start **moving forwards** you must do the following:

– Shift into **D** position

– Apply the parking brake

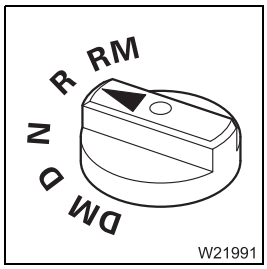
– Press the accelerator

– Release the parking brake after the clutch has engaged



If the **CL** warning appears when starting:

- Remove your foot from the accelerator immediately and apply the service brake. For the subsequent procedure; ➠ *Warning message when starting*, p. 5 - 30.



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.

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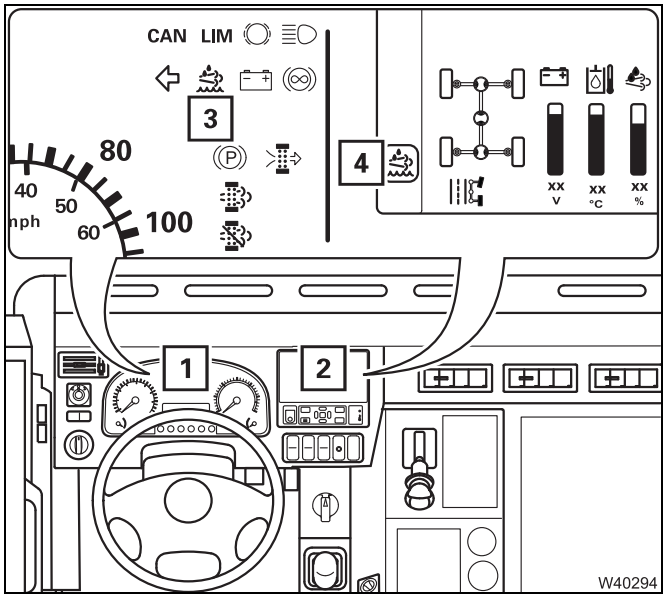
5.3.5 Torque reduction

Torque reduction can occur for various different reasons.

– The AdBlue (DEF) tank is empty.

– A system malfunction has been detected.

The torque reduction occurs automatically and can be overridden for a short period of time.



Information regarding the lamps and symbols

All indications for torque reduction, torque reduction override and Exhaust gas emission control occur simultaneously on the instrument panel (**1**) and the *CCS* display (**2**).

– If e.g. the lamp (**3**) lights up then the symbol (**4**) is shown.

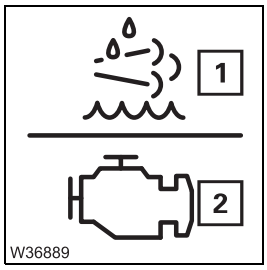
– If e.g. the lamp (**3**) flashes then the symbol (**4**) also flashes.

During crane operation, the same symbols are shown on the *CCS* display in the crane cab.

This section describes only the lamps.

AdBlue (DEF) tank

- Check the AdBlue (DEF) supply before and during driving and be sure to refill with AdBlue (DEF) in time.



The lamp (**1**) lights up when the AdBlue (DEF) tank reaches the reserve level.

In addition the yellow lamp (**2**) lights up if AdBlue (DEF) usage continues.

The torque reduction is automatically switched to level 1 – reduction by 25%.

The torque reduction can be overridden for a short period of time during levels 1 and 2; ➠ p. 5 - 48.

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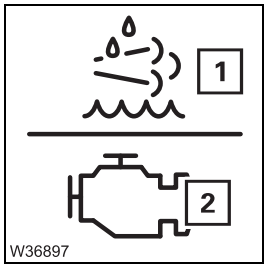
The lamp (**1**) starts flashing if AdBlue (DEF) usage continues.
The torque reduction is increased to level 2 – reduction by 50%.

After approx. 30 minutes the lamp (**3**) also lights up – level 3 is active.
The torque reduction can no longer be overridden and a currently active override is switched off.
After 2 minutes the torque is slowly reduced further until the engine speed reaches the idling speed.

- Refill the AdBlue (DEF) tank as soon as possible.

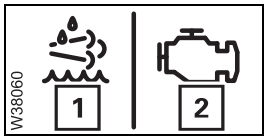


After refuelling with AdBlue (DEF)

- Start the engine – the lamp (**1**) goes out immediately.
- Actuate the accelerator pedal or parking brake – the lamp (**2**) goes out.

System malfunction

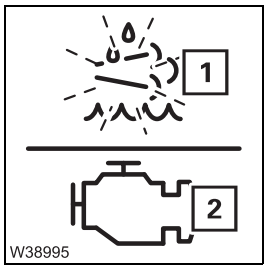
System malfunctions can be caused by poor-quality AdBlue (DEF), technical defects and electronic malfunctions.



If the exhaust gas system detects a fault then the lamps (**1**) and (**2**) light up.

If operation continues, the torque reduction is switched to level 1 – reduction by 25%.

The torque reduction can be overridden for a short period of time during levels 1 and 2; ➠ p. 5 - 48.



After approx. 75 minutes of further operation the lamp (**1**) starts to flash.
The torque reduction is increased to level 2 – reduction by 50%.

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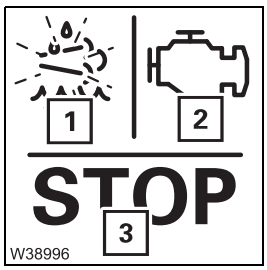
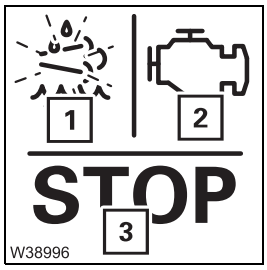


After approx. 15 minutes of further operation the red lamp (**3**) also lights up – level 3 is active. The torque reduction can no longer be overridden and a currently active override is switched off.
After 2 minutes the torque is slowly reduced further until the engine speed reaches the idling speed.

- Stop at the next opportunity.
- Note the error messages; ➠ *Error messages on the CCS display*, p. 8 - 16.
- Have the malfunction corrected.



When the malfunction has been corrected

- Start the engine – the lamp (**1**) goes out immediately.
- Actuate the accelerator or parking brake – the lamp (**3**) goes out immediately and the lamp (**2**) then goes out approx. 10 minutes later.

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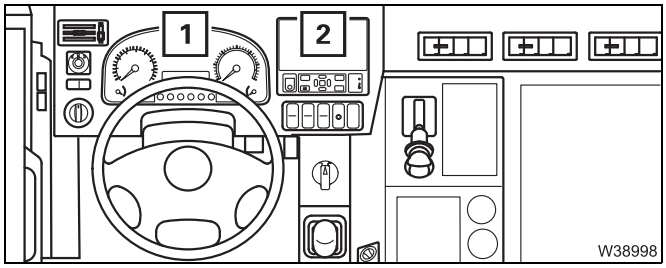
5.3.6 Overriding torque reduction

You can override the torque reduction 3 times for a limited time during operation so that the full motor output is available (e.g. for driving to a service station or setting down the load).

Displays in the case of torque reduction; ➠ *Torque reduction*, p. 5 - 45.



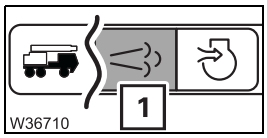
Information regarding the lamps and symbols

All indications are shown simultaneously on the instrument panel (**1**) and the *CCS* display (**2**); ➠ *Information regarding the lamps and symbols*, p. 5 - 45.

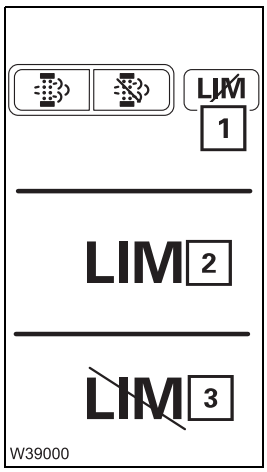
The lamp (**1**) lights up when the torque is reduced.

In driving mode, you can only switch the transmission in the *Manual* operating mode.

Depending on the current operating mode of the crane, the operation is performed on the *CCS* display in the driver's cab or the *CCS* display in the crane cab.



Select and confirm the symbol (**1**) – the *Exhaust system* menu opens.



- Select and confirm the symbol (**1**).
  - The lamp (**2**) goes out.
  - The symbol (**3**) is displayed.

The torque reduction function is overridden for 30 minutes.
In driving mode, the *Automatic* operating mode for the transmission is enabled.

After 30 minutes the torque is automatically reduced again.

You can override the reduction three times, after this the symbol (**1**) will become inactive until the engine is restarted.

You can override this reduction three times. The torque is reduced continuously with each override – down to 20%.

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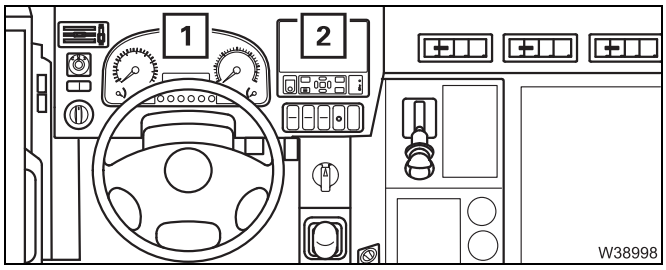
5.3.7 Cleaning the exhaust system

Risk of burns during the cleaning procedure!
The exhaust system can heat to over 600 °C (1,110 °F) during automatic and manual cleaning.
Keep away from the exhaust system and ensure that no persons on the carrier are in the region of the exhaust system or exhaust pipe. This will prevent severe burns.

Risk of fire!
Ensure that no inflammable materials or liquids are in the vicinity of the exhaust system or exhaust pipe before performing a cleaning procedure. Also observe all information in the enclosed engine manufacturer's operating instructions.

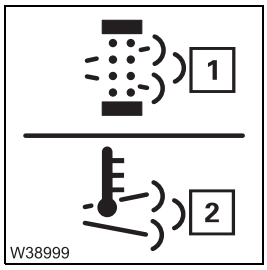


Information regarding the lamps and symbols

All displays occur simultaneously on the instrument panel and the *CCS* display; ➠ *Information regarding the lamps and symbols*, p. 5 - 45.

Automatic cleaning

The exhaust system cleaning procedure usually runs automatically, unless it has been manually disabled; ➠ *Disabling cleaning*, p. 5 - 51.



The lamp (**1**) flashes during automatic cleaning.
The lamp (**2**) will light up due to the increased temperature.

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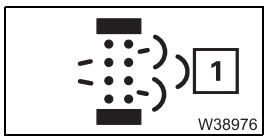


The lamp (**1**) lights up if automatic cleaning is not performed in time. In this case you can drive with an increased load for approx. 20 minutes. Perform a manual cleaning if this is not possible or the light does not go out afterwards.

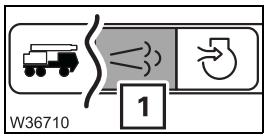
Manual cleaning

Depending on the current operating mode of the crane, the operation is performed on the *CCS* display in the driver's cab or the *CCS* display in the crane cab.

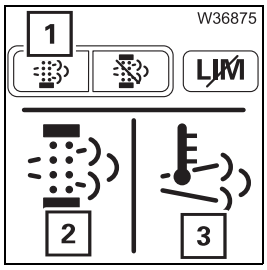
Manual cleaning is only performed when all prerequisites specified here have been fulfilled.

– The engine runs at idling speed – the idling speed must not be exceeded by more than 50 rpm during the cleaning procedure.
– The accelerator pedal is not actuated.
– The service brake is not actuated.
– The parking brake is engaged.

- Ensure that all prerequisites remain satisfied during the entire cleaning procedure.



- Select and confirm the symbol (**1**) – the *Exhaust system* menu opens.



- Select and confirm the symbol (**1**) – the cleaning process starts.
  – The lamp (**2**) flashes.
  – Lamp (**3**) lights up after the corresponding temperature increase.

The lamp (**2**) goes out when the cleaning procedure has finished.
The lamp (**3**) goes out once the exhaust system has cooled to the operating temperature.

If the idling speed is exceeded by more than 50 rpm then the manual cleaning procedure is interrupted and automatic cleaning can start, depending on the degree of soiling.

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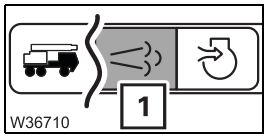
Disabling cleaning

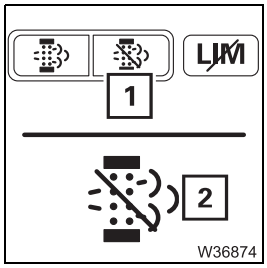
Depending on the current operating mode of the crane, the operation is performed on the *CCS* display in the driver's cab or the *CCS* display in the crane cab.

Automatic cleaning cannot be performed and manual cleaning cannot be started when cleaning is disabled. This function is for sites where an exhaust temperature greater than 600 °C (1,110 °F) presents a danger.

In normal operation, automatic cleaning is performed without interrupting operation and is the best solution for the exhaust system. Therefore, only disable cleaning when the site makes this necessary. Take care to ensure that cleaning is enabled again when the truck crane is outside the danger area.



- Select and confirm the symbol (**1**) – the *Exhaust system* menu opens.



Disabling cleaning

- Select and confirm the symbol (**1**) – the lamp (**2**) lights up, the symbol (**1**) **is green**.

Enabling cleaning

- Select and confirm the symbol (**1**) – the lamp (**2**) goes out, the symbol (**1**) **is orange**.

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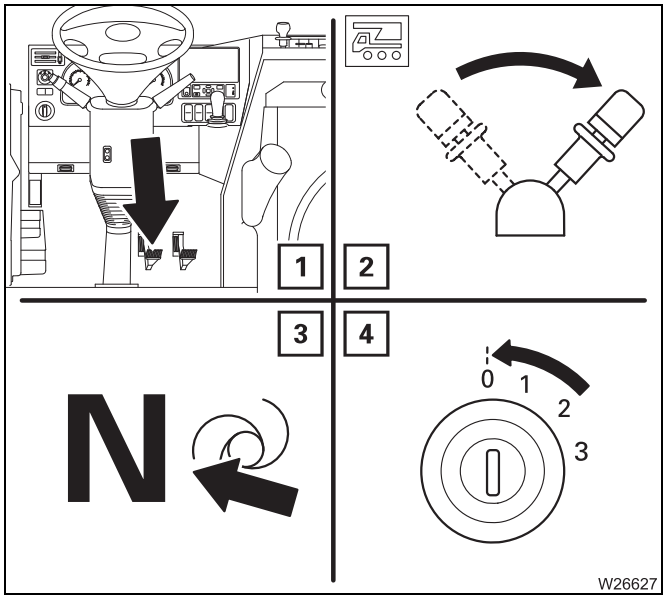
5.3.8 Parking the truck crane



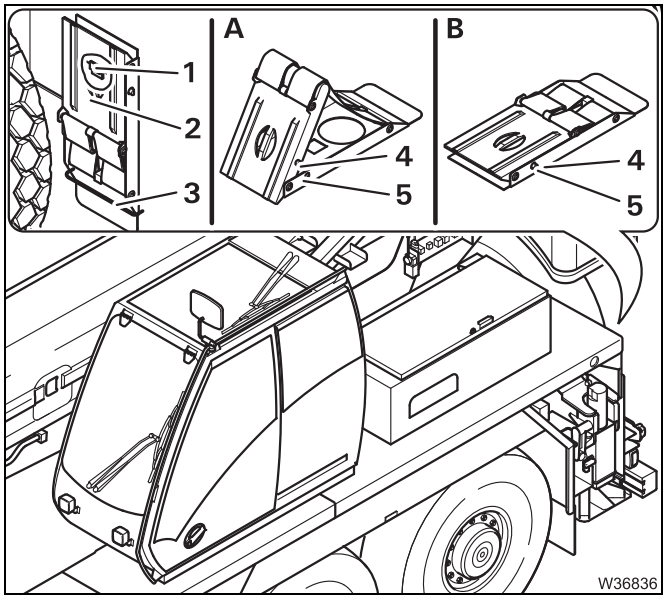
To switch the truck crane off, you must:

1. Stop the truck crane
2. Apply the parking brake
3. Switch to neutral gear; p. 5 - 26
4. Switch off the engine; p. 4 - 19

Securing against rolling away

The number of wheel chocks supplied varies according to country.

Risk of accidents by 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**).

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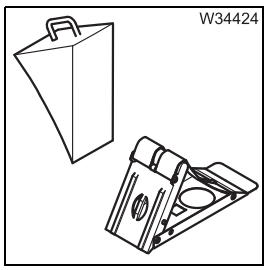
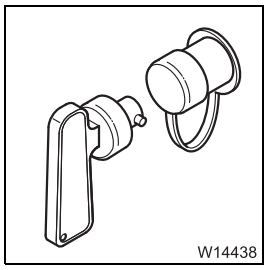


Additional chocks can be transported in the storage compartment on the turntable or at the rear of the truck crane.

When stationary for more than 8 hours

- Switch off all current consumers, for example, 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.

Securing the truck crane against unauthorised use

- Secure the truck crane against unauthorised use by:
  - Stowing 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 prevents unauthorised persons starting the engine using the hand-held control.

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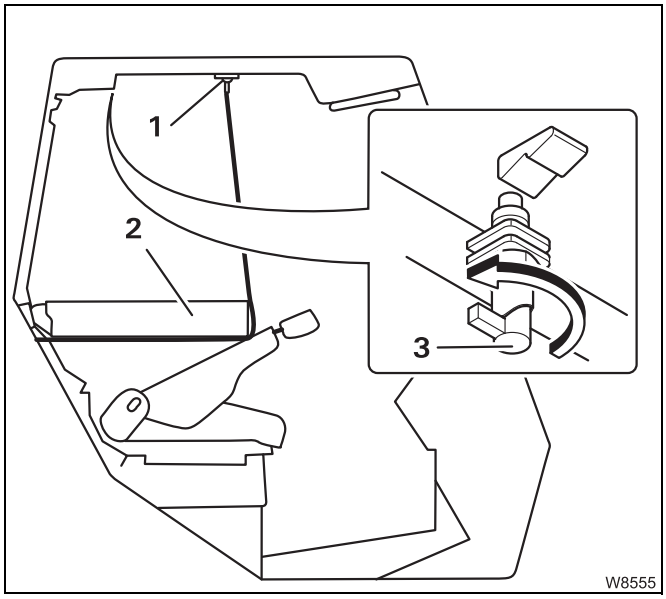
5.3.9 Fold-up berth

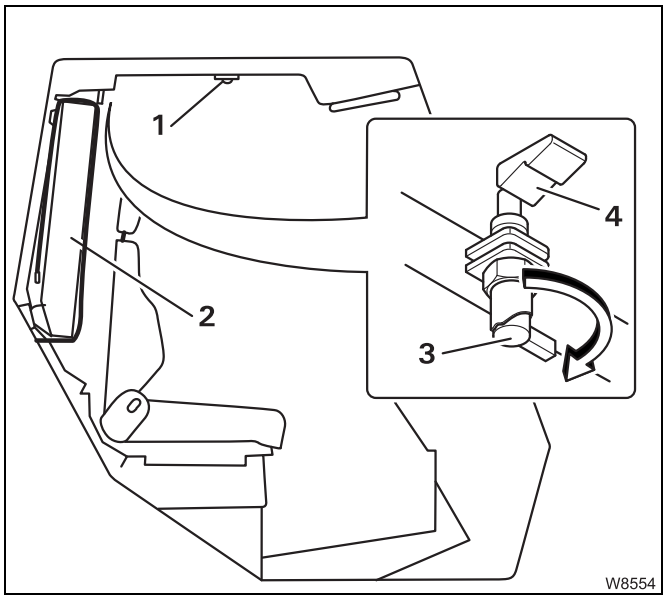
The berth must always be folded up and secured for driving.

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 folding down when braking, resulting in uncontrolled manoeuvres due to fright.



Folding down

- Tilt the backrests of the seats forwards; ➠ p. 5 - 12.
- Turn the locking bar (**3**) and fold the berth (**2**) down.
- Fasten both belts in the sockets (**1**).



Folding up

- Turn the locking bar (**3**) to position *Locked*.
- Undo the belts from the retainers (**1**) and place them on the berth.
- Fold up the berth (**2**) until you can hear the locking bar (**3**) latch into place behind the holder (**4**).
- Put up the back rests of the seats; ➠ p. 5 - 12.

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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 - 28.

– Select the *Manual* operating mode. This way you will be able to drive carefully and shift gears on time; ➠ 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:

– Switch on the longitudinal differential locks; ➠ p. 5 - 56.

– Switch on the transverse differential locks; ➠ p. 5 - 56.

Changing the vehicle level

You can also using the level adjustment system to adapt the truck crane to the off-road inclination or lift and lower the truck crane; ➠ p. 5 - 58.

Rocking the vehicle free and towing

If the truck crane is stuck in terrain; ➠ *Freeing a stuck truck crane*, p. 5 - 62.

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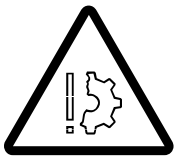
5.4.1 Longitudinal and transverse differential locks

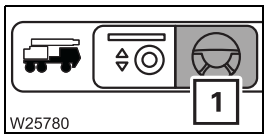
– The longitudinal differential locks prevent individual axle lines spinning when driving on a slippery surface. With the 6 x 6 x 6 drive, the 1st axle line is switched on and off together with the longitudinal differential locks.

– The transverse differential locks prevent individual wheels spinning when driving on a slippery surface.

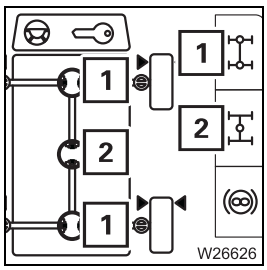


Risk of damage to the differential locks!
Leave the transverse differential locks switched on only for as long as necessary. Always switch off the transverse differential locks before driving on a firm surface!

For switching on and off, the current speed needs to be under approx. 5 km/h (3 mph).

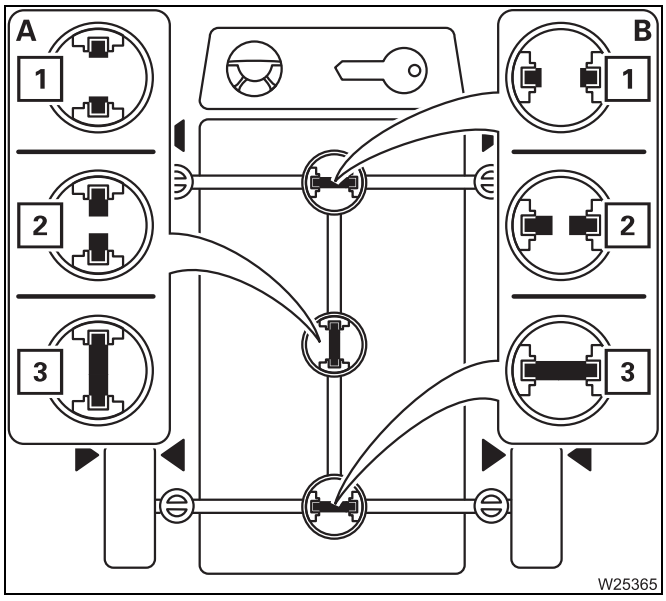


- Open the *Driving* menu (**1**).



- Straighten the steering.
- Stop the truck crane.

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.

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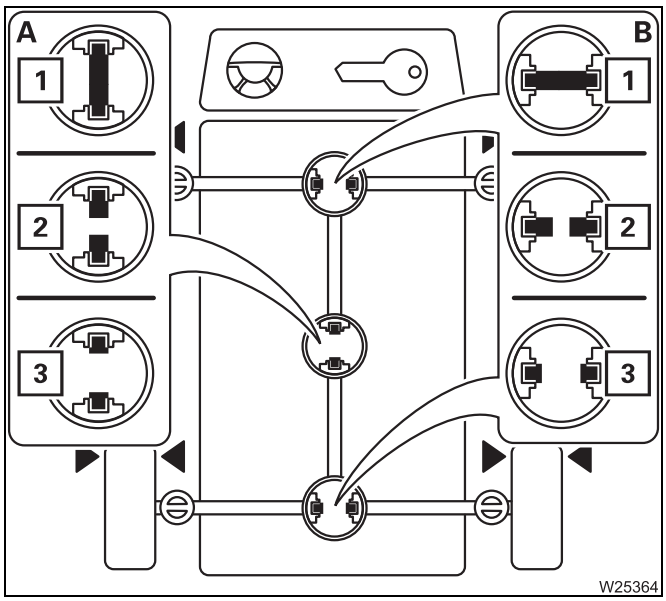


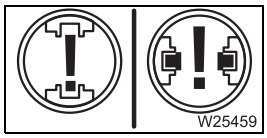
Switching off

- 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.



If the error symbol is displayed, please contact **Manitowoc Crane Care**.

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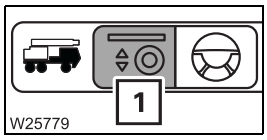
5.4.2 Operating the level adjustment system

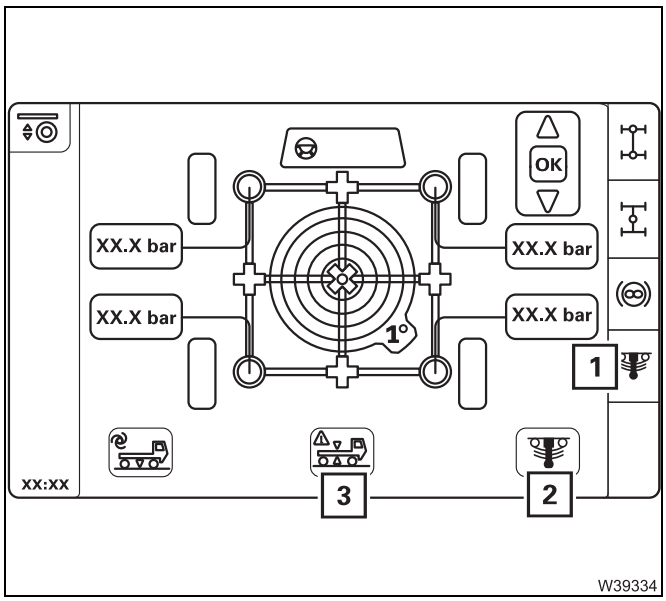
You can use the level adjustment system to set the on-road driving level, change the overall level and incline the truck crane.

Opening the menu

You can only open the *Level adjustment system* menu when the current speed is less than about 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 symbol (**3**) is shown for an error during a level adjustment, then contact **Manitowoc Crane Care**.

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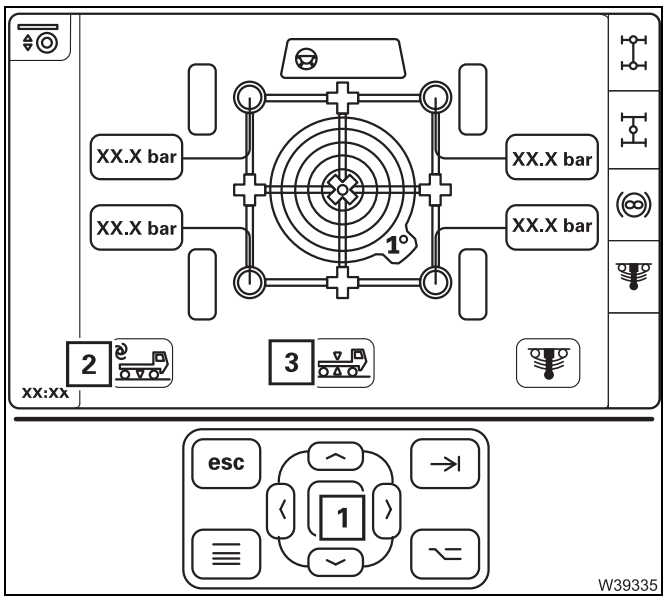
Setting the on-road level

For on-road driving, you must always set the on-road level in order to adhere to the specified overall height.

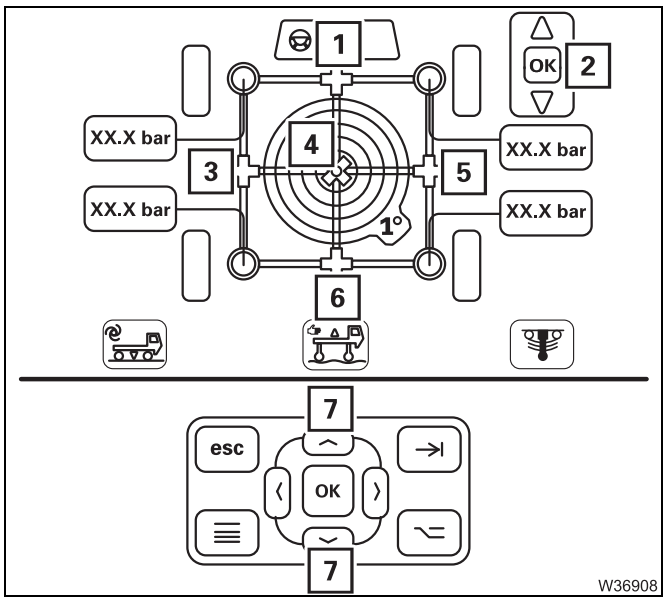
- Park the truck crane on a level surface.
- Straighten the steering.



- 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 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 2nd and 3rd axle line

- Select and confirm the desired symbol – the symbol turns**orange** and the symbol (**2**) is also displayed.

  Now the vehicle level can be changed with the (**7**) button.

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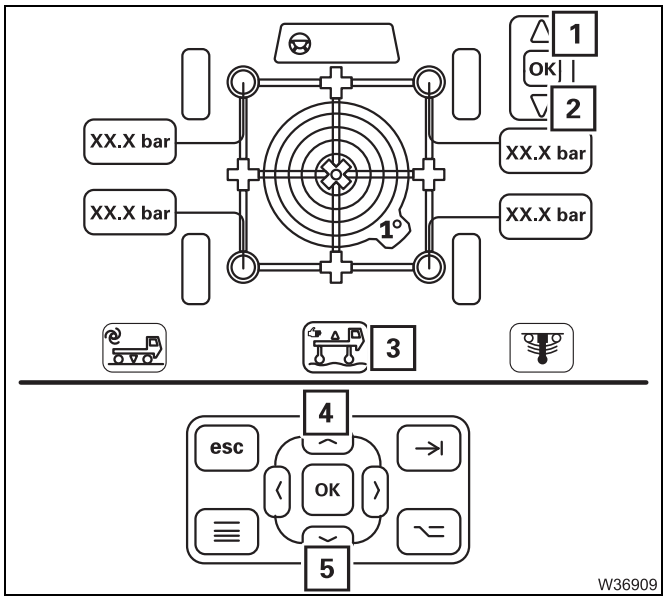
Changing the vehicle level

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.



The display (**3**) always shows the current status during the entire process, for example, the symbol *No road level*.

The level is continuously changed until you release the button or the end position is reached.

Raise the level

- Press the button (**4**) – the symbol (**1**) becomes orange, the suspension struts extend.

Lowering the level

- Press the button (**5**) – the symbol (**2**) becomes orange, the suspension struts retract.

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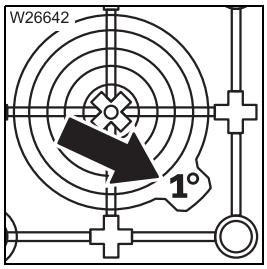
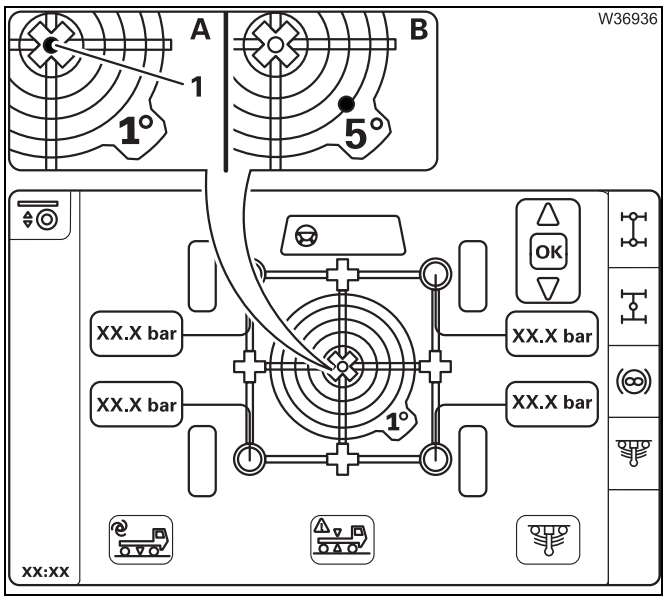
Viewing the current inclination

The inclination indicator shows the current alignment.



Switching between measuring ranges

The measuring range is automatically switched between 1° and 5°.

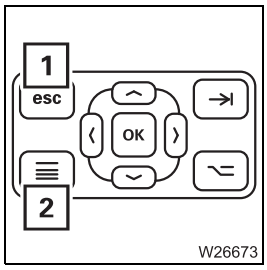


(**A**) – When the truck crane is level the marking (**1**) is in the middle.

(**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 about 5 km/h (3 mph).

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5.4.3 Freeing a stuck 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 does not make sense to switch between gear positions **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.

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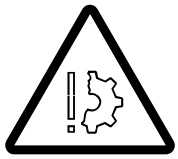
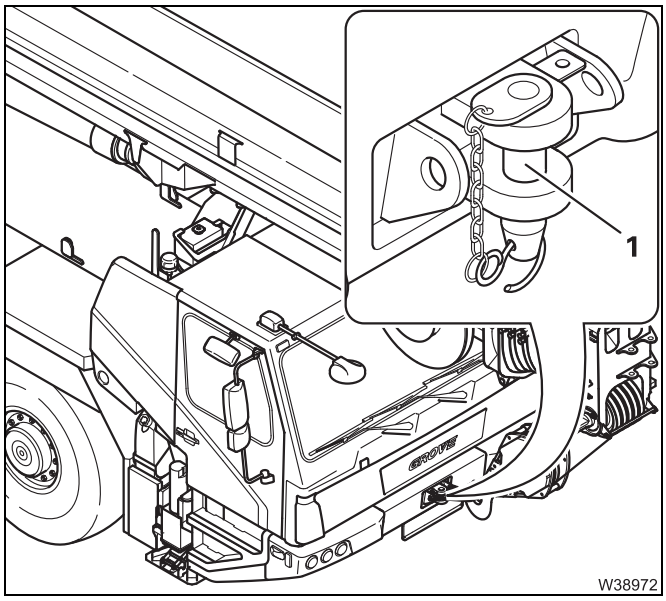
Towing free forwards

- 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.
Jerking the truck crane or pulling it at an angle can cause damage to 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:

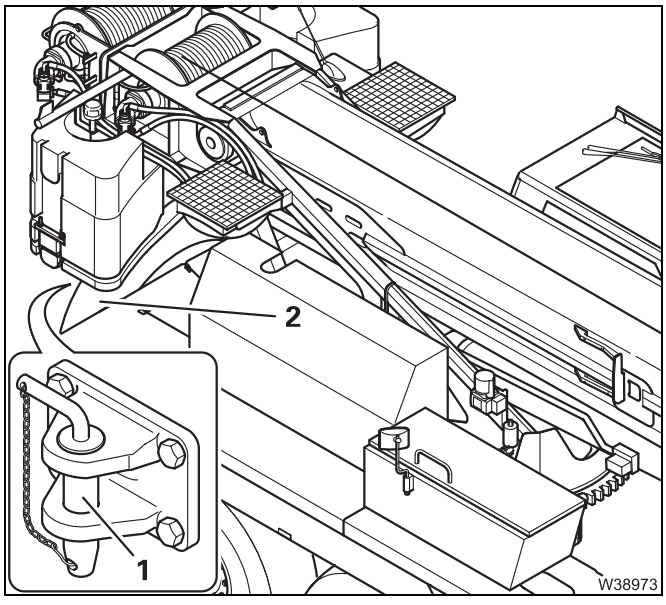
– The direction of pull runs forward along the longitudinal axis or at an angle of 45° to the right or left of the longitudinal axis **and**

– The direction of pull runs along the longitudinal axis 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 rear towing coupling (**1**) on the rear chassis wall is 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 **and**

– The direction of pull runs along the longitudinal axis towards the rear without diverting up or down.

Remove the spare wheel (**2**) if necessary;
p. 8 - 34.

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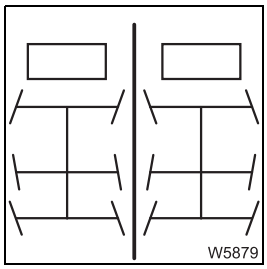
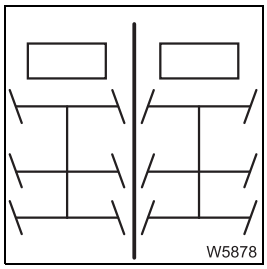
5.5 Separate steering

There are two steering modes with separate steering.



– Driving around corners:

When separate steering is switched on, the steering angle is larger than for normal steering mode – the turning circle is smaller.



– Crab travel mode:

When separate steering is switched on, you can turn the wheels of the front and rear axle lines in the same direction – the truck crane drives sideways.

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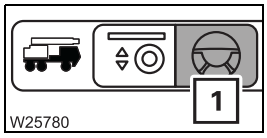
5.5.1 Switching to separate steering

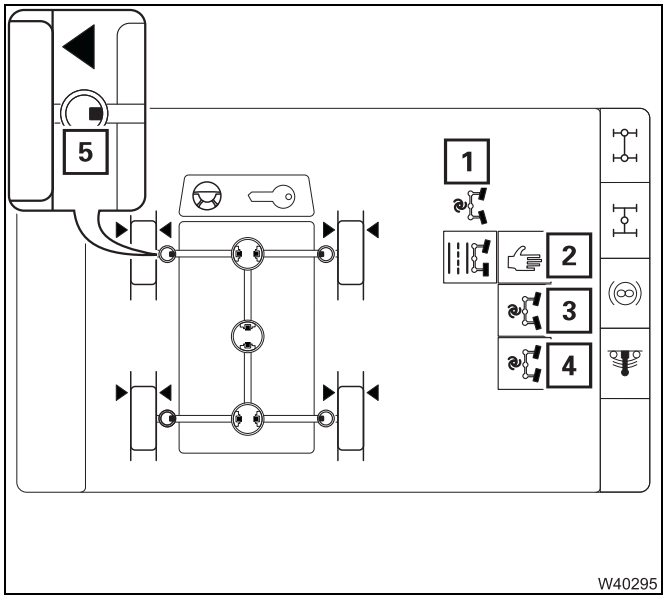
Always switch to separate steering when
– Driving with the rigged truck crane or
– Steering at low speed

Risk of accidents when driving on-road with unlocked steering!
After driving with separate steering, change over immediately to normal steering mode. The switchover process to normal steering is not completed until the symbols in the locking status display are **green**.

You can switch to separate steering only at low speeds.

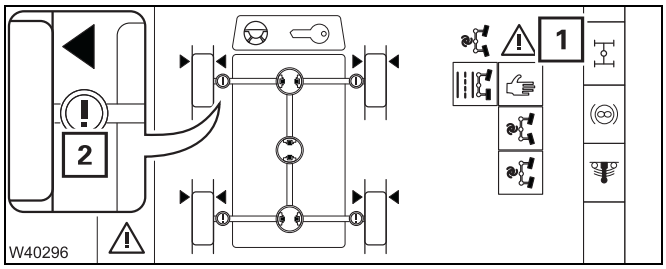


- Open the *Driving* menu (**1**).



- Select and confirm the symbol for the desired steering mode.
  - **2** Manual
    2nd and 3rd axle lines steered manually
  - **3** Driving around corners
    2nd and 3rd axle lines steered automatically
  - **4** Crab travel mode
    2nd and 3rd axle lines steered automatically

– The symbol (**1**) indicates the selected steering mode, e.g. *Driving around corners*.
– The symbols (**5**) become **red** – steering unlocked – separate steering is switched on.



If an error symbol (**1**) or (**2**) is displayed, contact **Manitowoc Crane Care**; ➠ p. 8 - 23.

When separate steering is switched on, the speed is limited to about 20 km/h (12 mph).

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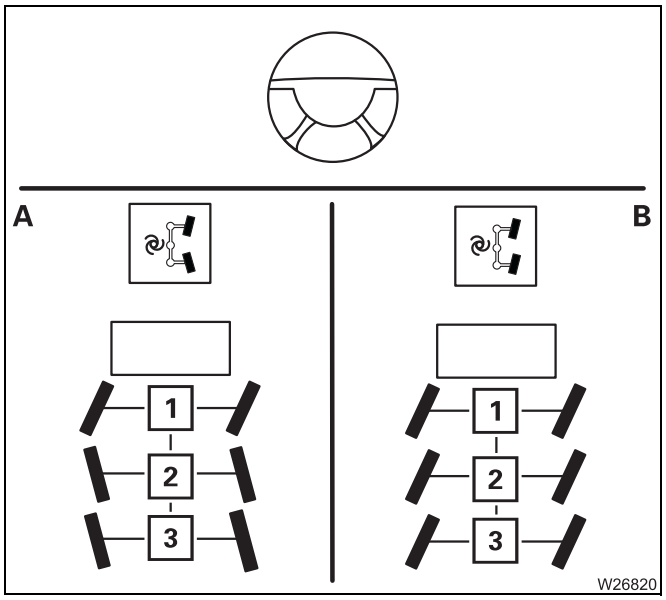
Steering with separate steering – automatic

- Steer the 1st axle lines with the steering wheel.



(A) – When driving around corners

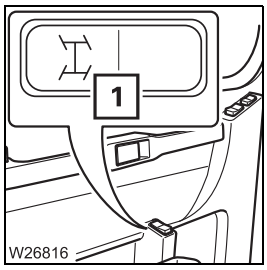
The 2nd and 3rd axle lines are steered out in line with the turning radius, against the steering angle on the 1st axle line.

(B) – For crab travel mode

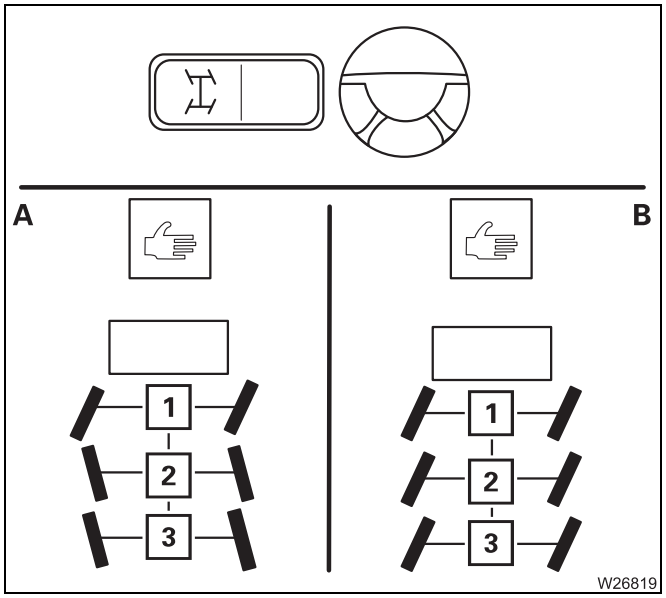
The 2nd and 3rd axle lines in the same direction as the 1st axle line.

Steering with manual separate steering

- Steer the 1st axle lines with the steering wheel.
- Steer the 2nd to 3rd axle lines with the button (**1**).
  - **– To turn to the left:** • Press the button in at the left.
  - **– To turn to the right:** • Press 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 2nd and 3rd axle line opposite to the 1st axle line.

(B) – For crab travel mode

- Steer the 2nd and 3rd axle lines in the same direction as the 1st axle line.

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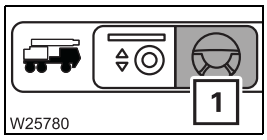
5.5.2 Switching to normal steering mode

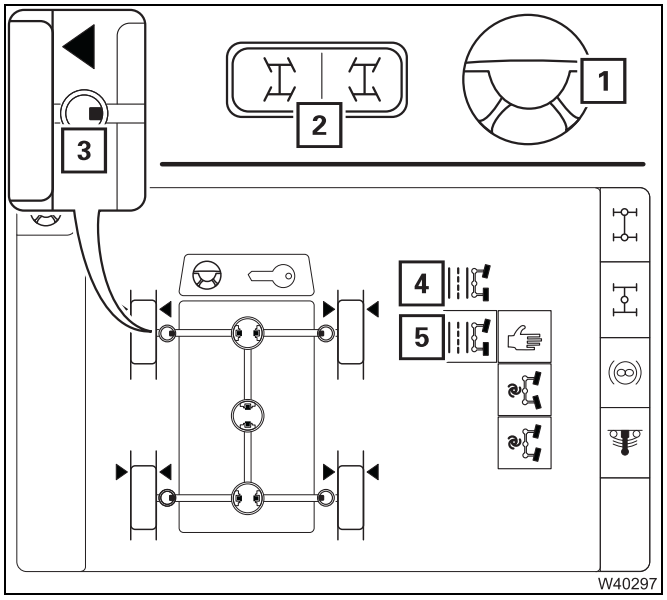
After driving with separate steering, change over immediately to normal steering mode.

Switching off the separate steering is possible during standstill and while travelling, up to a speed of about 5 km/h (3 mph).



- Select and confirm the symbol (**1**).

  The *Driving* menu opens.

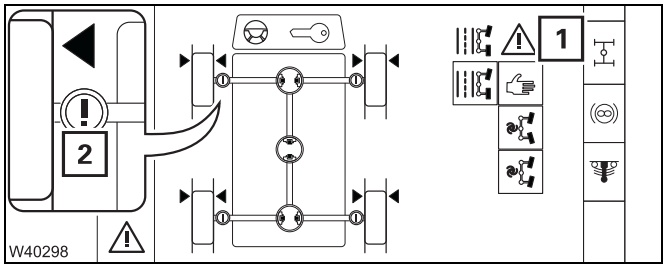


- Use the steering wheel (**1**) and the button (**2**) to turn the wheels to the *Straight ahead* position – the current wheel position is displayed.
- Select and confirm the symbol (**5**).

– The symbol (**4**) indicates the selected steering mode, e.g. *Normal steering*.
– The symbols (**3**) become **green** – steering locked – normal steering for on-road driving is switched on.

If the symbols (**3**) are **yellow**:

- Steer using the button (**2**) or the steering wheel (**1**) until the symbols (**1**) become **green**.



If an error symbol (**1**) or (**2**) is displayed, contact **Manitowoc Crane Care**; ➠ p. 8 - 23.

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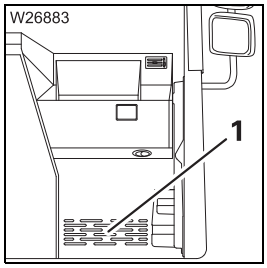
5.6 Heating and air-conditioning system



Air intake opening

- Do not cover the grille (**1**).

  Air is sucked in through the grille (**1**).

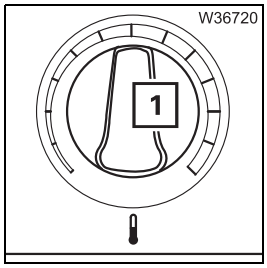
5.6.1 Standard heating system

Switching on

- Start the engine. Heating is only available when the engine is running.

Heating

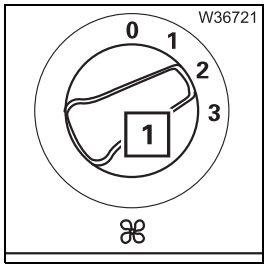
You must set the blower and the temperature.



Setting the temperature

1 – Increasing the temperature: Turn clockwise

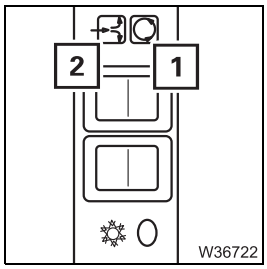
– Reducing the temperature: Turn anti-clockwise



Setting the fan

1 – Increasing the air volume: Turn clockwise
The switch engages in three different positions.

– Reducing the air volume: Turn anti-clockwise



Setting recirculated/fresh air

1 – Recirculated air: Air is sucked in from the driver's cab. Change to fresh air often to ensure that oxygen is supplied.

2 – Fresh air: Outdoor air is sucked in.

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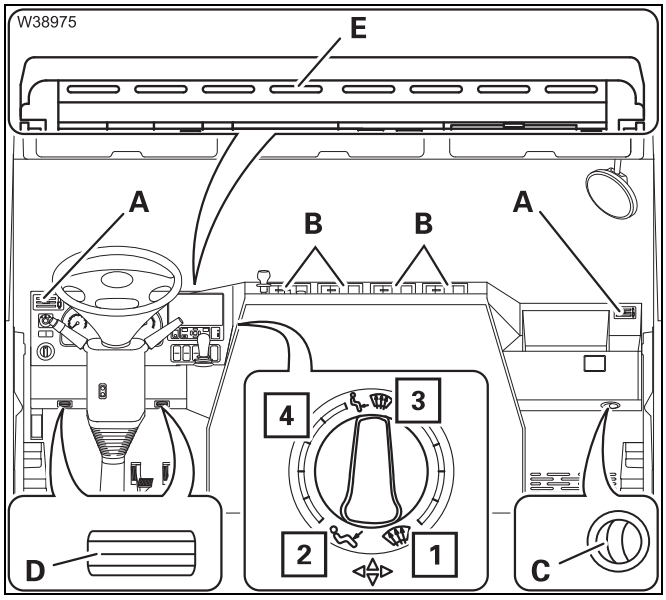
Air distribution You can direct the air to flow out of various air vents.

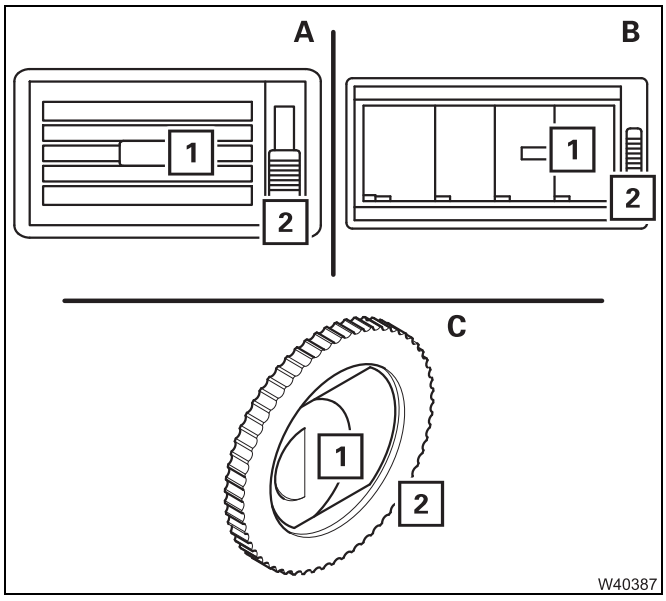


- Turn the switch (**4**) to the desired position

  (**1**) – Air vents (**A**), (**B**), (**E)**

  (**2**) – Air vents (**C**), (**D**)

  (**3**) – All air vents



Adjusting the air vents

– Open/close

A (**2**) Upwards/downwards

B, C (**1**) Folding the fins in/out

– To direct the air flow

A (**1**) Pivoting the fins

B (**1**), (**2**) Pivoting the fins

C (**1**) Pivoting the fins
(**2**) Rotating

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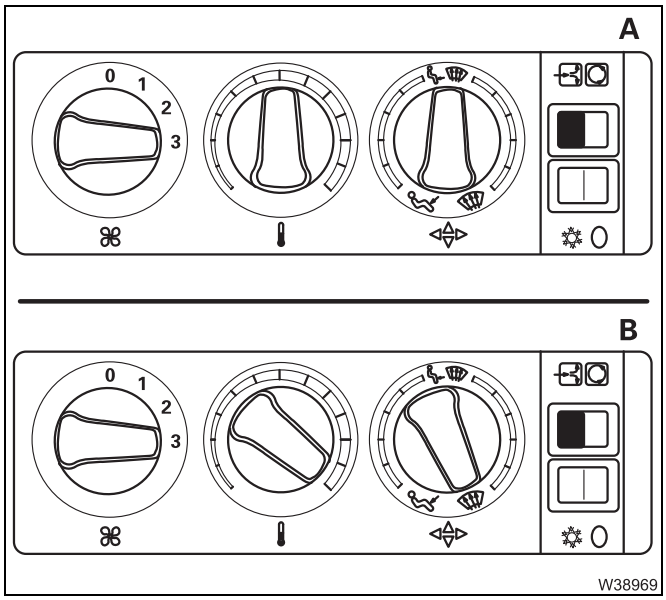
Examples

This section only contains examples of the settings.
Always adjust the setting to the current conditions (warm, cold, damp).



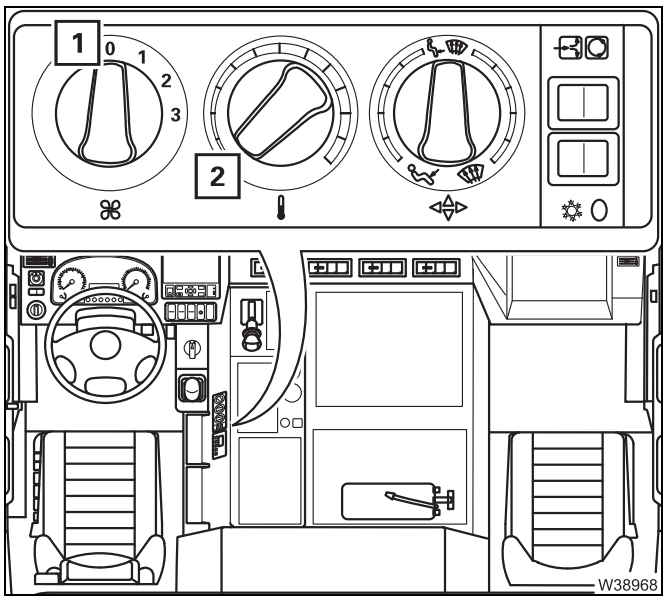
(A) – Ventilate

– Turn the switches to the positions shown.
– Open the air vents if necessary.

(B) – Defrosting the front windscreen

– Turn the switches to the positions shown.
– Close the air vents.

Switching off



Switching off the heater

- Turn the switch (**2**) anti-clockwise as far as it will go.

Switching off the ventilation

- Turn the switch (**1**) to the level 0.

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5.6.2 Air-conditioning system

You can cool the driver's cab and dry the air using the air-conditioning system.

Notes

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:

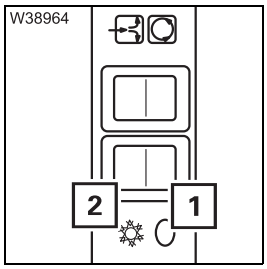
If the truck crane has been exposed to strong sunlight for a long period of time, for example, the air-conditioning system should initially be operated at the highest blower level with the engine running.
The door or at least the windows should be left open for a short while to thoroughly air the cab. 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 only functions when the engine is running.
- Switch off the auxiliary heater; ➠ p. 5 - 74.



– **Switch on:** • Press the switch next to symbol (**2**).
– **Switch off:** • Press the switch next to symbol (**1**).

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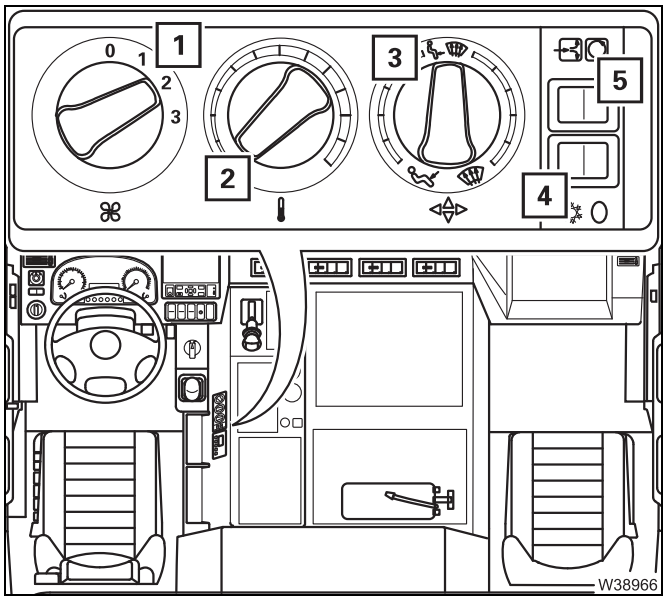
Cooling

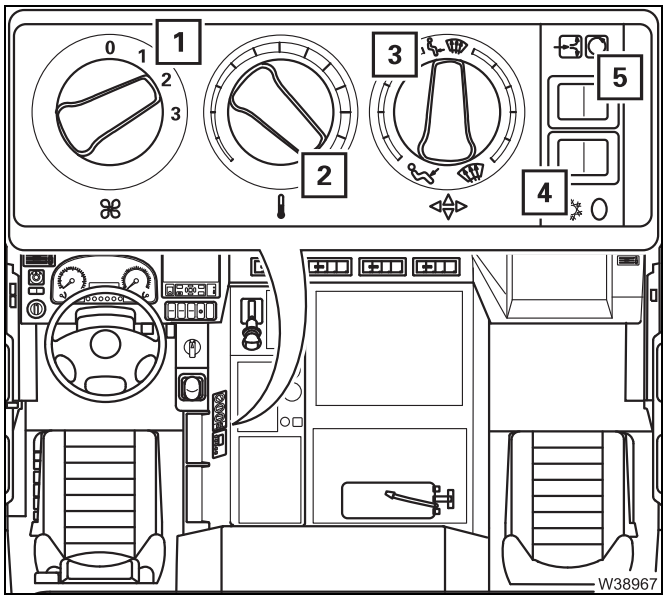
The illustration shows only a sample setting. Always adjust the setting to the current conditions.



- Switch the air-conditioning system on – (**4**).
- Turn the switch (**2**) as far as it will go, to *Cold*.
- Turn switch (**1**) to the required level. With recirculating air,(**5**) you will be able to cool more quickly, but no oxygen is fed in.
- Set the air distribution with switch (**3**) – open the air vents if necessary; ➠ p. 5 - 70.

Drying

You can dry the air in the driver's cab.



- Switch the air-conditioning system on – (**4**).
- Turn the switch (**2**) as far as it will go, to *Warm*.
- Turn the switch (**1**) to the desired level – adjust the fresh air/air (**5**) setting to the current conditions (humidity and temperature of the outside air).
- Set the air distribution with switch (**3**) – open the air vents if necessary; ➠ p. 5 - 70.

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.

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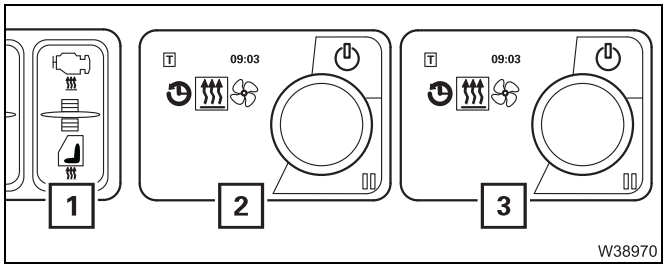
5.6.3 Auxiliary water heating system

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!

Further information on the operation of the auxiliary water heating system is provided at the address *Webasto.com*.

You can also scan the following QR code.

You can use the auxiliary water heating system for pre-heating the engine and driver's cab. Operation depends on the auxiliary water heating system version. There are two versions.

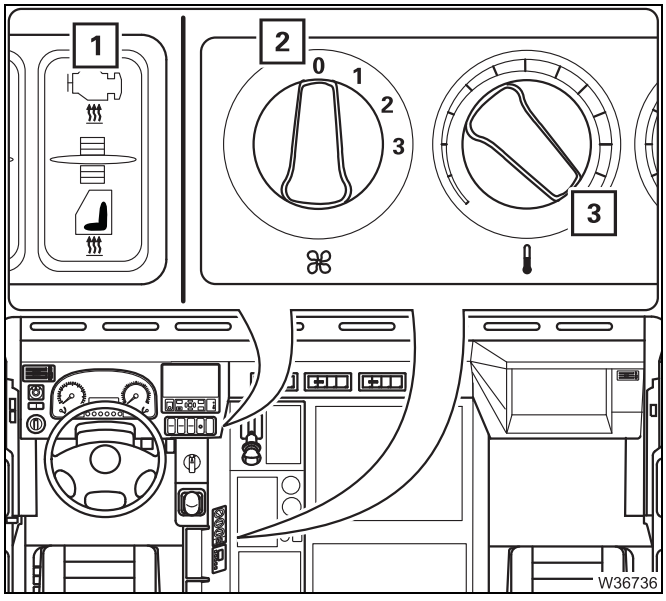


- **With the low temperature package** (**1**), (**2**) and (**3**) present
- **Without low temperature package** Only (**2**) present – possible also with (**1**) but without function, depending on the version

Preheating the engine

For versions without the low temperature package

The driver's cab is pre-heated first. Pre-heating of the engine is switched in when a defined temperature is reached; *Preheating the driver's cab*, p. 5 - 75.



For versions with the low temperature package

- Switch on the heating.
  - Switch (**1**) pushed in at the top.
  - Switch (**2**) to position *Fan off*.
  - Switch (**3**) to position *Warm*.

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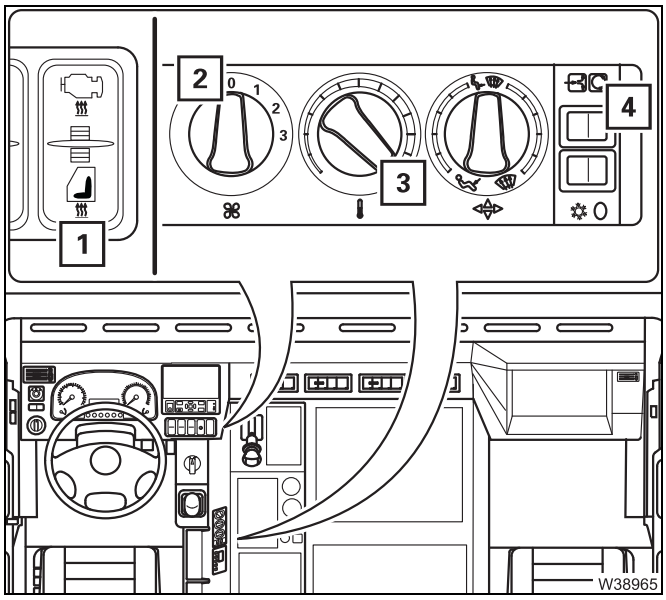
Preheating the driver's cab

- Switch on the heating.



For both versions

– Switch (**2**) to the required fan level.
– Switch (**3**) to position *Warm*.
– Switch (**4**) to the *Recirculated air* symbol.
– Air vents opened; ➠ p. 5 - 70.

For versions with the low temperature package

– Switch (**1**) pushed in at the bottom.

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

- 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 (for example, 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 use the auxiliary heater in closed spaces (for example, garage).

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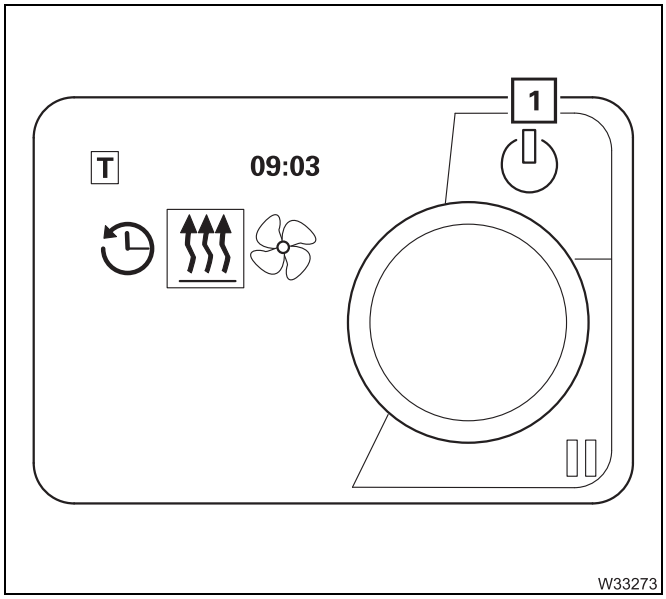
This section describes how to switch on manually. The auxiliary heater can also be switched on automatically; *Storing the heating start*, p. 5 - 78.

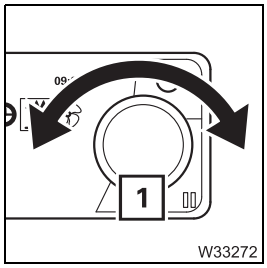
- Switch on the ignition; *Switching the ignition on*, p. 4 - 9.



- Press the button (**1**) once. The auxiliary heater is switched on and the control panel and buttons are illuminated.

The status of the auxiliary water heating system is indicated by the coloured light on the button (**1**):

Lights up green:	Heater operating
Lights up blue:	Fan operating
Lights up white:	Heater off – controls on
Flashing red:	Error
Flashing green:	Heater operation programmed
Flashing blue:	Fan operation programmed

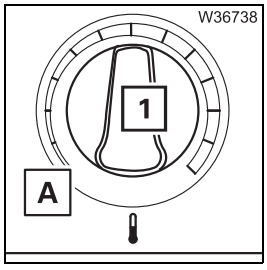


Menu control

The jog-dial (rotary push button) (**1**):

– turn to select,

– press to confirm.



Setting the temperature

- Turn switch (**1**) to the desired temperature.

If the switch (**1**) is turned as far as possible **A** (*Cold*), the auxiliary heater is not switched on.

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.

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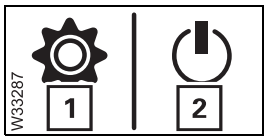
Always switch the auxiliary heater off if you switch off the truck crane while the battery master switch is switched on. In this way, you prevent the auxiliary heater from restarting and the batteries from running down after the engine has cooled down.

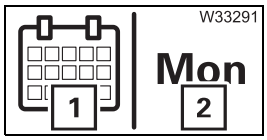
Setting the date and time

The error code TEB is shown in the display if the power supply has been interrupted for more than 8 minutes. You must reset the date and time.

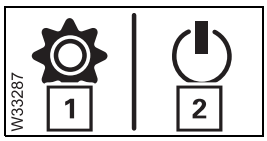
Always set the current time and current day of the week. These settings are required for the correct activation point of the automatic heating start.



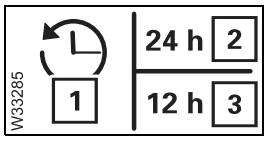
- Select and confirm the symbol *Settings* (**1**) – display symbol *Immediate start* (**2**).



- Select and confirm the symbol *Day of the week* (**1**) – display symbol (**2**), e.g. **MON** for Monday.
- Select and confirm the desired day of the week.



- Select and confirm the symbol *Settings* (**1**) – display symbol *Immediate start* (**2**).



- Select and confirm the symbol Time *Time* (**1**) – display symbol *Time format*.
- Select and confirm the desired time format (**2**) or (**3**).

The *Time* display flashes.

- At the flashing display, set the hours and confirm the selection.

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- Set the minutes at the flashing display and confirm the selection.

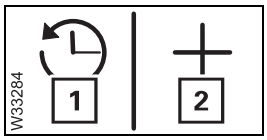
The time and day of the week have now been set.

Storing the heating start

Heating is started automatically on schedule only if the time and the day of the week have been correctly set; *Setting the date and time*, p. 5 - 77.

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.



- Select and confirm the symbol *Timer* (**1**) – display symbol *Add timer* (**2**).
- Select and confirm the symbol *Add timer* (**2**).

- Select and confirm the desired day of the week, e.g. **MON** for Monday.

The *Switch-on time* display flashes.

- At the flashing display, set the hours and confirm the selection.

- Set the minutes at the flashing display and confirm the selection.

The switch-on time is now set.
Next you must set the switch-off time.

The *Switch-off time* display flashes.

- At the flashing display, set the hours and confirm the selection.

- Set the minutes at the flashing display and confirm the selection.

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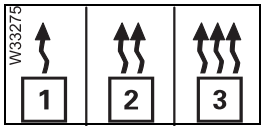
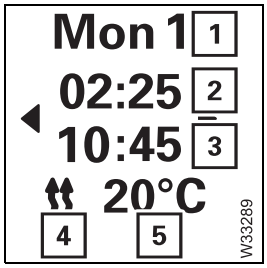


- Select and confirm the desired heating mode:
  - economical (**1**)
  - comfortable (**2**)
  - quick (**3**)

- Select and confirm the desired temperature.

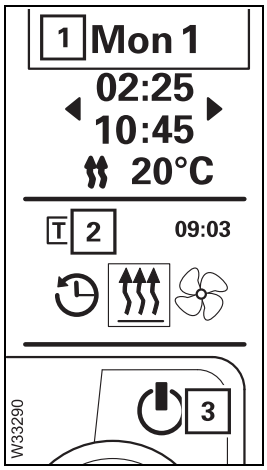
After the desired temperature has been input, the set values are saved and shown in the display:



- Day (**1**)
- Switch-on time (**2**)
- Switch-off time (**3**)
- Heating mode (**4**)
- Temperature (**5**)

- Confirm the set values.

- Confirm the *Activate* symbol.



A heating start that is activated is shown by:

– A white marking (**1**)

– The symbol *T* (**2**) in the main menu

– If the display is switched off, the button (**3**) flashes **green**.

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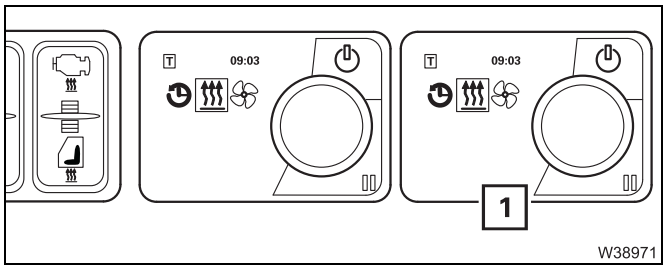
5.6.4 Battery heater

The battery is heated via an auxiliary air heater in the battery box.



The auxiliary air heater is operated via the control unit (**1**).

You can set an automatic start time and duration for the heating.

It is operated in the same way as the auxiliary water heating system; ➠ *Storing the heating start*, p. 5 - 78.

5.7 Radio

Click *here* for notes on the control of the radio.

You can also scan the following QR code.

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5.8 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 rolling away!
Before coupling or uncoupling the trailer, it must be secured with the trailer parking brake as well as with chocks to prevent it 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 be between the truck crane and 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 axle line are reduced by 74 kg (163 lbs) each.

– For every 100 kg (220 lbs) of drawbar load, the axle loads on the 2nd and 3rd axle lines are reduced by 87 kg (192 lbs) each.

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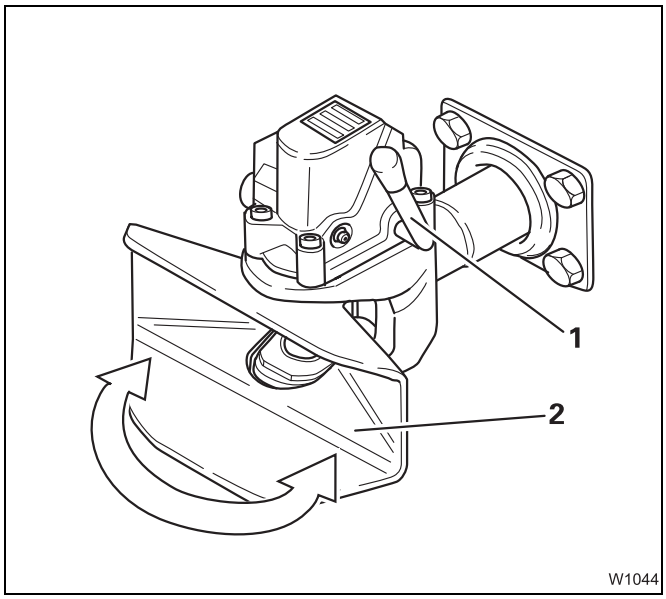
Coupling the trailer

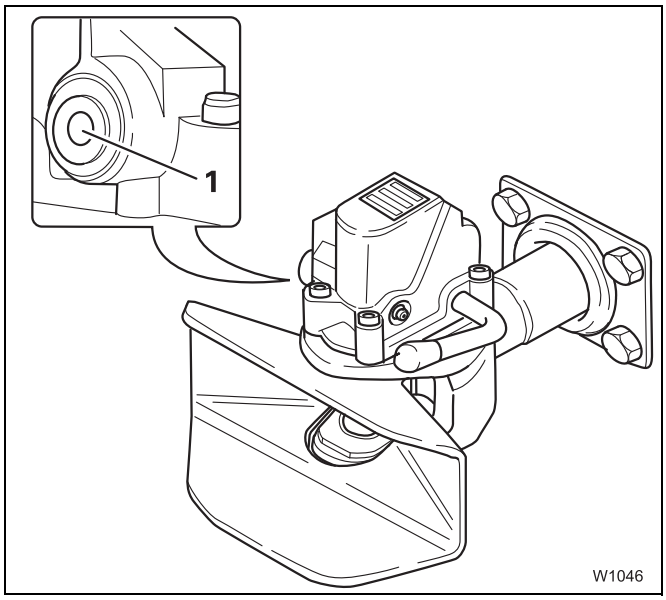
Risk of injury when the automatic closing device is triggered!
Do not put your hand into the coupling jaw when the towbar coupling is open. This may activate the automatic closing device, causing the cotter pin to move down with great force, seriously injuring your hand.



- 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.

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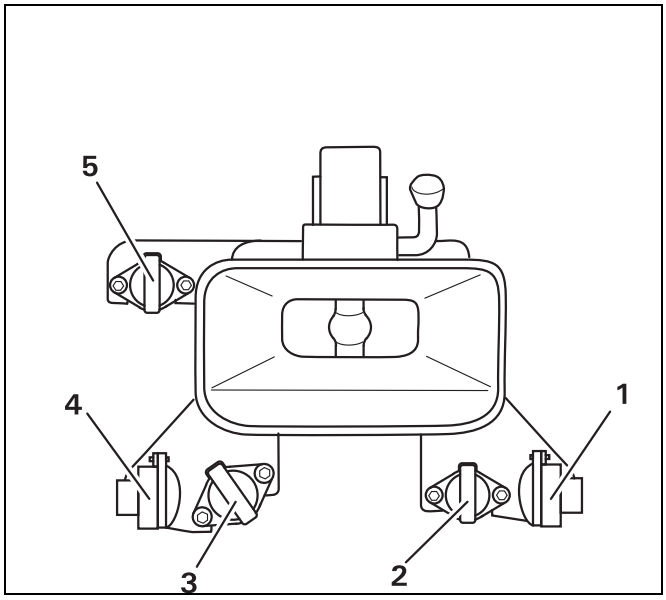
Risk of accidents if the trailer is coupled improperly!
If the pin is protruding from the guide bushing, the trailer is not coupled properly and could become disengaged from the towbar coupling while driving.

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 incorrectly routed!
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.

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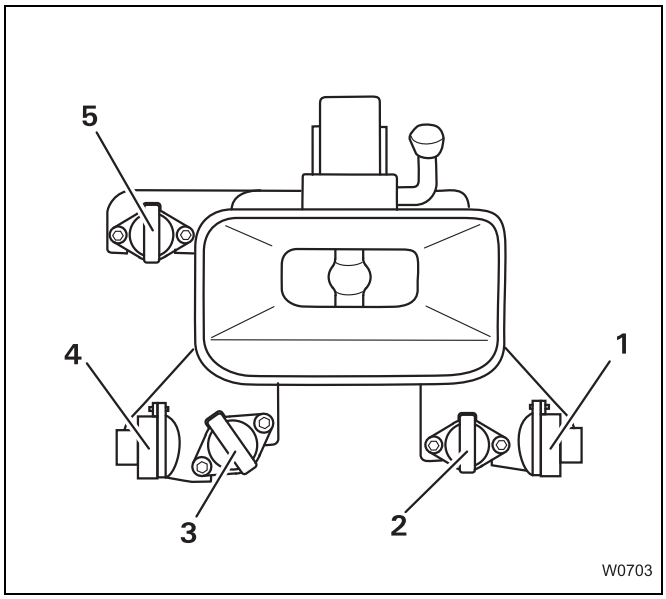
Removing the supply lines

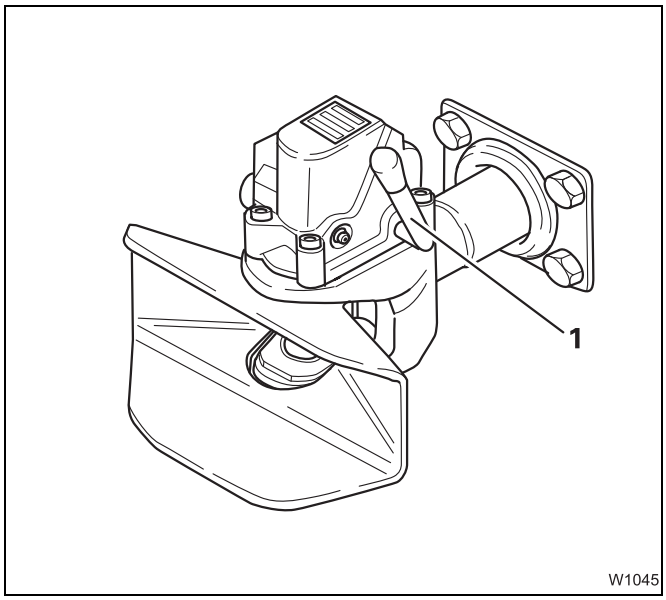
Risk of accidents due to trailer rolling in!
Always first remove the hose from the supply line so that the trailer is braked. This prevents the trailer moving when you remove the brake hose.



- Proceed as follows:
  - First disconnect the hose of the supply line from the coupling head (**1**) – red. Now the trailer is braked.
  - Then disconnect the hose of the brake pipe from the coupling head (**4**) – yellow.
- Remove the plug (**5**) of the trailer's electrical system from the socket.
- If necessary, remove the plugs (**2**) and (**3**) from the sockets (ABS and special equipment).

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 closing automatically, and the cotter pin causing serious injury to your hand.



- Secure the trailer with the (trailer) parking brake and chocks as prescribed to prevent it from rolling away.
- Open the towbar coupling.
  Push the lever (**1**) up until it latches into place.
- Drive the truck crane carefully away from the trailer.

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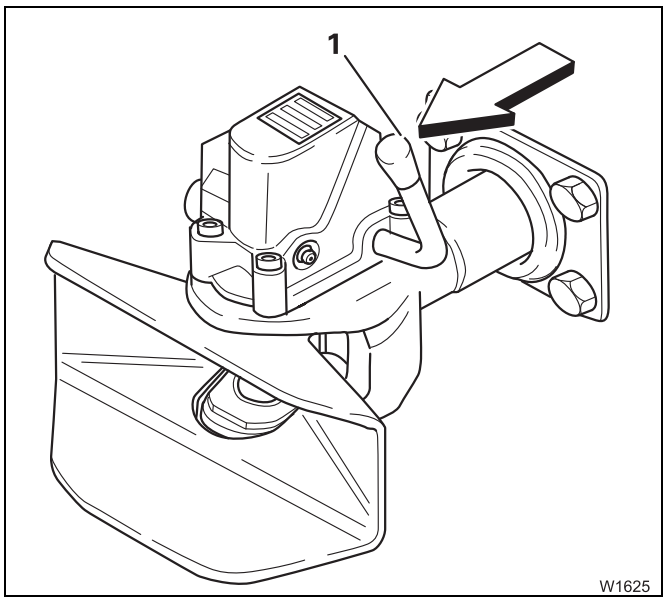
Risk of injury when closing the towbar coupling by hand!
When closing, the lever moves down with great force in the direction of the coupling jaw. Start the closing process only by moving the lever briefly in the direction of the coupling jaw with the ball of your hand.
If you hold the lever and move 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 being injured by the automatic closing device being activated unintentionally.

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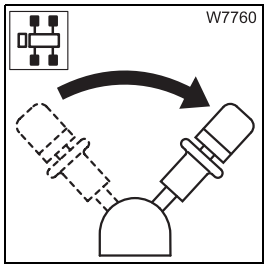
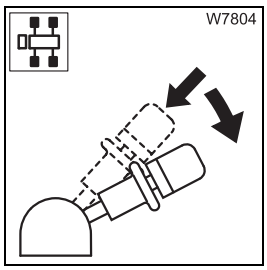
Checking the braking force

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 to the rear.
  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 rolling away!
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.

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6 Driving modes

This chapter contains tables with driving modes of the GMK3060, for which the maximum axle load is 12 t (26,500 lbs).

If country-specific regulations allow the truck crane to be driven with axle loads greater than 12 t (26,500 lbs), then observe the *Information on the axle loads* in the next section and the specifications in section *Maximum permitted speeds with an axle load of over 12 t (26,500 lbs)*; p. 6 - 6.

6.1 Driving modes

Information about the axle loads

The GMK3060 truck crane is designed for driving with maximum axle loads of 12 t (26,500 lbs). Die **Manitowoc Crane Group Germany GmbH** notes that driving with an axle load exceeding 12 t (26,500 lbs) can overheat the brake system 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 that 12 t (26,500 lbs), the crane driver/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).

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6.1.1 Information on how to use the tables

This section only shows some standard driving modes. For further information on additional or individual driving modes, please contact **Manitowoc Crane Care**.

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.

– 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:

Assume your truck crane is equipped with 385/95 tyres, 6 x 4 x 6 drive. Equipped with a retarder and towbar coupling.

In this case the driving mode in the upper part, next to equipment, is **4**.

According to the specifications in the lower part, in addition to rigging mode,

– the 3-sheave hook block may be attached to the front bumper,

– the 15 m lattice extension may be folded to the side and

– a 7.6 t counterweight may be installed on the turntable.

Additional parts must be transported on a separate vehicle

If you remove indicated parts from the truck crane in driving mode, then the total weight decreases but might be distributed in such a way that the front or rear axle loads are over 12 t.

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6.1.2 Table for a maximum axle load of 12 t (26,500 lbs)

Tyres
385/95 R25

Also be aware of the effects on the axle loads when towing a trailer; ➠ p. 5 - 81.

		Driving mode									
		1	2	3	4	5	6	7	8	9	10
Equipment	385/95 R25 tyres	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	Drive 6 x 4 x 6	✔	✔	✔	✔	✔	✔	✔			
	Drive 6 x 6 x 6								✔	✔	✔
	Towbar coupling				✔			✔		✔	
	Retarder		✔	✔	✔		✔	✔	✔		
	Auxiliary hoist installed					✔	✔	✔	✔		
Rigging mode	385/95 R25 spare wheel on rear					●	●	●	●		
	3 -sheave hook block attached to the bumper[1)]	●	●	●	●	●	●	●			
	1 -sheave hook block attached to the bumper[1)]								●	●	●
	15 m (49 ft) lattice extension folded to the side			●	●	●	●	●	●		●
	6.6 t counterweight attached to the turntable					●	●	●	●		
	7.6 t counterweight attached to the turntable	●	●	●	●					●	●
	1 t base plate on the counterweight platform	●	●								

1) The weight of the hook blocks is based on the information in this operating manual; ➠ p. 1 - 10.

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Tyres
445/95 R25

Also be aware of the effects on the axle loads when towing a trailer; ➠ p. 5 - 81.

		Driving mode						
		1	2	3	4	5	6	7
Equipment	445/95 R25 tyres	✔	✔	✔	✔	✔	✔	✔
	Drive 6 x 4 x 6	✔						
	Drive 6 x 6 x 6		✔	✔	✔	✔	✔	✔
	Towbar coupling				✔			
	Retarder			✔	✔	✔		
	Auxiliary hoist installed		✔	✔	✔			
Rigging mode	445/95 R25 spare wheel on rear					●		
	1 -sheave hook block attached to the bumper[1)]	●	●				●	
	Hook tackle hung on the bumper[1)]			●	●	●		●
	15 m (49 ft) lattice extension folded to the side	●	●	●	●	●	●	●
	6.6 t counterweight attached to the turntable		●	●	●	●		
	7.6 t counterweight attached to the turntable	●					●	●
	3-sheave hook block in storage box[1)]					●		

1) The weight of the hook blocks is based on the information in this operating manual; ➠ p. 1 - 10.

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Tyres
525/80 R25

Also be aware of the effects on the axle loads when towing a trailer; ➠ p. 5 - 81.

		Driving mode						
		1	2	3	4	5	6	7
Equipment	525/80 R25 tyres	✔	✔	✔	✔	✔	✔	✔
	Drive 6 x 4 x 6	✔	✔	✔			✔	✔
	Drive 6 x 6 x 6				✔	✔		
	Towbar coupling			✔	✔	✔	✔	✔
	Retarder				✔	✔	✔	✔
	Auxiliary hoist installed		✔	✔				
Rigging mode	525/80 R25 spare wheel on rear	●				●	●	●
	3 -sheave hook block attached to the bumper[1)]					●		
	1 -sheave hook block attached to the bumper[1)]	●	●	●	●		●	
	Hook tackle hung on the bumper[1)]							●
	15 m (49 ft) lattice extension folded to the side	●	●	●			●	●
	6.6 t counterweight attached to the turntable	●	●	●	●	●	●	●
	3-sheave hook block in storage box[1)]	●						
	1-sheave hook block in storage box[1)]							●
	Contents of the storage box 200 kg (441 lbs)						●	

1) The weight of the hook blocks is based on the information in this operating manual; ➠ p. 1 - 10.

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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 specified 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)
385/95 R 25[1] / 10 (145.0)	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)
445/95 R 25 / 9 (130.5) **525/80 R 25 / 7 (101.5)**	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)
[1] Michelin X-Crane 9 bar (130.5 psi)		

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6.2 Weighing the truck crane

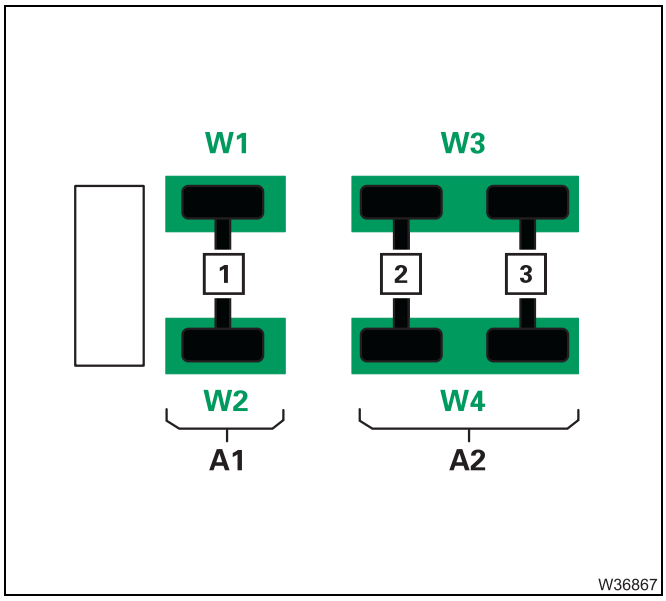
Weighing error

The most precise method for determining the total weight of the GMK3060 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 manual 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 GMK3060 has two coupled axle groups (**A1** to **A2**) and you will require four wheel load scales (**W1** to **W4**).

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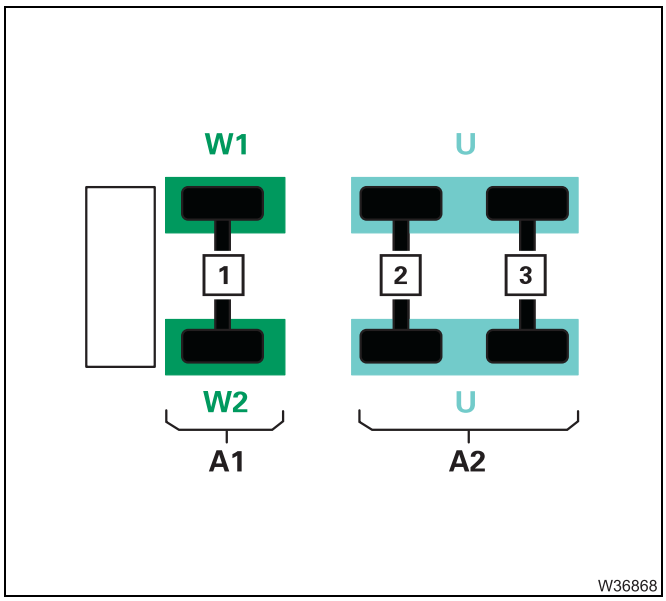
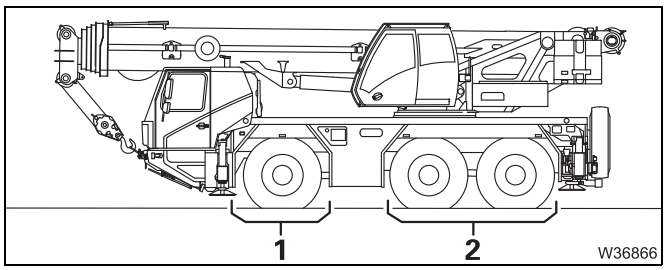


– Determining the axle loads

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 substructure **U** which has the same height as the scales **W1** and **W2**.

Axle groups



GMK3060

– Axle group **1**	1st axle line
– Axle group **2**	2nd + 3rd axle lines

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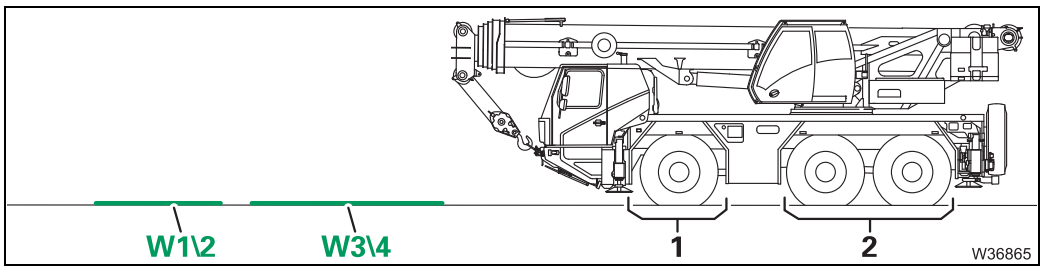
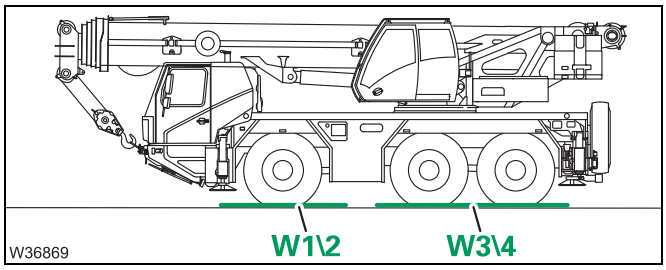
Weighing procedure



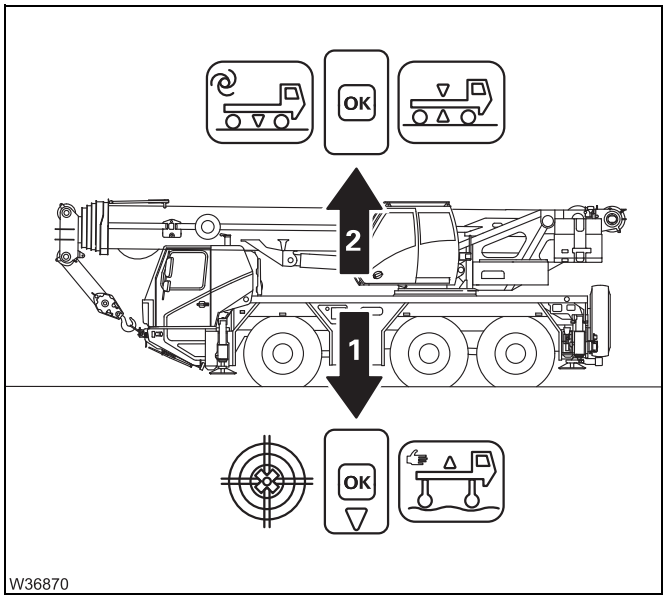
Perform the weighing procedure only with the crane truck standing on solid and horizontal ground! All scales must be at the same height!

- Position the scales **W1** to **W4** (or the necessary substructure) 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 substructure), 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 - 16.
- **(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.

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Evaluation

In the example shown you receive four weighing results. Assume you had made a note of the values listed here.

Passenger side:	W1 = 5.8 t, W3 = 11.8 t
Driver's side:	W2 = 5.8 t, W4 = 11.8 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 four results.

Passenger side:	W1 + W3 = 5.8 t + 11.8 t =	**17.6 t**
Driver's side:	W2 + W4 = 5.8 t + 11.8 t =	**17.6 t**
	Total weight =	**35.2 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.

Example for the 3rd 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 =	11.8 t
Driver's side:	W4 =	11.8 t
Weight of axle group 2 =		**23.6 t**

– Determine the axle load of the 3rd axle line.

  Axle group 2 has 2 axle lines.

  - Divide the weight of the axle group by the number of axle lines.

$$\textbf{Axle load} = \frac{\text{Weight of axle group 2}}{\text{Number of axle lines}} = \frac{23.6\ \text{t}}{2} = \textbf{11.8 t}$$

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7 Transport

Transport should be carried out only by qualified heavy transport companies whose personnel are well-acquainted with loads of these dimensions and weights.

7.1 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 load bearing 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.

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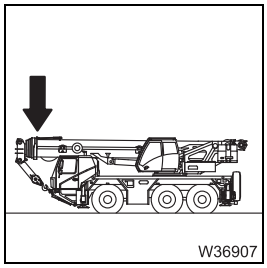
7.1.1 CHECKLIST: checks before transport

This checklist is not a complete operating manual. There are accompanying operating instructions which are indicated by cross-references.
Observe the warnings and safety instructions there!



1. For on-road driving without a dolly

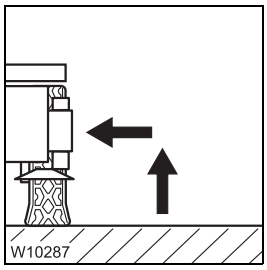
– All telescopic sections are interlocked; the telescoping cylinder is locked with telescopic section I.

– The boom must be resting in the boom rest.

– The slewing gear must be switched off; ➠ p. 11 - 126.

– The superstructure must be locked ➠ p. 11 - 18.

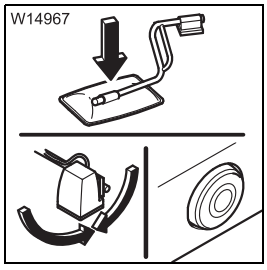
– The counterweight must be unrigged according to the driving mode; ➠ p. 6 - 1, ➠ p. 12 - 51.



2. On the outriggers

– All outrigger beams must be fully retracted and secured to prevent extension; ➠ p. 12 - 31.

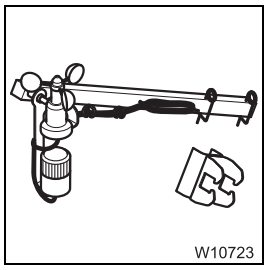
– The outrigger pads are in the driving position ➠ p. 12 - 37.



3. All mirrors for crane operation are folded in/removed; ➠ p. 12 - 105.

All spotlights are switched off and swivelled (if possible) so that no other drivers will be blinded by reflection; ➠ p. 11 - 134.

The lighting on the outrigger must be switched off; ➠ p. 12 - 30.



4. The anemometer and air traffic control light must be removed; ➠ *Anemometer and air traffic control light*, p. 12 - 101.

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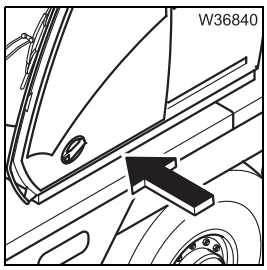
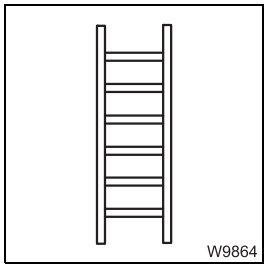
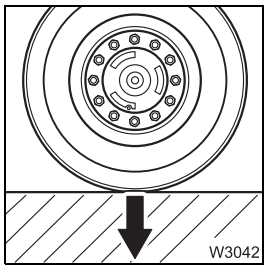


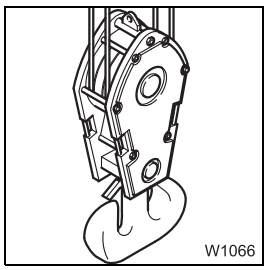
5. The step at the crane cab must be retracted; ➠ p. 12 - 112.



6. All ladders are secured; ➠ p. 3 - 77.



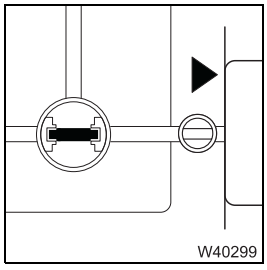
7. The detachable equipment parts must be stripped down so that they fulfil the regulations of the country in which you are working as regards permissible weights and axle loads, lengths, widths, height, etc.
All additional parts which may be transported must be secured against falling down.



8. The hook block is

– attached to the bumper; ➠ p. 12 - 77 or

– unreeved; ➠ *Unreeving the hoist rope*, p. 12 - 88.



9. The transverse differential locks must be switched on; ➠ p. 5 - 56.

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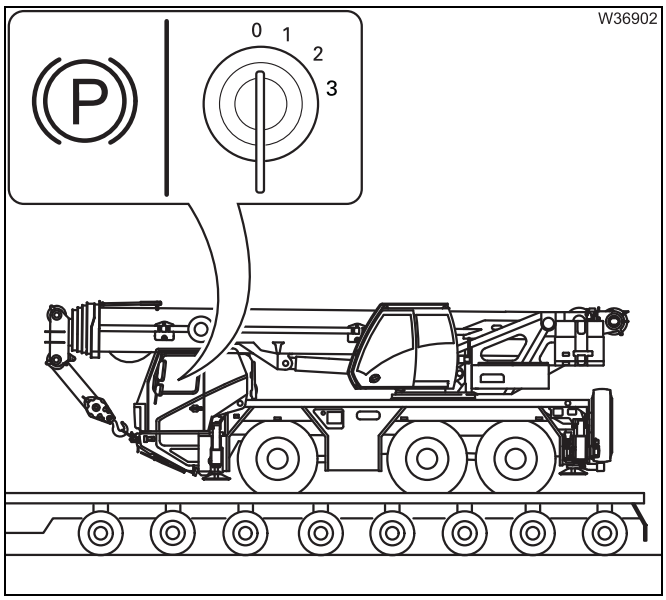
7.1.2 Driving the truck crane on to the transport vehicle and lashing down

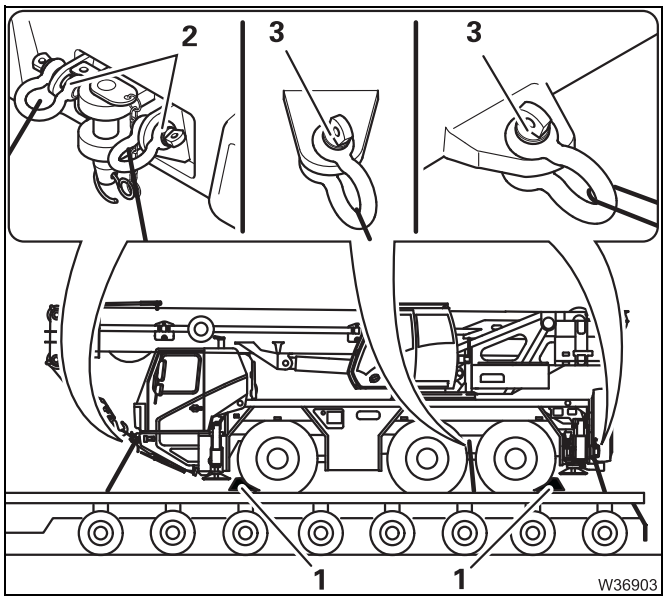
Risk of accidents due to inadequate field of vision!
Always have a banksman on hand to help when driving onto a transport vehicle. Maintain eye contact or radio contact with the banksman at all times while driving on to the transport vehicle. This helps ensure that you do not drive on to the transport vehicle at an angle, resulting in the truck crane falling off the transport vehicle.

Risk of accidents due to falling parts!
Use only suitable lifting gear with sufficient load bearing capacity and use only the slinging points provided.



Driving on

- Drive the truck crane onto the trailer. Apply the parking brake immediately, and switch the engine off.
- Close all the doors.



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.

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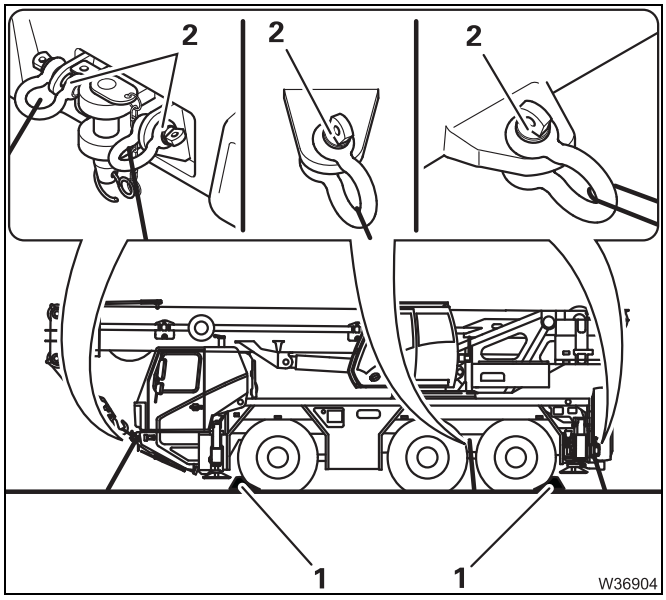
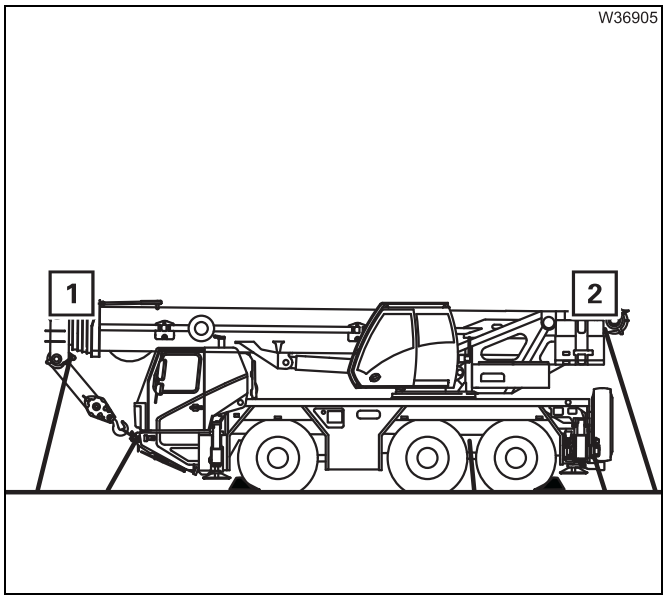
7.2 Transport by ship

Risk of accidents due to falling parts!
Use only suitable lifting gear with sufficient load bearing capacity and use only the slinging points provided.



- Secure the truck crane with the chocks (**1**).
- Fasten the lifting gear to the slinging points (**2**) on both sides. Ensure that no attachments, cables or hoses are damaged in this process.



Additional slinging points are usually necessary when the truck crane is transported on a ship. Ensure that the specified values are not exceeded when doing this.

- If necessary, use additional points as slinging points.

  1 Main boom head: 50 daN

  2 Main hoist: 50 daN

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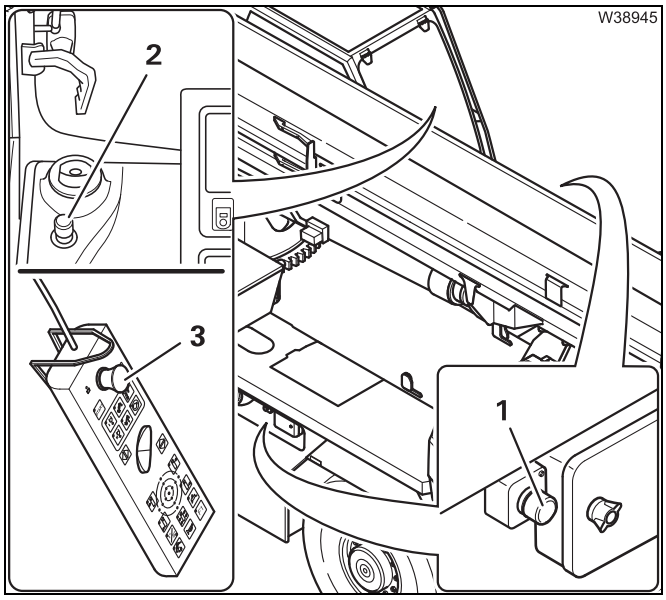
8 Malfunctions in driving mode

8.1 Emergency stop switch



Four emergency stop switches are provided for emergencies.

1 At the carrier – always active

2 In the crane cab – always active

3 Only active after the start of the engine with the hand-held control – in addition to (**1**) and (**2**)

- Press an active emergency stop switch.
  – The switch latches.
  – The engine switches off.

After activating an emergency stop switch;
➠ *Resetting the emergency stop switch*, p. 4 - 20.

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.

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8.2 What to do when malfunctions occur

8.2.1 Procedure in the event of a malfunction in road traffic

If the truck crane can no longer be driven due to an accident or another malfunction, observe the following:

- Keep calm!
- Brake 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 danger areas (e.g. tunnels, intersections, motorway bridges), even simple repairs can be dangerous.
When in a danger 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 the truck crane*, p. 8 - 29.

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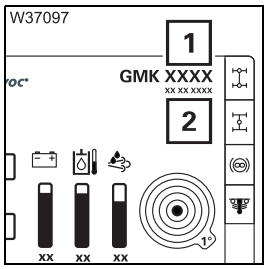
8.3 Warning and error messages

- Always note down the number of the program version and the serial number after a malfunction occurs before contacting **Manitowoc Crane Care**.



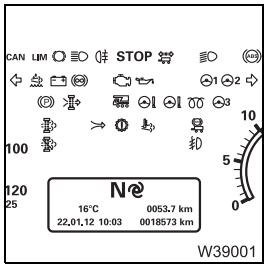
The crane type (**1**) and the serial number (**2**) are shown in the start menu.

The program version is displayed in the crane cab; ➠ p. 14 - 3.

8.3.1 Warning and 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.

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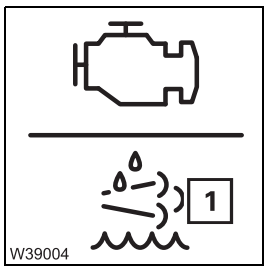


Engine malfunction early warning

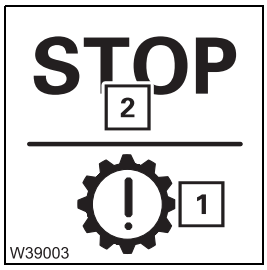
- Note the error messages at the next interruption in driving and have the malfunction corrected as soon as possible; ➠ *Error messages on the CCS display*, p. 8 - 16.

If the lamp (**1**) also lights up; ➠ *AdBlue warning*, p. 8 - 6.

Engine malfunction warning

- Stop the truck crane as quickly as possible while observing the traffic situation and switch off the engine. Further messages are displayed on the instrument panel; ➠ p. 8 - 19.

If the lamp (**1**) also lights up; ➠ *AdBlue warning*, p. 8 - 6.

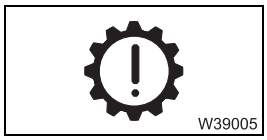


Transmission malfunction warning

If lamps (**1**) and (**2**) light up, there is a serious transmission malfunction.

- Stop the truck crane as quickly as possible while observing the traffic situation and switch off the engine.
- Switch off the ignition and wait about 15 seconds, then switch it on again.

If the lamps (**1**) and (**2**) remain lit then **driving any further is not permitted –** contact **Manitowoc Crane Care**.



Transmission malfunction

A transmission malfunction has been detected. Note the warning messages on the *CCS* display; ➠ *Error messages on the CCS display*, p. 8 - 16.

If no error messages are displayed then perform the troubleshooting checks; ➠ *Malfunctions in the transmission*, p. 8 - 22.

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**.

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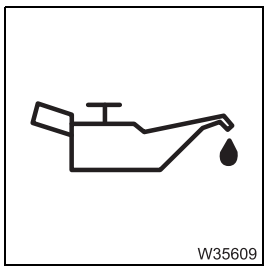
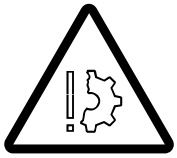


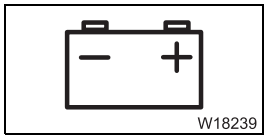
Oil pressure too low

A warning buzzer sounds and the lamp 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 is still displayed, contact **Manitowoc Crane Care**.



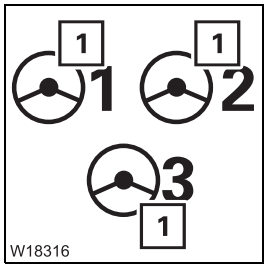
Risk of damage to the engine if the oil pressure drops!
Switch off the engine as soon as possible and look for the cause if the lamp lights up or the warning buzzer sounds!
Never restart the engine before you have found the cause and eliminated the problem.



Carrier voltage too low

- Stop the truck crane as quickly as possible while observing the traffic situation and switch off the engine.

Actual voltage display; ➠ p. 4 - 15.



Steering circuit warning

Malfunction in the associated steering circuit 1, 2 or 3 (emergency steering pump).

- Stop as quickly as possible, taking account of the current traffic situation.
- Switch the engine off.

Risk of accidents if the steering circuits fail!
If one or more lamps light up, 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 a couple minutes.

If oil has leaked out

- Warn any vehicles on the road behind you.
- Do not continue driving. Contact **Manitowoc Crane Care**.

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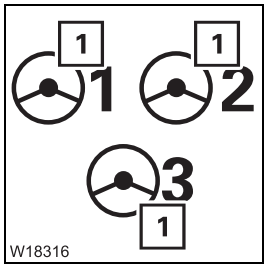
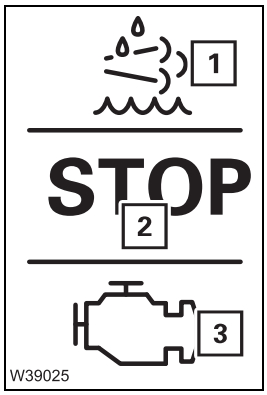
If no oil has leaked out

- Check the hydraulic oil level; ➠ *Maintenance manual*.
- Start the engine.



– If all 3 lamps (**1**) light up
  - Switch the engine off. Contact **Manitowoc Crane Care**.

– If **at least** 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**.



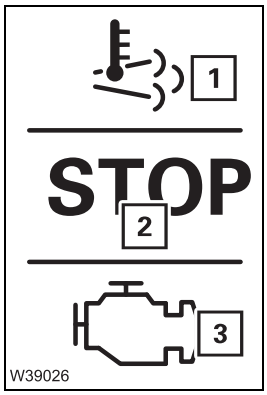
AdBlue warning

1 – Lights up: AdBlue (DEF) supply is exhausted or there is a malfunction in the exhaust system

– Flashing: Torque reduction early warning or
Torque reduction active – additional indication on lamps (**2**) and (**3**).

– Gone out: AdBlue (DEF) supply is sufficient, there is no malfunction in the exhaust system

➠ *AdBlue (DEF) tank*, p. 4 - 7
➠ *Torque reduction*, p. 5 - 45
➠ *Overriding torque reduction*, p. 5 - 48



Exhaust system temperature too high

Always lights up when during exhaust gas cleaning; ➠ p. 5 - 49.
May light up briefly under heavy loads, independently of any cleaning procedure.

- If the lamp remains lit after reducing the load and a cleaning procedure is not being performed then check the warning lamps (**1**) and (**3**) and check if a corresponding error message is present; ➠ *Engine malfunctions*, p. 8 - 19.

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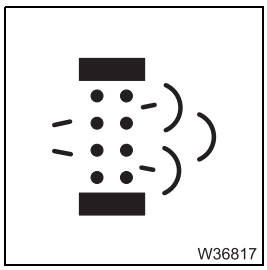


Exhaust system cleaning required

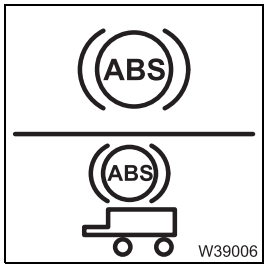
– The lamp lights up

The automatic exhaust gas cleaning has not been carried out in time.

- Manually start the cleaning procedure as soon as possible to prevent further error messages from occurring; *Manual cleaning*, p. 5 - 50.

– The lamp flashes

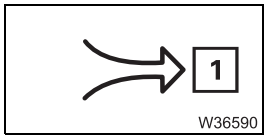
Information message – a cleaning procedure is being performed.



ABS warning
Trailer ABS warning

– Lights up while driving
ABS controls the braking operation; *ABS system*, p. 5 - 37.

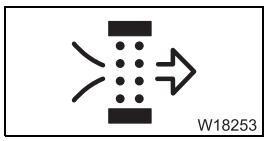
– Lights up during standstill
The associated ABS system is defective, and the wheels will no longer be prevented from blocking. The full braking force is retained;
Service brake malfunctions, p. 8 - 24



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; p. 4 - 21.

A warning message is also shown on the *CCS* display; p. 8 - 15.



Replace the air filter

The air filter is soiled, *Maintenance manual*.

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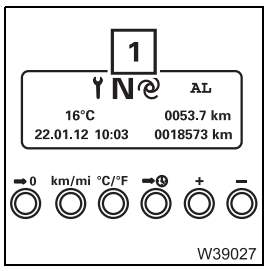
8.3.2 Warning messages on the driving mode display



The *Driving mode* display shows transmission warning messages in the area (**1**).

Transmission error messages are shown on the *CCS* display; ➠ p. 8 - 16

Error messages

Service symbol (1)
It is possible to continue driving. However, depending on the type of error, there may be restrictions in *Automatic* operating mode or you can only shift the transmission in *Manual* operating mode. Have the transmission checked as soon as possible.

Entry, error message (1)
The entry displays the error messages.

– Entry (1)
- Drive on until you have a chance to stop.
- Switch off the ignition and wait about 15 seconds, then switch it on again.

If **–** continues to be shown and the transmission does not shift, then contact **Manitowoc Crane Care**.

– Entry FP (1)
- Bring the accelerator to neutral position.

If **FP** continues to be shown, stop the truck crane, observing the traffic situation.

In this case, no further driving is possible – contact **Manitowoc Crane Care**.

– Entry HT (1)
- Release the accelerator after 30 seconds at the latest in order to prevent overheating of the coupling.

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– Entry CW

Brief error message – clutch wear

If the entry **CW** is displayed (approx. 10 seconds after switching on the ignition), then contact **Manitowoc Crane Care**. Repairs will be necessary in the near future.

– Entry AL

The supply pressure is insufficient.

- Top up the supply pressure, ➠ p. 5 - 9.

If **AL** is still displayed, check the compressed air system on the truck crane.

– Entry CL

- Release the accelerator after 30 seconds at the latest in order to prevent overheating of the coupling.

– Entry NS

- Shift to position **N**.

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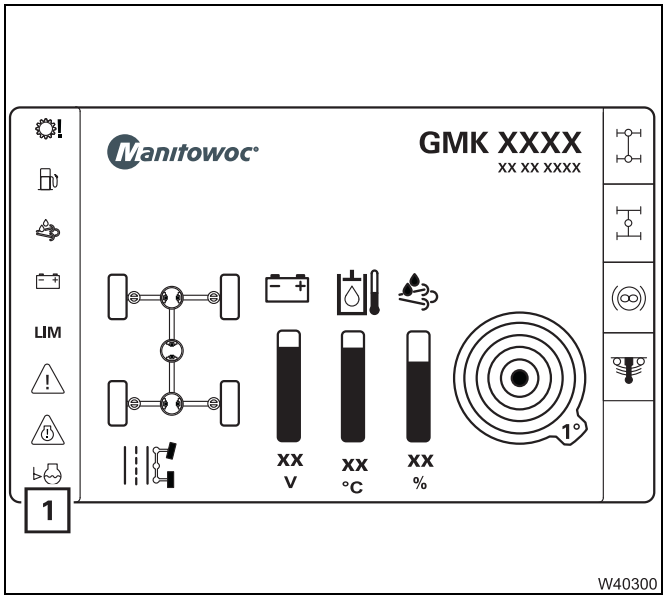
8.3.3 Warning messages on the CCS display



A warning message indicates that certain values do not correspond to a target value

If CCS detects a warning or a fault then a symbol is displayed in the display area (**1**).

Meaning of the symbols

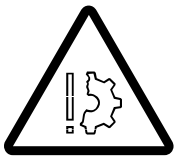
The colour of the symbols indicates whether a warning or malfunction message is active in the corresponding area.

– 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 not observed!
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.

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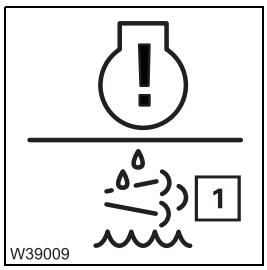
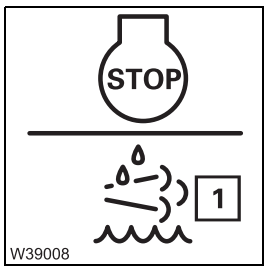


Engine malfunction early warning

- Note the error messages at the next interruption in driving and have the malfunction corrected as soon as possible; ➠ *Error messages on the CCS display*, p. 8 - 16.

If the symbol (**1**) is additionally displayed; ➠ *AdBlue warning*, p. 8 - 12.



Engine malfunction

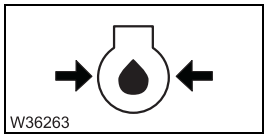
- Stop the truck crane as quickly as possible while observing the traffic situation and switch off the engine. Further messages are displayed on the instrument panel; ➠ p. 8 - 19.

If the symbol (**1**) is additionally displayed; ➠ *AdBlue warning*, p. 8 - 12.

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**.



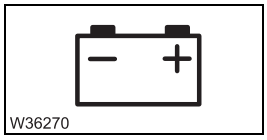
Oil pressure too low

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*.
- If the oil level is correct then start the engine and check the warning messages that are present.

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!

13.12.2018



Voltage monitoring

The voltage in the carrier electrical system is too low.

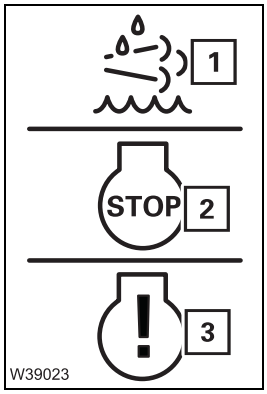
- Stop the truck crane as quickly as possible while observing the traffic situation and switch off the engine.

Actual voltage display; ➠ p. 4 - 15.

Hydraulic oil too hot

The hydraulic oil temperature is higher than 80 °C (176 °F).
Display of the current temperature; ➠ p. 4 - 15.
Possible cause and remedy; ➠ p. 8 - 25.

Risk of overheating!
There is a fault if the hydraulic oil temperature exceeds 80 °C (176 °F). Stop the truck crane at the next opportunity and try to find the cause.
Stop the truck crane immediately and switch off the engine if the temperature of the hydraulic oil rises to over 100 °C (212 °F)!



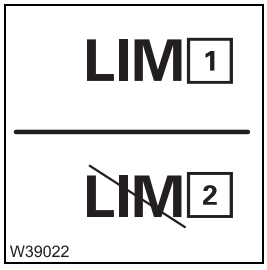
AdBlue warning

1 – Lights up: AdBlue (DEF) supply is exhausted or there is a malfunction in the exhaust system

– Flashing: Torque reduction early warning or
Torque reduction active – additional indication on lamps (**2**) and (**3**)

– Gone out: AdBlue supply is sufficient, no malfunction in the exhaust system

➠ *AdBlue (DEF) tank*, p. 4 - 7
➠ *Torque reduction*, p. 5 - 45
➠ *Overriding torque reduction*, p. 5 - 48



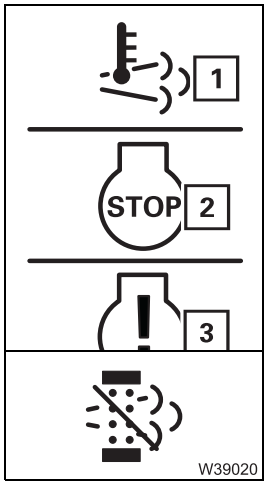
Torque reduction indicator display

1 Torque reduction on

2 Torque reduction overridden

➠ *Overriding torque reduction*, p. 5 - 48

13.12.2018



Exhaust system temperature too high

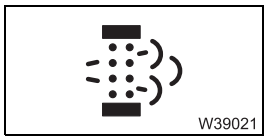
The lamp (**1**) always lights up when during exhaust gas cleaning; ➠ p. 5 - 49.
May light up briefly under heavy loads, independently of any cleaning procedure.

- If the lamp remains lit after reducing the load and a cleaning procedure is not being performed then check if the warning lamps (**2**) and (**3**) are lit and check if a corresponding error message is present; ➠ *Engine malfunctions*, p. 8 - 19.

Exhaust system cleaning disabled

Automatic and manual cleaning have been disabled.

Enable the cleaning procedure as soon as you have left the danger area; ➠ *Cleaning the exhaust system*, p. 5 - 49.



Exhaust system cleaning required

– The lamp lights up

The automatic exhaust gas cleaning has not been carried out in time.

- Manually start the cleaning procedure as soon as possible to prevent further error messages from occurring; ➠ *Manual cleaning*, p. 5 - 50.

– The lamp flashes

Information message – a cleaning procedure is being performed.

Refuelling

The fuel tank is filled only to a level of about 5%.

- Refuel before the fuel is used up; ➠ p. 4 - 5.

If the fuel tank is almost empty, air will be sucked in and you will have to bleed the fuel system; ➠ *Maintenance manual*.

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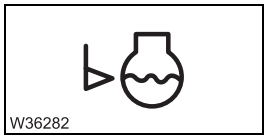


Coolant level too low

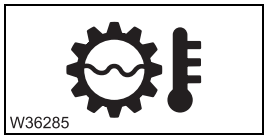
Immediately top up the coolant so that the engine does not overheat;
➠ *Maintenance manual*.

Coolant too hot

The engine coolant temperature is higher than approx. 95 °C.
Display of the current temperature; ➠ p. 10 - 8.
Possible cause and remedy; ➠ p. 8 - 19.

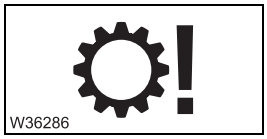
Transmission retarder too hot

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.



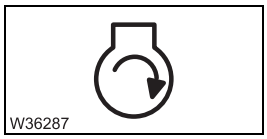
Gear oil too hot

- Stop the truck crane at the next opportunity and try to find the cause;
  ➠ *Malfunctions in the transmission*, p. 8 - 22.



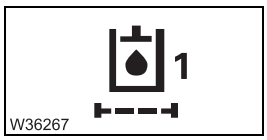
Transmission error

- Stop the truck crane at the next opportunity and try to find the cause;
  ➠ *Malfunctions in the transmission*, p. 8 - 22.



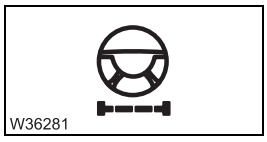
Permissible engine speed exceeded

- Brake the truck crane.



Change the engine oil filter

- Replace the engine oil filter as soon as possible; ➠ *Maintenance manual*.



Changing the steering circuit oil filter

- Replace the steering circuit oil filter as soon as possible;
  ➠ *Maintenance manual*.

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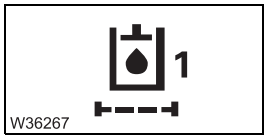
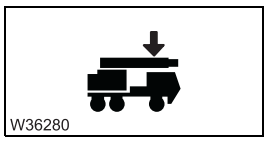


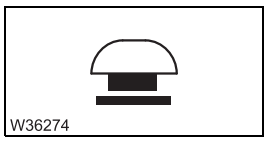
Replacing the hydraulic oil filter

Replace the corresponding hydraulic oil filter as soon as possible;
➠ *Maintenance manual*.



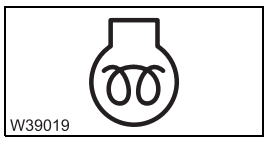
Main boom not set down

The main boom has not been set down in the boom rest; the specified vehicle height for the on-road level is exceeded; ➠ *Checking the vehicle height*, p. 5 - 8.



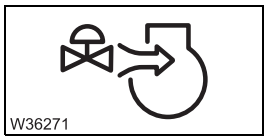
Emergency stop switch actuated

➠ *Resetting the emergency stop switch*, p. 4 - 20.



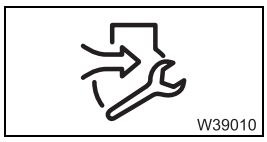
Flame start system indicator lamp

Lights up when switching on the ignition, goes out when the engine has been pre-heated; ➠ *Starting the engine*, p. 4 - 12.



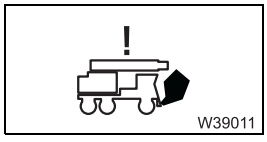
Air intake inhibitor triggered

The air intake inhibitor has been triggered because the maximum permissible engine speed was exceeded or an emergency stop switch has been actuated. It is only possible to start the engine after opening the air intake inhibitor;
➠ p. 4 - 21.



Air intake inhibitor – Performing a function check

Symbol yellow/red – function check due/overdue; ➠ *Maintenance manual*.



Driver's cab not locked

- Lock the driver's cab before commencing driving;
  ➠ *Tilting/lowering the driver's cab*, p. 8 - 39.

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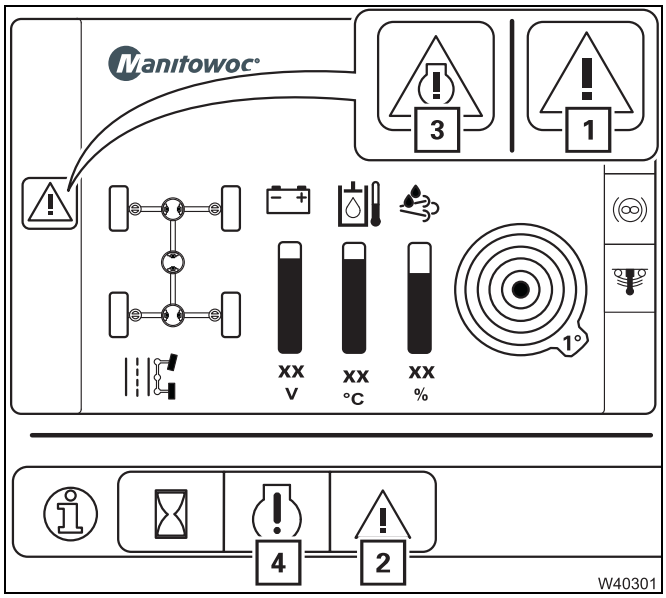
8.3.4 Error messages on the CCS display

Risk of accidents!
The crane control system may only be repaired by properly qualified personnel.

- If an error message occurs, stop while taking the traffic situation into consideration; ➠ *Procedure in the event of a malfunction in road traffic*, p. 8 - 2.



The symbol (**1**) or (**3**) flashes when the CCS has detected an error. The symbols flash alternately when both error types are present.

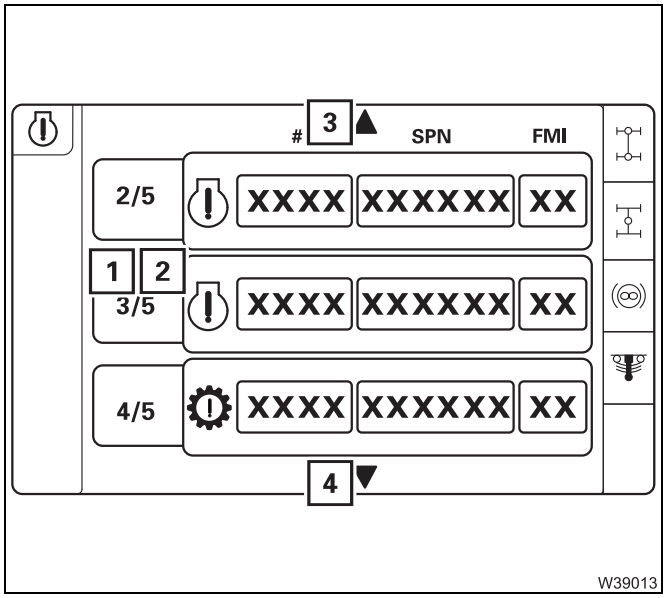
(1) – Crane operation error

The buzzer tone sounds once.

- Open the *Crane operation error* menu (**2**).
  For the subsequent procedure; ➠ p. 14 - 8.

(3) – Engine/transmission error

- Switch off the engine immediately.
- Open the *Engine/transmission 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:
– Error **3** is shown
– A total of **5** errors are pending.

Displaying errors

- Select and confirm the symbol (**3**) or (**4**) to show any additional errors.

  3 Next error

  4 Previous error

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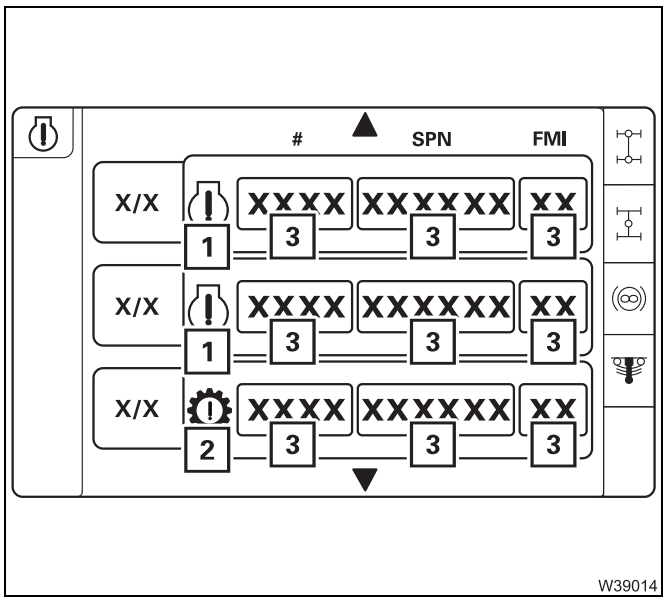


Error message display

For each error the display shows:

– The error code (**3**)

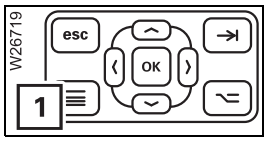
– The symbols for the faulty components:

1 Engine

2 Transmission

- Always note the error code before contacting **Manitowoc Crane Care**.

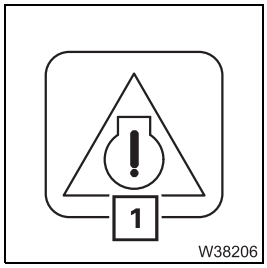
Exiting the menu



You can exit the *Engine errors* menu at any time.

- Press the button (**1**) once.

  The next highest menu is opened.



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.

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8.4 Troubleshooting

8.4.1 Engine malfunctions

In addition to this information; ➠ *Separate engine manufacturer's operating manual*.

Malfunction		Cause	Solution
Engine does not start – Starter does not turn		Battery master switch is switched off	Switch on the battery master switch; ➠ p. 4 - 9
		Switch the ignition off	➠ *Switching the ignition on*, p. 4 - 9
		Transmission not in neutral position	➠ *Switching the transmission to the neutral position*, p. 5 - 26
		Parking brake released	Apply the parking brake; ➠ p. 5 - 52
		Fuse F1/1, F1/2 blown	Replace blown fuses; ➠ p. 8 - 43
		Emergency stop switch pressed	Reset emergency stop switch; ➠ p. 4 - 20
Engine does not start – Starter turns		Batteries insufficiently charged	Charge the batteries; ➠ *Maintenance manual*
The lamp does not light after the ignition is switched on when the engine is cold		Fuse F6/8 blown	Replace blown fuses; ➠ p. 8 - 43
The truck crane drives at a maximum of 20 km/h (12 mph)		A locking procedure is not yet completed	Lock the differential locks or steering
Coolant temperature too hot – the symbol is displayed.		Coolant level too low	Top up coolant; ➠ *Maintenance manual*
		Oil level in the transmission too low	Check the oil level; ➠ *Maintenance manual*
		Outer surface of heat exchanger dirty	Clean the heat exchanger
		V-belt of coolant pump at engine loose	Tighten V-belt; ➠ *Separate engine manufacturer's operating manual*

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Malfunction		Cause	Solution
Engine cannot be switched off using the ignition key		Malfunction in the electronics	Switch off the engine with the emergency stop device; ➠ p. 8 - 1
Engine/transmission diagnostics plug not working		Fuse F1/5, F6/6 blown	Replace blown fuses; ➠ p. 8 - 43
The engine performance is reduced		The motor output is reduced due to an increase in the coolant temperature.	Wait until the coolant has cooled down and the motor output increases again
	LIM	Torque reduction activated – AdBlue (DEF) level too low	➠ *AdBlue (DEF) tank*, p. 4 - 7 ➠ *Overriding torque reduction*, p. 5 - 48
	LIM	Torque reduction activated – malfunction in the exhaust system	Observe the warning lights and follow the instructions; ➠ *System malfunction*, p. 5 - 46
		Due to a malfunction, the power is continuously reduced. The engine is not switched off however, in order to drive on to the next place where it is possible to stop.	**Manitowoc Crane Care** must be notified ➠ *Error messages on the CCS display*, p. 8 - 16

 For more information; ➠ *Warning messages on the CCS display*, p. 8 - 10.

For versions with the dual tank

Malfunction	Cause	Solution
Fuel supply cannot be switched over	Fuel supply cannot be switched over	Replace blown fuses; ➠ p. 8 - 43
Engine does not start – Starter turns	Dual tank empty	1. Refuel; ➠ p. 4 - 5
		2. Bleed the fuel system; ➠ *Maintenance manual* ➠ Operating manual of the engine manufacturer

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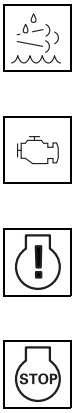
8.4.2 Faults on the Adblue (DEF) system

Malfunction		Cause	Solution
AdBlue (DEF) system not working		Fuse F6/8 blown	Replace blown fuses; ➠ p. 8 - 43
Symbols light up/are displayed		Various	➠ *AdBlue warning*, p. 8 - 12

For more information; ➠ *Warning messages on the CCS display*, p. 8 - 10.

8.4.3 Differential lock malfunctions

Malfunction	Cause	Solution
Differential locks cannot be switched on	Current speed above about 5 km/h (3 mph)	Slow down or stop the truck crane
	Drive train under tension	Drive the truck crane slowly back and forth ➠ p. 5 - 56
	Compressed air system insufficiently filled	➠ *building supply pressure*, p. 5 - 9
	Control unit fuse blown	Replace blown fuses; ➠ p. 8 - 43
Differential locks cannot be switched off	Current speed above about 5 km/h (3 mph)	Slow down or stop the truck crane
	Drive train under tension	Drive the truck crane slowly back and forth ➠ p. 5 - 56

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8.4.4 Malfunctions in the transmission

Malfunction		Cause	Solution
Transmission only shifts up to 2nd Shift up – the symbol is displayed		Gear oil too hot	Switch to the neutral position and wait until the gear oil has cooled down
		Gear oil colder than about -7 °C (20 °F)	Wait until gear oil temperature rises
Transmission is not upshifting at speeds over about 20 km/h (12 mph)		A locking procedure is not yet completed	Switch off differential locks; ➠ p. 5 - 57
Transmission not shifting – the symbol is displayed/ lights up		Retarder switched on	➠ *Switching off the additional brakes*, p. 5 - 43
		ABS system defective	Have the ABS system checked by **Manitowoc Crane Care** or an authorised GROVE retailer or an authorised specialised repair shop.
The transmission does not respond to the controls		Fuse F1/6 blown	Replace blown fuses; ➠ p. 8 - 43
		Transmission cannot shift down as otherwise the maximum permissible engine speed would be exceeded.	Braking the truck crane
Driving display indicates a malfunction		The electronic gear system has detected a malfunction	➠ *Warning messages on the driving mode display*, p. 8 - 8
Transmission diagnostics plug not working		Fuse F1/5, F6/5, F6/6 blown	Replace blown fuses; ➠ p. 8 - 43

For more information; ➠ *Warning messages on the CCS display*, p. 8 - 10.

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8.4.5 Steering malfunctions

Malfunction		Cause	Solution
Steering wheel hard to turn, grating noises when steering		Oil level in the hydraulic oil tank too low	Check the hydraulic oil level; ➠ *Maintenance manual*. Then drive at low speed to the nearest repair shop and have the cause checked
One or more lamps light up		Steering circuit failure	Stop and perform required inspections; ➠ *Steering circuit warning*, p. 8 - 5.
Separate steering cannot be activated		Current speed above about 5 km/h (3 mph)	Slow down or stop the truck crane
Separate steering cannot be switched off		Current speed above about 5 km/h (3 mph)	
Separate steering not working		Control unit fuse blown	Replace blown fuses; ➠ p. 8 - 43

For more information; ➠ *Warning messages on the CCS display*, p. 8 - 10.

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8.4.6 Service brake malfunctions

Malfunction		Cause	Solution
Lights up while driving or does not go out after the engine is started		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)	Top up the compressed air supply at the filler connection; ➠ p. 8 - 29 If necessary, have the truck crane towed; ➠ p. 8 - 29
Parking brake unable to be released		Supply pressure too low	➠ *building supply pressure*, p. 5 - 9
The retarder cannot be engaged		Fuse F7/4 blown	Replace blown fuses; ➠ p. 8 - 44

For more information; ➠ *Warning messages on the CCS display*, p. 8 - 10.

8.4.7 Malfunctions on the suspension

Malfunction		Cause	Solution
Suspension cannot be activated		Current speed above about 5 km/h (3 mph)	Slow down or stop the truck crane
		Compressed air system insufficiently filled	➠ *building supply pressure*, p. 5 - 9
The suspension does not respond to the controls		Control unit fuse blown	Replace blown fuses; ➠ p. 8 - 43
Suspension not working		Suspension is switched off	➠ *Switching on the suspension*, p. 5 - 17

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8.4.8 Malfunctions of the level adjustment system

Malfunction	Cause	Solution
Level adjustment system not working	Suspension is switched off	➠ *Switching on the suspension*, p. 5 - 17
	Control unit fuse blown	Replace blown fuses; ➠ p. 8 - 43

8.4.9 Malfunctions in the hydraulic system/hydraulic oil cooler

Malfunction		Cause	Solution
Hydraulic oil temperature above 80 °C (176 °F), fan in the hydraulic oil cooler running		Hydraulic system is heavily loaded	Stop the truck crane while taking the traffic situation into account and run the engine until the oil has cooled down
Hydraulic oil temperature above 80 °C (176 °F), fan in the hydraulic oil cooler not running		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; ➠ *Maintenance manual*

For more information; ➠ *Warning messages on the CCS display*, p. 8 - 10.

8.4.10 Malfunctions in the CCS control unit

➠ *Malfunctions on the CCS/RCL control units*, p. 14 - 25.

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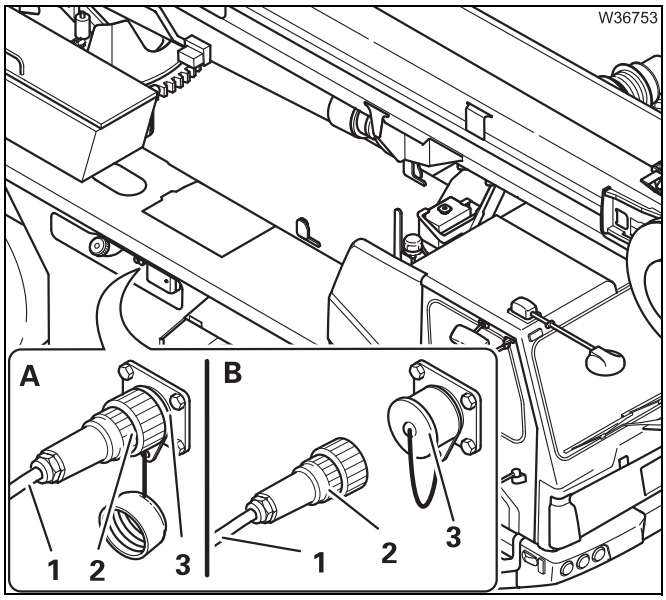
8.5 Emergency operation and breakdown assistance

8.5.1 Externally starting the truck crane



- Start the engine of the auxiliary vehicle.
- (**A**) – Connect the cable (**1**) to the power supply (24 V) of the auxiliary vehicle.
- Insert the plug (**2**) in the socket (**3**).
- Start the truck crane engine.

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

- (**B**) – Unplug 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).

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8.5.2 Battery charger

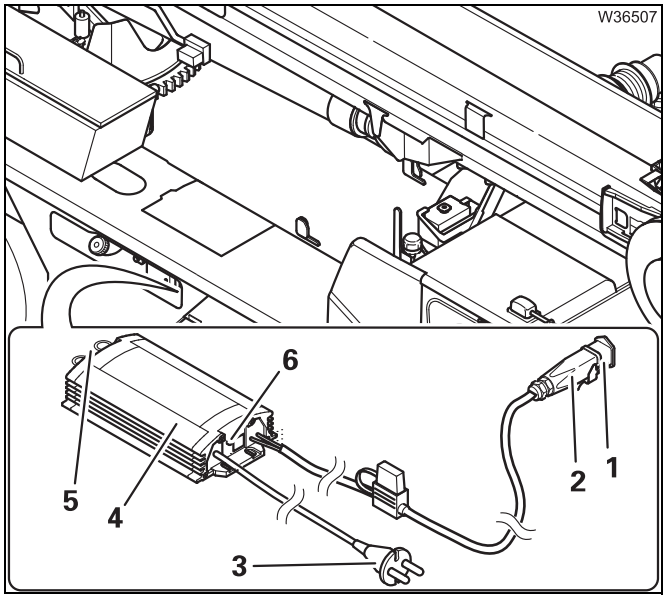
Prerequisites

– 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 (for example, 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

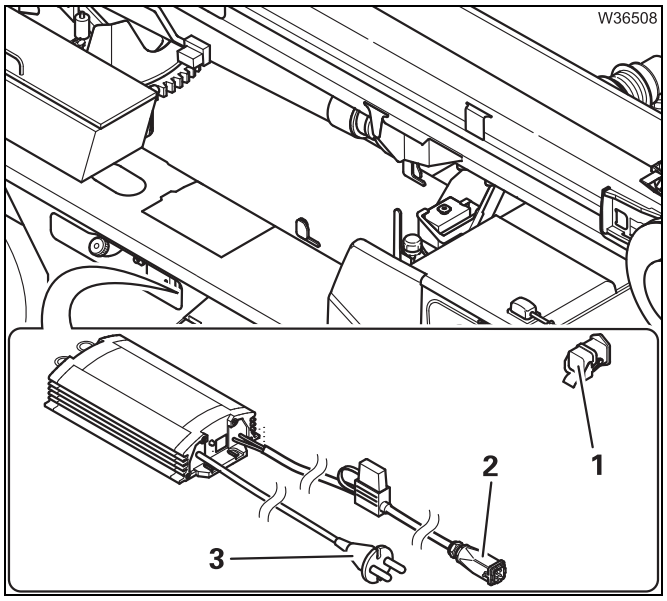
- Insert the plug (**2**) in the socket (**1**).
- Place the battery charger (**4**) in a protected place where you can see the indicator lamp (**6**).

  The battery charger can be suspended from the ring eyes (**5**).
- Insert the plug (**3**) into the socket on the mains supply 230 V at the location.

The battery charger switches on. The lamp (**6**) on the battery charger indicates the status:

– **Flashing:** The battery is being charged

– **Lights up:** Charging complete



Separating

- Withdraw the plug (**3**) from the socket.
- Take out the plug (**2**) from the socket (**1**).
- Close the socket (**1**).
- Return the battery charger to the storage compartment in the driver's cab.

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8.5.3 Towing the truck crane

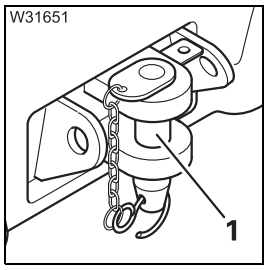
Observe the following if the truck crane has to be towed away:

– 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 total 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.

– 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 tensile 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 danger area in the event of damage to the engine or transmission.

Risk of damage to the drive train!
Always perform all the measures indicated in this section before towing away. Tow the truck crane at a maximum speed of 7 km/h (4 mph) and over a distance of max. 100 m (330 ft). 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.

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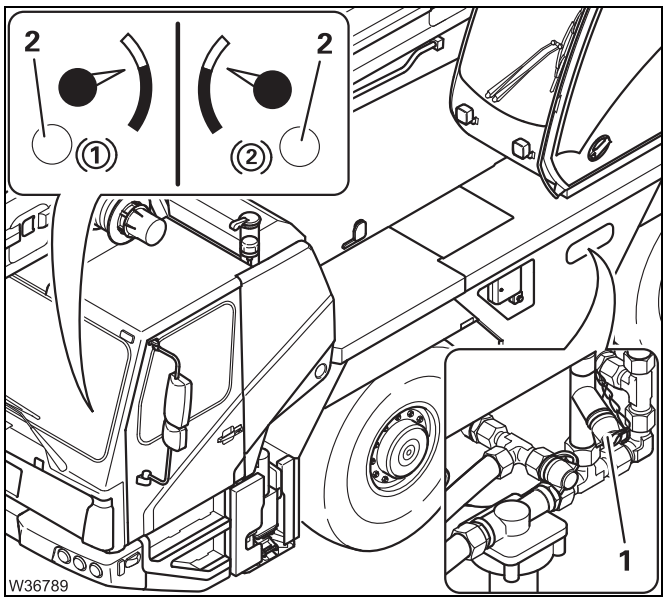
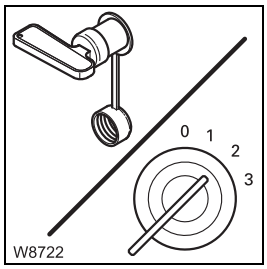


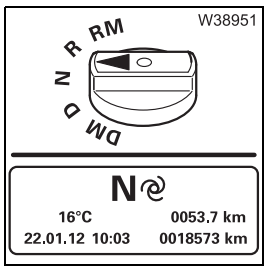
- Connect the filler connection (**1**) with the *Supply* coupling head of the towing vehicle.

A supply pressure of at least 6 bar (87 psi) must be displayed and the lamps (**2**) must not light up in the driver's cab when towing.



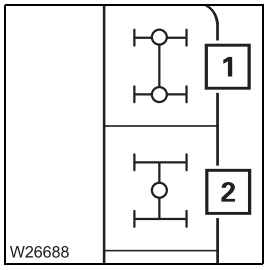
Electric power supply

- Switch on the battery master switch.
- Switch on the ignition.



On the transmission

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



Axle drives

- Switch off all differential locks.

The symbols (**1**) and (**2**) must be **green**,

– Transverse differential locks ➠ p. 5 - 56,

– Longitudinal differential lock; ➠ p. 5 - 56.

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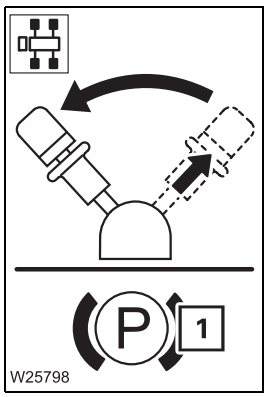

Parking brake

- Release the parking brake.
  The lamp (**1**) must go out.

If the lamp 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 supply pressure*, p. 5 - 9.

If the lamp (**1**) does not go out, there is a malfunction on the parking brake system. 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 danger area after consulting **Manitowoc Crane Care**.

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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 danger 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 7 km/h** (4 mph).
- Ensure that the towing distance does not exceed **100 m** (330 ft).

Longer towing distances

If a vehicle with automatic transmission is to be towed for a distance **greater than 100 m** (330 ft) you must disconnect the Cardan shaft between the transfer case and transmission.

- Contact **Manitowoc Crane Care**, if you need to tow the truck crane further than **100 m** (330 ft).

Risk of accidents and damage when towing the truck crane long distances!
Tow the truck crane at a maximum speed of 7 km/h (4 mph) and for a maximum distance of **100 m** (330 ft). Additional measures must be taken for longer distances, contact **Manitowoc Crane Care**.

Tow starting

Tow starting is not possible for reasons related to the transmission.

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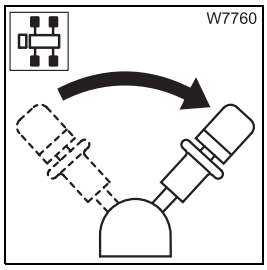
8.5.4 Wheel change

- 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.

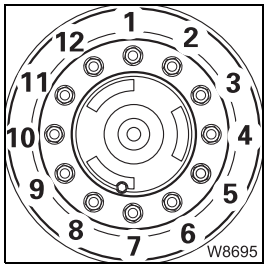


- Apply the parking brake.

Removing a damaged wheel

- Switch off the suspension; ➠ p. 5 - 17.
- 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 lug nuts (**1**) to (**12**) and remove the damaged wheel.
- Secure the wheel against falling over if you set it down temporarily.

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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.

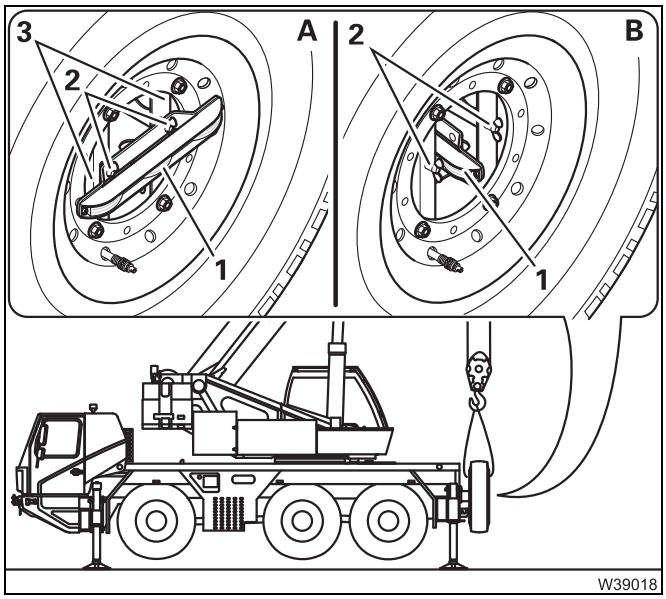
Danger of overturning if the truck crane is free-standing!
Always support the truck crane on outriggers before rotating the superstructure. Never operate the truck crane in the *Free on wheels* operating position if the tyres are damaged.

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 a rigged counterweight*, p. 12 - 76.

- Lift the spare wheel using only lifting gear with sufficient load bearing capacity; ➠ *Spare wheel*, p. 1 - 10.

Third brake light

If there is a third brake light, then you have to remove it before removing the wheel from the spare wheel holder. Before driving on the road, the brake light must be reattached.



– Removing

- (**A**) – Remove the nuts (**2**).
- (**B**) – Fit the brake light (**1**) into the holder.
- Undo the nuts (**2**).

– Installation

- (**B**) – Remove the nuts (**2**).
- (**A**) – Fit the brake light (**1**) onto the holder (**3**).
- Secure the brake light with the nuts (**2**).

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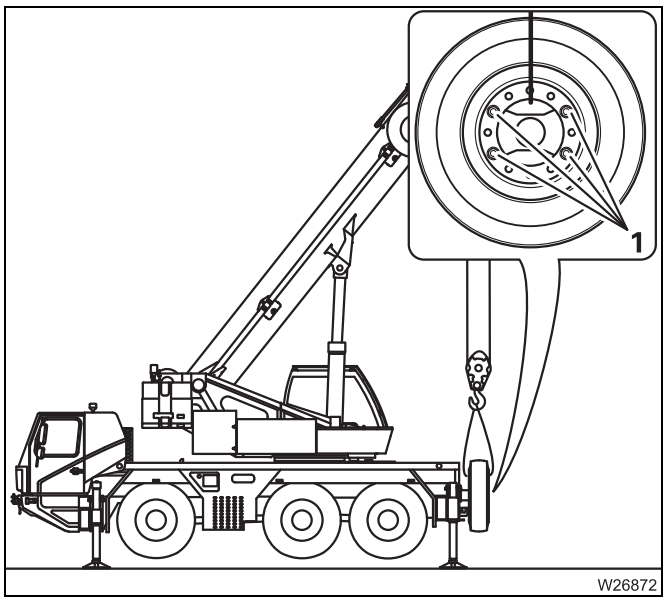

Removing a wheel

- Remove the nuts (**1**).
- Lift the spare wheel off the holder.
- Secure the spare wheel against falling over if you put it down temporarily.

Mounting a wheel

- Lift the wheel on to the holder.
- Secure the wheel with the nuts (**1**) and tighten them 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 supplied by **Manitowoc Crane Group Germany GmbH** or an approved 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.

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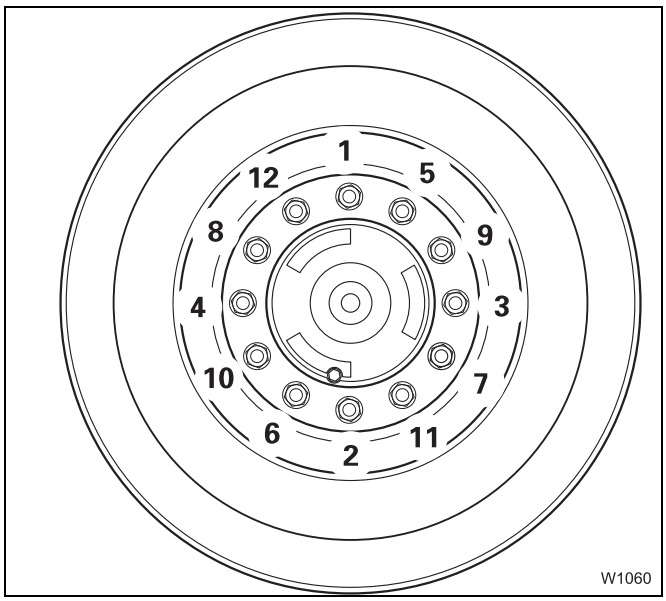

- Tighten the wheel nuts (**1**) and (**2**) finger-tight to secure the wheel.
- Tighten the remaining wheel nuts finger-tight.
- Always tighten the wheel nuts in the order (**1**) to (**12**).
  - Tighten all wheel nuts first to 200 Nm (150 lbf ft).
  - Then all wheel nuts to 400 Nm (300 lbf ft).
  - Finally tighten all wheel nuts to 650 Nm (480 lbf ft).

After 50 km (30 mi) and 150 km (90 mi) retighten all wheel nuts to 650 Nm (480 lbf ft).

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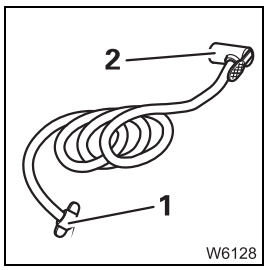
8.5.5 Inflating the tyres yourself

In an emergency, if an appropriate filling hose is available you can inflate the tyres using the compressed air system of the truck crane.
A tyre inflator connection set to a pressure of 10 bar (145 psi) is provided for this purpose. The tyres must not be filled above this maximum pressure.

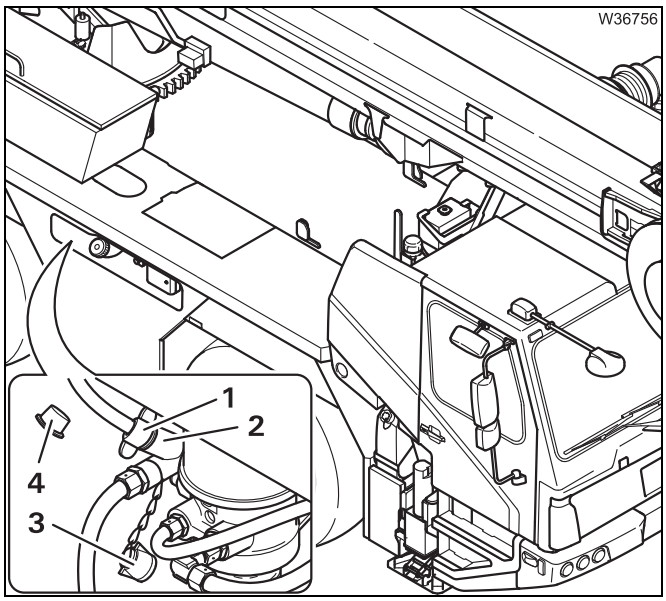
Risk of damage if the tyre pressure is too high!
Depending on the size of the tyres, the prescribed pressure may be less than 10 bar (145 psi); *Tyres*, p. 1 - 14. Fill the tyres no more than the specified pressure. Interrupt the filling procedure if necessary. This prevents the tyres becoming damaged 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.

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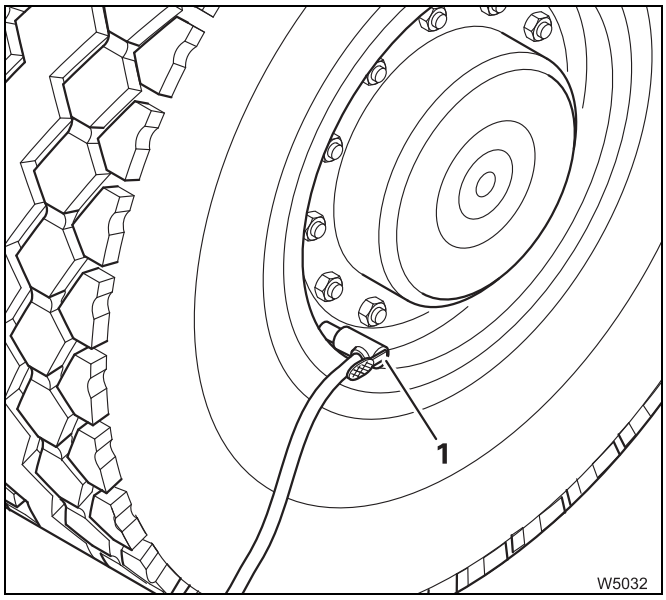
Inflating the tyres

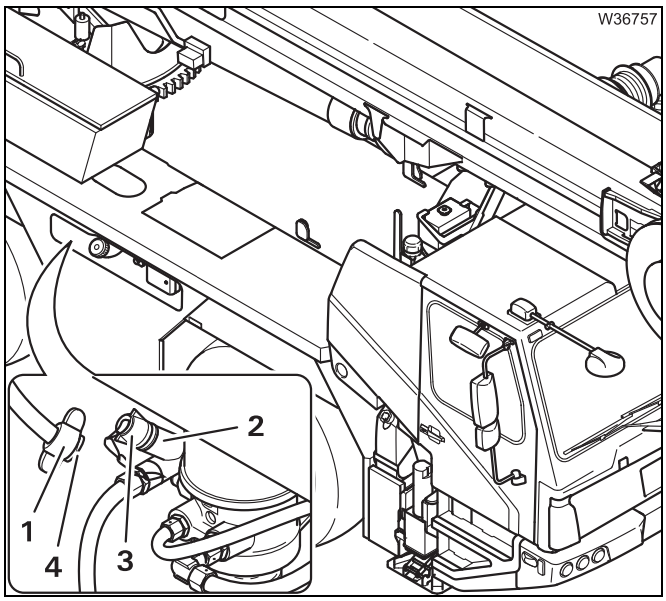
The maximum operation pressure of the compressed air system of 10 bar (145 psi) can only be reached with the engine running.



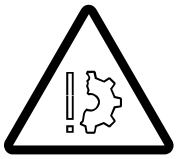
- Start the engine; p. 4 - 12.
- Fasten the tyre connection (**1**) to the tyre valve.
- Press the button on the tyre connection and inflate the tyre.
- Disconnect the tyre connection (**1**) from the tyre valve.

Remove the filling hose

Before driving, you must remove the tyre filling hose from the tyre inflator 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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8.6 Tilting/lowering the driver's cab

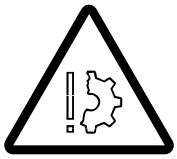
To tilt the driver's cab (e.g. for maintenance work), the main boom must be raised and the hoisting gear moved.
This assumes that the engine can be started.

If the engine cannot be started, you must use the hydraulic emergency operation to lift the main boom; ➠ p. 14 - 51.

8.6.1 Prerequisites and information on tilting

Before tilting the driver's cab, the following requirements must be met:

- The truck crane must be level.
- All loose objects must be removed from the driver's cab!
- The main boom is raised to the extent (about 1.5 m (4.9 ft)) that the driver's cab will not touch the main boom (nor the hose drum) when tilting!
- Ensure that the hook block is outside the driver's cab slewing range and the windscreen.



Risk of damage to the steering's universal joint!
The steering wheel may only be moved when the driver's cab is lowered and locked. When moving the steering wheel into other driver's cab positions, the steering's universal joint can be damaged.

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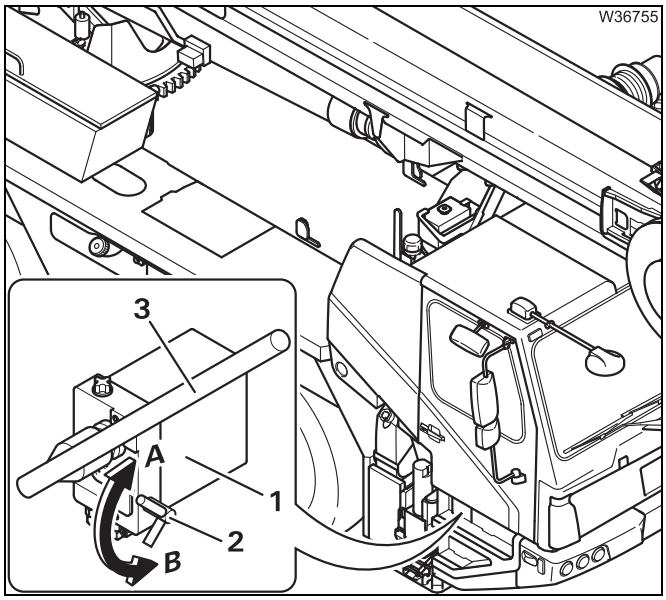
8.6.2 Tilting and lowering the driver's cab

Operating the hand pump

The driver's cab is tilted and lowered using a hand pump. The lever for the hand pump is below the seats or in the tool box.



You need the socket wrench provided (**3**) (wrench width 30 mm).

- Place the socket wrench on the hand pump (**1**).
- To **tilt** the driver's cab, turn the lever (**2**) upwards, to the **A** position.
- To **lower** the driver's cab, turn the lever (**2**) downwards, to the **B** position.

Before tilting the driver's cab, note the prerequisites specified at the beginning of the section; ➠ *Prerequisites and information on tilting*, p. 8 - 39.

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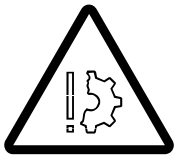
Tilting the driver's cab

- Remove all loose objects from the driver's cab. Close the doors.

