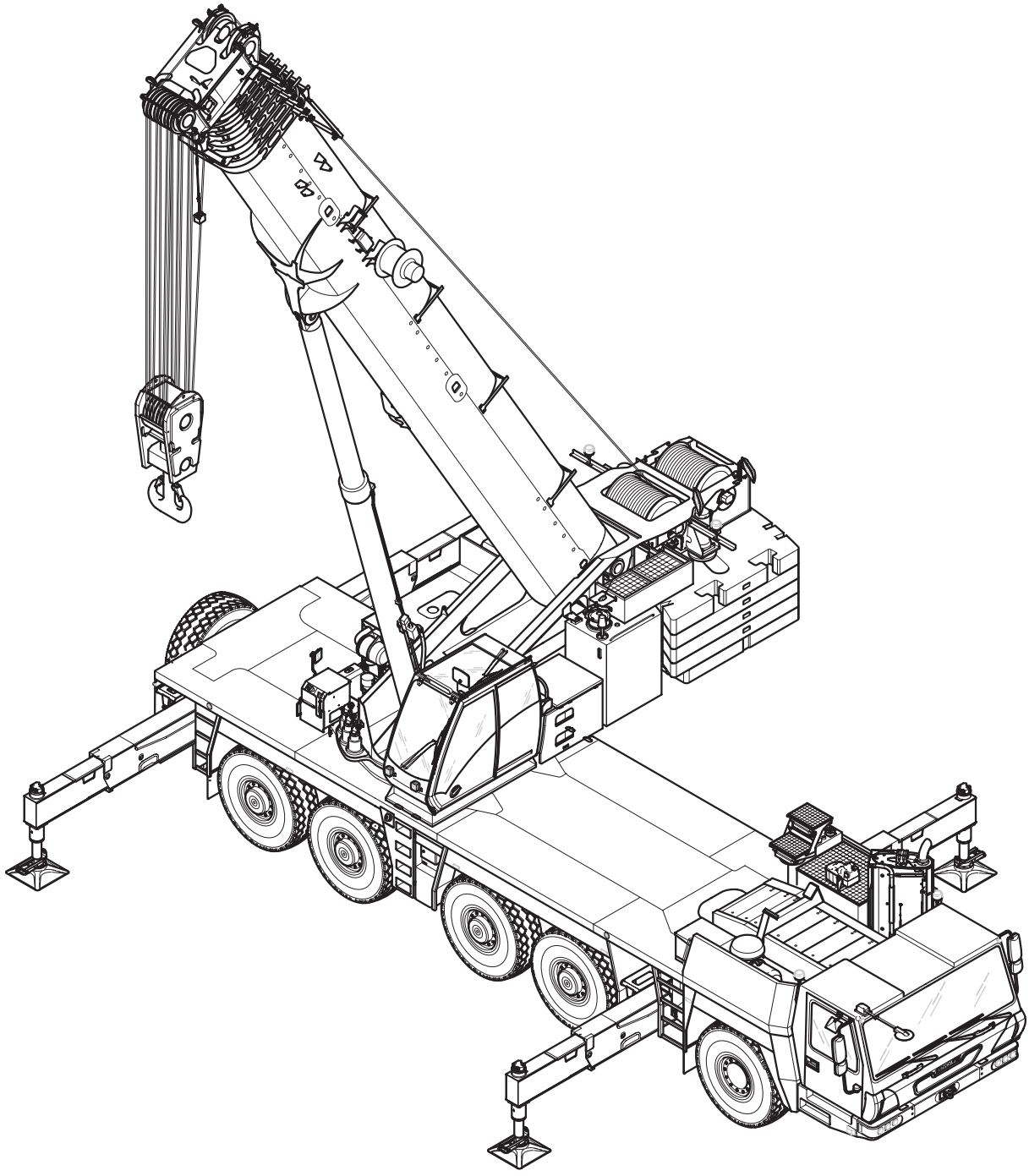
Grove GMK 5220

Operating instructions
Lattice extension



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1.4 Organizational measures

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

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

These could include:

– How to deal with hazardous materials

– Wearing personal protective equipment

– Traffic regulations

– All applicable regulations concerning the operation of a crane

Ensure that those appointed to work on the truck crane are given the information required to carry out the work before starting operations. Instruct your employees (e.g. banksmen, slingers, rigging personnel) accordingly.

Ensure that the maintenance personnel have the necessary expertise to safely operate the crane. Ensure that the maintenance personnel have access to the operating instructions.

Only properly trained or instructed personnel may carry out work on the truck crane.
Responsibilities related to crane operation, rigging, maintenance and repair work must be clearly defined.

Ensure that only the appointed employees operate the truck crane.

Do not leave long hair down or wear loose clothing or jewellery (including rings) when working with the crane. These could get caught or pulled in and lead to injury.

Use your personal protective equipment whenever necessary or prescribed.

Observe all safety and warning signs on the truck crane.

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3 12/21 m (39/69 ft) swing-away lattice extension

