Hygienic valves

GEA VARIVENT® Overflow Valve Q Type D Force

Operating instruction (Translation from the original language)

430BAL008550EN_4

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We kindly request that you answer a few short questions about these Operating Instructions. Use the following QR code or link to access the questionnaire:

https://www.ntgt.de/ra/s.aspx?s=367112X57707125X58087

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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

GEA engineering for a better world

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:	Valve with actuator
Type:	VARIVENT®

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

Relevant EC directives:	2006/42/EC	EC Machinery Directive
Applicable harmonized standards, in particular:	EN ISO 12100: 2010	

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

Person authorised for compilation and handover of technical documentation:

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

Büchen, 24 January 2020

Franz Bürmann
Managing Director

pp. Matthias Südel
Head of Engineering

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

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

We hereby declare that the machine named below

Designation:	Valve with actuator
Type:	VARIVENT®

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

Relevant EC directives:	2006/42/EC	EC Machinery Directive
Applicable harmonized standards, in particular:	EN ISO 12100: 2010	

Remarks:

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

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

Büchen, 24 January 2020

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:	VARIVENT®

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

Relevant 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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Büchen, 14 March 2023

Franz Bürmann
Managing Director

i.V. Matthias Südel
Senior Director Engineering

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2 Safety

2.1 Intended use

The Q and Q overflow valves type D-Force are used for overpressure protection in pipeline sections.

The medium must flow in the opening direction of the valve disk, so that the valve can open automatically in case of excess pressure.

The valve Q type D-Force can be opened for cleaning. In addition, the preset response pressure can be changed pneumatically with the valve Q type D-Force.

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 is borne solely by the operating company.

2.1.1 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.

2.2 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 Signs

Hazardous locations on the component are marked by warning labels, prohibition signs and mandatory signs.

The signs and instructions on the component must always be legible. Any illegible signs must be replaced immediately.

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

2.8 Residual dangers

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

Residual dangers on the valve and measures		
Danger	**Cause**	**Measure**
Danger to life	Inadvertent switch-on of the valve	Effectively disconnect all components, effectively prevent switch-on.
	Electric power	Observe the following safety rules: 1. Isolate from the power supply. 2. Take appropriate measures to prevent switch on. 3. Test absence of voltage. 4. Earthing and short-circuiting. 5. Cover or safeguard any adjacent live parts.
	Spring tension in the actuator	Danger to life caused by compression spring in the actuator. Do not open the actuator but return it to GEA Tuchenhagen for proper disposal.
Risk of injury	Danger presented by moving or sharp-edged parts	The operator must exercise caution and prudence. For all work: • Wear suitable work clothing. • Never operate the machine if the cover panels are not correctly fitted. • Never open the cover panels during the operation. • Never reach into openings. As a precautionary measure, wear personal protective equipment in the vicinity of the valve: • Protective gloves • Safety shoes
Environmental damage	Operating materials with properties which are harmful to the environment	For all work: • Collect lubricants in suitable containers. • Dispose of lubricants in accordance with the pertinent regulations.

2.9 Danger zones

Please observe the following notes:

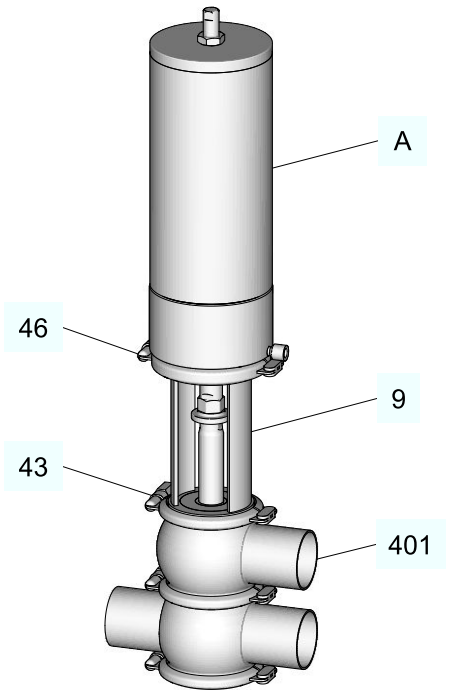


Fig.4

- In the event of malfunctions, shut down the valve (disconnect from the power and air supply) and secure it against being used.
- Never reach into the lantern (9) or the valve housing (401) when the valve is switching. Fingers can be crushed or cut off.
- On a spring-closing valve there is danger of injury when the clamp connection (43, 46) is opened, as the released spring pretension will suddenly lift the actuator. Therefore, release the spring tension before detaching the clamp connection (43, 46) by supplying the actuator (A) with compressed air.
- 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.
- The housing sockets have very sharp edges. When transporting and assembling the valve be sure to wear suitable protective gloves.

3 Description

3.1 Design

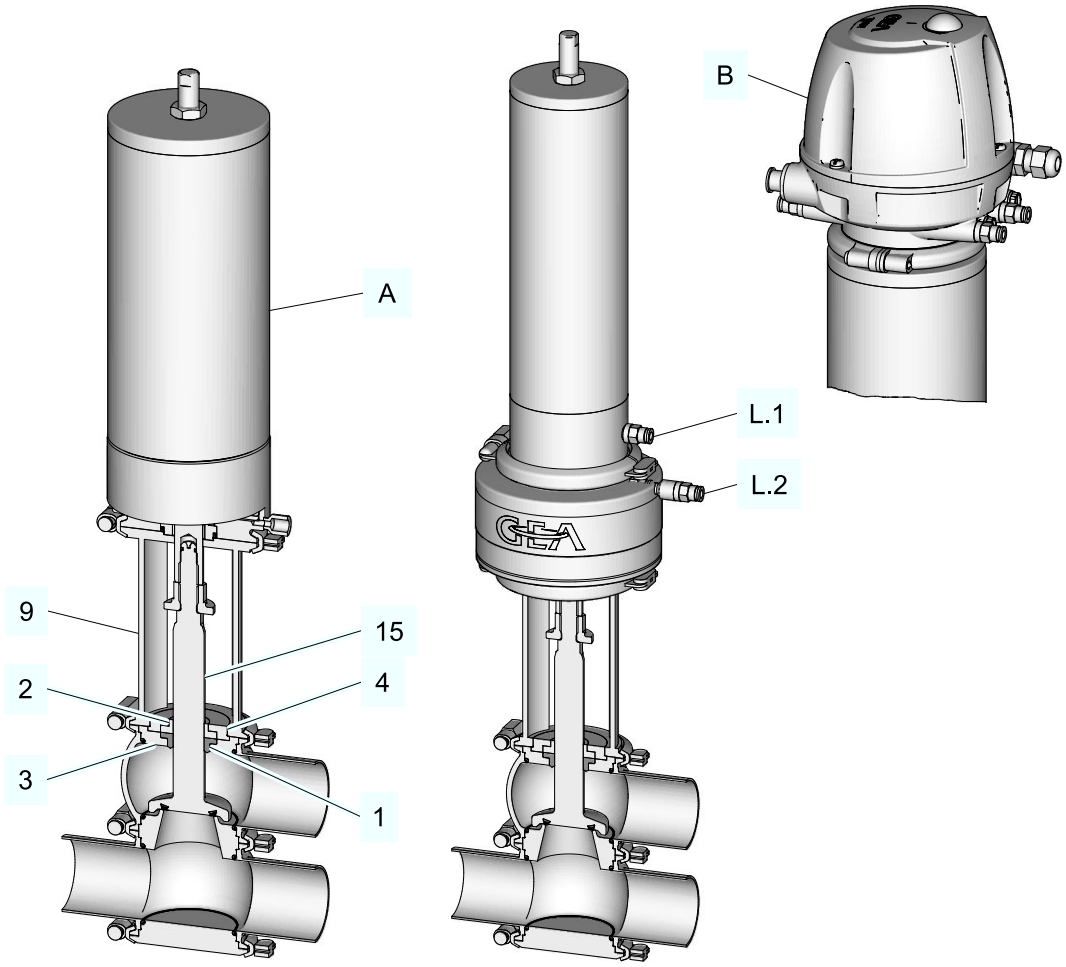


Fig.5

Design	
No.	**Designation**
A	Actuator
B	T.VIS control top
1	Seal ring
2	Bearing
3	Seal disk
4	Bearing disk
9	Lantern
15	Valve disk
L.1	Air connection to open, valve type F-CJ
L.2	Air connection to close, valve type F-CJ

3.2 Functional description

3.2.1 Valve Q

Closing Direction

Closing direction: from top to bottom

Standard: spring-to-close

Identification on the T.VIS Q-15 control top once the installation (SET-UP) has been completed:

- Valve in non-actuated position: green
- Downforce activated: yellow
- Lift: flashing yellow
- Programming mode active: red
- Error/malfunction: rapidly flashing red
- Flashing (1) yellow: Valve lifted

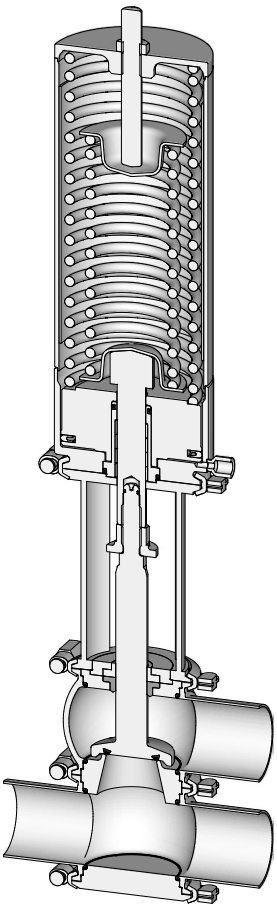


Fig.6

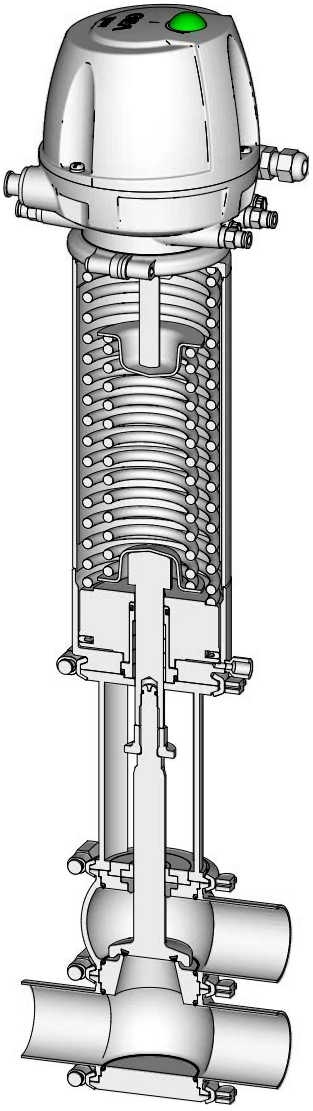


Fig.7

Actuator F with Adjustable Spring

- Valve opens when the set opening pressure is exceeded

Actuator M with Adjustable Spring and Integrated Pneumatic Actuator

- Valve opens when the set opening pressure is exceeded
- Valve can be lifted pneumatically, e.g. for cleaning

Actuator F-CJ – Type D-Force with Adjustable Spring and Integrated Pneumatic Actuator

- Valve opens when the set opening pressure is exceeded
- Valve can be lifted pneumatically, e.g. for cleaning
  A greater locking force can be achieved by applying air.

