Bohle

Operating Instructions

Vacuum lifter

BO B18DM4GS

Introduction

Dear Customer,

Thank you for purchasing the Bohle vacuum lifter B18DM4GS.

Please read these operating instructions carefully before start-up. The complete operating instructions should be kept beside the vacuum lifter at all times.

If you have questions or wish to order spare parts or report problems, please indicate the machine type and model number.

Table of Contents

UK CA Declaration of Conformity

We hereby declare that handling aid

Model	Vacuum lifter B18DM4GS
No.	
Date of manufacture	

in the version supplied, complies with the relevant provisions:

Supply of Machinery (safety) Regulations 2008

Harmonised standards applicable, in particular
DIN EN 13035-1
DIN EN 13035-2
DIN EN 12100
DIN EN 13155

Bohle does not accept any liability if:

- the vacuum lifter is not used for its intended purpose,
- the vacuum lifter has been modified or altered without authorisation,
- components or spare parts of other manufacturers are used,
- the vacuum lifter is installed incorrectly or by unauthorized personnel,
- the vacuum lifter is not serviced regularly,
- the warnings, instructions and specifications in this manual are not observed.

Intended use

This Bohle vacuum lifter is designed for transporting and handling glass elements and similar flat products with gas-tight surfaces up to the maximum specified load. Any other use of the vacuum lifter is considered improper use.

May 2022

Edgar Höhn
Technical machines manager, authorised for the compilation of technical documentation
Bohle AG, Dieselstraße 10, D-42781 Haan

1. General Safety Instructions

- This vacuum lifter must be set up, operated, and maintained only by authorised, trained and registered personnel, who are familiar with these instructions. Personnel must be informed about existing residual hazards.
- We will accept liability for trouble-free operation only if original Bohle spare parts are used.
- Before use, all safety devices must be checked to ensure that they are correctly in position and undamaged.
- To avoid hold-ups, the operator must operate the vacuum lifter according to these operating instructions and the relevant regulations.
- In addition to the operating instructions, all relevant legal and other binding regulations concerning accident prevention and environmental protection must be observed.
- When performing maintenance, remove the transport material / glass pane!
- Always wear suitable protective clothing when handling glass.
- Do not make any modifications, additions or conversions to the vacuum lifter. This particularly applies to safety devices. Unauthorised alterations and modifications to the vacuum lifter will cause the above EC Declaration of Conformity to become void.
- Keep these operating instructions available beside the vacuum lifter.
- Never release the vacuum in the vacuum lifter while transporting an object.
- Regularly check the suction pads, pressure gauge and vacuum hoses for damage. Immediately replace damaged parts!
- It is strictly forbidden to use the vacuum lifter in areas with potentially explosive atmospheres (ATEX areas).
- It is also strictly forbidden to stand or walk under a suspended load! Risk of injury!
- Never intervene in the work area around the vacuum lifter, either manually or using aids, while the vacuum lifter is in use. Do not bypass any safety devices. Risk of injury!
- The operator must ensure that no unauthorised persons work with the vacuum lifter or enter the surrounding area. Risk of injury!
- No-one must be lifted or carried with the vacuum lifter!
- Never attach the vacuum lifter to the U-handles of the lifting gear. Use the eye-bolts supplied.
- The equipment must not be used in windy conditions (maximum wind force 4 Beaufort), or in snow or rain. Depending on the shape and size of the workpiece, operation may have to be stopped.
- Never leave the vacuum lifter unattended with a suspended load.
- It is strictly forbidden to operate the vacuum lifter under the effect of medication which affects reaction speed or cognitive ability, or under the effect of drugs and alcohol!
- If the safety devices have been removed in the course of repair work, the vacuum lifter must not be operated again until all safety devices have been attached and checked for correct function.
- Never exceed the load capacity of the vacuum lifter or lift materials for which the vacuum lifter was not designed.
- Never raise a load higher than is necessary.

- Never attempt to lift cracked or split glass.
- Never actuate the lock pins while rotating or swivelling.
- Caution! The operator must at all times be in a position to see the vacuum displays in order to be able to judge whether there is sufficient vacuum. The operator must be able to reach the vacuum pump at all times if vacuum has to be regenerated. Therefore, never raise the vacuum lifter too high or block the access to the vacuum lifter.

