Operating Instructions

KMK 5090

Crane Identification Number:

16. 06. 93

2 085 623 en

1. Introduction

These operating instructions are intended for the KRUPP truck crane KMK 5090.

1.1 Instructions for use

Please read through sections 1 to 5 before starting work with your truck crane.

Your attention is drawn in particular to the following notes in the operating instructions:

Danger: Dangers are pointed out which are connected with the described procedure and may **endanger persons.**

Caution: Dangers are pointed out which are connected with the described procedure and may first and foremost lead to **damage to objects**, e.g. to the truck crane or the load which is lifted.

Note: **Further notes and tips** are given regarding the handling of the truck crane.

1.2 Contents

This section (**Section 1**) contains a **general drawing** of the truck crane with the terms used for the main assembly groups. A short technical description explains how the most important units work.

We have placed particular emphasis on the description of the **safety equipment**. This description is given in **Section 2,** together with general notes on safety.

Section 3 contains the operating instructions for driving the truck crane. This section gives a description of the condition in which the truck crane may be driven on roads (the transport condition), preparing to drive the truck crane and **driving.**

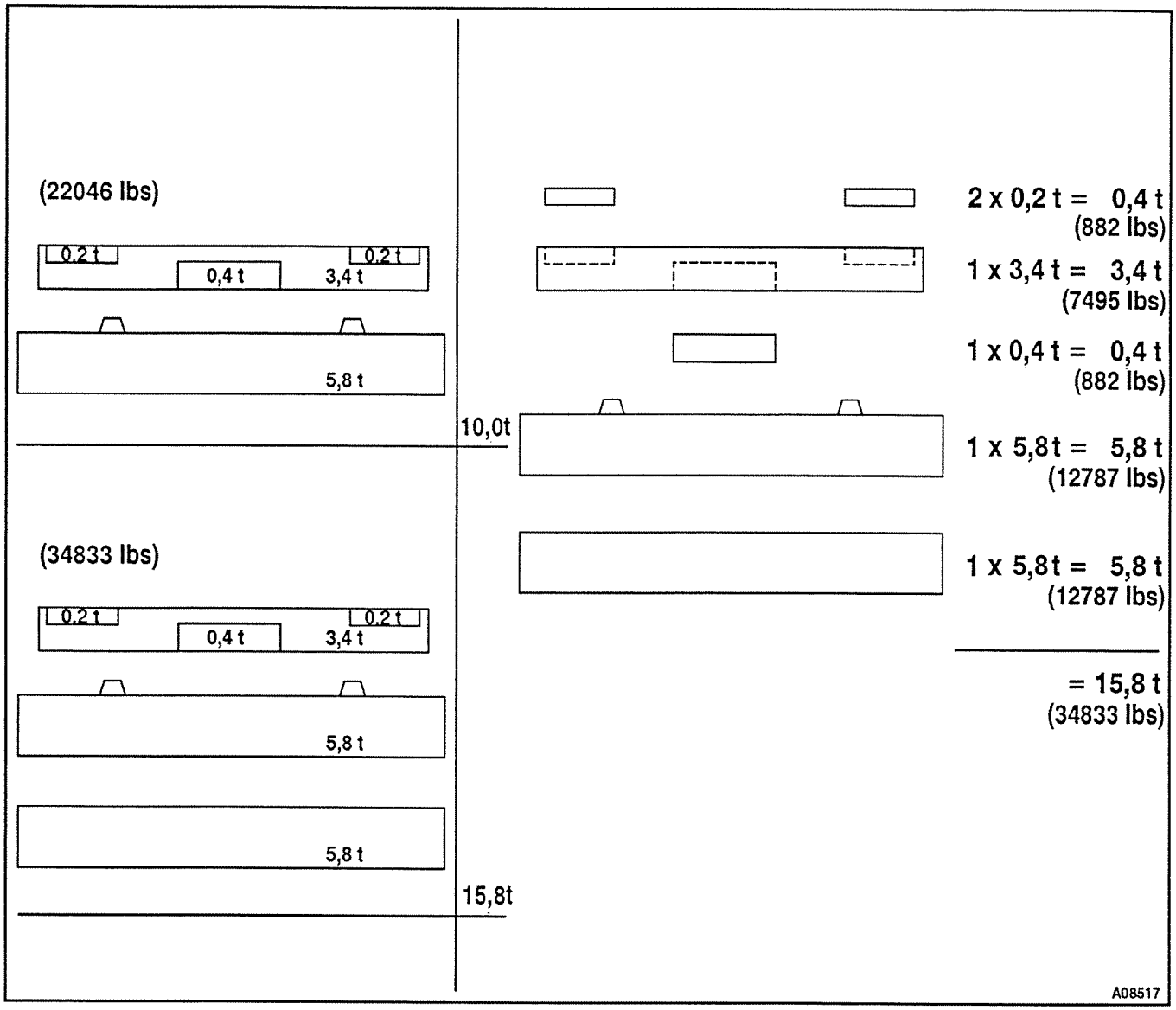
Section 4 describes **operation of the crane** starting with preparation of the job on the site and including rigging and unrigging the crane.

Section 5 gives instructions for working with the two-stage swing-away lattice extension. Installation, operation, removal and transportation are described in this section.

Section 6 lists the action which should be taken if the **crane is not working** properly and contains notes on how to rectify some malfunctions.

Care and maintenance of your truck crane are described in **Section 7**. This does not include care and maintenance of parts manufactured by our suppliers (e.g. engine, gearbox) which are described in their own manuals supplied with these operating instructions.

Counterweight



The parts of the counterweight can be assembled to form two different weights:

For driving on roads part of the counterweight can be transported on the truck crane. The table in section 8.2.18 "Weights" shows:

– which counterweights are allowed to be transported on the truck crane
– where the counterweight sections are during transport (carrier, superstructure)

Which counterweight sections are allowed to be transported on the truck crane depends on how the crane is equipped (e.g. with or without the two-stage swing-away lattice extension).

For installing the counterweight the individual counterweight sections are stacked on the carrier with the crane.

2.4.8 Hoisting capacity and lifting capacity

The hoisting capacity of the crane depends on the lifting capacity of the hoist and the number of falls on the hook block. The hoisting capacity is never greater than the lifting capacity of the hoist multiplied by the number of falls between the boom head and the hook block. Please read the information on the number of falls (reeving).

When calculating the required lifting capacity, please note that the weight of the hook block and lifting tackle must be added to the weight of the load itself.

The load which can be lifted with the crane is therefore lower than the value given in the table.

