



Hygienic valves

GEA VARIVENT® control valve type P

Operating instruction (Translation from the original language)

430BAL011665EN_5

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1 General Information

1.1 Information on the Document

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

1.1.1 Binding Character of These Operating Instructions

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

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

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

1.1.2 Notes on the Illustrations

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

1.1.3 Symbols and Highlighting

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



Danger

Warning: Fatal Injuries

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

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



Warning: Explosions

Failure to observe the warning can result in severe explosions.

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



Warning!

Warning: Serious Injuries

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

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



Caution!

Warning: Injuries

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

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

Notice

Warning: Damage to Property

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

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

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

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



Hint!

Further useful information.

1.2 Manufacturer address

GEA Tuchenhausen GmbH
Am Industriepark 2-10
21514 Büchen

1.3 Contact

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

1.4 EU Declaration of Conformity in accordance with the EC Machinery Directive 2006/42/EC

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

We hereby declare that the machine named below

Designation:	Valve with actuator
Type:	VARIVENT®

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

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

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

Remarks:

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

Person authorised for compilation and handover of technical documentation:	GEA Tuchenhausen GmbH CE Documentation Officer Am Industriepark 2-10 21514 Büchen, Germany
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Büchen, 24 January 2020

Franz Bürmann
Managing Director

i.V. Matthias Südel
Head of Engineering

2 Safety

2.1 Intended use

The control valve is used to control flow rates and pressures in automated process plants.

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



Hint!

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

2.1.1 Requirements for operation

The prerequisite for reliable and safe operation of the component is proper transportation and storage as well as professional installation and assembly.

Operating the unit within the limits of its designated use also involves adhering to the operating, inspection and maintenance instructions.

2.1.2 Pressure equipment directive

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

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

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

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

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

2.1.3 ATEX directive

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

The supplementary ATEX operating instructions for VARIVENT valves must be observed. For details regarding the marking of valves for potentially explosive areas also refer to the additional ATEX operating instructions for VARIVENT valves.

If used in explosion-proof areas, the regulations laid down in the European standards DIN EN 60079-0 and DIN EN 60079-11 must be observed.

2.1.4 Improper operating conditions

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

The operation of the component is not permitted if:

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

2.2 Operator's Duty of Care

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

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

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

- Only qualified personnel may work on the component.
- The operating company must authorize personnel to carry out the relevant tasks.
- Order and cleanliness must be maintained at the work stations and in the entire area surrounding the component.
- Personnel must wear suitable work clothing and personal protective equipment. As the operating company must ensure that work clothing and personal protective equipment are used.
- Inform personnel regarding any properties of the product which might pose a health risk and the preventative measures to be taken.
- Have a qualified first-aid representative on call during the operation. This person must be able to initiate any necessary first-aid measures in case of an emergency.
- Clearly define procedures, competences and responsibilities for those working in the area of the component. Everybody must know what to do in case of an emergency. Instruct the staff in this respect at regular intervals.
- The signs on the component must always be complete and easy to read. Check, clean and replace the signs as necessary at regular intervals.
- Observe the Technical Data specified and the limits of use!



Hint!

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

2.3 Subsequent changes

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

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

2.4 General safety instructions and dangers

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

Nevertheless, dangers can arise from the component, if:

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

2.4.1 Principles for safe operation

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

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

- The Operating Instructions must be kept ready to hand at the valve's place of use. They must be complete and in clearly legible form.
- Only use the valve for its intended use.
- The valve must be functional and in good working order. Check the condition of the valve before starting work and at regular intervals.
- Wear tight-fitting work clothing for all work on the valve.
- Ensure that nobody can get hurt on the parts of the valve.
- Immediately report any faults or noticeable changes on the valve to the person responsible.
- Never touch the pipes and the valve when these components are hot! Avoid opening the valve unless the process plants have been emptied and depressurised.
- Observe the accident prevention regulations and all local regulations.

2.4.2 Environmental Protection

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

For environmental protection the following principles apply:

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

2.4.3 Electrical Equipment

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

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

2.5 Supplementary Regulations

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

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

2.6 Qualification of personnel

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

Operating and maintenance personnel must

- have the necessary qualification to carry out their tasks,
- be instructed with regard to possible dangers,
- know and observe the safety instructions given in the documentation.

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

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

The following minimum qualifications are required:

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

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

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

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

User groups	
Staff	Qualifications
Operating personnel	Adequate instruction and sound knowledge in the following areas: • Functionality of the component • Operating sequences on the pump • What to do in case of an emergency • Lines of authority and responsibilities with respect to the task
Maintenance personnel	Appropriate training and a sound knowledge of the structure and functionality of the component. Sound knowledge in the following areas: • Mechanical equipment • Electrical equipment • Pneumatic system Authorization with regard to safety engineering standards to carry out the following tasks: • Setting devices into operation • Earthing of devices • Marking of devices The relevant certificates of qualification must be submitted before work can be carried out on ATEX certified machines.

2.7 Safety equipment

2.7.1 Signage

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

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

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

2.8 Residual dangers

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

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

Residual dangers on the valve and measures		
Danger	Cause	Measure
Danger of injury	Danger presented by moving or sharp-edged parts	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:

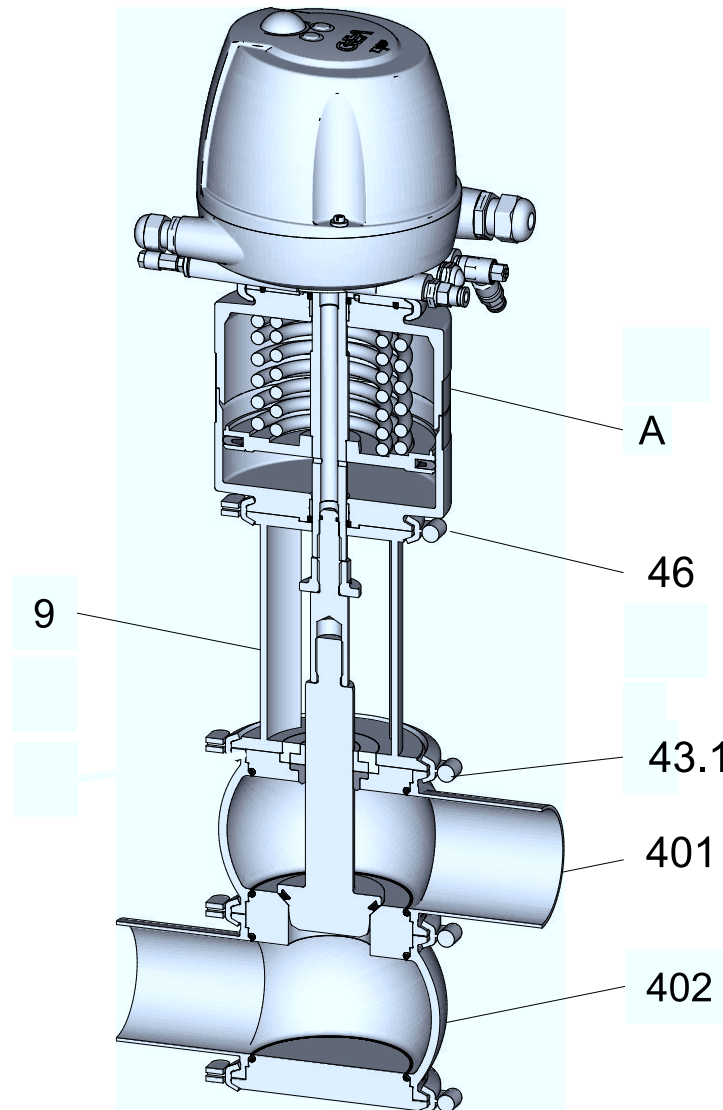


Fig.4

- 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 motor stool (9) or the valve housing (401/402) when the valve is switching. Fingers can be crushed or cut off.
- On a spring-closing valve there is a danger of injury when the clamp connection (43.1/46) is opened, as the released spring pretension will suddenly lift the actuator. Therefore, release the spring tension before detaching the clamp connection (43.1) 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

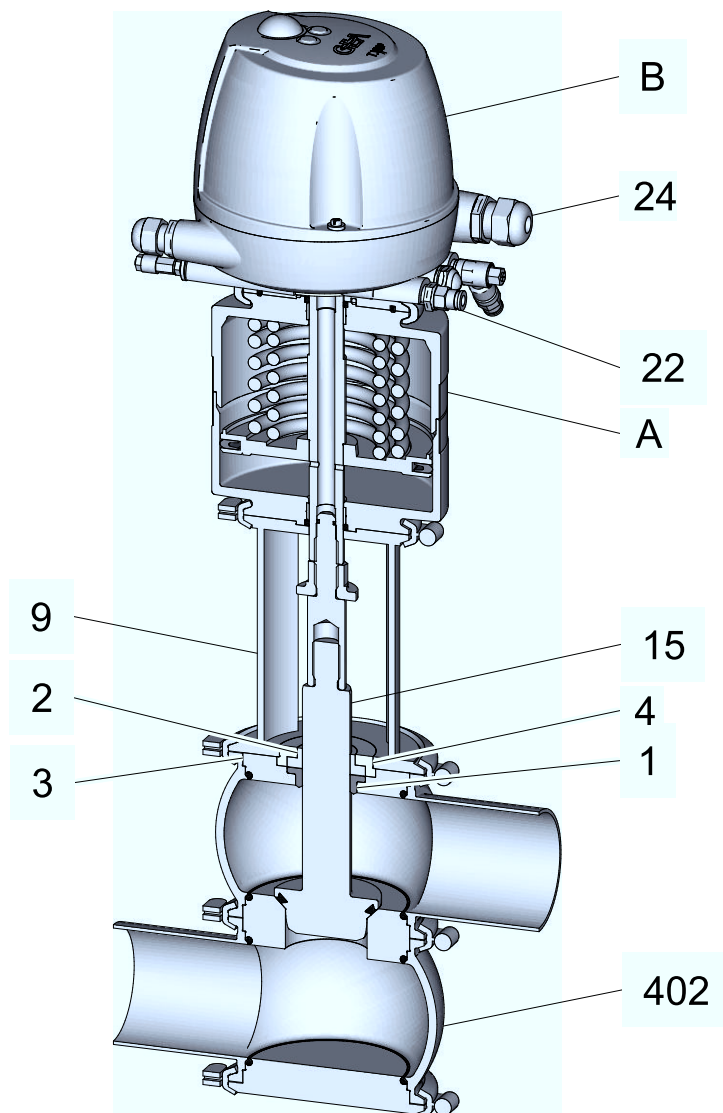


Fig.5

Design	
No.	Designation
A	Actuator
B	Control Top T.VIS P-15
1	Sealing ring
2	Bearing
3	Sealing disk
4	Bearing disk
9	Motor stool

Design	
No.	Designation
15	Valve disk
22	Air connection
24	Electrical connection
402	Valve housing

3.2 Functional description

3.2.1 Control valve type P- P_F / P_J

Closing Direction

Closing direction: from top to bottom

Standard: spring-to-close

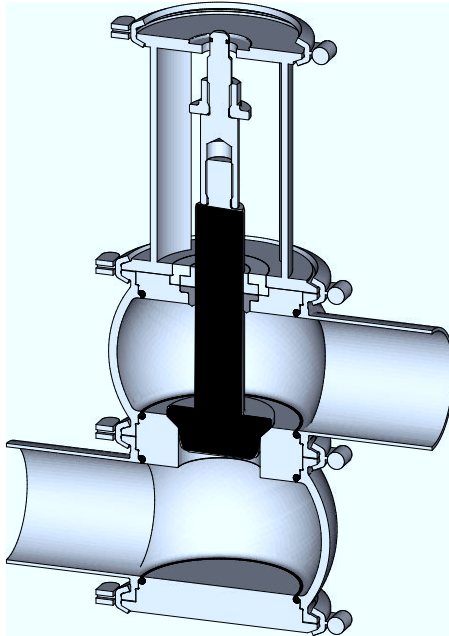


Fig.6: Distinguishing Feature of Spring-To-Close Actuator (Z)

The valve is closed in the non-actuated position.

