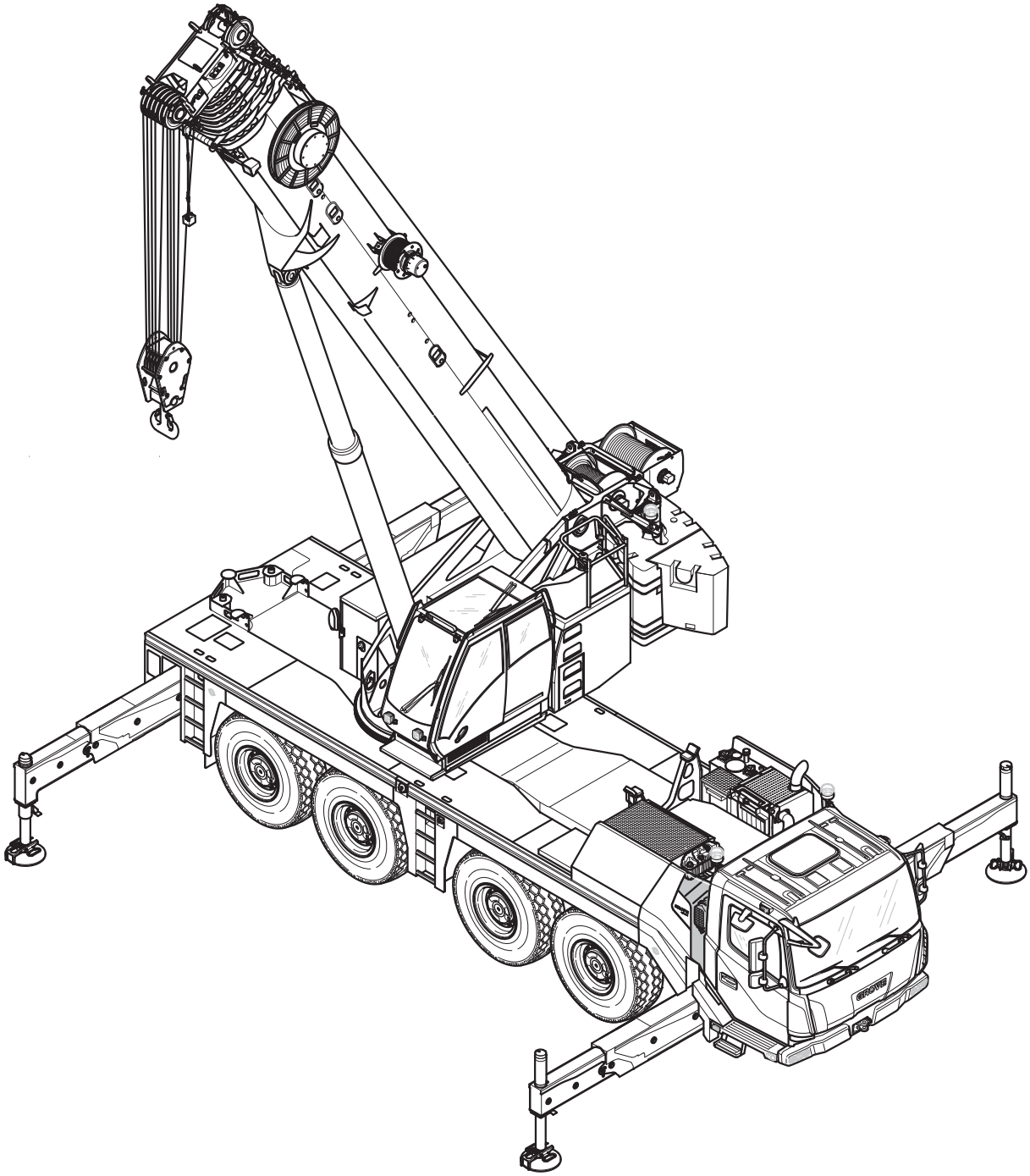
Lattice extension operating manual



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Manitowoc

2 Basic safety instructions

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7 Heavy load lattice extension (SLS) 2.0 m

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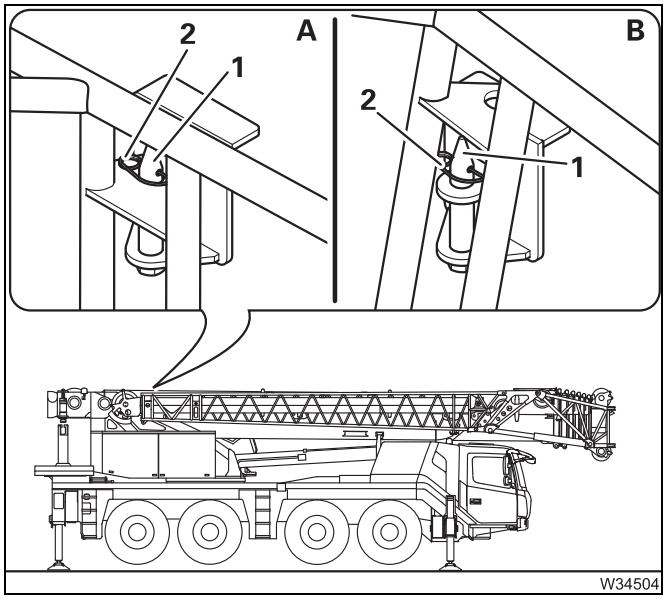
3.1.4 Connection *at rear*



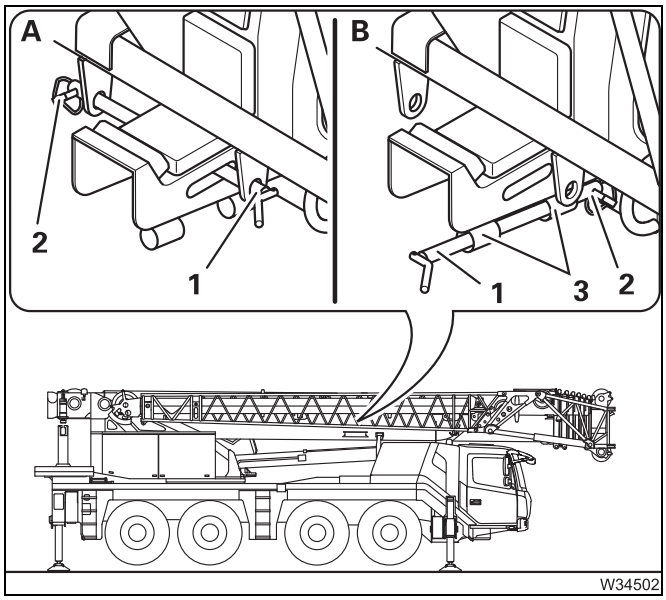
(A) – Connection established

The swing-away lattice is lowered onto the mandrel (**1**) and secured with the retaining pin (**2**).

(B) – Connection disconnected

The swing-away lattice (**1**) is lifted up from the mandrel. The retaining pin (**2**) in inserted into the mandrel.

3.1.5 Connection in the *centre*



(A) – Connection established

The rod (**1**) is inserted into the connecting points on the swing-away lattice and in the connection. The rod is secured with the retaining pin (**2**).

(B) – Connection disconnected

The rod (**1**) is inserted in the clamp (**3**) and is secured with the retaining pin (**2**).

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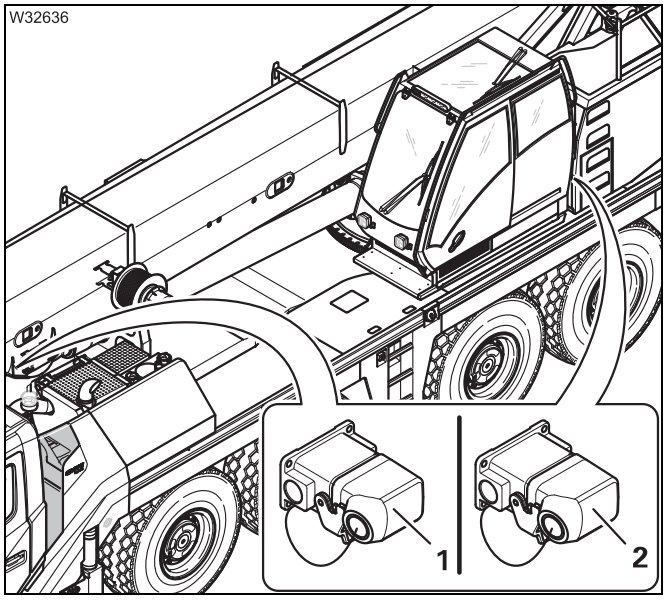
3.3.1 Hand-held control connection



With the hand-held control

Derricking the swing-away lattice is enabled at the sockets (**1**) and (**2**).

Connection to the socket (**2**) is not suitable for rigging since you cannot see the folded swing-away lattice from this point.

This socket (**2**) is intended for emergency operation.

- Connect the hand-held control to the socket (**1**).

Connecting and removing the hand-held control

➠ *Operating Instructions GMK4100L-1.*

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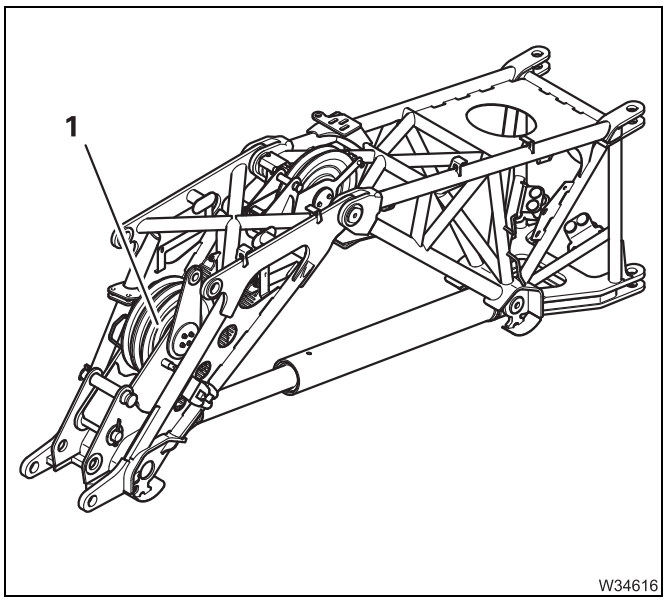
5 Swing-away lattice

5.1 Notes on this chapter



This chapter applies to the swing-away lattice with and without head sheaves (**1**) on section 3.