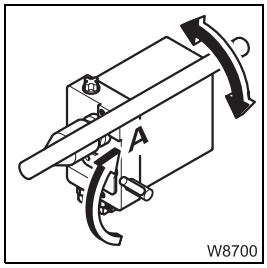
Risk of accidents from loose objects and doors swinging open!
Remove all loose objects (e.g. bottles) from the driver's cab so that they do not fall out when the cab is tilted. Close the doors!
This prevents e.g. liquids from getting into the instrument panels and doors from swinging open during tilting, thereby injuring people.

Risk of accidents due to driver's cab tilting!
When you are tilting the driver's cab forward and while it is actually tilted forward, no-one may be in front of the driver's cab.

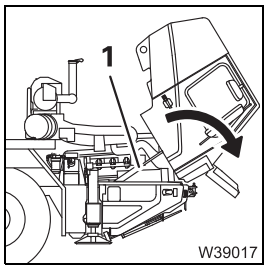


Risk of damage when the main boom angle is too small!
Only tilt the driver's cab when the main boom is sufficiently raised.
If you press the driver's cab against the main boom, the driver's cab may tear off at the pivot point and the steering will be damaged.

You cannot open the front flap when the driver's cab is tilted. If necessary, open the front flap before tilting the driver's cab.



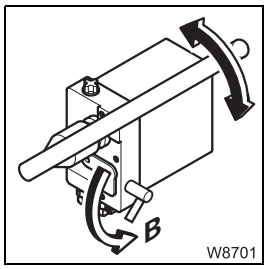
- Check that the lever (**2**) is pointing upwards (**A**).
- Pump with the socket wrench – the driver's cab locking system opens and the rear of the driver's cab is lifted up.



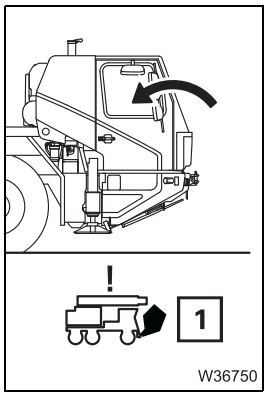
- Keep pumping, until the driver's cab tilts forwards over the pivot point and the lifting cylinder (**1**) is placed under tension.

Risk of accidents due to the driver's cab tilting back!
You may only stand under the tilted driver's cab when the lifting cylinder is placed under tension.

Lowering the driver's cab



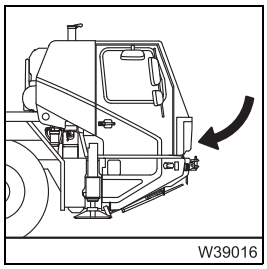
- Check that the lever (**2**) is pointing downwards (**B**).
- Pump with the socket wrench – the driver's cab is lowered.



- Lower the driver's cab to its end position.
- Continue to pump, until you feel a resistance – the driver's cab lock closes.
- Switch on the ignition and check that the symbol (**1**) has gone out.
- If necessary, lower the driver's cab further until the symbol (**1**) goes out.

Risk of accidents if the driver's cab is not locked!
Ensure that the driver's cab is locked afterwards every time it is lowered.
This prevents the driver's cab tilting forward when braking.

- Remove the socket wrench



- If necessary, close the front flap; ➠ *Front flap*, p. 3 - 75.

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8.7 Fuses on the carrier

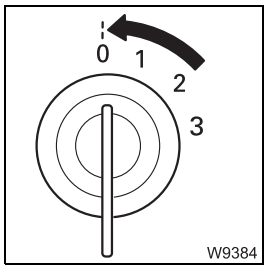
The fuses are divided into groups and are at various points on the carrier:

– In the driver's cab,

– In the battery box.

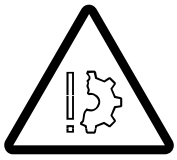
Notes on changing fuses

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. Notify **Manitowoc Crane Care** if a fuse with the same amperage blows again when the ignition is switched on.

Risk of fire!
Never repair a blown fuse with other electrically conductive materials.

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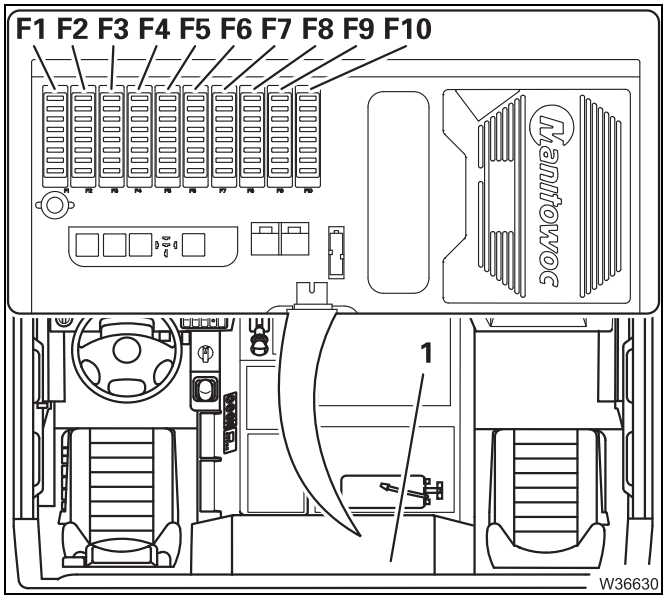
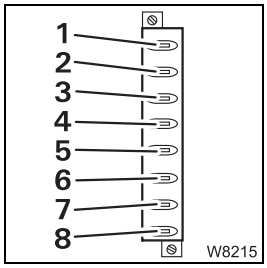
8.7.1 Fuses in the driver's cab



The driver's cab contains fuse groups **F1** to **F10**

- Remove the cover (**1**).

The following tables show the designations of the individual fuses, including their amperage and functions.



The designations 1 to 8 in the tables correspond to the order from top to bottom (fuse 1 is always the top fuse).

- Observe the instructions regarding fuse changes; p. 8 - 43.

Designation	Amperage (A)	Function
F1/1	10	Starter
F1/2	15	Control unit UB 2 CCM 11
F1/3	15	Control unit UB 1 CCM 11
F1/4	5	Ignition lock Engine start from the crane cab
F1/5	5	Engine/transmission diagnostics plug Hand-held control
F1/6	10	Electronic gear system control Transmission operating elements
F1/7	-	Unassigned
F1/8	-	Unassigned

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Designation	Amperage (A)	Function
F2/1	15	Control unit UB 1 IOL 31
F2/2	15	Control unit UB 1 IOL 31
F2/3	15	Control unit UB 2 IOL 31
F2/4	15	Control unit UB 2 IOL 31
F2/5	15	Control unit UB 1 IOL 32
F2/6	15	Control unit UB 1 IOL 32
F2/7	15	Control unit UB 2 IOL 32
F2/8	15	Control unit UB 2 IOL 32

Designation	Amperage (A)	Function
F3/1	15	Control unit UB 1 IOL 33
F3/2	15	Control unit UB 1 IOL 33
F3/3	15	Control unit UB 2 IOL 33
F3/4	15	Control unit UB 2 IOL 33
F3/5	10	ABS control unit
F3/6	10	AdBlue (DEF) heater
F3/7	15	Cigarette lighter, voltage transformer
F3/8	-	AdBlue (DEF) heater

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Designation	Amperage (A)	Function
F4/1	3	Cab lighting
F4/2	20	Dual tank switchover
F4/3	5	CCS display
F4/4	15	Fuel filter heating system
F4/5	15	Air intake inhibitor
F4/6	-	Unassigned
F4/7	-	Unassigned
F4/8	-	Unassigned

Designation	Amperage (A)	Function
F5/1	10	Radio
F5/2	15	AdBlue (DEF) heater Auxiliary heater
F5/3	20	Auxiliary heater
F5/4	15	Battery heater
F5/5	10	Fan
F5/6	5	Control unit auxiliary heater
F5/7	5	Tachograph
F5/8	5	Power supply relay

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Designation	Amperage (A)	Function
F6/1	5	Engine emergency stop switch Tachograph, instrument panel
F6/2	3	Control unit CCM 11 Control unit IOL 31/32/33
F6/3	3	CCS display Reversing camera Radio
F6/4	-	Unassigned
F6/5	10	Gearbox control
F6/6	5	Engine/transmission diagnostics plug
F6/7	3	Outrigger control panel left/right Inclination transmitter
F6/8	3	Engine electronic control system AdBlue (DEF) system Flame start system

Designation	Amperage (A)	Function
F7/1	3	Alternator
F7/2	10	auxiliary heater
F7/3	10	Dual tank
F7/4	15	Retarder
F7/5	5	Horn
F7/6	10	Power supply to the AdBlue (DEF) system
F7/7	10	Operating the mirror adjustment Window winder
F7/8	3	Brake circuits 1 and 2

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Designation	Amperage (A)	Function
F8/1	5	Central lubrication
F8/2	15	Windscreen wiper
F8/3	10	Trailer socket
F8/4	3	ABS ABS trailer
F8/5	10	Air-conditioning system coupling
F8/6	15	Blower heating system
F8/7	5	Steering coupling
F8/8	5	Air drier

Designation	Amperage (A)	Function
F9/1	2	Temperature gauge Fuel gauge
F9/2	2	Cruise control
F9/3		Unassigned
F9/4	-	Unassigned
F9/5	-	Unassigned
F9/6	-	Unassigned
F9/7	-	Unassigned
F9/8	-	Unassigned

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Designation	Amperage (A)	Function
F10/1	5	turn signal indicators Light switch
F10/2	5	Rotating beacon carrier/superstructure
F10/3	5	Parking light Side marker lights Side marker lights, front
F10/4	3	Instrument lighting
F10/5	5	Brake lights Trailer brake lights
F10/6	10	Light switch Warning blinkers
F10/7	-	Unassigned
F10/8	5	Reversing lamp

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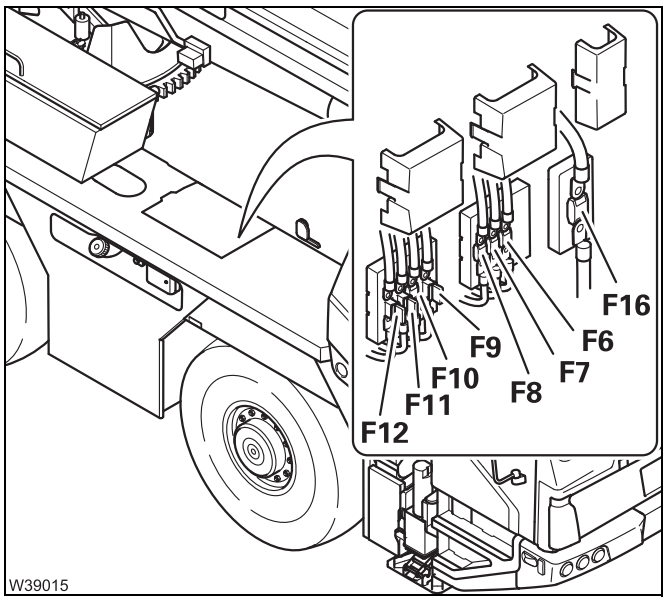
8.7.2 Fuses in the battery box

Fuses F7 to F16 are contained in the battery box.

Danger from lead and lead compounds on batteries!
Battery poles, 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 are in a terminal box in front of the batteries.

- Remove the lids from the terminal boxes.
- Observe the instructions regarding fuse changes; ➠ p. 8 - 43.

Designation	Amperage (A)	Function
F6	40	Carrier central fuse
F7	50	Carrier central fuse
F8	50	Superstructure central fuse
F9	20	Carrier central fuse
F10	20	Carrier central fuse
F11	30	Engine control system main fuse
F12	20	Battery charger connection
F16	150	Engine preheating

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9 Operating elements for crane operation

All operating elements for driving are described in Chapter 3.

9.1 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.

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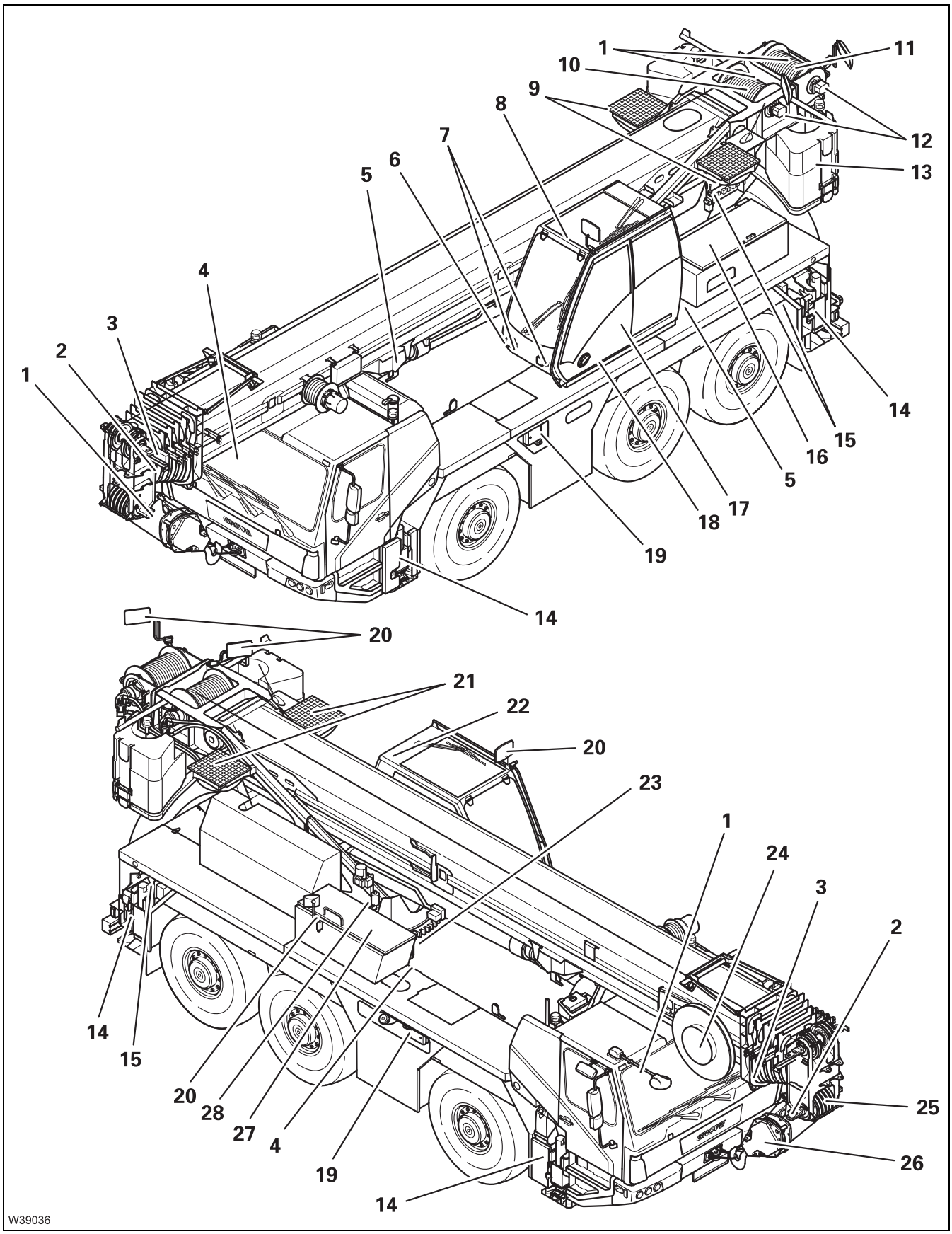
9.1.1 Exterior of the truck crane



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1 – Camera on main boom[1)] ➠ p. 12 - 106
– Camera on the hoists[1)] ➠ p. 12 - 109
– Camera on the driver's cab[1)] ➠ p. 12 - 109

2 – Lifting limit switch – function ➠ p. 11 - 88
– Installing/removing the lifting limit switch ➠ p. 12 - 95

3 Anemometer and air traffic control light[1)] ➠ p. 12 - 101

4 Using the slewable spotlights[1)] ➠ p. 11 - 134

5 Socket for hand-held control
– Hand-held control – Overview ➠ p. 9 - 82
– Emergency operation with the hand-held control ➠ p. 14 - 43

6 RCL override – Version A[2)]
– Key-operated switch for overriding the RCL in an emergency ➠ p. 9 - 137

RCL override – Version B[2)] ➠ p. 9 - 138
No function

7 Spotlights I[1)]
– Operating elements ➠ p. 9 - 8

8 *RCL* status display ➠ p. 11 - 67

9 Spotlights II[1)]
– Operating elements ➠ p. 9 - 8

10 Main hoist ➠ p. 9 - 108

11 Auxiliary hoist[1)] ➠ p. 9 - 110

12 Lowering limit switch ➠ p. 11 - 90

13 Counterweight ➠ p. 12 - 51

14 Outriggers
– Operation ➠ p. 12 - 27
– Lighting ➠ p. 12 - 30

15 – Hydraulic emergency operation with the hand pump ➠ p. 14 - 51
– Hydraulic emergency operation as per DGUV[1)] ➠ p. 14 - 57

1) Additional equipment

2) Version A or version B active depending on RCL programming

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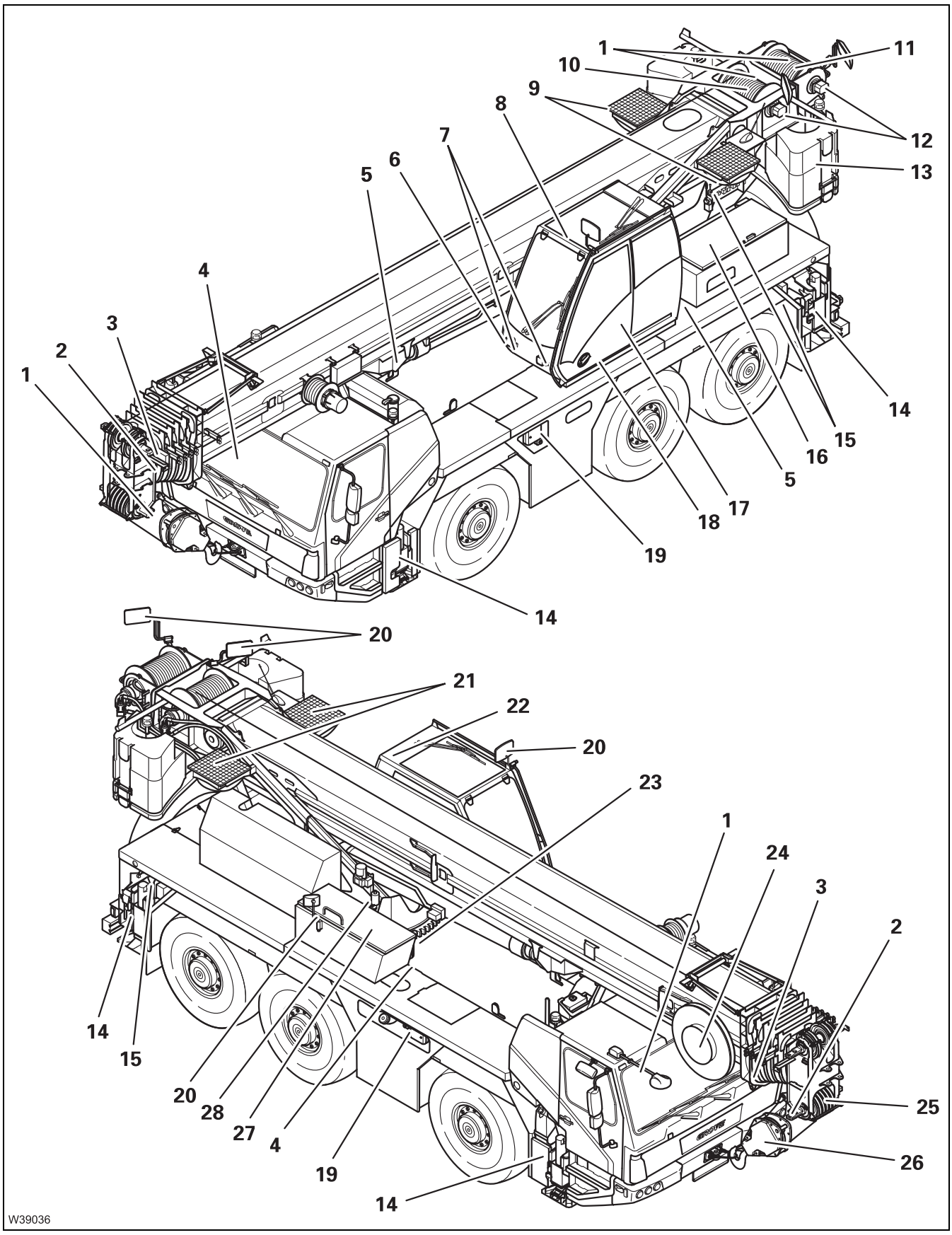
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16 Storage compartment
– Anemometer ➠ p. 12 - 101

17 Crane cab ➠ p. 9 - 6

18 Step at the crane cab Extendable/retractable ➠ p. 12 - 112

19 Outriggers:
– Control units[1)] ➠ p. 9 - 83
– Emergency stop switch ➠ p. 14 - 1

20 Mirror for crane operation ➠ p. 12 - 105

21 Hydraulic oil cooler, second cooler[1)]

22 CraneSTAR system ➠ p. 11 - 163

23 Crane cab heater fuel tank ➠ p. 11 - 5

24 Hose drum[1)]

25 Reeving and unreeving the hoist rope ➠ p. 12 - 82

26 – Hook block ➠ p. 12 - 77

27 Storage compartment[1)]

28 Slewing gear:
– Operation ➠ p. 11 - 121
– Turntable lock ➠ p. 9 - 123

[1)] Additional equipment

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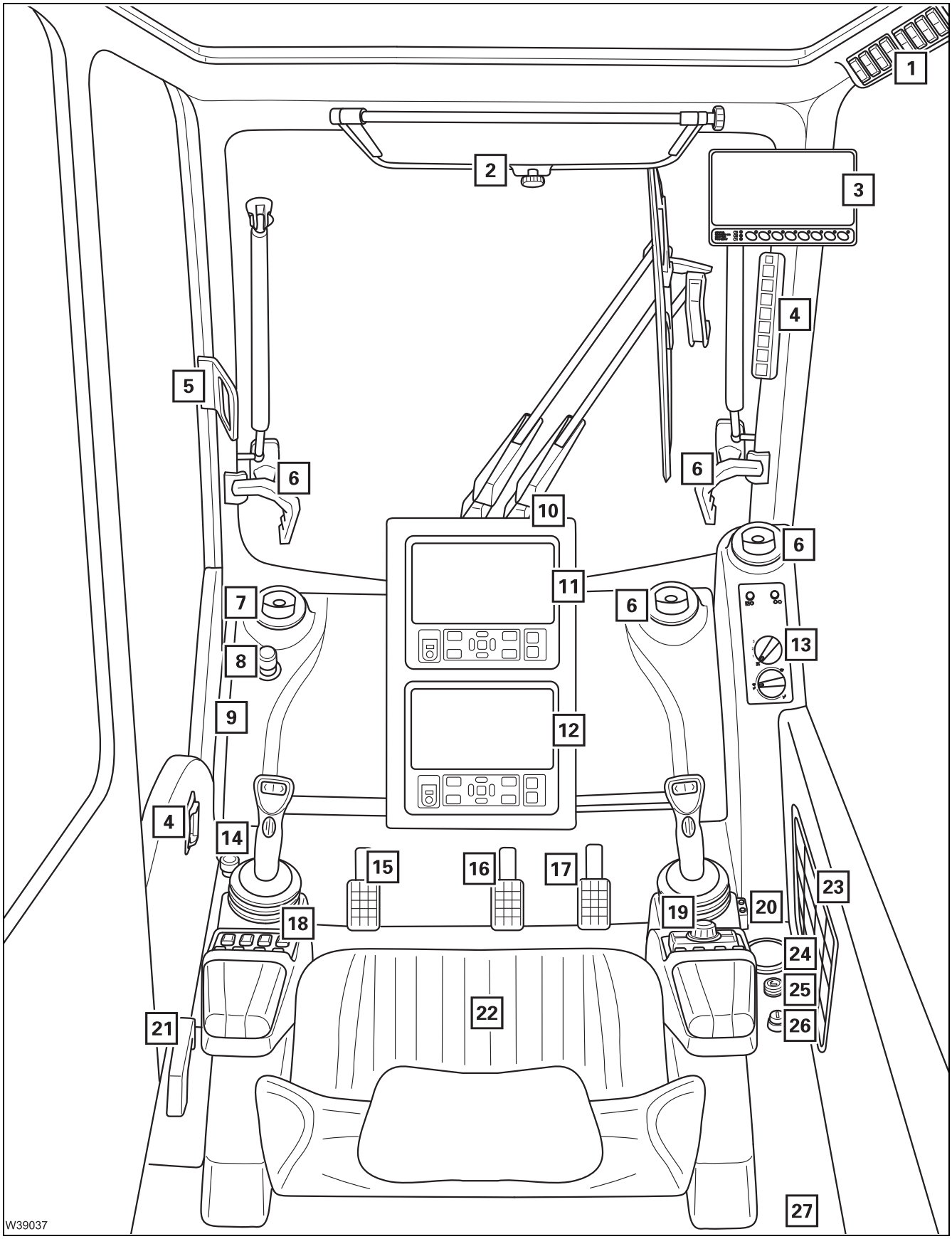
9.1.2 Crane cab



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1	Side panel	➠ p. 9 - 8
2	Sun visor	
3	Monitor[1)]	➠ p. 12 - 110
4	Current degree of utilization display[1)]	➠ p. 11 - 55
5	Door unlocking mechanism	➠ p. 9 - 147
6	Lock/unlock windows	➠ p. 9 - 146
7	Air vents	➠ p. 11 - 155
8	Emergency stop switch	➠ p. 9 - 98
9	Windscreen washing system tank[2)]	
10	Adjusting the front panel	➠ p. 11 - 10
11	RCL control unit (**R**ated-**C**apacity-**L**imiter)	➠ p. 9 - 76
12	CCS control unit	➠ p. 9 - 18
13	Heating/Air-conditioning system	➠ p. 9 - 17
14	Unlock step[1)]	➠ p. 12 - 112
15	– Brake pedal on slewing gear – switch on/off – Slewing gear brake pedal	➠ p. 11 - 121 ➠ p. 11 - 125
16	Service brake[1)]	➠ p. 9 - 154
17	Accelerator pedal	
18	Left-hand control panel	➠ p. 9 - 12
19	Right-hand control panel	➠ p. 9 - 13
20	Zoom lens operation[1)] (Camera on main boom)	➠ p. 12 - 110
21	Handle	
22	Crane cab seat Seat contact switch	➠ p. 11 - 8 ➠ p. 9 - 92
23	Rest	
24	Ashtray	
25	Cigarette lighter (24 volts)	
26	Ignition lock	➠ p. 9 - 89
27	Crane cab, rear	➠ p. 9 - 10

[1)] Additional equipment

[2)] ➠ *Maintenance manual*

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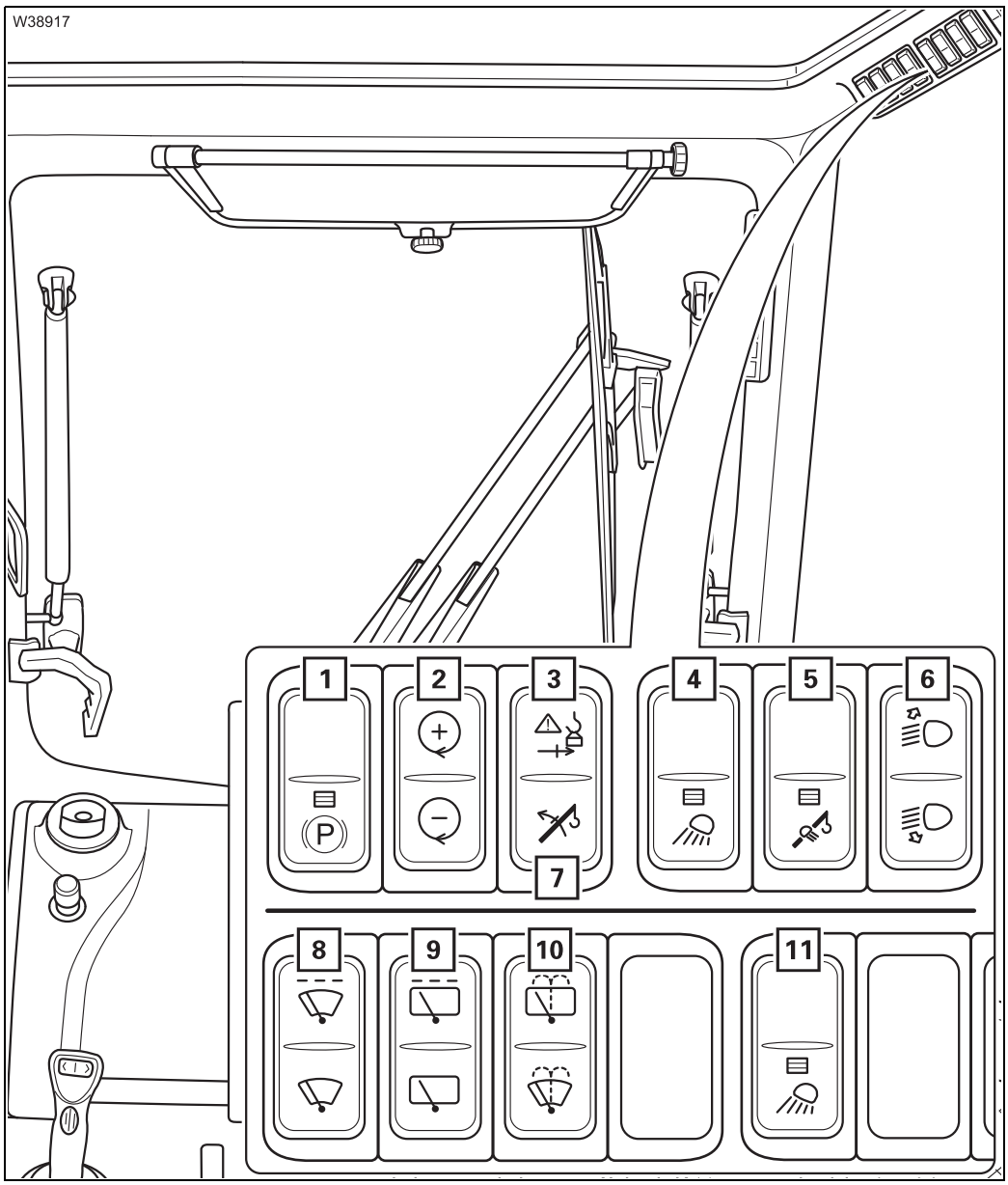
Side panel



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1 Applying/releasing the parking brake ➠ p. 9 - 155

2 – Starting the engine ➠ p. 9 - 89
– Setting idling speed ➠ p. 9 - 89

3 RCL override – Version A[2)]
– RCL override ➠ p. 9 - 137

RCL override – Version B[2)]
– Overriding the RCL in an emergency ➠ p. 9 - 138

4 Spotlights I on/off ➠ p. 9 - 140

5 Slewable spotlights on/off[1)] ➠ p. 9 - 141

6 Slewing the slewable spotlights[1)] ➠ p. 9 - 141

7 RCL override – Version A[2)]
– Raise enable button after RCL shutdown ➠ p. 9 - 115

RCL override – Version B[2)]
– No function ➠ p. 9 - 138

8 Windscreen wiper on/off ➠ p. 9 - 142

9 Roof window wiper on/off ➠ p. 9 - 142

10 Windscreen washing system ➠ p. 9 - 142

11 Spotlights II on/off ➠ p. 9 - 140

1) Additional equipment

2) Version A or version B active depending on RCL programming

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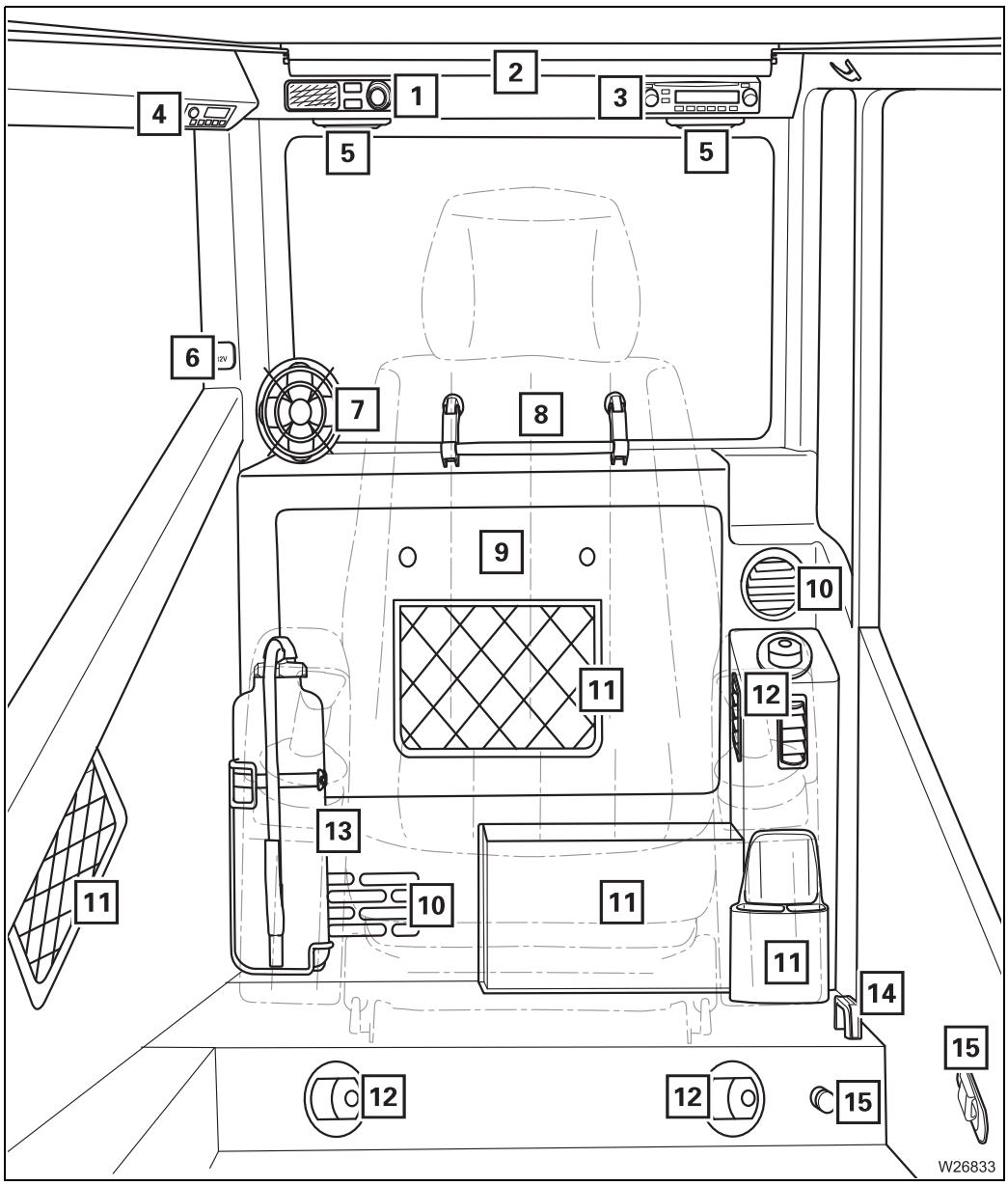
Crane cab, rear



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1 Cab lighting ➠ p. 9 - 141

2 Sun roller blind

3 Radio-CD/USB[1), 3)]

4 Heating system ➠ p. 9 - 17

5 Loudspeaker[1)]

6 Sockets 12 V ➠ p. 9 - 139

7 Fan with switch[1)]

8 Rear window ➠ p. 9 - 146

9 Cover, behind the cover: r
- Safety retainers ➠ p. 14 - 71
- Diagnostics ➠ p. 9 - 148
- CraneSTAR system[1)] ➠ p. 11 - 163

10 Intake/air vents ➠ p. 11 - 153

11 Rest

12 Air vents ➠ p. 11 - 155

13 Fire extinguisher[2)]

14 Handle

15 Door unlocking mechanism ➠ p. 9 - 147

1) Additional equipment

2) ➠ *Maintenance manual*

3) ➠ *Separate operating manual*

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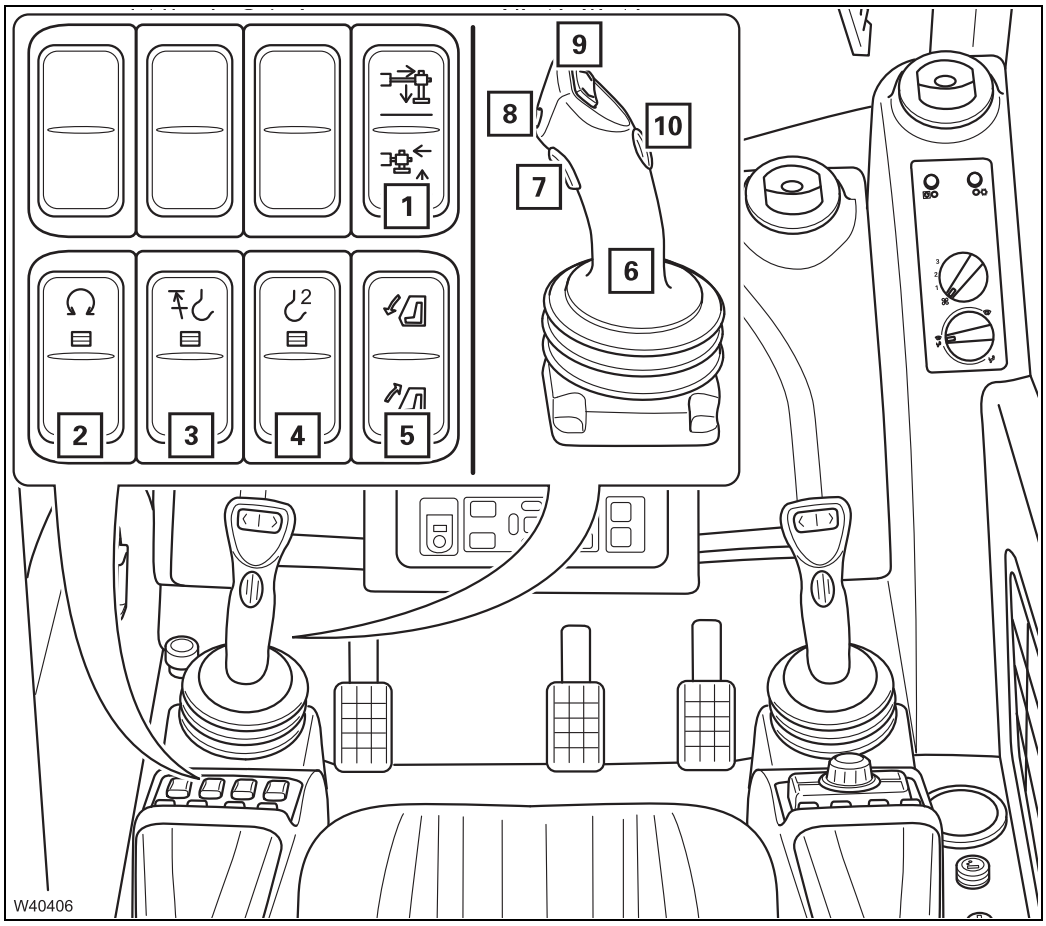
9.1.3 Control panels

Left



1 Moving the outrigger p. 9 - 100

2 Slewing gear on/off p. 9 - 112

3 Overriding the lifting limit switch p. 9 - 109
Override slewing gear shutdown p. 9 - 109

4 Auxiliary hoist[1)] on/off p. 11 - 85

5 Inclining the crane cab p. 9 - 122

6 Left-hand control lever (configuration depends on version) p. 9 - 14

7 Dead man's switch p. 9 - 92

8 Slewing gear freewheel p. 9 - 112

9 Depending on which function is switched on, button for:
- Derricking gear high-speed mode p. 9 - 115
- Telescoping mechanism high-speed mode p. 9 - 117
- Steering with separate steering p. 9 - 160

10 Auxiliary hoist slewing indicator p. 11 - 86

1) Additional equipment

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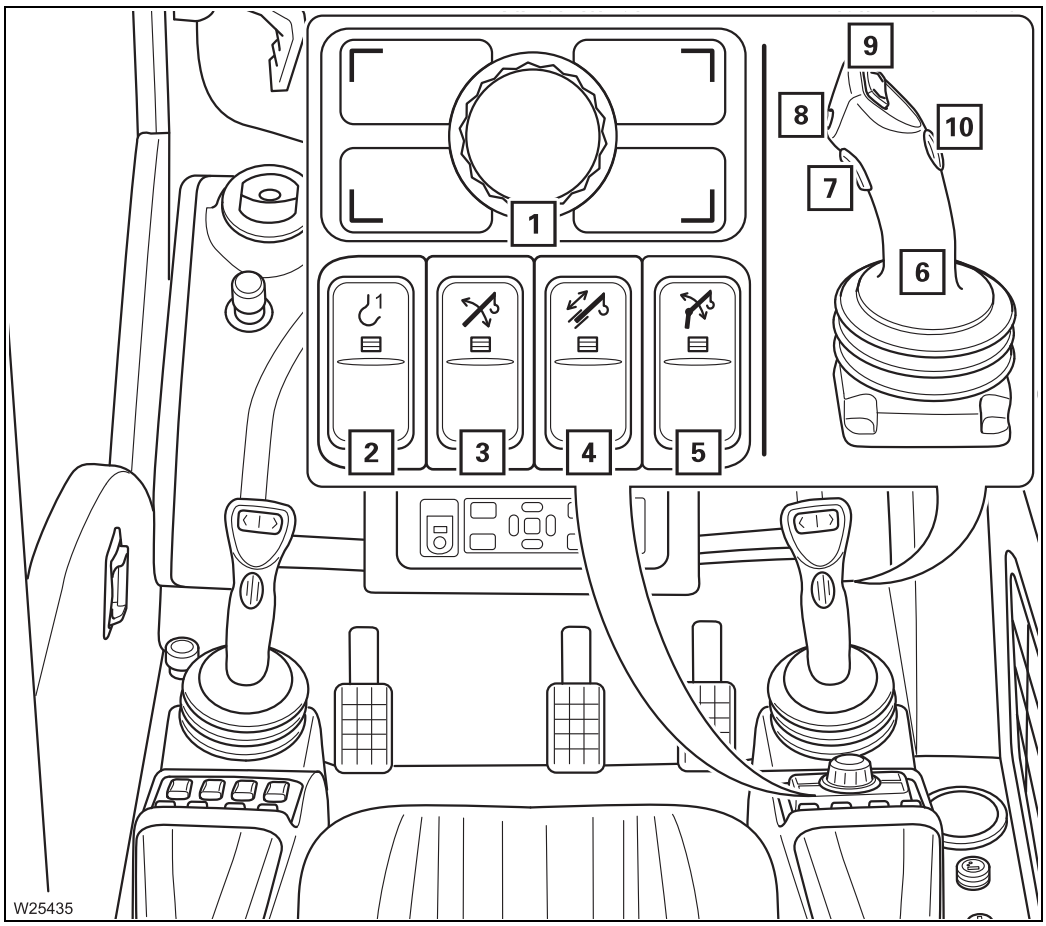
Right



1 Jog dial (rotary push button) ➠ p. 9 - 93

2 Main hoist on/off ➠ p. 9 - 108

3 Derricking gear on/off ➠ p. 9 - 114

4 Telescoping mechanism on/off ➠ p. 9 - 116

5 Lattice extension derricking gear[1), 2)]

6 Right-hand control lever (configuration depends on version) ➠ p. 9 - 14

7 Dead man's switch ➠ p. 9 - 92

8 Horn ➠ p. 9 - 143

9 Depending on which function is switched on, button for:
- Hoist high-speed mode on/off ➠ p. 9 - 108
- Steering in normal steering mode ➠ p. 9 - 160

10 Main hoist slewing indicator ➠ p. 11 - 84

1) Additional equipment

2) ➠ *Lattice extension operating manual*

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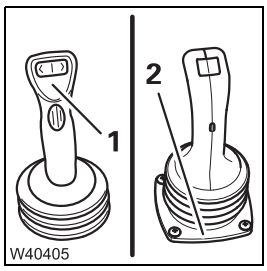
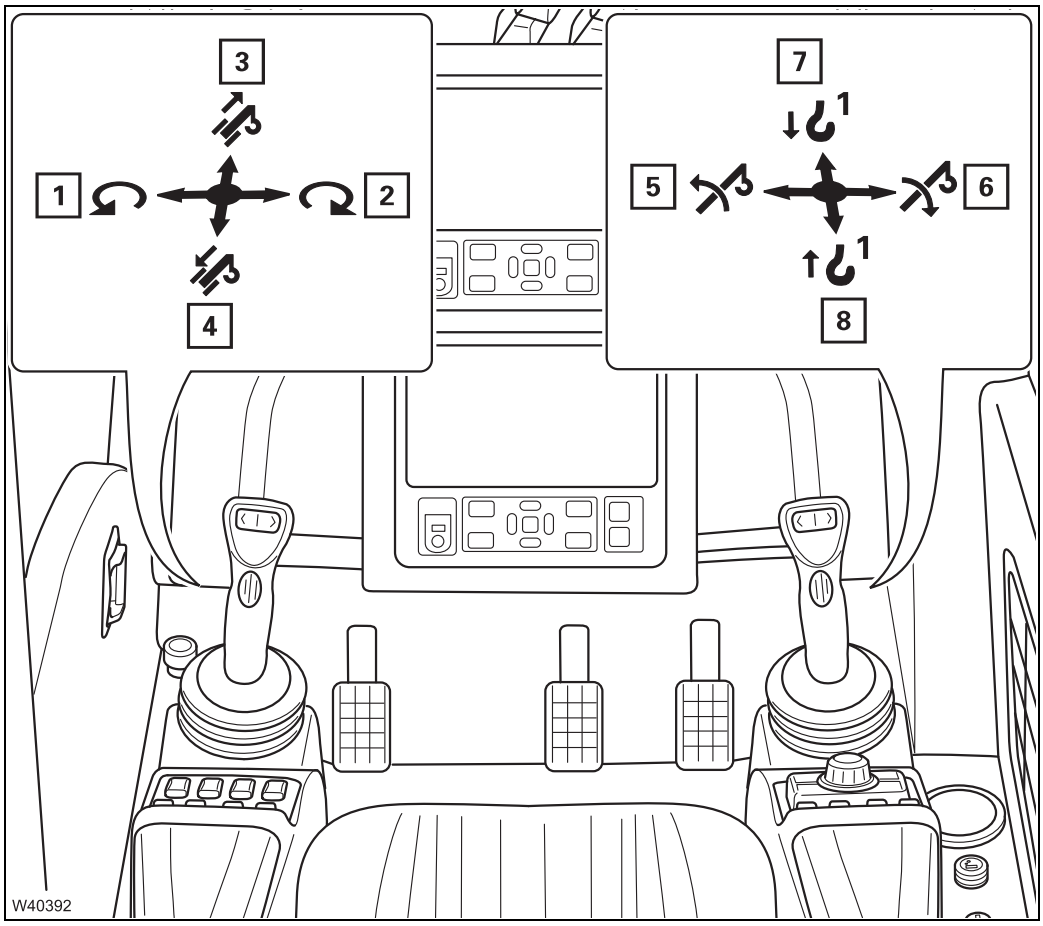
9.1.4 Control lever configuration



The truck crane can be equipped with two different control lever configurations.
The current configuration of the control levers is indicated by symbols.
The symbols are on the handles (**1**) or the panels (**2**) depending on the control lever version.

Version 1

In version 1, the left control lever is configured with the *Telescope* function.



Left control lever

- **1** Slewing to the left
- **2** Slewing to the right
- **3** Extend
- **4** Retract

Right control lever

- **5** Raising
- **6** Lowering the boom
- **7** Lower the main hoist
- **8** Lift the main hoist

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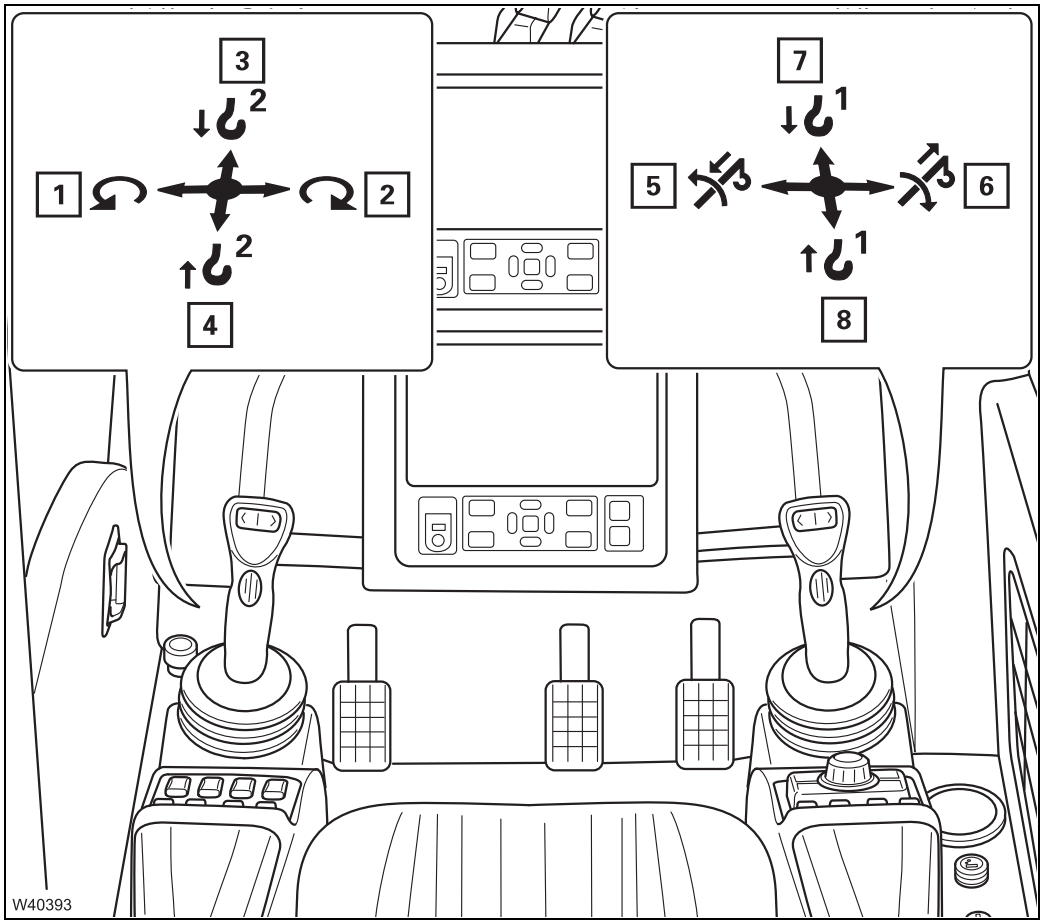
Version 2

In version 2, the right control lever is configured with the *Telescope* function.



Left control lever

1 Slewing to the left

2 Slewing to the right

3 Lower auxiliary hoist[1)]

4 Raise auxiliary hoist[1)]

Right control lever

5 Raise/retract[2)]

6 Lower/extend[2)]

7 Lower the main hoist

8 Lift the main hoist

[1)] Additional equipment

[2)] Derrick the lattice extension; ➠ *Lattice extension operating manual*

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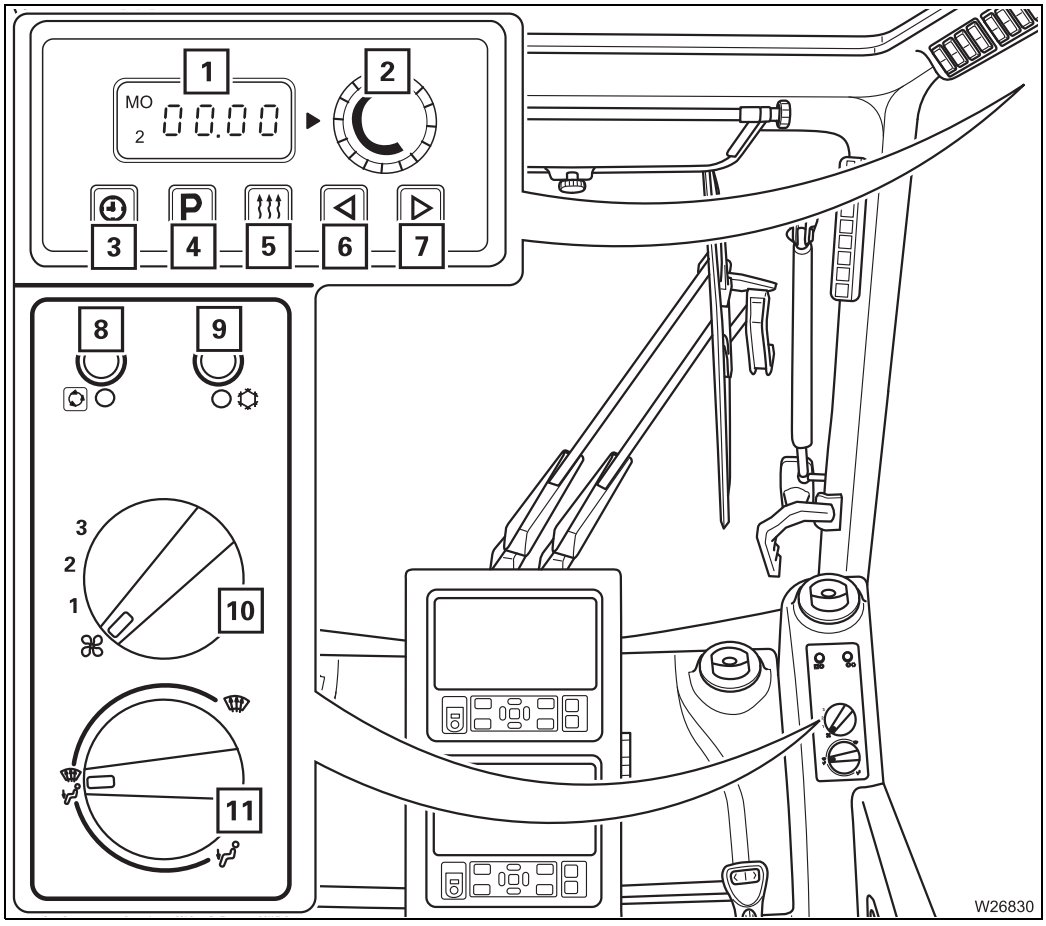
9.1.5 Heating/Air-conditioning system



1 Heating system display p. 11 - 153

2 Setting the temperature p. 11 - 154

3 Setting the time/day p. 11 - 156

4 Retrieving storage locations p. 11 - 157

5 – Switching on the heater p. 11 - 153
– Switching off the heater p. 11 - 159

6 Input – p. 11 - 157

7 Input + p. 11 - 157

8 Setting recirculated/fresh air p. 11 - 154

9 – Switching on the air-conditioning system[1)] p. 11 - 160
– Switching off the air-conditioning system[1)] p. 11 - 161

10 Setting the fan p. 11 - 154

11 Air distribution p. 11 - 155

[1)] Additional equipment

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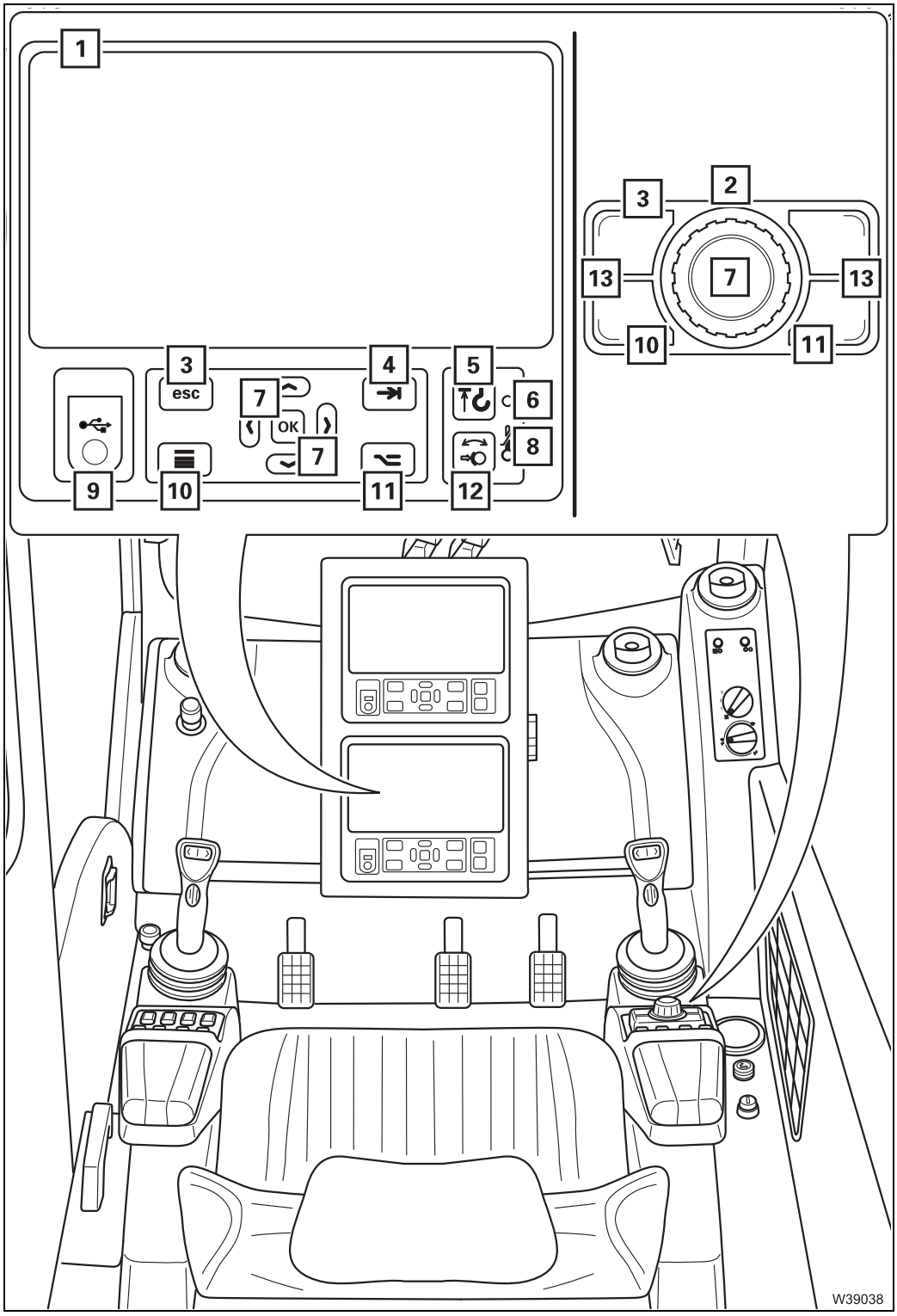
9.1.6 CCS control unit



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1	CCS display	p. 9 - 93
	– Menu-independent displays	p. 9 - 20
	– Overview start menu	p. 9 - 21
2	Jog dial (rotary push button)	
3	Exiting the menu/input mode	p. 9 - 96
4	Selecting / deselecting favourites	p. 9 - 97
5	Warning for lifting limit switch shutdown	p. 9 - 109
6	Sensor – no function	p. 9 - 96
7	Menu control Select / activate / confirm	p. 9 - 93
8	Display temperature warning display	p. 9 - 97
9	Service/diagnostics connection[1)]	p. 9 - 148
10	Overview menu groups – Operation Overview menu groups – Overview	p. 9 - 96 p. 9 - 24
11	Switch off RCL buzzer	p. 9 - 96
12	Slewing gear brake engaged/released	p. 9 - 113
13	Function only in the menu Outrigger	p. 9 - 31

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

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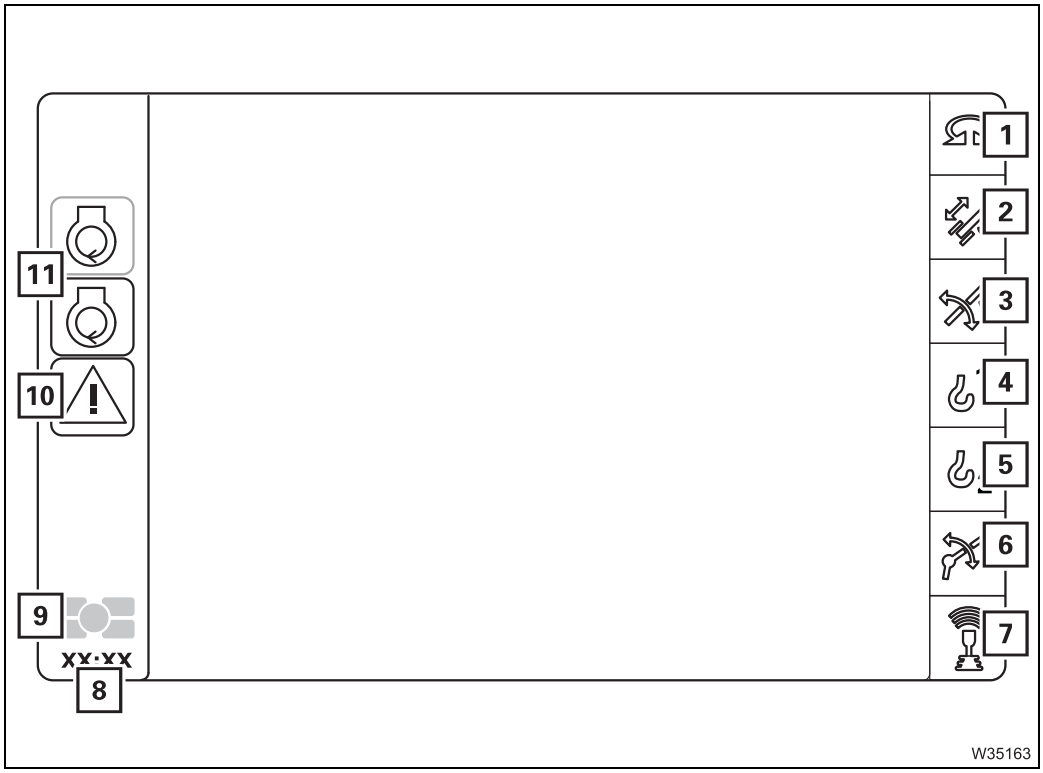
9.1.7 Menu-independent displays



1 Slewing gear ➠ p. 9 - 112
2 Telescoping mechanism ➠ p. 9 - 116
3 Derricking gear ➠ p. 9 - 114
4 Main hoist ➠ p. 9 - 108
5 Auxiliary hoist[1)] ➠ p. 9 - 110
6 Lattice extension derricking gear[1), 2)]
7 Remote control display[1), 3)]
8 Display time
9 Jog dial display ➠ p. 9 - 96
10 Error display ➠ p. 14 - 8
11 Warning messages display ➠ p. 14 - 3

[1)] Additional equipment
[2)] ➠ *Lattice extension operating manual*
[3)] ➠ *Separate operating manual*

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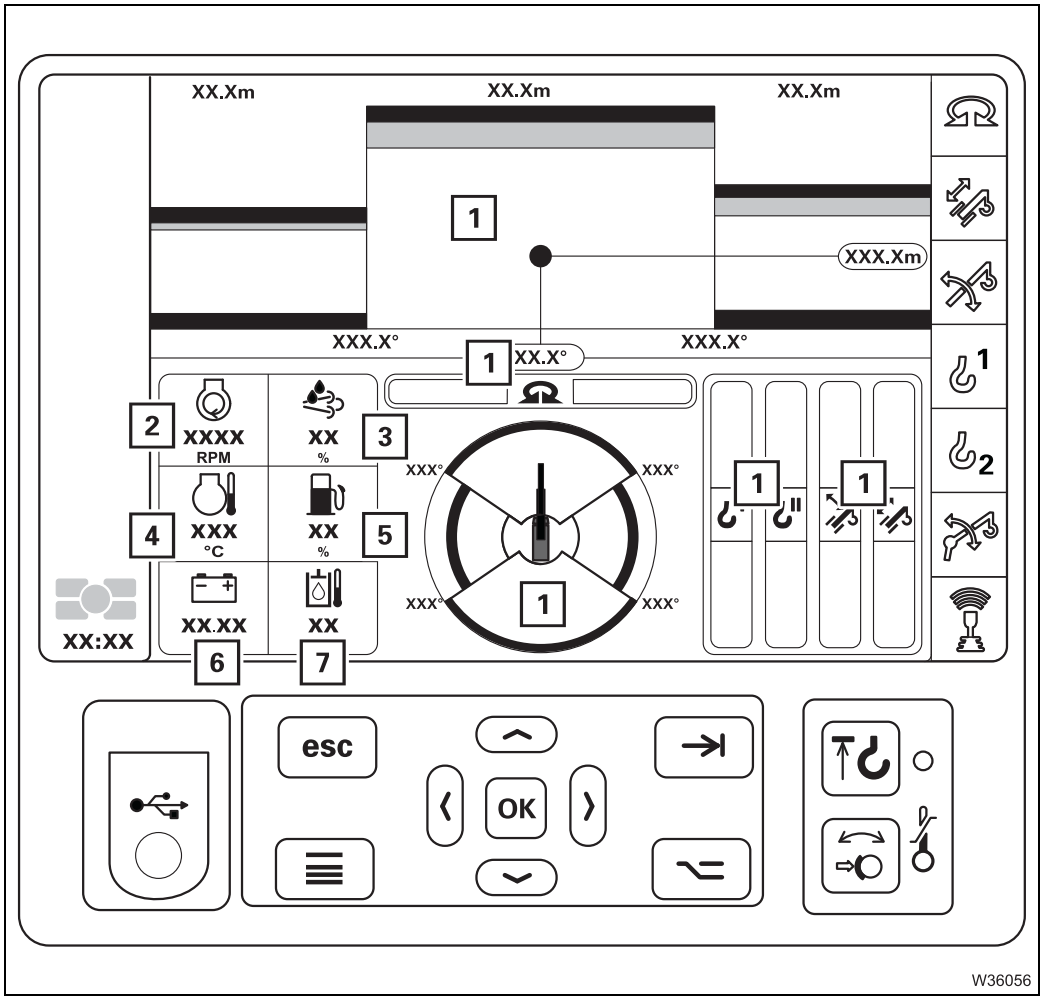
9.1.8 CCS – Start menu



1 RCL display p. 9 - 22
2 Engine speed display p. 10 - 8
3 AdBlue (DEF) tank level display p. 9 - 90
4 Coolant temperature display p. 10 - 8
5 Fuel level display p. 10 - 8
6 Voltage monitoring display p. 10 - 8
7 Hydraulic oil temperature display p. 10 - 8

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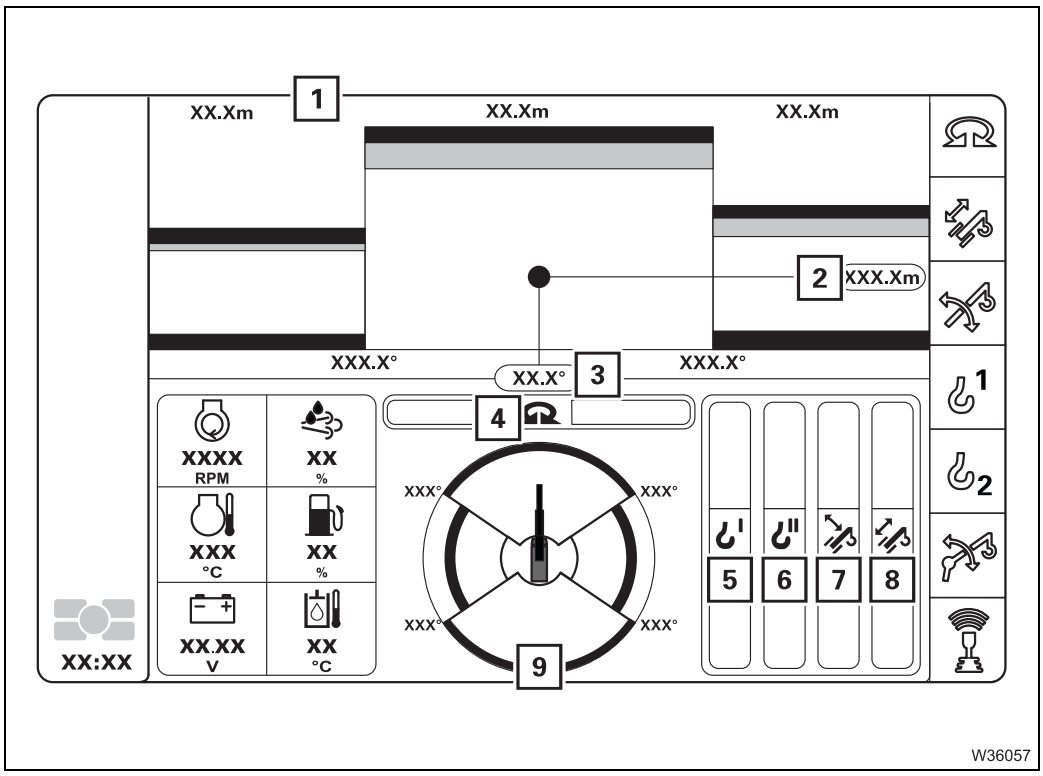
RCL display



1 Slewing ranges/working radii display ➠ p. 9 - 23

2 Current working radius display ➠ p. 9 - 128

3 Current slewing angle display ➠ p. 9 - 128

4 Maximum permissible speed display – Slewing gear ➠ p. 9 - 129

5 Maximum permissible speed display – Main hoist ➠ p. 9 - 129

6 Maximum permissible speed display – Auxiliary hoist[1)] ➠ p. 9 - 129

7 Maximum permissible speed display – Derricking gear ➠ p. 9 - 129

8 Maximum permissible speed display – Telescoping mechanism ➠ p. 9 - 129

9 Slewing ranges display ➠ p. 9 - 129

[1)] Additional equipment

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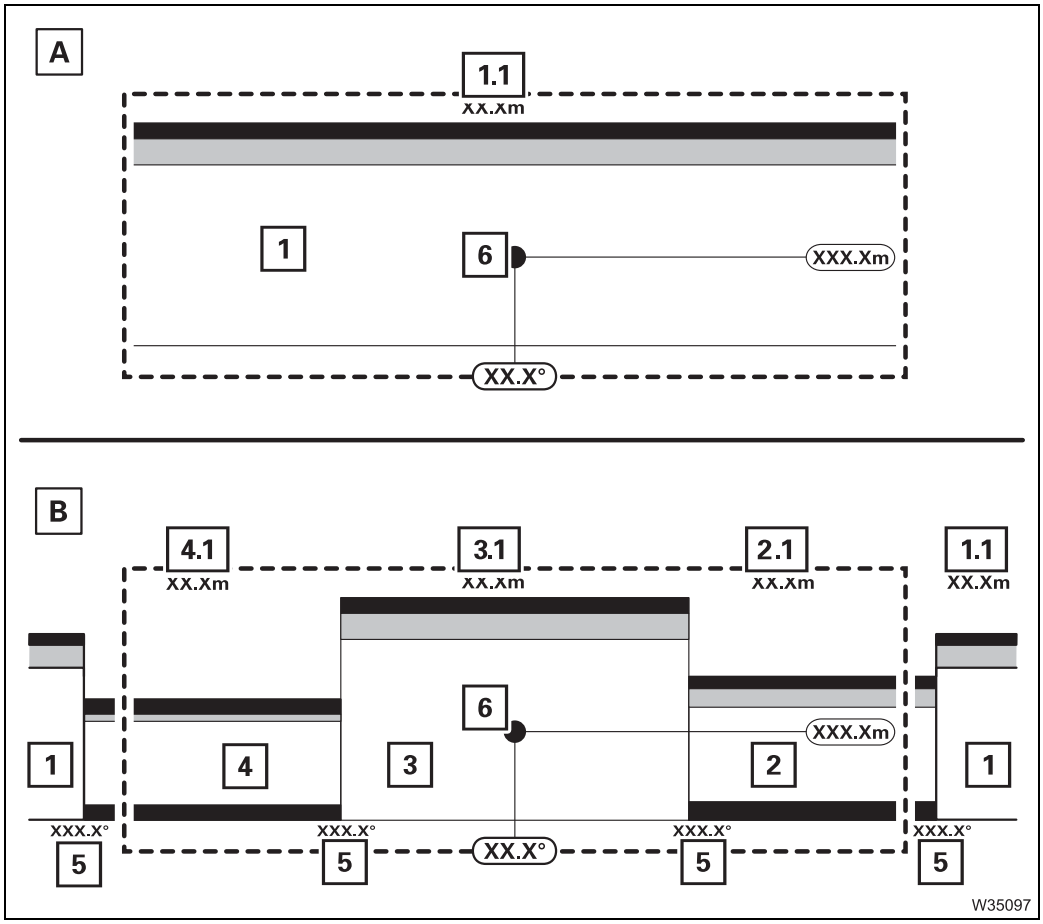
Slewing ranges/ working radii display



A For the *Standard* slewing range type

B For the *MAXbase* slewing range type

Display of current slewing range divisions p. 9 - 127

- **1** Slewing range 1 p. 9 - 127
- **2** Slewing range 2 p. 9 - 127
- **3** Slewing range 3 p. 9 - 127
- **4** Slewing range 4 p. 9 - 127
- **5** Display of current slewing range limits p. 9 - 127
- **6** Current position display p. 9 - 128

Maximum permissible working radius display p. 9 - 128

- **1.1** In slewing range 1 p. 9 - 128
- **2.1** In slewing range 2 p. 9 - 128
- **3.1** In slewing range 3 p. 9 - 128
- **4.1** In slewing range 4 p. 9 - 128

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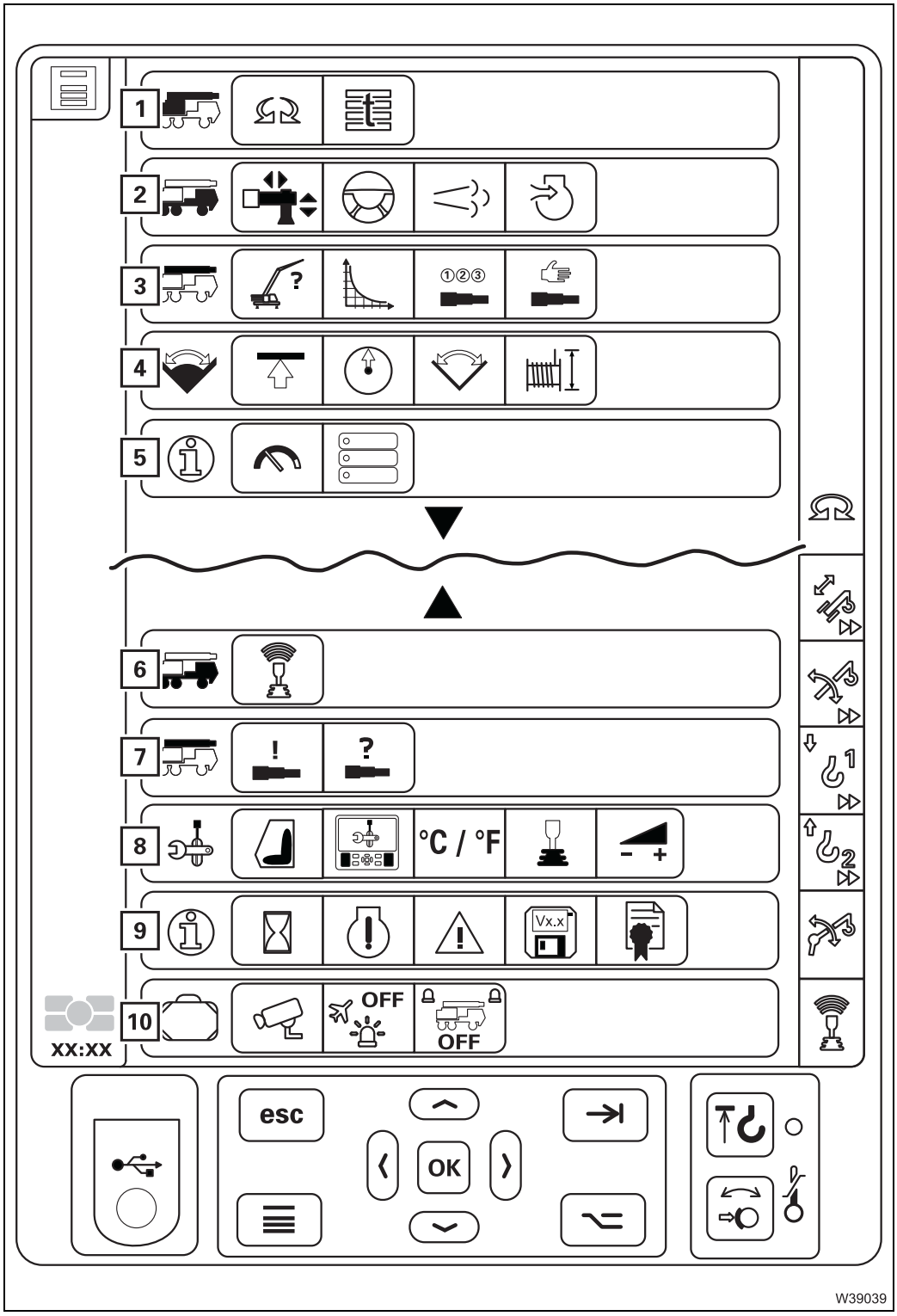
9.1.9 CCS – Overview of menu groups



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1 Superstructure menu group ➠ p. 9 - 28
- – Superstructure lock menu[1)]
- – Counterweight menu

2 Outrigger/driving menu group ➠ p. 9 - 31
- – Outrigger menu
- – Outrigger cylinders menu
- – Driving menu
- – Exhaust system menu
- – Air intake inhibitor menu[1)]

3 RCL/Telescoping menu group ➠ p. 9 - 41
- – Enter rigging mode/telescope status menu
- – Lifting capacity tables menu
- – Telescoping semi-automation menu
- – Manual telescoping menu

4 Working range limiter menu group ➠ p. 9 - 51
- – Overall height menu
- – Working radius menu
- – Slewing angle menu
- – Hoist rope travel limitation menu

5 Information menu group 1 ➠ p. 9 - 56
- – Hydraulic pressure and fuel consumption menu
- – Datalogger menu (Menu opens on the display RCL)

6 Heating/Engine/Additional equipment menu group ➠ p. 9 - 58
- – Remote control menu[1)]

7 Telescoping emergency program menu group ➠ p. 9 - 60
- – Telescoping emergency program menu
- – Unknown telescoping menu

[1)] Additional equipment

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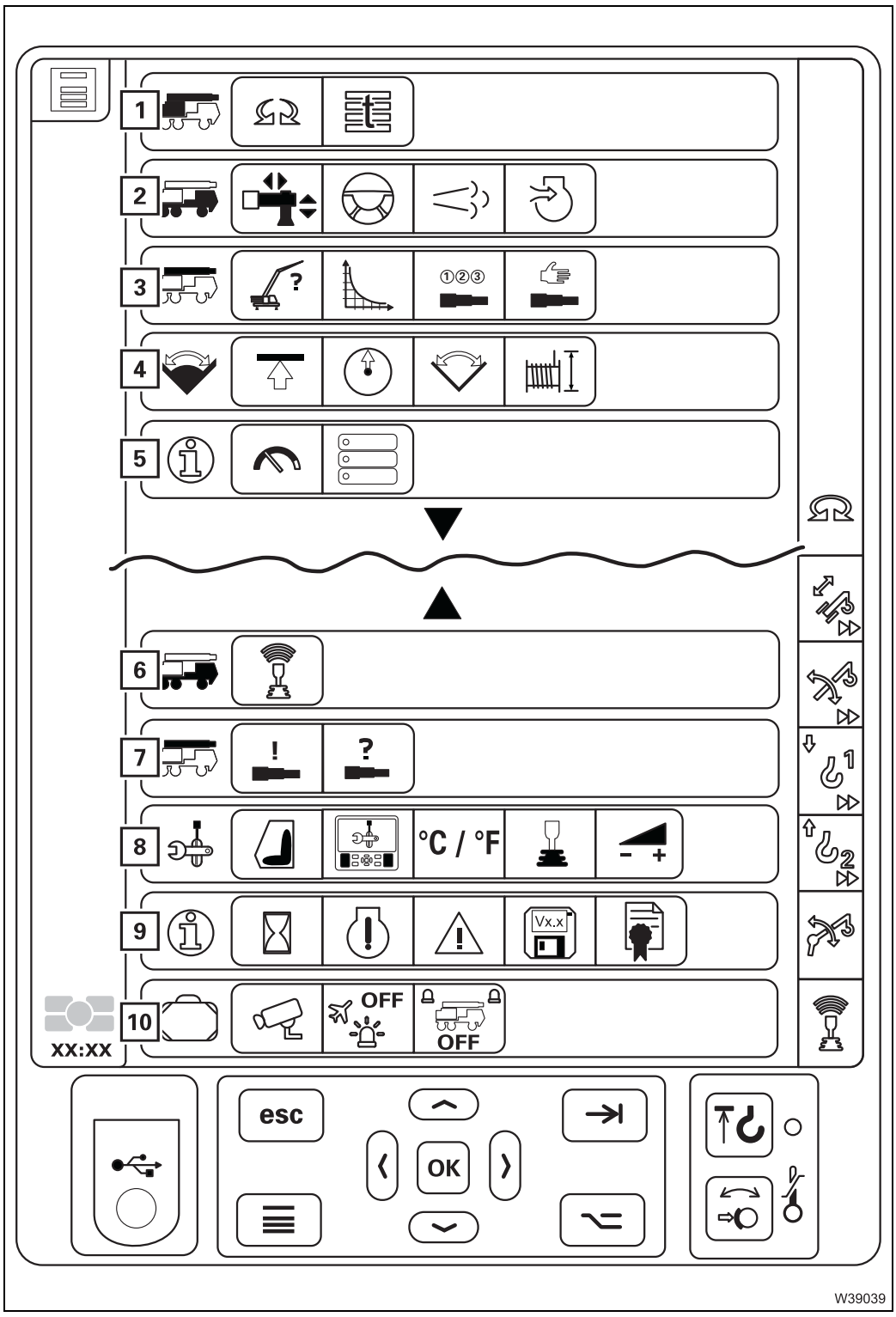

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8 Settings menu group ➠ p. 9 - 63

- 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 menu group 2 ➠ p. 9 - 69

- Operating hours menu
- Engine/transmission error menu
- Crane operation error menu
- Program version menu
- Disclaimer menu

10 Various controls ➠ p. 9 - 74

- Camera on/off
- Switching the air traffic control light on and off
- Switching the rotating beacon on/off

Query menus ➠ p. 9 - 75

Not selectable, automatically opened

1) Additional equipment

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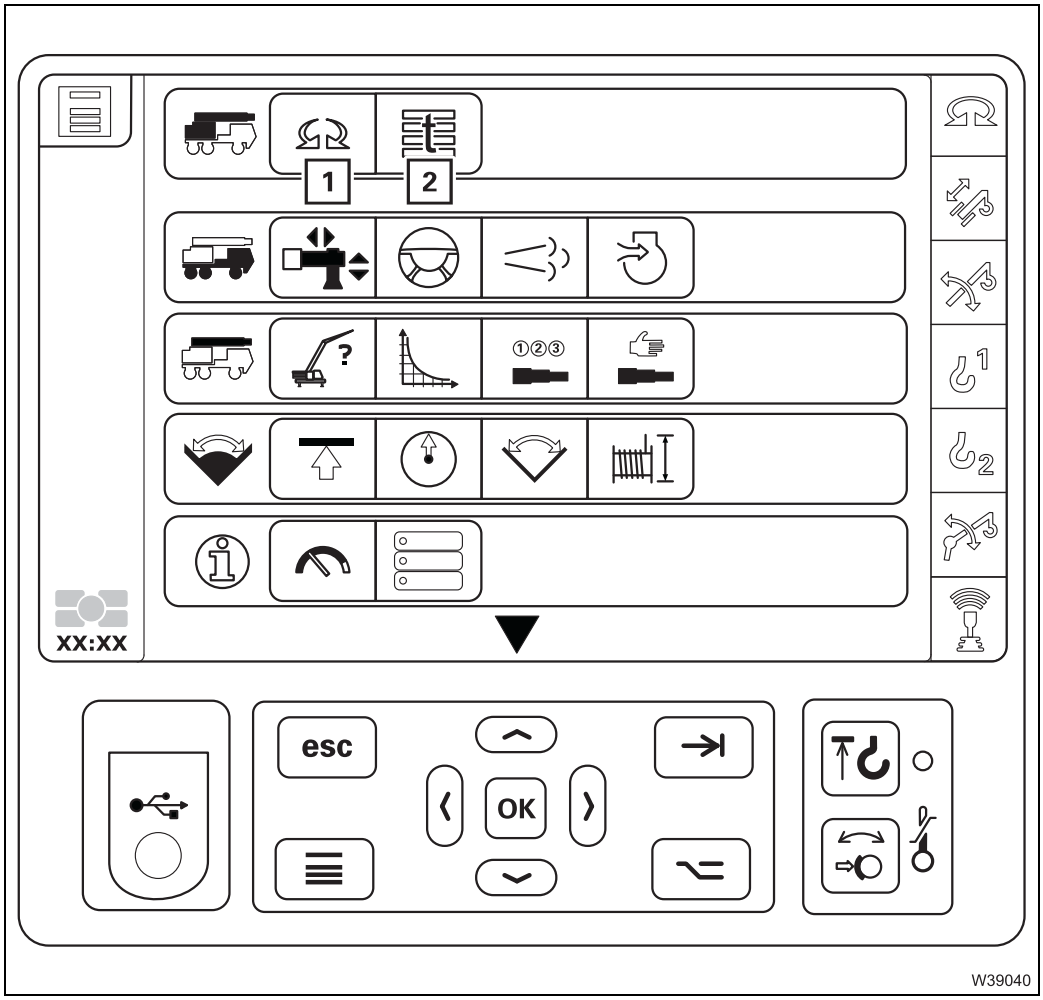
9.1.10 Superstructure menu group



1 Superstructure lock menu p. 9 - 29

2 Counterweight menu p. 9 - 30

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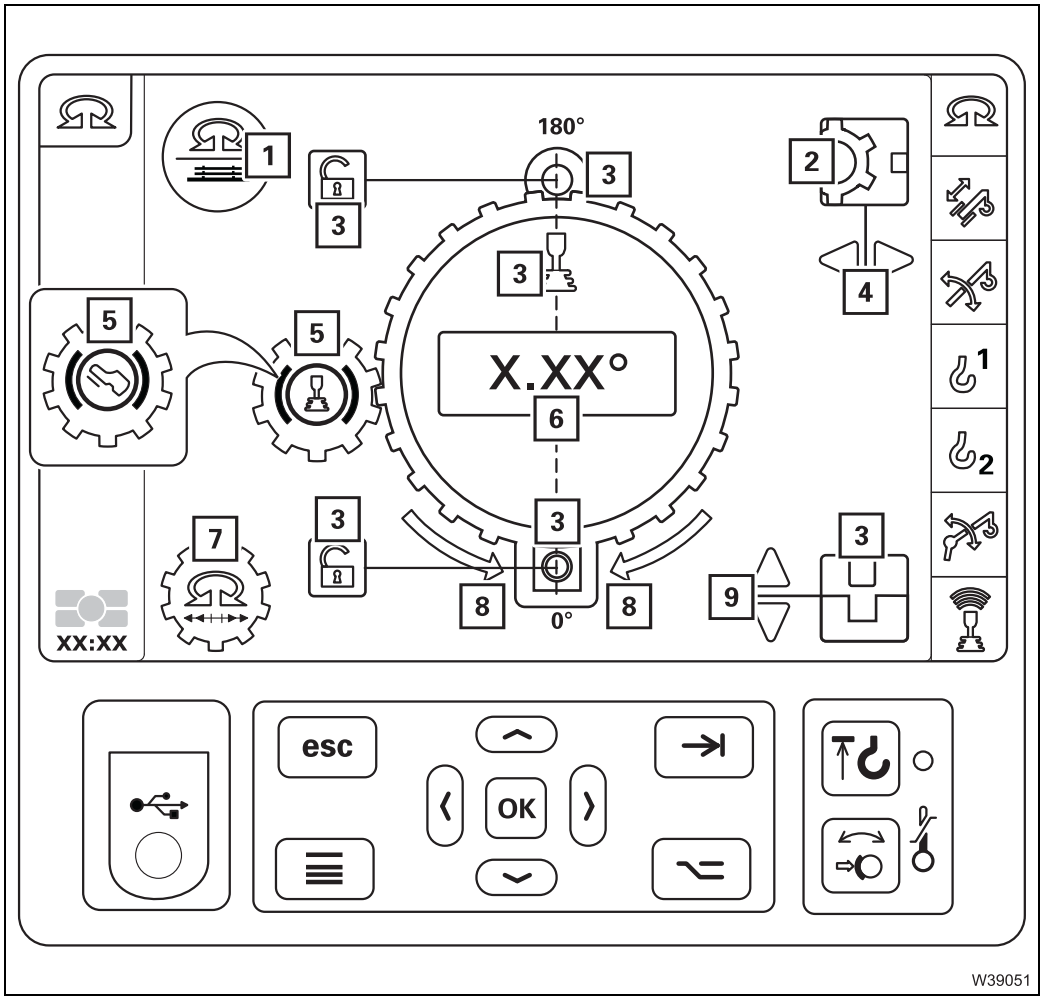
Superstructure lock menu



1 Slewing release display – identical to the display in the *Counterweight* menu p. 9 - 30

2 Houselock locking status displays[1)] p. 9 - 125

3 Locking status displays p. 9 - 123

4 Houselock on/off[1)] p. 9 - 125

5 Display/switch function for the slewing gear brake p. 9 - 113

6 Current slewing angle display[1)] p. 9 - 124

7 Slewing speed reduction on/off p. 9 - 113

8 Display slewing direction to 0°/180° p. 9 - 124

9 Locking/unlocking the turntable p. 9 - 123

1) Additional equipment

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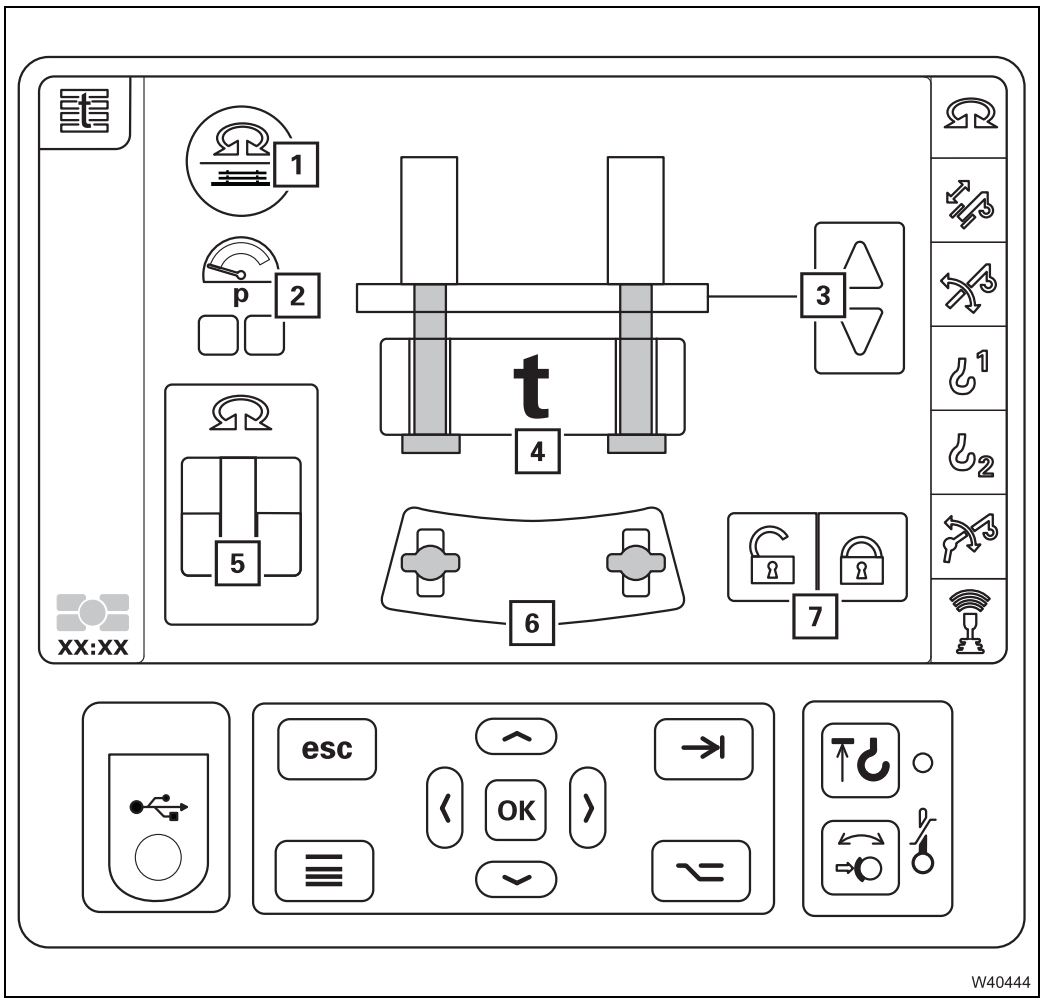
Counterweight menu



1 Slewing release display p. 9 - 107
2 Pre-tensioning pressure display p. 9 - 107
3 Extending/Retracting the lifting cylinders p. 9 - 107
4 Lifting cylinder position display p. 9 - 107
5 Turntable lock display p. 9 - 106
6 Locking/Unlocking the counterweight p. 9 - 106
7 Locking display p. 9 - 106

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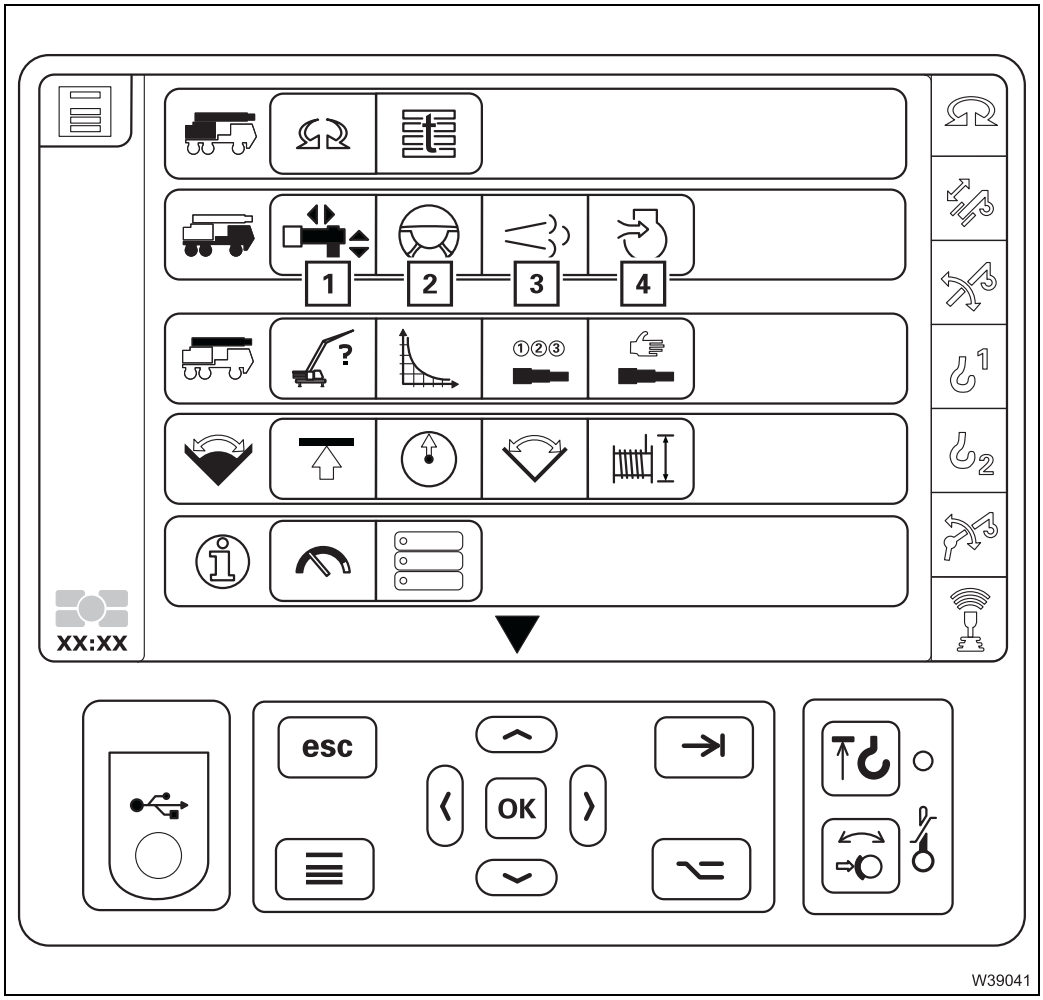
9.1.11 Outrigger/driving menu group



1 – Outrigger menu p. 9 - 32
– Outrigger cylinders menu p. 9 - 34

2 Driving menu p. 9 - 36

3 Exhaust system menu p. 9 - 38

4 Air intake inhibitor menu[1)] p. 9 - 39

[1)] Additional equipment

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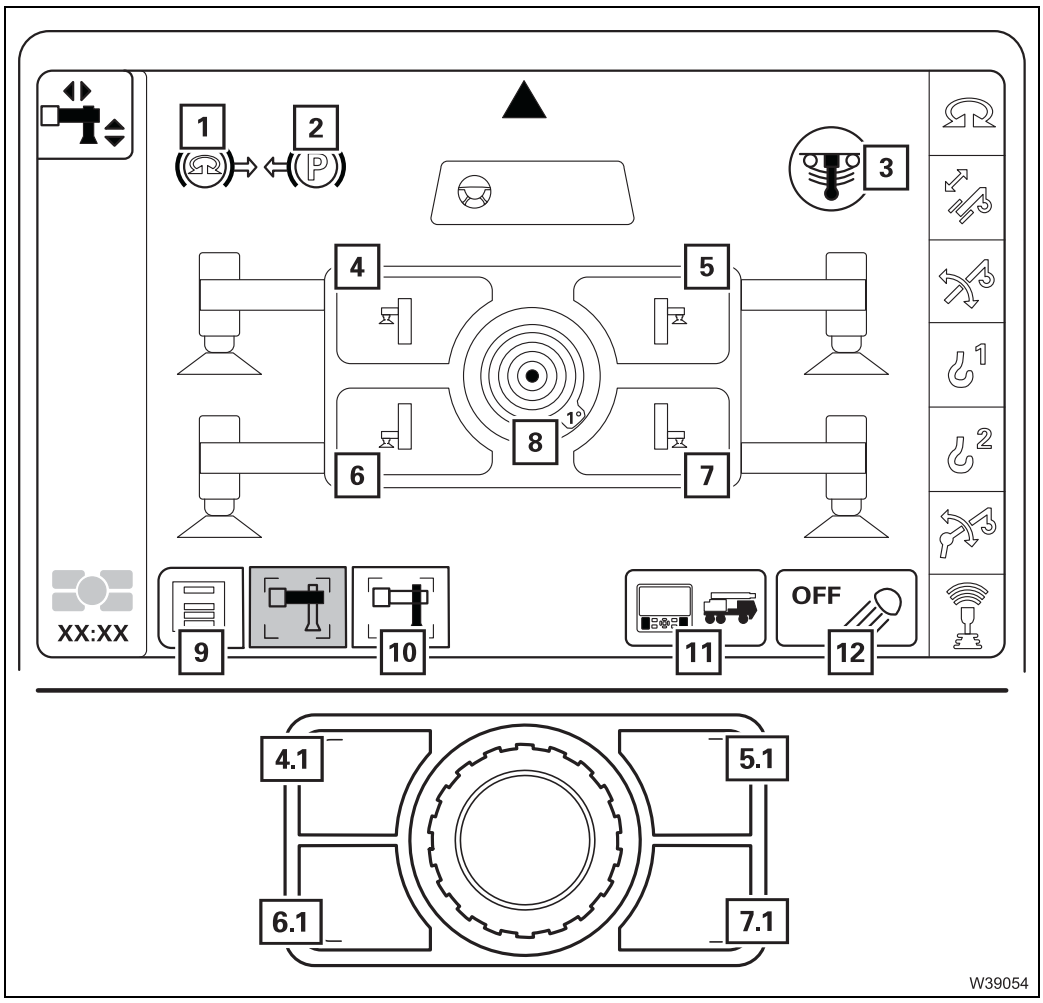
Outrigger menu



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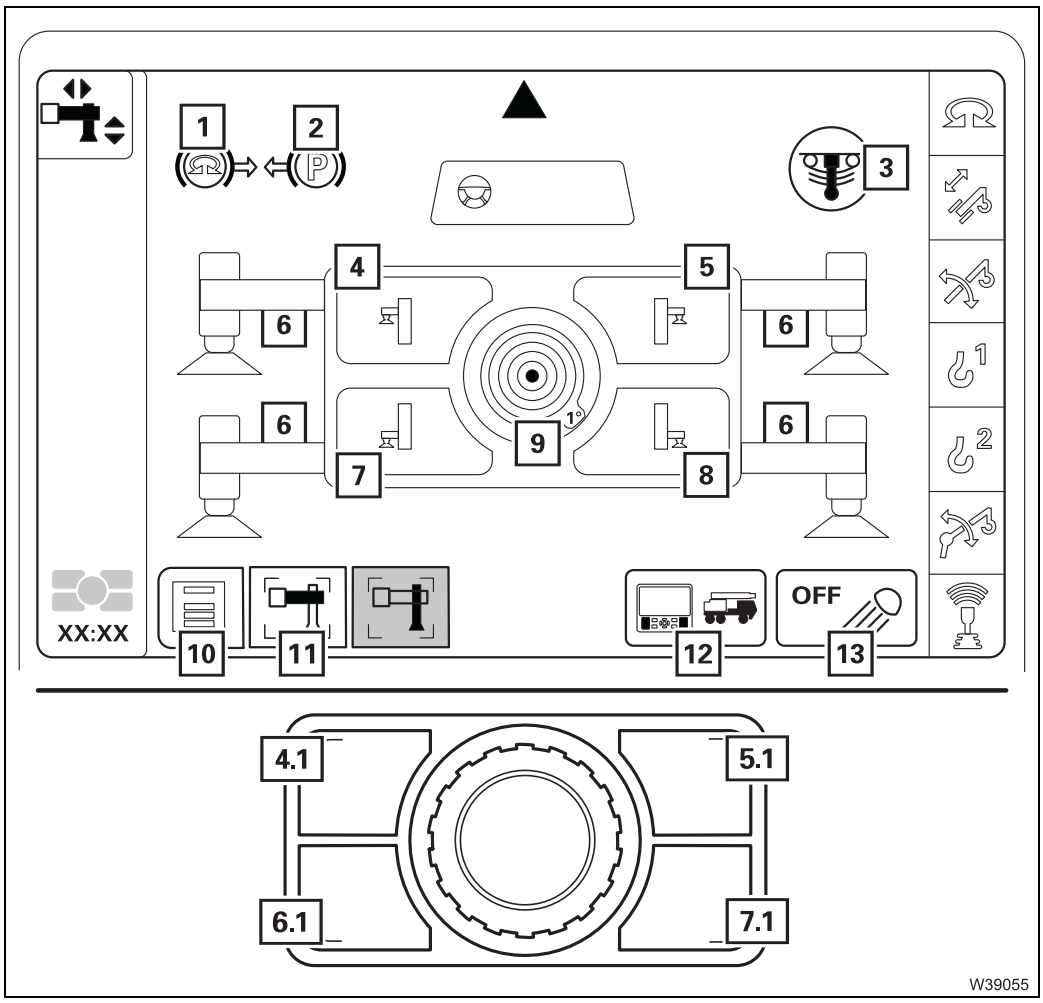
Outrigger cylinders menu



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1	Slewing gear/movements locked display	p. 9 - 99
2	Parking brake/movements locked display/warning	p. 9 - 99
3	Suspension on/off display/warning	p. 9 - 99
4	Pre-select front left outrigger cylinder display	p. 9 - 100
4.1	Pre-select front left outrigger cylinder	p. 9 - 100
5	Pre-select front right outrigger cylinder display	p. 9 - 100
5.1	Pre-select front right outrigger cylinder	p. 9 - 100
6	Outrigger pressure display[1)]	p. 12 - 48
7	Pre-select rear left outrigger cylinder display	p. 9 - 100
7.1	Pre-select rear left outrigger cylinder	p. 9 - 100
8	Pre-select rear right outrigger display	p. 9 - 100
8.1	Pre-select rear right outrigger	p. 9 - 100
9	Current inclination display	p. 9 - 104
10	exiting the menu	p. 9 - 100
11	Switching to the Outrigger menu	p. 9 - 100
12	Outrigger control units on/off	p. 9 - 100
13	Outrigger lighting on/off	p. 9 - 99

1) Additional equipment

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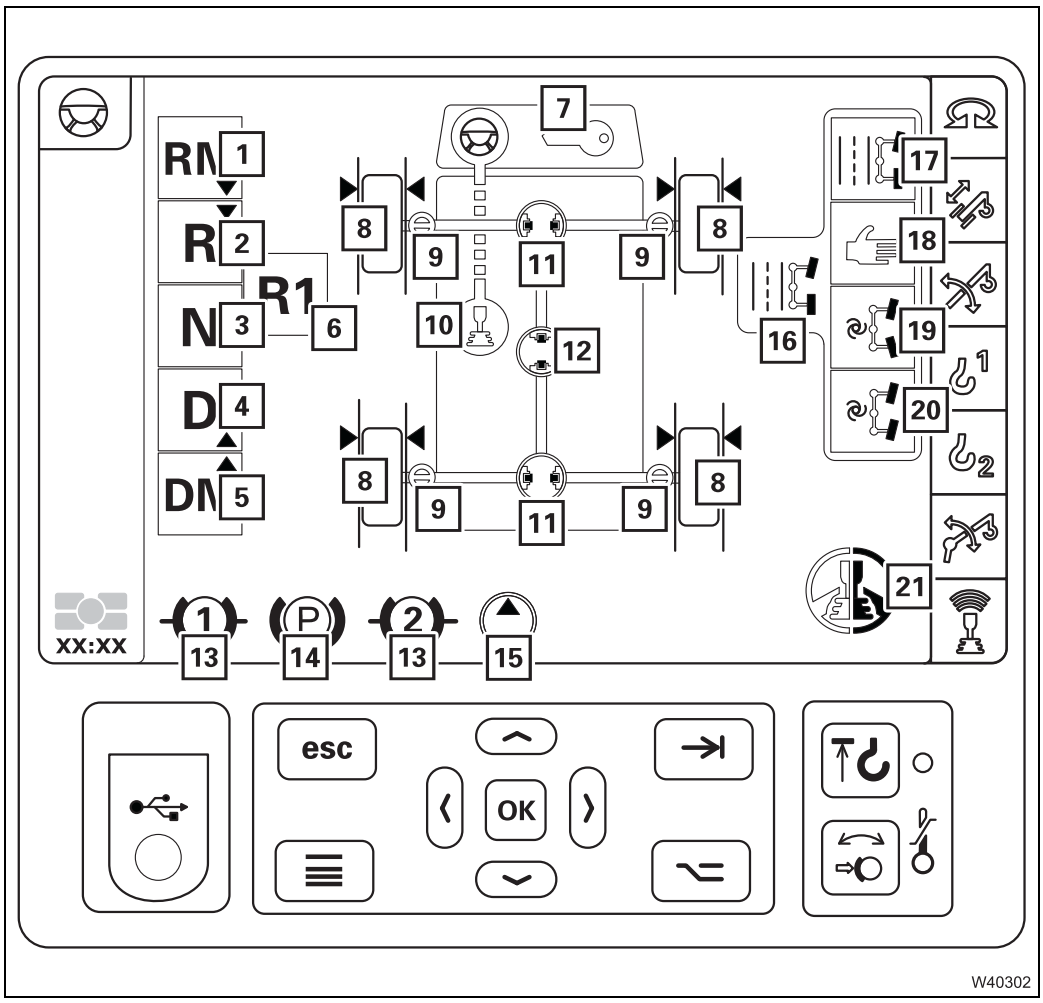
Driving menu



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1 Transmission mode **RM** ➠ p. 9 - 152

2 Transmission mode **R** ➠ p. 9 - 151

3 Neutral position **N** ➠ p. 9 - 151

4 Transmission mode **D** ➠ p. 9 - 151

5 Transmission mode **DM** ➠ p. 9 - 152

6 Current transmission mode display

7 Steering lock display ➠ p. 9 - 150

8 Current wheel position display ➠ p. 9 - 159

9 Steering locking status display ➠ p. 9 - 157

10 Change-over between crane operation and driving modes ➠ p. 9 - 150

11 – Transverse differential locks display ➠ p. 9 - 153
– Transverse differential locks on/off ➠ p. 9 - 153

12 – Longitudinal differential lock display ➠ p. 9 - 153
– Longitudinal differential lock on/off ➠ p. 9 - 153

13 Supply pressure brake circuits 1 and 2 display ➠ p. 9 - 154

14 Parking brake indicator lamp ➠ p. 9 - 154

15 Crane hydraulic system driving mode on/off display ➠ p. 9 - 150

16 Steering mode switched on display ➠ p. 9 - 157

17 Normal steering mode/on-road driving on ➠ p. 9 - 158

18 Manual separate steering on ➠ p. 9 - 158

19 Automatic separate steering driving around corners on ➠ p. 9 - 158

20 Automatic separate steering for crab travel mode on ➠ p. 9 - 158

21 Changing the steering direction[1)] ➠ p. 9 - 156

[1)] Display depends on carrier display; ➠ p. 9 - 149

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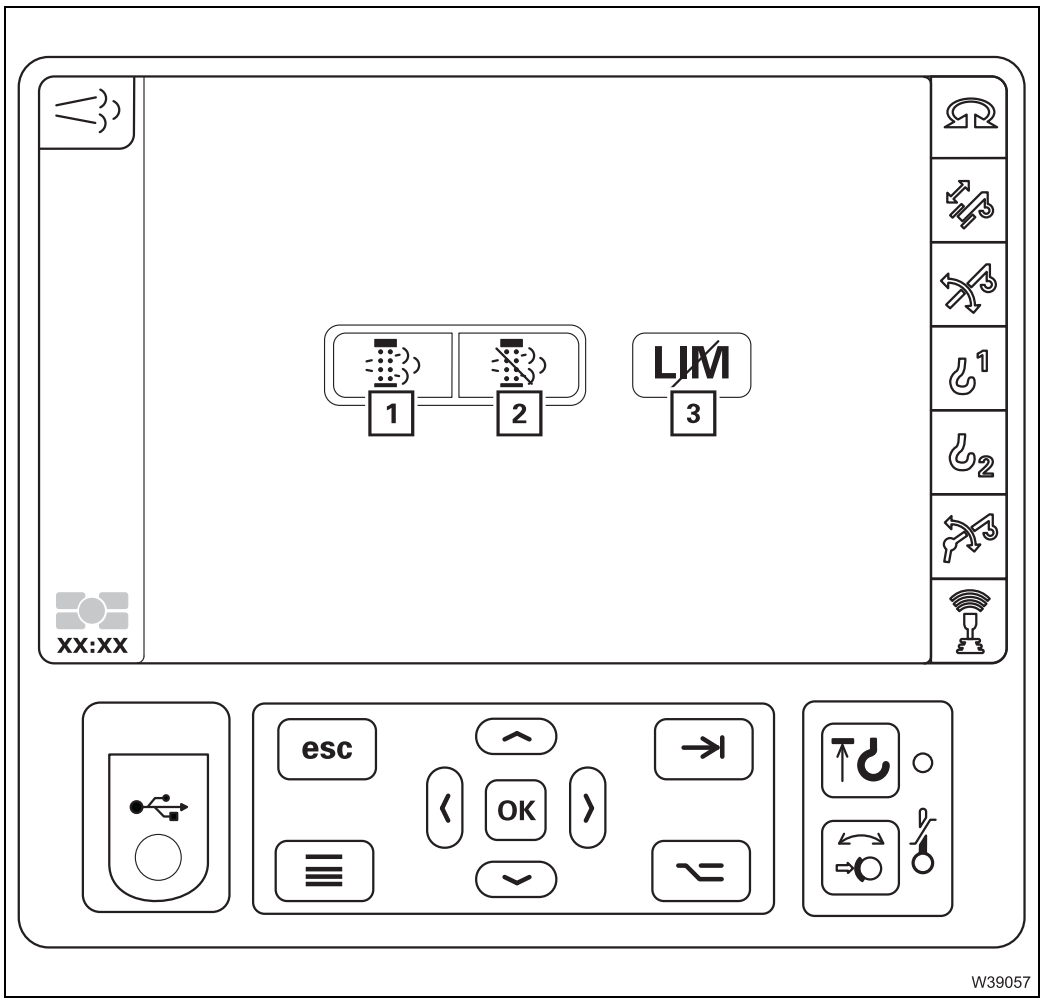
Exhaust system menu



1 Manually start exhaust system cleaning p. 9 - 91

2 Disable exhaust system cleaning p. 9 - 91

3 Overriding torque reduction[1)] p. 9 - 90

1) Additional equipment

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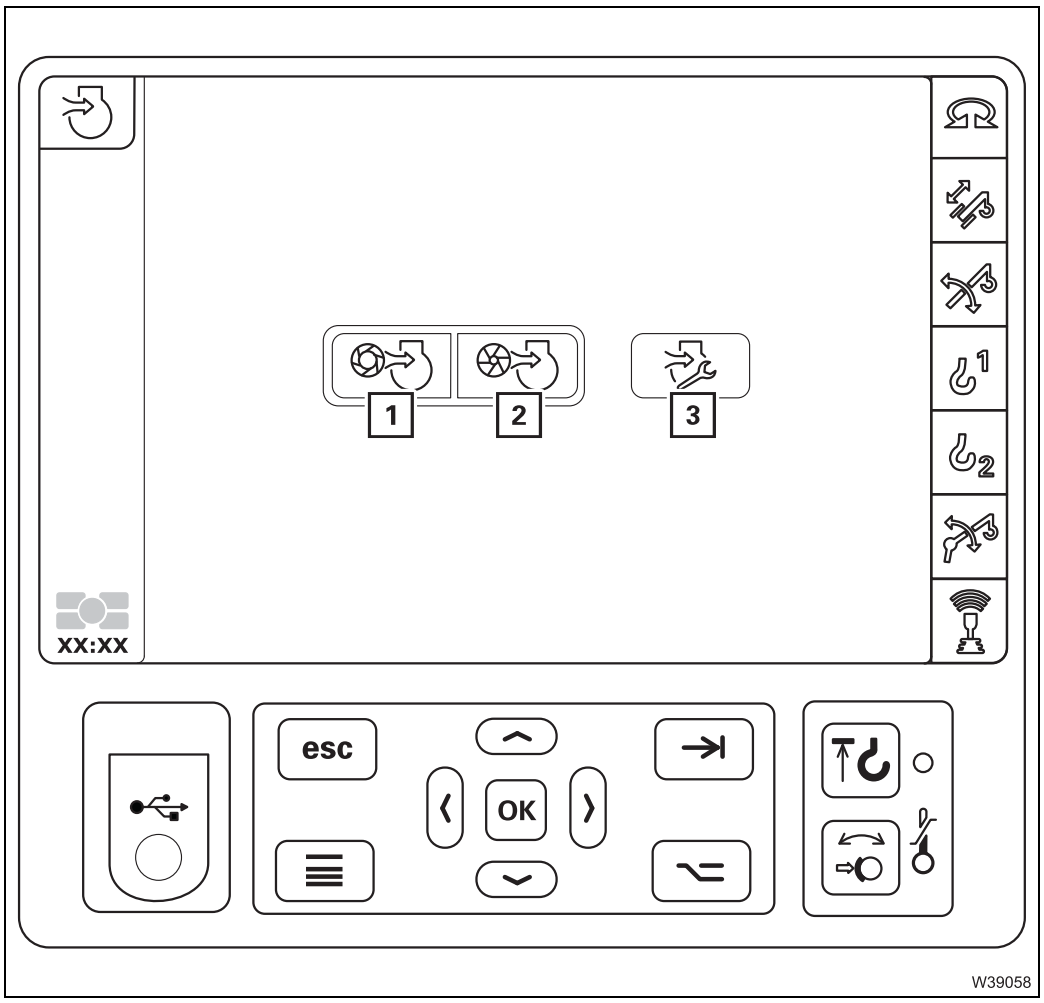
Air intake inhibitor menu



1 Opening the air intake inhibitor p. 9 - 90

2 Closing the air intake inhibitor[1)]

3 Air intake inhibitor maintenance[1)]

1) Only for checking functionality; *Maintenance manual*

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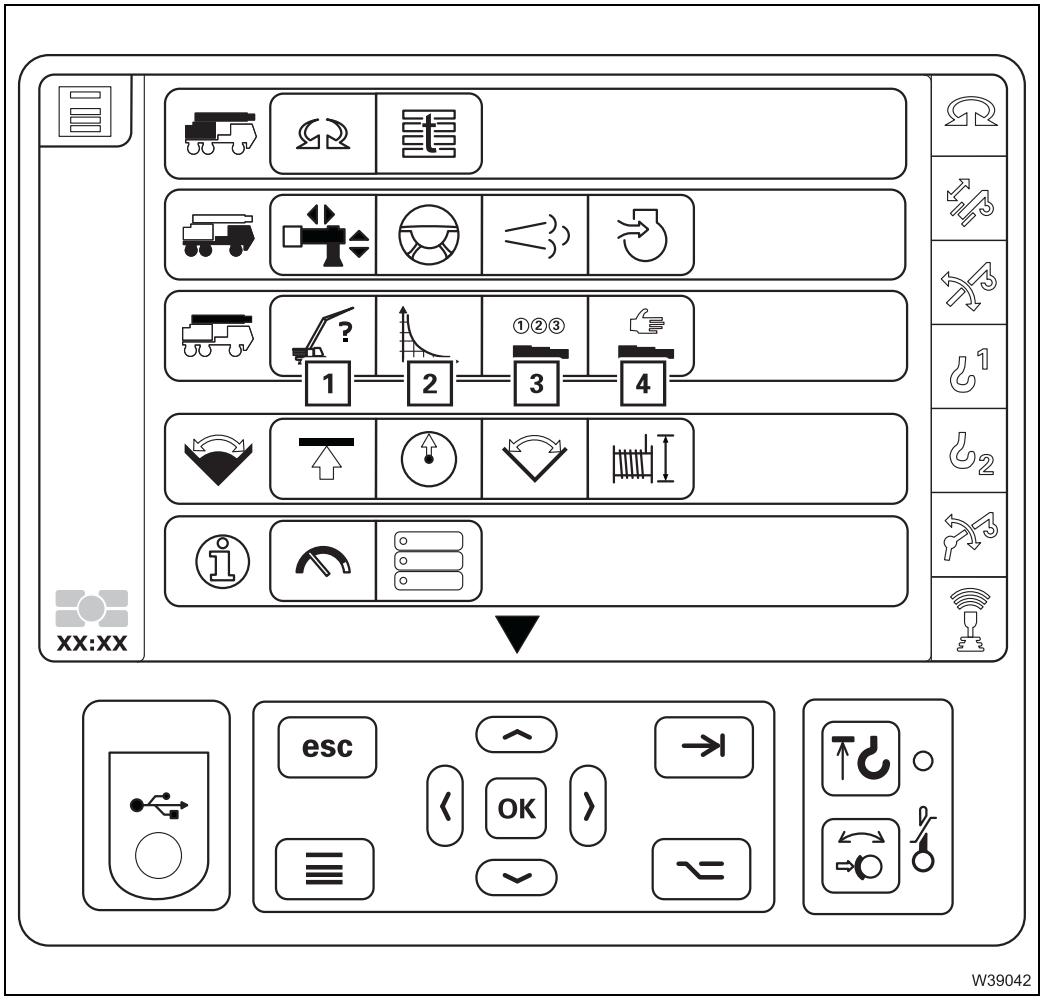
9.1.12 RCL/Telescoping menu group



1 Enter rigging mode/telescope status menu p. 9 - 42
2 Lifting capacity tables menu p. 9 - 48
3 Telescoping semi-automation menu p. 9 - 49
4 Manual telescoping menu p. 9 - 50

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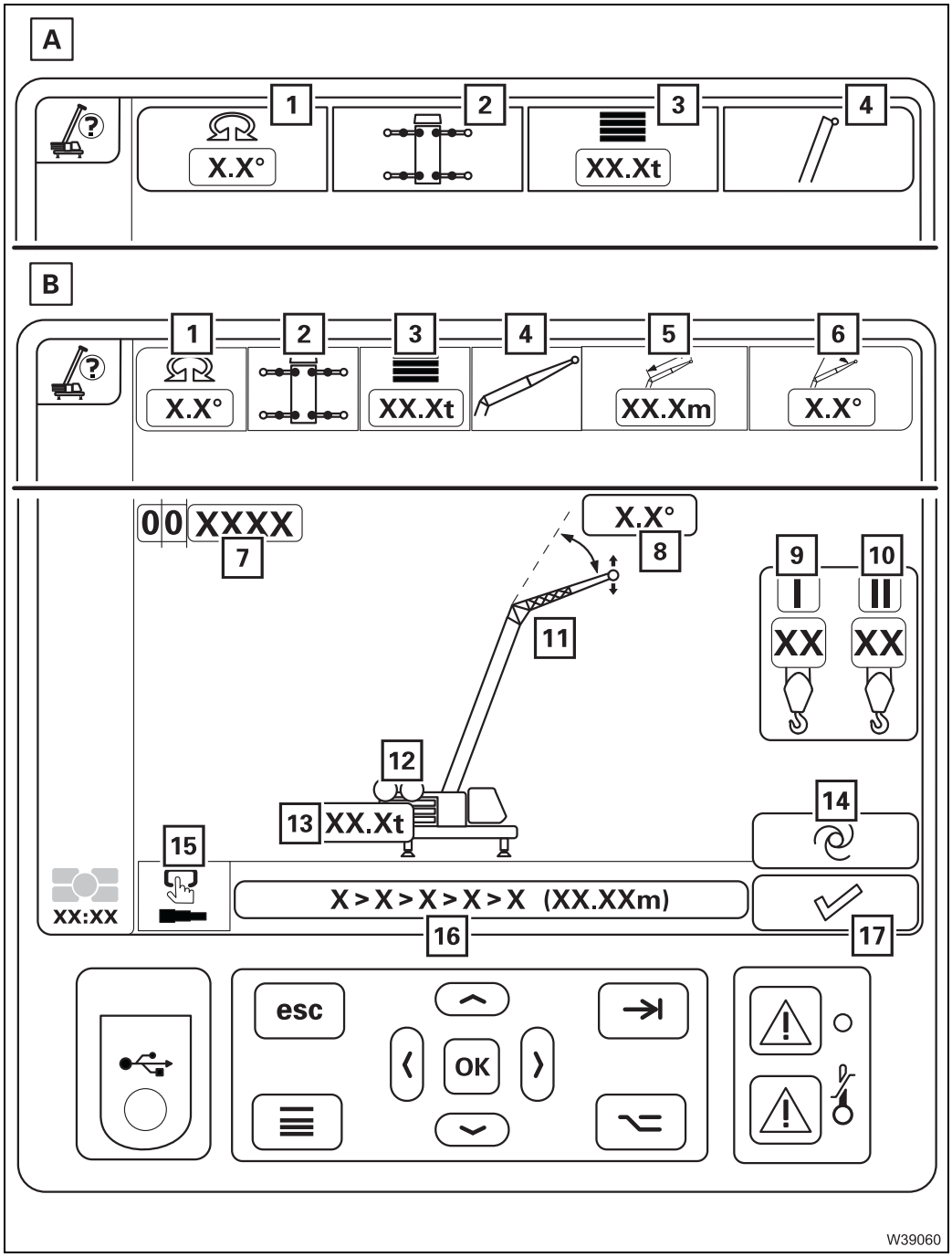
Enter rigging mode/telescope status menu

– For the *Standard* slewing range type



A For the *Main boom* boom system

B For the *Lattice extension* boom system

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1 Enter slewing range ➠ p. 9 - 130

2 Enter outrigger span ➠ p. 9 - 133
Outrigger span monitoring display[3)] ➠ p. 9 - 134

3 Entering counterweight ➠ p. 9 - 130

4 Boom system entry ➠ p. 9 - 132

5 Lattice extension input – length[1)] ➠ p. 9 - 132

6 Lattice extension input – angle[1), 2)] ➠ p. 9 - 132

7 Enter RCL code ➠ p. 9 - 134

8 Angle of the lattice extension display[1), 2)] ➠ p. 9 - 132

9 Entering reeving – Main hoist ➠ p. 9 - 131

10 Entering reeving – Auxiliary hoist ➠ p. 9 - 131

11 Boom system display ➠ p. 9 - 132

12 Reeving input mode display ➠ p. 9 - 131

13 Counterweight display ➠ p. 9 - 130

14 Accept the measured outrigger span ➠ p. 9 - 133

15 Pre-selection telescoping menu ➠ p. 9 - 46

16 Preselected telescoping display ➠ p. 9 - 131

17 Confirming the rigging mode ➠ p. 9 - 131

1) Additional equipment

2) Display only with an inclinable lattice extension

3) Additional equipment (for versions without *MAXbase* slewing range type)

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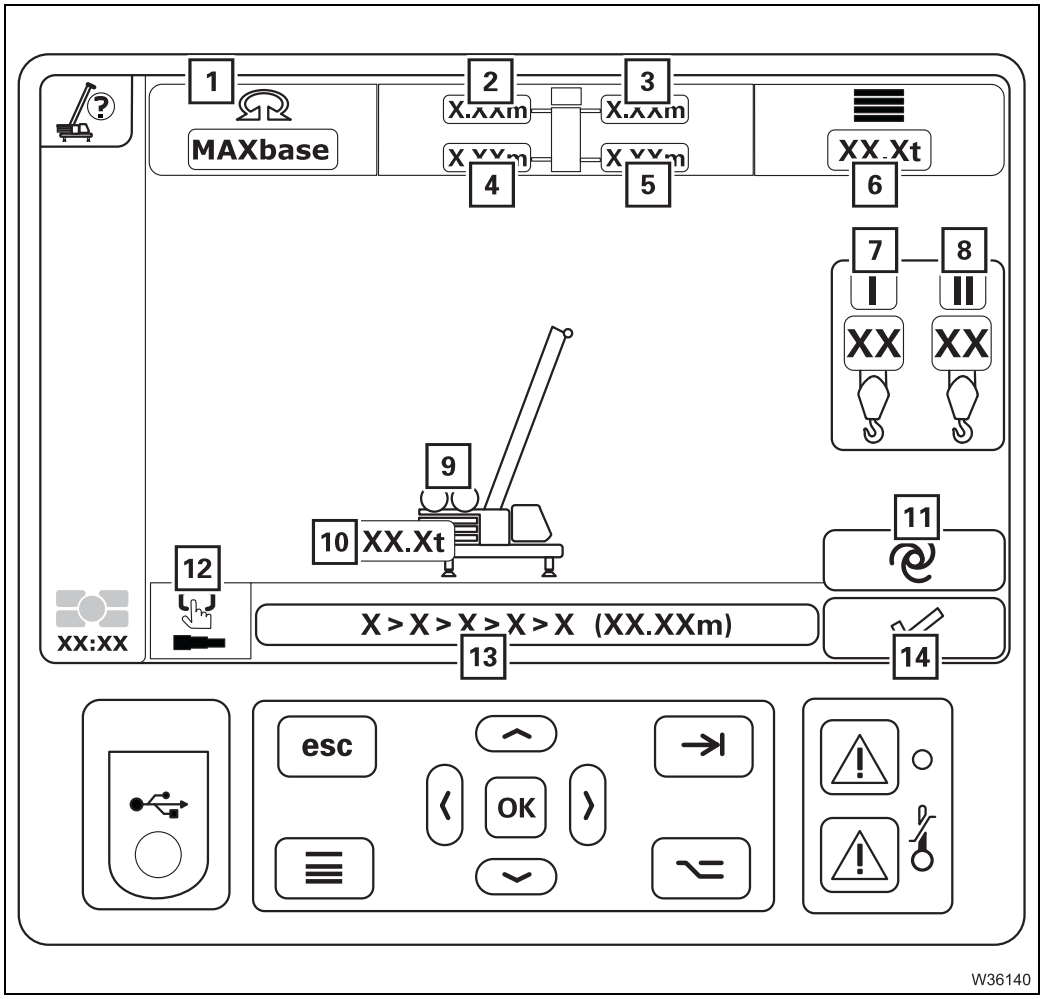
– For the *MAXbase* slewing range type [1)]



[1)] Additional equipment

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1	Enter slewing range	p. 9 - 130
2	Input front left outrigger span	p. 9 - 133
3	Input front right outrigger span	p. 9 - 133
4	Input rear left outrigger span	p. 9 - 133
5	Input rear right outrigger span	p. 9 - 133
2 to 5	Outrigger span monitoring display	p. 9 - 133
6	Entering counterweight	p. 9 - 130
7	Entering reeving – Main hoist	p. 9 - 131
8	Entering reeving – Auxiliary hoist	p. 9 - 131
9	Reeving input mode display	p. 9 - 131
10	Counterweight display	p. 9 - 130
11	Accept the measured outrigger span	p. 9 - 133
12	Pre-selection telescoping menu	p. 9 - 46
13	Preselected telescoping display	p. 9 - 131
14	Confirming the rigging mode	p. 9 - 131

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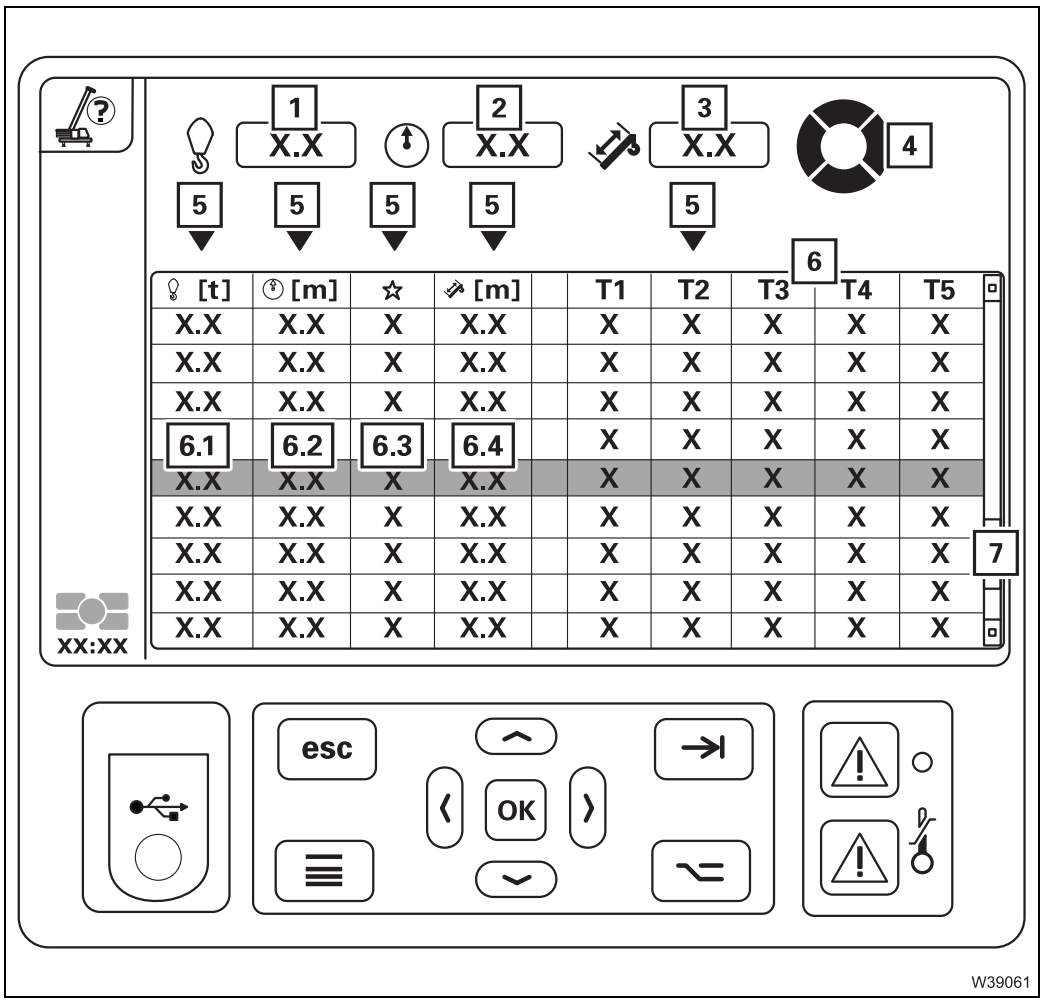
Pre-selection telescoping menu



Enter desired parameter

1 Input load p. 9 - 135

2 Input working radius p. 9 - 135

3 Input main boom length p. 9 - 135

4 Input slewing range[1)] p. 9 - 135

Pre-selection telescoping

5 Sort values p. 9 - 135

6 Selectable telescoping display p. 9 - 135

- **6.1** Associated maximum load p. 9 - 135
- **6.2** Associated maximum working radius p. 9 - 135
- **6.3** Associated telescoping duration p. 9 - 135
- **6.4** Associated main boom length p. 9 - 135

7 Overview of the table lengths

1) Display only with the *MAXbase* slewing range type

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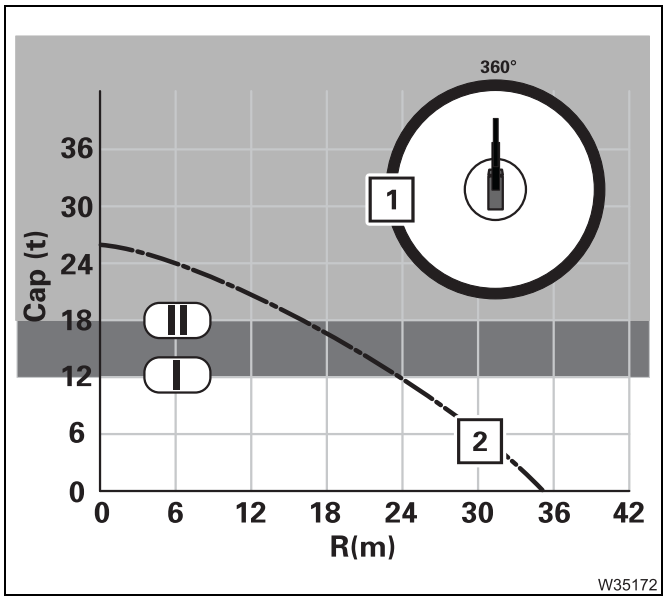
Lifting capacity tables menu

➠ *Displaying the lifting capacity tables*, p. 11 - 63



– For the *Standard* slewing range type

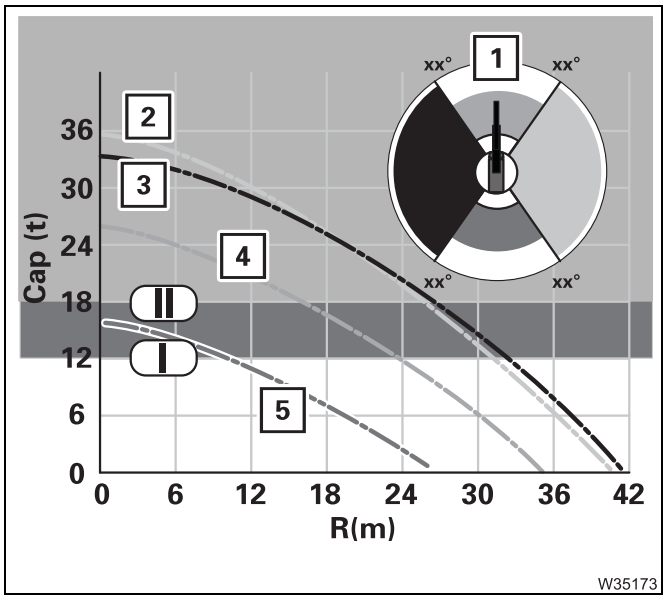
1 Slewing range display

2 Permissible working range display (range under the curve)

I Main hoist display
Limitation due to reeving

II Auxiliary hoist display
Limitation due to reeving

➠ p. 11 - 63



– 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
5

I Main hoist display
Limitation due to reeving

II Auxiliary hoist display
Limitation due to reeving

➠ p. 11 - 65

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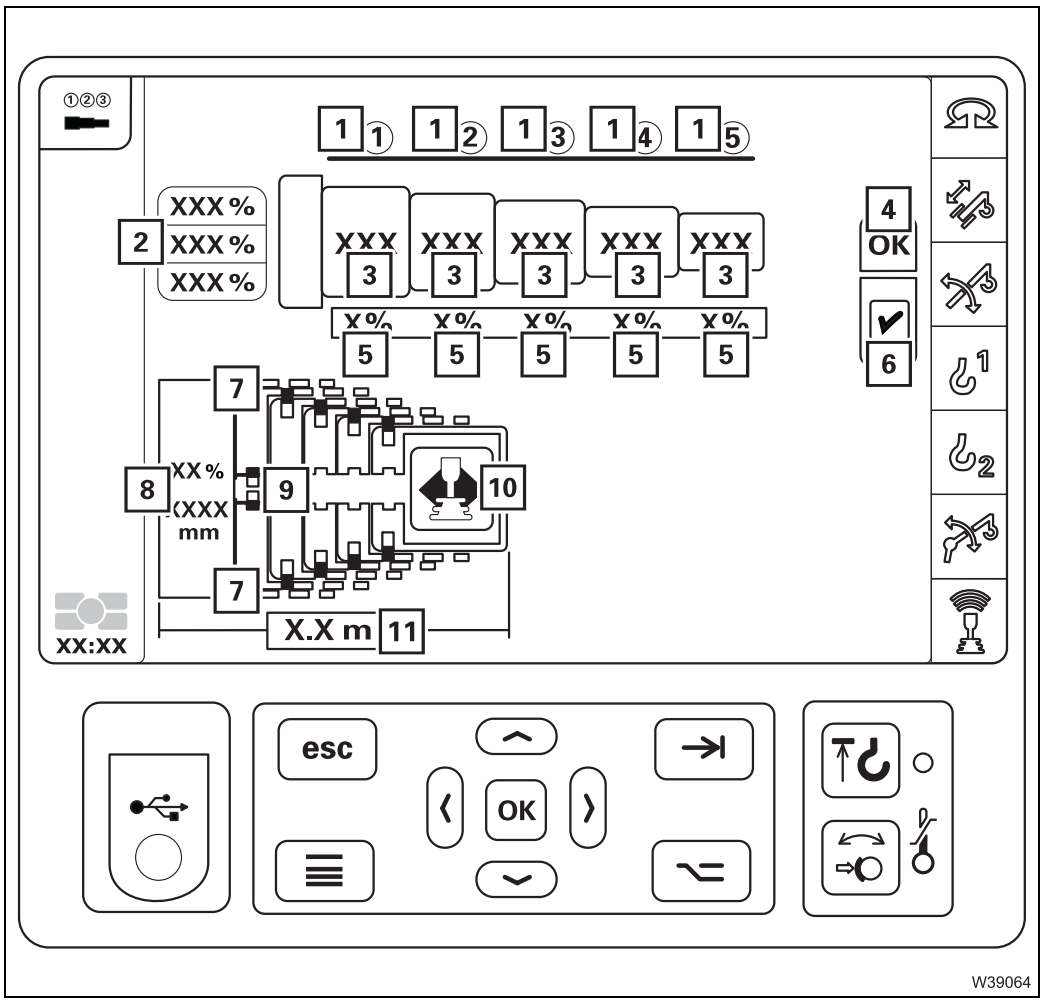
Telescoping semi-automation menu



1	Telescopic sections display	p. 9 - 118
2	Pre-selection for all telescopic sections	p. 9 - 118
3	Pre-selection individual telescopic sections	p. 9 - 119
4	Confirming preselection	p. 9 - 119
5	Current telescoping status display	p. 9 - 118
6	Telescoping permitted display Telescoping not permitted display	p. 9 - 119
7	Locking status telescopic section display	p. 9 - 117
8	Telescoping cylinder length display	p. 9 - 118
9	Locking status telescoping cylinder display	p. 9 - 117
10	Teleautomation direction display	p. 9 - 119
11	Main boom length display	p. 9 - 118

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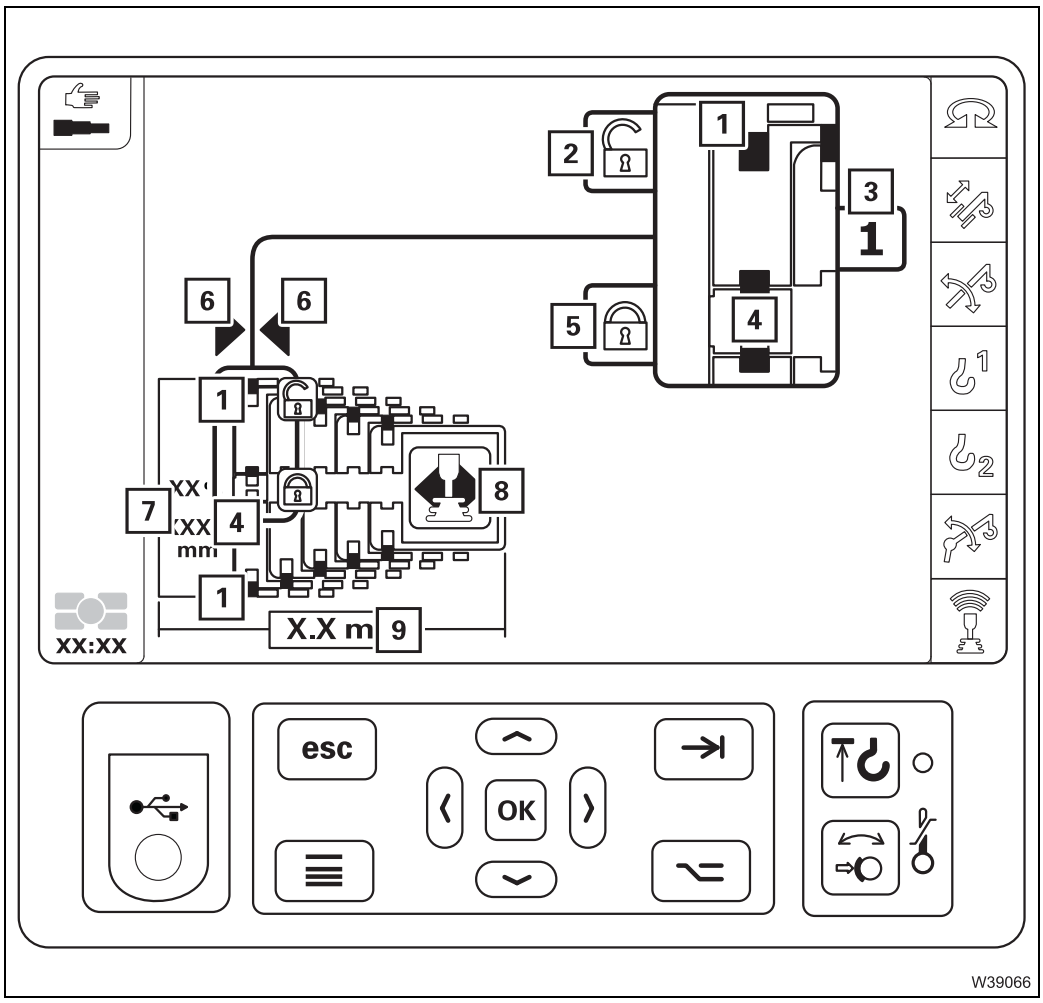
Manual telescoping menu



1 Locking status telescopic section display p. 9 - 120
2 Symbol lock/release telescopic section p. 9 - 120
3 Telescoping cylinder in the telescopic section display p. 9 - 121
4 Locking status telescoping cylinder display p. 9 - 119
5 Locking/releasing the telescoping cylinder p. 9 - 120
6 Locking point display p. 9 - 120
7 Telescoping cylinder length display p. 9 - 120
8 Telescoping direction display p. 9 - 121
9 Main boom length display p. 9 - 121

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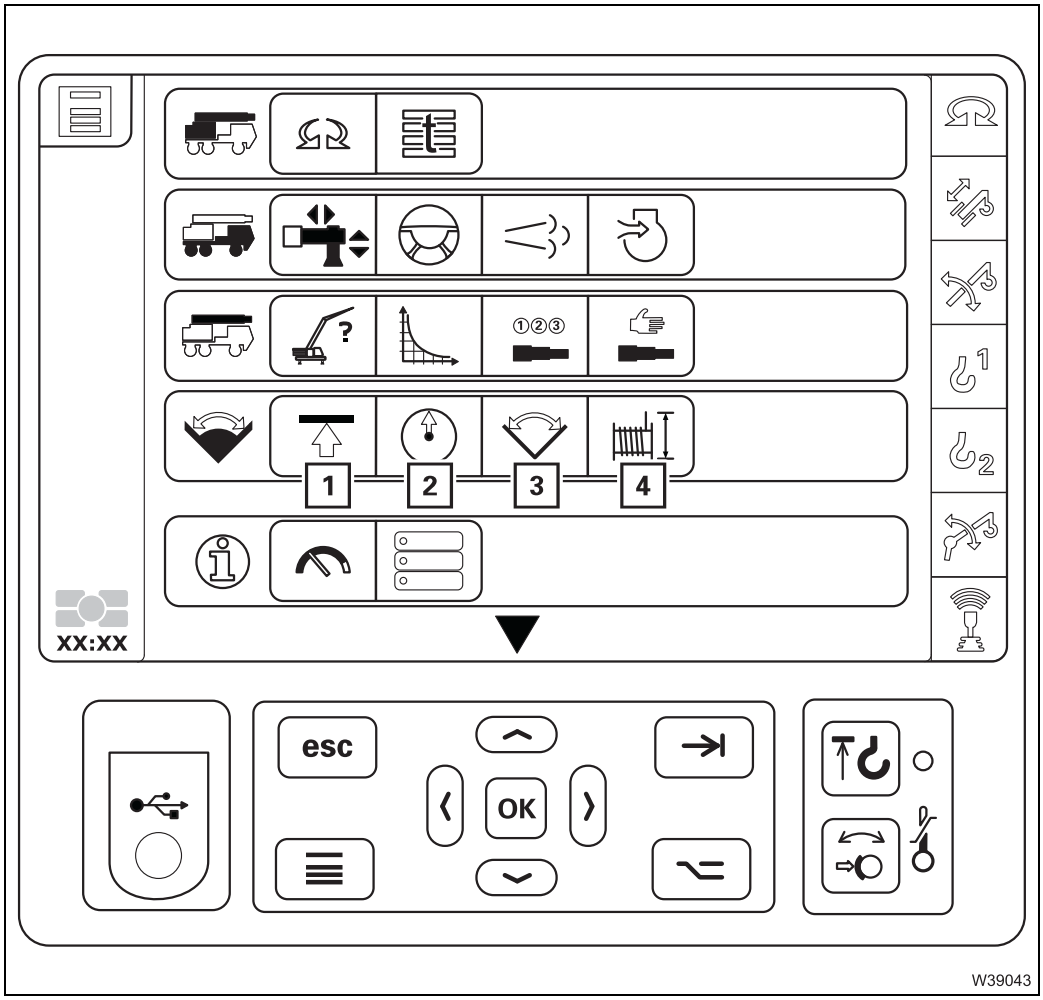
9.1.13 Working range limiter menu group



1 Overall height menu p. 9 - 52
2 Working radius menu p. 9 - 53
3 Slewing angle menu p. 9 - 54
4 Hoist rope travel limitation menu p. 9 - 55

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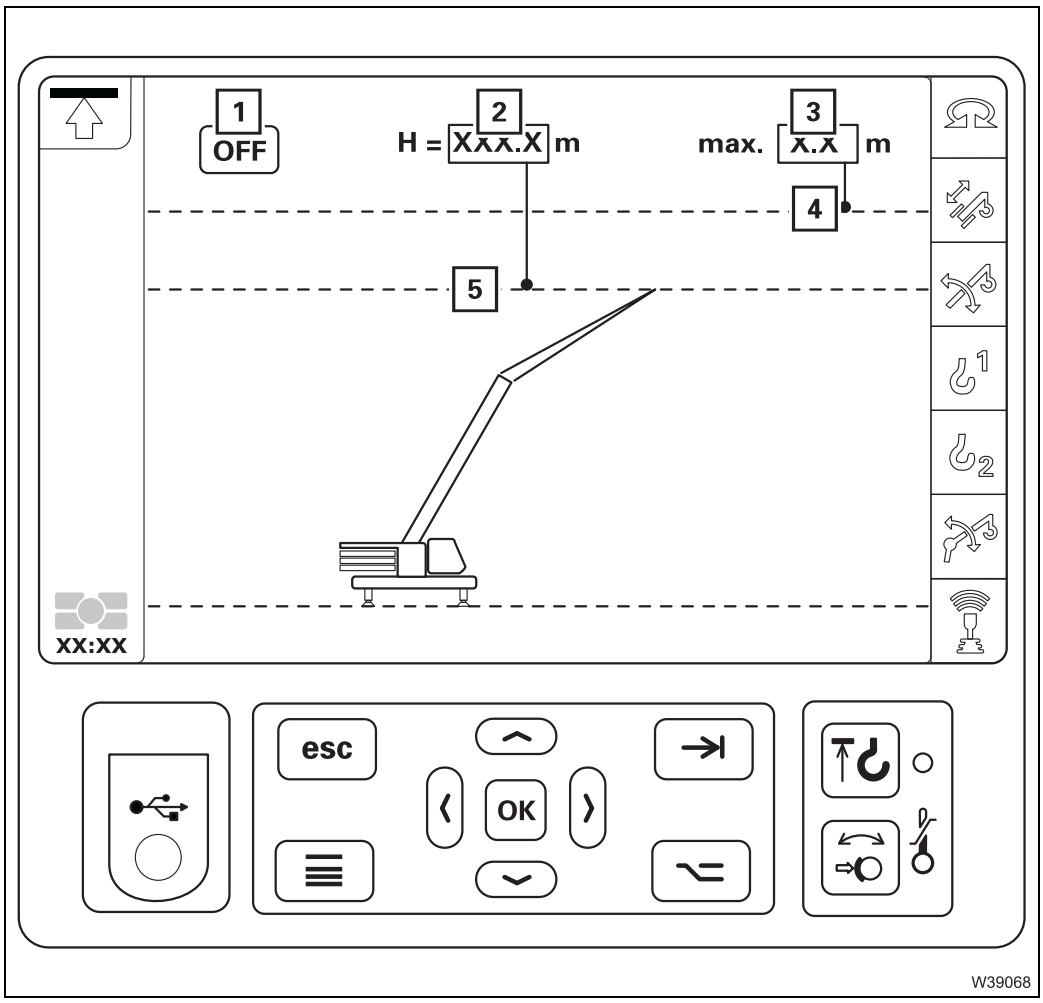
Overall height menu



1 Switching monitoring function on/off

2 – Current overall height display
– Accepting limit value

3 – Overall height limit value display
– Entering limit values manually

p. 11 - 140

4 Overall height limit value display

5 Current overall height display

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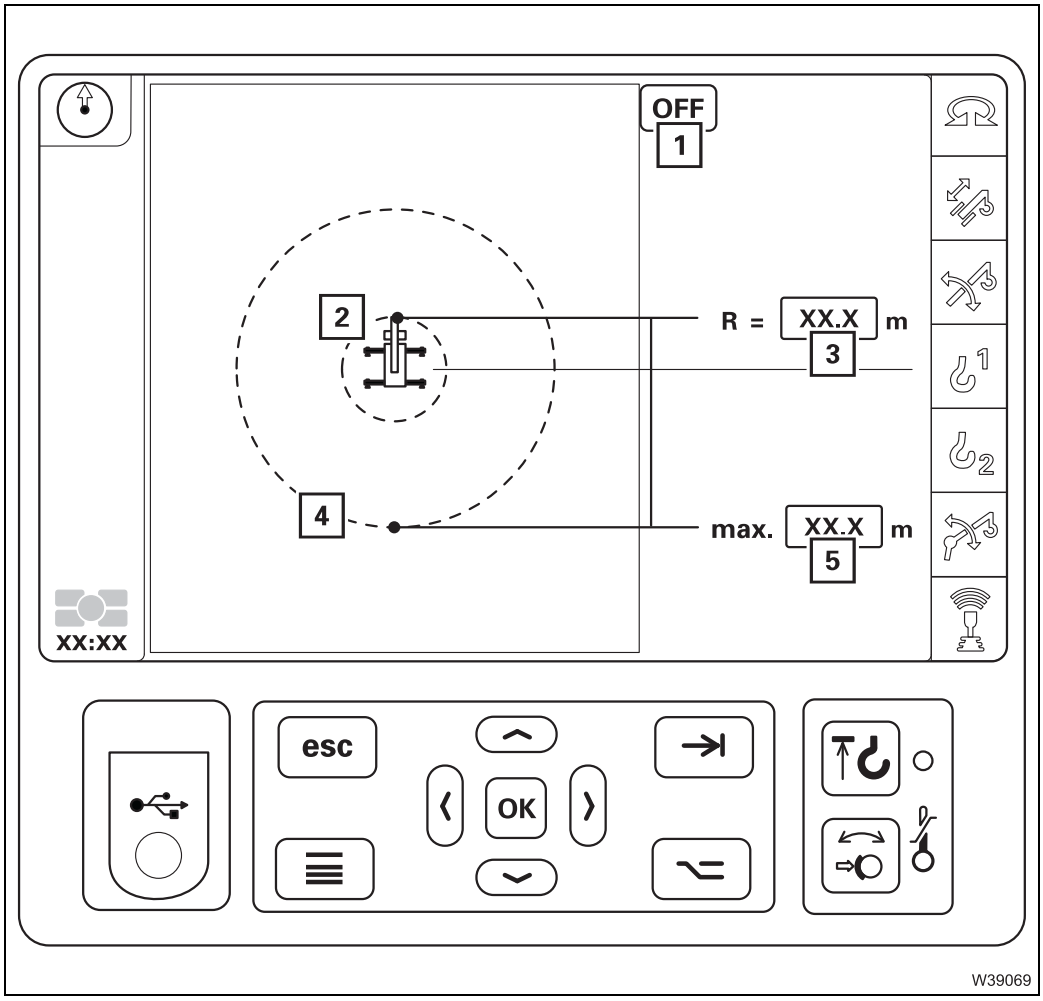
Working radius menu



1 Switching monitoring function on/off

2 Current working radius display

3 – Current working radius display
– Accepting limit value

p. 11 - 142

4 Working radius limit value display

5 – Working radius limit value display
– Entering limit values manually

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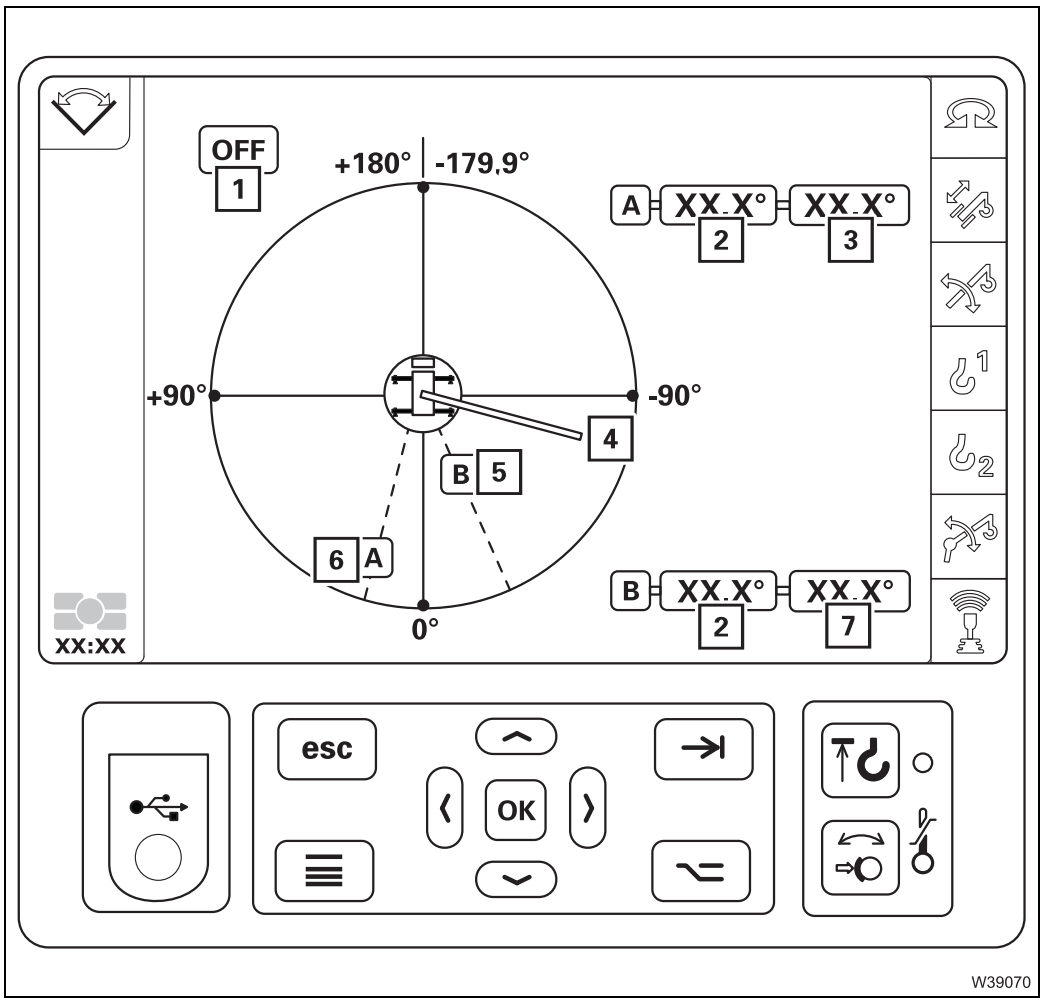
Slewing angle menu



1 Switching monitoring function on/off

2 – Current slewing angle display
– Accepting limit value

3 – Slewing angle A limit value display
– Manually entering limit value

4 Current slewing angle display

5 Slewing angle B display

6 Slewing angle A display

7 – Slewing angle B limit value display
– Manually entering limit value

p. 11 - 144

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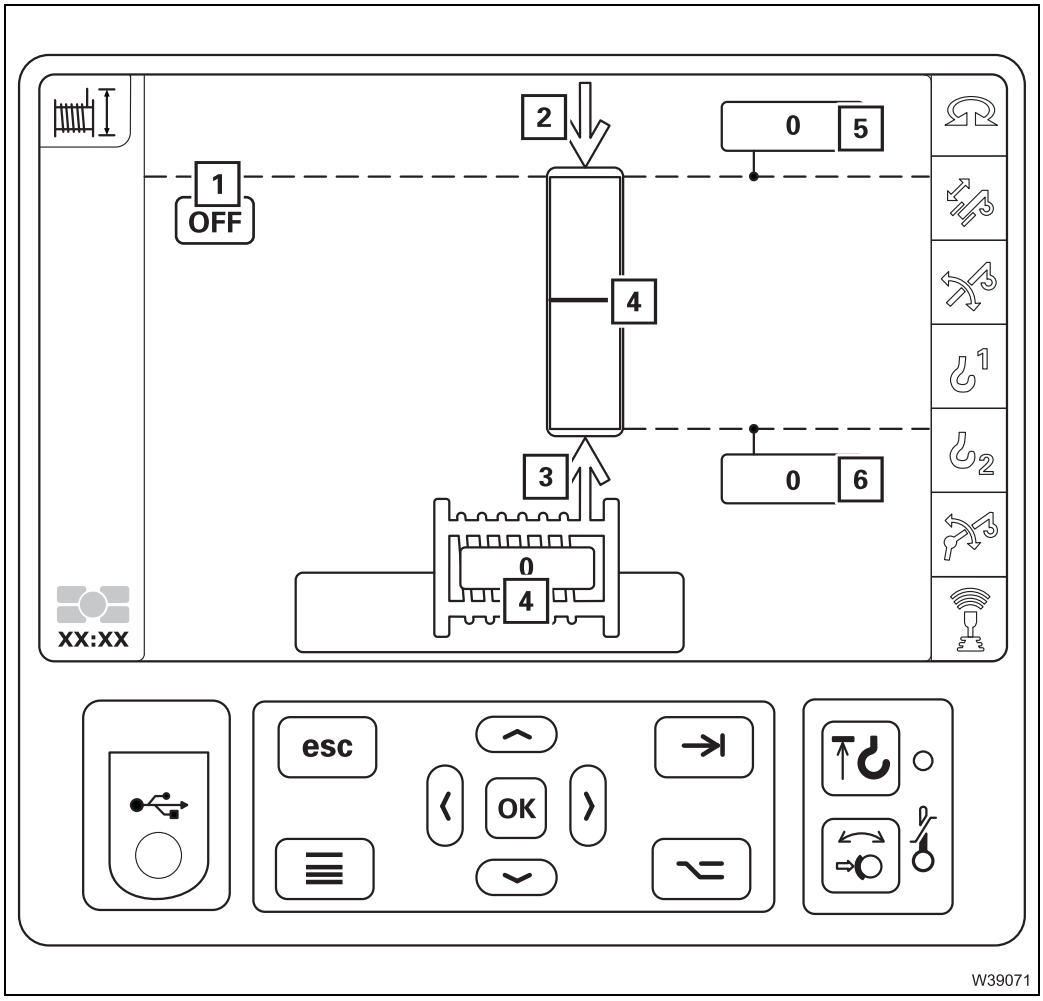
Hoist rope travel limitation menu