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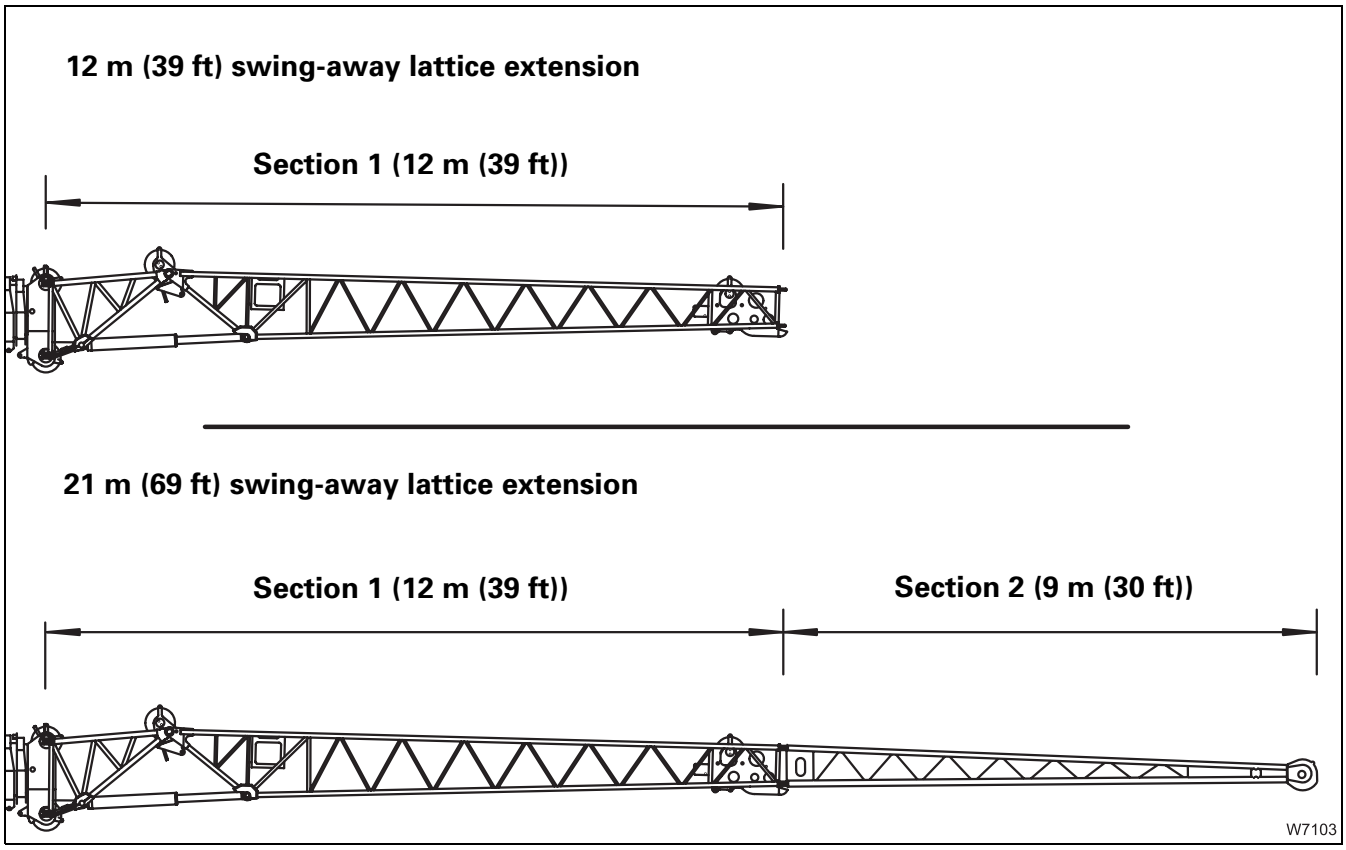
3.3 Composition of the swing-away lattice extension



The length data for the swing-away lattice extension of 12 m (39 ft) and 21 m (69 ft) corresponds to the distance between the centre of the locking pin (on the main boom head) and the front edge of the head sheave.
That is why the length data of the components in the *Transport dimensions and weights* section and their sums do not correspond to the specified lattice extension lengths; ➠ p. 2 - 1.

The *Lifting capacity tables* primarily contain the term *Swing-away lattice extension*. This term will only be used later in this chapter, when a length specification is necessary.
When no length data is necessary (e.g. for rigging work), the term *Lattice extension* is only used when the text needs to be as short as possible.

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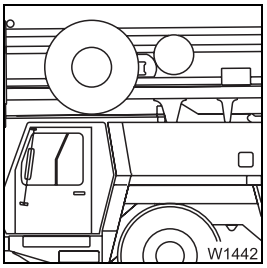
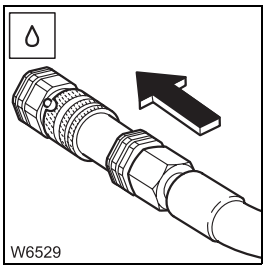
3.5.4 CHECKLIST: Rigging the 12/21 m (39/69 ft) swing-away lattice extension

This checklist is not a complete set of operating instructions. There are accompanying operating instructions which are referred to by cross-references. **Observe the warnings and safety instructions there.**

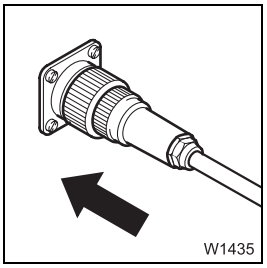
1. Prepare the truck crane for rigging the swing-away lattice extension; ➠ *Prerequisites for rigging*, p. 3 - 31.



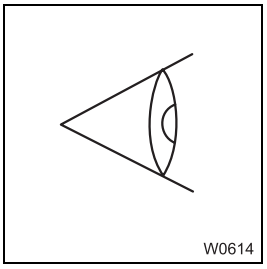
2. Put the hydraulic hoses into the correct position for working with the lattice extension, or install the hose drum if necessary:
   - Installing the hose drum; ➠ p. 3 - 41.
   - Releasing locking device on the hose drum, ➠ p. 3 - 38.
   - Positioning hydraulic hoses for working with the lattice extension; ➠ p. 3 - 40.



3. Establish a hydraulic connection between section 1 and the main boom; ➠ *Establishing the hydraulic connection*, p. 3 - 43.



4. Establish an electrical connection between section 1 and the main boom; ➠ *Establishing an electrical connection*, p. 3 - 74.



5. Check if the lattice extension was unrigged properly and is in transport condition; ➠ *Transport condition with lattice extension folded at the side*, p. 3 - 34.

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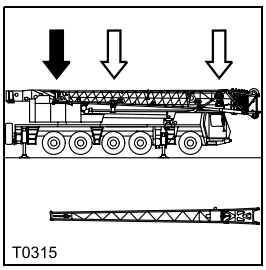
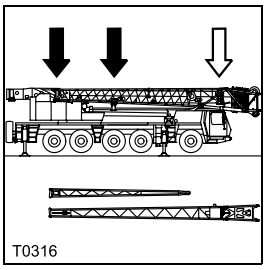


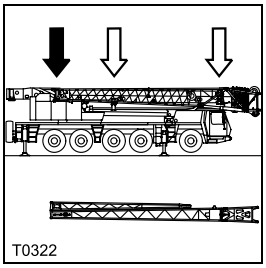
24. This point only applies to the unrigging of the **12 m (39 ft)** swing-away lattice extension, when only **section 1** is installed.

Release the connection between section 1 and the main boom in the *rear* area; ➠ p. 3 - 55.



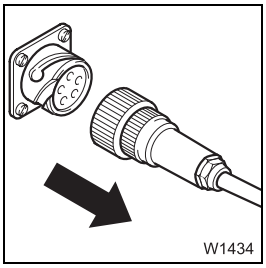
25. This point only applies to the unrigging of the **12 m (39 ft)** swing-away lattice extension, when **section 2** is also installed.

– Establish the connection between section 1 and section 2 in the *middle* area; ➠ p. 3 - 51.
– Establish the connection between section 1 and section 2 in the *rear* area; ➠ p. 3 - 57.

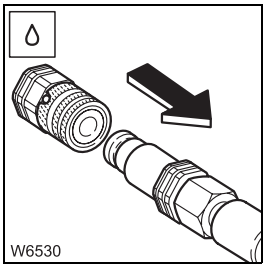


26. This point only applies when unrigging the **21 m (69 ft)** swing-away lattice extension.

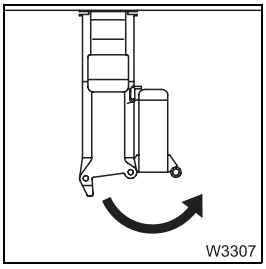
– Release the connection between section 2 and the main boom in the *rear* area; ➠ p. 3 - 53.



