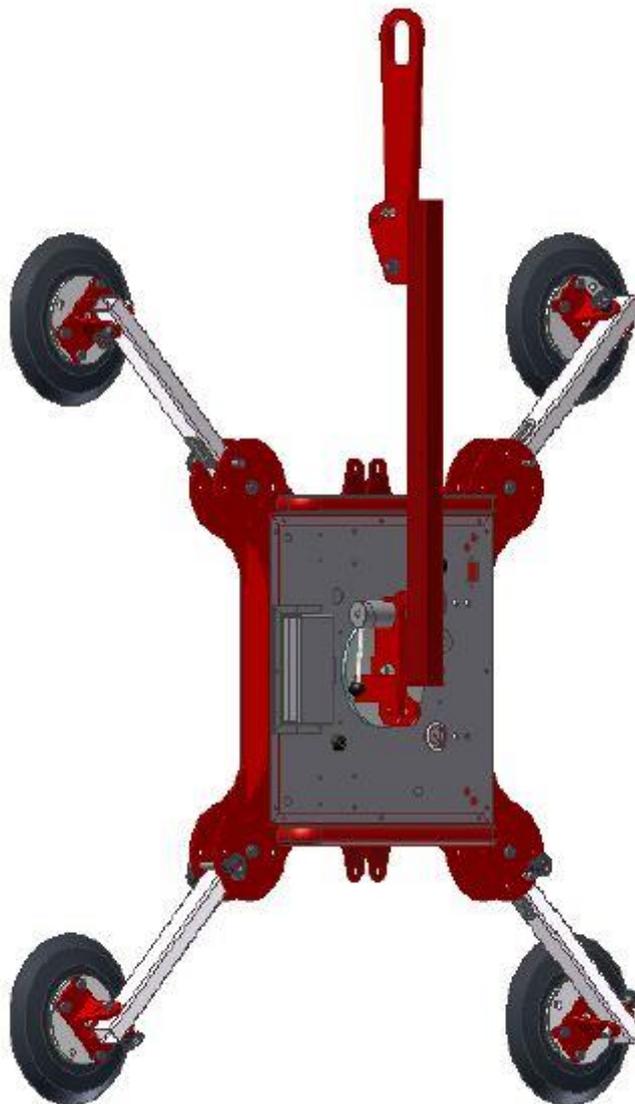


Operating Instructions Vakuflex 280



Attention!
Please read the instructions carefully before use.
Please keep the manual.

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Foreword

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

These operating instructions contain important instructions about operating the **Vakuflex 280** safely, effectively, and economically. Observing them helps to avoid repair costs and down time and to increase the reliability and working life of the **Vakuflex 280**.

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 **Vakuflex 280**.

These operating instructions must be read and observed by every person responsible for doing work on the **Vakuflex 280**, 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 recognized 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:

Starke Arvid AB

Manufactured by:

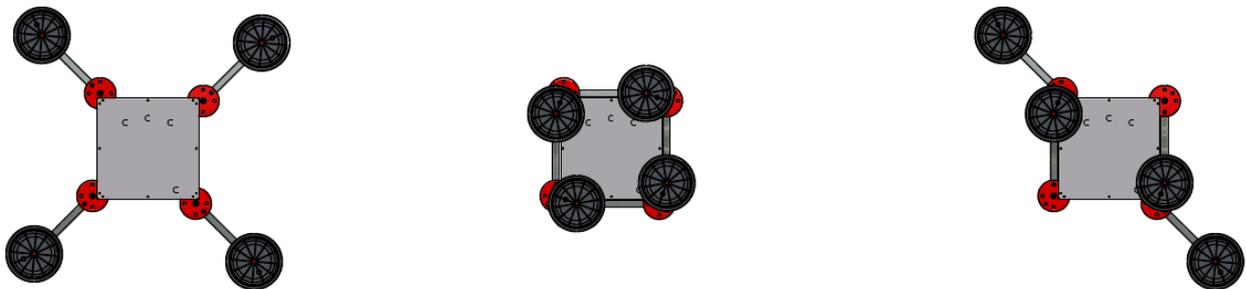
K. Schulten
Industriestr. 3-7
48488 Emsbueren
Germany

The management appreciates your cooperation.

