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**GLASS**

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## OPERATOR MANUAL

# VIAVAC GB2 CURVED



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## Index

A 1	Introduction.....	2
A 2	EC-declaration of conformity .....	4
A 3	Definitions .....	5
B 1	Operators declaration .....	1
B 2	Operating limits .....	2
B 3	Operation.....	3
B 4	Working at altitudes above 1200mtr .....	8
B 5	Storage.....	8
B 6	Transport- and manipulation possibilities.....	9
B 7	Battery .....	11
B 8	Options .....	12
B 9	Safety precautions.....	14
C 1	Expert declaration .....	1
C 2	Technical data.....	2
C 3	Checking and maintenance .....	3
C 4	Inspection & maintenance report .....	6
C 5	Mal functioning and repair.....	8
C 6	Electric wiring diagram .....	9
C 7	Vacuum diagram.....	22
C 8	Digital vacuum switch.....	23
C 9	Spare parts.....	24
C 10	Instruction and warning stickers .....	28
C 11	Maintenance record .....	30
C 12	Errata .....	32

## A 1 Introduction

Dear reader,

**This manual is subdivided into the following sections:**

**A General section**

This section is intended for anyone who uses this manual.

**B Operator's section**

This section is intended for anyone who utilizes and operates this device.

**C Technical section**

This section is intended for the specialist staff that maintain and repair this device.

Depending upon your function, you need to read the relevant section carefully.

To operate this device safely it is important that you strictly follow the instructions.

If you are in doubt, or face problems when using, maintaining or repairing, please contact your authorized VIAVAC dealer. They will do their utmost to serve you adequately and quickly.

In the text of this manual the following symbols are used.



**TIP:**

**Gives suggestions and advice to perform certain tasks more easily and effectively.**



**TAKE CARE**

**a remark with additional information, draws your attention to possible problems.**



**WARNING**

**If these instructions are not executed carefully, this can result in (serious) injuries or even death.**

These symbols indicate important information.

You need to be convinced that anyone who utilizes this device has properly understood this information.

This manual should be made available to anyone who operates, checks or repairs this device.

To ensure that the manual is available, it should be stored at the designated spot together with the device.

**REMARK**

In this manual 2 versions of the VIAVAC GB are described, namely:

**Main unit versions:**

GB2.2 :Manual operated “Suction and release” by ball valves on the main unit.

GB2.2r :Remote control operation “Suction and release” is possible because of electric valves on the main unit .

There is already a remote control installed:

- Radio Remote control, by transmitter and a built in receiver in the main unit.

These versions differ only concerning operation suction and release.

Where applicable, it will be indicated which version it concerns by marking GB2.2 or GB2.2r

Your version is indicated on the identification plate which is attached to the device.

**A 2 EC-declaration of conformity**

Complies to enclosure II A from directive 2006/42/EG



**The manufacturer:**

VIAVAC vacuum lifting BV  
Bedrijfsweg 6  
3411 NV Lopik  
The Netherlands

**Hereby declares that:**

Machine : Vacuum lifter

Type : **GB . . . . . -300/R800**

Machine No. : . . . . .

**Complies with the following directives:**

- Machine directive 2006/42/EG with modifications
- Low voltage directive 2014/35/EU
- EMC directive 2014/30/EU
- American standard ASME B30.20-2010
- American standard ASME BTH1-2011 design category "A", Service Class "O"
- Australian Standard AS 4991-2004

**The following standards have been applied:**

Safety of machinery	Basic concepts	EN-ISO 12100-1
Safety of machinery	Basic design principles	EN-ISO 12100-2
Safety of machinery	Principles of risk assessment	EN-ISO 14121
Safety of machinery	Audible and visual warning signals	EN 981+A1
Safety of machinery	Electrical equipment for machines	EN 60204-1:2001
Crane safety	Non-fixed load lifting attachments	EN 13155+A2

Date: . . . . .

Signature

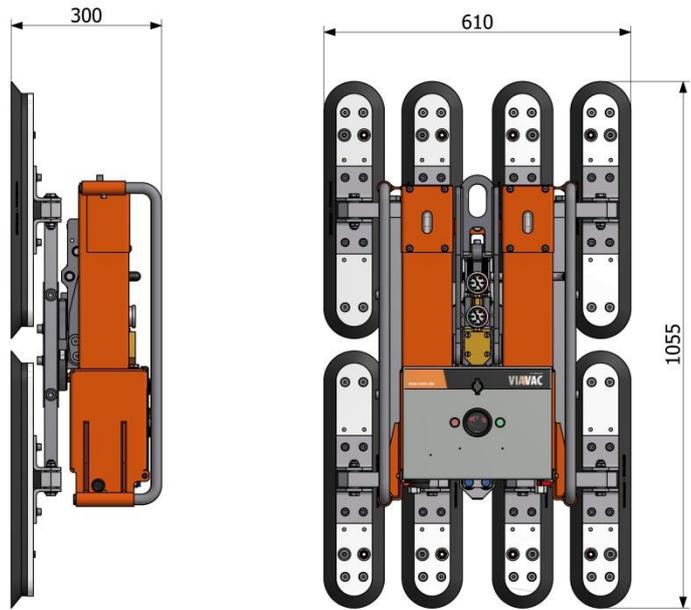
Arie de Groot  
Managing director

## A 3 Definitions

<b>Operator</b>	Person(s) who operate(s) and utilize(s) the vacuum lifter.
<b>Lifting device</b>	Lifting crane, overhead crane, forklift truck or any other, well or not into a machine integrated lifting arrangement, on which the vacuum lifter is suspended and lifting tasks are executed.
<b>Load</b>	The object being transported and/or handled by the vacuum lifter.
<b>Working load Limit</b>	The maximum weight of the load, which can be transported safely with the vacuum lifter
<b>Suction</b>	By actuating a valve, sucking the load fixed to the suction pad.
<b>Aerating</b>	By actuating a valve, releasing the load by enabling air flowing to the suction pad.
<b>Maintenance expert</b>	Expert responsible for inspection, maintenance and repair of the vacuum lifting device.
<b>Load ratio</b>	Ratio between the maximum calculated load which can be lifted with the device and the safe working load which is indicated on the device.
<b>Testing ratio</b>	Ratio between the load, used for the static test of the vacuum lifter and the safe working load indicated on the device.
<b>Static test</b>	Test where the vacuum lifter should withstand a static force equivalent to 2x working load limit without permanent deformation and after removal of the force, there shall be no visible defects.
<b>Holding time Test</b>	With the suction pad in vertical position, a (non-porous) load corresponding to the working load limit is lifted. After this, the main switch is switched off so the vacuum pump will not run anymore. The vacuum lifter should be able to hold the load for a prescribed time.



## B 2 Operating limits



**Lifting capacity**

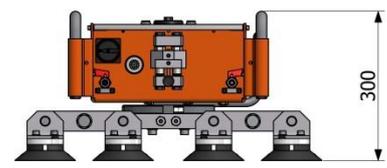
max. 300kg

**Own weight**

c.a. 90kg



Used for curved glass (R<sub>min</sub>=800mm)



Used for straight glass

**Load**

Non porous rigid material such as glass, aluminium, steel and stone.  
The suction area must be smooth and flat.

**Capabilities**

- 90° tilting from horizontal to vertical with locking facility in vertical position.
- 360° turning with locking facility every 90°.

**Operation elevation**

Max. 1,200 m. above sea level

**Operating Temperatures**

0°C to +40°C  
-10°C to 0°C with special precautions.

**Service life**

At least 20,000 cycles, when used as intended.

**Outside use**

This lifter can also be used outside, however not in hazardous areas where there is a risk of explosion.

**Rain and snow**



This lifter may also be used in rain and snow conditions, however care should be taken to ensure a dry suction area. The reason for this is that moisture or ice greatly reduces the necessary friction between suction pad and load. This friction is essential to lift the load in vertical position of the suction pad.

**Wind**

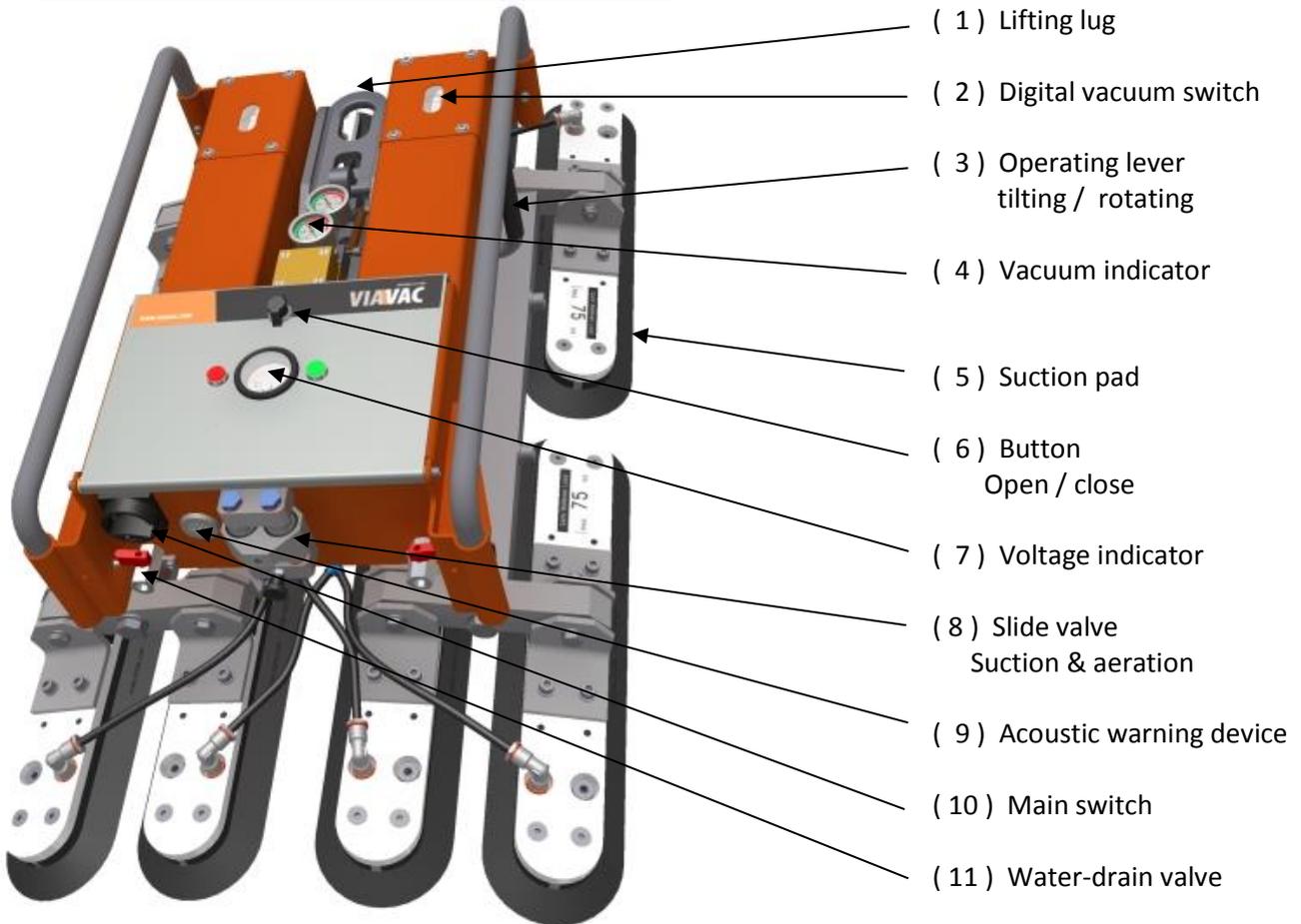
Do not use this lifter at wind speeds above 10 meter/sec.  
or when there is a chance for wind bursts.

**Non rigid plates**

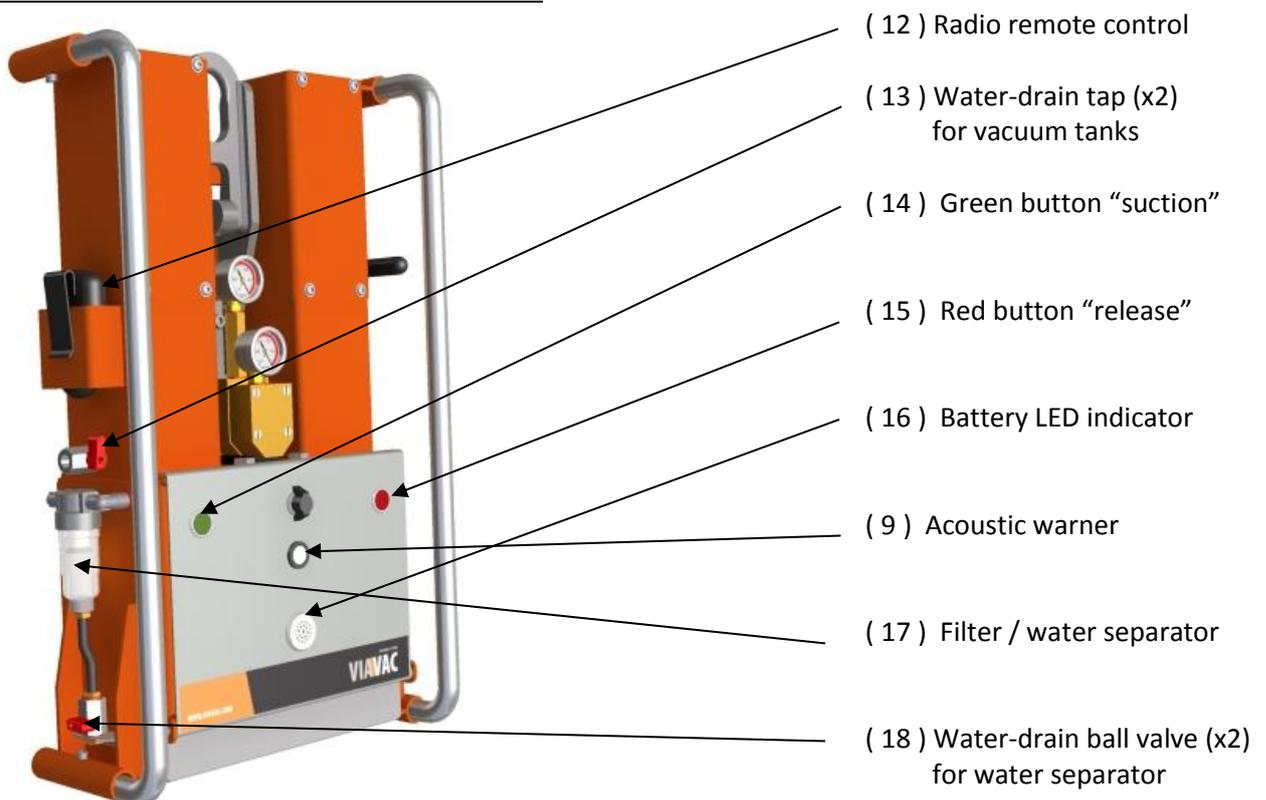
This lifter is not suitable for lifting non rigid plates.  
(the plate can peel off of the suction pad causing the load to be released).

