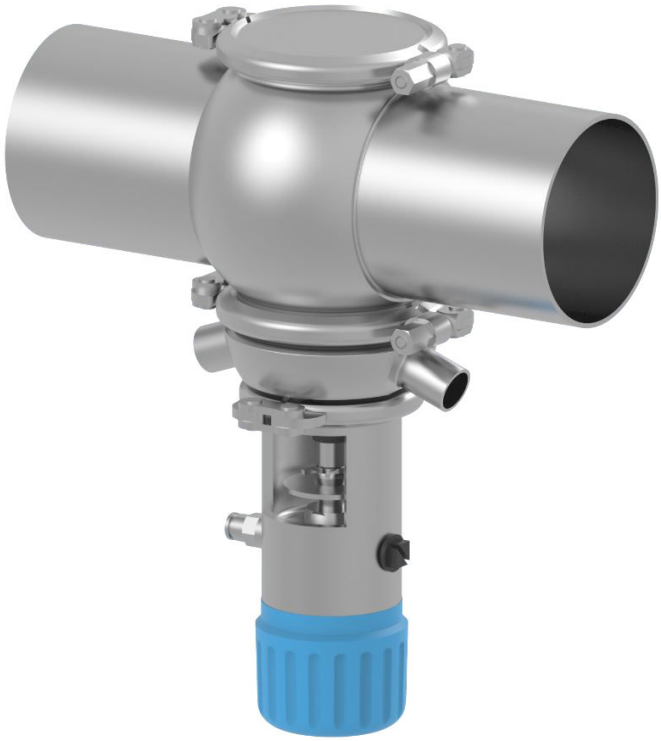

Hygienic valves

GEA VARIVENT® Sampling valve type TSVN and TSVN

Operating instruction (Translation from the original language)

430BAL008565EN_1

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TABLE OF CONTENTS

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

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:	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

2 Safety

2.1 Intended use

The sampling valve TSVN/TSVU is intended for taking samples of liquids and viscous media.

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 Requirements for operation

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

2.1.2 Pressure equipment directive

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

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

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

Nominal diameters ≥ 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

You should never make any technical modifications to the valve. 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 Aseptomag AG should be fitted. This ensures the reliable and economical operation of the valve.

2.4 General safety instructions and dangers

The valve is operationally reliable. It was built according to state-of-the-art science and technology.

Nevertheless, the valve can pose dangers, especially if

- the valve is not used in accordance with its intended use,
- the valve is not used correctly,
- the valve is operated under impermissible operating 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.

2.4.1.1 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.

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

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	Explosion-hazarded zones warning

3 Transport and storage

3.1 Scope of supply

On receipt of the valve check whether

- 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.

3.2 Transport

For transport, the following principles apply:

- Only use approved, fully functional means of transport, lifting gear and slings that are suitable for the purpose to transport the package units/valves. Observe the maximum load-bearing capacities.
- 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.
- 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.

3.3 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 Technical data

4.1 Type plate

The type plate clearly identifies the valve.

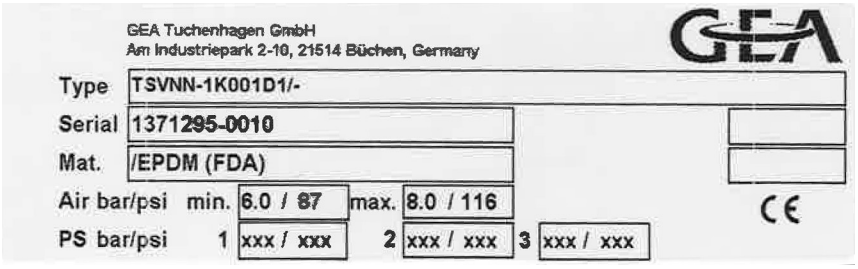


Fig.4: Type plate

The type plate provides the following key data:

Key data of the valve	
Type	Sampling Valve TSVN
Serial	Serial number
Material	EPDM (FDA)
Control air pressure bar/psi	min. 6.0 / 87; max. 8.0 / 116
Product pressure bar/psi	max. 10.0 / 145

4.2 Technical data

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

Technical data: valve	
Designation	**Description**
Size	DN 32/25 DN 50/40
Material of product contact parts	Stainless steel 1.4404
Max. temperature PTFE O-ring (7) material no. 930-464	+ 150 °C when flaming
Fitting position	Suspended

Technical data: temperatures	
Designation	**Description**
Ambient temperature	0 to 60 °C (32 ... 140 °F), standard < 0 °C Use control air with low dew point, protect valve stems from icing up
Product temperature and operating temperature	depending on the sealing material

Technical data: pressure	
Designation	**Description**
Product pressure	max. 10 bar (145 psi), standard
Control air pressure	6 bar, max. 8 bar
Air requirement	13.1 cm^3/stroke
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

4.3 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 materials**			
		EPDM	**FKM**	**HNBR**	**PTFE**
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 80 °C (176°F)	+	+	+	+
Steam	up to 135 °C (275° F)	+	o	o	+
Steam, approx. 30 min	up to 150 °C (320°F)	+	o	–	+
Fuels/hydrocarbons		–	+	+	+
Product with a fat content of max. 35%		+	+	+	+
Product with a fat content of more than 35%		–	+	+	+
Oils		–	+	+	+
* Depending on the installation conditions					

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)
PTFE	-200...+260 °C (-328...+500 °F)
* The general resistance of the material does not correspond to the maximum operating temperature	

4.4 Pipe ends (R)

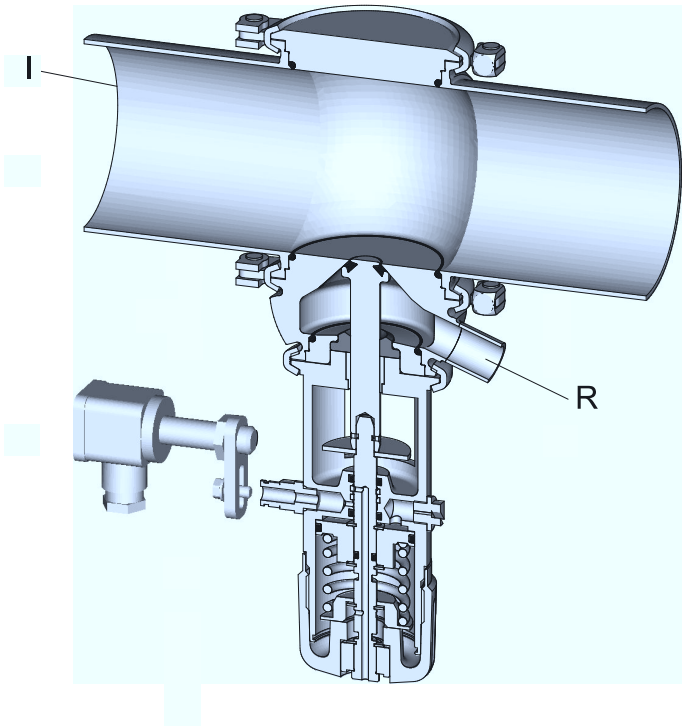


Fig.5: Sampling valve TSVN: I-Line_Housing (I), pipe ends (R)

Dimensions for tubes in DN		
Size TSVN/TSVU	**Pipe ends (R)**	
	Dimensions	**Size**
50/40	19x1.5	DN15
35/25	13x1.5	DN10

