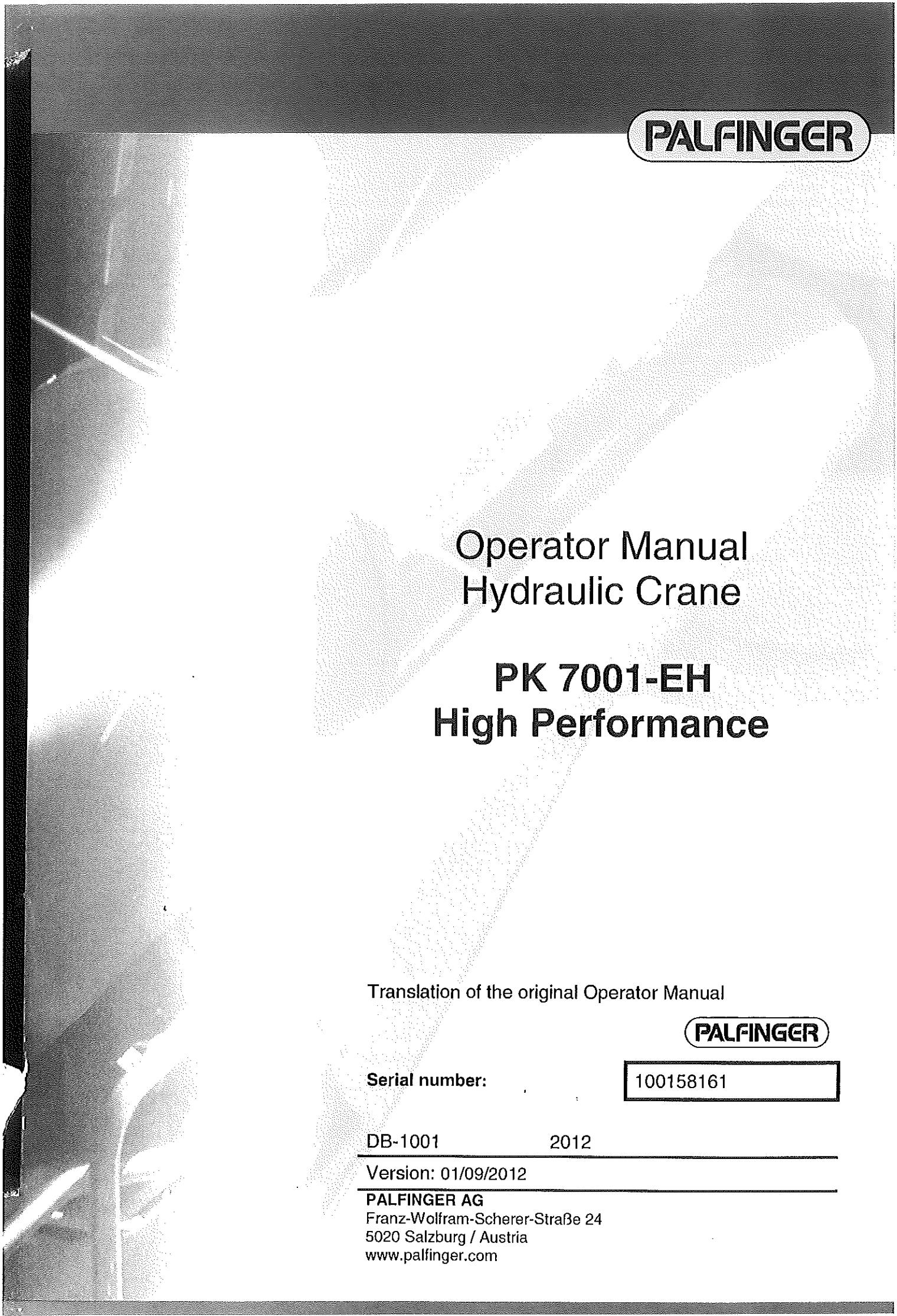

PALFINGER

Operator Manual
Hydraulic Crane

PK 7001-EH
High Performance

Translation of the original Operator Manual

PALFINGER

Serial number: 100158161

DB-1001 2012

Version: 01/09/2012

PALFINGER AG
Franz-Wolfram-Scherer-Straße 24
5020 Salzburg / Austria
www.palfinger.com

Dear customer,

thank your for purchasing and putting your faith in a quality product from PALFINGER. During the development and manufacture of your unit, everything was done to ensure that the equipment operates reliably and safely.

Please note the information that follows so that you can work with your PALFINGER product reliably and cost-effectively over the long term.

- Please follow all safety instructions.
- Please maintain your PALFINGER unit in accordance with regulations.
- Please adhere to the prescribed maintenance intervals.
- The unit must be cleaned at regular intervals, since dirt increases the amount of wear.
- Contamination by grease and oil increases the risk of accidents.
- All prohibitions and notes in these operating instructions must be complied with, since they protect your life and the lives of other persons.

We wish you good luck using your PALFINGER product!

Contents

CHAPTER 1

Notes regarding the operating instructions

In this chapter

Operating instructions

The operating instructions have been prepared to explain operation of the unit.

The operating instructions are part of the unit.

Always keep the operating instructions with the unit (driver's cab).

Neither the operating instructions nor the annexed Technical Sheets replace proper operator training.

Please contact your PALFINGER partner immediately if there is anything in this operating instruction which requires explanation. We appreciate any suggestions received from our customers; they help us to make the operating instructions ever more user friendly.

Information! Enclosed in these operating instructions you will also find the PALFINGER DVD "On the crane".

Changes since going to press

PALFINGER is anxious to apply the latest and most advanced technology in their devices by further development. This may result in deviations between operating instructions and the actual unit.

Please contact your PALFINGER partner immediately if any function in this operating instruction is described insufficiently or incorrectly.

The specifications, pictures and descriptions shown in these operating instructions do not qualify for any legal claims.

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Validity of operating instructions

These operating instructions are only valid for the equipment shown on the front page. They are only applicable in conjunction with the operating instructions from all other auxiliary equipment that is used on the equipment/vehicle.

Terms

Operating company	The owner, lessee, renter of the unit, uses the unit, operates the unit either himself or entrusts a third party with the operation.
Operator	Anyone who starts up the unit.
Start	Switch unit on, irrespective of purpose (operation, maintenance, service etc.)
Assistant	Provides assistance but does not operate the unit.
Installer	Fits the unit to the vehicle.
Service partner	Authorized by PALFINGER.
Expert	Someone with sufficient knowledge of loading cranes due to their technical training and experience who is familiar with the relevant government laws and regulations to the extent that they can assess whether the equipment is safe for operation.
Properly	A person who observes and complies with all duties of care that his work involves acts properly.
Negligent	A person who disregards the duties that his work involves acts (grossly) negligently.
(Grossly) negligent	Who fails to observe what should be obvious to anybody under the respective circumstances.
Load moment	The moment that is exerted by the load, ancillary equipment, lifting devices, etc. that are hanging on a hook.
Inherent moment	The moment that is exerted by the dead weight of the boom system.
Lifting capacity	Consists of the load moment and the inherent moment
Lifting power	The force needed to lift an object.
Overload situation	Reaching of the maximum permissible load for the current working position.
Working position	Crane position.
Working range	The area that is required to carry out the work.
Movement range	The area within which the crane can be moved.
Load range	The range within which the respective crane can handle loads.
Load path	The course of the path that is taken my the moved load.
Hold load	Holding the lifted load under the supervision of the operator whilst the crane safety systems are activated.
Setup status	Crane that has been prepared for the respective work.
EU	European Union.
CE marking	Shows that the unit has been manufactured in accordance with the EU directives.
Operating instruction	Produced in addition to these operating instructions by the operating company for special operating conditions.
Emergency operation	Operating mode that is not for normal crane operation. Used to put the crane into transport position after a failure of the electrical system and/or the safety equipment.

Symbols

The layout of the operating instructions is designed to make important notes, instructions or warnings particularly clear by using symbols and signaling words.

Danger!

These symbols and the Danger! signal words are used for immediately threatening dangers of fatal injury.

Ignoring this instruction will result in death or serious injury for operator and others.

Warning!

These symbols and the Warning! signal word are used for immediately threatening dangers.

Ignoring this instruction could result in death or serious injury for operator and others. Damage to the unit or property can also result.

Information!

The symbol and signal word are used for particularly important notes which make working with the unit easier.

Symbol for operating lever:

In neutral position

Operated

Sketches and pictures

Information! Some sketches within this operator manual (e.g. crane) are for illustration only.

CHAPTER 2

Safety and Health Standards

In this chapter

Safety for individuals

This unit is an item of working machinery. It has been constructed and built in accordance with prevailing EU standards, guidelines and safety provisions. During use, unforeseen risks to individuals, the device or other things may nevertheless arise.

The safety of the operators and other persons must be top priority.

Operating situations in which the operators or other persons are in danger are prohibited.

If used incorrectly or negligently and/or operated wrongly the unit can potentially be extremely dangerous.

In the event of manipulation or commissioning of the unit, the operator must ensure that neither he nor any other person is in the danger area!

The operator must recognize and understand all safety instructions in the operating instructions and the meaning of all signs.

Safety clothing

During any work in the unit such as:

- Cleaning and maintenance
- Setting up
- Daily monitoring
- Operation
- Service and repairs

safety clothing that is suitable for the respective danger must be worn.

Before putting on the safety clothing, remove jewelry (example: rings, chains, bracelets etc.).

Personal safety equipment:

Operation: safety clothing, work gloves, hard-capped boots, helmet.

Other activities: depending on the type of danger (example: hearing protection, safety goggles, work gloves).

Government regulations and standards for operating the unit

The operator must know about and follow the national regulations, standards and safety provisions for operating the unit.

If the operating instructions contain regulations and safety provisions that contradict the national laws and regulations, the national laws and regulations have priority.

Adverse working conditions

Do not operate the crane

- at wind speeds of 50 km/h (30 mph) and above;
- at wind speeds from 34 km/h (20 mph) when lifting bulky loads or working in near vertical position.

Wind speed in Beaufort	Description	m/s	km/h	mph
0 -2	Wind can be felt on the face or exposed skin. Tree leaves rustle.	max. 3.4	max. 11	max. 8.1
3	Leaves and twigs are in constant motion while the wind will extend light flags.	3,4 - <5,5	12 - 19	8,1 - <12,7
4	Branches are in motion, the wind will raise dust, leaves, and loose paper.	5,5 - <8,0	20 - 28	12,7 - <18,4
5	Larger branches and trees begin to sway, whitecaps on lakes.	8,0 - <10,8	29 - 38	18,4 - <25,3
6	Large tree branches are in motion, the wind whistles in overhead wires.	10,8 - <13,9	39 - 49	25,3 - <32,2
7	Whole trees are moving in the wind while walking becomes affected by the wind.	13,9 - <17,2	50 - 61	32,2 - <39,1

- when thunderstorms are approaching
- at ambient temperatures below -30°C (-22 °F) or above +50°C (122 °F) Average ambient temperature must not exceed +40°C (104 °F) during operation.

DANGER **Danger! Ignoring these instructions on working conditions may lead to risk of fatal injury for the operator and others and/or to damages to the crane.**

Risk of falling

Warning! Climbing up on the unit can lead to the individual falling or the unit being damaged. There is an acute danger of accident.

Climbing on the unit is prohibited.

Exceptions: Climbing up to operating stands using climbing aids (*see "High stand, high seat", Chapter 6*) or climbing to the emergency operator station at the crane column (see "Emergency control operation after remote control failure", Chapter 5).

Cables, sensors, sensor attachment lugs, drivers for sensors etc. may not be used as steps and / or handles.

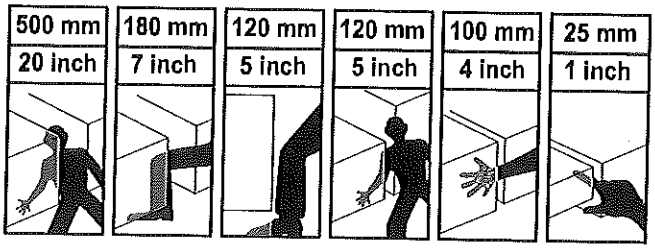
Warning! If you need to climb up the machine for instance for visual checks, maintenance and servicing absolutely use a climbing aid (e.g. ladder).

Danger of getting crushed

Danger! **If the minimum distances specified below are undershot, there is an acute risk of crushing.**

Operating situations in which the operators or other persons are at risk of crushing are prohibited!

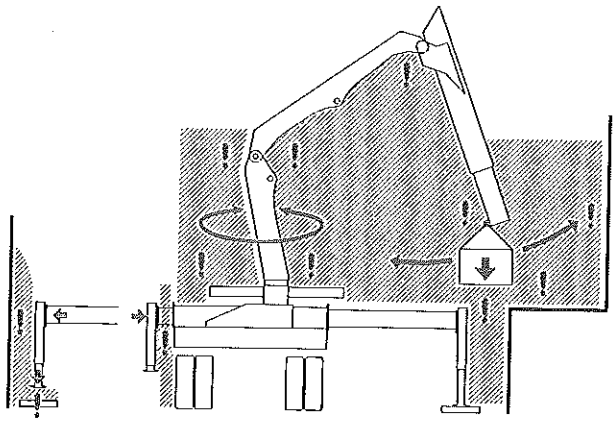
Required minimum distances



The crushing point for the parts of the body specified above are not considered to be dangerous locations provided that the specified safety distances are not undershot. It must also be ensured that the next biggest part of the body cannot get into the crushing point.

Crushing points

Possible crushing points.



More crushing points may result from your installation and use.

Risk of burns

Some components can become extremely hot during operation (lines, hoses, valves, valve operating levers, hose connections, hydraulic cylinders, oil motors, pumps etc.).

Contact with these parts can cause burns!

