



# Hygienic valves

## GEA VARIVENT® Valve Type B

Operating instruction (Translation from the original language)  
430BAL008326EN\_3

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# 1 General Information

## 1.1 Information on the Document

The present Operating Instructions are part of the user information for the product. The Operating Instructions contain all the information you need to transport, install, commission, operate and carry out maintenance for the product.

### 1.1.1 Binding Character of These Operating Instructions

These Operating Instructions contain the manufacturer's instructions to the operator of the product and to all persons who work on or use the product regarding the procedures to follow.

Carefully read these Operating Instructions before starting any work on or using the product. Your personal safety and the safety of the product can only be ensured if you act as described in the Operating Instructions.

Store the Operating Instructions in such a way that they are accessible to the operator and the operating staff during the entire life cycle of the product. When the location is changed or the product is sold make sure you also provide the Operating Instructions.

### 1.1.2 Notes on the Illustrations

The illustrations in these Operating Instructions show the product in a simplified form. The actual design of the product can differ from the illustration. For detailed views and dimensions of the product please refer to the design documents.

### 1.1.3 Symbols and Highlighting

In these Operating Instructions, important information is highlighted by symbols or special formatting. The following examples illustrate the most important types of highlighting.



#### **Danger**

##### **Warning: Fatal Injuries**

Failure to observe the warning can result in serious damage to health, or even death.

► The arrow identifies a precautionary measure you have to take to avoid the hazard.



##### **Warning: Explosions**

Failure to observe the warning can result in severe explosions.

► The arrow identifies a precautionary measure you have to take to avoid the hazard.



### **Warning!**

#### **Warning: Serious Injuries**

Failure to observe the warning can result in serious damage to health.

- The arrow identifies a precautionary measure you have to take to avoid the hazard.



### **Caution!**

#### **Warning: Injuries**

Failure to observe the warning can result in minor or moderate damage to health.

- The arrow identifies a precautionary measure you have to take to avoid the hazard.

### **Notice**

#### **Warning: Damage to Property**

Failure to observe the warning can result in serious damage to the component or in the vicinity of the component.

- The arrow identifies a precautionary measure you have to take to avoid the hazard.

Carry out the following steps: = Start of a set of instructions.

1. First step in a sequence of operations.
  2. Second step in a sequence of operations.
    - Result of the previous operation.
- The operation is complete, the goal has been achieved.



### **Hint!**

**Further useful information.**

## **1.2 Manufacturer address**

GEA Tuchenhausen GmbH  
Am Industriepark 2-10  
21514 Büchen

## **1.3 Contact**

Tel.: +49 4155 49-0  
Fax: +49 4155 49-2035  
flowcomponents@gea.com  
www.gea.com

**1.4 EU Declaration of Conformity in accordance with the EC Machinery Directive 2006/42/EC****EU Declaration of conformity within the meaning of the EC machine directive 2006/42/EC**

Manufacturer: **GEA Tuchenhausen GmbH**  
**Am Industriepark 2-10**  
**21514 Büchen, Germany**

Hereby, we declare that the machine designated in the following

Designation: Valve with actuator

Type: VARIVENT®

by virtue of its design and construction and in the versions placed on the market by us, complies with the essential health and safety requirements of the following directive:

Relevant EC directives: 2006/42/EC EC Machinery Directive

Applicable harmonized standards, in particular: EN ISO 12100: 2010

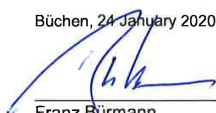
Remarks:


- In the event of a modification to the machine that was not agreed with us, this declaration loses its validity
- Furthermore, we declare that the specific technical documentation for this machine has been drawn up in accordance with Annex VII, Part A, and undertake to forward this documentation by means of data medium upon justified request by the national authorities

Person authorised for compilation and handover of technical documentation:

**GEA Tuchenhausen GmbH**  
**CE Documentation Officer**  
**Am Industriepark 2-10**  
**21514 Büchen, Germany**

Büchen, 24 January 2020

  
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Managing Director

  
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Head of Engineering

## General Information

Translated copy of the EU - Declaration of conformity in accordance with the Pressure Equipment Directive 2006/42/EU

### 1.5 Translated copy of the EU - Declaration of conformity in accordance with the Pressure Equipment Directive 2006/42/EU

Manufacturer: **GEA Tuchenhausen GmbH**  
**Am Industriepark 2-10**  
**21514 Büchen**

We hereby declare that the machine named below

Designation: Valve with actuator

Type: VARIVENT®

due to its design and construction as well as in the versions sold by us, meet the basic safety and health requirements of the following guideline:

Relevant EC directives: 2006/42/EC EC Machinery Directive

Applicable harmonized standards, in particular: EN ISO 12100: 2010

Remarks:

- This declaration will become invalid if any alterations are made to the machine which have not been agreed with us
- We also declare that the relevant technical documentation for this machine has been prepared in accordance with Annex VII, Part A, and agree to submit the documentation on justified request of national authorities on a data carrier

Person authorised for compilation and handover of technical documentation: **GEA Tuchenhausen GmbH**  
**CE Documentation Officer**  
**Am Industriepark 2-10**  
**21514 Büchen, Germany**

Büchen, 24 January 2020

Franz Bürmann  
Managing Director

i.V. Matthias Südel  
Head of Engineering



## 2 Safety

### 2.1 Intended use

Double-seat valve B is used for the mix-proof separation of incompatible media at flow path intersections in pipe systems.

The medium should preferably flow in the opening direction of the valve disk to avoid pipe hammers when the valve is opened or closed.

If the valve is used in the opposite direction (valve closing), a damping cylinder can be used to avoid pressure drops.

Do not install the valve in spring-opening, as this will open when there is a current or air failure and leads to product mixing.

In a closed pipe system, hydraulic pressure build-up may occur when the valve switches and result in seal damage.

The valve is resistant to pressure surges in its closed state.



#### Hint!

**The manufacturer will not accept any liability for damage resulting from any use of the valve which is not in accordance with the designated use of the valve. The risk of such misuse lies entirely with the operator of the facility.**

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#### 2.1.1 Requirements for operation

The prerequisite for reliable and safe operation of the component is proper transportation and storage as well as professional installation and assembly. Operating the unit within the limits of its designated use also involves adhering to the operating, inspection and maintenance instructions.

#### 2.1.2 Pressure equipment directive

The component is a piece of pressure equipment (without safety function) in the sense of the pressure equipment directive 2014/68/EU. Classified according to Annex II in category 1.

According to the scope of directive 2014/34/EC, article 1, paragraph 2, f, the exception of the directive applies, due to conformity with the machine directive 2006/42/EU.

The nominal diameters smaller than DN 25 are subject to article 4, paragraph 3 of the Pressure Equipment Directive which specifies sound engineering practice.

Nominal diameters  $\geq$  IPS 4"; DN 125 valid for the fluid group II.

In the event of any deviations, GEA Tuchenhausen GmbH will supply a specific Declaration of Conformity.

#### 2.1.3 ATEX directive

In areas with an explosive atmosphere, only valves suitable for use in such areas may be used.

Refer to and observe the additional operating instructions "ATEX version valves". For details regarding the marking of valves for potentially hazardous areas also refer to the additional operating instructions "ATEX version valves".

If these valves are used in areas with a potentially explosive atmosphere, you must absolutely comply with directive 2014/34/EC with respect to all ignition hazards.

#### **2.1.4 Improper operating conditions**

The operational safety of the component can not be guaranteed under improper operating conditions. Therefore avoid improper operating conditions.

The operation of the component is not permitted if:

- Persons or objects are in the danger zone.
- Safety devices are not working or were removed.
- Malfunctions have been detected on the component.
- Damage to the component has been detected.
- Maintenance intervals have been exceeded.

### **2.2 Operator's Duty of Care**

The operating company of the component has a special responsibility for the proper and safe handling of the component within their company. Only use the component when it is in perfect operating condition in order to prevent danger to persons and property.

This operating manual contains information that you and your employees need for safe operation over the life of the component. Be sure to read these Operating Instructions carefully and ensure that the measures described here are observed.

The operator's duty of care includes planning the necessary safety measures and monitoring that these measures are observed. The following principles apply:

- Only qualified personnel may work on the component.
- The operating company must authorize personnel to carry out the relevant tasks.
- Order and cleanliness must be maintained at the work stations and in the entire area surrounding the component.
- Personnel must wear suitable work clothing and personal protective equipment. As the operating company must ensure that work clothing and personal protective equipment are used.
- Inform personnel regarding any properties of the product which might pose a health risk and the preventative measures to be taken.
- Have a qualified first-aid representative on call during the operation. This person must be able to initiate any necessary first-aid measures in case of an emergency.

- Clearly define procedures, competences and responsibilities for those working in the area of the component. Everybody must know what to do in case of an emergency. Instruct the staff in this respect at regular intervals.
- The signs on the component must always be complete and easy to read. Check, clean and replace the signs as necessary at regular intervals.
- Observe the Technical Data specified and the limits of use!



**Hint!**

**Carry out regular checks. This way you can ensure that these measures are actually observed.**

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## **2.3 Subsequent changes**

No technical modifications should ever be made to this component. Otherwise you will have to undergo a new conformity process in accordance with the EC Machinery Directive on your own.

In general, only original spare parts supplied by GEA Tuchenhausen GmbH should be fitted. This ensures that the component is always operating properly and efficiently.

## **2.4 General safety instructions and dangers**

The component is safe to operate. It was built according to state-of-the-art science and technology.

Nevertheless, dangers can arise from the component, if:

- the component is not used as intended
- the component is used improperly
- the component is operated under impermissible conditions

### **2.4.1 Principles for safe operation**

Dangerous situations during operation can be avoided by safety-conscious and proactive behaviour of the staff.

To ensure safe operation of the valve the following principles apply:

- The Operating Instructions must be kept ready to hand at the valve's place of use. They must be complete and in clearly legible form.
- Only use the valve for its intended use.
- The valve must be functional and in good working order. Check the condition of the valve before starting work and at regular intervals.
- Wear tight-fitting work clothing for all work on the valve.
- Ensure that nobody can get hurt on the parts of the valve.
- Immediately report any faults or noticeable changes on the valve to the person responsible.

- Never touch the pipes and the valve when these components are hot! Avoid opening the valve unless the process plants have been emptied and depressurised.
- Observe the accident prevention regulations and all local regulations.

#### **2.4.2 Environmental Protection**

Harm to the environment can be avoided by safety-conscious and proactive behaviour of the staff.

For environmental protection the following principles apply:

- Substances harmful to the environment must not be discharged into the ground or the sewage system.
- Always observe the pertinent regulations relating to waste avoidance, disposal and utilization.
- Substances harmful to the environment must be collected and stored in suitable containers. Clearly mark the containers.
- Dispose of lubricants as hazardous waste.

#### **2.4.3 Electrical Equipment**

For all work on electrical equipment, the following principles apply:

- Access to electrical equipment should only be allowed to qualified electricians. Always keep unattended switch cabinets locked.
- Modifications of the control system can affect the safe and reliable operation. Modifications are only permitted with the express permission of the manufacturer.
- After completion of all work, check that the protective devices are fully functional.

#### **2.5 Supplementary Regulations**

In addition to the instructions in this documentation the following also has to be observed:

- pertinent accident prevention regulations,
- generally accepted safety rules,
- national regulations applicable in the country of use,
- work and safety instructions applicable in the facility,
- installation and operating regulations for use in potentially explosive areas.

