

GIS

swiss lifting solutions

OPERATOR'S MANUAL VACUUM LIFTER GN/K | GH/K



www.gis-ag.ch



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Spare parts / Ordering spare parts

The correct order numbers for original spare parts can be obtained from the relevant spare parts list. Please fill in the following data on your vacuum lifter type to have them available at all times. This will enable the correct spare parts to be supplied without delay.

Vacuum lifter type :

Serial number :

Year of manufacture :

Load capacity :

Original spare parts for the vacuum lifters can be acquired from the following addresses:

1. Manufacturer

GIS AG
Swiss Lifting Solutions
Luzernerstrasse 50
CH-6247 Schötz

Tel. +41 (0)41 984 11 33
Fax +41 (0)41 984 11 44

tel@gis-ag.ch
www.gis-ag.ch

2. Resellers

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0 General instructions

0.1 General safety instructions

0.1.1 Safety and hazard instructions

The following symbols and terms are used in this operator's manual for safety and hazard instructions:



CAUTION !

Non-compliance, either in part or full, with operating instructions with this symbol can result in serious personal injury or fatal accidents.

Warning information must be **strictly** adhered to.



CAUTION !

Non-compliance, either in part or full, with operating instructions with this symbol can result in major damage to machinery, property or material.

Instructions in the category "Caution" need to be adhered to **exactly**.



NOTE

Following the instructions marked with this symbol will lead to more effective and straightforward operation.

"Note" directions make work easier.

0.2 General safety regulations and organisational measures

The operator's manual for the vacuum lifter must always be available at the operation site. The instructions mentioned in this manual must be strictly adhered to.

Furthermore, supplementary to the instruction manual, the statutory regulations governing general accident prevention and environmental protection are to be enforced.

Operating and maintenance personnel must have read and understood the operator's manual, in particular the safety instructions, before starting work. Protective equipment must be made available for operating and maintenance personnel and worn at all times.

The operator or his representative is responsible for supervising operating personnel and ensuring they are aware of the hazards and safety implications of working with the vacuum lifter.



CAUTION !

Operating manuals for lifting units or trolleys must be observed imperatively.

0.2.1 Warning paint / marking / danger signs

- Caution - suspended load Figure 0-1
- Caution - the load must not be lifted higher than 1.8 m Figure 0-2
- Name plate Figure 0-3
- CE sign Figure 0-4
- Electric voltage Figure 0-5

Figure 0-1



Figure 0-2



Figure 0-3

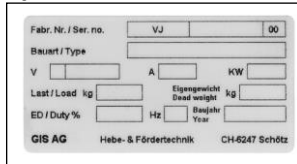
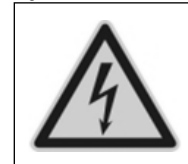


Figure 0-4



Figure 0-5



0.3 Particular safety instructions

Transport / assembly:

- Vacuum lifter, single parts and larger assemblies should be carefully affixed to suitable and technically acceptable hoisting apparatus / load lifting members with sufficient load capacity

Connection:

- Connection work is only to be performed by personnel specifically designated and trained for the job

Start-up / operation:

- Before initial start-up, as well as daily start-up, carry out a visual check and carry out the predefined user-checks routine
- Only operate the vacuum lifter if the protective and safety equipment provided is ready and working
- Damage to the vacuum lifter and changes in its operational behaviour must be reported immediately to the person responsible
- After use, or when in a non-operational mode, the vacuum lifter should be secured against unauthorized and unintentional use
- Refrain from hazardous mode of operation

See also intended use (chapter 0.6)

Cleaning / service / repair / maintenance / refitting:

- Use the working platforms and ladders provided for assembly work above body height
- Do not use machine parts for this purpose
- Check electrical cables for damage or wear
- Ensure any oils or other agents used are discharged, collected and disposed of safely and in an environmentally sound manner
- Mount and check safety installations that have been disassembled for servicing or repairing after service and repair work has been completed
- Adhere to predefined testing and service intervals specified in the operator's manual
- Follow the directions in the instruction manual regarding exchanging parts
- Operating personnel should be informed before starting special or refitting work
- Secure the repair working area
- Prevent the vacuum lifter from being unexpectedly switched on during maintenance or repair work
- Attach warning signs
- Switch off the mains connection switch and secure against unauthorized switch on
- Retighten screw connections that have been loosened for maintenance and repair work
- Replace non-reusable fixing elements and sealings (e.g. self-locking nuts, washers, cotter pins, O rings and sealings)

Shut down / storage:

- Clean and preserve (lubricate/grease) the vacuum lifter before long periods of inactivity or storage
- Longer-term storage can lead to loss of program data in the internal control memory. Consultation with the manufacturer is recommended.

0.4 Instructions for hazard protection

Hazardous areas must be clearly marked by warning signs and safety fences. It must be ensured that warnings regarding hazardous areas are given due attention.

Hazards can stem from:

- incorrect application
- not following safety directions properly
- not carrying out test and maintenance work thoroughly

0.4.1 Hazards with mechanical causes**Physical injury:****CAUTION !****Unconsciousness and injury through:**

- crushing, shearing, cutting and twisting
- drawing in, ramming, piercing and rubbing
- slipping, stumbling and falling

Causes:

- Crushing, shearing and twisting areas
- parts breaking or bursting

Safety options:

- keep floor, equipment and machinery clean
- eliminate leakages
- observe the required safety distances

0.4.2 Hazards due to electrical energy / current

Work on electrical apparatus or machinery may only be performed by qualified electricians or persons under the supervision and guidance of qualified electricians, in accordance with predefined electrical engineering regulations.

Physical injury:**CAUTION !****Death from electrical shock, injury and burns through:**

- contact
- faulty insulation
- faulty maintenance or repair work
- short circuit

Causes:

- contact with, touching of or standing too close to uninsulated power and live parts
- use of uninsulated tools
- exposed electrically conductive parts following insulation failure
- inadequate visual checks following maintenance work
- incorrect fusing

Safety options:

- de-energize machine and system parts designated for inspection tasks, maintenance and repair work before starting such work
- first check de-energized parts for residual voltage
- regularly check electrical equipment
- replace loose or damaged cables immediately
- always replace blown fuses with fuses of the correct value
- avoid contact with or touching of live parts
- only use insulated tools

0.4.3 Sound pressure level

Tests on the sound pressure level of the vacuum lifter are performed at a range of 1, 2, 4, 8 and 16 m from the center of the compressor motor to the measuring device. Vacuum sounds at the vacuum surface and air-permeable lifting goods lead to changing values.

Measurement of sound pressure level according to DIN 45 635.

The sound pressure level was measured when using the vacuum lifter in the factory hall:

- a) With sucked in lifting goods
- b) Without sucked in lifting goods

Table 0-1 Sound pressure level

Series	Measuring distance	1 m	2 m	4 m	8 m	16 m
	Measurement type	dBA				
GN/K	a)	75	73	69	66	63
	b)	73	71	67	64	61
GH/K	a)	63	61	57	53	50
	b)	64	62	58	54	51

0.5 Technical status

This operator's manual was issued in 2014. It corresponds to directive 2006/42/EC of the European parliament and council of 17 May 2006.

0.5.1 Technical data

- 0.5.1.1 Model GN/K Table 4-1, page 19
- 0.5.1.2 Model GH/K Table 4-1, page 19

0.5.2 Recurring checks

Each device / unit operator should adequately note all checks, service and revision works performed in the log book. These should confirmed by the competent person in charge. Incorrect or missing entries will lead to forfeiture of the manufacturer's warranty.



CAUTION !

Equipment and cranes are to be checked periodically by a specialist. Primarily visual and functional checks are to be carried out, whereby the condition of components with respect to damage, wear, corrosion or any other changes are determined. In addition, safety equipment is assessed for completeness and efficiency. It may be necessary to disassemble the equipment to correctly assess wear parts.



CAUTION !

Suspension means must be inspected over their entire length, including covered or hidden parts.



CAUTION !

All periodical checks should be arranged by the operator.

0.5.3 Warranty

- The warranty is void if the installation, operation, testing or service is not carried out according to these instructions
- Fault elimination and repair under warranty may only be carried out by qualified personnel and only after consultation and assignment with the manufacturer / supplier. Any modifications to the product or the use of non-original spare parts will void the warranty

0.6 Intended use

The vacuum lifter of the series GN/K and GH/K are vacuum lifting devices for different payloads. They can be installed as stationary or mobile units. The vacuum lifters are manufactured in accordance with the latest technical developments and approved safety standards. They are tested for safe operation by the manufacturer.