Risk of scalding if oil escapes!

In order to avoid burns, the exhaust system of the vehicle must be covered in the operating area, or a safe distance must be maintained.

Noise emission

Warning! Permanent low or short high noise emission levels endanger the health of operators and bystanders.

Main source of noise:	Vehicle motor.
Protective measures:	Ear protection.

Operators have to comply with the relevant national noise control standards and laws.

Measuring values

On operating stands of loading cranes which are mounted to Diesel motor vehicles (also in case of remote control operation within 1 m from the vehicle) the sound pressure level depends on vehicle model, status of operation (idling speed, full load) and crane installation, so the following values can be reached:

- At low or high idling speed of the vehicle engine 72 to 84 dB(A)
- In crane operation 79 to 86 dB(A)
- The sound power level is between 92 and 100 dB(A).

Information! In order to reduce noise exposure it is recommended to maintain a low idling speed and use the remote control at a distance from the vehicle motor greater than 1 m.

Dangers caused by exhaust

Exhaust components such as carbon monoxide, nitrous oxides or diesel soot can put the operator on the operator station at risk.

It must therefore be ensured that:

- the vehicle exhaust does not flow into the vicinity of operating stands.
- when working in closed rooms, the vehicle exhaust must be led outside using suitable auxiliary materials.

Danger from power lines

Danger! Even approaching a power line may lead to an electric shock. The operator will receive a fatal electric shock.

Condition and height of power lines do not say anything about their voltage.

If the voltage is unknown, the minimum distance from lines is 5 meters (16.5 feet). This applies to the crane, ancillary equipment, rope winch, rope, load lifting gear and load.

Note! The national minimum distances from live power lines may differ from the minimum distances specified in this document. The operator is therefore obliged to comply with the respective national regulations.

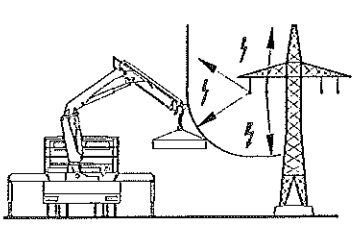
- The minimum distance from power lines must be observed at all times.
- Working above power lines is prohibited.
- Before starting work, obtain information about the voltage of the lines from the line operator.
- If you need to be closer than the minimum distance for work reasons, the lines must be switched off. Being closer than the minimum distance without switching off the lines is grossly negligent and potentially fatal!

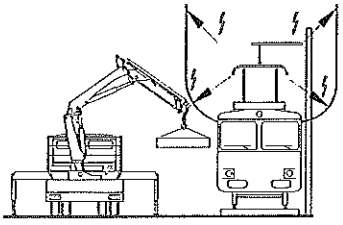
Also to be considered: Power lines move in the wind. Power lines can also be out of the operator's view.

The main boom of the crane or the load can swing because of a jerky movement (including up and down). This unwanted movement may mean that you get closer to power line. The crane, ancillary devices, the load lifting gear or the load may be electrified.

Minimum distances from live lines

Voltage	Minimum distance
up to 1000 Volts	1.0 meters (100.58 cm)
unknown or over 1000 Volts	5.0 meters (16.5 feet)





Actions in case of electric shock

Note! An accident with severe consequences can only be prevented by the correct response.

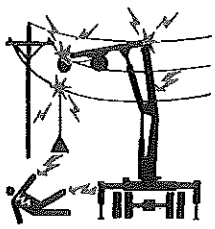
- Stay calm, do not move.
- Warn persons standing in the vicinity and direct them to observe the safety distance.

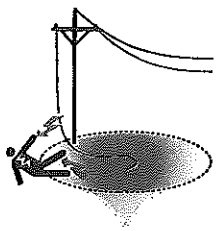
Danger! Upon contact with a live electric line with the ground, a potential gradient occurs. Within the potential gradient there is acute danger to life.

- The minimum distance to the vehicle, device, load or broken power lines is 10 meters / 33 feet (potential gradient).
- Leave the danger zone of potential gradient only by jumping with both feet. Keep your legs closed because of the step voltage.
- Under no circumstances you should leave the high stand, high seat, driver's cab or truck bed; stay where you are and don't touch anything.
- Do not touch the device, the load or the broken lines.
- Immediately arrange the switch-off of the live electric line.

Danger! Approaching any persons, devices or loads situated inside the electric circuit creates acute danger to life.

- Before rescuing any persons out of the electric circuit turn off the life electric line.





After maintenance, service and repairs

Note! Every time after maintenance, repair or service it is absolutely necessary to check the function of the entire safety equipment!

CHAPTER 3

General

In this chapter

CE symbol

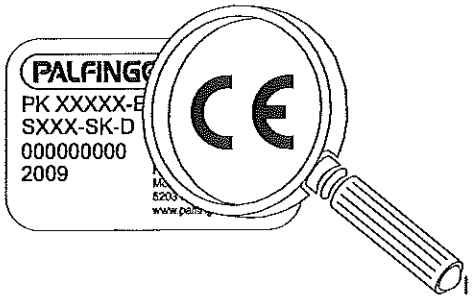
In the EU and in certain countries, the unit may only be operated with

- A valid CE symbol for the unit and the superstructure.
- A valid conformity declaration for the unit and the superstructure.

EU requirements are thus fulfilled.

CE marking: Shows that the unit has been manufactured in accordance with the EU directives.

Auxiliary devices require their own CE markings and their own conformity declaration.



Structure of system

Through a PALFINGER partner.

Carry out any legally required acceptance.

If the design differs from that of a truck loading crane (example: stationary installation) the load values may change. If you need any further information please contact your PALFINGER partner.

Crane delivery to operating company / operator

- Comprehensive training in how to operate the equipment.
- Note concerning any dangers and residual risks.
- Explanation of all control equipment.
- Delivery of maintenance manual, operating instructions (including any additions required by installation) and declarations of conformity for vehicle, crane and ancillary equipment, etc.
- Confirmation of any legally required acceptance.
- Registration: Warranty.

The company operating the equipment has to initiate any legally required periodic inspections.

Modifications to unit

Information! Modifications by the operating company/operator are prohibited! Exceptions: Corrosion protection and maintenance works according to chapter 'Maintenance'.

Modifications to the unit may only be made by PALFINGER service partners.

Operators

This system is a working machine that can be extremely dangerous to the operator and other persons if it is operated incorrectly or improperly. For this reason, the unit may only be started up by persons who meet all of the conditions specified below.

DANGER **Danger!** If the unit is operated without training and/or knowledge of these operating instructions, there is an acute risk of fatal injury for operators and other persons.

Information! The operating company must provide operators with comprehensive training or have such training carried out. These operators must meet all of the requirements mentioned in this document.

The following is required of the operator when operating this unit:

- Comprehensive training on this unit.
- Familiarity with the contents of these operating instructions.
- Have understood the training and the operating instructions.
- Familiarity with the contents of the operating instructions of all additional equipment used.
- Knowledge of the respective national regulations, standards and laws concerning the operation of this unit and all auxiliary devices that are used.
- Physical and mental fitness for the job.
- Be responsible, reliable and able to concentrate.
- The legally required training (pay attention to national laws).
- Be in no way incapacitated by alcohol, drugs or medication.
- Fulfill the minimum age requirement (pay attention to national laws).

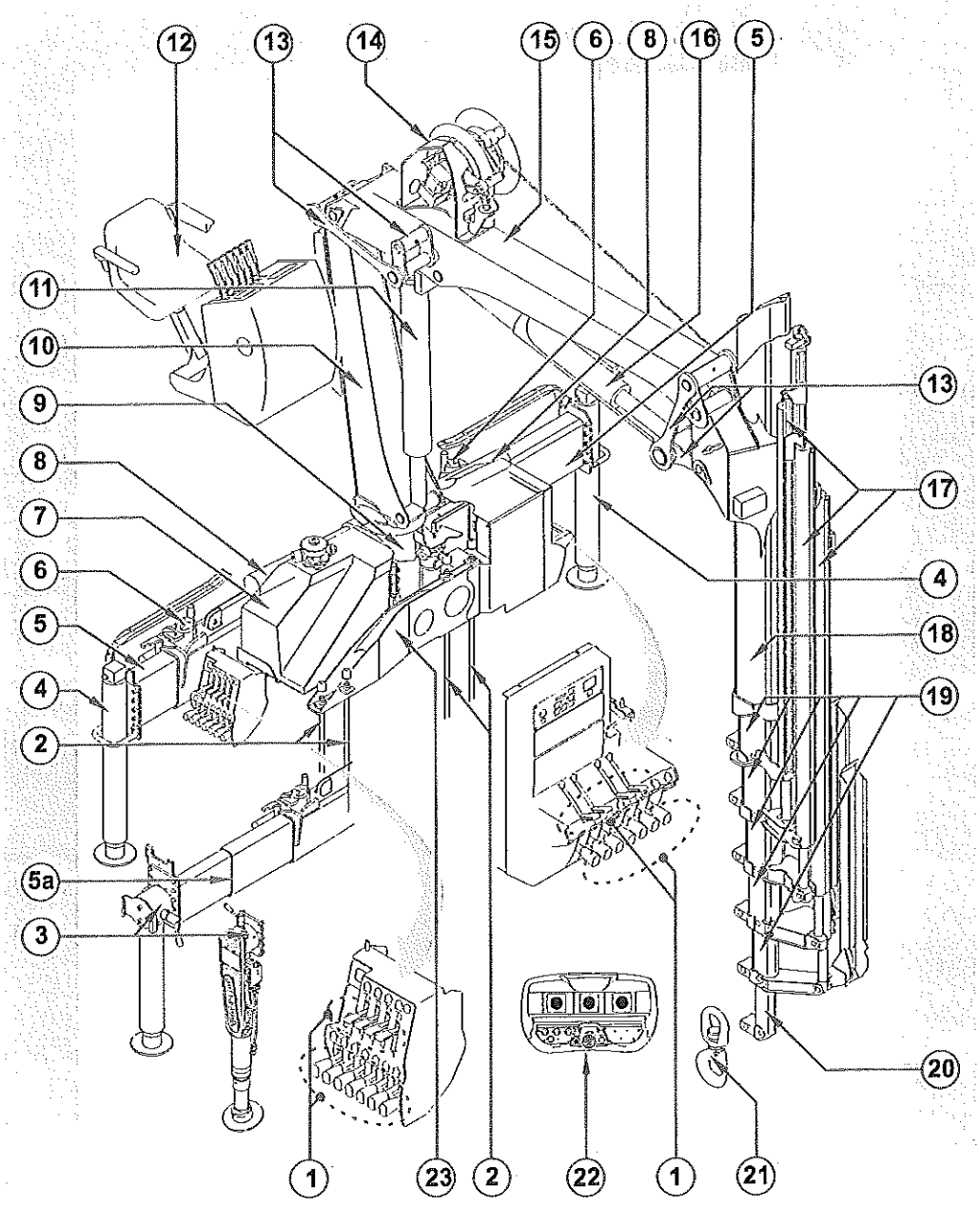
CHAPTER 4

Device and function

In this chapter

Main components

The illustrated crane is an example and shows components which may be optional on your unit, depending on model and version.



Find the names of the main components on the next page.

Main components

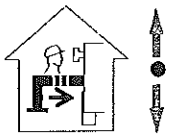
1	Ground control – control valve side, opposite side
2	Crane mounting bolts
3	Tiltable stabilizer cylinder
4	Rigid stabilizer cylinder
5	Stabilizer outrigger
0.12acres	Telescopic outrigger beams
6	Manual outrigger interlock system
7	Hydraulic oil tank with oil temperature indicator and oil level indicator
8	Slewing system
9	Base
10	Crane column
11	Lifting cylinder
12	Top seat
13	Linkage system
14	Rope winch
15	Main boom
16	Outer boom lift cylinder
17	Extension cylinder for hydraulic extension booms
18	Outer boom
19	Extension booms
20	Mechanical extension booms
21	Hook
22	Remote control handset
23	Balance

Function labels

The function labels are explained below. The order of functions (symbols) may be different on your operator station from the example shown below. Therefore it is absolutely essential to familiarize yourself with the symbols and how they are arranged on your device.

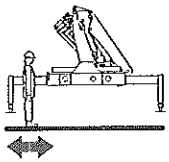
For the symbols on the remote control refer to the remote control operating instructions.

