



## HV Soft-Pump Angle Valve with pneumatic actuator, single acting with closing spring

This manual is valid for the valve ordering number(s):

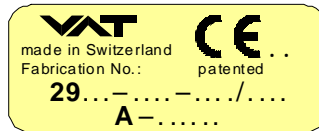
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29038-QA/H/E/11/21/31/41

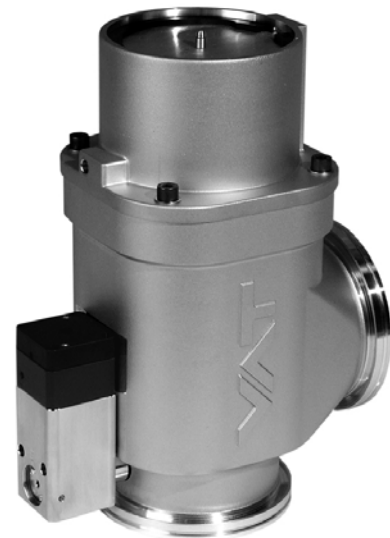
29136-QA/H/E/11/21/31/41

29138-QA/H/E/11/21/31/41

The fabrication number is indicated on each product as per the label below (or similar):



← Fabrication number



### Explanation of symbols:



Read declaration carefully before you start any other action!



Keep body parts and objects away from the valve opening!



Attention!



Hot surfaces; do not touch!



Product is in conformity with EC guidelines, if applicable!



Loaded springs and/or air cushions are potential hazards!



Disconnect electrical power and compressed air lines. Do not touch parts under voltage!



Wear gloves!



Read these «**Installation, Operating & Maintenance Instructions**» and the enclosed «**General Safety Instructions**» carefully before you start any other action!



Installation, Operating & Maintenance Instructions

**Series 290, DN 63 - 80 (I.D. 2½" - 3")**

**Series 291, DN 63 - 80 (I.D. 2½" - 3")**

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## 1 Use of product

Use product for clean and dry indoor vacuum applications under the conditions indicated in chapter «Technical data» only!  
Other applications are only allowed with the written permission of VAT.

### 1.1 Technical data

Pressure range: open and closed in closing direction (option: shaft feedthrough)	1 x 10 <sup>-8</sup> mbar to 4 bar (abs) 1 x 10 <sup>-7</sup> mbar to 4 bar (abs)
Differential pressure on the plate in opening direction	≤ 1.2 bar
Differential pressure at opening	≤ 1 bar in either direction
Admissible temperature	
- Valve body	≤ 120°C
- Actuators	≤ 120°C
- Position indicator	≤ 80°C (option 120°C)
Position indicator: contact rating	
- Voltage	≤ 50 V
- Current	≤ 0.1 A
- Power	≤ 10 W
Solenoid	see tag on solenoid

Further data according to Product Data Sheet.



## 2 Installation

### 2.1 Unpacking

Before unpacking the valve, make sure that the packaging is in impeccable condition and the valve has not suffered damage.

**Note!** The plastic packing material and/or protective covers may only be removed immediately before the valve is mounted into the system. Unprotected sealing surfaces must be treated with care and kept clean.

### 2.2 Installation into the system

Always wear cleanroom gloves when handling the valve and mount the valve to a clean system only.

### 2.3 Admissible forces

DN (nom. I.D.)		Axial tensile or compressive force «F <sub>A</sub> »		Bending moment «M»	
mm	inch	N	lbf	Nm	lbf · ft
63	2 ½	200	45	18	13
80	3	225	50	22	16

A combination of both forces («F<sub>A</sub>» and «M») is not allowed. Please contact VAT in this case.

### 2.4 Connections

#### 2.4.1 Compressed air connection



Connect compressed air only when  
 - valve is installed in the system  
 - moving parts cannot be touched

Valve is being closed by a spring when the compressed air pressure supply fails.

