Hygienic valves

GEA Hygienic butterfly valve

Operating instruction (Translation from the original language)

430BAL009990EN_11

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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

1/1

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

1.6 UK Declaration of Conformity for the Delivery of Machines (Safety) dated 2008

Engineering for a better world.

UK- Declaration of Conformity by Supply of Machinery (Safety) Regulations 2008

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

Hereby, we declare that the machine designated in the following

Designation:	Valve with actuator
Type:	GEA Hygienic Butterfly Valve GEA Hygienic Leakage Butterfly Valve

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 UK legislation:	Supply of Machinery (Safety) Regulations 2008	
Applicable harmonized standards, in particular:	EN ISO 12100: 2010	Safety of machinery - General principles for design - Risk assessment and risk reduction

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.

GEA Importer into UK:

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Old Wolverton Road, Old Wolverton, Milton Keynes
MK12 5PY, United Kingdom

Person authorised for compilation and handover of technical documentation:

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Büchen, 14 March 2023

Franz Bürmann
Managing Director

i.V. Matthias Südel
Senior Director Engineering

1/1

2 Safety

2.1 Intended use

The butterfly valve is used to open and partially or fully shut off 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 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 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.

2.1.3 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 ≥ IPS 4“; DN 125 valid for the fluid group II.

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

2.1.4 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.

2.1.5 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.

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

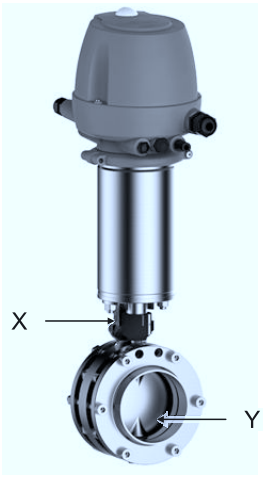
2.8 Residual dangers

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

Residual dangers on the valve and measures		
Danger	**Cause**	**Measure**
Danger 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.

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 Butterfly valve with control top

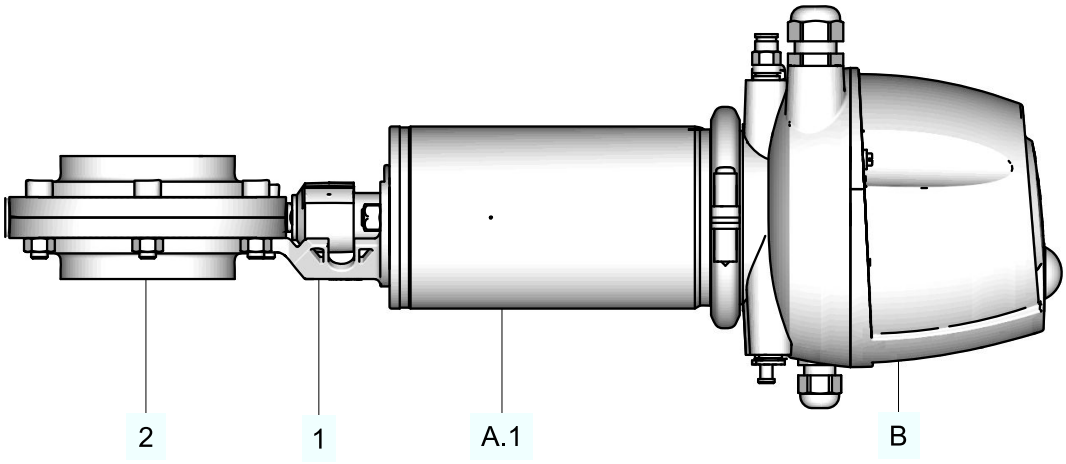


Fig.4

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

3.2 Butterfly valve without control top

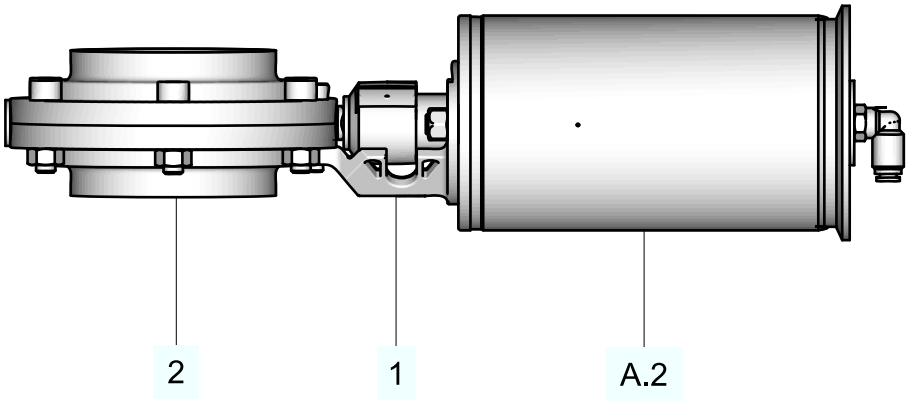


Fig.5

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

3.3 Intermediate flange design – VV (788)

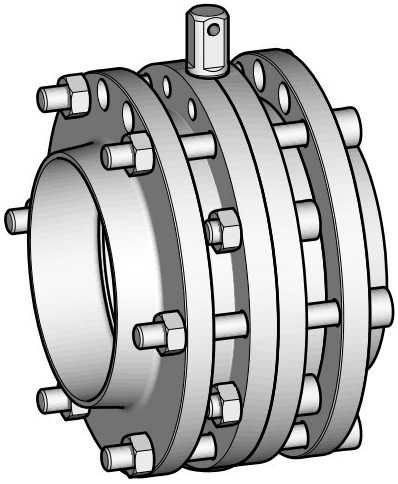


Fig.6

Butterfly valve design for matrix-piped systems.

3.4 Manual actuator

There are different construction designs for the manual actuator.

Standard design manual actuator

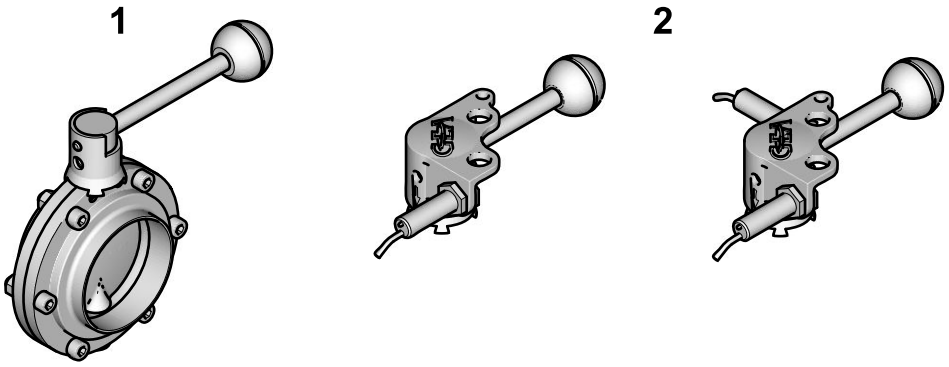


Fig.7

No.	Designation
1	Standard
2	Electric feedback

Scissor grip drive

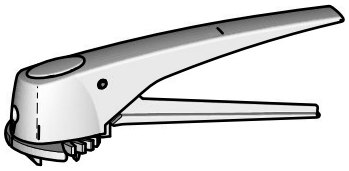


Fig.8

The scissor grip drive can position the shut-off disk in the predefined positions around the circumference (12 x 15°).

Adjustable manual operation

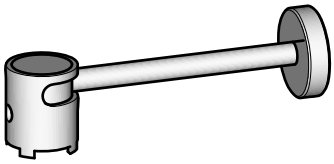


Fig.9

The lever on the adjustable hand drive can be continually adjusted in the range of 0° to 90°.

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 or closes, depending on the definition of the resting position. 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 butterfly valve.

3.5.2 Actuator A.1

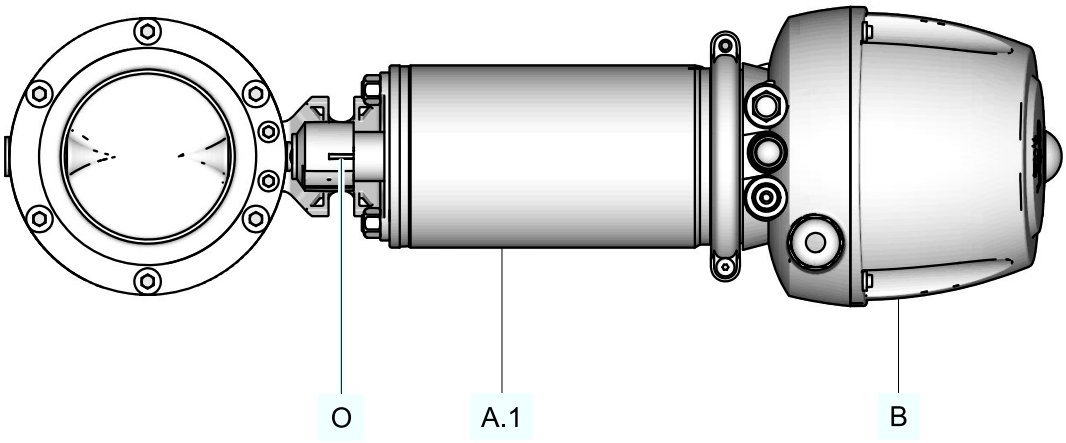


Fig.10

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

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

3.5.3 Actuator A.2

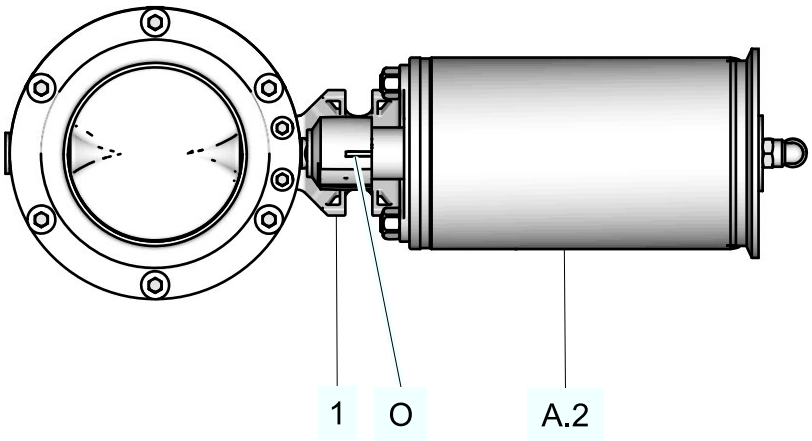


Fig.11

Feedback of switching states can be provided by proximity switches in the mounting bracket (1). The resting position can be reported by proximity switches that can be attached to the mounting bracket as required.

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

3.5.4 Manual Actuator Type H

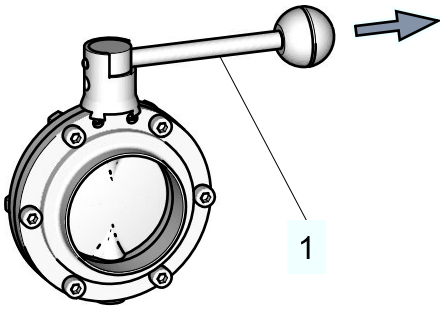


Fig.12

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

3.5.5 Butterfly Valve Body without Actuator

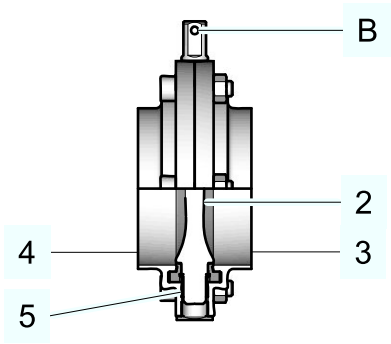


Fig.13

The valve disk (2) is supported between two flanges screwed together (3, 4) and a separate plain bearing (5).

Depending on the actuator position, the valve disk is opened to different angles and activated in the pipe opened. If the blade of the disk is parallel to the centre axis of the pipe, the butterfly valve is located in the fully opened position and guarantees maximum flow. When in the closed position, the blade of the valve disk blocks the flow of the butterfly valve.

Hint!

The hole (B) in the square end and the markings on the lower shaft are used as position indicators for the valve disk.

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 ≤ 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.

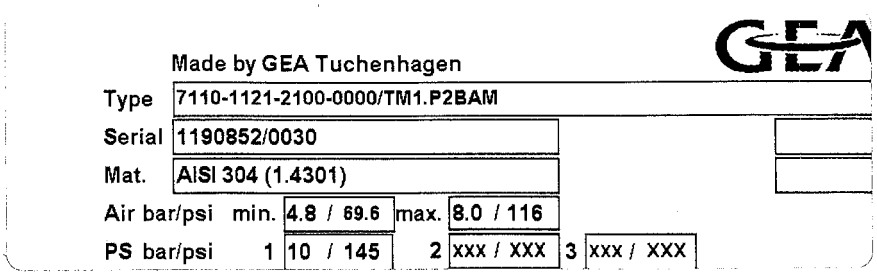


Fig.14

The type plate provides the following key data:

Key data of the valve	
Type	Hygienic butterfly valve
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 15 to DN 150 ½" to 4" OD
Material of product contact parts	Stainless steel AISI 304/316L (1.4301/1.4404) 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.
- Initiator	-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 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
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 pressure for stack cylinder plus air/spring actuator (no air/air permitted)	min. 3.0 bar max. 4.0 bar
Control air	acc. to ISO 8573-1
- 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**
BFV-7 83	88.9	0.325
BFV-7 109	114.3	0.530
BFV-7 AA	88.9	0.900

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 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 Tuchenhagen recommends that the user carries out resistance tests.

Resistance:

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

Table of sealing resistance / permitted operating temperature					
Medium	**Maximum operating temperatures**	**Sealing material**			
		EPDM	**FKM**	**HNBR**	**VMQ**
Alkalis up to 3%	up to 80 °C (176°F)	+	o	+	o
Alkalis up to 5%	up to 40 °C (104°F)	+	o	o	o

Table of sealing resistance / permitted operating temperature					
Medium	**Maximum operating temperatures**	**Sealing material**			
		EPDM	**FKM**	**HNBR**	**VMQ**
Alkalis up to 5%	up to 80 °C (176°F)	+	–	–	o
Alkalis 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
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 ** Inorganic acids are, e.g. carbonic acid, nitric acid and sulphuric acid					

Table sealing materials - temperature resistance	
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)
VMQ	-50...+200 °C (-58...+392 °F)
* The general resistance of the material does not correspond to the maximum operating temperature	

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 27.