Warning against hand injuries

Do not stand or walk under the suspended load

Warning against danger spot

Read instruction manual

Wear protective shoes

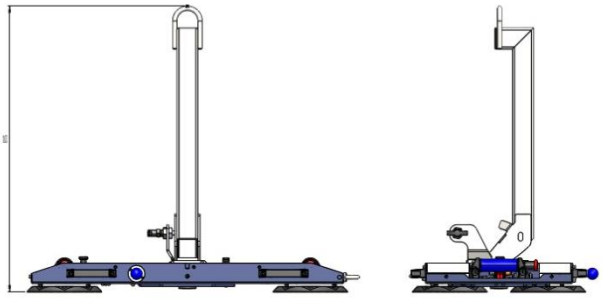
Wear hair net

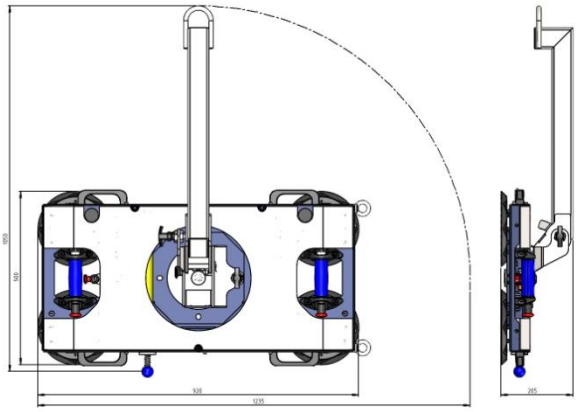
Wear protective glasses

Wear protective gloves

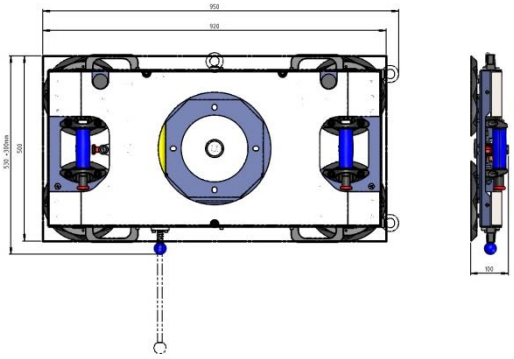
2. Technical Data

Total depth [mm] max.	205
Total width [mm] max.	1235
Total length [mm] max.	815
Glass thickness [mm] min.	3
Glass height [mm] max.	2000
Glass length [mm] max.	3000
Max. load [kg]	180
Turning range, manual	360°, locking at 4 points
Swivel range, manual	90°, lockable in vertical position
Vacuum circuits	2
Vacuum displays by vacuum gauge	2
Vacuum pump	manual
Working height [m above NN] max.	1800
Working temperature range [°C]	10 – 40
Weight with lift arm [kg] Weight without lift arm [kg]	31 23





Vacuum lifter **with** lift arm



Vacuum lifter **without** lift arm

3. Transport, Storage, and Scope of Delivery

The vacuum lifter is supplied pre-assembled in a cardboard box.
Scope of delivery BO B18DM4GS: one vacuum lifter, one lift arm, and one operating instructions manual

It is essential to check the delivery for completeness and for damage. Transport damage must be reported to the carrier (shipping agent, train operator, etc.) immediately and in writing.

Do not use the equipment if damaged!

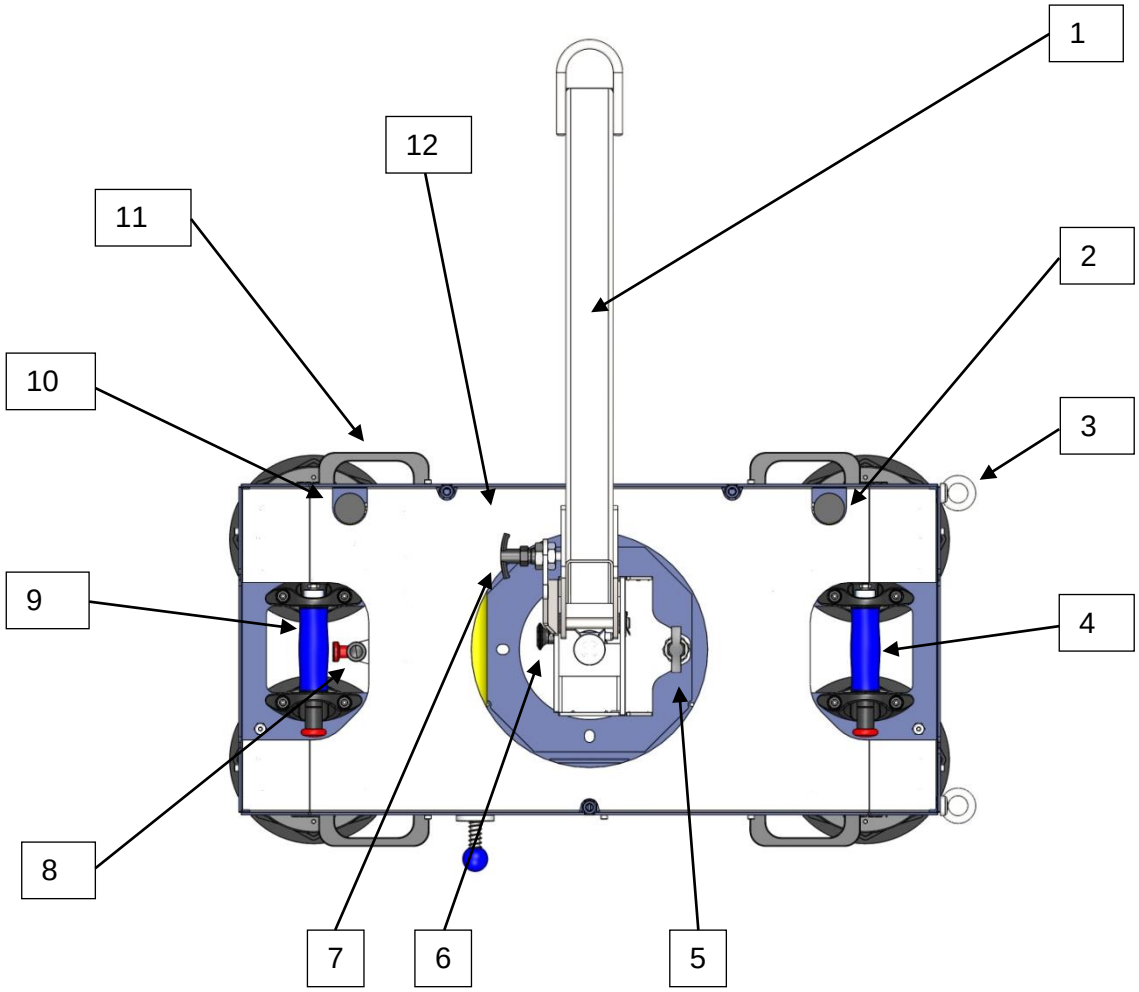
Remove all transport locks and packaging material and take the vacuum lifter out of the packaging.

It is essential to read these operating instructions before use.

