Hygienic valves

GEA hygienic leakage butterfly valve type ECOspace

Operating instruction (Translation from the original language)

430BAL010337EN_7

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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 Tuchenhagen 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 Tuchenhagen GmbH**
Am Industriepark 2-10
21514 Büchen, Germany

Hereby, we declare that the machine designated in the following

Designation: GEA Hygienic Butterfly Valve
GEA Hygienic Leakage Butterfly Valve

Type: Valve with actuator

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 Tuchenhagen GmbH
CE Documentation Officer
Am Industriepark 2-10
21514 Büchen, Germany

Büchen, 29 April 2021

Franz Bürmann
Managing Director

pp. Matthias Südel
Head of Engineering

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

Manufacturer:	GEA Tuchenhagen GmbH Am Industriepark 2-10 21514 Büchen

We hereby declare that the machine named below

Designation:	GEA Hygienic butterfly valve GEA Hygienic leakage butterfly valve
Type:	Valve with actuator

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:	DIN EN ISO 12100	

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 Tuchenhagen GmbH CE Documentation Officer Am Industriepark 2-10 21514 Büchen

Büchen, 29 April 2021

Franz Bürmann Managing Director	i.V. Matthias Südel Head of Engineering

2 Safety

2.1 Intended use

The Mixproof Butterfly Valve is used for the separation of media in pipe sections. Using the device for any other purpose is considered contrary to its designated use.

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.

2.1.1 Flow speed

With slow flow speeds, existing solids holding space can potentially settle.

When the butterfly valve is closed quickly, this causes negative pressure on the disk and in the area of the butterfly valve seal, as a result of a stall. With flow speeds of ≥ 3.5 m/s, the valve may only be closed with significantly reduced speed.

2.1.2 Pressure equipment directive

The Mixproof Butterfly Valves are pressure equipment (without safety function) in the sense of the pressure equipment directive: Directive 2014/68/EG. They are classified according to Annex II, article 4, section 3. In the event of any deviations, GEA Tuchenhagen 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.

2.1.5 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.

2.2 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.

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 Tuchenhagen 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: • Functionality of the component • Operating sequences on the pump • What to do in case of an emergency • Lines of authority and responsibilities with respect to the task
Maintenance personnel	Appropriate training and a sound knowledge of the structure and functionality of the component. Sound knowledge in the following areas: • Mechanical equipment • Electrical equipment • Pneumatic system Authorization with regard to safety engineering standards to carry out the following tasks: • Setting devices into operation • Earthing of devices • Marking of devices 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

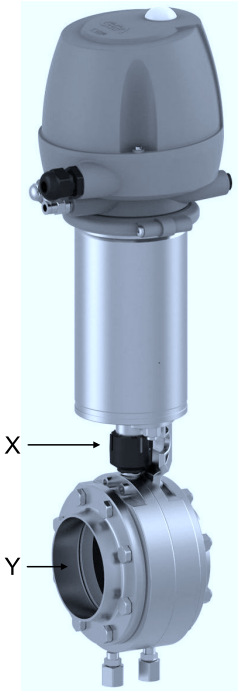
2.8 Residual dangers

Dangerous situations can be avoided by safety-conscious and proactive behaviour of the personnel 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 Tuchenhagen for proper disposal.

Residual dangers on the valve and measures		
Danger	**Cause**	**Measure**
Risk of injury	Danger presented by moving or sharp-edged parts	The operator must exercise caution and prudence. For all work: • Wear suitable work clothing. • Never operate the machine if the cover panels are not correctly fitted. • Never open the cover panels during the operation. • Never reach into openings. As a precautionary measure, wear personal protective equipment in the vicinity of the valve: • Protective gloves • Safety shoes
Environmental damage	Operating materials with properties which are harmful to the environment	For all work: • Collect lubricants in suitable containers. • Dispose of lubricants in accordance with the pertinent regulations.
Risk of injury	Danger due to liquid escaping from the leakage connections	Discharge the liquid in a controlled manner.

2.9 Hazard Areas



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.
- When the valve is switching, never reach into pipe Y or into bracket X (on pneumatic actuators). Fingers can be crushed or cut off.

- Before starting any service, maintenance 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.

3 Description

3.1 Pneumatic Butterfly Valve with Control Top

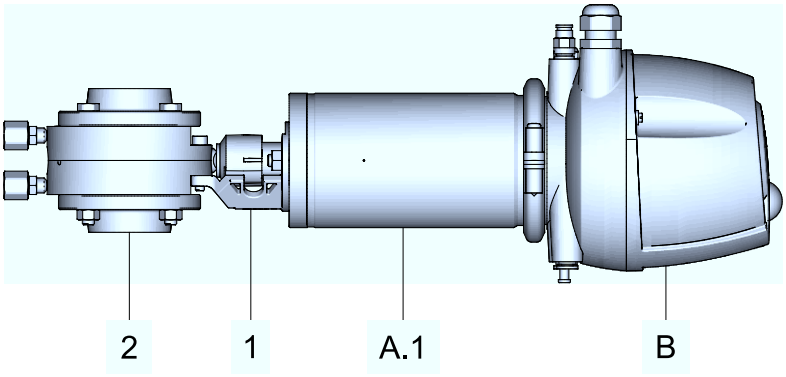


Fig.4

No.	Designation
A.1	Pneumatic Actuator
B	T.VIS control top
1	Mounting bracket
2	Butterfly valve body

3.2 Pneumatic Butterfly Valve without Control Top

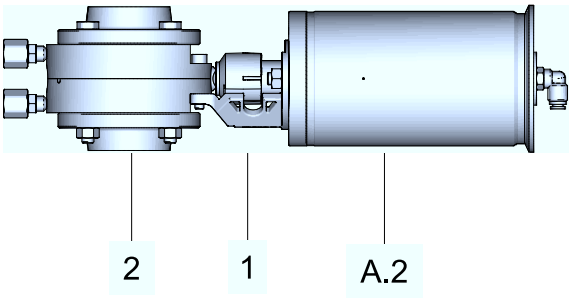


Fig.5

No.	Designation
A.2	Pneumatic Actuator
1	Mounting bracket
2	Butterfly valve body
Optional	Electrical feedback - proximity switch in the mounting bracket

3.3 Butterfly Valve Body without Actuator

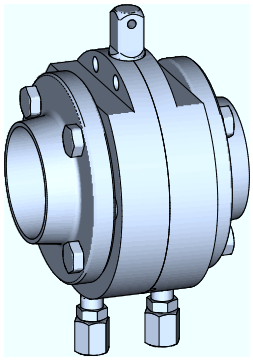


Fig.6

Butterfly valve design for matrix-piped systems.

3.4 Manual Actuator Type H

Various manual actuator variants are available.

Standard design of manual actuator

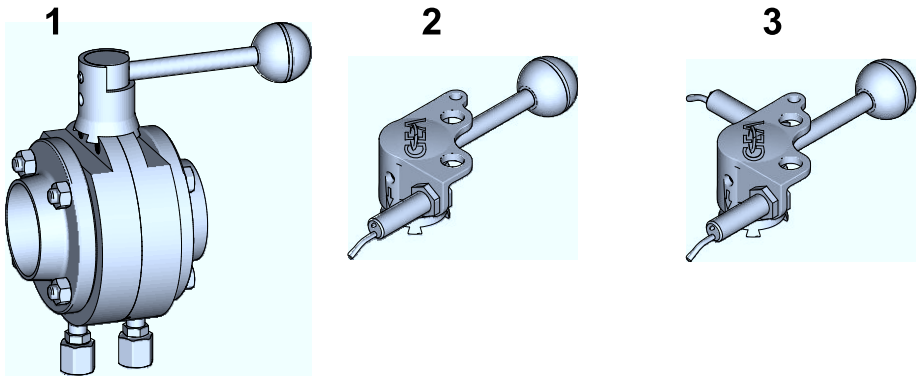


Fig.7

No.	Manual actuator variants
1	Standard
2	Optional – one electrical feedback signal
3	Optional – two electrical feedback signals

3.5 Functional description

3.5.1 Pneumatic Actuator

The compressed air which enters above the piston causes a downwards movement of the piston and the disk of the butterfly valve opens. When the air supply is shut off, the valve closes automatically as a result of the spring force.

The stroke of the piston is converted into a rotary movement of the shaft. The travel of the piston is limited, so that the shaft performs a 90° rotation per stroke. This rotation exactly corresponds to the rotational angle required to open or close the disk of the mixproof butterfly valve.