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 Tool

List of tools	
Tools	**Material no.**
Hose cutter	407-065
Ground-down open-ended wrench, a/f 8, 9, 10, 12 19, 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
Grease BARRIERTA L 55/3 (only for seals VMQ)	413-137

5.7 Weights

TYPE GS			
Size	**Weight butterfly valve with actuator [kg]**		
	Manual actuator	**Pneumatic actuator without control top**	**Pneumatic actuator with T.VIS control top**
DN 25, 1"	1.6	5.5	6.7
DN 40, 1.5"	1.7	5.7	6.9
DN 50, 2"	2.2	6.1	7.3

TYPE GS			
Size	Weight butterfly valve with actuator [kg]		
	Manual actuator	Pneumatic actuator without control top	Pneumatic actuator with T.VIS control top
DN 65, 2.5"	2.4	6.7	7.8
DN 80, 3"	3.6	7.5	8.7
DN 100, 4"	4.8	8.7	9.9
DN 125	7.4	11.4	12.5
DN 150	8.8	13.2	14.4

TYPE SS			
Size	Weight butterfly valve with actuator [kg]		
	Manual actuator	Pneumatic actuator without control top	Pneumatic actuator with T.VIS control top
DN 15, 0.5"	1.4	5.3	6.5
DN 20, 0.75"	1.4	5.3	6.5
DN 25, 1"	1.4	5.3	6.5
DN 40, 1.5"	1.5	5.5	6.7
DN 50, 2"	1.9	5.8	7.0
DN 65, 2.5"	2.0	6.3	7.5
DN 80,	3.1	7.0	8.2
3"	3.4	7.3	8.5
DN 100, 4"	4.4	8.3	9.5
DN 125	6.2	10.2	11.3
DN 150	7.0	11.4	12.6

TYPE VV			
Size	Weight butterfly valve with actuator [kg]		
	Manual actuator	Pneumatic actuator without control top	Pneumatic actuator with T.VIS control top
DN 15, 0.5"	2.5	6.5	7.7
DN 20, 0.75"	2.5	6.5	7.7
DN 25, 1"	2.5	6.5	7.7
DN 40, 1.5"	3.0	6.9	8.1
DN 50, 2"	3.6	7.6	8.8
DN 65, 2.5"	4.6	8.6	9.7
DN 80, 3"	5.3	9.2	10.4
DN 100, 4"	7.7	11.6	12.8
DN 125	9.6	13.5	14.7
DN 150	13.0	17.0	18.2

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 valve can be installed in any position. 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.
- 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 Butterfly Valve with Welding Flange Design

This section describes the welding procedure for the butterfly valve.

Notice

Damage caused by welding

The butterfly valve can be damaged by distortion due to welding and when the position of the grooves is altered.

► Only weld the butterfly valve in assembled condition without gasket and disk.
► To ensure that a proper weld is formed when the valve is welded into the pipe, make sure that the root side of the weld is protected against oxidation by forming gas.

Carry out the following steps:

1. Remove the complete actuator (A).

   To do so, unscrew the screws (1) from the bracket (K) and the butterfly valve body.

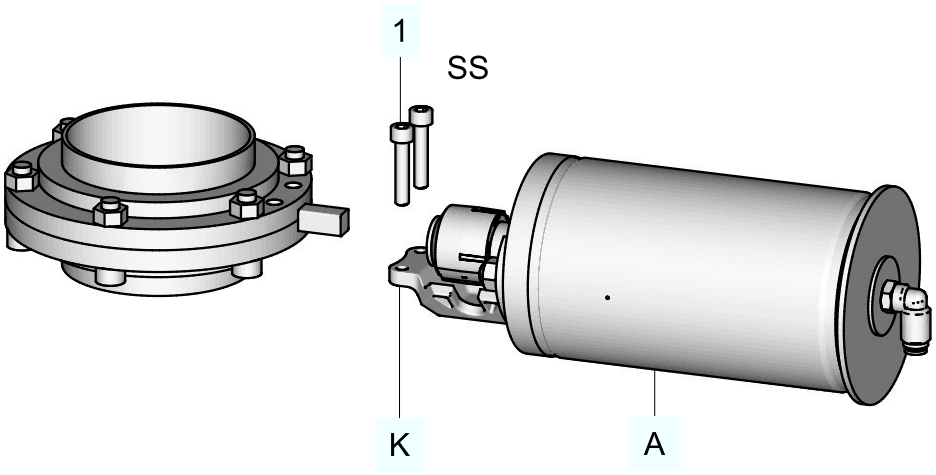


Fig.15

2. Cut the pipe open at the point of installation.
3. Weld the butterfly valve body in position in the pipe system, ensuring that the connection is free of stress and distortion. Use the TIG welding with pulse method.
4. Remove the welding beads.
5. Fit the complete actuator (A).

→ Done

6.4 Butterfly Valve with Intermediate Flange Design

Carry out the following steps:

1. 1. Remove the complete actuator (A).

   To do so, unscrew the screws (1) from the bracket (K) and the butterfly valve body.

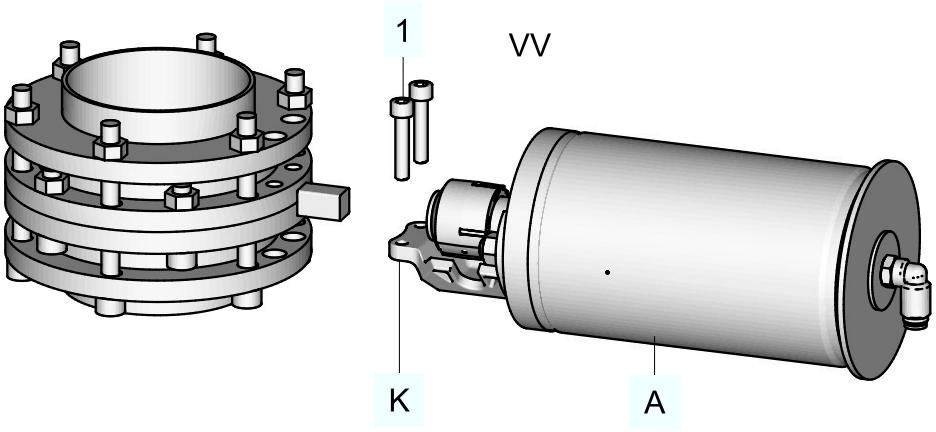


Fig.16

2. Detach the plain flanges from the butterfly valve body.

3. Weld the plain flanges in position in the pipe system, ensuring that the connection is free of stress and distortion. Use the TIG welding with pulse method.
4. Screw the butterfly valve body to the plain flanges.

   ! Installation outer flange type VV: Arrange additional holes so that bracket (K) can be dismantled in assembled condition.
5. Fit the complete actuator (A).

→ Done

Hint!

Fit exhaust air/supply air flow control devices for all compressed-air operated design variants. This way you prevent pipe hammers.

6.5 Butterfly valve with screw connection (G, K, C)

Carry out the following steps:

1. Remove the complete actuator (A).

   To do so, unscrew the screws (1) from the bracket (K) and the butterfly valve body.

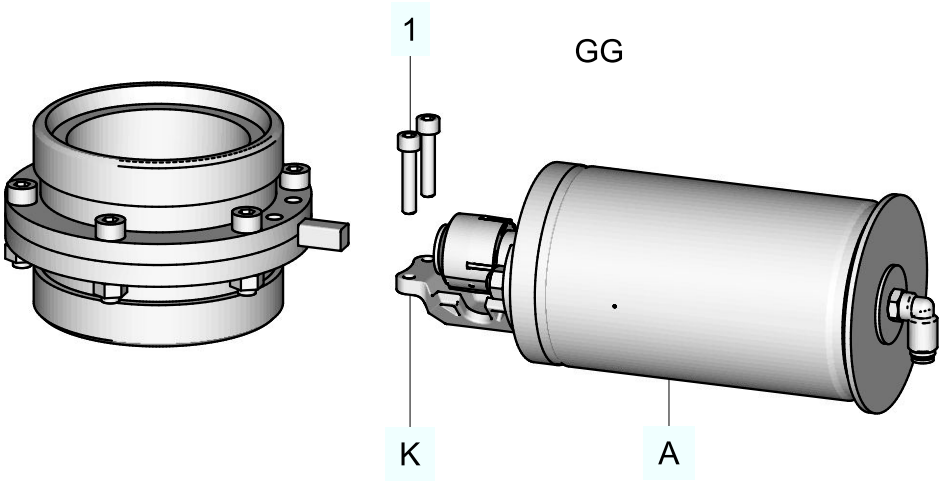


Fig.17

2. Open the pipe connection at the connection fittings.
3. Fit the butterfly valve body to the connection fittings.
4. Fit the complete actuator (A).

→ Done

Hint!

Fit exhaust air/supply air flow control devices for all compressed-air operated design variants. This way you prevent pipe hammers.

6.6 Pneumatic connections

6.6.1 Air requirement

see Section 5.2, Page 27

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.

6.6.3 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

6.6.4 Actuator without Control Top

Carry out the following steps:

1. Remove the screw plugs from the cylinder.
2. Screw in the air connector G 1/8“
3. Push the air hose into the air connector.
4. Re-open the compressed air supply.

→ Done

6.7 Electrical connections

6.7.1 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.

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).

6.7.2 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

6.8 Retrofitting a proximity switch

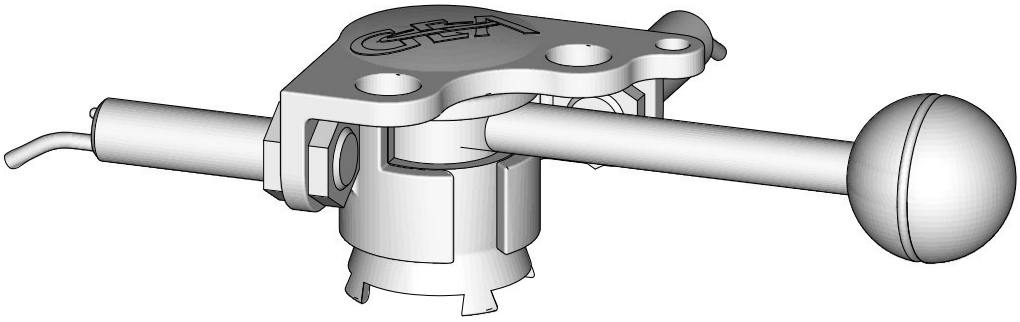


Fig.18

Carry out the following steps:

1. Place the proximity switch holder "overhead" on the workbench.
2. Angle the level of the manual actuator at 45°.
3. Insert the manual actuator in the proximity switch holder up to the fixation cam (A).

   ! Make sure that the components do not tilt together and position them so that the ball of the hand lever does not lie on the workbench during assembly.

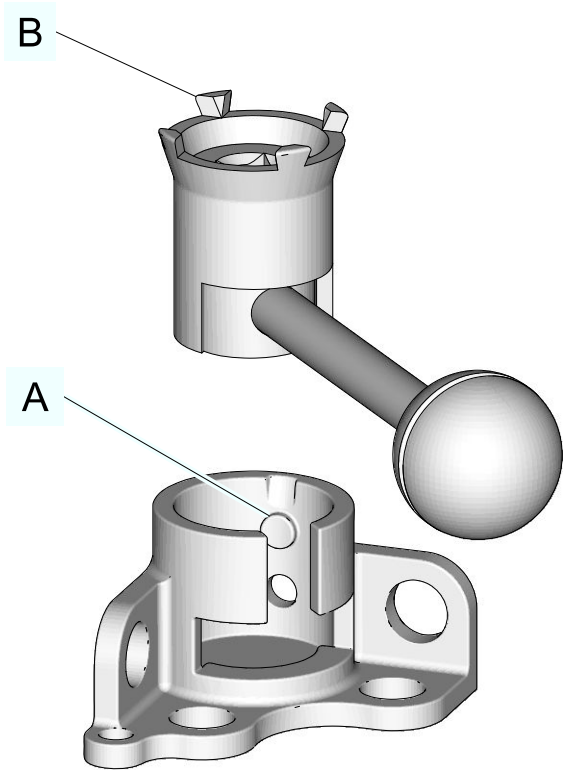


Fig.19

4. To protect against injuries, place a cloth or other suitable material over the four “retaining rods” (B) on the hand lever, press down slightly and insert a screwdriver into the side opening (C).

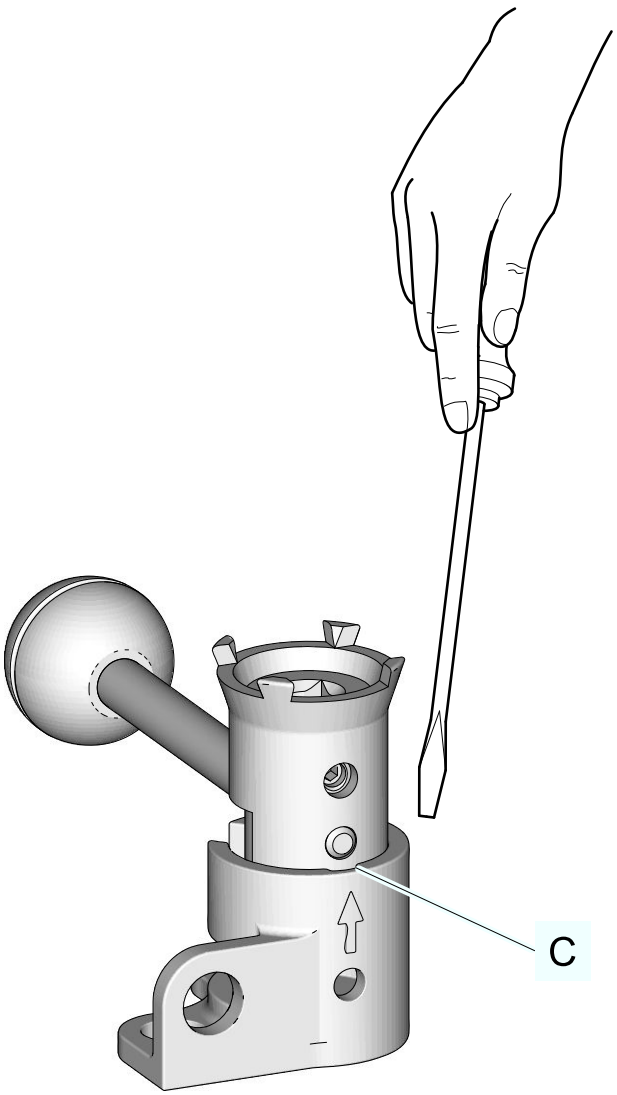


Fig.20

5. “Press on” the proximity switch holder using the screwdriver and push the hand lever up to the stop in the holder.
6. Check that the proximity switch is positioned correctly.
7. If necessary, push the fixation cam downwards by applying slight pressure.