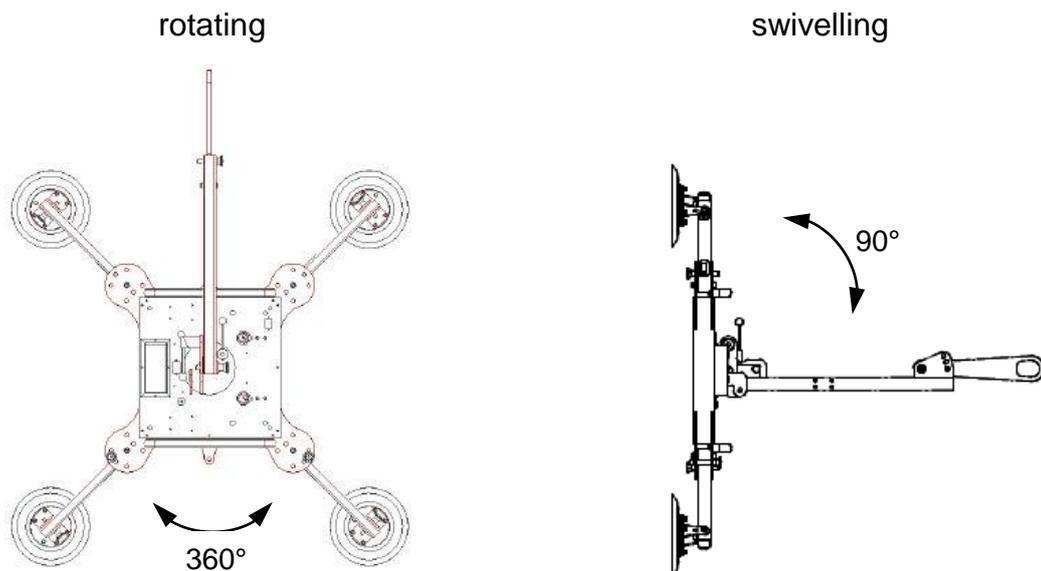
Technical Description

Vakuflex 280 is a network-independent vacuum device, made for using with a crane or other lifting facilities. Due to its different configuration possibilities, the **Vakuflex 280** can be used in several transport requirements.

Some examples as follows:



The transport element can be turned by 360° and swivelled by 90°.



Two closed vacuum circuits prevent a vacuum lost in case of power failure. Each vacuum circuit is equipped with a storage tank including a non-return valve, a vacuum switch and a checking vacuum gauge. Two vacuum pumps will be used to generate a vacuum (one pump per vacuum circuit). Two vacuum pumps are used to generate the vacuum (one vacuum pump each vacuum circuit). The vacuum pumps work without oil lubrication and are therefore maintenance-free.

Particularly, the device consists of one main frame including four swinging rectangular tubes and the loading arms including its suctions. The main frame exists of two vacuum storage tanks, vacuum pumps, a battery charger and a battery. The sucker connections are supplied with a vacuum (suction) or normal compressed air (releasing) by means of the manual valves (suction/release valves) of the two vacuum circuits. The suckers (two per vacuum circuit) can be blocked individually using vacuum couplings. 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 / 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 -0.7 bar in the vessel, switches the pumps off and switches the pumps back on when the pressure falls below approx. -0.68. This avoids premature draining of the batteries due to the pumps being allowed to run unnecessarily.

As accessories for the machine the crane facility and conveying facility are available.

Mode of operation

Switch the machine on using the ON/OFF switch (3).

Then set the two manual valves to RELEASE.

The vacuum unit 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 both manual valves to SUCTION using the remote control and wait until the pumps of both vacuum circuits switch off. You can check the vacuum using the vacuum meters (5.1 / 5.2) on the device. If there is a vacuum of -0.7 bar in both vacuum circuits, the load can be transported. To release the suckers from the load, set the two manual valves to RELEASE.