Vacuum lifters of the above series may only be used when in an acceptable technical condition and when in accordance with their intended use. It may only be used by trained personnel in a safe and responsible manner.

Using the vacuum lifters as intended also includes the adherence to the operating and maintenance requirements prescribed by the manufacturer.

The vacuum lifter type **GN/K** is not used as intended if:

- the defined maximum load is exceeded
- the position of the vacuum surfaces to the lifting goods is changed
- the load is pulled diagonally (see figure 0-6)
- the loads break away, are pulled or dragged
- the lifting good is dropped before the load is unloaded
- persons are transported
- loads are transported when personnel are underneath
- standing under suspended loads (see figure 0-7)
- excessive loads are transported
- loads are not observed constantly
- allowing the load to fall due to a slack chain
- the device is used at temperatures below -15° C or above +50° C
- the device is used in an potentially explosive environment

See also chapter 0.3.



CAUTION !

The operator always needs to be able to have an eye on the manometer and to monitor it.



CAUTION !

Lifting goods higher than 1.8 m is prohibited. (see figure 0-8)



CAUTION !

Sucking in and transporting of lifting goods with soiled and uneven surfaces is prohibited.



CAUTION !

The operating panel can only be actuated when the operator has full view at the complete panel and if an incorrect use can be ruled out.

The vacuum lifter of the type **GH/K** is not used as intended if:

- the defined maximum load is exceeded
- the position of the vacuum surfaces to the lifting goods is changed
- the load is pulled diagonally (see figure 0-6)
- the loads break away, are pulled or dragged
- the lifting good is dropped before the load is unloaded
- persons are transported
- loads are transported when personnel are underneath
- standing under suspended loads (see figure 0-7)
- excessive loads are transported
- loads are not observed constantly
- allowing the load to fall due to a slack chain
- the device is used at temperatures below -15° C or above +50° C
- the device is used in an potentially explosive environment

See also chapter 0.3.



CAUTION !

The operator always needs to be able to have an eye on the manometer and to monitor it.



CAUTION !

Sucking in and transporting of lifting goods with soiled and uneven surfaces is prohibited.



CAUTION !

Sucking in humid surfaces without a water separator is prohibited. Intrusion of humidity into the vacuum system can lead to a failure of the vacuum lifter.



CAUTION !

The operating panel can only be actuated when the operator has full view at the complete panel and if an incorrect use can be excluded.



CAUTION !

Sucking in and transporting goods that are not air-tight is prohibited.

Inching operations should be avoided. The manufacturer accepts no liability for damage to equipment and third parties ensuing from such action.

Figure 0-6

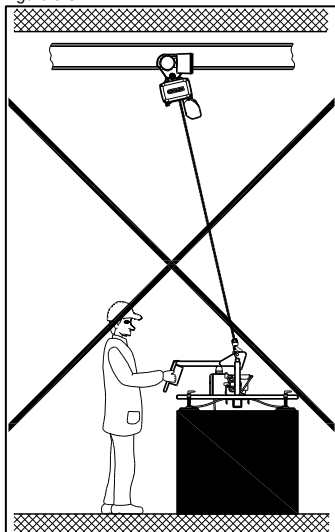


Figure 0-7

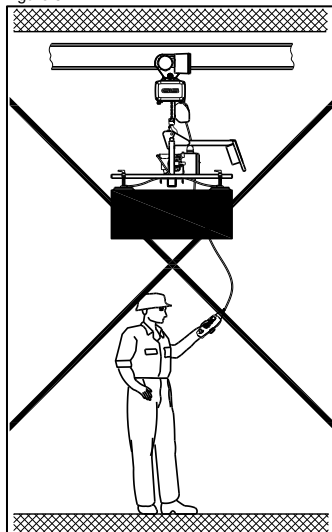
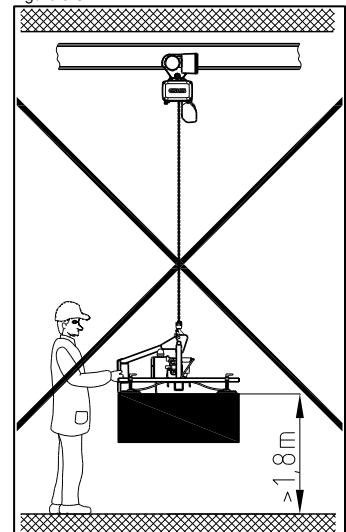


Figure 0-8



0.6.1 Instructions for using the operator's manual

This operator's manual includes the following chapters:

0	General instructions	3	Service and maintenance
1	Description	4	Appendix
2	Start-up		

Supplementary to the instruction manual, the following documentation from the operator must be noted:

- Declaration of Conformity
- Log book
- Spare parts list(s)
- Circuit diagrams

Page and figure numbering:

The pages are consecutively numbered. Blank pages are not numbered, nevertheless they are counted together with the consecutive pages.

Figures are numbered consecutively by chapter.

Example:

Figure 3-1 means: in chapter 3, figure 1

1 Description

General:

The GN and GH series include the following models:

- GN and GNK
- GH and GHK

1.1 Operation conditions

Payload:

The payload of the vacuum lifter is meant for certain lifting goods. The type of the lifting goods is noted in the log book. The manufacturer will only guarantee a safe and continuous operation of the vacuum lifter when used with this type of lifting goods. The position of the vacuum surface(s) to the lifting goods is defined and must not be changed.



NOTE

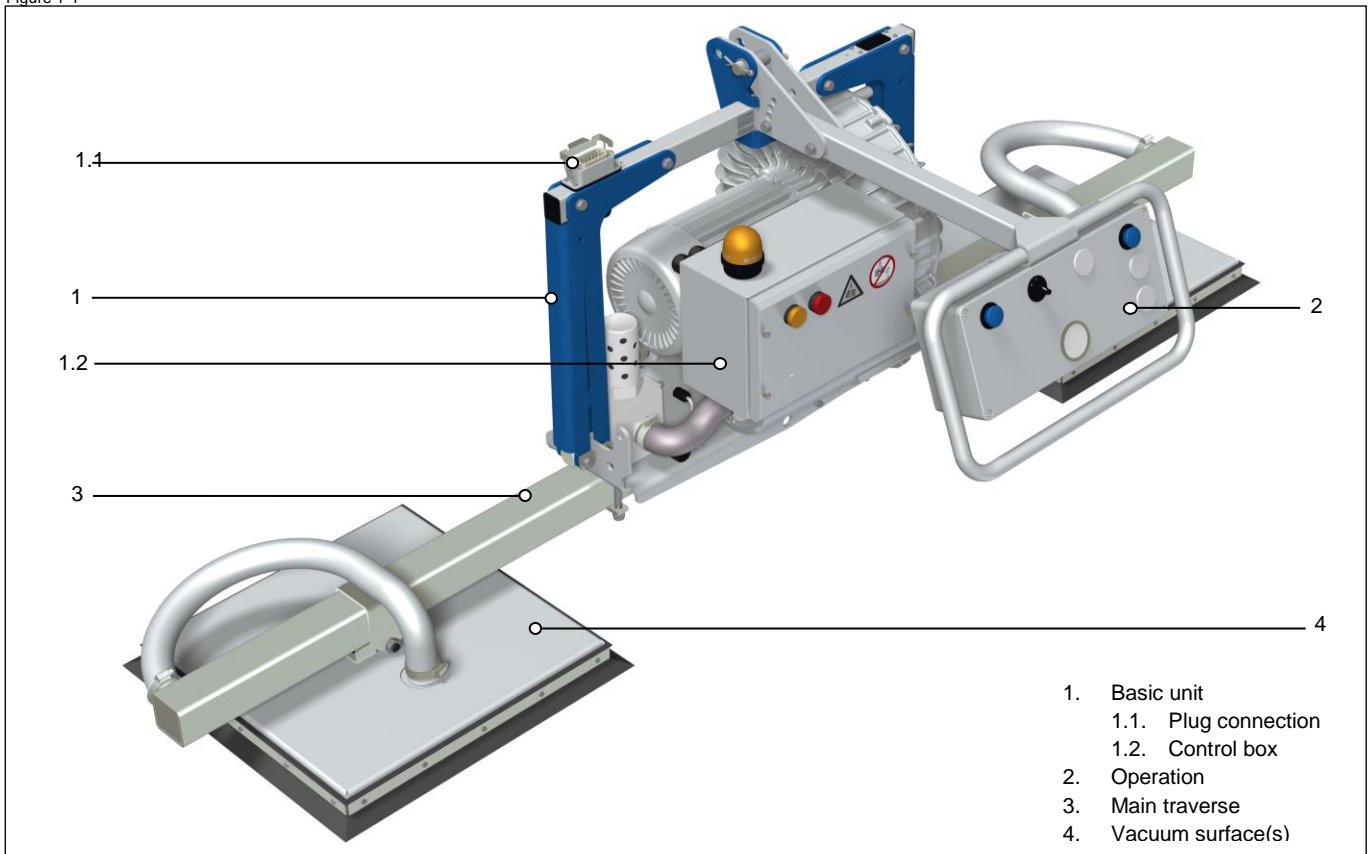
The payload is given on the payload plate and on the data plate at the control box.