#### **2.6 Qualification of personnel**

This section provides information on how the personnel working on the component must be trained.

Operating and maintenance personnel must

- have the necessary qualification to carry out their tasks,

- be instructed with regard to possible dangers,
- know and observe the safety instructions given in the documentation.

Only allow qualified electricians to carry out work on the electrical equipment or have a qualified electrician supervise the work.

Only allow specially trained personnel to carry out work on an explosion-protected system. When working on explosion-protected equipment observe the standards DIN EN 60079-14 for gases and DIN EN 50281-1-2 for dusts.

The following minimum qualifications are required:

- Training as a specialist for working independently on the component.
- Adequate instruction to work on the component under the supervision and guidance of a trained specialist

Each employee must meet the following requirements to work on the component:

- Personal suitability for the respective task.
- Sufficient professional qualification for the respective task.
- Received instruction about the functionality of the component.
- Received instruction about operating sequences on the component.
- Familiar with the safety devices and their function.
- Familiar with these Operating Instructions, especially with the safety instructions and the information which is relevant for the task on hand.
- Familiar with the basic regulations with regard to occupational health and safety and accident prevention.

When working with the component, a distinction is made between the following user groups:




User groups	
Staff	Qualifications
Operating personnel	Adequate instruction and sound knowledge in the following areas: <ul style="list-style-type: none"><li>• Functionality of the component</li><li>• Operating sequences on the pump</li><li>• What to do in case of an emergency</li><li>• Lines of authority and responsibilities with respect to the task</li></ul>
Maintenance personnel	Appropriate training and a sound knowledge of the structure and functionality of the component. Sound knowledge in the following areas: <ul style="list-style-type: none"><li>• Mechanical equipment</li><li>• Electrical equipment</li><li>• Pneumatic system</li></ul> Authorization with regard to safety engineering standards to carry out the following tasks: <ul style="list-style-type: none"><li>• Setting devices into operation</li><li>• Earthing of devices</li><li>• Marking of devices</li></ul> The relevant certificates of qualification must be submitted before work can be carried out on ATEX certified machines.

## **2.7 Safety equipment**

### **2.7.1 Signage**

Dangerous points on the valve are indicated by warning signs, prohibition signs and mandatory signs.

The signs and notes on the valve must always be legible. Any illegible signs must be replaced immediately.

Signs on the valve	
Sign	Meaning
 Fig.1	General hazard warning
 Fig.2	Warning Crushing
 Fig.3	Explosive atmosphere hazard warning

## 2.8 Residual dangers

Dangerous situations can be avoided by safety-conscious and proactive behaviour of the staff and by wearing personal protective equipment.

Residual dangers on the valve and measures		
Danger	Cause	Measure
Danger to life	Inadvertent switch-on of the valve	Effectively disconnect all components, effectively prevent switch-on.
	Electric power	Observe the following safety rules: 1. Isolate from the power supply. 2. Take appropriate measures to prevent switch on. 3. Test absence of voltage. 4. Earthing and short-circuiting. 5. Cover or safeguard any adjacent live parts.
	Spring tension in the actuator	Danger to life caused by compression spring in the actuator. Do not open the actuator but return it to GEA Tuchenhausen for proper disposal.

Residual dangers on the valve and measures		
Danger	Cause	Measure
Danger of injury	Danger presented by moving or sharp-edged parts	<p>The operator must exercise caution and prudence.</p> <p>For all work:</p> <ul style="list-style-type: none"> <li>• Wear suitable work clothing.</li> <li>• Never operate the machine if the cover panels are not correctly fitted.</li> <li>• Never open the cover panels during the operation.</li> <li>• Never reach into openings.</li> </ul> <p>As a precautionary measure, wear personal protective equipment in the vicinity of the valve:</p> <ul style="list-style-type: none"> <li>• Protective gloves</li> <li>• Safety shoes</li> </ul>
Environmental damage	Operating materials with properties which are harmful to the environment	<p>For all work:</p> <ul style="list-style-type: none"> <li>• Collect lubricants in suitable containers.</li> <li>• Dispose of lubricants in accordance with the pertinent regulations.</li> </ul>

## 2.9 Hazard Areas

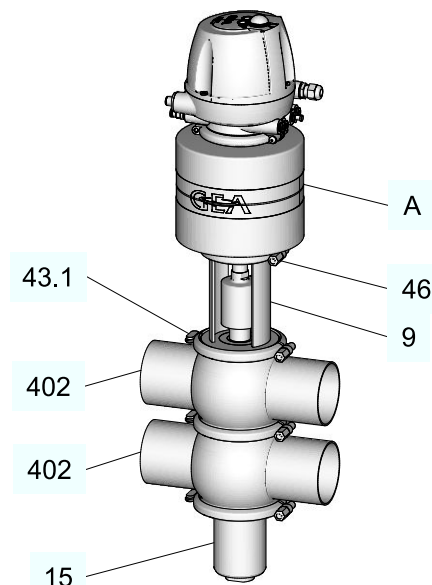


Fig.4

Please observe the following notes:

- In the event of malfunctions, shut down the valve (disconnect from the power and air supply) and secure it against being used.
- Never reach into the lantern (9) when the valve is switching. Fingers can be crushed or cut off.
- On a spring-closing valve there is danger of injury when the clamp connection (46) is opened, as the released spring pretension will suddenly lift the actuator. Therefore, release the spring tension before detaching the clamp connection (46) by supplying the actuator (A) with compressed air.



- Before starting any maintenance, servicing or repair work, disconnect the valve from the power supply and secure it against inadvertently being switched back on again.
- Only allow a qualified electrician to carry out any work on the electrical power supply.
- Check the electrical equipment of the valve at regular intervals. Immediately remedy loose connections and molten cables.
- If work on live parts cannot be avoided, call in a second person, who can operate the main switch in case of an emergency.
- The housing sockets (402) have very sharp edges. When transporting and installing the valve be sure to wear suitable protective gloves.
- When the valve switches, when the valve seat is being cleaned or if a seal is defective, medium (product cleaning medium) exits from the leakage outlet (15). Collect this liquid in a suitable container such as a funnel or a drip pan and discharge it in a safe manner. Observe the instructions in the safety data sheets issued by the cleaning agent manufacturers.

3 Description

3.1 Design

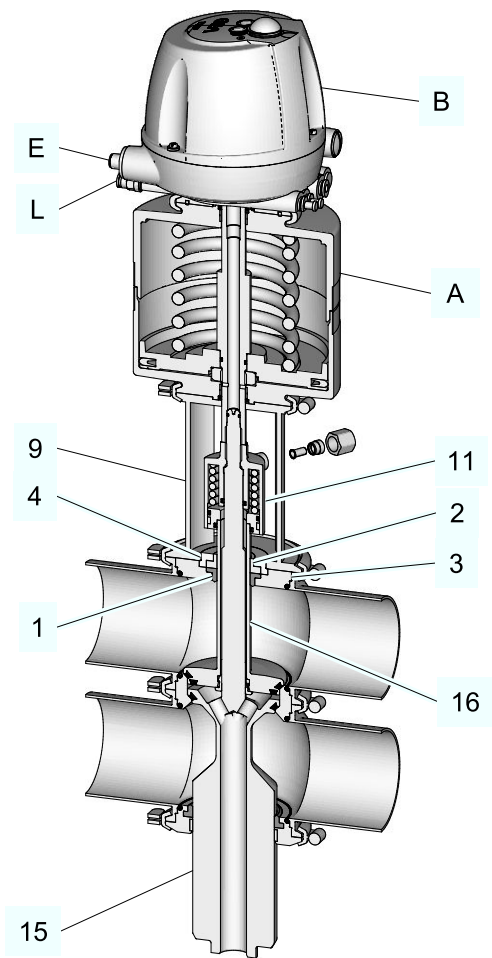


Fig.5

Design	
No.	Designation
A	Actuator
B	T.VIS control top
L	Air connection
S	Electrical connection
1	Sealing ring
2	Bearing
3	Sealing disk
4	Bearing disk
9	Lantern
11	Cleaning hood

Design	
No.	Designation
15	Valve disk
16	Double-disk

## **3.2 Functional description**

### **3.2.1 Actuator Function**

The actuator is of the spring-closing type (Z). The valve is closed in the non-actuated position.

Identification on the T.VIS control top once the installation (SET-UP) has been completed:

- Green steady light (1): valve in non-actuated position
- Yellow steady light (1): valve in end position (actuated position)

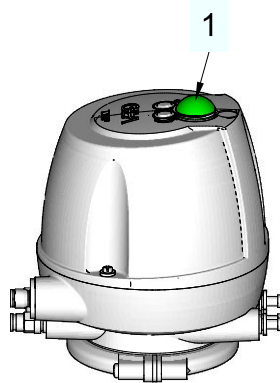


Fig.6

## 4 Transport and storage

### 4.1 Storage conditions

The valves, valve inserts or spare parts should be stored in a dry place, free of vibrations and dust, and protected from light. To avoid damage, leave the components in their original packaging if possible.

If, during transport or storage, the valve is going to be exposed to temperatures  $\leq 0^{\circ}\text{C}$ , it must be dried beforehand and suitable measures must be taken to protect it from damage.



#### Hint!

**We recommend that the valve should be stored at a temperature of  $\geq 5^{\circ}\text{C}$  for a period of 24 hours prior to any handling (disassembling the housings / activation of actuators) so that any ice crystals formed by condensation water can melt.**

### 4.2 Transport

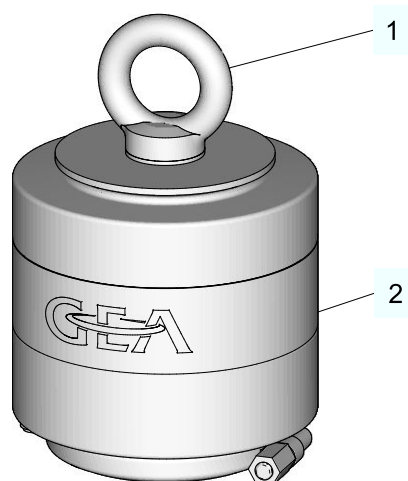


Fig.7

For transport, the following principles apply:

- When transporting the valve be sure to unscrew the control top and the switch bar from the actuator (2) and use the screwed-in eye bolt (1), material no. 221-104.98, to lift the valve.
- Only use suitable lifting gear and slings for transporting the package units/ valves.
- Observe the pictograms on the package.
- Handle valves with care to avoid damage caused by impact or careless loading and unloading. The outside synthetic materials are susceptible to breaking.
- Control tops must be protected from animal and vegetable fats.
- Only allow qualified staff to transport the valve.
- Movable parts must be properly secured.

- Only use approved, fully functional load lifting devices and lifting accessories which are suitable for the intended purpose. Observe the maximum load-bearing capacities.
- Secure the valve against slipping. Take the weight of the valve into account and the position of the point of gravity.
- Under no circumstances should anyone stand under a suspended load.
- Take care when transporting the valve. Do not grip sensitive parts of the unit to lift or push the unit or to support yourself. Avoid putting the unit down with a jerk.

### **4.2.1 Scope of supply**

After taking delivery of the component, check if

- the details on the type plate correspond to the data in the order and delivery documents,
- the equipment is complete and all components are in good order.

## 5 Technical data

### 5.1 Type plate

The type plate clearly identifies the valve.