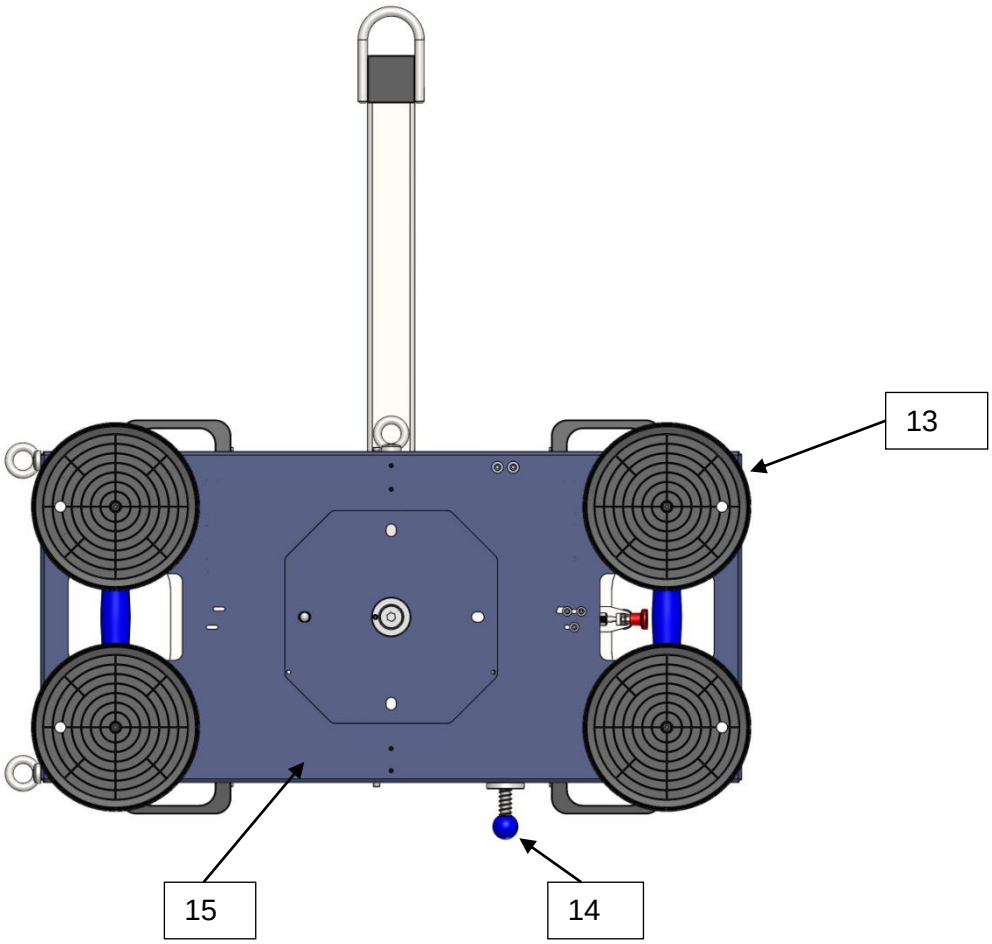
If the vacuum lifter is not in use, or is being transported or kept in storage, always put the protective covers on the suction pads to protect them from dust and dirt.

Always store the vacuum lifter in such a way as to prevent damage to the suction pads.

4. Overview



01: Lift arm (only for BO B18DM4GS)
02: Vacuum display vacuum circuit 1
03: Eye bolt
04: Handle with vacuum display vacuum circuit 1
05: Lock pin "Rotate vacuum lifter" function
06: Pin "Separate vacuum lifter from lift arm" function
07: Lock pin "Swivel vacuum lifter" function
08: Valve "Suction/Release" function vacuum circuit
09: Handle with vacuum display vacuum circuit 2
10: Vacuum display vacuum circuit 2
11: U-handle
12: Cover



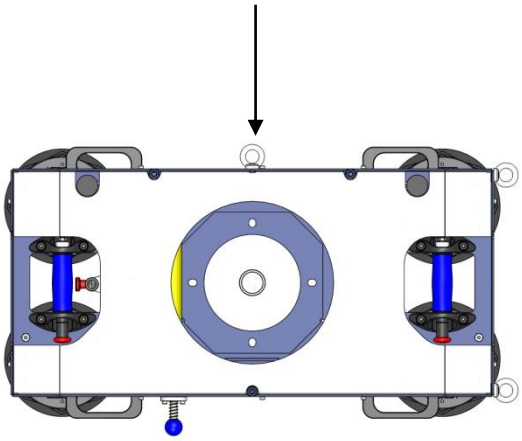
13: Suction pad
14: Vacuum pump
15: Base frame

5. Functions/Controls

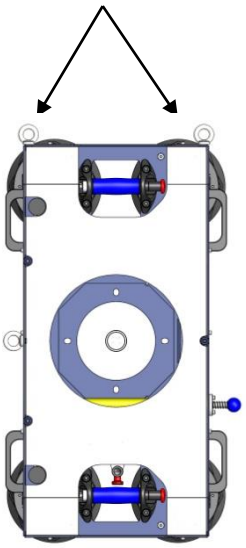
Configurations for moving loads

The vacuum lifter can be used **with** or **without** lift arm.

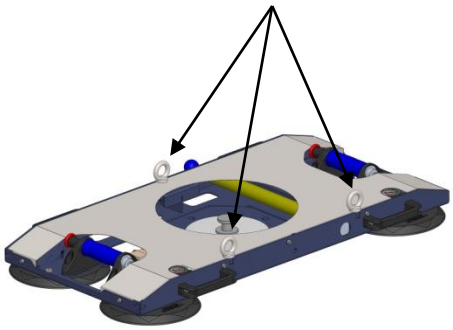
The vacuum lifter is used **without** the lift arm if the headroom is particularly low, or if the vacuum lifter is being used with Bohle Liftmaster B1.



Vacuum lifter, vertical/lateral, one attachment point by one eye bolt



Vacuum lifter, vertical/lateral, two attachment points by two eye bolts

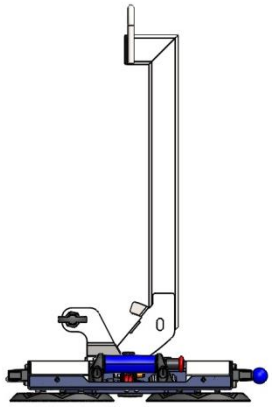


Vacuum lifter, horizontal, three attachment points by three eye bolts

A total of three eye bolts are included in the supply. These are to be screwed into the appropriate thread connection by the user.