#### **Main valve**

Internal thread R<sup>1</sup>/<sub>8</sub>" (1<sup>1</sup>/<sub>8</sub>" NPT for USA)

#### **Soft-pump valve**

Internal thread M5 (variety of adapters optionally available)

Compressed air pressure (min. - max. overpressure): 4.5 - 8 bar / 65 - 115 psi

Use clean, dry or slightly oiled air only!



2.4.2 Electrical connection

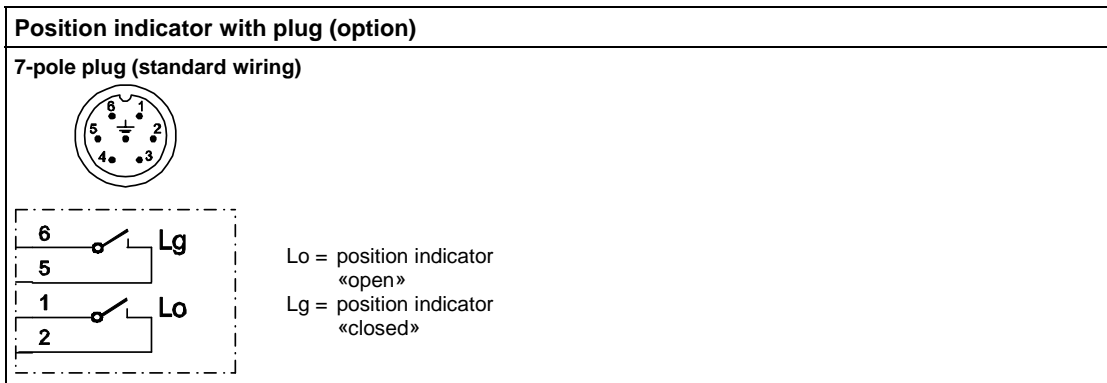
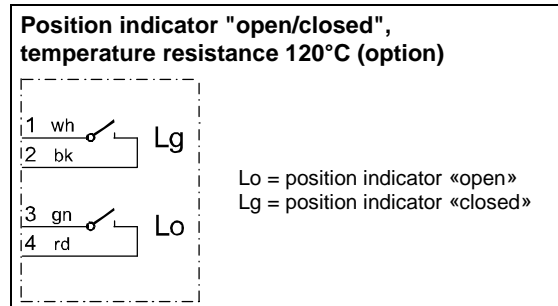
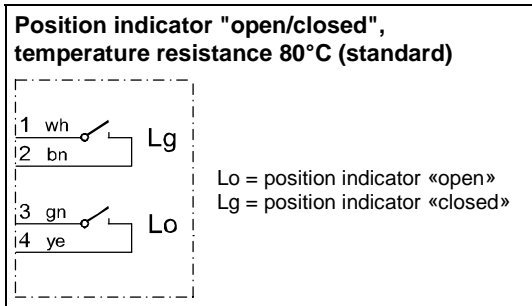
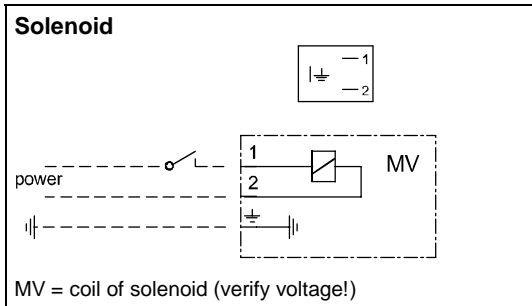


Do not touch electrical parts under voltage!



Connect electrical power only when  
- valve is installed in the system  
- moving parts cannot be touched

Make sure that the control voltage is in accordance with the voltage stated on the solenoid!  
Plugs for the position indicator and solenoid are supplied with the valve.

