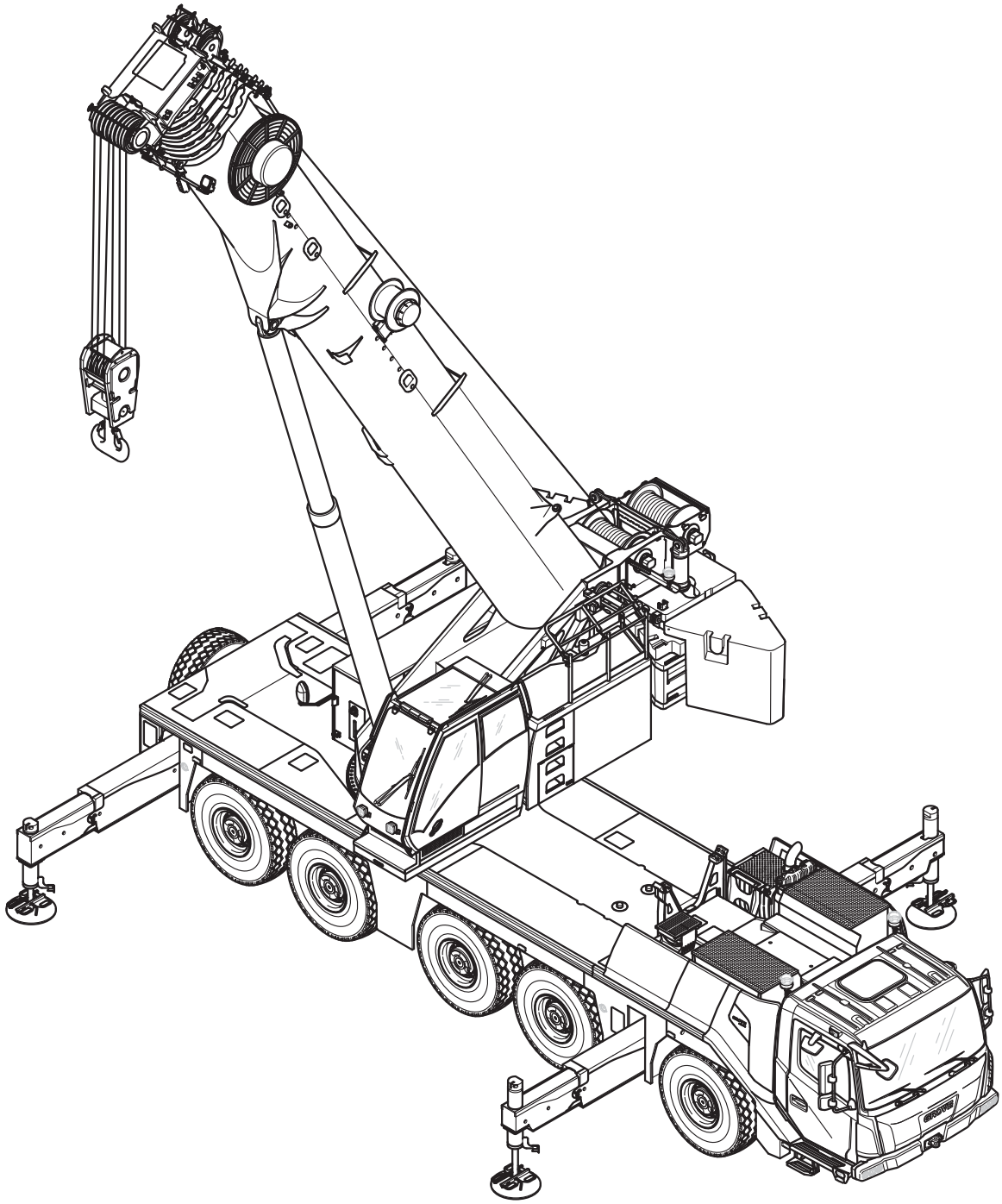
GROVE GMK5150L

Operating manual



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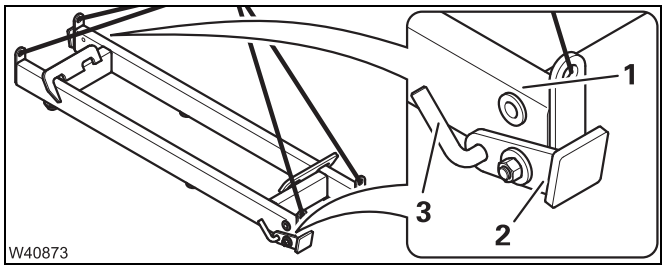
Manitowoc®

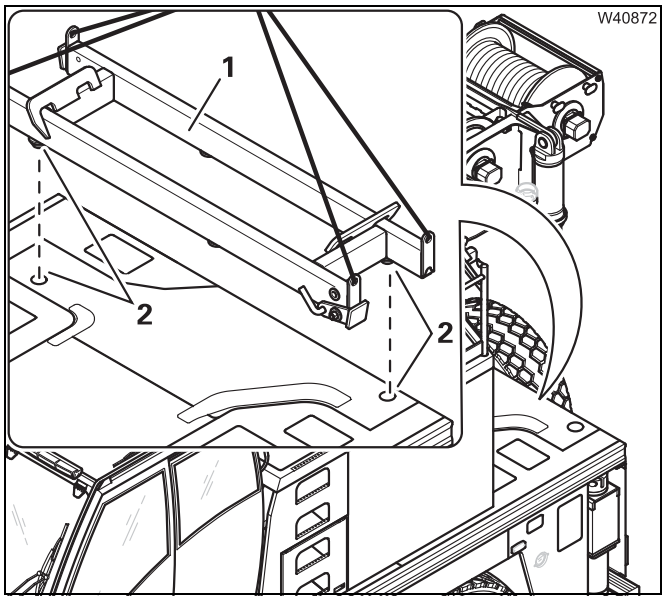
Counterweight on the rear storage area

Holder for 4.6 t block

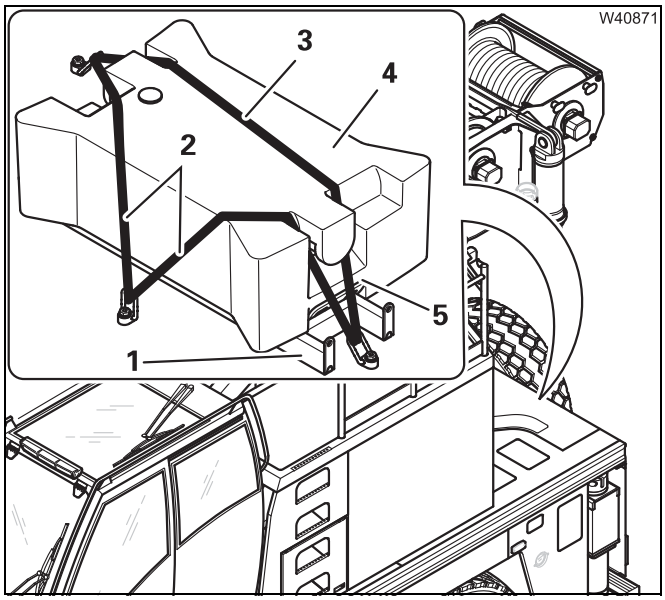


Placing the holder on the rear storage area

- Raise the holder (**1**).
- Remove the pins and fold in the feet (**2**).
- Insert the pins (**3**) and secure them.



- Place the holder (**1**) on the rear (**2**) so that the mountings engage with one another.



Setting down the 4.6 t block

- Place the 4.6 t block (**4**) onto the holder (**1**) so that the mountings (**5**) engage with one another.
- Secure the 4.6 t block with lashing straps (**2**) and (**3**).

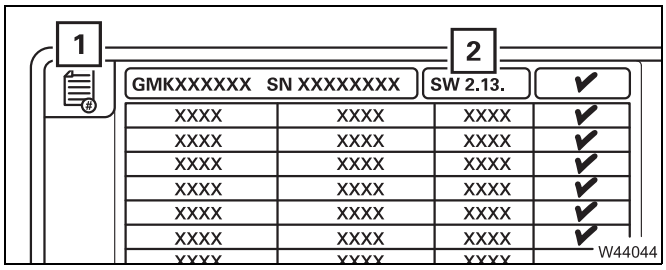
15.03.2019

Steering system warning

Additional functions

This additional page is valid for all listed cranes which have the cited program version or a higher version installed.

Crane type	Program version
GMK4080-2 / GMK4090	2.6
GMK4100L-1	2.9
GMK5150 / GMK5150L	2.13

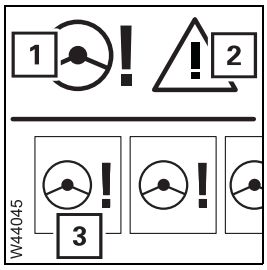


Checking the program version

- In the crane cab, open the *Program version* menu (**1**).

  The currently installed program version (**2**) is displayed, e.g. 2.13.

Additional functions



If the steering system warning is active, the light (**3**) on the instrument panel lights up. The *CCS* display in the start menu shows the corresponding symbol (**1**) and the red symbol (**2**).

In addition to the information in the supplied *operating manual*, two additional functions are activated.

– An uninterrupted buzzer tone sounds as long as the truck crane continues to travel.

– If the speed falls below 20 km/h (12 mph), the speed is then limited to 20 km/h (12 mph). This limitation remains active even after a restart and for as long as the error is present.

20.03.2020

4 Starting the engine for driving / switching it off

12.01.2018

9 Operating elements for crane operation

12.01.2018

14 Malfunctions during crane operation

12.01.2018

1.5 Technical data

GROVE crane GMK5150L

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)]	108 t (238,000 lbs)
– 0° to the rear:[1)]	130 t (286,000 lbs)
– 0° to the rear:[2)]	159 t (350,000 lbs)

Max. load moment

– Within the 360° slewing range:	440 tm (58 t x 7.6 m) 3,200 klbs x ft (128,000 lbs x 25 ft)

[1)] With additional equipment

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

12.01.2018

1.5.4 Carrier

Engine

Mercedes Benz

– Engine emissions:	➠ Engine data card
– Power:	➠ Engine data card
Fuel – Tank[1)]:	2 x 200 l (2 x 52.8 gal)
AdBlue tank:	40 ltr (10.6 gal)

[1)] For additional equipment: 2 x 325 l (85.9 gal)

Transmission Mercedes G280 – 16, automatic transmission, 16 forward speeds, 2 reverse speeds

Transfer case Kessler VG 2639, 2-stage

Axle lines

Drive:	**10 x 6 x 10**
1. axle line:	Steered axle line
2. axle line:	Steered and driven axle line
3. axle line:	Steered axle line
4. axle line:	Steered and driven axle line, steering can be switched on
5. axle line:	Steered and driven axle line

Drive:	**10 x 8 x 10[1)]**
1. axle line:	Steered axle line
2. axle line:	Steered and driven axle line
3. axle line:	Steered and driven axle line, drive can be activated
4. axle line:	Steered and driven axle line (steering can be switched on)
5. axle line:	Steered and driven axle line

[1)] Additional equipment

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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.

– The 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 according to the product, and give an overview of all operating elements on the truck crane. You will find cross-references to the associated brief descriptions, and from there, to further chapters.

Chapters **4** to **8** and **10** to **14** describe procedures, and are therefore structured relative to these operations. For more extensive processes, the description is given with **checklist** and **operating instructions**.

– The checklists show the procedure in the required sequence, 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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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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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 overhead power lines as well as oil, gas or other pipelines is dangerous and requires special precautionary measures. 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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1 Adjusting the passenger seat ➠ p. 5 - 14

2 Rear overview ➠ p. 3 - 8

3 Warning triangle, first-aid kit, warning lamp, high-vis vest[1)]

4 Auxiliary air heater[1)] ➠ p. 3 - 19

5 Accelerator ➠ p. 5 - 44

6 Diagnostics ➠ p. 3 - 71

7 Service brake ➠ p. 3 - 58

8 Adjusting the driver's seat ➠ p. 5 - 13

9 To open/lock/unlock door ➠ p. 3 - 75

10 Window winder ➠ p. 3 - 74

11 – Adjusting the mirrors ➠ p. 5 - 7
– Mirror heating ➠ p. 5 - 8

12 Adjusting the air vents ➠ p. 5 - 66

13 Cab lighting ➠ p. 3 - 67

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

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

16 Tachograph or cover ➠ p. 3 - 16

17 Battery heating[1), 2)]

18 Instrument panel, Middle ➠ p. 3 - 12

19 Auxiliary water heating system[1)] ➠ p. 3 - 18

20 Radio/USB [1), 2)] ➠ p. 5 - 80

21 Auxiliary water heating system[1)] ➠ p. 3 - 18

22 Heating and air-conditioning system ➠ p. 3 - 17

23 BirdView system 270° – Monitor[1)] ➠ p. 3 - 53

24 Parking brake ➠ p. 3 - 59

25 Cigarette lighter

26 CCS control unit ➠ p. 3 - 21

27 Push-up roof ➠ p. 3 - 71

28 Fire extinguisher[3)]

29 Sockets 12 V/24 V ➠ p. 3 - 46

30 Behind the cover ➠ p. 3 - 9

[1)] Additional equipment

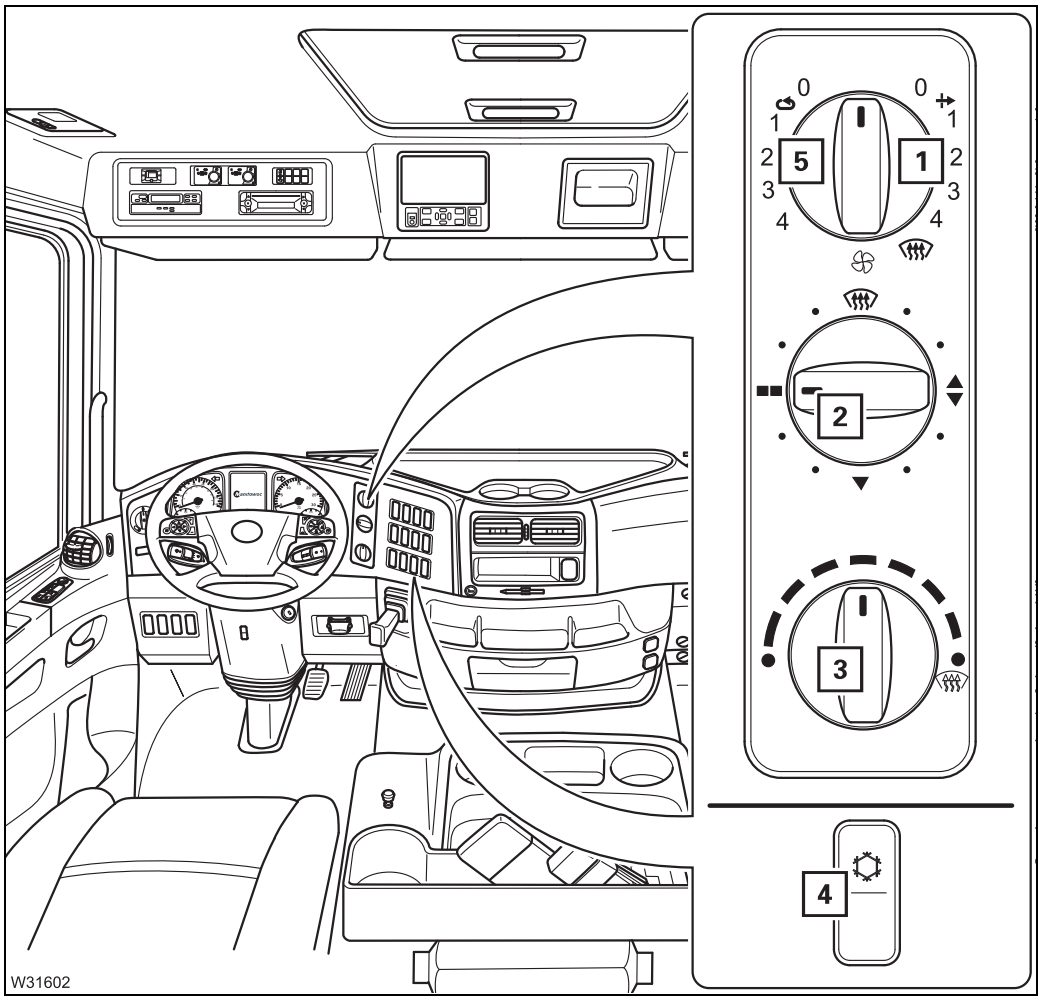
[2)] ➠ *Separate operating manual*

[3)] ➠ *Maintenance manual*

12.01.2018

3.1.8 Heating and air-conditioning system

Standard



1 Setting the fan p. 5 - 65
2 Air distribution p. 5 - 66
3 Setting the temperature p. 5 - 65
4 Air-conditioning system p. 5 - 68
5 Setting the fan p. 5 - 65

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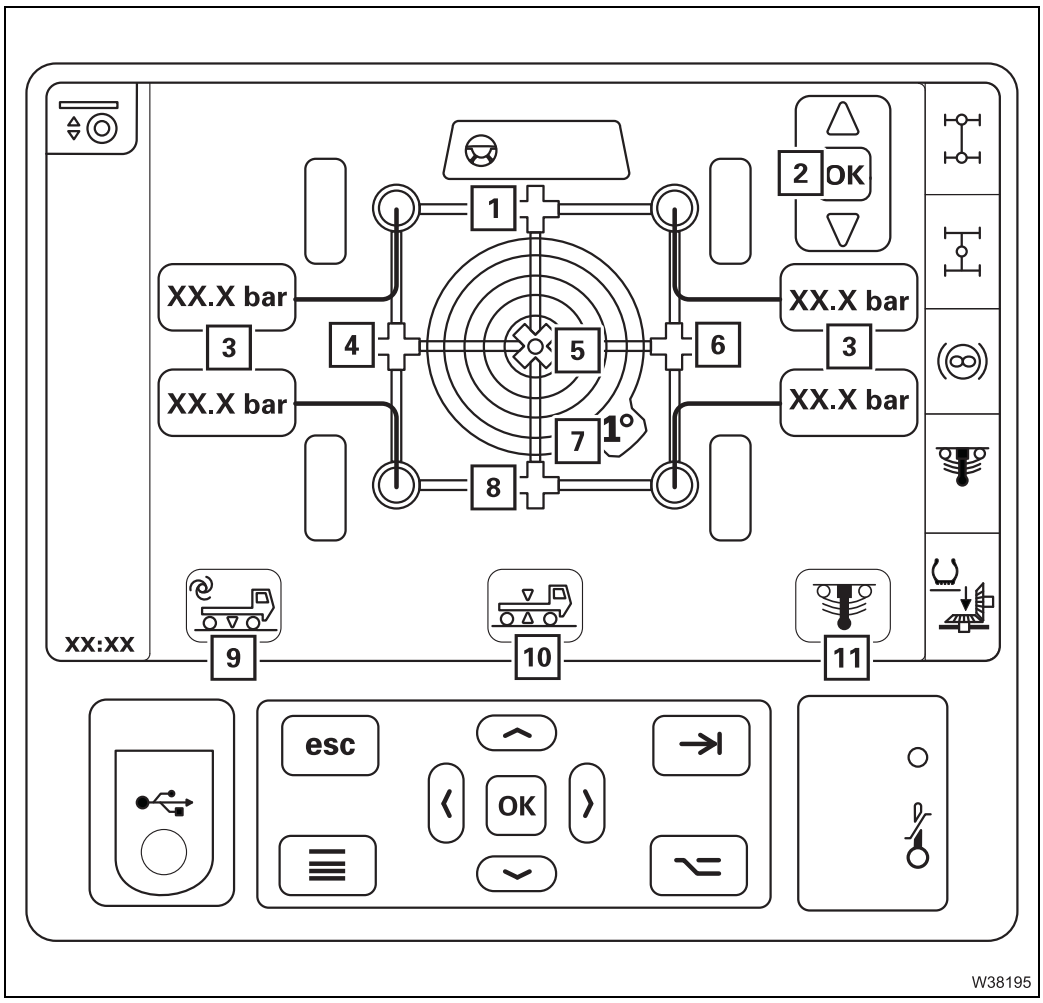
Suspension/level adjustment menu



1 Front level pre-selection p. 3 - 68
2 Level adjustment system enabled display p. 3 - 68
3 Suspension operation pressure gauge p. 3 - 64
4 Left level pre-selection p. 3 - 68
5 Overall level pre-selection p. 3 - 68
6 Right level pre-selection p. 3 - 68
7 Display of current inclination p. 3 - 69
8 Rear level pre-selection p. 3 - 68
9 Setting the on-road level p. 3 - 69
10 Vehicle level display p. 3 - 69
11 Suspension on/off p. 3 - 64

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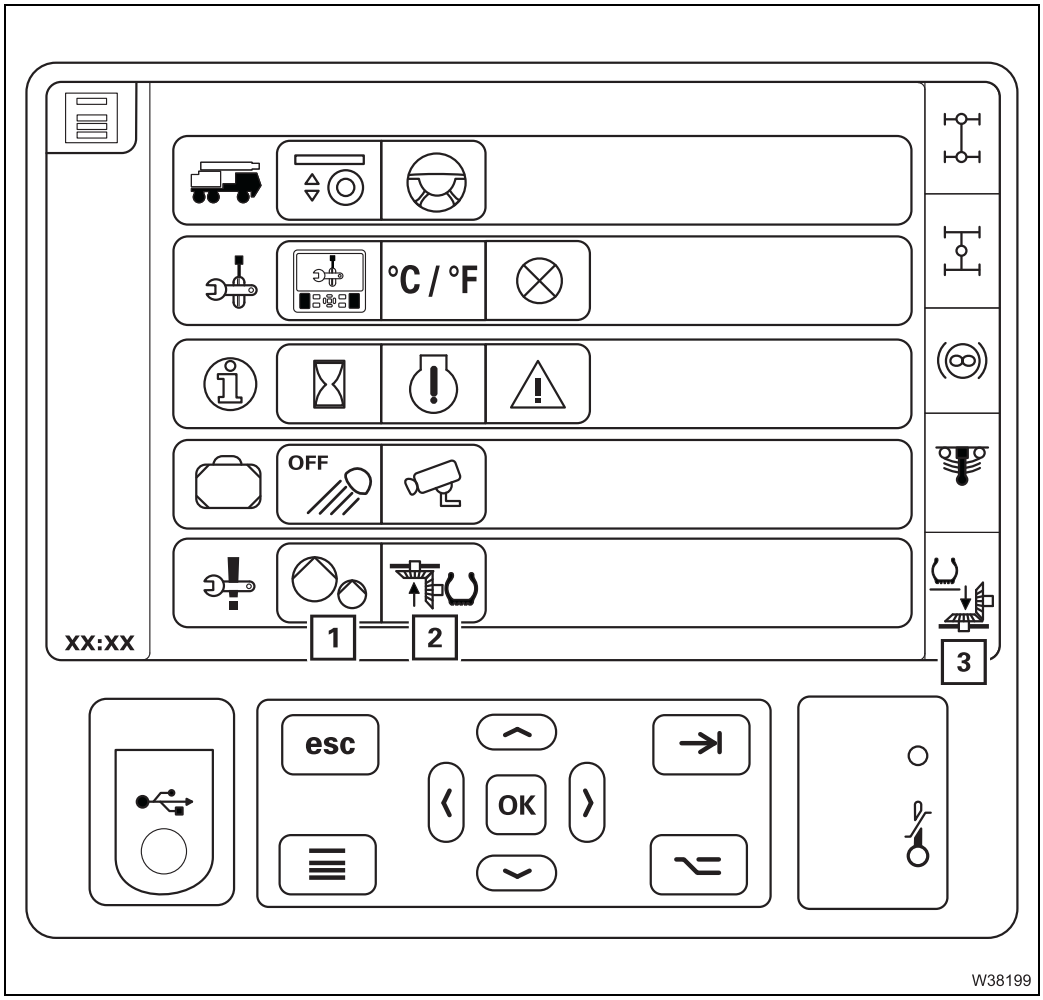
3.1.17 Emergency operations menu group



1 Switching emergency operation on/off p. 14 - 65

2 Switching towing mode on/off p. 8 - 31
(Transfer case for off-road gear on/off)

3 Transfer case display p. 8 - 31

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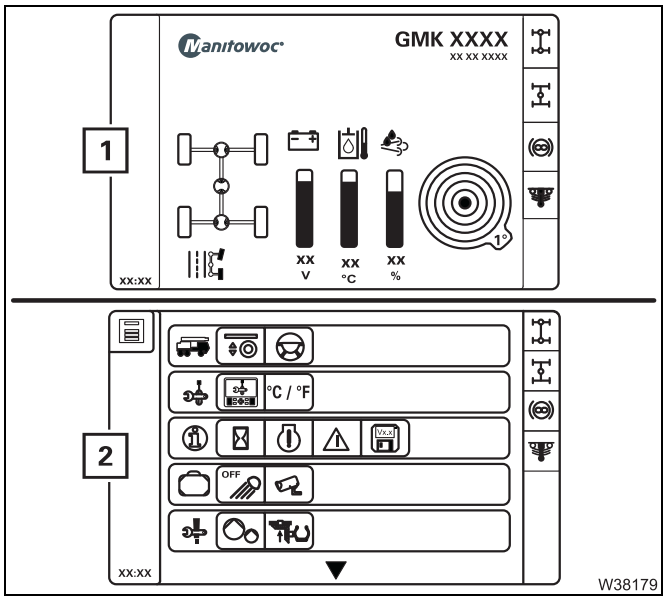
3.2.7 Crane control CCS

The GMK5150L truck crane is equipped with the **CCS** electronic crane control system (**C**rane **C**ontrol **S**ystem). CCS includes a control unit in the driver's cab and several control units (MWSCM and MWCCM) distributed over the superstructure and carrier.