Test that applies only to one of the swing-away lattices is explicitly indicated.

Where the *lifting capacity tables* use the term *swing-away lattice extension* in this chapter the term *swing-away lattice* is used.

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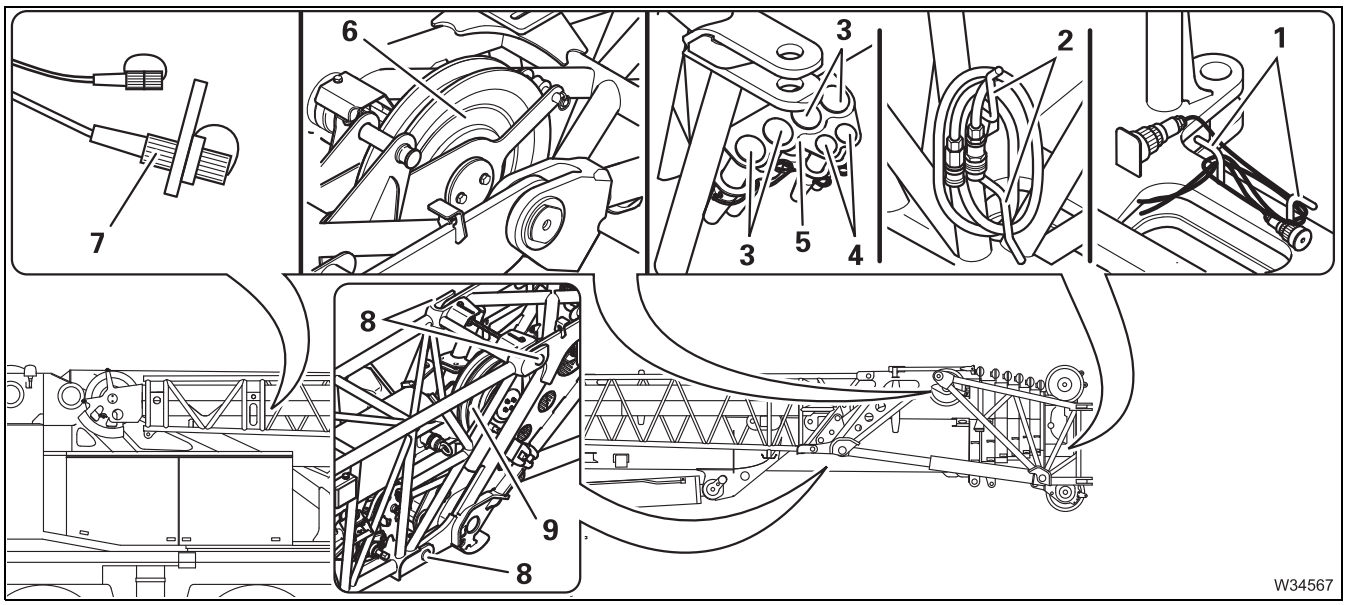

- Check that the heavy lattice load extension is secure for transport or secure it now, if necessary.
  - The lifting limit switch and air traffic control light are removed; lifting limit switch P. 5 - 80, air traffic control light P. 5 - 81.
  - The deflection sheave (**6**) is in the transport position; P. 5 - 59.
  - The hoses are stored in the holder (**2**) and the connections are closed with caps; P. 5 - 61.
  - The cables are wound onto the holder (**1**) and the plug is inserted into the dummy socket; P. 5 - 62.
  - The pins (**3**)and swivel pins (**4**) are plugged into the holder (**5**) and are secured; P. 5 - 67.
  - The socket (**7**) is closed with the protective cap.

  Additionally for section 3 with head sheaves:

  - The connection (**8**) between section 2 and section 3 is established; P. 8 - 42.
  - The head sheave (**9**) is folded in and secured, P. 8 - 61.

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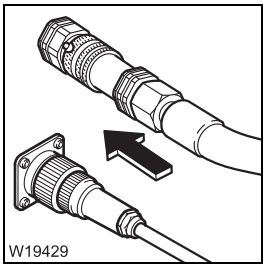
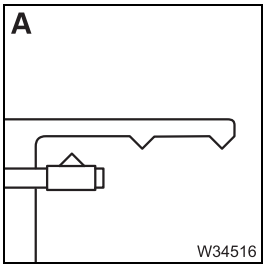
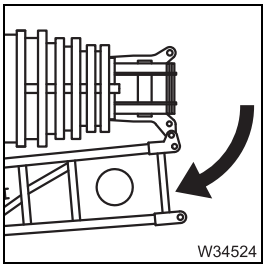
10. Remove the slinging tackle.



11. Make the hydraulic/electrical connections on the main boom.
- Hydraulic connection; ➠ P. 5 - 61,
- Electrical connection; ➠ P. 5 - 62.

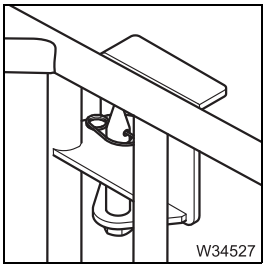


12. Move the derricking cylinder into position **A**; ➠ P. 5 - 58.

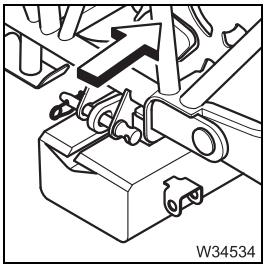


13. Swing the swing-away lattice on to the main boom; ➠ P. 5 - 65.

14. Establishing connections



- Connection *at the rear*; ➠ P. 5 - 53.



- Connection at the *front*; ➠ P. 5 - 55.

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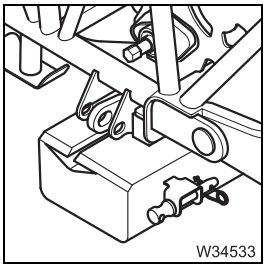
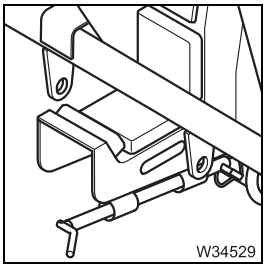
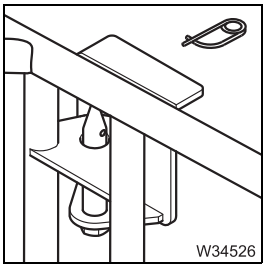
11. Disconnecting connections.



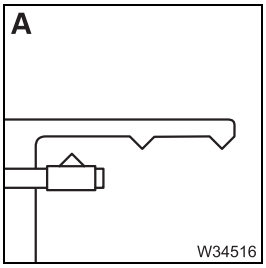
– Connection *in front*, ➠ P. 5 - 55.



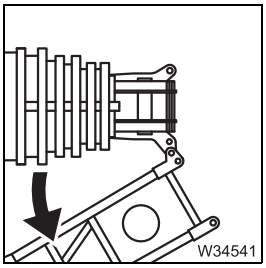
– Connection *in the centre*; ➠ P. 5 - 54.



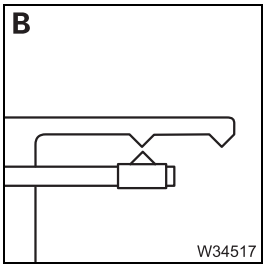
– Connection *at the rear*; ➠ P. 5 - 53.



12. Move the derricking cylinder into position **A**; ➠ P. 5 - 58.



13. Use the guide rope to swing the swing-away lattice approx. 30° outwards; ➠ P. 5 - 65.



14. Move the derricking cylinder into position **B**; ➠ P. 5 - 58.

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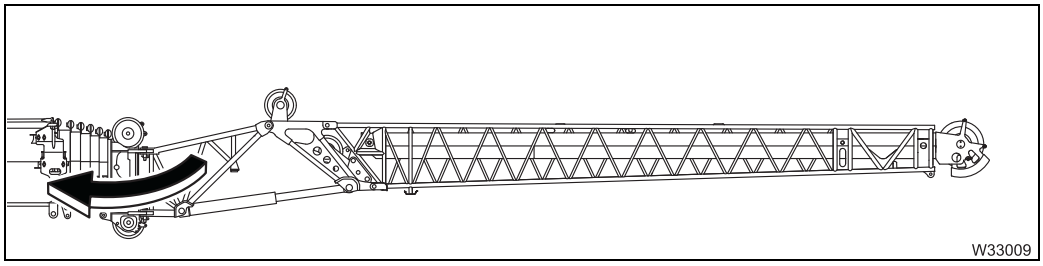
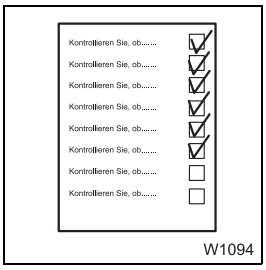
5.3.7 CHECKLIST: Rigging the swing-away lattice – into the transport position



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

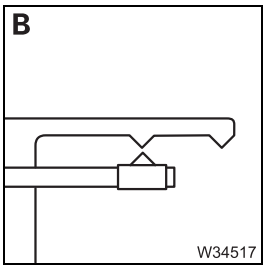


1. Prerequisite

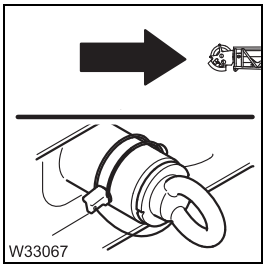
– The truck crane is on outriggers and the superstructure is turned to the side or to the rear.