1 Switching monitoring function on/off

2 *Raise* input confirmation

3 *Lower* input confirmation

4 Current hoist rope position display

p. 11 - 147

5 – *Raise* limit value display
– Accepting limit value

6 – *Lower* limit value display
– Accepting limit value

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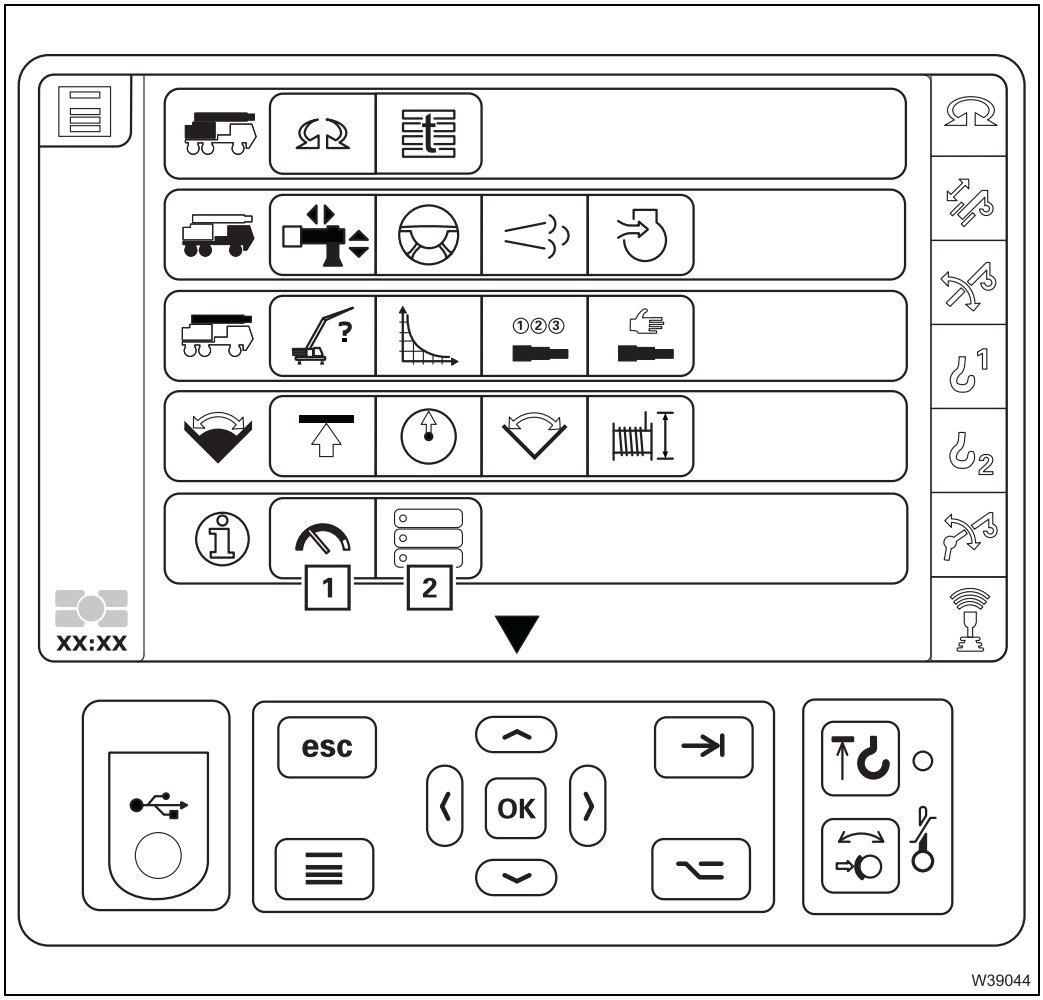
9.1.14 Information menu group 1



1 Hydraulic pressure and fuel consumption menu p. 9 - 57

2 Datalogger menu (Menu opens on the display *RCL)* p. 9 - 81

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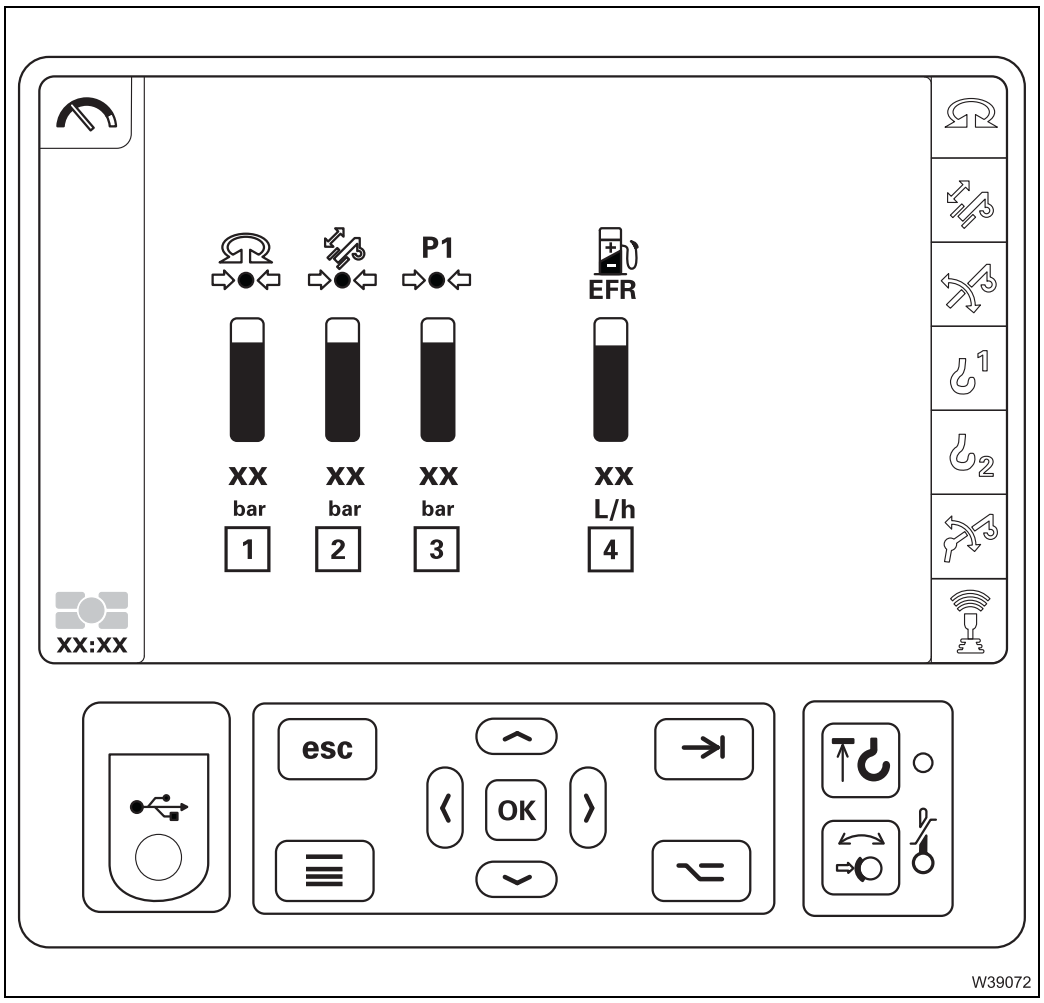
Hydraulic pressure and fuel consumption menu



1 Slewing gear hydraulic circuit pressure display p. 9 - 122

2 Telescoping cylinder pressure display p. 9 - 122

3 Hydraulic circuit pressure display p. 9 - 122

4 Display of consumption in litres per hour[1)]

[1)] Additional equipment

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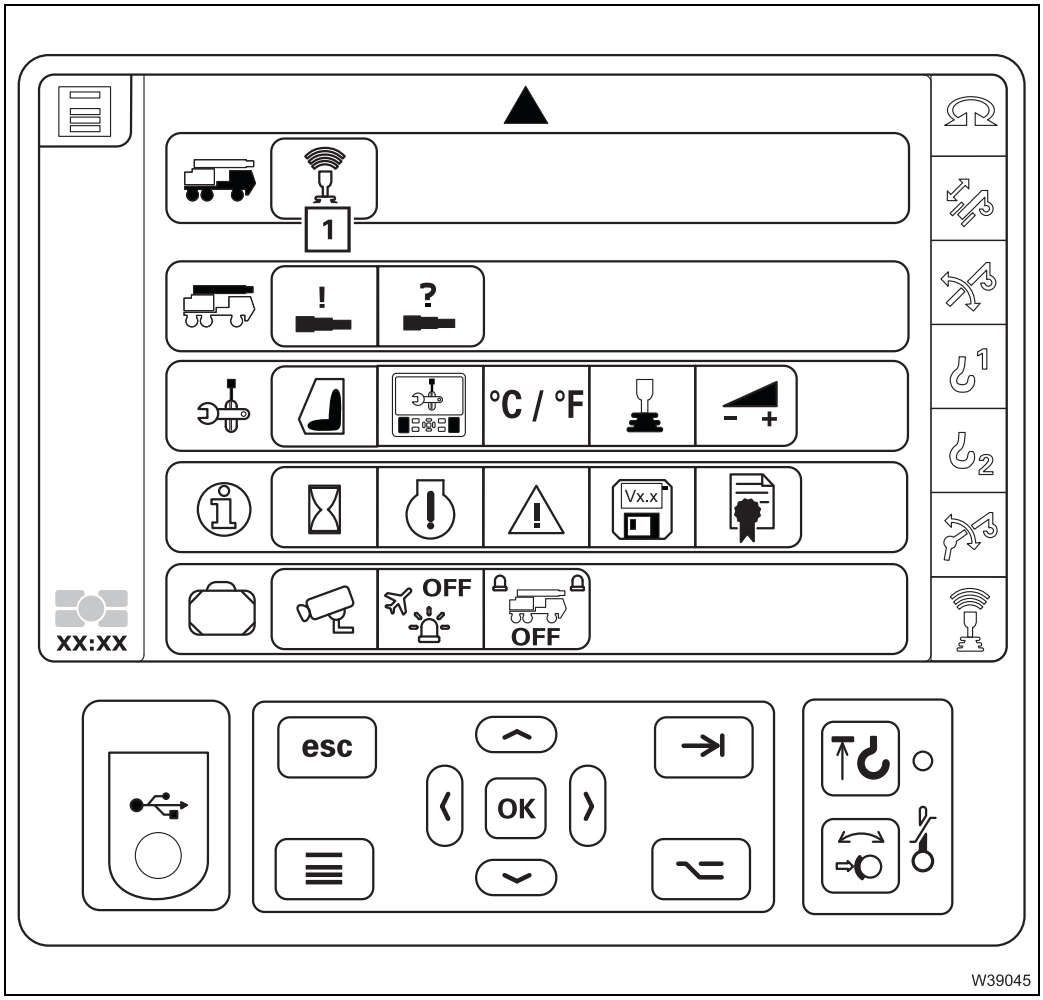
9.1.15 Heating/Engine/Additional equipment menu group



1 Remote control menu p. 9 - 59

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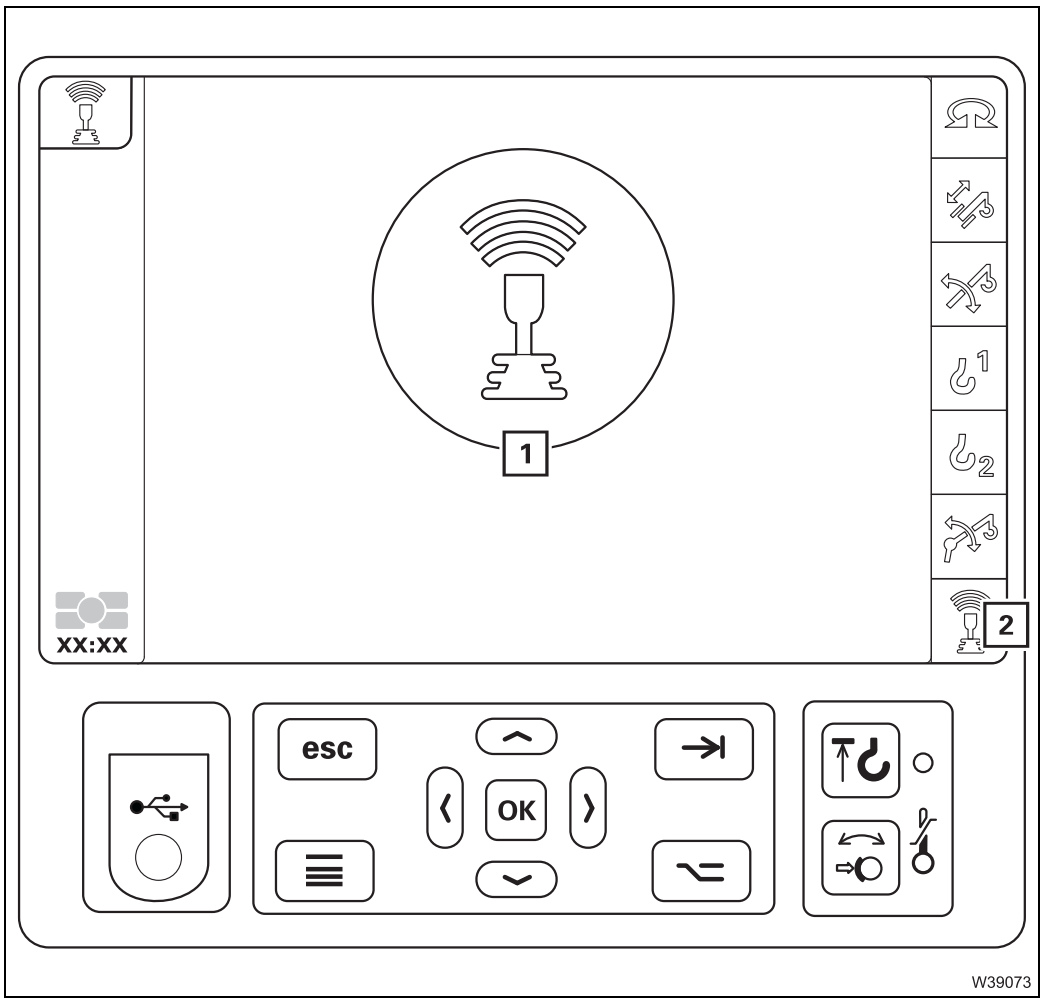
Remote control menu



1 Remote control menu p. 9 - 126

2 Remote control display p. 9 - 126

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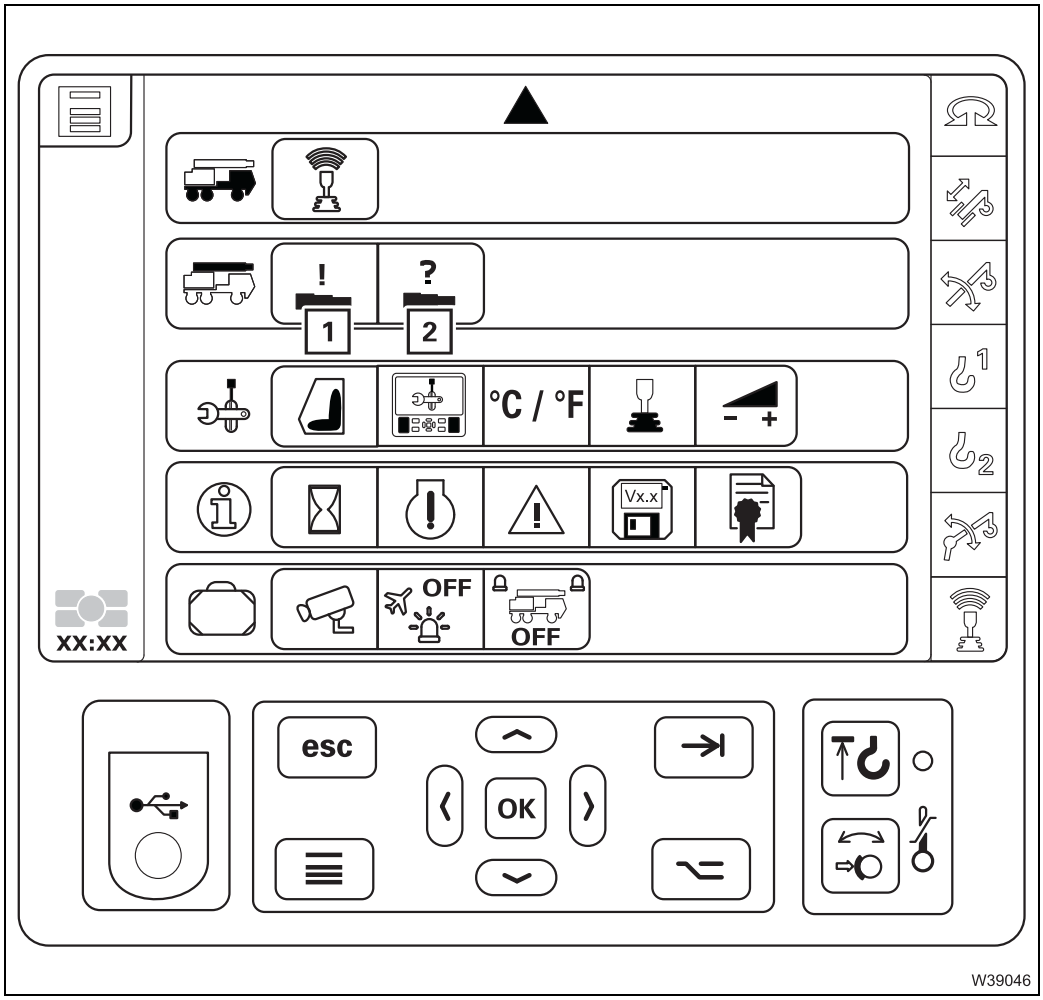
9.1.16 Telescoping emergency program menu group



1 Telescoping emergency program menu p. 9 - 61

2 Unknown telescoping menu p. 9 - 62

1) Additional equipment

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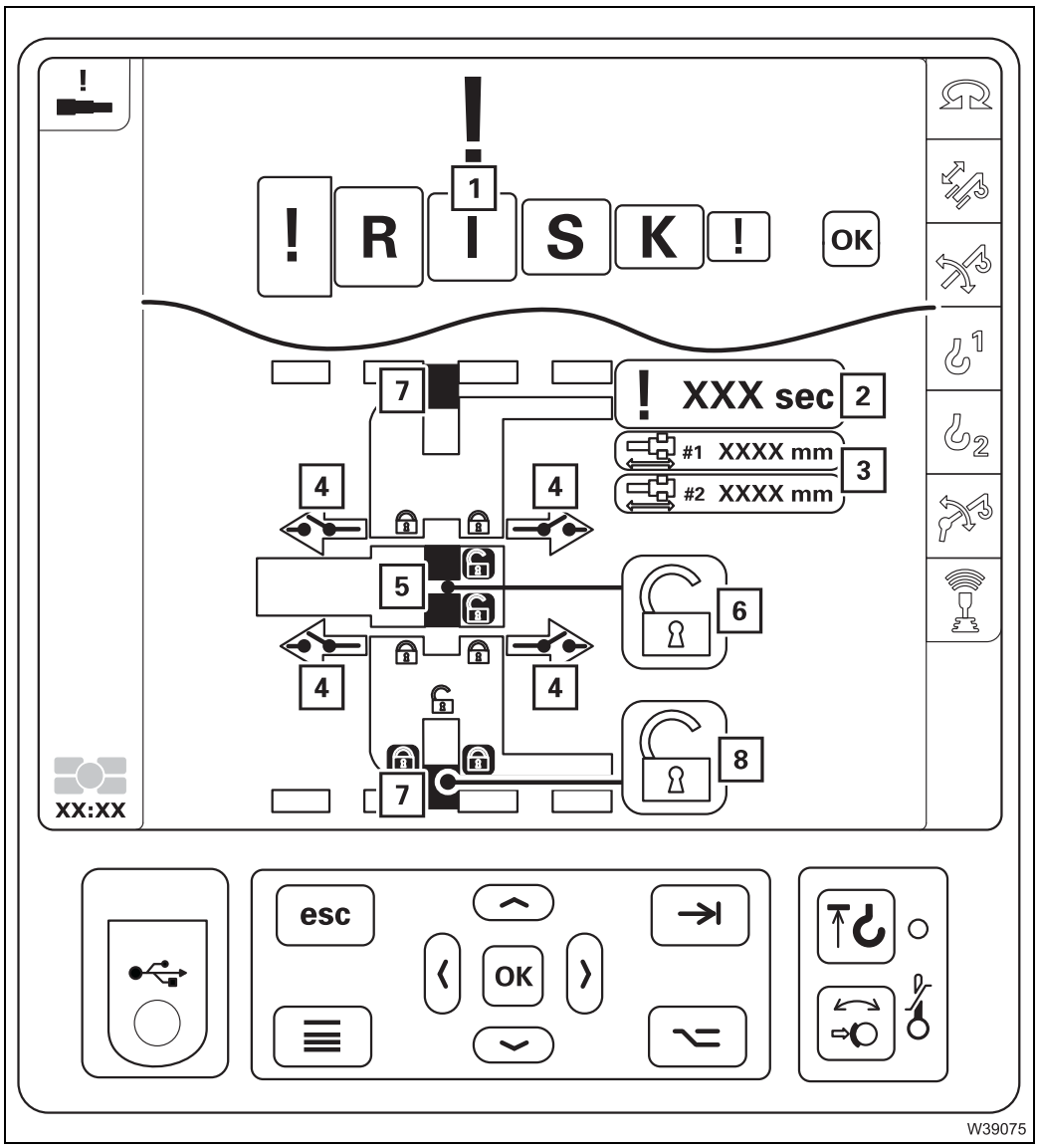
Telescoping emergency program menu



1 Input access code emergency program p. 14 - 33

2 Remaining time emergency program display p. 14 - 33

3 Telescoping cylinder length displays p. 14 - 33

4 – Locking status telescoping cylinder display
– Locking/unlocking the telescoping cylinder p. 14 - 33

5 – Locking status telescopic section display
– Locking/unlocking a telescopic section p. 14 - 33

6 Display, position of the telescoping cylinder in the foot section p. 14 - 33

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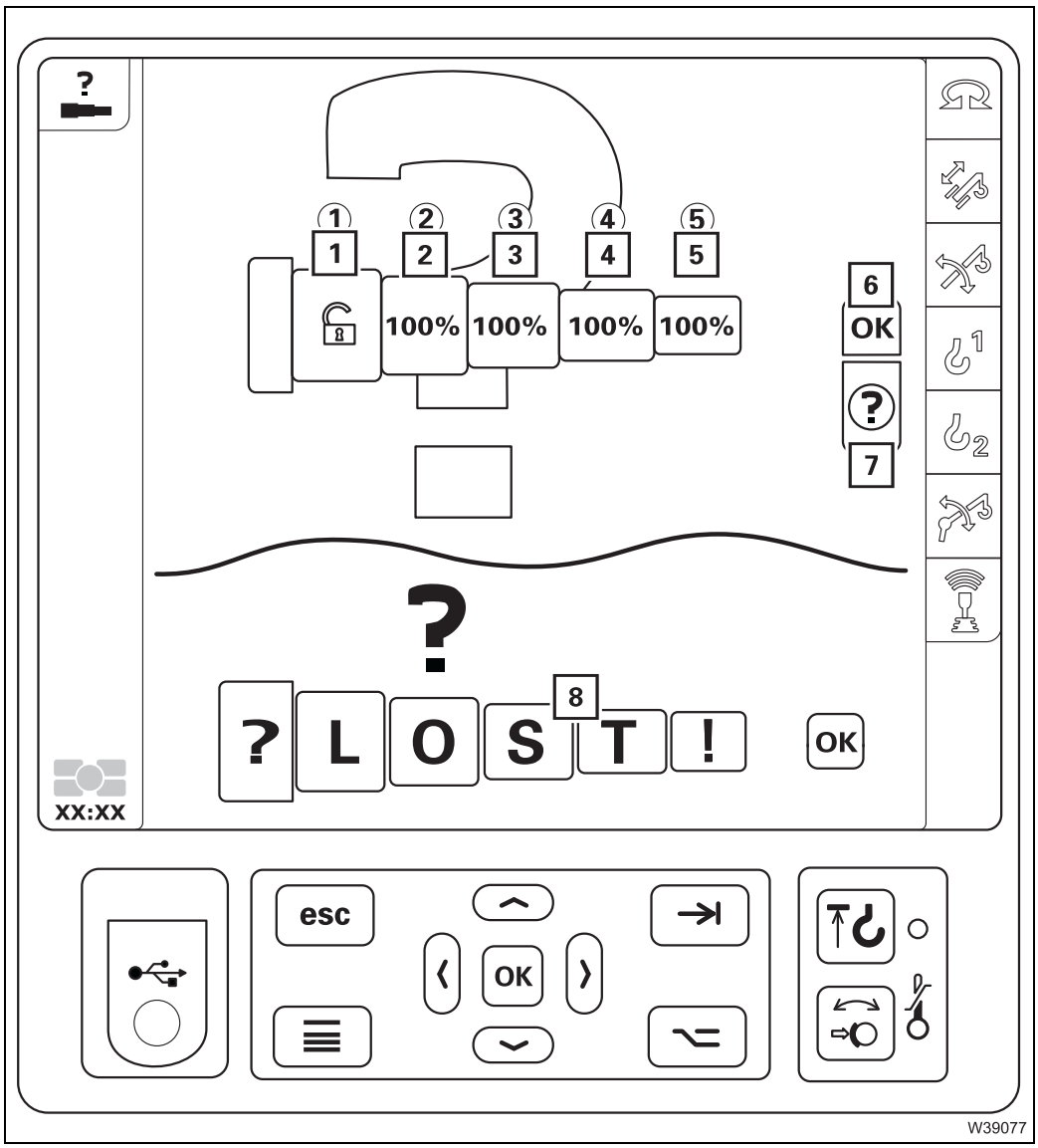
Unknown telescoping menu



1 Input for telescopic section I p. 14 - 41
2 Input for telescopic section II p. 14 - 41
3 Input for telescopic section III p. 14 - 41
4 Input for telescopic section IV p. 14 - 41
5 Input for telescopic section V p. 14 - 41
6 Input confirmation p. 14 - 41
7 Telescoping permitted/not permitted display p. 14 - 41
8 Input access code unknown telescoping p. 14 - 41

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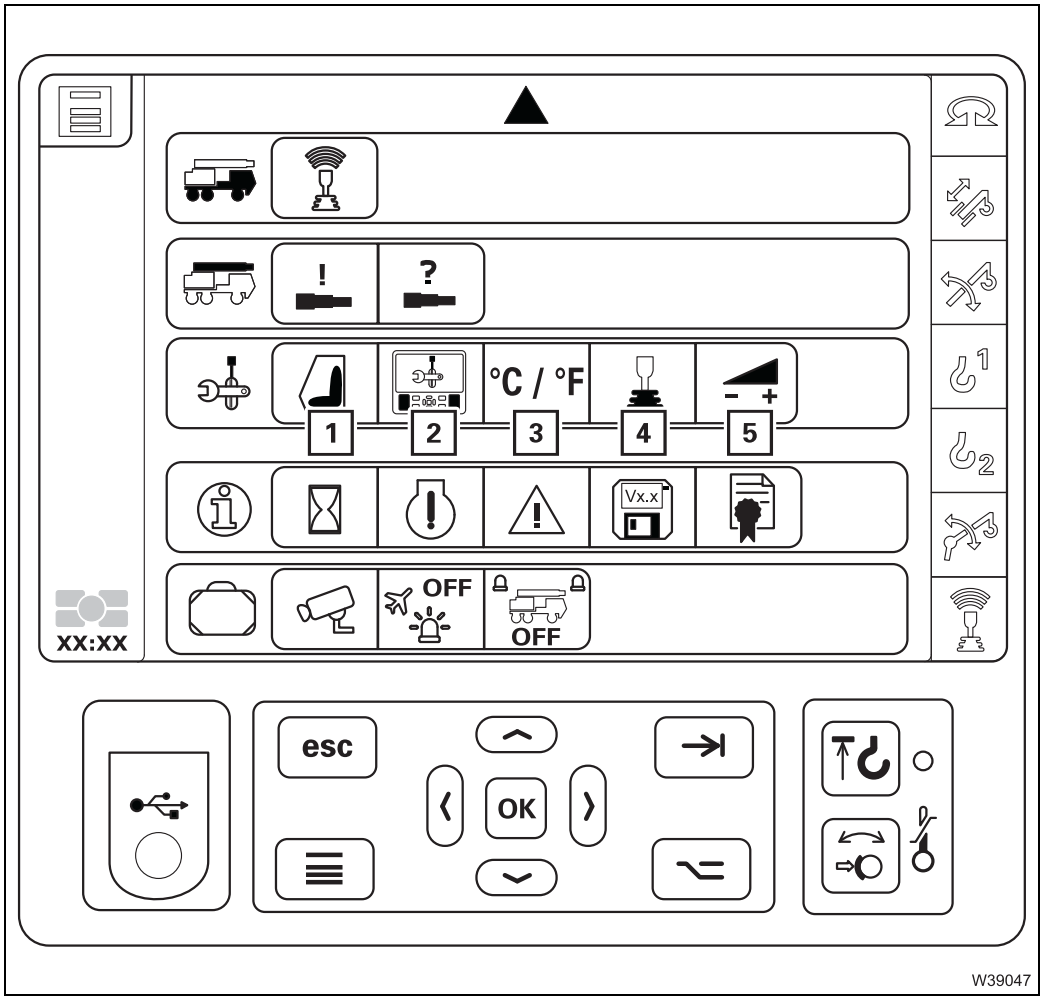
9.1.17 Settings menu group



1 Crane cab menu p. 9 - 64
2 Set display brightness and date/time menu p. 9 - 65
3 Switch units menu p. 9 - 66
4 Set control lever characteristic curve menu p. 9 - 67
5 Power unit speeds menu p. 9 - 68

1) Additional equipment

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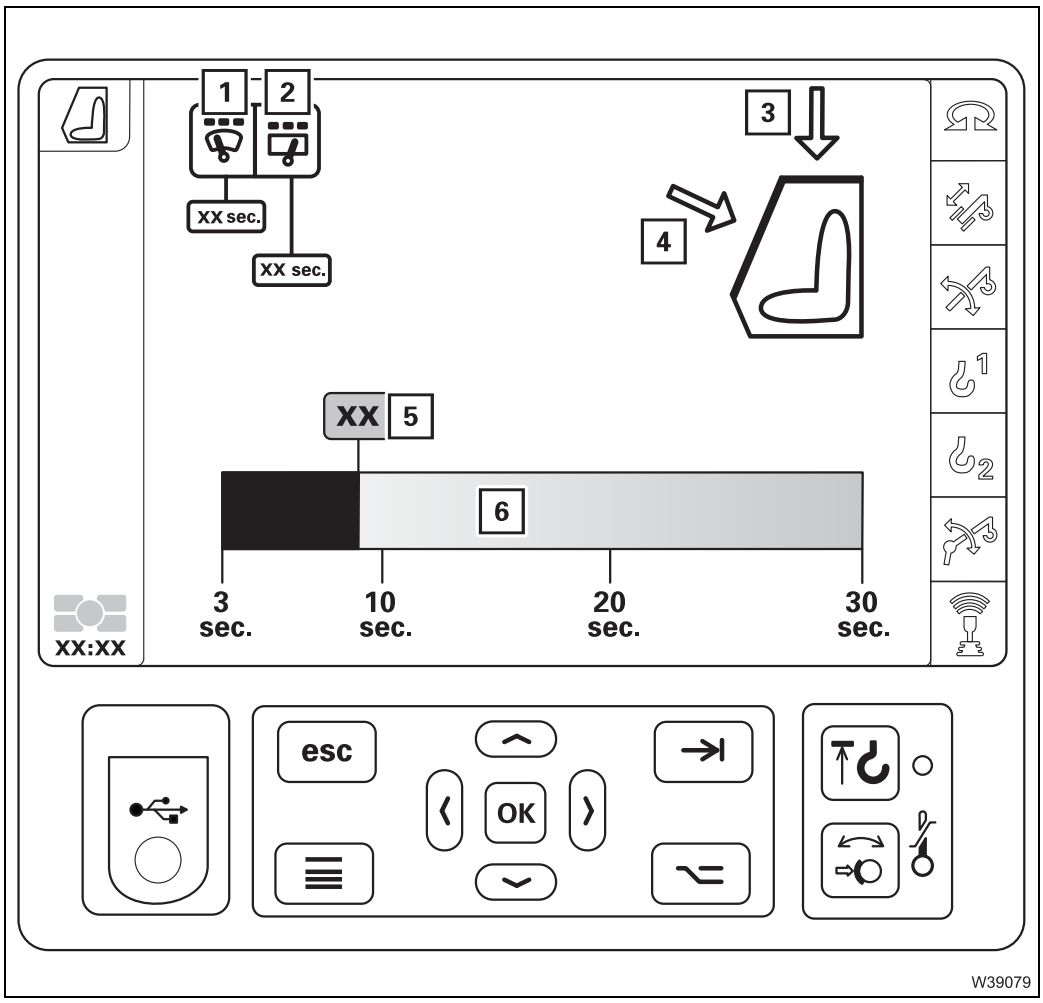
Crane cab menu



1 Windscreen interval duration selection/display p. 9 - 143
2 Skylight interval duration selection/display p. 9 - 143
3 Skylight selected display p. 9 - 143
4 Windscreen selected display p. 9 - 143
5 Adjust interval selection p. 9 - 143
6 Adjust interval display p. 9 - 143

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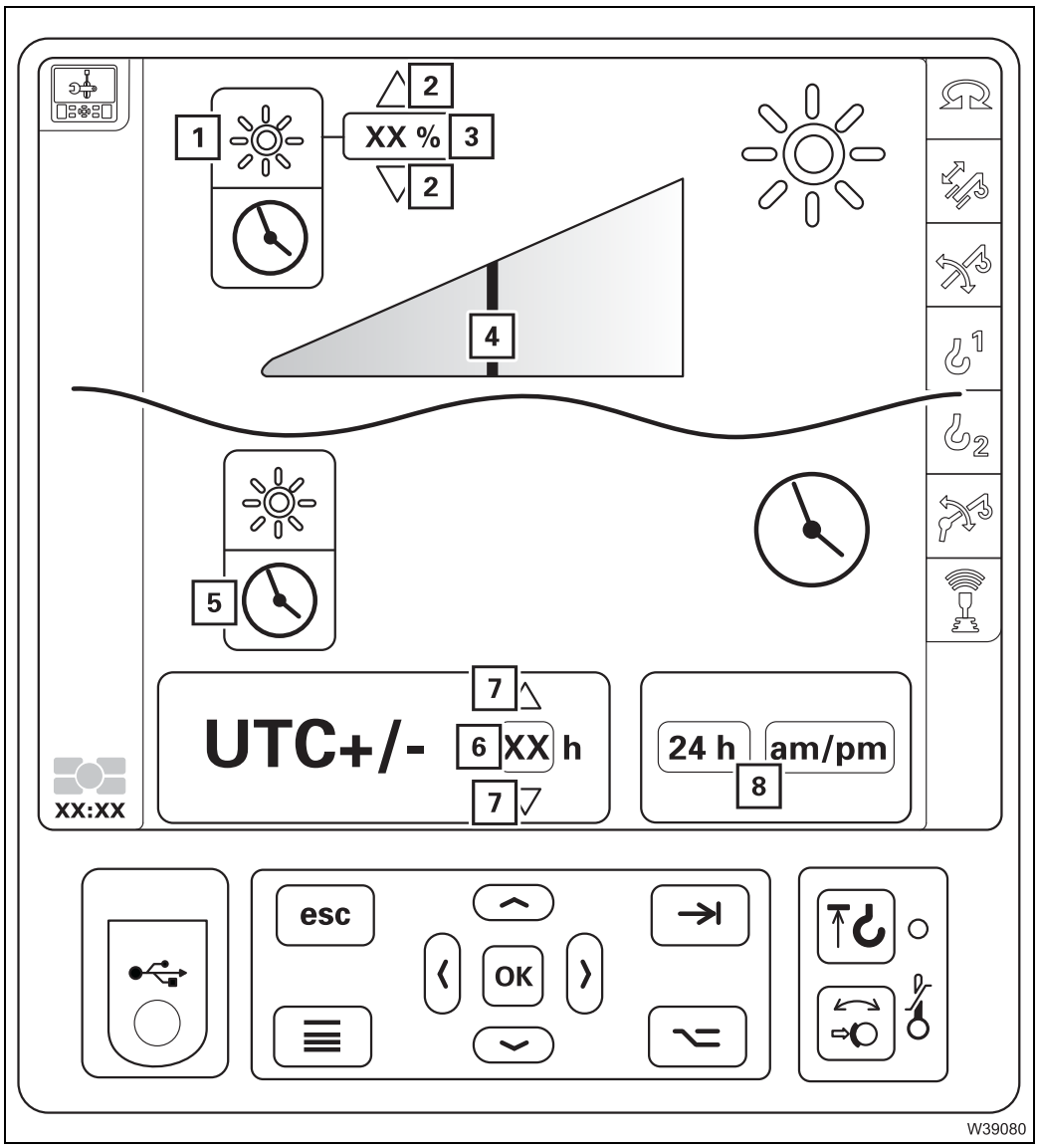
Set display brightness and date/ time menu

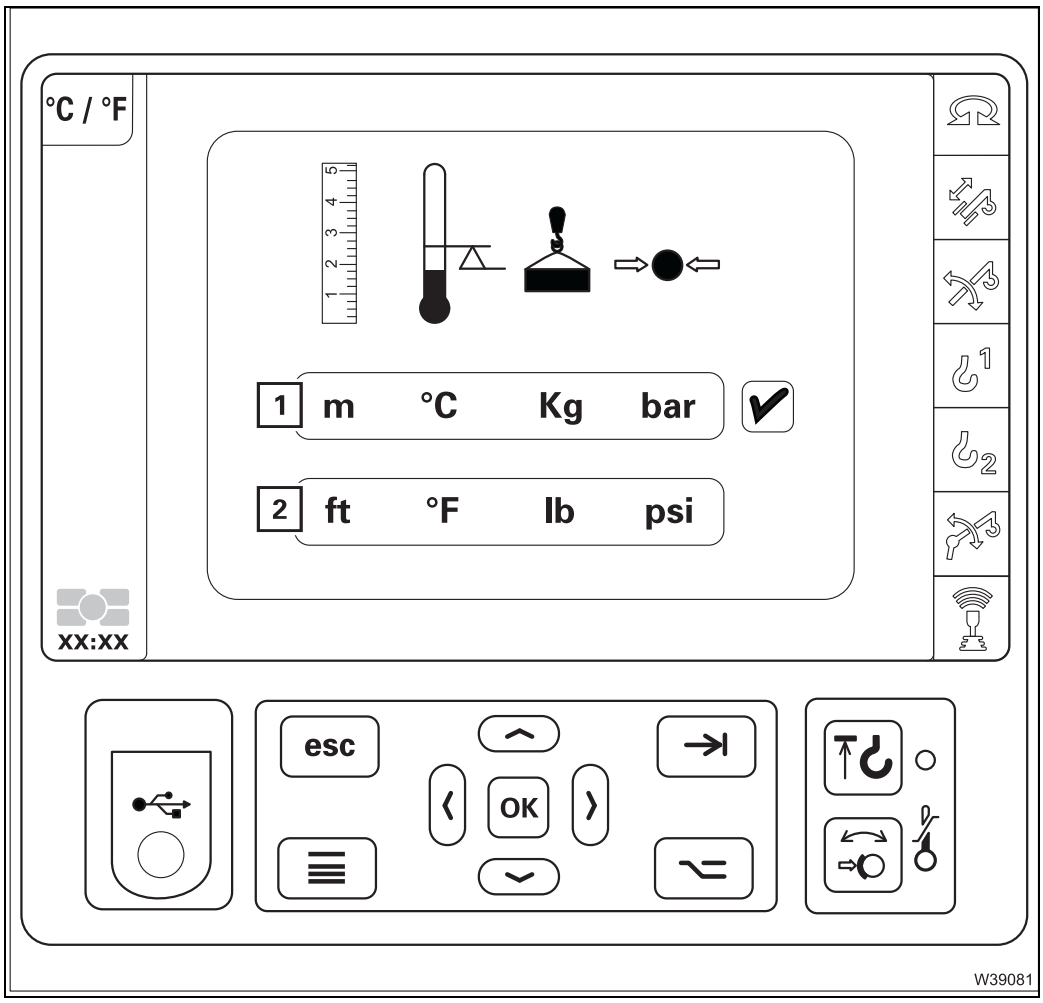


1 Selection for setting the display brightness[1)] p. 4 - 11
2 Increasing/reducing the value[1)] p. 4 - 11
3 Display in percent[1)] p. 4 - 11
4 Brightness display[1)] p. 4 - 11
5 Adjust time selection p. 11 - 23
6 Setting the time p. 11 - 23
7 Increasing/reducing the value p. 11 - 23
8 Switching the display type p. 11 - 23

[1)] This is operated in the same way as in the driver's cab.

13.12.2018

Switch units menu



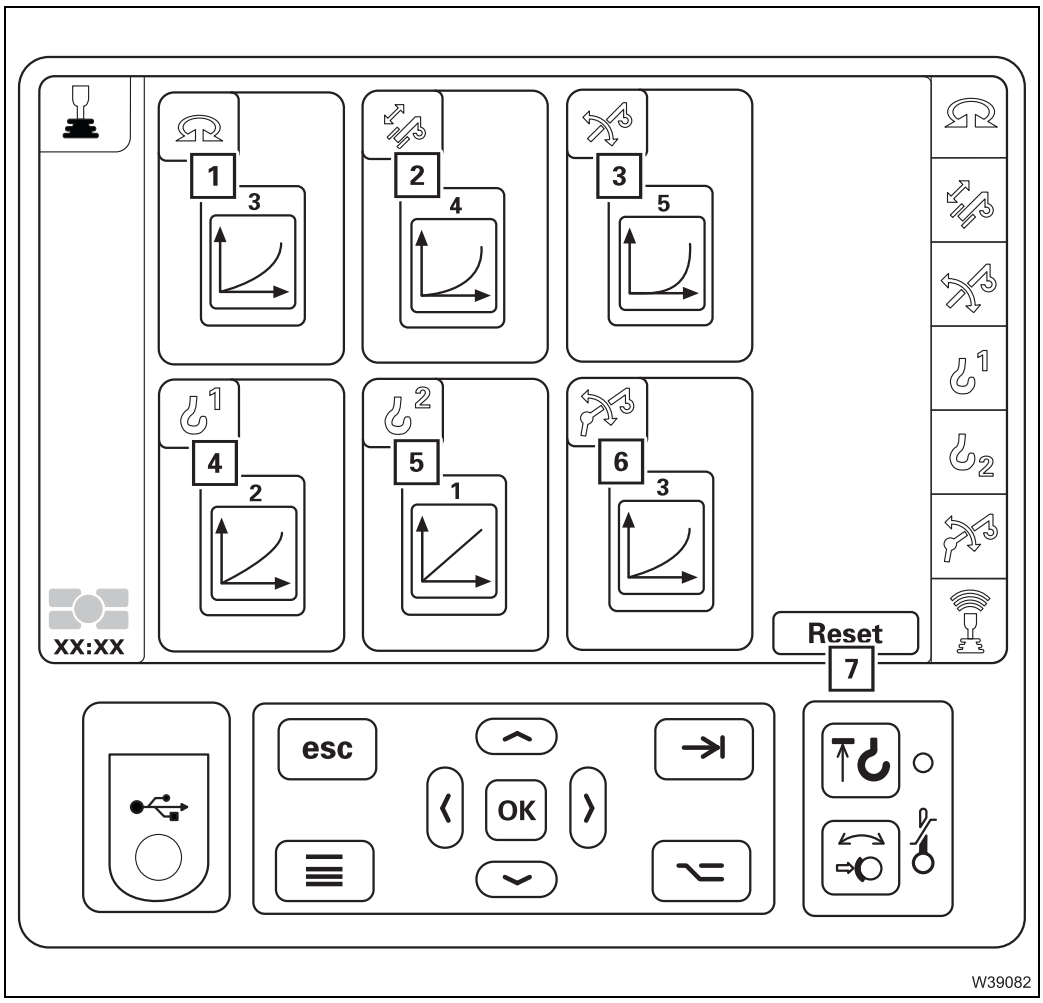
1 Display units in:
- Metres
- Degrees Celsius
- Kilograms
- Bar

p. 11 - 132

2 Display units in:
- Feet
- Degrees Fahrenheit
- lbs
- Psi

13.12.2018

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 ➠ p. 11 - 133
5 Auxiliary hoist[1)] characteristic curve
6 Lattice extension[1)] characteristic curve
7 Setting Reset characteristic curve

[1)] Additional equipment

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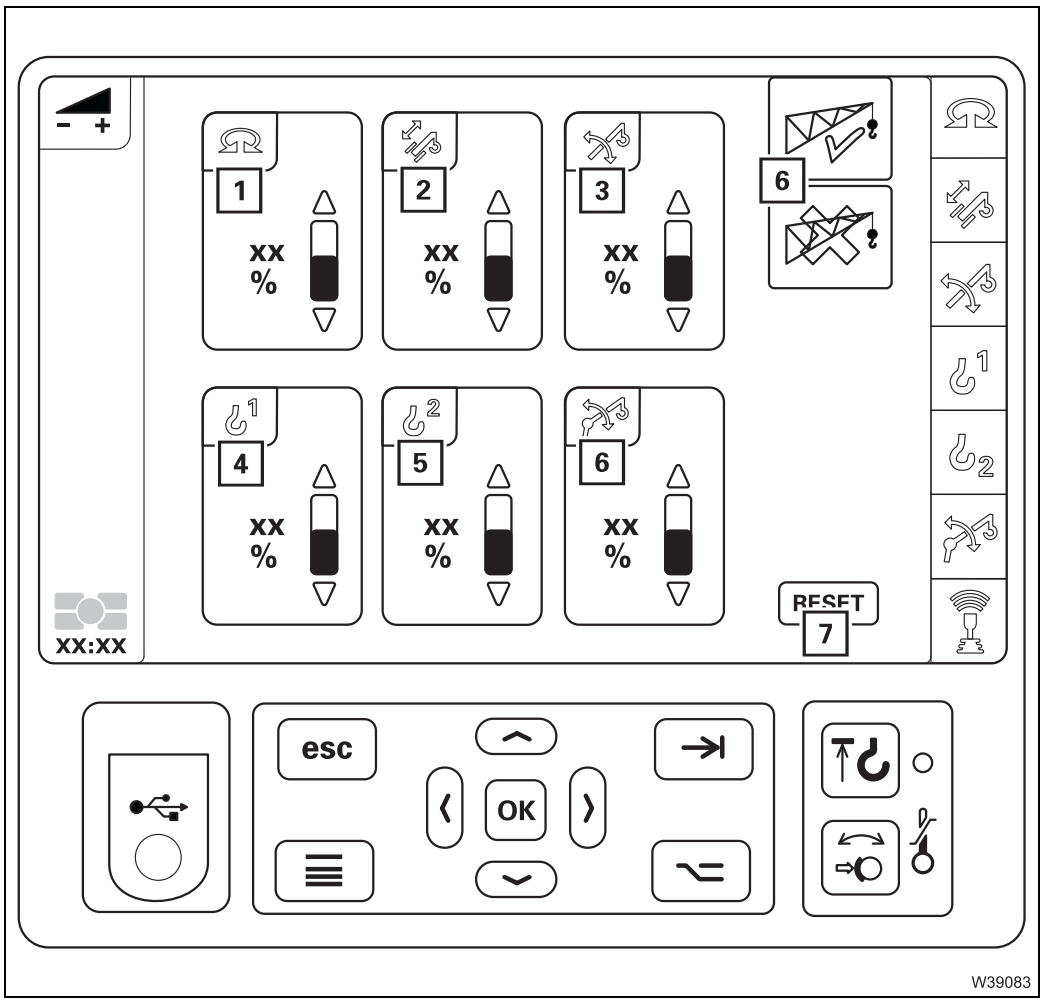
Power unit speeds menu



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[1)]

6 Enter speed for derricking gear of lattice extension[1)]

7 Reset power unit speed settings

p. 11 - 131

[1)] Additional equipment

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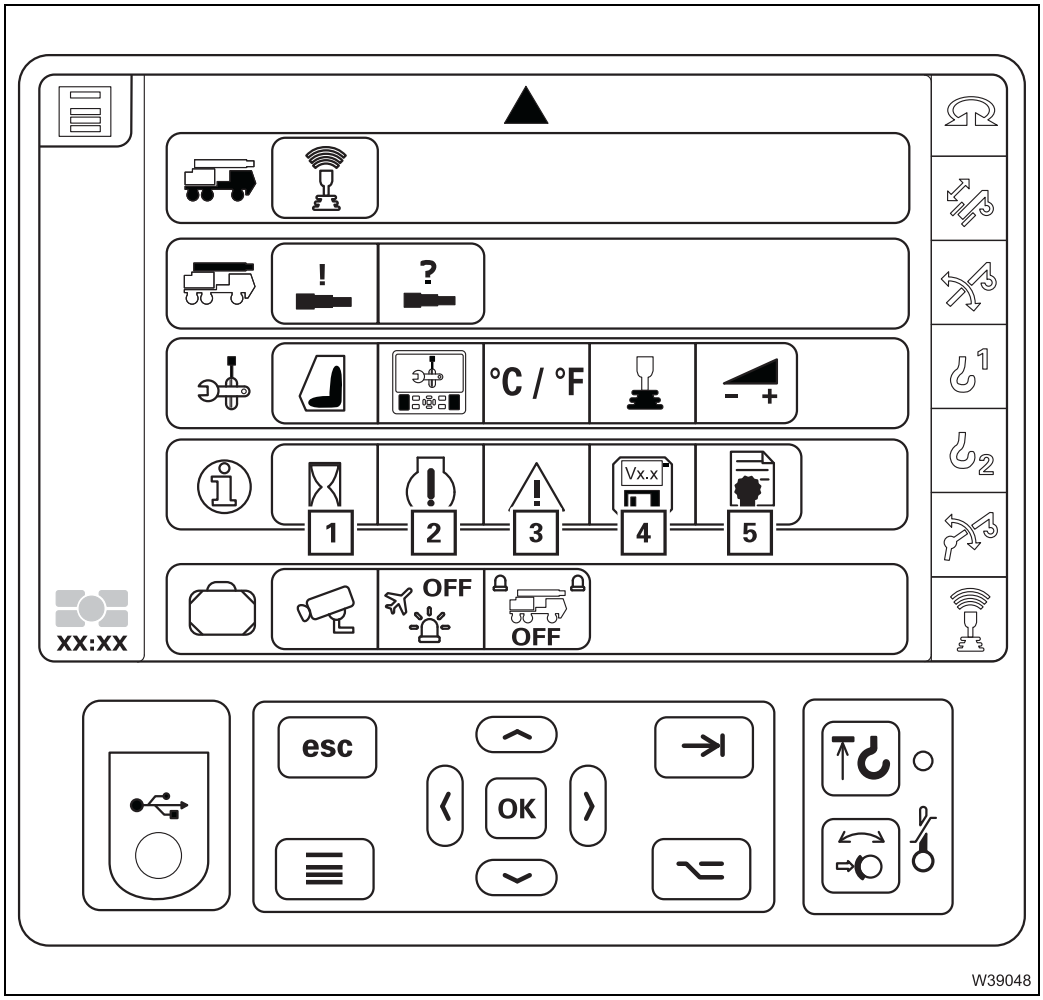
9.1.18 Information menu group 2



1 Operating hours menu p. 9 - 70
2 Engine/transmission error menu p. 9 - 71
3 Crane operation error menu p. 9 - 72
4 Program version menu p. 9 - 73
5 Disclaimer menu p. 9 - 148

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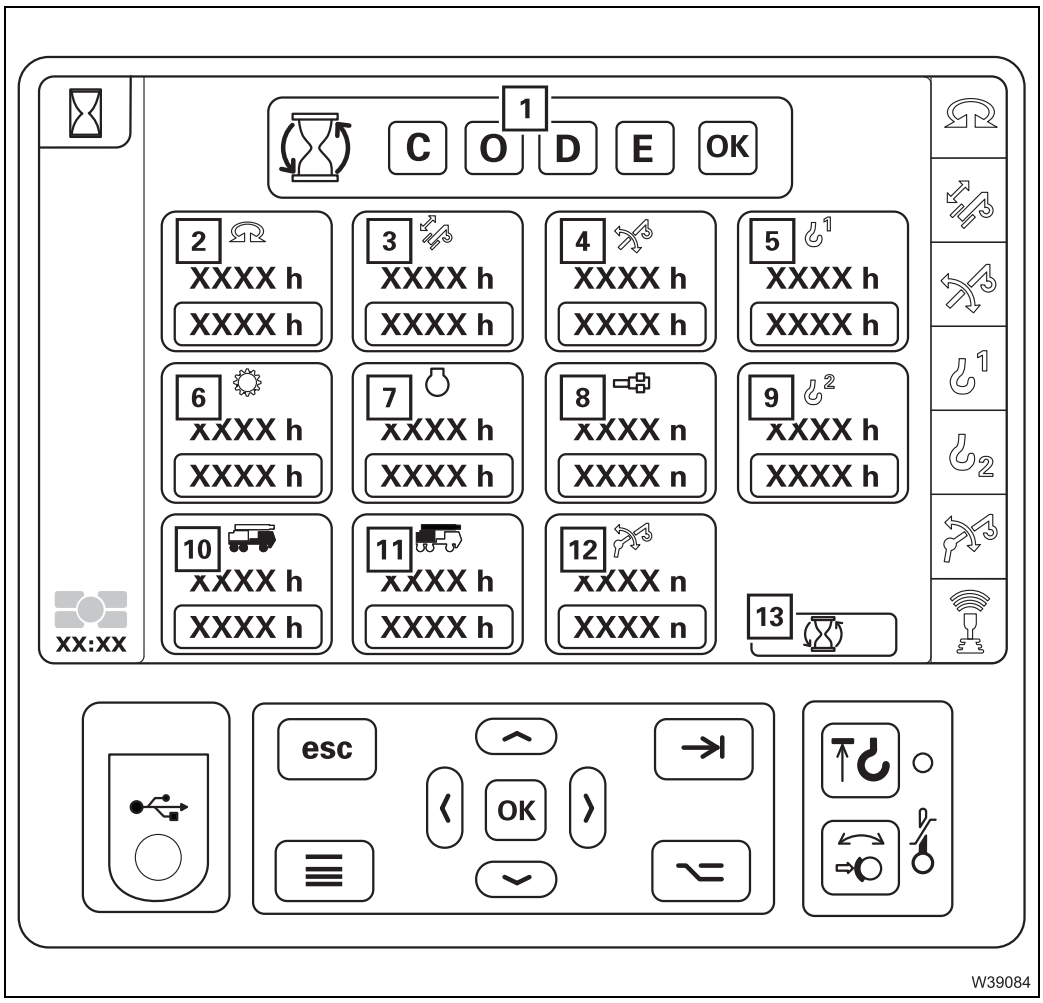
Operating hours menu



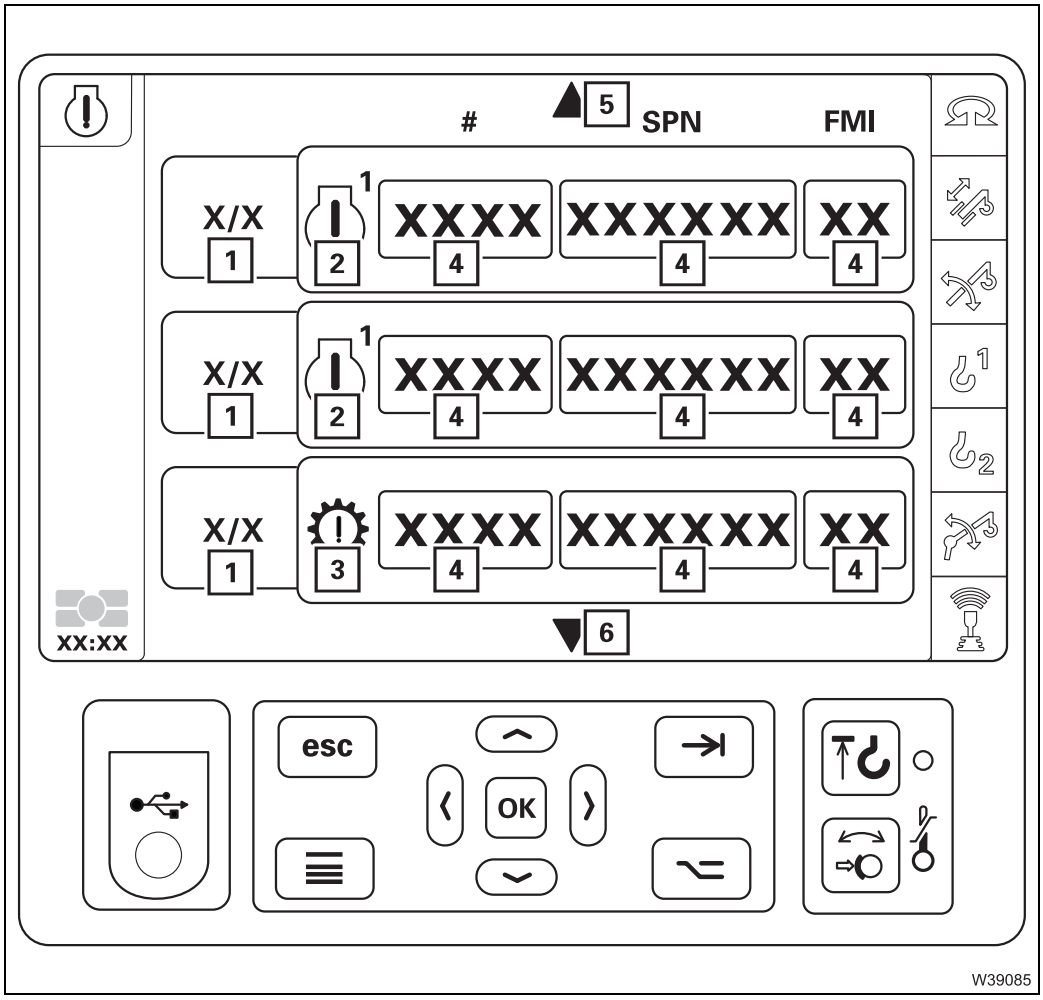
1 Keycode entry and confirmation
2 Slewing gear
3 Telescoping mechanism
4 Derricking gear
5 Main hoist
6 Transmission
7 Engine ➠ p. 11 - 135
8 Locking system
9 Auxiliary hoist
10 Carrier
11 Superstructure
12 Lattice extension – luffing jib[1)]
13 Selection all

[1)] Additional equipment

13.12.2018

Engine/ transmission error menu

This is operated in the same way as in the driver's cab.



W39085

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

p. 14 - 8

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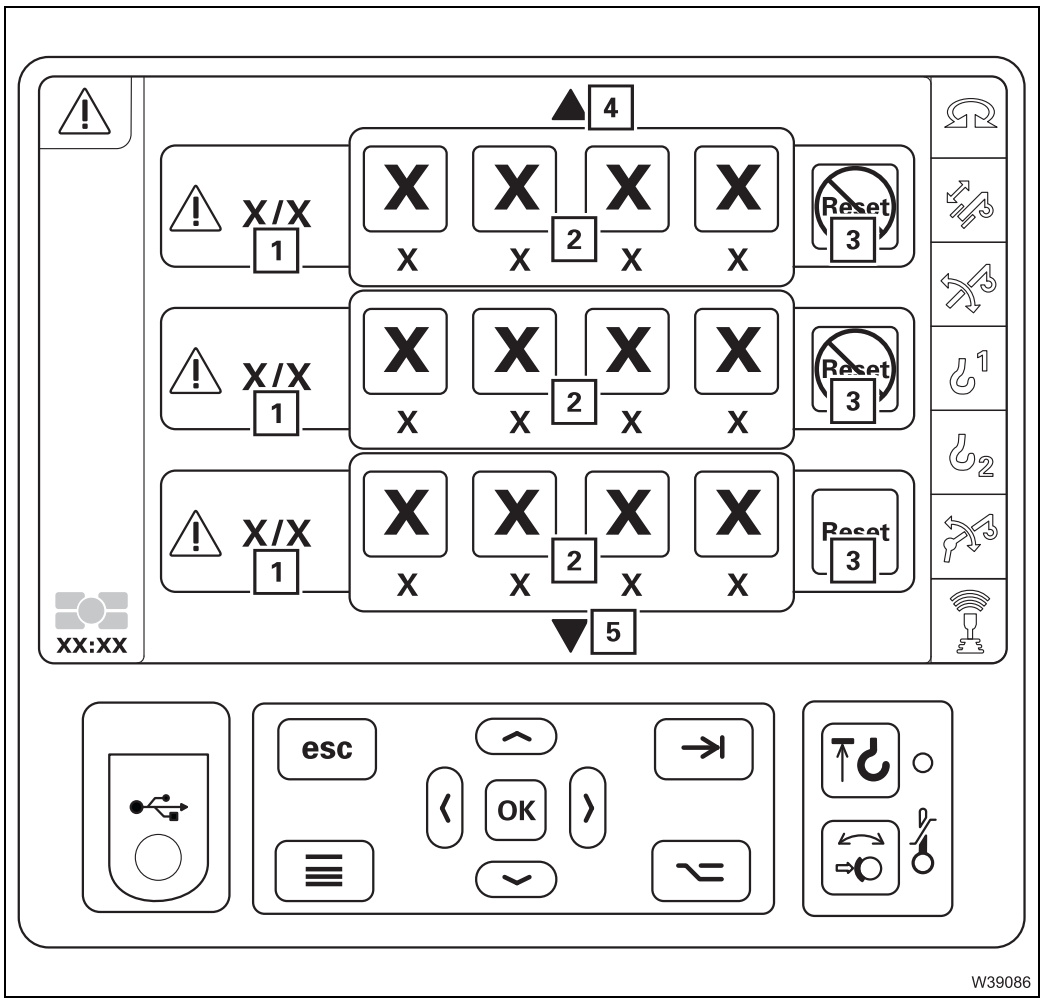
Crane operation error menu



1 Display of error / total errors

2 Error message display

3 To acknowledge the error p. 14 - 8

4 Previous error

5 Next error

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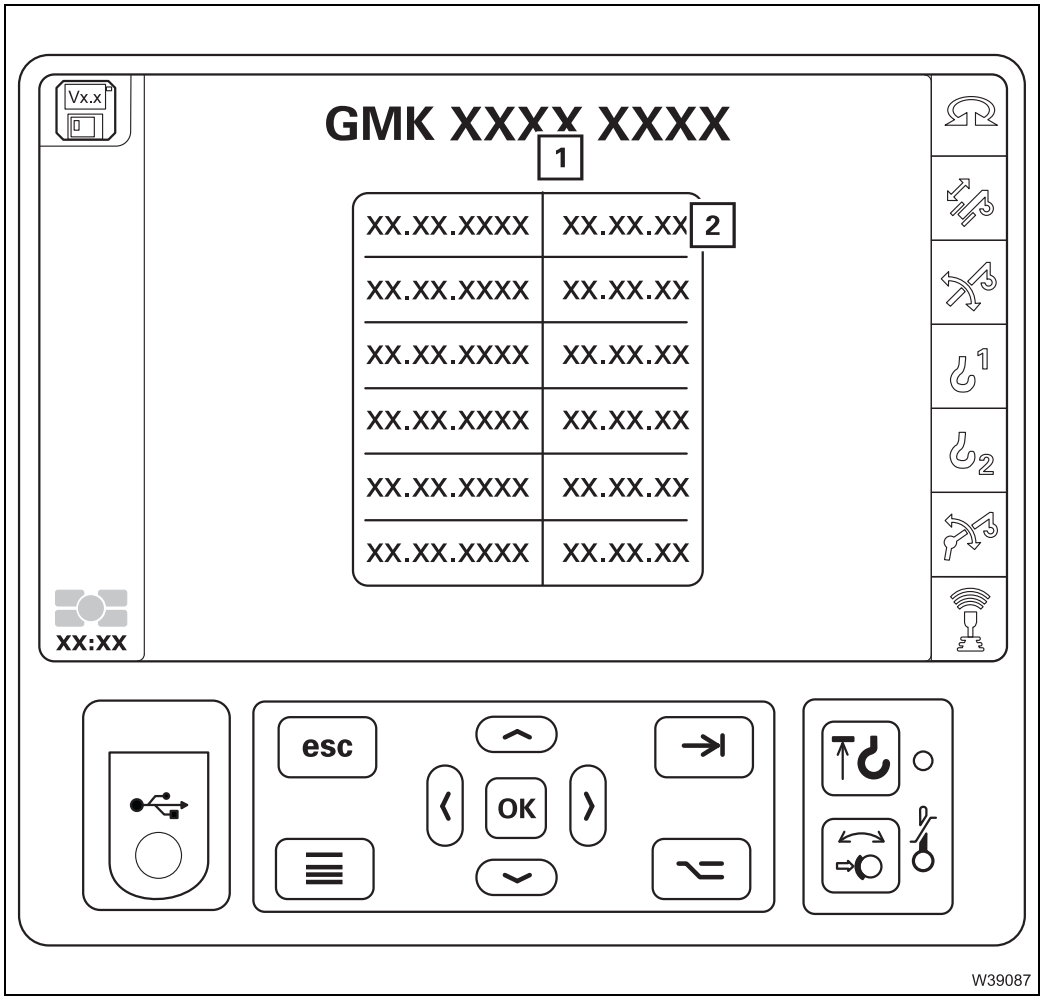
Program version menu



1 Serial number display p. 14 - 3

2 Program version display p. 14 - 3

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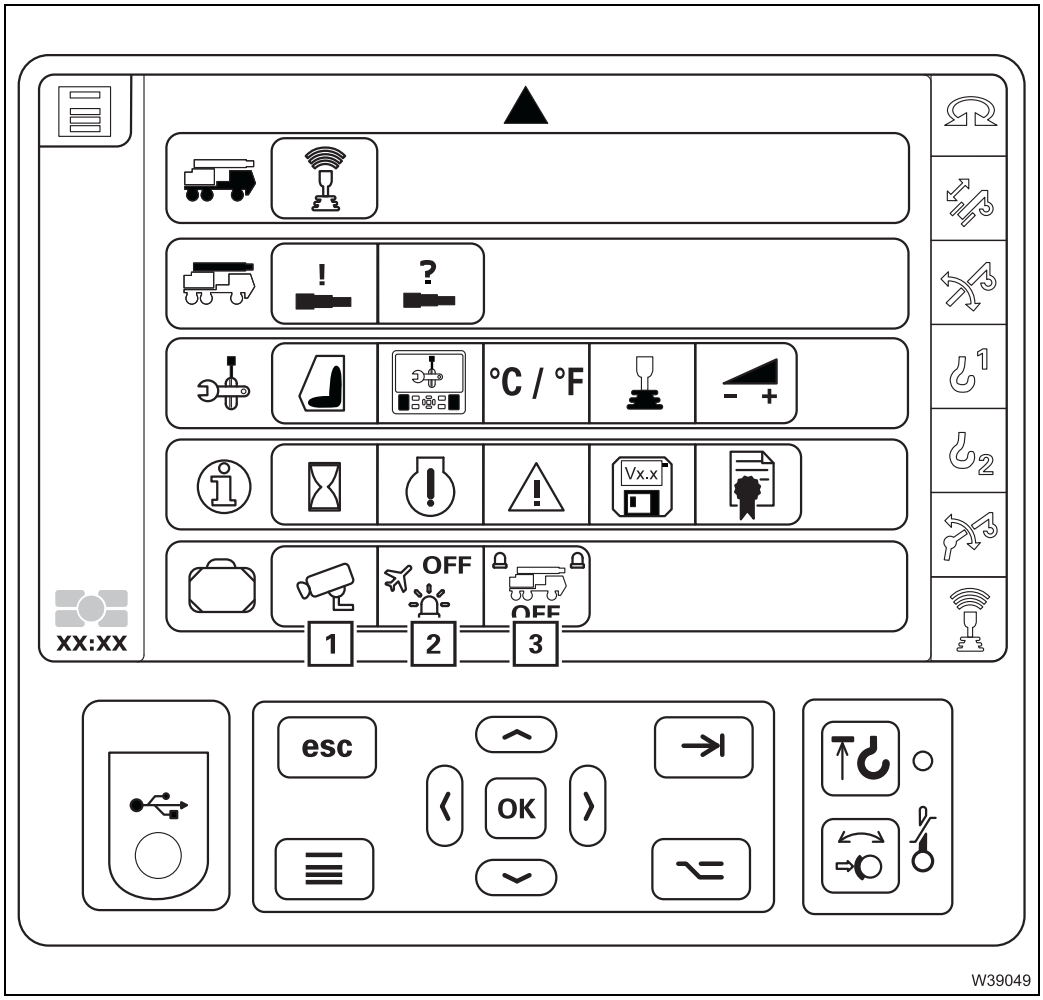
9.1.19 Various controls



1 Camera on/off ➠ p. 12 - 110

2 Switching the air traffic control light on and off ➠ p. 12 - 102

3 Switching the rotating beacon on/off ➠ p. 9 - 140

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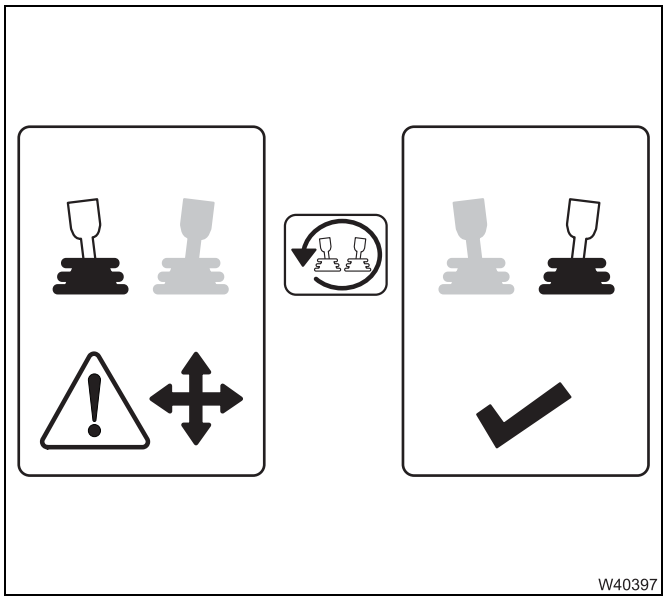
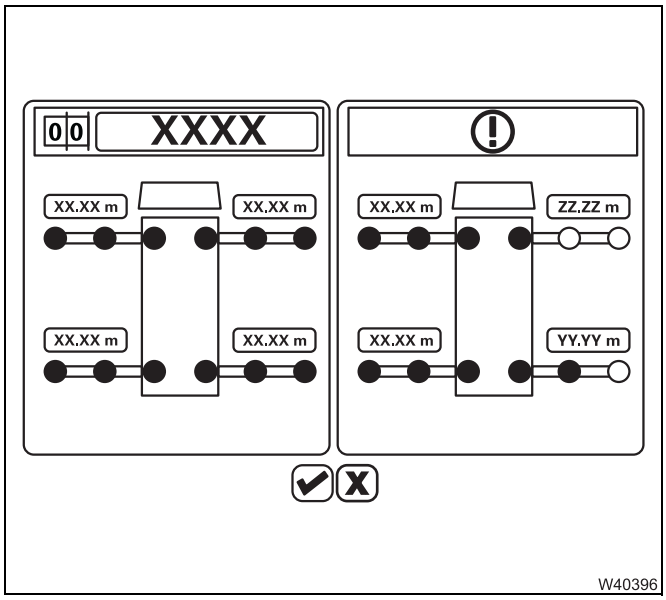
9.1.20 Query menus

The query menus open automatically only.



Control lever deflection query

p. 10 - 5



Outrigger span query

p. 11 - 46

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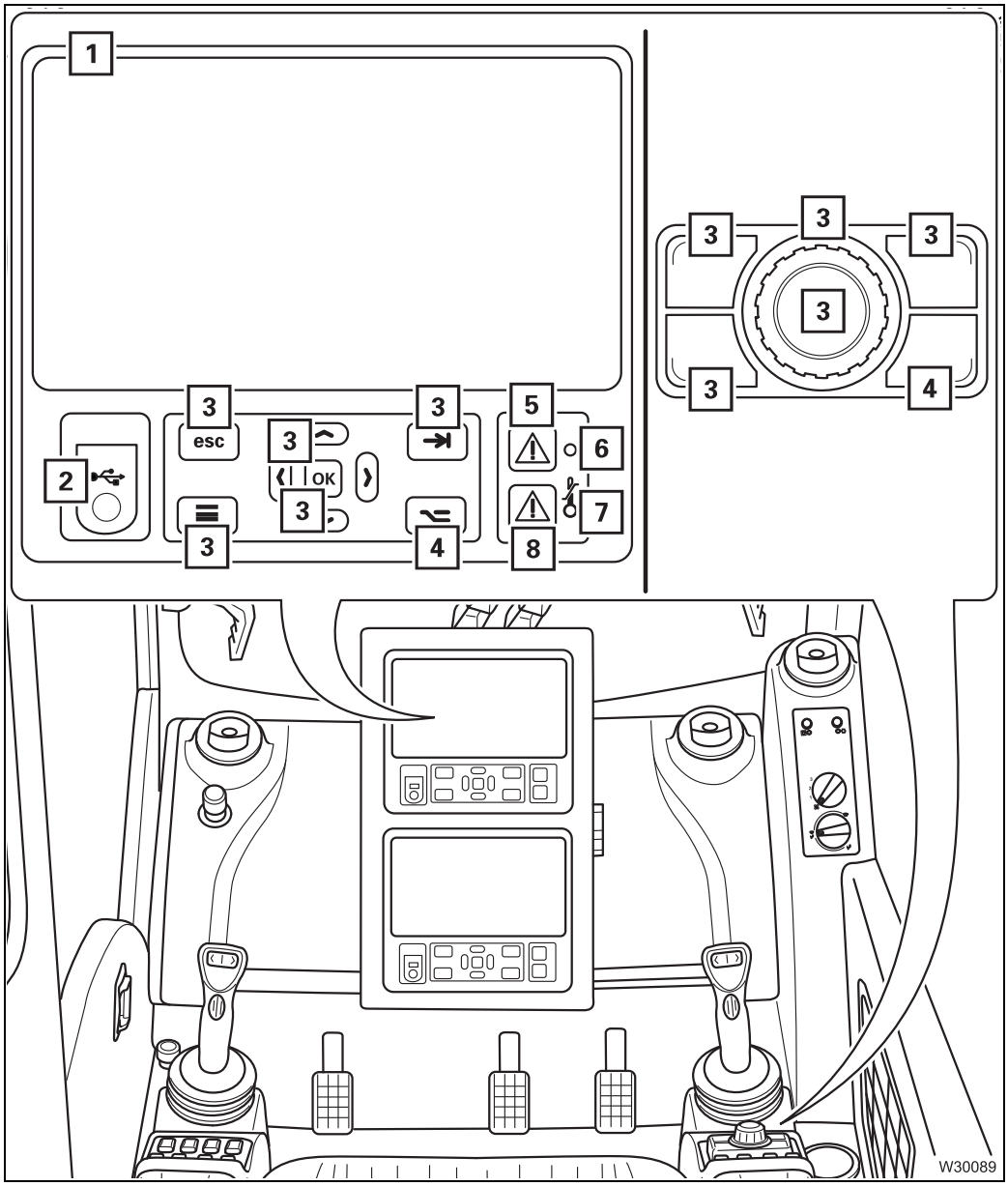
9.1.21 RCL control unit



1 *RCL* display
– Menu-independent displays ➠ p. 9 - 77
– RCL – menus ➠ p. 9 - 78

2 USB connection for data export ➠ p. 9 - 136

3 No function

4 Switch off *RCL* buzzer ➠ p. 9 - 96

5 RCL early warning ➠ p. 11 - 61

6 Sensor – no function ➠ p. 9 - 96

7 RCL shutdown ➠ p. 11 - 61

8 Display temperature warning display ➠ p. 9 - 98

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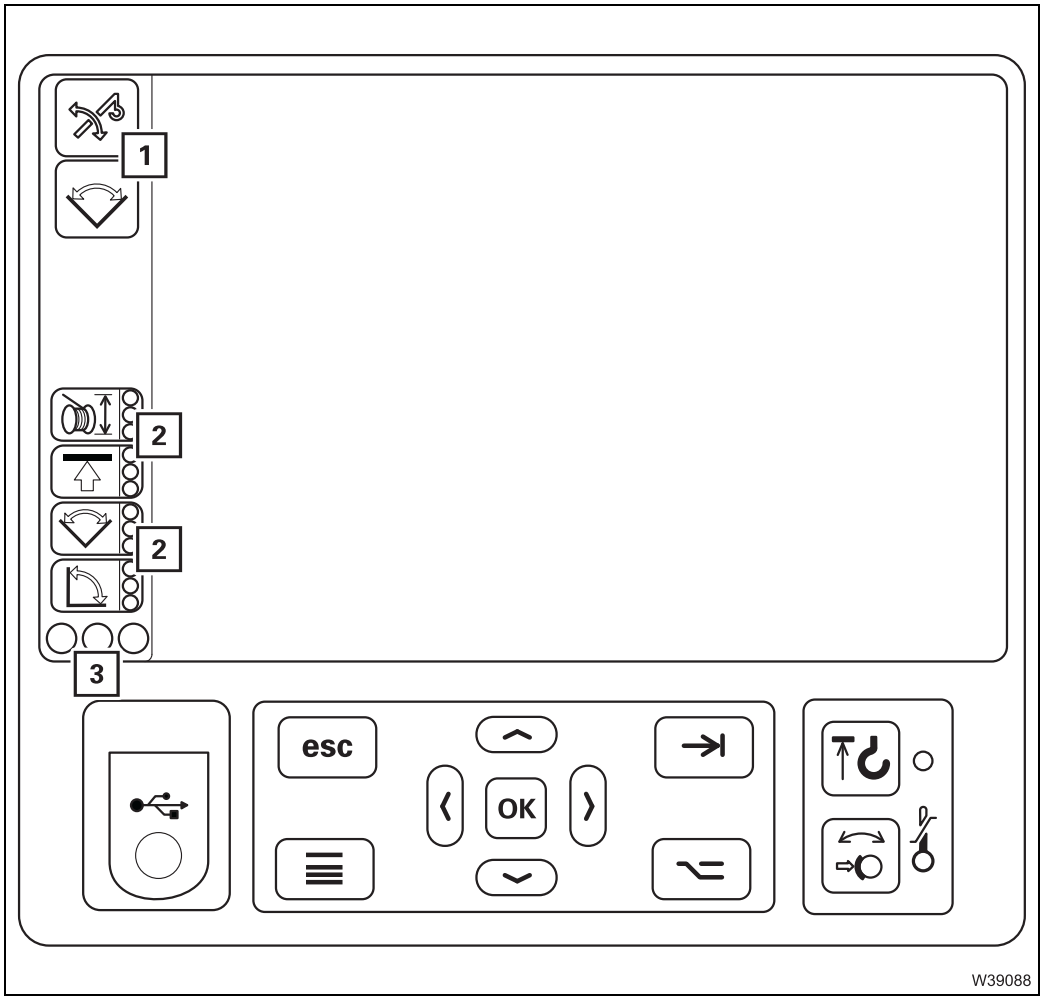
9.1.22 Menu-independent displays



1 Warning messages display p. 14 - 10
2 Working range limiter displays p. 11 - 138
3 RCL status display p. 11 - 55

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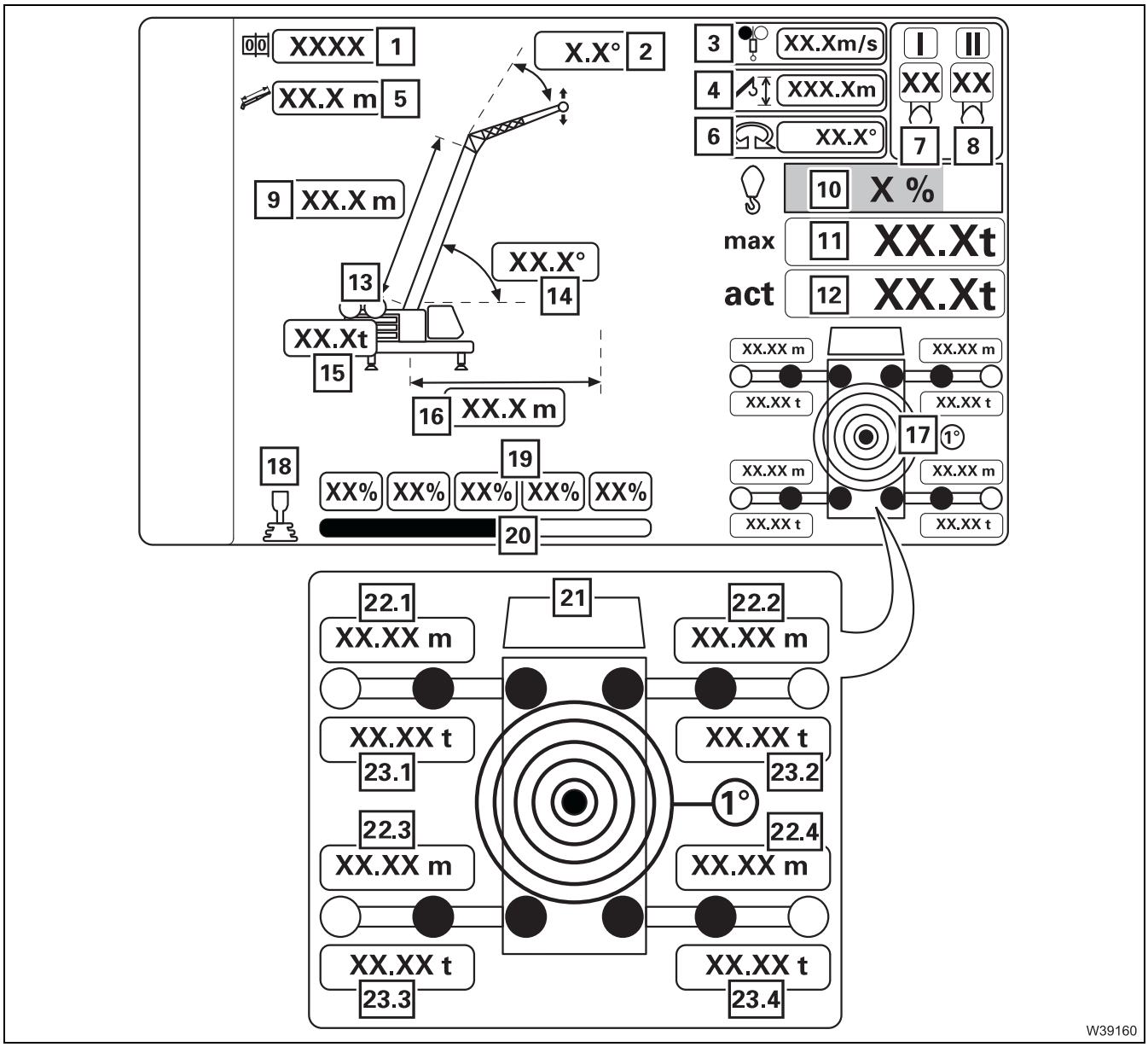
9.1.23 RCL – menus

Monitoring menu



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1	Display RCL code[2)]	p. 11 - 49
2	Current lattice extension inclination display[1), 2)]	p. 11 - 54
	Lattice extension display – angle[1), 2)]	p. 11 - 51
3	Current wind speed display	p. 11 - 56
4	Current overall height display	p. 11 - 53
5	Lattice extension display – length[1), 2)]	p. 11 - 51
6	Current slewing angle display	p. 11 - 54
7	Main hoist reeving display	p. 11 - 51
8	Auxiliary hoist reeving display	p. 11 - 51
9	Display of current main boom length	p. 11 - 53
10	Current degree of utilization display	p. 11 - 55
11	Maximum load display	p. 11 - 55
12	Display of the currently raised load	p. 11 - 54
13	Display of reeving used	p. 11 - 51
14	Status display for current main boom angle	p. 11 - 54
15	Counterweight display	p. 11 - 49
16	Current working radius display	p. 11 - 53
17	Current inclination display	p. 9 - 104
18	Telescoping direction display	p. 11 - 56
19	Current telescope status display	p. 11 - 55
20	Telescoping cylinder position display	p. 11 - 56
21	Outrigger span display	p. 11 - 50
22.1	Front left individual width	p. 11 - 50
22.2	Front right individual width	p. 11 - 50
22.3	Rear left individual width	p. 11 - 50
22.4	Rear right individual width	p. 11 - 50
23.1	Front left outrigger pressure	p. 9 - 105
23.2	Front right outrigger pressure	p. 9 - 105
23.3	Rear left outrigger pressure	p. 9 - 105
23.4	Rear right outrigger pressure	p. 9 - 105

1) Additional equipment

2) Display only with the *Standard slewing range type*

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Lifting capacity tables menu

The same menu is displayed as shown on the *CCS* display; ➠ p. 9 - 48.

Either the *Monitoring* menu or the *Lifting capacity table* menu is displayed. Additionally, the *Datalogger* menu can be manually opened (from the *CCS* display).

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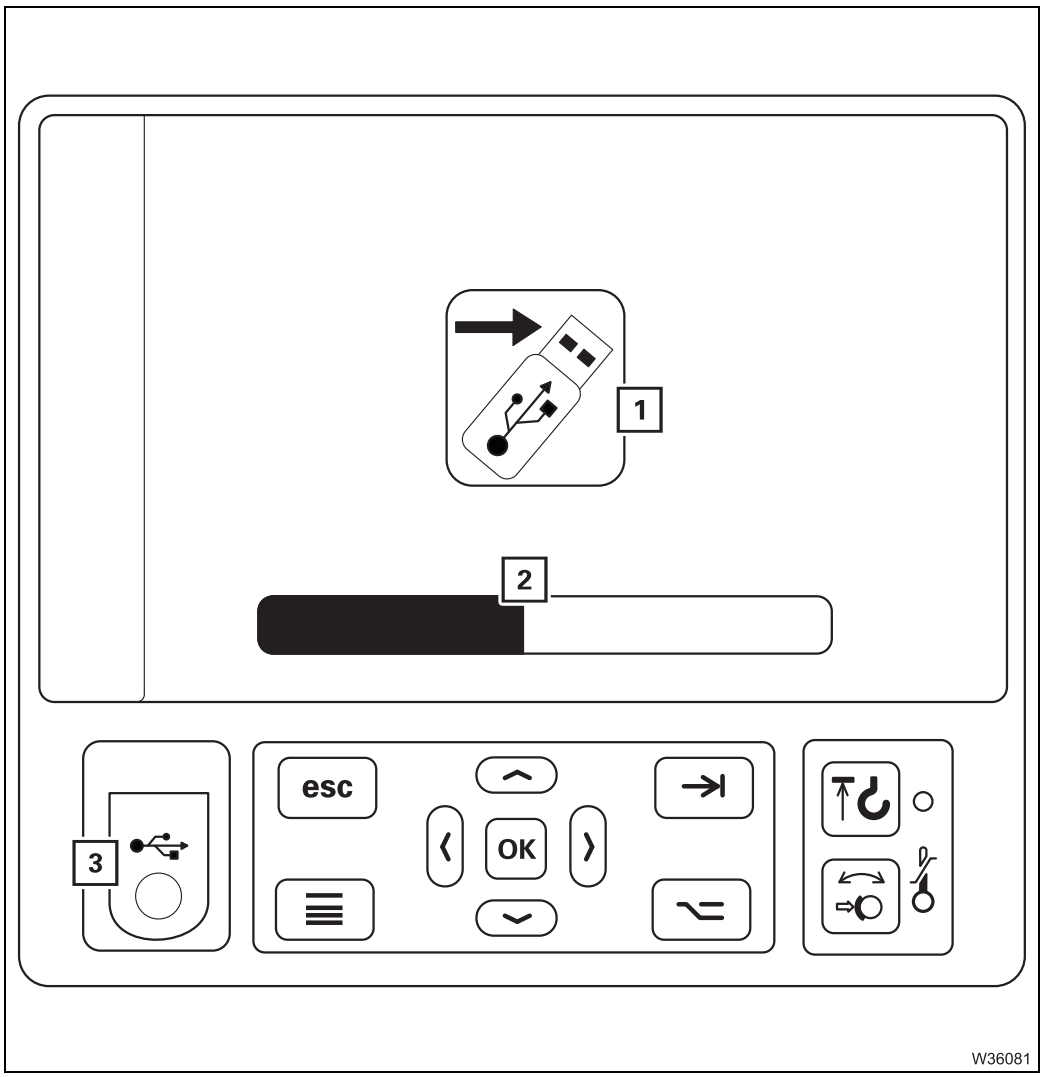
Datalogger menu



1 Export data p. 9 - 136

2 Display of export progress p. 9 - 136

3 USB connection for data export p. 9 - 136

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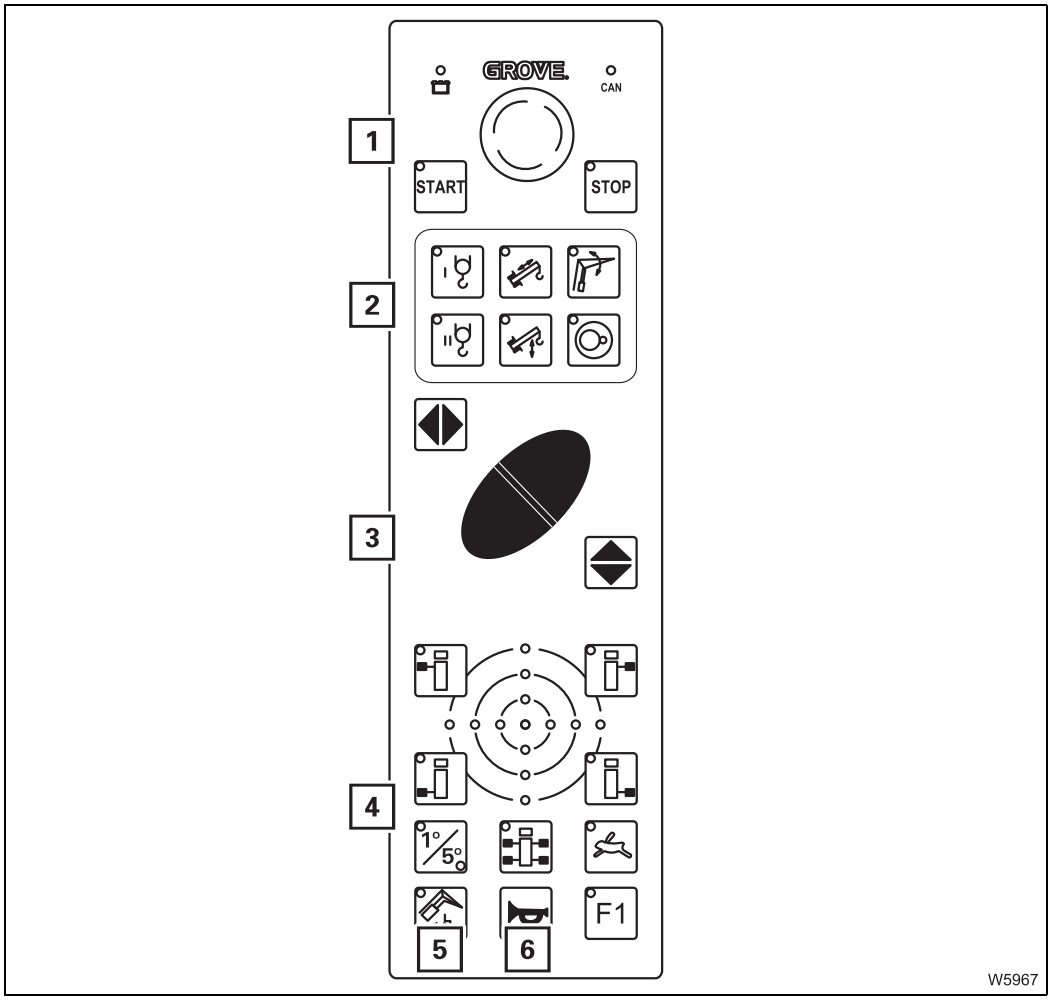
9.1.24 Hand-held control



1 Engine control panel ➠ p. 9 - 144
2 Pre-select emergency operation ➠ p. 9 - 145
3 Function buttons ➠ p. 9 - 145
4 No function
5 No function
6 Horn ➠ p. 9 - 144

Required connections for the different movements; ➠ p. 14 - 43.

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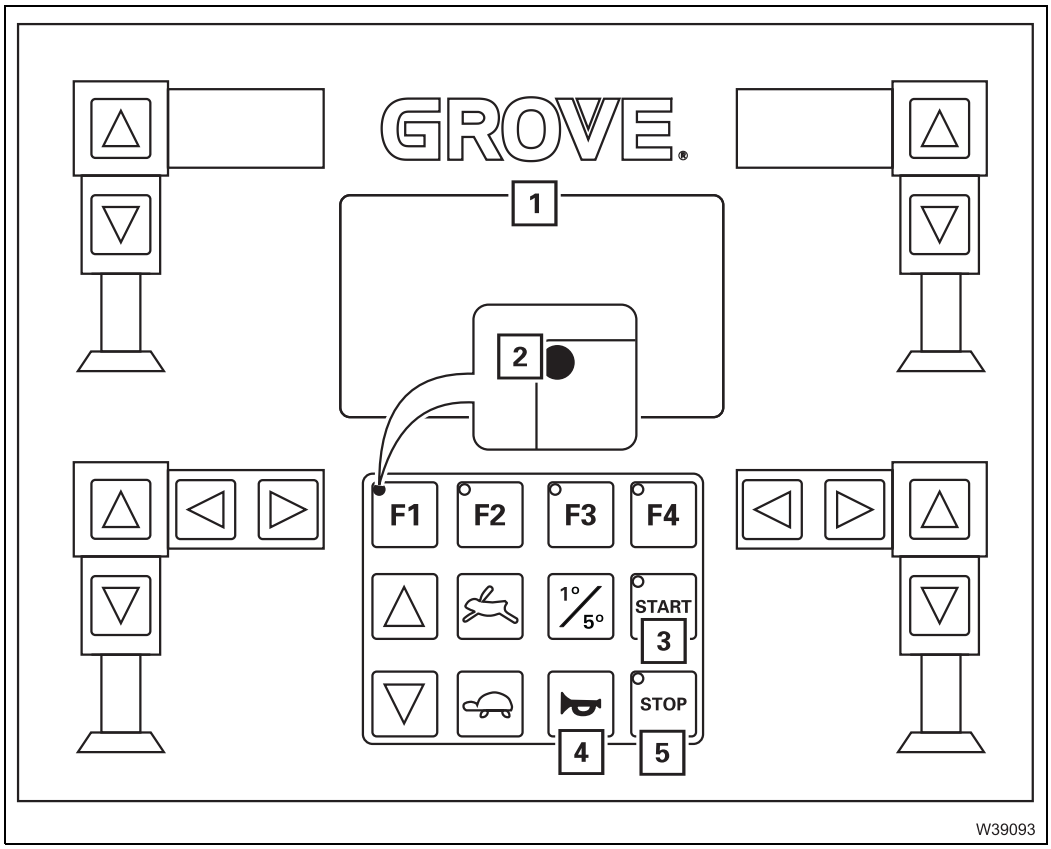
9.1.25 Outrigger control units

General operation



1 Display – Outrigger menu ➠ p. 9 - 84
2 Searchlights ➠ p. 9 - 101
3 START engine ➠ p. 4 - 17
4 Horn ➠ p. 9 - 101
5 STOP engine ➠ p. 4 - 19

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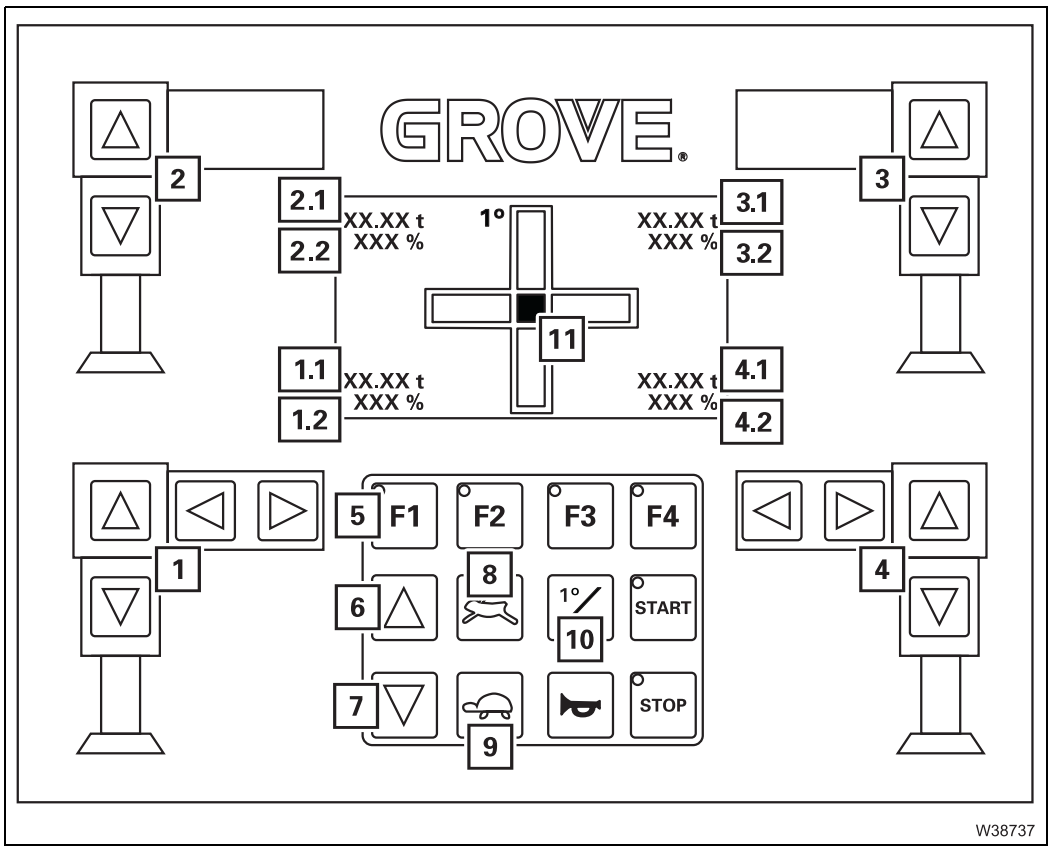
Outrigger menu



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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.

Outriggers

1	Operating the left outriggers	p. 9 - 103
2	Operating the left outriggers, opposite side	p. 9 - 103
3	Operating the right outriggers, opposite side	p. 9 - 103
4	Operating the right outriggers	p. 9 - 103
5	Additional function F1	
6	Retracting all supporting cylinders	p. 9 - 102
7	Extending all supporting cylinders	p. 9 - 102
8	Pre-select high-speed mode	p. 9 - 101
9	– Pre-select normal speed	p. 9 - 101
	– Automatic alignment – as additional function F1	p. 9 - 102

Outrigger pressure display

1.1	Left-hand outrigger pressure display	p. 9 - 105
2.1	Left-hand outrigger pressure display, opposite	p. 9 - 105
3.1	Right-hand outrigger pressure display, opposite	p. 9 - 105
4.1	Right-hand outrigger pressure display	p. 9 - 105

Display of outrigger span

1.2	Left outrigger span	p. 9 - 103
2.2	Left outrigger span, opposite	p. 9 - 103
3.2	Right outrigger span, opposite	p. 9 - 103
4.2	Right outrigger span	p. 9 - 103

Inclination indicator

10	Switching over the measuring range	p. 9 - 104
11	Current inclination display	p. 9 - 104

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Blank page

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9.2 Brief description of the operating elements

Risk of accident by 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.

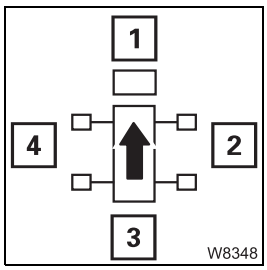
This section does not contain all the requirements that must be fulfilled for several operating elements to be active.
If some operating elements do not work, first read the subsequent chapters referred to at the respective places before contacting **Manitowoc Crane Care**.

9.2.1 Definition of direction information

Basic rule

Directions always depend on whether the carrier or the superstructure is being operated.

On the carrier

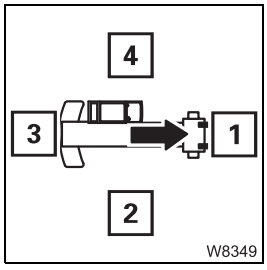


The driver's cab is always at the front, which means that:

1: front **2:** right
3: rear **4:** left

Forwards always means the driver's cab is to the front.
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

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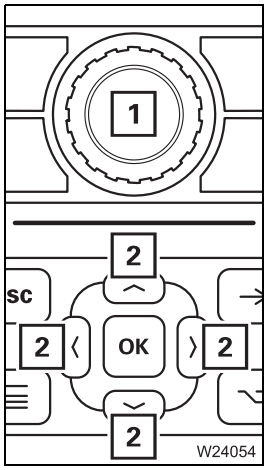
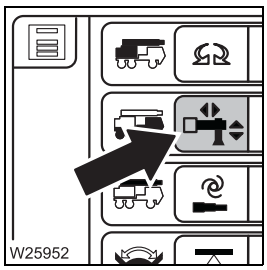
9.2.2 General rules for buttons and symbols on the display

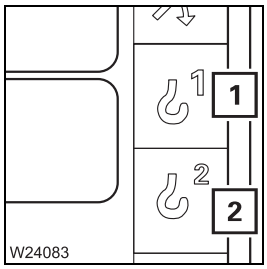
The symbols shown as an example are not present on all crane types. The following rules apply in all menus:



– A menu can only be opened if the relevant symbol has been selected with the jog dial (**1**) or direction buttons (**2**).

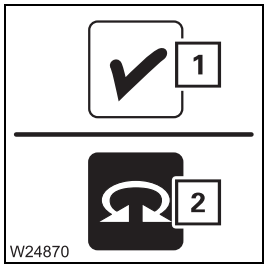


– A selected menu is marked in colour and can be opened.

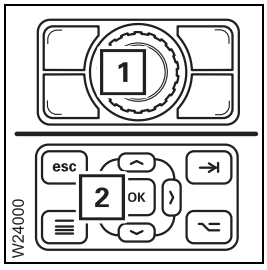


– Symbols can be shown in different colours. The colour of the symbol indicates the current switching state of the relevant power unit.

1	**Grey:**	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 (**1**) of a symbol is **red** or whether 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**) or (**2**). This is the case if a menu is opened or a function is to be carried out.

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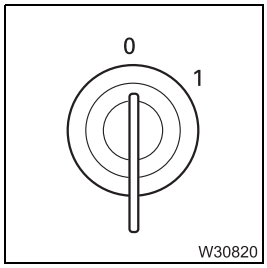
9.2.3 Engine

Side panel

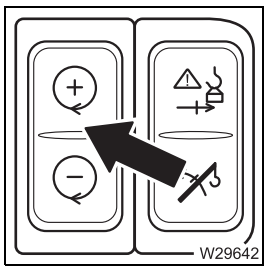
➠ *Starting the engine – from the crane cab*, p. 10 - 3.

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. 10 - 7



Starting the engine

– The engine must be off

- **– Press upwards once:** Engine starts,
  idling speed = standard

Setting idling speed

– The engine must be running

- **– Press up:** Increase idling speed
- **– Press down:** Decrease idling speed,
  engine cutout after about 6 seconds.

➠ p. 10 - 9

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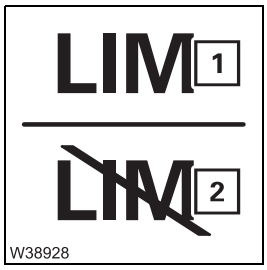
9.2.4 AdBlue (DEF) system/Exhaust gas emission control system

***CCS* display**

Description of further symbols for warning and malfunction messages;
➠ *Warning messages on the CCS display*, p. 8 - 10.



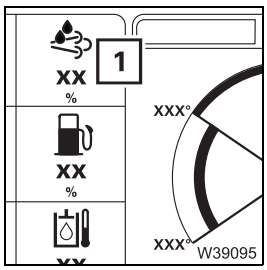
Torque reduction indicator display

For the menu-independent displays

1 Torque reduction active

2 Torque reduction overridden

➠ *Overriding torque reduction*, p. 5 - 48



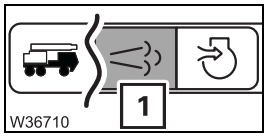
AdBlue (DEF) tank level display

In the Start menu

1 – Display

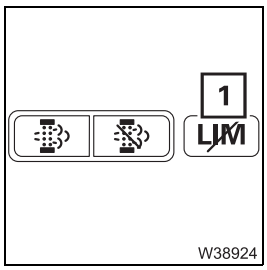
	Green:	Over 10% – over 4 l (0.9 gal)
	Yellow:	5 to 10% – 2 to 4 l (0.4 to 0.9 gal)
	Red:	Below 5% – less than 2 l (0.4 gal)

➠ p. 10 - 8



Exhaust system menu

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



Overriding torque reduction

The torque reduction is active

1 – Select and confirm:
– Symbol (**1**) green
– Torque reduction overridden

after 30 minutes:
– The symbol (**1**) is grey
– Torque reduced

– Select and confirm: Reaction as described above

– Select and confirm: Reaction as described above

After this, the function is deactivated until the next time the engine is restarted; ➠ *Overriding torque reduction*, p. 5 - 48

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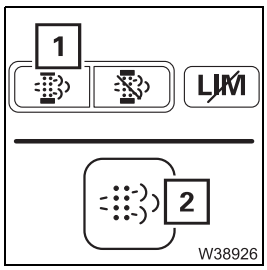


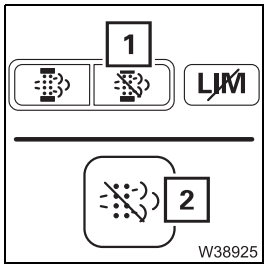
Manually start exhaust system cleaning

The engine must be running.

1 – Select and confirm:
- Symbol (**1**) green
- Cleaning procedure running
- The symbol (**2**) flashes

After cleaning
- The symbol (**1**) is grey
- Symbol (**2**) hidden

➠ *Cleaning the exhaust system*, p. 5 - 49



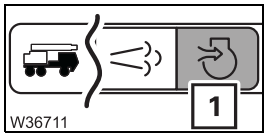
Disable exhaust system cleaning

1 – (Grey) Select and confirm:
- Symbol (**1**) green
- Exhaust system cleaning disabled
- Symbol (**2**) displayed

– (Green) Select and confirm:
- The symbol (**1**) is grey
- Exhaust system cleaning enabled
- Symbol (**2**) hidden

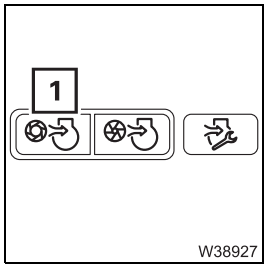
➠ *Cleaning the exhaust system*, p. 5 - 49

9.2.5 Air intake inhibitor



Air intake inhibitor menu

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



Opening the air intake inhibitor

The air intake inhibitor has been automatically triggered.

1 – Select and confirm: Symbol (**1**) green – air intake inhibitor opened – the engine can be started

➠ *Opening the air intake inhibitor*, p. 4 - 21

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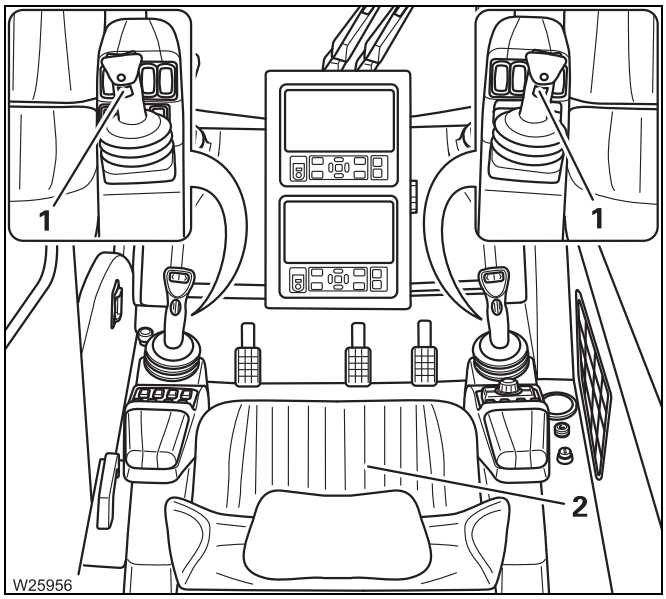
9.2.6 Seat contact switch and dead man's switch

The seat contact switch and the dead man's switch are safety devices for releasing crane functions.



Releasing crane functions

– Sit down – seat contact switch (**2**) on

or

– Press at least one dead man's switch (**1**)

Safety function on

– Stand up – 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. 11 - 13

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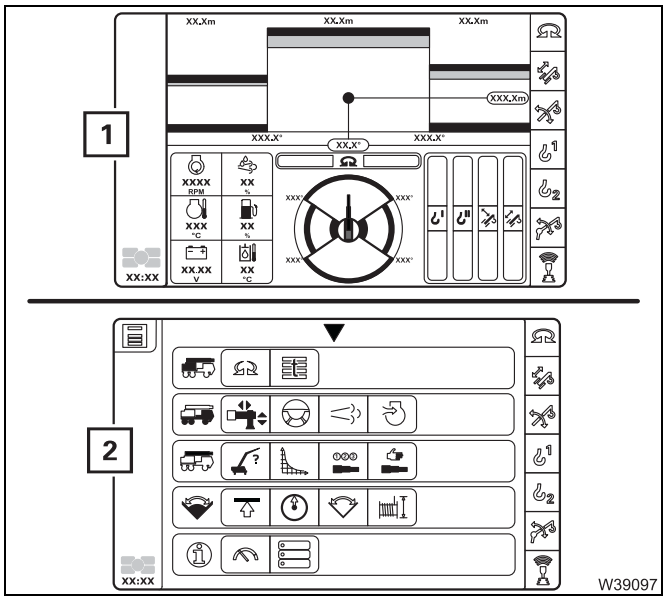
9.2.7 Crane control CCS

The GMK3060 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.



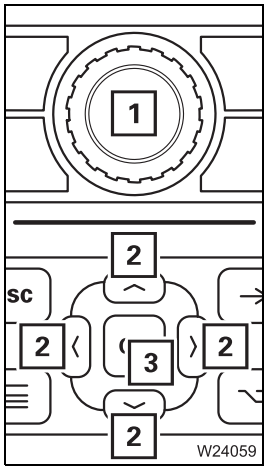
CCS display

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

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 Slewing or **2 Press**

– The selected range is marked.

– Activate / confirm

1 Press or **3 Press**

– The marked range 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. 9 - 94
In the Input area, p. 9 - 94
In the Operating area, p. 9 - 95

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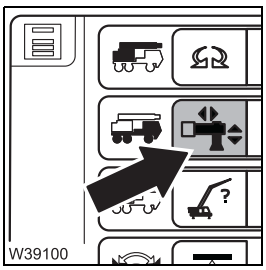
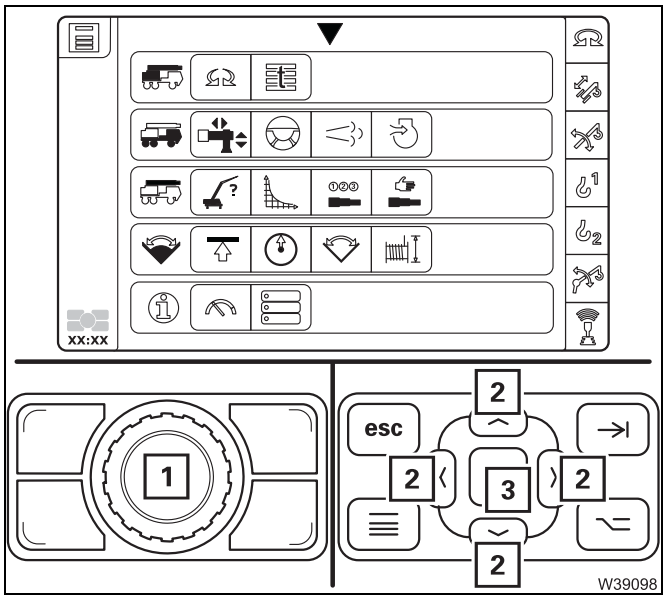


In the Menu area

– For selecting and opening menus.
One symbol is always selected.



Select a menu

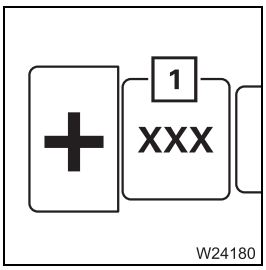
1 **Slewing** or **2** **Press**

– The next symbol is marked.

Opening the menu

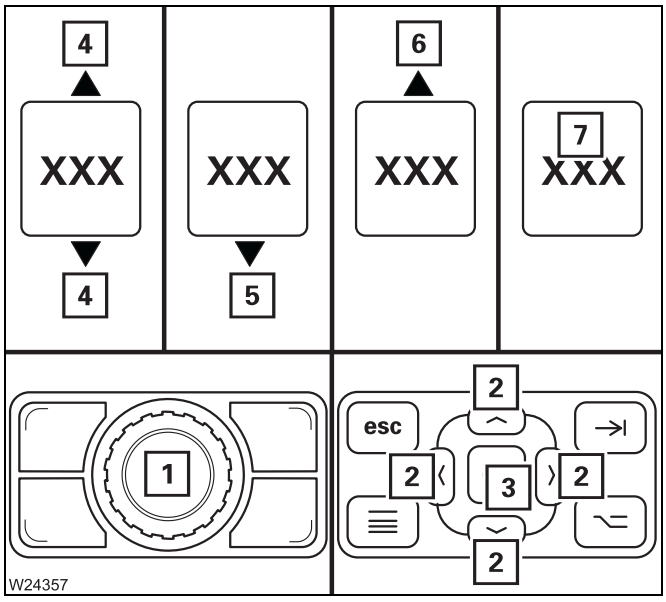
1 **Press** or **3** **Press**

– 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**[1)] or **2** **Press**

4 Value can be reduced/increased

5 Highest value achieved

6 Lowest value achieved

[1)] 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.

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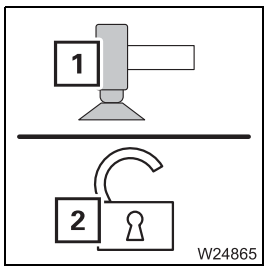
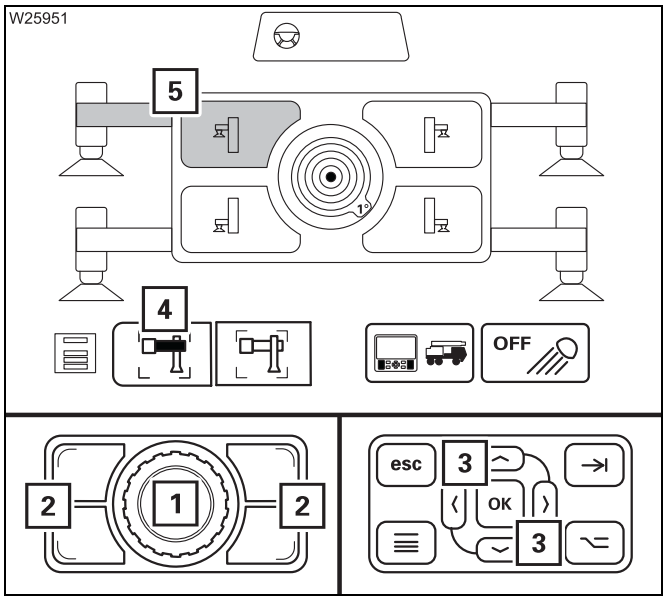


In the Operating area

– For carrying out movements during rigging.
  The required element is marked, e.g. outrigger cylinder (**1**).

– For switching on/off and switching
  A symbol for a status is marked, e.g. symbol (**2**).



Executing a movement

– Select function

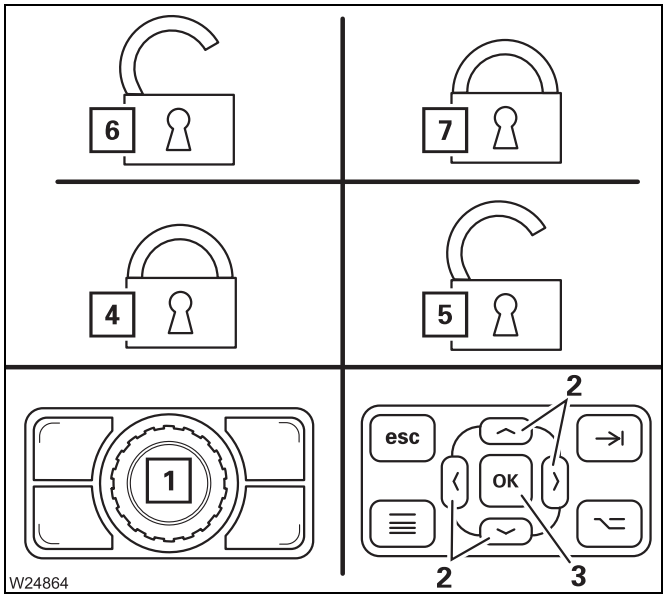
  3 Press or **1 Slewing**

  – The marked function (**4**) or (**5**) is selected.

– Move function

  2 Press

  – The selected function is carried out.



Switching on/off and switching

– Selecting status

  2 Press or **1 Slewing**

  – The marked state (**4**) or (**6**) is selected.

– Switch on state

  1 Press or **3 Press**

  – The selected state (**5**) or (**7**) is established.

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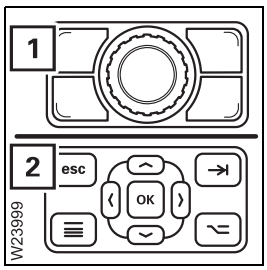
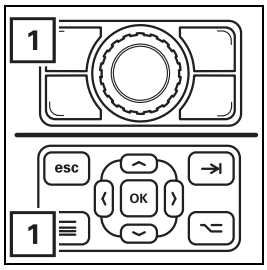


Exiting the menu/input mode

Press button (**1**) or (**2**) to exit the menu or input mode.

– Press the button once: – The opened menu closes – the menu from the next higher level is opened

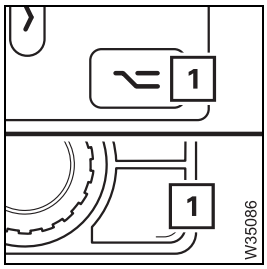
– Input mode is deactivated



Overview menu groups

1 Press: – After the first press
Menu groups overview display

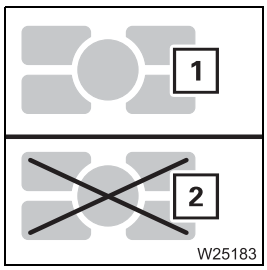
– After a subsequent press
Next/previous group overview



Switch off *RCL* buzzer

In some cases not active until after 5 seconds

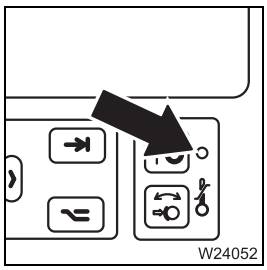
– Press once: Buzzer is switched off



Jog dial display

1 Jog dial OK

2 Jog dial disabled
Communication fault or error (error display)



Sensor – no function

➠ *Display – setting the brightness*, p. 4 - 11.

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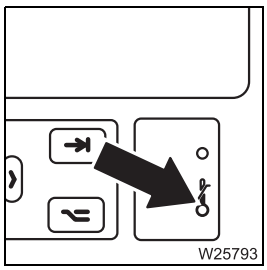


Display temperature warning display

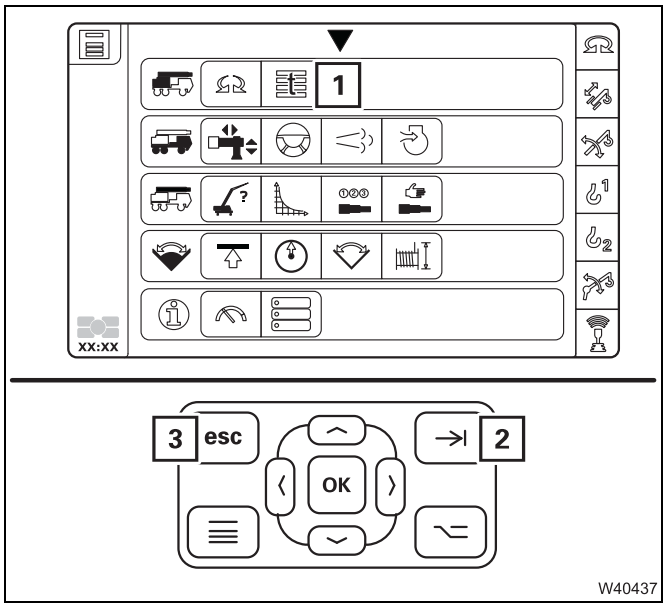
The temperature of the control unit is measured by an internal sensor.

– **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. 11 - 35

Selecting / deselecting favourites

Several symbols can be selected as favourites. The cursor jumps directly from favourite to favourite when scrolling through the menu groups.



Select

A symbol is selected, such as symbol (**1**).

2 Press

The symbol is marked as a favourite.

Deselect

– **Individually**
  The favourites symbol is selected.

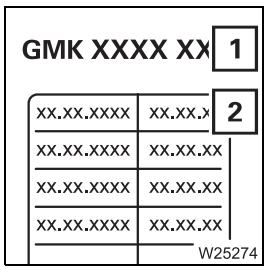
  2 Press

  The favourites selection is cancelled.

– **All**
  Any desired symbol is selected.

  2 + 3 Press

  All favourite selections are removed.



Serial number and programme version display

1 Truck crane serial number

2 Current program version of the crane control – always specify in the event of a malfunction; p. 14 - 3

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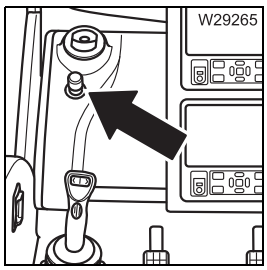


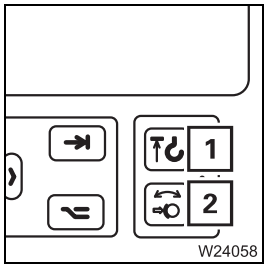
Emergency stop switch

May only be used in an emergency.

– **Press:** Engine off – crane functions stop immediately. Switch latches

– **Turn the latched switch:** Switch returns to initial position – crane functions released

➠ p. 10 - 12



Other

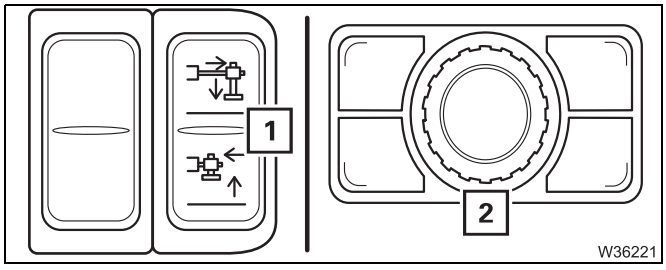
1 Lifting limit switch warning; ➠ p. 9 - 109

2 Checking the slewing gear brake; ➠ p. 9 - 112

9.2.8 Outrigger – crane cab

➠ *Extending/retracting outrigger beams*, p. 12 - 33
➠ *Extending/retracting supporting cylinders*, p. 12 - 39

Control panels



Short description on the *CCS* display

1 Left – Moving the outrigger; ➠ p. 9 - 100

2 Right – Outrigger pre-selection; ➠ p. 9 - 100

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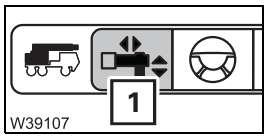
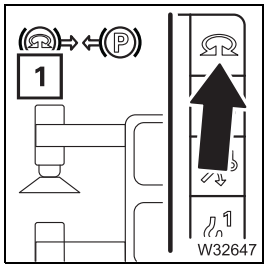
CCS display



Outrigger menu

– **Opening:** Select and confirm symbol (**1**)

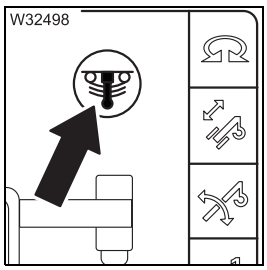


Slewing gear/movements locked display

– **Red:** Slewing gear switched off – symbol (**1**) out

– **Green:** Slewing gear switched on – outrigger movement disabled – symbol (**1**) is displayed

➠ p. 12 - 30

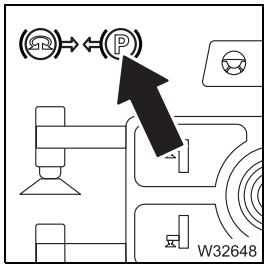


Suspension on/off display/warning

– **Red:** Suspension is switched off

– **Green:** Suspension switched on – outrigger movement disabled – symbol is displayed

➠ p. 12 - 30

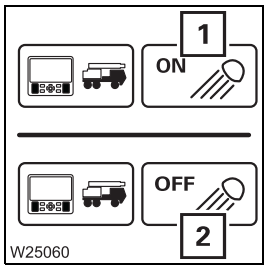


Parking brake/movements locked display/warning

– **Red:** Parking brake released – outrigger movements locked

– **Gone out:** Parking brake applied – outrigger movements enabled

➠ p. 12 - 30



Outrigger lighting on/off

– **Switch on:** Select symbol (**1**) and confirm – symbol *ON* is displayed

– **Switch off:** Select symbol (**2**) and confirm – symbol *OFF* is displayed

➠ p. 12 - 30

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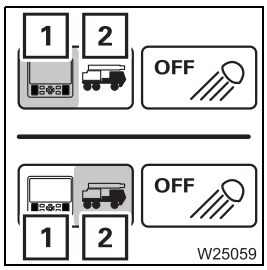
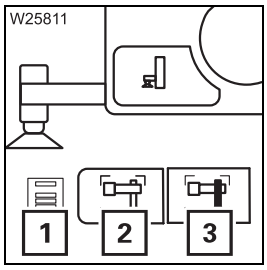


Outrigger control units on/off

– **Switch on:** Select symbol (**2**) and confirm – symbol (**1**) is **grey**
– **Switch off:** Select symbol (**1**) and confirm – symbol (**2**) is **grey**

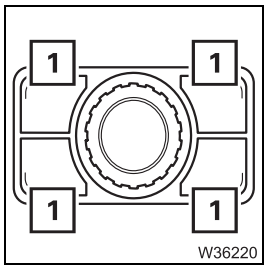
p. 12 - 30



Switch over/exit the menu

Select symbol and confirm – symbol is green

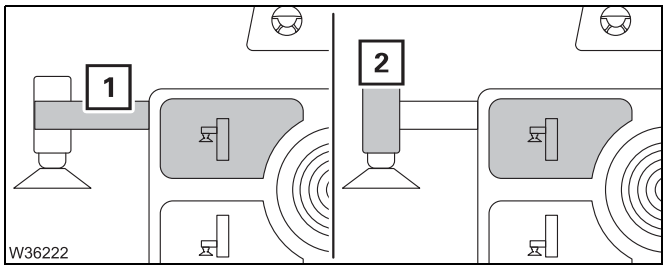
1 Exiting the menu:
2 Outrigger menu
3 Outrigger cylinders menu



Outrigger pre-selection

The associated outrigger cylinder or outrigger beam is pre-selected, depending on the menu that is open.

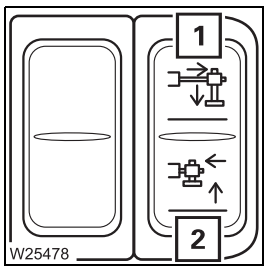
– **Pre-selection on:** Press the required button (**1**)
– **Pre-selection off:** Release the button



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.

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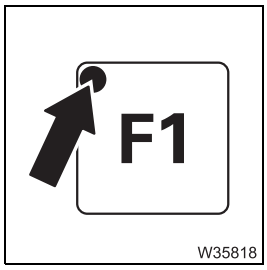
9.2.9 Outrigger control units

➠ *Extending/retracting outrigger beams*, p. 12 - 33
➠ *Extending/retracting supporting cylinders*, p. 12 - 39

The display fields must be switched on for crane operation – in the *Outriggers* menu in the crane cab.

General information

The function of the general elements is independent of the menu shown on the *Outrigger* display.

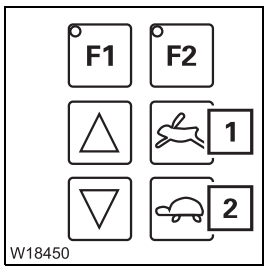


Searchlights

Light up when the ignition is on.

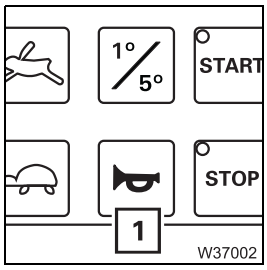
– **Display field lighting off:** Ignition on and no button activated yet or no button activated within the last 10 seconds
– **Display field lighting on:** Press any button

➠ p. 12 - 34



Pre-selecting 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



Horn

The ignition must be switched on.

1 – Press: Carrier horn on

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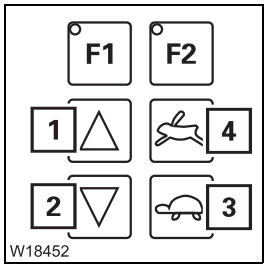
Outrigger menu

The operating elements for the outriggers are only active when the *Outrigger* menu is open.



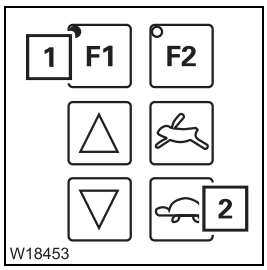
Extending/retracting all supporting cylinders

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. 12 - 40.



– 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. 12 - 46

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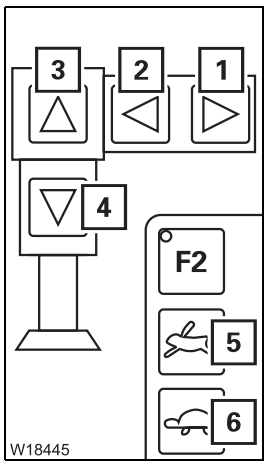


Operating the left-hand outriggers (next to control unit)

Button (**5**) or (**6**) is pressed.

1 **Retract:** Press button – outrigger beam retracts[1)]

2 **Extend:** Press button – outrigger beam extends[1)]

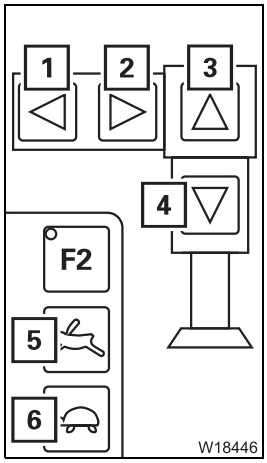
3 **Retract:** Press button – outrigger cylinder retracts

4 **Extend:** Press button – outrigger cylinder extends

[1)] only on operator's side

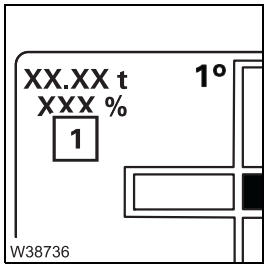
Outrigger beams; ➠ p. 12 - 34
Supporting cylinders; ➠ p. 12 - 40

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 *Left outriggers (next to the control unit)*.



Display of outrigger span

1 Outrigger span in percent

➠ p. 12 - 34

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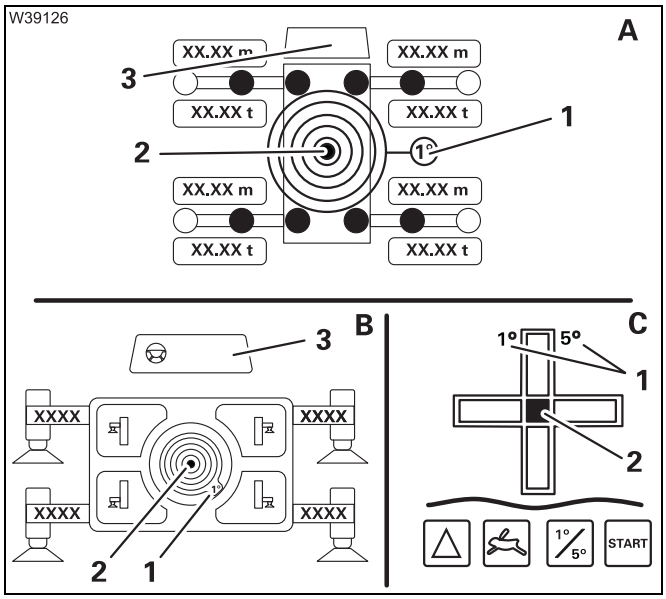
9.2.10 Inclination indicators

➠ *Inclination indicators*, p. 12 - 43



Current inclination display

A In the *Monitoring* menu

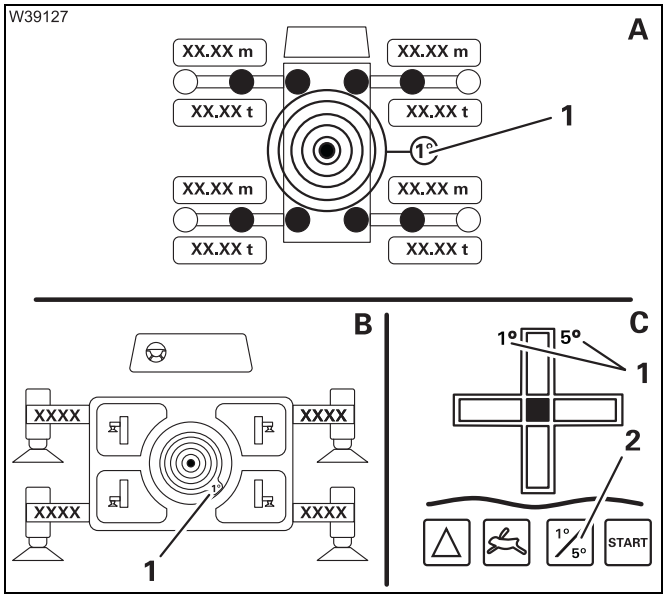
B In the *Outrigger* menu

C On the *Outriggers* control units

1 Measuring range display

2 Inclination indicator

3 Directional indicator



Switching over the measuring range

A In the *Monitoring* menu

B In the *Outrigger* menu

Changeover is automatic – the current measurement range (**1**) is displayed, 1° or 5°

C On the *Outrigger* control units

Press button (**2**) once – the current measurement range (**1**) is displayed, 1° or 5°

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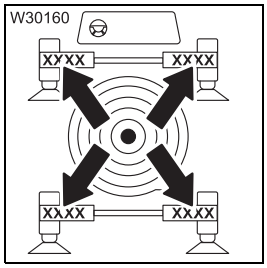
9.2.11 Outrigger pressure displays

Outrigger menu

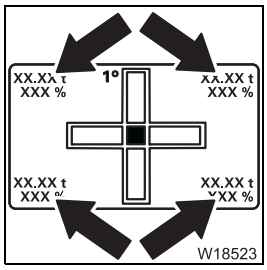


Outrigger pressure display

- **Unit of measurement:** Displayed depending on setting
  - **t** – tons or
  - **klbs –** kilopounds – (1 kilopound = 1,000 lbs)
- **Precision:** One decimal place

➠ p. 12 - 48

Outrigger control units



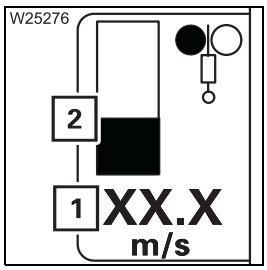
Outrigger pressure display

- **Unit of measurement:** Lights up depending on setting
  - **t** – tons or
  - **klbs** – kilopounds – (1 kilopound = 1,000 lbs)
- **Precision:** When in **t**, one place of decimals
  When in **klbs**, no places of decimals

➠ p. 12 - 49

9.2.12 Anemometer displays

This function is the same in all the menus.
The anemometer is electrically connected.



v_{max} = maximum permissible/reduced wind speed as shown in the *Lifting capacity table*

1 Display in metres per second (m/sec) or Beaufort scale (B)

2 Variable measurement range – 100% = v_{max}

- **Green:** Display (**1**) ≤ 90% of v_{max}
- **Red:** Display (**1**) > 90% of v_{max}

➠ p. 11 - 78

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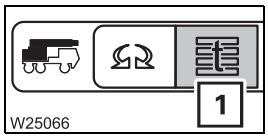
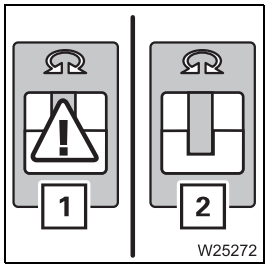
9.2.13 Counterweight menu

➠ *Rigging/unrigging the counterweight*, p. 12 - 51,
➠ *Counterweight hoist unit*, p. 12 - 68.



– **Opening:** Select and confirm symbol (**1**)

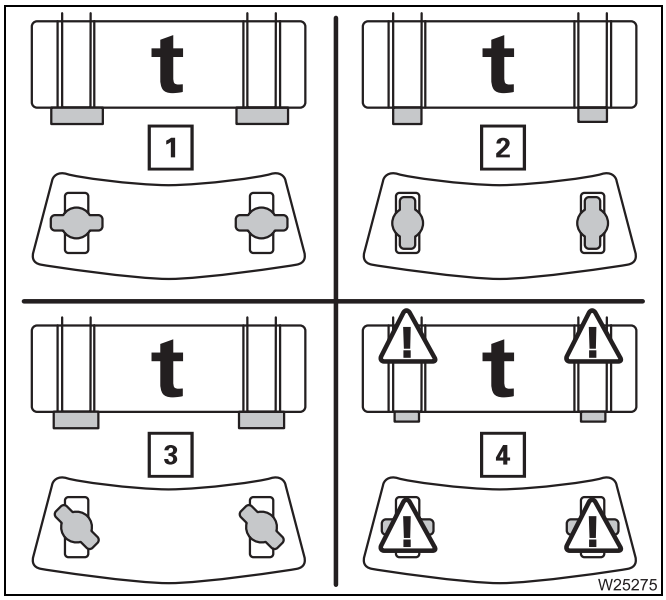


Turntable lock display

1 Superstructure not locked – *Counterweight* menu not enabled

2 Superstructure locked – *Counterweight* menu enabled

➠ *Locking/unlocking the turntable*, p. 11 - 18



Locking display

The current status of the counterweight locking is shown by different symbols:

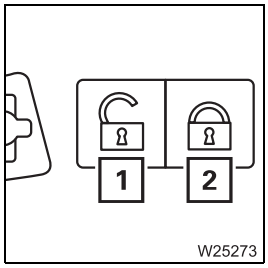
1 **Green** – locked

2 **Red** – unlocked

3 **Yellow** – intermediate position

4 Error

➠ p. 12 - 71



Locking/Unlocking the counterweight

The lifting cylinders are extended.

– **To unlock:** Symbol (**1**)

– **To lock:** Symbol (**2**)

Movement stops after the button is released and when an end position is reached; ➠ p. 12 - 71.

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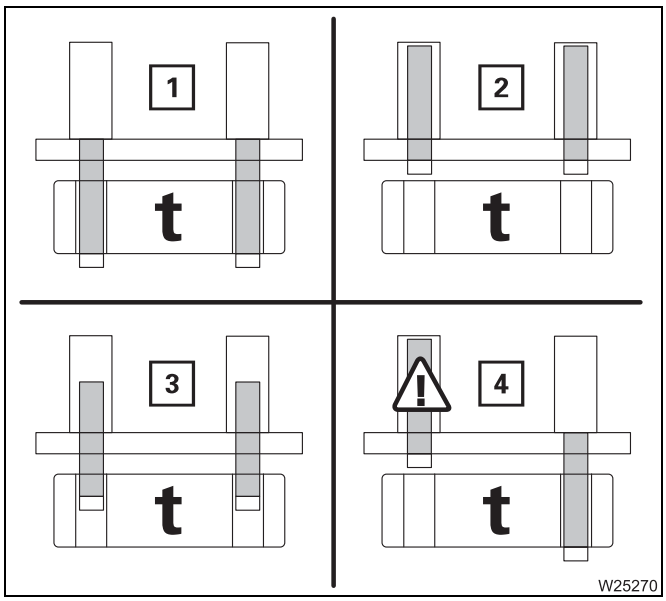


Lifting cylinder position display

The current position of the counterweight lifting cylinders is shown by different symbols:

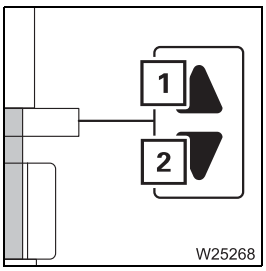
1 Green – extended

2 Green – retracted

3 Yellow – intermediate position

4 Red – error (with symbol)

➠ p. 12 - 69

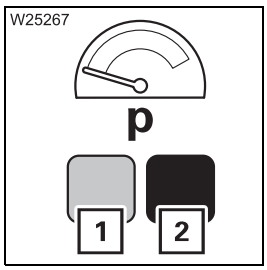


Extending/Retracting the lifting cylinders

1 Retract: Select symbol and confirm – after reaching the end position, the counterweight is pre-tensioned

2 Extend: Select symbol and confirm

Movement stops after the button is released and when an end position is reached; ➠ p. 12 - 69.

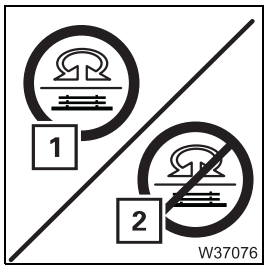


Pre-tensioning pressure display

1 – Green: Pre-tensioning pressure reached

2 – Red: Pre-tensioning pressure too low – pre-tension counterweight

➠ p. 12 - 70



Slewing release display

1 Green: Slewing enabled (if no other shutdown has occurred).

2 Red: Slewing disabled by counterweight – the corresponding warning is displayed.

The pre-tensioning pressure is too low.

➠ p. 12 - 69

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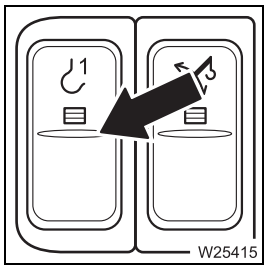
9.2.14 Main hoist

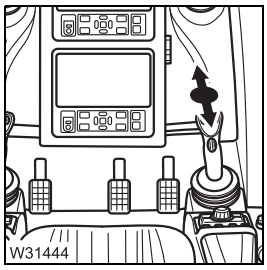
Control panels



Main hoist on/off
There is a lamp in the button.

– **Press once:** – Lamp bright – main hoist on
– Lamp dim – main hoist off

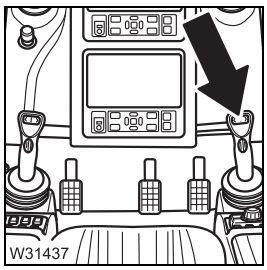
➠ p. 11 - 82



Right control lever

– **Back:** Raise
– **Forward:** Lower

➠ p. 11 - 83

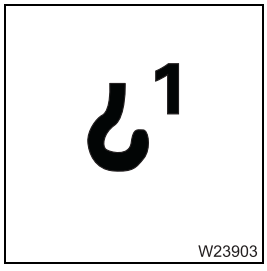


Hoist high-speed mode on/off
Parking brake is engaged – press in the button

– **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. 11 - 120

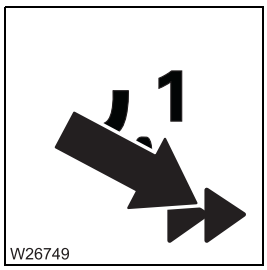
CCS display



Power units display

– **Green:** Main hoist on
– **Red:** Main hoist off

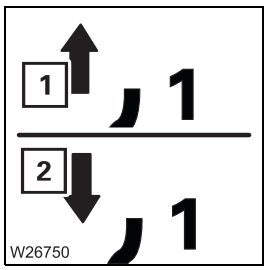
13.12.2018



High-speed mode monitoring for the hoist

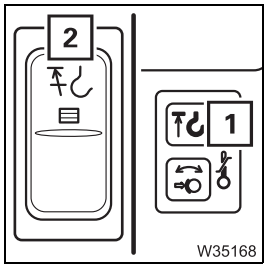
– **Lights up:** High-speed mode on
– **Gone out:** High-speed mode off

p. 11 - 120



Lift/lower the hoist display

– **Symbol (1):** Raise
– **Symbol (2):** Lower

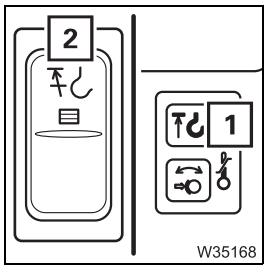


Overriding the lifting limit switch
Override slewing gear shutdown
Correct the counterweight rigging mode

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)
– Slewing gear shutdown bypassed

2 – Release: Shutdown functions of the lifting limit switch not bridged
Slewing gear shutdown not overridden

Lifting limit switch and lowering limit switch, p. 11 - 88
Slewing with an overridden slewing gear shutdown, p. 14 - 50



Warning for lifting limit switch shutdown

1 – Lights up: Lifting limit switch triggered – movements increasing the load moment stop

1 – Flashing: Button (**2**) pressed

1 – Gone out: Lifting limit switch not triggered and not bridged

p. 11 - 88

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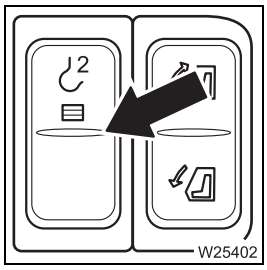
9.2.15 Auxiliary hoist

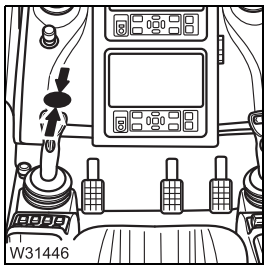
Control panels



Auxiliary hoist on/off
There is a lamp in the button.

– **Press once:** – Lamp bright – auxiliary hoist on
– Lamp dim – auxiliary hoist off

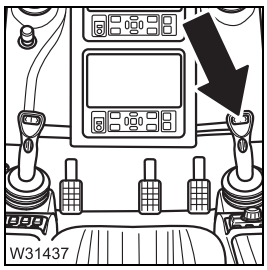
➠ p. 11 - 85



Left control lever

– **Back:** Raise
– **Forward:** Lower

➠ p. 11 - 86

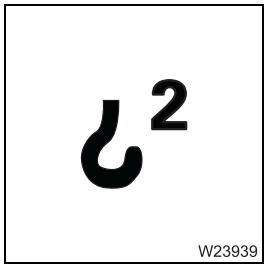


Hoist high-speed mode on/off
Parking brake is engaged – press in the button

– **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. 11 - 120

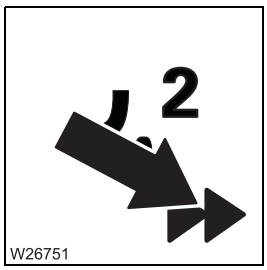
CCS display



Power units display

– **Green:** Auxiliary hoist on
– **Red:** Auxiliary hoist off

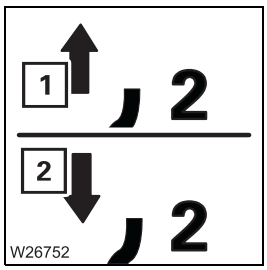
13.12.2018



High-speed mode monitoring for the hoists

– **Lights up:** High-speed mode on
– **Gone out:** High-speed mode off

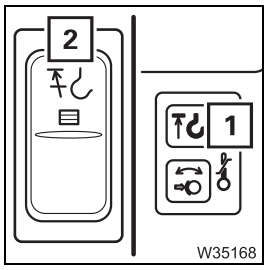
p. 11 - 120



Lift/lower the hoist display

– **Symbol (1):** Raise
– **Symbol (2):** Lower

p. 11 - 120



Warning for lifting limit switch shutdown
Overriding the lifting limit switch

1 Brief description for the main hoist; p. 9 - 109
2 Brief description for the main hoist; p. 9 - 109

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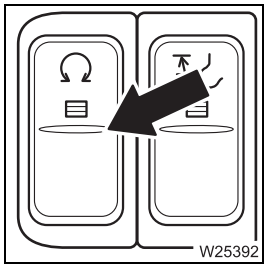
9.2.16 Slewing gear

➠ *Slewing gear*, p. 11 - 121.

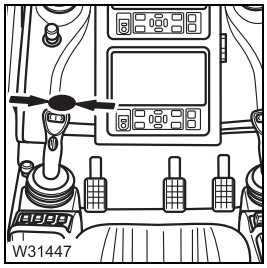
Control panels



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. 11 - 122

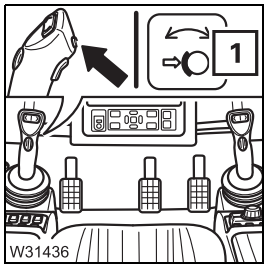


Left control lever

– **To the left:** Slewing to the left

– **To the right:** Slewing to the right

➠ p. 11 - 123



Slewing gear freewheel
At the slewing gear brake – *Control lever* function is switched on

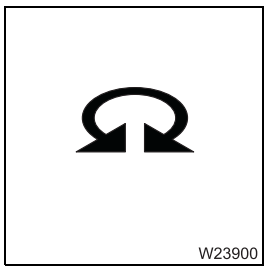
– **Switch on:** Move control lever to zero position and press button – slewing gear brake released, lamp (**1**) goes out

– **Switch off:** Release switch – slewing gear brake applied, lamp (**1**) lights up

➠ p. 11 - 125

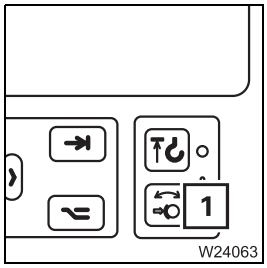
13.12.2018

CCS display



Power units display

– **Green:** Slewing gear on
– **Red:** Slewing gear off



Slewing gear brake engaged/released

1 **Lights up:** Slewing gear brake applied
1 **Gone out:** Slewing gear brake released

➠ p. 11 - 122

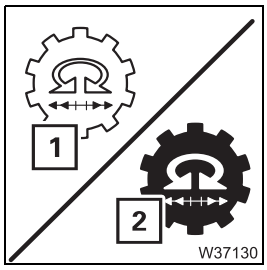
Switching over the slewing gear brake function
Slewing gear is switched on
– **Switch over:** Select symbol and confirm – the function is displayed

Slewing gear brake function display

1 Brake pedal function
Brake slewing movement – actuate *Slewing gear* brake pedal

2 Control lever function
Brake slewing movement – control lever in the zero position
Slewing gear brake pedal without function

➠ p. 11 - 121



Slewing speed reduction on/off

– **Switch off:** Select symbol (**1**) and confirm – Symbol (**2**) is displayed
– **Switch on:** Select symbol (**2**) and confirm – Symbol (**1**) is displayed

➠ *Slewing speed – Switching the reduction on and off*, p. 11 - 127

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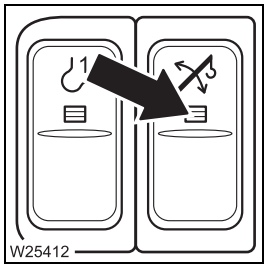
9.2.17 Derricking gear

➠ *Derricking gear*, p. 11 - 91.

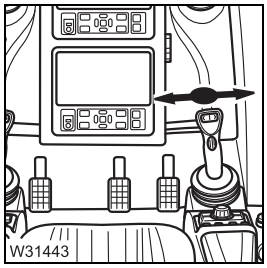
Control panels



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. 11 - 91

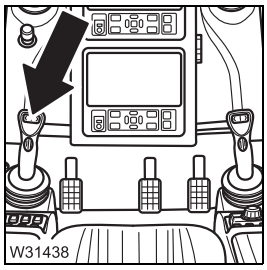


Right control lever

– **To the left:** Raise – lift main boom

– **To the right:** Lower – lower main boom

➠ p. 11 - 92



Derricking gear/telescoping mechanism high-speed mode on/off
Parking brake is engaged – press in the button

– **Left:** High-speed mode on, off when released

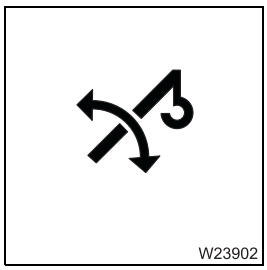
– **Once to the right:** High-speed mode on – continuous operation

– **Once to the right or once to the left:** High-speed mode off

➠ p. 11 - 119

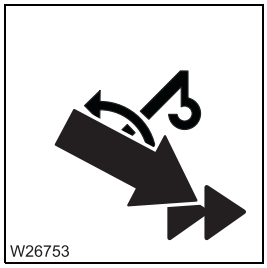
13.12.2018

CCS display



Power units display

- **Green:** Derricking gear on
- **Red:** Derricking gear off

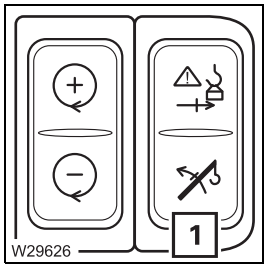


High-speed mode inspection derricking gear

- **Lights up:** High-speed mode on
- **Gone out:** High-speed mode off

➠ p. 11 - 119

Side panel



1 Raise enable button after RCL shutdown

For RCL override – version A; ➠ p. 9 - 137.

For RCL override – version B; ➠ p. 9 - 138.

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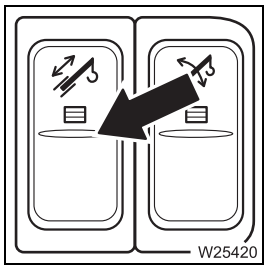
9.2.18 Telescoping mechanism

Control panels ➠ *Telescoping mechanism*, p. 11 - 95.

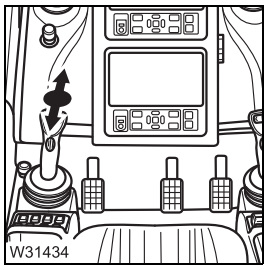


Telescoping mechanism on/off
There is a lamp in the button.

– **Press once:** – Lamp bright – telescoping mechanism on,
Power units with the same control lever configuration off
– Lamp dim – telescoping mechanism off

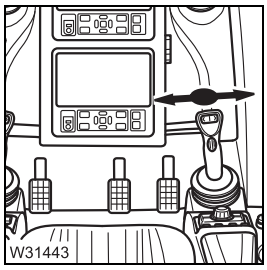
➠ p. 11 - 104

Control lever
The control lever configuration is depends on the version.



– **Version 1**
Left control lever
– **Back:** Retract
– **Forward:** Extend

➠ p. 11 - 104

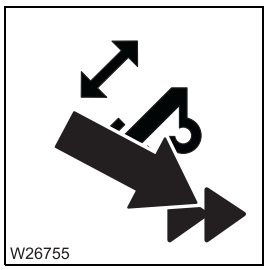


– **Version 2**
Right control lever
– **To the left:** Retract
– **To the right:** Extend

➠ p. 11 - 104

13.12.2018

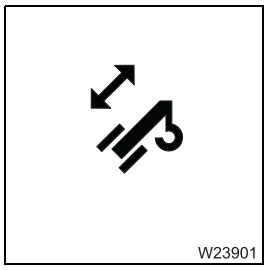
CCS display



Telescoping mechanism high-speed mode inspection

– **Lights up:** High-speed mode on
– **Gone out:** High-speed mode off

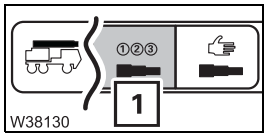
p. 11 - 119



Power units display

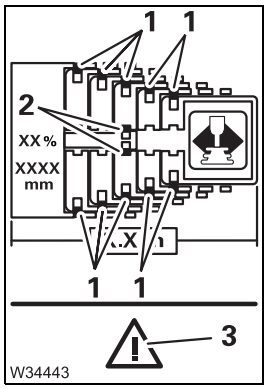
– **Green:** Telescoping mechanism on
– **Red:** Telescoping mechanism off

Telescoping semi-automation menu



Opening the menu

– **Opening:** 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. 11 - 108

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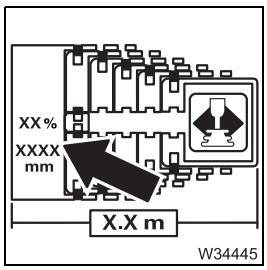
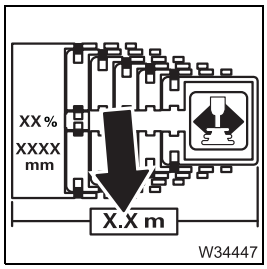


Telescoping cylinder length display

– **Display:** Current extended length of the telescoping cylinder

– **Unit of measurement:** Displayed in % (per cent) and, depending on setting, mm (millimetres) or ft (feet)

➠ p. 11 - 116

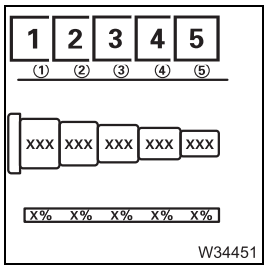


Main boom length display

– **Display:** Current extended length of the main boom

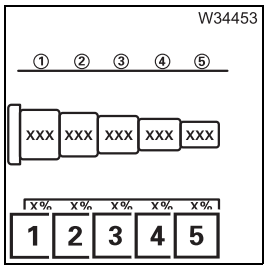
– **Unit of measurement:** Displayed depending on setting, mm (millimetres) or ft (feet)

➠ p. 11 - 116



Telescopic sections display

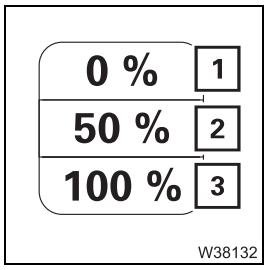
1 - 5 Display of telescopic sections 1 to 5



Current telescoping status display

Extended length of the telescopic sections in percentage

1 - 5 Display of telescopic sections 1 to 5



Pre-selection for all telescopic sections

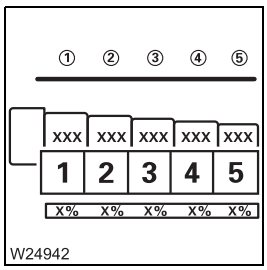
1 Pre-selection telescoping 0%

2 Telescope status 50% pre-selection – 47% to 55% depending on telescopic section

3 Pre-selection telescoping 100%

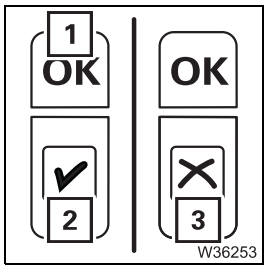
Overview of the fixed lengths; ➠ p. 14 - 39

13.12.2018



Pre-selection individual telescopic sections

1 - 5 Display of telescopic sections 1 to 5



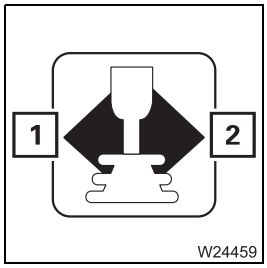
Confirming preselection

1 Confirm pre-selected telescoping

2 Telescoping permitted display

3 Telescoping not permitted display

➠ p. 11 - 116



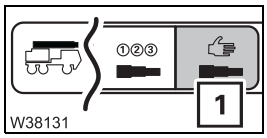
Teleautomation direction display

1 Start telescoping full automation with *Retract*

2 Start telescoping full automation with *Extend*

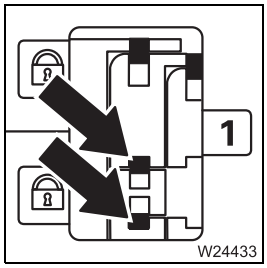
➠ p. 11 - 116

Manual telescoping menu



Opening the menu

– Opening: 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

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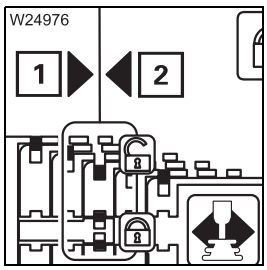
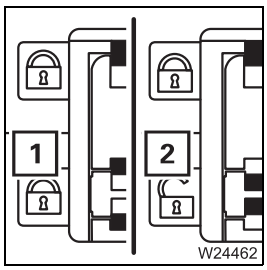


Locking point display

1 Extend telescoping cylinder

2 Retract telescoping cylinder

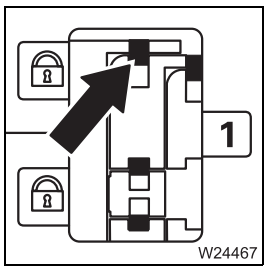


Locking/releasing the telescoping cylinder

– To lock: – Telescopic section locked:
Select symbol (**2**) and confirm – telescoping cylinder is locked

– To unlock: – Telescopic section locked:
Select symbol (**1**) and confirm – telescoping cylinder is unlocked

➠ p. 11 - 109

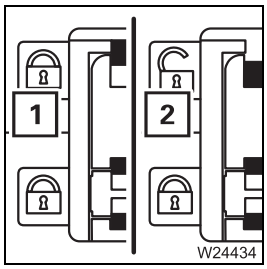


Lock/release telescopic section

– Display **Yellow:** Locking pins intermediate position

Green: Telescopic section locked

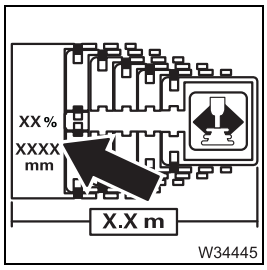
Red: Telescopic section unlocked



– 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. 11 - 113



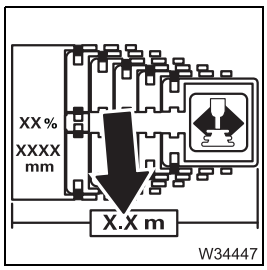
Telescoping cylinder length display

– Display: Current extended length of the telescoping cylinder

– Unit of measurement: Displayed in % (per cent) and, depending on setting, mm (millimetres) or ft (feet)

➠ p. 11 - 107

13.12.2018

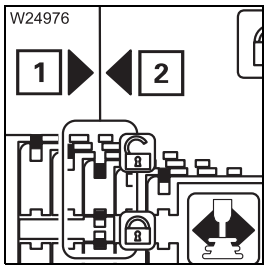


Main boom length display

– **Display:** Current extended length of the main boom

– **Unit of measurement:** Displayed depending on setting, mm (millimetres) or ft (feet)

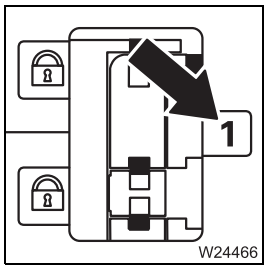
➠ p. 11 - 107



Locking point display

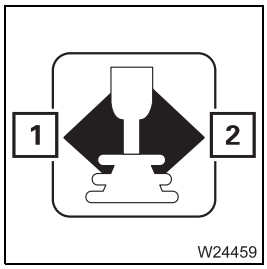
1 Extend telescoping cylinder

2 Retract telescoping cylinder



Telescoping cylinder in the telescopic section display

Displayed telescopic section, e.g. telescopic section I

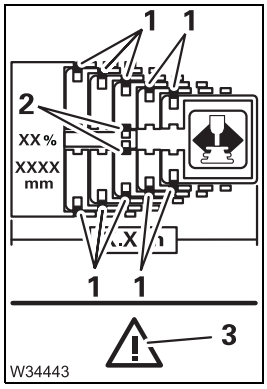


Telescoping direction display

1 Start with *Retract*

2 Start with *Extend*

➠ p. 11 - 116



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. 11 - 108

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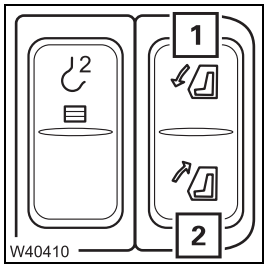
9.2.19 Hydraulic system

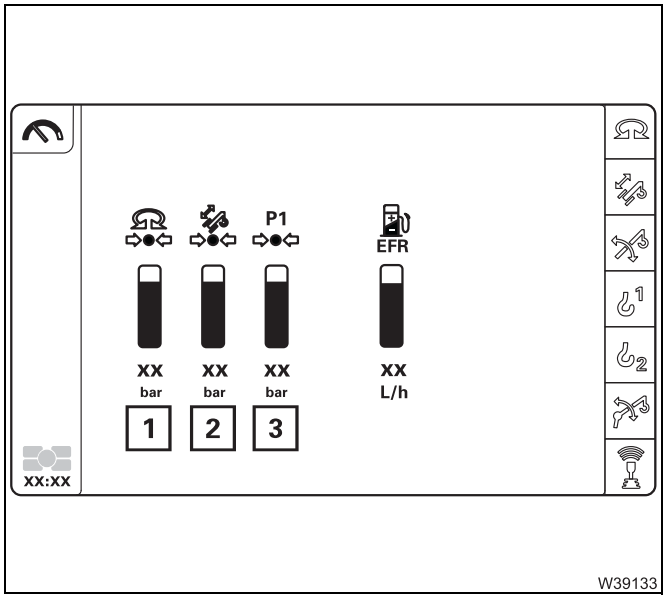


Inclining the crane cab

1 Incline forward

2 Incline back

p. 11 - 129



In the Information menu

Current pressure in bar for movements of:

1 Slewing gear

2 Telescoping mechanism

3 – Hoist
– Derricking gear
– Counterweight hoist unit
– Inclining the crane cab
– Locking units

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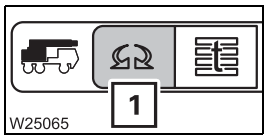
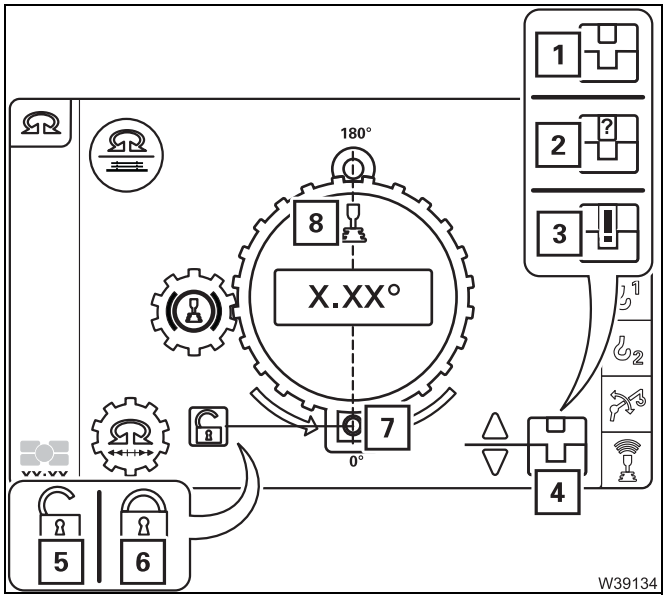
9.2.20 Superstructure lock menu



– **Opening:** Select and confirm symbol (**1**)

Turntable lock ➠ *Locking/unlocking the turntable*, p. 11 - 18.