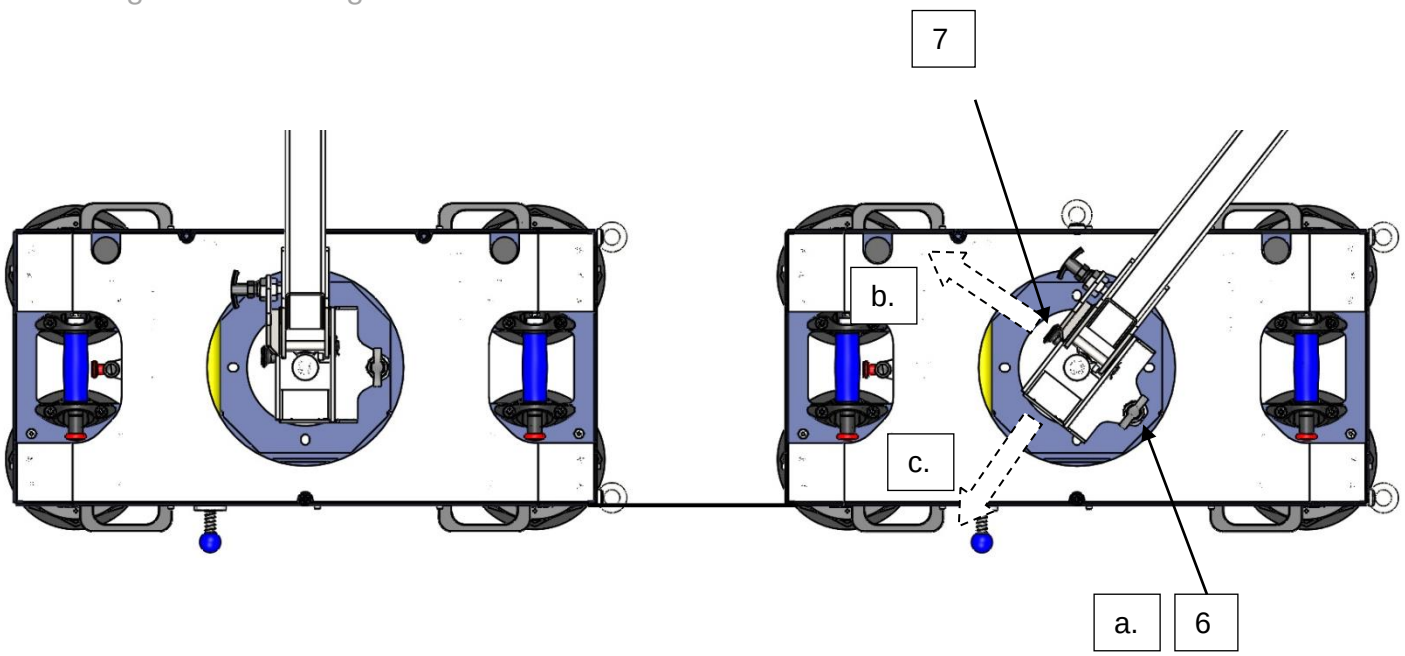
Before every use, check that the eye bolts are firmly seated. When using an eye bolt, check that it does not work loose during turning movements.

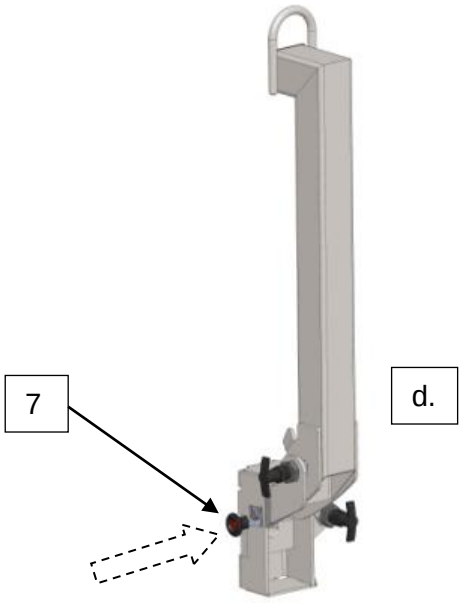
Use of the vacuum lifter **with** lift arm, if working mainly with lifting gear (crane, cable winch, chain hoist, etc.) or the load has to be swivelled or rotated



Vacuum lifter swivelled horizontally

Vacuum lifter swivelled vertically





To remove or mount the lift arm, place the vacuum lifter on a table.

a. Pull lock pin 6 and turn the lift arm through about 45°.
b. Remove pin 7 completely
c. Push the lift arm in the direction of the arrow and lift it off.
d. To prevent it from being lost, please insert pin 7 in the lift arm.

Assembly takes place in the reverse order.

Always check that pin 7 is correctly seated (snapped in).

6. Operation

Before using the vacuum lifter

Before using the vacuum lifter, you must decide whether the vacuum lifter is suitable for carrying out the planned task with regard to the "Technical Data" and "Intended Use", while following the general and special safety instructions.

It is essential to read these operating instructions in full before using the vacuum lifter.