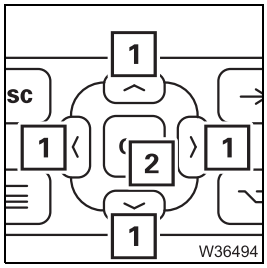
CCS display

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 - 96
➠ *In the input area*, p. 9 - 96
➠ *In the operating area*, p. 9 - 97

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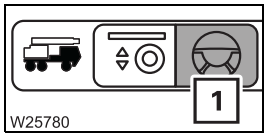
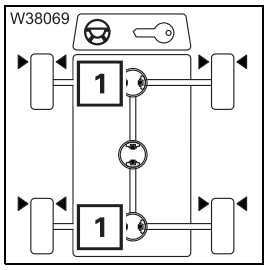
3.2.12 Final drive

Longitudinal and transverse differential locks, p. 5 - 51



Driving menu

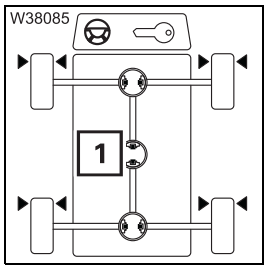
Opening: Select symbol (**1**) and confirm – menu is opened



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**

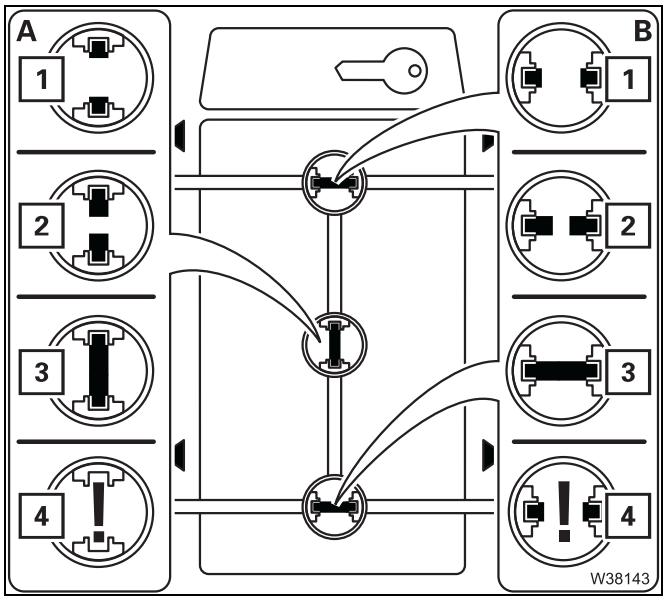
When a symbol (**1**) is selected **all** transverse differential locks are switched on or off.



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**

For drive 10 x 8 x 10 – simultaneously drive of first axle line on/out



(A) – longitudinal differential lock display

(B) – transverse differential lock display

The current status is shown using different symbols.

1 **Green** – locks off

2 **Red** – locks on

3 **Yellow** – intermediate position

4 **Violet** – error

p. 5 - 51

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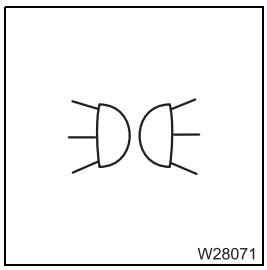
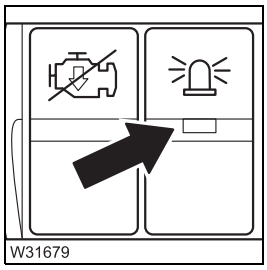


Checking headlight

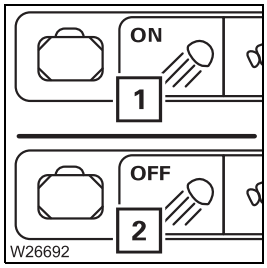
- **On:** Headlight on
- **Out:** Headlight off



Rotating beacon on/off

- **Switch on:** Push up
- **Switch off:** Push down

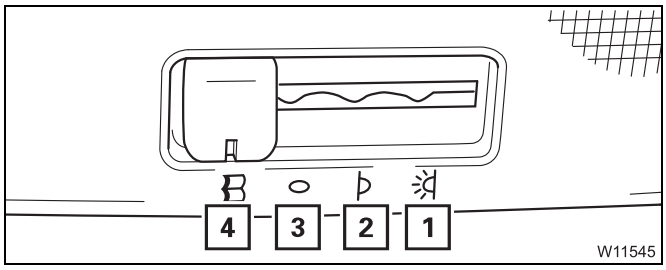
***CCS* display**



Outrigger lighting on/off

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

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



Cab lighting

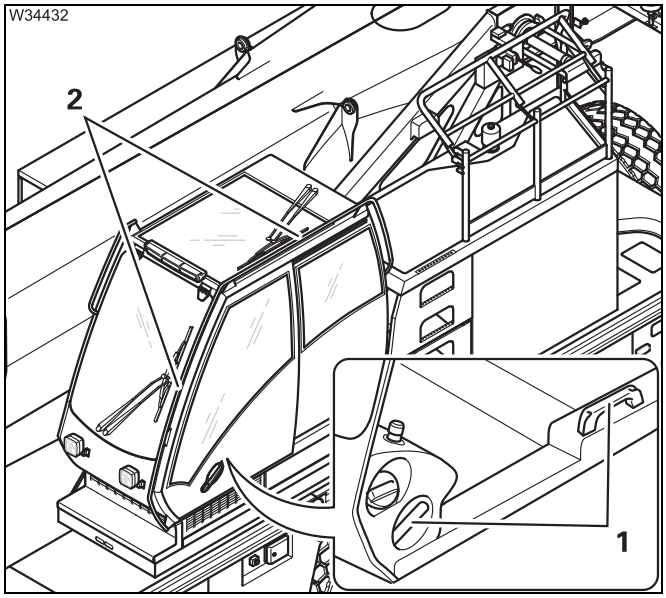
1 On
2 On/off via door contact
3 Off
4 Reading lamp on

12.01.2018

3.2.24 Access ladders and ladders

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

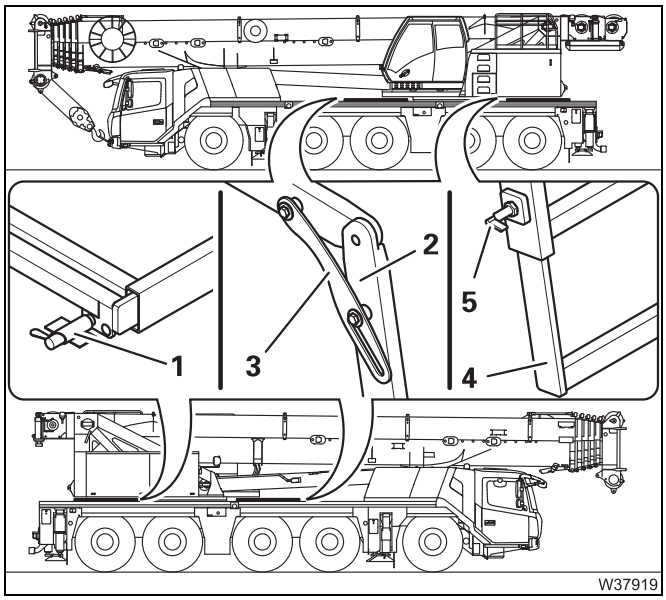
Hazard due to unsecured ladders
Always secure the ladders before driving. The prevents the ladders falling down or folding out whilst driving and thus endangering other vehicles.



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 – engage the spring latch (**5**) and pull out another access ladder (**4**).

12.01.2018

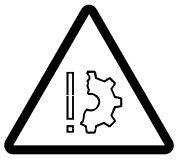
AdBlue tank

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

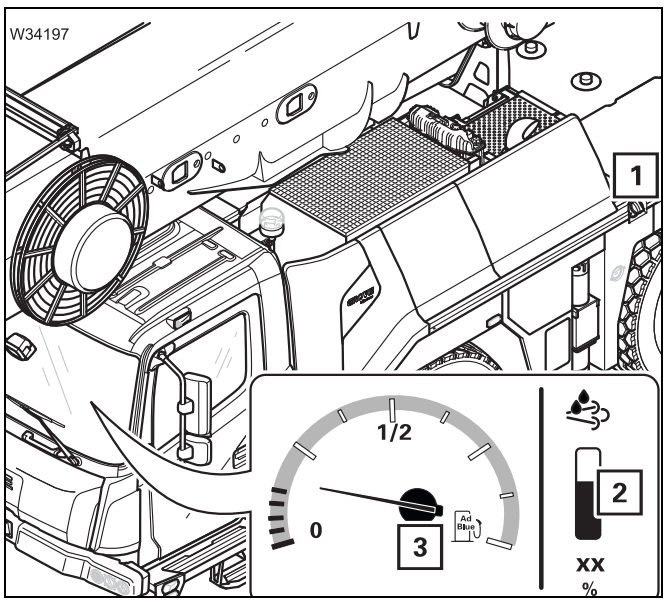
Risk of accidents if the tank is not closed.
Close the tank each time you have refilled it.
In this way you can prevent other vehicles from being endangered by the cap falling off or consumables escaping.

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* tank is opened at high outside temperatures. Ammonia vapours can irritate mucous membranes, skin and eyes.
Ensure that there is adequate fresh air supply and do not breathe in the escaping ammonia vapours.



Risk of damage to painted or aluminium surfaces
AdBlue can cause corrosion of these surfaces. Clean up spilled *AdBlue* with water immediately.



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

The level indicator (**2**) changes colour depending on the fill level:

Green: Over 10% – over 4 l (0.9 gal)

Yellow: 5 to 10% – 2 to 4 l (0.4 to 0.9 gal)

Red: Below 5% – less than 2 l (0.4 gal)

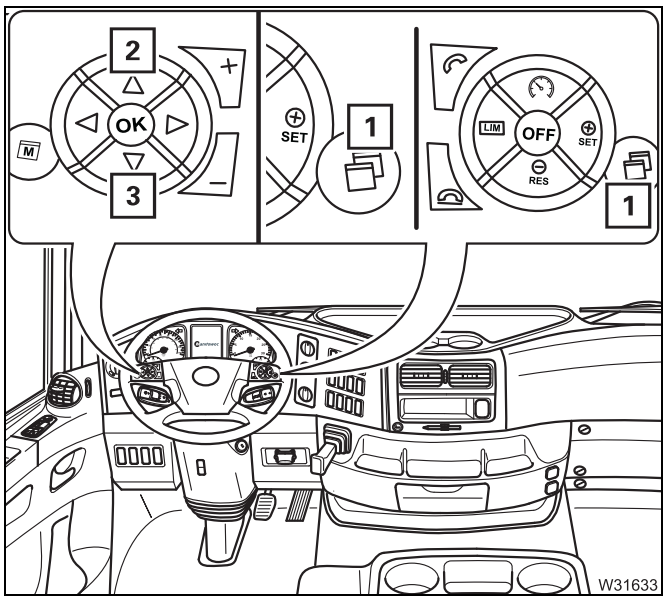
- Refill the *AdBlue* tank (**1**) in good time and close it using the cap.

12.01.2018

4.1.10 Setting the idling speed

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

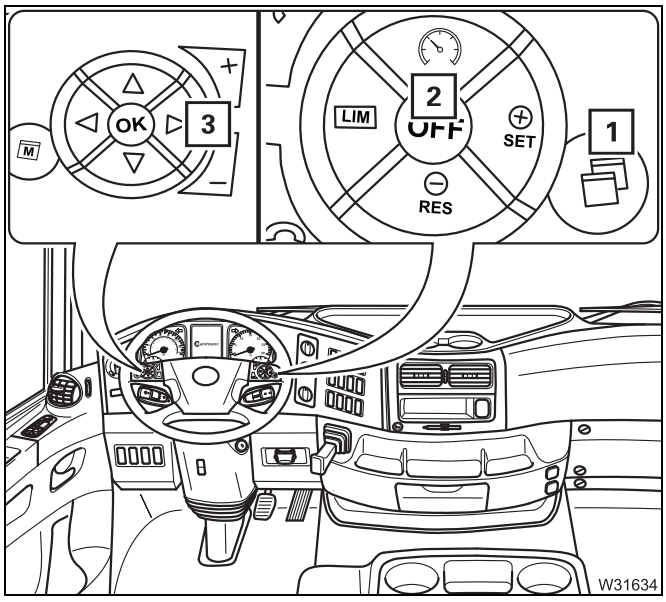
You can only set the idling speed when the truck crane is stationary.



Increasing/reducing the idling speed

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

  After about 3 seconds the setting is automatically saved.



Switching off the idling speed change

- Press the button (**1**) repeatedly until *Engine speed* is shown in the on-board computer display.
- Press the button (**3**).

  or

- Press the button (**2**).

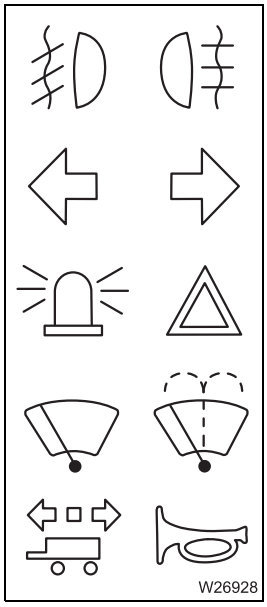
  or

- Accelerate to more than 20 km/h (12 mph).

12.01.2018

5.1.2 Check the condition of the truck crane

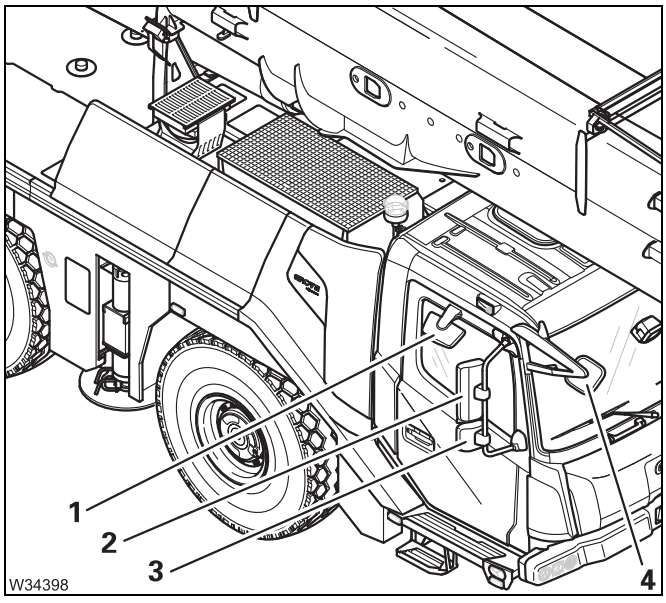
Electrical system



- Check the following functions and arrange for faulty parts to be repaired:
  - Parking light/headlight, rotating beacons, fog tail light, side marker lights
  - Hazard warning system,
  - Brake lights,
  - Reversing lamp/buzzer
  - 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**).

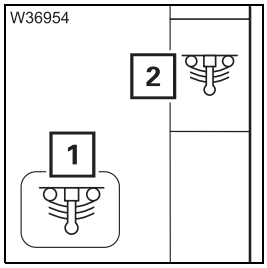
The mirrors (**2**) are adjusted electrically on both sides.

12.01.2018

Switching the suspension on

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

Danger of overturning when switching on the suspension
Do not switch the suspension on unless the truck crane has been rigged for on-road driving and the main boom has been set down.
If the rigged truck crane was standing on its wheels the suspension struts will be suddenly pushed together when the suspension was switched on, causing them to be damaged and possibly causing the truck crane to overturn.



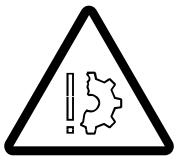
- Select and confirm the symbol (**1**).

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

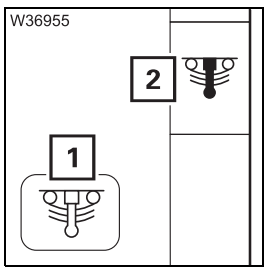
If the (**2**) symbol stays **red**, the supply pressure may be too low. In this case the suspension would only be switched on if sufficient supply pressure is built up; ➠ *Building up supply pressure*, p. 5 - 10.

Switching the suspension off

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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5.2.3 Selecting the direction of travel and starting gear

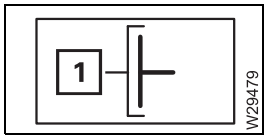
Selecting the driving direction

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

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

– The truck crane is stationary;
– The parking brake is applied;
– The accelerator is not operated.

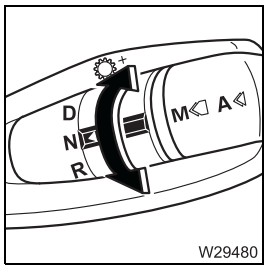
• Start the engine; ➠ p. 4 - 13.



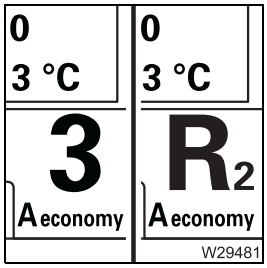
If the supply pressure is insufficient for shifting the transmission, the display will show the symbol (**1**). A corresponding message is also displayed. If necessary, wait until the supply pressure has built up, and the message disappears; ➠ *Building up supply pressure*, p. 5 - 10.

• Release the accelerator.

Risk of accidents from uncontrolled starting
When you press the accelerator, the clutch is engaged immediately after the start-up gear is (automatically) selected, and the truck crane will start to move.



• In order to
  – drive **forwards**, shift to position **D**.
  – drive **backwards**, shift to position **R**. An acoustic signal is given with additional equipment.



The operating mode *Automatic* 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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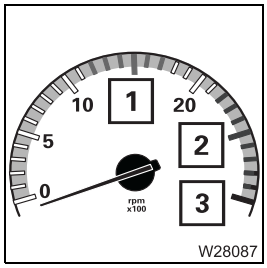
Monitoring elements

- Also pay attention to the monitoring elements.

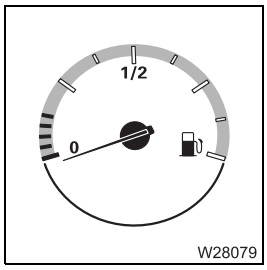


Tachometer

1 Green: Economic consumption

2 Yellow: Engine brake active

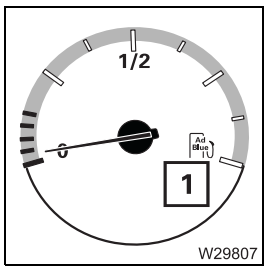
3 Red: Engine speed too high – danger;
➠ *Checks when driving downhill*, p. 5 - 42



Fuel level display

Never run the fuel tank completely dry; always refuel in time; ➠ p. 4 - 5.

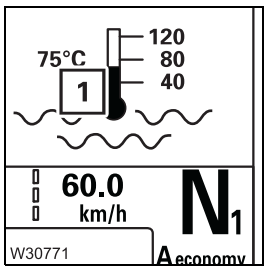
If the fuel tank is almost empty, air can be sucked in and the fuel system must then be bled; ➠ *Maintenance manual*.



***Adblue* filling level indicator**

If possible, never run the *Adblue* tank completely dry; refuel in due time; ➠ p. 4 - 7.

If the *Adblue* tank is empty, the lamp (**1**) lights and the slewing moment is reduced; ➠ p. 5 - 45.



Coolant temperature display

1 Coolant temperature display in degrees Celsius
In the event of malfunctions; ➠ p. 8 - 19

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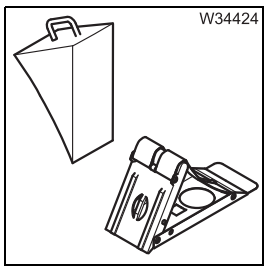
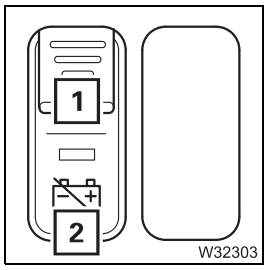


Additional chocks can be transported in the storage compartment on the turntable or at the rear of the truck crane.

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.



- Slide the guard (**1**) downwards and push the switch underneath it (**2**) in – the battery master switch is now off.

Securing the truck crane against unauthorised use

- Secure the truck crane against unauthorised use by:
  - Stowing away the hand-held control in the crane cab or in the driver's cab
  - Removing the ignition key
  - Locking the driver's cab and the crane cab.

Danger due to unauthorised use
Always stow away the hand-held control innormally open contact the crane cab or in the driver's cab before leaving the truck crane and lock the doors. This way you can prevent unauthorised persons starting the engine using the hand-held control.

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5.4.4 Freeing truck crane stuck in terrain

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.
- Press the accelerator as far as possible.
- 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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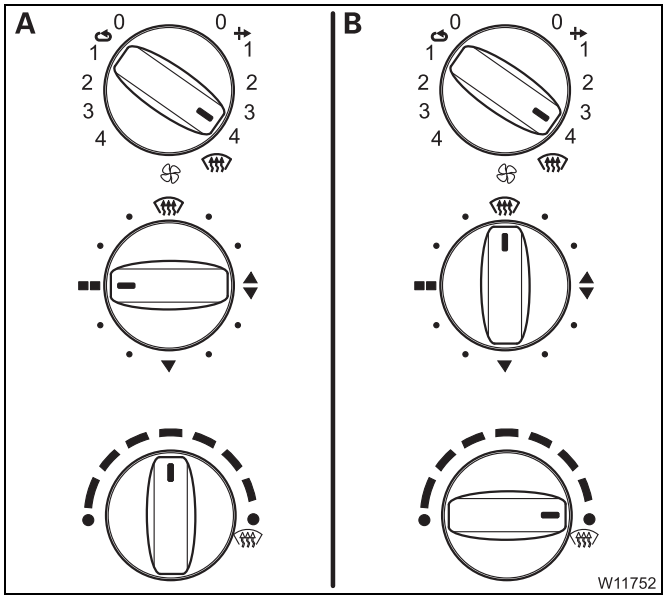
Examples

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



(A) – Ventilating

– Turn the switches to the positions shown.