2.4.9 Effect of wind on crane operations

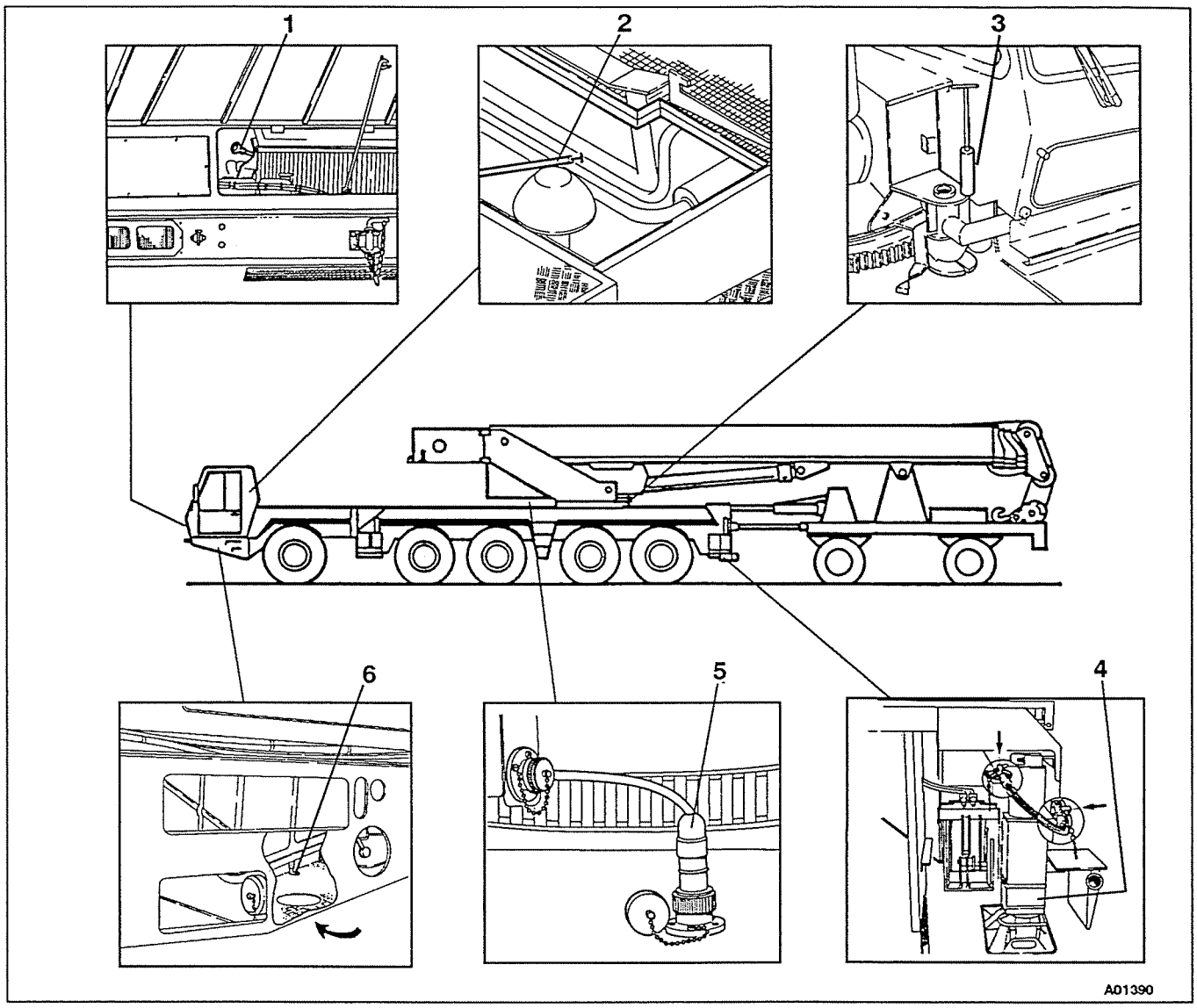
Overloading can occur in strong winds.

Please refer to the **lifting capacity tables** for maximum permissible wind speeds with the crane under full load.

What to do if the maximum permitted wind speed is exceeded

Wind speed below 20 m/s (65 ft/s)	Wind speed above 20 m/s (65 ft/s)	
Crane used with main boom or two-stage lattice extension	**Crane used with main boom**	**Crane used with two-stage lattice extension**
• Lower load. • Turn superstructure into the wind.	• Lower load. • Telescope boom in fully • Turn superstructure to front (0°) or rear (180°) of truck crane and lock it. If possible place boom on boom support	• Lower load. • Telescope boom in fully • Lower boom to horizontal position

3.1.2 Prescribed transport condition with the boom placed on a trailer



1 The oil level in the carrier engine must be checked (please see Section 3.4.4 "Checking the oil level in the driving engine").

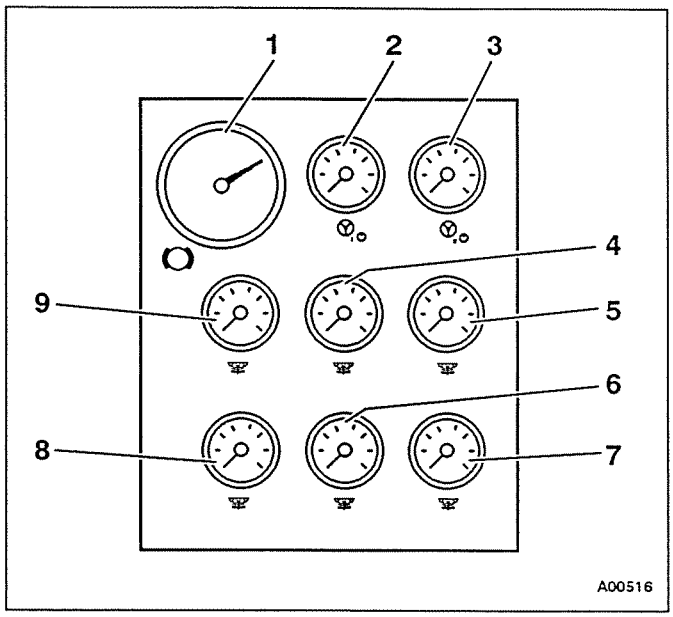
2 The oil level in the automatic gearbox must be checked (please see Section 3.4.5 "Checking the oil level in the automatic gearbox").

3 Mechanical lock for locking the superstructure not engaged; pin in the holder.

4 All four outriggers retracted and outrigger beams secured with holding ropes (please see Section 4.3.4 "Outriggers").

5 The electrical supply must be connected to the superstructure; the plug must be in the socket.

6 Battery master switch on the right-hand side of the vehicle switched on (please see Section 3.4.8 "Switching on the battery master switch").



1 Pressure gauge "compressed air supply"

2 Oil pressure "steering circuit I"

3 Oil pressure "steering circuit II"

4 Operating pressure "suspension, right-hand side, 2nd and 3rd axle lines"

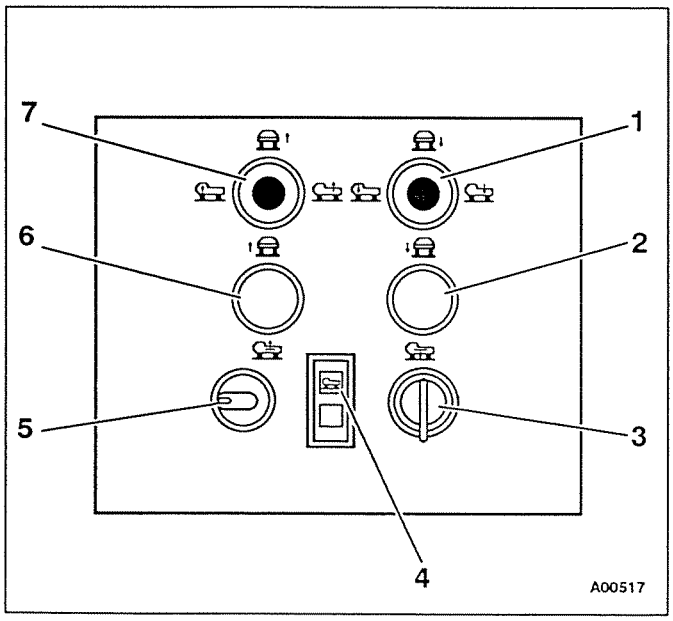
5 Operating pressure "suspension, right-hand side, 4th and 5th axle lines"

6 Operating pressure "suspension, left-hand side, 2nd and 3rd axle lines"

7 Operating pressure "suspension, left-hand side, 4th and 5th axle lines"

8 Operating pressure "suspension, left-hand side, 1st axle line"

9 Operating pressure "suspension, right-hand side, 1st axle line"



1 Joystick "level adjustment lower vehicle"

2 Push button "lower vehicle"

3 Key-operated switch

4 Warning light "carrier not at on-the-road level"

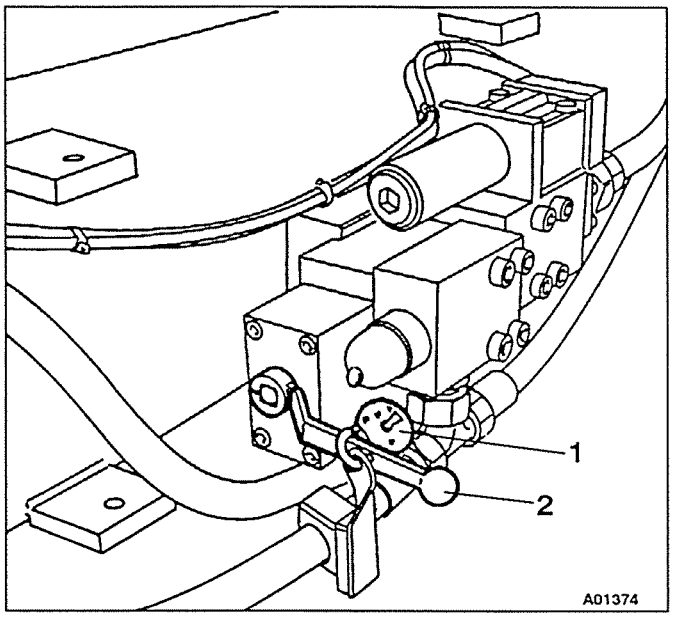
5 Knob "on-the-road level"