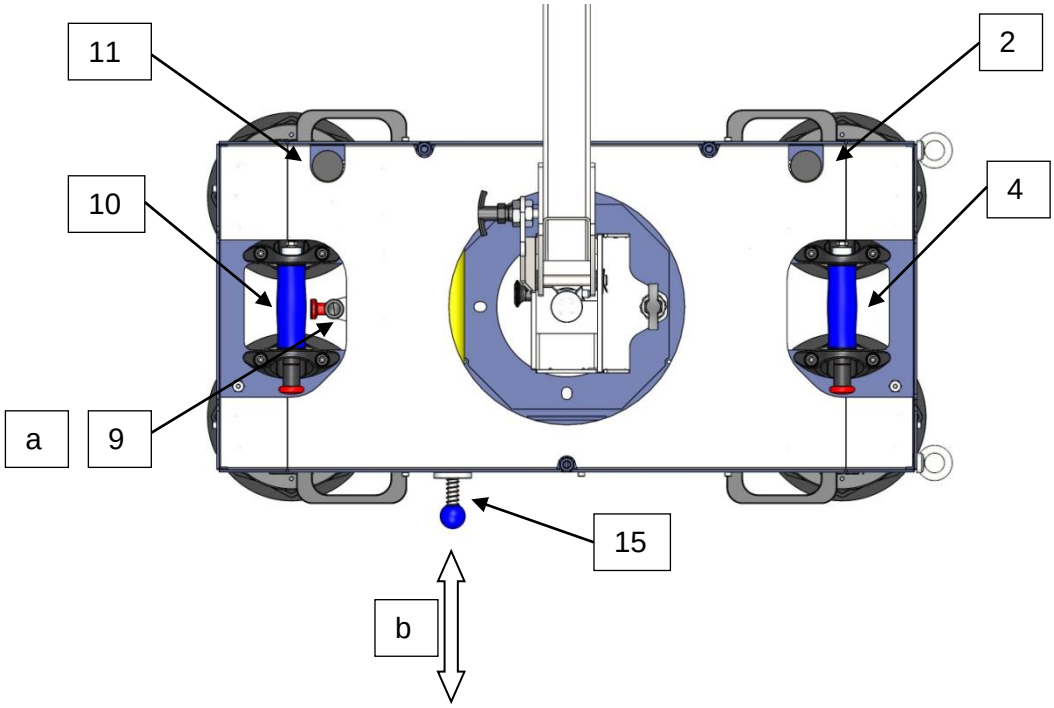
Do not use the equipment if damaged!

Always wear suitable protective clothing.

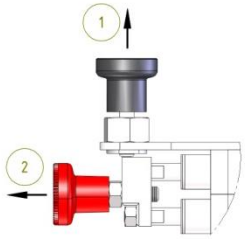
Suctioning a load

Before suctioning a load, check that the contact surfaces of the load are even, smooth, gas-tight, dry, and free of grease and dust.
Position the axis of rotation of the vacuum lifter at no more than 50 mm from the centre of the load, as off-centre loading can result in unexpected rotation and/or swivelling of the load.

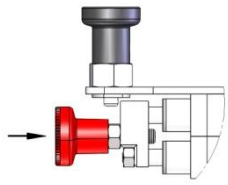
Make sure that all suction pads are placed fully and evenly against the contact surface of the load.



a. Pull the valve 9 out into the "Vent" position.



b. Generate a pre-vacuum by actuating vacuum pump 15 five times.
c. Press the vacuum lifter against the centre of the load, by pressing the two handles 4 and 10 at the same time so that all suction pads are evenly placed.
d. Push in the valve 9. (Black snap button snaps in)



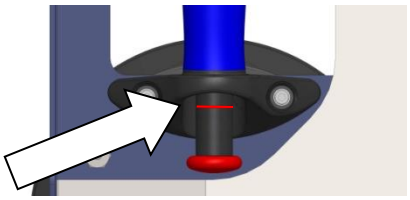
The load is now suctioned with a pre-vacuum of about -0.1 to -0.2 bar. **This is not sufficient for lifting a load!**

e. Therefore, actuate vacuum pump 15 until the indicator on both vacuum displays 2 and 11 is located in the green range between -0.6 and -0.8 bar. The plungers in the two handles 4 and 10 are retracted simultaneously. The red rings on the plungers are therefore no longer visible.

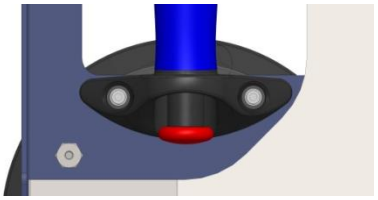
Red range:
Insufficient vacuum

Green range:
Sufficient vacuum

Sufficient vacuum is present only when both conditions are fulfilled!



Red ring visible➔Vacuum not OK



Red ring not visible➔Vacuum OK

Due to the slip-stick effect, it may occur that the plungers are not retracted even though there is sufficient vacuum. After the vacuum is generated, therefore, press each plunger once. If the red ring is not visible now, the vacuum is sufficient. If the red ring is visible, a higher vacuum level must be generated by pumping.

Vacuum level on optimal surfaces

When suctioned on clean, dry, smooth and non-porous load surfaces, the vacuum lifter can maintain the vacuum level in the green range (< -0.6 bar) of both vacuum displays for a longer time.
If this is not the case, the vacuum lifter must be taken out of service immediately for maintenance or servicing (see the Maintenance section).
If vacuum display falls below a value of -0.6 bar, the operator must renew the vacuum by pumping.

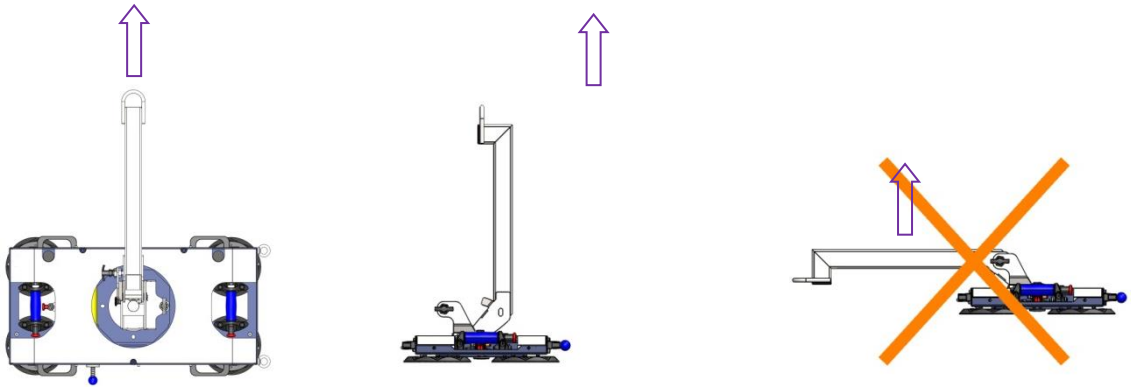
Caution! The operator must at all times be in a position to see the vacuum displays and be able to judge whether there is sufficient vacuum. The operator must be able to reach the vacuum pump at all times if vacuum has to be regenerated. Therefore, never raise the vacuum lifter too high or block the access to the vacuum lifter.