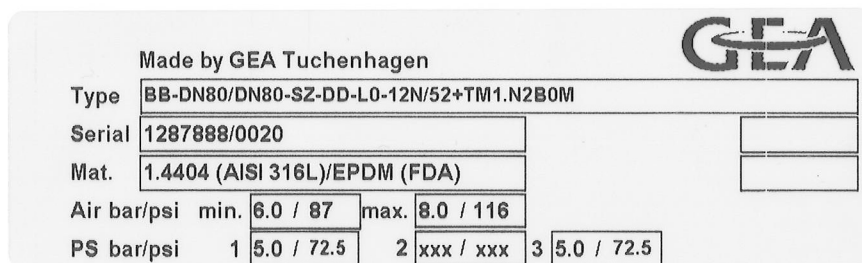


Fig.8

The type plate provides the following key data:

Key data of the valve	
Type	Double seat valve B
Serial	Serial number
Material	AISI 304/FKM
Control air pressure bar/psi	min. 4.8/69.6 max. 8.0/116
Product pressure bar/psi	10/145

### 5.2 Technical data

Refer to the following tables for the key technical data of the valve:

Technical data: Valve	
Designation	Description
Size	DN 65 to DN 150 2.5" to 4" OD 2" to 6" IPS
Material of product contact parts	Stainless steel AISI 304/316L (1.4301) Check corrosion resistance with respect to media and detergents.
Installation position	Vertical

Technical data: Ambient temperatures	
Designation	Description
- Valve	0 to 45 °C (32 ... 113 °F), standard < 0 °C (32 °F): use control air with a low dew point. Protect valve stems against freezing.
- Proximity switch	-20 to +80 °C (-4 ... +176 °F)
- Control top type T.VIS M-15, A-15	-20 to +50 °C (-4 ... +122 °F)
- Control top type T.VIS P-15	0 to +50 °C (-4 ... +122 °F)
Product temperature and operating temperature	Depending on the sealing material

Technical data: Compressed air supply	
Designation	Description
Air hose	
- Metric	Material PE-LD outside Ø 6 mm Inside Ø 4 mm
- Inch	Material PA outside-Ø 6.35 mm Inside Ø 4.3 mm
Air consumption (depending on the operating pressure)	2 to 3.8 l for DN 25 to DN 125 3.5 to 6.5 l for DN 150
Product pressure	5 bar (72.5 psi) standard max. 6 bar (87 psi)
Resistance to pressure surges* DN 80-100/OD 4"	max. 25 bar (362.6 psi)
Control air pressure	4.8 bar, max. 8 bar
Control air	acc. to ISO 8573-1
- Solid particle content:	Quality class 6 Particle size max. 5 µm Particle density max. 5 mg/m³
- Water content:	Quality class 4 max. dew point +3 °C If the unit is used at higher altitudes or at low ambient temperatures, the dew point must be adapted accordingly.
- Oil content:	Quality class 3, ideally oil-free, max. 1 mg oil for 1 m³ air

\* Resistance to pressure surges in the closed valve state

### 5.3 Cleaning connection



Connection for the hose	
DN 40...100	Ø8/6 mm
1,5"...4" OD; 2"...4" IPS	Ø8/6 mm
DN 125, 150; 6" IPS; 6" OD	Ø10/8 mm

**Service pressure for the optimal cleaning**

- min. 2 bar (29 psi)
- max. 5 bar (72.5 psi)

The duration of the rinsing operation via the rinsing valve depends on the type of soiling and typically ranges between 10 and 60 seconds.

The durability of the components of the cleaning connection (sealing disc, support sleeve, PTFE hose) is dependent on the style, pressure and temperature of the required medium.

Durability of the cleaning connection				
Medium	Max pressure		Temperature	
	[bar]	[psi]	[°C]	[°F]
Water	6	87	95	203
5% Nitric Acid	6	87	60	140
3% Sulfuric Acid	6	87	60	140
5% Nitric Acid	6	87	85	185
Steam	3	42	130	266

#### 5.4 Resistance and permitted operating temperature of the sealing materials

The resistance and permitted operating temperature of the sealing materials depend on the type and temperature of the medium conveyed. The exposure time can adversely affect the service life of the seals. The sealing materials comply with the regulations of FDA 21 CFR 177.2600 or FDA 21 CFR 177.1550.

The maximum operating temperature is defined by the sealing type and its mechanical load.

Due to the versatile conditions of use (e.g. usage duration, switching frequency, type and temperature of product and cleaning agents as well as usage environment), GEA Tuchenhausen recommends that the user carries out resistance tests.

Resistance:

- + = good resistance
- o = reduced resistance
- – = no resistance

**Technical data**

Resistance and permitted operating temperature of the sealing materials

Table of sealing resistance / permitted operating temperature				
Medium	Maximum operating temperatures	Sealing material		
		EPDM	FKM	HNBR
Alkalis up to 3%	up to 80 °C (176°F)	+	o	+
Alkalis up to 5%	up to 40 °C (104°F)	+	o	o
Alkalis up to 5%	up to 80 °C (176°F)	+	—	—
Alkalis more than 5%		o	—	—
Inorganic acids up to 3%	up to 80 °C (176°F)	+	+	+
Inorganic acids up to 5%	up to 80 °C (176°F)	o	+	o
Inorganic acids up to 5%	up to 100 °C (212°F)	—	+	—
Water	up to 100 °C (176°F)	+	+	+
Steam	up to 135 °C (275°F)	+	o	o
Steam, approx. 30 min	up to 150 °C (302°F)	+	o	—
Fuels/hydrocarbons		—	+	+
Product with a fat content of max. 35%		+	+	+
Product with a fat content of more than 35%		—	+	+
Oils		—	+	+

Sealing materials	General temperature resistance*
EPDM	-40...+135 °C (-40...275 °F)
FKM	-10...+200 °C (+14...+392 °F)
HNBR	-25...+140 °C (-13...+284 °F)
* The general resistance of the material does not correspond to the maximum operating temperature.	

## 5.5 Pipe ends - General table of measurements



### Hint!

Not every valve is available in every size. Particulars of available sizes of valves see Chapter 5, Page 23.

Dimensions for Pipes in DN				
Metric DN	Outside diameter	Wall thickness	Inside diameter	Outside diameter acc. to DIN 11850
15	19	1.5	16	x
20	23	1.5	20	x
25	29	1.5	26	x
40	41	1.5	38	x
50	53	1.5	50	x
65	70	2.0	66	x
80	85	2.0	81	x
100	104	2.0	100	x
125	129	2.0	125	x
150	154	2.0	150	x

Dimensions for Pipes in Inch OD				
Inch OD	Outside diameter	Wall thickness	Inside diameter	Outside diameter acc. to BS 4825
0.5"	12.7	1.65	9.4	x
0.75"	19.05	1.65	15.75	x
1"	25.4	1.65	22.1	x
1.5"	38.1	1.65	34.8	x
2"	50.8	1.65	47.5	x
2.5"	63.5	1.65	60.2	x
3"	76.2	1.65	72.9	x
4"	101.6	2.11	97.38	x
6"	152.4	2.77	146.86	x

Dimensions for Pipes in Inch IPS				
Inch IPS	Outside diameter	Wall thickness	Inside diameter	Outside diameter according to DIN EN ISO 1127
2"	60.3	2	56.3	x
3"	88.9	2.3	84.3	x
4"	114.3	2.3	109.7	x
6"	168.3	2.77	162.76	x

## 5.6 Tools

List of tools	
Tools	Material no.
Hose cutter	407-065
Belt wrench	408-142
V-ring insertion tool	229-109.88
Open end spanner, ends ground, a/f 17-19	229-119.01
Open end spanner, ends ground, a/f 21-23	229-119.05
Open end spanner, ends ground, a/f 22-24	229-119.03
Open end spanner, a/f 30-32	408-041
Mandrel 6 mm	
Installation mandrel	

## 5.7 Lubricants

Lubricants	Material no.
Rivolta F.L.G. MD-2	413-071
PARALIQ GTE 703	413-064

## 5.8 Weights

Size	Weight [kg]
DN 65	24
DN 80	24
DN 100	32
DN 125	51
DN 150	65

---

Size	Weight [kg]
OD 2.5"	23
OD 3"	24
OD 4"	32
OD 6 "	66
IPS 2"	13
IPS 3"	25
IPS 4"	33
IPS 6"	67

## 6 Assembly and installation

### 6.1 Safety instructions

Hazardous situations during installation can be avoided by safety-conscious and proactive behaviour of the personnel.

For installation, the following principles apply:

- Only qualified personnel are allowed to set-up, install and commission the component.
- Ensure that adequate working and traffic areas are available at the place of installation.
- Observe the maximum load-bearing capacity of the installation surface.
- Observe the transport instructions and markings on the part(s) to be transported.
- Remove any nails protruding from transport crates immediately after opening the crate.
- Under no circumstances should anyone stand under a suspended load.
- Safety devices of the component may not work effectively during installation.
- Reliably secure sections of the plant which have already been connected against inadvertently being switched on.

### 6.2 Notes on installation

The installation position of the valve is upright. Care must be taken to ensure that the valve housing and the pipe system can drain properly.

To prevent damage, make sure that

- the valve is installed in the pipe system free of tension and
- no foreign materials (e.g. tools, bolts, lubricants) are left in the system.

### 6.3 Control head

If external valves are connected in a control top with several solenoid valves, make sure that the control air pressure in the main actuator does not fall below the operating pressure.

### 6.4 Valve with Detachable Pipe Connection Elements

This section describes the procedure to fit the valve.

#### **Caution!**

##### **Liquids in pipes**

Danger of injury due to liquid spraying out

- Therefore, before releasing any pipe connections or hinged clamps: drain the pipe and, if necessary, clean or rinse it.
  - Separate the pipe section in which the valve is to be fitted from the rest of the piping system to prevent product entering again.
-

Carry out the following steps:

1. Fit valves with detachable pipe connection elements – using suitable connection fittings – directly into the pipe system.

→ Valve is installed.

## 6.5 Valve with Welded Ends

This section describes the welding procedure for the valve housing.



### Warning!

#### Spring tension in the valve

Danger of injury when opening the clamp connections on the actuator or on the housing as the released spring pretension will suddenly lift the actuator.

- Therefore, release the spring tension before detaching the clamp connections by pressurizing the actuator with compressed air at max. 8 bar.

### Notice

#### Seals are wearing parts

Old seals will cause malfunction of the valve

- When fitting the valve be sure to fit new housing O-rings.

### Notice

#### Welding distortions

An open housing can warp during welding.

- To avoid welding distortions, always seal the housing before welding.

Carry out the following steps:

1. Release the spring tension.
2. Remove the valve insert, see chapter Section 10.5, Page 41.
3. Weld the housing, without sealing rings, into position, ensuring that the connection is free of stress.
4. Fit the housing into place and tack it.
5. To avoid welding distortions, always seal the housing before welding.
6. Flush the housing with forming gas from the inside to push the oxygen out of the system.
7. Weld the housing into the pipe system; use welding filler if necessary. When technically possible, use the WIG-Orbital welding process with pulse configuration, according to guidelines EHEDG documentation. 35.
8. Passivate the seam after welding.
9. Assemble the valve and depressurize the actuator..
10. Fit the seals.

→ The valve disk is lowered.

→ Install the valve with welded ends.



