HIRD GLASS

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OPERATOR MANUAL

KAPPEL

DSKE2

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Contents

Content

1-1 Foreword

These operating instructions are intended to help you become familiar with the DSKE range and to use it as intended.

These operating instructions contain important instructions about operating the vacuum lifter safely, effectively, and economically. Observing them helps to avoid repair costs and down time and to increase the reliability and working life.

The DSKE range comprises the following models:

DSKE2-12V DSKEB2-12V DSKED2-12V

Note

The only difference between the models in the DSKE series is the number and arrangement of the suction pads and the position of the control elements on the device.
Since the technical description and all the other functions of the vacuum lifter are the same for all the models, the DSKE2-12V is depicted and technically described as an example for models in the DSKE2 series.

Examples for the technical description and the functions:
- The manual valve
- The cables / radio remote controls
- Commissioning
- Working cycle
- Care and maintenance

The **technical data** for all the other models can be found in the appendix of these operating instructions.
- Dimensions of the vacuum lifter
- Load capacity, WLL
- Maximum size of the sheet material to be transported

If you discover errors when reading these operating instructions, or if you have further comments or suggestions, please contact:

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The management appreciates your cooperation.

2-1 General safety information

2-2 Safety information and danger warnings

The following symbols and designations are used in these instructions to indicate safety and danger information:

Danger
Indicates a particularly dangerous situation which is to be avoided as it could lead to death or serious injury.

Warning
Indicates a potentially dangerous situation which is to be avoided as it could lead to moderate or minor injury.

Caution
Indicates a potentially dangerous situation which is to be avoided as it could lead to death or serious injury.

Note
Particular specifications for work and operating instructions

2-3 General safety regulations and organisational measures

Always keep the operating instructions within reach at the site where the vacuum lifter is used.

The operating instructions are to be complied with.

The operating instruction shall be supplemented by the relevant national regulations for accident prevention.

In addition to the Operating Instructions and the binding accident prevention regulations holding force in the country of use and at the point of use, the recognised regulations for accident prevention and environmental protection are applicable

The personnel authorised to operate and maintain the vacuum lifter must read and understand the operating instructions, particularly the chapter about safety instructions before starting work.

The operator of the vacuum lifter must monitor that personal working with the device must do so in a safe and proper manner in accordance with the instructions.

Protective equipment must be provided for and worn by the operating and maintenance personnel.

Spare parts must be in accordance with the technical requirements stipulated by the manufacturer.

Danger
Pay attention to the maximum load capacity of the vacuum lifter on the type plate on the device and keep the type plate in a legible condition.

Danger
Pay attention to the specifications on the right-hand front panel regarding the maximum load capacity of the vacuum lifter with four or six attached suction pads and keep them in legible condition.
(only in the case of DSKE2-12V)

Danger
No changes, attachments or upgrading work that could possibly impair safety should be carried out on the machine without the consent of the supplier. This also applies to the installation and setting of safety equipment and valves as well as to welding on load-bearing parts.

2-4 Personnel selection and qualifications

Operating and maintenance personal authorised to work with the vacuum lifter must read and understand the operating instructions before beginning work, especially the chapter on General safety instructions.

Work on/with the machine may only be performed by reliable personnel. The legal minimum working age should be observed.

Use only trained or instructed personnel; responsibilities among personnel should be clearly established for operation, equipping, maintenance, and repair.

Ensure that only authorised personnel works on the machine.

Specify a person who is responsible for operating the machine and give him/her the opportunity to refuse to comply with the safety instructions of third parties.

Personnel being trained or instructed, or who are taking part in a general training programme, may only work on the machine when under the constant supervision of an experienced person who is familiar with this situation.

2-5 Commissioning, maintenance, repair, cleaning

Secure a wide area around the repair area

Do not use machine parts as climbing aids.

Compulsory deadlines or those specified in the instructions for recurring tests / inspections should be complied with. These activities must be carried out by specialist personnel only.

Only carry out maintenance work if the machine is parked on level and sufficiently supporting ground and is secured against rolling away.

Clean the machine, in particular the connections and screw joints, before carrying out maintenance / repair work. Do not use any aggressive detergents for cleaning,

Never clean the device with water or steam cleaning device (high pressure cleaner).

After cleaning, check all vacuum lines in case there are leakages, loose connections, chafe marks and damage

Always tighten any screwed connections that have been loosened during maintenance and repair!

When handling oil, grease and other chemical substances, observe the product-related safety regulations

2-6 Periodic inspections

Danger

Please note that the trade association determines that an annual inspection of vacuum lifting devices is carried out by an expert (VbG 9a-prEN 13155:1998).
All periodic inspections are to be conducted by the operator.

Note

We carry out an annual inspection stipulated by the trade association either on our premises or on your premises.
During the annual inspection which we carry out, the load capacity of each individual sucker is checked.
More information can be obtained upon request.

2-7 Electrical power

Danger
Work on electrical equipment or operating materials may only be performed by an electrician or by trained personnel under the direction and supervision of an electrician in accordance with the rules and regulations of electrical engineering.

Machine and system parts on which inspection, maintenance, or repair work must be performed, must be switched free of current if required. First check the switched off parts to ensure that they are free of voltage, then ground and short-circuit them, and insulate neighbouring live parts.

Use only original fuses with the specified current strengths. Switch off the machine immediately during malfunctions to the electrical power supply.

The electrical equipment of the machine must be checked regularly. Flaws such as loose connections and melted cables must be repaired immediately.

2-8 Commissioning and operation

Danger
Secure vacuum lifters only to suitable and technically correct lifting equipment with sufficient load capacity

Danger
The DSKE may only be commissioned when all the vacuum circuits are functional.

Before starting work, become familiar with the working environment at the site of use. The working environment includes impediments in the work and traffic area, the load bearing capacity of the floor, and cordoning off the worksite from public traffic areas.

Danger areas must be clearly indicated by warning signs and cordoned off by barriers. Please ensure that instructions regarding danger areas are observed.

Before the initial commissioning as well as the daily starting up, ensure that a sight check and the stipulated inspection work is carried out.

The vacuum lifter should be operated only when all the existing safety devices, control lamps, the acoustic warning signal, the flashing light and the vacuum meters are functional.

Any damage to the vacuum lifter and any changes in the operating behaviour must be reported immediately to the responsible person:

- The vacuum pump no longer reaches the minimum deepest final pressure of approximately -0.72 bar.
  (see Chapter 8-1 Troubleshooting)

Refrain from any unsafe working methods.
Unsafe working methods:

- failing to observe the General Safety Instructions
- Failing to carry out inspection and maintenance work sufficiently
- Improper use (see Chapter 2-9)

Ensure that after the vacuum lifter has been switched off / shut down, they are protected from unauthorised use.

Always stop work if it becomes dark or if visibility is poor.

2-9 Authorised use

The vacuum lifters in the DSKE series have been constructed in accordance with the state of the art and recognised safety regulations. Nevertheless, their use may result in danger to life and limb of the operator or third parties and impairment of the machine or other property may occur.

Vacuum lifters may only be used when in technically perfect condition, as authorised. The user must be conscious of safety and risks and act in accordance with the instructions. In particular, failures which can interfere with safety must be eliminated immediately.

- Safety devices are not ready for operation.
- Changes in operational behaviour, (see Chapter 2.8)

Vacuum lifters in the DSKE series are exclusively for transporting gas-tight, dry materials with firm, flat surfaces.

Use as authorised use also inciudes complying with the operating instructions and the inspection and maintenance conditions.

The following is inappropriate use of vacuum lifters of the type DSKE.
- Exceeding the permissible load capacity (WLL)
- Dropping the cargo before setting down the load
- Pulling loads at angles
- Tearing, pulling or dragging loads
- Conveying persons
- Conveying loads above persons
- Standing under suspended loads
- Not keeping loads under constant observation
- Use in potentially explosive environments
- Use in ambient temperatures of below +1° or above +40° C
- Use in rain

Danger
Gripping and lifting gas-permeable materials, film-covered materials, wet materials is not allowed.

Danger
Gripping and transporting cargos with unclean and uneven surfaces is not allowed.

Danger
The surface of the suckers and the cargo must be absolutely free of dust, rust particles, water and similar.
If it is necessary to clean the goods to be transported, use a fat solvent that evaporates **without any residue**, such as Nitro or brake-cleaner.
The surface must **not** be cleaned with glass-cleaner, detergent or similar.
The suction pads must not be placed under protective hoods when the cargo is being gripped.

Danger
The operator must keep the vacuum meters in view and monitor them at all times.

Danger
If the following happen during lifting work:
- The acoustic warning signal sounds and the green control lamp is no longer lit
Set the cargo down and move away from it.

Danger

Uneven load distribution of the cargo is not permitted during rotation.
Fig. 0-1

Ensure that the load is distributed evenly during rotation.
Fig. 0-2

Fig. 0-1

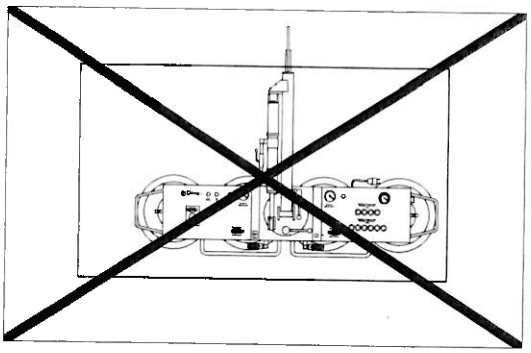
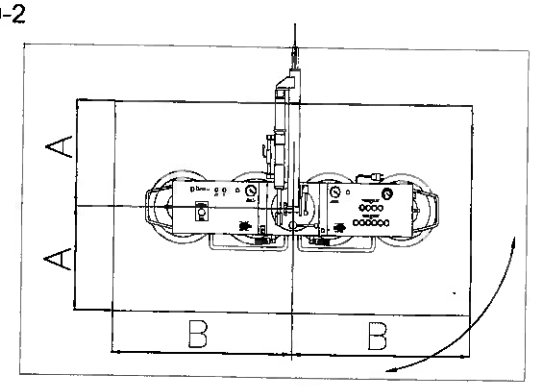


Fig. 0-2



Danger

Top-heavy or load distribution near the ground is not permitted during swivelling.
Fig. 0-3