Identification:

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

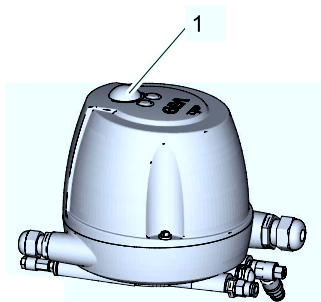


Fig.7: Distinguishing Feature of Spring-To-Open Actuator (A)

The valve is open in the non-actuated position.

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

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



Hint!

For further information regarding the control top please refer to the Operating Instructions “Control Top T.VIS P-15”.

3.2.2 Control valve type P - divert valve W/X

Closing Direction

Closing direction: from the bottom to the top

Standard: spring-to-close

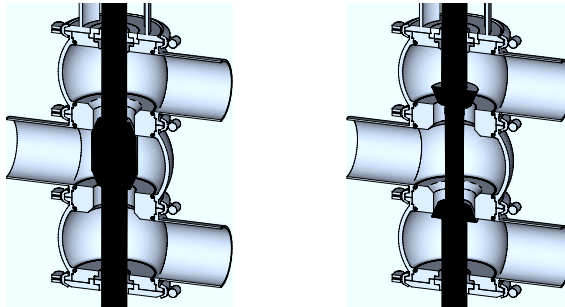


Fig.8: Distinguishing Feature of Spring-To-Close Actuator (Z)

The valve is closed in the non-actuated position.

Identification:

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

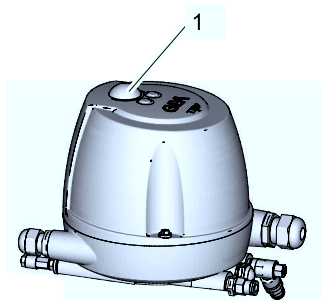


Fig.9: Distinguishing Feature of Spring-To-Open Actuator (A)

The valve is open in the non-actuated position.

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

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

4 Transport and storage

4.1 Storage conditions

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

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



Hint!

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

4.2 Transport



Fig.10

For transport, the following principles apply:

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

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

4.2.1 Scope of supply

After taking delivery of the component, check if

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

5 Technical data

5.1 Type plate

The type plate clearly identifies the valve.

GEA Tuchenhausen GmbH Am Industriepark 2-10, 21514 Büchen, Germany		GEA	
Type			
Serial			
Mat.			
Air bar/psi	min.	max.	
PSI bar/psi	1	2	3
			CE

The type plate provides the following key data:

Key data of the valve	
Type	Control valve P
Serial	Serial number
Material	1.4404 (AISI316L) / EPDM
Control air pressure bar/psi	6 bar (87 psi)
Product pressure bar/psi	5 bar (72.5 psi)
K _{vs} value / seat diameter	35.0 / 48.0

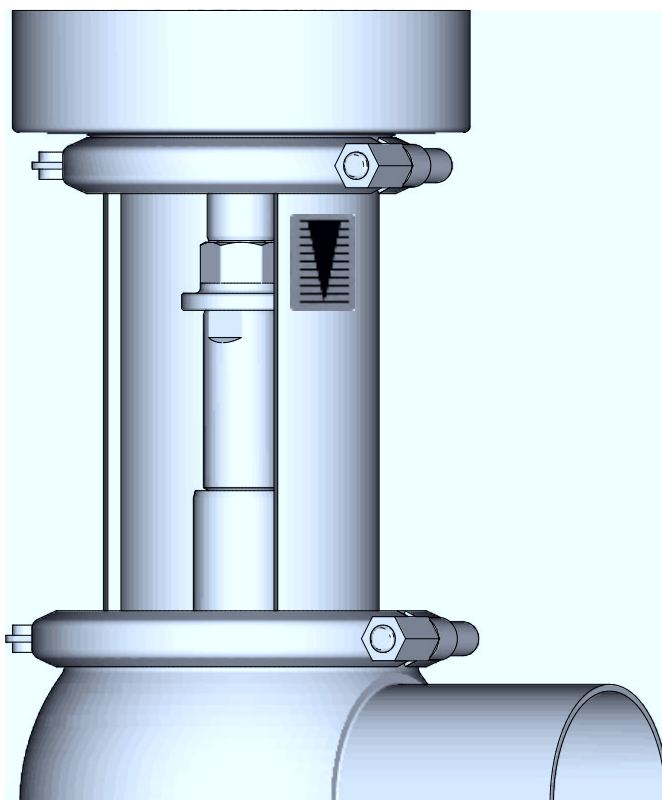


Fig.11: Marking on lantern - closed position

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 150 1" to 6" OD 2" to 6" IPS
Material of product contact parts	Stainless steel 1.4404
Fitting position	Any position, if valve and pipe system can drain properly

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. < -15 °C: no solenoid valves in the control top < +50 °C: no solenoid valves in the control top
Initiator	-20 to +80 °C (-4 ... +176 °F)
Control Top T.VIS P-15	-20 to +50 °C (-4 ... +122 °F)
Product temperature and operating temperature	depending on the sealing material

Technical data: Compressed air supply	
Designation	Description
Air hose	
• Metric	Material PE-LD Outside Ø 6 mm Inside Ø 4 mm
• Inch	Material PA Outside Ø 6.35 mm Inside Ø 4.3 mm
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

Technical data: Compressed air supply	
Designation	Description
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	6 bar (87 psi), max. 8 bar (116 psi) configuration with standard drive Alternative combinations of product pressure and control air pressure on request
Product pressure	5 bar (72.5 psi) configuration with standard drive max. 10 bar (116 psi) configuration with correspondingly designed actuator > 10 bar (145.0 psi) for static applications and on request

5.3 Seat leakage according to DIN EN 60534-4

Herewith we confirm that our hygienic VARIVENT® control valves type S and P meet the requirements according to DIN EN 60534-4.