Locking status displays

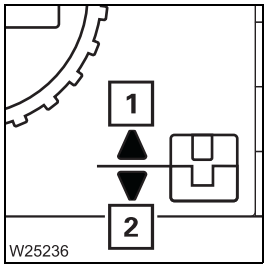
The current position of the locking pin is shown by different symbols:

1 and 7	**Red** – unlocked – symbol (**8**) green
2 and 7	**Yellow** – intermediate position
3 and 7	**Violet** – error
4 and 7	**Green** – locked – symbol (**8**) hidden

and

5	Unlocked
6	Locked

➠ p. 11 - 19



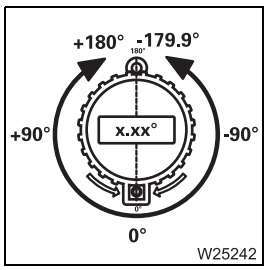
Locking/unlocking the turntable

The superstructure is in the 0° or 180° position.

To unlock:	Symbol (**1**) – locking pins retract
To lock:	Symbol (**2**) – locking pins extend

➠ p. 11 - 19

13.12.2018



Current slewing angle display

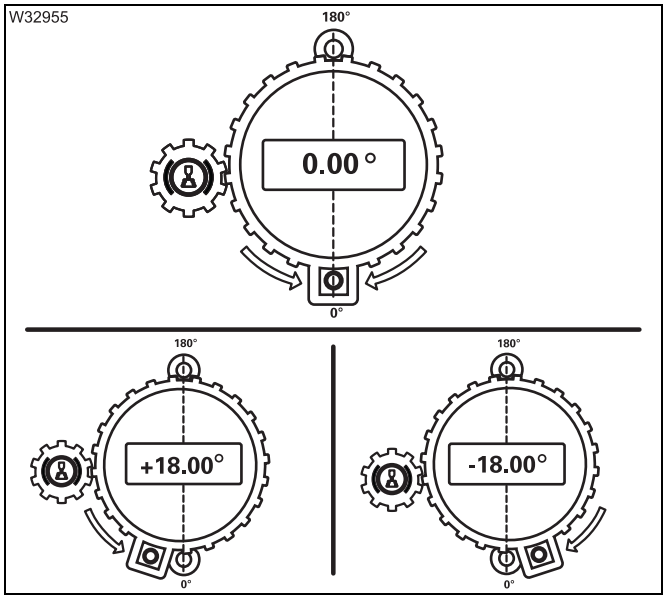
0°: Position *0° to the rear* – locking point

180°: Position *180° to the front* – locking point

+ 0.1 to +180.0°: Turned to the right from 0°

− 0.1 to −179.9°: Turned to the left from 0°

p. 11 - 121



Directional indicator

Current position: Range of ± 20° in front of the locking point.

– **Both arrows:** locking point reached

– **One arrow:** direction of arrow = turning direction towards the locking point

p. 11 - 18

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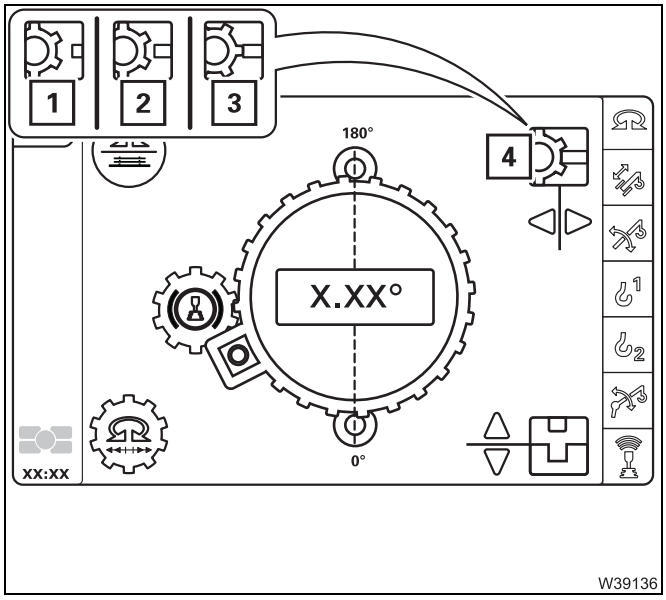
Houselock *Switching the houselock on/off*, p. 11 - 20.



Locking status displays

The current position of the locking pin is shown by different symbols:

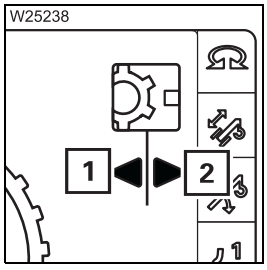
1 Unlocked

2 Intermediate position

3 Blocked, locking pin in front of a tooth

4 Locked

p. 11 - 20



Houselock on/off

Switch on: Symbol (**1**) – Pin extends

Switch off: Symbol (**2**) – Pin retracts

p. 11 - 20

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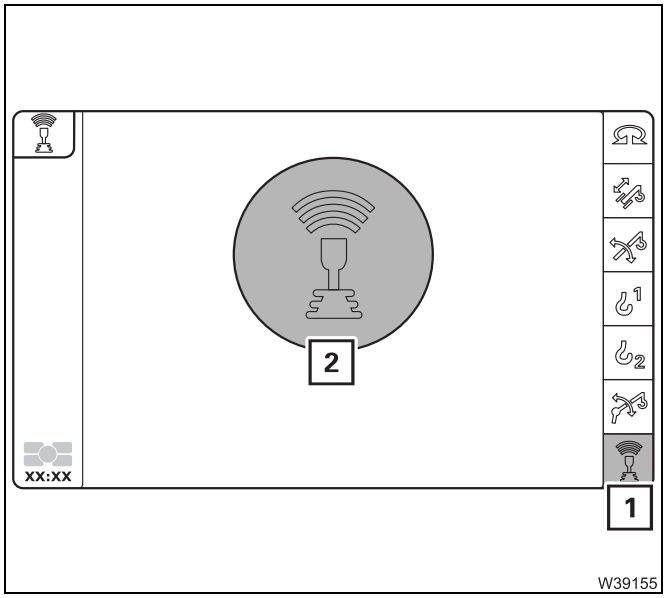
9.2.21 Remote control

Operating with the remote control is only enabled for the *Standard* slewing range type.



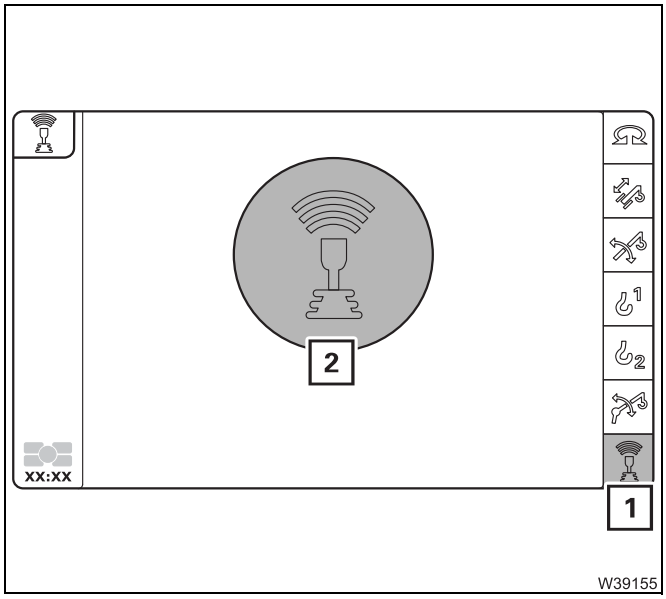
Remote control menu

1 – Orange:
Remote control connected

1 – Green:
Remote control switched on.
CCS operation from the crane cab is blocked. Symbol (**2**) is shown green on all menus.

1 – Off:
Remote control deactivated

For more information; ➠ *Separate operating manual*



Remote control display

1 – Green:
Remote control switched on.
CCS operation from the crane cab is blocked. Symbol (**2**) is shown on all menus.

1 – Off:
Remote control deactivated

For more information; ➠ *Separate operating manual*

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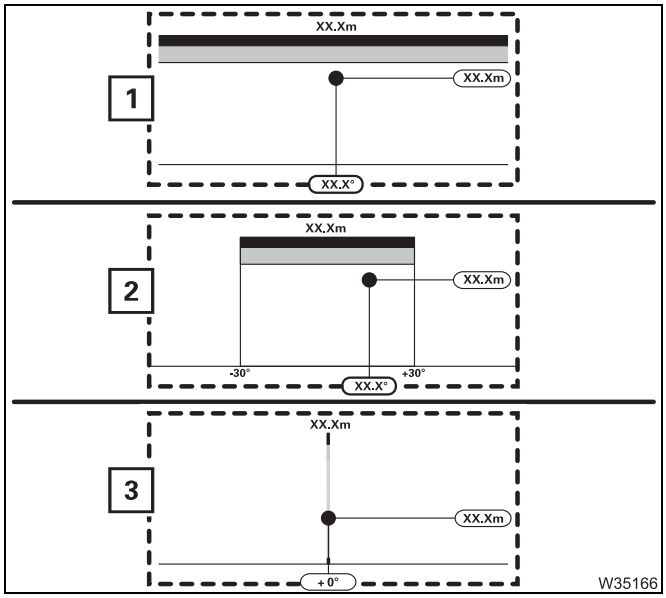
9.2.22 Rated capacity limiter (RCL)

CCS display In the Start menu



For the *Standard* slewing range type

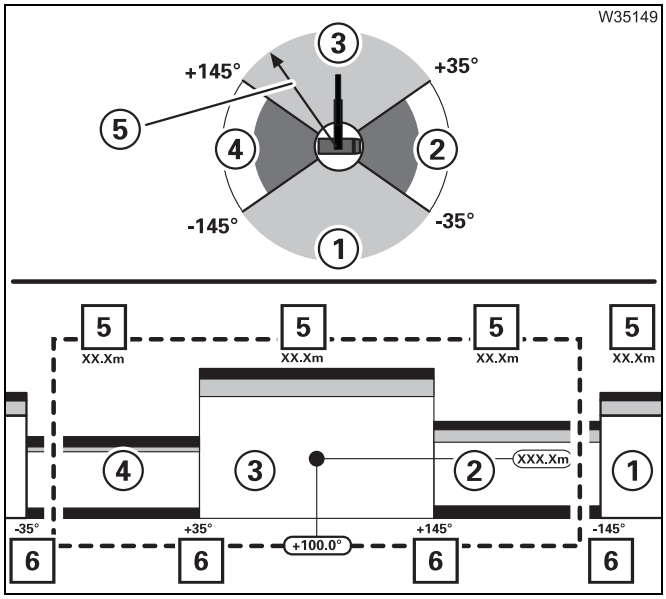
Only one slewing range is displayed

1 360° slewing range

2 Restricted slewing range, e.g. ±30°

3 Operating position, e.g. 0° 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° / +35° / +145° / -145°.

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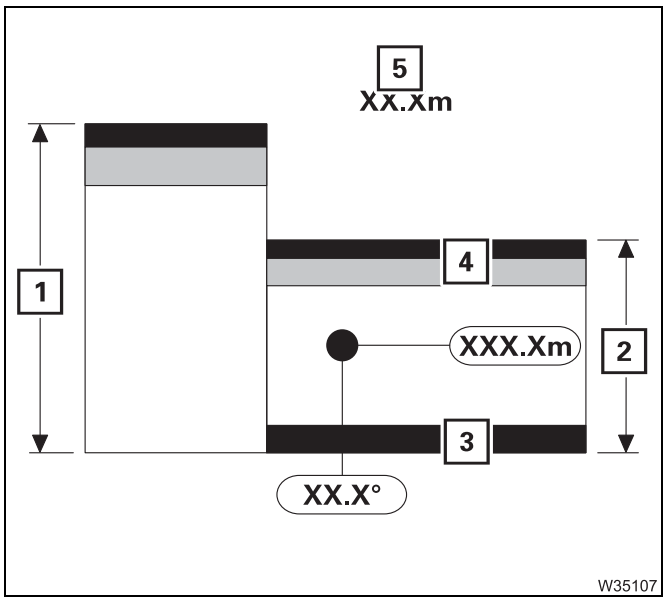


Maximum permissible working radius display

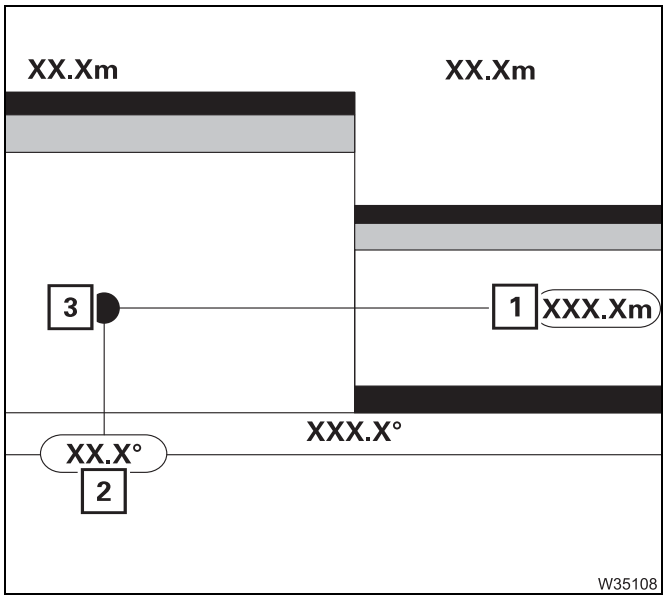
Shows the maximum permissible working radius (**5**) for each slewing range.

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* menu; ➠ p. 11 - 53.

Current slewing angle display

2 Display occurs in the same manner as in the *Monitoring* menu; ➠ p. 11 - 54.

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.

➠ *Slewing range type Standard*, p. 11 - 57

➠ *MAXbase slewing range type*, p. 11 - 59

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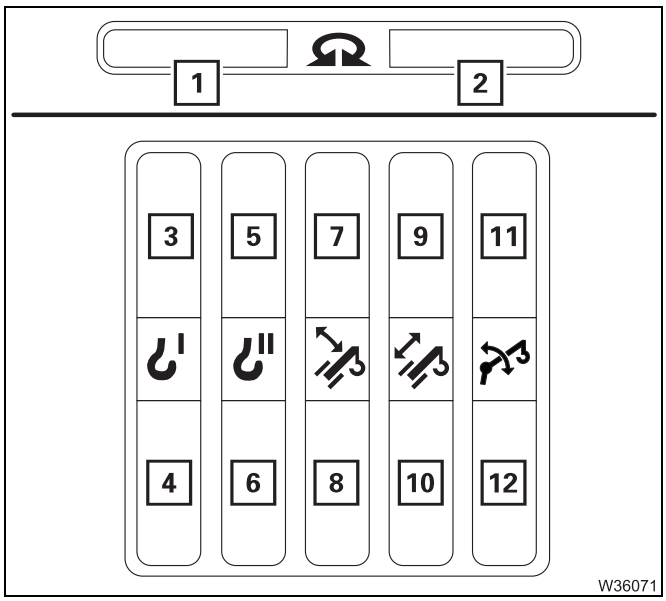
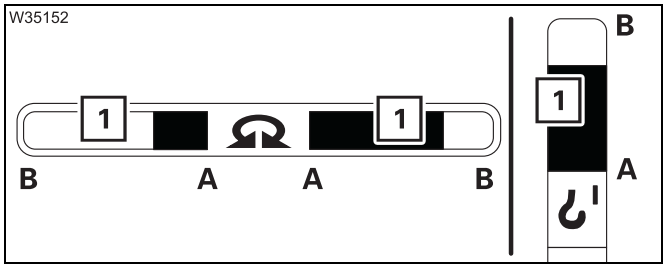


Maximum permissible speed display

Separate displays are provided for each direction of movement.

1 Slewing to the left
2 Slewing to the right
3 Lower the main hoist
4 Lift the main hoist
5 Lower the auxiliary hoist
6 Lifting the auxiliary hoist
7 Lowering the boom
8 Raising the boom
9 Extend
10 Retract
11 Lower the lattice extension
12 Raise the lattice extension

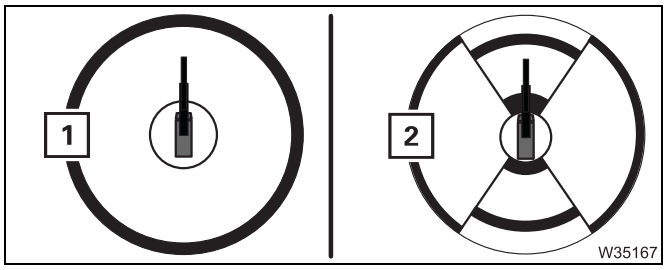


A bar (**1**) shows the maximum permissible speed – scale from 0% (**A**) to 100% (**B**).

The colour of the bar (**1**) changes.

Red:	0% to 10%
Yellow:	11% to 25%
Green:	26% to 100%

➠ *On the CCS display*, p. 11 - 57



Slewing ranges display

The function is identical to the display in the *Lifting capacity table* menu.

1 For the *Standard* slewing range type;
➠ p. 11 - 64

2 For the *MAXbase* slewing range type;
➠ p. 11 - 66

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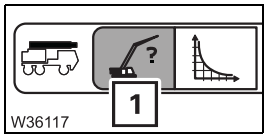
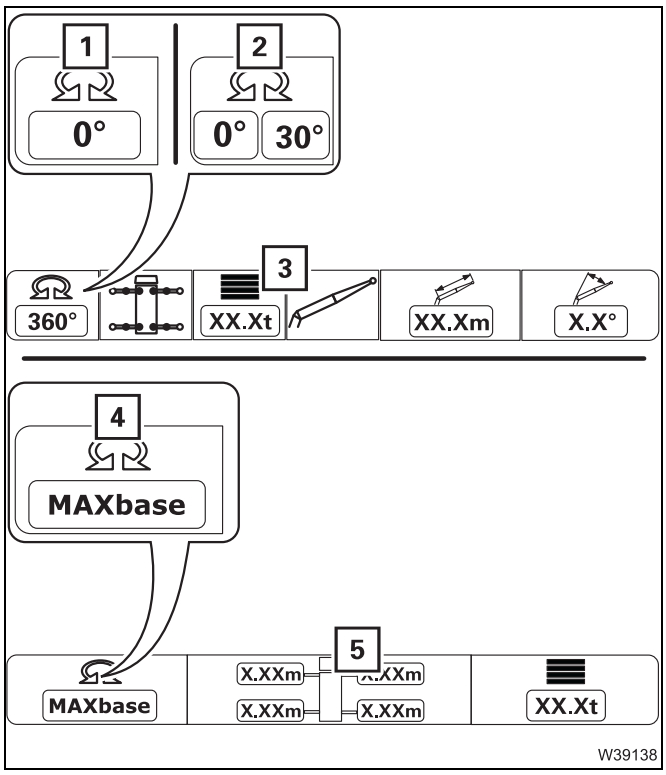
In the *Enter rigging mode/telescope status* menu



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 operating position[1)], e.g. 0° to the front

2 Display for restricted slewing range, e.g. 0° ± 30°

– After confirmation: Menu display (**3**)

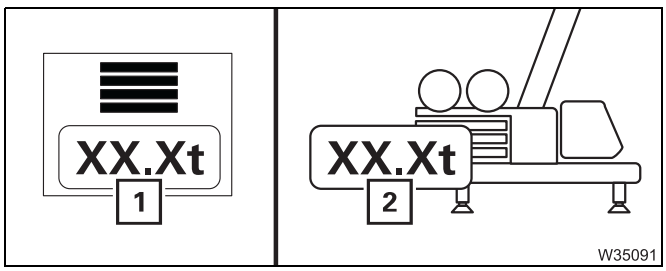
1) To accept, switch off the slewing gear

– For the *MAXbase* slewing range type

4 MAXbase

– After confirmation: Menu display (**5**)

Entering the rigging mode, p. 11 - 36



Entering counterweight
Counterweight display

1 In input mode – select and confirm counterweight

2 Shows the current entry

Entering the rigging mode, p. 11 - 36

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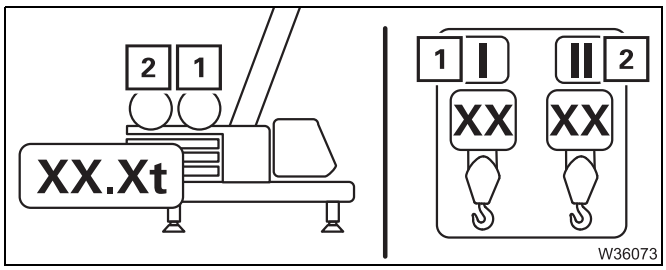


Reeving input mode display

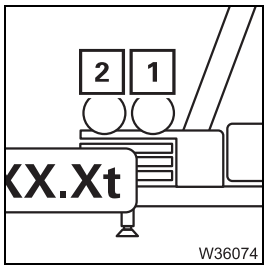
1 Main hoist

2 Auxiliary hoist

Orange: on

Grey: off

Entering the rigging mode, p. 11 - 36

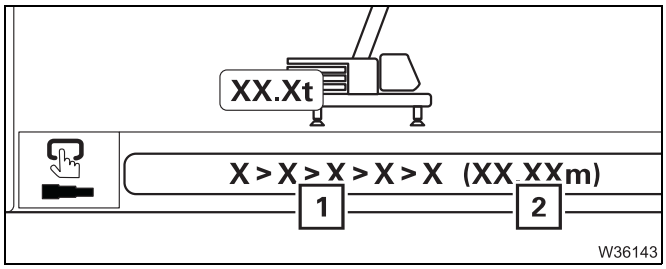


Entering reeving

1 Main hoist
In input mode – select and confirm current reeving

2 Auxiliary hoist – functions as with (**1**)

Entering the rigging mode, p. 11 - 36

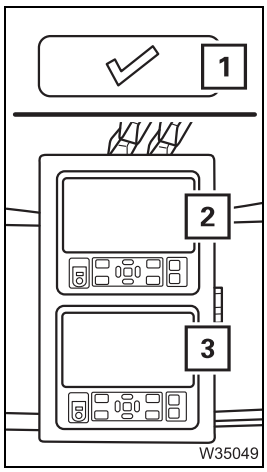


Preselected telescoping display

1 Telescope status display in percentage (%)

2 Preselected main boom length (**1**) in metres (m) or in feet (ft)

Entering the rigging mode, p. 11 - 36



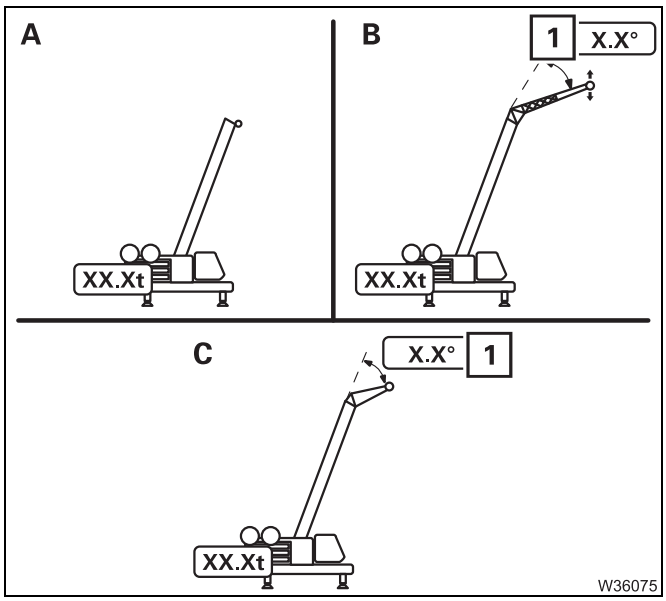
Confirming the rigging mode

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 span ≠ required outrigger span

Entering the rigging mode, p. 11 - 36

13.12.2018



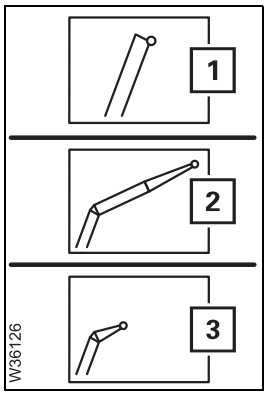
Boom system display

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

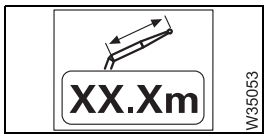
For the *Standard* slewing range type only.

In input mode – select and confirm the boom system

1 Main boom

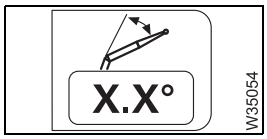
2 Lattice extension/boom extension

3 Heavy load lattice extension



Lattice extension input – length

In input mode – select and confirm length.



Lattice extension input – angle

Only for manually inclinable lattice extensions

In input mode – select and confirm the angle.

➠ *Entering the rigging mode*, p. 11 - 36

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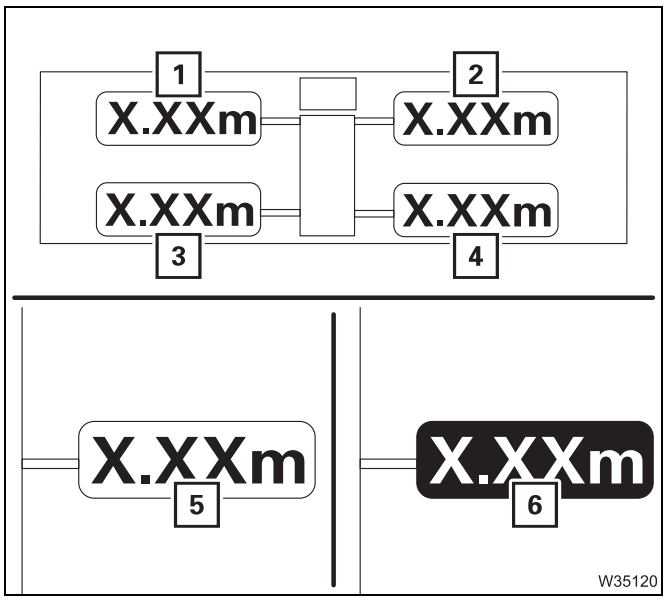
Accept the measured outrigger span
Select and confirm – the outrigger span provided by the outrigger span monitoring is adopted and shown on the *Enter outrigger span* display;
➠ *Confirming the rigging mode and lifting capacity table*, p. 11 - 45.



Enter outrigger span
(*MAXbase*)

The values are entered individually for outrigger beams (**1**) to (**4**).

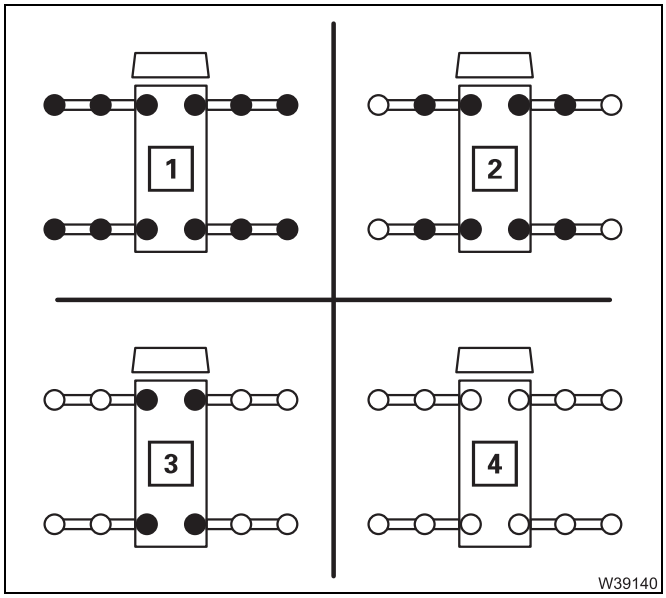
In input mode – select and confirm the individual widths.

Outrigger span monitoring display
(*MAXbase*)

5 Measured outrigger span = required width

6 Measured outrigger span ≠ required outrigger span

➠ *Entering the rigging mode*, p. 11 - 36



Enter outrigger span
(*Standard*)

The selection occurs simultaneously for all outrigger beams – selected outrigger spans are **orange**.

In input mode – select and confirm the outrigger span

1 6.825 x 6.20 m (22.4 x 20.3 ft)

2 6.825 x 4.40 m (22.4 x 14.4 ft)

3 6.825 x 2.32 m (22.4 x 7.6 ft)

4 Free on wheels – symbol is **grey**

➠ *Entering the rigging mode*, p. 11 - 36

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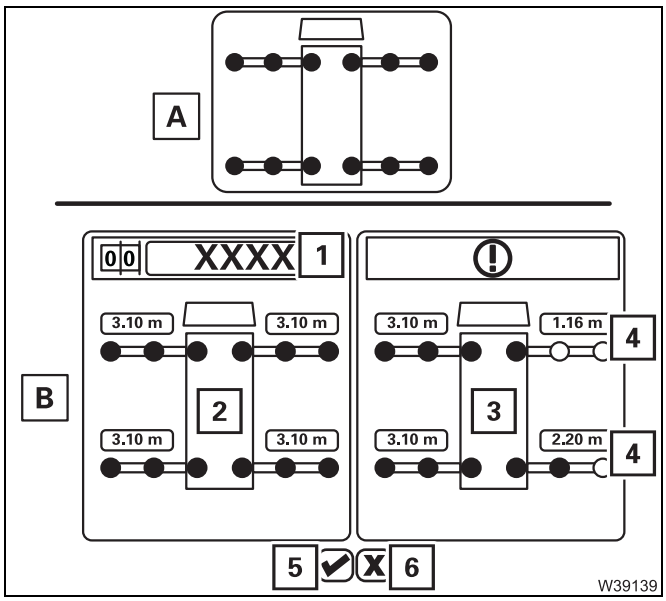


Outrigger span monitoring display (*Standard*)

Query after confirming the rigging mode.

A Measured outrigger span = required width

B Measured outrigger span ≠ required span (query menu)

2 Required outrigger span – for RCL code (**1**)

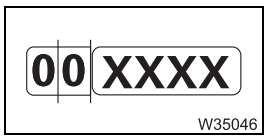
3 Measured outrigger span

4 Outrigger span not OK for RCL Code (**1**) – **red**

5 Confirmation
Rigged outrigger span = outrigger span (**2**),
Crane operation enabled

6 Confirmation
Rigged outrigger span ≠ outrigger span (**2**)
Crane operation not enabled

➠ *Entering the rigging mode*, p. 11 - 36



Enter RCL code
In input mode – select and confirm the RCL code.
The corresponding rigging mode is displayed; ➠ p. 11 - 44.

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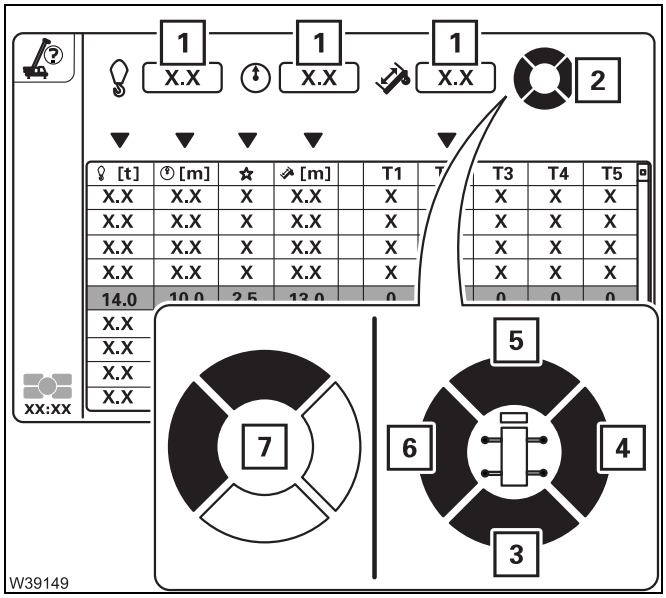
In the *Pre-selection telescoping* menu

Pre-selecting telescoping, p. 11 - 44



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

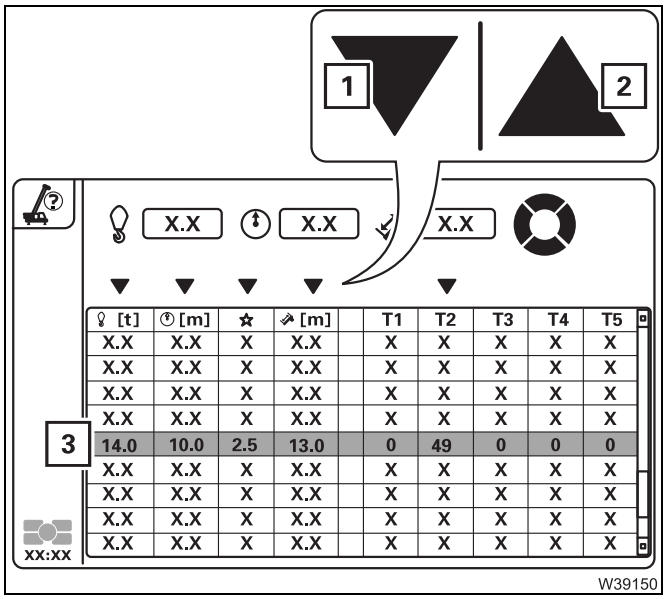
4 To the right

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

During the telescoping duration, the required telescoping times are compared and provided with values between 1 (shortest time) and 5 (longest time).

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. 11 - 44

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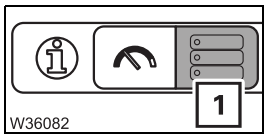
In the *Datalogger menu*

➠ *Datalogger*, p. 11 - 72

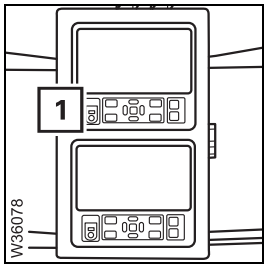


– **Opening:** Select and confirm symbol (**1**)

RCL display

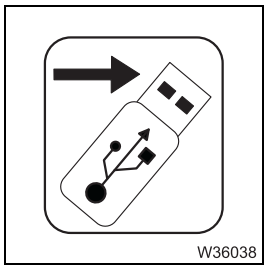
In the *Datalogger menu*

➠ *Datalogger*, p. 11 - 72

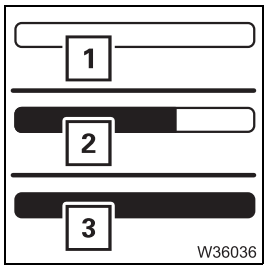


USB connection for data export

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

There are no short descriptions for these displays.

– In the *Lifting capacity tables* menu;
➠ *Displaying the lifting capacity tables*, p. 11 - 63

– In the *Monitoring* menu
➠ *Checks before operating the crane*, p. 11 - 49,
➠ *Display during the crane operation*, p. 11 - 53.

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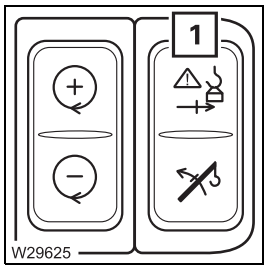
RCL override – version A

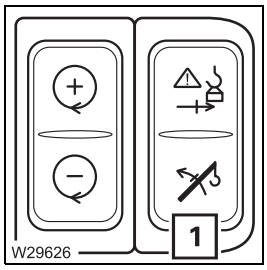
This version only applies to RCL programming as per EN 13000.
For other RCL programming; ➠ p. 9 - 138.



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 limited to max. 15%

➠ *RCL override – version A*, p. 11 - 67



Raise enable button after RCL shutdown

– Switch on function

Only active if the current degree of utilisation is greater than 100% – crane movements blocked.

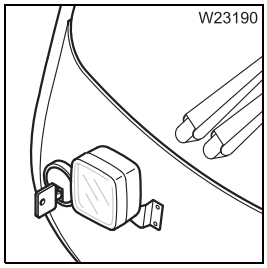
1 Press once: Release the raise function to the permitted working range.
If the degree of utilisation is less than 100% – release of the blocked crane movements.

– 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. 11 - 67



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. 11 - 70

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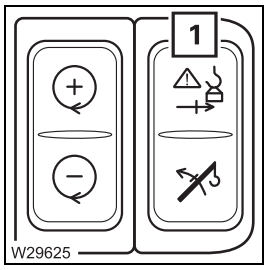
RCL override – version B

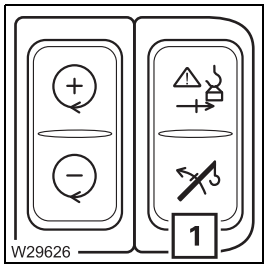
This point only applies to RCL programming deviating from EN 13000. For RCL programming in accordance with EN 13000; ➠ p. 9 - 137.



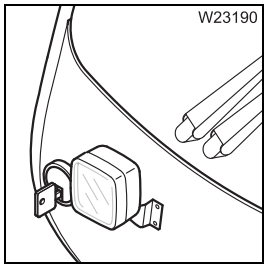
Overriding the RCL in an emergency

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. 11 - 71



No function



No function

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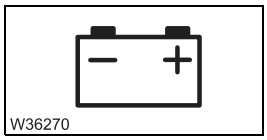
9.2.23 Electrical system

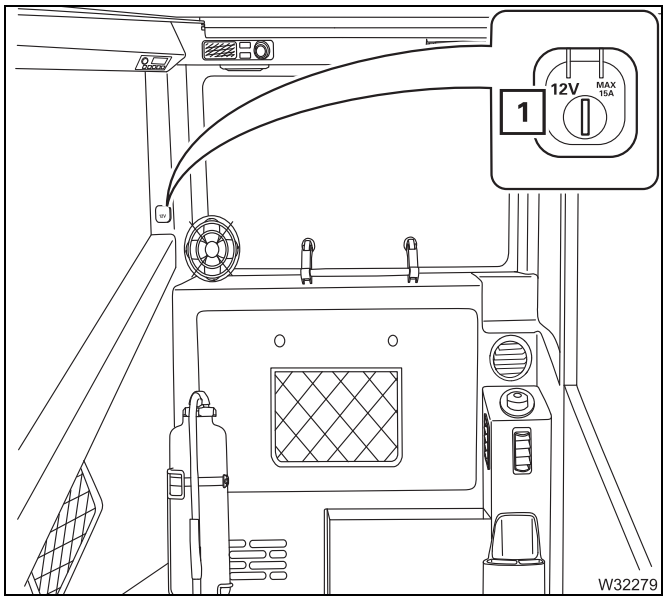


Voltage monitoring warning

– **Display symbol:** Engine on – power failure – switch off engine

– **Gone out:** Engine on – no malfunction

p. 10 - 8



Sockets 12 V

1 Socket 12 V/max. 15 A

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

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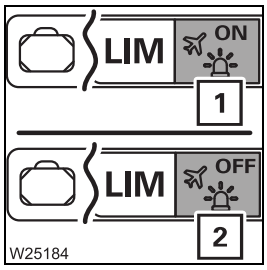
9.2.24 Lighting, windscreen wiper/washing system

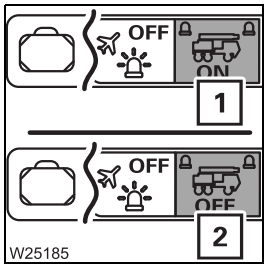
Lighting



Air traffic control light on/off

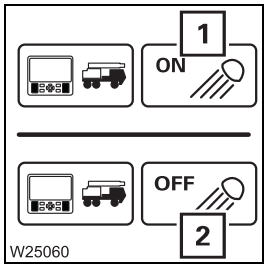
- **Switch on:** Select symbol (**1**) and confirm – symbol *ON* is displayed
- **Switch off:** Select symbol (**2**) and confirm – symbol *OFF* is displayed

p. 12 - 102



Rotating beacon on/off

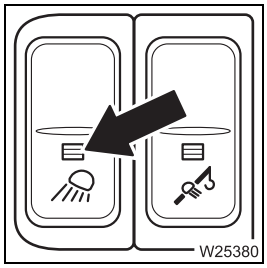
- **Switch on:** Select symbol (**1**) and confirm – symbol *ON* is displayed
- **Switch off:** Select symbol (**2**) and confirm – symbol *OFF* is displayed



Outrigger lighting on/off

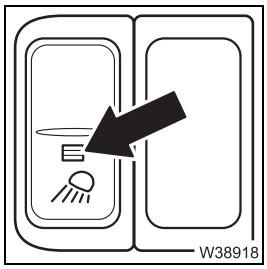
- **Switch on:** Select symbol (**1**) and confirm – symbol *ON* is displayed
- **Switch off:** Select symbol (**2**) and confirm – symbol *OFF* is displayed

p. 12 - 30



Spotlights I on/off

- **Switch on:** Press in at the bottom – lamp in button on
- **Switch off:** Press in at the top – lamp in button off



Spotlights II on/off

- **Switch on:** Press in at the bottom – lamp in button on
- **Switch off:** Press in at the top – lamp in button off

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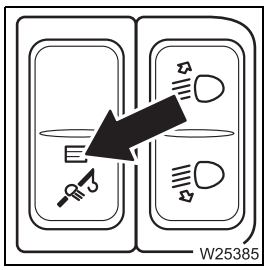
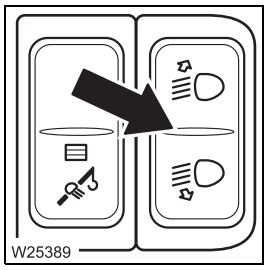


Slewable spotlights on/off

- **Switch on:** Press in at the bottom – lamp in button on
- **Switch off:** Press in at the top – lamp in button off

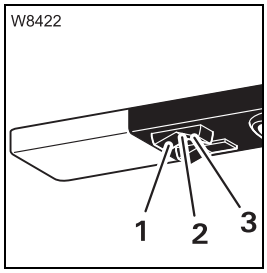
p. 11 - 134



Slewing the slewable spotlights

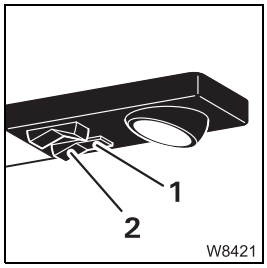
- **Down:** Press down
- **Up:** Press up

p. 11 - 134



Cab lighting

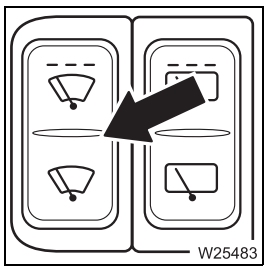
1 **Always on**
2 **Always off**
3 **On/off via door contact**



Reading lamp

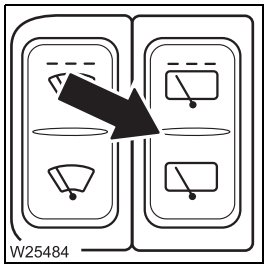
1 **On**
2 **Off**

Windscreen wiper/ washing system



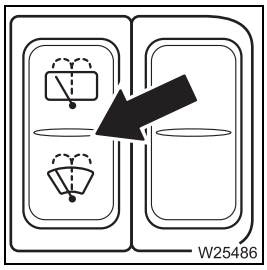
Windscreen wiper on/off

- **Off:** Middle position
- **Interval:** Press in at the top – wiper goes to end position
- **Continuous operation:** Push in at the bottom



Roof window wiper on/off

- **Off:** Middle position
- **Interval:** Press in at the top – wiper goes to end position
- **Continuous operation:** Push in at the bottom



Windscreen washing system

- **Windscreen:** Press down
- **Skylight:** Press up

No additional wiping function is performed

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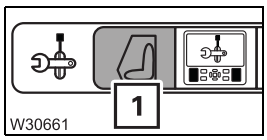
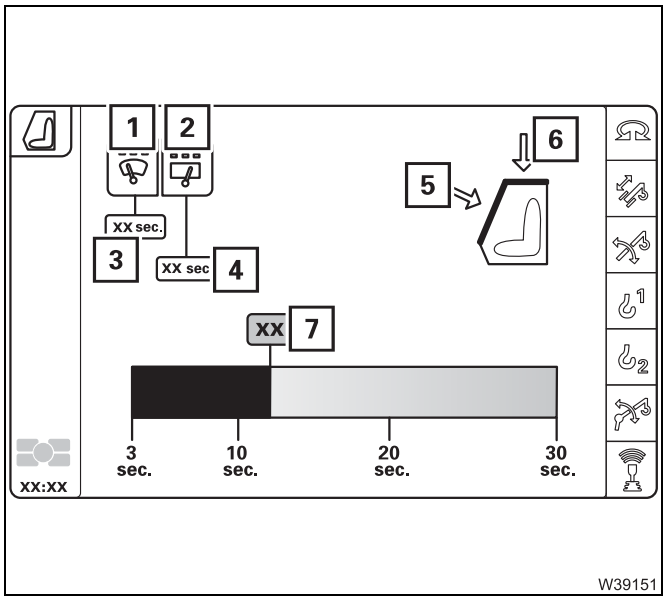


Crane cab menu

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



Adjusting the wiper stroke interval

1 Windscreen wiper selection, display (**5**)

2 Roof window wiper selection, display (**6**)

7 Changing the interval duration

Wiper interval in seconds for

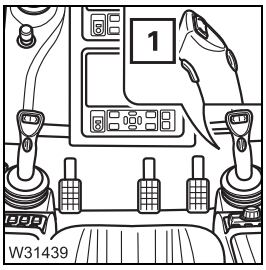
3 Windscreen wiper

4 Roof window wiper

⇛ p. 11 - 130

Horn

The ignition must be switched on.



1 – Press: superstructure horn on

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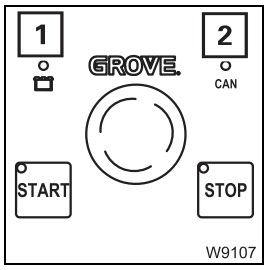
9.2.25 Hand-held control

➠ *Emergency operation with the hand-held control*, p. 14 - 43

Engine control panel

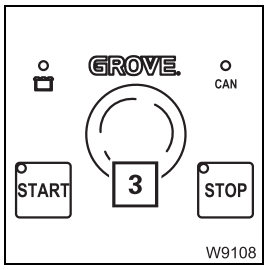


1 Voltage monitoring

- **– Lights up:** Ignition on
- **– Gone out:** Switch the ignition off

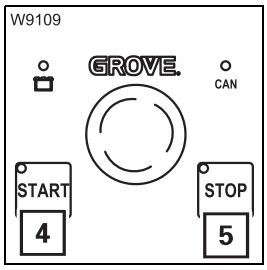
2 CAN monitoring

- **– Lights up:** 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 the latched switch:** Switch returns to initial position – crane functions released



4 START engine

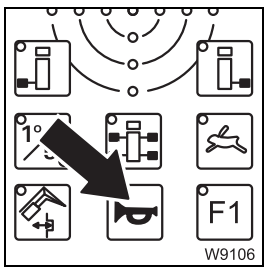
- **– Press once:** Engine on

5 STOP engine

- **– Press once:** Engine off

Horn

The ignition must be switched on.



- **– Press:** Hand-held control on the superstructure socket – superstructure horn on

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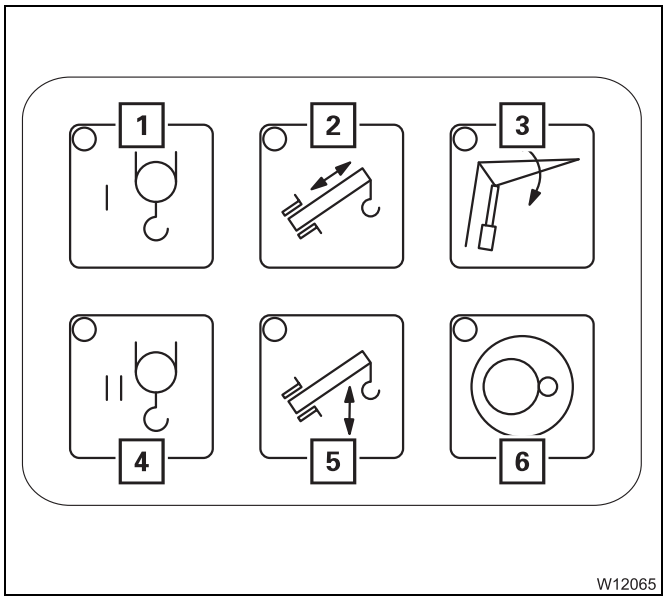
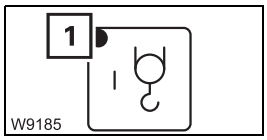
Pre-select emergency operation



Selectable power units

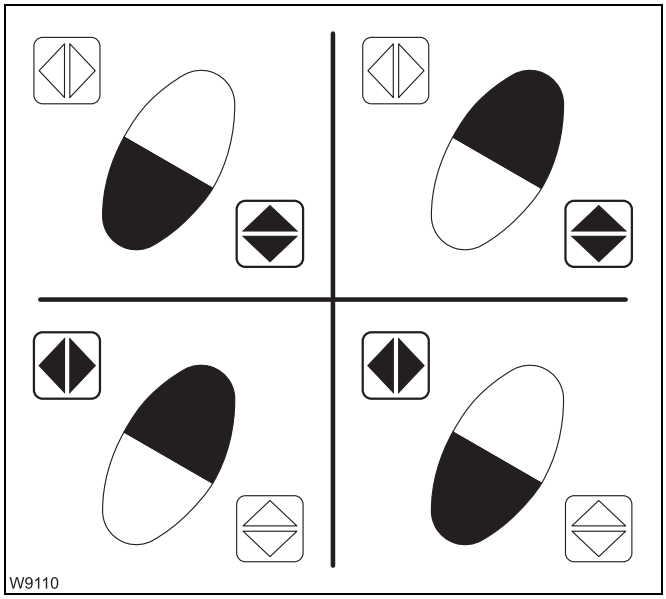
1 Main hoist
2 telescoping mechanism
3 Lattice extension derricking gear[1)]
4 Auxiliary hoist
5 Derricking gear
6 Slewing gear

[1)] Additional equipment



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 function depends on the pre-selected power unit; p. 14 - 45.

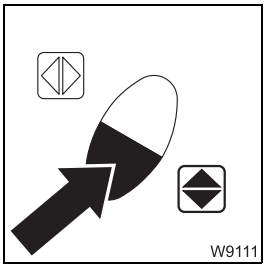
The operations are not monitored by the RCL.

There are four button combinations, activated 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:** Increase pressure on button

– **Slower movement:** Decrease pressure on button

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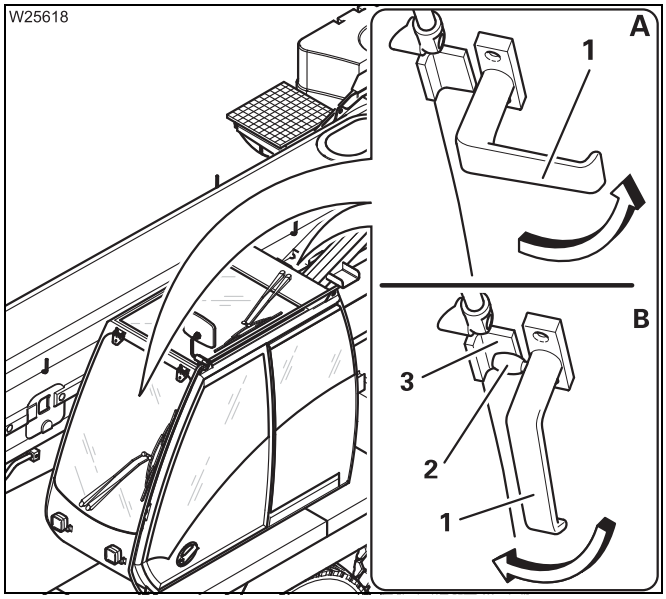
9.2.26 Windows and doors

Windows The handles on the windscreen and the rear window have the same function.



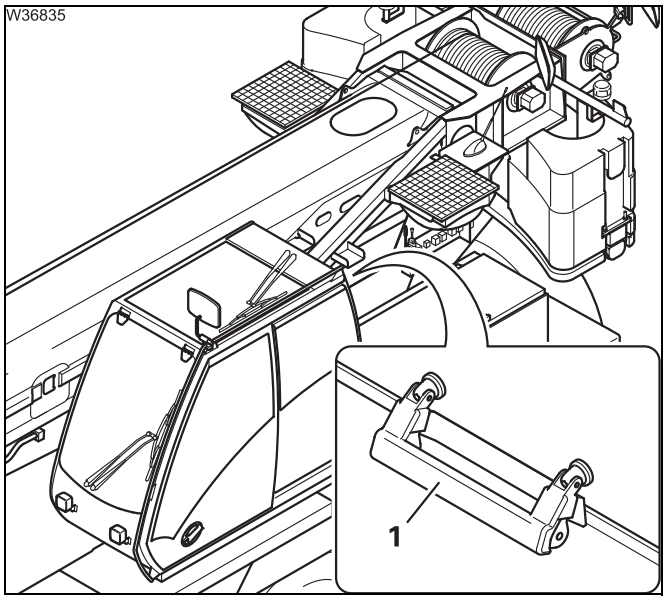
Open window (A)

- 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 holder (**3**).

Rear window



Opening

- Raise the handle (**1**).
- Push window outwards.

Closing

- Pull in window.
- Push down the handle (**1**).

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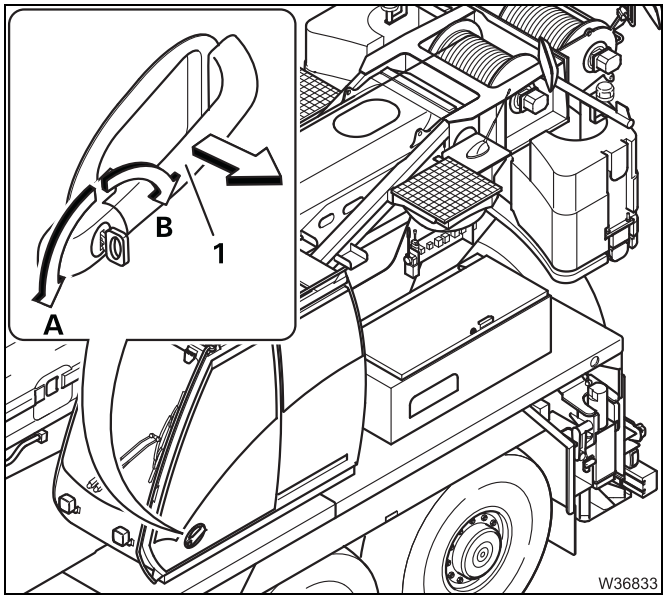
Crane cab door



From outside

Unlocking

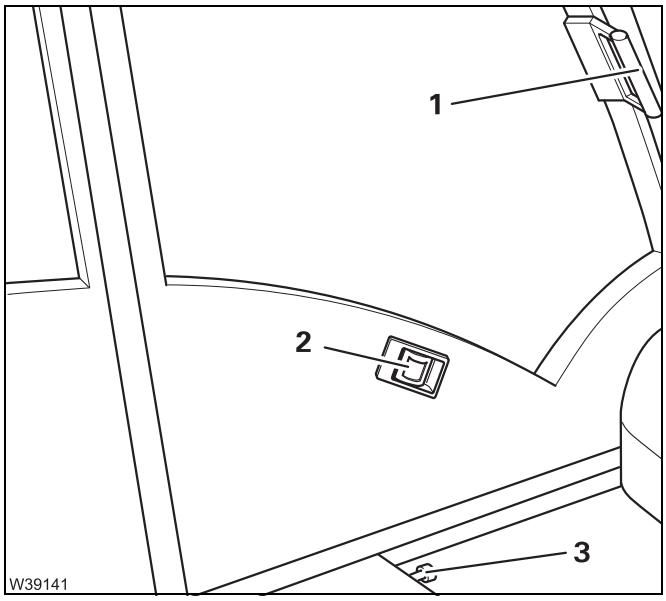
- Turn the key in direction **A**.

Locking

- Turn the key in direction **B**.

Open/close

- Pull the handle (**1**).
- Slide the door.



From inside

– Closing
Pull release lever (**3**), push door forwards by handle (**1**) – latches.
Locking from inside not possible.

– Opening
Pull release lever (**2**), push door back by handle (**1**) – latches.

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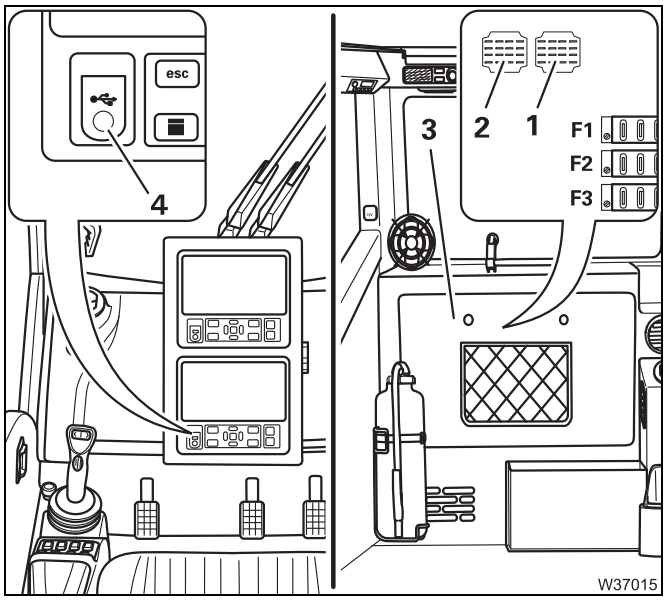
9.2.27 Diagnostics

The diagnostics connections may only be operated by the service personnel.



The following connections are below the cover (**3**).

1 *CCS* diagnostics – (serial interface)

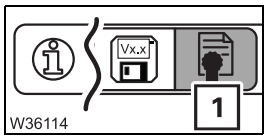
2 *CCS* diagnostics – CAN bus

Additional diagnostics and service connections are present on the *CCS* and *RCL* control units (**4**).

- 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.

9.2.28 Other



Disclaimer menu

– Opening: Select and confirm symbol (**1**). The warranty waiver text is shown on the display.

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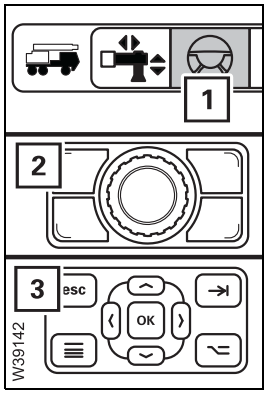
9.3 Short description of the operating elements – driving from the crane cab

9.3.1 Driving menu



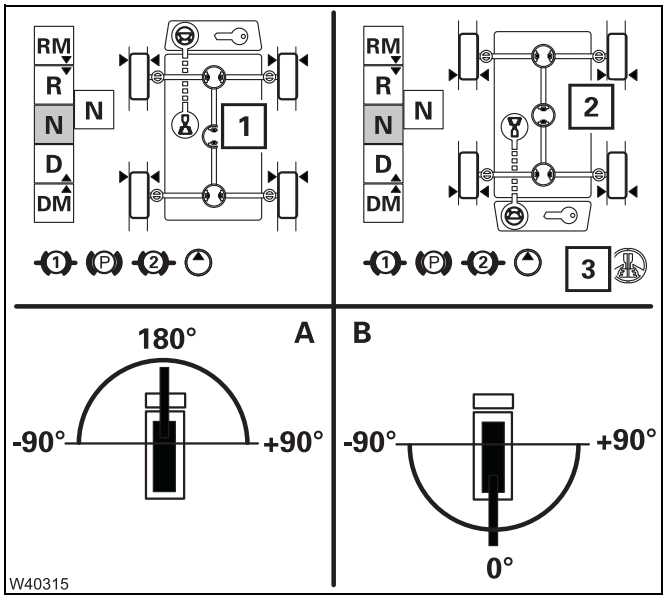
***Driving* menu**

– Opening: Select symbol (**1**) and confirm – menu is opened
The menu is also opened the first time the parking brake is released; ➠ p. 9 - 155

– Closing:
– The parking brake must be engaged
– Crane operation mode must be switched on

Press button (**2**) or (**3**) once – menu is closed

➠ p. 13 - 15



Carrier display

1 Display in the front semi-circle (**A**)

2 Display in the rear semi-circle (**B**) – display of symbol (**3**)

➠ p. 13 - 18

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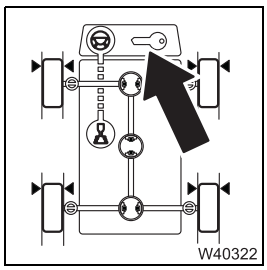
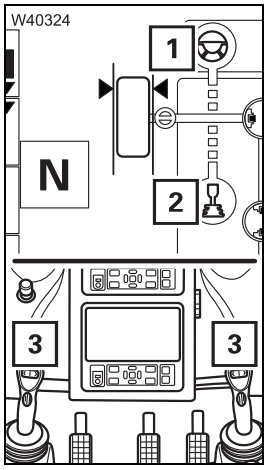


Steering lock display

White: Driver's cab: Ignition key in position **1**
Crane cab: Operating elements for driving active

Red: Driver's cab: Ignition key not in position **1**
Crane cab: Operating elements for driving without function

➠ p. 13 - 15

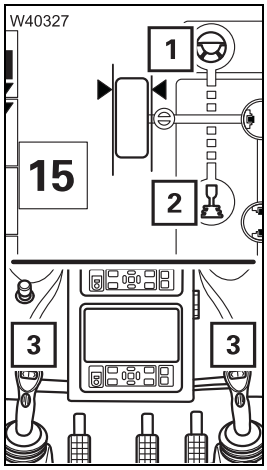


Change-over between crane operation and driving modes

– Switching on driving mode
Crane operation mode must be switched on

Select and confirm symbol (**2**)
- Symbol (**2**) green
- Symbol (**1**) black
- Buttons (**3**) have *Steering* function
- Transmission in neutral position
- Crane's hydraulic system *Driving mode* on

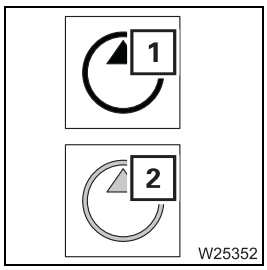
➠ *Selecting the operating mode*, p. 13 - 15



– Switching on crane operation mode
Driving mode must be switched on

Select and confirm symbol (**2**)
- Symbol (**2**) white
- Symbol (**1**) green
- Buttons (**3**) have *High-speed mode* function
- Transmission in gear 15
- Crane's hydraulic system *Driving mode* off

➠ *Selecting the operating mode*, p. 13 - 15



Crane hydraulic system driving mode on/off display

1 Arrow **orange** – crane's hydraulic system *Driving mode* on (N, DM or RM active)

2 Arrow **grey** – crane's hydraulic system *Driving mode* off (D or R active)

➠ *Crane's hydraulic system Driving mode*, p. 13 - 17

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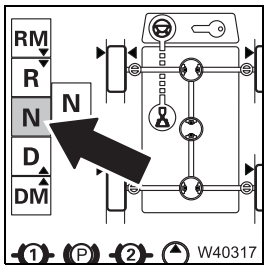
9.3.2 Transmission

Operating the transmission when driving with rigged truck crane;
➠ *Operating the transmission*, p. 13 - 24.

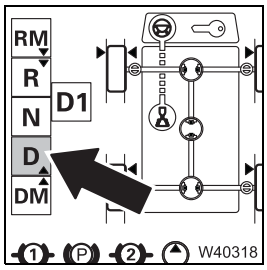
The following applies to all operating elements:
– Driving mode must be switched on
– The *Service brake* pedal must be applied
– The truck crane must be stationary.



Neutral position N

– Switch on: Select and confirm symbol – letter is **white** – no gear engaged

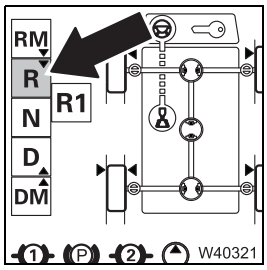
– Switch off: Shift to a different gear – letter is **blue**



Transmission mode D

– Switch on: Select and confirm symbol – letter is **white**
– Select forwards starting gear
– Crane's hydraulic system *Driving mode* off
– Crane movements disabled

– Switch off: Shift to a different gear – letter is **blue**



Transmission mode R

– Switch on: Select and confirm symbol – letter is **white**
– Select reverse starting gear
– Crane's hydraulic system *Driving mode* off
– Crane movements disabled

– Switch off: Shift to a different gear – letter is **blue**

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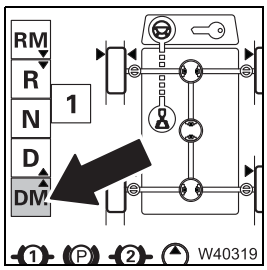
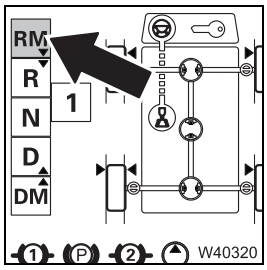


Transmission mode DM

– **Switch on:** Select and confirm symbol – letter is **white**
  – Gear 1 forwards on – transmission will not shift
  – Crane's hydraulic system *Driving mode* on
  – Crane movements released
– **Switch off:** Shift to a different gear – letter is **blue**



Transmission mode RM

– **Switch on:** Select and confirm symbol – letter is **white**
  – Gear 1 reverse on – transmission will not shift
  – Crane's hydraulic system *Driving mode* on
  – Crane movements released
– **Switch off:** Shift to a different gear – letter is **blue**

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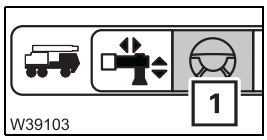
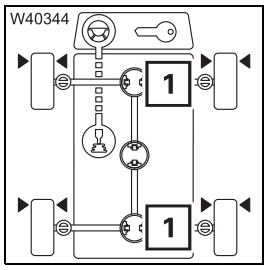
9.3.3 Final drive



Driving menu

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

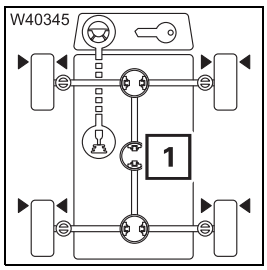


Transverse differential locks on/off

– **Switch on:** Select symbol (**1**) and confirm – symbol is **red**

– **Switch off:** Select symbol (**1**) and confirm – symbol is **green**

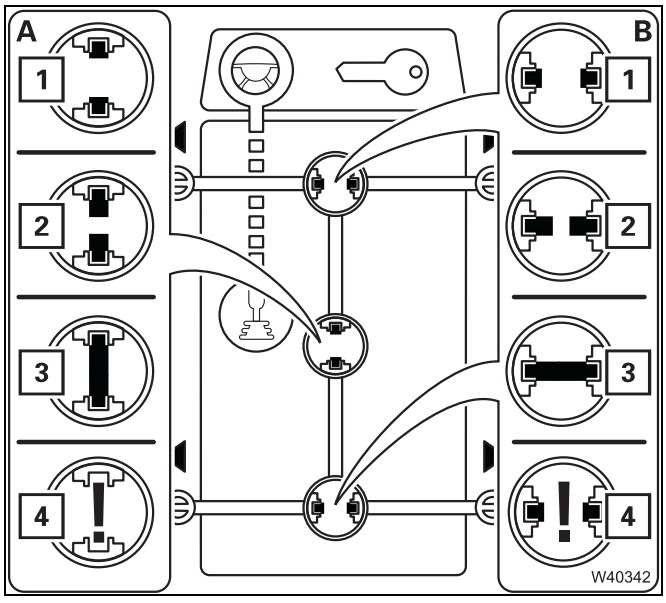
When a symbol (**1**) is selected **all** transverse differential locks are switched on or off.



Longitudinal differential lock on/off

– **Switch on:** Select symbol (**1**) and confirm – symbol is **red**

– **Switch off:** Select symbol (**1**) and confirm – symbol is **green**



(A) – longitudinal differential lock display

(B) – transverse differential lock display

The current status is shown using different symbols:

1 **Green** – locks off

2 **Yellow** – intermediate position

3 **Red** – locks on

4 **Violet** – error

➠ p. 13 - 26

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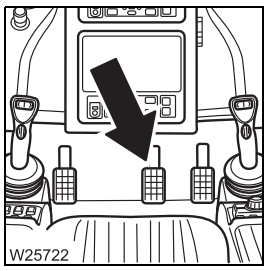
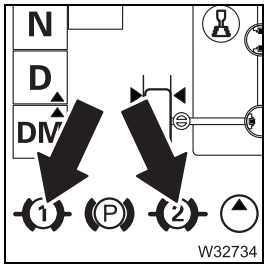
9.3.4 Brakes



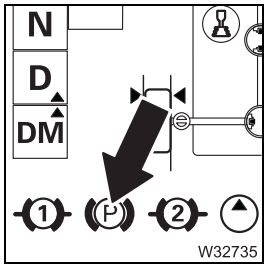
Service brake
The pedal acts on the carrier brakes – for continuously variable adjustment of the braking force.

***CCS* display**



Supply pressure brake circuits 1 and 2 display

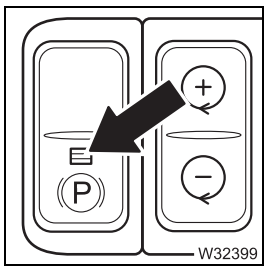
- **Red:** Supply pressure less than about 5 bar
- **Green:** Supply pressure greater than 5.5 bar



Parking brake indicator lamp

- **Red:** Parking brake applied
- **Grey:** Parking brake released

Side panel from above



Parking brake indicator lamp

- **Lights up:** Parking brake applied
- **Gone out:** Parking brake released

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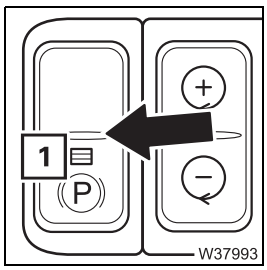

Applying/releasing the parking brake

– Closing: – press down once – lamp (**1**) lights up, Parking brake applied

– Releasing: **Releasing for the first time after ignition on**
- Press up once – *Driving* menu opens
- Apply the service brake
- Wait for about 5 seconds
- Press up once – lamp (**1**) goes out, Parking brake released

After the first release
- Apply the service brake
- Press up once – lamp (**1**) goes out, Parking brake released

➠ *After driving*, p. 13 - 28

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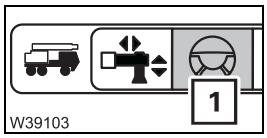
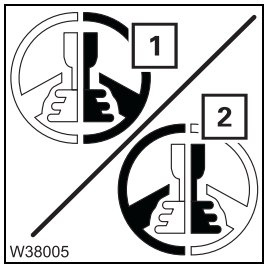
9.3.5 Steering

CCS display



***Driving* menu**

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

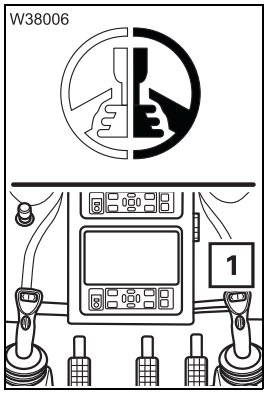


Changing the steering direction
Display

1 Steering direction *Steering wheel*

2 Steering direction *Reversed* (compared to steering wheel)

Switch over: Select desired symbol and confirm
The setting will be secured

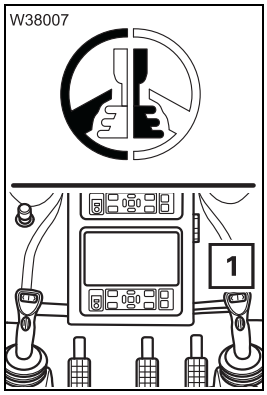


– Steering direction *Steering wheel*

Function

– Press button (**1**) to the right = wheels turn to the right – steering wheel turns to the right

– Press button (**1**) to the left = wheels turn to the left – steering wheel turns to the left



– Steering direction *Reversed*

Function

– Press button (**1**) to the right = turn wheels to the left – steering wheel turns to the left

– Press button (**1**) to the left = wheels turn to the right – steering wheel turns to the right

➠ *Changing the steering direction*, p. 13 - 19

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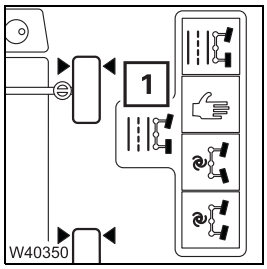
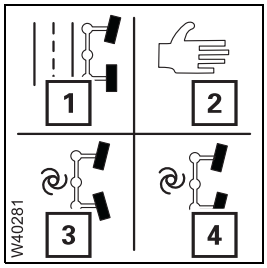


Steering mode switched on display

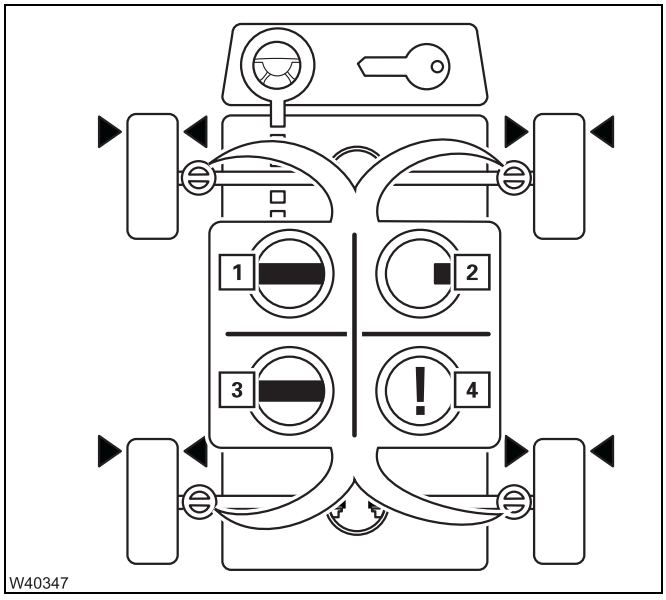
Shows the symbol for the currently selected steering mode.

The switching procedure for the selected steering mode has been initiated.



Selected steering mode	Gear change
1 Normal steering mode – on-road driving	Locking the steering
2 Separate steering – manual	Unlock steering
3 Separate steering – driving around corners	Unlock steering
4 Separate steering – crab travel mode	Unlock steering

The current switching status is displayed on the *Steering locking status* display.



Steering locking status display

Indicates whether the switching procedure for the selected steering mode has been completed.

1 **Green** – locked

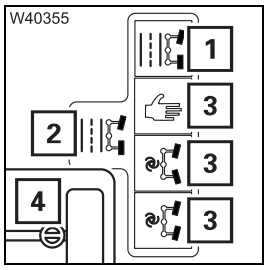
2 **Red** – unlocked

3 **Yellow** – intermediate position

4 Error

Switching steering modes on and off

The selected symbol must be confirmed within 2 seconds, otherwise the steering mode remains unchanged.

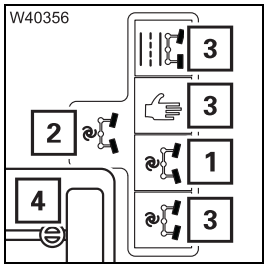


Normal steering mode/on-road driving on

– Switch on: Select symbol (**1**) and confirm – Symbol (**2**) is displayed
Displays (**4**) **green** – normal steering on

– Switch off: Select a different steering mode – symbol (**3**)
Displays (**4**) **red** – normal steering off

➠ p. 13 - 23

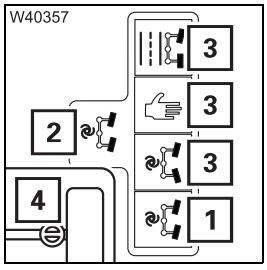


Automatic separate steering driving around corners on

– Switch on: Select symbol (**1**) and confirm – Symbol (**2**) is displayed
Displays (**4**) **red** – driving around corners on

– Switch off: Select a different steering mode – symbol (**3**)

➠ p. 13 - 20

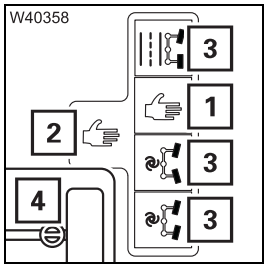


Automatic separate steering for crab travel mode on

– Switch on: Select symbol (**1**) and confirm – Symbol (**2**) is displayed
Displays (**4**) **red** – crab travel mode on

– Switch off: Select a different steering mode – symbol (**3**)

➠ p. 13 - 20



Manual separate steering on

– Switch on: Select symbol (**1**) and confirm – Symbol (**2**) is displayed
Displays (**4**) **red** – manual on

– Switch off: Select a different steering mode – symbol (**3**)

➠ p. 13 - 20

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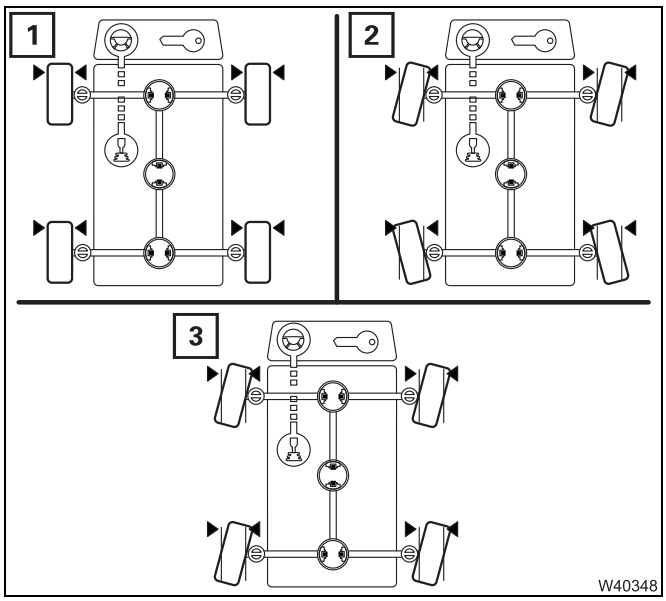


Current wheel position display

1 Straight ahead

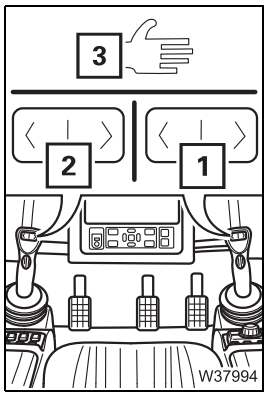
2 Driving around corners

3 Crab travel mode

p. 13 - 19

Control panels

The information in this section is based on the steering direction setting *Steering wheel*.



Steering with separate steering – manual
The symbol (**3**) is displayed.

1st axle line with the button (**1**).

Press and hold button (**2**)

– **To the left:** 2nd and 3rd axle lines – turn to the left

– **To the right:** 2nd and 3rd axle lines – turn to the right

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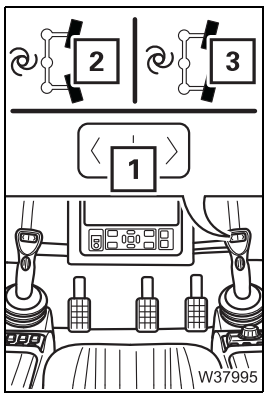


Steering with separate steering – automatic driving around corners/crab travel mode

The symbol (**2**) or (**3**) is displayed.

Press and hold button (**1**)

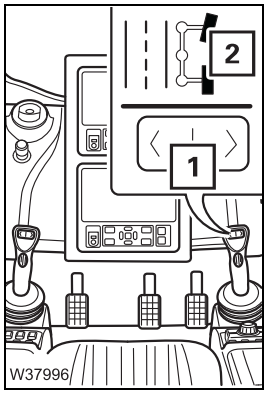
– **To the left:** 1st axle line – turn to the left

2nd and 3rd axle lines – the matching steering angle for steering mode

– **To the right:** 1st axle line – turn to the right

2nd and 3rd axle lines – the matching steering angle for steering mode

⇛ p. 13 - 21



Steering in normal steering mode

The symbol (**2**) is displayed.

1st axle line with the button (**1**).

– **To the left:** 1st axle line – turn to the left

2nd and 3rd axle lines – the matching steering angle for the corner

– **To the right:** 1st axle line – turn to the right

2nd and 3rd axle lines – the matching steering angle for the corner

⇛ p. 13 - 23

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10 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:

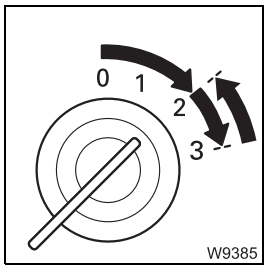
– Start the (cold) engine for the first time in the day

– Start the engine from the crane cab; ➠ p. 10 - 3,

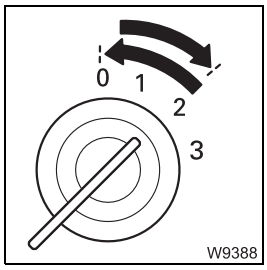
– Start the engine with the hand-held control; ➠ p. 10 - 10.

10.1 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; ➠ *Checks after starting the engine*, p. 4 - 15.



- Switch the engine off and switch off the ignition.

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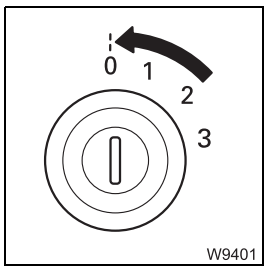
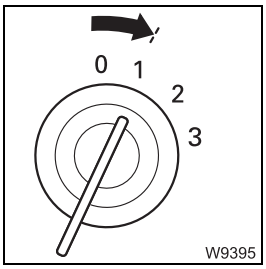


When not driving from the crane cab:

- Remove the ignition key.



If you want to drive from the crane cab:

- Turn the ignition key to position **1**.

Driving from the crane cab is enabled and the steering lock is prevented from engaging while driving; ➠ *Preparing to drive*, p. 13 - 14.

Lock the driver's cab for protection against unauthorised use.

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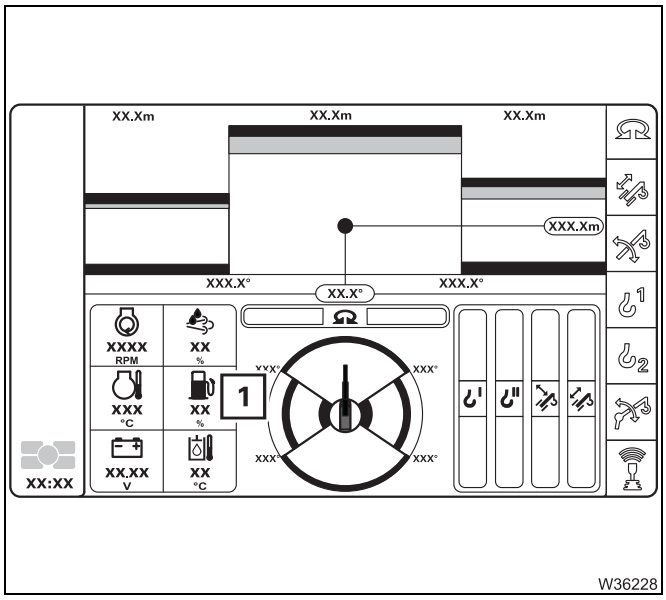
10.2 Starting the engine – from the crane cab

10.2.1 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 per cent.

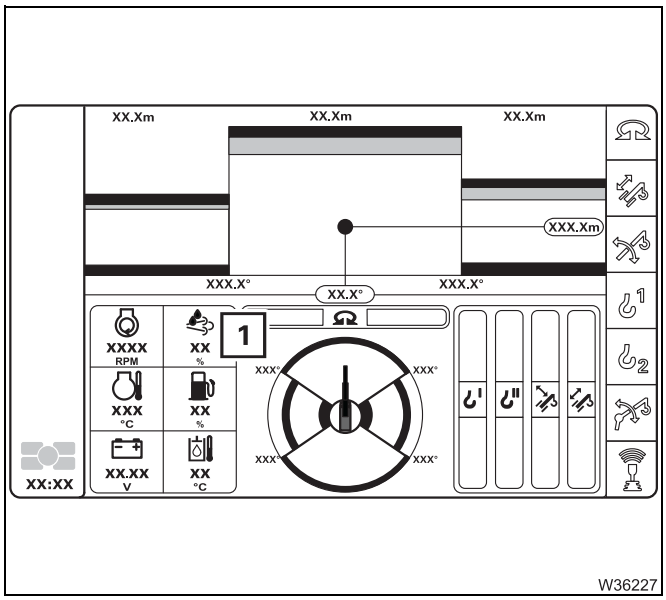
100% corresponds to about 400 l (105.6 gal)[1)].

The display changes colour depending on the filling level:

Green:	Over 10% (over 40 l) (10.6 gal)
Yellow:	5 to 10% (20 to 40 l) (5.3 to 10.6 gal)
Red:	below 5% (less than 20 l) (5.3 gal)

1) For a dual tank approx. 267 l (70.5 gal); ➠ p. 4 - 6.

AdBlue (DEF)



The display (**1**) indicates the current filling level in per cent.

100% corresponds to about 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)

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10.2.2 Checks before starting the engine

Checks on the carrier

All checks and switch positions for the first engine start of the day must be performed; ➠ p. 10 - 1.

Checking the hand-held control

Hand-held control removed

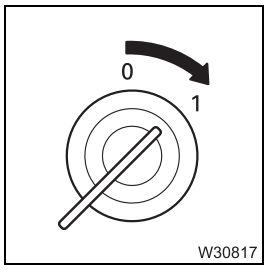
- Check that the bridging plugs are inserted into all sockets for the hand-held control; ➠ p. 14 - 43.

Hand-held control connected to the superstructure

After starting the engine, you can use the hand-held control to execute all functions which are provided from this socket.

10.2.3 Switching on the ignition

Do not start the engine until the *CCS* display shows a menu (usually the *Enter rigging mode* menu).



The control levers must be at their initial positions.

- Turn the ignition key to position **1**.

  The ignition is switched on.

  – A query regarding the control lever positions is displayed (depending on the installed equipment); ➠ *Control lever deflection query*, p. 10 - 5.

  – The switching states are compared; ➠ *Comparison of switching states*, p. 10 - 6.

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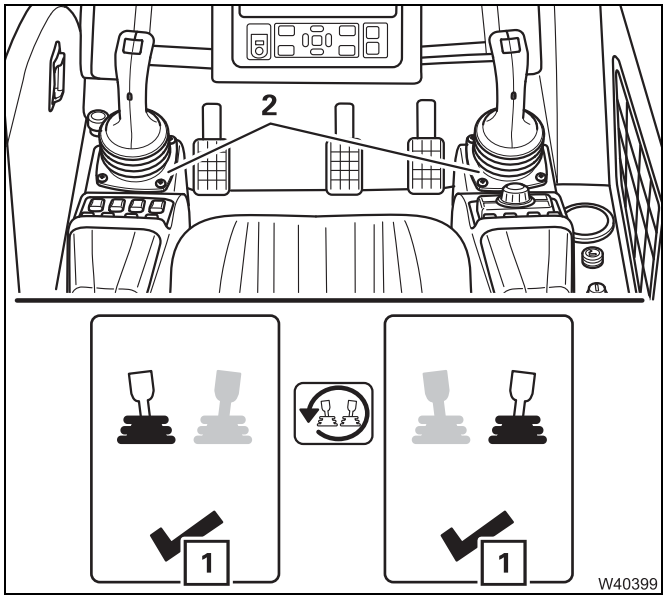
10.2.4 Control lever deflection query

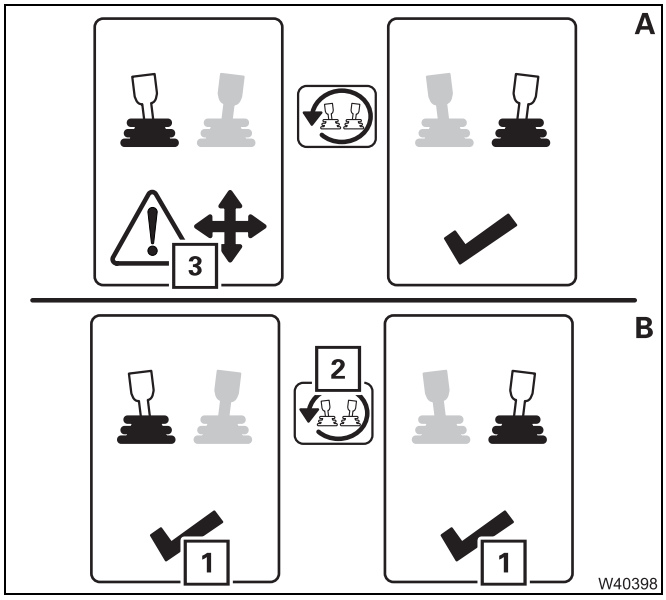


This section applies only to the control lever version with symbols on the instrument panels (**2**).

When the ignition is switched on, a query appears asking if both control levers are at their initial positions.

When at the initial position

The menu with the symbols (**1**) is displayed briefly then the *Start menu* opens.



When the control levers are actuated

(**A**) – The symbol (**3**) is displayed, e.g. for the left control lever.

- Move both control levers to their initial positions.

(**B**) – Repeat the query

- Select and confirm the symbol (**2**).

The symbols (**1**) are displayed briefly then the *Start menu* opens.

If the start menu is not displayed, you can switch off the ignition and then switch it on again with both control levers at their initial positions.

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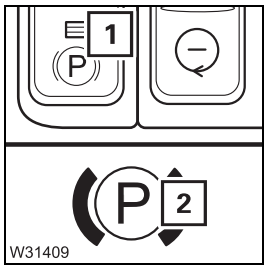
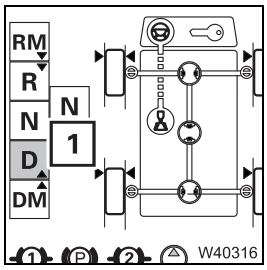
10.2.5 Comparison of switching states

When the ignition is switched on, various switching operations are performed automatically and the switching states of the differential locks and the steering are compared.

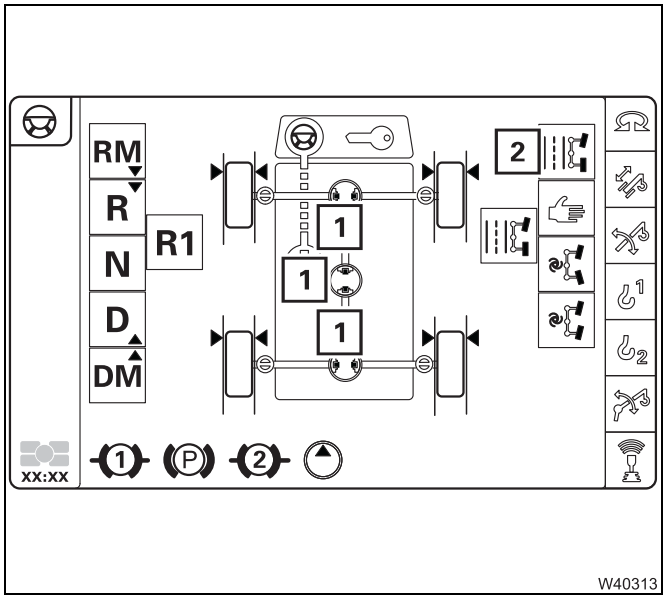


– The vehicle parking brake must be engaged. The lamp (**1**) lights up – symbol (**2**) in the *Driving* menu – **red**.



– The transmission must be switched to neutral position – symbol (**1**).

If the symbol (**1**) is grey then switch the ignition off and on again.



– The switching procedures for the last stored states are initiated.

The symbols (**1**) and (**2**) show the current states.

If a symbol (**1**) shows an intermediate position (yellow), you must actuate the steering, or drive slowly forwards and backwards, so that the locking processes are completed mechanically.

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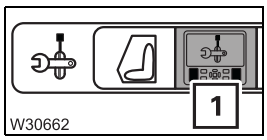
10.2.6 Display – setting the brightness

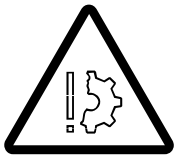


- Open the *Settings* menu (**1**).

This is operated in the same way as in the driver's cab; ➠ p. 4 - 11.

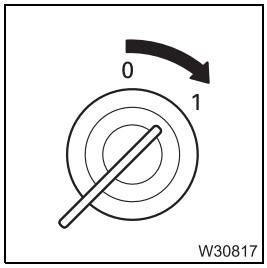
10.2.7 Starting the engine

This section pertains to starting a warm and cold engine.

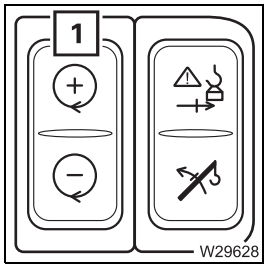


Danger of explosion when using starter fuel!
The engine may never be started with the aid of starter fuel. The starter fuel sprayed into the intake manifold can ignite.

- 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 about 15 seconds and wait one minute before trying again.

If the engine does not start after several attempts; ➠ *Engine malfunctions*, p. 8 - 19.

For setting the idling speed; ➠ p. 10 - 9.

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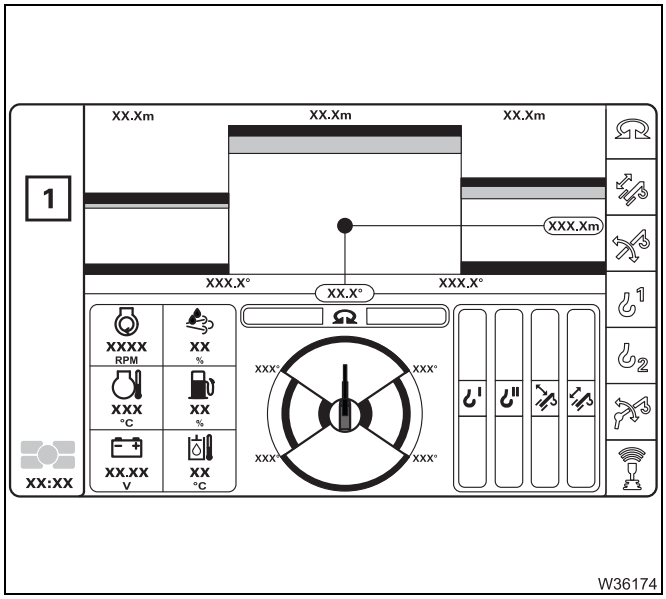
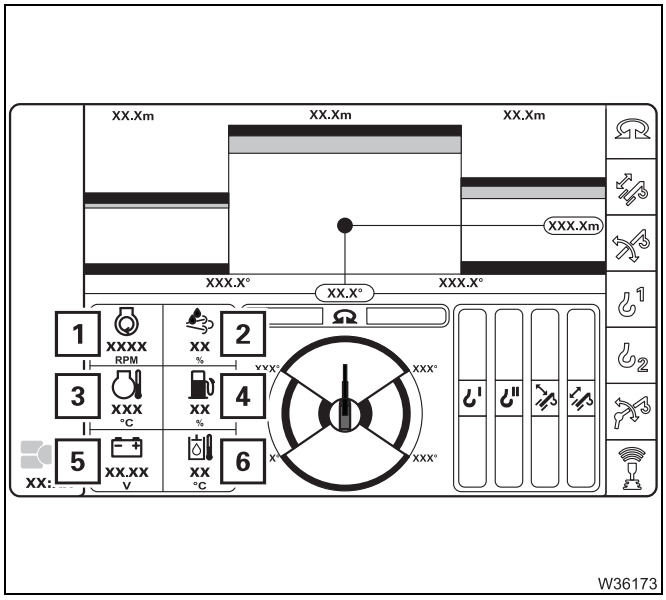
10.2.8 Checks after starting the engine



- Check the symbols in the display area (**1**) immediately after starting the engine.
- Switch off the engine immediately if a symbol is **red**; ➠ *Warning messages on the CCS display*, p. 8 - 10.



- Also check the displays.

1 Engine speed display in min^{-1} (rpm)

2 AdBlue (DEF) tank level display in percent

3 Coolant temperature display in °C (°F)

4 Fuel level display in per cent

5 Voltage monitoring display in volts

6 Hydraulic oil temperature display in °C (°F)

The colour of the numeral provides additional information:

Green:	Value OK
Yellow:	Limit value almost reached
Red:	Limit value exceeded (or dropped below) – warning message; ➠ p. 14 - 3.

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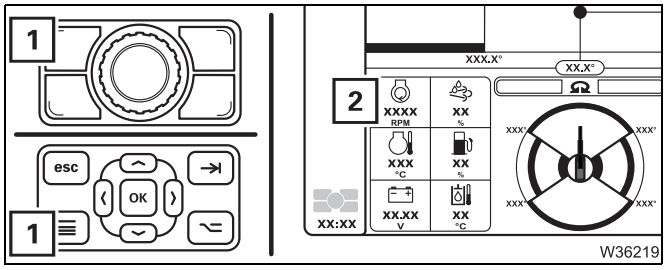
10.2.9 Setting idling speed

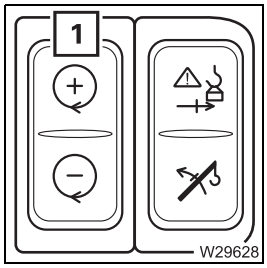


- Start the engine; ➠ p. 10 - 7.
- Open the start menu – button (**1**).

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

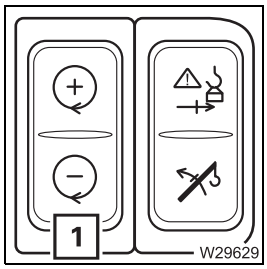


- Press the button (**1**) in **at the top**.
  The idling speed increases continuously until you release the button or the maximum value is reached.

or

- Press the button in **at the top** once.
  The idling speed is increased by one step.

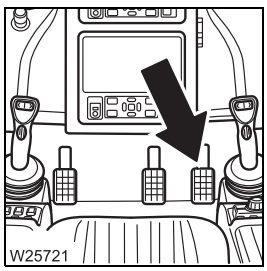
Reduces the idling speed



- 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.
    It is only possible to restart the engine when approx. 7 seconds have elapsed.



Exceeding the 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.

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10.3 Starting the engine – with the hand-held control

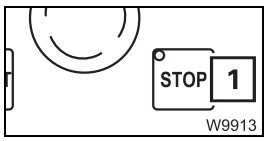
Starting with the hand-held control is only intended for emergency operation and allows derricking of the main boom during rigging;
➠ *Emergency operation with the hand-held control*, p. 14 - 43.

10.4 Switching off the engine

Risk of accident by suspended loads!
Never switch off the engine while 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.

10.4.1 When the hand-held control is connected

The engine can only be switched off using the hand-held control or via an emergency stop switch.



- Press the (**1**) button once – the engine switches off.

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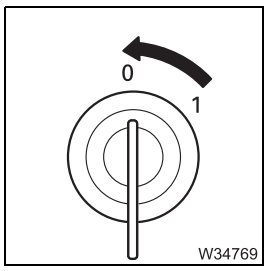
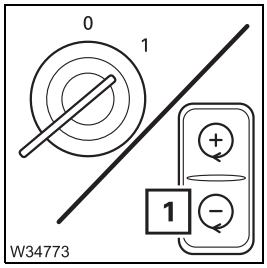
10.4.2 In the crane cab



At the ignition lock

- Turn the ignition key to position **0** – the engine switches off.



With the idling button

- 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 about 3 seconds, the engine will switch off – the crane control remains switched on.
    It is only possible to restart the engine when approx. 7 seconds have elapsed.

After switching off

Refer to the instructions in the respective sections for each type of stopping work;
➠ *In case of short work breaks*, p. 11 - 151,
➠ *In case of work breaks longer than 8 hours*, p. 11 - 152.

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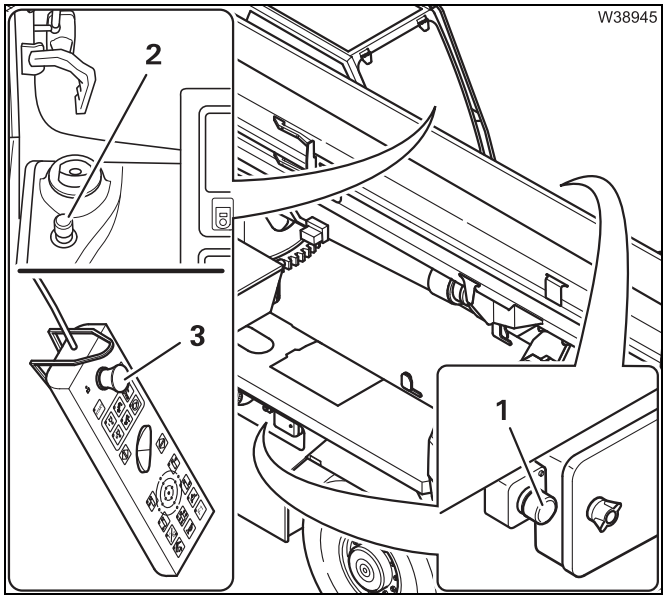
10.4.3 Using the emergency stop switches

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 At the carrier – always active

2 In the crane cab – always active

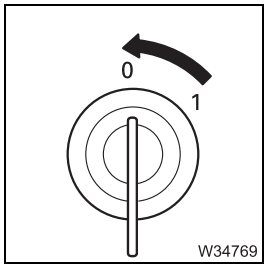
3 Only active for connected hand-held control – in addition to (**1**) and (**2**)

- Press an active emergency stop switch.
  – The switch latches.
  – The engine switches off.

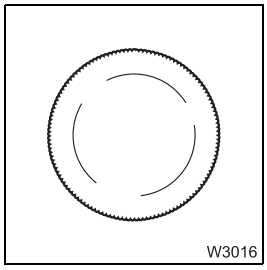
If an air intake inhibitor is present, this is then triggered.

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 fitted, you must open it; ➠ *Opening the air intake inhibitor*, p. 4 - 21.

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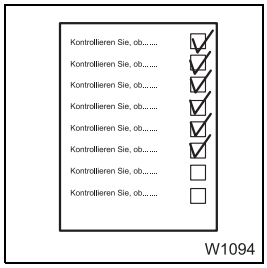
11 Crane operation

11.1 Before operating the crane

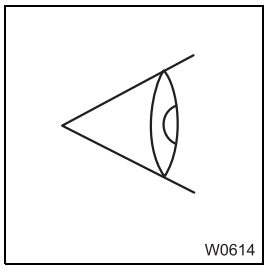
11.1.1 CHECKLIST: Checks before operating the crane

This checklist is not a complete operating manual. There are accompanying operating instructions which are indicated by cross-references.
Observe the warnings and safety instructions there!

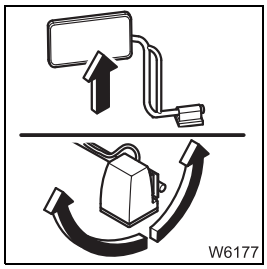
This checklist only applies to working with a rigged truck crane (supported and rigged with counterweight). If the truck crane is not yet rigged;
➠ *CHECKLIST: Rigging*, p. 12 - 1.



1. The truck crane has been rigged for the operation to be carried out as described in the *CHECKLIST: Rigging*; ➠ p. 12 - 1.



2. Inspect the truck crane, looking out in particular for any leaking fluids (oil, fuel or water).



3. – Adjust the mirrors for crane operation; ➠ p. 12 - 105.

– Adjust the slewable spotlights if necessary; ➠ p. 11 - 134.

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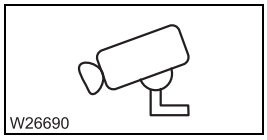
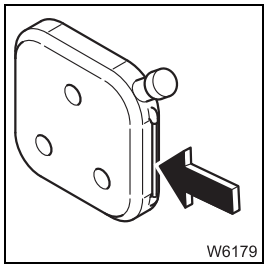
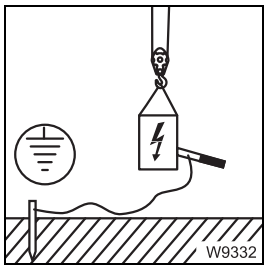


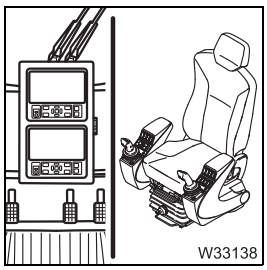
4. If necessary, Adjust/switch on the cameras for crane operation;
➠ p. 12 - 106.



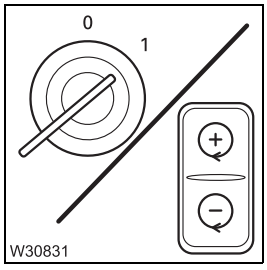
5. Crane cab heater – check the fuel level; ➠ p. 11 - 5.



6. Earth the load, if necessary; ➠ p. 11 - 15.



7. Adjust crane cab seat and front panel;
➠ *Crane cab seat*, p. 11 - 8,
➠ *Front control panel*, p. 11 - 10.



8. Start the engine for crane operation; ➠ p. 10 - 7.

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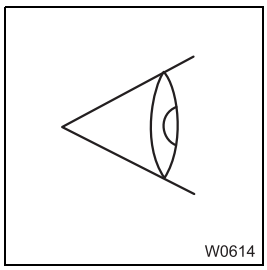
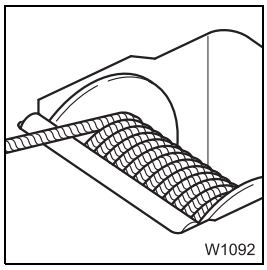
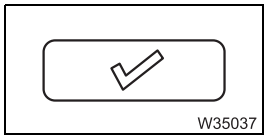


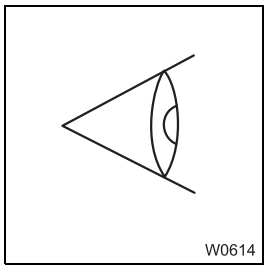
9. Check the safety devices for correct operation.
– RCL,
– lifting limit switch,
– seat contact switch and dead man's switch,
– emergency stop switch,
Have faulty units repared; ➠ p. 11 - 11.



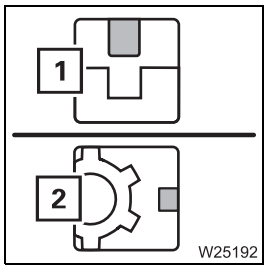
10. Check the position of the hoist ropes; ➠ p. 11 - 6.



11. Compare current rigging mode with the *RCL* display – enter and confirm current rigging mode, if necessary; ➠ p. 11 - 36.

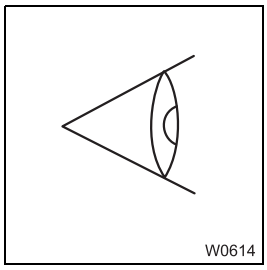


12. Check telescoping; ➠ *Checks before starting work*, p. 11 - 103.



13. – Lock turntable for 0° or 180° operating position – Symbol (**1**) **green**; ➠ p. 11 - 19.

– Unlock turntable and switch off houselock for other operating positions – Symbols (**1**) and (**2**) **red**; ➠ p. 11 - 22.



14. Check the electrical system for correct operation; ➠ p. 11 - 7.

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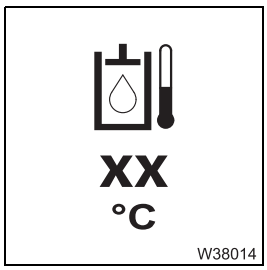
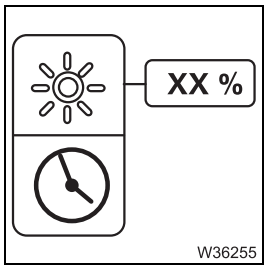


15. Check hydraulic oil temperature, preheat if necessary; ➠ p. 11 - 16.



16. – Adjust the brightness of the *CCS* display if necessary; ➠ p. 4 - 11.

– Adjust the time if necessary; ➠ p. 11 - 23.

Additional information on inspections during crane operation, on permissible operating positions and on how to operate the individual power units;
➠ *Crane operation with main boom*, p. 11 - 77.

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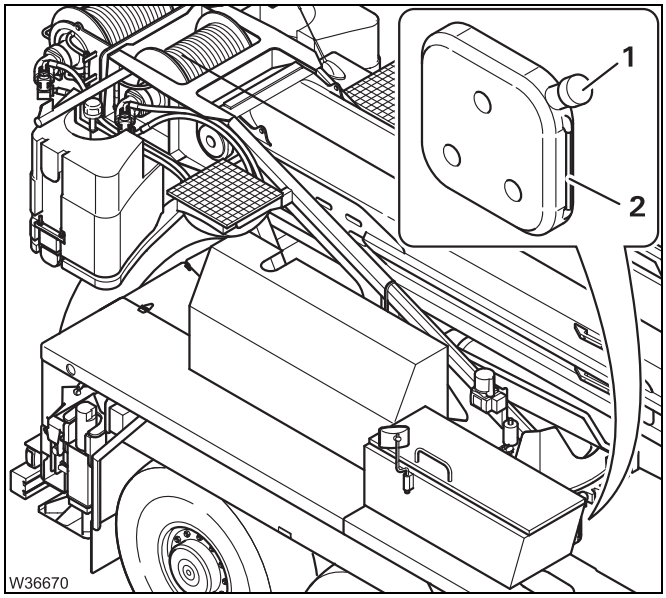
11.1.2 Check the condition of the truck crane

Crane cab heater fuel tank

Use the same fuel as for the engine or use EL heating oil for refuelling.

Danger of fire due to inflammable gases!
Switch off the engine and heating systems before refuelling.



- The display (**2**) shows the fuel level in the tank (**1**).
- Refill the fuel in due time, and close the tank (**1**) with the lid.

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 seeping into the ground or polluting waters.

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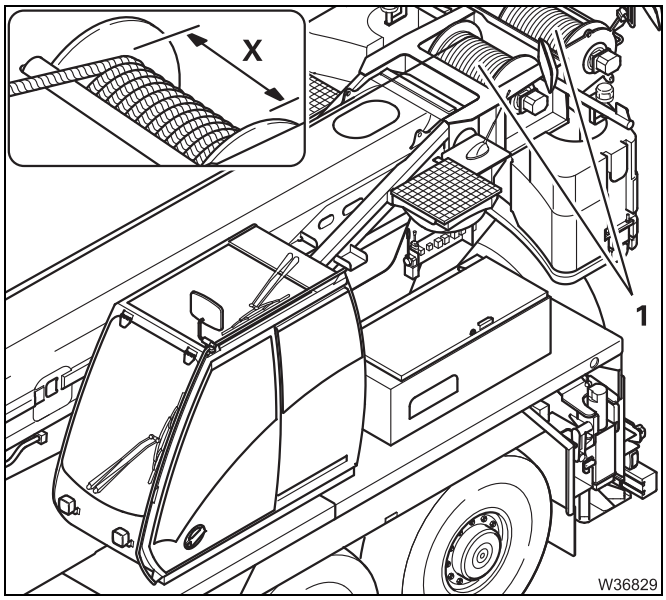
Checking the position of the hoist ropes

The hoist mirrors are folded out and adjusted or the camera at the hoists is folded out

➠ *Folding the mirrors in and out, and adjusting them*, p. 12 - 105,
➠ *Camera on the hoists*, p. 12 - 109.

Risk of crushing due to turning rope drum!
Keep away from the rope drum while it is turning.
This will prevent your limbs 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, 0 to 2 mm (0 to 0.08 in) apart.
  - The cross-over points must be offset by approx. 180°.

The top rope lines are laid over the next lower rope lines at the cross-over points.

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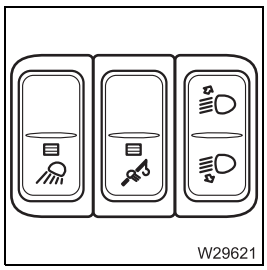
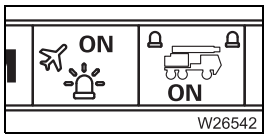
Checking the electrical system

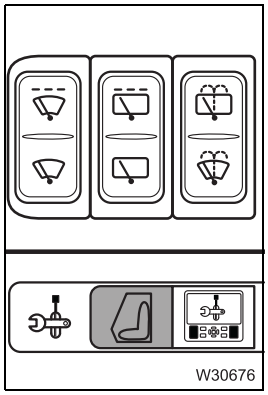
- Check the following functions and have faulty parts repaired.



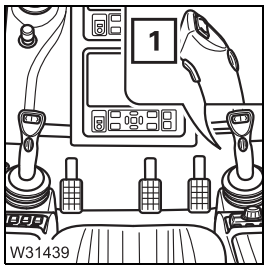
– Spotlights,



– Air traffic control light, rotating beacons



– Windscreen wipers, windscreen washing system,



– Horn (**1**).

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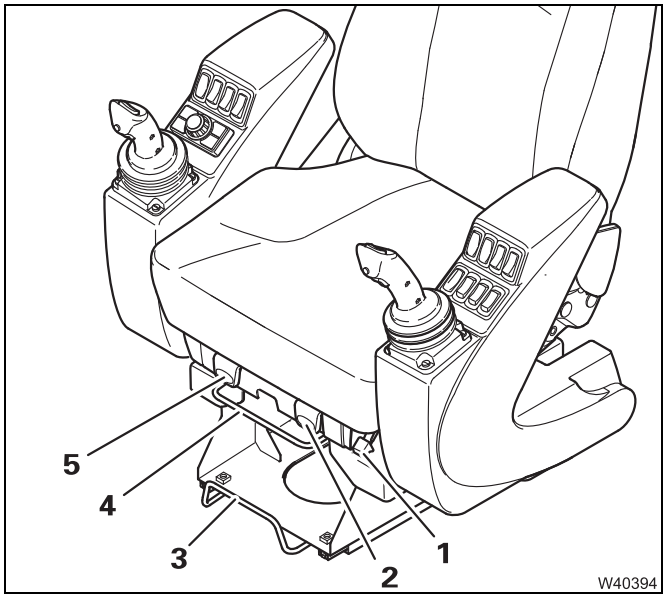
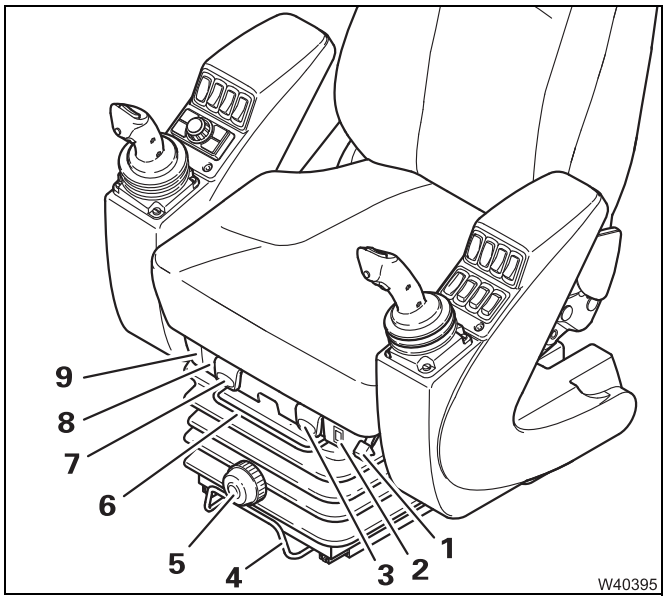
11.1.3 Adjusting the crane cab seat and front control panel

Crane cab seat You can adjust the crane cab seat to your height.



Version 1

1 Back rest – angle
2 Seat – height
3 Seat – longitudinal adjustment with control panels
4 Seat – longitudinal adjustment without control panels
5 Seat cushion – angle



Version 2

1 Back rest – angle
2 Seat heating[1)] on/off
3 Seat – height[1)]
4 Seat – longitudinal adjustment with control panels
5 Adjust suspension stiffness to body weight
6 Seat – longitudinal adjustment without control panels
7 Seat cushion – angle
8 Upper lumbar area support
9 Lower lumbar area support

[1)] Requirement – ignition is on

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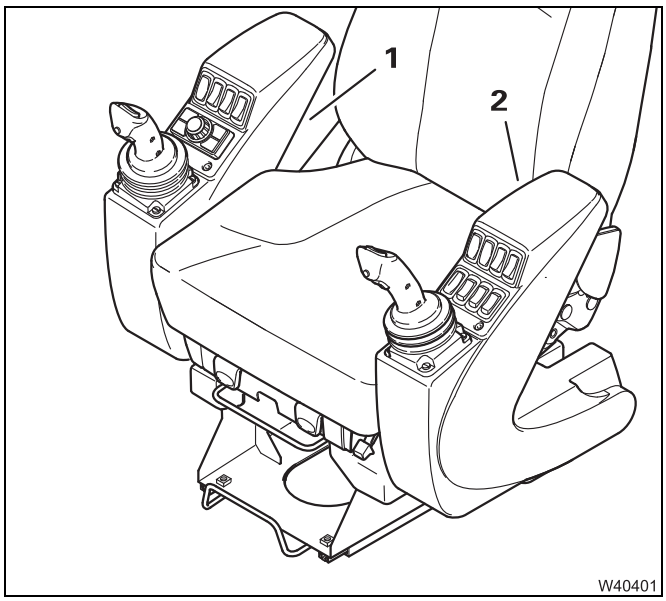
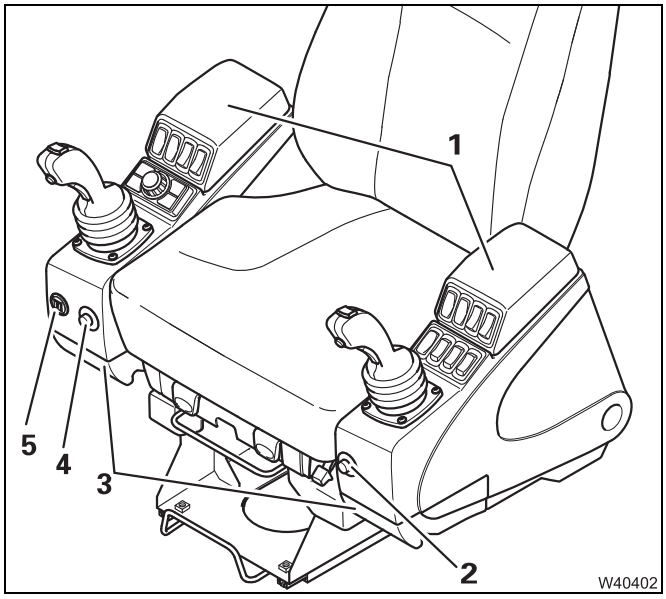
Control panels You can adjust the height of the front control panels.



Version 1

1 Control panel right – height

2 Control panel left – height



Version 2

1 Storage compartment with lid

2 Control panel left – height

3 Drawer

4 Control panel right – height

5 USB charging connection (5 V / 2 x 2,5 A)

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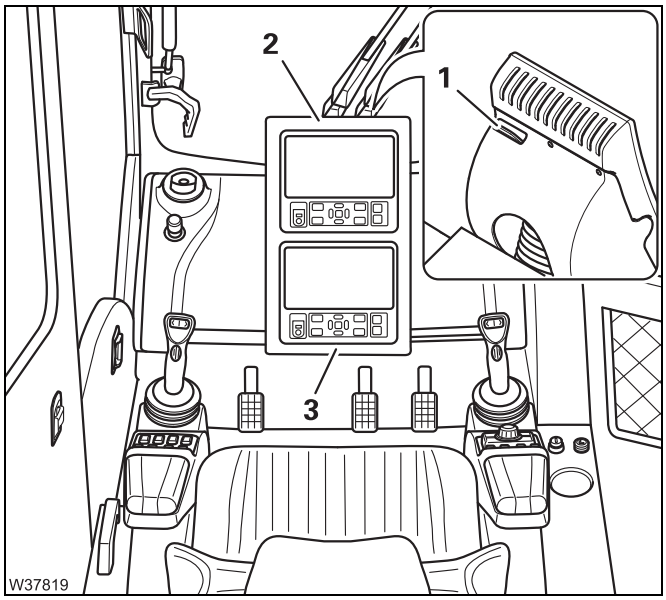
Front control panel

You can adjust the height and inclination.



- Pull and hold the handle (**1**).
- Adjust the front panel to suit your requirements.
- Release the handle (**1**).

In addition, the inclination of the display can be adjusted:

- Press either (**2**) or (**3**).

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11.1.4 Checking the safety devices

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**.

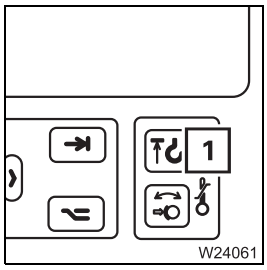
Rated capacity limiter

- Switch on the rated capacity limiter (RCL), do all of the checks and enter and confirm the current rigging mode; ➠ *Entering the rigging mode*, p. 11 - 36.
- 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 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 *Raise*, *Lower* and *Extend* movements are switched off.

If the lift limit switch is not working correctly, do not start work with the crane but notify **Manitowoc Crane Care**.

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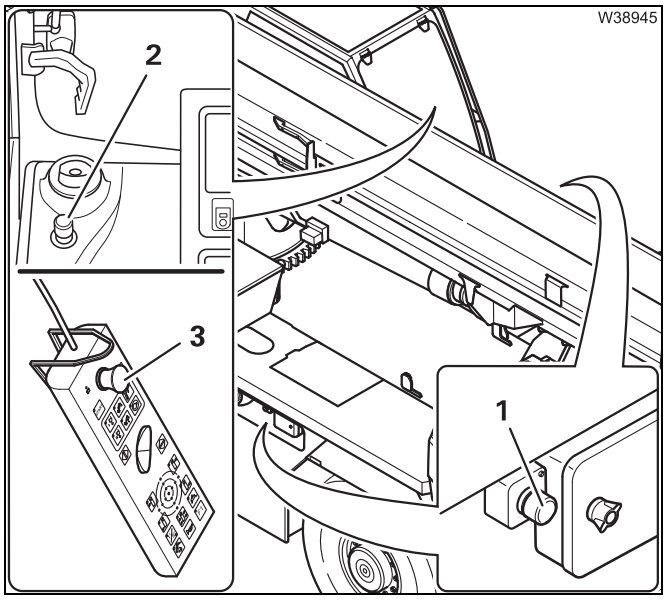
Emergency stop switch

- Set down the load and let go of both control levers.



- Press the emergency stop switch (**2**) so that it engages.
- Check whether the engine stops.
- Turn the emergency stop switch until it disengages.
- Open the air intake inhibitor if required;
  Air intake inhibitor, p. 4 - 21.
- Repeat the checks with the emergency stop switch (**1**) and, if the hand-held control is connected, with the emergency stop switch (**3**).

If the emergency stop switch is not working correctly, do not start work with the crane but notify **Manitowoc Crane Care**.

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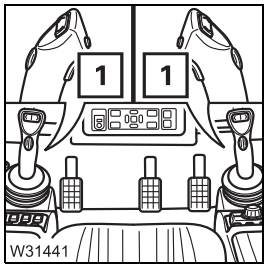
Seat contact switch

This check is carried out together with the dead man's switch.

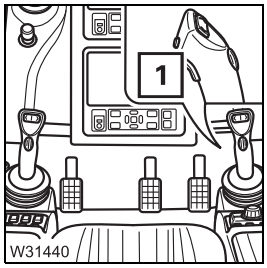
Danger of accident if the seat contact switch is faulty!
Always stand inside the crane cab when you do this check.
If you stand next to the crane cab, you may be pushed off the carrier if the superstructure slews as a result of a faulty dead man's switch.

Checks during standstill



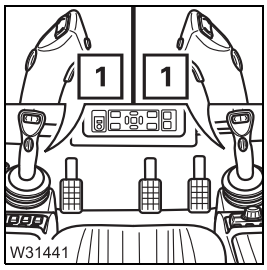
- Do not sit down on the crane cab seat.
- Do not press any dead man's switch (**1**).
- Move the control levers one after the other for all the crane movements and check whether all the crane movements are switched off.

Checks 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 about 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 about 3 seconds.

If the dead man's switch system is not working correctly, do not start work with the crane but notify **Manitowoc Crane Care**.

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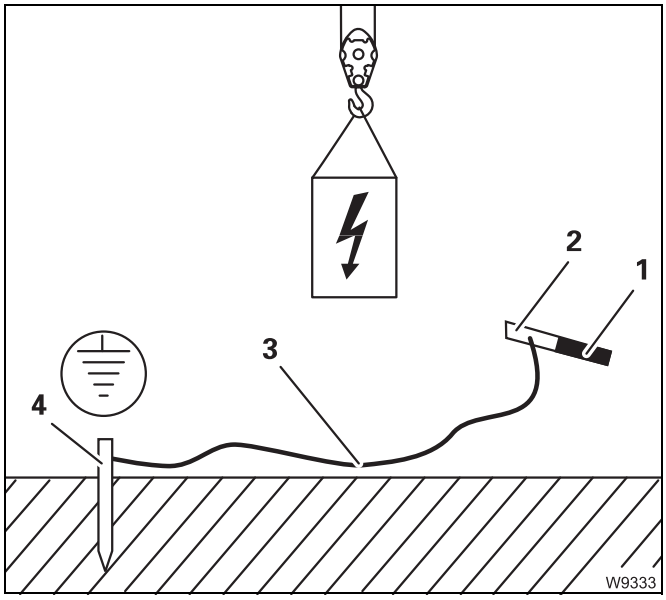
11.1.5 Earthing the load

Even if the truck crane is already earthed (➠ p. 12 - 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.

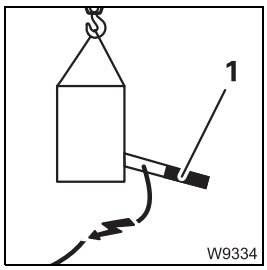
Risk of accident due to electric shock!
Always earth the load before operating the crane
– Near strong transmitters (radio transmitters, radio stations, etc.)
– Near high-frequency switchgear
– If a thunder storm is forecast
If the load is charged with static electricity, you must always earth the load before touching it.



Use electrically conducting material for earthing.

- Hammer a metal rod (**4**) (length of about 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 (**4**).
- Clamp an insulated cable (**3**) to the metal rod (**4**) (cross-section of at least 16 mm^2 (0.025 $inches^2$)).
- Clamp the other end of the cable (**3**) to a metal rod (**2**) with an insulated handle (**1**).

Risk of accident 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.

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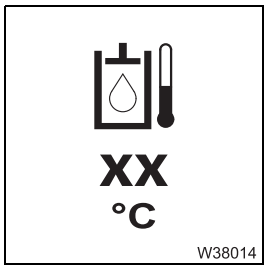
11.1.6 Preheating the hydraulic oil

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).

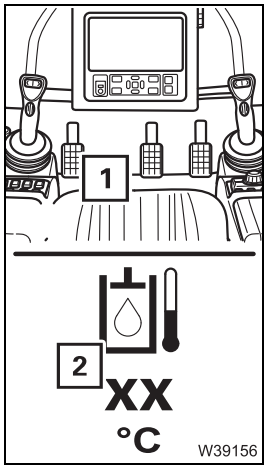
If the temperatures fall below 10 °C (50 °F), proceed as follows:

– **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.

Preheating



– **With standard equipment**

- Set the slewing gear to a maximum speed of 30%; ➠ p. 11 - 131.
- Lock the turntable; ➠ p. 11 - 19.
- Depress the brake pedal (**1**).
- Perform the crane function *Slewing* against the slewing gear brake.

The hydraulic oil is preheated when the display (**2**) shows a temperature of at least 10 °C (50 °F).

From -15 °C (32 °F), you can perform crane movements without a load in order to speed up the preheating process.

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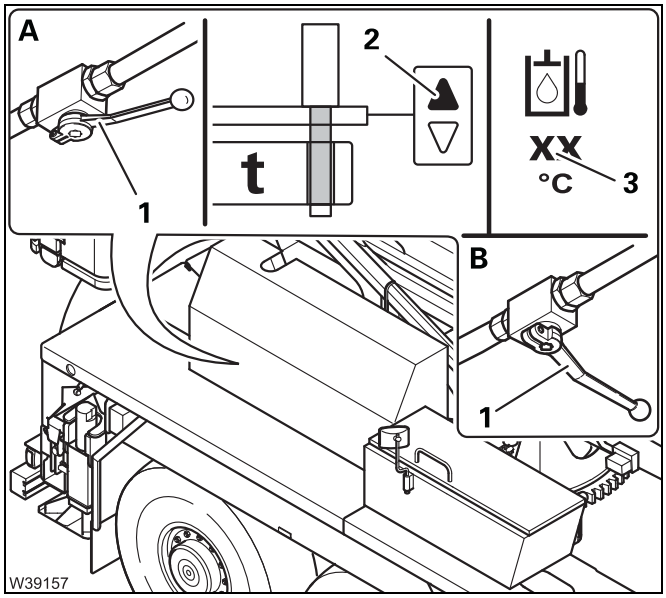
– In the case of additional equipment

With the relevant equipment, there is a valve for preheating.

Risk of burning yourself when the hydraulic oil is hot!
The add-on parts become very hot during operation.
Wear appropriate protective gloves and be careful not to touch hot parts.



(A) – Preheating

- Open the valve – lever (**1**) parallel to the line.
- Select and confirm the symbol (**2**) and retract the lifting cylinder against the stop;
  p. 12 - 69.

The hydraulic oil is preheated when the display (**3**) shows a temperature of at least 10 °C (50 °F).

(B) – Before crane operation

- Close the valve – lever (**1**) at right angles to the line.

After preheating

- Operate all crane functions at least twice after preheating (hydraulic oil temperature above 10 °C (50 °F)) in order to remove the cold oil from all parts of the hydraulic system.

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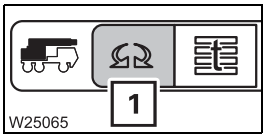
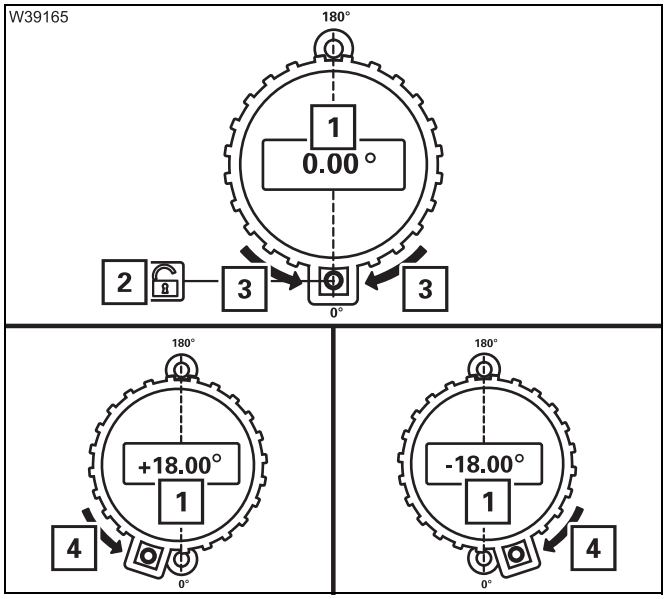
11.1.7 Locking/unlocking the turntable

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**) shows the current superstructure position.

- Slew to locking point at **0°** or **180°**.

The display (**1**) shows positive and negative values. For an overview; p. 11 - 124.

Both arrows (**3**) and the symbol (**2**) are displayed at the locking point – e.g. at 0°.

In the range of ± 20° around the locking point, an arrow (**4**) indicates the slewing direction that leads to the locking point.

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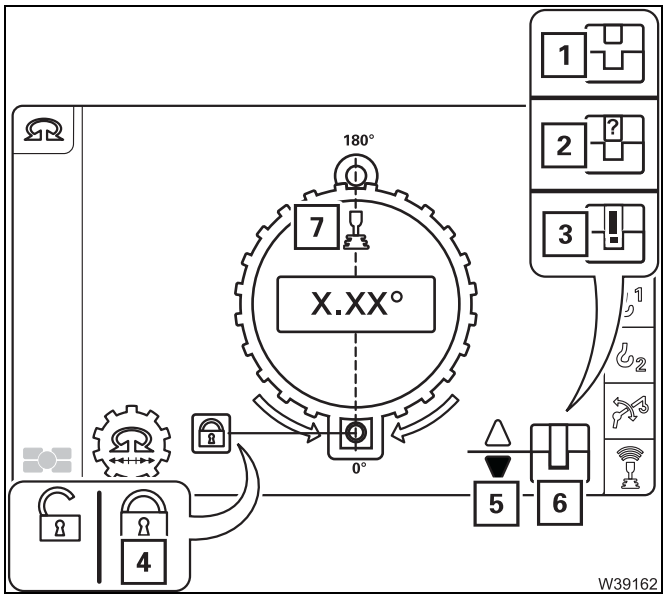
Locking the turntable

The superstructure needs to be at one of the locking points (0° or 180°).



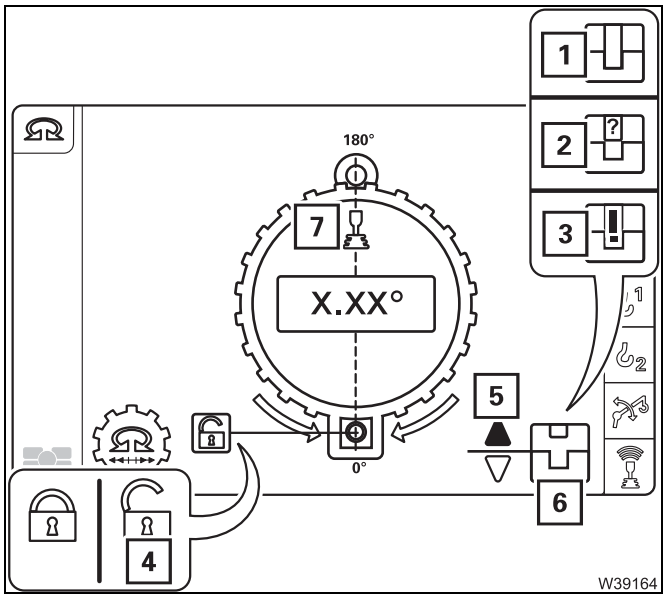
- Select the symbol (**5**).
- Press the button until the symbol (**4**) is displayed – *Turntable locked*.

The display changes from symbol (**1**) to symbol (**2**) and shows symbol (**6**) when the turntable is locked. The symbol (**7**) disappears.

If the error symbol (**3**) is displayed, contact **Manitowoc Crane Care**.

Unlocking the turntable

The RCL shutdown procedure will be triggered and slewing disabled if you unlock the turntable during a rigging mode for 0° to the rear has been entered. To acknowledge the shutdown procedure, you must either lock the turntable or set down the load and enter a rigging mode for a working range of 360°.



- Select the symbol (**5**).
- Press the button until the symbol (**4**) is displayed – *Turntable unlocked*.

The display changes from symbol (**1**) to symbol (**2**) and shows symbol (**6**) when the turntable is unlocked. The (**7**) symbol is displayed.

If the error symbol (**3**) is displayed, contact **Manitowoc Crane Care**.

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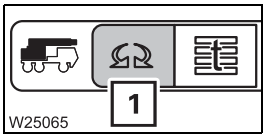
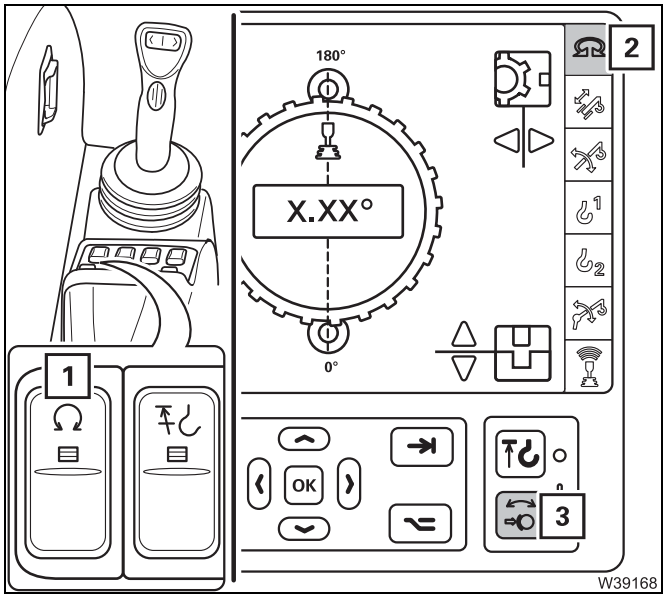
11.1.8 Switching the houselock on/off

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**.

– The 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.

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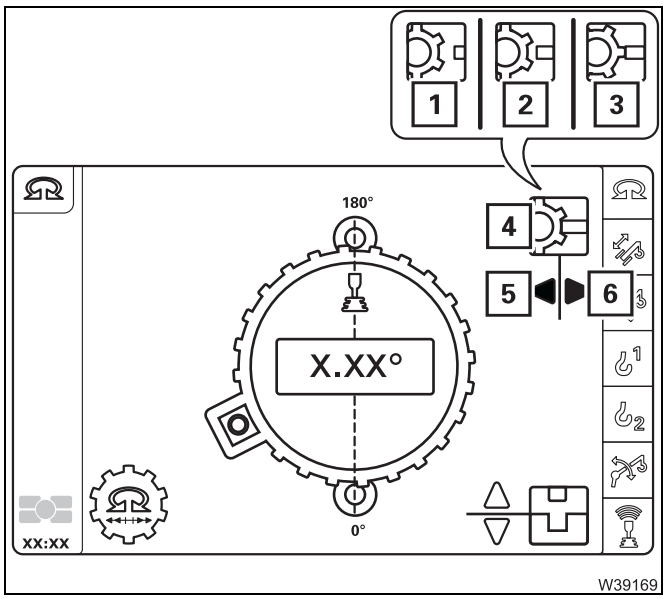


Switching on the houselock

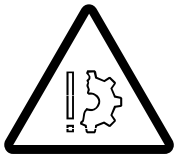
- Select the symbol (**5**).
- Press the button until the symbol (**4**) is displayed – *Houselock switched on*.

The display first shows the symbol (**1**), then (**2**) and then shows the symbol (**4**) when the houselock is switched on.

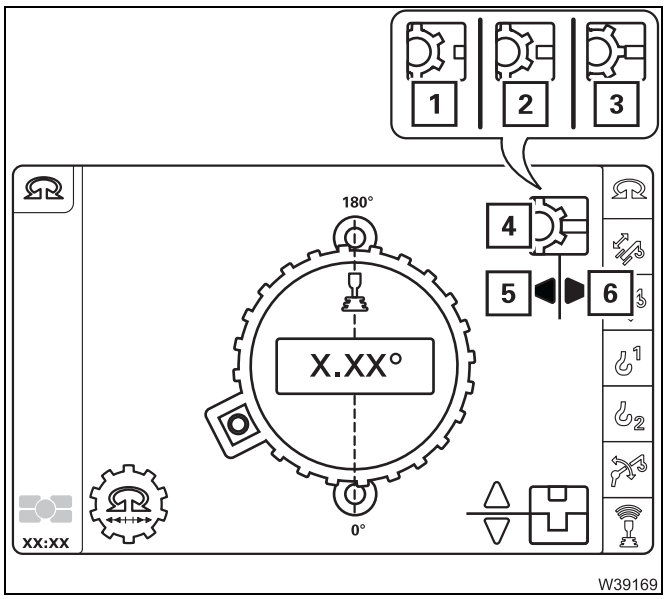
If the symbol (**3**) is displayed:

- 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.

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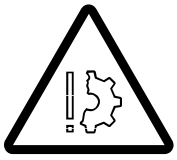
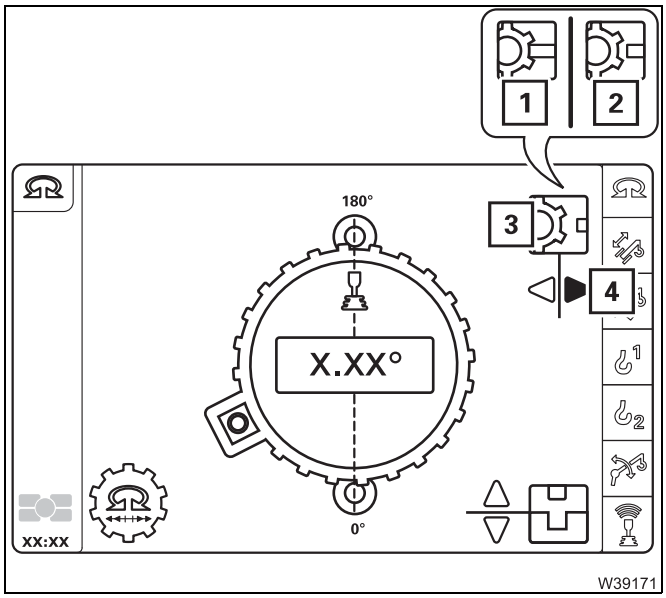
Switching off the houselock

- Check that the slewing gear is switched off, and switch if off if it is not; ➠ *Switching off the slewing gear*, p. 11 - 20.



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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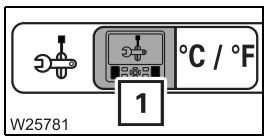
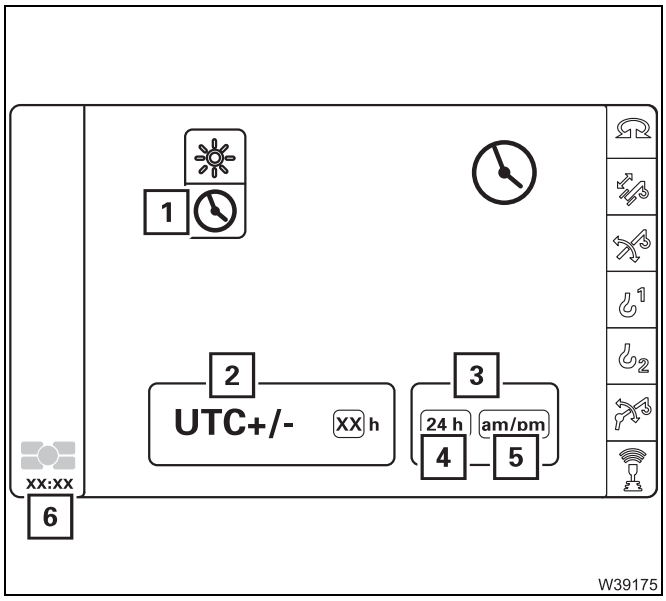
11.1.9 Setting the time



- 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**).
- Elect the current time – expressed as a deviation from UTC time.
- Confirm the selection. The newly set time is shown on the display (**6**).

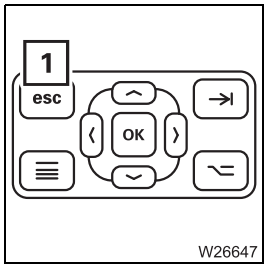
Switching the display type

- 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**) – no values are changed.

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11.2 Standard slewing range type

The *MAXbase* slewing range type is available in the case of additional equipment; ➠ *MAXbase slewing range type*, p. 11 - 27.

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.

11.2.1 Permissible slewing ranges and operating 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* ; ➠ *Entering the rigging mode*, p. 11 - 36.
- 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 a rigged counterweight*, p. 12 - 76.

Operating 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.
- Lock the turntable; ➠ p. 11 - 18.
- Enter an RCL code for the *0° to the rear* operating position according to *Lifting capacity table*; ➠ *Entering the rigging mode*, p. 11 - 36.
  The RCL will accept this code only if the turntable is locked and the superstructure is in the 0° position.

All slewing operations are disabled if an RCL code is entered for the *0° to the rear* operating position. An RCL shutdown is triggered by unlocking the turntable. To acknowledge this shutdown, if slewing is permissible with the rigged counterweight (➠ p. 12 - 76), 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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Free-on-wheels operating position

- Check that the truck crane has been rigged for free on wheels operation; *CHECKLIST: Rigging*, p. 12 - 1
- Enter the correct RCL code for the *Free on wheels* operating position in accordance with the *Lifting capacity table* ; *Entering the rigging mode*, p. 11 - 36.
- Before slewing, check how much counterweight is rigged and unrig the counterweight if necessary before slewing the superstructure; *Slewing with a rigged counterweight*, p. 12 - 76.

Danger of overturning if the truck crane is free-standing!
The superstructure of free on wheels truck cranes may only be rotated if the counterweight rigged on the turntable does not weigh more than 7.6 t (16,700 lbs) and the radius permitted in the working area is maintained according to *Lifting capacity table*.
In this way you prevent the truck crane tipping to the rear when slewing the superstructure.

Danger of overturning if the truck crane is free on wheels and the RCL is overridden!
If the RCL code for working free on wheels has been entered, when the working radius is reached the RCL prevents those crane movements that would reduce the radius any further. This is in order to provide stability to the rear.
The truck crane will overturn if you override the RCL and reduce the working radius any further.

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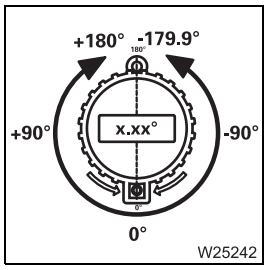
11.3 MAXbase slewing range type

This slewing range type is available in addition to the *Standard* slewing range type; ➠ *Permissible slewing ranges and operating positions*, p. 11 - 25. 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 from this operating 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°).

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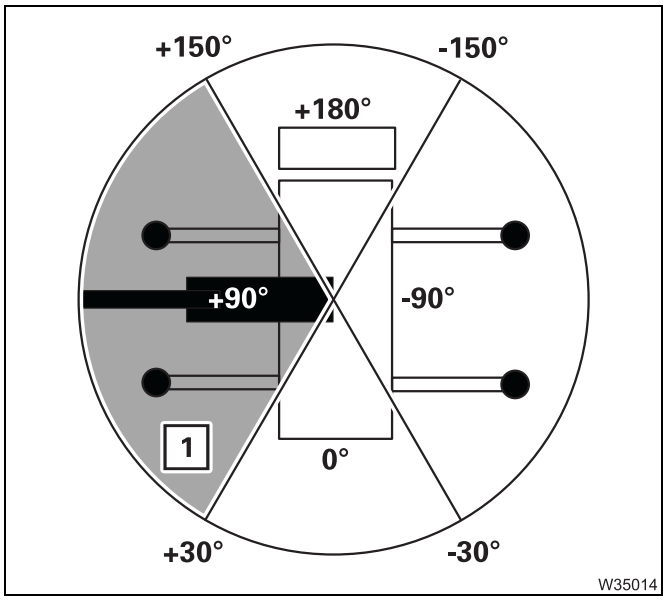
11.3.1 Specifications in the lifting capacity tables

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. ±60° for the slewing range (**1**).
This results in the enabled slewing range (**1**) between the slewing angles of +30° to +150°.

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.

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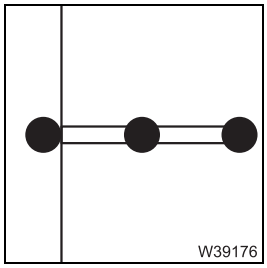
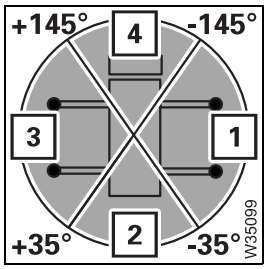
11.3.2 Enabled slewing ranges

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.

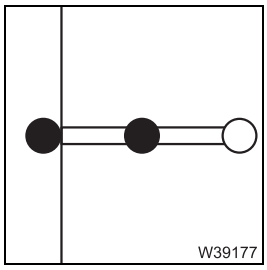


Smallest individual width 3.100 m (10.2 ft)

This case applies only to a symmetrical outrigger span with a span of 6.200 m (20.3 ft).



Positional reference		Angular range	Enabled slewing range
1	To the right	±55°	-145° to -35°
2	Backwards	±35°	-35° to +35°
3	To the left	±55°	+35° to +145°
4	Forwards	±35°	+145° to -145°

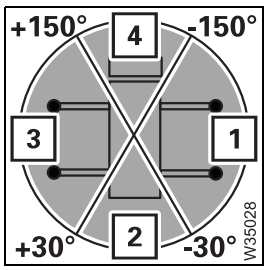


Smallest individual width 2.200 m (7.2 ft)

This case applies

– For a symmetrical outrigger span with a span of 4.400 m (14.4 ft).

– When one or more outrigger beams is extended to a span of 2.200 m (7.2 ft) and all other outrigger beams are extended to larger spans.



Positional reference		Angular range	Enabled slewing range
1	To the right	±60°	-150° to -30°
2	Backwards	±30°	-30° to +30°
3	To the left	±60°	+30° to +150°
4	Forwards	±30°	+150° to -150°

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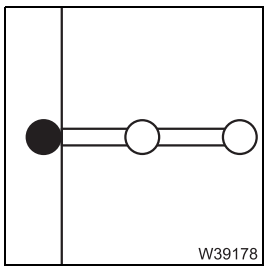
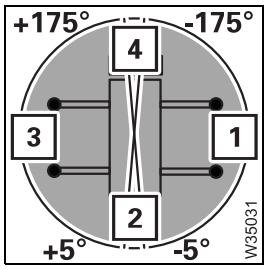


Smallest individual width 1.160 m (3.8 ft)

This case applies when one or more outrigger beams is extended to a span of 1.160 m (3.8 ft) and all other outrigger beams are extended to larger spans.



Positional reference		Angular range	Enabled slewing range
1	To the right	±85°	-175° to -5°
2	Backwards	±5°	-5° to +5°
3	To the left	±85°	+5° to +175°
4	Forwards	±5°	+175° to -175°

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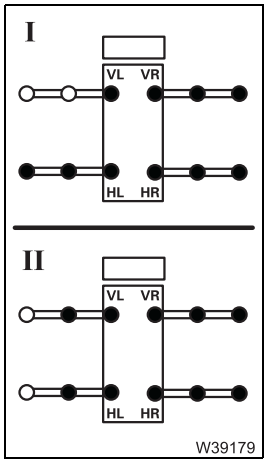
11.3.3 Lifting capacities and slewing ranges for outrigger spans without separate lifting capacity tables

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*

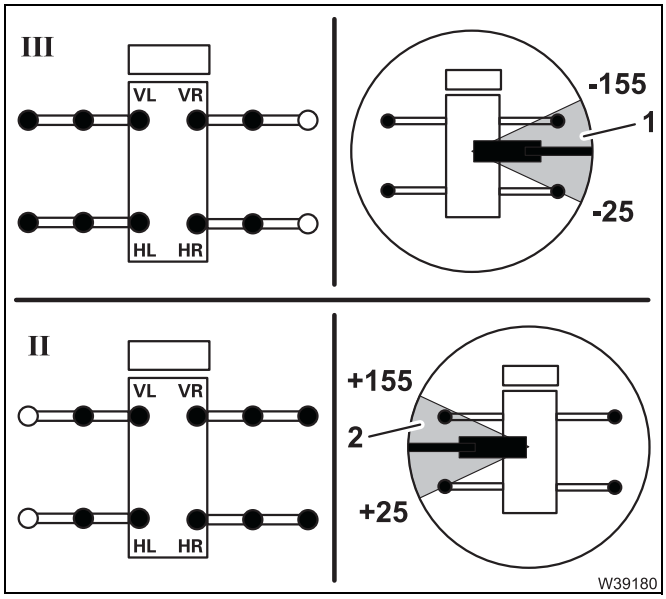
Lifting capacity tables are only provided for the combination *One outrigger span smaller – left,* e.g. for the outrigger span (**I**).

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**).

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11.4 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. An incorrect entry will give you a false sense of security. This will overload the truck crane and cause an accident!

The current rigging mode is registered via

– Measurements,

– Acquired via manual entry.

Acquired via measurements	Acquired via manual entry
– Main boom length – Main boom angle – Current load – Lattice extension inclination[1)] – Outrigger span	– Counterweight – Length of lattice extension – Angle of the lattice extension[2)] – Reeving

[1)] Lattice extension – luffable

[2)] Lattice extension – inclinable

During the 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.

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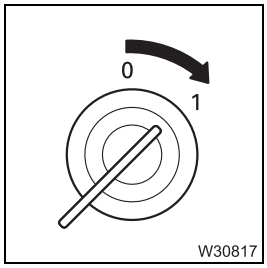
11.4.1 Switching on the RCL

Switching on

The RCL is switched on together with the ignition.

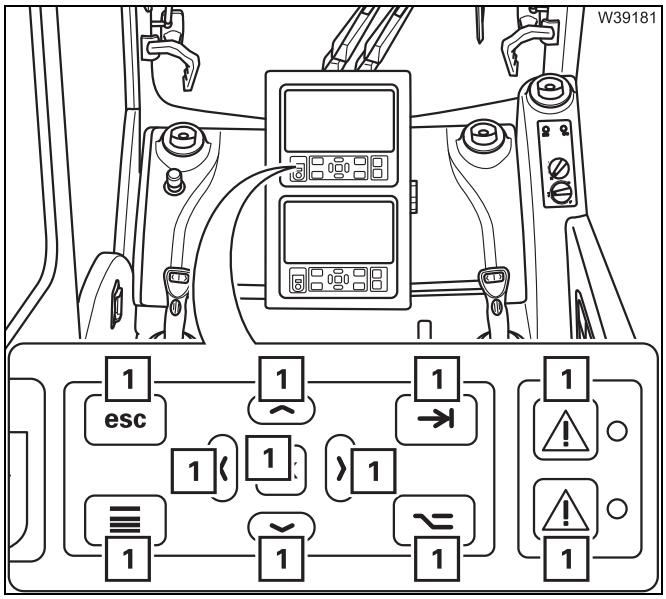


- Switch on the ignition.

A test program runs after switching on the ignition.

- Check whether you can hear a buzzer tone.

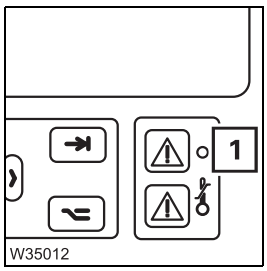
Risk of accidents in the event of faulty safety devices!
If the lamps or buzzer fail, notify **Manitowoc Crane Care** and have the error corrected.
In the meantime, pay particular attention to the lamps in the event of a failure of the buzzer tone and vice versa.



Lamp test

- Check that the lamps (**1**) light up after switching on the ignition.

If one or more lamps do not light up, contact **Manitowoc Crane Care**.



Brightness of the displays

The sensors (**1**) on the *CCS* and *RCL* displays have no function and the brightness is not automatically regulated. The brightness of the display can be adjusted manually.; p. 4 - 11.

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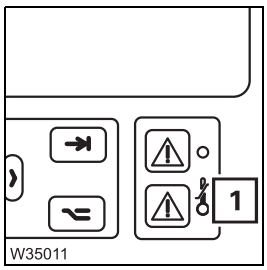
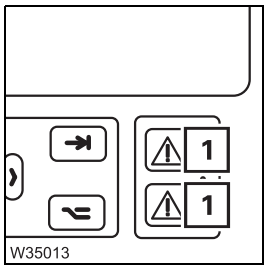


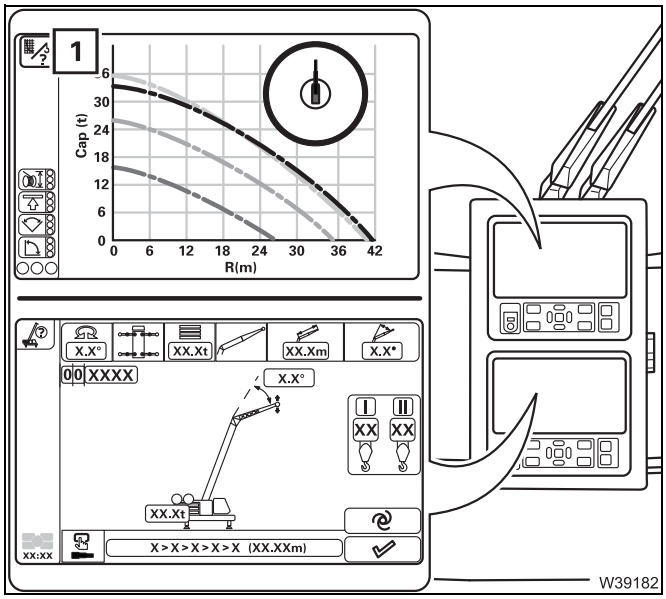
Temperature on the display

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. 11 - 45.

If the current rigging mode is not displayed, then you must enter the current rigging mode; ➠ p. 11 - 36.

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11.4.2 Entering the rigging mode

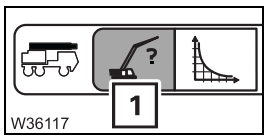
Notes on Input

You can enter the rigging mode for various different purposes.

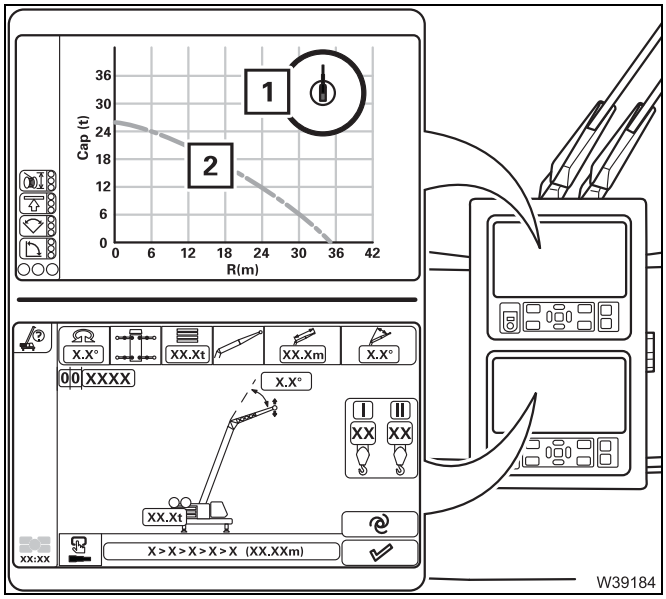
– **Entry for crane operation**
You enter the current rigging mode, select a telescope status according to the lifting capacity table and confirm the rigging mode to enable the crane functions.

– **Entry for operations planning**
You enter a possible rigging mode to check the lifting capacities, slewing ranges and telescopings 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.

Te 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. 11 - 37.

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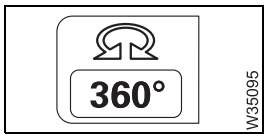
Enter the slewing range type

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 – Overview – Standard slewing range type*; ➠ p. 12 - 18.

– ***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 – Overview – MAXbase slewing range type*, ➠ p. 12 - 22.

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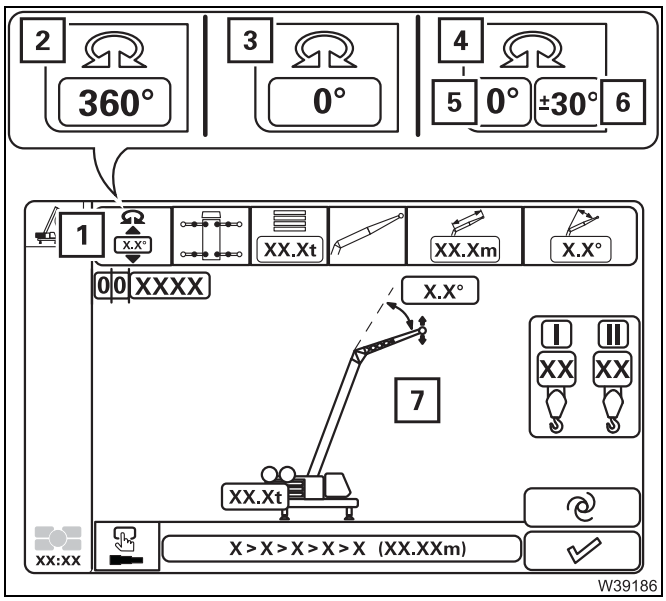
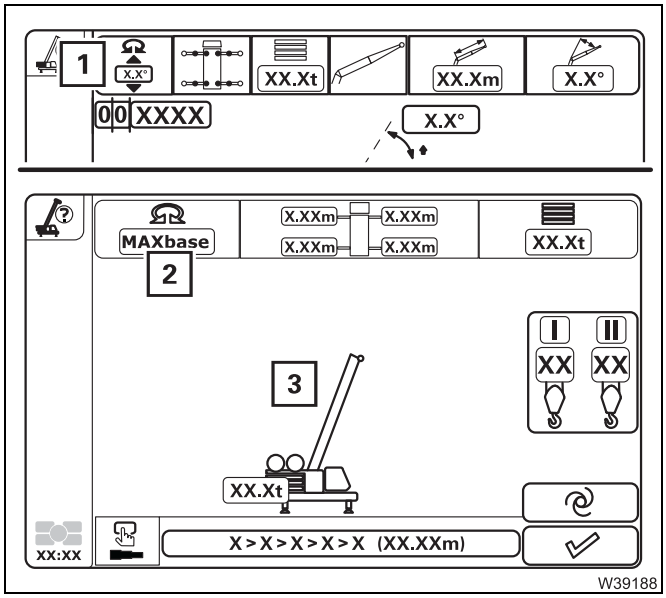


For the *Standard* slewing range type

- Select and confirm the display (**1**).
- Select and confirm the symbol for the desired slewing range.
  - **2** 360° slewing range
  - **3** Operating position 0° to the rear
  - **4** Limited slewing range
    - **5** Operating 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. 11 - 44.
  - – Entry via individual components; p. 11 - 38.



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.

  Entry only via individual components; p. 11 - 38.