Ensure that the load is distributed evenly during swivelling.
Fig. 0-4

Fig. 0-3

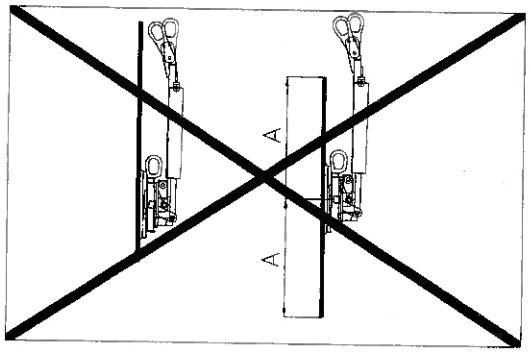
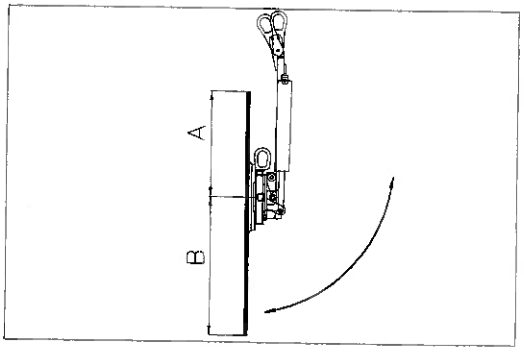


Fig. 0-4

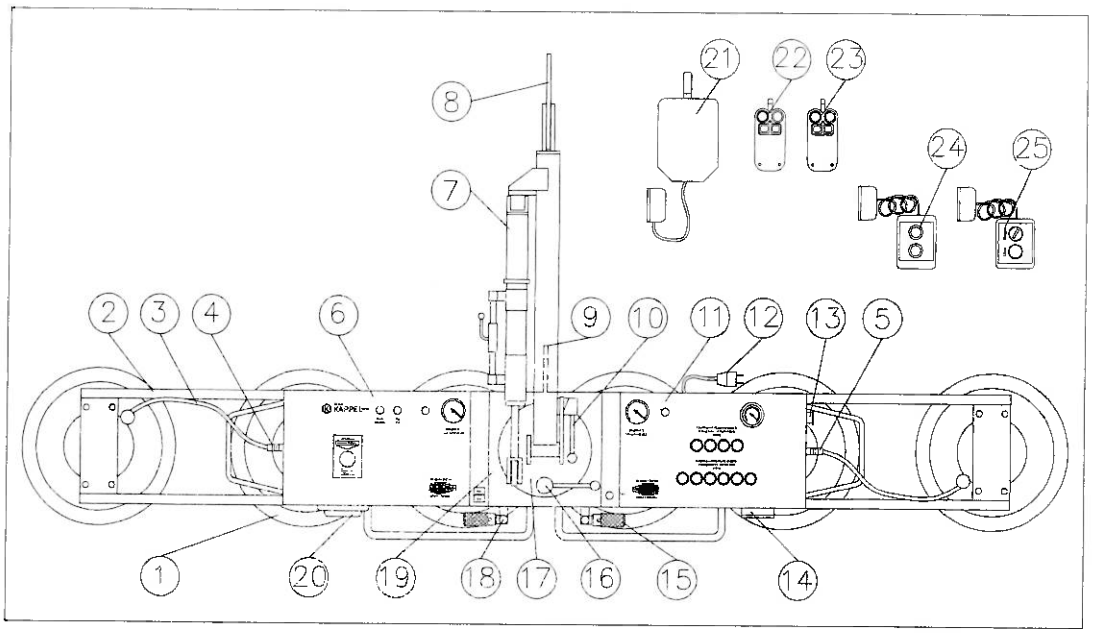


Danger

Rotating or swivelling cargo that has too large a surface is not permitted.
(See Technical Data, Chapter 7-4)

3-1 General description DSKE2-12V

Fig. 05



1. Suction pad type 150k
2. 2 pcs detachable extension
3. Vacuum line, blue = vacuum circuit 1 / black = vacuum circuit 2
4. Vacuum coupling, blue = vacuum circuit 1
5. Vacuum coupling, black = vacuum circuit 2
6. Front panel left
7. hydraulic cylinder
8. Suspension
9. Suspension on top frame
10. Locking device swivel
11. Front panel right
12. Mains plug
13. buzzer
14. Plug connection 10-pole, for remote controls
15. Manual valve (suction/release valve) suction circuit 2
16. Locking device rotation
17. Turn-plate
18. Manual valve (suction/release valve) suction circuit 1
19. Top frame

Options

20. Flashing light for radio remote control suction, release with quick release function
21. Radio receiver
22. Radio remote control for release
23. Radio remote control for suction, release with quick release function
24. Cable remote control for release
25. Cable remote control for suction, release with quick release function

3-2 Technical description

- The vacuum lifters in the DSke series are vacuum lifting devices with a low overall depth.
- They can be fitted with extensions so that they can be adapted to many different types of cargo and to lift and transport the cargo in stable way
- The top frame can be rotated electrically 360 degrees (4x90°) and also swivelled 90 degrees.
- They are intended for flexible use on construction sites and on various crane systems and anywhere where no 220 to 240 volt connection is available.
- The upper frame houses the vacuum reserve tanks, the vacuum pumps, the battery charging device and the battery.
- In addition to easy installation on a crane or similar device, the DSKE range offers the safety advantage that in general no vacuum supply hose or voltage supply line is required as is the case with separated devices (cross arm, vacuum pump).
- In addition, it is also possible to lower cargo during a power outage with this type of device as long as all vacuum circuits are perfectly sealed, because the vacuum reserve tanks are located in the vacuum lifter.

Vacuum generation

- The devices are equipped with two vacuum circuits working independently from each other (dual-circuit suction system).
- This means that each vacuum circuit should be able to maintain its load capacity with double safety.
- Two vacuum pumps (one vacuum pump per circuit) are used to generate vacuum.
- Each vacuum circuit has a vacuum reserve tank, two vacuum switches, a one-way valve, a manual valve and a control vacuum meter.
- The suckers are supplied with a vacuum (suction) or normal compressed air (release) by means of the manual valves (suction/release) of the circuits.
- The inspection vacuum meters provide information on the exact pressure ratios in the vacuum lines to the individual suckers.
- Insufficient vacuum is signalled by the acoustic warning signal.
- The suckers can be blocked individually via the stop valves.

Power supply

- Power is supplied by the built-in battery.
- A voltage display indicates the battery charge level.
- The charging circuit voltage for the built-in charger is 220-240 volt AC (50/60 Hz).
- In order to avoid draining the battery unnecessarily, the vacuum pumps are switched off by the vacuum switch when the vacuum reaches -0.72 bar in the vacuum reserve tank, and switches back on only when the pressure falls below approx. -0.68 vacuum.
- This avoids premature draining of the batteries due to the pumps being allowed to run unnecessarily

Operation

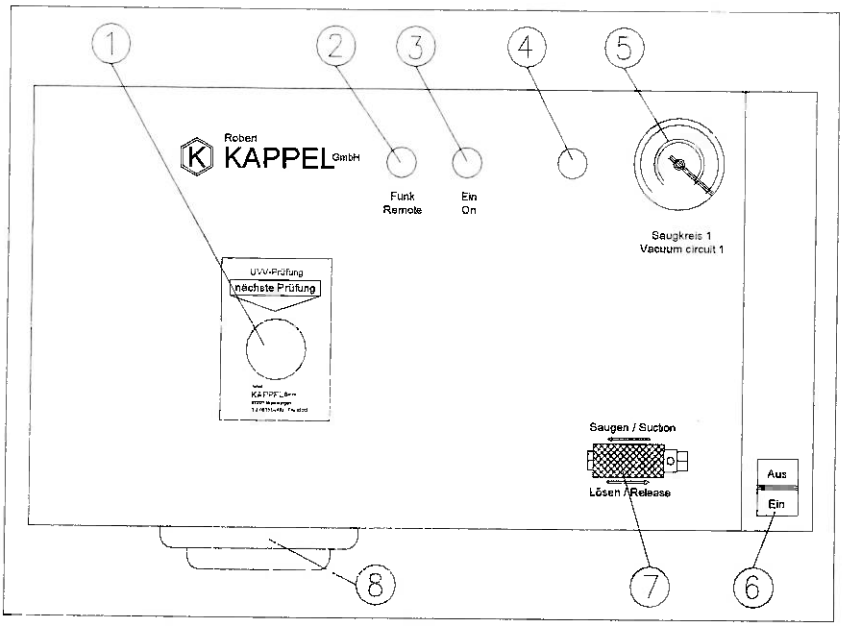
- The on / off swtich is situated on the device
- The changeover between SUCTION and RELEASE is carried out by the manual valves (Option remote control for SUCTION and RELEASE).

Danger
Note the maximum load capacity of the vacuum lifter on the type plate.

Danger
Vacuum lifters in the DSKE series are exclusively for transporting gas-tight, dry materials with firm, flat surfaces.

3-3 Front panel left

Fig. 06



No.	Description	Function	Reaction
1	UVV badge	Date of the next UVV inspection	
2	control lamp yellow, permanent light	is lit when radio receiver is active (option radio remote control)	
3	control lamp yellow, permanent light	is lit when On device ready for use	
4	control lamp vacuum green permanent light	is lit when there is -0.65 bar vacuum in the vacuum circuit	
5	vacuum meter	shows the current vacuum level in vacuum circuit 1	
6	on / off push switch	when switch is on ON setting device is ready for operation	
7	diagram manual valve	suction off / on	
8	flashing light red red flashing (option radio remote control)	flashes when suction is off	set down cargo and move away from it

Danger

Goods may only be transported when the vacuum meters in both vacuum circuits have reached the minimum final vacuum of -0.72 bar (green area).
This means that bothvacuum pumps in both vacuum circuits must have switched off.

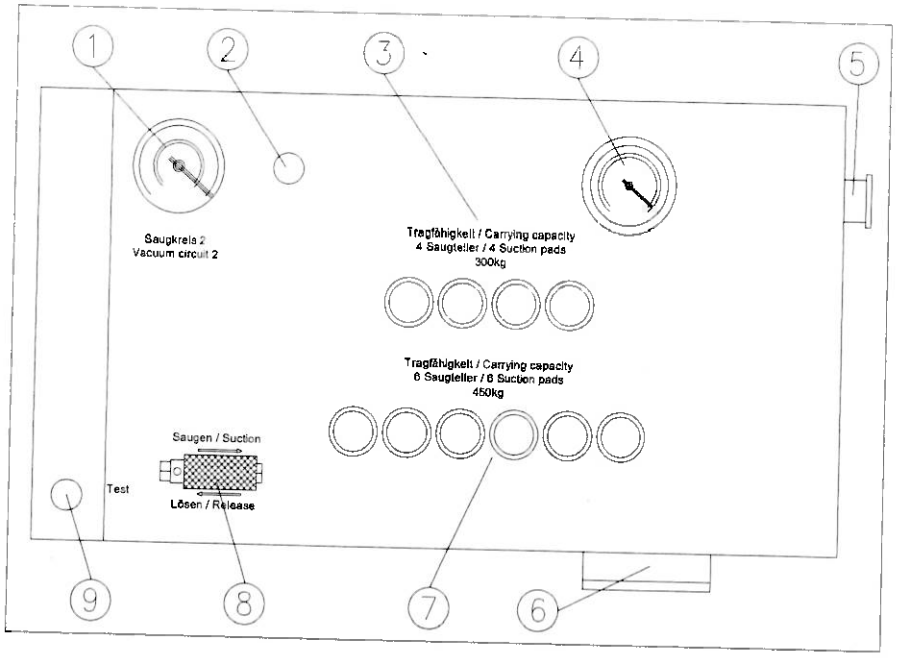
Danger

If during lifting:
- the acoustic warning signal sounds,

set down cargo immediately und move away from it.