– If necessary, open the air vents for the side and centre.

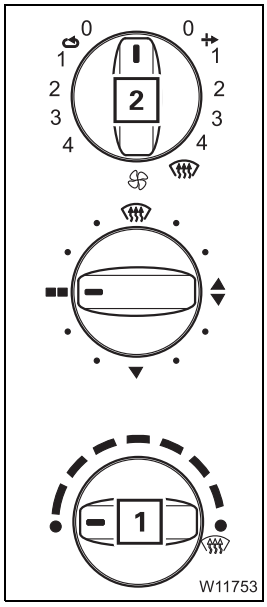
– **If necessary, open the push-up roof;** ➠ p. 3 - 71.

(B) – Defrosting the front windscreen

– Turn the switches to the positions shown.

– Close the air vents for the side and centre.

Switching off



Switching off the heating system

• Turn the switch (**1**) as far as it will go in a counter-clockwise direction, to *Cold*.

Switching off the ventilation

• Turn the switch (**2**) to the level 0.

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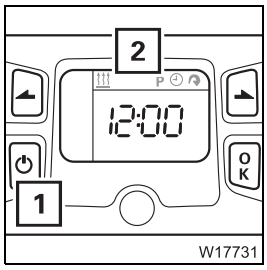
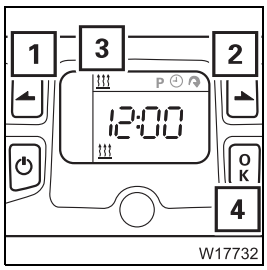
This section describes how to switch on manually. The auxiliary heater can also be switched on automatically; ➠ *Auxiliary water heating system*, p. 5 - 70.

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



- Press the button (**1**) until the menu row (**2**) is displayed.

If you do not make settings within 10 seconds of switching on, the control unit switches to idle mode.

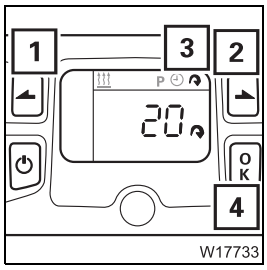


- Use button (**1**) or (**2**) to select the symbol (**3**) and confirm with button (**4**).

The auxiliary heater switches on.

Setting the heating level

You can preselect a heating level between 10 and 30.



- Use button (**1**) or (**2**) to select the symbol (**3**) and confirm with button (**4**).
- Change the heating level using button (**1**) or (**2**) and confirm with button (**4**).

The higher the preselected heating level, the faster the auxiliary heater fan.

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6 Driving modes and rigging for on-road driving

This chapter contains tables with driving modes of the GMK5150L, for which the maximum axle load is 12 t (26,500 lbs).

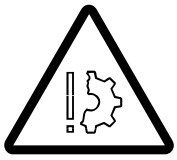
6.1 Driving modes

Information about the axle loads

The GMK5150L truck crane is designed for driving with maximum axle loads of 12 t (26,500 lbs). **Manitowoc Crane Group Germany GmbH** points out that if the truck crane is driven with axle loads greater than 12 t (26,500 lbs),the brake system may overheat and the braking deceleration required by the EU partial type-approval cannot be met.

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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6.3 Rigging work for driving with a dolly

To reduce the axle loads to the specifications applicable in the country in which you are working, you can set the main boom onto a dolly when driving.
For this purpose, the truck crane must be fitted with a slewing gear freewheel, boom floating position and if necessary, with a boom pre-tensioning device.

Before driving with the dolly, you must:

- Switch on the slewing gear freewheel; ➠ p. 6 - 12,
- Switch on the boom floating position; ➠ p. 6 - 13,
- Switch on boom pre-tensioning, if necessary; ➠ p. 6 - 14.
- If necessary, raise the 3rd axle line; ➠ p. 6 - 15

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6.4.2 CHECKLIST: Mounting the main boom

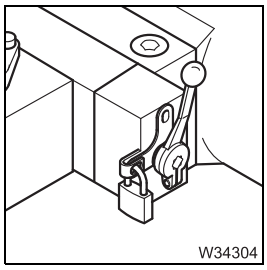
This checklist is not a complete operating manual. There are accompanying operating instructions which are indicated by cross-references.
Observe the warnings and safety instructions specified there!

Prerequisites

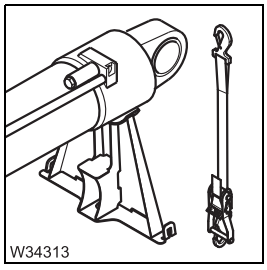
The truck crane is supported with at least an outrigger span of 8.030 x 2.50 m (26.3 x 8.2 ft).

Or the parking brake is applied, the truck crane has been aligned horizontally with the level adjustment system and the suspension is locked.

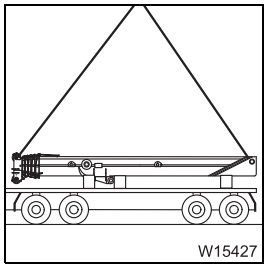
Checklist



1. Check whether the pressure relief for the derricking cylinder is switched on; ➠ p. 6 - 29.



2. Remove the tightening belt from the derricking cylinder; ➠ p. 6 - 35.



3. Sling the main boom to an auxiliary crane; ➠ p. 6 - 26.

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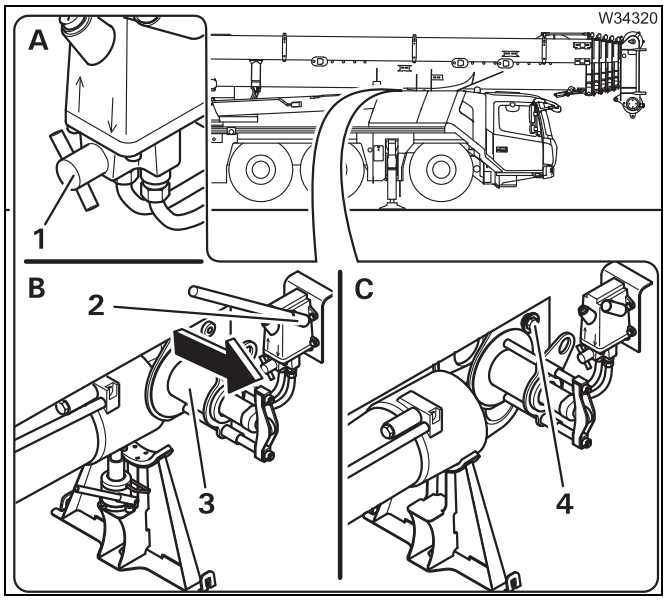
Risk of accident from falling derricking cylinder!
Always take the load off of the derricking cylinder using the lifting device before retracting the head pin. By doing this, you prevent the derricking cylinder from falling down, injuring people or being damaged while retracting the head pin.

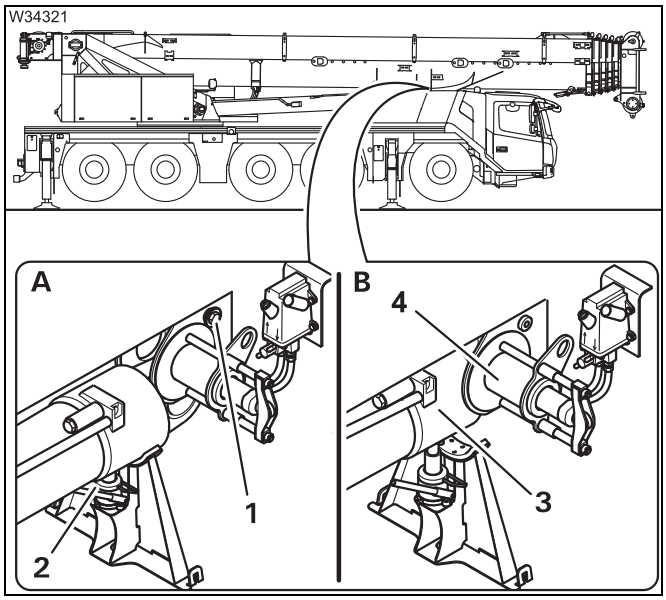


Pulling out the head pin

- (**A**) – Turn the switch (**1**) to the *Pull* position ⇧.
- (**B**) – Insert the lever into the clamp (**2**).
- Pump until the head pin (**3**) is completely drawn out.
- Carry out the movement *Lower* until the derricking cylinder is in the derricking cylinder support.
- (**C**) – Fasten the disc with the bolt (**4**).
- Stow away the lever and the lifting device.

Fitting the derricking cylinder head axle

- Check to see if the tightening belt of the derricking cylinder is taken off.



Aligning the derricking cylinder

- (**A**) – Remove the disc (**1**).
- Place the lifting device (**2**) underneath the middle of the derricking cylinder.
- (**B**) – Carry out the movement *Raise* until the head pin (**4**) is aligned with the bearing in the derricking cylinder (**3**).

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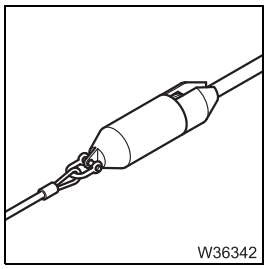
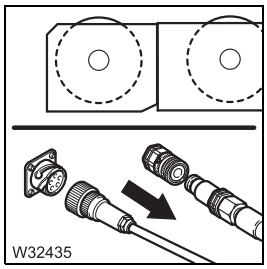
6.5.3 CHECKLIST: Removing the auxiliary hoist

– The main boom must be resting in the boom rest.

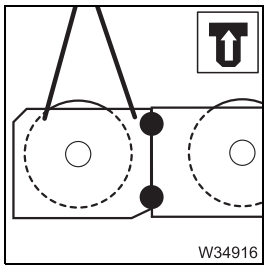
– The hoist rope is unreeved.



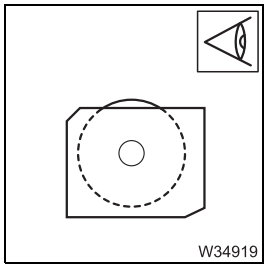
1. Wind on the auxiliary hoist rope, using the rigging aid if necessary; ➠ p. 6 - 48.



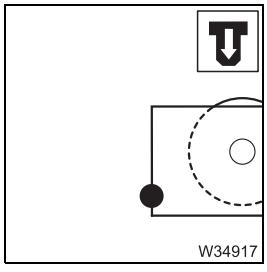
2. – Disconnecting hydraulic connections; ➠ p. 6 - 43.
– Disconnecting the electrical connection; ➠ p. 6 - 44.
– Disconnect the connection to the central lubrication; ➠ p. 6 - 45



3. – Attach the auxiliary hoist at the centre of gravity; ➠ p. 6 - 42.
– Disconnect the connection between the auxiliary hoist and turntable; ➠ p. 6 - 42.



4. Lift the auxiliary hoist onto the separate vehicle and prepare it for transportation; ➠ p. 6 - 46.



5. Insert and secure the pin; ➠ p. 6 - 46.

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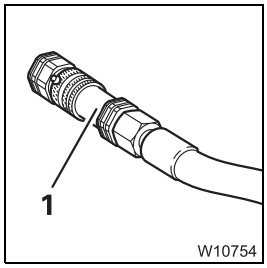
6.6 Installing/removing the outrigger beams



To rig the outrigger beams, the outriggers must be fitted with hydraulic connections (**1**) which can be separated.

During rigging, each outrigger beam is removed and mounted as a complete "package", consisting of inner and outer outrigger beams, cylinders and add-on parts.

Risk of truck crane overturning if not properly supported!
Loads may only be lifted when the truck crane is supported on all outrigger beams. The lifting capacity tables for the *Free on wheels* operating position **are not designed** for installation and removal of the outrigger beams.
For this reason, always use an auxiliary crane for installation and removal of the outrigger beams.

You will require the following equipment with a sufficient load bearing capacity:

– An auxiliary crane

– Suitable lifting gear and guide ropes,

– A chain hoist,

– A separate vehicle.

Dimensions and weights of the outrigger beams; ➠ p. 1 - 10.

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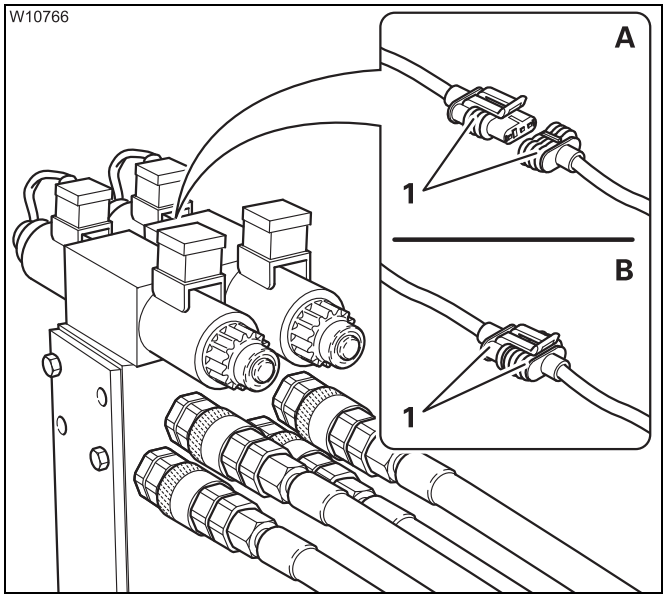
6.6.8 Disconnecting/establishing the electrical connection

The electrical connection is only present on truck cranes equipped with an outrigger pressure display or outrigger span monitoring system.

Risk of malfunctions in the electronic system!
Always turn off the ignition before you disconnect or establish the electrical connection. This prevents malfunctions and corresponding error messages in the subsequent crane operation.



(A) – Disconnecting the connection

- Pull the plugs (**1**) apart. Protect the plugs against dirt and moisture.

(B) – Establishing the connection

- Connect the plugs (**1**) together.
- Protect the separating points against dirt and moisture.

Some error messages can occur after disconnecting the electrical connections; ➠ *Note on error messages with removed outrigger beams*, p. 6 - 68.

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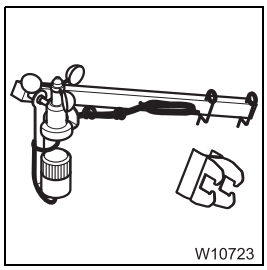
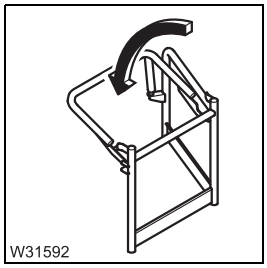
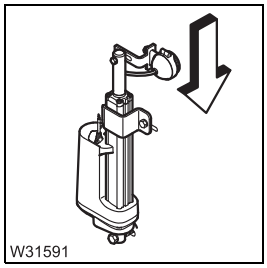


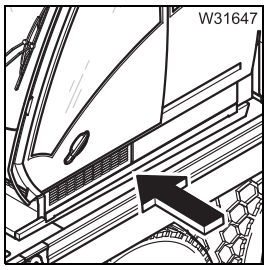
4. The anemometer and air traffic control light must be removed; ➠ *Anemometer and air traffic control light*, p. 12 - 145.



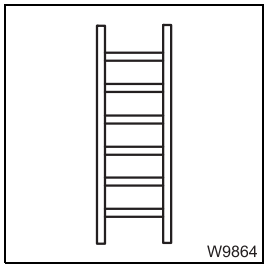
5. All railings must be folded in; ➠ p. 12 - 149.



6. The camera on the turntable must be retracted; ➠ p. 12 - 152.



7. The step at the crane cab must be retracted; ➠ p. 12 - 157.



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

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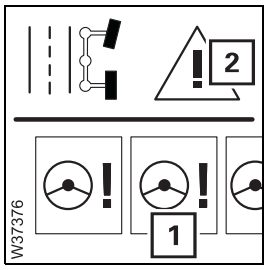


Steering malfunction

Lamp (**1**) lights up, symbol (**2**) yellow.

– The lamp (**1**) only lights up briefly and then goes out.

  Error with low priority; continued driving possible.

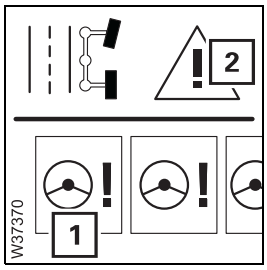
  • Pay attention to steering behaviour and have the error read out and corrected at the next opportunity.

– The lamp (**1**) stays on.

  There may be an error at the 3rd axle line or at the 4th axle line or at both axle lines.

  The affected axle line is steered into the straight running position or, the next time when the steering goes into the straight running position, it is held in this position and no longer steered. It is possible to continue driving.

  • Pay attention to steering behaviour and have the error read out and corrected at the next opportunity.



Steering system warning

The lamp (**1**) lights up, symbol (**2**) red.

There may be an error at the 3rd axle line or at the 4th axle line or at both axle lines.

The affected axle line stays on the current steering angle and can no longer steered.

• Stop as quickly as possible, taking account of the current traffic situation.

Risk of accidents because the truck crane cannot be steered.
Stop the vehicle as soon as possible.
The affected axle lines can no longer be steeted, which can lead to serious accidents even for reduced speeds.

• Briefly switch the ignition off and then on again. If the error is still present, then check the steering angle at the 3rd and 4th axle lines.

Whether it is possible to continue driving must be decided based on the current situation. Contact **Manitowoc Crane Care**.
If necessary, the 3rd and 4th axle lines can be steered into the straight running position with emergency operation to make it possible to drive to the repair shop; ➠ *Emergency operation, steering 3rd and 4th axle lines*, p. 8 - 39.

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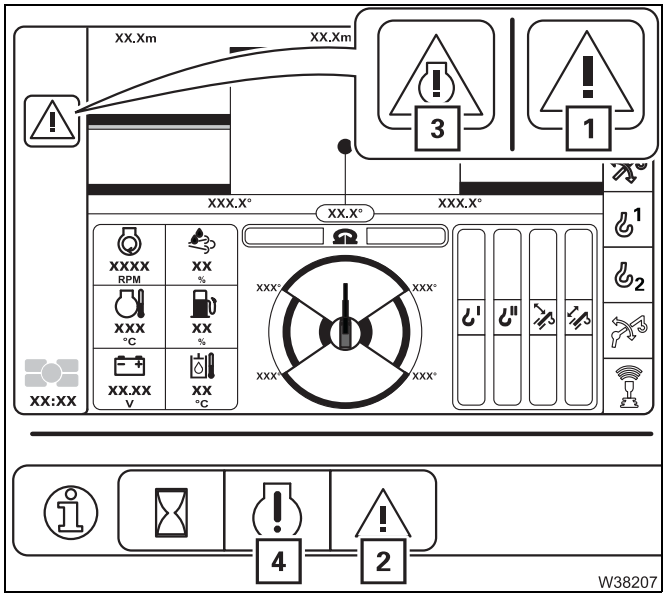
8.3.4 Error messages on the CCS display

Risk of accidents
The crane control may only be repaired by qualified personnel.

- If an error message occurs, stop while taking the traffic situation into consideration; ➠ *What to do when a malfunction occurs in road traffic*, p. 8 - 2.



The symbol (**1**) or (**2**) flashes when the CCS has detected an error. The symbols flash alternately when both error types are present.

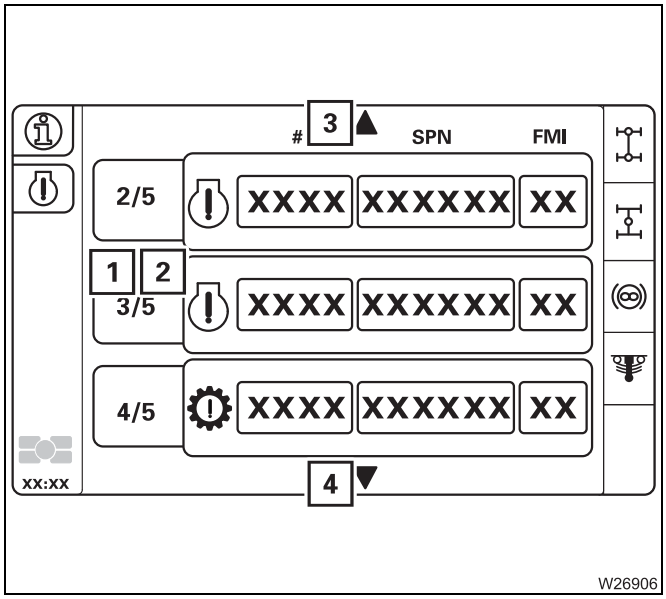
(1) – Crane operation error

The buzzer tone sounds once.

- Open the *Crane operation error* menu (**2**); ➠ *Special error messages*, p. 8 - 18.

(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
– there is a total of **5** errors.

Display errors

- Select and acknowledge the symbol (**3**) or (**4**) to show any additional errors.

3 Next error

4 Previous error

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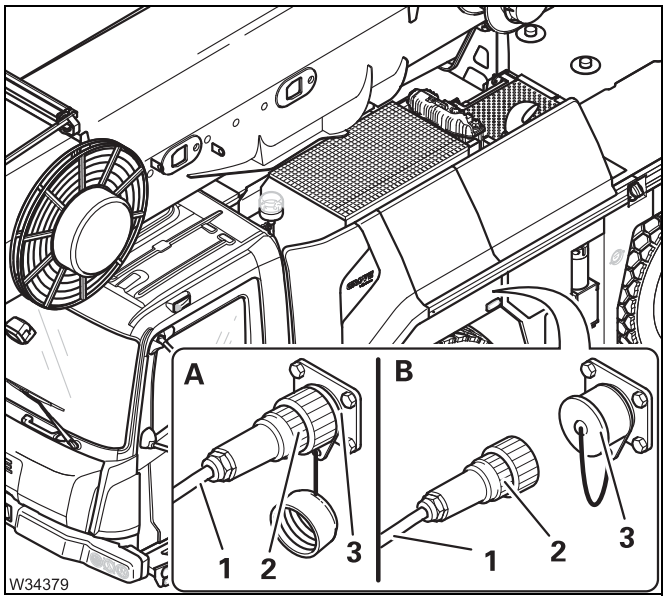
8.5 Emergency operation and breakdown assistance

8.5.1 Starting the truck crane externally



- 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**) into socket (**3**).
- Start the truck crane engine.
- (**B**) – Take out the plug (**2**).
- Close the socket (**3**).
- Remove the cable (**1**) from the auxiliary vehicle.

The socket (**3**) can also be used as a power source for another vehicle (with a 24 V on-board network).

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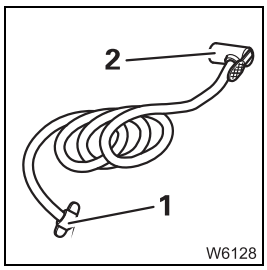
8.5.5 Inflating the tyres yourself

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.

