Operating Instructions

GMK 3050

Serial number:

10.07.1996

2 085 427 en

1.3 Overview and contents of truck crane user information

1.3.1 Operating Instructions

These Operating Instructions contain information required to operate the truck crane.

Chapter 2 contains the *Basic safety instructions*. Please read and observe these instructions, even if you are familiar with the safety manual. The *Basic safety instructions* are only found in this chapter. Special safety instructions that relate to specific hazards are described in the section containing the operation associated with the respective hazard.

Chapter 3 contains *Information for applications engineering*. It is intended primarily for the truck crane operator and those responsible for applications engineering.

This chapter contains

- the required qualifications of those involved in applications engineering,
- special safety instructions,
- information that is relevant to applications engineering.

Chapters 4 to 6 contain information required to *drive the truck crane:* a description of all structural and operational components, clearly defined check lists for rigging modes and work and the operating instructions for road and off-road driving.

Chapters 7 to 9 contain information required to *operate the crane section,* i. e. work with the truck crane: a description of all structural and operational components, clearly defined check lists for rigging modes and work, the operating instructions for for individual units and a description of the various rigging procedures.

Chapter 10 contains information required to rig and operate the *Two-stage swing-away lattice extension.*

Chapters 11 and 12 contain *Troubleshooting* information for both the vehicle section and the crane section of the truck crane.

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- two-hook operation,
- operation when the crane is not on outriggers (free-standing) outside the authorized slewing range,
- defining SLI codes that do not correspond to the actual rigging mode,
- working with an overridden SLI,
- on-road driving in an unauthorized driving mode (axle load, dimension),
- moving the rigged crane in an unauthorized driving mode,
- using equipment that is not authorized for use with the crane,
- transporting passengers on unauthorized means of passenger transportation,
- carrying passengers outside the driver's cab,
- loading and unloading work, i. e. continuous operation without a corresponding break.

2.3 Organizational measures

Store the Operating Instructions and the lifting capacity table in a handy place in the truck crane.

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.

This includes:

- the use of hazardous materials,
- wearing protective clothing and equipment, or
- traffic regulations.

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

Ensure that the maintenance personnel possesses the knowledge necessary to safely operate the crane. Ensure that the maintenance personnel has access to the Operating Instructions.

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3.2 Applications engineering

3.2.1 Application engineering requirements

Plan each application carefully. Gather information concerning the route, including in particular

- the distance,
- the route,
- overhead clearances, and
- the load bearing capacity of bridges.

Gather information about the job including

- the load bearing capacity and stability of the ground (soil, buildings),
- the weight and dimensions of the loads to be lifted,
- the type of load (degree of risk involved),
- required stroke length and radius,
- restricted movement due to buildings etc.

Have the necessary equipment arranged, such as

- lifting gear
- counterweight
- blocks for support etc.

Organise transportation and obtain any necessary driving permits.

Poor planning leads to improvisation – and improvisation is the cause of many accidents!

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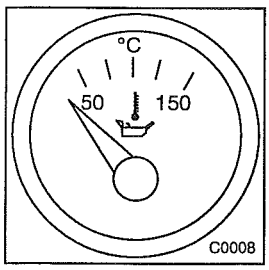
Automatic gearbox

➠ *Operating the automatic gearbox,* p. 6 - 16

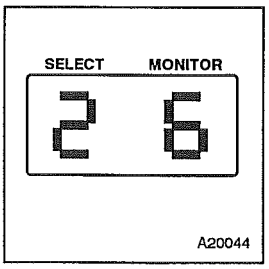


Status display for the automatic gearbox oil temperature

The gear oil temperature may not exceed 120 °C during on-road driving; ➠ p. 6 - 24.

Warning light for the automatic gearbox shift lock

Illuminates if a malfunction occurs in the automatic gearbox; ➠ p. 6 - 18



Display for automatic gearbox control

The monitor display always indicates the gear currently being used.
The select display shows the preselected driving range for **R** and **N** or the highest gear that is to be engaged by the automatic gearbox for driving range **D**; ➠ p. 6 - 16.

Switch for automatic gearbox neutral position N

May only be pressed when the vehicle is stationary. An acoustic signal acknowledges that the button has been pressed. The select display contains an **N**.
The monitor displays also shows an **N** if the automatic gearbox is in neutral position.
The automatic gearbox must always be shifted to neutral position **N** in order to start the diesel engine; ➠ p. 6 - 16.

Switch for automatic gearbox driving range D

May only be engaged when the vehicle is stationary and the diesel engine is running at idling speed.
An acoustic signal acknowledges that the button has been pressed.
The select display contains an **6**.
A warning signal sounds if the vehicle is moving or the engine speed is too high.
The monitor display shows an **2** if starting gear has been engaged.
This display changes with every gear change in the automatic gearbox.
➠ p. 6 - 17.

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Rocker switch for on-the-road level

Activate: Press the rocker switch down, until on-the-road level is reached.

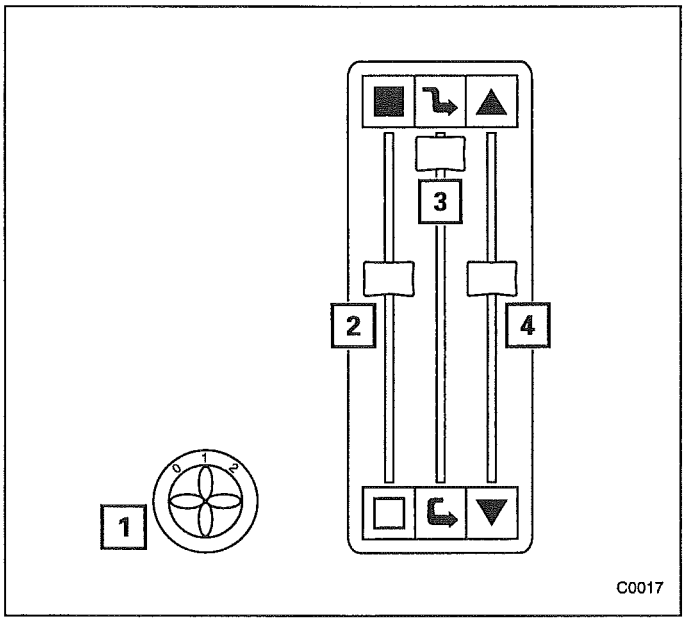
The indicator lamp *No on-the-road level* goes out when the truck crane has reached the on-the-road level.

Rocker switch for raising / lowering truck crane

Raise truck crane: Press the rocker switch up.

Lower truck crane: Press the rocker switch down.

Heating system for driver's cab



Heater control system

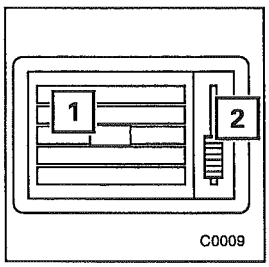
➠ p. 6 - 43

1 Heater fan knob
0 off
1 slow
2 fast

2 Heating temperature regulator,
up: warm
down: cold

3 Regulator for recirculated air / fresh air mode
up: Fresh air mode
down: Recirculated air mode

4 Air distribution regulator
up: Windscreen vents and air vents on the instrument panel
down: Cab floor:



Air vent with air flow regulator

1 adjustable ventilation louvre

2 air flow regulator;

➠ p. 6 - 44

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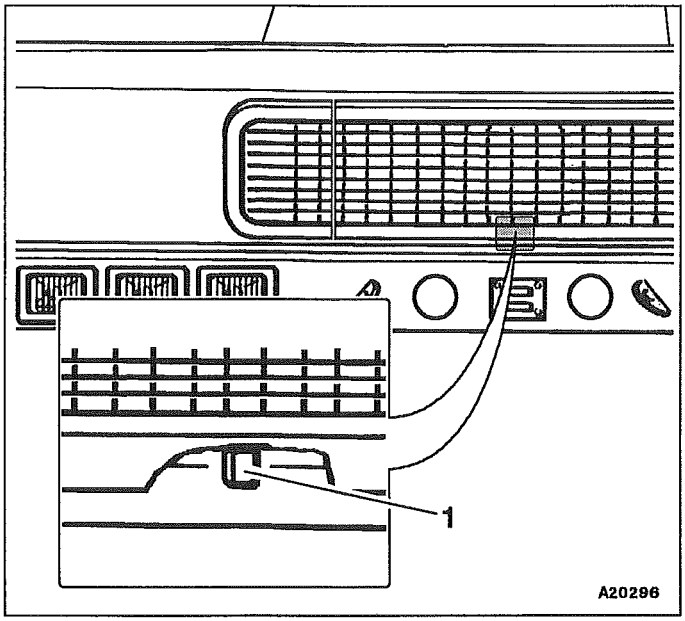
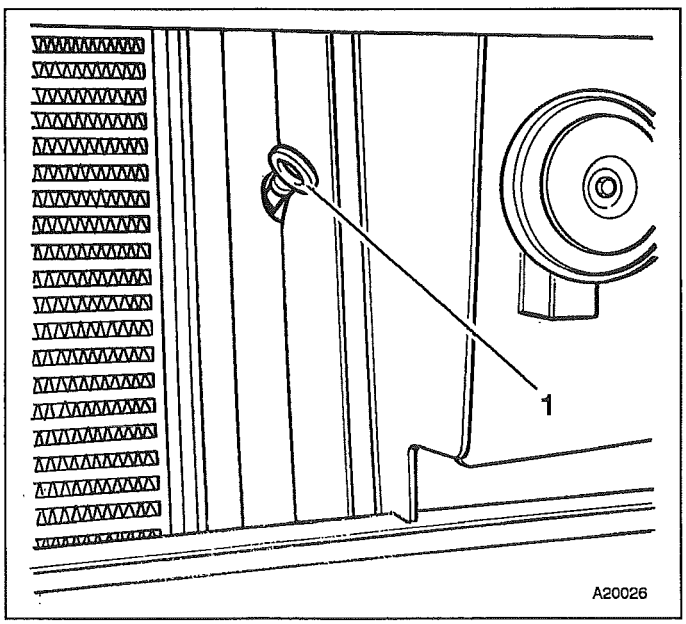
5.1.2 Inspections before starting the diesel engine

Checking the oil level in the diesel engine

Check the oil level in the diesel engine daily before commencing work. This requires that the truck crane is standing on a horizontal surface.



- Unlock the front grille (push lever (**1**) to the right) and remove it from the mounting brackets for the test.



- Check the oil level using the dipstick (**1**).

The oil level must always be between the MIN. and MAX. marks. Add engine oil if necessary.

- Hang the front grille back on to the mounting brackets.
- Press against the bottom of the front grille. You should hear the lock snap shut.

