

Operating Manual KS Robot Indoor

KS Robot 280 / 400 / 600 / 1000 / 1400



Model:

Machine number:

Date manufactured:

Manufacturer:

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

Attention!

**Please read the operating manual carefully before commissioning.
Please keep the operating manual in a safe place.**

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- Operating manual battery charger
- UVV [Accident Prevention Regulations] inspection certificate
- Operating manual remote control unit * (option)

Preface

Dear Customer!

This operating manual should help you to become familiar with the KS Indoor and to operate it in compliance with its designated use.

The operating manual contains important information about operating the KS Indoor safely, properly and efficiently. Compliance with the manual will help to prevent risks, reduce repair costs and downtime, and increase the reliability as well as service life of the KS Robot.

In order to take full advantage of your newly acquired KS Indoor, read and follow this operating manual carefully before commissioning the device.

Please make sure that all operators have read this manual before putting the machine into operation. Warranty claims due to operator error will be rejected by us.

The technical specifications, illustrations and dimensions in this manual are not binding. No claims can be derived from them.

We reserve the right to make improvements without changing this manual.

If you have any questions after reading this manual or if you discover any errors while reading it, please contact:

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

We wish you much success!

1 General Information

1.1 Introduction

This operating manual is an essential tool for the successful and safe operation of the KS Robot. The operating manual contains important information for the safe, proper, and efficient operation of the KS Robot. Observing the information in this manual helps to prevent risks.

The operating manual must always be available on the KS Robot and must also be read, understood and used by anyone who works on/with the KS Robot. Such work may include:

- Operation and setup
- Troubleshooting, care, and handling of operating materials and supplies
- Servicing (maintenance, inspection, repair).

The KS Robot may only be controlled and operated by trained and instructed personnel who have been authorized to do so by the operating company in writing.

Pay special attention to the safety instructions in chapter 2. This applies in particular if you only occasionally work with the KS Robot.

Attention!

Risk is avoided when the safety instructions are observed and complied with.

1.2 Information about the user manual

This operating manual describes the installation, operation and maintenance of the KS Robot. Compliance with all specified safety instructions and instructions for use is a prerequisite for safe work and proper handling of the KS Robot.

The operating manual is part of the product and must be kept in the immediate vicinity of the KS Robot for installation, operation, maintenance and cleaning purposes at all times.

In spite of our best efforts, we cannot guarantee the accuracy and completeness of the information in this manual.

Due to the continuous development and improvement of our products, we reserve the right to make changes related to engineering and technology, equipment and design. All descriptions, illustrations, weights and technical data are non-binding and are current as of the date this manual is printed.

The figures are only intended to illustrate certain aspects of the operation and maintenance of the KS Robot. The illustrations may differ in detail.

1.3 Notes regarding copyright and property rights

This operating manual is protected by copyright law. Any rights derived from the copyright, in particular those of translation, reproduction, extraction of illustrations, photo-mechanic or digital data processing remain reserved to the K. Schulten GmbH & Co. KG even if only extracts are used.

1.4 Information for the operating company

The operating manual is an integral part of the KS Robot. Since the operating manual is expected to be subject to heavy use at the place where the KS Robot is operated, the operating company is responsible for:

- Keeping the original copy safe
- Ensuring that a copy of the operating manual is always available on the KS Robot
- Making sure that every user reads the operating manual carefully as well as understands and complies with all of the specifications

Only allow instructed and trained to do so personnel to operate the KS Robot. These persons must be authorized to do so by the operating company in writing. Make sure to clearly identify those persons qualified for the maintenance and repair of the device.

In addition to the operating manual and the applicable regulations for accident prevention in the country of use and at the place of use, the recognized technical rules for safe and professional work must also be observed.

The operating manual is intended to supplement the operating instructions and is based on existing national accident prevention and environmental protection regulations, including information on supervisory and reporting obligations that take into account operational criteria, such as work organization, work processes and personnel.

After one year at most, the UVV test of all moving parts must be carried out by an expert in accordance with the respective national regulations. The test certificate must be documented in writing.

No alterations, attachments or modification to the KS Robot are allowed which could impair the safety of the device without the permission of K. Schulten GmbH & Co. KG. This also applies to the installation, adjustment and alteration of the safety devices and valves, and in particular to the welding of load-bearing components.

Replacement parts must meet the technical requirements specified by the K. Schulten GmbH & Co. KG. This is always guaranteed with the use of original spare parts.

1.5 Service and warranty

The K. Schulten GmbH & Co. KG makes every effort to answer your questions and orders as quickly as possible. We request you to state your name with the return address as well as the machine number of your KS Robot before each inquiry.

The warranty is 12 months after delivery. A warranty claim is only accepted in full if:

the KS Robot is used only as intended, the inspection and maintenance instructions are strictly followed.

During the warranty period the warranty of KS Schulten GmbH & Co. KG for KS Robot covers damages that are demonstrably due to design, material and manufacturing defects, but not to wear parts, such as seals, suction discs, etc.

The warranty does not apply to batteries/rechargeable batteries since incorrect handling, such as deep discharge and overcharging, may result in reduced life.

In the event there is warranty claim, K. Schulten GmbH & Co. KG will bear the material and assembly costs directly incurred as a result of repairing the damage to KS Robot. The replacement parts prices and remuneration rates of K. Schulten GmbH & Co. KG shall apply.

In addition, reference is made to the warranty provisions and the general terms and conditions of K. Schulten GmbH & Co. KG.

1.6 Intended use

The KS Robot is a motorized device with a wire connected or radio remote control unit. The KS KS Robot is used for lifting, lowering and rotating loads (e.g. laminated safety glass) as well as for transporting and vitrifying windows and facades. The robot is equipped with an electric wheel drive for smooth, bounce-free, two-stage driving.

1.7 Improper use

The use of KS Robot is prohibited in particular for:

- Transporting and lifting persons
- Increasing the maximum counterweight
- The transport of loads exceeding the maximum permissible load
- The transport of loads which have not been picked up safely by the load handling attachment
- Driving and braking with extended telescopes, both with and without load
- Driving with a load at maximum/fast speed
- The transport of loads exceeding the maximum permissible dimensions
- Moving loads that are stuck
- Dragging loads
- Driving with raised loads

1.8 Obligations of the operating company

The operating company must ensure that:

- The operating manual is read by the operating personnel and that the contents are fully understood.
- The KS Robot is used only as intended and in compliance with the safety regulations of this operating manual.
- The KS Robot is operated, maintained or repaired only by persons who have reached the age of 18, are familiar with the equipment and have been informed of the risks involved.
- The KS Robot is only operated by persons whose mental and physical condition are commensurate to the given task.

1.9 Instructions for operation and use

All users and those working with the KS Robot must be provided with detailed instructions regarding:

- Designated use
- Wearing the necessary personal protective equipment
- Correct use of the controller
- The loading of the load handling attachment and possible restrictions on the arrangement and securing of the load, as well as consideration of the dead weight of the load handling attachment
- Consideration of influences that cause a significant increase in sensitivity to wind attack, environmental conditions such as the maximum wind speed
- Behavior in emergencies





1.10 Instructions for maintenance and inspection

- Maintenance and inspection activities mentioned in the operating instructions, as well as dates including information on the replacement of parts and partial equipment must be adhered to.
- Maintenance and inspection tasks may only be carried out when the system is switched off. The switch-on and switch-off procedures must be observed in accordance with the operating manual. Deviations from this are only allowed if the work cannot be carried out without drive power.
- After maintenance work, any previously removed safety devices must be reinstalled properly.
- Repairs that are not described in this operating manual must be carried out by an authorized specialist workshop of the K. Schulten GmbH & Co. KG.

2 Safety

2.1 Information and symbols

The following terms and symbols are used in this operating manual for safety instructions and in particular with regard to important information:

	Danger! You will find this "Danger!" symbol in all safety instructions in this operating manual which represent imminent danger to the life and limb of persons.
	Warning! You will find this "Warning!" symbol in all safety instructions in this operating manual which represent potential danger to the life and limb of persons.
	Caution! This "Caution!" symbol can be found in all safety instructions in this manual, which include the risk of minor or non-serious injuries as well as the risk of property damage to the KS Robot or its surrounding area.
	Note! This "Information!" symbol indicates special circumstances, the observance of which ensures the safe, proper and efficient handling of the device. All instructions assume that the device is used as intended.
<ul style="list-style-type: none"> • - 	<ul style="list-style-type: none"> • Bullet points identify working and / or operating steps. The steps must be performed in order from top to bottom. - Indentation marks are used to indicate listings.

2.2 General information on safety

- The KS Robot may only be used by persons who have reached the age of 18, have been properly instructed in handling the device and are assigned specifically to use it.
- The operator may only start to move a load after he is certain that the load is securely fastened and that no persons are in the danger zone!
- Installation, maintenance or independent operation may only be entrusted to persons who are familiar with the corresponding procedure. You must be assigned by the contractor to set up, maintain or operate the device!
- The operator must be familiar with the relevant accident prevention regulations and the operating manual and have been instructed accordingly!
- If repairs are necessary, they must be reported immediately and carried out by qualified personnel!
- Only original spare parts from K. Schulten GmbH Co. KG may be used.

2.3 Safety information



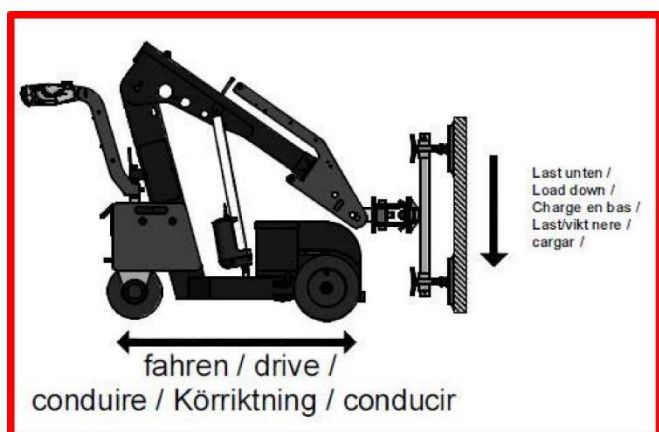
- Always wear the prescribed protective equipment, such as safety shoes, safety helmet and protective goggles, especially when working with glass.
- Keep loose clothing, parts of clothing, jewelry, hair, etc. away from moving parts.
- Do not use the machine for transporting people or climbing.
Do not stand on the parts intended for the transport of cargo (e.g. fork or similar). Do not climb onto the chassis or other components.

- No person may be present in the working area (danger zone) of the KS Robot.
If a person enters the danger zone, immediately stop every movement of the KS Robot and direct the person to leave the area.
- Before extending the cylinders, make sure there are no objects in the movement range of the cylinders.
- Use on public roads is prohibited.
- When lifting and transporting loads across public areas, these areas must be cordoned off. If the work area cannot be cordoned off properly, then additional personnel must be positioned to secure the work area.
- Protect the KS Robot from becoming soiled. The device may not be exposed to snow or rain.



Danger!

Danger of tipping



- Loads may only be transported when the telescopes are retracted, and the load is lowered.
Failure to comply may result in the device tipping over.



- The wind force must be taken into consideration when loading or unloading and driving to the installation site. The KS Robot may not be operated at wind forces greater than 5 (8.0 - 10.7 m/s).



- The KS Robot must be set up and operated on a horizontal, solid and stable surface. Make sure that all tires and the rollers on the safety supports are in firm contact with the ground.



- Lifting and lowering of the load is only allowed vertically up and down. Do not pull the load sideways, forwards or backwards. Do not use baffles or similar tools.



- Do not attach ladders or climb on them.
- Do not exceed the permissible load capacity of the KS Robot. Make sure to observe the load diagram.
- Adjust the driving speed to the local conditions, as well as the load being transported.



Danger!

Danger of crushing



- Only lift the load after it is properly fixed, centered and secured.
- Never walk under loads while they are suspended. The operator must also make sure that no persons are standing in this area.

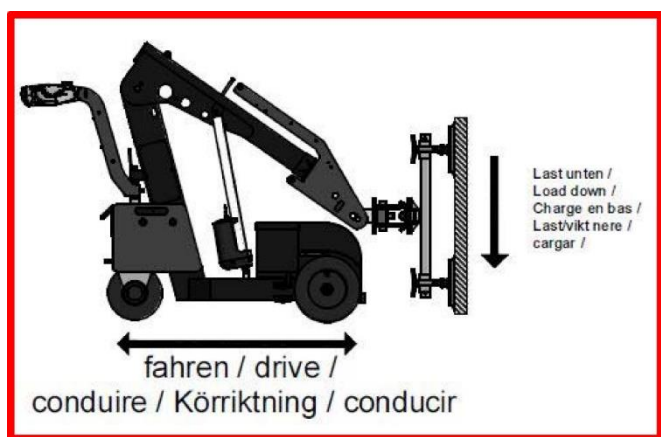


- Keep hands and fingers away from any parts where there is danger of crushing.



Danger!

Danger of slipping and tipping over on slopes



When driving on sloping terrain, there is a risk that the KS Robot may slip or tip over. This risk increases significantly in the event of abrupt braking or acceleration, cornering or crossing of the slope.

- Only drive on paths that are adequately paved. Make sure that the telescopes are retracted.
- Slopes may only be traveled on when there is no load.
- Do not drive the KS Robot over sloping or rising terrain that is out of the performance range of the machine. (See technical data)
- Only drive on slopes/inclines at reduced speed, with increased caution and with the load lowered.
- When driving on a slope/incline do not turn or drive diagonally.
- NEVER park the KS Robot unattended facing downhill. Should the KS Robot nevertheless be parked on a slope, it must be secured with chocks under the wheels.

**Danger!****Danger of collision**

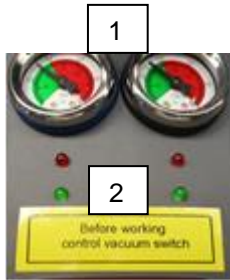
- Avoid collision with people, stationary structures or moving objects. (e.g. vehicles, cranes etc.)
- The maximum dimensions of the load must not be exceeded.
- Make sure to observe the device dimensions at all times.
- Check the working area and the driving area for obstacles, even in areas above the device (overhead position).

**Danger!****Danger of electrocution**

- Touching live electrical overhead lines can have fatal consequences. Danger due to high-voltage power lines! (For example, in the case of power lines over 1000 volts, current may pass at a distance of less than one meter.)
- Never drive over power cables that are lying on the ground. This may damage the cables.

**Danger!****Danger of injury from batteries**

- Danger of explosion in the vicinity of the battery chargers.
- Open the battery cover with extreme caution.
- Touching bare metal parts is prohibited.
- Open fire and sources of ignition should be kept away from the battery.
- Never charge a frozen battery.
- Maintenance work on the battery should only be carried out by qualified personnel.
- Always first disconnect the negative pole then the plus pole.
When connecting, proceed in reverse order. Touching live electrical overhead lines can have fatal consequences. Danger due to high-voltage power lines! (For example, in the case of power lines over 1000 volts, current may pass at a distance of less than one meter.)

**Danger!****Risk of injury when working with vacuum pressure**

- Work on the machine is dangerous if the various safety devices (1) (pressure gauge and signal transmitter) are defective.
- The lifting of workpieces is prohibited until the two light signals (2) go out.
- Damp and sticky workpieces should not be lifted with the suction discs. Workpieces with uneven and structured surfaces may not be lifted.
- Make sure that the air hoses are not bent when turning and tilting the suction system.

**Danger!****Danger due to a damaged device**

- Never operate a damaged or inoperable device that does not function at 100% capacity.
- If repairs are necessary, they must be carried out immediately by qualified personnel.

**Warning!****Risk of injury due to improper repair work!**

- Only carry out work on the KS Robot, which is specifically mentioned in this operating manual. Improper inspection, maintenance and repair work may result in personal injury or property damage, either directly or as a consequence thereof.
- Comply with all inspection and maintenance information in this manual. If in doubt, always consult with the appropriate professionals.

**Warning!****Risk of injury due to improper loading!**

- All electronics must be disconnected at the main switch prior to transport.
- Only transport the KS Robot when in transport position, with the telescopes retracted and when there is no load.
- The KS Robot must be carefully secured in the truck/trailer during transport and protected against rain and snow.
- Always lift the KS Robot by lifting lugs intended for this purpose. NEVER lift the KS Robot with straps or forks.

**Warning!****Danger to life due to hydraulic energy!**

- Work on the hydraulic system may only be carried out by qualified personnel.
- Repair work that is not described in this operating manual must be carried out by an authorized specialist workshop.
- Always check the hydraulic system, especially the piping and hoses. Make sure that damaged and worn parts are replaced immediately. The replaced hoses must meet the technical requirements of the manufacturer.
Hydraulic hoses must not be used for more than 6 years (including a maximum storage period of 2 years). Always have a qualified person inspect the hoses before commissioning and then at least once a year to make sure they are in proper working condition.
- When checking for leaks (leakage), make sure to take appropriate protective measures (wear protective goggles, gloves, protective clothing, etc.) due to the risk of injury.
- The hydraulic system must be completely free of pressure before working on it.
- If allowed to escape, high pressure hydraulic oil can cause serious injuries. Seek immediate medical attention in case of injury.

**Warning!****Warning against automatic startup!**










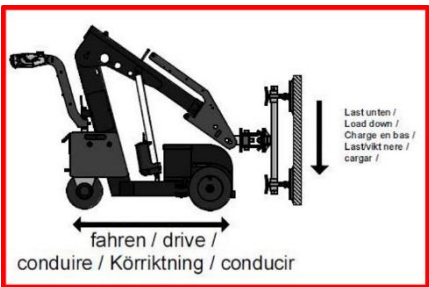
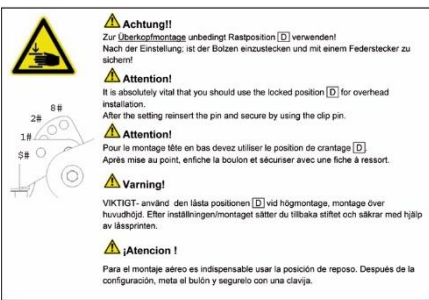
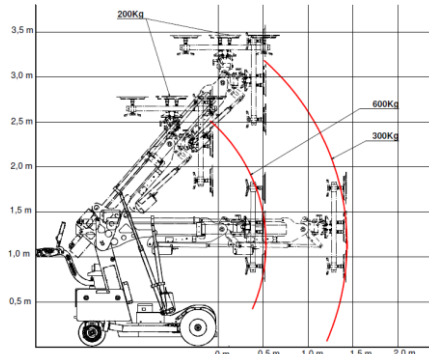
- Warns against possible automatic or remote startup of the rotary swivel motor on the suction unit.

**Caution!****Danger during operation of the device!**

- Taking drugs or medicine and consuming alcohol will negatively affect responsiveness and interfere with the ability to drive the KS Robot. Persons under the influence of the aforementioned substances may not carry out any work with or on the KS Robot.
- Wearing headphones to listen to music and the use of mobile phones (cell phone), affects concentration, impairs acoustical perception and therefore increases the risk of accidents at work. Therefore, the wearing or the use of such devices while working is prohibited.

2.4 Symbol and hazard symbol descriptions

The symbols used in this manual and on the machine identify the following hazards and provide the following information:

	Warning of general danger zones		Read the operating manual																	
	Warning of hand injuries (danger of crushing)		Lifting point																	
	Warning against automatic startup		Check annual UVV expert inspection sticker																	
	Do not stand under suspended loads																			
	Riding along is prohibited		Entering the area is prohibited																	
<div></div>		Driving only with the load lowered																		
<div><table><tr><td>Bezeichnung</td><td></td><td rowspan="2">CE</td></tr><tr><td>Typ</td><td></td></tr><tr><td>Maschinen-Nr.</td><td></td><td>Baujahr</td></tr><tr><td>Max. Traglast</td><td></td><td>Spannungsnetz</td></tr><tr><td>Batterie Ladegerät</td><td></td><td></td></tr><tr><td colspan="3">K.Schulten GmbH & Co. KG, Industriestraße 3-7, DE-48488 Emsbüren, Tel. 0049 5903/9390-0 Made in Germany</td></tr></table></div>		Bezeichnung		CE	Typ		Maschinen-Nr.		Baujahr	Max. Traglast		Spannungsnetz	Batterie Ladegerät			K.Schulten GmbH & Co. KG, Industriestraße 3-7, DE-48488 Emsbüren, Tel. 0049 5903/9390-0 Made in Germany			Type plate	
Bezeichnung		CE																		
Typ																				
Maschinen-Nr.		Baujahr																		
Max. Traglast		Spannungsnetz																		
Batterie Ladegerät																				
K.Schulten GmbH & Co. KG, Industriestraße 3-7, DE-48488 Emsbüren, Tel. 0049 5903/9390-0 Made in Germany																				
<div></div>		Rotating joint / overhead mounting																		
<div></div>		Load diagram	<div><div>Not-Halt / Emergency Stop / Nödstopp / parada de emergencia / arrêt d'urgence</div></div> Emergency stop switch on remote control unit																	

Information and symbols attached directly to the KS Robot, such as warning signs, operating signs, or similar, must be strictly observed. This information and these symbols may not be removed and must be kept in legible condition or replaced.

2.5 Protective devices

The KS Robot is equipped with protective devices to ensure that it does not endanger the safety and health of the operator or third parties.

The unauthorized removal or bypassing of the protective devices is a criminal offense.
All liability claims will be forfeited in the event of consequential damage.



Danger!

Maintenance work and settings on the protective devices should only be carried out by qualified personnel.

Emergency stop switch

- For the electrically controlled models there is an emergency stop button on the remote control unit that switches off all functions when pressed.

Emergency-stop button



- For the hydraulically controlled models there is a red stop button on the remote control unit that switches off all cylinder movements when pressed.

Stop button



- For the hydraulically controlled models there is also an emergency stop button on the housing that switches off all functions as well as the travel drive when pressed.