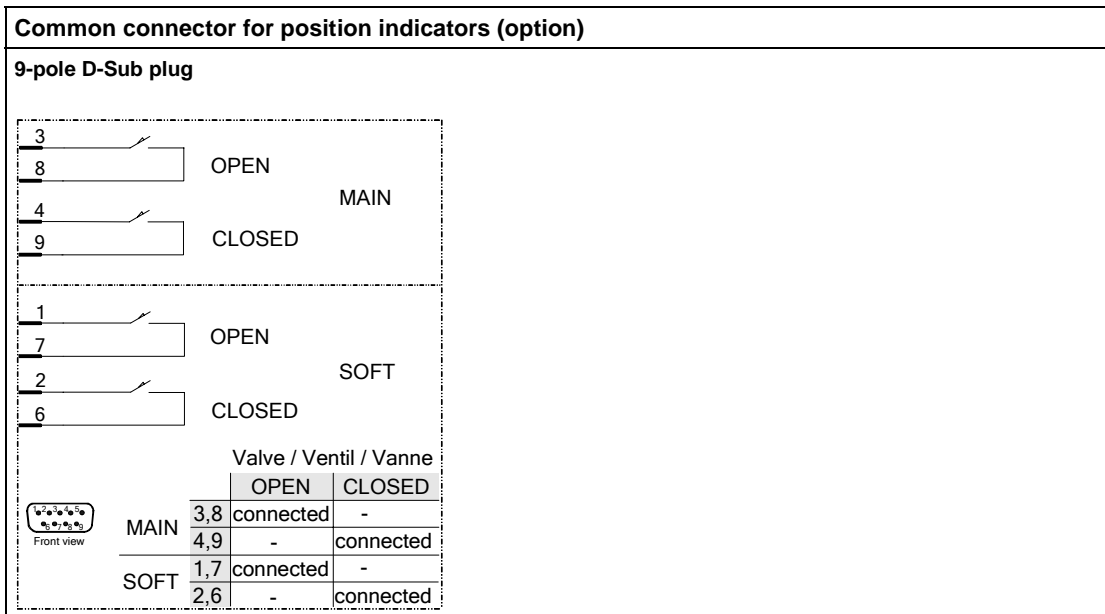
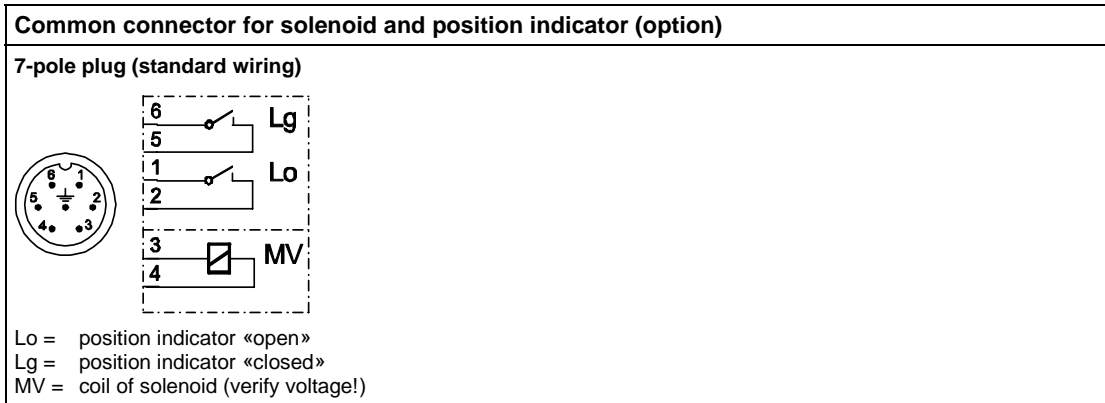
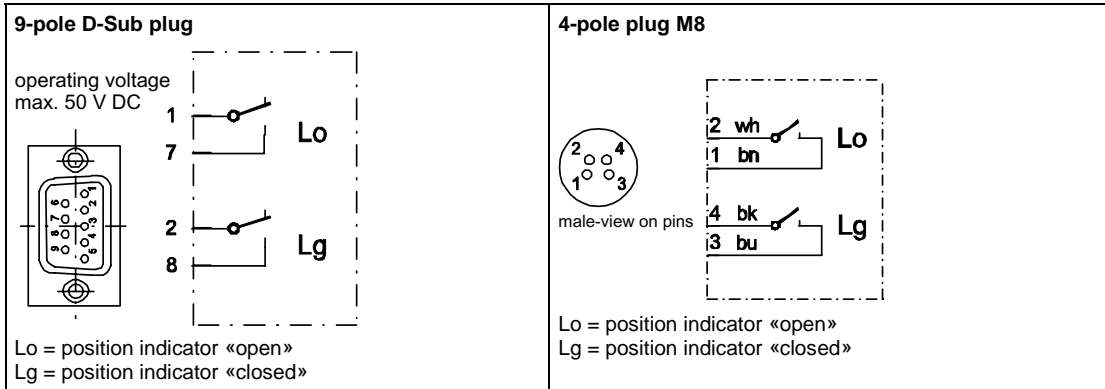