**Hint!**

**Welding method:** We recommend using the automatic orbital welding method. All welding work should only be performed by certified welders or machine operators (orbital welders).

**Housing O-rings:** When assembling the valve always replace the housing O-rings to ensure that the valve is tight.

## 6.6 Pneumatic connections

### 6.6.1 Air Requirement

Actuator type	Actuator Ø [mm]	Air requirement (dm <sup>3</sup> <sub>n</sub> /Stroke) dm <sup>3</sup> <sub>n</sub> at 1.01325 bar at 0 °C as per DIN 1343	Use
A...	98	0.16	DN 25 - DN 100 1" - 4" OD 2" - 4" IPS
B...	109	0.26	
C...	135	0.42	
D...	170	0.70	
E...	210	1.10	
R... <sup>1</sup>	170	1.60	
S... <sup>1</sup>	210	2.00	
T... <sup>1</sup>	210	2.20	DN 125 + DN 150 6" OD, 6" IPS
D... <sup>6</sup>	170	1.30	
E... <sup>6</sup>	210	2.00	
S... <sup>6</sup>	261	3.20	
T... <sup>6</sup> <sup>1</sup>	210	4.00	
U... <sup>6</sup> <sup>1</sup>	261	5.20	

<sup>1</sup> Actuators with booster cylinder for increasing the pneumatic actuating force when lower control air pressures are used

### 6.6.2 Establishing Hose Connections

To ensure reliable operation, the compressed air hoses must be cut exactly square.

Tools required:

- A hose cutter

Carry out the following steps:

1. Shut off the compressed air supply.



2. Use the hose cutter to cut the pneumatic hoses square.
  3. Push the air hose into the air connector on the control top.
  4. Re-open the compressed air supply.
- Establish a hose connection.

## 6.7 Electrical connection with T.VIS control top



### **Danger**

#### **Live parts**

Electrical shock can result in serious personal injury or death.

- ▶ Only allow properly qualified staff to carry out work on the electrical equipment.
- ▶ Prior to establishing electrical connections check the maximum permissible operating voltage.



#### **Explosive gases or dusts**

An explosion can result in serious personal injury or death.

- ▶ Observe the installation and operating regulations for use in potentially explosive areas.

Carry out the following steps:

1. Connect in accordance with the connection diagram and the instructions in the corresponding operating instructions for control tops T.VIS M-15, A-15 or T.VIS P-15.

→ Done



#### **Hint!**

The proximity switches are factory set. During transport and installation it can happen that the settings are changed, so that readjustment may be required (see the Operating Instructions for the control top).

## **7 Start-up**

### **7.1 Safety instructions**

#### **Initial commissioning**

For initial commissioning, the following principles apply:

- Take protective measures against dangerous contact voltages in accordance with pertinent regulations.
- The valve must be completely assembled and correctly adjusted. All screw connections must be securely tightened. All electrical cables must be installed correctly.
- Reliably secure machine parts which have already been connected against inadvertently being switched on.
- Relubricate all lubricating points.
- Make sure lubricants are used properly.
- After conversion of the valve, residual risks must be reassessed.

#### **Setting into Operation**

For commissioning, the following principles apply:

- Only allow properly qualified staff to set the valve into operation.
- Establish all connections correctly.
- The safety devices for the valve must be complete, fully functional and in perfect condition. Check the function before starting any work.
- When the valve is switched on, the danger zones must be free.
- Remove any liquids that have escaped without leaving residues.

### **7.2 Notes on commissioning**

Before starting commissioning observe the following:

- Make sure that there are no foreign materials in the system.
- Actuate the valve once by applying compressed air.
- Clean the pipe system prior to the first product run.
- During commissioning, regularly check all sealing points for leaks. Replace defective seals.

## **8 Operation and control**

### **8.1 Safety instructions**

Dangerous situations during operation can be avoided by safety-conscious and proactive behaviour of the personnel.

For operation, the following principles apply:

- Monitor the component during operation.
- Safety devices must not be changed, removed or taken out of service. Check all safety devices at regular intervals.
- All guards and hoods must be fitted as intended.
- The installation location of the component must always be properly ventilated.
- Structural changes to the component are not permitted. Report any changes to the component immediately to the person in charge.
- Always keep danger zones clear. Do not leave any objects in the danger zone. Only allow persons to enter the danger zone when the machine is de-energized.
- Regularly check that all emergency stop devices are working correctly.

## **9 Cleaning**

### **9.1 Cleaning**

All parts in contact with product must be cleaned at regular intervals. Always observe the safety data sheets issued by the cleaning agent manufacturers. Only use cleaning agents which do not cause damage to the seals and the inner parts of the valve. When the pipe is cleaned, the cleaning medium also flows through and cleans the valve housings.

With respect to the cleaning method and parameters like detergents, temperatures, times, and intervals, the component manufacturer can merely make recommendations but cannot provide any generally applicable details. Method and parameters should be determined and defined by the operator in accordance with the relevant process and product.

The cleaning effect must be checked regularly by the operator!

#### **9.1.1 Cleaning Process Examples**

##### **Typical Cleaning Parameters in Dairy Operations**

Example of a two-phase cleaning process:

- Sodium hydroxide solution and sodium hydroxide based combination products in concentrations from 0.5% to 2.5% at 75 °C (167 °F) to 80 °C (176 °F).
- Phosphoric or nitric acid, and combination products based thereon in the concentrations of 0.3 to 1.5% at approx. 65 °C (149 °F).

Example of a cleaning operation in one cleaning step:

- Formic acid and formic acid-based combination products at up to 85 °C (185 °F).

##### **Typical Cleaning Parameters in Breweries**

- Sodium hydroxide solution and sodium hydroxide based combination products in concentrations of 1% to 4% at about 85 °C (185 °F).
- Phosphoric or nitric acid, and combination products based thereon in the concentrations of 0.3 to 1.5% at 20 °C (68 °F).

#### **9.1.2 Cleaning effect**

The cleaning effect depends on the following factors:

- Temperature
- Time
- Mechanics
- Chemicals
- Degree of soiling

These factors can be combined in such a way as to make an optimal cleaning result probable.

### **9.1.3 Cleaning the Leakage Cavity**

Cleaning of the leakage cavity is performed using a spray nozzle in the double disk that is connected to a valve seat cleaning pipe. Here, there can only be general recommendations made as to how many and the length of the spray cleaning, which are all dependent on the conditions occurring at each facility, such as type of products, temperatures, cleaning means, cleaning intervals, etc., which could require more frequent or longer spray cleaning.

It is recommended to set the cleaning conditions in the system in a test phase, in order to save cleaning medium. To optimize the seating cleaning, check the valve after performing the cleaning to see if the valve seats are clean.

All appropriate systems for cleaning the valve should be regularly used so that an optimal cleanliness is ensured and any damage to the valve is prevented. The spray cleaner cleans the leakage cavity, while product flow can flow in both lines, using a spray nozzle that distributes the CIP fluid throughout the leakage cavity. However, the seal surfaces of the valve disc seals are not cleaned with them.

This type of leakage cavity cleaning should occur frequently with liquids which are easily flushable, which do not stick to the seal surfaces or which eventually crystallise.

## **9.2 Passivation**

Before commissioning a plant, passivation is commonly carried out for long pipes and tanks.

Valve blocks are usually excepted from this. Passivation is typically performed using nitric acid ( $\text{HNO}_3$ ) at approx. 80 °C (176 °F) at a concentration of 3 % and a contact time of 6 to 8 hours.

## 10 Maintenance

### 10.1 Safety instructions

#### Maintenance and repair

Before carrying out maintenance and repair work on the component's electrical equipment, perform the following steps in accordance with the "5 safety rules":

- Isolate from the power supply
- Take appropriate measures to prevent switch on
- Test absence of voltage
- Earthing and short-circuiting
- Cover or safeguard any adjacent live parts.

For maintenance and repair, the following principles apply:

- Observe the intervals specified in the maintenance schedule.
- Only qualified personnel may carry out maintenance or repair work on the component.
- The component must be switched off and secured against being switched back on before maintenance or repair work. Work may only be started once any residual energy has been discharged.
- Block access for unauthorized persons. Put up notice signs which draw attention to the maintenance or repair work going on.
- Do not climb on the component. Use suitable access aids and working platforms.
- Wear suitable protective clothing.
- Only use suitable and undamaged tools to carry out maintenance work.
- When replacing parts only use approved, fully functional load lifting devices and lifting accessories which are suitable for the intended purpose.
- Before setting the unit back into operation, refit all safety devices as originally provided in the factory. Then check that all safety devices are working correctly.
- Make sure lubricants are used properly.
- Check pipes are firmly secured, also check for leaks and damage.
- Check that all emergency stop devices are working correctly.

#### Disassembly

For disassembly, the following principles apply:

- Only qualified personnel are allowed to dismantle the component.
- The component must be switched off and secured against being switched back on before it is dismantled. Work may only be started once any residual energy has been discharged.

- Disconnect all power and utility lines.
- Markings, e.g. on lines, must not be removed.
- Do not climb on the component. Use suitable access aids and working platforms.
- Mark the lines (if unmarked) prior to disassembly to ensure they are not confused when re-assembling.
- Protect open line ends with blind plugs against ingress of dirt.
- Pack sensitive parts separately.
- For longer periods of standstill, observe the storage conditions, see Section 4.1, Page 21.

## **10.2 Inspections**

Between the maintenance periods, the valves must be checked for leakage and proper function.

### **10.2.1 Product contact seals**

Carry out the following steps:

1. Regularly check:
    - Stem seal between upper housing and lantern
    - V-ring in the valve disks
    - O-rings between the valve housings
- Done

### **10.2.2 Pneumatic connections**

Carry out the following steps:

1. Check the operating pressure at the pressure reducing and filter station.
  2. Regularly clean the air filter in the filter station.
  3. Check that the air hoses sit firmly in the air connections.
  4. Check the lines for kinks and leaks.
  5. Check the solenoid valves for proper function.
- Done

### **10.2.3 Electrical connections**

Carry out the following steps:

1. Check that the union nut on the cable gland is tight
2. Check that the cable connections are firmly secured.
3. Check the solenoid valves for proper function.
4. Check that the proximity switch connections are clean.

→ Done



**Hint!**

The electrical cable must be long enough to allow the control top to be removed via the switch bar.

---

#### 10.2.4 Signs on the valve

Carry out the following steps:

1. Check the signs on the valve.
2. Replace damaged or missing stickers with new ones.

→ Done

#### 10.3 Maintenance intervals

To ensure the highest operational reliability, all wearing parts should be replaced at longer intervals.

The actual maintenance intervals can only be determined by the user since they depend on the operating conditions, for instance:

- daily period of use,
- switching frequency,
- type and temperature of the product,
- type and temperature of the cleaning solution,
- ambient conditions.

Maintenance Intervals	
Applications	Maintenance intervals (guideline values)
Media at temperatures of 60 °C to 130 °C (140 °F to 266 °F)	approx. every 3 months
Media at temperatures of < 60 °C (< 140 °F)	approx. every 12 months

#### 10.4 Prior to disassembly

Prerequisite:

- Make sure that during maintenance and repair work no process is in operation in the area concerned.