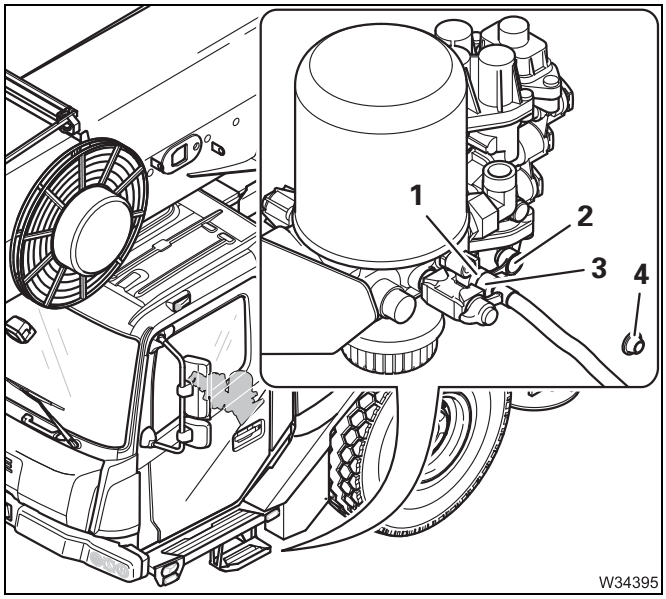
Risk of damage if the tyre pressure is too high!
Depending on the size of the tyres, the prescribed pressure may be less than 10 bar (145 psi); ➠ *Tyres*, p. 1 - 18. Fill the tyres no more than the specified pressure. If necessary, break off the filling procedure. This prevents the tyres becoming damaged 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 (**2**) and (**4**).
- Fasten the connection (**3**) to the filler connection (**1**).

You can now inflate the tyres.

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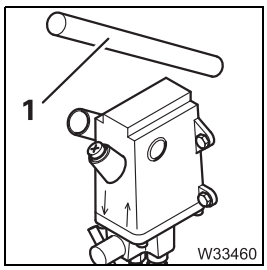
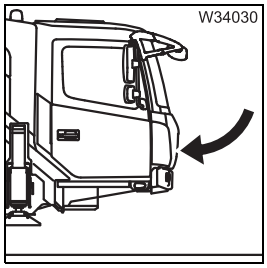


- Remove the lever (**1**) and stow it away safely.



- Close the front flap; ➠ *Front flap*, p. 3 - 73.

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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.

1 Cab lighting ➠ p. 9 - 147

2 Sun roller blind

3 Radio-CD/USB[1), 3)]

4 Loudspeaker[1)]

5 Sockets 12 V ➠ p. 9 - 145

6 Fan with switch[1)]

7 Rear window ➠ p. 9 - 154

8 Cover for:
- Fuses ➠ p. 14 - 75
- Diagnostics ➠ p. 9 - 156
- CraneSTAR system[1)] ➠ p. 11 - 158

9 Rest

10 Air vents ➠ p. 11 - 152

11 Fire extinguisher[2)]

12 Air vents ➠ p. 11 - 152

13 Door unlocking mechanism ➠ p. 9 - 155

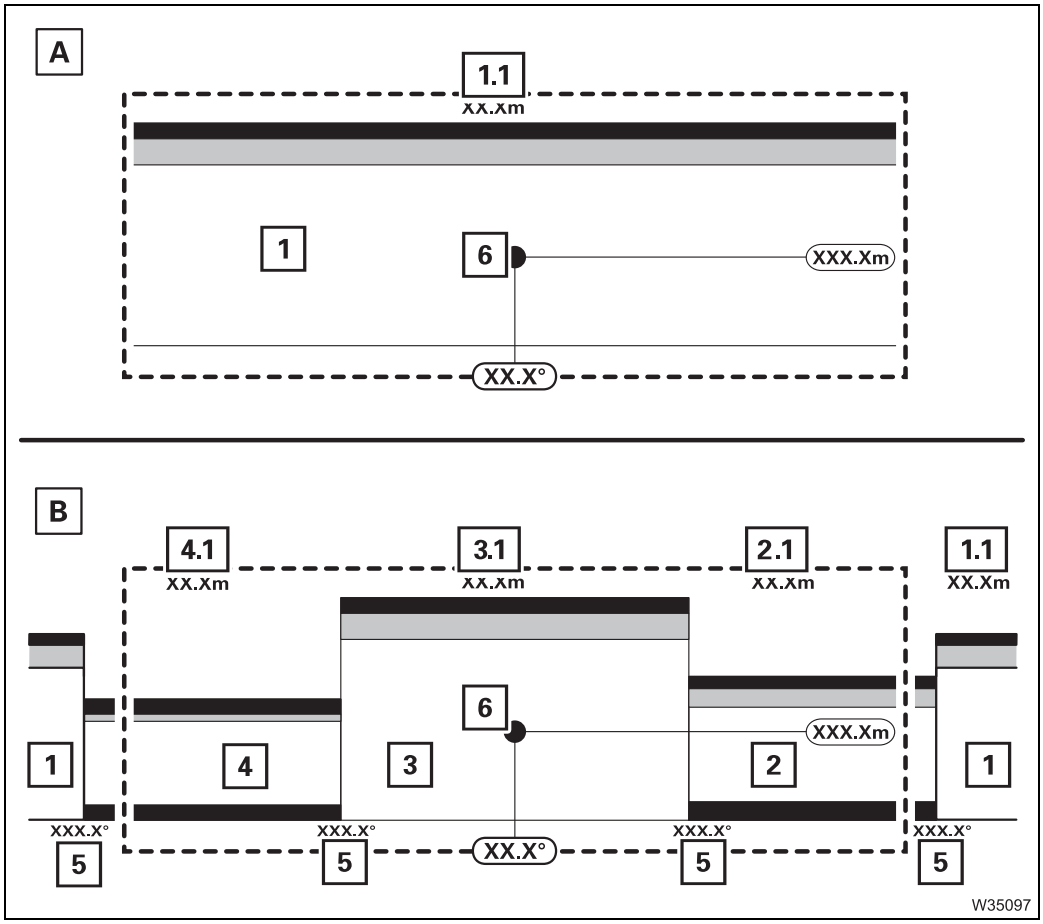
14 Handle

1) Additional equipment

2) ➠ *Maintenance manual*

3) ➠ *Separate operating manual*

Display Slewing ranges/working radii



A For the *Standard* slewing range type

B For the *MAXbase* slewing range type

Display of current slewing range divisions p. 9 - 133

1 Slewing range 1 p. 9 - 133

2 Slewing range 2 p. 9 - 133

3 Slewing range 3 p. 9 - 133

4 Slewing range 4 p. 9 - 133

5 Display of current slewing range limits p. 9 - 133

6 Current position display p. 9 - 134

Maximum permissible working radius display p. 9 - 134

1.1 In slewing range 1 p. 9 - 134

2.1 In slewing range 2 p. 9 - 134

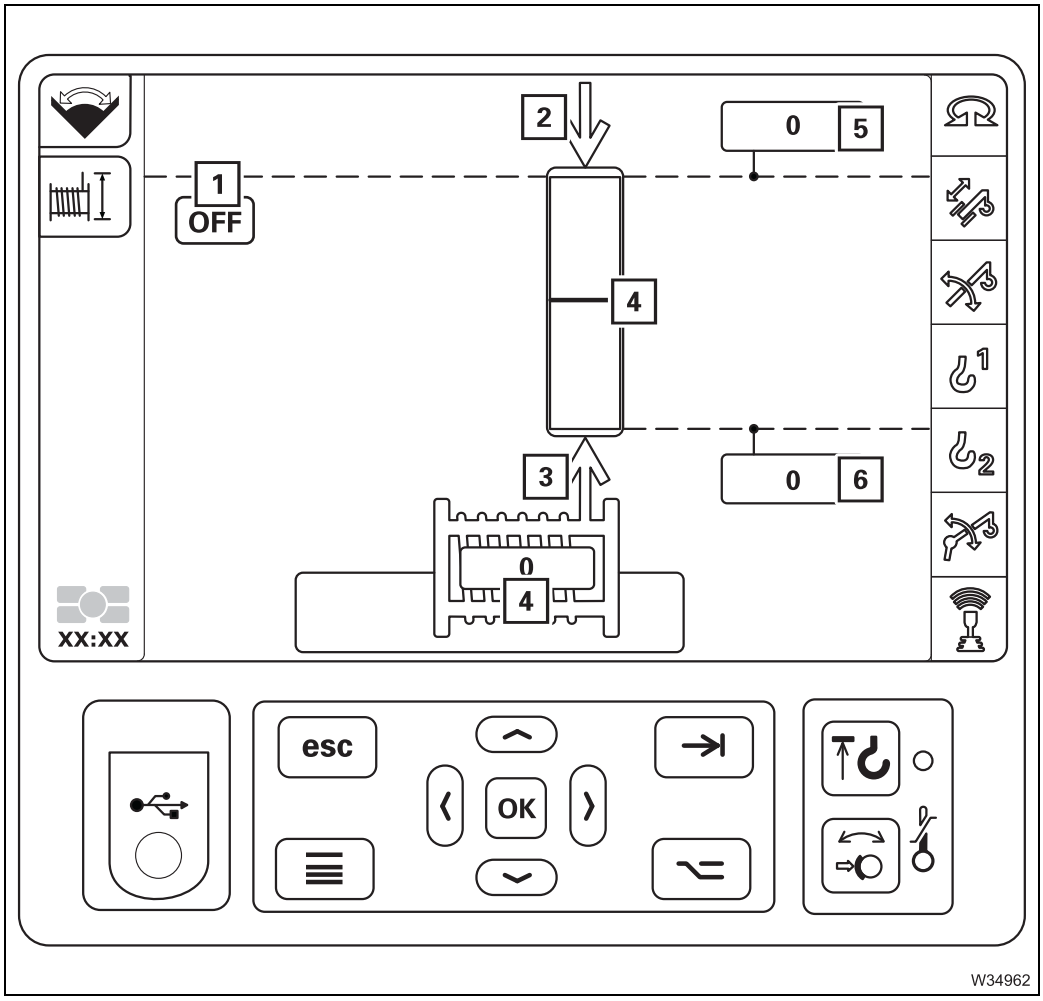
3.1 In slewing range 3 p. 9 - 134

4.1 In slewing range 4 p. 9 - 134

1	Slewing gear/movements locked display	p. 9 - 101
2	Parking brake/movements locked display/warning	p. 9 - 101
3	Suspension on/off display/warning	p. 9 - 101
4	Pre-select front left outrigger display	p. 9 - 102
4.1	Pre-select front left outrigger	p. 9 - 102
5	Pre-select front right outrigger display	p. 9 - 102
5.1	Pre-select front right outrigger	p. 9 - 102
6	Pre-select rear left outrigger display	p. 9 - 102
6.1	Pre-select rear left outrigger	p. 9 - 102
7	Pre-select rear right outrigger display	p. 9 - 102
7.1	Pre-select rear right outrigger	p. 9 - 102
8	Current inclination display	p. 9 - 108
9	exiting the menu	p. 9 - 102
10	Switching to the Outrigger cylinders menu	p. 9 - 102
11	Outrigger control units on/off	p. 9 - 102
12	Outrigger lighting on/off	p. 9 - 101

1	Enter slewing range	p. 9 - 136
2	Input front left outrigger span	p. 9 - 139
3	Input front right outrigger span	p. 9 - 139
4	Input rear left outrigger width	p. 9 - 139
5	Input rear right outrigger width	p. 9 - 139
2 to 5	Outrigger span monitoring display	p. 9 - 139
6	Enter counterweight	p. 9 - 136
7	Enter reeving – Main hoist	p. 9 - 137
8	Enter reeving – Auxiliary hoist	p. 9 - 137
9	Reeving input mode display	p. 9 - 137
10	Counterweight display	p. 9 - 136
11	Accept the measured outrigger span	p. 9 - 139
12	Pre-selection telescoping menu	p. 9 - 42
13	Preselected telescoping display	p. 9 - 137
14	Confirming the rigging mode	p. 9 - 137

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 - 145

5 – *Raise* limit value display
– Accepting limit value

6 – *Lower* limit value display
– Accepting limit value

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

Displays for the extended emergency operation

These displays are primarily intended for service personnel and are therefore only mentioned in this operating manual and are not described in more detail.

7 – Telescoping cylinder locked
– Telescopic section unlocked

8 – Telescoping cylinder locked
– Telescopic section locked

9 – Telescoping cylinder unlocked
– Telescopic section locked

10 Telescoping cylinder in the foot section

11 Left telescoping cylinder unlocked

12 Right telescoping cylinder unlocked

13 Telescoping cylinder just before the locking point

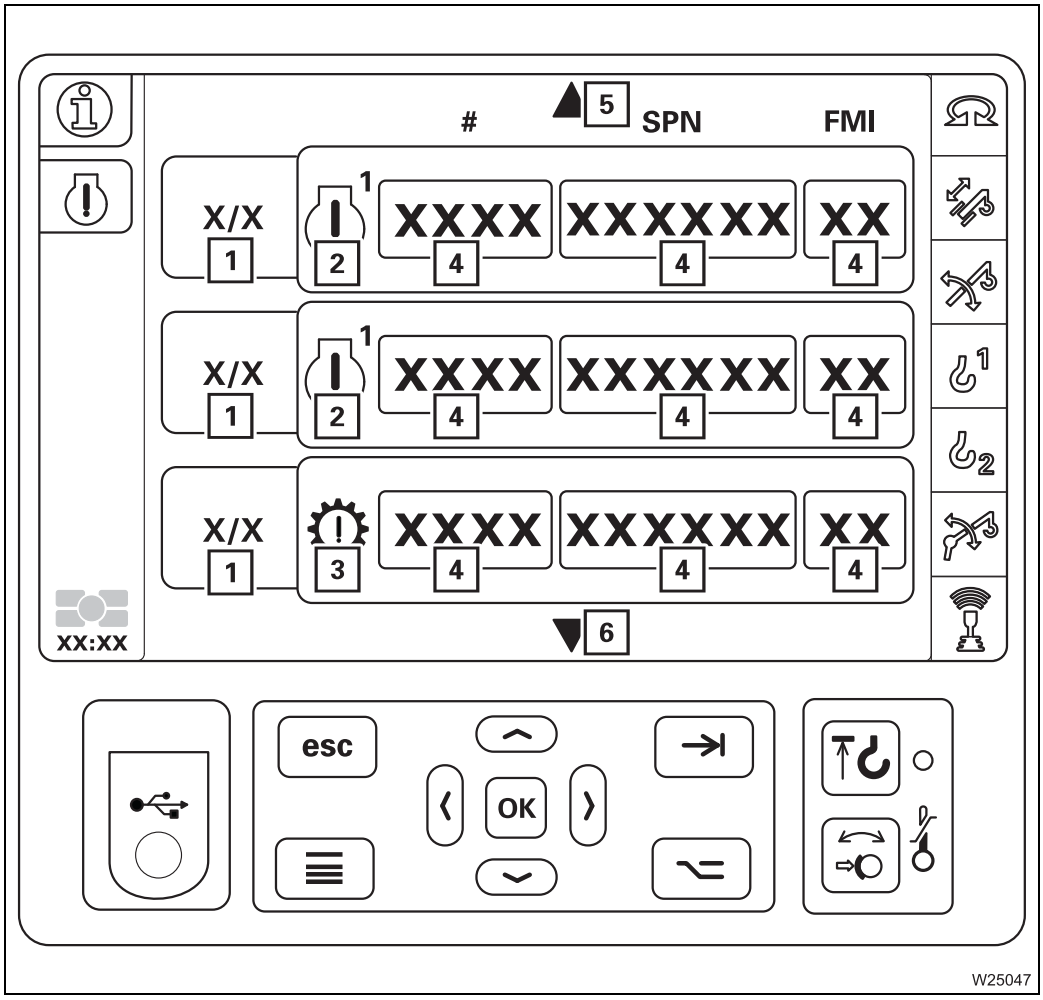
14 Telescoping cylinder just behind the locking point

The following applies to all displays

– **Grey:** Described position not reached
– **Coloured:** Described position reached

Engine/ transmission error menu

This is operated in the same way as in the driver's cab.

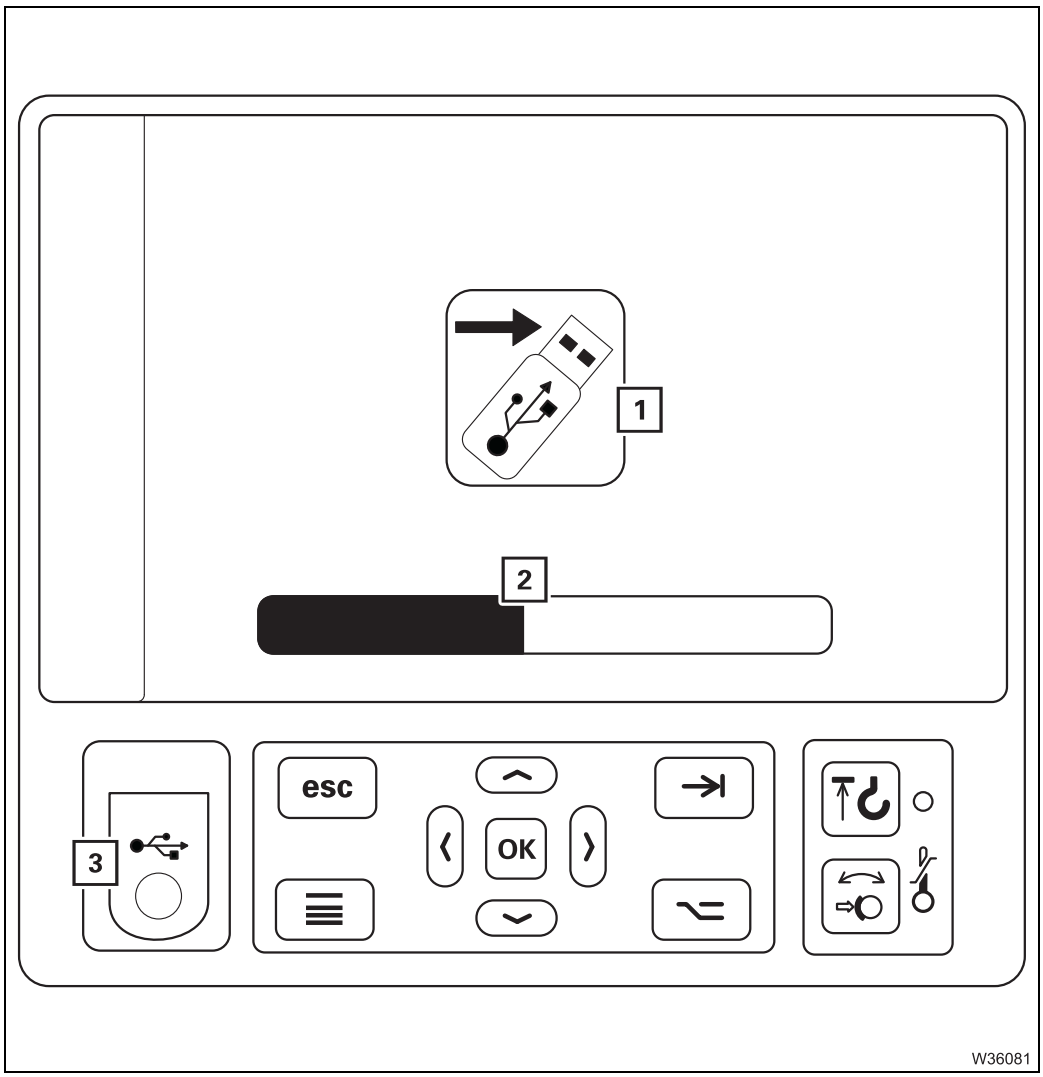


W25047

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

➠ p. 14 - 8

Datalogger menu



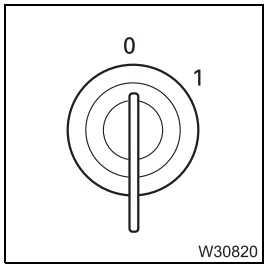
1 Export data p. 9 - 142
2 Display of export progress p. 9 - 142
3 USB connection for data export p. 9 - 142

9.2.3 Engine

Side panel

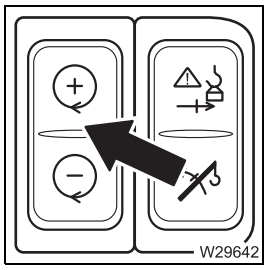
➠ *Starting the engine – from the crane cab*, p. 10 - 3.

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

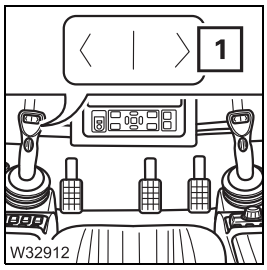
Set idling speed

– The engine is running:

- **– Press up:** Increase idling speed
- **– Press down:** Decrease idling speed,
  engine cutout after about 6 seconds.

➠ p. 10 - 9

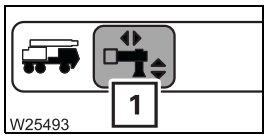
Left control lever



– The engine must be off:

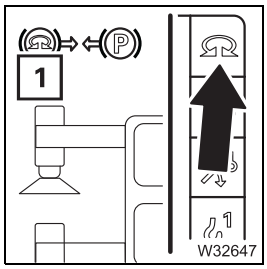
- **– Press and keep depressed:** Engine starts,
  Idling speed = standard

CCS display



Outrigger menu

– **Opening:** Select and confirm symbol (**1**)

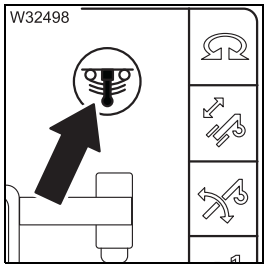


Slewing gear/movements locked display

– **Red:** Slewing gear switched off – symbol (**1**) out

– **Green:** Slewing gear switched on – outrigger movement disabled – symbol (**1**) is displayed

➠ p. 12 - 45

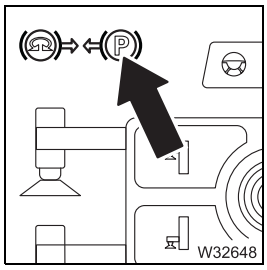


Suspension on/off display/warning

– **Red:** Suspension is switched off

– **Green:** Suspension switched on – outrigger movement disabled – symbol is displayed

➠ p. 12 - 45

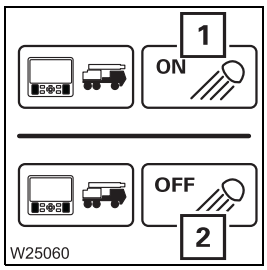


Parking brake/movements locked display/warning

– **Red:** Parking brake released – outrigger movements locked

– **Out:** Parking brake applied – outrigger movements enabled

➠ p. 12 - 45

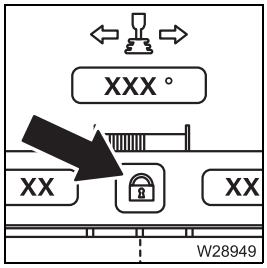


Outrigger lighting on/off

– **Switch on:** Select symbol (**1**) and confirm – symbol *ON* is displayed

– **Switch off:** Select symbol (**2**) and confirm – symbol *OFF* is displayed

➠ p. 12 - 45



Automatic mode, rigging

– Display

Yellow: Recognition that the counterweight is rigged

Flashing: Automatic mode on

Grey: Automatic mode cancelled or
No recognition that counterweight is rigged

The superstructure is within the rigging range, the slewing gear is switched on and the lifting cylinders are retracted

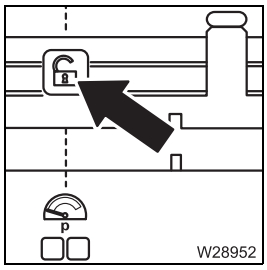
– To switch on: Select symbol and confirm – symbol flashes yellow

– To execute: Move control lever for slewing gear, automatically:
– Slewing in *Move lifting cylinders* position
– Extend lifting cylinders,

Move the control lever for slewing gear in indicated direction, automatically:
– Slewing in *Lift/lower counterweight* position,
– Lift counterweight,
– Pre-tension counterweight.