Attention!

The suction unit must **NEVER** be commissioned when there is only **one** functioning 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:

i 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 **Vakuflex 280** has been constructed in accordance with the state of the art 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 **Vakuflex 280** 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 user bears the risk alone.

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 instruction 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 fulfil 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 authorized personnel work 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 program, 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 external damages and flaws at least once per shift. Report any changes that occur (including those to the operating behavior) 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

Electrics

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 neighboring 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 suction unit in a damp or very cold (frost) environment. Otherwise there is no guarantee that the installed pump will function properly.



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 device.
- Do not place the device 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 device 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 **Vakuflex 280** to the supply network (9) using an extension cable.

The charging procedure can be checked in voltage display (12).

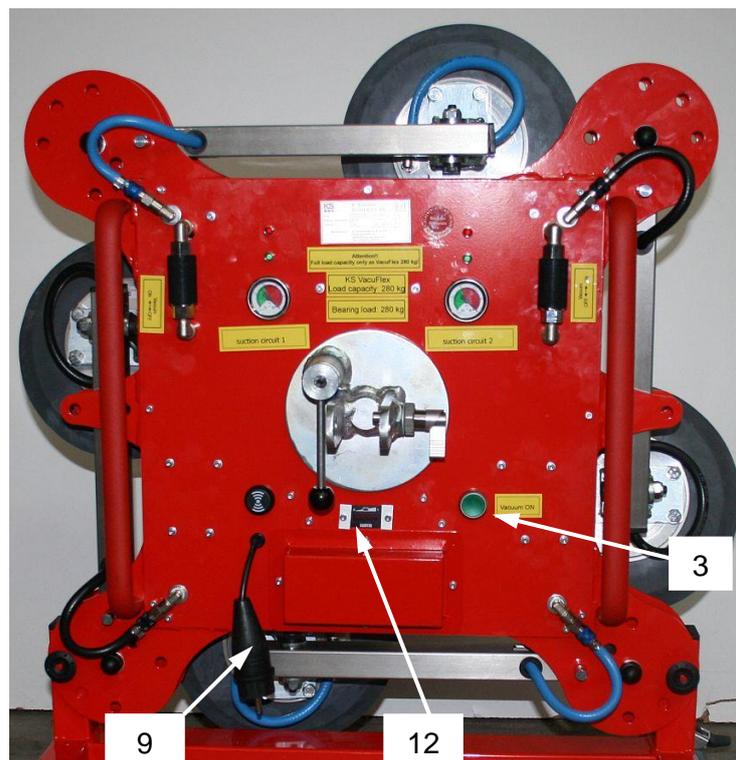
The battery is charged after a maximum of 12 hours.

Remove the extension cable from the supply network.

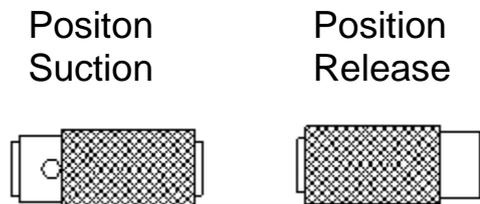
This completes the charging procedure.

i Note!

- Once the work has been finished, switch off the device with the green button (3). In case the battery is completely discharged, the machine cannot be used.



The manual valve (suction/release valve)



Attaching the suction pads to the KS VacuFlex



Attention!

- Blue hose line	=	vacuum circuit1	=	vacuum coupling blue
- Black hose line	=	vacuum circuit2	=	vacuum coupling black



Attention!

The suction pads on the device must always be attached in such a way that vacuum circuit 1 and vacuum circuit 2 are connected in every suction row see (A).

The suction pads must never be attached in such a way that only one vacuum circuit is connected in suction row (B).