Emergency-stop button



Signal light

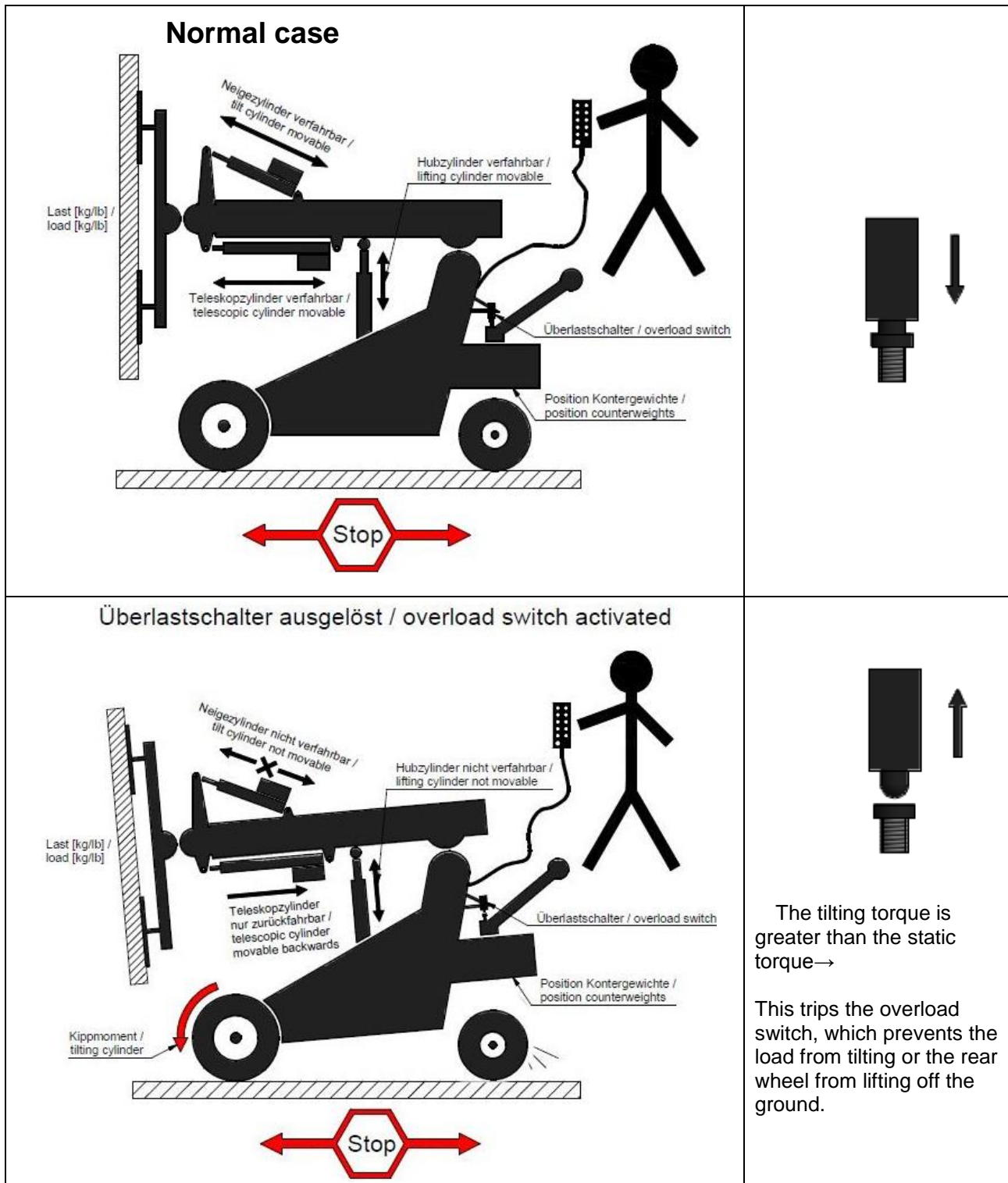
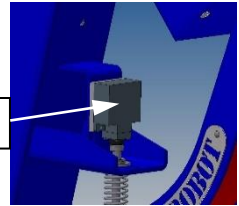
- As special equipment on customer request, the KS Robot is equipped with a signal light.
This may indicate, for example, vacuum loss and/or overload.



Circuit breaker

- There is an overload switch on the rotating drive joint. This is triggered if the load capacity is exceeded and stops all stroke motion, except for the retraction of the telescopic cylinder.

Circuit breaker



2.6 Regular safety inspections

The operator must ensure that the KS Robot is inspected by a qualified person at least once a year or after special occurrences.

A complete inspection of the technical condition of the KS Robot with respect to accident safety must be carried out at this time. In addition, the KS Robot must be thoroughly inspected for damage that may be caused by improper use. A test protocol must be created. A minimum of two successive test results must be maintained.



- The test date is indicated by a sticker on the KS Robot.

3 Product Description

The KS Robot Indoor is an electric motor-powered vitrification device.

The servomotors are controlled by the electric motor of models KS Robot 280 to 600. In the models KS Robot 1000/1400 they are electro-hydraulically controlled due to the higher payloads.

Depending on the version, the KS Robot can handle loads between 280 kg - 1400 kg.

The vacuum suction system can be rotated and telescoped forward.

A synchronous control system ensures a constant angle of inclination when lifting and lowering the load.

The front axle can be adjusted laterally for exact positioning during assembly work.

All vacuum suction systems are battery operated and for safety reasons have two separate vacuum circuits with independently operating pumps.

A 24V socket is located on the KS Robot, e.g. to connect chargers/power screwdrivers or LED spotlights.

With the electric wheel drive continuous (shift-free) driving (forward/backward) with load is possible. The speed is adjustable in two positions.

Standard version:

An articulated joint allows lateral swiveling of the load to pass through narrow doors, as well as manual turning of the load, e.g. for insertion of glass panes into the window reveal. Here, working from vertical to horizontal or from vertical to overhead position is realized manually by a locking pin adjustment.

All movements such as lifting, tilting, telescoping and moving sideways are controlled by a wired remote control unit. A radio remote control unit is also available.

Electrical turning and swiveling:

Depending on the equipment, the rotational movement of the vacuum suction system or alternatively the lateral swiveling can be carried out electrically.

Equipment with HDS module:

The KS Robot 1400 has a HDS module as standard equipment. The turning, swiveling and tilting movements are carried out electrohydraulically via the remote control unit.

The model KS Robot 1000 can be equipped with an HDS module as an option.

3.1 Options

- Special rotary articulated joint (**SDKG**) for electrical swiveling from the horizontal to the overhead position. (Attention! Additional projection approx. 170 mm)
- Vacuum suction system with electrical rotary cylinder
- Electrical swivel unit allows lateral swiveling up to + / - 90°
- Hydraulic rotary and swivel head (**HDS module**)
Equipment of the KS Robot 1000/1400 with a special head for hydraulic turning (270°) and swiveling (90° to the left and right) of the vacuum suction system
- Mechanical telescopic extension
(allows manual telescopic extension in 5 stages by approx. 900 mm of additional projection)
- Electrically controlled telescopic extension (allows continuously variable extension) on the models KS Robot 400 / 600
- Electro-hydraulic telescopic extension (allows continuously variable extension) on the KS Robot 1000 / 1400
- Remote control unit

3.2 Accessories and transport units

By default, the KS Robot is equipped with a vacuum suction unit when delivered.

In addition, the following transport units are available:

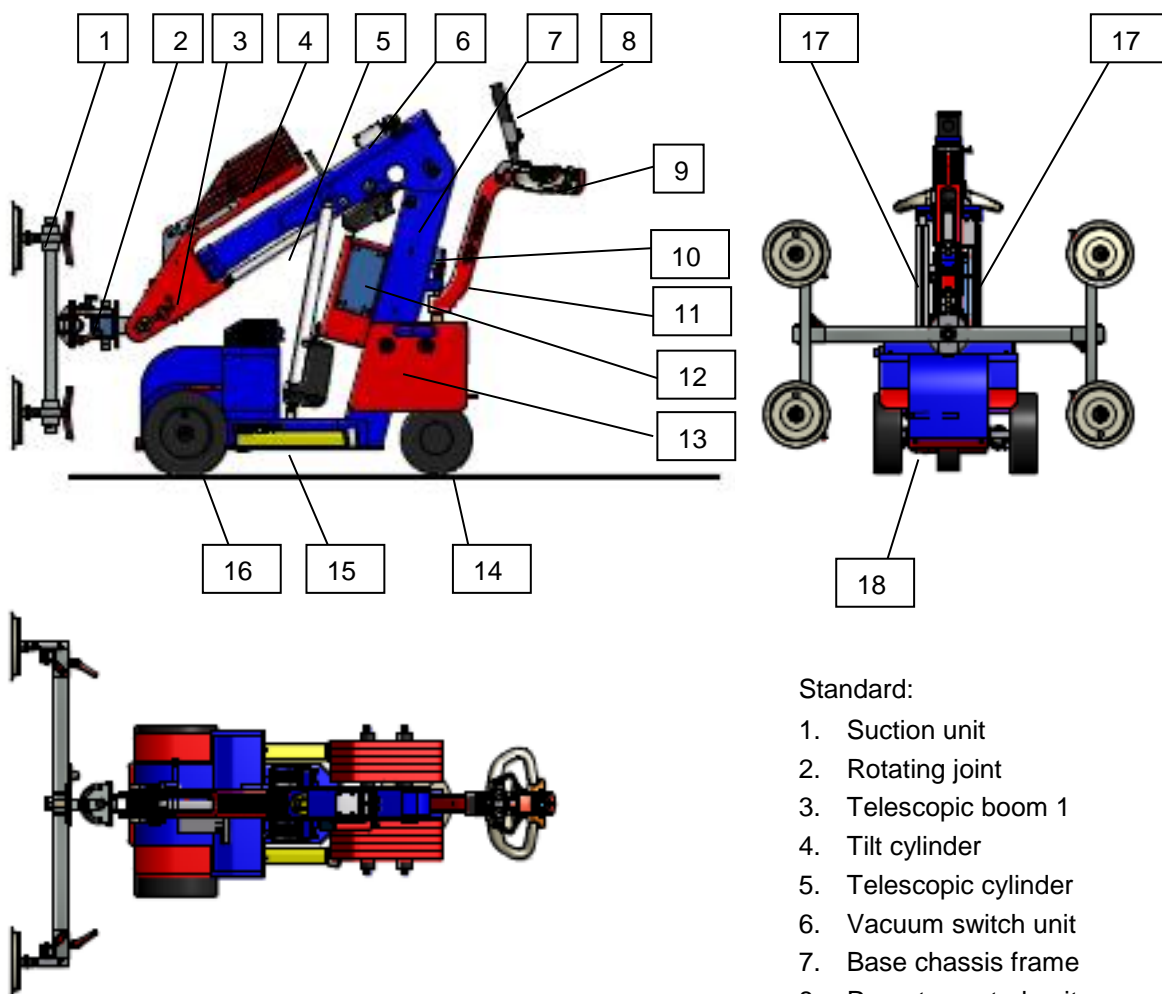
- Load hook
- Load fork
- Special solutions (e.g. additional arm, door holder, special gripper, etc.)

For the indoor series there are a variety of accessories, but depending on the device type are different, for example:

- Spare wheels (solid rubber)
- LED lighting
- Quick-release closures as vacuum discs
- Loading ramp
- Cover hood

3.3 Overview

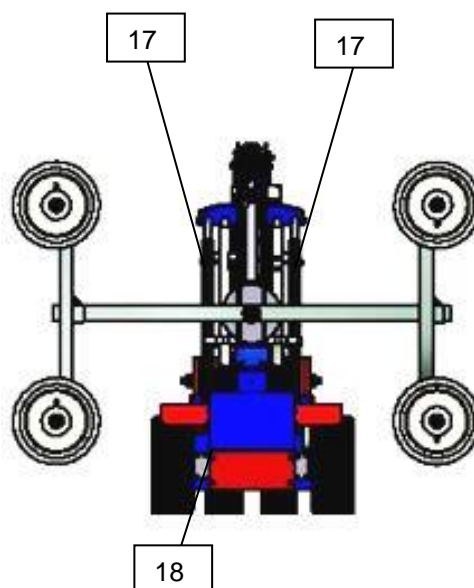
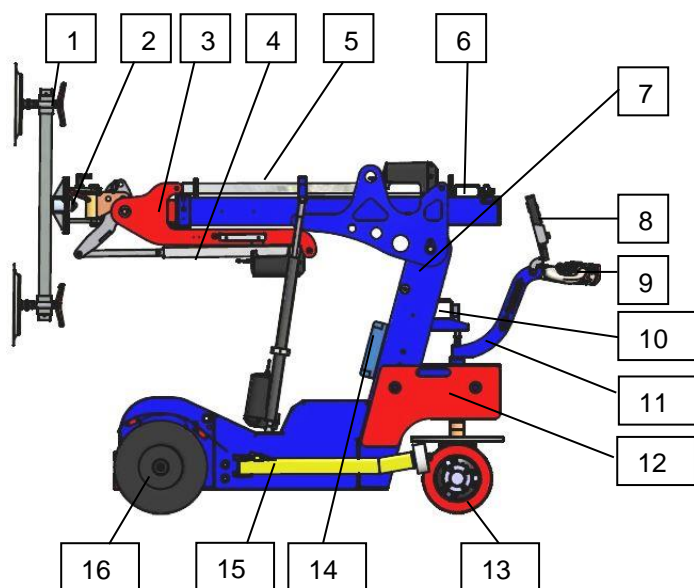
3.3.1 KS Robot 280



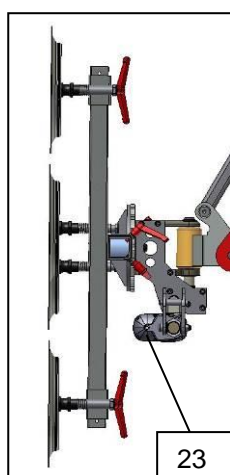
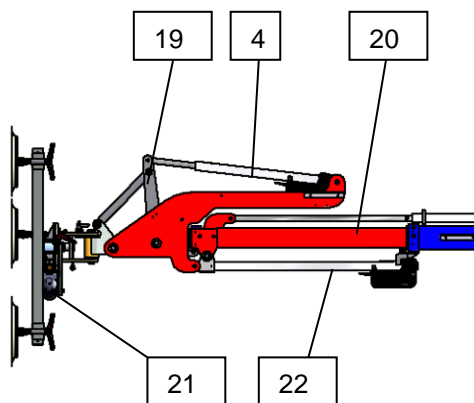
Standard:

1. Suction unit
2. Rotating joint
3. Telescopic boom 1
4. Tilt cylinder
5. Telescopic cylinder
6. Vacuum switch unit
7. Base chassis frame
8. Remote control unit
9. Handlebar with control button
10. Circuit breaker
11. Tiller head
12. Battery charger
13. Counterweights
14. Drive wheel
15. Safety supports
16. Front axle
17. Lifting cylinder
18. Lateral thrust cylinder

3.3.2 KS Robot 400



Options:



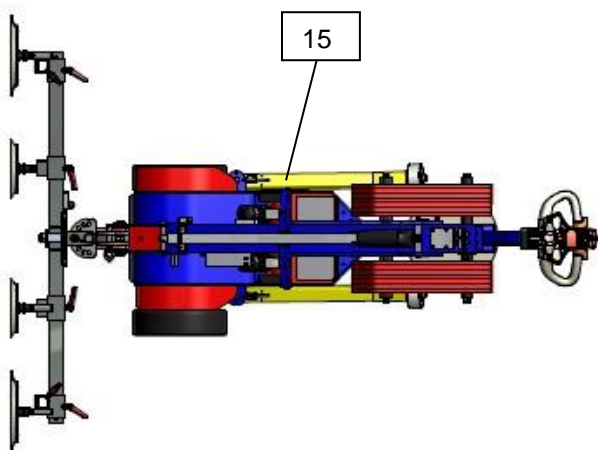
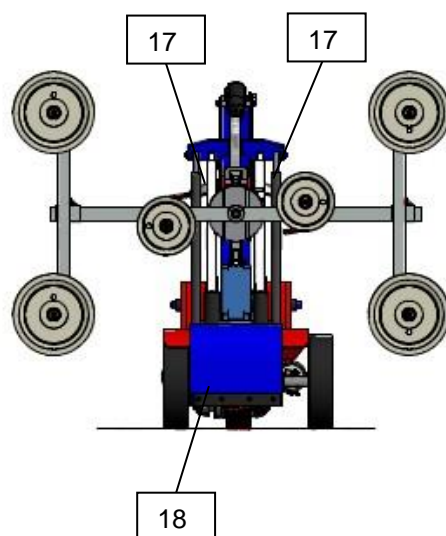
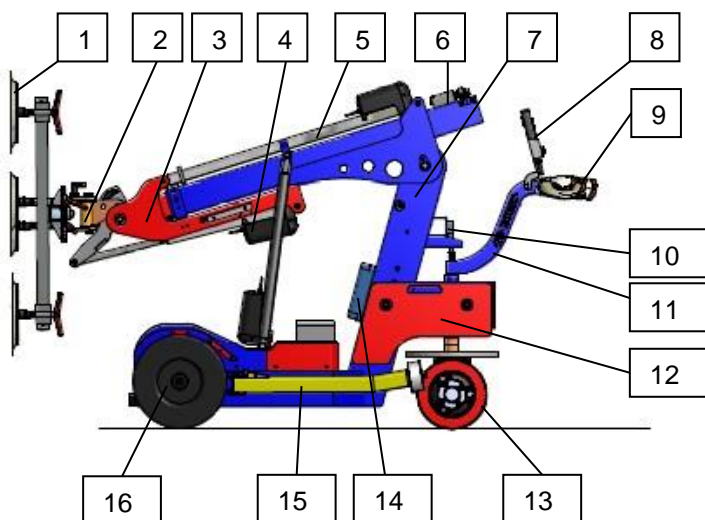
Standard:

1. Suction unit
2. Rotating joint
3. Telescopic boom 1
4. Tilt cylinder
5. Telescopic cylinder
6. Vacuum switch unit
7. Base chassis frame
8. Remote control unit
9. Handlebar with control button
10. Circuit breaker
11. Tiller head
12. Counterweights
13. Drive wheel
14. Battery charger
15. Safety supports
16. Front axle
17. Lifting cylinder
18. Lateral thrust cylinder

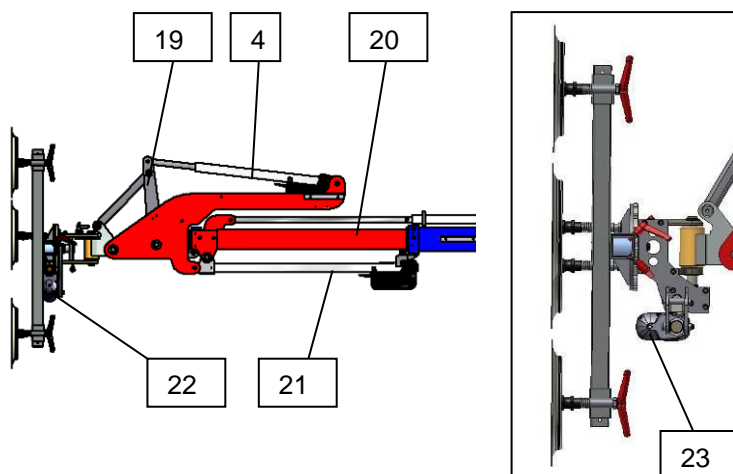
Options:

19. Special rotary articulated joint
20. (SDKG)
21. Telescopic boom 2
22. Telescopic cylinder 2
23. Rotary cylinder for suction unit
24. Electrical swivel unit

3.3.3 KS Robot 600



Options:



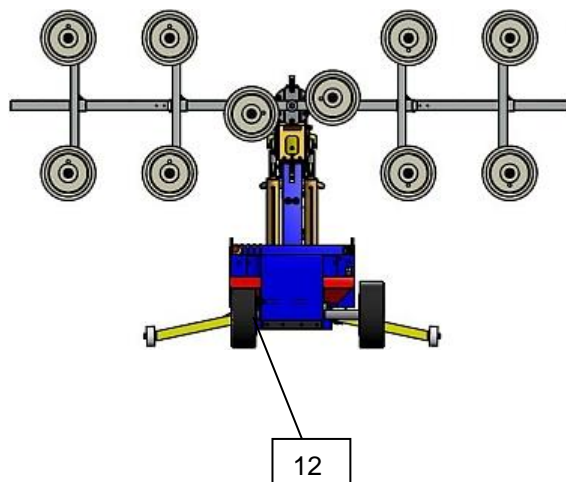
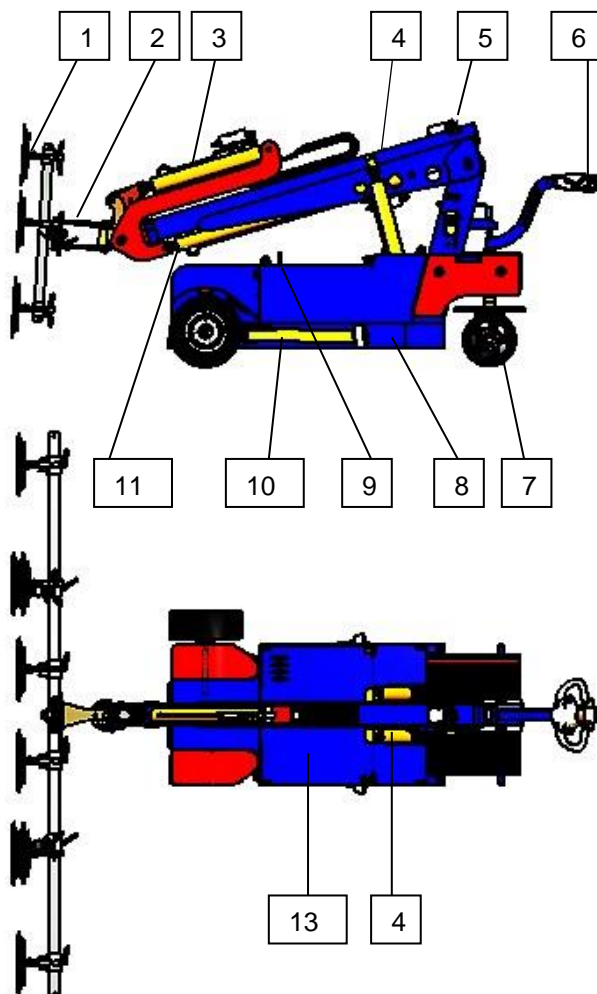
Standard:

1. Suction unit
2. Rotating joint
3. Telescopic boom 1
4. Tilt cylinder
5. Telescopic cylinder
6. Vacuum switch unit
7. Base chassis frame
8. Remote control unit
9. Handlebar with control button
10. Circuit breaker
11. Tiller head
12. Counterweights
13. Drive wheel
14. Battery charger
15. Safety supports
16. Front axle
17. Lifting cylinder
18. Lateral thrust cylinder

Options:

19. Special rotary articulated joint (SDKG)
20. Telescopic boom 2
21. Telescopic cylinder 2
22. Rotary cylinder for suction unit
23. Electrical swivel unit

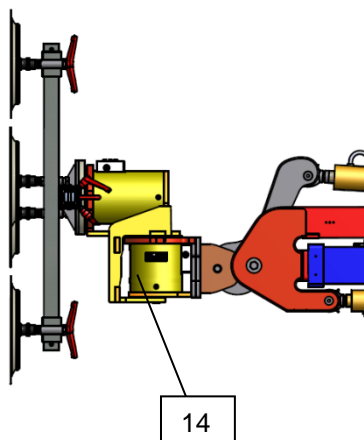
3.3.4 KS Robot 1000



Standard:

1. Suction unit
2. Rotating joint
3. Telescopic boom 1
4. Tilt cylinder
5. Telescopic cylinder
6. Pressure filter
7. Base chassis frame
8. Radio remote control unit (receiver)
9. Handlebar with control button
10. Circuit breaker
11. Tiller head
12. Counterweights
13. Drive wheel
14. Safety supports
15. Front axle
16. Lifting cylinder
17. Lateral thrust cylinder

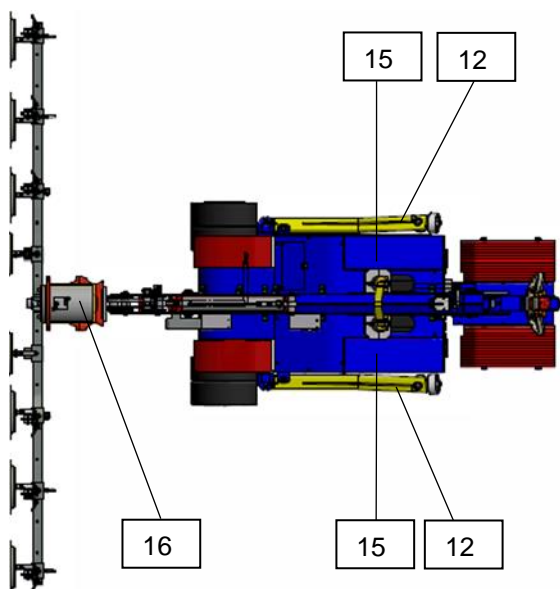
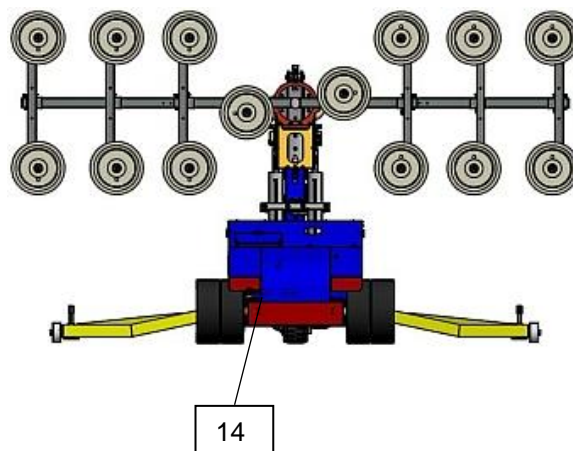
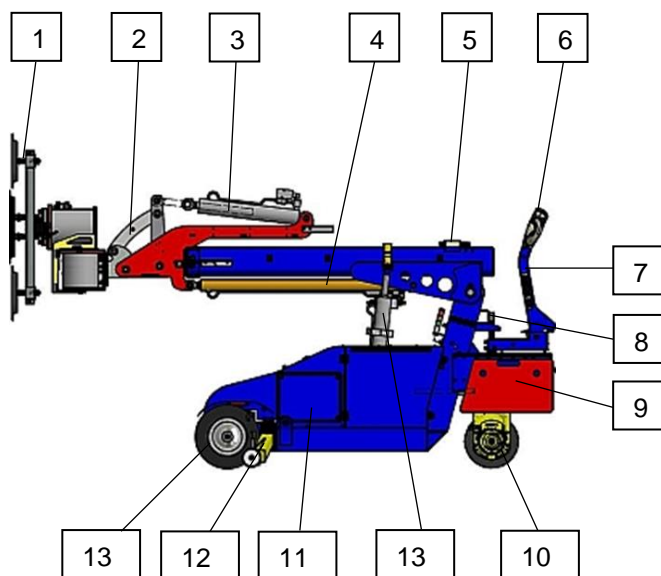
Options:



Options:

18. Hydraulic rotary-swivel head (HDS)

3.3.5 KS Robot 1400



Standard:

1. Suction unit
2. Swivel and tilt joint
3. Rotary cylinder
4. Telescopic cylinder
5. Vacuum valve
6. Control and steering
7. Counterweights
8. Drive wheel
9. Base chassis frame
10. Hydraulic unit
11. Lifting cylinder
12. Safety supports
13. Telescopic boom
14. Lateral thrust cylinder (inside)
15. Battery box
16. Hydraulic rotatory-swivel head (HDS)

3.4 Technical data

3.4.1 KS Robot 280

		SDKG (Standard)	
Max. load capacity		280 kg	
Total weight ¹ (including counterweights and suction unit)		approx.	525 kg
Counterweights		5 x 26 kg and 5 x 17 kg	
Dead weight suction crossbar ¹ :		approx.	25 kg
Ambient temperature		0°C to +50°C	
Boom angle		125°	
Max. permissible slope		17°	
Cross feed		100 mm	
Transport dimensions ¹			
Width		approx.	630 mm
Length		approx.	1700 mm
Height		approx.	1300 mm
Tires		Part No.	
Front	Ø306 x 105mm		11011063
Electrical system			
Drive		24 V	11008084
Electrical cylinders		Stroke	
Lifting cylinder 2 x		500 mm	11008095
Telescopic cylinder		500 mm	11008092
Tilt cylinder		Standard	300 mm
Cross feed		100 mm	11008093
Vacuum pumps			
2 x		24V DC	11008131
Vacuum suction system (standard)			
Suction disc		4 x d = 250 mm	11018539

¹ Due to manufacturing tolerances and continuous product improvement, weight and dimensional deviations may occur.

* Optional
 SDKG (special rotary articulated joint)
 d (diameter)
 DC (direct current)

3.4.2 KS Robot 400

		Standard	SDKG	Man. DH	Elec. DH
Max. load capacity		400 kg			
Total weight ¹ (including counterweights and suction unit)	approx.	861 kg	868 kg		
Counterweights		12 x 23 kg	14 x 23 kg		
Dead weight suction crossbar ¹ :		approx.	40 kg		
Ambient temperature		0°C to +50°C			
Boom angle		125°			
Max. permissible slope		10°			
Cross feed		100 mm			
Transport dimensions without vacuum suction unit ¹					
Width	approx.	730 mm			
Length	approx.	2400 mm			
Height	approx.	1500 mm			
Tires				Part No.	
Front	Ø405 x 105mm		11011067		
Electrical system					
Drive		24 V		11008146	
Electrical cylinders		Stroke			
Lifting cylinder 2 x		600 mm		11008176	
Telescopic cylinder		900 mm		11018535	
Tilt cylinder	Standard	400 mm		11008177	
	with SDKG	500 mm		11008095	
Cross feed		100 mm		11008153	
Vacuum pumps					
2 x		24V DC		11008130	
Vacuum suction system (standard)					
Suction disc		4 x d = 350 mm		11018538	
Rotary cylinder * (electrical turning)		Stroke 200 mm		11018229	
Special version with electrical rotary cylinder *				Man. DH	Elec. DH
Max. load capacity				570 kg	480 kg
Total weight cpl. (including counterweights and suction unit)	approx.			1045 kg	1075 kg
Counterweights		14 x 23 kg or 6 x 30 kg			

¹ Due to manufacturing tolerances and continuous product improvement, weight and dimensional deviations may occur.

* Optional / DH = (telescope extension) / SDKG = (special rotary articulated joint) / d = (diameter)
DC=(direct current)

3.4.3 KS Robot 600

		Standard	SDKG	Man. DH	Elec. DH
Max. load capacity		600 kg			
Total weight ¹ (including counterweights and suction unit)	approx.	954 kg	1010 kg		
Counterweights		14 x 23 kg / 4 x 30 kg	14 x 23 kg / 6 x 30 kg		
Dead weight suction crossbar ¹ :		approx.	50 kg		
Ambient temperature		0°C to +50°C			
Boom angle		125°			
Max. permissible slope		10°			
Cross feed		100 mm			
Transport dimensions without vacuum suction unit ¹					
Width		approx.	730 mm		
Length		approx.	2500 mm		
Height		approx.	1500 mm		
Tires				Part No.	
Front	Ø405 x 105mm				11011067
Electrical system					
Drive		24 V		11008146	
Electrical cylinders		Stroke			
Lifting cylinder 2 x		600 mm		11008176	
Telescopic cylinder		900 mm		11018535	
Tilt cylinder		Standard	400 mm		11008177
		with SDKG	500 mm		11008095
Cross feed		100 mm		11008153	
Vacuum pumps					
2 x		24V DC		11008128	
Vacuum suction system (standard)					
Suction disc		6 x d = 350 mm		11018538	
Rotary cylinder * (electrical turning)		Stroke 200 mm		11018229	
Special version with electrical rotary cylinder *				Man. DH	Elec. DH
Max. load capacity				570 kg	480 kg
Total weight cpl. (including counterweights and suction unit)	approx.			1045 kg	1075 kg
Counterweights		14 x 23 kg or 6 x 30 kg			

¹ Due to manufacturing tolerances and continuous product improvement, weight and dimensional deviations may occur.

* Optional / DH = (telescope extension) / SDKG = (special rotary articulated joint) / d = (diameter)
DC = (direct current)

3.4.4 KS Robot 1000

		Standard	HDS *
Max. load capacity		1000 kg	
Load capacity when swiveled to the side	Max.	400 kg	
Total weight ¹ (including counterweights and suction unit)	approx.	1995 kg	2170 kg
Counterweights		14 x 23 kg / 10 x 30 kg	14 x 23 kg / 10 x 30 kg
Ambient temperature		0°C - +50°C	
Boom angle		110°	
Max. permissible slope		10°	
Cross feed		100 mm	
Transport dimensions without vacuum suction unit ¹			
Width	approx.	980 mm	980 mm
Length	approx.	3200 mm	3600 mm
Height	approx.	1450 mm	1450 mm
Tires			Part No.
Front	Ø420 x 156mm		11011062
Electrical system			
Drive		24V 300/1300W	11008147
Hydraulic system			
Operating pressure:		Max.	150 bar
Oil tank capacity		8 liters	
Hydraulic oil type (Oils from different manufacturers may not be mixed together)		BP HLP-D46	
Hydraulic cylinders		Stroke	Part No.
Lifting cylinder 2 x		550 mm	11018724
Telescopic cylinder 2x		1200 mm	11016657
Tilt cylinder		500 mm	11016658
Cross feed		200 mm	11016659
HDS *			
Hydraulic swivel motor		180 °	11021758
		360 °	11021759
Vacuum pumps			
4 x		24V DC	11008131
Vacuum suction system (standard)			
Suction disc		10 x d = 350 mm	11018538

¹ Due to manufacturing tolerances and continuous product improvement, weight and dimensional deviations may occur.

* Optional

DH = (telescopic extension) d = (diameter) HDS = (hydraulic rotary and swivel head)

DC = (direct current)

3.4.5 KS Robot 1400

		Standard with HDS	
Max. load capacity		1400 kg	
Total weight ¹ (including counterweights and suction unit)		approx.	2550 kg
Counterweights		6 x 23 kg and 20 x 30 kg	
Ambient temperature		0°C - +50°C	
Boom angle		130°	
Max. permissible slope		7°	
Cross feed		200 mm	
Transport dimensions without vacuum suction unit ¹			
Width	approx.	1310 mm	(including spare wheels)
Length	approx.	3350 mm	
Height	approx.	1700 mm	
Tires			Part No.
Front	Ø420 x 156mm		11011062
Electrical system			
Drive		24V 300/1300W	11008147
Hydraulic system			
Operating pressure:		max.	150 bar
Oil tank capacity		8 liters	
Hydraulic oil type (Oils from different manufacturers may not be mixed together)		BP HLP-D46	
Hydraulic cylinders		Stroke	Part No.
Lifting cylinder 2 x		600 mm	11021514
Telescopic cylinder 2x		1200 mm	11016657
Tilt cylinder		500 mm	11021515
Cross feed		200 mm	11016659
HDS *			
Hydraulic swivel motor		180 °	11021760
		360 °	11021761
Vacuum pumps			
4 x		24V DC	11008131
Vacuum suction system (standard)			10018426
Suction disc		14 x d = 350 mm	11018538

¹ Due to manufacturing tolerances and continuous product improvement, weight and dimensional deviations may occur.

* Optional

DH = (telescopic extension) d = (diameter) HDS = (hydraulic rotary and swivel head)

DC = (direct current)

4 Delivery / Transport / Storage

The KS Robot is delivered by K. Schulten GmbH & Co. KG or by an authorized forwarder.

4.1 Transport of the KS Robot

The KS Robot can be transported on a truck. Depending on the circumstances, it can be loaded on a truck or trailer with a crane or driven onto the same truck or trailer.



Warning!

Incorrect handling during transport of the KS Robot can result in considerable personal injury and property damage!

- Transport may only be carried out by properly qualified and instructed personnel and in compliance with all safety instructions.
- The means of transport must have sufficient load-bearing capacity (see technical data, type plate).
- All electronics must be disconnected at the main switch prior to transport.
- The KS Robot must be carefully secured in the truck/trailer during transport and protected against rain and snow.
- Never transport the KS Robot when it is carrying a load.
- Make sure that the counterweights are adequately secured!
- Always transport the KS Robot in the transport position, i.e. with the cylinders retracted and the suction unit tilted sideways.

4.1.1 Lifting and lashing



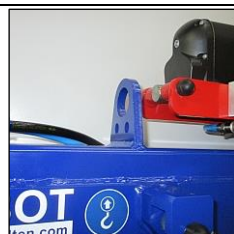
Warning!

- The KS Robot may only be lifted and secured by properly qualified and instructed personnel.
- Remove loose materials or objects from the machine.
- Make sure that the counterweights are adequately secured!
- Only lift the KS Robot on the designated lifting points.
- Always use suitable slings.
NEVER lift the KS Robot with straps, forks, or directly with ropes or hoisting belts.
- Place the slings so that damage to the machine is avoided.
- Make sure that the horizontal position of the machine is maintained.

The following points are provided for lifting and lashing the KS robot:

Lifting points:

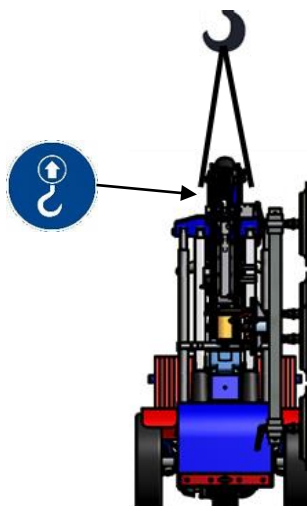
Lifting lugs are provided on the support arm for the models KS Robot 280/400 and 600.



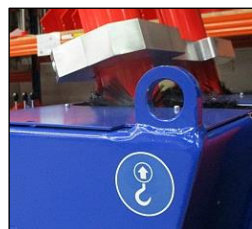
KS Robot 280



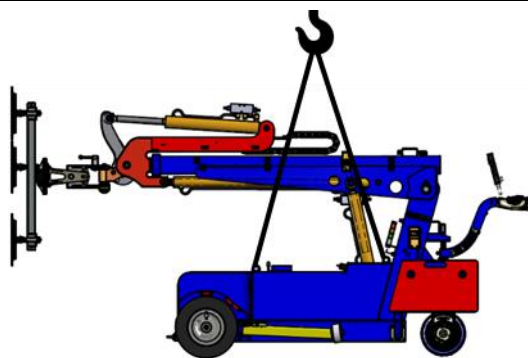
KS Robot 400/600



The model KS Robot 1000 has four lifting lugs on the housing.



KS Robot 1000



The KS Robot 1400 can be lifted with a special load beam.

For this purpose, attachment points are available on the top of the support arm and at the bottom on both sides of the housing.



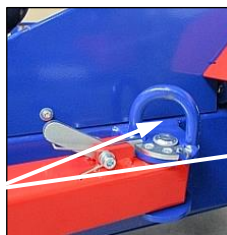
KS Robot 1400



Lashing points:

In addition to the marked lifting points, the KS Robot has lashing points on both sides of the safety supports and on the back of the base frame between the counterweights.

Make sure that the distances and lengths of the lashing are adequate when lashing.



4.1.2 Driving onto a transport vehicle

If necessary, the KS Robot can also be driven via a loading ramp onto a van, truck or trailer.



Warning!

- The KS Robot may only be loaded by properly qualified and instructed personnel.
- Remove loose materials or objects from the machine.
- Make sure that the counterweights are adequately secured!
- The KS Robot may NEVER be transported when it is carrying a load.
- When driving on slopes, the angle of incline may not be exceeded.
(See technical data.)
- Always extend the safety supports when driving on the transport vehicle.

4.2 Storage

The KS Robot must be stored in a clean and dry place. If possible, use protective covers to protect the vacuum suction discs on the vacuum suction unit from dust.

Secure the KS Robot against unauthorized use by removing the main switch key and the cable / radio remote control unit when you park it for extended periods of time on the construction site.

Protect the KS Robot from soiling, moisture and damage with a suitable cover. We recommend covering the KS Robot with a hood or tarpaulin during extended periods of storage.

5 Commissioning

5.1 Attaching lifting gear

First attach the load handling unit to the KS Robot.

By default, the KS Robot is equipped with a vacuum suction unit when delivered.

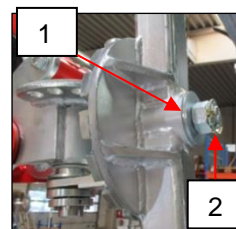
Additional transport units, such as load hooks, a fork or special solutions are available as options.

These have the same mounting as described below (points 1 to 2).

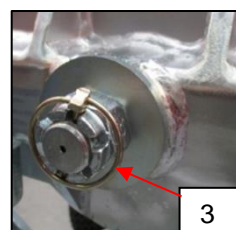


Procedure:

1. Place the load handling unit (e.g. vacuum suction unit) with the included washer (1) on the mounting of the KS Robot rotating assembly. Screw to the mounting with the nut (2).



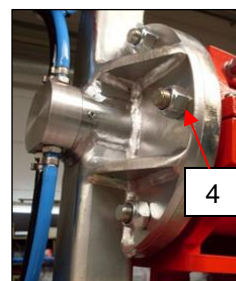
2. Then secure the nut with the linch pin (3) against twisting.



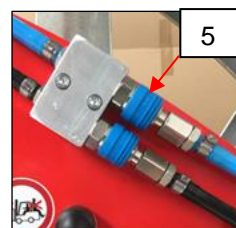
When equipped with HDS module (hydraulic rotary swivel unit)

3. The load handling unit (e.g. vacuum suction unit) is mounted on the rotating assembly with 6 threaded bolts (4). First loosen the 6 nuts, place the load handling unit on the mounting and then secure the load handling unit by screwing the nuts back on.

HDS-module

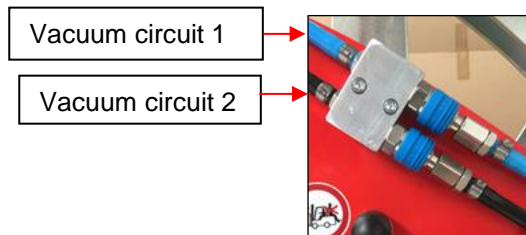


4. Now connect the two vacuum hoses of the suction unit via the quick couplings (5) to the telescopic boom of the KS Robot vacuum system.



- When installing a vacuum suction unit, make sure that the vacuum hoses are connected to the same vacuum circuit.

Vacuum circuit 1 = blue hose lines
Vacuum circuit 2 = black hose lines



Note!

The suction discs are evenly arranged on the vacuum suction unit in the two-circuit system. (Suction disc arrangement see 11.7.2)

Please observe the respective vacuum plan of your vacuum suction unit.

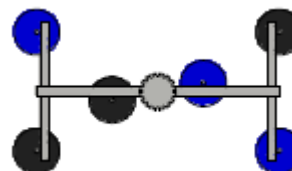


Fig. shows a 6-piece vacuum suction unit

If equipped with electrical turning unit or electrical swivel unit (90° laterally):



Fig. shows electrical rotary cylinder

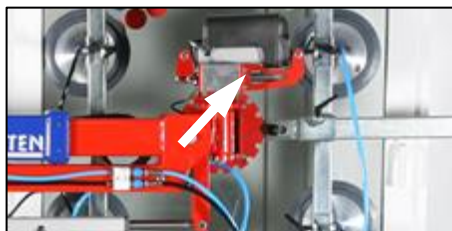
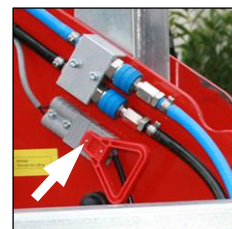


Fig. shows electrical swivel cylinder

- First, proceed as described above. (Point 1 to 3)
- In addition, the rotary or swivel cylinder must be electrically connected.

Connect the plug with the handle of the cylinder to the connector on the telescopic boom.



5.2 Switching on and off

The KS Robot is switched on and off via the battery main switch.

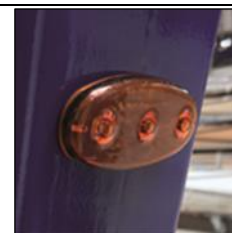


KS Robot 280 / 400 / 600 / 1000



KS Robot 1400

The KS Robot is equipped with a battery monitoring system to protect the batteries. When switched on, the device performs a system test and briefly flashes several times and then goes out again. As soon as the charge state of the battery drops within a critical range, it flashes permanently. This is a signal to the machine operator indicating that the battery must soon be recharged. ("Charge the battery").



Caution!

Deep discharge shortens the life of the battery

5.3 Connecting the hand-held remote control unit

The hand-held remote control unit is equipped with a Harting Han-1® connector. This is connected to the KS Robot on the battery box or control box (depending on the KS Robot model). The locking device of the connector must engage properly.



KS Robot 280



KS Robot 400



KS Robot 600



Note!

The receiver of a radio remote control unit can be connected here as an alternative.

5.4 Leakage check

A leakage check must be carried out prior to commissioning the KS Robot and at weekly intervals thereafter.

Procedure:

- Place the suction unit with all suction discs onto a plate of a gas-impermeable, flat material.
- Make sure that all suction discs are cleanly positioned over the entire surface and press or align a suction disc until it is in the correct position if necessary.
- Activate the vacuum suction unit by pushing the vacuum switch on the KS Robot forward or by pressing the switch on the remote control unit.
- When the acoustic warning signal goes out, the two control lamps light up green. The hands on the two vacuum meters should have reached a value of approx. -0.72 bar (green area). Now the vacuum pumps switch off.
- After the vacuum pumps for both vacuum circuits have shutdown, switch off the KS Robot at the main switch.
- Read the current level of vacuum on the vacuum meters and record the value in writing.
- Within the next fifteen minutes, the hands on the vacuum gauges may only change insignificantly, by no more than 5%.

If this test is positive, the vacuum suction unit has no leaks and it can be used safely.



Danger!

Should a leak also occur in a vacuum circuit, the leak must be sealed immediately.