Vacuum level on other surfaces

If it is to be suctioned on dirty, dry, moist, smooth, rough or porous load surfaces, the vacuum lifter may not be able to maintain the vacuum level in the green range (< -0.6 bar) of both vacuum displays for a longer time.
If dirt is present, clean the contact surfaces of the load and the suction pads and suction the load again.
If moisture is present, dry the contact surfaces of the load and the suction pads and suction the load again.
If the load surfaces are rough or porous, the vacuum lifter is not suitable for suctioning this load.

Lifting and moving a load

The lift arm must always be vertical when lifting a load.



Never attempt to lift a load from the horizontal position, with the lift arm engaged parallel to the load.

Caution! The operator must at all times be in a position to see the vacuum displays and be able to judge whether there is sufficient vacuum. The operator must be able to reach the vacuum pump at all times if vacuum has to be regenerated. Therefore, never raise the vacuum lifter too high or block the access to the vacuum lifter.

After suctioning the load, but before lifting the load, the operator must check whether:

- sufficient vacuum is present,
- vacuum level is not falling,
- the load is suctioned at its centre,
- there is sufficient room available for moving, rotating, and swivelling the load,
- external conditions (wind, wetness etc.) will allow the load to be moved.

If there is loss of vacuum while lifting, the vacuum level must be raised to a sufficient level again by operating the vacuum pump.
If there is continuous vacuum loss, it is either because the load surface is not suitable for generating a vacuum, or there is a vacuum leak in the vacuum lifter. In both cases, no loads should be moved.
In the case of a vacuum leak, please carry out a vacuum test and check the suction pads for damage (see also Section 7. Inspection and maintenance)

Configuration "vacuum lifter with lift arm“

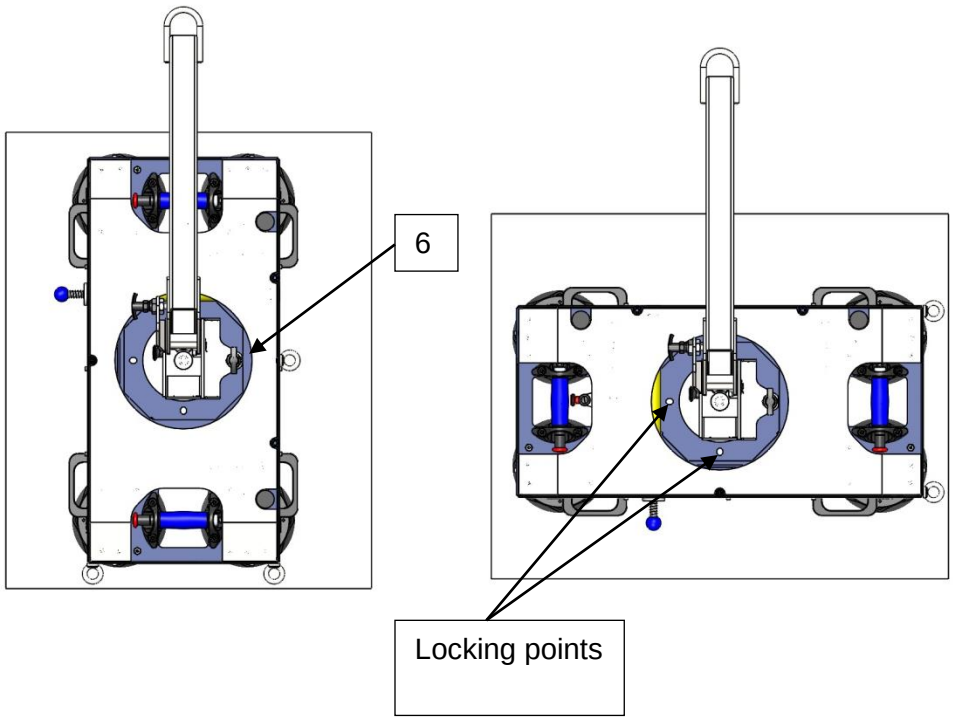
"Rotate vacuum lifter" function

The vacuum lifter can be turned continuously through 360° with or without load.
A locking point is provided every 90°

Remember that the diagonal dimensions of the load are longer than the lateral dimensions. Make sure that the load has sufficient room for rotation without touching the operator or colliding with nearby objects (ground, walls, ceiling etc.).

Grasp the load at the centre, otherwise substantial torsional forces will be created.

Pull lock pin 6 and turn the vacuum lifter slowly into the desired position.



Caution! Risk of crushing when turning!

To stop movement of the load automatically at each quarter turn, release the lock pin immediately after rotation has started, so that the lock pin engages at the next locking point. The lock pin should always remain engaged when no turning movement is required. This will prevent damage to the load and injuries to the operator.

Never engage the lock pin at a locking point while the vacuum lifter is turning – with or without load. This can cause severe wear and, in the worst case, accidents.

Configuration "vacuum lifter with lift arm“

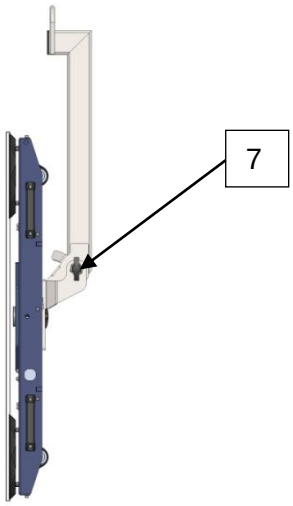
"Swivel vacuum lifter" function

The vacuum lifter can be swivelled continuously through 90° with or without load.