3-4 Front panel right

Fig. 07



No.	Description	Function	Reaction
1	vacuum meter	indicates the current vacuum level In the vacuum circuit 2	
2	control lamp vacuum green permanent light	is lit when there is 0.65 bar vacuum in the vacuum circuit	
3	diagram load capacity	max. load capacity with 4 suction pads is 300kg	
4	voltage display	when the test key is pressed the charge level of the battery is displayed	
5	buzzer signal tone	when the permitted vacuum level is lower than -0.60 bar the acoustic warning signal sounds	set down cargo and move away from it
6	plug connection 10 pole	remote control (option)	
7	diagram load capacity	max. load capacity with 6 suction pads is 450kg	
8	diagram manual valve	suction off /on	
9	test key	when the test key is pressed the charge level of the battery is displayed	

Danger

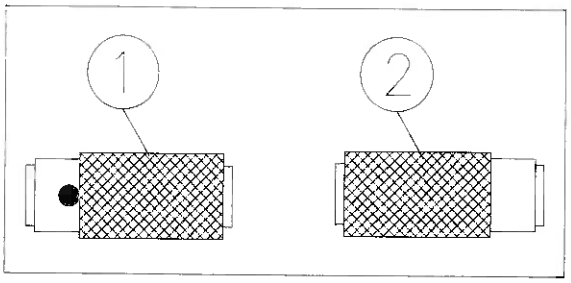
The load capacity indicated on the type plate on the device refers to the maximum load capacity of the vacuum lifter.

The permissible load capacity of the vacuum **always** depends on the number of the suckers attached. See diagrams on the front panel.

The operator is obliged not to exceed the load of the suction pads attached and the maximum load capacity of the vacuum lifter.

3-5 The manual valve (suction / release valve)

Fig. 08

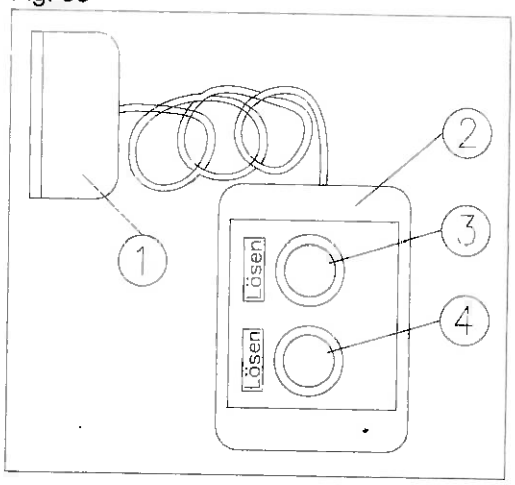


No.	Description	Function
1	manual valve setting for suction on	suction on/off
2	manual valve setting for release	suction on/off

Danger
During the lifting procedure, the manual valves must not be set to Release.

3-6 Remote control with cable for release (option)

Fig. 09



No.	Description	Function
1	plug connection 10-pole	the remote control is connected to the vacuum lifter via the plug connection
2	remote control	operation for releasing the cargo
3	pull switch suction circuit 1	press pull switch = release off (suction on) pull pull switch = release on
4	pull switch suction circuit 2	pull switch = release off (suction on) pull pull switch = release on

⚠ Danger

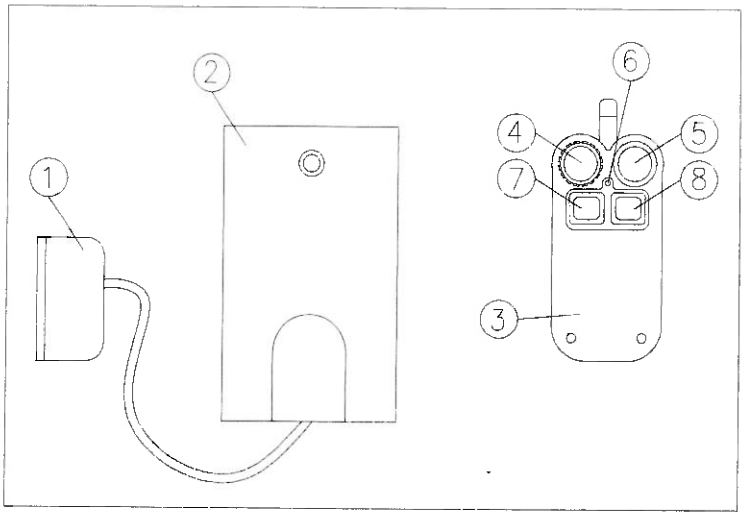
During operation, the remote control must be manually operated suction/release valves must always be set to the SUCTION position.

During lifting, the manual valves must not be set to Release.

During lifting, the pull switch must not be put into the Release On setting.

3-6 Radio remote control for release (option)

Fig. 10



Note
The radio remote control can be used up to approx. 100 m in the open.

Caution
The batteries in the radio transmitter have to be charged each time work is commenced

No.	Description		Function
1	plug connection 10-pole		the radio receiver is connected to the vacuum lifter via the plug connection
2	radio receiver		radio reception for radio remote control
3	radio remote control		operation for suction ON - Off
4	emergency Off key red		when release is ON = press key, release OFF
5	radio control On		switch on radio control = press key once
		Note	when radio receiver is active, the yellow control light radio control flashes on the left front panel
		Note	switch off radio control switch off the DSKE on the main switch. The radio remote control then switches off independently
6	control light charge level batteries		lights up green = sufficient voltage for use flashes red = insufficient voltage
7 and 8	release key red		when both keys are kept pressed, the release function is switched on or off

Please pay attention to the general operating instructions for the radio remote control in the appendix.

Danger
If the radio connection is interrupted during lifting, e.g. if the distance is too big, empty batteries in the radio remote control, the suction function stays on ON.
Consequently, it is possible to set down the cargo. The cargo must, however, be set down immediately and the reason for the interruption in the radio connection must be eliminated.

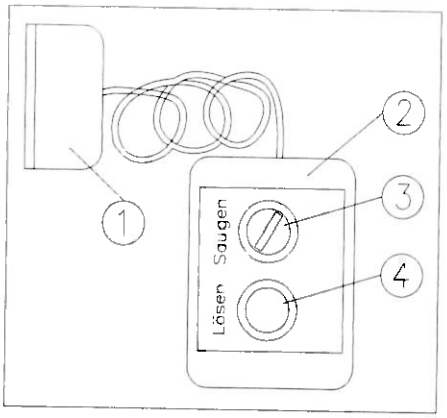
Danger
During operation of the remote control, the manually operated suction/release valves must always be set to the SUCTION position.

During lifting, the manual valves must not be set to Release.

During lifting, the Release function on the remote control must not be operated

3-8 Remote control with cable for quick releae function (Option)

Fig. 11



No.	Description	Function
1	plug connection 10-pole	the remote control is connected to the vacuum lifter via the plug connection
2	remote control	Operation for quick release function
3	suction On / Off selector switch orange, permanent light	is lit when suction On switch setting 1 switches the valve to suction On switch setting 2 switches the valve to suction Off
4	release Key red	by keeping the Release key pressed when on switch setting 2 suction Off, switches the valve to release (discharge)

Danger

During lifting, the suction function must **NOT** be switched off

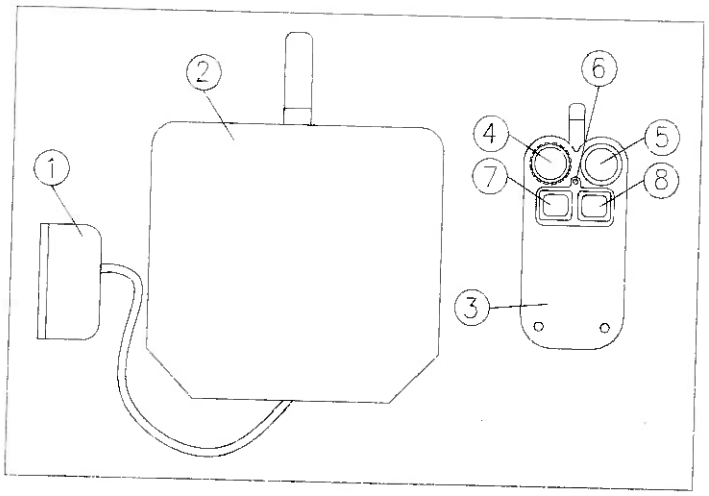
Danger

During lifting, if the plug connection (1) on the remote control is separated.
- due to unintentional unplugging
- cable breakage or other external factors;

the red flashing lamp starts to flash;
set down cargo immediately und move away from it.

3-9 Radio remote control for quick release function(option)

Fig. 12



Note
The radio remote control can be used up to approx. 100 m in the open.

Caution
The batteries in the radio transmitter have to be charged each time work is commenced

No.	Description	Function
1	plug connection 10-pole	the radio receiver is connected to the vacuum lifter via the plug connection
2	radio receiver	radio reception for radio remote control
3	radio remote control	operation for suction ON - Off
4	radio remote control switch off emergency Off key red	when suction is Off = press key, switch off radio remote control note when suction is ON = press key, the radio remote control is switched off, the suction function remains active
5	radio control On suction On-Off key	switch on radio control = press key once switch on suction = when radio control is on, press key once switch off suction = when suction is On, press key once note: when radio receiver is active, the yellow control light radio control flashes on the left front panel
6	control light charge level batteries	lights up green = sufficient voltage for use flashes red = insufficient voltage
7 and 8	release key red	when both keys are kept pressed when suction is Off, the valve switches to release (discharge)

Please pay attention to the general operating instructions for the radio remote control in the appendix.