Automatic mode ends – symbol yellow

p. 12 - 105



Automatic mode, unrigging

– Display

Yellow: Recognition that the counterweight is unrigged

Flashing: Automatic mode on

Grey: Automatic mode cancelled or no recognition that the counterweight is unrigged

The superstructure is within the rigging range and the slewing gear is switched on

– To switch on: Select symbol and confirm – symbol flashes yellow

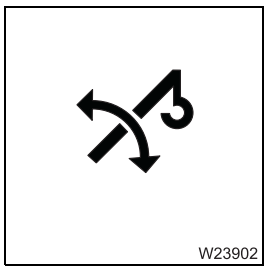
– To execute: Move control lever for slewing gear, automatically:
– Slewing in *Lift/lower counterweight* position,
– Lower the counterweight,

move the control lever for slewing gear in indicated direction, automatically:
– Slewing in *Move lifting cylinders* position,
– Retract the lifting cylinders,

Automatic mode ends – symbol yellow

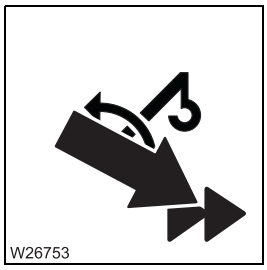
p. 12 - 107

CCS display



Power units display

- **Green:** Derricking gear on
- **Red:** Derricking gear off

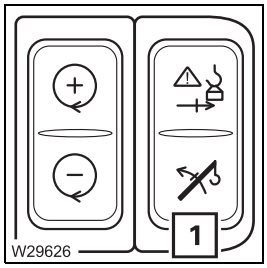


High-speed mode inspection derricking gear

- **On:** High-speed mode on
- **Out:** High-speed mode off

➠ p. 11 - 113

Side panel

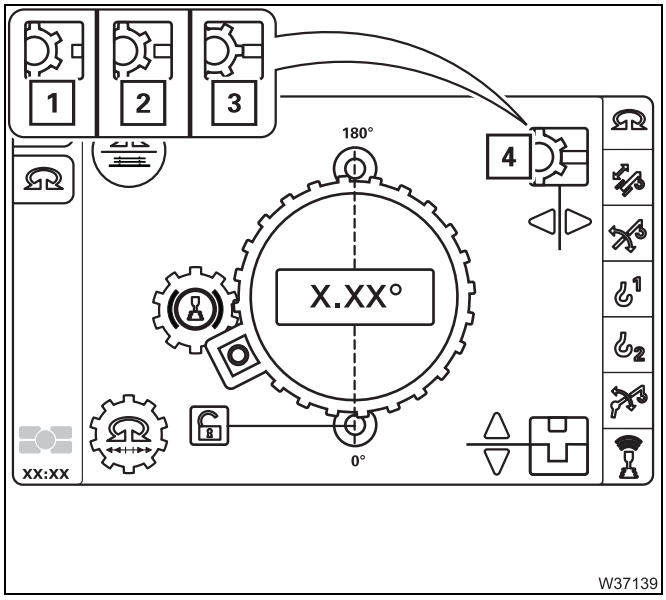


1 Raise enable button after RCL shutdown

RCL override – version A; ➠ p. 9 - 143.

RCL override – version B; ➠ p. 9 - 144.

Houselock *Switching the houselock on/off*, p. 11 - 17.



Locking status displays

The current position of the locking pin is shown by different symbols:

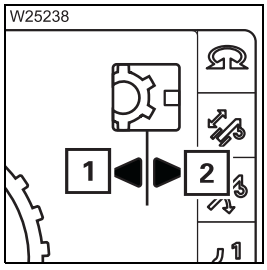
1 Unlocked

2 Intermediate position

3 Blocked, locking pin in front of a tooth

4 Locked

p. 11 - 17



House lock on/off

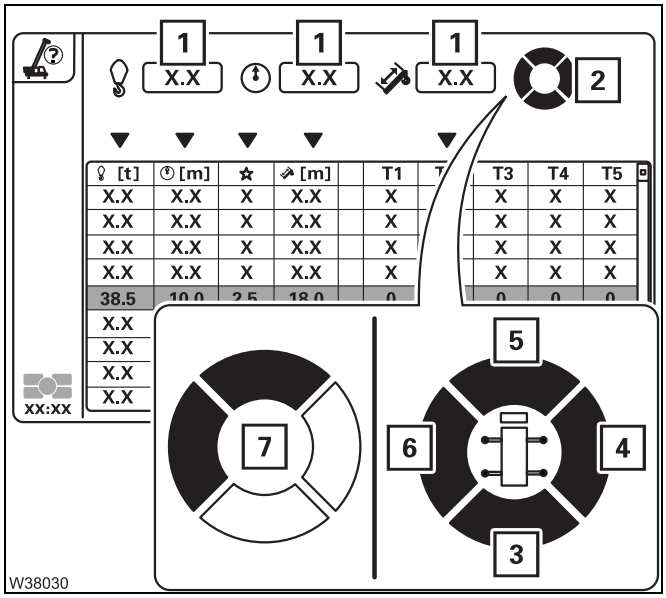
Switch on: Symbol (**1**) – Pin extends

Switch off: Symbol (**2**) – Pin retracts

p. 11 - 17

In the *Pre-selection telescoping menu*

➠ *Pre-selecting telescoping*, p. 11 - 40

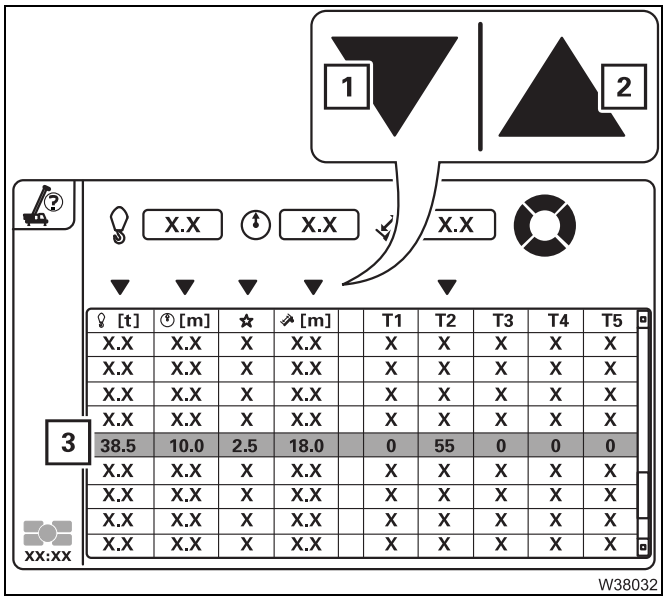


Enter desired parameter

In input mode – select and confirm parameters (**1**), (**2**).

- **1** Selection of numerical values
- **2** Selection by marking the segments – marked segments are black
  - **3** Backwards
  - **4** To the right
  - **5** Forwards
  - **6** To the left
  - **7** Example for selecting the slewing range to the front and to the left

The corresponding table is displayed.



Pre-selection telescoping

Table sorted by columns – select and confirm the desired symbol.

- **1** Descending sorting
- **2** Ascending sorting

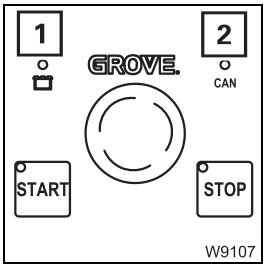
During the telescoping duration, the required telescoping times are compared and provided with values between 1 (shortest time) and 5 (longest time).

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 - 40

Engine control panel

➠ *Starting the engine – with the hand-held control*, p. 10 - 10

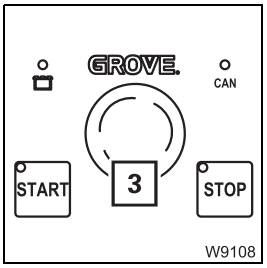


1 Voltage monitoring

- **On:** Switch the ignition on
- **Out:** Switch the ignition off

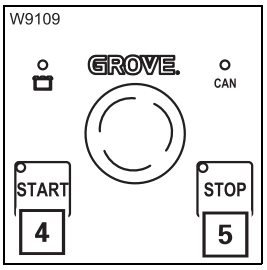
2 CAN monitoring

- **On:** Hand-held control connected – no malfunction – goes out after 20 seconds
- **Flashing:** Hand-held control connected – malfunction



3 Emergency stop switch
May only be used in an emergency

- **Press:** Engine off – crane functions stop immediately, Switch latches
- **Turn the latched switch:** Switch returns to initial position – crane functions released



4 START engine

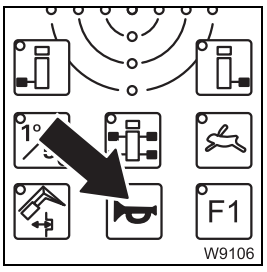
- **Press once:** Engine on

5 STOP engine

- **Press once:** Engine off

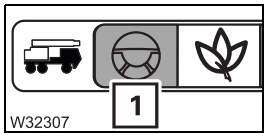
Horn

The ignition must be switched on.



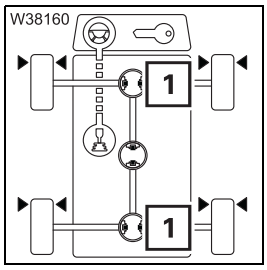
- **Press:** Hand-held control on the superstructure socket – superstructure horn on

9.3.3 Final drive



Driving **menu**

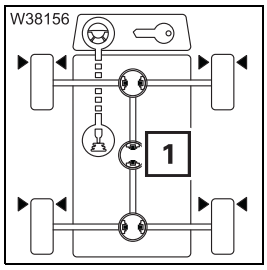
Opening: Select symbol (**1**) and confirm – menu is opened



Transverse differential locks on/off

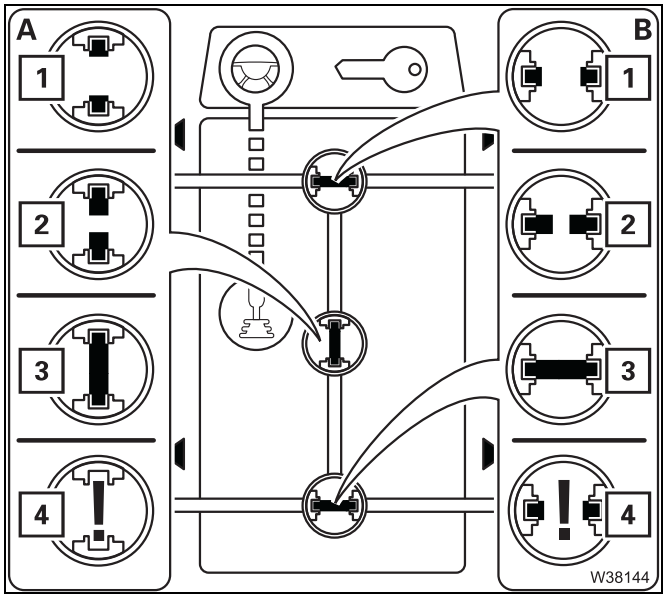
- **Switch on:** Select symbol (**1**) and confirm – symbol is **red**
- **Switch off:** Select symbol (**1**) and confirm – symbol is **green**

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

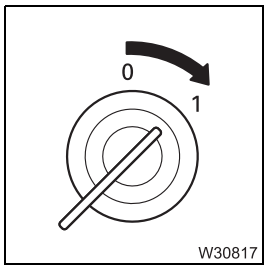
The current status is shown using different symbols:

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

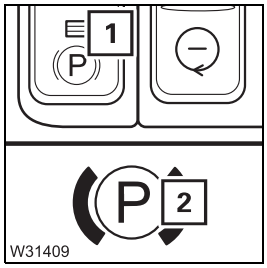
➠ p. 13 - 30

10.2.3 Switching the ignition on

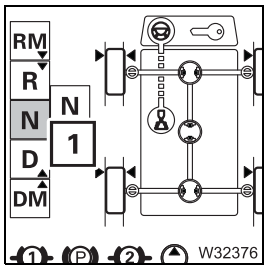
Do not start the engine until the *CCS* display shows a menu (usually the *Enter rigging mode* menu).



- Turn the ignition key to position **1**.
  The ignition is switched on:



– The vehicle parking brake must be engaged. The lamp (**1**) lights up – symbol (**2**) – **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.

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

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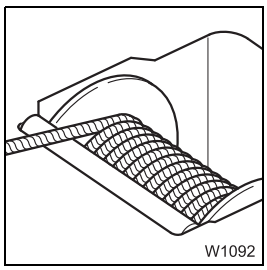
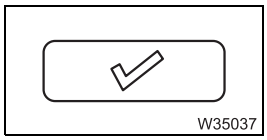
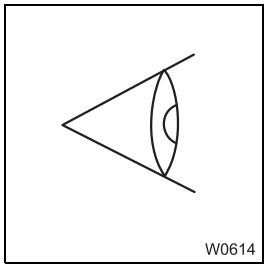


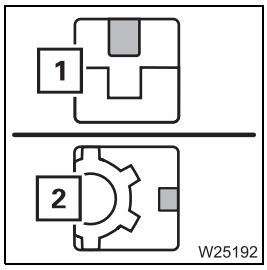
9. Check the position of the hoist ropes; ➠ p. 11 - 6.



10. Compare current rigging mode with the *RCL* display – enter and confirm current rigging mode, if necessary; ➠ p. 11 - 32.

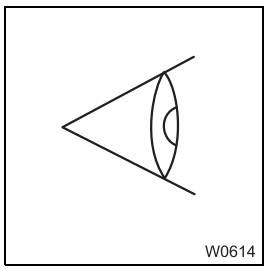


11. Check telescoping; ➠ *Inspections prior to starting operations*, p. 11 - 97.



12. – Switch off the slewing gear for 0° and 180° working positions – symbol (**1**) **red**; ➠ p. 11 - 120.

– Switch off houselock (if fitted) for other working positions – symbol (**2**) **red**; ➠ p. 11 - 19.



13. Check the electrical system for correct operation; ➠ p. 11 - 7.

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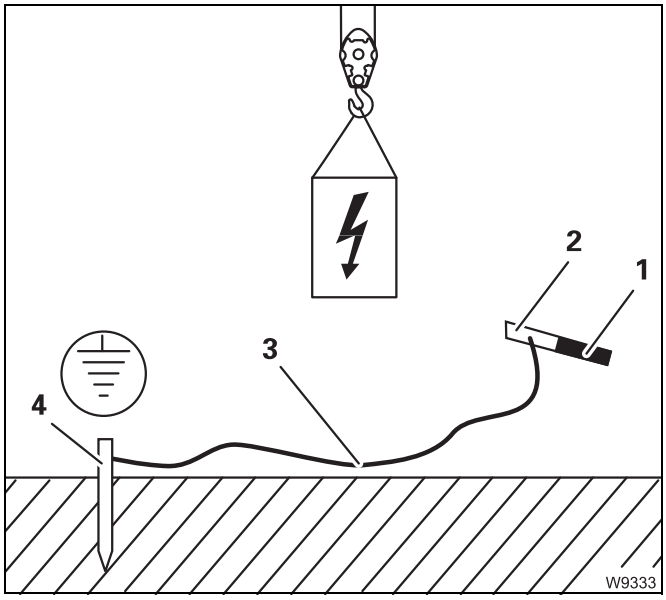
11.1.5 Earthing the load

Even if the truck crane is already earthed (➠ p. 12 - 15), the load may become charged with static electricity. For example, if a hook block with synthetic sheaves or non-conducting sling gear is used.

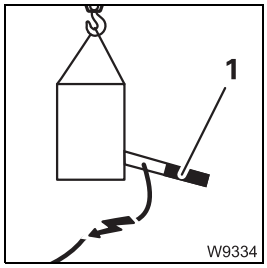
Risk of accident due to electric shock
Always earth the load before operating the crane
– Near strong transmitters (radio transmitters, radio stations, etc.)
– Near high-frequency switchgears
– If a thunder storm is forecast.
If the load is charged with static electricity, you must always earth the load before touching it.



Use electrically conducting material for earthing.

- Hammer a metal rod (**4**) (length approx. 2.0 m (6.6 ft)) at least 1.5 m (5 ft) deep into the ground.
- For better conductivity, dampen the soil around the metal rod (**4**).
- Clamp an insulated cable (**3**) to the metal rod (**4**) (cross-section of at least 16 mm^2 (0.025 in^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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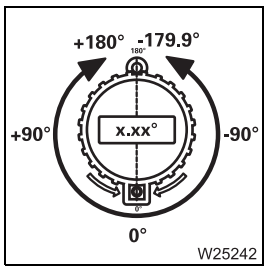
11.3 MAXbase slewing range type

This slewing range type is available in addition to the *Standard* slewing range type; ➠ *Permissible slewing ranges and working positions*, p. 11 - 21. You must decide between the two slewing range types when entering the rigging mode.

Lifting capacity tables with different, variable outrigger spans are available for the *MAXbase* slewing range type. These additional lifting capacity tables are supplied in digital form with the truck crane and can be shown as a diagram on the display in the crane cab.



The designation of the slewing angle always relates to the starting point 0° to the rear. A full turn from this working position is divided into two semi-circles.

– When slewing **clockwise** the slewing angle is displayed as a **positive** value (0° to +180.0°).

– When slewing **anticlockwise** the slewing angle is displayed as a **negative** value (0° to -179.9°).

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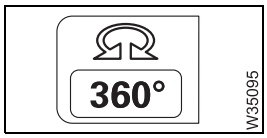
Enter the slewing range type

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.



– **Slewing range type** ***Standard***
The standard lifting capacity tables provided in printed form with the truck crane apply. All rigging modes listed there can be entered.
  – The rigging mode can be specified via entry of the reeving and RCL code or via the individual components.
  – In the case of individual components, the outriggers are always entered as complete outrigger span.
  – In the case of individual components, the slewing range is entered according to the *Lifting capacity table*.

An overview of all enabled Standard outrigger spans is provided in the section *Outriggers*; ➠ *Supplied operating manual*.

– **Slewing range type** ***MAXbase***
The MAXbase tables apply, which are only provided in digital form due to the wide diversity of configurations. All rigging modes listed there can be entered.
  – The rigging mode is entered via the individual components.
  – The outriggers are entered as individual widths for each outrigger beam.
  – The enabled slewing range is displayed, divided into four areas with different lifting capacities.

An overview of all enabled MAXbase outrigger spans is provided in the section *Outriggers*; ➠ *Supplied operating manual*.

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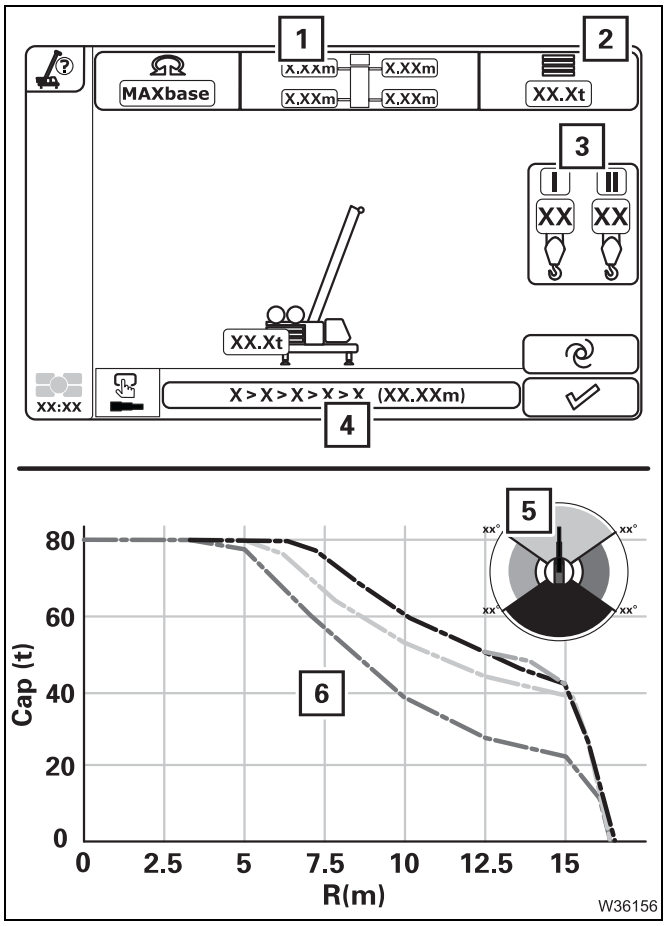
Risk of accident due to incorrectly supported truck crane!
A shutdown is not initiated as standard when an outrigger span monitoring error message is issued. When an error message is displayed, compare the rigged outrigger span with the required outrigger span and rig the required outrigger span.
This 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 - 41.

- Check whether 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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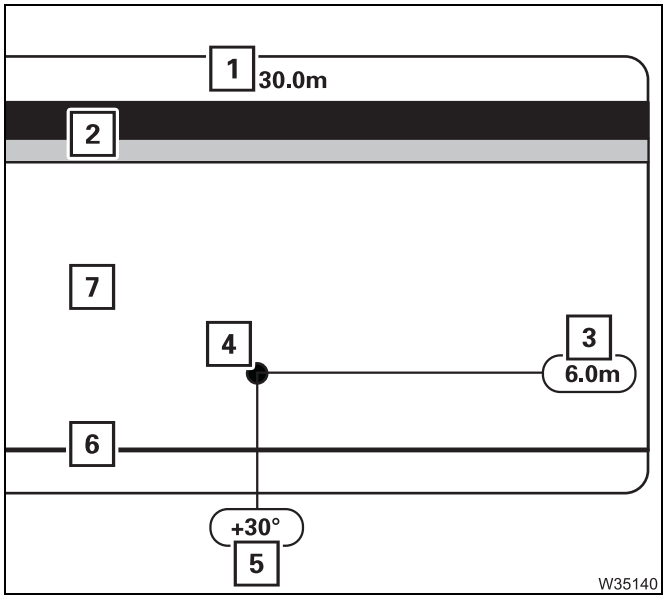
On the *CCS*display After confirming a permissible rigging mode, the *Start menu* opens automatically.

Slewing range type *Standard*

If the *MAXbase* slewing range type has been entered; ➠ p. 11 - 55.

The RCL display differs according to the confirmed slewing range.



360° slewing range

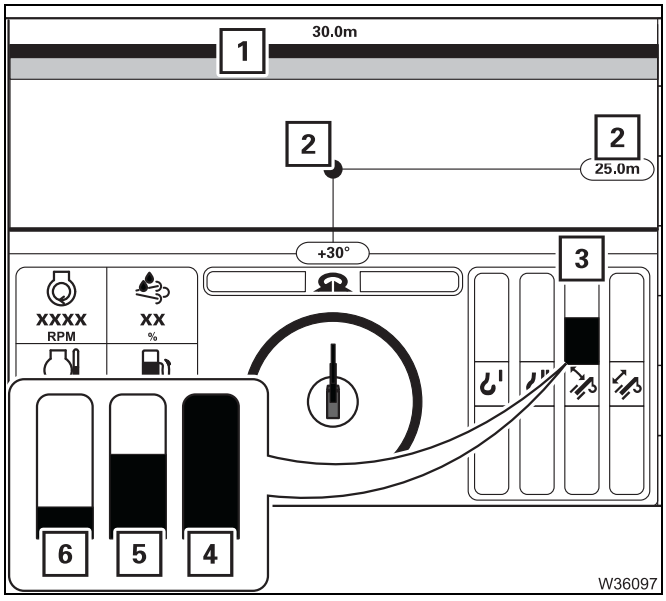
The diagram (**7**) covers the entire width. The height of the diagram corresponds to the maximum permissible working radius (**1**), for example, 30 m (100 ft).