Stabilizer outrigger on operator side



Retract

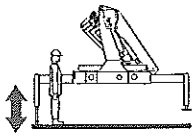
Extend



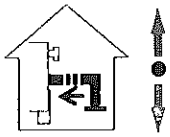
Stabilizer cylinder - operator side

Lift (hoist)

Lower

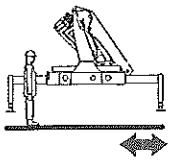


Stabilizer outrigger on opposite side

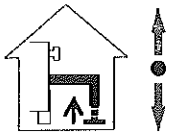


Retract

Extend

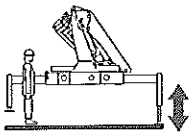


Stabilizer cylinder - opposite side

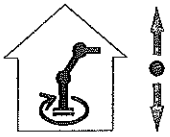


Lift (hoist)

Lower

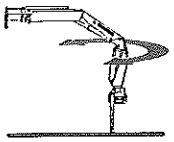


Slewing

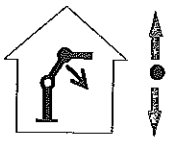


Clockwise (right)

Counter-clockwise (left)

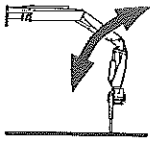


Main boom

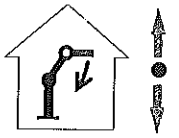


Lower

Lift (hoist)

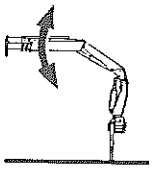


Outer boom

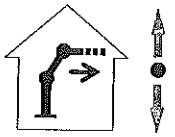


Lower

Lift (hoist)

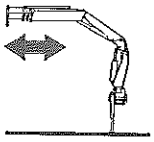


Extension boom

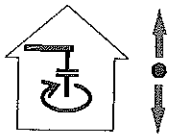


Extend

Retract

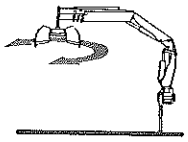


Rotator

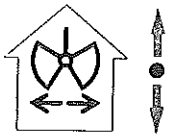


Clockwise (right)

Counter-clockwise (left)

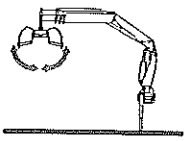


Grab

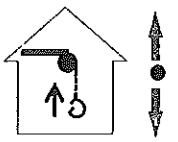


Open

Close

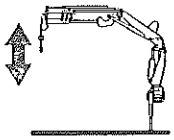


Rope winch

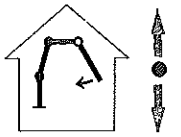


Lift (hoist)

Lower

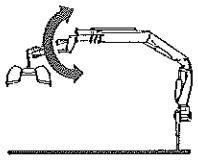


Fly jib - main boom

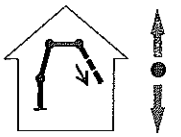


Lower

Lift (hoist)

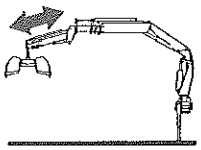


Fly jib - extension boom



Extend

Retract



Switches / buttons

Switch between rotator and fly jib main boom

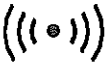
Switch between grab and fly jib extension

OLP

OLP Button

Warning horn

Working light on/off



Remote control operating mode

"Extend support outrigger beam" push button, remote control

Manual operating mode

Support operation

Motor start

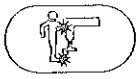
Motor stop

Engine rpm up/down

Seat heat off/on

Check operating instructions

Crane crushing hazard



Stabilizer supports crushing hazard

High pressure cleaner not allowed . .

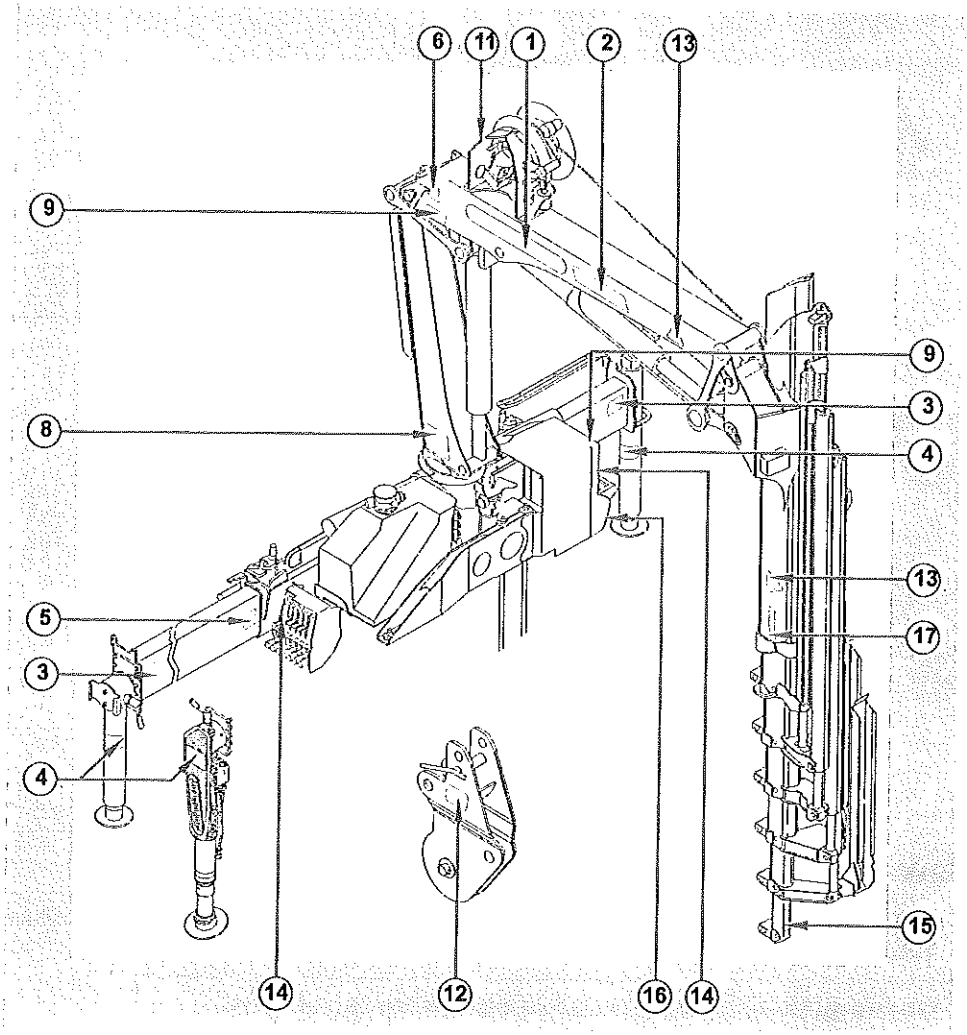
Overview of labels

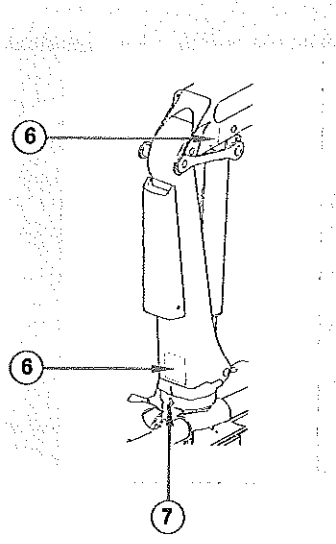
The labels are part of the unit, they serve to protect the operator and others and facilitate correct crane operation.

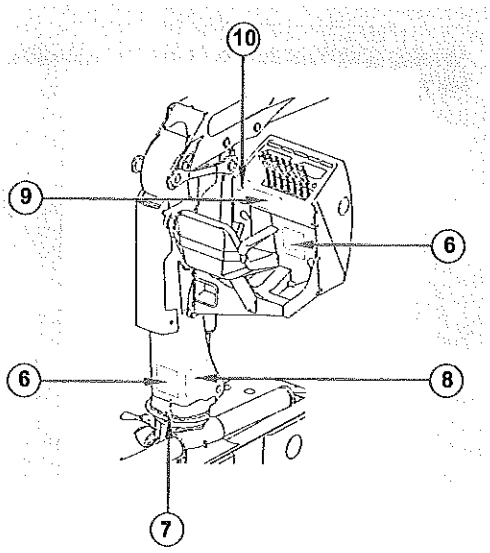
Warning! Missing or illegible labels increase the risk of injury.

Missing and illegible labels lead to operating errors and mistakes during crane operation; they must be replaced immediately.

Overview of labels:







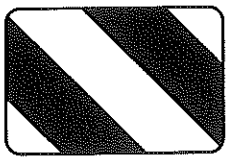
1. Company name label

Position:
Both sides on main boom and fly jib

2. Crane model label

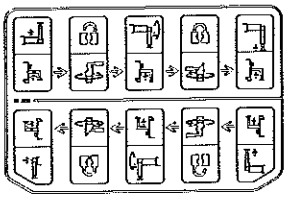
Position:
Both sides of main boom.
Meaning:
Product title.

3. Hazardous area



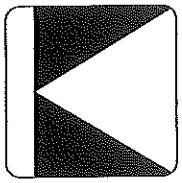
Position:
On the outrigger box and extension cylinders.
Meaning:
Warning of hazardous areas.
Risk if ignored:
Various hazards and dangers.

4. Tiltable stabilizer cylinder instruction label



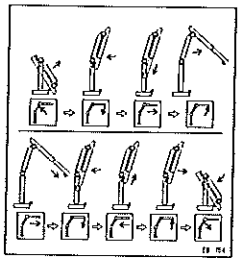
Position:
On the stabilizer cylinders.
Meaning:
Controls order, support out/in.
Risk if ignored:
Damages to the crane and acute danger of fatal injury.

5. Indication for completely extended outrigger beam



Position:
On the outrigger beam.
Meaning:
Outrigger beam completely extended.
Risk if ignored:
If outrigger beam is not completely extended the vehicle stability may be reduced.

6. Instruction label: Folding/unfolding crane



Position:
Back of crane column and main boom.
Meaning:
Controls order, unfold/fold crane.
Risk if ignored:
Damages to the crane and risk of fatal injury.

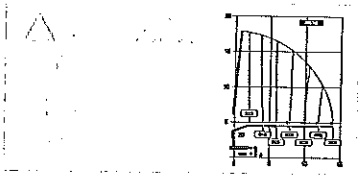
7. Folding arrow

Position:
Back of crane column and crane base.
Meaning:
Indicates the transport position.
Risk if ignored:
Damages to the crane and risk of fatal injury.

8. Identification plate

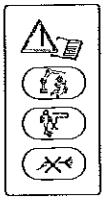
Position: On the crane column.
Meaning: Information about
1 Machine type
2 Internal code
3 Serial number
4 Year built
5 Company address
The identification plate may not be changed or removed.

9. Load capacity label



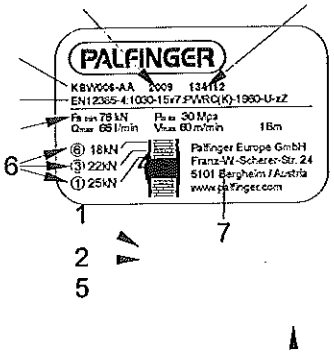
Position:
Operating stand, main boom
Meaning:
Specification of loads, load ranges and ranges.
Risk if ignored:
Overloading the crane, danger of the vehicle tipping over.

10. Warnings (only in the case of top seat or remote control)



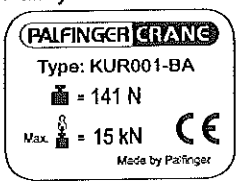
Position:
Operating stand.
Meaning:
Before operating the crane read the operating instructions.
Warning of dangers during crane operation.
Risk if ignored:
Damages to the crane and risk of fatal injury.

11. Rope winch identification plate



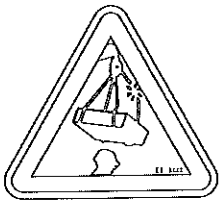
Position: On the rope winch.
Meaning: Information about
1 Machine type
2 Rope standard designation
3 Serial number
4 Year built
5 Rope's minimum breaking load
6 Load capacity for number of rope layers
7 Company address
The identification plate may not be changed or removed.
Risk if ignored: Damages to the crane and risk of fatal injury.

12. Pulley head identification plate



Position:
On the pulley head.
Meaning:
Information about year built, device type, technical data. The identification plate may not be changed or removed.
Risk if ignored:
Damages to the crane and risk of fatal injury.

13. Warning sign ‚Keep out from under suspended loads.'

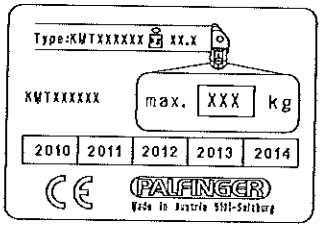


Position:
On both sides of outer boom or main boom.
Meaning:
It is prohibited to step under the suspended load.
Risk if ignored:
Risk of fatal injury by falling loads.

14. Radio controlled support warning sign

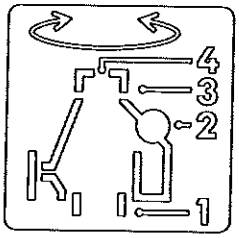
Position:
In the case of equipment with radio controlled support on all operating stands.
Meaning:
Note that the support can be extended or retracted using the remote control.
Risk if ignored:
Danger of injury by supports moving out or in.

15. Identification plate for manual boom extensions



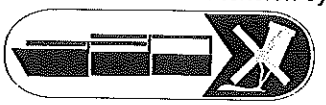
Position:
On manual extensions.
Meaning:
Information about year built, device type, maximum capacity.
Risk if ignored:
Damages to the crane and risk of fatal injury.

16. Lubrication label



Position:
On crane base.
Meaning:
Indicates the bearing points to be lubricated.
Risk if ignored:
Premature failure of bearing components.

17. Maintenance free extension system - instruction label

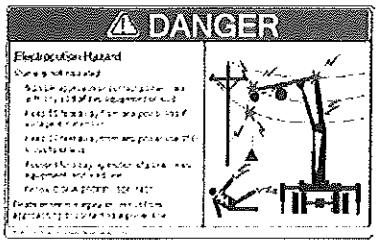


Position:
On outer boom.
Meaning:
Extension boom need not be lubricated.
Risk if ignored:
Premature failure of sliding elements.

Labels for North America

Following labels are only used in USA and Canada. Operators have to read and understand all additional labels.

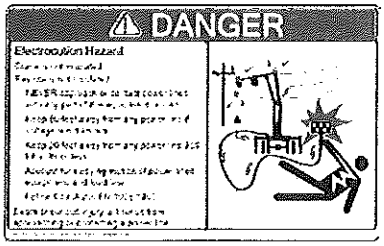
Electrocution hazard (manual or manual / RRC control)



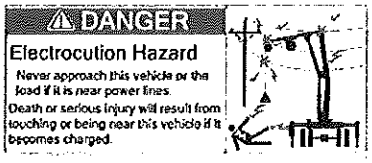
Position: Near the operator station.

Meaning: Shows minimum required distances to live electrical power lines; remote control not insulated.

Risk if ignored: Death or serious injury.