→ 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 Rinsing operations

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

Medium	Duration [s]	Number of rinsing operations	Cleaning steps
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	
Fruit juice	2...5	3	
Milk	2...5	3	
Yoghurt	3...5	3	

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 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 26.

10.2 Inspections

Between the maintenance periods, the components 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 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.

10.2.3 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, 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 T.VIS M-15 Control Top

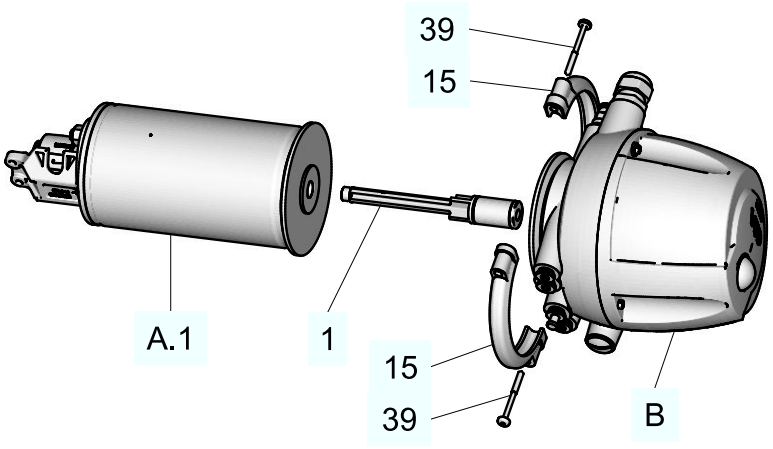


Fig.21

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 control top type T.VIS P-15 and A-15

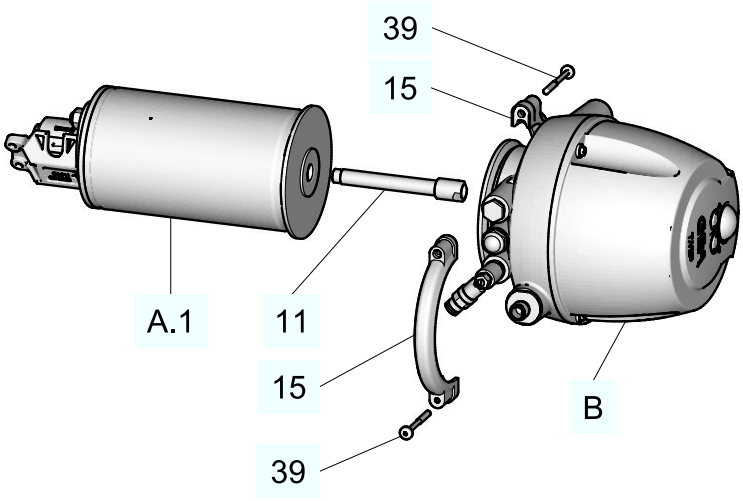


Fig.22

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!

Assembly in reverse order (also refer to the instruction manual for the T.VIS P-15 / A-15).

10.5.3 Removing the proximity switch – actuator without T.VIS

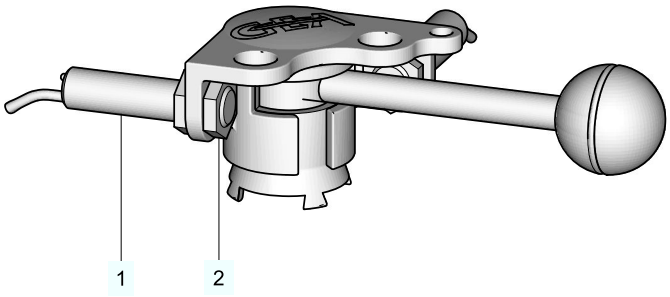


Fig.23

Carry out the following steps:

1. Unscrew the hexagon nuts (2) on the proximity switches (1).
2. Remove the proximity switches (1).

→ Done

10.5.4 Intermediate flange design type VV – removing the valve

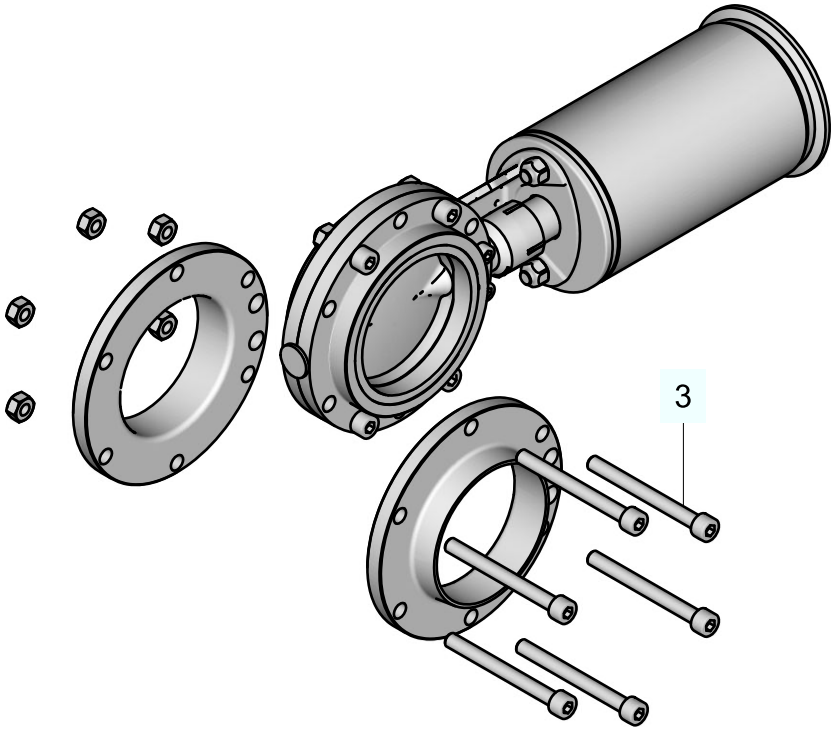


Fig.24

Carry out the following steps:

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

→ Done

10.5.5 Disconnecting the actuator

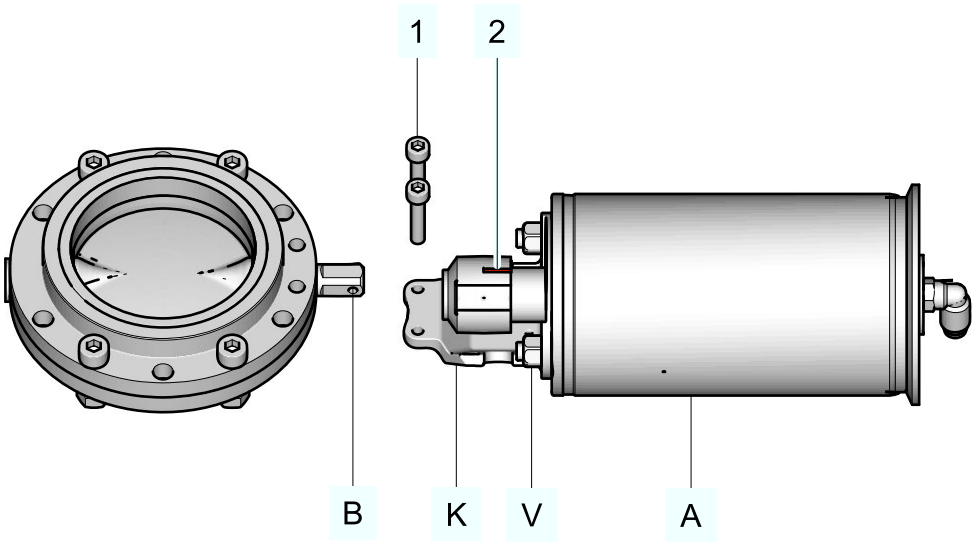


Fig.25

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 disk so that it indicates the position of the disk in the valve.

10.5.6 Dismantling the Actuator Parts

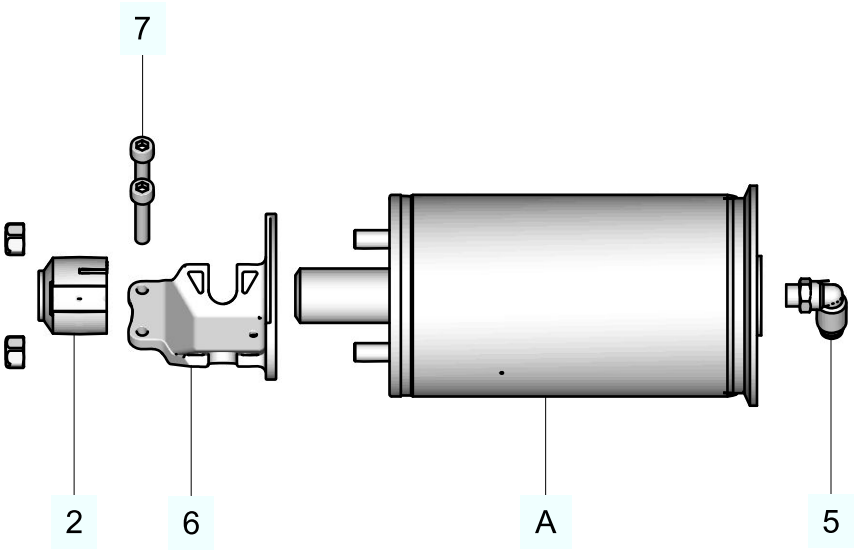


Fig.26

Carry out the following steps:

1. Undo the screw connections (7).

2. Remove the position indicator (2) together with the bracket (6).
3. Unscrew the elbow screw-in plug connection (5).

→ Done

10.5.7 Removing the manual actuator H

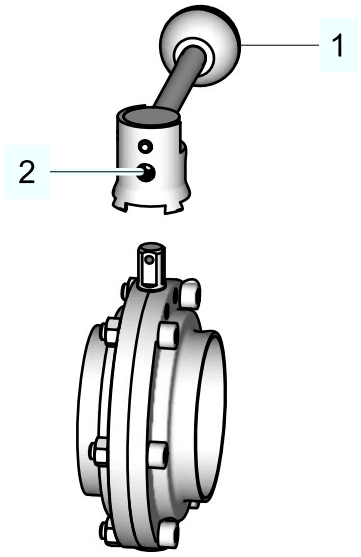


Fig.27

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

10.5.8 Removing the Valve Disk Seal

The work steps to remove the disk seal are the same for both valve types.

Type SS

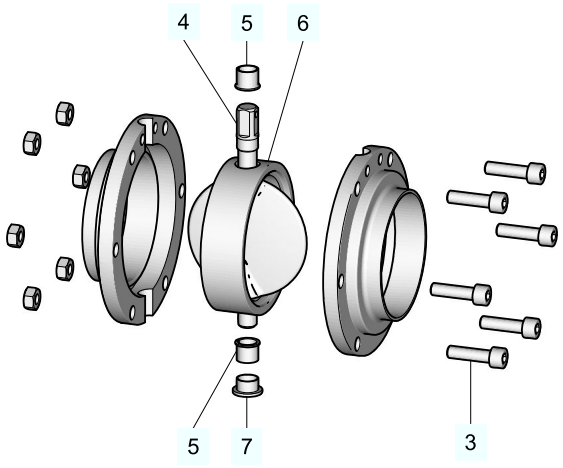


Fig.28

Type VV

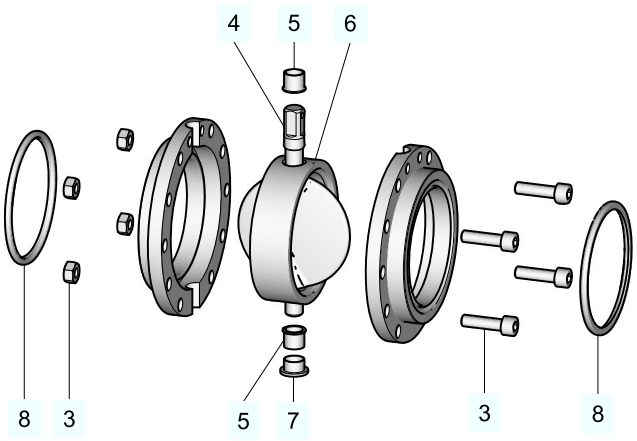


Fig.29

Removing the Flanges

Carry out the following steps:

1. Undo the screw connections (3).

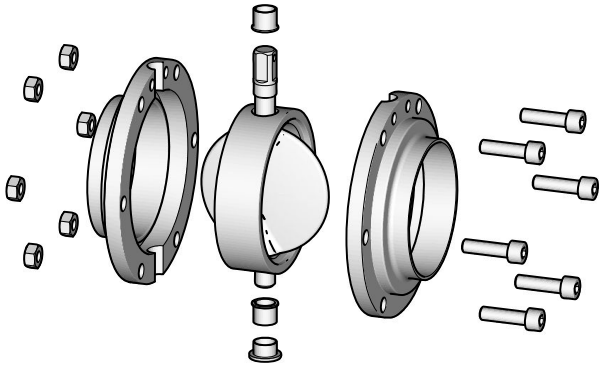


Fig.30

2. Pull the butterfly valve body apart.
3. Remove the stopper (7).

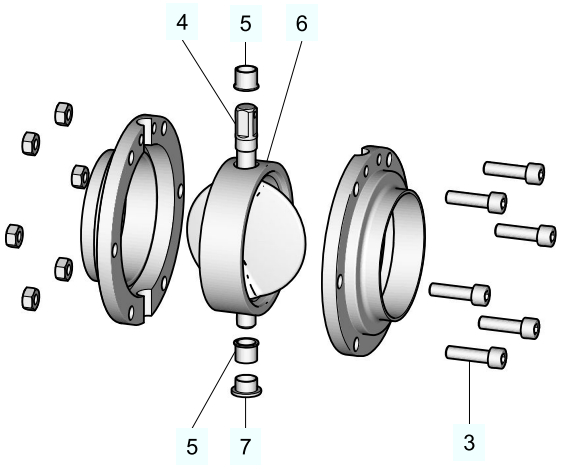


Fig.31

→ The stopper protects the plain bearing from soiling.