3.2.2 Possible Response Pressure Settings

The versions are available with different spring packages. For the selection of the suitable actuator see the following tables:

Response pressure actuators F and M							
Nominal width		**Response pressure (bar)**					
Metric	**Inch OD/IPS**	**F11 / M11**	**F21 / M21**	**F1 / M1**	**F2 / M2**	**F3 / M3**	**F4 / M4**
25	1" OD	1.5 - 4.5	3 - 9	8 - 16	--	--	--
40	1.5" OD	--	1.5 - 2	1.5 - 5	4 - 15	14 - 16	--
50	2" OD	--	--	1.5 - 4	3 - 11	10 - 16	--
65	2.5" OD	--	--	--	1 - 4	3 - 10	9 - 15
80	3" OD	--	--	--	1 - 4	3 - 10	9 - 10
100	4" OD	--	--	--	0.5 - 1.5	0.5 - 4	3 - 7

Response pressure actuator F-CJ					
Nominal width		**Response pressure (bar)**			
Metric	**Inch OD/IPS**	**F1-CJ**	**F2-CJ**	**F3-CJ**	**F4-CJ**
25	1" OD	8 - 16	--	--	--
40	1.5" OD	1.5 - 5	4 - 15	14 - 16	--
50	2" OD	1.5 - 4	3 - 11	10 - 16	--
65	2.5" OD	--	1 - 4	3 - 10	9 - 15
80	3" OD	--	1 - 4	3 - 10	9 - 10
100	4" OD	--	0.5 - 1.5	0.5 - 4	3 - 7

Control air pressure required to open the valve						
Nominal width	**Response pressure (bar)**					
	M11	**M21**	**M1 / F1-CJ**	**M2 / F2-CJ**	**M3 / F3-CJ**	**M4 / F4-CJ**
Actuator M	3	3	3	4	3	5
Actuator F-CJ	--	--	3	3	4	6.5

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.
- 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

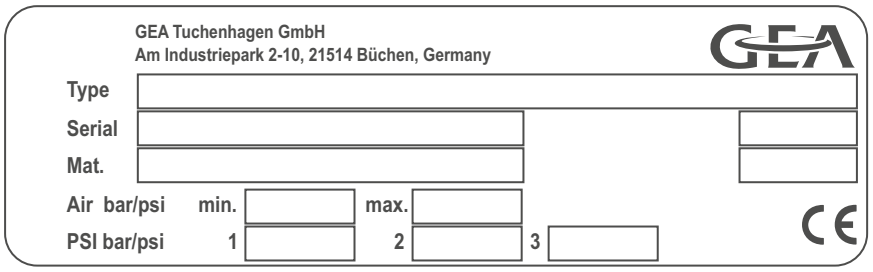
After taking delivery of the component, check if

- 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.



The type plate provides the following key data:

Key data of the valve	
Type	Overflow valve type Q
Serial	Serial number
Material	1.4404 (AISI 316L) / EPDM (FDA)
Control air pressure bar/psi	6.0 / 87
Product pressure bar/psi	5.0 / 72.5

5.2 Technical data

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

Technical data: Valve	
Designation	**Description**
Size	DN 25 to DN 100 1" to 4" OD 2" to 4" IPS
Material of product contact parts	Stainless steel 1.4404
Fitting position	Vertical

Technical data: Ambient temperatures	
Designation	**Description**
Valve	0 to 45 °C (32 ... 113 °F), standard < 0 °C (32 °F): Use control air with low dew point. Protect valve rods against freezing.
Control top T.VIS Q-15	-20 to +55°C (-4 to +131°F)
Product temperature and operating temperature	depending on the sealing material

Technical data: Compressed air supply, control air pressure and product pressure	
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
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, preferably oil free, max. 1 mg oil to 1 m^3 air
Control air pressure	see table in chapter Section 3.2.2, Page 21 max. 8 bar
Product pressure	see table in chapter Section 3.2.2, Page 21

5.3 Resistance and permitted operating temperature of the sealing materials

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

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

Due to the varied operating conditions (e.g. duration of use, switching frequency, type and temperature of product and cleaning agents as well as operating environment), GEA Tuchenhagen recommends carrying out resistance tests by the user.

Resistance:

- + = good resistance
- o = reduced resistance

- - = no resistance

Table sealing reasistance / permitted operating temperature				
Medium	**Maximum operating temperatures**	**Sealing materials**		
		EPDM	**FKM**	**HNBR**
Alkalis up to 3%	up to 80 °C (176°F)	+	o	+
Alkalis up to 5%	up to 40 °C (104°F)	+	o	o
Alkalis up to 5%	up to 80 °C (176° F)	+	–	–
Alkalis more than 5%		o	–	–
Inorganic acids up to 3%	up to 80 °C (176°F)	+	+	+
Inorganic acids up to 5%	up to 80 °C (176°F)	o	+	o
Inorganic acids up to 5%	up to 100 °C (212°F)	–	+	–
Water	up to 100 °C (212°F)	+	+	+
Steam	up to 135 °C (275° F)	+	o	o
Steam, approx. 30 min	up to 150 °C (320°F)	+	o	–
Steam, approx. 30 min	up to 160 °C (320°F)	–	o	–
Fuels/hydrocarbons		–	+	+
Product with a fat content of max. 35%		+	+	+
Product with a fat content of more than 35%		–	+	+
Oils		–	+	+

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

5.4 Pipe ends - General table of measurements

Hint!

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

Dimensions for Pipes in DN				
Metric DN	**Outer diameter**	**Wall thickness**	**Inner diameter**	**Outer diameter according 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

Dimensions for Pipes in Inch OD				
Inch OD	**Outer diameter**	**Wall thickness**	**Inner diameter**	**Outer diameter according 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

Dimensions for Pipes in Inch IPS				
Inch IPS	**Outer diameter**	**Wall thickness**	**Inner diameter**	**Outer 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

5.5 Tool

Tool	Material no.
Belt wrench	408-142
Open-ended wrench, ends ground, a/f 17-19	229-119.01
Open-ended wrench, ends ground, a/f 21-23	229-119.05
Open-ended wrench, ends ground, a/f 22-24	229-119.03
Open-ended wrench, a/f 30-32	408-041
Scriber	414-001
Hose cutter	407-065

Tool	Material no.
Vice support	470-001
Allen key for tightening the installation base	408-448
V-ring insertion tool	229-109.88

5.6 Lubricants

Lubricants	
Lubricant designation	**Material no.**
Rivolta F.L.G. MD-2 (1000 g)	413-071
Rivolta F.L.G. MD-2 (100 g)	413-136

5.7 Weights

Valve Without Actuator	
Size	**Weight [kg]**
DN 25, 1"	approx. 2.0
DN 40, 1.5"	approx. 2.6
DN 50, 2"	approx. 2.7
DN 65, 2.5"	approx. 4.0
DN 80, 3"	approx. 5.5
DN 100, 4"	approx. 7.0

Actuator type M	
Size	**Weight [kg]**
M 11	5.3
M 21	5.4
M 1	7.4
M 2	7.5
M 3	8.9
M 4	9.2

Actuator type F	
Size	**Weight [kg]**
F 11	1.6
F 21	1.9
F 1	2.7
F 2	2.8

Actuator type F	
Size	**Weight [kg]**
F 3	3.2
F 4	3.6

D-Force Actuator Type F-CJ	
Size	**Weight [kg]**
F 1-CJ (D-Force)	11.8
F 2-CJ (D-Force)	11.9
F 3-CJ (D-Force)	12.3
F 4-CJ (D-Force)	12.7

6 Assembly and installation

6.1 Safety instructions

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

For installation, the following principles apply:

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

6.2 Notes on installation

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

To prevent damage, make sure that

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

6.3 Valve with Detachable Pipe Connection Elements

This section describes the procedure to fit the valve.

⚠ Caution!

Liquids in pipes

Danger of injury due to liquid spraying out

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

Carry out the following steps:

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

→ Valve is installed.

6.4 Valve with welded ends

This section describes the welding procedure for the valve housing.

Warning!

Spring tension in the valve

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

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

Notice

Seals are wearing parts

Old seals will cause malfunction of the valve

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

Carry out the following steps:

1. Release the spring tension.
2. Remove the valve insert, see chapter Section 10.5, Page 42.
3. Weld the housing, without gaskets, into position, ensuring that the connection is free of stress.
4. Fit the housing into place and tack it.
5. To avoid welding distortions, always seal the housing before welding.
6. Flush the housing with forming gas from the inside to push the oxygen out of the system.
7. Weld the housing into the pipe system; use welding filler if necessary. When technically possible, use the WIG-orbital welding process with pulse configuration, according to guidelines EHEDG documentation. 35.
8. Passivate the seam after welding.
9. Assemble the valve and vent the actuator.
10. Fit the seals.

    → The valve disk is lowered.

→ Install the valve with welded ends.

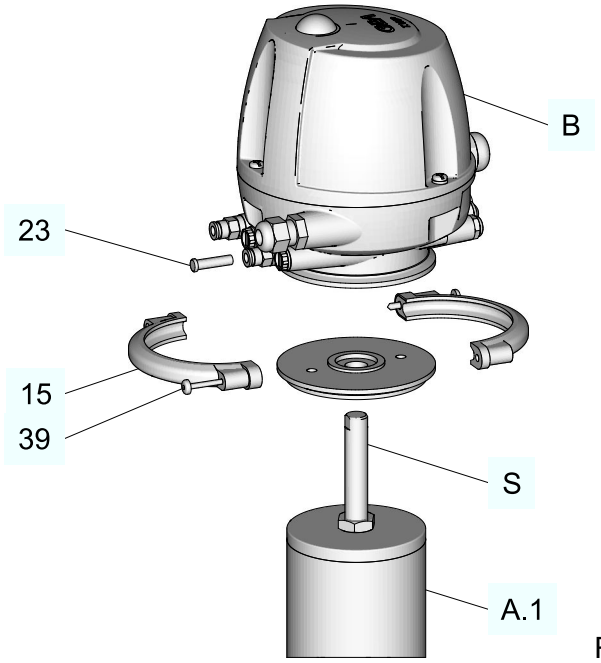
Hint!