3.5.2 Actuator (A.1)

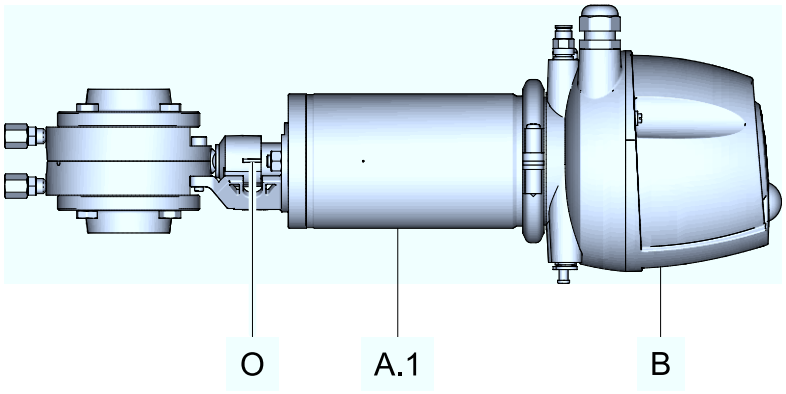


Fig.8

The switching state is detected and indicated by the control top (B).

The visual position indication (O) can be recognized by the red marking on the coupling.

3.5.3 Actuator (A.2)

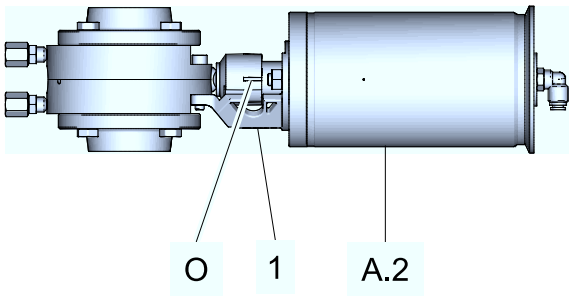


Fig.9

Feedback of switching states can be provided by proximity switches in the mounting bracket (1).

The visual position indication (O) can be recognized by the red marking on the coupling.

3.5.4 Manual Actuator Type H

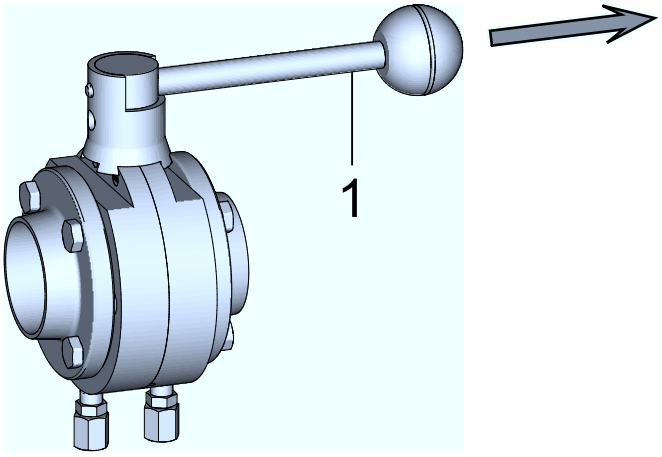


Fig.10

To open or close the mixproof butterfly valve, unlock the hand lever (1) by gently pulling it out of the locking device and turn it through 90°. When the lever is released, it locks into place in the holes provided. The limit positions of the mixproof butterfly valve can be detected by proximity switches.

3.5.5 Butterfly Valve Body without Actuator

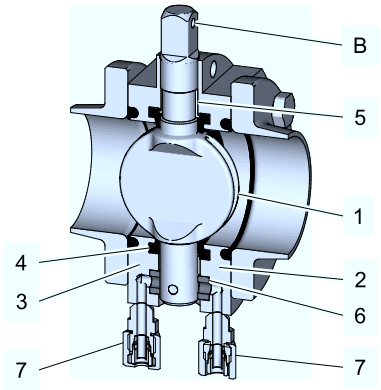


Fig.11

No.	Designation
1	Valve disk
2	Flange
3	Flange
4	Disk seal
5	Plain bearing
6	Radial seal
7	Leakage connections
8	Hole on the square end

The mixproof butterfly valve is used for separating media. The valve disk (1) as the shut-off element is supported between two flanges screwed together (2, 3) and plain bearings (5). The valve positions are OPEN / CLOSED.

In the CLOSED position, two media can be reliably separated from one another. The leakage cavity is open towards the atmosphere in this case. After switching, the medium in the valve disk leakage areas can drain by gravity (7).

In the OPEN position (maximum throughflow), the leakage paths towards the atmosphere are closed. The leakage cavity is sealed by the radial seal (6) on the short valve disk shaft.

Hint!

The hole (B) in the square end is used to indicate the position of the valve disk.

4 Transport and storage

4.1 Storage conditions

Valves 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 ≤ 0 °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 ≥ 5 °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

For transport, the following principles apply:

- 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.

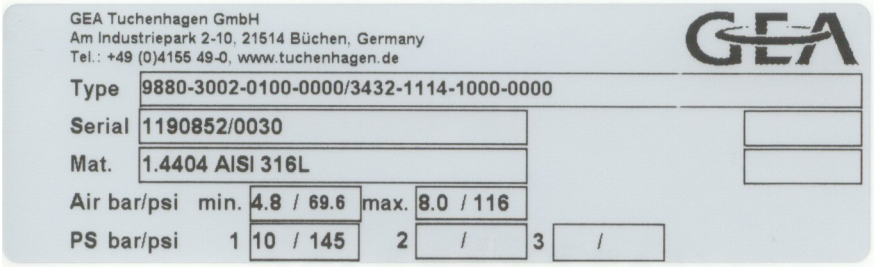


Fig.12

The type plate provides the following key data:

Key data of the leakage butterfly valve	
Type	Hygienic leakage butterfly valve ECOspace
Serial	Serial number
Material	1.4404/AISI 316L
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 mixproof butterfly valve:

Technical data: Mixproof butterfly valve	
Designation	**Description**
Size	DN 15 to DN 100 2" to 4" OD
Material of product contact parts	Stainless steel Check corrosion resistance with respect to media and detergents.

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)

Technical data: Ambient temperatures	
Designation	**Description**
- 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 and operating temperature	-40 to +135°C

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
Product pressure	max. 10 bar (116 psi)
Control air pressure	min. 4.8 bar max. 8 bar
Control air pressure for air/air - A/A actuator	min. 4.0 bar max. 8 bar
Control air	acc. to ISO 8573
- Solid particle content:	Quality class 6 Particle size max. 5 µm Particle density max. 5 mg/m^3
- 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 m^3 air

Air requirement per switching operation		
Actuator type	**Actuator diameter [mm]**	**Air requirement (dm^3 $_n$/ stroke) dm^3 $_n$ with 1.01325 bar at 0 °C as per DIN 1343**
"DN 50, DN 65 2" OD, 2.5" OD"	88.9	0.325
"DN 80, DN 100 3" OD, 4" OD"	114.3	0.530

Equipment: Proximity switches – actuator without T.VIS		
Operating voltage [V]	10...65 DC	20...25 AC
Switching distance [mm]	5	5
Max. continuous current [mA]	>3...<100	>3...<100
Ambient temperature [°C]	-25...+80	-25...+80
Protection class	IP 67	IP 67

5.3 Resistance of Sealing Materials

The resistance of sealing materials depends 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.