27. Disconnect the electrical connection between section 1 and the main boom; ➠ *Disconnecting the electrical connection*, p. 3 - 75.



28. Disconnect the hydraulic connection between section 1 and the main boom; ➠ *Breaking the hydraulic connection*, p. 3 - 43.



29. Fold in the run-up rail; ➠ *Folding the run-up rail out/in*, p. 3 - 45.

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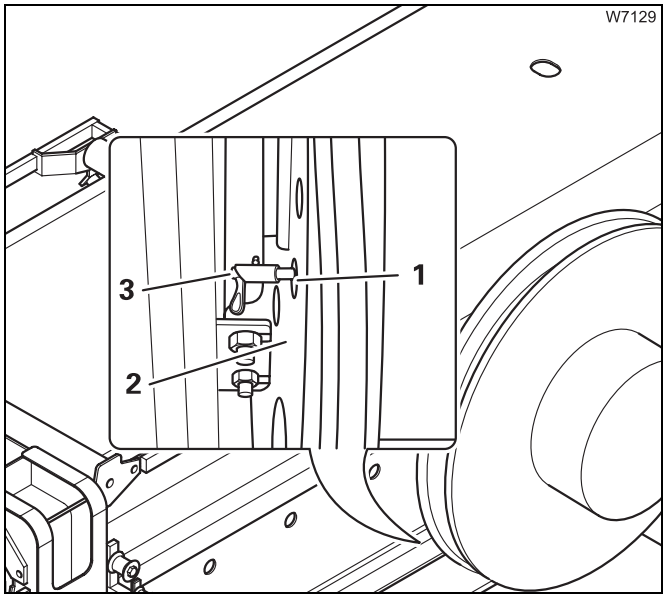
Inserting the locking device

If the hose drum has to be removed, you have to insert the locking device beforehand.

Risk of accidents from uncontrolled turning of hose drum
The locking device always has to be inserted before the hose drum is removed. Otherwise, the hose drum will twist uncontrollably against the holder and could injure you.



- There are eight bores (**1**) spread around the inner flanged wheel (**2**) of the hosedrum.
- Turn the hose drum until a bore is in front of the spring latch (**3**).
- Move the spring latch into the bore, the hose drum is secured against twisting.

Position of the hydraulic connections

Before operating the lattice extension, you must ensure the hydraulic connections are in the *Lattice extension operation* position.

Before working with the main boom for longer periods, you must place the hydraulic connections in the *main boom operation* position, so that the hose drum is not put under unnecessary strain.

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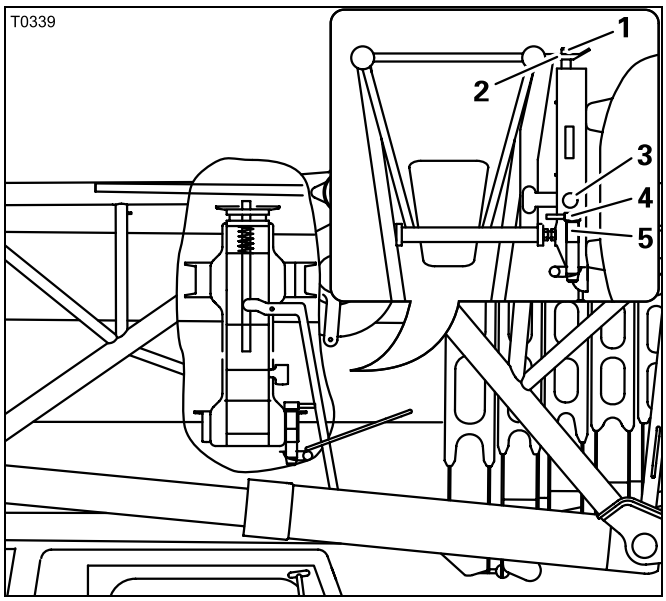
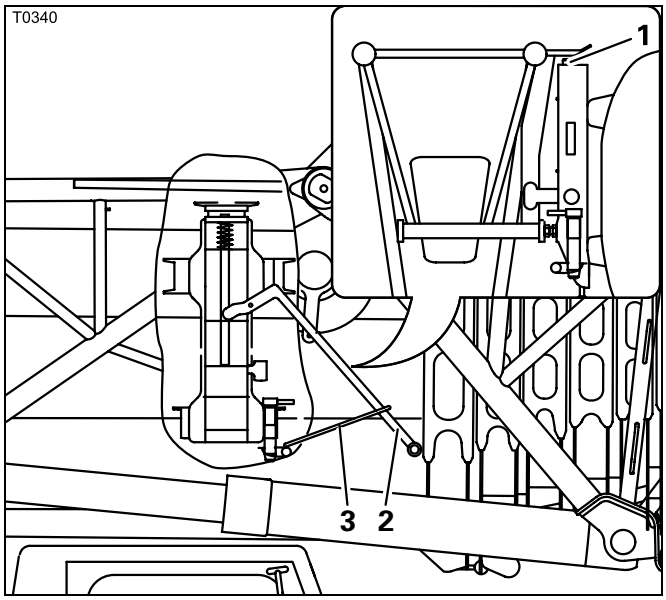


- Withdraw the pin (**4**) from the bore (**3**) and insert it into the holder (**5**).
- Secure the pin (**4**) using the retaining pin.

You can now retract the slewing axis (**1**) so that it no longer protrudes from the holder (**2**).



- Push the lever (**2**) upwards against spring force.
- Set down the lever (**2**) on the rest (**3**).

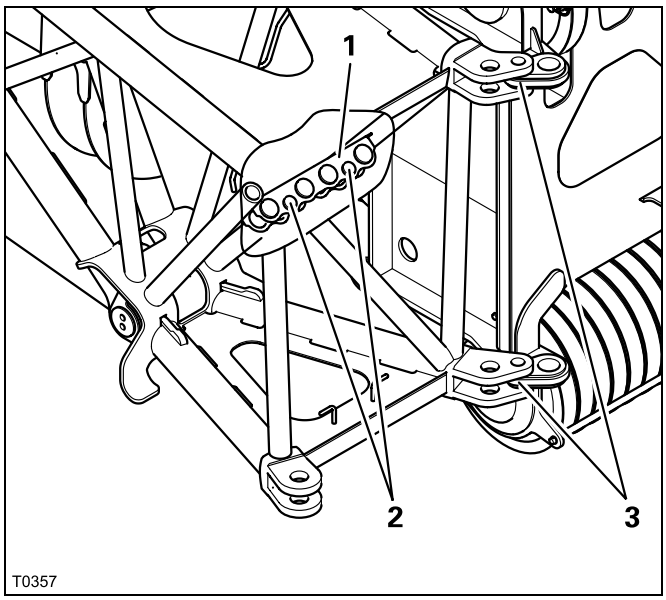
  The slewing axis (**1**) is now retracted and you can swing the lattice extension from the main boom head.

