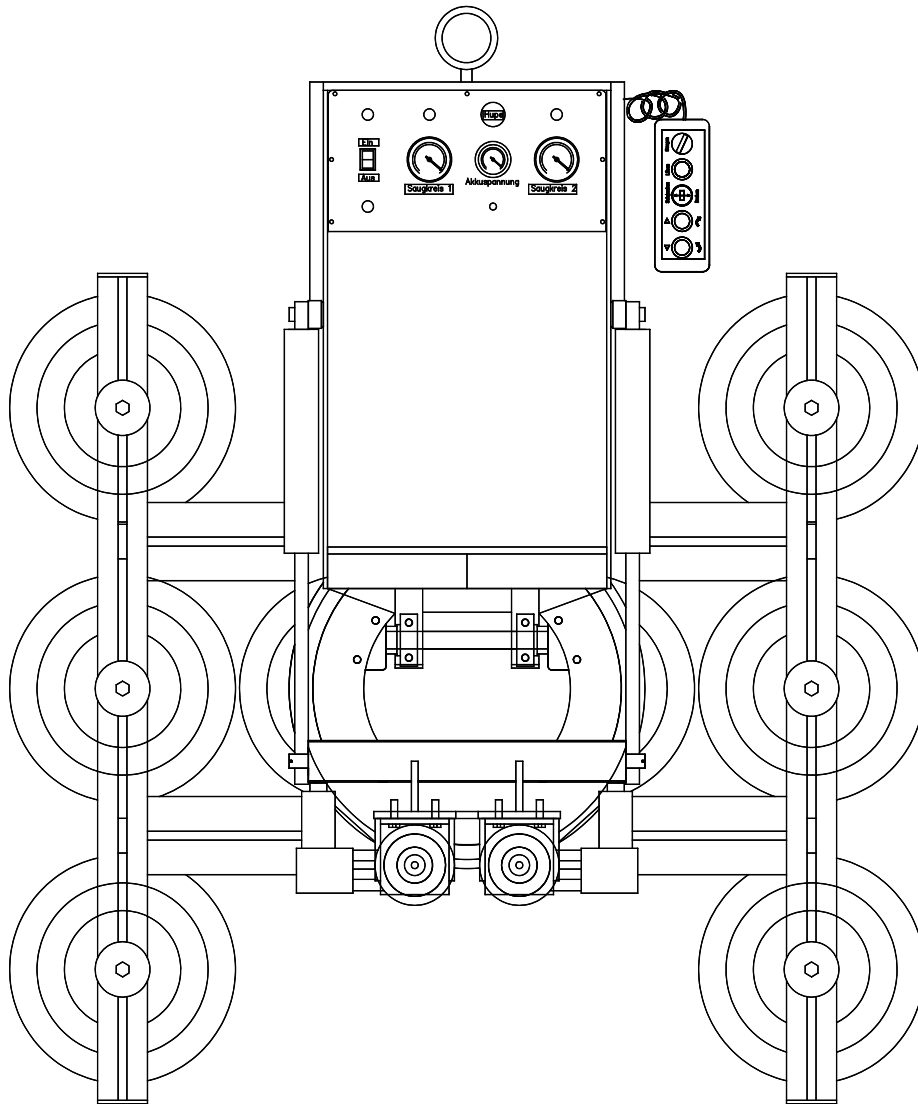


Robert
KAPPEL GmbH

FLACHGLASTECHNIK Verkauf & Service

Robert Kappel GmbH, Schlachthofstraße 3-5, 87700 Memmingen



Operating Instructions

for

DSMH2-12V

Contents

Foreward	1-1
Technical description	1-2
Basic safety information	2-1
Warning instructions and symbols	2-1
Authorised use	2-1
Organisational measures	2-2
Personnel selection and qualifications	2-3
Safety instructions regarding particular operating stages	2-3
Normal operation	2-3
Special work	2-4
Safety instructions for special types of danger	2-4
Electrical energy	2-4
Oils, greases and other chemical substances	2-4
Commissioning	3-1
Charging the battery	3-2
The remote control	3-3
Attaching the suction pads to the DSMH2-12V	3-4
Before transporting	3-5
Operation	4-1
Working cycle	4-2
Switching off	4-5
Charging the battery	4-5

Troubleshooting	5-1
Pumps no longer perform correctly	5-1
Leak check	5-2
Leak check for the entire system	5-2
Leak check without suckers	5-2
Electrical malfunction	5-3
Vacuum pumps do not start when the device is actuated	5-3
Vacuum pumps do not switch off when vacuum of -0.72 bar is reached	5-3
No warning signals	5-3
Rotating cannot be carried out	5-4
Swivelling cannot be carried out	5-4
Maintenance	6-1
The suckers	6-1
The vacuum lines	6-1
Leak check	6-2
The geared motors	6-3
The hydraulic pumps with cylinder	6-3
The vacuum pump	See appendix
Technical data	7-1
Performance data of the DSMH2-12V	7-2
Options for the DSMH2-12V	7-3
Wiring diagram of the DSMH2-12V	7-4
Spare parts list	8-1

Foreword

These operating instructions are intended to help you become familiar with the DSMH2-12V and to use it as intended.