Danger
During lifting, if the plug connection (1) on the remote control is separated.
- due to unintentional unplugging
- cable breakage or other external factors;

the acoustic warning signal sounds and the red flashing lamp starts to flash;
set down cargo immediately und move away from it.
(red flashing light see Chapter 3-1)

Danger
If the radio connection is interrupted during lifting, e.g. if the distance is too big, empty batteries in the radio remote control, the suction function stays on ON.
Consequently, it is possible to set down the cargo. The cargo must, however, be set down immediately and the reason for the interruption in the radio connection must be eliminated.

Danger
During lifting, the suction function must **NOT** be switched off

4-1 Commissioning

Danger
Operating personnel must read carefully and understand the operating instructions and carry out all inspection work before the initial commissioning of the vacuum lifter.

Caution
When using the radio remote control. (See Chapter 3-7/3-9, Radio remote control).

During commissioning and operation, the General Safety Information (see Chapter 2) should be observed.

Before commissioning, the vacuum lifter should be stored at room temperature not below 0°C.

The delivery should be checked to ensure that it is complete, the packaging should be disposed of in an environment-friendly way.

4-2 Charging the battery

Before connecting the vacuum lifter, check that the operating voltage indicated on the type plate corresponds to the power supply available. If they do not correspond, the device must not be used.

Connect the vacuum lifter at the mains plug to the supply network using an extension cable.
(see Chapter 3-1, Fig. 05)

The charging procedure can be checked in the voltage display after pressing the test button.
(see Chapter 3-4, Fig. 07)

After the charging procedure has finished, a deflection of 12 Volt should be visible on the voltage display after the test key has been pressed.

The battery is charged after a maximum of 12 hours.

Remove the extension cable from the supply network.

This completes the charging procedure

Note

After the transporting work is completed, switch the device off with the switch in order not to drain the battery unnecessarily.

Warning
Please avoid clamping, grinding and squashing the mains supply line.

4-3 Function check rotating and swivelling

Hang the vacuum lifter onto a crane hook or similar.
Carry out the manual rotation / swivel functions and check that the locks are working safely. If a function is not possible, the device must be inspected (see Troubleshooting/Remedies)

4-4 Connecting the suction pads to the vacuum circuits

In order to ensure even load distribution in the event of a power failure in one of the vacuum circuits, The suction pads must always be distributed on the vacuum circuits as shown in (Fig. 13).

Connect the vacuum lines on the suction pads to the vacuum couplings on the upper frame.

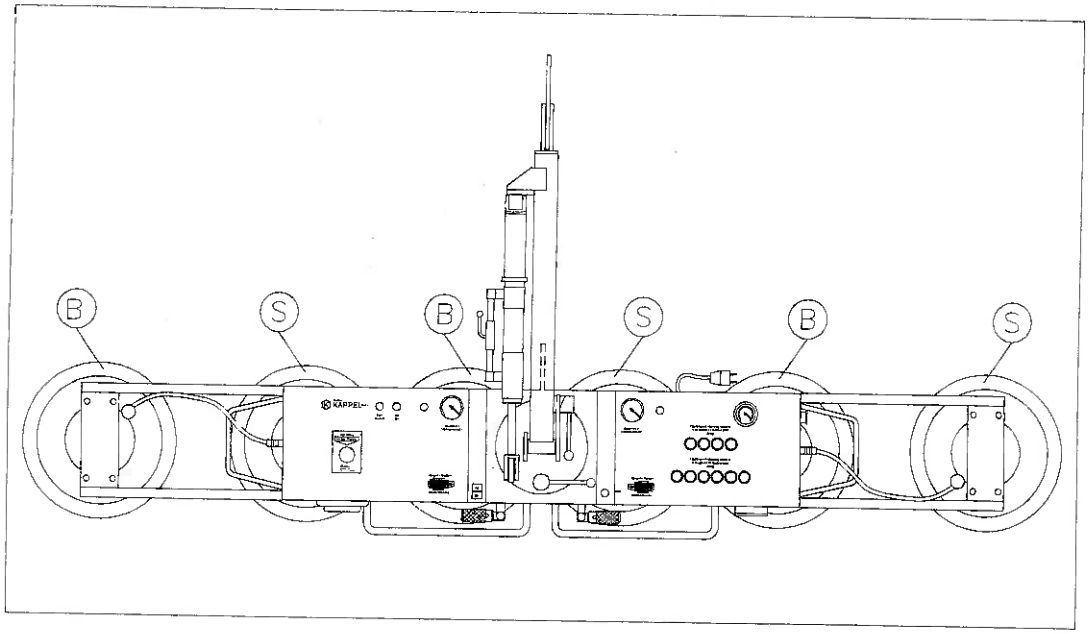
Danger

When attaching the detachable extensions, connect the vacuum lines of the suction pads to the vacuum couplings on the top frame.

When being attached, the extensions must be secured using fixing screws and/or locking pins.

B = blue hoses	vacuum circuit 1	vacuum couplings blue
S = black hoses	vacuum circuit 2	vacuum couplings black

Fig. 13



Danger

The DSKE must only be commissioned with **two** functional vacuum circuits
Before every transport operation, ensure that all suction pads of the extensions are connected to the vacuum lines on the vacuum couplings.

4-5 Leak check

A leak check must be carried out before commissioning the vacuum lifter and at weekly intervals.

Place the vacuum lifter with **all** suction pads onto a plate of gas-impermeable, flat material.

Check that all the suction pads are clean on the surface and that the whole surface is in contact and, if necessary, press any suction pads that are not in full contact or adjust until in the right position.

Switch the vacuum lifter to On using the On/Off switch.

During this process, the acoustic warning signal as long as the required vacuum has not yet been reached.

Once this has happened, the section switch Suction is set to On.

Once the acoustic warning signal and the red warning lamps have extinguished, the two control lamps are lit green; a short period later, the indicators of the two vacuum meters must have reached a value of approx. -0.72 bar (green range). The vacuum pumps then switch off.

After the vacuum pumps in all the vacuum circuits have switched off, switch off the vacuum lifter using the On/Off switch.

Read the achieved vacuum from the vacuum meters and record the value in writing.

The indicators of the vacuum meters should only change slightly within the next fifteen minutes, not more than 5%.

If the result of this test is positive, the vacuum lifter is tight and you can work with it without risk.

Danger
If a leak is detected even in only one vacuum circuit, the leak must be corrected immediately or the porous material replaced. (see Chapter 8-1 Troubleshooting)

5-1 Working cycle

Use the suspension to secure the vacuum lifter to lifting equipment with sufficient load capacity.

Before transporting cargo, the number of suction pads must be determined on the basis of the weight of the cargo (see right-hand front panel)

Danger
The vacuum lines on the suction pads must be connected to the vacuum couplings on the upper frame. (see chapter 4-4 Connecting the suction pads to the vacuum circuits)

Using the rotation and/or suction device, determine the position of the upper frame in which the cargo is to be gripped.

Position the vacuum lifter on the cargo.
(Observe safety information Chapter 2-9, Fig. 0-1 to 0-4)

Check that all suckers on the surface are clean and have full contact and, if necessary, press on or align a sucker that is not making contact until it is in the correct position.

Switch the vacuum lifter to On/Off on the On switch.

If this is done, the manual valves are set to Suction On.
During this process, the acoustic warning signal as long as the required vacuum has not yet been reached. Once the acoustic warning signal, the two control lamps are lit green; a short period later, the indicators of both vacuum meters must have reached a value of approx. -0.72 bar (green range). The vacuum pumps then switch off.

After the vacuum pumps in all the vacuum circuits have switched off, the vacuum lifter is ready to lift cargo.

The cargo is guided from the side, which means that the operator stands as far as possible from the cargo in order to guide it.

In order to rotate or swivel the cargo, the corresponding lock in activated. (See safety instructions Chapter 2-9, Fig. 0-1 to 0-4)

It must also be ensured that the rotation or swivelling motion can be performed without danger and that no damage occurs to the cargo. Larger panes should be additionally held or supported.

Once the lifting is finished and you want to release the cargo, the manual valves must be set to Release and the release key must be activated.
If the inspection vacuum meters indicate 0, the procedure is completed and the cross arm is released from the cargo. Therefore, hold on tightly to the cargo during the release procedure.

Note
After the lifting has been finished, switch off the device in order not to drain the battery unnecessarily.

Danger
Goods may only be transported when the vacuum meters in both vacuum circuits have reached the minimum final vacuum of -0.72 bar (green area).
This means that the vacuum pumps in both vacuum circuits must have switched off.

Danger
During lifting, the suction function must **NOT** be switched off

Danger
If during lifting,
- the acoustic warning signal sounds;

set down cargo immediately und move away from it.

6-1 Care and maintenance

6-2 General guidelines for maintenance and servicing work

The maintenance instructions must be followed carefully and at the stipulated intervals so that the vacuum lifter functions safely and operational safety is not affected. Any visible defects on the equipment should be eliminated immediately before the DSKE is put into operation again.

Maintenance intervals can vary according to what the device is used for and to the surroundings (e.g. dust, heat, humidity, vapour) in which the vacuum lifters are used.

Any alterations, attachments and upgrades made to the vacuum lifter which could affect safety must be authorised by the manufacturer. Kappel original spare parts are to be used exclusively for repair and maintenance work. The original spare parts are appropriate for the loads and forces relevant to the vacuum lifter. Using other spare parts can lead to serious defects and to the guarantee becoming void.

6-3 Daily maintenance

- Clean the suction pads and/or replace them if damaged.

- Check the vacuum lines for any damage and ensure that they have a firm fit.

- Check that the fastening screws on the suction pads have a firm fit on the upper frame.

- Check that the vacuum pumps are not making any unusual noises.

- Check whether the acoustic and optical warning devices function.

- Check the charge level of the battery.

- Visual inspection of the suspension

- Charge the batteries in the radio remote control (option)

6-4 Weekly maintenance

- Visual inspection of the vacuum lifter (see Chapter 4-5, Leak check)

- Visual inspection of the power supply

- Inspect the rotary and swivel lock to ensure they are functioning safely.

- Check that the suspension on the upper frame has a firm fit.

- Visual inspection of the hydraulic cylinder to ensure it is tight.

6-5 Monthly maintenance

- Relubricate the turn-table and the locking bolts (rotation, swivelling) on the grease nipples.

- Check the bearing clearance on the turn-table

6-6 Maintenance after 12 months

- Check all bearing parts to ensure that they are not deformed

- Check that there are no cracks in the upper frame

- Check that there are no cracks in the extensions

- Check that there are no cracks in the suspension

- Check that no unusual noises coming from the vacuum pumps

- Check that the acoustic and optical warning devices are functioning

- Check that the rotary and swivel drive are not making any unusual noises

- Check the bearing clearance of the turn-table

- Check the electrical equipment for any wear and tear or defective insulation

- Check the vacuum lines and screw connections.