– The appropriate counterweight for the crane operation must be rigged; ➠ *Operating Instructions GMK4100L-1*.

– The main boom is fully retracted and locked.
The telescoping cylinder must be locked in telescopic section VI; ➠ P. 5 - 52.
The main boom is lowered to the horizontal position; ➠ *Operating Instructions GMK4100L-1*.



2. Move the derricking cylinder into position **B**; ➠ P. 5 - 58.



3. For swing-away lattice 1.7 + 15.9 m

– Retract and secure section 1; ➠ P. 5 - 69.

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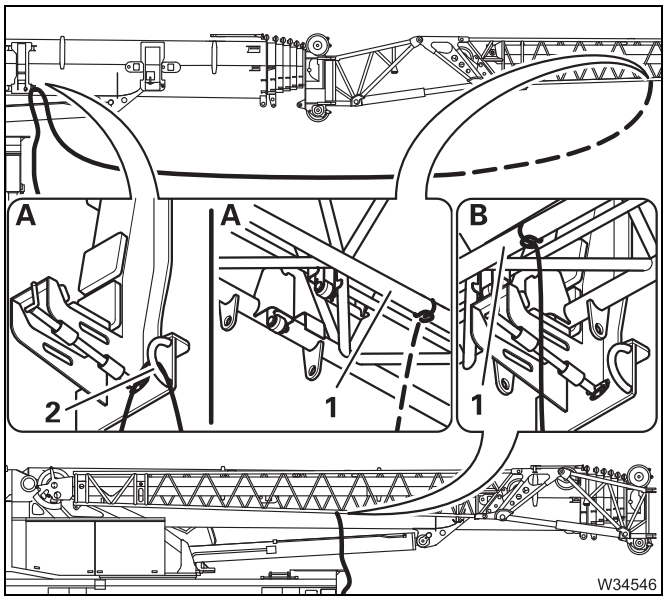
5.4 Rigging work

5.4.1 Securing the swing-away lattice with guide ropes

Risk of accidents due to sections swinging of their own accord!
Always fasten a guide rope to the sections being swung before you unlock or separate the connections.
An extra person must keep the guide rope tightly tensioned or you must fasten the guide rope so that the sections cannot slew unintentionally when the necessary connections are unlocked or separated.



(A) – For pivoting onto the main boom

- Attach the guide rope to the strap pipe (**1**).
- Feed the guide rope under the swing-away lattice and through the rope guide (**2**).

(B) – For pivoting in front of the main boom head

- Attach the guide rope to the strap pipe (**1**).

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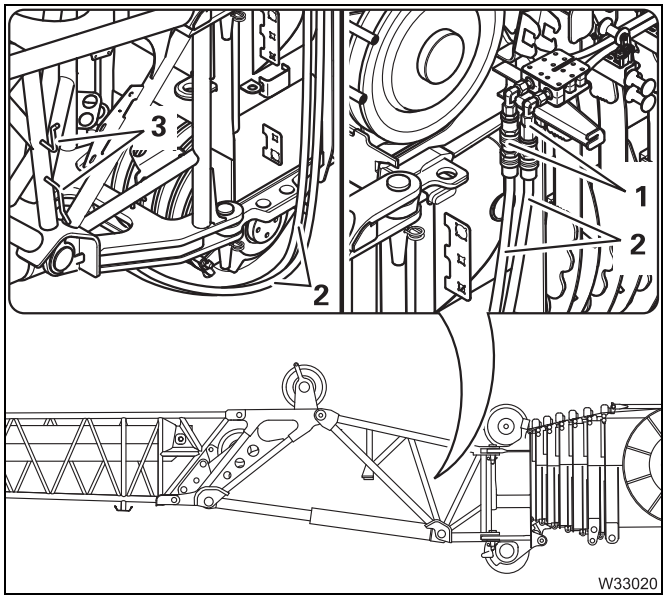
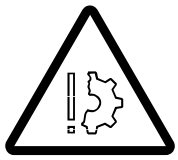
5.4.10 Establishing/disconnecting the hydraulic connections – Main boom/swing-away lattice

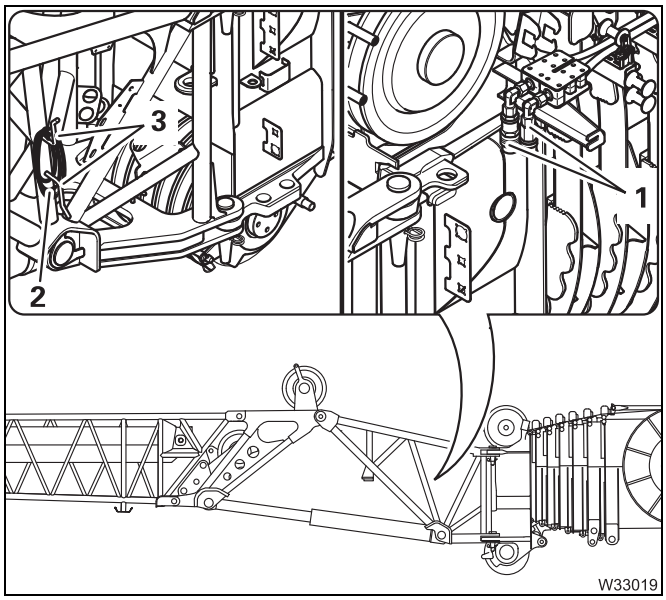


Connecting

- Remove the hoses (**2**) from the holders (**3**).
- Connect the hoses to the connections (**1**) (match the markings).



Risk of damage to the hoses!
Feed the hydraulic hoses under the main boom head so that they hang freely. Ensure that the hoses cannot be ripped off when folding the lattice extension.



Disconnecting

- Remove the hoses (**2**) from the connections (**1**).
- Close the hoses and the connections (**1**) with the caps.
- Wind the hoses (**2**) onto the holder (**3**) .

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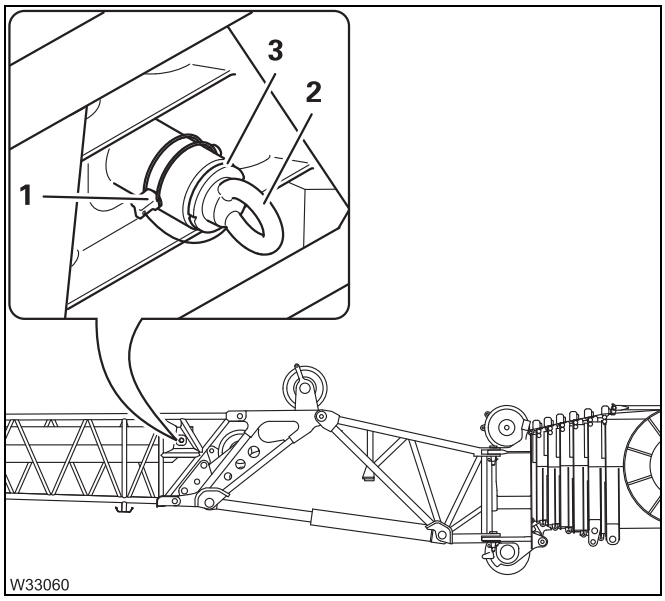
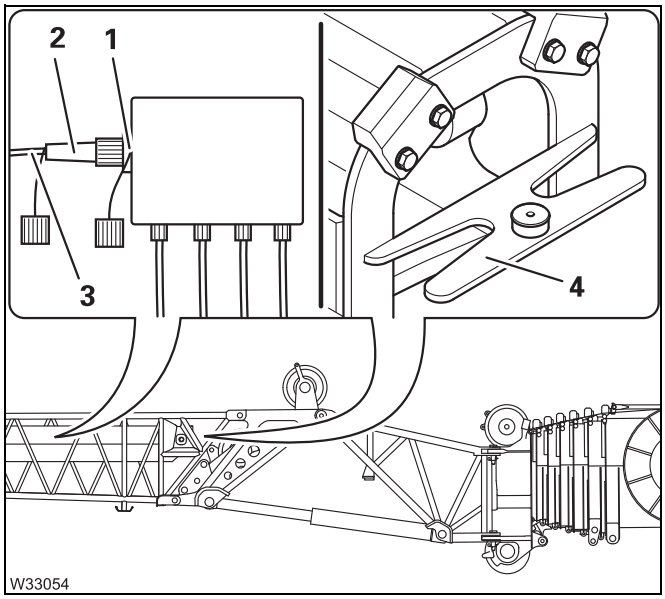


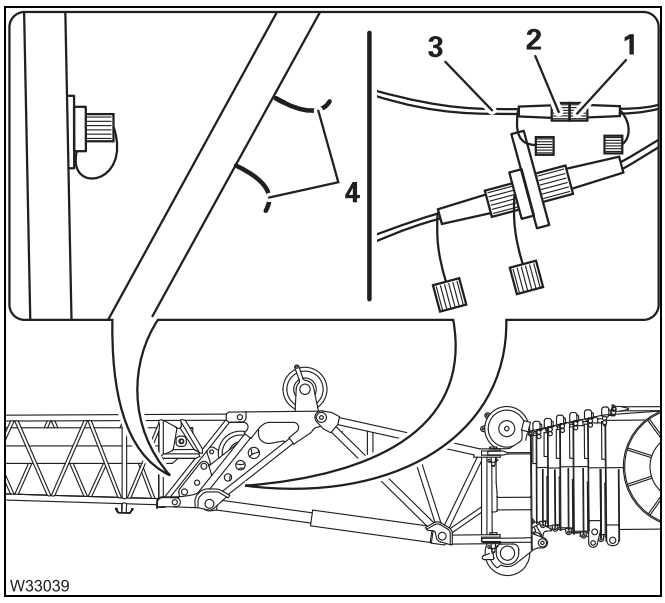
When section 1 is fully retracted and the connecting point is aligned:

- Insert the pin (**2**) into the connecting point (**3**).
- Insert the safety pin (**1**) into the pin (**2**).
- Secure the safety pin (**1**).