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Checking the oil level in the automatic gearbox

The oil level in the automatic gearbox cannot be checked when the diesel engine is switched off.

- Check the oil level in the automatic gearbox daily before commencing work. This requires that the truck crane is standing on a horizontal surface.

Checking the level of the cold gear oil daily prevents gear damage caused by the unnoticed loss of gear oil.

The accurate measurement of the oil level requres that the temperature of the gear oil be between 70 °C and 90 °C. The oil level should therefore be measured e. g. after driving or during a work break. The maintenance manual explains how to heat the gear oil without having to drive the truck crane.

- Lock the parking brake.
- Switch the automatic gearbox into neutral position **N**.
- Let the diesel engine run in neutral gear for at least one minute.
- Switch the automatic gearbox into driving range **D**.
- Let the diesel engine run at a speed of 1000–1500 rpm for 30 seconds.
- Switch the automatic gearbox into driving range **R** for approx. 5 seconds.
- Switch the automatic gearbox into neutral position **N**.
- Let the diesel engine run in neutral gear when checking the oil level.

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Driving mode table

Driving mode of the truck crane on public roads with a maximum axle load of 12 t :

	Equipment	Driving mode					
		1	2	3	4	5	6
A	Tyres 14.00 R 25	X	X	—	—	X	X
	Tyres 16.00 R 25	—	—	X	X	—	—
	Drive 6 x 6 x 6	—	X	X	X	—	X
	Auxiliary hoist	—	—	—	X	X	—
	Telma eddy current retarder	—	—	—	X	—	X
B	Spare wheel	●	●	—	—	—	—
	12 t - Hook block	—	●	●	—	●	●
	28 t - Hook block	●	—	—	●	—	—
	Tetelescopic swing-away lattice extension	●	●	●	●	●	●
	Counterweight section 1.3 t	●	●	●	—	●	●
	Counterweight section 3.5 t	—	—	—	—	—	—

How to use the table:

The driving mode of your truck crane depends on the equipment specified under **A**.

Every truck crane has a driving mode.

Use the table to determine the driving mode of your truck crane. Move to section **B** to determine the equipment that you may carry on your truck crane during on-road driving on the basis of the respective driving mode.

Example: Your truck crane has a 6 x 6 x 6 drive and 14.00 R 25 tyres.
The correct driving mode is **2**.
According to column **2**, you may carry the spare wheel, the 12 t hook block, the two-stage swing-away lattice extension and the 7 t counterweight on your truck crane.

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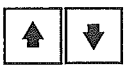
D

Switch for driving range D of automatic gearbox = normal automatic driving range

The automatic gearbox automatically selects the appropriate forward gear from gears 2 to 6 in driving rage **D**.
The automatic gearbox begins driving in second gear and automatically upshifts and downshifts via the hydraulic torque converter. The gear display changes correspondingly in the Monitor status display.
The converter is bridged and purely mechanical power is generated by the diesel engine and transmitted to the automatic gearbox in all forward gears and every driving range when the respective number of revolutions and speed have been reached.

The gearbox electronics establishes gear selection and shifting point using the travelling speed, the position of the accelerator and the load condition.



Selector switch for automatic gearbox upshifting or downshifting

You may shift gears manually using the selector switches *Upshifting* and *Downshifting*. Press the respective selector switch once or as often as necessary. The Select status display will show the highest possible gear that you have selected. The Monitor status display will also show the gear as soon as the automatic gearbox has switched to this gear.

First gear may only be reached through manual downshifting. First gear may be used to drive on difficult terrain or deep snow or to shunt in narrow areas.
The truck crane reaches its highest lifting capacity and engine braking power in first gear.

R

Switch for driving range R of automatic gearbox = reverse gear

The truck crane drives backwards in driving range **R**.
The Select status display contains an **R**. The Monitor status display also shows an **R** if reverse gear has been engaged.

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6.2.4 Cruise control

The truck crane is equipped with cruise control. This allows you to drive at the speed of your choice without difficulty or to operate the truck crane at a specific idling speed for a longer period of time.

Cruise control only works if you are driving at a speed of 30 km/h or more.

Accidents may occur due to carelessness!
You must remain alert and ready to brake when using the cruise control!

Activating cruise control

- Press the *Cruise control* rocker switch down when you have reached the speed at which you wish to drive.

The *Cruise control* indicator lamp indicates that the cruise control function is active.

Driving with cruise control

When driving with cruise control, you may release the accelerator without changing the defined speed.

If you wish to increase the speed, e. g. in order to pass another vehicle, you may press the accelerator and increase the speed of the diesel engine without erasing the predefined cruising speed. The truck crane will return to the defined cruising speed when you release the accelerator.

Cruise control is deactivated if you press the service brake, the retarder or the Telma eddy current retarder.

Accidents may occur if the driving speed is too high.
Do not activate cruise control when you are driving on downhill slopes as the cruise control device cannot decelerate your truck crane. The driving speed of your truck crane could be greater than the speed which you have set on the cruise control device.

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Tilting the mobile crane lengthwise or crosswise

- Select the direction of movement of the level adjustment using the rocker switch *Raise / lower vehicle level*:

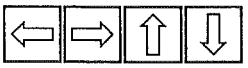
Raise truck crane: Press the rocker switch up.

Lower truck crane: Press the rocker switch down.

The indicator lamps *Raise vehicle level* and *Lower vehicle level* show the selected direction of movement.

- Let the truck crane roll at approx. 3 km/h during the level change.

Applying the brakes during the level change increases tyre wear as well as the load on the suspension cylinders. You should therefore release the parking brake and allow the truck crane to roll during a level change whenever possible.



Using the rocker switches you may tilt the truck crane
– forward or backward (longitudinal tilt) or
– to one side (diagonal tilt):

raise or lower at the front,

raise or lower at the rear,

raise or lower on the right-hand side,

raise or lower on the left-hand side,

The indicator lamp *No on-the-road level* will illuminate as soon as the truck crane is no longer at on-the road-level.

Be careful not to damage the suspension cyclinders!
The distance the truck crane is raised or lowered changes the suspension range accordingly. Drive carefully after changing the vehicle level in order to prevent damage to the suspension cylinders!

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6.5.3 Additional water heating system (additional equipment)

Preheating the diesel engine

The diesel engine may be preheated using the additional heating system. The *Heating air temperature* regulator in the driver's cab must be set to *Warm* and the blower should be off.

If you run the additional heating system while the engine is off, the batteries will empty. If you use the additional heating system frequently, you must recharge the batteries in shorter intervals!

When the diesel engine is running, the additional heating system supports the heating power of the diesel engine if outdoor temperatures are low and it has not sufficiently heated the coolant.

When the operating temperature of the diesel engine has been reached, a thermostat turns off the heater, while the pump of the heating system remains on.

Once the heater has been turned off, the additional heating system should be turned off manually to prevent it from starting up again.

Preheating the driver's cab

If you turn on the blower as described in the section *Heating the driver's cab,* p. 6 - 43, the driver's cab will be heated at the same time.

If you heat the driver's cab at the same time, the amount of time required to preheat the diesel engine will increase significantly.

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7 Description of the truck crane – crane section

7.1 Overview of the operating and display instruments

This section only contains the operating and display instruments for crane operation that are located on the outside of the truck crane or in the crane cab.

Operating and display instruments used for the vehicle section must also be monitored when driving the truck crane from the crane cab. An overview of these instruments may be found in Chapter 4.

7.1.1 Overview of crane section

The figures on the following pages illustrate the location of the operating and control instruments that are required for crane work.

All operating and display instruments used to start a cold diesel engine and drive the truck crane from the driver's cab are described in Chapter 4.

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1 Anemometer (additional equipment) ➠ p. 7 - 46

