Operating and Maintenance Instructions

PALFINGER PLATFORMS

P 370 KS

Palfinger Platforms GmbH
Postfach 93 19 – 47750 Krefeld
Düsseldorfer Str. 100 – 47809 Krefeld (Linn)
Tel.: +49 2151 47 92-0
Fax: +49 2151 47 92-110
E-Mail: platforms@palfinger.com
Internet: www.palfinger-platforms.com

Inhaltsverzeichnis

Foreword and Signage

1 FOREWORD AND SIGNAGE

1.1 HANDLING OF THE OPERATING INSTRUCTIONS

These operating and maintenance instructions form part of the scope of supply of your PALFINGER PLATFORMS lifting platform. They contain information about the permitted applications and the safe operation and about care and maintenance.

The buyer is obliged to give comprehensive instruction to anyone hiring or using the lifting platform and to train them in its operation. The buyer must hand over the operating instructions along with the device and draw attention to their content.

Within the internal relationship between buyer and manufacturer the latter indemnifies the manufacturer against any claims of third parties due to insufficient instruction.

Note valid only for P1000: These operating and maintenance instructions are only valid in connection with the operating instructions P1000 of TADANO FAUN.

It is crucial that you read and follow important guidance notes for the operator:
As the operator, you are responsible for the lifting platform and all work associated with it. For your own safety and that of others, you should therefore adhere to the following instructions:

- Read these operating instructions carefully and compare all the illustrations with your PALFINGER PLATFORMS lifting platform. Technical details may differ from the specifications and illustrations in the operating instructions, although this does not have any significant bearing.
- Follow the functions described step by step on your PALFINGER PLATFORMS lifting platform.
- In these operating instructions you will frequently find notes marked with a hazard triangle to alert you to particular hazards. Follow these instructions carefully.
- Always keep these operating instructions and related components with you in the vehicle.
- Familiarize yourself with the operation of the PALFINGER PLATFORMS lifting platform in all permitted operational situations prior to the initial application.

- Plan each application carefully and find out the associated conditions.
  This means, for example: determining the clearance heights, load capacity of bridges, necessary working heights, lateral outreach required, load capacity of supporting ground etc.

- Put together the necessary equipment.
  This means, for example: preparing the support boards for stabilization, the separating gird for tree cutting, the rest for the power saw etc.

- Check the PALFINGER PLATFORMS lifting platform and its integrated safety devices to make sure that they are working properly before each start-up. If you have noticed or suspect that any safety device is missing or not working properly, you must stop the operation!

- Carry out a function check of the lifting platform before each start-up. Inspect the chassis in accordance with the carrier vehicle manufacturer's instructions.

- When working with access platforms, ensure that you follow all relevant national regulations and directives, e.g. highway code, accident prevention regulations, the Health and Safety at Work Act, rules on operating access platforms and their application and safety guidelines, even if they are not all included in these operating instructions.

- Should anyone other than you also work with the PALFINGER PLATFORMS lifting platform, ensure that they also receive training and read the operating instructions carefully. The owner of the lifting platform must be provided with written confirmation that the training has been received.

- Maintain the operating safety and functional efficiency of the PALFINGER PLATFORMS lifting platform through careful maintenance and servicing.

- Information on the operation and maintenance of the carrier vehicle should be obtained from the vehicle manufacturer's technical documentation.

- Charging the vehicle battery with charging equipment may only be carried out, if the battery cables have been disconnected.

- Never postpone any necessary repairs, and have them carried out only by trained personnel.

- Welding work on load-bearing parts or on any other access platform parts of relevance to safety must comply with the comprehensive quality requirements pursuant to EN ISO 3834-2 and may only be carried out by qualified personnel or specialist companies.

- We will accept no liability for the consequences of any modifications, conversions, overriding safety equipment, manipulations to electronic systems and sensors, readjusting of valves, operating errors or deficient maintenance.

- PALFINGER Technical Service is available for your maintenance and repair work.
- Use only original PALFINGER PLATFORMS spare parts. Use the EPC catalogue when ordering spare parts and please specify the type ('Type') and serial number ('No.').
- We are happy to advise you regarding any queries that might arise with day-to-day operations.
- We are always grateful for any ideas and feedback.

1.2 CE TYPE PLATE

Technical information about the lifting platform and its application may be obtained from our Technical Service department.

In the event of queries or orders for replacement parts, please let us have the type specified on the type plate (Type) and the serial number (No.) to enable processing to be carried out quickly.

Specifying this data will guarantee that you receive the correct information or the necessary spare parts.

Typ Type	Eigengewicht Vehicle weight
Serial - Nr. Serial - No.	Personenzahl + Zuladung No. of persons + load
Baujahr Year of construction	max. Tragfähigkeit max. bearing capacity
Anlagendruck System pressure	max. Schrägstellung max. incline
max. Windgeschwindigkeit max. wind speed	max. Seitenkraft max. lateral force

Palfinger Platforms GmbH
Düsseldorfer Str. 100 D-47809 Krefeld / Germany CE

B29060

1.3 DIRECTIVE 2000/14/EC FOR OUTDOOR EQUIPMENT

The lifting platform meets the requirements of Directive 2000/14/EC.

1.4 SOUND POWER LEVEL

The A-weighted sound power level is shown at the swivel table.

Palfinger Platforms GmbH

Düsseldorfer Str 100

47809 Krefeld (Linn)

Tel.: + 49 2151 /47 92-0

Fax: + 49 2151 / 47 92-110

We reserve the right to change the technical details of the PALFINGER PLATFORMS from the details and illustrations provided in the operating instructions.

1.5 EXPLANATIONS OF SYMBOLS AND INSTRUCTIONS

1.5.1 Note on safety at work

You will find this symbol in all safety at work instructions in these operating instructions where there is a risk to life and limb. Follow these instructions and exercise particular care in these situations. Also forward all safety-at-work information to other users.
The safety and accident prevention guidelines generally applicable must be followed together with the information in these operating instructions.

1.5.2 Information

You will find this symbol in places within the operating instructions that merit particular attention to ensure compliance with the guidelines, regulations and information and to ensure that the work is carried out correctly, and to prevent damage or destruction of the machine and other system components.

1.5.3 Environmental information

Working instructions with this symbol alert the user in relation to compliance with applicable environment protection regulations.

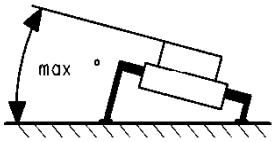
1.5.4 Information on electrical flashover

You will find this symbol in all spots where there is a dangerous current, whenever there is a risk to life and limb.

1.6 SYMBOLS USED ON SIGNS

No steam blasting

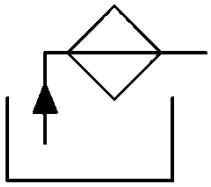
No access



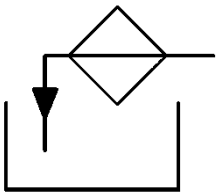
Maximum set-up inclination

Types of oil

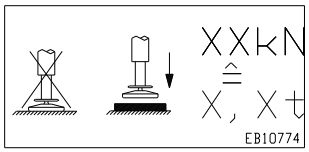
Wind gauge



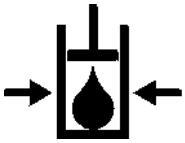
Connection for oil rinsing (suction port)



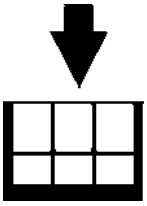
Connection for oil rinsing (pressure port)



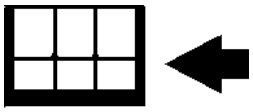
Supporting force



Hydraulic oil pressure



Basket load



Basket lateral force

Load

Loops for safety harness

Danger of electrical flashover

Caution - danger of stumbling

Caution - danger of getting crushed

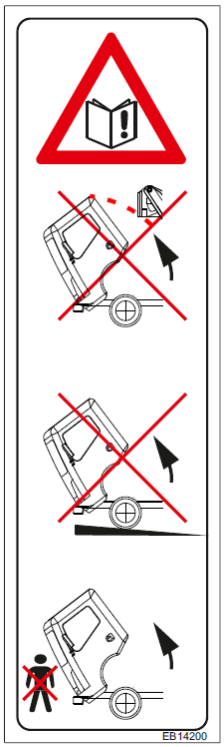
Caution - danger of slipping

Caution - danger of getting hit

Caution - hot surface

No setting down or storing

(Applicable for Nissan 3.5t chassis): When tilting the cab, it is imperative that you adhere to the following rules:



- Prior to tilting the cab make sure to rotate the telescopic beam! Otherwise there is a **risk of collision**.
- If the vehicle is positioned at an angle, tilting the cab is not allowed! There is a **risk of tipping over!**
- Nobody is allowed within the cab's tilting range! There is a **risk of accidents!**

Application
and
Safety Regulations

2 APPLICATION AND SAFETY REGULATIONS

2.1 AREA OF USE

The PALFINGER PLATFORMS lifting platform meets the regulations of the EU Machinery Directive (2006/42/EC) and DIN EN 280.

It may only be used for the following work:

- Inspection
- Assembly
- Cleaning
- Maintenance
- Trimming trees
- Painting

➢ Proper use also includes complying with prescribed operating, maintenance and repair conditions.

➢ The relevant national accident prevention regulations and other generally recognized safety, road traffic and occupational health regulations must be complied with.

➢ The lifting platform may only be used to carry persons, tools and work pieces up to the nominal load specified on the working platform (maximum permitted load capacity).

➢ The lifting platform may be used outdoors and inside buildings, although not in any areas where there is a risk of explosion.

When using the lifting platform inside a building, it is important to adhere to the following:
- Exhaust hoses should be used on the vehicle where the motor is left running
- The load-bearing capacity of the area on which the platform is to be set up (basement, floor) must be considered.

Risk of accident!

The advice and approval of the manufacturer is required for particular operational modes or conditions where there is some dispute regarding appropriate use.

2.2 OFFICIAL REGULATIONS AND STANDARDS FOR OPERATING THE DEVICE

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

If these operating instructions contain provisions or safety regulations that run contrary to any national laws or regulations, then the national laws or regulations will only have priority if they increase the safety of the operator.

2.3 IMPROPER USE IS PROHIBITED

Risk of accident!

It is prohibited to use the lifting platform other than for its intended purpose.

All actions that could cause an accident, increase the inherent risk or result in the working platform collapsing are PROHIBITED. For example:

1. Not observing relevant national road traffic regulations
2. Using the lifting platform in areas where there is a risk of explosion
3. Remaining within the driver's cab while the platform is in operation
4. Extending or slewing, if the boom is placed on or close to the equipment support
5. Remaining on or in the support, slewing or rotating range unnecessarily while the platform is in operation
6. Entering the cover and loading areas while the platform is in operation
7. Entering or leaving the workman basket at over the maximum permitted height for doing so of 650mm
8. Exceeding the maximum nominal load, the number of persons, the maximum lateral force on the side of the basket or the vehicle load capacity (see technical data)
9. Quickly approaching and or bumping into any type of obstacle
10. Stacking the workman basket
11. Deliberately causing the lifting platform to vibrate
12. Attaching any parts that increase the lifting platform's wind load (e.g. name boards)
13. Using ladders, platforms etc. in the basket to increase the working height/outreach
14. Using the lifting platform as a crane or lift
15. Throwing objects into the workman basket or from it
16. Increasing the basket load by adding additional loads if the load torque limitation is already indicating the maximum load by a warning tone or display
17. Using the lifting platform as sports equipment (for bungee jumping etc.)
18. Pulling the cable, line or rope
19. Operating the lifting platform in winds of force 6 or above (as per Beaufort: strong wind, wind speed c. 12.5 m/s [45 km/h]) or during / in the event of approaching storms.
20. Operating the lifting platform, even though it has not been regularly serviced
21. Operating the lifting platform despite an identified fault
22. Operating the lifting platform, even though the fittings and extensions, such as control gear boxes, power units etc. necessary for stability, have been removed.
23. Starting up the working platform after any oil change, repair works to the lifting boom cylinder or its valves without having first checked the outreach

2.4 SAFETY REGULATIONS DRAWING ON THE 'OPERATING LIFTING PLATFORMS' REGULATIONS

 Operating a lifting platform does carry certain risks that can never be completely ruled out, even if all the regulations are followed.
The operator is obliged to exercise due care and attention to minimize the inherent risk as much as possible!

2.4.1 Requirements for the operator

1. The vehicle keeper is obliged to provide extensive instruction to any one hiring or otherwise using the lifting platform and to train them in its operation. He must hand over the operating instructions with each lifting platform and refer to its content. Within the internal relationship between vehicle keeper and vehicle seller the former indemnifies the latter against any claims by third parties due to insufficient instruction.

2. Only persons aged 18 and over, who have been trained in the operation of lifting platforms and have proven their ability to the employer may be employed to operate lifting platforms independently. They must be explicitly instructed by the employer to operate the platform.
   The instruction to operate the lifting platforms must be made in writing.

3. If several people work on the lifting platform, the vehicle keeper must nominate a supervisor.

4. The nationally applicable safety rules and standards on operating access platforms and the operating instructions need to be observed.

2.4.2 Starting operation

Important inspections relating to the safe condition of the lifting platform to be performed every workday:

1. Inspect the lifting platform for operational readiness before each start-up and carry out a function check:

- Checking the operating fluids
  - Truck motor oil
  - Truck coolant
  - Truck diesel level / Ad-Blue fill-level
  - Lifting platform hydraulic oil
- Check contamination indicator on the filters daily and where necessary replace filter elements.
- Checking the battery charge status
  Carry out regular battery maintenance!
- Check alarm equipment is working
- Check the motor start and motor stop equipment
- Functional test of the electric emergency pump
- Inspect the battery-operated hydraulic pump (if available)
  - Check the emergency lowering system
  - Check the outreach shut-off mechanism
  - The lifting platform must not be taken into service, if the safety equipment does not respond!
- Visual check (status of tyres, brakes, batteries, damage due to accident, illegible signs, special safety equipment etc.)
- Check the warning lights on the lifting platform.

2. Before start-up, visually check the superstructure and the chassis for any external defects, damage and changes, i.e.:

a) Check the screw connections, hose connections and elements of the hydraulic equipment for damage or leaking hydraulic oil. Leaking hydraulic oil poses a risk of accidents and causes serious and expensive environmental harm!

b) Check the operating elements for smooth operation and self-return, loss of electric connections, scuffed cables

c) Carry out a general inspection for cracks in the load bearing components of the chassis and in the structure of the work platform, including checking for damage and smooth operation of rotating parts (e.g. bolt connections, rope pulls, etc.)
The lifting platform may not be operated, if any such defects occur or are suspected!
If you detect any cracks, deformations or similar changes during inspections, you must contact an expert.

d) Inspect the chassis in accordance with the carrier vehicle manufacturer's instructions.

3. After the platform has been removed from service for a longer period of time or after having used it in extreme environmental conditions (heat, cold, humidity, dust etc.), additional inspections must be made regarding its readiness for use, functionality and all safety equipment, including emergency operation.

Risk of accident!

The lifting platform may **not be taken into service** if it has **not** been regularly serviced.

2.5 HANDLING AND CONDUCT DURING OPERATION

1. The lifting platform may only be operated if the stabilizing system is in transport position and the lifting boom is on the equipment support.

2. The workman basket may only be entered or exited using the access intended for this purpose.

3. Ensure that the access area on the basket is closed.

4. The operator must ensure an even weight distribution in the workman basket.

5. The use of whole body safety harnesses with an adjustable stay rope is strongly recommended (use attachment loops provided). Keep the stay rope as short as possible.
   A safety harness will prevent the operator from falling out of the basket, which is a frequent cause of serious injury and death, even at low heights!

   Guidance on the use of safety harnesses:
   Always make sure the harness fits correctly and the attachment ring is in the center of the back!

   Use the attachment ring in the back with an EN 363 fall arresting system or EN 1497 rescue system. The two lateral retaining rings have to be used with EN 358 retaining systems or EN 359 restraint systems. Retaining and restraint systems are not suitable for arresting a fall. Use the lateral attachment rings only with a stay rope that is attached to both sides. Adjust the stay rope so as to limit any free fall to a maximum of 0.5 m. Do not run the connecting ropes over sharp edges or through holes with diameters that are too small.
   Adjust retaining and restraint systems' connecting ropes to prevent the user from falling.
   The user must visually inspect the safety harness and the entire system every time before use. Remove from service any damaged parts or parts worn by a fall and forward them to the manufacturer or a person authorized by the latter for examination.
   Protect the safety harnesses from damage (follow the information given in the manufacturer's operating instructions in this regard).

6. Lifting platforms may only be operated from the control points designated in the instructions.

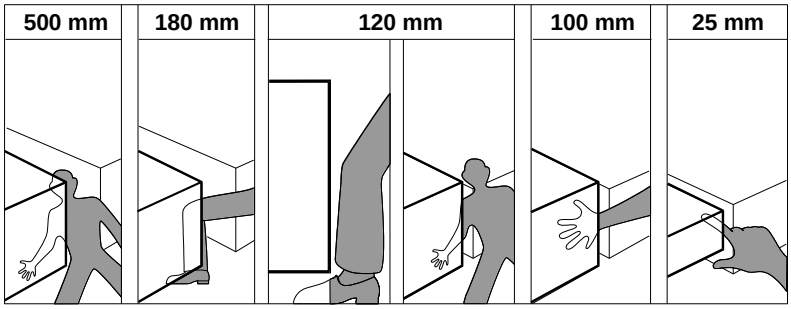
7. Whenever carrying out lifting platform movements, operators must be sure that they do not endanger themselves or any other persons.

8. Even in an emergency, the movements of the lifting platform must be initiated and continued slowly and smoothly.

9. Points where there is a **risk of crushing** should be provided with a warning sign.

10. Avoid all operating situations where for you or any bystanders there is any **risk of being crushed** by the workman basket or the stabilisers.
    The crushing point is not potentially dangerous for the parts of the body indicated if the safety distances are observed. Make sure that the nearest part of the body cannot inadvertently get caught in the gap.

    Minimum distances:



    If the distances are not observed, there is risk of bodily or even fatal injury!

11. There is a **risk of injury** from moving parts (drive shaft, auxiliary drive), if you remain under the vehicle with the motor running and auxiliary drive engaged.

12. Hydraulic and/or electric components can get very hot during operation! **Risk of burns!**

13. The vehicle's permitted axle load and the permitted overall load should be taken into account if control gear boxes, platform gates etc. are attached to the vehicle.

14. At a **wind force 6** and above (according to the Beaufort scale: strong wind, approximately 12.5 m/s (45 km/h, i.e. thick branches move, there are audible sounds under the wires or at the corners), the operation should be stopped and the lifting platform brought into the starting position.

15. Stop work on the lifting platform immediately, if the weather turns stormy. There is an acute risk of a lightning flash and/or electrostatic charge.

16. The sensor equipment (angle transmitters, proximity switches, limit switches etc.) must always be kept clean, and free from snow and ice in the winter. Particular care should be exercised when trimming trees to ensure that no branches, twigs or wood chips get into the sensitive parts of the lifting platform.

17. If the lifting platforms have laterally slewed workman baskets or load-bearing constructions that are lowered lower than 4.5 m above the ground in an area of vehicular traffic, the area beneath the working platform and the load-bearing equipment must be secured. Warning lights, roadblocks or safety guards can be used to safeguard against traffic hazards.

18. Protect the working area below the platform with a barrier, if there is danger of objects falling down.

19. Indicator lamps with an amber flashing light fitted on the lifting platform must be switched on whenever it is set up in an area of rail or non-rail traffic.

20. The vehicle should be supported as level as possible and on solid ground. The operator is responsible for ensuring that the supports are extended when on solid ground and for lining up the vehicle. The permitted set-up accuracy (vehicle slope) should be observed. The support pads must be complete and as level as possible. The support pads may be lined with suitable wooden panels or boards, if required. The wheels of the carrier vehicle should no longer be in contact with the floor. Check that the supports are sitting on a suitable base before starting up the lifting platform.

21. Power-driven supports should be monitored during extension and retraction. **Risk of crushing!**

22. Particular care must be exercised when using ladders on top of the cover panels!
    There is a **risk of stumbling** when climbing over a platform gate!
    Be especially careful on painted base frame surfaces, as there is a **risk of slipping**!
    There is an additional **risk of slipping** in weather conditions such as rain, snow and ice.

23. On gradients there is a risk of an accident as a result of the supports slipping. On gradients the vehicle must be parked with the braked axle towards the top of the slope. The handbrake must be applied. Additional safety measures are necessary on a steep gradient (by securing the uphill axle with wedges or securing to another vehicle). When extending the supports the downhill (lower) supports must be extended first, so as to keep within the maximum set-up incline for the lifting platform as quickly as possible. **Under no circumstances must the braked axle be raised first!** This support sequence, which must always be followed, also applies in reverse when the supports are retracted. Using an automatic vehicle support system is not permitted when working on an incline. (See also section on 'Raising and levelling the lifting platform')

24. If there are two workers in the basket using a power saw, a separating grid must be between the two people in accordance with the regulations of the German Horticultural Association. Otherwise only the power saw operator should be in the workman basket. Exceptions to this regulation are only permitted within the scope of an exemption to the national accident prevention legislation.

2.5.1 Avoiding danger during platform operation

2.5.1.1 Danger of toppling over (see also section “Støttesystemets underground”)

a) due to surface unable to bear the load:

- Unsuitable support boards
- Max. support load exceeded
- Change in ground conditions during use (rain, thawing, etc.)
- Sodden ground
- Varying ground conditions (soil, concrete, rock, etc.)

Possible actions:

- ➢ Adequately large support boards (original support boards)
- ➢ To ensure even load distribution, place the support board down horizontally and flat on the ground and position the base plate / stabiliser on it centrally.

b) due to ground caving in:

If the support load is too high, there is a risk of falling through/into:

- Sewers
- Manhole covers
- Built structures
- Cavities

Possible actions:

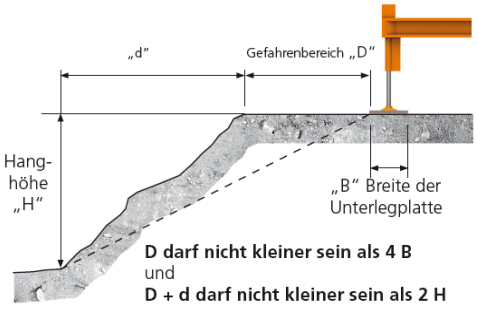
- ➢ Before starting work, obtain clarification about any possible installations. This applies to the working area and the area over which the crane will drive. The load-bearing capacity must be worked out based on the MEWP being used. Particular attention should be paid here to wheel and support load.

c) due to insufficient distance from the land's edge:

It is possible that the ground may give way under the stress of the weight. That can cause the bank to collapse and the platform to topple over.

Possible actions:

Keeping an appropriate minimum distance based on the angle of the embankment and the depth of the trench.



Source: IPAF 'Safety Guidelines for Operators'

2.5.2 Removal from service

➢ Power-driven and power-operated lifting platforms must be secured against unauthorized use following removal from service.

2.5.3 Maintenance and repairs

1. Only suitable and qualified personnel who meet the safety regulations may be assigned with doing maintenance or repair work on access platforms. The vehicle keeper must ensure that the access platform is inspected at least once a year by a qualified specialist. The national rules on inspections of access platforms and safety regulations need to be observed.

2.  **Welding, heat-treatment and straightening jobs** on 'load-bearing components' is **fundamentally not allowed** (see 'Inspection of load-bearing steel structures' section).

   The high-strength steels used might lose their properties if welded, heat-treated or straightened improperly.

3. Before any repair work is started on elevated parts of lifting platforms, these should be secured against unintentional movement.

4. Prior to starting any repair work, the lifting platform must be disconnected from any electrical equipment (230/400V).

5. Hydraulic and/or electric components can get very hot during operation! Particular care in this respect should be taken during maintenance and repairs.

6. The supporting structures and the driving gear, including the safety systems, must be inspected after any load-bearing equipment has broken or in the event of leaks in the hydraulic or pneumatic lines. Any damaged parts must be replaced.

7. Inspect the vehicle chassis in accordance with the vehicle manufacturer's instructions.

8. Permanent operational safety, performance and efficiency of the lifting platform depends on its proper use and regular maintenance.

2.5.4 Using the lifting platform on or near unprotected electric systems

2.5.4.1 Basic considerations (for platforms without insulation)

 No work should be carried out on uninsulated parts without sufficient insulation. Always maintain a sufficiently safe distance if there are any overhead lines running in the working area of the lifting platform that have not been switched off or covered in the danger area by qualified electricians. Also observe regulation EN 50110-1 and EN 50110-2 and/or the applicable national regulations.

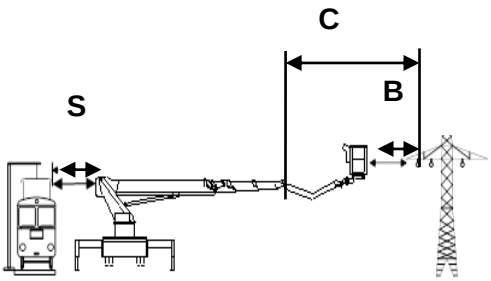
Take into consideration that electric lines may sway in wind or the lifting boom may start swinging because of jerky movements. If they unintentionally get nearer in this way, that could result in a flashover.

 The operator of the access platform must observe all national standards and the operating instructions and regulations of the utilities provider or network operator.

Country-specific minimum distances to live lines may differ from those given here.

Furthermore, the safety instructions of the company operating the power installation must be observed.

 Always maintain a distance of **5m (16’5”)** if the nominal voltage is unknown!



Safety distances valid in Europe:

Safety distances between lifting platform and overhead lines of electric trains (A - AC and DC)

DC	AC
Up to 1500 V 1.0 m	Up to 1 kV 1.0 m
over 1,500 V 1.5 m	over 1 kV 1.5 m

Minimum distances between lifting platform and power installations (B and C - AC and DC)

Nominal voltage	**Minimum distance (m) (ft. in.)**
Up to 1000V	1.0 m (3.3”)
Over 1kV to 110kV	3.0 m (9’10”)
Over 110 kV to 220 kV	4.0 m (13’1”)
Over 220kV to 380kV	5.0 m (16’5”)
unknown voltage	14.0 m (46’)

The minimum distances valid in the country of use apply, e.g. North America:

Nominal voltage	**Minimum distance (m) (ft. in.)**
Up to 50 kV	3 (10’)
Over 50 kV to 200 kV	4.6 (15’)
Over 200 kV to 350 kV	6.1 (20’)
Over 350 kV to 500 kV	7.6 (25’)
Over 500 kV to 750 kV	10.6 (35’)
Over 750 kV to 1000 kV	13.7 (45’)

1 meter = approx. 39.37 inches = approx. 3.2808 feet

If lifting platforms are used for work above live electric power lines of electrified tracks or overhead lines that are **not** [...] **insulated**, [...] it is important to ensure that no part of the lifting platform comes into contact with the power lines or comes so close to them that there is a risk of any parasitic voltage on the platform.

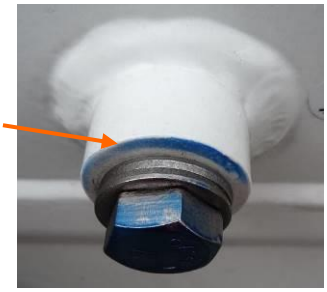
There must be at least two people on the lifting platform if work is being carried out from it on or close to any unprotected live parts of an electrical system. This does not apply to minor works, such as inspecting lamps or overhead power lines.

Recommended actions in the event of flashover:

- **Observe all national standards and the operating instructions and regulations of the utilities provider or network operator.**
- **Keep calm.**
- **Bystanders must keep a minimum distance of 10 m away from the vehicle, workman basket and crane load (potential gradient).**
- **Do not touch the vehicle or load.**
- **Also, you should warn any bystanders not to touch the vehicle or load or get near to them.**
- **Do not try to exit the operator stand and do not touch any metal parts of the platform from the ground.**
- **Have the power lines switched off.**
- **If you are on the truck bed or in the driver's cab, do not leave it. Stay where you are!**
- **If anybody is touching any live part of the circuit, the power must be switched off before you rescue them. Approaching this person before switching the power off puts your own life in danger.**

2.5.4.2 Earthing when operating close to high voltage and transmitter systems

As lifting platforms close to high voltage systems (substations, overhead power lines etc.) can become charged, it must be ensured that they are properly earthed to prevent injury and to safeguard the lifting platform from damage. The regulations of the particular operator's systems should be observed here. If they are not known, the earthing measures must be clarified with the operator prior to any work being carried out.



On the base of the platform one earthing point must be connected to an earthing bar that is placed in the ground. Completely unwind the earthing tape. Apply water to the insertion point if the soil is dry.

(Depending on the platform model, bridge all joints with suitable earthing tape.)

All earning points should be labelled with a sticker.

The earthing chain from the BASKET to EARTH may not be broken!
Otherwise, electro-magnetic compatibility (EMC) cannot be guaranteed.
Any insulation of the lifting platform will be reversed by the earth.
Always maintain a distance of **5 m** if the nominal voltage is unknown!

Under certain circumstances it is also necessary to earth lifting platforms close to larger transmission systems, in particular, medium-wave transmitters or mobile phone masts. The area around the transmitter, in which earthing measures are required, depends on the particular transmitter's transmitting power and the lifting platform's working height. This can be several kilometers for larger lifting platforms.

In areas affected by electro-magnetic fields (transmitter masts, radar systems etc.) the operator of the equipment and PALFINGER Technical Service must be consulted before using the lifting platform. The safety distances from radio masts are shown on the website of the Federal Network Agency and must be taken into account.

2.5.4.3 Insulation (optional)

Requirement for a lifting platform insulated for up to a maximum of 1000 V is a special working basket made from plastic that ensures the required standard insulation.

Before starting any work on live parts, the operating personnel must ensure that the insulation is working properly and reach agreement with the safety officer responsible about how to proceed with the work on live parts.

Please note that the insulation is ***no*** longer guaranteed, as soon as

An integrated socket is used in the working basket

One of the integrated power supplies 'basic' or 'rotary table' is used

A water conduit that has not been completely emptied is laid to the workman basket

Parts of the lifting platform have been bridged (e.g. by bars, aerials or earthing tapes), a basket other than a plastic basket is used

A metallic securing plate is fitted to the plastic workman basket (see next page)

Covers or safety systems have been removed

When working on live electric parts, observe the European directives, national regulations and the applicable parts of the series of standards EN 50110-1 and EN 50110-2 and/or the applicable national regulations.

Never exceed the values for contact and step voltages

Insulated parts should not be bypassed by operating personnel from inside the lifting platform or standing next to the vehicle (e.g. as a result of tools they are holding)

The inspection log book should be kept (enter the result of recurrent inspections)

Work on live parts should be stopped immediately in fog, with the onset of rain, thunder or a storm

For temperatures below freezing, check whether the insulation sections are frozen. The lifting platform may only be operated with live parts if the insulation sections are clean, dry and free from ice

De-icing agents can affect the insulation

The components of the insulation must always be cleaned, avoiding the use of high pressure cleaners and chemical agents. The carrier vehicle must always be earthed.

For work on or close to unprotected live parts of electric systems, lifting platforms may only be used if the working platform has been insulated in such a way that

- Persons are insulated to earth as a result of their location on the lifting platform and are insulated to earth from the parts in the immediate vicinity of the workplace or connected with them by another potential (standard insulation)
- The insulation is calculated for the nominal voltage of the system, though at least for 1000 V
- Conductive parts do not affect the standard insulation and
- The lifting platform cannot collapse should the insulators break

A metallic securing plate in the plastic working basket will bypass the standard insulation!

Risk of a voltage flashover!

A.) Initial check of the insulation of plastic working cages

The initial check of insulation is carried out at the manufacturer's plant. This initial check includes:

- Voltage check of the insulation distances
  - Basket – Chassis
  - Basket – Lifting equipment
  - Chassis – Lifting equipment
- Measuring leakage currents
- Measuring insulation resistances

The result of this initial check of the insulation is documented in the inspection log book. The initial check is only carried out by authorised persons and includes the following points:

1. Measurement of leakage current with 1000 V AC voltage over a test period of a minute on the above insulation sections.

- The inspection is successful, if the conditions in the table have been met

Basket – Chassis	< 0.5 mA
Basket – Lifting equipment	< 0.5 mA
Chassis – Lifting equipment	< 3.5 mA

2. Insulating resistance with 1000 V DC current over the insulation distances mentioned above.

- The inspection is successful, if there is insulation resistance to ≥200 MΩ over all insulation distances

3. Apply a 3000 V AC voltage over a test period of 3 minutes to the above insulation distances.

- The inspection is successful, if there is no dielectric breakdown over all insulation distances

4. Check the availability of potential equalisation between the chassis and the vehicle and check the availability of potential equalisation (earth) on the chassis.

B.) Initial inspection of the insulation for an alternating basket system

In principle, the same test conditions that apply to the initial inspection of the insulation for plastic baskets apply to the initial inspection of insulation for alternating basket systems.
If the new vehicle was delivered with a plastic basket, the initial inspection will already have been carried out and documented at the manufacturer's plant. If it was not supplied with a plastic basket, the manufacturer may only have carried out a reduced initial inspection.
The result of this initial inspection of the insulation is documented in the inspection log book.

If plastic baskets are constructed as part of basket alternating systems, further safety checks must be carried before they can used as insulated equipment!
The complete initial inspection with the plastic basket must be repeated before the platform is used with live parts for the first time.
The device may only be used for work on unprotected live parts of electrical systems up to a max. of 1000 V AC and 1500 V DC after a successful inspection.

In addition to the initial inspection, it is the responsibility of the machine operator that the insulation repeat test is carried out ***after each assembly and before each application*** of a plastic basket (see point 'C'). These inspections should be documented accordingly and the test certificates retained

C.) Repeat test of the insulation for an alternating basket system

If the lifting platform is fitted with an alternating basket system and the aluminium basket is replaced with a fibre-glass basket, the manufacturer must repeat the inspection of the insulation.
The following versions must definitely be observed and adhered to:
Party responsible for the process
The operator of the lifting platform is responsible for adhering to the test specifications. Only qualified personnel may carry out the test.

Other applicable documents, general conditions
DIN VDE 0682-742 'Aerial devices for working on live parts with voltages up to AC 1,000V and DC 1,500V' and/or the applicable national regulations.

Test conditions

- The insulation distances must be clean and dry This also applies to additional water and ventilation conduits
- The lifting platform may not be connected to the low voltage network
- The connections of the electronic components that are put at risk by the inspection (e.g. basket load cell) can be bypassed.
- Joints and connections in the path of the current that do not act as insulators but only have limited conductivity must be bridged
- The cap of the push rod to the electric basket slewing cylinder, if available, should be connected to the basket jib
- Any 230 or 400 V electric lines to the working basket must be fully short-circuited at the base and have an electric connection to the vehicle chassis
- All the metallic parts not covered must be connected electrically in the plastic workman basket These form the measuring point 'basket'.

Further conditions

To carry out the measurement the lifting platform must be in a state that allows it to be operated properly.

Clean and degrease the insulation sections before the inspection using a suitable cleaning agent.

Repeat inspection: *Testing the insulation resistance*

The measurement is carried out at a voltage of 1kV (DC).

1. The measured values are entered in an inspection report.
2. If all measured values are greater than 20 MΩ, the inspection is regarded as successful.
3. The following insulation distances have to be inspected:

- Insulation distances
  - Basket – Chassis
  - Basket – Lifting equipment
  - Chassis – Lifting equipment

4. Use a calibrated insulation measuring instrument which meets the requirements of EN 50191.

Inspection results

If the inspection identifies any defects, determine and remedy their causes. Repeat any unsuccessful inspection until the system passes.

Documentation

The tests are documented in an inspection report and in the inspection log book.

2.5.5 Inspections required by the authorities

➢ The official inspections shall be executed according to the applicable state law and regulations; they must conform to the German regulations as stated below.

The keeper of the vehicle is responsible for arranging all of the inspections (see also German Health and Safety at Work Act). The vehicle must be prepared for the inspection to ensure that the inspection can go ahead as planned.

-The keeper of the vehicle must determine the nature, scope and intervals of the necessary inspections. These inspections should identify and remedy any safety deficiencies systematically.
The keeper of the vehicle further determines the requirements of the persons he nominates have to meet (qualified persons).
According to current opinion, it is assumed that the duties of the persons qualified for the tasks listed in the following will be carried out by the persons stated. Nature, scope and interval of the inspections are taken from current practice and meet recognized standards of technology.

2.5.5.1 Regular inspections

After the initial start-up, lifting platforms should be inspected by an expert at intervals of a maximum of one year.

The vehicle-related part of the inspection should be carried out by a professional access platform technician. The maintenance work card or invoice for the inspection carried out shall be kept for a period of one year.
An expert is someone who, as a result of his/her professional training and experience, has enough knowledge in the area of lifting platforms and is sufficiently familiar with the relevant statutory regulations, accident prevention rules and generally recognized rules of technology (e.g. DGUV regulations, DIN standards, VDE provisions, technical rules of other European Union Member States or members of the European Economic Area) to assess whether lifting platforms are in a safe working order.

2.5.5.2 Inspection of load-bearing structures

If you detect any cracks, deformations or similar changes during inspections, you must contact an expert.
After the damage has been assessed, the platform manufacturer, PALFINGER PLATFORMS, is to be consulted. How the unit is to be repaired will then be agreed between platform manufacturer and expert.

If welding works need to be carried out on the lifting platform, it is essential that you observe the regulatory information and instructions at point 5 in the 'Welding works procedures' section.

2.5.5.3 Extraordinary inspections

Lifting platforms with a lifting height of more than 2 m, as well as lifting platforms that are intended to convey people on the load-handling equipment or have people underneath the load-bearing equipment or load, must be checked by an expert before they are taken back into service following any changes to the design or significant repairs to load-bearing parts.

An expert is someone who, as a result of his/her professional training and experience, has specialist knowledge in the area of lifting platforms and is familiar with the relevant statutory regulations, accident prevention rules and generally recognized rules of technology (e.g. DGUV regulations, DIN standards, VDE provisions, technical rules of other European Union Member States or members of the European Economic Area). He must be able to inspect and provide an expert assessment of lifting platforms.

2.5.5.4 Inspection scope

1. The regular inspection according to the section 'Regular inspections' is essentially a visual inspection and function test. It extends to the inspection of the condition of the components and systems, checking that the safety systems are complete and are effective and that the inspection log book has been completed.
2. The scope of the extraordinary inspection is based on the nature and scope of any changes made to the design or repairs.

2.5.5.5 Inspection log book

1. Evidence is to be kept that lifting platforms have been inspected in the inspection log book.
2. The inspection log book should contain the inspection before the initial start-up and the regular and extraordinary inspections, and, where applicable, the certificates of any (EU) type approval test and the EU certificate of conformity. The documents required for the regular inspections must be attached.
3. The findings must contain:
   - Date and scope of the inspection with details of any inspection sections that are still outstanding
   - Result of the inspection with details of the identified deficiencies
   - Assessment of whether there are any reservations about start-up or further operation.
   - Details of any subsequent inspections required
   - Name, address and signature of the tester
4. The keeper of the vehicle should confirm he has acknowledged and has rectified the deficiencies in the findings

2.5.6 FI-protective switches

Exercise care where the lifting platform is fitted with a 230 V/400 VAC unit.

Risk to life!

Conventional FI-protective switches of the A/AC type do not detect any DC residual currents. Before operating any devices controlled by frequency converters using CEE power sockets with a nominal current of 16 to 125 A, universal current-sensitive RCCBs type B-SK must be applied (if fire protection is required type B-NK - retrofitting possible).

The supply points of the RCCB must be designed in accordance with national regulations and standards. Particular care should be taken that the supply points meet standards and that the system is earthed.

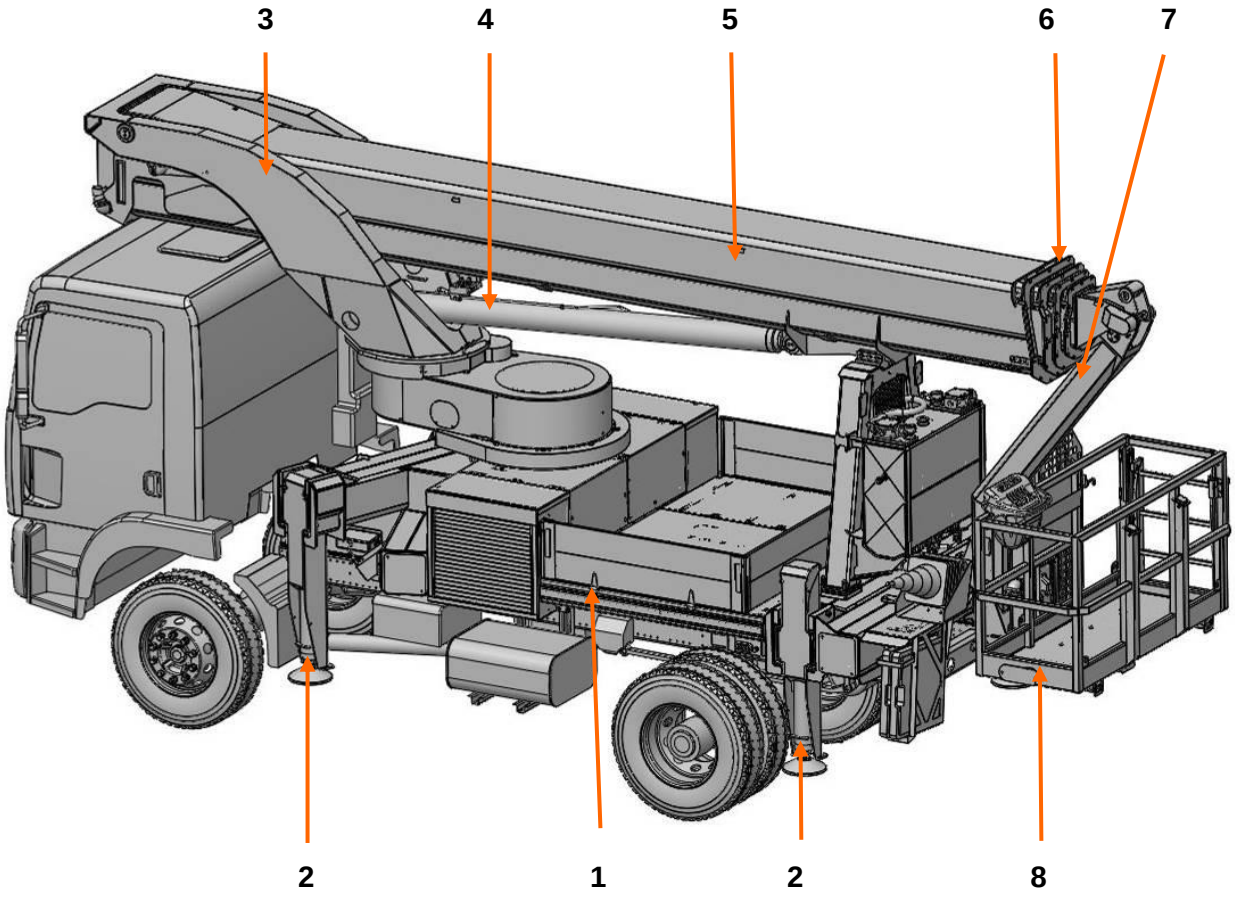
Observe also the regulations of the utilities provider or network operator.