Making the electrical connections

- Unwind the cable (**3**) from the holder (**4**).
- Remove the plug (**2**) from the dummy socket (**5**) and plug it into the socket (**1**).
- Lay the cable (**3**) so that it will not be damaged during crane operation.



Making the connections for the camera

- Remove the plug (**2**) from the socket (**1**).
- Wind the cable (**3**) on to the holder (**4**).
- Cover the plug and socket with caps.

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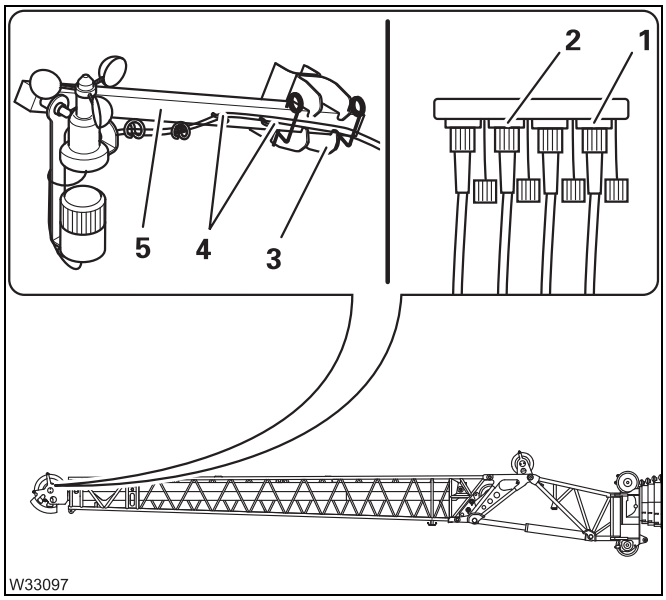
5.4.18 Installing/removing the anemometer and air traffic control light

Installation

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



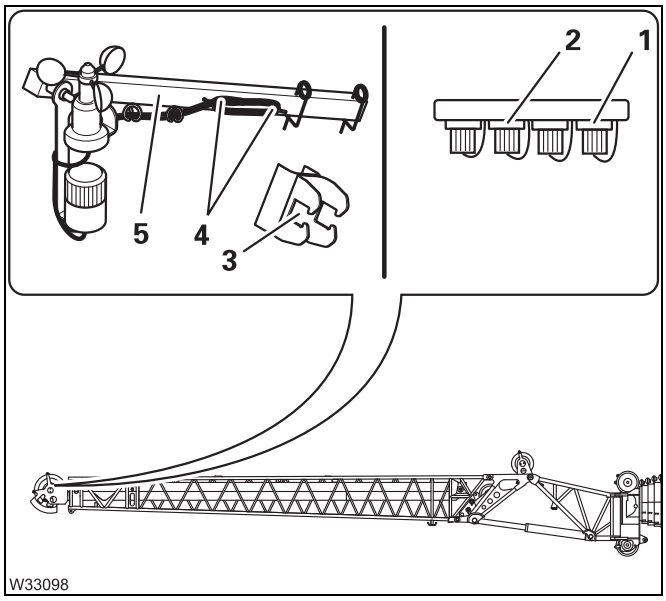
On section 1

- Insert the rod (**5**) into the holder (**3**) and secure it.
- Remove the cable from the holders (**4**) and connect
  - the anemometer to socket (**1**),
  - the air traffic control light to the socket (**2**).
- 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.

Removing

You must remove the rod with the anemometer/air traffic control light before driving on the road.

- Switch off the air traffic control light.



From Section 1

- Remove the plug and close the sockets (**1**) and (**2**) with caps.
- Wind the cables on to the holder (**4**).
- Remove the rod (**5**) from the holder (**3**) .

Stow away the anemometer safely;
➠ *Operating Instructions GMK4100L-1.*

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5.5.5 Procedure if permissible wind speed is exceeded

Risk of accidents at excessively high wind speeds!
If the current wind speed is higher than the maximum permissible wind speed, cease crane operation immediately and set up the corresponding rigging mode.
This will prevent the truck crane from overturning due to overload.

- Prior to and during crane operation, check whether the current wind speed is lower than the maximum permissible wind speed.
- Make sure that you follow the instructions for checking the wind speed; ➠ *Lifting capacity table* and *Operating Instructions GMK 4100L-1.*

If the maximum permissible wind speed is exceeded

An automatic shutdown **does not** occur if the maximum permissible wind speed is exceeded.

- Immediately cease crane operation.
- Put the truck crane into the rigging mode specified for the current wind speed in the *Lifting capacity table*.

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Joints

Grease [1]	Designation to DIN 51502	Specification Classification	GROVE part no.[1]
Grease	KP - L2K	DIN 51825	00554201

[1] ➠ *Maintenance manual*

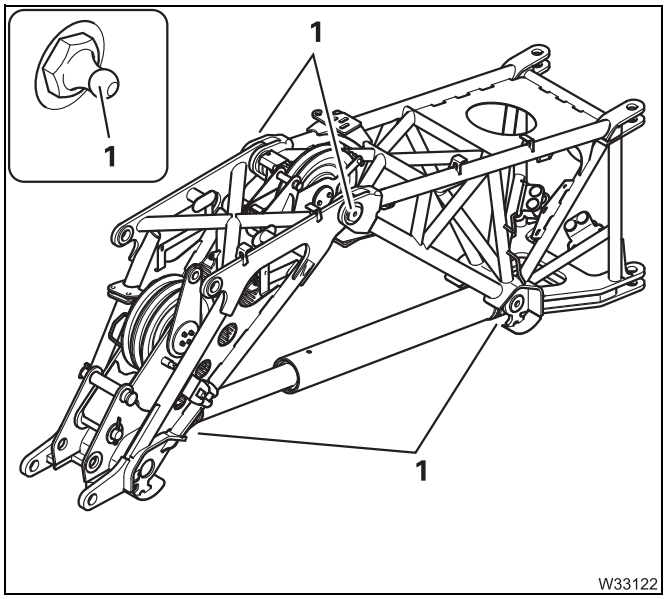
– Grease gun

Prerequisite

– The truck crane is secured against unauthorised use; ➠ *Maintenance manual*.

or

– The swing-away lattice is removed; ➠ P. 5 - 25.



Lubricate joints

Section 3 is fitted with four grease nipples (**1**).

- Clean the grease nipples (**1**).
- Press grease into the grease nipples (**1**) until new grease comes out at the lubricating point.

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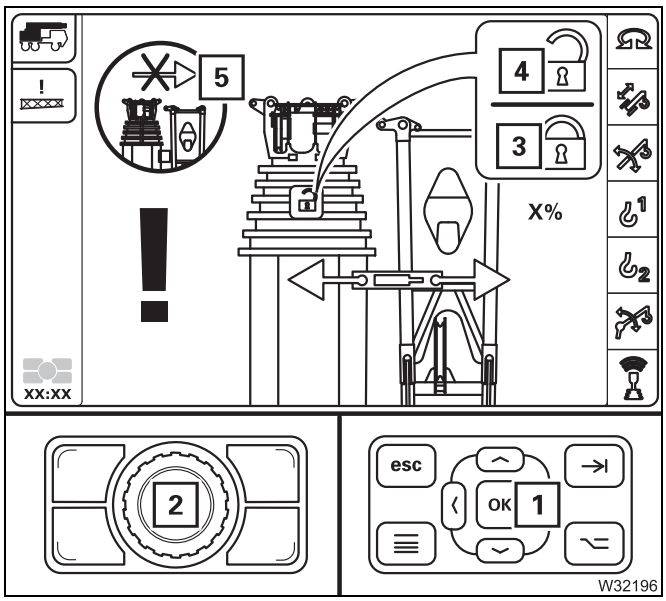


Releasing telescoping

- Select the symbol (**3**).
- Press button (**1**) or (**2**) sufficiently often until the symbol (**4**) is displayed.

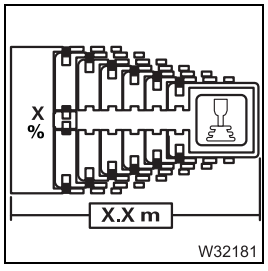
Telescoping is now released and will be performed when you move the control lever. Automatic swinging is disabled – warning message (**5**).

Telescoping is released until the telescoping mechanism or the ignition is switched off.

The symbol (**5**) *Automatic swinging disabled* is also shown as a warning message in the main menu.

Retract

If the automatic swinging malfunction occurred while telescoping the main boom out, then first check that the swing-away lattice is swung out before telescoping in. If necessary, use emergency operation to swing the swing-away lattice outwards before telescoping in.

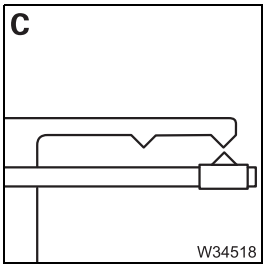


- Telescope the main boom in completely and lock the main boom. Lock the telescoping cylinder in telescopic section VI.

After telescoping in

After telescoping in you must swing the swing-away lattice onto the main boom and disable telescoping.