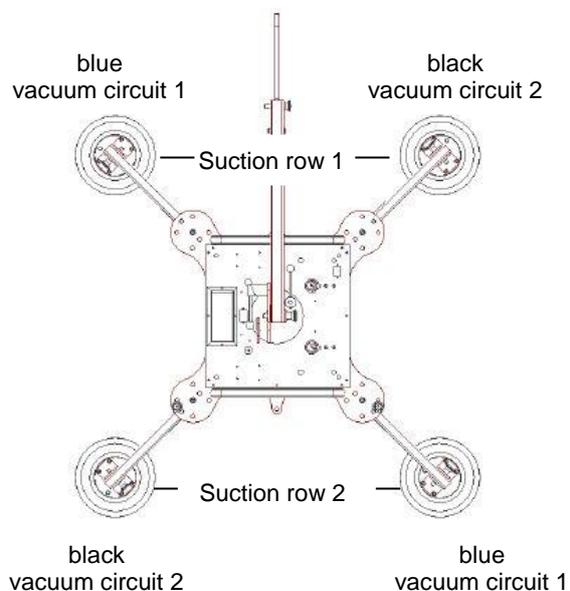


Figure A

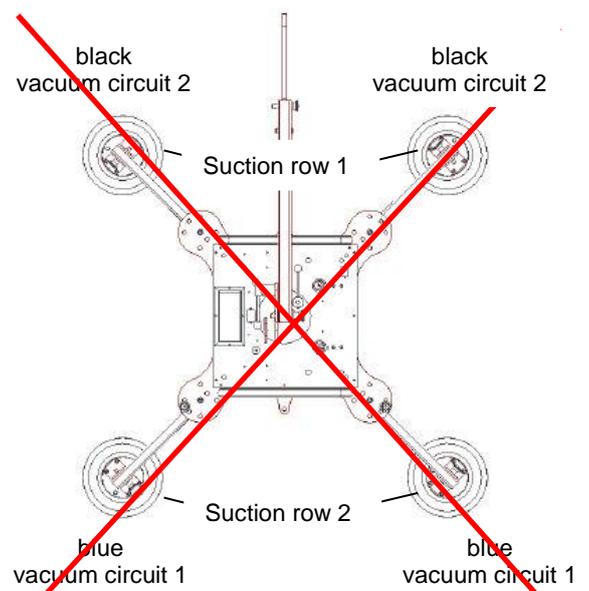
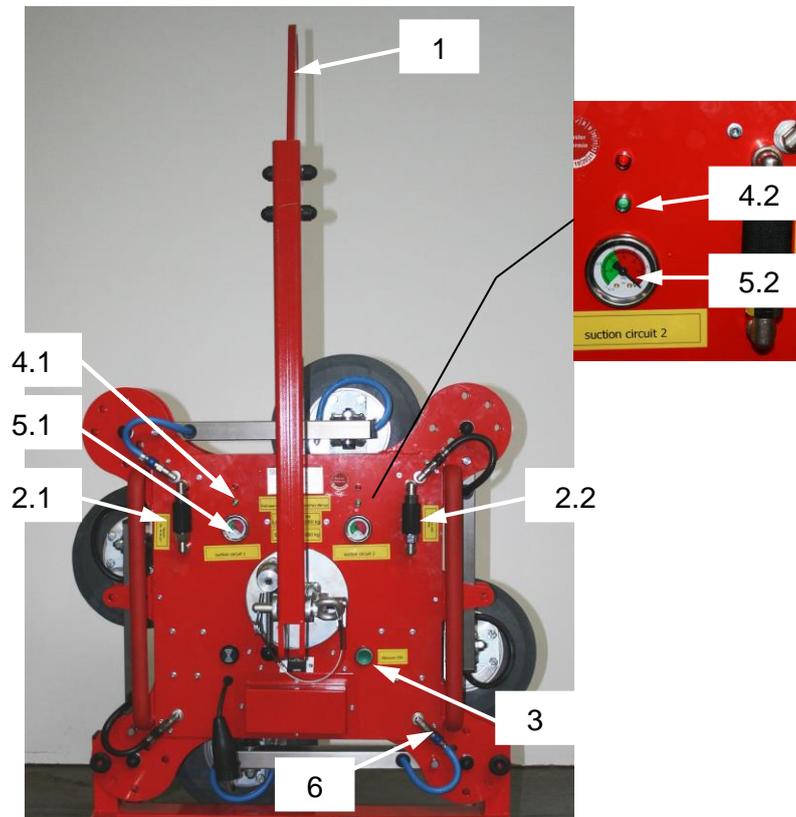