- Check the suction pads for any damage

Danger

Please note that the trades association requires an annual inspection of vacuum lifting devices by a specialist, in accordance with the accident prevent regulations (VbG 9a-prEN 13155:1998).
All periodic inspections are to be conducted by the operator.

We offer annual maintenance for the inspections stipulated by the trade association on our premises or your premises.
The inspection carried out by us includes an inspection of the load capacity of the individual suckers. Please contact us for details.

6-7 Suction pads

If it is necessary to clean the goods to be transported, use a fat solvent that evaporates **without any residue** such as Nitro or brake-cleaner.
The surface must **not** be cleaned with glass-cleaner, detergent or similar.

Always ensure that the suckers are not placed on sharp edges because this could damage the sucker lips. This would lead to leaks in the suction circuit, impairing the functioning of the device.

Never place the machine with mounted suckers with the rubber surfaces of the suckers on sandy or similar ground. This could damage the sealing lips of the suckers. This would lead to leaks in the suction circuit, impairing the functioning of the device. Or the grains of sand or similar substances could be pressed into the rubber surfaces, leading to damage to the upper surface of the cargo.

6-8 Vacuum pumps

The vacuum obtained must be constantly monitored on the vacuum meters. If the minimum final vacuum of approx. -0.72 bar is no longer obtained, the vacuum lifter must no longer be used.
Possible causes for not obtaining the final vacuum (see Chapter 8-1 Troubleshooting)

Danger
If the vacuum lifter no longer reaches the minimum final vacuum of -0.72 bar, it is no longer able to lift the specified load.

6-9 Radio remote control (option)

Caution
The batteries in the radio transmitter should always be charged before the device is used.

6-10 Battery

If the vacuum lifter is not used for a long period, the battery must be charged at least once a week in order to avoid deep discharge.

6-11 Turn-table and locking devices

- Clean lubrication nipple before lubricating
- During the lubrication process, turn the turn-table slowly.
- During the lubrication process, move the locking devices slowly.
- Refill the grease until a fresh ring of grease forms on the bearing gaps.

7-1 Technical data

Manufacturer:	Kappel Flachglastechnik GmbH Schlachthofstrasse 3-5 87700 Memmingen Germany Tel: +49 (0) 8331/4487 Fax: +49 (0) 8331/82962 E-mail : info@vakuumlifter-kappel.de Internet : www.vakuumlifter-kappel.de
Designation:	Vacuum lifter (battery operated)
Type:	DSKE2/12V
Serial number:	3278
Year of construction:	2019
Operating instructions:	Art. No.: KA-DSKE-12V-22.1.18
Temperature range Storage temperature	+1 to +40 degrees Celsius (ambient) room temperature, not below 0 degrees
Dead weight	without extensions 45kg / with extensions 55kg
Vacuum supply Hose connection	0.3 litre / vacuum circuit 6 mm
Two vacuum pumps Supply voltage: Nominal current	 12V, DC approx. 8A / pump
battery Nominal voltage: Nominal capacity:	 12V, DC approx. 7 Ah

7-2 Dimensions of the DSKE2-12V

Fig. 14

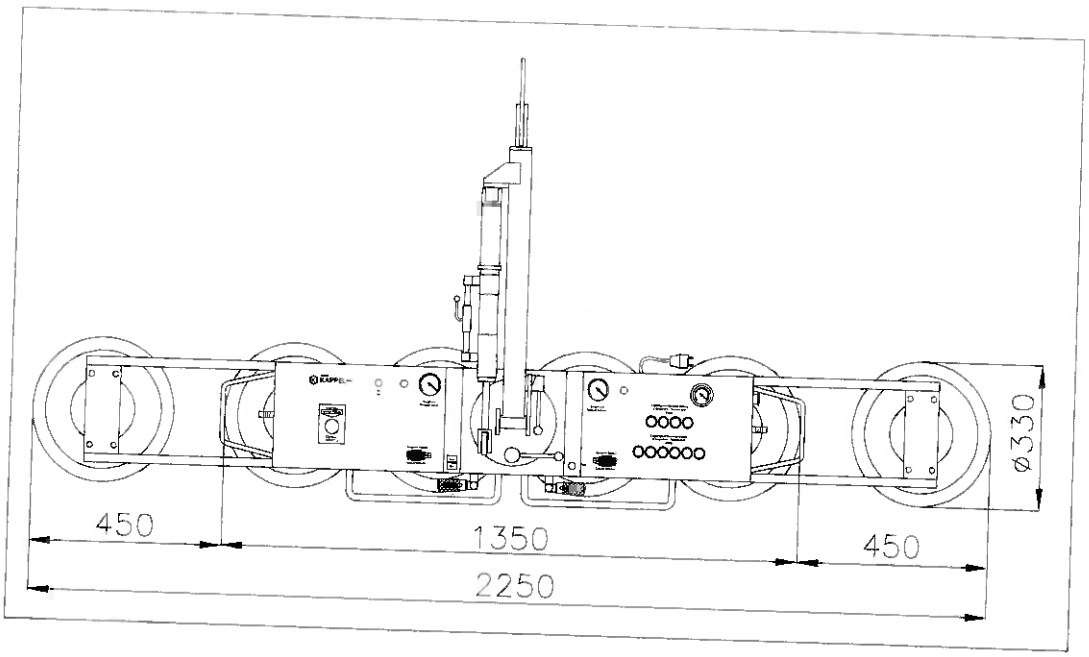
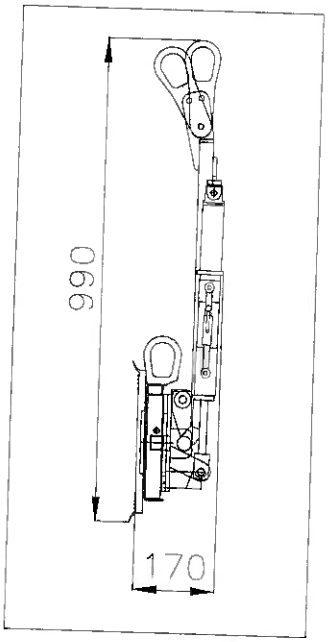


Fig. 15



7-3 Load capacity, WLL of the DSKE-12V

Maximum load capacity = WLL = Working Load Limit (see type plate)

Permitted load capacity = Depends on quantity of suction pads attached.

Danger

The load capacity indicated on the type plate on the device refers to the maximum load capacity of the vacuum lifter.

The permitted load capacity of the vacuum lifter **always** depends on the number of the suction pads attached.

The operator is obliged not to exceed the load of the suction pads attached and the maximum load capacity of the vacuum lifter.

All specifications relating to the load capacity refer to an even surface load.
Furthermore, all suckers must also have gripped the goods to be transported.

Sucker type 150 K
Diameter: 330 mm
Load capacity on smooth, clean, dry surface with 60% vacuum
Vertical: 150 kg
Horizontal: 150 kg
Load capacity suction pad type 150K in dual-circuit system 75kg / suction pad

Fig. 16 Without extensions

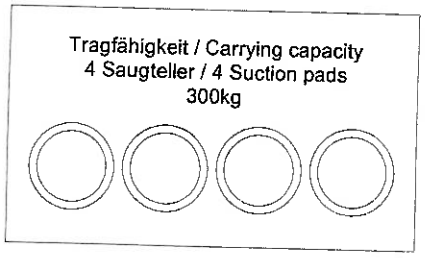
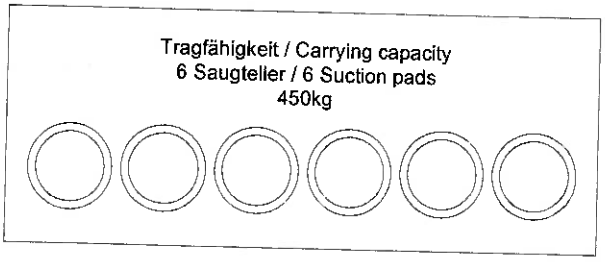