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

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

6.5 Installation on overflow valve

This chapter describes how the control top is installed on VARIVENT overflow valves (also with lifting actuator).



Requirement:

- Pay attention not to kink the air hoses when mounting the control top.

Carry out the following steps:

1. In order to mount the installation base T.VIS on the Q-valve, the pin screw (S) must be screwed completely out of the valve. The installation base cannot be screwed on until this has been done. Then the pin screw together with the installation base must be screwed back into the valve. When screwing, note that the spring force acting on the valve disk can change due to the pin screw (S) rotating. (see operating manual Q-valve)
2. Set the required response pressure.
3. Tighten the installation base using a face spanner.
4. Fit the control top (B) over the pin screw (S) on the actuator (A.1).
5. Tighten the clamps (15) and screws (39) to a torque of 1Nm (0.7 lbft).
6. Align the pneumatic and electrical connections in accordance with the valve block configuration.

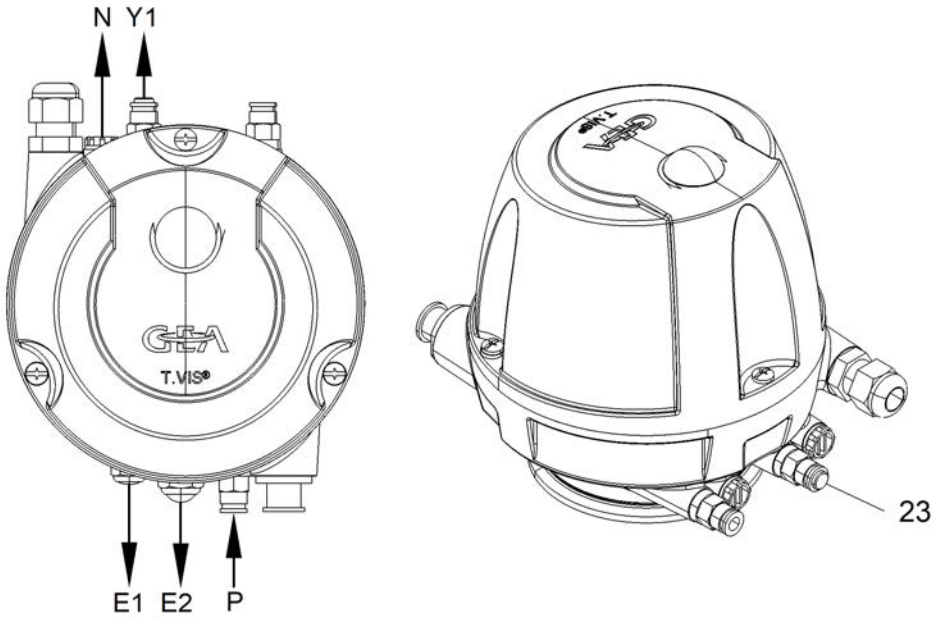


Fig.8

7. Carry out commissioning, refer to Chapter 6, Page 29 and Chapter 7, Page 35 as well as the operating manual for T.VIS Q-15 / 430BAL015251.

→ Done.

6.6 Pneumatic connections

6.6.1 Air Requirement

Actuator Ø [mm]	**Air requirement (dm^3_n/Stroke) dm^3_n at 1.01325 bar at 0 °C as per DIN 1343**	**Use**
98	0.16	DN 25 - DN 100 1" - 4" OD, 2" - 4" IPS
109	0.26	
135	0.42	
170	0.70	
210	1.10	
170	1.60	
210	2.00	
210	2.20	

6.6.2 Establishing hose connections

To ensure reliable operation, the compressed air hoses must be cut exactly at a right angle.

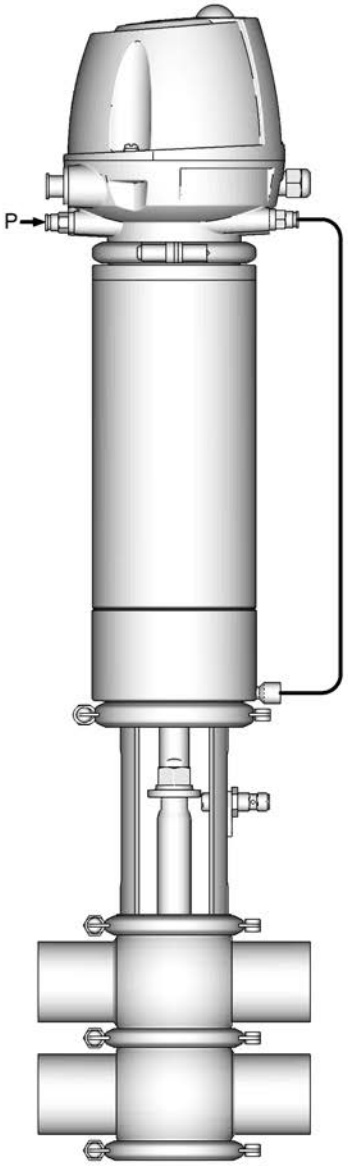


Fig.9

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 at a right angle.
3. Push the air hose into the air connector on the control top.
4. Re-open the compressed air supply.

→ Hose connection has been established.

6.7 Electrical connections

Danger

Live parts

Electrical shocks can cause serious personal injuries or death..

► Only allow properly qualified staff to work on the electrical equipment.
► Prior to establishing electrical connections, check the maximum permissible operating voltage.

Danger

Explosive gases or dusts

An explosion can cause serious personal injuries or death.

► Observe the installation and operating regulations for use in potentially explosive areas!

Prerequisites:

- Valve is installed.

Carry out the following steps:

1. Connect the control top in accordance with the connection diagram and the instructions in the operating instructions for T.VIS Q-15 control tops.

   → Control top is connected.

Hint!

The initiator is set ex-works. Settings can become changed during transport and installation and the initiator may need to be reset, see the instruction manual for the control top T.VIS Q-15 / 430BAL015251.

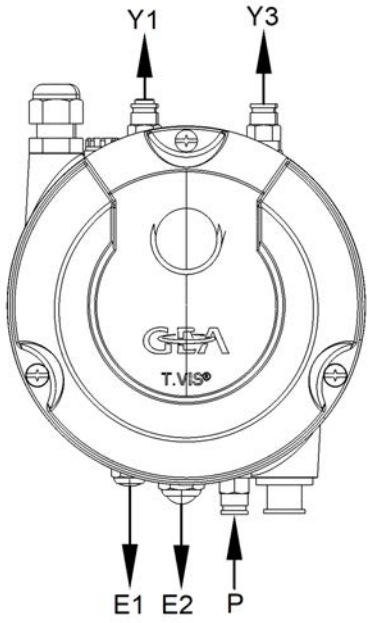


Fig.10

7 Start-up

7.1 Safety notes

Initial commissioning

For initial commissioning, the following principles apply:

- Carry out protective measures against dangerous contact voltages in accordance with the applicable regulations.

  Reliably secure sections of the plant which have already been connected against inadvertently being switched on.
- Completely assemble the component and then adjust it. All screw connections must be securely tightened.
- Relubricate all lubricating points. Make sure lubricants are used properly.

Commissioning

For commissioning, the following principles apply:

- Allow only qualified personnel to commission the components.
- Make sure all connections are properly established.
- Remove any liquids that have escaped without leaving residues.
- Check the function before starting any work. The safety devices on the component must be completely installed, in working order and function properly.
- When switching on the component, the danger zones must be clear.

7.2 Commissioning activities

Carry out the following activities before commissioning:

- Only for actuator types M and F-CJ: Actuate the valve once by applying compressed air.
- Clean the pipe system prior to the first product run.
- Make sure that there are no foreign objects in the system.
- 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. Depending on the cleaning method (medium, concentration, temperature and contact times), the seals are affected to different degrees. This can impair the function and the service life.

9.2 Passivation

Before commissioning a plant, passivation is commonly carried out for long pipes and tanks. Valve blocks are usually excepted from this.

Passivation is typically performed using nitric acid (HNO_3) at approx. 80 °C (176 °F) at a concentration of 3 % and a contact time of 6 to 8 hours.

The ultimate temperatures, chemicals, concentrations and contact time to be used must be determined by the plant operator along with its chemical supplier.

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 22.

10.2 Inspections

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

10.2.1 Product contact seals

Carry out the following steps:

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

→ Done

10.2.2 Pneumatic connections

Carry out the following steps:

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

→ Done

10.2.3 Checking the electrical connection

Prerequisites:

- Access to the electrical connection.

Carry out the following steps:

1. Check that the cap 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.

   → The electrical connection has been checked.

Hint!

The electrical cable must be long enough to allow the control top to be removed via the spindle!

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

Requirement:

- Make sure that during maintenance and servicing work no process is in operation in the area concerned.
- Before turning out the pin screw, mark the position of the screw with a pencil for later assembly.

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 Q

10.5.1 Removing the control top

Tools required:

- Hex socket key

Carry out the following steps:

1. Unscrew the screws (B11) of the half-rings (B12) using a hex key, size 3, and remove the half-rings (B12).
2. Lift off the control top (B), also refer to the operating instructions for the "T.VIS Q-15 / 430BAL015251 control top".

→ The control top has been removed.