Carry out the following steps:

1. Drain all pipe system elements that lead to the valve and, if necessary, clean or rinse them.



2. Shut off the control air supply.
  3. Disconnect the power supply.
  4. Take the valve out of the pipe section, with all housings and housing connections if possible.
- Done

## 10.5 Disassembling the Valve

### 10.5.1 Removing the Valve Insert

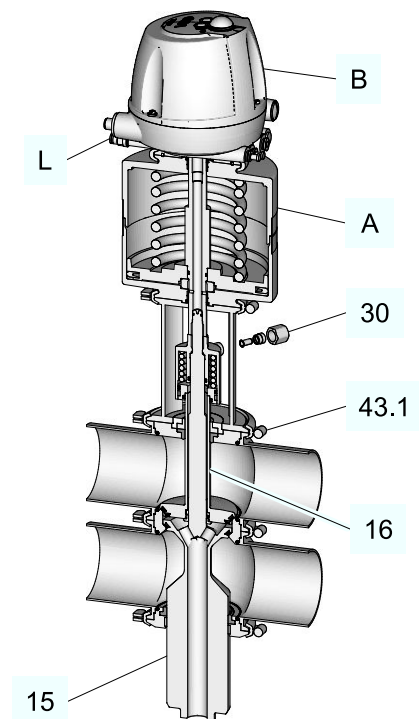


Fig.9

Prerequisite:

- No solenoid valve must be actuated electrically or manually.
- The pneumatic and electrical connections on the plant side can remain on the control top.

#### Notice

**The permanent magnet on the switch bar is fragile.**

Damage to the permanent magnet.

► Protect the permanent magnet against impact stress.



### Warning!

#### Spring tension in the valve

Danger of injury when detaching the clamp connection (43) as the released spring pretension will suddenly lift the actuator.

- Therefore, release the spring tension before detaching the clamp connections by pressurizing the actuator with compressed air at max. 8 bar.

Carry out the following steps:

1. Remove the cleaning connection (30).
  2. Vent the valve at connection (L).
    - The valve discs (15/16) are raised.
  3. Remove the snap ring (43.1).
  4. Interrupt the compressed air supply to the connection (L).
  5. Pull off the control top (B) upwards.
    - Light-emitting diode A (green) will go out and light-emitting diode B will flash yellow.
- The valve insert has been removed.

#### 10.5.2 Separating the valve from the drive

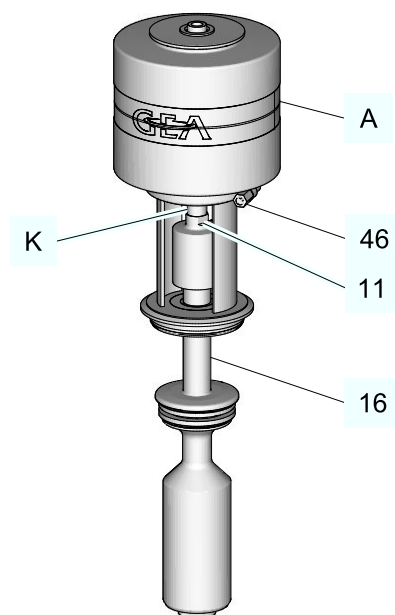


Fig.10

### Notice

**The piston rod and the shaft of the valve disc are delicate components.**

When unscrewing the actuator, the lantern can damage the piston rod (K) and the shaft of the valve disc (16).

- Secure the lantern when unscrewing the actuator.

Carry out the following steps:

1. Unscrew the snap ring (46) between the actuator and lantern.
  2. Secure drive (A) with a band wrench. Place the spanner onto the spanner surface of the cleaning hood (11) and remove the drive
- The valve insert has been removed from the actuator.

### 10.5.3 Disassembly of the valve insert.

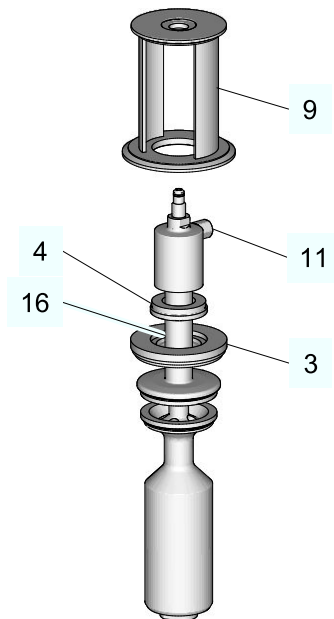


Fig.11

#### Notice

**The lantern and the shaft of the valve disc are delicate components.**

When the valve insert is withdrawn, the bearing washer (4) and the sealing washer (3) can damage the shaft (16) of the double disc.

- Carefully remove the valve insert out of the lamp (9).
- Do not hit the threads of the cleaning hood (11) on the lamp.

Carry out the following steps:

1. Pull the valve insert out of the lamp (9).
2. Secure the valve disc on the borehole (15a) with a suitable tool. Place the spanner on to the spanner flat (11a) of the cleaning hood (11) and undo the valve disc.

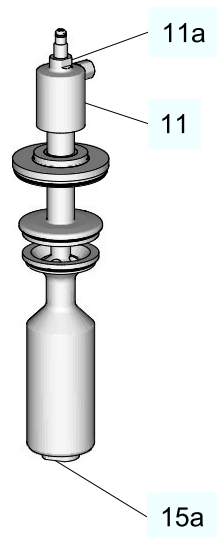


Fig. 12

3. Unscrew the cleaning hood (11) from the valve disc.
4. Remove spring (18), abutment (12), bearing washer (4), bearings (2), seal (1) with the seal washer (3) and double disc (16) from the valve disc.

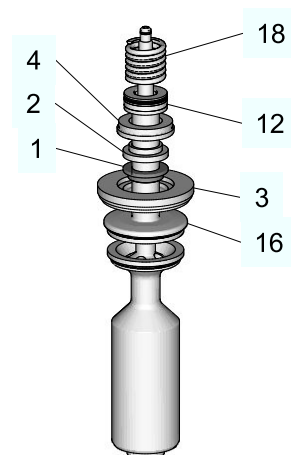


Fig. 13

5. Remove the snap ring from the housing and take out the components (5, 65, 66, 92).

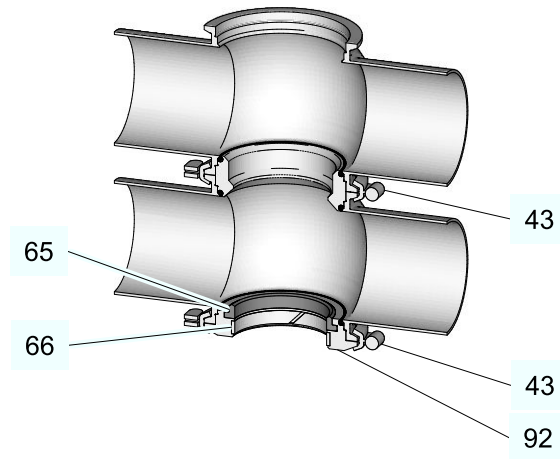


Fig. 14

6. → The individual components are readily accessible.

→ Done

## 10.6 Maintenance

### 10.6.1 Cleaning the Valve

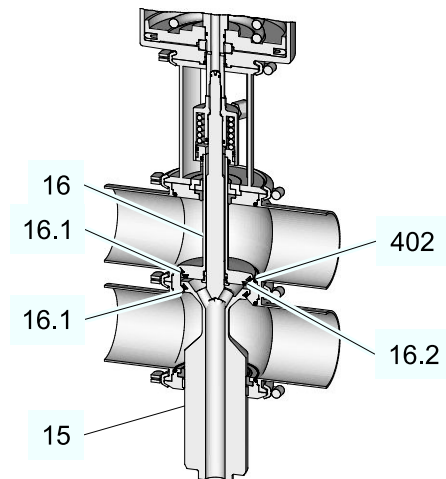


Fig. 15

#### Notice

**The shaft of the valve disc (16), the housing seat (402), the valve seat (16.1) and the V-ring groove (16.2) are precision parts.**

Damage to these parts can result in a malfunction.

► Handle the valve with care!

### Notice

#### Damage to the valve

Damage to these parts can result in a malfunction.

- ▶ Observe the safety information sheets issued by the detergent manufacturers!
- ▶ Only use detergents which are non-abrasive and not aggressive towards stainless steel.

---

Carry out the following steps:

1. Disassemble the valve, see Section 10.5, Page 41.
2. Carefully clean the individual parts.

→ Done

### 10.6.2 Replacing the V-Ring

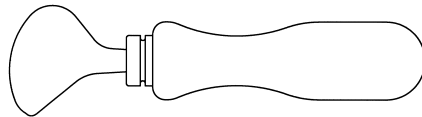


Fig.16: V-ring insertion tool

Prerequisite:

- Insert V-Ring without grease. To facilitate fitting, use water with a drop of washing-up liquid to remove the surface tension. In order that no rust is transferred, the washing-up liquid solution must be made up in a ceramic, plastic, or stainless steel container.

Tools required:

- V-ring insertion tool

### ⚠ Caution!

#### Danger of injury!

The scriber can slip off when the V-ring is removed

- ▶ Grip the valve disk in a vice with protected jaws.
- ▶ Unscrew the curved side of the scriber.

---

Carry out the following steps:

1. Put a scriber into the V-ring and take it out.

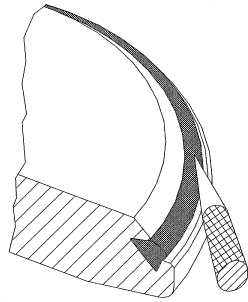


Fig.17

2. Before fitting, wet the V-ring on the side not in contact with product (rear side). Pay attention that water does not drip into the V-ring groove on the valve disk.
3. Air out the valve upon connection (22).
4. Put in the V-ring. Make sure the installation position of the V-ring is correct (see illustration).

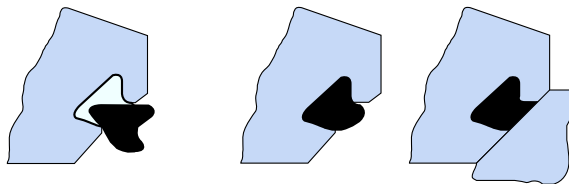


Fig.18

5. Use the insertion tool to press in the V-ring – evenly press in at several opposite points along the circumference.

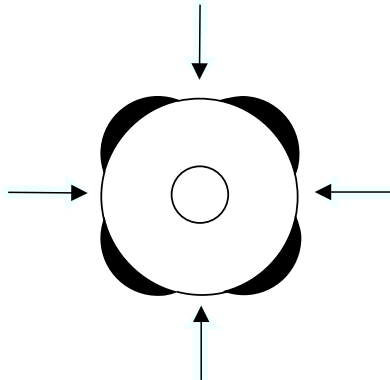


Fig.19

6. Insert the V-ring evenly.
  7. Replace all the other seals identified in the spare parts lists.
- Done



#### Hint!

Used seals must not be used again, since the proper function of the seal can then no longer be ensured.

### 10.6.3 Lubricating seals and threads



### **Caution!**

#### **Damage to seals and threads**

Stainless steel threads tend to seize and cold weld and must be greased. Damage to seals and threads can result in malfunction.

- ▶ Ensure that an adequate film of lubricant is applied. No grease residues must be visible once the valve has been assembled completely.
- ▶ For product contact seals only use suitable greases and oils.
- ▶ Observe the safety data sheets issued by the lubricant manufacturer.