Installation, Operating & Maintenance Instructions

Series 290, DN 63 - 80 (I.D. 2½" - 3")

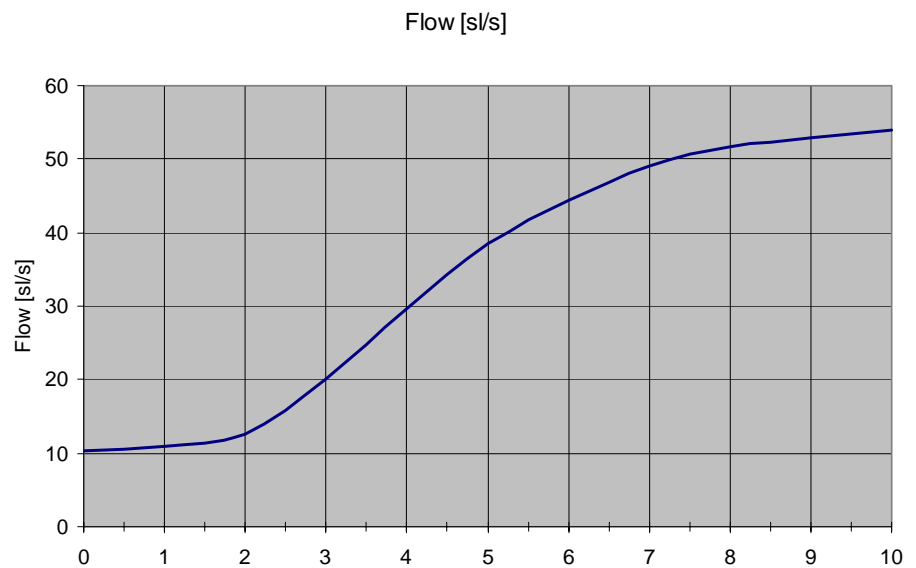
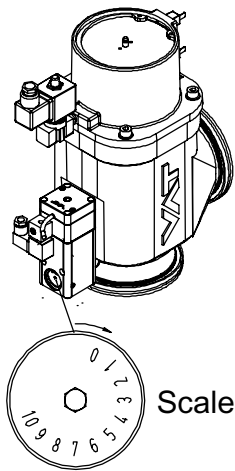
Series 291, DN 63 - 80 (I.D. 2½" - 3")





## 2.5 Adjustment of the soft-pump orifice

Adjust the appropriate flow by turning the setting scale of the soft-pump valve with a hexagonal wrench. At the lowest scale value, the conductance is minimal. By turning the rod counter-clockwise the conductance of the soft-pump opening increases. At the highest scale value, the conductance is maximal.



## 3 Operation

### 3.1 Normal operation

Both, the main valve and the soft-pump valve, are closed by a spring (NC) and opened pneumatically.