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.

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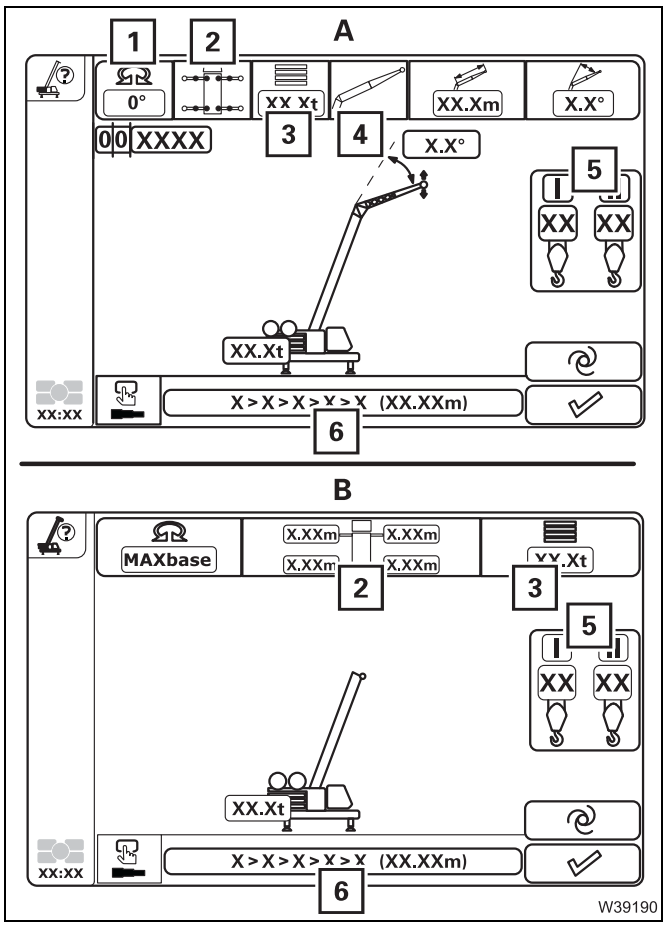


The displayed menu depends on the slewing range type.

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

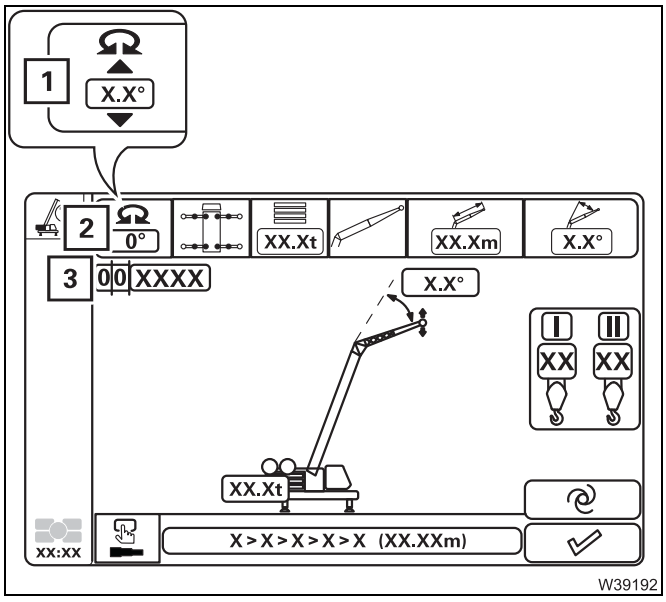
2 Outrigger span – can also be adopted from the outrigger span monitoring

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**), for example, operating 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 operating 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.

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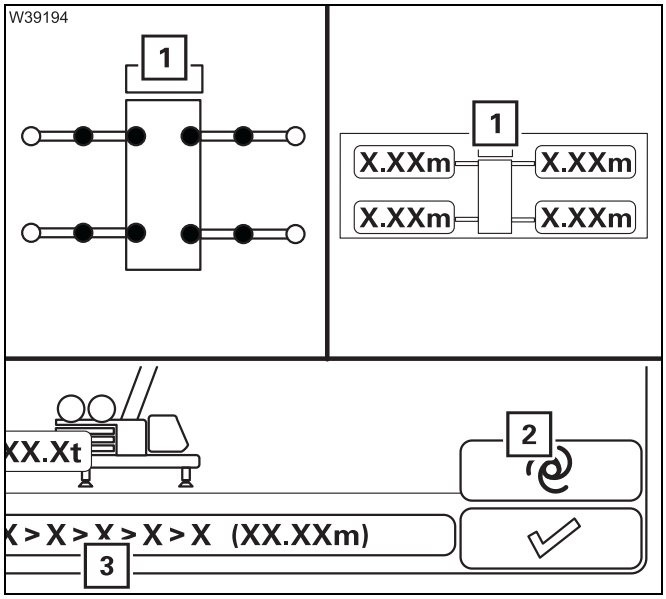
Outrigger span

You can adopt the outrigger span provided by the outrigger span monitoring or manually enter the outrigger span.



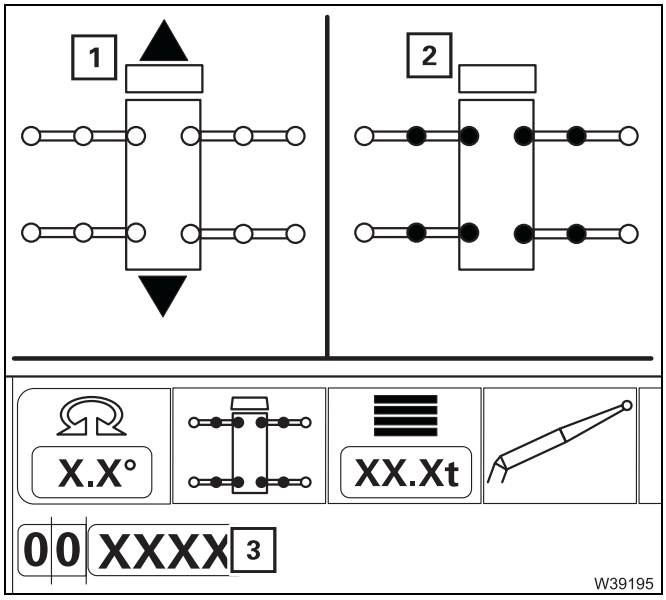
Adopt the outrigger span

- Select and confirm the symbol (**2**).

The outrigger span provided by the outrigger span 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 6.825 x 4.400 m (22.4 x 14.4 ft).
- Confirm the selection.
  The selection and the corresponding RCL code (**3**) are displayed.

If the outrigger span provided by the outrigger span monitoring deviates from the entered value then a query is displayed after confirming the rigging mode; ➠ p. 11 - 46.

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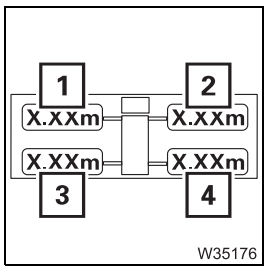
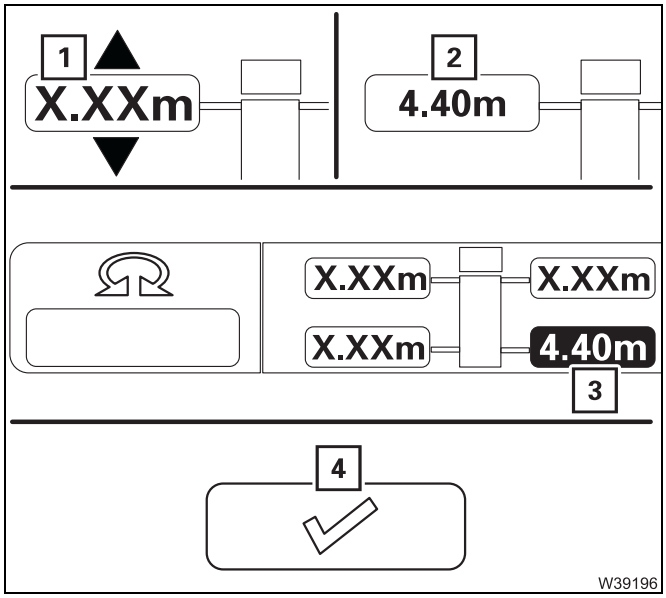
Enter outrigger span (*MAXbase*)

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
6.200 m (20.3 ft)	3.100 m (10.2 ft)
4.400 m (14.4 ft)	2.200 m (7.2 ft)
2.320 m (7.6 ft)	1.160 m (3.8 ft)



If changing an outrigger span would result in an impermissible outrigger span, then the selection is disabled for this outrigger beam. If necessary, you must re-enter the outrigger spans 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. 4.400 m (14.4 ft).
- Confirm the selection.

If the outrigger span measured by the outrigger span 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.

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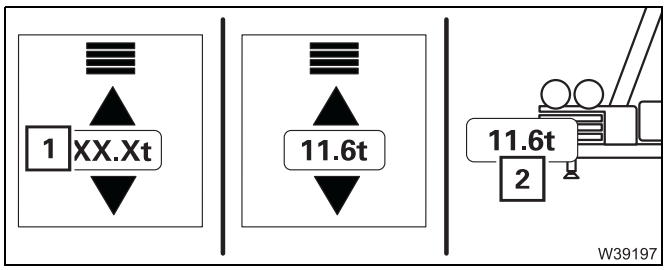
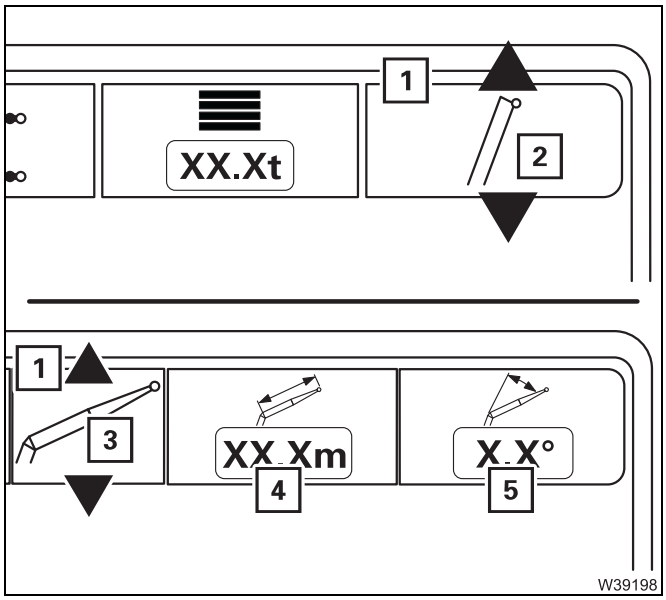


Counterweight

- Select and confirm the display (**1**).
- Select the rigged counterweight combination, for example, 11.6 t.
- Confirm the selection.
  The display (**2**) shows the entered counterweight combination.



Boom system

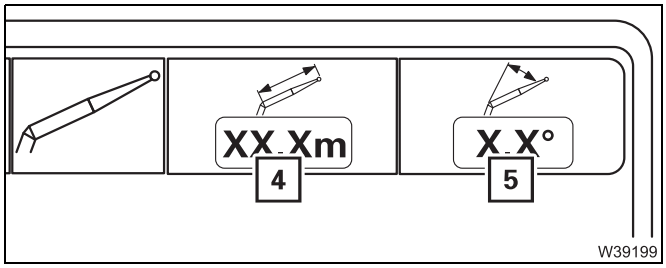
For the *Standard* slewing range type only.

- 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**) and (**5**) are shown – selection and confirmation is performed in the same manner as with display (**1**).



– Display (4)

- Select and confirm the current length of the lattice extension.

– Display (5)

Only for inclinable lattice extensions.

- Select and confirm the currently rigged angle.

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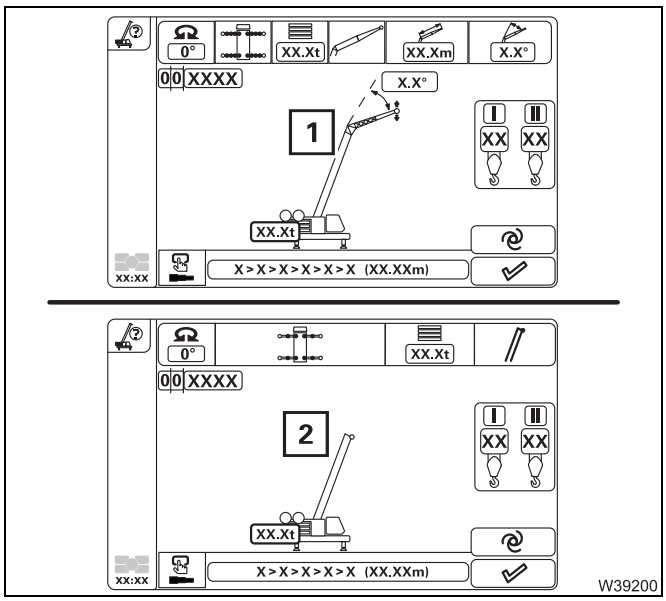
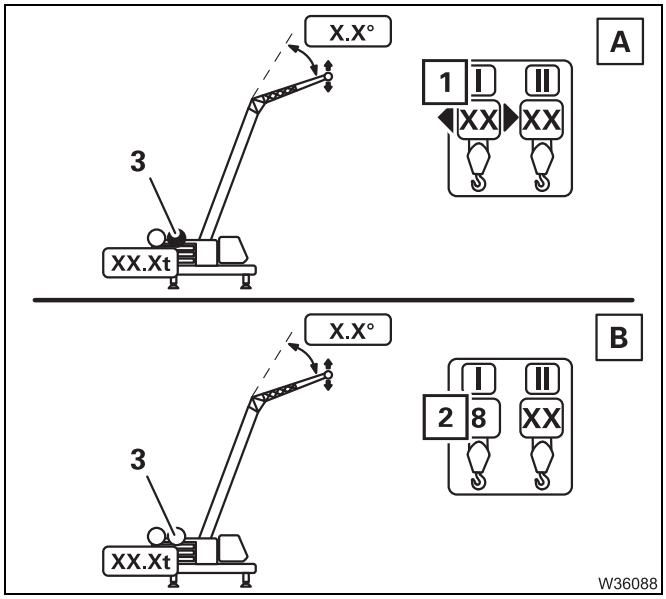


The confirmed boom system (**1**) or (**2**) is displayed.



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 and leave the display (**1**) – symbol (**3**) grey.

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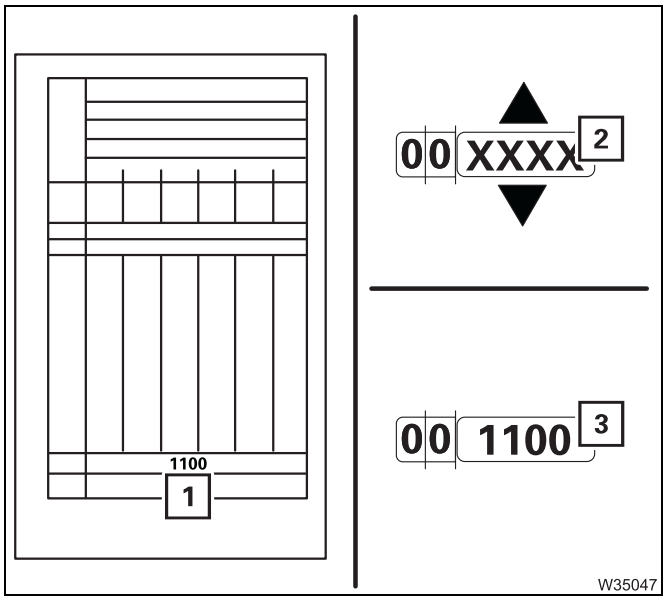
Entering the RCL code

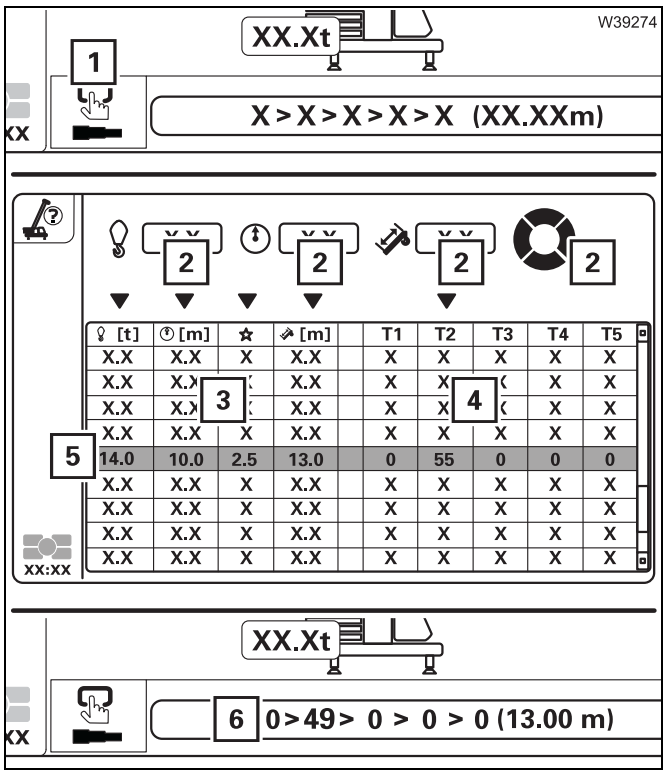
You must enter the RCL code for the rigging mode according to the *Lifting capacity table*.



- 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.

11.4.3 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**); ➠ p. 9 - 46.

  The table shows all permissible telescopings (**4**) and the associated parameter (**3**) for the entered rigging mode and entered parameter.
- Select and confirm the line with the desired telescope status, for example, line (**5**).

  The *Enter rigging mode/telescope status* menu opens – the preselected telescope status (**6**) is displayed.

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11.4.4 Confirming the rigging mode and lifting capacity table

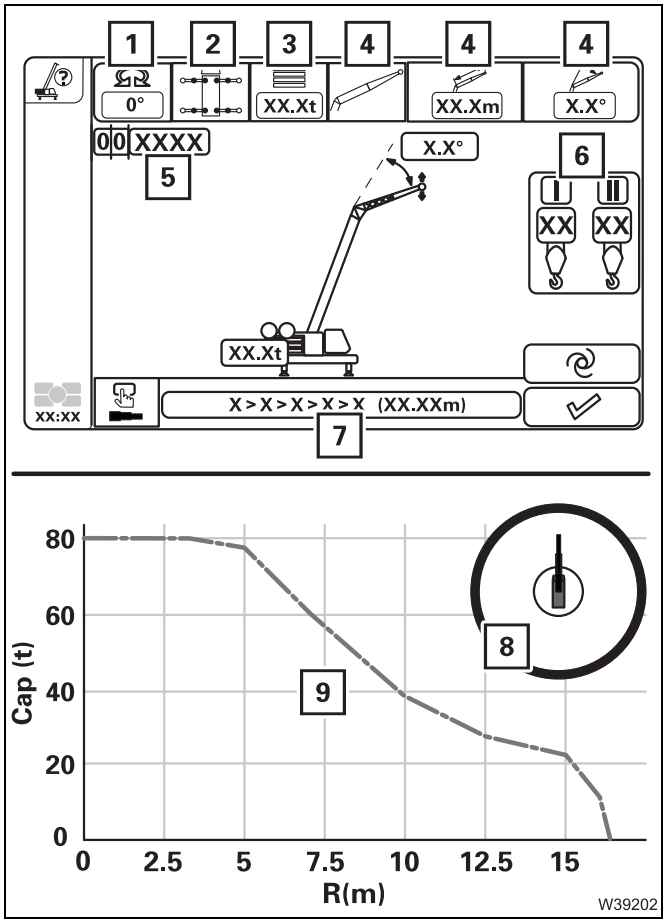
You must confirm the rigging mode together with the display lifting capacity table before commencing crane operation. Some parts of the procedure are different, depending on the entered slewing range type.

Slewing range type *Standard*

If the *MAXbase* slewing range type has been entered; ➠ p. 11 - 47.

- 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.

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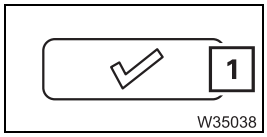
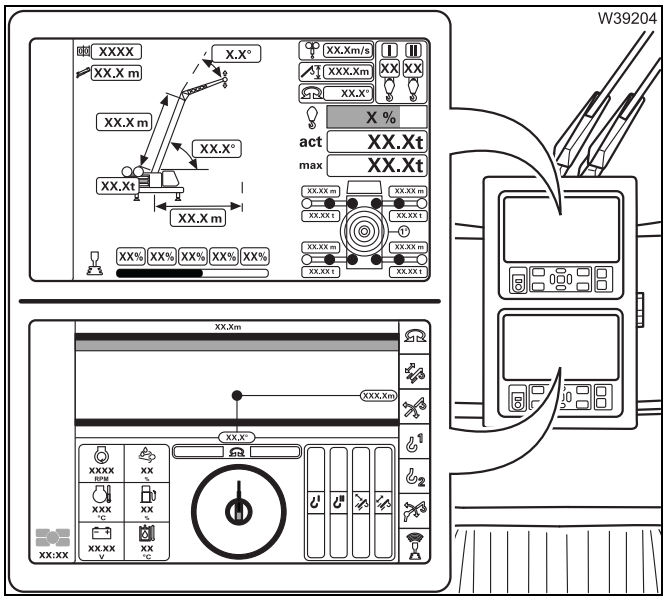


- Select and confirm the symbol (**1**).



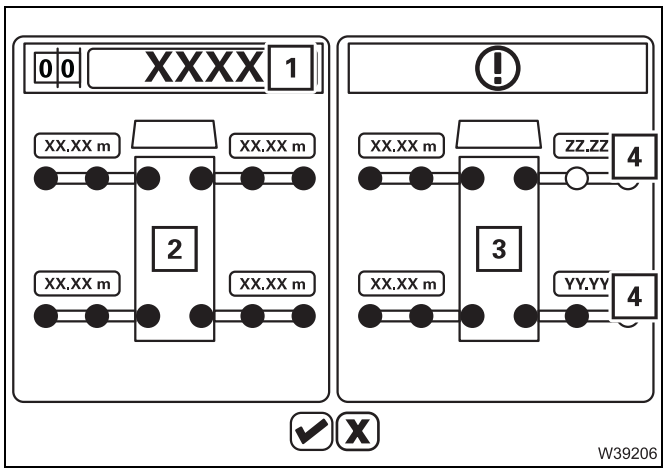
If the rigging mode is permissible

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 enabled if no error is present; ➠ *Checks before operating the crane*, p. 11 - 49.



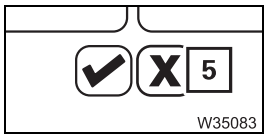
If a deviation in the outrigger span is detected

A query menu opens.

The display (**2**) shows the outrigger span corresponding to the RCL code (**1**).

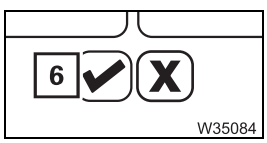
The display (**3**) shows the acquired outrigger span – deviating outrigger spans (**4**) are red.

- 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 span monitoring checked after finishing operations.

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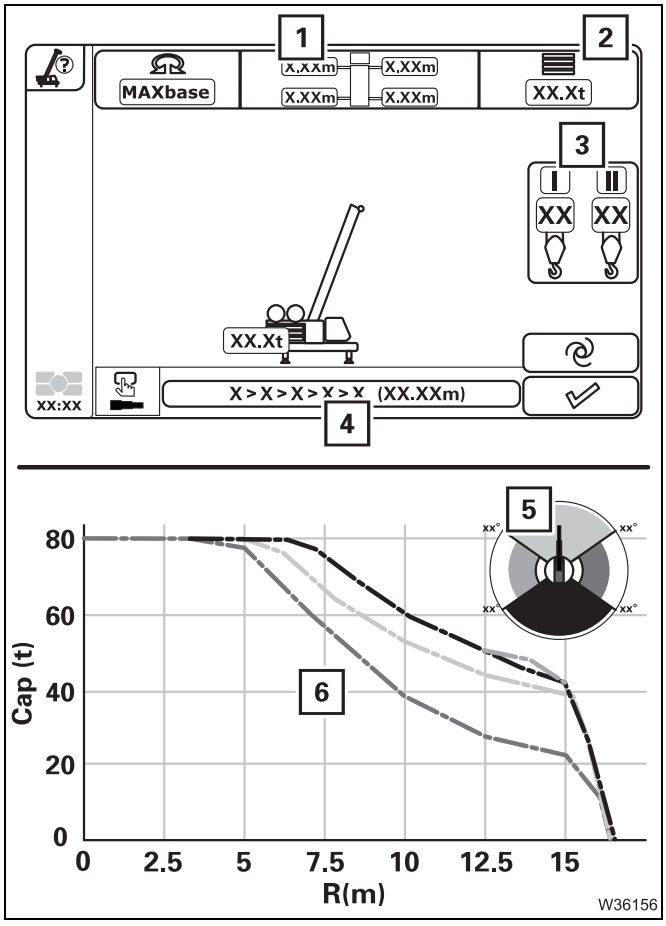
Risk of accident due to incorrectly supported truck crane!
A shutdown is not initiated as standard when an outrigger span monitoring error message is issued. When an error message is displayed, compare the rigged outrigger span with the required outrigger span and rig the required outrigger span.
This prevents the truck crane from tilting due to an inadequate outrigger span.

Slewing range type *MAXbase*

If the *Standard* slewing range type has been entered; ➠ p. 11 - 45.

- 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.

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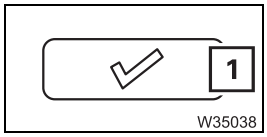
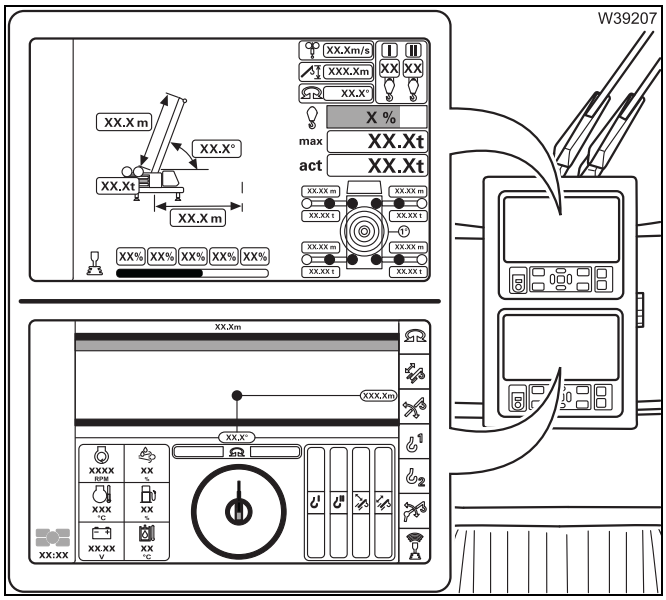


- Select and confirm the symbol (**1**).



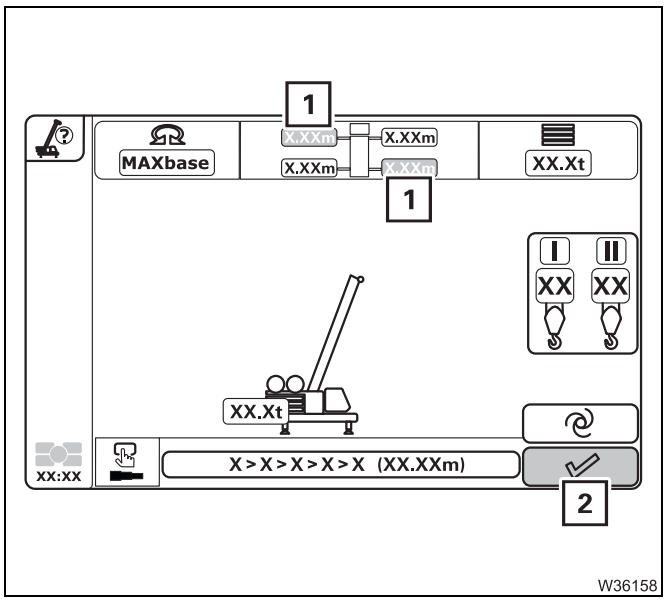
If the rigging mode is permissible

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 enabled if no error is present; ➠ *Checks before operating the crane*, p. 11 - 49.



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 span is red then a deviating outrigger span has been detected, for example, for the values (**1**).

- Rig the required outrigger spans.

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11.4.5 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. 11 - 45.

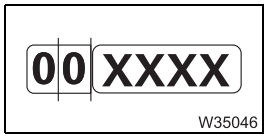
– After opening the *Enter rigging mode/telescope status* menu, the *Monitoring* menu is exited and the *RCL* display opens the *Lifting capacity table*; ➠ p. 11 - 36.

Checking the rigging mode

- Check that the *Monitoring* menu displays the current rigging mode of the truck crane.

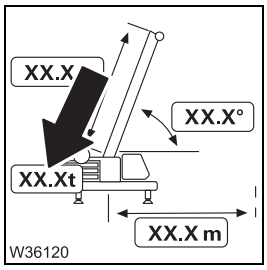
Risk of accidents due to an incorrectly set RCL!
If the current rigging mode varies from the displayed rigging mode, the maximum load displayed by the *RCL*will not correspond to the actually permissible lifting capacity according to the *Lifting capacity table*.
Overloading and accidents will certainly 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*.



Counterweight display

Shows the required counterweight combination in tons (t) for the confirmed rigging mode.

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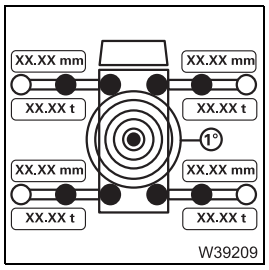
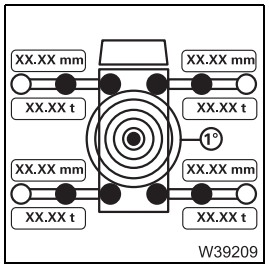
Outrigger span display



– For versions without outrigger span monitoring

– Numerical values – show the individual widths of the outrigger beams for the confirmed rigging mode, in metres (m) or feet (ft).
With a confirmed operating position of *Free on wheels*, the value 1.035 m (3.40 ft) is displayed.

– Visual display – shows the required outrigger span in **orange**.
With a confirmed operating position of *Free on wheels*, all displays are **grey**.



– For versions with outrigger span monitoring

– 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**. With a confirmed operating position of *Free on wheels*, all displays are **grey**. For the *Standard* slewing range type only – the display is **red** when the measured outrigger span deviates from the required outrigger span.

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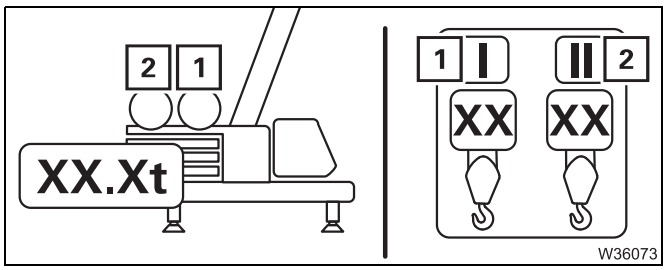


Display of reeving used

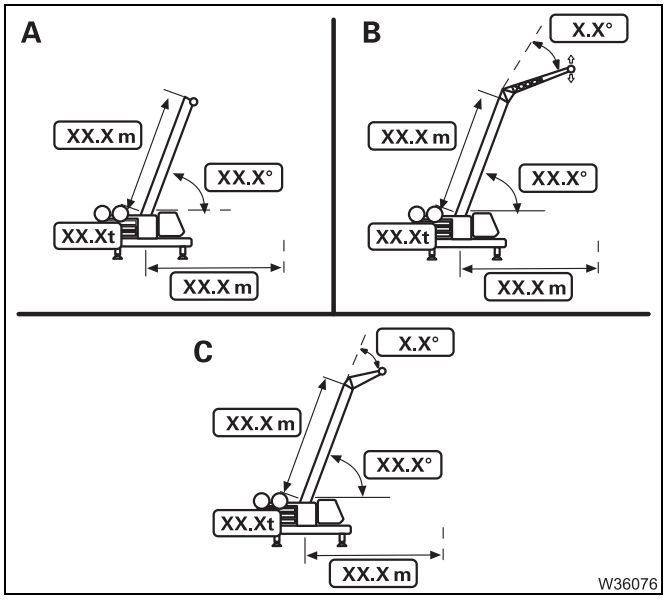
1 Main hoist

2 Auxiliary hoist

Orange: Used [1)]

Grey: Not used

[1)] The value on the *Maximum load* display applies to this reeving.
You may need to switch over the display if necessary; ➠ p. 11 - 52.



Boom system display

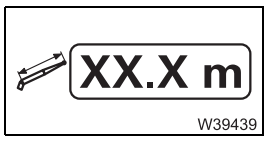
Shows the boom system corresponding to the confirmed rigging mode.

A Main boom

B Swing-away lattice extension[1)] / boom extension[1)]

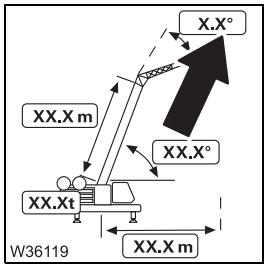
C Heavy load lattice extension[1)]

[1)] For the *Standard* slewing range type only. The lattice extension must be electrically connected.



Lattice extension display – length

Shows the required length of lattice extension according to the confirmed rigging mode – in metres (m) or feet (ft).

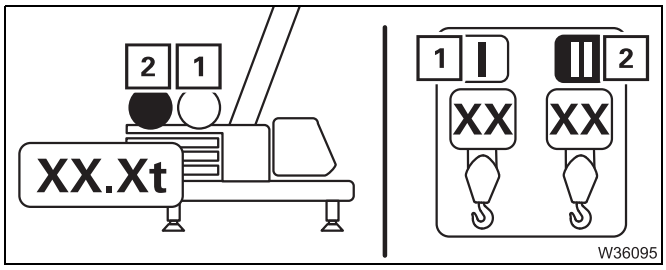


Lattice extension display – angle

Only for manually inclinable lattice extensions
Shows the required angle of the lattice extension for the confirmed rigging mode.

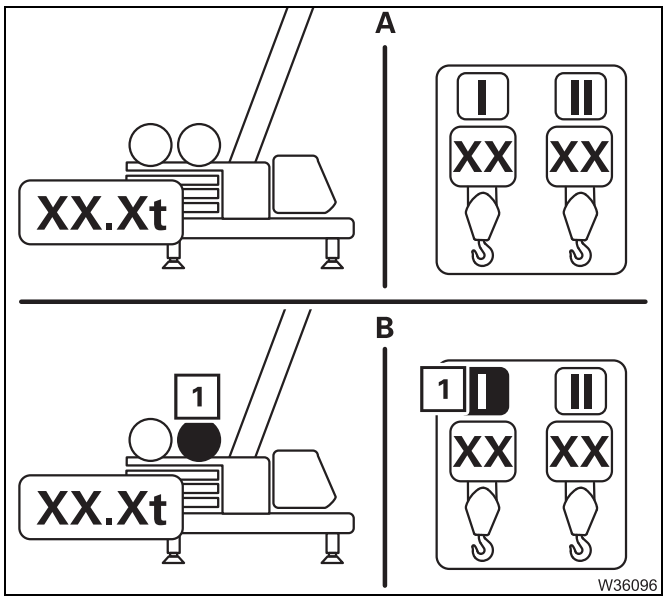
Hoist checking

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**, for example, 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**, for example, 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.

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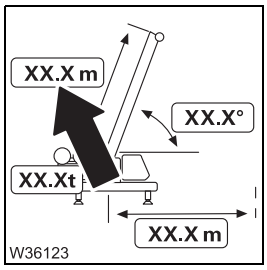
11.4.6 Display during the crane operation

Various different information is shown on the *RCL* display and *CCS* display. This section describes only the displays that change during crane operation.

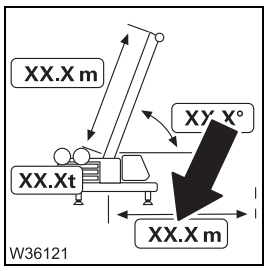
On the *RCL* display

All displays are shown in the *Monitoring* menu.



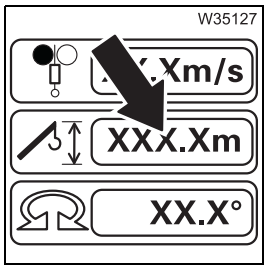
Display of current main boom length

Shows the current main boom length in metres (m) or feet (ft).



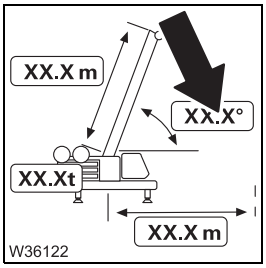
Current working radius display

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.



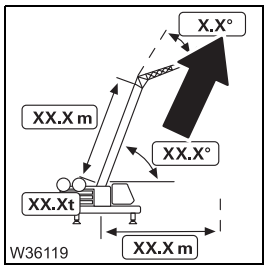
Current overall height display

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.



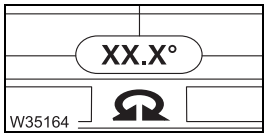
Status display for current main boom angle

Shows the current main boom angle in relation to the horizontal. Angles below the horizontal are displayed with a minus sign, e.g. – 3°.



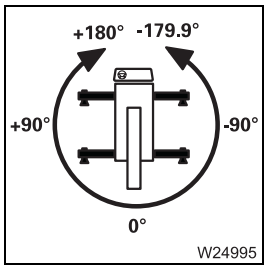
Current lattice extension inclination display

A luffing jib is connected.
Shows the current angle between the lattice extension and main boom in degrees (°).

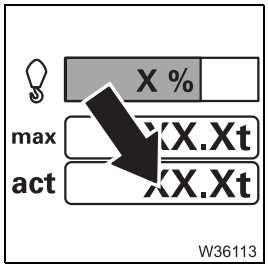


Current slewing angle display

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 from this operating 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°).



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 equals 55,200 lbs.

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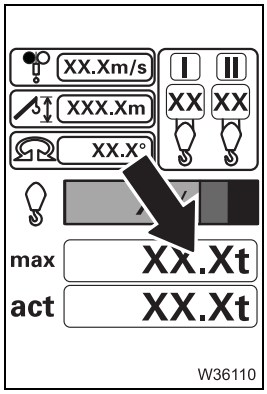
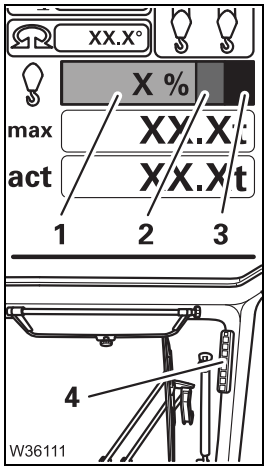


Maximum load display

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 x current load/maximum load).

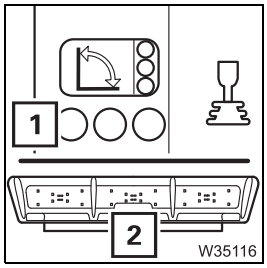
The display has three coloured regions.

1 Green: 0 - 90%

2 Yellow: approx. 90 - 100% – early warning

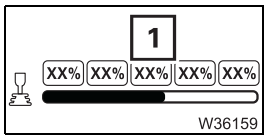
3 Red: greater than 100% – shutdown

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 V. When the display is **coloured** then the telescoping cylinder head is in this telescopic section.

– **Green:** Telescoping cylinder locked

– **Green/Yellow:** Flashing – intermediate position

– **Red:** Telescoping cylinder unlocked

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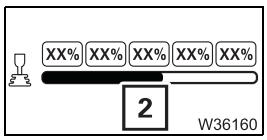
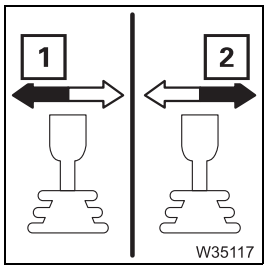


Telescoping cylinder position display

The bar (**2**) shows the telescoping length of the telescoping cylinder – the total bar length corresponds to 100%.



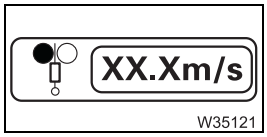
Telescoping direction display

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*

Telescoping with semi-automation, p. 11 - 116



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: about 90 - 100% of v_{max} reached

Red: v_{max} exceeded

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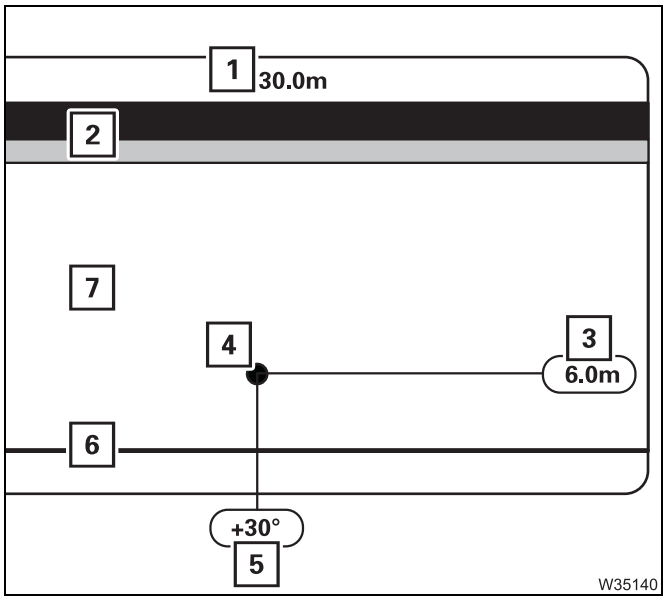
On the *CCS display* After confirming a permissible rigging mode, the *Start menu* opens automatically.

Slewing range type *Standard*

If the *MAXbase* slewing range type has been entered; ➠ p. 11 - 59.

The RCL display differs according to the confirmed slewing range.



360° slewing range

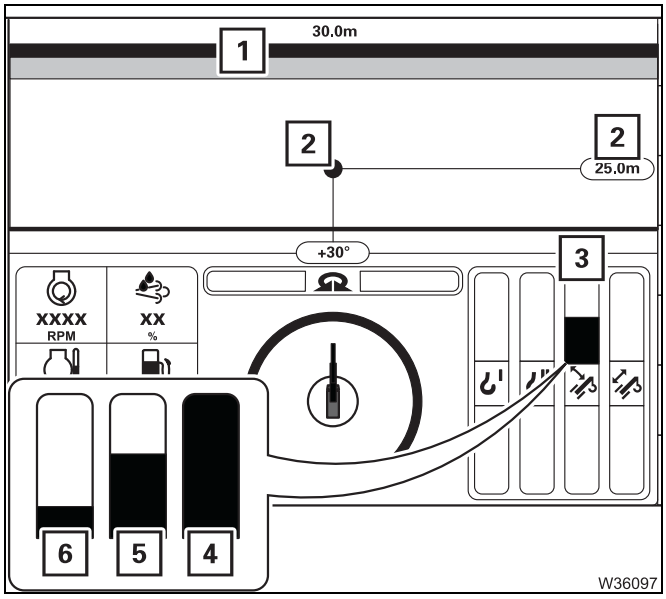
The diagram (**7**) covers the entire width. The height of the diagram corresponds to the maximum permissible working radius (**1**), e.g. 30 m (100 ft).

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 range for the maximum working radius (**2**) is shown in colour and – if active – the shutdown range for the minimum working radius (**6**) is displayed.



– When telescoping or derricking

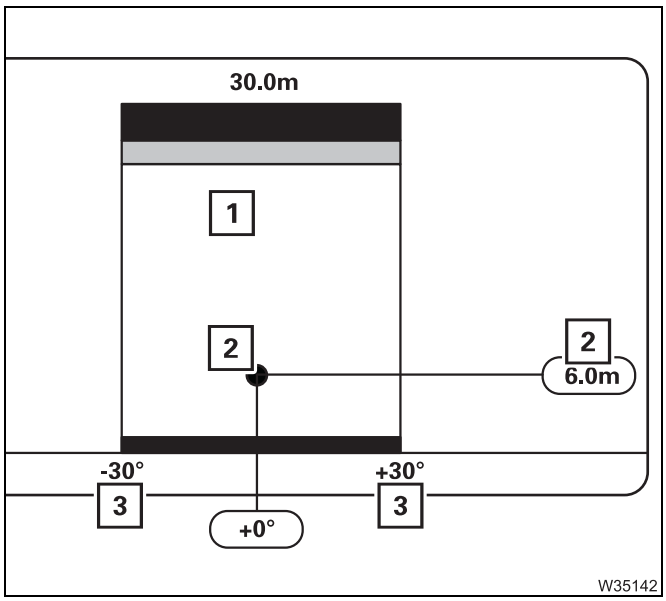
The displays (**2**) move up and down to show the current working radius, e.g. 25 m (20 ft).

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%



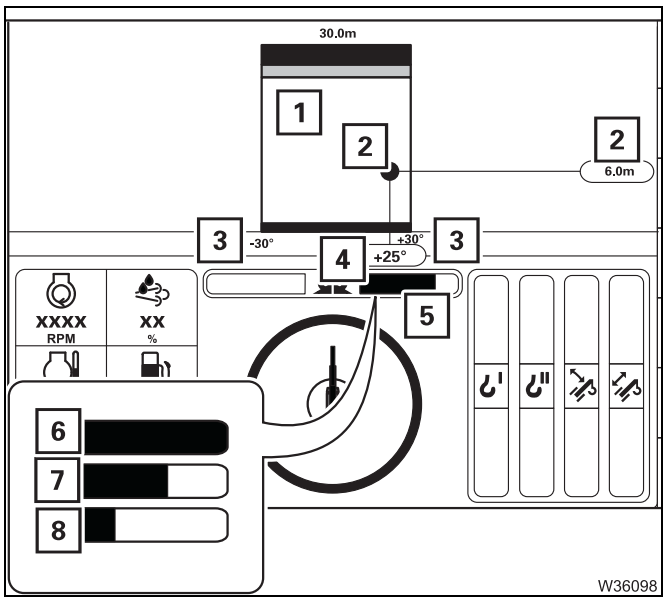
Limited slewing range

The diagram (**1**) shows the enabled slewing range and the slewing range limits (**3**), for example, +30° and -30°.

– 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° slewing range; ➠ p. 11 - 57.



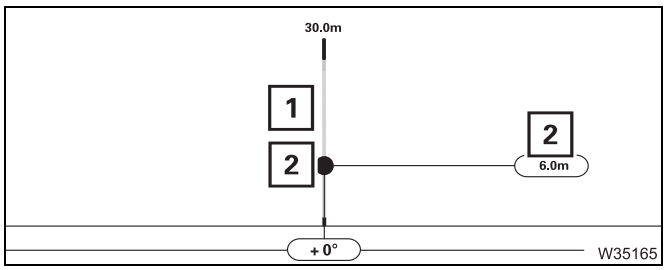
– When slewing
The displays (**2**) and (**4**) remain at the current position. The diagram (**1**) and the displays (**3**) move to the left or right.

Immediate 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%



Operating position

The diagram (**1**) shows the working range, e.g. *0° 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.

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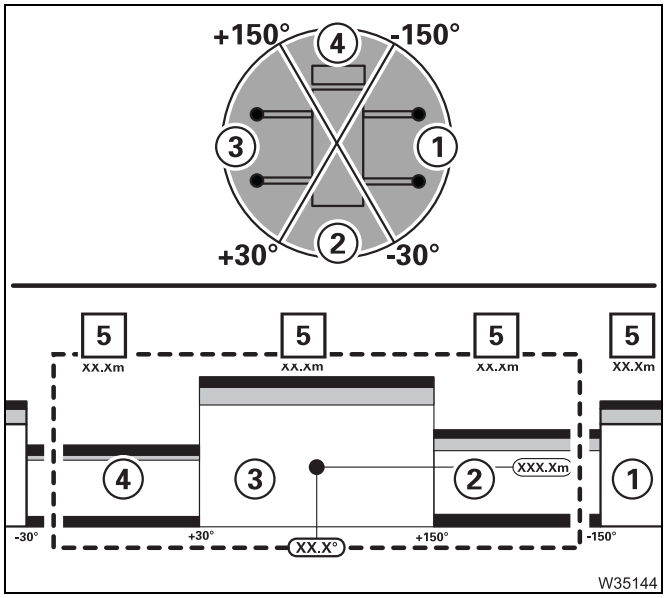
MAXbase slewing range type

If the *Standard* slewing range type has been entered; ➠ p. 11 - 57.



Display of the slewing ranges

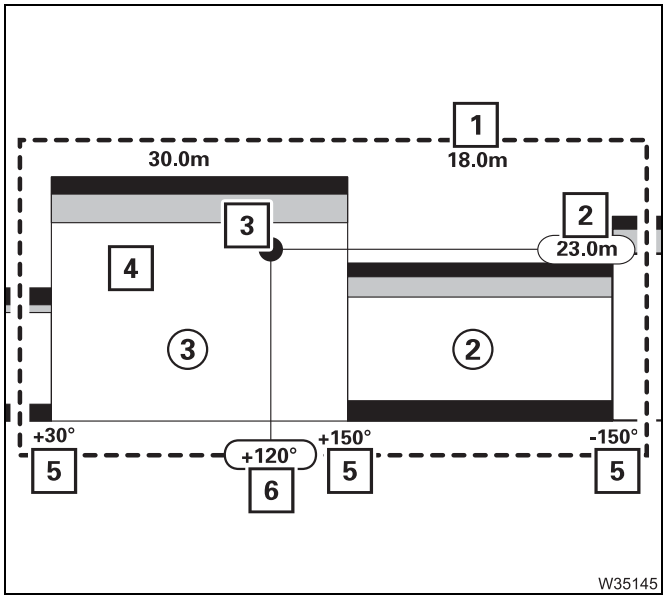
The RCL display represents the four enabled slewing ranges ① to ④ in a diagram with four regions.
The maximum permissible working radius (**5**) is shown for slewing range.

Assume that the confirmed lifting capacity table applies to the angular ranges

– ±60° to the left/right

– ±30° to the front/rear

According to the definition for the slewing angle display (0° to the rear) the slewing range limits would be -30°/+30°/+150° and -150°.



The *RCL* display shows an angular range of about 200°. The range of the diagram is always in the middle corresponding to the current slewing angle (**6**), for example, the range ③ for 120°.

– 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. 11 - 58.

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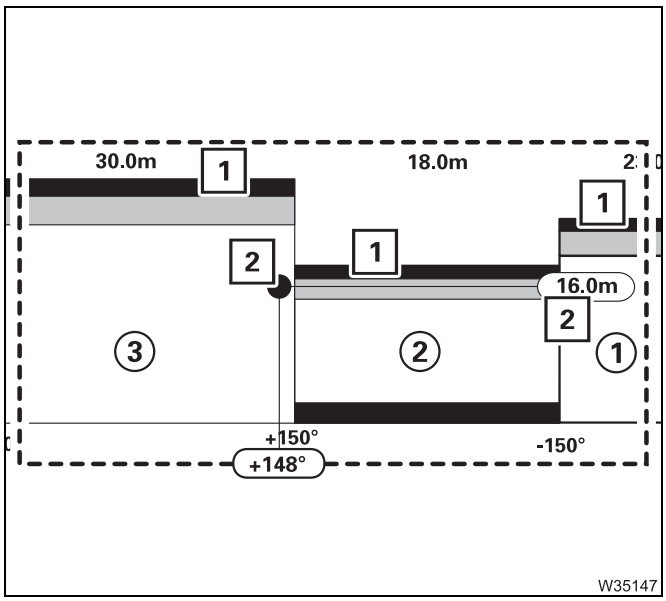


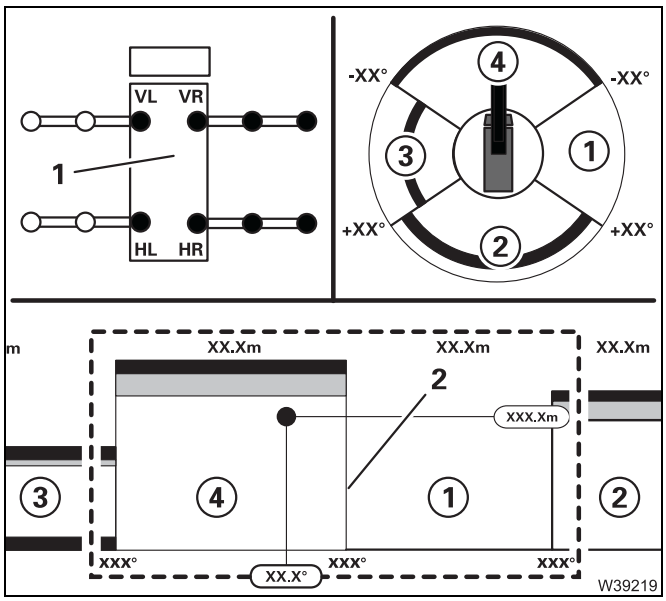
To enable the slewing movement, you must reduce the working radius correspondingly, e.g. to 16 m (52.5 ft) for slewing into slewing range ②.

– 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; ➠ p. 11 - 58.



Special case – disabled range
A slewing range can be disabled in certain cases.

If for example, 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.

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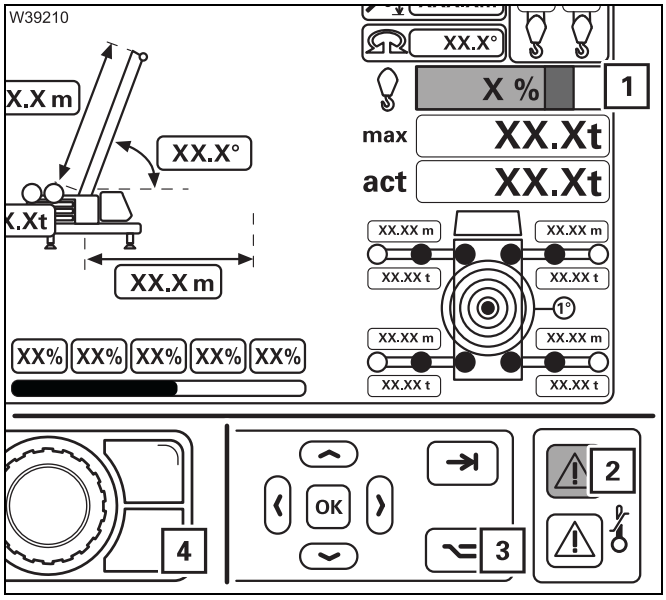
11.4.7 RCL early warning



If about 90% of the maximum permissible load is exceeded, an RCL early warning will be issued.

– An intermittent buzzer tone will sound. After five seconds, you can switch off the buzzer tone using button (**3**) or (**4**).

– The 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.

11.4.8 RCL shutdown

There are different types of RCL shutdowns

– Shutdown due to overload

– Shutdown due to an error; p. 14 - 8.

– Shutdown due to working range limiter; p. 11 - 149.

Shutdown due to overload

If about 100% of the maximum permissible load is exceeded, shutdown will occur due to overload.

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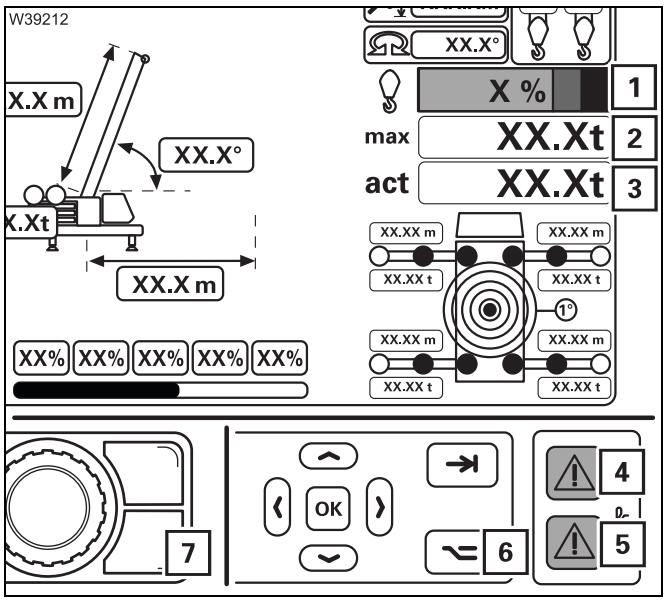


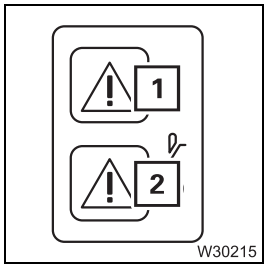
– All crane movements which increase the load moment will be switched off.
– A continuous buzzer tone will sound.
After five seconds, you can switch off the buzzer tone using button (**6**) or (**7**).
– Lamps (**4**) and (**5**) light up.
– The display (**1**) is in the red range.
– The value on display (**3**) is equal to or greater than the value on display (**2**).

Cancelling a shutdown

- Switch 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[1)]
Extend the main boom	Retracting the main boom[1)]
Slewing to the left	Slewing to the right
Slewing to the right	Slewing to the left
Lower the lattice extension	Raise the lattice extension

[1)] 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 enabled when you have left the shutdown area – lamps (**1**) and (**2**) go out.

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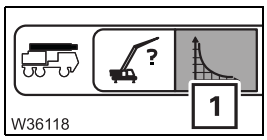
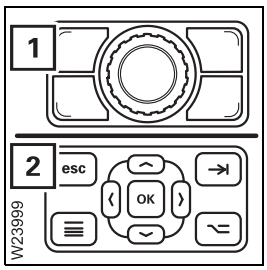
11.4.9 Displaying the lifting capacity tables



Opening the menu

- Open the *Lifting capacity table* menu (**1**) on the *CCS* control unit.

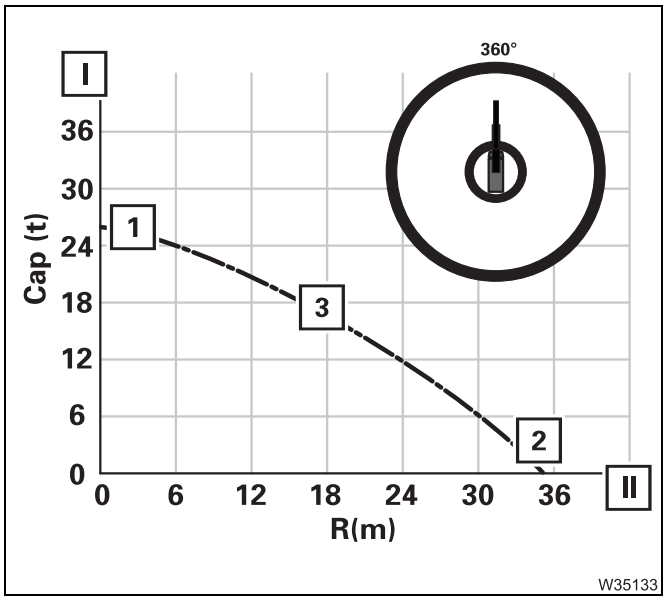


Exiting the menu

- Press the button (**1**) or press the button (**2**) on the *CCS* control unit once – the Start menu opens.

Slewing range type *Standard*

If the *MAXbase* slewing range type has been entered; ➠ p. 11 - 65.



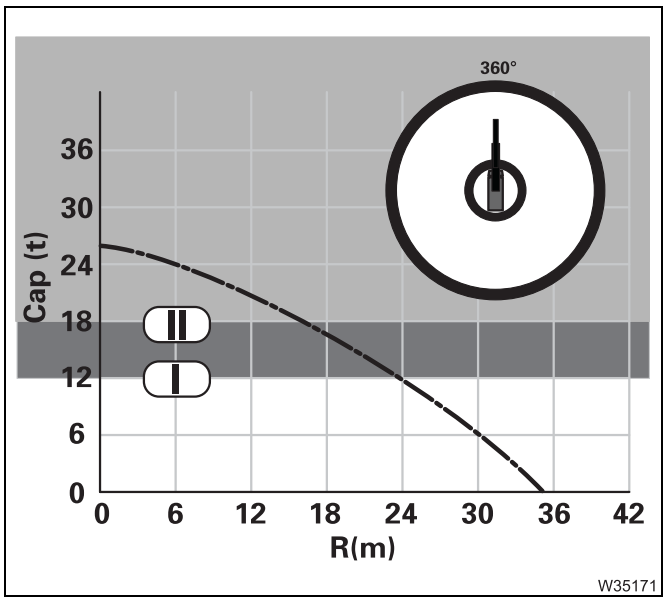
Permissible working range display

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**).

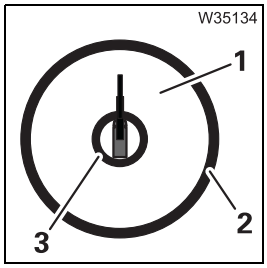


Limitation due to reeving

If the maximum load is limited due to the confirmed reeving then the disabled range is marked.

I Display for main hoist, for example, maximum load 12 t

II Display for auxiliary hoist, for example, maximum load 18 t

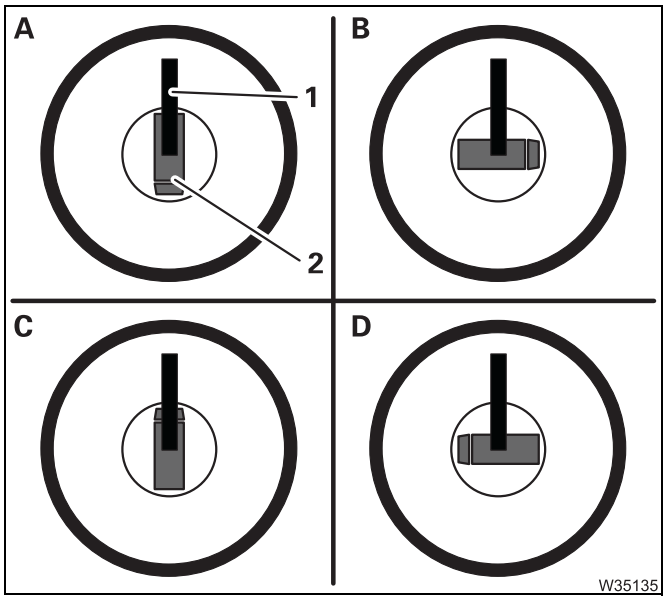


Slewing range display

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°

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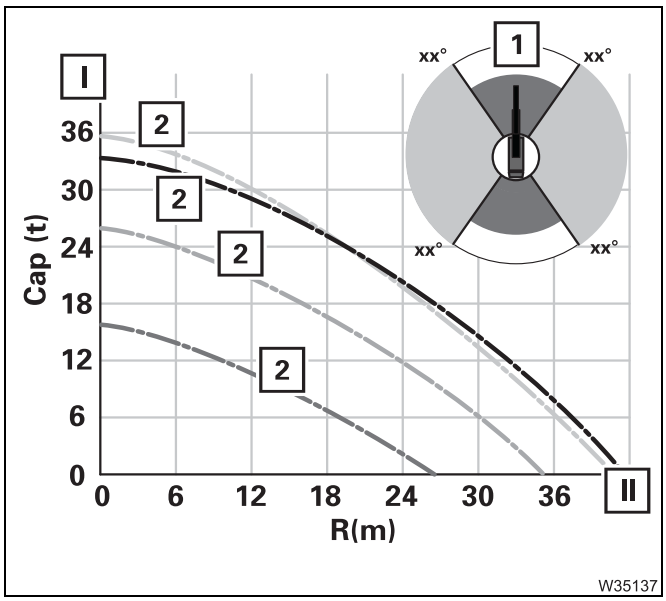
Slewing range type *MAXbase*

If the *Standard* slewing range type has been entered; ➠ p. 11 - 63.



Permissible working range display

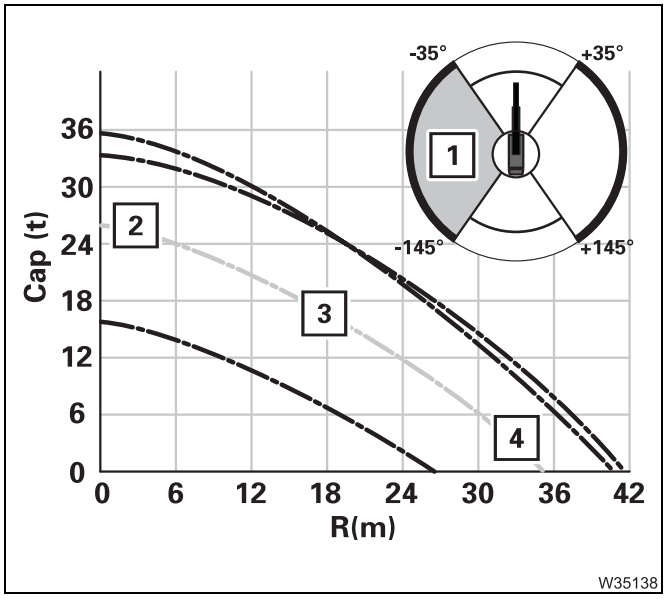
The displays apply to the confirmed rigging mode.

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)



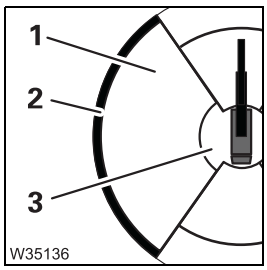
Example of a permissible working range

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. 11 - 64.



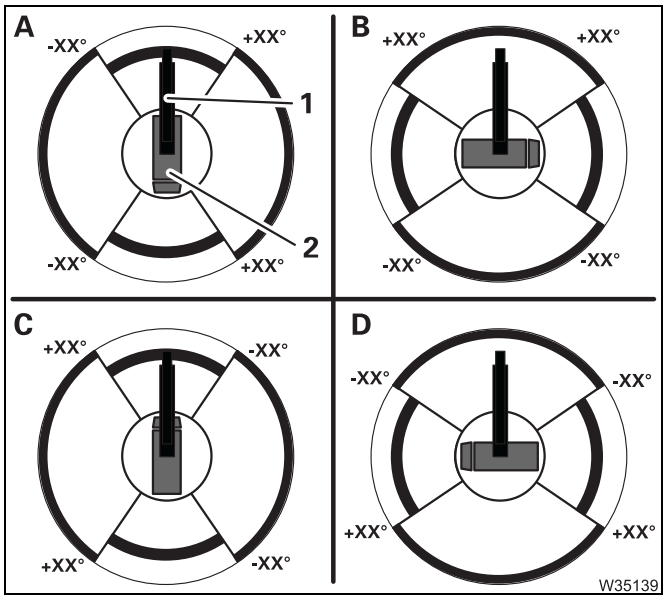
Slewing ranges display

The display is same in all four slewing ranges.

1 Coloured: Enabled slewing range, for example, 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°

B Current slewing angle +90°

C Current slewing angle +180°

D Current slewing angle -90°

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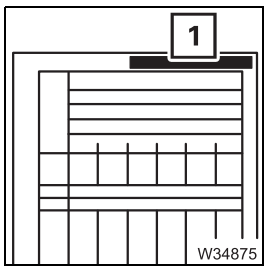
11.4.10 RCL override – version A



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. 11 - 71.

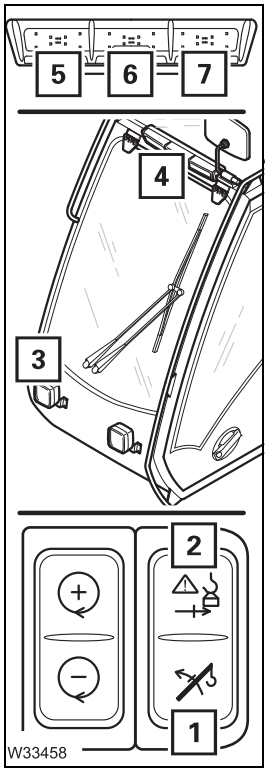
If the RCL is overridden, the crane operation is not monitored and the switched off crane movements are enabled again. Once the RCL is switched off, there are three options for overriding.

– **During rigging**, you can override the RCL shutdown or the lifting limit switch for rigging work; ➠ *When rigging*, p. 11 - 68.

– You can enable the derricking function **to leave the shutdown range**; ➠ *To raise the boom*, p. 11 - 69.

– **In an emergency** you can override the RCL shutdown completely; ➠ *In emergencies*, p. 11 - 70.

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%	about 90-100%	greater than 100%
No switch (normal operation)	Display (**5**) **green**	Display (**6**) Yellow	Display (**7**) Red
Button (**2**) Overriding for rigging	Display (**5**) **green**	Display (**6**) Yellow	Display (**6**) **yellow**, flashing
Button (**1**) Raising	Display (**5**) **green**	Display (**6**) Yellow	Display (**5**) **green**, flashing
Key-operated switch (**3**) RCL override in case of emergency	Display (**7**) **red**, flashing	Display (**7**) **red**, flashing	Display (**7**) **red**, flashing

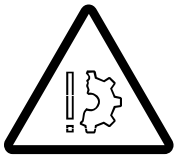
When rigging

For rigging work, you can:

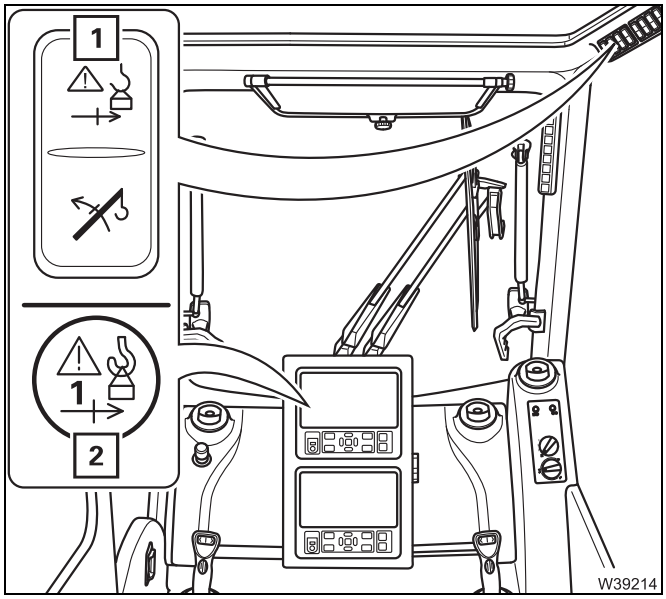
– Override the lifting limit switch; ➠ p. 11 - 89

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 power unit speeds are 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.

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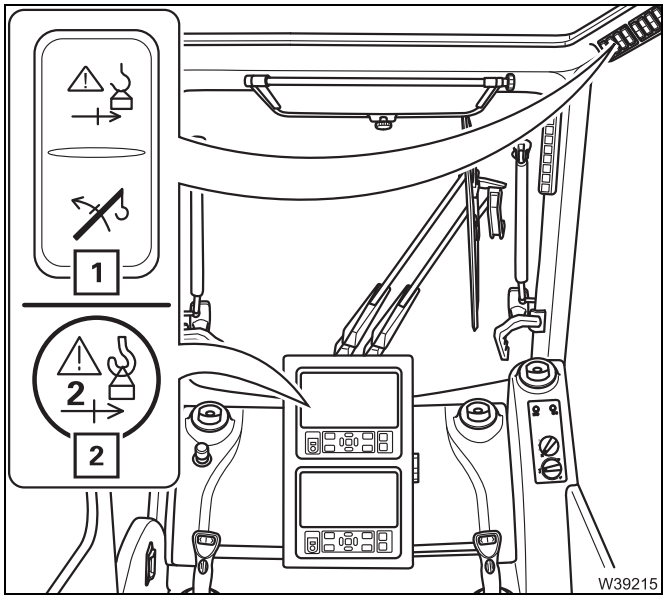
To raise the boom You can release the raise boom function for derricking again within the permitted working range.

This function is only active if the current degree of utilisation lies above 100% and the crane movements are switched off.



Raising the main boom

- Press the button (**1**) once – the information message (**2**) is displayed.
  - Raising is enabled.
  - The speed is 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.

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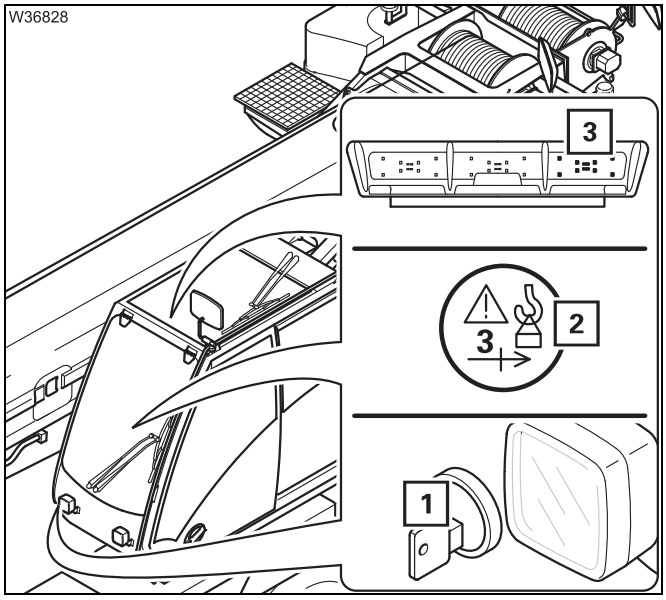
In emergencies

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 being overridden unintentionally.



Cancelling a shutdown

- Insert the key into the key-operated switch (**1**).
- Turn the key to the left or right once.
  The status display (**3**) will flash **red**.
  The information display (**2**) appears.
  - All crane movements are enabled for 30 minutes.
  - The speed of the movements which increase the load moment is reduced to 15%.
  - At a degree of utilisation over 110% the warning signal will sound.

Cancelling 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.

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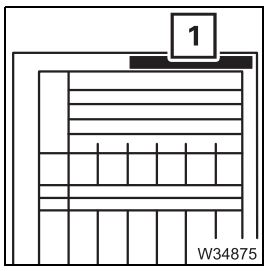
11.4.11 RCL override – version B

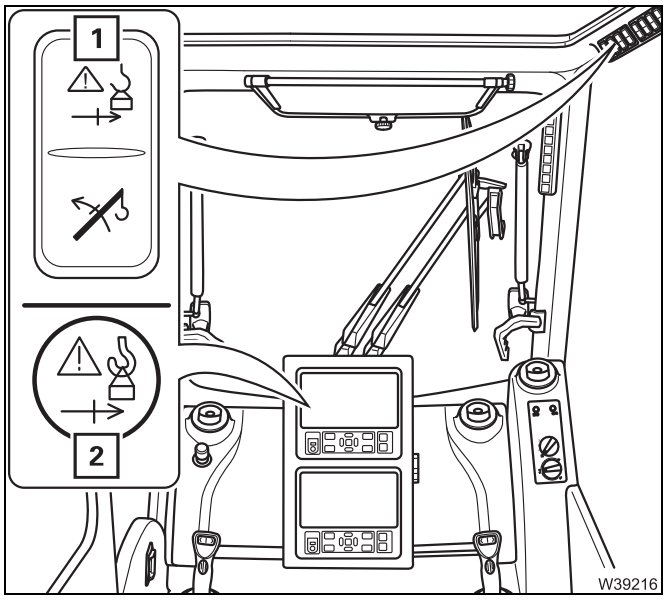


His section applies only when the supplied *Lifting capacity tables* contain an entry other than *EN 13000* in the header (**1**), e.g. the entry *ASME*.

For standard *EN 13000*; ➠ *RCL override – version A*, p. 11 - 67.

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. 11 - 67.

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.

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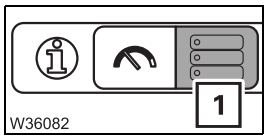
11.4.12 Datalogger

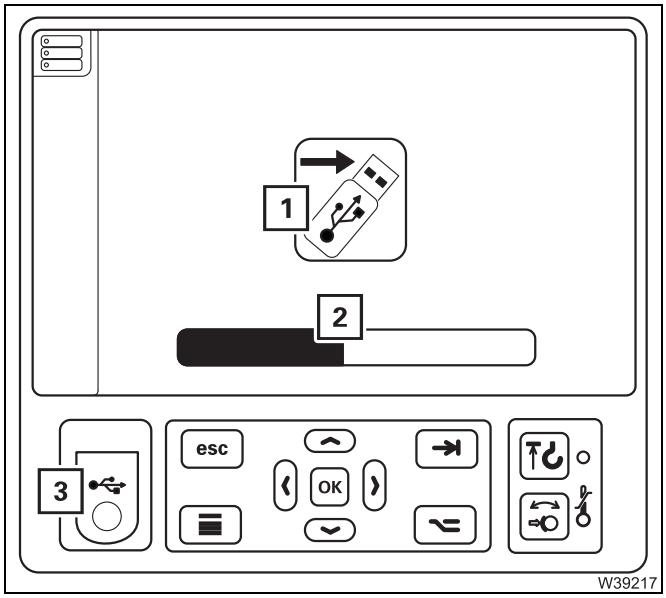
You can export data from the CCS crane control system to a USB stick and display this on a PC using the *CraneEvaluation* program supplied.



- Open the *Data logger* menu (**1**).

Export data

You need a USB Stick (USB 2.0/FAT32 file system / about 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.

xxx.**mcd**	Contains all exported data – can only be opened with the *CraneEvaluation* program.
xxx**CraneFault.csv**	Contains all exported error messages – can be opened for example, with Excel.

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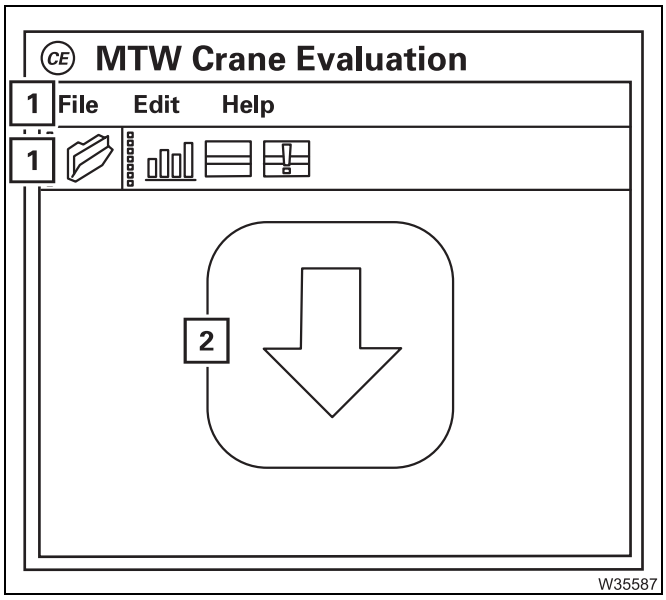
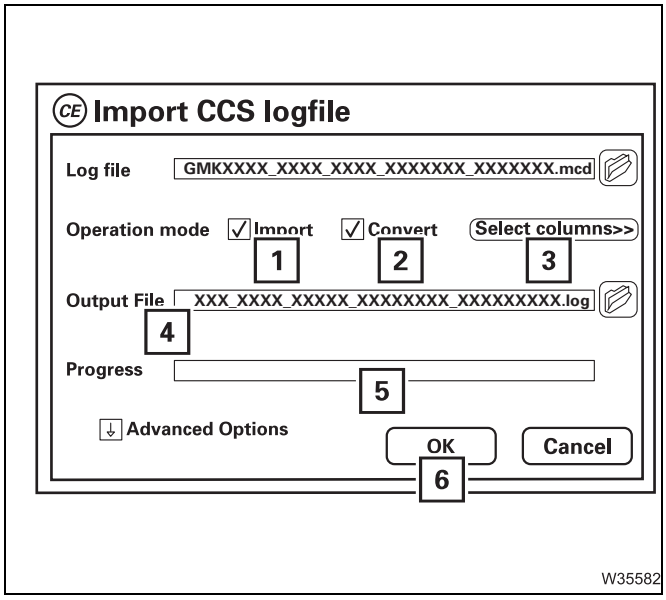
Display the data

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.

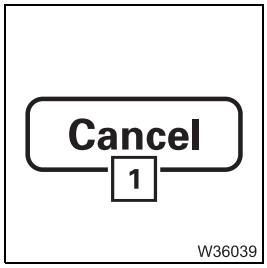
1 *Import* – the data is imported for display in the program.

2 *Convert* – the data is saved in a log file that can be opened for example, with 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. 11 - 75.

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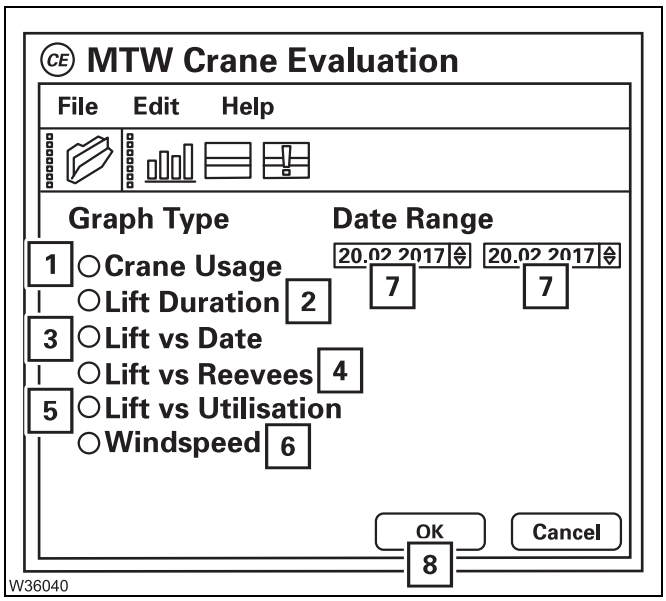


Displaying the graphic

- Select the desired period (**7**) and desired graphic.

  1 Crane use (offers the greatest variety of information)

  2 Lifting duration per utilisation area

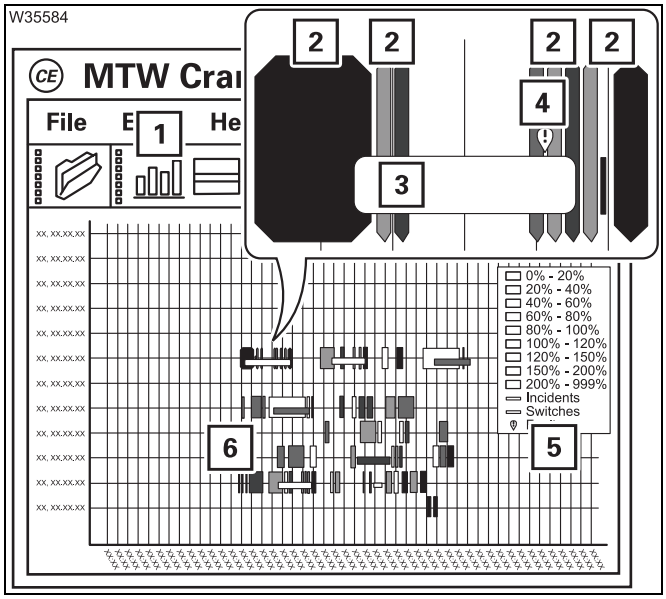
  3 Number of lifts per day

  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, for example, 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.

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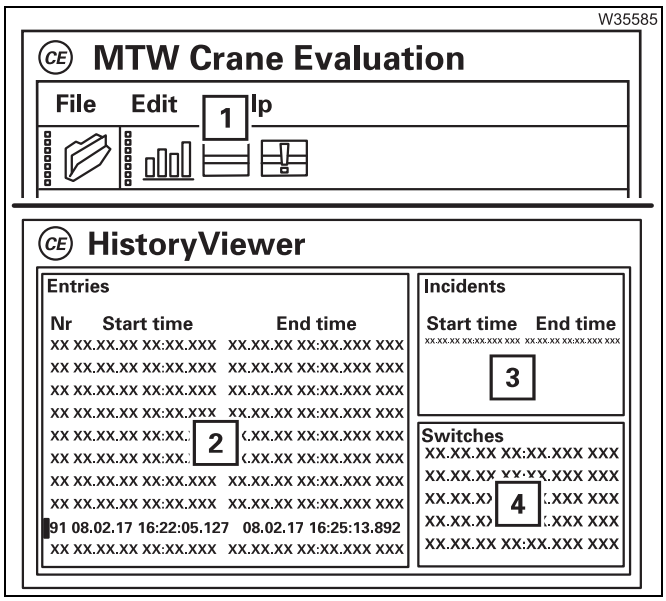


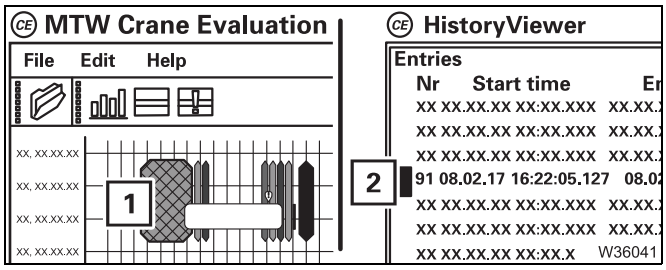
Displaying tables

- Select the symbol (**1**) – a table is displayed.

  2 List with all lifts

  3 List with all events

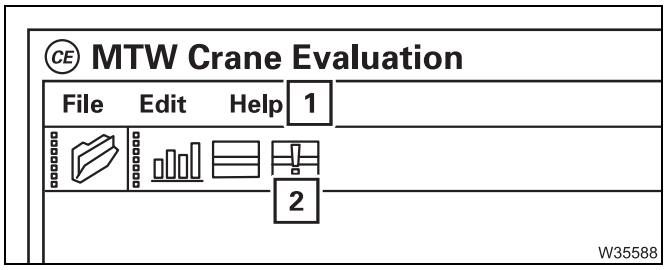
  4 List with all actuated switches



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.

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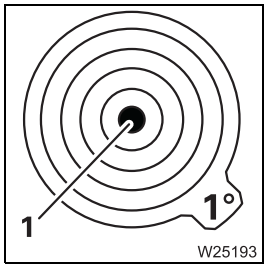
11.5 Crane operation with main boom

11.5.1 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. 12 - 43.

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 horizontally*, p. 12 - 43.

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 (for example, gas containers or scaffolding).

Keep a safe distance away from electrical lines; ➠ *Safe distance from overhead power lines*, p. 12 - 14.

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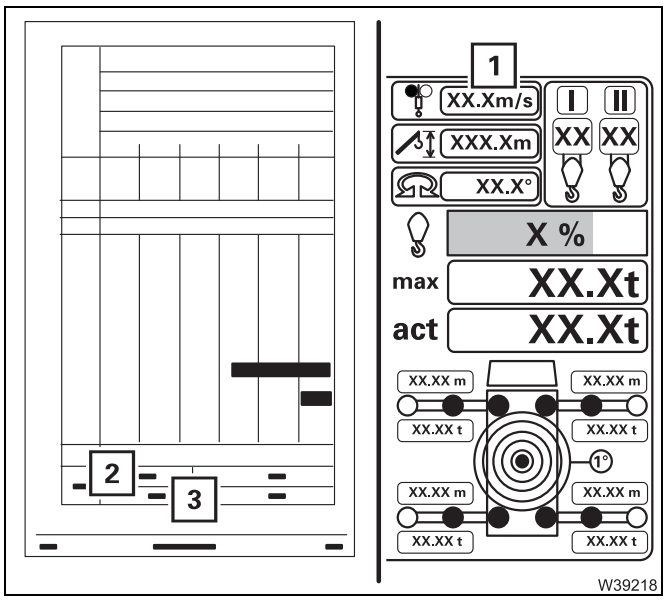
Checking the wind speed

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:** about 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 permissible wind speed is exceeded

No automatic shutdown occurs 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 at excessively high wind speeds!
If the current wind speed is higher that the maximum permissible wind speed, stop crane operation immediately and set up an appropriate rigging mode. This will prevent the truck crane overturning due to overload.

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Deformation of the main boom due to direct sunlight

One-sided direct sunshine can lead to a temperature difference between the left and the right main boom side. This results in a different length extension. A lateral deformation of the main boom is the result. The degree of deformation depends on the actual temperature difference and the current main boom length.

Assuming a temperature difference of 30° (86 °F) and a system length of 60 m (196.85 ft), a deformation without load of up to 1 m can occur. This would be a deformation of 1.7%.

Risk of accidents due to overloading the truck crane!
An excessively deformed main boom can be overloaded or suffer from invisible damage which can lead to overloading of the main boom on subsequent lifts with permissible deformation or reduce the life span of the main boom.
Make sure that the maximum permissible values for lateral deformation are not exceeded.

Preventive measures

- If possible, turn the superstructure to a (park) position where both main boom sides are heated evenly to prevent deformation.

Before any lift with deformed main boom

The main boom must be telescoped out to the length required for the lift. The maximum permissible lateral deformation of the **unloaded** main boom (with reeved hook block) is 1% of the main boom length.

- Check the deformation before the lift.
- Only lift the load if the current deformation is permissible.

For any lift with deformed main boom

The maximum permissible lateral deformation of the loaded main boom is 3% of the current boom length.

- Check the deformation during the lift.
- Put the load down before the maximum permissible deformation is exceeded.
- Reduce additional, dynamic influences by wind.
- Carry out crane movements with minimal speed.

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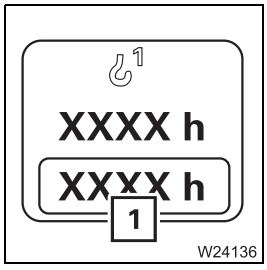
11.5.2 Main hoist

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 dragging and helpers being injured.
Inform all helpers about this issue.

Danger due to slack rope!
Only use hook blocks and lifting 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. 11 - 135.

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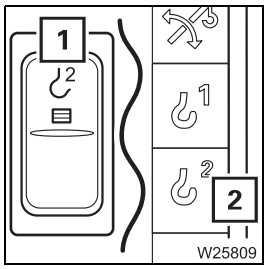
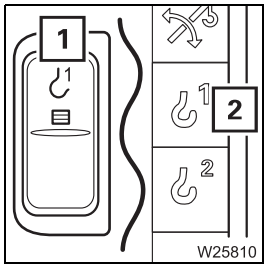
Switching on the main hoist

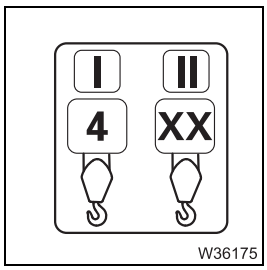
After the ignition is switched on, all of the power units will be switched off and the lamps in the corresponding buttons will light up only dimly.



- Check that 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**) will light 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. 11 - 43.

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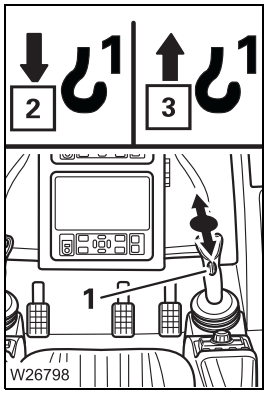
Lifting and lowering

You can adjust the sensitivity of the control levers to suit the operating conditions; ➠ *Setting the characteristic curves for the control levers*, p. 11 - 133.

Risk of accidents due to incomplete monitoring!
Operation of the hoist will only be monitored fully if:
– The lifting limit switch is correctly installed; ➠ p. 12 - 95
– The lifting limit switch is not overridden; ➠ p. 11 - 88
– The lowering limit switch is correctly set; ➠ p. 11 - 90.

Risk of accident by suspended loads!
Never switch off the engine while 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.

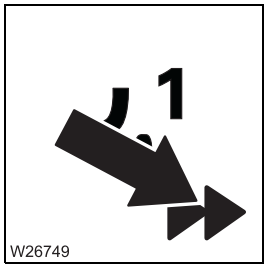


Lifting: Pull the control lever to the rear – symbol (**3**) is displayed.

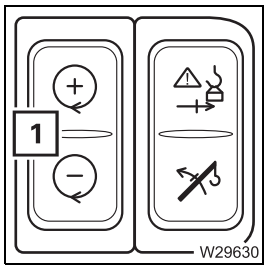
Lowering: Push the control lever to the front – symbol (**2**) is displayed.

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 switch on the high-speed mode for a higher speed; ➠ p. 11 - 119.



You can adjust the desired engine speed (idling speed) with button (**1**); ➠ p. 10 - 9.

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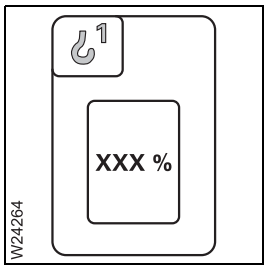
Maximum permissible hoist rope speed

The maximum permissible hoist rope speed is limited automatically depending on the degree of utilisation of the lifting capacity and reeving. The scale of the limitation is specified in the supplied lifting capacity table.

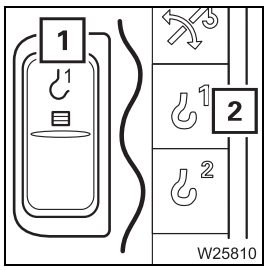
The current speed reduction is displayed in the start menu; p. 9 - 21.



You can limit the maximum hoist speed in the *Power unit speed* menu; p. 11 - 131.

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**) will light up dimly.
  - Symbol (**2**) is **red** when the main hoist is switched off.

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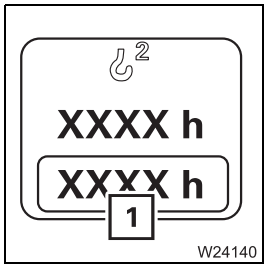
11.5.3 Auxiliary hoist

Risk of accidents when operating the auxiliary hoist!
Read and observe all of the safety instructions in the section titled *Main hoist*, p. 11 - 81 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.

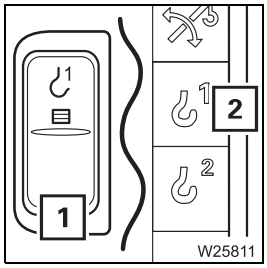
Risk of accidents due to a damaged hoist rope!
If you reeve the auxiliary hoist rope in addition to the main hoist rope, make sure the hoist ropes do not rub against each other and that the auxiliary hoist rope does not touch the rotating flanged wheel of the main hoist during subsequent operation.



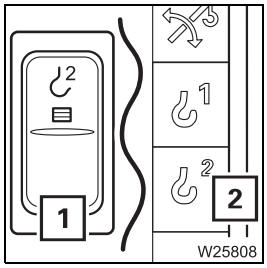
You can display the operating hours (**1**) of the hoist; ➠ p. 11 - 135.

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 that 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**) will light up brightly.
  - Symbol (**2**) is **green** when the auxiliary hoist is switched on.

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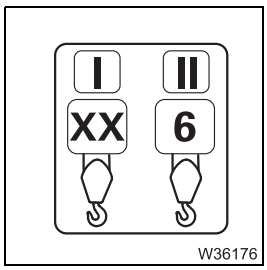


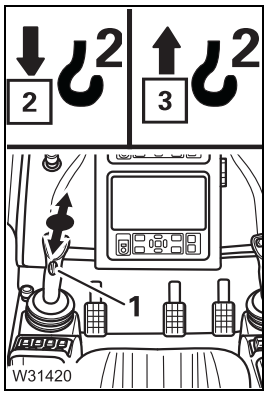
- Check that the current reeving of the auxiliary hoist is displayed, e.g. **6**. Correct the reeving if necessary; ➠ p. 11 - 43.

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. 11 - 133.

Risk of accidents due to incomplete monitoring!
Operation of the hoist will only be monitored fully if:
– The lifting limit switch is correctly rigged; ➠ p. 12 - 95
– The lifting limit switch is not overridden; ➠ p. 11 - 88
– The lowering limit switch is correctly set; ➠ p. 11 - 88.

Risk of accident by suspended loads!
Never switch off the engine while 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.

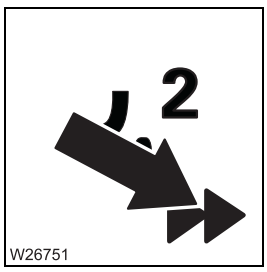


Lifting: Pull the control lever to the rear – symbol (**3**) is displayed.

Lowering: Push 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 switch on the high-speed mode for a higher speed; ➠ p. 11 - 119.

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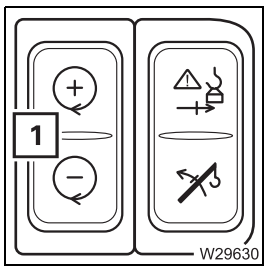
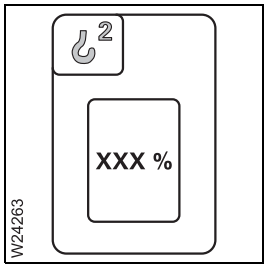


You can adjust the desired engine speed (idling speed) with button (**1**);
➠ p. 10 - 9.

Maximum permissible hoist rope speed

The maximum permissible hoist rope speed is limited automatically depending on the degree of utilisation of the lifting capacity and reeving. The scale of the limitation is specified in the supplied *Lifting capacity table*.

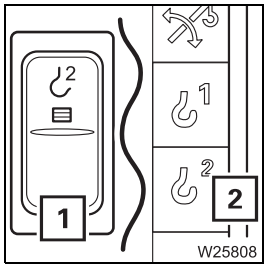
The current speed reduction is displayed in the start menu; ➠ p. 9 - 21.



You can limit the maximum hoist speed in the *Power unit speed* menu;
➠ p. 11 - 131.

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**) will light up dimly.
  - Symbol (**2**) is **red** when the auxiliary hoist is switched off.

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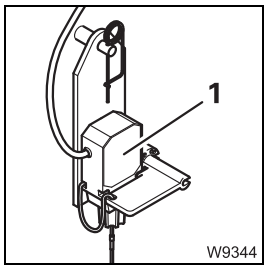
11.5.4 Lifting limit switch and lowering limit switch

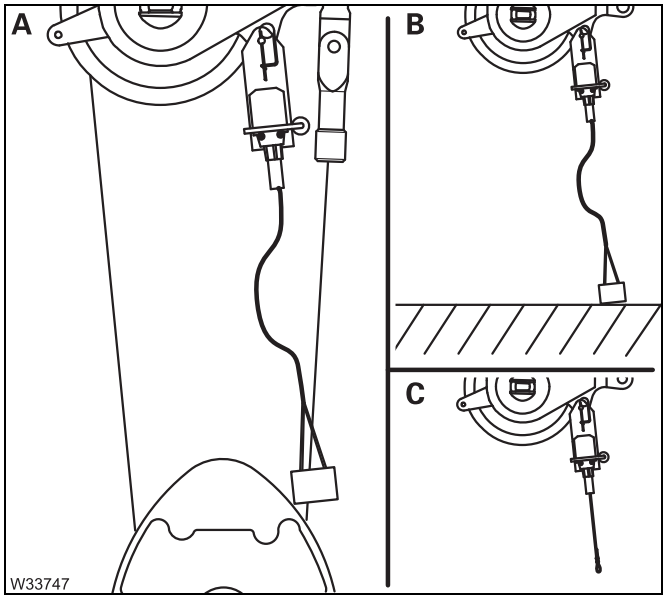
Lifting limit switch To install/remove the lifting limit switch; ➠ p. 12 - 95.



The lifting limit switch (**1**) prevents the hook block being lifted up to the main boom head and damaging it.

The lifting limit switch only works if it has been unlocked; ➠ p. 12 - 100.

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 weight 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.



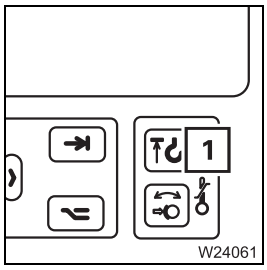
The lifting limit switch will be triggered if:

(**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 – *Lifting*, *Lowering, Extending* and *Derricking the lattice extension* if necessary.

To cancel the shutdown, leave the shutdown range by performing a different crane movement or by setting down the load.

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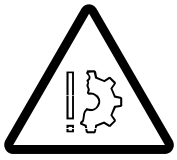
Lifting limit switch override

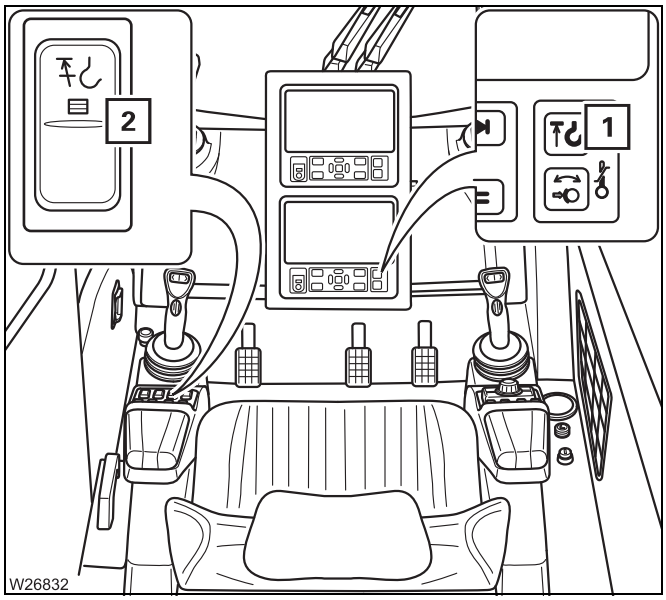
When overriding, the shutdown of the lifting limit switch is cancelled and the crane operation is no longer completely monitored.

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 incomplete 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.



Risk of damage due to overridden slewing gear shutdown!
If the lifting limit switch has been overridden, then the load torque related shut-downs of the slewing gear will not be released (for example, if the pre-tensioning pressure of the counterweights is too low). In this case, avoid moving the control lever for slewing as long as the lifting limit switch is overridden.



- Press the button (**2**)
  - The 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.

Cancelling the override

- Release the button (**2**) or leave the shutdown range.
  - The lamp (**1**) goes out.
  - The buzzer tone is switched off.

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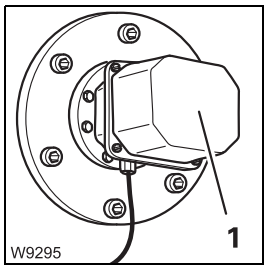
Lowering limit switch



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 (for example, 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 becoming damaged due to complete unreeling or switching off at high speeds, and the load being dropped as a result.

Risk of accidents due to adjustments made to 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 switching off too late or not switching off at all, the hoist rope being damaged and the load being dropped.

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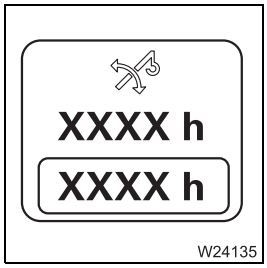
11.5.5 Derricking gear

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!

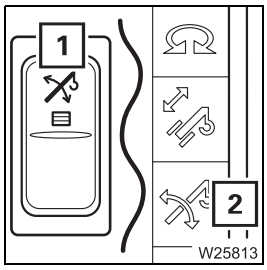
Raising the boom is a movement that reduces the load moment and that is not switched off by the RCL. However, raising the boom is the movement which can cause the truck crane to overturn if the load lifted is too heavy.



You can display the operating hours of the derricking gear; ➠ p. 11 - 135.

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**) will light up brightly.
  - Symbol (**2**) will be **green** if 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. 9 - 14.

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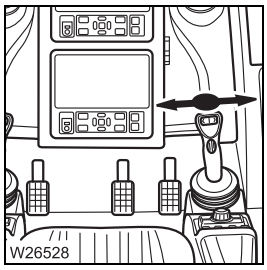
Raising and lowering

You can adjust the sensitivity of the control levers to suit the operating conditions; ➠ *Setting the characteristic curves for the control levers*, p. 11 - 133.

Risk of accident due to unexpected crane movements!
If assigned more than one function, check whether the *Derricking* control lever function is switched on before you move the control lever for derricking.
This prevents accidents due to unexpected crane movements.

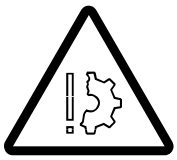


Lowering: Push the control lever to the right – the main boom is lowered.

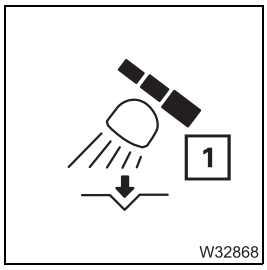
Raising: Push the control lever to the left – the main boom is raised.

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 (for example, by retracting the telescoping), the derricking speed will automatically be increased again.

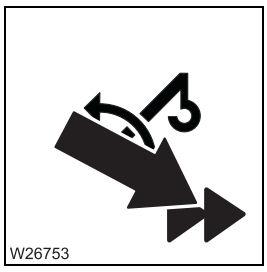


Risk of damage to the slewable spotlights!
Make allowances for the position of the slewable spotlights before setting down the main boom.
This is prevent a collision between the working spotlights and the engine cover.



If when the main boom is being set down, the symbol (**1**) is displayed:

- Correct the position of the slewable spotlights until the symbol (**1**) goes out; ➠ p. 11 - 134.



You can switch on the high-speed mode for a higher speed; ➠ p. 11 - 119.

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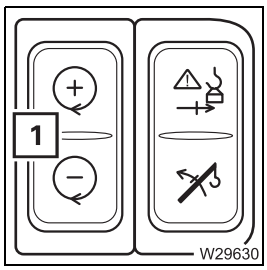
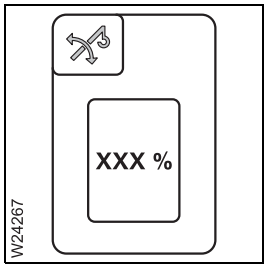


You can adjust the desired engine speed (idling speed) with button (**1**);
➠ p. 10 - 9.

Maximum 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; ➠ p. 9 - 21.

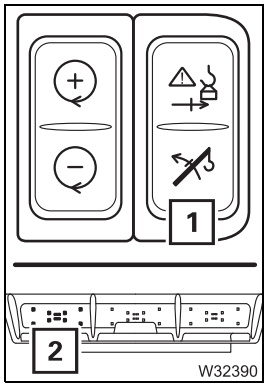


You can limit the maximum telescoping speed in the *Power unit speed* menu;
➠ p. 11 - 131.

Re-enabling the raising function

For RCL override – version A

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 (**1**) button in at the bottom 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.

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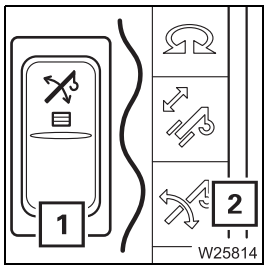
Switching off the derricking gear

If the derricking gear is not required, it should be switched off to avoid unintentional use.

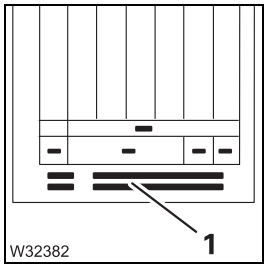


- Press the button (**1**) once.
  - The lamp in the button (**1**) will light up dimly.
  - Symbol (**2**) will be **red** if the derricking gear is switched off.

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. 9 - 14.

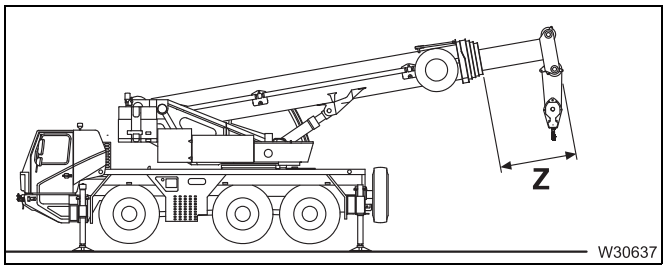
Lowering the main boom to a horizontal position

The main boom can be set down by referring to the working curves within the working range specified in the *Lifting capacity tables*.

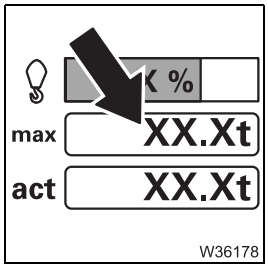


These additional pages supplement the information (**1**) in the *lifting capacity tables* supplied for the main boom intermediate lengths.

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 capacity on the *Maximum load* display.
The RCL continuously calculates this value while taking the derricking cylinder pressure into account. An RCL shutdown occurs if the current load is too heavy; ➠ p. 11 - 61.

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11.5.6 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 telescopings 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 *CCS* control unit remains active as a control element. 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.

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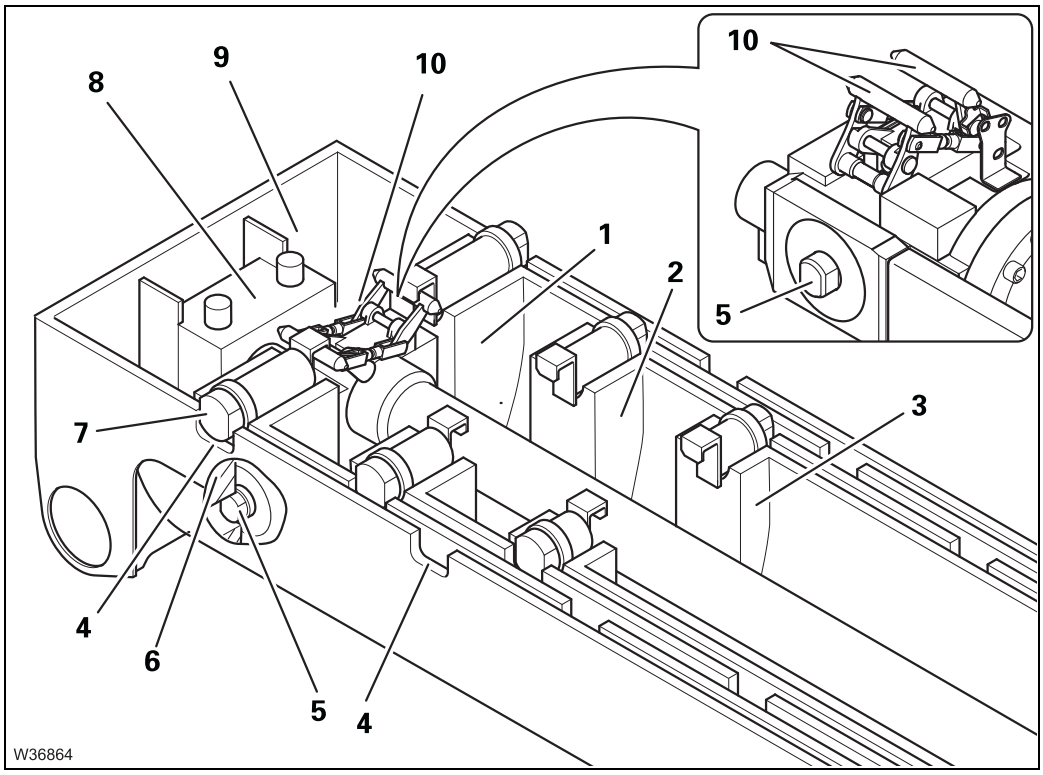
Overview

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**).

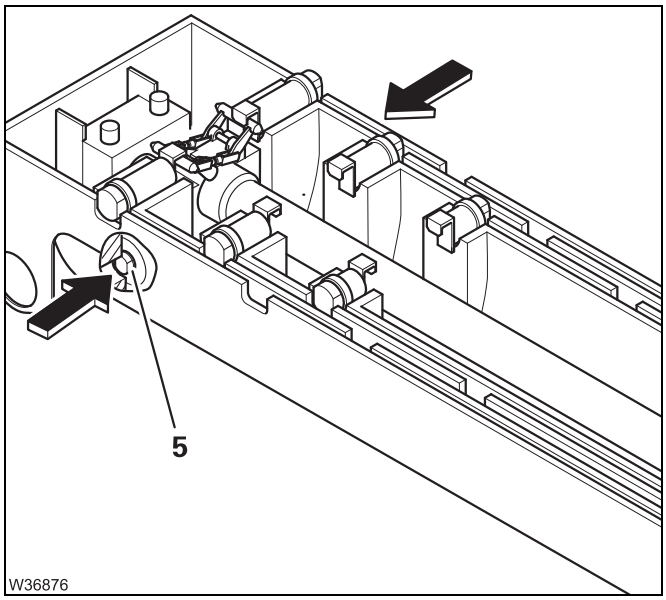
When the telescoping cylinder is positioned at a locking point:

– Then the locking pins (**5**) can be extended into the cutouts (**6**) – the telescoping cylinder is locked.

– Then the mechanism (**10**) engages into the locking pins (**7**) and can retract them – the telescopic section is unlocked.

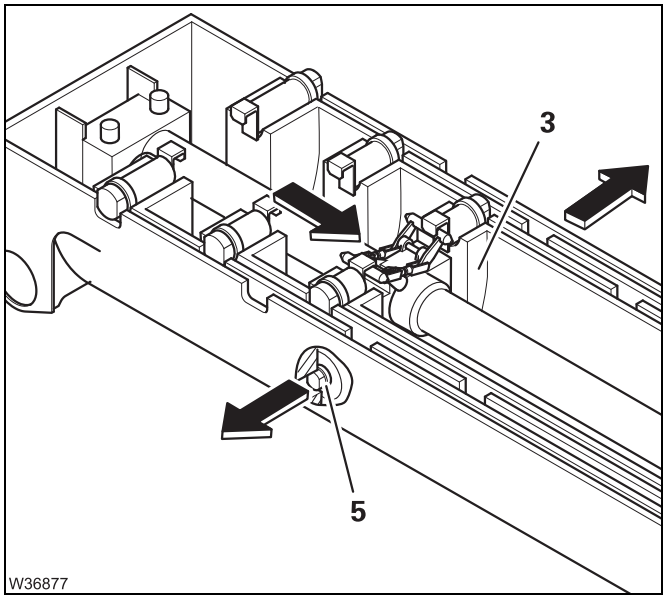
Telescoping process

This state should be the starting point for a telescoping process. Telescoping processes consist 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, for example, telescopic section III (**3**).

The locking pins (**5**) extend – the telescoping cylinder is locked.

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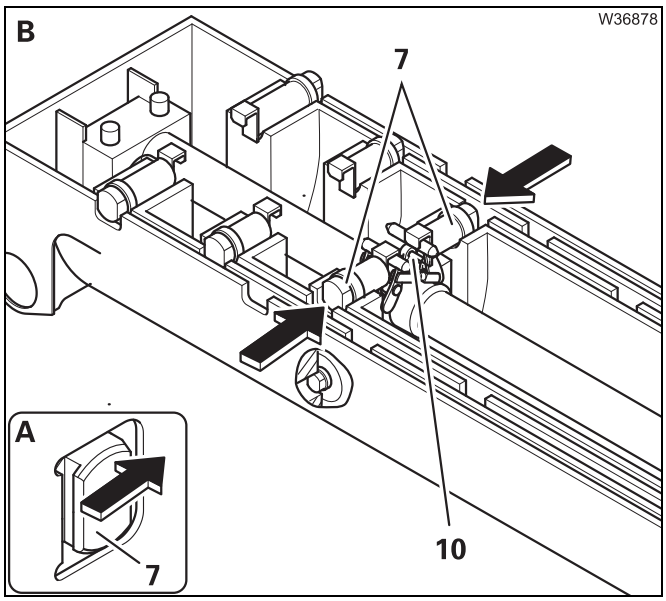
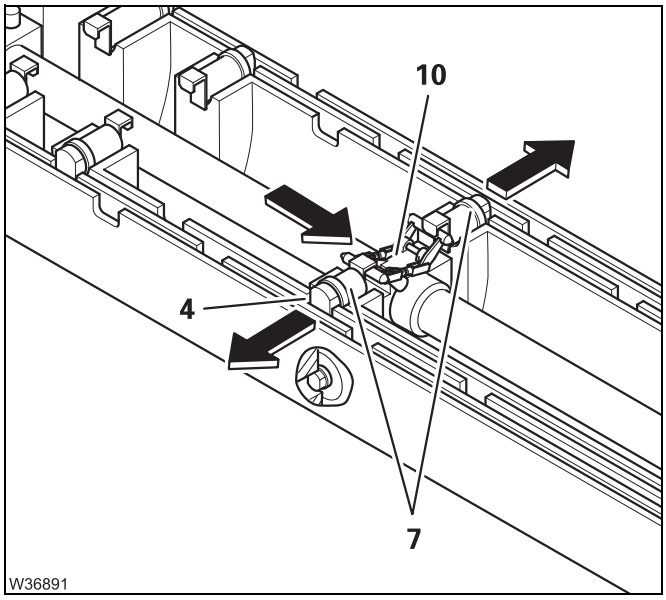


3. Unlocking the telescopic section

(A) – The telescoping cylinder extends until the locking pins (**7**) can move freely.

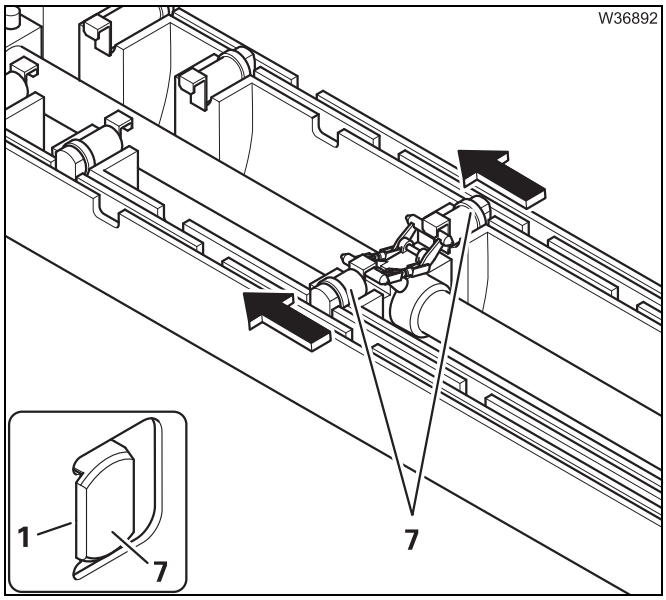
(B) – The mechanism (**10**) retracts the locking pins (**7**) – the telescopic section is unlocked.



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.

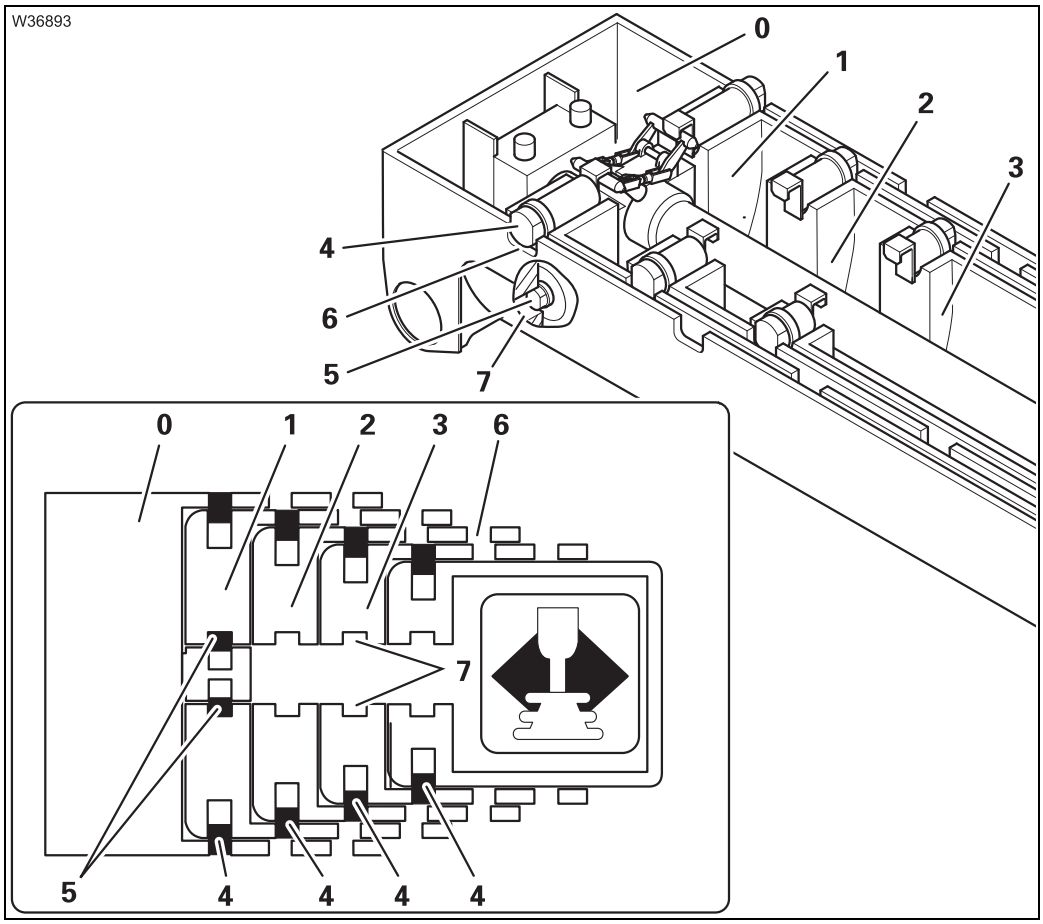
The telescoping cylinder retracts until the locking pins (**7**) are positioned on the above telescopic section (**1**).

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

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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.

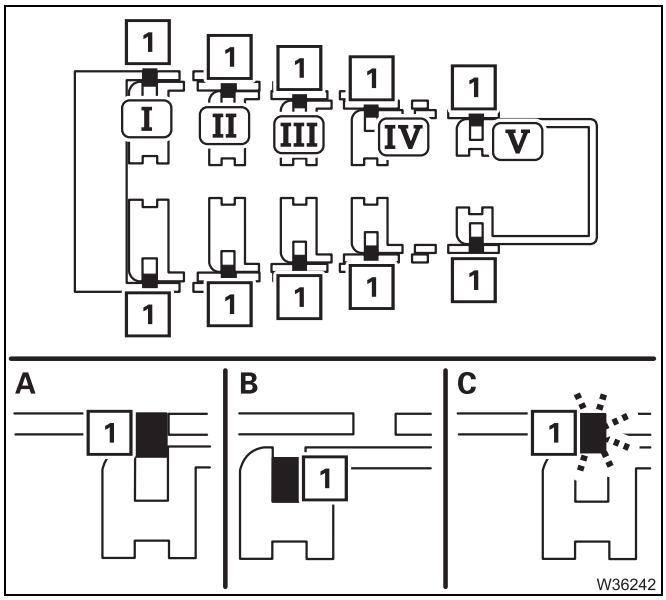
Main boom telescoping length

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

(A) – The locking pins (**1**) are green.

Each telescopic section **I** to **V** has four fixed lengths – Fixed lengths overview;
➠ p. 14 - 39.

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**, the telescopic section (**1**) to (**6**) with the highest number must always be extended first, then the telescopic section with the next lower number and so on (e.g. IV, III, II, I).

The telescopic sections are always **retracted** in the reverse order of extending.

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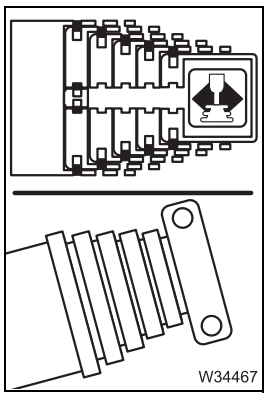
Checks before starting work

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, the CCS detects differences between the current and the displayed telescoping and displays the corresponding error message;
➠ *Malfunctions in the telescoping mechanism*, p. 14 - 19.

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 being damaged when telescoping.



- Before telescoping the first boom, compare the telescoping shown 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. 11 - 108.

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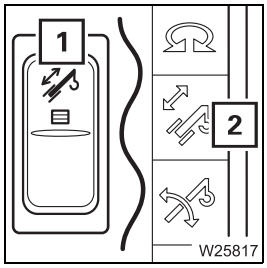
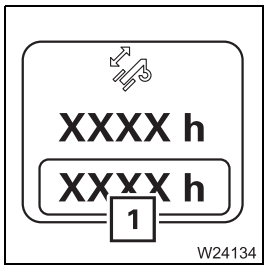
Switching on the telescoping mechanism

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**) will light up brightly.
  - The symbol (**2**) will be **green** if 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. 9 - 14.



You can display the operating hours (**1**) of the telescoping mechanism;
➠ p. 11 - 135.

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.

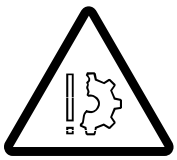
– Before manual telescoping; ➠ p. 11 - 107.

– Before telescoping with teleautomation; ➠ p. 11 - 116.

You can adjust the sensitivity of the control levers to suit the operating conditions;
➠ *Setting the characteristic curves for the control levers*, p. 11 - 133.

Risk of accident due to unexpected crane movements!
In the case of multiple configuration, check that 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 incomplete monitoring!
Boom extension will only be monitored completely if
– The lifting limit switch is correctly rigged; ➠ p. 12 - 95
– The lifting limit switch is not overridden; ➠ p. 11 - 88.



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.

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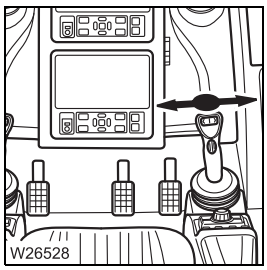
The distance between the hook block and the boom head changes during telescoping. Ensure that the hook block does not trigger the lifting limit switch or touch the ground.

- Additionally carry out the following movements
  - *Lower hoist* when extending and
  - the *Raise hoist* movement when retracting.

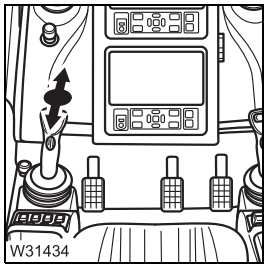
The control lever movements for telescoping vary depending on the configuration.



– With telescopic extension on the right-hand side

To extend: • Push the control lever to the right.

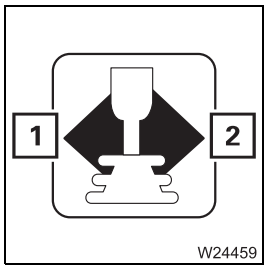
To retract: • Push the control lever to the left.



– With telescopic extension on the left-hand side

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. 11 - 61.

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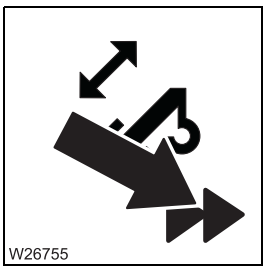
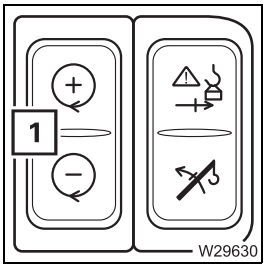
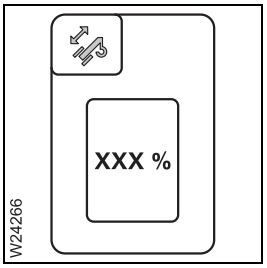


You can switch on the high-speed mode for a higher speed; ➠ p. 11 - 119.



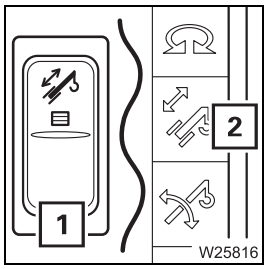
You can adjust the desired engine speed (idling speed) with button (**1**); ➠ p. 10 - 9.



You can limit the maximum telescoping speed in the *Power unit speed* menu; ➠ p. 11 - 131.

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**) will light up dimly.
  - The symbol (**2**) **red** if the telescoping mechanism is switched off.

If the control lever is assigned more than one function, the telescoping mechanism 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. 9 - 14.

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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
– Unlocking the telescoping cylinder; ➠ p. 11 - 109
– Moving the telescoping cylinder (without telescopic section); ➠ p. 11 - 111
– Locking the telescoping cylinder; ➠ p. 11 - 112
– Unlocking a telescopic section; ➠ p. 11 - 113,
– Telescoping a telescopic section; ➠ p. 11 - 114
– Locking a telescopic section; ➠ p. 11 - 115

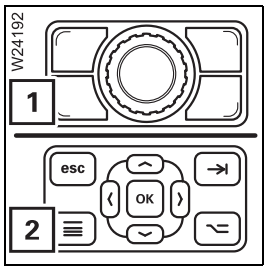
The operating order depends on the current initial position. For an overview of a telescoping process (example); ➠ p. 11 - 98.

The lengths given in the following illustrations are purely sample values, and may differ from the current display.

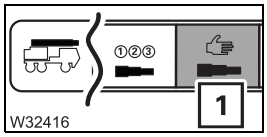
Checking the initial position

Before telescoping, you must check the following statuses:

– **Current telescope status**
– **Position of the telescoping cylinder**
– **Position of the locking pins**



- If necessary, open the overview of the menu groups – press button (**1**) or (**2**) once.



- Open the *Manual telescoping* menu (**1**).

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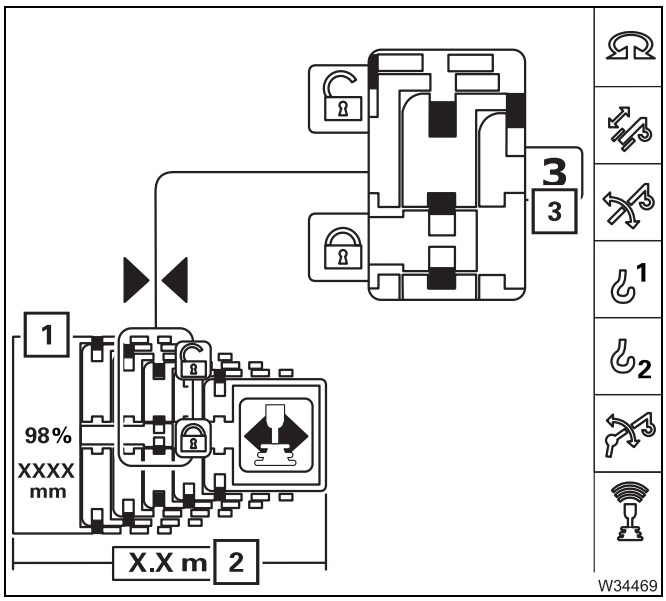
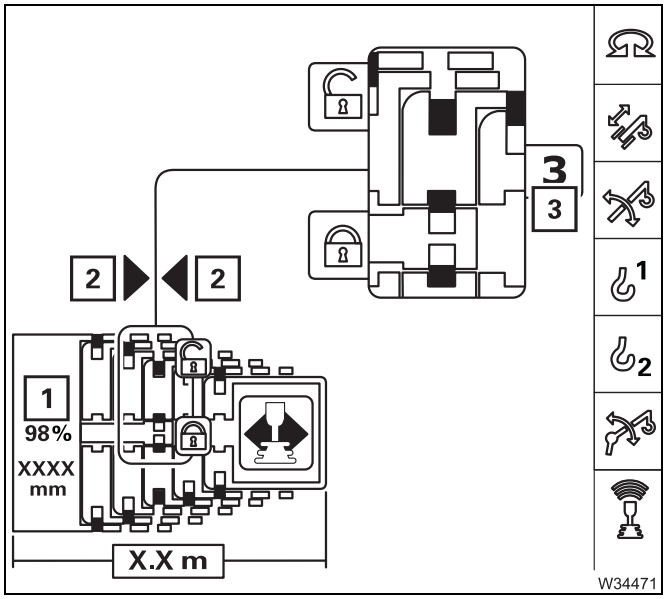


Current telescoping

The display (**1**) shows how far the telescoping cylinder is extended, for example, 98%.

The display (**2**) shows the current main boom length.

The display (**3**) shows the corresponding telescopic section, e.g. **3** for telescopic section III.



Position of the telescoping cylinder

The display (**1**) shows how far the telescoping cylinder is extended, for example, 98%.

If the telescoping cylinder is near a locking point:

– The display (**3**) shows the corresponding telescopic section, e.g. **3** for telescopic section III.

– The display (**2**) shows one or two arrows, depending on the distance to the locking point.

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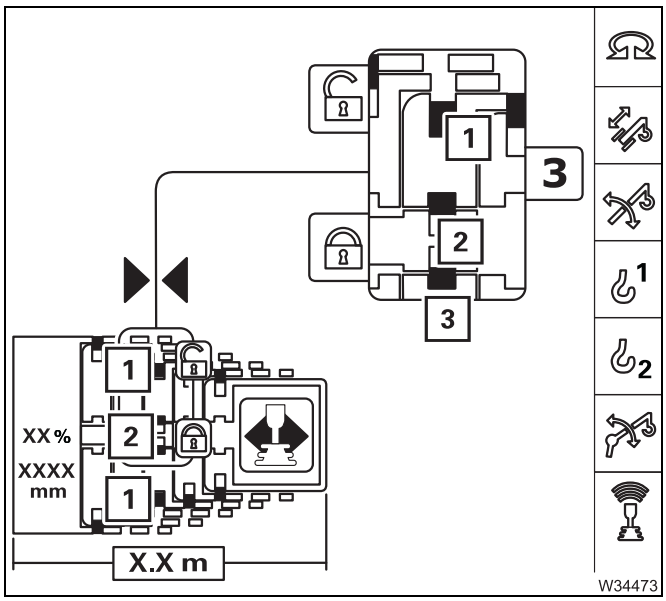


Position of the locking pins

The current positions of the locking pins are:

1 On the telescopic section

2 On the telescoping cylinder

The area (**3**) shows an enlarged cut-out.

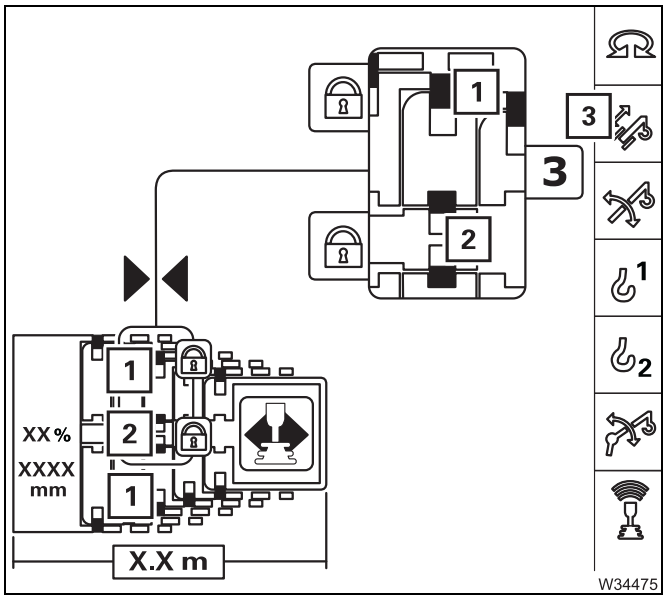
The current settings are shown in different colours.

– **Red:** Unlocked
– **Green:** Locked
– **Yellow:** Intermediate position

Unlocking the telescoping cylinder

Unlocking the telescoping cylinder is required for the telescoping cylinder to be moved separately (without telescopic section).

The telescoping cylinder and the telescopic section cannot be unlocked simultaneously.



Prerequisites

– Telescoping mechanism on – symbol (**3**) **green**
– Telescoping cylinder locked – symbol (**2**) **green**
– Telescopic section locked – symbol (**1**) **green**

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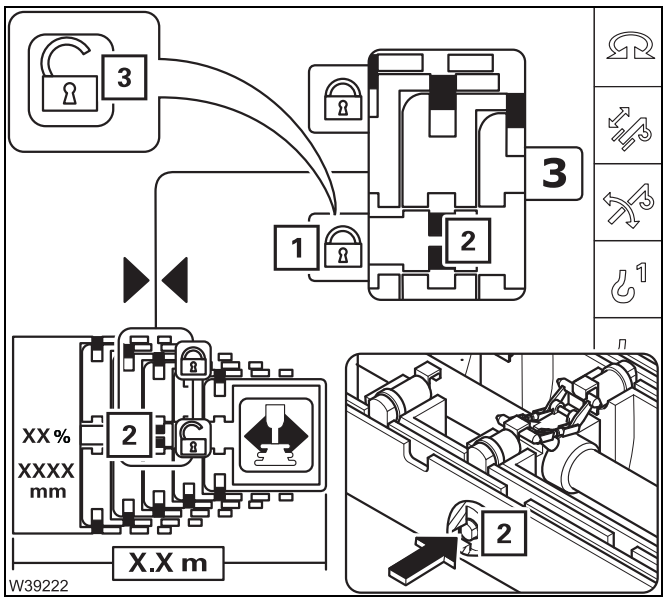

Unlocking

- Select and confirm the symbol (**1**).

The locking pins (**2**) retract.

– **Yellow:** Intermediate position

– **Red:** unlocked – symbol (**3**) displayed

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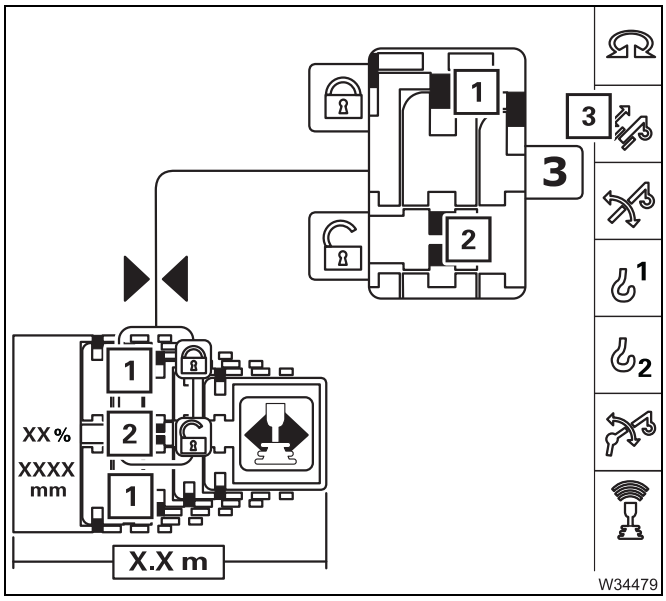
Extending/ retracting the telescoping cylinder

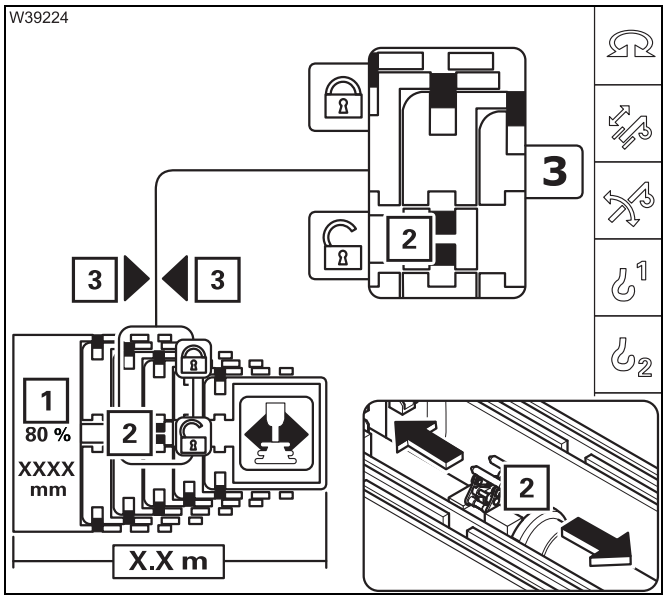


Prerequisites

– Telescoping mechanism on – symbol (**3**) **green**

– Telescopic section locked – symbol (**1**) **green**

– Telescoping cylinder unlocked – symbol (**2**) **red**



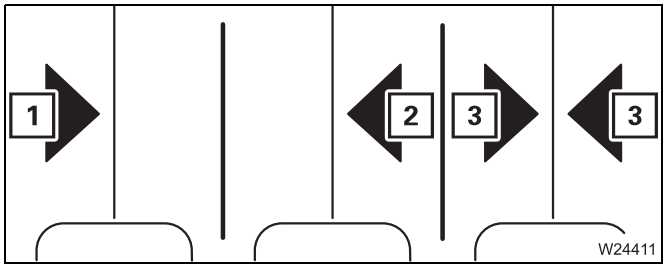
Extending/retracting

- Move the control lever in the corresponding telescoping direction:
  - **Extend:** Extend
  - **Retract:** Retract

The telescoping cylinder (**2**) extends/retracts.

The display (**1**) shows the currently extended length, for example, 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

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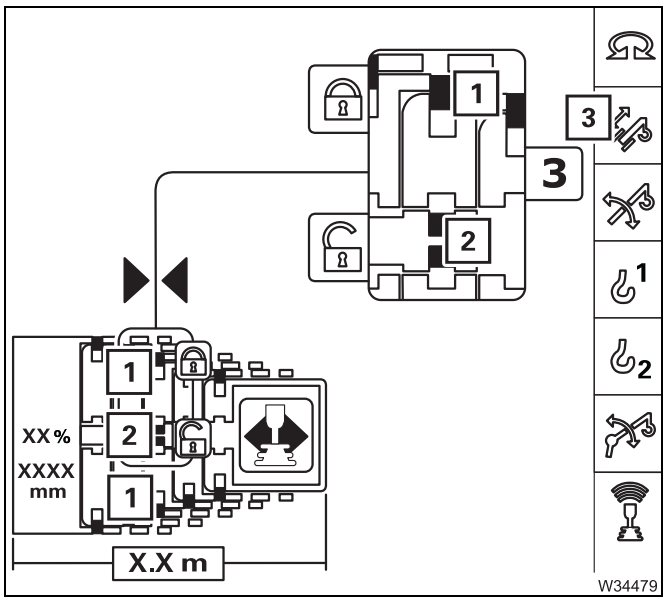
Risk of damage to the boom system!
If extending and retracting several times does not lead to the lock being released, you must not telescope any further against the stop.

If removing the load does not cause the lock to be released, you must lock the telescoping cylinder (➠ p. 11 - 112) and then restart unlocking.

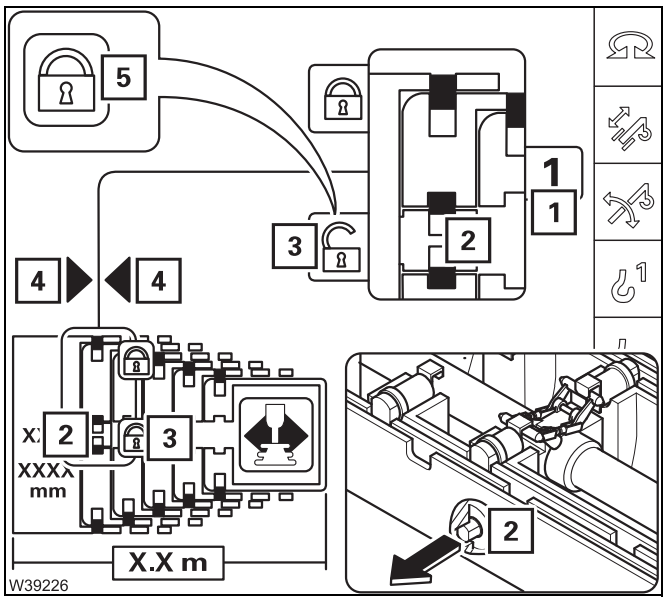
Lock telescoping cylinder

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 I.

Wait until the display:

– shows the desired telescopic section (**1**)

and

– the symbols (**4**) are shown.

- Select and confirm the symbol (**3**).
  The locking pins (**2**) extend.
  – **Yellow:** Intermediate position
  – **Green:** locked – symbol (**5**) displayed

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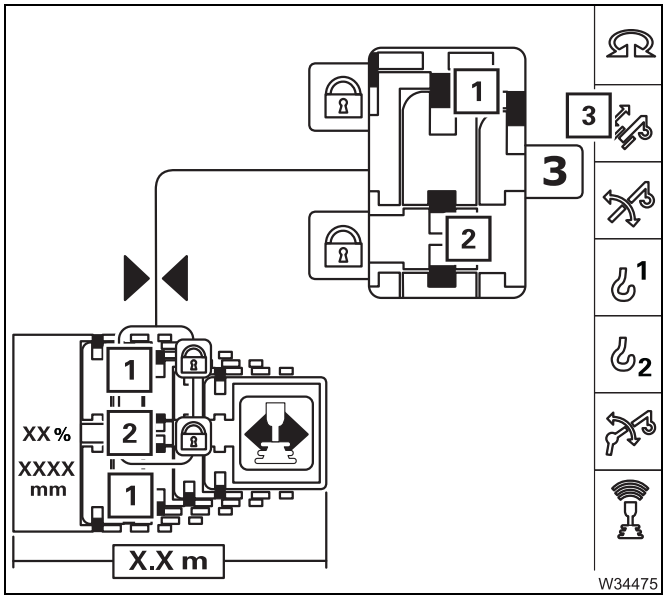
Unlocking the telescopic section

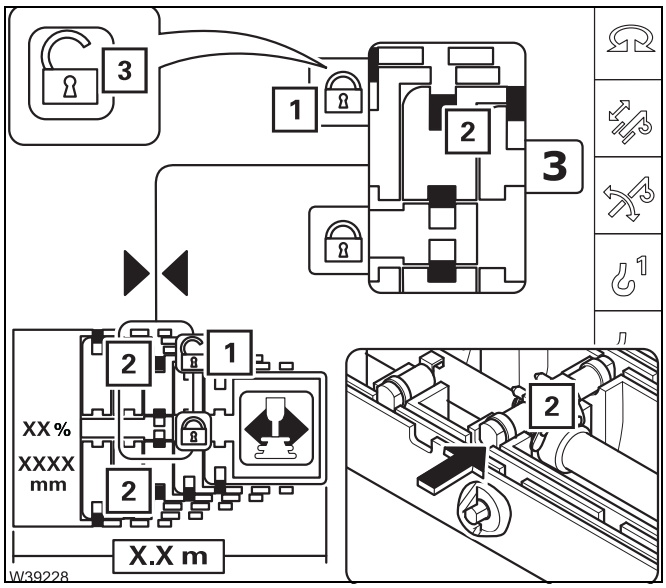
Unlocking a telescopic section is required for the telescopic section to be telescoped.

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 and confirm the symbol (**1**).
  The locking pins (**2**) retract.
  – **Yellow:** Intermediate position
  – **Red:** unlocked – symbol (**3**) displayed

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.

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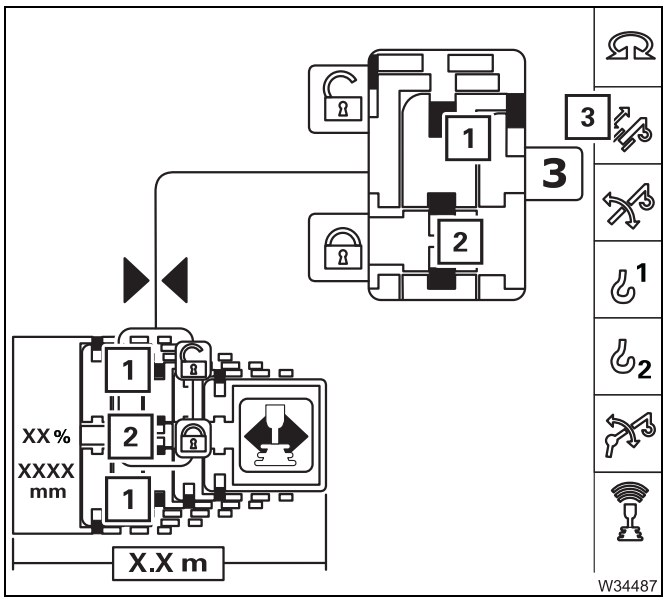
Risk of damage to the boom system!
If extending and retracting several times does not lead to the lock being released, you must not telescope any further against the stop.

If removing the load does not cause unlocking, you must lock the telescopic section (➠ p. 11 - 115) and restart unlocking.

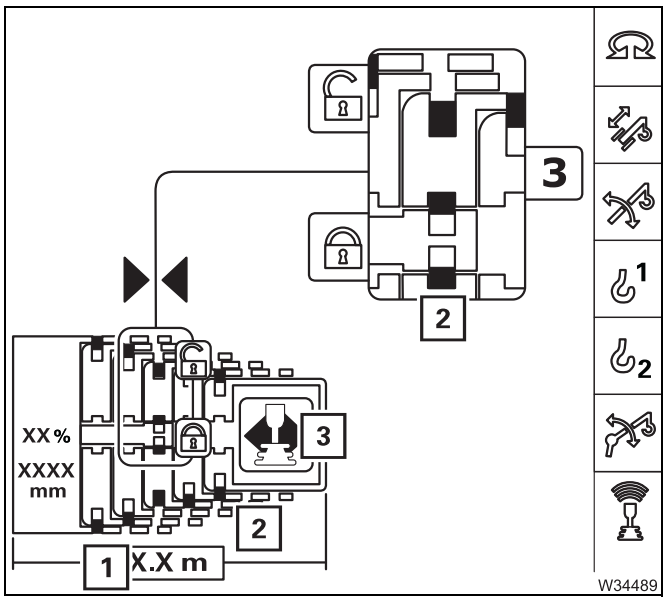
Telescoping the telescopic section

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.

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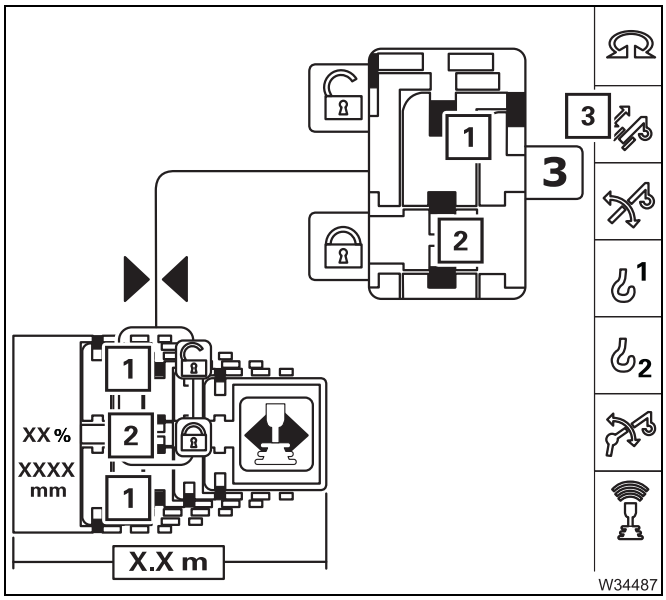
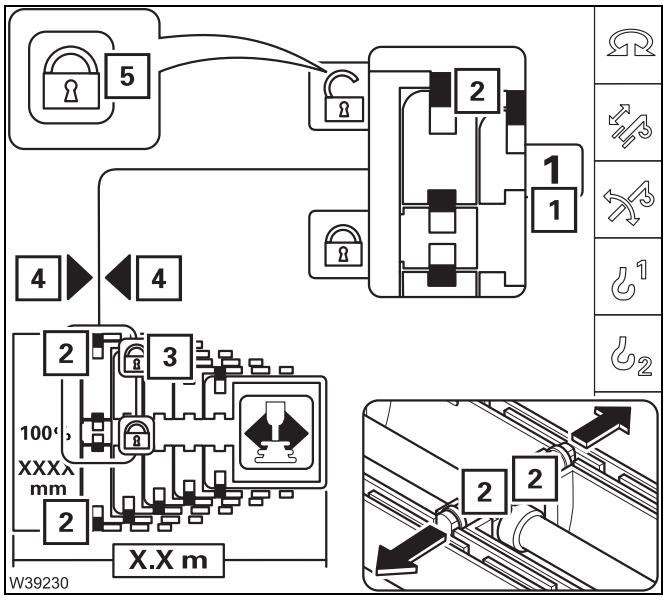
Locking the telescopic section

Every telescopic section can be locked at the fixed lengths – fixed lengths; ➠ p. 11 - 101.



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, for example, telescopic section (**1**) 1 to 100%.

If the symbol (**4**) is displayed, the telescopic section must be locked.

- Select and confirm the symbol (**3**).
  The locking pins (**2**) extend.
  – **Yellow:** Intermediate position
  – **Green:** locked – symbol (**5**) displayed

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Locking the telescopic section for on-road driving

Once you have retracted the main boom for on-road driving, you must 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.

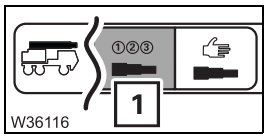
If another telescopic section was retracted last, you must do the following before selecting locking:
– Unlock the telescoping cylinder; p. 11 - 109,
– Move the telescoping cylinder into telescopic section I; p. 11 - 111 and
– lock the telescoping cylinder; p. 11 - 112.

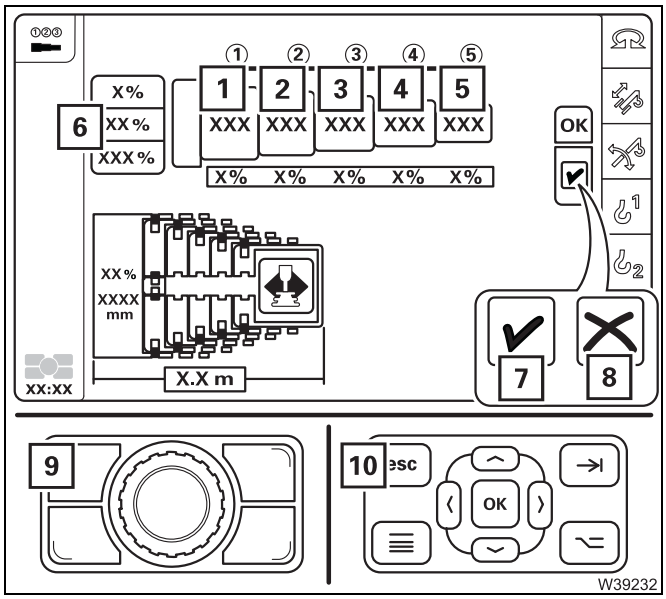
Telescoping with semi-automation

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; p. 11 - 95.
- Open the *Telescoping semi-automation* menu (**1**).





Entering the telescoping status

You can cancel the input at any time – 1 x button (**9**) or (**10**).

Entry for all telescopic sections
- Select and confirm the desired value (**6**).

Entry for individual telescopic sections
- Select and confirm the desired value (**1**) to (**5**).

– Display symbol (**8**) – telescoping **not permitted** – enter a new value.

– Display symbol (**7**) – telescoping permitted – the entry can be confirmed.

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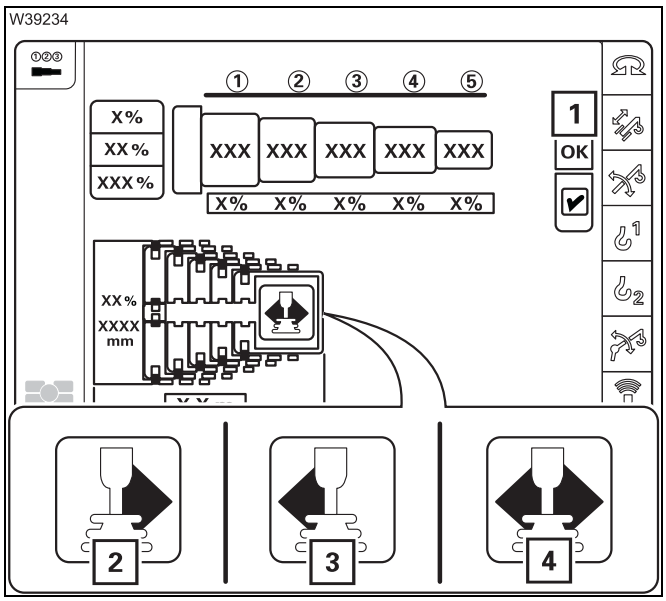


Confirming the entry

- Select and confirm the symbol (**1**).

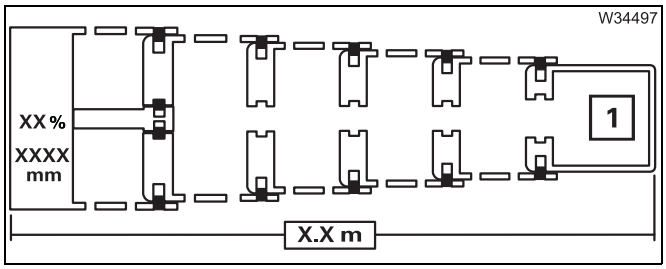
Telescoping

- Move the control lever for the displayed telescoping direction.

  2 Extend

  3 Retract

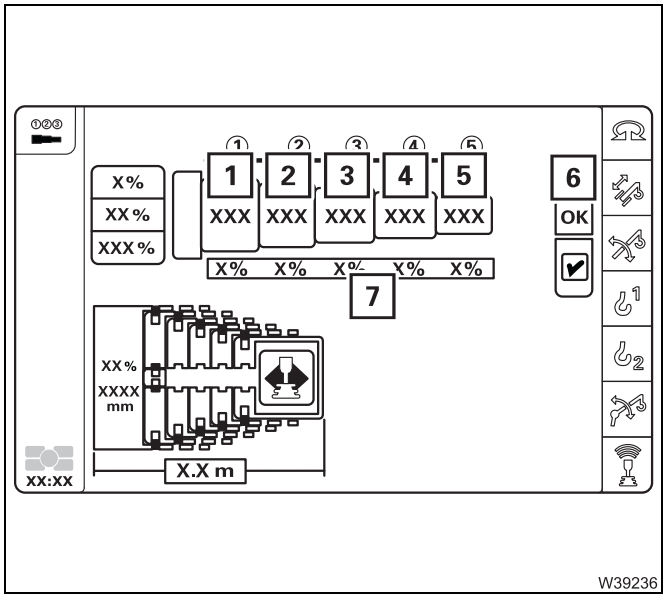
  4 Display in the case of return runs (without a telescopic section)



End telescoping semi-automation

The teleautomation will stop when the entered telescope status is reached – symbol (**1**) go 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 (**7**) shows the current telescoping:

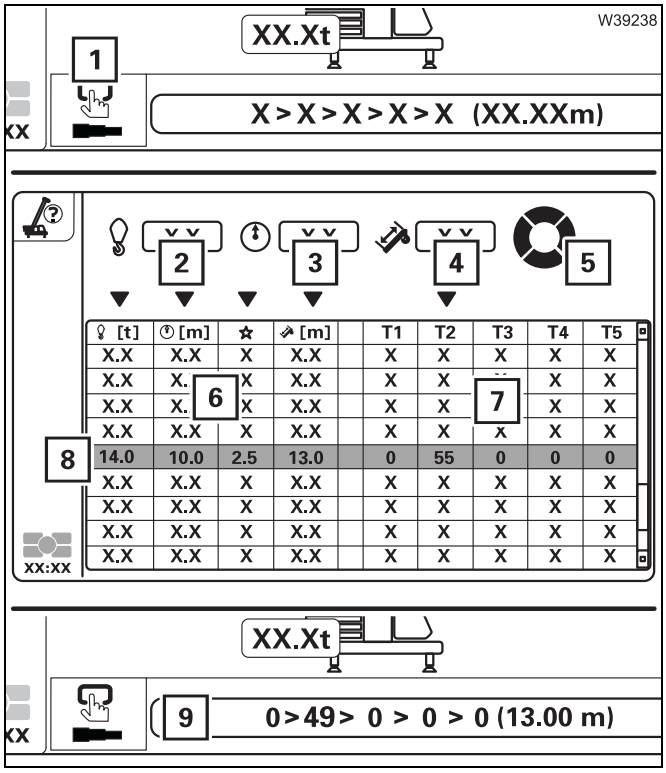
– **Red:** Unlocked

– **Green:** Fixed length and locked

- Enter the current telescoping (**1**) to (**5**) and confirm the selection with (**6**).

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. 11 - 44.



Pre-selection – Overview

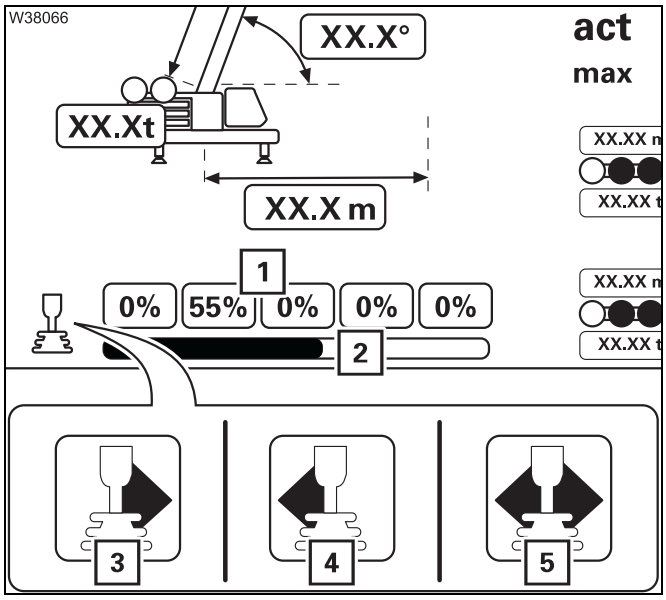
The menu is opened with the symbol (**1**).

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 telescopings (**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** Extend
  - **4** Retract
  - **5** Display in the case of return runs (without a telescopic section)

The display (**2**) shows the current position of the telescoping cylinder.

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11.5.7 High-speed mode

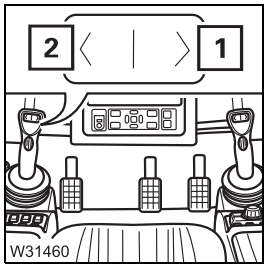
The slewing gear cannot be operated in high-speed mode.

You can switch on the high-speed mode for a higher speed.

Risk of accidents due to suddenly accelerating movements!
Reduce the engine speed before starting high-speed mode.
This will prevent movements 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.

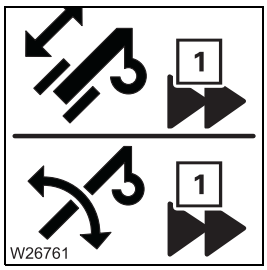


To switch on briefly

- Press the button at the right on – for (**1**).
  High-speed mode will be active until you release the button.

Continuous operation

- Press the button at the left on – for (**2**).
  High-speed mode will be enabled until you press the button again.



The symbol (**1**) indicates the current status:

- **– Lights up:** High-speed mode switched on
- **– Gone out:** High-speed mode switched off

When lowering the boom, high-speed mode only supports the start 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.

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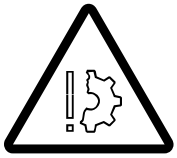
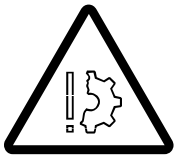
Hoists

High-speed mode is always switched on and off simultaneously for the main hoist and the auxiliary hoist.

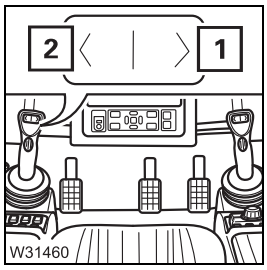
Risk of accidents due to overloading!
Make sure the lifted load is no more than 50% of the maximum load according to the *Lifting capacity table* (maximum degree of utilisation of 50%) before operating the hoists in high-speed mode.



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.

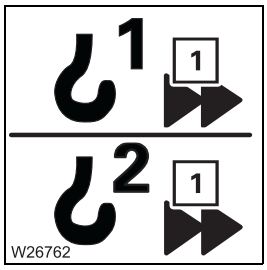


To switch on briefly

- Press the button at the right on – for (**1**).
  High-speed mode will be active until you release the button.

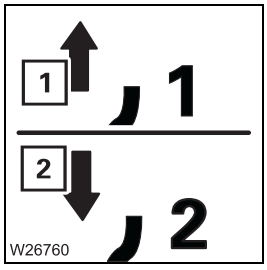
Continuous operation

- Press the button at the left on – for (**2**).
  High-speed mode will be enabled until you press the button again.



The symbol (**1**) indicates the current status:

- **– Lights up:** High-speed mode switched on
- **– Gone out:** 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%.