Fig. 17 With extensions

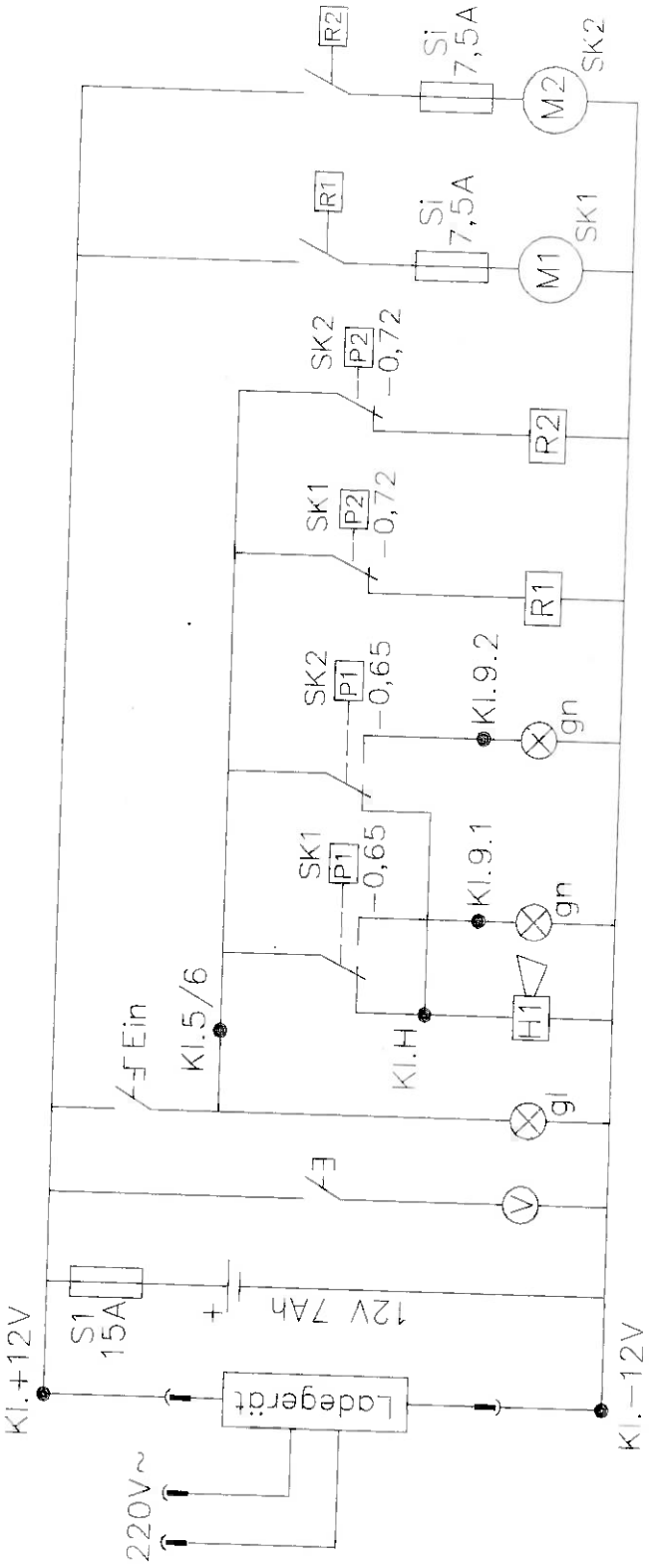


7-4 Maximum size of the plate material to be transported

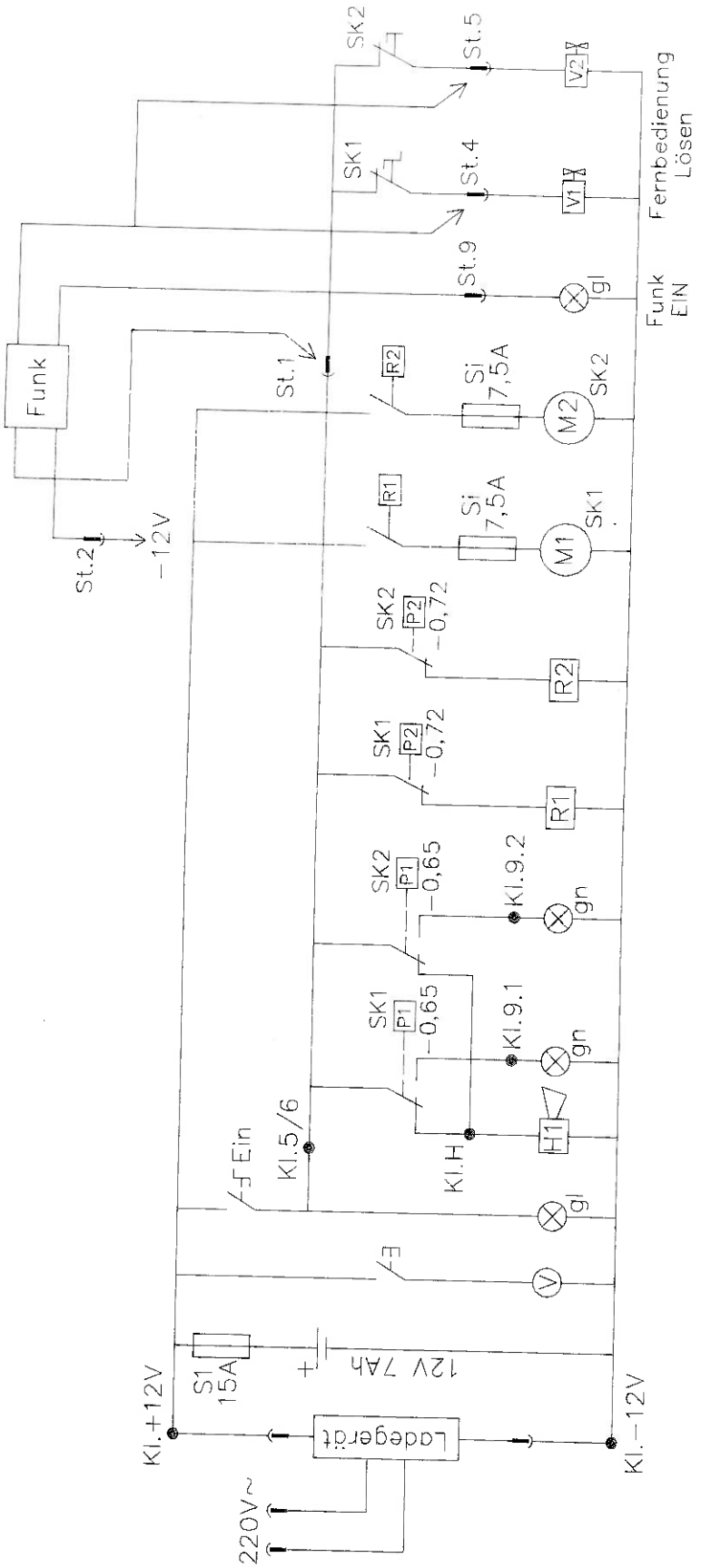
The maximum size of the plate material to be lifted depends on the number of suction pads.
The cargo may only go 0.5m over the outer edge of the suction pads.

Example (see Fig.14)
Outer edge of suction pad max. width =2.253m max. height =0.33m
The maximum size of the cargo in this case would be: Width=3.25m height=1.33m

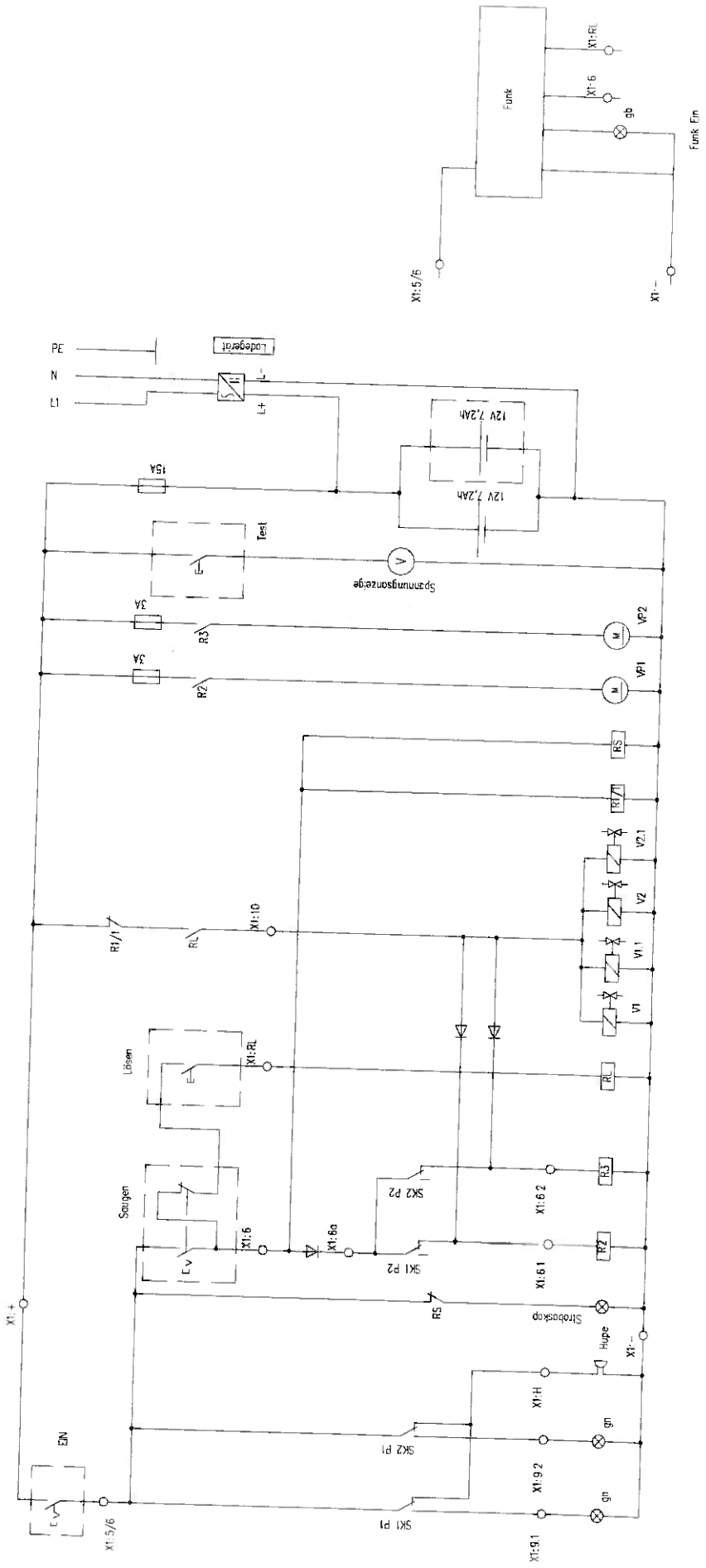
7-5 Wiring diagram of the DSKE2-12V



7-6 Wiring diagram of the DSKE2-12V with cable / radio remote control for releasing



7-7 Wiring diagram of the DSKE2-12V with cable / radio remote control with quick release function



8-1 Troubleshooting, remedies

Defect	Cause	Remedy
no warning signals	vacuum above -0.65bar	device in order
	vacuum switch defective	contact customer service
	signal tone defective	replace
vacuum pumps do not switch on when suckers are switched on	battery empty	charge battery
	battery defective	replace
	vacuum switch defective	contact customer service
	relay fuse in top frame defective	replace
	vacuum pump defective	contact customer service
	batteries in remote control empty	recharge
vacuum pump does not switch off when -0.72bar is reached	vacuum switch defective or switch point moved	contact customer service
vacuum pumps no longer reaches minimum final vacuum of approx.-0.72 bar	A suction pad is no longer properly on	correct the suction pad or press
	suction pad defective	replace
	vacuum line defective	replace
	vacuum coupling defective	replace
	screw connection defective	replace
	vacuum pump defective	contact customer service
a leak is discovered during leak check	suction pad defective	replace
	vacuum line defective	replace
	vacuum coupling defective	replace
	screw connection defective	replace
	leak in built-in parts in upper frame	contact customer service
rotation not possible	locking device defective	contact customer service
swivelling not possible	locking device defective	contact customer service
plate material falls off during lifting	load capacity too high	determine weight of cargo and compare with built-in suction pads
	cargo or suction pads wet	dry off
	cargo oder suction pads soiled	clean
	suction pads are covered by protective hood	remove
	suction pad defective	replace
	vacuum hose bent	alter hose routing and/or replace vacuum hose
	vacuum lines are not connected to the vacuum couplings	connect

9-1 Spare parts / Spare parts order

Please fill in the following identification data of your vacuum lifter so that they are always to hand. This will enable you to obtain the correct spare parts.

Vacuum lifter type ..... DSKE2 112V .....

Serial no. ..... 3278 .....

Construction year ..... 2019 .....

Load capacity ..... 450 kg .....

Original spare parts can be ordered from the following address.