Resistance:

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

Sealing resistance table					
		Sealing material (general operation temperature)			
Medium	**at permissible operating temperature**	**EPDM -40...+135°C* (-40...275°F*)**	**FKM -10...+200 °C* (+14...+392°F*)**	**HNBR -25...+140 °C* (-13...+284°F*)**	**VMQ -50...+200 °C* (-58...+392 °F*)**
Caustics up to 3%	up to 80 °C (176°F)	+	o	+	o
Caustics up to 5%	up to 40 °C (104°F)	+	o	o	o
Caustics up to 5%	up to 80 °C (176°F)	+	–	–	o
Caustics at more than 5%		o	–	–	o
Inorganic acids** up to 3%	up to 80 °C (176°F)	+	+	+	o
Inorganic acids** up to 5%	up to 80 °C (176°F)	o	+	o	o
Inorganic acids** up to 5%	up to 100 °C (212°F)	–	+	–	o
Water	up to 80 °C (176°F)	+	+	+	+
Water	up to 100 °C (212°F)	+	+	+	o
Steam	up to 135 °C (275°F)	+	o	o	o
Steam, approx. 30 min	up to 150 °C (302°F)	+	o	–	o

Sealing resistance table					
		Sealing material (general operation temperature)			
Medium	**at permissible operating temperature**	**EPDM -40...+135°C* (-40...275°F*)**	**FKM -10...+200 °C* (+14...+392°F*)**	**HNBR -25...+140 °C* (-13...+284°F*)**	**VMQ -50...+200 °C* (-58...+392 °F*)**
Fuels/ hydrocarbons		–	+	+	-
Product with a fat content up to 35%		+	+	+	o
Product with a fat content of more than 35%		–	+	+	o
Oils		–	+	+	o

Other applications upon request

* Depending on the installation conditions

** Inorganic acids are, e.g. carbonic acid, nitric acid and sulphuric acid

5.4 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

5.5 Tools

List of tools	
Tools	**Material no.**
Hose cutter	407-065
Open-end spanners a/f 8; 9; 10; 12; 13; 14; 15; 16; 17; 24	
Pin punch Ø 4	403-209
Belt wrench	408-142
Face pin wrench Ø 4, adjustable 80	408-197
Hex. key a/f 3; 4; 5	
Installation mandrel	229-000061

5.6 Lubricants

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

5.7 Weights

TYPE GS			
Size	**Mixproof butterfly valve with drive [kg]**		
	Manual actuator	**Pneumatic actuator without control top**	**Pneumatic actuator with T.VIS control top**
DN 50, 2"	4.0	7.9	9.1
2 1/2"	5.1	9.0	10.2
DN 65	5.0	8.9	10.1
3"	6.1	10.4	11.8
DN 80	5.9	10.2	11.7
DN 100	8.3	12.4	13.9
4"	8.3	12.4	13.8

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 mixproof butterfly valve ECOspace should be installed in horizontal pipes, with the actuator in vertically upright position; in special applications the actuator can also be installed at a 30° tilt.

To prevent damage, make sure that

- the mixproof butterfly valve is installed in the pipe system free of tension.
- no foreign materials (e.g. tools, bolts, lubricants) are left in the system.
- with all pneumatic actuators that are used in a vertical pipe, the brackets are facing upwards.

6.3 Pneumatic connections

6.3.1 Air Requirement

The air requirement for the switching operations depends on the actuator type.

Actuator type	**Actuator Ø (mm)**	**Air requirement (dm^3_n/ stroke) dm^3_n at 1.01325 bar at 0°C in accordance with DIN 1343**
DN 50, DN 65 2" OD, 2.5" OD	88.9	0.325
DN 80, DN 100 3" OD, 4" OD	114.3	0.530

6.3.2 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.

→ Done.

6.3.3 Actuator with T.VIS Control Top

Carry out the following steps:

1. Push the air hose into the air connector on the control top.
2. Re-open the compressed air supply.

→ Done.

6.3.4 Actuator without Control Top

Carry out the following steps:

1. Remove the plug from the actuator.
2. Screw in connector G 1/8" or an exhaust air throttle for slow closing.
3. Push the air hose into the air connector.
4. Re-open the compressed air supply.

→ Done.

6.4 Electrical connections

6.4.1 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.

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

6.4.2 Adjusting the proximity switch – actuator without T.VIS

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. Loosen the cap nuts on the proximity switch.

2. Hold the proximity switch and turn the cap nuts until a switching gap of max. 4 mm to the associated contact element is achieved.
3. Tighten the cap nuts.

→ Done.

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

On the mixproof butterfly valve, two connections for flushing are provided at the deepest point of the housing to enable cleaning of the leakage cavity.

A special sealing mechanism allows the valve to be operated without any additional shut-off valves.

- Cleaning liquid is flushed into the leakage cavity through one of the flushing connections.
- The second flushing connection is used for discharging medium and as a leakage indicator in the event of sealing damage.
- When the pipe is cleaned, it is recommended to completely open and close the flap twice per minute (at least 6 times per cleaning operation) so that medium flows around it, in order to clean the areas underneath the flap.

The leakage cavity can be flushed via the leakage connections when the flap is closed. The recommended admission pressure for the cleaning medium supply at the inlet valve to the leakage cavity is 2.5 bar ± 0.5 bar. Pressure build-up between the seals on the valve disk should always be avoided. Non-pressurized discharging at the outlet valve is therefore required. Generally also ensure a positive pressure difference from the product chamber to the leakage cavity. We recommend also cleaning the leakage cavity as part of all cleaning steps using the relevant cleaning media.

The duration of the entire washing process depends on the type of soiling and typically ranges between 10 and 90 seconds.

Flow rates for cleaning the leakage cavity						
Size	DN 50 2" OD	2.5" OD	DN 65	3" OD	DN 80	DN 100 4" OD
Kvs values (l/h)	194	198	178	203	188	163

The table lists the values for the duration and number of rinsing operations.

Medium	**Duration (s)**	**Number of rinsing operations**	
Beer	1...2	2...3	During every cleaning phase 1. Prerinse 2. Hot caustic 3. Intermediate rinse 4. Acid 5. Rinse
Yeast	1...2	2...3	
Milk	2...5	3	

Depending on the cleaning method (medium concentration, temperature and contact times), the seals are affected to different degrees. This can impair the function and the service life.

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 (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 notes

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 long-term decommissioning, observe storage conditions, see "Transport and storage".

10.2 Inspections

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

10.2.1 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.

10.2.2 Electrical connections

Carry out the following steps:

1. Check that the cap nut on the cable gland is tight.
2. Only for T.VIS control top: check the cable connections on the adapter and interface module (see operating instructions for control top types T.VIS M-15 or T.VIS A-15).

→ Done.

10.2.3 Mechanical Connections

Carry out the following steps:

1. Check that all screw connections and locking devices are firmly secured.

→ Done.

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 of the valves, 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.

Guideline Values for 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 T.VIS M-15 Control Top

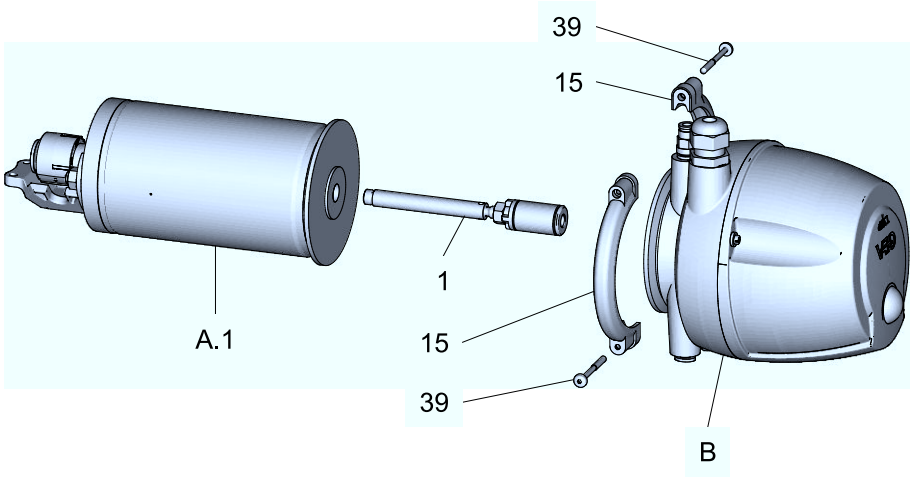


Fig.13

Prerequisite:

- 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.

Carry out the following steps:

1. Undo the screws (39).
2. Remove the clamps (15).
3. Withdraw the control top (B) via the switch bar (1) from the actuator (A.1).
4. Unscrew the switch bar (1).

→ Done.

Hint!

Assemble the valve in reverse order. Also refer to the instruction manual for the T.VIS M-15.

10.5.2 Removing the T.VIS A-15 Control Top

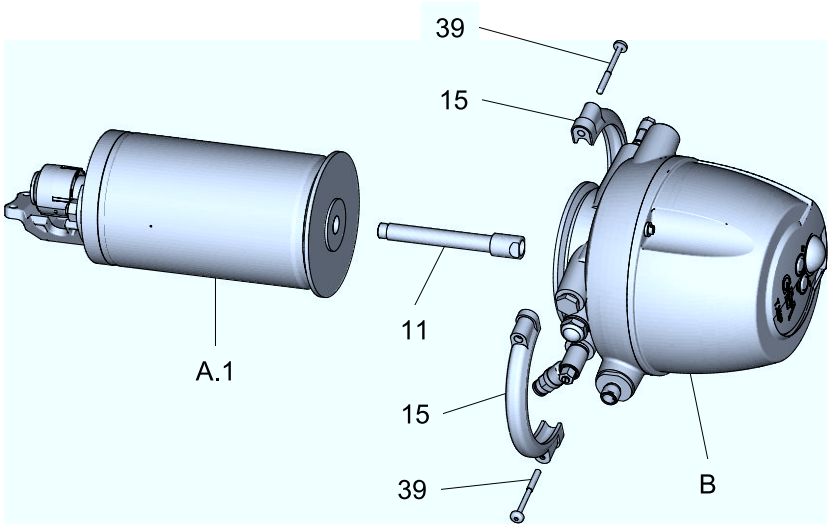


Fig.14

Prerequisite:

- 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.