Examples for the different seat seals:

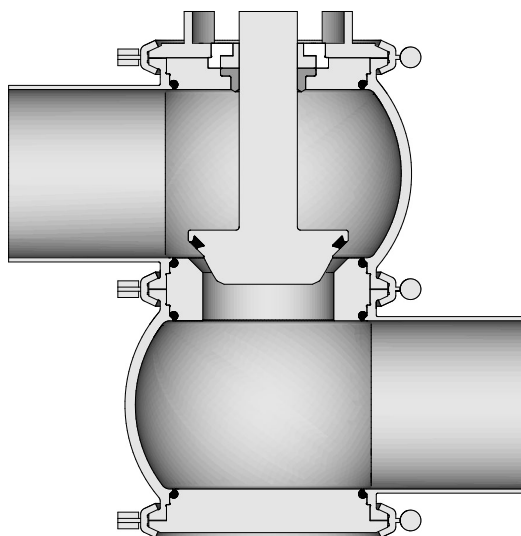


Fig.12: Soft-sealing seat version (VARIVENT® principle with V-ring)

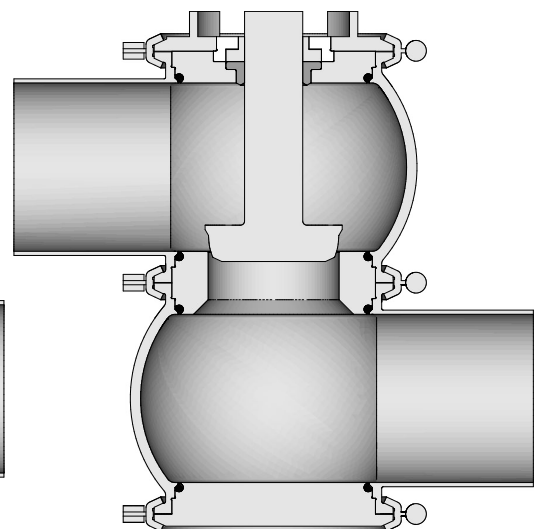


Fig.13: Metallic seat version

Technical data

Resistance and permitted operating temperature of the sealing materials

The **soft-sealing seat version** is subject to **leakage class VI**. This results in the following exemplary permissible seat leakages for 5 barg (test medium air).

KVS (m ³ /h)	4	6.3	10	16	25	35	40	60	80	100	160	200	260	360
Permissible leakage (air in ml/min)	0.23	0.23	0.23	0.32	0.45	0.68	0.68	0.90	1.35	2.55	2.55	3.24	4.62	6.00

The **metallic seat version** is subject to **leakage class IV** (test procedure 2). This results in the following exemplary permissible seat leakages for 5 barg (test medium air).

KVS (m ³ /h)	4	6.3	10	16	25	35	40	60	80	100	160	200	260	360
Permissible leakage (water in ml/min)	20	20	40	60	90	130	150	220	300	370	590	730	950	1320

5.4 Resistance and permitted operating temperature of the sealing materials

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

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

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

Resistance:

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

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

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

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

5.5 Pipe ends - General table of measurements



Hint!

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

Dimensions for Pipes in DN				
Metric DN	Outside diameter	Wall thickness	Inside diameter	Outside diameter acc. to DIN 11850
15	19	1.5	16	x
20	23	1.5	20	x

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

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

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

5.6 Tools

Tools	Material no.
Manual emergency actuator	221.310.74
Pneumatic emergency switch bar (DN 25 to 100)	221-105.67
Pneumatic emergency switch bar (DN 125 to 162 (6" IPS))	221-105.65
Hose cutter	407-065
Belt wrench	408-142
V-ring insertion tool	229-109.88
Open end spanner, ends ground, a/f 17-19	229-119.01
Open end spanner, ends ground, a/f 21-23	229-119.05
Open end spanner, ends ground, a/f 22-24	229-119.03
Open end spanner, a/f 30-32	408-041
Open end spanner, a/f 25-28	408-268
Open end spanner a/f 13	408-035
Assembly tool HBV	221-105.99

5.7 Lubricants

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

5.8 Weights

Size	Weight [kg]
DN 25, 1"	approx. 7.5
DN 40, 1.5"	approx. 10.0
DN 50, 2"	approx. 10.5
DN 65, 2.5"	approx. 17.0
DN 80, 3"	approx. 17.5
DN 100, 4"	approx. 25.0
DN 125	approx. 55.0
DN 150.6"	approx. 63.5

6 Assembly and installation

6.1 Safety instructions

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

For installation, the following principles apply:

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

6.2 Notes on installation

The valve can be installed in any position. Care must be taken to ensure that the valve housing and the pipe system can drain properly. If the valve is installed in the horizontal position, pay attention that the vent hole in the actuator is aligned horizontally on one side.

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.
- If the valve is installed horizontally, the stress on the valve stem seals is higher than in the vertical installation position. Therefore, support the actuator and regularly check the valve for leakage.

6.3 Control head

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

6.4 Valve with Detachable Pipe Connection Elements

This section describes the procedure to fit the valve.

 Caution!

Liquids in pipes

Danger of injury due to liquid spraying out

- ▶ Therefore, before releasing any pipe connections or 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.

6.5 Valve with Welded Ends

This section describes the welding procedure for the valve housing.

 Warning!

Spring tension in the valve

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

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

Notice

Seals are wearing parts

Old seals will cause malfunction of the valve

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

Carry out the following steps:

1. Release the spring tension.
2. Remove the valve insert, see chapter Section 10.5.1, Page 41.
3. Weld the housing, without sealing rings, into position, ensuring that the connection is free of stress.
4. Fit the housing into place and tack it.
5. To avoid welding distortions, always seal the housing before welding.
6. Flush the housing with forming gas from the inside to push the oxygen out of the system.
7. Weld the housing into the pipe system; use welding filler if necessary. When technically possible, use the WIG-Orbital welding process with pulse configuration, according to guidelines EHEDG documentation. 35.
8. Passivate the seam after welding.
9. Assemble the valve and depressurize the actuator.

10. Fit the seals.
→ The valve disk is lowered.
→ Install the valve with welded ends.



Hint!