These operating instructions contain important instructions about operating the DSMH2-12V safely, effectively, and economically. Observing them helps to avoid repair costs and down time and to increase the reliability and working life of the DSMH2-12V.

These operating instructions must be supplemented by additional instructions due to existing national accident prevention regulations.

These operating instructions must always be available at the site of use of the DSMH2-12V

These operating instructions must be read and observed by every person responsible for doing work on the DSMH2-12V, for example:

- operation, including equipping, troubleshooting during operation, removal of production waste, care
- maintenance (servicing, inspection, repair) and/or
- transport.

In addition to the operating instructions and binding accident prevention regulations applicable for the country of use and the application case, the recognised technical rules for safe and professional work must also be observed.

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

Kappel Flachglastechnik GmbH
Schlachthofstraße 3-5
87700 Memmingen

The management appreciates your cooperation.

Technical Description

The DSMH2-12V is a combination of two vacuum pumps with power supply (battery or mains, including charger) and a vacuum cross arm with two vacuum circuits working independently from each other. This vacuum cross arm is intended for flexible use on construction sites, for attaching to a cross arm with counterweight, anywhere where no 220 to 240 volt connection is available. Using the DSMH2-12V, the transported goods can be rotated 360 degrees by two geared motors and also be swivelled 90 degrees hydraulically. The rotation and swivelling movement is operated by remote control with a cable. The DSMH2-12V is hung on a crane hook and is supplied with energy via the installed battery. In addition to easy installation on a crane or similar device, the DSMH2-12V also 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 transported goods during a power outage with this type of device as long as both vacuum circuits are perfectly sealed, because the vacuum reserve tanks are located on the vacuum cross arm.

In detail, the device consists of a casing frame with a suspension eye, the basic frame. This basic frame simultaneously forms the two vacuum reserve tanks and holds the vacuum pumps, the battery charging device, the battery and the hydraulic pumps. A second rectangular pipe frame is connected to this basic frame first via a swivelling joint and then via a rotating joint. This frame is the carrier frame on which the geared motors and the suckers are mounted. You can switch from SUCTION to RELEASE by using a remote control. The suckers can be blocked individually by stop valves. Two inspection vacuum meters provide information on the exact pressure ratios in the vacuum lines to the individual suckers. A voltage display indicates the battery charge level.

The charging circuit voltage for the charger is 220-240 volt AC (50/60 Hz).

Two vacuum pumps are used to generate the vacuum (one vacuum pump per vacuum circuit). The vacuum pumps work without oil lubrication and are therefore maintenance-free.

In order to avoid draining the batteries unnecessarily, the pump switch has a two-point controller that switches off the vacuum when the pressure reaches -0.72 bar in the vessel, switches the pumps off and switches the pumps back on 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. The batteries are maintenance-free and enclosed; they are totally discharge-safe.

Mode of operation

Switch the machine to On using the ON/OFF switch. Then set the suction switch to OFF. The vacuum cross arm must be positioned on the load to be transported in such a way that all suckers are flat on the smooth clean surface so that the sucker lips can seal completely. Set the suction switch to ON and wait until the pumps of both vacuum circuits switch off. You can check the vacuum using the vacuum meters 1-4 on the device. If there is a vacuum of -0.72 bar in each vacuum circuit, the load can be transported. To release the suckers from the load, set the suction switch to OFF and the release key must be operated.

Caution

The DSMH2-12V must **NEVER** be commissioned with only **one** functional vacuum circuit.

Basic safety information

Warning instructions and symbols

The following terms and symbols are used in the operator's manual for especially important information:

- Note** Special information regarding the economical use of the device
- Caution** Special information regarding requirements and prohibitions for preventing damage.
- Danger** Information or requirements or prohibitions for protecting people or preventing extensive damage.

Authorised use

The DSMH2-12V has been constructed in accordance with the state of the art and recognised safety regulations. Nevertheless, its 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.

The machine 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. Failures which can interfere with safety must be eliminated immediately.

The DSMH2-12V is exclusively for transporting gas-tight, dry materials with firm, flat surfaces. Other use or use going beyond this, for example transporting gas-permeable materials, film-covered materials, wet materials, or rotating or swivelling large or heavy transported goods is not authorised. The manufacturer/supplier is not liable for the damages resulting from this. The risk is carried by the user.

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

Organisational measures

Always keep the operating instructions within reach at the site of use.

In addition to the operating instructions please observe and teach any other generally applicable statutory regulations concerning accident prevention.

Such obligations can also include providing and wearing personal protective equipment.

Please supplement the operating instructions with instructions including supervision and reporting obligations taking into consideration operational corporate circumstances, e.g. relating to work organisation, work processes, personnel used.

The personnel authorised to operate the device must read the operating instructions, particularly the chapter about safety instructions before starting work. It is too late to read the instructions if work has already been started. This applies in particular to personnel who only work on the machine occasionally, e.g. for equipping it and carrying out maintenance work.