---

Carry out the following steps:

1. Apply a light film of lubricant to all threads.
  2. Grease all seals – including the O-rings at the top and bottom of the actuator piston stem – very thinly.
    - ! Do not grease the V-ring.
- Done



### **Hint!**

**GEA Tuchenhausen recommends Rivolta F.L.G. MD-2 and PARALIQ GTE 703. These lubricants are approved for foodstuff and are resistant to beer froth. They have the NSF-H1 (USDA H1) registration. They do not affect the taste or the consistency of the products and are compatible with the seals in contact with product.**

**Rivolta F.L.G. MD-2 can be ordered from GEA Tuchenhausen. Using other types of grease can result in malfunctions or in premature seal failure. The warranty will also become null and void.**

**A Manufacturer's Declaration for these products can be obtained from GEA Tuchenhausen if required.**

**A thin film of grease is required on the seals to ensure the proper function of the fittings. It reduces friction and extends the service life of the seals. This is absolutely harmless from a health and hygienic point of view.**

**Running dry must be avoided!**

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## **10.7 Installation**

Assemble the valve in reverse order of disassembly. Observe the notes and instructions given in the following sections when doing so.



### 10.7.1 Spring

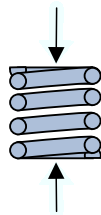


Fig.20

Before the spring is placed into the cleaning hood, both surface ends must be greased.

### 10.7.2 Cleaning hood

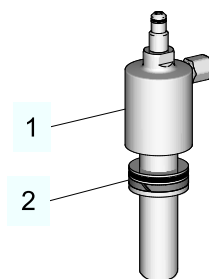


Fig.21

When assembling the cleaning hood, the following instructions must be followed:

- a. When assembling the cleaning hood (1), carefully insert the rod guide strip (2) of the abutment into the cleaning hood.
- b. After the valve placement has been bolted to the cleaning hood, counter the piston rod against it.

### 10.7.3 Place the seating ring between the housings

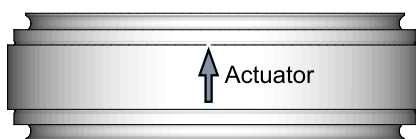


Fig.22

The seating ring should be placed with the arrow pointing to the displayed installation direction. Be extremely careful during assembly that the seating ring is properly placed between the housings so that the arrow later properly displays the direction of the drive when the valve is completely assembled.

### 10.7.4 Installing the Valve in the Housing

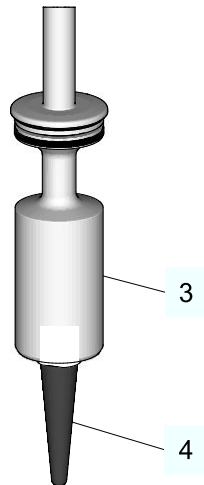


Fig. 23

### Notice

#### Valve disk has sharp edges

When the valve is installed in the valve housing, the lower rod seal can become damaged by the valve disk (15).

► For this reason, an assembly mandrel (M) must always be used.

Carry out the following steps:

1. Insert assembly mandrel (M) with O-ring side in valve disk (15).
2. Insert valve into housing with assembly mandrel.
3. Remove assembly mandrel from valve disk.

→ Done

### 10.7.5 Checking assembly

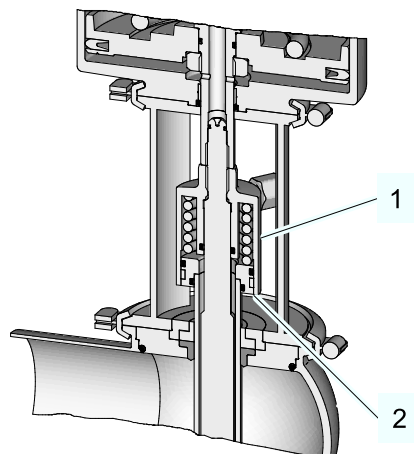


Fig. 24

When the valve is closed, the lower edge of the cleaning hood (1) should be flush with the underside of the abutment (2).

### 10.7.6 Reconnect the cleaning hose

Prerequisite:

- The cleaning hose is made of plastics. When screwing the cleaning hose on, it can become easily constricted in the area of the sealing disc and the cleaning hose can become detached. Therefore, during assembly of the cleaning hose, insert sleeves must be used.

### Cleaning hose preparation

Carry out the following steps:

1. Cut off the cleaning with the hose cutter at a right angle.
2. Place insertion sleeves up to the edge of the hose.
3. Grease the threads and cone of the fitting, as well as the sealing disc and the threads of the union nut.



### Hint!

**GEA Tuchenhausen recommends Rivolta F.L.G. MD-2 and PARALIQ GTE 703. These lubricants are approved for foodstuff and are resistant to beer froth. They have the NSF-H1 (USDA H1) registration. PARALIQ GTE 703 can be ordered under mat. no. 413-064, and Rivolta F.L.G. MD-2 can be ordered under mat. no. 413-071 from GEA Tuchenhausen.**

### Fitting the cleaning hose

1. Slide the union nut (2) and sealing disc (1) over the cleaning hose disc.

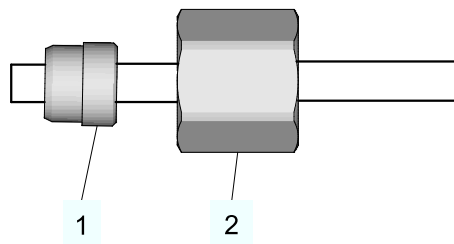


Fig.25

### Assembling the cleaning hose

Carry out the following steps:

1. Screw on the union nut hand tight. When the cleaning hose stops, press it against the inner cone.
2. Turn the union nut about another 1 1/2 turns. Do not turn the cleaning hose with the union nut. The stop-edge limits the motion, requiring a greater turning strength.

**! A marked line on the cleaning hose should aid in making sure that the cleaning hose does not turn.**

### Checking

Carry out the following steps:

1. Loosen the union nut.

2. Make sure that there is a visible connection (3) in the space before the 1. Make sure the disc fits.

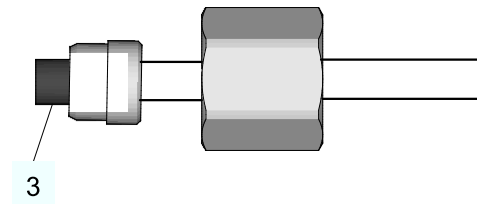


Fig.26

→ It will not hurt if the disc on the end of the cleaning hose turns.

#### Re-assembly

Carry out the following steps:

1. After removing the union nut replace it without using aggressive force. Make sure that the nozzle is also tight.

→ Done

### 10.7.7 Torques for the Clamps and Clamp Connections

Tighten the clamp connection and semi-rings on the valve to the torques specified in the table.

Torques		[Nm]	[lbft]
Clamps on the control top		1	0.7
Clamp connection cast half rings	M6	9	6.6
Clamp connection cast half rings	M8	22	16.2
Cast clamps	M10	45	33

### 10.7.8 Checking the function

#### Setting the valve stroke

Carry out the following steps:

1. Actuate the valve with compressed air.
2. Check the stroke of the valve in accordance with (Page 53).

→ The stroke is set.

**Valve stroke depending on size**

Valve Stroke	
Valve size	Valve stroke [mm]
Metric	
65	30
80	30
100	30
125	60
150	60
Inch OD	
2.5"	30
3"	29
4"	30
Inch IPS	
2"	30
3"	30
4"	30
6"	60

## 11 Alarms

### 11.1 Malfunctions and remedies

In the event of malfunctions immediately deactivate the valve and secure it against inadvertent reactivation. Malfunctions may only be remedied by qualified staff, who must observe the safety instructions.

Malfunction	Cause	Remedy
Valve does not work	Fault in the control system	Check the system configuration
	No compressed air or compressed air too low	Check compressed air supply and check air hoses for free passage and air tightness
	Fault in the electrical system	Check actuation / external controller and routing of electrical lines
	Solenoid valve defective	Replace the solenoid valve
Valve does not close	Dirt/foreign material between valve seat and valve disk	Clean valve housing and valve seat
Valve closes too slowly	O-rings in actuator and control top are dry (friction losses)	Grease O-rings
Leakage in the area of the valve housing	Housing O-rings defective	Valve disassembly - Housing Replace the O-Ring
Leakage in the lantern	Sealing ring defective	Replace the sealing ring
Leakage in the leakage cavity	V-rings defective	Replace the V-rings

## 12 Decommissioning

### 12.1 Safety instructions

For shutting down, the following principles apply:

- Switch off the compressed air.
- Switch off the component with the main switch.
- Padlock the main switch (if fitted) in the off position to prevent it from being switched back on. The key to the padlock must be deposited with the person responsible until the machine is restarted.
- For longer periods of standstill, observe the storage conditions, see Chapter 4, Page 21.

### 12.2 Disposal

#### 12.2.1 General notes

Dispose of the component in an environmentally safe manner. Observe the statutory waste disposal regulations applicable at the place of installation.

The component consists of the following materials:

- Metals
- Synthetic materials
- Electronic parts
- Lubricants containing oil and grease

Separate the different materials and dispose of them correctly sorted. Also observe the instructions regarding disposal in the operating instructions for the individual components.

#### 12.2.2 Valve Actuator Disposal



#### **Danger**

**The spring forces in the actuator can be as high as 24 kN.**

The pre-stressed spring can cause serious personal injury or death.

- ▶ Never open the actuator.
- ▶ GEA Tuchenhausen accepts unopened actuators and arranges for proper disposal free of charge.

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Carry out the following steps:

1. Remove the actuator.
  2. Pack the actuator safely and send it to GEA Tuchenhausen GmbH.
- Done

13 Spare parts list - mixproof valve B

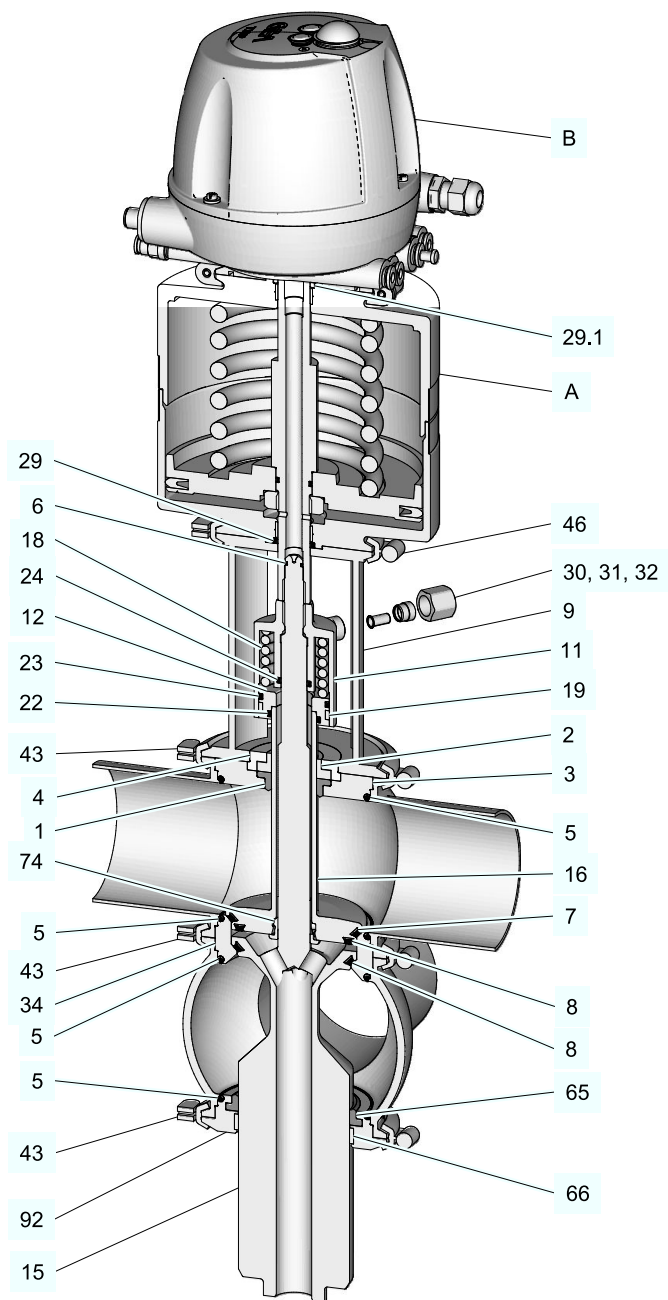


Fig.27: Spare Parts Drawing

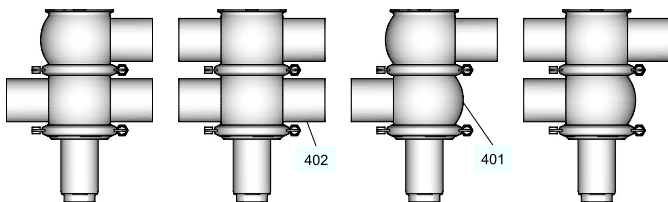


Fig.28: Housing combinations



Item	Designation	Material	DN 65	DN 80	DN 100	DN 125	DN 150
Sealing set complete 1)		EPDM	221-511.38	221-511.38	221-511.39	221-511.40	221-511.41
		FKM	221-519.17	221-519.17	221-519.18	221-519.19	221-519.20
		HNBR	--	--	--	--	--
1*	Seal ring	EPDM	924-085	924-085	924-085	924-088	924-088
		FKM	924-083	924-083	924-083	924-087	924-087
		HNBR	924-313	924-313	924-313	--	--
2	Bearing	PTFE / carbon	935-002	935-002	935-002	935-003	935-003
	Bearing, 3A	PEEK450G	935-099	935-099	935-099	935-102	935-102
3	Seal disk	1.4404	221-141.03	221-141.03	221-141.04	221-141.07	221-141.05
4	Bearing disc	1.4301	221-142.03	221-142.03	221-142.03	221-142.04	221-142.04
5*	O-ring	EPDM	930-150	930-150	930-156	930-372	930-260
		FKM	930-176	930-176	930-178	930-409	930-259
		HNBR	930-634	930-634	930-863	--	--
6*	O-ring	NBR	930-004	930-004	930-004	930-007	930-007
**7*	V-ring	EPDM	932-024	932-024	932-028	932-060	932-042
		FKM	932-035	932-035	932-039	932-062	932-041
		HNBR	932-090	932-090	932-100	--	--
**8*	V-ring	EPDM	932-023	932-023	932-027	932-059	932-045
		FKM	932-034	932-034	932-038	932-036	932-044
		HNBR	932-089	932-089	932-099	--	--
9	Lantern	1.4301	221-121.03	221-121.03	221-121.04	221-121.06	221-121.22
11	Cleaning hood	1.4301	221-146.01	221-146.01	221-146.01	221-146.02	221-146.02
12	Support bracket	1.4301	221-148.01	221-148.01	221-148.01	221-148.03	221-148.03
15	Valve disc B	1.4404	221-317.05	221-317.06	221-317.03	221-317.02	221-317.28
16	Double-disk	1.4404	221-112.03	221-112.04	221-112.05	221-112.08	221-112.07
18	Compression spring	1.4310	931-249	931-249	931-002	931-093	931-093
19	Guide ring	Turcite	935-021	935-021	935-021	935-025	931-024
22*	O-ring	EPDM	930-243	930-243	930-243	930-356	930-356
		FKM	930-244	930-244	930-244	930-357	930-357
		HNBR	930-640	930-640	930-640	--	--
23*	O-ring	EPDM	930-246	930-246	930-246	930-266	930-266
		FKM	930-247	930-247	930-247	930-265	930-265
		HNBR	930-631	930-631	930-631	--	--
24*	O-ring	EPDM	930-235	930-235	930-235	930-268	930-268
		FKM	930-162	930-162	930-162	930-164	930-164
		HNBR	930-638	930-638	930-638	--	--
29*	O-ring	NBR	930-026	930-026	930-026	930-035	930-035
29.1*	O-ring	NBR	930-026	930-026	930-026	930-026	930-026
30	Cap nut	1.4571	933-456	933-456	933-456	933-482	933-482
31	Cutting ring	1.4571	933-455	933-455	933-455	933-481	933-481
32	Support sleeve	1.4571	933-382	933-382	933-382	933-385	933-385
34	Seat ring	1.4404	221-108.03	221-108.03	221-108.04	221-108.12	221-108.06

## Spare parts list - mixproof valve B

Item	Designation	Material	DN 65	DN 80	DN 100	DN 125	DN 150
43	Clamp join KL	1.4401	221-507.09	221-507.09	221-507.11	221-507.13	221-507.14
46	Clamp join KL	1.4401	221-507.06	221-507.06	221-507.06	221-507.11	221-507.11
65*	Seal ring	EPDM	924-296	924-296	924-254	924-262	924-261
		FKM	924-308	924-308	924-309	924-319	924-320
		HNBR	924-331	924-331	924-332	--	--
66	Guide ring	Turcite	935-042	935-042	935-043	935-044	935-045
	Guide ring 3A	MF 6	935-113	935-113	935-114	935-115	935-116
74	Cleaning nozzle	PVDF	221-334.02	221-334.02	221-334.02	221-334.03	221-334.03
92	Balancer fastener	1.4404	221-348.02	221-348.02	221-348.01	221-348.05	221-348.04
401	Housing V1	1.4404	221-101.05	221-101.06	221-101.07	221-101.18	221-101.66
402	Housing V2	1.4404	221-102.05	221-102.06	221-102.07	221-102.29	221-102.09
A	Actuator VARIVENT®		See parts list/dimensions sheet for VARIVENT® actuator				
B	Control top T.VIS®		See parts list for control top T.VIS®				
Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set						413-136	
** Do not grease item 7 and 8							
* Items marked with an * are wearing parts							
1) The sealing set contains items 1, 5, 6, 7, 8, 22, 23, 24, 29, 29.1 and 65							

Item	Designation	Material	2.5"OD	3"OD	4" OD	2"IPS	3"IPS	4"IPS	6"IPS
Sealing set complete 1)			EPDM	221-511.38	221-511.38	221-511.39	221-511.37	221-511.38	221-511.41
			FKM	221-519.17	221-519.17	221-519.18	221-519.16	221-519.17	221-519.20
			HNBR	--	--	--	--	--	933-455
1*	Seal ring	EPDM	924-085	924-085	924-085	924-084	924-085	924-085	924-088
		FKM	924-083	924-083	924-083	924-082	924-083	924-083	924-087
		HNBR	924-313	924-313	924-313	924-311	924-313	924-313	--
2	Bearing	PTFE/carbon	935-002	935-002	935-002	935-002	935-002	935-002	935-003
	Bearing, 3A	PEEK450G	935-099	935-099	935-099	935-099	935-099	935-099	935-102
3	Seal disk	1.4304	221-141.03	221-141.03	221-141.04	221-141.02	221-141.03	221-141.04	221-141.05
4	Bearing disc	1.4301	221-142.03	221-142.03	221-142.03	221-142.02	221-142.03	221-142.03	221-142.04
5*	O-ring	EPDM	930-150	930-150	930-156	930-144	930-150	930-156	930-260
		FKM	930-176	930-176	930-178	930-171	930-176	930-178	930-259
		HNBR	930-634	930-634	930-863	930-633	930-634	930-863	--
6*	O-ring	NBR	930-004	930-004	930-004	930-004	930-004	930-004	930-007
**7*	V-ring	EPDM	932-024	932-024	932-028	932-021	932-024	932-028	932-042
		FKM	932-035	932-035	932-039	932-033	932-035	932-039	932-041
		HNBR	932-090	932-090	932-100	932-088	932-090	932-100	--
**8*	V-ring	EPDM	932-023	932-023	932-027	932-019	932-023	932-027	932-045
		FKM	932-034	932-034	932-038	932-032	932-034	932-038	932-044
		HNBR	932-089	932-089	932-099	932-084	932-089	932-099	--
9	Lantern	1.4301	221-121.08	221-121.08	221-121.09	221-121.12	221-121.03	221-121.04	221-121.05
11	Cleaning hood	1.4301	221-146.01	221-146.01	221-146.01	221-146.01	221-146.01	221-146.01	221-146.02
12	Support bracket	1.4301	221-148.01	221-148.01	221-148.01	221-148.02	221-148.01	221-148.01	221-148.03
15	Valve disc B	1.4404	221-317.05	221-317.06	221-317.03	221-317.18	221-317.07	221-317.04	221-317.01
16	Double-disk	1.4404	221-112.03	221-112.04	221-112.05	221-112.31	221-112.13	221-112.12	221-112.07
18	Compression spring	1.4310	931-249	931-249	931-002	931-001	931-249	931-002	931-093
19	Guide ring	Turcite	935-021	935-021	935-021	935-021	935-021	935-021	935-024
22*	O-ring	EPDM	930-243	930-243	930-243	930-268	930-243	930-243	930-356
		FKM	930-244	930-244	930-244	930-164	930-244	930-244	930-357
		HNBR	930-640	930-640	930-640	930-639	930-640	930-640	--
23*	O-ring	EPDM	930-246	930-246	930-246	930-246	930-246	930-246	930-266
		FKM	930-247	930-247	930-247	930-247	930-247	930-247	930-265
		HNBR	930-631	930-631	930-631	930-631	930-631	930-631	--
24*	O-ring	EPDM	930-235	930-235	930-235	930-235	930-235	930-235	930-268
		FKM	930-162	930-162	930-162	930-162	930-162	930-162	930-164
		HNBR	930-638	930-638	930-638	930-638	930-638	930-638	930-639
29*	O-ring	NBR	930-026	930-026	930-026	930-026	930-026	930-026	930-035
29.1*	O-ring	NBR	930-026	930-026	930-026	930-026	930-026	930-026	930-026
30	Union nut	1.4571	933-456	933-456	933-456	933-456	933-456	933-456	933-482
31	Cutting ring	1.4571	933-455	933-455	933-455	933-455	933-455	933-455	933-481