2 Off-the-road gear indicator lamp ➠ p. 7 - 50

3 On-the-road gear indicator lamp ➠ p. 7 - 50

4 Indicator lamp for separate steering release ➠ p. 7 - 52

5 Indicator lamp for 7.0 t counterweight ➠ p. 7 - 31

6 Indicator lamp for counterweight hoist unit – position locked ➠ p. 7 - 31

7 Indicator lamp for vehicle parking brake ➠ p. 7 - 52

8 Indicator lamp for drive of second axle line (for 6 × 6 drive only, additional equipment) ➠ p. 7 - 51

9 Indicator lamp for transverse differential locks ➠ p. 7 - 51

10 Indicator lamp for 10.5 t counterweight ➠ p. 7 - 31

11 Indicator lamp for counterweight hoist unit – position locked ➠ p. 7 - 32

12 Indicator lamp for complete extension of counterweight hoist unit ➠ p. 7 - 31

13 Rocker switch for transfer case off-the-road gear ➠ p. 7 - 50

14 Rocker switch for transfer case on-the-road gear ➠ p. 7 - 50

15 Rocker switch with lock button for separate steering release ➠ p. 7 - 52

16 Rocker switch for locking / unlocking counterweight ➠ p. 7 - 31

17 Rocker switch for vehicle parking brake ➠ p. 7 - 52

18 Rocker switch for drive of second axle line (for 6 × 6 drive only, additional equipment) ➠ p. 7 - 51

19 Rocker switch for transverse differential locks ➠ p. 7 - 51

20 Rocker switch with indicator lamp for counterweight lifting gear release ➠ p. 7 - 31

21 Rocker switch for counterweight hoist unit extension / retraction ➠ p. 7 - 31

22 Rocker switch with indicator lamp for counterweight hoist unit prestress ➠ p. 7 - 31

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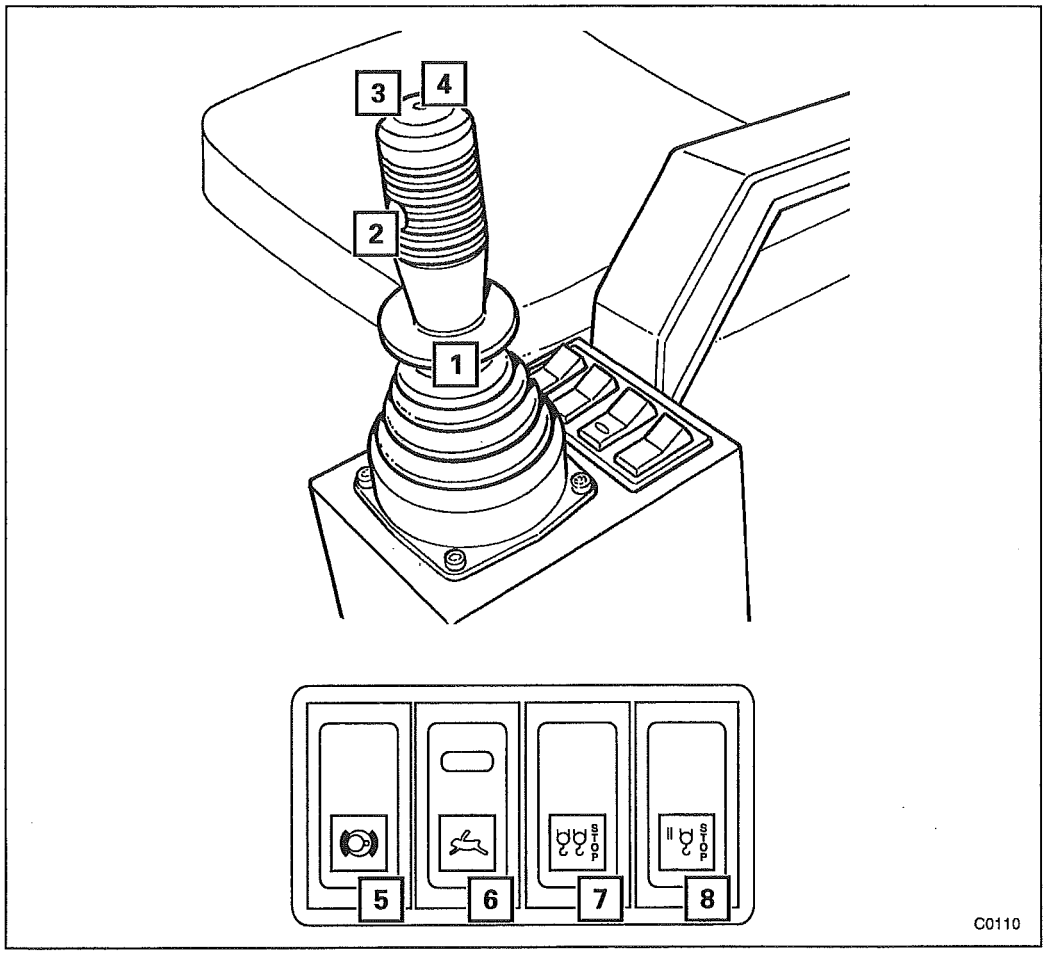
7.1.5 Left control console



1 Control lever for slewing gear and auxiliary hoist (additional equipment) p. 7 - 34
p. 7 - 33

2 Horn button

3 Dead man's switch p. 7 - 58

4 Hoist drum synchro for auxiliary hoist (additional equipment) p. 8 - 36

5 Rocker switch for slewing gear permanent brake p. 7 - 34

6 Rocker switch with lock button for fast speed p. 7 - 32
p. 7 - 33
p. 7 - 35
p. 7 - 36

7 Rocker switch for two-hook operation shutdown (additional equipment) p. 7 - 33

8 Rocker switch for auxiliary hoist shutdown (additional equipment) p. 7 - 33

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Auxiliary hoist (additional equipment)

➠ *Auxiliary hoist,* p. 8 - 37

Rocker switch for auxiliary hoist shutdown

Shuts off the auxiliary hoist to prevent inadvertent operation.

Deactivate auxiliary hoist: Press the rocker switch down.

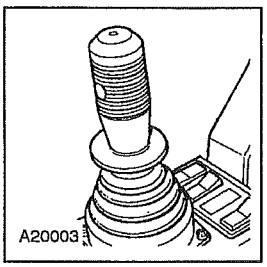
Activate auxiliary hoist: Press rocker switch up.

Rocker switch for two-hook operation shutdown

Both hoists may be operated at the same time with different speeds and in different directions during two-hook operation.

Deactivate two-hook operation: Press the rocker switch down.

Activate two-hook operation: Press rocker switch up.



Control lever left

Raise auxiliary hoist: Pull control lever back.

Lower auxiliary hoist: Push control lever forward

Rocker switch with lock button for fast speed

The rocker switch may only be pressed down if the lock button is pressed down simultaneously.

Activate fast speed: Press the rocker switch down.

Deactivate fast speed: Press the rocker switch up.

Lifting limit switch warning lamp

Illuminates when a lifting limit switch responds. All movements which increase the load moment are switched off; ➠ *Lifting limit switch,* p. 7 - 57.

SLI early warning lamp

Illuminates when 90% of the permissible load has been reached. An intermittent buzzer tone sounds at the same time. ➠ *SLI early warning,* p. 8 - 25.

SLI shutdown warning lamp

Lights up if the SLI has shut dowm crane movements which increase the load moment because the maximum load has been reached or an error message has been received. A continuous buzzer tone sounds at the same time; ➠ *SLI shutdown,* p. 8 - 26.

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Lamp test and SLI display dimmer

After switching on the ignition the basic brightness of the SLI displays, warning and indicator lamps automatically adapt to the ambient light.

Lamp test

Briefly press down the rocker switch for *lamp test and SLI display dimmer*. All displays, warning and indicator lamps illuminate for approx. 2 seconds with maximum brightness, then with automatically adjusted brightness.

SLI display dimmer

To switch on the function *SLI display dimmmer* briefly press up the rocker switch for *lamp test and SLI display dimmer*.

To adjust the brightness of the SLI displays briefly press the rocker switch up or down again.

SLI displays brighter:	press rocker switch up
SLI displays darker:	press rocker switch down

The function *SLI display dimmer* switches off 3 to 5 seconds after the last brightness adjustment.

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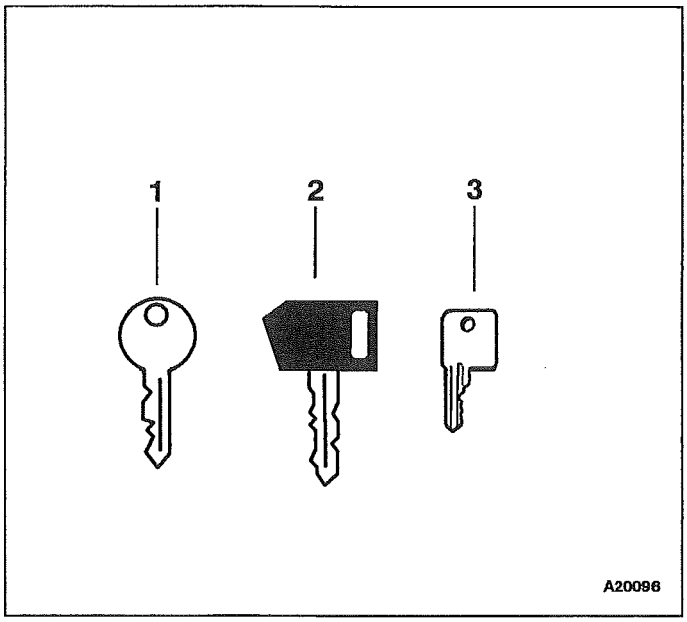
7.2.4 Other operating instruments on the crane cab

Doors, keys, windows

The following keys belong to the crane cab of your truck crane:

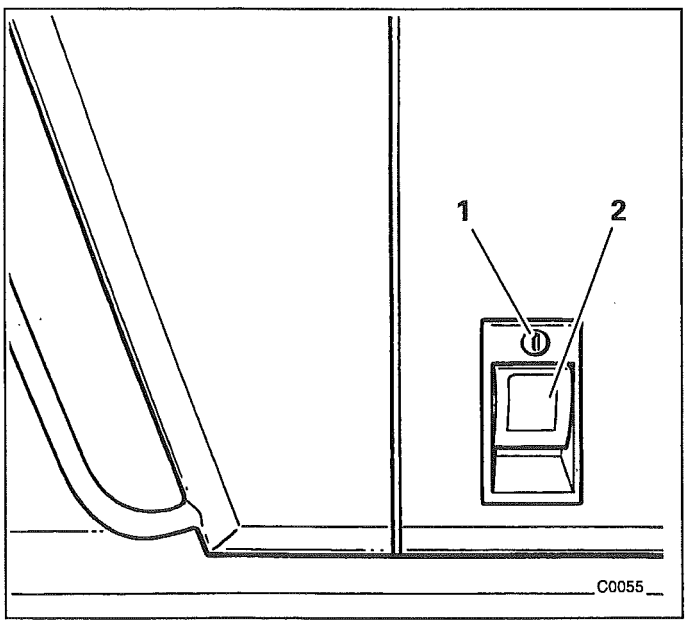


1 Crane cab door lock

2 Crane cab ignition lock

3 Key switch for SLI override

The lock on the door of the crane cab may be locked from the outside using the door key.



Open lock: Turn key (1) to the right

Close lock: Turn key (1) to the left

Open door: Pull lever (2).

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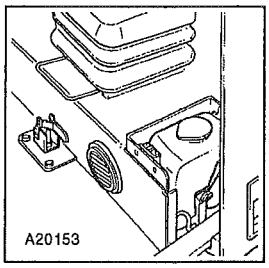
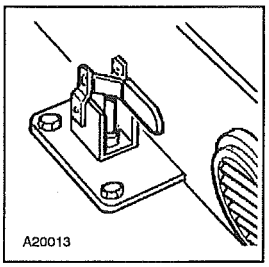
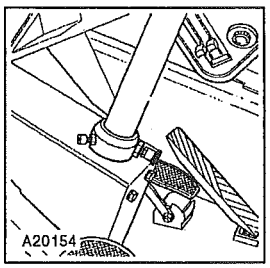
11. The lamp test has been performed on the SLI and the contrast of the SLI status display has been set in such a way that all of the displays are easily read; ➠ p. 8 - 17.



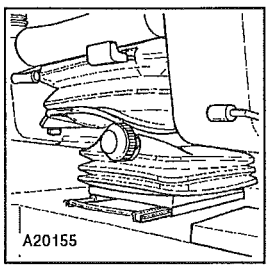
12. The level of the windscreen washing system is regulated; ➠ *Checking the windscreen washing system reservoir,* p. 8 - 13.



13. The superstructure lock is released; ➠ *Superstructure lock,* p. 8 - 12.



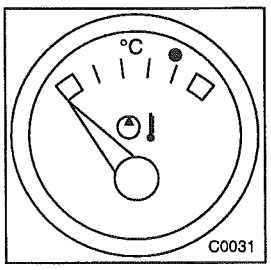
14. The steering wheel with steering column has been removed, if necessary; ➠ *Removing the steering wheel,* p. 8 - 53.



15. The crane operator's seat has been suitably adjusted; ➠ *Adjusting the seat,* p. 7 - 55.

16. The mirrors for monitoring the outrigger and the hoist are correctly adjusted; ➠ *Adjusting the mirror,* p. 8 - 13.

17. The electrical system (spotlight for working area, windscreen wiper/washing system, horn) has been checked to ensure perfect working order; ➠ *Electrical system,* p. 8 -14.