6 Operation

6.1 Inspections before starting work

Carry out a visual inspection for externally visible damage and defects before starting work. If damage or safety-related defects have been detected, the KS Robot must be taken out of service immediately. Check the following components for function and damage:

- Cracks in welds or components
- Electrical components, cylinders, circuit breakers, wires and electrical cables
- Charge state of the batteries
- Vacuum system, signal alarm and pressure gauge
- Hydraulic hoses, connections, cylinders and control blocks (only KS Robot 1000 / 1400)
- Tires and wheels, screws, nuts and other fasteners
- Load capacity labels and signs

6.2 Carrying out a reference run



Note!

This only affects the models with electrical lifting cylinders, such as the **KS Robot 280/400/600**. (not models with hydraulic cylinders, e.g. KS Robot 1000 / 1400).

To ensure that the lifting cylinders operate in parallel during work, a reference run must be carried out each time before work is started and each time the KS robot is switched off and back on again. For this purpose, and to prevent fluctuations in the movement of the cylinder the lifting cylinders must be moved down to the stop each time the device is started.

Procedure:

- Press the "Lower" button (↓) on the remote control unit and keep the button pressed until the lifting cylinders have moved all the way down.



Caution!

Make sure that the suction crossbar does not touch the ground.



If there is a situational failure at the construction site, e.g. because the cylinders have come to a standstill and the downward movement cannot be carried out, you can bypass the reference run and start up the lifting cylinders first:

- Press the reset key "Reference run" on the housing (Fig. 1) or on the control box (Fig. 2) of the KS Robot and at the same time press the "Lift" key (↑) on the remote control unit. The lift function on the remote control unit is enabled again.



Figure 1
KS Robot 280



Figure 2
KS Robot 400 /600

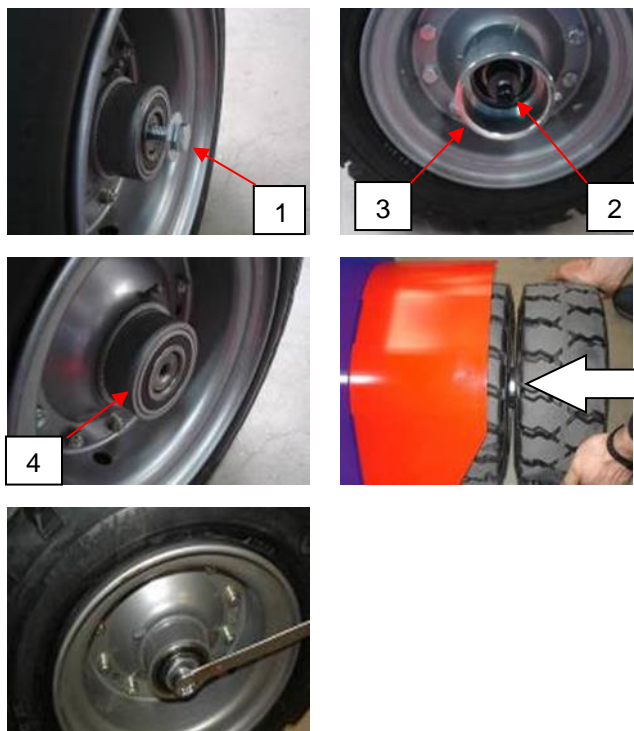
- Move the cylinders until you can perform a reference run.



6.3 Installation / removal of additional tires (KS Robot 1000/1400)

For better load distribution, the KS Robot 1000 / 1400 models can be equipped with twin tires at the front.

1. First remove the screws of the wheel on the KS Robot (1) and the screw for the additional tires (2).
2. Now place the additional wheel with the wheel hub adapter (3) on the cone (4) of the main wheel.
3. Now secure the additional wheel with the hexagon screw (1). Make sure that the screw connection is firmly seated.



6.4 Supporting and aligning the device



Warning!



Life-threatening injuries and significant amounts of property damage can result if the device falls over.

- Make sure the ground is stable before setting up the device. Rain and thaw can cause the ground to become soft.
- Maintain a proper distance from embankments and slopes.
- Do not set up the device on sand.

The KS Robot must be set up on a stable and flat surface before starting any work. For this purpose, the side supports must be pulled out **without** exception.

Larger slopes in the ground must be leveled with suitable means before setup.

Procedure:

- Check the degree of incline on the spirit level (circular level)
The air bubbles must be inside the markings.



- Extend the side supports.

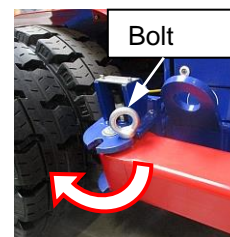
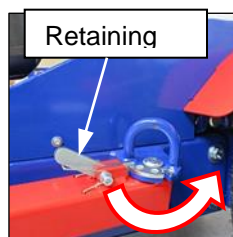


When swiveling, make sure that the retaining lever engages correctly.

Exception KS Robot 1400:

The supports are secured here with a bolt (3).

- Pull the bolt upward, swing out the supports and secure them with the bolt again.



KS Robot 1400

The KS Robot 1400 model has additional jack shafts (4) in order to compensate for height when the distance between the support wheel and the ground is too great. They are only used for height compensation and may not support the machine.

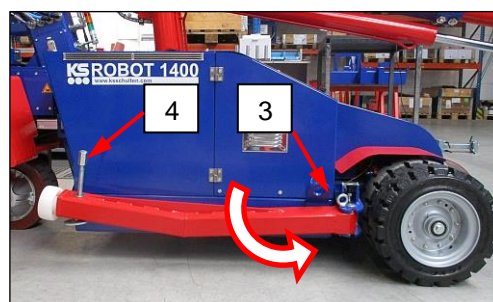
- Screw down the jack shafts (4) until just before contact with the ground.

Attention!

Use a stable underlay when working on soft/sinking ground.



Jack shafts (4) only on KS Robot 1400



6.5 Tiller head positions

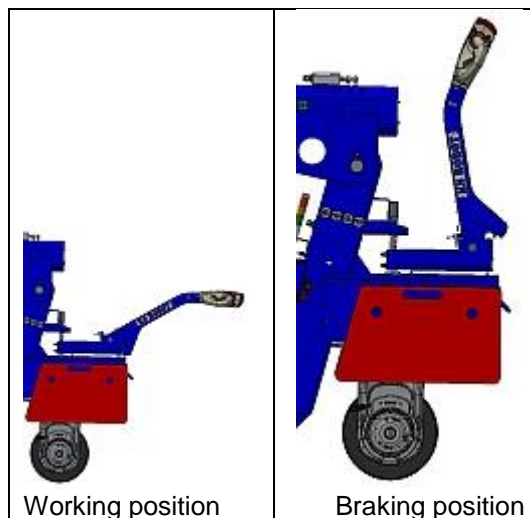
The KS Robot can be driven and controlled with the aid of the multi-functional tiller head.

The tiller head is normally in the working position on all models.

Exception: KS Robot 1400:

There are two possible positions here.

In the **working position**, the travel can be initiated via the direction switch and when in the **brake position**, the drive is locked, and the brake is applied.

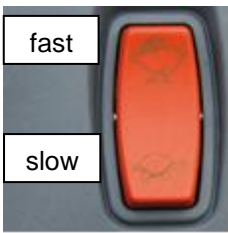




6.6 Wheel drive operation

The wheel drive is operated via the tiller head control unit.



Functions:

1	Drive direction button	Press in direction A: KS Robot drives forward. Press in direction B: KS Robot moves backward.
2	Safety switch	KS Robot stops and drives forward.
3	Drive speed	<div> <div> <div>fast</div> <div>slow</div> </div>  <div>  Fast  Slow </div> </div>
4	Battery indicator	The battery charge level is indicated.
5	Horn	Operation in the event of danger

6.7 Travel



Warning!

- Use on public roads is prohibited.
- Only drive on paths that are adequately paved.
- Make sure that the telescopic cylinders of the boom are retracted.
- Only drive on slopes/inclines at reduced speed, with increased caution and with the load lowered.
- Only inclines up to max. of 10° and without load may be driven on.
- When driving on a slope/incline do not turn or drive diagonally.
- Never drive over power cables that are lying on the ground.
These could become damaged or could be damaged and therefore cause damage to the KS Robot.

Procedure:

- If necessary, bring the tiller head into working position.
- Set the driving speed on the switch (3).
- Regulate the direction of travel with the direction of travel button (1).

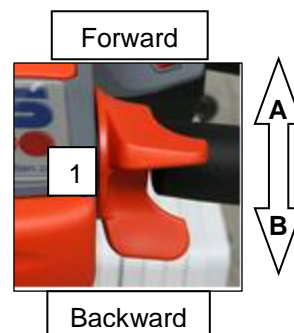
6.7.1 Selecting the direction of travel

Forward travel:

To move forward, press the direction button (1) with a light push of the thumb in the forward direction (A). The KS Robot now accelerates forward depending on the pressure applied to the direction switch.

Backward travel:

To move backward, press the direction button (1) with a light push of the thumb in the backward direction (B). The KS Robot now accelerates backward depending on the pressure applied to the direction switch.



6.7.2 Safety switch

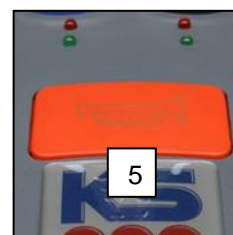
A safety switch (2) is located at the end of the tiller head control unit to protect the driver from getting caught between an object and the KS Robot.

As soon as pressure is detected on the switch, the KS Robot stops immediately and moves forward a little.



6.7.3 Horn

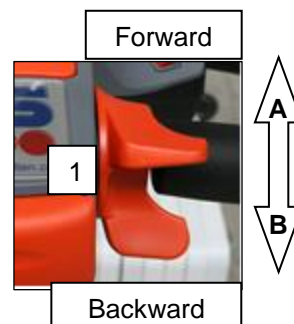
The horn (5) must be blown on poorly visible road sections and junctions or in cases of immediate danger.



6.7.4 Auto stop function

In order to prevent unnecessary discharging of the batteries, the travel drive switches off automatically after approx. 1 minute (becomes inactive).

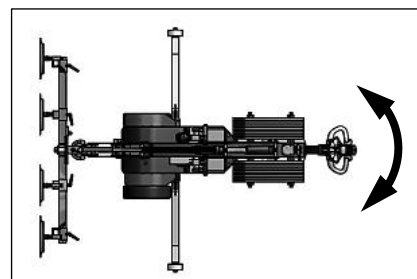
To continue driving, press the drive switch 1x short "Forward" (press in direction A).



6.8 Steering

Procedure:

The KS Robot is steered by swiveling the tiller head to the left or right in the desired direction.



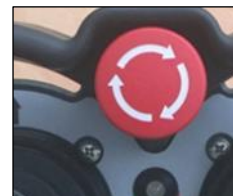
6.9 Emergency stop switch

There is an emergency stop button on the wired remote control unit. This must be pulled out during normal operation.

In case of emergency, press the switch to interrupt the power supply of the vehicle and bring the vehicle to a standstill.



The switch on the remote control units of the KS Robot with hydraulic control is a stop button that switches off all cylinder movements when actuated.



To bring the vehicle to a standstill in an emergency, press the emergency stop button on the vehicle for the models KS Robot 1000/1400.

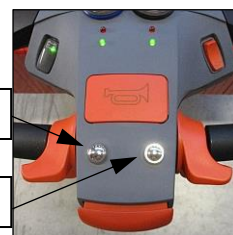


6.10 Repositioning the counterweights (KS Robot 1400)

To achieve the max. load, it is necessary to reposition the counterweights all the way to the rear. The counterweights can be moved forward or backward from the tiller head control unit for this purpose.

Weights forward

Weights back



6.11 Operating the boom

The telescopic boom is controlled by the remote control unit.



Caution!

The remote control unit must always remain in the possession of the KS Robot operator.

If the KS Robot is left unattended for a longer period of time, the remote control unit should be switched off and safely stowed so that it is not accessible to unauthorized persons.



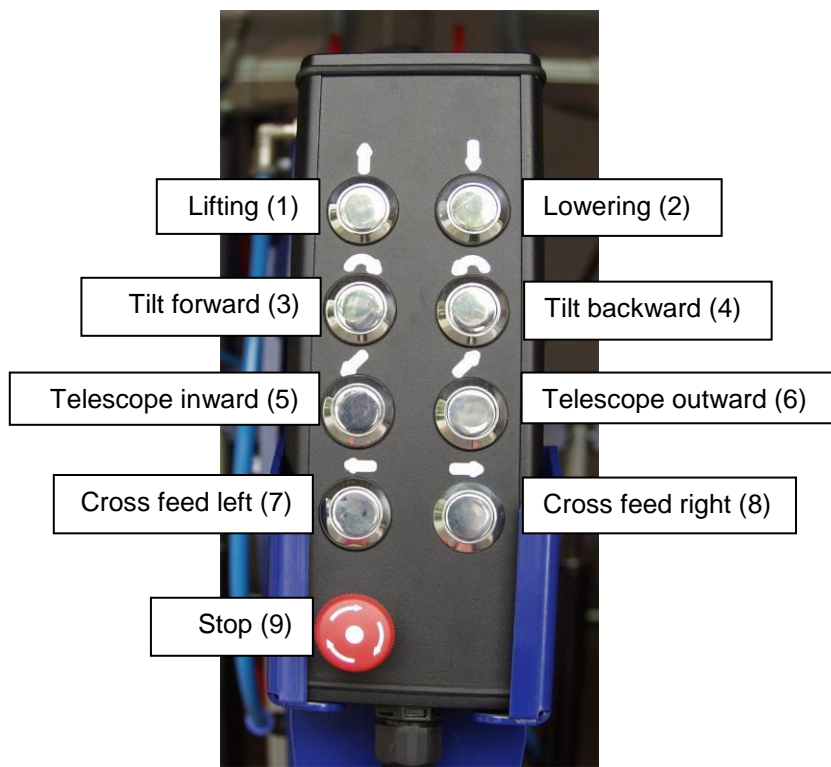
Warning!

Before extending the cylinders, make sure there are no objects in the movement range of the cylinders.

6.11.1 Wired remote control unit (KS Robot 280/400/600)

Standard wired remote control unit with 8 functions

Boom lifting/lowering	
1	Lifting
2	Lowering
Tilt boom	
3	Tilt forward
4	Tilt backward
Telescope the boom	
5	Telescope inward
6	Telescope outward
Cross feed	
7	Axis moves to the left
8	Axis moves to the right
Stop	
9	Emergency-stop

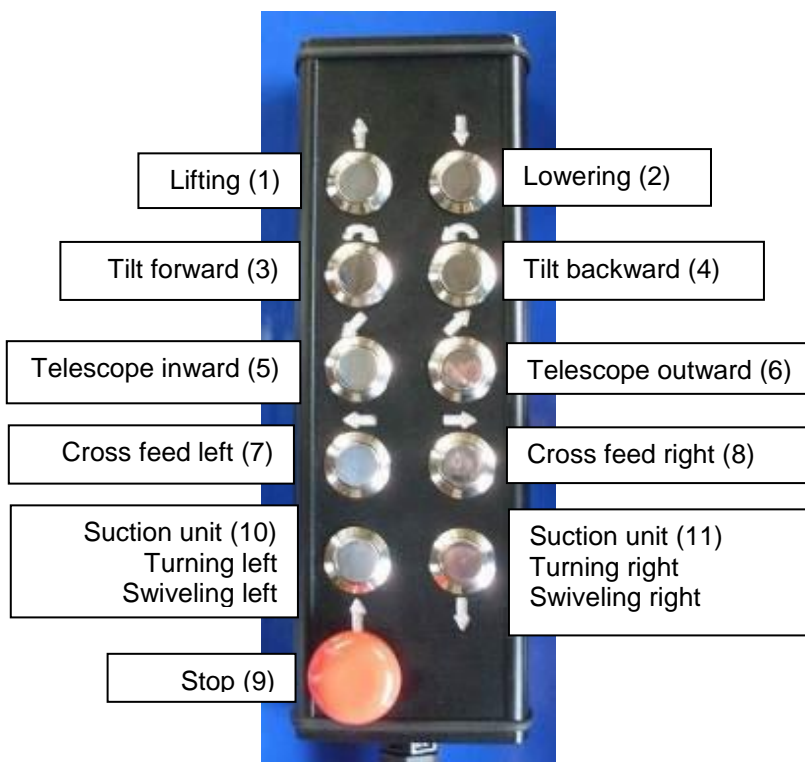


Wired remote control unit with 10 functions

In this case, the KS Robot is equipped with electrical turning of the vacuum suction system or with electrical swiveling (90° sideways) in addition to the standard equipment.

For technical reasons, only one of the two functions (either turning or lateral swiveling of the vacuum suction system) is possible.

Boom lifting/lowering	
1	Lifting
2	Lowering
Tilt boom	
3	Tilt forward
4	Tilt backward
Telescope the boom	
5	Telescope inward
6	Telescope outward
Cross feed	
7	Axis moves to the left
8	Axis moves to the right
Stop	
9	Emergency-stop
Turning the suction unit or swiveling the suction unit depending on the equipment	
10	Electrically to the left
11	Electrically to the right



6.11.2 Radio remote control unit

Radio remote control units are also available in addition to the wired remote control unit.







Warning!

The control commands are also transmitted outside the range of vision:

- Switch off the transmitter when not in use and remove the battery.
- Safety devices may not be removed or altered.

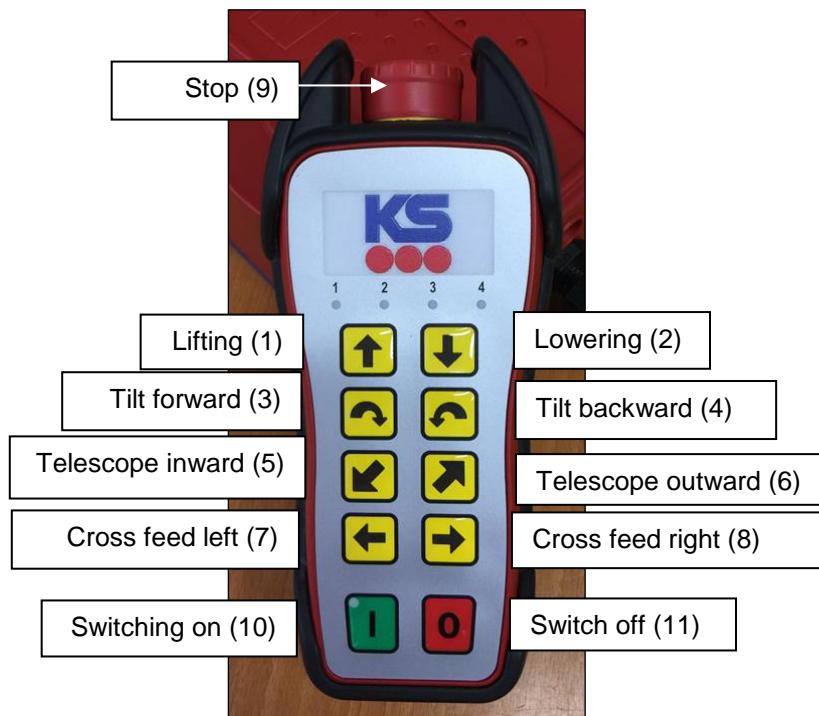
Summary

Types	Operation	Models	Telescope
<div>1</div> 	8 Functions	Indoor: KS Robot 280 / 400 / 600 Offroad: KS Robot 350 / 400 / 600 Of-froad	Electrical
<div>2</div> 	10 Functions (for devices with electrical turning and electrical swiveling)	Indoor: KS Robot 280 / 400 / 600 Offroad: KS Robot 350 / 400 / 600 Of-froad and with all devices for the American market	
<div>3</div> 	8 Functions	KS Robot 1000 without HDS module KS Robot 800 Offroad without HDS module	Hydraulic
<div>4</div> 	10 Functions (for devices with electrical turning and electrical swiveling)	Indoor: KS Robot 1000 / 1400 With HDS module Offroad: KS Robot 800 Offroad With HDS module	

Radio remote control unit type 1 with 8 functions

As an option the **KS Robot** can be equipped with a wireless remote control unit (instead of a wired remote control unit as usual). For all KS Robots with electrical telescope (KS Robot 280/400/600).

Boom lifting/lowering	
1	Lifting
2	Lowering
Tilt boom	
3	Tilt forward
4	Tilt backward
Telescope the boom	
5	Telescope inward
6	Telescope outward
Cross feed	
7	Axis moves to the left
8	Axis moves to the right
Stop	
9	Emergency-stop
Button functions	
10	Electrically to the left
11	Electrically to the right



Switching on the transmitter:

Press and hold down the "I" button (10, green) for two seconds.

Switching off the transmitter:

Press and hold down the "O" button (11, red) for one second.

Switching the button illumination on and off:

Switch on the transmitter.

If you press and hold down the green button (10) for 5 seconds the button illumination will be activated.

If you press the green button (10) again for 5 seconds, the button illumination will be deactivated.

The remote control unit has a range protection device. The receiver constantly checks the radio path to see if the transmitter's signal is still there. If not, the system automatically switches into the safety mode.

Recharge the remote control unit daily if you are using it every day.

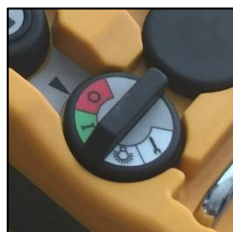
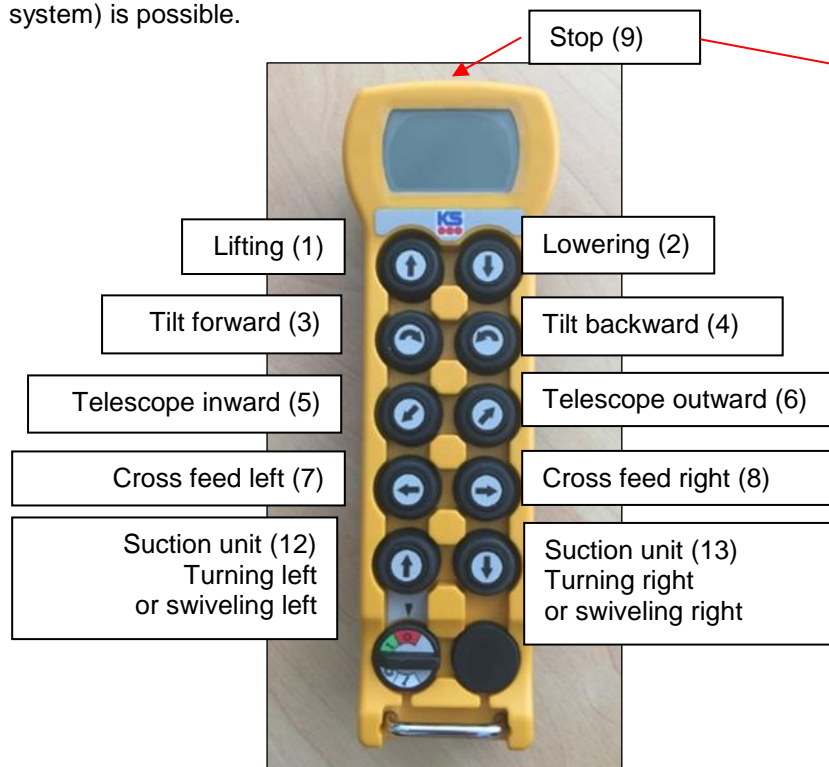
See also the separate operating manual for the remote control unit in the appendix.