Notice

The sensor is a sensitive component.

Damage of the sensor and failure of the valve.

► Always handle the sensor with care!

Carry out the following steps:

1. Undo the screws (39).
2. Remove the clamps (15).
3. Withdraw the control top (B) via the switch bar (11) from the actuator (A.1).
4. Unscrew the switch bar (11).

   → Done.

Hint!

Assemble the valve in reverse order. Also refer to the instruction manual for T.VIS A-15.

10.5.3 Removing the Valve

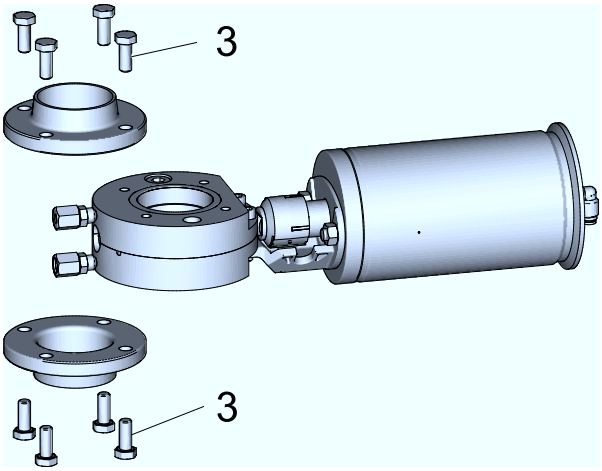


Fig.15

Carry out the following steps:

1. Undo the screw connections (3).
2. Remove the valve from the pipe.

→ Done.

10.5.4 Disassembling the Pneumatic Actuator

10.5.4.1 Taking off the Actuator

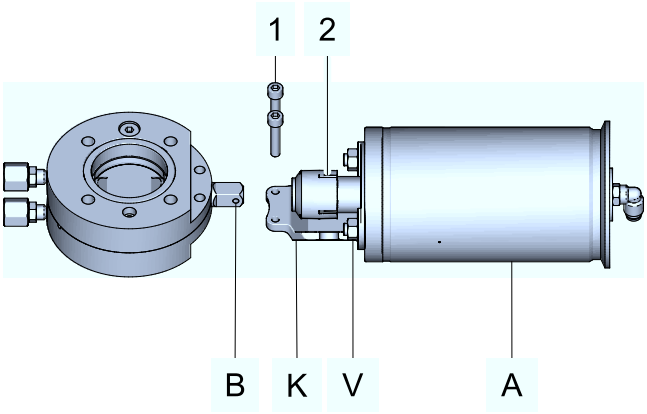


Fig.16

Carry out the following steps:

1. Undo the screw connections (1).
2. Lift off the actuator (A).

→ Done.

Hint!

The red position indication marker (2) is aligned with the hole (B) in the valve disk so that it indicates the position of the disk in the valve.

10.5.4.2 Dismantling the Actuator Parts

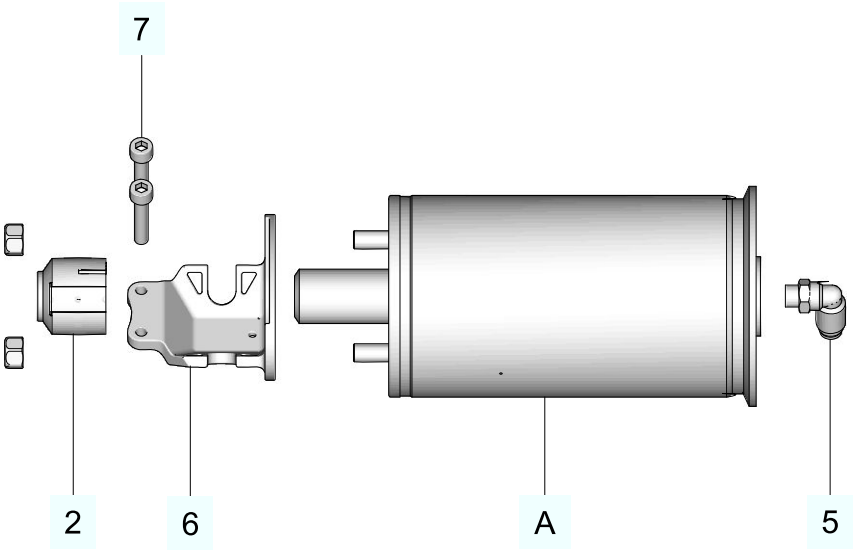


Fig.17

Carry out the following steps:

1. Undo the screw connections (7).
2. Take off the position indicator (2).
3. Remove the mounting bracket (6).

→ Done.

10.5.5 Disassembling the Manual Actuator

Removing the proximity switch

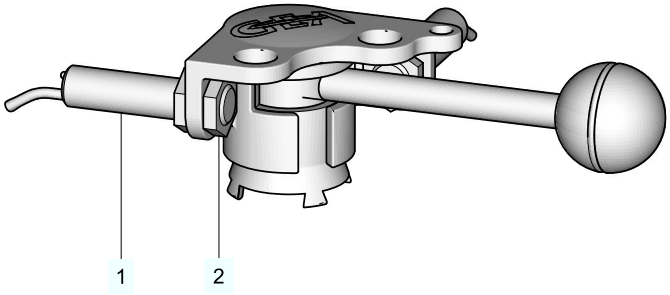


Fig.18

Carry out the following steps:

1. Use an a/f 4 hex socket screwdriver to unscrew the locking screw (2) until it is flush with the bushing.
2. Take off the hand lever (1).

→ Done.

Removing the Manual Actuator

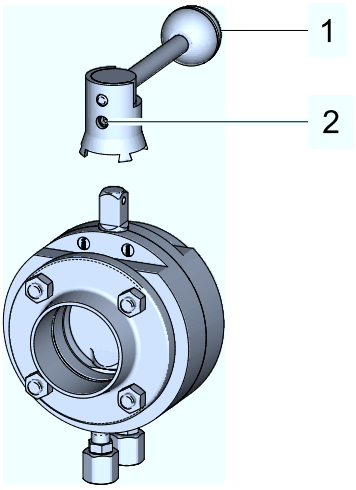


Fig.19

Carry out the following steps:

1. Use an a/f 4 hex socket screwdriver to unscrew the locking screw (2) until it is flush with the bushing.
2. Take off the hand lever (1).

→ Done.

10.5.6 Removing the Valve Disk Seal

Removing the Flanges

Carry out the following steps:

1. Undo the screw connections (3).

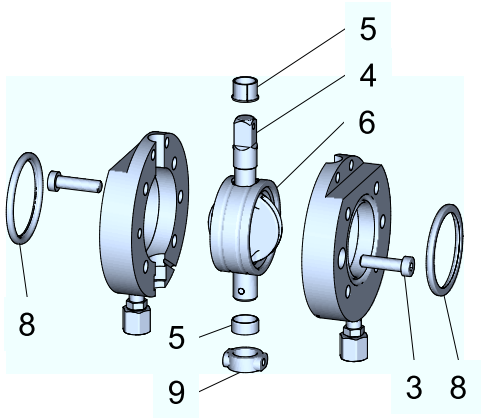


Fig.20

2. Pull the butterfly valve body apart.
3. Remove the radial seal (9).

   → The radial seal protects the plain bearing from soiling. The plug protects the plain bearing from soiling.
4. Take out the valve disk (4) with the disk seal (6).

→ Done.

Removing the Seal

Carry out the following steps:

1. Pull off the plain bearings (5).
2. Turn the disk seal (6) until it is positioned at a 90° angle to the valve disk (4).

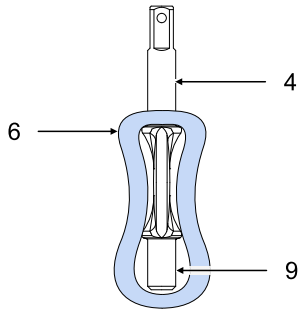


Fig.21

3. Pull the disk seal over the free end (12) of the valve disk.
4. Unclamp the valve disk.
5. Pull the disk seal over the long end (10).