18. Check the temperature of the hydraulic oil; preheat the hydraulic oil if necessary; ➠ *Preheating the hydraulic oil,* p. 8 - 11.

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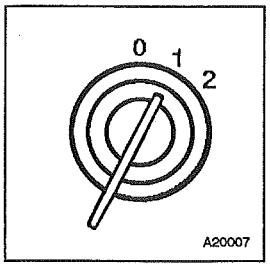
8.2 Operating the safe load indicator

8.2.1 Switching on the SLI

Activating



The SLI is switched on with the ignition.

A test programme is run in the SLI in the first 5 seconds.
During this time

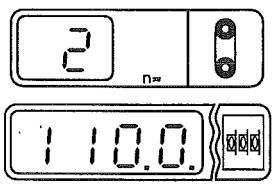
- the warning lights *SLI early warning* und *SLI shutdown* illuminate,
- the numbers in the displays constantly change or flash and
- an acoustic signal (continuous buzzer tone) sounds.

The test programme also runs after every voltage drop, e. g. when starting the engine.

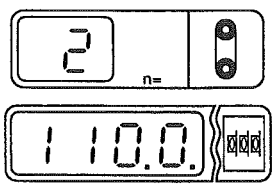
After completion of the test programme

- the *SLI shutdown* warning lamp lights up,
- the *SLI early warning lamp* lights up
- the continuous buzzer tone continues to sound.

Different numbers are shown in the *Working position* and *Reeving* displays, depending on the length of time for which the SLI was switched off:



- If the SLI was only switched off briefly, the last settings and the signalling point are shown in both displays.



- If the SLI was switched off for longer than 12 hours, the digit zero and the signalling point appears in both displays.

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Optional status displays

You can have the the information listed in the following section shown in the *Information* display.

- To do this, press the appropriate membrane key.
  The green indicator lamp in the membrane key lights up and the current value appears in the *Information* display.

If a different membrane key was pressed before the selection was made, the green indicator lamp in the membrane key goes out and the displayed value changes.

– Permissible slewing range in degrees with the *Slewing angle* membrane key

– Current main boom angle in degrees with the *Main boom angle* membrane key

– Current main boom length in metres with the *Main boom length* membrane key

– Current height of the roller head in metres with the *Height of the roller head* membrane key

– Current angle of the lattice extension in degrees with the *Angle of the lattice extension* membrane key

– Current degree of utilization with the *Degree of utilization* membrane key

– Current hydraulic oil pressure in bar in the lower chamber of the derricking cylinder with the *Hydraulic oil pressure in the derricking cylinder lower chamber* membrane key.

– Current hydraulic oil pressure in the upper chamber of the derricking cylinder in bar with the *Hydraulic oil pressure in derricking cylinder lower chamber* membrane key.

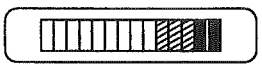
More detailed information on the respective displays ➠ Chapter 7.2 *Functional description of the display and operating instruments.*

If a selector key is which has no function assigned to it is pressed, the value in the *Information* display does not change and the green indicator lamp in the key does not light up.

SLI early warning

If the actual load amounts to approximately 95% to 100% (depending on the regulations of the country in question) of the maximum permissible load or more, the *SLI early warning lamp* lights up. The intermittent buzzer tone sounds at the same time.

- Press the *Acknowledge* key to switch off the buzzer tone.



The load is shown in the *Degree of utilization* display. The green and yellow LED's light up.

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8.3.2 Hoists

Main hoist

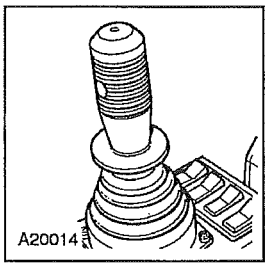
- You may work with the main boom or the lattice extension using the hoist rope on the main hoist.

Accidents may occur due to the inadvertent operation of a hoist!
Always switch off the hoist that is not in use!
You may no longer turn the drum if the hook block is unreeved and you have reeled the hoist rope in completely.
- If the hoist rope is unintentionally turned in lowering direction, the switching point of the lowering limit switch changes which results in slack. This causes rope loops to form on the hoist drum which can lead to load slipping and damage to the hoist rope.
- If the hoist rope is unintentionally turned in lifting direction, the switching point of the lowering limit switch changes, leaving less than the required number of safety windings on the drum.

- Switch on the main hoist.
  Press up the rocker switch *Deactivate main hoist* on the right control lever.

- Check whether two-hook operation is switched off.
  The *Two-hook operation* rocker switch on the left control lever must be pressed down.

- Check whether auxiliary hoist (additional equipment) is switched off.
  The *Two-hook operation* rocker switch on the left control lever must be pressed down to prevent the unauthorized use of the auxiliary hoist.



Lift: Pull the right-hand control lever back.

Lower: Push the right-hand control lever forward

You may regulate the speed of the main hoist by moving the control lever and changing the engine speed using the accelerator.

You may set a constant engine speed using the *Constant engine speed* rocker switch; ➠ p. 8 - 47.

You may set a higher speed using the *Fast speed* rocker switch; ➠ p. 8 - 48.

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You may regulate the telescoping speed by moving the control lever and changing the engine speed using the accelerator.

You may set a higher spped using the *Fast speed* rocker switch; ➠ p. 8 - 48.

You may set a constant engine speed using the rocker switch *Constant engine speed;* ➠ p. 8 - 47.

You can press the *Derricking gear / telescoping gear shutdown* rocker switch down to prevent the unauthorized use of the auxiliary hoist.

The distance between the hook block and the boom head also changes during telescoping. Reel off the hoist rope when retracting and reel it on when extending the telescoping.

Be careful not to damage the hoist rope!
Slack rope will occur if the hook block is allowed to touch the ground when retracting the telescoping. This causes rope loops to form on the hoist drum which can lead to load slipping and damage to the hoist rope.

Telescoping movement is shut off if the hook block reaches the lifting limit switch when extending.

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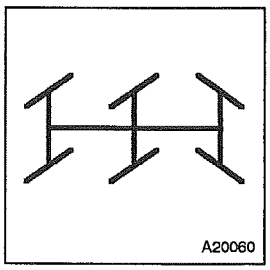
Steering

You must first remount the support column and the steering wheel if you removed these during crane work; ➠ *Removable steering wheel,* p. 8 - 53.

The first and second axle line are steered using the steering wheel.

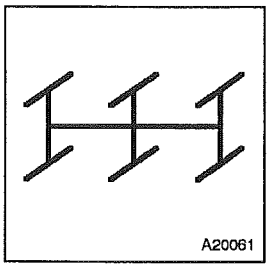
If separate steering is released, the third axle line is steered using the rocker switch *Separate steering*.

When the superstructure with the crane cabin is turned to the rear: steering the first and second axle with the steering wheel and the third axle with the separate steering rocker switch in the crane cabin causes the wheels to react in one way. The same steering actions in the drivers's cab cause the wheels to react in the opposite way to the way they react when steered from the crane cabin.
Turning the steering wheel to the right results in a right turn.



All-wheel steering mode:

The turning circle of the truck crane will become smaller if you turn the wheels of the front and rear axle lines in opposite direction.



Crab travel mode:

The truck crane will move sideways if you turn the wheels of the front and rear axle lines in the same direction.

Unlocking the steering of the third axle line

You must first unlock the steering before you can steer the third axle line.

- Press the *Release separate steering* rocker switch down.
  This requires pressing the lock button down.

The indicator lamp *Release separate steering* illuminates when the steering is unlocked.

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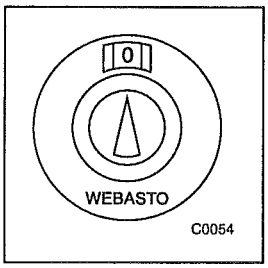
8.6.2 Ventilating the crane cab



The crane cab can be ventilated with fresh air using the blower of the heating system.
Turn the *Crane cab heating* regulator to the **blue** position.

The indicator lamp in the regulator will not illuminate.

You may also open the sliding window in the door or push out the windscreen to ventilate the crane cab; ➠ p. 7 - 54.

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The outrigger pressure for the intended use of the crane may be found in the outrigger pressure table. The maximum outrigger pressure and the size of the outrigger pads may be found in the chapter *Technical specifications*, p. 13 - 14.

The following table contains approximate values for the load bearing capacity of the ground.

If you are unsure of the load bearing capacity of the ground at the site, have the ground tested (e. g. with a ram probe).

Approximate values for the load bearing capacity of the ground		**Load bearing capacity (t/m^2)**
Backfilled, not artificially compacted soil		0 to 10
Grown, obviously untouched soil:		
mud, peat, marsh		0
non-cohesive, sufficiently weathered ground:	fine to medium-grain sand	15
	course sand to gravel	20
cohesive soil:	pulpy	0
	soft	4
	stiff	10
	semi-solid	20
	hard	40
solid rock with few cracks in healthy unweathered condition and favourable bedding:	in closed succession of beds	150
	massive or columnar formation	300

Calculate the required surface area of the outrigger:

$$\textbf{surface area for outrigger } (m^2) = \frac{\textbf{outrigger pressure (t)}}{\textbf{load bearing capacity } (\frac{t}{m^2})}$$