Figure B

Before transporting



Before using the **Vakuflex 280**, check it for any externally recognisable damage or flaws.

Now, fix the **Vakuflex 280** on the lifting device or on a crane hook.

Then set the two manual valves to the RELEASE position.

Turn on the device with the button "On/Off" (3). The light is green now. The pumps must start up if the vacuum is insufficient. The Pump indicator light (4.1 / 4.2) indicates that the pumps are active. If this is not the case, working with the **Vakuflex 280** is not permitted (see Troubleshooting).

The signal tone signals insufficient vacuum in the lines to the suckers. The existing vacuum in the hose system of both vacuum circuits can be checked on the two vacuum meters (5.1 / 5.2). After a short time, a vacuum of at least -0.65 bar should have built up in each tank. The vacuum pumps switch off when -0.7 bar vacuum is reached. This should be the case after a short time.

In order to check the vacuum, the individual suckers (two per vacuum circuit) must be blocked from the vacuum reserve tanks using the vacuum couplings. Then the two manual valves (2.1 / 2.2) are set to SUCTION. The indicators of the two inspection vacuum meters (5.1 / 5.2) must then be in the green area. Then switch the device off with the switch (3) and wait ten minutes. During this time the indicators of the two 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. However, if this is not the case, the Vakuflex 280 is ready for

operation after the machine switch (3) has been switched on and the two manual valves (2.1 / 2.2) have been reset to RELEASE.

The individual suckers must be connected to the vacuum reserve tanks by the vacuum couplings (6).

In order to check the tightness of the hose lines and the individual suckers, either a larger plate or several smaller plates of a gas-impermeable material must be present. These plates are held onto the individual suckers and then sucked on. To do so, the manual valves (2.1 / 2.2) must be set to SUCTION using the remote control. A vacuum of at least 0.65 bar should build up immediately in each vacuum circuit. If this happens, the machine switch (3) must be switched off. Read the achieved vacuum from the two inspection vacuum meters (5.1 / 5.2) and compare it with a reading taken about 15 minutes later. If there is no discrepancy, the Vakuflex 280 is leak-tight and safe to operate. If a discrepancy of more than 5% occurs, the Vakuflex 280 must be checked to find the leak (see Troubleshooting).

Commissioning is complete once the machine switch (3) has been switched back on.



Attention!

The device must **NEVER** be commissioned when there is only **one** functioning vacuum circuit.

Operation



Note!

- Do not store the suction unit in a damp or very cold (frost) environment. Otherwise there is no guarantee that the installed pump will function properly.



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.



Caution!