4.5 Lubricants

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

5 Description

5.1 Design of the valve

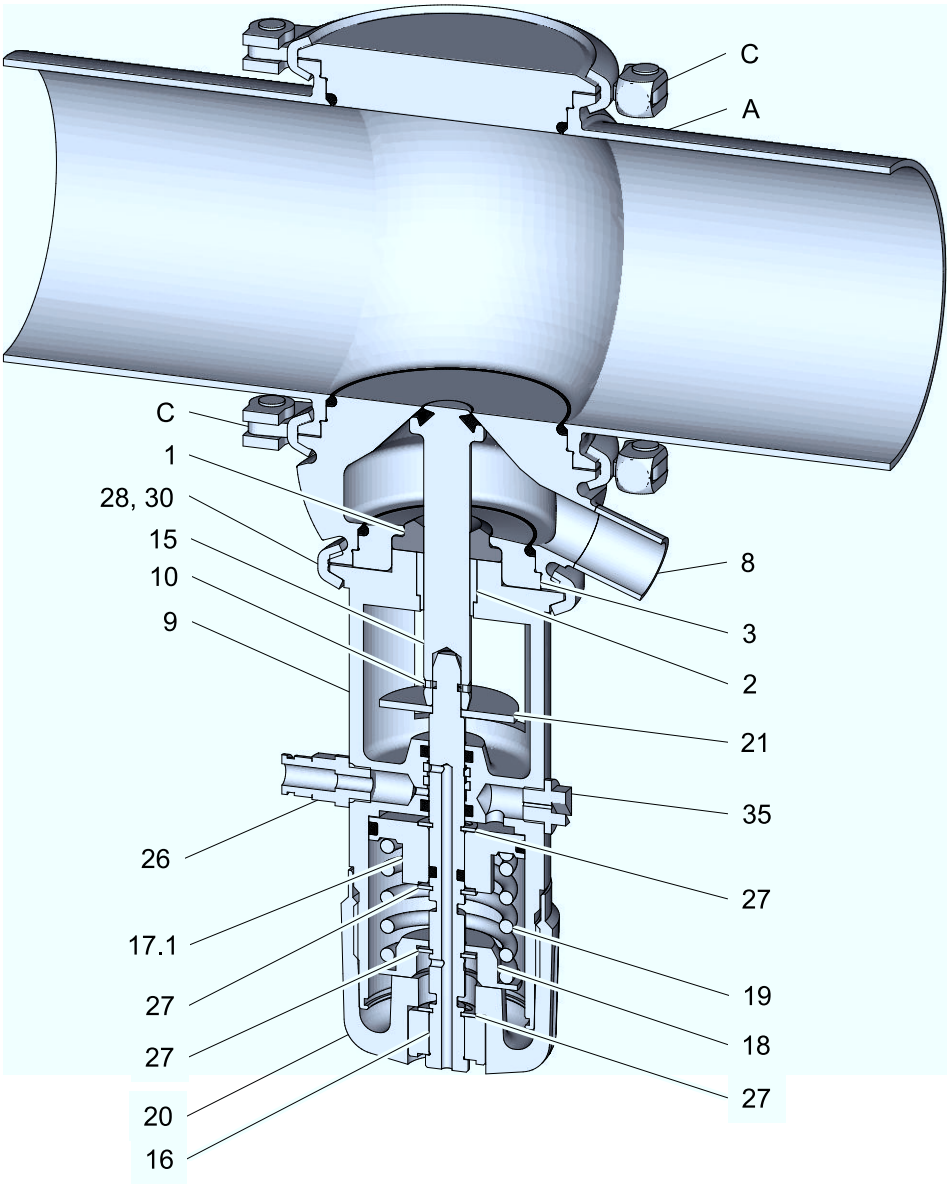


Fig.6: Main components on the valve

Key	
No.	**Designation**
1	Seal ring
2	Seal disk
8	Sampling housing
9	Sampling lantern
15	Valve disk
16	Piston rod

Key	
No.	**Designation**
17.1	Piston
18	Spring cage cover
19	Compression spring
20	Handwheel
21	Contact disk
26	Screw-in plug connection
27	Lock washer
28, 30	Hinged clamp
35	Vent screw
A	Housing
C	Hinged clamps

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 vertically suspended. 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 hinged clamps: drain the pipe and, if necessary, clean or rinse it.
► Separate the pipe section in which the valve is to be fitted from the rest of the piping system to prevent product entering again.

Carry out the following steps:

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

→ Valve is installed.

6.4 Welding In a Valve with Pipe Connection

6.4.1 Valve with Welded Ends

This section describes the welding procedure for the valve housing.

⚠ Warning!

Spring tension in the valve

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

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

Notice

Seals are wearing parts

Old seals will cause malfunction of the valve

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

Notice

Welding distortions

An open housing can warp during welding.

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

Carry out the following steps:

1. Release the spring tension.
2. Remove the valve insert, see chapter Section 9.5, Page 30.
3. Weld the housing, without sealing rings, into position, ensuring that the connection is free of stress.
4. Fit the housing into place and tack it.
5. To avoid welding distortions, always seal the housing before welding.
6. Flush the housing with forming gas from the inside to push the oxygen out of the system.
7. Weld the housing into the pipe system; use welding filler if necessary. When technically possible, use the WIG-Orbital welding process with pulse configuration, according to guidelines EHEDG documentation. 35.
8. Passivate the seam after welding.
9. Assemble the valve and depressurize the actuator..
10. Fit the seals.

    → The valve disk is lowered.

→ Install the valve with welded ends.

Hint!

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

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

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 Commissioning activities

Before starting commissioning observe the following:

- Make sure that there are no foreign objects 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 Cleaning and Passivation

8.1 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!

8.1.1 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).

8.1.2 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. Please define the cleaning parameters yourself in accordance with your product and process and regularly verify the result.

We recommend a flow velocity of at least 2 m/s.

8.2 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.

9 Maintenance

9.1 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 3.3, Page 15.

9.2 Inspections

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

Carry out the following steps:

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

   → Inspection has been carried out.

9.3 Maintenance intervals

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

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

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

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

9.4 Prior to removal

Requirement:

- Make sure that during maintenance and servicing 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. Disconnect the power supply.
3. Block control air if it is not required for removal.
4. Take the valve out of the pipe section, with all housings and housing connections if possible.

→ Done

9.5 Disassembling the Valve

9.5.1 Removing the valve

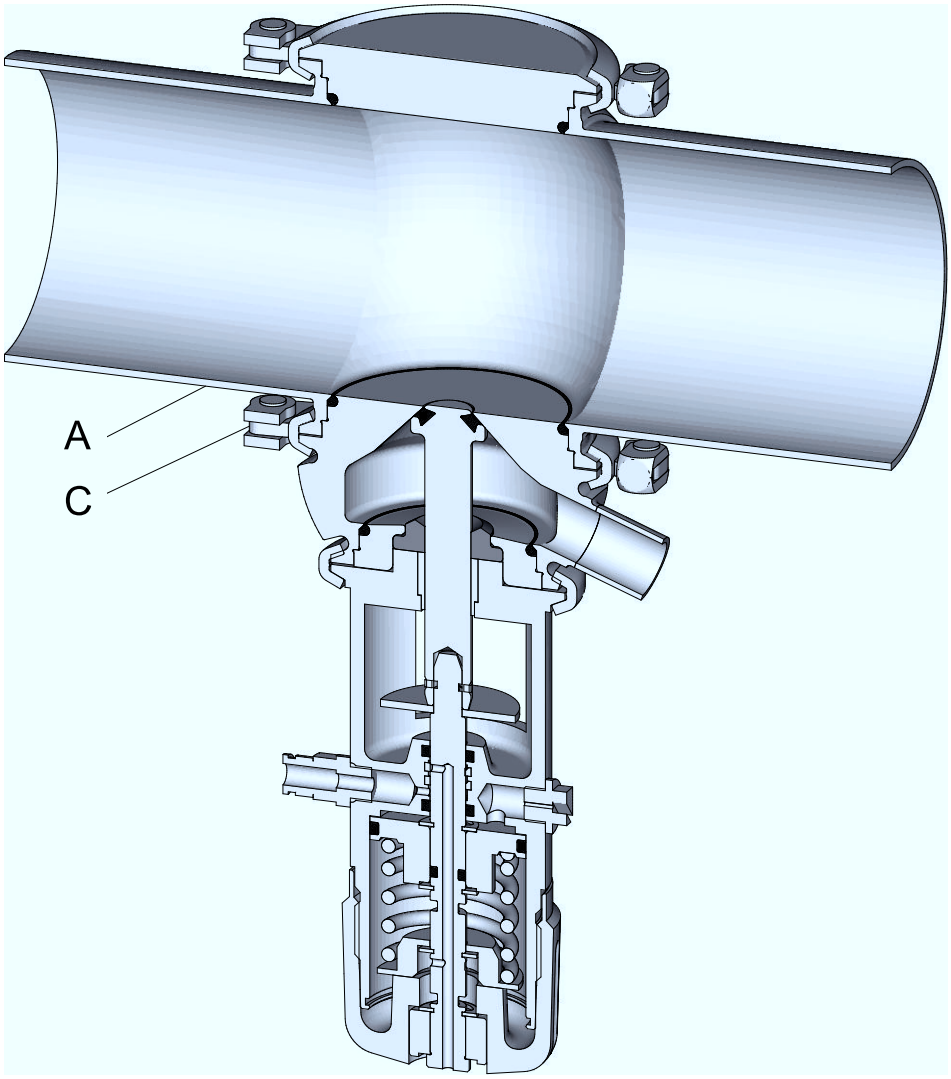


Fig.7

Carry out the following steps:

1. Hold the valve.
2. Remove the clamps (C).
3. Take the valve out of the pipe.

→ Done.

9.5.2 Removing the valve disk

9.5.2.1 Valve TSVU without bellows

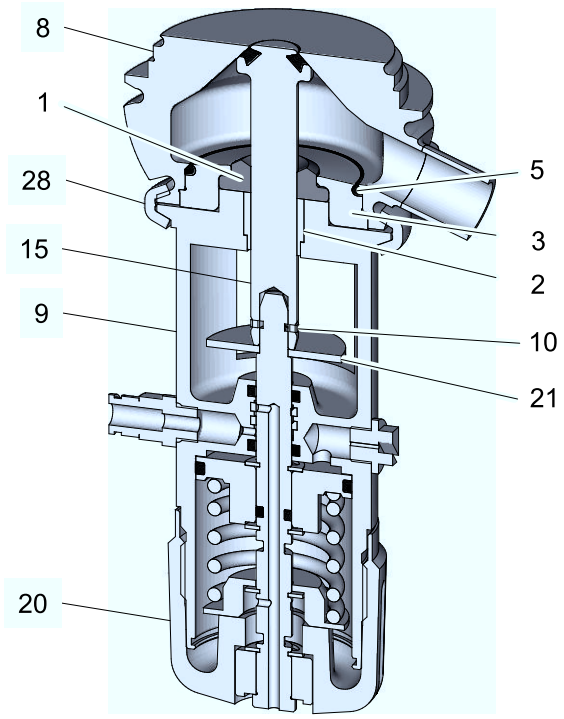


Fig.8: Removing the valve disk, valve without bellows

Carry out the following steps:

1. Turn the handwheel (20) counterclockwise.
   - The valve disc (15) is raised.
2. Remove the hinged clamp (28) between housing (8) and lantern (9).
3. Withdraw the valve insert from the housing (8).
4. Pull off the square ring (10).
5. Take out the contact disk (21).
6. Pull the valve disk (15) with bearing (2), sealing disk (3), sealing ring (1) and O-ring (5) out of the lantern (9).