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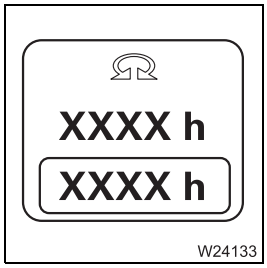
11.5.8 Slewing gear

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 a rigged counterweight*, p. 12 - 76.

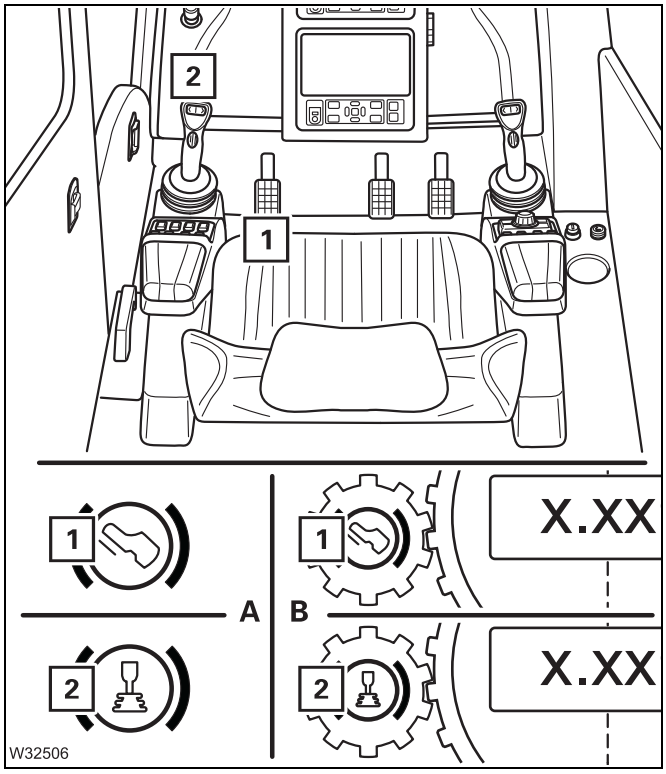


You can display the operating hours of the slewing gear; ➠ p. 11 - 135.

Slewing gear brake

Depending on the function that is switched on, the slewing gear is braked with the brake pedal or with the control lever.

Risk of accidents due to switched off operating elements!
Always check that the slewing gear brake function is switched on and switch to the function you prefer as required.
This prevents the slewing movement from continuing when you use the switched off operating element for braking.



Checking for correct function

- Check which function is switched on.

(**A**) – In the start menu or

(**B**) – In the *Slewing gear/houselock* menu

1 Brake pedal function
The only means of braking the slewing movement is by using the brake pedal (**1**).

2 Control lever function
The only means of braking the slewing movement is by using the control lever (**2**).

Switching over the function

- Select and confirm the symbol (**3**) or (**4**) until the function is displayed.

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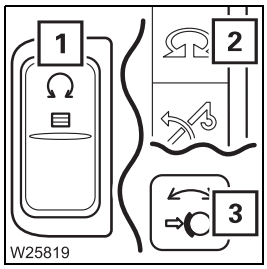
Switching on the slewing gear

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.

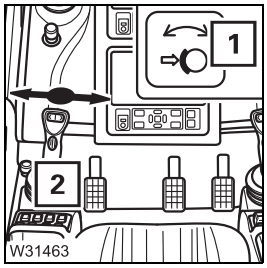


- Press the button (**1**) once.
  - The lamp in button (**1**) will light up brightly.
  - Symbol (**2**) is **green** if the slewing gear is switched on.

If an rigging mode has been entered for the operating position *0° to the rear* or *Free-on-wheels*, an RCL shutdown will occur after switching on the slewing gear, and slewing will be disabled. To acknowledge the shutdown, you must either switch off the slewing gear or set down the load and enter an rigging mode for the 360° working range.

Releasing the slewing gear brake

– With the *Brake pedal* function
The slewing gear brake is released when you switch on the slewing gear.

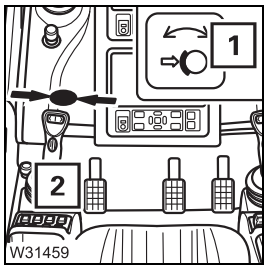


– With the *control lever*function
The slewing gear brake is released as soon as you move the control lever (**2**).

Lamp (**1**) will extinguish if the slewing gear brake has been released.

Engaging the slewing gear brake

– With the *Brake pedal* and the *Control lever* functions
The slewing gear brake is engaged when you switch off the slewing gear;
p. 11 - 126.



– With the *control lever*function
The slewing gear brake will also be applied if the control lever (**2**) is in its initial position.

The lamp (**1**) will light up if the slewing gear brake has been engaged.

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Slewing

The following requirements must be fulfilled before slewing:

– Houselock is switched off; ➠ p. 11 - 20.

– The superstructure must be unlocked; ➠ p. 11 - 18.

– Slewing is permissible with the current rigging mode; ➠ p. 12 - 76.

– The current rigging mode is shown on the *RCL* display.

– The counterweight is pre-tensioned; ➠ p. 12 - 70.

If slewing is not permissible with the current rigging mode, the slewing gear will be locked.

Danger of overturning when slewing with an incorrectly set RCL!
Before slewing, always check that the current rigging mode is shown on the *RCL* display.
His prevents slewing operations 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 being 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.

Risk of damage due to overridden slewing gear shutdown!
If the lifting limit switch has been overridden, then the load torque related shut-downs of the slewing gear will not be released (for example, if the pre-tensioning pressure of the counterweights is too low). For this reason, do not start slewing as long as the lifting limit switch is overridden.

You can adjust the sensitivity of the control levers to suit the operating conditions; ➠ *Setting the characteristic curves for the control levers*, p. 11 - 133.

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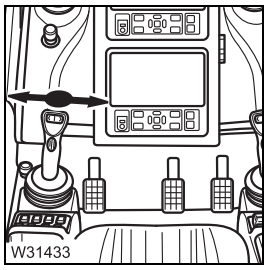
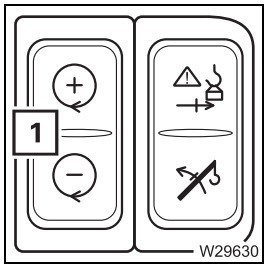
With the *Brake pedal* function switched on, slewing movements are not braked automatically. If you let go of the control lever or move it to initial position, the slewing movement will slowly run down; *Braking the slewing movement*, p. 11 - 125.



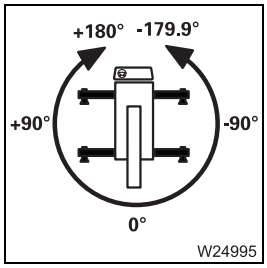
Slewing to the left: • Push the control lever to the left.

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. 10 - 9.



The current slewing angle is shown in the *Start menu* and in the *Superstructure lock* menu.

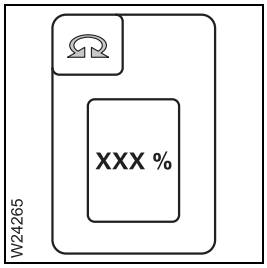
0° means that the superstructure is slewed to the rear.

– Angles in the **right-hand 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°).

Maximum slewing speed

The current speed reduction is displayed in the *Start menu*; p. 9 - 21.

The maximum permissible slewing speed is limited automatically depending on the working radius and degree of utilisation of the lifting capacity. Under certain circumstances, you can switch off this reduction; p. 11 - 127.



You can limit the maximum slewing speed in the *Power unit speed* menu; p. 11 - 131.

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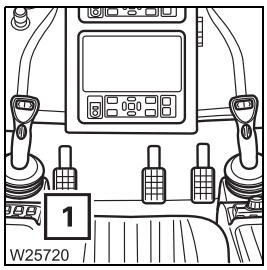
Braking the slewing movement

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.

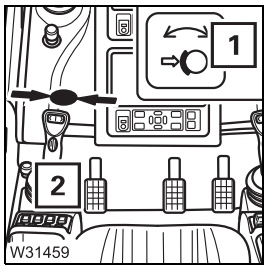
With the *brake pedal* function active



- Depress the brake pedal (**1**). Do not brake to such a degree that the load starts swinging.

If you only move the control lever to initial position, the slewing movement will slowly run down.

With the *control lever* function active



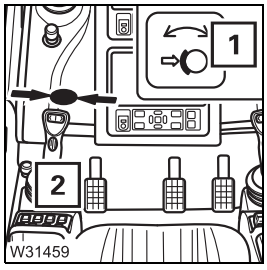
- Move the control lever (**2**) towards its initial position – the slewing movement will be braked.

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.

Slewing gear freewheel

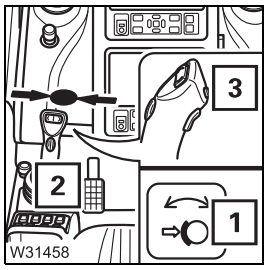
The slewing gear freewheel is required if the slewing gear needs to be slewed by means of external forces, for example, when operating with two cranes.

With the *brake pedal* function active



- Switch on the slewing gear.
  The slewing gear brake is released – lamp (**1**) lights up.
- Move the control lever (**2**) to its initial position.

With the *control lever* function active



- Switch on the slewing gear.
- Move the control lever (**2**) to its initial position.
- Press the button (**3**).
  The slewing gear brake is released – lamp (**1**) lights up.

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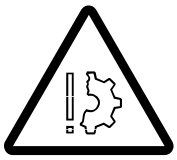
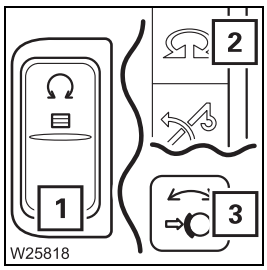
Switching off the slewing gear

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 affecting the main boom due to heavy deceleration or swinging loads.



- Press the button (**1**) once.
  - The lamp in the button (**1**) will light up dimly.
  - Symbol (**2**) will be **red** if the slewing gear is switched off.
  - When the *Brake pedal* function is switched on – the slewing gear brake is closed – the lamp (**3**) lights up.

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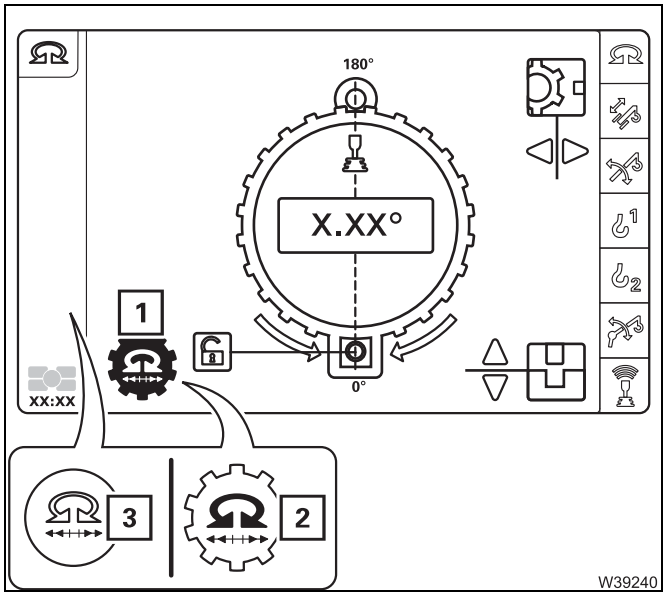
11.5.9 Slewing speed – Switching the reduction on and off

When the ignition is switched on the reduction of slewing speed is switched on and 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.

Switching reduction off

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

Risk of accidents due to excessive slewing speed
Observe the specified maximum permissible slewing speeds. This prevents the truck crane 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.



- 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 remain valid and the continuous speed reductions due to the working range limiter remain active.

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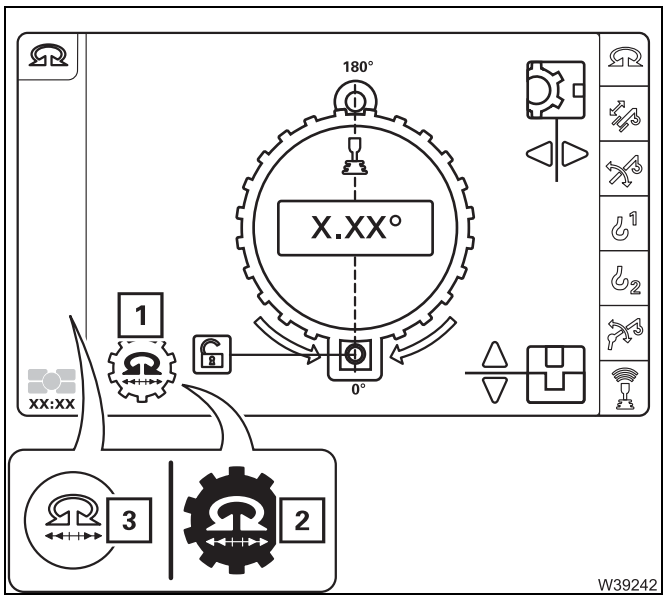

Switching reduction on

- 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*.

11.5.10 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, counterweight hoist unit – cannot be operated with the *Telescoping* 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 *Extending* movement.

Certain movement combinations can reduce the speed in high-speed mode.

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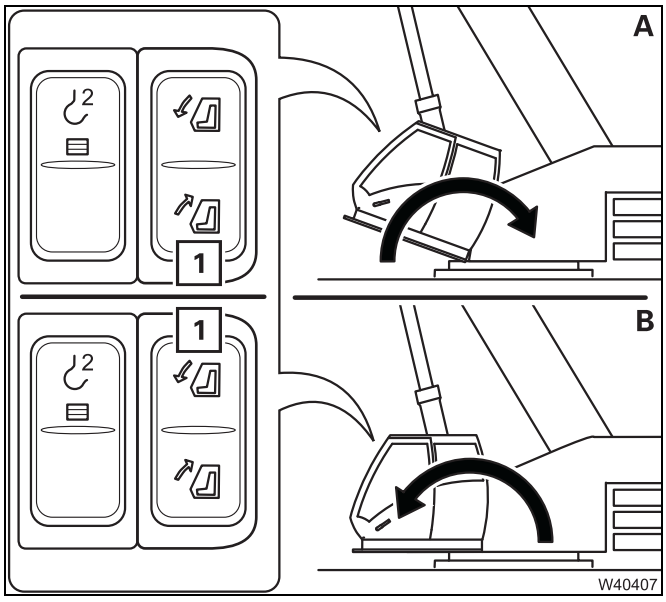
11.6 Settings and displays for crane operation

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.

11.6.1 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 (for example, bottles) from the crane cab.
This prevents objects tipping over, the crane cab door opening by itself, and unintended operational accidents caused by fright.



- Close the crane cab door.

(A) – Incline to the rear

- Press the switch next to symbol (**1**).

(B) – Incline to the front

- Press the switch next to symbol (**1**).

The crane cab will tilt as long as you hold the button down or until its end position is reached.

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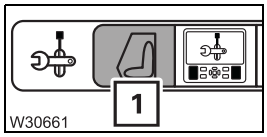
11.6.2 Setting idling speed

➠ *Setting idling speed*, p. 10 - 9

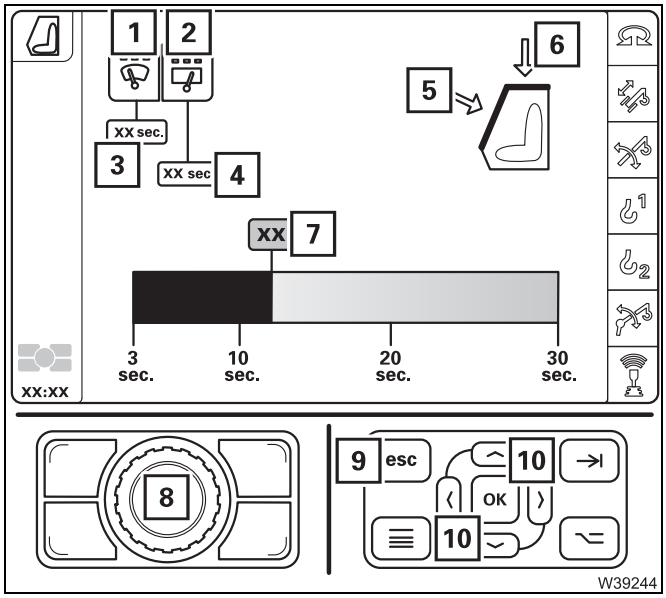
11.6.3 Adjusting the wiper stroke interval of the windscreen wiper

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* (**1**) menu.



- The displays (**1**) and (**2**) 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.

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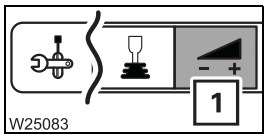
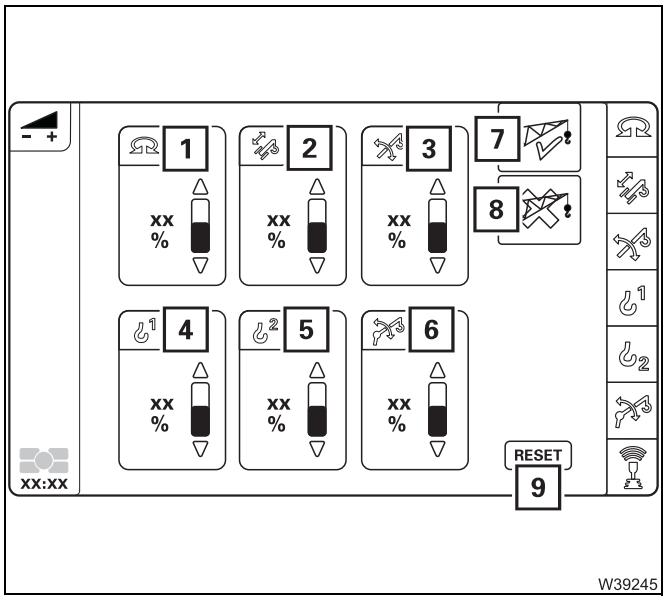
11.6.4 Limiting the power unit speeds

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.

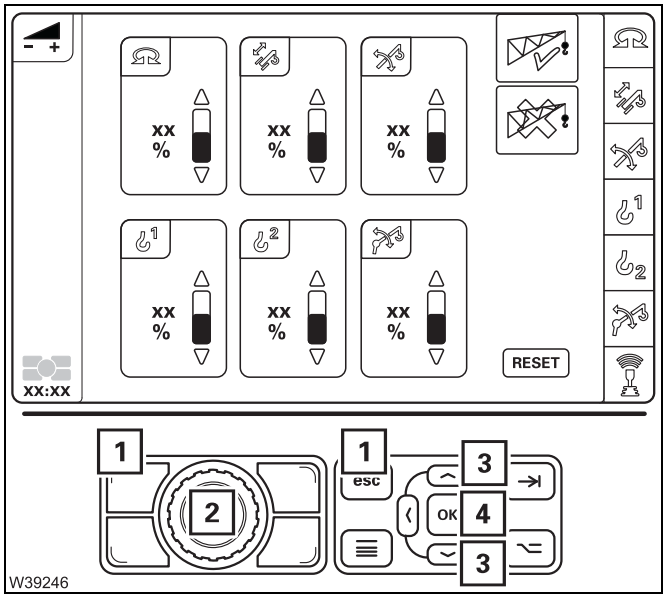
The symbol (**5**) is only active when the auxiliary hoist is connected.

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.

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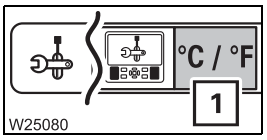
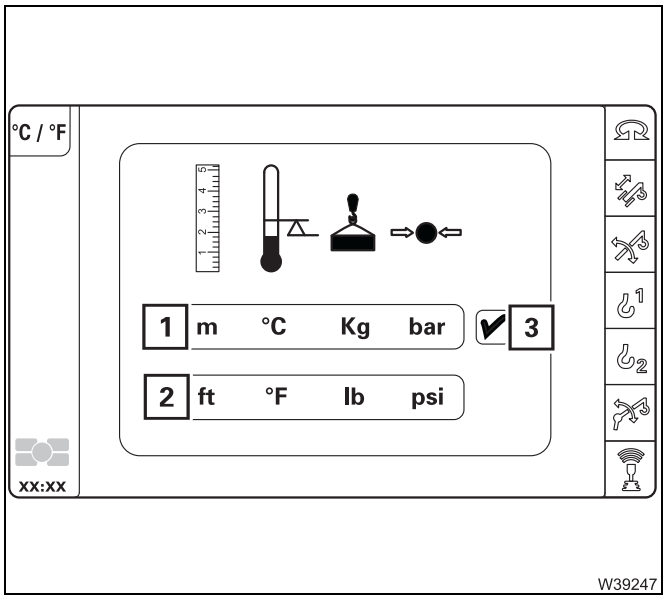
11.6.5 Switching the units of measure

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.

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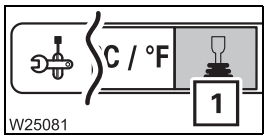
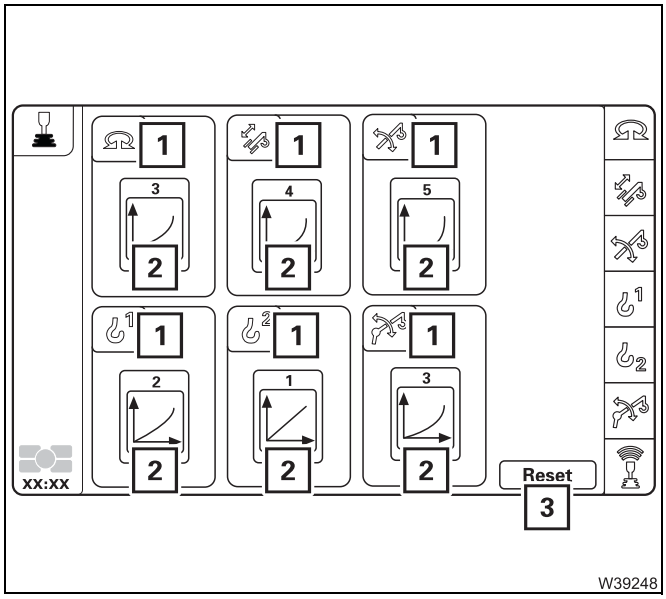
11.6.6 Setting the characteristic curves for the control levers

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.



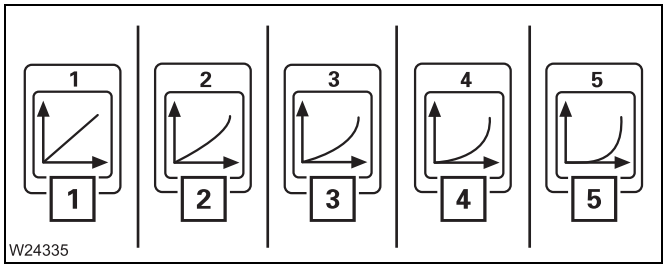
- Open the *Settings* menu (**1**).



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.

When the characteristic curve (**5**) is set, you can work particularly sensitively with the control lever.

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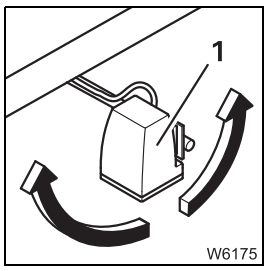
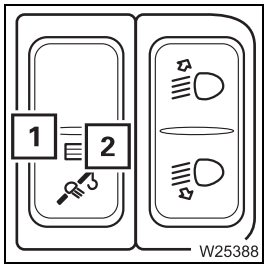
11.6.7 Using the slewable spotlights



With the relevant equipment, the slewable spotlights (**1**) are located on the main boom. They are controlled from the crane cab.

Risk of 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 being dazzled and causing accidents.

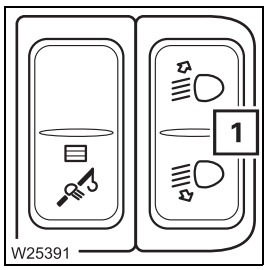


Switching on

- 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.



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.

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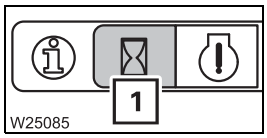
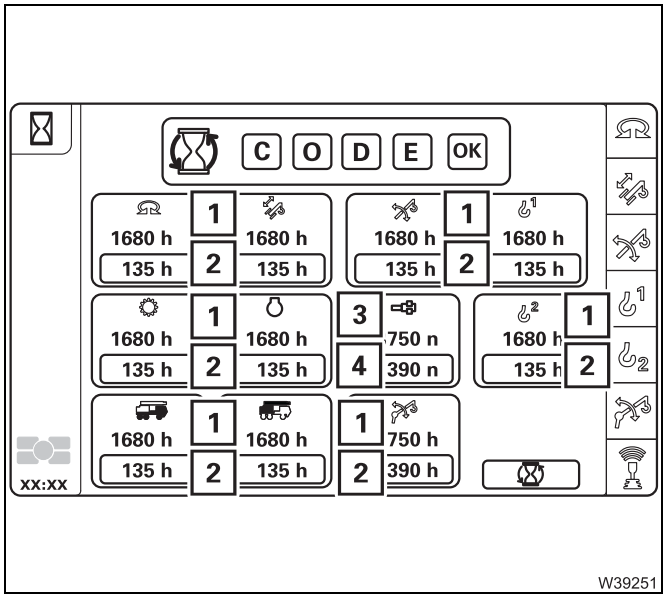
11.6.8 Displaying the operating hours

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**).



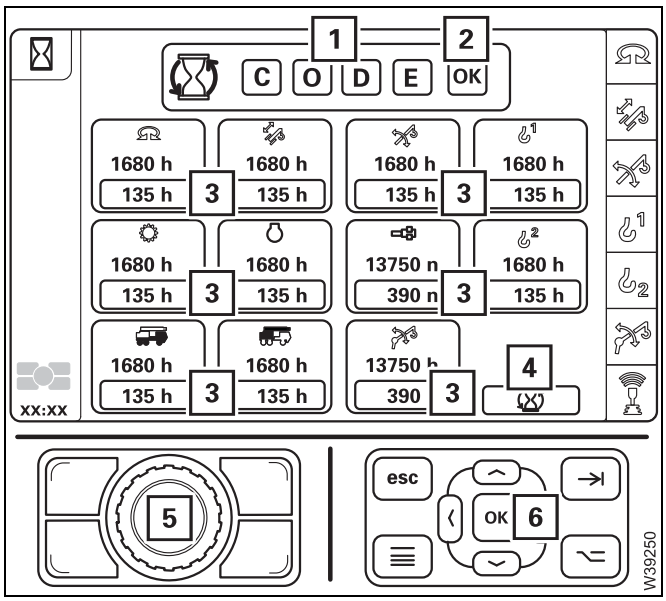
Displays

– The value (**1**) indicates the total operating hours, for example, 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.

- Select and confirm the symbols (**1**) one after the other.
- Confirm the entry with the symbol (**2**).

You can select the power units
– individually – display (**3**) or

– select all – symbol (**4**).

- Reset the selected operating hours with button (**5**) or (**6**).

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11.7 Working range limiter

You can set and monitor different limits in the working range limiter menus:

– A maximum overall height

– A maximum working radius

– A maximum slewing angle

– A limited hoist rope travel

The monitoring of the programmed limits can be switched on and off separately. After switching on the ignition, all monitoring functions are switched on that were on before the ignition was turned off.

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 safe distance to the object.

Risk of accidents due to insufficient safe distances!
Always observe all safe distances in accordance with the national legal regulations (for example, concerning overhead power lines) even if the working range limiter is switched on.

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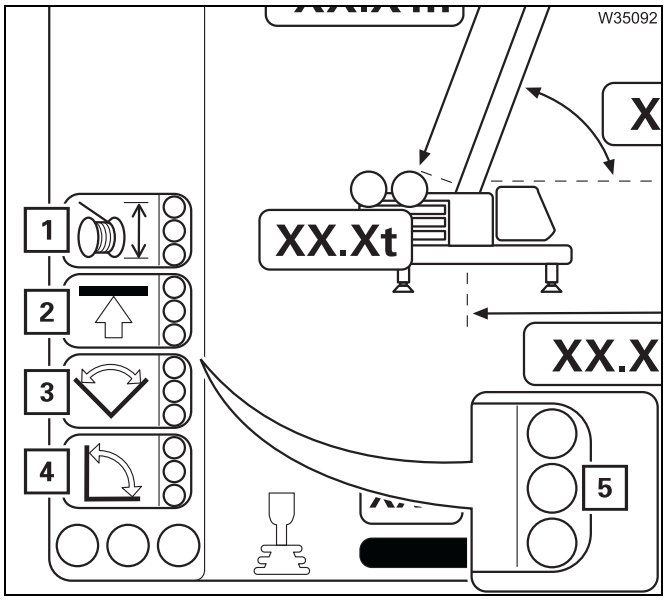
11.7.1 Viewing current settings

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.

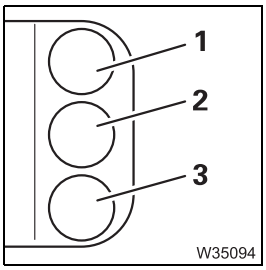
1 Hoist rope travel limitation monitoring

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[1)]

3 Green: Speed not reduced

[1)] The maximum enabled power unit speed depends on the distance to the limit value.

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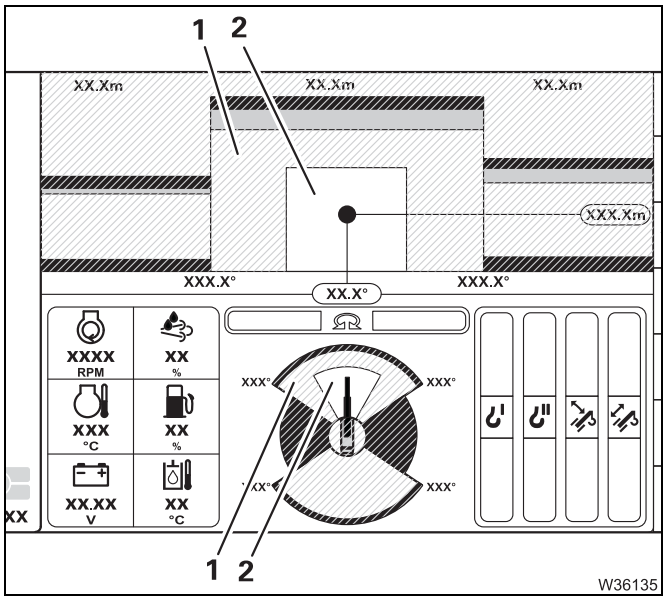
In the CCS
Start menu

The *RCL* shows the limited working range for the *Slewing angle* and *Working radius* monitoring systems.

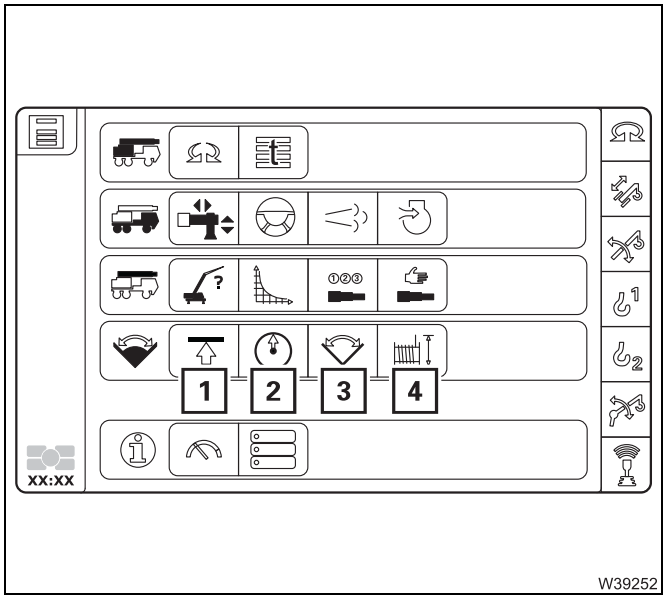


Display examples for switched-on *Slewing angle* and *Working radius* monitoring systems.

1 Permissible working range according to the *Lifting capacity table* – shown darkened

2 Limited working range – shown lightened

11.7.2 Opening the working range limiter menu



- If necessary, open the overview of the menu groups and select the corresponding symbol (**1**) to (**4**).

The corresponding menu will open, and you can enter limit values and switch the monitoring on and off.

1 For the overall height; ➠ p. 11 - 140

2 For the working radius; ➠ p. 11 - 142

3 For the slewing range; ➠ p. 11 - 144.

4 For the hoist rope limiting; ➠ p. 11 - 147

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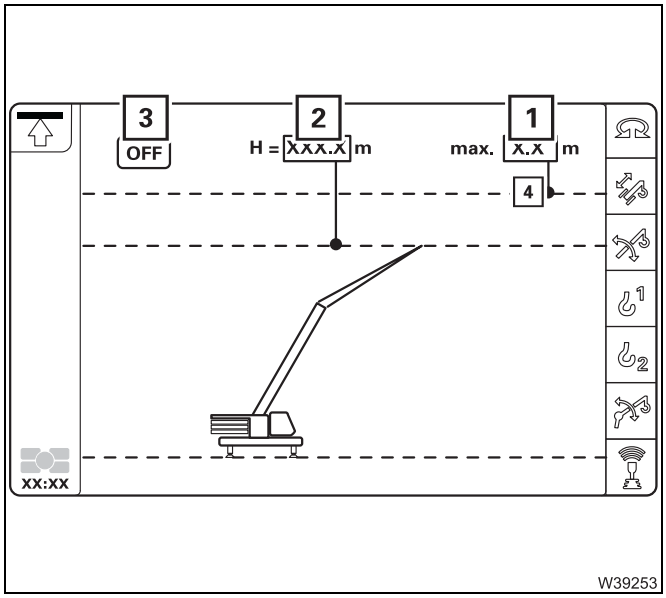
11.7.3 Enter limit values – for the overall height

– For unknown limit values, you can approach a shut-off point and accept the current overall height as **Accept limit value**.

– If the limit values are known, you can **Manually enter limit value**.

Risk of accident due to incorrectly set limit values
When entering the limit values, please note that movements leading further into the shutdown range can still take place even after switching off. Before crane operation, slowly approach all limit values, check that they are shutdown in good time and, if necessary, enter new limit values with larger safe distances.



Switch off monitoring

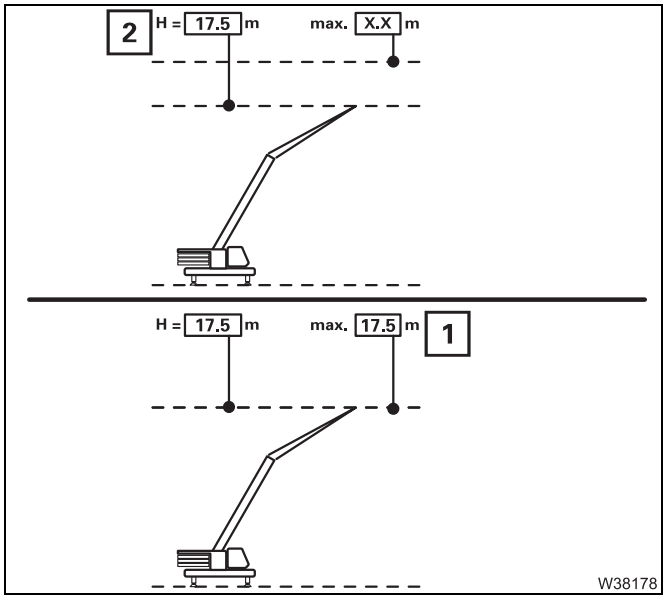
Before you enter a limit value, you must switch off the monitoring.

- Select and confirm the symbol (**3**).
  The *Overall height* monitoring is switched off.

Displays

1 Overall height limit value

2 Current overall height



Accepting limit value

- Move the main boom head to just before the shutdown point without a load, e.g. up to 17.5 m – display (**2**).
- Select and confirm the display (**2**).
  The current value (**2**) will be accepted as the limit value (**1**).

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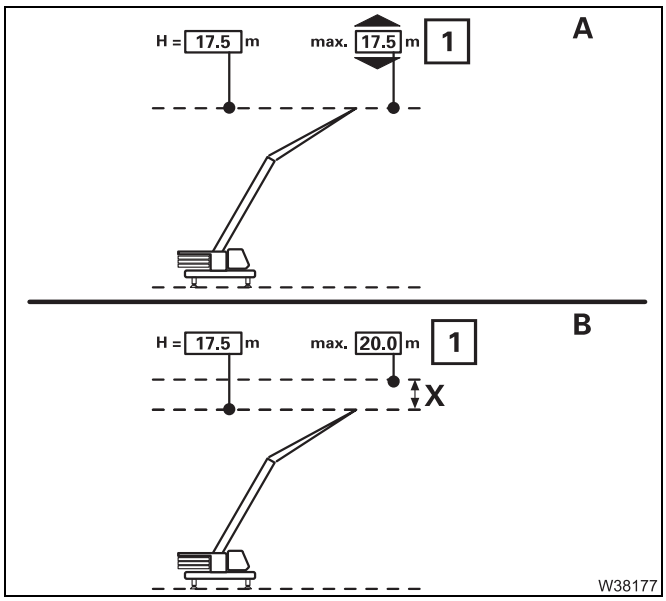
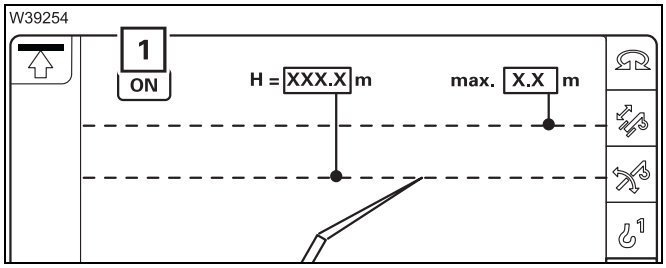


Entering limit values manually

- (**A**) – Select and confirm the display (**1**).
- (**B**) – Enter the limit value, e.g. 20.0 m and confirm the input.

Display (**1**) shows the newly entered limit value.

The distance (**X**) shows the current distance to the shutdown range.



Switch on monitoring

- Select and confirm the symbol (**1**).
  The *Overall height* monitoring is switched on.

The movement towards the shutdown limit is continually reduced until reaching a standstill. The current limitation is displayed;
On the RCL display, p. 11 - 138,
On the CCS display, p. 11 - 57.

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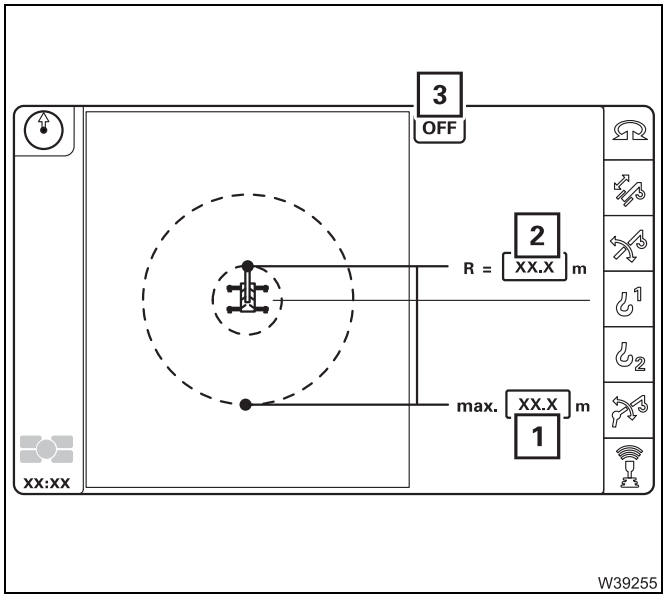
11.7.4 Entering limit values – for the working radius

– For unknown limit values, you can approach a shut-off point and accept the current working radius as **Accept limit value**.

– If the limit values are known, you can **Manually enter limit value**.

Risk of accident due to incorrectly set limit values
When entering the limit values, please note that movements leading further into the shutdown range can still take place even after switching off. Before crane operation, slowly approach all limit values, check that they are shutdown in good time and, if necessary, enter new limit values with larger safe distances.



Switch off monitoring

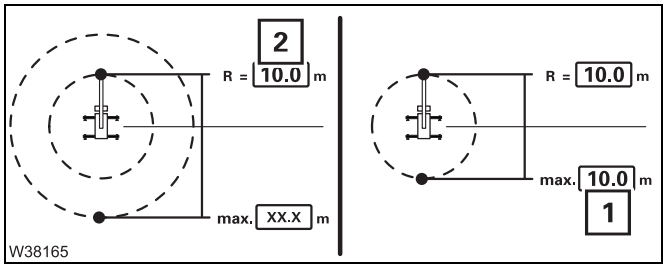
Before you enter a limit value, you must switch off the monitoring.

- Select and confirm the symbol (**3**).
  The *Working radius* monitoring is switched off.

Displays

1 Working radius limit value

2 Current working radius



Accepting limit value

- Move the main boom head to just before the shutdown point without a load, e.g. up to 10.0 m – display (**2**).
- Select and confirm the display (**2**).
  The current value (**2**) will be accepted as the limit value (**1**).

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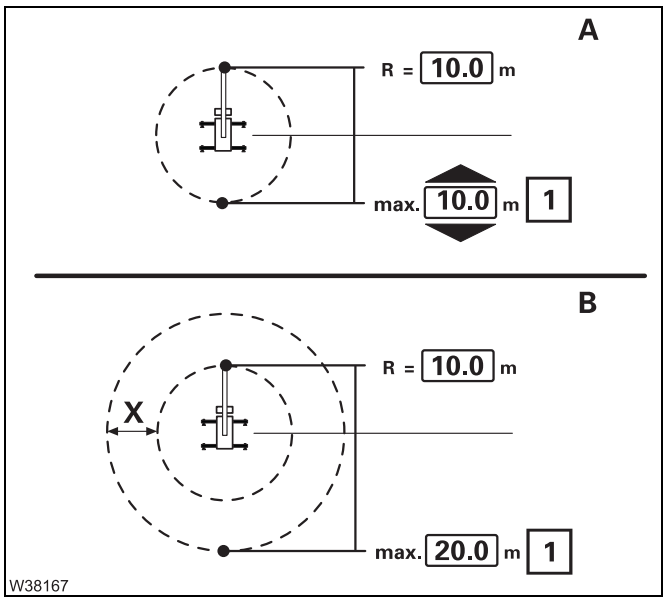
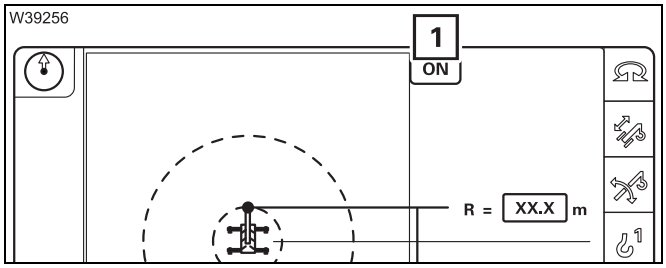


Entering limit values manually

- (**A**) – Select and confirm the display (**1**).
- (**B**) – Enter the limit value, e.g. 20.0 m and confirm the input.

Display (**1**) shows the newly entered limit value.

The distance (**X**) shows the current distance to the shutdown range.



Switch on monitoring

- Select and confirm the symbol (**1**).
  The *Working radius* monitoring is switched on.

The movement towards the shutdown limit is continually reduced until reaching a standstill. The current limitation is displayed;
On the RCL display, p. 11 - 138,
On the CCS display, p. 11 - 57.

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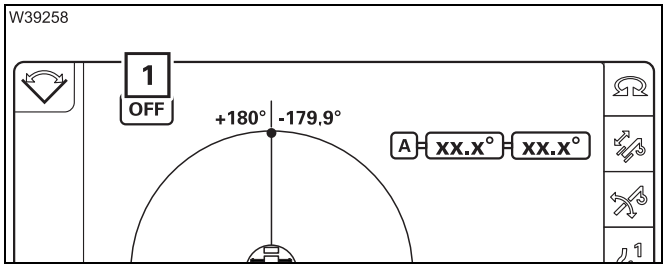
11.7.5 Enter limit values – for the slewing range

– For unknown limit values, you can approach a shut-off point and accept the current slewing angle as **Accept limit value**.

– If the limit values are known, you can **Manually enter limit value**.

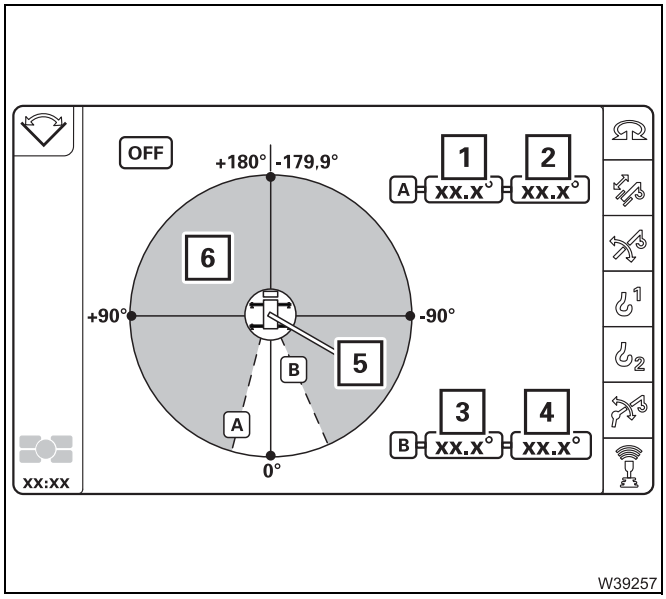
Risk of accident due to incorrectly set limit values
When entering the limit values, please note that movements leading further into the shutdown range can still take place **Even after switching off.** Before crane operation, slowly approach all limit values, check that they are shutdown in good time and, if necessary, enter new limit values with larger safe distances.



Switch off monitoring

Before you enter a limit value, you must switch off the monitoring.

- Select and confirm the symbol (**1**).
  The *Slewing range* monitoring is switched off.



Displays

1, 3, 5 Current slewing angle

2 Limit value for the slewing angle **A**

4 Limit value for the slewing angle **B**

Permissible slewing range

– The slewing angle **A** limits slewing to the left.
– The slewing angle **B** limits slewing to the right.

The permissible slewing range (**6**) – **green** – is the angle from **A** clockwise to **B**.

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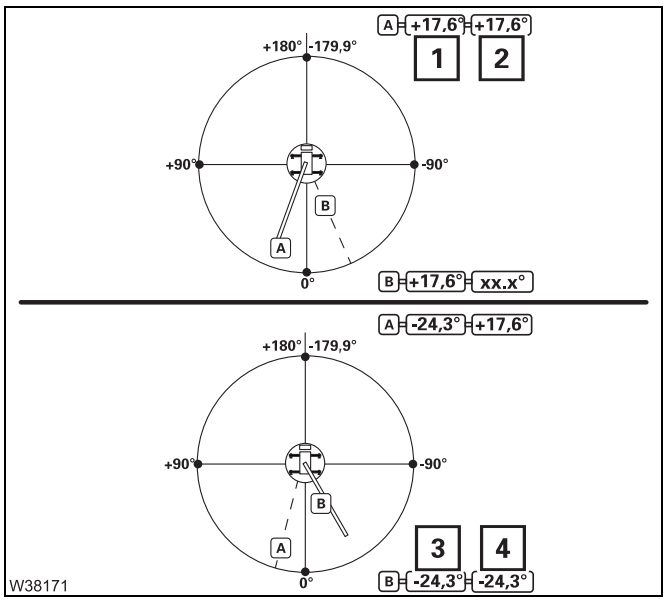


Accepting limit value

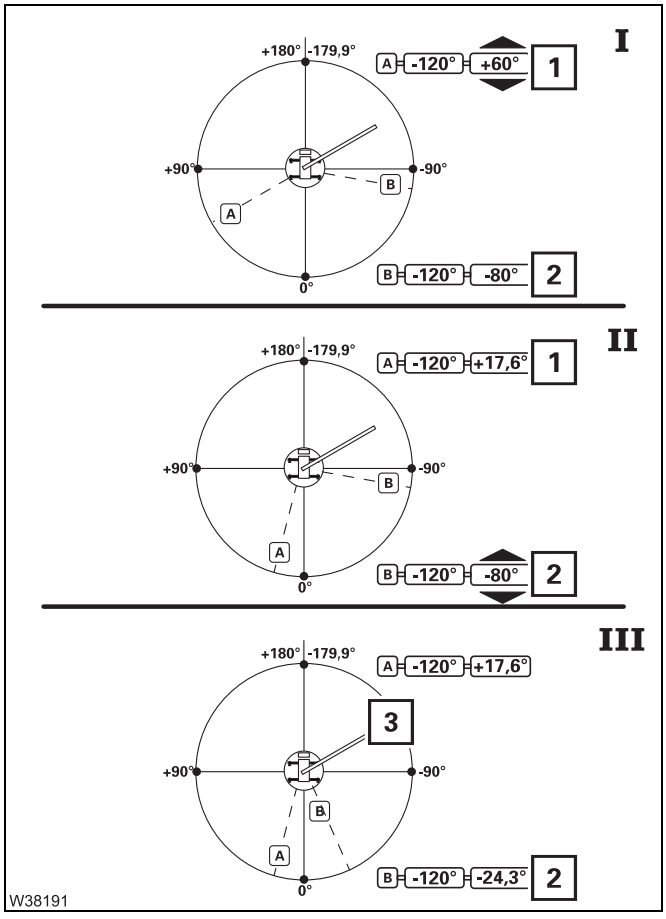
– Slewing angle A

- Slew the main boom to the shutdown point from the right, for example, value (**1**).
- Select and confirm the display (**1**). The value (**1**) will be accepted as the limit value (**2**), for example, +17.6°.

– Slewing angle B

- Slew the main boom to the shutdown point from the left, for example, value (**3**).

- Select and confirm the display (**3**). The value (**3**) will be accepted as the limit value (**4**), for example, -24.3°.



Entering limit values manually

– Slewing angle A

- (**I**) – Select and confirm the display (**1**).
- (**I**) – Enter the limit value, e.g.,+17.6° and confirm the input. Display (**1**) shows the newly entered limit value.

– Slewing angle B

- (**I**) – Select and confirm the display°(**2**).
- (**II**) – Enter the limit value, e.g. -24.3° and confirm the input. Display (**2**) shows the newly entered limit value.

The current slewing angle (**3**) shows the current position to the shutdown range.

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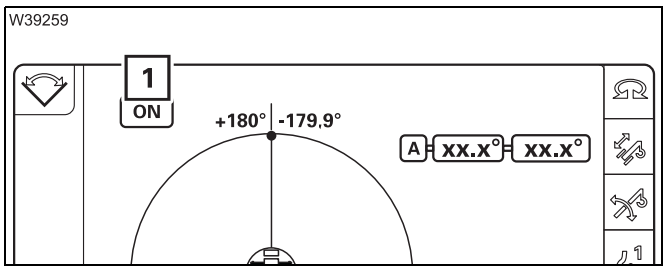

Switch on monitoring

- Select and confirm the symbol (**1**).
  The *Slewing range* monitoring is switched on.

The movement towards the shutdown limit is continually reduced until reaching a standstill. The current limitation is displayed;

On the RCL display, p. 11 - 138,
On the CCS display, p. 11 - 57.

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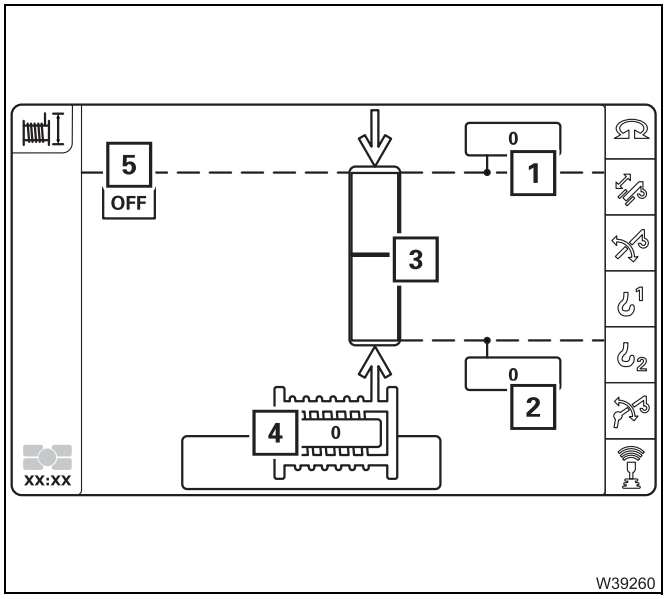
11.7.6 Enter limit values – for the hoist rope travel

The limit values for the hoist rope travel can only be input by approaching the shutdown points. Manually inputting is not possible.

Risk of accident due to incorrectly set limit values
When entering the limit values, please note that movements leading further into the shutdown range can still take place even after switching off. Before crane operation, slowly approach all limit values, check that they are shutdown in good time and, if necessary, enter new limit values with larger safe distances.



Switch off monitoring
Before you enter a limit value, you must switch off the monitoring.

- Select and confirm the symbol (**5**).
  The *Hoist rope travel* monitoring is switched off.

Displays

1 Limit value for the *Raise* movement

2 Limit value for the *Lower* movement

3 Current position – optical

4 Current position – count value

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.

Entering limit values

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;
➠ *Error messages on the CCS display*, p. 14 - 8.

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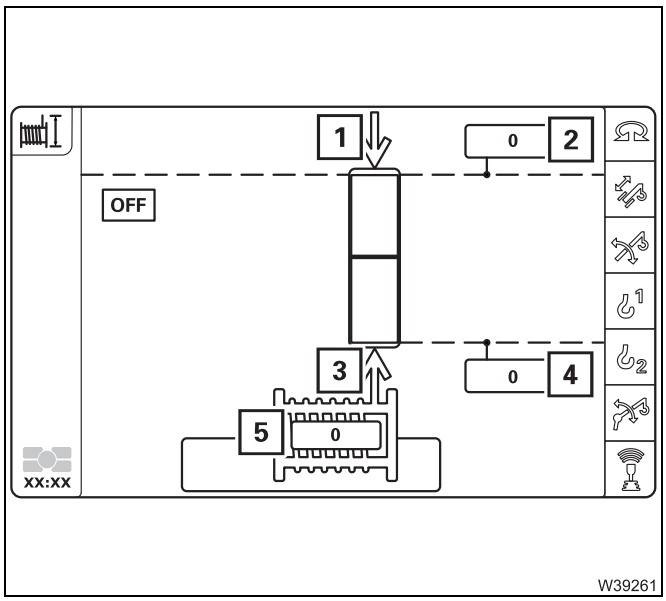
Risk of accidents due to the hoist rope travel limitation being switched off
Always set the telescope status and the boom position for crane operation first before setting limit values.
In this way you prevent an interruption of crane operation due to shutdown.

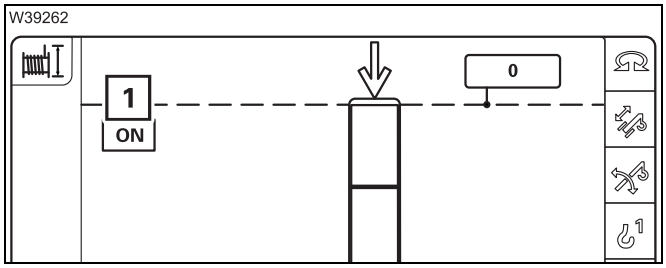


Entering the limit value for *Raise*

- Lift the load to the necessary height.
- Select and confirm the display (**2**).
  The number value (**5**) is set as limit value (**2**) for *Raise*. The symbol (**1**) confirms the entry.

Entering the limit value for *Lower*

- Lower the load to the necessary height.
- Select and confirm the symbol (**4**).
  The number value (**5**) is set as limit value (**4**) for *Lower*. The symbol (**3**) confirms the entry.



Switch on monitoring

- Select and confirm the symbol (**1**).
  The *Hoist rope travel* monitoring is switched on.

The movement towards the shutdown limit is continually reduced until reaching a standstill. The current limitation is displayed;
➠ *On the RCL display*, p. 11 - 138,
➠ *On the CCS display*, p. 11 - 57.

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11.7.7 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	– Raising – Extend – Lowering the hoist – Derricking the lattice extension
	Working radius	– Lowering the boom – Extend – Lifting the hoist – Derricking the lattice extension
	Slewing angle **A**	– Slewing to the left
	Slewing angle **B**	– Slewing 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 danger 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.

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Blank page

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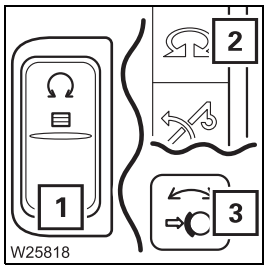
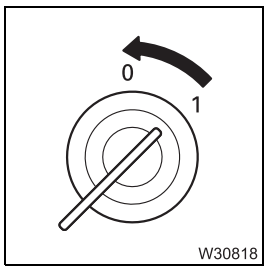
11.8 Work break

11.8.1 In case of short work breaks

Risk of accident by suspended loads!
Never switch off the engine while 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.
  - 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. 11 - 152.

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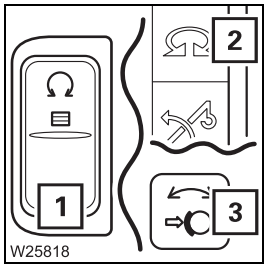
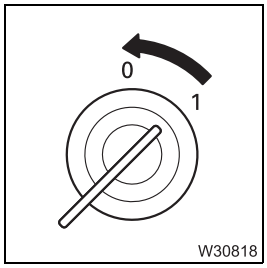
11.8.2 In case of work breaks longer than 8 hours

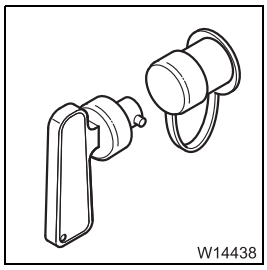
- Set down the load.
- Retract all telescopic sections.
- Lower the main boom.



- Switch off the slewing gear.
  - The lamp in the button (**1**) must be dimly lit.
  - 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 prevents unauthorised persons from starting the engine using the hand-held control.

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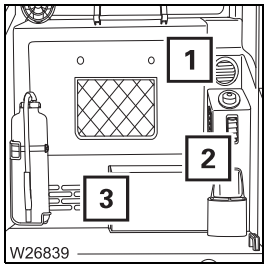
11.9 Heating and air-conditioning system



- Do not cover the grilles (**1**), (**2**) and (**3**).
  - Air is drawn in through grilles (**2**) and (**3**)
  - The grille (**1**) is used to ventilate the electronics.

11.9.1 Heating system

The heating system can be operated when the engine is stationary or running. The heating fuel tank must be adequately filled in order to operate the heating; ➠ p. 11 - 5.

Accelerated discharging of battery when the engine is switched off.
The batteries will run down if you operate the heater with the engine switched off. They will then have to be recharged after shorter periods of time.

Switching on

- 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 (for example, at places where fuel is stored and in chemical factories)
– At locations where explosive dust is found or can be formed (e.g. coal dust, wood dust, 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 (for example, garages).

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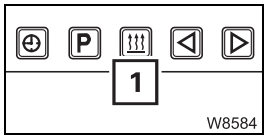
This section describes how to switch on manually. The heating can also be switched on automatically; *Storing the heating start*, p. 11 - 157.

- Switch on the ignition; p. 4 - 9.

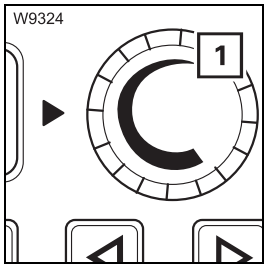


- Press the button (**1**) once.
  The heating switches itself on and the control panel lights up.

The fan also switches on with the heating in order to avoid overheating.

Heating

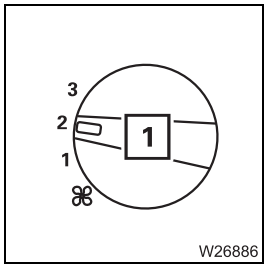
- Set the heating as desired.



Setting the temperature

1 – Increasing the temperature: Turn clockwise

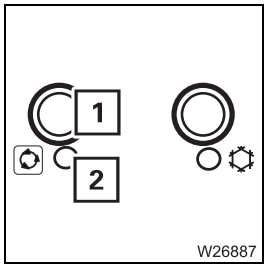
– Reducing the temperature: Turn anti-clockwise



Setting the fan

1 – Increasing the air volume: Turn clockwise
The switch engages in three different positions.

– Reducing the air volume: Tun anti-clockwise.
When the heating is switched on the fan always runs at the smallest level.



Setting recirculated/fresh air

1 – Fresh air: Press repeatedly until the lamp (**2**) goes out.

– Recirculated air: Press repeatedly until the lamp (**2**) lights up.
Air is sucked into the crane cab.
Change to fresh air often to ensure that oxygen is supplied.

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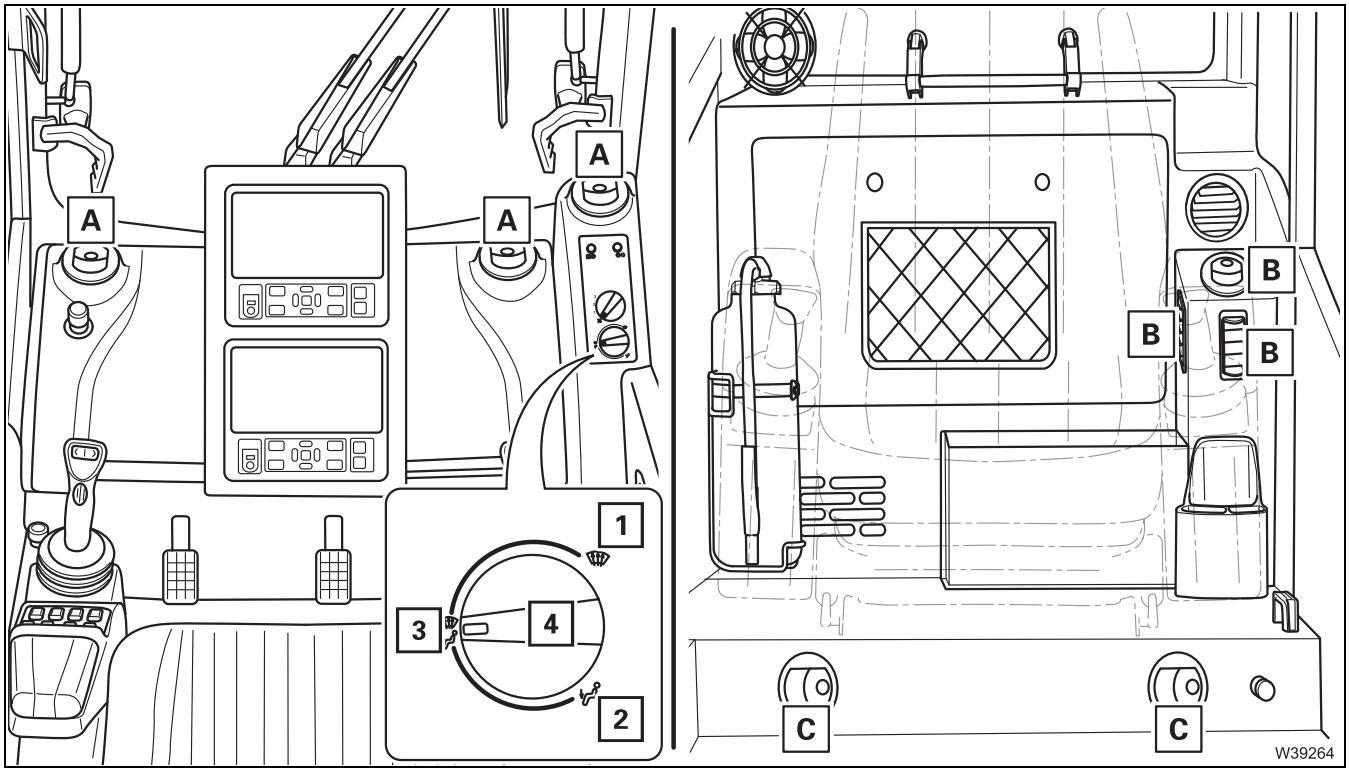
Air distribution You can direct the air to flow out of various air vents.

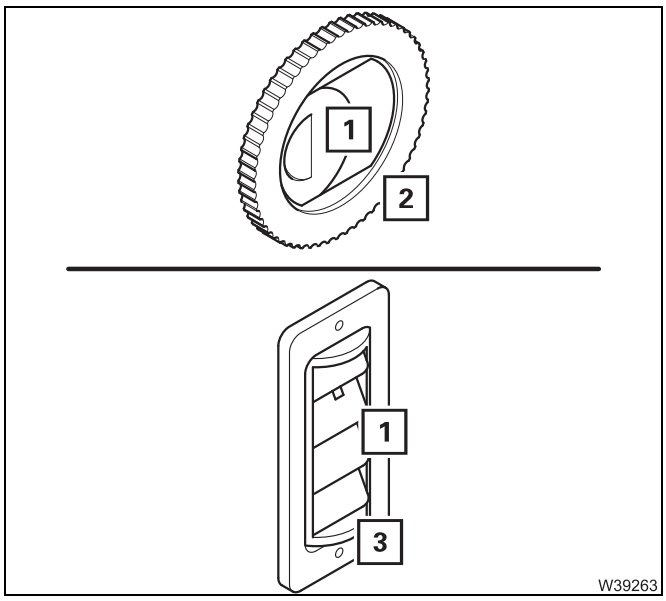


- Turn the switch (**4**) to the desired position

  (**1**) – Air vents (**A**)

  (**2**) – Air vents (**C**)

  (**3**) – Air vents (**A**), (**B**), (**C)**



Adjusting the air vents

– Open/close

Folding fins (**1**) in/out
or twist (**3**)

– To direct the air flow

Pivot the fins (**1**)
turn (**2**) and (**3**)

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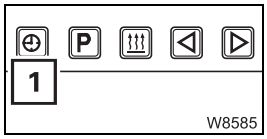
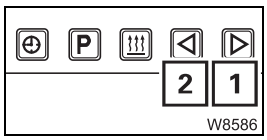
Setting the day and time

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.

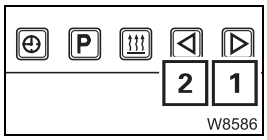


- Press the button (**1**) for longer than 2 seconds.
  The displayed time flashes, e.g. 10.00.



- Set the current time on the flashing display, e.g. 14:00 – button (**1**) or (**2**).

- Wait 5 seconds. The new time is saved and then the weekday flashes, e.g. **MO** for Monday.



- Set the current weekday on the flashing display – button (**1**) or (**2**).

The display stops flashing after 5 seconds and the current time is displayed. The weekday goes out.

The time and weekday have now been set.

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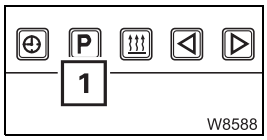
Storing the heating start

Heating is started automatically on schedule only if the time and the day of the week have been correctly set; ➠ p. 11 - 156.

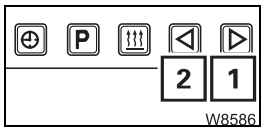
You can set three different automatic heating starts – up to seven days in advance.

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.



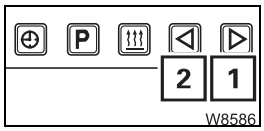
- To retrieve a storage location, press the button (**1**) once.

The following flash:
– the retrieved storage location, e.g. 2 and
– the last saved heating start, e.g. 6.00.



- Set the time for the desired heating start e.g. 8.00 – button (**1**) or (**2**).

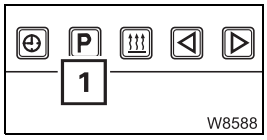
Wait for approx. 5 seconds until the weekday for the heating start flashes, e.g. **MO** for Monday.



- Set the weekday for the desired heating start – button (**1**) or (**2**).

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 button (**1**) and repeat the procedure.



After you have saved the heating start, you can also set the heating period; ➠ *Setting the heating period*, p. 11 - 158.

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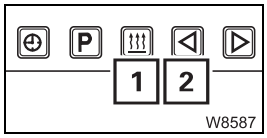
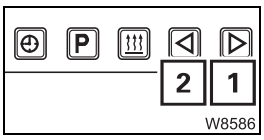
Setting the heating period

After an automatic start, the heating system will switch off automatically as soon as the set heating period has elapsed.
The heating period applies to all saved heating starts.



- Switch off the heating 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.



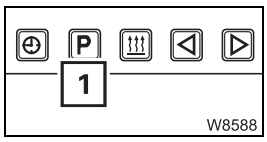
- Set the desired heating period with the buttons (**1**) or (**2**). You can set a heating period of 10 to 120 minutes.

Wait 5 seconds until the current time is displayed, e.g.14.00.

A new heating period has now been set.

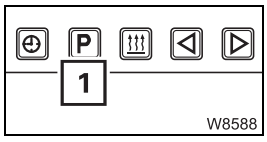
Switching the heating start on and off

To switch on an automatic heating start, you must retrieve the corresponding storage location.

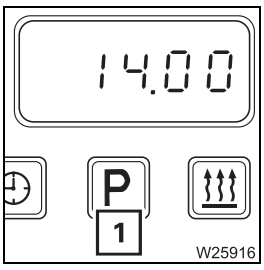


- To retrieve a storage location, press the button (**1**) once.

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 button (**1**) 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 button (**1**) repeatedly until a storage location is no longer displayed.

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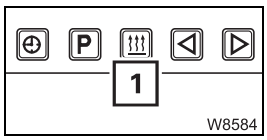
Switching off

This section only describes how to switch off the heater manually. If the heater is switched on automatically, it switches off after the set heating period has elapsed;
➠ *Setting the heating period*, p. 11 - 158.

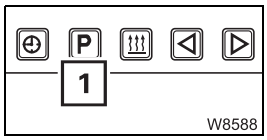


- **To switch off**, press the button (**1**) once. The heater goes off immediately.

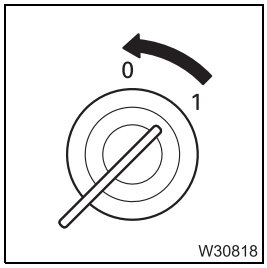
If you switch off the ignition while the heater is in operation, the heater will continue running for a certain period. You can set this remaining time;
➠ p. 11 - 159.

Setting the remaining time

If the ignition is turned off with the heating turned on, the heating will remain switched on for the remaining time.

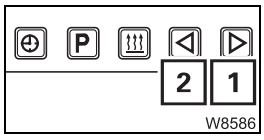


- Switch on the heater using the (**1**) button



- Switch off the ignition.

The heater continues to run and the remaining run time set last flashes, e.g. 48 minutes.



- Set the desired remaining heating period with the buttons (**1**) or (**2**) in 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.

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11.9.2 Air conditioning system

You can use the air-conditioning system to cool and dry the air in the crane cab.

Notes

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.

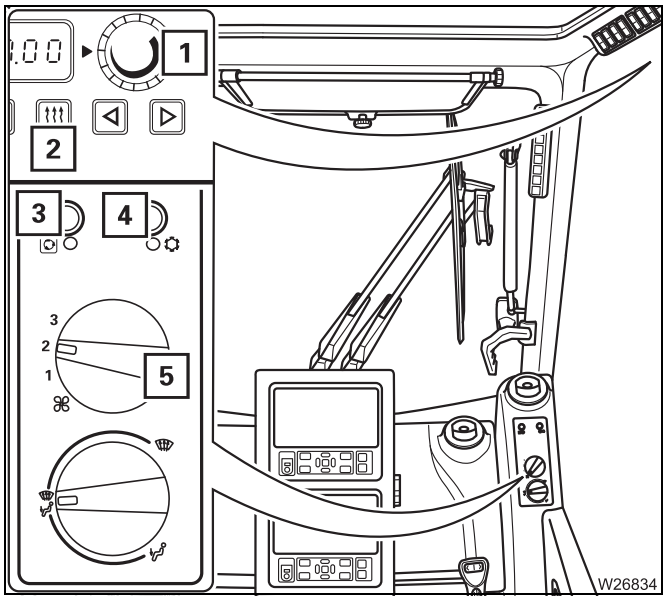
When using recirculated air, you should switch over to fresh air mode to ensure a fresh supply of oxygen at the same time. Adjust the cooling output to your actual needs:

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.

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



- At the heating:
  - Press button (**2**) once, heating/lighting off
  - Switch (**1**) as far as it will go to *cold* position,
  - Turn the switch (**5**) to the required level,
  - For faster cooling, press in button (**3**) for *Recirculated air*.
- Switch the air conditioning on – press in button (**4**).

Set the air distribution and ventilation nozzles; ➠ p. 11 - 155.

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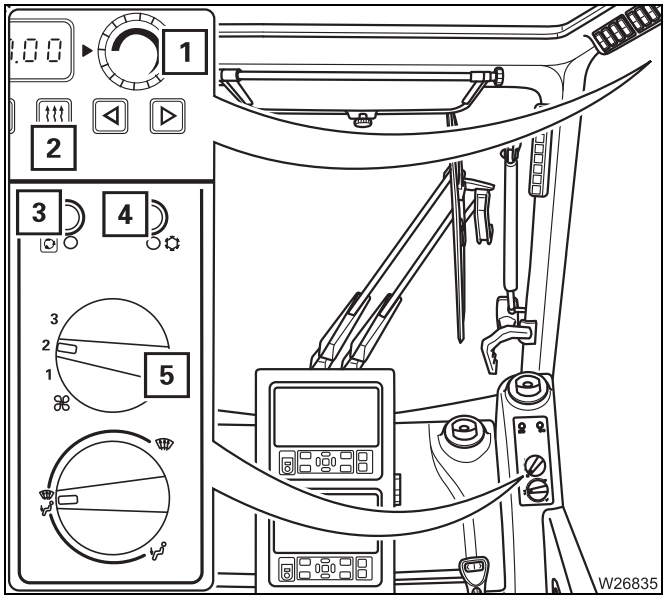
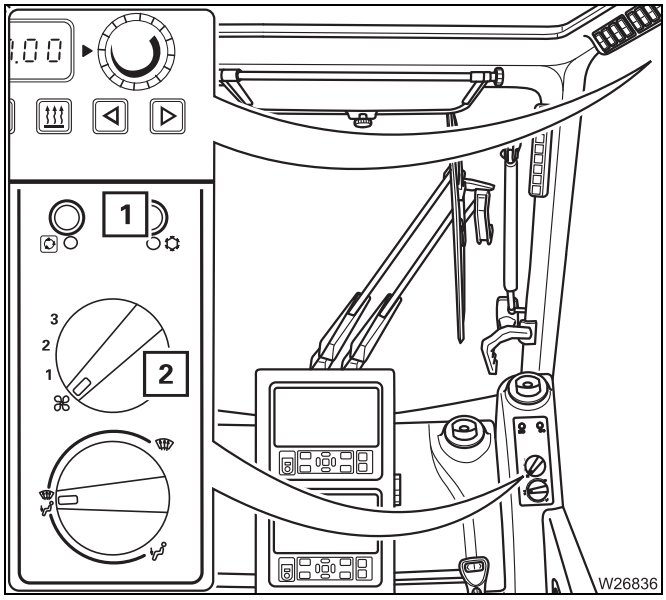
Drying the air You can dry the air in the crane cab.



- Switch the air conditioning on – press button (**4**) – lamp **on**.
- At the heating:
  - Press button (**2**) once, heating/lighting on,
  - Switch (**1**) as far as it will go to *warm*.
  - Turn the switch (**5**) to the required level,
  - Button (**3**) on the *Recirculated air* symbol – lamp **on**.

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.

Switching off



- Switch the air-conditioning system off:
  - Press the button (**1**) – lamp **off**,
  - If you do not wish air to be circulated, turn the switch (**2**) to the *off* position.

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11.10 CraneSTAR system

11.10.1 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.

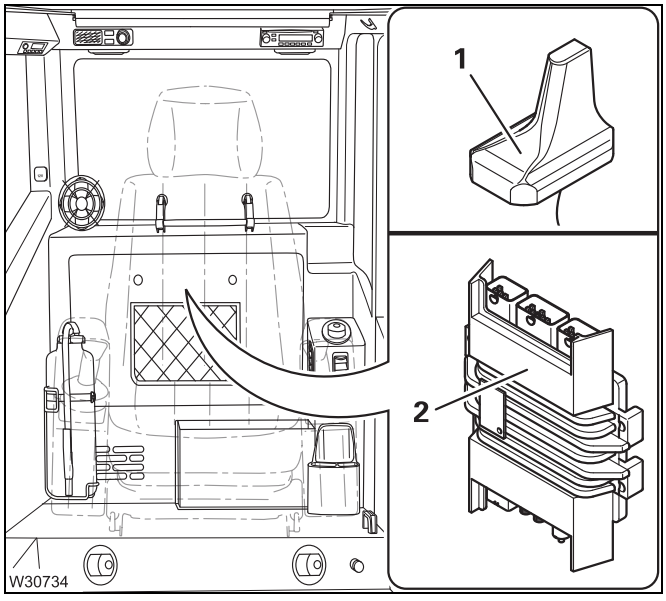
The CraneSTAR system works automatically, no controls must be operated. This sections shows only the location of the associated components.

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 – here, you will find all the information about activating the CraneSTAR system.

11.10.2 Position of the components

The CraneSTAR system includes an antenna and a *TCU* control unit (**T**elematic **C**ontrol **U**nit = data transmission 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.

When a malfunction occurs; ➠ p. 14 - 26.

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12 Rigging work

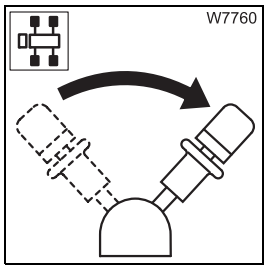
If the truck crane on the site has already been rigged, proceed according to the *CHECKLIST: Checks before operating the crane*, p. 11 - 1.

12.1 Rigging work checklists for crane operation with the main boom

This checklist is not a complete operating manual. There are accompanying operating instructions which are indicated by cross-references.
Observe the warnings and safety instructions there!

12.1.1 CHECKLIST: Rigging

1. Choose a suitable site; *Selecting the suitable site*, p. 12 - 9.



2. Check that the parking brake is engaged – if necessary, engage the parking brake.

The following points only apply to rigging in *Free on wheels* operating position. Continue the checklist at **point 7.** when rigging the truck crane on outriggers.

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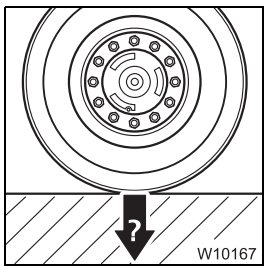
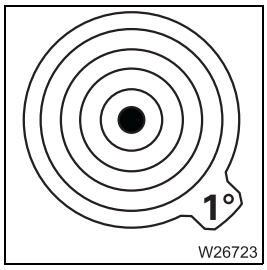


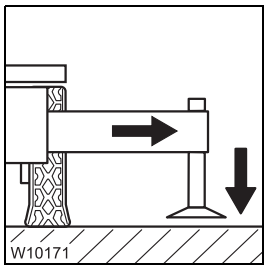
3. For the *Free on wheels* operating position

– Check that the tyre pressure is correctly set; ➠ p. 1 - 14.

– Check that the ground can support the maximum axle loads
➠ *Weight and axle loads*, p. 1 - 9,
➠ *Determining the required load-bearing area*, p. 12 - 9.



4. Align the truck crane horizontally with the level adjustment system;
➠ *Operating the level adjustment system*, p. 5 - 58.

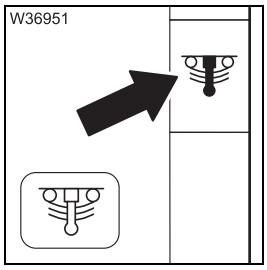


5. On the outriggers:

– Extend all outrigger beams as far as possible; ➠ p. 12 - 33.

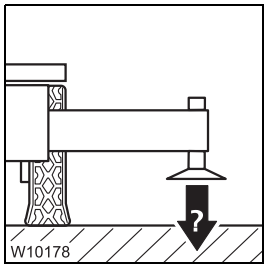
– Move all outrigger pads into the operating position; ➠ p. 12 - 37.

– Extend all outrigger cylinders far enough so that the outrigger pads are just above the ground; ➠ p. 12 - 39.



6. Deactivate (Lock) the suspension – symbol **red** (suspension off);
➠ p. 5 - 17.

The following points only apply when rigging the truck crane on outriggers. To continue rigging in the *Free on wheels* operating position, continue the checklist at **point 11.**



7. Check that the ground will support the maximum occurring outrigger pressures; ➠ *Determining the required load-bearing area*, p. 12 - 9.

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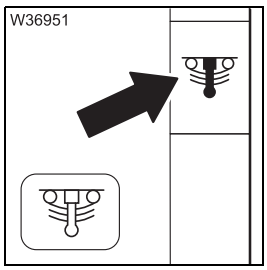
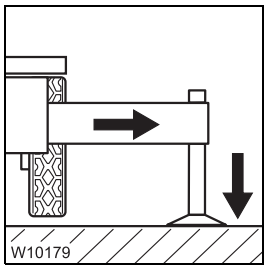
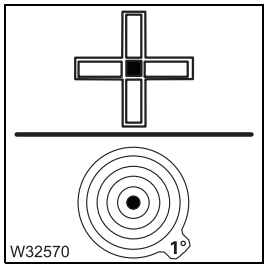


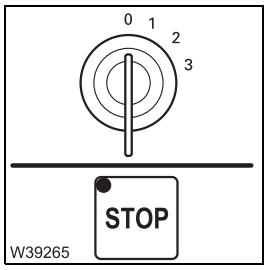
8. Deactivate (Lock) the suspension – symbol **red** (suspension off);
➠ p. 5 - 17.



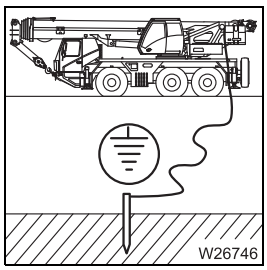
9. Support the truck crane with the outrigger span required for the job according to the *Lifting capacity table* and raise until none of the wheels is touching the ground; ➠ *Operating the outriggers*, p. 12 - 27.



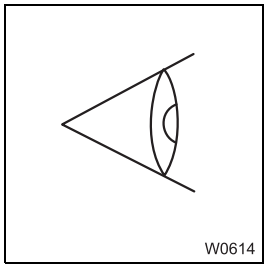
10. Align the truck crane horizontally.; ➠ p. 12 - 43.



11. Switch off the engine;
➠ *In the driver's cab*, p. 4 - 19,
➠ *On the outrigger control units*, p. 4 - 19.



12. Earth the truck crane, if necessary; ➠ *Earthing the truck crane*, p. 12 - 13.



13. Inspect the truck crane, while looking out in particular for any leaking fluids (oil, fuel or water).

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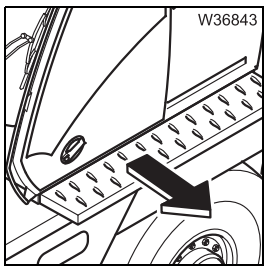
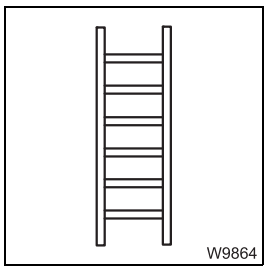
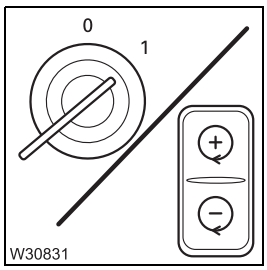


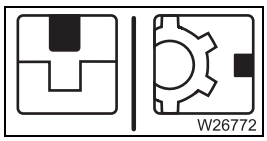
14. Extend the step if necessary; ➠ p. 12 - 112.



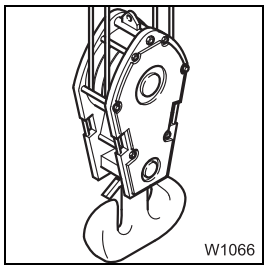
15. Fold down the ladder in front of the crane cab; ➠ p. 3 - 77.



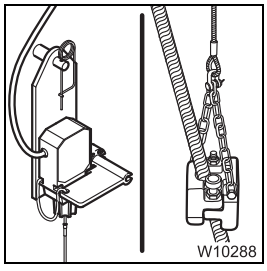
16. Start the engine for crane operation; ➠ p. 10 - 3.



17. Unlock the turntable and if necessary switch off the houselock;
➠ *Unlocking the turntable*, p. 11 - 19,
➠ *Switching off the houselock*, p. 11 - 22.



18. Pick up the hook block and re-reeve the hoist rope, if necessary;
➠ *Hook block on a separate vehicle*, p. 12 - 79,
➠ *Hook block on the bumper*, p. 12 - 77,
➠ *Reeving and unreeving the hoist rope*, p. 12 - 82.



19. Install the lifting limit switch; ➠ p. 12 - 95.

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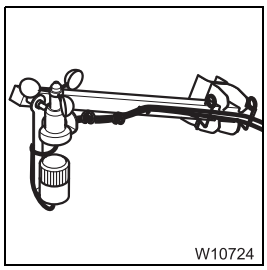
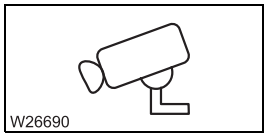
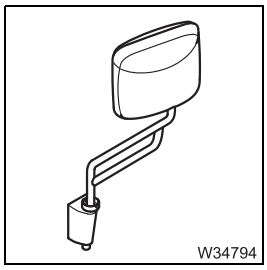


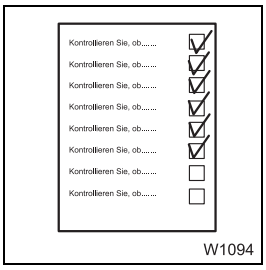
20. Install anemometer and if necessary air traffic control light;
➠ *Anemometer and air traffic control light*, p. 12 - 101.



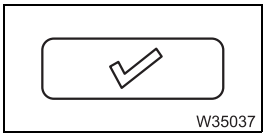
21. Install the camera on main boom if required;
➠ *Cameras for crane operation*, p. 12 - 106.



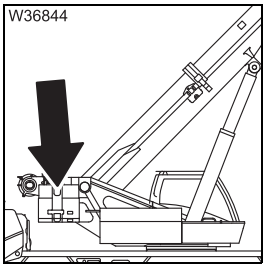
22. Fold out and adjust all mirrors for crane operation; ➠ p. 12 - 105.



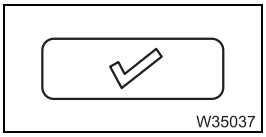
23. Perform all the required checks prior to crane operation;
➠ *CHECKLIST: Checks before operating the crane*, p. 11 - 1.



24. Enter and confirm the current rigging mode;
➠ *Entering the rigging mode*, p. 11 - 36.



25. With the rigging mode adjusted accordingly, rig the counterweight combination required for the operation according to *Lifting capacity table*;
➠ *CHECKLIST: Rigging the counterweight*, p. 12 - 56.



26. Enter and confirm the current rigging mode with the new rigged counterweight combination; ➠ *Entering the rigging mode*, p. 11 - 36.

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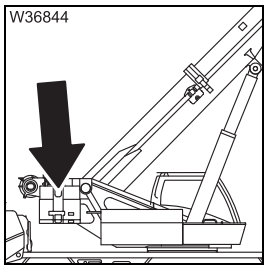
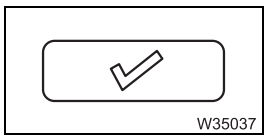
12.1.2 CHECKLIST: Unrigging

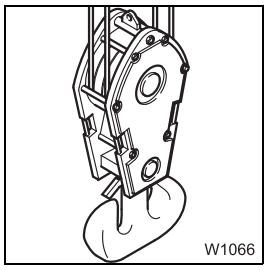
This checklist is not a complete operating manual. There are accompanying operating instructions which are indicated by cross-references.
Observe the warnings and safety instructions there!



1. With the rigging mode set correspondingly, unrig the counterweight;
➠ *CHECKLIST: Unrigging the counterweight*, p. 12 - 58.



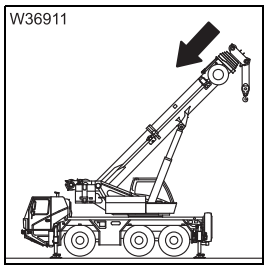
2. Enter and confirm the current rigging mode with the new rigged counterweight combination; ➠ *Entering the rigging mode*, p. 11 - 36.



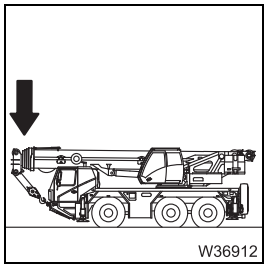
3. Depending on transport:

– Attach the hook block to the bumper; ➠ p. 12 - 78 or

– Set down the hook block and unreeve the hoist rope;
➠ *Setting down the hook block*, p. 12 - 80
➠ *Unreeving the hoist rope*, p. 12 - 88



4. Retracting the main boom; ➠ p. 11 - 95.



5. – Turn the superstructure to the 180° position to the front with the RCL set accordingly,

– Set down the main boom on the boom rest**.**

– Lock the turntable; ➠ p. 11 - 18.

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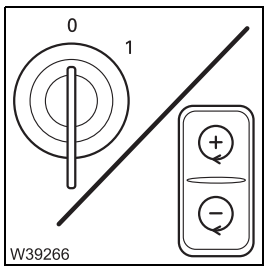
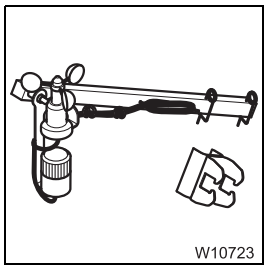
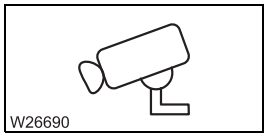


6. Switch off the engine; p. 10 - 11



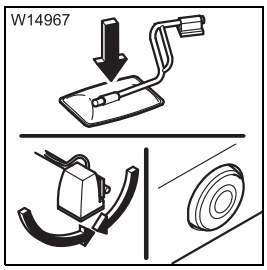
7. If necessary, remove the anemometer and air traffic control light;

➠ *Anemometer and air traffic control light*, p. 12 - 101.



8. If necessary, remove the camera from the main boom;

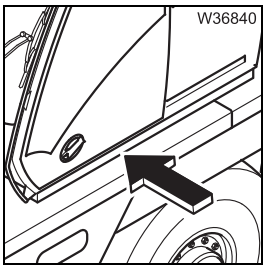
➠ *Cameras for crane operation*, p. 12 - 106.



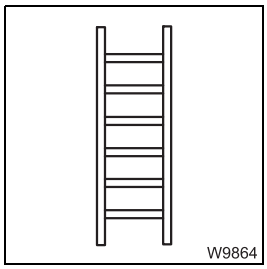
9. – Fold in all mirrors for crane operation; ➠ *Folding the mirrors in and out, and adjusting them*, p. 12 - 105.

– Pivot down the slewable spotlights; ➠ p. 11 - 134

– The lighting on the outrigger must be switched off; ➠ p. 12 - 30.



10. Push in the stair tread; ➠ p. 12 - 112.



11. Fold up and secure the ladder in front of the crane cab; ➠ p. 3 - 77.

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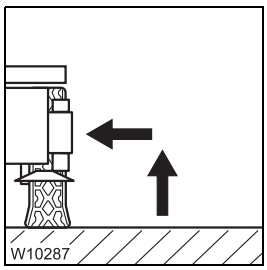
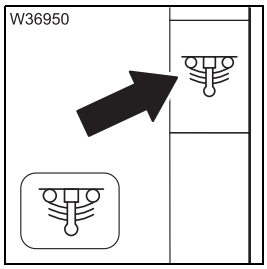
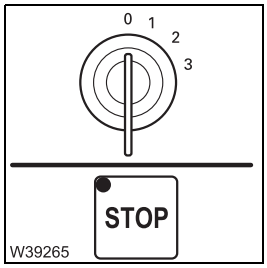


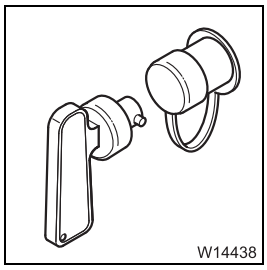
12. Retract the outriggers; ➠ *CHECKLIST: retracting the outriggers*, p. 12 - 29.



13. Switch on suspension (release locking) – symbol **green** (suspension on); ➠ p. 5 - 17.



14. Switch off the engine;
➠ *In the driver's cab*, p. 4 - 19,
➠ *On the outrigger control units*, p. 4 - 19.



15. When the truck crane is no longer being used; ➠ *In case of work breaks longer than 8 hours*, p. 11 - 152.

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12.2 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 load-bearing area; ➠ p. 12 - 9.

– Observe the required safe distances to slopes and pits; ➠ p. 12 - 12.

– If there is a danger of it becoming charged with static electricity, earth the truck crane; ➠ p. 12 - 13.

– Keep a safe distance away from electrical lines; ➠ p. 12 - 13.

– Choose the site such that the unevenness of the ground can be compensated for by adjusting the outrigger cylinders. Maximum stroke of the outrigger cylinders; ➠ p. 1 - 15.

– 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.

12.2.1 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.

$$\text{Load-bearing area } (m^2) = \frac{\text{Outrigger pressure (t)}}{\text{Load bearing capacity of the ground } \left(\frac{t}{m^2}\right)}$$

Outrigger pressure

- Determine the outrigger pressure for the operation planned using the *Outrigger pressure table*.

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Load bearing capacity of the ground

- Find the load bearing capacity of the ground using the table.

APPROXIMATE VALUES FOR THE LOAD BEARING CAPACITY OF THE GROUND		Load bearing capacity (t/m^2) (lbs/ft^2)
Backfilled, not artificially compacted ground:		0 bis 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 ground:	Mushy	0
	Soft	4 (820)
	Stiff	10 (2,050)
	Semi-solid	20 (4,100)
	Hard	40 (8,200)
Rock with minimal fissures in sound, unweathered condition and with favourable strata:	In a compact succession 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.

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Load-bearing area

- Now calculate the required load-bearing area.
- Check that the surface of the outrigger pad (➠ p. 1 - 15) is larger than the calculated load-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.

Example for calculating the required load-bearing area:

If the outrigger pressure is 25 t and the ground has a load bearing capacity of 40 t/m^2. Then the required ground bearing area for this supporting cylinder is 0.625 m^2 (= 6,250 cm^2).

If the outrigger pad has a surface of 2,000 cm^2 – you would need to enlarge the load-bearing area by placing packing under the outrigger pad; ➠ p. 12 - 38.

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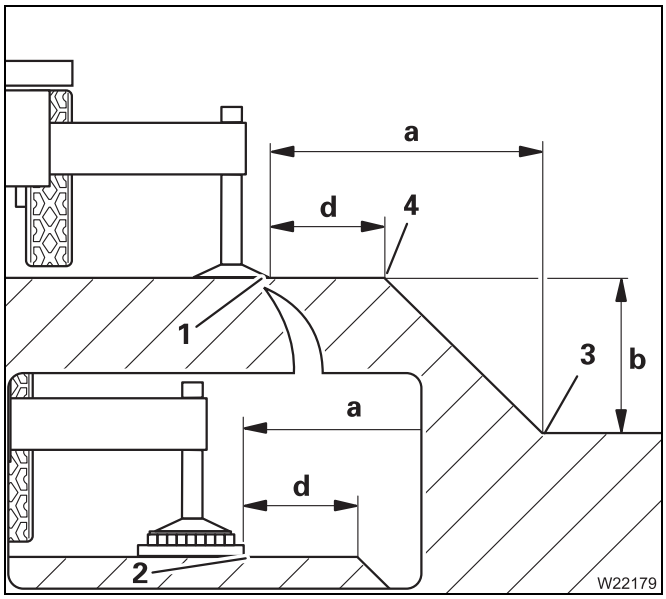
12.2.2 Safe distance from slopes and pits

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 safe distance (**a**) must be twice as large as the pit depth (**b**).

a = 2 x 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 x b

The safe distance is measured from the base of the pit (**3**).

In addition to this the safe distance (**d**) between the outrigger pad (**1**) or substructure (**2**) and the edge of the pit (**4**) must always be more than 2.00 m (6.6 ft).

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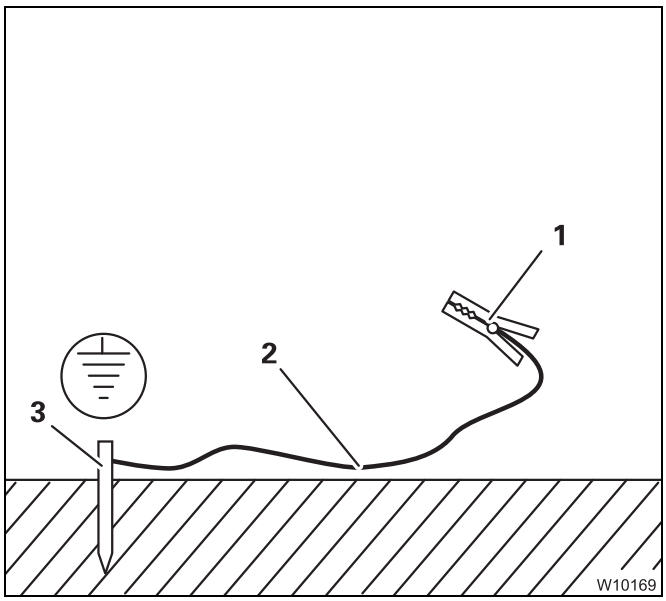
12.2.3 Earthing the truck crane

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).

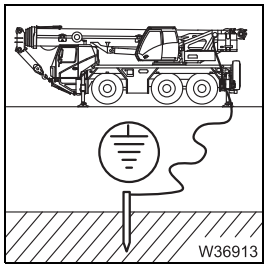
Risk of accident due to electric shock!
Earth the truck crane before you start to work with it
– Near strong transmitters (radio transmitters, radio stations, etc.)
– Near high-frequency switchgear
– If a thunder storm is forecast



Use electrically conducting material for earthing.

- Hammer a metal rod (**3**) (length about 2.0 m (6.6 ft)) at least 1.5 m 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^2 (0.025 in^2)).
- Connect the free end of the cable using a clamp (**1**).

Risk of accident 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 to the superstructure.

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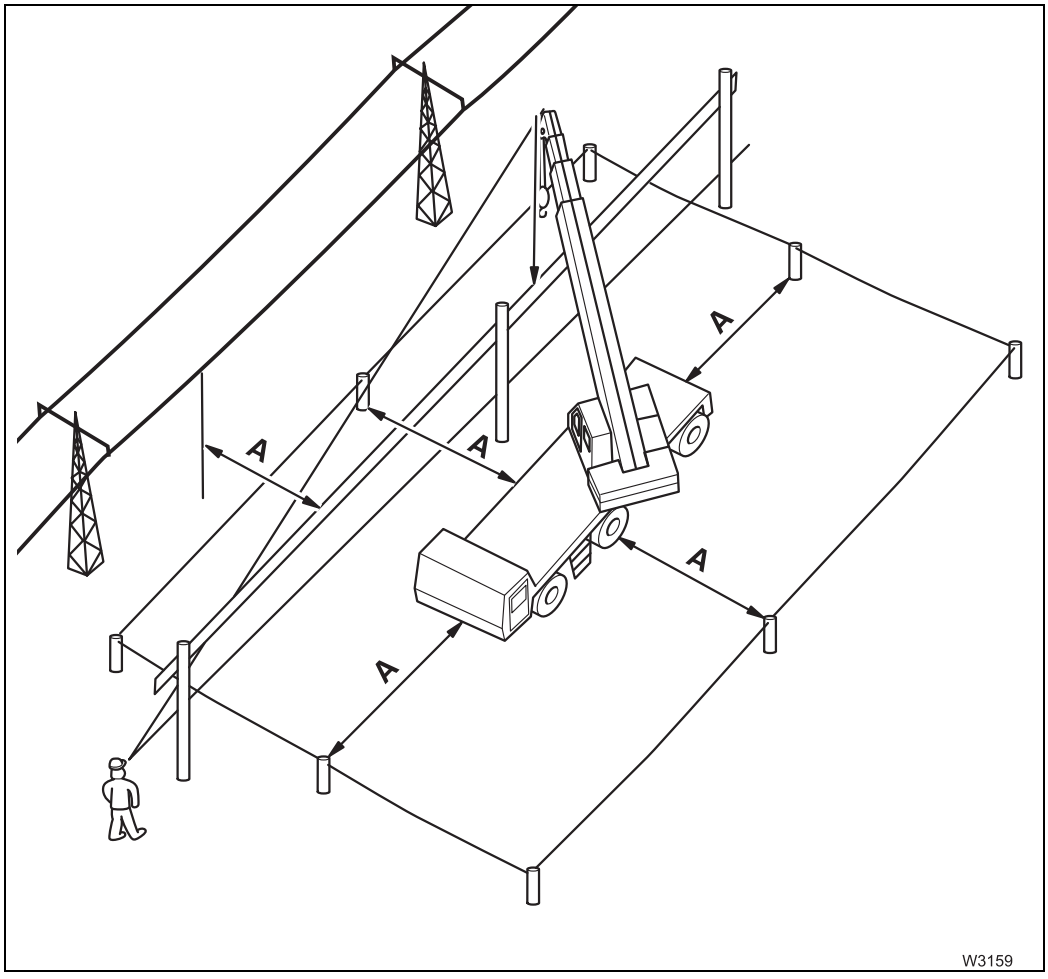
12.2.4 Safe distance from overhead power lines

Always observe the regulations in the country in which you are working when working in the vicinity of overhead power lines.

Risk of accident 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 this is not possible, you must at least observe the prescribed safe distance (**A**).

Different safe distances are recommended by the respective national regulations:

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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 up 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)
over 50,000 V up to 200,000 V	4.60 m (15 ft)
over 200,00 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 1,000,000 V	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 maintaining 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 danger area!

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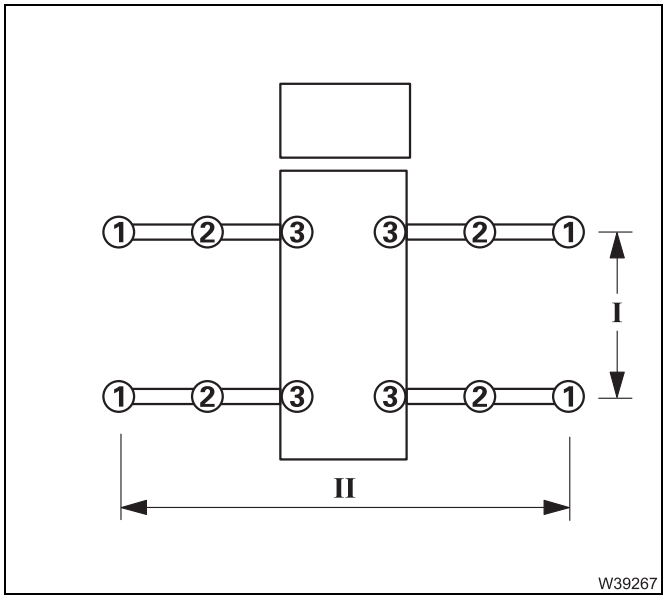
12.3 Outriggers – Overview – Standard slewing range type

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. 12 - 19.

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. 12 - 18.

12.3.1 Representation in the lifting capacity tables



The outrigger span is always specified in this form in the *Lifting capacity table*.

Outrigger length xxxx – outrigger span yyyyy

– Outrigger length
The outrigger length (**I**) has a fixed value of 6.825 m (22.4 ft) and never changes for a fully supported truck crane.

– Outrigger span
The outrigger span relates to the overall width (**II**). There are five outrigger spans (**1**) to (**3**).

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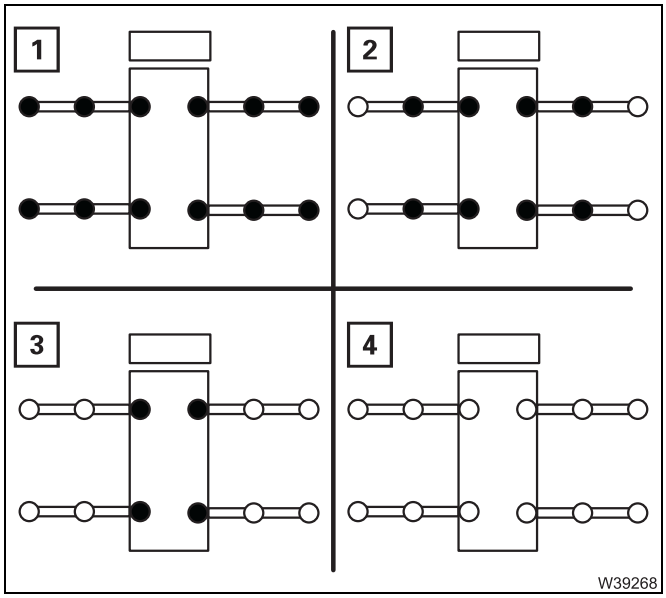
12.3.2 Enabled outrigger spans

Risk of overturning when slewing the superstructure!
For some outrigger spans, slewing is only permissible with certain counterweight versions and boom positions; ➠ *Slewing with a rigged counterweight*, p. 12 - 76.



The tables show the values for permissible outrigger spans with overall widths (**1**) to (**3**).

1	6.200 m (20.3 ft)
2	4.400 m (14.4 ft)
3	2.320 m (7.6 ft)

In addition, there is a lifting capacity table for the *Free on wheels* operating position – Display (**4**).

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12.4 Outriggers – Overview – MAXbase slewing range type

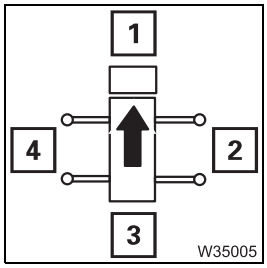
The information in this section applies to the *MAXbase* slewing range type. If you wish to operate the truck crane using the *Standard* slewing range type;
➠ p. 12 - 17.

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.

12.4.1 Definitions

Specific terms and graphical illustrations are used in the description.

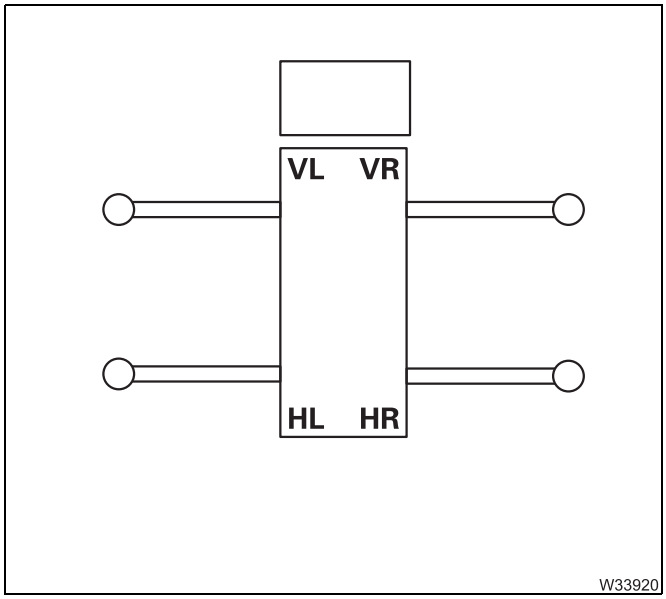


Positional references

The directional information is always based on the carrier regardless of the position of the superstructure.

1: Front **2:** Right

3: Rear **4:** Left



Designation of the outrigger beams

FL	Front left
FR	Front right
RL	Rear left
RR	Rear right

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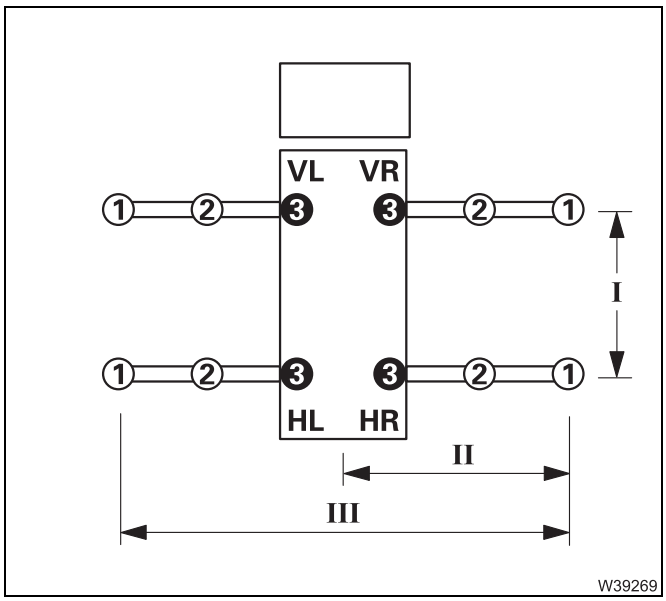


Representation of the outrigger spans

– Outrigger length

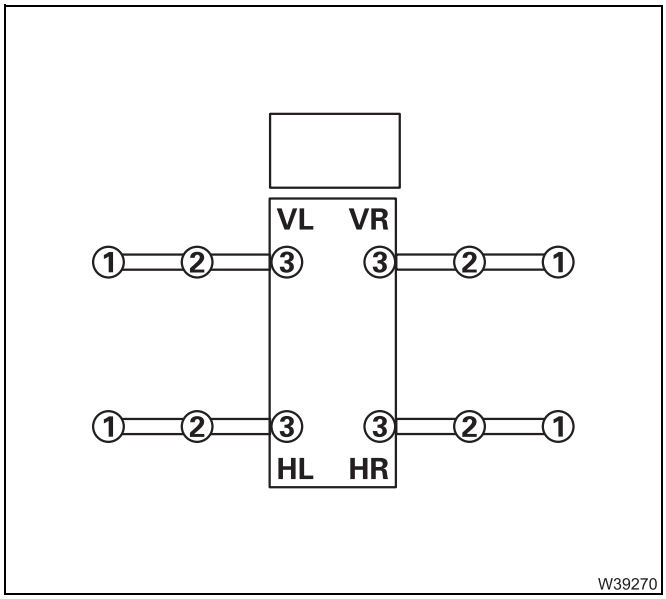
The outrigger length (**I**) has a fixed value of 6.825 m (22.4 ft) and never changes.

– Outrigger span

All possible outrigger spans (**1**) to (**3**) 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 spans (**3**).

The outrigger span 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 spans (**1**) to (**3**).

	Individual widths	Overall widths
1	3.100 m (10.2 ft)	6.200 m (20.3 ft)
2	2.200 m (7.2 ft)	4.400 m (14.4 ft)
3	1.160 m (3.8 ft)	2.320 m (7.6 ft)

The individual widths and overall widths are specified in metres (feet) in the lifting capacity tables.

The cover pages of the MAXbase lifting capacity tables provide a brief overview in per cent.

Outrigger span	Per cent
1	100%
2	50%[1)]
3	0%

[1)] Display on the *outrigger* control unit 51%

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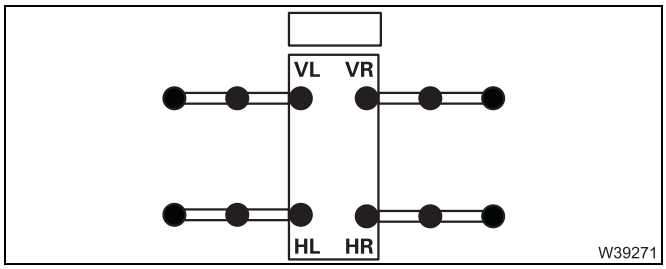
12.4.2 Representation in the lifting capacity tables

The outrigger span is always specified in this form

Outrigger length xxxx – outrigger span yyyyy

– The value **xxxx** is always 6.825 m (22.4 ft).

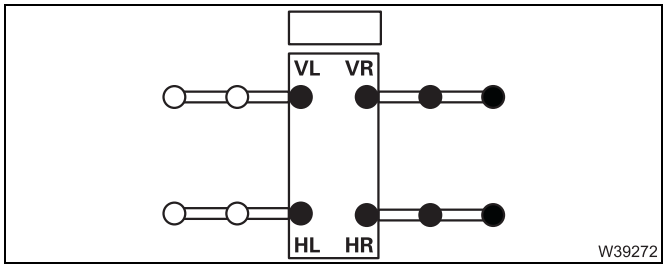
– The value **yyyy** depends on the type of outrigger span.
A distinction is made between four types.



Symmetrical

The outrigger span is the same for all outrigger beams. The overall width is entered once.
For example

Outrigger span	**6.200 m (20.3 ft)**

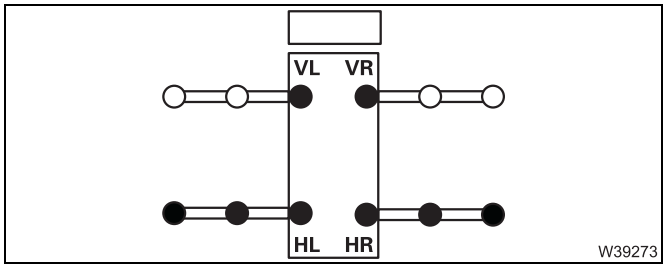


Right / Left

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	**3.100 + 1.160 m (10.2 + 3.8 ft)**
Rear outrigger span	**3.100 + 1.160 m (10.2 + 3.8 ft)**



Front / rear

The outrigger span 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	**2.320 m (7.6 ft)**
Rear	**6.200 m (20.3 ft)**

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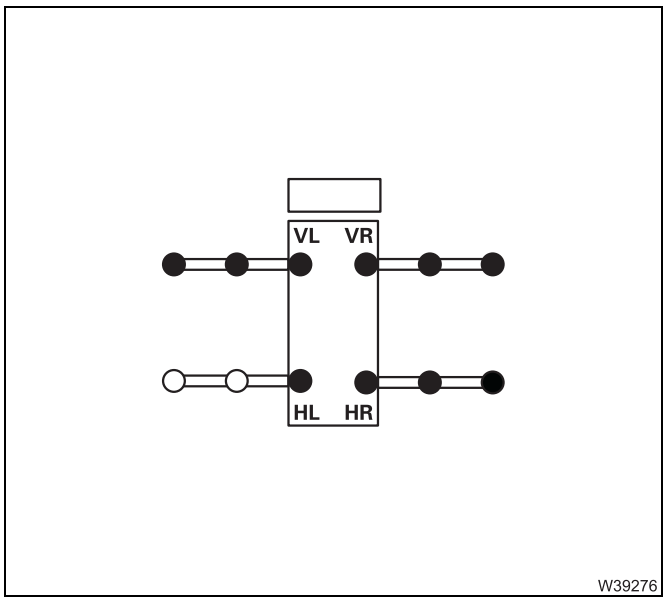


Three / One

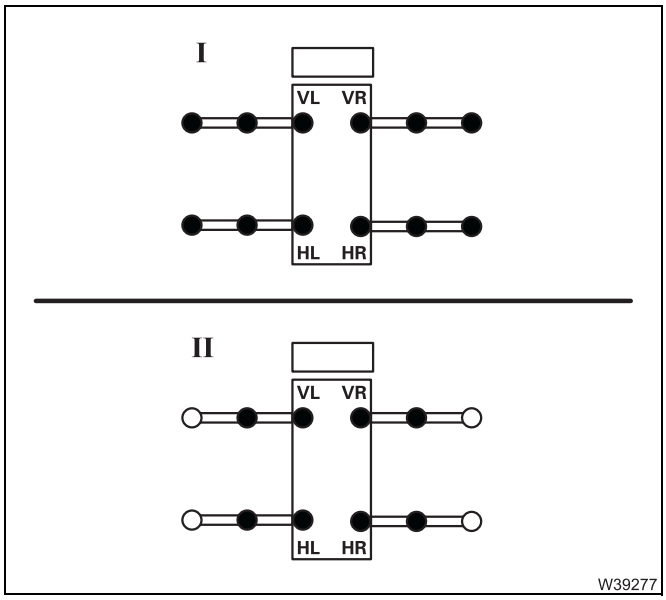
The outrigger span is the same for three outrigger beams and one outrigger beam has a smaller outrigger span.

The overall width is entered once and an individual width is entered once. For example

Front outrigger span	**6.200 m (20.3 ft)**
Rear outrigger span	**3.100 + 1.160 m (10.2 + 3.8 ft)**

12.4.3 Enabled outrigger spans

Particular combinations are enabled for each type of outrigger span. This section shows all released combinations with the associated individual widths of the outrigger beams.



Symmetrical

The outrigger span is the same for all outrigger beams. The table shows the released combinations.

	FL / FR / RL / RR (front left / front right / rear left / rear right)
I	3.100 m (10.2 ft)
II	2.200 m (14.4 ft)

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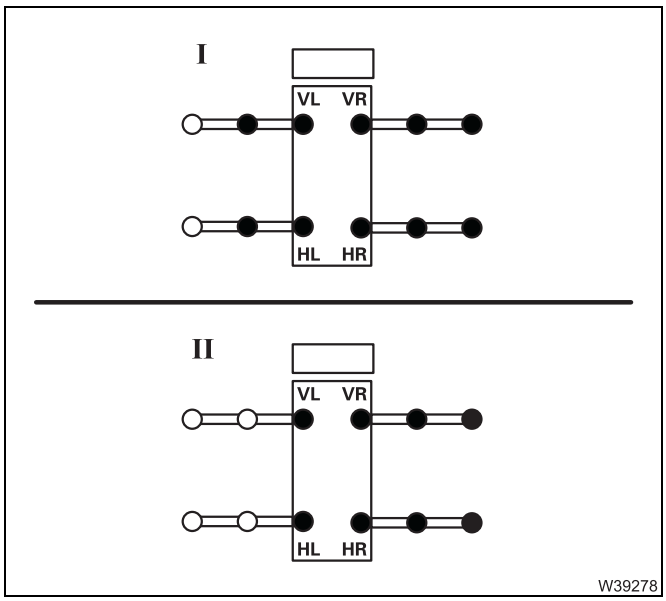
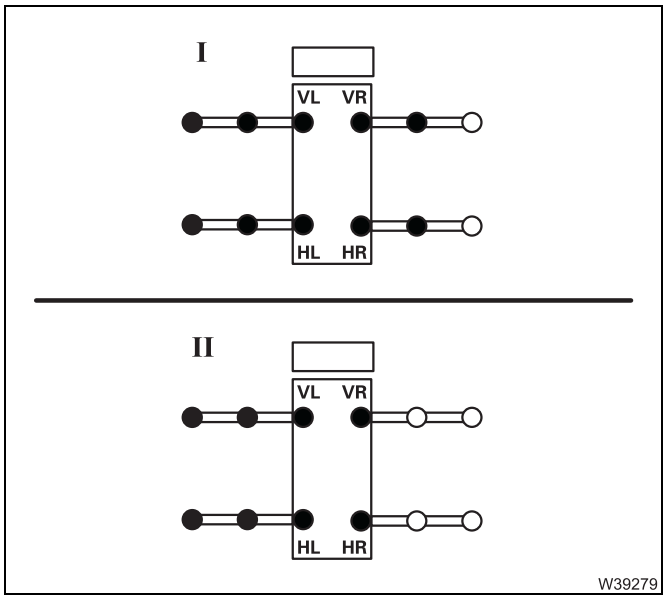


Right / Left

– Right greater than left

The outrigger span is the same at the left and the same at the right. The table shows the permissible combinations.

	FR / RR	FL / RL
I	3.100 m (10.2 ft)	2.200 m (7.2 ft)
II	3.100 m (10.2 ft)	1.160 m (3.8 ft)



– Left greater than right

The outrigger span is the same at the left and the same at the right. The table shows the permissible combinations.

	FR / RR	FL / RL
I	2.200 m (7.2 ft)	3.100 m (10.2 ft)
II	1.160 m (3.8 ft)	3.100 m (10.2 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. 11 - 32.

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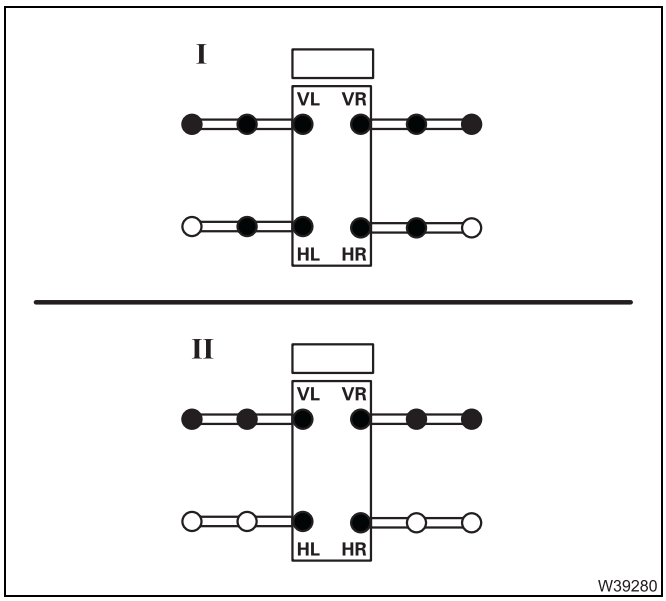
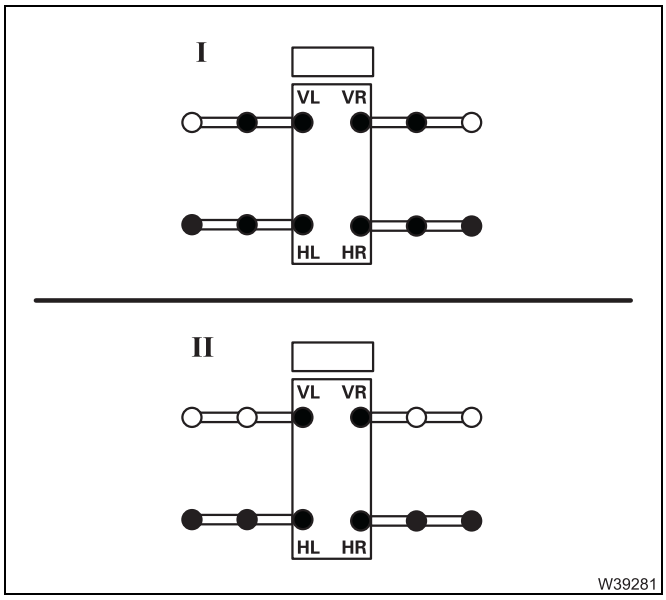


Front / rear

– 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
I	3.100 m (10.2 ft)	2.200 m (7.2 ft)
II	3.100 m (10.2 ft)	1.160 m (3.8 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
I	2.200 m (7.2 ft)	3.100 m (10.2 ft)
II	1.160 m (3.8 ft)	3.100 m (10.2 ft)

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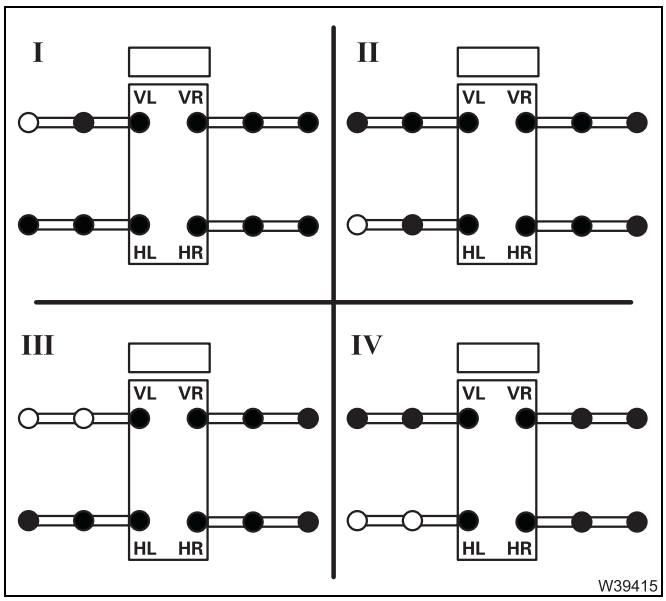
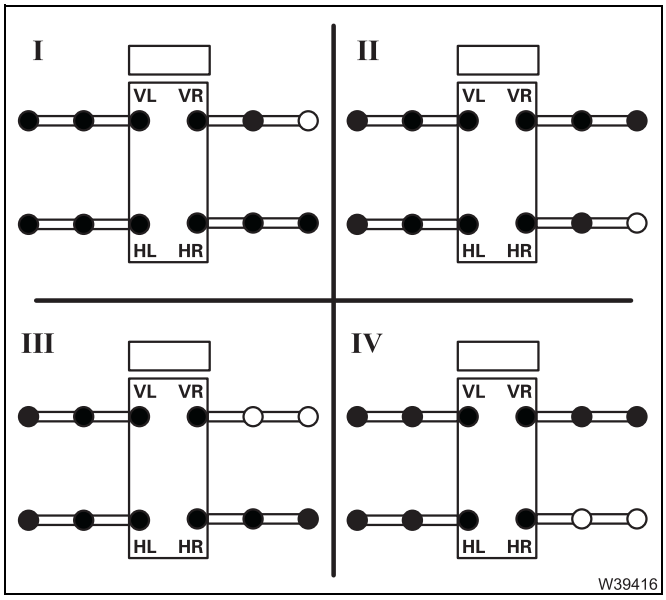


Three / One

– One outrigger span smaller – Left

Three outrigger beams are extended the same distance and one outrigger beam has a smaller outrigger span. The table shows the released combinations.

	FR	FL	RR	RL
I	3.100 m (10.2 ft)	2.200 m (7.2 ft)	3.100 m (10.2 ft)	3.100 m (10.2 ft)
II	3.100 m (10.2 ft)	3.100 m (10.2 ft)	3.100 m (10.2 ft)	2.200 m (7.2 ft)
III	3.100 m (10.2 ft)	1.160 m (3.8 ft)	3.100 m (10.2 ft)	3.100 m (10.2 ft)
IV	3.100 m (10.2 ft)	3.100 m (10.2 ft)	3.100 m (10.2 ft)	1.160 m (3.8 ft)



– One outrigger span smaller – Right

Three outrigger beams are extended the same distance and one outrigger beam at the right side has a smaller outrigger span. The table shows the released combinations.

	FR	FL	RR	RL
I	2.200 m (7.2 ft)	3.100 m (10.2 ft)	3.100 m (10.2 ft)	3.100 m (10.2 ft)
II	3.100 m (10.2 ft)	3.100 m (10.2 ft)	2.200 m (7.2 ft)	3.100 m (10.2 ft)
III	1.160 m (3.8 ft)	3.100 m (10.2 ft)	3.100 m (10.2 ft)	3.100 m (10.2 ft)
IV	3.100 m (10.2 ft)	3.100 m (10.2 ft)	1.160 m (3.8 ft)	3.100 m (10.2 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. 11 - 32.

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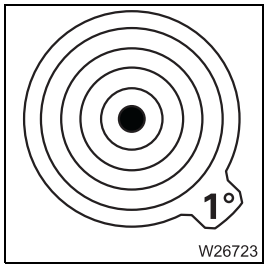
12.5 Operating the outriggers

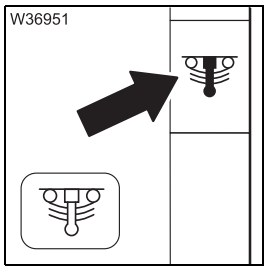
Danger of crushing by extending outrigger beams!
You may only activate the outriggers if you yourself or a banksman with whom you are in visual contact have an unobstructed view of their movements.

12.5.1 CHECKLIST: extending the outriggers

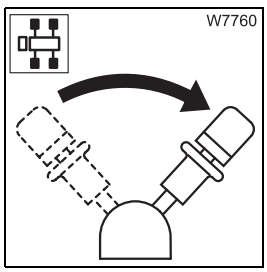
This checklist is not a complete operating manual. There are accompanying operating instructions which are indicated by cross-references.
Observe the warnings and safety instructions there!



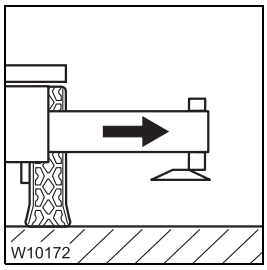
1. Level the truck crane with the level adjustment system and lower it as far as possible; p. 5 - 58.



2. Deactivate (Lock) the suspension – symbol **red** (suspension off); p. 5 - 17.



3. Apply the parking brake; p. 5 - 52.



4. Extend all outrigger beams to the required span;
– For the *Standard* slewing range type; p. 12 - 18
– For the *MAXbase* slewing range type; p. 12 - 22
Setting the spans, p. 12 - 31
Extending/retracting outrigger beams, p. 12 - 33.

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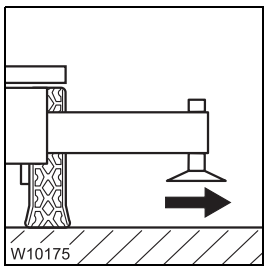
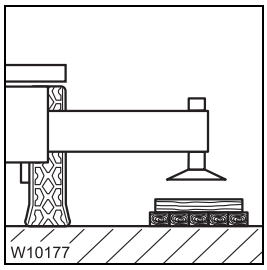
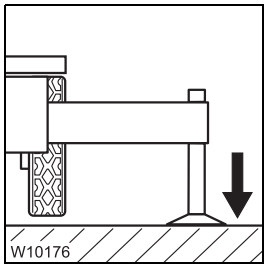


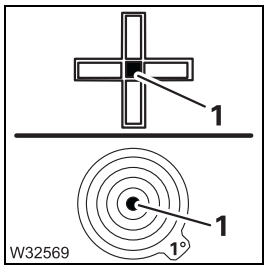
5. Move the outrigger pads into the operating position and secure them;
➠ p. 12 - 37.



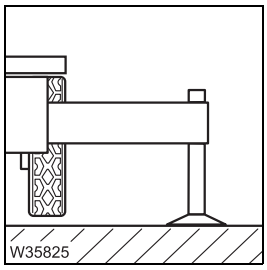
6. Enlarge the load-bearing area if necessary;
➠ *Determining the required load-bearing area*, p. 12 - 9,
➠ *Enlarging the load-bearing area*, p. 12 - 38.



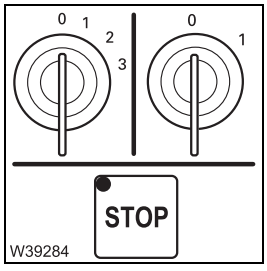
7. Extend the supporting cylinders until none of the wheels is touching the ground;
➠ p. 12 - 39.



8. Level the truck crane with the outriggers.
The lamp (**1**) lights up in the measuring range **1°;** ➠ p. 12 - 43



9. Check that none of the wheels are touching the ground.
Adjust the position if necessary.



10. Switch off the engine;
➠ *In the driver's cab*, p. 4 - 19,
➠ *In the crane cab*, p. 10 - 11
➠ *On the outrigger control units*, p. 4 - 19.

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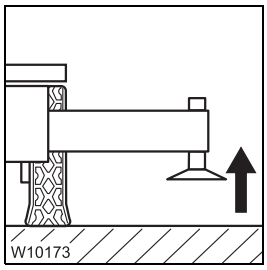
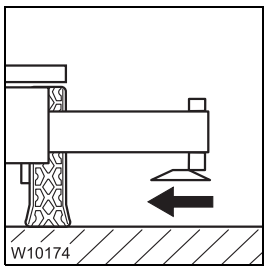
12.5.2 CHECKLIST: retracting the outriggers

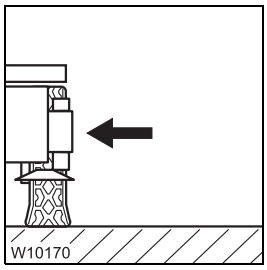
This checklist is not a complete operating manual. There are accompanying operating instructions which are indicated by cross-references.
Observe the warnings and safety instructions there!



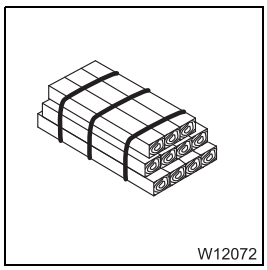
1. Retract the outrigger cylinders as far as possible; ➠ p. 12 - 39.



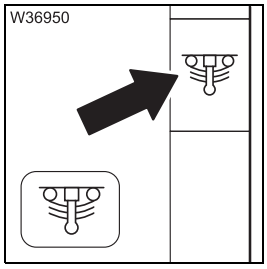
2. Move the outrigger pads into the driving position and secure them;
➠ *Moving into the driving position*, p. 12 - 37.



3. Fully retract and secure all outrigger beams;
➠ *For on-road driving*, p. 12 - 32,
➠ *Extending/retracting outrigger beams*, p. 12 - 33.



4. Stow away packing material safely, if applicable.



5. Switch on suspension (release locking) – symbol **green** (suspension on);
➠ p. 5 - 17.

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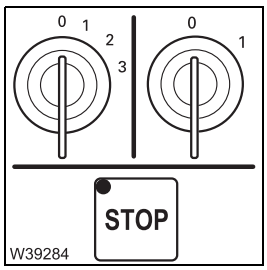
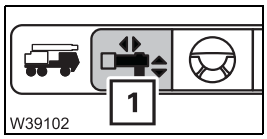


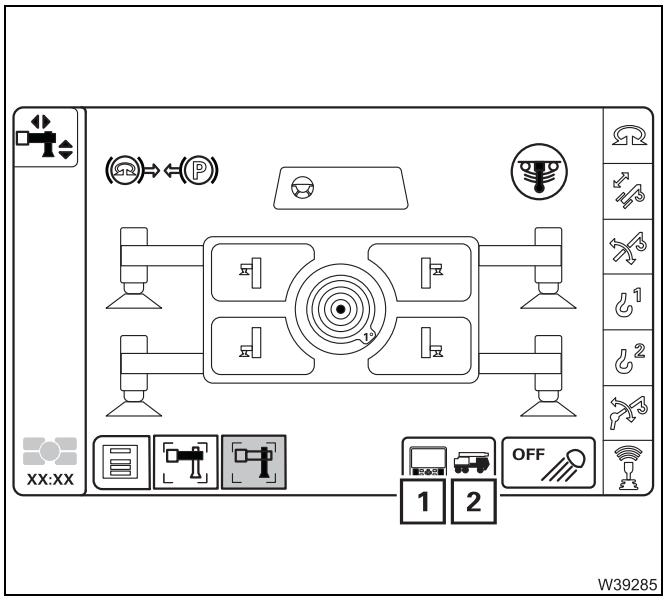
6. Switch off the engine;
➠ *In the driver's cab*, p. 4 - 19,
➠ *In the crane cab*, p. 10 - 11
➠ *On the outrigger control units*, p. 4 - 19.

12.5.3 Preparing the truck crane

You can switch the *Outriggers* control units and *Outrigger lighting* on and off from the crane cab.



- Open the *Outrigger* menu (**1**).



Outrigger control units

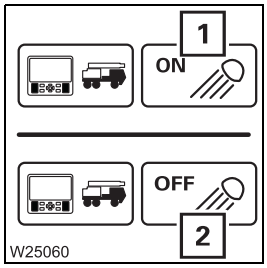
The current status is displayed, either the symbol (**1**) or (**2**) **grey.**

– Switching on
- Select and confirm the symbol (**1**) – symbol (**1**) **red** symbol (**2**) **grey**.

Warning messages on the *CCS* display

– Switching off
- Select and confirm the symbol (**2**) – symbol (**2**) **orange** symbol (**1**) **grey**.

Enable operation on the *CCS* display



Outrigger lighting

– Switching on
Select symbol (**1**) and confirm – *Input mode* on

– Switching off
Select symbol (**2**) and confirm – *Input mode* off.

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12.5.4 Setting the spans

Extend the outrigger beams only as far as the permissible spans.

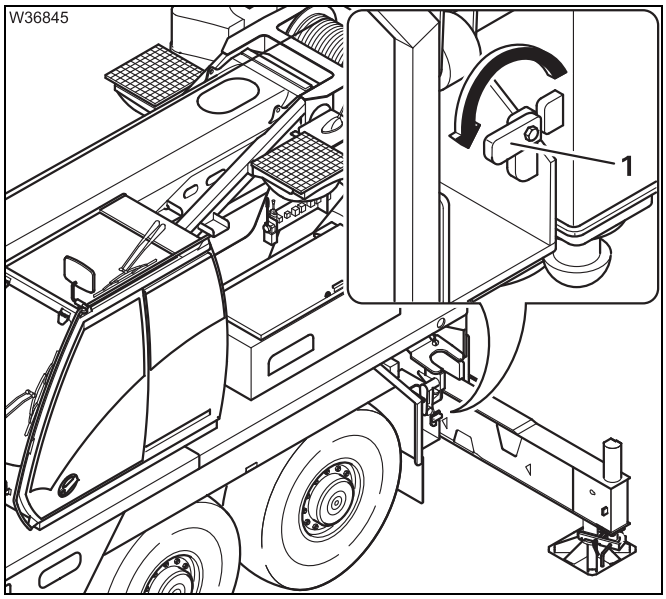
Danger of overturning if the outrigger beams are not correctly extended!
Extend the outrigger beams only as far as the permissible spans.
Always extend all outriggers to the outrigger spans specified in the *Lifting capacity table* for the planned application.
Even when you are only working on one side. Otherwise the rear stability for the rigging mode according to the displayed rigging mode is no longer guaranteed.

Risk of accidents from incorrect or missing markings!
Replace missing and illegible markings. First ask **Manitowoc Crane Care** for the correct position.
This way you prevent the truck crane overturning due to an incorrect outrigger span.

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. 12 - 33.

The illustrations show only the rear right outrigger beam as an exampled, the procedure is the same for the other outrigger beams.

The procedure is identical for the overall width and associated individual width.



Overall width 6.200 m (20.3 ft)
Smallest individual width 3.100 m (10.2 ft)

- Release the outrigger beam – locking bar (**1**) forwards.
- Fully extend the outrigger beam.

For the overall width

- Set the same outrigger span in the same way at the opposite outrigger beam.

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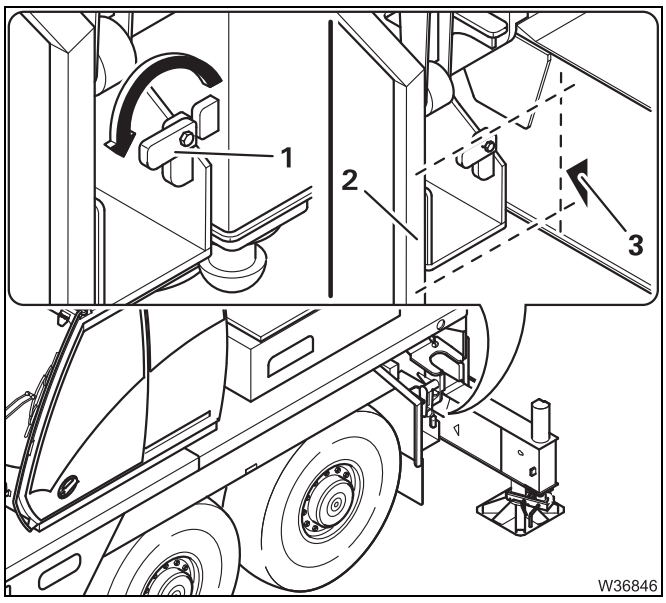
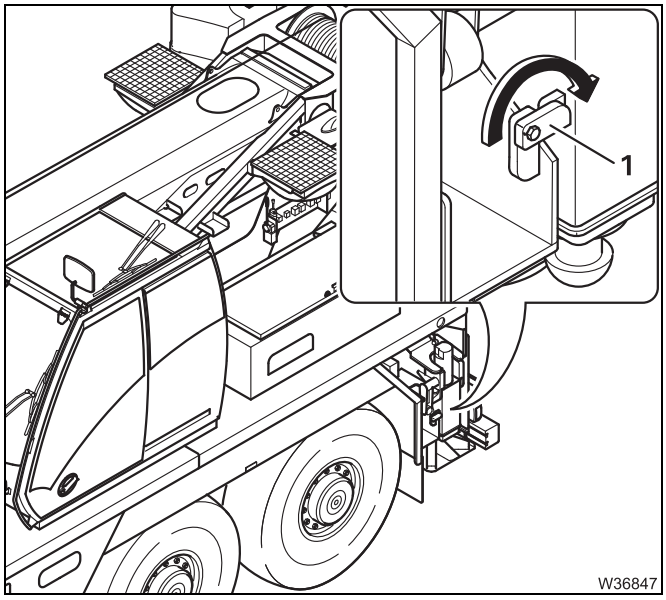


Overall width 4.400 m (14.4 ft)
Smallest individual width 2.200 m (7.2 ft)

- Release the outrigger beam – locking bar (**1**) forwards.
- Extend the outrigger beam until the tip of the marking (**3**) protrudes exactly the same distance from the vehicle chassis as the splash guard (**2**).

For the overall width

- Set the same outrigger span in the same way at the opposite outrigger beam.



Overall width 2.320 m (7.6 ft)
Smallest individual width 1.160 m (3.8 ft)

- Retract the outrigger beam until it reaches the stop.
- Secure the outrigger beam – locking bar (**1**) to the rear.

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 2.320 m (7.6 ft) on all outrigger beams and secure them.
- Bring all the outrigger pads into driving position; ➠ p. 12 - 37.

Risk of accidents due to outrigger beams sliding out
Completely retract all outrigger beams and secure them. This prevents the outrigger beams sliding out when driving around corners and causing serious accidents.

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12.5.5 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 the outrigger beams, always check whether they have been released. This prevents damage to the locking bars.

Risk of damage to driver's cab!
Always bring the outrigger pads to the driving position before retracting the outrigger beams.
This prevents the outrigger pads damaging the driver's cab when the outrigger beams are retracted.

Depending on the rigging, control elements are provided for moving the outrigger beams

– On the *outrigger* control units; ➠ p. 12 - 35,

– In the crane cab; ➠ p. 12 - 35.

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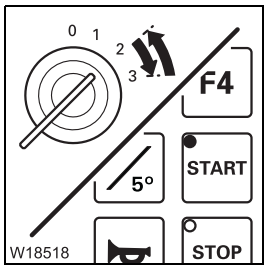
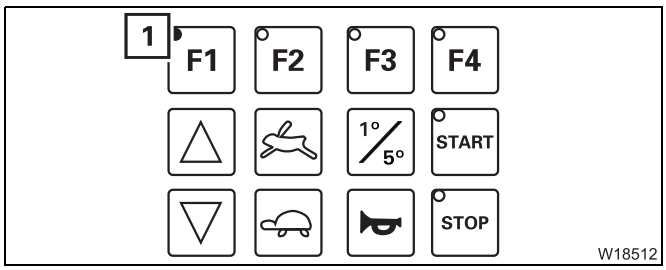
From the control units



Starting the engine

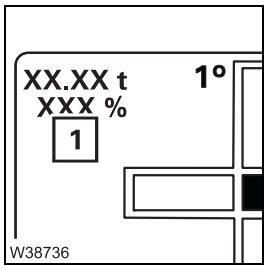
- Start the engine from the driver's cab (➠ p. 4 - 12) or from the *outrigger* control units (➠ p. 4 - 17).



Switching on the lighting

Only the lamp (**1**) lights up after opening the door.

- Press any button.
  The lights are switched on.



Display of the outrigger span

The table gives an overview of what percent (**1**) you have to move the outrigger beam at the control unit to get to the desired outrigger span.

Length specifications		Per cent
Overall widths	**Individual widths**	
6.20 m (20.3 ft)	3.10 (10.2 ft)	100%
4.40 m (14.4 ft)	2.20 (7.2 ft)	51%[1)]
2.32 m (7.6 ft)	1.16 (3.8 ft)	0%

[1)] Specification in the MAXbase lifting capacity table – 50%

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. 12 - 33.

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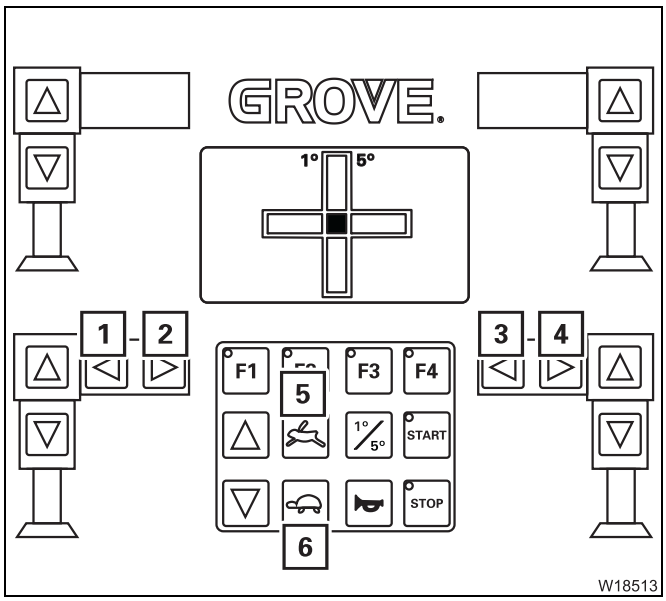


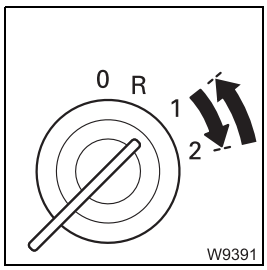
- Press the button
  - **5** For high-speed mode
  - **6** For normal speed.
- Additionally press the button for the desired outrigger beam.
  - **1** Extend left
  - **2** Retract left
  - **3** Retract right
  - **4** Extend right
  - **1 + 4** Extend both
  - **2 + 3** Retract both

The outrigger beams move until you let go of the respective button or until the respective end position has been reached.

From the crane cab

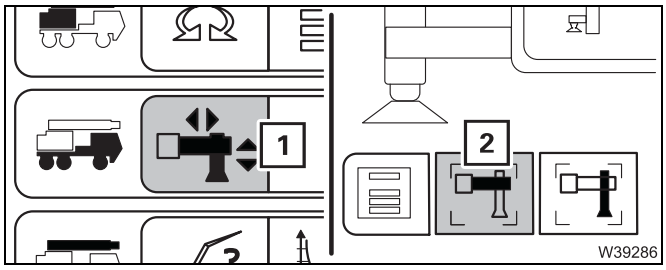
The following operating elements are found in the *Outrigger* menu.

The parking brake is engaged.



Starting the engine

- Start the engine from the crane cab; ➠ p. 10 - 3.
- Switch off the slewing gear; ➠ p. 11 - 126.



Opening the menu

- Open the *Outrigger* menu (**1**).
- Select and confirm the symbol (**2**) – *Move outrigger beams*.

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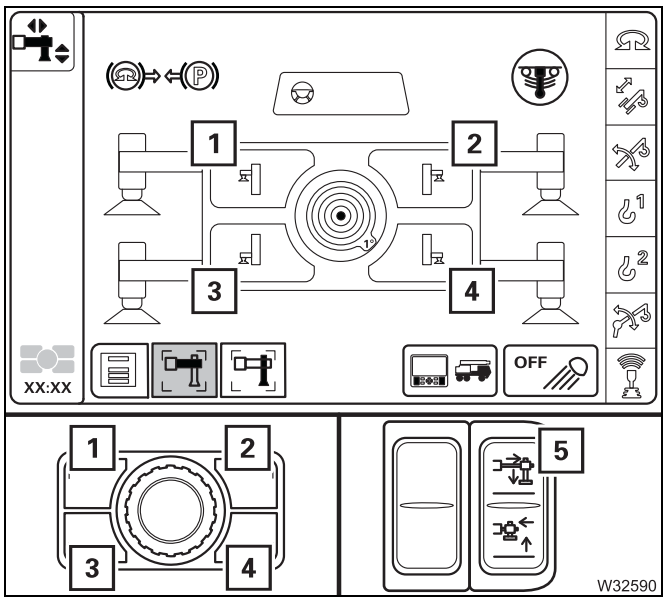
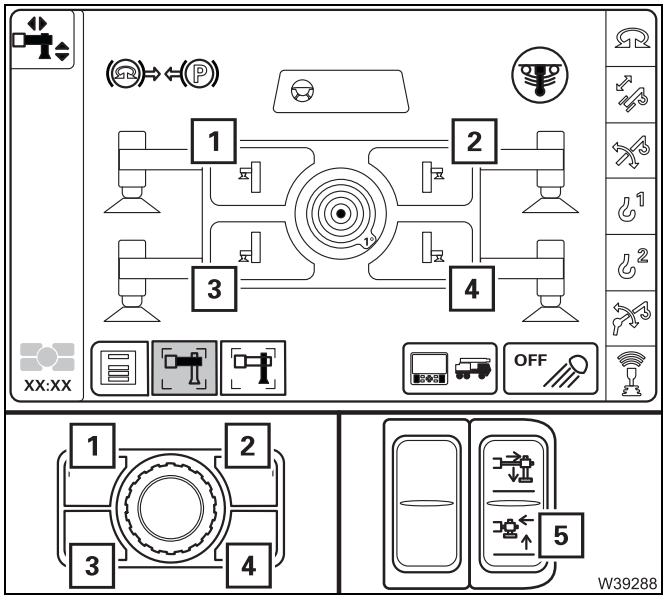


Extending

- 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.



Retracting

- 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.

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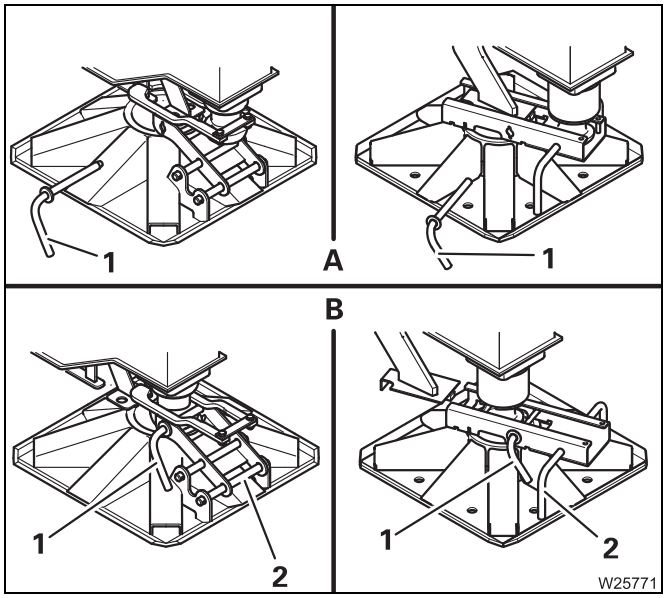
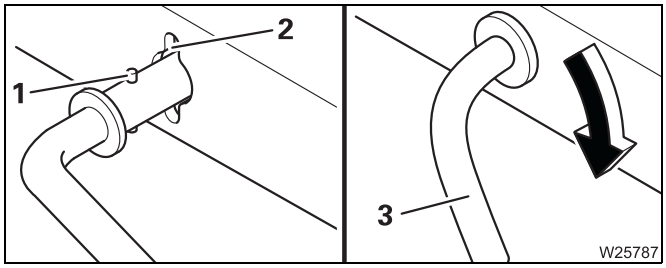
12.5.6 Moving the outrigger pads into operating/driving position



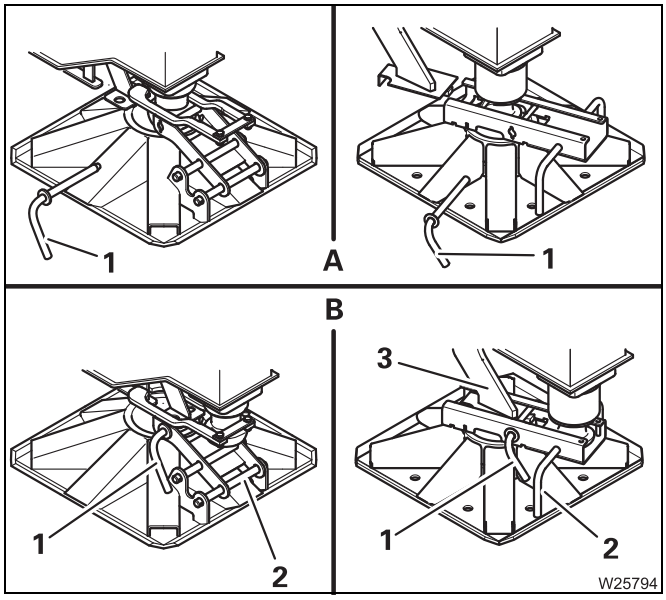
Moving them into operating position

- (**A**) – Pull out the pin (**1**)
- (**B**) – Pull the outrigger pad outwards by the handle (**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 the pin

- Plug the pin with the peg (**1**) through the cutout (**2**).
- Turn the grip (**3**) downwards.



Moving into the driving position

- (**A**) – Pull out the pin (**1**).
- (**B**) – Pull the outrigger pad by the handle (**2**) onto the holder (**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.

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12.5.7 Enlarging the load-bearing area

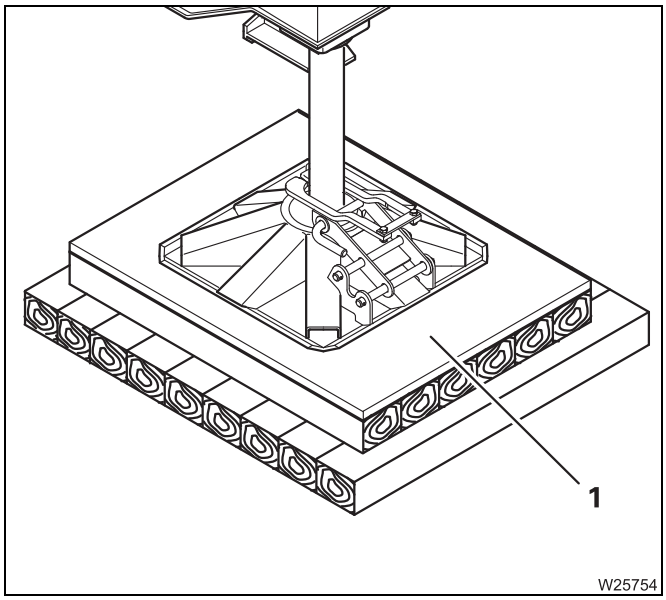
If the surface of the outrigger pads is too small, you must enlarge the load-bearing area by packing the outrigger pads; ➠ *Determining the required load-bearing area*, p. 12 - 9.

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 being 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.

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12.5.8 Extending/retracting supporting cylinders

Danger of overturning due to insufficient load bearing capacity of the ground!
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 points under the boom.
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. 12 - 40,
– In the crane cab; ➠ p. 12 - 41.

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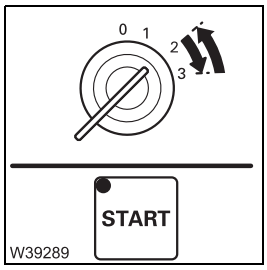
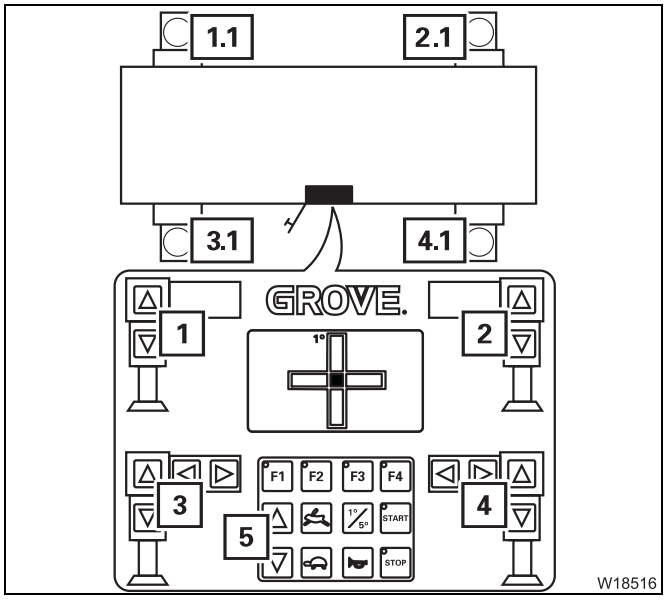
From the control units



Starting the engine

- Start the engine from the driver's cab (p. 4 - 1) or from the control units (p. 4 - 17).



Moving the supporting cylinders

Assignment of buttons:

1 Supporting cylinder **1.1**

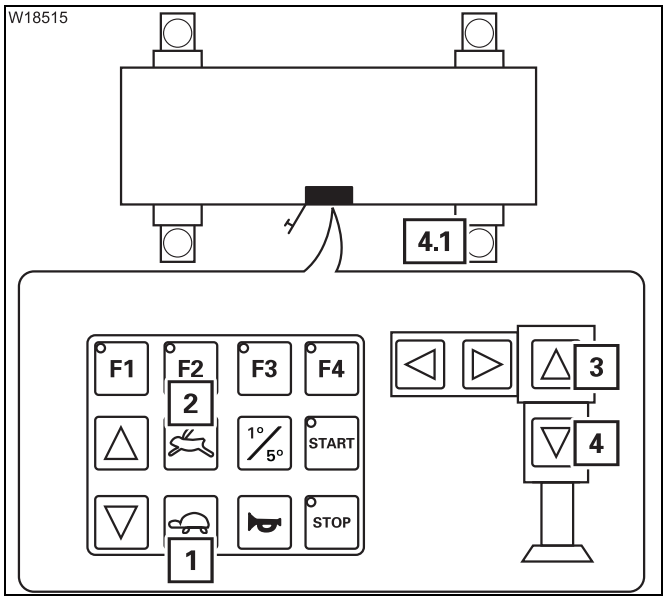
2 Supporting cylinder **2.1**

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. 12 - 39.



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.

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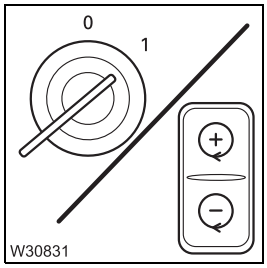
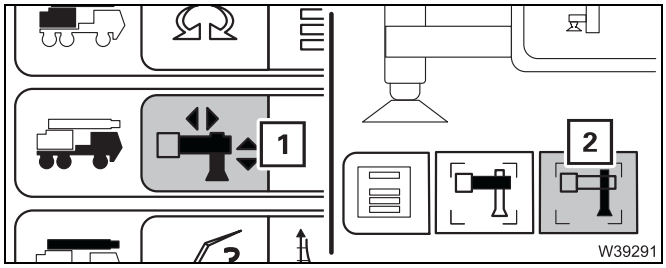
From the crane cab

The following operating elements are found in the *Outrigger*menu.



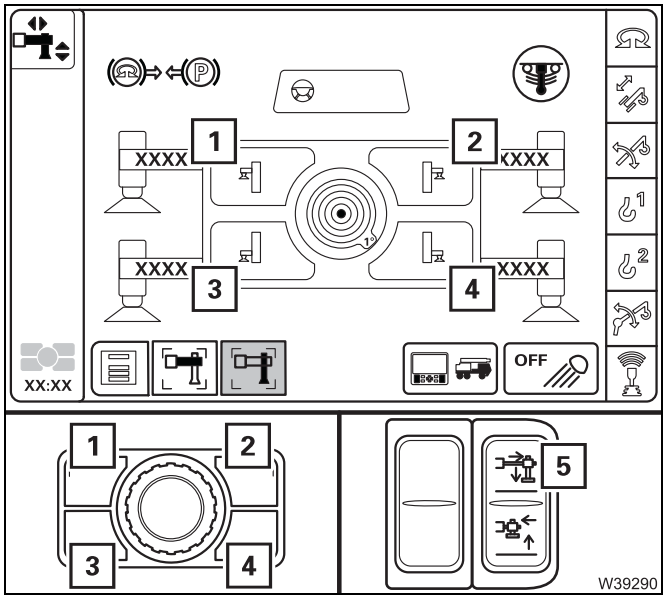
Starting the engine

- Start the engine from the crane cab; ➠ p. 10 - 3.
- Switch off the slewing gear.



Opening the 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
- Also press the button (**5**) in at the top – the selected supporting cylinder extends.

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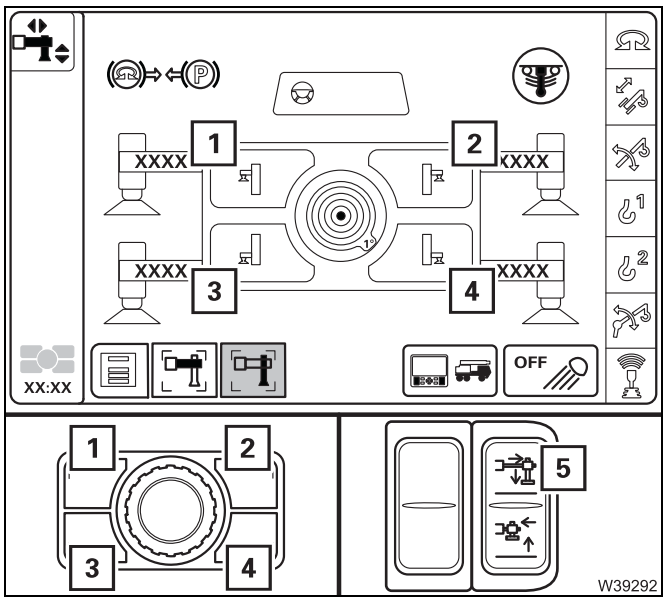

Retracting

- Press the button for the desired outrigger cylinder.
  - **1** Front left
  - **2** Front right
  - **3** Rear left
  - **4** Rear right
- Also press the button (**5**) in at the bottom – the selected supporting cylinder retracts.

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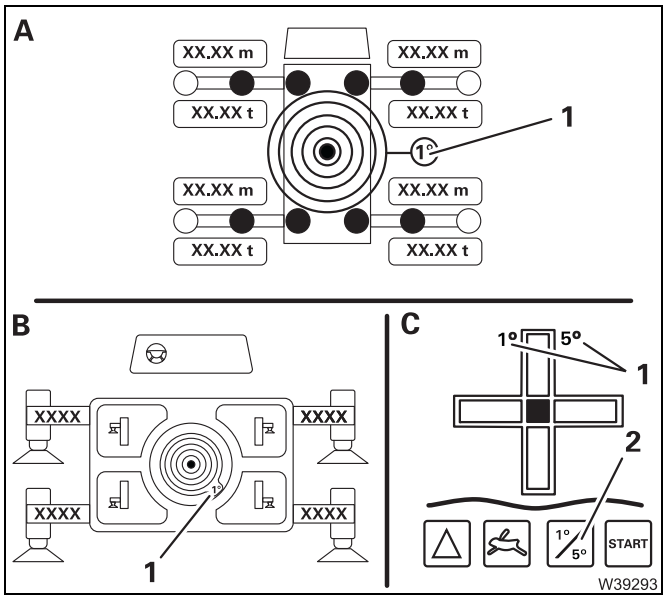
12.5.9 Levelling the truck crane on outriggers horizontally

You must level the truck crane horizontally 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 In the *Monitoring* menu

B In the *Outrigger* menu

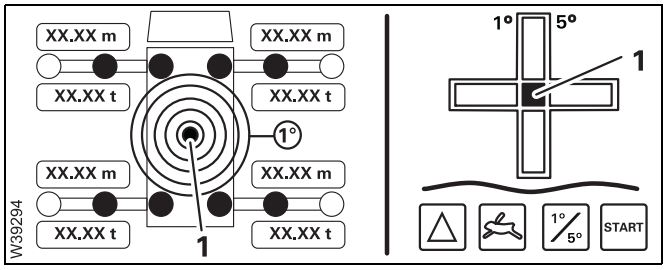
C On the *Outrigger* control units

Switching between measuring ranges

You can change the measuring range between 1° and 5°.