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

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

6.6 Pneumatic connections

6.6.1 Air Requirement

Actuator type	Actuator Ø [mm]	Air requirement (dm ³ _n /Stroke) dm ³ _n at 1.01325 bar at 0 °C as per DIN 1343	Use
A...	98	0.16	DN 25 - DN 100 1" - 4" OD, 2" - 4" IPS
B...	109	0.26	
C...	135	0.42	
D...	170	0.70	
E...	210	1.10	
R... ¹	169	1.60	
S... ¹	210	2.00	
T... ¹	210	3.10	DN 125 + DN 150 6" OD, 6" IPS
D... ⁶	170	1.30	
E... ⁶	210	2.00	
S... ⁶	261	3.20	
T... ⁶ ¹	210	4.00	
U... ⁶ ¹	261	5.10	

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

6.6.2 Establishing Hose Connections

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

Tools required:

- A hose cutter

Carry out the following steps:

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

6.7 Electrical connection with T.VIS control top



Danger

Live parts

Electrical shock can result in serious personal injury or death.

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



Explosive gases or dusts

An explosion can result in serious personal injury or death.

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

Carry out the following steps:

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

→ Done



Hint!

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

7 Start-up

7.1 Safety instructions

Initial commissioning

For initial commissioning, the following principles apply:

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

Setting into Operation

For commissioning, the following principles apply:

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

7.2 Notes on commissioning

Before starting commissioning observe the following:

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

8 Operation and control

8.1 Safety instructions

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

For operation, the following principles apply:

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

9 Cleaning

9.1 Cleaning

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

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

The cleaning effect must be checked regularly by the operator!

9.1.1 Cleaning Process Examples

Typical Cleaning Parameters in Dairy Operations

Example of a two-phase cleaning process:

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

Example of a cleaning operation in one cleaning step:

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

Typical Cleaning Parameters in Breweries

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

9.1.2 Cleaning effect

The cleaning effect depends on the following factors:

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

These factors can be combined in such a way as to make an optimal cleaning result probable. Depending on the cleaning method (medium, concentration, temperature and contact times), the seals are affected to different degrees. This can impair the function and the service life.

9.2 Passivation

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

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

10 Maintenance

10.1 Safety instructions

Maintenance and repair

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

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

For maintenance and repair, the following principles apply:

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

Disassembly

For disassembly, the following principles apply:

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

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

10.2 Inspections

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

10.2.1 Product contact seals

Carry out the following steps:

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

10.2.2 Pneumatic connections

Carry out the following steps:

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

10.2.3 Electrical connections

Carry out the following steps:

1. Check that the 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.
- Done

10.3 Maintenance intervals

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

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

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

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

10.4 Prior to disassembly

Prerequisite:

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

Carry out the following steps:

1. Drain all pipe system elements that lead to the valve and, if necessary, clean or rinse them.
2. Shut off the control air supply.
3. Disconnect the power supply.
4. Take the valve out of the pipe section, with all housings and housing connections if possible.

→ Done

10.5 Disassembly

10.5.1 Disassembling Control Valve Type P-P_F / P_J / Disassembling Control Valve Type P - 3-Stage Seat K

Detaching the Clamp Connection (43.1)

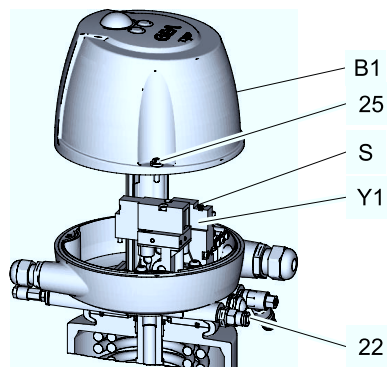


Fig.14

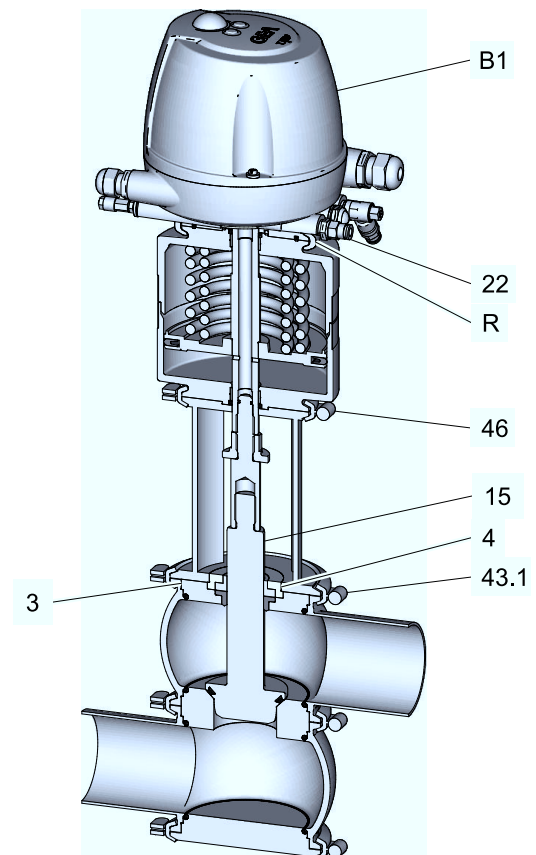


Fig.15

Prerequisite:

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

Spring-closing valve

Warning!

Spring tension in the valve

Danger of injury when opening the clamp connections at the actuator (46) or at the housing (43.1) 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), the bearing disk (4) and the sealing disk (3) are sensitive parts.

Damage to these parts can result in a malfunction.

- ▶ When the valve is pulled out, the stem of the valve disk (15) must not hit the valve housing!
- ▶ The bearing disk (4) and the sealing disk (3) must not hit the stem of the valve disk when the valve insert is withdrawn.
- ▶ Do not set the valve insert down on the valve disk but lay it down.

Carry out the following steps:

1. Release three cheese head screws (25) and take off the cap (B1).
2. Pressurize the actuator with compressed air, max. 8 bar, via the connection (22) by activating the solenoid valve (Y1) at the manual operation element (S).