Radio remote control unit type 2 with 10 functions

For all KS Robots with electrical telescope.

The **KS Robot** is equipped with a wireless remote control unit (instead of a wired remote control unit as usual). This remote control unit is used on the models KS Robot 280 - 600 with electrical turning of the vacuum suction system or electrical lateral swiveling of the vacuum suction system.

For technical reasons, only one of the two functions (either turning or lateral swiveling of the vacuum suction system) is possible.



Switch on (10) green
Switch off (11) red

Boom lifting/lowering	
1	Lifting
2	Lowering
Tilt boom	
3	Tilt forward
4	Tilt backward
Telescope the boom	
5	Telescope inward
6	Telescope outward
Cross feed	
7	left
8	right
Stop	
9	Emergency-stop
Button functions	
10	Switch on
11	Switch off
Turn suction unit or Swivel suction unit depending on the equipment	
12	Electrically to the left
13	Electrically to the right

Radio remote control unit type 2 with 10 functions

Switching on the transmitter:

Make sure the stop button on the transmitter is not pressed.
Turn the rotary switch from the "0" (11-red) to the "I" (10-green) position.
A short beep will sound, and the display will show the startup screen.

Switching off the transmitter:

Turn the rotary switch from the "I" (10-green) to the "I" (11-red) position.

Stop button:

The radio remote control unit is equipped with a stop button.
The stop signal is transmitted as a digital command and the transmitter also switches off as soon as the stop button is pressed.

The stop button is the most important safety device of the radio remote control unit.
It ensures that the operator can stop the machine immediately during operation. As a safety-related component, the stop button is not intended to switch the transmitter on or off but should only be operated during the functional test or in emergency situations.

Radio remote control unit type 3 with 8 functions

For all KS Robots with **hydraulic** Telescope and **without** HDS module.
The radio remote control unit type 3 with 8 functions is part of the standard equipment in these models.

Controls and accessories



1. Stop button
2. Power indicator
3. Control joystick
4. Toggle switch
5. Pushbutton - vacuum off
6. Pushbutton - vacuum on
7. Pushbutton - vacuum off
8. Key switch on / off (black)
9. Green start button
10. Battery charger and battery

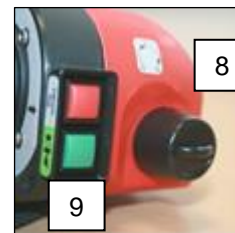


Note!

A red programming key is provided for controlling the programming mode.
This is for service purposes only.

Radio remote control unit on / off

- The transmitter is put into operation with the key switch (8).
- After that you will hear 2 short beeps.
- The green LED in the operating display (2) then flashes.
- Now press the green start button (9).



Applying/releasing suction to and from the load

The buttons for applying suction or releasing the load are located on the left and right side of the remote control unit.

- Pressing the green button (6) on the left of the remote control unit will create the vacuum (application of suction).
- By simultaneously pressing the red buttons (5 7), on the left and right of the remote control unit, the vacuum is released.



left

right

Radio remote control unit type 3 with 8 functions

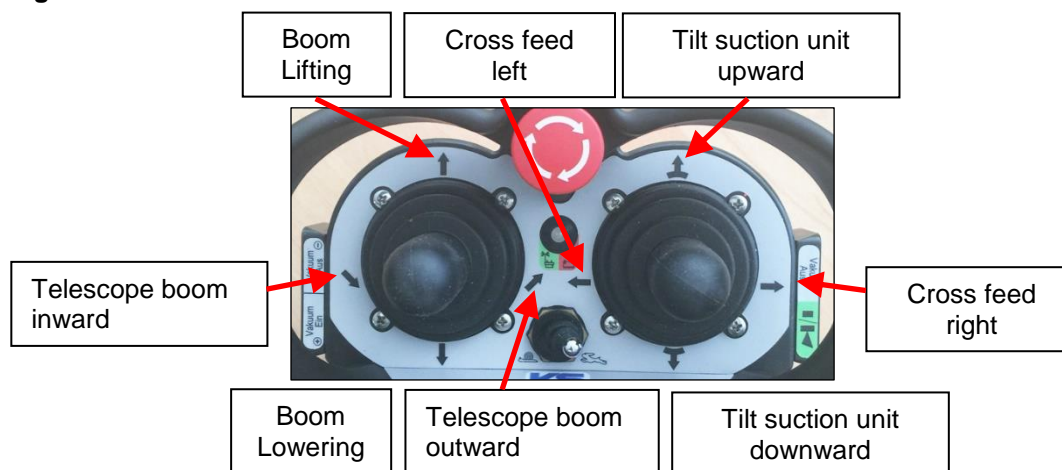
Stop button

Please check the function of the stop button (1) after each switch on.

- When you switch on the transmitter: LED flashes (2)
- When you press the stop button: LED flashes faster



Operating functions



Radio remote control unit type 4 with 10 functions

For all KS Robots with **hydraulic** Telescope (KS Robot 1000/1400) and equipment **with** HDS module for hydraulic turning, swiveling and tilting of the vacuum suction system.
The radio remote control unit type 4 with 10 functions is part of the standard equipment in these models.

Controls and accessories



1. Stop button
2. Power indicator
3. Control joystick
4. Toggle switch
5. Pushbutton - vacuum off
6. Pushbutton - vacuum on
7. Pushbutton - vacuum off
8. Key switch on / off (red or black)
9. Green start button
10. Battery charger and battery



Note!

A red programming key is provided for controlling the programming mode.
This is for service purposes only.

Radio remote control unit type 4 with 10 functions

Switching on / off the radio remote control unit

- The transmitter is put into operation with the key switch (8).
- After that you will hear 2 short beeps.
- The green LED in the operating display (2) then flashes.
- Now press the green start button (9).



Applying/releasing suction to and from the load

The buttons for applying suction or releasing the load are located on the left and right side of the remote control unit.

- Pressing the green button (6) on the left of the remote control unit will create the vacuum (application of suction).
- By simultaneously pressing the red buttons (5 7), on the left and right of the remote control unit, the vacuum is released.



left

right

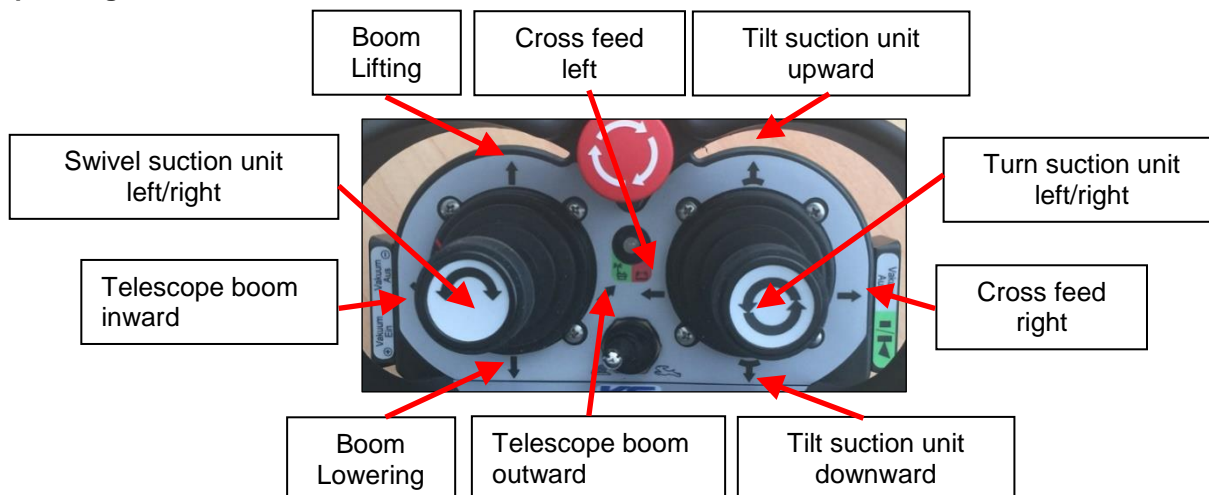
Stop button

Please check the function of the stop button (1) after each switch on.

- When you switch on the transmitter: LED flashes (2)
- When you press the stop button: LED flashes faster



Operating functions



6.11.3 Manual mode for operating the boom



Note!

Only if the radio remote control unit type 3 and type 4 fails.

If the radio remote control unit fails, it is still possible to operate the boom in the manual mode.

- First, turn the key switch for the "manual mode cylinder" to the "On" position.

The hydraulic unit is now switched on.

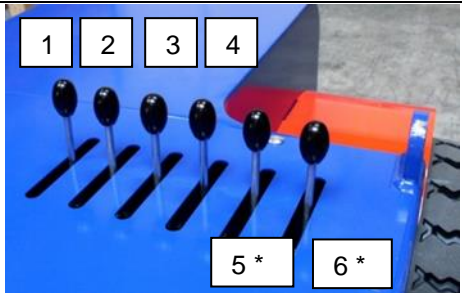


Caution!

The manual mode is intended only for emergency operation. To prevent overheating of the hydraulic unit, the unit shuts off automatically in manual mode after one minute. If you wish to continue working, switch the key switch off and then back on again.

Now you can manually use the shift levers as described below. They assume the functions of the remote control unit.

For most hydraulic KS Robots, the shift levers are freely accessible on the chassis, others are protected under the hood. In this case, you must first unscrew the protective cover.

Pos. 1	Boom lifting / lowering	
Pos. 2	Boom telescoping - retracting / extending	
Pos. 3	Tilting the vacuum system - upward / downward	
Pos. 4	Cross feed - axis movement right / left	
Pos. 5 *	* Suction unit swiveling - right / left	
Pos. 6 *	* Suction unit turning - right / left	

* Optional
only when equipped with HDS module (hydraulic turning and swivel head)

6.12 Operating the vacuum suction unit



Warning!

- Observe the safety instructions in chapter 2.
- Working with the machine is dangerous, if the various safety devices such as the pressure gauge and the signal alarm are defective.
- The lifting of workpieces is prohibited until the two light signals on the vacuum display go out.
- Damp and sticky workpieces may not be lifted with the vacuum discs.
- Make sure that the air hoses are not bent when turning and tilting the suction system.
- Do not transport loads over persons or machines.
Cordon off a wide area under the suspended cargo.
- If the vacuum drops below -0.62 bar in both or in just one vacuum circuit when transporting a load, the signal tone will sound off. Then you should try to remove the cargo as quickly as possible so that it does not fall.
- The device may **NEVER** be put into operation with only **one** functioning vacuum circuit.
- Make sure the load is distributed evenly. Always center the application of suction on the cargo.
Improper suction of loads can result in serious accidents.

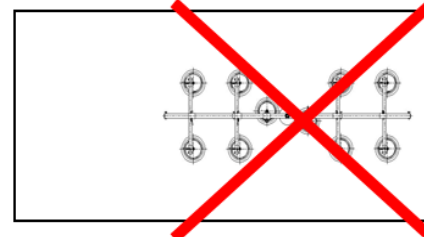
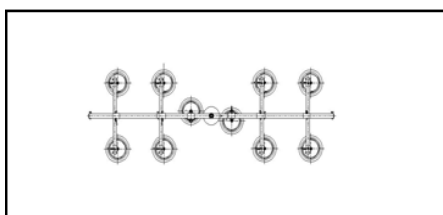
6.12.1 Picking up the load

- Carefully position the vacuum suction unit in a suitable position on the cargo (e.g. window pane).

Make sure that all suction discs lie flat on the smooth, clean surface so that the suction discs can seal completely.



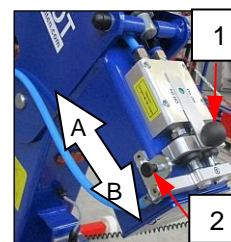
- Always apply suction to the cargo symmetrically / centrally.



6.12.2 Vacuum suction / release (manual)

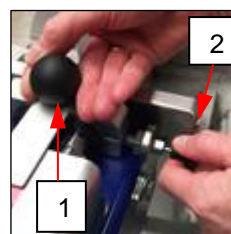
- The vacuum suction system is activated by pushing the vacuum switch (1) forward in direction (A).
The adjusting screw (2) engages behind the switch.

The vacuum pumps start, and a vacuum builds up.



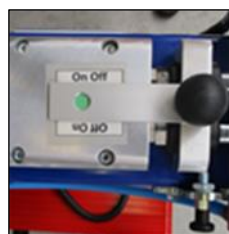
For safety reasons the release of the vacuum takes place in two-hand operation.

- The vacuum is released by pulling the adjusting screw (2) and by simultaneously pushing back the vacuum switch (1) in direction (B).

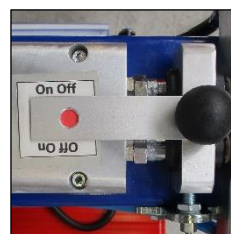


Caution!

Check the position of the vacuum switch before starting work.



Vacuum on



Vacuum off

6.12.3 Vacuum suction / release (radio remote control unit)

The buttons for applying vacuum and releasing the vacuum (A, B, C) are located on the left and right side of the remote control unit.



Type 3 for hydraulic KS Robots without HDS module

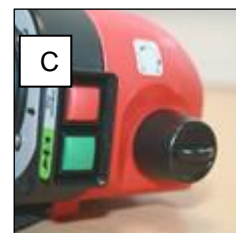


Type 4 for hydraulic KS Robots with HDS module

- The vacuum suction system is activated by pressing the button (A).
The vacuum pumps start, and a vacuum builds up.
- The vacuum is released by pressing the two red buttons (B and C) at the same time.
Keep the buttons pressed until the pumps switch off.



left



right

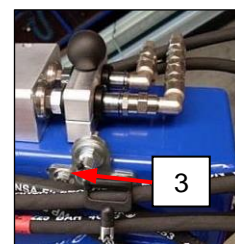
6.12.4 Manual operation in case of failure of the remote control unit *



Warning!
Only operate in an emergency

In addition to the radio remote control unit, a manually operated vacuum valve can be installed as an option. This is secured with a lock and may only be operated in an emergency.

* Optional

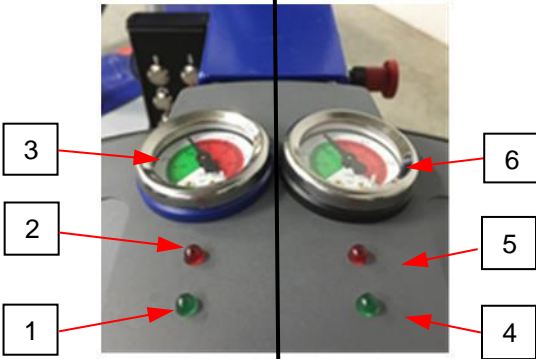


6.12.5 Vacuum indicators

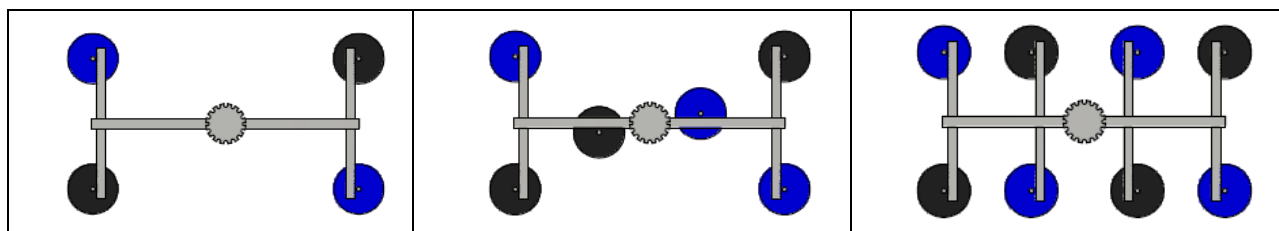
The KS Robot is equipped with a dual-circuit vacuum system. The two circuits are marked in color. Furthermore, different visual and acoustic control options are available.

Marking of the vacuum circuits:

Vacuum circuit 1 = Blue hose lines
Vacuum circuit 2 = Black hose lines

Vacuum circuit function indicators:			
Vacuum circuit 1		Vacuum circuit 1	Vacuum circuit 2
Pos. 1	Switched on		
Pos. 2	Lights up during vacuum loss and during vacuum build-up		
Pos. 3	Vacuum indicator		
Vacuum circuit 2 (safety circuit)			
Pos. 4	Switched on		
Pos. 5	Lights up during vacuum loss and during vacuum build-up		
Pos. 6	Vacuum indicator		

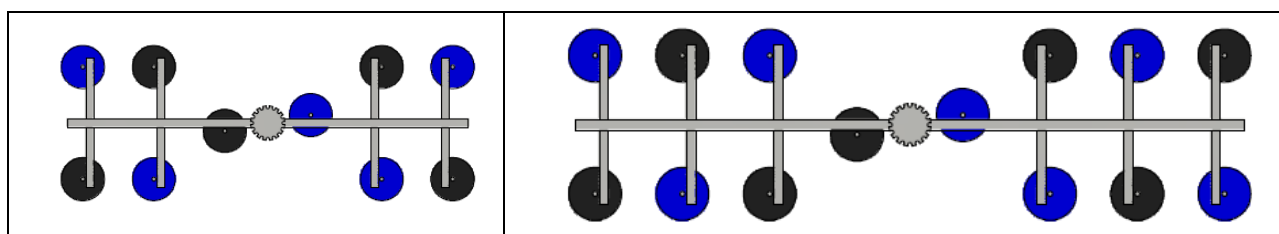
The vacuum suction discs of the suction unit are arranged evenly and crosswise in the two-circuit system.



4-piece suction unit

6-piece suction unit

8-piece suction unit



10-piece suction unit

14-piece suction unit



Warning!

If the vacuum is lost, a warning signal sounds, LEDs light up red and the pressure gauge hands are in the red area.

- No loads may be picked up or transported.
- Any picked up loads must be lowered and set down immediately.



Caution!

Vacuum control:

The negative pressure of the two vacuum circuits is monitored by pressure switches. They switch the vacuum pumps on and off independently of each other. If the vacuum in one of the two circuits falls below -0.62 bar, a beep sounds and the vacuum pump or both vacuum pumps switch on. Vacuum should be restored within a short period.

Control gauge:

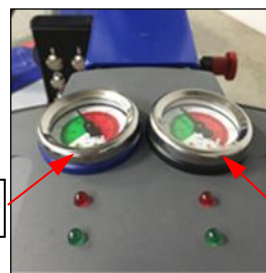
The current vacuum of the two vacuum circuits is displayed on the control gauges.

The vacuum circuit assignment is marked in color.

For transport readiness, the vacuum gauge must be between -0.6 and -0.7 bar (green field).

1 blue

2 black



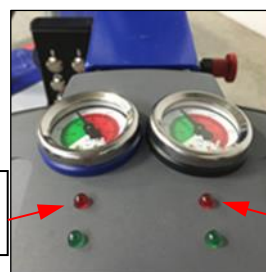
Warning devices:

Furthermore, visual and audible warning devices are available, which indicate if the vacuum is too low.

If vacuum is lost, a warning signal sounds and the LEDs light up red.

Light emitting diode

Light emitting diode



Signal light indicator (optional equipment):

The KS Robot can be equipped with a signal light as an option. This usually indicates the operating status. Depending on the programming, the signal lights assumes different functions.

Green	Green - Yellow	Yellow - Red	Red
The KS Robot is switched on	Vacuum build up	Vacuum loss	Emergency stop is activated
Special version:			
Green	Yellow	Red	
	Lights up shortly before overload	Emergency stop is activated	
		Overload - KS Robot switches off (only the telescopic arm can still retract)	
When the boom is lowered, the indicator lights up			Green Yellow



6.12.6 Lateral swiveling of the vacuum suction unit



Caution!

Make sure that the air hoses are not bent when swiveling the suction system.

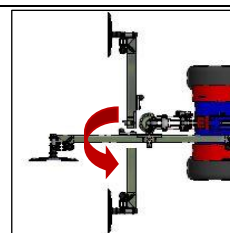


Danger!

Danger of tipping over:

- The load-bearing capacity may be limited if the load is swiveled sideways ($\pm 90^\circ$) (see "load diagram").
- Only swivel a suction unit when in the vertical position (never swivel the unit when tilted).

The vacuum suction unit can be swiveled with the load up to 90° to the side of the unit.



Standard version: manual lateral swiveling

- To swivel the suction unit, first open the latch bolt (1) on the latching system.
- Swivel the suction unit by hand into the desired position.
- Then secure the latch bolt back in place to block the movement on the latching system.

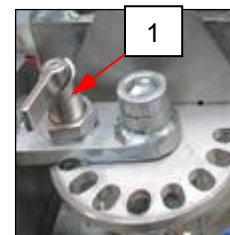


Fig. can vary depending on the model



When swiveling the suction unit, be sure to note the position of the latch bolt for swiveling the suction unit!
The latch bolt should always be located opposite the direction in which it is swiveled.

Optional version: electrical swiveling



Danger!

Danger of tipping over:

- The increased weight of the suction unit reduces the max. load of the overall device. Please observe the corresponding load diagram.
- Only swivel a suction unit when in the vertical position (never swivel the unit when tilted).

The KS Robot can be optionally equipped with an electrical swivel unit, which allows continuously variable sideways swiveling of the suction unit by the remote control unit (see chapter "Remote control units").



Fig. can vary depending on the model

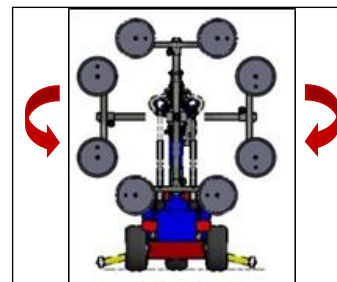
6.12.7 Turning the vacuum suction unit



Caution!

- Make sure that the air hoses are not bent when turning the suction system.
- Only turn a suction unit when in the vertical position (never turn the unit when tilted).

The suction unit can be turned manually, or optionally electrically, up to 180° to each side.



Standard version: manual turning

- Open the latch bolt (1) and turn the suction unit into the desired position.

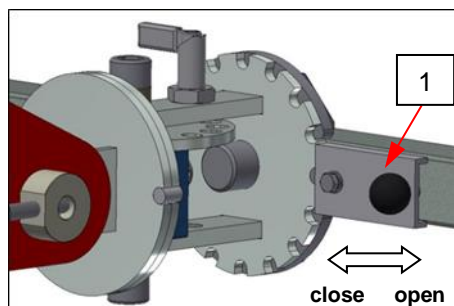


Fig. can vary depending on the model

Optional version: electrical turning



Danger!