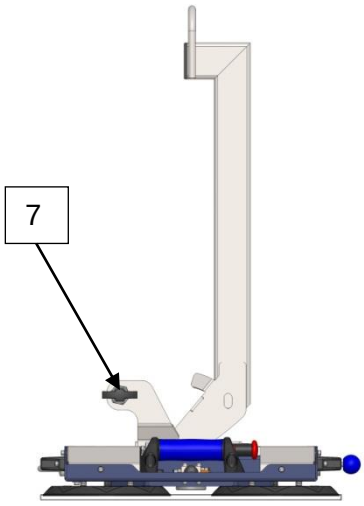
Caution! Load may overturn

Grasp the load at the centre, otherwise substantial torsional forces will be created.

Make sure that the load has sufficient room for rotation without touching the operator or hitting against nearby objects.



Vacuum lifter swivelled in the vertical position



Vacuum lifter swivelled in the horizontal position

To swivel out of the vertical position, release lock pin 7 and swivel the vacuum lifter to the horizontal position.
For safety reasons, no locking points are provided.

To swivel from the horizontal to the vertical position, swivel the vacuum lifter until lock pin 7 engages.

Caution! Risk of crushing when swivelling.

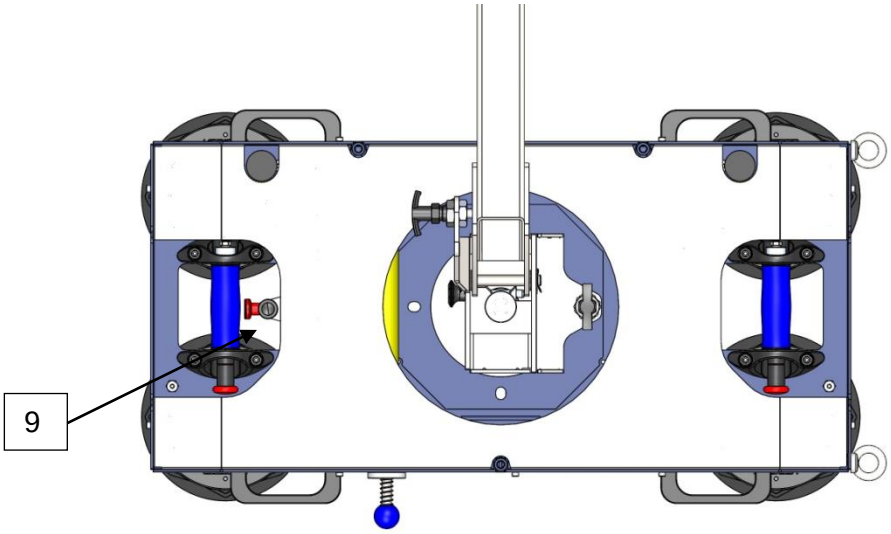
Guide the load securely to prevent overturning.

The lift arm must be vertical when lifting a load.

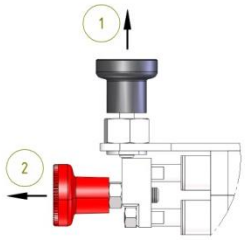
Releasing the vacuum from the load

Before releasing the load, make sure that the load is supported fully, independently, and steadily.

Lower the load and support it.



Pull out the valve 9 to the "Ventilate" position (pull the black snap-in button upwards and hold it, pull the red button outwards).



The vacuum lifter can now be moved away.

After using the vacuum lifter

After using the vacuum lifter, and especially for transport and storage, separate it from the lifting gear (crane, chain hoist, etc.).
To keep the suction pads clean, please use the protective covers supplied. Then place all four suction pads on a horizontal, even, dry and clean surface.
Put valve 9 in the release position, i.e. the out position.
Lower the lift arm to horizontal position.

Do not place the vacuum lifter on surfaces that could cause deformation, soiling, or damage to the suction pads.

7. Inspection and Maintenance

Inspection at initial start-up and before every use

- Check the suction pads for dirt and visible damage
- Check the vacuum lifter for visible damage

Any soiling or visible damage should be corrected before use.

Regular inspection

This should be carried out every 20 operating hours or if the vacuum lifter has been out of service for 4 weeks

- Check the suction pads for dirt and visible damage
- Check the vacuum system, including suction pads, joints, and all hoses, for visible damage
- Carry out **suction pad inspection and maintenance**. A description is provided at the end of this section.
- Inspect the whole vacuum lifter for visible wear, deformation, bumps and dents on functional elements, cracks, corrosion, loose screws and other defects that could represent a safety risk
- Carry out a **vacuum test**. A description is provided at the end of this section.
- Keep a written log for each regular inspection.

If any damage is found during the inspection, correct this before use.

Yearly inspection

The contractor must comply particularly with the corresponding national regulations for the operation and inspection of industrial vehicles (e.g. in Germany: the regulations of the German statutory accident insurance association - "DGUV-Vorschriften BGV")

The contractor must make sure that the safety devices on the vacuum lifter are inspected by an authorised person at intervals no longer than one year.
Inspections should be recorded in writing and an inspection label attached to the vacuum lifter.

Bohle would be pleased to provide this service. Please contact us.

Suction pad inspection and maintenance

Two factors are involved in lifting loads with a vacuum lifter.

- sufficient vacuum
- sufficient friction between suction pads and load surface

First check the suction pads for cuts, dents, abrasion, especially at the outer sealing edges. Damage to the suction pads has a considerable effect on the load carrying capacity of the vacuum lifter. Damaged suction pads should be replaced immediately.
Now check whether the sieve (Page 24, No.24) and felt plate (Page 24, No.25) are present. These prevent the vacuum-carrying components from
becoming clogged with dirt. Replace any missing parts immediately
(see Replacement parts list).

The friction of the suction pads against the load surface can be reduced, for example, by soiling (oil, grease, dust etc.), wear, ageing, hardening, and heat (sunlight, naked flames etc.).
If there is soiling, the suction pads should be cleaned with a suitable cleaning agent (Bohle glass cleaner BO 5107805) and a lint-free cloth (BC 5056000).