Occasional checks should be carried out to ensure that the members of personnel follow the instructions and work in a safety-conscious manner and are aware of risks.

If necessary or if required by regulations, personal protective equipment should be used. Glass should only be transported with the appropriate protective equipment (safety shoes, protective gloves, wrist protectors, helmet etc.) A helmet should be worn at all times when transporting goods above head height.

All safety and danger instructions on the device should be complied with.

All safety and danger instructions on the device should be kept complete and in legible condition.

If there are any safety-related changes to the device or its operation, the device should be stopped immediately and the malfunction should be reported to the relevant office or person.

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.

Spare parts must fulfill the technical requirements specified by the manufacturer. This is always guaranteed with original replacement parts.

Vacuum hose lines should be replaced at the specified intervals or at appropriate intervals, even if there are no recognisable safety defects.

Compulsory deadlines or those specified in the instructions for recurring tests / inspections should be complied with

Appropriate workshop equipment is absolutely necessary for performing the maintenance measures.

Personnel selection and qualification

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.

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

Safety instructions on particular operating phases

Normal operation

Avoid all unsafe work practices.

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.

Take measures to ensure that the machine is only operated when safe and functional.

Check the machine for externally recognisable damages and flaws at least once per shift. Report any changes that occur (including those to the operating behaviour) immediately to the responsible office/person. If necessary, stop the machine immediately and secure it!

During malfunctions, the machine should be stopped immediately and secured. Malfunctions should be corrected immediately.

The switching on and off procedures should be complied with, and the inspection displays should correspond to the operating instructions.

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

Special work

The setting, maintenance, inspection activities and deadlines, including information on replacement of parts and modules stipulated in these operating instructions must be observed. These activities may only be performed by authorised specialists.

Only perform maintenance and repair work when the machine is positioned on flat ground with sufficient bearing capacity and is secured so that it cannot roll away or collapse.

Clean machines, particularly connections and screw connections at the beginning of maintenance/repair work. Do not use aggressive cleaning agents! Use lint-free cloths for cleaning.

Never clean the machine with water or steam jet (high-pressure cleaner).

After cleaning, inspect all vacuum lines for leaks, loosened connections, abrasion and damage. Repair any flaws immediately!

Always tighten screw connections loosened during maintenance and repair work.

Safety instructions for special types of danger

Electrical power

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

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.

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

Oils, greases, and other chemical substances

Observe the safety regulations applicable for the product when using oils, greases, and other chemical substances!

Commissioning

Note

- Do not store the DSMH2-12V in a damp or very cold (frost) environment. Otherwise there is no guarantee that the installed pumps will function properly.
- Rotation and swivelling can only be carried out when the pumps in the two vacuum circuits are switched off.
- Swivelling can only be carried out when the DSMH2-12V is hanging from a crane hook or similar.

Caution

- 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 transported goods.

Danger

- Do not allow heavy rain to fall on the DSMH2-12V.
- Do not place the DSMH2-12V in water.
- Do not convey loads over persons or machines. Cordon off the area under hanging transported goods with wide clearance.

Charging the battery

Check the DSMH2-12V for any externally recognisable damages or flaws.

Compare the connection on the power supply network and check the voltage, current and mechanical connection (plug connection) with the necessary data for the vacuum pumps. If they do not correspond, the machine may not be operated.

Connect the DSMH2-12V to the supply network using an extension cable.

The charging procedure can be checked in the voltage display after pressing the test button.

After the charging procedure is completed, a value of 100% must be visible in the voltage display when Test button is pushed.

The battery is charged after a maximum of 12 hours.