- Valve disk has been removed.

9.5.2.2 Valve TSVU with bellows

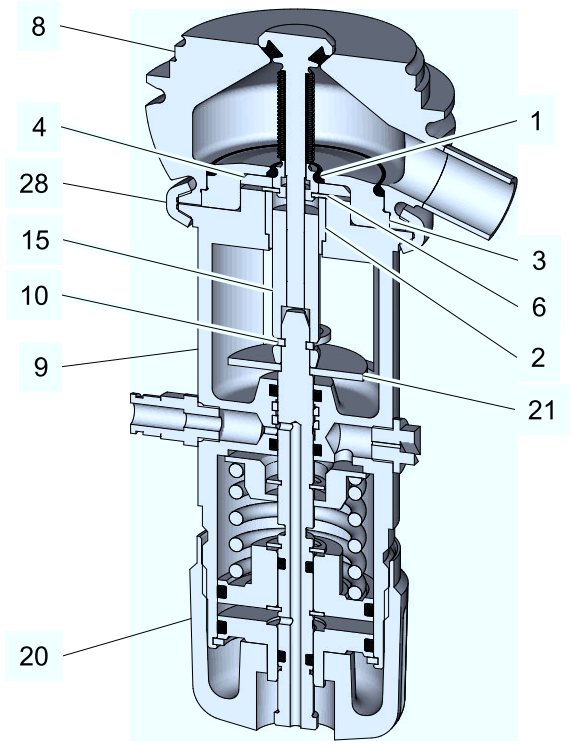


Fig.9: Removing the valve disk, valve with bellows

Carry out the following steps:

1. Turn the handwheel (20) counterclockwise.
   - The valve disc (15) is raised.
2. Remove the hinged clamp (28) between housing (8) and lantern (9).
3. Withdraw the valve insert from the housing (8).
4. Pull off the square ring (10).
5. Take out the bearing (2) and the contact disk (21).
6. Lever out the lock washer (6).
7. Strike the valve disk shaft (15) gently against the worktop to release the disk (4) from the housing and remove it.
8. Remove the O-ring (1) from the groove using a scriber and pull it off over the valve disk (15).
9. Pull the valve disk (15) out of the lantern (9).

- Valve disk has been removed.

9.5.3 Removing the handwheel

9.5.3.1 Valve TSVN

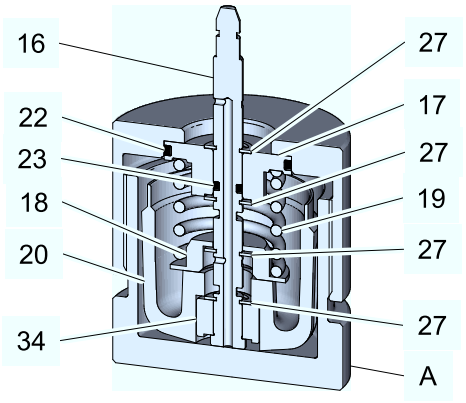


Fig.10: Removing the handwheel valve TSVN

Carry out the following steps:

1. Turn the handwheel (20), together with piston rod (16), lock washers (27), compression spring (19), spring cage cover (18), O-rings (22, 23), piston (17) and bush (34), out of the lantern (9).
2. Tension the compression spring (19) using the assembly tool (A), material no. 222-601.51.
3. Pull off the circlip (27).
4. Use the assembly tool (A), material no. 222-601.51, to relieve the tension on the compression spring (19) and remove the assembly tool.
5. Pull the piston (17) off the piston rod (16) and take all the remaining parts out of the handwheel.

– Handwheel has been removed.

9.5.3.2 Valve TSVU

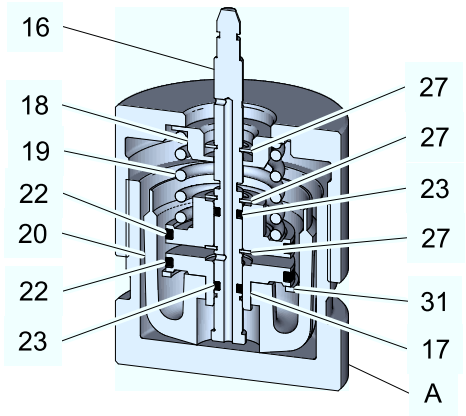


Fig.11: Removing the handwheel valve TSVU

Carry out the following steps:

1. Unscrew the handwheel (20).
2. Take off the circlip (31).

3. Pull out the piston rod (16), lock washers (27), compression spring (19), spring cage cover (18), O-rings (22, 23) and piston (17).
4. Tension the compression spring (19) using the assembly tool, material no. 222-601.51.
5. Pull off the lock washer (27).
6. Use the assembly tool (A), material no. 222-601.51, to relieve the tension on the compression spring (19) and remove the assembly tool.
7. Pull the piston (17) off the piston rod (16) and take all the remaining parts out of the handwheel.

– Handwheel has been removed.

9.6 Maintenance

9.6.1 Cleaning the valve

Notice

Damage to the valve disk

All the surfaces of the valve disk are functional surfaces.

► Carefully remove the valve disk.

Carry out the following steps:

1. Disassemble the valve, see Section 9.5, Page 30.
2. Carefully clean the individual parts.

→ Done.

Hint!

Observe the safety data sheets supplied by the detergent manufacturers. Only use detergents which are non-abrasive and not aggressive towards stainless steel.

9.6.2 Replacing seals

Replace defective seals to ensure the tightness of the valve. Always use genuine spare parts.

9.6.3 Lubricating seals and threads

Notice

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 disc thread.
2. Grease all seals very thinly.

→ Done.

Hint!

GEA Tuchenhagen recommends Rivolta F.L.G. MD-2 and PARALIQ GTE 703. These lubricants are approved for foodstuff and are resistant to beer froth. They have the NSF-H1 (USDA H1) registration. They do not affect the taste or the consistency of the products and are compatible with the seals in contact with product. PARALIQ GTE 703 can be ordered from GEA Tuchenhagen under mat. no. 413-064, and Rivolta F.L.G. MD-2 can be ordered under mat. no. 413-071 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!

9.7 Installation

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

9.7.1 O-Ring on the valve disk

Carry out the following steps:

1. Fit the O-ring for the valve disk (7) without applying any grease.

– Done.

9.7.2 Fitting the piston

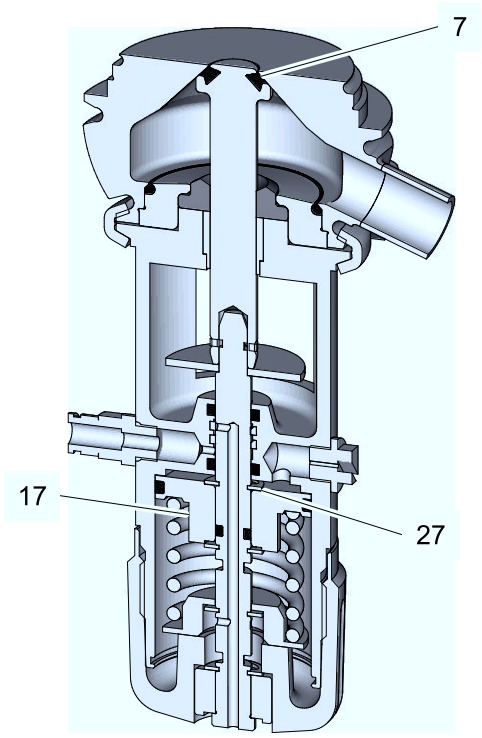


Fig.12: Fitting the piston

Carry out the following steps:

1. Fit the piston (17) so that the recess points towards the lock washer (27).

→ Done.

9.7.3 Fitting position

The valve must be installed in vertically suspended position. This is the only position in which the valve housing can reliably drain.

10 Alarms

10.1 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 precautions.

Malfunction	Cause	Remedy
Valve does not close	Dirt/foreign material between valve seat and valve disk	Clean valve housing and valve seat
Leakage in the area of the valve housing	Housing O-rings defective	Removing the valve Replace the housing O-rings

11 Decommissioning

11.1 Safety precautions

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 Section 3.3, Page 15.

11.2 Disposal

11.2.1 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.