Electrocution hazard

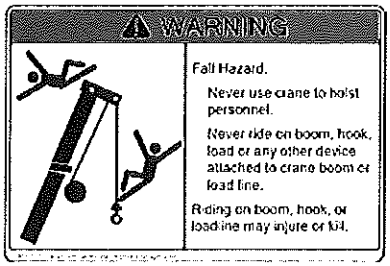


Position: On 4 sides of the vehicle.

Meaning: Bystanders keep distance from the crane/vehicle in case of flash over.

Risk if ignored: Death or serious injury.

Never ride the boom or hoist people

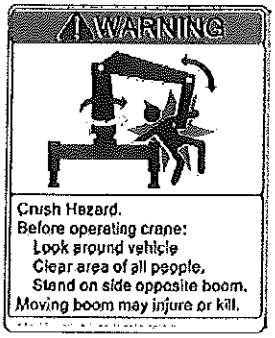


Position: Near the operator station.

Meaning: Under no circumstances shall any personnel be transported on a boom, hook, load, or any device attached to the crane, boom or load line.

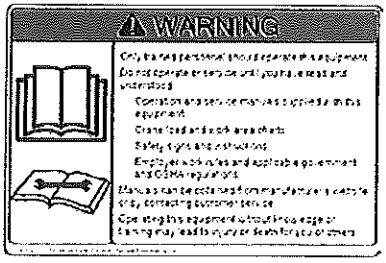
Risk if ignored: Death or serious injury.

Stay clear of the boom



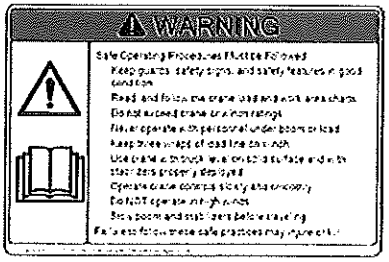
Position: Near the operator station.
Meaning: Stand on the side opposite the boom when folding or stowing the crane. Stay clear of the boom when operating or servicing the crane.
Risk if ignored: Death or serious injury.

Well trained operator



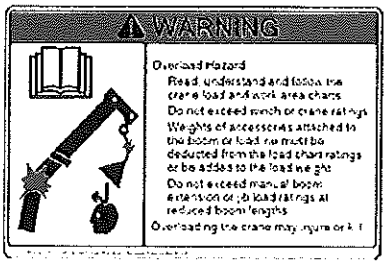
Position: Near the operator station.
Meaning: Only well trained operators must operate the crane.
Risk if ignored: Death or serious injury.

Operating conditions and requirements



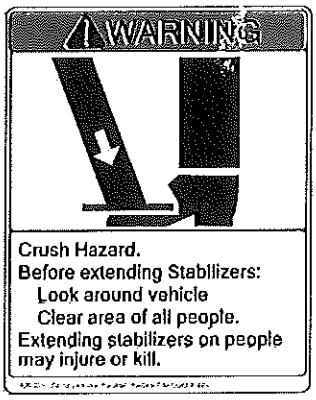
Position: Near the operator station.
Meaning: Observe all operating conditions and requirements.
Risk if ignored: Death or serious injury.

Overload hazard



Position: Near the operator station.
Meaning: Don't exceed loads, work areas, ratings.
Risk if ignored: Death or serious injury.

Danger of moving stabilizer

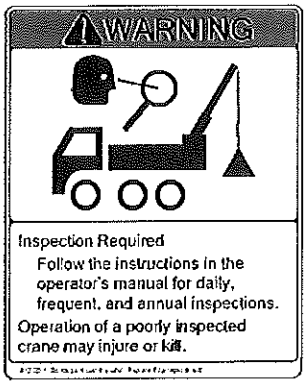


Position: On every stabilizer cylinder.

Meaning: Do not operate any stabilizer unless you or a signal person can see that all personnel are clear of the stabilizer and its ground contact point.

Risk if ignored: Serious crushing injury.

Crane mounting and prescribed inspections

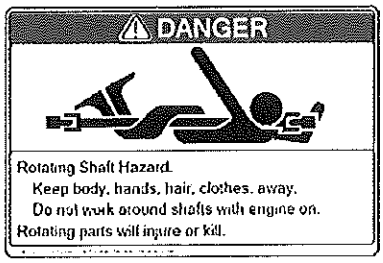


Position: Near the operator station.

Meaning: Do all prescribed inspections and maintenance practices.

Risk if ignored: Death or serious injury.

Keep clear or rotating drive shaft, power take off

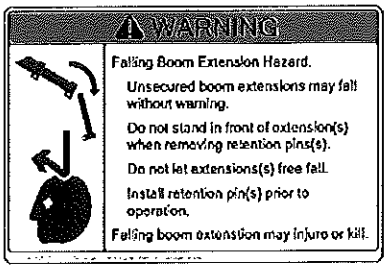


Position: On both sides of the vehicle.

Meaning: Keep clear of rotating drive shaft. Never work on or near an installed power take off or drive line with the engine running.

Risk if ignored: Death or serious injury.

Manual extension booms (if equipped)

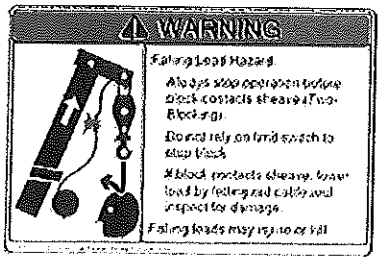


Position: Near the operator station.

Meaning: How to operate manual boom extensions.

Risk if ignored: Death or serious injury.

Winch / falling load hazard (if equipped)

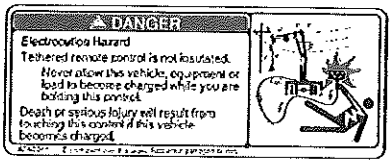


Position: Near the operator station.

Meaning: Avoid two-block situation.

Risk if ignored: Death or serious injury.

Electrocution hazard remote control (if equipped)



Position: On the RRC handset.

Meaning: Shows minimum required distances to live electrical power lines; remote control not insulated.

Risk if ignored: Death or serious injury.

CHAPTER 5

Crane control systems

In this chapter

General

PALFINGER has developed safety systems that protect the operator and the unit in order to guarantee safe operation.

Safety systems are adjusted before delivery of the unit to the operating company/operator.

Danger! Any unauthorized manipulation to the control equipment leads to danger of fatal injury.

Only PALFINGER service partners are allowed to set up and adjust the safety equipment.

Manipulating or inactivating these safety features is not allowed.

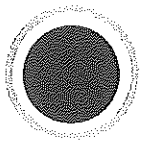
Note! Any warranty and liability of the manufacturer will expire if unauthorized persons manipulate the safety features or seals are broken.

On the operating company's/operator's request the PALFINGER service partner has to replace any missing or damaged seals immediately.

Emergency cut-off button

The emergency cut-off button stops all crane functions within 0.5 seconds (500 ms) after activation in an emergency situation.

An emergency cut-off button can be found at every operating station and on the remote control handset.



1. In dangerous situations let go all operating levers immediately.
2. Press the emergency cut-off button until it locks.

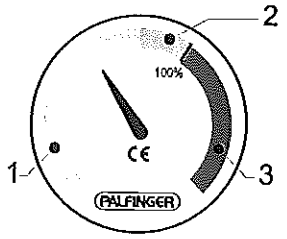
All crane functions stop.

Danger! Releasing the emergency cut-off button before ensuring safe crane operation leads to acute risk of fatal injury.

Release the emergency cut-off button only in safe working conditions.

Capacity indicator

If the crane is equipped with a capacity indicator, it shows the current load status on a three-color scale. The capacity indicator does not protect the crane from overloading.

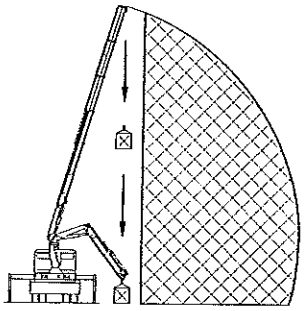


Color	Crane utilization	
1 = green:	Working range	
2 = yellow:	Limit range	Lower operating speed.
3 = Red:	Overload range	Reduce load moment immediately.

Watch de capacity indicator while operating the crane.

DANGER **Danger!** **If the load moment is not reduced immediately upon reaching the overload range (example: retract extension booms) the crane will be overloaded or become unstable. The load may sink uncontrollably. This creates an acute risk of fatal injury.**

It is prohibited to work in the red range.

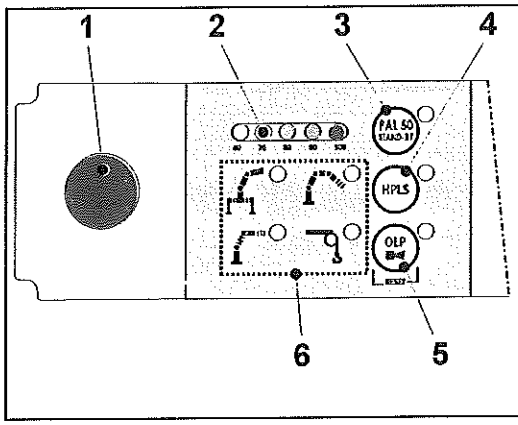


While working in the limit range, do not increase the horizontal reach any further when lowering the load.

Paltronic 50 Control System

Paltronic 50 is an electronic crane control system.

Display



1	Emergency cut-off button
2	Capacity indicator
3	Paltronic 50 stand-by mode
4	HPLS button
5-1	OLP button
5-2	Warning horn
5-3	Reset button
6	Overload situation indicator Refer also to steep position monitoring.

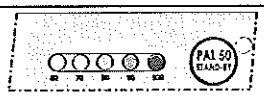
Activating Paltronic 50

Paltronic 50 activates automatically when the crane is supplied with power. The emergency cut-off button must not be activated. The operating levers must be in neutral position.

1 Emergency cut-off button

(see "Emergency cut-off button" chapter 5).

2 Capacity indicator

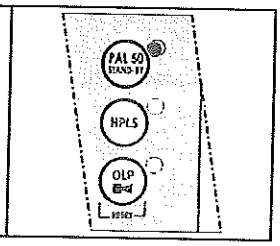
The capacity indicator on the unit shows the percentage of the currently applicable load limit in steps of 10% from 60% to 100%.	

Capacity utilisation	LED-Band	LED-Color	Acoustic warning
Under 60%	no light	none	none
Up to 90%	light	green	none
Above 90%	light	yellow	discontinuous sound*
At 100%	flashing	red	continuous sound
*Intermittent alarm can be switched off by pressing OLP button.			

Crane with fly-jib: The higher applicable load is always displayed (either crane or fly-jib).

3 Paltronic 50 stand-by mode

The PAL 50 stand-by key deactivates/activates the Paltronic's stand-by mode while operating the crane.



Stand-by mode:

- Press PAL 50 stand-by key.
  - LED goes out. All crane functions and operating features are inactive.

Switching on:

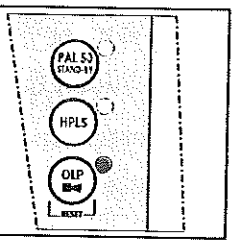
- Press PAL 50 stand-by key.
  - LED is green: Paltronic 50 is ready for operation.
  - LED is flashing: Paltronic 50 is ready for operation; the activated function is not permitted in the current operating status.

Information! When switching the crane on the operating levers must be in the neutral position. Don't press the emergency cut-off button on the display unit.

If a lever is activated during start up, Paltronic 50 shows an error code.

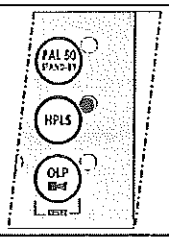
Clearing error codes:

- ▷ Move all operating levers to neutral position.
- ▷ Press Reset.
- ◆ The crane is ready for operation.



4 HPLS (only in remote control mode on HPLS models)

HPLS: System to increase the crane's load capacity.

If required PALFINGER HPLS can be used to increase the crane's lifting force by reducing the speed of the crane functions.	

Switching HPLS on/off: Press the HPLS button on the display unit.

Status - HPLS	LED	Operating status
On	is green	Crane in the HPLS area. The HPLS cannot be turned off.
	flashes green	Crane not in the HPLS area. The HPLS can be turned off.
Off	no light	-----

The load display is adjusted when HPLS is activated.

5.1 OLP function

If it is impossible in overload situation to make load moment decreasing movements, the crane can be moved out of the overload situation after pressing the OLP button.

DANGER **Danger! It is prohibited to increase the load moment using the OLP button while the crane is in an overload situation. This may lead to fatal injury.**

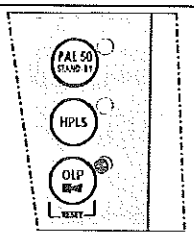
When pressing the OLP button, Paltronic releases all crane functions for 1.5 s operating time, Exceptions: the extension boom extending movement.

Simulated overload situation

If you move the main boom of the crane or fly jib up to the stop the load moment restricting system activates. This is caused by the pressure peak in the lifting cylinder.

After this any crane movements that increase the load moment are blocked.

The crane is not in an overload situation.



Releasing the blocked crane functions

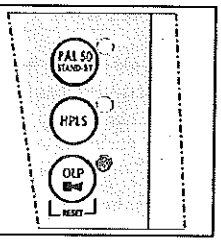
- Press the OLP key.
- Lower the crane's or fly jib's main boom (depending on which one is in the overload position).
- The crane is ready for operation.

After the OLP button has been activated it is blocked for 30 seconds.

LED	Operating status
no light	Crane in normal status.
light	OLP key pressed, movements that increase the load moment are enabled.
flashing	OLP function is blocked for 30 seconds.

5.2 Warning horn

The crane can be equipped with a warning horn.

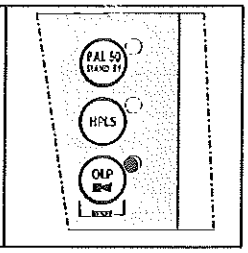


Honking:

- Press the OLP button for longer than half a second.
  The warning tone sounds until the OLP button is released.