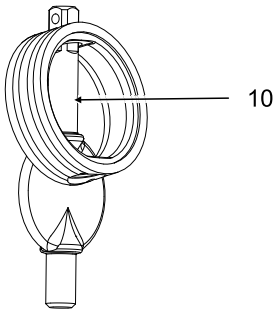


Fig.22

6. Remove the O-ring (8).

→ Done.

→ The disk seal is now completely removed.

10.6 Maintenance

10.6.1 Cleaning the Mixproof Butterfly Valve

Notice

Damage to the valve

Damage to the valve 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.
► Use only cleaning mediums which do not damage the materials of the control top (PPE, PA).

Carry out the following steps:

1. Carefully clean the individual parts.
2. Check that air can exit freely from the vent screw (3).

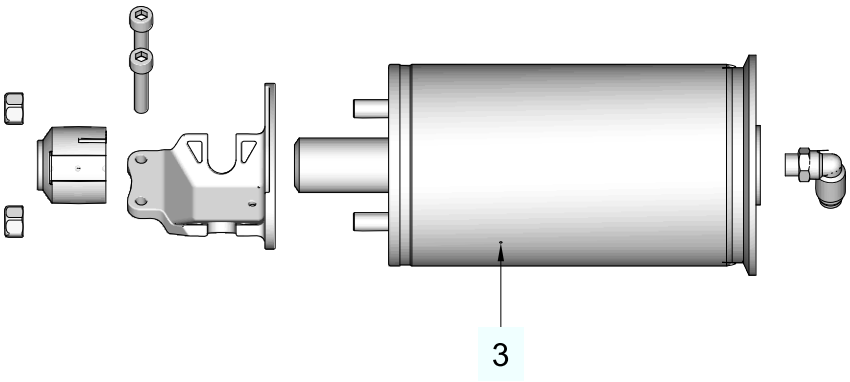


Fig.23

→ Done.

10.6.2 Lubricating Seals and Threads

⚠ Caution!

Damage to seals and threads

Damage to seals and threads can result in a 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 information sheets issued by the lubricant manufacturer!

Carry out the following steps:

1. Apply a light film of lubricant to all threads.
2. Apply a light film of lubricant to all seals.
3. Apply a light film of lubricant to the shaft ends.

→ Done.

Hint!

GEA Tuchenhagen 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.

PARALIQ GTE 703 can be ordered from GEA Tuchenhagen under material no. 413-064, and Rivolta F.L.G. MD-2 can be ordered under material no. 413-071. 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 Tuchenhagen 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.

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 Assembling the Valve Disk

Overview Drawing

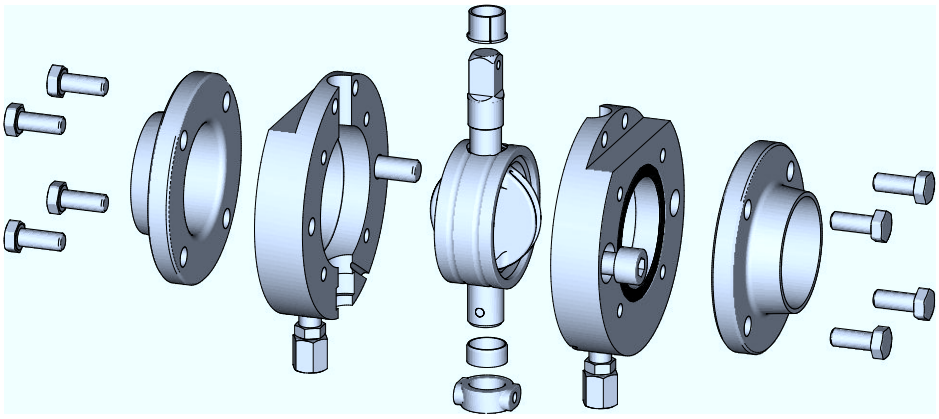


Fig.24

Observe the following points when assembling:

- Before the valve disk is inserted between the flanges it must be positioned at a 90° angle to the seal.
- The plain bearings must be refitted. To fit the upper plain bearing on valves with nominal widths DN 80 and DN 100 or 3" OD and 4" OD put installation mandrel 229-000061 over the square end to mount the plain bearing.

- When the actuator is mounted, the valve disk must be in the correct position: for resting position closed: valve disk closed for resting position open: valve disk at 90° position.
- Installation outer flange type VV: Arrange additional holes so that bracket can be dismantled in assembled condition.

10.7.2 Torques for the clamps and bolts

Tighten the clamps and bolts on the valve to the torques specified in the table.

Torques		**[Nm]**	**[lbft]**
Clamps on the control top		1	0.7
Bolts	M6	9	6.6
Bolts	M8	22	16.2
Bolts	M10	45	33
Bolts	M12	78	57.5

11 Alarms

11.1 Malfunctions and remedies

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

Malfunction	Cause	Remedy
Actuator does not work	Air hoses clogged or leaking	Clean or replace the air hoses
	Control air pressure too low	Increase the control air pressure
	Solenoid valve defective	Replace the solenoid valve
	Valve disk is blocked	Clear the blockage
No feedback signal	Proximity switch adjusted	Adjusting the proximity switch
	Proximity switch not connected correctly	Check and correct the wiring
	Proximity switch faulty	Replace the proximity switch
	Valve disk is blocked	Clear the blockage
Leakage at flanges	Disk seal defective O-ring defective	Replace the disk seal

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 22.

12.2 Disposal

12.2.1 General notes

Dispose of the valve at the end of its life cycle in an environmentally friendly manner. Observe the statutory waste disposal regulations applicable at the place of installation.

The valves 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 Tuchenhagen accepts unopened actuators and arranges for proper disposal free of charge.

Carry out the following steps:

1. Remove the actuator.
2. Pack the actuator safely and send it to GEA Tuchenhagen GmbH.

→ Done.

13 Parts list - Hygienic leakage butterfly valve ECOspace

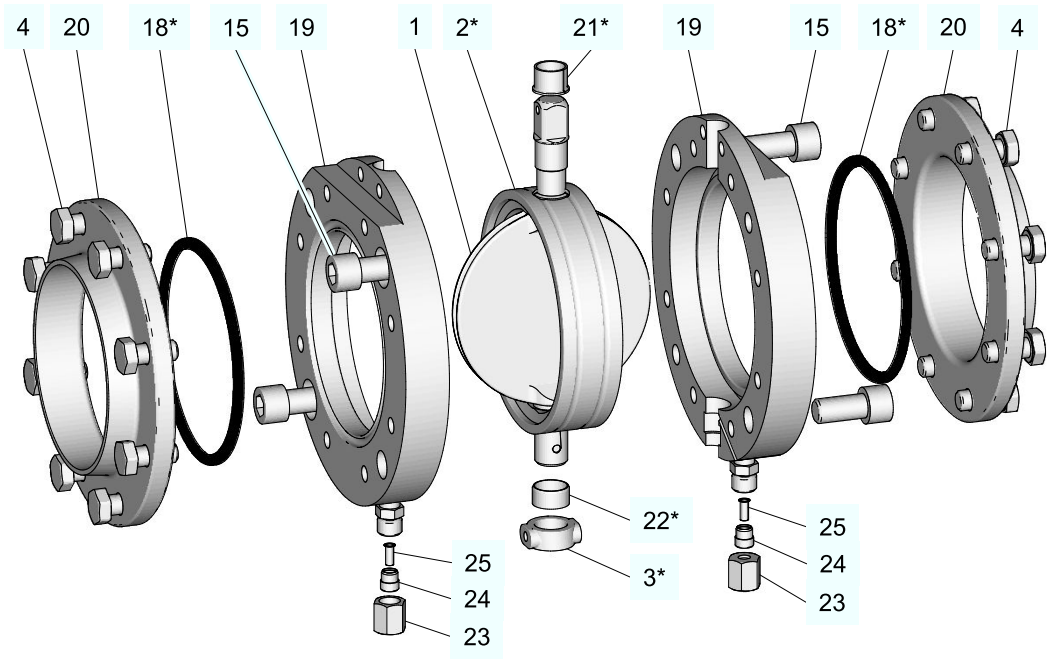


Fig.25: Items marked with an * are wearing parts.