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

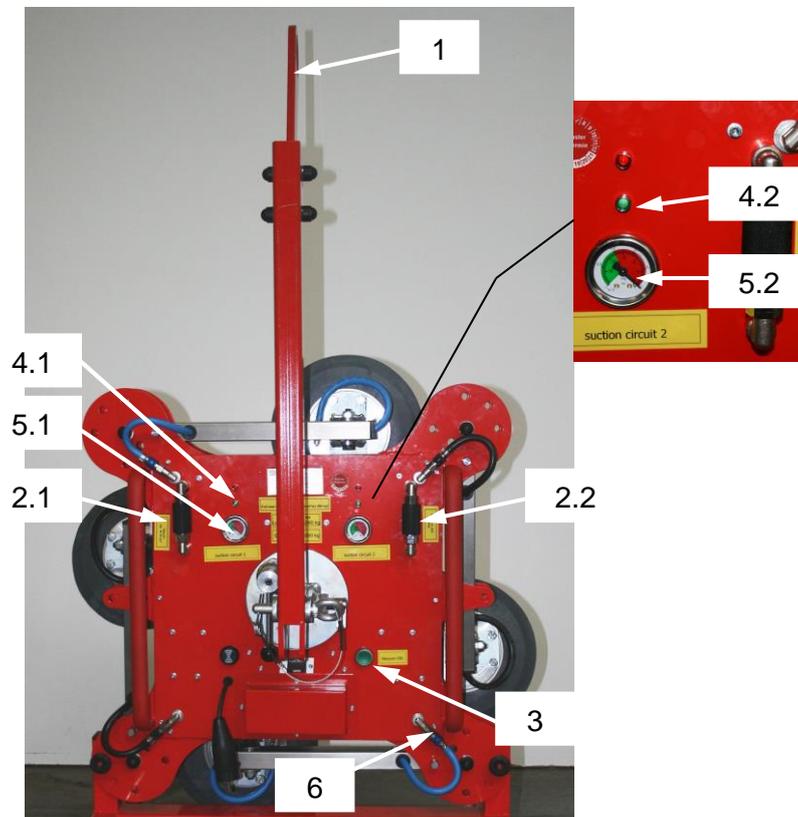
Switching on

Set the two manual valves (2.1 / 2.2) to RELEASE.

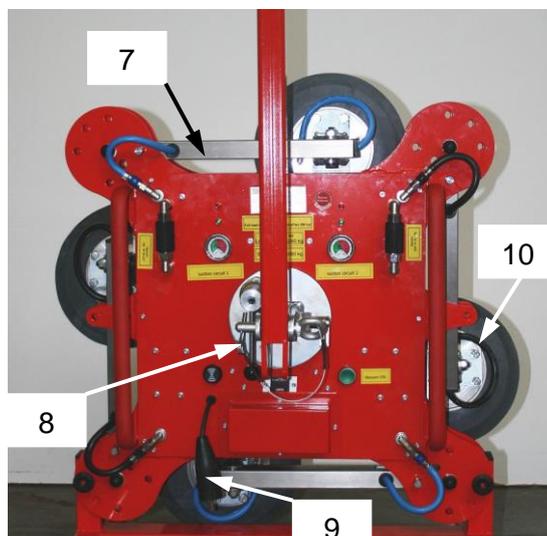
Switch on the device with the switch (3). The pumps must start up if the vacuum is insufficient. The pump indicator light (4.1 / 4.2) indicates that the pumps are active. If this is not the case, working with the KS Vacu Power is not permitted (see Troubleshooting) the signal tone indicates insufficient vacuum.

After a short period, a vacuum of at least -0.65 bar should have built up. The vacuum pumps switch off when approx. -0.7 bar is reached. This should be the case after a short time.

As long as no transported goods are sucked on or the suction pads, it is not possible to check the vacuum from the two inspection vacuum meters (5.1 / 5.2).

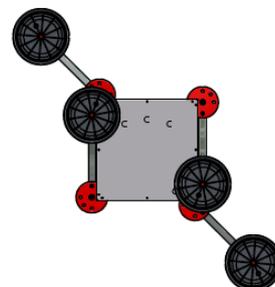
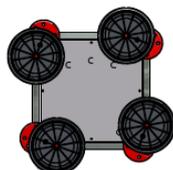
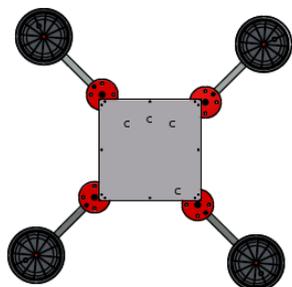


Working cycle



Determine the position of the carrier frame (7) using the rotating or swivelling device (8), in which the transported goods are to be sucked on. Always order the suction symmetrically in order to hold the device in balance.