Danger of tipping over:

- The increased weight of the suction unit reduces the max. load of the overall device. Please observe the corresponding load diagram.
- Only turn a suction unit when in the vertical position (never turn the unit when tilted).

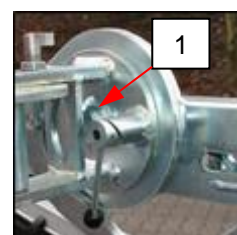
The KS Robot can be optionally equipped with an electrical turning unit. The rotary cylinder allows turning via the remote control unit up to 90° to each side (see chapter "Remote control units").



Fig. can vary depending on the model

The suction system can also be turned manually. For this purpose, a latching system is provided for turning in 45° increments.

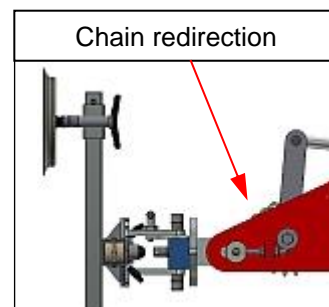
- Open the latch bolt (1) and turn the suction unit into the desired position.



6.13 Operation rotary articulated joint

Chain redirection

The suction unit on the KS Robot 280 is tilted through chain redirection.

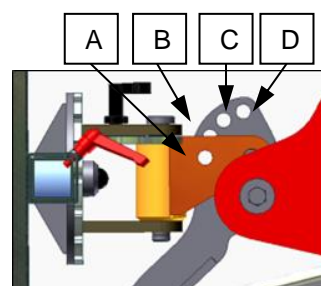


Rotating joint - standard

The models KS Robot 400 / 600 / 1000 are equipped with an articulated joint including adjustable latching mechanism in order to enable overhead installation and the removal of loads on pallets.

4 latching positions are possible on the tilting joint.

Position A	For pick-up from the floor
Position B	Working in standard mode
Position C	
Position D	For overhead installation



Warning!

- After setting the latching position, always secure with a bolt and spring pin!
- Never adjust the tilting joint when carrying a load!



Caution!

Load-bearing capacity for overhead installation: Max. 200 kg!

Special rotary articulated joint

The models KS Robot 400 / 600 can be optionally equipped with a special rotary articulated joint (SDKG joint).

In addition to overhead mounting, the special rotary articulated joint allows for ground-level pick-up and more projection in front of the wheels.

With the special rotary articulated joint it is possible to move the suction unit into an overhead position without manual adjustment of the position on the ground.

This function is controlled via the remote control unit.



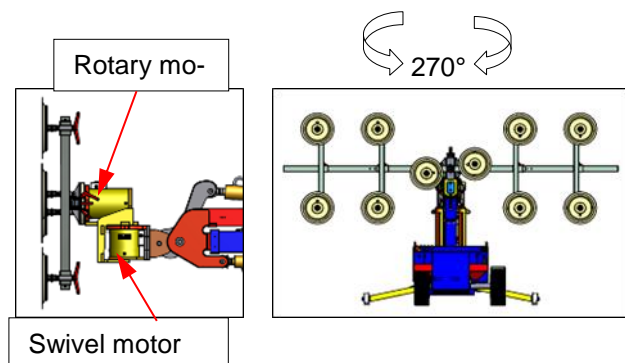
HDS module KS Robot 1400 (option on the KS Robot 1000)

The model KS Robot 1400 has a hydraulic rotary swivel module (HDS module) as standard equipment. This is optional for the model KS Robot 1000.

The turning and lateral swiveling of the suction unit is controlled by two hydraulic motors.

This allows the suction unit to be turned by up to 270° and swiveled by 90° to the side.

The functions are controlled via the radio remote control unit.



6.14 Operation telescope extension

The KS Robot 400 and 600 models can optionally be equipped with a manual or electrical double telescopic lift. This allows additional telescoping-out and therefore further projection. The telescopic extension is only possible in combination with the special rotary articulated joint (SDKG).



Caution!

Load-bearing capacity for overhead installation: Max. 200 kg!

6.14.1 Mechanical telescopic extension (KS Robot 400/600)

The manual double telescope is manually moved via an adjustable latching mechanism (holes with linch pin). The telescopic arm can be adjusted in 5 positions, with an extension of 225 mm per position.



Caution!

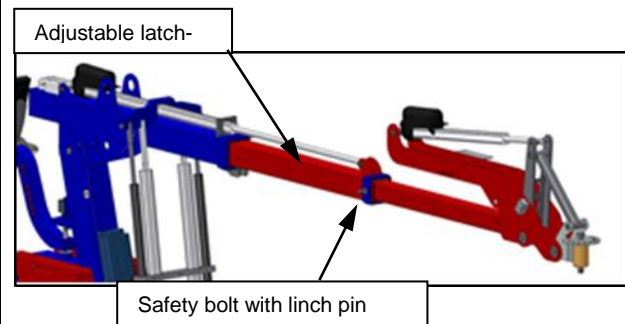
Never adjust when suction is applied to a load!
After adjusting, always secure with a bolt and a linch pin



Warning!

Always pay attention to the payloads!
(Payloads with extended telescopic arm)

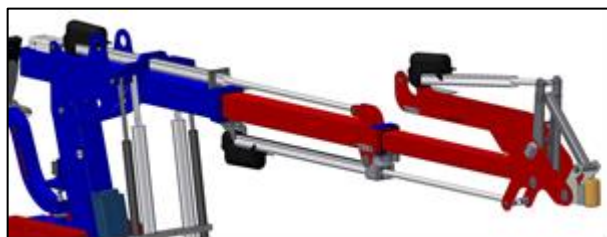
	Robot 400	Robot 600
Pos. 1	220 kg	220 kg
Pos. 2	180 kg	180 kg
Pos. 3	160 kg	160 kg
Pos. 4	140 kg	130 kg
Pos. 5	100 kg	100 kg
Standard design		



6.14.2 Electrical / hydraulic telescopic extension

When equipped with an electrical or hydraulic telescopic extension, the telescopic arm can be infinitely telescoped inward and outward by the remote control unit.

Payloads see load diagram (chapter 11)



6.15 Finishing work

After finishing work the KS Robot must be parked and properly secured.

- **NEVER** park the KS Robot when loaded and unattended.
- **NEVER** park the KS Robot on slopes or with the handlebar pushed in!
- Only park the KS Robot in a safe place, i.e. on a firm flat horizontal surface without obstacles or traffic.
- Retract the telescopic arm and put it into the parking position.
- Switch off the KS Robot via the main switch and secure it against startup by unauthorized persons.



Caution!

- Never switch off the KS Robot when it has a load, or as in Fig. 2, with the suction unit lowered to the ground! **Always switch off as in Figure 1!**

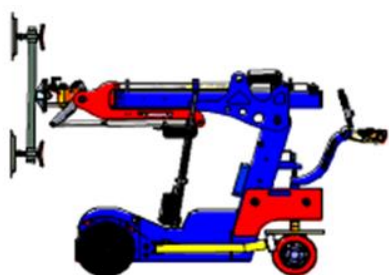


Figure 1

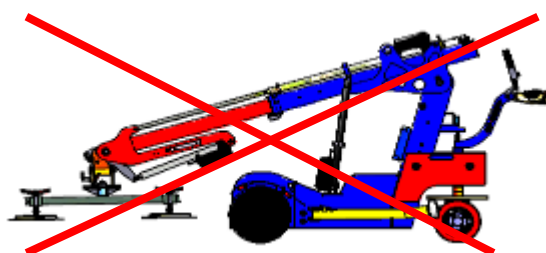


Figure 2

7 Maintenance

7.1 General Information

A distinction must be made between maintenance work which may only be carried out by authorized dealers of K. Schulten GmbH & Co. KG for the preservation of warranty claims and maintenance work which must be carried out by the operating company or its authorized representative to maintain the proper operating condition of the device. The latter includes regular cleaning and performance of the most frequent maintenance work on the KS Robot.

Periodic maintenance by the operating company or its representative is a prerequisite for the preservation of warranty claims for damage to parts that require service and maintenance.

The operating company must ensure that:

- All performed maintenance work is recorded.
- The required inspections are carried out by an authorized specialist workshop and documented in writing.
- The annual UVV inspection is carried out by an expert and documented in the inspection book as well as with the inspection sticker on the KS Robot.

Otherwise, all warranty claims will be void.

The operating company or its authorized representative may only perform the maintenance tasks listed in this chapter. Otherwise, all warranty and warranty claims expire. If you have questions, please contact K. Schulten GmbH & Co. KG for further information.

No alterations, attachments or modification to the KS Robot may be made which could impair the safety of the device without the permission of K. Schulten GmbH & Co. KG! This also applies to the installation, adjustment and alteration of the safety devices and valves, and in particular to welding on load-bearing components.

Replacement parts must meet the technical requirements specified by the K. Schulten GmbH & Co. KG. This is always guaranteed with original spare parts.

Before starting work, the safety rules listed in chapter 2.0 Safety must be read, understood and implemented.

Trouble-free operation of the KS Robot is only guaranteed if the following information is observed and followed during regular maintenance work.

7.2 Basic information



Note!

- A UVV inspection must be carried out at least once a year, as well as after every safety-related change or repair.
- Service and periodic maintenance work may only be carried out by specially instructed and authorized persons who are informed of potential dangers.
- Before carrying out any maintenance work check again for defects that were determined during the last maintenance interval (see maintenance records at the end of this chapter).
- For repairs and spare parts orders all of the identification data must be provided (see entry page at the beginning of this manual).

7.3 Maintenance plan

The maintenance plan is listed below. It will help you to plan and carry out regular maintenance. Each inspection due date is also listed.

Pos	Task	Number of operating hours					
		Daily	After the first month	Quarterly	Semiannually	Annually	Every 500 operating hours
	Character explanation: O = Check Y = Clean X = Replace						
1	General condition	o	o	o	o	o	o
2	Telescopic boom						
	Check profiles for cracks, deformation <u>Free movement</u> of guides, joints, telescope Wear on guides, slide rails	o	o	o	o	o	o
3	Chassis						
	Check fastening screws for cracks in load-bearing parts. Check tires for cracks	o	o	o	o	o	o
4	Support						
	Check the side supports (deformation corrosion, cracks, welds, support wheel)	o	o	o	o	o	o
5	Control unit						
	Check motor brake, check the operating lever, check the operating label for legibility	o	o	o	o	o	o
6	Electronic equipment						
	Check condition of connectors and fuses	o	o	o	o	o	o
	Check the battery and cable connections					o	
	Check the remote control unit (emergency stop) and connection cable	o	o	o	o	o	o
	Battery charger	o	o	o	o	o	o

7	Hydraulics (KS Robot 1000/1400)						
	Check the oil level (when warm, with retracted cylinders)		o	o	o	o	
	Oil change with warm hydraulic oil		x				x
	Hydraulic hoses:						
	Brittleness, porosity, leaks, attachment, abrasions	o	o	o	o	o	o
	Cylinder:						
	Check the surface of the piston rod				o	o	o
	Check the tightness of the cuff, mechanical attachment, pipe and hose connections	o					
8	Vacuum system						
	Check condition of suction discs and lines	o	o	o	o	o	o
	Check pumps and pressure gauge for proper function						

7.4 UVV Inspection according to DGUV principle 309-001

[German Statutory Accident Insurance]

7.4.1 Preliminary remarks

According to the accident prevention regulations "Cranes" (DGUV regulation 52), cranes must be subjected to regular inspections at intervals not to exceed one year as well as special inspections after design changes and after major repairs to supporting parts; these inspections must be carried out by expert personnel (§26 paragraphs 1 and 2). Significant changes are, for example, increasing the load-bearing capacity and changes in the design.

7.4.2 Inspections by the expert for cranes

(according to BGG [Occupational Health and Safety Regulations] 924)

Expert persons are persons who, due to their professional training and experience, have sufficient knowledge in the field of cranes and are familiar with the relevant and official occupational health and safety regulations, accident prevention regulations, guidelines and generally accepted rules of technology which allow them to assess the safe working condition of cranes.

7.4.3 Introductions of the inspections

The inspections must be planned by the operating company of the crane. It is the responsibility of the operating company to assign expert personnel to carry out the inspection. The operating company must ensure that the selected persons meet the aforementioned requirements. A special responsibility is incumbent on the operating company if he assigns persons working in his own company as expert personnel. Upon request, the inspections are carried out by us.

7.4.4 Inspection results

The results of the inspections according to DGUV regulation 52 §26 must be recorded in writing and retained until the next inspection.

Test results to the periodic testing for attachment to the inspection log				KS Robot			
Customer: _____				Date manufactured: _____			
Type No.: _____				Lifting capacity: _____			
Completed				Completed			
Description	*	on	by	Description	*	on	by
1. Signs				19. Remote control unit			
2. Welding seams				20. Emergency-stop			
3. Bolted connections				21. Switchbox			
4. Lifting cylinder				22. Brake, holder tests			
5. Telescopic cylinder				22.1 Without weight			
6. Tilt cylinder				22.2 With weight			
7. Cross feed cylinder				23. Drive			
8. Chain				24. Vacuum pumps			
9. Chain wheel, large				25. Valves			
10. Chain wheel, small				26. Pressure switch			
11. Articulated joint				27. Pressure indicator			
12. Steering				28. Filter block			
13. Overload protection				29. Suction disc			
14. Batteries				30. Vacuum hoses			
15. Fuses				31. Clamping sleeve vacuum valve			
16. 24V socket				32. Locking in place suction unit			
17. Battery charger				33. Support wheels			
18. Horn				34. Wheels			
				35. Replacement fuses			
Remarks on the inspection findings:							
Continued operation approved							
Acknowledged:				Defects eliminated:		The expert:	
Date:				Date:		Date:	
For the operating company				For the operating company		Signature	
Next inspection:							
Explanations regarding the inspection findings in column *:							
1. No visible defects				' 6 Urgent maintenance required			
2. Readjustment/tightening				'7. Ineffective			
2a. Secure				'8. Incomplete			
3 Wear, still OK, please monitor				'9. Not present			
4. Defective				10. Detailed examination necessary			
5. Wear, replacement recommended				11. Not inspected			

7.5 Errors and troubleshooting

The following table lists the most common causes of errors.
Technical defects of assemblies were not taken into account.


Note!

- If you cannot locate or repair faults or errors that occur on your KS Robot then contact our service personnel immediately!
- Repair and maintenance work may only be carried out by qualified personnel.

Fault	Cause	Remedy
KS Robot does not drive	Emergency stop button pressed Main switch not switched on Batteries are empty Fuses defective	Pull out the emergency stop button Switch-on the main switch Charge batteries Check/replace fuses
Lifting cylinders do not extend.	Overload switch is activated or defective Fuses defective Reference run not executed	Retract telescopic cylinder Check/replace fuses Run reference run
Cross feed does not move	Fuses defective	Check/replace fuses
Tilt cylinder does not move	Fuses defective	Check/replace fuses
Telescopic cylinder does not retract or extend	Fuses defective Overload switch is activated or defective	Check/replace fuses Retract telescopic cylinder
Vacuum pumps do not start	Fuses defective Pump defective	Check/replace fuses Have pumps checked by a qualified electrician, replace if necessary
Vacuum is not built up	Pump defective Suction discs are not applied Suction disc seal defective Control vacuum gauge defective Vacuum hose defective	Have pumps checked by a qualified electrician, replace if necessary Reposition suction discs Replace suction disc Replace vacuum meter Replace hose
Vacuum drops sharply	Pump defective Suction discs are not applied Suction disc seal defective Control vacuum gauge defective Vacuum hose defective Vacuum filter clogged	Have pumps checked by a qualified electrician, replace if necessary Reposition suction discs Replace suction disc Replace vacuum meter Replace hose Replace vacuum filter
Remote control unit does not respond	Emergency stop button pressed Battery discharged Range exceeded	Pull out the emergency stop button Charge the battery Get closer to the machine

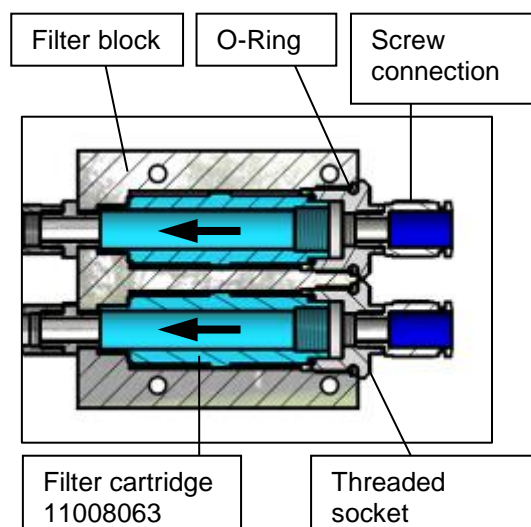
7.6 Replacing the vacuum filter

The filter cartridges in the vacuum switching unit may be clogged if the pressure drops.

If necessary, replace the filter cartridges.

Be careful not to damage the O-rings and gaskets during disassembly or assembly of the vacuum circuit unit.

When installing the filter cartridges, check the flow direction indicated on the cartridge.



7.7 Battery maintenance

7.7.1 Safety regulations

The following safety rules must be observed for maintenance, charging and changing the battery:



Warning!

- Maintenance work on the battery should only be carried out by qualified personnel.
- Follow the operating manual for the charging station or charger and battery.

Damaged cables may cause a short circuit.

- Be careful not to damage the battery cables when removing and installing the battery. (The battery cable may not be pinched when closing the battery door/cover.)

Risk of crushing and shearing!

- Always wear safety shoes when changing the battery.
- Only close the battery door/cover if there are no limbs between the battery door and edge of the frame.



Caution!

Explosion hazard due to flammable gases!

- Do not place metal objects or tools on the battery.
- Stay away from flames and do not smoke.
- Disconnect the battery connector before charging and only when the device and the charger are switched off.



Danger!

Risk of tipping over:

- Only change the battery in a no-load state.
- Pay attention to the weight of the battery! The weight of the battery has an influence on the stability of the device.

7.7.2 Changing the battery



Note!

- The battery is maintenance-free and is located in the housing of the base frame.
- Park the KS Robot in a safe area and switch it off via the main switch.



Warning!



- Maintenance work on the battery should only be carried out by qualified personnel.
- **Always first disconnect the negative pole then the plus pole.**
When connecting, proceed in reverse order.

Battery types

Depending on the model, the KS Robot is equipped with different battery types. The following table shows which combination is intended as standard and specifies the capacity:

Model	Battery type	Capacity	Weight
KS Robot 280	2 x 12 V	2 x 60 Ah	2 x 17.0 kg
KS Robot 400	2 x 12 V	2 x 70 Ah	
KS Robot 600	2 x 12 V	2 x 75 Ah	2 x 27.0 kg
KS Robot 1000	2 x 12 V	2 x 260 Ah	2 x 7.85 kg
KS Robot 1400	2 x 12 V	2 x 300 Ah	

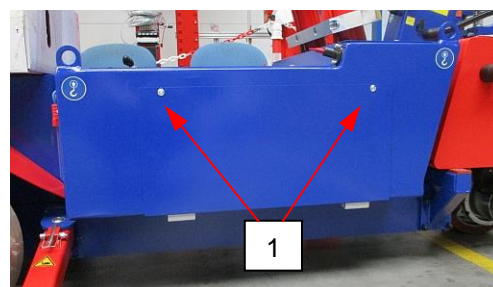
The battery weights can be found on the type plate of the battery. The battery poles must be covered with protective terminal caps.

KS Robot 280 / 400 / 600

- Remove the housing cover.
- Remove the protective mat over the battery.
- Then disconnect the terminal posts from the battery, (**Attention! always first disconnect the negative pole then the plus pole**) remove the battery and replace it with a new one.

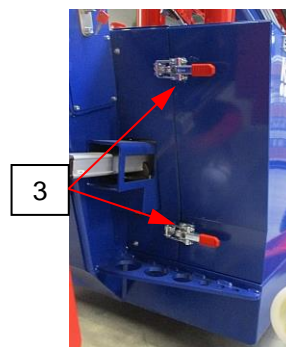
KS Robot 1000

- Open the battery box cover.
To do this, loosen the two upper screws (1).
The cover can now be pulled outward.
- Remove the cover and place it to the side.
- Place a tray, pallet or similar in front of the opening.
- Now pull out the battery toward the front and disconnect the battery connector (2).
- Remove the battery and replace it with a new one.
Reconnect the battery connector (2), insert the battery, close the battery box cover and screw it on.

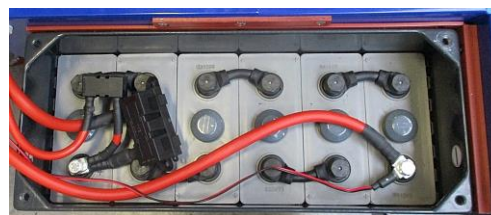


KS Robot 1400

- Open the battery case.
To do this, loosen the two clamps (3).
- Now disconnect the terminals from the battery.
(Attention: Always first disconnect the negative pole then the plus pole.)



- Screw diagonally, 2 eyebolts M12, into the threaded holes.
- Use the eyebolts to lift the discharged battery upward, e.g. using a crane.
- Place the new battery back in the holder and connect it.
- Close the battery case again.



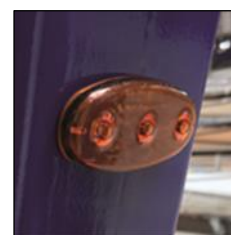
7.7.3 Checking the battery charge status



Caution!

Deep discharge shortens the life of the battery

- A deep discharge of the KS Robot must be avoided at all cost. Therefore, connect the KS Robot immediately to the battery charger via the power cord and an electrical outlet.
- If the battery voltage is too low, it will be indicated on the tiller head control unit and the battery monitor lights up permanently.



7.7.4 Charging the battery



Note!

Charge the batteries after each shift or more frequently when the battery charge is low.

Procedure:

Park the KS Robot in a well-ventilated area where it is not exposed to condensation or soiling (see "finishing work").

In the models **KS Robot 280/400/600** the charger is attached to the base frame.

- Connect the charging cable of the charger to the KS Robot and to a grounded power outlet.

Two LEDs indicate the charge status:

- Yellow LED: battery is charging
- Yellow LED and Green LED: battery is charging and is in the constant voltage phase
- Green LED: Trickle charge, battery is charged



The models KS Robot 1000/1400 are delivered with a separate charger, which is configured for the battery.

- First connect the charger to a grounded power outlet.
- Now connect the KS Robot to the connector on the charger.

The battery charge level is indicated on the charger by a charging characteristic curve.



Note!

See also separate operating manual for the charger!

7.7.5 Maintenance of the hydraulic system (KS Robot 1000/1400)



Note!