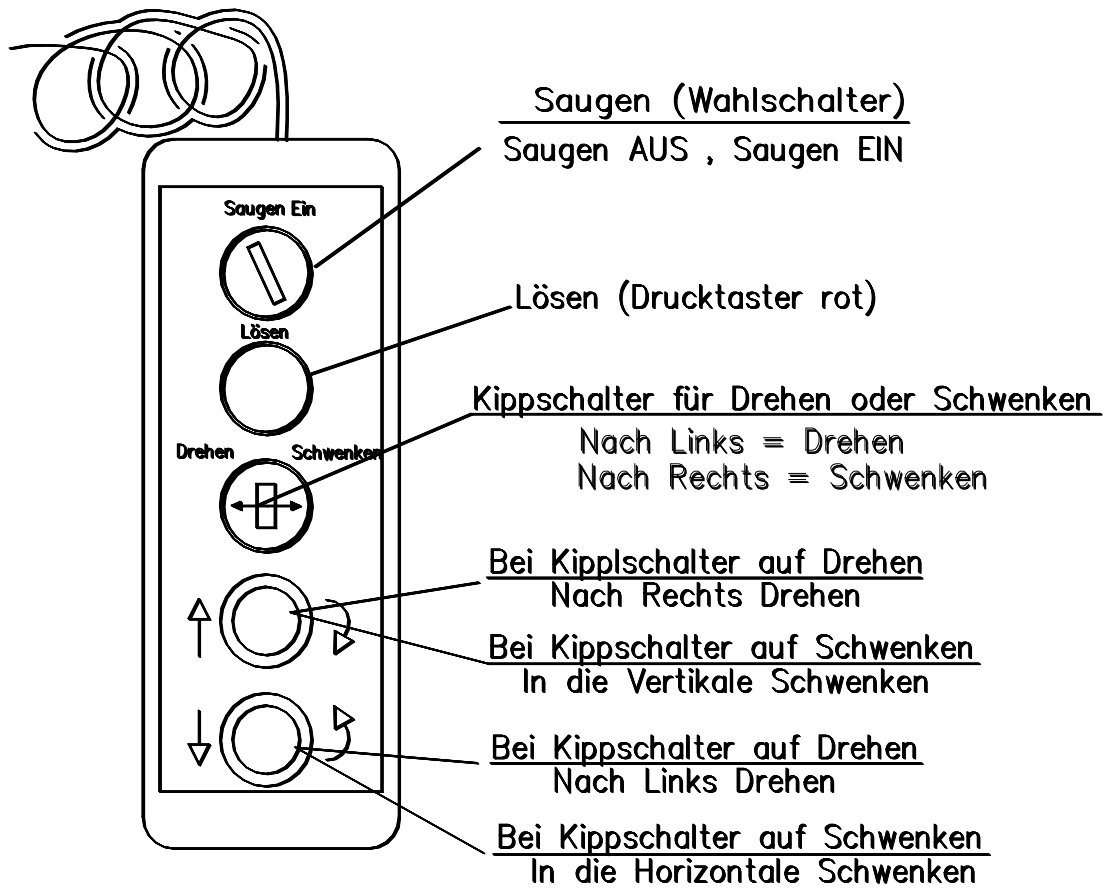
Remove the extension cable from the supply network.

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.

The remote control



Die Fernbedienung, Seite 3-3

1.	Saugen (Wahlschalter)	Suction (selector switch)
2.	Saugen AUS, Saugen EIN	Suction OFF, Suction ON
3.	Lösen (Drucktaster rot)	Release (push button red)
4.	Kippschalter für Drehen oder Schwenken	Flip switch for rotation or swivelling
5.	Nach Links = Drehen	To the left = rotate
6.	Nach Rechts = Schwenken	To the right = swivel
7.	Bei Kippschalter auf Drehen	With flip switch to rotate
8.	Nach Rechts Drehen	Rotate to the right
9.	Bei Kippschalter auf Schwenken	With flip switch to swivel
10.	In die Vertikale Schwenken	Swivel to vertical
11.	Nach links drehen	Rotate to the left
12.	In die horizontale schwenken	Swivel to horizontal
13.	Saugen EIN lösen	Suction On release
14.	Drehen, Schwenken	Rotate, swivel

Attaching the suction pads to the DSMH2-12V

Caution

- Blue hose lines = vacuum circuit1 = vacuum strip blue
- Black hose lines vacuum circuit 2 = vacuum strip black

There must always be the same amount of suction pads distributed as there are suction circuits, in order to ensure even load distribution in case one of the vacuum circuits fail.

With 8 suction pads 4 / vacuum circuit

With 10 suction pads 5 / vacuum circuit

Before transporting

Check the DSMH2-12V for any externally recognisable damage or flaws.

Attach the DSMH2-12V to the cross arm.

Separate the vacuum lines to the suckers via the vacuum couplings.

Switch the device to On with the On/Off switch and set the rotary switch Suction to On.

The pumps must start up if the vacuum is insufficient. The two vacuum indicator lamps are red and the signal tone signalise insufficient vacuum. It is possible to check the vacuum in the vacuum circuits on the two vacuum inspection meters. After a short time, a vacuum of -0.65 bar should have formed in each vacuum circuit, the red vacuum indicator lamps and signal tone go out and the indicator lamps light up green. When approx. 0.72 vacuum is reached, the vacuum pumps switch off. This should happen after a short time. The indicators on the vacuum meters should then be in the green area.

In order to check the vacuum, the rotary switch Suction is set to Off.

Then switch the device switch off and wait ten minutes. During this time the indicators of the inspection vacuum meters may not move. If only one indicator changes, the device is leaking and may no longer be used until the error has been corrected.

Connect the vacuum lines to the suckers via the vacuum couplings.

The tightness of the hoses and the individual suckers must be tested before transporting any goods. In order to do so, either a larger plate or several smaller plates of a gas-impermeable material must be present. A vacuum of at least -0.65 bar should build up immediately in each vacuum circuit. When this happens, the machine switch must be switched off. Read the achieved vacuum from the inspection vacuum meters and compare it with a reading taken about 15 minutes later.

If there is no discrepancy, the device is leak-tight and safe to operate. If a discrepancy of more than 5% occurs, the DSMH2-12V must be checked to find the leak.

(see Troubleshooting).