1 Spare parts list - Sampling valve TSVN"

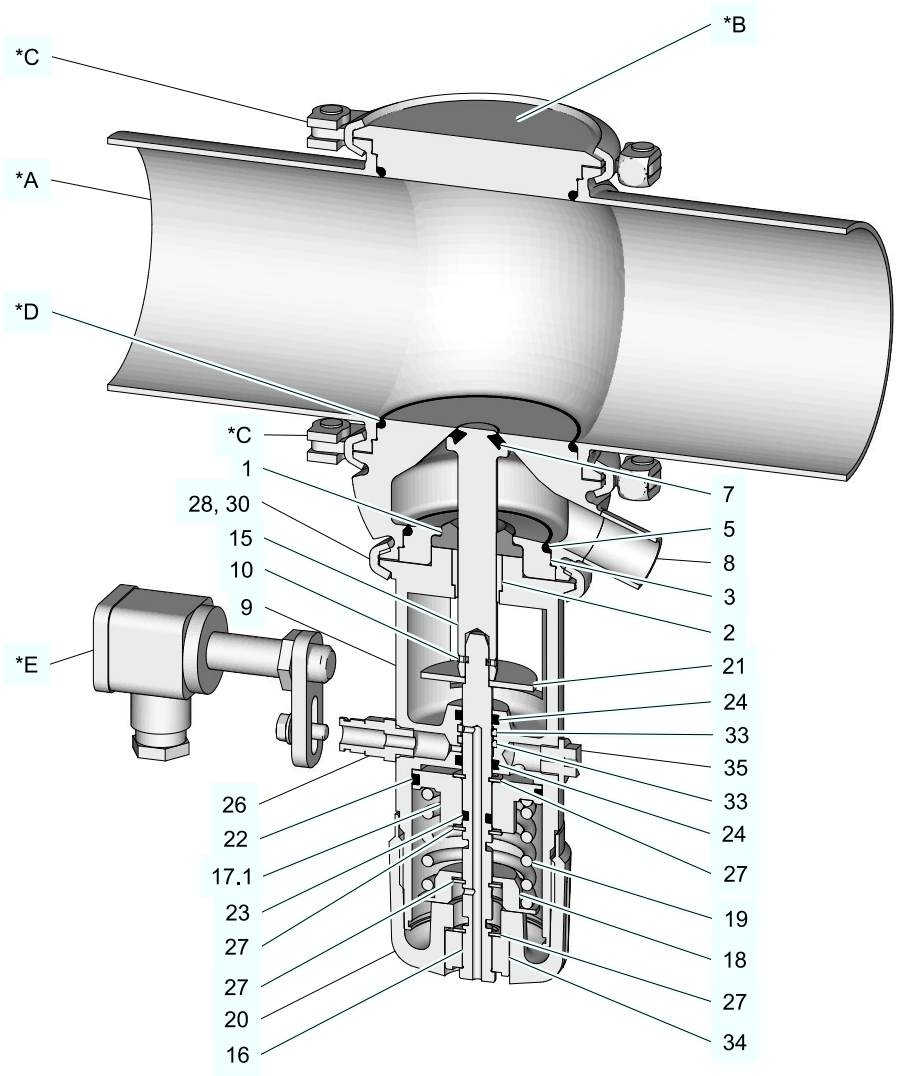
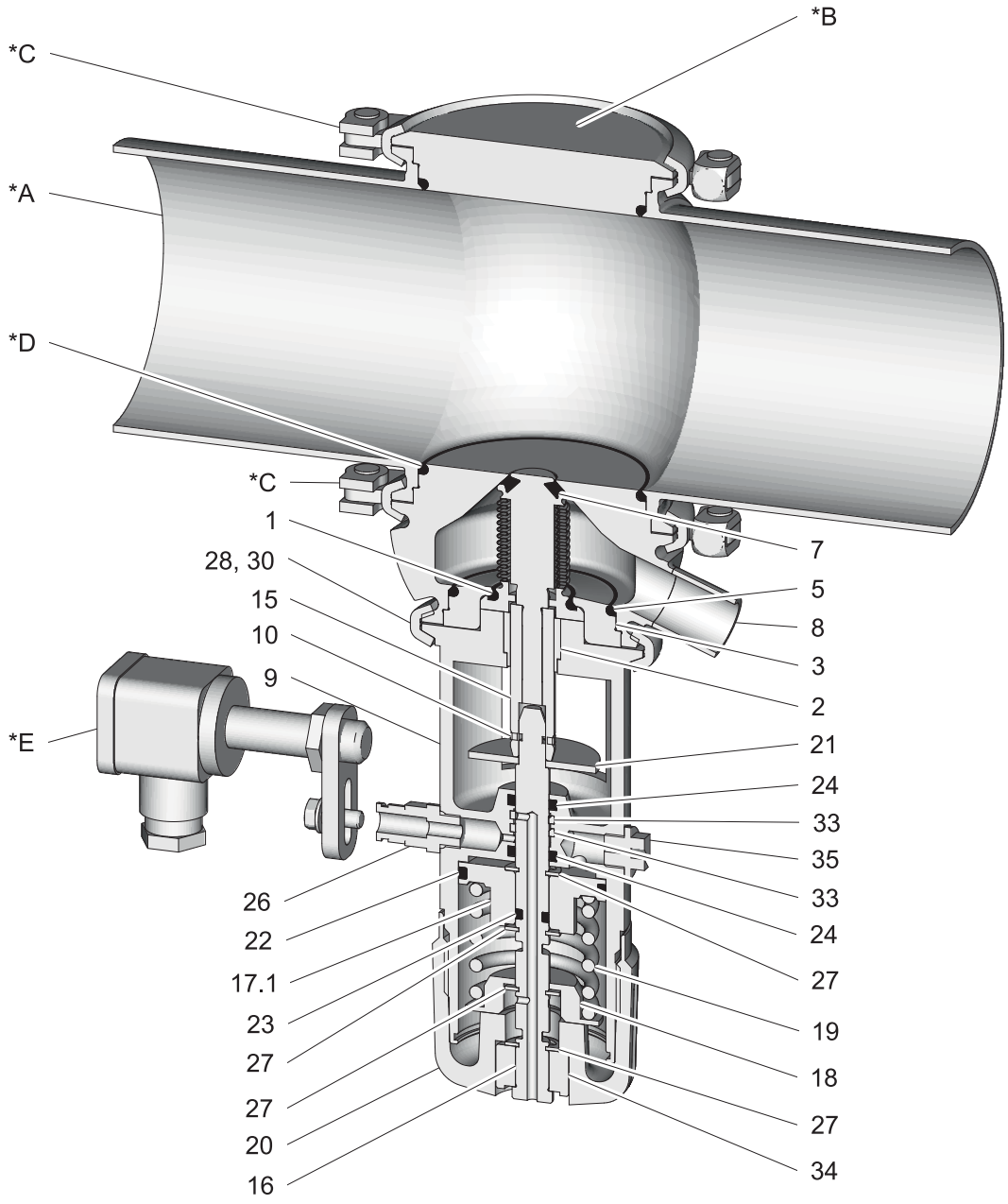


Fig.1

Item	Designation	Material	DN 25	DN 32	DN 40	DN 50
1	Seal ring	EPDM	924-255	924-255	924-255	924-255
		FKM	924-297	924-297	924-297	924-297
2	Bearing	PTFE/carbon	935-037	935-037	935-037	935-037
	Bearing, 3A	PEEK 450G	935-097	935-097	935-097	935-097
3	Sealing washer I	1.4404	222-601.01	222-601.01	222-601.01	222-601.01
5	O-ring	EPDM	930-309	930-309	930-309	930-309
		FKM	930-168	930-168	930-168	930-168
7	V-ring	EPDM	932-064	932-064	932-064	932-064
		FKM	932-073	932-073	932-073	932-073
8	Sampling housing N-1, 1 connectors	1.4404	229-330.05	229-330.05	229-330.06	229-330.06
	Sampling housing N-2, 2 connectors	1.4404	229-330.01	229-330.01	229-330.02	229-330.02
9	Sampling lantern	1.4404	229-336.02	229-336.02	229-336.02	229-336.02
10	Square ring	1.4571 K	221-313.01	221-313.01	221-313.01	221-313.01
15	Valve disk N	1.4404	229-331.05	229-331.05	229-331.04	229-331.04
16	Piston rod	1.4460	229-336.04	229-336.04	229-336.04	229-336.04
17.1	Piston	3.2315.72	229-332.04	229-332.04	229-332.04	229-332.04
18	Spring cage cover	EN AW-6082 T6	229-332.07	229-332.07	229-332.07	229-332.07
19	Compression spring	1.4310	931-258	931-258	931-258	931-258
20	Handwheel	PPH 4150	229-332.09	229-332.09	229-332.09	229-332.09
21	Contact disk	1.4301	229-336.01	229-336.01	229-336.01	229-336.01
22	O-ring	NBR	930-052	930-052	930-052	930-052
23	O-ring	NBR	930-605	930-605	930-605	930-605
24	Quad ring	NBR	930-466	930-466	930-466	930-466
26	Screw-in plug connection G 1/8" -6/4	Ms CV	933-176	933-176	933-176	933-176
	Screw-in plug connection G 1/8" -6.35/4.31	Ms CV	933-173	933-173	933-173	933-173
27	Lock washer	1.4122	917-119	917-119	917-119	917-119
28	Hinged clamp	1.4404	701-074	701-074	701-074	701-074
33	Guide ring	Turcite-T51	935-038	935-038	935-038	935-038
34	Bush	1.4301	229-332.10	229-332.10	229-332.10	229-332.10
35	Vent screw	PP	221-133.14	221-133.14	221-133.14	221-133.14
Used in combination with a VARIVENT housing, 2 sockets						
A	DN 25	1.4404	221-102.41	221-102.41	--	--
	DN 40	1.4404	--	--	221-102.43	221-102.43
	DN 50	1.4404	--	--	221-102.44	221-102.44
	DN 65	1.4404	--	--	221-102.23	221-102.23
	DN 80	1.4404	--	--	221-102.24	221-102.24
	DN 100	1.4404	--	--	221-102.18	221-102.18
	DN 125	1.4404	--	--	221-102.21	221-102.21
	1" OD	1.4404	221-102.52	221-102.52	--	--
	1.5" OD	1.4404	--	--	221-102.53	221-102.53