Lifting units:

As a lifting unit an electrical chain hoist from the company GIS AG is recommended. When using lifting systems from other suppliers the lifting goods could fall off or the vacuum lifter could get damaged due to its higher acceleration. The manufacturer will only guarantee a safe and continuous operation when the vacuum lifter is lifted with an electrical chain hoist from GIS or with a third-party product with fine start.

1.2 General description GN

Figure 1-1



1.2.1 Basic unit

The complete framework with a mounted side channel blower, a switching valve, a connector and a control box is referred to as the basic unit.

1.2.1.1 Control box

All functions of the vacuum lifter are actuated via an integrated control in the control box. The control is equipped with a logic that provides information to the operator via three indicator lights on the control box. When the device is started all indicator lights light up for several seconds. In this process, the control checks the function of all indicator lights.



CAUTION !

If the warning lamp or the fault indicator do not work properly, the device cannot be started anymore. In this case it is obligatory to purchase an original light bulb from the manufacturer and install it.



NOTE

In case of delivery ex works, spare bulbs for the warning lamp, service lamp and fault indicator are to be found on the inside of the control-box cover.

Figure 1-2

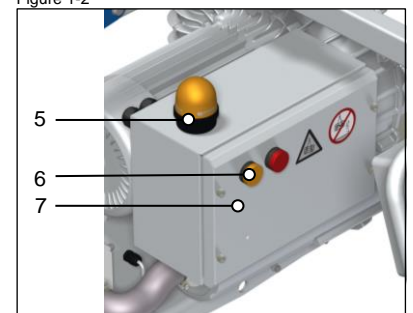


Table 1-1 Lamps

No.	Description	Indicator light	Function	Reaction
5	Warning lamp	Yellow, flashing or continuous	The lamp will start flashing when the vacuum level falls below a permissible value. If the lamp lights up without flashing, this indicates an interruption of the power supply or a power failure.	With sufficient distance to the load, unload load and move away from the lifting goods. Under no circumstances should you try to support or catch the falling goods.
6	Service lamp	Yellow, continuous	The service lamp will start flashing in a defined cycle and it reminds the operator that service is due.	Service needs to be carried out by trained and authorized personnel. After the service the service lamp is reset.
7	Fault indicator	Red, continuous	If the warning system is defective, the fault indicator lights up continuously and the device cannot be started anymore.	Replace the light bulb in the warning lamp. Should that not be sufficient, contact the manufacturer.
			If the service lamp is defective, the fault indicator lights up. The device can still be started though.	Replace the light bulb in the service lamp. Should that not be sufficient, contact the manufacturer.

1.2.1.2 Plug connection

The vacuum lifter is supplied with voltage via the 10-pin plug connection(s) and possibly connected to a crane. The first plug connection is needed for the electrical supply as well as for the control of the lifting unit. The second one is used optionally for trolley and crane drive. The integrated coding of the plugs prevents any confusion of the plugs.

1.2.2 Operation

All functions of the vacuum lifter as well as the lifting and travelling movements of the crane can be carried out via the operating panel. The manometer which displays the actual negative pressure at the vacuum surfaces is located on the operating panel.

Figure 1-3

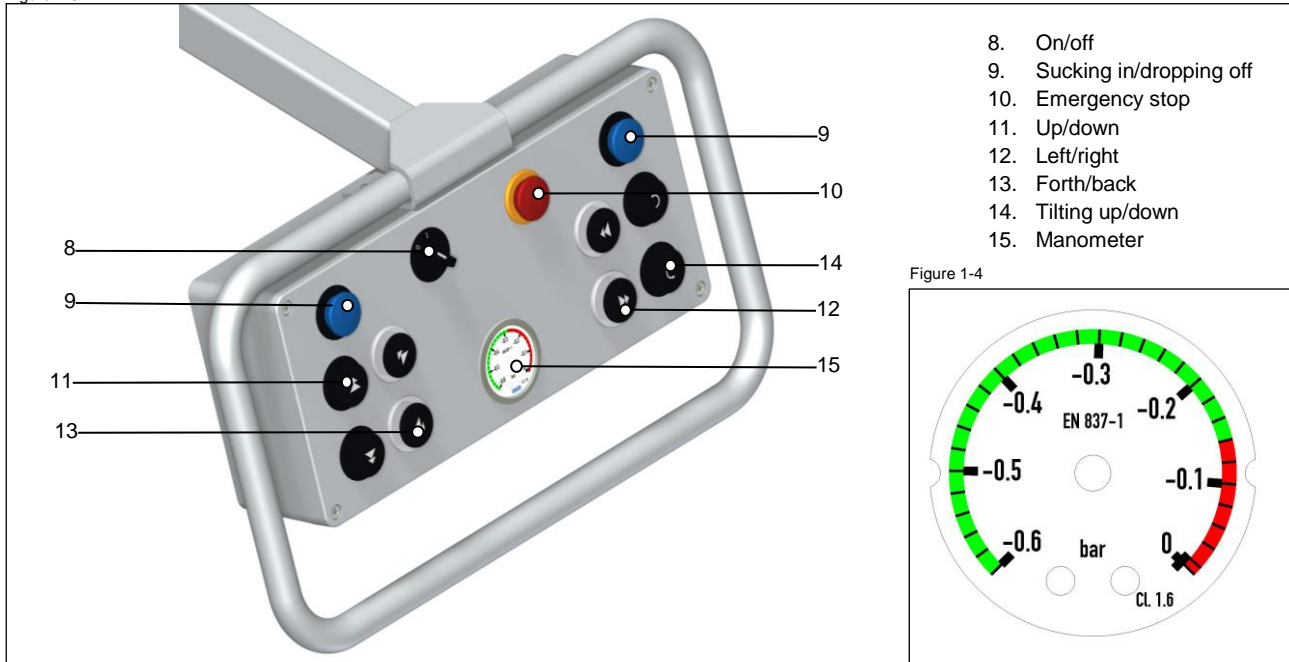
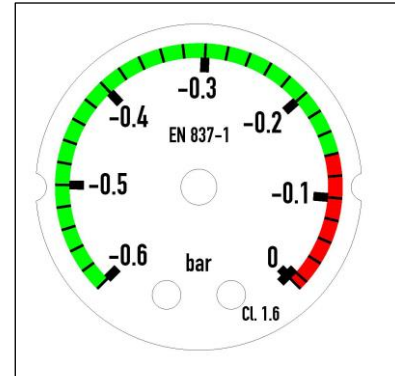


Figure 1-4



CAUTION !

If the indicator of the manometer is not clearly in the green range (see figure 1-4), it is prohibited to carry out any lifting, travelling or tilting movements.

The following push buttons are installed as a standard:

Table 1-2 Push button standard

No	Description	Colour	Function
8	On/off	Toggle switch, black	At switch position 1 the device starts. Before the compressor starts working, the control checks all functions. At switch position 0 the device switches off.
9	Sucking in/dropping off	Mushroom-head push button, blue	When actuating a button, the valve switches to sucking in. As soon as both push buttons are actuated at the same time, the valve switches to dropping off.

As an option, the following push buttons can be installed or retrofitted, if necessary.