Kappel Flachglastechnik GmbH
Schlachthofstrasse 3-5
87700 Memmingen
Germany
Tel: +49 (0) 8331/4487
Fax: +49 (0) 8331/82962
E-mail: info@vakuumlifter-kappel.de
Internet: www.vakuumlifter-kappel.de

Dimensions DSKE2-2000-12V

Fig. 18

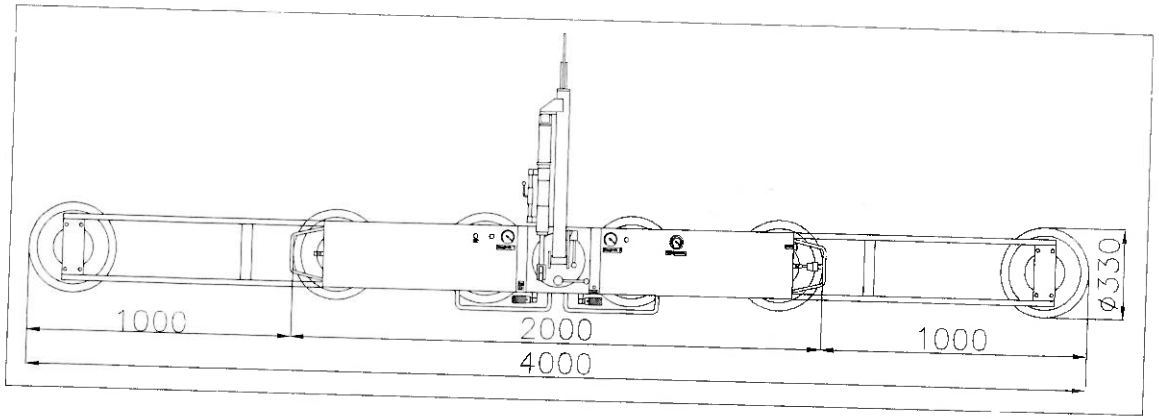
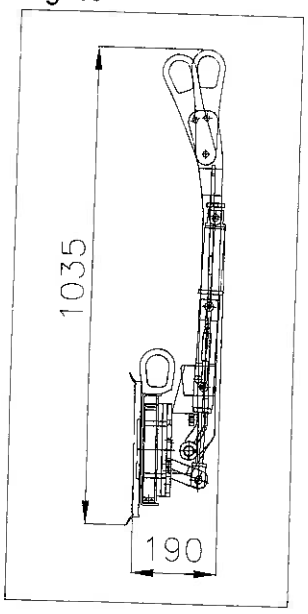


Fig. 19



Dead weight of the DSKE2-2000-12V

See type plate

Load capacity, WLL of the DSKE-2000-12V

Maximum load capacity = WLL = Working Load Limit (see type plate)

Permitted load capacity = Depends on quantity of suction pads attached.

Danger

The load capacity indicated on the type plate on the device refers to the maximum load capacity of the vacuum lifter.

The permitted load capacity of the vacuum lifter **always** depends on the number of the suction pads attached.

The operator is obliged not to exceed the load of the suction pads attached and the maximum load capacity of the vacuum lifter.

All specifications relating to the load capacity refer to an even surface load.
Furthermore, all suckers must also have gripped the goods to be transported.

Sucker type 150 K
Diameter: 330 mm
Load capacity on smooth, clean, dry surface with 60% vacuum
Vertical: 150 kg
Horizontal: 150 kg
Load capacity suction pad type 150K in dual-circuit system 75kg / suction pad

Fig. 20

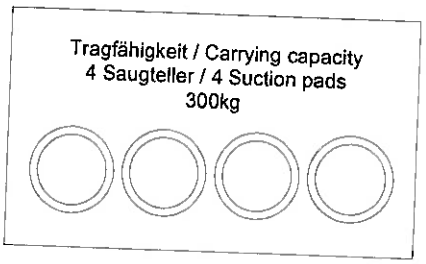


Fig. 21

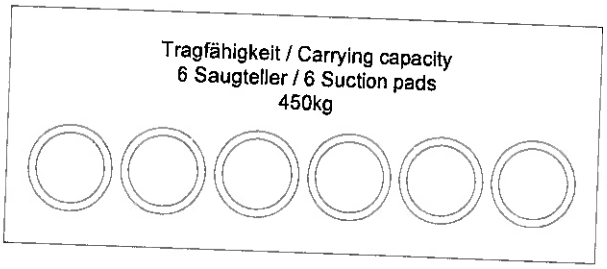
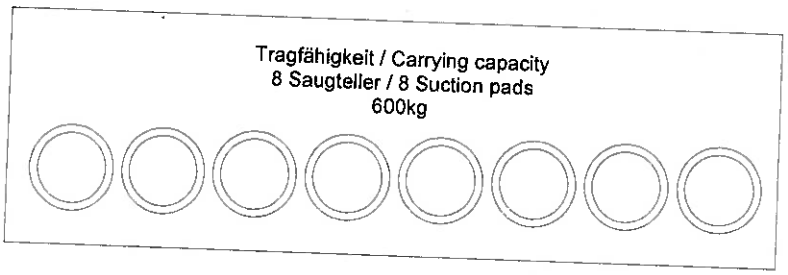


Fig. 22



Maximum size of the plate material to be transported

The maximum size of the plate material to be lifted depends on the number of suction pads.
The cargo may only go 0.5m over the outer edge of the suction pads.

Example (see Fig.18)
Outer edge of: suction pad: max. width= 4m max. height =0,33m
The maximum size of the cargo in this case would be: Width= 5m height=1.33m

Dimensions of the DSKED2-12V

Fig. 23

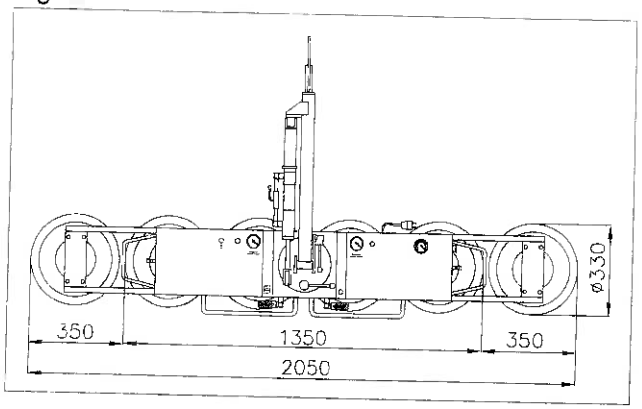


Fig. 24

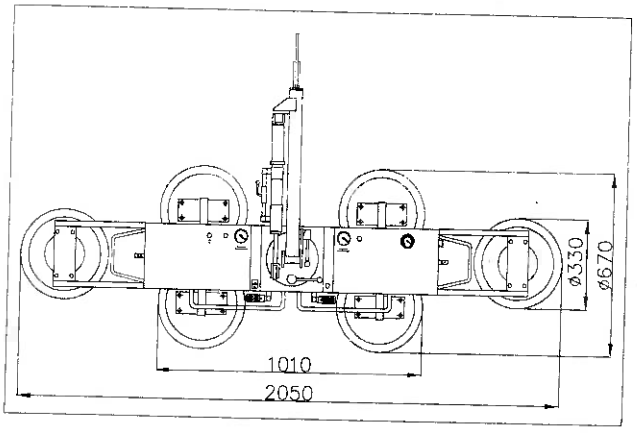
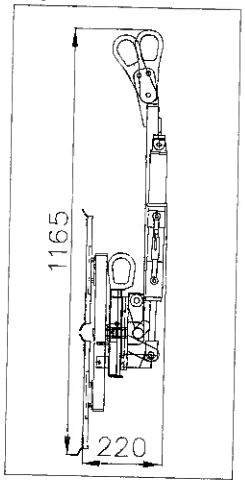


Fig. 25



Dead weight of the DSKED2-12V

See type plate

Load capacity, WLL of the DSKED2-12V

Maximum load capacity = WLL = Working Load Limit (see type plate)

Permitted load capacity = Depends on quantity of suction pads attached.

Danger

The load capacity indicated on the type plate on the device refers to the maximum load capacity of the vacuum lifter.

The permitted load capacity of the vacuum lifter **always** depends on the number of the suction pads attached.

The operator is obliged not to exceed the load of the suction pads attached and the maximum load capacity of the vacuum lifter.

All specifications relating to the load capacity refer to an even surface load.
Furthermore, all suckers must also have gripped the goods to be transported.

Sucker type 150 K
Diameter: 330 mm
Load capacity on smooth, clean, dry surface with 60% vacuum
Vertical: 150 kg
Horizontal: 150 kg
Load capacity suction pad type 150K in dual-circuit system 75kg / suction pad

Fig. 26

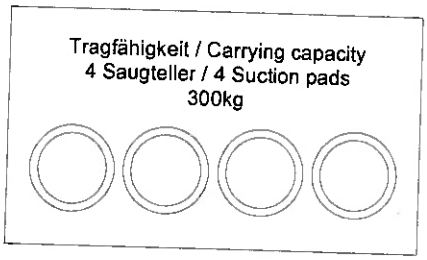
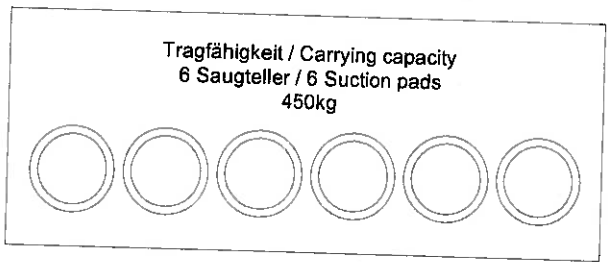


Fig. 27



Maximum size of the plate material to be transported

The maximum size of the plate material to be lifted depends on the number of suction pads.
The cargo may only go 0.5m over the outer edge of the suction pads.