Item	Designation	Material	DN 25	DN 32	DN 40	DN 50
	2" OD	1.4404	--	--	221-102.54	221-102.54
	2.5" OD	1.4404	--	--	221-102.63	221-102.63
	3" OD	1.4404	--	--	221-102.64	221-102.64
	4" OD	1.4404	--	--	221-102.65	221-102.65
	2" IPS	1.4404	--	--	221-102.62	221-102.62
	3" IPS	1.4404	--	--	221-102.66	221-102.66
	4" IPS	1.4404	--	--	221-102.67	221-102.67
	6" IPS	1.4404	--	--	221-102.22	221-102.22
B	Blanking plate	1.4404	221-144.01	221-144.01	221-144.02	221-144.02
C	Hinged clamp	1.4401	701-074	701-074	701-075	701-075
	Hexagon nut	1.4305	912-035	912-035	912-035	912-035
D	O-ring	EPDM	930-309	930-309	930-144	930-144
		FKM	930-168	930-168	930-171	930-171
S	Feedback	See spare parts list 221ELI002735				

Sampling Valve, Type TSVN with Metal Bellows



Spare Parts Drawing

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Spare Parts List

Sampling Valve, Type TSVN with Metal Bellows

Item	Designation	Material	DN 25	DN 32	DN 40	DN 50
1	O-ring	EPDM FPM	930-270 930-163	930-270 930-163	930-270 930-163	930-270 930-163
2	Bearing Bearing, 3A	TUR PEEK 450G	935-037 935-097	935-037 935-097	935-037 935-097	935-037 935-097
3	Sealing disk N.M	1.4404	229-332.13	229-332.13	229-332.13	229-332.13
5	O-ring	EPDM FPM	930-309 930-168	930-309 930-168	930-309 930-168	930-309 930-168
7	V-ring	EPDM FKM	932-064 932-073	932-064 932-073	932-064 932-073	932-064 932-073
8	Sampling housing N-1, 1 socket(s)	1.4404	229-330.05	229-330.05	229-330.06	229-330.06
	Sampling housing N-2, 2 socket(s)	1.4404	229-330.01	229-330.01	229-330.02	229-330.02
9	Sampling lantern	1.4404	229-336.02	229-336.02	229-336.02	229-336.02
10	Square ring	1.4571 K	221-313.01	221-313.01	2291-313.01	221-313.01
15	Valve disk N.M	1.4404	229-331.09	229-331.09	229-331.08	229-331.08
16	Piston rod	1.4460	229-336.04	229-336.04	229-336.04	229-336.04
17.1	Piston	3.2315.72	229-332.04	229-332.04	229-332.04	229-332.04
18	Spring cage cover	1.4301	229-332.07	229-332.07	229-332.07	229-332.07
19	Compression spring	1.4310	931-258	931-258	931-258	931-258
20	Handwheel	PPH 4150	229-332.09	229-332.09	229-332.09	229-332.09
21	Contact disk	1.4301	229-336.01	229-336.01	229-336.01	229-336.01
22	O-ring	NBR	930-052	930-052	930-052	930-052
23	O-ring	NBR	930-605	930-605	930-605	930-605
24	Quad ring	NBR	930-466	930-466	930-466	930-466
26	Screw-in plug connection G 1/8" - 6/4	Brass/nickel-plated	933-176	933-176	933-176	933-176
	Screw-in plug connection G 1/8" - 6.35/4.31	Brass/nickel-plated	933-173	933-173	933-173	933-173
27	Lock washer	1.4122	917-119	917-119	917-119	917-119
28	Hinged clamp	1.4404	701-074	701-074	701-074	701-074
30	Hex nut	1.4305	912-035	912-035	912-035	912-035
33	Guide ring	Turcite	935-038	935-038	935-038	935-038
34	Bush	1.4301	229-332.10	229-332.10	229-332.10	229-332.10
35	Vent screw	PP	221-133.14	221-133.14	221-133.14	221-133.14

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Spare Parts List

Sampling Valve, Type TSVN with Metal Bellows

Used in combination with a VARIVENT housing, 2 sockets

Item	Designation	Material	DN 25	DN 32	DN 40	DN 50
A	DN 25	1.4404	221-102.41	221-102.41	--	--
	DN 40	1.4404	--	--	221-102.43	221-102.43
	DN 50	1.4404	--	--	221-102.44	221-102.44
	DN 65	1.4404	--	--	221-102.23	221-102.23
	DN 80	1.4404	--	--	221-102.24	221-102.24
	DN 100	1.4404	--	--	221-102.18	221-102.18
	DN 125	1.4404	--	--	221-102.21	221-102.21
	1" OD	1.4404	221-102.52	221-102.52	--	--
	1.5" OD	1.4404	--	--	221-102.53	221-102.53
	2" OD	1.4404	--	--	221-102.54	221-102.54
	2.5" OD	1.4404	--	--	221-102.63	221-102.63
	3" OD	1.4404	--	--	221-102.64	221-102.64
	4" OD	1.4404	--	--	221-102.65	221-102.65
	2" IPS	1.4404	--	--	221-102.62	221-102.62
	3" IPS	1.4404	--	--	221-102.66	221-102.66
	4" IPS	1.4404	--	--	221-102.67	221-102.67
	6" IPS	1.4404	--	--	221-102.22	221-102.22
B	Cover	1.4404	930-605	930-605	930-605	930-605
C	Hinged clamp	1.4401	701-074	701-074	701-075	701-075
	Hex nut	1.4305	912-035	912-035	912-035	912-035
D	O-ring	EPDM FKM	930-309 930-168	930-309 930-168	930-144 930-171	930-144 930-171
E	Feedback	See spare parts list 221ELI002735				

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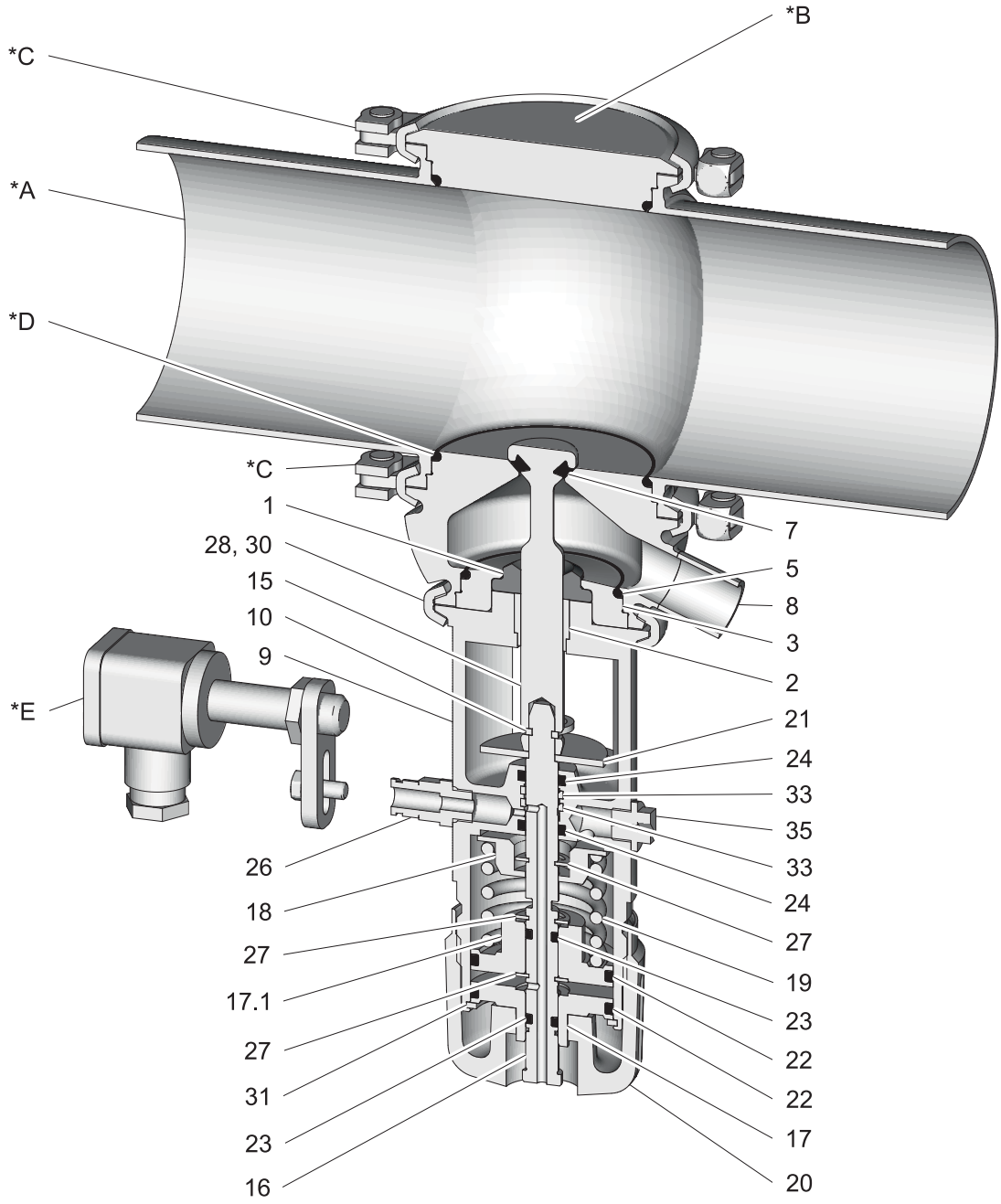
Spare Parts List