Table 1-3 Push button optional

No.	Description	Colour	Function
10	Emergency stop	Mushroom-head push button, red and yellow	Emergency stop function for lifting and travelling movements. The vacuum lifter is not and must not be affected by the emergency stop.
11	Up/down	Mushroom-head push button, black	2-position push button for controlling a lifting unit.
12	Left/right	Mushroom-head push button, black	2-position push button for controlling the trolley drive.
13	Forth/back	Mushroom-head push button, black	2-position push button for controlling the crane drive.
14	Tilting up/down	Mushroom-head push button, black	The tilting drive of the vacuum lifter is actuated via these two push buttons.

1.2.3 Main traverse

With multi-surface devices a main traverse is used in order to have the vacuum surfaces at the intended distance. The traverses can differ dimensionally due to the payload and the desired length.

1.2.4 Vacuum surfaces

Every vacuum lifter is equipped with one or more vacuum surfaces. These are adapted to the lifting goods and are designed as a steel-sheet construction with a NBR frame sealing. For ordering a spare sealing, the serial number of the vacuum lifter, the box size (dimensions of the sheet metal box) and the number of sealings to be replaced need to be provided. If the sealing is equipped with an additional sealing (Spörri), this needs to be included in the order.



NOTE

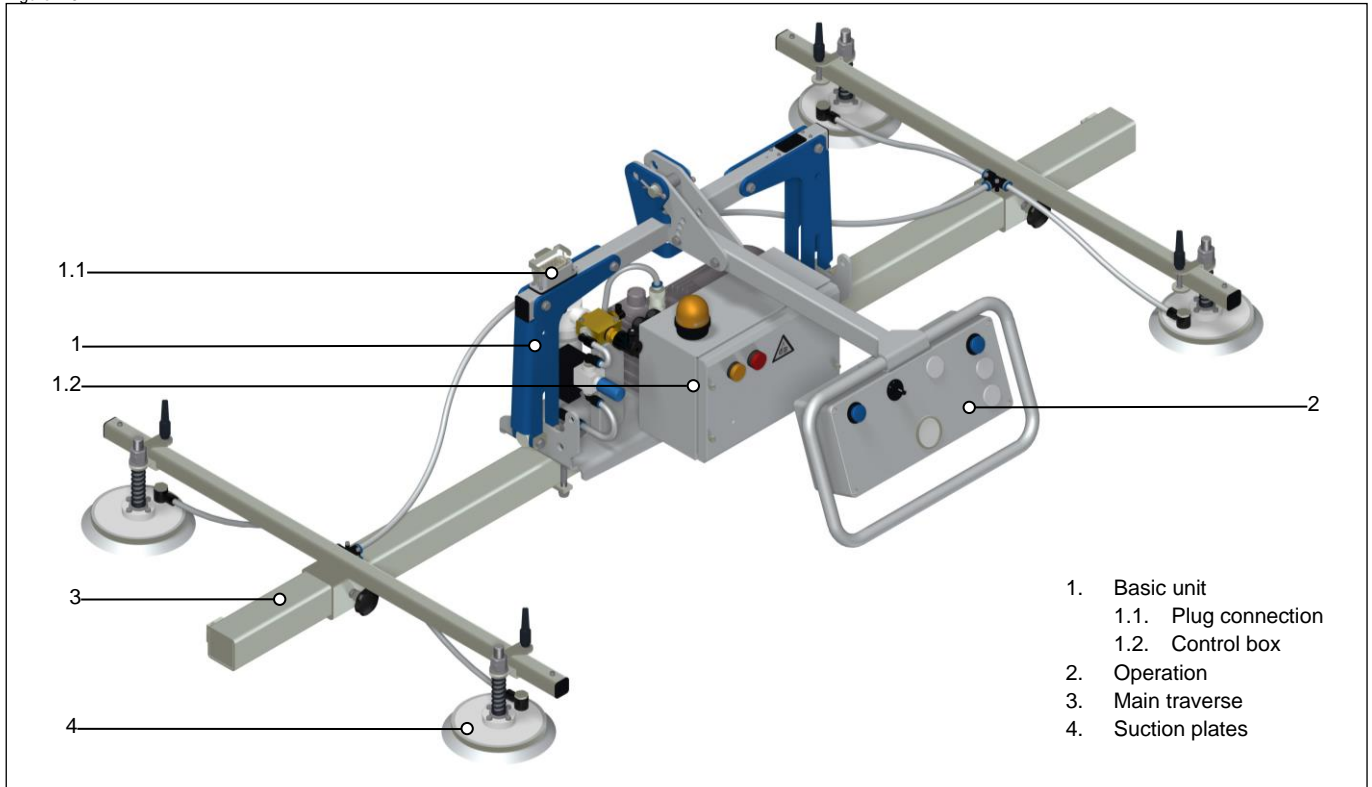
All information on the vacuum surfaces and the corresponding sealing are noted in the log book of the vacuum lifter.

1.2.4.1 Replacing the frame sealing:

1. Loosen the screws along the sealing
2. Remove old sealing and mount bars
3. Clean the contact areas of the sealing
4. Mount new sealing and bars (insert screws through sealing)

1.3 General description GH

Figure 1-5



- 1. Basic unit
- 1.1. Plug connection
- 1.2. Control box
- 2. Operation
- 3. Main traverse
- 4. Suction plates

1.3.1 Basic unit

The complete framework with a mounted rotary vane pump, a switching valve, a connector and a control box is referred to as the basic unit.

1.3.2 Control box

All functions of the vacuum lifter are actuated via an integrated control in the control box. The control is equipped with a logic that provides information to the operator via three indicator lights on the control box. When the device is started all indicator lights light up for several seconds. In this process, the control checks the function of all indicator lights.



CAUTION !

If the warning lamp or the fault indicator do not work properly, the device cannot be started anymore. In this case it is obligatory to purchase an original light bulb from the manufacturer and install it.



NOTE

In case of delivery ex works, spare bulbs for the warning lamp, service lamp and fault indicator are to be found on the inside of the control-box cover.

Figure 2-2

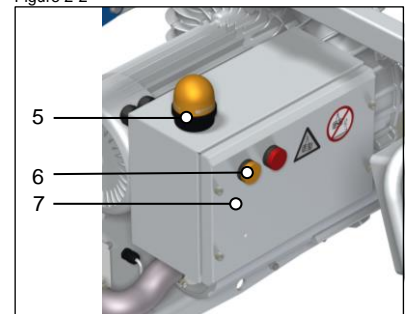


Table 1-1 Lamps

No.	Description	Indicator light	Function	Reaction
5	Warning lamp	Yellow, flashing or continuous	The lamp will start flashing when the vacuum level falls below a permissible value. If the lamp lights up without flashing, this indicates an interruption of the power supply or a power failure.	With sufficient distance to the load, unload load and move away from the lifting goods. Under no circumstances should you try to support or catch the falling goods.
6	Service lamp	Yellow, continuous	The service lamp will start flashing in a defined cycle and it reminds the operator that service is due.	Service needs to be carried out by trained and authorized personnel. After the service the service lamp is reset.
7	Fault indicator	Red, continuous	If the warning system is defective, the fault indicator lights up continuously and the device cannot be started anymore	Replace the light bulb in the warning lamp. Should that not be sufficient, contact the manufacturer.
			If the service lamp is defective, the fault indicator lights up. The device can still be started though.	Replace the light bulb in the service lamp. Should that not be sufficient, contact the manufacturer.