Commissioning is complete once the machine switch has been switched back on.

Caution

- Blue hose lines = vacuum circuit1 = vacuum strip blue
- Black hose lines vacuum circuit 2 = vacuum strip black

Caution

The DSMH2-12V must **NEVER** be commissioned with only **one** functional vacuum circuit.

Operation

Note

- Do not store the DSMH2-12V unit in a damp or very cold (frost) environment. Otherwise there is no guarantee that the installed pumps will function properly.
- Rotation and swivelling can only be carried out when the pumps in the two vacuum circuits are switched off.
- Swivelling can only be carried out when the DSMH2-12V is hanging from a crane hook or similar, i.e. the hydraulic pump is in a vertical position.

Caution

- 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 transported goods.

Danger

- Do not allow heavy rain to fall on the DSMH2-12V
- Do not place the DSMH2-12V in water.
- Do not convey loads over persons or machines. Cordon off the area under hanging transported goods with wide clearance.

Working Cycle

Arrange the suckers in correspondence with the size of the goods to be transported.

Use the remote control to determine the position of the carrier frame via the geared motor and the hydraulic cylinders. (see page 3-3 Remote control).

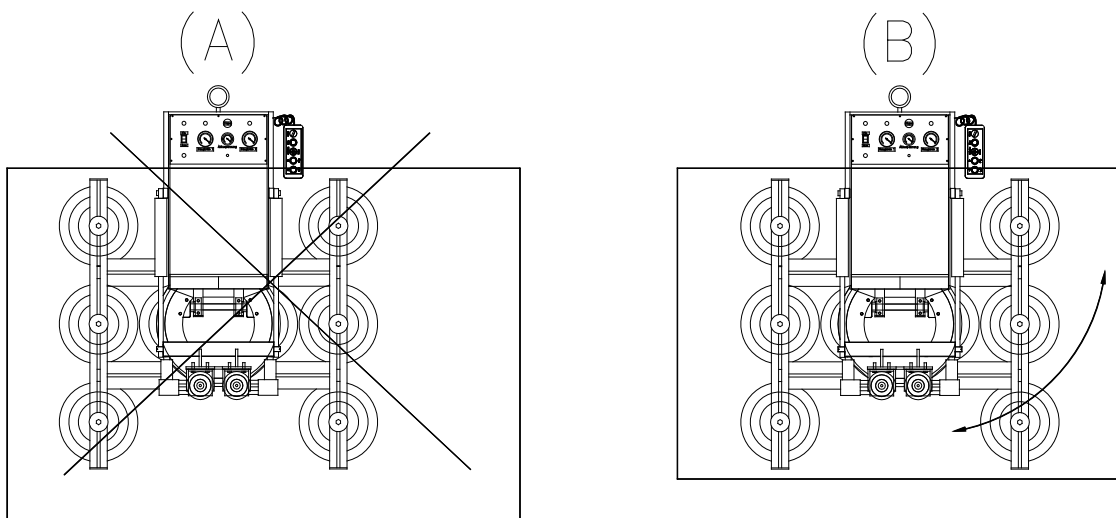
Position the DSMH2-12V on the respective goods to be transported

Note

- Swivelling can only be carried out if the pumps in both vacuum circuits are switched off.
- Swivelling can only be carried out if the DSMH2-12V is attached to the cross arm, i.e. the hydraulic pumps are in the vertical position.

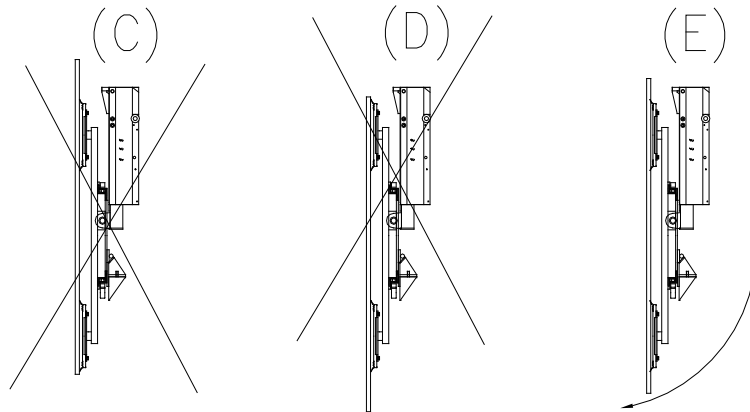
Caution

- An uneven (A) load distribution is not permitted during rotation!
- Ensure an even (B) load distribution during rotation.
- The surface must be absolutely free of dust, rust particles, water and similar.



Caution

- Top-heavy (C) load distribution is not permitted during swivelling.
- Load distribution near the ground (D) is not permitted during swivelling!
- Ensure that there is even (E) load distribution during swivelling.



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 right position. If this is not done, a vacuum cannot build up and the DSMH2-12V can therefore not lift the material. Set the rotary suction switch to ON.

Check the vacuum achieved using the two inspection vacuum meters. The two vacuum indicator lights and the signal tone indicate insufficient vacuum. The transport procedure can take place with the pumps switched off as soon as there is -0.72 bar in each of the two vacuum circuits.