Releasing a slewing connection

The connection must be released after the lattice extension is swivelled onto the main boom side and pinned there during unrigging.

Risk of accidents from a falling lattice extension
When the lattice extension is folded to the side, make sure that all the connections are created as stipulated according to *CHECKLIST: Unrigging the 12/21 m (39/69 ft) swing-away lattice extension* for the lattice extension currently installed; ➠ p. 3 - 25, point 21. and point 24. to point 26.
In this way you prevent the lattice extension from slipping or falling from the boom when it is operated again after the connection is released and causing injury to you or other persons.

Danger of crushing by swinging lattice extension
When removing, always secure the lattice extension with a guide rope before releasing the slewing connection, and only insert the pins in the holders when the lattice extension has been set down.
In this way you prevent the swinging lattice extension from knocking you off the ladder, or crushing you against the main boom.



- Remove the retaining pins and pull the pins (**2**) out of the connecting points (**3**).
- Insert the pins into the holder (**1**).
- Secure the pins using the retaining pins.

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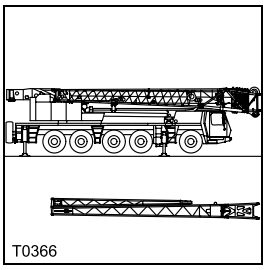
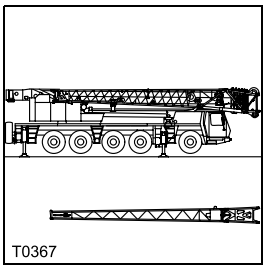
3.6.12 Establishing/releasing connections on the lattice extension

The procedure for establishing and releasing the connections between section 1 and section 2 depends on the transport condition of the sections.



– When section 1 and section 2 are folded up on the side for transportation, you only need to establish and release the connection on the left-hand side; ➠ *Section 1 and section 2 installed*, p. 3 - 70.



– If only section 1 is folded up on the side for transportation and section 2 is removed for transportation, you must establish and release the connections on both sides; ➠ *Only section 1 installed*, p. 3 - 72.

Risk of accidents due to falling parts
Always secure the pins both in the connecting points and in the holders using retaining pins. This prevents unsecured pins from becoming loose, falling out and causing injuries.

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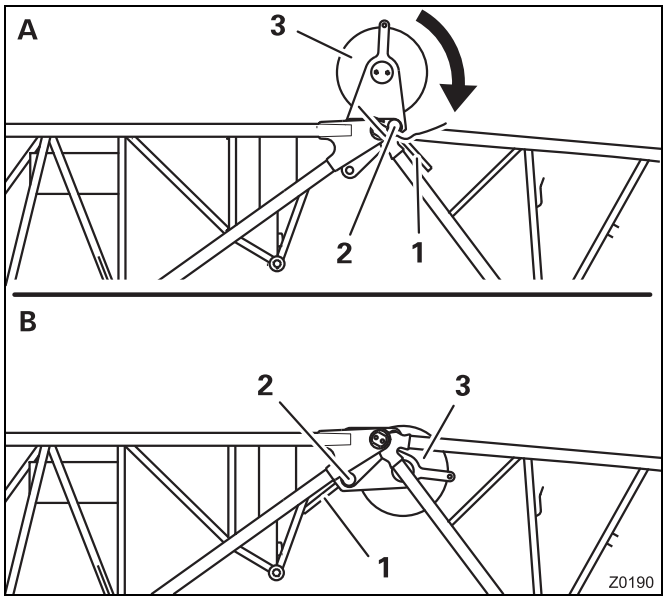
Folding in the deflection sheaves

For transportation you must fold in the deflection sheaves.

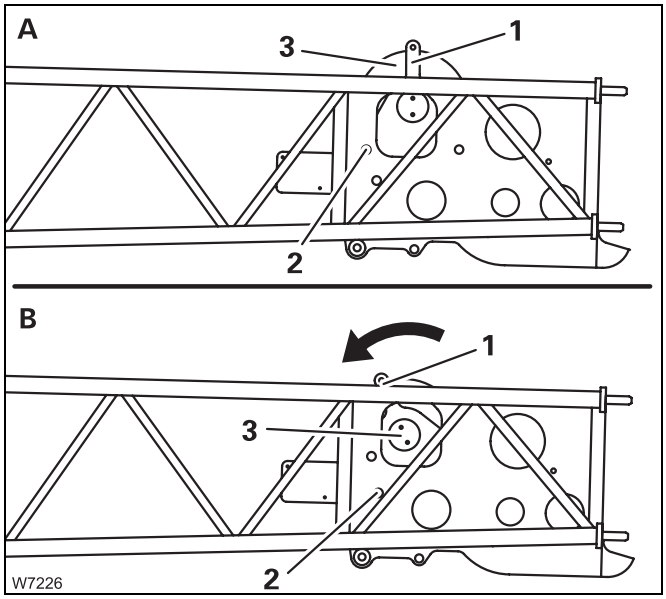
Danger of accidents by exceeding the permitted overall height!
Always fold in the deflection sheave when the lattice extension is folded onto the side of the main boom for driving. When the deflection sheave is folded out, the overall height specified for on-road driving is exceeded.

Risk of crushing
When you pull out the pins, always keep a firm grip on the *Rear deflection sleeve* with the handle, and keep at firm grip on the *Front deflection sheave* at the strut.
Your fingers might get crushed if you hold the sheave by the side plate.



Rear deflection sheave

- (**A**) – Unscrew the retaining pin from the pin (**2**).
- Hold the deflection sheave by the handle (**1**) and pull out the pin (**2**).
- (**B**) – Fold the deflection sheave (**3**) downwards and fasten it in this position with the pin (**2**).
- Secure the pin (**2**) using the retaining pin.



Front deflection sheave

- (**A**) – Unscrew the retaining pin from the pin (**2**).
- Hold the deflection sheave by the strut (**1**) and pull out the pin (**2**).
- (**B**) – Fold the deflection sheave (**3**) downwards and fasten it in this position with the pin (**2**).
- Secure the pin (**2**) using the retaining pin.