5.3 Reset

The Reset function is used when functional errors occurred.

The Reset button attempts to reset the Paltronic 50 to its initial settings.	

When functional errors occurred:

- Try a reset with the OLP button.

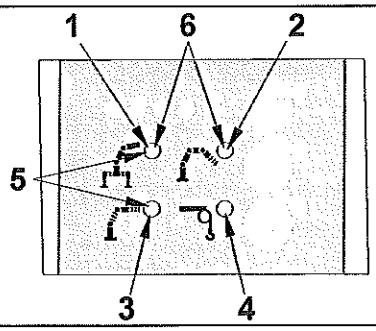
The crane is ready for operation if there are no more errors.

If the crane is not ready for operation after a reset:

Contact a PALFINGER partner (refer also to „Failure of the crane's electric system", chapter 5)

6 Overload situation / movement restriction indication

It shows the crane system that triggered the overload protection device.



1. Overload - reduced load limit (stability control)
2. Overloaded fly jib
3. Overloaded crane
4. Overloaded rope winch
5. Geometry monitoring system - crane
6. Geometry monitoring system - fly jib

The overload protection / geometry monitoring system indicates when the crane is in an overload range or in a working position that is not permitted. The display unit shows the relevant situation for the current working position.

Movements that are not permitted or increase the load moment will then be blocked.

The load moment must be reduced for example by reducing the range.

If you actuate a non-permitted crane function the stand-by LED starts flashing.

Move the crane out of its overload position with one of the following movements:

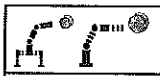
Overload situation with capacity indicator

(capacity indicator flashes)

	Stability control	Reduce the outreach / slew back.
	Crane	Reduce the outreach.
	2. Fly-jib	Reduce the fly-jib outreach.
	Rope winch	Retract extension boom or lower the load.
	Geometry monitoring system - crane	Reduce outer boom angle, retract extension booms.
	Geometry monitoring system - fly jib	Reduce outer boom angle, retract extension booms.

Movement restriction

(capacity indicator not flashing)

	Geometry monitoring system - crane	Reduce outer boom angle.
	Geometry monitoring system - fly jib	Reduce outer boom angle.

Refer also to chapter 5, "Geometry monitoring".

Stability control (ISC - S)

If the crane is delivered with CE conformity, it is standard equipped with stability control (ISC - S).

The incorporation of the support situation in the load moment limiter is realized using this system at PALFINGER. This also means that the crane must not be operated with fully extended support outrigger beams.

After the supporting procedure, the stability control system records the support situation. The load limits are adapted to the current support situation and saved when switching from support to crane operation.

DANGER **Danger! If the support situation is changed (also with stability control) and the outer boom is not in the transport position, the vehicle can tip over!**

Changing the support situation is only permitted if the outer boom is in the transport position!

Note! The installer has to adjust the stability control system. For this reason, the installer must produce an appropriate load capacity label and include it with the operating instructions.

Note! In order to be able to lift loads, all available stabilizer cylinders must be in the support position (firmly on the ground).

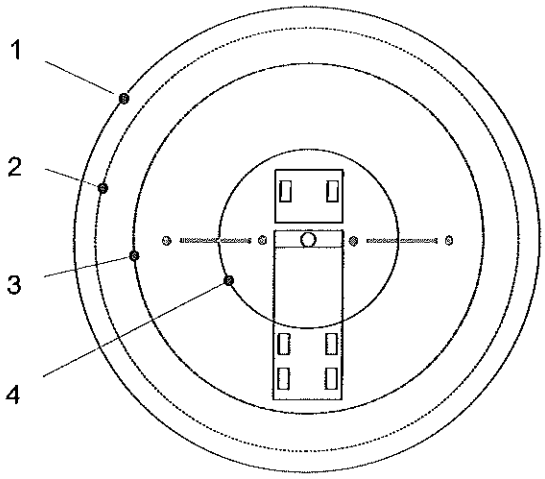
The maximum permissible load moment can only be reached with all available outrigger beams fully extended.

ISC - S (Integrated Stability Control - standard)

The following work areas / support situations exist with this variant:

- All outrigger beams fully extended and all support cylinders on the ground (working ranges 1 and 2).
- Outrigger beams not fully extended and all support cylinders on the ground (working range 3).
- Vehicle not supported, not all support cylinders on the ground (working range 4).

Working ranges:



1. HPLS button
2. Nominal
3. Reduced lifting power - stabilizers not fully extended.
4. Reduced lifting power - vehicle not supported.

HPSC stability control

Purpose of HPSC

PALFINGER's High Performance Stability Control system (HPSC) is an electronic system that monitors the stability of vehicles with loading cranes.

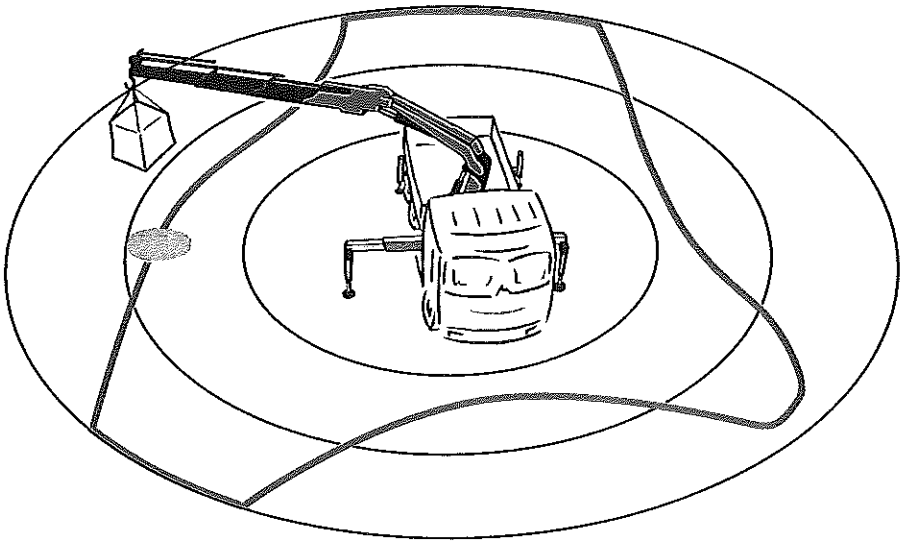
Benefits for the operator

Information! When equipped with HPSC, loading cranes are stable even if the vehicle's stabilizer cylinders and outrigger beams are only partly or not extended / used.

This makes it possible to work safely with the loading crane even in narrow areas.

Function

The HPSC system is based on an a real time computation of the vehicle's actual stability taking the current positions of the stabilizers into account. As a result a lifting power limit curve is produced which covers the entire slew range and comes close to the actual vehicle stability.



Operation

You may only utilize the maximum allowable lifting power of the loading crane when the carrier vehicle is sufficiently stable.

Therefore it is required

- to extend all stabilizer outriggers completely (even with available additional stabilizers);
- that all stabilizer cylinders are completely on the ground (even with available additional stabilizers).

If this is impossible for instance because of limited space, and the vehicle is therefore only partly or not supported at all, you may still work with those cranes equipped with the HPSC system.

In order to be able to lift as much as possible with your crane always choose the maximum possible support version.

Please note

- Always extend all stabilizer cylinders for crane operation. If not all stabilizer cylinders have ground contact this strongly reduces the lifting power of the crane.
- Therefore make absolutely sure that the stabilizer outriggers are extended as far as possible on the intended working side. This increases the possible lifting power on this side.
- The system can be setup only after the vehicle superstructure. The manufacturer of vehicle superstructure is therefore responsible for the setup.

DANGER **Danger! Improper crane operation such as:**

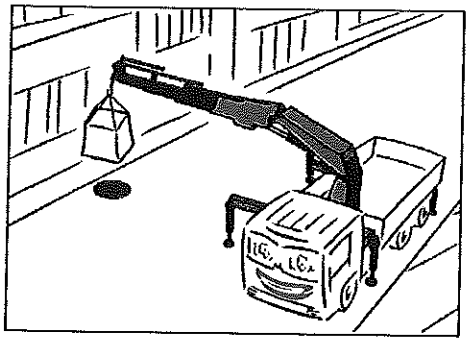
- supporting on insufficiently stable ground;
- swinging loads;
- jerky crane movements;
- lowering from nearly vertical position while increasing the range;

may cause the vehicle to tip over even if equipped with HPSC system.
This creates an acute risk of fatality for the operator and others.

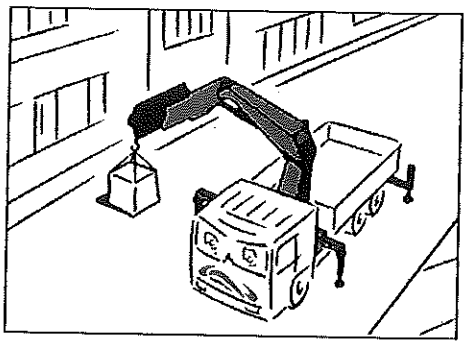
How to park and support the vehicle correctly

It is better to extend the outriggers further on the crane's working side than on the opposite side. This way the crane has more or even maximum lifting power on the working side.

optimally supported crane

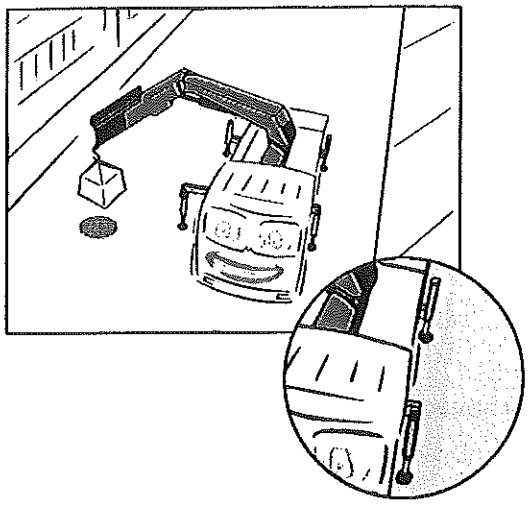


inappropriately supported crane

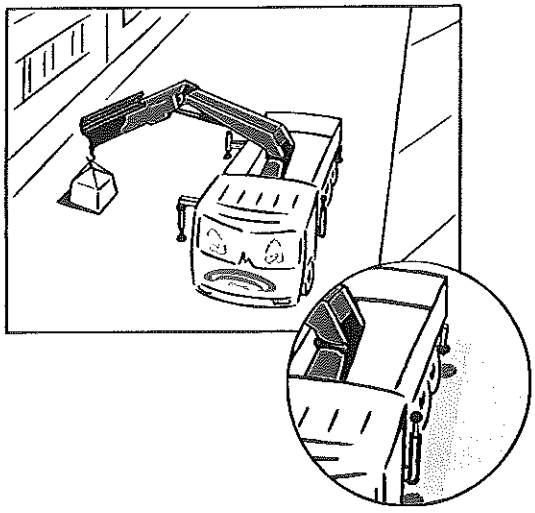


The loading crane's lifting power on the working side is higher if the opposite side is also supported. If this is not the case the lifting moment will be reduced in all ranges because of the insufficient stability of the vehicle.

optimally supported crane

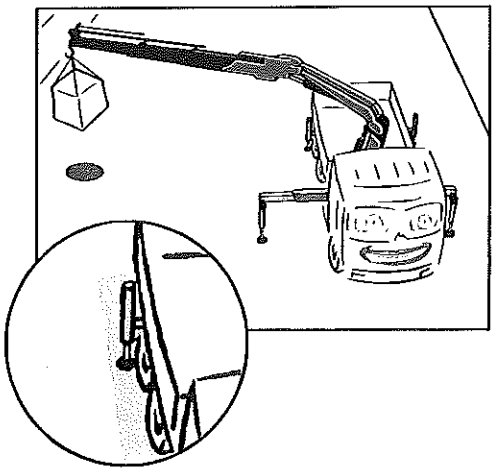


inappropriately supported crane

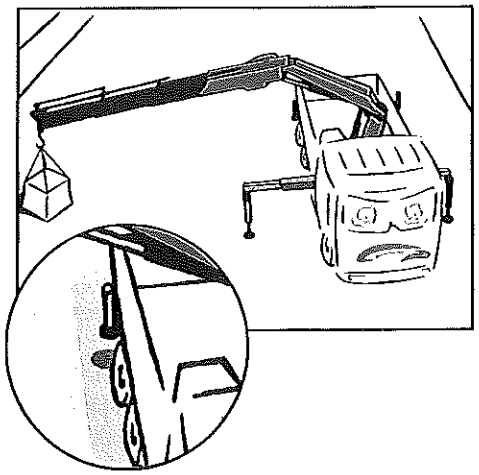


Vehicles with additional stabilizers should better be supported using both stabilizers on the working side. If only the crane stabilizer is used it is necessary to reduce more lifting power because of the higher chassis torsion.

optimally supported crane



inappropriately supported crane

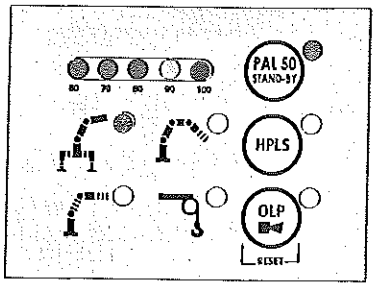


HPSC in combination with Paltronic 50

Switch-off in limit situations

Upon reaching the safety limit allowable in the respective position (due to high load moment), the system switches off all crane movements that impair the vehicle stability.