6 Push button "'raise vehicle'"

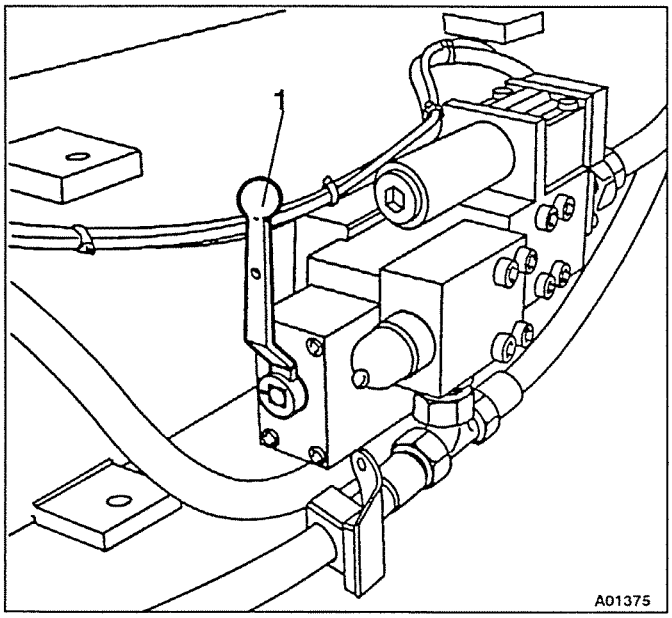
7 Joystick "level adjustment raise vehicle"

3.4.10 Engaging the free movement position for the boom (only for driving on roads with the boom placed on a trailer)

If the boom is placed on a trailer for driving on roads the trailer with the boom on it must be able to move up and down freely, e.g. for driving over the crest of a hill. So that the boom can "float" in this way the piston rod side of the derricking cylinder has to be connected hydraulically to the piston top side by switching over a valve.



- Place the boom on the trailer.
- Remove the lock on the lever (padlock **1**) on the change-over valve (**2**).



- Turn the manual lever (**1**) so that it is pointing upwards vertically.

Danger:

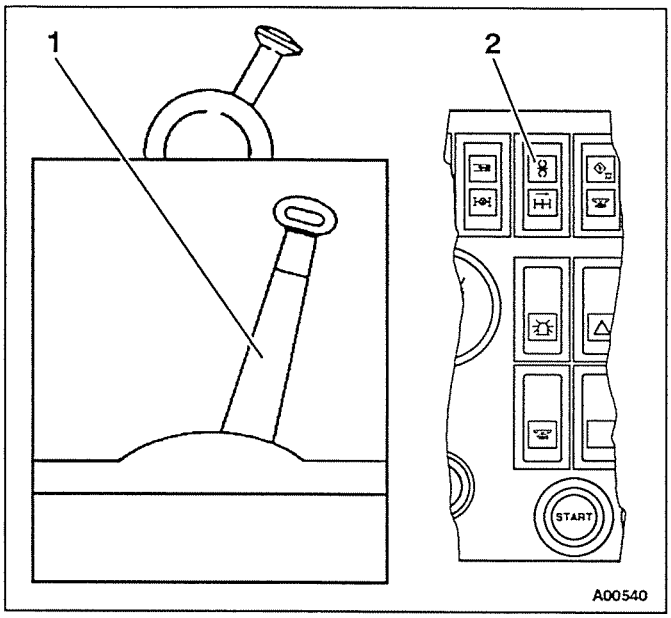
The change-over valve may only be changed over when the boom is lying on the trailer, otherwise the boom will drop and **accidents will occur.**

3.5 During the journey

3.5.1 Testing the brakes

As soon as you have started to drive, test both the service brake and parking brake.

3.5.2 Gears of the automatic gearbox



The different gear ranges of the automatic gearbox are selected with gear lever (**1**).

N = neutral

The engine can only be started in neutral (**N**). When in neutral the parking brake or service brakes must be on to prevent the crane from rolling.

D = drive (normal automatic gear range)

In position **D** the gearbox automatically selects the suitable forward gear from second to fifth gear. The gearbox always starts in second gear and automatically changes up or down via the hydraulic torque converter. In all forward gears and all gear ranges the converter is cut out (overridden) when a sufficient number of revolutions and travelling speed have been reached so that power transmission from the engine to the gearbox is purely mechanical. When the converter is overridden indicator lamp (**2**) is on. The gearbox selects the appropriate gear and the right moment to change gear from the travelling speed, the position of the accelerator and the load condition.

4 = restricted automatic gear range

When the gear lever is in position **4** the gearbox starts in second gear and only changes up and down between second and fourth gear.

3.5.8 Driving uphill

On certain gradients the gearbox switches back and forth between two gears. Either release the accelerator a little or select a lower gear range.

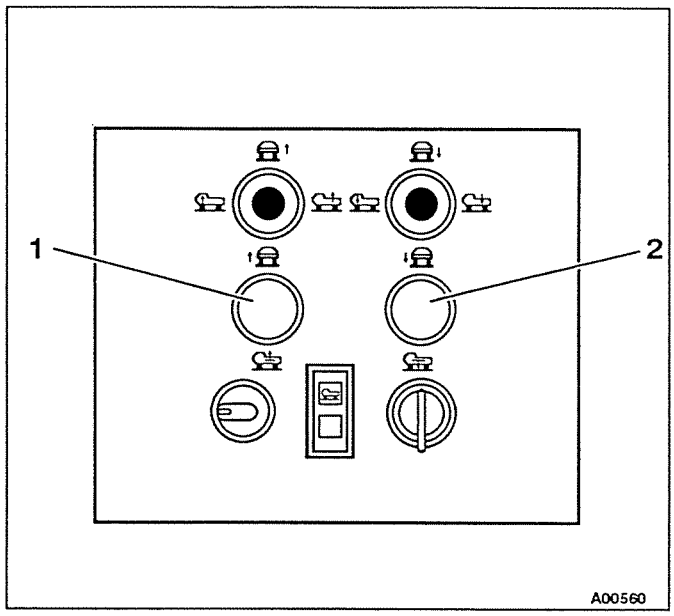
For hill starts the engine may not have sufficient power in second gear (starting gear in gear range **D**). If you want to start in first gear and the higher gears are not to be blocked you must start in gear range **1** and change into a higher gear when the vehicle has started to move.

Note: For hill starts on steep gradients and for manoeuvring it may be better to operate the service brake with your left foot so that you can operate the brake and the accelerator at the same time for more precise control of the vehicle. For driving uphill change into gear mode **P** (hill).

Danger:

When you release the parking brake always hold the vehicle with the service brake, particularly on uphill and downhill slopes, as when you release the parking brake it takes approx. 2 seconds for the gear to engage after the parking brake has been released. During this time the vehicle immediately starts to roll if the brakes are not on. Do not press the accelerator for any reason during these 2 seconds.