## Spare parts list - mixproof valve B

Item	Designation	Material	2.5"OD	3"OD	4" OD	2"IPS	3"IPS	4"IPS	6"IPS
32	Support sleeve	1.4571	933-382	933-382	933-382	933-382	933-382	933-382	933-385
34	Seat ring	1.4404	221-108.03	221-108.03	221-108.04	221-108.02	221-108.03	221-108.04	221-108.06
43	Compression connection KL	1.4401	221-507.09	221-507.09	221-507.11	221-507.04	221-507.09	221-507.11	221-507.14
46	Compression connection KL	1.4401	221-507.06	221-507.06	221-507.06	221-507.06	221-507.06	221-507.06	221-507.11
65*	Seal ring	EPDM	924-296	924-296	924-254	924-305	924-296	924-254	924-261
		FKM	924-308	924-308	924-309	924-307	924-308	924-309	924-320
		HNBR	924-331	924-331	924-332	924-333	924-331	924-332	—
66	Guide ring	Turcite	935-042	935-042	935-043	935-056	935-042	935-043	935-045
	Guide ring 3A	MF 6	935-113	935-113	935-114	935-117	935-113	935-114	935-116
74	Cleaning nozzle	PVDF	221-334.02	221-334.02	221-334.02	221-334.01	221-334.02	221-334.02	221-334.03
92	Balancer lock	1.4404	221-348.02	221-348.02	221-348.01	221-348.03	221-348.02	221-348.01	221-348.04
401	Housing V1	1.4404	221-101.30	221-101.31	221-101.32	221-101.37	221-101.35	221-101.36	221-101.17
402	Housing V2	1.4404	221-102.55	221-102.56	221-102.57	221-102.62	221-102.59	221-102.60	221-102.17
A	Actuator VARIVENT®			See parts list/dimensions sheet for VARIVENT® actuator					
B	Control top T.VIS®			See spare parts list for control top T.VIS®					
Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set								413-136	
** Do not grease item 7 and 8									
* Items marked with an * are wearing parts									
1) The sealing set contains items 1, 5, 6, 7, 8, 22, 23, 24, 29, 29.1 and 65									

sealing sets for VARIVENT® mixproof valve B								
Item	Pcs.	Designation	Material	2"	DN 65/80 2.5"/3"	DN 100 4"	DN 125	DN 150 6"
1	1	Seal ring	EPDM	924-084	924-085	924-085	924-088	924-088
			FKM	924-082	924-083	924-083	924-087	924-087
			HNBR	924-311	924-313	924-313	--	--
5	4	O-ring	EPDM	930-144	930-150	930-156	930-372	930-260
			FKM	930-171	930-176	930-178	930-409	930-259
			HNBR	930-633	930-634	930-863	--	--
6	1	O-ring	NBR	930-004	930-004	930-004	930-007	930-007
**7	1	V-ring	EPDM	932-021	932-024	932-028	932-060	932-042
			FKM	932-033	932-035	932-039	932-062	932-041
			HNBR	932-088	932-090	932-100	--	--
**8	2	V-ring	EPDM	932-019	932-023	932-027	932-059	932-045
			FKM	932-032	932-034	932-038	932-063	932-044
			HNBR	932-084	932-089	932-099	--	--
22	1	O-ring	EPDM	930-268	930-243	930-243	930-356	930-356
			FKM	930-164	930-244	930-244	930-357	930-357
			HNBR	930-639	930-640	930-640	--	--
23	1	O-ring	EPDM	930-246	930-246	930-246	930-266	930-266
			FKM	930-247	930-247	930-247	930-265	930-265
			HNBR	930-631	930-631	930-631	930-631	930-631
24	1	O-ring	EPDM	930-235	930-235	930-235	930-268	930-268
			FKM	930-162	930-162	930-162	930-164	930-164
			HNBR	930-638	930-638	930-638	930-639	930-639
29	1	O-ring	NBR	930-026	930-026	930-026	930-035	930-035
29.1	1	O-ring	NBR	930-026	930-026	930-026	930-026	930-026
65	1	Seal ring	EPDM	924-305	924-296	924-254	924-262	924-261
			FKM	924-307	924-308	924-309	924-319	924-320
			HNBR	924-333	924-331	924-332	--	--
Sealing set complete			EPDM	221-511.37	221-511.38	221-511.39	221-511.40	221-511.41
			FKM	221-519.16	221-519.17	221-519.18	221-519.19	221-519.20
			HNBR	--	--	--	--	--
Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set							413-136	
** Do not grease item 7 and 8								
Advice on storage: storage in accordance with DIN 7716 Relative humidity approx. 65%, temperature 15-25°C and protected from light When replacing seals, observe the instructions in the instruction manual!								
429-012								

14      Dimension sheet - VARIVENT® Double seat valve B

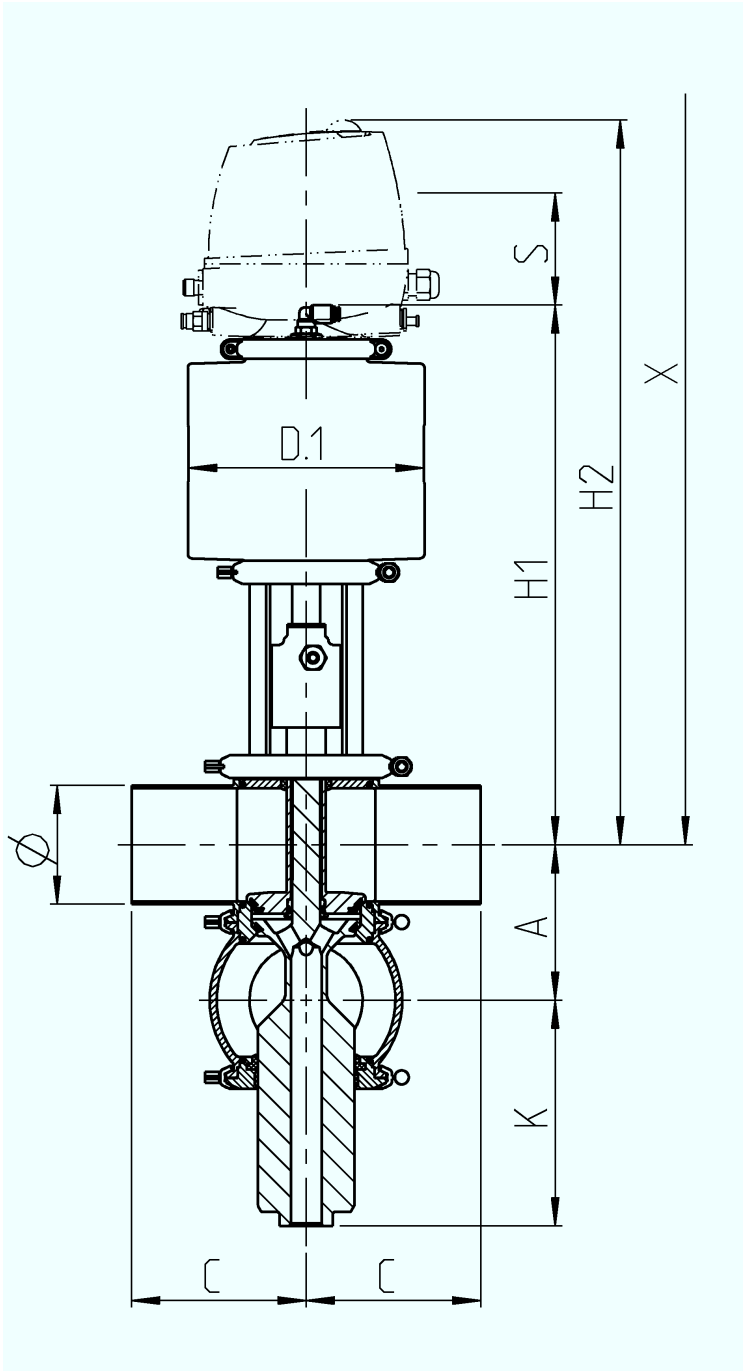


Fig.29

Nominal width	Pipe	Housing			Actuator	Size			Valve	
	Ø [mm]	A [mm]	C [mm]	C [mm]		H 1 [mm]	H 2 [mm]	Expansion X [mm]	Stroke S [mm]	Weight [kg]
DN 65	70.0 × 2.00	96.0	125	154	170	382	511	916	30.0	24
DN 80	85.0 × 2.00	111.0	125	161.5	170	390	519	924	30.0	24
DN 100	104.0 × 2.00	130.0	125	182	210	399	528	933	30.0	32
DN 125	129.0 × 2.00	155.0	150	264.5	210	555	684	1274	60.0	51
DN 150	154.0 × 2.00	180.0	150	275	260	579	708	1298	60.0	65
OD 2.5"	63.5 × 1.65	90.0	125	157	170	386	515	920	31.0	23
OD 3"	76.2 × 1.65	103.0	125	165.5	170	393	522	927	29.0	24
OD 4"	101.6 × 2.11	127.5	125	183.5	210	401	530	935	30.5	32
OD 6"	152.4 × 2.77	177.0	150	276.5	260	578	707	1297	60.0	66
IPS 2"	60.3 × 2.00	81.0	114.3	130.5	110	345	474	734	30.0	13
IPS 3"	88.9 × 2.30	115.0	152.5	163.5	170	392	521	926	30.0	25
IPS 4"	114.3 × 2.30	140.0	152.5	187	210	404	533	938	30.0	33
IPS 6"	168.2 × 2.77	192.0	152.5	291	260	573	702	1292	60.0	67
Please keep in mind that a free space of 10-100 mm should be kept under the leakage outlet for this valve type.										

## 15 Appendix

### 15.1 Lists

#### 15.1.1 Abbreviations and terms

Abbreviation	Explanation
BS	British Standard
bar	Unit of measurement of pressure [bar] All pressure data expressed in [bar/psi] is assumed to be gauge pressure [barg/psig] unless explicitly specified otherwise.
approx.	approximately
°C	Unit of measurement of temperature [degree Celsius]
dm <sup>3</sup> <sub>n</sub>	Unit of measurement of volume [cubic decimetre] Standard volume (standard litre)
DN	DIN nominal width
DIN	German standard issued by DIN (Deutsches Institut für Normung e.V., German Institute for Standardization)
EN	European Standard
EPDM	Material designation Short designation according to DIN/ISO 1629: Ethylene Propylene Diene Rubber
°F	Unit of measurement of temperature [degree Fahrenheit]
FKM	Material designation, short designation according to DIN/ISO 1629: Fluorine rubber
h	Unit of measurement of time [hour]
HNBR	Material designation Short designation according to DIN/ISO 1629: Hydrogenated Acrylonitrile Butadiene Rubber
IP	Protection class
ISO	International standard issued by the International Organisation for Standardisation
kg	Unit of measurement of weight [kilogram]
kN	Unit of measurement of force [kilonewton]
Kv value	Flow coefficient [m <sup>3</sup> /s] 1 KV = 0,86 x Cv
l	Unit of measurement of volume [litre]
max.	maximum
mm	Unit of measurement of length [millimetre]
µm	Unit of measurement of length [micrometre]



Abbreviation	Explanation
M	Metric
Nm	Unit of measurement of work [newton metre] Specification of torque 1 Nm = 0.737 lbft Pound-Force (lb) + Feet (ft)
PA	Polyamide
PE-LD	Low-density polyethylene
PPE	Polytetrafluoroethylene
psi	America measurement for pressure [Pound-force per square inch] All pressure data expressed in [bar/psi] is assumed to be gauge pressure [barg/psig] unless explicitly specified otherwise.
PTFE	Polytetrafluoroethylene
SET-UP	Self-learning installation During commissioning and maintenance, the SET-UP procedure carries out all the necessary settings for the generation of messages.
AF	Specifications for the size of spanners width across flats
T.VIS	Tuchenhagen Valve Information System
V AC	Volt alternating current
V DC	Volt direct current
W	Unit of measurement of power [Watt]
TIG	Welding method Tungsten inert gas welding
Inch	Unit of measurement of length in the Anglo-American language area
Inch OD	Pipe measurement according to British Standards (BS), Outside Diameter
Inch IPS	American pipe measure - Iron Pipe Size



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