4. Take out the shut-off disk (4) with the seal (6).

→ Done

Removing the Seal

Carry out the following steps:

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

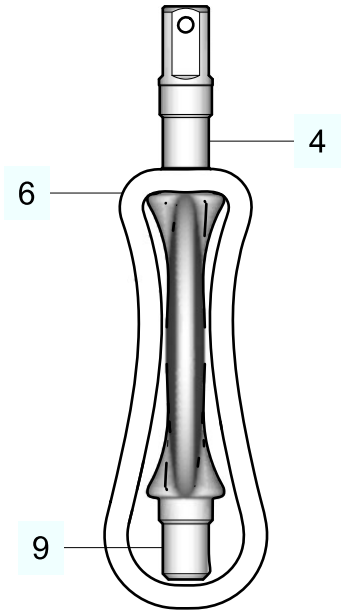


Fig.32

3. Pull the seal over the short end (9) of the disk.
4. Unclamp the disk.
5. Pull the seal over the long end of the shaft (10).

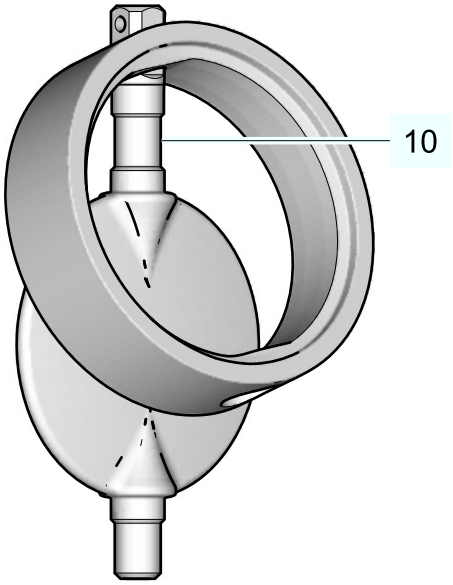


Fig.33

6. Remove the O-ring (8).

→ Done

→ The disk seal is now completely removed.

10.6 Maintenance

10.6.1 Cleaning the 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. Valve disassembly, see “Valve disassembly” (Section 10.5, Page 48)
2. Carefully clean the individual parts.
3. Check that air can exit freely from the vent screw (3).

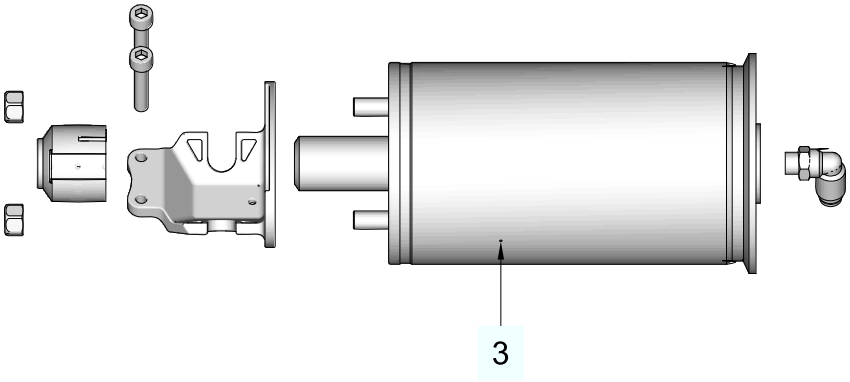


Fig.34

→ 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, PARALIQ GTE 703 and grease BARRIERTA L 55/3*. 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 under the material no. 413-064, Rivolta F.L.G. MD-2 under the material no. 413-071 and grease BARRIERTA L 55/3* under the material no. 413-137 from GEA Tuchenhagen. 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.

Running dry must be avoided!

***Grease BARRIERTA L 55/3 only for seals VMQ**

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

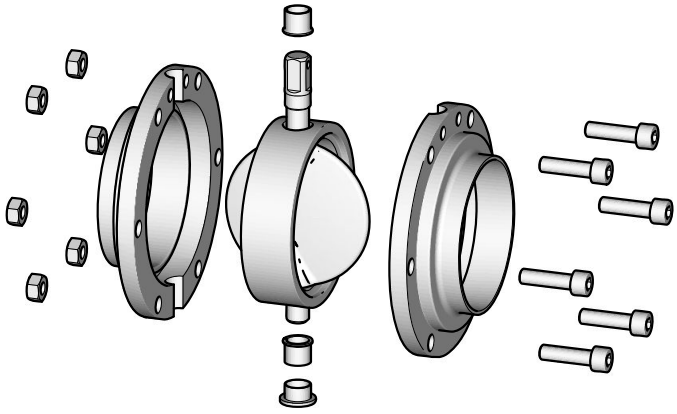


Fig.35

Observe the following points when assembling:

- Before the 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 disk must be in the correct position: for resting position closed: disk closed for resting position open: 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 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
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 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
	Switch bar loose (caution: the switch bar might be under pressure).	Check that the switch bar is firmly in place.
	Proximity switch not connected correctly	Check and correct the wiring
	Proximity switch faulty	Replace the proximity switch
Leakage at flanges	Disk seal 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 26.

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 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 - Manual actuator hygienic butterfly valve

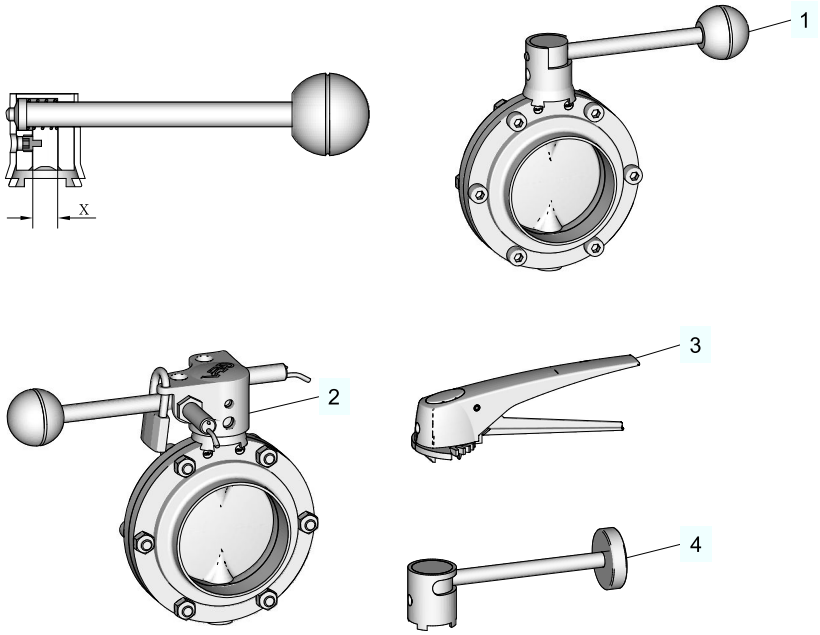


Fig.36: Manual actuator for BFV

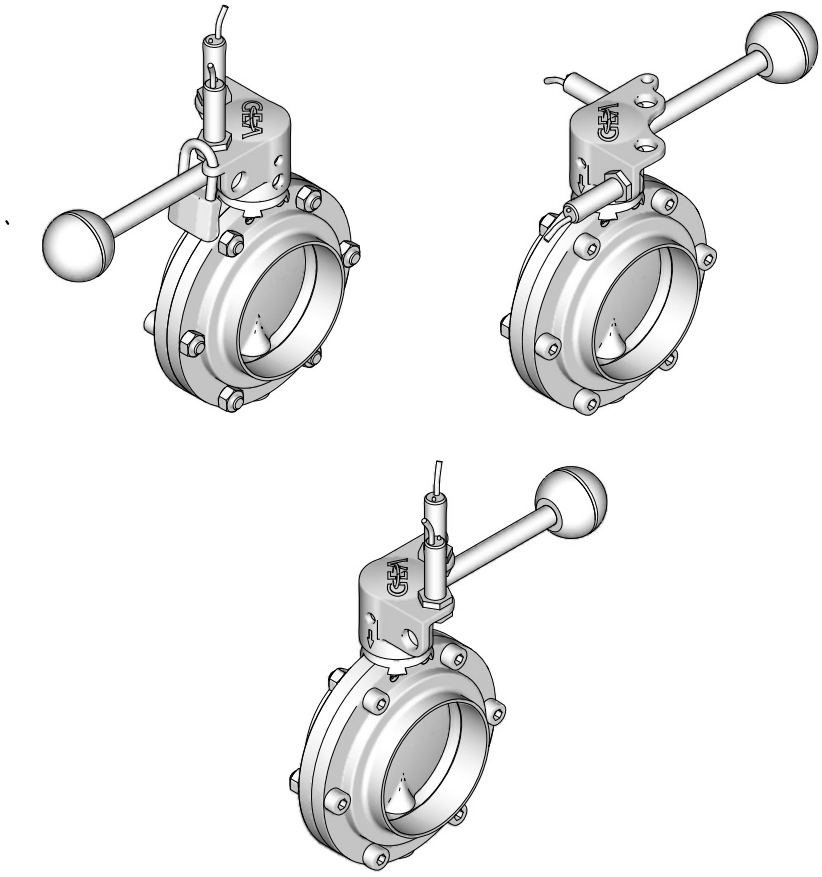


Fig.37: Installation variants for proximity switches

Item	Designation	Nominal width	Nominal width	Nominal width
		DN 15 - DN 65 0.5" OD - 2.5" OD	**DN 80 / 3" OD DN 100 / 4" OD**	**DN 125 DN 150**
X	Square	10 mm	12 mm	14 mm
1	Manual actuator	224-001054	224-001055	224-001056
2	Proximity switch holder	224-001057	224-001058	224-001058
3	Scissors-handle actuator complete	224-000544	224-000545	--
4	Manual stepless actuator complete	224-000235	224-000236	224-000237