- FI-protective switches should be checked in accordance with manufacturers' details every six months.

Technical Description

3 TECHNICAL DESCRIPTION

3.1 PRINCIPLE CONSTRUCTION OF A PALFINGER PLATFORMS LIFTING PLATFORM (PREMIUM CLASS)



Chassis:	**1**	**Base frame**
	2	**Support equipment (stabiliser extensions / stabilisers)**
Lifting equipment (device):	**3**	**Swivel table**
	4	**Lifting boom cylinder**
	5	**Lifting boom**
	6	**Telescopes**
	7	**Basket boom**
	8	**Workman basket (access platform)**

This PALFINGER PLATFORMS lifting platform consists of a welded base frame (1) with a cover made from a double aluminium sheet. The base frame supports any forces that arise during the operation from the supporting mechanism (2) against the foundation. The swivel table (3 including counter slewing system), with which the lifting gear can be slewed in both directions by a hydraulic motor, is located on the base frame. The lifting boom (4) can be raised or lowered with the lifting boom cylinder (5). The lifting boom consists of several telescopes (6) pushed inside one another that can be extended and retracted with the help of a cylinder and wires. The basket boom (7) is mounted to the upper lifting boom articulation, and the working platform (workman basket 8) is pivot-mounted to the basket boom's end. The workman basket is always held in a horizontal position by means of a levelling mechanism. In platform operation it is possible to regulate the movements and working speed from various different control points (see 3.17) via a sensitive electronic control system.

In emergency situations it is possible to bring the platform into its transport position via the electric or hydraulic emergency control system.

3.2 HYDRAULIC CYCLE

The hydraulic pump is driven by the vehicle's motor by engaging the auxiliary drive. It directs the hydraulic oil to the switch valves of the lifting gear and support equipment.
Pressure limitation valves protect the pump cycle from excess pressure.
In the support and lifting equipment control blocks electro-magnetic valves feed oil to the respective hydraulic cylinders or motors based on the electric control impulses.
They control:

- The supporting system
- The slewing drive
- The lifting boom
- The telescopes
- The basket boom
- The levelling system
- The basket rotation

The control blocks feed any returning oil back into the tank. A return filter there protects the hydraulic cycle from contaminants. In the event of a leak in the hydraulic cycle the check valves on the cylinders will prevent the lifting platform from being lowered.
The oil cooler provides for a constant oil temperature.

Optionally, the hydraulic pressure can be created by an electric motor (see also ‘Options’ chapter).

Should pressure generated by the hydraulic pump fail while the platform is in operation, the pressure in the hydraulic cycle can also be generated with a manual pump/electric emergency pump. This emergency drive is intended solely to bring the passengers in the workman basket safely back to the ground.

3.3 SUPPORT EQUIPMENT

General set-up

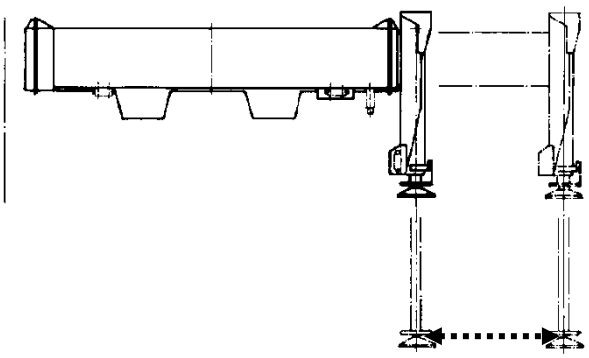
- The stabilisation equipment (see section 4.3 'Stabilising the lifting platform') can be controlled:

  - From the control panel in the basket
  - From the control panels on the chassis on the left and right side of the vehicle
  - From the secondary/emergency control panel on the chassis (option)
  - Using the valve control block on the chassis (right side of the vehicle)
    - Retracting by hand in the event of hydraulic emergency operation

A switch valve directs the oil stream to the supporting valves only if the lifting equipment is in its starting position. This safety measure prevents the platform from tipping over during platform operation.
Hydraulically releasable check valves that are flanged directly to the support cylinders reliably guarantee the cylinder's holding pressure.

Fully variable support

The stabilisation system features continuously variable support widths with different working areas. The ranges are enabled by the PLC.
Support is possible on one side or on both sides, and variable from 'within the vehicle's contour' up to 'maximum support width'. So the available place can be perfectly used and the unit adjusted on uneven grounds.



Note: The smallest stabilizer extension determines the outreach!

3.4 LIFTING EQUIPMENT

After supporting the lifting platform correctly and switching from *SUPPORT OPERATION* to *LIFTING PLATFORM OPERATION* the lifting platform can be controlled as follows (cf. Section 'OPERATING THE LIFTING PLATFORM'):

- From the panel in the basket
- From the base unit display in the electrics box / operator station for hydraulic emergency operation *(depending on platform equipment)*
- From the secondary or emergency control panel at the chassis *(option)*
- Via valve control block at the chassis
  - Retracting by hand in the event of hydraulic emergency operation

The operating levers, called joysticks, have downstream electronics (PLC, **P**rogrammable **L**ogical **C**ontrol) that controls the hydraulic valves. The electronic controls specify the values for maximum speeds, driving and braking, which means that a smooth driving and braking operation is even ensured with jerky joystick movements.

Risk of collision!

Reduce the speed in good time before approaching an obstacle. As the electronics generate a slight run on when braking at maximum speed, the lifting platform can bump into an obstacle.

Use the Hare/Tortoise button. 

➢ In case of limited freedom of movement or when placing the basket exactly on a target the Tortoise function facilitates moving the lifting equipment carefully by reducing the possible maximum speed.

3.5 EMERGENCY SHUTDOWN

3.5.1 Emergency cut-off function of the working platform

The **emergency cut-off function** for the **complete platform** can be triggered as follows:

1. Manually by activating the emergency-off button on the basket control panel
2. (optionally) Manually by activating the emergency-off button on the secondary/emergency control panel
3. Manually by actuating the emergency-off button on the base unit display
4. Electrically with the basket's anti-tipping device from a basket inclination of >8°
5. Electrically with PLC emergency-off (reset using the *MOTOR START* button)

Description of the functions 1 - 3:

The hydraulic control system is fitted with on/off switchover valves that are linked to the emergency-off chain. If the emergency cut-off button is activated, the electric control voltage to the pump pressure safety valve (PPSV) is switched off. It is then no longer possible to control the lifting platform!

Note: For as long as an emergency-off button is depressed, the equipment cannot be moved, not even from the emergency operation control panel.

To release the platform the emergency-off switch must be unlocked manually.

Description of function 4:

The basket's anti-tipping device (basket inclination button) will shut down the movement of the lifting equipment and the basket levelling system if the workman basket reaches too great an inclination (>±8°). In this scenario the basket can however be brought to a horizontal position manually using the *EMERGENCY LEVELLING* button (see points 4.5.2, 4.5.3 and 4.5.4). If the basket is brought once again within the maximum permitted angle of inclination, the lifting platform can be enabled by pressing the *MOTOR START*, button, even if the motor is running.

Description of function 5:

If the lifting platform’s electronics, the PLC (Programmable Logical Controller), identifies an error, it will switch the lifting platform automatically to emergency cut-off. The PLC is unable to disable this again automatically. When you push the 'MOTOR START' button or switch the ignition off and then on again in the driver's cab or reset the PLC on the basket control panel, a system check will start, even with the motor running. If no reason for shutdown can be detected the PLC deactivates the emergency cut-off.

If a PLC emergency cut-off cannot be deactivated, trained personnel must identify the cause. The equipment may only be taken into service again after the fault has been rectified.

3.5.2 Emergency stop of the support equipment

After the emergency-stop button has been pressed

- at the stabiliser control panels at the base
- at the control panel in the basket
- (optionally) at the secondary or emergency control panel

the function for the support equipment gets switched off.

3.6 LOAD TORQUE LIMITATION / RANGE LIMITATION

The lifting equipment can be raised, lowered, extended and slewed. The lifting platform could tip, if the maximum permitted range dependent upon the basket's load is exceeded.

The PALFINGER PLATFORMS lifting platform therefore is equipped with an outreach limiting function. It constantly monitors the permitted outreach and prevents any inadmissible movements, e.g.

- Slewing left/right
- Lifting boom down
- Extending telescopes
- Basket boom up/down

that could result in the lifting platform tipping over, and switches off the hydraulic valves.

Risk of accident!

Unauthorized changes to the sensory equipment of the outreach limitation system are strictly forbidden!

3.7 BASKET LEVELING (ELECTRO-HYDRAULIC)

The workman basket is always held in a horizontal position independently of the position of the lifting equipment. This is ensured by the PLC by means of an electro-hydraulic basket leveling mechanism that works in the following way:

The PLC receives the signals from the angle sensors and uses these to calculate the relevant control impulse for the valve on the leveling cylinder that is necessary to compensate for the inclination of the basket again.

If the workman basket is tilting at an angle of more than 8°, movement of the lifting equipment and basket levelling system gets switched off. An appropriate message appears on the display.
(The basket can be brought to a horizontal position using the emergency levelling function; see points 4.5.2, 4.5.3, 4.5.4 or 4.5.5).
If the system is once again within the permitted maximum angle of inclination, the lifting platform can be activated by pressing the *MOTOR START* button, even if the motor is running.

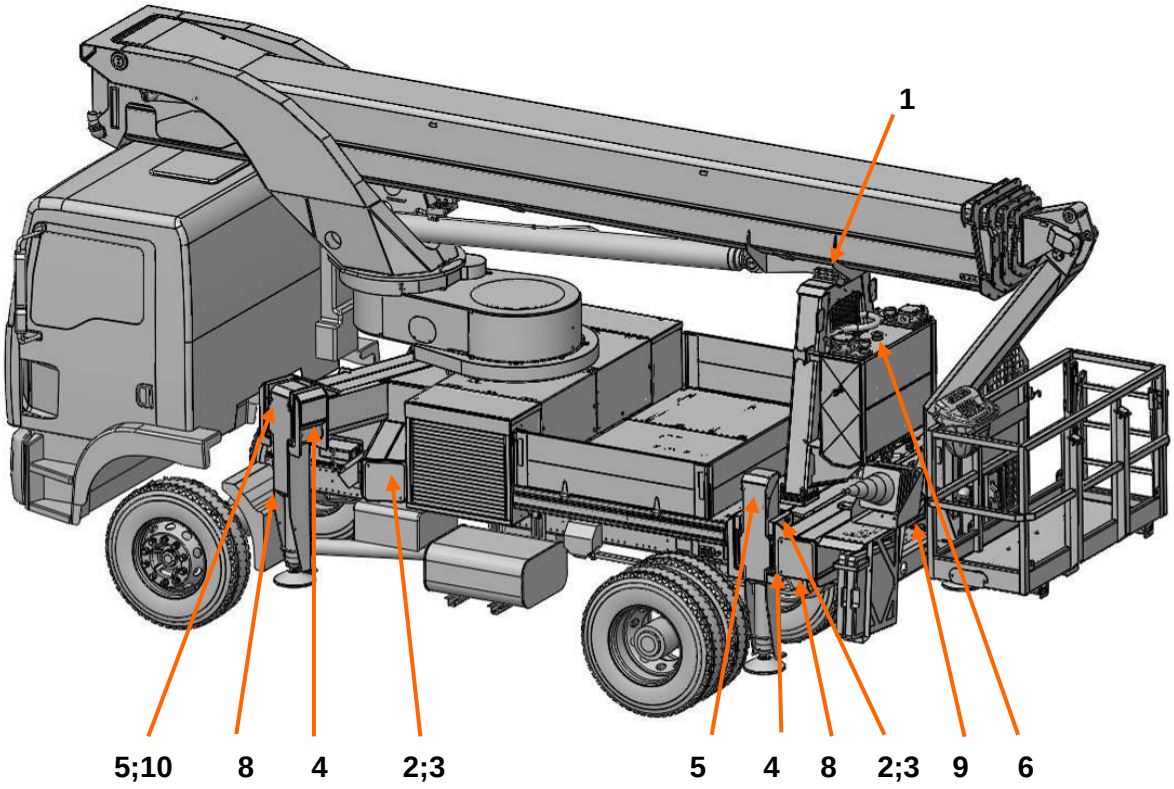
3.8 BASKET LOAD MEASUREMENT

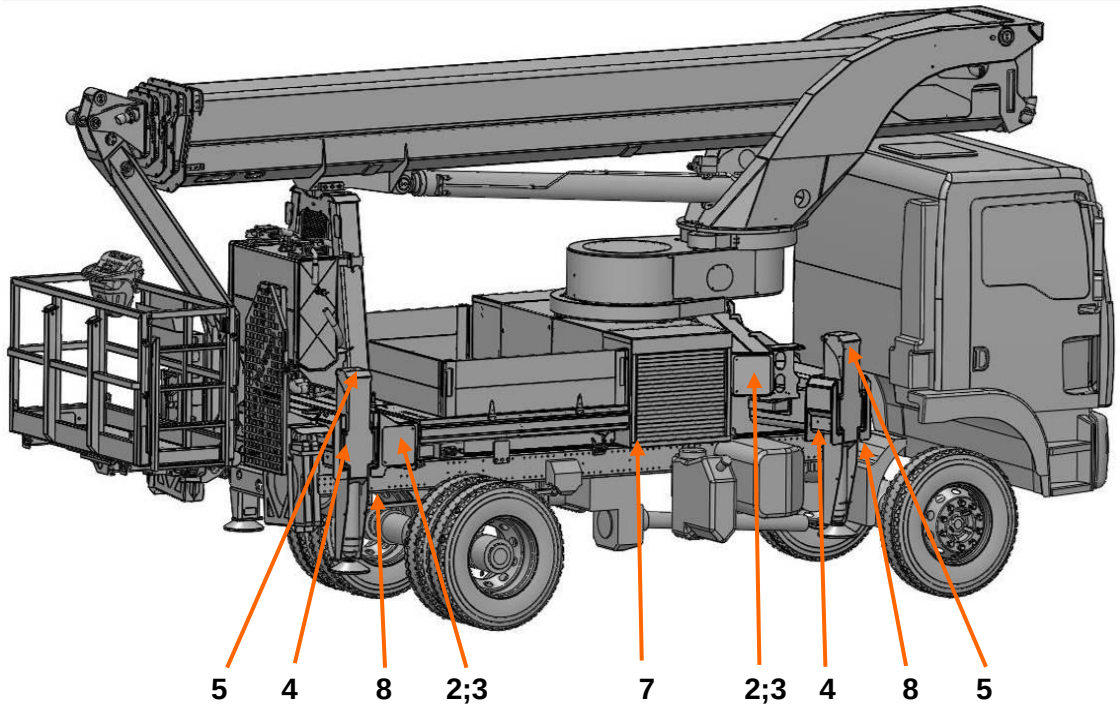
When the basket load exceeds the permissible maximum the lifting equipment controls get blocked. The load measuring system is to prevent the boom system from overload for instance by too heavy loads in the basket.

The maximum permitted nominal load can be taken from the warning sign in the workman basket!

Basket attachments or material carried within the basket (e.g. wooden trim, Rondo® rubber mat) will reduce the nominal load by the corresponding weight.

3.9 SENSORS ON THE CHASSIS AND THEIR FUNCTIONS





1. **‘Lifting boom not in starting position’ sensor**

   Checks the starting position of the lifting equipment (activates support operation).

2. **'Length of outrigger extension' sensor**

   Checks the extending position of the outriggers.

3. **‘Outriggers in transport position’ sensor**

   Checks the transport position of the outriggers.

4. **‘Ground pressure’ sensor**

   Checks the ground pressure of the vertical stabiliser cylinders.

5. **‘Stabilisers in transport position’ sensor**

   Checks the transport position of the vertical stabiliser cylinders.

6. **‘Filter contamination’ sensor**

   Checks the status of the oil filter.

7. **‘Valves of emergency operator station’ sensor**

   Switches off the electric control mechanism when the emergency operator station is open.

8. **‘Ground clearance wheel monitoring of axles’ sensor**

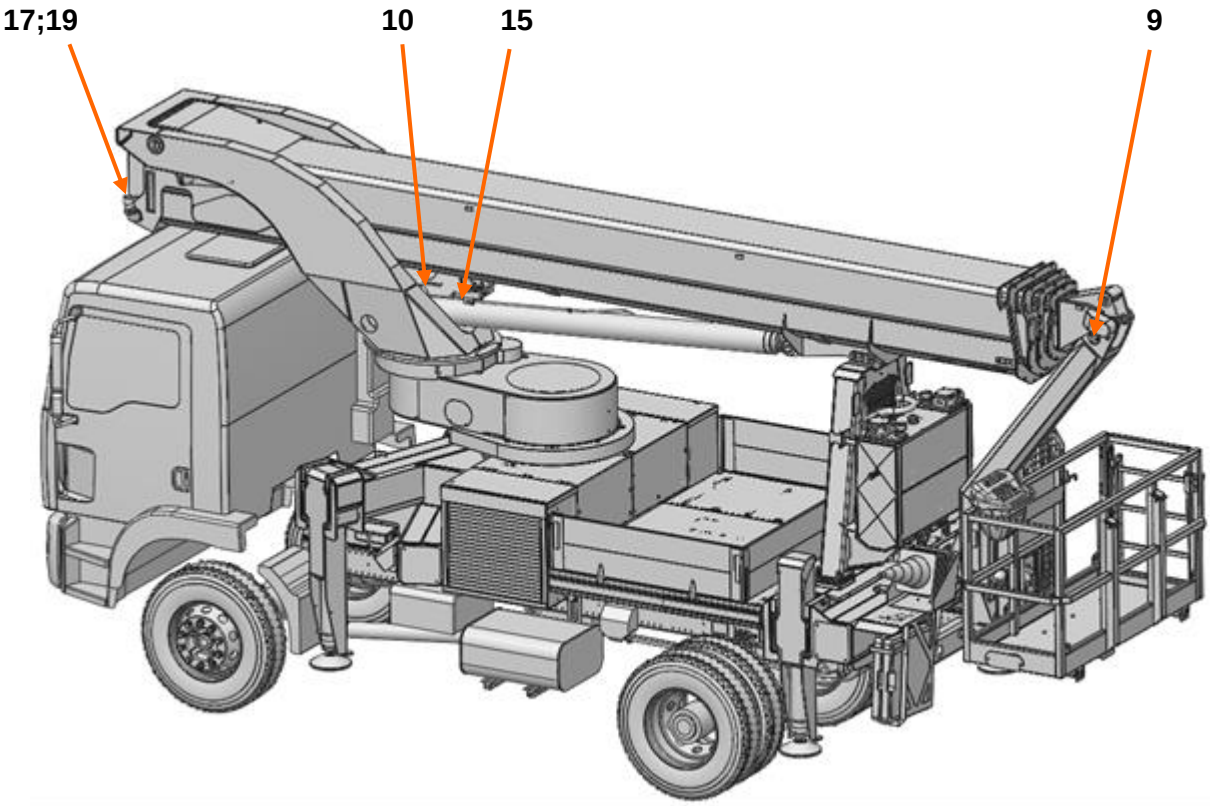
   Checks whether the wheels are not in contact with the ground.

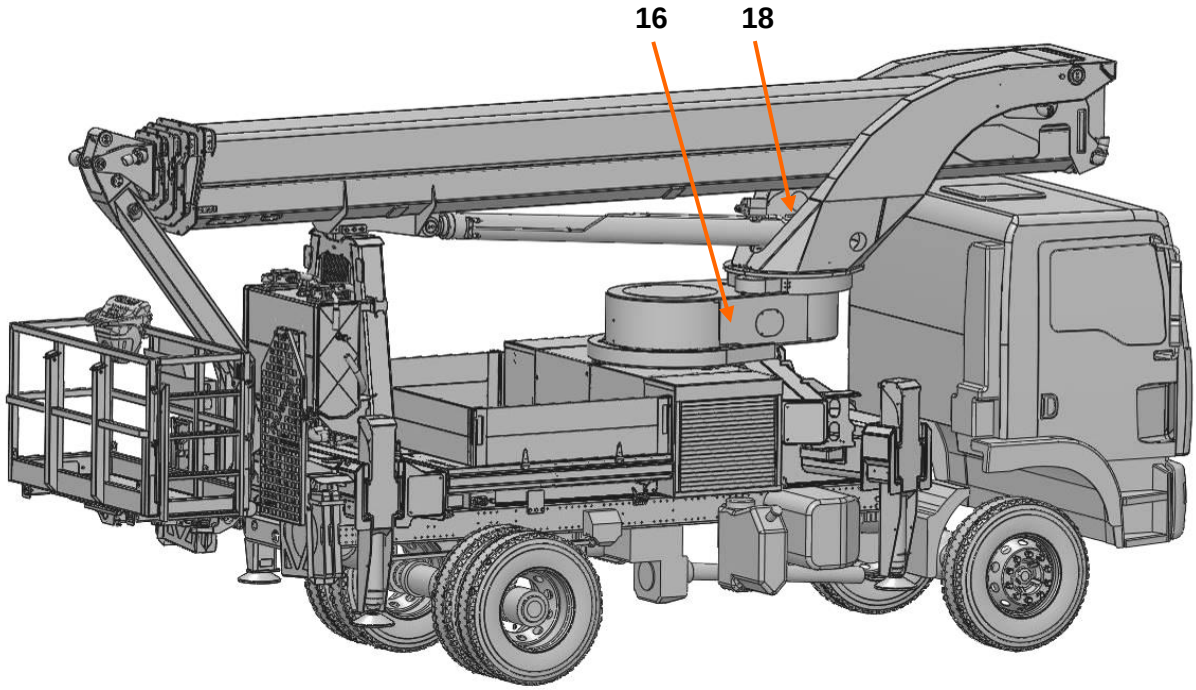
9. **‘Basket boom in support’ sensor**

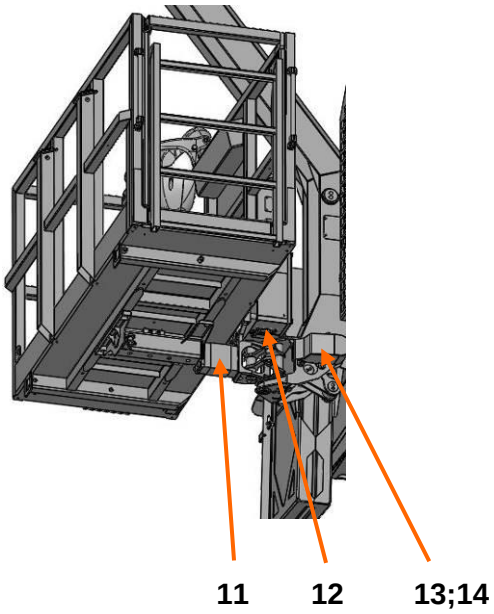
   Checks whether the basket boom is in its support.

10. **LED flashing stabiliser lights**

3.10 SENSORS ON THE LIFTING GEAR AND THEIR FUNCTIONS







9. ‘Basket boom angle’ sensor

Determines the angle between the basket boom and the lifting boom.

10. 'Swivel table inclination' sensor

11. ‘Basket load’ sensor

Captures the current basket load and stops all device motions when the basket has hit the ground.

12. 'Basket angle' sensor

Detects the basket's central position / current turning position.

13. ‘Basket tilt’ sensor

Monitors the maximum basket inclination of ± 8°.

14. ‘Basket carrier angle’ sensor

Determines the angle between the basket boom and the basket carrier.

15. ‘Pressure/force in lifting boom cylinder’ sensor

Determines the current load.

16. 'Swivel table angle' sensor

Determines the angle of swivel table.

17. ‘Rope check’ sensor

Monitors the telescope extension system.

18. ‘Lifting boom cylinder angle' sensor

Determines the angle of the lifting boom cylinder.

19. 'Telescopic extension' sensor

Determines the lifting boom telescope's extension length.

3.11 LIFTING PLATFORM LIGHTING

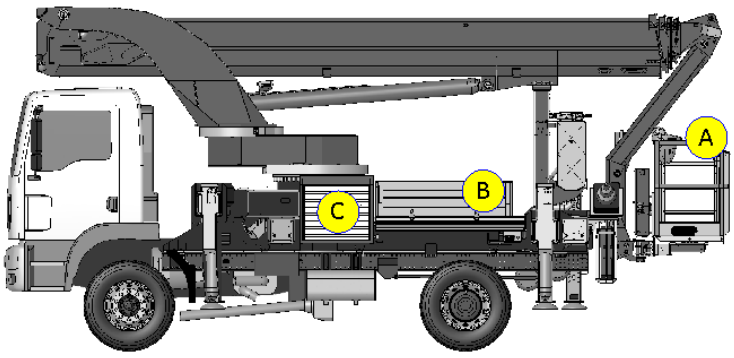
3.11.1 Types of lighting

Present on the lifting platform are numerous work lights, LED lighting fixtures and rotating beacons (dependent on platform model). These serve to illuminate the working area adequately and thus to ensure safe operation and use of the lifting platform. The lighting gets activated either automatically or by hand via controls at the panel or buttons in the cab.

a) Automatically activated lighting (standard/options)

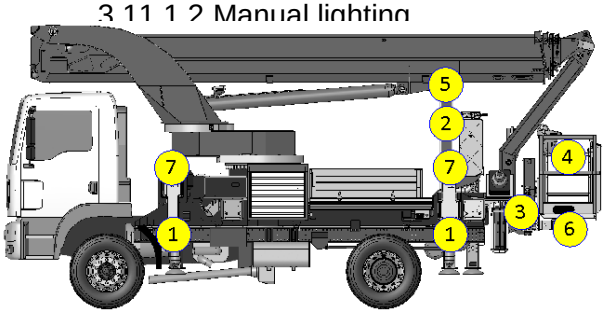
b) Manually controllable lighting (options)

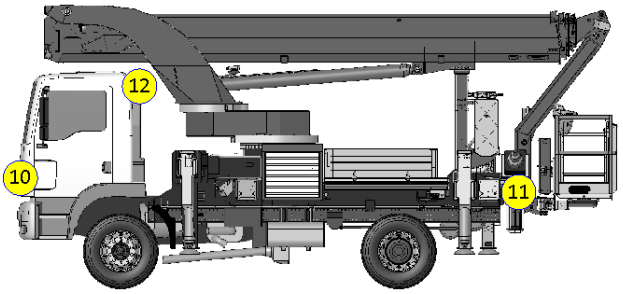
3.11.1.1 Automatic lighting



Automatic lighting			Requirement for activating this function
A	Option	LED work lights, basket	Plug connected
B	Option	LED lighting, device box	Flap open
C	Standard	LED lighting, electrics and hydraulics cabinets	Flap open

3.11.1.2 Manual lighting





Lighting			Can be turned on/off from the cab display	Can be turned on/off by external switch on cab	Can be turned on/off from the control panel Workman basket / swivel table	Can be turned on/off from the stabiliser controls	Requirement for activating this function
1	Option	LED lighting, stabilisers	yes	no	no	yes	
2	Option	LED lighting for the base unit, mounted on the device stabiliser	yes	no	no	no	Parking brake pulled or reverse gear
3	Option	LED lighting, rear	yes	no	no	no	Parking brake pulled or reverse gear
4	Option	LED lighting, inside the basket	yes	no	yes	no	
5	Option	Rotating beacons on left device stabilizer	yes	no	yes	no	
5	Option	Rotating beacons on right device stabilizer	yes	no	yes	no	
6	Option	LED lighting, basket underside	yes	no	yes	no	
7	Option	Deactivation of the flashing stabiliser lights	yes	no	yes	no	
10	Option	LED flashing lights (orange) on the radiator grille	no	yes	no	no	Parking brake and power take-off
11	Option	LED flashing lights (orange) on the rear end	no	yes	no	no	Parking brake and power take-off
12	Option	LED working lights on the cab's back wall	no	yes	no	no	Parking brake

3.11.2 Control of the lighting in the driver's cab

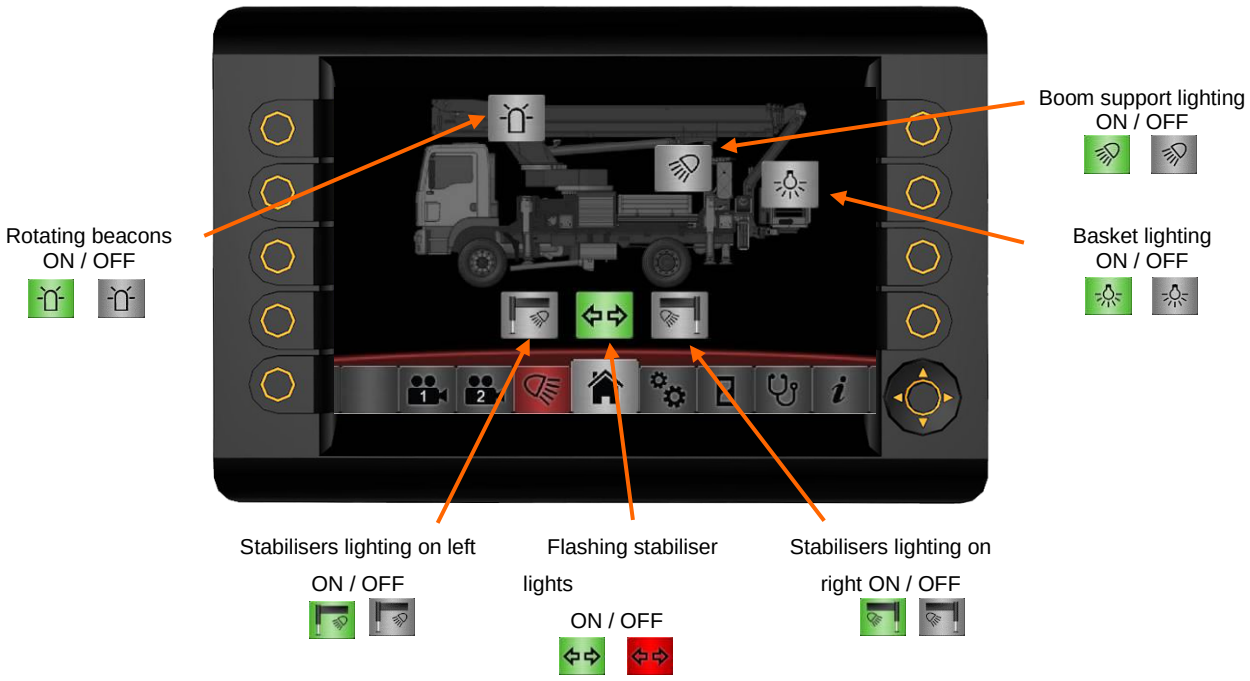
➢ *See also the remarks at point 3.18*

By touching the symbol in the main window, switch to the 'Lighting' display screen.

Main image*:*

From the 'Lighting' display screen you are able, depending on specification, to activate and deactivate all lighting systems and work lights present on the platform.

Lighting screen:



Camera screen

On the camera screen it is additionally possible (only when reverse gear is engaged or the parking brake is applied) to activate and deactivate the headlights on the base unit and the rear end.
Note: Any lights already activated, get automatically deactivated if the parking brake is released or reverse gear is not engaged.

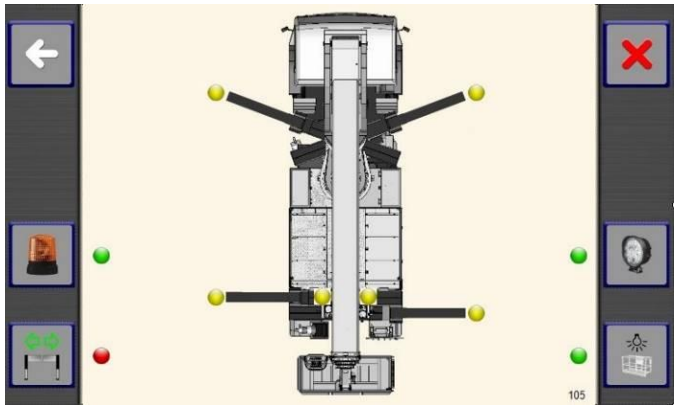
- If any of the lights are activated, this gets additionally shown to the user in the status bar on the main screen (see point 3.18.3).

3.11.3 Controlling the lighting from the workman basket control panel

This assistance function enables lighting control from the basket control panel.

Launching the **'Lighting control'** function:

Main window 005 is open:  ***ndow 105*** *opens*



3.12 TEMPERATURE-DEPENDENT AREA OF USE FOR LIFTING PLATFORMS

		Ambient temperatures	
Ambient temperatures		approx. –20°C to + 40°C (-4°F to +104°F)	
Electric components:		approx. –25°C to + 70°C (-13°F to +158°F)	
		Oil temperatures	
Hydraulic components:	Winter operation (for short periods)	Normal operation	Summer operation (for short periods)
Standard oil: AVILUB FLUID P-LPD 22	approx. -15 °C (+5 °F)	approx. +20°C to +50°C (+68°F to +122°F)	approx. +60°C (+140 °F)
Bio oil: AVIA SYNTOFLUID PE-B 30	approx. -20°C (-4 °F)	approx. +15°C to +55°C (+59°F to 131°F)	approx. +60°C (+140 °F)

Use only the oils mentioned in the above table!

Using any different hydraulic oil may cause malfunctions (e.g. stick-slip effects, component failure, etc.)

Any use of different oils needs to be approved by PALFINGER PLATFORMS. In such event, always contact PALFINGER Technical Service!

3.13 LAYOUT AND FUNCTIONS OF THE CONTROL PANELS FOR THE STABILISATION EQUIPMENT ON THE BASE

The lifting platform is equipped with two control panels on the left and right side of the vehicle. The stabilisation equipment can be controlled from these control panels.

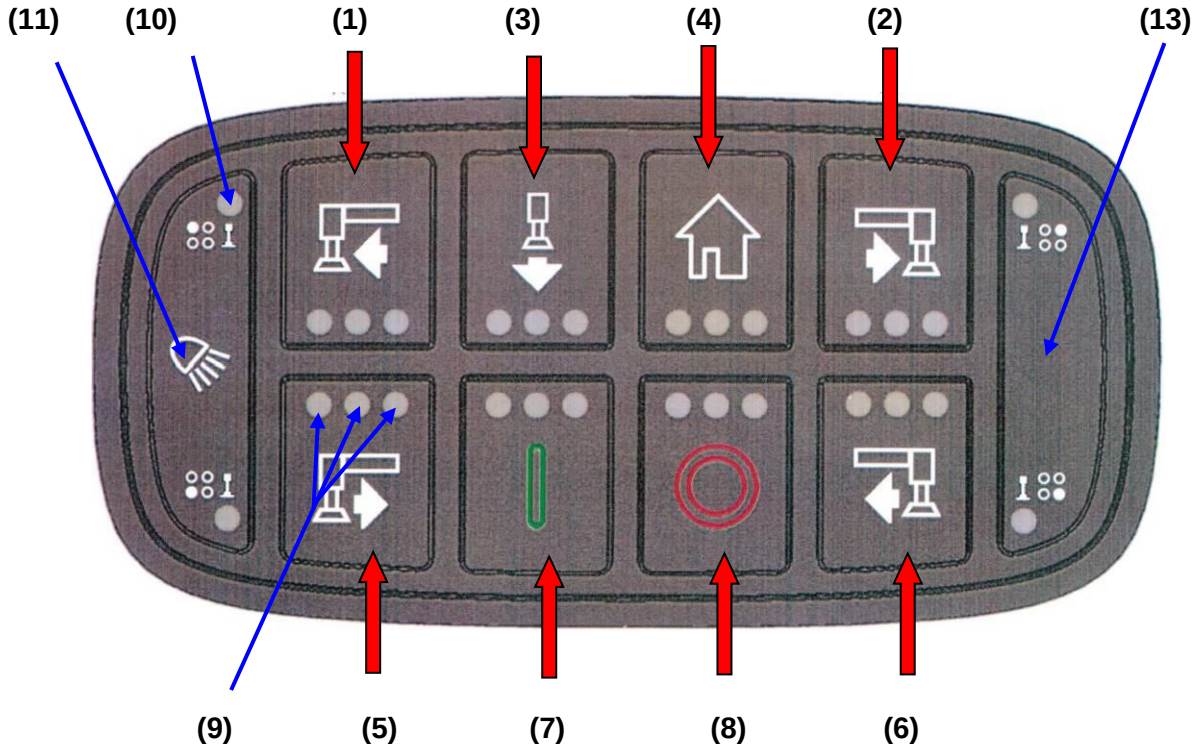
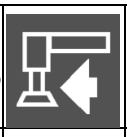
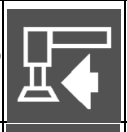
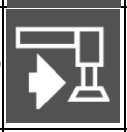
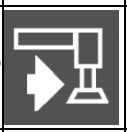
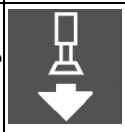
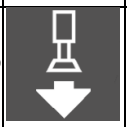
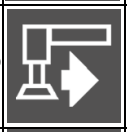
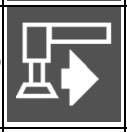
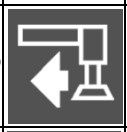
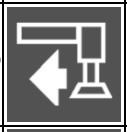
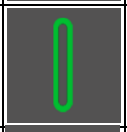
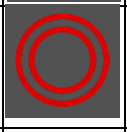


Illustration and description - **Left** side of the vehicle

(1)	**Left front stabiliser outrigger out**	**(6)**	**Left rear stabiliser outrigger in**
(2)	**Left rear stabiliser outrigger out**	**(7)**	**'Start' vehicle motor**
(3)	**Left vertical stabiliser out, until stabiliser under ground pressure**	**(8)**	**'Stop' vehicle motor**
(3)	**If all stabilisers have ground pressure => extend all vertical stabilisers**	**(11)**	**Stabilisation equipment lighting ON**
(4)	**Vertical stabilisers and stabiliser outriggers in (home function)**	**(12)**	**Emergency stop function**
(5)	**Left front stabiliser outrigger in**	**(13)**	**Undercarriage protection IN /OUT (optional)**

LEDs (9) glow green:	***if function is active (when button pressed)***
LEDs (9) flash briefly red:	***if function is disabled (when button pressed)***
LED (10) flashes green:	***if stabiliser has left transport position***
LED (10) glows green:	***if stabiliser has ground pressure***
LED (10) flashes red:	***if EMERGENCY STOP has been activated***

The following stabilisation configuration is created by pressing the respective button:

(1) ***left side of the vehicle***		Stabiliser outrigger on front left side of the vehicle extends
(1) ***right side of the vehicle***		Stabiliser outrigger on rear right side of the vehicle extends
(2) ***left side of the vehicle***		Stabiliser outrigger on rear left side of the vehicle extends
(2) ***right side of the vehicle***		Stabiliser outrigger on front right side of the vehicle extends
(3) ***left side of the vehicle***		a) Vertical stabilisers on the left side of the vehicle extend until they have ground pressure. b) If all four stabilisers are under ground pressure => all four extend until wheels free
(3) ***right side of the vehicle***		a) Vertical stabilisers on the left side of the vehicle extend until under ground pressure b) If all four stabilisers are under ground pressure => all four extend until wheels free
(4)		All stabilisers and stabiliser outriggers retract **(Home function)**
(5) ***left side of the vehicle***		Stabiliser outrigger on the front left side of the vehicle retracts
(5) ***right side of the vehicle***		Stabiliser outrigger on the rear right side of the vehicle retracts
(4) ***left side of the vehicle***		Stabiliser outrigger on the rear left side of the vehicle retracts
(4) ***right side of the vehicle***		Stabiliser outrigger on the front right side of the vehicle retracts
(7)		Vehicle motor starts
(8)		Vehicle motor stops
(9)		EMERGENCY STOP function - Using this switch, an emergency shut-off of the support function is possible at any time

3.14 LAYOUT AND FUNCTIONS OF THE CONTROL PANEL ON THE WORKMAN BASKET

3.14.1 General layout of the control panel

The **panel** consists of the following components:

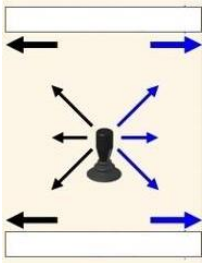
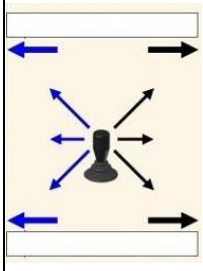
Component	***Function***
(1) Display	Display of information and errors
(2) Buttons	Essential functions
(3) Joystick	Control of the lifting gear / stabilisation equipment
(4) Emergency-off button	Instant shut-off in an emergency

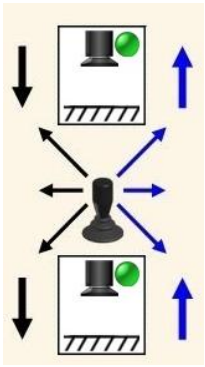
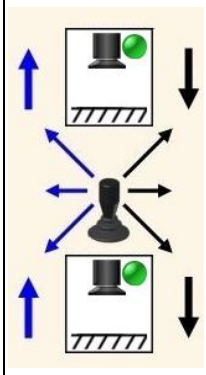
The control panel is fixed to the basket rail in a movable manner so as to ensure the best position for the operator in any given situation.

Take care when retracting the lifting gear that it does not break the control panel. If necessary, adjust the panel's position.

3.14.2 Basket control panel joy stick allocation

3.14.2.1 Joystick configuration for stabiliser operation

Extend/retract stabiliser outriggers					
left joystick			**right joystick**		
Extend front left stabiliser outrigger		**Retract front left** stabiliser outrigger	**Retract front right** stabiliser outrigger		**Extend front right** stabiliser outrigger
Automatically **Extend left** stabiliser outrigger		*Automatically* **Retract left** stabiliser outrigger	*Automatically* **Retract right** stabiliser outrigger		*Automatically* **Extend right** stabiliser outrigger
Extend rear left stabiliser outrigger		**Retract rear left** stabiliser outrigger	**Retract rear right** stabiliser outrigger		**Extend rear right** stabiliser outrigger

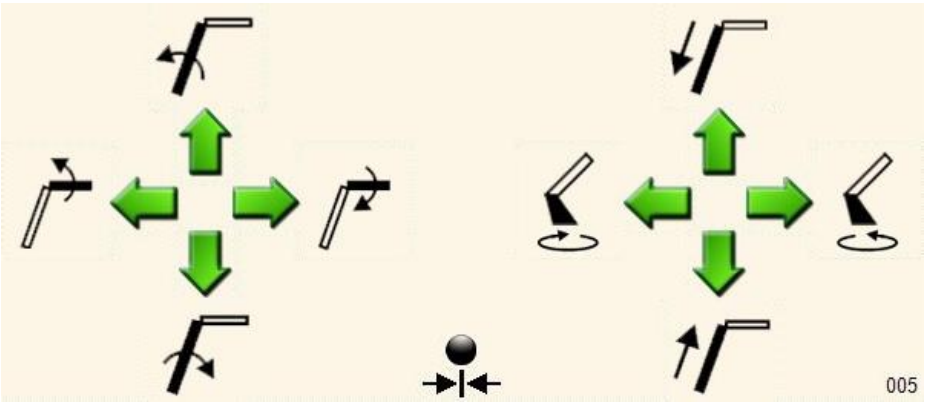
Extend/retract stabilisers					
left joystick			**right joystick**		
Extend front left stabiliser		**Retract front left** stabiliser	**Retract front right** stabiliser		**Extend front right** stabiliser
Automatically **Extend** stabiliser on **left** side		*Automatically* **Retract** stabiliser on **left** side	*Automatically* **Extend** stabiliser on **right** side		*Automatically* **Extend** stabiliser on **right** side
Extend rear left stabiliser		**Retract rear left** stabiliser	**Retract rear right** stabiliser		**Extend rear right** stabiliser

Support operation activation and control, see comments in section 4.3

3.14.2.2 Joystick assignment for device operation

	Basket boom UP		Telescope OUT
	Basket boom DOWN		Telescope IN
	Lifting boom UP		*Clockwise slewing*
	Lifting boom DOWN		*Anti-clockwise* slewing

Standard joystick assignment for device operation (can be changed as desired by customer):



Deadman function:

By pushing or pulling the joysticks briefly in the direction of movement the safety lock (**deadman function**) on the lifting equipment is released.