Raising and lowering the complete truck crane



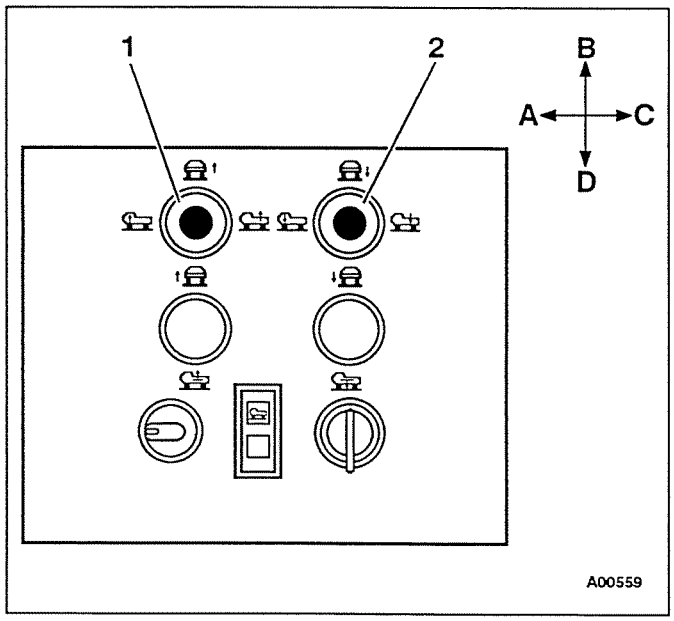
The complete truck crane is raised with switch (**1**) and lowered with switch (**2**).

The suspension cylinders are adjustable over the full working stroke.

Caution:

The suspension range of the carrier changes in accordance with the amount by which the carrier is raised or lowered. When the level of the carrier has been changed you may only drive slowly, otherwise damage may be caused to the suspension cylinder assemblies.

Tilting the truck crane longitudinally or transversely



The truck crane is raised at one end (longitudinal tilt) or at one side (transverse tilt) with joystick (**1**), and is lowered with joystick (**2**).

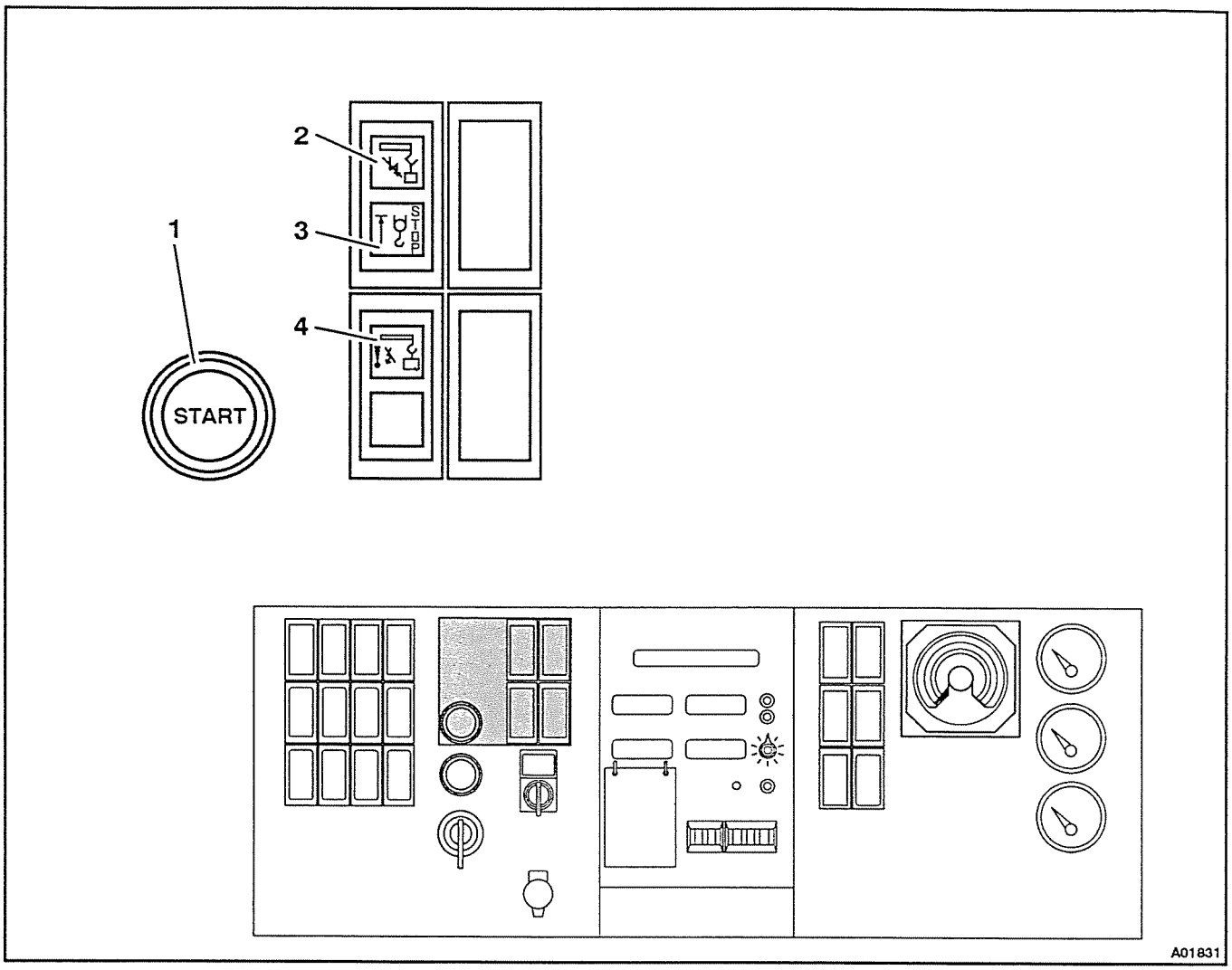
Both joysticks alter the level of the carrier as follows:

A front

B left

C rear

D right



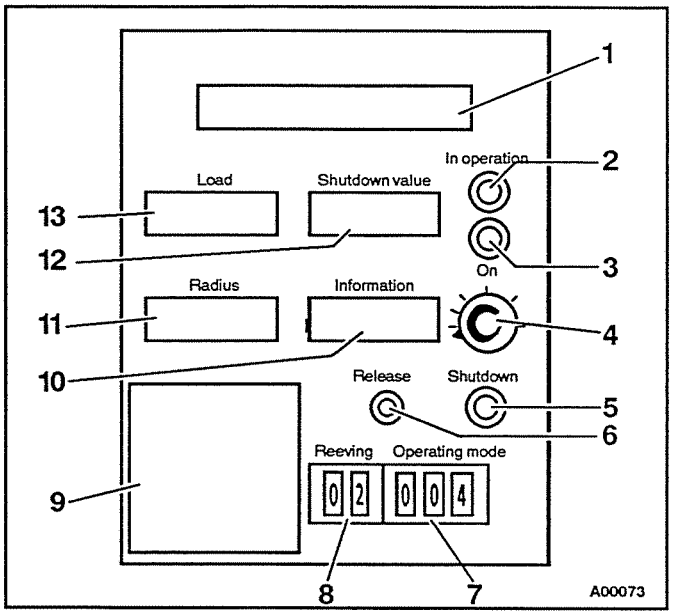
1 Push button "starter, crane engine"

2 Warning light "SLI shutdown"

3 Warning light "lifting limit switch shutdown"

4 Warning light "SLI warning"

4.1.6 Controls of the safe load indicator (SLI)



1 Status indicator (operating configuration and fault indication)

2 Indicator lamp "SLI in operation"

3 Indicator lamp "power on"

4 Selection switch for indication of information:
- a degree of utilization in %
- b possible hook height in ft
- c boom length in ft
- d boom angle in degrees
- e no function
- f piston area pressure in derricking cylinder in bar
- g ring area pressure in derricking cylinder in bar
- h no function
- i no function
- k no function