It is forbidden to drain oil on the ground or into waterways.
Never mix oil of different types or brands in the system.

Recommended hydraulic oil:

	Type	Part number
Hydraulic and machine tool oil with cleaning effect	BP HPL-46	11014364

7.7.6 Checking the oil level

To operate the KS Robot, it is essential that the hydraulic oil is maintained at an appropriate level. The wrong hydraulic oil level can lead to damage of hydraulic system components. Therefore, check the hydraulic oil level on the tank of your KS Robot regularly.

Procedure:

- Make sure the cylinders are fully retracted.
- Open the cover.
- Open the cover on the hydraulic unit tank and check the oil level on the dipstick.
- If necessary, add oil.



7.7.7 Changing the hydraulic oil filter

The hydraulic oil filter is located in the return line. It is equipped with an indicator that shows the degree of soiling. If the red field is in the indication range, the filter is soiled and must be replaced.

Procedure:

- Make sure the cylinders are fully retracted.
- Open the cover.
- Remove the oil filter by turning it counter-clockwise.
- Now screw on a new filter.
- Then check the oil level on the tank and top off if necessary.



7.7.8 Checking the hydraulic hoses

Check the hydraulic hoses:

- Are there any leaks in the hydraulic hoses?
- Is damage to the outer jacket (such as kinks, chafing, cuts, brittleness) visible?
- Are the hoses properly attached in the fittings?
- Are there leaks between fittings and hose?

If damage has occurred, replace the damaged hoses.



Attention:

All hydraulic hoses must be replaced after 6 years at the latest, even if no damage or wear is visible on the outside!

8 Disposal

Operating the KS Robot results in waste and replacement parts that must be disposed of properly and in compliance with the legal regulations.

8.1 Environmental protection



Caution!

Environmental damage due to improper disposal!

Oils and solvent-containing operating and auxiliary materials have a high risk potential for the environment.

During all work on and with the KS Robot, the legal obligations for waste prevention and proper recycling / disposal must be observed.

In particular, during repair and maintenance work, water polluting substances such as greases, solvent-based cleaning fluids may not pollute the soil or enter the sewage system.

These substances must be collected and stored in suitable containers, transported and disposed of properly.

8.2 Decommissioning

If the KS Robot is permanently decommissioned, the disposal of the components must comply with the laws and regulations for disposal at that time.

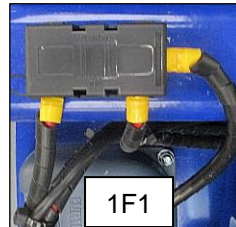
9 Individual Parts

9.1 Fuse assignment

() Version with battery charger 110V

9.1.1 KS Robot 280

Des.	Function	Size
1F0	Battery charger	15A (20A)
1F1	Drive	50A
1F2	Control unit	30A

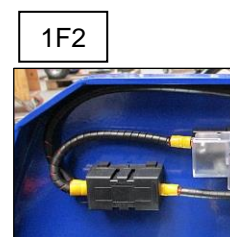
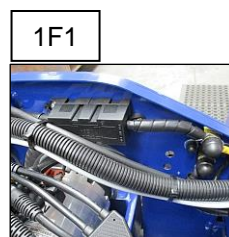


Des.	Function	Size
2F1	Circuit board	10A
2F2	Power outlet	3A
2F3	Remote control unit	3A
2F4	Reserve	
2F5	Travel drive	3A
2F6	Horn	5A



9.1.2 KS Robot 400

Des.	Function	Size
1F0	Battery charger	15A (20A)
1F1	Drive	150A
1F2	Control unit	30A

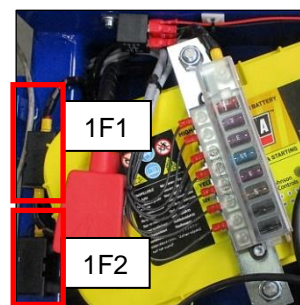


Des.	Function	Size
2F1	Circuit board	10A
2F2	Power outlet	3A
2F3	Remote control unit	3A
2F4	Add-on board	15A
2F4 *	Electrical turning	15A
2F5	Travel drive	3A
2F6	Horn	5A
2F7	Battery monitoring	3A
2F8	Reserve	



9.1.3 KS Robot 600

Des.	Function	Size
1F0	Battery charger	15A (20A)
1F1	Drive	150A
1F2	Control unit	30A

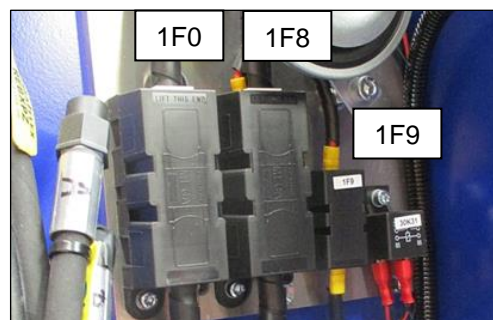


Des.	Function	Size
2F1	Circuit board	10A
2F2	Power outlet	3A
2F3	Remote control unit	3A
2F4	Add-on board	15A
2F4 *	Electrical turning	15A
2F5	Travel drive	3A
2F6	Horn	5A
2F7	Battery monitoring	3A
2F8	Reserve	

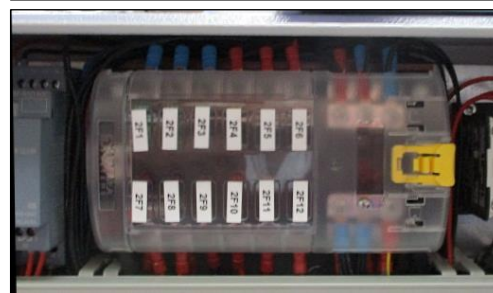


9.1.4 KS Robot 1000

Des.	Function	Size
1F0	Control unit	300A
1F8	Hydraulic pump	200A
1F9	Terminal box	30A

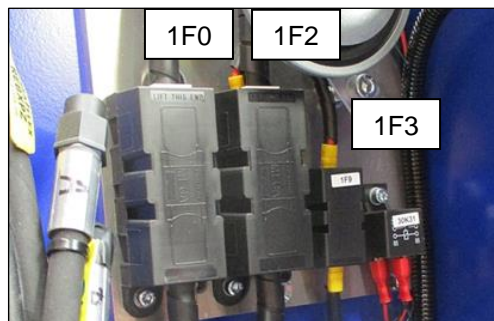


Des.	Function	Size
2F1	Vacuum pump 1	5A
2F2	Vacuum pump 2	5A
2F3	Vacuum pump 3	5A
2F4	Vacuum pump 4	5A
2F5	Overload	3A
2F6	Logo	10A
2F7	Pressure switch vacuum blue	3A
2F8	Pressure switch vacuum black	3A
2F9	Fans / sockets	5A
2F10	Radio remote control unit	10A
2F11	Drive / motor	5A
2F12	Buzzer / signal light / battery monitoring	3A

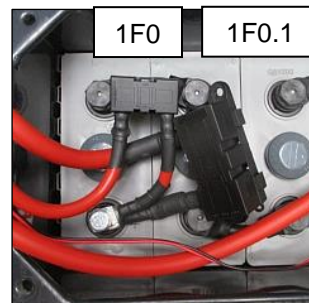


9.1.5 KS Robot 1400

Des.	Function	Size
1F1	Drive	300A
1F2	Hydraulic pump	200A
1F3	Terminal box	30A



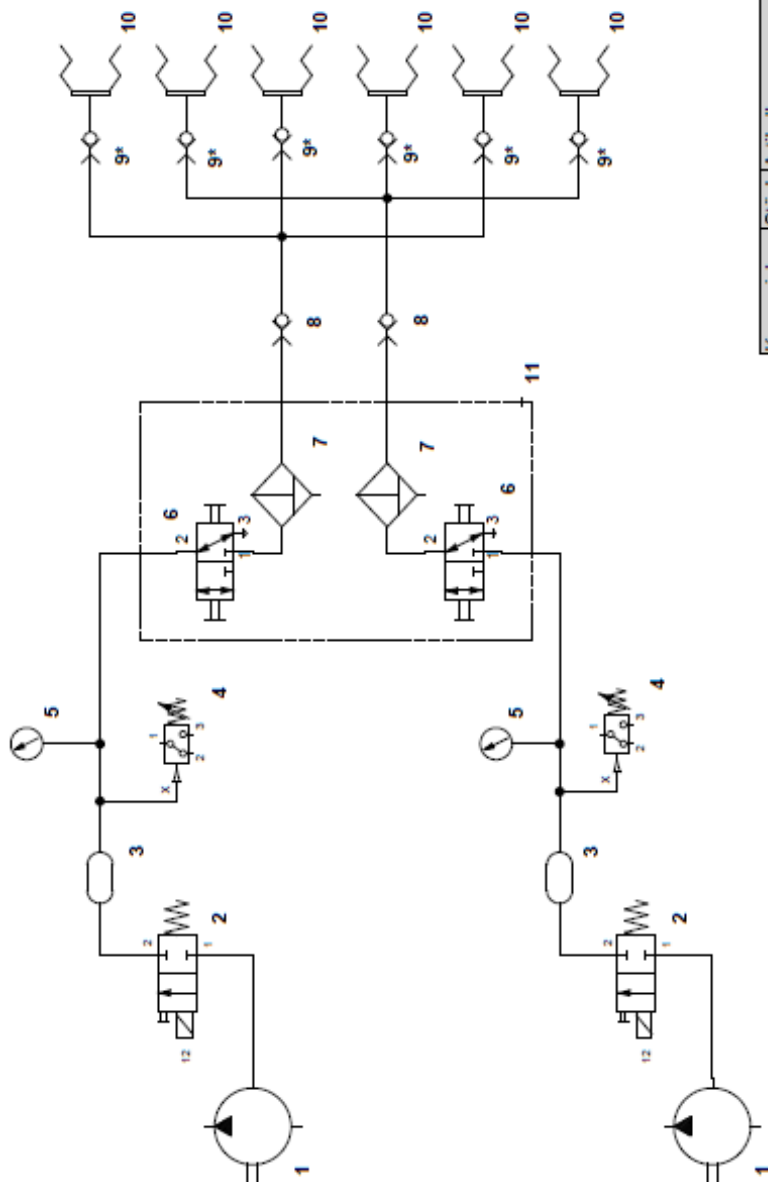
Des.	Function	Size
1F0	Battery charger	125A
1F0.1	Battery-main fuse	300A



Des.	Function	Size
2F1	Vacuum pump 1	5A
2F2	Vacuum pump 2	5A
2F3	Vacuum pump 3	5A
2F4	Vacuum pump 4	5A
2F5	Overload	3A
2F6	Logo	10A
2F7	Pressure switch vacuum	3A
2F8	Battery monitoring	3A
2F9	Fans / sockets	3A
2F10	Radio remote control unit	10A
2F11	Drive / motor	5A
2F12	Buzzer / signal light / Pressure switch, weight control	3A



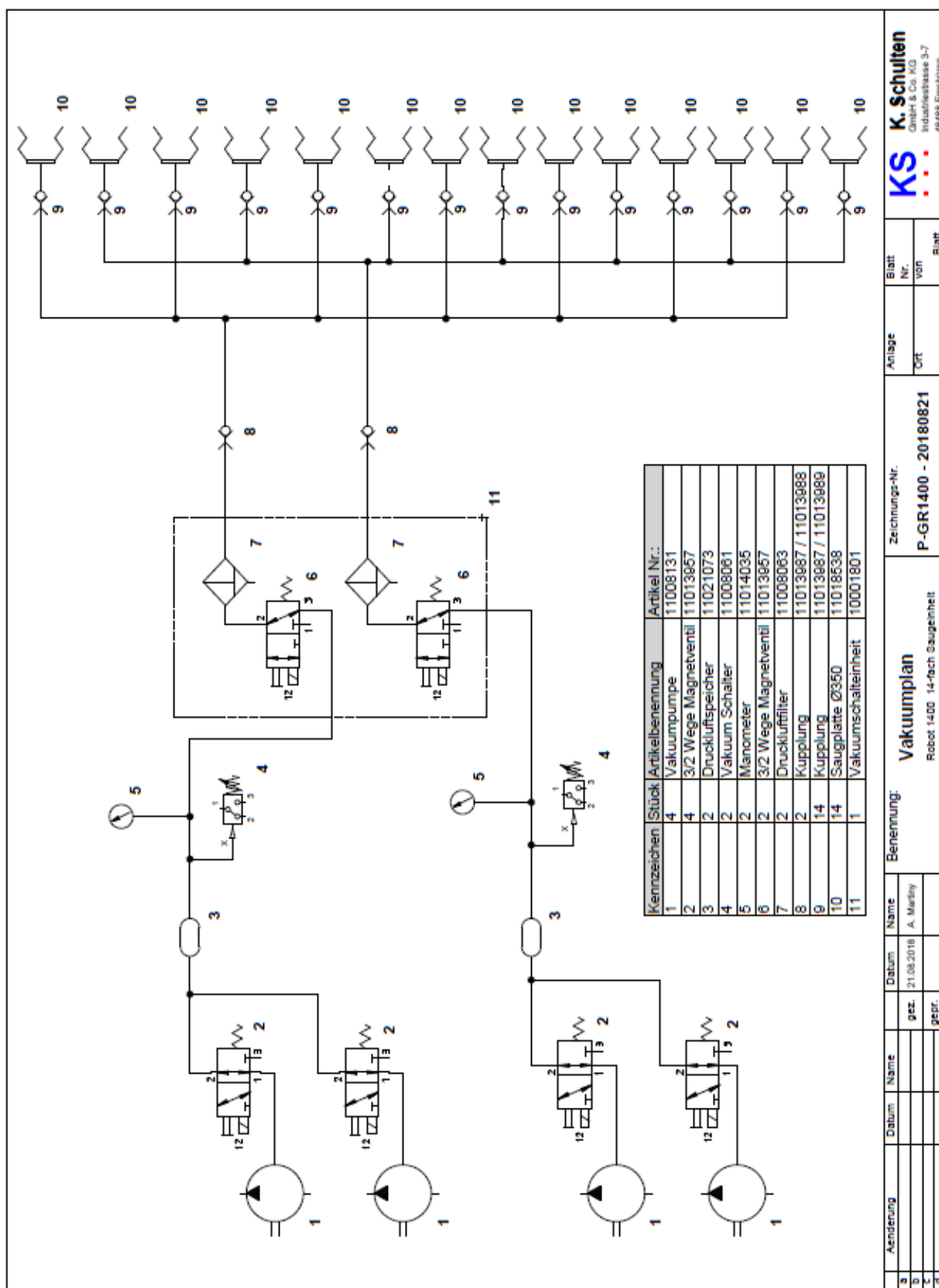
10.3 Vacuum plan KS Robot 600



Kennzeichen	Stück	Artikelbenennung	Artikel Nr.:
1	2	Vakuumpumpe	11008128
2	2	Magnetventil	11013958
3	2	Druckluftspeicher	11013965
4	2	Druckschalter	11008061
5	2	Manometer	11014035
6	2	Handschiebeventil	11014009
7	2	Druckluftfilter	11008063
8	2	Kupplung	11013987 / 11013988
9*	6	Kupplung *optional	11013937 / 11013989
10	6	Saugplatte Ø 350 mm	11018638
11	1	Vakuum-Schalteinheit	10001801

				Benennung:		Zeichnungs-Nr.		Anlage		Blatt		 K. Schulten GmbH & Co. KG Industriestraße 3-7 48488 Emmeln
				Vakuumpplan		P-GR600 - 20180914		Ort		von		
				Robot 600 Standard 6-fach Saugereinheit						Blatt		
Aenderung	Datum	Name	Datum	Name								
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10.5 Vacuum plan KS Robot 1400



KS **K. Schulten**
GmbH & Co. KG
Industriestrasse 3-7
48488 Emmeln

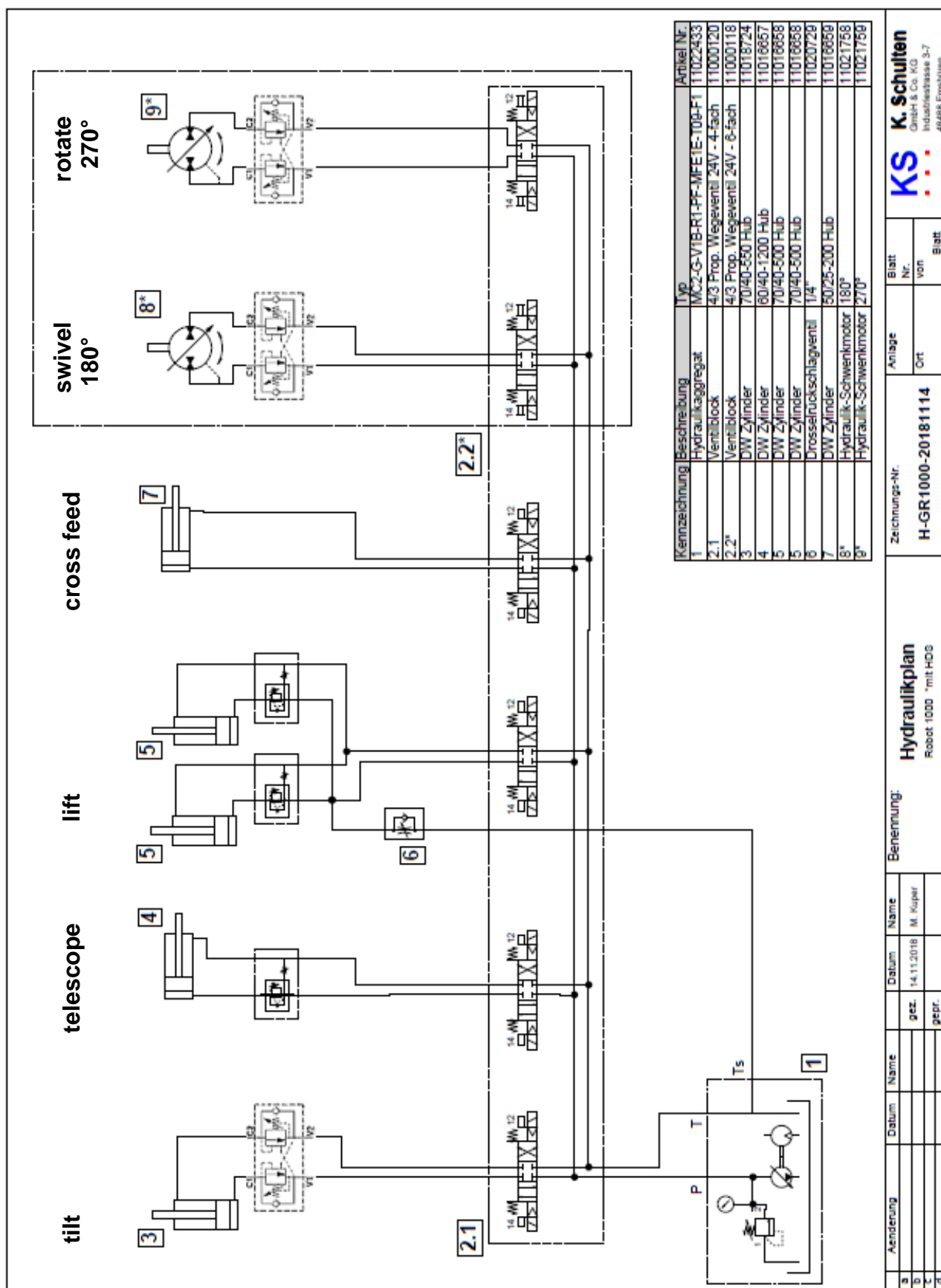
Anlage
Nr.
Ort

Zeichnungs-Nr.
P-GR1400 - 20180821

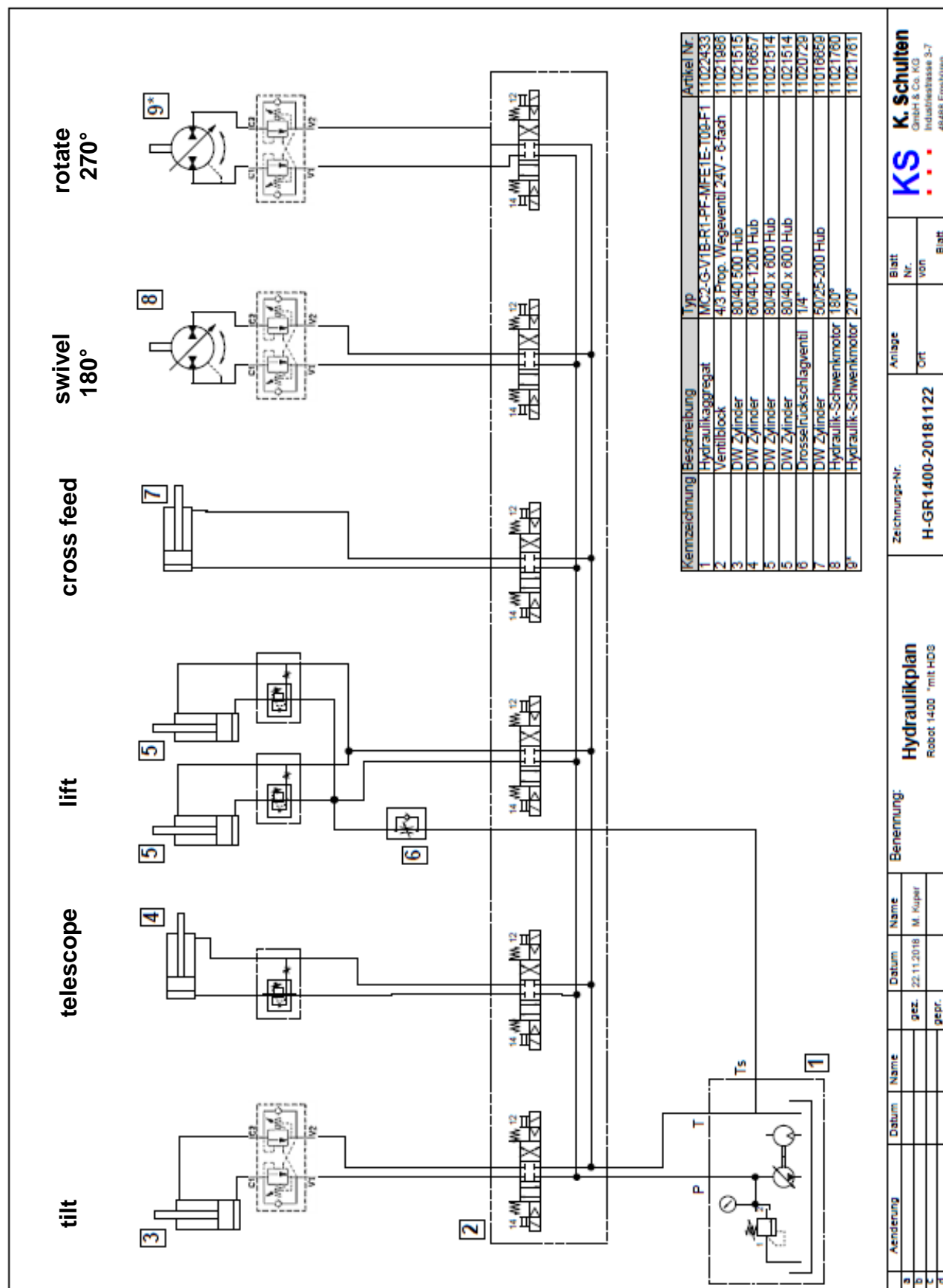
Benennung:
Vakuumplan
Robot 1400 14-fach Saugenheit

Änderung	Datum	Name	Datum	Name
1				
2				
3				

10.6 Hydraulic diagram KS Robot 1000



10.1 Hydraulic diagram KS Robot 1400



Änderung		Datum		Name		Benennung:		Zeichnungs-Nr.		Anlage		Blatt	
1	gepr.		22.11.2018	M. Kuper		Hydraulikplan		H-GR1400-20181122		Ort		von	
2	gepr.					Robot 1400 "mit HOG						Blatt	
3													

KS **K. Schulten**
GmbH & Co. KG
Industriestrasse 3-7
48488 Emmeln

11 Load Diagrams

By default, the KS Robot is equipped with a vacuum suction unit when delivered.