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, for example +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%

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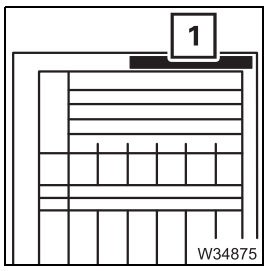
11.4.10 RCL override – version A



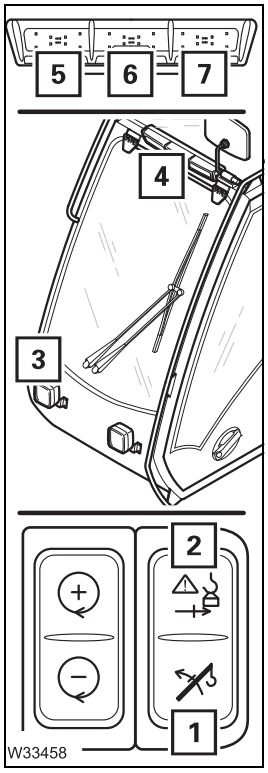
This section applies only when the supplied *Lifting capacity table* contains the entry *EN 13000* in the header (**1**).

In the case of other entries; ➠ *RCL override – version B*, p. 11 - 67.

If the RCL is overridden, the crane operation is not monitored and the switched off crane movements are enabled again. Once the RCL is switched off, there are three options for overriding.

- **During rigging**, you can override the RCL shutdown or the lifting limit switch for rigging work; ➠ *When rigging*, p. 11 - 64.
- **You can release the raise boom function to leave** the shutdown area; ➠ *To raise the boom*, p. 11 - 65.
- **In an emergency** you can override the RCL shutdown completely; ➠ *In emergencies*, p. 11 - 66.

Overview status display



The lamps (**5**) to (**7**) of the status display (**4**) light up or flash depending on the RCL degree of utilisation and button confirmations.

Switch pressed	Degree of utilisation		
	0-90%	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

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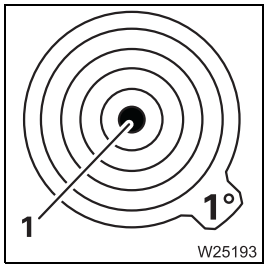
11.5 Crane operation with main boom

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 - 60.

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 - 60.

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 to electrical cables; ➠ *Safe distance from overhead power lines*, p. 12 - 16.

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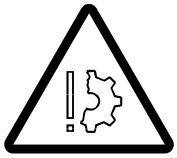
Lifting limit switch override

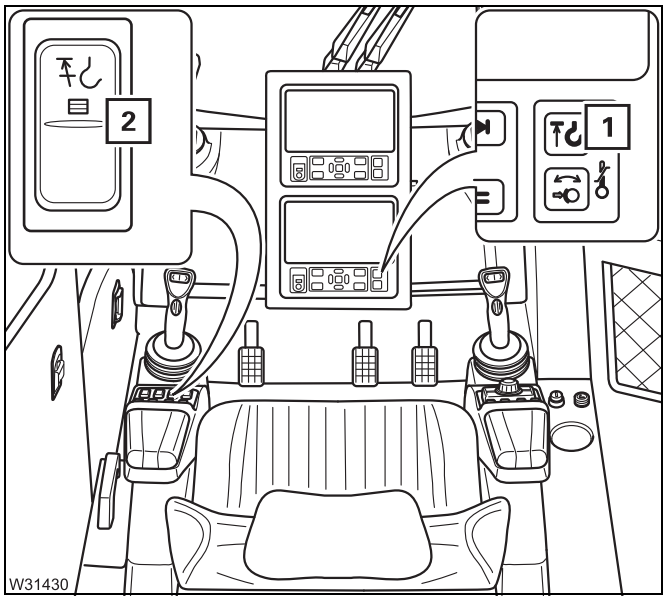
When overriding, the shutdown of the lifting limit switch is cancelled and the crane operation is no longer completely monitored.

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 gaps in monitoring
If the lifting limit switch is overridden, crane operation is no longer completely monitored.
When hoisting the lifting limit switch weight, the crane movement will be stopped once. After moving the control lever again, the crane movement will again be enabled and will not be switched off again.



Risk of damage due to overridden slewing gear shutdown.
If the lifting limit switch has been overridden, then the load torque related shutdowns of the slewing gear will not be released (for example, if the pretensioning 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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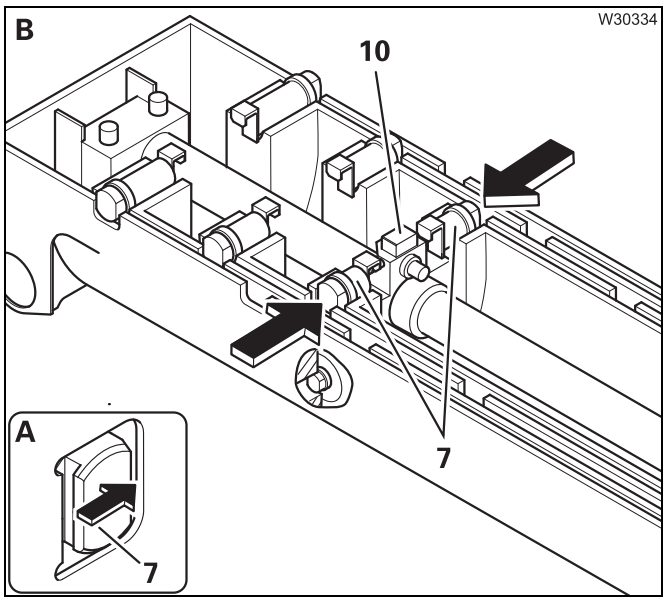
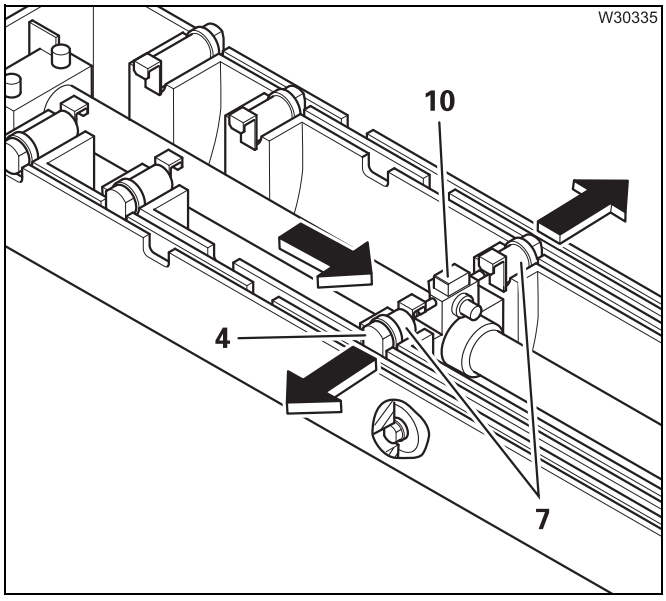


3. Unlocking the telescopic section

(A) – The telescoping cylinder extends until the locking pins (**7**) are clear.

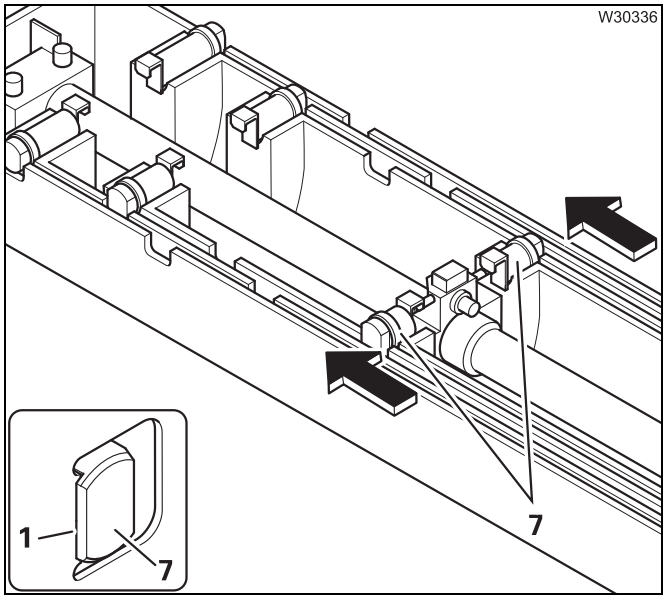
(B) – The mechanism (**10**) retracts the locking pins (**7**) – the telescopic section is unlocked.



4. Telescoping, locking and setting down a telescopic section

The telescoping cylinder pushes the telescopic section to a locking point.

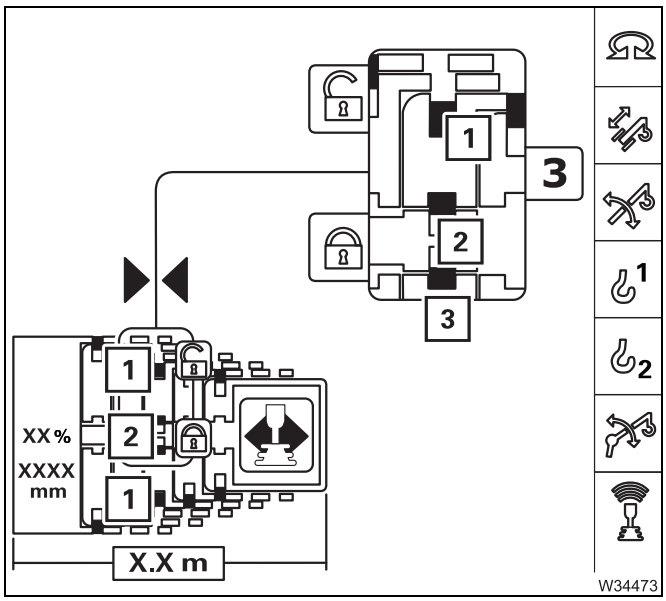
The weight is taken off the mechanism (**10**). The locking pins (**7**) extend into the cutouts (**4**).



The telescopic section is automatically set down.

The telescoping cylinder retracts until the locking pins (**7**) are positioned on the above telescopic section (**1**).

The weight of the load is now on the telescopic sections and not on the telescoping cylinder.



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.

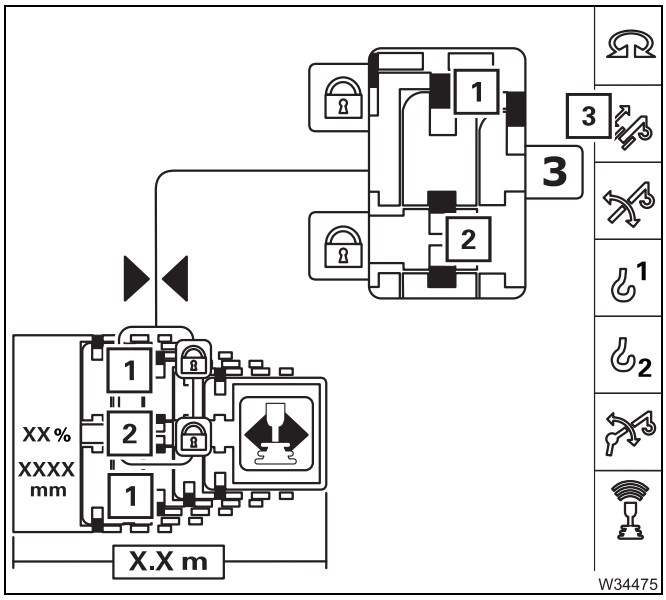
The current settings are shown in different colours.

– **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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11.5.7 High-speed mode

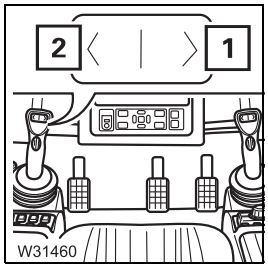
The slewing gear cannot be operated in high-speed mode.

You can switch on the high-speed mode for a higher speed.

Risk of accidents due to the 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.

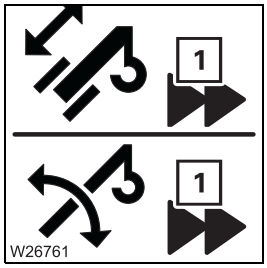


To switch on briefly

- 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:

- **On:** High-speed mode switched on
- **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.

Hoists

High-speed mode is always switched on and off simultaneously for the main hoist and the auxiliary hoist.

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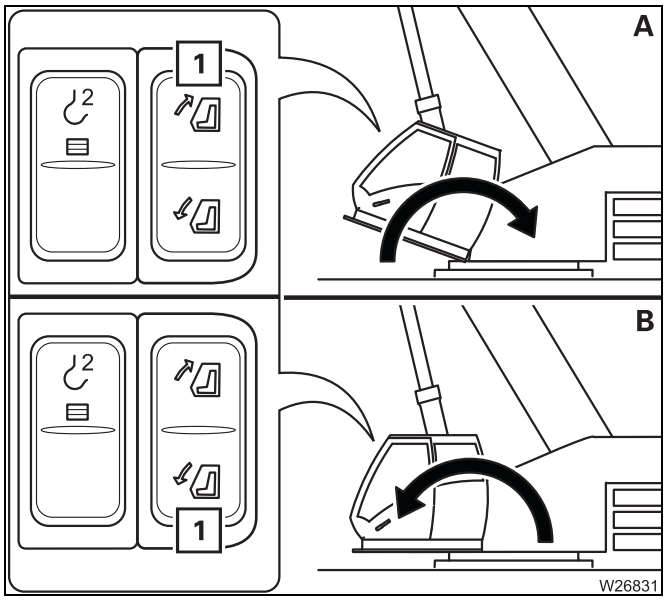
11.6 Settings and displays for crane operation

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.



(A) – Incline to the rear

- Close the crane cab door.
- Press the button (**1**) in at the top.

(B) – Incline to the front

- Close the crane cab door.

The crane cab will tilt as long as you hold the button down or until its end position is reached.

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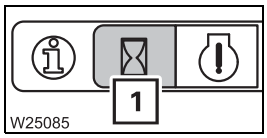
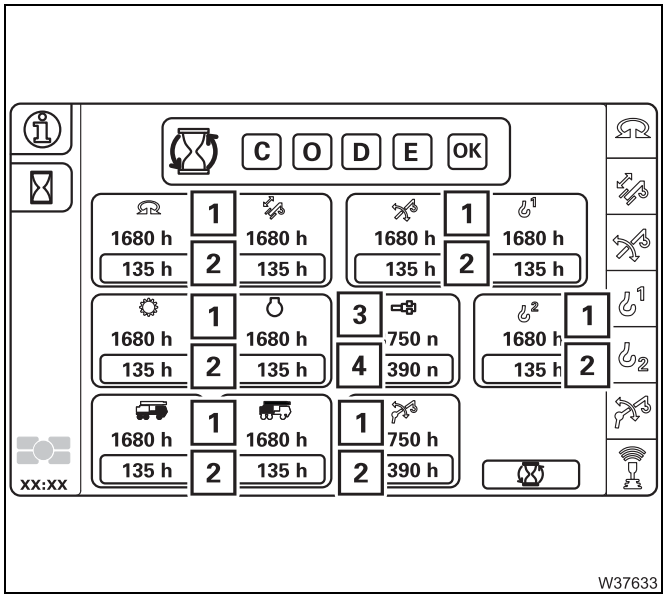
11.6.10 Displaying the operating hours

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



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



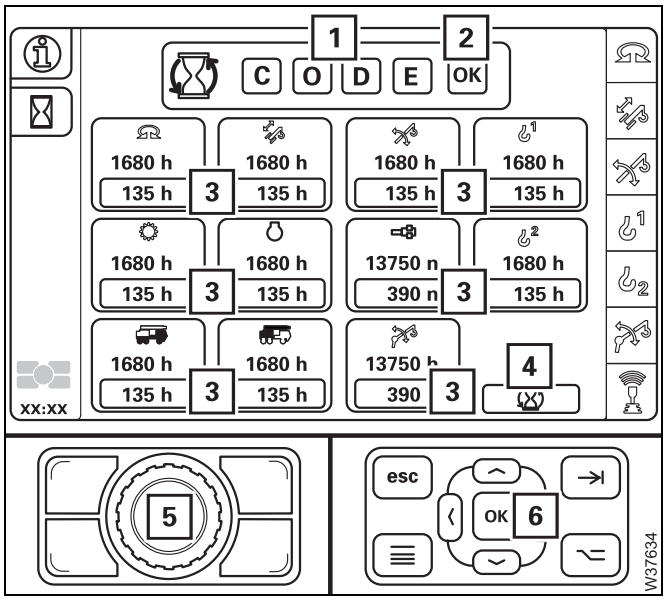
Displays

– 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 performed, for example, 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 individually select power units
– display (**3**) or

– select all – symbol (**4**).

- Reset the selected operating hours with button (**5**) or (**6**).

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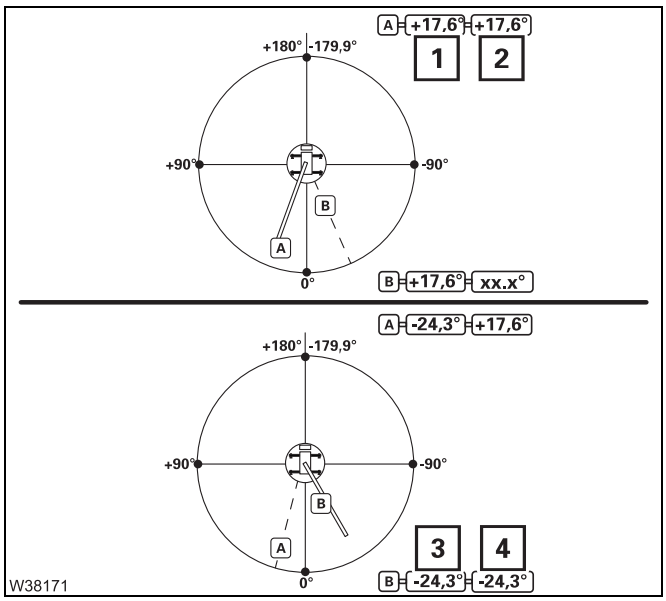


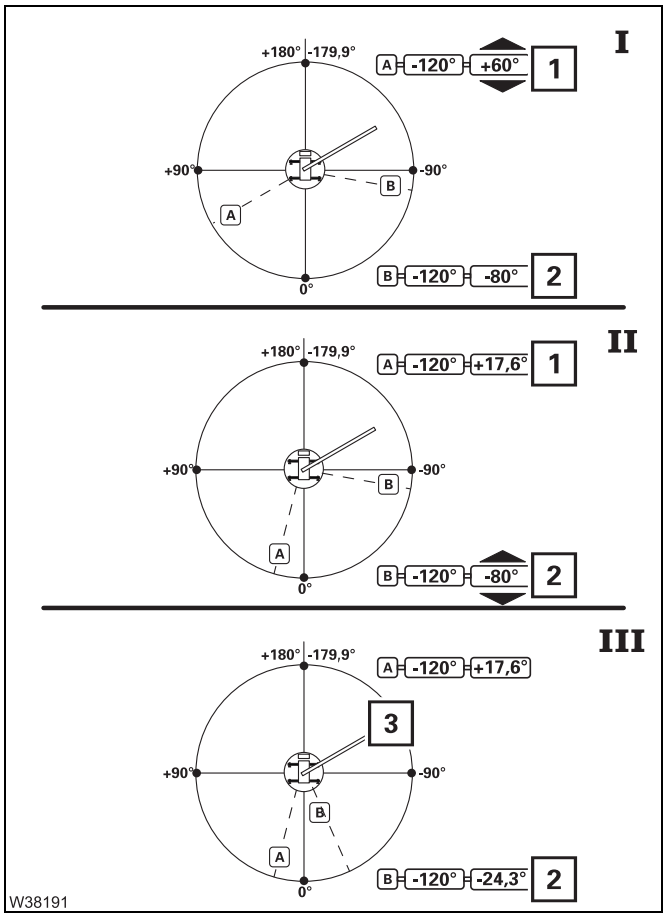
Accepting limit value

– 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**).
- (**II**) – Enter the limit value, for example, +17.6° and confirm the input. Display (**1**) shows the newly inputted limit value.

– Slewing angle B

- (**II**) – Select and confirm the display (**2**).
- (**III**) – Enter the limit value, for example -24.3° and confirm the input. Display (**2**) shows the newly inputted limit value.

The current slewing angle (**3**) shows the current position to the shutdown range.

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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:

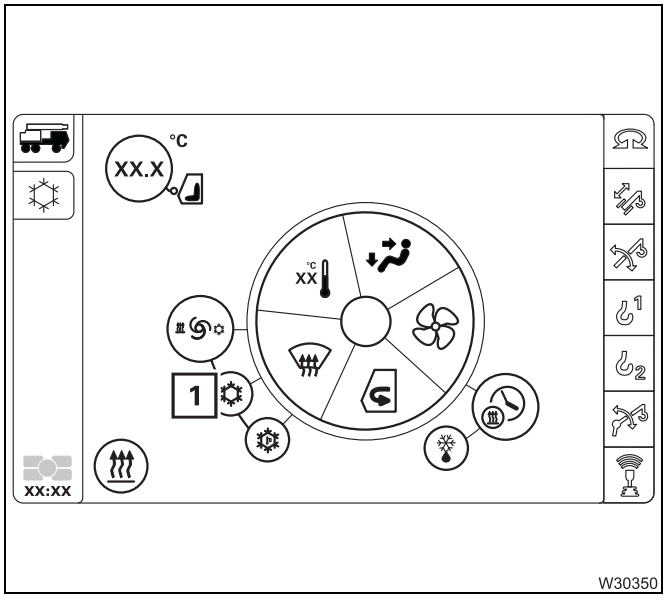
If the truck crane has been exposed to strong sunlight for a long period of time, for example, the air-conditioning system should initially be operated at the highest blower level with the engine running.
The door or at least the windows should be left open for a short while to thoroughly air the cab.

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/off

- Start the engine. The air-conditioning operates only when the engine is running.



Switching on

- Select and confirm the symbol (**1**)
  – symbol is **red**

Switching off

- Select and confirm the symbol (**1**) again – symbol is **grey**

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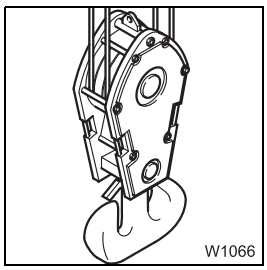
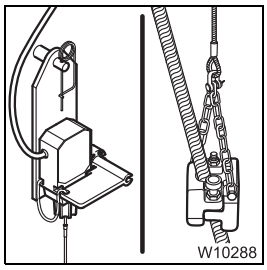
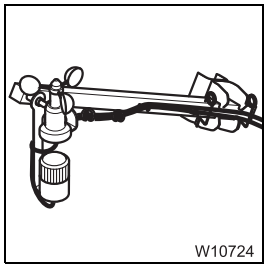


19. Pick up the hook block and re-reeve the hoist rope, if necessary;

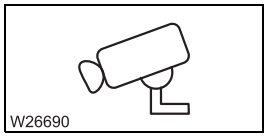
- *Hook block on a separate vehicle*, p. 12 - 117,
- *Hook block on the bumper*, p. 12 - 115,
- *Reeving and unreeving the hoist rope*, p. 12 - 124.



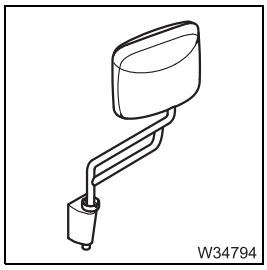
20. Install lifting limit switch; p. 12 - 139.



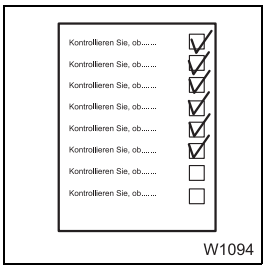
21. Install the anemometer and if necessary the air traffic control light; *Anemometer and air traffic control light*, p. 12 - 145.