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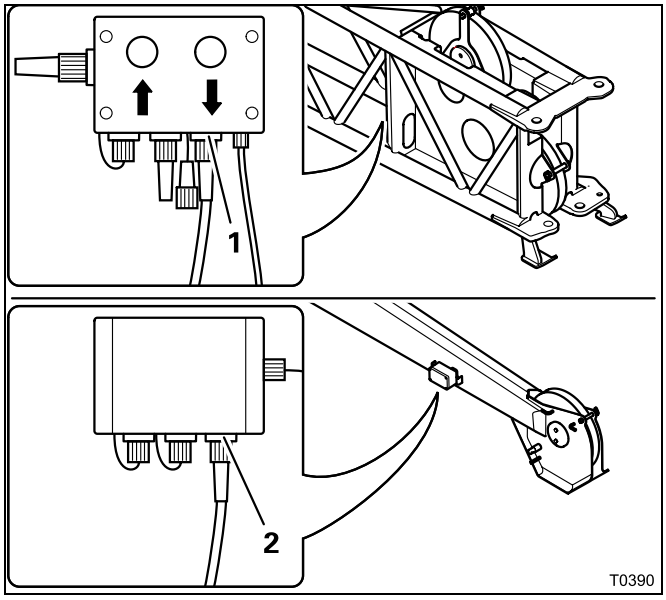
3.6.18 Air traffic control light – electrical connection

The air traffic control light (additional equipment) is mounted on the grip of the anemometer.

Establishing the electrical connection



On 12 m (39 ft) swing-away lattice extension:

- Mount the anemometer; ➠ p. 3 - 85.
- Loosen the protective cap on the socket (**1**).
- Insert the plug of the air traffic control light into the socket (**1**).

On 21 m (69 ft) swing-away lattice extension:

- Mount the anemometer; ➠ p. 3 - 87.
- Loosen the protective cap on the socket (**2**).
- Insert the plug of the air traffic control light into the socket (**2**).

Switching on/off

You can switch the air traffic control light on and off from the crane cab with the *Air traffic control light on/off* rocker switch if you connect it to the electrical power supply.

To switch on: press the rocker switch downwards

To switch off: press the rocker switch upwards

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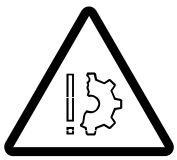
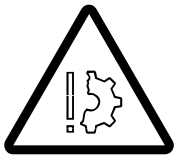
3.7.3 Telescoping with rigged lattice extension



Risk of overloading the main boom
If you telescope the main boom with a rigged lattice extension or boom extension, you must not rotate the superstructure at the same time.
This prevents the main boom being subjected to additional side forces and increased vibration and becoming overloaded.



Risk of damage to hydraulic hoses
Before telescoping with the hydraulically derricking lattice extension, check whether the locking device is released at the hose drum (➠ p. 3 - 38).
By doing this you prevent the hydraulic hoses tearing when the main boom is telescoped.

The information in this section also applies to telescoping with a rigged boom extension.

The telescoping of the main boom with rigged lattice extension is monitored by the RCL. Telescoping will only be enabled if the main boom is derricked to a certain angle and a maximum permissible load is not exceeded. The required angle (between 75° and 83°) depends on:
– the length of the lattice extension
– the angle of of the lattice extension
– the extended length of the main boom
– the rigged counterweight
– the rigged outrigger span

You will find the required main boom angle and the maximum permissible load (weight of the hook block) in the *Lifting capacity tables*, in Chapter *Rigging tables – Swing-away lattice extension*.

If the main boom angle is too small for telescoping with the rigged lattice extension, the RCL shows the corresponding error message.

The telescoping mechanism is operated in the same way as the main boom; ➠ *Operating instructions GMK 5220 – Telescoping mechanism*.

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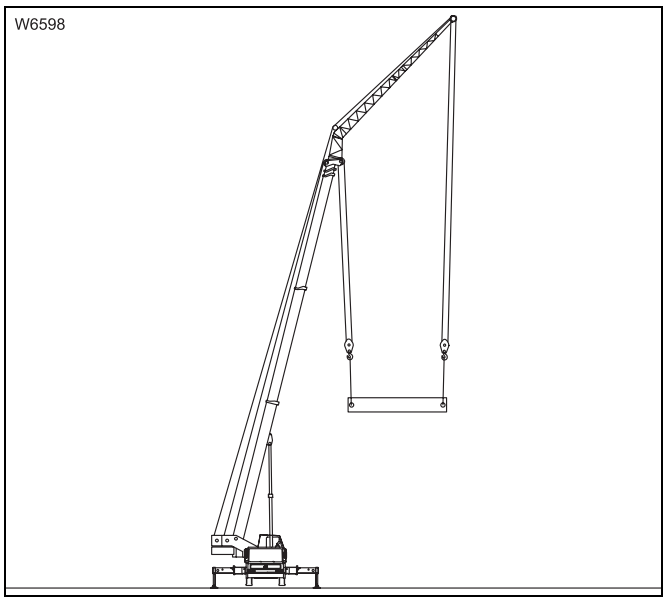
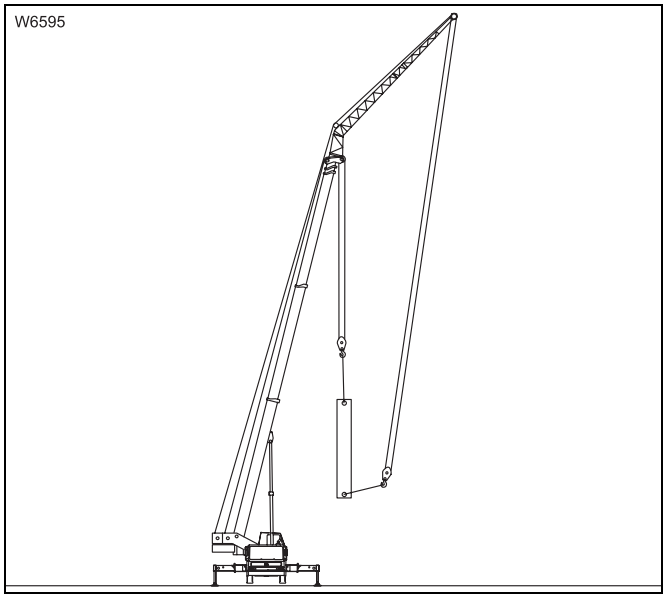


- Now lift the load with the hook block on the main boom until both slinging points are at the same height.



- Slacken the hoist rope on the lattice extension until the load is only hanging from the hook block on the main boom.

Turning the load has now been completed.

Please observe the following points when driving:

- Drive as slowly as possible.
- The turning radius should be as large as possible when driving around corners.
- Steer the truck crane only when it is rolling and avoid sudden steering movements.

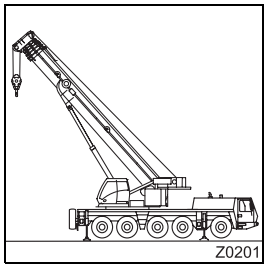
When the surface is uneven, the truck crane must be raised with the outrigger cylinders, horizontally aligned and then re-lowered, as described in the following section.

Levelling the free-standing truck crane

If the rigged truck crane is on wheels and the suspension is switched off, then you must not under any circumstances switch on the suspension.

Risk of overturning when switching on the suspension
As long as the rigged truck crane is on wheels, you must not turn on the suspension for any reason. The suspension is no longer under pressure and when the suspension is switched on, the suspension struts would be pressed together abruptly, damaging them and possibly causing the truck crane to tip over.