### B 3 Operation

#### GB2.2 Vacuum unit with handle "suction / release"



#### GB2.2r Vacuum unit with radio remote control



### **Operation procedure GB2.2**

1. Suspend device on the crane hook by the lifting eye (1).
2. Before every lift, check the condition of the rubber sealing profile of the suction pad, there should be no tears or damage.
3. Before every lift, check the black rubber backplate on the backside of the suction cup; this must be clean and dry.
4. Ensure that the control lever (8) "suction & aerating" is set to the left (red area)  
Start the device by setting the main switch (10) to 1.
  - Now you will hear the vacuum pump running, it will stop 10 seconds after a vacuum level of -0.65 bar has been built up in the vacuum buffer tank.
  - The alarm is audible and the red lamp will light up as long as the vacuum level is still below -0.6-bar, above that the alarm will stop and the green lamp will light up instead of the red.
5. Check on the voltage indicator (7) whether the battery has been sufficiently charged; the pointer should remain between 11 and 13 volts while the vacuum pump is running.
6. Use the control lever (3) to set the suction pad in the right position.
  - Lever up: rotate suction pad with automatic stop every 90°
  - Lever down: suction pad will tilt from vertical to horizontal.
7. Put the device with the suction pad on the load, ensure that the suction surface is dry and clean.
8. Move the slide valve (8) to suction (green area).
9. Check on the vacuum indicator (4) whether the required vacuum level of >-0.60 bar has been built up (pointer in the green area).
10. When the load has been placed and secured, set the slide valve (8) to aerating (red area).
11. The suction pad will release and a new load can be lifted by putting the suction pad on it and setting the slide valve (8) to "suction".
12. After the last element has been placed, disconnect the device by setting the main switch (10) to 0.

### **Operation procedure GB2.2r with radio remote control**

This is identical to GB2.2 except for at the following points:

For safety reasons, a code on the transmitter has to be pressed first before it is possible to activate "suction & release".

4. Start up the device by pressing green button (14) one time.
  - Now you will hear the vacuum pump running, it will stop 10 seconds after a vacuum level of -0.65 bar has been built up in the vacuum buffer tank.
  - The alarm is audible and the red lamp will light up as long as the vacuum level is still below -0.6-bar, above that the alarm will stop and the green lamp will light up instead of the red one.
5. Check on the battery LED indicator (16) whether the battery has been sufficiently charged; the lamp must glow yellow or green while the vacuum pump is running.
8. Push the green button "suction" (14).
10. When the load has been put on its place and is secured, the device can be released by simultaneously pressing the green (14) and red (15) buttons.
11. The suction pad will release and then a new load can be taken up by putting the suction pad on it and pressing the green button (14) "suction".
12. After the last element has been placed, disconnect the device can be switched off by simultaneously pressing for 8 seconds the red button (15) and green button (14).

**Button control**

 (off)	<u>1<sup>st</sup> PRESS</u>	=	switch device on
 (blinking)	<u>PRESS</u>	=	suction
 (illuminated) +  (illuminated)	<u>PRESS</u>	=	release
 (illuminated) +  (illuminated)	<u>PRESS (8 seconds)</u>	=	switch device off



Device will automatic switch off 30 minutes after being in released state

**Radio Remote Control**

Suction and release can be activated on the transmitter.



( 1 ) ( 2 ) ( 3 )

**Fail Safe**

Because the Radio Remote control works with coded signals, there is no risk for unintentional switching caused by interference of other radio signals.

The maximum operating distance is approx. 50 meter.

**Operation procedure with radio remote control**

Before it is possible to activate release, a security code has to entered which remains active for 5 seconds.

**Suction**

1. Press green button ( 2 ) to switch to “suction”

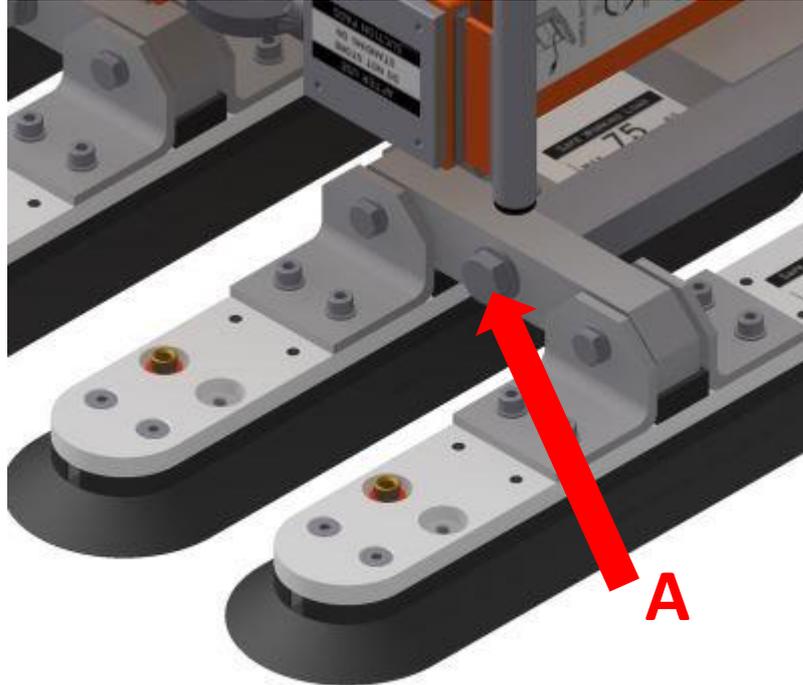
**Release (with security code)**

1. Enter security code by pressing subsequently ( 1 ) – ( 2 ) – ( 3 ).
2. Press simultaneously red buttons ( 1 ) and ( 3 ) to switch to “release”.

**Procedure adjusting suction pads to curve profile**

1. Loosen the 4 bolts (A) with one turn
2. Put suction pad set on curved profile
3. Put device on "Suction"
4. Tighten the bolts (A)
5. Release suction pad set device

The device is now ready to pick up the curved element.

**Before any lift, the user must check the following:**

- I. Check the rubber sealing profile of the suction pad for damage and cracks and replace if necessary.
- II. Check rubber back-plate of the suction pad to verify whether it is clean and oil-free and, if necessary, clean it up.
- III. Whether the battery is sufficiently charged;
  - in GB2.2: check the voltmeter (7). Must point between 11 and 13 volts.
  - in GB2.2r: check battery LED indicator (16). The lamp must glow green.
- IV. Functioning of the acoustic alarm (9) at a vacuum level below -0.60m bar.  
This can be checked by briefly putting the control lever (8) in the position "suction" (green area) before the suction pad is placed on the load. Or for GB2.2r push the green button "suction" (14) before the suction pad is placed on the load
- V. In GB2.2:
  - Remove water from vacuum tanks by using the water drain valve (11)
 In GB2.2r:
  - Remove water from vacuum tanks by using the water-drain ball valve (13)
  - Remove water from filter/water separator (17) by using the water-drain ball valve (18)



If the load has a protective film, it must first be removed before the suction pad is placed on the load.

**During every lift the operator must constantly monitor the following:**

- a. Vacuum meter: the pointer must constantly remain in the green area during lifting.
- b. Acoustic alarm signal: should not be audible during the lift.

- Lifting is not permitted if the vacuum meter is in the red area and/or the acoustic alarm signal sounds.



- If the vacuum meter is in the red area and/or the acoustic alarm signal sounds, a lifted load must be put down as quickly as possible.

- If the vacuum pump fails for any reason, the load will be held for a minimum of 5 minutes from the moment the vacuum level decreases below the required level of > -0.60.

**To work safely with the device, it is therefore necessary that:**

- The operator must have good hearing and not use hearing protection.
- During lifting, the operator must be within hearing and visibility distance of the device.
- The ambient sound does not amount to more than 70db.
- The operator of the device is constantly in contact with the operator of the lifting machine and agreements have been made about a clear communication.

**Protective precautions at operation temperatures between -10°C and 0°C.**

- To prevent clogging of the filters, it should be ensured that all the humidity has been removed from the device. This is achieved by letting the vacuum pump run approx. 15 minutes with the slide valve (9) in the position "suction" in a dry and heated compartment.
- To be assured of sufficient battery capacity, store the device at a temperature of 15°C or higher at night.
- For sufficient friction between suction pad and the load, it should be ensured for every lift that both the suction pad and the suction surface of the load are dry and clean. All humidity, snow and ice must therefore be removed.

**Acoustic alarm**

The acoustic alarm will sound in the following situations

1. When the vacuum level in 1 or both vacuum systems sinks below - 600mbar.  
Intermediating beep
2. When the battery goes down or power cut off when in active mode:  
Intermediating beep with extra-long intermediate after every three beeps.

**Vacuum pump control**

For energy efficiency, the vacuum pump runs intermediate, keeping the vacuum level within a certain range.

- It starts pumping when vacuum sinks below level of -650 mbar.
- It stops pumping when vacuum has reached level of -720 mbar.



The vacuum pump can run approx. 120 minutes constantly with a fully charged battery.

To ensure that it is possible to work a whole day with a battery load, the user must also keep an eye on the vacuum condition of the system during the operation:

Check that the vacuum pump stops within 10 seconds after a vacuum level of 0.65 bar has been reached. Then it must take at least 30 seconds before it starts pumping again.

If the pump starts up more frequently, this indicates a leak. This causes the battery to discharge faster than expected and one cannot operate for a whole day.

Therefore it is advisable to first rectify this, before the work is continued.

## B 4 Working at altitudes above 1200mtr



### Adjustments needed when working at altitudes above 1200mtr from sea level.

The reduced atmospheric pressure at high altitudes affects the vacuum switch which controls switching on and off of the vacuum pump and the alarm.

Depending on the altitude the settings of the vacuum switch needs to be adapted.

This procedure needs to be done by an expert appointed from VIAVAC.



### Reduced lifting capacity at higher altitudes

Lifting capacity of the suction pads are set at 500m altitude at an atmospheric pressure of 950mbar. With increase of height, atmospheric pressure reduces and so does lifting capacity.

This reduction has to be taken into account when lifting at altitudes above 500meter from sea level.

<u>Altitude (meter)</u>	<u>Atmospheric pressure (mbar)</u>	<u>Lifting capacity</u>
0 ... 500	1050 ... 950	100%
501 ... 1000	949 ... 900	95%
1001 ... 1500	899 ... 850	90%
1501 ... 2000	849 ... 800	85%
2001 ... 2500	799 ... 750	80%
2501 ... 3000	749 ... 700	75%

### Rated lifting capacity on suction pads is calculated with

- most unfavourable (-vertical) position of suction pad
- vacuum level of -600 mbar
- safety factor of 2

## B 5 Storage

The device should preferably be stored as follows:

Overnight at job site:

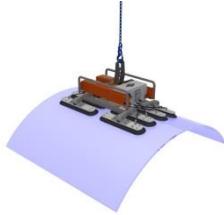
- keep the unit in a dry and above 0°C secure place.

Long time storage when out of use :

- In a dry place at temperatures between 10 and 25°C.
- Switched off, water drained, charged battery and suction pad shielded.

## B 6 Transport- and manipulation possibilities

### Horizontal



- Place suction pad centralized on the load



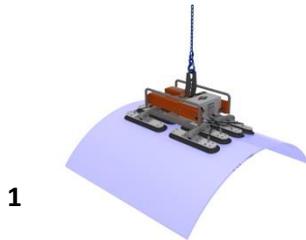
The load should be guided by hand, this because the horizontal position is not locked and it can, therefore, tilt uncontrolled to the vertical position.

### Vertical

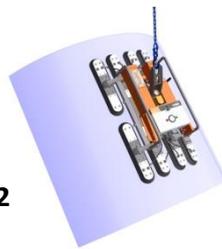


- Place suction pad horizontally centred, in or above the middle of the load

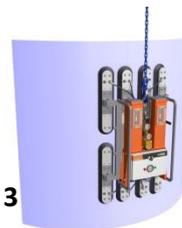
### Tilting from horizontal to vertical



1



2



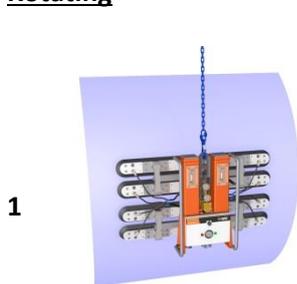
3

1. Place suction pad horizontally centred, in or above the middle of the load.
2. During lifting the load will tilt.
3. If, after lifting, the load still hangs in a tilted position, move it manually to the vertical position so the suction pad will fall into the locked position.

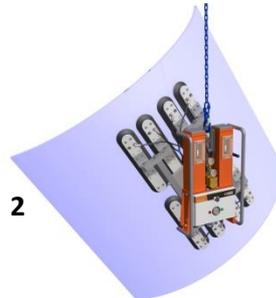


When tilting, the lifting bar should be in the free pivoting position.

### Rotating



1



2



3

1. Place suction pad centralized on the load.
2. Move operating lever (3) upwards, the position becomes unlocked and the load can be manually rotated.
3. When the load has rotated 90°, the suction pad will automatically fall into the next locked position.



The suction pad must be placed centralized on the load; otherwise the load will rotate uncontrolled when unlocking the suction pad.

The operator should have sufficient information and knowledge to examine the weight and properties of the load to be lifted and handled.



### Permissible overhang

With larger dimension loads, there is a risk of breaking or buckling of the load as a result of the weight hanging outside of the suction pad.

The allowable overhang depends on the material properties and thickness, this effect is even stronger when the load is in the horizontal position.

The allowable overhang is determined by experience with the product. If in doubt this should be examined before lifting.