Example (see Fig.24)
Outer edge of suction pad max. width =2.05m max. height =0.67m
The maximum size of the cargo in this case would be: Width=3.05m height=1.67m

Dimensions of the DSKEB2-12V

Fig. 28

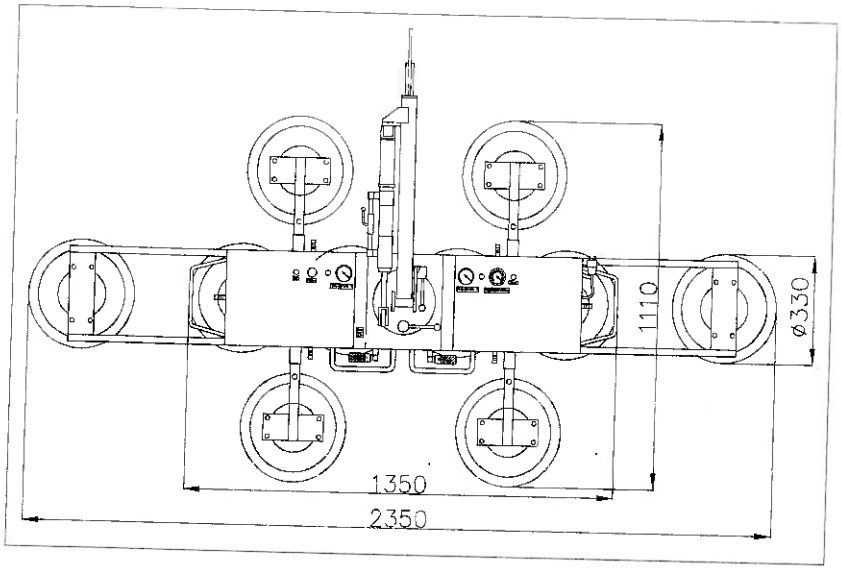
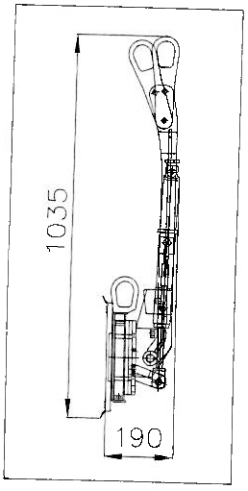


Fig. 29



Dead weight of the DSKEB2-12V

See type plate

Load capacity, WLL of the DSKEB2-12V

Maximum load capacity = WLL = Working Load Limit (see type plate)

Permitted load capacity = Depends on quantity of suction pads attached.

Danger

The load capacity indicated on the type plate on the device refers to the maximum load capacity of the vacuum lifter.

The permitted load capacity of the vacuum lifter **always** depends on the number of the suction pads attached.

The operator is obliged not to exceed the load of the suction pads attached and the maximum load capacity of the vacuum lifter.

All specifications relating to the load capacity refer to an even surface load.
Furthermore, all suckers must also have gripped the goods to be transported.

Sucker type 150 K
Diameter: 330 mm
Load capacity on smooth, clean, dry surface with 60% vacuum
Vertical: 150 kg
Horizontal: 150 kg
Load capacity suction pad type 150K in dual-circuit system 75kg / suction pad

Fig. 30

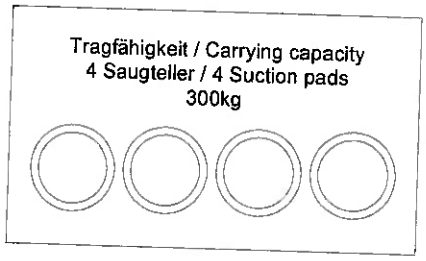


Fig. 31

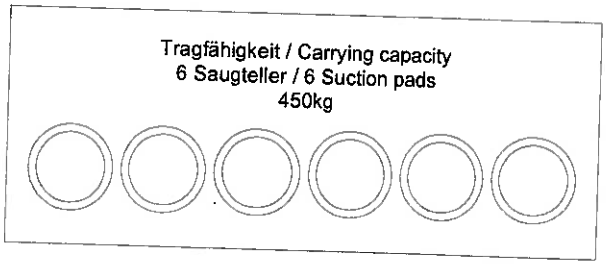
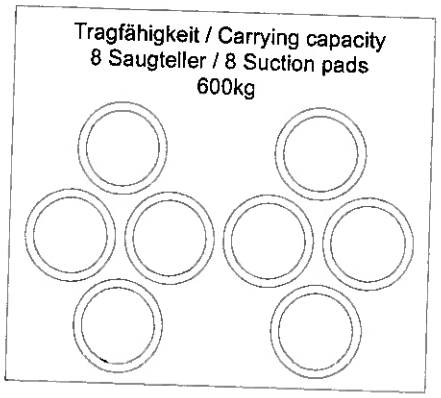


Fig. 32



Maximum size of the plate material to be transported

The maximum size of the plate material to be lifted depends on the number of suction pads.
The cargo may only go 0.5m over the outer edge of the suction pads.

Example (see Fig.28)
Outer edge of suction pad max. width =2.35m max. height =1.11m
The maximum size of the cargo in this case would be: Width=3.35m height=2.11m

Dimensions of the DSKE2-12V special version

Fig. 33

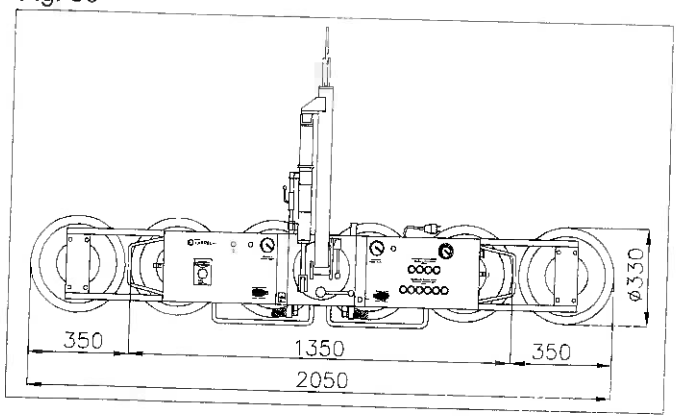


Fig. 34

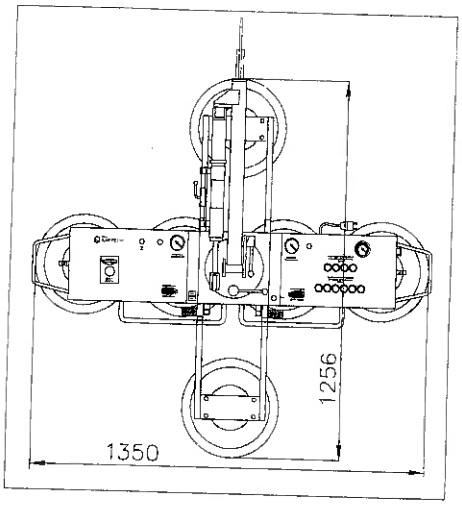
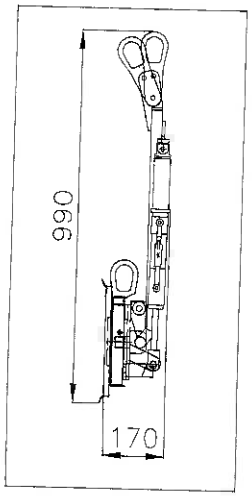


Fig. 35



Dead weight of the DSKE2-12V special version

See type plate

Load capacity, WLL of the DSKE2-12V special version

Maximum load capacity = WLL = Working Load Limit (see type plate)

Permitted load capacity = Depends on quantity of suction pads attached.

Danger

The load capacity indicated on the type plate on the device refers to the maximum load capacity of the vacuum lifter.

The permitted load capacity of the vacuum lifter **always** depends on the number of the suction pads attached.

The operator is obliged not to exceed the load of the suction pads attached and the maximum load capacity of the vacuum lifter.

All specifications relating to the load capacity refer to an even surface load.
Furthermore, all suckers must also have gripped the goods to be transported.

Sucker type 150 K
Diameter: 330 mm
Load capacity on smooth, clean, dry surface with 60% vacuum
Vertical: 150 kg
Horizontal: 150 kg
Load capacity suction pad type 150K in dual-circuit system 75kg / suction pad

Fig. 36

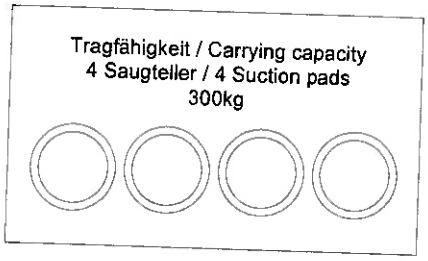
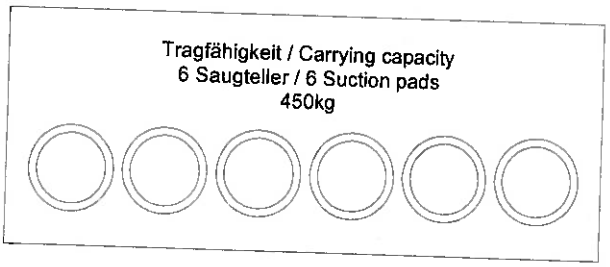


Fig. 37



Maximum size of the plate material to be transported

The maximum size of the plate material to be lifted depends on the number of suction pads.
The cargo may only go 0.5m over the outer edge of the suction pads.

Example (see Fig.33)
Outer edge of suction pad max. width =2.05m max. height =0.33m
The maximum size of the cargo in this case would be: Width=3.05m height=1.33m

Example (see Fig.34)
Outer edge of suction pad max. width =1.35m max. height =1.256m
The maximum size of the cargo in this case would be: Width=2.35m height=2.256m

Daily Pre-Use Checklist
Vacuum Lifter

Northern (Head Office) **Tel: +44 (0)1482 227333**
Central Tel: +44 (0)1302 341659
Western Tel: +44 (0)1384 900388
Southern Tel: +44 (0)203 174 0658
www.hird.co.uk

Machine Model: **Kappel DSKE2**		Site Name:
Date Week Commencing:	Fleet No:	Address:
Inspected by:		

	Daily Pre-use Checks	M	T	W	T	F	S	S	COMMENTS
1	Are all operators manuals present and readable								
2	Is the Report of Thorough Examination (LOLER) in date								
3	Complete a visual walk around / Inspection for any noticeable defects								
4	Are all safety information decals present and readable								

Check the following components or areas for damage, or missing parts & unauthorised modifications:

5	Is the lifting attachment free from defects and safe to use								
6	Vacuum pads for rips, tears, quality and cleanliness								
7	Vacuum pipes and connections (in particular quick release fittings)								
8	All extension arms are present and free from defects (where applicable)								
9	Make sure all individual pad shut off valves are open (where applicable)								
10	Electrical components, wiring, connectors,								
11	Check input mains voltage corresponds with charger voltage (110v or 240v)								
12	Charger								
13	Check battery has sufficient charge								
14	Are rotation and tilting movements functional								
15	Check handles security								
16	Check remote for any damage or defects (where applicable)								
17	Check operation buttons / switches are working and free from defects								
18	Energise vacuum on non porus surface								
19	Are lights and audible alarms on during vacuum process								
20	Does the vacuum reach sufficient level, before switching off (see gauges)								
21	Does battery gauge illuminate when pump switches off **If NO - DO NOT USE**								
22	Check Safe Working load of vacuum - is it suitable for the proposed load								
23	Carry out full function test								

Is the machine safe to use? (please circle)	YES / NO	YES / NO	YES / NO	YES / NO	YES / NO	YES / NO	YES / NO	
Operator's Initials								

Result of Inspections: List defects or state "No Defects"

Signature:	**Name:**	**Date:**