Some examples as follows:

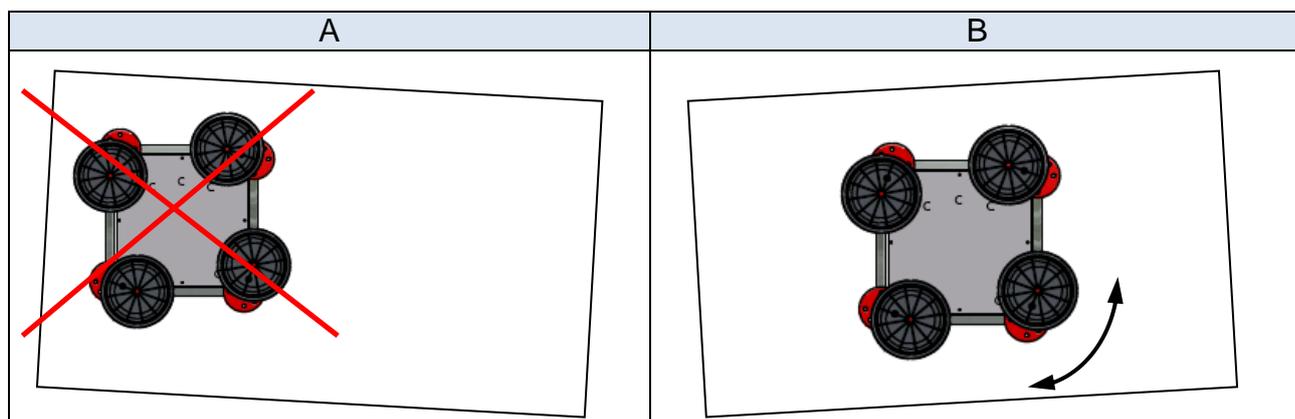


Position the KS Vakuflex 280 on the goods to be transported.



Danger!

- 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 substances.



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 Vakuflex 280 can therefore not lift the material. Set both manual valves successively to the suction.

Check the vacuum achieved using the two inspection vacuum meters (5.1 / 5.2). The signal tone indicates insufficient vacuum. The transport procedure can take place with the pumps switched off as soon as there is -0.7 bar vacuum in each of the two vacuum circuits, i.e. the control lamps vacuum (4.1 / 4.2, green) light up and the signal tone is off.



Danger!

- Do not convey loads over persons or machines.
- If the vacuum sinks below -0.65 bar in both or only one of the vacuum circuits during transport work, a signal tone sound. In this case, try to set down the load as soon 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.

To rotate or swivel (8) the transported goods, use the appropriate locking mechanism. The transported goods must always be positioned according to the drawing (B). It must also be ensured that the rotation or swivelling motion can be performed without danger and that no damage occurs to the transported goods. For larger plate materials, the transported goods must be supported or held additionally.

To release the transported goods, set both manual valves to RELEASE.

The vacuum decreases and the cross arm is released from the transported goods. If the two inspection vacuum meters (5.1 / 5.2) indicate 0, the procedure is complete and the cross arm is released from the transported goods. It can occur that the device remains stuck to the transported goods only to then release them, which can lead to a small shock that shakes the transported goods. Therefore hold on tightly to the transported goods during the release procedure.



Hint!

- If the battery is flat, the device cannot be used in network operation.

Switching off

After completing transport work, switch the machine off using the switch (3) to conserve the battery power.

Charging the battery

Check the device for any external damages 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 device to the mains power supply at the plug (9).

The charging procedure can be checked in voltage display.