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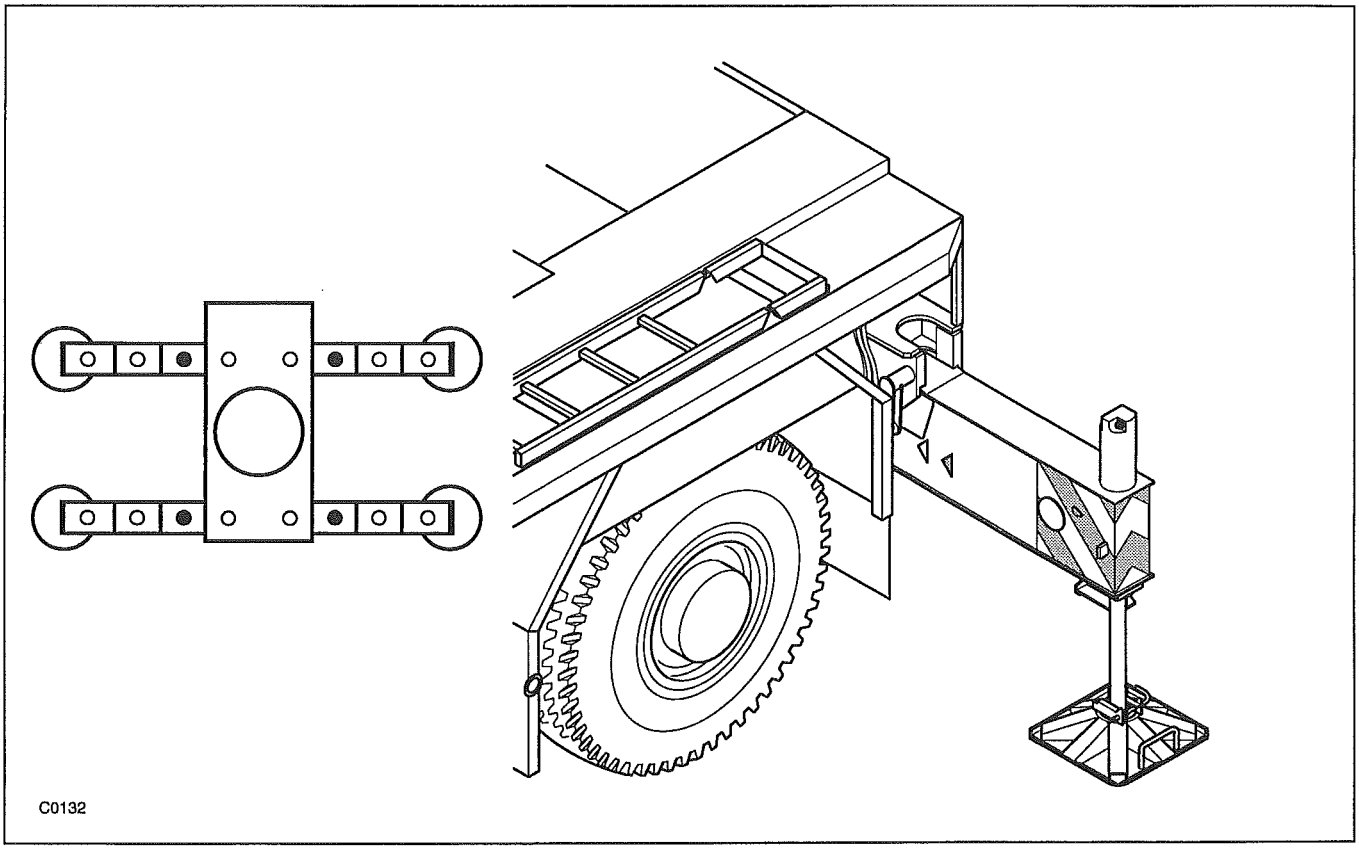
Small	Front span	4.40 m
Outrigger span B:	Rear span	4.40 m



9.3.4 Preparing for outrigger operation

Aligning the truck crane horizontally

Before supporting the truck crane it should be aligned horizontally and lowered as far as possible.

- Align the truck crane horizontally in longitudinal and lateral direction using the level adjustment system; ➠ *Level adjustment system,* p. 6 - 35.

Locking the suspension

The suspension must be locked in all axle lines when the truck crane is supported.

- Press the *Suspension locking system* rocker switch in the driver's cab down to lock the suspension. The indicator lamp illuminates when the suspension is locked.

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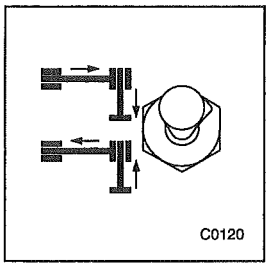
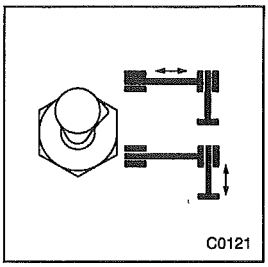
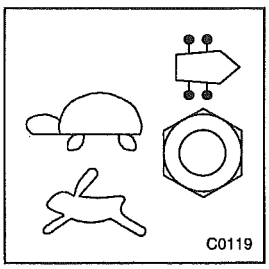
Retracting the outrigger cylinders



- Press the toggle switch for preselection of *Direction of outrigger movement* down.



- Press the toggle switch for preselection of *Outrigger cylinder / outrigger beam* down.



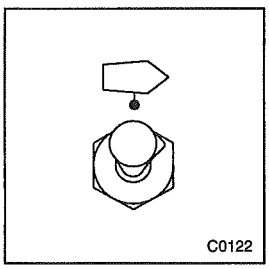
Retract all four outrigger cylinders one after the other.

Quick outrigger cylinder movements:

- Press the central toggle switch *Outrigger* down. The speed of the diesel engine is increased.

Slow outrigger cylinder movements:

- Press the central toggle switch *Outrigger* up. The diesel engine continues to run at idling speed.



- In addition, press the toggle switch for the desired outrigger cylinder (e. g. front right).

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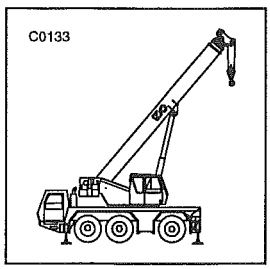
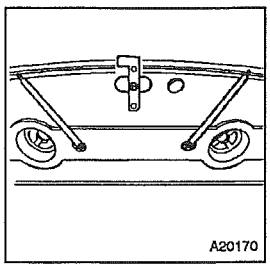
From 7.0 t to 5.7 t

Prerequisites

- the truck crane is supported,
- SLI is set to actual rigging mode (with 7.0 t counterweight),.

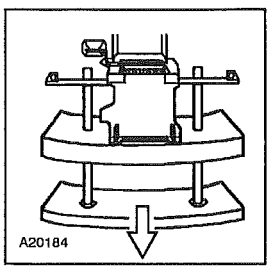


1. Turn the superstructure to the rear and lock it into place.



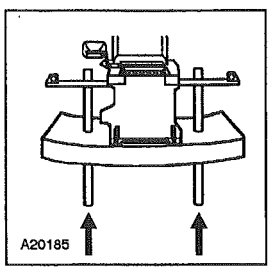
2. Open the mechanical lock on the 1.3 t counterweight section; ➠ *Lock open,* p. 9 - 42.

3. Release the counterweight lifting gear; ➠ p. 9 - 44.



4. Lower the hoist unit with the 1.3 t counterweight section onto the counterweight platform; ➠ *Extending the hoist unit under load,* p. 9 - 45.

5. Turn the hoist unit to *Unlocked* position; ➠ p. 9 - 47.



6. Retract the hoist unit as far as possible; ➠ *Retracting the hoist unit without load,* p. 9 - 46.

7. Lock the counterweight lifting gear; ➠ p. 9 - 45.

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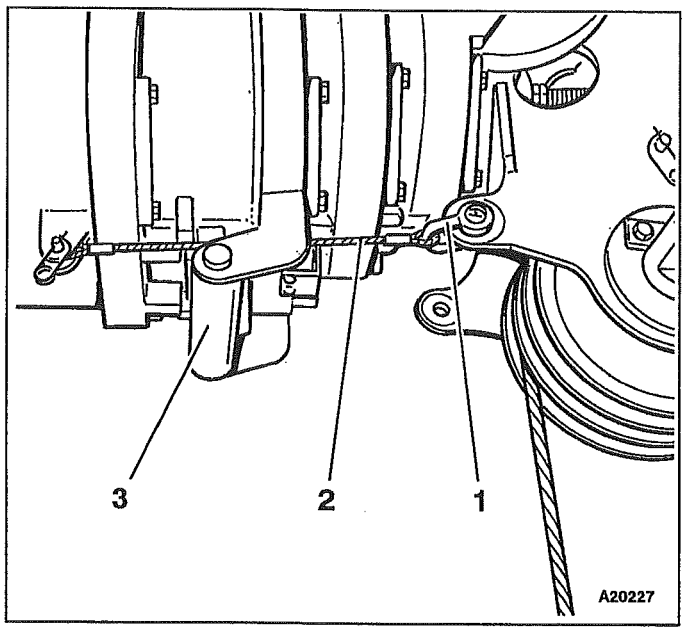
9.5 Rigging work on the main boom

9.5.1 Safety rope



In order to prevent the main boom from slipping apart during on-the-road driving, it is secured with a safety rope.
The safety rope is secured with shackles on the collar of the main boom non-telescoping section and on the top of the telescope section IV.

You must carry out the following steps for working with the crane:

- Release shackle (**1**) on non-telescoping section of main boom.
- Release shackle (**1**) from safety rope (**2**).
- Secure shackle (**1**) on non-telescoping section of main boom again.
- Pull safety rope (**2**) under guide roller (**3**) and allow it to hang freely.

Risk of accidents due to falling parts!
Tighten the pin of the shackle on the top of the main boom, so that it cannot loosen and fall.

The main boom must always be secured with the safety rope for on-road driving. To this end, you must:

- Retract the main boom telescoping in as far as possible.
- Insert the safety rope (**2**) under the guide roller (**3**).
- Release shackle (**1**) on non-telescoping section of main boom.
- Connect shackle (**1**) with the safety rope (**2**).
- Secure shackle (**1**) on non-telescoping section of main boom.

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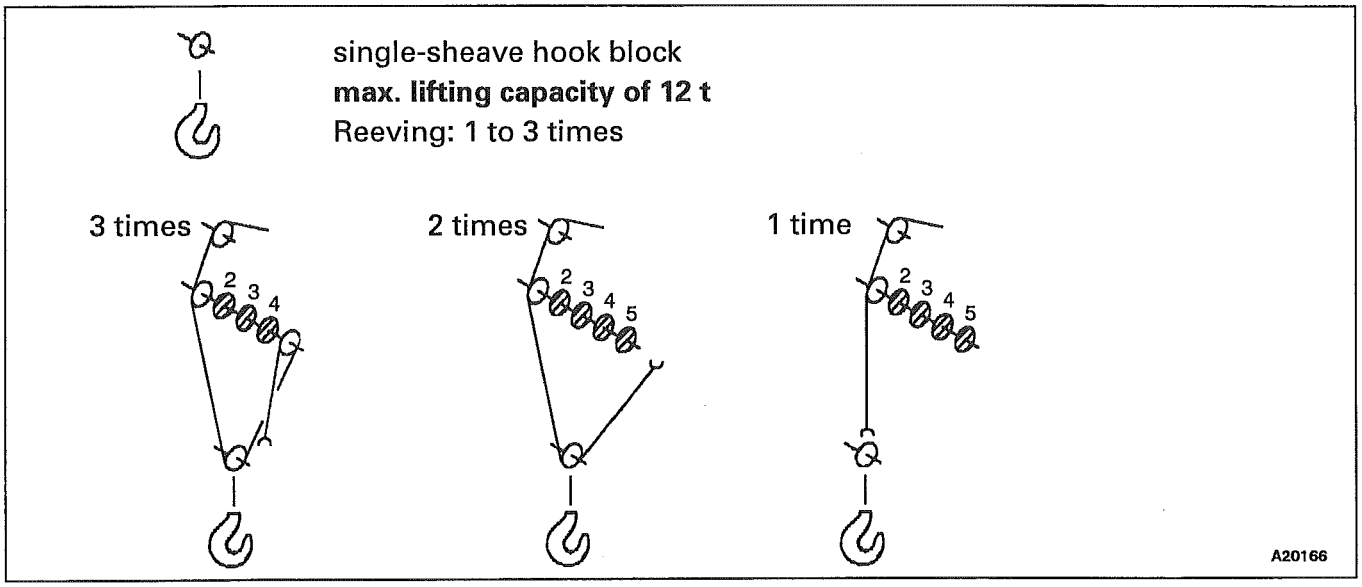

Possible reeving methods on the two-stage swing-away lattice extension (additional equipment) ➠ *Possible reeving methods*, p. 10 - 42.