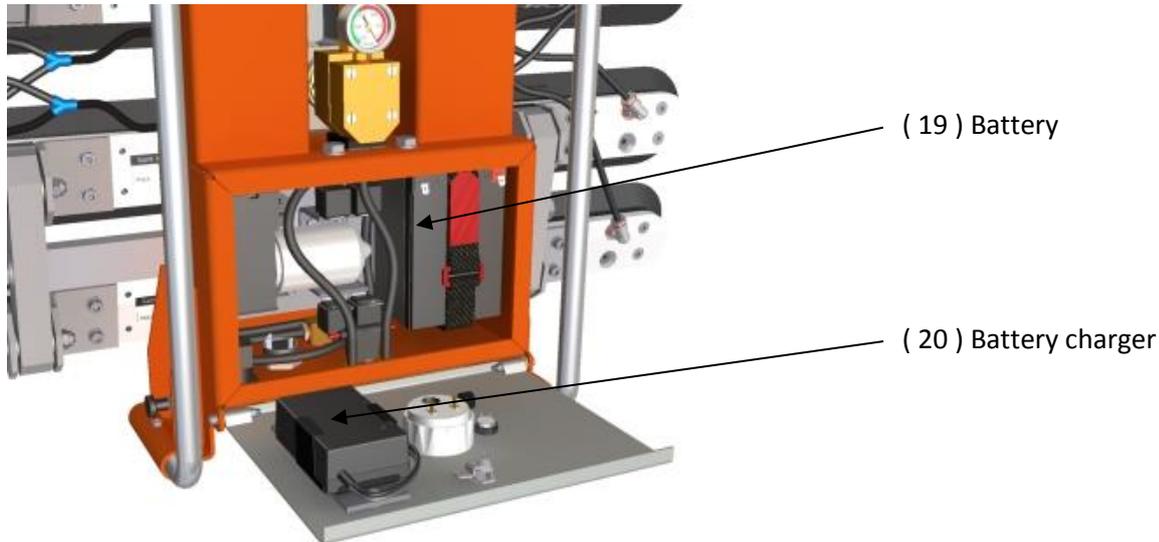
Below is a guideline for the maximum dimensions of the following materials.

### GLASS

thickness	Horizontal transport ( l x b )	Vertical transport ( l x b )
6 mm	2.0 x 2,0 mtr.	3,0 x 3,0 mtr.
8 mm	2.4 x 2,4 mtr.	3,3 x 3,3 mtr.
10 mm	2,8 x 2,8 mtr.	3,6 x 3,6 mtr.
15+ mm	3,0 x 3,0 mtr.	4,0 x 4,0 mtr.

## B 7 Battery

The battery can be charged using the battery charger, which is placed in the switchbox.



- Turn the device off:
  - For GB2.2: turn the main switch (10) off.
  - For GB2.2r: device can be switched off by simultaneously pressing for 8 seconds the red button (15) and green button (14).
- Insert the plug of the charger (20) in the socket;  
The mains voltage should be between 110 ... 240V.
- The LED lamp on the battery charger changes during the load cycle from red (empty battery) to yellow (almost fully charged battery) to green (fully charged battery).

After approx. 6 hours charging time, an empty battery (19) is again fully charged (green LED lamp is lighted). A full battery load is sufficient for placing a minimum of 60 elements (approx. 1 full day of operation).

When the green LED lamp is on, the battery charger will automatically switch to maintenance loading. The connector can therefore remain in the electric socket without any danger of overloading the battery.

In case of a charged battery the voltmeter on the cabinet indicates between 12 ... 14 Volt, when the vacuum pump runs, it will fall approx. 1V.

If the meter falls significantly by 2 volts or more during additional pumping, this means that the battery is discharged.

In case of a discharged battery the vacuum pump will also run slower, due to which it will not achieve the set switch off vacuum level and the vacuum pump will run constantly.

If the voltage of the battery decreases below the 11V, the electronic vacuum switch will also turn off, because of this, the vacuum pump will run constantly, the red lamp will light up and the acoustic alarm signal will sound.

The battery will last approx. 3 to 5 years, after which the capacity will decrease; we advise renewing the battery every 3 years as a precaution.



It improves the lifetime of the battery when it is stored in a charged state.

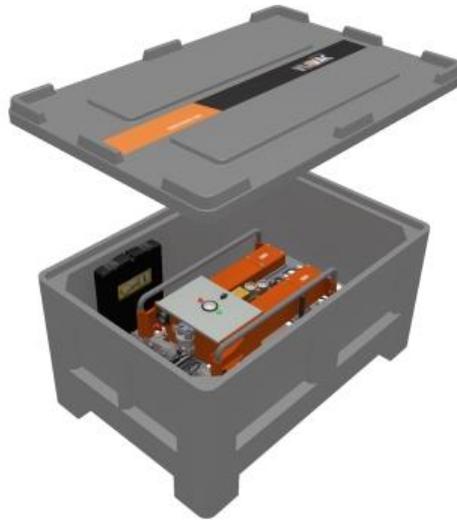
We recommend that, even if you don't need the device the next day, it should be charged again immediately after use.

Interim charging of the battery has no negative impact on its capacity (no memory effect).

## B 8 Options

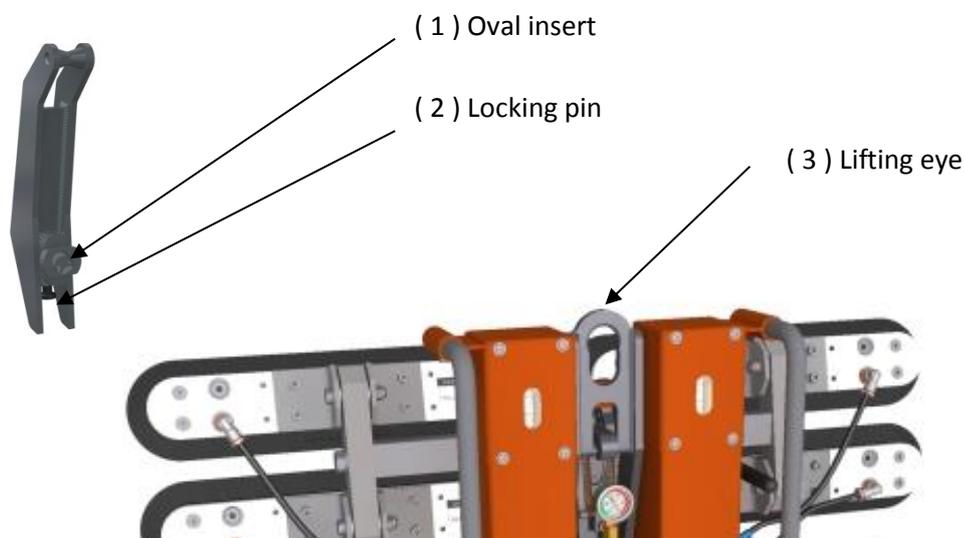
### B 8.1 Transport box

The transport box is a very useful to transport the device easily and also to protect the suction pad from damage and sunlight.



### B 8.2 Extended suspension

The VIAVAC GB2.2(r)- 300kg,  $R_{min}=800$  is provided with a long suspension, this is favourable in those cases where a job is performed under ceilings or balconies. As a result, when in the vertical position, the load hangs at a slightly inclined position from vertical. By coupling the extended suspension to the lifting eye, the position of the pivoting point is displaced relative to the load and the load will hang almost vertically.



Coupling of the extended suspension to the lifting eye should be performed as follows.

- 1 Pull on the locking pin (2) and put the swivelling oval insert (1) in the vertical position.
- 2 Put the oval insert piece (1) at the front through the oval hole of the hoisting eye (3).
- 3 Twist the swivelling oval insert piece  $90^{\circ}$  so that the extended suspension is set at the buckle. The swivelling oval insert piece is automatically secured in this position by the securing pin.
- 4 After use, the extended suspension can be removed by pulling on the locking pin and simultaneously turning the swivel to the vertical position.

### B 8.3 Falling safety device



According to CE regulation EN 13155, in all countries of the European Union, a secondary safety system is obligatory when a vacuum lifter is used at building site.

This can be realized in the following ways:

- One (single ) vacuum circuit and the use of a falling safety device
- Two (dual) independent vacuum circuits.

**This device is provided with 2 independent vacuum circuits and the use of an extra falling safety device is therefore not mandatory!**

However in situations where this is desired by the operator, it is possible to provide this lifter with an extra falling safety device.

Falling safety devices can be applied for the different forms and dimensions of the elements in accordance with the figure below.

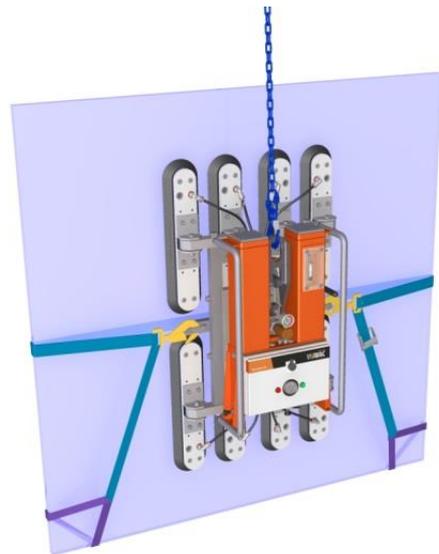
#### Falling safety device

1x art. 268407



#### Rectangular elements

1x art. 17007



The falling safety devices are implemented by means of lifting straps with hooks, which must be hooked to the suction pad. During use the following shall be observed.

- 1 The correct falling safety device is hooked to the intended fixing points on the frame.
- 2 Lift the element with the vacuum lifter approx. 0.5 meter free of the ground.
- 3 The strap should then be placed around the element as indicated above.
- 4 Using the clamp buckle, the strap should be pulled tight around the element (no clearance).
- 5 The whole unit is lifted to the designated place using the lifting device.
- 6 Immediately before putting the element into place, the falling safety device is removed; the element is then placed on its spot.



1. Protect from sharp edges of the elements to be lifted at the location of the straps.
2. If there are cracks or tears in the lifting straps, do not use them and replace them immediately.

---

## B 9 Safety precautions

### Recommendations

- 9.1 **Only** use this lifter when you have read and understood the operators section of this manual.
- 9.2 **Only** use this lifter when the main switch (10) for the power supply is turned “on” before lifting. (danger of lifting with the vacuum which is still in the vacuum tank.
- 9.3 **Always** check this lifter before use for its conditioning and correct functioning.
- 9.4 **Always** charge the battery before and after use.
- 9.5 **Always** ensure that the contact area of the load is clean and dry before placing the suction pad on the surface.
- 9.6 **Always** position the suction pad correctly on the load.
- 9.7 **Always** put down the load immediately when the alarm sounds.
- 9.8 The operator should **always** be within sight- and hearing distance of the lifter and the operator of the lifting machine.
- 9.9 There should be **always** be an agreement about the communication between the operator of the vacuum lifter and the lifting machine.
- 9.10 **Always** wear protective equipment that is appropriate for the material being handled. Follow trade association guidelines.
- 9.11 **Always** keep the device periodically checked and maintained by an expert
- 9.12 The vacuum lifter should **always** be examined within the period as prescribed by the safety regulations which are valid for the country where the vacuum lifter is in use.

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**Prohibitions**

- 9.15 **Never** operate a lifter when it is damaged, malfunctioning, or missing parts.
- 9.16 **Never** operate a lifter as the seal of the suction pad is damaged or cracked.
- 9.17 **Never** operate a lifter if the Load capacity or any warning appears to be missing or obscured.
- 9.18 **Never** exceed the Load Capacity which is indicated on the lifter.
- 9.19 **Never** attempt to lift a cracked or broken load with this lifter.
- 9.20 **Never** lift a load which is buckled.
- 9.21 **Never** lift a load when any vacuum indicator shows an inadequate vacuum.
- 9.22 **Never** lift a load when the alarm sounds.
- 9.23 **Never** lift a load higher than necessary.
- 9.24 **Never** leave suspended loads unattended.
- 9.25 **Never** lift a load over people
- 9.26 **Never** store the lifter standing on the suction pad.
- 9.27 **Never** lift a load at wind speeds exceeding 11 m/s.
- 9.28 **Never** lift a load when there is a risk of wind gusts.
- 9.29 **Never** release the load when the lifting sling or chain is not vertically above the vacuum lifter. (danger of the lifter swinging).
- 9.30 **Never** use the lifter when it's examined period has been exceeded.
- 9.31 **Never** use the lifter when the operator has a hearing loss or wears ear muffs.
- 9.32 **Never** use the device where the ambient noise exceeds the 70dB.
- 9.33 **Never** use solvents, petrol or other chemicals to clean the rubber parts of the suction pad.



---

## C 2 Technical data

<b>Model number</b>	GB2.2(r)-300/R800
<b>Description</b>	Below the hook vacuum lifter.
<b>Application</b>	Horizontal, vertical and inclined picking of rigid and non-porous elements with a flat or slightly structured surface. The suction pad seal can compensate (when not too rough) unevenness up to 2 mm.
<b>Functions</b>	<ul style="list-style-type: none"><li>- 90° tilting mechanism.</li><li>- 360° rotation with locking facility every 90°</li></ul>
<b>Lifting capacity</b>	Max. 300 kg at -0.60 bar vacuum level.
<b>Own weight</b>	90 kg
<b>Dimensions</b>	Suction pads: 610x1095mm (8 x SP10-120x520 (70 SHA))
<b>Power supply</b>	Battery 12V / 12Ah
<b>Battery charger</b>	Primary 110 ... 240V / Secondary 12V-2A
<b>Vacuum pump</b>	Piston pump 12V capacity 1,5m <sup>3</sup> per hour, max. approx. -0.85 bar vacuum.
<b>Safety features</b>	<ul style="list-style-type: none"><li>- Secondary safety device (optional).</li><li>- Audible low vacuum warning.</li><li>- Large vacuum buffer tank which prevents a sudden vacuum loss in case of leakage or break down of the vacuum pump.</li><li>- Vacuum indicator with red / green indication.</li></ul>
<b>Service life</b>	At least 20,000 cycles, when used as intended.

### C 3 Checking and maintenance

Checking, maintenance and repair activities must be executed by relevant expert technical personnel.

If your company does not have such expert personnel it can be executed by a VIAVAC expert.  
Contact VIAVAC or your VIAVAC dealer for this.

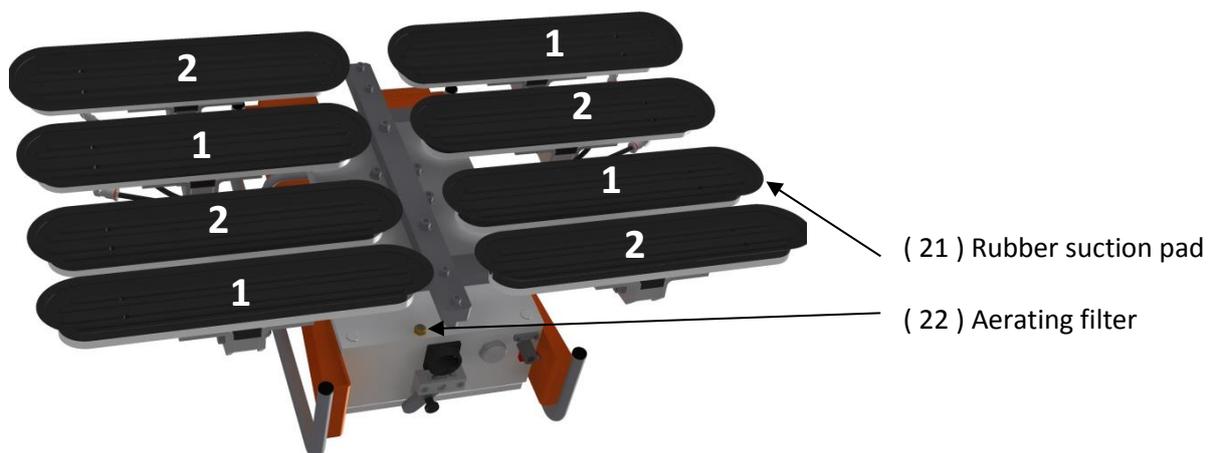
Use only original VIAVAC parts in case of repair, because the properties and quality of these are guaranteed.