3.14.3 Meaning of the buttons / switches

Essential functions

	The **I** button (*MOTOR START*) starts the vehicle's motor. It is also possible to reset the PLC. When the motor is running, the ignition is locked to prevent a restart.
	The **O** button (*MOTOR STOP*) switches the vehicle's motor off.
When the vehicle's motor is switched off, it continues to use electricity, as the ignition on the carrier vehicle is still switched on. Therefore always monitor the battery's state of charge. If possible switch off big consumers such as low beams, windscreen wipers, ventilation motor, mirror heating, window heating, etc.!	
	Pressing the *EMERGENCY CUT-OFF* button will bring the lifting platform to an immediate standstill.
The joysticks and the buttons that actuate movements will be disabled if the emergency cut-off button is pressed. Note: It is still possible to start and stop the motor and operate from the display. Emergency operation is not possible from the control panels in the workman basket and at the base. **The emergency cut-off button can only be pressed in an emergency!** **Check regularly to make sure it is working!**	

Emergency control functions

You use the **!** button (WARNING) to switch the lifting gear to emergency operation.

The safety shut-off mechanisms are disabled. Risk of accident!

It is your responsibility to control the lifting platform during emergency operation!

- Activate emergency operation => Hold down button

An ELECTRONIC EMERGENCY PUMP can be started if there is no longer any hydraulic energy supplied from the vehicle's motor (power take-off). The emergency pump is powered by the vehicle's battery. The electrical emergency pump should therefore only be used to lower the lifting platform in an emergency.

- Activate emergency pump => Hold down button

=> after 20 seconds the function switches off automatically

=> Starting up again: Release button, press again and hold down

- After emergency operation, press the 'Start motor' button (LED flashes)

The *CANCEL STOP* button can be used to deactivate an operational shutdown.

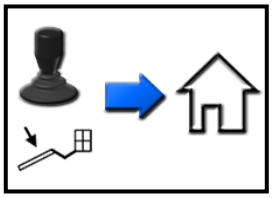
❖ *- Cancel operational shutdown => Hold down the button and initiate the movement carefully using the joystick. Caution: Risk of collision!*

❖ ***It is now your responsibility to control the lifting platform!***

Additional functions

- Activate the home function with the HOME FUNCTION button;

=> Following message appears in main window 005



- By moving the joystick (lifting boom down) initiate device movements

=> First the lifting gear moves into the home position and upon further activation the support equipment into the transport position

Danger of collision where there are obstacles!

The *DRIVER'S CALL* button activates an acoustic signal in the driver's cab or in the basket.

Signals can be issued for the workman basket to communicate with the driver's cab and vice versa.

Personnel should reach agreement over the meaning of the signals.

- Activate driver's call => Press button

The *BASKET LEFT* button turns the workman basket to the left.

- Activate rotate basket to the left => Hold the button down

The further the lifting gear is from the starting position, the bigger the working range for basket rotation.

The *BASKET RIGHT* button turns the workman basket to the right.

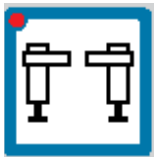
- Activate rotate basket to the right => Hold the button down

The further the lifting gear is from the starting position, the bigger the working range for basket rotation.

Buttons F1 - F8 are used to perform the functions currently shown on the graphic display.

Pressing the *RESET* button (for >3 seconds) resets the complete control system
=> Power shut-off => Start-up process takes c. 15 seconds
- To reset complete control system => press button

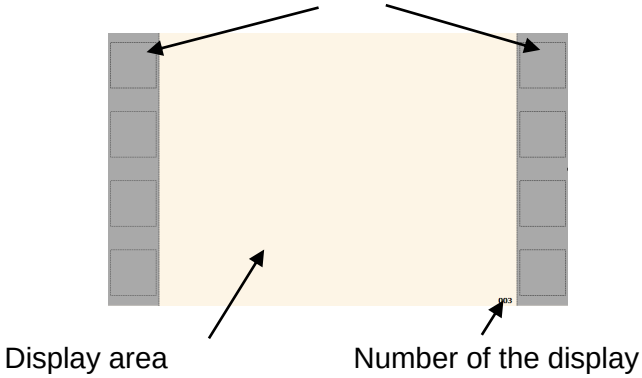
No function



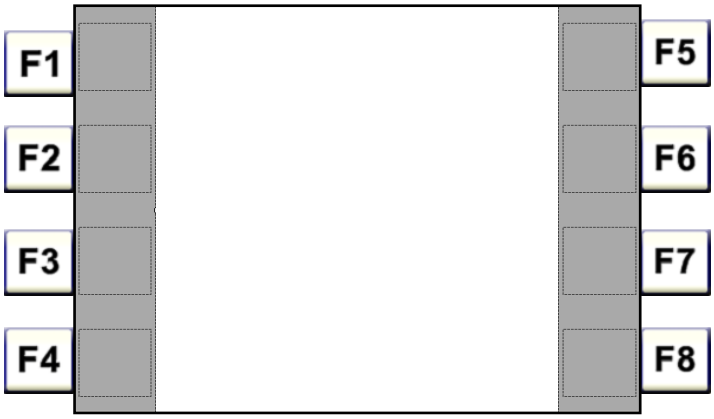
This button activates the support operation

3.14.4 Layout and functions of the display

3.14.4.1 Basic structure



Control the display using the F1 to F8 keys. Appropriate symbols will be shown next to the keys as required. On pressing the relevant key you may call up this function, alternatively another window opens. Within the description the keys are named as shown in the pattern below.



 Back to last menu window

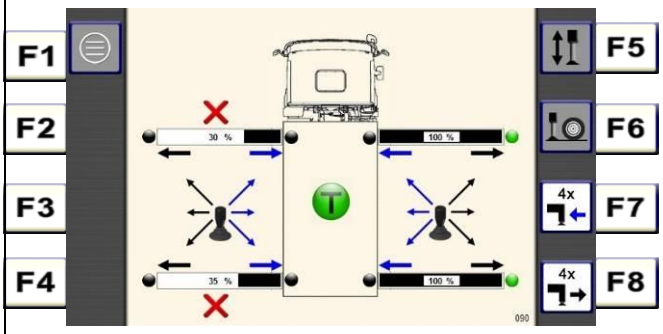
 Back to operating window

 Back to previous window

 Continue to next window

3.14.4.2 Description of the display indicators in stabilisation mode

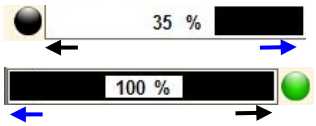
Outrigger operation (90)



Graphical representation of the stabiliser outriggers' positions:

Blue arrow => Retracting stabiliser outriggers

Black arrow => Extending stabiliser outriggers



(Left) stabiliser outrigger in intermediate position

(Right) stabiliser outrigger extended

F5 Change-over to vertical stabiliser operation (91)

F6 Change-over to partial operation (92) - option

F7 Retract all stabiliser outriggers

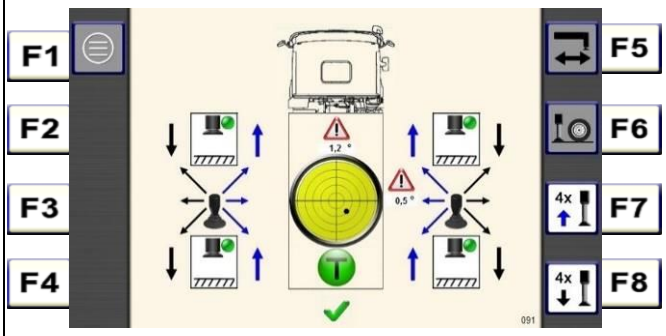
F8 Extend all stabiliser outriggers

Platform in transport position

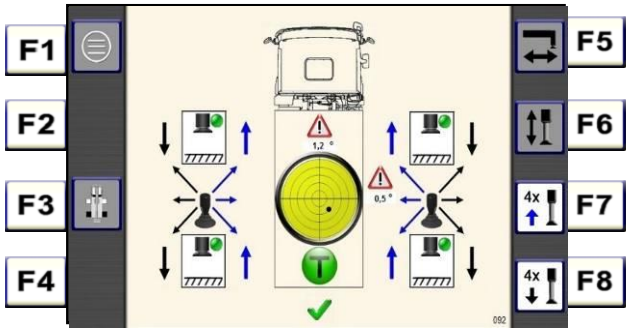
Outrigger blocked, stabiliser not in transport position

Vertical stabiliser operation

Normal operation (91)



Partial operation (92) - option

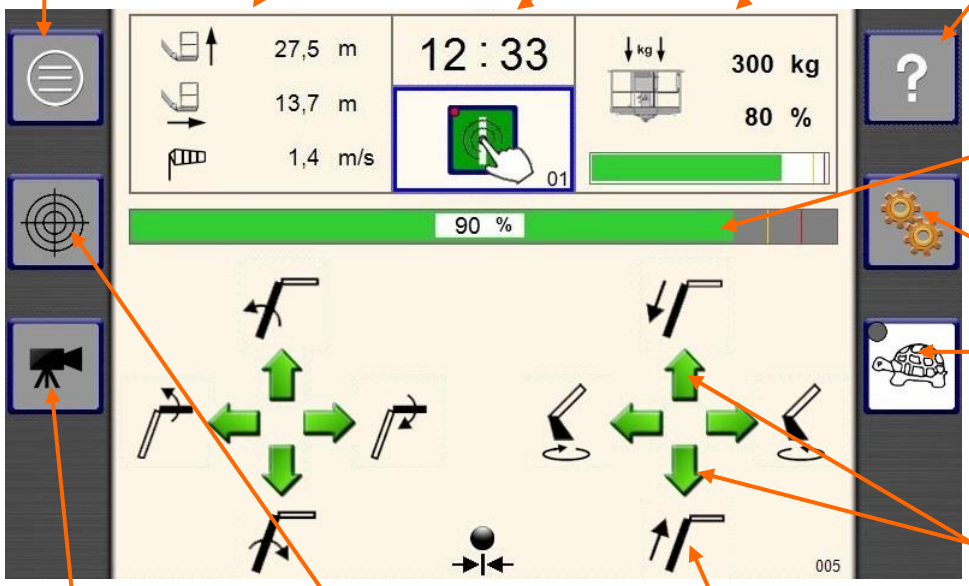


Blue arrow => Retracting stabilisers

Black arrow => Extending stabilisers

	Stabiliser is retracted
	Stabiliser is in intermediate position
	Stabiliser has ground pressure
F5	Change-over to stabiliser outrigger operation (90) (only when stabilisers are in transport position)
F6	Change-over to partial operation or normal operation
F7	Retract all vertical stabilisers
F8	Extend all vertical stabilisers
	Stabilisers are correctly positioned (providing support) => lifting equipment enabled
	Platform in transport position

3.14.4.3 Description of the main window in platform operation



Changeover to query menu (diagnostics) see point 3.14.4.6

Display of
- Working area
- Wind speed (optional)

Display of information

Display of the basket load

Changeover to Help menu see point 3.14.4.19

Display of the current load torque in %

Launching options

Activation of the 'Tortoise' function (device movements slowed down)

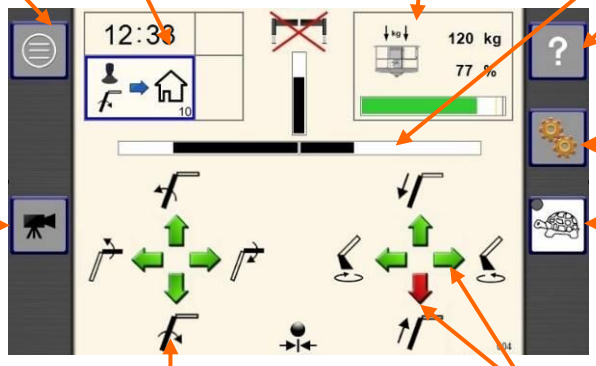
Status of movement
red: function disabled
green: function enabled

Launching camera screen (optional)

Changeover to Memory menu (optional) see 5.1.1

Joystick configuration (depending on selection)

3.14.4.4 Description of the main window during relocation



Changeover to query menu (diagnostics) see point 3.14.4.6

Display of information

Display of the basket load

Enabled movement range

Changeover to Help menu see point 3.18.5

Launching options

Activation of the 'Tortoise' function (device movements slowed down)

Launching camera screen (optional)

Joystick configuration (depending on selection)

Status of movement
red: function disabled
green: function enabled

3.14.4.5 Description of the ‘Options’ window

Memory function, image 101 **Lighting function Image 105** **Hydraulic work port function / generator function, screen 102** **Vertical parallel travel function, image 104**		**Automatic basket rotation function, image 107** **Limitation of working range function, image 108**

Configuration dependent on equipment fitted to the platform

- In the 'Options' functions window you can select or activate the options listed below (dependent on equipment fitted to the platform).

	'Memory' option	Image 101
	'Hydraulic generator' option	Image 102
	'Electric motor' option	Image 103
	'Cruise control' option, foot switch	On/Off
	'Vertical parallel travel' option	Image 104
	'Lighting' option	Image 105
	'Restriction of the working range' option	Image 108
	'Ultrasound sensors' option	Image 191

3.14.4.6 Description of the ‘Query menu’ window

Create QR code

Settings submenu, image 130

‘Diagostics’ submenu Image 140

‘PIN-protected area’ submenu, image 171

‘Memory’ submenu Image 180

3.14.4.7 Description of the errors window

Error display

Example: Emergency-off triggered by PLC

- By pressing the MOTOR START button , reset the controls

3.14.4.8 QR code for reading out machine data

It is possible to read information about the work platform's status via QR code.
This procedure facilitates trouble shooting in case of a failure. Within a very short time all required data will be available without errors for further processing (e-mailing).

Preconditions:

- Smartphone and appropriate software available
- Active internet connection

System configuration:

- QR code gets automatically recognized as e-mail.
- Recipient address is flexible and must be stored in the relevant control panel.

Calling up the input menu:

- Restart the lifting platform
- During start-up a short signal sounds and the following screen appears for 5 seconds:

- On pressing the  button the recipient address input screen opens with the stored address.

Changing the recipient address:

Cursor to the left

Cursor to the right

Delete characters

Transfer

- Use the arrow keys to move the cursor in the required place.
- Use the joystick to select the required character and press the Apply button to add it at cursor position.
- Add all other characters in the same way.
- Via Delete button you can delete characters in front of the cursor.

- Save the recipient address by selecting  and pressing the Apply key on the control panel.

  ⇨ Correct saving is visually indicated by a green checkmark next to the address.

- Finally restart the control panel (ignition off/on).

The e-mail address must be added separately on all control panels.

<u>Launching the function:</u> 'Read QR code'

- Main window 005 is open:  ***low 120** opens*

Create QR code 

- Press the F1 key (create QR code) =>  automatic procedure for creating the QR code starts.

  - During start-up the following is shown:

    The loading bar indicates the progress. 

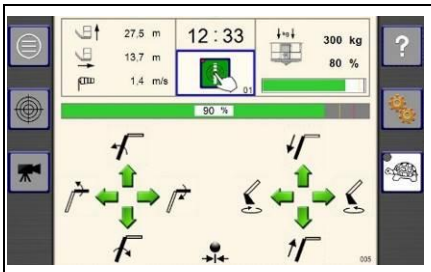
  - After finishing code creation the QR code and the stored e-mail address show automatically on the display.

Email@provider.com

- Now the QR code can be read.

- To close the window press the F5 key.

3.14.4.9 Description of the ‘PIN-protected area’ submenu



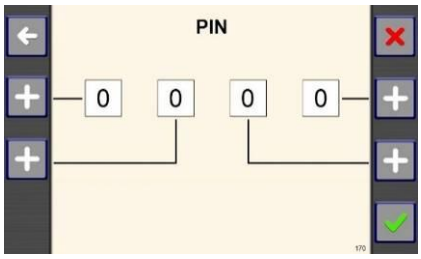
- Switch from main window 005 to QUERY MENU window 120

- Press the MENU button

=> Query menu window 120 opens

- Press the PADLOCK button

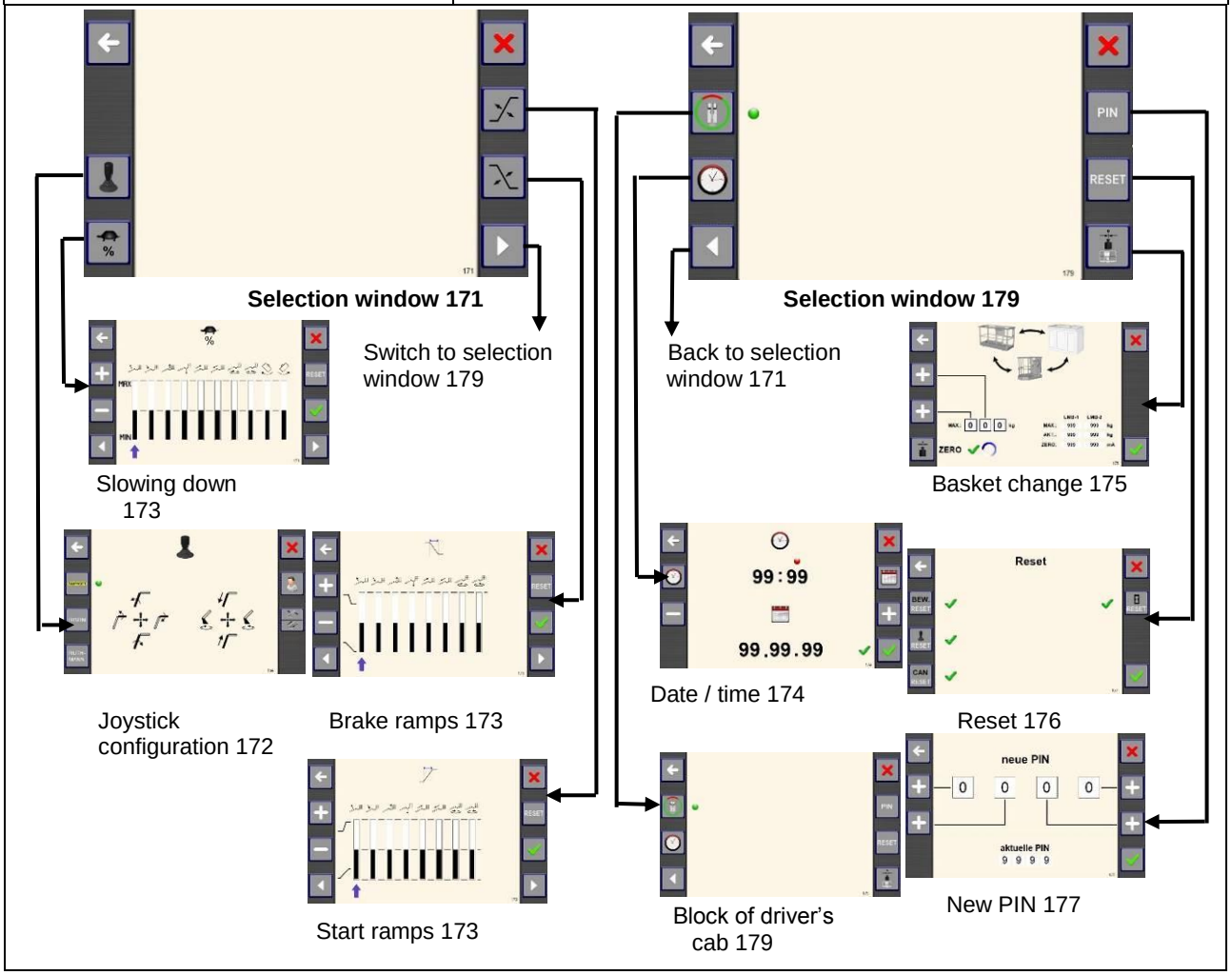
=> PIN window 170 opens



- Enter 4-digit PIN number using the buttons

- Confirm using the button

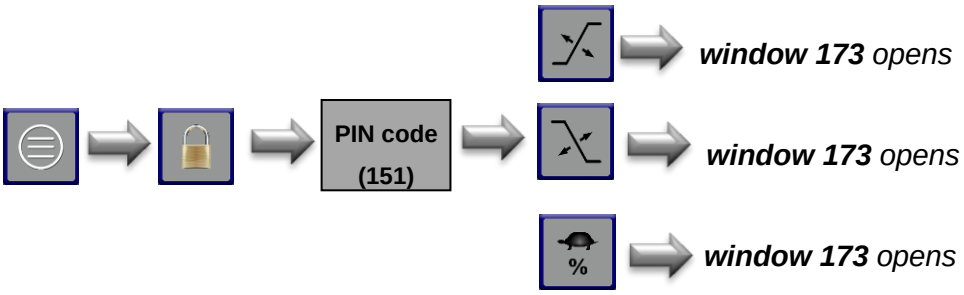
=> Selection window 171 opens



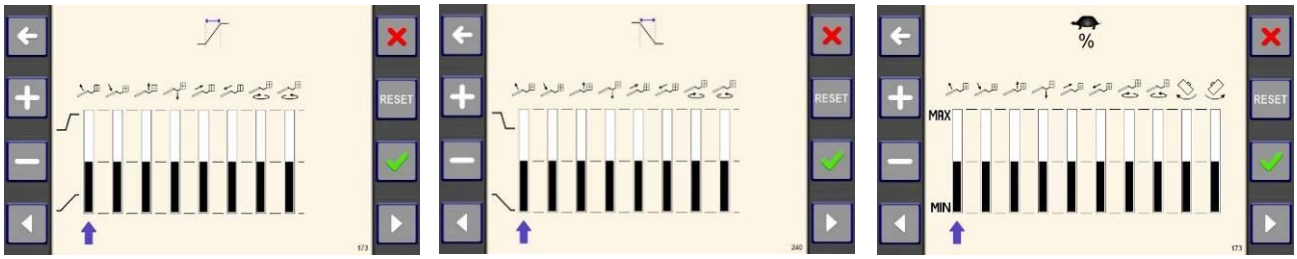
3.14.4.10 'Adjustment of ramps and deceleration' description

The settings are made in the PIN-protected area; see section 3.14.4.9 above.

Launching **'Start ramps' / 'Brake ramps' / 'Slowing down' function:**



Start ramp **Brake ramp** **Deceleration**



- Using the **F4 and F8 keys**, **select the respective function**, for which the 'Start ramp' / 'Brake ramp' / 'Slowing down' is to be changed.
  - ➢ The selected function is depicted by the blue arrow.

- Using the **F2 and F3 keys**, you can then **change the settings**.
  - Increase the figures => harder ramps / higher speed
  - Lower the figures => softer ramps / lower speed

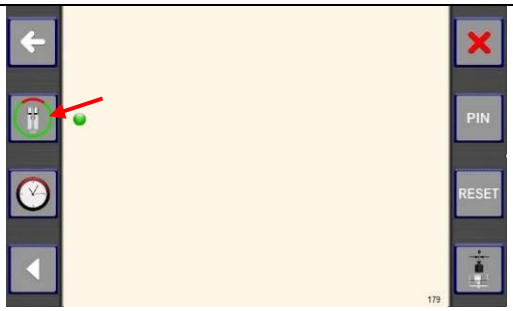
- **Save** the new figures: confirm using key **F7**
- **Reset** the figures to **factory settings**: simultaneously press **F6 + F7**.

3.14.4.11 Block driver's cab area

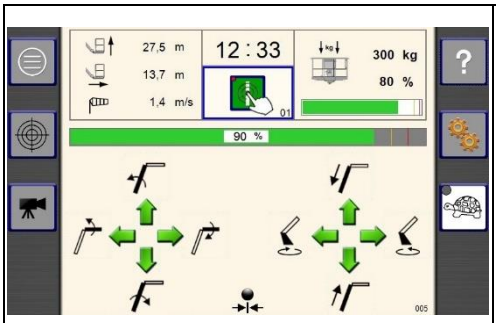
By activating the **'Block driver's cab area'** function, the area above the cab gets completely blocked off, thus preventing it from suffering any damage.
The settings are made in the PIN-protected area; see section 3.14.4.9.

Launch **'Driver's cab area'** function:

***Selection window 179** opens*

	*- Press the DRIVER'S CAB AREA*  *button* *=> Driver's cab area gets blocked off*

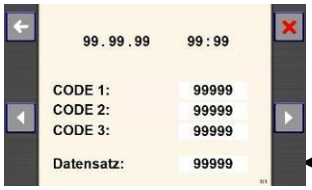
3.14.4.12 Description of the ‘Memory’ sub-menu



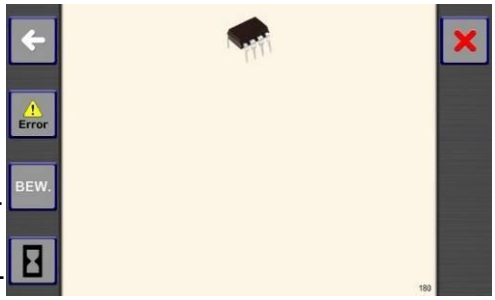
- Switch from main window 005 to QUERY MENU window 120

- *Press the MENU*  *button*
  => Query menu window 120 opens

- *Press the MEMORY*  *button*
  => MEMORY window 180 opens



List of error codes 181



Memory 180

Operating hours / inspection 183

Movement monitoring 182

3.14.4.13 For the meaning of the error code refer to PALCODE app

- The fitter/inspector must investigate the cause of any fault to a Palfinger lifting platform.

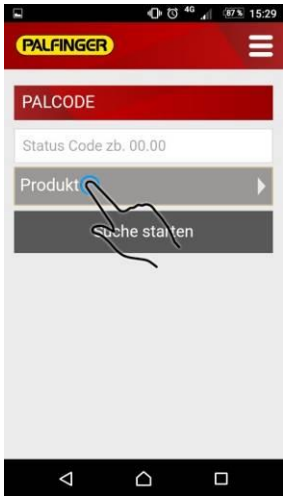
PALCODE app

Palfinger Mobile QR Apple

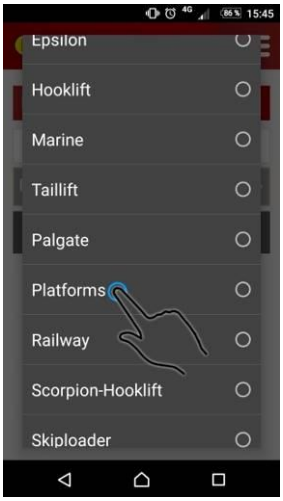
Palfinger Mobile QR Google

1.

2.

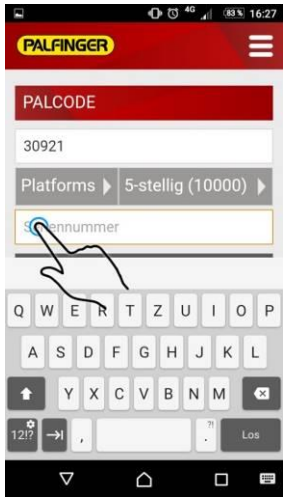


3.

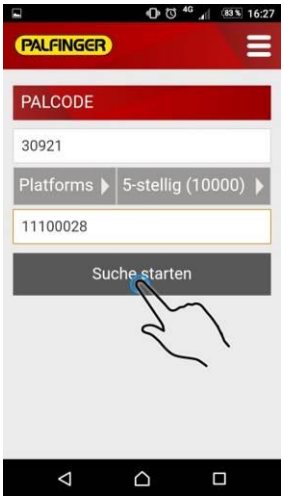


4.

5.



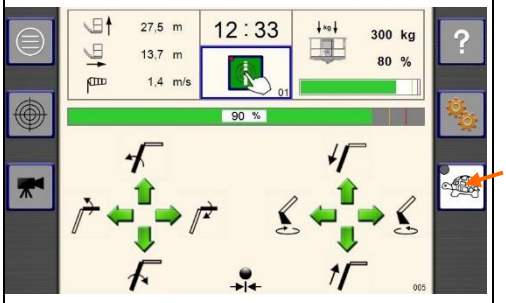
6.



- If the cause is unclear, then further inspections should be initiated, if appropriate, or PALFINGER Technical Service should be consulted. If the cause of any fault or damage is unknown, operating the PALFINGER lifting platform is not permitted!

3.14.4.14 ‘Hare / Tortoise’ menu function

Using the ‘Hare / Tortoise’ menu function, you are able to reduce the general speed of movement / increase it back up to 100%.



Main window 005 is open:

- Press ‘HARE / TORTOISE’  *button => all platform functions now get performed at the previously defined reduced speed (see 3.14.4.10, image 173)*

➢ *LED becomes red* 

- Press ‘HARE / TORTOISE’  *button => all platform functions now get performed at normal speed (100%)*

➢ *LED went out* 

3.14.4.15 Warning sound during downward movements

With the **'Warning sound during downward movements'** function enabled, an audible signal is sounded whenever the lifting equipment is moving down.

Launch **'Warning sound during downward movements'** function:

Main window 005 is open:  ***window 130** opens*

- Press WARNING SOUND DURING DOWNWARD MOVEMENTS button

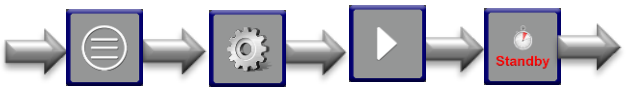
=> audible signal during downward movements of the platform

3.14.4.16 Dead man time setting

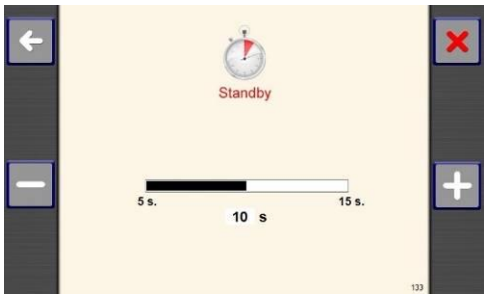
With the **'Dead man time setting'** function activated, you can set the dead man time within the range 5-15s.

Default: 10s

Launching the **'Dead man time setting'** function:

Main window 005 is open: 

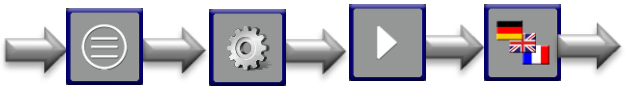
***window 133** opens*

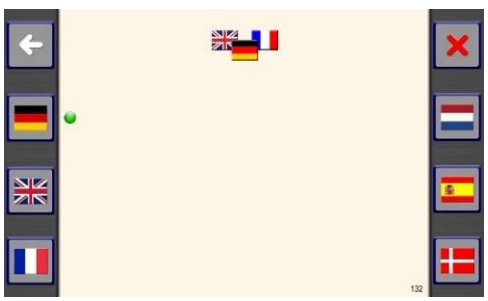
	*- By pressing the + and − buttons, set the desired dead man time*

3.14.4.17 Change language

By activating the **'Languages'** function, it is possible to select the desired display language.

Launch **'Language'** function:

Main window 005 is open: 
***window 132** opens*

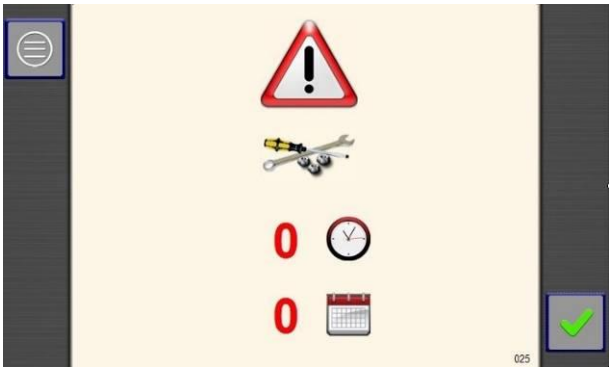
	*- By pressing the corresponding button, set the desired language*

3.14.4.18 Inspection key

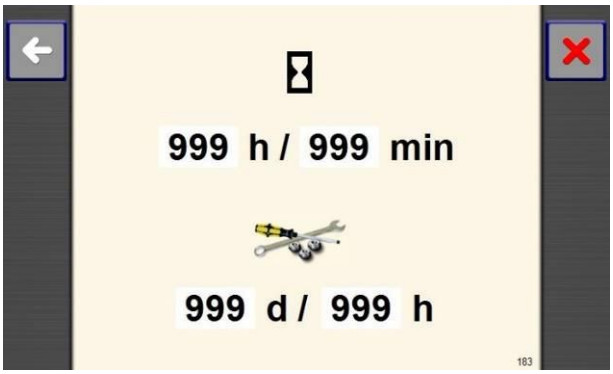
50 working hours or 30 days before a scheduled service, screen 024 (shown below) appears for 3 seconds on the display after you switch from support operation to lifting gear operation:

Operating hours are counted for as long as the hydraulic system is being pressurised by the auxiliary drive, HATZ or electric generator.

After expiry of the time interval, display 025 (below) appears. This has to be acknowledged by pressing the button marked by the green checkmark:



The service deadlines can also be viewed at any time on display screen 183:



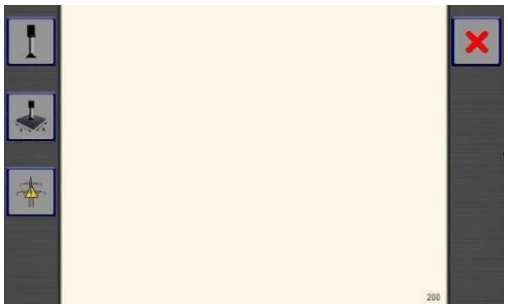
3.14.4.19 Help menu

By pressing on the  symbol, switch from the main screen 005 to the 'Help menu' window screen 200.

Stabilisation help, screen 201

Support board calculator help, screen 202

Distance from live power lines help, screen 203



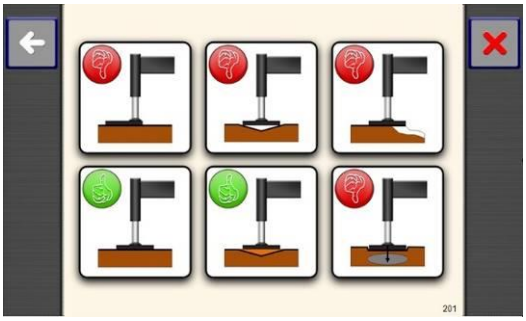


Image 201

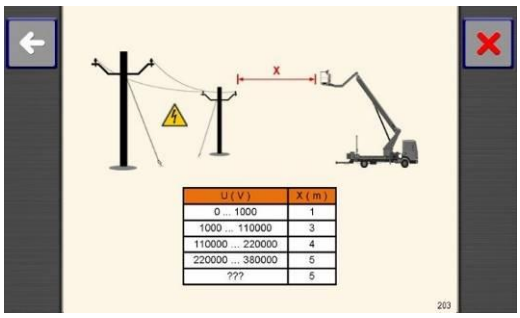


Image 203

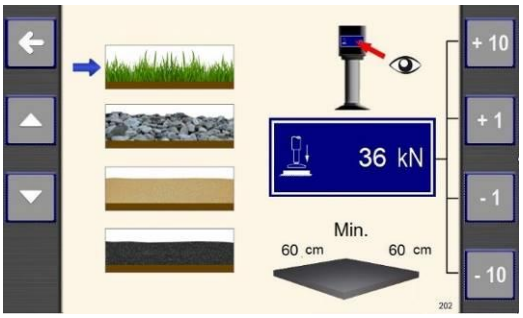


Image 202

You select the relevant ground type on the left-hand side on screen 202 and enter the stabiliser's supporting force. This aid then calculates for you how big the supporting board needs to be.

 Back to main image

3.15 LAYOUT AND FUNCTIONS OF THE BASE DISPLAY UNIT'S CONTROL PANEL

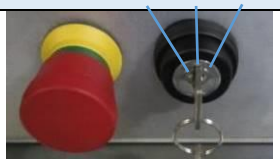
3.15.1 General layout

The lifting platform is additionally equipped with a display in the electrics box (X1) on the base unit on the left side of the vehicle. This enables the lifting platform to be controlled (including emergency operation), parameters to be identified more easily, information (sensor data and error codes) to be read and additional functions to be performed. It is technically ensured that control of the lifting platform is only ever possible from one control panel.

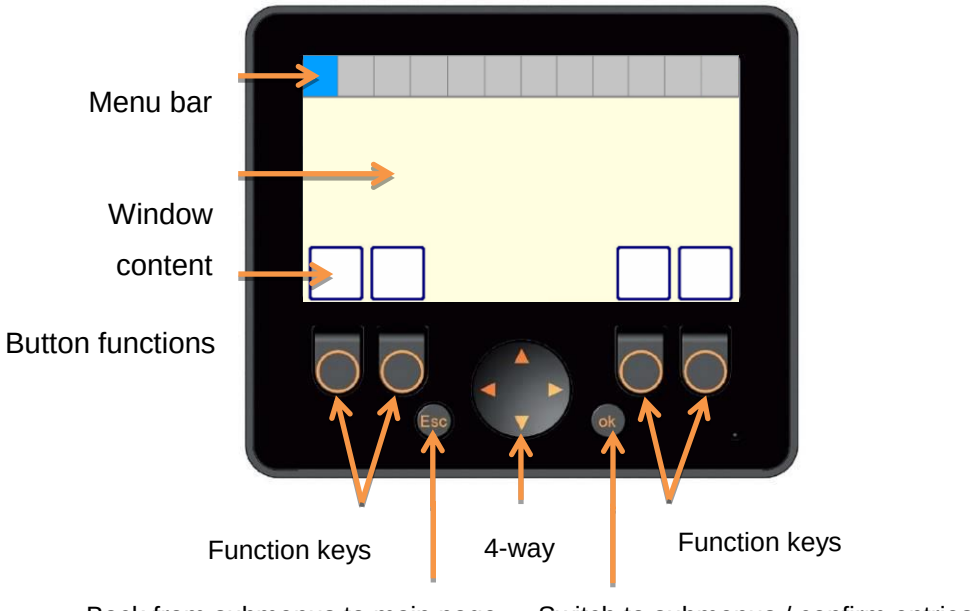
Note:

Lifting platform diagnosis and settings are possible from the base unit display at any time.

The following preconditions must be met for control from the base unit display:

Key-operated switch *(in the electrics box on the left side of the vehicle)* **I 0 II** 	
0 Normal operation	**I Emergency operation**
• Set key-operated switch to position **'0'** and • enable the base display unit: - *Press the **'Esc'** and **'OK'** buttons for **1s***	• Set key-operated switch to position '**I**' • There must be no secondary control unit plugged in.

➢ **When the electric box (X1) is closed, the base unit display gets automatically deactivated.**



Menu bar: contains the available menu items. The menu item currently selected has a blue background.

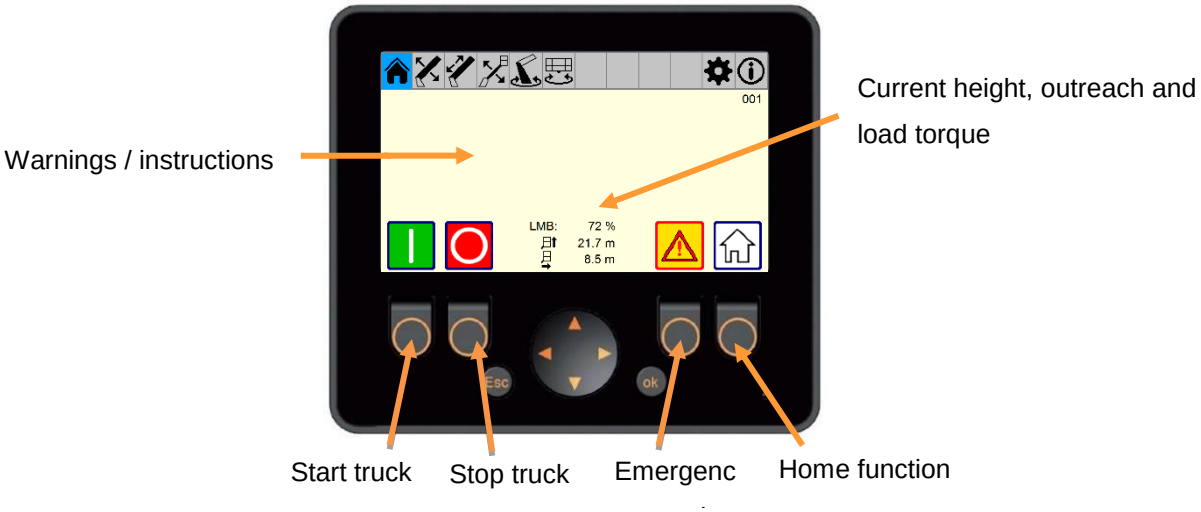
➢ Switching between menu items is done using the 4-way rocker switch by pressing ◀ or ▶ .

Window content: Representation of information relating to the current menu item

Button assignment: identifies the function of the respective button dependent on the menu item

3.15.2 Main window

Shown on the main screen are all key items of information for the lifting platform.



Warnings/instructions:


Power take-off is not engaged


Diesel reserve


Battery voltage too low


Valves' flap open


Emergency cut-off active


Start motor


The parking brake must not be pulled


Cab door open

Oil warning


Error present


Height limitation enabled

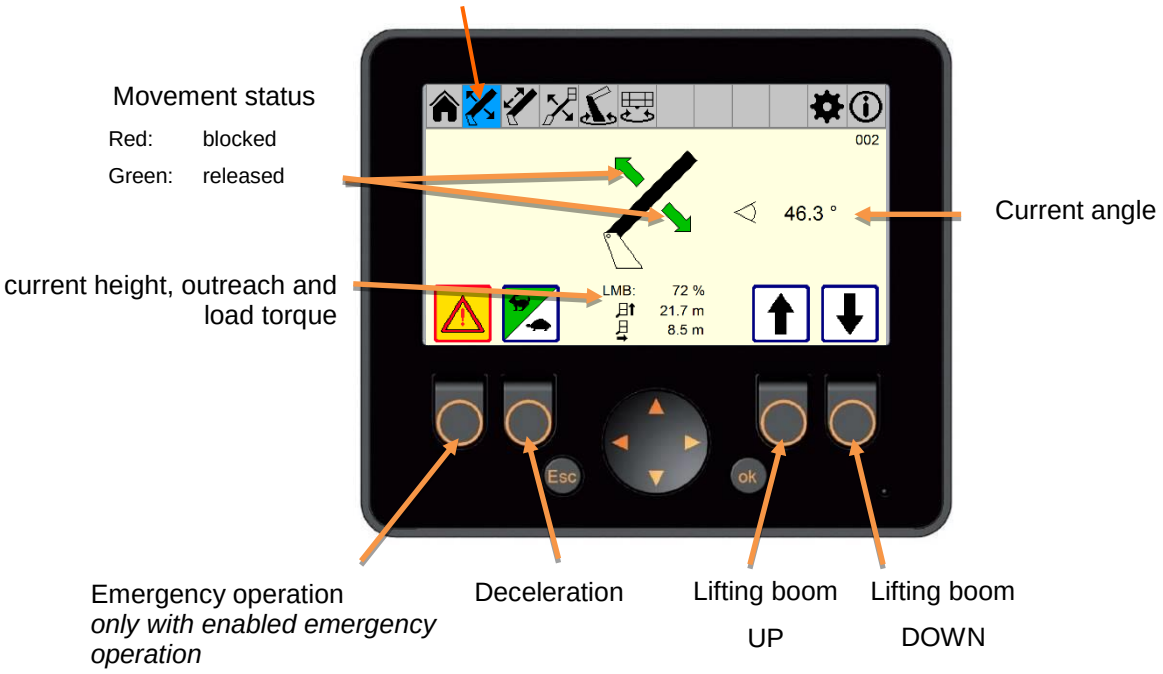
➢ Press the 'Home function' button => lifting equipment inclusive of support equipment moves into transport position.