Checks



Ensure that:
– The derricking cylinder is derricked into position **C**; P. 5 - 58.
To derrick the swing-away lattice with the hand-held control unit; P. 5 - 83.

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Further installation is performed in the same manner as installation of the swing-away lattice. This is described in the checklist ➠ *CHECKLIST: Installing the swing-away lattice – into the working position*, p. 5 - 15 .

16. Start on page **5 - 16** at point **9.** and perform the required steps.

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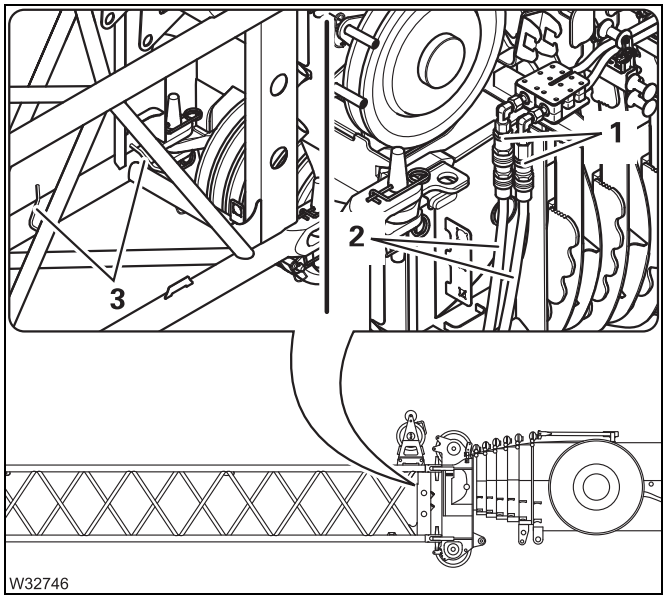
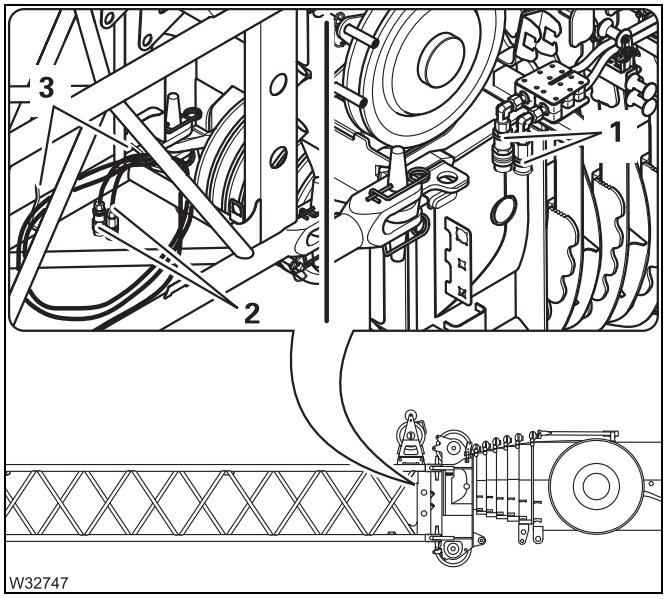
6.3.4 Making/breaking the hydraulic connections– section 4 / main boom



Connecting

- Take the hoses (**2**) from the holders (**3**).
- Remove the caps from the connections (**1**) and attach the hoses (match the markings).



Disconnecting

- Remove the hoses (**2**) from the connections (**1**).
- Close the hoses and the connections (**1**) with the caps.
- Secure the hoses on the holder (**3**) on section 4.

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6.4.3 Procedure if permissible wind speed is exceeded

Risk of accidents due to excessively high wind speeds!
If the current wind speed is higher than the maximum permissible wind speed, cease crane operation immediately and set up the corresponding rigging mode.
This will prevent the truck crane from overturning due to overload.

- Prior to and during crane operation, check whether the current wind speed is lower than the maximum permissible wind speed.
- Be sure to follow the instructions for checking the wind speed;
  ➠ *Operating Instructions GMK4100L-1.*

If the maximum permissible wind speed is exceeded

An automatic shutdown **does not** occur if the maximum permissible wind speed is exceeded.

- Immediately cease crane operation.
- Put the truck crane into the rigging mode specified for the current wind speed in the *Lifting capacity table*.

6.4.4 Instructions for turning loads over

Turning loads over with a rigged boom extension is prohibited.

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7.2 Checklists for rigging work

7.2.1 Overview

The distinction is made between various different procedures.

– **Installation** and **removal**
These procedures must be performed when the lattice extension is being transported separately. The installation and removal of the lattice extension is described.

– **Rigging**
These procedures must be performed when the lattice extension is being transported on the crane. The changeover between the transport position and the working position is described.

The table shows which checklist is applicable to any required rigging work.

	Required rigging work		Checklist
Heavy load lattice extension 2.0 m	– Installing the SLS	– In working position	*CHECKLIST: Installing SLS 2.0 m – in working position*, pag. 7 - 8
		– In transport position	*CHECKLIST: Installing SLS 2.0 m – in transport position*, pag. 7 - 11
	– Removing the SLS	– From working position	*CHECKLIST: Removing SLS 2.0 m – in working position*, pag. 7 - 12
		– From transport position	*CHECKLIST: Removing SLS 2.0 m – in transport position*, pag. 7 - 15
	– SLSRigging	– In working position	*CHECKLIST: Rigging SLS 2.0 m – in working position*, pag. 7 - 17
		– In transport position	*CHECKLIST: Rigging SLS 2.0 m – in transport position*, pag. 7 - 21

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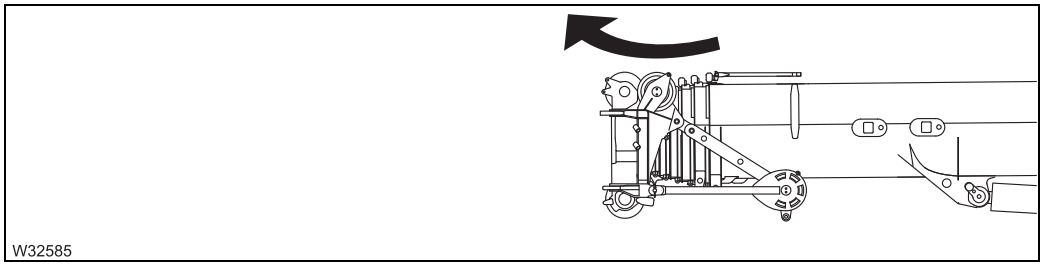
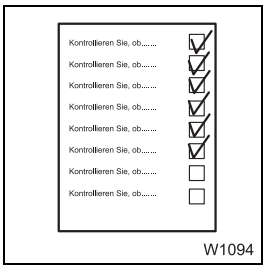
7.2.6 CHECKLIST: Rigging SLS 2.0 m – in working position



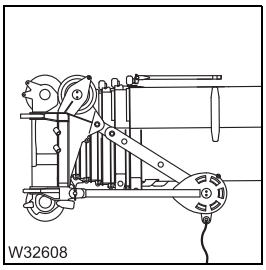
This checklist is not a complete operating manual. There are accompanying instructions, which are indicated by cross-references.
Observe the warnings and safety instructions there.



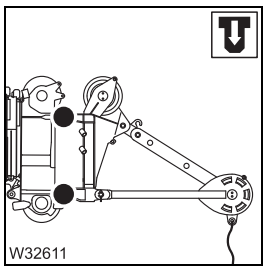
1. Prerequisite

– The truck crane must be supported on its outriggers; ➠ *Operating Instructions GMK4100L-1.*

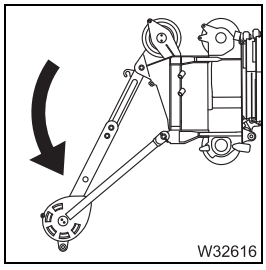
– The appropriate counterweight for the crane operation must be rigged ➠ *Operating Instructions GMK4100L-1*.



2. Fasten the guide rope to section 6; ➠ pag. 7 - 3.



3. Bring section 6 into the working position; ➠ pag. 7 - 26.



4. Set the angle position, if necessary; ➠ pag. 7 - 36.

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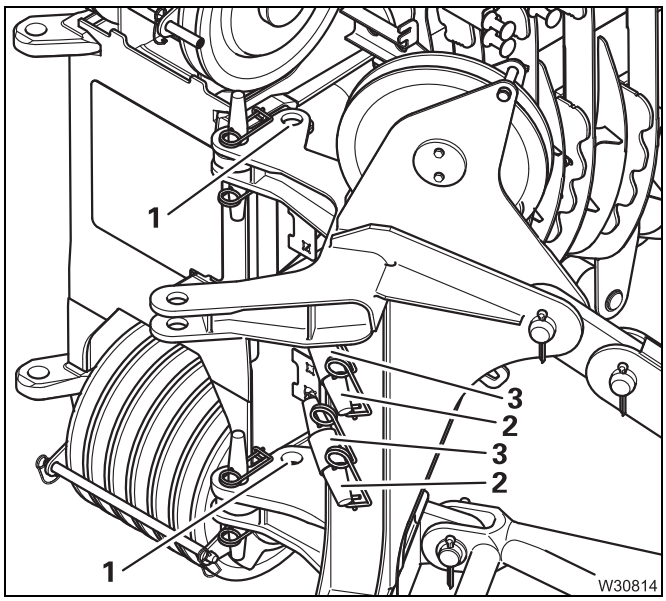
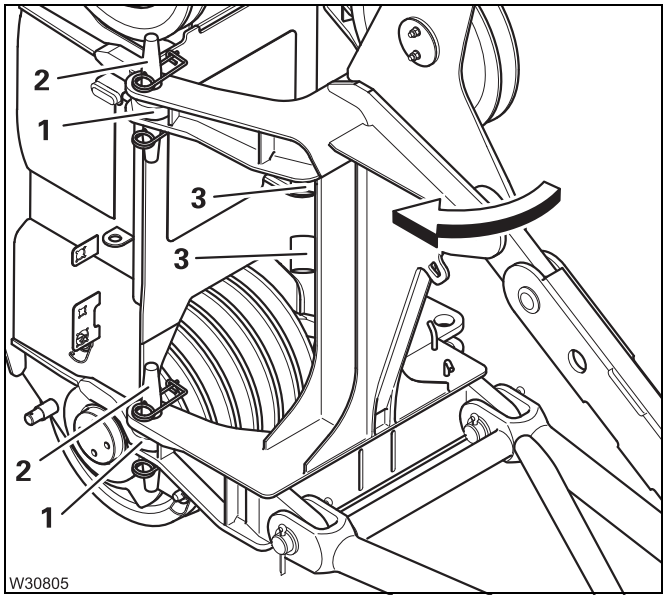


- Remove the pins (**2**) from the connecting points (**1**).
- Insert the pins into the holders (**3**).
- Secure the pins.