Modification of the device can influence the safety of the device and is, therefore, not allowed.



**If the above conditions are not fulfilled this will lead to a risk that reliability and safe use will be compromised. In this case VIAVAC cannot accept any responsibility.**

#### Periodic checks and tests.



1 & 2 = circuit 1 & circuit 2

The activities and periods described hereafter pertain to the minimum requirements with regard to maintenance.

It is advisable to perform these activities more frequently if circumstances make this necessary, such as increased frequency of use resulting in more wear and tear, corrosion and/or an increased defect pattern.

### Daily

- a. Check rubber suction pad (21) for presence of wear and tear and replace, if necessary.
- b. Check whether rubber suction pad (21) is clean and oil-free, and clean if necessary.
- c. Mechanical status of the lifting eye and the pivoting points.
- d. Aerating filter (22) at the back of the switch box.
- e. Functioning of the vacuum meter.
- f. Functioning of the acoustic alarm.
- g. In GB2.2:
  - Remove water from vacuum tanks by using the water drain valve (11)
 In GB2.2r:
  - Remove water from vacuum tanks by using the water-drain ball valve (13)
  - Remove water from filter/water separator (17) by using the water-drain ball valve (18)
- h. Check falling safety device for wear and tear and replace if necessary.

### Monthly

- a. The same as the daily maintenance.
- b. Check control of the vacuum pump.
- c. Clean the rubber suction pad with natural vinegar

### Yearly

- a. The same as the monthly maintenance.
- b. Testing the battery capacity.
- c. Static test procedure.

### 3 yearly

- a. The same as the yearly maintenance.
- b. Replace rubber suction pad (21).
- c. Replace battery.

Compulsory: regular inspection of the device must be carried out.

This shall be in accordance with the requirements of the authorities from the country where the device is used.

In the device there are no pivoting points or parts which require lubrication.

The vacuum pump is completely maintenance free and lubrication is not allowed.



In the vertical position of the suction pad, the load is held by the friction between the rubber backplate of the suction pad and the load; therefore it is essential that this is clean, dry and oil-free. Monthly cleaning of the rubber backplate with natural vinegar ensures that the required friction between suction pad and the load remains retained.



Never use solvents, petrol or other chemical agents to clean the rubber of the suction pad.



Checks and repairs must be documented in writing; for this purpose the following forms can be found in this manual:

- C 4 Check and maintenance report.
- C 11 Maintenance history.

**METHOD OF OPERATION:**

- Vacuum tightness\*** The device must be put on a non-porous sheet of glass, metal or plastic, after which suction is applied and you must wait until the pump stops running. Then the main switch is turned off and after waiting 1 minute it is then checked to which extent the vacuum level of each circuit has decreased.  
The loss of vacuum in each circuit may not exceed 10% per minute.
- Vacuum indicator\*** The device must be put on a non-porous sheet of glass, metal or plastic, after which suction is applied and you must wait until the pump stops running. Compare the value indicated by the pointer of the vacuum indicator with the value indicated by the digital vacuum switch (2).  
Indication from the vacuum meter may not deviate more than 3% from the digital value.
- Acoustic alarm\*** The device must be put on a non-porous sheet of glass, metal or plastic, after which suction is applied and you must wait until the pump stops running. By slowly opening the water drain valve (11), the system will be gradually aerated and the vacuum level will decrease.  
As soon as the vacuum level falls below the -0.60 bar the acoustic alarm should sound, the volume thereof should amount to at least 85db at 1 metre of distance.
- Control of the vacuum pump\*** The device must be put on a non-porous sheet of glass, metal or plastic, after which suction is applied and you must wait until the pump stops running. The water drain valve (11), should then be opened slowly. The system will then be gradually aerated and the vacuum level will decrease. As soon as the vacuum level falls below the -0.65 bar the vacuum pump must start.  
After 10 seconds the vacuum pump should automatically stop, and the digital vacuum switch should indicate a vacuum level of -0.70 bar or more.
- Battery capacity** First the battery is fully charged with a battery charger, after which the battery is discharged at a certain amperage and the time needed for discharging is measured. The battery capacity is determined by multiplying time and amperage.  
This should be 90% or more of the nominal battery capacity (65 Ah).
- Static test\*** With the suction cup in a vertical position, a (non-porous) load with a weight equal to twice the working load limit should be lifted. Subsequently 1 circuit should be completely aerated by opening the water drain valve.  
The load should be held and after removal of the load, there should be no permanent deformation of the device should be visible.
- Holding time test\*** With the suction cup in a vertical position, a (non-porous) load with a weight equal to the working load limit should be lifted. Subsequently 1 circuit should be completely aerated by opening the water drain valve. The main switch should be turned off so that the vacuum pump no longer runs.  
The load should be held for at least 5 minutes.



The tests indicated with \* should be performed separately for each vacuum circuit.



During the static test and the endurance test, the load should be lifted only a few millimetres so that, in case of an unsuspected release, this will not result in damage or personal injury.

## C 4 Inspection & maintenance report

Machine No. : . . . . . Owner : . . . . .

Type : . . . . . Contact person : . . . . .

		<u>Limited value</u>	<b>APPROVED</b>				
			A	D	M	Y	3Y
<b>Suction pad</b>		<b>Type . . . . .</b>	O				
Rubber suction pad checked for cracks and wear.			O	O	O	O	O
Replace the rubber suction pad.			-	-	-	-	O
Rubber suction pad cleaned and free from grease.			O	O	O	O	O
Rubber suction pad cleaned with natural vinegar.			-	O	O	O	O
<b>Filters</b>							
In the suction pad and switchbox checked cleaned			O	O	O	O	O
In the vacuum tank			-	-	O	O	O
Remove water and dirt from bowl of the water separator			O	O	O	O	O
Clean filter in bowl of the water separator			-	-	O	O	O
<b>Water</b>							
Drain by opening valve (when used in rain) or water drain plug			O	O	O	O	O
Check securing device of valve.			-	-	O	O	O
Drain by opening drain tap and water separator (when used in rain)			O	O	O	O	O
<b>Falling safety device</b>			O				
Check for cracks and wear of straps			O	O	O	O	O
Check functioning of hook, strap adjustment and attachments on suction pad			O	O	O	O	O
<b>Mechanical</b>							
Check lifting eye and pivot points of suspension arm			O	O	O	O	O
Check securing device from handle "suction/aeration"			O	O	O	O	O
<b>Alarm (both circuits)</b>							
Acoustic alarm + illumination of red lamp at vacuum level < -0.60 bar (+/- 2%)		85db	O	O	O	O	O
Illumination of green lamp & alarm off at vacuum level of > -0.60 bar (+/- 2%)			O	O	O	O	O
<b>Control of vacuum pump (both circuits)</b>							
Switching on at vacuum level -0.65 bar		+/- 2%	-	O	O	O	O
Time for switching off 10 sec after reaching vacuum level -0.65 bar		+/- 2 sec.	-	O	O	O	O
Vacuum level after switching off		min. 70%	-	O	O	O	O
<b>Sealed condition (both circuits)</b>							
Decrease of vacuum in non-sucked state		max. 3 % in 60 sec.	-	O	O	O	O
Decrease of vacuum level with wall panel suction pads in sucked state		max. 10 % in 60 sec.	-	O	O	O	O
<b>Vacuum indicator (both circuits)</b>							
Compare level of vacuum indicator with digital vacuum switch		+/- 0.03 bar	O	O	O	O	O
<b>Battery</b>							
Capacity test		min. 85% of 12Ah	-	-	O	O	O
Preventive replacement			-	-	-	O	O
Charging current of battery charger		min. 13V	-	-	O	O	O
Level indicator (Voltmeter)		max.1V difference	-	-	O	O	O
<b>Tests (both circuits)</b>							
Static load test		2x working load	-	-	O	O	O
Holding time test		min. 5 minutes	-	-	O	O	O

**Continues on the next page**

(A=Available / D = Daily / M = Monthly / J = Yearly / 3 Yearly)



## C 5 Mal functioning and repair

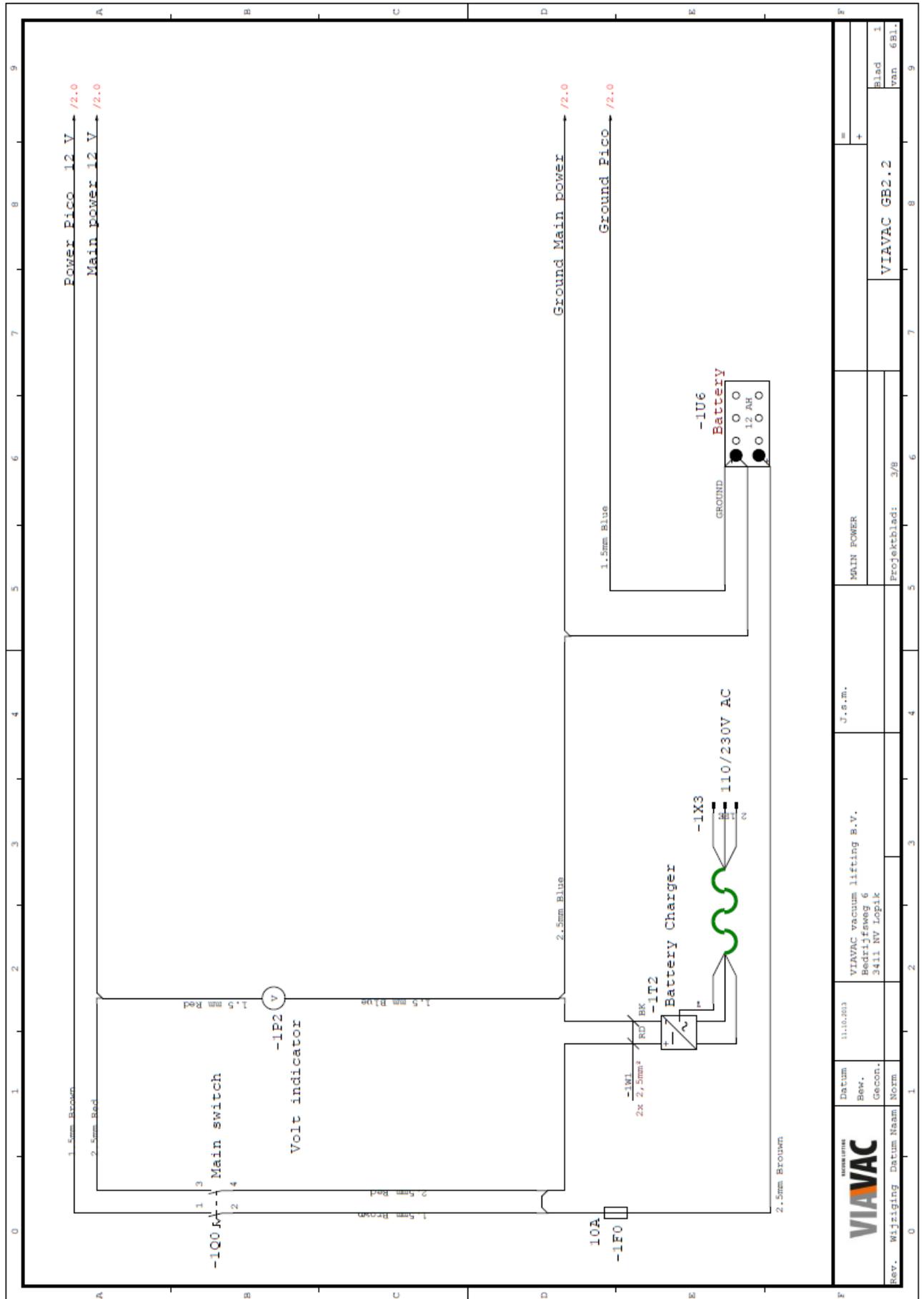
### MAL FUNCTION ANALYSE

Fault	CAUSE	ACTION
1. No action and volt indicator shows 0 or battery LED is red or OUT	Battery very low	Charge battery or replace
	Fuse of the control current faulty	Replace glass fuse
2. Insufficient vacuum level acoustic alarm sounds	Sealing profile of suction pad is damaged	Replace sealing profile
	Load is from porous material	Move load in another way
	Surface is too rough	Move load in another way
	Battery is low	Charge battery or replace
3. Sufficient vacuum level Acoustic warning signal sounds	Relay K1 or K3 is faulty (only in GB2.2)	Replace relay K1 or K3
	Vacuum switch is deprogrammed (only in GB2.2)	Reprogram or replace
	Leakage of non-return valve	Clean non-return valve or replace
	Capacity of vacuum pump has decreased	Replace vacuum pump or valve plate in the vacuum pump
4. Sufficient vacuum level No acoustic warning signal but vacuum pump keeps running	Relay K2 or K4 is faulty (only in GB2.2)	Replace relay K2 or K4
	Vacuum switch is deprogrammed(only in GB2.2)	Reprogram or replace.
	Battery low	Charge or replace battery
	Vacuum leakage	Check and replace if necessary seal of suction pad
	Leakage of non-return valve	Clean or replace non-return valve
	Capacity of vacuum pump has decreased	Replace vacuum.
	Surface too rough or porous	Move load in another way
5. Vacuum pump does not run	Fuse of the electric motor is faulty	Replace fuse.
	Vacuum pump faulty	Repair or replace vacuum pump.