➢ With emergency operation enabled and the 'Emergency mode' button pressed, it is possible to perform an emergency lowering and levelling of the lifting platform. For how to do this, see section 4.5.3 'Emergency operation from the base unit display'.

3.15.3 Lifting boom window

❖ This window is where the movement of the LIFTING BOOM is controlled.

➢ From the menu bar select the ‘Lifting boom’ symbol via 4-way rocker switch.



➢ Press the respective movement button => the lifting boom can be moved within the permissible limits.

➢ Press the 'Slow down' button => the movement speed gets reduced.

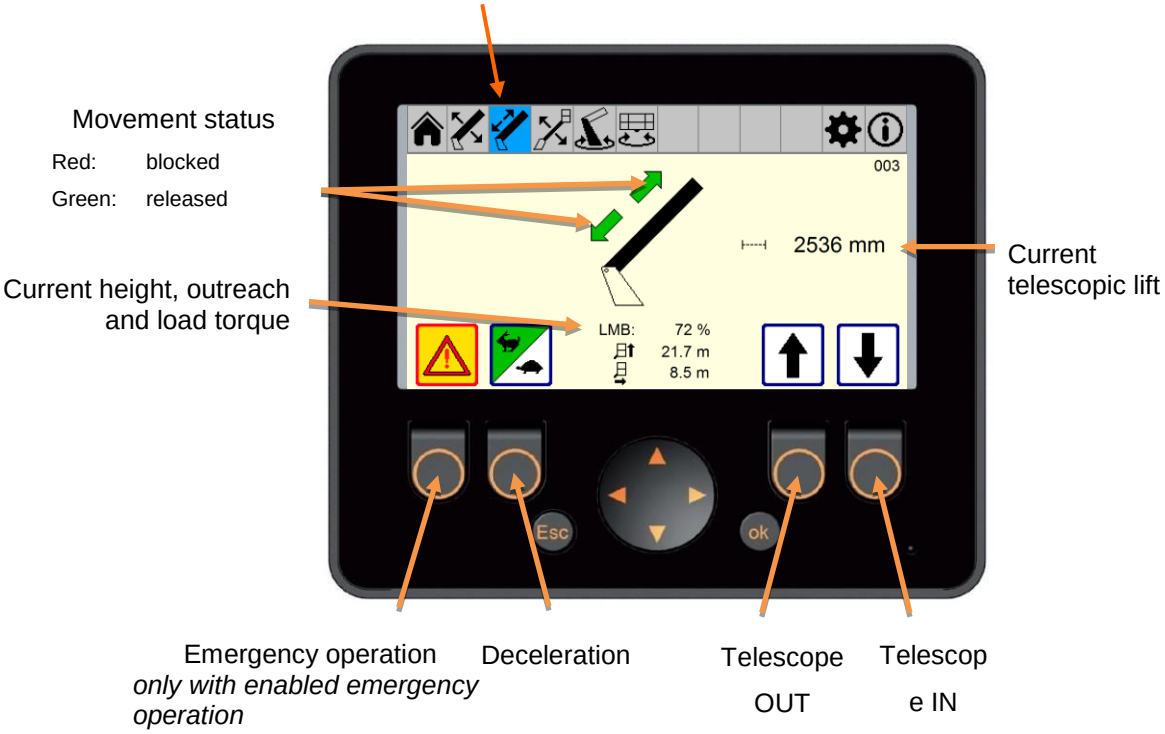
In the event of a fault, it is possible with emergency operation activated and by pressing the 'Emergency mode' button to use the movement buttons to operate the lifting boom in emergency mode.

When moving the lifting boom using emergency operation, the load torque limitation and the geometric limitations are disabled!
The following is additionally shown as a warning:

3.15.4 Telescope window

❖ This window is where the movement of the TELESCOPIC BOOM is controlled.

➢ From the menu bar select the ‘Telescope’ symbol via 4-way rocker switch.



➢ Press the respective movement button => telescopic boom can be moved within the permissible limits.

➢ Press the 'Slow down' button => the movement speed gets reduced.

In the event of a fault, it is possible with emergency operation activated and by pressing the 'Emergency mode' button to use the movement buttons to operate the telescopic boom in emergency mode.

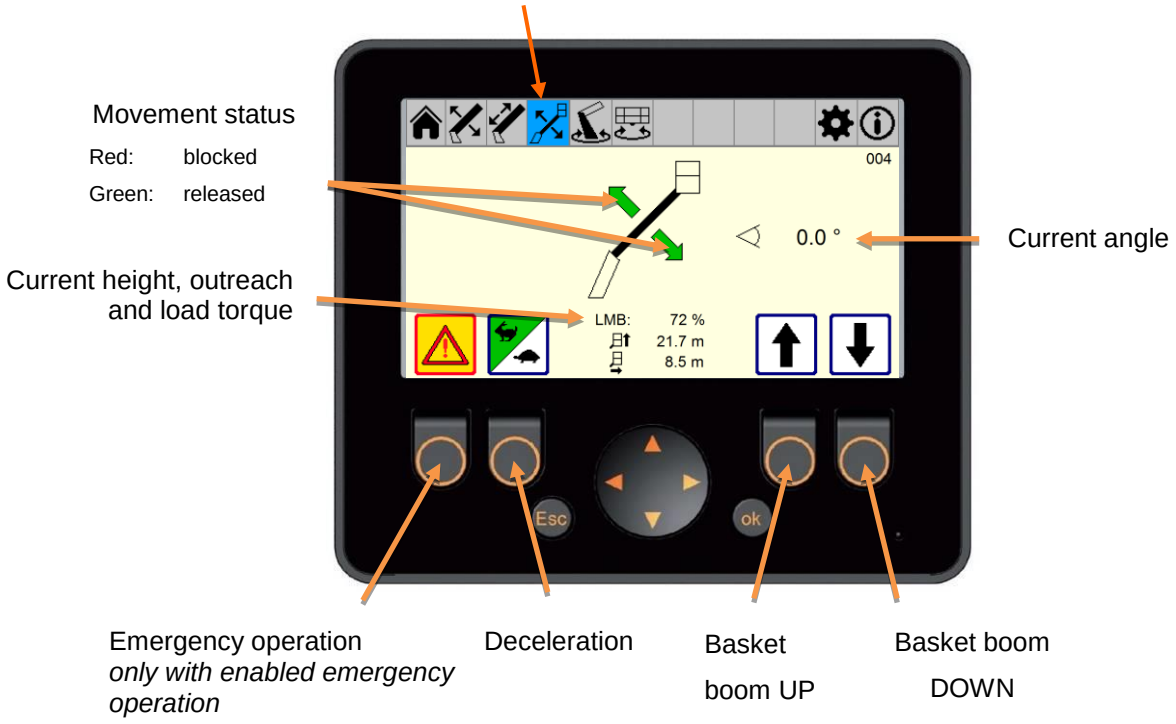
When moving the telescopic boom using emergency operation, the load torque limitation and the geometric limitations are disabled!

The following is additionally shown as a warning:

3.15.5 Basket boom window

❖ This window is where the movement of the BASKET BOOM is controlled.

➢ From the menu bar select the ‘Basket boom’ symbol via 4-way rocker switch.



➢ Press the respective movement button => basket boom can be moved within the permissible limits.

➢ Press the 'Slow down' button => the movement speed gets reduced.

In the event of a fault, it is possible with emergency operation activated and by pressing the 'Emergency mode' button to use the movement buttons to operate the basket boom in emergency mode.

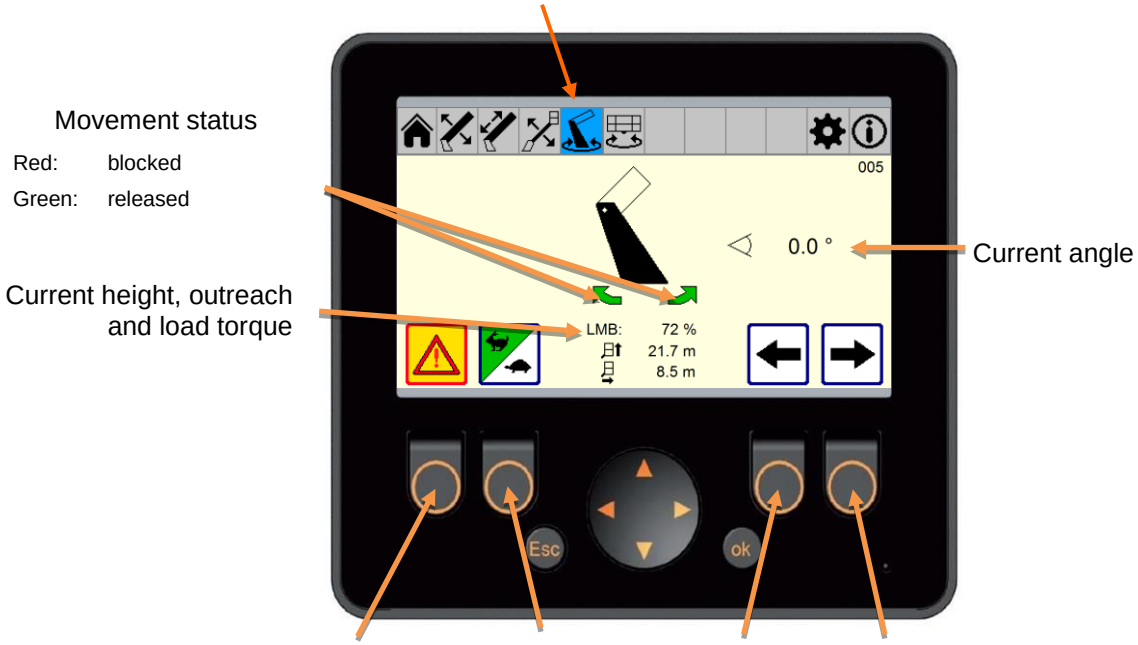
When moving the basket boom using emergency operation, the load torque limitation and the geometric limitations are disabled!

The following is additionally shown as a warning:

3.15.6 Slewing window

❖ This window is where the SLEWING movement is controlled.

➢ From the menu bar select the ‘Slewing’ symbol via 4-way rocker switch.



➢ Press the respective movement button	=> slewing tower can be moved within the permissible limits.
➢ Press the 'Slow down' button	=> the movement speed gets reduced.

In the event of a fault, it is possible with emergency operation activated and by pressing the 'Emergency mode' button to use the movement buttons to operate the slewing tower in emergency mode.

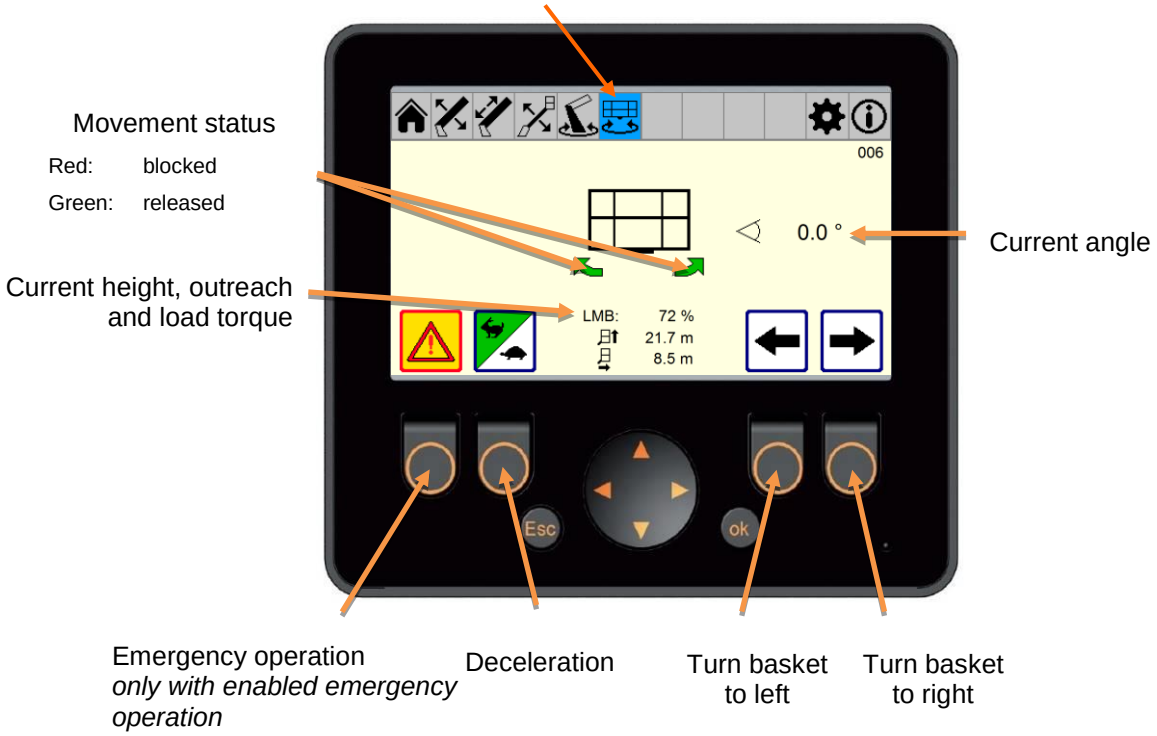
When moving the slewing tower using emergency operation, the load torque limitation and the geometric limitations are disabled!

The following is additionally shown as a warning:

3.15.7 Basket rotation window

❖ This window is where the BASKET ROTATION movement is controlled.

➢ From the menu bar select the ‘Basket rotation’ symbol via 4-way rocker switch.



➢ Press the respective movement button => basket can be moved within the permissible limits.

➢ Press the 'Slow down' button => the movement speed gets reduced.

In the event of a fault, it is possible with emergency operation activated and by pressing the 'Emergency mode' button to use the movement buttons to operate the basket in emergency mode.

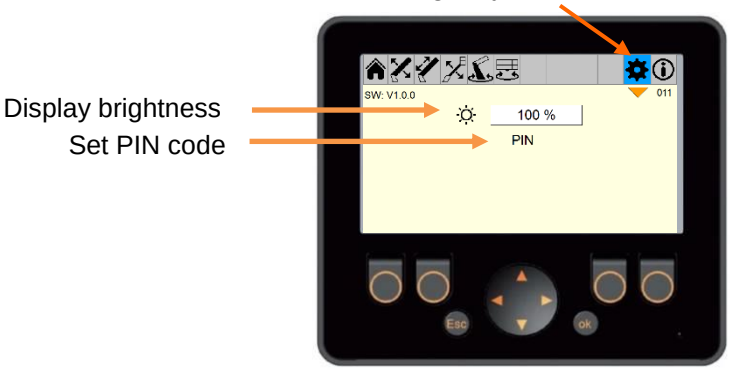
When moving the basket using emergency operation, the load torque limitation and the geometric limitations are disabled!

The following is additionally shown as a warning:

3.15.8 Settings

❖ On this screen you are able to make various adjustments for the device.

➢ From the menu bar select the ‘Settings’ symbol via 4-way rocker switch.



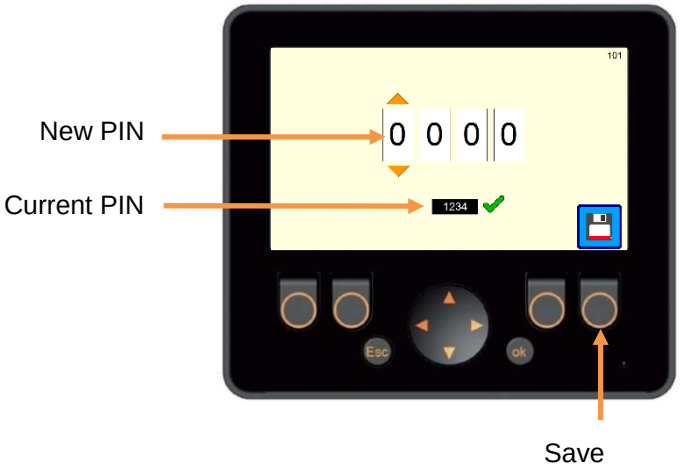
- Selecting the respective setting is done using the 4-way rocker switch by pressing ▼ or ▲ .

Setting display brightness

The display brightness can be set within a range of 10-100%.

It is set using the 4-way rocker switch by pressing ◀ or ▶ .

Changing the PIN code



- Selecting the point is done using the 4-way rocker switch by pressing ◀ or ▶.
- You use the ▼ and ▲ buttons to change the respective value.
- By pressing the 'Save' button you accept the new PIN.

➢ You can see that it has been successfully saved from the green tick.

If after the settings are made in the PIN-protected area a minute passes with no button being pressed on the display, the enabled PIN area gets automatically disabled again.

3.15.9 Info screen

❖ This screen shows information on error codes and the lifting platform's sensor data.

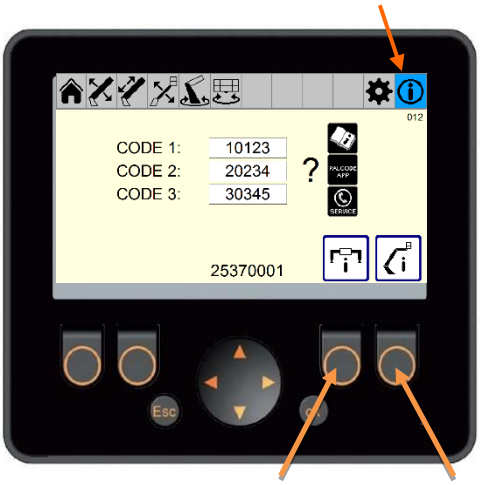
➢ From the menu bar select the ‘Information’ symbol via 4-way rocker switch.

➢ By using the respective function keys, you are able to switch between the relevant screens.

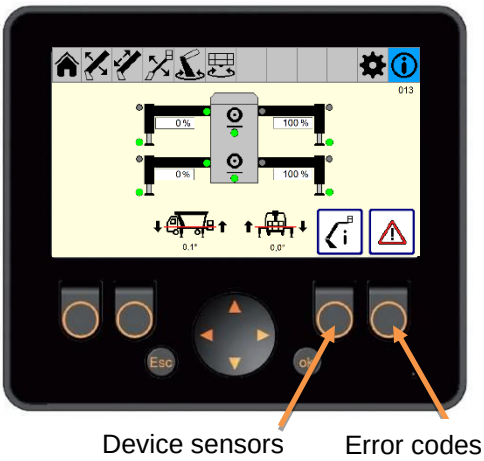
Error codes 

Stabiliser  sensors

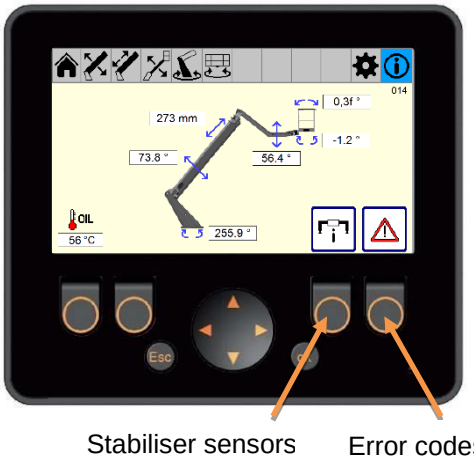
Device sensors 



Stabiliser sensors



Device sensors



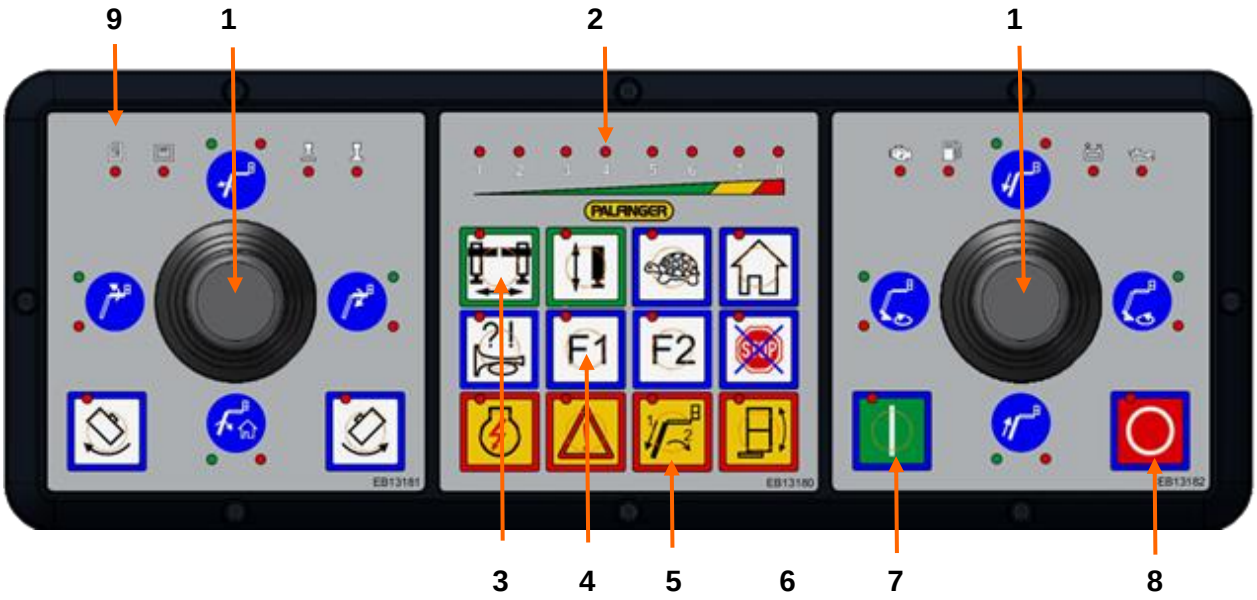
3.16 LAYOUT AND FUNCTIONS OF SECONDARY/EMERGENCY CONTROL PANEL

3.16.1 General set-up

All operating and display elements are clearly laid out on the control panel.

The panel consists of the following components:

Component	***Function***
(0) Key switch	Switch to secondary control panel - **(II)** *(Key-operated switch in the electrics box on the left side of the vehicle)*
(1) Joysticks	Control of the support equipment / device controls
(2) Bar graph / error code	Indicates the increase and decrease in the load torque / error code display
(3) Green-white buttons	Activate the functions for the support equipment
(4) Blue-white buttons	Functions for device operation and additional functions
(5) Red-amber buttons	Emergency control functions
(6) Emergency off pushbutton	Instant shut-off in an emergency
(7) Motor start	Start the vehicle motor
(8) Motor stop	Stop the vehicle motor
(9) LED indicator	Indicates the operating states

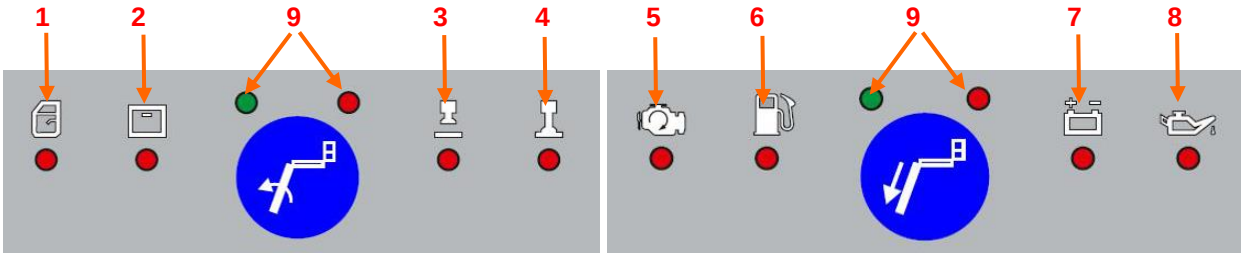


Secondary control panel / emergency control panel

The control panel may under no circumstances

- Be exposed to a steam cleaner/high pressure cleaner
- Be subject to excessive or permanent sunlight
- Be worked with spatulas, knives or other tools - danger of damage!

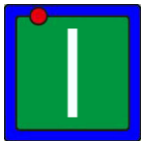
3.16.2 LED indicators



LED	***Indicator is on***
(1)	**Driver's cab is open. Risk of collision!**
	⇨ *Functions for operating the support equipment have not been enabled*
(2)	**'Emergency control' flap (hydraulic valves) is open** or
	'Electrics box' flap is open
(3)	**Outriggers and stabilisers are in the transport position**
(4)	**Stabilisers have ground pressure**
(5)	**Motor is off (joystick deflected)** => operator must start motor
(6)	**Diesel level - reserve**
(7)	**Battery state of charge too low**
(8)	**Oil filter clogged up or oil temperature too high**
(9)	**LED glows green** 🟢 **respective device movement is enabled**
	LED glows red 🔴 **respective device movement is blocked**

3.16.3 Meaning of the buttons/switches:

Essential functions:

	The **I** button (*MOTOR START*) starts the vehicle's motor. It is also possible to reset the PLC. When the motor is running the ignition is locked to prevent a restart.

If the vehicle is fitted with an internal electronic starter mechanism, a motor *START/STOP* can only be repeated after 5 seconds.

	The **O** button (*MOTOR STOP*) switches the vehicle's motor off.

When the vehicle's motor is switched off, it continues to use electricity, as the ignition on the carrier vehicle is still switched on. Therefore always monitor the battery's state of charge.

	Pressing the *EMERGENCY CUT-OFF* button will bring the lifting platform to an immediate standstill.

The joysticks and the buttons on the control panel are disabled whenever the emergency cut-off button is pressed. Emergency operation from the control panels in the workman basket and from the base is not possible. **The emergency cut-off button can only be pressed in an emergency!**

Additional functions

By holding down the *BYPASS* button it is possible to deactivate an operational shut-off and to initiate the desired movement by carefully operating the joystick.
Risk of collision!
It is your responsibility to control the lifting platform!

With the *CALL* button signals can be issued for the people at the workman basket panel or secondary panel to communicate with the driver's cab and vice versa.
Personnel should reach agreement over the meaning of the signals.

BAR GRAPH(indicates the increase and decrease in the load torque)
Scale for reading the load torque (1 min-> 8 max->

LED ERROR CODE
The *error code* button must be pressed to switch the LED display from 'bar chart' mode to 'LED error code'.

By pressing the *ERROR CODE* button, it is possible to show/view the following on the display:

a) when the LED is out, the last error that occurred
b) when the LED is flashing, the error code

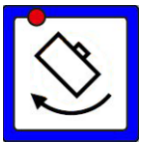
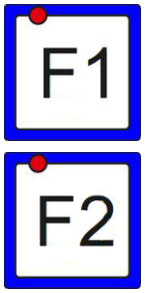
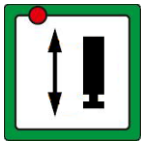
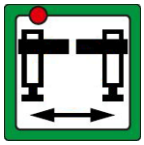
Activate the *HOME* function by pressing the button.

- The relevant joystick movement initiates the device movements

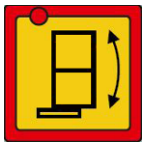
- first the lifting equipment moves into the home position
- and then the support equipment into the transport position.

Danger of collision where there are obstacles!

Pressing the *TORTOISE BUTTON* slows down the movements of the lifting platform.
- Activate slow drive => Press button => LED on
- Deactivate slow drive => Press button => LED off

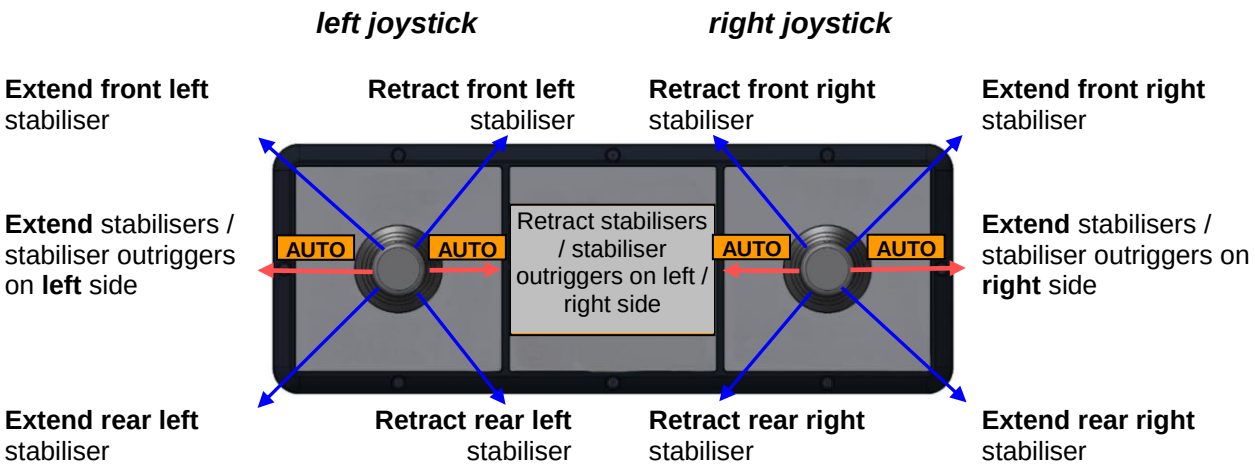
	By pressing the *BASKET LEFT* button the workman basket turns to the left. **The lifting boom must be raised to the minimum height to turn the basket!**
	By pressing the *BASKET RIGHT* button the workman basket turns to the right. **The lifting boom must be raised to the minimum height to turn the basket!**
	Optional functions, depending on platform equipment
	Pressing the *STABILISER OPERATION* button activates operation for the vertical stabilisers
	Pressing the *STABILISER OUTRIGGERS* button activates operation for the stabiliser outriggers

Emergency control functions

	(OPTION): An *ELECTRICAL EMERGENCY PUMP* can be started, if there is no longer any hydraulic energy supplied from the vehicle's motor (power take-off). Use the electrical emergency pump only to lower the lifting platform (battery discharge).
	You use the *WARNING* button to switch the lifting equipment to emergency operation. **The safety shut-off mechanisms are disabled. Risk of accident!** ***In emergency operation all platform movements can be made only by pressing the***  ***button at the same time!***
 	The *EMERGENCY LEVELLING* button will raise the workman basket into a horizontal position, if the automatic control is not working.
 	With the *EMERGENCY LOWERING* button the lifting platform can be lowered if it is not possible to move it using the joysticks. *1.) Telescopic arm moves fully in* *2.) Basket boom gets lowered* *3.) Lifting boom gets lowered* ***Using the 'Emergency lowering' function, the operator is able to bring the basket safely down towards the ground.***

3.16.4 Joystick configuration on secondary / emergency panel

Joystick configuration for stabilization

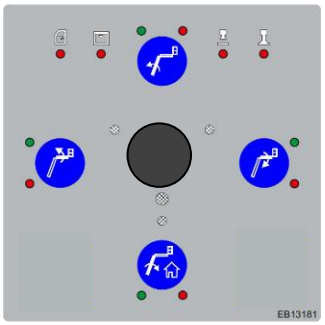


Joystick functions for device operation

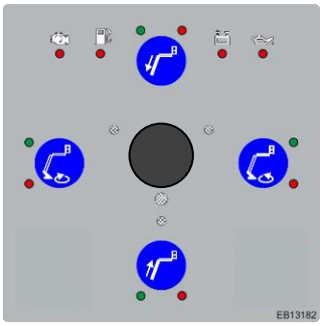
	Basket boom UP		Telescope OUT
	Basket boom DOWN		Telescope IN
	Lifting boom UP		*Clockwise slewing*
	Lifting boom DOWN / Home function		*Anti-clockwise* slewing

Standard joystick assignment for device operation (can be changed as desired by customer):

left joystick



right joystick



3.16.5 Connect secondary/emergency control panel

- Remove the dummy connector on the chassis and plug in the connector from the electric secondary/emergency control panel.

  - ➢ All connections should only be made when the system is isolated from the mains
    - Turn off the ignition
    - Plug in secondary/emergency control panel
    - Turn on the ignition

- Check of emergency cut-off function by actuating the emergency cut-off button on the secondary control panel.

  <u>The secondary control panel must not be taken into service if the safety equipment does not respond!</u>

3.17 ENABLING THE CONTROL POINTS

- The individual control points are enabled only when the key is in the relevant position
  - ➢ The key-operated switch is in the electrics box on the left side of the vehicle.

Position I => **Emergency operation**
Secondary control panel (optional) / base unit display
Position 0 => **Platform / stabilisation operation**
Basket control panel / base unit display
Position II => **Secondary operation**
Secondary control panel (optional)

- A lock ensures that the lifting platform can always be operated only from **one** control panel.

- Control from the base unit display in normal operation is possible only if the key-operated switch is in position 0 and the display is enabled by pressing the 'ESC' and 'OK' keys for 1 second.

- Emergency operation from the base unit display is possible only if **no secondary control unit** has been plugged in.

  - ❖ When the X1 box is closed, the base unit display gets automatically deactivated.

3.18 SET-UP AND DESCRIPTION OF HOW IT WORKS - DISPLAY IN DRIVER'S CAB

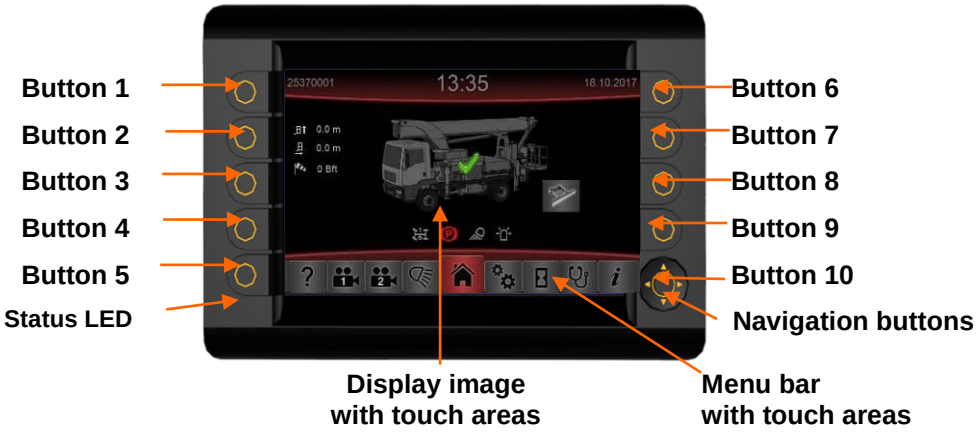
3.18.1 General

The display in the driver's cab aids monitoring the working platform during road transport. Shown on the display are all pieces of working platform information of importance to the driver and a range of control options.

Note: Its installation mean there is no longer any need for the otherwise usual display elements and switches on the carrier vehicle's dashboard.

3.18.2 Display module layout

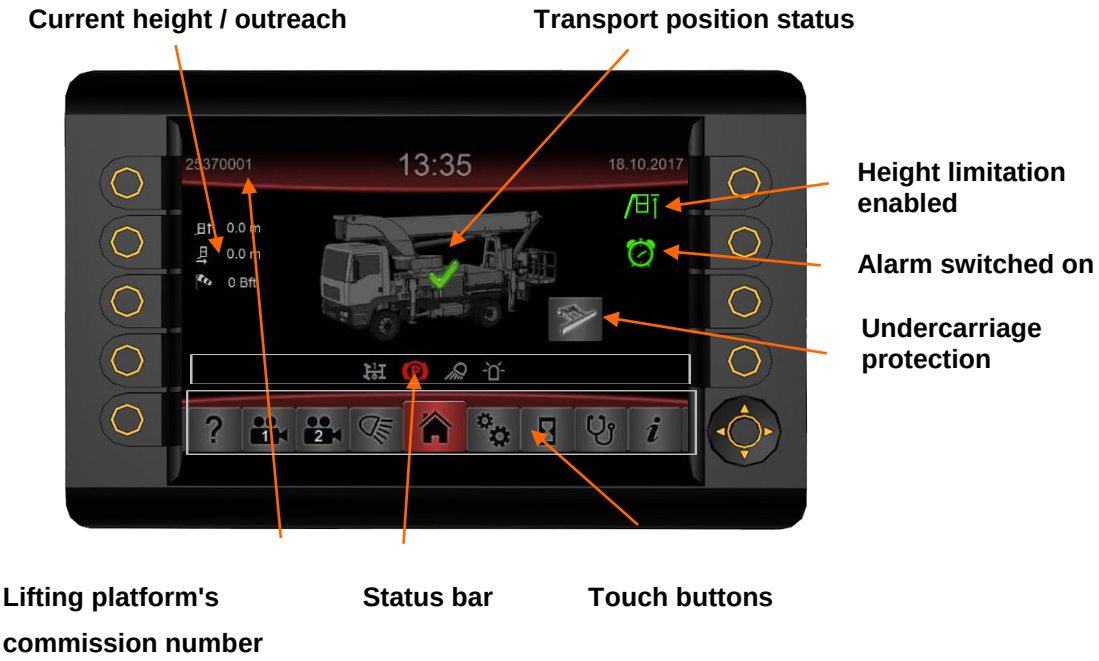
The display screen is equipped with a touch function. Many functions can thus be directly accessed by pressing on a symbol.



Menu bar functions

- Switching to help screen
- Activating rear view camera
- Activating additional camera (optional)
- Switching to lighting screen
- Switching to main screen
- Switching to settings screen
- Launch of operating hours counter
- Switching to diagnostics screen
- Switching to information screen

3.18.3 Overview and structure – Main screen



Functions

 Switching to screen for hydraulic undercarriage protection

 Switching to status screen

Status bar

The main screen's status bar shows the following information:

 Platform lighting switched on

 Rotating beacon switched on

 Power take-off engaged

 Parking brake pulled

Driver call

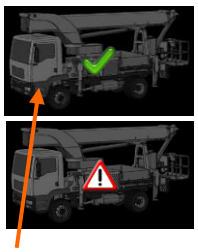
The signalling of any driver call occurs on the display.

When the 'Driver call' button is pressed on one of the control panels, an audible signal is sounded.

This gets simultaneously shown in visual form on the display.

Platform information

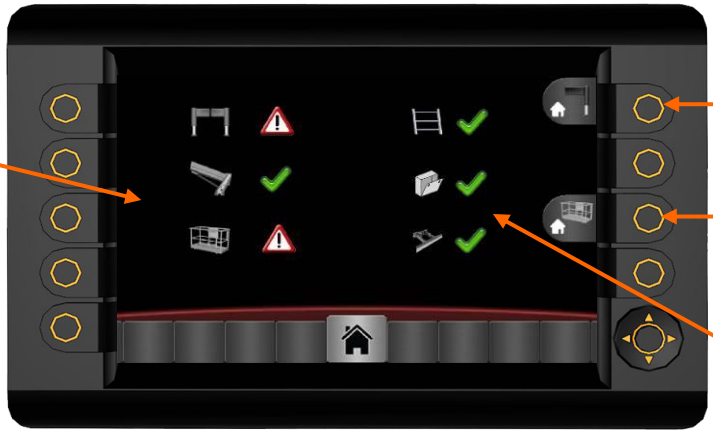
Shown on the main screen is the status relating to the platform's transport position (TPS):



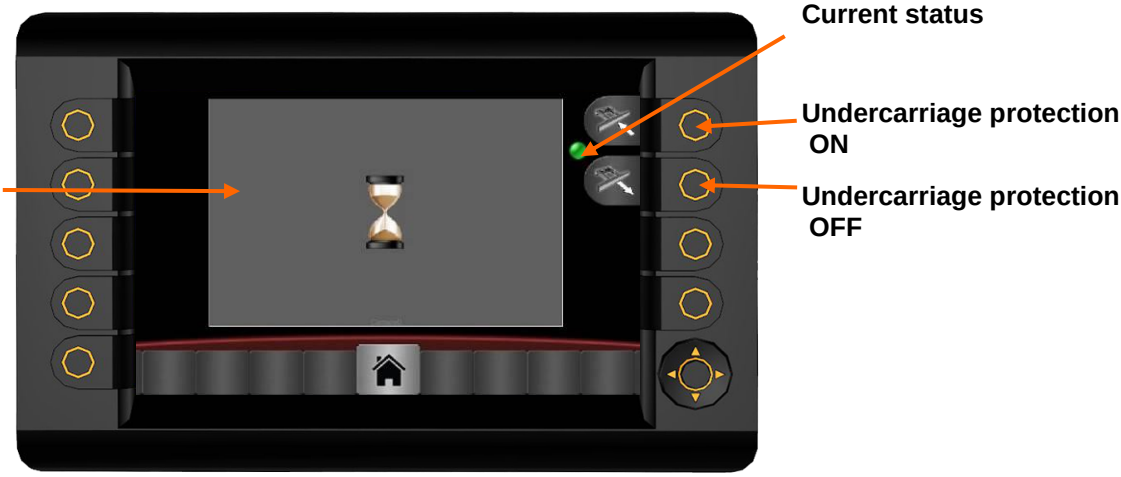
Vehicle is in transport position

Vehicle is **not** in transport position

Press on the truck ➔ Switches to detailed transport position monitoring.



3.18.4 Control of undercarriage protection



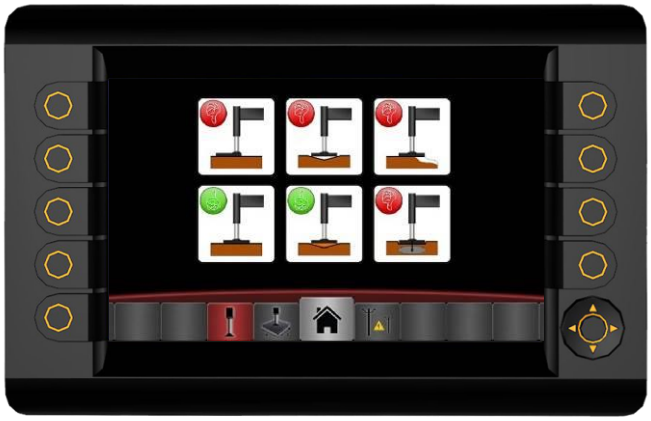
The current status of the undercarriage protection indicates as follows:

- Red: Undercarriage protection retracted
- Yellow: Undercarriage protection is in intermediate position
- Green: Undercarriage protection extended

3.18.5 Help menu

By pressing on the  symbol, switch from the main screen to the ‘Help menu' window

- You launch the individual functions by touching the relevant button.



 Back to main image

 Stabilisation help page

 Distance to live power lines - help page

 Support board calculator help page

Support board calculator 

You select the relevant ground type on the left-hand side and enter the stabiliser's supporting force. This aid then calculates for you how big the supporting board needs to be.