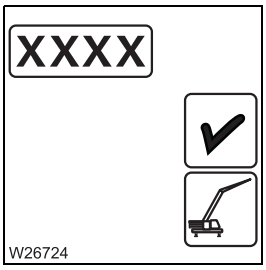
- Swing the heavy load lattice extension until the connecting points (**2**) are aligned.
- Remove the pins (**1**) from the holders (**3**).
- Insert the pins into the connecting points.
- Secure the pins.
- Remove the guide rope.

7.4 Operating the heavy load lattice extension

The raising, lowering, slewing, derricking and telescoping movements of the main boom are carried out in the same way as when operating with the main boom. This section only contains information that you will need for a rigged or folded heavy load lattice extension.

7.4.1 Setting the RCL

Input

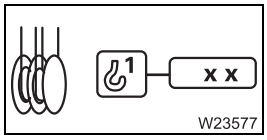


- Input the current rigging mode for operation with the **heavy load lattice extension** into the RCL. Either via the corresponding RCL code in accordance with the *lifting capacity table* or via the individual components.

When you input the current rigging mode for the individual components you must also input

– the length of the heavy load lattice extension **and**

– the angle of the heavy load lattice extension.



- Input the current reeving on the heavy load lattice extension for the hoisting gear whose hoist rope is reeved on the heavy load lattice extension into the RCL.

The lifting capacity for the RCL code is enabled once the telescopic sections are locked.

Shutdown

Operation with the heavy load lattice extension is monitored by the RCL.

When operating with the heavy load lattice extension, RCL shutdowns may occur for the same reasons as when operating with the main boom; ➠ *Operating Instructions GMK4100L-1*.

In certain rigging modes, the RCL shuts down when lifting loads that are lighter than the maximum load bearing capacity specified in the *lifting capacity table*.

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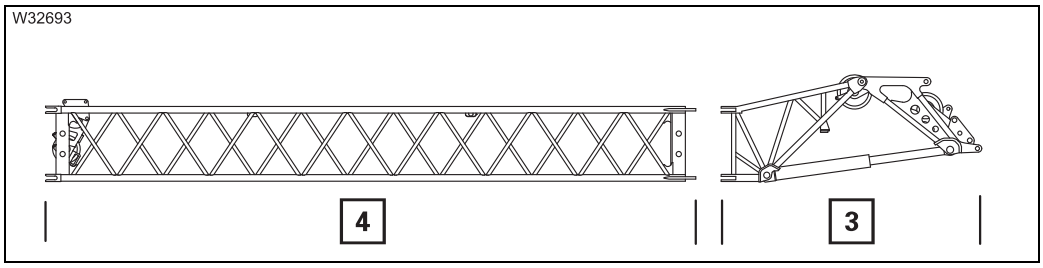
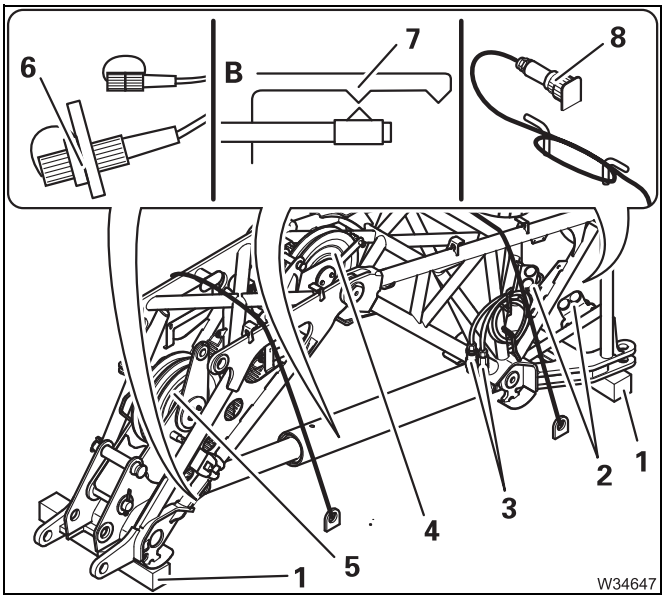
8.1.4 Transport dimensions and weights



Section	Length x width x height in m	Weight in kg
3	3.30 x 0.70 x 1.30	780
4	8.15 x 0.70 x 1.15	580

8.1.5 Transport condition

Section 3



- Check that the ISS is secure for transport, and secure it now if necessary:
  - All pins (**2**) must be secured in the holders.
  - The hoses (**3**) must be wound on to the holders.
  - The head sheave (**5**) and the deflection sheave (**4**) must be folded in and secured.
  - The plug (**8**) must be plugged in and the socket (**6**) must be closed with caps.
  - Section 3 must be placed on a suitable support (**1**), and secured.
  - The derricking cylinder must be in position (**B**) (**7**); ➠ p. 8 - 60.

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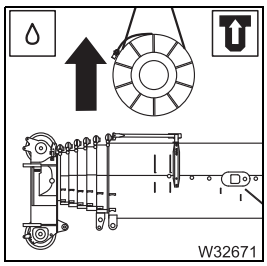
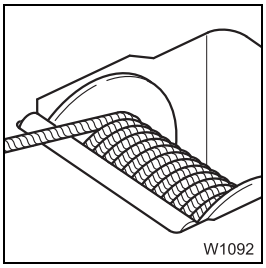


17. If necessary, remove the hose drum; ➠ p. 4 - 3.



18. Reeve the hoist rope on to the main boom head, or roll it onto the drum; ➠ *Operating Instructions GMK4100L-1*.

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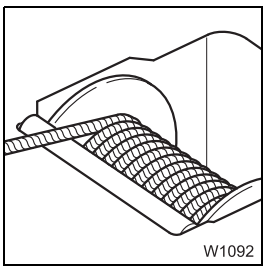
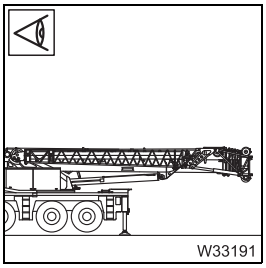


23. Reeve the hoist rope on to the main boom head, or roll it onto the drum; ➠ *Operating Instructions GMK4100L-1*.



24. Check that the swing-away lattice is secured for transport; ➠ p. 5 - 10.

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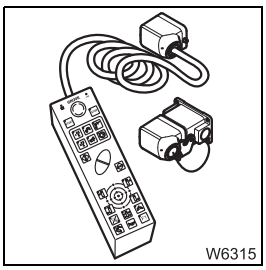
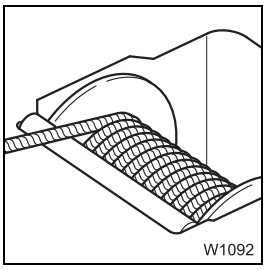
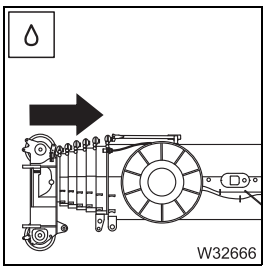