14 Parts list - Pneumatic actuator hygienic butterfly valve

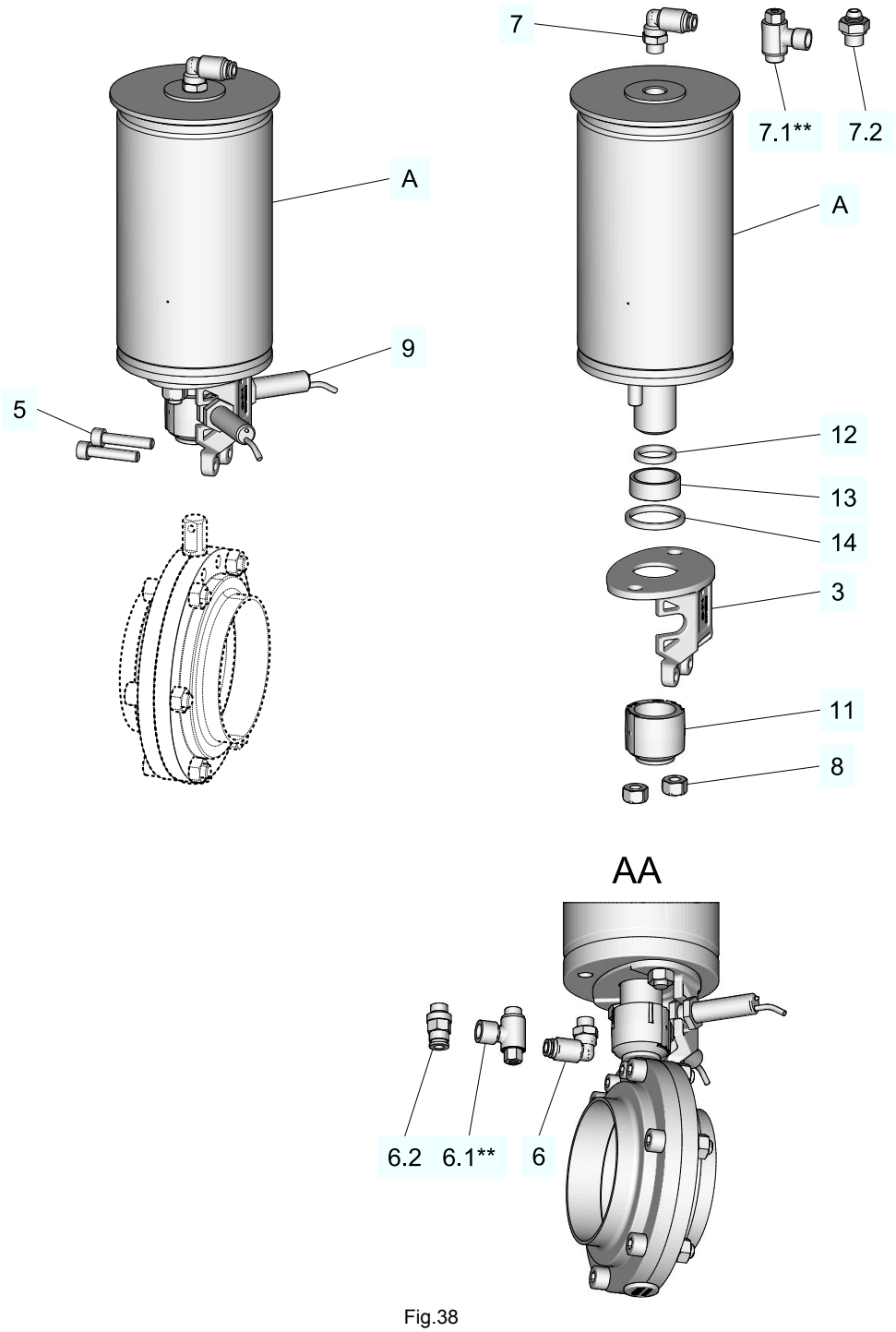


Fig.38

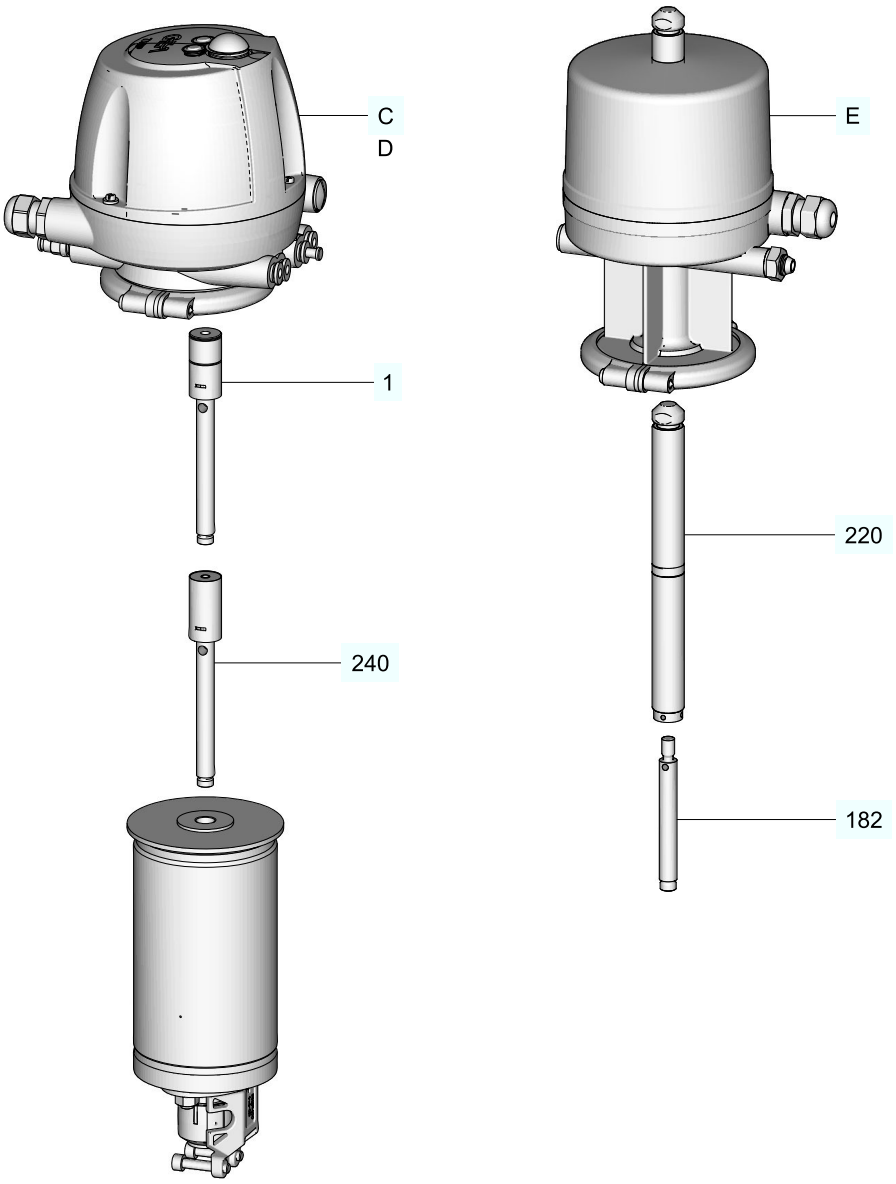


Fig.39

Item	Designation	Material	DN15 - DN65 0.5"OD-2.5"OD	DN 80 3" OD	DN 100 4" OD	DN 125 DN 150
A	Actuator BFV-7/NC/NO/ cpl.	--	224-001816	224-001818	224-001823	224-001821
A (opt.)	Actuator BFV-7/AA/ cpl.(air/air)	--	224-001817	224-001819	224-001819	224-001820
	Actuator BFV-7/NC/NO/cpl./EX	--	224-001824	224-001826	224-001830	224-001829
	Actuator BFV-7/AA/ cpl.(air/air)/EX	--	224-001825	224-001827	224-001827	224-001828
3	Bracket BFV-7	1.4301	224-001042	224-001042	224-001042	224-001071
5*	Cheese head screw	A2-70	902-099	902-099	902-099	902-099
6	Angle screw-in connection metric (1/8 "- 6/4)	Brass/ nickel-plated	933-475	933-475	933-475	933-475
	Angle screw-in connection inch (1/8 "- 6.35)	Brass/ nickel-plated	933-979	933-979	933-979	933-979
6.1**	Throttle check valve, exhaust air 1/8"	Brass/ nickel-plated	603-042	603-042	603-042	603-042
6.2	Screw-in plug connection metric (1/8" - 6/4)	Ms CV	933-176	933-176	933-176	933-176
	Screw-in plug connection, imperial (1/8" - 6.35)	Ms CV	933-173	933-173	933-173	933-173
7	Angle screw-in connection metric (1/4 "- 6/4)	Brass/ nickel-plated	933-034	933-034	933-034	933-034
	Angle screw-in connection inch (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, imperial (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	224-001068	224-001069	224-001069	224-001070
12	O-ring	NBR	930-024	930-024	930-024	930-024
13	Plain bearing form S	IGLIDUR-F	704-074	704-074	704-074	704-074
14	O-ring	NBR	930-041	930-041	930-041	930-041

* Two cylinder screws (pos. 5) are included in each actuator A.
** For the air choke, Pos. 6.1 and 7.1, an additional plug-in connection must be ordered.
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		

		Item	Material	Designation	Material no.
C	Control Top T.VIS P-15, A-15 and M-20	240	--	Switch bar for T.VIS P-15, A-15 and M-20	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 - Butterfly valve body hygienic butterfly valve (two-piece flange variants)

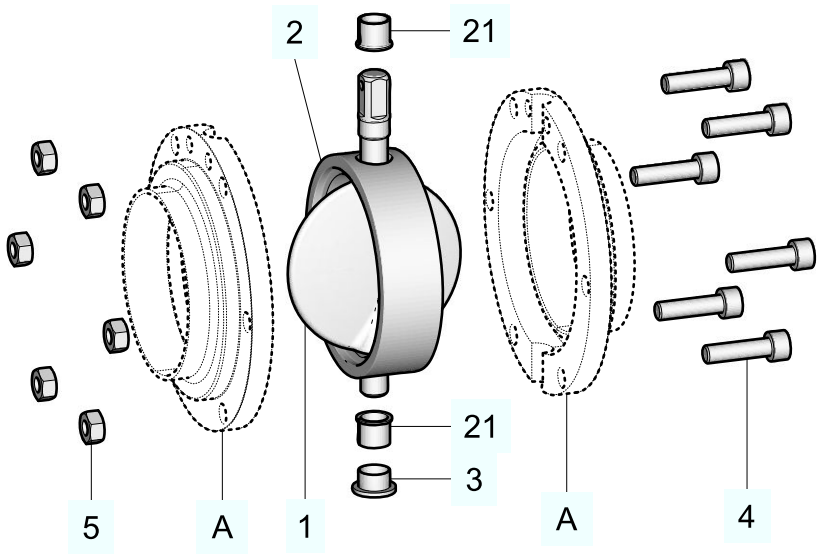


Fig.40: Butterfly valve body hygienic butterfly valve

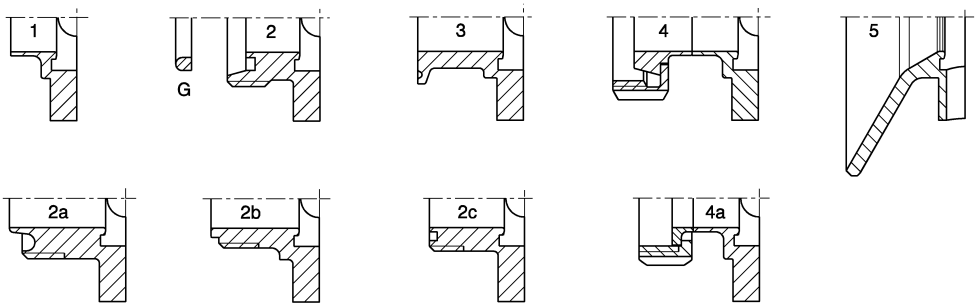


Fig.41: Two-piece flange versions

Item	Designation	Material	DN 15	DN 20	DN 25	DN 40	DN 50
Sealing set SS complete		EPDM	224-001332	224-001332	224-001300	224-001304	224-001308
		FKM	224-001333	224-001333	224-001301	224-001305	224-001309
		HNBR	224-001334	224-001334	224-001302	224-001306	224-001310
		VMQ	224-001335	224-001335	224-001303	224-001307	224-001311
1	Flap	304	224-001007	224-001007	224-000999	224-001000	224-001001
		316L	224-000810	224-000810	224-000802	224-000803	224-000804
2	Seal	EPDM	224-170.61	224-170.61	224-170.67	224-170.68	224-170.69
		FKM	224-170.75	224-170.75	224-170.81	224-170.82	224-170.83
		HNBR	224-170.89	224-170.89	224-170.95	224-170.96	224-170.97
		VMQ	224-173.05	224-173.05	224-173.11	224-173.12	224-173.13
3	Round plug	PE	922-338	922-338	922-338	922-338	922-338
4	Cheese head screw	A2-70	4x 902-099	4x 902-099	4x 902-099	4x 902-099	4x 902-100
			M6 x 30	M6 x 30	M6 x 30	M6 x 30	M8 x 30
5	Hexagon nut	A2	4x 910-013	4x 910-013	4x 910-013	4x 910-013	4x 910-018
			M6	M6	M6	M6	M8
21	Plain bearing	IGLIDUR F	704-045	704-045	704-045	704-045	704-045
A	Flange	see Overview of flanges					
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		
Items 2 and 21 are included in the sealing set					429-043		

Item	Designation	Material	DN 65	DN 80	DN 100	DN 125	DN 150
Sealing set SS complete		EPDM	224-001312	224-001316	224-001320	224-001324	224-001328
		FKM	224-001313	224-001317	224-001321	224-001325	224-001329
		HNBR	224-001314	224-001318	224-001322	224-001326	224-001330
		VMQ	224-001315	224-001319	224-001323	224-001327	224-001331
1	Flap	304	224-001002	224-001003	224-001004	224-001005	224-001006
		316L	224-000805	224-000806	224-000807	224-000808	224-000809
2	Seal	EPDM	224-170.70	224-170.71	224-170.72	224-170.73	224-170.74
		FKM	224-170.84	224-170.85	224-170.86	224-170.87	224-170.88
		HNBR	224-170.98	224-170.99	224-173.02	224-173.03	224-173.04
		VMQ	224-173.14	224-173.15	224-173.16	224-173.17	224-173.18
3	Round plug	PE	922-338	922-338	922-338	922-338	922-339
4	Cheese head screw	A2-70	6x 902-100	6x 902-100	6x 902-100	6x 902-119	8x 902-088
			M8 x 30	M8 x 30	M8 x 30	M10 x 40	M12 x 45
5	Hexagon nut	A2	6x 910-018	6x 910-018	6x 910-018	6x 910-026	8x 910-029
			M8	M8	M8	M10	M12
21	Plain bearing	IGLIDUR F	704-045	704-045	704-045	704-046	704-046
A	Flange	see Overview of flanges					
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		
Items 2 and 21 are included in the sealing set					429-043		

Item	Designation	Material	0.5" OD	0.75" OD	1" OD	1.5" OD
Sealing set SS complete		EPDM	224-001332	224-001332	224-001332	224-001336
		FKM	224-001333	224-001333	224-001333	224-001337
		HNBR	224-001334	224-001334	224-001334	224-001338
		VMQ	224-001335	224-001335	224-001335	224-001339
1	Flap	304	224-001007	224-001007	224-001007	224-001008
		316L	224-000810	224-000810	224-000810	224-000811
2	Seal	EPDM	224-170.61	224-170.61	224-170.61	224-170.62
		FKM	224-170.75	224-170.75	224-170.75	224-170.76
		HNBR	224-170.89	224-170.89	224-170.89	224-170.90
		VMQ	224-173.05	224-173.05	224-173.05	224-173.06
3	Round plug	PE	922-338	922-338	922-338	922-338
4	Cheese head screw	A2-70	4x 902-099	4x 902-099	4x 902-099	4x 902-099
			M6 x 30	M6 x 30	M6 x 30	M6 x 30
5	Hexagon nut	A2	4x 910-013	4x 910-013	4x 910-013	4x 910-013
			M6	M6	M6	M6
21	Plain bearing	IGLIDUR F	704-045	704-045	704-045	704-045
A	Flange	see Overview of flanges				
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	
Items 2 and 21 are included in the sealing set					429-043	

Item	Designation	Material	2" OD	2.5" OD	3" OD	4" OD
Sealing set SS complete		EPDM	224-001340	224-001344	224-001348	224-001352
		FKM	224-001341	224-001345	224-001349	224-001353
		HNBR	224-001342	224-001346	224-001350	224-001354
		VMQ	224-001343	224-001347	224-001351	224-001355
1	Flap	304	224-001009	224-001010	224-001011	224-001012
		316L	224-000812	224-000813	224-000814	224-000815
2	Seal	EPDM	224-170.63	224-170.64	224-170.65	224-170.66
		FKM	224-170.77	224-170.78	224-170.79	224-170.80
		HNBR	224-170.91	224-170.92	224-170.93	224-170.94
		VMQ	224-173.07	224-173.08	224-173.09	224-173.10
3	Round plug	PE	922-338	922-338	922-338	922-338
4	Cheese head screw	A2-70	4x 902-100	4x 902-100	6x 902-100	6x 902-100
			M8 x 30	M8 x 30	M8 x 30	M8 x 30
5	Hexagon nut	A2	4x 910-018	4x 910-018	6x 910-018	6x 910-018
			M8	M8	M8	M8
21	Plain bearing	IGLIDUR F	704-045	704-045	704-045	704-045
A	Flange	see Overview of flanges				
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	
Items 2 and 21 are included in the sealing set					429-043	

Item	Designation	Material	DN 15	DN 20	DN 25	DN 40	DN 50
1	Welding flange	304	224-000899	224-000900	224-000901	224-000902	224-000903
		316L	224-000705	224-000706	224-000707	224-000708	224-000709
2	Threaded flange DIN	304	--	--	224-000945	224-000946	224-000947
		316L	--	--	224-000721	224-000722	224-000723
3	Clamping flange	304	--	--	224-000933	224-000934	224-000935
		316L	--	--	224-000735	224-000736	224-000737
4	Conical flange DIN	304	--	--	on request	on request	on request
		316L	--	--	on request	on request	on request
5	Tank flange	316L	--	--	224-001690	224-001691	224-001692