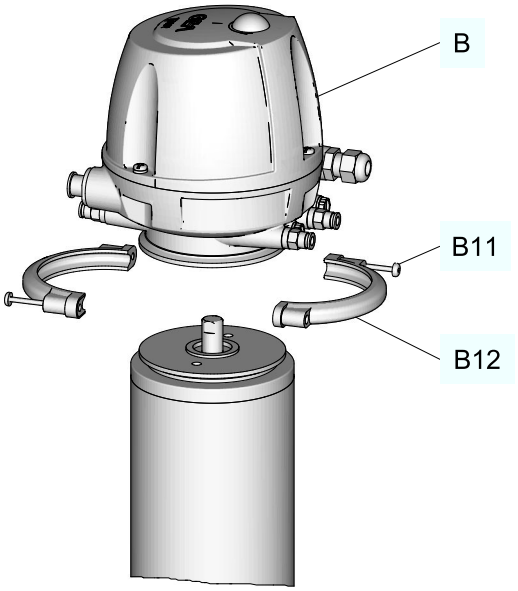


Fig.11

10.5.2 Disconnecting the Valve from the Housing

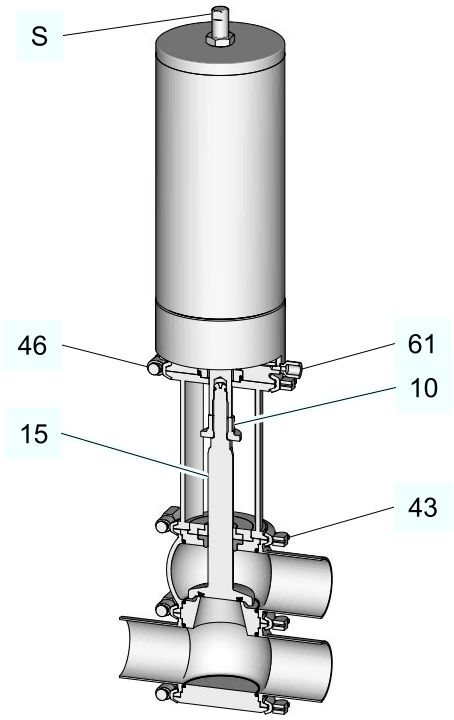


Fig.12

⚠ Warning!

Spring tension in the valve

Danger of injury when detaching the clamp connections (46, 43) as the released spring pretension will suddenly lift the actuator.

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

Notice

The valve disk (15) is a sensitive component.

Damage to this part can result in malfunctions.

► When the valve is pulled out, the stem of the valve disk (15) must not hit the valve housing!

► Do not set the valve insert down on the valve disk but lay it down.

Actuators M and F-CJ

Carry out the following steps:

1. Vent actuator at connection (61) with compressed air, max. 8 bar.

   → The valve disc (15) is raised.

2. Remove the clamp connection (43).
3. Vent the actuator.
4. Carefully draw the valve out of the housing.

→ The valve is now separated from the housing.

Actuator F

Carry out the following steps:

1. Unscrewing the pin screw (S)
2. Remove the clamp connection (43).
3. Carefully draw the valve out of the housing.

→ The valve is now separated from the housing.

10.5.3 Removing the Valve Disk

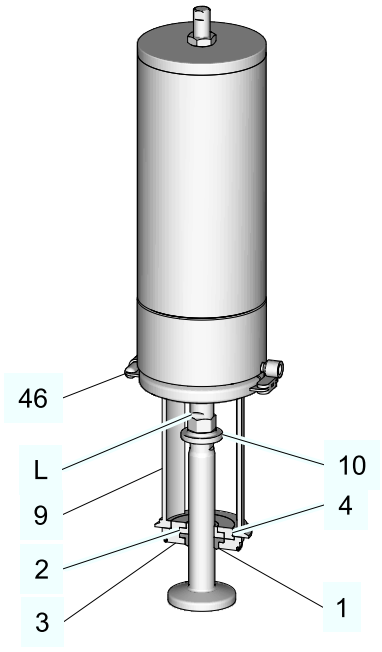


Fig.13

Notice

Sensitive valve parts

Damage to these parts can result in these parts malfunctioning.

► Protect the valve parts against impact stress.
► Do not set the valve insert down on the valve disk but lay it down.

Carry out the following steps:

1. Release the clamp connection (46) but do not remove it.
2. Place an open end spanner on the spanner flat (L), another open end spanner on the spacer nut (10) and detach the valve disk from the actuator.
3. Unscrew the valve disk together with the bearing disk (3), the bearing (2), the seal ring (1) and the seal disk (4).

! The bearing disk (3) and the seal disk (4) must not hit the rod of the valve disk when the valve disk is withdrawn.

4. Unscrew the spacer nut (10) from the valve disc using 2 open-ended wrenches.

5. Pull off the bearing disk (3) with the bearing (2) and the sealing washer (4) with the gasket (1) from the valve disk.
6. Remove the clamp connection (46) between the lantern and the actuator.
7. Remove the lantern (9).

→ This completes removal of the valve disk.

10.6 Maintenance

10.6.1 Cleaning the Valve

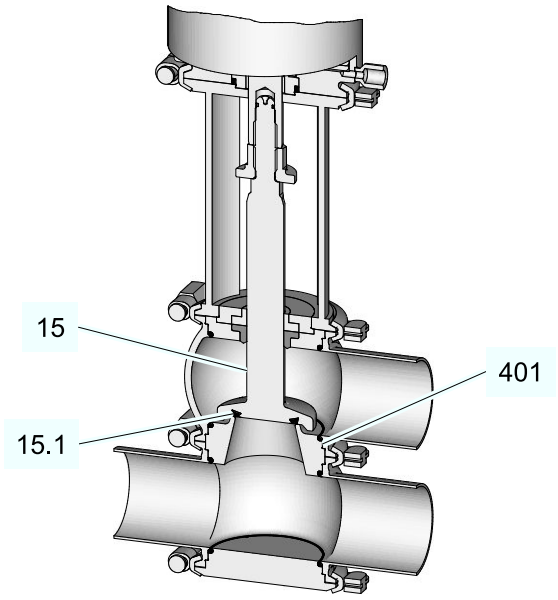


Fig.14

Notice

The rod of the valve disk (15), the housing seat (401), and the V-ring groove are precision parts.

Damage to these parts can result in malfunction.

► Handle the valve with care!

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.

1. Carry out the following steps:

   Dismantle valve see, and .
2. Carefully clean the individual parts.

→ Done

10.6.2 Replacing the V-Ring

Hint!

Replace defective seals, but always fit new housing O-rings to ensure the tightness of the valve. Always use original spare parts.

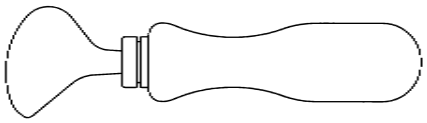


Fig.15: V-ring insertion tool

Prerequisite:

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

Tools required:

- V-ring insertion tool

Caution!

Danger of injury!

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

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

Carry out the following steps:

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

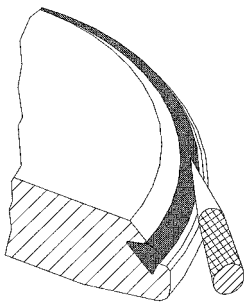


Fig.16

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

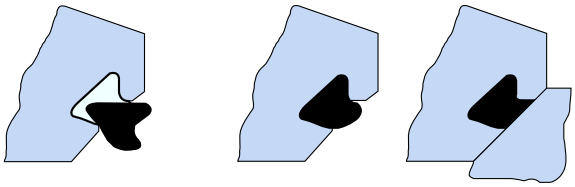


Fig.17

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

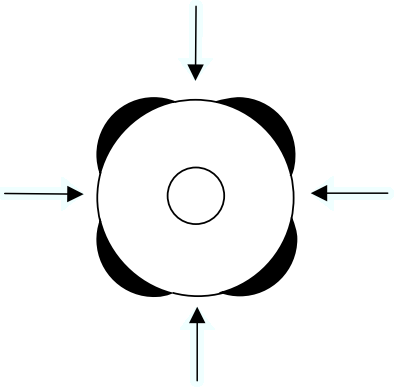


Fig.18

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

→ Done

Hint!

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

10.6.3 Lubricating Seals and Threads

⚠ Caution!

Damage to seals and threads

Damage to seals and threads can result in malfunction.

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

Carry out the following steps:

1. Lightly grease the valve disk thread.
2. Grease all seals – including the O-rings at the top and bottom of the actuator piston rod – very thinly.

! Do not grease the V-ring

→ Done

Hint!

GEA Tuchenhagen recommends Rivolta F.L.G. MD-2 This lubricant is food grade, beer foam resistant and has NSF-H1 (USDA H1) registration. It does not affect the taste or the consistency of the products and is compatible with the seals in contact with product.

Rivolta F.L.G. MD-2 can be ordered under material no. 413-071 (1000 g can) or 413-136 (100 g tube) 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!

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 Setting the Response Pressure

Requirement:

- The valve is used to discharge an overpressure in the lower valve housing or from the vertical housing connection.
- Install the valve in the pipeline.
- The desired set pressure must be determined with a pressure gauge in the line.

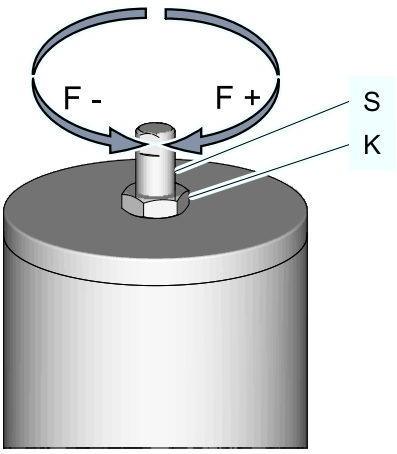


Fig.19

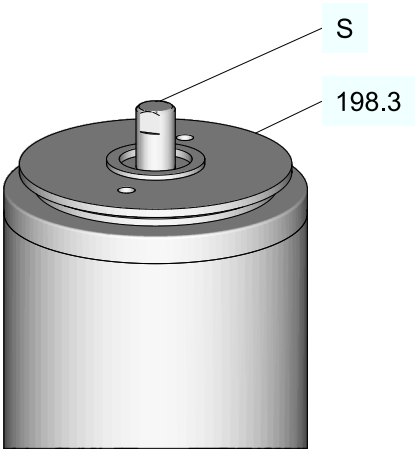


Fig.20

For variants without T.VIS

Carry out the following steps:

1. Release the lock nut (K).
2. Turn the pin screw (S) to change the spring force acting on the valve disk.

→ Turn clockwise:

The spring force is increased and which results in an increase in the response pressure.

→ Turn counter-clockwise:

The spring force is decreased which results in a decrease in the response pressure.

3. Set the required response pressure.
4. Tighten counter nut (K).
5. Check the required response pressure on the pressure gauge and repeat the procedure if necessary.

→ Done

For variants with T.VIS

Carry out the following steps:

1. Loosen the installation base (198.3).
2. Turn the pin screw (S) to change the spring force acting on the valve disk.

→ Turn clockwise:

The spring force is increased and which results in an increase in the response pressure.

→ Turn counter-clockwise:

The spring force is decreased which results in a decrease in the response pressure.

3. Set the required response pressure.
4. Tighten the installation base (198.3).
5. Check the required response pressure on the pressure gauge and repeat the procedure if necessary.