### 3.2 Operation under increased temperature

See «1.1 Technical data»

### 3.3 Behavior in case of compressed air pressure drop

Valves closed: valves remain closed and leaktight  
Valves open: valves close leaktight

### 3.4 Behavior in case of power failure

Valves close leaktight if provided with solenoid valves.  
Otherwise, the behavior is dependent on the customer's installation and therefore not predictable.





## 4 Trouble shooting

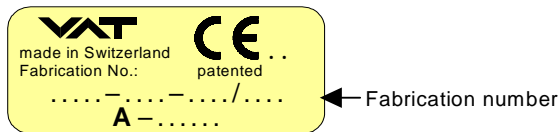
Failure	Check	Action
Valve does not open	Power available?	Connect correct voltage
	Compressed air available?	Connect correct air pressure

If you need any further information, please contact one of our service centers. You can find the addresses on our website: <http://www.vat.ch>

## 5 Maintenance & repairs

Under clean operating conditions, the valve does not require any maintenance during the specified cycle life. Contamination from the process may influence the function and requires more frequent maintenance.

Before carrying out any maintenance or repairs, please contact VAT. It has to be individually decided whether the maintenance/repair can be performed by the customer or has to be carried out by VAT. The fabrication number on the valve



has always to be specified.

All supplies (e. g. compressed air, electrical power) must be disconnected for removal/installation of the valve from/into the system and for maintenance work.



Even with disconnected supply, loaded springs and/or air cushions in cylinders can be potential hazards.



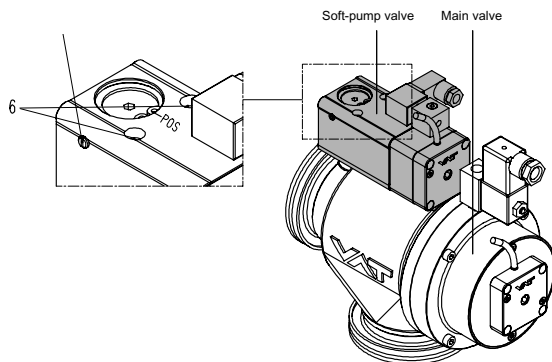
Keep fingers and objects away from the valve opening!

Products returned to VAT must be free of harmful substances such as e.g. toxic, caustic or microbiological ones. If products are radioactively contaminated, fill in the VAT form «Contamination and Radiation Report» and send it with the product. The form is available at VAT. The maximum values indicated in the form must not be exceeded.

## 5.1 Preparatory steps

The item number refers to the drawing on page 12

1. Detach the soft-pump valve from the main valve by removing the 2 screws (6)
2. Remove O-rings (7) and (9) and discard them



## 5.2 Replacement of vacuum seals - soft-pump valve

The item numbers in brackets refer to the drawing on page 12



1. Remove 4 screws (64) uniformly and crosswise  
**Attention:** Loaded spring!
2. Withdraw "actuator/plate assembly" carefully from valve body
3. Remove bonnet seal (O-ring, 62) from groove and discard it
4. Pull plate seal (O-ring, 63) out of groove by picking it with a needle and discard it  
**Attention:** Do not damage the sealing surface!
5. Remove setscrew (4) and clean it with alcohol
6. Remove circlip (5) and take out the setting piece (3) by pushing it from the vacuum side
7. Remove O-rings (8,10) and discard them
8. Make sure that all sealing surfaces are undamaged and clean them with alcohol
9. Lubricate new O-rings (8,10) slightly with VAT high vacuum grease
10. Mount lubricated O-rings (8,10) to the setting piece (3)
11. Insert setting piece (3) and circlip (5)  
**Attention:** Do not damage O-rings while inserting setting piece (3)