Item	Designation	Material	DN 65	DN 80	DN 100	DN 125	DN 150
1	Welding flange	304	224-000904	224-000905	224-000906	224-000907	224-000908
		316L	224-000710	224-000711	224-000712	224-000713	224-000714
2	Threaded flange DIN	304	224-000948	224-000949	224-000950	224-000951	224-000952
		316L	224-000724	224-000725	224-000726	224-000727	224-000728
3	Clamping flange	304	224-000936	224-000937	224-000938	--	--
		316L	224-000738	224-000739	224-000740	--	--
4	Conical flange DIN	304	on request	on request	on request	on request	on request
		316L	on request	on request	on request	on request	on request
5	Tank flange	316L	224-001693	224-001694	224-001695	--	--

Item	Designation	Material	0.5" OD	0.75" OD	1" OD	1.5" OD
1	Welding flange	304	224-000915	224-000899	224-000909	224-000910
		316L	224-000816	224-000705	224-000715	224-000716
2	Threaded flange DIN	304	--	--	224-000978	224-000979
		316L	--	--	224-000729	224-000730
3	Clamping flange	304	--	--	224-000939	224-000940
		316L	--	--	224-000741	224-000742
4	Conical flange DIN	304	--	--	on request	on request
		316L	--	--	on request	on request
2a	Threaded flange RJT	304	--	--	224-000965	224-000966
		316L	--	--	224-000784	224-000785
2b	Threaded flange IDF	304	--	--	224-000953	224-000954
		316L	--	--	224-000790	224-000791
2c/1	Threaded flange SMS	304	--	--	224-000971	224-000972
		316L	--	--	224-000777	224-000778
2c/2	Threaded flange DS	304	--	--	224-000959	224-000960
		316L	--	--	224-000796	224-000797
4a	Conical flange SMS	304	--	--	on request	on request
		316L	--	--	on request	on request
5	Tank flange	316L	--	--	224-001794	224-001795

Item	Designation	Material	2" OD	2.5" OD	3" OD	4" OD
1	Welding flange	304	224-000911	224-000912	224-000913	224-000914
		316L	224-000717	224-000718	224-000719	224-000720
2	Threaded flange DIN	304	224-000980	224-000981	224-000982	224-000983
		316L	224-000731	224-000732	224-000733	224-000734
3	Clamping flange	304	224-000941	224-000942	224-000943	224-000944
		316L	224-000743	224-000744	224-000745	224-000746
4	Conical flange DIN	304	on request	on request	on request	on request
		316L	on request	on request	on request	on request
2a	Threaded flange RJT	304	224-000967	224-000968	224-000969	224-000970
		316L	224-000786	224-000787	224-000788	224-000789
2b	Threaded flange IDF	304	224-000955	224-000956	224-000957	224-000958
		316L	224-000792	224-000793	224-000794	224-000795
2c/1	Threaded flange SMS	304	224-000973	224-000974	224-000975	224-000976 * 224-000977 **
		316L	224-000779	224-000780	224-000781	224-000782 * 224-000783 **
2c/2	Threaded flange DS	304	224-000961	224-000962	224-000963	224-000964
		316L	224-000798	224-000799	224-000800	224-000801
4a	Conical flange SMS	304	on request	on request	on request	on request
		316L	on request	on request	on request	on request
5	Tank flange	316L	224-001796	224-001797	224-001798	224-001799

* until April 2017 (Rd 125)
** from April 2017 (Rd 132)

Item	Designation	Material	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150
G	Seal ring G for threaded flange DIN	EPDM	928-338	928-340	928-341	928-342	928-343	928-344	928-349	928-368
		FKM	928-324	928-325	928-326	928-327	928-328	928-329	928-350	928-376
		HNBR	928-758	928-759	928-760	928-761	928-762	928-763	928-764	928-765
		VMQ	928-796	928-797	928-798	928-799	928-800	928-801	928-802	928-803

Item	Designation	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
G	Seal ring G for threaded flange DIN	EPDM	928-338	928-340	928-341	928-342	928-793	928-344
		FKM	928-324	928-325	928-326	928-327	928-794	928-329
		HNBR	928-758	928-759	928-760	928-761	--	928-763
		VMQ	928-796	928-797	928-798	928-799	--	928-801

Complete valve bodies can be ordered using the order code.
Select here the actuator type “9 = without actuator”.
e.g. 7111-1002-0900-0000

16 Dimension sheet - Hygienic butterfly valve (intermediate flange variant)

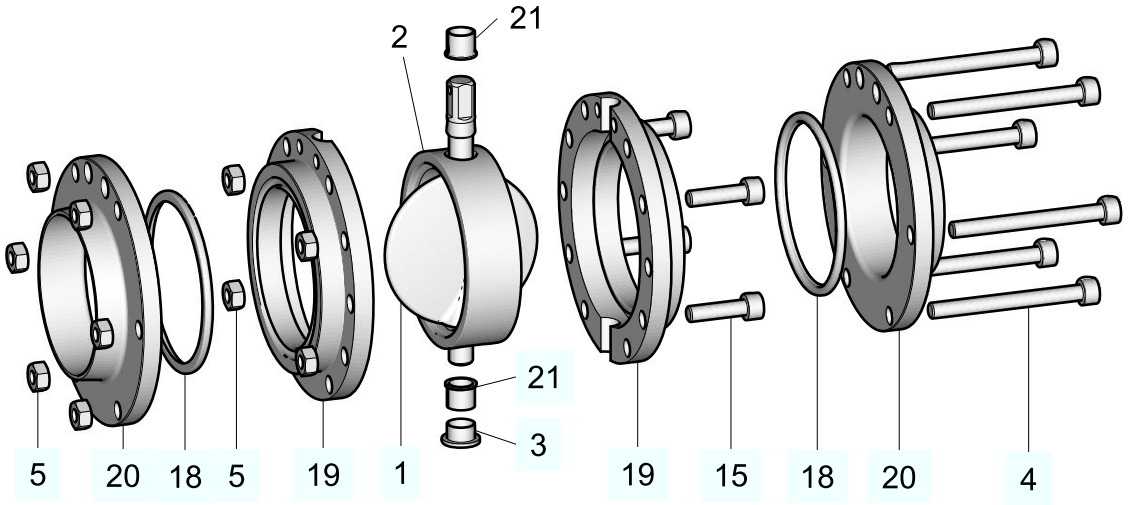


Fig.42

Item	Designation	Material	DN 15	DN 20	DN 25	DN 40
Sealing set VV complete		EPDM	224-001388	224-001388	224-001356	224-001360
		FKM	224-001389	224-001389	224-001357	224-001361
		HNBR	224-001390	224-001390	224-001358	224-001362
		VMQ	224-001391	224-001391	224-001359	224-001363
1	Butterfly valve disc	304	224-001007	224-001007	224-000999	224-001000
		316L	224-000810	224-000810	224-000802	224-000803
2	Butterfly valve seal	EPDM	224-170.61	224-170.61	224-170.67	224-170.68
		FKM	224-170.75	224-170.75	224-170.81	224-170.82
		HNBR	224-170.89	224-170.89	224-170.95	224-170.96
		VMQ	224-173.05	224-173.05	224-173.11	224-173.12
3	Round plug	PE	922-338	922-338	922-338	922-338
4	Cheese head screw	A2-70	4x 902-135	4x 902-135	4x 902-135	4x 902-135
			M6 x 75	M6 x 75	M6 x 75	M6 x 75
5	Hexagon nut	A2	8x 910-013	8x 910-013	8x 910-013	8x 910-013
			M6	M6	M6	M6
15	Cheese head screw	A2-70	4x 902-099	4x 902-099	4x 902-099	4x 902-099
			M6 x 30	M6 x 30	M6 x 30	M6 x 30
18	O-ring	EPDM	930-376	930-376	930-393	930-545
		FKM	930-593	930-593	930-564	930-566
		HNBR	930-851	930-851	930-551	930-552
		VMQ	930-066	930-066	930-072	930-074
19	Flange V, int.	304	224-000992	224-000992	224-000984	224-000985
		316L	224-000755	224-000755	224-000747	224-000748
20	Flange V, ext.	304	224-000931	224-000932	224-000916	224-000917
		316L	224-000818	224-000819	224-000762	224-000764
21	Plain bearing	IGLIDUR-F	704-045	704-045	704-045	704-045
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	
Items 2, 18 and 21 are included in the sealing set					429-044	

Item	Designation	Material	DN 50	DN 65	DN 80
Sealing set VV complete		EPDM	224-001364	224-001368	224-001372
		FKM	224-001365	224-001369	224-001373
		HNBR	224-001366	224-001370	224-001374
		VMQ	224-001367	224-001371	224-001375
1	Butterfly valve disc	304	224-001001	224-001002	224-001003
		316L	224-000804	224-000805	224-000806
2	Butterfly valve seal	EPDM	224-170.69	224-170.70	224-170.71
		FKM	224-170.83	224-170.84	224-170.85
		HNBR	224-170.97	224-170.98	224-170.99
		VMQ	224-173.13	224-173.14	224-173.15
3	Round plug	PE	922-338	922-338	922-338
4	Cheese head screw	A2-70	4x 902-136	6x 902-136	6x 902-136
			M8 x 75	M8 x 75	M8 x 75
5	Hexagon nut	A2	8x 910-018	12x 910-018	12x 910-018
			M8	M8	M8
15	Cheese head screw	A2-70	4x 902-100	6x 902-100	6x 902-100
			M8 x 30	M8 x 30	M8 x 30
18	O-ring	EPDM	930-546	930-547	930-450
		FKM	930-567	930-526	930-527
		HNBR	930-553	930-554	930-555
		VMQ	930-075	930-076	930-078
19	Flange V, int.	304	224-000986	224-000987	224-000988
		316L	224-000749	224-000750	224-000751
20	Flange V, ext.	304	224-000918	224-000919	224-000920
		316L	224-000765	224-000766	224-000767
21	Plain bearing	IGLIDUR-F	704-045	704-045	704-045
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
Items 2, 18 and 21 are included in the sealing set					429-044

Item	Designation	Material	DN 100	DN 125	DN 150
Sealing set VV complete		EPDM	224-001376	224-001380	224-001384
		FKM	224-001377	224-001381	224-001385
		HNBR	224-001378	224-001382	224-001386
		VMQ	224-001379	224-001383	224-001387
1	Butterfly valve disc	304	224-001004	224-001005	224-001006
		316L	224-000807	224-000808	224-000809
2	Butterfly valve seal	EPDM	224-170.72	224-170.73	224-170.74
		FKM	224-170.86	224-170.87	224-170.88
		HNBR	224-173.02	224-173.03	224-173.04
		VMQ	224-173.16	224-173.17	224-173.18
3	Round plug	PE	922-338	922-339	922-339
4	Cheese head screw	A2-70	8x 902-136	8x 902-133	8x 902-132
			M8 x 75	M10 x 100	M12 x 110
5	Hexagon nut	A2	14x 910-018	14x 910-026	16x 10-029
			M8	M10	M12
15	Cheese head screw	A2-70	6x 902-100	6x 902-118	8x 902-134
			M8 x 30	M10 x 35	M12 x 40
18	O-ring	EPDM	930-549	930-550	930-574
		FKM	930-568	930-569	930-575
		HNBR	930-556	930-557	930-1053
		VMQ	930-079	930-084	930-085
19	Flange V, int.	304	224-000989	224-000990	224-000991
		316L	224-000752	224-000753	224-000754
20	Flange V, ext.	304	224-000921	224-000922	224-000923
		316L	224-000768	224-000769	224-000770
21	Plain bearing	IGLIDUR-F	704-045	704-046	704-046
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
Items 2, 18 and 21 are included in the sealing set					429-044

Item	Designation	Material	0.5" OD	0.75" OD	1" OD	1.5" OD
Sealing set VV complete		EPDM	224-001388	224-001388	224-001388	224-001392
		FKM	224-001389	224-001389	224-001389	224-001393
		HNBR	224-001390	224-001390	224-001390	224-001394
		VMQ	224-001391	224-001391	224-001391	224-001395
1	Butterfly valve disc	304	224-001007	224-001007	224-001007	224-001008
		316L	224-000810	224-000810	224-000810	224-000811
2	Butterfly valve seal	EPDM	224-170.61	224-170.61	224-170.61	224-170.62
		FKM	224-170.75	224-170.75	224-170.75	224-170.76
		HNBR	224-170.89	224-170.89	224-170.89	224-170.90
		VMQ	224-173.05	224-173.05	224-173.05	224-173.06
3	Round plug	PE	922-338	922-338	922-338	922-338
4	Cheese head screw	A2-70	4x 902-135	4x 902-135	4x 902-135	4x 902-135
			M6 x 75	M6 x 75	M6 x 75	M6 x 75
5	Hexagon nut	A2	8x 910-013	8x 910-013	8x 910-013	8x 910-013
			M6	M6	M6	M6
15	Cheese head screw	A2-70	4x 902-099	4x 902-099	4x 902-099	4x 902-099
			M6 x 30	M6 x 30	M6 x 30	M6 x 30
18	O-ring	EPDM	930-376	930-376	930-376	930-497
		FKM	930-593	930-593	930-593	930-570
		HNBR	930-851	930-851	930-851	930-852
		VMQ	930-066	930-066	930-066	930-067
19	Flange V, int.	304	224-000992	224-000992	224-000992	224-000993
		316L	224-000755	224-000755	224-000755	224-000756
20	Flange V, ext.	304	224-000930	224-000931	224-000924	224-000925
		316L	224-000817	224-000818	224-000771	224-000772
21	Plain bearing	IGLIDUR-F	704-045	704-045	704-045	704-045
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	
Items 2, 18 and 21 are included in the sealing set					429-044	

Item	Designation	Material	2" OD	2.5" OD	3" OD	4" OD
Sealing set VV complete		EPDM	224-001396	224-001400	224-001404	224-001408
		FKM	224-001397	224-001401	224-001405	224-001409
		HNBR	224-001398	224-001402	224-001406	224-001410
		VMQ	224-001399	224-001403	224-001407	224-001411
1	Butterfly valve disc	304	224-001009	224-001010	224-001011	224-001012
		316L	224-000812	224-000813	224-000814	224-000815
2	Butterfly valve seal	EPDM	224-170.63	224-170.64	224-170.65	224-170.66
		FKM	224-170.77	224-170.78	224-170.79	224-170.80
		HNBR	224-170.91	224-170.92	224-170.93	224-170.94
		VMQ	224-173.07	224-173.08	224-173.09	224-173.10
3	Round plug	PE	922-338	922-338	922-338	922-338
4	Cheese head screw	A2-70	4x 902-136	6x 902-136	6x 902-136	8x 902-136
			M8 x 75	M8 x 75	M8 x 75	M8 x 75
5	Hexagon nut	A2	8x 910-018	10x 910-018	12x 910-018	14x 910-018
			M8	M8	M8	M8
15	Cheese head screw	A2-70	4x 902-100	4x 902-100	6x 902-100	6x 902-100
			M8 x 30	M8 x 30	M8 x 30	M8 x 30
18	O-ring	EPDM	930-559	930-560	930-319	930-561
		FKM	930-571	930-572	930-666	930-573
		HNBR	930-853	930-854	930-652	930-855
		VMQ	930-068	930-069	930-070	930-071
19	Flange V, int.	304	224-000994	224-000995	224-000996	224-000997
		316L	224-000758	224-000759	224-000760	224-000761
20	Flange V, ext.	304	224-000926	224-000927	224-000928	224-000929
		316L	224-000773	224-000774	224-000775	224-000776
21	Plain bearing	IGLIDUR-F	704-045	704-045	704-045	704-045
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	
Items 2, 18 and 21 are included in the sealing set					429-044	

Complete valve bodies can be ordered using the order code.