You must therefore align the truck crane as follows.



- Extend the outrigger cylinders until all wheels are just above the ground.
- Align the truck crane horizontally with the outrigger cylinders.

Risk of crushing when switching on the suspension
When the suspension is switched on, the wheels drop down suddenly. Ensure that nobody is in close proximity to the wheels when you switch on the suspension.

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4 Boom extension

4.1 Identification and slinging points

4.1.1 Identification

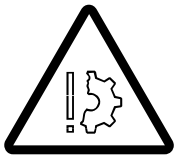
The boom extension consists of the 21 m (69 ft) swing-away lattice extension and two boom extension sections. The boom extension is designed for the truck crane it was delivered with. The parts which belong to the truck crane have the same serial number as the truck crane.

The following sections are identified by the serial number:

– Section 1 and section 2 of the 21 m (69 ft) swing-away lattice extension; ➠ p. 3 - 7,

– Section 3 (8 m (26 ft)) with deflection sheave

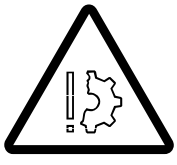
– Section 4 (8 m (26 ft)) without deflection sheave



Risk of accidents during operation with non-modified lattice extension
Operate the truck crane only with those sections of the boom extension which have the same serial number as the crane.
The RCL is only set for this boom extension.
This prevents malfunctions and damage.

For technical reasons a truck crane may only be set with one boom extension.

If you wish to use the boom extension on several GROVE truck cranes, the parts of the boom extension must be adjusted for these cranes and labelled with all of the respective serial numbers.



Risk of accidents if not adjusted correctly
The adjustment of the boom extension may only be carried out by **Manitowoc Crane Care**.

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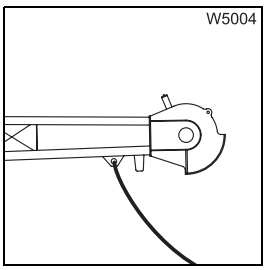
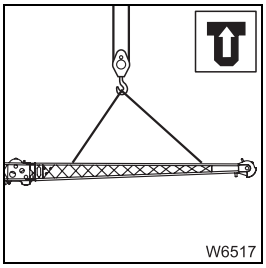
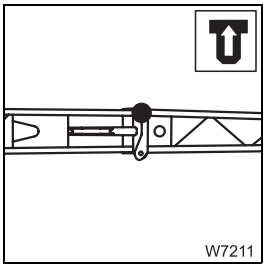


12. Fasten the guide ropes to the front of section 2.

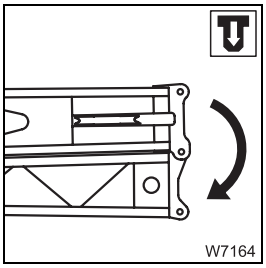


13. If section 2 is to be removed:
- Sling section 2 onto the auxiliary crane, centre of gravity; ➠ p. 3 - 10.
- Remove the locking pins between section 2 and section 1; ➠ p. 3 - 69.
- Set down section 2 on the separate vehicle.

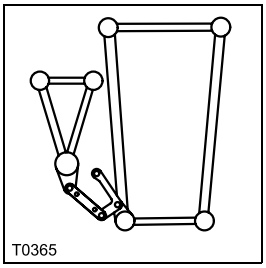
After removing section 2, proceed as from **item 17.**



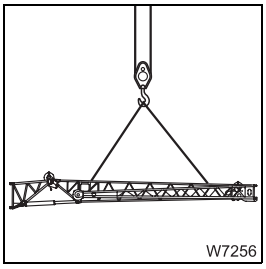
14. Disconnect the connection on the left between section 2 and section 1; ➠ p. 3 - 71.



15. Swing section 2 to the side of section 1; ➠ *When unrigging – section 2*, p. 3 - 68,



16. Move the connection in the *Middle* area into the position *Section 1/ section 2*; ➠ *Position Section 1/section 2*, p. 3 - 51.



17. Sling the lattice extension on auxiliary crane and fasten the guide ropes; ➠ *Centres of gravity for slinging*, p. 3 - 10.

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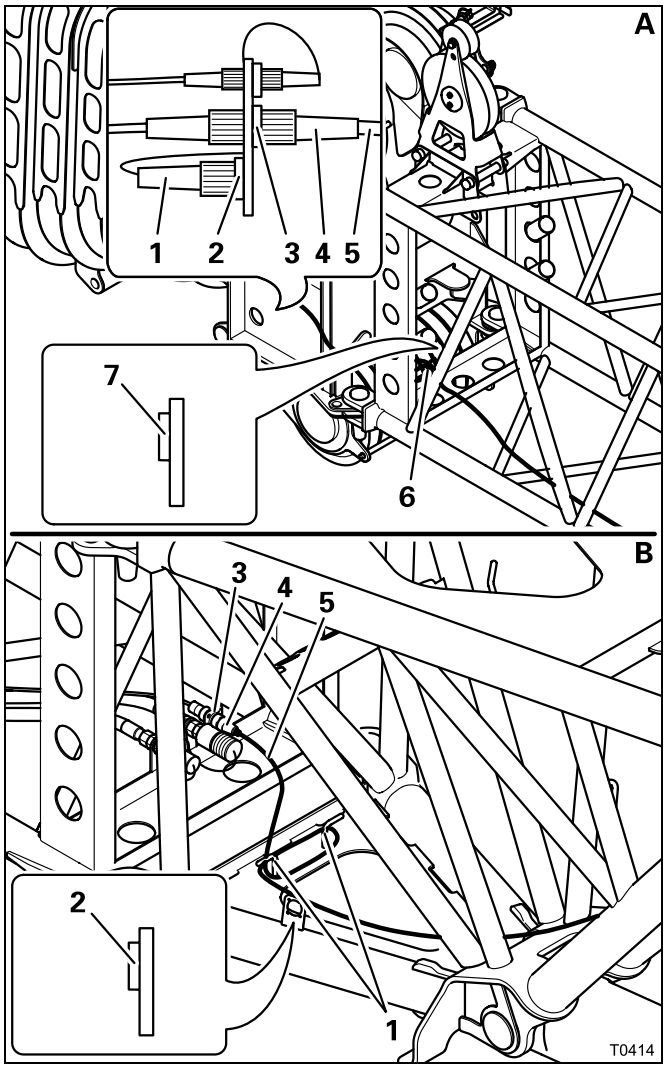
4.4.4 Electrical connection at the boom extension

On the 29 m (95 ft) boom extension



Establishing a connection

- (**A**) – Remove the bridging plug (**1**) from the socket (**3**) and insert it into the dummy socket (**2**).
- Unwind the cable (**5**) from the holder (**6**).
- Remove the bridging plug (**4**) from the dummy socket (**7**) and plug it into the socket (**3**).
- Wind up the cable (**5**) far enough on the clamp (**6**) so that it does not hang down.