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. If this is not done, a vacuum cannot build up and the DSMHQT2-24V can therefore not lift the material. Set the suction switch to the ON position using the remote control.

Check the vacuum achieved using the inspection vacuum meters. The vacuum indicator lights and the signal tone indicate insufficient vacuum. The transport procedure can take place with the pumps switched off as soon as there is -0.72 bar vacuum in both of the vacuum circuits.

Caution

During the transport procedure, the Suction switch must stay in the ON setting. This means the strobe light on the device must always flash during the transport procedure.

Note

When the Suction switch is on ON, the strobe always flashes, even when the vacuum has been achieved and the green warning lights are on.

Danger

- Do not convey load over persons or machines.

- If the vacuum in both or only one of the vacuum circuits drops to below -0.65 bar during the transport work, the signal tone sounds. You should then try to put down the load as quickly as possible so that it does not fall down.

The transported goods are guided from the side, which means that the operator stands as far as possible from the transported goods in order to guide them.

In order to rotate or swivel the goods to be transported using the remote control, please refer to page 3-3. Make absolutely sure that the goods to be transported are positioned as per the drawings (B). Furthermore, make sure that the rotation and swivelling can be carried out safely and the goods to be transported cannot be damaged.

The goods to be transported are rotated and swivelled from the side. This means that the operator stands outside the area in which the goods to be transported are rotated and/or swivelled.

If you want to release the transported goods, the suction switch must be set to OFF and the release switch must be activated.

If the inspection vacuum meters indicate 0, the procedure is completed and the cross arm is released from the transported goods. It can occur that the suction pads remains stuck to the transported goods, but they are released again by the DSMHQT2-24V, which can lead to a small shock that shakes the transported goods. Therefore, hold on tightly to the transported goods during the release procedure.

Note

- If the battery is drained, you can also use the DSMH2-12V in mains mode. You only have to ensure that the cable to the network supply line is run appropriately.

Switching off

After completing transport work, switch the machine off in order not to drain the battery unnecessarily.

Charging the batteries

Check the DSMH2-12V for any externally recognisable damage or flaws.

Compare the connection on the power supply network with regard to voltage, current, and mechanical connection (plug connection) with the necessary data for the vacuum pumps: If they do not correspond, the machine may not be operated.

Connect the DSMH2-12V to the mains power supply at the plug using an extension cable.

The charging procedure can be checked in voltage display after the Test button has been pressed.

After the charging procedure is completed, a value of 100% must be visible in the voltage display when Test button is pushed.

The battery is charged after a maximum of 12 hours.

Remove the extension cable from the mains power supply

This completes the charging.

Troubleshooting

Pumps no longer perform correctly

The machine no longer reaches -0.72 bar vacuum.

Please check whether all suckers contact the transported goods cleanly; align them if necessary.

Check the suckers and hose lines for possible damage and replace them if necessary.

Check hose clamps for firm fit and tighten them if necessary.

Leak check

Leak check for the entire system

You can perform a leak check of the two independently functioning vacuum circuits to find the leak as follows.

First of all, you should check the entire vacuum circuits with all suckers and the hose lines to both vacuum circuits.

To do so, it is necessary to set all suckers on a gas-impermeable, flat material (for example, a metal or glass sheet) that can be sucked up. Then switch the device to On using the On/Off switch and set the rotary Suction switch suction to On. When the maximum achievable vacuum, as a rule approx. -0.72 bar in each vacuum circuit is achieved, set the Suction switch to Off and switch off the device.

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 lifting device is tight and you can work with it without risk. If a leak is detected even in only one vacuum circuit, the leak must be corrected immediately or the porous material replaced.

Leak check without suckers

If the result of the test of the entire vacuum circuit is negative, the next step is to check the vacuum reserve tanks with the supply lines to the connections of the individual suckers.

Separate the vacuum lines to the suckers using the vacuum couplings.

Switch the device to On with the On/Off switch and set the rotary Suction switch on ON and continue with the leak test as described above. If this test runs positively, it is tight from the vessel areas to the individual stop valves and the error must be in the supply lines of the individual suckers or in the suckers themselves. Connect one sucker after the other and test each one in the same way. To do this, the sucker must be sealed with a gas-impermeable material. The procedure determines the defective area exactly and the error can be corrected quickly by replacement.

Note

- Blue hoses = vacuum circuit 1
- Black hoses = vacuum circuit 2

Electrical malfunction

Vacuum pumps do not start when the device switch is actuated

- Vacuum supply sufficient. Device running correctly.
- Battery flat? Press button Test to check voltage display. Run machine in mains operation or charge battery.
- Vacuum monitor for switching point P2 defective? Replace
- Circuit board defect? Have circuit board checked by an expert.

Mains operation not possible

- Main control light is not on? Check cutout
- Have mains supply checked by an expert

Vacuum pumps do not switch off when -0.72 bar vacuum is reached.