→ Done

10.7.2 Install valve Q with actuator F-CJ type D-Force

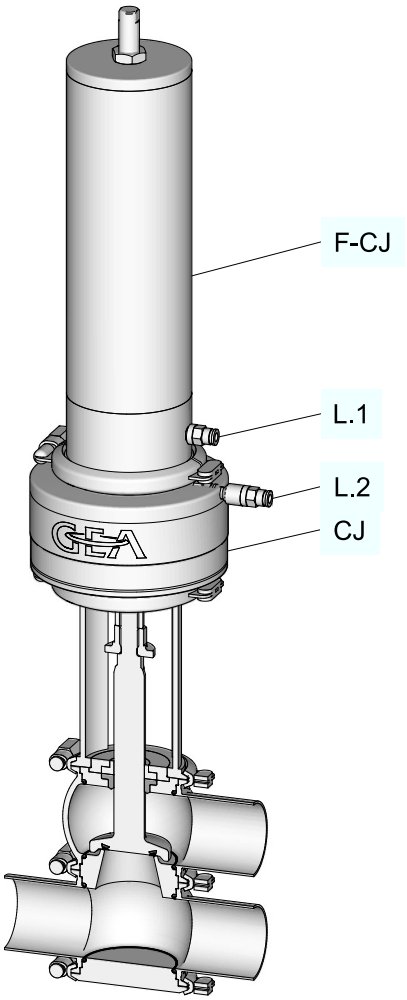


Fig.21

Carry out the following steps:

1. Fit actuator CJ with air connection at the top of the lantern.
2. Screw rod F-CJ into actuator CJ.
3. Fit actuator F-CJ on actuator CJ.
   - L.1 Air connection for full stroke
   - Air connection for keeping-shut function

→ Done

10.7.3 Function Check of Actuator M

Carry out the following steps:

1. Actuate the valve with compressed air.

→ Done

10.7.4 Torques for the Clamp Connections

Tighten the clamp connections and semi-rings of the valve to the torques specified in the table.

Tightening torques required			
Torques		**Nm**	**lbft**
Clamp connection cast half rings	M6	9	6.6
Clamp connection cast half rings	M8	22	16.2
Cast clamps	M10	45	33

11 Alarms

11.1 Malfunctions and remedies

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

Malfunction	Cause	Remedy
Valve with actuator M or F-CJ does not work	Fault in the control system	Check the system configuration
	No compressed air or compressed air too low	Check compressed air supply and check air hoses for free passage and air tightness
	Fault in the electrical system	Check actuation / external controller and routing of electrical lines
	Solenoid valve defective	Replace the solenoid valve
Valve does not close	Dirt/foreign material between valve seat and valve disk	Clean valve housing and valve seat
	V-rings defective	Replace the V-rings
	Seat defective	Replace the seat
Valve closes too slowly	O-rings in actuator and control top are dry (friction losses)	Grease O-rings and sealing rings
Leakage in the area of the valve housing	Housing O-rings defective	Valve disassembly - Housing Replace the O-Ring
Leakage in the lantern	Seal ring defective	Replace the gasket
Does not respond when the pressure is elevated	Valve set incorrectly	Setting the Response Pressure
Response pressure too high	Seals dry	Grease the seals
Actuator making loud noise	Spring or spring plate broken	Replace the spring
Valve with actuator F-CJ does not close properly	Friction too high	Shut valve briefly by air support

12 Decommissioning

12.1 Safety instructions

For shutting down, the following principles apply:

- Switch off the compressed air.
- Switch off the component with the main switch.
- Padlock the main switch (if fitted) in the off position to prevent it from being switched back on. The key to the padlock must be deposited with the person responsible until the machine is restarted.
- For longer periods of standstill, observe the storage conditions, see Chapter 4, Page 22.

12.2 Disposal

12.2.1 General notes

Dispose of the 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 Spare parts list – overflow valve Q

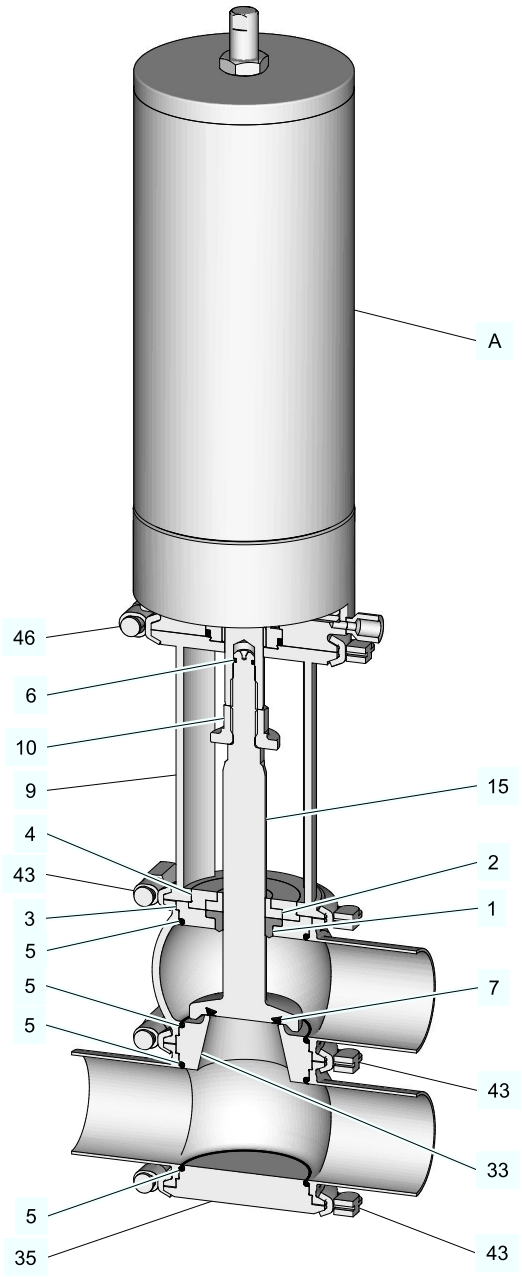


Fig.22

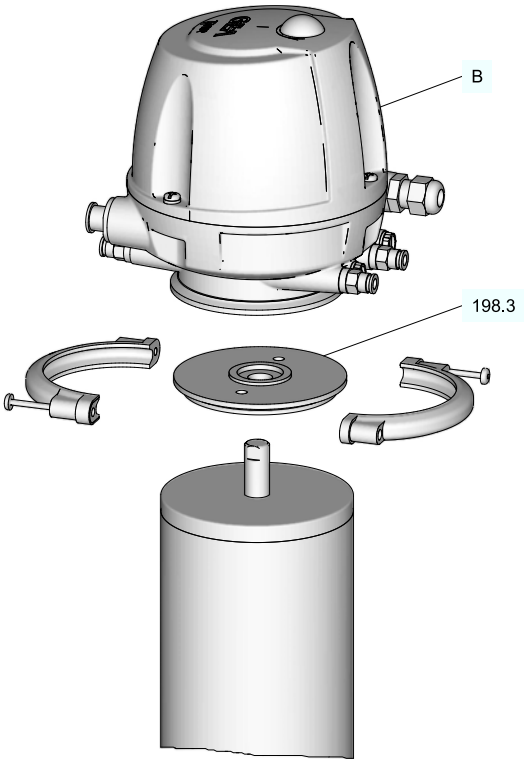


Fig.23

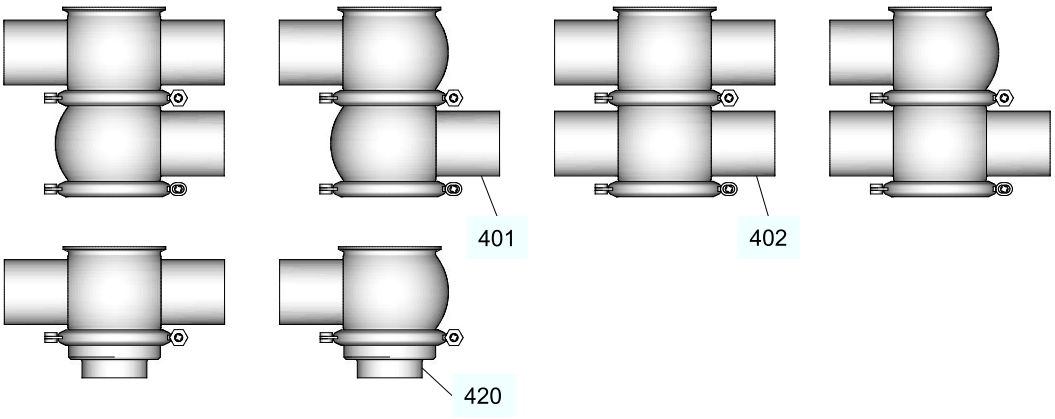


Fig.24: Housing combinations

Item	Designation	Material	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100
Seal set complete 1)		EPDM	221-304.39	221-304.40	221-304.40	221-304.41	221-304.41	221-304.42
		FKM	221-519.49	221-519.50	221-519.50	221-519.51	221-519.51	221-519.52
		HNBR	221-519.62	221-519.63	221-519.63	221-519.64	221-519.64	221-001019
1*	Seal ring	EPDM	924-084	924-084	924-084	924-085	924-085	924-085
		FKM	924-082	924-082	924-082	924-083	924-083	924-083
		HNBR	924-311	924-311	924-311	924-313	924-313	924-313
2	Bearing	PTFE/ carbon	935-001	935-001	935-001	935-002	935-002	935-002
	Bearing, 3A	SUSTA-PVDF	935-098	935-098	935-098	935-099	935-099	935-099
3	Seal disk	1.4404	221-141.01	221-141.02	221-141.02	221-141.03	221-141.03	221-141.04
4	Bearing disc	1.4301	221-142.01	221-142.02	221-142.02	221-142.03	221-142.03	221-142.03
5*	O-ring	EPDM	930-309	930-144	930-144	930-150	930-150	930-156
		FKM	930-168	930-171	930-171	930-176	930-176	930-178
		HNBR	930-632	930-633	930-633	930-634	930-634	930-863
6*	O-ring	NBR	930-004	930-004	930-004	930-004	930-004	930-004
**7*	V-ring	EPDM	932-058	932-046	932-046	932-021	932-021	932-025
		FKM	932-049	932-030	932-030	932-033	932-033	932-036
		HNBR	932-086	932-087	932-087	932-088	932-088	932-101
9	Lantern	1.4301	221-574.01	221-574.02	221-574.02	221-574.03	221-574.03	221-574.04
10	Spacer nut	1.4301	221-147.02	221-147.02	221-147.02	221-147.01	221-147.01	221-147.01
15	Valve disk Q	1.4404	221-266.01	221-266.02	221-266.02	221-266.03	221-266.05	221-266.04
	Valve disk Q-MET***	1.4404	221-339.05	221-339.01	221-339.01	221-339.02	221-339.03	221-339.04
33	Seat ring Q	1.4404	221-274.01	221-274.02	221-274.02	221-274.03	221-274.03	221-274.04
35	Blanking plate	1.4404	221-144.01	221-144.02	221-144.02	221-144.03	221-144.03	221-144.04
43	Clamp connection KL	1.4401	221-507.02	221-507.04	221-507.04	221-507.09	221-507.09	221-507.11
46	Clamp connection KL	1.4401	221-507.06	221-507.06	221-507.06	221-507.06	221-507.06	221-507.06
198.3	Installation base	1.4305	221-007461	221-007461	221-007461	221-007461	221-007461	221-007461
401	Housing V1	1.4404	221-101.19	221-101.21	221-101.22	221-101.05	221-101.06	221-101.07
402	Housing V2	1.4404	221-102.41	221-102.43	221-102.44	221-102.05	221-102.06	221-102.07
420	Housing connection Q	1.4404	221-572.02	221-572.04	221-572.06	221-572.09	221-572.11	221-572.14
A	Actuator F/F-CJ		See parts list for actuator F/F-CJ					
	Actuator M		See parts list for actuator M					
B	Control top T.VIS Q-15		See spare parts list for Control Top T.VIS P-15					
Grease RIVOLTA F.L.G. 100g tube not included with seal set.					413-136			