Sampling Valve TSVU

Sampling Valve TSVU



Spare Parts Drawing

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Spare Parts List

Sampling Valve TSVU

Item	Designation	Material	DN 25	DN 32	DN 40	DN 50
1	Sealing ring	EPDM FPM	924-255 924-297	924-255 924-297	924-255 924-297	924-255 924-297
2	Bearing Bearing, 3A	PTFE / carbon PEEK 450G	935-037 935-097	935-037 935-097	935-037 935-097	935-037 935-097
3	Sealing disk P	1.4404	229-601.01	229-601.01	229-601.01	229-601.01
5	O-ring	EPDM FPM	930-309 930-168	930-309 930-168	930-309 930-168	930-309 930-168
7	V-ring	EPDM FKM	932-064 932-073	932-064 932-073	932-064 932-073	932-064 932-073
8	Sampling housing U-1, 1 socket(s)	1.4404	229-330.07	229-330.07	229-330.08	229-330.08
	Sampling housing U-2, 2 socket(s)	1.4404	229-330.04	229-330.04	229-330.03	229-330.03
9	Sampling lantern	1.4404	229-336.02	229-336.02	229-336.02	229-336.02
10	Square ring	1.4571 K	221-313.01	221-313.01	2291-313.01	221-313.01
15	Valve disk U	1.4404	229-331.11	229-331.11	229-331.10	229-331.10
16	Piston rod	1.4460	229-336.04	229-336.04	229-336.04	229-336.04
17	Piston	PP	229-332.06	229-332.06	229-332.06	229-332.06
17.1	Piston	3.2315.72	229-332.04	229-332.04	229-332.04	229-332.04
18	Spring cage cover	1.4301	229-332.07	229-332.07	229-332.07	229-332.07
19	Compression spring	1.4310	931-258	931-258	931-258	931-258
20	Handwheel	PPH 4150	229-332.09	229-332.09	229-332.09	229-332.09
21	Contact disk	1.4301	229-336.01	229-336.01	229-336.01	229-336.01
22	O-ring	NBR	930-052	930-052	930-052	930-052
23	O-ring	NBR	930-605	930-605	930-605	930-605
24	Quad ring	NBR	930-466	930-466	930-466	930-466
26	Screw-in plug connection G 1/8" - 6/4	Brass/nickel-plated	933-176	933-176	933-176	933-176
	Screw-in plug connection G 1/8" - 6.35/4.31	Brass/nickel-plated	933-173	933-173	933-173	933-173
27	Lock washer	1.4122	917-119	917-119	917-119	917-119
28	Hinged clamp	1.4404	701-074	701-074	701-074	701-074
30	Hex nut	1.4305	912-035	912-035	912-035	912-035
31	Circlip	1.4122	917-141	917-141	917-141	917-141
33	Guide ring	Turcite	935-038	935-038	935-038	935-038
35	Vent screw	PP	221-133.14	221-133.14	221-133.14	221-133.14

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Spare Parts List

Sampling Valve TSVU

Used in combination with a VARIVENT housing, 2 sockets

Item	Designation	Material	DN 25	DN 32	DN 40	DN 50
A	DN 25	1.4404	221-102.41	221-102.41	--	--
	DN 40	1.4404	--	--	221-102.43	221-102.43
	DN 50	1.4404	--	--	221-102.44	221-102.44
	DN 65	1.4404	--	--	221-102.23	221-102.23
	DN 80	1.4404	--	--	221-102.24	221-102.24
	DN 100	1.4404	--	--	221-102.18	221-102.18
	DN 125	1.4404	--	--	221-102.21	221-102.21
	1" OD	1.4404	221-102.52	221-102.52	--	--
	1.5" OD	1.4404	--	--	221-102.53	221-102.53
	2" OD	1.4404	--	--	221-102.54	221-102.54
	2.5" OD	1.4404	--	--	221-102.63	221-102.63
	3" OD	1.4404	--	--	221-102.64	221-102.64
	4" OD	1.4404	--	--	221-102.65	221-102.65
	2" IPS	1.4404	--	--	221-102.62	221-102.62
	3" IPS	1.4404	--	--	221-102.66	221-102.66
	4" IPS	1.4404	--	--	221-102.67	221-102.67
	6" IPS	1.4404	--	--	221-102.22	221-102.22
B	Cover	1.4404	221-144.01	221-144.01	221-144.02	221-144.02
C	Hinged clamp	1.4401	701-074	701-074	701-075	701-075
	Hex nut	1.4305	912-035	912-035	912-035	912-035
D	O-ring	EPDM FKM	930-309 930-168	930-309 930-168	930-144 930-171	930-144 930-171
E	Feedback	See spare parts list 221ELI002735				

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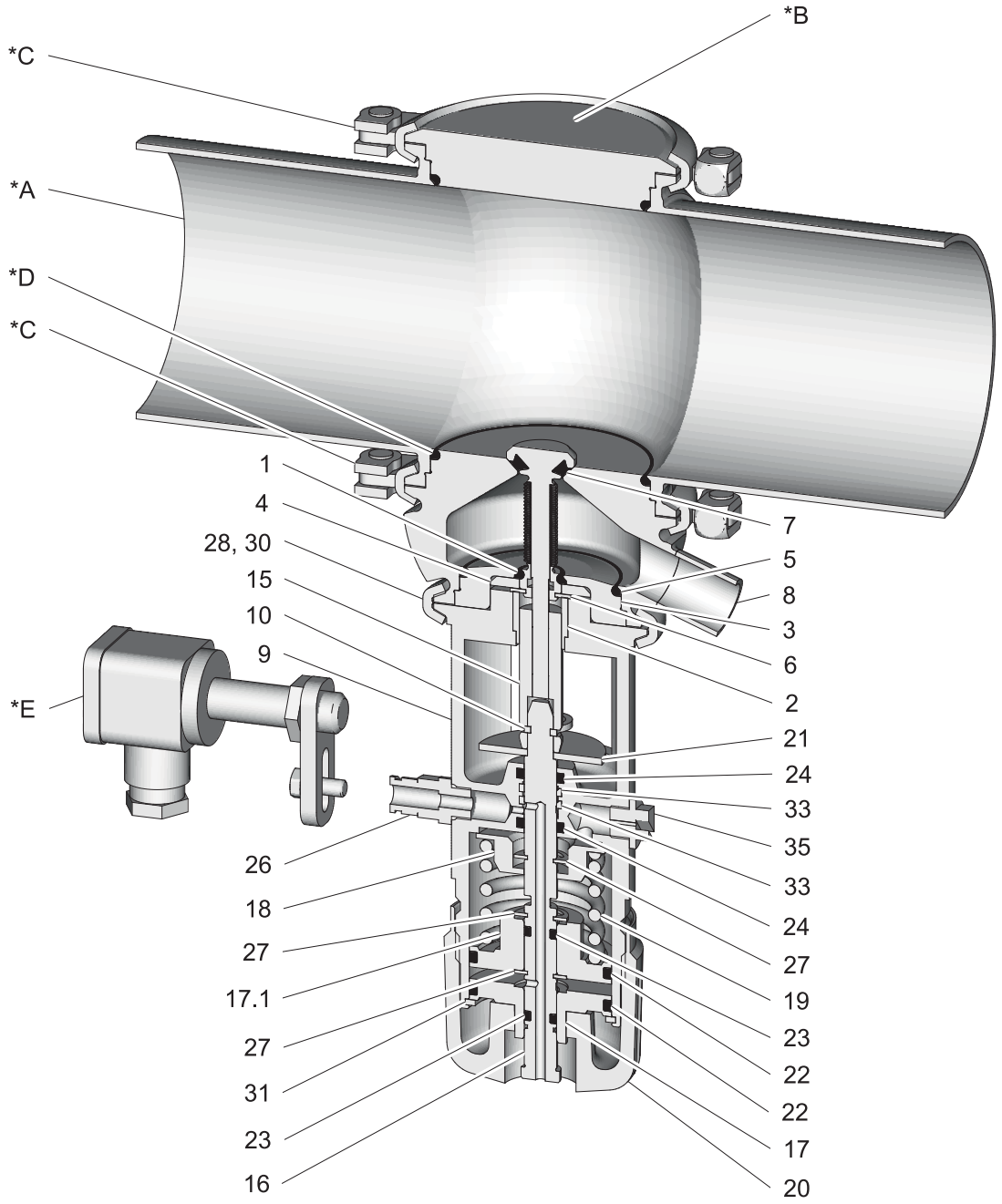
Sampling Valve, Type TSVU with Metal Bellows