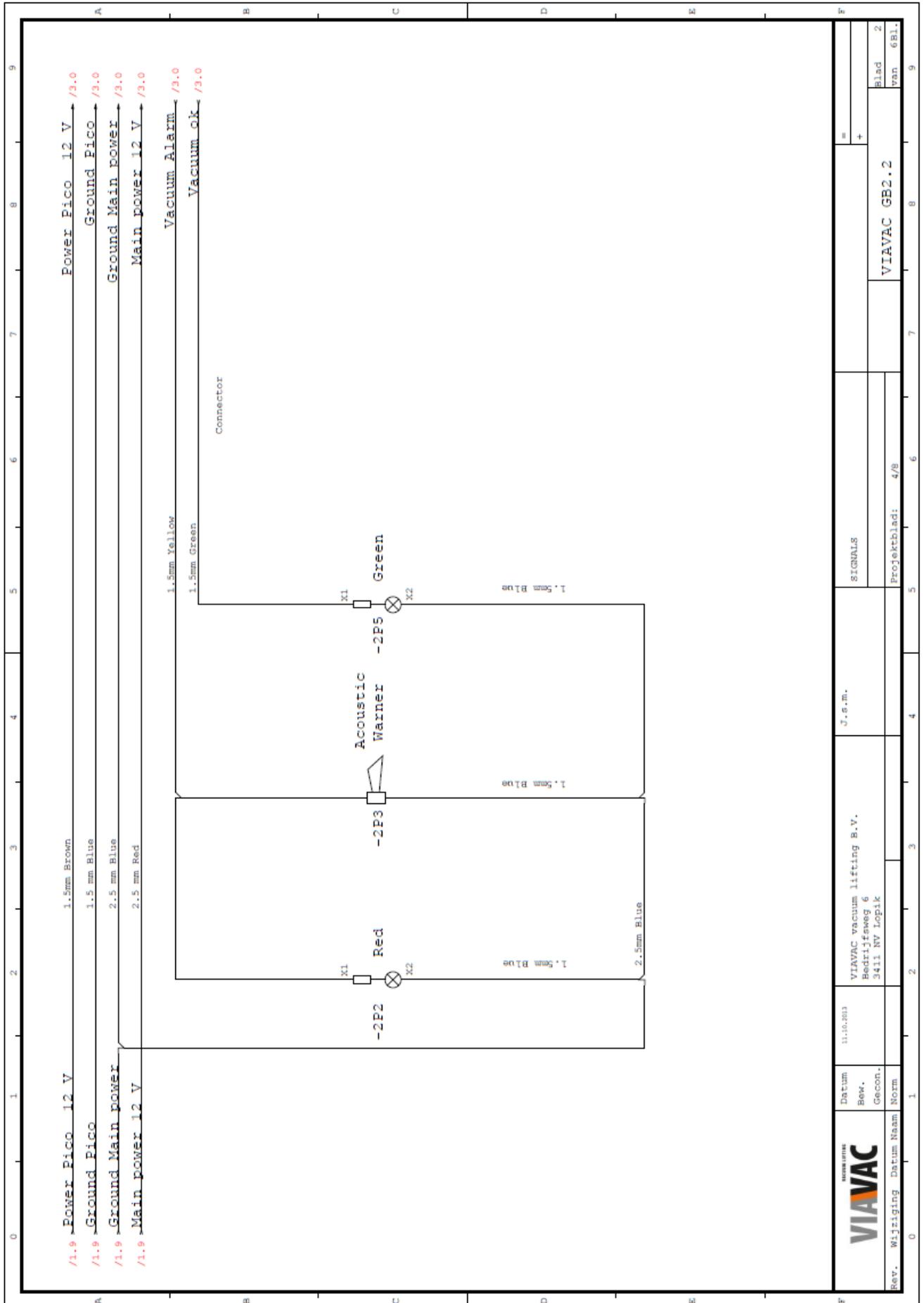
Faults 2, 3 & 4 apply to each independent vacuum circuit.

### C 6 Electric wiring diagram

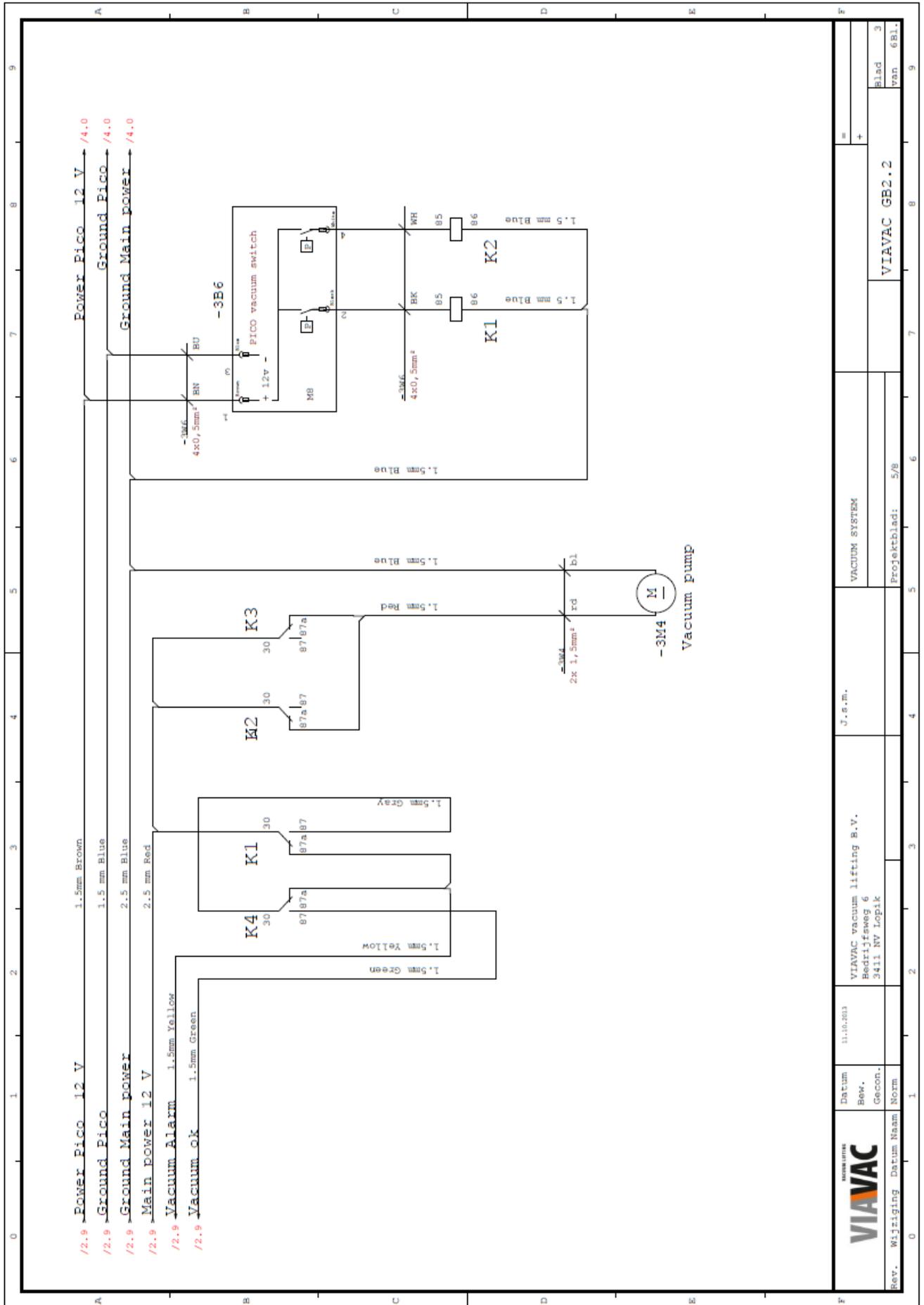
#### GB2.2



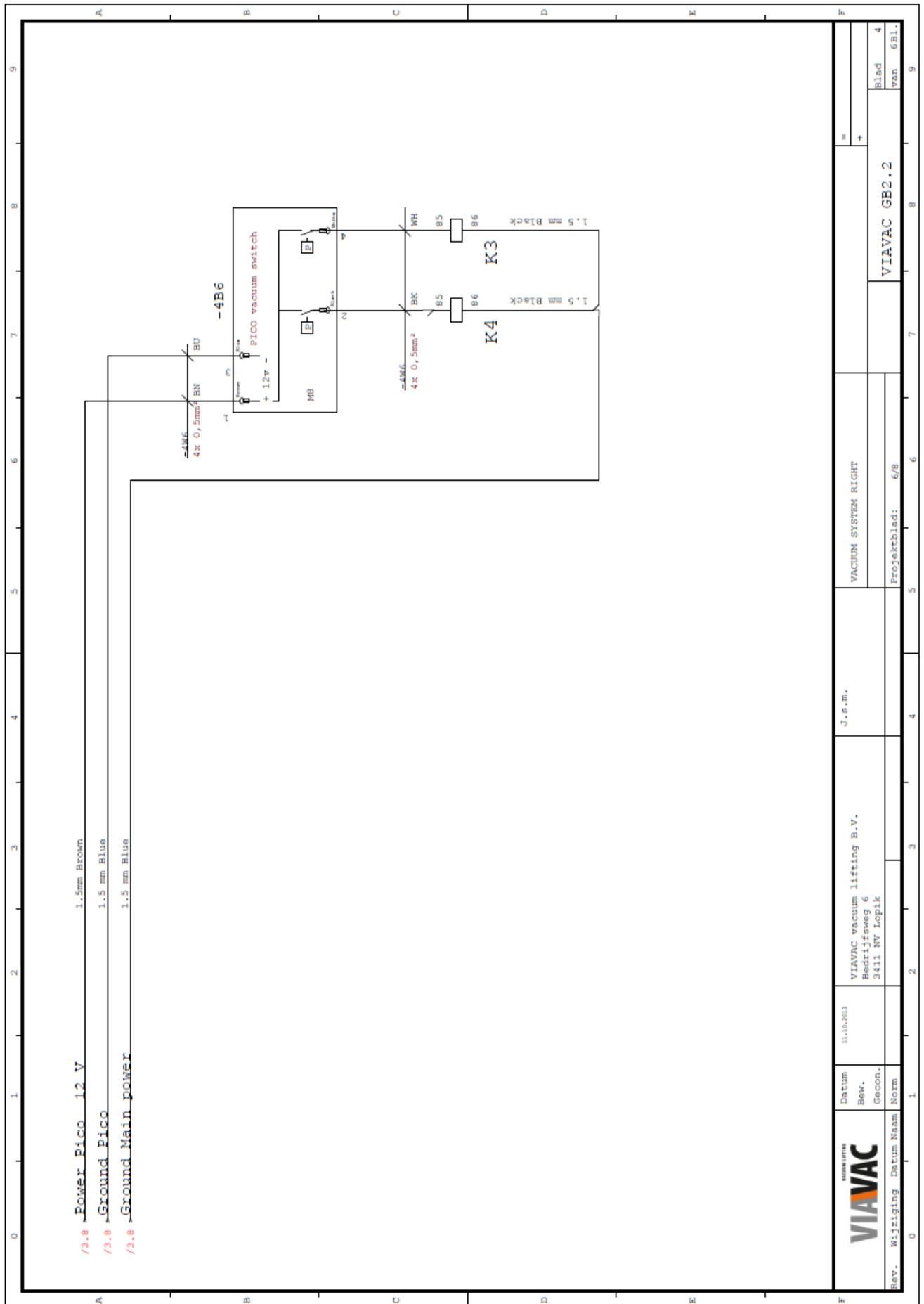
		Datum	11.10.2013	J.s.m.	MAIN POWER	
Rev.	Wijziging	Bev.	Gecon.	VIAVAC vacuum lifting B.V. Bedrijfweg 6 3411 NV Lopik		VIAVAC GB2.2
			Norm	Projektblad:	3/8	Blad van 6Bl.