** Do not grease Item 7
*** Q-MET > metal sealing (without V-ring)
1) The seal set includes items 1, 5, 6 and 7
Items marked with an * are wearing parts

Item	Designation	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
Seal set complete 1)		EPDM	221-304.39	221-304.40	221-304.40	221-304.41	221-304.41	221-304.42
		FKM	221-519.49	221-519.50	221-519.50	221-519.51	221-519.51	221-519.52
		HNBR	221-519.62	221-519.63	221-519.63	221-519.64	221-519.64	221-001019
1*	Seal ring	EPDM	924-084	924-084	924-084	924-085	924-085	924-085
		FKM	924-082	924-082	924-082	924-083	924-083	924-083
		HNBR	924-311	924-311	924-311	924-313	924-313	924-313
2	Bearing	PTFE/ carbon	935-001	935-001	935-001	935-002	935-002	935-002
	Bearing, 3A	SUSTA-PVDF	935-098	935-098	935-098	935-099	935-099	935-099
3	Seal disk	1.4404	221-141.01	221-141.02	221-141.02	221-141.03	221-141.03	221-141.04
4	Bearing disc	1.4301	221-142.01	221-142.02	221-142.02	221-142.03	221-142.03	221-142.03
5*	O-ring	EPDM	930-309	930-144	930-144	930-150	930-150	930-156
		FKM	930-168	930-171	930-171	930-176	930-176	930-178
		HNBR	930-632	930-633	930-633	930-634	930-634	930-863
6*	O-ring	NBR	930-004	930-004	930-004	930-004	930-004	930-004
**7*	V-ring	EPDM	932-058	932-046	932-046	932-021	932-021	932-025
		FKM	932-049	932-030	932-030	932-033	932-033	932-036
		HNBR	932-086	932-087	932-087	932-088	932-088	932-101
9	Lantern	1.4301	221-574.01	221-574.07	221-574.07	221-574.08	221-574.08	221-574.09
10	Spacer nut	1.4301	221-147.02	221-147.02	221-147.02	221-147.01	221-147.01	221-147.01
15	Valve disk Q	1.4404	221-266.01	221-266.02	221-266.02	221-266.03	221-266.05	221-266.04
	Valve disk Q-MET***	1.4404	221-339.05	221-339.01	221-339.01	221-339.02	221-339.03	221-339.04
33	Seat ring Q	1.4404	221-274.01	221-274.02	221-274.02	221-274.03	221-274.03	221-274.04
35	Blanking plate	1.4404	221-144.01	221-144.02	221-144.02	221-144.03	221-144.03	221-144.04
43	Clamp connection KL	1.4401	221-507.02	221-507.04	221-507.04	221-507.09	221-507.09	221-507.11
46	Clamp connection KL	1.4401	221-507.06	221-507.06	221-507.06	221-507.06	221-507.06	221-507.06
198.3	Installation base	1.4305	221-007461	221-007461	221-007461	221-007461	221-007461	221-007461
401	Housing V1	1.4404	221-101.27	221-101.28	221-101.29	221-101.30	221-101.31	221-101.32
402	Housing V2	1.4404	221-102.52	221-102.53	221-102.54	221-102.55	221-102.56	221-102.57
420	Housing connection Q	1.4404	221-572.01	221-572.03	221-572.05	221-572.08	221-572.10	221-572.13
A	Actuator F/F-CJ		See parts list for actuator F/F-CJ					
	Actuator M		See parts list for actuator M					
B	Control top T.VIS Q-15		See spare parts list for Control Top T.VIS P-15.					
Grease RIVOLTA F.L.G. 100g tube not included with seal set.					413-136			

** Do not grease Item 7
*** Q-MET > metal sealing (without V-ring)
1) The seal set includes items 1, 5, 6 and 7
Items marked with an * are wearing parts

Item	Designation	Material	2" IPS	3" IPS	4" IPS
Seal set complete 1)		EPDM	221-304.40	221-304.41	221-304.42
		FKM	221-519.50	221-519.51	221-519.52
		HNBR	221-519.63	221-519.64	221-001019
1*	Seal ring	EPDM	924-084	924-085	924-085
		FKM	924-082	924-083	924-083
		HNBR	924-311	924-313	924-313
2	Bearing	PTFE/carbon	935-001	935-002	935-002
	Bearing, 3A	SUSTA-PVDF	935-098	935-099	935-099
3	Seal disk	1.4404	221-141.02	221-141.03	221-141.04
4	Bearing disc	1.4301	221-142.02	221-142.03	221-142.03
5*	O-ring	EPDM	930-144	930-150	930-156
		FKM	930-171	930-176	930-178
		HNBR	930-633	930-634	930-863
6*	O-ring	NBR	930-004	930-004	930-004
**7*	V-ring	EPDM	932-046	932-021	932-025
		FKM	932-030	932-033	932-036
		HNBR	932-087	932-088	932-101
9	Lantern	1.4301	221-574.12	221-574.10	221-574.11
10	Spacer nut	1.4301	221-147.02	221-147.01	221-147.01
15	Valve disk Q	1.4404	221-266.02	221-266.05	221-266.04
	Valve disk Q-MET***	1.4404	221-339.01	221-339.03	221-339.04
33	Seat ring Q	1.4404	221-274.02	221-274.03	221-274.04
35	Blanking plate	1.4404	221-144.02	221-144.03	221-144.04
43	Clamp join KL	1.4401	221-507.04	221-507.09	221-507.11
46	Clamp join KL	1.4401	221-507.06	221-507.06	221-507.06
198.3	Installation base	1.4305	221-007461	221-007461	221-007461
401	Housing V1	1.4404	221-101.37	221-101.35	221-101.36
402	Housing V2	1.4404	221-102.62	221-102.59	221-102.60
420	Housing connection Q	1.4404	221-572.07	221-572.12	221-572.15
A	Actuator F/F-CJ		See parts list for actuator F/F-CJ		
	Actuator M		See parts list for actuator M		
B	Control top T.VIS Q-15		See spare parts list for Control Top T.VIS P-15.		
Grease RIVOLTA F.L.G. 100g tube not included with seal set.					413-136

** Do not grease Item 7
*** Q-MET > metal sealing (without V-ring)
1) The seal set includes items 1, 5, 6 and 7
Items marked with an * are wearing parts

sealing sets for overflow valve Q							
Item	**Qty.**	**Designation**	**Material**	**DN 25 1"**	**DN 40/50 1.5"/2"**	**DN 65/80 2.5"/3"**	**DN 100 4"**
1	2	Seal ring	Ø	22	22	28	28
			EPDM	924-084	924-084	924-085	924-085
			FKM	924-082	924-082	924-083	924-083
			HNBR	924-311	924-311	924-313	924-313
5	4	O-ring	Ø	42 x 3	60 x 3	85 x 4	113 x 4
			EPDM	930-309	930-144	930-150	930-156
			FKM	930-168	930-171	930-176	930-178
			HNBR	930-632	930-633	930-634	930-863
6	1	O-ring	Ø	8 x 1.6	8 x 1.6	8 x 1.6	8 x 1.6
			NBR	930-004	930-004	930-004	930-004
7*	1	V-ring	Ø	17-5	35-5	52-6	81-6
			EPDM	932-058	932-046	932-021	932-025
			FKM	932-049	932-030	932-033	932-036
			HNBR	932-086	932-087	932-088	932-101
Seal set complete			EPDM	221-304.39	221-304.40	221-304.41	221-304.42
			FKM	221-519.49	221-519.50	221-519.51	221-519.52
			HNBR	221-519.62	221-519.63	221-519.64	221-001019
Grease RIVOLTA F.L.G. 100g tube not included with seal set						413-136	

* Do not grease item 7
Advice on storage: storage in accordance with DIN 7716
Relative humidity approx. 65%, temperature 15-25°C and protected from light
When replacing seals, observe the instructions in the instruction manual!
429-002