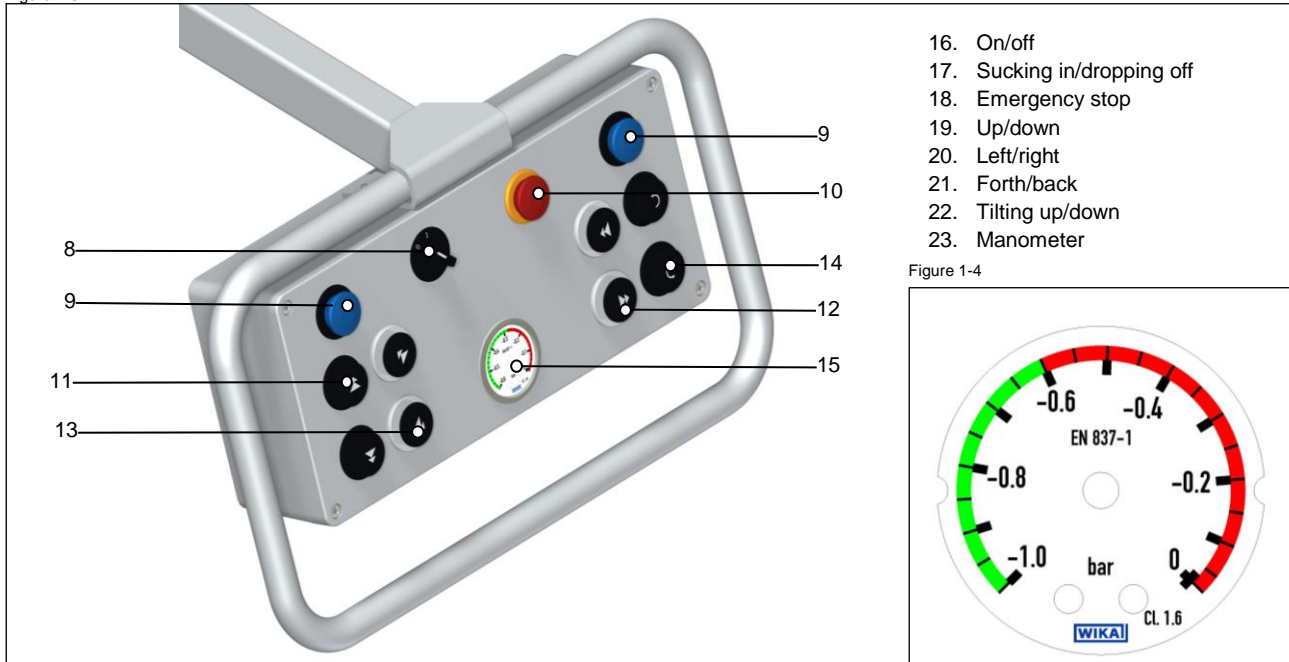
1.3.2.1 Plug connection

The vacuum lifter is supplied with voltage via the 10-pin plug connection(s) and possibly connected to a crane. The first plug connection is needed for the electrical supply as well as for the control of the lifting unit. The second one is used optionally for trolley and crane drive. The integrated coding of the plugs prevents any confusion of the plugs.

1.3.3 Operation

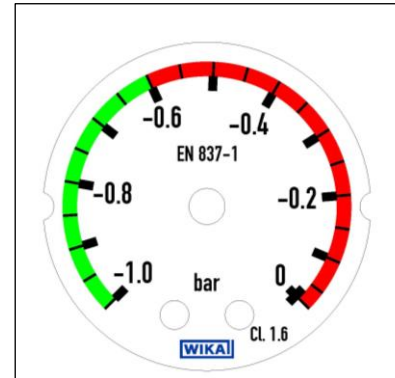
All functions of the vacuum lifter as well as the lifting and travelling movements of the crane can be carried out via the operating panel. The manometer which displays the actual negative pressure at the vacuum surfaces is located on the operating panel.

Figure 1-3



- 16. On/off
- 17. Sucking in/dropping off
- 18. Emergency stop
- 19. Up/down
- 20. Left/right
- 21. Forth/back
- 22. Tilting up/down
- 23. Manometer

Figure 1-4



CAUTION !

If the indicator of the manometer is not clearly in the green range (see figure 1-4), it is prohibited to carry out any lifting, travelling or tilting movements.

The following push buttons are installed as a standard:

Table 1-2 Push button standard

No	Description	Colour	Function
8	Off/on	Toggle switch, black	At switch position 1 the device starts. Before the compressor starts working, the control checks all functions. At switch position 0 the device switches off.
9	Sucking in/dropping off	Mushroom-head push button, blue	When actuating a button, the valve switches to sucking in. As soon as both push buttons are actuated at the same time, the valve switches to dropping off.

As an option, the following push buttons can be installed or retrofitted, if necessary.

Table 1-3 Push button optional

No.	Description	Colour	Function
10	Emergency stop	Mushroom-head push button, red and yellow	Emergency-stop function for lifting and travelling movements. The vacuum lifter is not and must not be affected by the emergency stop.
11	Up/down	Mushroom-head push button, black	2-position push button for controlling the lifting unit.
12	Left/right	Mushroom-head push button, black	2-position push button for controlling the trolley drive.
13	Forth/back	Mushroom-head push button, black	2-position push button for controlling the crane drive.
14	Tilting up/down	Mushroom-head push button, black	The tilting drive of the vacuum lifter is actuated via these two push buttons.

1.3.4 Main traverse and crossbar

With GH vacuum lifters a main traverse and several crossbars are used in order to have the suction plates at the intended distance. The traverses can differ dimensionally due to the payload and the desired length.

1.3.5 Suction plates

Every GH/K vacuum lifter is equipped with several vacuum surfaces. These are adapted to the lifting goods.

When ordering a spare sealing, the serial number of the vacuum lifter, the suction-plate diameter (outer diameter of the sealing) and the number of sealings to be replaced need to be provided.



NOTE

All information on the vacuum surfaces and the corresponding sealing are noted in the log book of the vacuum lifter.

1.3.5.1 Replacing the suction-plate sealing:

1. Loosen the tightening strap
2. Remove the old sealing
3. Clean the contact areas of the sealing
4. Mount new sealing
5. Mount and tighten the tightening strap

1.4 Options and accessories

1.4.1 Power supply with coiled cord

Figure 1-9



The feeding in of the vacuum lifter with AC and the connection of the vacuum lifter with lifting units, trolley and crane drives can be implemented via one or two 10-pin coiled cords.

1.4.2 Power supply with cable reels

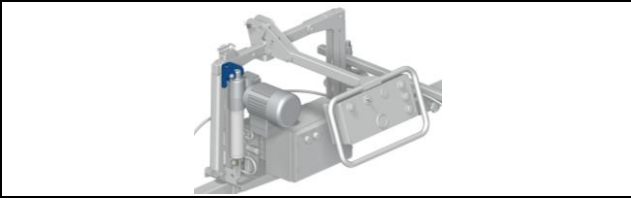
Figure 1-10



The feeding in of the vacuum lifter with AC and the connection of the vacuum lifter with lifting units, trolley and crane drives can be implemented via one to four 5-pin cable reels. For supply, lifting movements, trolley drive and crane drive there is one cable reel each.

1.4.3 Tilting

Figure 1-11



Vacuum lifter types GNK and GHK are equipped with an electrical linear drive. By the help of it the lifting goods can be tilted by 90°. Starting from a certain payload or in case of oversized lifting goods, two parallelly running linear drives are used.

1.4.4 Longitudinal operation

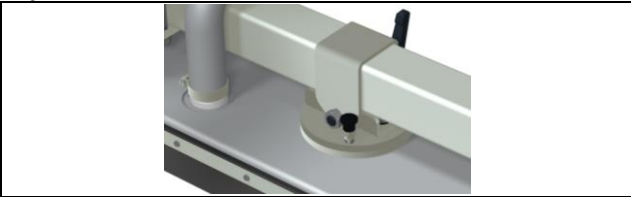
Figure 1-12



The operating panel of the vacuum lifter can be installed in longitudinal direction with regard to the traverse. By loosening the star handle the operating panel can be pulled out. The star handles must be tightened after pulling out or pushing in the operating panel.

1.4.5 Vacuum-surface turning

Figure 1-13



With GN/K vacuum lifters a vacuum-surface turning can be installed. By pulling the locking bolt and swivelling the vacuum surface at the same time, the vacuum-surface turning can be rotated by 90° one-sided. It is obligatory to work with the locking bolt engaged.

1.4.6 Turning main traverse

Figure 1-14



With GH/K vacuum lifters a turning of the main traverse can be installed. By pulling the locking bolt and swivelling the main traverse at the same time, the main traverse can be rotated. Turning infinitely in both directions is possible. As a standard, the turning engages at 90°.

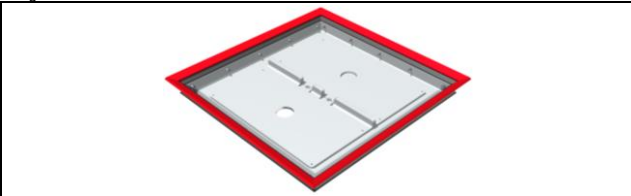


CAUTION !

Turning in a tilted position must be carried out very carefully. In case of eccentric sucking in of the lifting goods, the lifting good can turn powerfully after pulling the locking bolt.