5 Warning light "shutdown"

6 Release button

7 Preselection of operating configuration (SLI code)

8 Preselection of reeving condition

9 SLI brief information

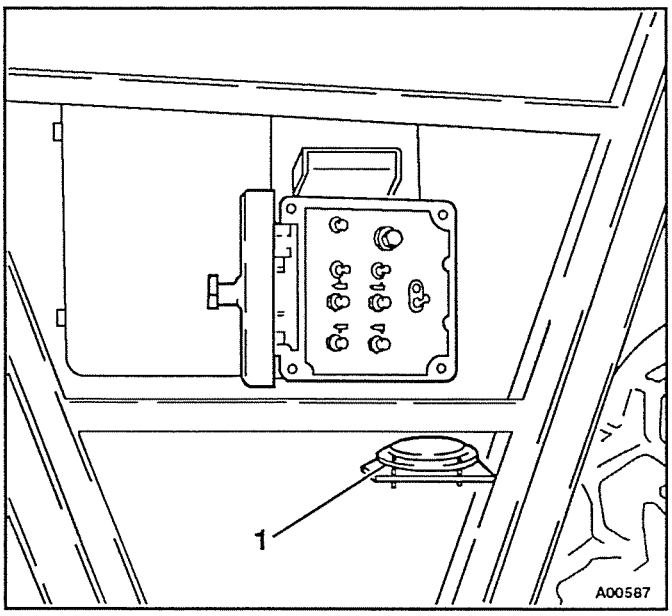
10 Indicator "information"

11 Indicator "radius"

12 Indicator "shutdown value"

13 Indicator "load"

Extending the outrigger cylinders and levelling the crane

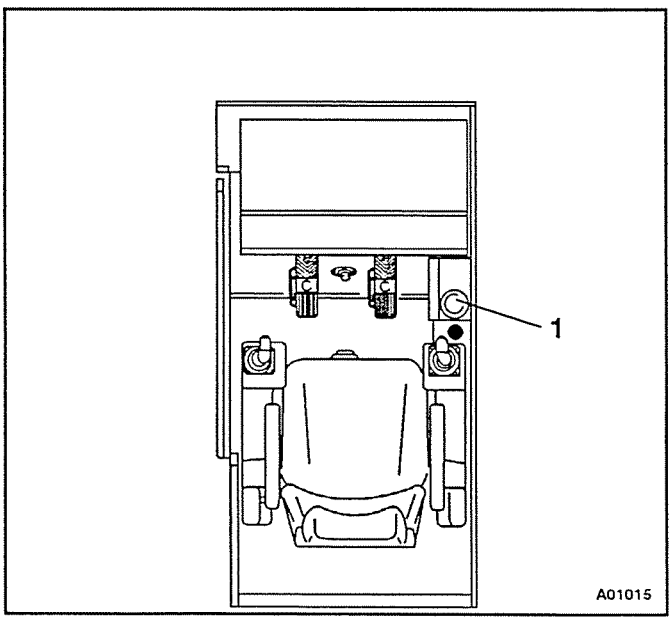


- Extend the outrigger cylinders until all the wheels are off the ground.
- Check the spirit level (**1**) to ensure that the crane platform is level horizontally.

Caution:

The level can be adjusted by extending/retracting individual outrigger cylinders. You must ensure, however, that the crane platform is raised and lowered equally at all four supporting points, otherwise you may overload the cylinders and cause them to buckle.

Before the crane is used you must check that it is exactly level. This is done by raising the boom to a steep angle and lowering the hook until it is just above the ground. When the superstructure is slewed in different directions the hook must always hang along the central axis of the boom.



While you are working with the crane keep checking the spirit level (**1**) in the crane operator's cab on the superstructure.

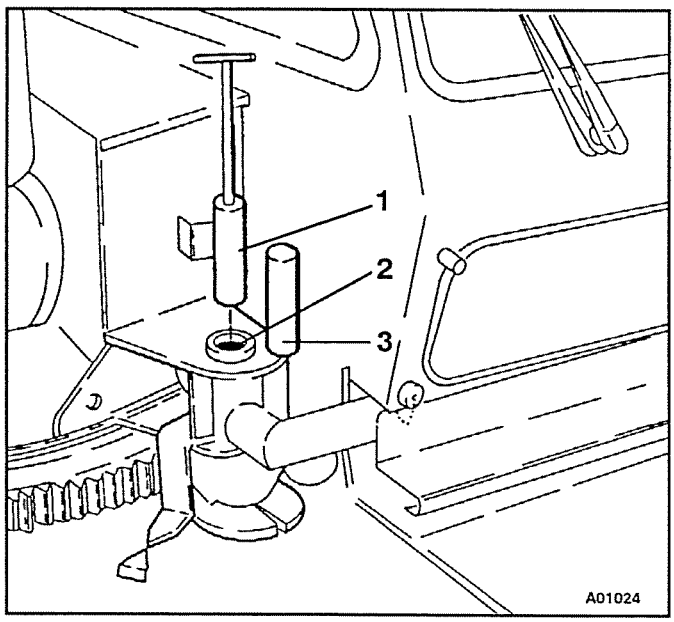
If there is a change in the alignment you must find out why immediately and the crane must be levelled again.

4.4 Operating the crane with/without outriggers

4.4.1 Operating mode with outriggers

- The suspension system must be locked.
- The outrigger pad loads must be spread by extra packing so that the outrigger pressures occurring during the planned crane operation do not exceed the load-bearing capacity of the ground under any circumstances.
- When the crane is supported with the outriggers all four outrigger beams must be extended to the span stipulated in the lifting capacity tables.
- All wheels must be off the ground.
- The lifting capacity tables "truck crane supported by outriggers" are applicable.
- Set the SLI for the appropriate operating mode as stipulated in the lifting capacity tables.
- The slewing range of the superstructure is 360 degrees except where restrictions are stated in the lifting capacity tables.

Note: For working with the boom at the rear of the crane (0° position) the superstructure has to be locked in place with the locking pin.



- Remove the pin (**1**) from the holder (**3**) and insert the pin in the locking device (**2**).

4.6.4 Counterweights

The counterweight sections can be put together to form two different counterweights (10 t or 22046 lbs and 15.8 t or 34833lbs). The required counterweight in each case is listed in the **lifting capacity tables**.

Danger: The counterweight sections may only be put together to form counterweights of 10.0 t (22046 lbs) and 15.8 t (34833 lbs). No other combinations are permitted.

Transporting the counterweight

All counterweight sections can be removed from the superstructure. Depending on the maximum permissible axle load some counterweight sections may be attached to the superstructure or placed on the counterweight platform on the carrier when the truck crane is driven on roads. All other counterweight sections have to be transported on a separate vehicle.

The table in Section 8.2.18 "Weights" shows the axle loads for the different combinations of counterweight sections.

Counterweight system

The counterweight can be assembled from the following parts:

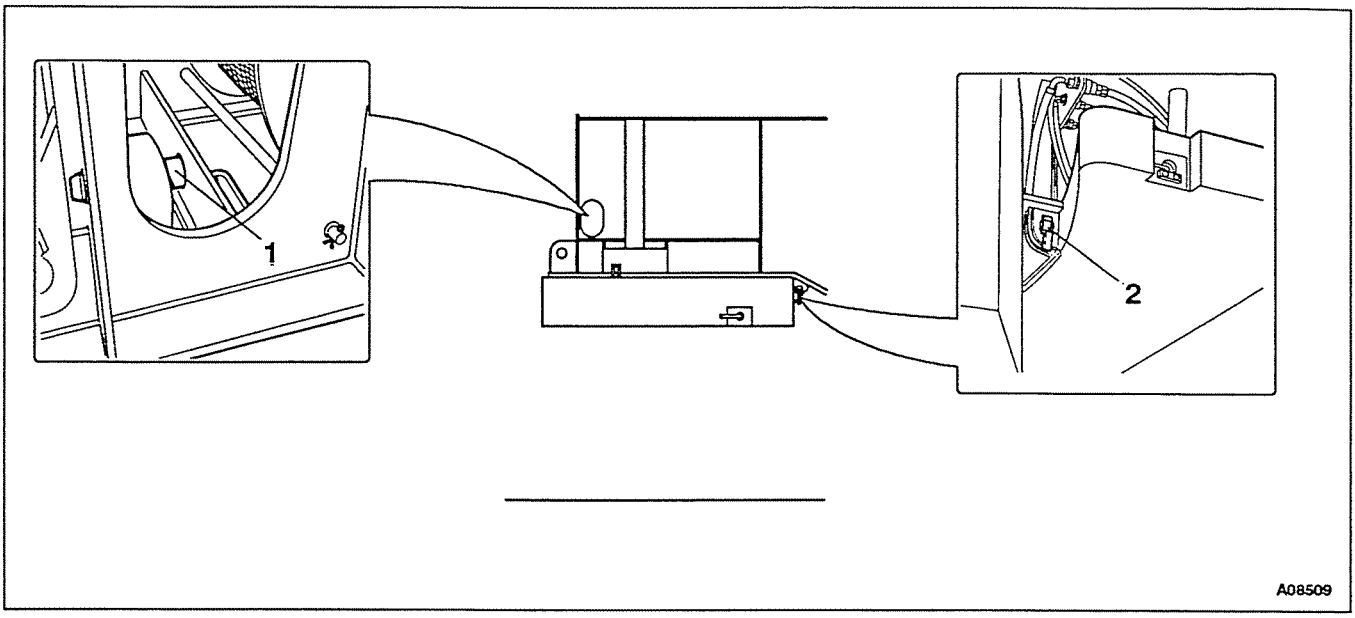
- The basic 3.4-t (7495 lbs) counterweight section with two inserted 0.2-t (441 lbs) counterweight sections and one inserted 0.4-t (882 lbs) counterweight section (total weight 4.2 t or 9259 lbs) and the locking mechanism for the lifting cylinders.
- The 5.8-t (12787 lbs) counterweight section with the locking mechanism for the lifting cylinders.
- An additional 5.8-t (12787 lbs) counterweight section.

A maximum of two counterweight sections at a time can be lifted by the lifting cylinders.

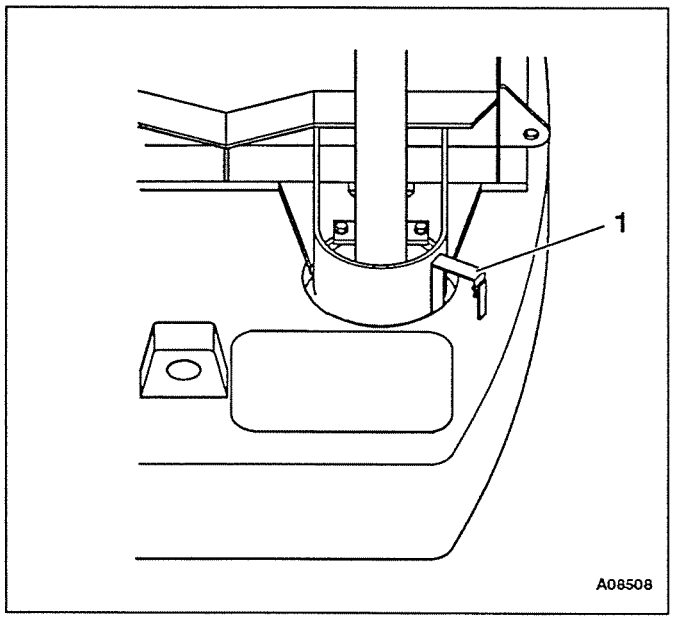
When the lifting cylinders are attached to the basic counterweight section, this section can be lifted alone or together with the additional 5.8-t (12787 lbs) counterweight section. The basic section can only be lifted alone when the additional counterweight section is placed on the counterweight platform on the carrier.

For lifting the 5.8-t (12787 lbs) counterweight section with locking mechanism for the lifting cylinders or for lifting this section together with the additional 5.8-t (12787 lbs) section, the lifting cylinders must be attached to the 5.8-t (12787 lbs) section with locking mechanism.

During crane operation no counterweight section may be suspended from the lifting cylinders without being locked. All sections must be locked together and the basic section must be locked to the turntable.
The counterweight sections may only be assembled in the order described in this Section of the operating instructions.



- Lock the basic counterweight section to the turntable by inserting pin (**1**) in the middle and the other two pins (**2**) on the left-hand and right-hand sides.



- Slightly extend the lifting cylinders until the basic counterweight section is freely suspended under the turntable.
- Turn both locking levers on the basic counterweight section into position (**1**).
- Fully retract the two lifting cylinders.
- Unlock the superstructure.
- Pull the three locking pins as far as they will go out of the 5.8-t (12787 lbs) counterweight section with locking mechanism and stack this section on the additional section placed on the counterweight platform.
- Push the three locking pins as far as they will go into the 5.8-t (12787 lbs) counterweight section with locking mechanism. Turn the grips into the pockets to secure the pins. The 5.8-t (12787 lbs) counterweight section with locking mechanism is now locked to the additional 5.8-t (12787 lbs) counterweight section.
- Turn the superstructure to the 0° position at the back of the crane.

If you have not already switched off the buzzer press the "release" button after you have left the shutdown range to cancel the shutdown.

If you do not know why the shutdown has occurred, hold the "release" button down.

After approximately 1 second, the status display will change:

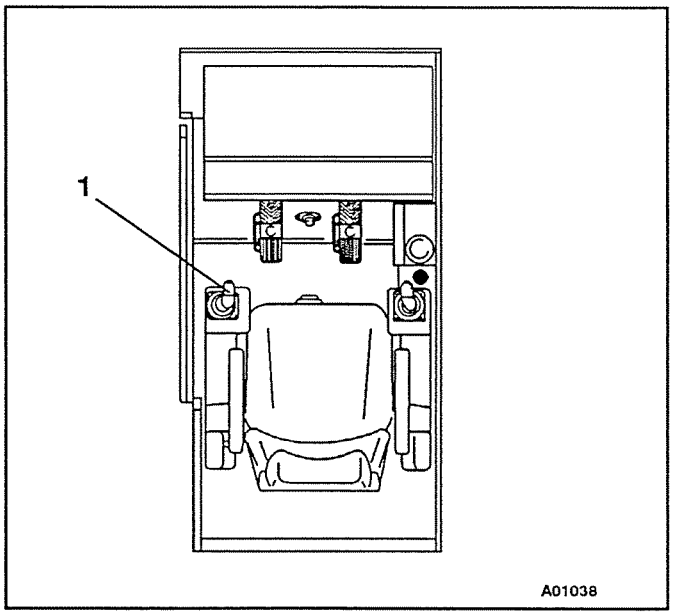
. . . . . f . . . . . M . . . . .

If, for example, the information switch is in position **b**.

Continue to hold the "release" button down and turn the information switch to position **f**.

. . . . . f . . . . . M . f = 1 . . . .

In the table of *status messages* you will find under "f=1" that the angle of the boom is not within the permitted range.



Lifting:
Pull the left-hand control lever (**1**) backwards

Lowering:
Push the left-hand control lever (**1**) forwards

The speed of the auxiliary hoist can be regulated with the lever and by altering the engine speed.

The high stregth hoist rope is stiff at low temperatures. If the multi-fall reeved hook block cannot be lowered, hang a weight on it.
When winding the rope onto the drum the hoist must be run slowly, as the rope is difficult to reel when it is stiff.

The rope running on the drum can be monitored with the mirror over the hoist.

Danger:

When work is stopped the load must always be lowered.
Never leave the crane operator's cab with a load still hanging on the hook. Suspended loads can cause accidents.

A synchro is built into the manual control lever. When the hoist drum turns the end of the lever vibrates slightly.

The lowering limit switch prevents the hoist rope from being reeled off the drum completely. It shuts down the lowering movement when only five turns are left on the drum.

Caution:

If the lowering limit switch is not working properly or is damaged it is possible to unreel the rope from the drum completely. Because the drum continues to turn the rope is then reeled back onto the drum in the other direction. This may cause the rope to break.

Caution:

The drum must not be turned further if all of the rope has been reeled onto the drum. This would alter the shutdown point of the lowering limit switch.