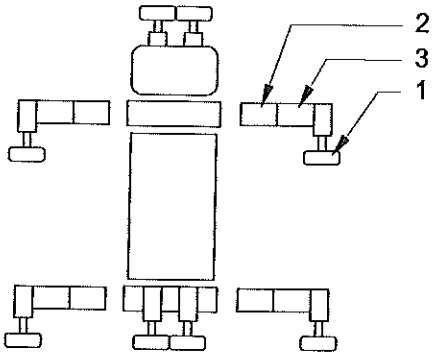
In such a case the capacity indicator starts flashing at 100% and the LED shows the text "Overload within reduced load limit".



Only those crane movements can still be actuated that improve the vehicle stability.

Visual indications

The selected positions of the stabilizers are permanently shown on the HPSC status indicator.



1. Stabilizer cylinder
   - LED off means not on the ground.
   - LED on means on the ground.
2. Inside stabilizer outrigger
   - LED off means, the outrigger is completely retracted.
   - LED flashing means, the outrigger is half extended.
   - LED on means the outrigger is extended by more than half.
3. Outside stabilizer outrigger
   - LED off means the outrigger is not extended by more than half.
   - LED flashing means the outrigger is extended by more than half but not completely.
   - LED on means the outrigger is completely extended.

The flash frequency of the outrigger's LED is adjusted to the outrigger's position.

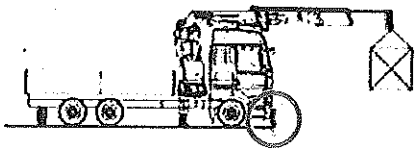
- Short exposure time - longer interval: Outrigger is only somewhat extended in the indicated area.
- Longer exposure time - short interval: Outrigger is almost completely extended in the indicated area.

HPSC options LCA (load capacity area)

LCA01, LCA02 and LCA03 or a combination of these safety systems are optionally available. They are needed to calculate the crane's stability when additional supports or a ballast weight are applied. The installer has to adjust these optional features. Therefore it's the installer who has to train the operator / operating company on the LCA01, LCA02, LCA03 or a combination of these. And an appropriate load capacity label needs to be produced and attached to every operator station on the device.

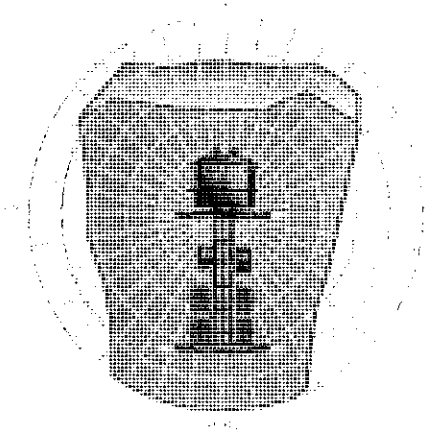
LCA01

Incorporating optional stabilizer cylinders in front of the driver's cab.



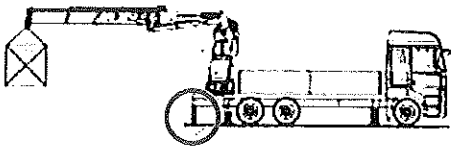
Example LCA01:

The red area shows the working range additionally calculated by using LCA01.



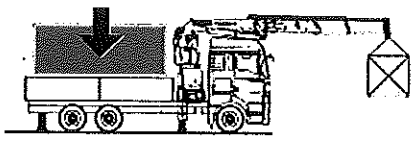
LCA02

Incorporating optional stabilizer cylinders at the vehicle rear.



LCA03

Incorporating a removable ballast weight, trailer, etc. (also for HPSC-L).



The installer calculates the working range by using a defined ballast weight.

LCA03 starts automatically when the ballast weight is being attached and stops when it is being removed.

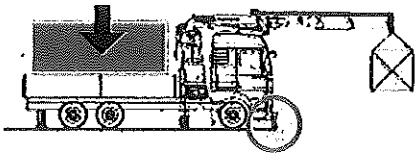
Danger! If you use other ballast weight for LCA03 than the one defined by the installer, this implies danger of the vehicle tipping over and thus, risk of fatal injury!

For LCA03 use only the ballast weight defined and calculated by the installer.

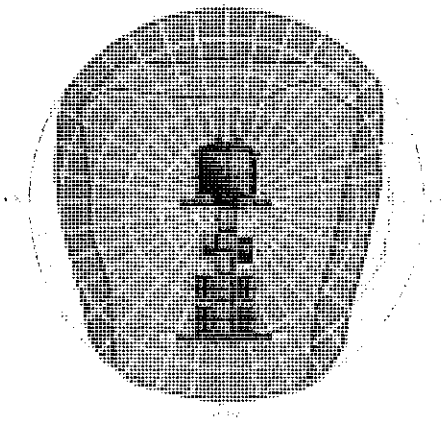
Combination of LCAs

It is possible to combine various load capacity areas.

Example - LCA01 in combination with LCA03:



The red area shows the working range additionally calculated again by using LCA03 in combination with LCA01.



Information! A ballast weight considerably improves also the lateral stability with HPSC!

An overload situation in the derated area is indicated on the display.

HPSC-L stability control

Purpose of HPSC-L

PALFINGER's High Performance Stability Control Light (HPSC-L) is an electronic system that monitors the stability of vehicles with loading cranes.

Benefits for the operator

Information! **With HPSC-L loading cranes are stable even if the vehicle's stabilizer cylinders and outrigger beams are only partly or not extended / used.**

This makes it possible to work safely with the loading crane even in narrow areas.

Function

The HPSC-L is a simplified version of the HPSC system. The crane booms' extension lengths are not controlled variably here but monitored by a switch. The switch recognizes whether an outrigger beam is fully extended or not.

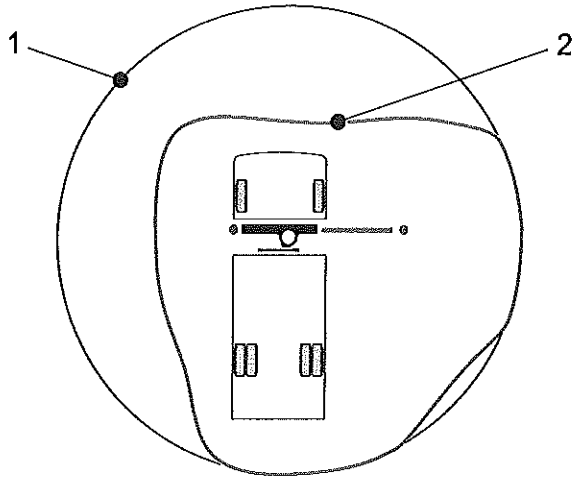
Additionally the system knows the crane's slewing position. Using the current support situation of the vehicle, the system calculates a lifting power limit curve in real time which covers the entire slew range and comes close to the actual vehicle stability.

This lifting power limit curve is subject to the following criteria:

- Depending on the stabilizers' positions the curve may be different on either side:
- There are 3 support situations possible on each vehicle side:
  - Stabilizer(s) not on the ground;
  - Outrigger beams completely retracted and stabilizer cylinders on the ground;
  - Outrigger beams completely extended and stabilizer cylinders on the ground.

Example

Symbolic lifting power limit curve of front-mounted crane, one side fully supported, other side inside supported.

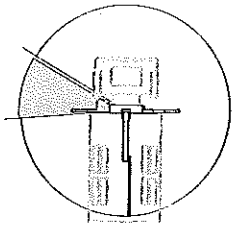


1 = 100 % lifting power
2 = Lifting power limit curve

High stand slewing limiter IS

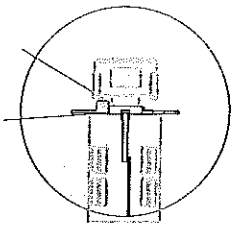
IS001

Locks the slewing range above the high stand to protect the operator. Range is setup by the installer.



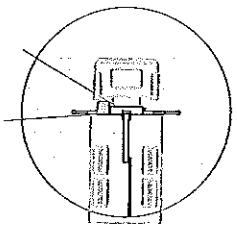
IS002

Locks the slewing range above the high stand to protect the operator. Range is setup by the installer. If the main boom is lifted beyond a certain set angle, it is possible to slew over the high stand. The customer/operator has to be trained in this function by the installer.



IS003

Locks the slewing range above the high stand to protect the operator. Range is setup by the installer. If the main boom and outer boom are lifted beyond a certain set angle, it is possible to slew over the high stand. The customer/operator has to be trained in this function by the installer.



Geometry monitoring

Danger! **At a boom position higher than 60°**

- abrupt crane movements

may lead to an excessive side or rear loading of the boom system.

Consequently the load may fall down. This creates an acute risk of fatality for the operator and others.

If the crane is delivered with CE conformity, it is equipped with geometry monitoring system depending on the extensions installed.

The geometry monitoring system provides load-dependent and load-independent control of the boom system.

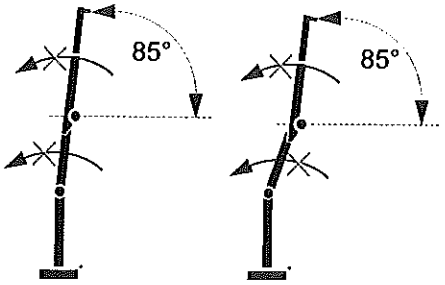
It measures the total of all boom angles (of crane and fly jib, if installed).

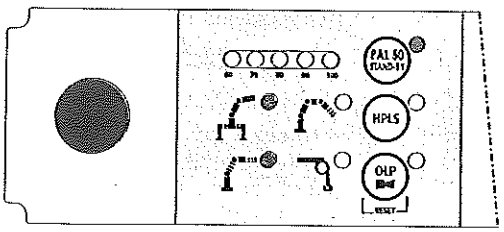
It is indicated on the Paltronic 50 display unit at the crane and/or the remote control handset whether the geometry monitoring was triggered with the crane or the fly jib (see also "Paltronic 50 control system", overload situation / movement restriction indication).

Load-independent geometry monitoring (crane boom angle = max. 85°)

All crane movements that increase the outer boom angle are blocked at an outer boom angle of max. 85°, irrespective of the load that has been lifted.

Crane examples:





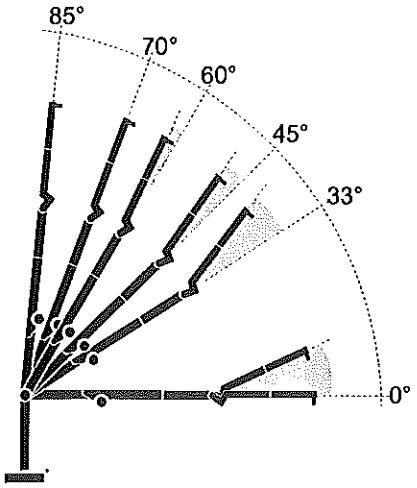
Function - without fly jib:

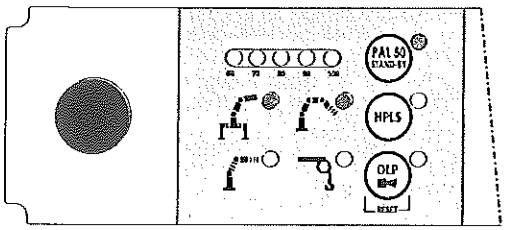
- No acoustic warning signal.
- Capacity indicator is not flashing.
- All movements that increase the outer boom angle are blocked.
- Display of status code Paltronic 33.00

Example crane with fly jib:

As the outer boom angle increases, the possible overstretching angle of the fly jib reduces. The possible overstretching angle depends on the fly jib model.

As the outer boom angle increases (load-independent, 30° to 70°) the overstretching angle of the fly jib gradually reduces.





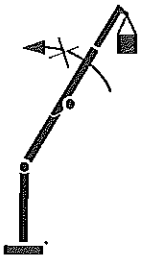
Function - with fly jib:

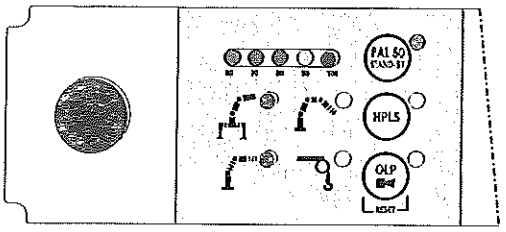
- No acoustic warning signal.
- Capacity indicator is not flashing.
- All movements that increase the outer boom angle are blocked.
- Display of status code Paltronic 34.00

Information! As the outer boom angle increases reduce the fly jib's overstretching angle accordingly. This prevents the geometry monitoring system from turning the unit off too early.

Load-dependent geometry monitoring

Example crane:





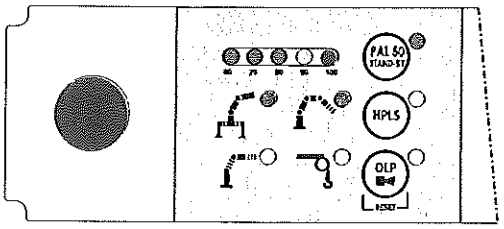
The load-dependent geometry monitoring system provides a boom system control that takes the boom angle and the lifted load into account.

Function - without fly jib:

- Acoustic warning signal.
- Capacity indicator flashes.
- All movements that increase the outer boom angle are blocked.
- "Extend extension booms" function blocked.
- Display of status code Paltronic 03.08

Function - with fly jib:

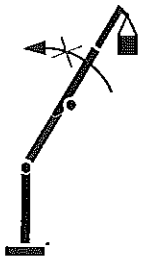
- Acoustic warning signal.
- Capacity indicator flashes.
- All movements that increase the outer boom angle are blocked.
- "Extend extension booms" function (crane and fly jib) blocked.
- "Raise rope winch" function blocked.
- Display of status code Paltronic 30.08



All crane movements that reduce the outer boom system and retract the extension booms can be operated.