3.18.6 Settings menu

Menu bar functions

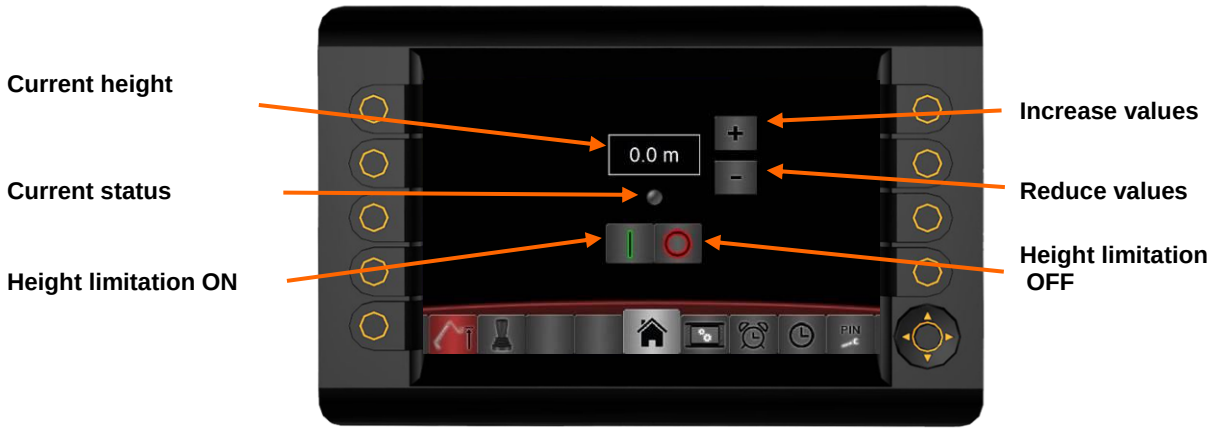
- Setting of height limitation
- Joystick configuration
- Display settings
- Setting of alarm
- Date/time setting
- Change PIN

3.18.6.1 Height limitation

The settings for height limitation are protected by a PIN in order to prevent any unwanted changes.

In order to perform any settings:

- Press button
- Then enter the correct PIN and confirm.



Using the + and − buttons, set the desired height for the limitation.
Using the | and ○ buttons, activate/deactivate height limitation.

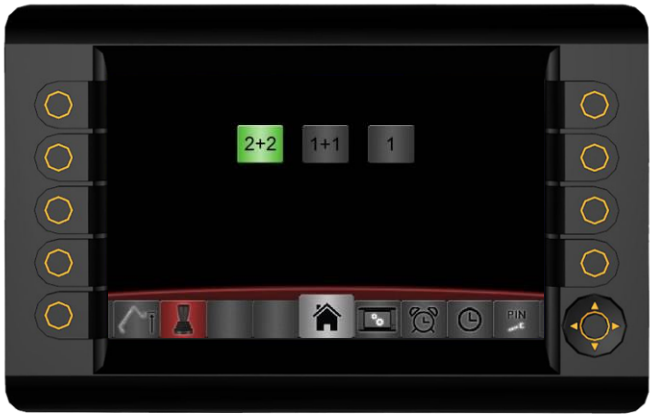
- ➢ The current status gets displayed.
- ➢ If height limitation is activated, this gets additionally shown on the main screen with details of the height set displayed. 35.0 m

3.18.6.2 Joystick configuration

The settings for joystick configuration are protected by a PIN in order to prevent any unwanted changes.

In order to perform any settings:

- Press  button
- Then enter the correct PIN and confirm.

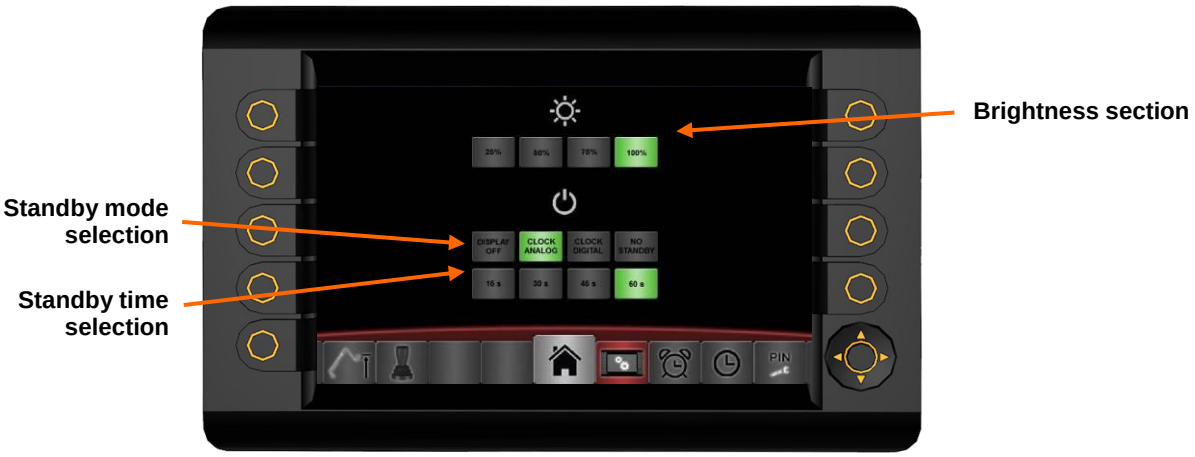


Using this function, you are able to select the number of simultaneous movements.
Possible options are:

2+2	all 4 movements can be run simultaneously
1+1	one movement can be run per joystick
1	only one movement can be run

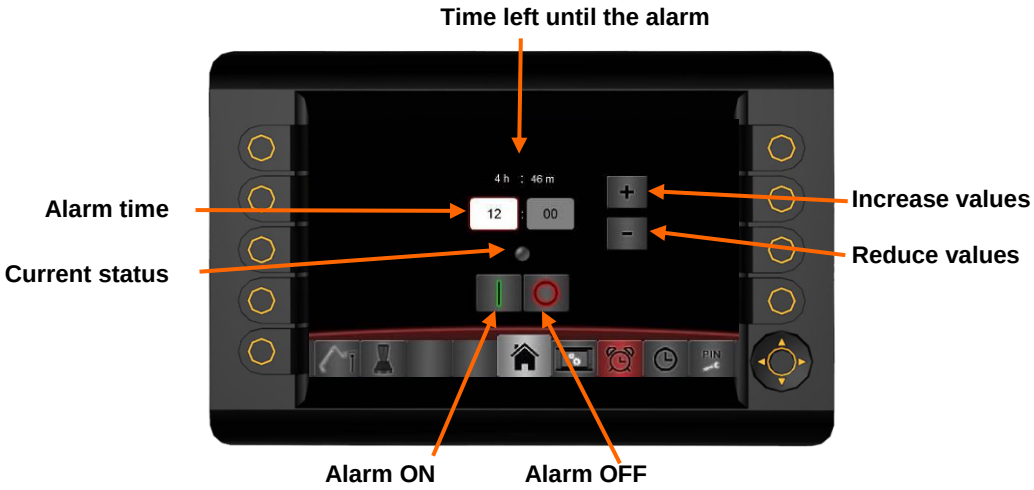
If the number of movements is limited, the movement instigated first always takes priority. The other movements are disabled.
The joystick must be brought into the neutral position in order to trigger a new movement.

3.18.6.3 Display settings



Display brightness:	25 / 50 / 75 / 100% can be set	
Standby:	DISPLAY OFF	- Display gets completely switched off
	ANALOG CLOCK	- Time as an analogue clock
	DIGITAL CLOCK	- Time as a digital clock
	NO STANDBY	- Display always remains on.
Standby time:	15 / 30 / 45 / 60 sec. can be set	

3.18.6.4 Alarm



For changing the alarm time press the hours / minutes display buttons.

Using the + and − buttons, set the desired time for the alarm.

Using the | and ○ buttons, activate/deactivate the alarm.

- The current status gets displayed.
- If the alarm is activated, this gets additionally shown in the status bar on the main screen.

3.18.6.5 Set date / time

For changing the time press on the required value.

Using the + and − buttons, you can change the respective figures.

When you have finished, press the button to save the setting. You can see that it has been successfully saved from the green tick ✓.

3.18.6.6 Change PIN

Changing the PIN:

1. Press the button
2. Enter old PIN and touch the green tick to confirm ✓
3. Enter the new PIN (4-digit)
4. By pressing the button, save the new PIN.

⇨ Successfully saved => the field with the PIN gets a green background

3.18.7 Operating hours counter

Four operating hours counters are integrated in the display. A flashing green dot on the counter concerned indicates that it is recording.
The following can be recorded:

- Power take-off engaged (can be reset by Service only)
- Oil circulation (can be reset by Service only)
- Optional signal (can be defined by customers when ordering; can be reset by Service only)
- Customer operating hours counter (can be started, stopped and reset from the display itself)

➢ The customer operating hours counter is protected by a PIN.

Make changes:

- Press the button
- Enter the correct PIN and touch the green tick to confirm

Once the correct PIN has been entered, the following settings are possible:

	Activate operating hours counter
	Deactivate operating hours counter
RESET	Reset operating hours counter (>3 seconds)

3.18.8 Diagnostics menu

Menu bar functions

Oil diagnosis


Warnings / faults

J1939 diagnosis

Display diagnosis

Test display

3.18.8.1 Warnings / faults

- The 'Warning' screen displays any current fault codes from the platform control system. For more information on the faults indicated, refer to the operating instructions, use the PALCODE app or contact the Service team.

3.18.8.2 J1939 diagnosis

➢ This screen is used to diagnose communication between set-up control system and carrier vehicle via the J1939 bus.

- After the relevant carrier vehicle has been selected, the signals transmitted on the bus can be checked.

3.18.8.3 System information

➢ The following information is displayed on the diagnosis screen:

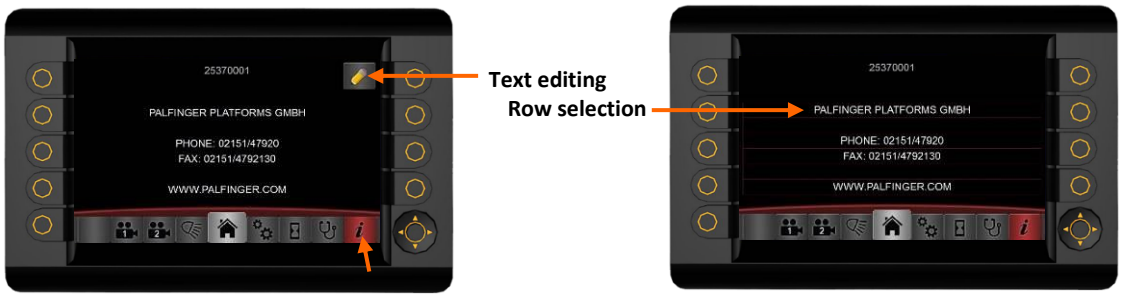
- Serial number of the device
- Ethernet configuration
- Components' firmware version
- Display's software version
- Application's software version
- Operating voltage
- System temperature

3.18.8.4 System test

➢ This diagnosis screen is used for checking the buttons and the display's touch function. As a check of the buttons lighting it is made to flash.

- Testing the touch function: Touch display
  - ➢ A yellow dot appears where you touched it
- Testing a button: press it
  - ➢ If the signal was recognised, this gets confirmed by the green dot in the corresponding button symbol.
  - ➢ Perform this test for every button.

3.18.9 Customised informative texts



Procedure:

- From the main menu bar select the required function *i.*
- Touch the editing button, the window opens where you enter the PIN. 
- Enter PIN and touch the green tick to confirm 
- Select the required text row and enter new text.

Control & emergency operation of the lifting platform

4 CONTROLLING THE LIFTING PLATFORM

4.1 TRAVEL BY ROAD

4.1.1 General principles

The following description applies to preparation for driving with the lifting platform on public roads in the Federal Republic of Germany.

Pay attention to any national regulations deviating from this in the territory where it is being used. Adhere to the traffic regulations and permissible total weight. Adhere to the permitted axle loads.

4.1.2 Preparing for travel by road

Prior to all road journeys with PALFINGER PLATFORMS lifting platforms, you must ensure that they are in the transport position.

This means:

- The boom system must be properly rested on the boom supports,
- all stabilisers completely retracted,
- all outriggers retracted
- the rear undercarriage protection folded out (see point 4.1.3)
- all blinds closed and
- all control panels covered / properly stowed away.

The control panel in the workman basket must be fixed to the basket railing (in the direction of travel) and sealed off with the panel cover provided so that the airflow does not blow it back, allowing water or dirt to get in.

If the working platform is not in the transport position, the platform may get damaged in transit and/or the external dimensions may be significantly different. **Risk of collision!**

- The sticker with details of clearance heights can be found on the windscreen. Example: Clearance height 3.4 m

The items mentioned below are captured by sensors and can be viewed via a **display in the cab** (see point 4.21):

- When travelling by road, the following indicators on the display **must come on** prior to departure:

Stabilisers in transport position

Device in transport position

- When travelling by road, the following indicators on the display **must be off** prior to departure:

Stabilisers not in transport position

Device not in transport position

If one of these indicators is on, stop the vehicle immediately and put the lifting platform in its transport position (see main screen of the display in the cab).

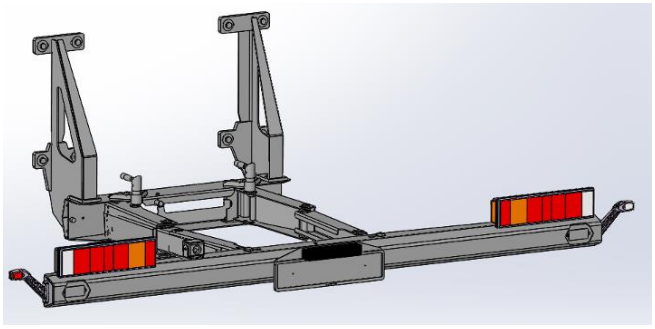
Safety instructions:

- Accessories and attachments (e.g. support boards) or loads on the platform must be secured against shifting or falling off.
- Chocks *) must be securely stowed away.
- Tools and accessories must be stored such that they cannot be lost.

Loads in storage boxes (loose, pointed parts, etc.) must be appropriately secured against unintentional movement. Pay attention to the maximum load the box is able to take!

- All work lights are to be turned off.
- The equipment box lighting's control lights must be off before the driving away.
- All equipment boxes must be properly closed.

4.1.3 Undercarriage protection when driving on roads



- When driving on roads, the rear undercarriage protection must be extended (folded out) and fixed in place by means of locking bolts (in the case of **variant a**).
- The ramp angle thus gets smaller.

Procedure for folding out the undercarriage protection:

a) mechanical operation by hand	b) hydraulic operation (optional)
❖ Undo the locking bolts on the rear undercarriage protection ❖ Extend the undercarriage protection and put the bolts back in ❖ Re-insert the securing pins	❖ Activate the 'Undercarriage protection' function from the driver's cab display unit (see point 3.18.4) Alternatively ❖ From the control panels of the stabilisation control system actuate the 'Undercarriage protection' function (see point 3.13)

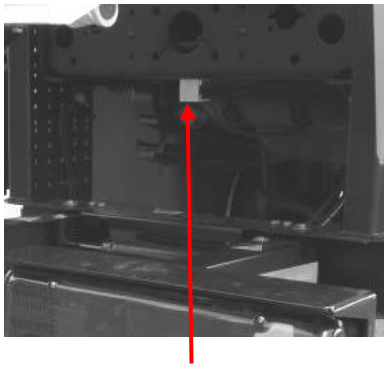
If there is anyone in the danger zone, they are at risk of crushing or loss of limbs. In emergency situations operate:

1. The emergency-off button on the basket control panel
2. The emergency-off button on the base display unit
3. (Optional) - the emergency-off button on the secondary/emergency control panel

4.1.4 Reversing camera (option)

The platform has been equipped with an external camera at the rear to facilitate reversing.

Whenever reversing, bear in mind the blind spot! Therefore a second person must always be deployed for giving instructions.



External camera for safe reversing

Monitor mounted in the cab

As soon as **reverse gear is engaged** the driver can see any object behind the lifting platform on a monitor in the driver's cab.

- Note: The **camera can also be activated** by touching **button**  on the monitor's main screen (see section 3.18.3).
  - You disable the camera functions again via button  .

4.2 PREPARING TO SET UP THE LIFTING PLATFORM

4.2.1 Operating the device without stabilisers—Minimal operation

Only the *LIFTING BOOM, BASKET BOOM and SLEWING* functions get enabled while working without stabilizers. The working ranges of the lifting boom and slewing system are limited in this operating mode.

Don't exceed the maximum basket load of 250kg when operating the device without it being stabilised!

When not stabilised, operate the device only under the following conditions:

- Always check the tyres are in good condition prior to use.
- When operating the platform without stabilisation, the staff trained to do this must take special care.
- When operating the platform without stabilisation, the permissible maximum set-up inclination must not be exceeded (refer to the information sign in the basket)!
- For stability reasons it is forbidden to operate the stabilisers or move the truck (*vehicle relocation) while the lifting boom is up. In both cases, the lifting boom must always be moved down onto its support!

*Vehicle relocation:

Vehicle relocation with people in the basket is allowed only under the following conditions:

- **In order to relocate the working platform, the lifting boom must first be lowered onto its support (home position) and the telescopic element retracted.**
- Anyone in the workman basket must wear a safety belt.
- Perfect communication between driver and person/people in the basket.
- Driving movements may be performed only by mutual agreement between the people in the workman basket and the driver.
- Gentle pulling away and braking.
- There must be no obstacles in the lifting platform's area of travel.
- The surface condition of the route taken must be such that platform stability is not impaired.
- Driving speed no more than 1.6 m/s (equating to approx. 6 km/h)

Moving the working platform is only permitted with the lifting boom secured in its support and the telescopic element retracted.

4.2.2 Operating the platform with stabilisers—place of use

1. Set up vehicle in a way that allows a sufficiently safe distance to the surrounding area on consistently solid and non-slip supporting ground. Do not set it up on or in the immediate vicinity of grids, manhole covers, pipelines, cable ducts, hoist ways, kerbstones or soft or piled up soil (gravel, sand, boggy ground, etc.).
2. Park with the driver's cab facing downhill when working on a slope. Secure the axle facing uphill with two wedges. See the 'Technical data' page for the maximum permitted set-up incline.
3.  **ways apply the parking brake!**
4. Depress the clutch pedal and select neutral.
   (In the case of automatic transmission, set the pre-selection lever to N.)
5. Depress the clutch pedal and wait a few seconds. Set the split switch on the gear lever to 'Quick splitter group' (depending on vehicle, refer also to truck manufacturer's operating instructions).
   (Point 5 does not apply for automatic transmission)
6. Switch on the auxiliary drive (or both auxiliary drives if the vehicle is equipped accordingly). The clutch must be depressed again, if the auxiliary drive shall be switched off again (not applicable with automatic transmission).

 Coasting or driving is prohibited when the auxiliary drive is on! This may destroy the hydraulic pump.

 Once work is complete, the auxiliary drive must be switched off, otherwise there is a risk of gearbox damage!

7. Slowly release the clutch pedal (not applicable with automatic transmission).
8. Check the content of the tank; it must match the operational duration.
9. Leave the cab.
10. When working on a slope the uphill axle should be secured with the brake wedges available as truck accessories. The wheels of the uphill axle should only be lifted so far until they are no longer in contact with the ground. The wheels must be within the wedge contour. Ensure that the free wedges are not removed while the axles are raised!
11. On ground with a significant slope, the vehicle may have to be secured, for example, to a tree or another vehicle parked uphill.

12. Lifting platforms which are set up in or extend over the traffic space of vehicles must be secured appropriately against traffic hazards (e.g., use warning lamps, roadblocks or safety guards).

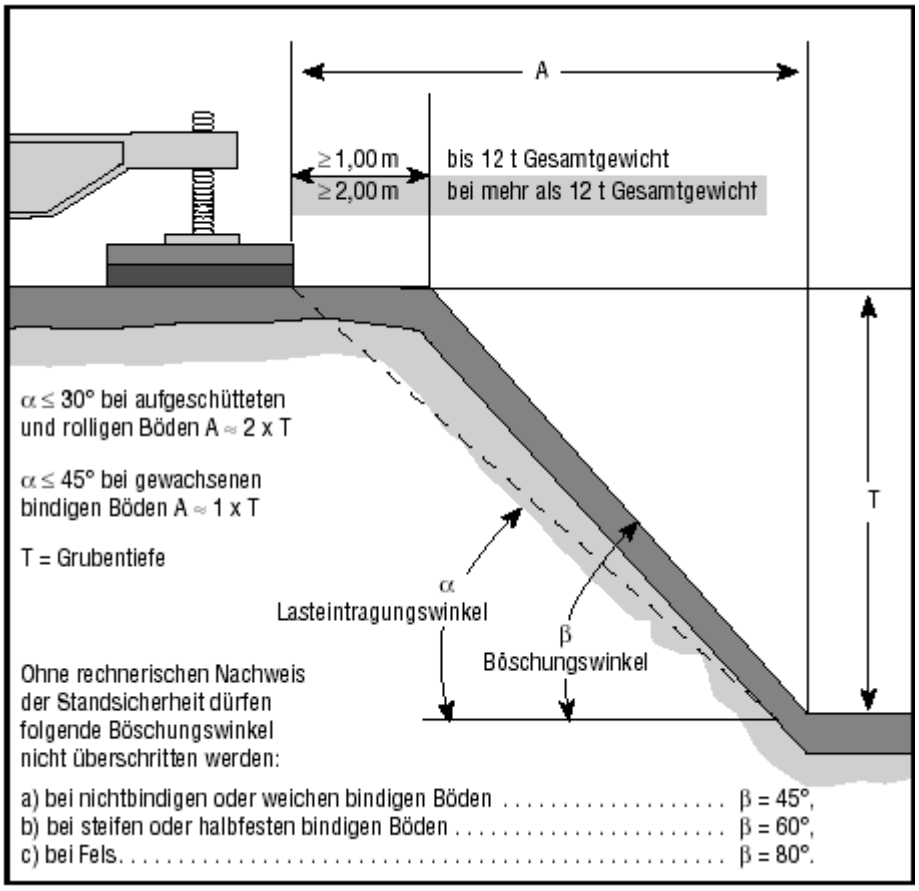
A correct vehicle set-up is a prerequisite for the lifting platform's stability.

4.2.3 Ground for support pads

Before stabilising the lifting platform, the operator must ensure that the selected location will enable work with it to be carried out safely. This particularly concerns the nature and conditions of the supporting ground, as well as the inclination of the installation surface.

Danger of tipping!

- Absolutely avoid the following types of ground:
  All covered openings, such as basements, grids, manhole covers, pipelines, cable ducts, hoist ways, kerbstones or soft or piled up soil (gravel, sand, boggy ground etc.)
- The support pad must sit completely on the ground if directly beside kerbstones. This must be inspected visually!
- Observe the applicable statutory regulations for the prevention of industrial accidents and the safety distances and angles of slope defined in statutory standards.



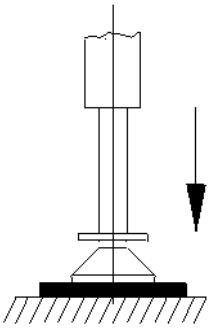
Safe distance A and maximum angle of slope β

For safety reasons, it is important to always use suitable boards under the stabilisers, as they will increase the contact area. The boards must be dry, free from oil, grease and ice and from any other lubricants.

Weather conditions, such as rain or snow, may affect stability.

Support jacks and supporting boards must lie completely flat and may not tilt. The supporting boards may in turn need to be properly lined.

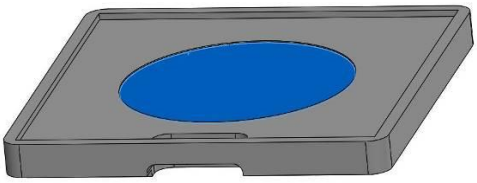
Work with the lifting platform will not be permitted, if the operator is unable to assess and ensure the safety of the supporting ground!



4.2.3.1 PALFINGER safety supporting board

This supporting board with handle is made from abrasion-resistant plastic. For easier stacking and for centring the base plate, it has a concentric groove on the top. A rubber substrate prevents it from slipping away.

- A maximum of two boards may be placed on top of one another. And the boards must fully interlock in the groove.



- Both sides of the supporting board must always be kept clean.
- The rubberised side of the board must always point downwards.
- The base plate must always be lowered onto the supporting board so that it is in the centre of the lowered spot.
- Ensure the supporting board is used correctly and that there is even support.

Note: The figures shown in the following table are approximate figures and cannot be used to draw any conclusions about the ground's actual characteristics. The operator must therefore always obtain information at the place of use on the ground pressure that is actually permissible in each instance.

Type of ground	Permitted ground compression in N/cm²
A) Heaped up soil, that has not been artificially stabilised	0 - 10
B) Mature, obviously untouched soil: 1. Mud, marsh, turf, quick sand	0
2. Incohesive soils: - Fine to medium sand - Coarse sand to gravel	15 20
3. Cohesive soils: - Mushy - Soft - Stiff - Semi-solid - Solid	 0 4 10 20 30
Solid surfaces	approx. 50 – 60
Road surface	approx. 75 – 100

Divide the maximum supporting force of a stabiliser specified by the surface area of a supporting board (in cm²). This will give you the ground pressure of the lifting platform when using supporting boards and you can compare this value with the values given above.

Example:

Maximum supporting force (see notice) ..... 180,000 N
Area of a PALFINGER PLATFORMS safety supporting board - 60 cm x 60 cm ..... 3600 cm²
Ground compression in N/cm² ..... 50 N/cm²

Using this sample calculation, it is possible to see that by using PALFINGER safety supporting boards in the format 60 x 60 cm the supporting area is increased to such an extent that the maximum permitted ground pressure of solid surfaces is not exceeded.
On soft ground, even the use of PALFINGER safety supporting boards may be insufficient!

Note: To calculate the required size of the support boards it is also possible to use the help menus on the workman basket control panel display (see point 3.14.4.19) or on the driver's cab display unit (see point 3.18.5).

4.2.3.2 Table with the necessary supporting areas

Maximum supporting force	**Permitted surface pressure**		
	10 N/cm²	20 N/cm²	40 N/cm²
	Necessary supporting area		
10 kN	0.32 m x 0.32 m	0.22 m x 0.22 m	0.15 m x 0.15 m
20 kN	0.45 m x 0.45 m	0.32 m x 0.32 m	0.22 m x 0.22 m
30 kN	0.55 m x 0.55 m	0.39 m x 0.39 m	0.27 m x 0.27 m
40 kN	0.63 m x 0.63 m	0.45 m x 0.45 m	0.32 m x 0.32 m
50 kN	0.71 m x 0.71 m	0.50 m x 0.50 m	0.35 m x 0.35 m
60 kN	0.77 m x 0.77 m	0.55 m x 0.55 m	0.39 m x 0.39 m
100 kN	1.0 m x 1.0 m	0.7 m x 0.7 m	0.5 m x 0.5 m
200 kN	1.4 m x 1.4 m	1.0 m x 1.0 m	0.7 m x 0.7 m
300 kN	1.7 m x 1.7 m	1.2 m x 1.2 m	0.9 m x 0.9 m
400 kN	2.0 m x 2.0 m	1.4 m x 1.4 m	1.0 m x 1.0 m
500 kN	2.2 m x 2.2 m	1.6 m x 1.6 m	1.1 m x 1.1 m
600 kN	2.4 m x 2.4 m	1.7 m x 1.7 m	1.2 m x 1.2 m

Even apparently stable ground can give way if it conceals cavities beneath it (e.g. cellars, tunnels, disused cemeteries, tanks, cesspits etc.). Therefore familiarise yourself with the supporting ground prior to deployment.

4.3 SUPPORTING THE LIFTING PLATFORM

4.3.1 Stabilisation systems and control points for the stabilising process

System 1: Fully variable support

The stabilisation system features continuously variable support widths with different working areas. The ranges are enabled by the PLC.

Support is possible on one side or on both sides, and variable from 'within the vehicles contour' up to 'maximum support width'.

System 2: Vertical stabiliser

No stabiliser outriggers available

Control points for the stabilising process:

The platform's support equipment can be operated:

a) **From the workman basket control panel** *(Regarding set-up and functions refer to points 3.14 and 4.3.6)*
   Note when entering the control point in the workman basket:
   Before stepping on the ladder of the basket fold in the undercarriage protection, if necessary. ***Risk of collision****!*
b) **From the control panels of the stabilisation control system on the left and right side of the vehicle** *(see point 3.13)*
c) **(Optional) from the secondary control system** *(see points 3.16 and 4.3.7)*
d) **Emergency control system: from the valve control block on the base on the right side of the vehicle** *(see point 4.5.6)*

4.3.2 Rules of procedure during the stabilising process

Risk of accident!

- Observe the movement range as the supports are extended and retracted. **Risk of getting crushed!**
- When the lifting platform is supported, the driver's cab must be empty. There must be no loads or people in the driver's cab during this time!
  The front steps in the bumper may also not be used.
- **The lifting boom must be on the boom support, otherwise the stabilisers will not be released!**

When supporting on a slope:

- Park with the driver's cab facing downhill when working on a slope. Secure the axle facing uphill with two wedges.
- The wheels of the uphill axle should only be lifted so far until they are no longer in contact with the ground. The wheels must be within the wedge contour.
- Ensure that the free wedges are not removed while the axles are raised!
- On **steep gradients** the use of **chocks is strongly recommended!**

4.3.3 Operating modes

4.3.3.1 Conditions for working in the various operating modes and their working ranges

The lifting platform can be controlled in a number of different operating modes.

1. **Normal operation**

   Support possibilities:

   a) - All stabiliser outriggers fully extended
   - All stabilisers extended to such extent that the wheels are lifted clear and the stabilisers have ground pressure.

   b) - Outriggers on one side of the vehicle are fully extended, while those on the opposite side are in the transport position
   - All stabilisers extended to such extent that the wheels are lifted clear and the stabilisers have ground pressure

   c) - All stabiliser outriggers are in their transport position (within the contour)
   - All stabilisers extended to such extent that the wheels are lifted clear and the stabilisers have ground pressure

2. **Partial operation(Able to be selected only from the control panel in the workman basket)**
3. **Minimal operation**

In order to use the required mode of operation it is necessary that the conditions below are met:

Prerequisites of the operating modes			
1. Normal operation (*Standard)*	**2. Partial operation *(Option)***	**3. Minimal operation**	
		Standard	**Extended working range *(Option)***
Parking brake pulled			
Power take-off engaged			
Stabilisers have ground pressure	Stabilisers have ground pressure	Stabilisers retracted	
Wheels free	Wheels on the ground	Wheels on the ground	
Max. nominal load of basket: 500 kg	Max. nominal load of basket: 250 kg	Max. nominal load of basket: 250 kg	
Max. vehicle inclination ❖ In any direction: 2 °	Max. road gradient ❖ Vehicle lengthways direction: 8° uphill ❖ Vehicle lengthways direction: 8° downhill ❖ Vehicle sideways direction: +/- 5°	Max. vehicle inclination ❖ Vehicle lengthways direction: 7° uphill ❖ Vehicle lengthways direction: 7° downhill ❖ Vehicle sideways direction: +/- 5°	❖ Vehicle lengthways direction:27° uphill ❖ Vehicle lengthways direction: 2° downhill ❖ Vehicle sideways direction: +/- 2°

- The working range is adjusted (reduced) in accordance with the vehicle inclination.
- On steep gradients the use of chocks is strongly recommended.

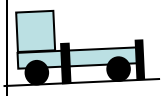
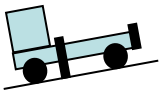
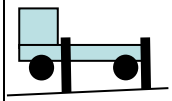
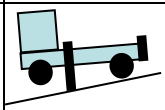
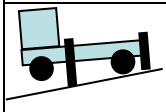
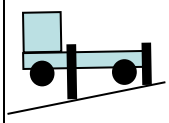
	Operating modes' working ranges			
	1. Normal operation (*Standard)*	**2. Partial operation *(Option)***	**Minimal operation**	
			Standard	**Extended working range *(option)***
Lifting boom	Free up to load torque limit	Up to 60°	Up to 5°	Up to 20°
Slewing	Free up to load torque limit	Up to +/- 30°	Up to +/- 5°	Up to +/- 15°
Telescopic element	Free up to load torque limit	2m*(cylinder stroke 0.5m)*	2m*(cylinder stroke 0.5m)*	2m*(cylinder stroke 0.5m)*
Basket boom	Free up to load torque limit	free		

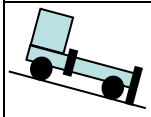
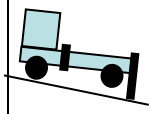
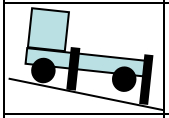
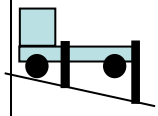
Minimal operation / relocation

Minimal operation and relocation with people in the workman basket may be undertaken only under the preconditions described at point 4.2.1.

Relocating the working platform is only permitted with the lifting boom on its support!

4.3.4 Functions of automatic alignment facility with various gradients

Normal operation: Downhill slope <4.5° **Partial operation: Downhill slope <2°**		**Normal operation: Downhill slope >4,5°** **Partial operation: Downhill slope >2°**	
	**1. All stabilisers move until they have ground pressure**		**1. Front stabilisers move until they have ground pressure**
	**2. Vehicle is lifted up and levelled until axles are free** • Axle activation available **=>** Automatic stabiliser function stops by itself • Axle activation not available **=>** Stabilisers extend for as long as button is being pressed		**2. Front stabilisers move out until vehicle inclination is less than 4.5°**
			**3. Rear stabilisers move until they have ground pressure**
			**4. Vehicle is lifted up and levelled until axles are free** • Axle activation available **=>** Automatic stabiliser function stops by itself • Axle activation not available **=>** Stabilisers extend for as long as button is being pressed

Front axle braked		Front axle <u>not</u> braked
Normal operation: Uphill slope >4.5° **Partial operation: Uphill slope >5°**		**Normal operation: Uphill slope >4.5°** **Partial operation: Uphill slope >5°**
	**1. Rear stabilisers move until they have ground pressure**	**Automatic operation not possible!**
	**2. Rear stabilisers move out until vehicle inclination is <4.5°**	
	**3. Front stabilisers move until they have ground pressure**	
	**4. Vehicle is lifted up and levelled until axles are free** • Axle activation available **=>** Automatic stabiliser function stops by itself • Axle activation not available **=>** Stabilisers extend for as long as button is being pressed	

4.3.5 Control of the stabilisation system from the control panels on the left and right side of the vehicle

The stabilisation system can be controlled from the control panels on the left and right side of the vehicle.

- For layout and button assignment see point 3.13.

Procedure:

1. One side at a time, extend the stabiliser outriggers on the left and then right side of the vehicle individually or in pairs to the desired position by continuously pressing buttons (1)  and (2) 

2. One side at a time, extend the vertical stabilisers on either side by pressing button (3)  until they have ground contact.

3. With all four stabilisers on the ground this button's function changes automatically from 'Move all stabilisers on one side' to 'Move all four stabilisers' and the stabilisers extend.

- By extending the vertical stabilisers, the platform gets stabilised and automatically levelled.

With ground clearance monitoring

4. When correctly stabilised, the stabilisation process stops automatically, i.e.:

- ❖ Stabilisers have ground pressure
- ❖ Lifting platform is within the permissible tilt limits
- ❖ Axles are lifted clear,

=> Lifting equipment is enabled

- ➢ **Performing visual inspection**

Without ground clearance monitoring

4. Stabilisation process has to be stopped by the operator by releasing the button (3) 

=> Lifting equipment is enabled

- ➢ **Be sure to carry out a visual check** to see if:
  - The stabilisation is correct
  - The wheels are lifted clear
  - The axles are suspended in the check straps (optional, if check strap is fitted)

While extending the stabilisers make sure the area is empty (nobody and nothing in it) – **Risk of injury!**

Using the emergency stop button, you can stop the stabilisation function at any time in an emergency!

4.3.6 Controlling the support equipment from the control panel in the basket

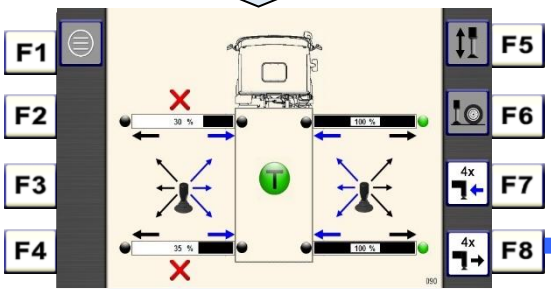
4.3.6.1 Extending the stabiliser outriggers and stabilisers

➢ The layout and functions of the basket control panel are explained at point 3.14.

What needs to be done to extend the stabiliser outriggers and stabilisers:

- By pressing the  button on the operating panel switch on support operation (LED comes on).

*=> The 'Outrigger support operation' window **(090)** opens.*



Switching to partial operation

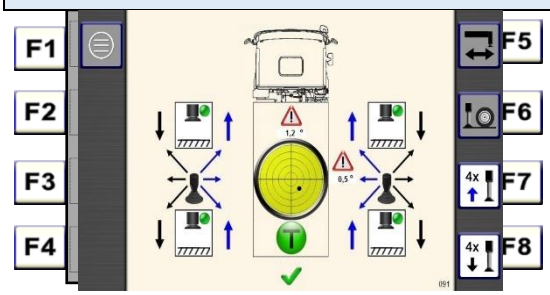
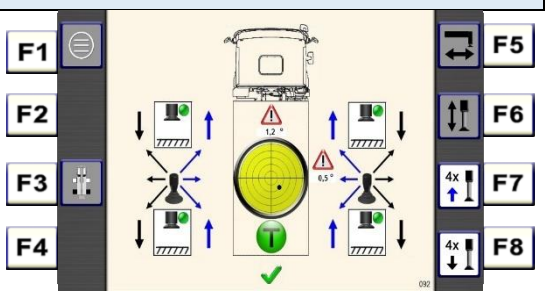
Press the **F8** key in the window **(090)** and extend the stabiliser outriggers as required.

❖ Warning lights on the stabilisers are active!

Alternatively, the stabiliser outriggers can be moved one by one or in pairs using the joysticks (see point 4.3.6.2).

Press the F5 key  in the window **(090)** to activate the vertical stabiliser operation.

*=> The vertical stabiliser operation window **(091)** opens for normal operation.*

Normal operation (091)	**Partial operation (092)** (option)
	
a) Press F8 key Extending the vertical stabilisers => The lifting platform gets supported and automatically levelled b) alternatively, the vertical stabiliser can be moved one by one or in pairs using the joysticks (see point 4.3.6.2).	a) Press F8 key • Vertical stabilisers move out until they all have ground pressure. b) alternatively, the vertical stabiliser can be moved one by one or in pairs using the joysticks (see point 4.3.6.2).

By pressing button F6, it is possible to change operating mode

(possible only when stabilisation equipment is in transport position)

With ground clearance monitoring	**Without ground clearance monitoring**
• When correctly stabilised, the stabilisation process stops automatically, i.e.: ❖ Stabilisers have ground pressure ❖ Lifting platform is within the permissible tilt limits ❖ Axles are lifted clear • Perform visual inspection	• Stabilisation process has to be stopped by the operator by releasing the joysticks (2) • Be sure to carry out a visual check to see if: - The stabilisation is correct - The wheels are lifted clear - The axles are suspended in the check straps (optional, if check strap is fitted)

If the stabilisers are (correctly) positioned in accordance with the operating mode, this gets indicated on the displa - warning lights on the stabilisers flash!

Switch off the support operation by activating the button on the operating panel.

➢ The setup-angle can be seen from the bubble level and the two angles given on the display.

When supporting on a slope: absolutely observe the instructions given under point 4.2.2.!

The working range is adjusted (reduced) in accordance with the vehicle inclination.

- The movements of the stabilisers are initiated or slowed down softly, which results in a start-up / run-out delay.

You may only change the operating mode (normal/partial operation) if all 4 stabilisers and stabiliser outriggers are in the transport position!

4.3.6.2 Raising and levelling the lifting platform manually (via joystick)

Lift up and level out the working platform using joysticks (by hand) following the instructions below (push relevant joystick outwards).
The joystick assignment is shown at point 3.14.2.1.

❖ *This needs to be done!*

1. By pressing the button on the operating panel, switch on support operation (LED is illuminated).

2. Move the stabiliser outriggers into the desired positions either one by one or in pairs using joysticks (except stabilisation within the contour) – warning lights on stabilisers active!

3. Press the F5 key in window 090 to change into the vertical stabiliser operation mode and extend the stabilisers using the joysticks in the order given below.

4. Extend the stabilisers on the front axle evenly on both sides (push the left joystick forwards/left and simultaneously the right joystick forwards/right) to retain the braking effect on the rear axle for as long as possible and to avoid any chassis distortion.
   - ➢ Make sure that the front wheels of the vehicle are raised clear and not touching the ground and that the stabilisers have ground contact.

5. Lift up the rear axle(s) evenly (move the left joystick back/left and the right joystick back/right simultaneously).

6. Level out the platform by extending or retracting one or several stabilisers using the relevant joystick. Check the inclination via the bubble!

When supporting on a slope: absolutely observe the instructions given under point 4.2.2.!

The working range is adjusted (reduced) in accordance with the vehicle inclination.

If the stabilisers are positioned in accordance with the operating mode, this gets indicated on the display - warning lights on the stabilisers flash!

Switch off the support operation by activating the button on the operating panel.

Risk of accident!

Especially **on slopes** absolutely observe the described order of stabilizers being retracted and extended. The operator has to make sure that the working platform is properly supported (wheels must be lifted clear) before starting to operate the lifting gear.

When the vehicle is supported the **driver's cab** must be **empty**. Nobody and no loads are allowed in it during this time!

4.3.6.3 Retracting the support equipment

❖ *This needs to be done!*

- By pressing the  button on the operating panel switch on support operation (LED comes on)

*=> The 'Vertical stabiliser operation' window **(091)** opens*

Retract the stabilizers either automatically with F7 key or via joysticks in the order given below until they have reached their basic positions:

- The stabilisers must be retracted in reverse order!

1. **First retract the stabilisers on the side where the axle is braked**, so that the braking effect may be used again.
2. Then retract the stabilisers near the unbraked axle.

Press **F5** in window **(091)** to change into the outrigger support operation window **(090)**.

Retract the stabilizer outriggers either automatically with **F7** key or via joysticks until they have reached their basic positions.

When all stabilisers and stabiliser outriggers are in the home position, this status gets indicated T the display

Switch off the support operation by activating the  button on the operating panel.

Risk of accident!

Always retract the stabilisers in the correct order!

4.3.7 Controlling the support equipment from the secondary controls (optional)

4.3.7.1 Extending the stabiliser outriggers and stabilisers

➢ The PALFINGER PLATFORMS lifting platform optionally offers the possibility of controlling the stabilisation system from the secondary control panel (can be plugged into the base on the left side of the vehicle). All connections should only be made when the system is isolated from the mains (see point 3.16.5).

This secondary control panel is ready for use after a key switch has been set accordingly, they can also be used as emergency control.

➢ Set-up and functions are described under point 3.16.

Using the emergency-off button, you can stop the platform any time in an emergency!

Activate secondary control panel:

By setting the key-operated switch (electrics box on the left side of the vehicle) to position 'II', switch on the secondary control system.

=> Secondary control active

=> Operation from the basket control panel no longer possible, except for 'Emergency shut-off' and 'Emergency levelling'

How to operate the stabilisers using the secondary controls (see also point 3.16):

Extending stabiliser outriggers
Activate outrigger operation: Press the key and select the stabiliser outriggers as required.  ⇨ LED in the button comes on.