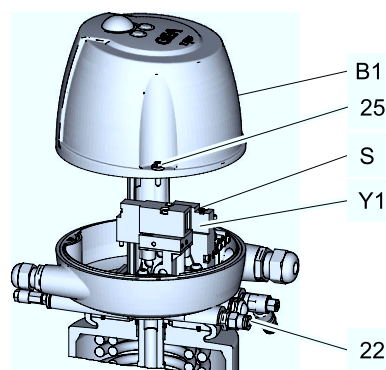


Fig.16

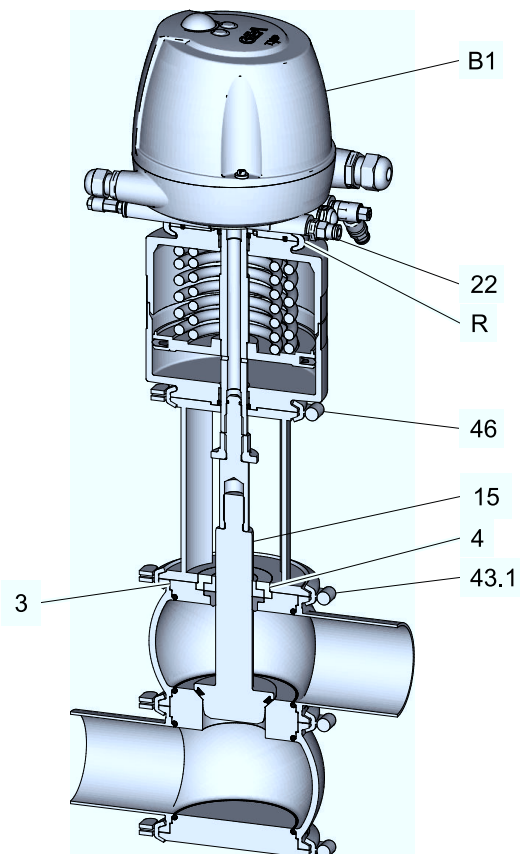


Fig.17

→ The valve disk (15) is raised.

3. Remove the clamp connection (43.1).
4. Vent the actuator.

Spring-opening valve

Notice

The valve disk (15), the bearing disk (4) and the sealing disk (3) are sensitive parts.

Damage to these parts can result in a malfunction.

- ▶ When the valve is pulled out, the stem of the valve disk (15) must not hit the valve housing!
- ▶ The bearing disk (4) and the sealing disk (3) must not hit the stem of the valve disk when the valve insert is withdrawn.
- ▶ Do not set the valve insert down on the valve disk but lay it down.

Carry out the following steps:

1. Release three cheese head screws (25) and take off the cap (B1).
2. Depressurise the actuator by deactivating the solenoid valve (Y1) at the manual operation element (S).

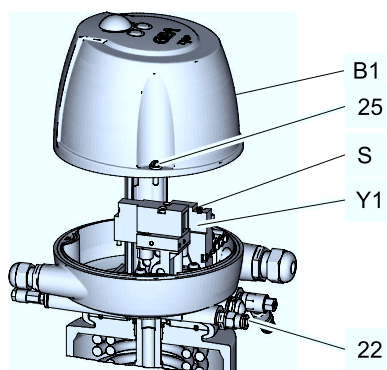


Fig.18

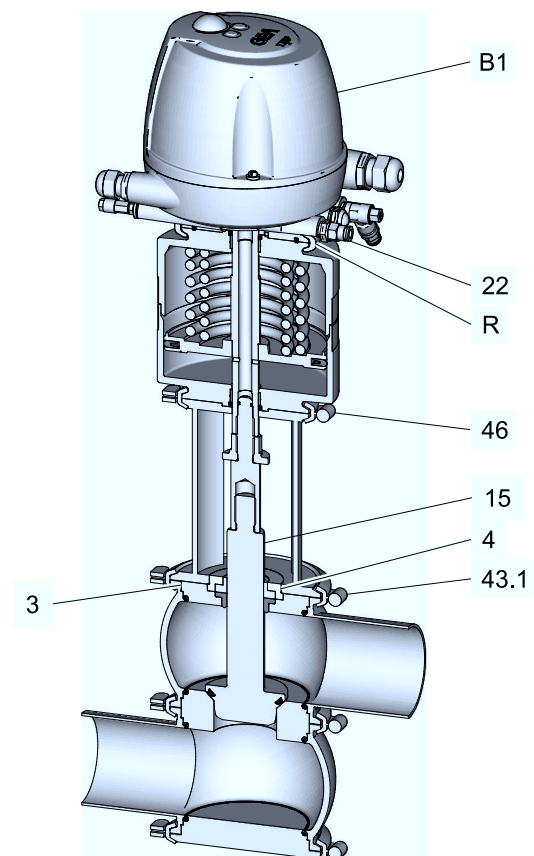


Fig.19

→ The valve disk (15) is raised.

3. Remove the clamp connections (43.1).

Removing the Control Top

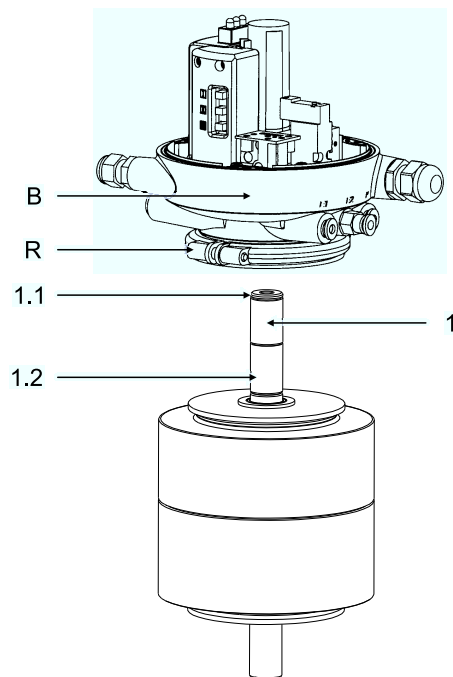


Fig.20

Prerequisite:

- The pneumatic and electrical connections on the plant side can remain on the control top.

Notice

The permanent magnet on the switch bar is fragile.

Damage to the permanent magnet.

- Protect the permanent magnet against impact stress.