If the KS Robot is used to lift while the load is in front of the wheels, it has a different load capacity than if the load is telescoped, lifted or swiveled.

In addition, the load-bearing capacity of the KS Robot with each attachment (e.g. fork) or the number of suction discs on the suction crossbar is different.



Danger!

Danger of tipping over:

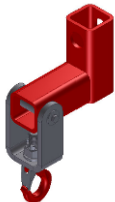
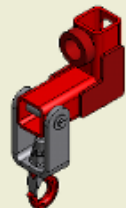

- Please observe the respective load diagram of your KS Robot
- Please note the load diagram that corresponds to the respective attachment and the specified weights (e.g. manual double telescope) may not be exceeded.
- The load-bearing capacity may be limited if the load is swiveled sideways (+/- 90°) or electrically turned.
- Please note that by reducing the number of suction discs the load-bearing capacity is also reduced.
- The number of counterweights on the KS Robot may not be increased.

- The load diagram is located on the side of the base frame support arm.



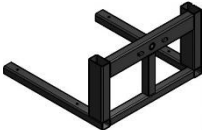

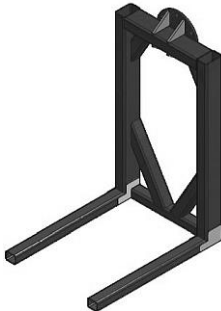
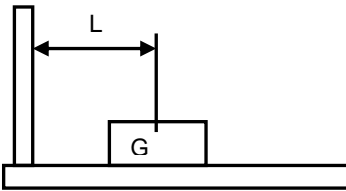
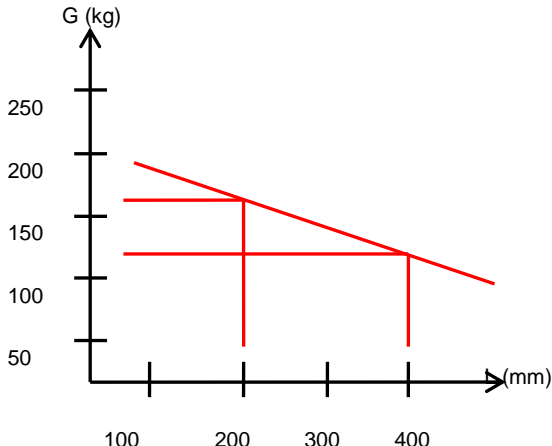
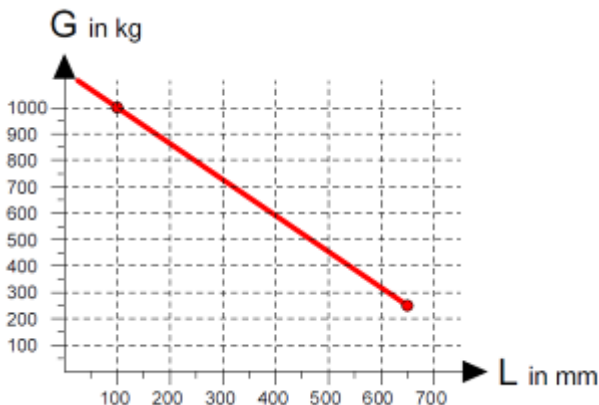
11.1 Attachments

11.1.1 Load hook (optional)

KS Robot 280 - Standard					
	Part number:	Load-bearing capacity:			
	10000897	Max. 280 kg			
KS Robot 400 / 600 / 1000 - Standard			KS Robot 1000 HDS *		
	Part number:	Load-bearing capacity:		Part number:	Load-bearing capacity:
	10000896	Max. 600 kg		10014203	Max. 800 kg

* Optional - HDS (hydraulic turning)

11.1.2 Load fork

KS Robot 280 Standard	
 <p>Part number: 10001390</p>	
KS Robot 400 / 600 / 1000 - Standard	KS Robot 1000 HDS *
 <p>Part number: 10005286</p>	 <p>Part number: 10017258</p>
<p>Fork diagram</p>  <p>L = rail leading edge to payload center of gravity G = payload</p>	
	

12 Suction Unit (standard)

12.1 Intended use

The suction unit is intended for use with the KS Robot.

It is suitable for the vertical and horizontal transport of flat glass and sheet materials. The load is held during lifting by vacuum.

12.2 Improper use

- The load-bearing capacity may not be exceeded.
- No alteration of the load handling attachment is allowed.
- The use of the load handling attachment to transport persons is prohibited.
- When transporting the load, avoid pendulum movement and bumping into obstacles.
- Only one load may be transported at a time with the load handling attachment.
- Do not drop the load handling attachment from a significant height.

12.3 Safety information

All work with the suction unit may only be carried out by trained and instructed personnel.

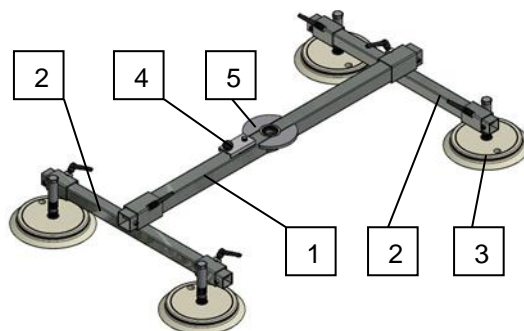
Please make sure that every person responsible for transport has read and understood these operating instructions before starting work.

- Wear suitable work clothes: hard hat, work gloves, safety shoes.
- Only use the suction unit under conditions for which it is intended.
(see Intended Use)
- Never use a damaged, not fully functional or incomplete device.
- Do not use the device if the sealing edge of a suction disc has been cut or otherwise damaged.
- Do not use the device if it appears that information about the lifting capacity or other warning labels is missing or unrecognizable.
- Always make sure that the contact surfaces of the load and all suction discs are clean before applying vacuum from the suction discs.
- The transport of persons as well as dwelling in the danger zone is forbidden.
- Position the suction discs correctly on the load before lifting.
- Never walk under suspended loads.
- The specified payload may not be exceeded.
- Never leave the load unattended.
- Any defects found must be remedied immediately by qualified personnel.

12.4 Product Description

The suction unit consists of a support frame and adjustable suction discs on a longitudinal beam with two or four cross members.

1. Longitudinal crossbar (beam)
2. Crossbeam
3. Suction unit, simple
4. Latch bolt
5. Mounting flange

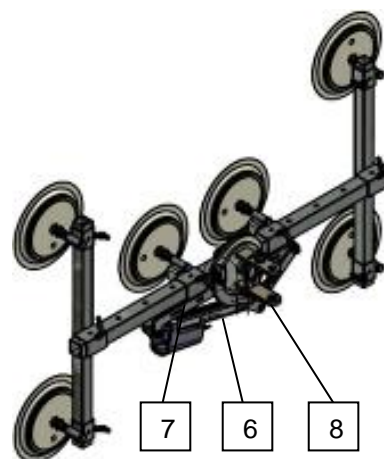


12.4.1 Accessories

The suction unit can also be equipped with an electrical rotary cylinder as an option. It allows turning up to 100°.

Option:

6. Rotating joint
7. Rotary cylinder
8. Crank



12.5 Technical data

Suction unit	4-piece - Ø250	4-piece - Ø300	4-piece - Ø350	6-piece - Ø350	8-piece - Ø350
Load-bearing capacity max.:	280 kg	350 kg	400 kg	600 kg	800 kg
Lifting capacity per suction disc approx.:	70 kg	90 kg	100 kg	100 kg	100 kg
Dimensions frame:					
Length approx.:	1200 mm	1200 mm	1600 mm	1600 mm	1600 mm
Width approx.:	750 mm	750	1000 mm	1000 mm	1000 mm

12.6 Payloads suction unit

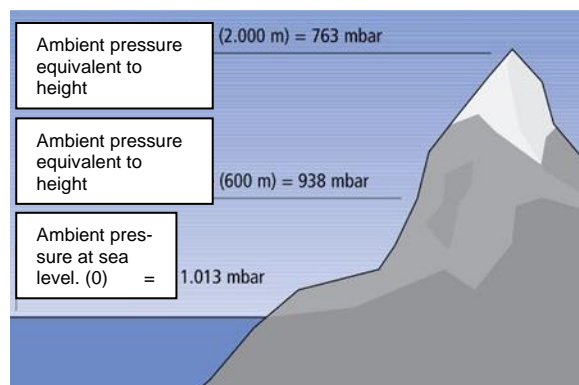
Suction disc Ø	Number of suction plates	Max. load capacity (kg)	Suction disc Ø	Number of suction plates	max. load capacity (kg)	Suction disc Ø	Number of suction plates	Max. load capacity (kg)
Ø 250	2	140	Ø 300	2	180	Ø 350	2	200
	4	280		4	350		4	400
	6	400					6	600
							8	800

12.7 Effect of air pressure changes on the suction force

The load-bearing capacity of the vacuum suction depends, among other things, on the pressure difference between the suction surface and the atmosphere. As the altitude increases, the air pressure and thus the load-bearing capacity of the vacuum suction system decreases.

Up to 2000 m above sea level, the atmospheric pressure drops by 12.5 mbar per 100 m.

This would result in an atmospheric pressure of just under 938 mbar for the city of Memmingen in Bavaria (601 m above sea level).



Altitude	Air pressure (compared to 0m altitude)	Air pressure	Differential pressure (at 78% achievable vacuum)	Suction force (at 600 mbar set differential pressure)
0 m	100 %	1013.25 mbar	790 mbar	100 %
100 m	98.7 %	1000.3 mbar	780 mbar	100 %
200 m	97.5 %	987.6 mbar	770 mbar	100 %
300 m	96.2 %	975.0 mbar	760 mbar	100 %
400 m	95.0 %	962.5 mbar	750 mbar	100 %
500 m	93.8 %	950.3 mbar	741 mbar	100 %
600 m	92.6 %	938.1 mbar	731 mbar	100 %
700 m	91.4 %	926.2 mbar	722 mbar	100 %
800 m	90.2 %	914.4 mbar	713 mbar	100 %
900 m	89.1 %	902.7 mbar	704 mbar	100 %
1000 m	88.0 %	891.2 mbar	695 mbar	100 %
1500 m	82.5 %	835.8 mbar	652 mbar	100 %
2000 m	77.4 %	783.8 mbar	611 mbar	100 %
2241 m	75.0 %	759.9 mbar	593 mbar	98.8 %
2500 m	72.5 %	735.1 mbar	573 mbar	95.5 %
2962 m (Zugspitze)	68.4 %	692.8 mbar	540 mbar	90 %
3000 m	68.0 %	689.4 mbar	538 mbar	89.67 %
3500 m	63.8 %	646.5 mbar	504 mbar	84 %
3798 m (Großglockner)	61.4 %	622.8 mbar	486 mbar	81 %
4000 m	59.8 %	606.3 mbar	473 mbar	78.83 %
4810 m (Mt. Blanc)	53.9 %	546.52 mbar	426 mbar	71 %

The vacuum pumps of the vacuum suction system are always set to a differential pressure of 600 mbar, so that a suction force of 100% is guaranteed up to an altitude of 2000 m.



Note!

When used at altitudes greater than 2000 meters, the vacuum pressure switch must be readjusted to prevent the vacuum pumps from running continuously. Adjustments to the vacuum parts may only be made by authorized and properly qualified personnel.

12.8 Handling

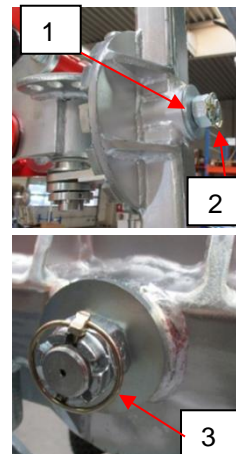
12.8.1 Installation

Attach the suction unit to the KS Robot as follows.



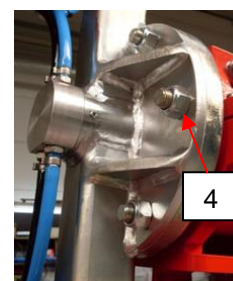
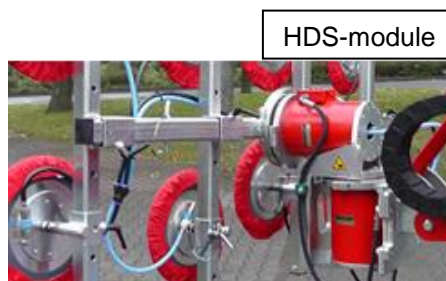
Procedure:

1. Place the load handling unit (e.g. vacuum suction unit) with the included washer (1) on the mounting of the KS Robot rotating assembly. Screw to the mounting with the nut (2).
2. Then secure the nut with the linch pin (3) against twisting.



When equipped with HDS module (hydraulic rotary swivel unit)

3. The load handling unit (e.g. vacuum suction unit) is mounted on the rotating assembly with 6 threaded bolts (4). First loosen the 6 nuts, place the load handling unit on the mounting and then secure the load handling unit by screwing the nuts back on.

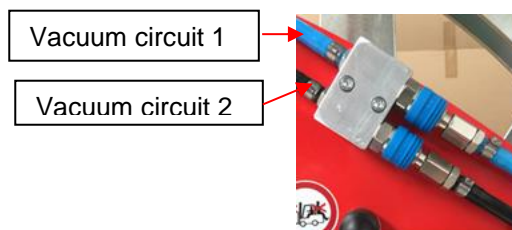


4. Now connect the two vacuum hoses of the suction unit via the quick couplings (5) to the telescopic boom of the KS Robot vacuum system.



- When installing a vacuum suction unit, make sure that the vacuum hoses are connected to the same vacuum circuit.

Vacuum circuit 1 = blue hose lines
Vacuum circuit 2 = black hose lines



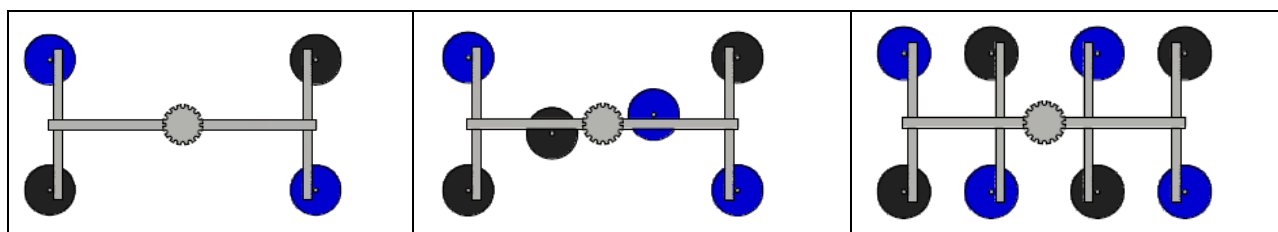
Note!

The suction discs are evenly arranged on the vacuum suction unit in the two-circuit system.

Please observe the respective vacuum plan of your vacuum suction unit.

12.8.2 Arrangement of suction discs

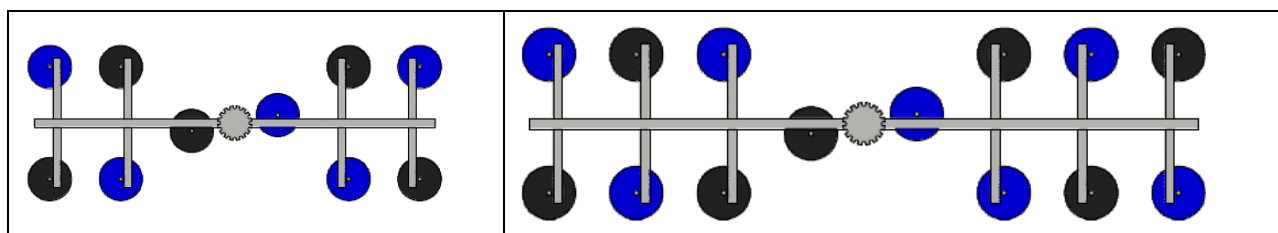
The vacuum suction discs of the suction unit are arranged evenly in the two-circuit system.



4-piece suction unit

6-piece suction unit

8-piece suction unit



10-piece suction unit

14-piece suction unit

12.8.3 Transport of elements

The suction unit offers various options for positioning the suction discs in order to accommodate different load dimensions.

The operator can set up the configurations by inserting or removing the extension arms of the suction frame, repositioning or removing the adjustable suction holders, and connecting or disconnecting the vacuum hoses for certain suction discs.

Always position the suction frame symmetrically in order to balance the suction unit.



Warning!

The removal or separation of any suction disc affects the lifting capacity of the suction unit!

Make sure that all vacuum hoses are rolled up or arranged and that they do not become knotted, kinked or punctured during the turning or tipping process.

12.9 Maintenance and service

12.9.1 Inspection

**Note!**

Check every vacuum disc for defects on a regular basis.
Eliminate any defects before using the lifting device.

Defects	Remedy
Soiling on the surface or the sealing edges of the suction disc:	Soiling can impair the ability of the suction discs to seal properly. Follow the instructions for cleaning the suction disc if necessary.
Notches, cuts and abrasions at the sealing edges:	Damage to the suction unit may affect the load-bearing capacity of the lifting device. Replace each damaged suction disc immediately.

**Warning!**

Replace a vacuum disc if the edges of the seal have any notches, cuts, or abrasions.

12.9.2 Cleaning the suction discs

- Clean the suction discs with soap and warm water, while at the same time using a tool (e.g. a soft brush).
Then allow the suction discs to dry at room temperature.

**Caution!**

Under no circumstances should solvents such as trichlorethylene, carbon tetrachloride, hydrocarbons or vinegar cleaner be used for cleaning.
Do not use sharp objects, wire brushes, sandpaper, etc.

- **Declaration of Conformity**

- Translation -

EC Declaration of Conformity

in accordance with EC Machinery Directive 2006/42/EC dated 17 May 2006, Appendix II 1.A



We hereby declare that the machine described below, in its design and construction as well as in the version we have placed on the market, complies with the basic health and safety requirements of the EC Directive 2006/42/EC.

This declaration loses its validity if unauthorized modifications are made to the machine.

Manufacturer / Distributor

K. Schulten GmbH & Co. KG
Industriestraße 3-7
D-48488 Emsbüren

Product:

Product name: Glass lift
Functional description: be used for lifting and lowering of loads
Model name: KS Robot 280, KS Robot 400, KS Robot 600, KS Robot 1000
KS Robot 1400

Machine No.:

Date manufactured:

Consistency with other directives/regulations that also apply to the product is declared:

EMC Directive 2014/30/EU

The following harmonized standards were applied:

EN ISO 12100:2011-03 Safety of machinery - General principles for design -
Risk assessment and risk reduction
EN 349:2008 Safety of machinery – Minimum gaps to avoid crushing of body parts
EN 13035-1:2008 Machines and plants for the manufacture, treatment and processing of flat glass -
Safety requirements - Part 1: Storage, handling and transportation equipment inside the factory
EN 13035-2:2008 Machines and plants for the manufacture, treatment and processing of flat glass -
Safety requirements - Part 2: Storage, handling and transportation equipment outside the factory
EN 13155:2017-11 Crane - loose load lifting attachments

The following entity is authorised to compile the technical documentation in accordance with the Machinery Directive:

K. Schulten GmbH & Co. KG
Industriestraße 3-7
D-48488 Emsbüren

Place: D- 48488 Emsbüren

Date: 12.01.2018

Jörg Alsmeier, Managing Director

Horst Anker, Managing Director

Vacuum pump heater



Attention!

The KS Robot may be used in an environmental temperature range between 0°C to + 50°C! The machines exploitation is to be stopped when the environmental temperature falls below 0°C!

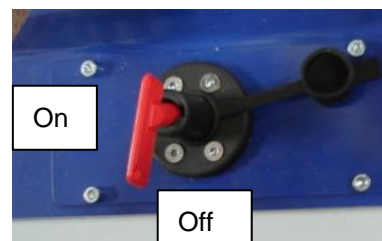
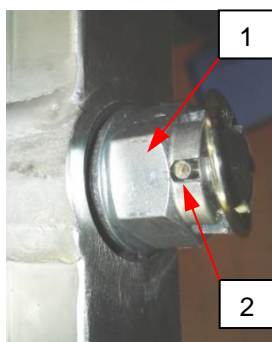
The machine is equipped by vacuum pump heaters, which grant a secure usage also during lesser environmental temperatures.



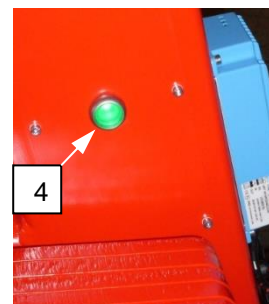
Hint!

For environmental temperatures lesser than 5°C, we recommend to switch on the vacuum pump heaters prior to switch on the machine by the main key.

Putting into Operation



- 1) Firstly mount the load attachment on the KS Robot.
- 2) For that purpose, please put the load attachment (for example a suction unit) onto the pin on the KS Robot and fix it by the female screw (1).
- 3) Following this, secure the female screw with the lock pin (2) against loosening.
- 4) Connect both vacuum pipes (black/blue) tot he according adapters 3).
- 5) The KS Robot is switched on and off by the battery key (main key).
- 6) The pump heating is switched on by pushing the green button (4), now the button lights.
- 7) The pump heaters shall be activated approx. 15 minutes prior to machines putting into operation, by what the pumps gains the required operation temperature.
- 8) After this the machine may be switched on by the main key.



Attention!

Switch off the pump heater again by pushing of green button after the assignment, to rest the batteries.

Notes