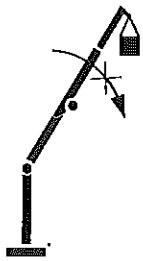
Note:

Load-dependent geometry monitoring



Various blocking functions between load-dependent geometry monitoring and normal crane overload.

Crane overload



Steep position monitoring

Danger! **At a boom position higher than 60°**

- abrupt crane movements
- overstretching of outer boom or fly-jib

may lead to an excessive side or rear loading of the boom system.

Consequently the load may fall down. This creates an acute risk of fatality for the operator and others.

When working above 60°, pay particular attention to the stated load limits.

Function:

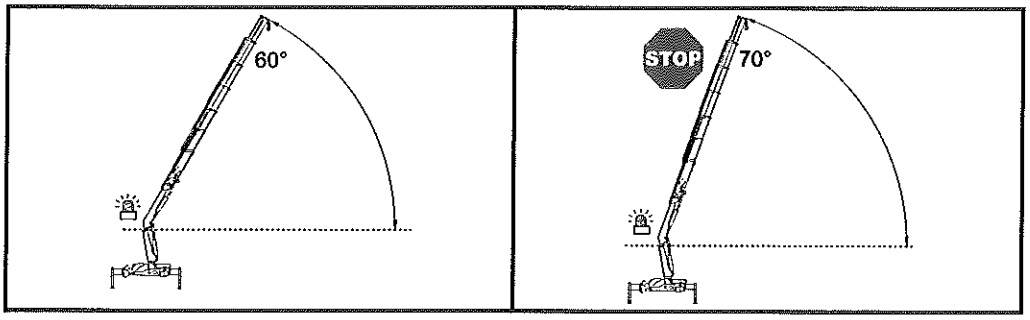
When the outer boom or fly jib reaches an angle of

60° Yellow light flashes on the crane.

70° Crane stops, overload signal sounds. The crane functions

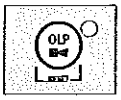
- Lift main boom
- Lift outer boom
- 2. Lift fly jib

are blocked. All other crane functions are enabled.



Moving in steep position:

After checking the permissible load capacity for the range above 70° (steep position), it is possible to move to steeper positions by pressing the OLP button (short beeper sounds). The light continues flashing (***refer also to "Crane working position"*** chapter 8)



- Move the crane smoothly when in steep position.
- Don't overstretch the outer boom or fly-jib.
- Comply with the load capacities and/or ranges.

When outer boom and fly-jib are below 60° again, the light stops flashing.

Steep position monitoring system up to 5+ extension + fly jib

Refer to operating instructions of the fly jib.

OSK overload protection system

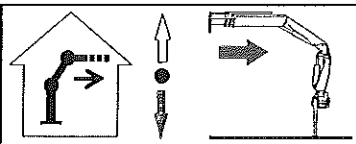
Hydraulic overload protection device with outer boom blocked on both sides:

When the crane reaches the overload range the locking cylinders push all hand levers that increase the load moment back into neutral position.

The following movements will then be blocked:

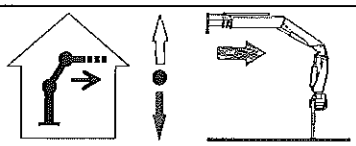
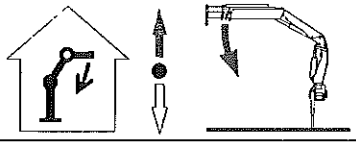
Main boom	Lower
Outer boom	Lift/lower
Extension boom	Extend

The hand levers will only be released when the load moment has been reduced.

If possible, reduce the load moment by operating the "Retract extension boom" function. After this all crane functions will be operable.	

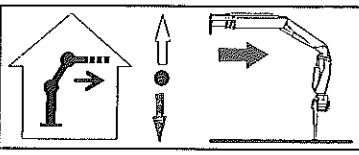
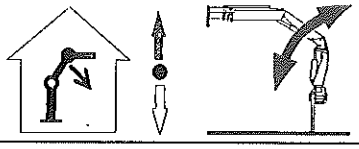
WARNING **Warning! The load moment briefly increases while the outer boom / main boom is being lowered above the horizontal.**

If crane movements that reduce the load moment are not possible because of the crane position (all extension booms retracted), take the following steps to unlock the crane functions:

Press the lever "Retract extension booms" and	
. . . . . lower the outer boom until the hand levers (operating levers) are released.	

All crane functions are operable again.

When the main boom is completely extended to the stop and any crane movements that reduce the load moment cannot be executed, take the following steps to unlock the crane functions:

Press the lever "Retract extension booms" and	
. . . . . lower the main boom until the hand levers (operating levers) are released.	

All crane functions are operable again.

Transport position monitoring system

The following systems are optionally available:

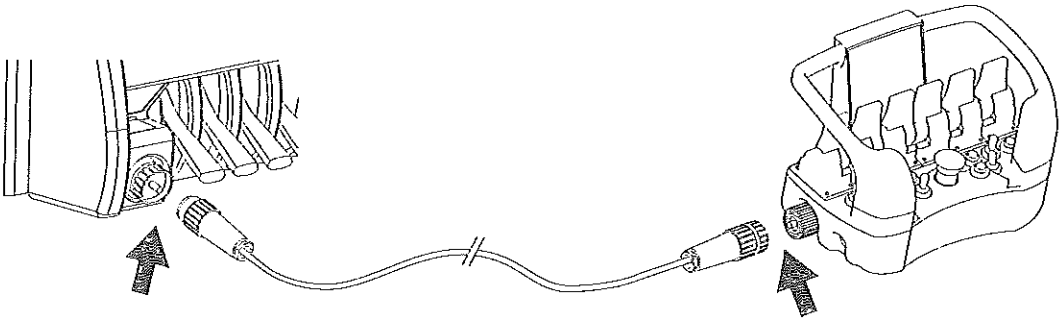
- Main boom above vehicle platform (height warning) - standard on cranes with declaration of CE conformity (EN12999).
- Crane folded and main boom in transport position.
- Monitoring of the manual outrigger beams (interlock) – standard on cranes with declaration of CE conformity (EN 12999).
- "Hydraulic outrigger beam" completely retracted.
- Stabilizer cylinders and outrigger beams completely retracted.

Usually the installer connects all above mentioned systems to a warning light and buzzer, as well as immobilizer, etc. in the driver's cab.

Emergency operation after remote control failure

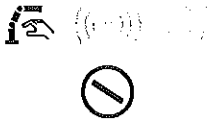
Remove the battery and insert the charged spare battery. Charge the battery you removed immediately.

If it is still not possible to operate the crane via remote control, connect handset and receiver as shown below.



If the remote control still does not work:

Set the key switch to manual operation.



Operate the crane via emergency control station. Any loading and unloading can be finished. Contact your PALFINGER partner.

Danger! If the user cannot observe all support/crane movements or the lifted load from the crane's emergency operation stand, there is risk of fatal injury.

If it is not possible to fully observe all

- support components;
- crane movements and the resulting load path:
- loads;

from the emergency operation stand during support and/or crane operation, the operator must be given signals by a qualified signaller.

Failure of electric system

If the crane stops because of a fault in the electric or electronic systems

- press the Reset button on the Paltronic 50 display;
- check the power supply (fuse).

If the fault cannot be remedied use the emergency operation mode described below to put the crane in transport position.

DANGER **Danger! In emergency control operation all control systems such as emergency cut-off button, overload protection systems, etc. are ineffective.**

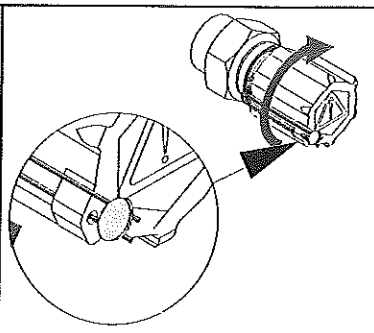
Immediately reduce the load moment in emergency operation.

If you continue working you put yourself and others at risk of fatality.

Immediately end loading operations.

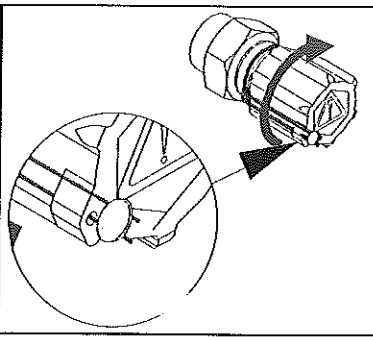
Crane with HPLS and remote control valve on the crane base

- Remove the seal from the yellow by-pass screw (on the control valve).
- Tighten the by-pass screw as far as it will go and screw it back two or three turns.
- Put down the load without increasing range and load moment (see "Load limits, loads", chapter 8)
- Move the crane in transport position as described in chapter 9.
- Screw in the by-pass screw as far as it will go.
- Retract the stabilizer cylinders and outrigger beams.
- Contact a PALFINGER partner immediately to get the crane repaired.



All other cranes (without ISC)

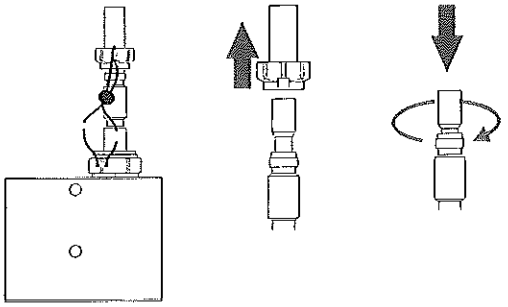
- Remove the seal.
- Screw in the by-pass screw as far as it will go.
- Put down the load without increasing range and load moment (see "Load limits, loads", chapter 8)
- Move the crane in transport position as described in chapter 9.
- Contact a PALFINGER partner immediately to get the crane repaired.



All other cranes (with ISC)

The valve is a separate valve, located between the crane control valve and support control valve.

- Remove the cover from the control valve.
- Remove the seal from the valve.
- Screw off the protective cap.
- Press the pin and lock it by turning it.
- Put down the load without increasing range and load moment (see "Load limits, loads", chapter 8)
- Move the crane in transport position as described in chapter 9.
- Contact a PALFINGER partner immediately to get the crane repaired.



CHAPTER 6

Ancillary equipment

In this chapter

General

The crane can be operated with a number of different ancillary equipment and load lifting gear.

Example of ancillary equipment:	Example of load lifting gear and lifting equipment:
Rope winch, grab, rotator, manual extension, fly-jib, hydraulic palette forks, auger, etc.	Hooks, ropes, chains, belts, shackles, palette forks, etc.

Depending on the type of equipment, a plate might be attached informing about:

- Name of the model
- Year built
- Manufacturer
- Serial number
- Dead weight
- Maximum permissible load capacity
- Operating pressure
- etc.

.

The operator must be trained on all the ancillary equipment, load lifting gear and lifting equipment used and has to understand the relevant operating instructions.

Danger! **There is acute danger of fatal injury if**

1. the crane is overloaded by ancillary equipment and/or load lifting gear;
2. ancillary equipment, load lifting gear and/or lifting devices are overloaded using the crane.

Observe the load capacities of ancillary equipment, load lifting gear and lifting equipment.

Observe the maximum permissible angle of inclination for lifting devices.

The maximum load capacity is defined by the weakest load lifting gear used.

Note! **Matching ancillary equipment and load lifting gear are available from all PALFINGER partners.**

Any damages or accidents caused by the use of unsuited ancillary equipment and/or load lifting gear are not covered by the PALFINGER warranty.

Load lifting gear and ancillary equipment:

- Are always considered as part of the load (except rope winch and fly-jib).
- Always attach and secure them using original PALFINGER bolts and securing devices.

DANGER **Danger! Depending on the type of ancillary equipment, the crane has to be turned off before attaching the device. Follow the relevant instructions. Keep the minimum distances (see chapter 2).**

Carry out any necessary steps for attachment before starting to operate the crane.

Carry out and complete any necessary assembly works before starting to operate the crane.

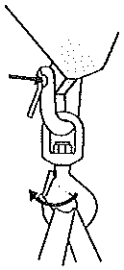
Slingers, other attachments to lift the load

Hook

DANGER **Danger! Undersized, incorrectly attached, defective or unsecured crane hooks or shackles may cause the load to drop. This creates an acute risk of fatality for the operator and others.**

- Use hook and shackle suitable for the weight of the load that is being lifted.
- Different hooks and shackles are provided for some crane models. Depending on the load, the suitable
  - PALFINGER hook and bolt or
  - PALFINGER shackle

  must be used on the appropriate load lug.
- The safety latch of the hook must close by means of spring pressure after the load has been attached.
- Secure the shackle pin with the lynch pin. Use only the original pin for the shackle!



- Have any damaged safety latch or linch pin immediately replaced by a PALFINGER partner.

WARNING **Warning! When attaching and detaching loads, be aware of increased risk of crushing.**

Keep the required minimum distances to all crushing points (refer "Danger of getting crushed" in chapter 2).

Ancillary equipment

Quick connect coupling for auxiliary hydraulic equipment

A number of ancillary equipment such as grab, rotator, fly-jib, etc. are powered hydraulically. Therefore the hydraulic system of the auxiliary equipment has to be connected to the crane's hydraulic system.

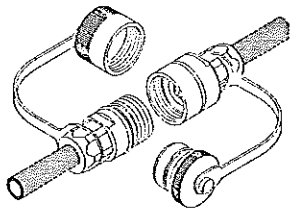
WARNING **Warning! Incorrectly connected or dirty couplings may lead to oil leakage (environmental pollution) or failure of the auxiliary equipment.**

Always keep the couplings clean.

Threaded couplings

Connecting:

- Switch off the pump.
- Operate hydraulic levers in both positions to release residual pressure.
- Make sure all operating levers are in neutral position.
- Remove the protective caps from the couplings.
- Screw the threaded couplings until they seated (mind the colors).
- Connect the protective caps together.
- Store the hoses properly in the hose trays.