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

Problem	Possible cause	Solution
Pumps no longer perform correctly	<ul style="list-style-type: none"> - The machine no longer reaches -0.7 bar vacuum. 	<ul style="list-style-type: none"> - Please check whether all suckers contact the transported goods cleanly; align them if necessary. - Check suckers and hoses for any damage and replace them if necessary. Check the hose clips for tightness and retighten if necessary.
Vacuum pumps do not start when the device switch is actuated	<ul style="list-style-type: none"> - Battery empty 	Control mechanism over the voltage display <ul style="list-style-type: none"> - Charge battery
	<ul style="list-style-type: none"> - Check safety cut-out 	<ul style="list-style-type: none"> - Check fuses
	<ul style="list-style-type: none"> - Pumps are defect 	<ul style="list-style-type: none"> - Cables of pumps have been checked by expert for possible cable break.
	<ul style="list-style-type: none"> - Vacuum pressure switch is defect 	<ul style="list-style-type: none"> - Change switch
Vacuum pumps do not switch off when -0.7 bar vacuum is reached	<ul style="list-style-type: none"> - Vacuum pressure switch is defect 	<ul style="list-style-type: none"> - Change switch
No warning signals	<ul style="list-style-type: none"> - Vacuum monitor defect 	<ul style="list-style-type: none"> - Replace
	<ul style="list-style-type: none"> - Signal buzzer defect 	<ul style="list-style-type: none"> - Replace

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 the two vacuum circuits. To do so, the two manual valves should be set to SUCTION. Furthermore, 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 the vacuum pumps are switched on and when the maximum achievable vacuum, as a rule approx. -0.7 bar in each vacuum circuit is achieved, the pumps are switched off. 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 one vacuum circuit, so the device will not function and may not be put into operation.

The leak must be corrected immediately or the porous material replaced.

Leak check without suckers

If the result of the test of the entire circuit is negative, the next step is to check the vacuum reserve tanks with the supply lines to the vacuum couplings of the individual suckers (two per vacuum circuit). To do so, set the manual valves (2.1 / 2.2) to SUCTION and block the hose line to the vacuum couplings. Then switch the vacuum pumps 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 vacuum couplings and the error must be in the individual suckers. 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. This procedure determines the defective area exactly and the error can be corrected quickly by replacement.



Attention!

- Blue hose line	=	vacuum circuit1	=	vacuum coupling blue
- Black hose line	=	vacuum circuit2	=	vacuum coupling black



Attention!

The suction pads on the device must always be attached in such a way that vacuum circuit 1 and vacuum circuit 2 are connected in every suction row see (A).

The suction pads must never be attached in such a way that only one vacuum circuit is connected in suction row (B).

Maintenance

i 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.

Starke Arvid AB

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!

i 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. First 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. Also set the manual valves (2.1 / 2.2) to SUCTION other. Then the vacuum pumps are switched on, and when the maximum achievable vacuum, as a rule approx. -0.7 bar in each vacuum circuit, has been achieved, the pumps are switched off. Read the achieved vacuum from the vacuum meters (5.1 / 5.2) and record the value in writing. The indicator of the vacuum meters (5.1 / 5.2) is only 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 a leak is detected even in one vacuum circuit, so the device will not function and may not be put into operation. 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 device must **NEVER** be commissioned if only **one** of the vacuum circuits is functioning.

Technical data

Manufacturer:	K. Schulten GmbH & Co. KG
Designation:	Vacuum lift
Type:	Vakuflex 280
Manufacturer's address:	K. Schulten GmbH & Co. KG Industriestraße 3 – 7 D-48488 Emsbüren Tel.: +49 5903 9390 – 0 Fax: +49 5903 9390 – 93 Internet: www.ksschulten.com E-mail: info@ksschulten.com
Performance data	
Ambient temperature:	0 to +50 degrees Celsius
Dead weight:	
Vacuum storage tank:	1 Liter
Hose connection:	6 mm
Carrying capacity	
vertical	280 kg
horizontal	280 kg
Transport dimensions	
Width appx.	742 mm
Length	742 mm
Height appx.	230 mm
Components	
Battery:	12V; 7.0Ah
Buzzer:	1x
Vacuum pumps:	2x
Vacuum pressure switch:	2x
Suckers:	4 x Ø 250 mm

i Note!

- Any information regarding the carrying capacity refers to even surface load. Furthermore, all suckers must have solid suction contact with the goods to be transported.