1.4.7 Additional sealing „Spörri“

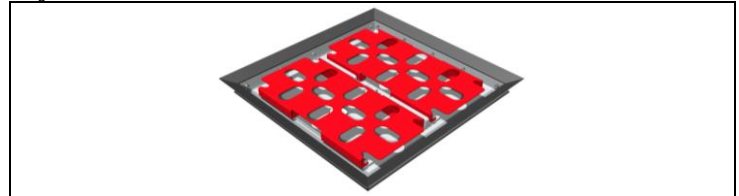
Figure 1-15



With vacuum lifters of the type GN/K an additional sealing can be glued onto the vacuum-surface sealing. This improves the sealing off in case of uneven and deeply structured surfaces. When ordering a spare sealing, note needs to be given whether an additional sealing is in place.

1.4.8 Vacuum-surface support

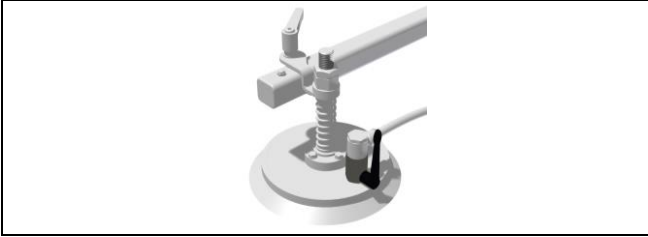
Figure 1-16



With vacuum lifters of the type GN/K a vacuum-surface support, i.e. a galvanized sheet, can be screwed in. This helps to prevent brittle and easily deformable lifting goods from being sucked in and can be retrofitted for various vacuum surfaces.

1.4.9 Shutting-off mechanism vacuum surfaces and suction plates

Figure 1-17



Vacuum lifters can be equipped with a manual vacuum surface or suction-plate shutting-off mechanism. By switching the ball valve the downstream vacuum-surface or the downstream suction-plate can be switched off.

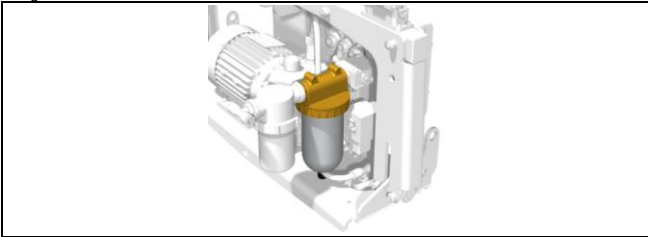


CAUTION !

The specified payload on the vacuum lifter refers to all vacuum surfaces. In case one or more vacuum surfaces are switched off, the payload can no longer be reached. The operator is obliged to not exceed the payload of the activated vacuum surfaces. It has to be observed that a manual shutdown of the vacuum surfaces or suction plates can lead to reduced safety conditions. Thus, the operator has to act more cautiously.

1.4.11 Water separator

Figure 1-19



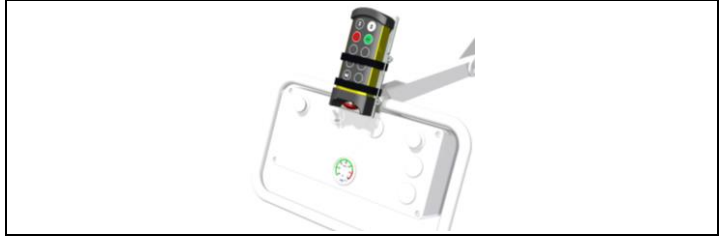
With vacuum lifters of the type GH/K a water separator can be installed. This protects the system against humidity. By turning the acrylic glass container it can be removed and emptied. The mark on the container must not be exceeded. The operator is responsible for checking the filling level periodically and empty the separator, if necessary.

1.4.13 Acoustic warning system

The acoustic warning system gives a signal parallelly to the yellow flashing warning lamp and can be used as an additional safety device in case of power failures and vacuum drops. As a result, the sound pressure level increases. This is not taken into account in table 0-1.

1.4.10 Control switch holder

Figure 1-18



Vacuum lifters that are connected to a lifting unit with its own control pad or radio control possess a holder for the control switch or radio control.

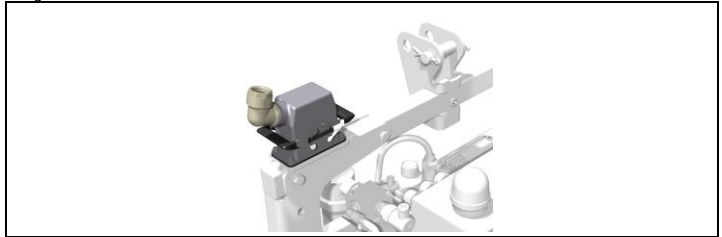


NOTE

These holders are designed and made for control switches by the company GIS AG. For third-party products a perfect attachment can not be guaranteed.

1.4.12 Reinforced plug

Figure 1-20



For vacuum lifters that operate in a rough and intense working environment a plug can be installed that is more robust and thus has a longer life cycle than the standard version.

1.4.14 Power saving mechanism

With vacuum lifters of the type GH/K a power saving mechanism can be installed. It controls the vacuum pump and switches it off when it is not needed. This leads to a lower power consumption, the life cycle of the compressor is increased drastically and the noise pollution is reduced.



CAUTION !

It should necessarily be noted that a power saving mechanism leads to a reduction of the working area and thus to a reduction in safety. It is absolutely necessary for the operator to act more carefully.

2 Start-up



CAUTION !

Mechanical adjustments may only be performed by authorized specialists.



CAUTION !

Operating staff must carefully read the operator's manual of the vacuum lifter before its initial operation and carry out all checks. Only when safe operation has been established may the device be put into operation. Unauthorized persons may not operate the device or carry out work with it.



CAUTION !

The operator must create a log book when starting up the vacuum lifter. The log book contains all technical data and the start-up date. It provides a record of all servicing and maintenance work.

2.1 Transport and assembly

The safety directions for handling with loads should be followed (see chapter 0.3) when transporting and assembling the vacuum lifter. Vacuum lifters must be assembled by qualified staff, always bearing in mind the accident prevention directions in chapter 0.2. Before assembly the vacuum lifters must be stored in an enclosed room or covered area. Should the vacuum lifter be destined for operation outdoors, then it is recommended that a protection cover is erected to shield it from the effects of the weather. The goods delivered should be checked for completeness and the packaging disposed of in an environmentally sound manner. It is recommended vacuum lifter is assembled and connected on-site by our qualified customer-service personnel.

2.2 Connection:

2.2.1 Electrical connection with power supply provided by the customer



CAUTION !

Electrical adjustments may only be performed by authorized personnel.

The mains-connection cable, the mains-connection fuse and the main switch for connecting the electrical vacuum lifter to the mains-power supply must be installed beforehand by the customer.

A 4-wire cable with a PE protective conductor is needed to provide the power supply. The length and cross-section must be appropriate for the power consumption of the vacuum lifter.

Connection of the vacuum lifter according to the enclosed circuit diagram.

- Before connecting the vacuum lifter, check whether the operating voltage and frequency that are specified on the name plate correspond with the available power supply
- Take off the upper part of the plug and remove the plug insert
- Insert connecting cable through the screwed cable connection M25 x 1.5 and connect to terminals 6, 7, 8 and PE in accordance with the supplied circuit diagram
- Insert control cable through the screwed cable connection M25 x 1.5 and connect to terminals 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 in accordance with the supplied circuit diagram
- Mount cable discharging device(s) at the eyebolt



CAUTION !

The protective conductor should not conduct any current. When installing a motor protector, the current has to be observed according to the name plate of the vacuum lifter.



CAUTION !

Checking direction of rotation: If the direction of rotation of the compressor is not correct, the supply wires L1 and L2 need to be swapped.



CAUTION !

The supply line must not pull on the plug but on the eyebolt.

2.2.2 Electrical connection with supplied coiled cords



CAUTION !

Electrical adjustments may only be performed by authorized personnel.

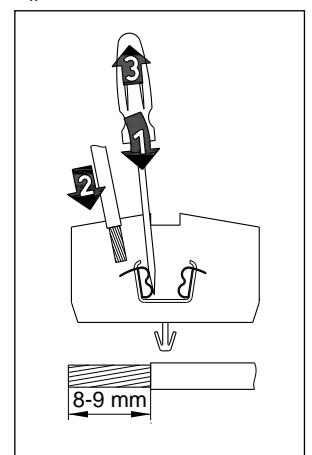
The mains-connection cable, the mains-connection fuse and the main switch for connecting the vacuum lifter to the mains-power supply must be installed beforehand by the customer.