21. Disconnect the hand-held control; ➠ *Operating Instructions GMK 4100L-1*.

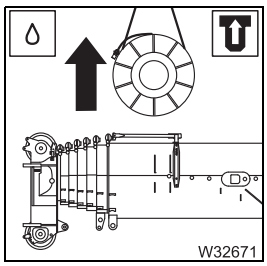


22. Reeve the hoist rope on to the main boom head, or roll it onto the drum; ➠ *Operating Instructions GMK4100L-1*.

I



23. If necessary, move the hoses into the position for working with the main boom; ➠ p. 4 - 6.



24. If necessary, remove the hose drum; ➠ p. 4 - 3.

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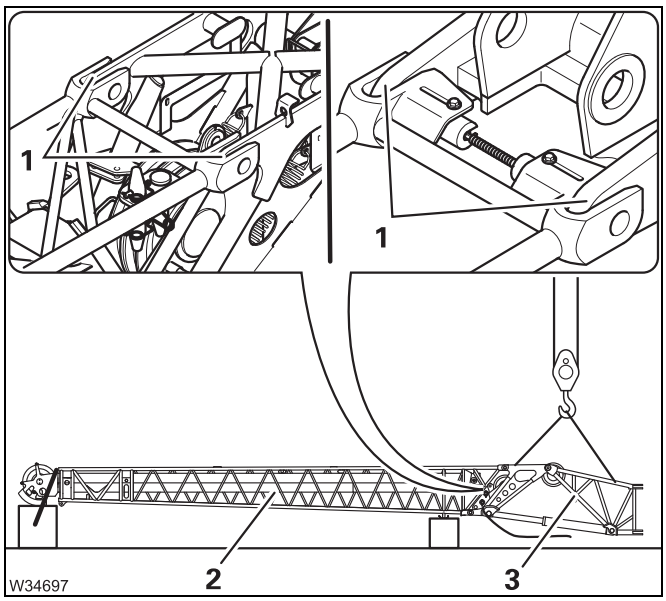
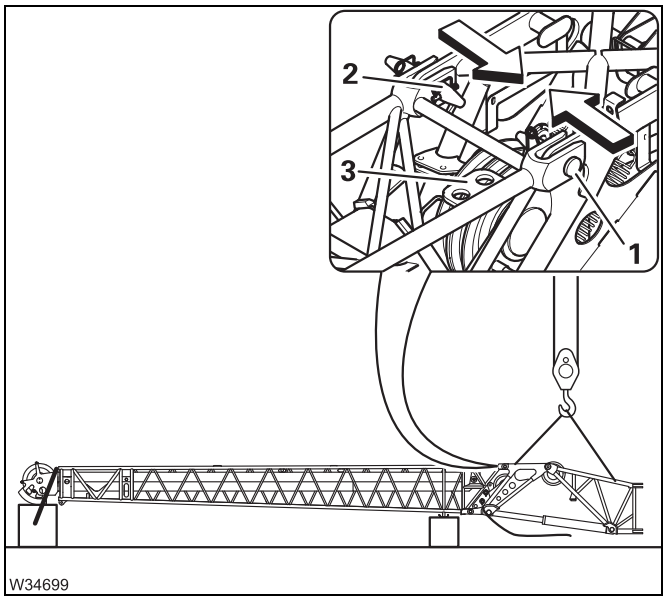


Establishing connections

- Pack the section combination so that it cannot fall over.
- Lift section 3 (**3**) in front of section 2 (**2**) so that the connecting points (**1**) are aligned.

Risk of accidents by exceeding the permissible vehicle width!
Always use the pins with the double taper on the right-hand side. If you use the pins with the double taper on the left-hand side, the permissible maximum vehicle width will be exceeded.



Upper connection

If necessary, relieve the load on the connection points; ➠ *Relieving the connecting points*, p. 8 - 42.

- Take the pin (**1**) out of the holder (**3**).
- Drive the pins (**1**) into the connecting point in the direction of the arrow.
- Secure the pin.
- Take the pin (**2**) out of the holder (**3**).
- Drive the pins (**2**) into the connecting point in the direction of the arrow.
- Secure the pin.

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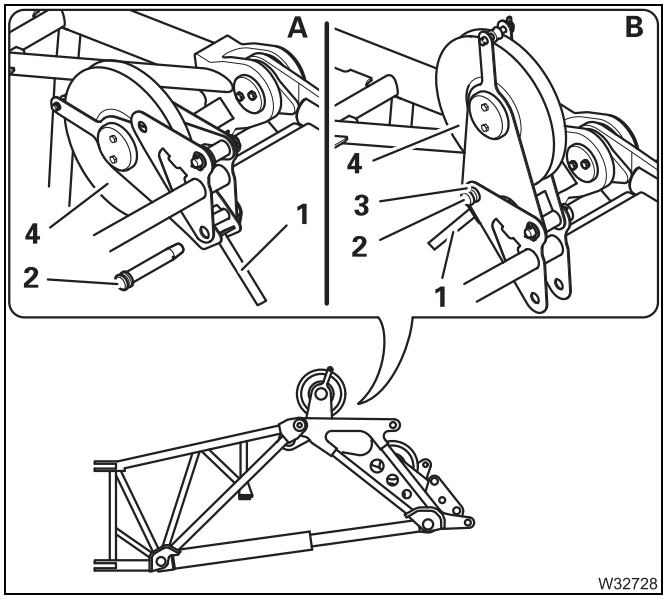
8.3.8 Folding the deflection sheave out/in – section 3

Risk of crushing!
Always hold the deflection sheave firmly by the handle when removing the pin.
Your fingers may be crushed if you hold the sheave by the side panel.

Folding out



- (**A**) – Hold the deflection sheave (**4**) by the handle (**1**) and pull out the pin (**2**).
- (**B**) – Fold the deflection sheave (**4**) upwards until it is aligned with the connecting point (**3**).
- Insert the pin (**2**) into the connecting point.
- Secure the pin.

Folding in

Risk of accidents by exceeding total permissible height!
Fold the deflection sheave in if section 3 is folded to section 1 and section 2 for the journey. When the deflection sheave is folded out, the overall height specified for on-road driving is exceeded.

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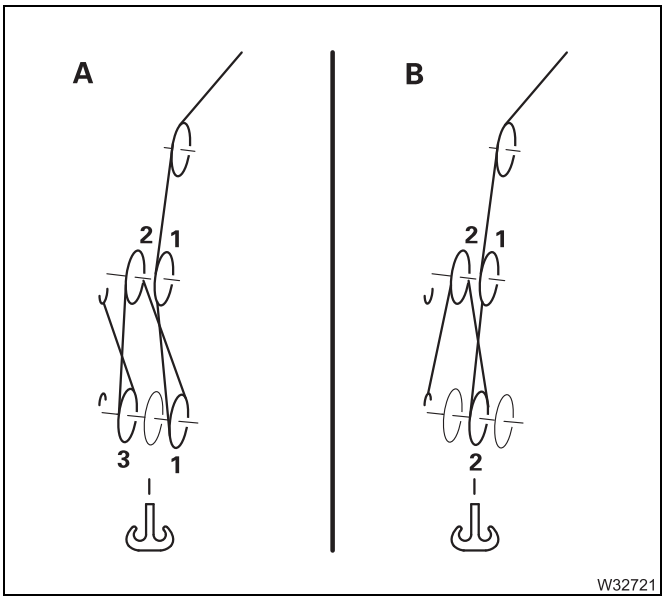
8.3.14 Possible reeving methods

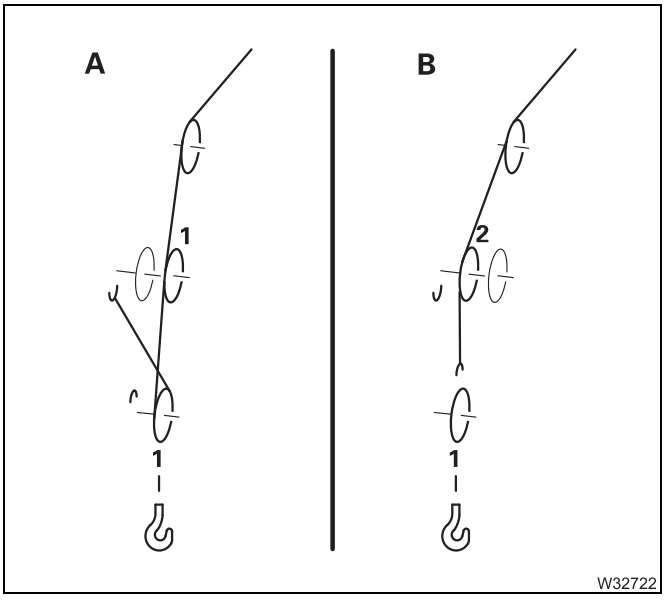


3-sheave hook block

Reeving

A 4-falls

B 3-falls

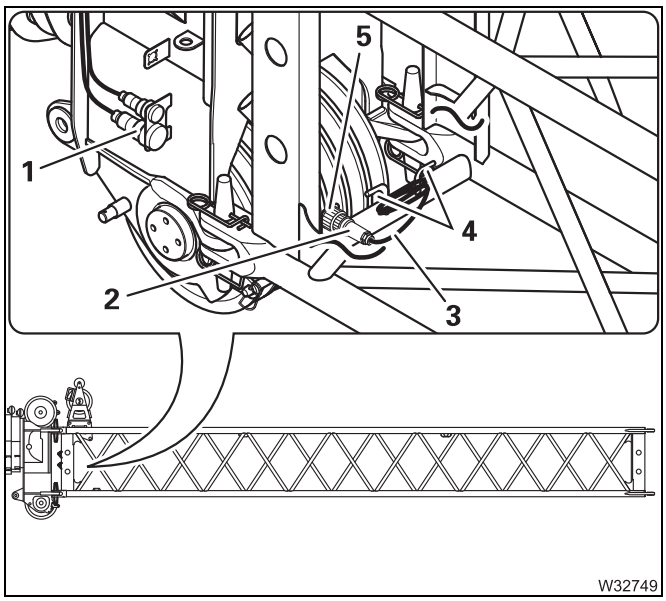


1-sheave hook block

Reeving

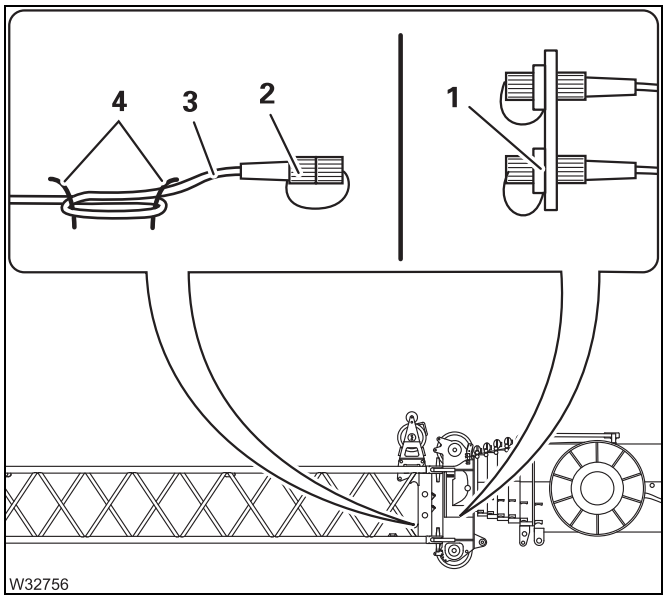
A 2-falls

B 1-falls



Breaking the electrical connections

- Remove the plug (**2**) from thesocket (**1**) and plug it into the dummy socket (**5**).
- Wind the cable (**3**) on to the holder (**4**).
- Cover the socket (**1**) with the cap.