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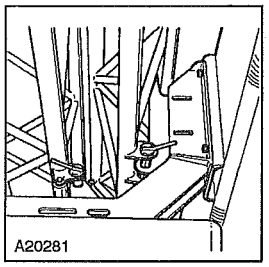
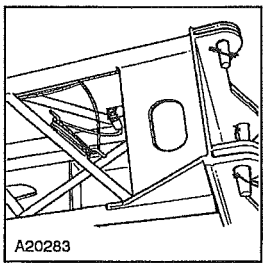


7. Remove the locking pins from both bearing points between the 8.7 m swing-away lattice extension and the main boom or remove the 6.3 m section, insert and secure them in the holders; ➠ *Locking pins,* p. 10 - 24.



8. Remove pin from the pivot point between the 8.7 m swing-away lattice extension and the 6.3 m section, insert and secure in the holder; ➠ *Connecting pins,* p. 10 - 30.

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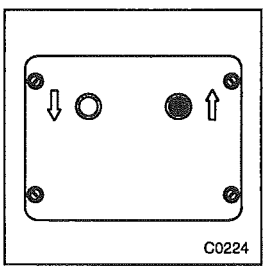
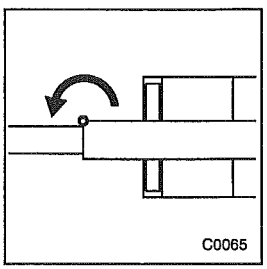
9. Acknowledge new error message at SLI.

10. Slew 8.7 m swing-away lattice extension at the head to the end of the stop rail of the 6.3 m section



11. Lift (raise) the 8.7 m swing-away lattice extension; ➠ *Raising while rigging,* p. 10 - 45.



12. Turn the 8.7 m swing-away lattice extension in front of the main boom with a guide rope; ➠ *Turning the 8.7 m section in front of the main boom,* p. 10 - 31.

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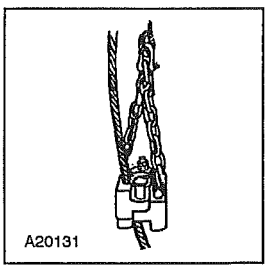
10.7 CHECK LIST: Unrigging 15 m two-stage swing-away lattice extension

1. Set the SLI for 15 m two-stage swing-away lattice extension rigging; ➠ *Input of values*, p. 8 - 17.

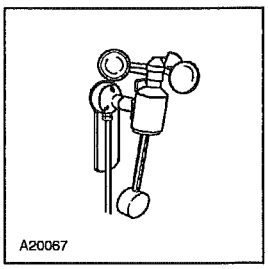
2. Derrick the two-stage swing-away lattice extension from inside the crane cab to 0° position; ➠ *Raising crane during crane operation*, p. 10 - 46.

3. Retract the main boom: ➠ *Telescoping gear*, p. 8 - 44.

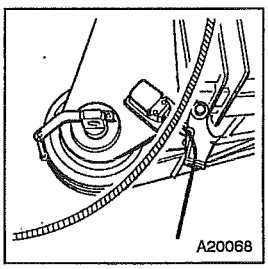
4. Lower the boom to horizontal position (0° ±0.5°).



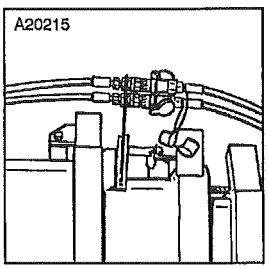
5. Suspend lifting limit switch weight and lifting limit switch from main boom; ➠ *Lifting limit switch*, p. 10 - 43.



6. Remove the anemometer (additional equipment); ➠ *Anenometer on two-stage swing-away lattice extension (Additional equipment)*, p. 10 - 39.



7. Unreeve the hook block and set down the hoist rope; ➠ *Positioning the hoist rope*, p. 10 - 41.



8. Swap over the holders for hydraulic hose guide mechanisms and quick connection coupling; ➠ *Holders*, p. 10 - 33.

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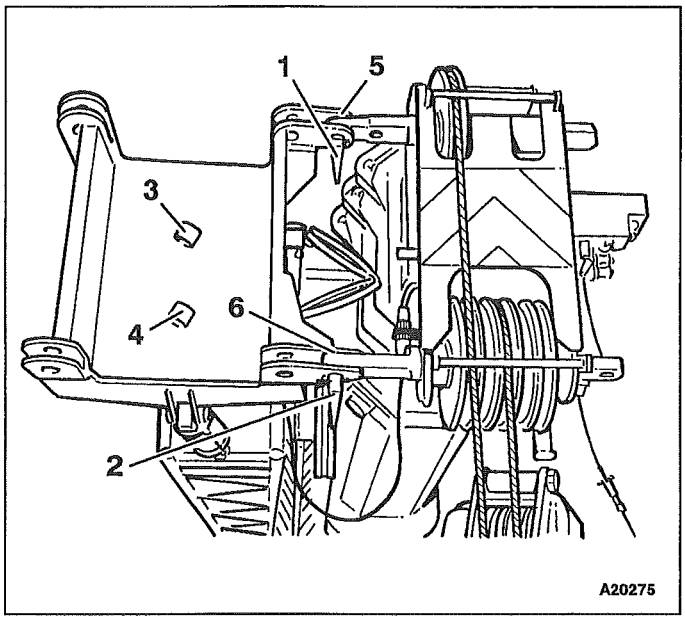
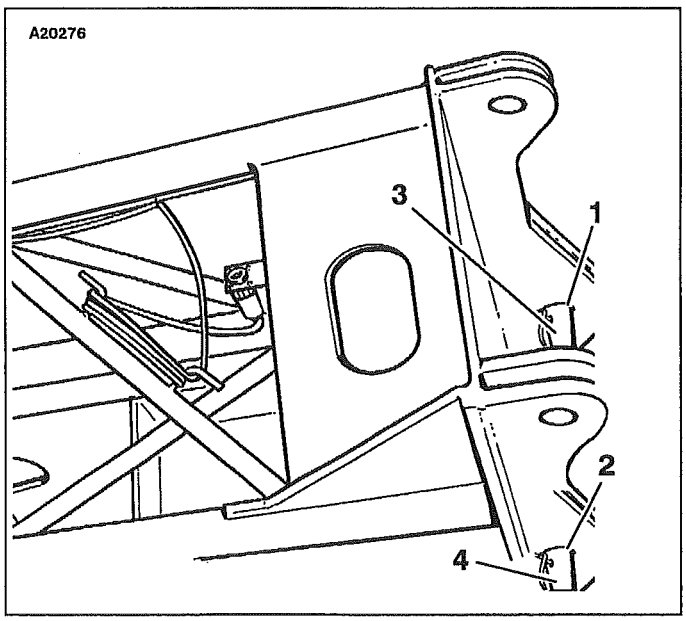


To rig the 8.7 m swing-away lattice extension or 15 m two-stage swing-away lattice extension:

- Remove the swivel pins (**1**) and (**2**) from the holders (**3**) and (**4**) at the foot section of the 8.7 m section and insert them in the pivot bearings (**5**) and (**6**) at the top and bottom of the foot section.

To rig the 8.7 m swing-away lattice extension or 15 m two-stage swing-away lattice extension:

- Remove the swivel pins (**1**) and (**2**) from the pivot bearings (**5**) and (**6**) on the foot section and on the head of the main boom and insert them in the holders (**3**) and (**4**) on the foot section of the 8.7 m section.



If only the 8.7 m swing-away lattice extension is to be rigged:

- Remove the pins (**1**) and (**2**) from the pivot points (**3**) and (**4**) between the 8.7 m and 6.3 m sections and insert them in the holders on the foot section of the 6.3 m section.

When unrigging the 8.7 m swing-away lattice extension:

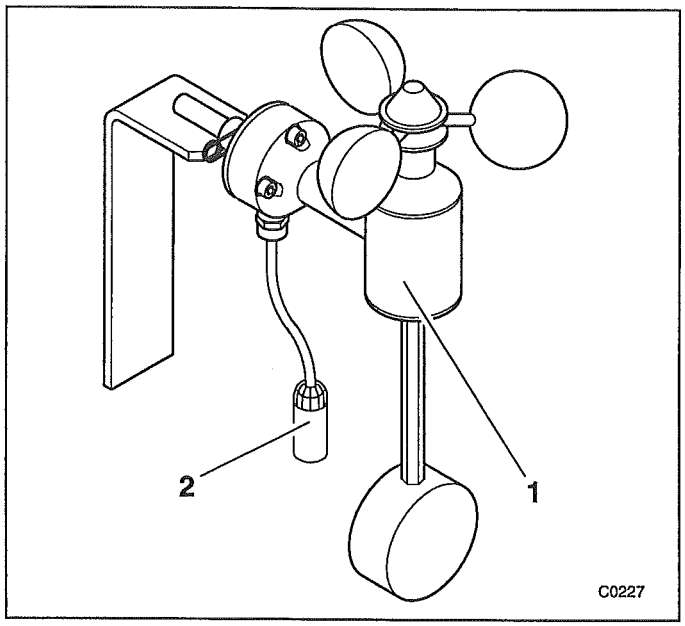
- Remove the pins (**1**) and (**2**) from the holders on the foot section of the 6.3 m section and insert them in the pivot points (**3**) and (**4**) between the 8.7 m and 6.3 m sections.

Accidents may occur due to falling parts!
The swivel pins must be locked into placed with retaining pins both in the bearing points and the holders. If the swivel pins are not secured, they could slip and fall.

Damage may occur to the two-stage swing-away lattice extension!
It is imperative that the swivel pins be removed from the pivot bearings after unrigging the two-stage swing-away lattice extension. If the pins are left in the pivot bearings while telescoping the main boom, the bearing points will be torn off and the pins will buckle!
It is essential that the pins in the pivot points between the 8.7 and 6.3 m sections are inserted and secured!