- Vacuum monitor P2 defect. Replace.
- Circuit board defect? Have circuit board checked by an expert.

No warning signals

- Vacuum above -0.65 bar? Device OK.
- Vacuum monitor P1 defective? Replace.
- Signal buzzer defective? Replace.

Electrical malfunction

Rotation movement cannot be carried out

- Pumps are active
- The 25A fuse in the junction plate of the geared motor is defect due to overloading

Swivelling movement cannot be carried out

- Vacuum pumps are active

Maintenance

Note

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). If you do not have a suitable staff member, we offer a maintenance contract for our vacuum lifting devices which includes annual maintenance including testing and certification. Please contact us for details.

Kappel Flachglastechnik GmbH
Schlachthofstraße 3-5
D-87700 Memmingen
Phone: (+49) 8331 / 4487
Fax: (+49) 8331 / 82962

The suckers

The suckers must be cleaned occasionally with a clean cloth. Please do not use a solvent (such as gasoline or similar substances). Never treat the suckers with talc, lubricants, or smoothing agents, as this impairs the adhesion of the suckers, causing the transported goods to slip from them.

The vacuum lines

The hoses must be inspected occasionally for visible cracks, etc. Replace defective hoses immediately!

Note

- Blue hoses = vacuum circuit 1
- Black hoses = vacuum circuit 2

Leak check

A leak test of the two independently functioning vacuum circuits must be performed at least once a week. You should check the entire vacuum circuit with all suckers and the hose lines.

To do this, it is necessary to set all suckers of the vacuum cross bar on a gas-impermeable, flat material (for example, a metal or glass sheet) that can be sucked up. Switch the device to On using the On/Off switch and set the suction switch to On. When the maximum achievable vacuum, as a rule approx. -0.72 bar in each vacuum circuit, has been achieved, set the suction switch to Off and switch off the device.

Read the vacuum obtained from the vacuum meters and record the value in writing. The indicator of the vacuum meters should only change slightly within the next 15 minutes, not more than 5%. If the result of this test is positive, the vacuum lifting device is tight, and you can work with it without risk.

If the test of only one of the vacuum circuits is negative, you can repair the leak and seal it or replace the leaking material, as described in the Troubleshooting chapter. The leak must be corrected immediately or the porous material replaced.

Caution

Always check the operational safety of the pump and the other elements before starting work / commissioning.

Caution

The DSMH2-12V must **NEVER** be commissioned with only one functional vacuum circuit.

The Geared motor

- Maintenance free

The Hydraulic pump with cylinder

- Maintenance free

Technical data

Manufacturer:	Kappel Flachglastechnik GmbH
Designation:	Vacuum lifting device (battery operated)
Type:	DSMH2-12V
Serial number:	_____
Year of manufacture:	_____
Operating instructions:	Art. no: KA-DSMH2-12V
Manufacturer's address:	Kappel Flachglastechnik GmbH Schlachthofstraße 3-5 D-87700 Memmingen Phone: 08331/4487 Fax: 08331/82962
After-sales service:	Phone: 08331/4487

Performance data for DSMH2-12V

Maximum size of the plate material to be transported

Height:	approx. 2000 mm
Width:	approx. 3000 mm

With extensions

Height:	approx. 2000 mm
Width:	approx. 5000 mm

Frame size

Height:	1250 mm
Width:	1268 mm
Depth:	280 mm

Temperature range

Operating temperature	-1 to +35°C (ambient)
Storage temperature	-5 to +50°C (ambient)

Dead weight

160 kg

Vacuum storage tank Hose connection

1st vacuum circuit / 2nd vacuum circuit 1 litre
6 mm

Performance data of the DSMH2-12V

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

DSMH2-12V delivered with suckers type _____

Number of suckers _____

Load capacity vertical: _____

Load capacity horizontal: _____

Sucker type 150 K

Diameter:	330 mm
Load capacity on smooth, clean, dry surface with 60% vacuum	
vertical:	150 kg
horizontal:	150 kg
vacuum connection:	6 mm