By actuating **one or both joysticks** (outwards), **move out** the **stabilizer outriggers** individually or in pairs (refer to joystick allocation in section 3.16.4).

- *Monitor the extension area!*

Extend stabilizers

Activate the support operation by pressing the button on the operating panel.

⇨ LED in the button comes on. 

a) Automatic operation

By simultaneously pushing both joysticks out, extend all 4 vertical stabilisers until they have ground pressure (see joystick function assignment at point 3.16.4)

⇨ The lifting platform gets correctly stabilised and automatically levelled, i.e.:

- ❖ Stabilisers have ground pressure
- ❖ Lifting platform is within the permissible tilt limits
- ❖ Axles are lifted clear

⇨ The stabilisation process stops automatically

⇨ LED indicator no. (4) on the control panel is lit up

⇨ Lifting equipment gets enabled

➢ Perform a visual inspection!

b) By hand

By operating the respective **joystick** (moving the joystick outwards), **extend** the **vertical stabilisers** individually or in pairs (see joystick assignment, point 3.16.4) until the lifting platform is correctly stabilised and levelled, i.e.:

- ❖ Stabilisers have ground pressure
- ❖ Lifting platform is within the permissible tilt limits
- ❖ Axles are lifted clear

➢ Stabilisation process has to be stopped by the operator by releasing the joystick

➢ If the lifting platform is correctly stabilised and all stabilisers have ground pressure, LED indicator no. (4) is lit up

⇨ Lifting equipment gets enabled

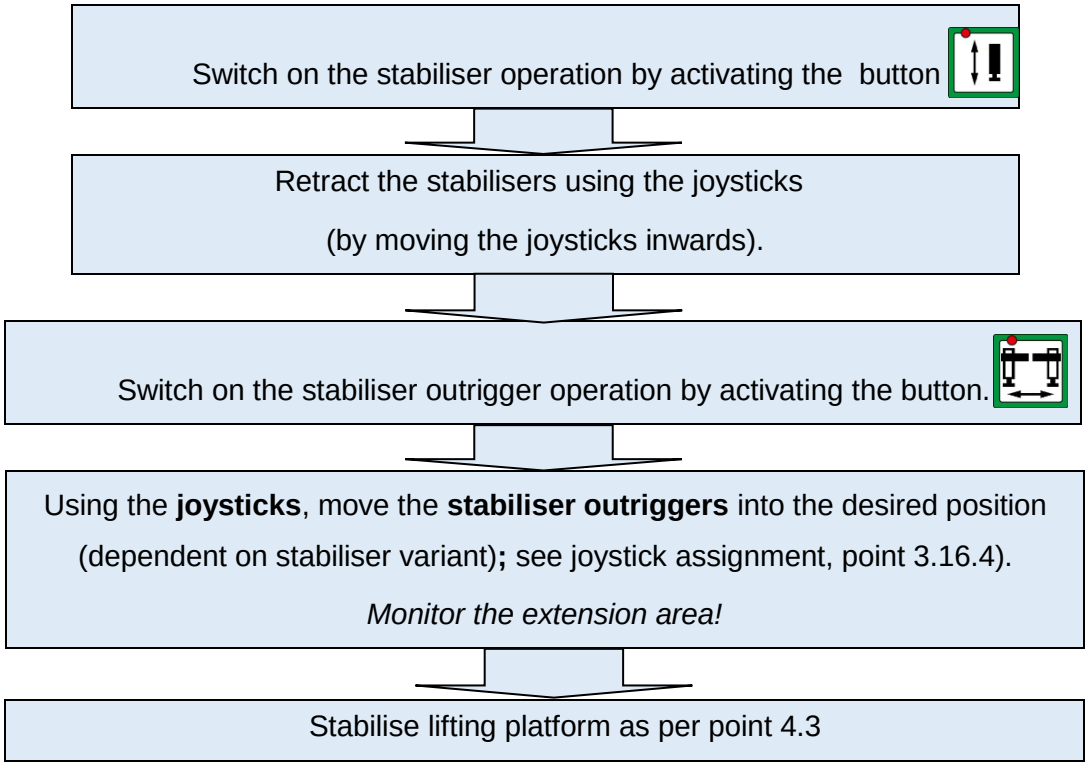
➢ Perform a visual inspection!

The working range is adjusted (reduced) in accordance with the vehicle inclination.

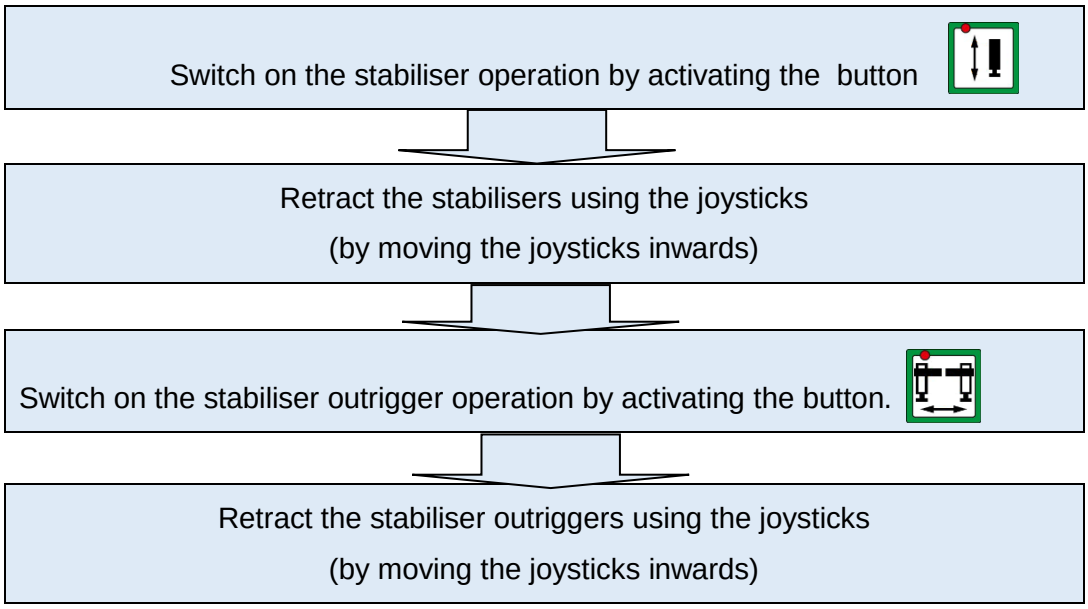
The movements of the stabilisers are introduced or slowed down softly, which results in a start-up / run-out delay.

When supporting on a slope: absolutely observe the instructions given under point 4.2.2.!

4.3.7.2 Changing the stabiliser variants



4.3.7.3 Retracting the support equipment



- All stabilisers and stabiliser outriggers are in the transport position if the LED indicator no. (3) is illuminated and the flashing stabiliser lights are off.

4.4 CONTROL OF THE LIFTING EQUIPMENT

4.4.1 Control points

The lifting equipment can be controlled:

a) From the control panel on the workman basket; *see point 3.14*

Note when entering the control point in the workman basket:

Before stepping on the ladder of the basket fold in the undercarriage protection, if necessary. ***Risk of collision****!*

b) From the base display unit in the electrics box; *see point 3.15*

c) From the secondary/emergency control panel on the chassis (option; can be plugged in on the left side of the vehicle), see point 3.16

- *After turning the key-operated switch, this control system can also be used as an emergency control system.*

d) Emergency control: using the valve control block on the chassis (right side of the vehicle)

- *Retracting by hand in the event of hydraulic emergency operation*

Enable control points:

Setting the key-operated switch in the electrics box on the left side of the vehicle to the relevant position enables the control point that you want to use, see point 3.17.

➢ A lock ensures that the lifting platform can always be operated only from **one** control panel.

If the lifting platform is being controlled from the control panel in the workman basket, it is imperative to ensure that the basket entrance is and remains closed.

4.4.2 Moving the lifting gear, possible restrictions and remedies

4.4.2.1 Extend lifting platform

As per the possibilities described at points 3.14, 3.15 and 3.16, the lifting platform can be moved into the desired working position from a number of different control points.

In doing so, it is imperative that you heed and adhere to the following guidance:

Risk of damage!

- Any movements of the lifting gear must be initiated slowly and smoothly.
- Monitor the movement range as they are made.

Danger of collision where there are obstacles!

Any obstacles must always be approached at a reduced speed.

- Under no circumstances must the basket or parts of the boom's construction be driven into obstacles (facades etc., but also the equipment support or driver's cab).

The maximum lateral force detailed on the type plate should be observed as well as the warning notices (**risk of crushing, danger of collision**) in the basket.

Danger of tipping!

Once the permissible outreach is reached, no further loading on the basket may take place.

Risk of tipping over if ground pressure is lost!

If two adjacent stabilisers lose ground pressure, an audible signal is sounded, and the lifting platform is shut off. Operating in normal mode is no longer possible.

In such event, stabilisation by means of emergency lowering must be performed at once (see emergency lowering sections 4.5.2, 4.5.3 and 4.5.4).

Movement end position!

- If during a platform movement the end position is reached, the workman basket's desired position can be achieved only through different platform movements.
- If the maximum reach is achieved, the only movements that can then still be made are those that lead to a reduction of the load.

For reasons that lead to the platform movements stopping and possible remedies, please refer to the remarks below.

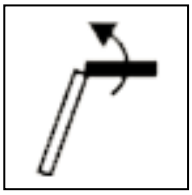
4.4.2.2 Raise lifting boom

Possible reason for the movement stopping	Remedy
• Upper end stop has been reached	Move basket free in opposite direction
• Basket load exceeded	Reduce basket load
• *MEMORY* function has reached the target position.	Switch off *MEMORY* function.
• For platforms with lifting eye or rope winch: Lifting platform is nearly at / at the load moment limit	Reduce load or retract lifting boom

4.4.2.3 Lower lifting boom

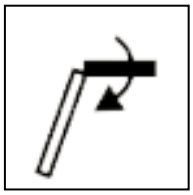
Possible reason for the movement stopping	Remedy
• Lower end stop reached.	Move basket free in opposite direction
• Basket load exceeded	Reduce basket load
• Stop due to load torque limit	Start movements that reduce the load torque.
• Emergency cut-off due to load torque limit	Only *RAISE LIFTING BOOM* and *RETRACT LIFTING BOOM* are possible
• *MEMORY* function has reached the target position.	Switch off *MEMORY* function.
• Basket has hit the ground	Activate *BYPASS* button. Release basket
• Basket is not centred (risk of crushing)	Centre basket
• For platforms with trailer hitch / undercarriage protection: Basket boom is not completely lowered	Completely lower basket boom, keeping an eye on the rear section Basket boom may collide with trailer hitch / undercarriage protection. **Risk of damage!**

4.4.2.4 Raise basket boom



Possible reason for the movement stopping	Remedy
• Upper end stop has been reached	Move basket free in opposite direction
• Basket load exceeded	Reduce basket load
• Stop due to load torque limit	Start movements that reduce the load torque.
• Emergency cut-off due to load torque limit	Only *RAISE LIFTING BOOM* and *RETRACT LIFTING BOOM* are possible
• *MEMORY* function has reached the target position.	Switch off *MEMORY* function.
• Lifting boom on support	Raise lifting boom
• For platforms with trailer hitch / undercarriage protection: Basket boom too close to the trailer hitch, only RAISE LIFTING BOOM possible.	Raise lifting boom while monitoring the rear area. Basket boom may collide with trailer hitch / undercarriage protection. **Risk of damage!**

4.4.2.5 Lower basket boom



Possible reason for the movement stopping	Remedy
• Lower end stop reached.	Move basket free in opposite direction
• Basket load exceeded	Reduce basket load
• Stop due to load torque limit	Start movements that reduce the load torque.
• Emergency cut-off due to load torque limit	Only *RAISE LIFTING BOOM* and *RETRACT LIFTING BOOM* are possible
• *MEMORY* function has reached the target position.	Switch off *MEMORY* function.
• Basket has hit the ground	Activate *BYPASS* button. Release basket
• Basket is not centred (risk of crushing)	Centre basket

4.4.2.6 Extending the lifting boom

Possible reason for the movement stopping	Remedy
• Upper end stop has been reached	Move basket free in opposite direction
• Basket load exceeded	Reduce basket load
• Stop due to load torque limit	Start movements that reduce the load torque.
• Emergency cut-off due to load torque limit	Only *RAISE LIFTING BOOM* and *RETRACT LIFTING BOOM* are possible
• *MEMORY* function has reached the target position.	Switch off *MEMORY* function.
• Basket has hit the ground	Activate *BYPASS* button. Release basket
• Lifting boom on support	Raise lifting boom

Risk of damage and tipping over!

Never extend the boom system if it is resting on the support or on any other obstacle. Normally this is prevented in the area around the support. If extension of the arm is nevertheless possible, a sensor may be defective. If the boom system has been placed on the support or another obstacle, the load torque limit sensors get deceived. It is thus possible for the platform to be steered to prohibited levels of reach and to overbalance.

4.4.2.7 Retracting the lifting boom

Possible reason for the movement stopping	Remedy
• Lower end stop reached.	Move basket free in opposite direction
• Basket load exceeded	Reduce basket load
• *MEMORY* function has reached the target position.	Switch off *MEMORY* function.
• Basket has hit the ground	Activate *BYPASS* button. Release basket

4.4.2.8 Slew clockwise

Possible reason for the movement stopping	Remedy
• Slewing limit has been reached.	Move basket free in opposite direction
• Basket load exceeded	Reduce basket load or actuate *EMERGENCY LOWERING* function.
• Stop due to load torque limit	Start movements that reduce the load torque.
• Emergency cut-off due to load torque limit	Only *RAISE LIFTING BOOM* and *RETRACT LIFTING BOOM* are possible
• *MEMORY* function has reached the target position.	Switch off *MEMORY* function.
• Basket has hit the ground	Activate *BYPASS* button. Release basket
• Lifting boom on support	Raise lifting boom

4.4.2.9 Slew anti-clockwise

Possible reason for the movement stopping	Remedy
• Slewing limit has been reached.	Move basket free in opposite direction
• Basket load exceeded	Reduce basket load
• Stop due to load torque limit	Start movements that reduce the load torque.
• Emergency cut-off due to load torque limit	Only *RAISE LIFTING BOOM* and *RETRACT LIFTING BOOM* are possible
• *MEMORY* function has reached the target position.	Switch off *MEMORY* function.
• Basket has hit the ground	Activate *BYPASS* button. Release basket
• Lifting boom on support	Raise lifting boom

4.4.2.10 Retracting the lifting platform

Variant a) - From the workman basket control panel / secondary control panel

- Activate the home function with the HOME FUNCTION button 
- By moving the joystick (lifting boom down) initiate device movements, see points 3.14.2 or 3.16.4.
  - ⇨ *First the lifting gear moves into the home position*
  - ⇨ *and upon further activation the support equipment into the transport position*

  Danger of collision where there are obstacles!

Variant b) - from the operating panel at the base unit display

- ➢ Press the 'Home function' button, see point 3.15.2.
  - ⇨ The lifting equipment inclusive of support equipment moves into transport position.

4.5 EMERGENCY OPERATION

4.5.1 General instructions and procedures

Under certain circumstances, it may be necessary to operate the lifting platform in emergency mode in the event of operational malfunctions. The various emergency operation options are described on the following pages.

It is your responsibility to control the lifting platform during emergency operation!
The details in the EMERGENCY OPERATION operating instructions must be adhered to!
➢ **If you have any questions, consult PALFINGER Technical Service by telephone.**

➢ **In case of emergency operation always work with great care and in consultation with the people in the basket!**

➢ **All movements must be controlled slowly, with great care and under constant supervision and monitoring!**

Emergency operation of lifting system			
When the platform stops (error indicated)			**When the electric control system totally fails**
Emergency lowering of lifting equipment from basket **see points 4.5.2 and 3.14**	**Emergency operation of the lifting equipment from the base display unit in the electrics box** **see points 4.5.3 and 3.15**	**Emergency operation of the lifting equipment from the secondary control panel on the base (optional)** **see points 4.5.4 and 3.16**	**Hydraulic emergency operation of lifting equipment from the chassis** **see point 4.5.5**

Operating the platform in electrical emergency mode is only possible if *none* of the EMERGENCY-OFF buttons has been pressed. If that is not the case, the EMERGENCY-OFF button concerned has to be released manually.

An emergency-off button can be used to abort any incorrect use during emergency operation.

Risk of accident!

In emergency operation the safety shut-off systems are not effective and the lifting platform can be steered into prohibited areas.

There is thus a danger to stability!

This means the following:

- All movements must be controlled slowly, with great care and under constant supervision and monitoring!
- **Load torque limitation is not active in emergency mode!**

  Therefore, in emergency operation you must first always trigger the movements that reduce the load torque. Otherwise there is a risk of tipping over!
- **Risk of collision! During EMERGENCY OPERATION neither the basket nor any other part of the boom system should touch any obstacles.**
- **Danger of tipping! The ground pressure query does not function in emergency operation!**

Emergency operation of stabilisation system

Point 4.5.6

Hydraulic emergency operation of the stabilisers from chassis

Applying the electrical emergency pump

In emergency operation after failure of the vehicle motor or hydraulic pump

Point 4.5.7 **Lowering the lifting equipment via electrical emergency pump**	**Point 4.5.7** **Retracting the stabilisation system via electrical emergency pump**

4.5.2 Emergency lowering of the lifting equipment from the basket control panel

➢ In an emergency it is possible to lower the lifting equipment from the basket.

Risk of accident!

In emergency operation the safety shut-off systems are not effective.

The safety advice given under point 4.5.1 must definitely be observed and adhered to!

Using the 'Emergency lowering' function, the operator is able to bring the basket safely down towards the ground even if certain parts, sensors or functions have failed.

Broad stabiliser support on both sides reduces the likelihood of the system shutting off this function.

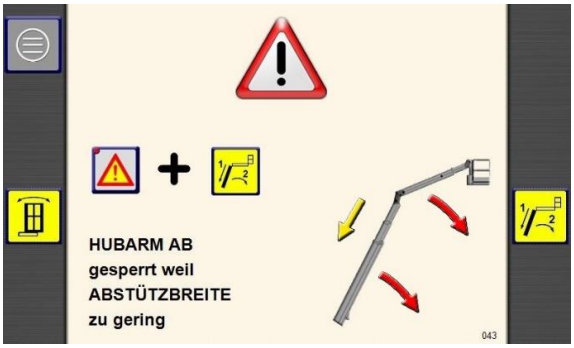
➢ For control panel layout see point 3.14

Lower the basket in the order given below:

❖ *This needs to be done!*

- Activate emergency operation => Hold down button

=> Menu window 043 (emergency lowering) opens



Function completed (component in home position)

Function active

Function disabled

- *Activate movement => Hold down button*

1.) Telescopes get fully retracted

2.) Lifting boom and basket boom get lowered

(Precondition: lifting platform is supported with sufficient width)

3.) In emergency operation **automatic levelling of the basket** may not be working,

In such event, also press this button (refer to next page).

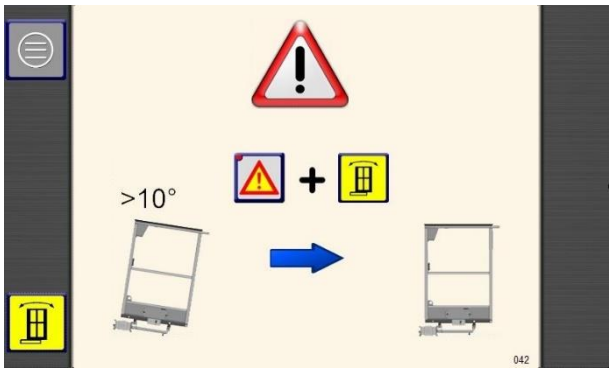
- *After emergency operation, press the 'Start motor' button (LED flashes)*

Basket leveling:

In case of failure of the automatic basket levelling system, the basket can be levelled via emergency functions.

❖ *This needs to be done!*

- Activate emergency operation => Hold down button
=> Menu window 042 (emergency leveling) opens



The *EMERGENCY LEVELLING* button will raise the workman basket into a horizontal position.

- Activate movement => Hold down button
(Tilt switch detects the direction)
- After emergency operation, press the 'Start motor' button (LED flashes)

4.5.3 Emergency operation / emergency lowering of lifting equipment from the operating panel at the base unit display

Risk of accident!

It is your responsibility to control the lifting platform during emergency operation!

In emergency operation the safety shut-off systems are not effective.

It is therefore imperative that you adhere to the safety guidance described at point 4.5.1!

When moving the lifting gear in emergency mode, the load torque limitation and the geometric limitations are disabled!

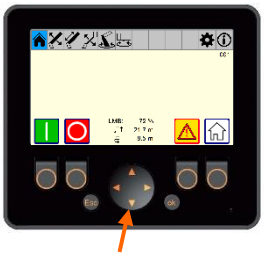
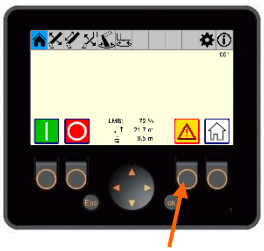
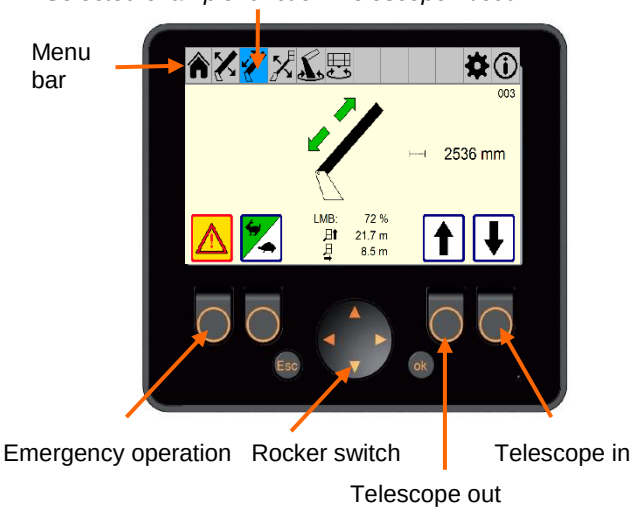
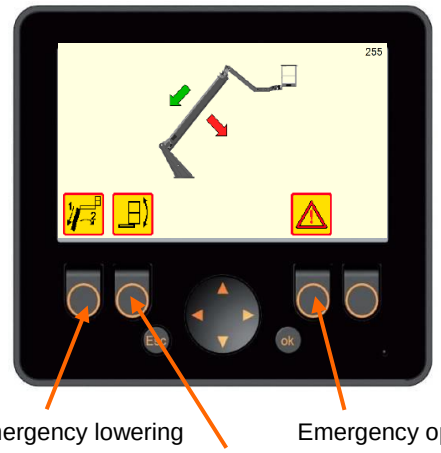
There is thus a danger to stability!

The following is additionally shown as a warning:

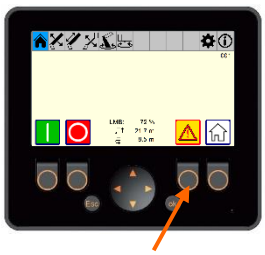
➢ When the base display unit is enabled, control from the basket control panel is no longer possible, except for 'Emergency Stop' and 'Emergency Levelling'

❖ ***Emergency operation/lowering*** *=> What has to be done in order to bring the lifting equipment into the home position in the event of a fault:*

Emergency operation by means of individual movements	**Emergency lowering**
1. Turn key-operated switch in electrics box • Set key-operated switch to **'Emergency operation'**.  ➢ There must be no secondary control system plugged in, or the base display unit will be inactive!	**1. Turn key-operated switch in electrics box** • Set key-operated switch to **'0'**. 

Emergency operation by means of individual movements	Emergency lowering
2. Select platform movement • On the menu bar select the movements you want using the 4-way rocker switch 	**2. Enable the base display unit and activate emergency operation:** • Press the **"Esc"** and **"OK"** buttons for 1s • Press the 'Emergency mode' button  on the base display unit => Emergency operation has been activated!  => *Emergency lowering/levelling window opens*
3. Bring lifting platform into home position *(see point 3.15)* *Selected example function 'Telescope in/out'*  • By pressing the **Emergency operation** button and simultaneously **pressing the function buttons** (e.g. 'Telescope IN'), move the lifting platform into the home position in the order set out below.	**3. Bring lifting platform into home position** *(see point 3.15)*  • Simultaneous pressing of the EMERGENCY OPERATION AND EMERGENCY LOWERING buttons => *Lowering of the lifting equipment* The current status is shown by the arrows: Yellow arrow: Movement active Green arrow: End position reached Red arrow: Movement blocked

Emergency operation by means of individual movements	Emergency lowering
How to proceed (order must be followed!): ▪ **Fully retract lifting boom** ▪ **Turn basket in center position (home)** ▪ **Slew the lifting equipment towards the vehicle's centerline.** (Pay attention to rotary direction! Always slew in the opposite direction to the last rotary direction in which it moved!) ▪ **Lower the basket boom (right before reaching the mechanical end!)** ▪ **Lower the lifting boom** **Danger of collision!** To prevent it from colliding with the locking mechanism correct the basket boom's position until positive locking with the locking mechanism is possible. ➢ Make sure to carry out all movements that reduce the load first, otherwise there is a risk of tipping over! ➢ At the same time **constantly check the basket tilt** and correct it if necessary! ▪ **Lower the lifting boom down into the device support** Emvergency levelling: **a)** From the workman basket via **hydraulic emergency operation**, see point 4.5.5, or **b) from the base display unit** ➢ back to the main screen	➢ As doing so, **constantly check the basket tilt** and **correct if necessary by means of EMERGENCY LEVELLING** Emvergency levelling: • Simultaneous pressing of the EMERGENCY OPERATION AND EMERGENCY LEVELLING buttons *=> Levelling of the workman basket into the normal position*



➢ Press the 'Emergency mode' button  on the base display unit

➢ Perform emergency levelling:

- Simultaneous pressing of the EMERGENCY OPERATION AND EMERGENCY LEVELLING buttons

=> Levelling of the workman basket into the normal position

4.5.4 Emergency lowering/operation of the lifting equipment from the secondary/emergency control panel on the base (option)

Risk of accident!

It is your responsibility to control the lifting platform during emergency operation!

In emergency operation the safety shut-off systems are not effective.

It is therefore <u>imperative</u> that you adhere to the safety guidance described at point 4.5.1!

❖ ***Emergency lowering/operation*** *=> What has to be done in order to bring the lifting equipment into the home position:*

1. Connect secondary/emergency control panel (optional)

Remove the dummy connector on the chassis and plug in the connector from the electric secondary/emergency control panel.

=> Emergency operation from the base unit display is then no longer possible

➢ All connections must be made with the vehicle powered down (see point 3.16.5); ignition switched off!

2. Check position of the key-operated switch in the electrics box

➢ Turn key-operated switch (in the electrics box on the left side of the vehicle; optionally on the control panel for hydraulic emergency operation on the right side of the vehicle) to the **'II'** or **'Emergency operation' (I)** position

=> With the secondary/emergency control panel enabled, control from the basket or base control panels is no longer possible, except for 'Emergency Stop' and 'Emergency Levelling'

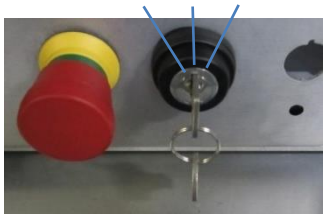
Position I => **Emergency operation**

Secondary control panel (optional) / base unit display

Position 0 => Platform / stabilisation operation - *basket control panel / bas*

Position II => **Secondary operation -** *secondary control panel (optional)*

I 0 II



3. Bringing the lifting platform into the home position

- Control the platform from the secondary control panel.

<table>
<tr><th>Emergency lowering using 'Emergency lowering' button: Key-operated switch in position 'II'</th><th>Emergency operation using joysticks: Key-operated switch in position 'I'</th></tr>
<tr><td>
• By holding down the ALERT button, switch the lifting gear into emergency operation.
• By pressing the  EMERGENCY LOWERING button at the same time, initiate  the movements for emergency lowering.

 The safety shut-off mechanisms are disabled. Risk of accident!
</td><td>
• By holding down the ALERT button, switch the lifting gear into emergency operation.
• By operating the  joysticks at the same time, initiate the desired movements for emergency lowering in the order listed (for joystick assignment see point 3.16.4).

 The safety shut-off mechanisms are disabled. Risk of accident!

How to proceed (keep to this order!):
- Fully retract lifting boom
- Turn basket in center position (home)
- Slew lifting equipment to the centre axis of the vehicle (pay attention to the rotary direction! Always slew in the opposite direction to the last rotary direction in which it moved!)

▪ Lower the basket boom (right before reaching the mechanical end!)

▪ Lower the lifting boom
 Danger of collision! To prevent it from colliding with the locking mechanism correct the basket boom's position until positive locking with the locking mechanism is possible.

▪ Lower the lifting boom down into the device support
</td></tr>
<tr><td colspan="2">
➢ As you do so, constantly check and correct the basket tilt. See remarks below.
➢ Make sure to carry out all movements that reduce the load first, otherwise there is a risk of tipping over!
</td></tr>
</table>

Emergency levelling of the basket:

The **automatic basket levelling** function is switched off during emergency operation! Therefore constantly check the basket tilt and correct, if necessary.

❖ ***Emergency levelling*** *=> What has to be done in order to place the workman basket in a horizontal position:*

➢ By holding down the ALERT button, switch the lifting gear into emergency operation.

➢ By pressing the *EMERGENCY LEVELLING* button at the same time, bring the working basket into a horizontal position.
(Tilt switch detects the direction)

The operator must permanently monitor the workman basket and, if necessary, stop the function!

4. After ending emergency operation

- Set the key-operated switch on the secondary/emergency control panel to the following position

Position **0** => Platform / stabilisation operation
Basket control panel / base unit display

or

Position **II** => Secondary operation
Secondary control panel (optional)

I 0 II

5. Press 'Motor start'

- After emergency operation, press the 'Motor start' button in order to return to normal operating mode.

6. Disconnect secondary control panel from the electrical power supply

- At the end of emergency operation, remove the connector from the electric secondary/emergency control panel on the chassis and reconnect the dummy connector.
  - ➢ All connections must be made with the vehicle powered down (ignition switched off)!

4.5.5 Hydraulic emergency operation of lifting equipment

4.5.5.1 General

In the event of the electric emergency control failing you can initiate lifting equipment movements directly at the hydraulic valves as well (right side of the vehicle).

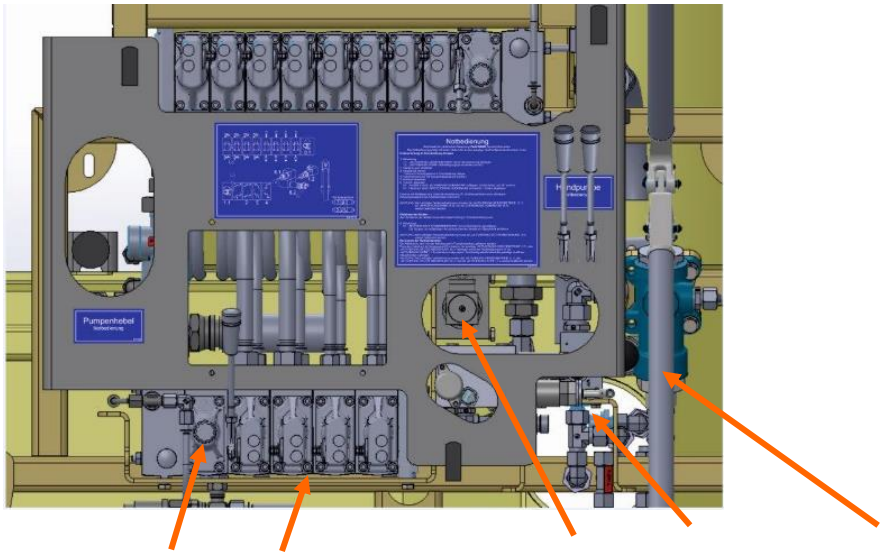


Illustration: ***(1.1) Device control block (1.2) (6.1 & 6.2) Hand pump***

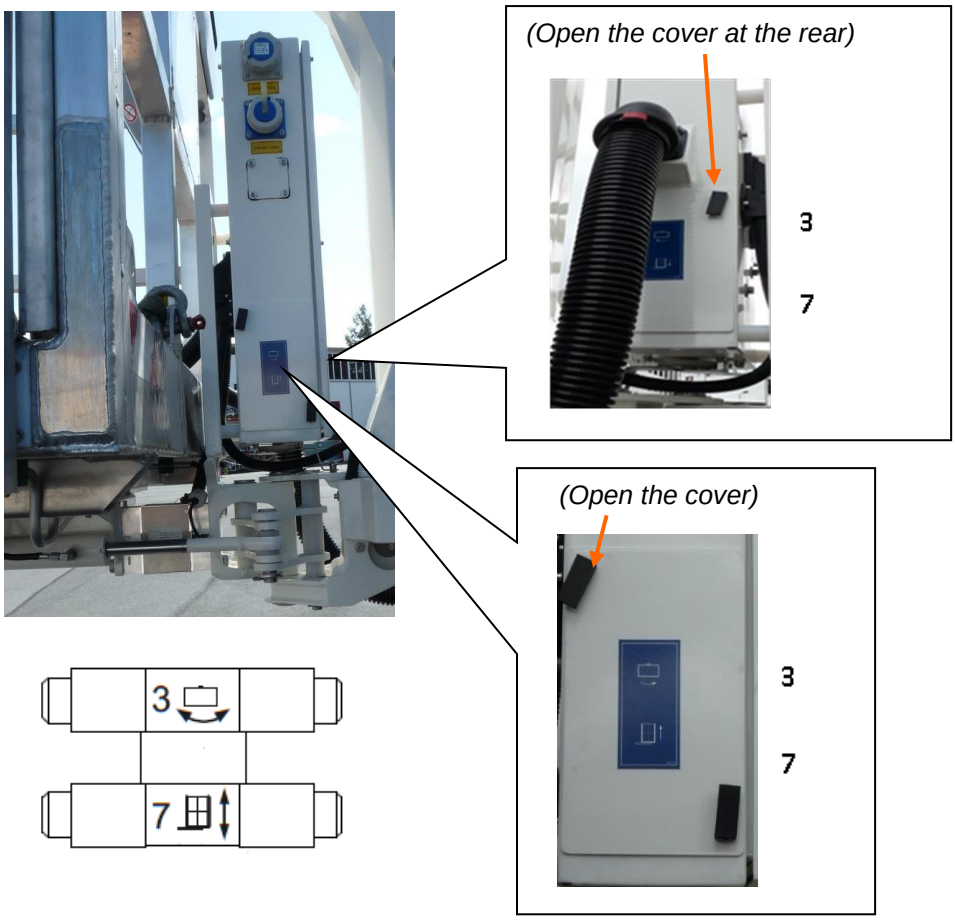


Illustration: ***Basket control block*** *in the P370 KS workman basket*

 The details in the EMERGENCY OPERATION operating instructions must be adhered to!

 **Hydraulic emergency operation may for safety reasons be performed only by professionally trained individuals.**

Risk of burns!

When the unit is being operated from the valve block in an emergency there is risk of burns from the hot surfaces of hydraulic components!

Wear protective gloves!

 **Risk of accident!**

The safety shut-off mechanisms are disabled during hydraulic emergency operation!

This means the following:

- In hydraulic emergency operating mode it is possible to **exceed the tip-over limit**!
- The lifting platform can be moved into prohibited areas.
  There is thus a danger to stability!
- **Risk of collision!** During EMERGENCY operation neither the basket nor any other part of the boom system should touch any obstacles.
- **Danger of tipping!** The ground pressure query does not function in emergency operation!
- **Danger of tipping!** The load torque query does not function in emergency operation!
- The automatic **basket levelling system** is also not functional in hydraulic emergency operation!

Due to this risk of accidents it is imperative to adhere to the following regulations whenever in hydraulic emergency operating mode:

- **Operate the platform with extreme care in emergency cases!**
- **In case of emergency operation always work with great care and in consultation with the people in the basket!**
- **All movements must be controlled slowly, with great care and under constant supervision and monitoring!**
- **Movements reducing the load moment must always be performed first or there is danger of tipping over!**

When operating in emergency mode from the valve block, the 'emergency off' switch cannot be used to interrupt any incorrect operations.

If you have any questions, consult PALFINGER Technical Service by telephone.

4.5.5.2 Hydraulic emergency operation of the lifting platform if electric control system / hydraulic pump fails

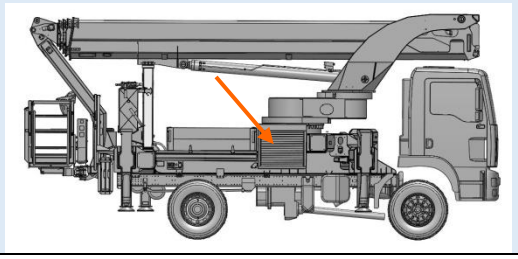
❖ **Using the hydraulic valves, bring the lifting gear into its home position!**

- **As the safety shut-off functions are inactive, adhere wherever possible to the prescribed order / follow the information on the emergency operation sign near you.**
- **Make absolutely sure to carry out all movements that reduce the load first, otherwise there is a risk of tipping over!**

❖ *This needs to be done!*

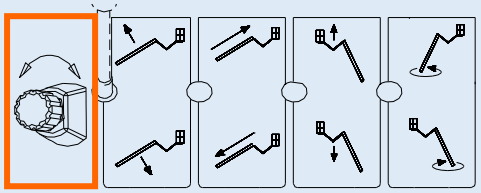
0. Open operator station for hydraulic emergency operation on the right side of the vehicle

➢ Once the operator station has been opened, the lifting platform can no longer be operated from the control panels!

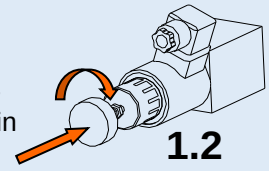


1. Activating hydraulic emergency control

1.1 'DEVICE OPERATION ACTIVATION' **(1.1)** – turn to the right as far as it will go



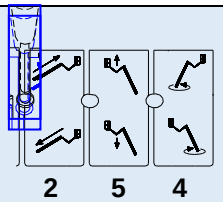
1.2 'BASKET ACTIVATION' **(1.2)** – Turning to the right, screw pin in



in the event that the electric control system should fail:

in the event that the hydraulic pump should fail:
Switch on electrical emergency pump (see point 4.5.7), while simultaneously operating the relevant valves perform the desired platform movements for the emergency lowering.

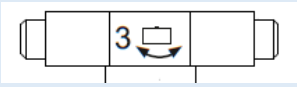
To perform emergency operation, turn the lever to the relevant valve and actuate the following platform movements:



2. Move in telescope completely [valve 2]

3. Turn basket in center position

- By operating **[valve 3]** (pressing pin into valve) on the basket control block, turn the workman basket into a central position (home position)



4. Slew the lifting equipment towards the vehicle's centerline.

- **Slew the lifting equipment towards the vehicle's centerline (valve 4).**

  (Pay attention to rotary direction! Always slew in the opposite direction to the last rotary direction in which it moved!)

5. Lower the basket boom

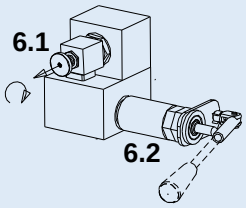
- **Lower the basket boom (right before reaching the mechanical end!) (valve 5)**

6. Lower the lifting boom

- For this the lever must be screwed onto valve 6.2

  6.1 **Operate valve 6.1 'LIFTING BOOM DOWN APPROVAL'** (pull valve and rotate by 90°)

  6.2 By simultaneously operating the lever on **valve 6.2 'LIFTING BOOM DOWN ACTUATION'**, lower the lifting boom



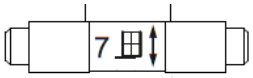
- **Lower the lifting boom**

Danger of collision! To prevent it from colliding with the locking mechanism correct the basket boom's position until positive locking with the locking mechanism is possible.

7. Lower the lifting boom down into the device support

- see point 6.1 and 6.2

- For all platform movements constant adjustment of the tilt **(levelling)** must be performed at **valve 7** (basket control block in the workman basket), i.e. after every movement has been performed, the basket tilt must be checked and if necessary corrected.



After completed emergency operation, the **'DEVICE OPERATION ACTIVATION' (1.1); 'BASKET ACTIVATION' (1.2**) and **'LIFTING BOOM DOWN APPROVAL' (6.1**) must be disabled again. The emergency control stand and basket control block cover must then be closed and Palfinger's support team contacted without delay.

4.5.6 Hydraulic emergency operation of the support equipment

4.5.6.1 General

In the event of the electric control system failing, it is also possible to return the stabilisation system to the transport position directly from the hydraulic valves (on the right side of the vehicle).


The details in the EMERGENCY OPERATION operating instructions must be adhered to!


Hydraulic emergency operation may for safety reasons be performed only by professionally trained individuals.


Observe the movement range as the supports are extended and retracted. **Risk of getting crushed!**


Risk of burns!

When the unit is being operated from the valve block in an emergency there is risk of burns from the hot surfaces of hydraulic components! **Wear protective gloves!**


Retracting the stabilisers without the lifting equipment being down in its support is prohibited!

- **If you have any questions, consult PALFINGER Technical Service by telephone.**

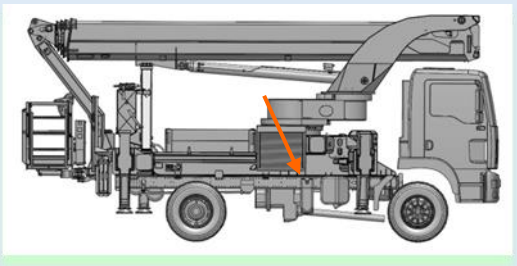
4.5.6.2 Hydraulic emergency operation of the stabilisation system (if electric controls / hydraulic pump fail)

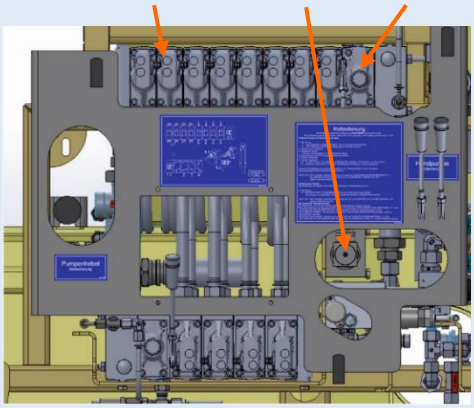
In the event of failure of the electric control system, bring the stabilisation system into transport position in the order stated**:**

Before moving the stabilisers in, the lifting equipment must be in transport position!

0. Open operator station for hydraulic emergency operation on the right side of the vehicle

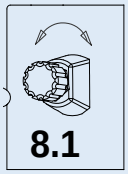
Stabilisers control valve block (1.2) (8.1)





➢ Once the operator station has been opened, the lifting platform can no longer be operated from the control panels!