12. Mount setscrew (4) by using Loctite 222  
**Attention:** The dimension of 1.35 ±0.2 must be met!
13. Put new plate seal (O-ring, 63) on groove and press it crosswise into groove at 4 points
14. Press entire plate seal (O-ring, 63) uniformly into groove
15. Mount new bonnet seal (O-ring, 62) into groove
16. Insert "actuator/plate" assembly carefully into the valve body  
**Attention:** Do not cant!
17. Mount 4 screws (64) uniformly and crosswise in 2 to 3 steps



### 5.3 Replacement of vacuum seals - main valve

The item numbers in brackets refer to the drawing on page 12



1. Open valve by applying the specified air pressure
2. Remove screws (65) uniformly and crosswise  
**Attention:** Loaded spring!
3. Withdraw "actuator/plate assembly" carefully from valve body
4. Remove bonnet seal (O-ring, 60) and discard it
5. Pull plate seal (O-ring, 61) out of groove by picking it with a needle and discard it  
**Attention:** Do not damage the sealing surface!
6. Make sure that all sealing surfaces are undamaged and clean them with alcohol
7. Put new plate seal (O-ring, 61) on groove and press it crosswise into groove at 4 points
8. Press entire plate seal (O-ring, 61) uniformly into groove
9. Put new bonnet seal (O-ring, 60) onto sealing surface of the bellows (option: shaft feedthrough) endpiece
10. Verify that valve is in open position and insert "actuator/plate" assembly carefully into the valve body  
**Attention:** Do not cant!
11. Mount screws (65) uniformly and crosswise in 2 to 3 steps by tightening them with 14.5 Nm

### 5.4 Final steps

The item number refers to the drawing on page 12

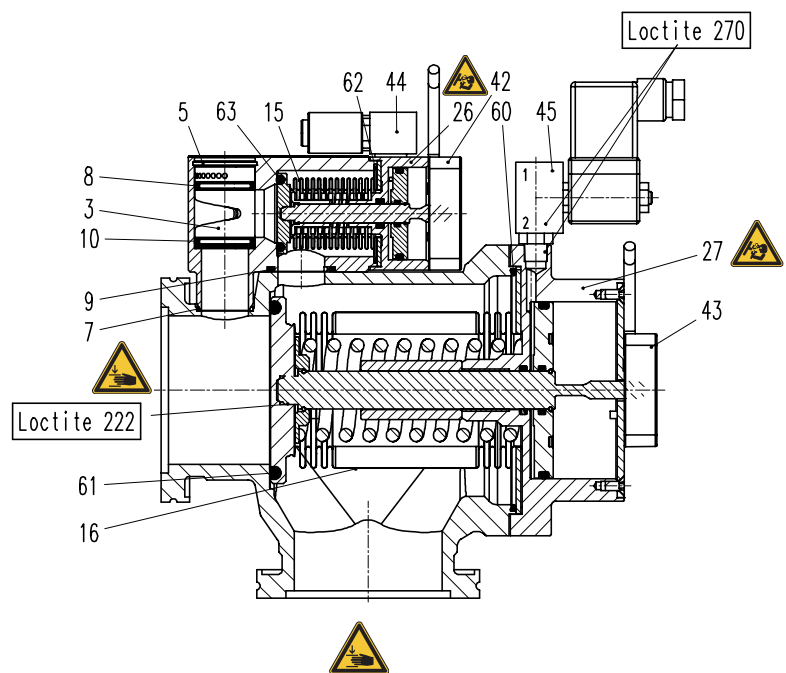
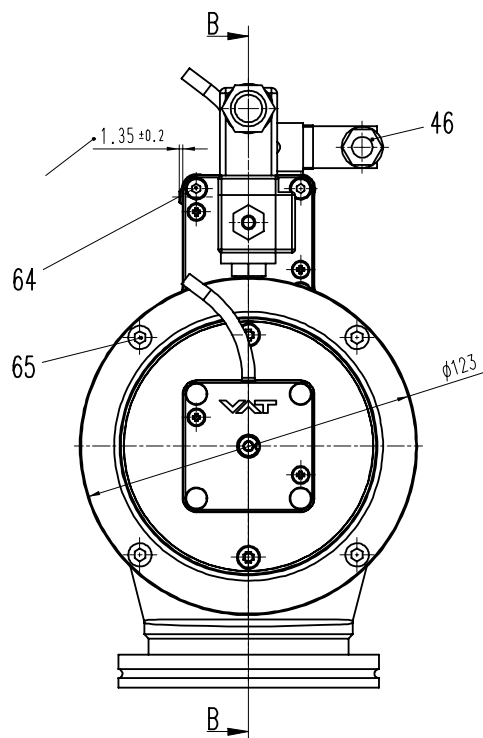
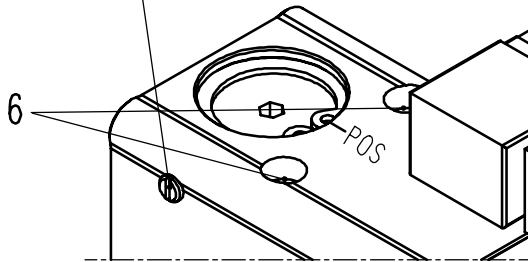
1. Mount new O-rings (7) and (9)
2. Attach the soft-pump valve to the main valve by mounting the 2 screws (6).
3. Perform a function and leak test