Anemometer on the lattice extension (additional equipment)

For operation with the 8.7 m swing-away lattice extension or the 15 m two-stage swing-away lattice extension you should install the anemometer (additional equipment) on the telescopic swing-away lattice extension head.



- Attach the anemometer (1) to the holder on the lattice extension.
- Connect the plug (2) of the connecting cable to the distribution box on the head of the main boom.

You must remove the anemometer before unrigging the lattice extension.

All points listed in section *External influences while working with the crane* apply without restrictions; ➠ p. 8 - 31.

Proceed as follows if the permissible wind speed is exceeded while carrying out crane work with the 8.7 m swing-away lattice extension or the 15 m two-stage swing-away lattice extension:

Crane work with the 8.7 m swing-away lattice extension or 15 m two-stage swing-away lattice extension	
Wind speed less than 20 m/s	**Wind speed greater than 20 m/s**
Put down the load. Retract main boom completely. Turn the superstructure in such a way that the main boom provides the wind with as little resisting surface as possible.	Put down the load. Retract main boom completely. Turn the superstructure to the front (180° Position) or to the rear (0° Position) and lock the superstructure mechanically. Set the main boom on the boom support if possible.

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Telescoping the main boom

If you require a different main boom length while working with the crane, proceed as follows:

- Put down the load.
- Telescope the main boom to the desired main boom fixed length, ➠ *Telescoping gear,* p. 8 - 42.
- Pay attention to the hook block, lower / raise it with the hoist.

If, while telescoping, there is an SLI shutdown because of an incorrect lattice extension angle ➠ Note on p. 10 - 47.

Changing angle of lattice extension

If you wish to change the angle of the lattice extension during crane work, proceed as follows:

- Put down the load.
- Set the appropriate SLI rigging code specified in the *Lifting capacity table* on the SLI.
- Set the desired angle of the lattice extension; ➠ p. 10 - 45.
- Once you have completed this, set the rigging code specified in the *Lifting capacity table* for work with the 8.7 m swing-away lattice extension or the 15 m two-stage swing-away lattice extension.

If, while lowering the boom, there is an SLI shutdown on account of exceeding the permissible operating area ➠ Note on p. 10 - 47.

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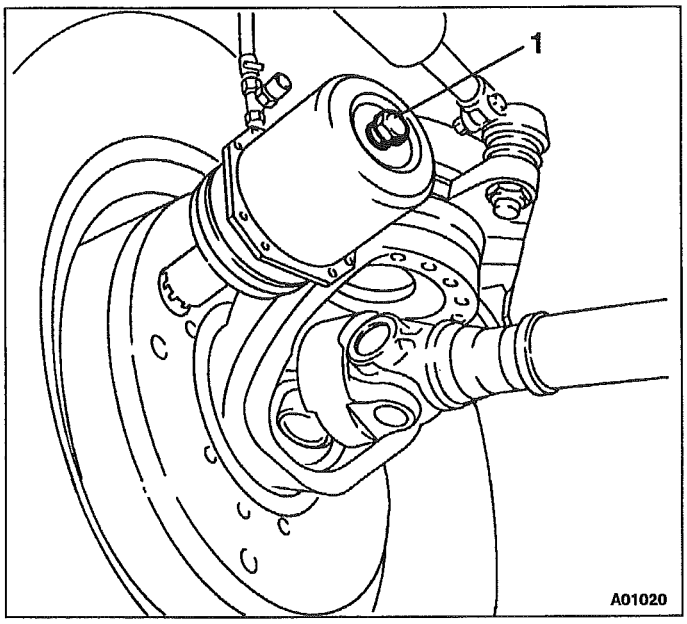
Removing the mechanical locking from all spring-loaded brake cylinders

- Use chocks to prevent the vehicle from rolling.

- Fill the compressed-air supply completely (the warning light *Supply pressure of brake circuits I and II* must not illuminate).
- Do not operate the service brake.

Accidents may occur if the brakes are improperly adjusted!
The removal of the mechanical locking on the brake cylinders may only be carried out by trained, qualified personnel.

- Release the vehicle parking brake (indicator lamp *Vehicle parking brake* must not illuminate).



- Screw in the hexagon screw (**1**) completely.
- Tighten the hexagon screw with 40 + 10 Nm.
- Perform a functional test on the service brake and the parking brake.

Tow starting

The diesel engine **cannot** be started by tow starting the truck crane.

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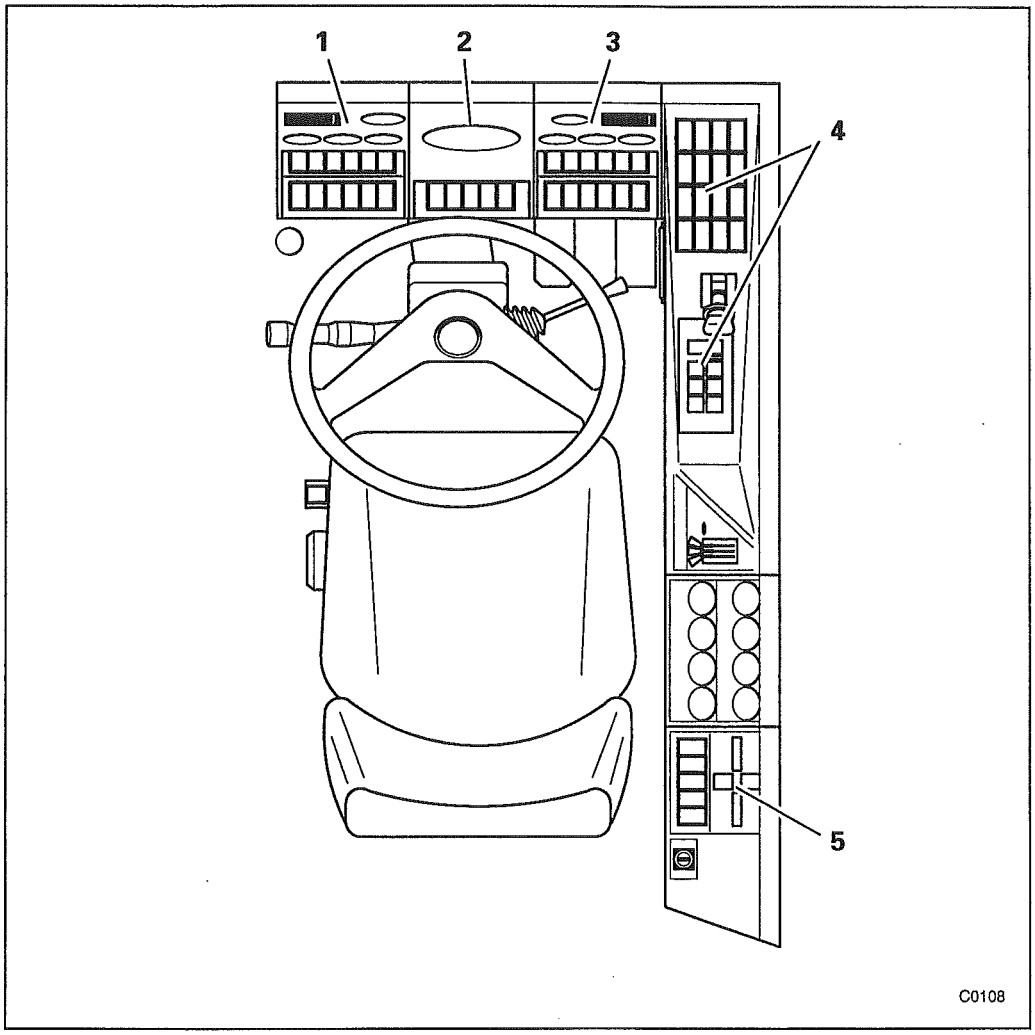
11.6 Electrical system

11.6.1 Plug-in modules



Designation of plug-in module on electric circuit diagram	Function
BE 550.A1 (1)	display and monitoring
BE 550.A2 (2)	speed indicator and trip recorder
BE 550.A3 (3)	display and monitoring
BE 550.A4 (4)	driving and heating system
BE 550.A5 (5)	level adjustment system

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Drive of the 2nd axle line cannot be engaged / disengaged	Stress in transmission system.	Drive truck crane backwards and forwards slowly with the steering straight.
	Compressed-air system not filled sufficiently.	Let the engine run in neutral. Approx. 10 minutes after the indicator lamp for brake circuit 3 goes out, the compressed-air circuit 4 is filled for the secondary consumers, ➠ p. 6 - 8; Test the switch again.
	Carrier key-operated switch not actuated.	Actuate key-operated switch.
	Fuse F 3/3 UW or F2/5 UW blown.	Check fuse, replace if necessary, ➠ p. 11 - 20.
Steering lock on 3rd axle line cannot be released	Tension in axle lines.	Straighten truck crane and drive a short distance.
	Compressed-air system not filled sufficiently.	Let the engine run in neutral. Approx. 10 minutes after the indicator lamp for brake circuit 3 goes out, the compressed-air circuit 4 is filled for the secondary consumers, ➠ p. 6 - 8; Test the switch again.
	Fuse F 3/4 UW or F2/5 UW blown.	Check fuse, replace if necessary, ➠ p. 11 - 20.
Steering lock on 3rd axle line cannot be engaged	Axle lines not in straight position.	Turn 3rd axle to the left and right.
	Compressed-air system not filled sufficiently.	Let the engine run in neutral. Approx. 10 minutes after the indicator lamp for brake circuit 3 goes out, the compressed-air circuit 4 is filled for the secondary consumers, ➠ p. 6 - 8; Test the switch again.
	Fuse F 3/4 UW or F2/5 UW blown.	Check fuse, replace if necessary, ➠ p. 11 - 20.

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12 Malfunctions on the superstructure

12.1 Troubleshooting for malfunctions that occur during crane operation

If a malfunction occurs:

- Keep calm!
- Put down the load immediately if possible, retract the main boom completely and subsequently lower it onto the boom support.
- Use warning signs in the crane cab to prevent the unauthorized use of the truck crane. Remove the ignition key.
- Inform your supervisor.

Accidents may occur when the load is suspended!
Under no circumstances is repair work to be carried out with a suspended load!

You may override the SLI to set down the load if SLI malfunctions occur.

Risk of accidents!
Do not perform any crane movements that may increase the size of the load moment when a load is on the hook block and the SLI is overriden;
➠ *SLI override,* p. 8 - 29.

- Try to repair the malfunction. Notify the customer service department if you cannot repair the problem yourself.