For cleaning the suction pads, do not use solvents, petroleum products (kerosene, benzine, diesel), softeners, silicone or aggressive agents. These reduce the friction properties of the suction pads and may ruin them.

When cleaning the suction pads, prevent cleaning fluid from getting into the vacuum system. To do this, cover the suction opening and hold the suction pad surface horizontally, facing downward. Wipe off any residues. The suction pad surface must be completely dry before use.

Vacuum test

The vacuum test is used to determine the rate of vacuum loss over a given time period.

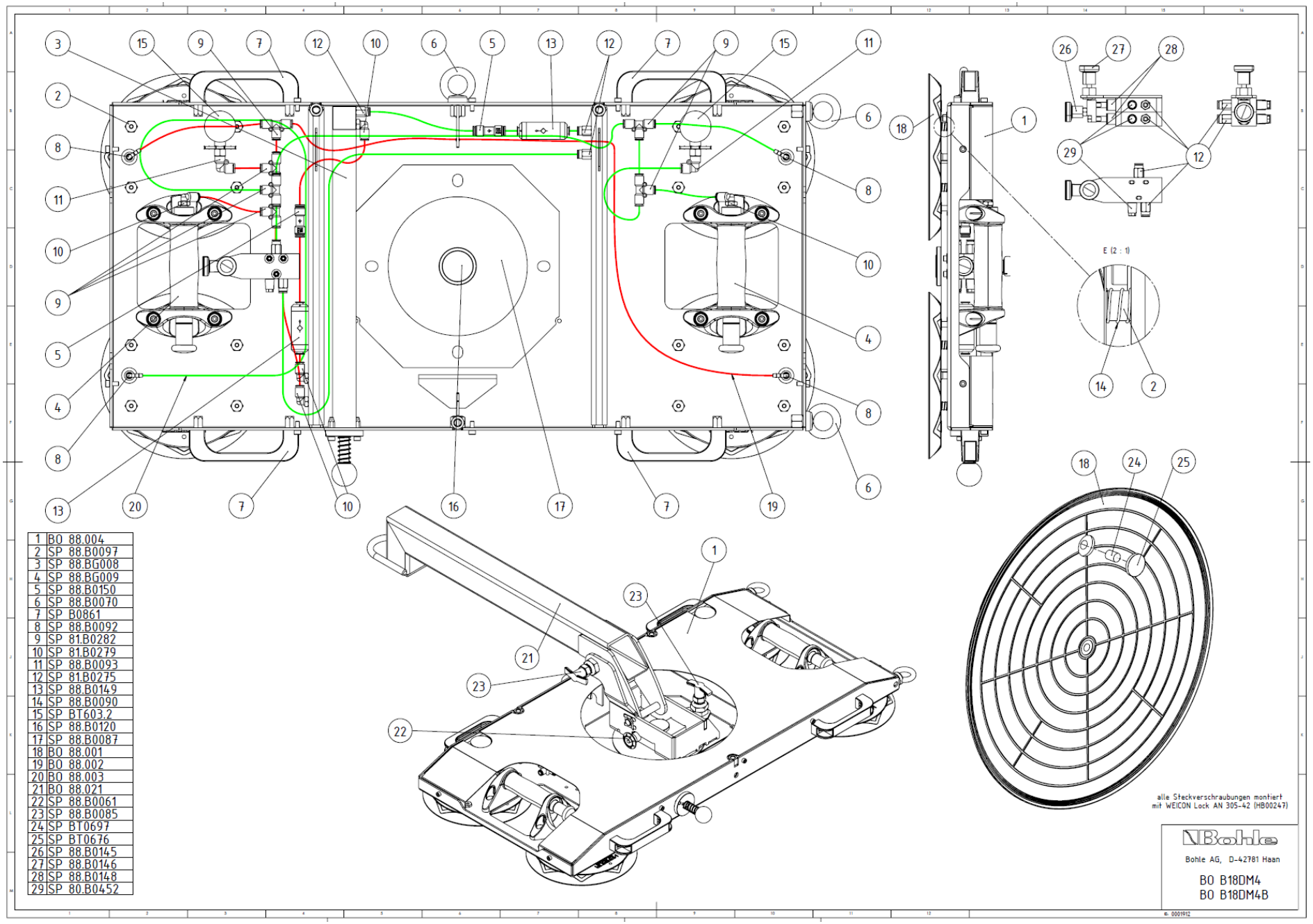
- Carry out suction pad inspection and maintenance
- Suction the vacuum lifter on a clean, dry, smooth, gas-tight and non-porous surface (e.g. a glass sheet).
  Both vacuum displays should indicate more than -0.75 bar.
- Observe the two vacuum displays. The vacuum on both displays should not fall by more than -0.14 bar within 10 minutes.

If one or both displays fall by more than -0.14 bar within 10 minutes, the vacuum lifter should not be used.

Correct the defect in the vacuum system before using the vacuum lifter.

8. List of Spare Parts

If you have questions or wish to order spare parts or report problems, please indicate the machine type and serial number. These can be found on the machine model plate.



1	BO 88.004
2	SP 88.B0097
3	SP 88.BG008
4	SP 88.BG009
5	SP 88.B0150
6	SP 88.B0070
7	SP B0861
8	SP 88.B0092
9	SP 81.B0282
10	SP 81.B0279
11	SP 88.B0093
12	SP 81.B0275
13	SP 88.B0149
14	SP 88.B0090
15	SP BT603.2
16	SP 88.B0120
17	SP 88.B0087
18	BO 88.001
19	BO 88.002
20	BO 88.003
21	BO 88.021
22	SP 88.B0061
23	SP 88.B0085
24	SP BT0697
25	SP BT0676
26	SP 88.B0145
27	SP 88.B0146
28	SP 88.B0148
29	SP 80.B0452

Inspection Log Appendix

Type of inspection	Work carried out	Signature/date

Type of inspection	Work carried out	Signature/date