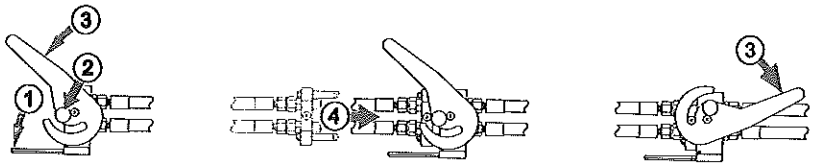
Disconnecting:

- Switch off the pump.
- Operate hydraulic levers to release residual pressure.
- Make sure all operating levers are in neutral position.
- Disconnect the protective caps from each other.
- Unscrew the threaded couplings.
- Screw the protective caps to the couplings.
- Store the hoses properly in the hose trays.

Multiple coupling

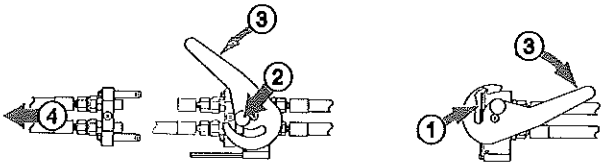
Connecting:

- Switch to manual operation (in case of Paltronic).
- Switch off the pump.
- Operate all levers for accessory equipment such as basket, grab, rotator etc. to release residual pressure.
- Make sure all operating levers are in neutral position.
- Open the protective lid (1) until it locks.
- Press the safety button (2) and open the tightening lever (3).
- Put the plug (4) on the coupling.
- Close the tightening lever (3) until the safety button locks.



Disconnecting:

- Switch to manual operation (in case of Paltronic).
- Switch off the pump.
- Operate all levers for accessory equipment such as basket, grab, rotator etc. to release residual pressure.
- Make sure all operating levers are in neutral position.
- Press the safety button (2) and open the tightening lever (3).
- Remove the plug (4) and store it properly.
- Withdraw the tightening lever (3) until the safety button locks.
- Close the protective lid (1).



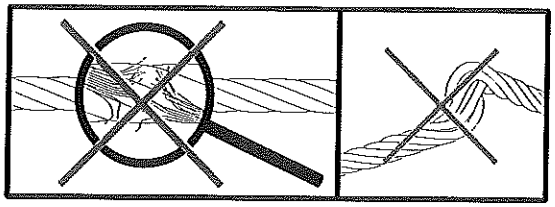
Rope winch

Use the rope winch only to lift loads vertically. Any other use is prohibited.

Use only PALFINGER rope winches, ropes and winch components (guide pulleys, pulley heads, attaching and safety material, etc.) for the rope winch operation.

Information! Assembly, weight and use of winch components such as guide pulleys, pulley heads, intermediate pulleys, rope, rope diameter, etc. refer to chapter 13 "Technical Description".

Ropes must be in good condition (see "Rope discarding", in the maintenance chapter 10).



Assemble the rope winch components before starting work (boom in working position):

Danger!Failure to maintain the minimum distances represents an acute risk of fatality for the operator and others.

Keep the required minimum distances to all crushing points (refer "Danger of getting crushed" in chapter 2).

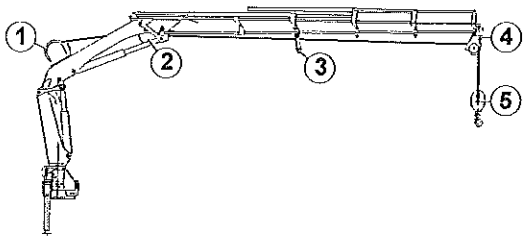
For the positions of the intermediate pulleys, guide pulleys, pulley head and rope refer to the "Technical Description" in chapter 13.

Turn off the crane power during assembly steps, where crane movement is not required.

Carry out and complete any necessary assembly works before starting to operate the crane.

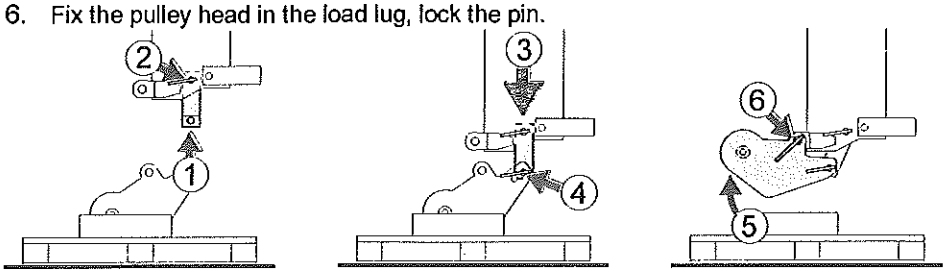
Structure:

1. Rope winch
2. Deflection pulley
3. Intermediate pulley
4. Pulley head
5. Lower load block



Assembling the pulley head:

- Put the main boom in horizontal position, outer boom in vertical position (refer "Moving crane in working position" in chapter 7)
- Extend the extension booms until approx. 50 cm (2 ft) before the pulley head.
  1. Put the connecting block into the extension boom.
  2. Fix the connecting block and secure it with the pin.
  3. Extend the extension boom until the connecting block can be attached to the pulley head.
  4. Attach the connecting block to the pulley head, lock the bolt.
  5. Rotate the pulley head upwards, until it is possible to fix it in the load lug.
  6. Fix the pulley head in the load lug, lock the pin.



- Raise the outer boom to horizontal. Lower the main arm until it is possible to mount the intermediate rollers.
- Reeve the rope.
- Assemble the lower load block.
- Check rope guidance and rope.
- While operating the winch the rope must run over all of the pulleys (additional rollers, guide pulleys), etc.).

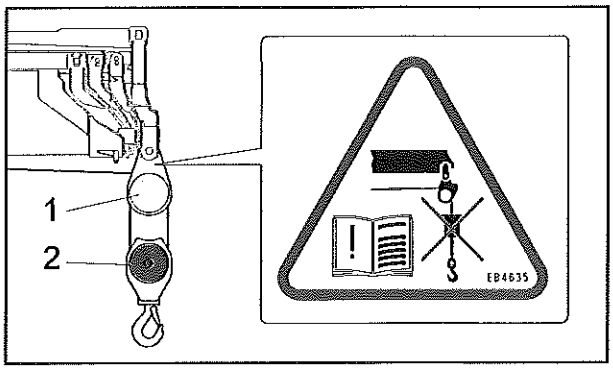
Move the load arm to a working position.

Winch components with composite pulleys

Danger!When using composite pulleys exclusively, the inner braid strands may break before the outer braid strands after longer periods of use. This may lead to unexpected rope failure and falling down loads.

At least one steel pulley must be used. When using composite pulleys exclusively, the inner braid strands may break before the outer braid strands after longer periods of use. Therefore rope breakage may not be detected during normal inspection.

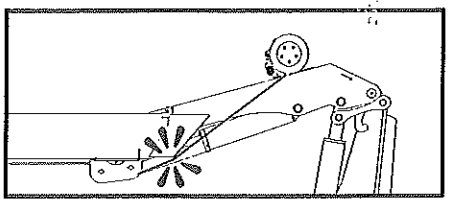
Single-strand winch operation with composite pulley head (1) is prohibited. The lower load block must be equipped with a steel pulley (2). Single-strand winch operation is not permitted.



Rope winch on main boom

If the outer boom with retracted boom system is overstretched, the rope may contact the first extension boom. This may damage the rope and the extension boom.

In order to prevent this, extend the boom system before starting rope winch operation until it no longer protrudes out of the back side of the outer boom.

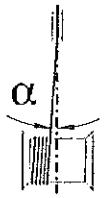


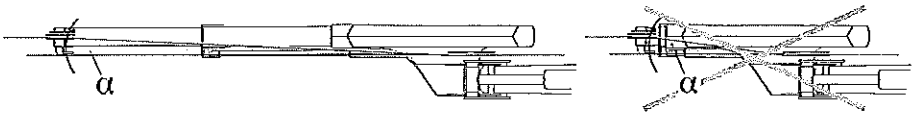
Rope deflecting angle

Information! In order to keep the rope deflecting angle (α) as small as possible, extend at least one extension boom completely before winch operation.

Purpose:

- This will lead to better rope winding behavior.
- Small entry angle into rope pulleys.

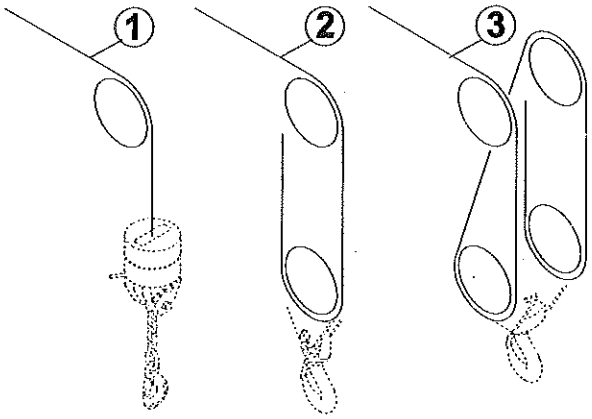




WARNING **Warning!** If the rope rubs against crane components it gets damaged. The rope may tear, and this creates risk of fatality for the operator and others.

The rope should run smoothly over the pulleys and not rub anywhere.

Rope winch operation examples



1. single-strand
2. double-strand
3. four-strand

Extend/retract extension booms in winch operation

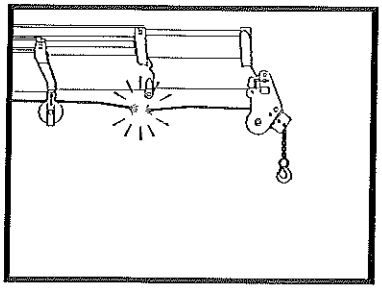
Danger!When extending the extension booms and / or unfolding the outer boom, the rope is tightened. If the unwound rope is too short the lower load block will be pulled to the pulley head at full force (two-blocking).

In case of rope winches without overload protection system:

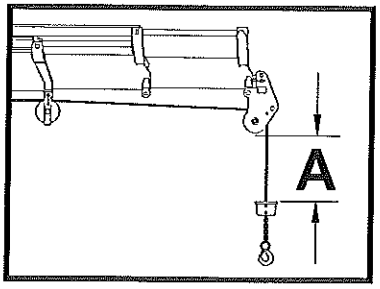
Rope may break if not un-spooled enough. This may lead to unexpected rope failure and falling down loads.

In case of rope winches with overload protection system:

The rope winch components are protected, but this working position must generally be avoided.



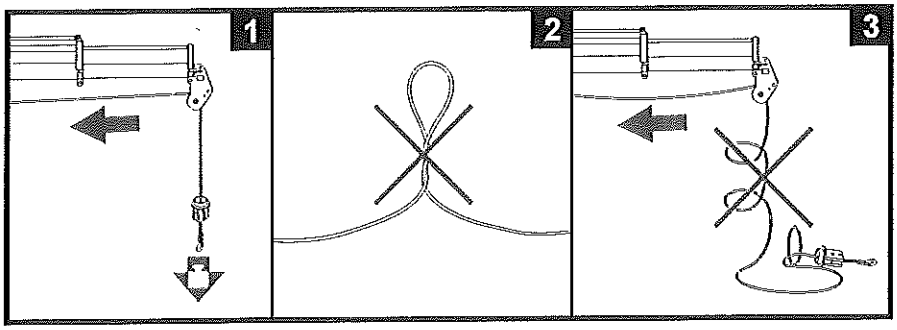
Ensure there is enough distance (A) between pulley head and lower load block during all winch operations.



Winding up the rope:

Warning! Injuries can result, if rope is tightened by hand.

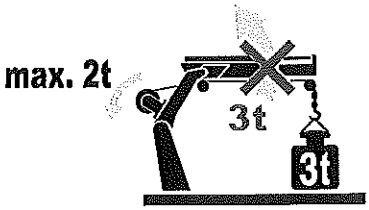
- Never tighten the rope by hand.
- Use a weight when winding up the rope (1).
- Prevent rope kinks (2) and slack rope (3).



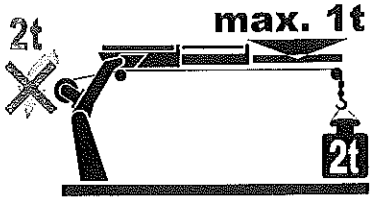
If the lower rope layers are rarely or never used, unwind the rope after every 100 working hours and wind it up again while tightening it.

Crane without overload protection device

- Do not overload the rope winch with the lifting power of the crane.



- Do not overload the crane components/accessory equipment such as hydraulic extendable booms, manual extensions, etc. using the lifting power of the rope winch.



DANGER **Danger!** Rope might be pulled off the drum if there are too few rope wraps left on the drum. This may lead to unexpected rope failure and falling down loads.

- At least three wraps of rope must be left on the drum.

Rope winch with end position protection

The built-in end layer limiting switch stops the winch when only three wraps of rope remain on the drum.

Refer to "Paltronic 50" in chapter 5.

Ending rope winch operation (load-arm still in working position)

If disassembly of winch components is necessary:

- Lower the load arm boom (to carry out the following work)
- Disassemble the lower load block and store it properly.
- Unreeve the rope, pin it to the storage point and secure it properly.
- Slowly and carefully operate the winch to tighten the rope.
- Disassemble and store the winch components properly (pulley head, guide pulleys, etc.).

If disassembly of the winch components is not necessary:

- Slowly and carefully wind up the rope with the winch.

WARNING **Warning!** Abrupt crane movements can cause the lower load block to swing uncontrollably.

- Move the crane in transport position (refer to "Ending crane operation" in chapter 9). While moving the crane in transport position keep sufficient distance between pulley head and lower load block.
- Wind up the rope with the winch slowly and carefully until the lower load block is tightly on the pulley head (not allowed as working position).

Traversing winch

For traversing winch refer to the fly jib operating instructions.