- Press the button (**2**) once.
  The current measuring range (**1**) is displayed.

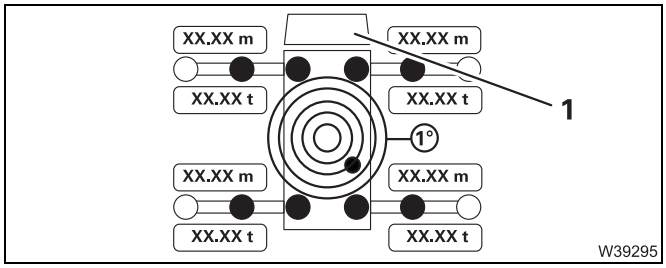
The measuring range is automatically switched in the *Outrigger* menu and the *Monitoring* menu.



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.



– *RCL / 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.

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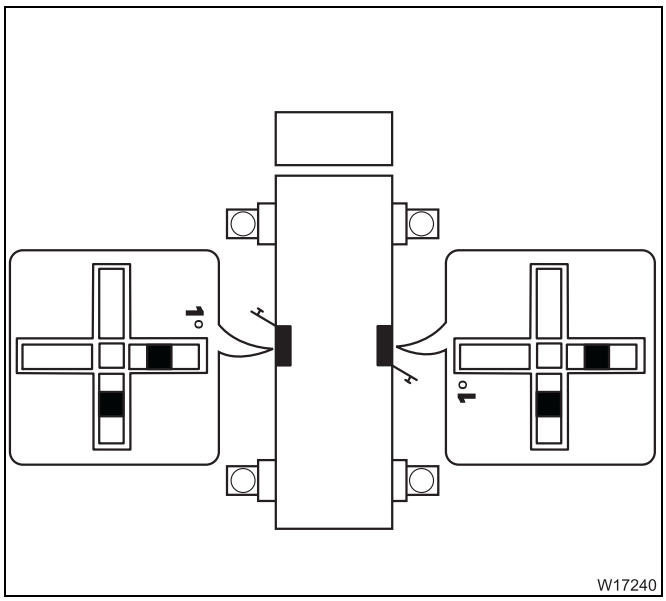


– *Outrigger* control units

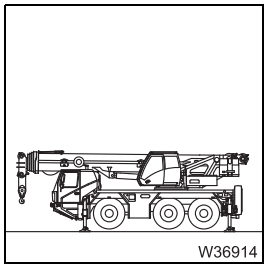
  The assignment to the carrier corresponds to the top view.

  Due to the position of the control units, the displays on both sides differ.

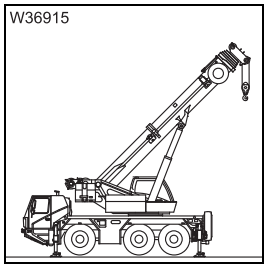
  In this example, the carrier would be standing higher to the rear on the right hand side.

Prerequisites

The following prerequisites apply to manual and automatic alignment.



The main boom is resting in 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 create incorrect results for the inclination and the truck crane will be at an angle. This could cause the boom to become overloaded during crane operation.

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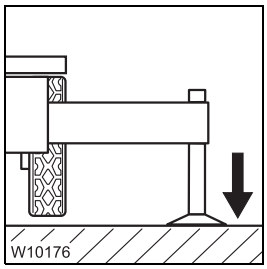
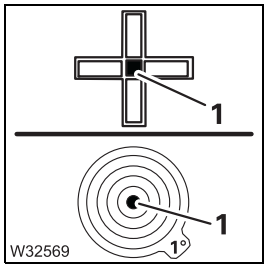
Manual alignment

- Check that the prerequisites are met; ➠ p. 12 - 44.



- 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. 12 - 39.
- 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 accidents 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 allowed by the RCL.

- After you have levelled the truck crane, check:
  - that all the wheels are lifted off the ground.
  - that the ground has not given way under any of the outrigger pads,
  - 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.

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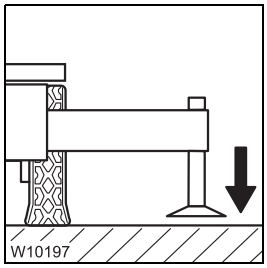
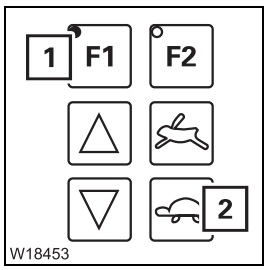
Automatic alignment

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. 12 - 44.



- Extend the supporting cylinders until the outrigger pads are just above the ground

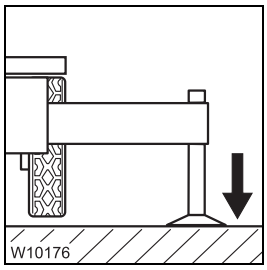


Starting procedure

On the control units

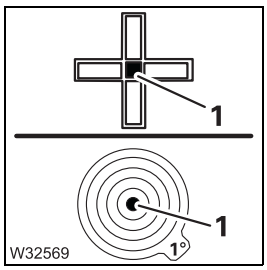
- Press the button (**1**).
- Additionally, press the button (**2**).

The procedure begins.



Automatic procedure

1. All 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

   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.

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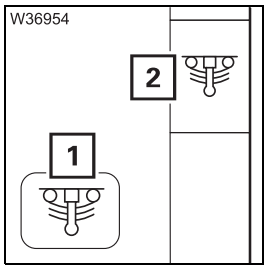
12.5.10 Levelling the free-standing truck crane

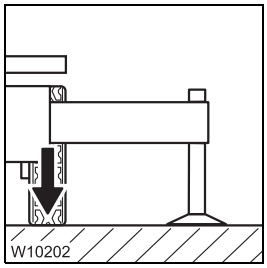
The suspension is deactivated (locked) if the truck crane is in the *Free on wheels* operating position.
The suspension must remain switched off until the truck crane is on outriggers.

Danger of overturning if the supporting cylinders are operated unevenly!
Extend or retract the supporting cylinders as evenly as possible!
This prevents the truck crane overturning while retracting individual outrigger cylinders.

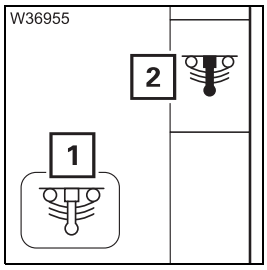


Switching on the suspension

- Select and confirm the symbol (**1**) once.
  The symbol (**2**) is **green** when the suspension is switched on.

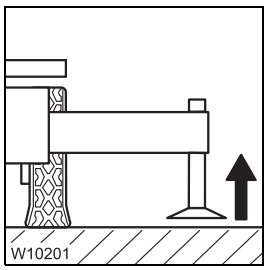


Now all wheels are lowered to the ground and are in the right position for the horizontal alignment



Switching off the suspension

- Select and confirm the symbol (**1**) once.
  The symbol (**2**) is **red** when the suspension is switched off.



To secure the truck crane

- Retract the supporting cylinders until the outrigger pads are about 5 to 10 cm (2 to 4 in) above the ground. Leave the outrigger beams extended.

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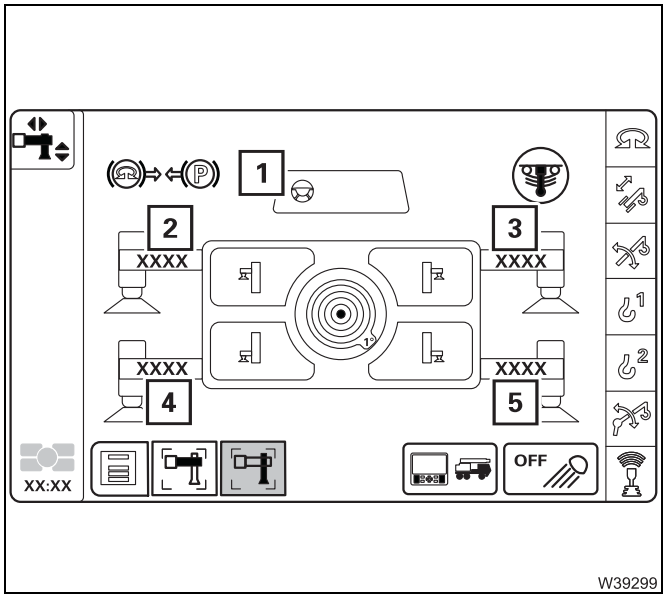
12.5.11 Outrigger pressure display

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. 12 - 43.

After switching on the ignition, the outrigger pressure displays indicate the current outrigger pressure for all supporting cylinders. The value shown has an accuracy of ±10%, therefore the value specified in the outrigger pressure table always determines the load on the ground.
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 nor guarantee protection against overturning or overloading. For this reason, never override the RCL.



In the Outrigger menu

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

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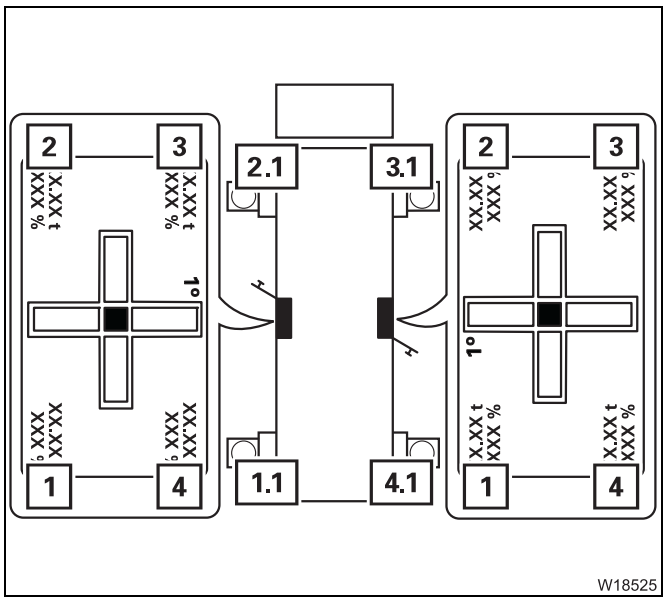

On the outrigger control units

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**

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12.6 Rigging/unrigging the counterweight

For driving, parts of the counterweight must be set down on the counterweight platform, installed on the turntable or removed, depending on the driving mode;
➠ *Driving modes*, p. 6 - 1

12.6.1 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 – on the counterweight platform*.
- 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.

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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.

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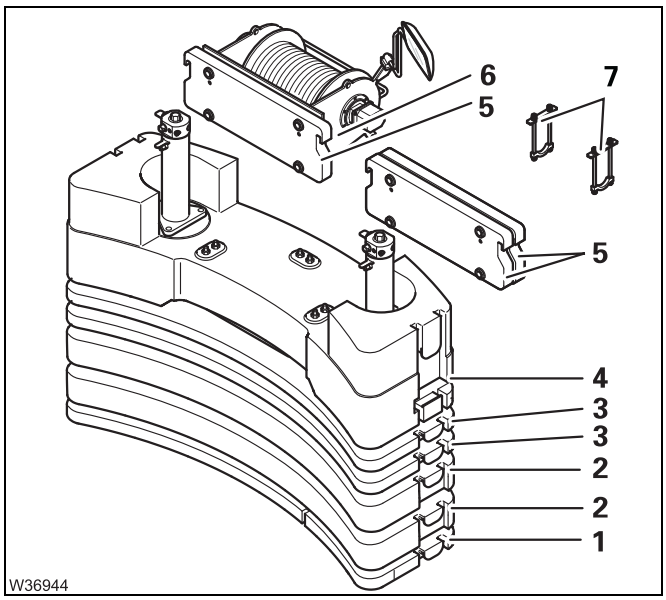
12.6.2 Counterweight sections

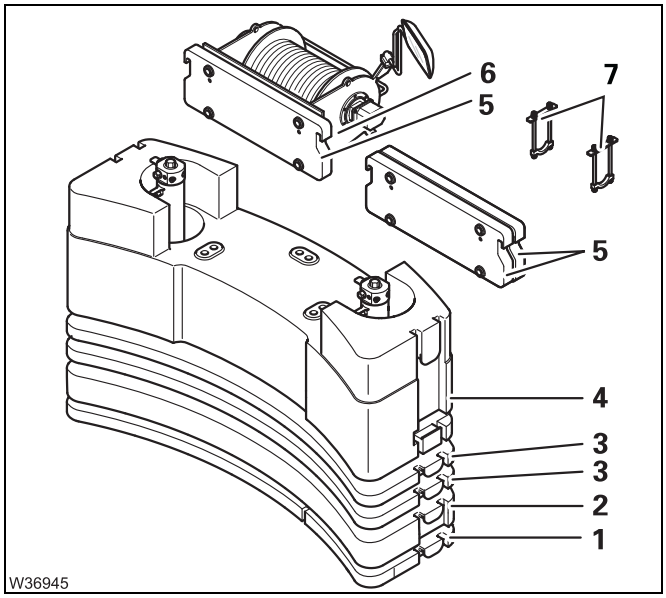
The GMK3060 can be equipped with a counterweight mass of 13.6 t (29,900 lbs). There are two counterweight versions.



Version A

Standard
- One 5.6 t section (**4**) with lifting cylinders,
- Two 0.5 t sections (**5**) **or** the auxiliary hoist (**6**) and one 0.5 t section (**5**),
- One 1.0 t section (**3**)
- two holders (**7**) for fastening counterweight sections to the turntable.

Additional equipment
- One 1.0 t section (**3**)
- Two 2.0 t sections (**2**),
- one 1.0 t base plate (**1**).



Version B

Standard
- One 7.6 t section (**4**) with lifting cylinders,
- Two 0.5 t sections (**5**) **or** the auxiliary hoist (**6**) and one 0.5 t section (**5**),
- One 1.0 t section (**3**)
- two holders (**7**) for fastening counterweight sections to the turntable.

Additional equipment
- Two 1.0 t sections (**3**),
- One 2.0 t section (**2**)
- One 1.0 t base plate (**1**).

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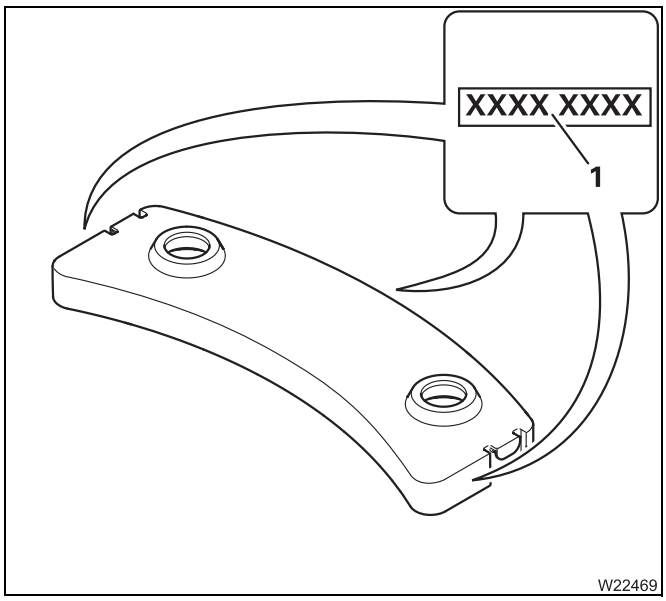
12.6.3 Identification

The truck crane and its corresponding counterweight sections are labelled with the same serial number.

Danger if counterweight sections are interchanged!
Use only counterweight sections that belong to your truck crane. The truck crane and counterweight sections are labelled with the same serial number.
Other or additional counterweight sections may not be rigged.



The serial number (**1**) is situated on all counterweight sections on the back in the middle or above the weight specification.

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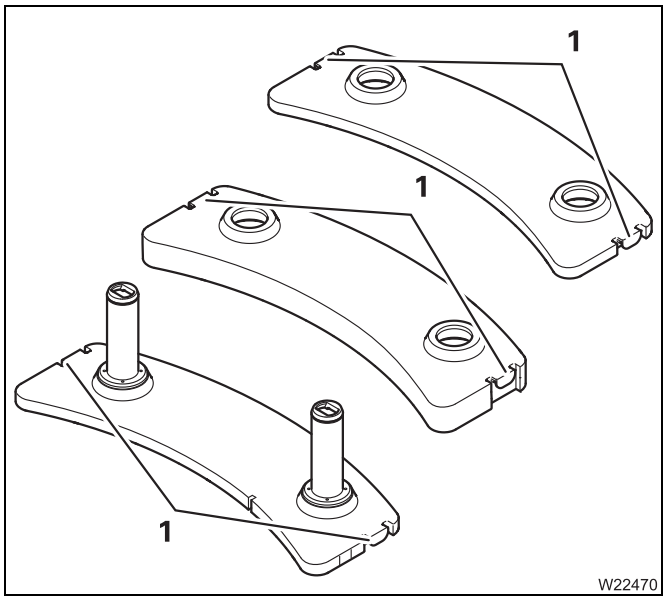
12.6.4 Slinging points on the counterweight sections

Risk of accident if used improperly!
Attach the lifting gear to various counterweight section only at the appropriate slinging points. Ensure the lifting gear has sufficient load bearing capacity. Only lift the sections one by one, since the slinging points are not designed for lifting stacked sections.

- Only use lifting gear of sufficient load bearing capacity.
  Weights; ➠ *Counterweight sections*, p. 1 - 11.



- Attach the counterweight sections at the slinging points (**1**).

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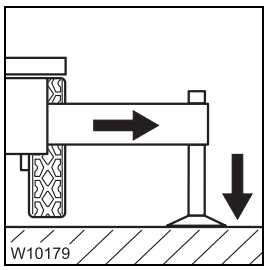
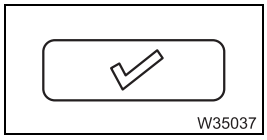
12.6.5 CHECKLIST: Rigging the counterweight

This checklist is not a complete operating manual. There are accompanying operating instructions which are indicated by cross-references.
Observe the warnings and safety instructions there!

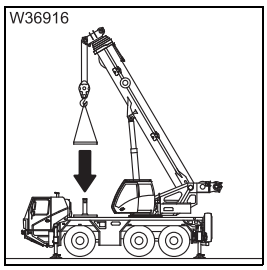
Danger of overturning when slewing with a rigged counterweight!
Always check before slewing whether slewing is permitted in the truck crane's current rigging mode (counterweight, outrigger span, working radius).
Correct the rigging mode if necessary; ➠ *Slewing with a rigged counterweight*, p. 12 - 76.



1. The truck crane is stabilised with the outrigger span required for crane work according to the *Load capacity table*. Enabled outrigger spans
– For the *Standard* slewing range type; ➠ p. 12 - 18
– For the *MAXbase* slewing range type; ➠ p. 12 - 22



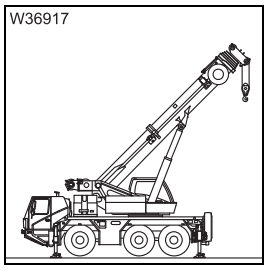
2. Enter and confirm the current rigging mode; ➠ p. 11 - 36.



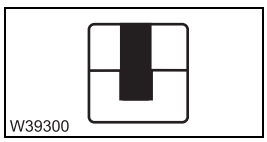
3. Assemble the required combination of counterweights:

➠ *Slinging points on the counterweight sections*, p. 12 - 55

➠ *Assembling counterweight versions – on the counterweight platform*, p. 12 - 62



4. Slew the superstructure to the *0° to the rear* position.



5. Lock the turntable; ➠ p. 11 - 18.

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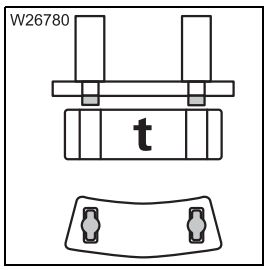
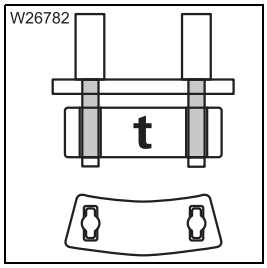
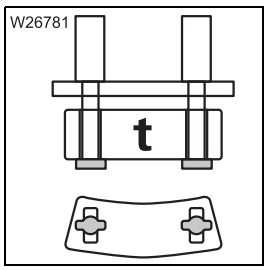


6. – Open *Counterweight* menu

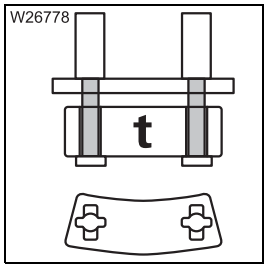
– Check the position of the lifting cylinders and, if necessary, turn into the *Unlocked* position; ➠ *Locking/Unlocking the counterweight*, p. 12 - 71.



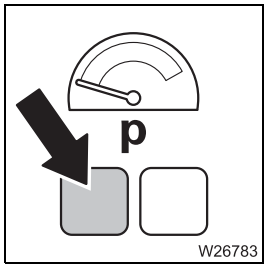
7. Extend the lifting cylinders – to the end position *Extended*; ➠ *Extending/retracting the lifting cylinders*, p. 12 - 69.



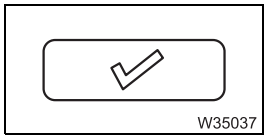
8. Lock the lifting cylinders – to the end position *Locked*; ➠ *Locking/Unlocking the counterweight*, p. 12 - 71.



9. Lift the counterweight combination by retracting the lifting cylinders – to the end position *Retracted*; ➠ *Extending/retracting the lifting cylinders*, p. 12 - 69.



10. Further retract the counterweight lifting cylinder towards the end position – until the *Charging pressure* display lights up in **green**; ➠ *Extending/retracting the lifting cylinders*, p. 12 - 69.



11. Enter and confirm the current rigging mode with the new rigged counterweight combination; ➠ p. 11 - 36.

12. Only switch on the slewing gear if slewing is permissible for the current outrigger span; ➠ *Slewing with a rigged counterweight*, p. 12 - 76

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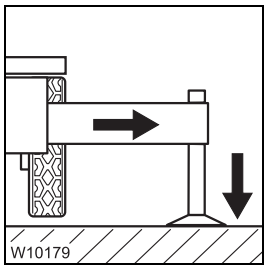
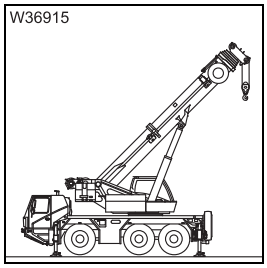
12.6.6 CHECKLIST: Unrigging the counterweight

This checklist is not a complete operating manual. There are accompanying operating instructions which are indicated by cross-references.
Observe the warnings and safety instructions there!

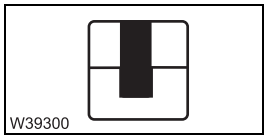
Danger of overturning when slewing with a rigged counterweight!
Before slewing with the rigged counterweight, check that slewing is permissible with the rigged outrigger span or with the truck crane free on wheels;
➠ *Slewing with a rigged counterweight*, p. 12 - 76.



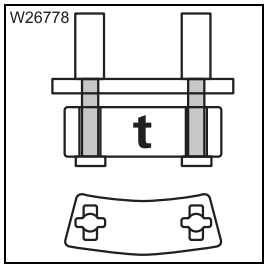
1. The truck crane is stabilised with the outrigger span required for crane work according to the *Load capacity table*. Enabled outrigger spans
– For the *Standard* slewing range type; ➠ p. 12 - 18
– For the *MAXbase* slewing range type; ➠ p. 12 - 22



2. Slew the superstructure to the *0° to the rear* position;



3. Lock the turntable; ➠ p. 11 - 18.



4. – Open *Counterweight* menu;
– Lower the counterweight combination by retracting the lifting cylinders – until the end position *Extended*; ➠ *Extending/retracting the lifting cylinders*, p. 12 - 69.

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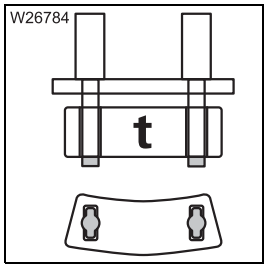
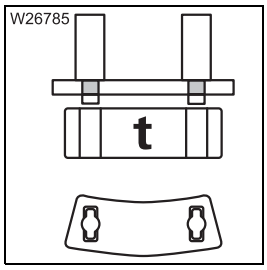
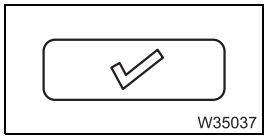


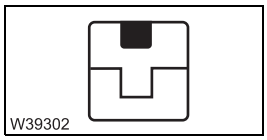
5. Unlock the lifting cylinders – to the end position *Unlocked*;
➠ *Locking/Unlocking the counterweight*, p. 12 - 71.



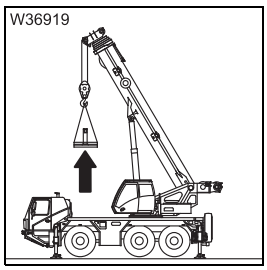
6. Retract the lifting cylinders – to the end position *Retracted*;
➠ *Extending/retracting the lifting cylinders*, p. 12 - 69.



7. Enter and confirm the current rigging mode with the currently rigged counterweight combination; ➠ p. 11 - 36.



8. Unlock the turntable; ➠ p. 11 - 18.



9. Lift the counterweight sections off the counterweight platform, as required by the respective driving mode;

➠ *Slinging points on the counterweight sections*, p. 12 - 55,

➠ *Driving modes*, p. 6 - 1.

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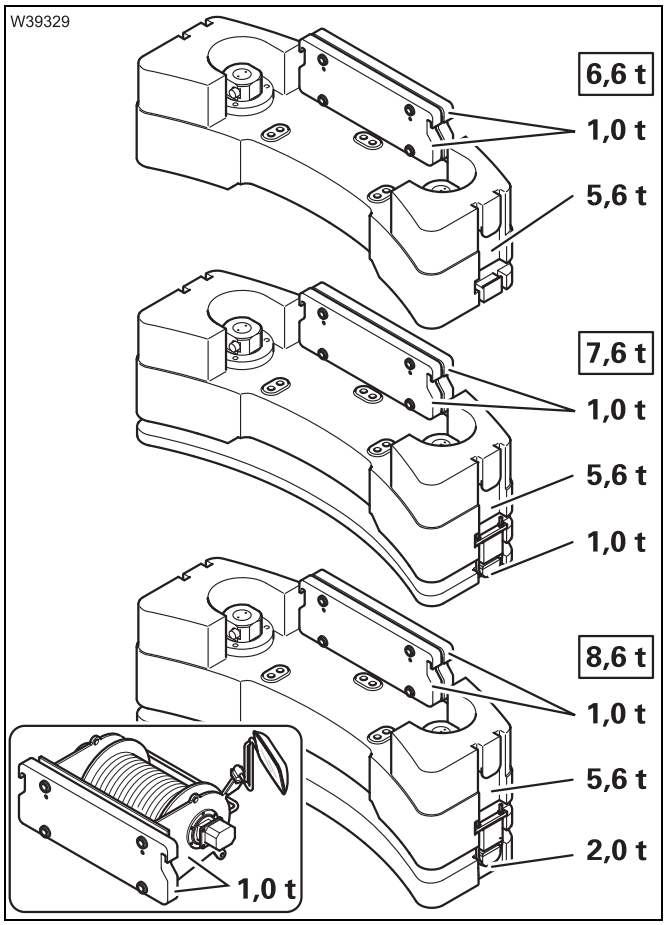
12.6.7 Assembling counterweight versions – on the turntable

Danger of overturning when slewing with a rigged counterweight!
You may only slew the superstructure with a rigged counterweight if an outrigger span of sufficient size is rigged. Support the truck crane accordingly and confirm the rigging mode at the *RCL*; ➠ *Slewing with a rigged counterweight*, p. 12 - 76.
This prevents the truck crane overturning when slewing.

If more than 7.6 t (16,700 lbs) counterweight is mounted on the turntable then the axle load when driving is greater than 12 t (26,500 lbs); ➠ *Table for a maximum axle load of 12 t (26,500 lbs)*, p. 6 - 3.



Version A

– **6.6 t (14,500 lbs),**
Fixed on the turntable

– **7.6 t (16,700 lbs)**
1.0 t section mounted on the turntable with holders; ➠ p. 12 - 72.

– **8.6 t (18,900 lbs)**
2.0 t section mounted on the turntable with holders; ➠ p. 12 - 72.

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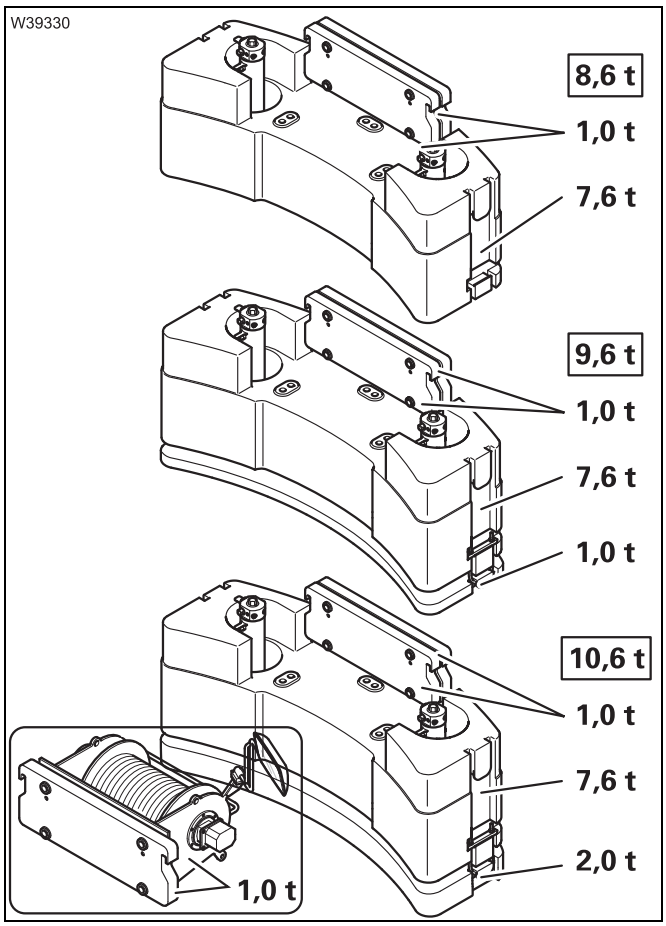

Version B

– **8.6 t (18,900 lbs)**
  Fixed on the turntable

– **9.6 t (21,100 lbs)**
  1.0 t section mounted on the turntable with holders; ➠ p. 12 - 72.

– **10.6 t (23,300 lbs),**
  2.0 t section mounted on the turntable with holders; ➠ p. 12 - 72.

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12.6.8 Assembling counterweight versions – on the counterweight platform

Danger of overturning when slewing with a rigged counterweight!
You may only slew the superstructure with a rigged counterweight if an outrigger span of sufficient size is rigged. Support the truck crane accordingly and confirm the rigging mode at the *RCL*; ➠ *Slewing with a rigged counterweight*, p. 12 - 76.
This prevents the truck crane overturning when slewing.

Risk of accidents!
Combine the counterweights with each other only in the way prescribed in this chapter and in the *Lifting capacity table*. Other combinations are not permitted.
If other versions are assembled, the truck crane is no longer protected against overloading by the RCL.

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 from the counterweight platform that could become jammed or crushed!

Risk of crushing when slewing the superstructure!
The access ladders are located in the slewing range of the superstructure.
Make sure nobody uses the access ladders (helpers for example) whilst you are lifting a section on to the counterweight platform.

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.

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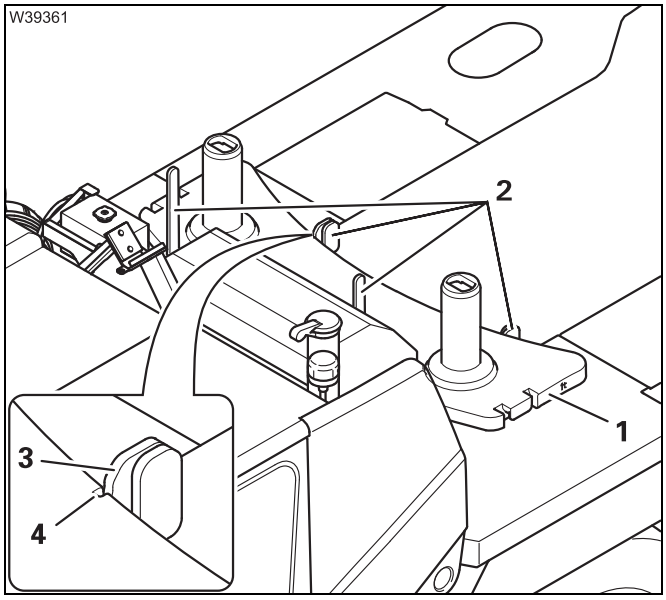
Setting down the 1.0 t base plate



For version A and B

Only the 1.0 t base plate (**1**) may be set down directly on the counterweight platform.

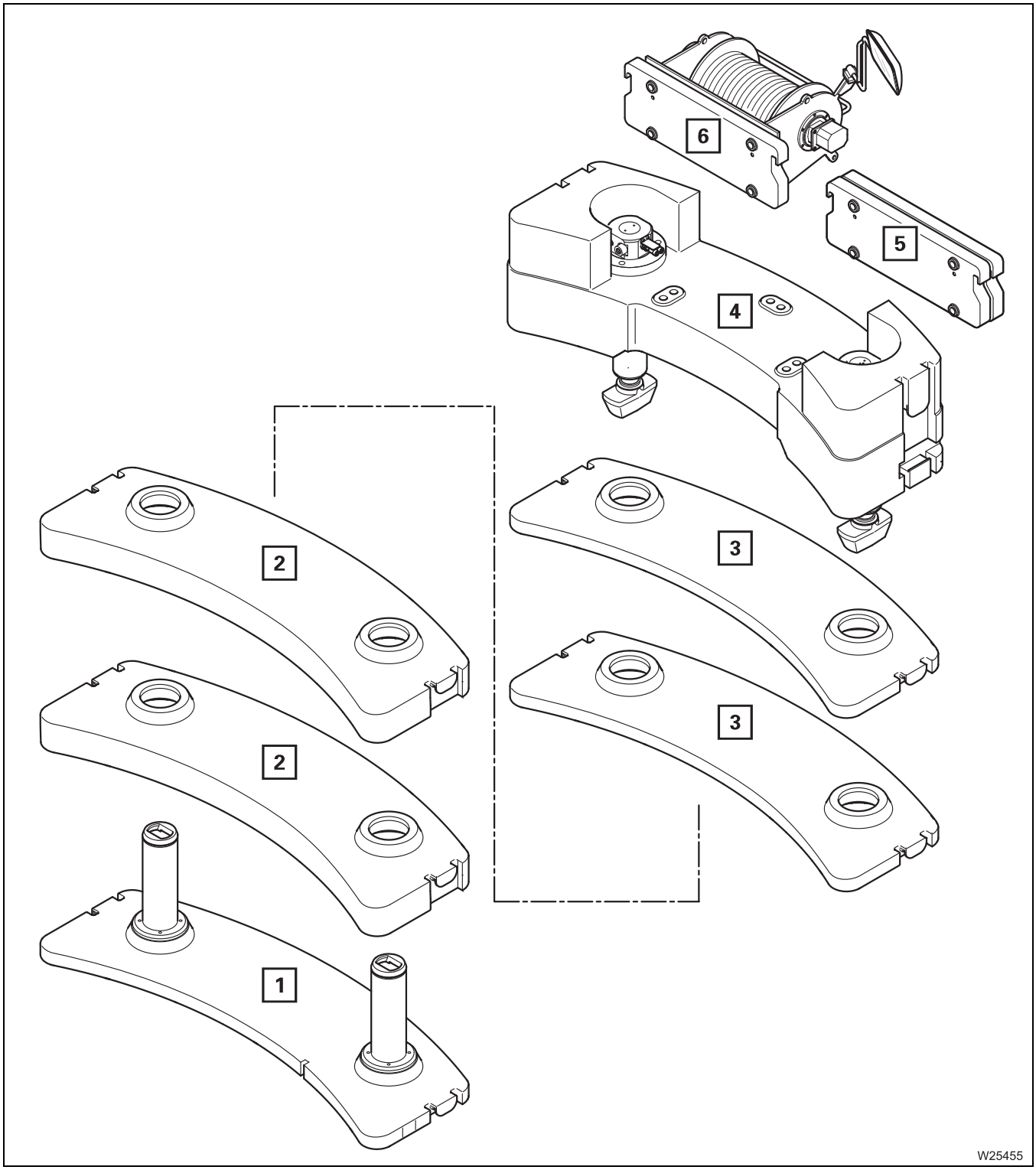
The retaining sheets (**2**) on the counterweight platform bring the 1.0 t base plate into the right position for rigging.

- Position the 1.0 t base plate in such a way that the recess (**4**) engages in the rear retaining sheet (**3**),

For larger counterweight combinations, now set additional counterweight sections onto the 1.0 t base plate.

Version A

The illustration and the table show all counterweight sections and all counterweight combinations which can be rigged.



- Lift the counterweight sections onto the base plate;
  ➠ *Slinging points on the counterweight sections*, p. 12 - 55.

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Counterweight combination in t (lbs)	Counterweight sections in t (lbs)				
	1.0 (2,205) [1]	2.0 (4,410) [2]	1.0 (2,205) [3]	5.6 (12,345) [4]	1.0 (2,205) [5]
6.6 (14,00)	–	–	–	●	●[1)]
7.6 (16,700)	–	–	●[2)]	●	●[1)]
	●	–	–	●	●[1)]
8.6 (18,900)	–	●[2)]	–	●	●[1)]
	●	–	●[3)]	●	●[1)]
9.6 (21,160)	●		2 x[4)]	●	●[1)]
	●	●[3)]	–	●	●[1)]
10.6 (23,360)	●	●[5)]	●[5)]	●	●[1)]
11.6 (25,500)	●	●[5)]	2 x[5)]	●	●[1)]
12.6 (27,770)	●	2 x[5)]	●[5)]	●	●[1)]
13.6 (29,980)	●	2 x[5)]	2 x[5)]	●	●[1)]

1) 1 x [6] can also be used instead of 1 x [5]

2) Must be installed on the turntable

3) Can also be installed on the turntable

4) 1 x [3] can be installed on the turntable

5) 1 x [3] or 1 x [2] can be installed on the turntable

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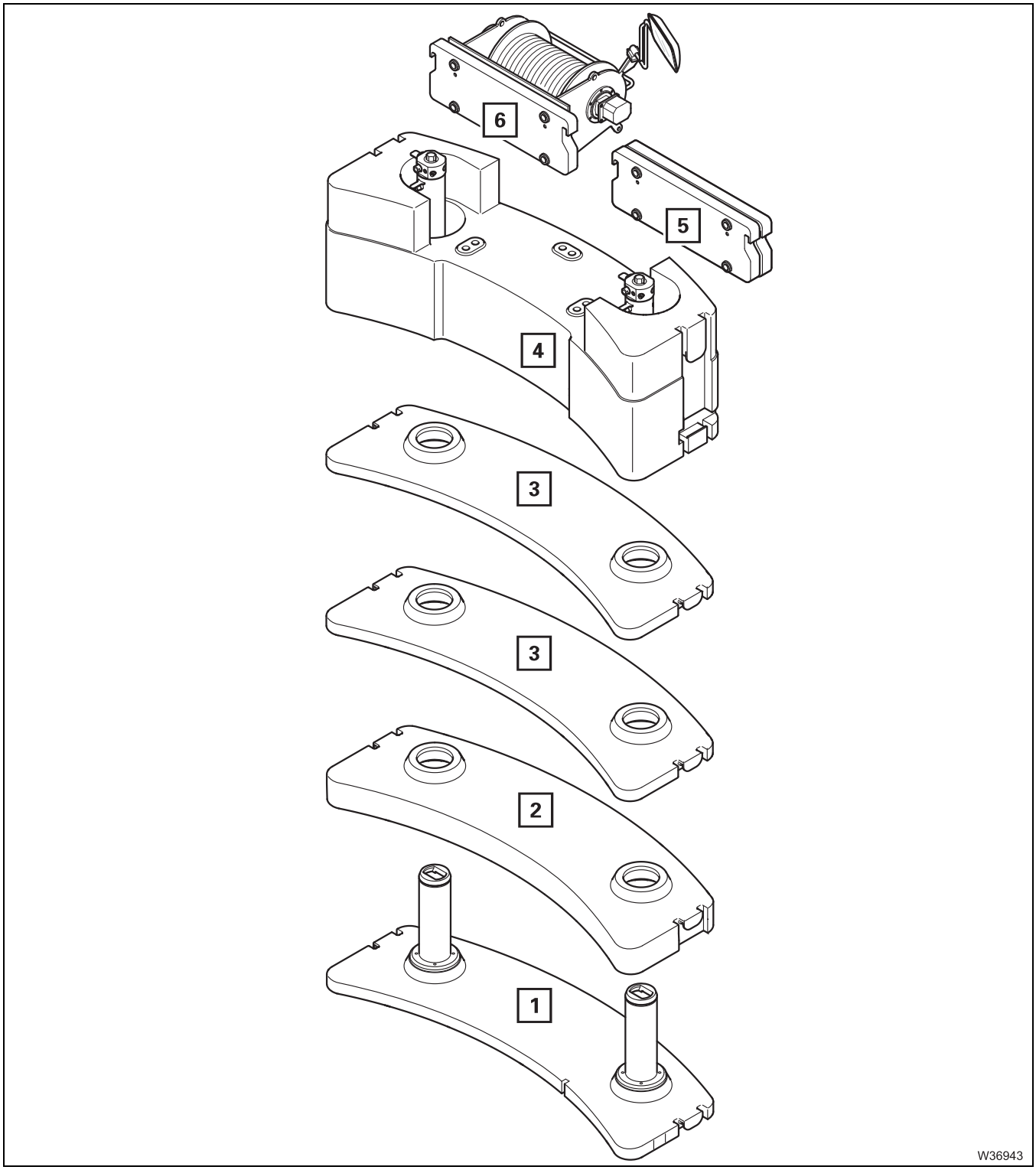
Version B

The illustration and the table show all counterweight sections and all counterweight combinations which can be rigged.



- Lift the counterweight sections onto the base plate; ➠ *Slinging points on the counterweight sections*, p. 12 - 55.

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Counterweight combination in t (lbs)	Counterweight sections in t (lbs)				
	1.0 (2,205) [1]	2.0 (4,410) [2]	1.0 (2,205) [3]	7.6 (16,755) [4]	1.0 (2,205) [5]
8.6 (18,900)	–	–	–	●	●[1)]
9.6 (21,160)	–	–	●[2)]	●	●[1)]
	●	–	–	●	●[1)]
10.6 (23,360)	–	●[2)]	–	●	●[1)]
	●	–	●[3)]	●	●[1)]
11.6 (25,500)	●		2 x[4)]	●	●[1)]
	●	●[3)]	–	●	●[1)]
12.6 (27,770)	●	●[5)]	●[5)]	●	●[1)]
13.6 (29,980)	●	●[5)]	2 x[5)]	●	●[1)]

1) 1 x [6] can also be used instead of 1 x [5]

2) Must be installed on the turntable

3) Can also be installed on the turntable

4) 1 x [3] can be installed on the turntable

5) 1 x [3] or 1 x [2] can be installed on the turntable

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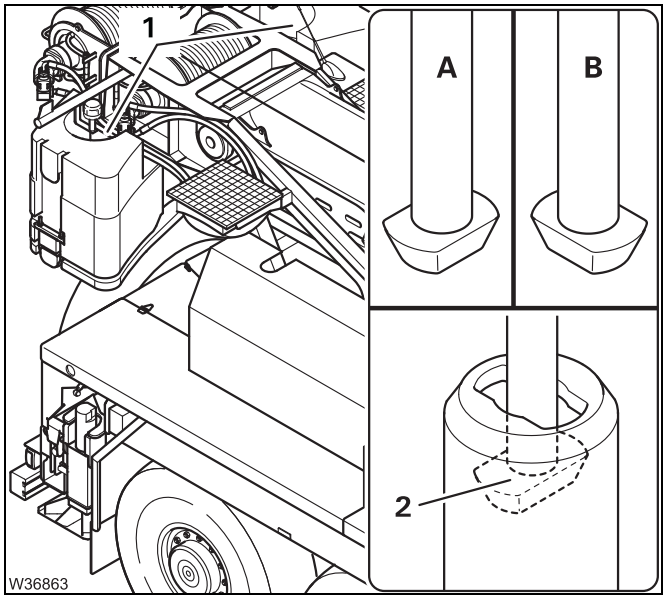
12.6.9 Counterweight hoist unit



The lifting cylinders (**1**) can be

– extended and retracted and

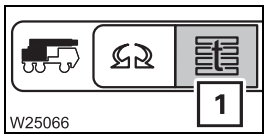
– turned to the positions *Locked* (**A**) or *Unlocked* (**B**).

To lift and lower the counterweight, the lifting cylinders have to be locked into the plate (**2**).

Risk of crushing when lifting and lowering the counterweight
Remove all objects from the sections and the counterweight platform before raising/lowering.
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.



Opening the menu

- Open the *Counterweight* menu (**1**).

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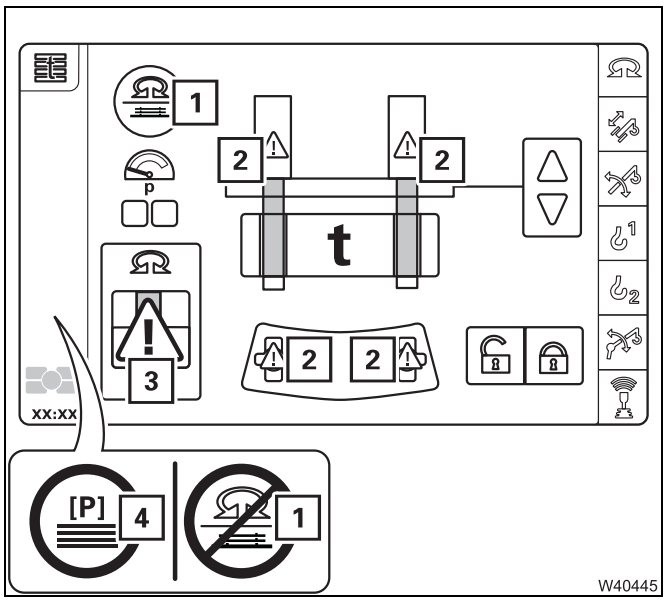


The *Counterweight* menu opens.

Errors and warning messages can be shown for operation.

1 Slewing disabled – pre-tension the counterweight; ➠ p. 12 - 70.

2 Contact **Manitowoc Crane Care**

3 Turntable unlocked – lock the turntable; ➠ p. 11 - 18.

4 If the pre-tensioning pressure continues to drop, the message (**1**).

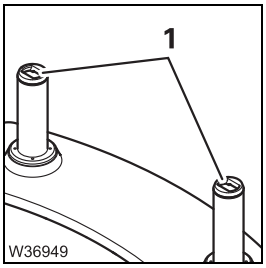
Extending/ retracting the lifting cylinders

Extending and retracting is only enabled when:

– both lifting cylinders are in the *locked* or *unlocked* position and

– the turntable is locked.

Extending the lifting cylinders



If the lifting cylinders (**1**) are to moved into the cutouts, then the lifting cylinders have to be in the (*Unlocked*) position.

Is the lifting cylinders are in the *Locked* position, then you have to:
– lock the superstructure in the *180° to the front* position,
– extend the lifting cylinders,
– turn the lifting cylinders into the *Unlocked* position; ➠ p. 12 - 71,
– retract the lifting cylinders,
– lock the superstructure in the *0° to the rear* position.

Risk of damage to the hoist unit
The hoist unit can become damaged by moving the lifting cylinders against the plate in the *Locked* position.

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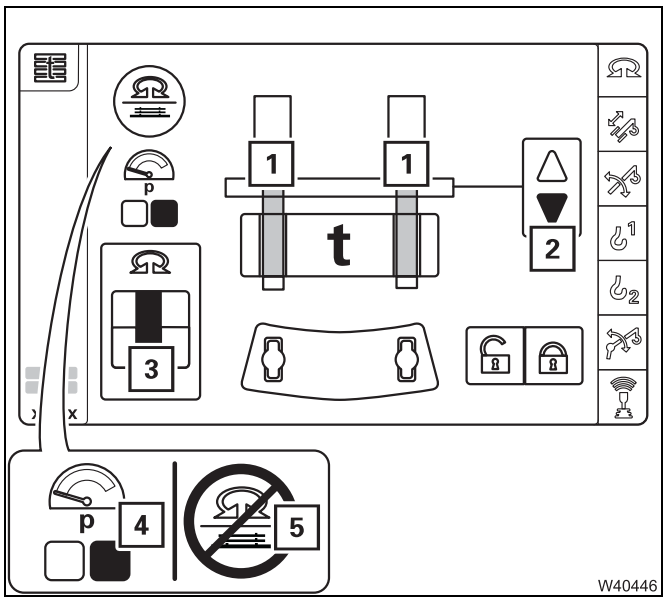


The turntable is locked – display (**3**) **green**.

- Select and confirm the symbol (**2**).

  The lifting cylinder (**1**) extends:

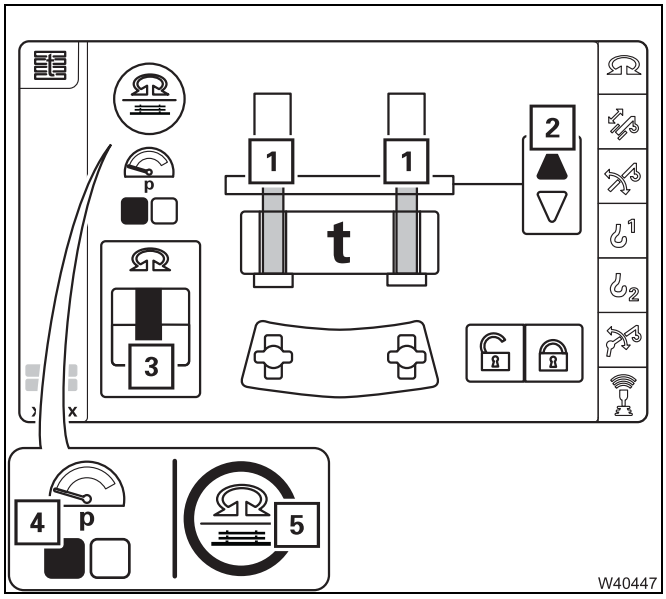
  – **Yellow:** Intermediate position

  – **Green:** Extended

Rigged and not bolted sections are now lowered.

– The display (**4**) is **red.**

– Display symbol (**5**) – slewing disabled.



Retracting the lifting cylinders

The turntable is locked – display (**3**) **green**.

- Select and confirm the symbol (**2**).

  The lifting cylinders (**1**) retract.

  – **Yellow:** Intermediate position

  – **Green:** Retracted

Pre-tension counterweight

- Retract the lifting cylinders until the display (**4**) is **green**.

  Display symbol (**5**) – slewing enabled.

The counterweight which is needed for crane operation will now be pulled under the turntable with pressure.

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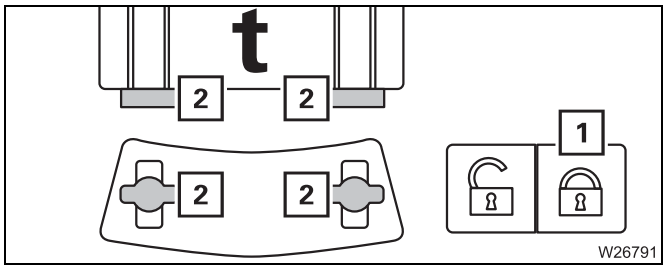
Locking/ Unlocking the counterweight

The switch between the positions *Locked* and *Unlocked* will only be released with the lifting cylinders have been extended.



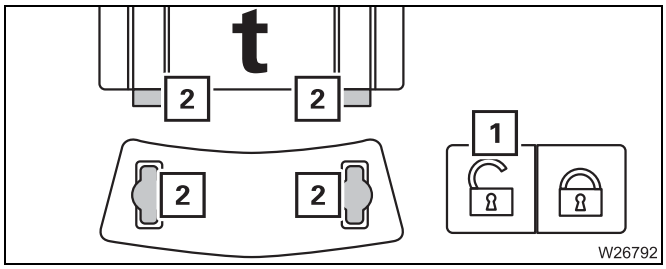
Locking

- Select and confirm the symbol (**1**).

  The lifting cylinders (**2**) rotate:

  – **Yellow:** Intermediate position

  – **Green:** Locked



Unlocking

- Select and confirm the symbol (**1**).

  The lifting cylinders (**2**) rotate:

  – **Yellow:** Intermediate position

  – **Red:** Unlocked

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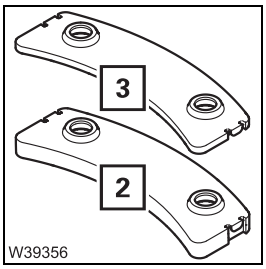
12.6.10 Removing/installing the counterweight on the turntable



You can remove and install a 1.0 t section (**3**) or a 2.0 t section (**2**) on the turntable.

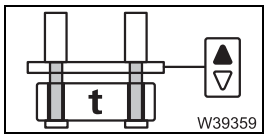
This section describes the procedure using counterweight combinations. You can also use suitable lifting gear, e.g. a fork lift truck.

Danger of overturning when slewing with an incorrectly set RCL!
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.

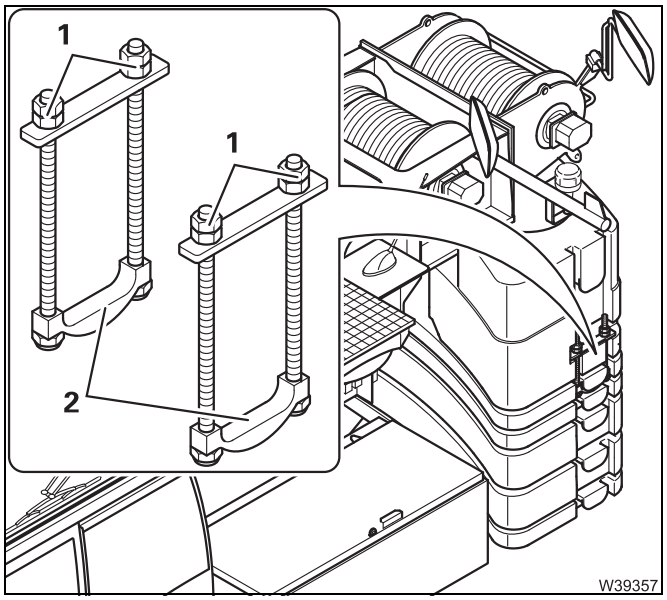
Removing

- Assemble the necessary counterweight combination on the counterweight platform.
  - For the 1.0 t section, the 12.6 t (17,700 lbs) counterweight combination.
  - For the 2.0 t section, the 11.6 t (25,500 lbs) counterweight combination.

➠ *Version A*, p. 12 - 64, ➠ *Version B*, p. 12 - 66.



Raise the counterweight onto the turntable and pre-tension it; ➠ p. 12 - 70.



- Unscrew the nuts (**1**) and remove the holder (**2**).
- Remove the bracket on the other side in the same way.
- Lower the counterweight onto the counterweight platform.
- Enter the current rigging mode on the *RCL*.

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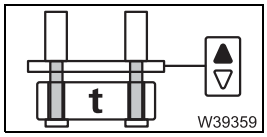
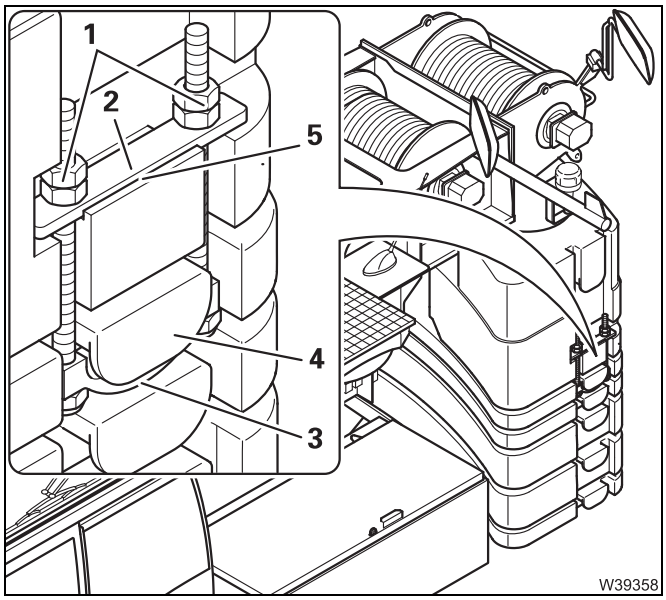
Installing

- Assemble the 13,6 t (29,900 lbs) counterweight combination on the counterweight platform so that the required counterweight sections are positioned on top.
  ➠ *Version A*, p. 12 - 64, ➠ *Version B*, p. 12 - 66.



Raise the counterweight onto the turntable and pre-tension it; ➠ p. 12 - 70.



- Suspend the bracket (**3**) in the plate (**4**) from below.
- Fold the locking bar (**2**) up, behind the slinging point (**5**).
- Tighten the nuts (**1**) only enough so that the bracket is at the slinging point and has no more play.
- Secure the nuts in with the counternuts (**1**).
- Secure the clamp on the other side in the same way.
- Lower the counterweight onto the counterweight platform.
- Enter the current rigging mode on the *RCL*.

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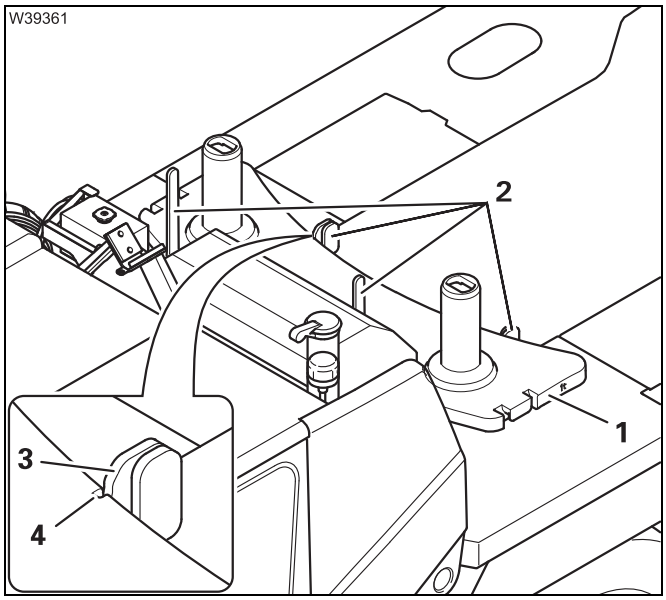
12.6.11 Setting down the counterweight for driving

The parts of the counterweight sections that can be transported on the turntable and counterweight platform when driving the truck crane depends on the driving mode of the truck crane; ➠ *Driving modes*, p. 6 - 1.

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.

Risk of accidents due to the counterweight slipping or tipping over!
Place only the 1 t base plate directly onto the counterweight platform.
In this way you prevent the counterweight from slipping.



Only the 1 t base plate (**1**) may be set down directly on the counterweight platform.

- Position the 1 t base plate in such a way that the cutouts (**4**) grip into the retaining sheets (**3**).

Other sections are not secured by the retaining sheets (**2**) and cannot be set down in a flat position.

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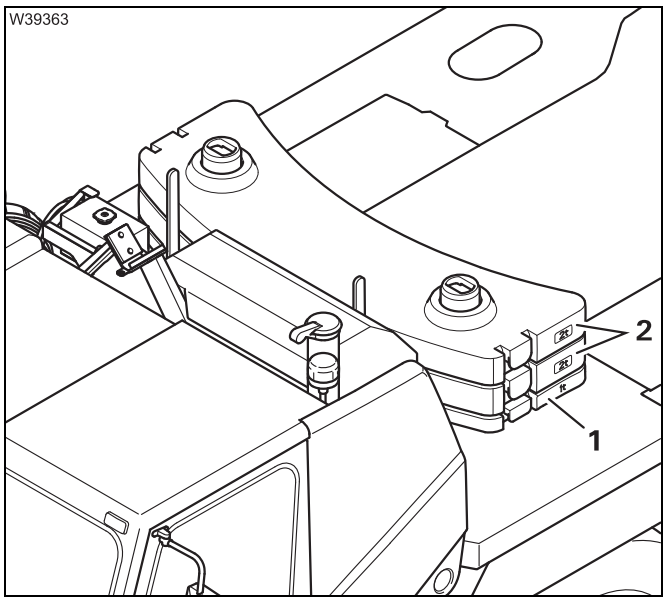
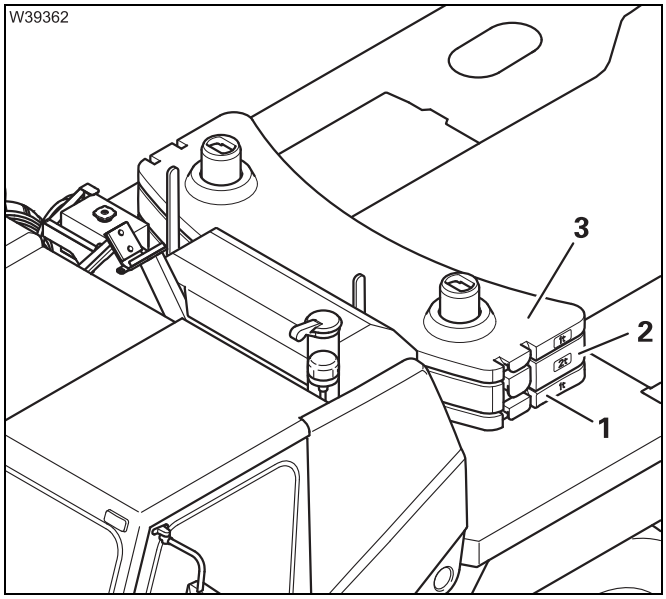


For version A

A maximum of two 2.0 t sections (**2**) may be placed on the 1.0 t base plate (**1**).



For version B

A maximum of one 2.0 t section (**3**) and one 1.0 t section (**2**) may be placed on the 1.0 t base plate (**1**).

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12.6.12 Slewing with a 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 during emergency operation!
Various checks are therefore necessary, depending on the active slewing range type, before slewing in emergency operation; ➠ p. 14 - 48.

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12.7 Rigging work on the main boom

12.7.1 Hook block on the bumper

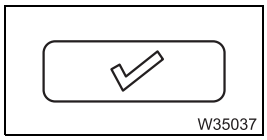
When the hook block is transported on a separate vehicle; ➠ p. 12 - 79.

Picking up the hook block

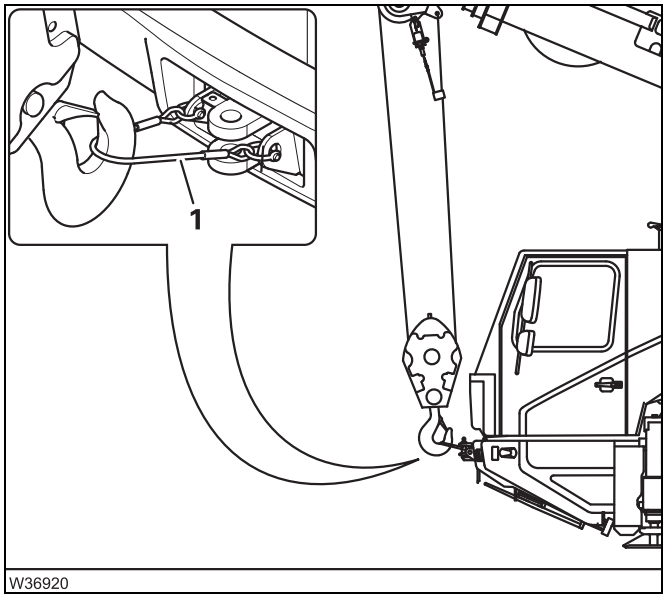
Depending on the driving mode, you must pick up the hook block from the front bumper; ➠ *Driving modes*, p. 6 - 1.

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.
- Raise the main boom until the boom head is in a vertical position above the hook block.
- Detach the hook block from the retaining rope (**1**).

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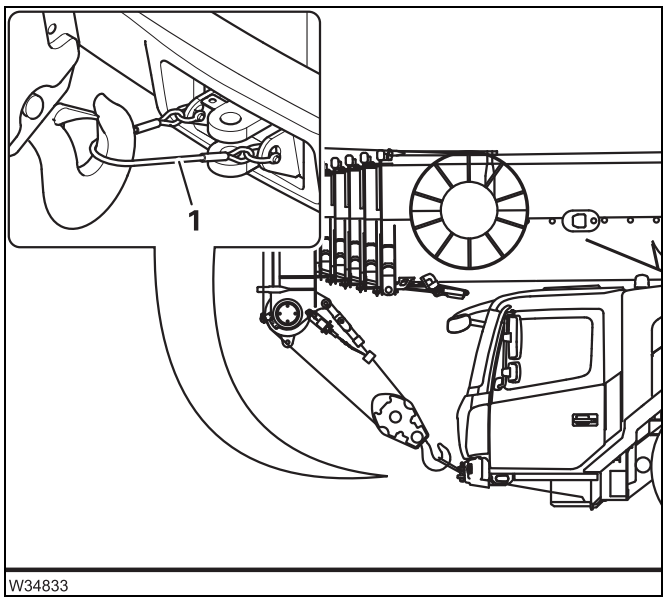
Attaching the hook block

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 be reeved no more than 4 times when driving on the road.

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 clamp 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 on to 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. 11 - 89.

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12.7.2 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 a rigged counterweight*, p. 12 - 76.

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!

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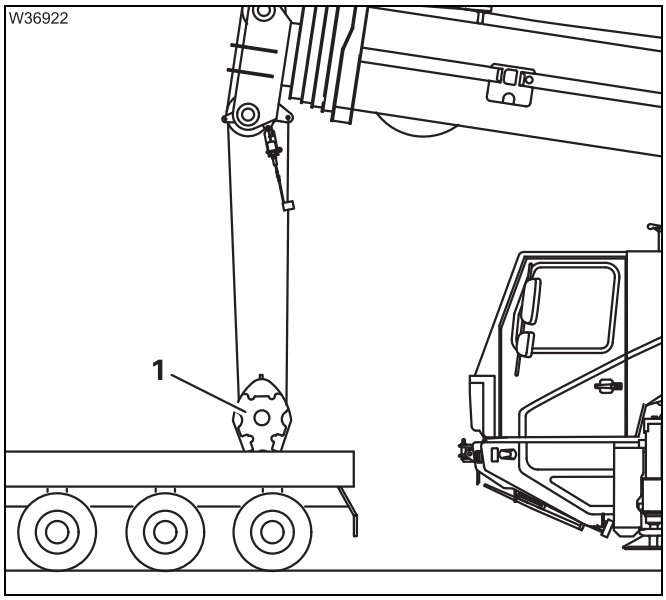
Picking up the hook block

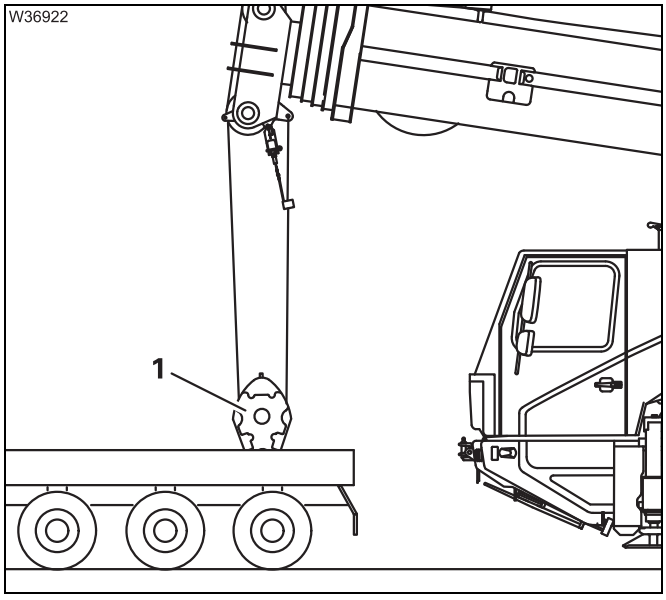
Depending on the driving mode, the hook block can be placed on a separate vehicle; *Driving modes*, p. 6 - 1.



- 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. 12 - 82.
- Raise the hook block off the separate vehicle.

Setting down the hook block

Depending on the driving mode, the hook block must be set down 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 about 1 m (3.3 ft) below the main boom.
- Lower the main boom and set the hook block (**1**) down on the separate vehicle.

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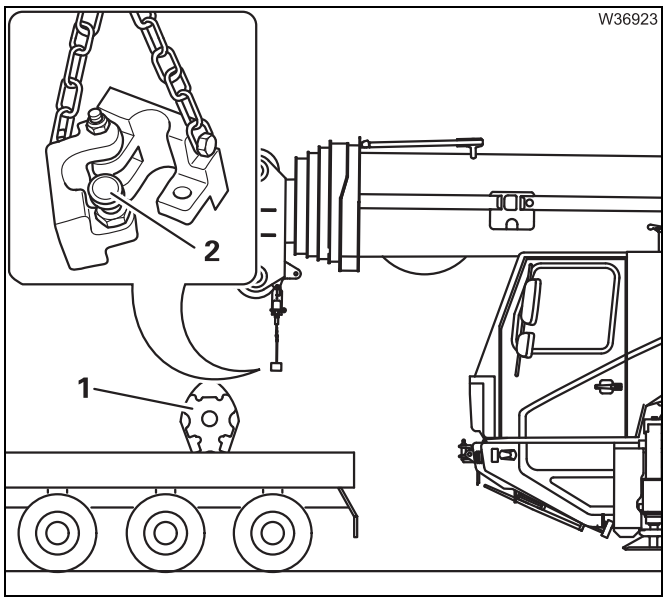
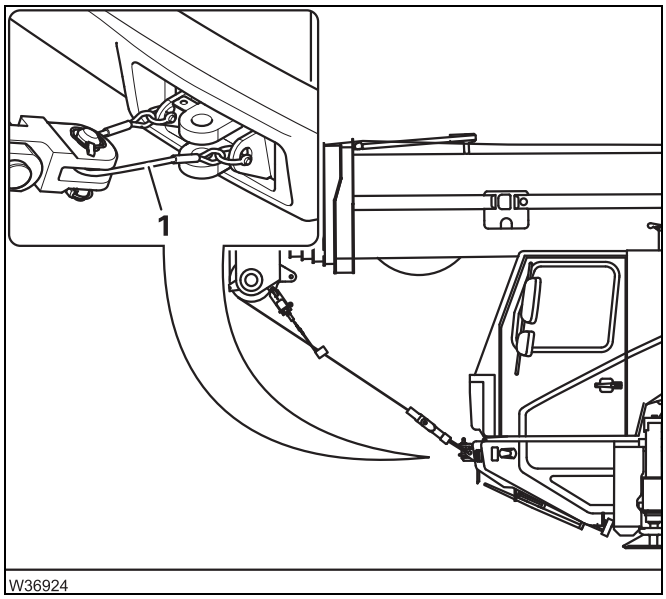


- Detach the lifting limit switch weight (**2**) from the hoist rope; p. 12 - 98.
- Unreeve the hoist rope; p. 12 - 88.
- Secure the hook block (**1**) for transport.
- Set down the main boom on the boom rest.

Fastening the hoist rope to the bumper

Do not attach the rope end clamp to the front towing coupling! The towing coupling must be free for a tow-rod in emergencies.



- Attach the rope end clamp 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.

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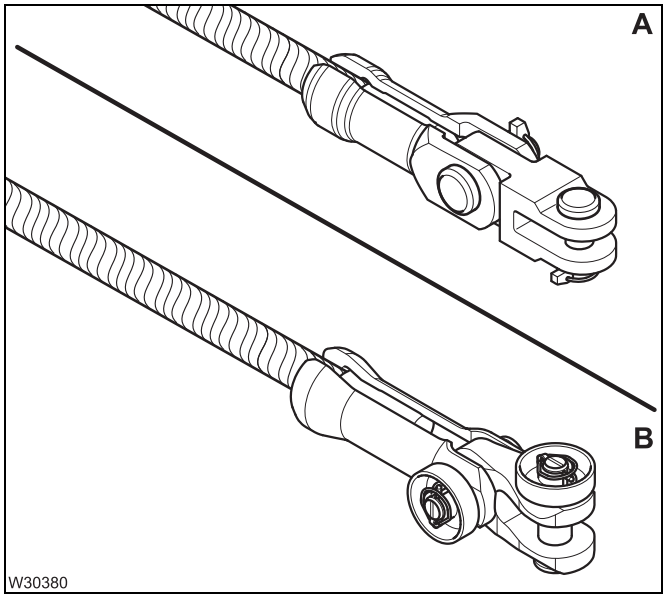
12.7.3 Reeving and unreeving the hoist rope

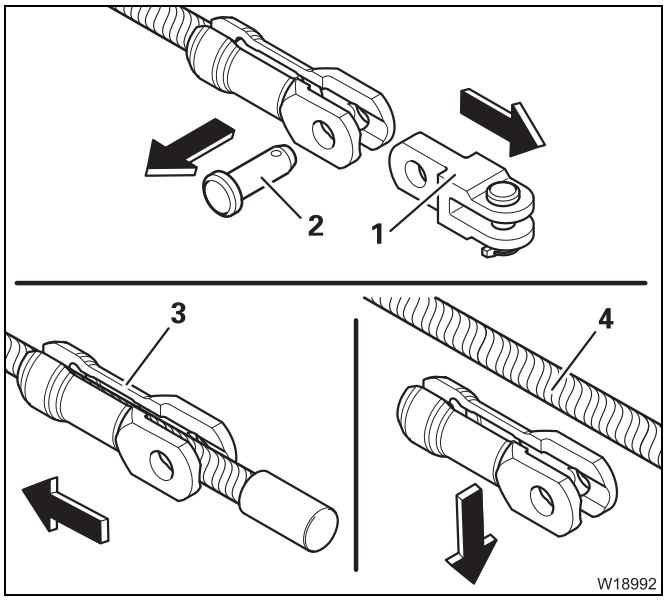
You must reeve a certain number of rope lines, depending on the required load bearing capacity. Four reeved rope lines correspond, for example, to 4-fall reeving; *Possible reeving methods on the main boom*, p. 12 - 89.

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**) out and remove the fork element (**1**).
- Slide the holder (**3**) back and remove it from the hoist rope (**4**).

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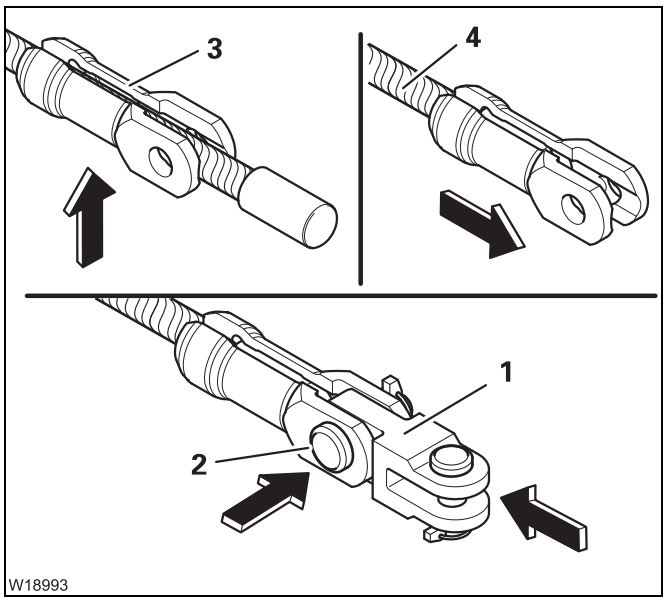
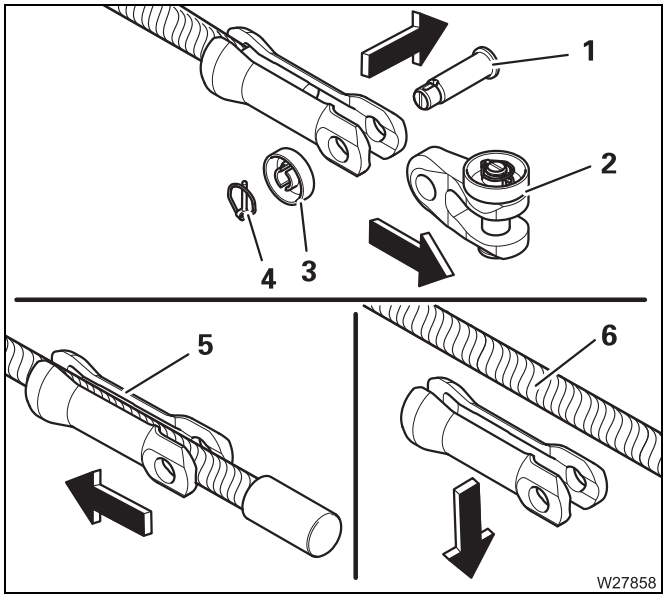


Positioning

- Plug the holder (**3**) and slide it onto the hoist rope as far as it will go (**4**).
- Fasten the fork element (**1**) using the pin (**2**).
- Secure the pin.

Version B



Removing

- Remove the linchpin (**4**).
- Release the locknuts (**3**) and pull out the pins (**1**). Remove the bracket (**2**).
- Slide the padlock (**5**) back and remove it from the hoist rope (**6**).

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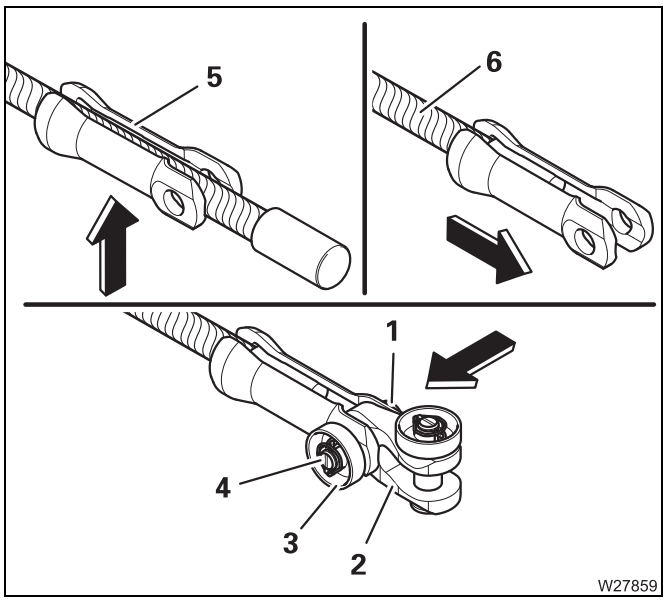
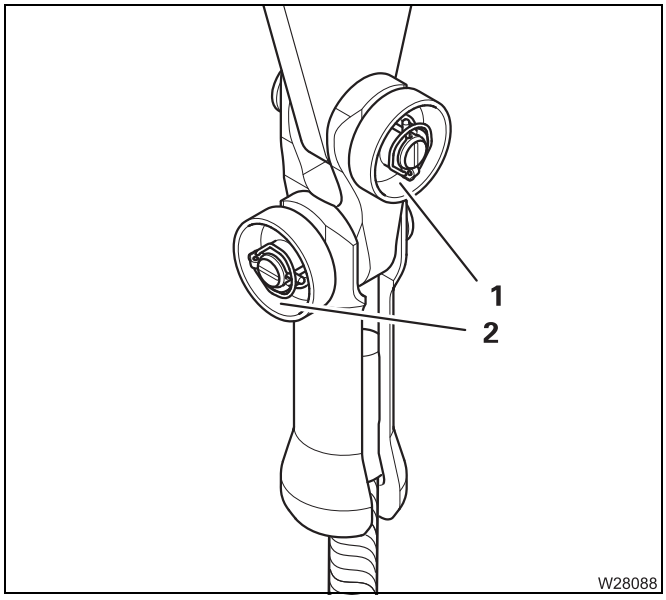


Positioning

- 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 outward

  and
  - The locknut (**2**) faces forward in the driving direction.

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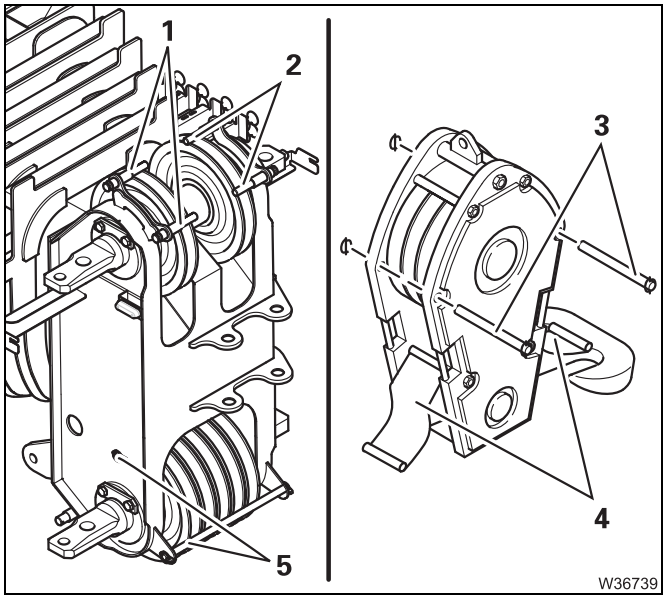
Reeving the hoist rope

Danger due to slack rope!
Only use hook blocks and lifting 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.

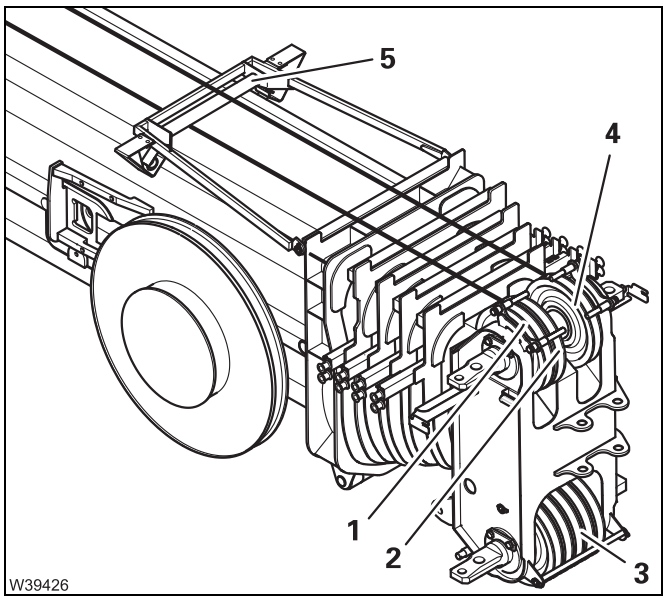


Opening the hook block

- Pull out the rods (**3**).
- Fold down the plates (**4**).

Positioning the hoist rope

- Pull out the rods (**5**).
- Pull out the rods (**1**) for the **main hoist rope**.
- Pull out the rods (**2**) for the **auxiliary hoist rope**.



- Guide the main hoist rope **underneath** the rope grab (**5**)

If two hoist ropes are reeved, you must feed the auxiliary hoist rope **over** the rope grab. Use the rope grab also when working with the lattice extension.

- Feed the auxiliary hoist rope to the head sheave (**4**).

With 5 head sheaves (3)
- Feed the main hoist rope to the head sheave (**1**).

With 6 head sheaves (3)
- Feed the main hoist rope to the head sheave (**1**) or (**2**) specified in the reeving images.

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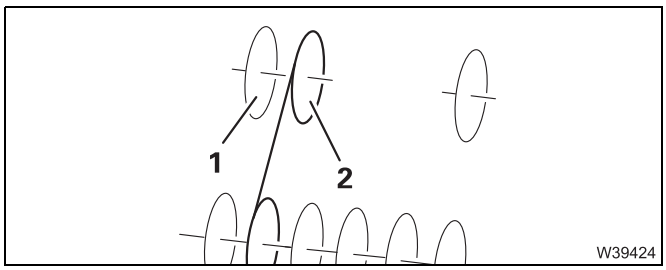
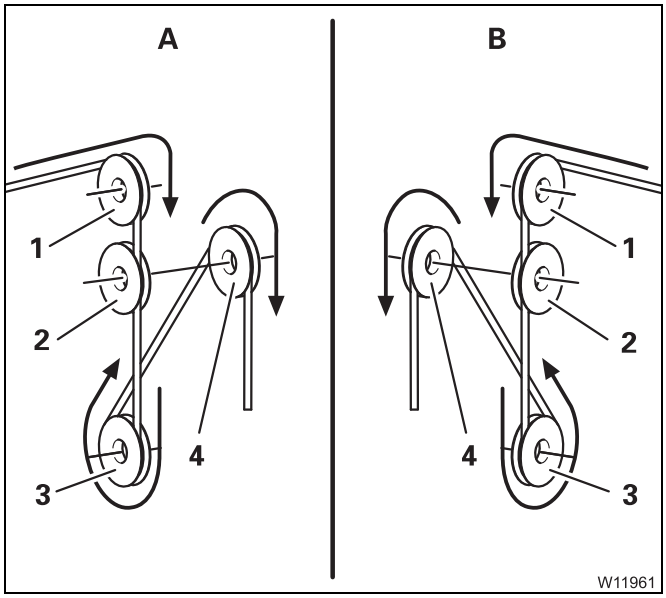


The reeving images show the head sheaves (**1**) and (**2**). You must always use the head sheave over which the hoist rope will run – e.g. head sheave (**2**); *With 6 head sheaves*, p. 12 - 92.



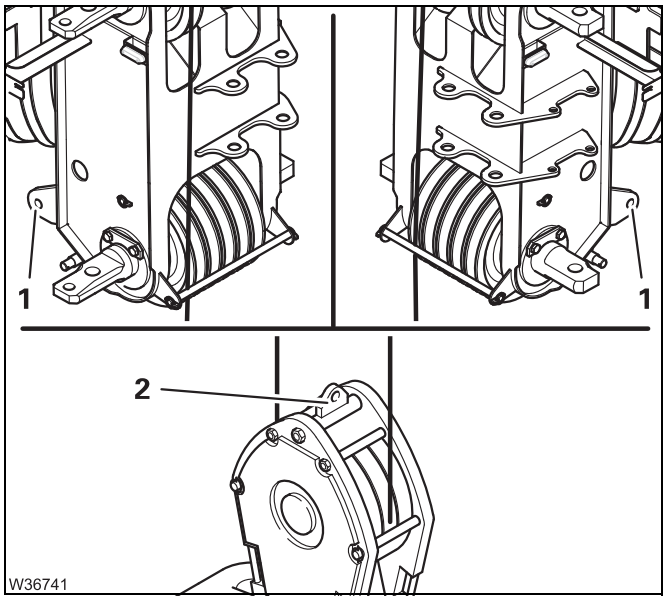
Reeving the hoist rope

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 reevings; p. 12 - 89.



Fastening the hoist rope

The fixed point used depends on the number of reeved rope lines.

– **Fixed points for an even number of lines**
The rope end clamp 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 clamp is fastened to the fixed point (**3**) for 1-fall, 3-fall, 5-fall reevings etc.

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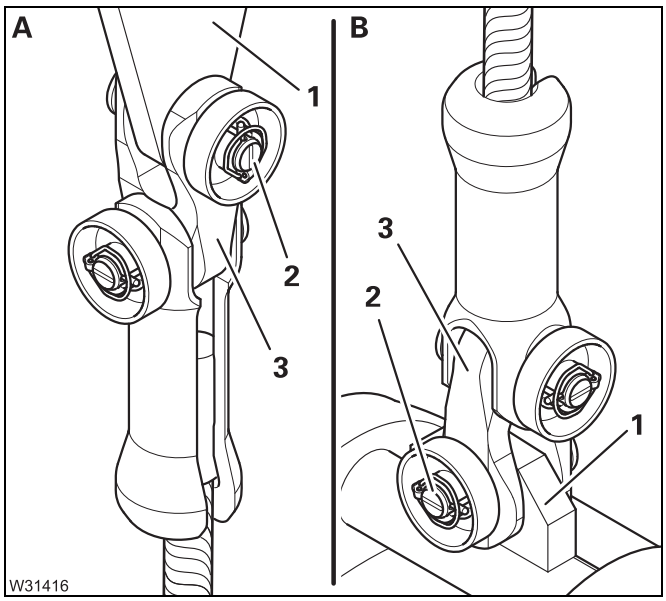


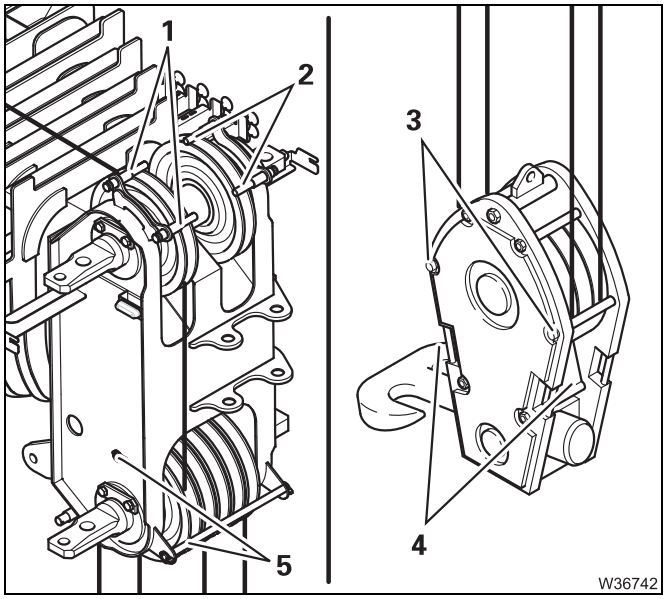
– Rope end fitting

- Fasten the rope end fitting (**3**) using the pin (**2**).

  (**A**) – If there are an even number of lines to a fixed point (**1**) of the main boom head.

  (**B**) – If there are an odd number of lines to a fixed point (**1**) of the hook block.

- Secure the pin (**2**) with the safety hinged pin.



Securing the hoist rope

- Insert the rods (**1**), (**2**) and (**5**).
- Secure all the rods.

Closing the hook block

- Fold up the plates (**4**) on both sides.
- Insert the rods (**3**) and secure them.

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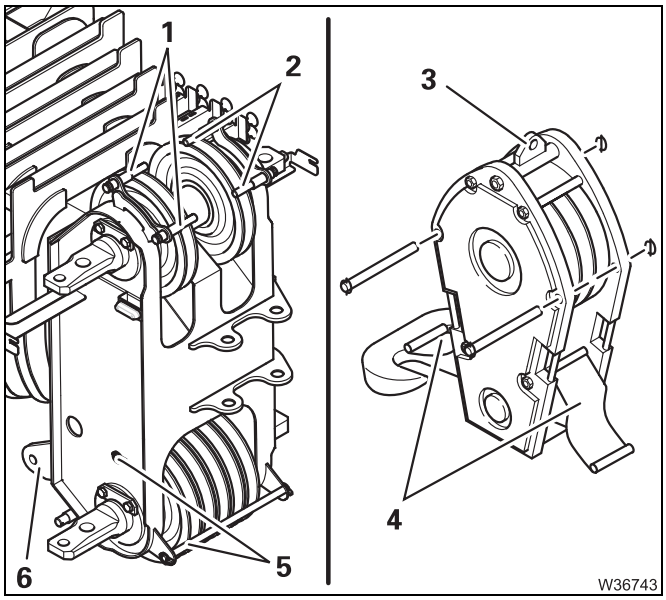
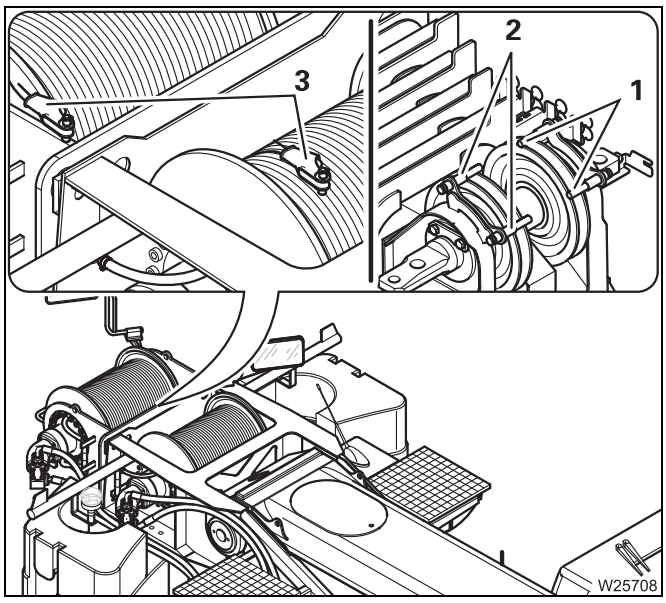
Unreeving the hoist rope



- Pull out the rods (**5**) and (**3**).
- Fold down the plates (**1**).
- Remove the rope end fitting from the fixed point (**2**) or (**4**).
- Unreeve the hoist rope.
- Insert the rods (**5**) and (**3**) and secure them.



Depending on the driving mode, you can:

– Fasten the hoist rope to the bumper;
p. 12 - 81 or

– Pull out the rods (**1**), (**2**) and roll the hoist rope (**3**) on to the drum.

- Insert the rods (**1**), (**2**) and secure them.
- Secure the hoist rope (**3**).

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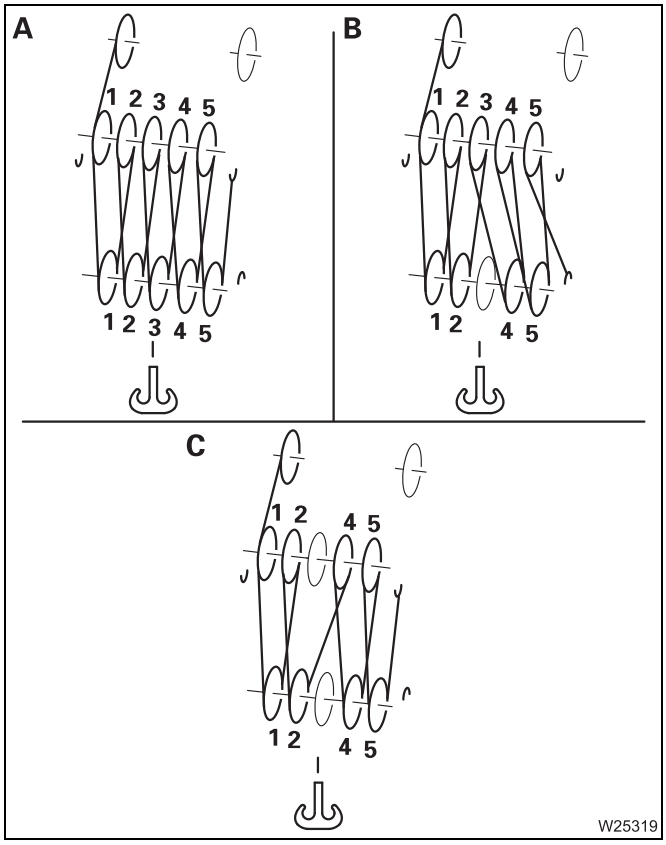
12.7.4 Possible reeving methods on the main boom

Possible reevings on lattice extensions and the auxiliary single-sheave boom top;
➠ *Lattice extension operating manual.*

The maximum lifting capacity is specified in the supplied *Lifting capacity table*.

With 5 head sheaves

If 6 head sheaves are present; ➠ p. 12 - 92.



5 sheave hook block

Reeving

A 10-fall

A 9-fall

B 8-fall

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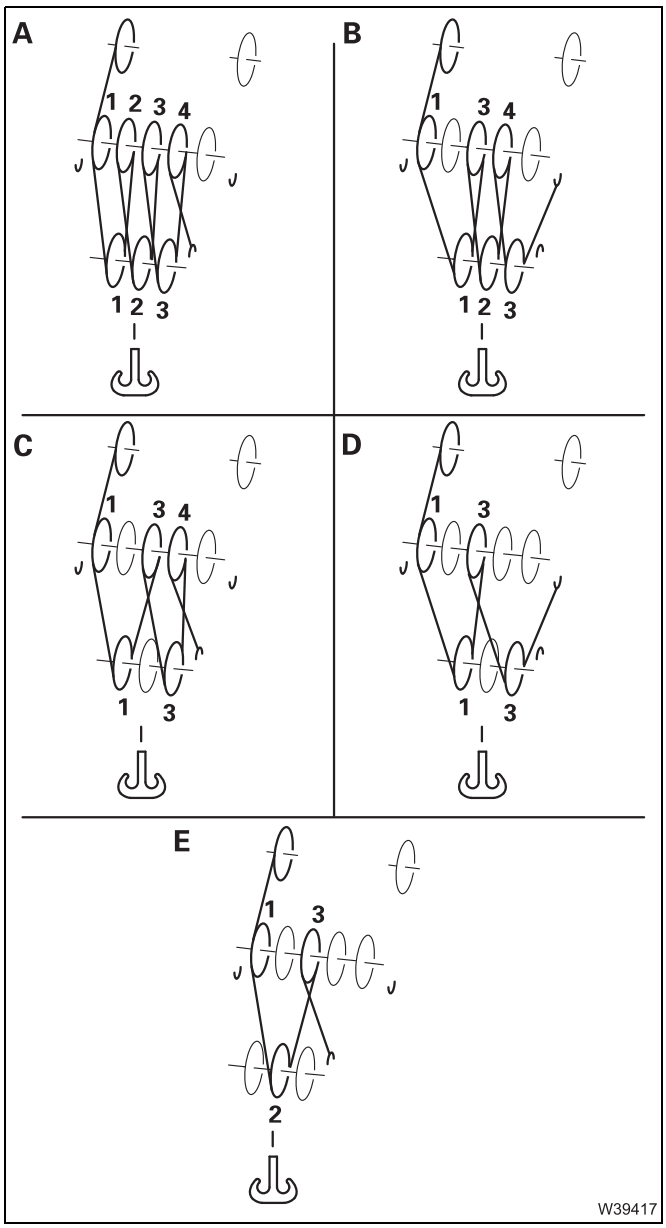

3 sheave hook block

Reeving

- **A** 7-fall
- **B** 6-fall
- **C** 5-fall
- **D** 4-fall
- **E** 3-fall

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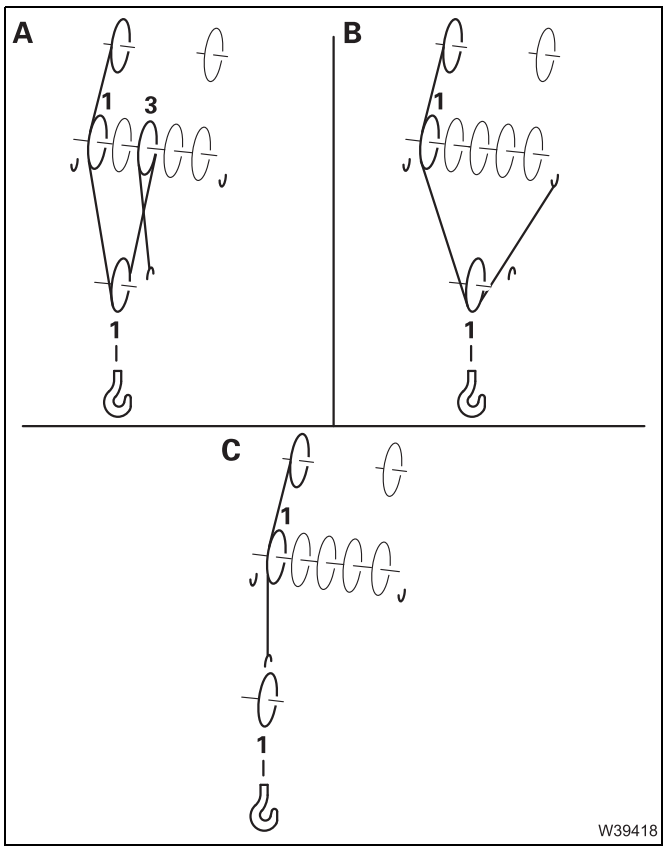


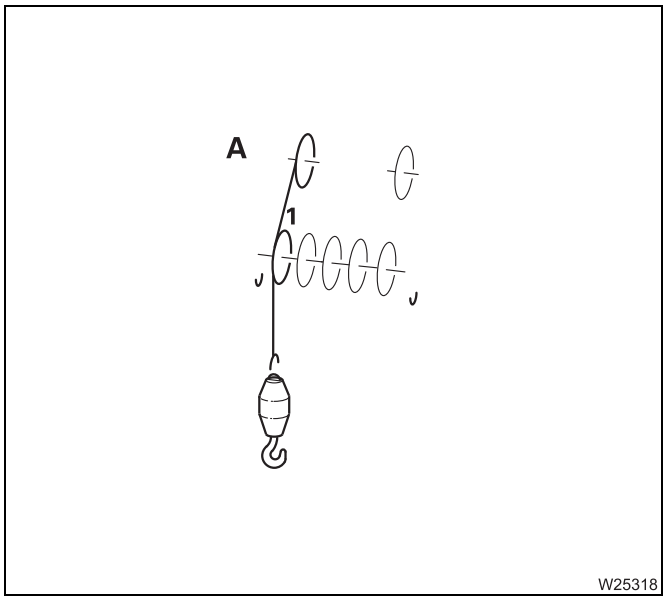
1 sheave hook block

Reeving

A 3-fall

B 2-fall

C 1-fall



Hook tackle

Reeving

A 1-fall

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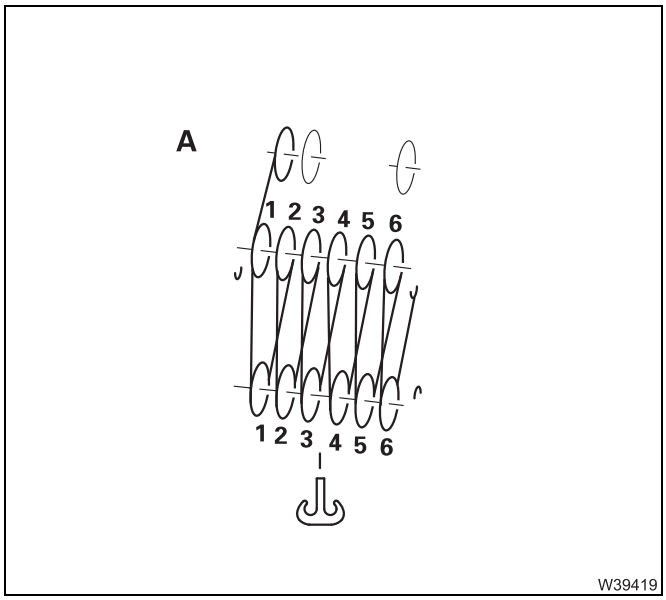
With 6 head sheaves

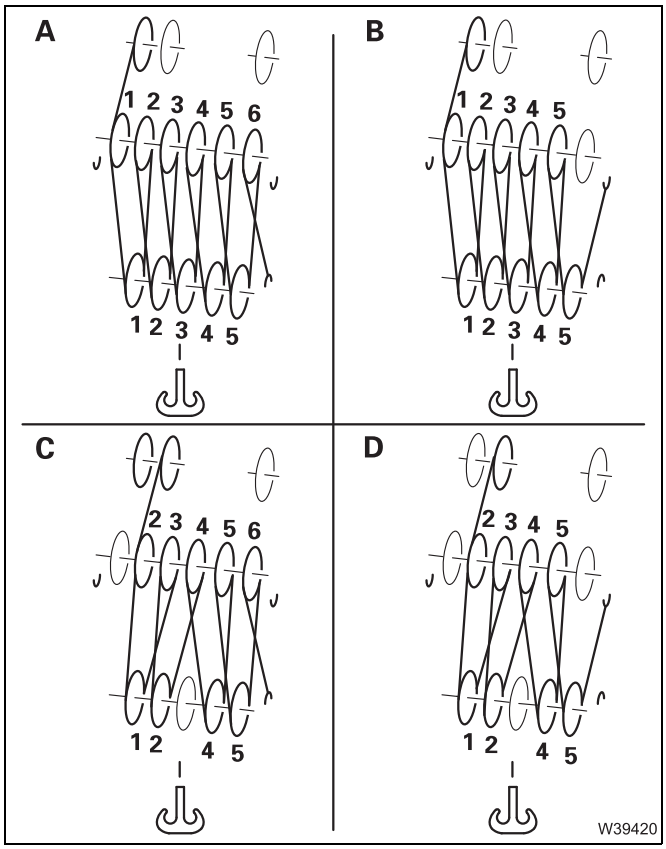
If 5 head sheaves are present; ➠ p. 12 - 89.



6 sheave hook block

Reeving

A 12-fall



5 sheave hook block

Reeving

A 11-fall

B 10-fall

C 9-fall

D 8-fall

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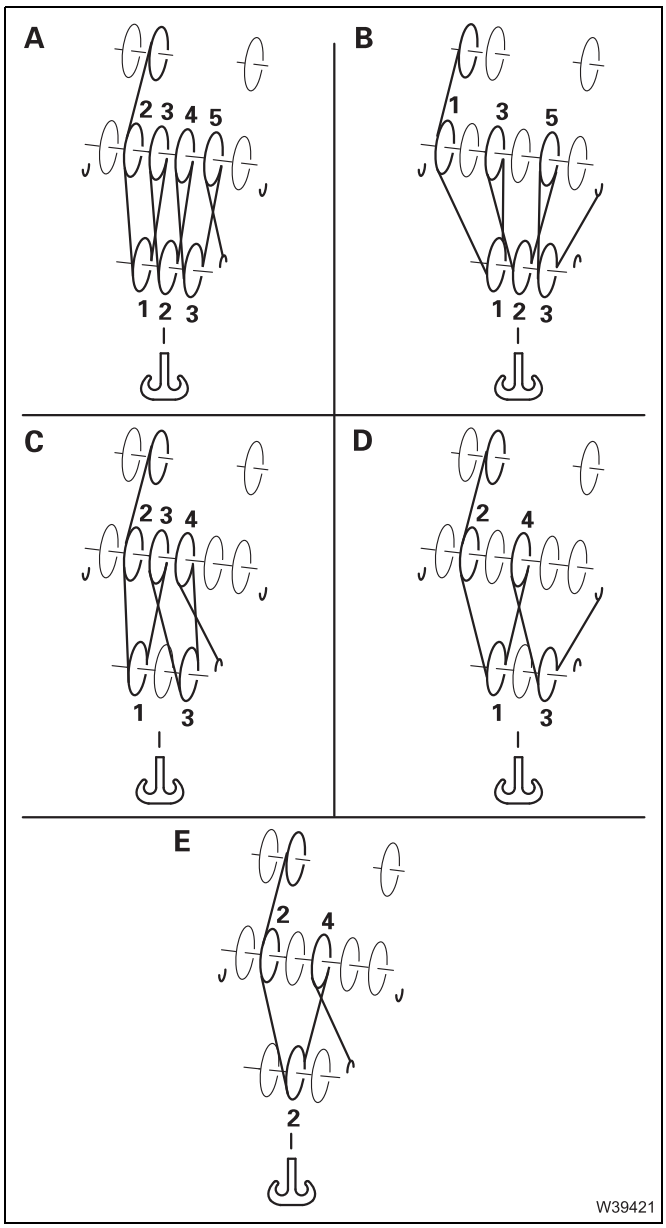

3 sheave hook block

Reeving

- **A** 7-fall
- **B** 6-fall
- **C** 5-fall
- **D** 4-fall
- **E** 3-fall

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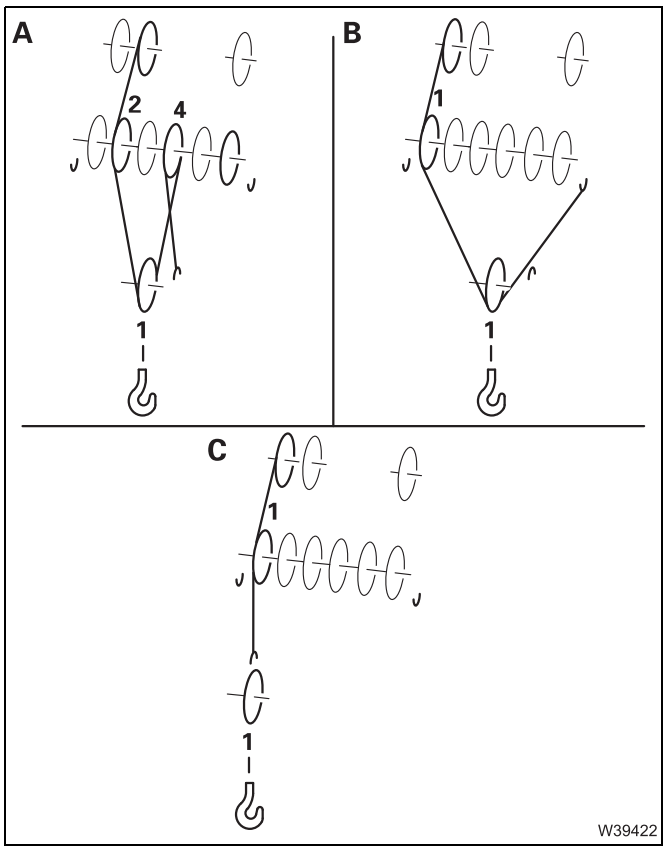


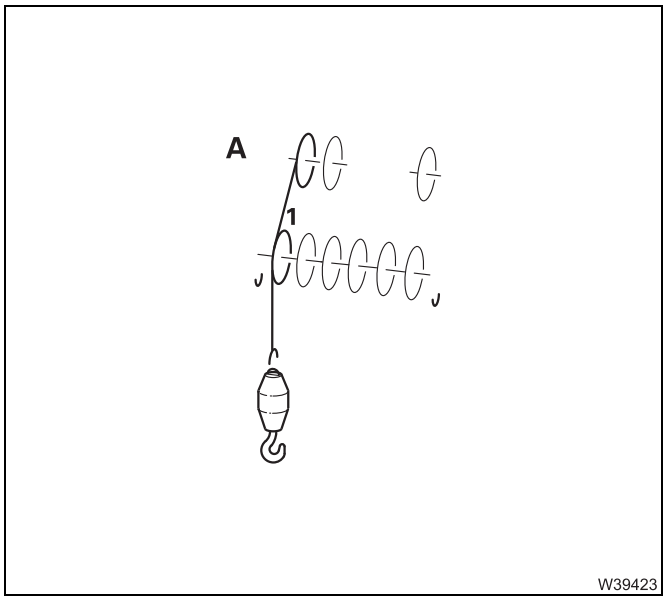
1 sheave hook block

Reeving

A 3-fall

B 2-fall

C 1-fall



Hook tackle

Reeving

A 1-fall

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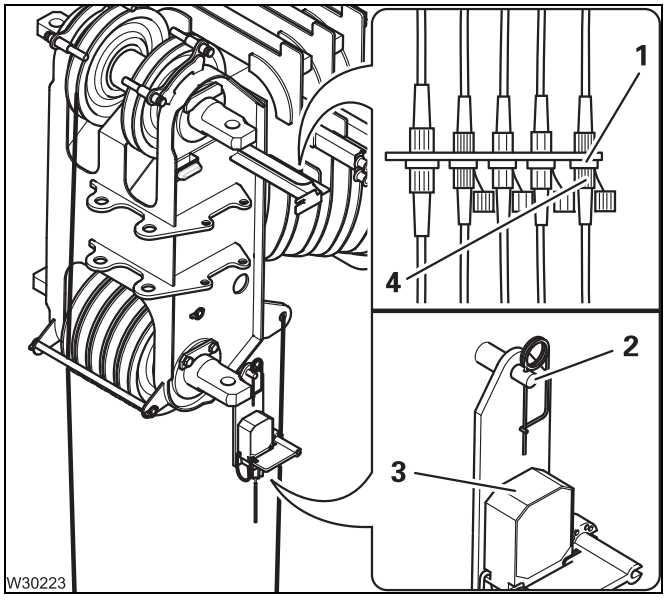
12.7.5 Installing/removing the lifting limit switch

For the function of the lifting limit switch; ➠ p. 11 - 88.
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.

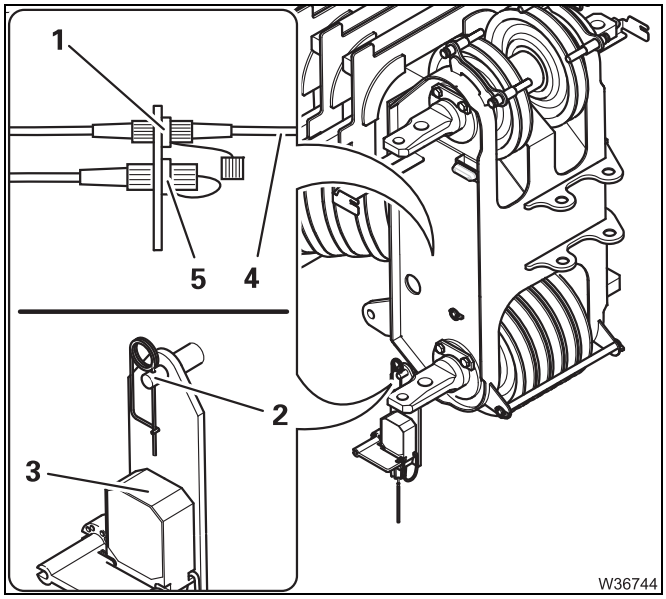
Installing lifting limit switch

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**) so that it will not be damaged during crane operation, and insert the lifting limit switch into 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**) so that it will not be damaged during crane operation, and insert the lifting limit switch into the socket (**1**).

Connections (**5**); ➠ *Lattice extension operating manual*.

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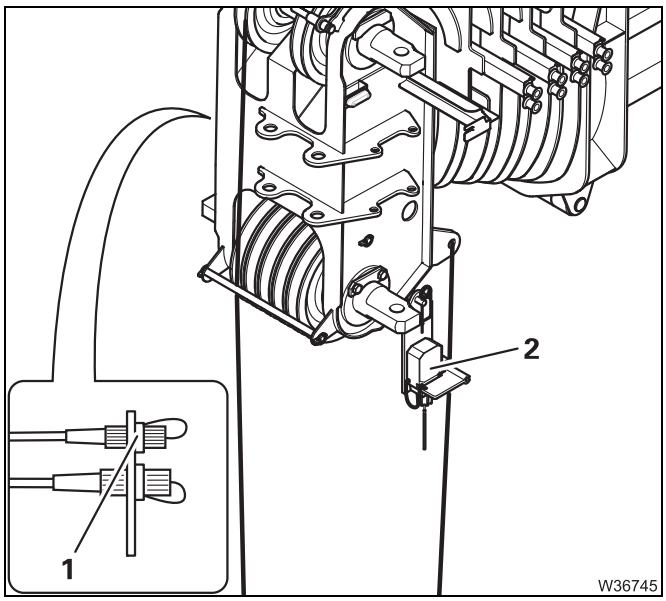
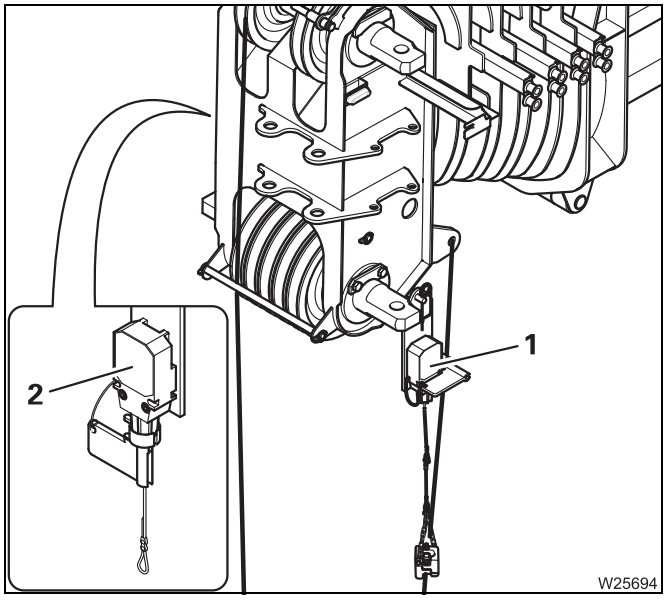


If only one lifting limit switch has been installed

- Cover the unused socket with the protective cap (**1**).
- Check that the lock has been released on the lifting limit switch used, e.g. (**2**); *Unblocking*, p. 12 - 100.

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, e.g. been attached to the left lifting limit switch (**1**), you must lock the right lifting limit switch (**2**); *Locking*, p. 12 - 100.

Otherwise the movements *Raise hosting gear*, *Telescope out* and *Lower the boom* will be locked.

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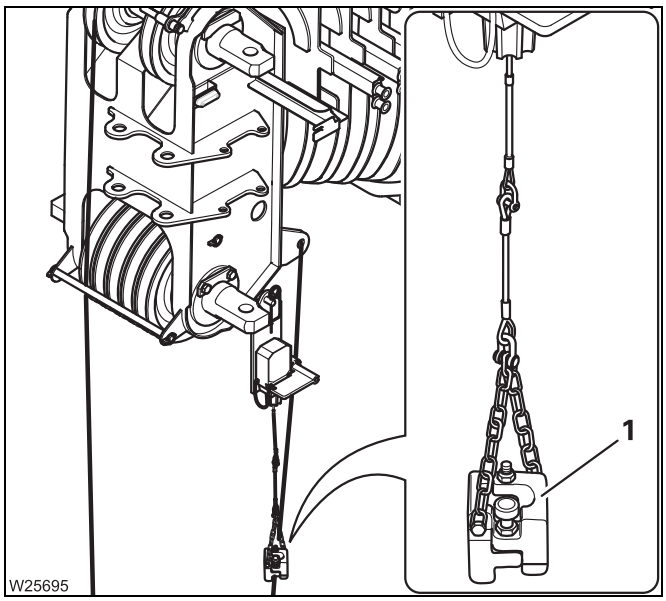
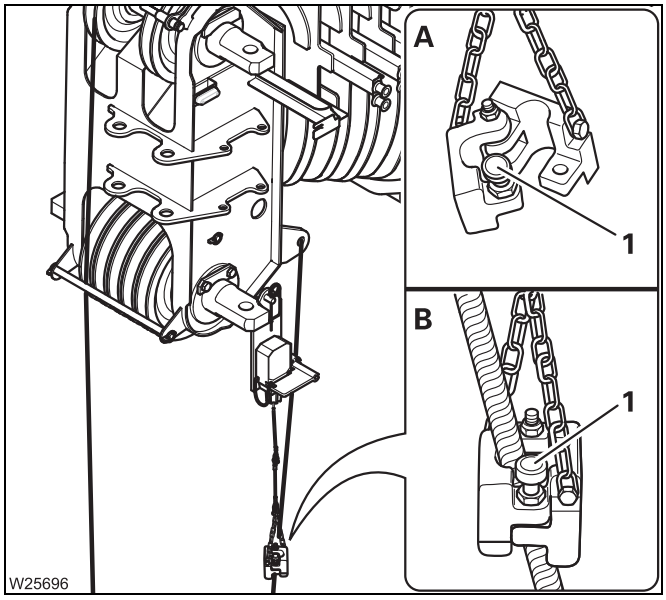


Attaching the lifting limit switch weight

- Attach the lifting limit switch weight (**1**).

This lifting limit switch must not be locked;
Unblocking, p. 12 - 100.

If two hoist ropes are reeved, you must attach a lifting limit switch weight to each of the two lifting limit switches.



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.

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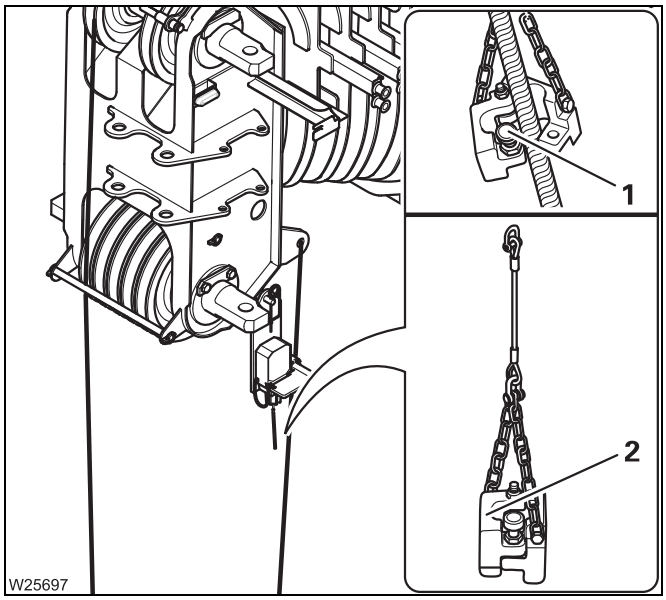
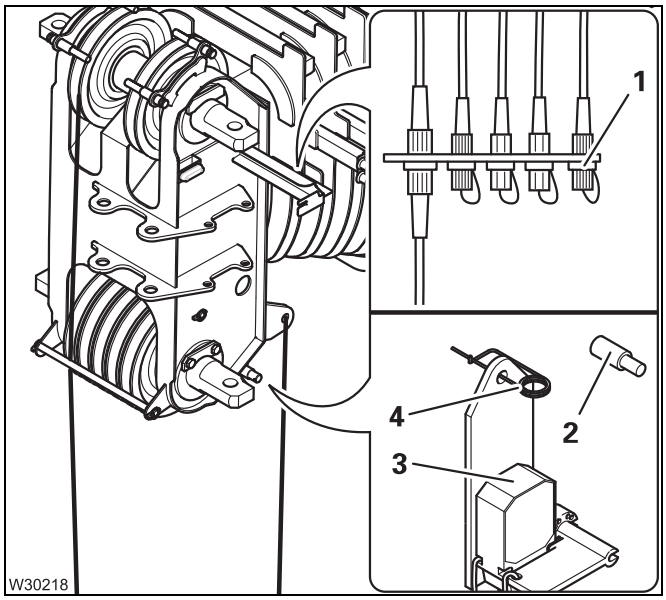
Removing the lifting limit switch

This section describes complete removal.
If the hook block is to be attached to the bumper at a later point, you will need to detach the lifting limit switch weight from the hoist rope, so that you can unreeve or reeve when unrigging the hoist rope. 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 out the plug and close the socket with the protective cap (**1**).
- Remove the lifting limit switch (**3**) from the bracket (**2**).
- Attach the retaining pin (**4**) to the lifting limit switch.

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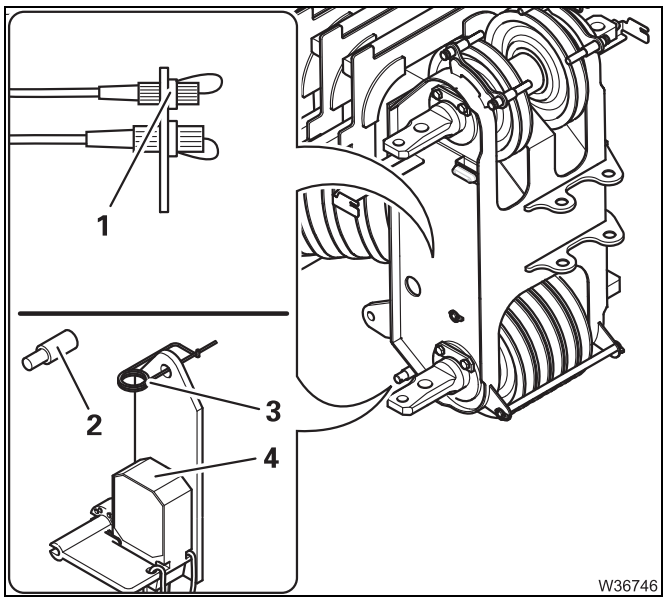

Removing the right lifting limit switch

- Pull out the plug and close the socket with the protective cap (**1**).
- Remove the lifting limit switch (**4**) from the bracket (**2**).
- Attach the retaining pin (**3**) to the lifting limit switch.

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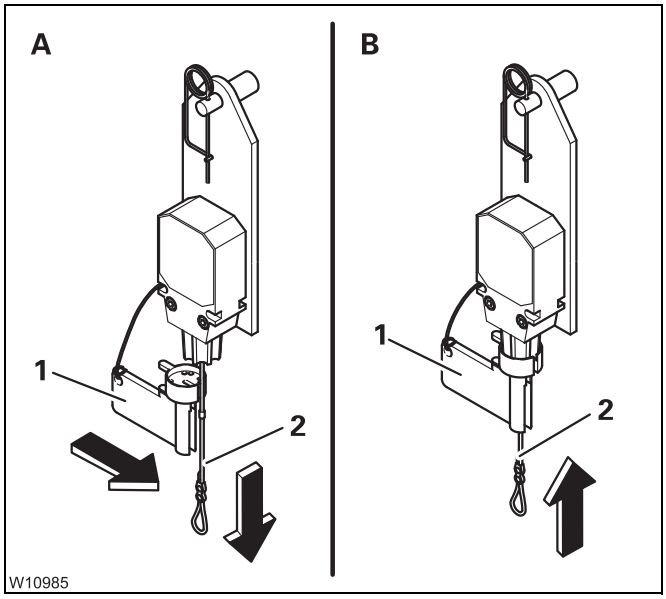
12.7.6 Locking/unlocking the lifting limit switch

Locking

If two lifting limit switches are installed, you must lock the lifting limit switch not used in order to enable all crane operations.

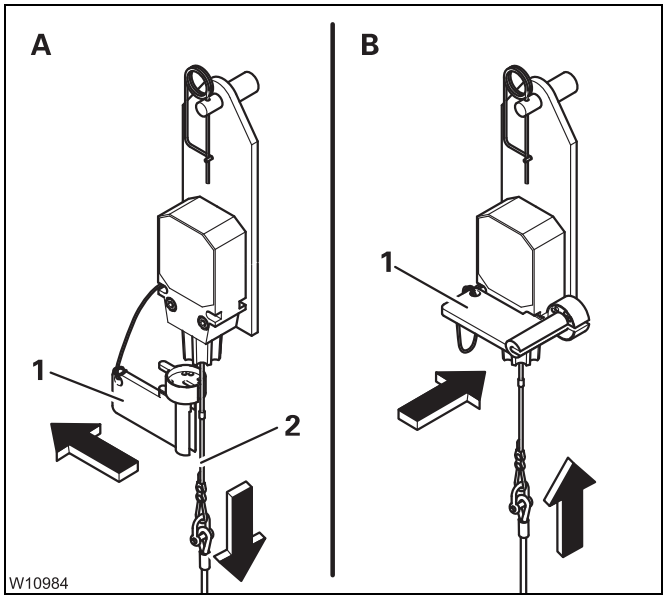
Risk of damage if the lifting limit switch is locked!
If the lifting limit switch on which the lifting limit switch weight hangs is locked, release the lock.
This prevents the hook block hitting the main boom head, causing damage to the hook block, main boom head and hoist rope.



- Remove the lifting limit switch weight.
- (**A**) – Remove the cap (**1**).
- Pull the rope (**2**) down; the lifting limit switch is triggered.
- (**B**) – Secure the rope (**2**) in this position using the cap (**1**) – the lifting limit switch is locked.

Unblocking

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.

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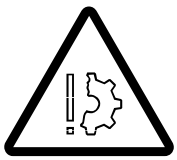
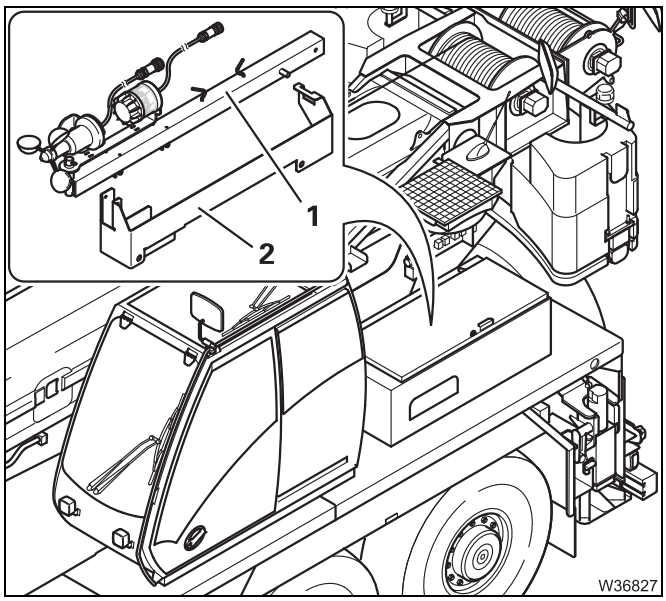
12.7.7 Anemometer and air traffic control light



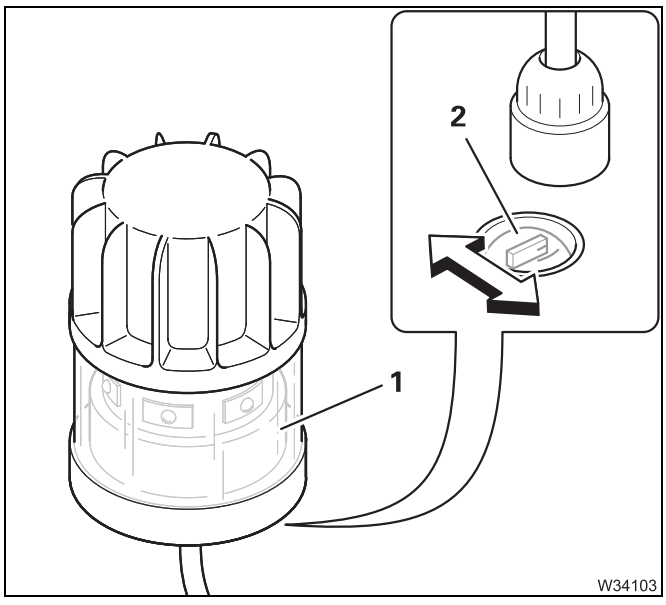
Risk of damage during on-road driving
Always remove the anemometer and air traffic control light before on-road driving.
This prevents the specified overall height from being exceeded at on-road level, and the anemometer from being damaged due to unfavourable air currents.

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**).



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**).

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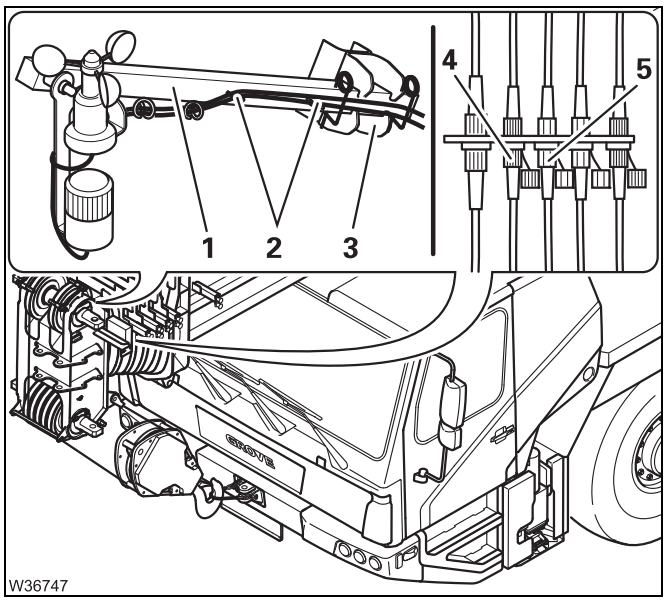
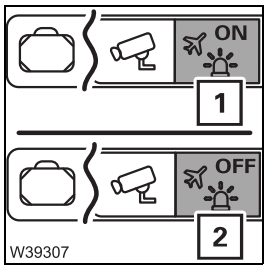


- Insert the rod (**1**) into the clamp (**3**) and secure it with the retaining pins.
- Remove the cables from the holders (**2**) and connect:
  - the anemometer to the socket (**4**),
  - the air traffic control light to the socket (**5**).
- Lay the cables in such a way that they will not be damaged during crane operation
- Check that the anemometer is able to swing so that it hangs vertically even when the main boom is raised.

Switching on/off



Switch on: Select symbol (**1**) and confirm – symbol *ON* is displayed

Switch off: Select symbol (**2**) and confirm – symbol *OFF* is displayed

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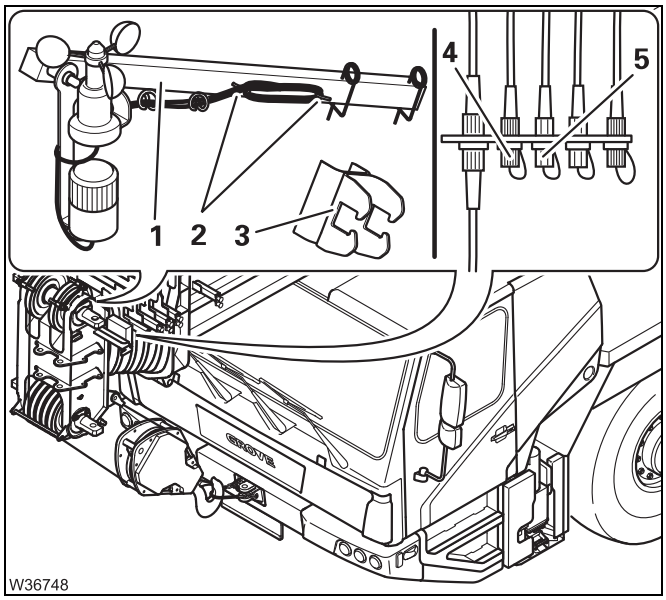
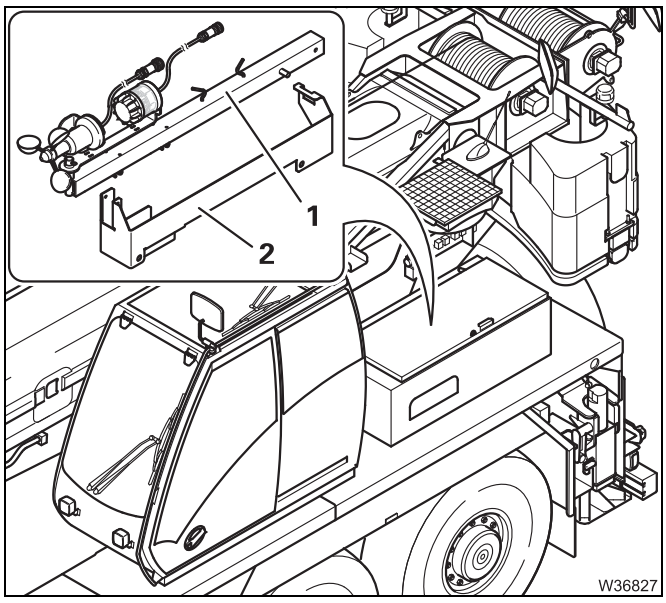
Removing

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 cables on to the clamps (**2**).
- Remove the rod (**1**) from the clamp (**3**).
- For transportation, fasten the retaining pins to the rod (**1**).



For transport

- Place the rod (**1**) in the holder (**2**).
- Secure the rod (**1**) using the retaining pins.

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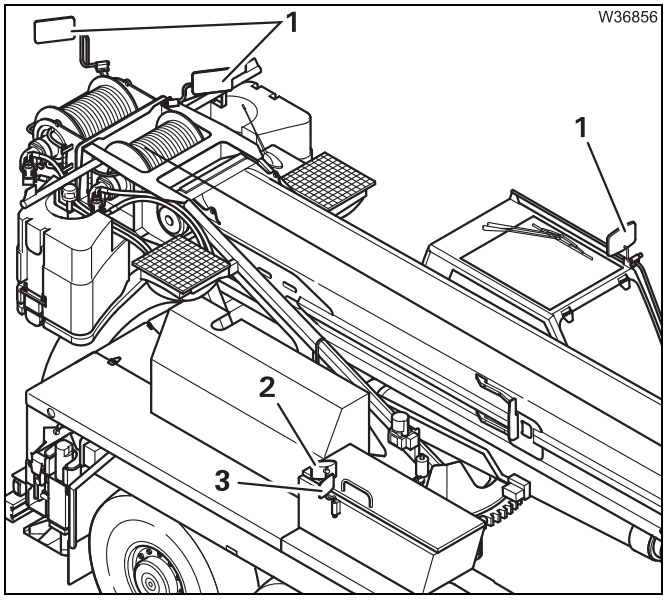
12.8 Other rigging work

12.8.1 Folding the mirrors in and out, and adjusting them

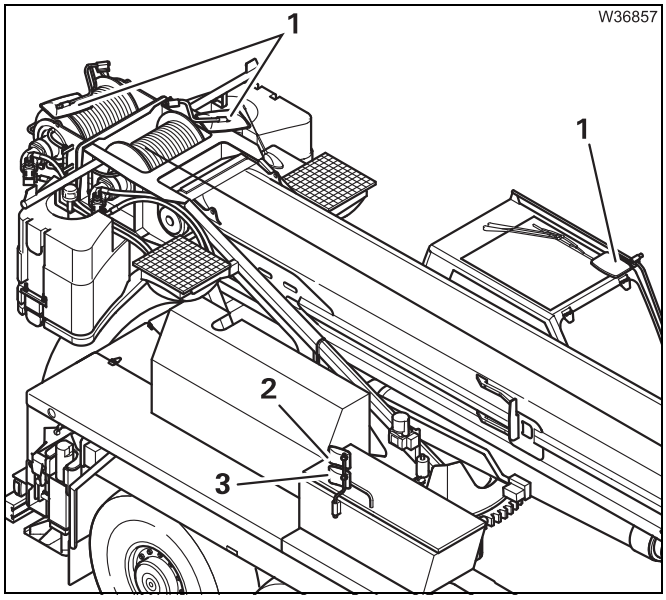
All mirrors must be folded in for driving. For crane operation, you must fold out the mirrors again and adjust them.

Risk of accidents due to exceeding the permissible dimensions
Fold all mirrors in for driving. With the mirrors folded out, the specified overall height at on-road level and the specified overall width for driving on roads is exceeded.



Folding out and adjusting the mirror

- Fold the mirrors (**1**) upwards.
- Adjust the mirrors in such a way that you have a clear view of the rope running on the hoist.
- Adjust the mirrors (**2**) and (**3**) in such a way that you can clearly see the right-hand outrigger beams from the crane cab when the main boom is raised.



Folding in the mirror

- Fold the mirrors (**1**) downwards.
- Fold in the mirrors (**2**) and (**3**) far enough that they no longer protrude over the side of carrier.

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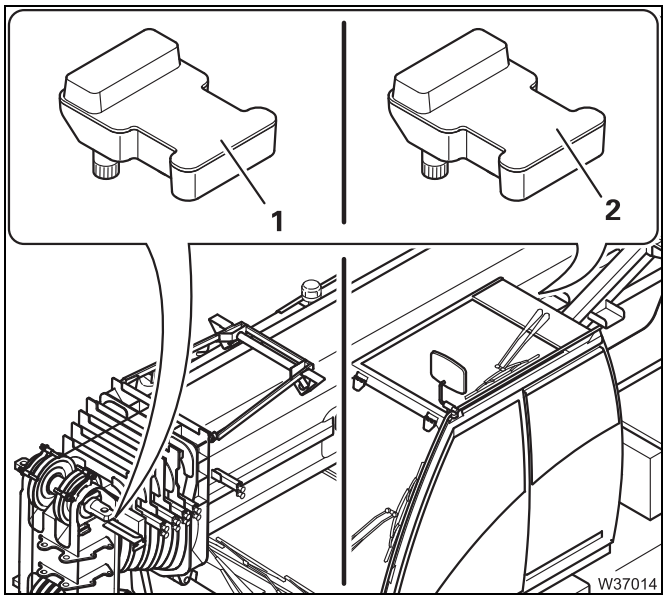
12.8.2 Cameras for crane operation

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.

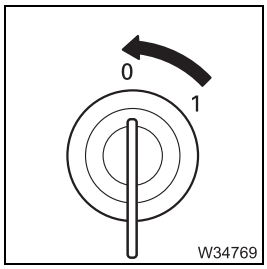


The transmitter (**1**) and the associated receiver (**2**) are matched to each other and are identified by the same number on the model plates.

Neither the transmitter nor the receiver should be removed or installed; they remain together on the truck crane at all times.

In the event of a defect, both transmitter and receiver must always be replaced, even if only one part is defective. When spare parts are ordered both transmitter and receiver are always delivered together.

Risk of accidents if an incorrect transmitter or receiver is used
In the event of a defect, do not under any circumstances use a transmitter or receiver from another truck crane.
This is to avoid the wrong image appearing on the monitor of your crane or the monitor of a neighbouring crane.



- Switch off the ignition in the crane cab

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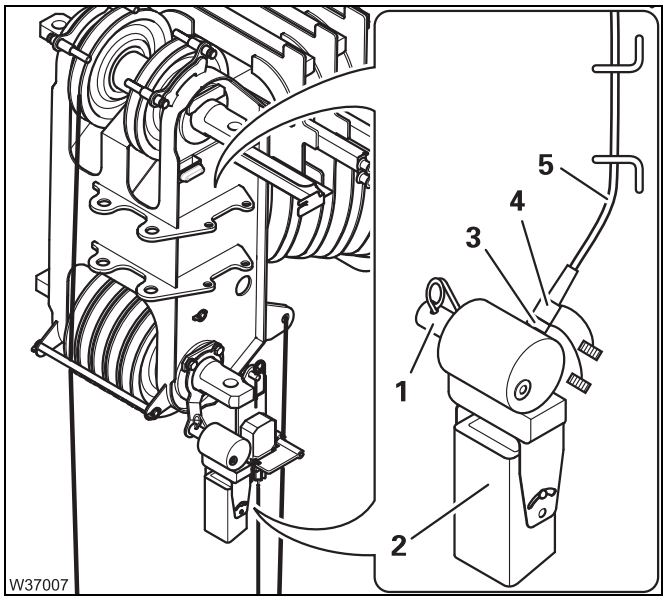
You will need the respective connecting cable to connect the camera to a lattice extension. This means certain pre-conditions are applicable to installation and removal.

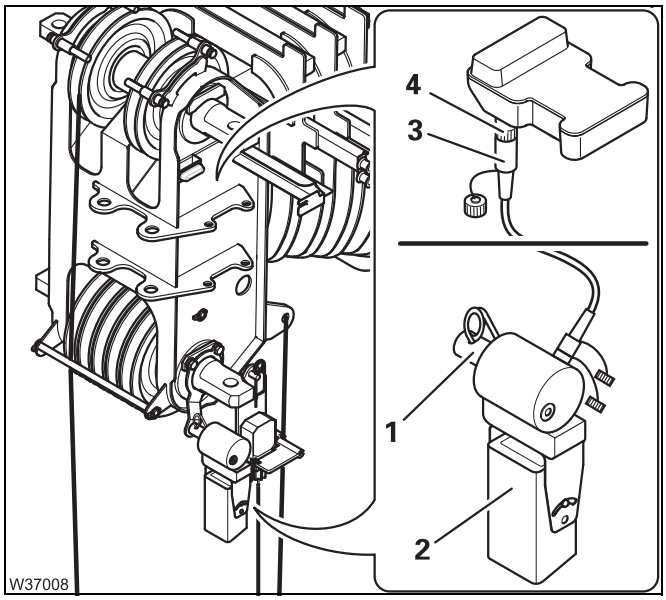
Risk of accidents due to falling camera!
Always use a retaining pin to hold the camera in the clamp.
This prevents the camera falling down and injuring someone.



Installing

– Only the camera

- Insert the camera (**2**) into the clamp (**1**) and secure it with the retaining pin.
- Insert the plug (**4**) in the socket (**3**).
- Lay the cable (**5**) so that it will not be damaged.



– The camera and the connecting cable

- Insert the camera (**2**) into the clamp (**1**) and secure it with the retaining pin.
- Insert the plug (**3**) in the socket (**4**).
- Lay the cable (**5**) so that it will not be damaged.

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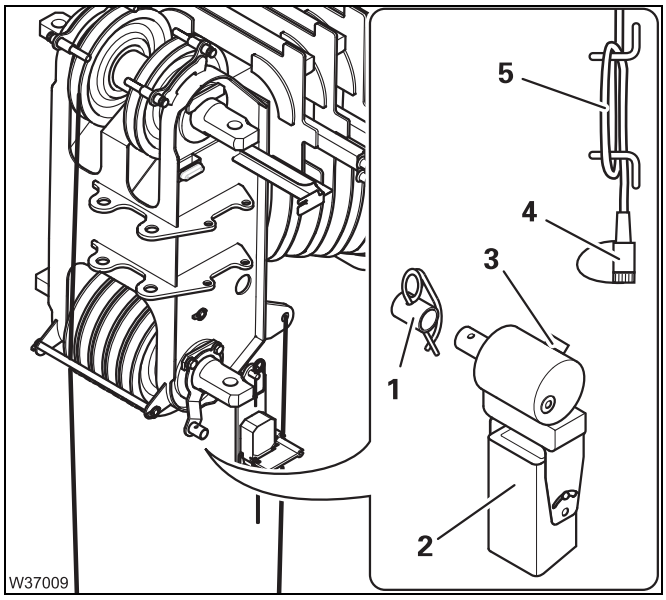
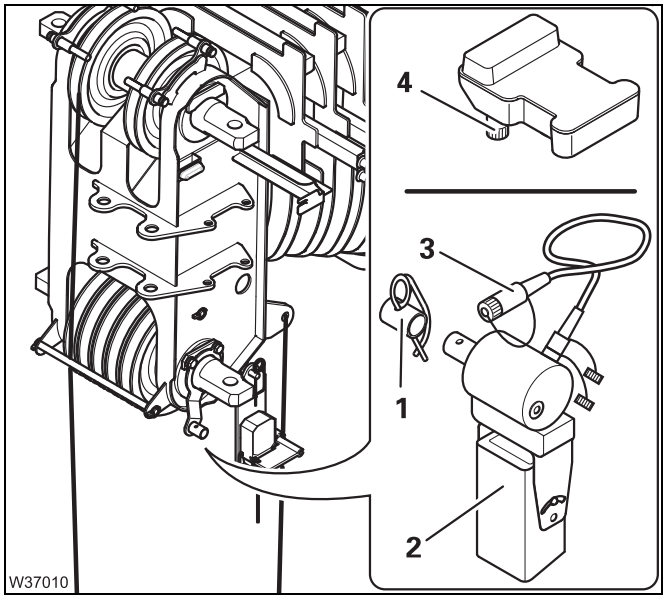


Removing

– Only the camera

- Withdraw the plug (**4**) from the socket (**3**) and close it with the cap.
- Remove the camera (**2**) from the clamp (**1**) and put the retaining pin in the holder (**1**).
- Wind the cable (**5**) on to the clamp.



– The camera and the connecting cable

- Withdraw the plug (**3**) from the socket (**4**) and close it with the cap.
- Remove the camera (**2**) from the clamp (**1**) and put the retaining pin in the holder (**1**).
- Wind the cable (**5**) on to the clamp.

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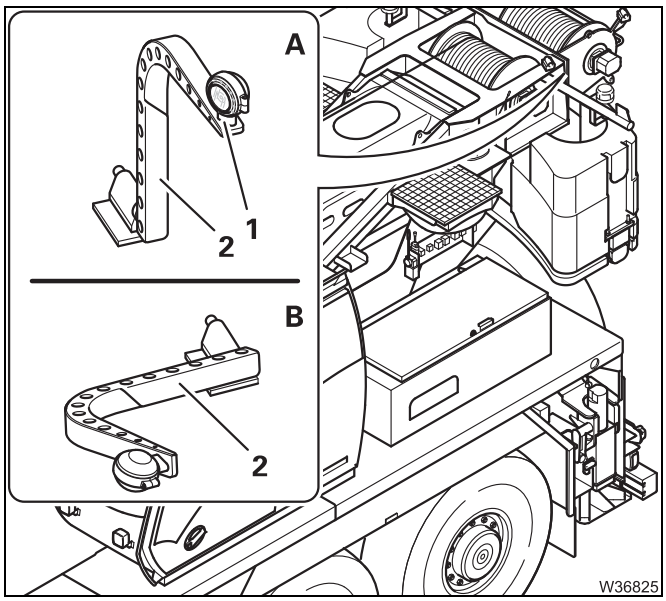
Camera on the hoists

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 fold in the camera before driving. When the camera is extended it exceeds the overall height specified for on-road driving.

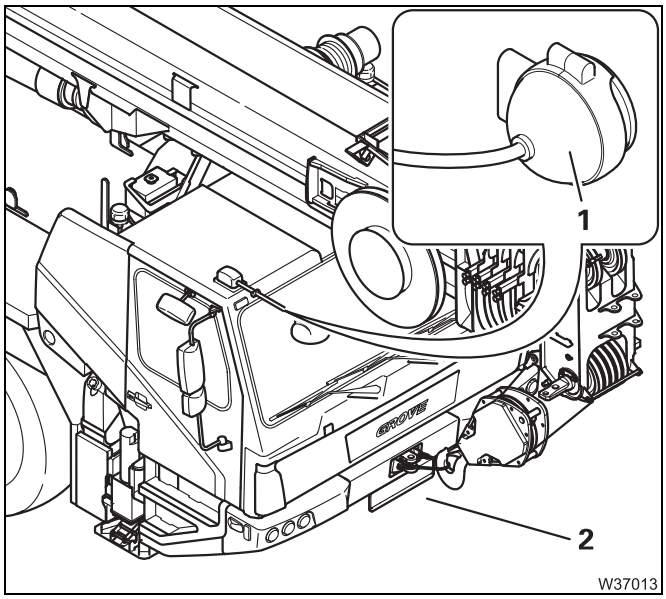


A camera (**1**) transmits an image of the main and auxiliary hoists to the display in the crane cab.

(**A**) – For crane operation you must swing out the holder (**2**).

(**B**) – For driving you must fold in the holder (**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 on a separate monitor.

- Adjust the camera (**1**) to show the area (**2**) in front of the bumper on the display or monitor.

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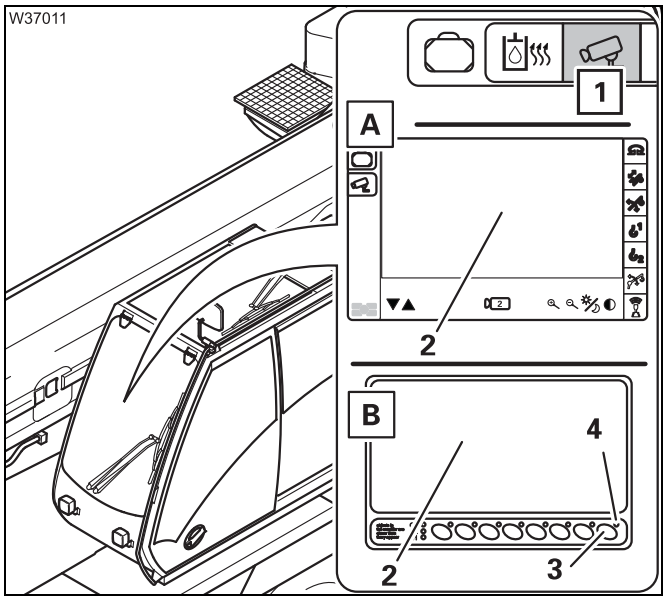
Operating the camera

Depending on the version, the image is shown on the *CCS* display or on a separate monitor.



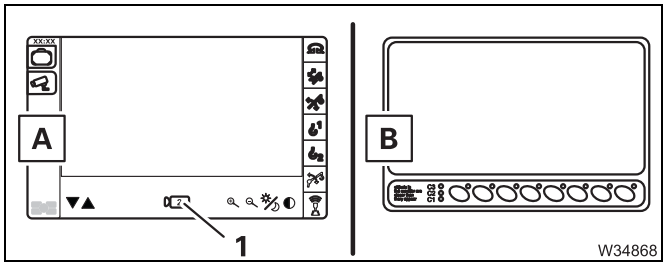
Switching on

- Switch on the ignition.
- (**A**) – Select and confirm the symbol (**1**)

  or

- (**B**) – Press the button (**3**) once. The lamp (**4**) lights up.

The image appears on the display after a few seconds.



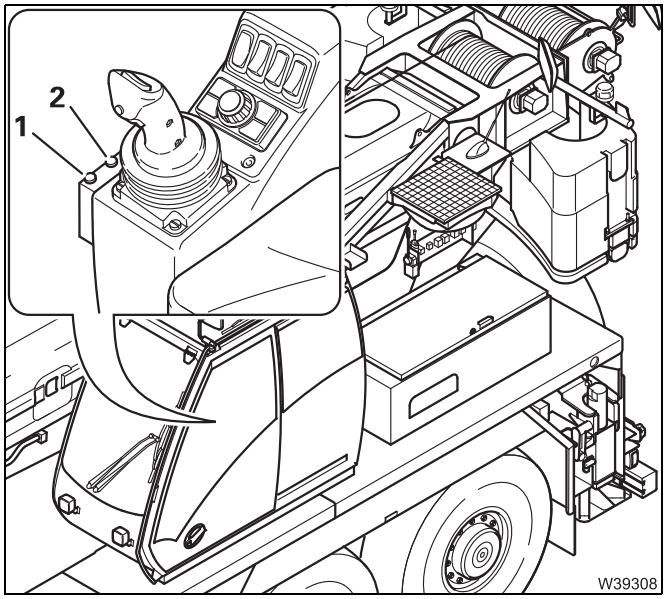
Switching the representation

– (**A**) – with symbol (**1**),

  or

– (**B**) – With the buttons + or -.

If no image appears; ➠ p. 14 - 17.



Changing views

For the main boom camera with zoom lens

1 Enlarge the view

2 Reduce the view

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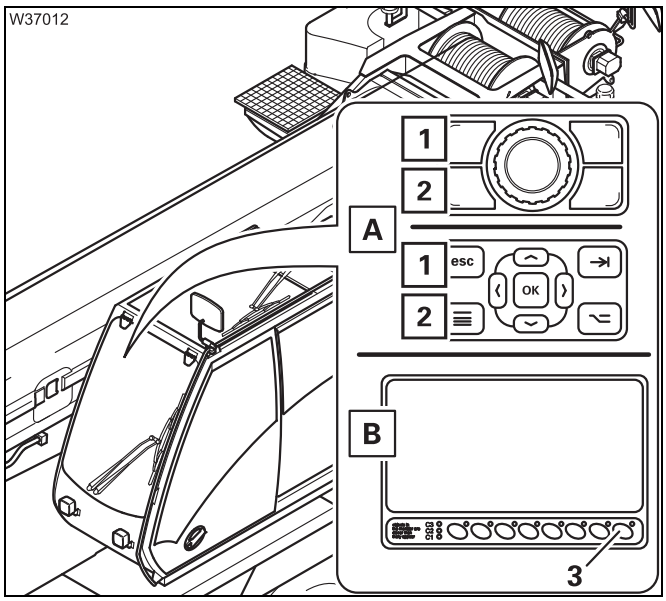

Switching off

- (**A**) – Press the button (**1**) or (**2**) once

  or

- (**B**) – Press the button (**3**) once.

The image will disappear.

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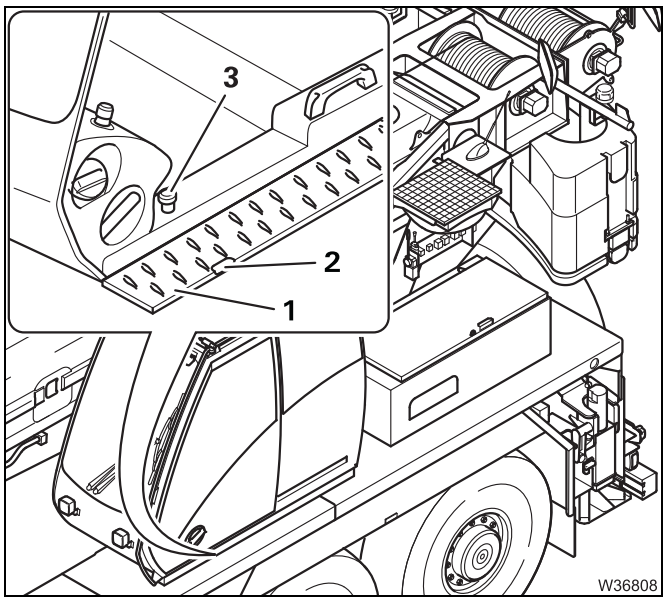
12.8.3 Step at the crane cab

You can pull out the stair tread for crane operation.
For driving operation you must slide in the step.

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.

Risk of accidents during on-road driving due to the step moving out
Always secure the retracted step using the spring latch.
This prevents the step from sliding out by itself during cornering.



Extending

- Pull the spring latch (**3**) and pull out the step (**1**) by the handle (**2**) at the same time until the spring latch (**3**) latches into place.

Retracting

Retracting is performed in the reverse sequence.

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13 Driving with a rigged truck crane

This section describes driving the truck crane with the counterweight rigged.
If a lattice extension is also rigged; ➠ *Lattice extension operating manual*.

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, for example, the raised main boom in the *0° to the rear* position.

Risk of overturning by slewing superstructure!
When driving the rigged truck crane, the slewing gear must be switched off – slewing gear brake engaged. The turntable must be locked.

Risk of accidents when driving with a lifted load!
The truck crane may only be driven with a lifted load if it is in a permissible *Free on wheels* operating position in accordance with *Lifting capacity table*. The truck crane must not be driven from the driver's cab with a raised load.

Risk of accidents when driving on public roads!
Driving on public roads is permissible only if all requirements listed in the *CHECKLIST: checks before on-road driving* are met; ➠ p. 5 - 1.
Driving from the crane cab and driving with the truck crane rigged is not permissible on public roads.

13.1 Driving route

The driving distance to be driven must be level. The level adjustment system cannot compensate for uneven surfaces.

The entire driving distance must be level. The rigging modes and axle loads specified in this chapter only for routes which are free of inclines in longitudinal and lateral direction.

The ground of the driving route 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 laying stable material (e.g. wooden planks) on it.

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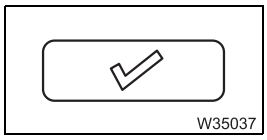
13.2 Permissible rigging modes and axle loads

In the *Free on wheels* operating position, slewing is only enabled when a maximum counterweight combination of 7.6 t (16,700 lbs) is rigged. If you wish to move the rigged truck crane with a rigged counterweight combination of 8.6 t (18,900 lbs), then you must first adequately support the truck crane and slew the superstructure into the *0° to the rear* operating position.

- Bring the truck crane into a permissible *Free on wheels* operating position in accordance with the *Lifting capacity table*; ➠ *CHECKLIST: Rigging*, p. 12 - 1. A maximum counterweight combination of 8.6 t (18,900 lbs) may be rigged.



- Enter and confirm the current rigging mode at the *RCL* for the *Free on wheels* operating position.
- For reasons of safety, extend the outrigger beams in accordance with the available space. The outrigger pads must not touch the ground whilst the crane is being driven.
- You can drive without a load and, under certain circumstances, even with a lifted load. Observe the information in the corresponding section.

13.2.1 To drive without a load

- Slew the superstructure to the *0° to the rear* position – if slewing is not permitted in the current *Free on wheels* operating position then you must support the truck crane on outriggers before slewing.
- Lock the turntable.
- Switch off the slewing gear.
- Bring the main boom to an inclination permitted within the working range.
- Tie down the hook block so that it cannot swing around.

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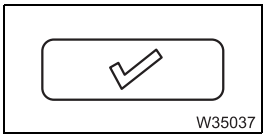
13.2.2 To drive with a load

When the truck crane is being driven with a lifted load, it may be driven only from the crane cab.

Risk of accidents when driving with a lifted load!
When driving with a lifted load, you must be able to operate the crane at any time in the event of an emergency. That is why the truck crane may not be driven from the driver's cab with a lifted load.

- Lift the load.
- Bring the main boom to an inclination permitted within the working range.
- Slew the superstructure to the *0° to the rear* position – if slewing is not permitted in the current *Free on wheels* operating position then you must support the truck crane on outriggers before slewing.
- Lock the turntable.
- Switch off the slewing gear.



- Enter and confirm the rigging mode according to *Lifting capacity table* for the current *Free on wheels, 0° to the rear* operating position.

Risk of accidents when driving with a lifted load!
Secure the load when driving so that it cannot swing and use the transmission mode **DM** or **RM** so that the transmission does not shift.
In this way you can prevent the swinging load leaving the permissible working range and the truck crane overturning.

- Tie down the load so that it cannot swing back and forth.
- Switch to transmission mode **DM** or **RM** depending on the driving direction.
- Before driving with a load, observe the specifications in the relevant section;
➠ *Driving from the crane cab*, p. 13 - 13

13.2.3 Axle loads

The maximum axle loads are 25.0 t (55,116 lbs), when the main boom is in the permissible operating range for a *Free on wheels* operating position according to the *Lifting capacity table*.

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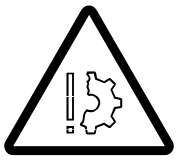
13.3 Before driving the rigged truck crane

13.3.1 Checking tyre pressure and wind speed

- Ensure that all the tyres are at the prescribed pressure levels;
  ➠ *Tyres*, p. 1 - 14.



Risk of damage to the tyres!
Only drive the rigged 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!

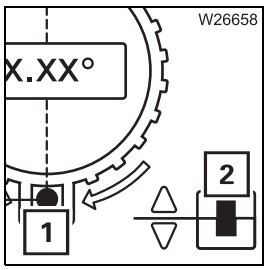
The wind speeds stated in *Lifting capacity table* for the entered rigging mode apply for driving the truck crane.

- Check the wind speed; ➠ p. 11 - 78.

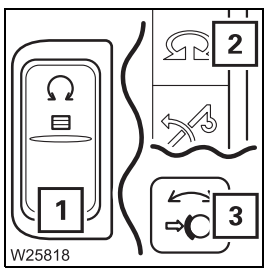
Risk of accidents at excessively high wind speeds!
You may not drive the rigged truck crane if the wind speed exceeds the maximum permissible values specified in *Lifting capacity table*. In this case, you must bring the truck crane into a secure state.

13.3.2 Secure the superstructure against slewing

Danger of overturning by the superstructure slewing while driving the truck crane!
Always secure the superstructure before driving the rigged truck crane to prevent it slewing. Slewing the superstructure while driving the truck crane increases the risk of overturning.!



- Lock the turntable – the symbols (**1**) and (**2**) must be **green**.



- Switch off the slewing gear; ➠ p. 11 - 126.
  - 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.

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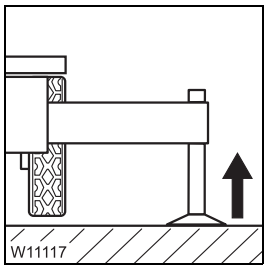
13.3.3 Putting the truck crane on the wheels

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.

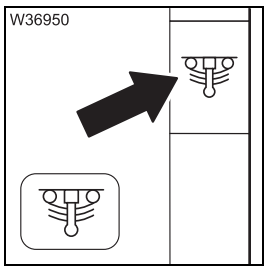
Risk of damage to the axle lines!
Retract the outrigger cylinders evenly! This prevents excessive strain on the axle lines.

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 collapsed and damaged, and the truck crane could overturn.

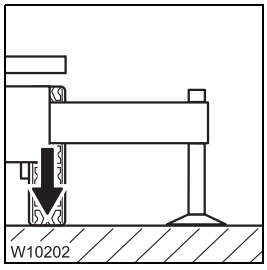


Lowering wheels

- 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 - 16.



Now lower all wheels to the ground.