Select here the actuator type “9 = without actuator”.

e.g. 7881-1002-0900-0000

17 Dimension sheet - Hygienic butterfly valve (two-piece variants)

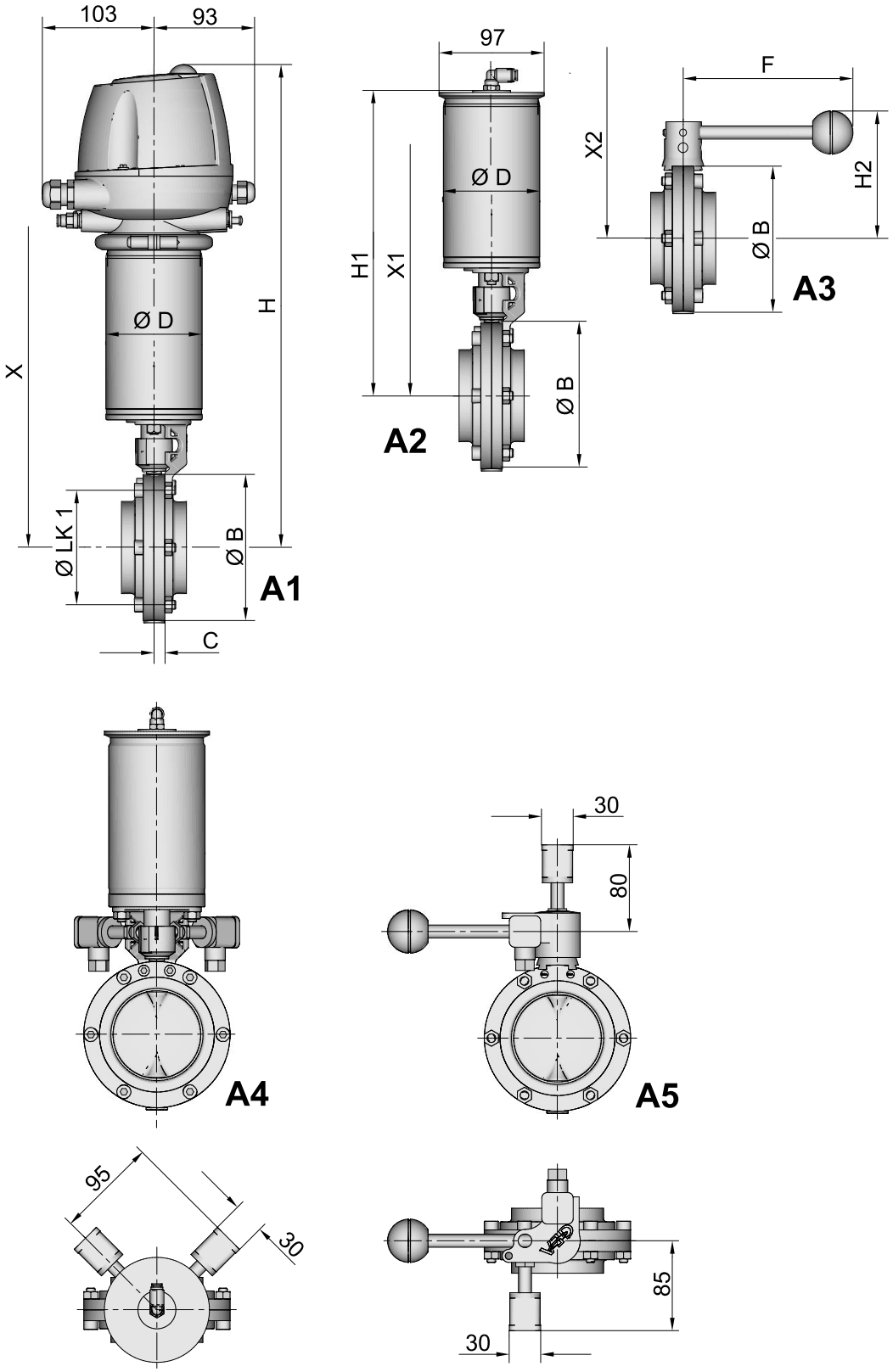


Fig.43: Installation of proximity switches optional / observe removal reserve

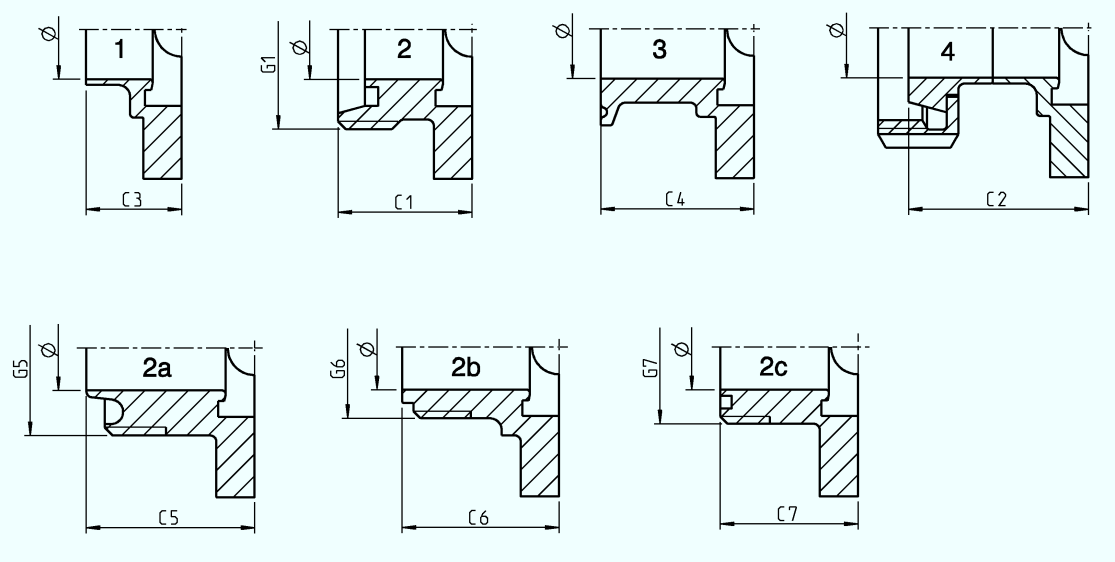


Fig.44

Item	Designation	Dimension	DN 15 0.5" OD	DN 20 0.75" OD	DN 25 1" OD	DN 40 1.5" OD	DN 50 2" OD
A1	Pneumatic actuator with T.VIS control top, installation dimension X	Ø B / DN Ø B / OD	78 78	78 78	78 78	87 84	103 101
		C	10	10	10	10	10
		D / actuator Ø	88.9	88.9	88.9	88.9	88.9
		H / DN H / OD	415 415	415 415	415 415	418.5 420	427 428
		Ø LK 1 DN Ø LK 1 OD Bolts DN Bolts OD	68 68 4x M6x30 4x M6X30	68 68 4x M6x30 4x M6X30	68 68 4x M6x30 4x M6X30	77 74 4x M6x30 4x M6x30	90 88 4x M8x30 4x M8x30
		X / DN X / OD	435 435	435 435	435 435	438.5 440	447 448
A2	Pneumatic actuator without control top, installation dimension X1	Ø B / DN Ø B / OD	78 78	78 78	78 78	87 84	103 101
		D / actuator Ø	88.9	88.9	88.9	88.9	88.9
		H1 / DN H1 / OD	253 253	253 253	253 253	256.5 258	265 265
		X1 / DN X1 / OD	273 273	273 273	273 273	276.5 278	285 286
A3	Manual actuator, installation dimension X2	Ø B / DN Ø B / OD	78 78	78 78	78 78	87 84	103 101
		Q	116	116	116	116	116
		H2 / DN H2 / OD	83 83	83 83	83 83	86.5 88	95 96
		X2 / DN X2 / OD	103 103	103 103	103 103	106.5 108	115 116
1	Welding flange	C3 DIN	25	25	25	25	25
		C3 OD	25	25	25	25	25
		Internal Ø DN	16	20	26	38	50
		Internal Ø OD	9.5	15.85	22.2	34.9	47.6
2	Threaded flange DIN 11851	C1 DIN	--	--	35	35	35
		G1 DIN	--	--	Rd 52x1/6	Rd 65x1/6	Rd 95x1/6
		C1 OD	--	--	47	47	48
		G1 OD	--	--	Rd 52x1/6	Rd 65x1/6	Rd 78x1/6
		Internal Ø DN	16	20	26	38	50
		Internal Ø OD	9.5	15.85	22.2	34.9	47.6
3	Clamping flange	C4 DIN	--	--	40	40	30
		C1 OD	--	--	40	40	30
		Internal Ø DN	16	20	26	38	50
		Internal Ø OD	9.5	15.85	22.2	34.9	47.6
4	Conical flange DIN 11851	C2 DIN	--	--	47	51	53
		Internal Ø DN	16	20	26	38	50
		Internal Ø OD	9.5	15.85	22.2	34.9	47.6

Item	Designation	Dimension	DN 15 0.5" OD	DN 20 0.75" OD	DN 25 1" OD	DN 40 1.5" OD	DN 50 2" OD
2a	Threaded flange RJT	C5 OD	--	--	44	44	44
		G5 OD	--	--	45.7x1/8	58.4x1/8	72.7x1/6
		Internal Ø DN	16	20	26	38	50
		Internal Ø OD	9.5	15.85	22.2	34.9	47.6
2b	Threaded flange IDF	C5 OD	--	--	41	41	41
		G5 OD	--	--	Tr 37.1x1/8	Tr 50.6x1/8	Tr 64.1x1/8
		Internal Ø DN	16	20	26	38	50
		Internal Ø OD	9.5	15.85	22.2	34.9	47.6
2c/1	Threaded flange SMS	C7/1 OD	--	--	36	41	41
		G7/1 OD	--	--	Rd 40x1/6	Rd 60x1/6	Rd 70x1/6
		Internal Ø DN	16	20	26	38	50
		Internal Ø OD	9.5	15.85	22.2	34.9	47.6
2c/2	Threaded flange DS	C7/2 OD	--	--	38	38	40
		G7/2 OD	--	--	Rd 44x1/6	Rd 58x1/6	Rd 72x1/6
		Internal Ø DN	16	20	26	38	50
		Internal Ø OD	9.5	15.85	22.2	34.9	47.6
		Switch rod stroke	56	56	56	56	56
		Disc square	10	10	10	10	10

Item	Designation	Dimension	DN 65 2.5" OD	DN 80 3" OD	DN 100 4" OD	DN 125	DN 150
A1	Pneumatic actuator with T.VIS control top, installation dimension X	Ø B / DN Ø B / OD	120 116	135 128	155 160	191 --	219 --
		C	10	10	10	13	14
		D / actuator Ø	88.9	88.9	88.9	114.3	114.3
		H / DN H / OD	434.5 436.5	440.5 444	456.5 454	472 --	486 --
		Ø LK 1 DN Ø LK 1 OD	107 103	122 115	142 147	175 --	200 --
		Bolts DN Bolts OD	6x M8x30 4x M8x30	6x M8x30 6x M8x30	6x M8x30 6x M8x30	8x M10x40 --	8x M12x45 --
		X / DN X / OD	454.5 456.5	460.5 464	476.5 474	492 --	506 --
A2	Pneumatic actuator without control top, installation dimension X1	Ø B / DN Ø B / OD	120 116	135 128	155 160	191 --	219 --
		D / actuator Ø	88.9	88.9	88.9	114.3	114.3
		H1 / DN H1 / OD	272.5 274.5	278.5 282	294.5 292	310 --	324 --
		X1 / DN X1 / OD	292.5 294.5	298.5 302	314.5 312	330 --	344 --
A3	Manual actuator, installation dimension X2	Ø B / DN Ø B / OD	120 116	135 128	155 160	191 --	219 --
		Q	116	160	160	220	220
		H2 / DN H2 / OD	103 105	114.5 118	128 130.5	146 --	-- --
		X2 / DN X2 / OD	123 125	134.5 138	148 150.5	166 --	180 --
1	Welding flange	C3 DIN	25	30	30	35	40
		C3 OD	25	30	30	--	--
		Internal Ø DN	66	81	100	125	150
		Internal Ø OD	60.3	73	97.6	--	--
2	Threaded flange DIN 11851	C1 DIN	38	43	43	55	80
		G1 DIN	Rd 95x1/6	Rd 110x1/4	Rd 130x1/4	Rd 160x1/4	Rd 190x1/4
		C1 OD	50	55	60	--	--
		G1 OD	Rd 95x1/6	Rd 104x1/4	Rd 130x1/4	--	--
		Internal Ø DN	66	81	100	125	150
		Internal Ø OD	60.3	73	97.6	--	--
3	Clamping flange	C4 DIN	30	30	30	63	68
		C1 OD	30	30	30	--	--
		Internal Ø DN	66	81	100	125	150
		Internal Ø OD	60.3	73	97.6	--	--
4	Conical flange DIN 11851	C2 DIN	57	67	74	69	77
		Internal Ø DN	66	81	100	125	150