- (**B**) – Remove the protective cap from the socket (**3**).
- Unwind the cable (**5**) from the holder (**1**).
- Remove the plug (**4**) from the dummy socket (**2**) and plug it into the socket (**3**).
- Wind up the cable (**4**) far enough on the clamp (**1**) so that it does not hang down.

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4.6 Driving with rigged truck crane and rigged boom extension

This section describes how you can move the truck crane with installed counterweight and rigged boom extension (e.g if, because of lack of space, the boom extension cannot be directly installed at the site).

Risk of accidents when driving with a lifted load
When using a boom extension, moving the truck crane with a load on the hook is not permitted.
Put the load down before you move the truck crane.

Risk of accidents due to swinging hook block
Secure the hook block against swinging when driving the rigged truck crane.

Risk of overturning when rotating the superstructure
When driving the rigged truck crane, the slewing gear brake must be closed.

Danger of accidents by being unable to overview the entire truck crane!
While driving the equipped truck crane, always stay in visual or radio contact with a banksman who can observe the parts which you cannot see. This prevent accidents resulting from collisions with persons, other construction equipment, ledges of buildings, cables or other objects.

Risk of accidents when driving from the crane cab
Before moving the truck crane from the crane cab, observe all instructions in the *Operating instructions GMK 5220* and set the rigging code described there for free-standing works; ➠ *Operating instructions GMK 5220 – Driving the truck crane from the crane cabin*.

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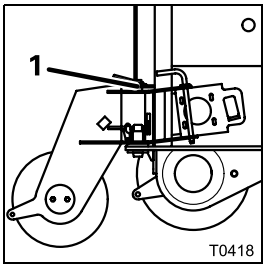
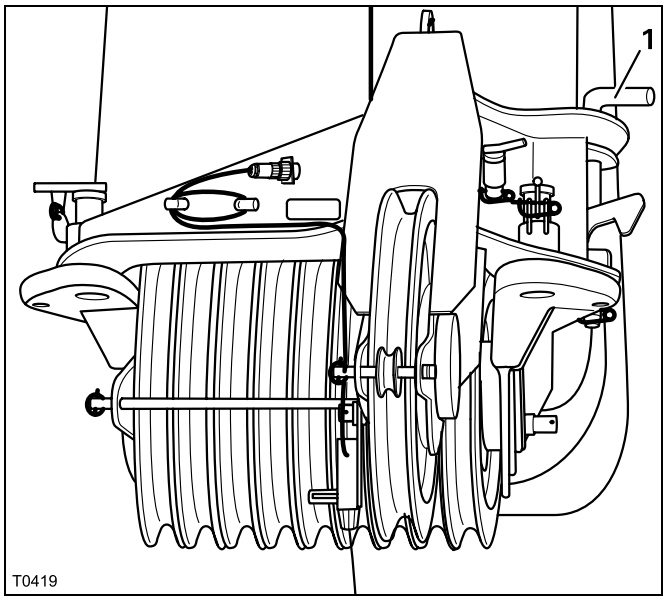
5.2 Installing/removing auxiliary single-sheave boom top

Risk of accidents if the auxiliary single-sheave boom top should fall off
Attach the auxiliary single-sheave boom top only at the designated slinging point.
Use only lifting gear with sufficient lifting capacity; ➠ *Auxiliary single-sheave boom top*, p. 2 - 2.

5.2.1 Installing the auxiliary single-sheave boom top



- Attach the auxiliary single-sheave boom top at the slinging point (**1**).
- Hoist the auxiliary single-sheave boom top in front of the main boom head.



- Plug the pin (**1**) into the bearing point and secure it with the retaining pin.
- Depending on the application, bring the auxiliary single-sheave boom top into transport position or working position;
  ➠ *Rigging in transport position*, p. 5 - 5,
  ➠ *Rigging in working position*, p. 5 - 6.

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5.5 Turning loads with the auxiliary single-sheave boom top

Two-hook operation is required for turning loads.
The only type of two-hook operation technically possible and protected by the RCL is described in this chapter using the turning of loads as an example.

Risk of accidents due to overloading
Lifting a load with two hooks is permitted only if the following instructions and illustrations are observed.
If these instructions are disregarded, accidents can occur due to individual parts of the truck crane being overloaded. The RCL then no longer provides protection.

Risk of accidents due to overloading
The load must always be lifted with the weakest part first (auxiliary single-sheave boom top).

For information on the position and function of the operating instruments required; ➠ *Operating instructions GMK 5220 – Part 2 Crane operation – Operating elements*.

5.5.1 Prerequisites

The following description requires that:

– the main hoist rope is reeved on the main boom

– the auxiliary hoist rope is reeved on the auxiliary single-sheave boom top

– the lifting limit switches for both hoists are connected

Risk of accidents due to overloading
The reeving on the main boom must be the equal or greater than the reeving on the auxiliary single-sheave boom top.
The main hoist rope and the main hoist will become overloaded if this condition is not met.

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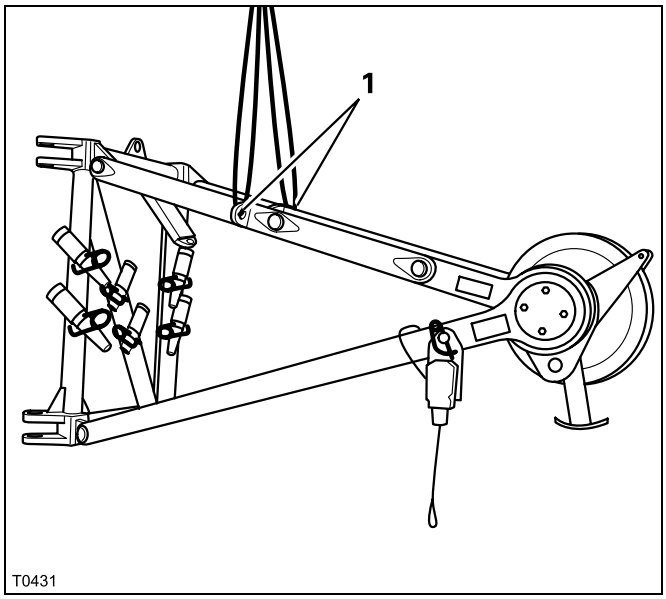
6.2 Attaching and securing the heavy load lattice extension

6.2.1 Slinging point

Risk of accidents due to the heavy load lattice extension falling down
Attach the heavy load lattice extension only as described in this section to ensure that it has the right centre of gravity.
Only use appropriate lifting gear having sufficient lifting capacity; ➠ *Heavy load lattice extension*, p. 2 - 2.