22. Install the camera on main boom if required; *Cameras for crane operation*, p. 12 - 152.



23. Fold out and adjust all mirrors for crane operation; p. 12 - 150.



24. Perform all the required checks prior to crane operation;
CHECKLIST: Checks before operating the crane, p. 11 - 1.

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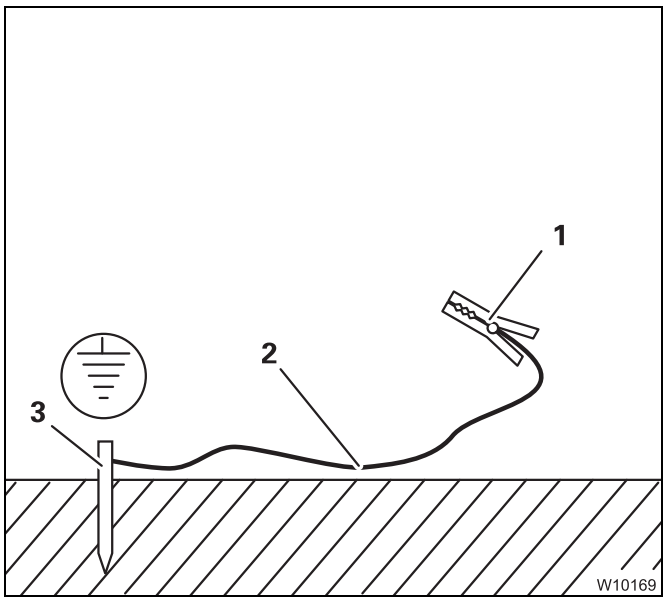
12.2.3 Earthing the truck crane

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).

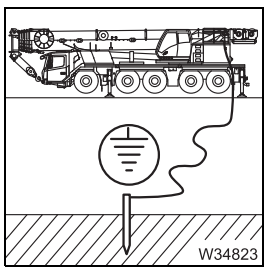
Risk of accident due to electric shock
Earth the truck crane before you start to work with it
– Near strong transmitters (radio transmitters, radio stations, etc.)
– Near high-frequency switchgears
– If a thunder storm is forecast



Use electrically conducting material for earthing.

- Hammer a metal rod (**3**) (length about 2.0 m (6.6 ft)) at least 1.5 m (5 ft) into the ground.
- For better conductivity, dampen the soil around the metal rod (**3**).
- Clamp an insulated cable (**3**) to the metal rod (**2**) (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 the superstructure.

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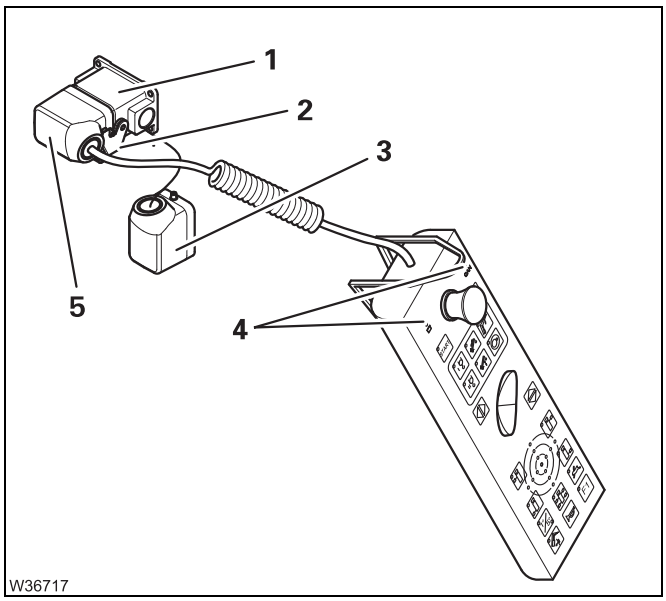
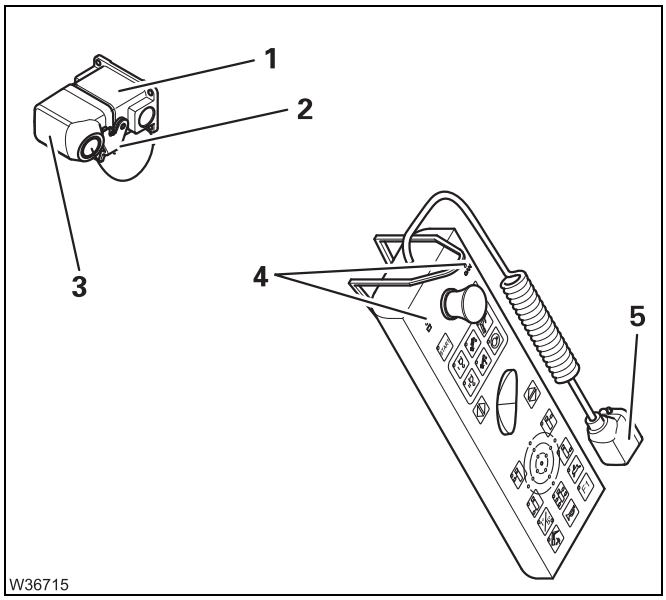


Connect the hand-held control

- 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 cap (**2**).
- After approx. 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.

Danger due to unauthorised use
Always stow the hand-held control in the driver's cab or in the crane cab before you leave the crane, and lock the doors.
This way you can prevent unauthorised persons starting the engine.



Disconnecting the hand-held control

- Open the cap (**2**).
- 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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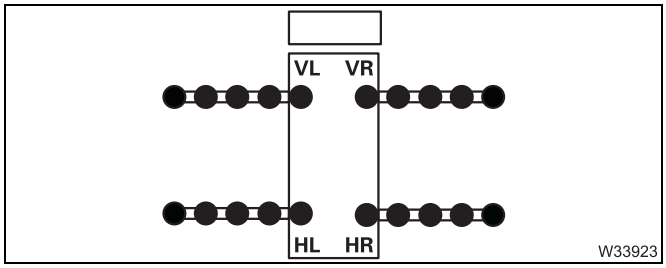
12.7.2 Representation in the lifting capacity tables

The outrigger span is always specified in this form

Outrigger length xxxx – outrigger width yyyyy

– The value **xxxx** is always 8.030 m (26.3 ft).

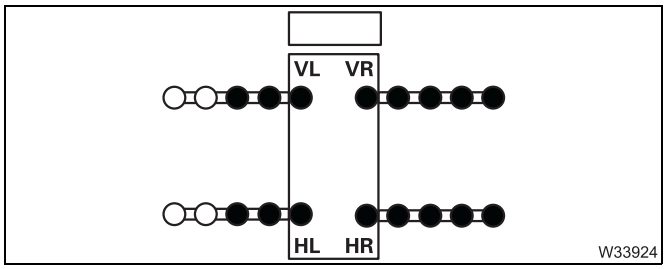
– The value **yyyy** depends on the type of outrigger span.
A distinction is made between four types.



Symmetrical

The outrigger width is the same for all outrigger beams. The overall width is entered once. For example

Outrigger width	**7.600 m (24.9 ft)**

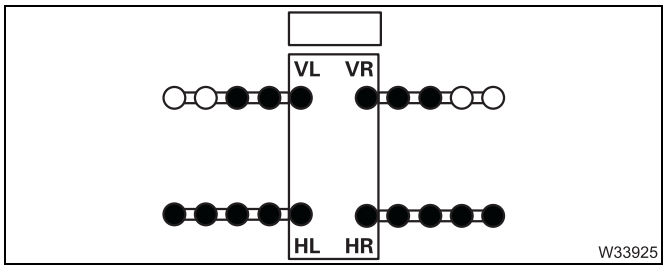


Right / Left

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	**3,800 + 2,950 m (12.5 + 9.7 ft)**
Rear outrigger span	**3,800 + 2,950 m (12.5 + 9.7 ft)**



Front / rear

The outrigger width is the same at the front and the same at the rear – but different between the front and rear.

The overall width is entered for the front and for the rear. For example

Front outrigger span	**5.900 m (19.4 ft)**
Rear outrigger span	**7.600 m (24.9 ft)**

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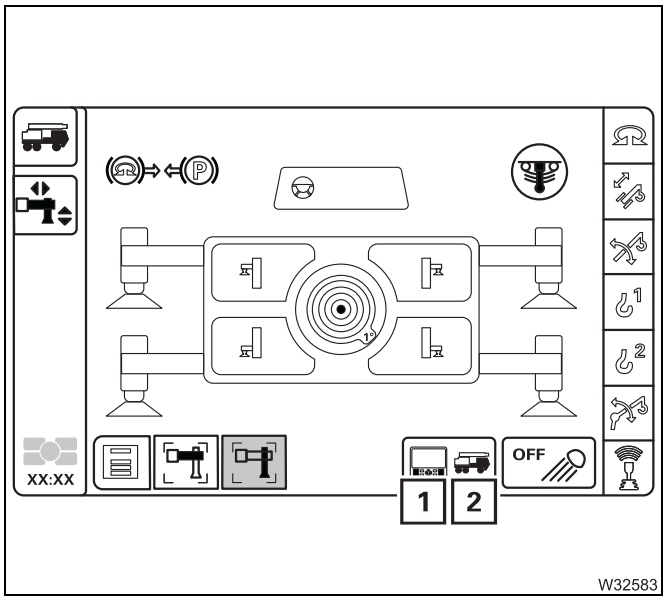
Switching the outrigger control units on/off

You can switch the *Outriggers* control units on and off from the crane cab.



The current status is displayed, either the symbol (**1**) or (**2**) **grey.**

Switch the control units on:

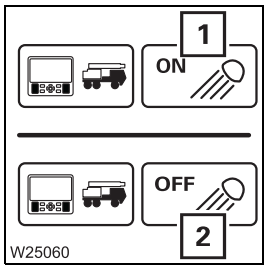
- Select and confirm the symbol (**1**) – symbol (**1**) **red** symbol (**2**) **grey**.
  – The outriggers cannot now be operated via the *CCS* display.

Switch the control units off:

- Select and confirm the symbol (**2**) – symbol (**2**) **red** symbol (**1**) **grey**.
  – The outriggers can now be operated via the *CCS* display.

Outrigger lighting on/off

You can switch the *outrigger lighting* on and off from the crane cab.



Switching on

Select symbol (**1**) and confirm – *Input mode* on

Switching off

Select symbol (**2**) and confirm – *Input mode* off.

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12.8.7 Enlarging the load-bearing area

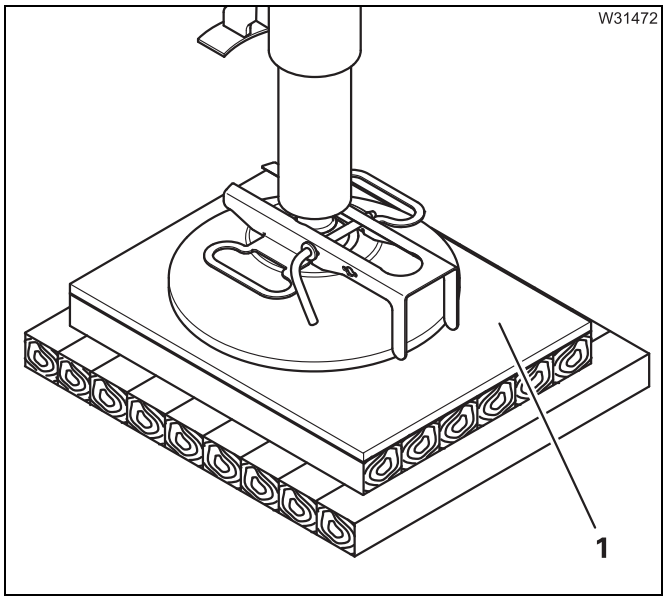
If the surface of the outrigger pads is too small, you must enlarge the load-bearing area by packing the outrigger pads; ➠ *Determining the required load-bearing area*, p. 12 - 11.

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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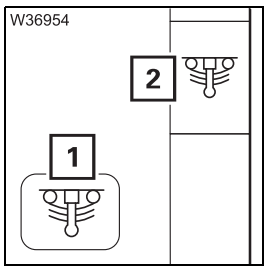
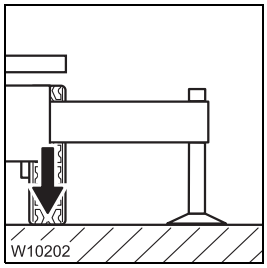
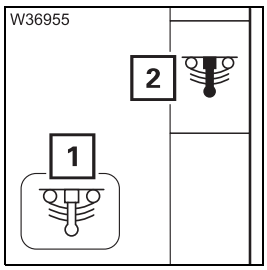


Switching on the suspension

- Select and confirm the symbol (**1**) once.
  The symbol (**2**) is **green** if the suspension is switched on.

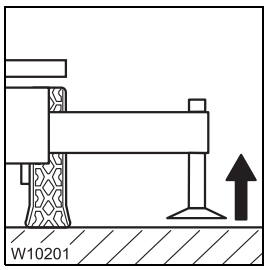


Now all wheels are lowered to the ground and are in the right position for the horizontal alignment.



Switching off the suspension

- Select and confirm the symbol (**1**) once.
  The symbol (**2**) is **red** if the suspension is switched off.



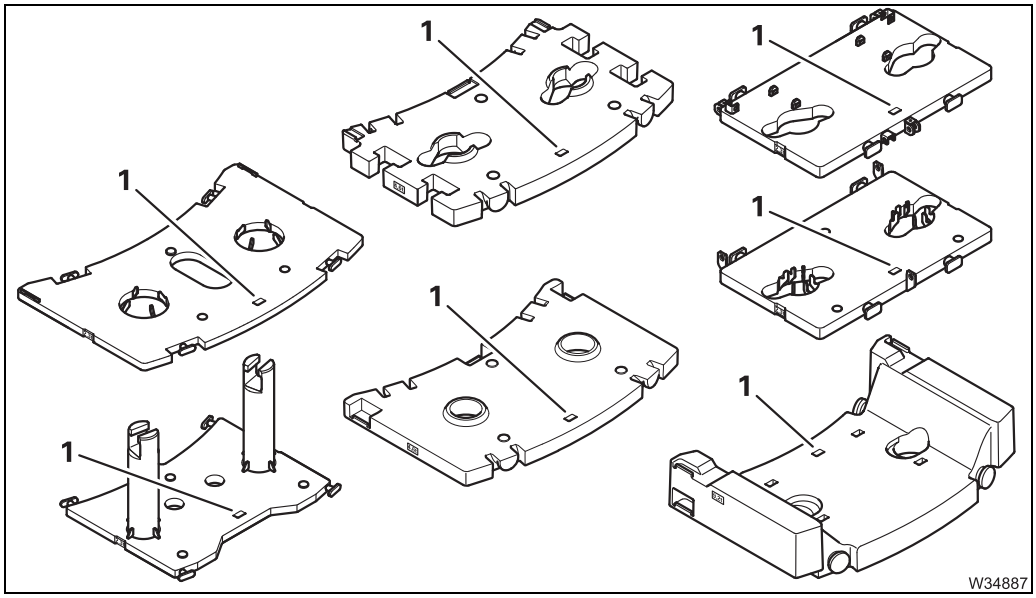
To secure the truck crane

- 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.

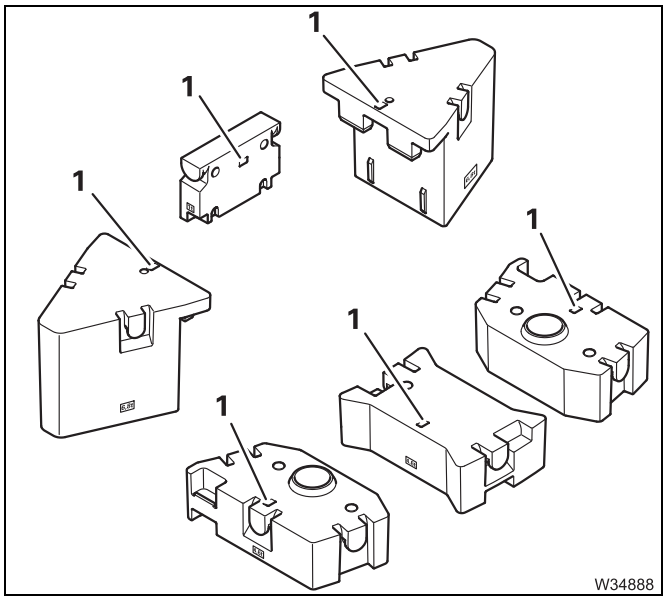
12.9.3 Identification

The truck crane and its corresponding counterweight sections are labelled with the same serial number.

Danger if counterweight sections are interchanged
Operate the truck crane only with the counterweight sections that belong to it. The truck crane and counterweight sections are labelled with the same serial number.
Other or additional counterweight sections may not be rigged.



The base plate and the counterweight sections are labelled with the serial number (**1**).



Depending on the version, other counterweight sections, e.g. blocks, are labelled with a serial number (**1**).

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Counter-weight combination in t (lbs)	**Counterweight sections** in t (lbs)									
	2.3 (5,071) [1]	**2.3** (5,071) [2]	**4.6** (10,142) [3] 1)	**4.6** (10,142) [4] 1)	**2.3** (5,071) [5]	**4.6** (10,142) [6]	**2.3** (5,071) [7]	**2.3** (5,071) [8]	**1.0** (2,205) [9] 2)	**6.8** (14,991) [11]
10.2 (22,487)	●	●3)	–	–	–	●	–	–	●	–
	●	–	–	–	●	●	–	–	●	–
	●	●3)	–	–	●	–	–	●4)	●	–
	●	–	–	–	●	–	●6)	●7)	●	–
	●	●3)	–	–	–	–	●5)	●4)	●	–
12.5 (27,558)	●	●3)	–	–	●	●	–	–	●	–
	●	●3)	–	–	–	●	–	●4)	●	–
	●	●3)	–	–	●	–	●5)	●4)	●	–
14.8 (32,628)	●	●	**2 x**	–	–	–	–	–	●	–
	●	●3)	–	–	●	●	–	●4)	●	–
	●	●3)	–	–	–	●	●5)	●4)	●	–
17.1 (37,699)	●	●	**2 x**	–	●	–	–	–	●	–
	●	●	**2 x**	–	–	–	●3)	–	●	–
	●	●	**2 x**	–	–	–	–	●7)	●	–
	●	●3)	–	–	●	●	●5)	●4)	●	–

1) Must always lie on [2]

2) Or use [10]

3) Must always lie on top

4) Must be installed on the turntable

5) [7] Must be installed under [8]

6) [7] Must lie on top, or lie under [8] or installed under [8]

7) [8] Must lie on top or be installed on the turntable

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Counter-weight combination in t (lbs)	**Counterweight sections** in t (lbs)							
	2.3 (5,071) [1]	**2.3** (5,071) [2]	**4.6** (10,142) [3]	**4.6** (10,142) [4]	**2.3** (5,071) [5]	**2.3** (5,071) [6]	**1.0** (2,205) [7] 1)	**6.8** (14,991) [9]
1.0 (2,205)	–	–	–	–	–	–	●	–
3.3 (7,275)	●	–	–	–	–	–	●	–
	–	–	–	–	–	● 3)	●	–
5.6 (12,346)	●	1 x	–	–	–	–	●	–
	●	–	–	–	–	●	●	–
	●	–	–	–	● 5)	–	●	–
	–	–	–	–	● 5)	● 4)	●	–
7.9 (17,417)	●	2 x	–	–	–	–	●	–
	●	–	1 x 2)	–	–	–	●	–
	●	1 x	–	–	● 5)	–	●	–
	●	1 x	–	–	–	● 7)	●	–
	●	–	–	–	● 6)	● 7)	●	–
10.2 (22,487)	●	1 x	1 x 2)	–	–	–	●	–
	●	–	1 x 2)	–	●	–	●	–
	●	–	1 x 2)	–	–	● 7)	●	–
	●	–	1 x 2)	–	● 6)	● 7)	●	–

1) Or use [8]

2) 1 x [3] can be replaced with [4]

3) Must be installed on the turntable

4) [5] Must be installed under [6]

5) Must always lie on top

6) [5] Must lie on top, or lie under [6] or installed under [6]

7) [6] Must lie on top or be installed on the turntable

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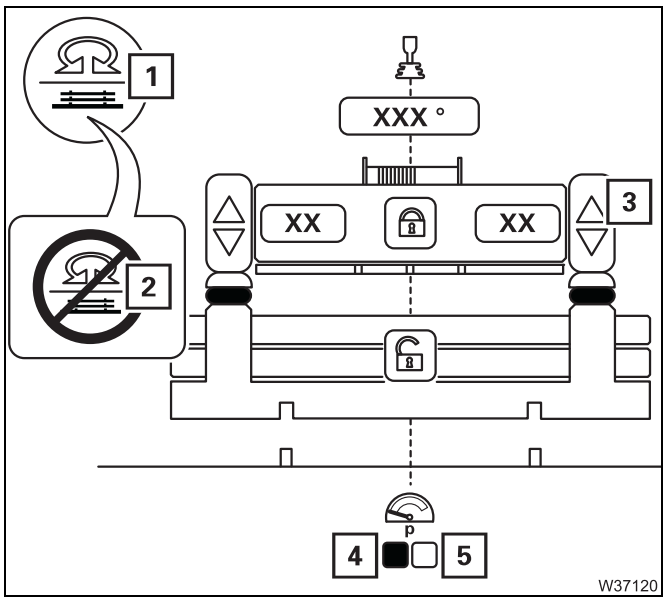


Pre-tensioning

When the symbol (**5**) is **red**, you must pre-tension the counterweight. Slewing is blocked – symbol display (**2**).

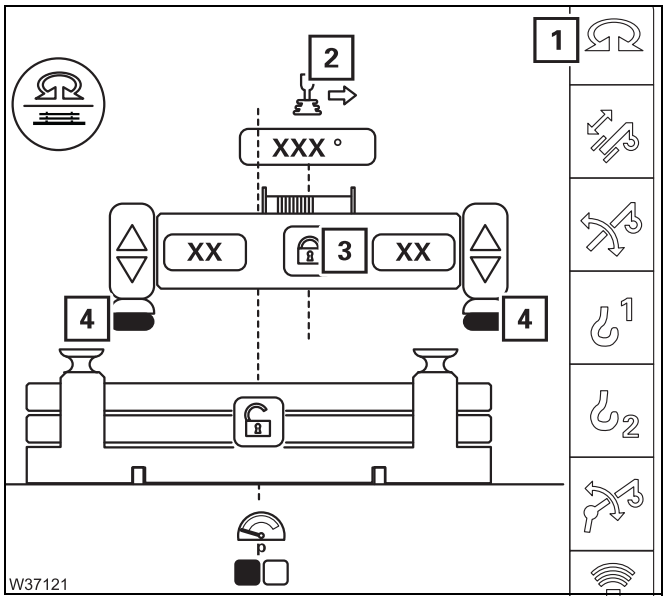
- Select and confirm the symbol (**3**) until the symbol (**4**) becomes **green**. The slewing is released – display symbol (**1**).

Automatic mode rigging

While the automatic mode is being executed, you can always

– **Cancel** the automatic mode; ➠ *Cancel automatic mode*, p. 12 - 108.

– **Interrupt** the automatic mode by letting go of the control lever. After moving the lever in the displayed direction once more, the automatic mode is continued.



Prerequisites

– The counterweight combination must be assembled.

– The lifting cylinders must be fully retracted – symbol (**4**) **green**.

– The slewing gear is switched – symbol (**1**) **green**.