Item	Designation	Dimension	DN 65 2.5" OD	DN 80 3" OD	DN 100 4" OD	DN 125	DN 150
		Internal Ø OD	60.3	73	97.6	--	--
2a	Threaded flange RJT	C5 OD	44	44	44	--	--
		G5 OD	85.4x1/6	98.1x1/6	123.5x1/6	--	--
		Internal Ø DN	66	81	100	125	150
		Internal Ø OD	60.3	73	97.6	--	--
2b	Threaded flange IDF	C5 OD	41	41	41	--	--
		G5 OD	Tr 77.6x1/8	Tr 91.1x1/8	Tr. 108,2x1/8	--	--
		Internal Ø DN	66	81	100	125	150
		Internal Ø OD	60.3	73	97.6	--	--
2c/1	Threaded flange SMS	C7/1 OD	45	45	56	--	--
		G7/1 OD	Rd 85x1/6	Rd 98x1/6	Rd132x1/6	--	--
		Internal Ø DN	66	81	100	125	150
		Internal Ø OD	60.3	73	97.6	--	--
2c/2	Threaded flange DS	C7/2 OD	40	41	42	--	--
		G7/2 OD	Rd 88x1/6	Rd 100x1/6	Rd 130x1/4		
		Internal Ø DN	66	81	100	125	150
		Internal Ø OD	60.3	73	97.6	--	--
		Switch rod stroke	56	56	56	56	56
		Disc square	10	12	12	14	14

18 Dimension sheet - Hygienic butterfly valve (intermediate flange)

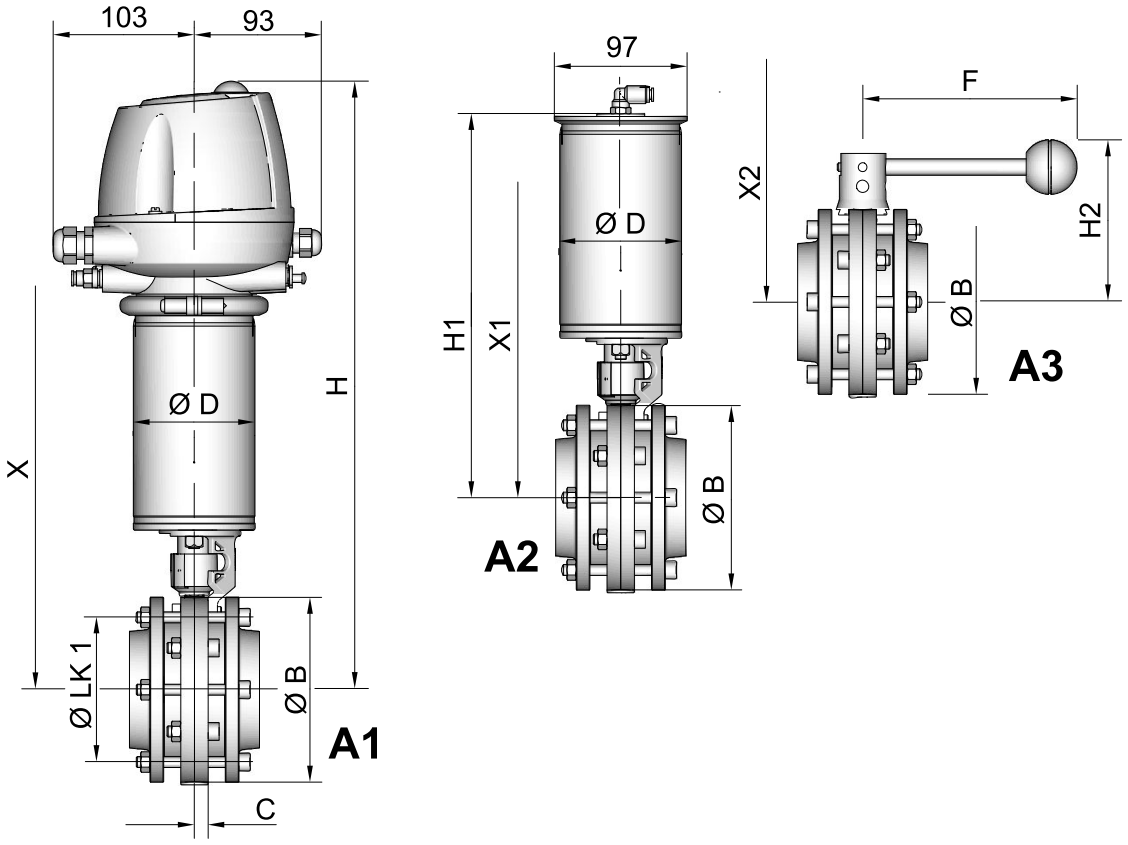


Fig.45

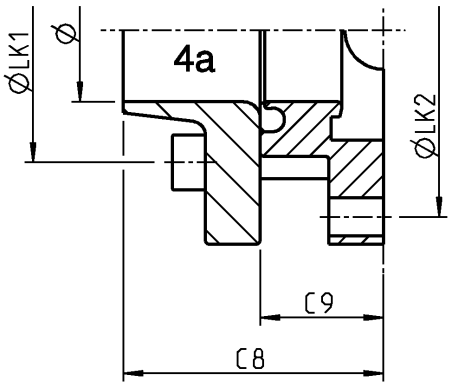


Fig.46

Item	Designation	Dimension	DN 15 0.5" OD	DN 20 0.75" OD	DN 25 1" OD	DN 40 1.5" OD	DN 50 2" OD
A1	Pneumatic actuator with T.VIS control top, installation dimension X	Ø B / DN Ø B / OD	78 78	78 78	78 78	87 84	103 101
		C	10	10	10	10	10
		D / actuator Ø	88.9	88.9	88.9	88.9	88.9
		H / DN H / OD	415 415	415 415	415 415	418.5 420	427 428
		Ø LK 1 DN Ø LK 1 OD	68 68	68 68	68 68	77 74	90 88
		Bolts DN Bolts OD	4x M6x30 4x M6x30	4x M6x30 4x M6x30	4x M6x30 4x M6x30	4x M6x30 4x M6x30	4x M8x30 4x M8x30
		X / DN X / OD	435 435	435 435	435 435	438.5 440	447 448
A2	Pneumatic actuator without control top, installation dimension X1	Ø B / DN Ø B / OD	78 78	78 78	78 78	87 84	103 101
		D / actuator Ø	88.9	88.9	88.9	88.9	88.9
		H1 / DN H1 / OD	253 253	253 253	253 253	256.5 258	265 265
		X1 / DN X1 / OD	273 273	273 273	273 273	276.5 278	285 286
A3	Manual actuator, installation dimension X2	Ø B / DN Ø B / OD	78 78	78 78	78 78	87 84	103 101
		Q	116	116	116	116	116
		H2 / DN H2 / OD	83 83	83 83	83 83	86.5 88	95 96
		X2 / DN X2 / OD	103 103	103 103	103 103	106.5 108	115 116
4a	Intermediate flange design	C8 DIN	47.5	47.5	47.5	47.5	47.5
		C8 OD	47.5	47.5	47.5	47.5	47.5
		C9 DIN	22.5	22.5	22.5	22.5	22.5
		C9 OD	22.5	22.5	22.5	22.5	22.5
		Ø LK 2/DN	68	68	68	77	90
		Ø LK 2/OD	68	68	68	74	88
		Bolts	2x M6x30	2x M6x30	2x M6x30	2x M6x30	2x M8x30
		Internal Ø DN	16	20	26	38	50
		Internal Ø OD	9.5	15.85	22.2	34.9	47.6
		Switch rod stroke	56	56	56	56	56
		Disc square	10	10	10	10	10

Item	Designation	Dimension	DN 65 2.5" OD	DN 80 3" OD	DN 100 4" OD	DN 125	DN 150
A1	Pneumatic actuator with T.VIS control top, installation dimension X	Ø B / DN Ø B / OD	120 116	135 128	155 160	191 --	219 --
		C	10	10	10	13	14
		D / actuator Ø	88.9	88.9	88.9	114.3	114.3
		H / DN H / OD	434.5 436.5	440.5 444	456.5 454	472 --	486 --
		Ø LK 1 DN Ø LK 1 OD	107 103	122 115	142 147	175 --	200 --
		Bolts DN Bolts OD	6x M8x30 4x M8x30	6x M8x30 6x M8x30	6x M8x30 6x M8x30	6x M10x40 --	8x M12x45 --
		X / DN X / OD	454.5 456.5	460.5 464	476.5 474	492 --	506 --
A2	Pneumatic actuator without control top, installation dimension X1	Ø B / DN Ø B / OD	120 116	135 128	155 160	191 --	219 --
		D / actuator Ø	88.9	88.9	88.9	114.3	114.3
		H1 / DN H1 / OD	272.5 274.5	278.5 282	294.5 292	310 --	324 --
		X1 / DN X1 / OD	292.5 294.5	298.5 302	314.5 312	330 --	344 --
A3	Manual actuator, installation dimension X2	Ø B / DN Ø B / OD	120 116	135 128	155 160	191 --	219 --
		Q	116	160	160	220	220
		H2 / DN H2 / OD	103 105	114.5 118	128 130.5	146 --	-- --
		X2 / DN X2 / OD	123 125	134.5 138	148 150.5	166 --	180 --
4a	Intermediate flange design	C8 DIN	47.5	47.5	47.5	55.0	60.0
		C8 OD	47.5	47.5	47.5	--	--
		C9 DIN	22.5	22.5	22.5	30.0	30.0
		C9 OD	22.5	22.5	22.5	--	--
		Ø LK 2/DN	107	122	142	175	200
		Ø LK 2/OD	103	115	147	--	--
		Bolts	4x M8x30	4x M8x30	2x M8x30	2x M10x35	2x M12x40
		Internal Ø DN	66	81	100	125	150
		Internal Ø OD	60.3	73	97.6	--	--
		Switch rod stroke	56	56	56	56	56
		Disc square	10	12	12	14	14

19 Dimension sheet - Hygienic butterfly valve/ seals

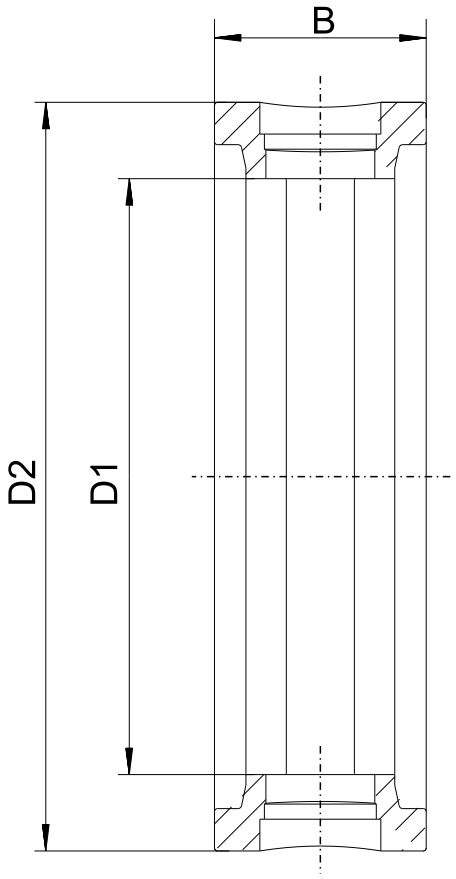


Fig.47: Dimension drawing BFV-7 seals

Nominal width	Material	Material	D1	D2	B
DN 15	EPDM	224-170.61	22.2	36.0	20.5
	FKM	224-170.75			
	HNBR	224-170.89			
	VMQ	224-173.05			
DN 20	EPDM	224-170.61	22.2	36.0	20.5
	FKM	224-170.75			
	HNBR	224-170.89			
	VMQ	224-173.05			
DN 25	EPDM	224-170.67	26.0	40.0	20.5
	FKM	224-170.81			
	HNBR	224-170.95			
	VMQ	224-173.11			
DN 40	EPDM	224-170.68	38.0	53.0	21.5
	FKM	224-170.82			
	HNBR	224-170.96			
	VMQ	224-173.12			
DN 50	EPDM	224-170.69	50.0	66.0	22.5
	FKM	224-170.83			
	HNBR	224-170.97			
	VMQ	224-173.13			
DN 65	EPDM	224-170.70	66.0	83.2	25.0
	FKM	224-170.84			
	HNBR	224-170.98			
	VMQ	224-173.14			
DN 80	EPDM	224-170.71	81.0	99.0	28.0
	FKM	224-170.85			
	HNBR	224-170.99			
	VMQ	224-173.15			
DN 100	EPDM	224-170.72	100.0	120.0	30.0
	FKM	224-170.86			
	HNBR	224-173.02			
	VMQ	224-173.16			
DN 125	EPDM	224-170.73	125.0	147.0	33.0
	FKM	224-170.87			
	HNBR	224-173.03			
	VMQ	224-173.17			
DN 150	EPDM	224-170.74	150.0	172.0	35.0
	FKM	224-170.88			
	HNBR	224-173.04			
	VMQ	224-173.18			

Nominal width	Material	Material	D1	D2	B
0.5" OD	EPDM	224-170.61	22.2	36.0	20.5
	FKM	224-170.75			
	HNBR	224-170.89			
	VMQ	224-173.05			
0.75" OD	EPDM	224-170.61	22.2	36.0	20.5
	FKM	224-170.75			
	HNBR	224-170.89			
	VMQ	224-173.05			
1" OD	EPDM	224-170.61	22.2	36.0	20.5
	FKM	224-170.75			
	HNBR	224-170.89			
	VMQ	224-173.05			
1.5" OD	EPDM	224-170.62	34.9	49.7	21.5
	FKM	224-170.76			
	HNBR	224-170.90			
	VMQ	224-173.06			
2" OD	EPDM	224-170.63	47.6	63.0	22.5
	FKM	224-170.77			
	HNBR	224-170.91			
	VMQ	224-173.07			
2.5" OD	EPDM	224-170.64	60.3	77.0	25.0
	FKM	224-170.78			
	HNBR	224-170.92			
	VMQ	224-173.08			
3" OD	EPDM	224-170.65	73.0	90.0	27.5
	FKM	224-170.79			
	HNBR	224-170.93			
	VMQ	224-173.09			
4" OD	EPDM	224-170.66	97.6	117.6	30.0
	FKM	224-170.80			
	HNBR	224-170.94			
	VMQ	224-173.10			

20 Appendix

20.1 Lists

20.1.1 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 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 [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] 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-forse 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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