- Attach the heavy load lattice extension at the slinging points (**1**) at an angle of 0°. Now the heavy load lattice extension hangs in a horizontal position on the auxiliary crane.

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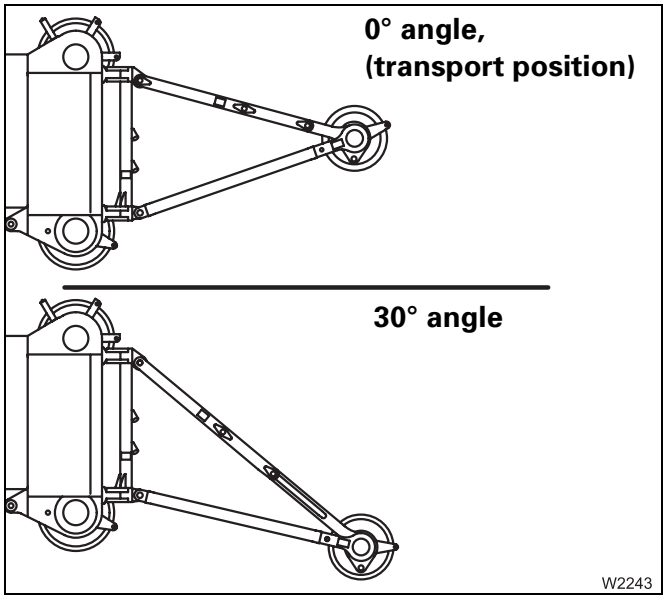
6.4.3 Setting the angle position of the heavy load lattice extension

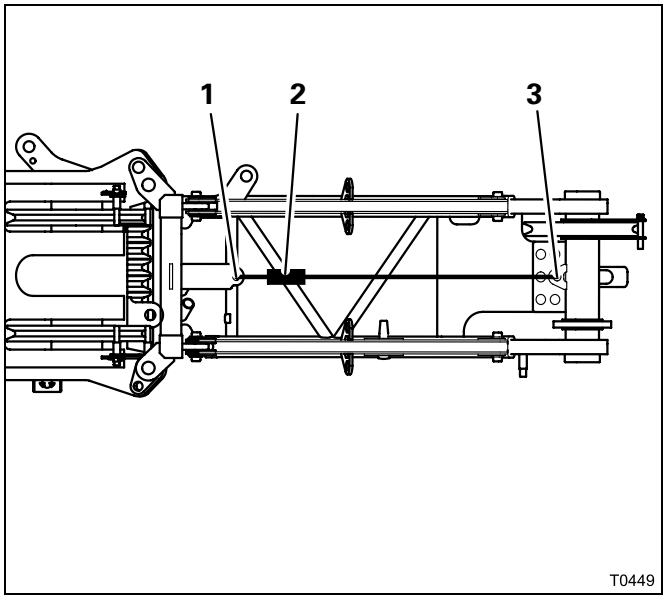


Depending on requirements, the heavy load lattice extension can be operated at two different angles.

Installing/ removing the chain hoist

Only use the chain hoist supplied to set the angle.

Risk of accidents from uncontrolled movements
When removing the chain hoist, the heavy load lattice extension must be set at an angle of 0° or 30°. This prevents the heavy load lattice extension from folding down in an uncontrolled manner and injuring or even killing you or others standing nearby.



Installation

- Attach the chain hoist (**2**) at the slinging points (**1**) and (**3**).

Removal

The heavy load lattice extension is set at a 0° or 30° angle.

- Unload the chain hoist (**2**).
- Remove the chain hoist at the slinging points (**1**) and (**3**).

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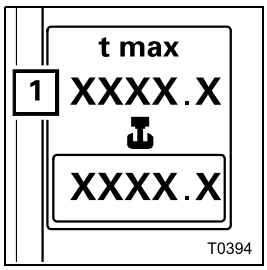
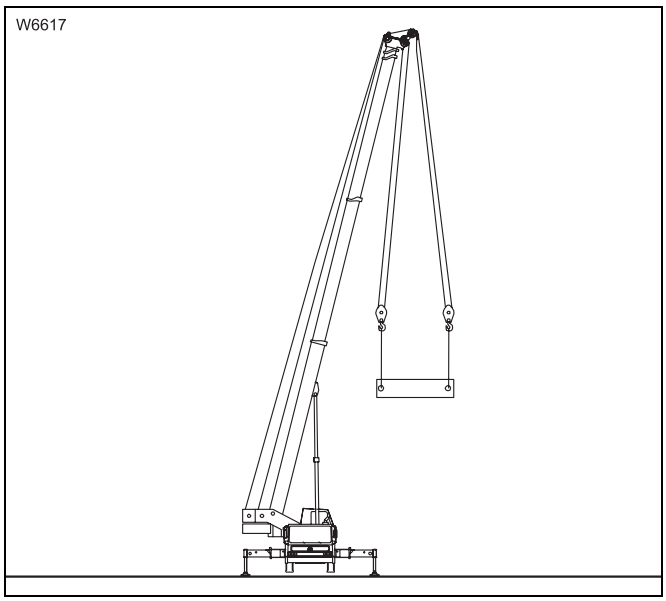
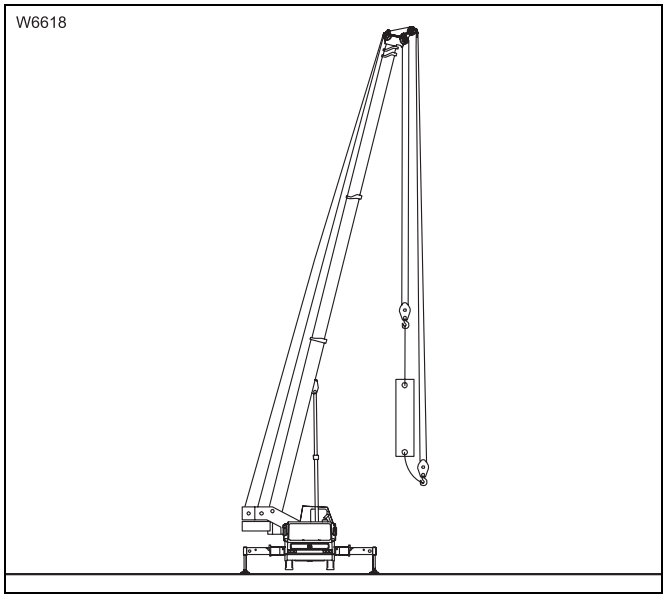


If the telescopic sections are mechanically locked, the RCL will now release the load according to the *Lifting capacity table* and the *Maximum load* display (**1**) shows the corresponding value.

Only the value for the empty hook curve is released and shown when the telescopic sections are unlocked.



- Now lift the load with the hook block on the main boom until both slinging points are at the same height.



- Slacken the hoist rope on the heavy load lattice extension until the load is only hanging from the hook block on the main boom.

Turning the load has now been completed.

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