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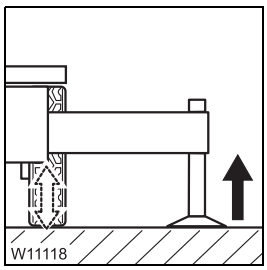
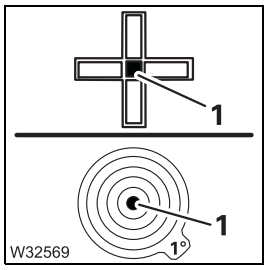
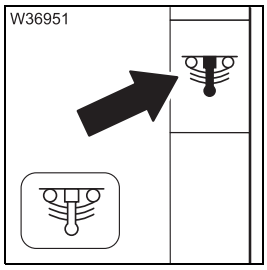


Levelling the truck crane

- Retract the supporting cylinders evenly. Lower the truck crane only to the extent that the suspension struts still have enough play for alignment.

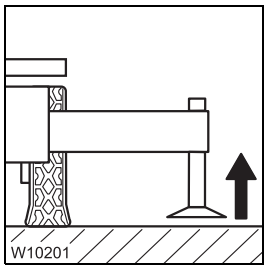


- Level the truck crane with the outriggers until only lamp (**1**) is illuminated in the measuring range **1°**.



Switching off the suspension

- Switch off the suspension – the symbol must be **red**;
  ➠ *Switching the suspension on/off*, p. 5 - 16.



To secure the truck crane

- Retract the supporting cylinders until the outrigger pads are about 5 to 10 cm (2 to 4 in) above the ground. Allow the outrigger beams to extend as far as possible.

Danger of overturning if outriggers are retracted!
Always leave the outrigger beams extended as far as possible and the outrigger pads just above the ground to secure the truck crane against overturning.

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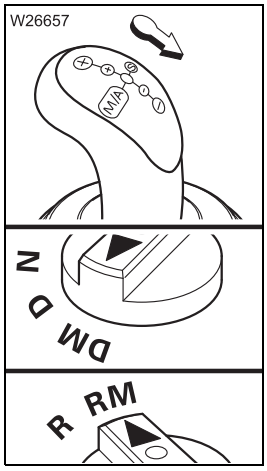
13.4 Driving from the driver's cab

Risk of accidents when driving the truck crane from the driver's cab with a lifted load!
With a lifted load, drive the truck crane only from the crane cab. You must be able to carry out crane movements in an emergency at all times.

13.4.1 Preparing to drive

Transmission

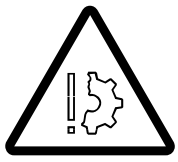


- Switch to the lowest starting gear and remain in the *Manual* operating mode; ➠ p. 5 - 29.

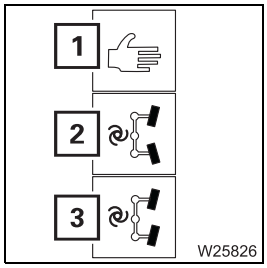
In this way you prevent the gears changing up and ensure that the speed is kept to a minimum.

Switching on separate steering

When driving the rigged truck crane, the separate steering must be switched on.



Risk of damage to the steering linkage!
Always switch on separate steering before driving the rigged truck crane and steer the truck crane only when it is rolling.
The steering linkage can be damaged if separate steering is switched off or if you steer the vehicle while it is stationary.



- Select and confirm the symbol

  1 – for Manual separate steering or

  2 – separate steering automatic for driving around corners or

  3 – separate steering automatic for crab travel mode.

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Connections

If required, you can

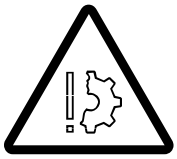
– Switch on the longitudinal differential locks; ➠ p. 5 - 56.

– Switch on the transverse differential locks; ➠ p. 5 - 56.

13.4.2 While driving

- Only drive slowly, do not change up.
- Use the greatest possible turning radius when you are driving around corners!
- Steer the truck crane when it is moving, and avoid sudden steering movements!

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.

Danger of overturning by switching on the suspension!
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.

Never level the truck crane with the level adjustment system if the ground is uneven. In this case you must raise the truck crane with the supporting cylinders, level it and then re-lower it; ➠ *Levelling the free-standing truck crane*, p. 12 - 47.

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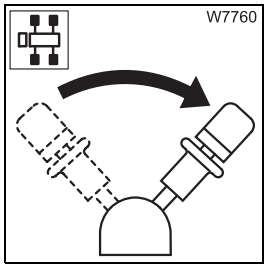
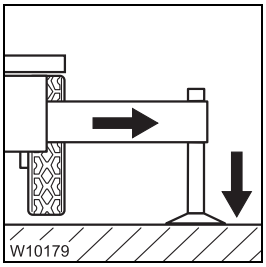
13.4.3 After driving

- Switch separate steering off after driving; ➠ p. 5 - 68.



- 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
– For the *Standard* slewing range type; ➠ p. 12 - 18
– For the *MAXbase* slewing range type; ➠ p. 12 - 22.

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13.5 Driving from the crane cab

Risk of accidents when driving with a lifted load!
The truck crane may be driven with a lifted load only when it is in the *Free on wheels* operating position and the current rigging mode has been entered and confirmed on the RCL.

Risk of accidents due to the hook block/load swinging!
Secure the hook block/load when driving so that it cannot swing.
Start away slowly so that the hook block/load does not swing.

Risk of accidents due to partially obstructed view of the truck crane!
While driving, always stay in visual or radio contact with a banksman who can observe the parts which you cannot see, such as the erected main boom.

Risk of overturning by slewing superstructure!
When driving the rigged truck crane, the slewing gear must be switched off – slewing gear brake engaged. The turntable must be locked.

Risk of accidents when an increased idling speed is used!
If necessary, reset the idling speed to the default value. Do not drive with increased idling speed. You may drive the truck crane from the crane cab only at the lowest speed possible.

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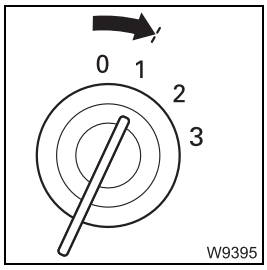
13.5.1 Preparing to drive

- Make sure that the rigging mode for driving with a load or without a load is set correctly; ➠ p. 13 - 2.

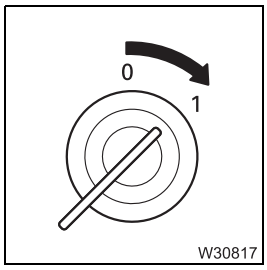


In the driver's cab

– The ignition key must be in position **1** so that the steering cannot block.

– The driver's cab must be locked with the second ignition key in order to secure it against unauthorised use – for example, braking.

– The parking brake is engaged.



In the crane cab

– The ignition must be switched on.

– The hand-held control must be disconnected and bridging plugs plugged into all the sockets.

– The superstructure must be locked.

– The parking brake is engaged.

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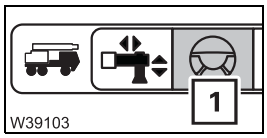
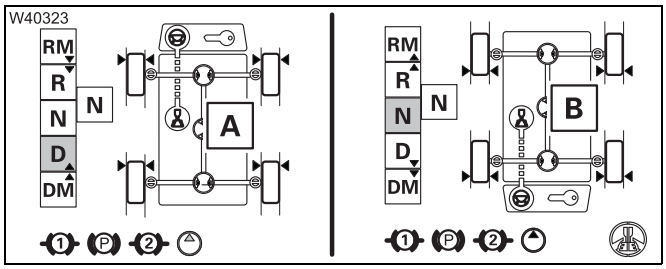
13.5.2 Opening/closing the Driving menu

Opening the menu

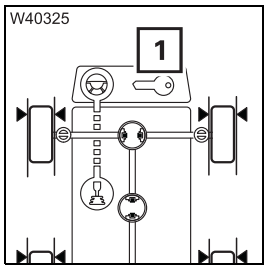


- Select and confirm the symbol (**1**).

The menu opens automatically the first time you release the parking brake after switching on the ignition.



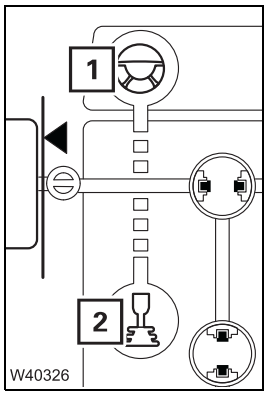
The display will show (**A**) or (**B**) depending on the current slewing angle; *Carrier display*, p. 9 - 149.



If the symbol (**1**) is **red**, you must turn the ignition key in the driver's cab to position **1** – the symbol then turns **grey**.

Selecting the operating mode

The available operating modes are *Crane operation* and *Driving*.



Crane operation
Symbol (**1**) **green** – symbol (**2**) **white**
In this operating mode, you can perform crane operation in exactly the same way as when the *Driving* menu is closed. This operating mode is selected when the menu is opened.

Driving
Symbol (**1**) **white** – symbol (**2**) **green**
In this operating mode, the operating elements for driving are activated and you can choose to drive with the crane's hydraulic system switched on. When the crane's hydraulic system is switched on, the crane movements are released with reduced power (no high-speed mode).

Selecting the operating mode

- Select and confirm the symbol (**2**) – the active operating mode is displayed.

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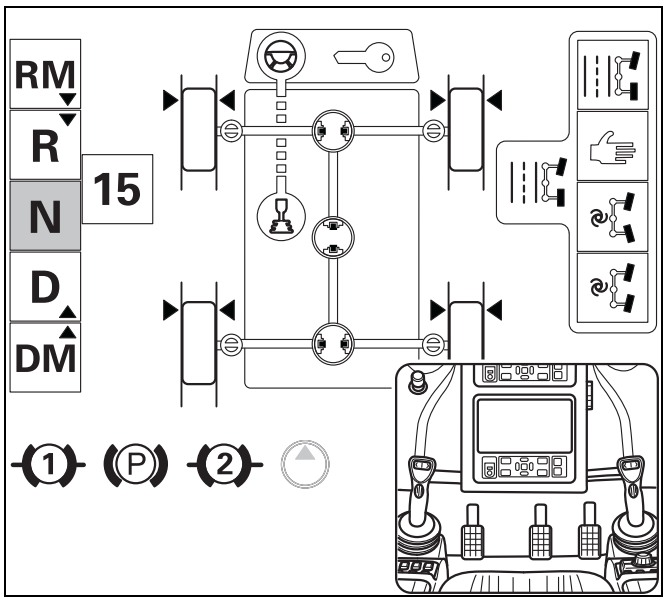


In crane operation

The symbol (**2**) is **white**.

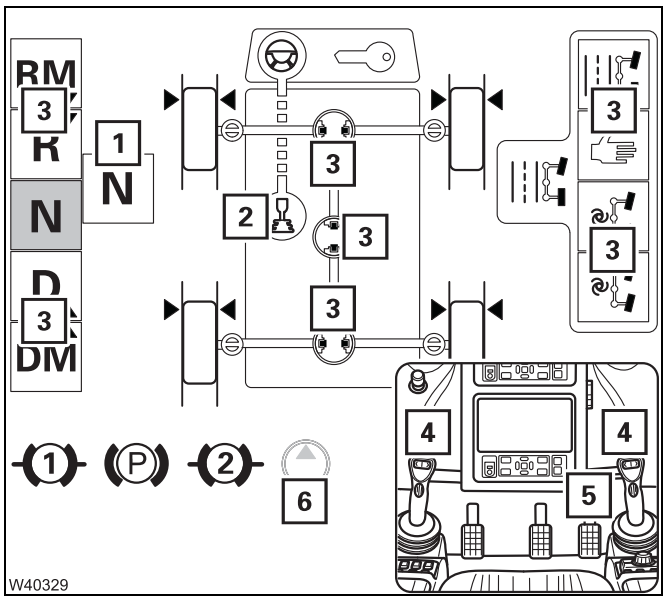
The gear indicator (**1**) indicates gear 15 (shift position for supplying the crane's hydraulic system).

The operating elements (**3**) are disabled.

The buttons (**4**) are assigned the *High-speed* function.

The crane's hydraulic system *Driving mode* is switched off – symbol (**6**) **grey**.

The engine speed for crane operation is regulated using the pedal (**5**).



In driving operation

The symbol (**2**) is **green**.

The transmission is in neutral position – display (**1**).

The operating elements (**3**) are released.

The buttons (**4**) are assigned the *Steering* function.

The crane's hydraulic system *Driving mode* is switched on – symbol (**6**) **orange**.

The engine speed for driving is regulated using the pedal (**5**).

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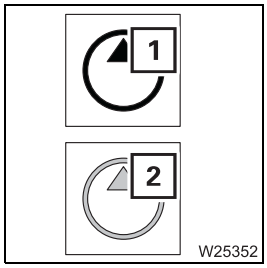
Crane's hydraulic system *Driving mode*

In driving mode, the crane's hydraulic system is driven by a different energy source from the one used in crane operation.

The switchover is automatic, and the current status is displayed.



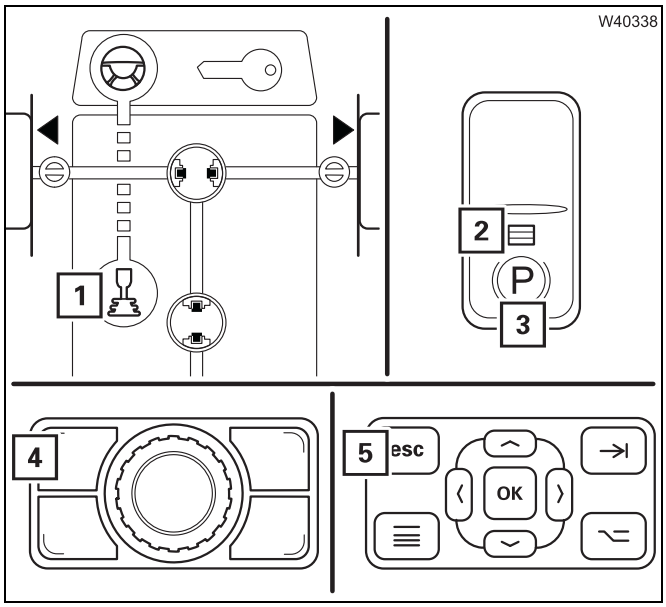
1 Arrow **orange** – crane's hydraulic system *Driving mode* on
The transmission mode **RM**, **DM** or neutral position **N** is selected – you can carry out crane movements.

2 Arrow **grey** – crane's hydraulic system *Driving mode* off
The transmission mode **D or R** is selected – the crane movements are disabled.

Closing menu

This section describes only how to close the *Driving* menu.

If you want to stop driving, ➠ *After driving*, p. 13 - 28.



- Apply the parking brake.
  Press button (**3**) in at the bottom once – lamp (**2**) lights up.
- Switch to crane operation mode.
  Select symbol (**1**) and confirm – symbol is **white**.
- Close the *Driving* menu.
  Press button (**4**) or (**5**) once.

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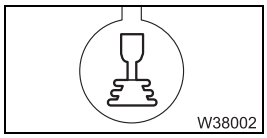
13.5.3 Steering

Switching on



Switching over to *Driving* mode switches on the normal steering mode.

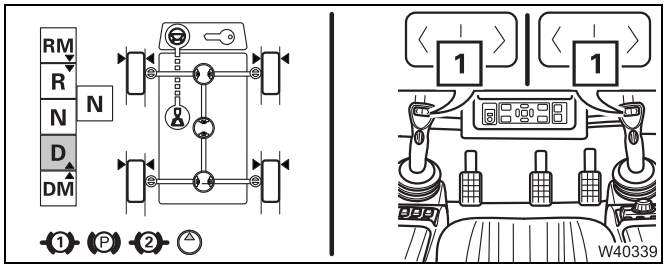
Display and steering direction

The display of the carrier depends on the current slewing angle; *Carrier display*, p. 9 - 149.

The steering direction depends on whether the superstructure is in the front semi-circle or in the rear semi-circle.

In the front semi-circle

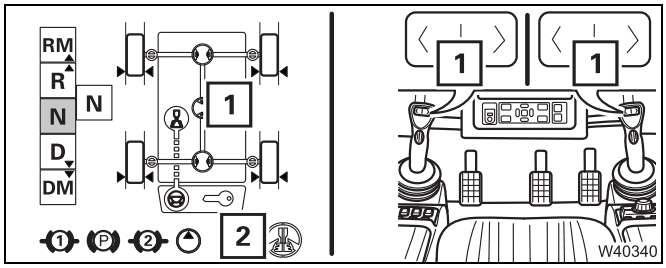
The steering direction is *Steering wheel*.



– **Turn to the right**
  Press button (**1**) to the right – steering wheel turns to the right (with right control lever).
– **Turn to the left**
  Press button (**1**) to the left – steering wheel turns to the left (with right control lever).

In the rear semi-circle

The steering direction can be switched between *Steering wheel* and *Reversed*. The current steering direction is displayed.



With steering direction *Reversed* – symbol (**2**) displayed – the following applies:

– **Turn to the right**
  Press button (**1**) to the left – steering wheel turns to the right (with right control lever).
– **Turn to the left**
  Press button (**1**) to the right – steering wheel turns to the left (with right control lever).

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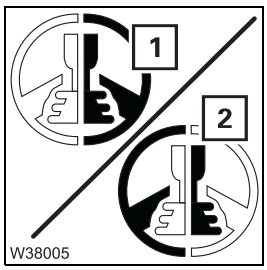
Changing the steering direction

The steering direction switched on is saved and is retained even after a restart.



The display shows the currently set steering direction.

Switching over

1 Steering direction *Steering wheel*

2 Steering direction *Reversed* (compared to steering wheel)

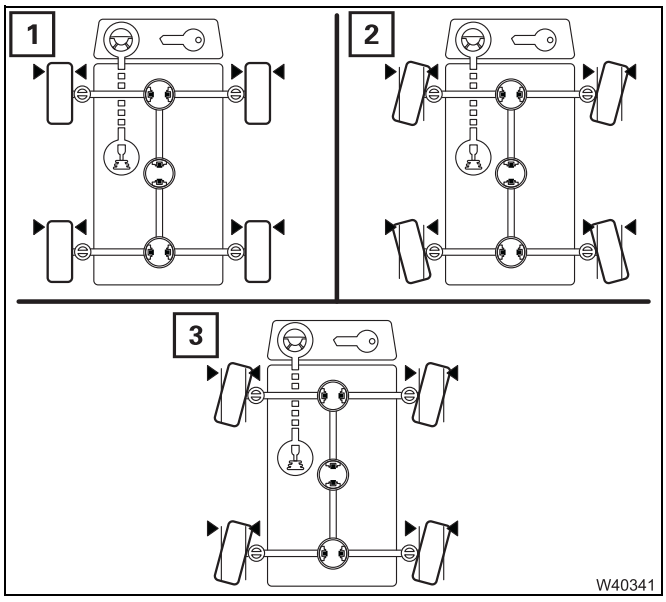
Switching over

- Select and confirm the desired symbol

All illustrations and descriptions in the following sections refer to the steering direction *Steering wheel*. When you switch to the *Reversed* steering direction, remember that the wheels will turn in the opposite direction.

Displays when steering

The current steering angle of the wheels is displayed.



The symbols show the current steering angle:

1 Straight ahead position

2 Driving around corners

3 Crab travel mode

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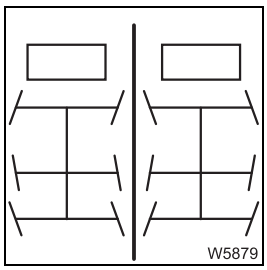
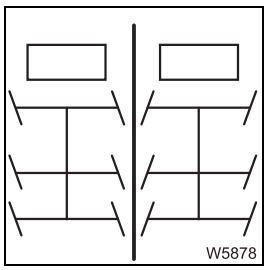
Separate steering Always switch off the separate steering when driving a rigged truck crane.

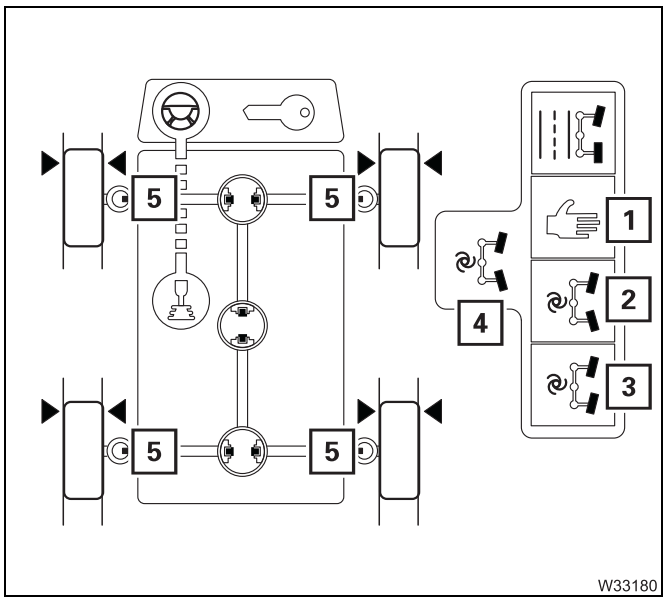


There are two steering modes with separate steering.

– **Driving around corners**
When separate steering is switched on, the steering angle is larger than for normal steering mode – the turning circle is smaller.



– **Crab travel mode**
When separate steering is switched on, you can turn the wheels of the front and rear axle lines in the same direction – the truck crane drives sideways.



Switching to separate steering

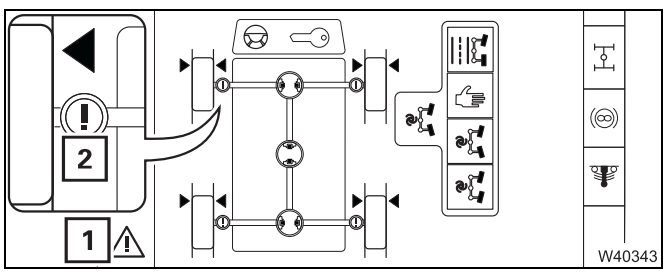
- Select and confirm the symbol for the desired steering mode.

  1 Manual
  2nd and 3rd axle lines steered manually

  2 Automatic – driving around corners
  2nd and 3rd axle lines steered automatically

  3 Automatic – crab travel mode
  2nd and 3rd axle lines steered automatically

– The symbol (**4**) indicates the selected steering mode, e.g. *Driving around corners*.
– The symbols (**5**) become **red** – steering unlocked – separate steering is switched on.



If an error symbol (**1**) or (**2**) is displayed, contact **Manitowoc Crane Care**; p. 8 - 23.

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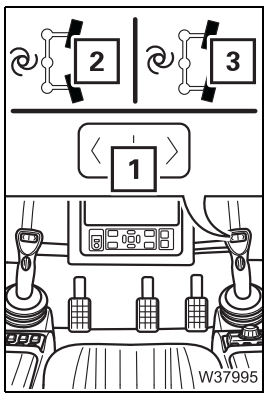


Steering with separate steering – automatic

The symbol (**2**) or (**3**) is displayed for the desired steering mode.

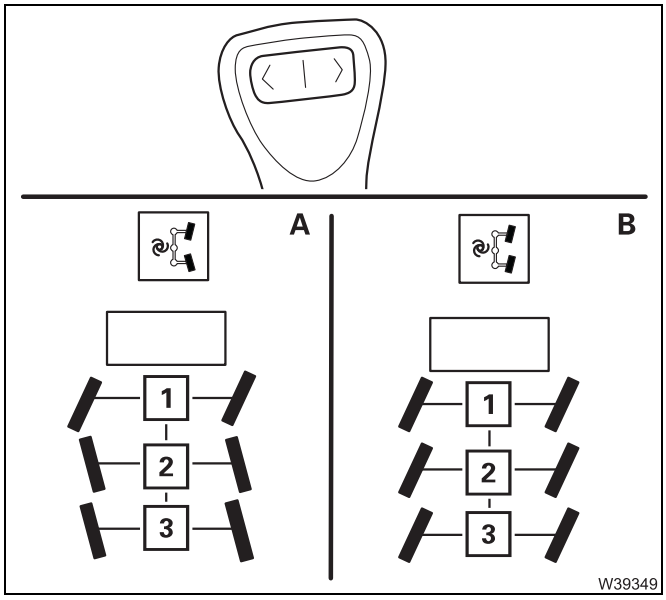
- Steer the 1st axle line with the button (**1**).

– **To turn to the left:** • Press button (**1**) to the left.

– **To turn to the right:** • Press button (**1**) to the right.

The axle lines are steered as long as you keep the button pressed or until an end position is reached.

The electronics measures the steering angle of the 1st axle line and automatically steers the wheels of the 2nd and 3rd axle lines correspondingly.

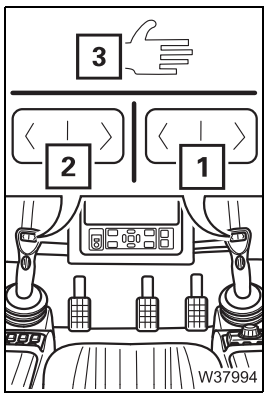


(A) – When driving around corners

The 2nd and 3rd axle lines are steered out in line with the turning radius, against the steering angle on the 1st axle line.

(B) – For crab travel mode

The 2nd and 3rd axle lines are steered in the same direction as the 1st axle line.



Steering with separate steering – manual

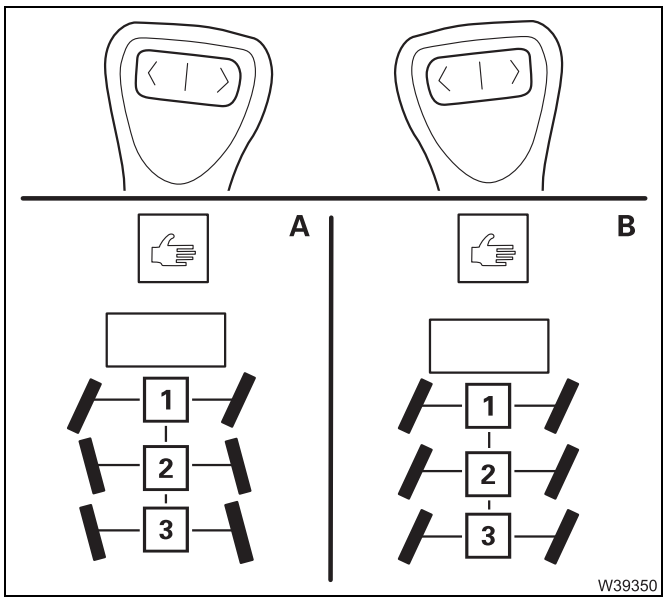
The symbol (**3**) is displayed.

- Steer the 1st axle line with the button (**1**).
- Steer the 2nd and 3rd axle lines with the button (**2**).

– **To turn to the left:** • Press buttons (**1**), (**2**) to the left.

– **To turn to the right:** • Press buttons (**1**), (**2**) 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 2nd and 3rd axle lines opposite to the 1st axle line.

(B) – For crab travel mode

- Steer the 2nd and 3rd axle lines in the same direction as the 1st axle line.

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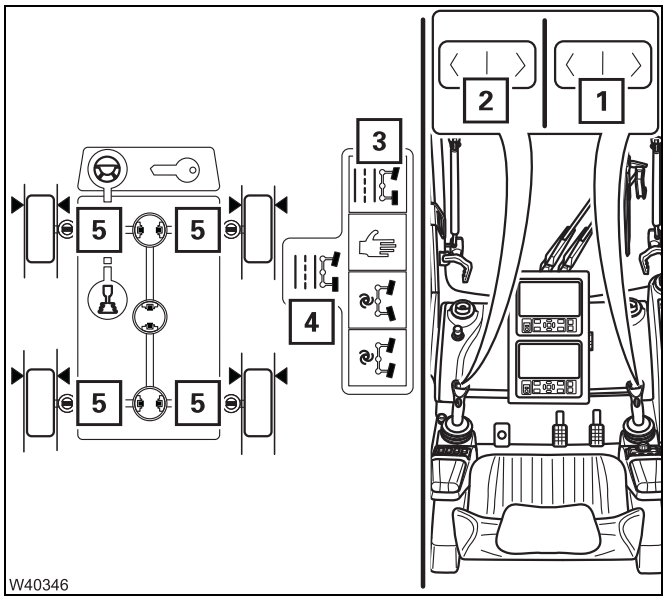
Normal steering

When driving a **rigged** truck crane, always use the separate steering; ➠ p. 13 - 20.



Switching to normal steering mode

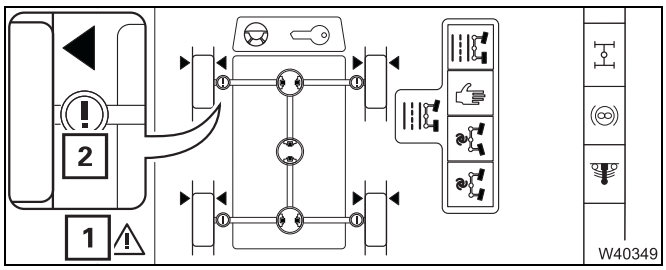
- Use buttons (**1**) and (**2**) to turn the wheels to the *Straight ahead* position – the current wheel position is displayed.
- Select and confirm the symbol (**3**).

– The symbol (**4**) indicates the selected steering mode, e.g. *Normal steering*.

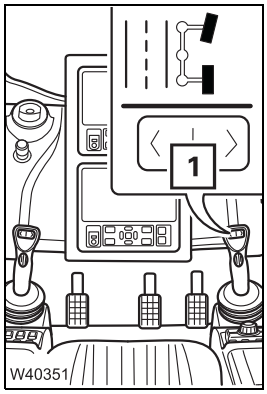
– The symbols (**5**) become **green** – steering locked – normal steering for on-road driving is switched on.

If the symbols (**5**) are **yellow**:

- Use buttons (**1**) and (**2**) to turn the wheels to the *Straight ahead* position – the current wheel position is displayed.



If an error symbol (**1**) or (**2**) is displayed, contact **Manitowoc Crane Care**; ➠ p. 8 - 23.



Steering in normal steering mode

The steering system is set to normal steering.

- Steer the 1st axle line with the button (**1**).
  The wheels of the 2nd and 3rd axle lines are turned correspondingly for driving around the corner.

  – To turn to the left: • Press button (**1**) to the left.

  – To turn to the right: • Press button (**1**) to the right.

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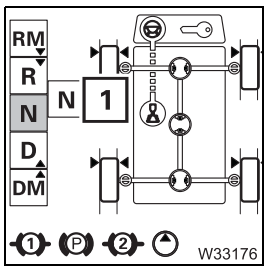
13.5.4 Operating the transmission

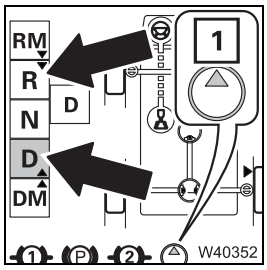


When the *Driving* operating mode is switched on, the transmission is in neutral position – letter **N** (**1**) **white**.

Selecting the transmission mode

You can select transmission modes with crane functions and transmission modes without crane functions.

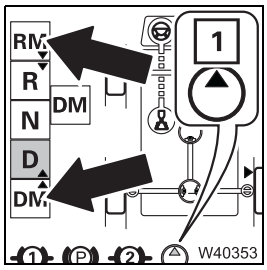
Risk of accidents when driving with a lifted load!
Secure the load when driving so that it cannot swing and use the transmission mode **DM** or **RM** so that the transmission does not shift.
In this way you can prevent the swinging load leaving the permissible working range and the truck crane overturning.



Transmission modes without crane functions

- Switch to transmission mode **D** or **R.**

– The crane's hydraulic system *Driving mode* is switched off – symbol (**1**) is **grey**.
– The transmission shifts.
– The speed is limited to about 20 km/h (12 mph).



Transmission modes with crane functions

- Switch to transmission mode **DM** or **RM.**

– The crane's hydraulic system *Driving mode* is switched on – symbol (**1**) **orange**.
– The transmission switches up to a maximum of 1st gear (reverse or forwards).
– The speed is limited to about 5 km/h (3 mph).

In these transmission modes you can start moving more slowly than in the transmission modes **D** or **R**. These transmission modes are intended for manoeuvring mode and for driving with a load.

The crane functions are also available in the neutral position **N**.

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13.5.5 While driving

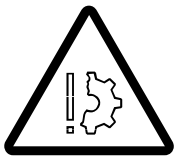
DM and RM transmission mode

The speed is limited to approx. 8 km/h (5 mph) (only in 1st or 2nd gear).

Risk of accidents when driving with a lifted load!
The maximum permissible speed for driving with a lifted load is 1.5 km/h (1 mph).

With a load lifted, drive at the lowest possible speed, at the most 1.5 km/h (1 mph). The speed is not automatically limited to this value.

- Use the greatest possible turning radius when you are driving around corners!
- Do not steer the truck crane when it is stationary.



Risk of damage to the steering linkage!
The steering linkage can be damaged if the steering wheel is moved while the vehicle is stationary.

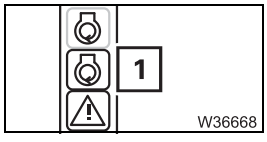
Danger of overturning by switching on the suspension!
The suspension must be deactivated (locked) while the rigged truck crane is on wheels.
When switching on the suspension, the suspension cylinders would suddenly be pressed together and damaged, and the truck crane could overturn.

Never level the truck crane with the level adjustment system if the ground is uneven. You can level the truck crane using the outrigger or the axle raising;
➠ *Levelling the free-standing truck crane*, p. 12 - 47.

Transmission mode D

The speed is limited to a maximum of approx. 20 km/h (12 mph) (maximum of 5th gear).
Use this transmission mode only when:
– The main boom is completely retracted
– The main boom is resting in the boom rest
– The outrigger beams/cylinders are fully retracted

Warning messages



If a symbol is shown in area (**1**);
➠ *Warning messages on the CCS display*, p. 14 - 3,
➠ *Error messages on the CCS display*, p. 14 - 8.

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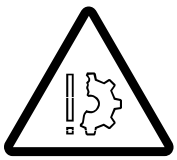
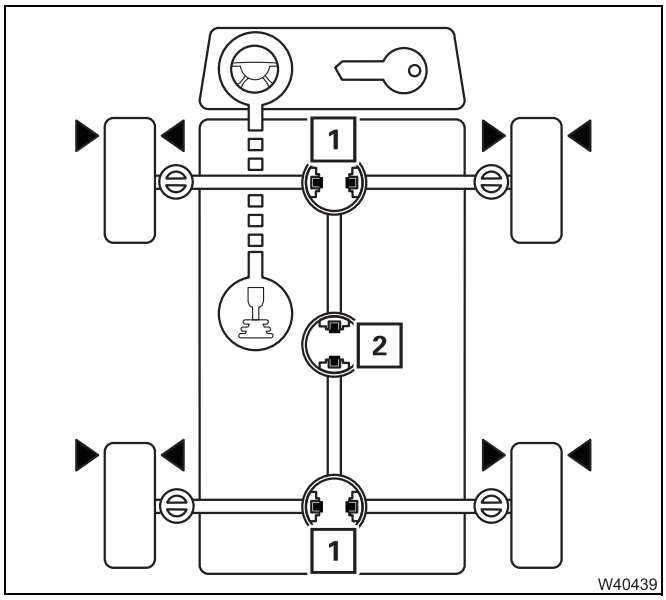
13.5.6 Possible connections



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 firm surface!

The telescoping cylinder and the telescopic section cannot be unlocked simultaneously.



You can make the following connections, one after the other:

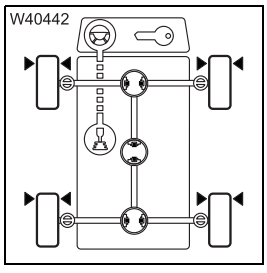
– Longitudinal differential locks (**2**)

– Transverse differential locks (**1**).

The symbols indicate the current switching state.

Longitudinal/ transverse differential locks

With a 6 x 6 x 6 drive, the drive of the 1st axle line is switched on and off together with the longitudinal differential locks.



Straighten the steering.

- Stop the truck crane.

For switching on and off, the current speed needs to be under approx. 5 km/h (3 mph).

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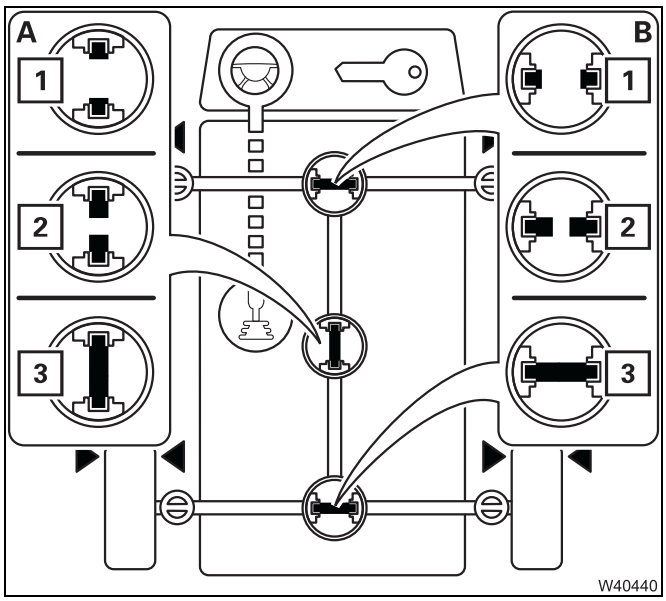
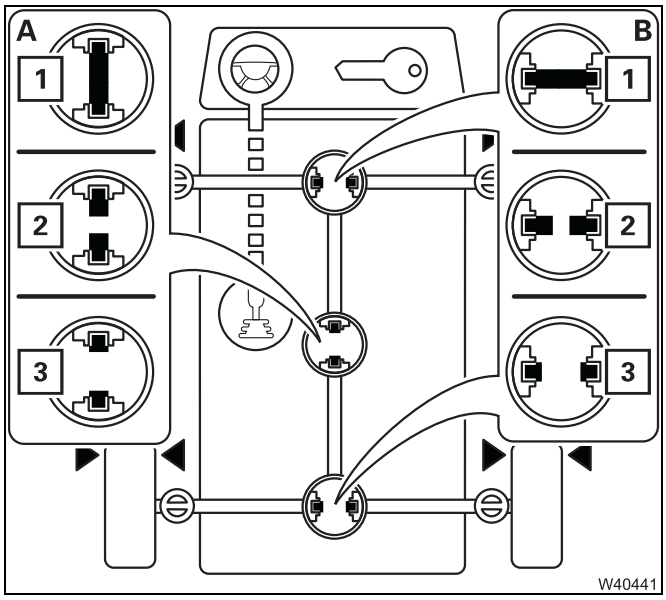


Switching on

- 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.



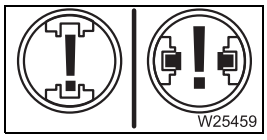
Switching off

- 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.



If the error symbol is displayed, please contact **Manitowoc Crane Care**.

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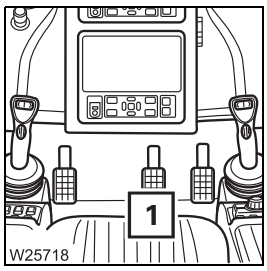
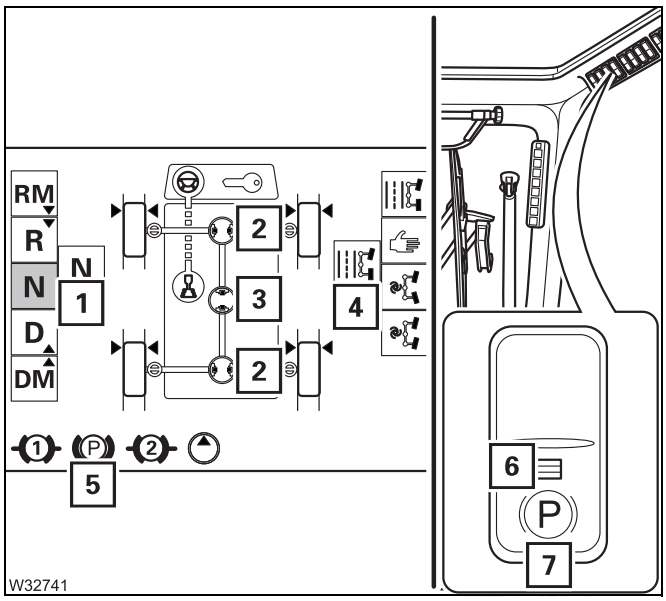
13.5.7 After driving



- Bring the truck crane to a halt with the brake pedal (**1**).



- Restore the original condition:
  - Switch the transmission to neutral position (**1**)
  - Switch off longitudinal differential lock (**3**)
  - Switch off transverse differential locks (**2**)
  - Switch on normal steering mode (**4**)
- Press the (**7**) button in at the bottom once. The lamp (**6**) lights up, symbol (**5**) is **red** – the parking brake is applied.

- If necessary, switch the engine off; ➠ *Switching off the engine*, p. 10 - 10.
- Remove the ignition key from the ignition lock in the driver's cab and lock the driver's cab to prevent unauthorised access.

Support the truck crane on outriggers if you do not intend to work in the *Free-on-wheels* operating position.

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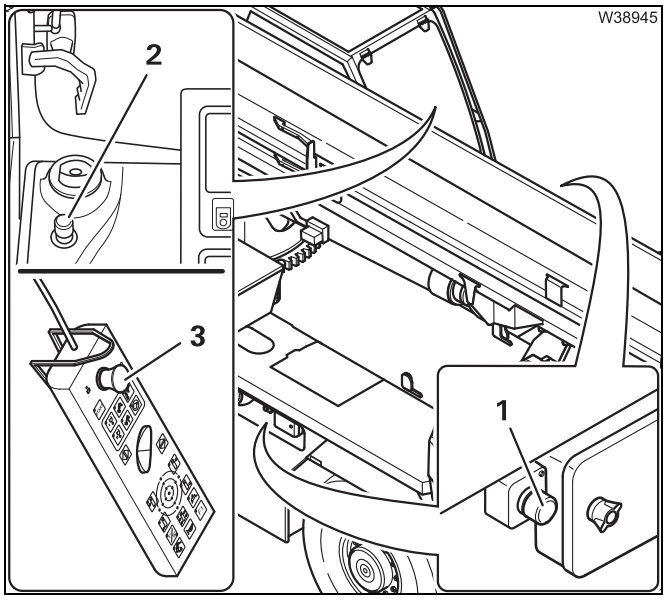
14 Malfunctions during crane operation

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.



Four emergency stop switches are provided for emergencies.

1 At the carrier – always active

2 In the crane cab – always active

3 Only active for connected hand-held control – in addition to (**1**) and (**2**)

- Press an active emergency stop switch.
  – The switch latches.
  – The engine switches off.

After activating an emergency stop switch;
➠ *Resetting the emergency stop switch*, p. 4 - 20.

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.

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14.2 What to do when malfunctions occur during crane operation

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 section titled *RCL override*;
➠ *RCL override – version A*, p. 11 - 67.
➠ *RCL override – version B*, p. 11 - 71

Risk of accidents due to overridden or faulty RCL!
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.

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 - 43,
➠ *Hydraulic emergency operation with the hand pump*, p. 14 - 51,
➠ *Hydraulic emergency operation as per DGUV*, p. 14 - 57.

- 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. Notify **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**.

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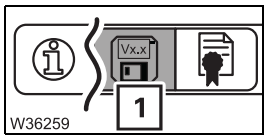
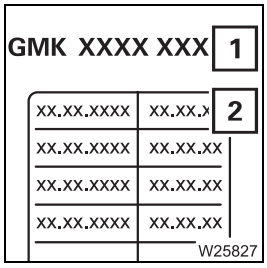
14.3 Warning and error messages

Program version

- Always note down the number of the program version and the serial number after a malfunction occurs before notifying **Manitowoc Crane Care**.



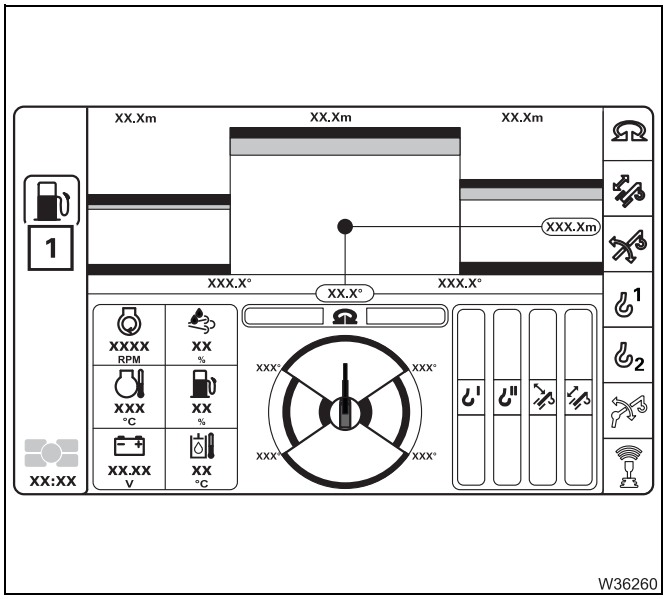
- Open the *Program version* menu (**1**).



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.

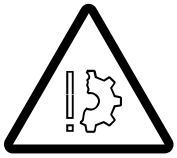
– Symbol **yellow** – malfunction.

– Symbol **red** – warning message.

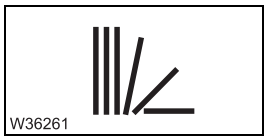
– **No** symbol – no malfunction or warning message.

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 not observed!
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.



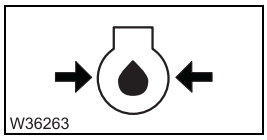
Collective warning

- Set down the load as soon as possible and switch 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.

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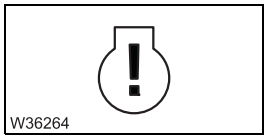
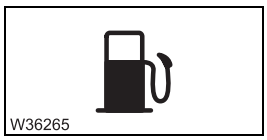


Engine malfunction

- Switch off the engine immediately and open the *Engine/transmission error* menu; p. 8 - 16.
- If necessary, note the error messages and contact **Manitowoc Crane Care**.



Refuelling

The fuel tank is filled only to a level of about 5%.

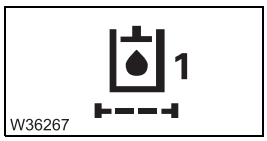
- Refuel before the fuel is used up; p. 4 - 5.

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

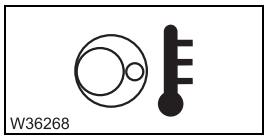
The hydraulic oil temperature is higher than 80 °C (176 °F).
Display of the current temperature; p. 10 - 8.
Possible cause and remedy; p. 14 - 22.

Risk 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 switch off the engine if the temperature of the hydraulic oil exceeds 100 °C (176 °F)!



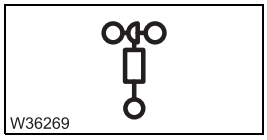
Replacing the hydraulic oil filter

- Replace the corresponding hydraulic oil filter as soon as possible; *Maintenance manual*.



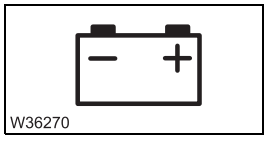
Slewing gear brake too hot

- Stop crane operation as soon as possible and let the slewing gear brake cool down.



Anemometer not connected

- Connect the anemometer to the electrical power supply; p. 12 - 101.



Voltage monitoring

The voltage in the electrical system is too high or too low.
Actual voltage display; p. 10 - 8.

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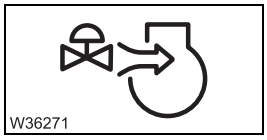


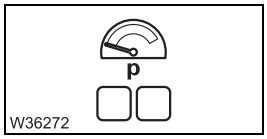
Air intake inhibitor triggered

It is only possible to start the engine after the air intake inhibitor has been released manually; *Opening the air intake inhibitor*, p. 4 - 21.

Pre-tension counterweight (early warning)

The pre-tensioning pressure is at the lower limit – if the pre-tensioning pressure continues to drop, the slewing is disabled.

- Pre-tension counterweight; p. 12 - 70.



Pre-tension counterweight

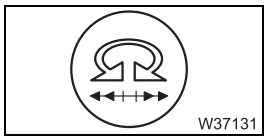
The pre-tensioning pressure is too low.

- Pre-tension counterweight; p. 12 - 70.

Slewing disabled by counterweight

The pre-tensioning pressure is too low or the counterweight is not completely lifted.

- Pre-tension counterweight; p. 12 - 70.



Slewing speed reduction switched off

– Blue – information
The slewing speed is not reduced automatically.

– Red – warning
The maximum permissible slewing speed stated in the *Lifting capacity table* for the current loading case has been exceeded.
There is a risk of accidents – slowly reduce the slewing speed to a permissible value and, if possible, switch the slewing speed reduction on to prevent the slewing speed being exceeded; p. 11 - 127.

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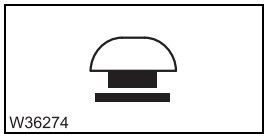
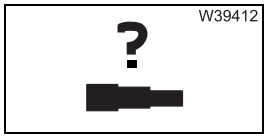


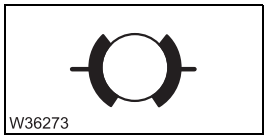
Emergency stop switch actuated

➠ *Resetting the emergency stop switch*, p. 4 - 20



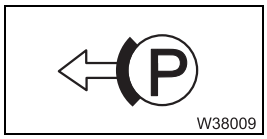
Unknown telescoping

RCL and *CCS* measure different values for the current telescoping – an RCL shutdown occurs.
You can enter the current telescope status if necessary; ➠ p. 14 - 41.
In an emergency, you can override the RCL to bring the truck crane into a safe state; ➠ *RCL override – version A*, p. 11 - 67.



Vehicle brake

- Stop the truck crane immediately and check the pressure in the brake circuits; ➠ p. 5 - 9.



Parking brake released

Information – the parking brake was released from the crane cab.

This section does not include all messages. Symbols described for driving may also be displayed; ➠ *Warning messages on the CCS display*, p. 8 - 10.

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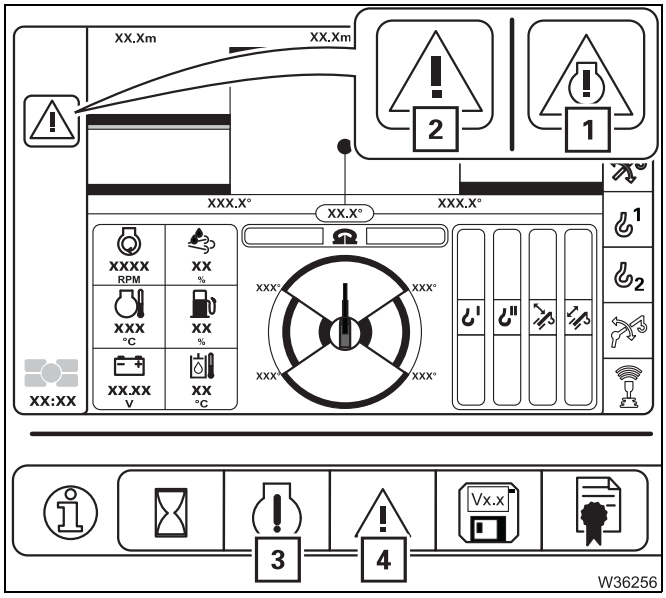
14.3.2 Error messages on the CCS display

Risk of accidents!
Immediately stop operating the crane if an error message is displayed!
The crane control system 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.

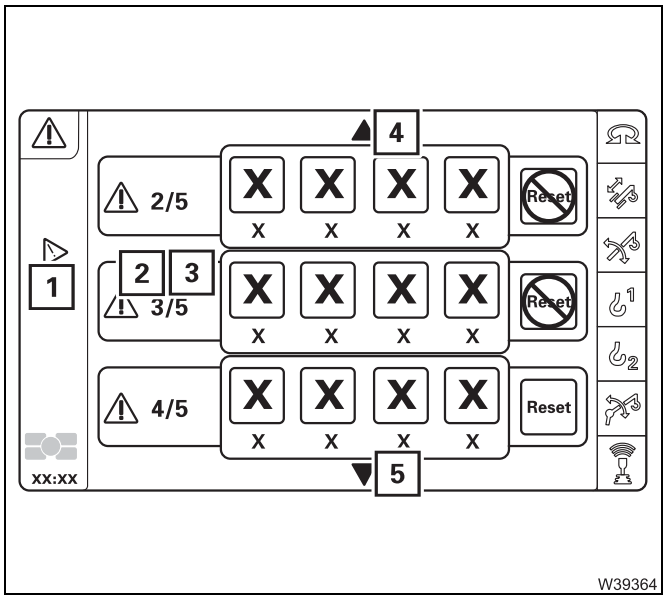
(1) – Engine error

- Switch off the engine immediately.
- Open the *Engine/transmission error* menu (**3**). For the subsequent procedure; ➠ p. 8 - 16.

(2) – Crane operation error

The buzzer tone sounds once.

- Open the *Crane operation error* menu (**4**).



Display of error / total errors

Display (**3**) shows the error total, and display (**2**) shows which error is displayed.

3/5, for example, means:
– Error **3** is shown
– A total of **5** errors are pending.

Displaying errors

The rotating symbol (**1**) indicates that further unacknowledged errors are present.

- Select and confirm the symbol (**4**) or (**5**) to show any additional errors.

4 Previous error

5 Next error

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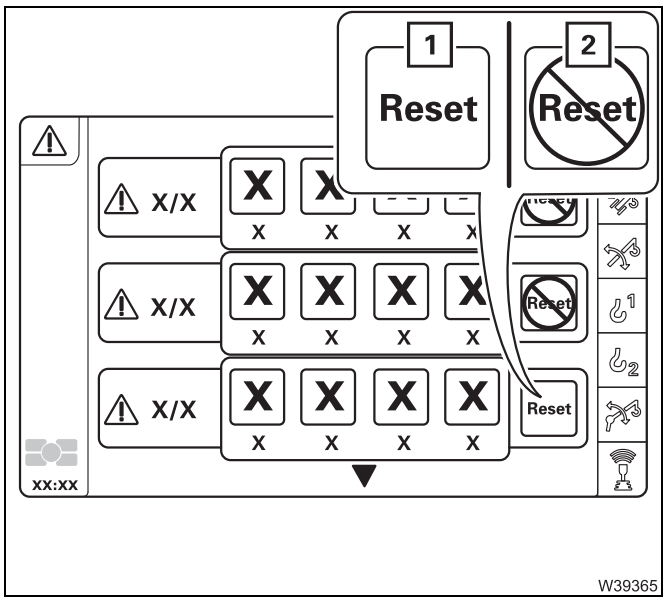
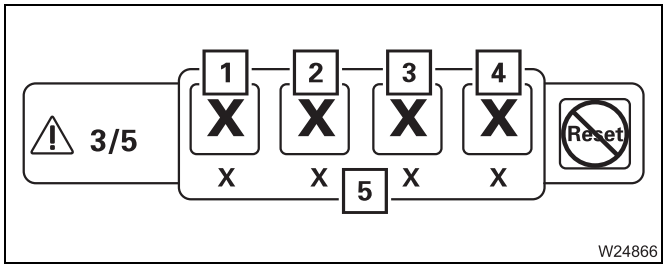


To acknowledge the error

Display symbol (**1**) – error can be acknowledged
Display symbol (**2**) – error cannot be acknowledged

- Select and confirm symbol (**1**) to acknowledge the error.

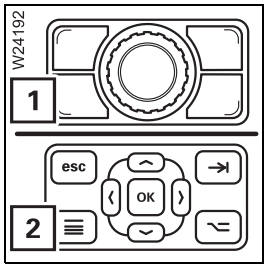
If the error cannot be acknowledged, contact **Manitowoc Crane Care**.



Error message display

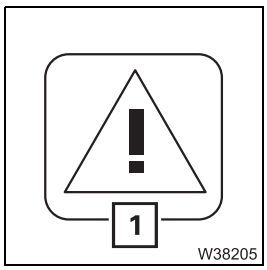
For each error the display shows:

– 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.

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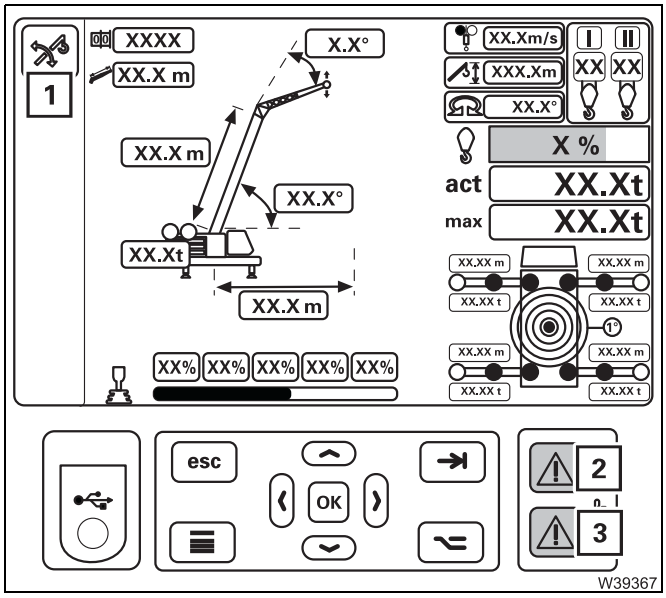
14.3.3 Warning messages on the RCL display



The buzzer tone sounds once when the RCL detects a malfunction.

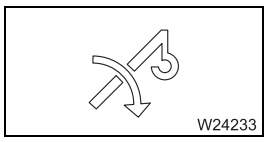
Lamps (**2**) and (**3**) light up.

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**.

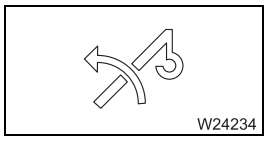
Risk of damage if warning messages are not observed!
Observe the following information in good time and take the appropriate remedial measures if a warning message appears. This prevents these malfunctions causing defects in the truck crane.

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.



– Main boom angle too small

Raise the main boom; ➠ *Derricking gear*, p. 9 - 114.



– Main boom angle too large

Lower the main boom; ➠ *Derricking gear*, p. 9 - 114.

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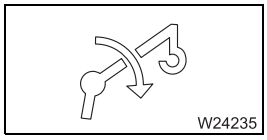
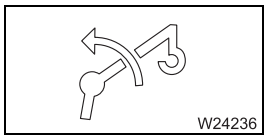


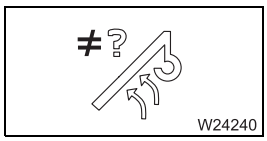
– Lattice extension angle too small

Raise the lattice extension; ➠ *Lattice extension operating manual*.

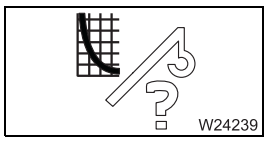


– Lattice extension angle too large

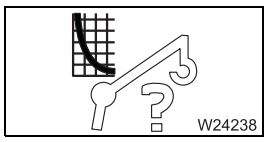
Lower the lattice extension; ➠ *Lattice extension operating manual*.



– Boom angle not measured (different sensor values)

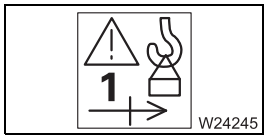


– Main boom, lifting capacity table not present



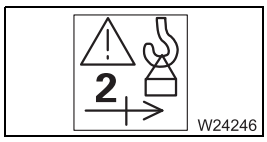
– Lattice extension, lifting capacity table not present

– RCL override (switch 1) not actuated



– RCL override (switch 1) actuated

– RCL override (switch 2) not actuated



– RCL override (switch 2) actuated

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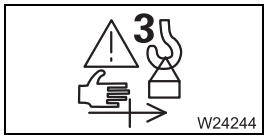
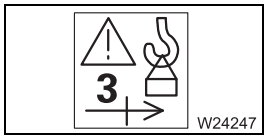
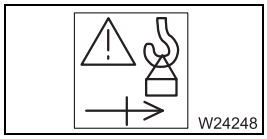


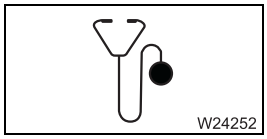
– RCL override (switch 3) not actuated



– RCL override (switch 3) actuated

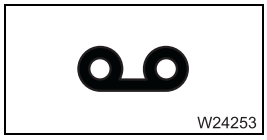


– RCL override, all switches actuated



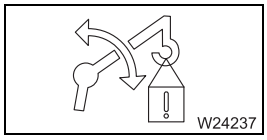
– Learn-in phase

Displayed only during maintenance by service personnel

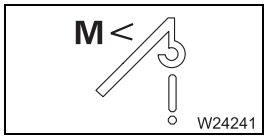


– Data acquisition

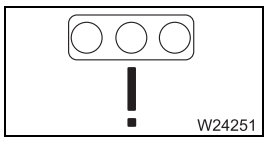
Displayed only during maintenance by service personnel



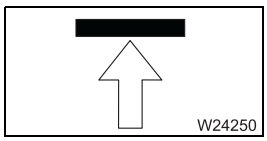
– Lattice extension, maximum permissible load exceeded



– Load too low



– RCL error status display



– Active working range limiter, maximum permissible overall height reached

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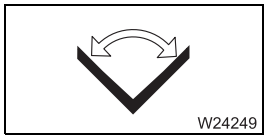
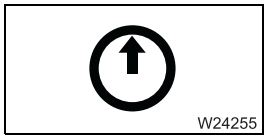
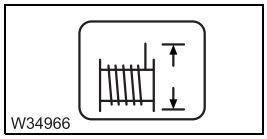


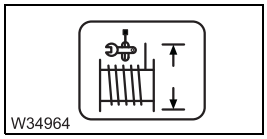
– Active working range limiter, maximum permissible slewing angle reached



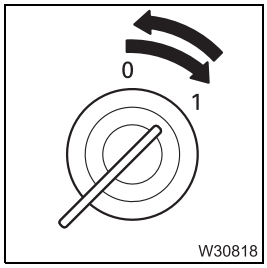
– Active working range limiter, maximum permissible working radius reached



– 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.

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14.4 Troubleshooting

14.4.1 Engine malfunctions

Observe all specifications in the section *Engine malfunctions*; ➠ p. 8 - 19.

Malfunction		Cause	Solution
Engine does not start – Starter does not turn		Ignition switched on in the driver's cab	Switch off the ignition in the driver's cab; ➠ p. 10 - 1
Symbol red		Engine malfunction	➠ *Engine malfunctions*, p. 8 - 19

14.4.2 Malfunctions on the main hoist/auxiliary hoist

Malfunction		Cause	Solution
Main hoist not working or malfunctioning		Main hoist off, lamp in button lights up dimly	➠ *Switching on the main hoist*, p. 11 - 82, ➠ *Switching on the auxiliary hoist*, p. 11 - 85
		Dead man's switch not actuated	Press dead man's switch
		Emergency stop switch engaged	➠ *Resetting the emergency stop switch*, p. 4 - 20
		Control unit fuse blown	Replace blown fuse; ➠ p. 14 - 71.
		Control unit faulty, error message is displayed	Acknowledge error message once; ➠ p. 14 - 8 – if error persists, notify **Manitowoc Crane Care**
Only the lifting function works		Lowering limit switch approached	Leave the shutdown range and raise the hoist

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Malfunction		Cause	Solution
Only the lowering function works		Lifting limit switch approached, lamp lights up	Leave the shutdown range and lower the hoist
		RCL shutdown, lamp lights up	Leave the shutdown range; p. 11 - 62
		Control unit fuse blown	Replace blown fuse; p. 14 - 71.
Lifting, lowering or high-speed mode function not working		Function disabled by CCS	If required, acknowledge error message once and briefly switch off the ignition – it if occurs again, notify **Manitowoc Crane Care**
No lifting function		Control unit fuse blown	Replace blown fuse; p. 14 - 71.
Lifting or lowering is either not possible at all or only at a low speed		Speed limited	Increase the limit; p. 11 - 131.
Lifting or lowering function cannot be switched off		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 - 43

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14.4.3 Malfunctions in the hoist cameras

Malfunction	Cause	Solution
No image appears on the monitor after it is switched on.	Fuse has blown	Replace blown fuse; ➠ p. 14 - 71.
	Fuse blown in monitor.	Check fuses and replace as necessary; ➠ *Manufacturer's operating manual*.
	Connection between camera and monitor is disconnected.	Check cable connection and notify **Manitowoc Crane Care** if necessary.

14.4.4 Malfunctions in the main boom camera

Malfunction	Cause	Solution
No image appears on the monitor after it is switched on.	Fuse is defective	Replace blown fuse; ➠ p. 14 - 71.
	Fuse blown – in camera or monitor.	Check fuses and replace as necessary; ➠ *Manufacturer's operating manual*.
	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 **Manitowoc Crane Care** if necessary.

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14.4.5 Malfunctions in the derricking gear

Malfunction		Cause	Solution
Derricking gear not working or malfunctions		Derricking gear off, lamp in button lights up dimly	Switch on the derricking gear; ➠ p. 11 - 91.
		Dead man's switch not actuated	Press the dead man's switch.
		Emergency stop switch engaged	➠ *Resetting the emergency stop switch*, p. 4 - 20
		Control unit fuse blown	Replace blown fuse; ➠ p. 14 - 71.
		Control unit faulty, error message is displayed	Acknowledge error message once; ➠ p. 14 - 8 – if error persists, notify **Manitowoc Crane Care**
Lowering function not working		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. 11 - 62
		Control unit fuse blown	Replace blown fuse; ➠ p. 14 - 71.
Derricking function not working		Function disabled by CCS	If required, acknowledge error message once and briefly switch off the ignition – it if occurs again, notify **Manitowoc Crane Care**
		Control unit fuse blown	Replace blown fuse; ➠ p. 14 - 71.
Derricking not possible, or only at low speed		Speed limited	Increase the limit; ➠ p. 11 - 131.
Derricking cannot be switched off		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 - 43

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14.4.6 Malfunctions in the telescoping mechanism

Malfunction		Cause	Solution
Telescoping mechanism not working or malfunctioning		Telescoping mechanism off, lamp in button lights up dimly	Switch on the telescoping mechanism; ➠ p. 11 - 95.
		Dead man's switch system not actuated	Press dead man's switch
		Emergency stop switch engaged	➠ *Resetting the emergency stop switch*, p. 4 - 20
		Control unit fuse blown	Replace blown fuse; ➠ p. 14 - 71.
		Control unit faulty, error message is displayed	Acknowledge error message once; ➠ p. 14 - 8 – if error persists, notify **Manitowoc Crane Care**
Extending function not working		Control unit fuse blown	Replace blown fuse; ➠ p. 14 - 71.
		RCL shutdown, lamp lights up	Leave the shutdown range; ➠ p. 11 - 62
		Lifting limit switch approached, lamp lights up	Leave the shutdown range, retract boom
Retracting function not working		Insufficient lubrication	Lubricate the main boom; ➠ *Maintenance manual*
		Main boom is not steep enough	Leave the shutdown range and raise the boom
Telescoping function not working		Function disabled by CCS, error message is displayed	Acknowledge error message once; ➠ p. 14 - 8 – if error persists, notify **Manitowoc Crane Care**
		Control unit fuse blown	Replace blown fuse; ➠ p. 14 - 71.
Telescoping not possible or only possible at very low speed		Speed limited	Increase the limit; ➠ p. 11 - 131.
Telescoping cannot be switched off		Malfunction in crane control	Emergency stop switch; ➠ p. 10 - 12

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Malfunction		Cause	Solution
Operation with the teleautomation menus is blocked		Diverse errors, e.g. length indicator failed	Retract main boom with the emergency program; ➠ p. 14 - 33
The main boom can no longer be telescoped; the telescoping cylinder can no longer be moved		The hydraulic supply is interrupted	**Manitowoc Crane Care** must be notified
No response to control lever movements		CCS malfunction for operating elements in the crane cab	Unrig using hand-held control; ➠ p. 14 - 43

14.4.7 Malfunctions in the slewing gear

Malfunction		Cause	Solution
Slewing gear not functioning		Slewing gear off, lamp in button lights up dimly	Switch on the slewing gear; ➠ p. 11 - 122.
		Superstructure locked	Unlock the superstructure; ➠ p. 11 - 18.
		Dead man's switch not actuated.	Press dead man's switch
		Emergency stop switch engaged	➠ *Resetting the emergency stop switch*, p. 4 - 20
		Control unit fuse blown	Replace blown fuse; ➠ p. 14 - 71.
		Control unit faulty, error message is displayed	Acknowledge error message once; ➠ p. 14 - 8 – if error persists, notify **Manitowoc Crane Care**
		Rigging mode for position *0° to the rear* or *180° to the front* confirmed.	Confirm rigging mode for a slewing range
		Counterweight not pre-tensioned.	Pre-tension counterweight; ➠ p. 12 - 70. **In case of emergency** – override the shutdown; p. 14 - 50
Slewing function not working		Function disabled by CCS	If required, acknowledge error message once and briefly switch off the ignition – it if occurs again, notify **Manitowoc Crane Care**

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Malfunction		Cause	Solution
Slewing only possible in one direction		Shutdown angle of a limited slewing range reached	Enter the rigging mode for a slewing range of 360° (*Standard*) or reduce the working radius (*MAXbase*) or slew in the opposite direction to leave the shutdown angle
Slewing not possible or only at low speed		Speed limited	Increase the limit; ⇛ p. 11 - 131.
Slewing gear no longer responds to the control lever movement		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 - 43

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14.4.8 Malfunctions in the counterweight hoist unit

Malfunction		Cause	Solution
Counterweight hoist unit not working		Emergency stop switch engaged	➠ *Resetting the emergency stop switch*, p. 4 - 20
		Control unit fuse blown	Replace blown fuse; ➠ p. 14 - 71.
Error symbol (!) is displayed		Function disabled by CCS	If required, acknowledge error message once and briefly switch off the ignition – it if occurs again, notify **Manitowoc Crane Care**
		Electronic system has detected an electrical or logical error	
Hoist unit locking/unlocking function not working		Lifting cylinders retracted	Extend lifting cylinders; ➠ p. 12 - 69
Lifting cylinder extension/ retraction function not working		Hoist unit not in the *locked* or *unlocked* end position, symbol **yellow**	Lock or unlock hoist unit completely, symbol must be **green** or **red**; ➠ p. 12 - 71
Extend lifting cylinder not working		Superstructure unlocked	➠ *Locking the turntable*, p. 11 - 19

14.4.9 Malfunctions in the hydraulic system/hydraulic oil cooler

Malfunction		Cause	Solution
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		Control unit fuse blown	Stop crane operation and replace blown fuse; ➠ p. 14 - 71
		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; ➠ *Maintenance manual*

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14.4.10 Malfunctions when operating with the hand-held control

Malfunction		Cause	Solution
After connection: The *CAN* lamp does not light up or blinks		Some other socket is lacking a bridging plug	Insert bridging plug; p. 14 - 43
		Crane cab: Fuse F5/6 blown	Replace blown fuse; p. 14 - 71.
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	**Manitowoc Crane Care** must be notified

14.4.11 Malfunctions when inclining the crane cab

Malfunction	Cause	Solution
Crane cab inclination function not working	Control unit fuse blown	Replace blown fuse; p. 14 - 71.

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14.4.12 Malfunctions on the outriggers

Malfunction		Cause	Solution
Outrigger cylinders and beams can neither be extended nor retracted and the inclination indicator does not work		Control unit fuse blown	Replace blown fuses; ➠ *Fuses in the driver's cab*, p. 8 - 44
When operating from the crane cab		– Hand-held control connected to the superstructure or a bridging plug not inserted – Parking brake not applied – Slewing gear switched on	Disconnect hand-held control or insert bridging plug; ➠ p. 14 - 43. Apply the parking brake; ➠ p. 5 - 52 Switching off the slewing gear; ➠ p. 11 - 126
When operating from the control units		Display fields switched off	Switch on display fields; ➠ p. 12 - 30
		Hand-held control connected to the superstructure or a bridging plug not inserted	Disconnect hand-held control or insert bridging plug; ➠ p. 14 - 43.
None of the specified causes apply		Solenoid valves are not switching electrically	**Manitowoc Crane Care** must be notified

14.4.13 Malfunctions on the turntable lock

Malfunction	Cause	Solution
Turntable locking or unlocking function not working	Control unit fuse blown	Replace blown fuse; ➠ p. 14 - 71.

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14.4.14 Malfunctions on the CCS/RCL control units

Malfunction	Cause	Solution
Control unit not working	Power supply not switched on	Switching the ignition on
	Fuses have blown	Replace blown fuses; ➠ p. 14 - 71
Display is dark – LED flashes blue	Ambient temperature too low	Heat the crane cab
Display is dark – LED flashes yellow	Ambient temperature too high	Cool the crane cab
Display weak	Ambient temperature too high – brightness is reduced automatically	The set brightness is restored after cooling

14.4.15 Malfunctions when driving from the crane cab

Malfunction		Cause	Solution
The transmission, the differential locks and the separate steering do not respond to the operating elements **– symbols grey**		Parking brake applied	Release the parking brake; ➠ p. 13 - 14
		Ignition key in driver's cab not in position 1	Turn the ignition key in the driver's cab to position 1; ➠ p. 13 - 14
Button for separate steering has no function		Separate steering switched off	➠ *Switching on separate steering*, p. 13 - 9
Symbol for error appears during differential locking		An illogical switching state was recorded	If required, acknowledge error message once and briefly switch off the ignition – it if occurs again, notify **Manitowoc Crane Care**

If this table does not help to remedy the malfunction;
➠ *Malfunctions in the transmission*, p. 8 - 22,
➠ *Differential lock malfunctions*, p. 8 - 21,
➠ *Steering malfunctions*, p. 8 - 23.

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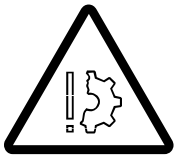
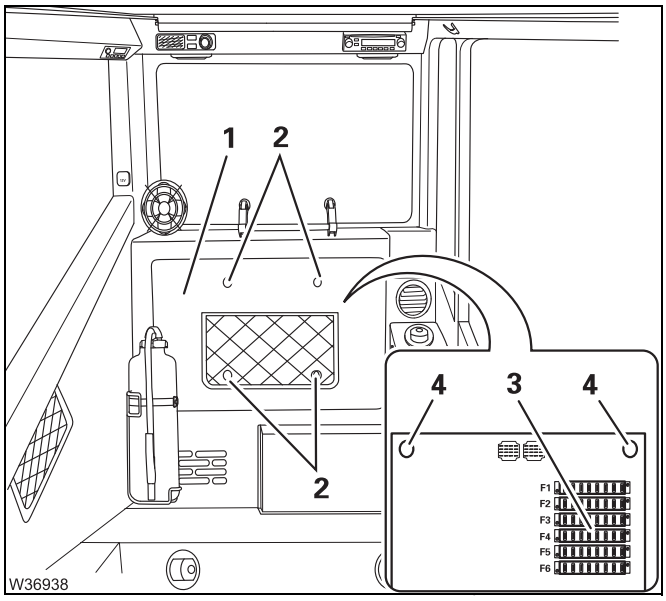
14.4.16 Malfunctions on the CraneSTAR system

If an error is present, then check the fuses and the electronic connections.



Risk of damage if procedure is incorrect!
Observe the following notes to avoid malfunctions and damage.
– Always switch the ignition off before changing a fuse and before checking the antenna plugs.
– Replace blown fuses only with new fuses of the same amperage.



Checking

- 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 - 71.
- Loosen the screws (**4**) and fold down the plate (**3**) to the front.

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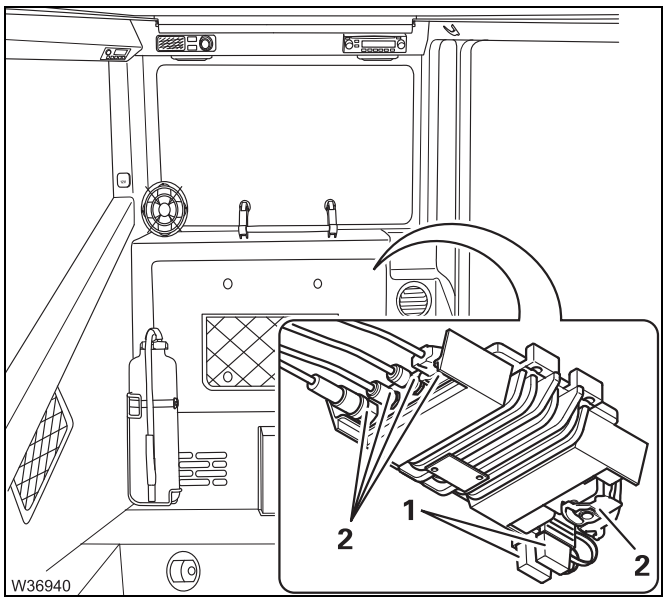
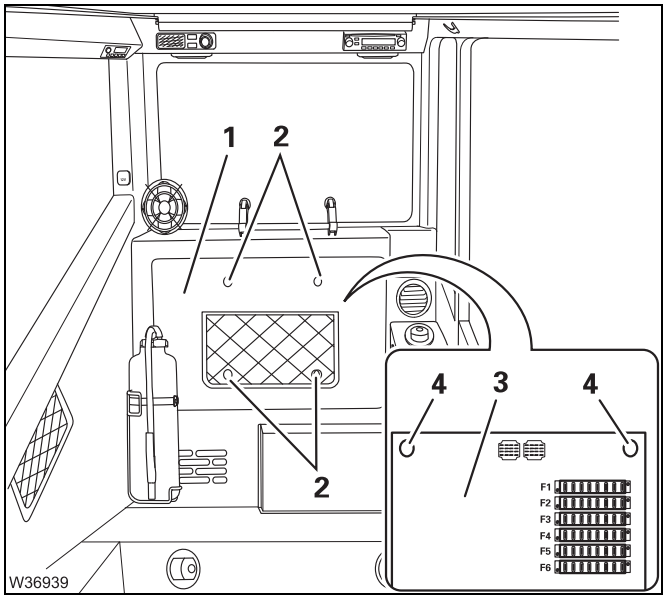


- Check the fuses (**1**) and replace them if necessary.

Designation	Amperage
F3401	5 A
F3402	5 A

- Check that the plugs (**2**) are plugged in



After checking

- Fold the plate (**3**) up and secure it with the screws (**4**).
- Fasten the cover (**1**) using the bolts (**2**).

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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* menu

– Entering the telescoping after an emergency operation and

– Operation of the power units with the hand-held control

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14.5.1 Mechanical emergency activation for retracting

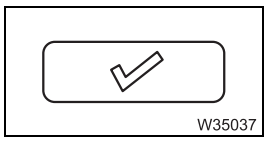
If you can no longer lock and unlock the telescopic sections from within the crane cab because of a malfunction, you can do so manually by performing mechanical emergency activation.

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.

Checks before emergency activation

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 authorised to lift persons 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. 13 - 1.

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**.

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Mechanical emergency activation

The following requirements must be met before manually unlocking a lock:

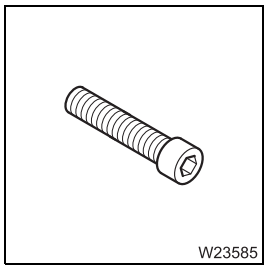
– The main boom must be lowered to the horizontal position so that the telescopic section cannot retract by itself.

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.

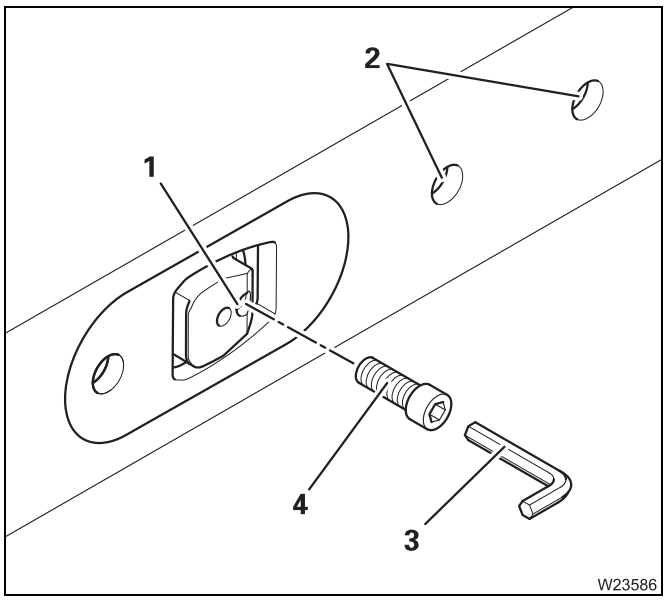


There are two bolts for every telescopic section.

– **M8 x 140** for telescopic sections I to IV

– **M8 x 125** for telescopic section V

These bolts are in the toolbox supplied with the crane.



You will need a suitable tool (**3**), at least 250 mm (9.8 in) long.

In order to unlock the telescopic section, screw the bolts (**4**) into the bores (**1**) in the locking pins.

Pins located further inside are reached through the bores (**2**).

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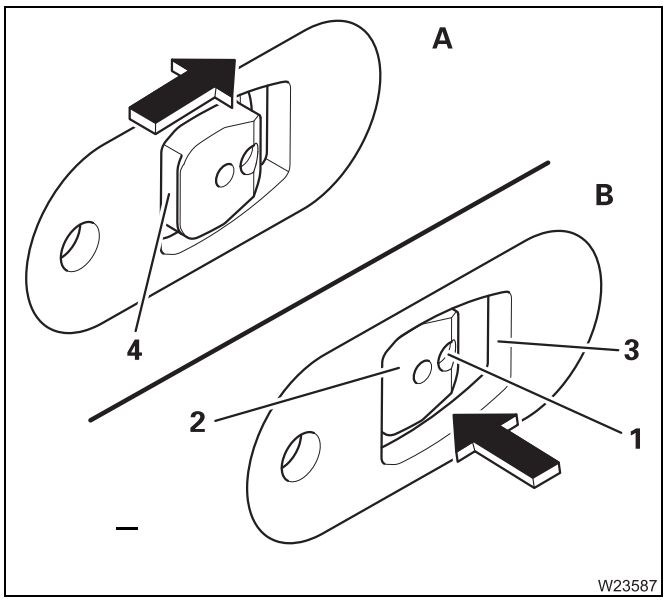
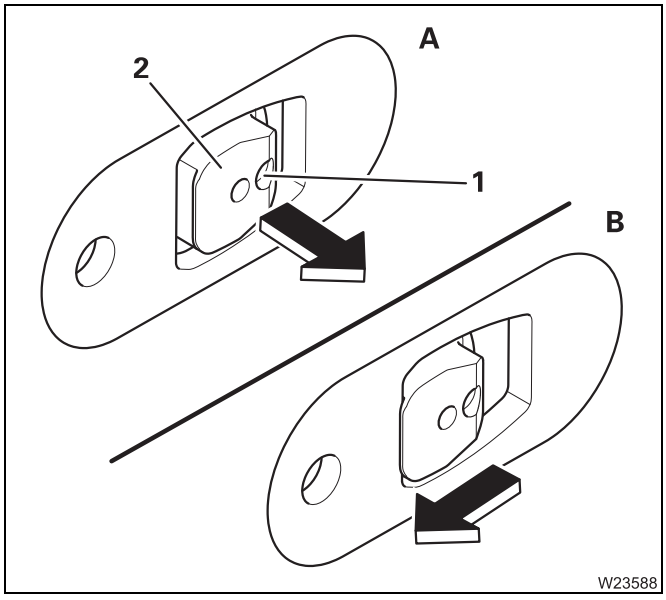


Unlocking lock

- (**A**) – Extend about 35 mm (0.11 ft), so that the cutout (**4**) is accessible.
- (**B**) – Screw a bolt into the bore (**1**). The locking pins (**2**) must retract behind the telescopic section (**3**).
  If necessary, give the locking pin (**3**) a slight knock to help this procedure.
- Unlock the lock on 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 (alone) whilst the lock is mechanically released. Unscrew all bolts out of the bores immediately after finishing the repair work.
This prevents damage to the telescoping cylinder and the locking system.



Locking the telescopic section

- (**A**) – Retract the telescoping until the locking pin (**2**) is in the middle of the opening.
- Unscrew the bolt from the bore (**1**) until the locking pin (**2**) is extended completely.
- Remove the bolt from the bore (**1**).
- (**B**) – Retract the telescoping further until the telescopic section is set down.

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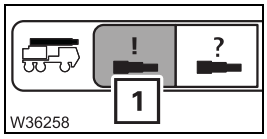
14.5.2 Telescoping emergency program

The emergency program is intended only for retracting the telescoping when operation with the teleautomation menus is no longer possible due to a malfunction.
The emergency program is enabled only when the current locking status can still be detected by the crane control.

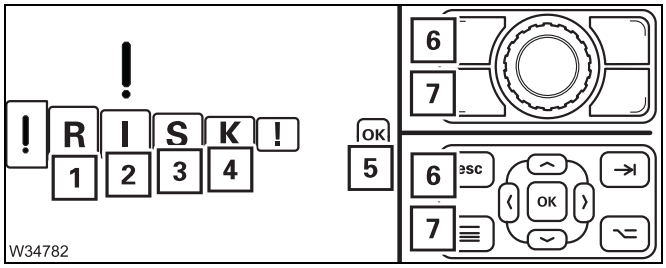
The emergency program is not intended for crane operation and is therefore restricted to a certain amount of time.

Telescoping emergency program menu

- If possible, set down the load before starting the emergency program;
  ➠ *What to do when malfunctions occur during crane operation*, p. 14 - 2.

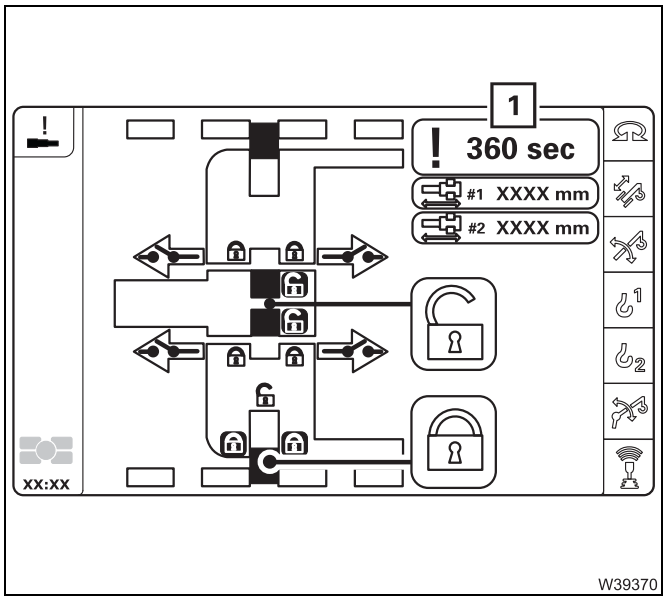


- Select and confirm the symbol (**1**) – the *Telescoping* emergency program is opened.



- Select and confirm the symbols (**1**) to (**4**).
- Confirm the entry with the symbol (**5**).

You can cancel the entry at any time using the (**6**) or (**7**) buttons.



Once the correct entry has been made, the *Telescoping* emergency programme is started.

The emergency program has a time limit.

The display (**1**) counts down a time span of about 360 seconds.

Within this time, you can operate the telescoping mechanism using the emergency program.

If the time is not sufficient you must restart the emergency program.

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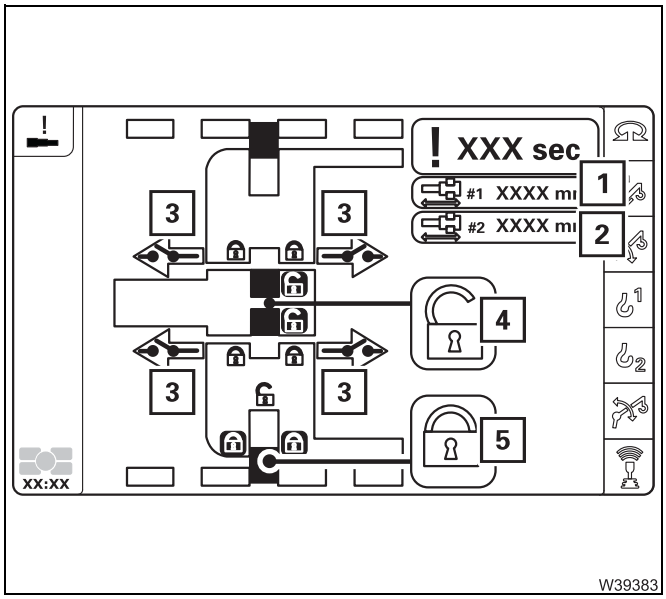
Determining the error type

- 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**.

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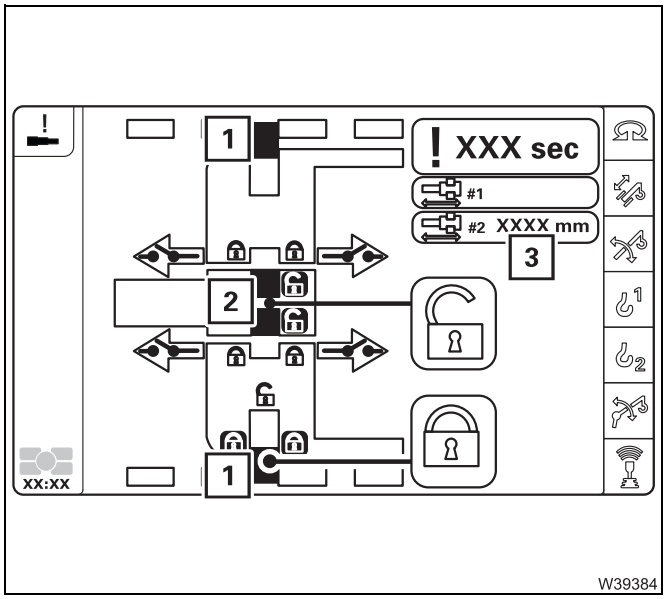
Risk of damage to the main boom!
Never telescope the main boom if at the same time there is an error at both the length indicator and the proximity switch.
It would then not be possible for you to monitor operations, and components in the main boom could be damaged, or a situation could arise in which the main boom can no longer be extended or retracted.

In the *Telescoping* emergency programme, 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 about 30% of the maximum speed.

In the case of an error at the length indicator

First register the current status of the telescoping mechanism.

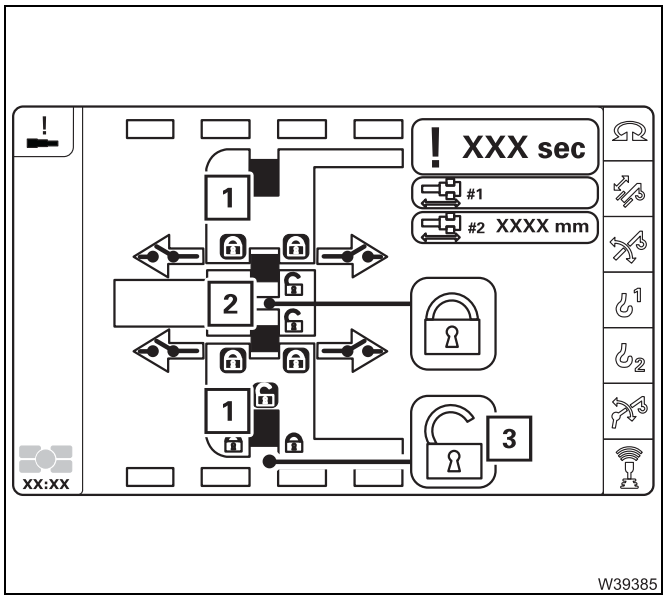


- Check the positions of the locking pins as usual, i.e. at the symbols (**1**) and (**2**).
- Check that the display (**3**) shows the RCL measured value for the extended length of the telescoping cylinder.

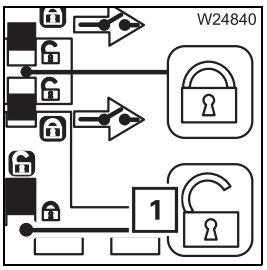
Checks before telescoping

- 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**.

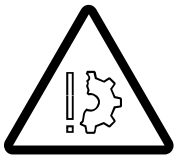


– The telescoping cylinder is at the locking point and is locked, symbols (**2**) are **green**.
– The telescopic section is unlocked, symbol (**3**) (**select no more than 2 x)**, symbols (**1**) are **red**.



Retracting and locking a telescopic section

During telescoping you may **not** select Lock. Under **no** circumstances should you 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.

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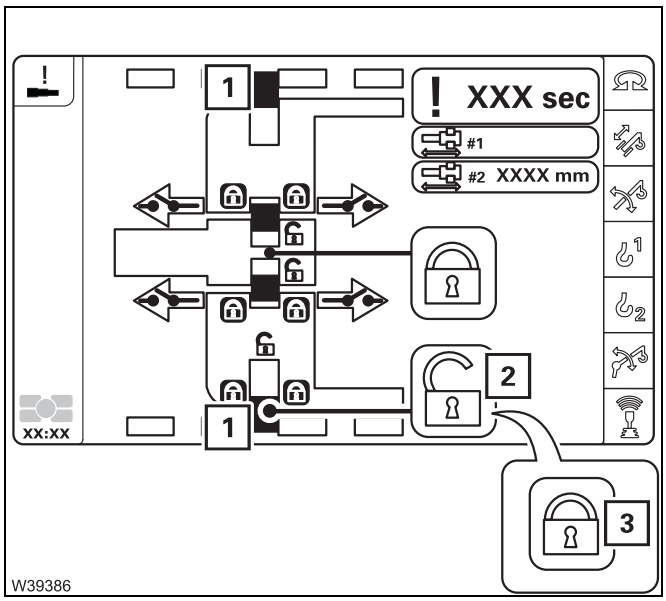
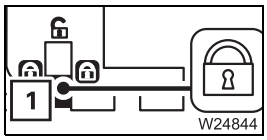


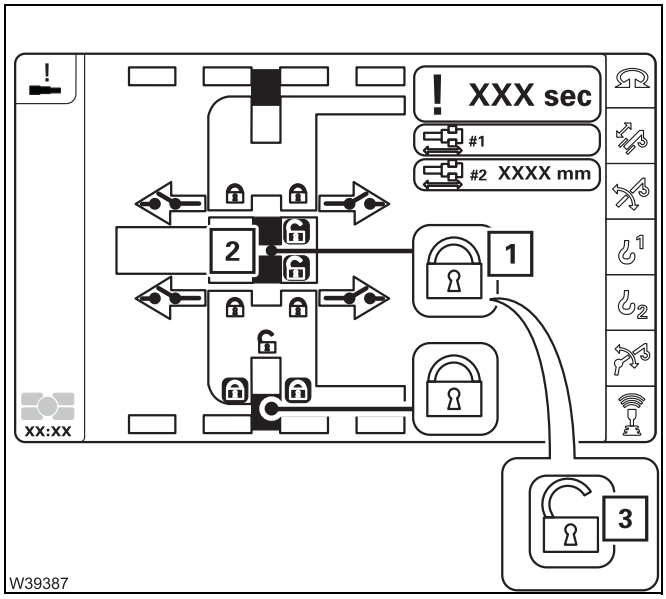
- Retract the telescopic section slowly all the way to the end stop; ➠ *Locking points for the telescopic sections*, p. 14 - 40.
- Extend to about 25 mm (1 in).
- Select and confirm the symbol (**2**).
  The telescopic section is locked – display symbol (**3**), locking pin (**1**) **green**.
- Set down the telescopic section, retracting 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 unlocked – display symbol (**3**), locking pin (**2**) **red**.

You can now move the telescoping cylinder into the next telescopic section; ➠ *Locking points for the telescoping cylinder*, p. 14 - 39.

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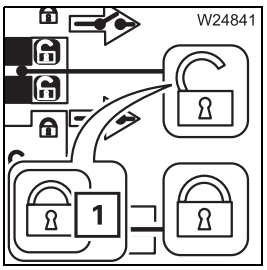
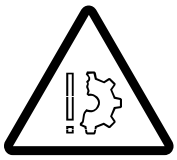


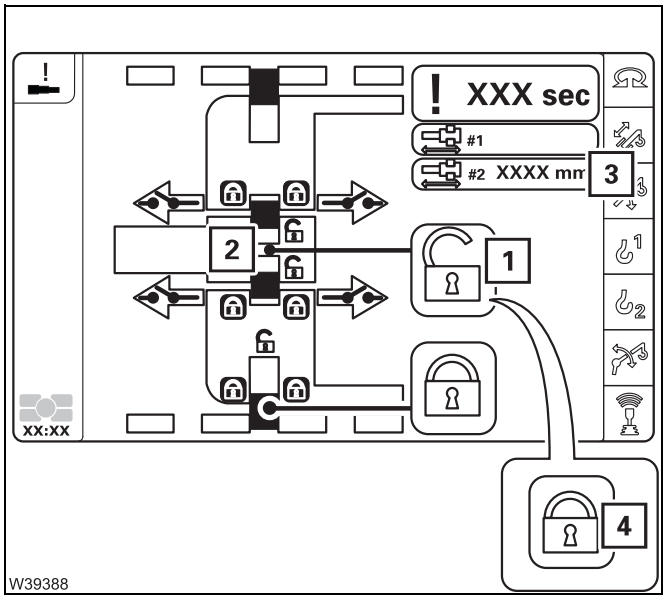
Extending and locking the telescoping cylinder

You may **not** select Lock while the telescoping cylinder is retracting or extending. Under **no** circumstances should you 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 - 39.

- Select and confirm the symbol (**1**).
  The telescoping cylinder is locked – display symbol (**4**), locking pin (**2**) **green**.
- You can now retract this telescopic section; p. 14 - 36.

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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.

Table for locking the telescoping cylinder			
Telescopic section	**Locking point at fixed length**	**Extended length of telescoping cylinder**	
	in %	**in mm**	**(in ft)**
Telescopic section I	0	5	(0.02)
	47	3,401	(11.16)
	100	7,172	(23.53)
Telescopic section II	0	347	(1.14)
	49	3,745	(12.29)
	100	7,324	(24.03)
Telescopic section III	0	666	(2.19)
	51	4,065	(13.34)
	100	7,324	(24.03)
Telescopic section IV	0	938	(3.08)
	53	4,335	(14.23)
	100	7,324	(24.03)
Telescopic section V	0	1,189	(3.90)
	55	4,586	(15.05)
	100	7,329	(24.05)

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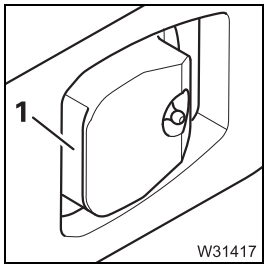
Locking points for the telescopic sections



The telescopic section must not be set down for locking or unlocking.

The cutout (**1**) must be clear. You must therefore extend the telescoping cylinder 35 mm (0.11 ft) 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	(0.02)
	47	3,436	(11.27)
	47,100	7,207	(23.64)
Telescopic section II	0	347	(1.14)
	49	3,780	(12.40)
	100	7,359	(24.14)
Telescopic section III	0	666	(2.19)
	51	4,100	(13.45)
	100	7,359	(24.14)
Telescopic section IV	0	938	(3.08)
	53	4,370	(14.34)
	100	7,359	(24.14)
Telescopic section V	0	1,189	(3.90)
	55	4,621	(15.16)
	100	7,364	(24.16)

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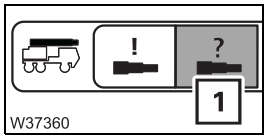
14.5.3 Entering the current telescoping

CCS no longer displays the current telescoping,

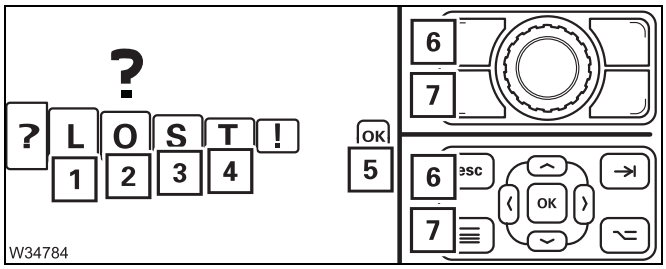
– if you telescoped in emergency mode, or

– 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.



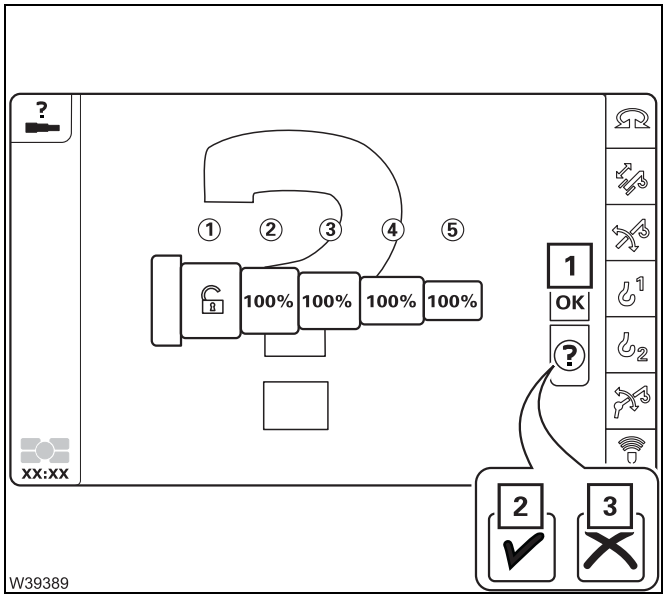
- Select and confirm the symbol (**1**) – the *Unknown telescoping* menu opens.



- Select and confirm the symbols (**1**) to (**4**).
- Confirm the entry with the symbol (**5**).

You can cancel the entry at any time using the (**6**) or (**7**) buttons.

After the correct input, the area for the set value input will be opened.



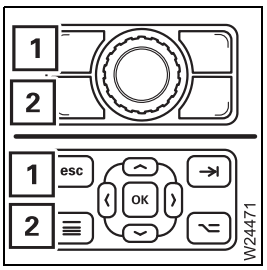
Entering target values

- Select and confirm the symbols for telescopic sections **1** to **5** one after another.
- Enter the desired target values for all telescopic sections, for example, *Unlocked*, 100%, 100%, 100%, 100%.
- Confirm the entry with the symbol (**1**).

  Display symbol:

  2 Permissible values

  3 Impermissible values



You can cancel the entry at any time using the (**1**) or (**2**) buttons.

Risk of damage due to incorrect input!
Before working with the crane, check that the 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.

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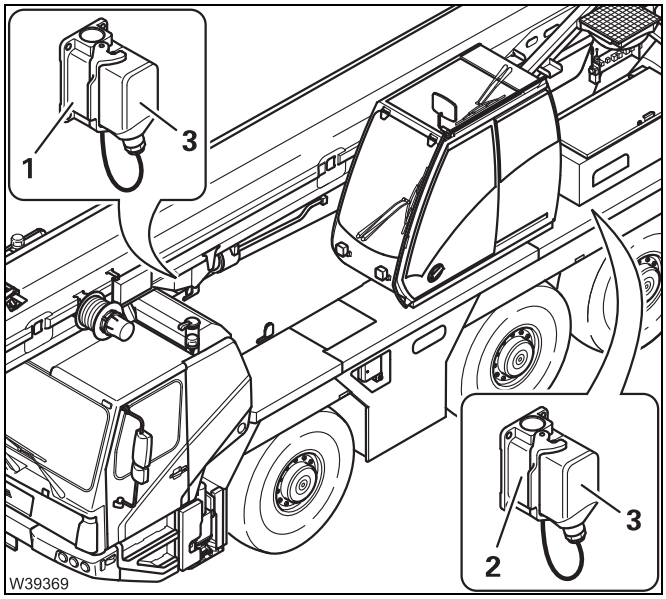
14.5.4 Emergency operation with the hand-held control

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.

Sockets



	Enabled operations
1	– Emergency operation for crane movements (except for telescoping mechanism) – Derricking the lattice extension
2	– Emergency operation for crane movements

The bridging plug (**3**) must be plugged if the hand-held control is not connected.

The following applies to all sockets:

– Pull bridging plug: Engine off – ignition off
– Connect the hand-held control: Ignition on

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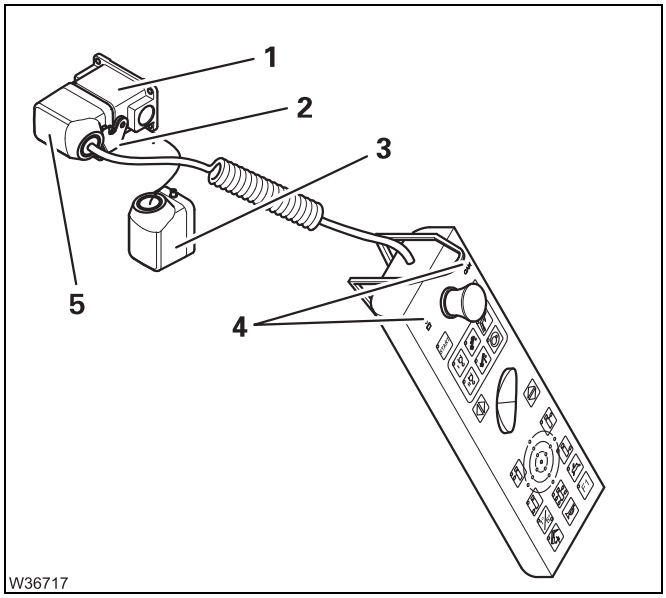
Connection

- Switch off the engine

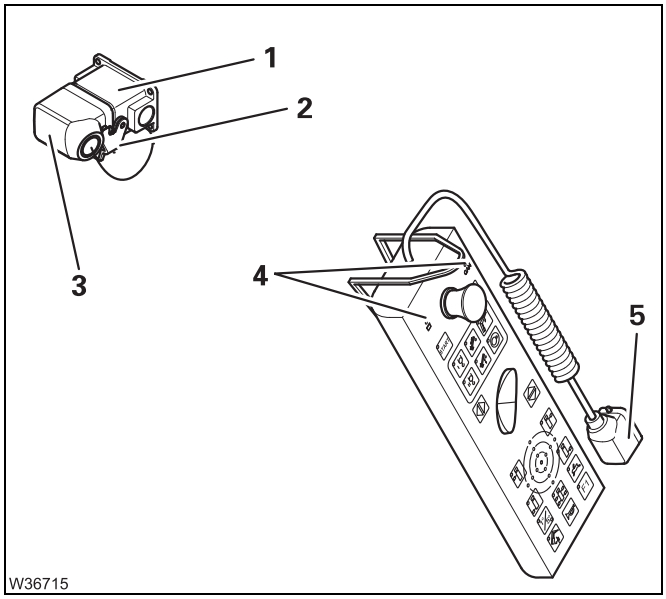
Pulling a bridging plug will shut the engine off, but this action is only designed for emergencies.



Connecting the hand-held control

- Open the cap (**2**) and remove the bridging plug (**3**) from the socket (**1**).
- Insert the plug (**5**) into the socket (**1**) and secure it with the lock (**2**).
- After about 20 seconds, the lamps (**4**) light up – the ignition is now switched on.

If the lamp (**4**) does not light up or if it flashes, there is a malfunction; p. 14 - 23.



Disconnecting the hand-held control

- Open the cap (**2**).
- Remove the plug (**5**) from the socket (**1**) – the lamps (**4**) will 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.

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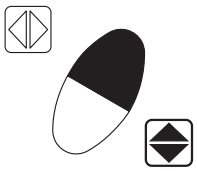
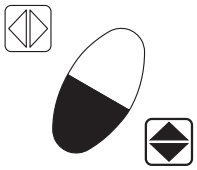
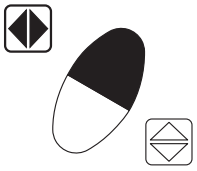
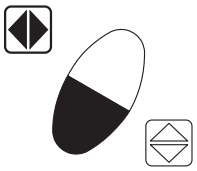
Button combinations

The table shows all the button combinations. Engaged buttons are shown in **black**.

Button combination	Pre-selected power unit				
	Telescoping mechanism	Derricking gear	Slewing gear	Main hoist	Lattice extension derricking gear
 W3851	None	Lower boom	Lock turntable	Lower load	Lower boom
 W3850	Retract	Raise the boom	Unlock turntable	Raise load	Raise boom
 W3849	None	None	Slew to the right	None	None
 W3848	None	None	Slew to the left	None	None

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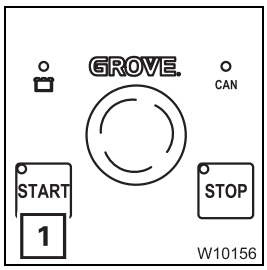
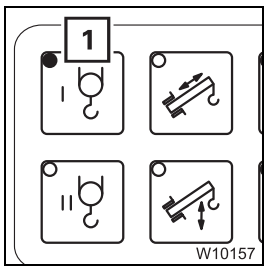
Emergency operation



Starting the engine

- Press the (**1**) button once – the engine starts; ➠ p. 10 - 10.



Pre-selecting a power unit

- Press the corresponding button once, e.g. button (**1**) for the main hoist. The lamp in the button lights up – preselection on.

With the telescoping mechanism, teleautomation with the target 0/0/0/0/0 is always selected at the same time – fully retract.

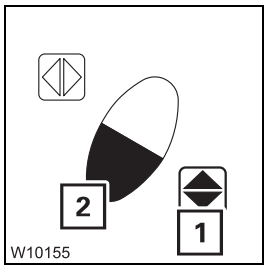
The extension function is disabled in emergency mode.

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 that this is permissible in the current rigging mode; ➠ *Notes on slewing in emergency operation*, p. 14 - 48.

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 function button (**1**) first, and then also button (**2**).

The further you press button (**2**), the quicker the movement. The maximum speed is limited to about 50% for all power units.

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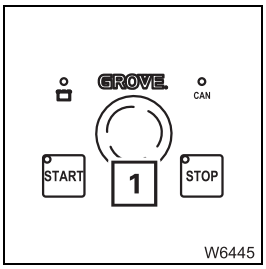
Stopping movements

The movement continues until you let go of the function button or the end position is reached.

Stopping movements in emergencies

This section applies only to the situation where a motion does not stop after releasing the Function button.



- Press the emergency stop switch (**1**) – the engine switches off.

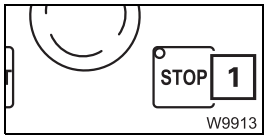
The switch (**1**) latches.

After activating an emergency stop switch; ➠ *Resetting the emergency stop switch*, p. 4 - 20.

You can also use the emergency stop switch on the carrier or in the crane cab; ➠ p. 14 - 1.

Switching off the engine

You can switch off the engine only by using the hand-held control.



- Stop all crane movements.
- Press the button (**1**) – the engine switches off.

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.

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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 - 49.

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 6.825 x (22.4 x)			
		6.200 m (20.3 ft)	4.400 m (14.4 ft)	2.320 m (7.6 ft)	Free on wheels
Rigged counterweight	6.6 t (14,500 lbs)	Slewing permitted[1]			
	7.6 t (16,700 lbs)				
	8.6 t (18,900 lbs)				[2]
	9.6 t (21,100 lbs)			Slewing not permissible[2]	Slewing not permissible[3]
	10.6 t (23,300 lbs)				
	11.6 t (25,500 lbs)				
	12.6 t (27,700 lbs)				
	13.6 t (29,900 lbs)				

1) Slewing only permitted if the working radius permitted in the working range is observed; ➠ *Lifting capacity table*

2) Only *0° operating position to the rear* permitted

3) Rigging modes not permitted

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For the *MAXbase* slewing range type

If the *Standard* slewing range type is activated; ➠ p. 14 - 48.

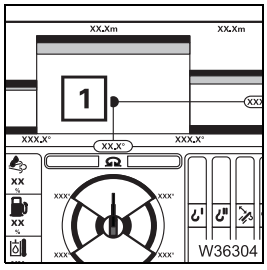
Slewing is not monitored by the RCL in emergency operation.

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).

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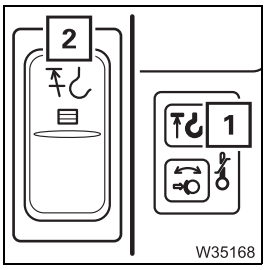
14.5.6 Slewing with an overridden slewing gear shutdown

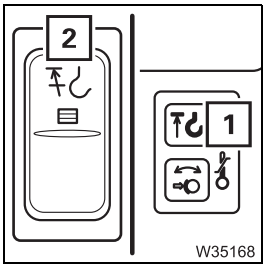
If the slewing gear is not switched off due to the load torque, slewing can be released within the permissible working range. For example, for emergency unrigging when the counterweight cannot be fully pre-stressed.

Risk of damage due to overridden slewing gear shutdown!
The slewing is not monitored if the shutdown is overridden.
Before slewing, always make sure that the superstructure and the counterweight (partially lowered if necessary) cannot damage any parts in the slewing range.



Overriding shutdown

- Press the button (**2**) in at the top.
  - The lamp (**1**) lights up.
  - The lifting limit switch is overridden.
  - Slewing in permissible working range will be released.
  - The slewing speed is limited to about 6%.



Cancelling the override

- Release button (**2**).
  - The lamp (**1**) goes out.
  - The lifting limit switch override is cancelled.
  - The slewing will be blocked (if the shutdown is still pending).

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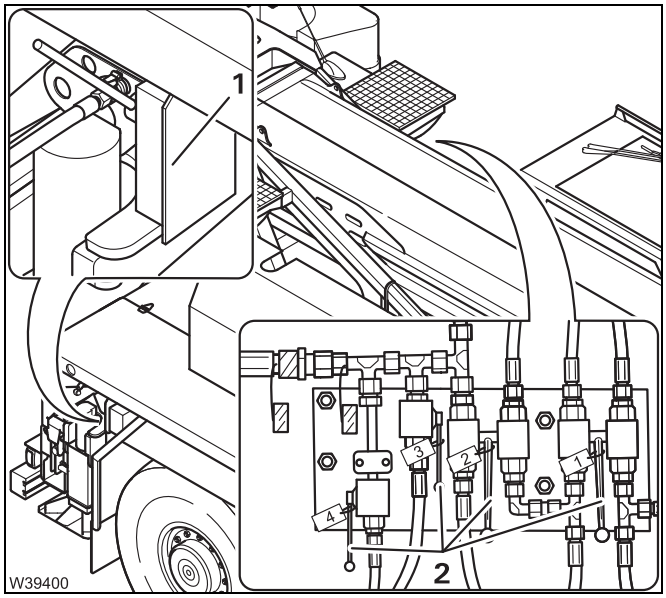
14.6 Hydraulic emergency operation with the hand pump

This section only applies to the standard hydraulic emergency operation. With the appropriate equipment you can also use the hydraulic emergency operation according to DGUV; ➠ p. 14 - 57.

14.6.1 Operating principle



In hydraulic emergency operation, you can operate the derricking gear and the main hoist, e.g. to raise the main boom in the case of a defective engine.

The hand pump (**1**), which is integrated into the hydraulic circuit via a hose connection, is used as the energy source for the crane's hydraulic system.

The hydraulic circuits are switched via the valves (**2**).

The crane movements are performed by operating the hand pump.

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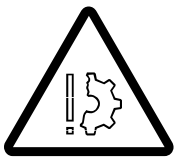
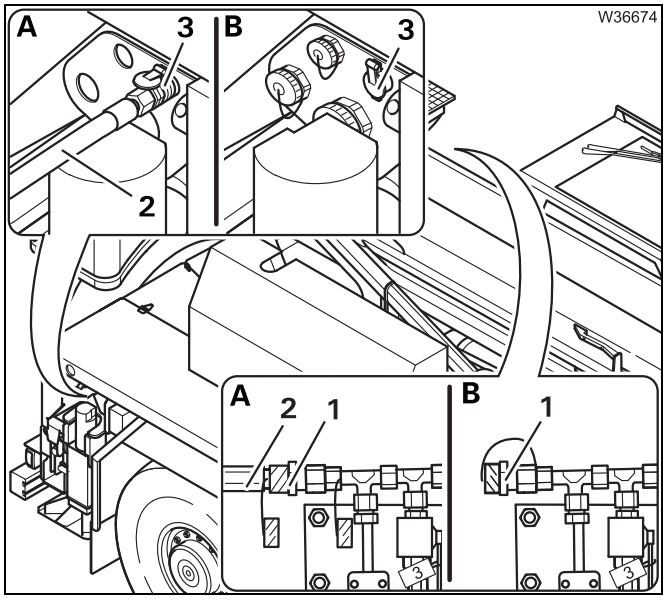
14.6.2 Connecting/disconnecting hoses



Risk of damage to the hose!
Lay the hose in such a manner that it can be moved freely in order to prevent it being crushed or torn or getting caught during the subsequent crane operations.



(A) – Establishing the connection

The required hose is supplied with the crane.

- Connect connections (**1**) and (**3**) using the hose (**2**).

(B) – Disconnecting the connection

- Remove the hose from the connections (**1**) and (**3**).
- Close the hose and the connections with the caps.

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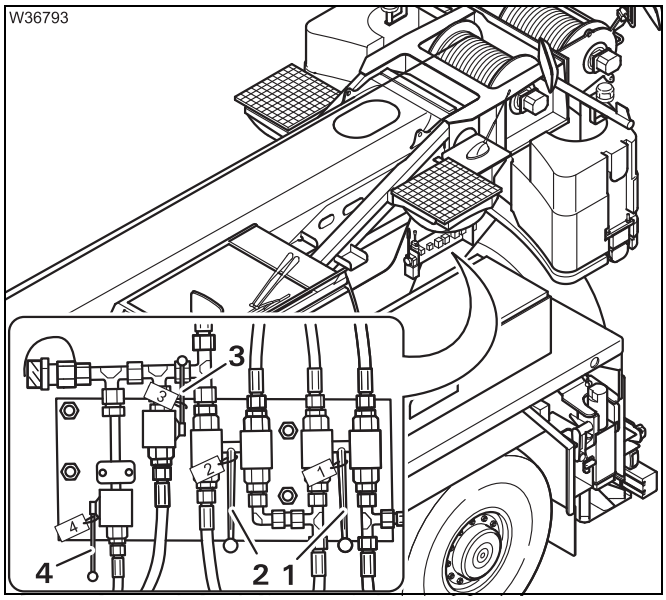
14.6.3 Establishing the required hydraulic circuits

To establish a hydraulic circuit you must switch over certain valves and may need to perform additional switching operations.

Switching over valves

The valve **1** to **4** are labelled with their respective numbers.



For emergency operation

- Switch the valve **1** to **4** to the positions for the required crane movement – as shown in the following table.

For lowering the boom you must e.g. switch the valve **3 upwards** – valve open.
Valves **1**, **2** and **4** must be switched **downwards**.

Danger from mutual interference of the power units!
Bring only the valves for **one crane movement** to the emergency operation position.
This prevents wrong crane movements being performed and several movements being performed unintentionally at the same time.

Emergency operation for crane movements	Valves upwards	Valves downward	Additional switching operations
Lifting	**1**	**2, 3, 4**	Valve Y1105 on continuous operation; ⇛ p. 14 - 54
Lowering	**2**	**1, 3, 4**	Valve Y1104 on continuous operation; ⇛ p. 14 - 54
Raising the boom	**3**	**1, 2, 4**	None
Lowering the boom	**4**	**1, 2, 3**	

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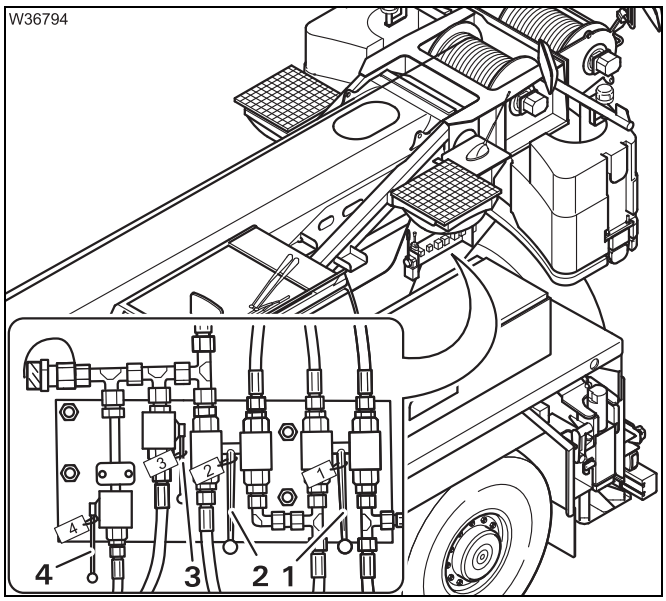


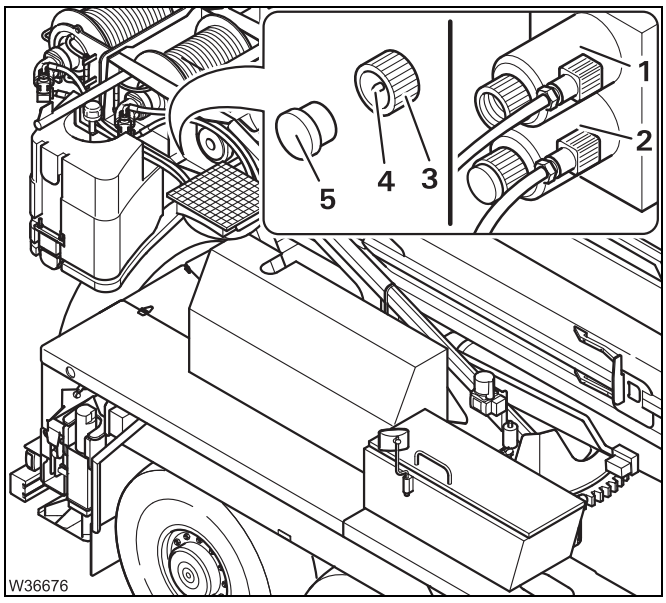
For crane operation

- Switch the valves (**1**), (**2**) (**3**) and (**4**) downwards – valves closed.

Danger from mutual interference of the power units!
For crane operation, always switch **all** the valves **1** to **4** to the Crane operation position. This prevents the power units suddenly starting to move.

For lifting/lowering the load

You must additionally switch a valve to continuous operation for lowering.



Switching on continuous operation

Always switch only **one** valve to continuous operation.

1 Valve Y1105 – *Raising* **or**

2 Valve Y1104 – *Lowering*

- Unscrew the cap (**3**), e.g. from the valve (**1**).
- Remove the plug (**5**).
- Screw the cap and pin (**4**) onto the valve – continuous operation is switched on.

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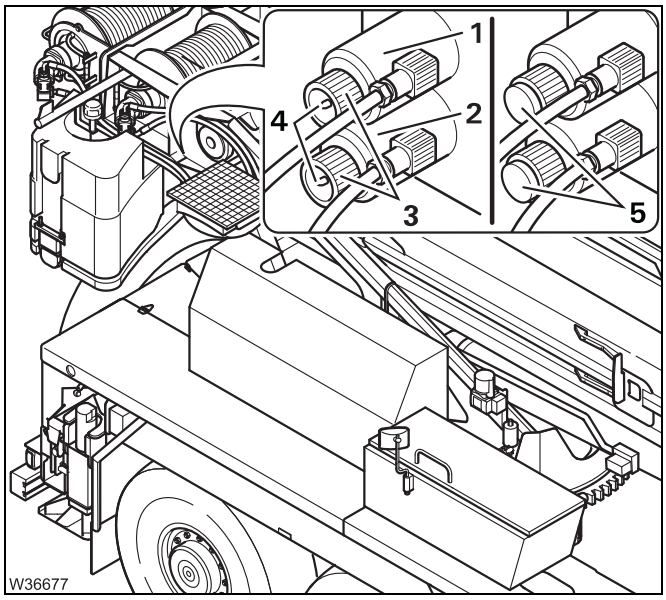
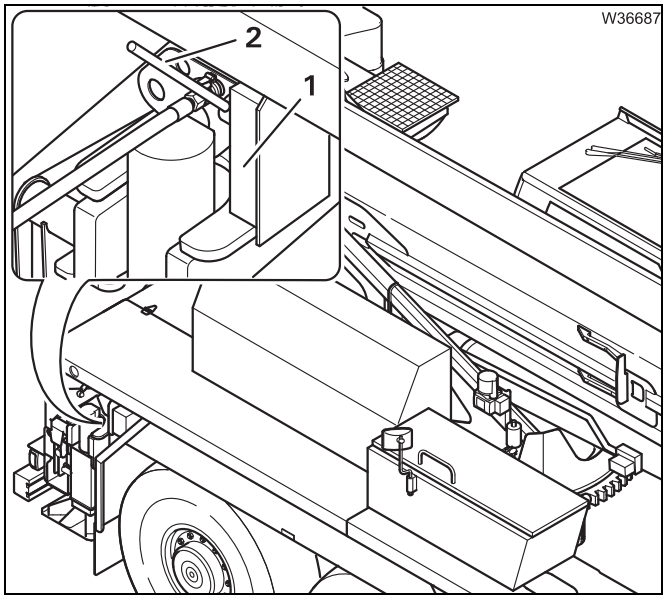
Danger due to falling loads!
Switch off continuous operation immediately after emergency activation.
Check whether the pins can be seen on both caps.
This prevent loads falling down immediately after lifting in subsequent crane operation.



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**).

14.6.4 Performing emergency activation



If the required hydraulic circuit has been established, you can make the corresponding crane movement using the hand pump (**1**).

- Insert the lever (**2**) provided into the holder at the hand pump lever.
- Pump with the lever – the corresponding crane movement is performed.

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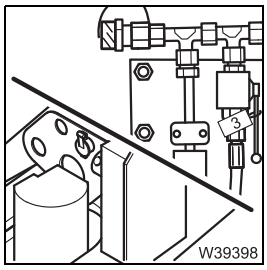
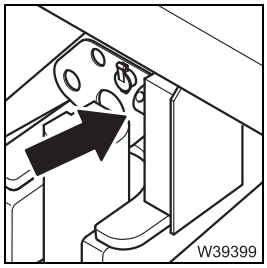
14.6.5 After emergency activation

You must restore the truck crane to its original state after finishing emergency activation.

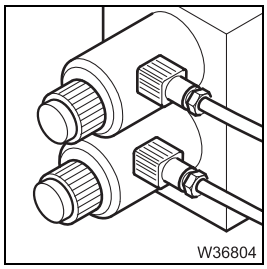


After each emergency activation

- Disconnect the hose connection; ➠ p. 14 - 52.



- Remove the lever from the hand pump.



Also after lifting/lowering

- Switch off the continuous operation; ➠ p. 14 - 55.

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14.7 Hydraulic emergency operation as per DGUV

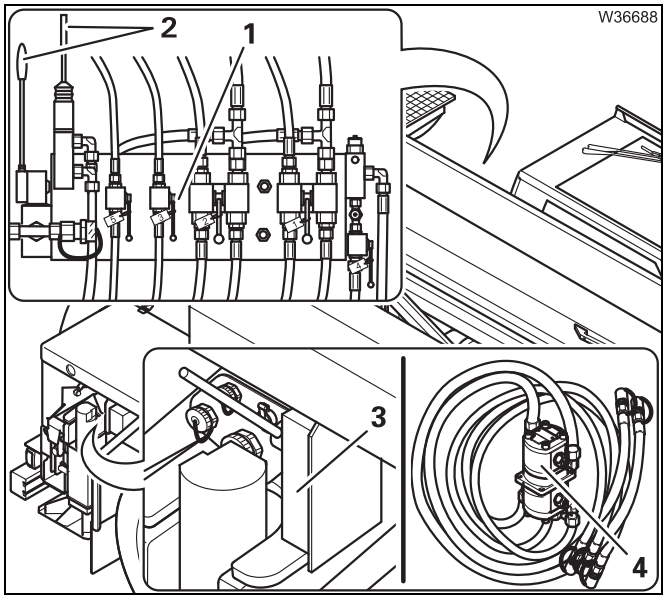
This section only applies to the hydraulic emergency operation as per DGUV. When the truck crane is equipped with the **standard hydraulic emergency operation**; *Hydraulic emergency operation with the hand pump*, p. 14 - 51.

With this additional equipment, the truck crane is equipped with an hydraulic emergency bleed valve in accordance with DGUV. 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 Applications and function

The hydraulic emergency operation in accordance with DGUV enables the **Emergency operation** of the GMK3060 and the **Emergency supply** of another truck crane.



Emergency operation

In emergency operation, you can drive the main hoist, derricking gear and slewing gear.

The energy source for the crane's hydraulic system can be:

– The hand pump (**3**) for **self-supply**
– A transformer (**4**) driven by an external hydraulic energy source for **external supply**

The hydraulic circuits are switched via the valves (**1**).

The control levers (**2**) are used to control the direction of movement and the speed.

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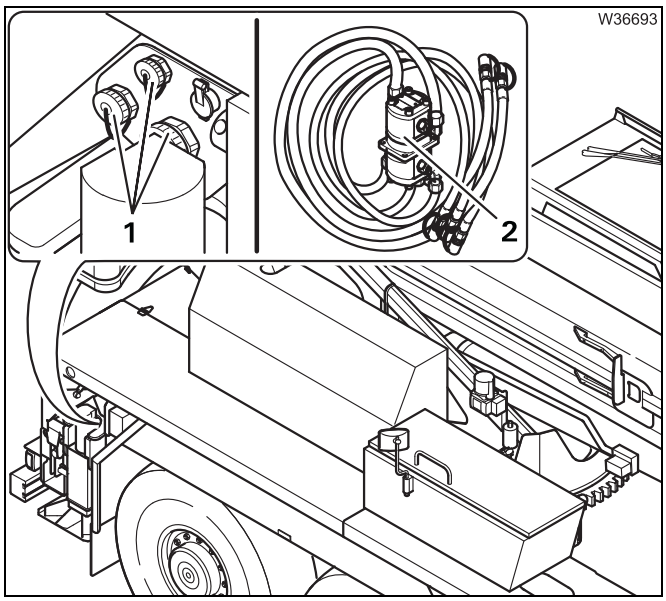

Emergency supply

You can supply another crane that also has hydraulic emergency operation as per DGUV.

In the event of emergency supply, the connections (**1**) feed a transformer (**2**) which is connected to the hydraulic system of the other crane.

Emergency supply of another crane, p. 14 - 69.

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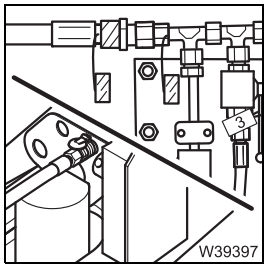
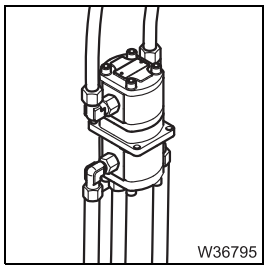
14.7.2 CHECKLIST: Emergency operation

This checklist is not a complete operating manual. There are accompanying operating instructions which are indicated by cross-references.
Observe the warnings and safety instructions there!



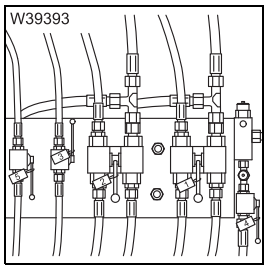
1. For emergency operation with self-sufficiency

Establish the hose connection for the hand pump; ➠ p. 14 - 61.



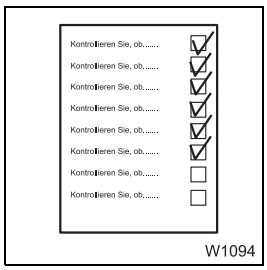
2. For emergency operation with external energy source

Hang the transformer on the superstructure and connect it; ➠ p. 14 - 62.



3. – Establish the required hydraulic circuits; ➠ p. 14 - 63.

– Perform emergency operation; ➠ p. 14 - 66.



4. Return the truck crane to the original state; ➠ *CHECKLIST: after emergency operation*, p. 14 - 60.

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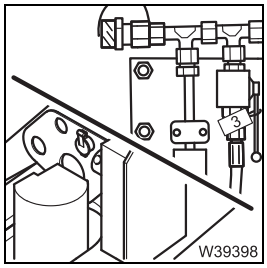
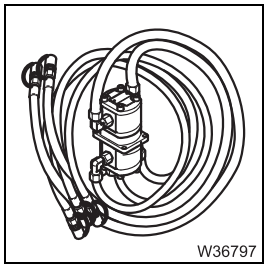
14.7.3 CHECKLIST: after emergency operation

This checklist is not a complete operating manual. There are accompanying operating instructions which are indicated by cross-references.
Observe the warnings and safety instructions there!



1. After emergency operation with self-supply

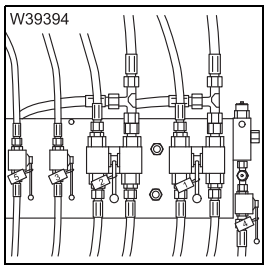
Disconnect the hose connection for the hand pump; ➠ p. 14 - 61.



2. After emergency operation with external supply

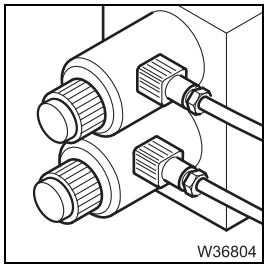
– Switch off the emergency operation; ➠ *Operating manual of energy source*.

– Disconnect the hose connections and remove the transformer from the superstructure; ➠ p. 14 - 62.

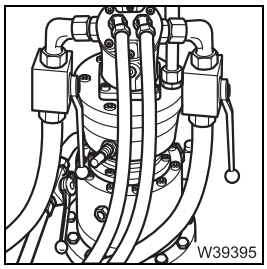


3. Establish hydraulic circuit for the crane operation.

– Switch valves **1** to **5** into position for crane operation; ➠ p. 14 - 64.



– Switch off continuous operation; ➠ p. 14 - 64.



– Open valves **6**, **7**, **8**; ➠ p. 14 - 65.

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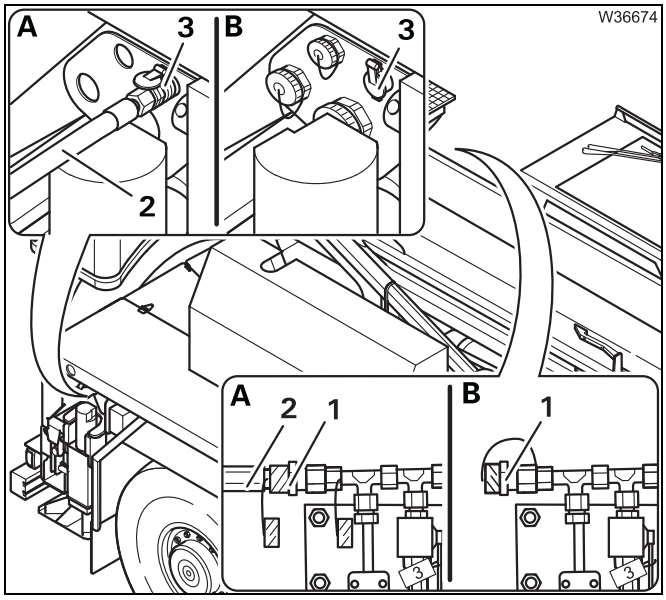
14.7.4 For self-supply – connecting/disconnecting hoses

Risk of damage to the hose!
Lay the hose in such a manner that it can be moved freely in order to prevent it being crushed or torn or getting caught during the subsequent crane operations.



(A) – Establishing the connection

The required hose is supplied with the crane.

- Connect connections (**1**) and (**3**) using the hose (**2**).

(B) – Disconnecting the connection

- Remove the hose from the connections (**1**) and (**3**).
- Close the hose and the connections with the caps.

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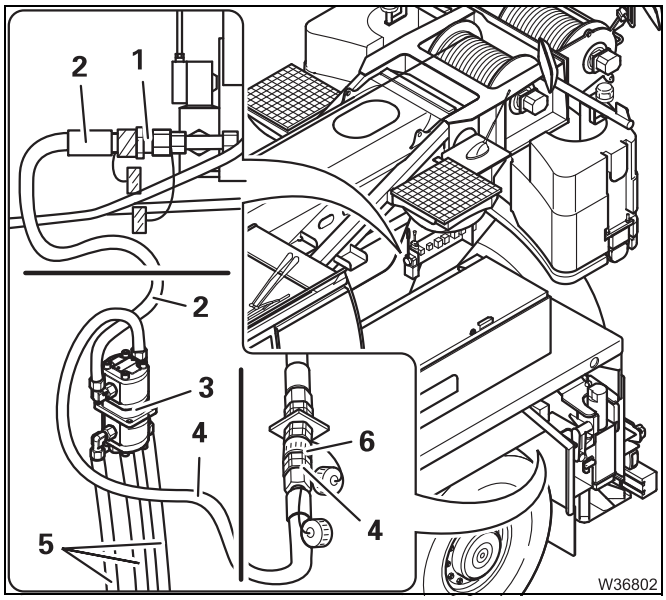
14.7.5 For external supply – connecting/disconnecting the transformer

The external energy source can be provided by a vehicle with hydraulic emergency operation according to DGUV or by an external, hydraulic energy source that meets the requirements of hydraulic emergency operation according to DGUV.

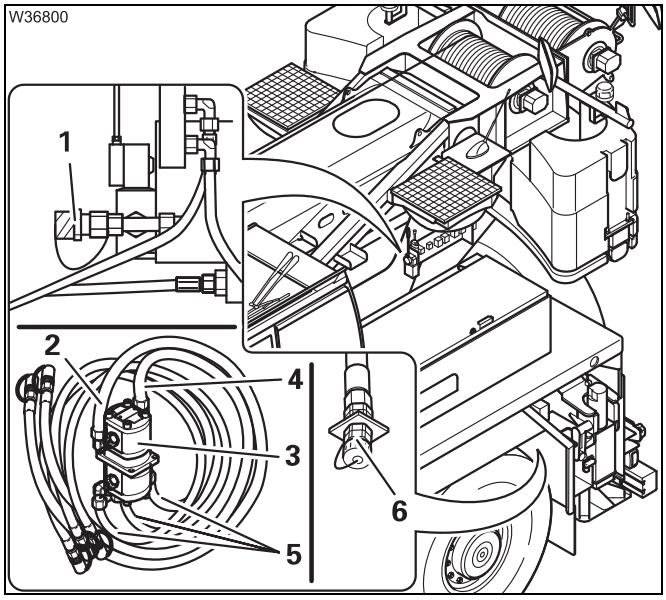
Risk of damage to the hoses!
Lay the hoses in such a manner that they can be moved freely, so as to prevent them being crushed or torn or becoming caught during subsequent crane movements.



Connecting

The hoses are assigned according to the various diameters.

- Switch off the hydraulic energy source.
- Attach the transformer (**3**) to the superstructure.
- Connect the hose (**2**) to the connection (**1**).
- Connect the hose (**4**) to the connection (**6**).
- Connect the hoses (**5**) to the supplying energy source.
- Switch on the hydraulic energy source.



Removing

- Switch off the hydraulic energy source.
- Remove the hose (**2**) from the connection (**1**).
- Remove the hose (**4**) from the connection (**6**).
- Remove the hoses (**4**) from the supplying energy source.
- Remove the transformer (**3**).
- Close off the hoses and connections with the caps.

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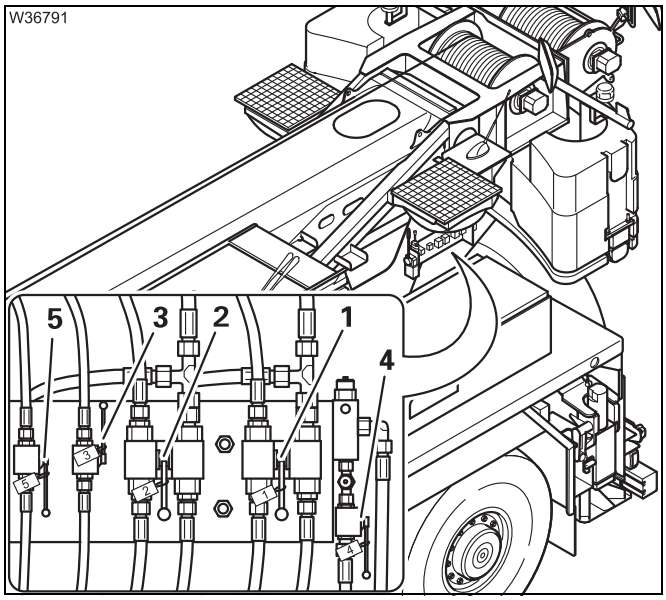
14.7.6 Establishing the required hydraulic circuits

To establish a hydraulic circuit you must switch over certain valves and may need to perform additional switching operations.

Valves at the control panel

The valves **1** to **5** are labelled with their respective numbers.



For emergency operation

- Switch the valve **1** to **5** to the positions for the required 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 point down.

Danger from mutual interference of the power units!
For **one crane movement**, always switch valves upward.
This prevents wrong crane movements being performed and several movements being performed unintentionally at the same time.

Emergency operation for crane movements	Valves upwards	Valves downward	Additional switching operations
Lifting	**1**	**2, 3, 4, 5**	Valve Y1105 on continuous operation; ⇛ p. 14 - 64
Lowering	**1**	**2, 3, 4, 5**	Valve Y1104 on continuous operation; ⇛ p. 14 - 65
Raising the boom	**3**	**1, 2, 4, 5**	None
Lowering the boom	**5**	**1, 2, 3, 4**	
Slewing to the left or right	**2, 4**	**1, 3, 5**	Valves **6**, **7**, **8** closed; ⇛ p. 14 - 65

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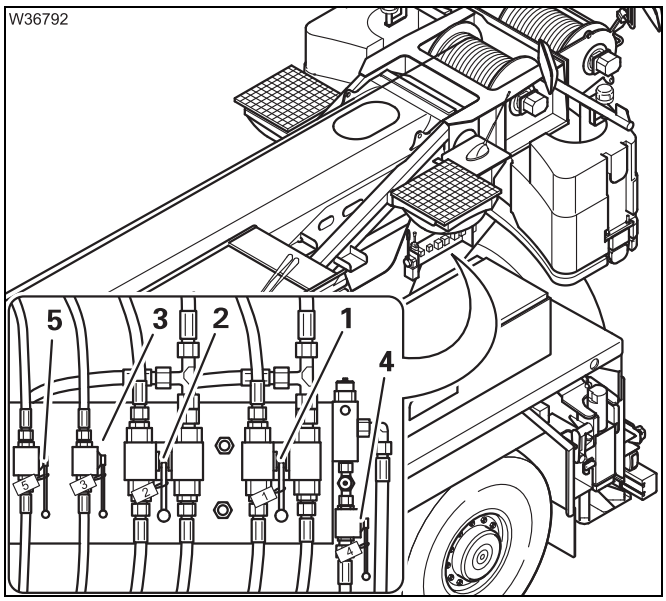


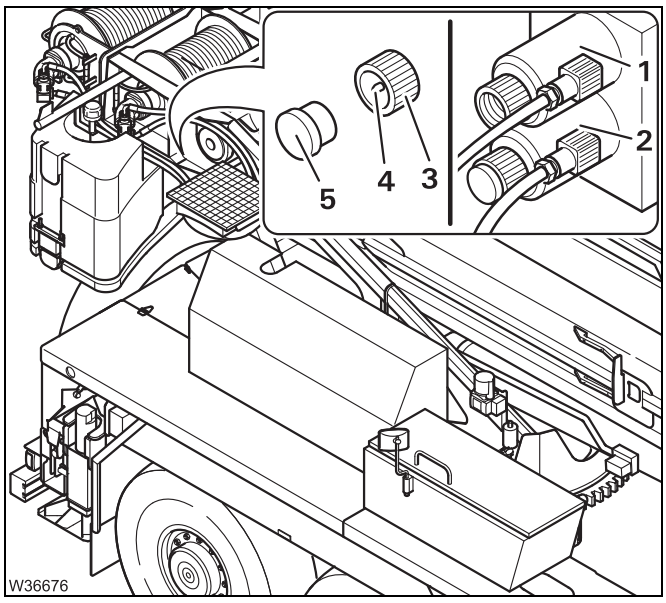
For crane operation

- 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 lifting/ lowering

After establishing hydraulic circuits, switch one additional valve to continuous operation.



Switching on continuous operation

Always switch only **one** valve to continuous operation.

1 Valve Y1104 – *Lowering* **or**

2 Valve Y1105 – *Lifting*

- Unscrew the cap (**3**), e.g. from the valve (**1**).
- Remove the plug (**5**).
- Screw the cap and pin (**4**) onto the valve – continuous operation is switched on.

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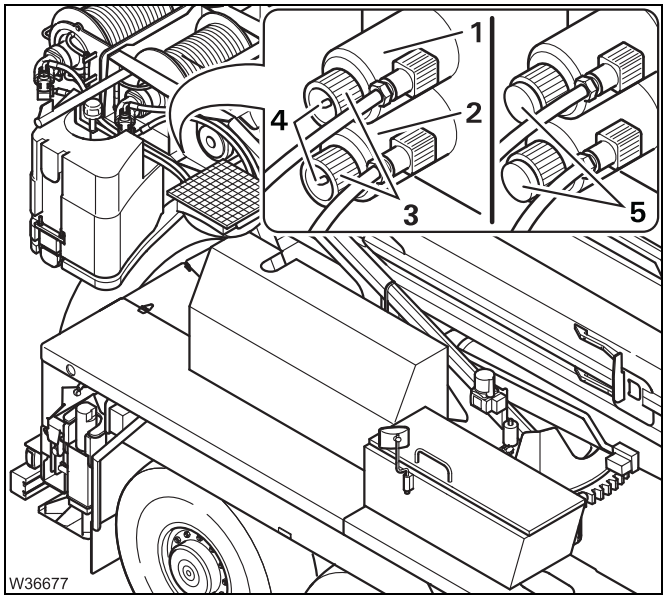
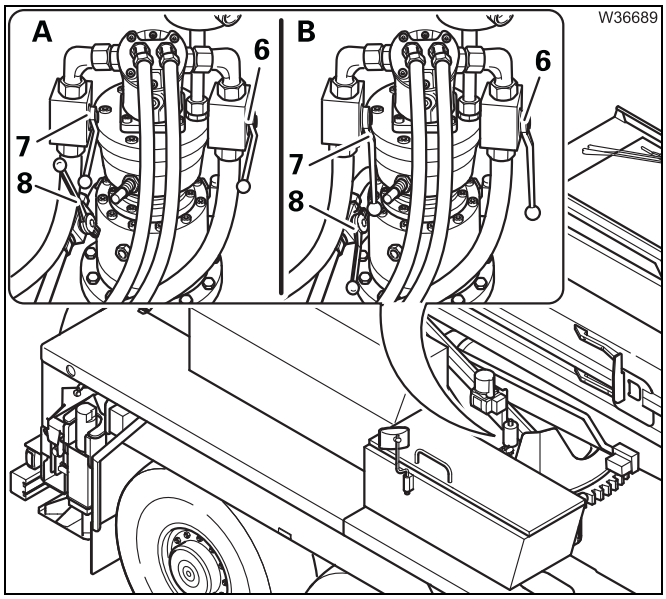
Danger due to falling loads!
Switch off continuous operation immediately after emergency activation.
Check whether the pins can be seen on both caps.
This prevent loads falling down immediately after lifting in subsequent crane operation.



Switching off continuous operation

- Unscrew the cap (**3**) from the actuated valves (**1**), (**2**).
- Screw the cap on so that the pin (**4**) can be seen.
- Insert the plug (**5**).

For slewing After switching over the valves behind the crane cab, you must also close other valves.



(A) – Emergency operation position

- Close the valves **6**, **7** and **8** – lever (**1**) at right angles to the line.

(B) – Crane operation position

- Open the valves **6**, **7** and **8** – lever (**1**) parallel to the line.

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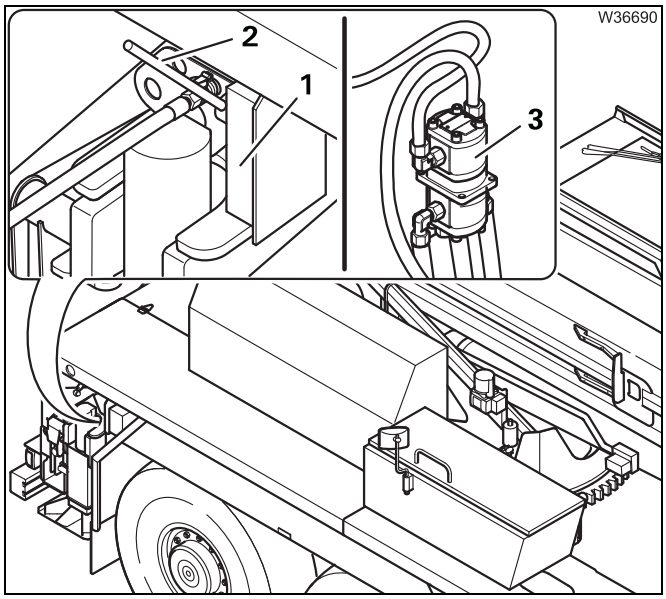
14.7.7 Performing emergency operation

If the required hydraulic circuit has been established, you can make the corresponding crane movement.



With transformer

- Start the engine that drives the transformer (**3**).

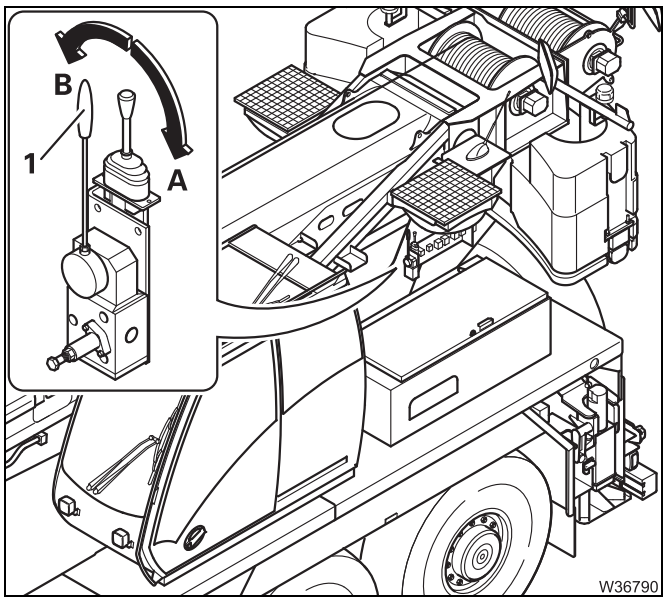
You can influence the maximum speed of the power units via the engine speed.

With the hand pump

- Insert the lever (**2**) provided into the holder at the hand pump (**1**).
- Pump using the lever (**2**).

You can control the speed of all power units with the control lever.

Lifting/lowering For these crane movements, you only need the large control lever.



- Move the control lever (**1**) in the required direction.
  - **A:** Lowering
  - **B:** Lifting

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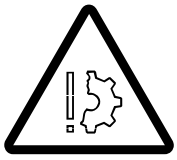
Slewing

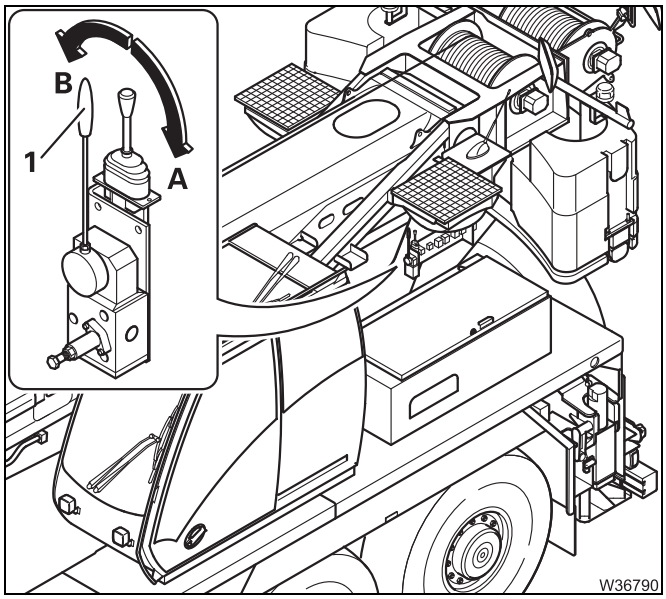
It is not possible to control the slewing movements with the control lever for emergency operation with the same degree of sensitivity as with the control lever in the crane cab.

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 - 48.

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:** Slewing to the right
  - **B:** Slewing to the left

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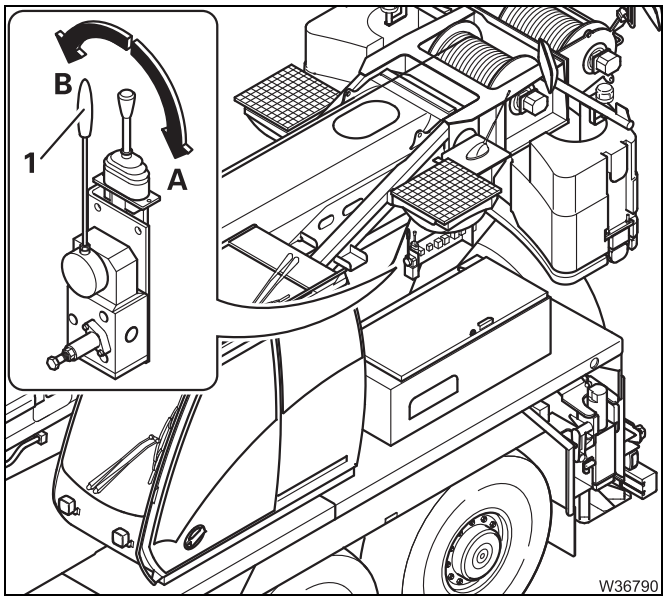
Derricking

- Determine the maximum permissible working radius for the current rigging mode according to the *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 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* when lowering the boom.



- 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:** Lowering the boom
  - **B:** Raising the boom

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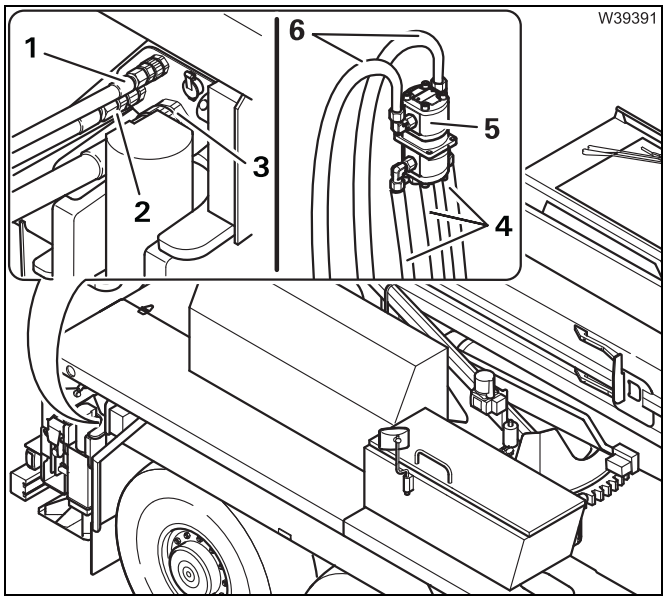
14.7.8 Emergency supply of another crane

For emergency supply

The hoses are assigned according to the various diameters.



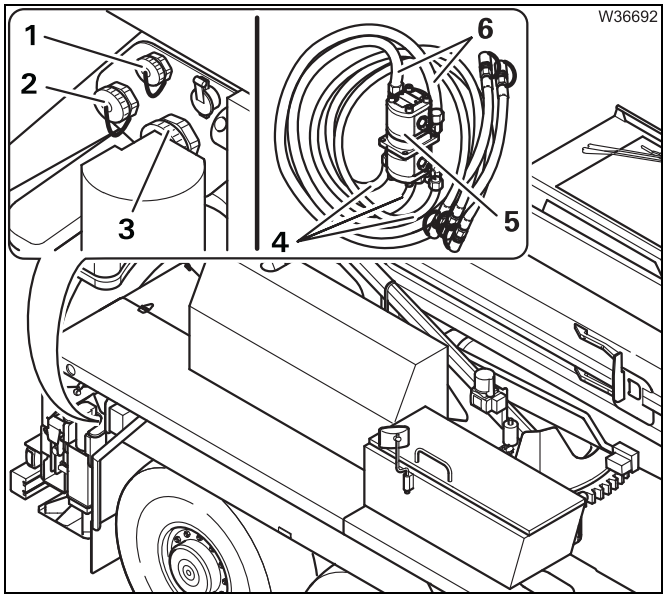
– On the crane to be supplied

- Attach the transformer (**5**).
- Connect the hoses (**6**); ➠ *Operating manual of the other crane*.

– On the GMK3060

- Switch the engine off.
- Connect the hoses (**4**) to the connections (**1**), (**2**) and (**3**).
- Switch on the hydraulic emergency operation; ➠ p. 14 - 70.

After emergency supply



– On the GMK3060

- Switch off the hydraulic emergency operation; ➠ p. 14 - 70.
- Remove the hoses (**4**) from the connections (**1**), (**2**) and (**3**).

– On the crane that was supplied

- Disconnect the hoses (**6**).
- Remove the transformer (**5**).

- Close all the hoses and connections with the caps.

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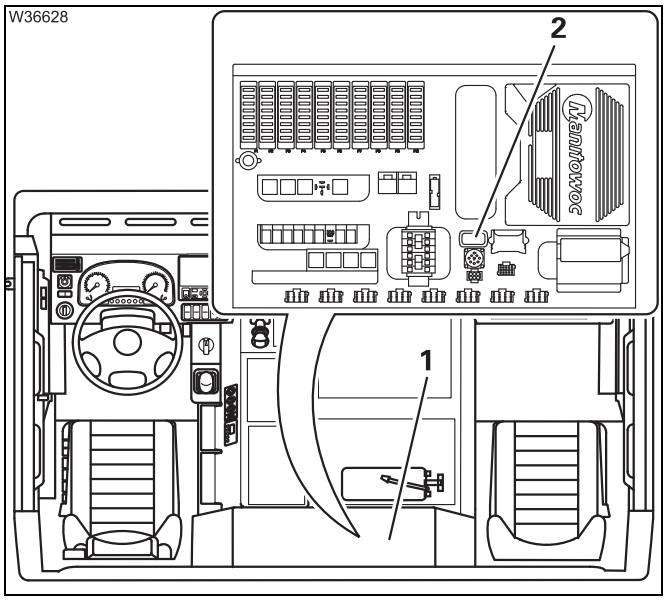
14.7.9 Switching emergency operation on/off

The emergency supply is switched on and off in the driver's cab.



Switching on

- Remove the cover (**1**).
- Start the engine.
- Press switch (**2**) in at the bottom.

Switching off

- Press switch (**2**) in at the top.
- Switch the engine off.
- Attach the cover (**1**).

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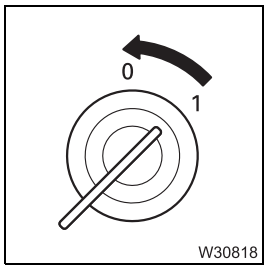
14.8 Fuses in the crane cab

The fuses are located in the crane cab behind the crane cab seat.

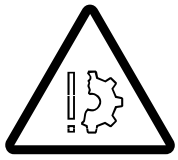
Notes on changing fuses

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. Notify **Manitowoc Crane Care** if a fuse with the same amperage blows again when the ignition is switched on.

Risk of fire!
Never repair a blown fuse with other electrically conductive materials.

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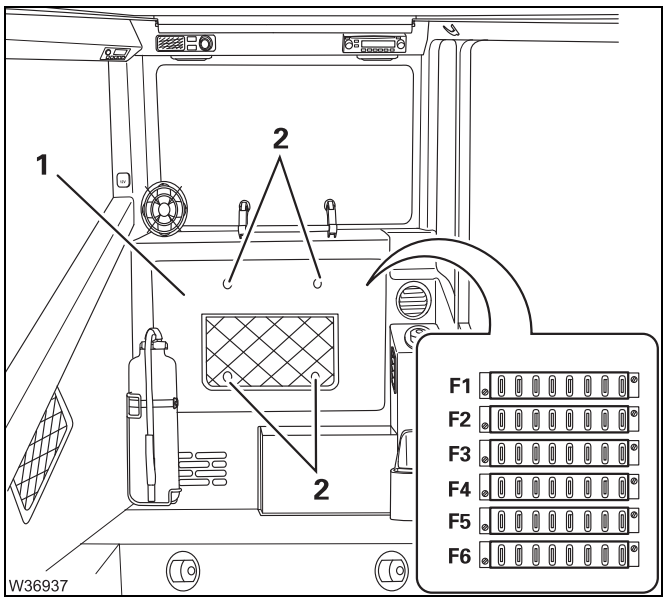
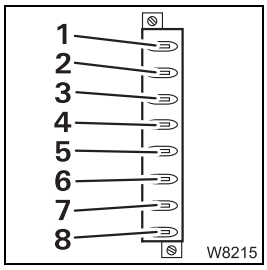


- Loosen the bolts (**2**) and remove the cover (**1**).

The fuse groups **F1** to **F6** 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 - 71.



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 SCM
F1/2	15	Control unit UB 1 CCM 10
F1/3	15	Control unit UB 2 CCM 10
F1/4	15	Control unit UB IOL 30
F1/5	15	Control unit UB IOL 30
F1/6	15	Control unit UB IOL 30
F1/7	15	Control unit UB IOL 30
F1/8	3	Crane cab lighting

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Designation	Amperage (A)	Function
F2/1	3	Control unit UB IOS 20
F2/2	15	CCS display
F2/3	15	Control unit UB IOS 22
F2/4	15	Control unit UB IOS 22
F2/5	10	Control unit UB IOS 21
F2/6	10	Heater fan
F2/7	–	Unassigned
F2/8	2	AGND SCM

Designation	Amperage (A)	Function
F3/1	3	Crane control power supply CCS display
F3/2	5	Control lever supply CAN bus system
F3/3	5	Instrument lighting Control unit for auxiliary air heating system
F3/4	5	Control lever supply RCL display (on the outside of the crane cab)
F3/5	10	Central lubrication Windscreen wiper/washing system
F3/6	20	Spotlight
F3/7	15	Heater fan
F3/8	–	Unassigned

1) Additional equipment

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Designation	Amperage (A)	Function
F4/1	10	Cigarette lighter diagnostics plug
F4/2	5	Camera
F4/3	5	rotating beacon
F4/4	3	Remote control CraneStar system
F4/5	10	Houselock
F4/6	3	Spotlight
F4/7	10	Radio Voltage transformer 24/12 V
F4/8	7.5	Power supply to the comfort seat

Designation	Amperage (A)	Function
F5/1	20	auxiliary air heater
F5/2	5	Control unit for auxiliary air heating system CraneStar system
F5/3	3	Control units UE IOS 20 and 21
F5/4	3	Control units UE IOS 21 and 22 Control unit CCM 10
F5/5	10	Radio
F5/6	5	Hand-held control
F5/7	–	Unassigned
F5/8	–	Unassigned

1) Additional equipment

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Designation	Amperage (A)	Function
F6/1	3	Control unit SCM
F6/2	3	Control unit CCM 10
F6/3	3	Control unit IOL 30
F6/4	–	Unassigned
F6/5	–	Unassigned
F6/6	–	Unassigned
F6/7	–	Unassigned
F6/8	–	Unassigned

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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 9 *Truck Crane Description*.
From there, you are referred, as usual, to more detailed descriptions of these elements.

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O Operating manual

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R Rated capacity limiter RCL

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W Warning messages

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