14 Spare Parts List – Actuators F and F-CJ

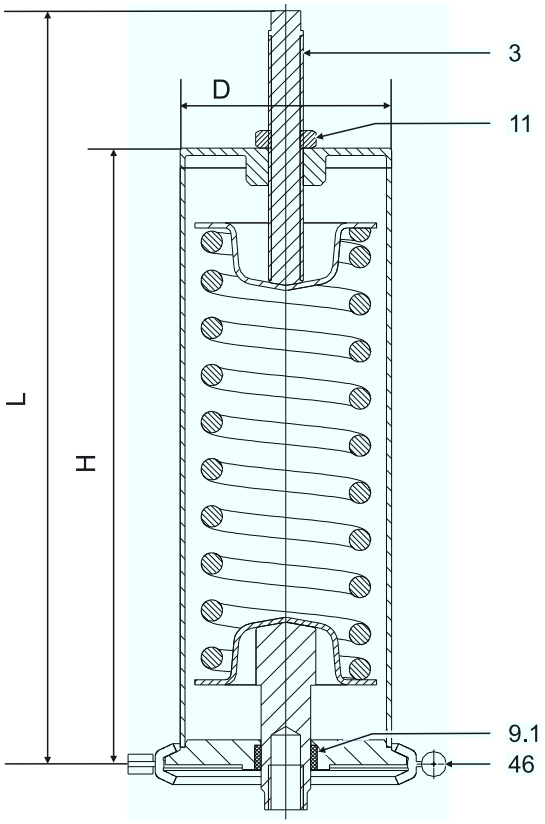


Fig.25: Actuator F

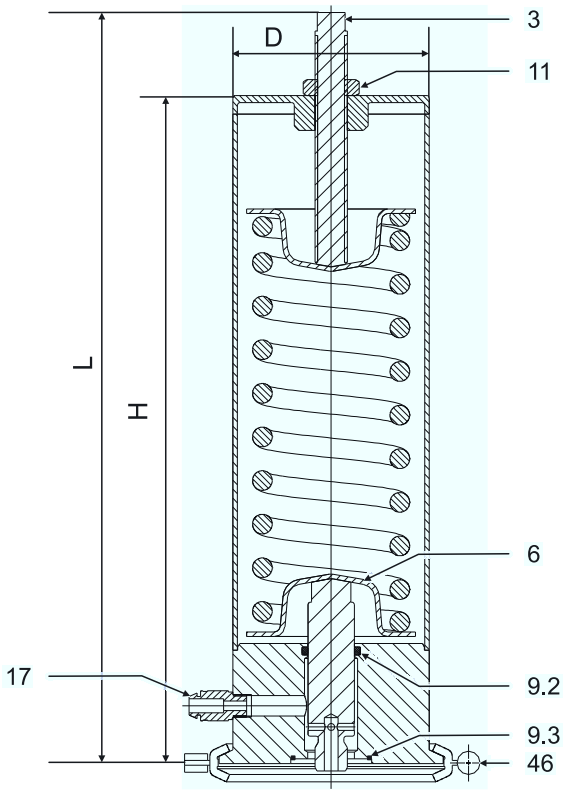


Fig.26: Actuator F-CJ - only use in combination with actuator CJ (221-136.01)!

Item	Designation	Material	F 11	F 21	F 1	F 2	F 3	F 4
Actuator complete			221-177.10	221-177.11	221-177.01	221-177.02	221-177.03	221-177.09
3	Setscrew	A4-70	221-177.05	221-177.05	221-177.05	221-177.05	221-177.05	221-177.05
6	Rod F-CJ	1.4301	--	--	--	--	--	--
9.1	Rod guide ring	Turcite	935-017	935-017	935-017	935-017	935-017	935-017
11	Hexagon nut	A2	910-036	910-036	910-036	910-036	910-036	910-036
17	Screw-in plug connection	Brass/nickel-plated	--	--	--	--	--	--
46	Clamp connection	1.4401	221-507.06	221-507.06	221-507.06	221-507.06	221-507.06	221-507.06

Designation	F 11	F 21	F 1	F 2	F 3	F 4
D	85	85	85	85	85	85
H	150	150	250	250	250	250
L	230	230	330	330	330	330

Nominal width		Response pressure (bar)					
Metric	Inch OD/IPS	F 11	F 21	F 1	F 2	F 3	F 4
25	1" OD	1.5 - 4.5	3 - 9	8 - 16	--	--	--
40	1.5" OD	--	1.5 - 2	1.5 - 5	4 - 15	14 - 16	--
50	2" OD	--	--	1.5 - 4	3 - 11	10 - 16	--
65	2.5" OD	--	--	--	1 - 4	3 - 10	9 - 15
80	3 OD	--	--	--	1 - 4	3 - 10	9 - 10
100	4" OD	--	--	--	0.5 - 1.5	0.5 - 4	3 - 7

Item	Designation	Material	F 1-CJ	F 2-CJ	F 3-CJ	F 4-CJ
Actuator complete			221-177.13	221-177.12	221-177.14	221-177.15
3	Setscrew	A4-70	221-177.05	221-177.05	221-177.05	221-177.05
6	Rod F-CJ	1.4301	221-001591	221-001591	221-001591	221-001591
9.1	Rod guide ring	Turcite	--	--	--	--
9.2	O-ring	NBR	930-026	930-026	930-026	930-026
9.3	O-ring	NBR	930-041	930-041	930-041	930-041
11	Hexagon nut	A2	910-036	910-036	910-036	910-036
17	Screw-in plug connection metric G1/8"-6/4	Brass/nickel-plated	933-176	933-176	933-176	933-176
	Screw-in plug connection inch G1/8"-6.35	Brass/nickel-plated	933-173	933-173	933-173	933-173
46	Clamp connection	1.4401	221-507.06	221-507.06	221-507.06	221-507.06

Designation	F 1-CJ	F 2-CJ	F 3-CJ	F 4-CJ
D	85	85	85	85
H	290	290	290	290
L	370	370	370	370

Nominal width		Response pressure (bar)			
Metric	Inch OD/IPS	F 1-CJ	F 2-CJ	F 3-CJ	F 4-CJ
25	1" OD	8 - 16	--	--	--
40	1.5" OD	1.5 - 5	4 - 15	14 - 16	--
50	2" OD	1.5 - 4	3 - 11	10 - 16	--
65	2.5" OD	--	1 - 4	3 - 10	9 - 15
80	3 OD	--	1 - 4	3 - 10	9 - 10
100	4" OD	--	0.5 - 1.5	0.5 - 4	3 - 7

15 Spare Parts List - Actuator M

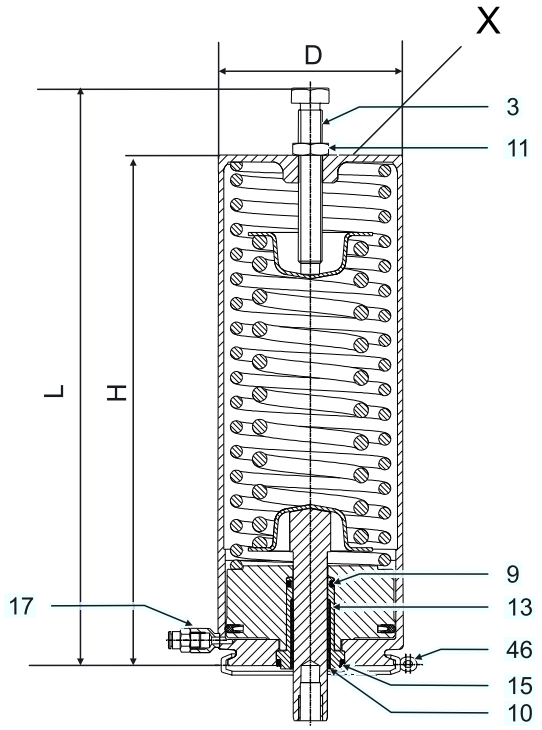


Fig.27: X = actuator identification

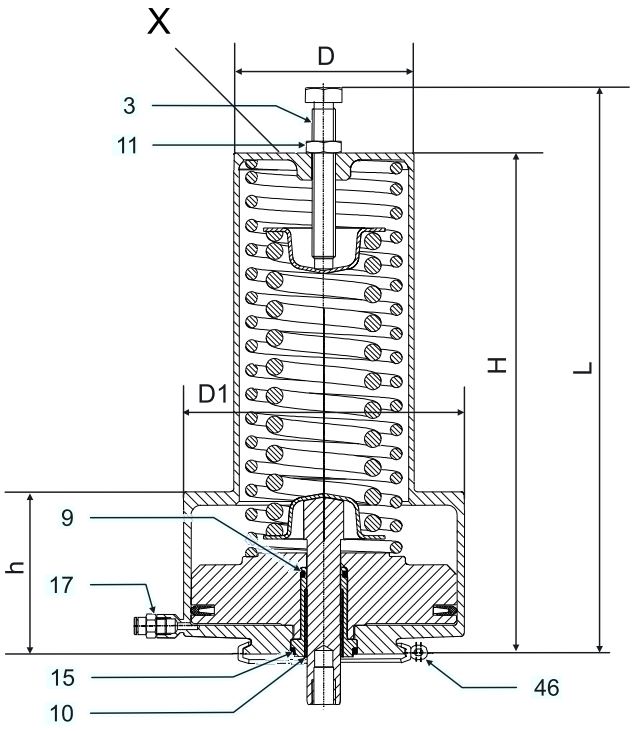


Fig.28: X = actuator identification

Item	Designation	Material	M 11	M 21	M 1	M 2	M 3	M 4
Actuator complete			221-260.05	221-260.06	221-260.01	221-260.02	221-260.14	221-260.13
3	Setscrew	A4-70	221-177.05	221-177.05	221-177.05	221-177.05	221-177.05	221-177.05
9	O-ring	NBR	930-029	930-029	930-029	930-029	930-029	930-029
10	Plain bearing	IGLIDUR-G	704-041	704-041	704-041	704-041	704-041	704-041
11	Hexagon nut	A2	910-036	910-036	910-036	910-036	910-036	910-036
13	Bush	1.4301	221-260.15	221-260.15	221-260.15	221-260.15	221-260.15	221-260.15
15	O-ring	NBR	930-251	930-251	930-251	930-251	930-251	930-251
17	Screw-in plug connection metric G1/8"-6/4	Brass/nickel-plated	933-176	933-176	933-176	933-176	933-176	933-176
	Screw-in plug connection inch G1/8"-6.35	Brass/nickel-plated	933-173	933-173	933-173	933-173	933-173	933-173
46	Clamp connection	1.4401	221-507.06	221-507.06	221-507.06	221-507.06	221-507.06	221-507.06

Designation	M 11	M 21	M 1	M 2	M 3	M 4
D	110	110	110	110	110	110
D1	--	--			170	170
h	--	--			95	95
H	195	195	295	295	295	295
L	275	275	375	375	375	375
Required control air pressure (bar)	3	3	3	4	3	5

Nominal width		Response pressure (bar)					
Metric	Inch OD/IPS	M 11	M 21	M 1	M 2	M 3	M 4
25	1" OD	1.5 - 4.5	3 - 9	8 - 16	--	--	--
40	1.5" OD	--	1.5 - 2	1.5 - 5	4 - 15	14 - 16	--
50	2" OD	--	--	1.5 - 4	3 - 11	10 - 16	--
65	2.5" OD	--	--	--	1 - 4	3 - 10	9 - 15
80	3 OD	--	--	--	1 - 4	3 - 10	9 - 10
100	4" OD	--	--	--	0.5 - 1.5	0.5 - 4	3 - 7