A 4-wire cable with a PE protective conductor is needed to provide the power supply. The length and cross-section must be appropriate for the power consumption of the vacuum lifter.

Connection of the vacuum lifter according to the enclosed circuit diagram

- Before connecting the vacuum lifter, check whether the operating voltage and frequency that are specified on the name plate correspond with the available power supply
- In case of a single coiled cord it can be ducted into the lifting unit.
- In case there is a supply with two coiled cords, a feeding-in into both terminal boxes is necessary.
- Terminals are labelled and have to be installed according to the enclosed circuit diagram. (See figure 2-1)

Figure 2-1



**CAUTION !**

The protective conductor should not conduct any current. When installing a motor protector, the current has to be observed according to the name plate of the vacuum lifter.

**CAUTION !**

Checking the direction of rotation: If the direction of rotation of the compressor is not correct, the supply wires L1 and L2 have to be swapped.

2.2.3 Electrical connection with supplied cable reel(s)

**CAUTION !**

Electrical adjustments may only be performed by authorized personnel.

The mains-connection cable, the mains-connection fuse and the main switch for connecting the vacuum lifter to the mains-power supply must be installed beforehand by the customer.

A 4-wire cable with a PE protective conductor is needed to provide the power supply. The length and cross-section must be appropriate for the power consumption of the vacuum lifter.

Connection of the vacuum lifter according to the circuit diagram.

- Before connecting the vacuum lifter, check whether the operating voltage and frequency that are specified on the name plate correspond with the available power supply.
- The cable reels have an internal clamp. The supply line has to be connected to it according to the circuit diagram.

**CAUTION !**

The protective conductor should not conduct any current. When installing a motor protector, the current has to be observed according to the name plate of the vacuum lifter.

**CAUTION !**

Checking direction of rotation: If the direction of rotation of the compressor is not correct, the supply wires L1 and L2 have to be swapped.

**CAUTION !**

The supply line must not pull on the plug but on the eyebolt.

2.3 Checks after the assembly and setup

2.3.1 Check fuses

Check upstream fuses. The values of the fuses built in the equipment box must correspond with the values specified in table 4-1 Technical Data for the respective motor type.

**CAUTION !**

Under no circumstance stronger fuses than those specified in table 4-1 should be used!

2.3.2 Check electrical connections

Electrical supply cables must be checked for safe guidance and tightness.

**CAUTION !**

- Squeezing, dragging and smashing of the cables must be avoided.
- Check whether cable clamps and fastening material are tightened properly.

2.3.3 Check warning system

The functioning of the warning system has to be checked during start-up:

Set the device to suction position:

- Disconnect the plug to simulate power failure
- By disconnecting a hose on the vacuum surface or the suction plate, a vacuum drop can be simulated

The warning system is run with a maintenance-free lead accumulator. The life cycle of this accumulator highly depends on the use and the mains supply. At least it should last for one year.

2.3.4 Function check

Function check of all push buttons on the control panel

The movement directions must correspond with the icons

Checking the suction power using a smooth, airtight surface. The manometer has to reach the minimum final pressure. (See table 4-1)

**CAUTION !**

Foreign bodies and liquids such as lubricant or cooling agent, solid and movable items and heavy dust on the lifting goods should be avoided. If these are sucked in, this can lead to malfunctions.

3 Service and maintenance

3.1 General guidelines for maintenance and servicing

Operating failures in vacuum lifters affecting the safe operation of the device should be eliminated immediately. The vacuum lifters may only be serviced by trained and authorized personnel.



NOTE

We recommend to ask our customer service to perform the service work.



CAUTION !

If the operator performs maintenance work on a vacuum lifter on his own account, the type of maintenance performed together with the date carried out must be entered in the log book.

Modifications as well as supplements and retrofittings to the vacuum lifters which may affect safety must be authorized by the manufacturer in advance. Structural alterations to vacuum lifters not authorized by the manufacturer exempt the manufacturer from liability in case of damage. Material warranty claims will only be recognized as valid if exclusively original manufacturer's spare parts are used. We explicitly advise that original parts and accessories not delivered by us are also not checked and released by us.

General:

Service and maintenance are preventive measures designed to preserve the full functionality of vacuum lifters. Non-compliance with service and maintenance routines can result in reduction in the useful function and damage to vacuum lifters.

Service and maintenance work should be carried out at the predefined time intervals.

During service and maintenance work, general accident-prevention directions, special safety directions (chapter 0.3) as well as hazard-protection instructions (chapter 0.4) should be followed.



CAUTION !

Service and maintenance work should only be performed on unloaded vacuum lifters. The main switch must be off. The lower sheave or hook fittings must be lying on the floor or a maintenance platform.

Service work encompasses visual checks and cleaning routines. Service work encompasses additional functional checks. During the functional checks, all fixing elements and cable clamps must be checked for tightness. Cables must be inspected for dirt, discoloration and scorching.



CAUTION !

Used operating materials (oil, grease, etc.) should be safely collected and disposed of in an environmentally sound manner.

Service and maintenance intervals are defined as follows:

t..... : daily
 3 M..... : after 3 months
 12 M..... : after 12 months

The mentioned service and maintenance intervals apply to normal operating hours. The predefined service and maintenance intervals should be reduced if the strain on the vacuum lifter is excessively high and when adverse conditions (dust, heat, humidity, steam, etc.) occur frequently during operation.

3.1.1 Service overview

Table 3-1 Service overview

Designation	t	3 M	12 M	Activity	Notes
Basic frame		X		Visual check Cleaning and lubricating, if needed	
Suspension	X			Visual check	
Compressor GN/K	X			Check for abnormal noise / sealing	See chapter 3.5
Compressor GH/K	X			Check for abnormal noise / sealing	See chapter 3.6
Control/illuminant	X			Visual check for functioning of the warning system and whether service lamp or fault indicator is lit.	See chapter 3.2
Tilting drives	X			Check for abnormal noise / sealing	
Control panel	X			Check for abnormal noises and pressure resistance	
Sealings		X		Visual check	See chapter 3.3
Power supply		X		Visual check	See chapter 3.7 & 3.8
Water separator	X			Visual check whether mark reached, empty if needed	See chapter 3.6.3

3.1.2 Maintenance overview

Table 3-2 Maintenance overview

Designation	T	3 M	12 M	Activity	Note
Basic frame			X	Visual check and cleaning	
Suspension			X	Check for cracks	
Compressor GN/K			X	Check for abnormal noise / sealing / clean silencer	See chapter 3.5
Compressor GH/K			X	Check for abnormal noise / sealing / clean air filter	See chapter 3.6.1
Control/illuminant			X	Check warning system / check and replace accumulators, if necessary	See chapter 3.2
Tilting drives			X	Check for abnormal noise / sealing / check limit switch	
Main traverse			X	Check for cracks and tightness	
Vacuum-surface suspension			X	Check for cracks	
Sealings			X	Check for wear and tightness	See chapter 3.3
Rotary disks/ring gear			X	Check for cracks	
Power supply			X	Functioning check / checking for wear and defective insulation	See chapter 3.7. & 3.8
Air filter GH/K			X	Clean air filter	See chapter 3.6.2

3.2 Control and illuminant

The control and the corresponding illuminants are self-checking. If the light bulb or the warning system are defective, the red fault indicator lights up. If maintenance is due, the yellow service lamp lights up. After finishing maintenance work the service lamp is reset.



NOTE

Resetting the service lamp should only be performed by trained and authorized personnel.

3.3 Sealings for vacuum surfaces and suction plates

The vacuum surface and suction plate sealings have to be checked for abrasion periodically. For this purpose, the vacuum lifter has to be positioned on a smooth and airtight surface. If the minimum final vacuum is not reached due to damages or other modifications, the vacuum-surface sealings have to be replaced immediately.

3.4 Vacuum system

The vacuum has to be monitored permanently on the vacuum gauge. If the minimum final vacuum is not reached, the vacuum lifter must not be operated.

Possible causes for not reaching the final vacuum:

- Clogged air cell at compressor
- Leakage in duct system
- Damaged or heavily worn out sealing(s) for vacuum surfaces and suction plates
- Clogged lines



CAUTION !

If the minimum final vacuum is not reached, the vacuum lifter is not able to suck in the specified payload safely.