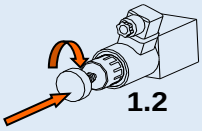
8. Activating hydraulic emergency control of the stabilisation system



8.1 'Stabilisation system ACTIVATION' **(8.1)** - turn to the right as far as it will go

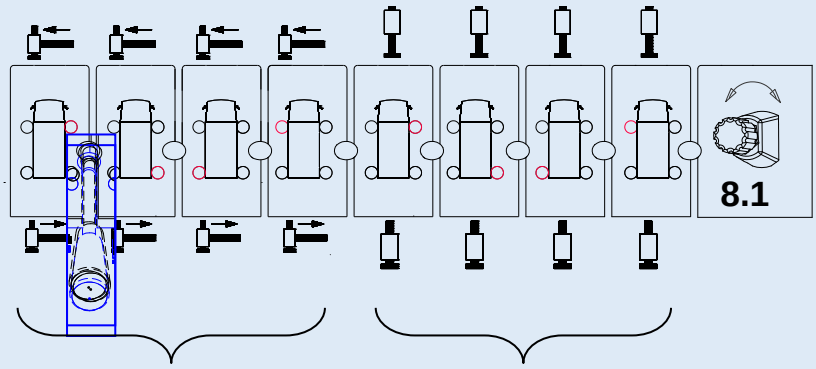
- Only if the hydraulic pump fails:

Turning it to the right, screw in 'BASKET ACTIVATION' pin **(1.2)**



in the event that the electric control system should fail:	**in the event that the hydraulic pump should fail:** Switch on electrical emergency pump (see point 4.5.7), while simultaneously operating the relevant valves perform emergency operation of the stabilisation system.

To perform emergency operation, plug the lever onto the relevant valve and control the following movements of the stabilisers / stabiliser outriggers:



(10) Stabiliser outriggers in **(9) Stabilisers in**

10. Retract stabilisers

By operating the respective **'Stabilisers In'** valves, retract stabilisers as far as they will go. In order to avoid any extreme tilting, move the stabilisers alternately

The vertical stabilisers must be in the transport position before the stabiliser outriggers can be moved!

11. Retract stabiliser outriggers

Then retract the stabiliser outriggers by operating the respective **'Stabiliser outrigger in'** valves until they are in the transport position.

After completed emergency operation, **'STABILISATION MODE ACTIVATION' (8.1);** and (if enabled), **'BASKET ACTIVATION' (1.2**) must be disabled again. The emergency control stand must then be closed and Palfinger's support team contacted without delay.

4.5.7 Electrical emergency pump

- In the event of vehicle motor failure

If the hydraulic pump or the vehicle's motor fails, an alternative pump unit can be switched on using the *ELECTRICAL EMERGENCY PUMP* buttons on the 'Basket' control panel or 'Secondary/emergency control panel (optional)'.

The electrical emergency pump is powered by the vehicle's battery. It should therefore only be used in an emergency to lower the work platform or to retract the stabilisers.

❖ *What needs to be done to start the electrical emergency pump:*

Switching on the electrical emergency pump from the basket control panel		**Switch on the electrical emergency pump from the secondary / emergency control panel**	
	Using this button, you can start an ***ELECTRICAL EMERGENCY PUMP***. *- Activate emergency pump => Hold down button* *=> The electrical emergency pump gets switched off after 30 seconds. The function is reactivated by pressing the button again and holding it down.* *- After emergency operation, press the 'Start motor' button (LED flashes)*		Using this button, you can start an ***ELECTRICAL EMERGENCY PUMP***. *- Activate emergency pump => Hold down button* *=> The electrical emergency pump gets switched off after 30 seconds. The function is reactivated by pressing the button again and holding it down.* *- After emergency operation, press the 'Start motor' button (LED flashes)*
➢ All movements can be started as usual as described at point 4.4.			

Note: If additionally a sensor error or similar occurs, carry out emergency operation as described in chapter 4.5.2.

As this pump is operated electrically, attention should be paid to the vehicle battery's state of charge.

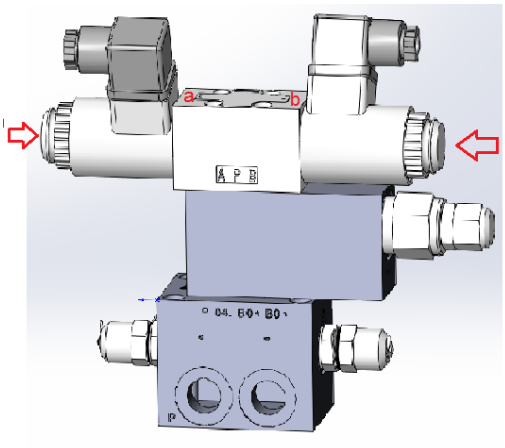
The 24V electric emergency pump may only be used in case of failure of either the hydraulic pump or the vehicle motor! Operating the hydraulic pump / main pump and the electrical emergency pump simultaneously is prohibited!

The **maximum period of operation** should not exceed **6 minutes per hour**. Not following the prescribed operating times can result in the electrical emergency pump overheating!

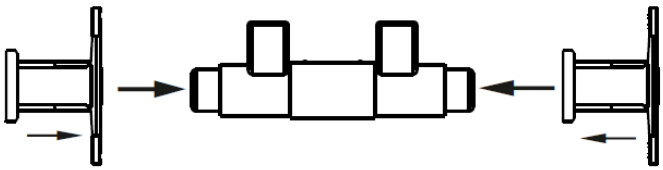
4.5.8 Hydraulic emergency operation of undercarriage protection (option)

In the event of the electric control system failing, it is also possible to control the undercarriage protection directly via the hydraulic valve of the undercarriage protection on the rear.

Unfold undercarriage protection protection
(Retract cylinder)



Fold undercarriage
(Extend cylinder)



Risk of getting crushed! When operating the emergency controls do not stand in the area where the rear undercarriage protection may move!

Options

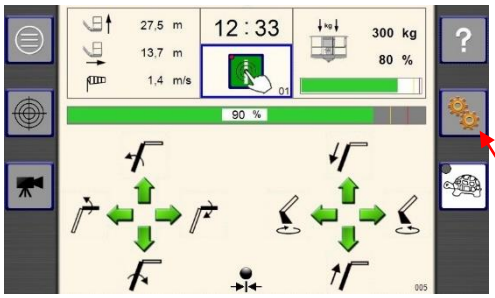
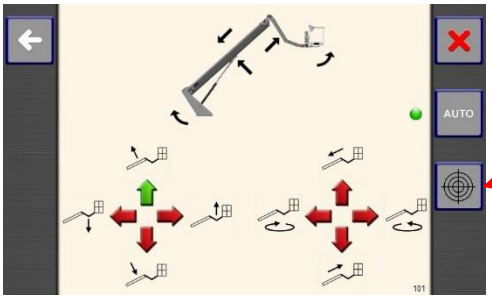
5 OPTIONS

5.1 OPTIONS OF THE PREMIUM CLASS

5.1.1 Memory function

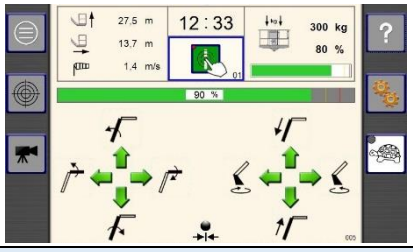
Using the memory function, it is possible to store a particular position of the workman basket and, if needed, to move into it again.

❖ *This needs to be done!*

Store target position	
	*- Move workman basket via joystick control into the desired position* *- Press the OPTION button* *=> Switch from main window 005 to option menu 100*
	*- Press MEMORY button*  *=> Memory menu 101 opens*
	*- Move workman basket via joystick control into the desired position* *- Press MEMORY button*  *=> Position is stored* *- Press MEMORY button*  *and keep pressed* *=> Switch straight to the main window 005* • *stored point is shown in main window 005* • *Switching straight from main window 005 to Memory menu 101 possible, see below.*

❖ *This needs to be done!*

Move to target position using memory function



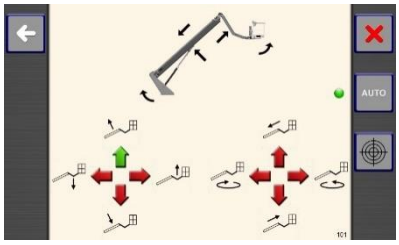
Switch from main window 005 to memory menu 101

- Press MEMORY button  *=> Memory menu 101 opens*

Scenario 1:
Automatic mode act

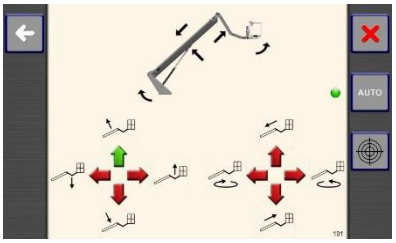
Umschaltung über Taste F6

Scenario 2:
Automatic mode inactive:



- Direct workman basket via LIFTING BOOM UP joystick control into the desired position

❖ *The system automatically moves to the saved position.*



- Direct workman basket via joystick control into the desired position in the order you choose.

Movement enabled

Movement blocked

❖ *The arrows indicate the functions to be actuated to reach the target.*

➢ In the target area the movements are dampened as they reach the stop position.

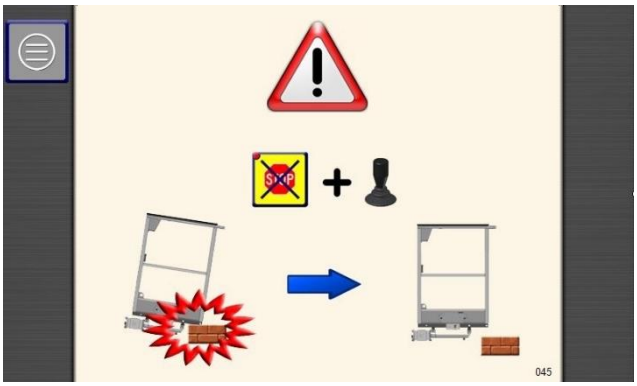
➢ The position has been reached when all arrows go out

5.1.2 Basket landing protection

In the event of the workman basket unintentionally touching down on anything, the control system stops all movement and the operator gets a message on the display.

The sensory system is not able to cover all impact directions and all obstacles. The basket landing protection function is no substitute for the operator handling the lifting platform in a careful manner!

❖ *This needs to be done!*

Basket landing protection has responded	
	- Basket landing protection has responded => *Window 045 opens* - Bypass operational shutdown => *Hold down and keep pressed the CANCEL STOP button, while carefully activating the movement to release the basket using the joystick.* ***Caution: Risk of collision!*** You use the *CANCEL STOP* button on your own responsibility!

5.1.3 Powerlift System

5.1.3.1 Set-up and load capacities

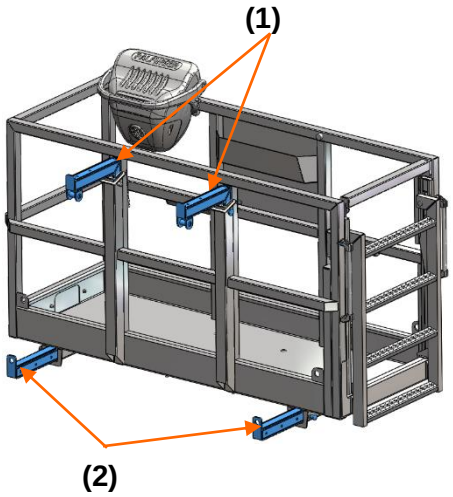
➢ The Powerlift system serves to pick up and secure loads.

Use the Powerlift system only to pick up and secure goods!

It consists of four load-bearing elements (**load handling attachment**):

Standard basket with Powerlift system

- 2 pull-out **load-bearing cross beams (2)**
- 2 pull-out **load booms (1)**

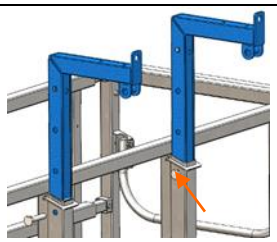
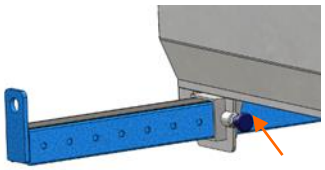


- Maximum basket load **without** Powerlift system: **500 kg**
- Maximum basket load **with** Powerlift system:

Nominal load in workman basket:	**170 kg**
Load handling attachment in total:	**150 kg**
Total:	**320 kg**

- Maximum payload **per** item of load handling attachment: **150 kg**
- Maximum payload of **all** items of load handling attachment in total: **150 kg**

Do not exceed the maximum nominal load of the workman basket!

Load boom	Load-bearing cross beam
	
Socket pin	**Locking pin**

It is possible to put down load on the cross beam and/or to attach it to hooks at the load booms.

For varying load dimensions the booms / beams can be adjusted by pulling out the socket / locking pins and pushing them in another hole.

After the load booms and/or telescopic segments have been adjusted, all locking pins must lock in perfectly for proper securing.

5.1.3.2 Regulatory information and safety instructions on how to use the Powerlift system

The operator must without fail observe and adhere to the following regulatory information and safety instructions **before, during** and **after** using the Powerlift system:

- **Taking up any load during operation of the lifting gear can in essence lead to the gear being damaged or tipping over!**

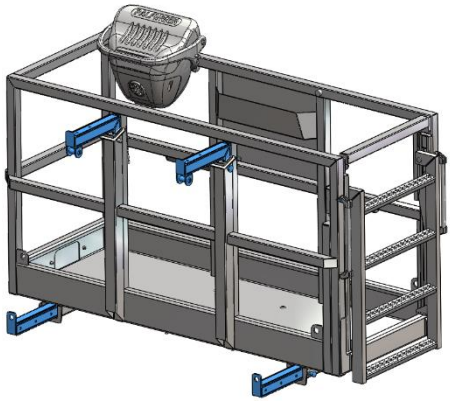
Before use of the Powerlift system:

- Thorough assembly of the Powerlift system in the working position - refer to illustrations.
- Proper mounting of load booms and load-bearing cross beams, i.e. all socket/locking pins must lock in perfectly.
- Sufficient lighting of the surrounding area of travel and use in order to prevent collision.
- Secure the transported goods sufficiently (using straps). This is in the operator's responsibility!

Use only load handling attachment suitable and tested for the load case.

Risk of getting crushed!
During the load-carrying process the areas near and under the load present a risk of getting crushed.

Risk of accident!
It is prohibited to stay in the danger zone of the Powerlift system!



Working position - Powerlift system with standard basket

During use of the Powerlift system:

- It is a mandatory requirement to use safety harnesses, as the telescopic system may swing up like a catapult if the load works loose (make use of the lashing eyes provided). Keep the stay rope as short as possible (observe without fail the instructions given under 2.5!).

  ➢ A safety harness will prevent the operator from falling out of the basket, which is a frequent cause of serious injury and death, even at low heights!

-  In order to guarantee the platform's stability, the load may **only** be attached **when the upper boom is retracted** (if upper boom available, depending on platform type). Only then extend the platform to its reach.

➢ The slings may only exert vertical traction on the Powerlift system.

- The carried (attached) load's maximum allowable surface exposed to wind is 4,8 m² at maximum wind speed of 11.5 m/s.

  4.8m² maximum wind exposure area = basket width (without telescopic segment) multiplied by operators' body height (2m).

- Make sure that the weight is evenly distributed in the basket!

 In use the maximum nominal load in the workman basket reduces (see Point 5.3.1)!

-  **Risk of getting crushed!**

  Avoid operating situations, in which there is any danger of being crushed by the Powerlift system for you or for bystanders. When travelling with the workman basket, limbs may get crushed between platform and Powerlift system.

  Before moving off the platform, the operator must warn any bystanders so that they may leave the danger zone or change their positions well in advance!

  Observe the relevant safety distances between parts of your body and potentially dangerous spots (refer also to 2.5[10])!

   If the distances are not observed, there is risk of bodily or even fatal injury!

   **Risk of collision!**

  While working, avoid all situations where parts of the Powerlift system might collide with the platform. This may cause damage to and hence failure of the Powerlift system. Therefore push in or even disassemble the Powerlift system before moving the platform into the transport position.

What is not allowed:

- **To exceed the maximum permissible load weight, as this may cause the platform to tip over or damage the workman basket;**
- **To use the load boom for anchoring the platform against buildings;**
- **To operate the system during thunderstorms;**
- **To make the load booms or cross beams longer;**
- **To transmit forces to the Powerlift system using lifting equipment;**
- **To pull loads at an angle or transversely, (danger of tipping over!);**
- **To stand under any suspended loads.**

After use of the Powerlift system:

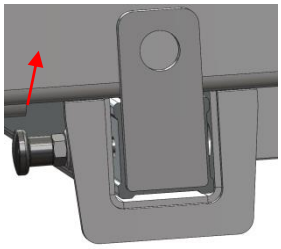
Risk of collision!

Before folding the lifting platform (including basket extension) into the basic position push in the Powerlift system or move it in transport position.

In order to prevent any damages to the lifting platform, absolutely put the Powerlift system in transport position first. Only after this retract the basket extension and put the basket boom down as per below descriptions:

Cross beams (2):

After use of the Powerlift system push in the load-bearing cross beams to the depicted positions and secure them with locking pin (see illustrations).

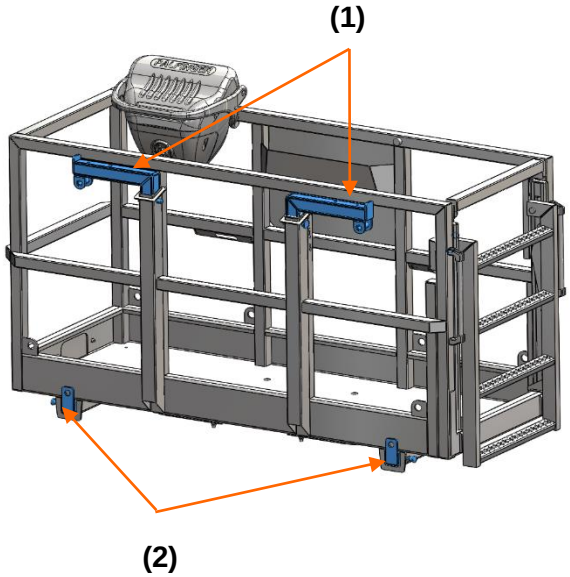


Load boom (1):

After use of the Powerlift system undo the load booms and turn them in the depicted positions, finally secure them with socket pin (see illustration).

Powerlift system in transport position

(standard basket)



5.1.4 Hydraulic work port inside the workman basket

5.1.4.1 General

The hydraulic work port inside the basket is used for hydraulically powered accessories, tools etc.

You may not use any equipment attached to the hydraulic work port inside the basket that is not approved for the same oil type as contained in the respective PALFINGER PLATFORMS lifting platform's hydraulic oil container (cf. plate on tank lid)!
Biologically degradable oils may not be mixed, not even within a group.
Note, too, that inside the accessories there may be residual oil of possibly different specifications. PALFINGER PLATFORMS do not accept responsibility for any damage to accessories or to the lifting platform attributable to the use of the wrong type of oil. After disconnecting the accessory device, always close off the sockets using the dust caps!

The following advices must definitely be observed and adhered to when using the hydraulic work port:

- The operator must carefully read the hydraulic unit's operating instructions and in particular adhere to the safety regulations when connecting and disconnecting the unit.
- Connected hydraulic units must not contaminate the platform's hydraulic system.
- **Only activate the hydraulic work port when there is a consumer unit connected.**
- Before **disconnecting,** discharge the hydraulic unit (with the motor not running, actuate the hydraulic unit to relief pressure).
- When **disconnecting** the hydraulic connectors check whether the lines and fittings are hot. (Risk of burns)
- Do not mix different oils. This may impair the motion functions of the platform and its safety functions. Change the oil in the hydraulic units using the platform's oil type and rinse the unit. (Oil types: refer to order-specific datasheet in the operating instructions.)

During breaks in work with the motor running, switch off the hydraulic work port.

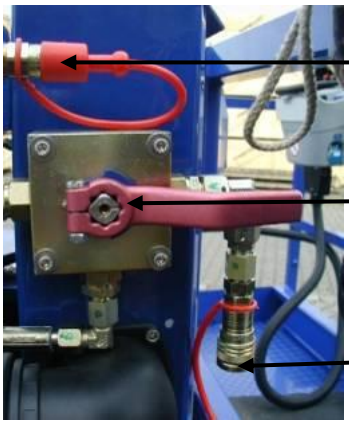
When moving the device out of the lifting boom support the hydraulic work port must be off (see above).

Note:

- The oil temperature must not exceed 60°!
  - ➢ It is possible to prevent unnecessary heating up of oil by disconnecting the hydraulic port immediately when not in use.
  - ➢ Observe the oil temperature warning indicator!

5.1.4.2 Start-up

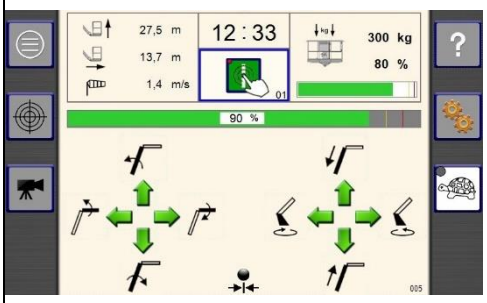
1. Take dust caps off both quick-connect couplings and connect the accessory hydraulic device onto them (cf. picture). **Make sure to connect to the right side!**



2. Open the ball valve (set to the vertical).
3. Open the display window and activate the hydraulic work port (see next page).
4. Take it out of operation in reverse order.

The hydraulic work port is branched off from the lifting platform's levelling circuit. When it is in use the rates of movement are therefore reduced.

Hydraulic work port – On / Off



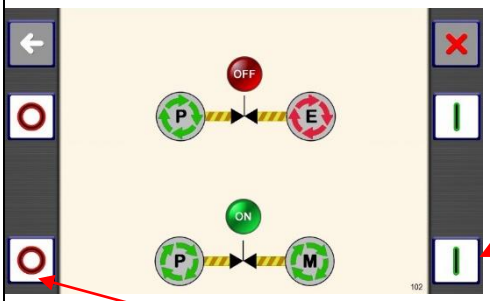
- Switch from main window 005 to option menu 100

- Press the OPTION  *button*

=> Options menu 100 opens

- Press the hydraulic unit  *button*

=> Hydraulics menu 102 opens



- Press HYDRAULIC WORK PORT ON button 

=> Hydraulic pump is activated

Signal: ON **Function on**

OFF **Function off**

- Press HYDRAULIC WORK PORT OFF button 

=> Hydraulic pump is deactivated

Safety instructions:

- It is imperative to connect the quick-connect couplings (plug-in couplings) correctly.
- When disconnecting the hydraulic work ports avoid skin contact with any escaping hydraulic fluid.
- Protect hydraulic lines from mechanical damage!

5.1.5 400V electrical unit

With the 400V electrical unit you can connect an alternative pump drive. This is recommended everywhere where diesel motors cannot be used due to noise and exhaust gas emissions.

Before switching on the 400V unit the operator should ensure that the ball valves are open and all the hydraulic lines are correctly connected.
Otherwise the hydraulic pump can run dry and be destroyed.
Additionally all electrical lines must be connected with the working platform.

5.1.5.1 Start-up

A **C** **B**

1. Connect the switchbox with a 400V line.

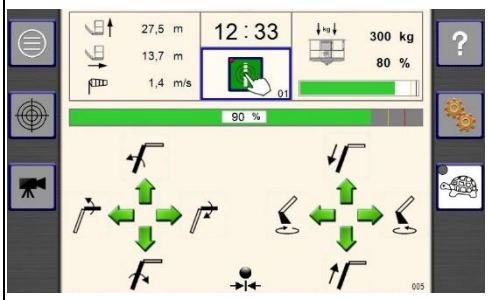
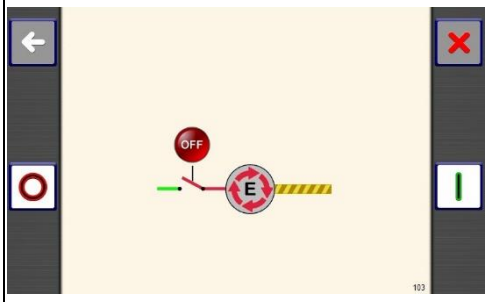
2. Switch the unit to ready-for-operation on the main switch A.

3. If the warning light B is on, then the phases are crossed.
In such a case it is not possible to operate the electrical unit.
Switch off the main switch, pull the three-phase current plug and turn the phase inverter in the socket by 180° using a screwdriver. Plug connector in.
After switching the main switch on, the electrical unit is ready for operation and can be started via graphics display (see next page).

4. Alternatively you can switch on the unit directly at the switchbox via I/O switch C. This becomes necessary if you want to operate it from the secondary control on the swivel table.

The battery charger in the switchbox must always be switched on.

❖ *This needs to be done!*

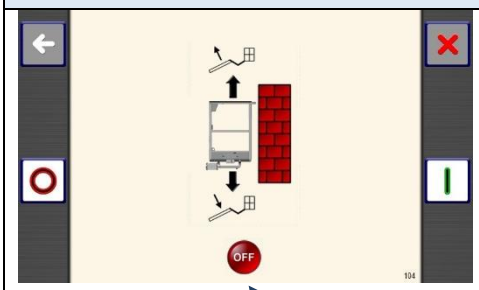
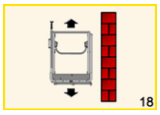
Electric generator on/off	
	*- Switch from main window 005 to option menu 100* *- Press the OPTION*  *button* *=> Options menu 100 opens* *- Press the ELECTRIC GENERATOR*  *button* *=> Electric generator menu 103 opens*
	*- Press the ELECTRIC GENERATOR ON*  *button* *=> Electric generator is switched on* *- Press the ELECTRIC GENERATOR OFF*  *button* *=> Electric generator is switched off*
Signal:  **Function on**  **Function off**	

5.1.6 Vertical parallel travel

This assistance function enables automatic vertical movement of the workman basket.

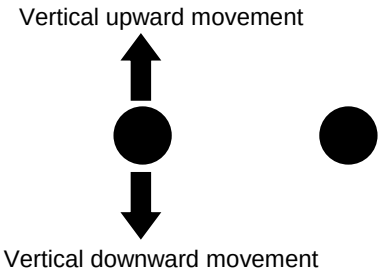
Launch **'Vertical parallel travel'** function:

Main window 005 is open:  ***window 104*** *opens*

Vertical parallel travel on / off	
 Current status Parallel travel **Signal:** **Function on** **Function off**	*- Push the button VERTICAL PARALLEL TRAVEL ON* *=> vertical parallel travel gets switched on* *=> activated parallel travel is indicated by this symbol in the top right corner of the display window:*  *- Start the required platform movement (up / down) in parallel to the object via joystick for lifting boom, refer to joystick configuration* ➢ *All other movements are blocked when vertical parallel travel is active* *- Push the button 'VERTICAL PARALLEL TRAVEL OFF* *=> vertical parallel travel gets switched off*

With activated vertical parallel travel it is impossible to make any other movements with the lifting platform.

Joystick configuration:



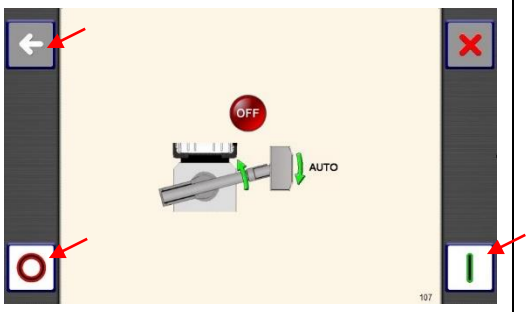
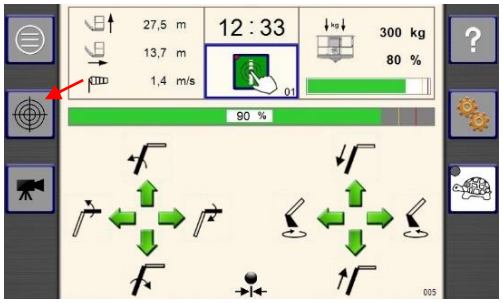
5.1.7 Automatic basket rotation

This assistance function enables automatic horizontal movement of the workman basket.

Launch **'Automatic basket rotation'** function:

Main window 005 is open: → → → ***window 107** opens*

Note: When 'Automatic basket rotation' is activated it is not possible to activate the Memory function.

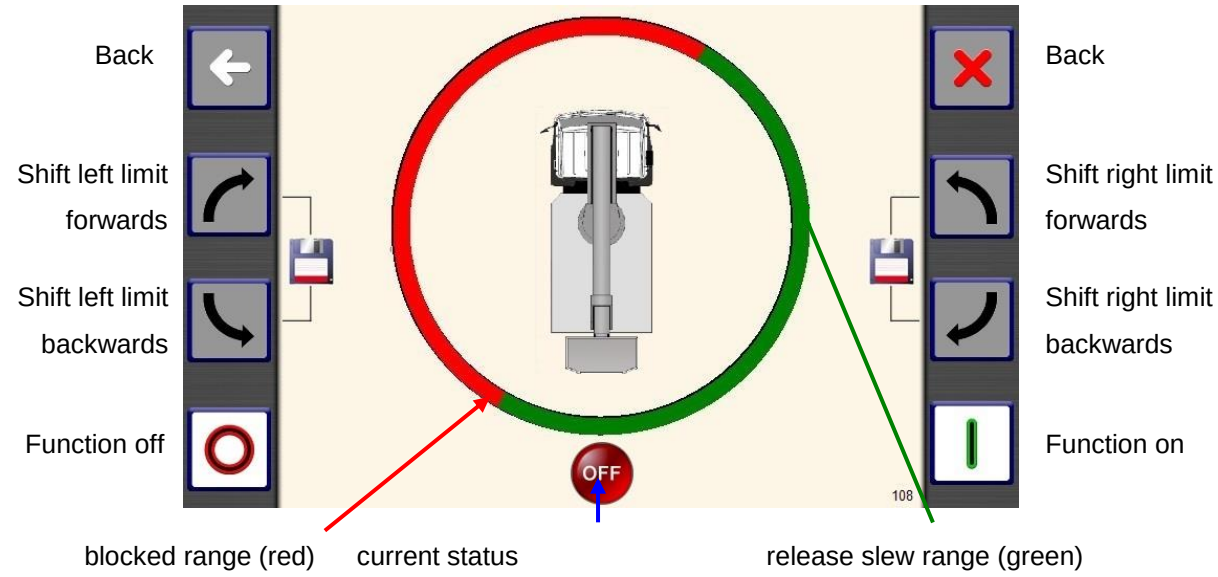
Automatic basket rotation On/Off	
	*Switching on the function:* ▪ ***Move workman basket via joystick control into the desired position.*** ▪ ***Press the button*** *=> The selected function gets activated (switched on)* *How to save a new basket position:* ▪ ***Back to main window 005*** → → → *window 005 opens* ▪ ***Press the MEMORY button*** *=> the current basket position gets saved* *=> A visual signal is shown (symbol flashing)* *=> While the unit is slewing the basket holds its position or also rotates automatically (remains parallel for instance to a wall).*
	How to save a new basket position: **1.** *Switch off the function (as per instructions to the right).* ***2.*** *Move workman basket via joystick control into the desired position.* **3.** *Switch on the function and save the new basket position (as per instructions to the right).*
	Switching off the function: ▪ ***Press the OFF button in window 107*** *=> The selected function gets deactivated (switched off)*

5.1.8 Limiting the working area

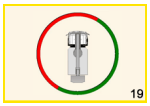
This assistance function allows the user to limit the slewing motion at the display.
Consequently slewing unintentionally in road traffic can be prevented.

Launching the function: **Limiting the working area:**

Main window 005 is open:  ***window 108** opens*



Activate the function by pressing the button 

⇨ When the function is active this is shown in the main window 005 in the right upper information window that displays the following: 

Deactivate the function by pressing the button 

⇨ If this function is inactive, the full slewing range is available.

Note: The current status  of the function gets shown on screen 109 (bottom section).

Setting the slewing range:

Setting manually	Setting using workman basket positioning
▪ Launch the 'Limiting the working area' function => window 108 opens ▪ Activate the function by pressing the button ▪ Move the slewing limits by using the arrow buttons on the left and right side of the display window => values you have set get automatically saved	▪ Move the workman basket all the way to the desired limit position. ▪ Launch the 'Limiting the working area' function => window 108 opens ▪ Activate the function by pressing the button ▪ Save the value(s) set by pressing simultaneously on the two arrow buttons (left or right)
⇨ If active, this function allows slewing within the set limits only.	

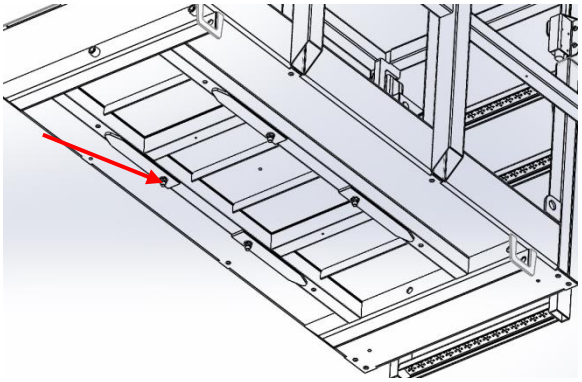
Note: The set values and the function's status (on/off) are kept even when turning the ignition on/off.

5.1.9 Basket change

➢ Any basket must be approved for the relevant access platform, see inspection log book.

1. Remove basket control panel from basket edge and place on basket floor

2. Loosen the fixing bolts on the carrier and remove the basket (see standard basket sketch).



3. Push control panel out between basket floor and knee rail

4. Push control panel into the replacement basket between basket floor and knee rail and set it down in such a way that it cannot get damaged.

5. Put on the replacement basket and fix using the relevant securing elements.
It is <u>imperative</u> that you heed the following notes:

a. Use the correct screws and nuts

b. Tighten nuts using the prescribed torque
- Aluminium basket = 80 Nm
- Pruning basket = 80 Nm
- Plastic basket = 50 Nm

c. When fixing it place the basket clean and flat onto the carrier.

6. <u>Pruning basket only</u>: Stow the protective hose wound up in the box provided (in the basket) in order to avoid any **trip hazard**!

7. Control panel

a) For the pruning basket, set up and brace in the prescribed position

b) For the standard basket, set up and brace in the basket in such a way that it does not get destroyed by the lifting equipment when moving into the transport position.

8. Setting basket **parameters**

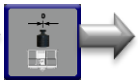
Precondition:
- Basket has been changed over
- Control panel is set up and connected
- During the parameter setting process, all removable add-on parts (e.g. the power lift system) are <u>not</u> on the basket!

The settings are made in the PIN-protected area; see section 3.14.4.9.

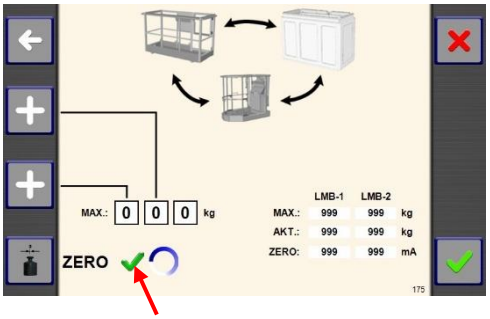
Launch **'Basket change'** function:

Main window 005 is open: 

***window 171** opens*

Main window 171 is open  *window 179*  ***window 175** opens*

Basket parameter settings



1. Set the basket's maximum weight via PLUS – buttons (see load sign in the basket)

2. Confirm using button

3. Save the basket's own weight (tare)
   Precondition: - Basket must not be touching the ground
   - Basket must be empty
   - Basket must be attached to the basket load cell
   - Truck engine must be stopped

- Specialist must lean over the basket rail from the outside and press the F4 ZERO key and the F8 acknowledge key at the same time, let go and move away from the basket.

=> Current tare saved after c. 5 seconds

➢ Run a test under safe conditions to check it works.

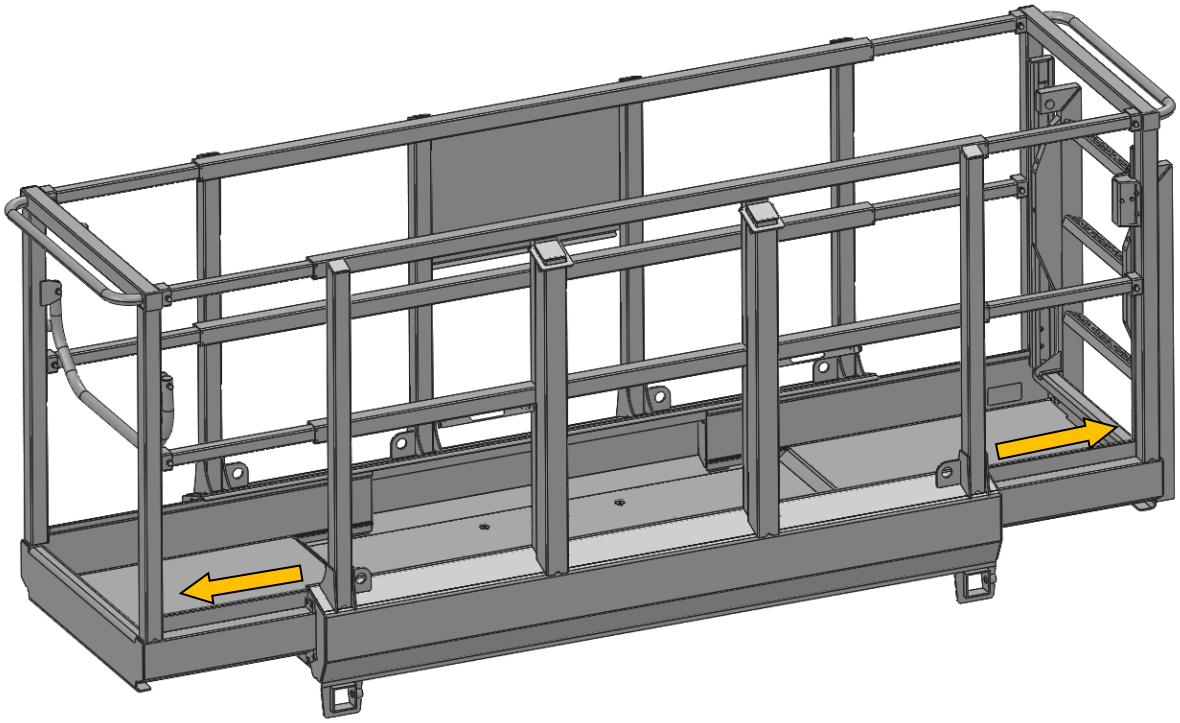
5.1.10 Plastic basket

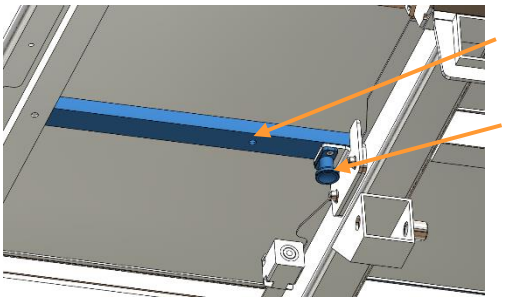
To ensure stability of the plastic baskets make sure the door is always firmly locked.
Promptly repair any damages to the basket, yet open GRP laminate will absorb water.
Consequently, the basket may lose its insulation properties.

5.1.11 Telescopic workman basket

The telescopic workman basket can be extended mechanically on both sides.

During extending and retracting no persons are allowed in the workman basket!





(**L**)

(**F**)

➢ Before extending or retracting release the appropriate spring cotter (**F**), and after, absolutely, snap it in the provided holes (**L**).

Risk of getting crushed!

Wear protective gloves when extending or retracting the basket mechanically.

Ensure an even weight distribution in the workman basket when the basket is being extended!

General

Maintenance Instructions

6 GENERAL MAINTENANCE INSTRUCTIONS

6.1 GENERAL

The keeper must contact the vehicle manufacturer in the event of warranty claims relating to the vehicle chassis.

Regular and careful servicing must be carried out to maintain the guarantee for the PALFINGER PLATFORMS lifting platform but also after the warranty period has expired. This guarantees greater functional reliability and increases the service life of important parts. Only qualified persons who are familiar with the manufacturer's maintenance instructions should be entrusted with servicing lifting platforms.

- Ensure compliance with the relevant safety regulations when carrying out maintenance.
- The working platform should be taken out of service prior to the start of maintenance work and safeguarded against being started up accidentally and from unauthorized persons.
- The lifting platform should be secured against unintended changes in position and movements before the safety systems are taken out of service and before dismantling any load-bearing parts for repair.
- It should be ensured that the lines are free from pressure and the pump is not connected before any work is carried out to the hydraulic lines.
- The battery should be disconnected, provided it is not required for testing or for isolating faults, before any work is carried to the lifting platform's electric system components.
- If tops or covers are removed for maintenance purposes, the utmost care must be exercised with any exposed points where there is a risk of crushing and shearing.
- Changes during servicing and maintenance work, e.g. repair of accidental damage, which affect the stability, strength or operation, require the approval of PALFINGER PLATFORMS.
- All signs and notices must be maintained to ensure they are legible.

Collect any oil and fuel during maintenance work and dispose of it in an environmentally sound manner. Do not allow anything to escape into the ground or into the sewage system.

Emptying oils (including bio oils) into the natural environment is prohibited!

6.2 CLEANING AND CARE OF THE PALFINGER PLATFORMS LIFTING PLATFORM

Regular cleaning and professional maintenance will preserve the value and keep the lifting platform in a working condition.

6.2.1 Washing

Washing is necessary in order to keep the platform in a clean and visually acceptable condition. The intervals may have to be reduced for extreme applications.

Risk to life!

Lifting platforms with a high voltage system (electric system with a voltage over 24 V) may only be washed, if the additional equipment (Hatz motor, 230/400 V electric unit etc.) is switched off

Only clean the lifting platform on a suitable washing station.

Follow environmental protection regulations!

6.2.2 High-pressure cleaner

To avoid any damage to the hydraulic components they must not be cleaned using high pressure!

- Follow the manufacturer's operating instructions when using high-pressure cleaners.
- Always move the jet of water during cleaning.
- Do not direct the water jet at units that are still warm from operation (e.g. magnetic coil).
- Do not aim any high-pressure jet directly at the gap in the door, at electric components or at any plug connectors, as this may damage seals allowing water to get in.
- Do not clean using high-pressure cleaners during the first 6 weeks following painting.
  Thereafter observe the minimum distance between high pressure nozzle and the object to be cleaned:
  - For rounded jet nozzles approx. 700 mm.
  - At 25° flat stream nozzles and dirt grinder approx. 400 mm.
- After cleaning with a high-pressure cleaner or any degreasing agent, lubricate outriggers and/or telescopic boom sliding surfaces (see oiling and lubricating schedule)

Risk of corrosion!

The interior of the extension system may not be cleaned with high-pressure cleaners, steam jet equipment or similar and may also not come into contact with cold cleaners, corrosive or aggressive agents or agents containing chlorine or acid, such as P3.

Corroded ropes can break!

We cannot accept any liability or provide any warranty for damage to paintwork, electrics or material that occurs because the instructions have not been followed.

6.2.3 Paint treatment

Touch up any damage to paintwork immediately to prevent rust developing beneath the paint.

Maintain the lifting platform's paintwork in good time.

Major damage to paint and metal must be repaired in the responsible special service workshop.

Reactions to paint can occur in conjunction with bio-oils with mountings on Daimler-Chrysler chassises. The manufacturer will not accept any liability here.

6.3 OILS AND GREASES

For topping up, use only the hydraulic oil used to fill the system when it was delivered or the oil given in table 3.1.3. Follow the information notice on the hydraulic oil tank.