16 Spare Parts List - Actuator CJ

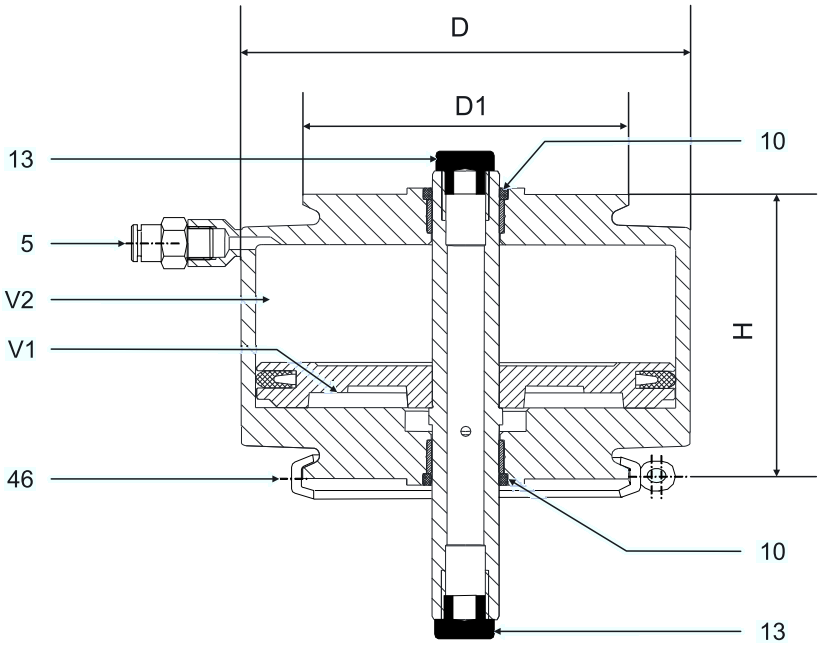


Fig.29

Item	Designation	Material	Material no.
Actuator CJ complete			221-136.01
5	Screw-in plug connection metric G1/8"-6/4	Brass/nickel-plated	933-176
	Screw-in plug connection inch G1/8"-6.35	Brass/nickel-plated	933-173
10	O-ring	NBR	930-026
13	Plug	LD-PE	922-036
46	Clamp connection	1.4401	221-507.06
Stopping plugs, Pos.13, are only used to protect the thread. They must be removed before using the actuator.			

Designation		Dimension
D		135 mm
D1		97 mm
H		85 mm
Weight		4.35 kg
Volume V1	not actuated	0.1616 dm^3
Volume V2	actuated (stroke 35)	0.4185 dm^3

17 Dimension sheet – overflow valve Q

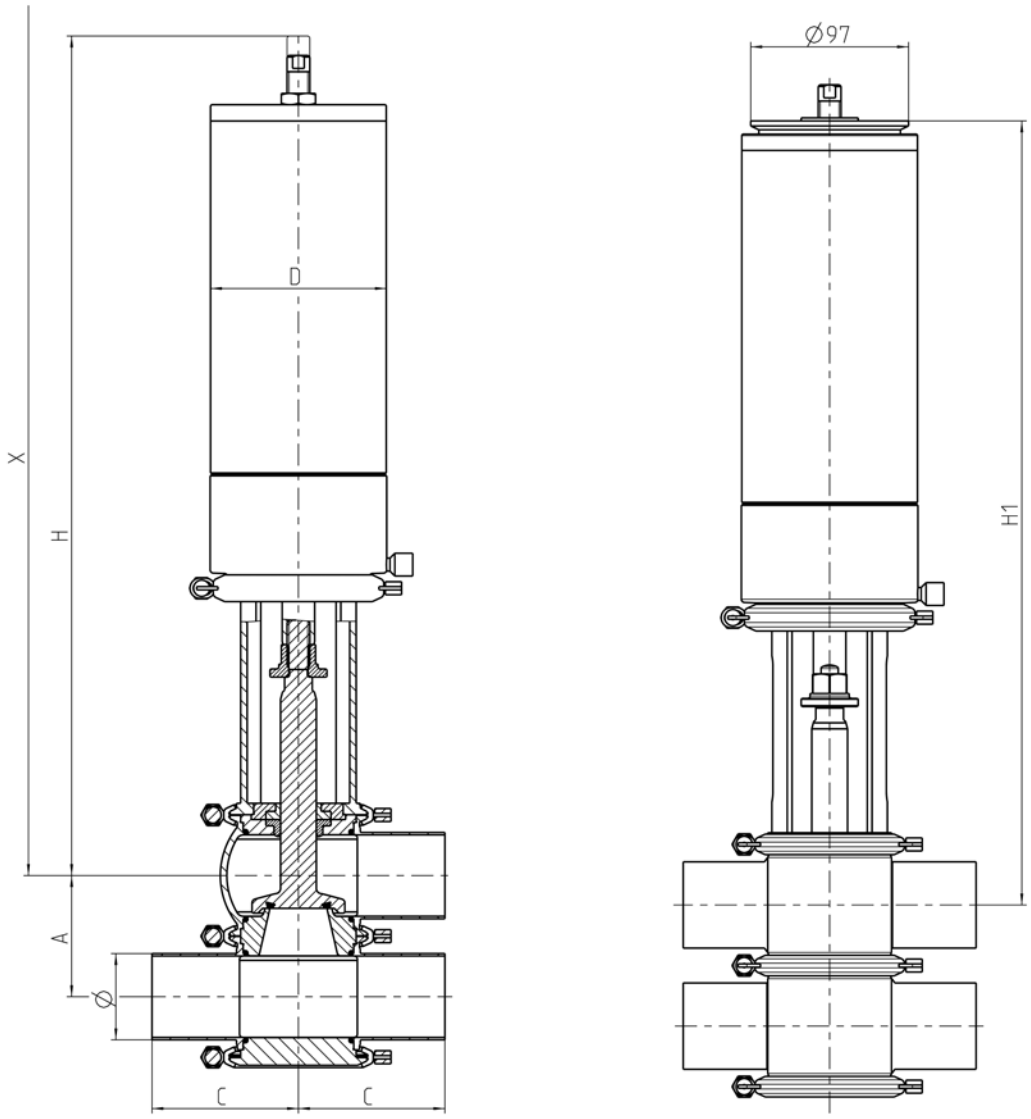


Fig.30

Dimension		**DN 25**	**DN 40**	**DN 50**	**DN 65**	**DN 80**	**DN 100**
Ø		29 x 1.5	41 x 1.5	53 x 1.5	70 x 2	85 x 2	104 x 2
A		50	62	74	96	111	130
C		90	90	90	125	125	125
Actuator F		F11 / 21	F1 / 2	F1 / 2	F3 / 4	F3 / 4	F3 / 4
	D	85	85	85	85	85	85
	H	394	500	506	517	524.5	534
	H1	319	425	431	442	449.5	459
	X	480	585	590	660	670	680
Actuator F-CJ in combination with actuator CJ	D	--	85/135	85/135	85/135	85/135	85/135
	H	--	625	631	642	649.5	659
	X	--	710	715	785	795	805
Actuator M		M11 / 21	M1 / 2	M1 / 2	M3 / 4	M3 / 4	M3 / 4
	D	110	110	110	110/170	110/170	110/170
	H	439	545	551	562	569.5	579
	X	525	630	635	705	715	725
Stroke		10	15	27	30	30	30

Dimension		**1" OD**	**1.5" OD**	**2" OD**	**2.5" OD**	**3" OD**	**4" OD**
Ø		25.4 x 1.6	38.1 x 1.6	50.8 x 1.6	63.5 x 1.6	76.2 x 1.6	101.6 x 2
A		46	59	71.5	90	103	127.5
C		90	90	90	125	125	125
Actuator F		F11 / 21	F1 / 2	F1 / 2	F3 / 4	F3 / 4	F3 / 4
	D	85	85	85	85	85	85
	H	392	501.5	508	521	527.5	536
	H1	317	426.5	433	446	452.5	461
	X	480	585	595	665	675	680
Actuator F-CJ in combination with actuator CJ	D	--	85/135	85/135	85/135	85/135	85/135
	H	--	626.5	633	646	652.5	661
	X	--	710	720	790	800	805
Actuator M		M11 / 21	M1 / 2	M1 / 2	M3 / 4	M3 / 4	M3 / 4
	D	110	110	110	110/170	110/170	110/170
	H	437	546.5	553	566	572.5	581
	X	525	630	640	710	720	725
Stroke		6	15	27.5	31	29	30.5

Dimension		**2" IPS**	**3" IPS**	**4" IPS**
Ø		60.3 x 2	88.9 x 2.3	114.3 x 2.3
A		81	115	140
C		114.3	152.4	152.4
Actuator F		F1 / 2	F3 / 4	F3 / 4
	D	85	85	85
	H	502.5	522.5	529
	H1	427.5	447.5	454
	X	590	670	675

Dimension		2" IPS	3" IPS	4" IPS
Actuator F-CJ in combination with actuator CJ	D	85/135	85/135	85/135
	H	627.5	647.5	654
	X	715	795	800
Actuator M		M1 / 2	M3 / 4	M3 / 4
	D	110	110/170	110/170
	H	547.5	567.5	574
	X	635	715	720
Stroke		27	30	30

18 Appendix

18.1 Lists

18.1.1 Abbreviations and terms

Abbreviation	Explanation
BS	British Standard
bar	Unit of measurement of pressure [bar] All pressure data expressed in [bar/psi] is assumed to be gauge pressure [barg/psig] unless explicitly specified otherwise.
approx.	approximately
°C	Unit of measurement of temperature [degree Celsius]
C_v	valve coefficient, non-metric flow coefficient, see K_v
dm^3_n	Unit of measurement of volume [cubic decimetre] standard volume (standard litres)
DN	DIN nominal width
DIN	German standard issued by DIN (Deutsches Institut für Normung e.V., German Institute for Standardization)
EN	European Standard
EPDM	Material designation Short designation according to DIN/ISO 1629: Ethylene Propylene Diene Rubber
°F	Unit of measurement of temperature [degree Fahrenheit]
FKM	Material designation, short designation according to DIN/ISO 1629: Fluorine rubber
h	Unit of measurement of time [hour]
HNBR	Material designation Short designation according to DIN/ISO 1629: Hydrogenated Acrylonitrile Butadiene Rubber
IP	Protection class
ISO	International Standard of the International Organization for Standardization
kg	Unit of measurement of weight [kilogram]
kN	Unit of measurement of force [kilonewton]
K_v value	Flow coefficient [m³/s], 1 K_v = 0.86 × C_v
l	Unit of measurement of volume [litre]
max.	maximum
mm	Unit of measurement of length [millimetre]

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

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