Spare Parts Drawing

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Spare Parts List

Sampling Valve, Type TSVU with Metal Bellows

Item	Designation	Material	DN 25	DN 32	DN 40	DN 50
1	O-ring	EPDM FPM	930-311 930-335	930-311 930-335	930-311 930-335	930-311 930-335
2	Bearing Bearing, 3A	PTFE / carbon PEEK 450G	935-037 935-097	935-037 935-097	935-037 935-097	935-037 935-097
3	Sealing disk N.M	1.4404	229-332.03	229-332.03	229-332.03	229-332.03
4	Thrust washer TIU/M	1.4404	229-331.01	229-331.01	229-331.01	229-331.01
5	O-ring	EPDM FPM	930-309 930-168	930-309 930-168	930-309 930-168	930-309 930-168
6	Lock washer	1.4122	917-142	917-142	917-142	917-142
7	V-ring	EPDM FKM	932-064 932-073	932-064 932-073	932-064 932-073	932-064 932-073
8	Sampling housing U-1, 1 socket(s)	1.4404	229-330.07	229-330.07	229-330.08	229-330.08
	Sampling housing U-2, 2 socket(s)	1.4404	229-330.04	229-330.04	229-330.03	229-330.03
9	Sampling lantern	1.4404	229-336.02	229-336.02	229-336.02	229-336.02
10	Square ring	1.4571 K	221-313.01	221-313.01	2291-313.01	221-313.01
15	Valve disk U.M	1.4404	229-331.12	229-331.12	229-331.02	229-331.02
16	Piston rod	1.4460	229-336.04	229-336.04	229-336.04	229-336.04
17	Piston	PP	229-332.06	229-332.06	229-332.06	229-332.06
17.1	Piston	3.2315.72	229-332.04	229-332.04	229-332.04	229-332.04
18	Spring cage cover	1.4301	229-332.07	229-332.07	229-332.07	229-332.07
19	Compression spring	1.4310	931-258	931-258	931-258	931-258
20	Handwheel	PPH 4150	229-332.09	229-332.09	229-332.09	229-332.09
21	Contact disk	1.4301	229-336.01	229-336.01	229-336.01	229-336.01
22	O-ring	NBR	930-052	930-052	930-052	930-052
23	O-ring	NBR	930-605	930-605	930-605	930-605
24	Quad ring	NBR	930-466	930-466	930-466	930-466
26	Screw-in plug connection G 1/8" - 6/4	Brass/nickel-plated	933-176	933-176	933-176	933-176
	Screw-in plug connection G 1/8" - 6.35/4.31	Brass/nickel-plated	933-173	933-173	933-173	933-173
27	Lock washer	1.4122	917-119	917-119	917-119	917-119
28	Hinged clamp	1.4404	701-074	701-074	701-074	701-074
30	Hex nut	1.4305	912-035	912-035	912-035	912-035
31	Circlip	1.4122	917-141	917-141	917-141	917-141
33	Guide ring	Turcite	935-038	935-038	935-038	935-038
35	Vent screw	PP	221-133.14	221-133.14	221-133.14	221-133.14

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Spare Parts List

Sampling Valve, Type TSVU with Metal Bellows

Used in combination with a VARIVENT housing, 2 sockets

Item	Designation	Material	DN 25	DN 32	DN 40	DN 50
A	DN 25	1.4404	221-102.41	221-102.41	--	--
	DN 40	1.4404	--	--	221-102.43	221-102.43
	DN 50	1.4404	--	--	221-102.44	221-102.44
	DN 65	1.4404	--	--	221-102.23	221-102.23
	DN 80	1.4404	--	--	221-102.24	221-102.24
	DN 100	1.4404	--	--	221-102.18	221-102.18
	DN 125	1.4404	--	--	221-102.21	221-102.21
	1" OD	1.4404	221-102.52	221-102.52	--	--
	1.5" OD	1.4404	--	--	221-102.53	221-102.53
	2" OD	1.4404	--	--	221-102.54	221-102.54
	2.5" OD	1.4404	--	--	221-102.63	221-102.63
	3" OD	1.4404	--	--	221-102.64	221-102.64
	4" OD	1.4404	--	--	221-102.65	221-102.65
	2" IPS	1.4404	--	--	221-102.62	221-102.62
	3" IPS	1.4404	--	--	221-102.66	221-102.66
	4" IPS	1.4404	--	--	221-102.67	221-102.67
	6" IPS	1.4404	--	--	221-102.22	221-102.22
B	Cover	1.4404	221-144.01	221-144.01	221-144.02	221-144.02
C	Hinged clamp	1.4401	701-074	701-074	701-075	701-075
	Hex nut	1.4305	912-035	912-035	912-035	912-035
D	O-ring	EPDM FKM	930-309 930-168	930-309 930-168	930-144 930-171	930-144 930-171
E	Feedback	See spare parts list 221ELI002735				