Item	Designation	Material	DN 50	DN 65	DN 80	DN 100
Sealing set cpl.		EPDM	224-000696	224-000697	224-000698	224-000699
1	Flap BFV-L	1.4404	224-000583	224-000585	224-000540	224-000568
2**	Seal BFV-L	EPDM	224-000570	224-000571	224-000535	224-000573
3**	Radial seal BFV-L	EPDM	224-000536	224-000536	224-000536	224-000536
4	Hex head screw	A2-70	901-046	901-046	901-046	901-381
			8x M8 x 20	16x M8 x 20	16x M8 x 20	16x M10 x 22
15	Cheese head screw	A2-70	902-033	902-033	902-033	902-048
			2x M10 x 30	4x M10 x 30	4x M10 x 30	4x M12 x 25
18**	O-ring	EPDM	930-546	930-547	930-450	930-549
19	Flange BFV-LE	1.4404	224-001554	224-001552	224-001555	224-001556
20	VARIVENT smooth flange	1.4404	752-727	752-728	752-729	752-730
21**	Plain bearing	IGLIDUR-F	704-046	704-046	704-046	704-046
22**	Plain bearing	IGLIDUR-F	704-069	704-069	704-069	704-069
23	Cap nut M12 x 1.5	1.4571	933-459	933-459	933-459	933-459
24	Cutting ring 6/4	1.4571	933-458	933-458	933-458	933-458
25	Support sleeve 6/4	1.4571	933-380	933-380	933-380	933-380
Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set Grease BARRIERTA L 55/3 (only for seals VMQ)					413-136 413-137	
** The sealing set includes items 2, 3, 18, 21 and 22.					429-045	

Item	Designation	Material	2"OD	2.5"OD	3" OD	4" OD
Sealing set cpl.		EPDM	224-000700	224-000701	224-000702	224-000703
1	Flap BFV-L	1.4404	224-000583	224-000584	224-000586	224-000568
2**	Seal BFV-L	EPDM	224-000570	224-000574	224-000572	224-000573
3**	Radial seal BFV-L	EPDM	224-000536	224-000536	224-000536	224-000536
4	Hex head screw	A2-70	901-046	901-046	901-046	901-381
			8x M8 x 20	16x M8 x 20	16x M8 x 20	16x M10 x 22
15	Cheese head screw	A2-70	902-033	902-033	902-033	902-048
			2x M10 x 30	4x M10 x 30	4x M10 x 30	4x M12 x 25
18**	O-ring	EPDM	930-559	930-560	930-319	930-561
19	Flange BFV-LE	1.4404	224-001558	224-001553	224-001545	224-001546
20	VARIVENT smooth flange	1.4404	752-741	752-742	752-743	752-744
21**	Plain bearing	IGLIDUR-F	704-046	704-046	704-046	704-046
22**	Plain bearing	IGLIDUR-F	704-069	704-069	704-069	704-069
23	Cap nut M12 x 1.5	1.4571	933-459	933-459	933-459	933-459
24	Cutting ring 6/4	1.4571	933-458	933-458	933-458	933-458
25	Support sleeve 6/4	1.4571	933-380	933-380	933-380	933-380
Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set Grease BARRIERTA L 55/3 (only for seals VMQ)					413-136 413-137	
** The sealing set includes items 2, 3, 18, 21 and 22.					429-045	

Complete valve bodies can be ordered using the order code.
Select here the actuator type “9 = without actuator”.
e.g. 9771-1002-0900-0000