4.6.14 Movements which can be carried out simultaneously

Lifting/lowering with the main hoist (without fast speed) can be carried out simultaneously with:

- Slewing
- Telescoping
- Slewing and telescoping
- Lifting/lowering the boom
- Slewing and lifting/lowering the boom

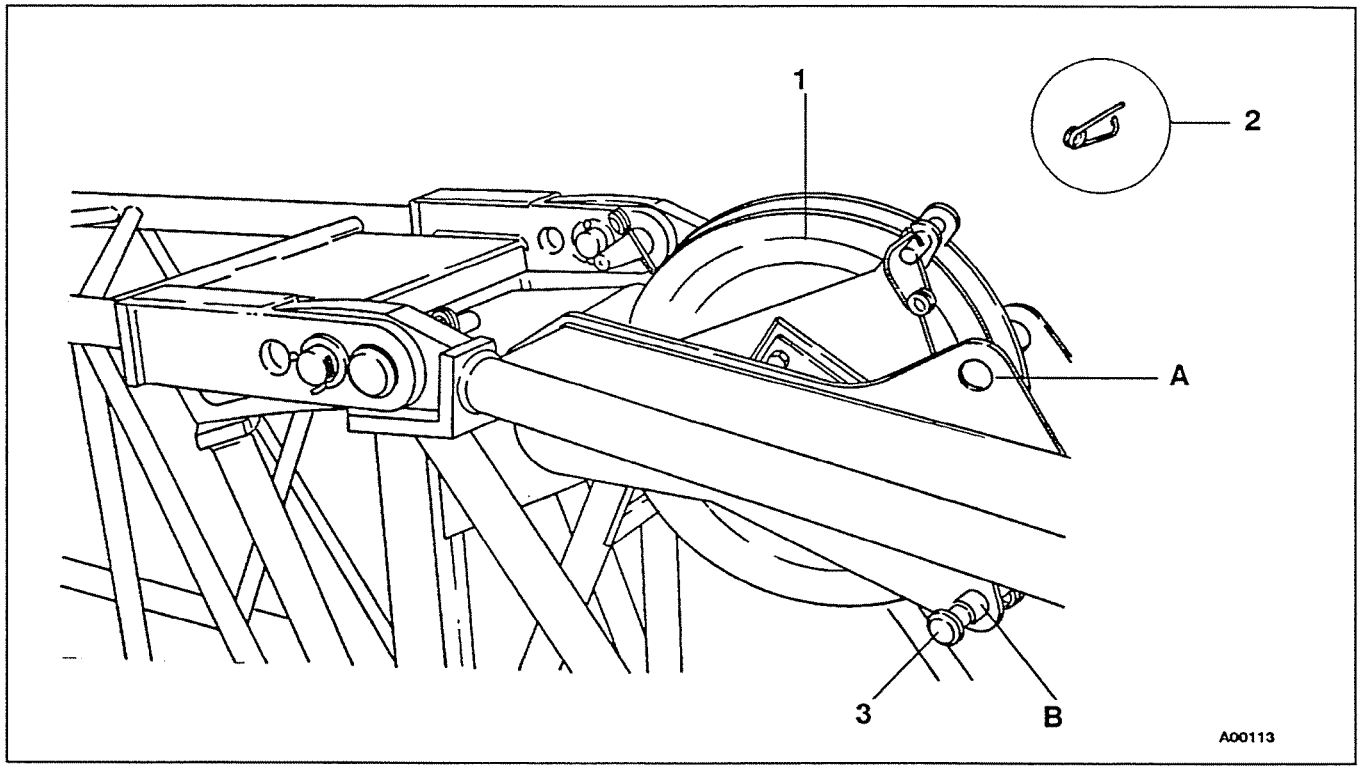
Lifting/lowering with the auxiliary hoist (without fast speed) can be carried out simultaneously with:

- Slewing
- Telescoping
- Slewing and telescoping
- Lifting/lowering the boom
- Slewing and lifting/lowering the boom

Caution:

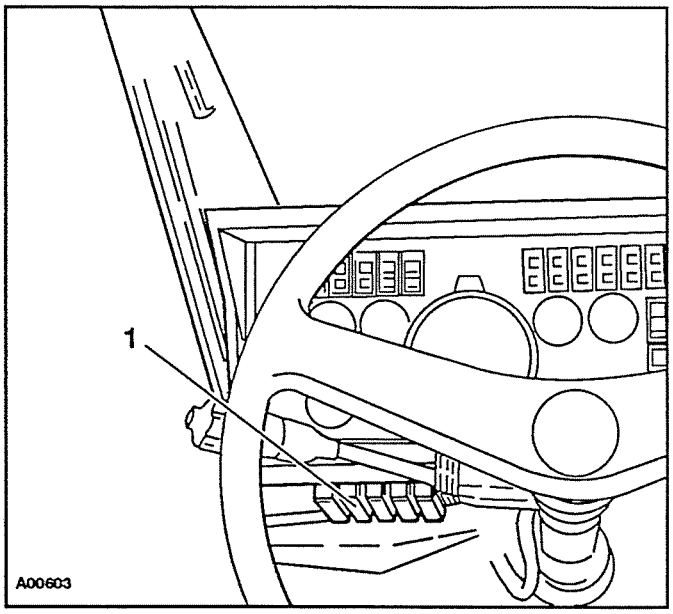
The SLI provides no protection when you are working with two hooks. The SLI only covers operation with one hook. Working with two hooks can overload the crane and cause it to overturn.

- Hang a lifting limit switch weight on the lifting limit switch on the 10-m (32.8 ft) lattice extension with a shackle.
- Unscrew the short-circuit plug from the socket on the distribution box on the main boom. Unscrew the plug from the dummy socket at the foot of the 10-m (32.8 ft) lattice extension. Insert the plug into the socket on the distribution box on the main boom.
- Screw the short-circuit plug into the dummy socket on the 10-m (32.8 ft) lattice extension.
- Move the anemometer from the main boom to the end of the 10-m (32.8 ft) swing-away lattice extension and secure the anemometer with a retaining pin.
- Screw the anemometer plug into the socket on the distribution box on the end of the 10-m (32.8 ft) swing-away lattice extension.



- Remove pin (**3**) from bearing point **B**.
- Lift the deflection sheave (**1**) until it can be fixed with pin (**3**) at bearing point **A**. Secure the pin with a retaining pin (**2**).
- Unreel the hoist rope from the main or auxiliary hoist. Pass the rope over the deflection sheave at the head of the main boom and over the deflection sheave (**1**) at the foot of the lattice extension to the head of the 10-m (32.8 ft) lattice extension.
- Lay the hoist rope over both head sheaves.
- Pass the hoist rope through the lifting limit switch weight as described in Section 4.6.2 "Reeving the hoist rope".
- Hook on the hook tackle or hook block. The hoist rope can be reeved once or twice with the 10 m (32.8 ft) lattice extension.

Fuse groups F1 to F5



The fuses (**1**) are on the left next to the steering column under the instrument panel.
The fuses are divided into five groups **F1** to **F5**

Designation in electric circuit diagram: F1	Size (A)	Function
1	3	Tachograph
2	10	Spare
3	10	Start/Stop engine, Suspension locking system, Longitudinal rocking
4	10	Gauges, Tachograph
5	10	Mirror heating, Additional (optional) heating system
6	3	Indicator lamps, Level monitoring for cooling system, Transverse differential locks, Activation of axle line drive

Designation in electric circuit diagram: F2	Size (A)	Function
1	10	Hazard warning lights, Socket
2	15	Rotating warning lights
3	10	Cab lighting, Brake lights
4	10	Horn, Windscreen washing system
5	10	Flasher system
6	10	Heating system blower, Air drier

7.3 Routine work

7.3.1 Daily inspection and maintenance work

- Check the oil level in both engines with the dipsticks (please see Mercedes Benz's operating and maintenance instructions).
- Check the cooling water (reservoirs on the right-hand side behind the driver's cab and on the right-hand side of the turntable above the cooler for the engine coolant).
- Check that all lights and switches are working.
- Check the engines' dry air filters.
  If the indicator lamps are on, clean or replace the filters (please see Mercedes Benz's operating and maintenance instructions).
- Check the oil level in the automatic gearbox with the dipstick.