Carry out the following steps:

1. Remove the clamps (R) between control top and actuator.
2. Pull off the control top (B) upwards.
3. Release the T.VIS switch bar (1) by applying a hex key at (1.1) or an open end spanner SW 13 at (1.2) and remove it.

→ The control top has been taken off.



Hint!

For further information regarding the control top please refer to the Operating Instructions "Control Top T.VIS P-15".

Disconnecting the Valve from the Housing

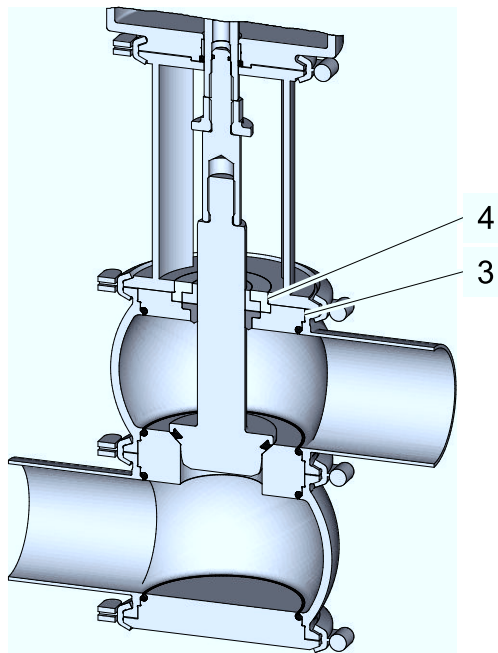


Fig.21

Notice

Sensitive valve parts

Damage to valve parts.

► Protect the valve parts against impact stress.

Carry out the following steps:

1. Withdraw the valve from the housing.

! The bearing disk (4) and the sealing disk (3) must not hit the stem of the valve disk when the valve insert is withdrawn.

→ The valve is separated from the housing.

Removing the Valve Disk

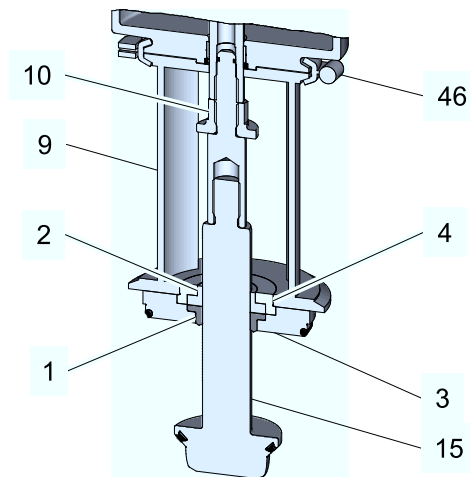


Fig.22

Notice

Sensitive valve parts

Damage to valve parts.

► Protect the valve parts against impact stress.

Carry out the following steps:

1. Slacken the clamp connection (46) but do not remove it.
 2. Place an open end spanner on the spacer nut (10), use a strap wrench to turn the actuator and release the valve disk.
 3. Unscrew the valve disk together with the bearing disk (4), bearing (1), sealing ring (2) and sealing disk (3).
! The bearing disk (4) and the sealing disk (3) must not hit the stem of the valve disk when the valve disk is withdrawn.
 4. Unscrew the spacer nut (10) from the valve disk using 2 open end spanners.
 5. Pull off the bearing disk (4) with bearing (1) and the sealing disk (3) with sealing ring (2) from the valve disk.
 6. Remove the clamp connection (46) between the motor stool and the actuator.
 7. Remove the motor stool (9).
- This completes removal of the valve disk.

10.5.2 Control Valve Type P - Disassembling Divert Valve W

Detaching the Clamp Connection (43.2)

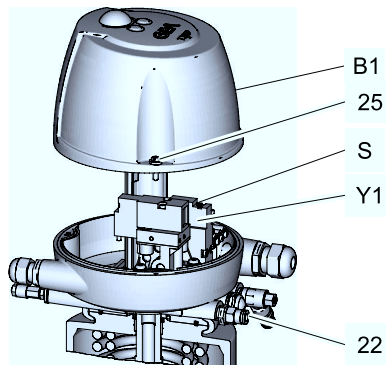


Fig.23

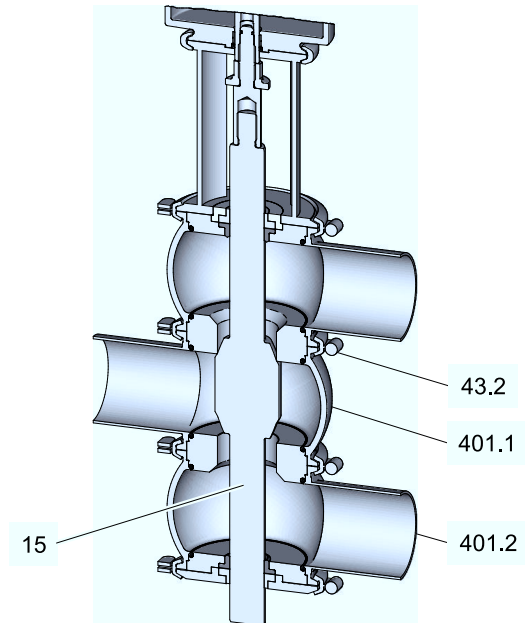


Fig.24

Prerequisite:

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



Warning!

Spring tension in the valve

Danger of injury when detaching the clamp connection (43.2) at 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

Sensitive parts.

Damage to these parts can result in a malfunction.

- 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.

Carry out the following steps:

1. Release three cheese head screws (25) and take off the cap (B1).
2. Raise the valve disk (15):

- Spring-closing valve (NC): pressurize the actuator with compressed air, max. 8 bar, via connection (22) by activating the solenoid valve (Y1) at the manual operation element (S).
- Spring-opening valve (NO): Vent the actuator.