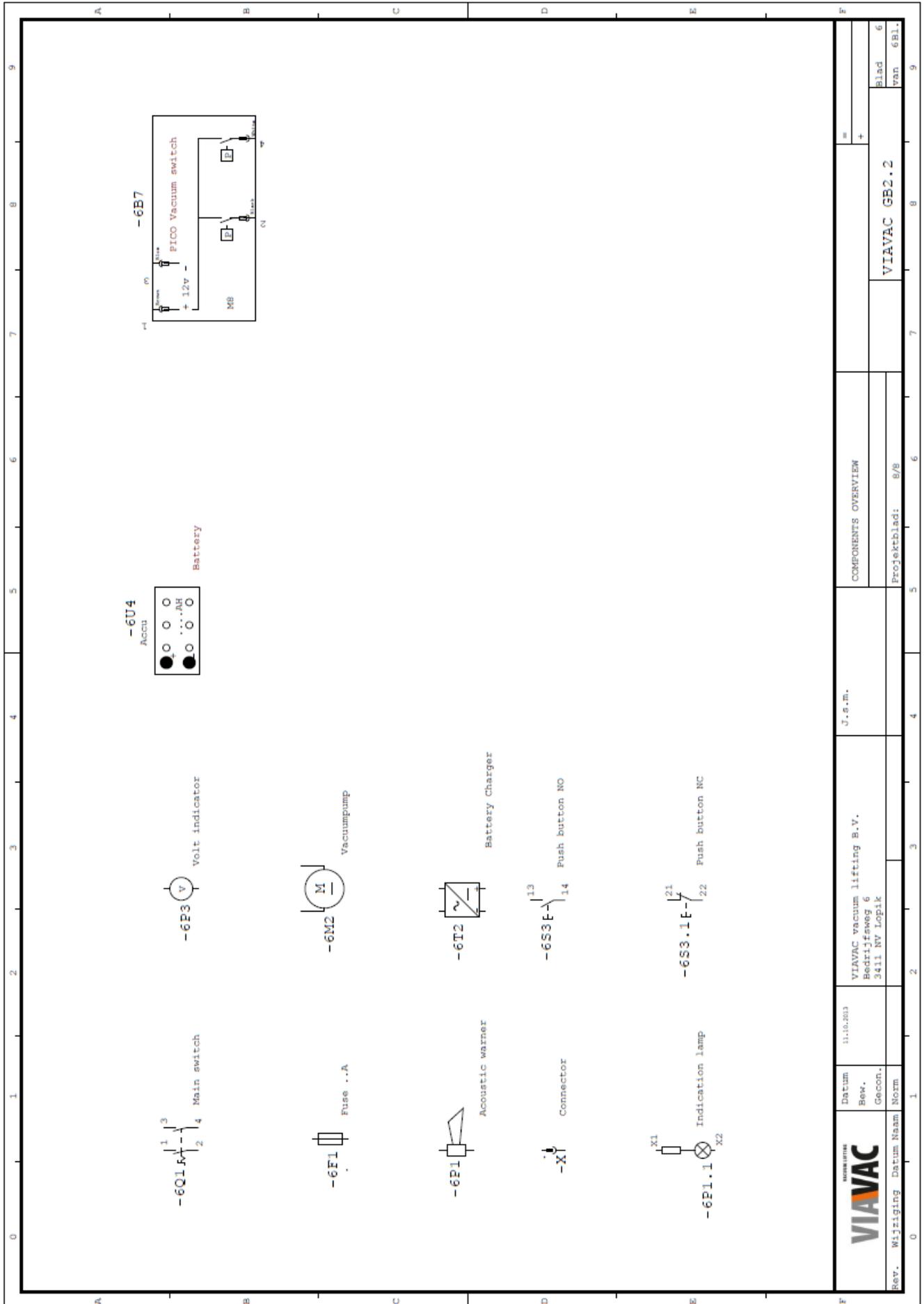




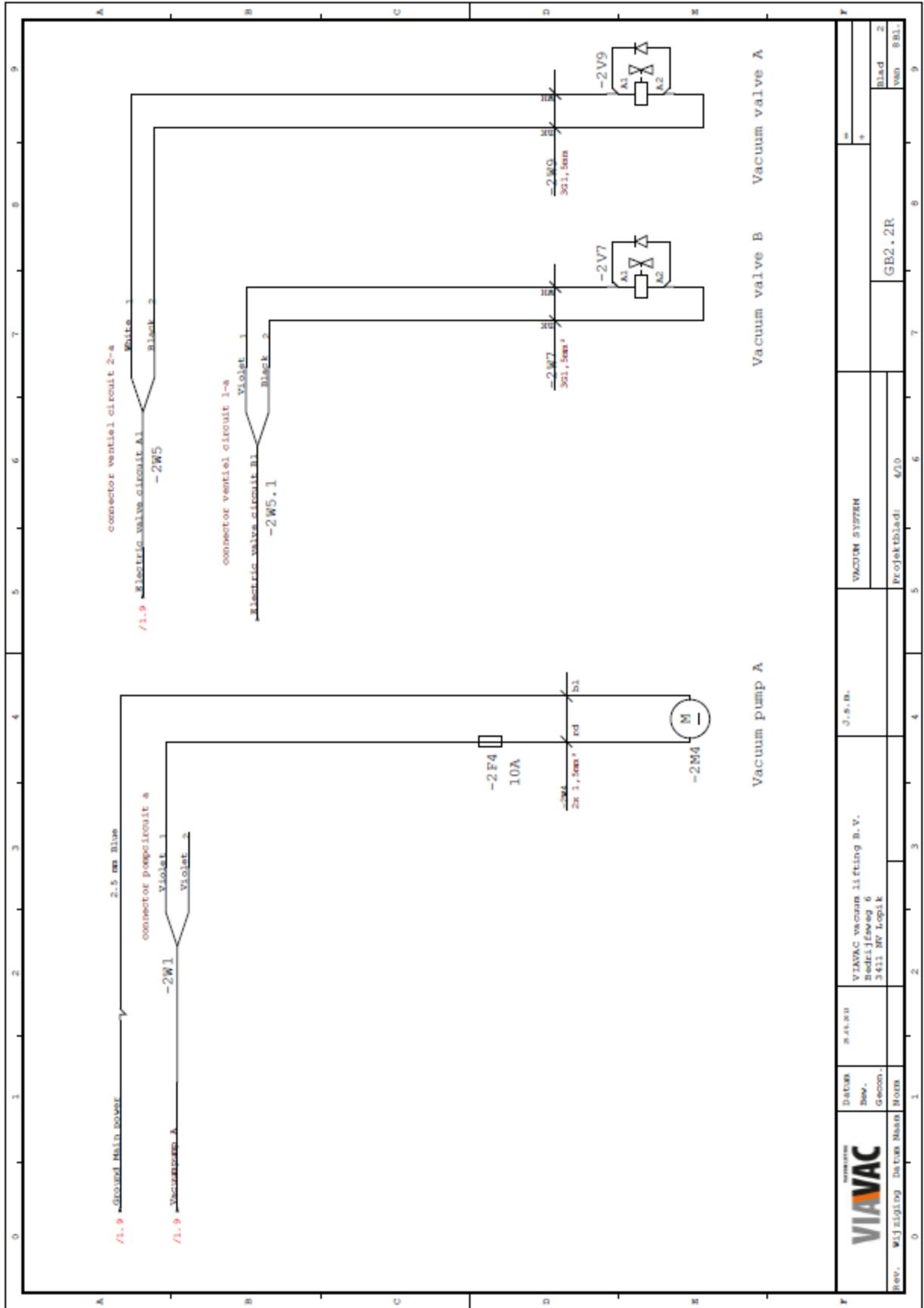


		Datum	11.10.2013	VIAVAC vacuum lifting B.V. Bedrijfweg 6 3411 NV Lopik		VACUUM SYSTEM	
Rev.	Wijziging	Rev.	Gecon.			J.s.m.	
				Datum Naam Norm		Projectblad: 5/8	
				Datum Naam Norm		VIAVAC GB2.2	
				Datum Naam Norm		Blad van 6B1	

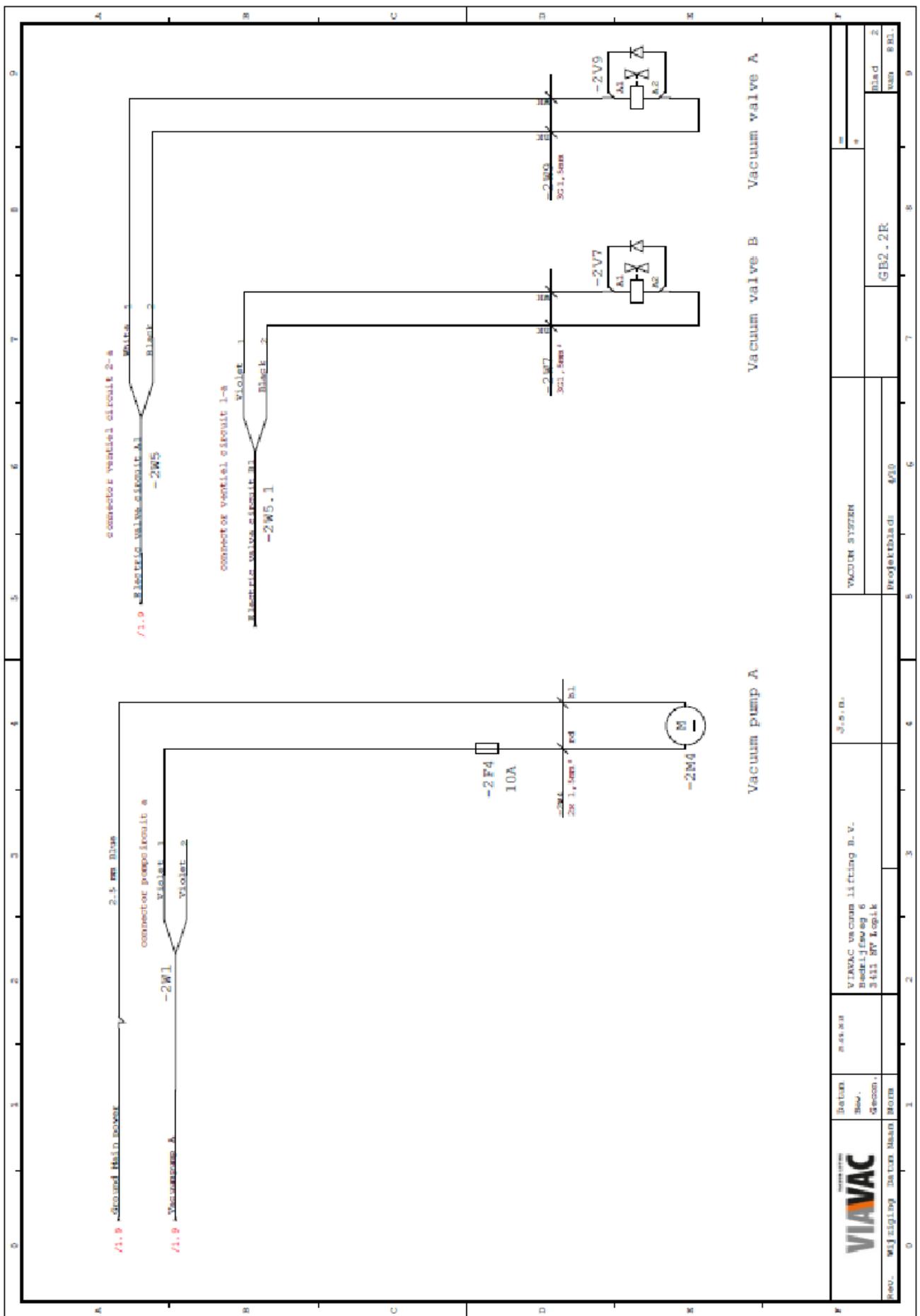




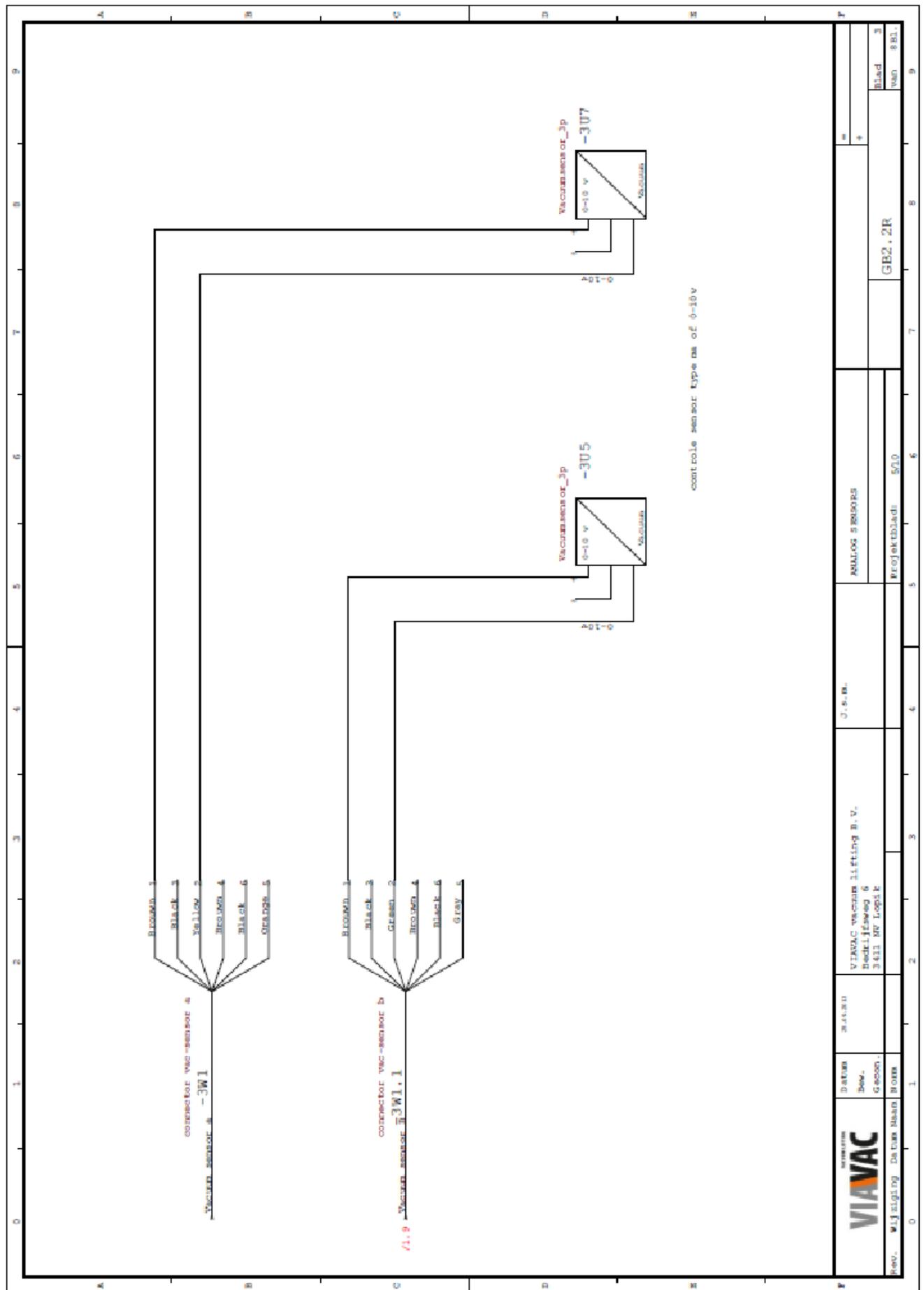
**GB2.2r**

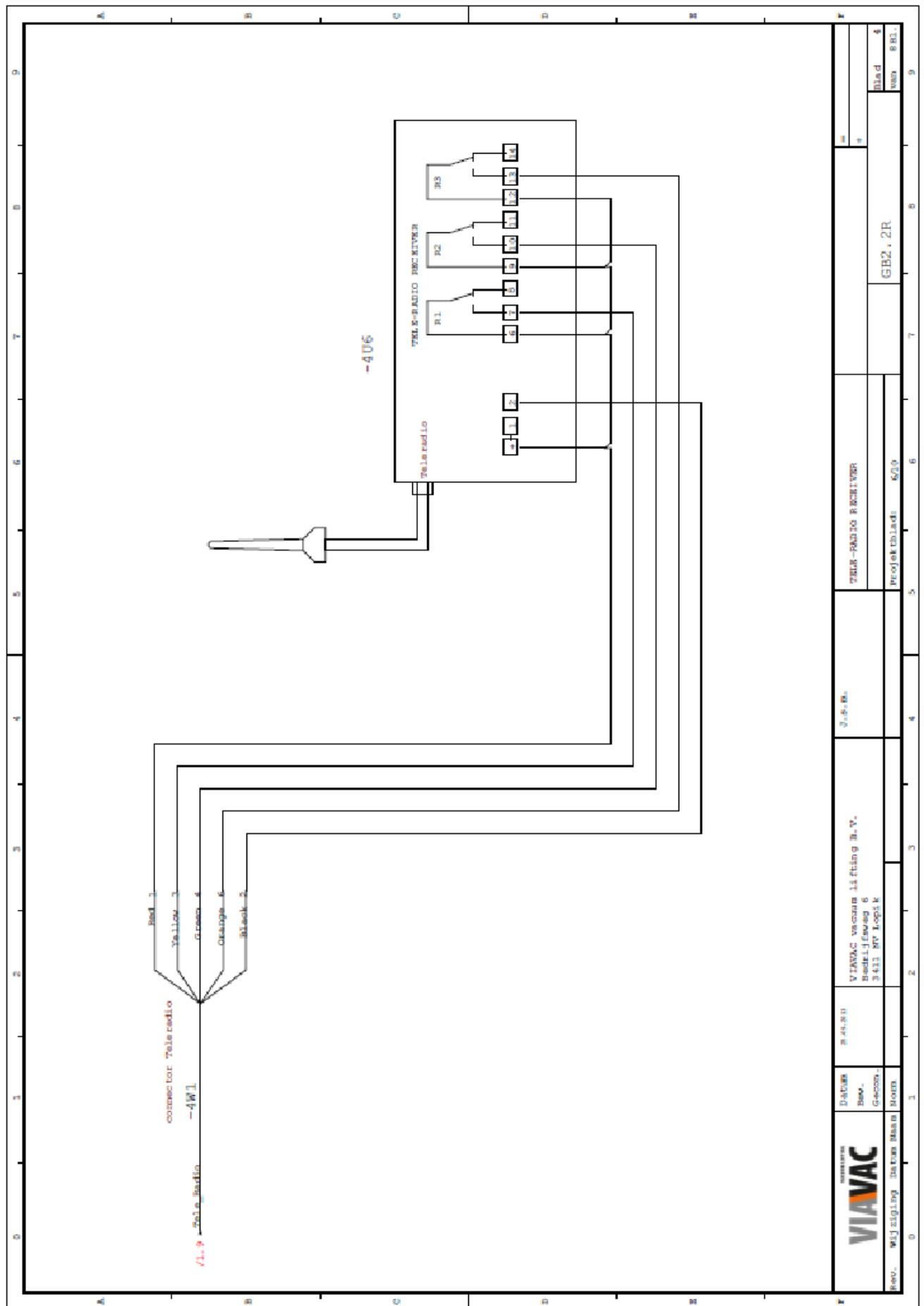


	DATAB Bew. Gecon- Noot	MASTRO	VIAVAC vacuum lifting B.V. Bedrijfsweg 6 3411 NV Lopik	J.S.B.	VACUUM SYSTEM	Blad 2 van 981.
	Rev. Wijziging Deuren Meest Noot	Projektno: 400	GB2.2R	GB2.2R	981.	9