– The superstructure must be in the rigging range:
  – Symbol (**3**) active,
  – Symbol (**2**) displayed.

12.10 Rigging work on the main boom

12.10.1 Hook block on the bumper

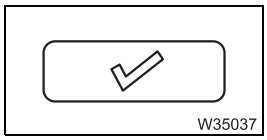
When the hook block is transported on a separate vehicle; ➠ p. 12 - 117.

Picking up the hook block

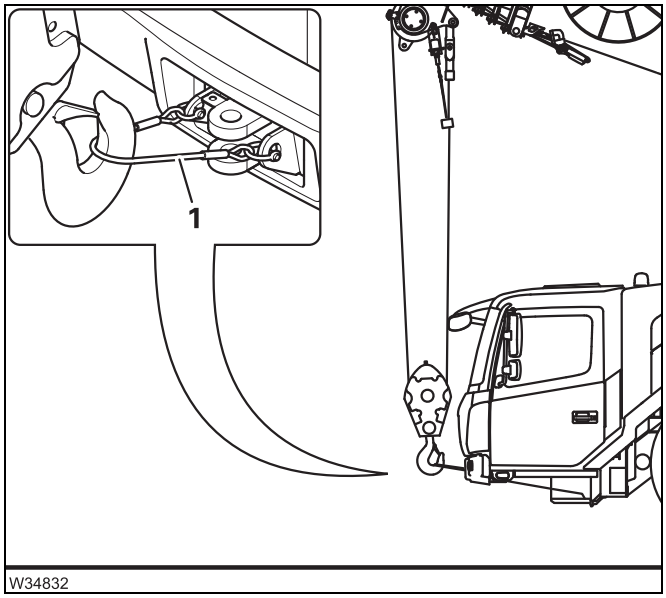
Depending on the driving mode, you must pick up the hook block from the front bumper; ➠ *Driving modes*, p. 6 - 1.

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.

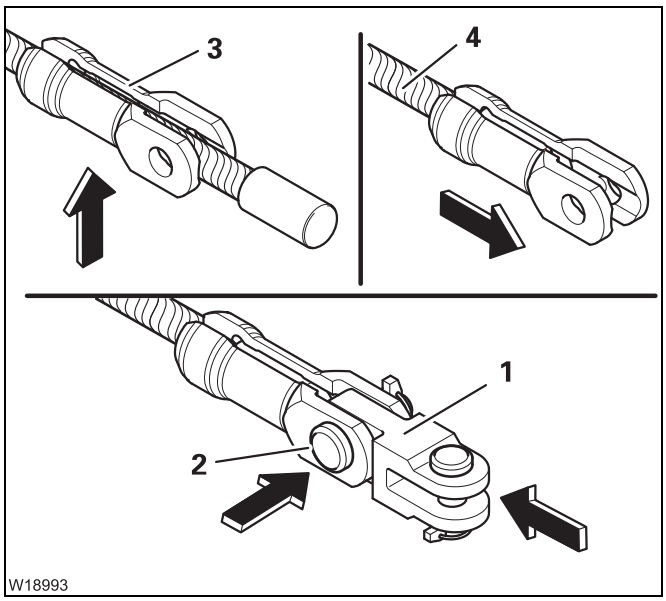
The main boom must be fully retracted.



- Enter and confirm the current rigging mode.



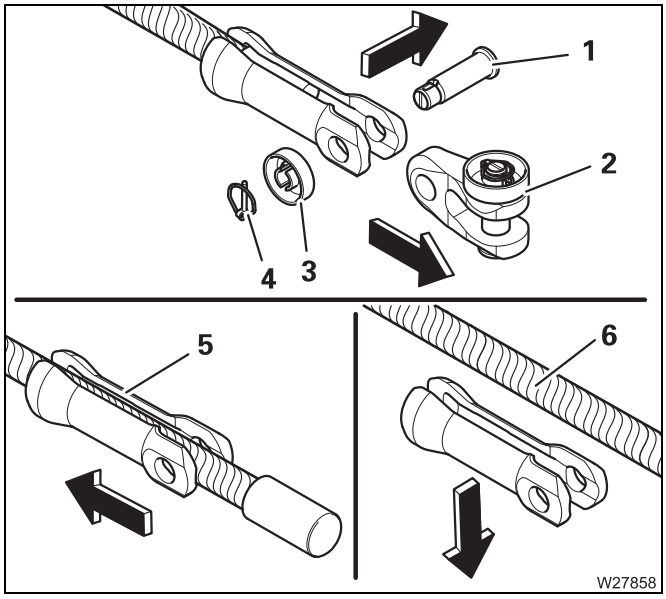
- Slacken the hoist rope and raise the main boom simultaneously.
- Raise the main boom until the boom head is in a vertical position above the hook block.
- Detach the hook block from the retaining rope (**1**).



Positioning

- Plug the holder (**3**) and slide it onto the hoist rope as far as it will go (**4**).
- Fasten the fork (**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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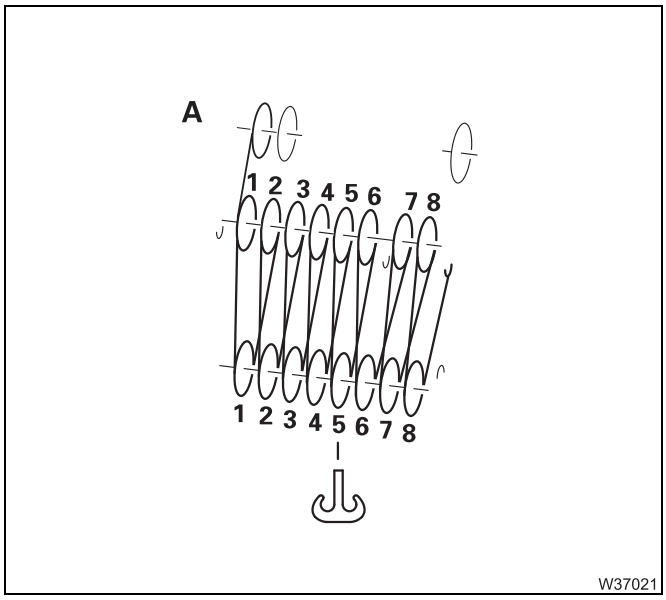
With 8 head sheaves

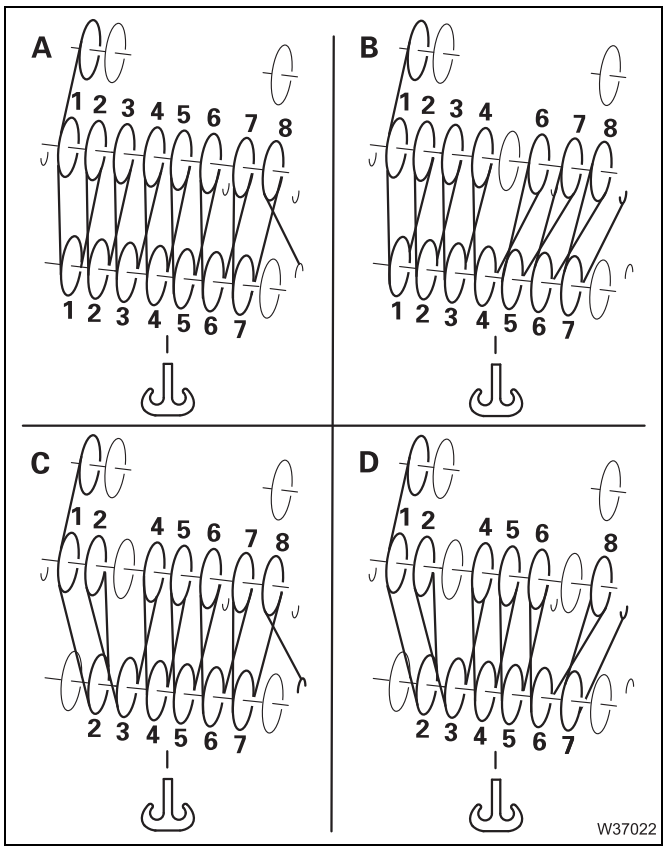
With additional equipment, 8 head sheaves may be present.
If 6 head sheaves are provided; ➠ p. 12 - 132.



8-sheave hook block

Reeving

A 16-fall



7-sheave hook block

Reeving

A 15-fall

B 14-fall

C 13-fall

D 12-fall

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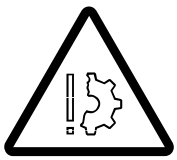
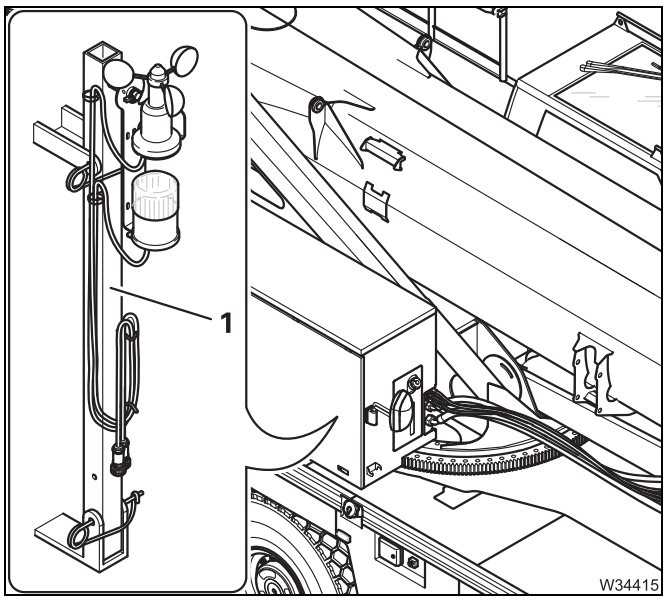
12.10.9 Anemometer and air traffic control light



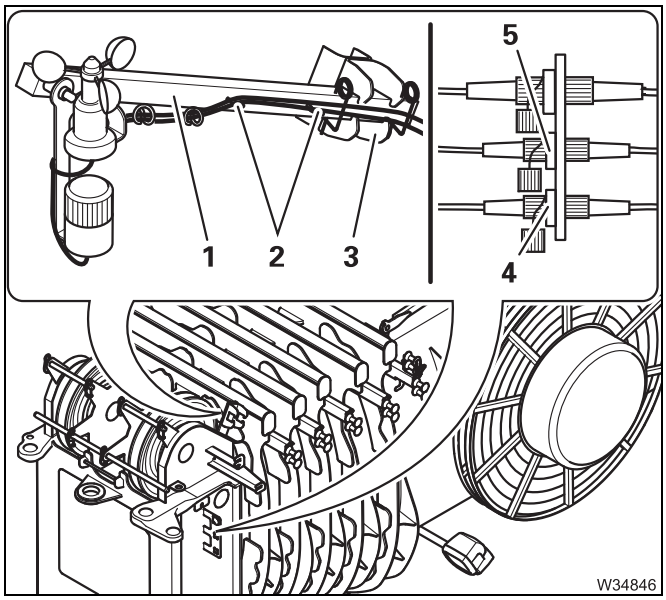
Risk of damage during on-road driving
Always remove the anemometer and air traffic control light before on-road driving.
This prevents the specified overall height from being exceeded at on-road level, and the anemometer from being damaged due to unfavourable air currents.

Installing

The anemometer and the air traffic control light – if provided – are located on the same rod.



- If necessary, remove the rod from the storage compartment (**1**).



- Insert the rod (**1**) into the clamp (**3**) and secure it with the retaining pins.
- Remove the cable from the holders (**2**) and connect
  - The anemometer to 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.

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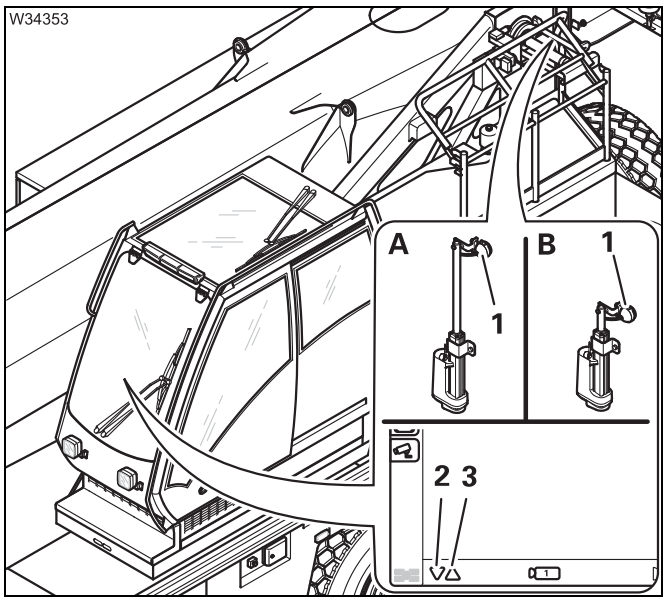
Camera on the hoists

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 retract the camera before driving. When the camera is extended, the overall height specified for on-road driving is exceeded.

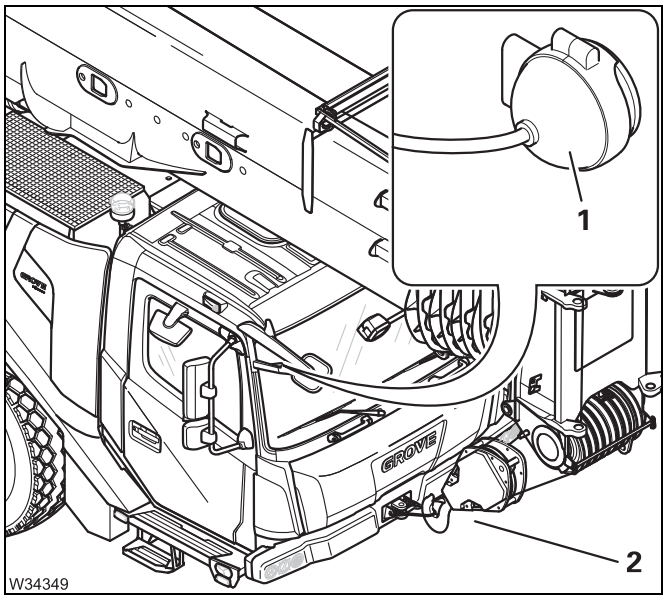


A camera (**1**) transmits an image of the main and auxiliary hoists to the display in the crane cab.

(**A**) – For crane operation you must extend the camera – symbol (**3**).

(**B**) – For crane operation you must retract the camera – symbol (**2**).

Camera on the driver's cab



A camera (**1**) allows viewing of the non-visible area in front of the driver's cab.

Depending on the version, the camera image is shown on the *CCS* display or 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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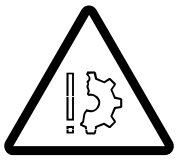
13.3 Before driving the rigged truck crane

13.3.1 Check the tyre pressures and wind speed

- Ensure that all the tyres are at the prescribed pressure levels; ➠ *Tyres*, p. 1 - 18.



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!

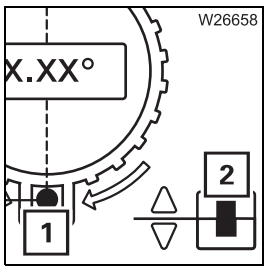
The wind speeds stated in *Lifting capacity table* for the entered rigging mode apply for driving the truck crane.

- Check the wind speed; ➠ p. 11 - 74.

Risk of accidents due to excessively high wind speeds!
You may not drive the rigged truck crane if the wind speed exceeds the maximum permissible values specified in *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 whilst driving the truck crane
Always secure the superstructure before driving the rigged truck crane to prevent it slewing. Slewing the superstructure whilst driving the truck crane increases the risk of overturning.



- Lock the turntable – the symbols (**1**) and (**2**) must be **green**

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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* working 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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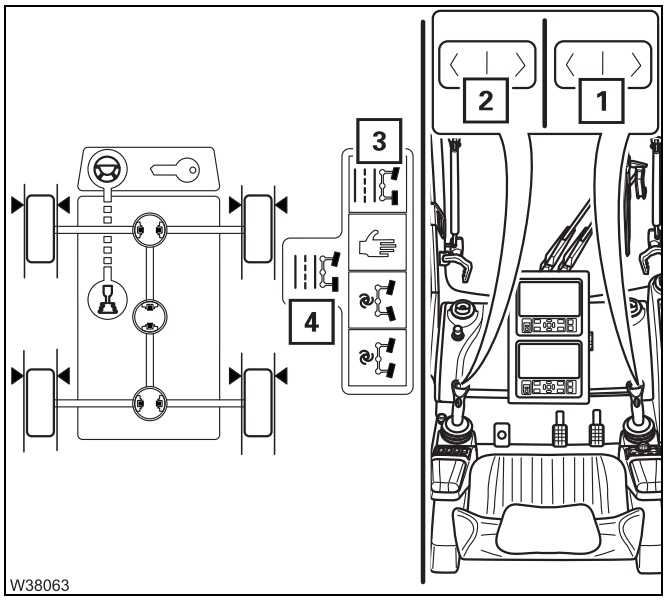
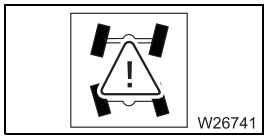
Normal steering mode

When driving a **rigged** truck crane, always use the separate steering; ➠ p. 13 - 24.

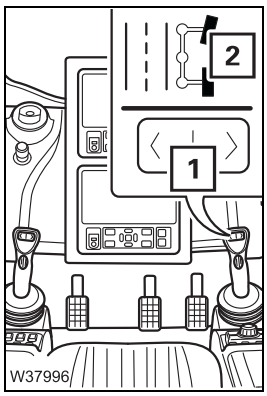


Switching to normal steering mode

- 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**) – display symbol (**4**).



If the error symbol is displayed, contact **Manitowoc Crane Care**; ➠ p. 8 - 24.



Steering in normal steering mode

The (**2**) symbol is displayed.

- Steer the 1st and 2nd axle lines with the button (**1**).
  The wheels of the 3rd to 5th 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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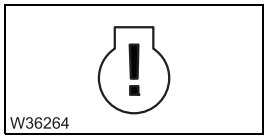


Engine malfunction

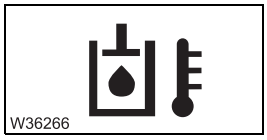
- Switch off the engine immediately and open the *Engine error* menu; p. 8 - 17.
- If necessary, note the error messages and contact **Manitowoc Crane Care**.

Refuelling

The fuel tank is filled only to a level of about 5%.

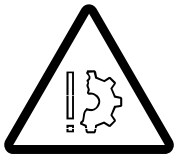
- Refuel before the fuel is used up; p. 4 - 5.

If the fuel tank is almost empty, air will be sucked in and you will have to bleed the fuel system; *Maintenance manual*.

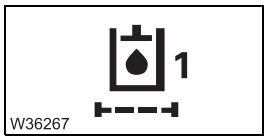


Hydraulic oil too hot

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.

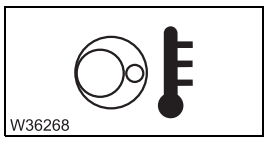


Danger of overheating
There is a fault if the hydraulic oil temperature exceeds 80 °C (176 °F).
Set down the load as soon as possible and try to find the cause.
Set down the load as soon as possible and turn off the engine if the temperature of the hydraulic oil exceeds 100 °C (176 °F).



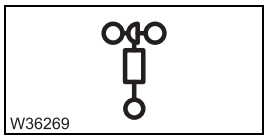
Replace hydraulic oil filter

- Replace the corresponding hydraulic oil filter as soon as possible; *Maintenance manual*.



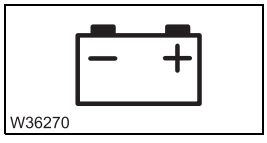
Slewing gear brake too hot

- 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 - 145.



Voltage monitoring

The voltage in the electrical system is too high or too low.
Display of the current voltage; p. 10 - 8.

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14.4 Troubleshooting

14.4.1 Malfunctions on the engine

Observe all specifications in the section *Malfunctions on the engine*; ➠ 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	➠ *Malfunctions on the engine*, 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 - 76, ➠ *Switching on the auxiliary hoist*, p. 11 - 79
		Dead man's switch not actuated	Press dead man's switch
		Emergency stop switch on	➠ *Resetting the emergency stop switch*, p. 4 - 19
		Control unit fuse blown	Replace the blown fuse; ➠ p. 14 - 75
		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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14.4.15 Malfunctions on the CCS/RCL control units

Malfunction	Cause	Solution
Control unit not working	Power supply not switched on	switching the ignition on
	Fuse F1/4 blown	Replace blown fuses; ➠ p. 14 - 75
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

14.4.16 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	Releasing the parking brake; ➠ p. 13 - 18
		Ignition key in driver's cab not in position 1	Turn the ignition key in the driver's cab to position 1; ➠ p. 13 - 18
Button for separate steering has no function		Separate steering switched off	➠ *Switching on separate steering*, p. 13 - 13
Symbol for error appears during differential locking		An illogical switching state was recorded	If required, acknowledge error message once and briefly turn 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 - 23,
➠ *Differential lock malfunctions*, p. 8 - 22,
➠ *Malfunctions of the steering*, p. 8 - 24.

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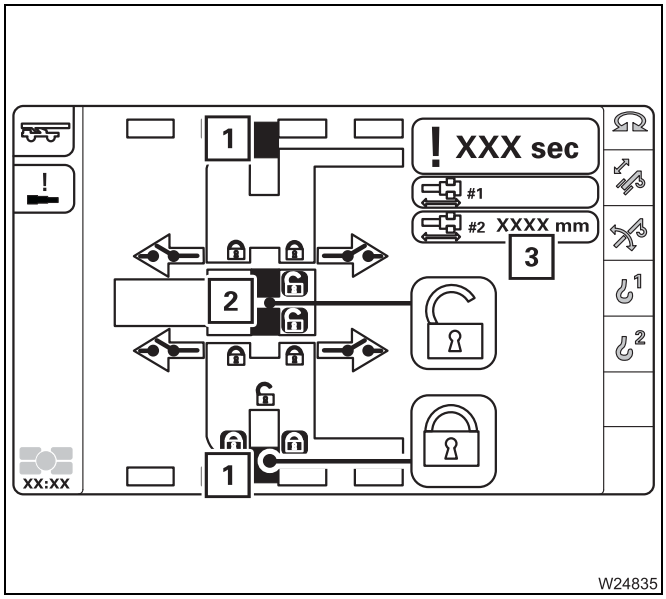
Risk of damage to the main boom
Never telescope the main boom if at the same time there is an error at both the length indicator and the proximity switch.
It would then not be possible for you to monitor operations, and components in the main boom could be damaged, or a situation could arise in which 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 approximately 30% of the maximum speed.

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.

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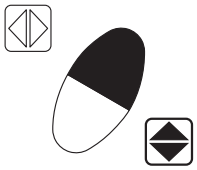
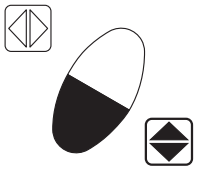
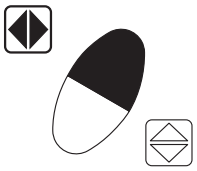
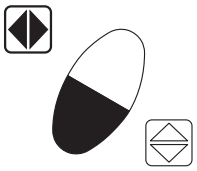
Button combination	Pre-selected power unit				
	Telescoping mechanism	Derricking gear	Slewing gear	Hoist	Lattice extension
 W3851	No	Lower	Lock turntable	Lowering	Lower
 W3850	Retract	Raise	Unlock turn-table	Lifting	Raise
 W3849	No	No	Slew to right	No	No
 W3848	No	No	Slew to left	No	No

Stopping movements

The movement continues until you release the button or the end position is reached.

12.01.2018