6.3.1 Using different hydraulic oils on your PALFINGER working platform

Any use of different oils needs to be approved by PALFINGER PLATFORMS. In such a case always contact the PALFINGER Technical Service!

➢Before you decide on a different oil, it is essential to consider the guidance below!

Before using a different oil it is necessary to check the important criteria below in order to make sure it is compatible with your hydraulic system and does not impair its functional safety.

The inspection is based on the hydraulic oil used on your working platform when it was delivered or the oil you are using now.

1.) Base oil

Hydraulic base oils can be mineral oils as well as ester-based or polyalphaolefin-based synthetic oils. Always use oils with the same type of base oil.

When you change the type of base oil (e.g. from mineral oil to biodegradable oil) observe the relevant guidelines. Do not mix differing base oils.

2.) Viscosity

Viscosity is an important property regarding functionality and reliability of your working platform.

If viscosity is too high (oil too thick) efficiencies go down. So, in winter the pump can run dry. Because of the lengths of lines within the unit the working platform will not reach its performance.

If viscosity is too low (oil too thin), this may result in insufficient lubricity or a drop in performance of the hydraulic system because of increased leakage losses. At the same time the hydraulic system's temperature rises in your working platform.

3.) Additivation

Additives significantly determine the hydraulic oil's properties. Large deviations may occur between products of various manufacturers even if the oils are of the same type. As the oil manufacturers made in some cases considerable changes to the oil additives, it is not possible to evaluate oils of the same product name only according to the standard description, product information or safety datasheet.

For instance the zinc content was reduced in additives. Zinc served as an anti-wear high pressure additive that at the same time reduced friction. After it has been dropped a stick-slip effect may occur in slow motions.

Therefore a detailed list of additives or an oil analysis are needed to evaluate the compound.

Relevant information is available for all oils used at Palfinger Platforms GmbH. To evaluate any new oils or hydraulic oils not used so far comprehensive information is needed. If it is missing Palfinger Platforms GmbH cannot say anything about the application of this hydraulic oil in your working platform.

Please, remember that considerable problems may arise if you top up your system with any product that differs from your current hydraulic oil. For instance do not mix zinc-free oils with zinc-containing hydraulic oils.

More important notes:

No warranty is taken regarding the flawless operation of your working platform if you use new hydraulic oils or oils that have not been used by Palfinger Platforms GmbH before. The same applies to the change from mineral oils to a biodegradable hydraulic oil based on synthetic ester. The increased ability of this medium to dissolve dirt may lead to deposits getting washed off. They have to be strained off. This clearly shortens the life of the filter elements. Finally, this may even lead to leakages on piston seals and similar components.

Bio-oils

We urge you to observe the advice given in the above section as well as the oil manufacturers guidelines before changing from mineral to bio-degradable hydraulic oils or vice versa.

Biologically degradable oils may not be mixed, not even within a group.

- Free acids are released by a process of hydrolysis when the bio-oils are combined with water. These can attack non-ferrous metals and standard sealing materials. The water content should therefore be less than 0.1%.
- As the ester-based bio-oils have a high capacity for releasing dirt, the filter elements should be inspected again and replaced after around 50 hours.

In accordance with VDMA Directive 24569, for a biologically degradable oil (Panolin HLP synthetic 15/22, Plantolube polar 15S/22S) mixtures with a maximum of 2% mineral-based lubricants are permitted. The manufacturer permits mixtures of up to 5% (observe the warranty conditions of the oil manufacturer).

Even the environmentally friendly hydraulic liquids are subject to special regulations regarding disposal (disposal in accordance with the Waste Act) and must be disposed of in accordance with statutory regulations.

Emptying bio oils into the natural environment is prohibited!

6.3.2 Grease

Use a high pressure grease for lubrication, lithium soap (Penetration 2). We recommend AVIALIT 2 or KLÜBER ZENTOPLEX HO as a multi-purpose oil.

- for chains: KLÜBER STRUCTOVIS BHD chain semi-fluid grease.
- for the lubricator dispenser: SF 01, temperature range -30 to +110°C
- for the smooth surfaces of the telescope: INTERFLON FIN LUBE TF spray-on grease

Normally hard chromium-plated surfaces of hydraulic piston rods have a resistance of approx. 36 hours in the salt spray test.

It is recommended that you use suitable measures to protect the piston rods from the long-term effects of moisture and salt aerosol (proximity to the sea, road salt etc.) (e.g. rubbing with oil cloths, lubricant).

6.4 MAINTENANCE INFORMATION ON THE HYDRAULIC SYSTEM

6.4.1 General

Cleanliness is of the utmost importance when servicing the hydraulic system. Prevent dirt and other contaminating materials from getting into the system.

Dirt particles in the hydraulic system can cause striations in the valves, cause the pumps to freeze and block throttles and radial drillings. There is a **risk of fatality** if the safety valves are no longer able to open due to the effects of dirt.

With annual oil servicing, it is possible to increase the life of the oil used considerably. In addition to saving money, this means a drastically reduced quantity of old oil and therefore less pollution.

The hydraulic system is under high pressure!

- Release all pressure before working on the hydraulic system (even from the tank and cylinders etc.) and ensure that the pump cannot be switched on.
- For your protection wear gloves, protective goggles and use suitable tools
- Avoid contact with the skin and inhaling any vapors from the hydraulic liquids.
- Liquids that escape under high pressure can cause serious injuries (penetrate limps).
- There is a risk of burns when hot oil is released!
- Ensure that the hydraulic connections are fitted properly! Mixing up the connections will reverse the functions (e.g. raising/lowering)!
- Use suitable equipment when looking for leaks in the hydraulic system!
- Observe environmentally sound disposal of any resources used.
- Check the safety systems on a regular basis!

- If a drop of hydraulic oil level is identified, then all the lines, hoses and units should be checked to ensure that they are tight.
- External leaks should be repaired immediately. If necessary, consult PALFINGER Technical Service.
- DIN 20066:2002 recommends that the pressure hoses be replaced after 6 years. The inspection criteria of this standard should be followed!
- The condensation water in the hydraulic tank must be drained once a month to counteract corrosion and, in particular, malfunctions in the hydraulic components.

- We recommend an auxiliary flow filtration during the annual inspection and maintenance of the PALFINGER PLATFORMS lifting platform. Technical support will use a filtration unit that also enables smaller quantities of water to be filtered out. The subsequent oil investigation will enable the hydraulic oil to be used further beyond the replacement intervals specified by the manufacturer. Follow the warranty conditions of the oil manufacturer.

6.4.2 Regular visual inspection of the hydraulic system for damage and leaks

- Check the entire hydraulic system's condition and ensure that it is complete.
- Check the condition of all pipes and hoses of the hydraulic system and for any leaks.
- Have any damaged, buckled or seriously corroded hydraulic components (pipes, hoses or screw fittings) replaced by qualified personnel.

➢ Check the condition of emergency valve activation.

Excessive heating up indicates an error in the hydraulic system. Regular inspection of the temperature is therefore recommended.

Risk of burns!

6.5 INFORMATION REGARDING THE ELECTRIC SYSTEM

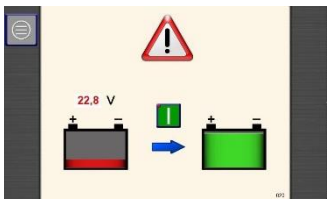
The purpose of the monthly visual inspection is to maintain flawless electrical contacts and to check the cables.
If a malfunction occurs, it must be identified and remedied with the help of PALFINGER Technical Service. Information about the PLC should be taken from the electric diagrams.

Possible sources of error can be:

- Defective fuse, protection circuit
- Crushed or torn off cables
- Damage to the elements of the cable layout (protective sheathing, cable conduits, power supply chains)
- Corroded buttons/switches
- condensed water in insert casing

After the fault has been resolved, the switch boxes should be returned to their initial state.

6.5.1 Vehicle battery



- Check the battery's fill-level and charge status..
- If the charge level of the battery is too low, the display will show a message (depending on platform type).
  - ➢ The battery needs tob e charged urgently.
    (No fast charging permitted!)
- Keep the battery terminals clean and clean the batteries, if necessary.
- Protect the area around the battery terminals against corrosion and oxidation by applying battery terminal grease. As a consequence, the unit will start more reliably and have a longer service live, it prevents acid damage and leakage currents and reduces contact resistance.
- Recharge battery more frequently during the winter, when lower temperatures will reduce performance.
- We recommend that the battery be replaced by PALFINGER Technical Service or qualified personnel authorised by us due to disposal.

Vehicle batteries should be returned properly.
Any contaminated materials should be disposed of in an environmentally sound manner.

- Do not connect or change the connection of any live charging leads.
- Battery gases can be released during the charging operation. **There is risk of explosion!** Smoking, naked flames and sparks are prohibited!
- For your safety, wear gloves and protective goggles when changing the battery.
- Do not tilt the battery, as battery acid can be very corrosive! Battery acid may not come in contact with your hands, eyes, clothing or vehicle paintwork. Seek medical attention immediately, if any acid is swallowed!
- If in contact with your eyes, rinse immediately with cold water. Then seek medical attention straightaway.
- If in contact with your hands or clothing neutralize immediately with soapy water. You may need to seek medical attention.
- Ensure it is properly connected (first positive terminal, then negative terminal)

Operating elements

The operating elements on the control stands in the basket and on the base should undergo a regular visual inspection and maintenance. Replace defective protective caps of buttons!

The bellows of the joysticks must be rubbed with, for example, talcum every 3 months to prevent breaks or tears.

Insulation is no longer guaranteed, if the bellows are damaged.

It will then no longer be permitted to operate the lifting platform on live parts. Replace the damaged components straightaway!

6.6 MALFUNCTIONS AND MEASURES TO RECTIFY THEM

The lifting platform should be taken out of service immediately, if serious defects occur, and PALFINGER Technical Service informed.
All repairs should be agreed with PALFINGER Technical Service.

Work to the hydraulics must only be carried out by personnel qualified for this (hydraulics fitter) and should be restricted to small-scale repairs (e.g. tightening the screw fittings).

Only qualified personnel (electricians) should work on the electrics and should be restricted to small-scale repairs (e.g. changing fuses, securing loose cable connections).

Only PALFINGER Technical Service should carry out work to the electronics, in particular, to electronic components and security systems.

Risk to life!

Security is put at risk by repairs or adjustment of electronic components not being carried out properly.

6.7 INSPEKTION/SPANNEN DER TELESKOPSEILE /-KETTEN

Achten Sie darauf, dass das Seil- / Kettensystem der Teleskope regelmäßig durch den Technischen Service von PALFINGER inspiziert und gegebenenfalls nachgespannt wird.

Die Drahtseile / Ketten dürfen keine starken Verschmutzungen, Beschädigungen oder Korrosion aufweisen und müssen gefettet werden.

Bei der jährlichen Inspektion ist das Seil-/ Kettensystem zu warten.

Nach Ausnutzung des maximalen Spannweges der Seile, jedoch spätestens nach 10 Jahren hat eine vollständige Kontrolle der Seile durch Demontage zu erfolgen.

6.8 SCREW CONNECTIONS

➢ Screw connections need to be checked from time to time and tightened if required.

Tightening torque / torque

Usually screws are installed by applying a tightening torque. The tightening torque is specified on the assembly drawing.

In case of missing specifications, use the tightening torques in the following table. The tightening torques specified here refer to headless screws with standard metric threads according to DIN 13, and apply to DIN 931 hexagon head screws and DIN 912 hexagon socket head cap screws.

The table values take into account:

- Utilization of minimum yield strength = 90%
- Friction coefficient μ_{ges} = 0.12

Screw dimension	Tightening torque / Nm 8.8	Tightening torque / Nm 10.9	Tightening torque / Nm 12.9
M4	2.9 Nm	4.0 Nm	4.9 Nm
M5	6.5 Nm	9.1 Nm	11 Nm
M6	9.7 Nm	13 Nm	16 Nm
M8	23 Nm	32 Nm	39 Nm
M10	46 Nm	64 Nm	78 Nm
M12	80 Nm	113 Nm	135 Nm
M14	127 Nm	178 Nm	213 Nm
M16	197 Nm	276 Nm	333 Nm
M20	382 Nm	538 Nm	648 Nm
M24	659 Nm	926 Nm	1,110 Nm
M27	968 Nm	1,360 Nm	1,630 Nm
M30	1,320 Nm	1,850 Nm	2,220 Nm

Table of tightening torques not specified in the assembly drawings

Additional thread lubrication or different coatings significantly vary the friction coefficients and cause uncertain tightening torques!

➢ The tightening torque is checked using a manual torque wrench.

➢ After disassembly of components, always replace self-locking nuts.

Inspection of highly stressed screw connections

Regular inspections of highly stressed screw connections is of particular importance to the function and safe operation of your access platform.

The company that operates the machine is responsible for regular checks and professional maintenance.

The safety of a screw connection depends on:

- Regular checks of highly dynamically stressed screw connections;
- Use of appropriate tools e.g. torque wrench, to tighten the screws in a way that the preload force is permanently preserved.

Functional durability of highly stressed screw connections thanks to:

a) Performing visual inspections:

⇨ Detection of cracks, deformation, broken components

Conditions	**Inspection interval**
Normal operation	Once every week
Heavy duty	Every day
Extreme ambient conditions (heat, frost, etc.)	Every day

b) Performing systematic maintenance:

Conditions	**Inspection interval**
Normal operation	After every 1000 operating hours / once every year minimum
Heavy duty	After every 500 operating hours
Extreme ambient conditions (heat, frost, etc.)	After every 500 operating hours
in case of reassembly	then

about b)

Before starting assembly works:

- Fully retract the telescope of the access platform before inspecting the ball bearing slewing ring.
- Make sure the basket is free of any load.
- Use the matching torque wrenches and the appropriate assembly drawings (print).

Carry out the following maintenance steps:

- Clean the screw connections.
- Unload the screws to be inspected.
  - For example at the ball bearing slewing ring on the swivel table:
    Slew the lifting boom into the correct position (screws under the lifting boom are unloaded).
- Inspect the screws by tightening them with the specified torque.
  - Mark any loose screws.
  - Replace all loose and broken screws and the screws to the left and right of the loose/broken one.

    Procedure: Step by step, remove and replace all screws. Before you remove the next one, properly replace the removed screw with a new one (tighten with specified torque).

    Note: If you do not detect any loose or damaged screws, we recommend you visually inspect approx. 10% of all highly stressed screws.

    Note: Removed screws that show visible damage, deformation or rust on the shank or thread must not be reused. In case of doubt, replace the screw and increase the scope of the inspection.

General advice for screws with increased stability (> 1.000 N/mm², i.e. > 10.9)

These screws may show so-called hydrogen induced cracking ('hydrogen embrittlement'), in other words hydrogen penetrates during screw production or as a result of corrosion in use. Depending on the environmental conditions this process may accelerate. You may minimize, however, not completely eliminate this risk by thorough maintenance and care.

Recommendation: Palfinger recommends replacing highly stressed screw connections **after 5 years**. Of course, our technical customer service will be at your disposal for inspection and/or replacement of screws.

6.9 WELDING WORKS PROCEDURES

If welding is necessary on machines and equipment observe the following regulations:

1. **DGUV regulation 3 on accident prevention** (electric systems and consumable materials)
2. **DGUV regulation 100-500, section 2.26 on accident prevention** (welding, cutting and related processes), **in particular point 3.19** (welding circuit)

ATTENTION: Only qualified staff members are allowed to carry out welding on machines and equipment.

Take the following steps to protect electronic devices:

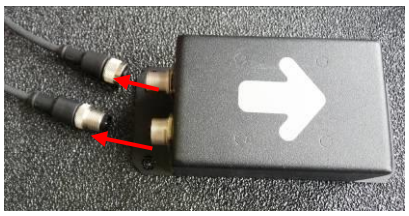
1. Ignition switch: Off

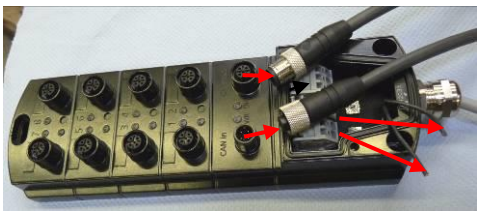
2. Starter battery:

a) First disconnect the negative pole, then disconnect the positive pole, or perform equivalent action to disconnect the circuits.

b) Pull the compact connectors from all PLCs

c) Pull the M12 connectors and disconnect the power supply from the I/O-nodes.





d) Pull the compact connector on/in the control panel in the basket.

e) Pull the connectors from the optional data capturing device/modem.

Additionally observe the special advice given by the truck manufacturer.

3. Connecting the earth terminal:

Connect the earth terminal directly with the part to be welded.

Never connect via rotating elements. Avoid stray welding currents.

4. Welding cable installation:

Never lay welding cable in parallel to electric lines.

5. **Electronic casing:**

   Don't touch the casing of electronic components and electric lines with the welding electrode.

When doing welding work, disconnect the electronic appliance plugs before welding.

6.10 PROCEDURE FOR QUICK CHARGE

Quick charge is only allowed with **disconnected** starter battery.

6.11 PROCEDURE WITH JUMP START

Jump start is only allowed with **connected** starter battery.

No jump start using the fast charging set.

6.12 DISPOSAL AFTER REMOVING THE ACCESS PLATFORM FROM SERVICE

When removing the access platform from service and disassembling it from the vehicle its components must be disposed of properly. Here, note that many components are contaminated with grease and oil and must not get into the environment under any circumstances. Even biologically degradable oil and grease must not get into the environment.

Therefore, dispose of the parts separately depending on their characteristics (steel, plastic, aluminum, electric parts, oil, grease, etc.) and according to the currently applicable legal regulations in your country.

6.13 GENERAL INSTRUCTIONS ON ASSEMBLY AND COMMISSIONING OF REPLACEMENT PARTS

Important note to the fitter

As the fitter, you are responsible for the work to be carried out on the lifting platform and all of the functions associated with this. For your own safety and that of others, you should therefore adhere to the following instructions:

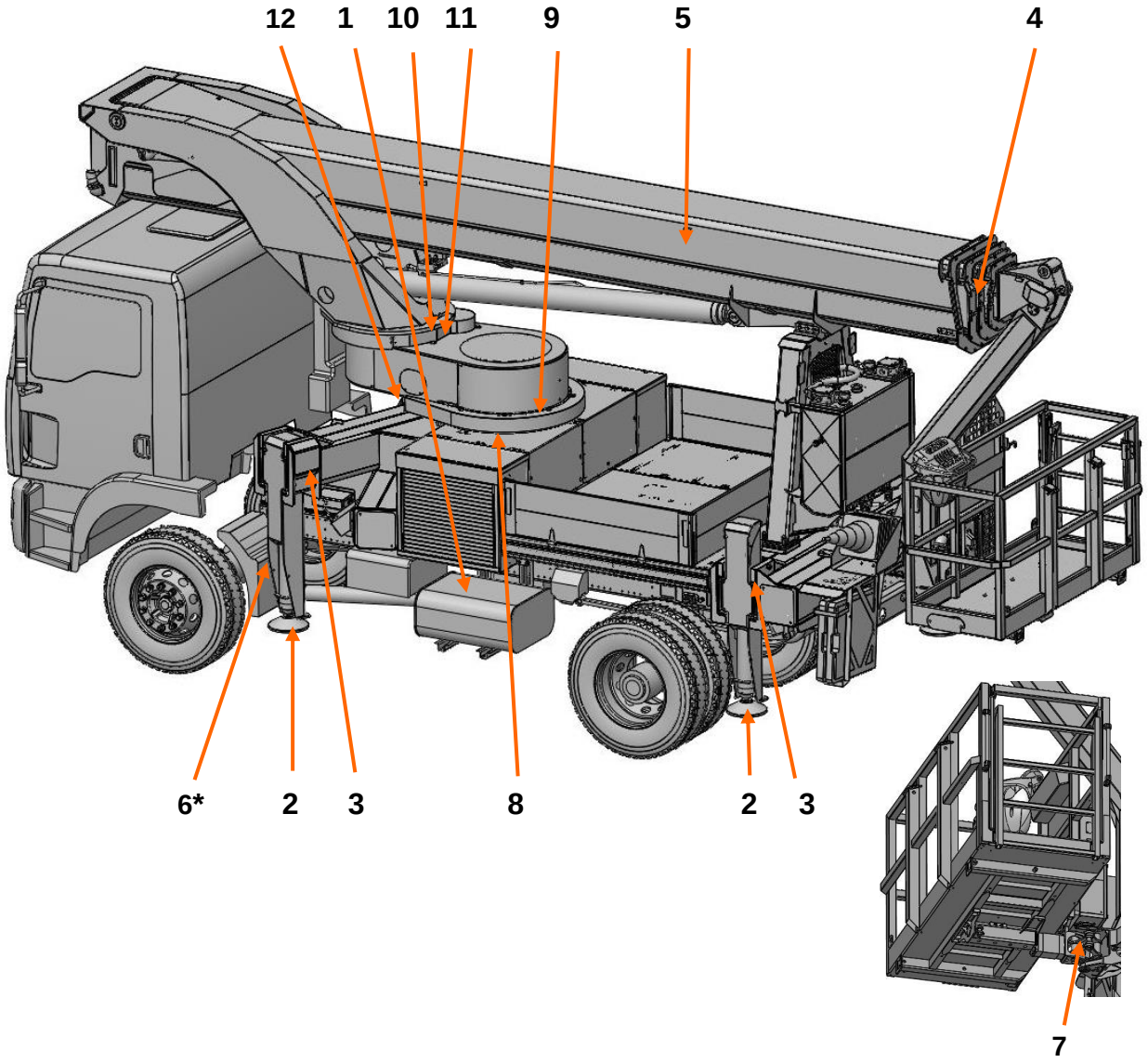
- Your Palfinger elevating work platform's operating guide, the valid catalogue of replacement parts (EPC) and the fitting drawings form the basis for all inspections and repairs.
- While the work is being carried out, the operating guide, spare parts catalogue (EPC) and fitting and commissioning instructions must be kept to hand. The instructions must be read through carefully before work begins
- The notes in the instructions marked with a hazard triangle indicate particular hazards. Careful attention must be paid to these notes!
- Maintenance and repair work may generally only be carried out by authorized personnel. Appropriate personal protective equipment must be provided and used.
- Your work should comply with all relevant provisions and regulations under state law, such as accident prevention regulations, the safety regulations and rules and information on how to operate work platforms.
- When carrying out inspections, the provisions under state law on 'Inspection of Elevating Work Platforms' and 'Working Safely with Mobile Elevating Work Platforms' must be observed.
- It must be ensured that all hazardous substances are handled correctly. Make sure to observe the safety data sheets.
- Each individual step of the work must be carefully planned Any equipment required for this must be provided.
- The fitter/inspector must familiarise himself with the operation of the Palfinger lifting platform in all permitted operational situations prior to carrying out any work.
- Attention must be paid to all safety and warning signs on the Palfinger platform
- The Palfinger lifting platform and its integrated safety devices must be checked to make sure that they are working properly prior to and after any repairs. If you have noticed or suspect that any safety device is missing or not working properly, operating the lifting platform will not be permitted!

- The fitter/inspector must investigate the cause of any fault or damage to a Palfinger lifting platform. If the cause is unclear, then further inspections should be initiated, if appropriate, or PALFINGER Technical Service should be consulted. If the cause of any fault or damage is unknown, operating the PALFINGER lifting platform is not permitted!
- Operating the Palfinger lifting platform with damaged welding joints is not permitted.
- Welding work on load-bearing parts or on any other access platform parts of relevance to safety must comply with the comprehensive quality requirements pursuant to EN ISO 3834-2 and may only be carried out by qualified personnel or specialist companies.
- Work on the Palfinger lifting platform's hydraulic system must be carried out in accordance with the guidelines of DIN 24346, 'Hydraulic Systems', and ISO 4413, 'Fluid Technology – Hydraulics Systems Guidelines'.
- Inspect the chassis in accordance with the carrier vehicle manufacturer's instructions.
- Information on the operation and maintenance of the carrier vehicle should be obtained from the vehicle manufacturer's technical documentation.
- Charging the vehicle battery using chargers may only be carried out if the battery cables have been disconnected.
- Only original PALFINGER replacement parts may be used. The use of other parts will render the safety systems ineffective and invalidate our warranty and liability.
- When ordering spare parts take note of the relevant Palfinger spare parts catalogue (stating the serial no.).
- Before commissioning the working platform after any oil change, repair works to the lifting boom cylinder or its valves, it is imperative that you check the outreach. For outreach values refer to the inspection log book.
- Maintenance work on safety equipment and load-holding valves may fundamentally be carried out only by trained professionals. After any maintenance or repairs, all load-holding functions must be tested!

Maintenance of Hydraulic System and Slewing Drive

7 MAINTENANCE OF HYDRAULIC SYSTEM AND SLEWING DRIVE

7.1 OIL AND LUBRICATION SCHEDULE



The lifting platform keeper is responsible for the following maintenance work. PALFINGER Technical Service will carry out all the lubrication not listed here. The intervals should be halved if there is heavy soiling and a very high permanent load.

No.	Interval	Monitor the level:	Type of oil:
1	Weekly	Hydraulic oil tank	See information notice

No.	Interval:	Lubricating point:	Lubricant:
2	Monthly	Support jack, stabiliser cylinder guide	Grease
3	Monthly	Outrigger guide, outrigger sliding surfaces	acc. to data sheet ‘Lubrication specification’, refer to Annex

No.	Interval:	Lubricating point:	Lubricant:
4	Monthly	Telescope sliding surfaces	acc. to data sheet 'Lubrication specification', refer to Annex
5	c. 250 operating hours	Telescope system wires	Grease/chain liquid grease
6*	Every 3 months	Propeller shaft (Cardan shaft)	Grease
7	Every six months	Basket turning equipment	Grease
8 9	Every six months Every three months	Counter slewing system: Rim bearing track Rim bearing gearing	 Grease Grease
10 11	Every six months Every three months	Rotating column: Rim bearing track Rim bearing gearing	 Grease Grease
12	refer to point 7.2	Slewing drive	Grease (refer to point 7.2)

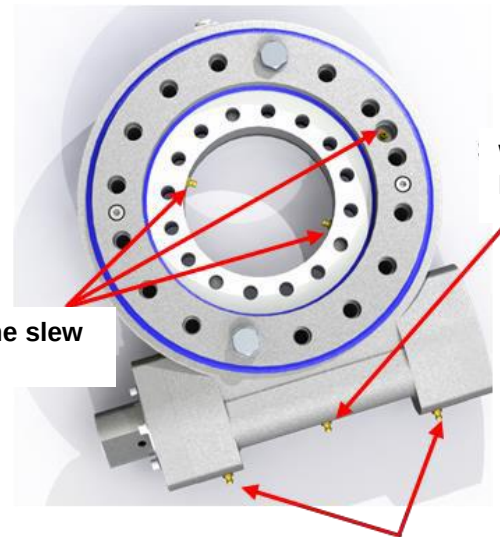
*If available (depending on the equipment)

7.2 SLEWING DRIVE MAINTENANCE

For smooth operation and long service life correct lubrication of the slewing drive is necessary.

There are three parts that have to be lubricated:

Parts	Required amount of grease
Track	c. 10cm³/250mm Ø
Worm gear's cogging	c. 60cm³
Worm gear's bearing	c. 10cm³



Procedure for re-lubricating the slew ring bearing

1. Press lubricant into one of the inner ring's lubricating nipples while simultaneously turning the slewing drive 180°
2. Press lubricant, as described at point 1, into the second lubricating nipple

Note: *If neither lubricating nipple can be reached, the track can be lubricated via the lubricating nipple on the top clamp. In order to achieve appropriate lubrication from this lubricating nipple, the slew ring bearing must fully rotate once so that the lubricant is distributed correctly on the entire ring.*

Procedure for re-lubricating the worm screw and bearings:

1. Press lubricant into the relevant lubricating nipples of the worm screw and bearings while simultaneously rotating the worm screw (at least) three times

Maintenance intervals:

Perform re-lubrication as per the following table.

Working conditions	**Slew ring guide and worm gear Re-lubrication intervals**
Rotary speeds <0.5 rpm No extreme weather conditions	After every 400 operating hours or once every 12 months
Rotary speeds >0.5 rpm No extreme weather conditions	After every 200 operating hours or once every 6 months
Extreme climatic conditions (sea / desert / Arctic climate / very dirty environment)	After every 100 operating hours or once every 3 months
Bearing lubrication intervals	
All working conditions	After every 400 hours or every 12 months

- Also re-lubricate the slewing drive after cleaning and before/after any long periods of downtime.

- Check the screws as per the following table:

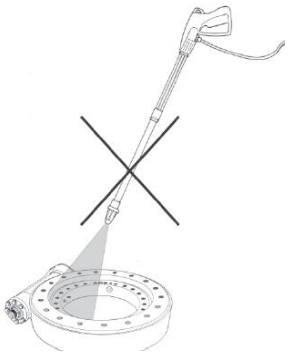
Frequency	**Component**	**Type of intervention**	**Intervention**
after 100 h	All screws	Tightness check	The correct starting torque is reproduced (without exposing the threaded fasteners to any outside loads)
2000 h / at least after every 12 months			

Tightening torques for metric screws (thread not lubricated)

Screw dimensions		**Torque MA in Nm quality 10.9**	**Torque MA in lbs-ft SAE quality grade 8**
M6	1/4-20 UNC	15 ± 1	12 ± 1
M8	5/16-18 UNC	37 ± 3	24 ± 2
M10	3/8-16 UNC	72 ± 6	45 ± 4
M12	1/2-13 UNC	126 ± 10	110 ± 7
M16	5/8-11 UNC	312 ± 25	210 ± 18
M20	3/4-10 UNC	609 ± 50	380 ± 36

What is not allowed:

- ❖ Cleaning the slewing gears with high-pressure steam systems!
- ❖ Welding parts of the gearing
- ❖ Exposing the gearing to heat sources
- ❖ Letting currents of any kind flow through the device



The gear will only keep its maximum performance, if it is maintained regularly as prescribed by the manufacturer.

Lubricant for the slewing gears

The drive unit must be lubricated using water-resistant lubricating grease. The lubricant suited to and to be used in normal working conditions is listed in the following table

TGB—gears Details as per the gear manufacturer	
Recommended type of lubricant *(for example ULTRAPLEX CS 2)*	Mineral grease or synthetic lubricants. (When using a synthetic lubricant ensure that it is 100% compatible with any mineral grease.)
EP (high pressure)	YES
NLGI consistency (ISO2137)	Grade 2
Separation of the oil	< 3%
Protection from water and corrosion	YES
Permitted bonding agent	Calcium, lithium or aluminium sulphates
Temperature range in °C	-20 ºC / +125 ºC
Original viscosity (at 40°C)	>125 mm_2/s
Welding load	>200 kg

Properties of a standard lubricant

7.3 OIL COOLER

7.3.1 Cleaning the oil cooler

Risk of injury!

Before starting to clean the oil cooler, disconnect the fan from mains.

Cooling air must flow in and out the cooler unhindered. Therefore, clean any dirt from the cooling grid on a regular basis.

- Clean the cooling air ducts with compressed air or water.
- Point the cleaning jet in parallel with the fins and against the usual direction of the cooling air flow.
- When applying cleaning agents make sure they are compatible with aluminium.
- Cover the cooler motor to protect it against water.

For cleaning the oil tubes the oil cooler must be disassembled. Consult PALFINGER Technical Service.

7.3.2 Oil cooler function check

If the oil temperature continues to rise with increasing operating time, check the cooling fins' contamination, the free running of the fan, the electrical connection and the cooling air supply and extraction. If necessary have the sensor function checked by Palfinger Platforms Customer Service.

7.4 CHECKING THE HYDRAULIC OIL LEVEL

➢ **Oil monitoring indicator on the display in the driver's cab**

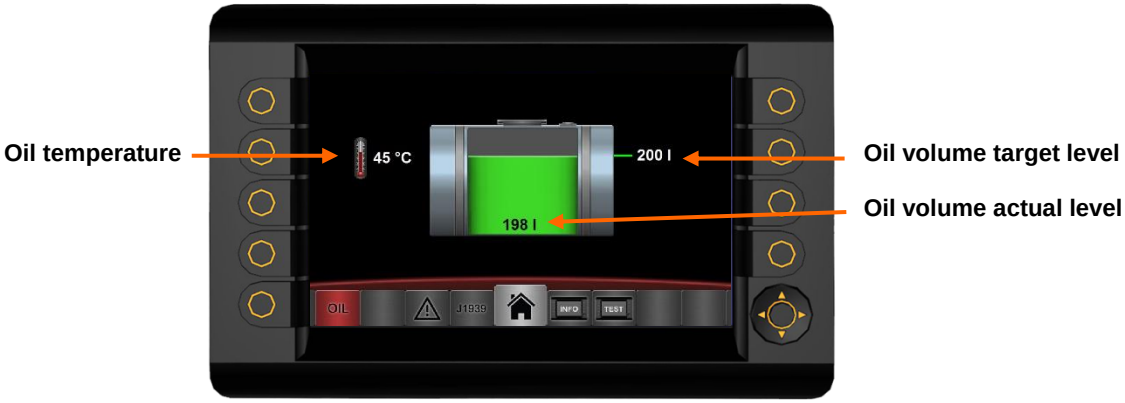
On the display in the driver's cab you can keep a check on the current oil level in the hydraulic tank and on the oil temperature.

Prerequisite for correct monitoring of the oil level:

- The working platform is in the transport position and is horizontal

  If the machine is not in retracted state, the following appears on screen:

If the working platform is in the transport position => Display of the current oil level in the hydraulic tank



➢ In addition to the numbers, the tank's oil level is also shown graphically.

Oil level correct

Oil level a bit too high,
correct oil level where appropriate

Oil level much too high,
do not use working platform,
urgently correct oil level

Oil level a bit too low, correct where appropriate

Oil level much too low,
do not use working platform,
urgently correct oil level

7.5 CHANGING THE HYDRAULIC OIL

7.5.1 Important advice on changing oil:

- Only carry out an oil change when the hydraulic oil is warm.
- Do not use any detergents to clean the system.
- Only use lint-free cleaning cloths.
- Clean the area surrounding the hydraulic tank as well as the ventilation filter and return filter.
- **Replace the filter elements at every hydraulic oil change (see point 7.7)!**

7.5.2 Drain off waste oil and refill fresh oil

- Only use the filter unit to fill with new hydraulic oil (absolute filter fineness of approx. 10 µm, not directly out of the oil can).
  - The new oil often has a level of solid particle contamination that is too high to permit its use! Therefore use an oil service unit (with an at least one grade finer filter element than used in the lifting platform) when filling with new oil, changing the oil or topping up the oil in the hydraulic container!
- Check the oil level (refer to point 7.4) and refill oil, if necessary!

Procedure:

1. Open drain cock and drain old oil into a catch tank.
2. Unscrew the screw joint **(A)** of the filling ventilation filter from the hydraulic oil tank.

(B)

3. Fill up fresh oil through the filling ventilation filter **(B)**.

4. Check oil level and change, if necessary!

5. Close the unit and check for any leaks.

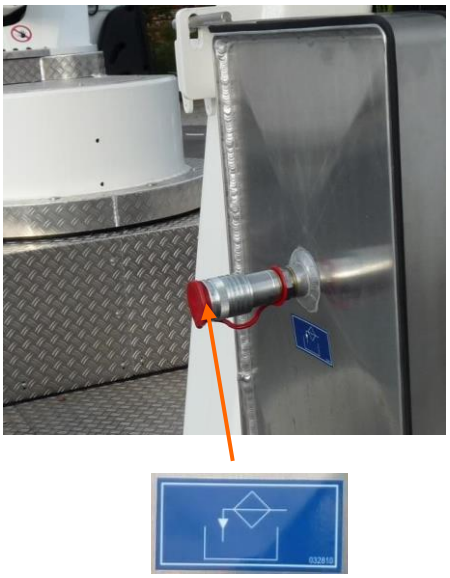

Never switch on the pump drive when the hydraulic oil has been drained!


Dispose of the drained hydraulic oil in an environmentally sound manner in accordance with statutory regulations (also applies to bio-oils). Shut the drain cock after draining the hydraulic oil.

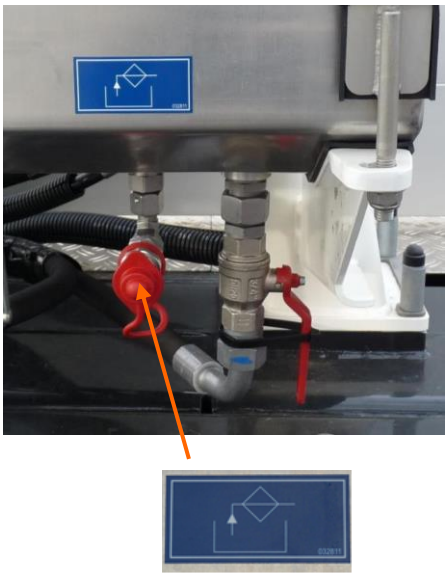

Emptying oils (including bio oils) into the natural environment is prohibited!

7.6 RINSING THE HYDRAULIC OIL TANK

1. Remove protective cap from each of the two rinsing connections on the hydraulic tank.



Flush connection (pressure port)



Flush connection (intake port)

2. The pressure-side flush connection gets connected to the filter system's pressure port and the suction-side flush connection to its intake port.
3. Flushing must be carried out with a suitable filter system with micro-filters. An absolute filter fineness of approx. 10 µm is recommended.

Recommendation: The content of the hydraulic system should be rinsed at least three to five times through a micro-filter system that is at least one grade higher than the filter element used for the lifting platform. The instructions for the filter unit should be observed here. During rinsing, every platform movement should be carried out at least once.

7.7 FILTER MAINTENANCE (RETURN FILTER / VENTILATION FILTER)

7.7.1 General

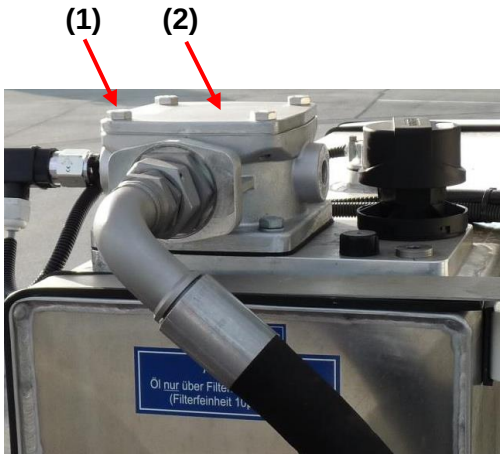
- For indicating and monitoring when it is time for a change, display graphics (control panel in the workman basket) are provided for the return filter.

Dirty filter indicators/graphics

Display graphic for return filter

7.7.2 Changing the return filter

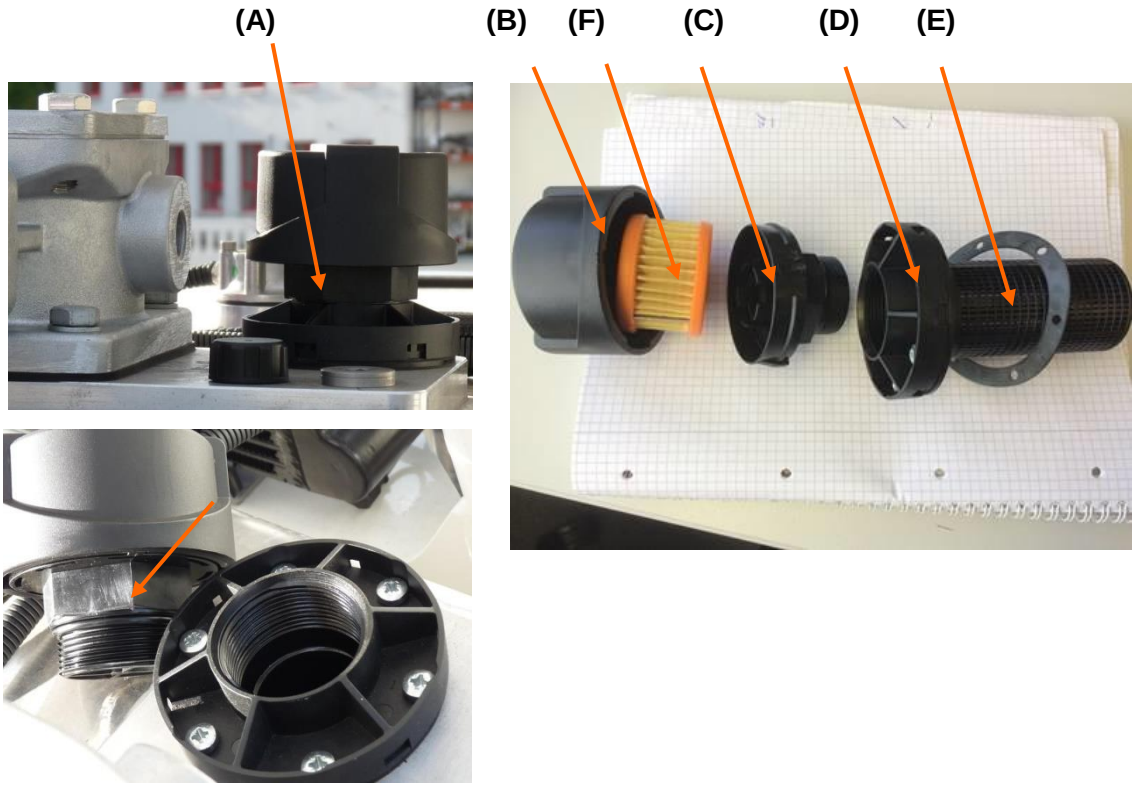
- The return filter should be changed when the contamination indicator responds on the display or every time after hydraulic oil change.
  - ➢ In the event of high air pollution change the return filter more frequently.



1. Undo retaining screws (1) on the cover of the return filter (2) and remove cover.
2. Remove the return filter.
3. Collect any hydraulic oil that is running out and dispose of it in an environmentally friendly way.
4. Fit new return filter with seal and close it with cover.
5. Check the hydraulic oil level (see point 7.4).
6. Carry out trial run and check the system for leaks.

7.7.3 Changing the ventilation filter

The tank ventilation filter **(A)** consists of a top part **(B)**, which is connected by a threaded connection **(C)** to the securing flange **(D)** and the filling sieve **(E)**.



Change the complete tank ventilation filters, including filter **(F)** as frequently as the return filters, at least once every year. In the event of high air pollution this interval is shorter.

Lubrication specification for extension parts

Lubricate the extension parts:

- in the defined maintenance intervals (see operating instructions, 'Maintenance' section) and
- using the following lubricants

Platform type	Lubricating point	Internal bearing hole	External bearing hole
P 180 BK P 220 BK P 250 BK P 280 B P 280 CK	Base body of telescope	Centoplex HO	Interflon Fin Lube TF
	Remaining telescope sliding surfaces	Interflon Fin Lube TF	Interflon Fin Lube TF
	Sliding surfaces of stabilizer outriggers	Centoplex HO	Interflon Fin Lube TF
P 300 P 300 KS P 320 P 370 KS P 480 WT 370 WT 450	Telescope sliding surfaces	Centoplex HO	Interflon Fin Lube TF
	Sliding surfaces of stabilizer outriggers	Centoplex HO	Interflon Fin Lube TF
P 570 P 640 P 750 P 900	Telescope sliding surfaces	Interflon Fin Grease	Interflon Fin Lube TF
	Sliding surfaces of stabilizer outriggers	Centoplex HO	Centoplex HO