14 Spare parts list - Pneumatic actuator hygienic leakage butterfly valve

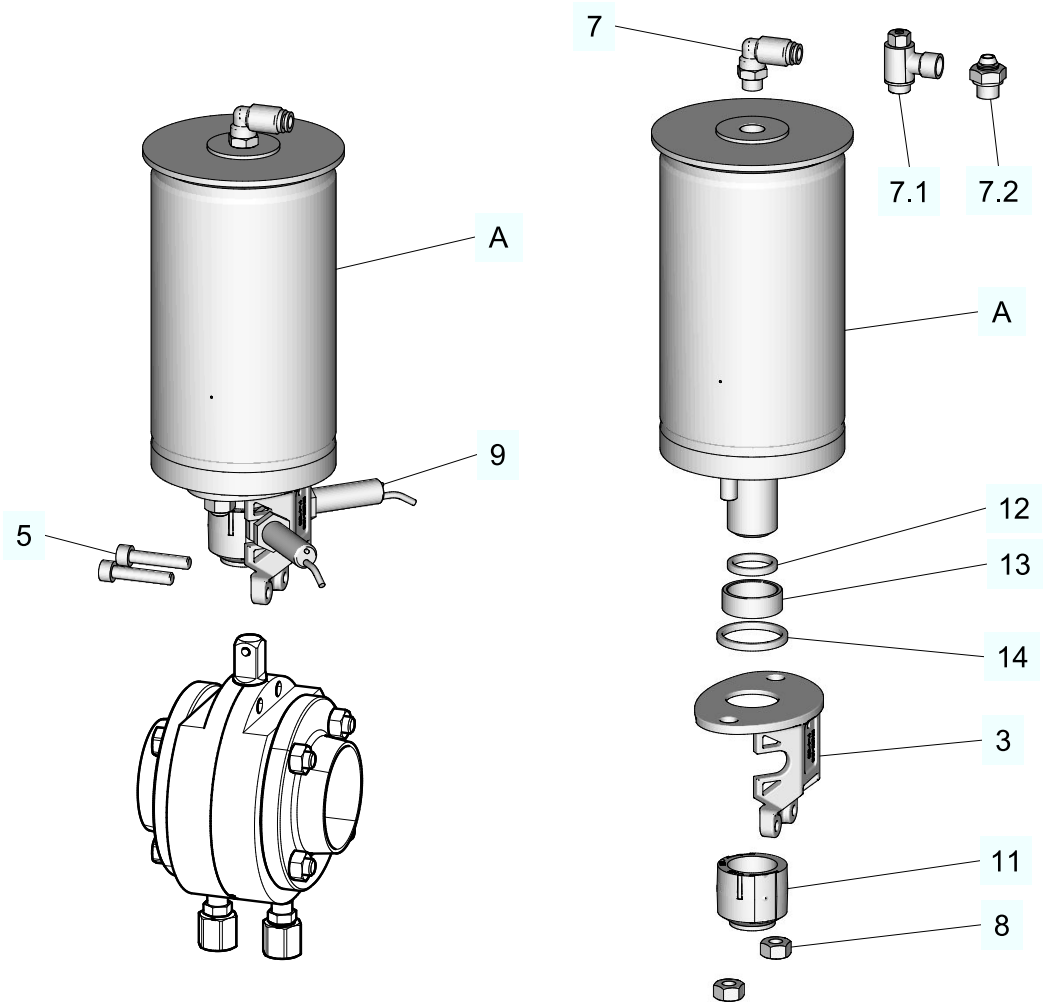


Fig.26

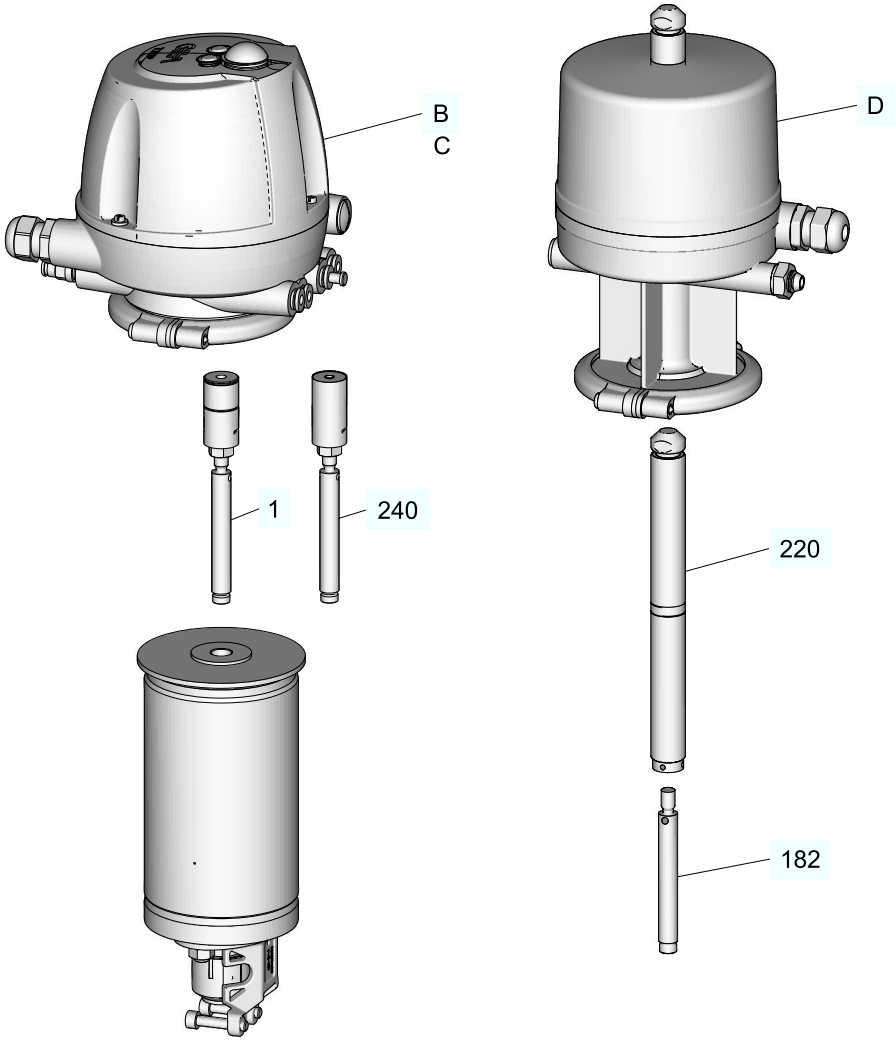


Fig.27

Item	Designation	Material	DN 50 2" OD	DN 65 2.5" OD	DN 80 3" OD	DN 100 4" OD
A	Actuator BFV-7 / NC/NO/ cpl.	--	224-001822	224-001822	224-001821	224-001821
A (opt.)	Actuator BFV-7/NC/NO/cpl./EX	--	224-001831	224-001831	224-001829	224-001829
3	Bracket BFV-7	1.4301	224-001071	224-001071	224-001071	224-001071
5*	Cheese head screw	A2-70	902-099	902-099	902-099	902-099
7	Elbow screw-in plug connection, metric (1/4" - 6/4)	Brass/nickel-plated	933-034	933-034	933-034	933-034
	Elbow screw-in plug connection (1/4"-6.35)	Brass/nickel-plated	933-972	933-972	933-972	933-972
7.1	Throttle check valve, exhaust air 1/4"	Brass/nickel-plated	603-048	603-048	603-048	603-048
7.2	Screw-in plug connection metric (1/4" - 6/4)	Ms CV	933-480	933-480	933-480	933-480
	Screw-in plug connection, metric (1/4"-6.35)	Brass/nickel-plated	933-477	933-477	933-477	933-477
8	Hexagon nut	A2-70	910-018	910-018	910-018	910-018
9	Initiator M12x1; 10-65V/DC/2wire	Synthetic material	505-104 (electrical connection with terminal compartment)			
	Initiator M12x1; 10-30V/DC/3wire	1.4301	505-088 (electrical connection with terminal compartment) 505-096 (electrical connection with M12 connector)			
11	Position indicator BFV-7	PP	224-001069	224-001069	224-001070	224-001070
12	O-ring	NBR	930-041	930-041	930-041	930-041
13	Guide ring	Turcite-T51	935-105	935-105	935-105	935-105
14	O-ring	NBR	930-903	930-903	930-903	930-903

* Two cylinder screws (pos. 5) are included in each actuator A.
A includes positions A, 3, 8, 11, 12, 13, and 14

		Item	Material	Designation	Material no.
			Accessories for T.VIS M-15		
B	Control Top T.VIS M-15	1	1.4301	Switch bar T.VIS	224-001697
			Accessories for T.VIS P-15 and A-15		
D	Control top type T.VIS P-15 and A-15	240	--	Switch bar for T.VIS P-15 and A-15	224-001696
			Accessories for control top SES/EX		
S	Control top SES/EX	220		Switch bar	224-001548
		182		Extension	224-001549

15 Dimension sheet - Manual operation hygienic leakage butterfly valve

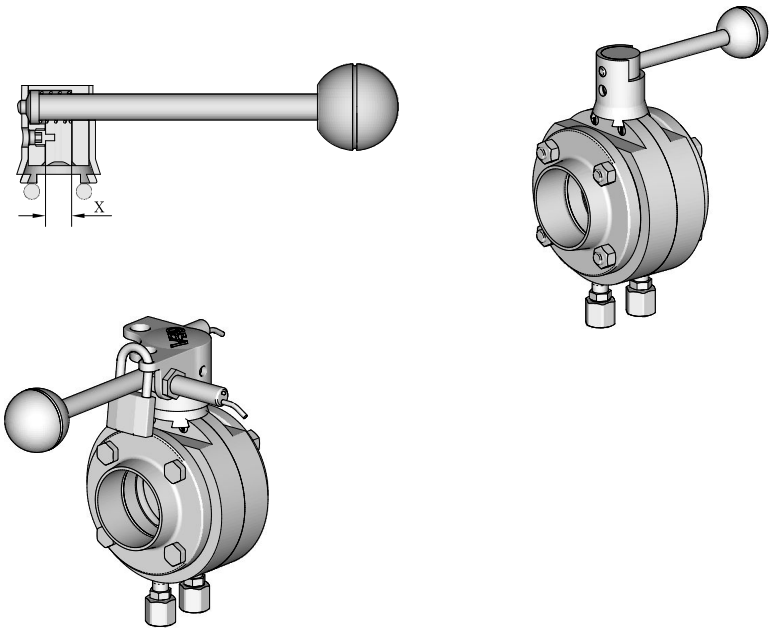


Fig.28: Manual actuator for BFV-L

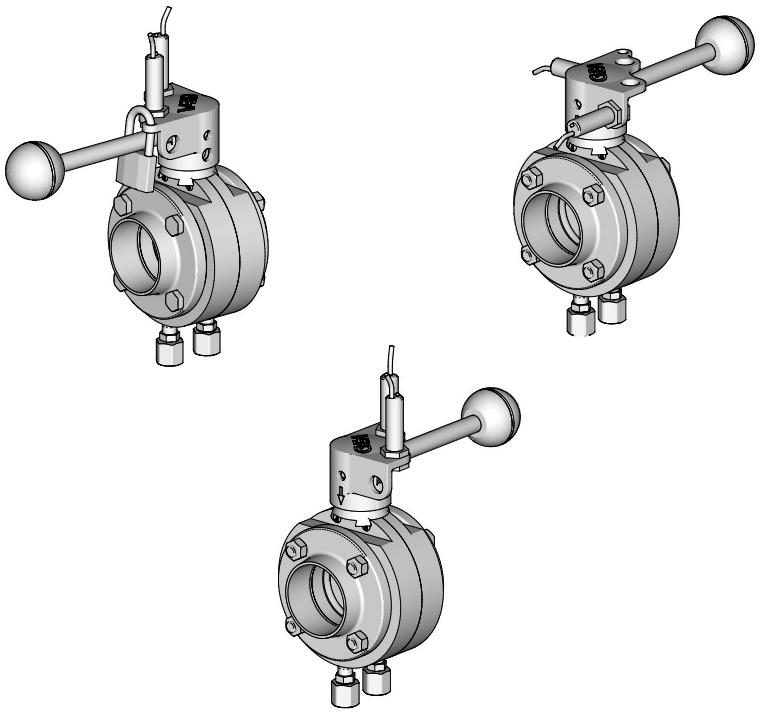


Fig.29: Installation variants for proximity switches

Item	Designation	Nominal width	Nominal width
		DN 25 - DN 65 2" OD - 2.5" OD	**DN 100 / DN 80 3” OD / 4” OD**
X	Square	12 mm	14 mm
	Manual actuator	224-001055	224-001056
	Proximity switch holder	224-001058	224-001058