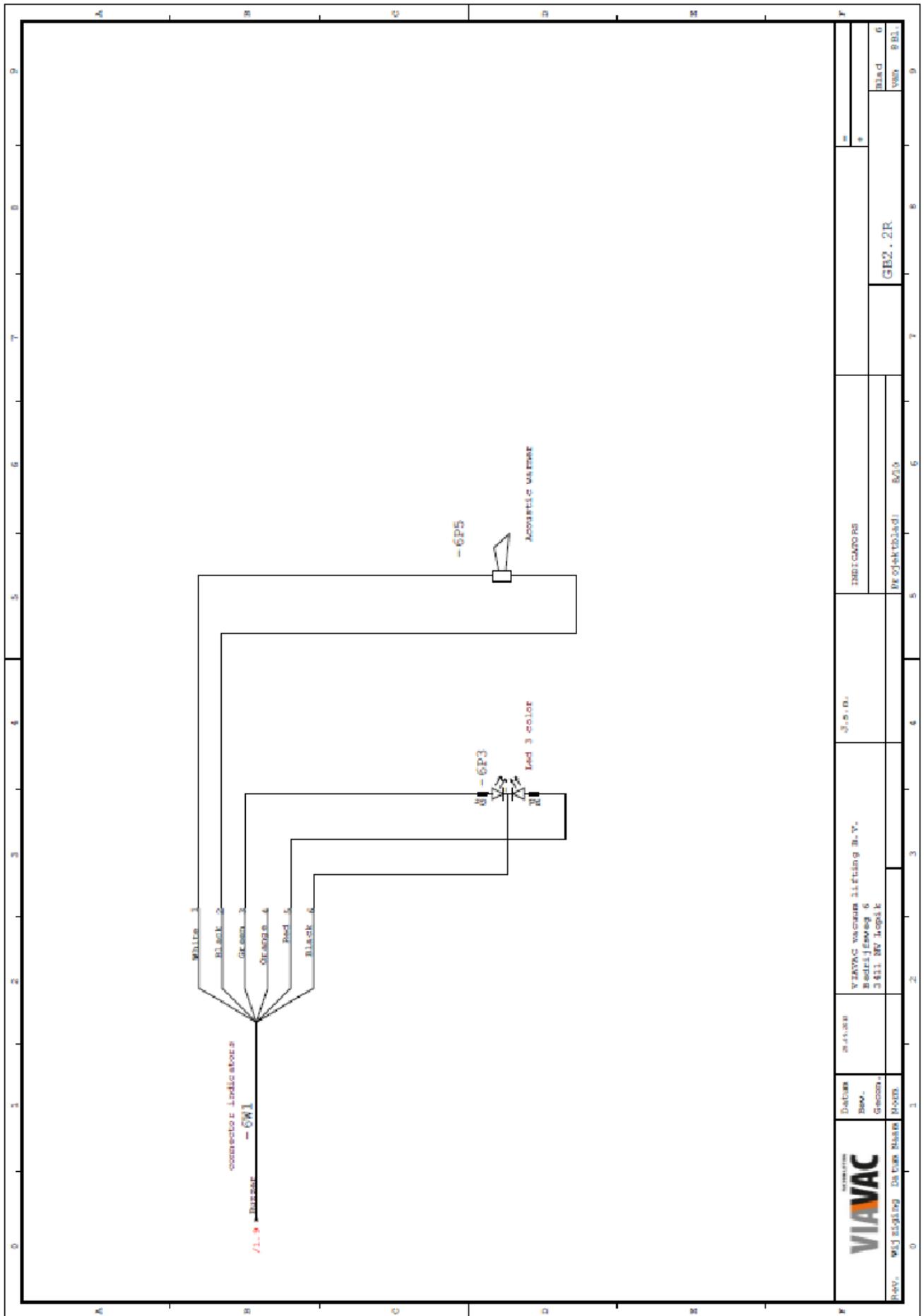


Rev.	wjt/glg	Date	Norm	Reviz.	3	3411 BY Logistik	3.0.0.	VACUUM SYSTEM	GB2.2R	Reviz.	3
				Reviz.	Norm						

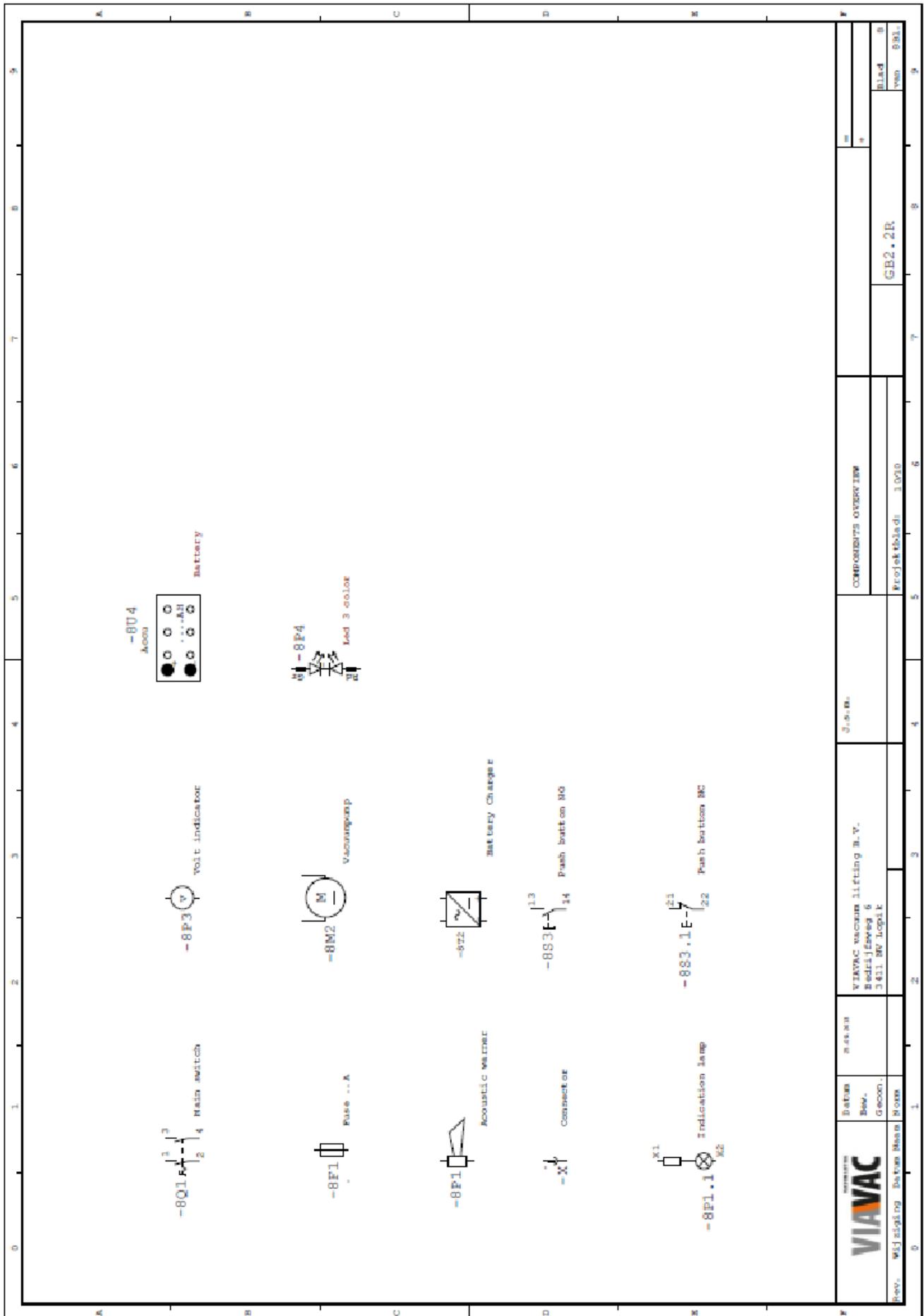






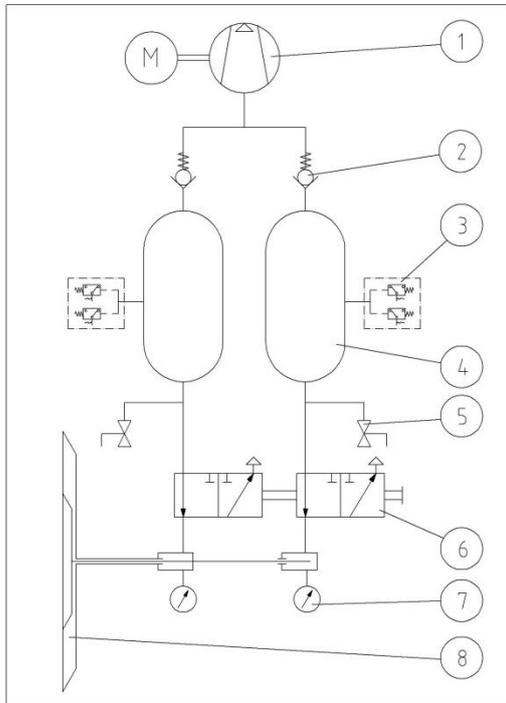


	Datum Rev. Datum Moods	Datum Rev. Datum Moods	VZAVAC vacuum lifting B.V. Beeld J.Emsing 6 3411 BV 't Loepelk	J.S.O.	INDICATOR PB	Pr ojektboladi B.00	GB2 . 2R	+	=	+
									Rev.	WJ slijding



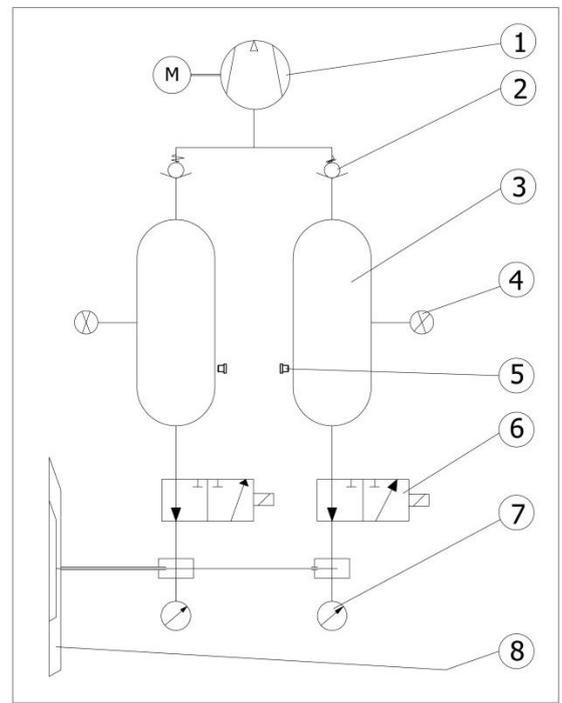
### C 7 Vacuum diagram

**GB2.2**



ITEM	DESCRIPTION
1	Vacuum pump
2	Non-return valve
3	Vacuum switch
4	Vacuum reserve tank
5	2 way ball valve
6	3/2 slide valve
7	Vacuum indicator
8	Suction pad

**GB2.2r**



ITEM	DESCRIPTION
1	Vacuum pump
2	Non return valve
3	Vacuum reserve tank
4	Pressure transmitter
5	Plug
6	E-valve
7	Vacuum indicator
8	Suction pad

## C 8 Digital vacuum switch

### Available only for GB2.2 Vacuum unit with handle "suction / release"

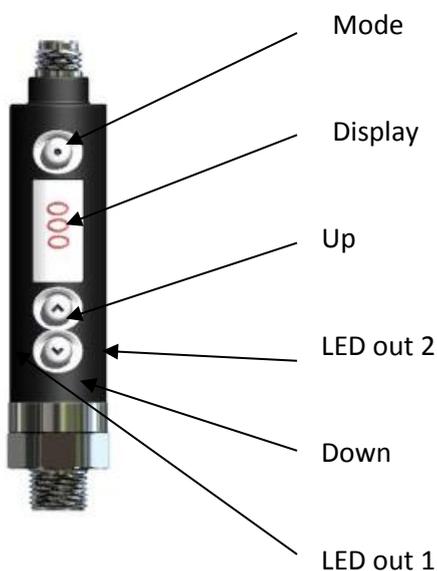
The digital vacuum switch is programmed in such a way that:

#### ALARM

When the vacuum level sinks below -0.60 bar, the acoustic alarm will sound and the red lamp will light up and when the vacuum level increases above -0.60 bar, the acoustic alarm stops and the green lamp lights up.

#### VACUUM PUMP

When the vacuum level sinks below -0.65 bar, the vacuum pump starts running and will switch off after 10 seconds.



The settings of the digital vacuum switch are very exact and stable.  
It should not normally be necessary to adapt the settings during the lifetime of this device.

Should it be necessary to reset the values, contact VIAVAC for instructions.