Disconnecting – for the camera

- Remove the plug (**2**) from the socket (**1**).
- Wind the cable (**3**) on to the holder (**4**).
- Close the plug (**2**) and the socket (**1**) with the caps.

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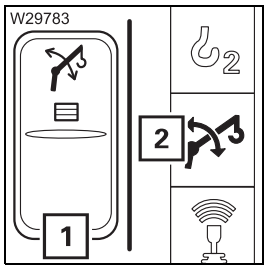
8.4 ISS, derricking

Switching on the derricking gear

After the ignition is switched on, all of the power units will be switched off and the lamps in the corresponding buttons will light up only dimly.



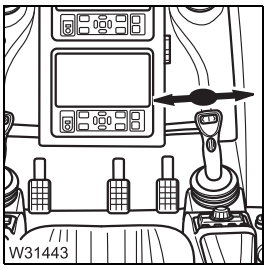
- Press the button (**1**) once.
  - The lamp in button (**1**) lights up brightly.
  - Symbol (**2**) is **green** when the derricking gear is switched on.

If the control lever is assigned more than one function, all other power units which are assigned the same control lever operation are switched off.

Raising and lowering

You can adjust the sensitivity of the control levers to the operating conditions; ➠ *Operating Instructions GMK4100L-1*.

Risk of accident due to unexpected crane movements
If assigned more than one function, check that the *Derricking* control lever function is switched on before you move the control lever for derricking. This prevents accidents due to unexpected crane movements.

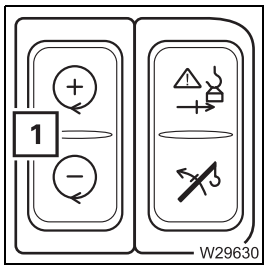


Lowering: Push the control lever to the right - the ISS will be lowered.

Raising: Push the control lever to the left - the ISS will be raised.

You can regulate the speed by moving the control lever and changing the engine speed with the accelerator.

The maximum derricking speed will automatically be reduced as the system length is increased. If you now reduce the working radius (e.g. by retracting the telescoping), the derricking speed will automatically be increased again.



You can set the desired engine speed (idling speed) with button (**1**); ➠ *Operating Instructions GMK4100L-1*.

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Rollers

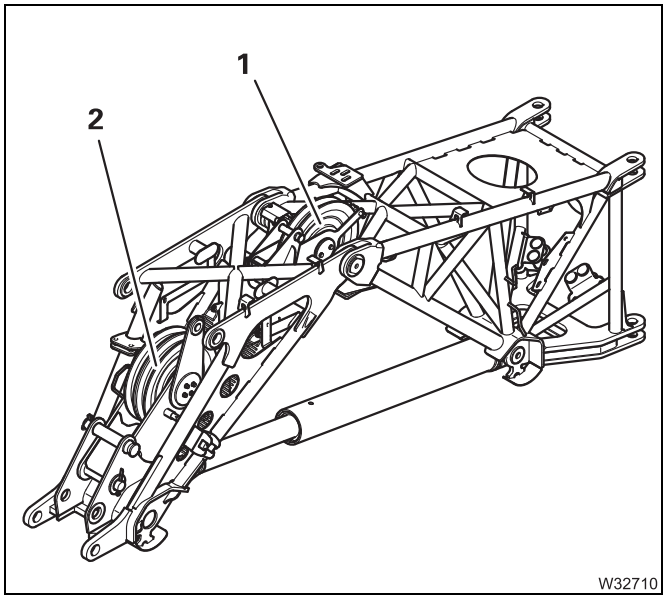
Grease [1]	Designation to DIN 51502	Specification Classification	GROVE part no. [1]
Grease	KP - L2K	DIN 51825	00554201

[1] ➠ *Maintenance manual*

Check the sheaves

If the truck crane was supplied with a swing-away lattice this maintenance work on the ISS is not required.

Check all sheaves specified here for damage, wear, mobility and heavy soiling.



- Check the head sheaves (**2**).
- Check the deflection sheave (**1**).
- Have damaged, worn, stiff or extremely soiled sheaves replaced by **Manitowoc Crane Care** or an authorised GROVE dealer or your repair crew.

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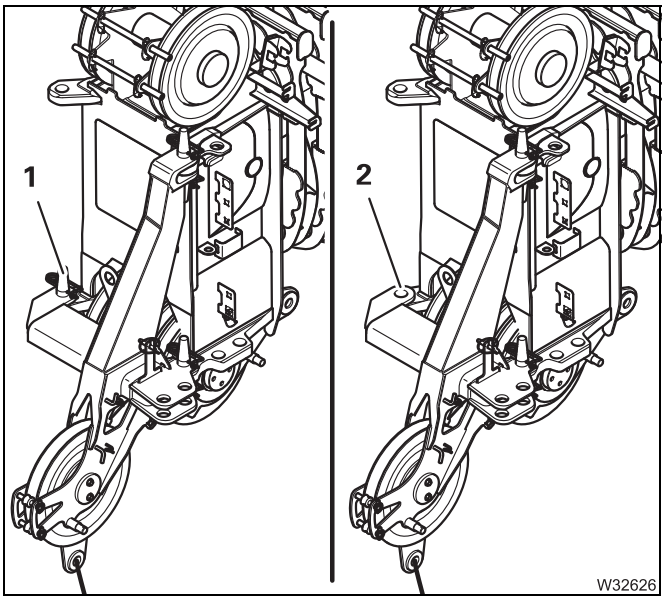
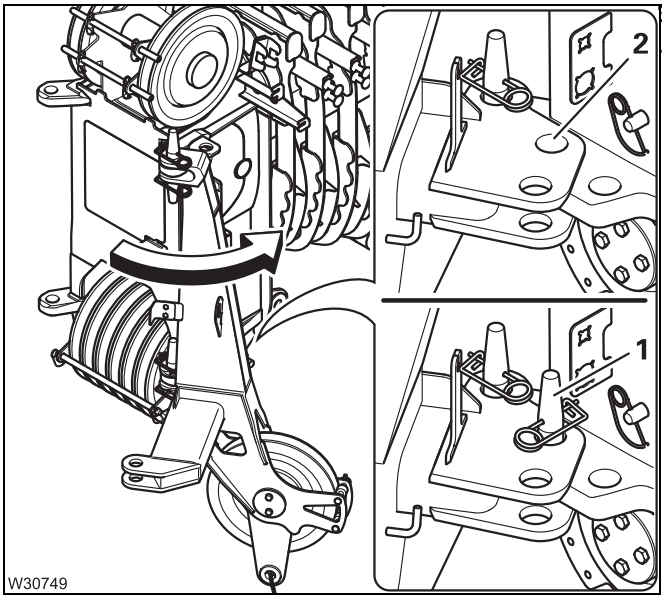


For transport on the main boom

- If necessary, remove the hoist rope; pag. 9 - 11.
- Attach a guide rope.
- Remove the pin (**1**) from the connecting point (**2**).



- Swing the auxiliary single-sheave boom top until the connecting point (**2**) is aligned.
- Insert the pin (**1**) into the connecting point (**2**).
- Secure the pin.

9.4 Maintenance

If the auxiliary single-sheave boom top has been in storage for an extended period of time, perform maintenance work on it no later than when it is next used.

9.4.1 Maintenance plan M 1 — M 1

Maintenance work on the LATTICE EXTENSION: Monthly/after approx. 100 operating hours	
Auxiliary single-sheave boom top	
– Lubricate the pins	pag. 9 - 18

9.4.2 Maintenance plan M 3 — M 3

Maintenance work on the LATTICE EXTENSION: every three months/after 250 oper. hrs.	
Auxiliary single-sheave boom top	
– Check the sheaves	pag. 9 - 18

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Counter-weight in t	Telescoping Telescopic section I-II-III-IV-V-VI in %	Main boom angle in °	Lattice extension inclination in °	Superstructure position[1]	Maximum Axle load [2] in t	
					front	rear
21.4	50-0-0-0-0-0	45 - 50	0 45	front	13.5	22.0
	0-0-0-0-0-0	45 - 80	0 - 45	rear	22.5	20.0
24.0	50-50-0-0-0-0	45 - 55	0 - 45	front	16.0	23.0
	0-0-0-0-0-0	45 - 75	0 - 45	rear	22.5	20.0
26.2	50-50-0-0-0-0	45 - 50	0 - 45	front	15.5	23.0
	0-0-0-0-0-0	45 - 75	0 - 45	rear	23.5	20.0

[1], [2] ➠ *Information about the tables*, pag. 11 - 3

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Counter-weight in t	Telescoping Telescopic section I-II-III-IV-V-VI in %	Main boom angle in °	Lattice extension inclination in °	Superstruc-ture position[1)]	Maximum Axle load [2)] in t	
					front	rear
24.0	50-0-0-0-0-0	5 - 35	20 - 45	front	14.5	22.5
	0-0-0-0-0-0	5 - 75	20 - 45	rear	22.5	20.5
26.2	50-0-0-0-0-0	5 - 30	20 - 45	front	14.0	23,5
	0-0-0-0-0-0	5 - 75	20 - 45	rear	23.5	20.5

[1)], [2)] ➠ *Information about the tables*, pag. 11 - 3

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