3.5 Basic unit GN/K

These basic units are generally maintenance-free. All bearings are designed with permanent lubrication.

3.6 Basic unit GH/K

3.6.1 Compressor:

- For maintenance work on the rotary vane pump, we recommend the spare-part kits of the manufacturer. These contain the necessary instructions. Maintenance every 6000 operating hours.



CAUTION !

After having transported humid goods, the vacuum lifter has to continue running for at least 5 minutes on the "dropping of" position.

3.6.2 Air filter:

- The air filter of the rotary vane pump must be replaced every 3000 operating hours. The filter cartridge of the upstream filter must be cleaned on a regular basis.

3.6.3 Water separator (optional):

The water separator has to be emptied on a regular basis depending on air humidity.



CAUTION !

If the water separator is filled up to the mark, it has to be emptied immediately. If this is not done or done too late, the compressor can be subject to serious damage.

3.7 Coiled cord

Coiled cords are generally maintenance-free. Due to repeated extraction of the coil, the spring force can decrease and the coiled cord must be replaced, if needed.

3.8 Cable reels

The coil spring of the cable-reel rewinder is subject to wear due to the bending cycles. This can lead to the coil spring being broken. The coil spring is secured for safe removal. The spare spring comes with instructions for replacement.

3.9 Spare part orders

Material warranty claims will only be recognized as valid if exclusively original manufacturer's spare parts are used. We explicitly inform you that original parts and accessories not delivered by us are also not checked and released by us.



NOTE

Spare parts and the corresponding spare part numbers can be found on the enclosed spare part list.

4 Appendix

4.1 Technical data

Table 4-1 Technical Data GN/K and GH/K

Series	Power [kW]	Min. friction coefficient [μ _s]	3 x 400V, 50Hz [A]	Control voltage [V]	Min. vacuum [bar]	Nominal suc- tion capacity [m ³ /h]
GN	2.2	-	6	24	-0,280	335
GNK	2.2	0.5	6	24	-0,280	335
GH	0.37	-	1.4	24	-0,800	10
GHK	0.37	0.5	1.4	24	-0,800	10

4.2 Possible options

Table 4-2 Possible options

Option	GN	GNK	GH	GHK
Power supply coiled cord				
Power supply cable reel(s)				
Longitudinal operation		-		-
Vacuum-surface turning			-	-
Turning main traverse	-	-		
Shutdown mechanism for vacuum surfaces or suc- tion plates				
Control switch holder				
Water separator	-	-		
Reinforced plug				
Additional sealing "Spörri"			-	-
Vacuum-surface support			-	-
Acoustic warning system				
Energy saving mechanism	-	-	On request	On request

4.3 Troubleshooting, elimination

Table 4-3 Troubleshooting, elimination

Error	Cause	Elimination
Warning lamp is lit	Power failure or power-supply interruption	Check supply line, check fuses
Warning lamp flashing	Vacuum falls below its lower limit for the working area	Leave the working area immediately
Fault indicator (red) is lit, compressor starts	Service lamp defective	Replacement of the light bulb in the service lamp. Spare light bulbs are to be found in the control box in case of delivery ex works
Fault indicator (red) is lit, compressor does not start	Warning lamp defective	Replacement of the light bulb in the warning lamp. Spare light bulbs are to be found in the control box in case of delivery ex works
Compressor does not start, fault indicator does not light up during lamp check	Fault indicator defective	Replacement of the light bulb in the fault indicator. Spare light bulbs are to be found in the control box in case of delivery ex works
Warning system does not work in case of power failures	Accumulators defective	Replace accumulators
	Control defective	Replace control
Vacuum generation works, workpiece is not sucked in	Hose / screwed connection leaking	Replace / seal components
	Wrong direction of rotation of compressor	Check direction of rotation, check / correct connection
	Filter or silencer clogged	Cleaning
	Sealing at vacuum surface or suction plate defective	Replace sealing
	Device on position "dropping off"	Change to "sucking in" using operating panel
	Switching valve defective	Contact customer service
	Lifting goods too porous	Contact customer service
Workpieces fall off during transportation	Payload too high	Determine weight of payload and compare with name plate
	Sealing at vacuum surface or suction plate defective	Replace sealing
	Hose is kinked	Change hose position and/or replace hose
	Lifting acceleration too high	Reduce lifting speed
	Several lifting goods are sucked in	Separate workpieces from another
	Lifting goods too porous	Contact customer service
Compressor does not work	Electrical connection defective	Check / correct connection
	Voltage only on two phases	Check connection / fuse
	Power consumption increased	Check motor for faults, check for thermal overload (cooling necessary), clean vacuum filter
	Power supply interrupted	Check mains supply
	Warning lamp or fault indicator defective	Replace light bulb
	Control defective	Contact customer service
	Compressor defective	Contact customer service



EC DECLARATION OF CONFORMITY

Declaration for machinery according to the EC 2006/42/EC, Appendix II A, 2004/108/EC, Appendix I and 2006/95/EC, Appendix III

Hereby we,

GIS AG, Lifting and Crane Technology, Luzernerstrasse 50, CH-6247 Schötz,

declare that the machinery



**GIS vacuum lifter, series
payload range**

**GN/K and GH/K
up to 1000 kg**

which is developed for sucking in loads, meets the essential requirements of the following EC directives, in standard production and from the 2013 model year, inclusive of load control, as applicable to the scope of delivery:

EC machine directive	2006/42/EC
EC directive on electromagnetic compatibility	2004/108/EC
EC directive on low voltage	2006/95/EC

Harmonized standards applied:

EN 13155	Cranes, safety, non-fixed load lifting members
DIN EN ISO 13849-1	Safety related parts of controls; part 1: General principles for design
DIN EN 60204-1	Electrical equipment of machines, part 1: General requirements
DIN EN 14238	Cranes - Manually controlled load manipulating devices Without: 5.4.2.1 Paragraph 3 und 5.4.2.3 Paragraf 3

Standards and technical specifications applied:

ISO 12100-1	Safety of machines, part 1: Basic terminology
ISO 12100-2	Safety of machines, part 2: Technical principles

Authorized to compile relevant technical documentation:

GIS AG, Luzernerstrasse 50, CH-6247 Schötz.

Schötz, 01.01.2014

GIS AG

I. Muri
Board of Directors

E. Widmer
Sales Management

The completion, installation and start-up as per instruction manual is documented in the log book.



EC DECLARATION OF INCORPORATION

Declaration for the incorporation of partly completed machinery according to EU directives 2006/42/EC, Annex II B, 2004/108/EC, Annex and 2006/95/EC, Annex III

Hereby we,

GIS AG, Lifting and Crane Technology, Luzernerstrasse 50, CH-6247 Schötz,

declare that the partly completed machinery



**GIS vacuum lifter, series
payload range**

**GN/K and GH/K
up to 1000 kg**

which is developed for sucking in loads, which is designed for incorporation in machinery and meets the essential requirements of the following EC directives, in standard production and from the 2013 model year, inclusive of load control, as applicable to the scope of delivery:

EC machine directive	2006/42/EC
EC directive on electromagnetic compatibility	2004/108/EC
EC directive on low voltage	2006/95/EC

We also declare that the technical documentation has been compiled in accordance with Annex VII, Part B of Directive 2006/42/EC. We undertake to submit the specific documents relating to the lifting device to national authorities on receipt of a reasonable request. The information will be supplied by electronic means.

Harmonized standards applied:

EN 13155	Cranes, safety, non-fixed load lifting members
DIN EN ISO 13849-1	Safety related parts of controls; part 1: General principles for design
DIN EN 60204-1	Electrical equipment of machines, part 1: General requirements
DIN EN 14238	Cranes - Manually controlled load manipulating devices Without: 5.4.2.1 Paragraph 3 und 5.4.2.3 Paragraf 3

Standards and technical specifications applied:

ISO 12100-1	Safety of machines, part 1: Basic terminology
ISO 12100-2	Safety of machines, part 2: Technical principles

This declaration only refers to the vacuum lifter. A start-up is prohibited until it is proven that the crane where the lifting device is built in corresponds with the above mentioned EC directives.

Authorized to compile relevant technical documentation:

GIS AG, Luzernerstrasse 50, CH-6247 Schötz.

Schötz, 01.01.2014

GIS AG

I. Muri
Board of Directors

E. Widmer
Sales Management

The completion, installation and start-up as per instruction manual is documented in the log book.