## C 9 Spare parts

VIAVAC GB2.2 vacuum unit							
							
Spare parts							
	A	B	C	D	E	F	G
1							
2							
3							

Pict.	Qty.	Description	Type	Art. no.	A
1-A	1	Battery charger with fitted plug	12V/3A	151105	
1-B	2	Filter Sinter Bronze	G3/8	5037	x
1-C	1	Battery	12V-12AH	33003	x
1-D	1	LED lamp red	12V	31001	
1-E	1	LED lamp green	12V	31002	
1-F	2	Digital vacuum sensor	G1/8"	29001	
1-G	2	Connection cable	4 pole	29002	
2-A	4	Relay	12V	21001	x
2-B	1	Vacuum pump	VP1-12V-36lmp	23002	
2-C	2	Vacuum meter	Ø40mm ¼"	51001	x
2-D	1	Volt indicator	12V	31010	
2-E	1	Main switch	10A	9023	
2-F	1	Acoustic warner	96dB	162105	
2-G	2	Crane handle safety		26004	
3-A	2	Upper part lid	GB	285107	
3-B	1	Lid	complete – GB3/4	288137	
3-C	1	Non return valve	G1/2" I-I	2002	
3-D	2	Ball valve	G1/4" I-I	5055	
3-E	2	Air inlet	1/8"-3/8"-1/4" I-O-I	287904	
3-F	2	Air inlet	3/8"-1/2"-3/8" O-O-I	287903	

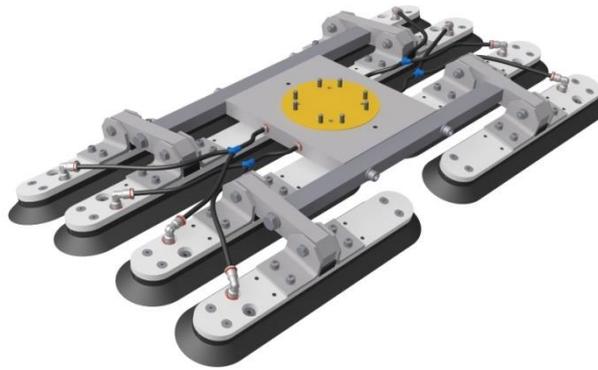
X = Recommended spare part

VIAVAC-GB2.2r vacuum unit							
							
Spare parts							
	A	B	C	D	E	F	G
1							
2							
3							

Pict.	Quan.	Description	Type	Art. no.	A
1-A	1	Battery charger	12V/2,3A	151105	
1-B	1	Acoustic warner	Ø32mm, 0.7...15VDC	162104	
1-C	1	Battery	12V-12AH	33003	x
1-D	1	Vacuum pump	VP1-12V-26lpm	23002	
1-E	2	Vacuum meter	Ø40mm ¼"-O	51001	x
1-F	1	Non return valve	G3/8"-I-I	2003	
1-G	2	E-valve	12V DC	177610	
2-A	4	Ball valve	G1/4" I-O	5036	
2-B	1	Hose	Ø5x9 black (EPDM)	5087	
2-C	1	Illuminated pushbutton	IP68 - 1S, green led	156219	
2-D	1	Illuminated pushbutton	IP68 - 1S, red led	156218	
2-E	8	L-hose coupling	G1/4" O - Ø6	172207	
2-F	2	Modified pressure transducer	A-10	300410	
2-G	1	Y-hose coupling	Ø6 - Ø6 - Ø6	184302	
3-A	2	Cover	front	288135	
3-B	1	Remote control transmitter	3 buttons+ code	279304	
3-C	2	Pipe	G1/2" - 624	287617	
3-D	1	Led	3 colors	157210	
3-E	8	Low head bolt with flange	ELVZ - M6x8	144402	
3-F	1	Cover	GB2.2r	285108	
3-G					

X = Recommended spare part

**Suction pads for curved glass**  
Art. No. 262409

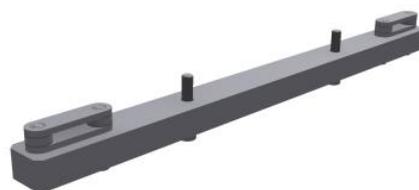


Spare parts							
	A	B	C	D	E	F	G
1							
2							

Pict.	Qty.	Description	Type	Art. no.	
1-A	1	Gasket for suction pad	SP6	30702	x
1-B	12	Hose	Ø6x8 black	5030	x
1-C	8	I-coupling	G1/4" O-O	5044	
1-D	8	L-coupling	G1/4" I-I	5035	
1-E	36	Seal ring	G1/4"	5023	
1-F	8	Suction pad SWL=75kg	SP10-120x520 (70 SHA)	265001	x
1-G	4	Y-hose coupling	Ø6 - Ø6 - Ø6	184302	
2-A	12	Hose coupling	G1/4" - Ø6	5070	

X = Recommended spare part

**FALLING SAFETY DEVICE**  
Art. No. 268407



PALLET BOX ASSEMBLY  
Art. No. 270001



REMOVABLE EXTENDED SUSPENSION "1000" – LLE1  
Art. no. 273403



LIFTING LUG EXTENSION "1000" – LLE4  
Art. no. 273419



FALLING SAFETY DEVICE FOR SQUARE ELEMENTS  
Art. No. 17007



C 10 Instruction and warning stickers

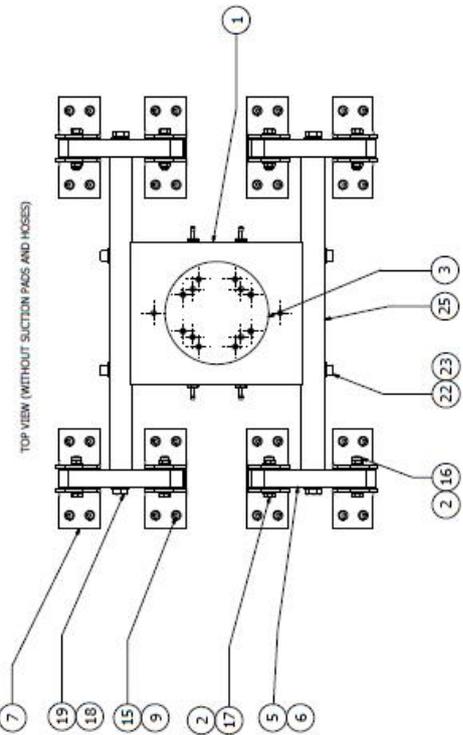
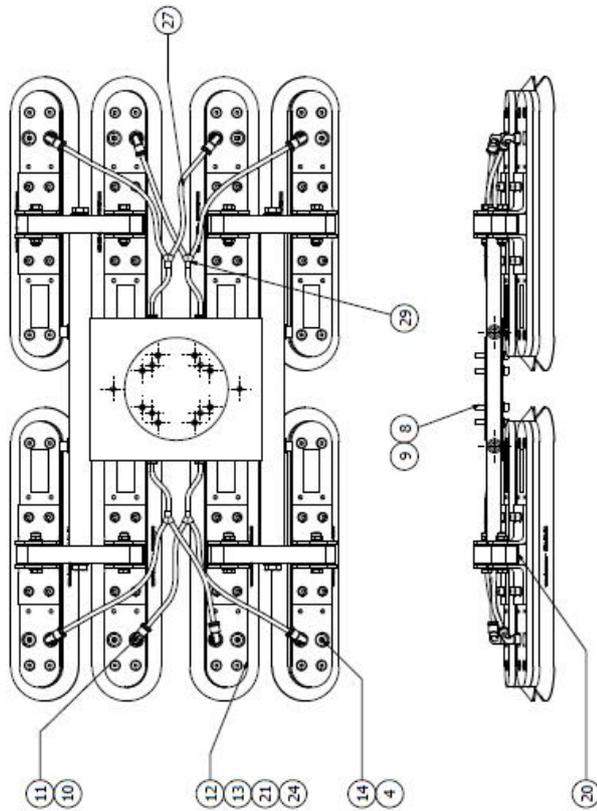
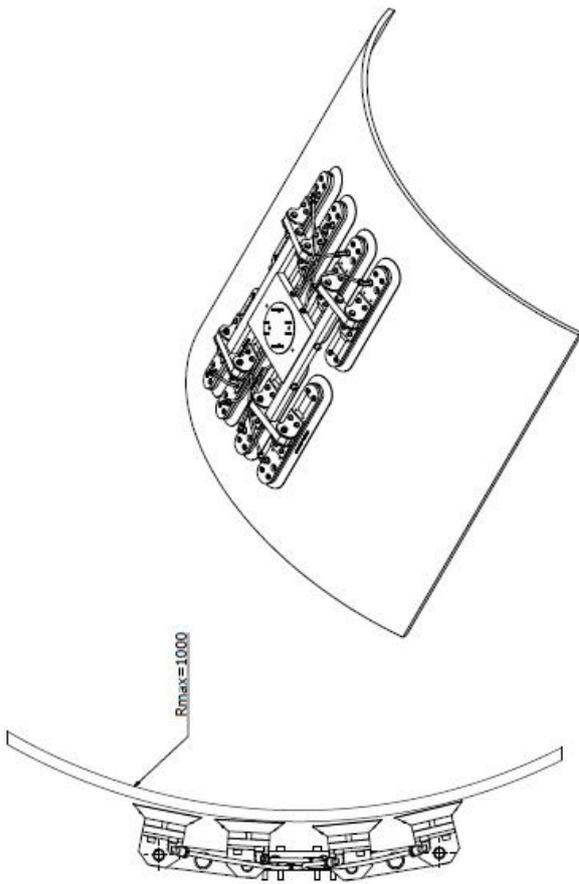
GB2.2

**Remarks:**  
- select the applicable language for textual stickers  
(arts. nrs. ending with \*\*)

100	1	TEXT number 4	20x10	1004012000
101	1	TEXT number 3	20x10	1004012000
102	1	TEXT number 2	20x10	1004012000
103	1	TEXT number 1	20x10	1004012000
104	1	5 WMS robot. BL GB	20x95	1004031000
105	1	5 WMS such on bottom GB2	20x90	1004031000
106	1	TEXT w/wor drain	10x45	10040132**
107	1	TEXT 18kg GB2.2	60x180	10040189**
108	1	5 WMS suction 180kg GB2	40x50	1004030500
109	1	TEXT safety precautions GB2	75x125	10040182**
110	1	TEXT before use manual	75x125	10040182**
111	1	TEXT after use sheet	75x125	10040183**
112	1	TEXT battery charging	75x125	10040184**
113	1	TEXT max dimensions plates	75x125	10040185**
114	1	TEXT enter use instructions	75x125	10040186**
115	1	TEXT enter use instructions	75x125	10040187**
116	1	5 WMS not under load	10x60	10040188**
117	1	3M SP track inspection	10x70	10040189**
118	1	3M SP wear 2017	10x70	10040190**
119	1	3M SP max. load	10x70	10040191**
120	1	TYPE H Plate	10x70	10040192**

**Technical Specifications Table:**

Model	GB2.2
Max. lift	180 kg
Max. lift height	11.10/12.10/1.10 C
Max. lift speed	2 / 2 / 1.2
Max. lift capacity	71668 l
Max. lift capacity (with 100% load)	71668 l
Max. lift capacity (with 50% load)	71668 l
Max. lift capacity (with 25% load)	71668 l
Max. lift capacity (with 12.5% load)	71668 l
Max. lift capacity (with 6.25% load)	71668 l
Max. lift capacity (with 3.125% load)	71668 l
Max. lift capacity (with 1.5625% load)	71668 l
Max. lift capacity (with 0.78125% load)	71668 l
Max. lift capacity (with 0.390625% load)	71668 l
Max. lift capacity (with 0.1953125% load)	71668 l
Max. lift capacity (with 0.09765625% load)	71668 l
Max. lift capacity (with 0.048828125% load)	71668 l
Max. lift capacity (with 0.0244140625% load)	71668 l
Max. lift capacity (with 0.01220703125% load)	71668 l
Max. lift capacity (with 0.006103515625% load)	71668 l
Max. lift capacity (with 0.0030517578125% load)	71668 l
Max. lift capacity (with 0.00152587890625% load)	71668 l
Max. lift capacity (with 0.000762939453125% load)	71668 l
Max. lift capacity (with 0.0003814697265625% load)	71668 l
Max. lift capacity (with 0.00019073486328125% load)	71668 l
Max. lift capacity (with 0.000095367431640625% load)	71668 l
Max. lift capacity (with 0.0000476837158203125% load)	71668 l
Max. lift capacity (with 0.00002384185791015625% load)	71668 l
Max. lift capacity (with 0.000011920928955078125% load)	71668 l
Max. lift capacity (with 0.0000059604644775390625% load)	71668 l
Max. lift capacity (with 0.00000298023223876953125% load)	71668 l
Max. lift capacity (with 0.000001490116119384765625% load)	71668 l
Max. lift capacity (with 0.0000007450580596923828125% load)	71668 l
Max. lift capacity (with 0.00000037252902984619140625% load)	71668 l
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Max. lift capacity (with 0.000000011641532182693482265625% load)	71668 l
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Max. lift capacity (with 0.0000000000000000000000000000000003009265089286171390625% load)	71668 l
Max. lift capacity (with 0.00000000000000000000000000000000015046325446428690625% load)	71668 l
Max. lift capacity (with 0.0000000000000000000000000000000000752316272321428690625% load)	71668 l
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Max. lift capacity (with 0.00000000000000000000000000000000000000143492941328125000001428690625% load)	71668 l
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Max. lift capacity (with 0.0089683088330625000000001428690625% load)	71668 l
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Max. lift capacity (with 0.0001401298255161062500000000001428690625% load)	71668 l
Max. lift capacity (with 0.007006491	



**Remarks:**  
 - pos. 20 (rubber plate) should be glued on pos. 12 (back plate) with Bicon Tix;  
 - threaded connections to be fitted vacuumtight with henna and Eplole Z;

30	1	30x30x100	110.03.00100
29	4	4 from coating	50.03.04502
28	12	12 from coating	50.03.03114
27	4	4 from coating	50.03.03114
26	4	4 from coating	50.03.03114
25	2	2 from coating	50.03.03114
24	8	8 from coating	50.03.03114
23	4	4 from coating	50.03.03114
22	4	4 from coating	50.03.03114
21	4	4 from coating	50.03.03114
20	1	1 from coating	50.03.03114
19	4	4 from coating	50.03.03114
18	4	4 from coating	50.03.03114
17	4	4 from coating	50.03.03114
16	4	4 from coating	50.03.03114
15	4	4 from coating	50.03.03114
14	4	4 from coating	50.03.03114
13	4	4 from coating	50.03.03114
12	4	4 from coating	50.03.03114
11	4	4 from coating	50.03.03114
10	4	4 from coating	50.03.03114
9	4	4 from coating	50.03.03114
8	4	4 from coating	50.03.03114
7	4	4 from coating	50.03.03114
6	4	4 from coating	50.03.03114
5	4	4 from coating	50.03.03114
4	4	4 from coating	50.03.03114
3	4	4 from coating	50.03.03114
2	4	4 from coating	50.03.03114
1	4	4 from coating	50.03.03114



Do not cover or remove stickers.  
 When unreadable or removed, replace by new one immediately.





## C 12 Errata

Date	Rev.	Description	Sect.	Name
01-11-2016	-	Completely rewritten.	-	IG
01-07-2017	Modified	Low voltage directive.	A2	IG
		EMC directive.	A2	
		Vacuum unit with radio remote control received new revision.	B3	
		New rule added to before lifting (V).	B3	
		New check for daily use is added (h).	C3	
		Electric wiring diagram modified.	C7	
		New spare parts added.	C10	
		Drawing with instruction and warning stickers modified.	C11	



# Daily Pre-Use Checklist

## Vacuum Lifter

Northern (Head Office) Tel: +44 (0)1482 227333

Central Tel: +44 (0)1302 341659

Western Tel: +44 (0)1384 900388

Southern Tel: +44 (0)203 174 0658

www.hird.co.uk

Machine Model: <b>VIVAVAC GB2 Curved</b>		Site Name:
Date Week Commencing:	Fleet No:	Address:
Inspected by:		

### Daily Pre-use Checks

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

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

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

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

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

Signature:	Name:	Date:
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