One vacuum pump / vacuum circuit

Supply voltage:	12 V, DC
Nominal current:	approx. 8A

One battery

Supply voltage:	12V, DC
Nominal capacity:	approx. 26 Ah

Mains operation

Supply voltage:	220-240V, AC
Mains frequency:	50/60 Hz

Rotation drive

Two geared motors	12V 180W
-------------------	----------

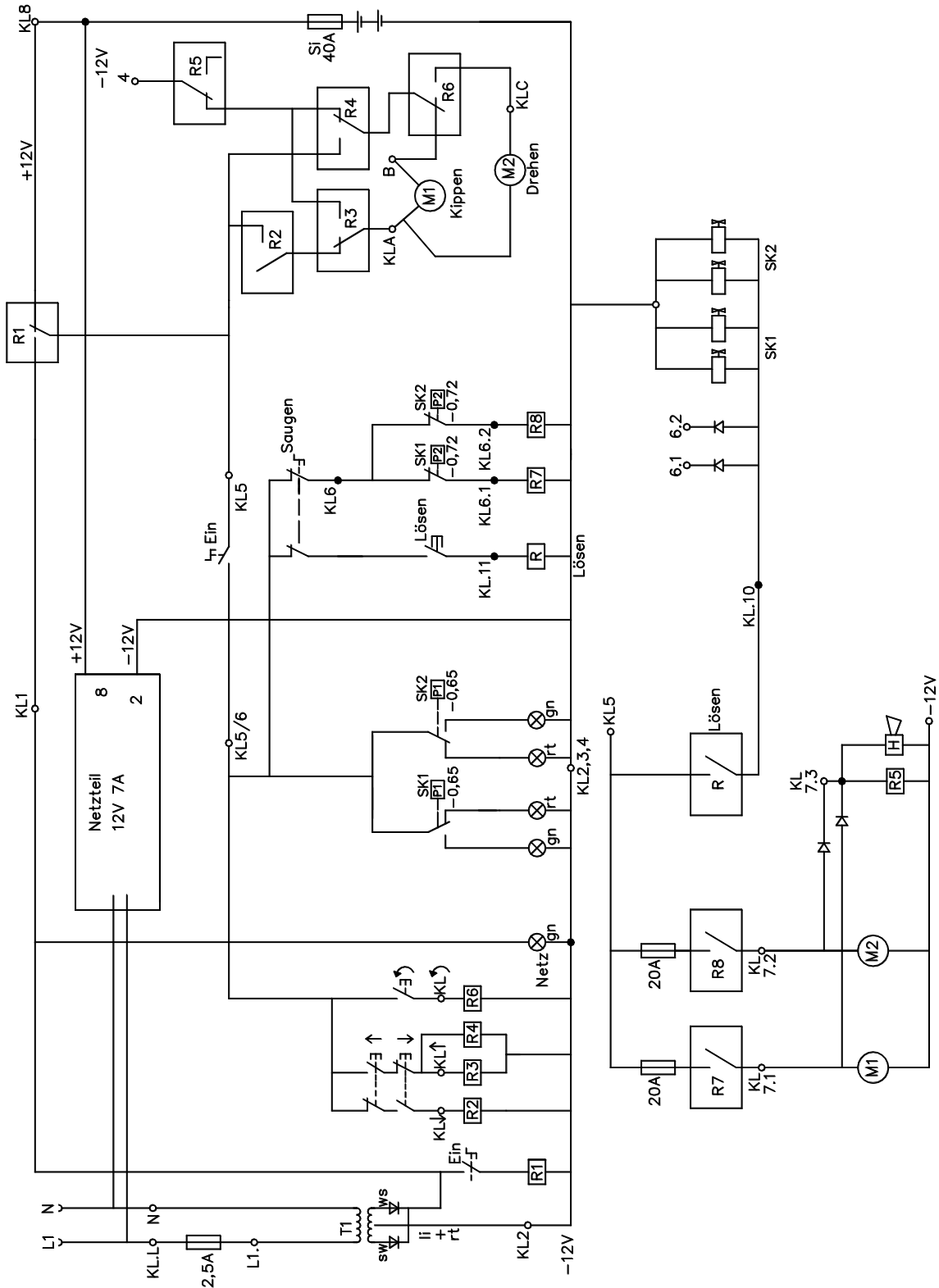
Swivel drive

Hydraulic cylinder with pump	12V 150W
------------------------------	----------

Options for the DSMH2-12V

Removable extensions with support suckers via which greater stability in the case of larger panes is achieved.

Wiring diagram DSMH2-12V



Spare parts list for DSMH2-12V

Position	Order no.	Quantity	Designation
1	M16 / 1.2t , 135597	1	Suspension eye / articulated suspension
2	LX98206	2	Vacuum meter 12V 63mm ¼"
3	150K	8	Suction pad 150 Kappel
4	-----	1	Remote control
5	905708	1	Schuco plug
7	723999	1	Push-button switch
8	118.068.14	1	Bugger (horn) 12V DC
9	706124	1	Test button, push button
10	64590	1	Charge indicator 12 V DC
11	726052	2	LED indicator lamp 12V red
12	726079	2	LED indicator lamp 12V ultra green
13	726060	1	LED indicator lamp 12V yellow
14	-----	1	Fuse 40 amp.(S2)
15	-----	1	Fuse 2.5 amp.(S1)
16	-----	2	Membrane pump Dy 12 volt
17	-----	1	Battery 12V DC 26Ah
18	Mader	4	3/2 way valve 1/8"12V DC
19	6.256.540	2	Vacuum control type 625 (P1)
20	6.256.540	2	Vacuum control type 625 (P2)
21	Distributor tube rail	4	Distributor tube rail
22	Rectus 18	8	¼" vacuum S.S. couplings
23	859829	1	Magn. core transf. RKT 300VA / 230V / 2x12V
24	-----	2	Geared motor
25	-----	2	Hydraulic cylinder
26	-----	1	Hydraulic pump
27	-----	1	Charging device 5.0A