7.3.2 Weekly inspection and maintenance work

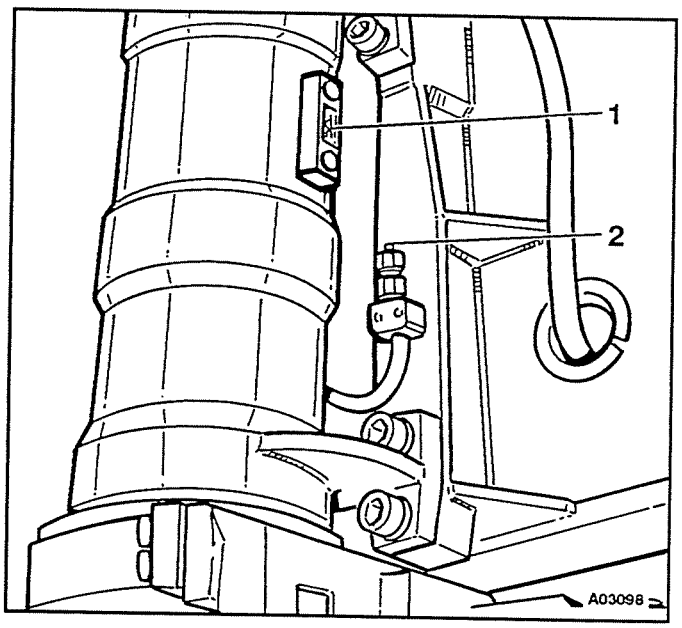
- Carry out a visual inspection of the engines, axle lines, gearbox and transfer case, checking for leaks and inspecting their general condition.
  Repair any leaks and check the oil level.
- Check the compressed-air and hydraulic systems for leaks.
  Repair any leaks.
- Drain moisture from the compressed air reservoir.
- Check the oil level in the crane's hydraulic oil tank on the superstructure through the inspection glass (the truck crane must be in the correct condition for driving on roads, i.e. **transport condition**).
- Check the oil level in the carrier's hydraulic tank through the inspection glass
  (the truck crane must be in the correct condition for driving on roads, i.e. **transport condition**).
- Check the tyres for damage and ensure that they have sufficient tread. Check tyre pressures.

Tyres	Air pressure	Air pressure
14.00 R 24 (optional equipment)	10.0 bar	145.0 psi
16.00 R 25	9.0 bar	130.5 psi
20.5 R 25 (optional equipment)	7.0 bar	101.5 psi

Note: When you buy new tyres please note that they must be for the same load as the original tyres, which means that the tyre pressures will also be the same.

7.8.2 Suspension cylinder assembly with oil level inspection glass

Caution: If the oil level is above the upper mark on the inspection glass the suspension cylinder assembly is defective and must be changed.
Inform Krupp-Service.



- Check the oil level at each of the inspection glasses (**1**).
  The oil level must be between the marks.

If the oil level is too low:

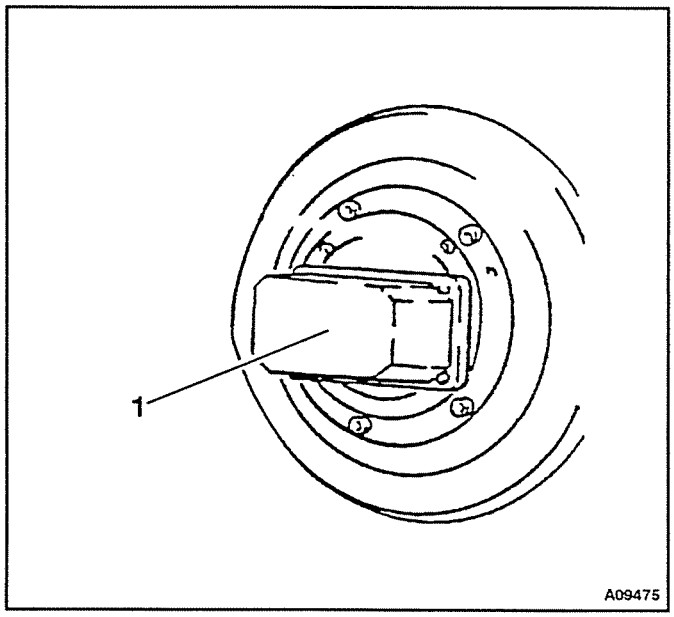
- Screw the high-pressure oil can (supplied with the crane) to the filler connection (**2**).
- Pump in oil until it reaches the lower mark.
  Only use oil in accordance with the Lubricant Table, Section 7.6.

Caution: Even if it is difficult to pump in the oil, do not fill in the oil through the inspection glass connections as it will not reach all lubricating points.

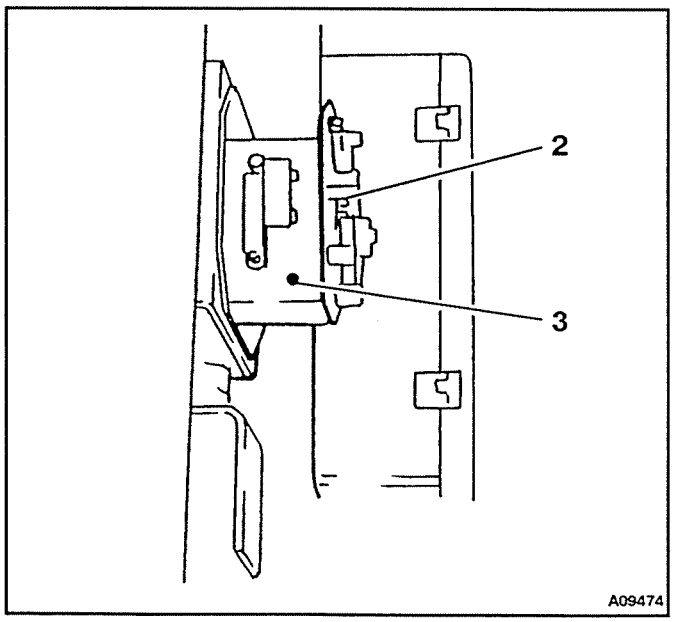
7.9.3 Setting the lowering limit switch

Caution: After repairs to the hoist or when the hoist rope has been changed the lowering limit switch always has to be reset. If the lowering limit switch is not working properly it must be replaced immediately.

- Reeve the hoist rope with 6 falls.
- Extend all the telescope sections of the boom fully.
- Lower the hook block until there are only five turns of the rope on the hoist drum.



- Take the cover (**1**) off the lowering limit switch (**2**).
- Turn the setting screw (**3**) until you hear the microswitch switch.
- Replace the cover on the lowering limit switch, making sure that the seal is in place correctly.
- Raise the hook block until there are approx. 10 turns of the rope on the hoist drum and then lower the hook block again.
- The lowering limit switch must shut down the hoist when only five turns of the rope are left on the drum.



Parking brake

Construction:	The parking brake acts indirectly on the spring brake cylinders on the second to fifth axle lines. The spring accumulators produce the braking force mechanically. If there is a fault in the compressed-air line the parking brake can be released mechanically. The warning light in the driver's cab indicates that the brake is on or that there is insufficient pressure (below 5.4 bar = 78.3 psi) to release the brake.

Retarder

Construction:	Hydraulic hydrodynamic brake in the automatic gearbox.
Operation:	With a foot-operated switch in the driver's cab.

Trailer brake (optional equipment)

Two-line brake via trailer brake valve.

Compressed-air secondary consumers

- Change-over of transfer case to on-the-road/off-the-road gear
- Longitudinal differential lock in transfer case
- Longitudinal differential lock in transfer-drive axle line, fourth axle line (optional equipment)
- Transverse differential locks in the driven axle lines
- Activation of the third axle line drive
- Suspension locking system
- Activation of additional pressure accumulators for driving off-the-road
- Driving engine cut-out
- Driving engine speed reduction
- Actuation of the retarder
- Fuel reduction in gears 1 and 2 and in reverse