16 Dimension sheet - Hygienic leakage butterfly valve ECOspace

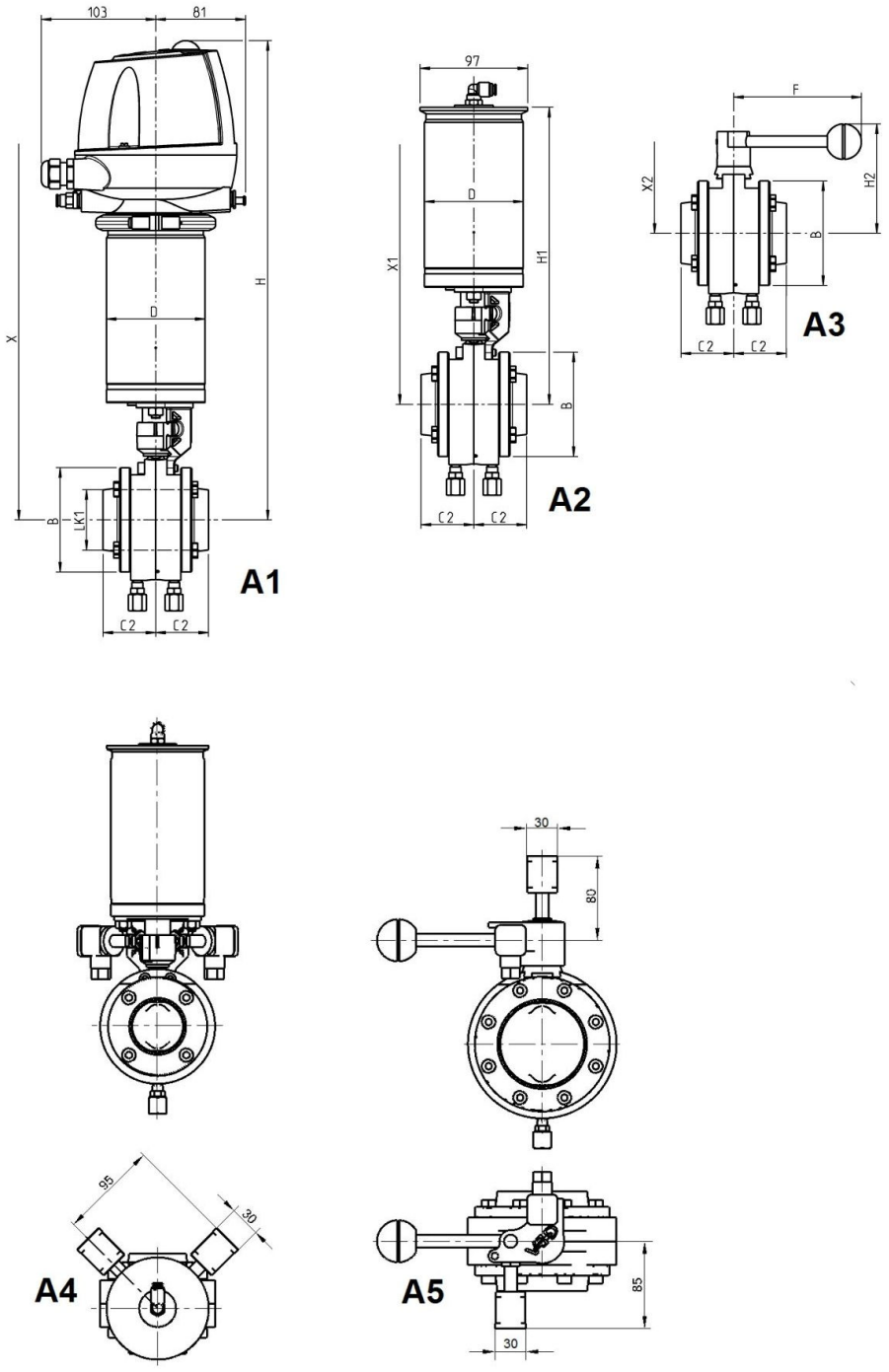


Fig.30: Installation of proximity switches optional / observe removal reserve

Item	Designation	Dimension	DN 50 2" OD	DN 65 2.5" OD	DN 80 3" OD	DN 100 4" OD
A1	Pneumatic actuator with T.VIS control top, installation dimension X	B	109	127	141	168
		C2	47.5	47.5	47.5	47.5
		D / actuator Ø	88.9	88.9	114.3	114.3
		H / DN H / OD	431.5 431.5	440.5 440.5	447.5 447.5	461 461
		LK 1 DN LK 1 OD Bolts	77 74 4x M8	95 88 6x M8	110 101 6x M8	137 134 6x M8
		X	520	520	535	550
A2	Pneumatic actuator without control top, installation dimension X1	B	109	127	141	168
		C2	47.5	47.5	47.5	47.5
		D / actuator Ø	88.9	88.9	114.3	114.3
		H1	267.5	276.5	283.5	297
		X1	360	360	380	390
A3	Manual actuator, installation dimension X2	B	109	127	141	168
		C2	47.5	47.5	47.5	47.5
		F	160	160	220	220
		H2	106.5	115.5	122.5	136
		X2	130	139	146	159

17 Dimension sheet - Hygienic butterfly valve - seals

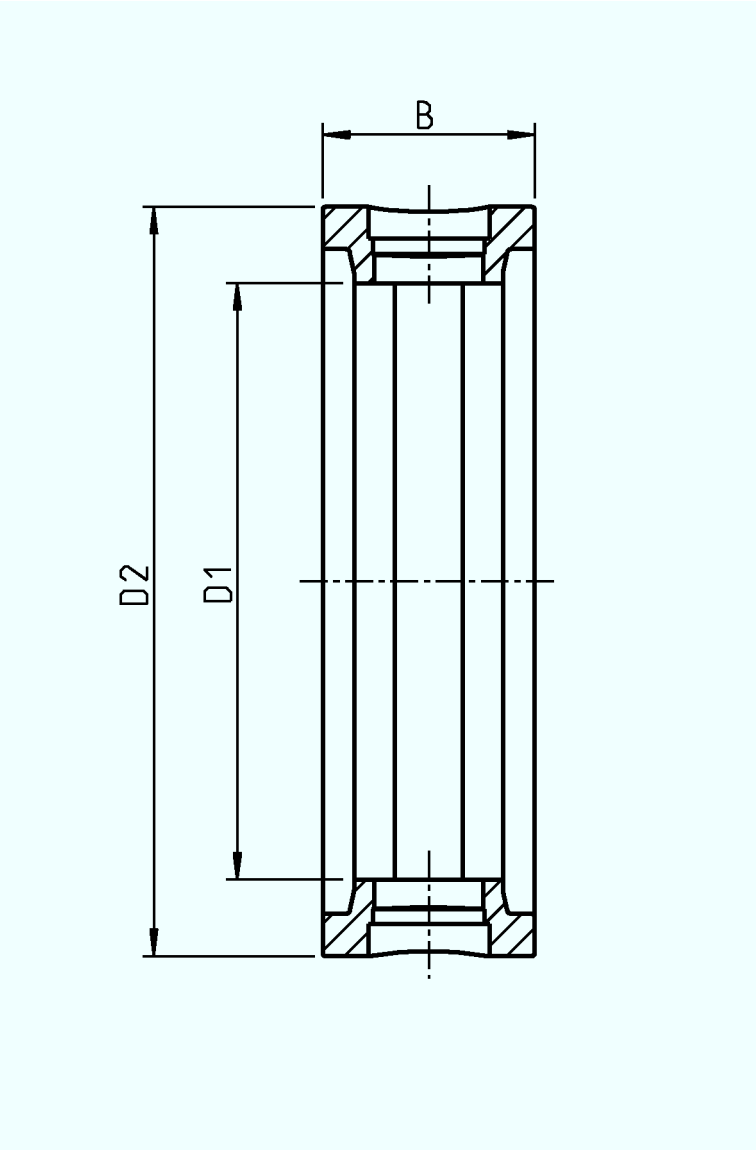


Fig.31

Nominal width	Material	Material	D1	D2	B
DN 50	EPDM	224-000570	56.3	63.2	28.0
DN 65	EPDM	224-000571	74.1	82.7	28.0
DN 80	EPDM	224-000535	88.9	97.5	31.0
DN 100	EPDM	224-000573	109.1	118.7	32.0
2" OD	EPDM	224-000570	56.3	63.2	28.0
2.5" OD	EPDM	224-000574	68.4	76.7	28.0
3" OD	EPDM	224-000572	81.2	89.7	31.0
4" OD	EPDM	224-000573	109.1	118.7	32.0

18 Appendix

18.1 Lists

18.1.1 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^3_n	Unit of measurement of volume [cubic decimetre] Standard volume (standard litres)
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 of the International Organisation for Standardisation
kg	Unit of measurement of weight [kilogram]
kN	Unit of measurement of force [kilonewton]
Kv value	Flow rate coefficient [m³/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] SPECIFIED TORQUE: 1 Nm = 0.737 lbft Pound-Force (lb) + Feet (ft)
PA	Polyamide
PE-LD	Low-density polyethylene
PPE	Polytetrafluoroethylene
psi	Anglo-American measurement of 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.
SW	Indicates 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	Tube measurement according to British Standard (BS), outside diameter
Inch IPS	American pipe measurement, iron pipe size

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