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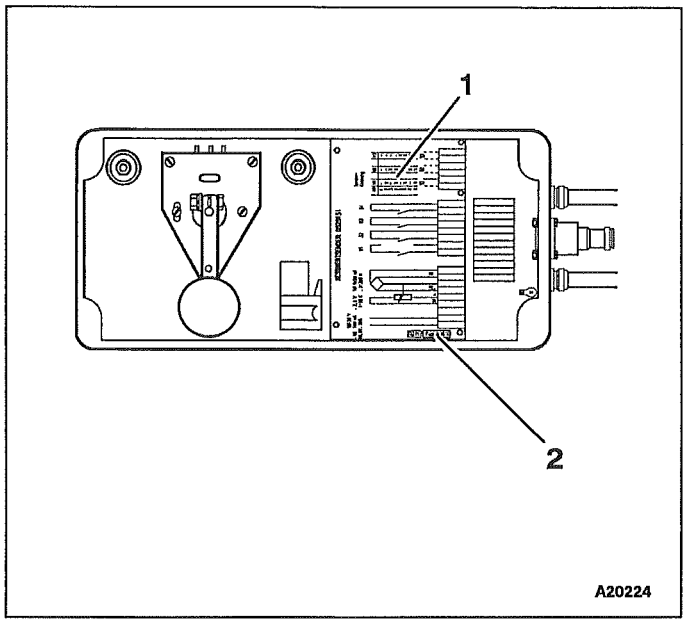

The fuse of the *two-stage swing-away lattice extension data transmitter* is attached to the plate. One spare fuse (**2**) is secured to a support.

(**1**) SLI 9

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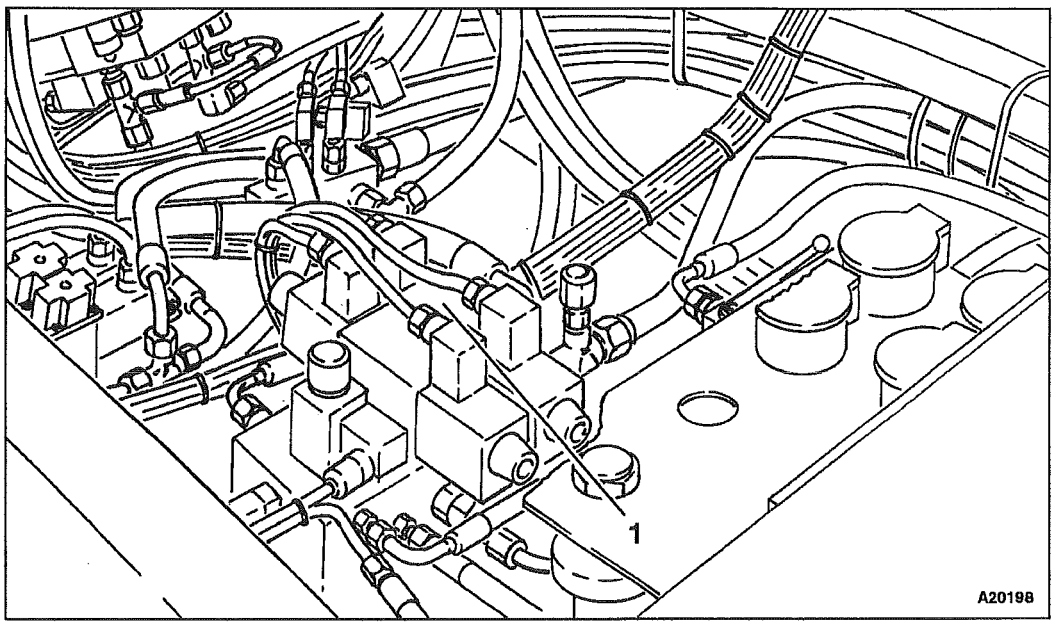
12.4 Procedure in the event of malfunctions

12.4.1 Emergency operation of counterweight hoist unit

If the electric control of the counterweight hoist unit fails, the hoist unit can be operated by means of the manual operation of the solenoid valve, ➠ *Failure of the control,* p. 12 - 26.

During crane work or after the crane has been standing still for a longer period and the precharge has dropped considerably, the hoist unit may have independently changed the previously set end position. The counterweight hoist unit can no longer be operated from the crane cab in this case. These end positions can be set again by manually operating the solenoid valves, ➠ *End position,* p. 12 - 24.

Accidents may occur when operating area cannot be clearly seen! Persons may be injured by a swaying counterweight hoist unit. The danger area is not completely visible during emergency operation. For this reason, make sure that there are no people in the vicinity of the hoist unit (both hydraulic cylinders). Work with a banksman for this purpose.



The solenoid valves (**1**) of the counterweight hoist unit are situated behind the compartment on the right-hand side of the superstructure.

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The size of the turning circle decreases during all-wheel steering. The front and rear axle lines are turned in opposite directions.

The truck crane moves diagonally sideways in crab travel mode. The front and rear axle lines are turned in the same direction.

Lubricating points in the steering system are supplied by an automatic central lubrication system.

Wheel suspension and suspension system

All wheels are individually suspended from the crane carrier with hydropneumatic suspension cylinders. The hydraulic system of the suspension system is separated from the hydraulic system of the truck crane by solenoid valves.

The oil displaced when the suspension cylinders are compressed is stored in pressure accumulators. Wheel-load compensation takes place between the suspension cylinders of the first and second axle lines.

The suspension must be locked for various driving modes on the site and during crane work. The suspension cylinders are separated from the pressure accumulators by pneumatically operated blocking valves.

The overall level of the vehicle (if necessary in longitudinal and lateral direction) can be adjusted by extending and retracting the suspension cylinders. If the level of the vehicle is on-the-road level, the solenoid valves are controlled by sensors on the suspension cylinders.

Outrigger

As with the suspension system, the outrigger is supplied with hydraulic oil from the hydraulic system of the truck crane.

The cylinders in the outrigger beams and the outrigger cylinders are controlled separately via solenoid valves from both sides of the carrier and from inside the crane cab. The horizontal and vertical position of the 4-point outrigger can be controlled individually.

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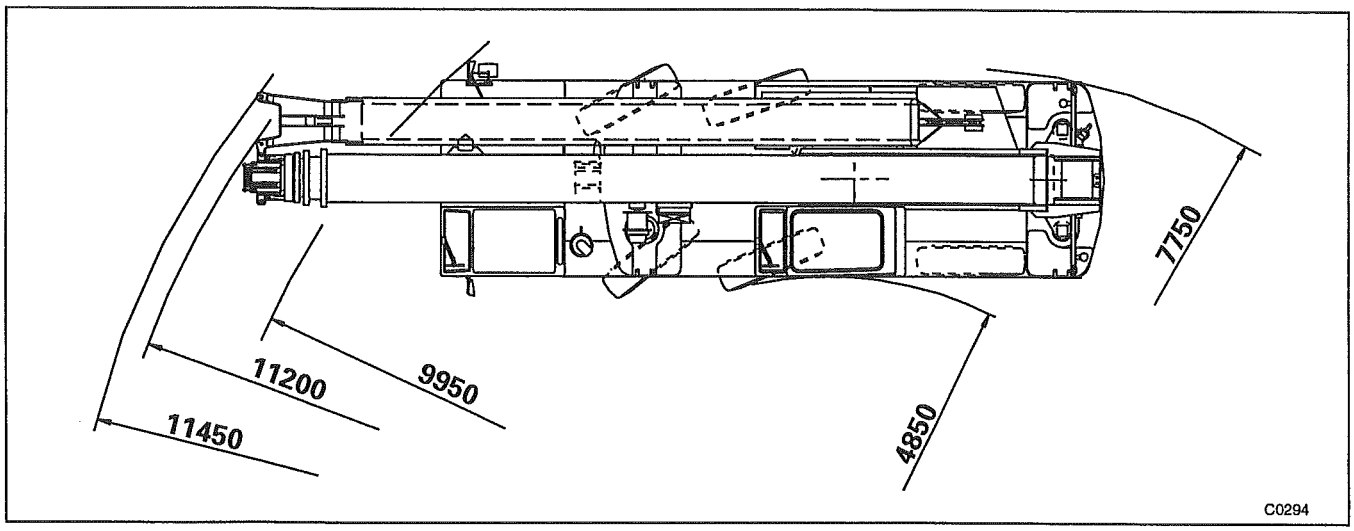
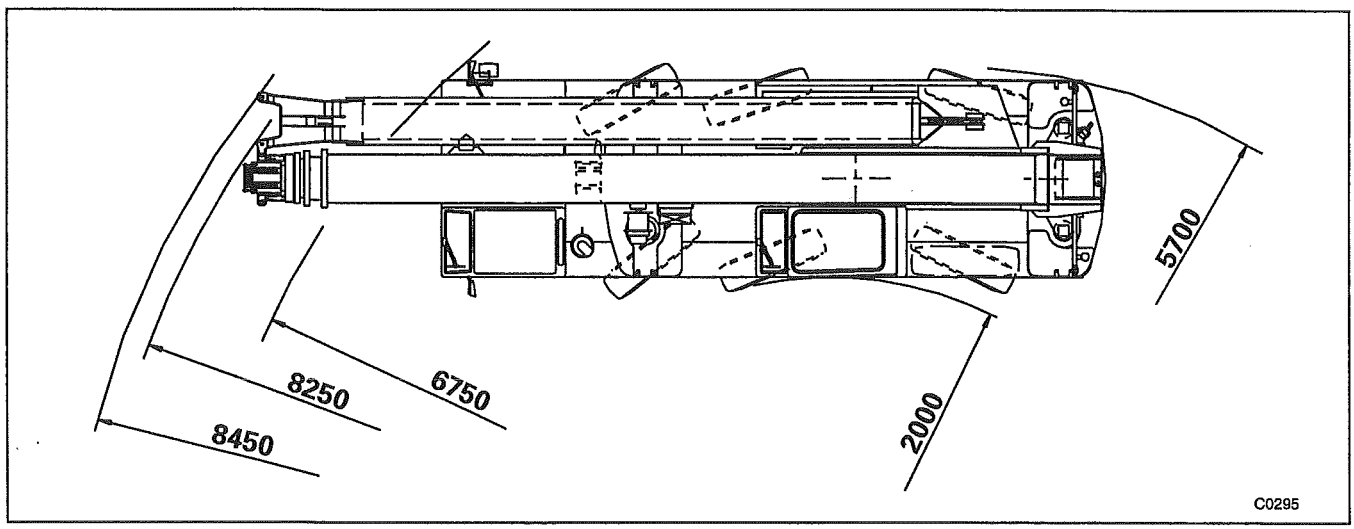
Turning circle radii

The following details also apply to the version with two-stage swing-away lattice extension.

– for normal steering mode



– for separate steering mode



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