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12 Appendix

12.1 Lists

12.2 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

13 Spare parts list - Sampling valve TSVN"

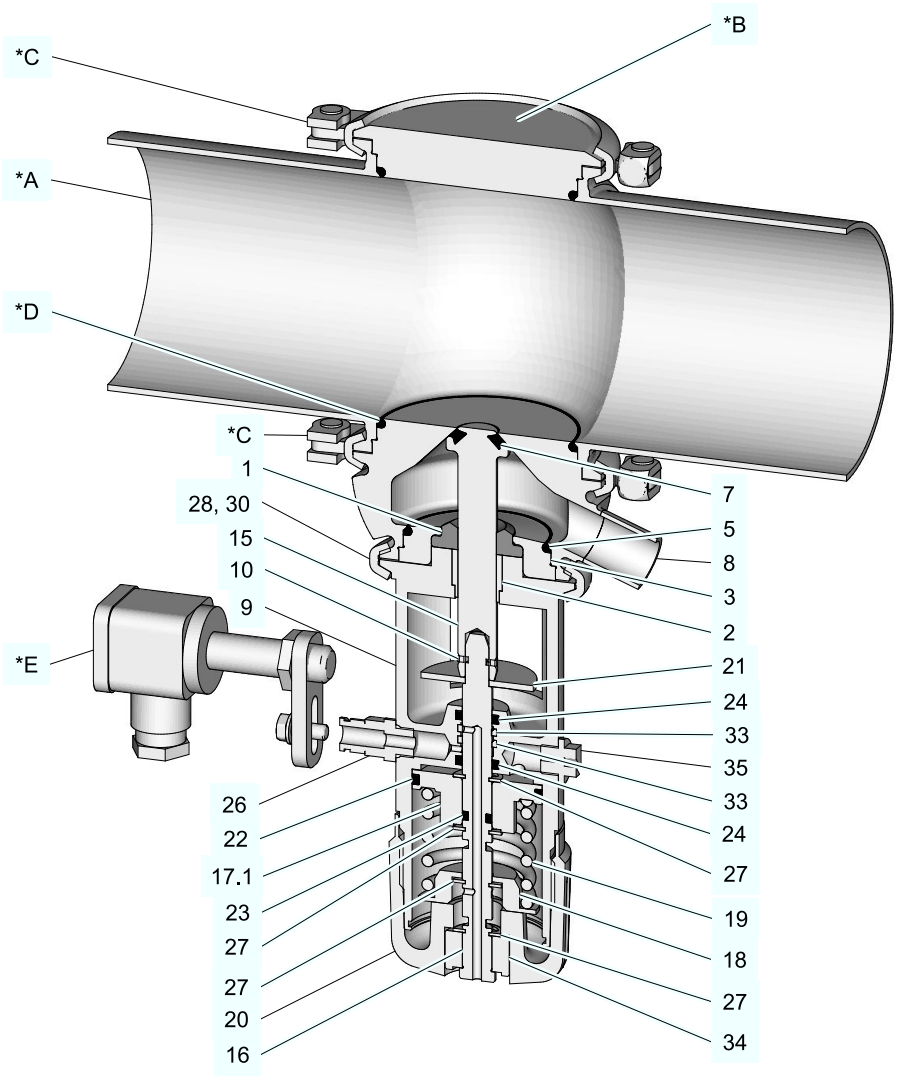

Fig.13

Item	Designation	Material	DN 25	DN 32	DN 40	DN 50
1	Seal ring	EPDM	924-255	924-255	924-255	924-255
		FKM	924-297	924-297	924-297	924-297
2	Bearing	PTFE/carbon	935-037	935-037	935-037	935-037
	Bearing, 3A	SUSTA-PVDF	935-097	935-097	935-097	935-097
3	Sealing washer I	1.4404	222-601.01	222-601.01	222-601.01	222-601.01
5	O-ring	EPDM	930-309	930-309	930-309	930-309
		FKM	930-168	930-168	930-168	930-168
7	V-ring	EPDM	932-064	932-064	932-064	932-064
		FKM	932-073	932-073	932-073	932-073
8	Sampling housing N-1, 1 connectors	1.4404	229-330.05	229-330.05	229-330.06	229-330.06
	Sampling housing N-2, 2 connectors	1.4404	229-330.01	229-330.01	229-330.02	229-330.02
9	Sampling lantern	1.4404	229-336.02	229-336.02	229-336.02	229-336.02
10	Square ring	1.4571 K	221-313.01	221-313.01	221-313.01	221-313.01
15	Valve disk N	1.4404	229-331.05	229-331.05	229-331.04	229-331.04
16	Piston rod	1.4460	229-336.04	229-336.04	229-336.04	229-336.04
17.1	Piston	3.2315.72	229-332.04	229-332.04	229-332.04	229-332.04
18	Spring cage cover	EN AW-6082 T6	229-332.07	229-332.07	229-332.07	229-332.07
19	Compression spring	1.4310	931-258	931-258	931-258	931-258
20	Handwheel	PPH 4150	229-332.08	229-332.08	229-332.08	229-332.08
21	Contact disk	1.4301	229-336.01	229-336.01	229-336.01	229-336.01
22	O-ring	NBR	930-052	930-052	930-052	930-052
23	O-ring	NBR	930-605	930-605	930-605	930-605
24	Quad ring	NBR	930-466	930-466	930-466	930-466
26	Screw-in plug connection G 1/8" -6/4	Ms CV	933-176	933-176	933-176	933-176
	Screw-in plug connection G 1/8" -6.35/4.31	Ms CV	933-173	933-173	933-173	933-173
27	Lock washer	1.4122	917-119	917-119	917-119	917-119
28	Hinged clamp	1.4404	701-074	701-074	701-074	701-074
33	Guide ring	Turcite-T51	935-038	935-038	935-038	935-038
34	Bush	1.4301	229-332.10	229-332.10	229-332.10	229-332.10
35	Vent screw	PP	221-133.14	221-133.14	221-133.14	221-133.14
Used in combination with a VARIVENT housing, 2 sockets						
A	DN 25	1.4404	221-102.41	221-102.41	--	--
	DN 40	1.4404	--	--	221-102.43	221-102.43
	DN 50	1.4404	--	--	221-102.44	221-102.44
	DN 65	1.4404	--	--	221-102.23	221-102.23
	DN 80	1.4404	--	--	221-102.24	221-102.24
	DN 100	1.4404	--	--	221-102.18	221-102.18
	DN 125	1.4404	--	--	221-102.21	221-102.21
	1" OD	1.4404	221-102.52	221-102.52	--	--
	1.5" OD	1.4404	--	--	221-102.53	221-102.53

Item	Designation	Material	DN 25	DN 32	DN 40	DN 50
	2" OD	1.4404	--	--	221-102.54	221-102.54
	2.5" OD	1.4404	--	--	221-102.63	221-102.63
	3" OD	1.4404	--	--	221-102.64	221-102.64
	4" OD	1.4404	--	--	221-102.65	221-102.65
	2" IPS	1.4404	--	--	221-102.62	221-102.62
	3" IPS	1.4404	--	--	221-102.66	221-102.66
	4" IPS	1.4404	--	--	221-102.67	221-102.67
	6" IPS	1.4404	--	--	221-102.22	221-102.22
B	Blanking plate	1.4404	221-144.01	221-144.01	221-144.02	221-144.02
C	Hinged clamp	1.4401	701-074	701-074	701-075	701-075
	Hexagon nut	1.4305	912-035	912-035	912-035	912-035
D	O-ring	EPDM	930-309	930-309	930-144	930-144
		FKM	930-168	930-168	930-171	930-171
S	Feedback	See spare parts list 221ELI002735				

14 Dimension sheet - VARINLINE® Sampling valve, type TSVN

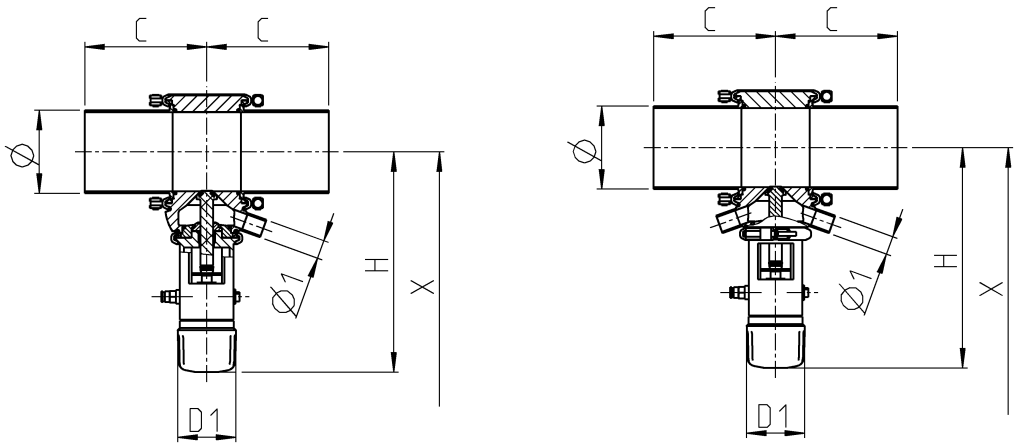

Fig.14

Nominal width	Process connection	Pipe	Housing		Size		Actuator	Valve	
		Ø [mm]	Ø1 [mm]	C [mm]	H [mm]	X [mm]	D1 [mm]	Stroke [mm]	Weight [kg]
DN 25	F	29.0 x 1.50	13 x 1.5	90.0	193.0	205.0	60	8	3.0
DN 40	N	41.0 x 1.50	19 x 1.5	90.0	199.0	212.0	60	8	3.9
DN 50	N	53.0 x 1.50	19 x 1.5	90.0	205.0	218.0	60	8	4.0
DN 65	N	70.0 × 2.00	19 x 1.5	125.0	213.0	226.0	60	8	4.6
DN 80	N	85.0 × 2.00	19 x 1.5	125.0	220.5	233.5	60	8	4.8
DN 100	N	104.0 × 2.00	19 x 1.5	125.0	230.0	243.0	60	8	5.2
DN 125	N	129.0 × 2.00	19 x 1.5	125.0	242.5	255.5	60	8	5.5
DN 150	N	154.0 × 2.00	19 x 1.5	150.0	255.0	268.0	60	8	9.9
OD 1"	F	25.4 × 1.65	13 x 1.5	90.0	191.0	204.0	60	8	2.9
OD 1.5"	N	38.1 × 1.65	19 x 1.5	90.0	197.5	210.5	60	8	3.8
OD 2"	N	50.8 × 1.65	19 x 1.5	90.0	203.8	216.8	60	8	4.0
OD 2.5"	N	63.5 × 1.65	19 x 1.5	125.0	210.0	223.0	60	8	4.4
OD 3"	N	76.2 × 1.65	19 x 1.5	125.0	216.5	229.5	60	8	4.6
OD 4"	N	101.6 × 2.11	19 x 1.5	125.0	228.8	241.8	60	8	5.1
OD 6"	N	152.4 × 2.77	19 x 1.5	150.0	258.0	272.0	60	8	10.5
IPS 2"	N	60.3 × 2.00	19 x 1.5	114.3	208.5	221.5	60	8	4.4
IPS 3"	N	88.9 × 2.30	19 x 1.5	152.4	222.5	235.5	60	8	5.0
IPS 4"	N	114.3 × 2.30	19 x 1.5	152.4	235.0	248.0	60	8	6.0
IPS 6"	N	168.3 × 2.77	19 x 1.5	152.4	261.0	274.0	60	8	11.0
ISO 33.7	F	33.70 x 2.00	13 x 1.5	114.3	194.9	207.9	60	8	3.1
ISO 42.4	N	42.40 x 2.00	19 x 1.5	114.3	199.2	212.2	60	8	4.0
ISO 48.3	N	48.30 x 2.00	19 x 1.5	114.3	202.2	215.2	60	8	4.1
ISO 60.3	N	60.30 x 2.00	19 x 1.5	114.3	208.1	221.1	60	8	4.5
ISO 76.1	N	76.10 x 2.00	19 x 1.5	152.4	216.5	229.5	60	8	4.8
ISO 88.9	N	88.90 x 2.30	19 x 1.5	152.4	222.5	235.5	60	8	5.3
ISO 114.3	N	114.30 x 2.30	19 x 1.5	152.4	235.0	248.0	60	8	6.1

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