## 6 Drawing

(Drawing shows the valve version with bellows feedthrough)

4 Loctite 222





## 6.1 Spare parts

The item numbers refer to the drawing on page 12



Please specify the **fabrication number of the valve** (see yellow label on valve) when ordering spare parts. This is to ensure that the appropriate spare parts are supplied.

Item	Qty.	Description
43	1	Position indicator complete – main valve
42	1	Position indicator complete – soft pump valve
	1	Seal kit Vacuum (consists of all o-rings below)
61	1	Plate seal (O-ring) – main valve
60	1	Bonnet seal (O-ring) – main valve
63	1	Plate seal (O-ring) – soft pump valve
62	1	Bonnet seal (O-ring) – soft pump valve
7	1	Interface seal (O-ring)
8	2	Seal for setting piece (O-ring) – soft pump valve
9	1	Interface seal (O-ring)
		VAT high vacuum grease, 10 g

## 7 Warranty

Each product sold by VAT Vakuumentile AG (VAT) is warranted to be free from the manufacturing defects that adversely affect the normal functioning thereof during the warranty period stated in VAT's «Terms of Sale» immediately following delivery thereof by VAT, provided that the same is properly operated under conditions of normal use and that regular, periodic maintenance and service is performed or replacements made, in accordance with the instructions provided by VAT. The foregoing warranty shall not apply to any product or component that has been repaired or altered by anyone other than an authorized VAT representative or that has been subject to improper installation or abuse, misuse, negligence or accident. VAT shall not be liable for any damage, loss, or expense, whether consequential, special, incidental, direct or otherwise, caused by, arising out of or connected with the manufacture, delivery (including any delay in or failure to deliver), packaging, storage or use of any product sold or delivered by VAT shall fail to conform to the foregoing warranty or to the description thereof contained herein, the purchaser thereof, as its exclusive remedy, shall upon prompt notice to VAT of any such defect or failure and upon the return of the product, part or component in question to VAT at its factory, with transportation charges prepaid, and upon VAT's inspection confirming the existence of any defect inconsistent with said warranty or any such failure, be entitled to have such defect or failure cured at VAT's factory and at no charge therefor, by replacement or repair of said product, as VAT may elect. VAT MAKES NO WARRANTY OR REPRESENTATION OF ANY KIND, EXPRESS OR IMPLIED, (INCLUDING NO WARRANTY OR MERCHANTABILITY), EXCEPT FOR THE FOREGOING WARRANTY AND THE WARRANTY THAT EACH PRODUCT SHALL CONFORM TO THE DESCRIPTION THEREOF CONTAINED HEREIN, and no warranty shall be implied by law.

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