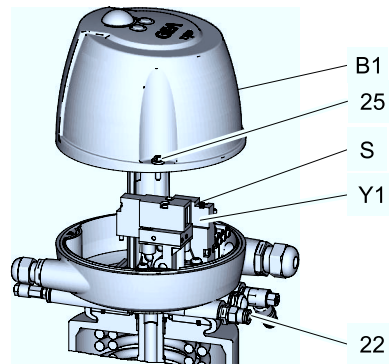


Fig.25

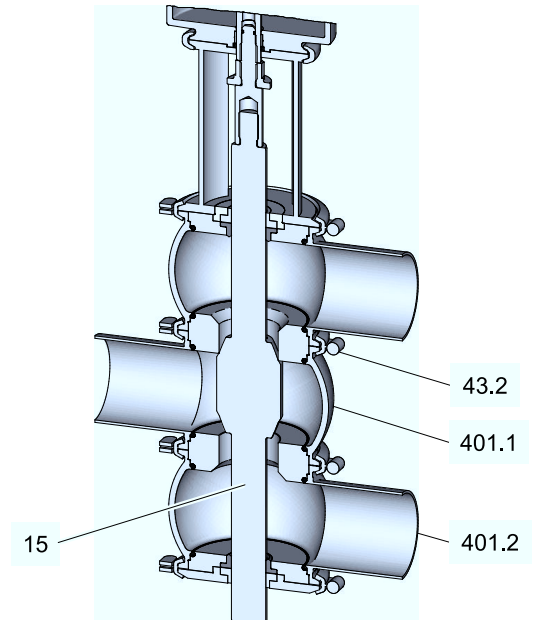


Fig.26

- The valve disk (15) is raised.
- 3. Remove the clamp connection (43.2).
- 4. Withdraw the valve from the housings (401.1, 401.2).
- The clamp connection has been removed.

Releasing the Valve Disk

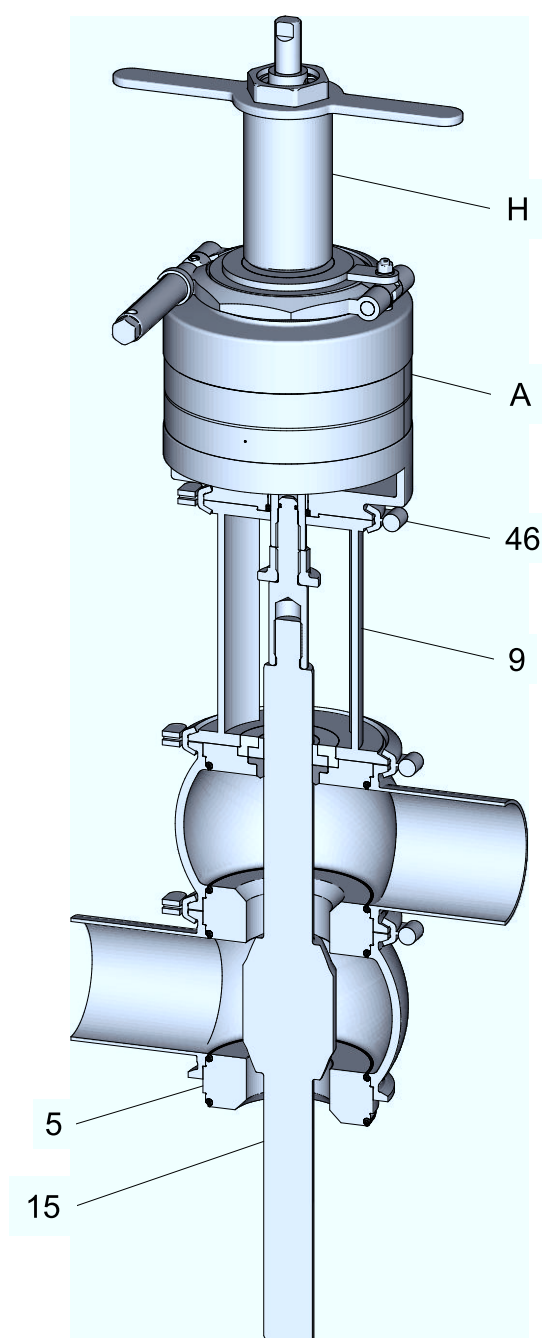


Fig.27

Tools required:

- Emergency manual actuator (H)



Warning!

Spring tension in the valve

There is a risk of injury when dismantling a spring-closing valve as the released spring tension will suddenly lift the actuator.

- ▶ Do not put your hand into the valve housing.
- ▶ Before releasing the clamp connection (46), pretension the actuator using an emergency manual actuator (H).

Notice

Seat ring (5) fitted freely in the housing.

The seat ring can hit the valve disk when the valve is moved. The sealing surfaces of the seat ring and the valve disk shaft can be damaged.

- ▶ Carefully disassemble the valve

Carry out the following steps:

1. Lower the valve disk (15):
 - Spring-closing valve (NC): Vent the actuator.
 - Spring-opening valve (NO): pretension the actuator using an emergency manual actuator (H).
- The valve disk (15) is lowered.
2. Loosen the clamp connection (46) between actuator (A) and motor stool (9).
3. Place an open end spanner on the spanner flat on the valve disk (15) and use a strap wrench to unscrew the actuator by three turns.
4. Spring-opening valve: release the actuator pretension.
- The valve disk is released.

Removing the Control Top

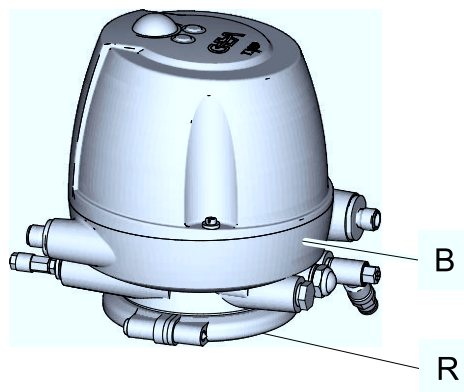


Fig.28

Prerequisite:

- The pneumatic and electrical connections on the plant side can remain on the control top.

Notice

The permanent magnet on the switch bar is fragile.

Damage to the permanent magnet.

► Protect the permanent magnet against impact stress.

Carry out the following steps:

1. Remove the clamps (R) between control top and actuator.
2. Pull off the control top (B) upwards.

The control top has been taken off.



Hint!

For further information regarding the control top please refer to the Operating Instructions “Control Top T.VIS P-15”.

Removing the Valve Disk

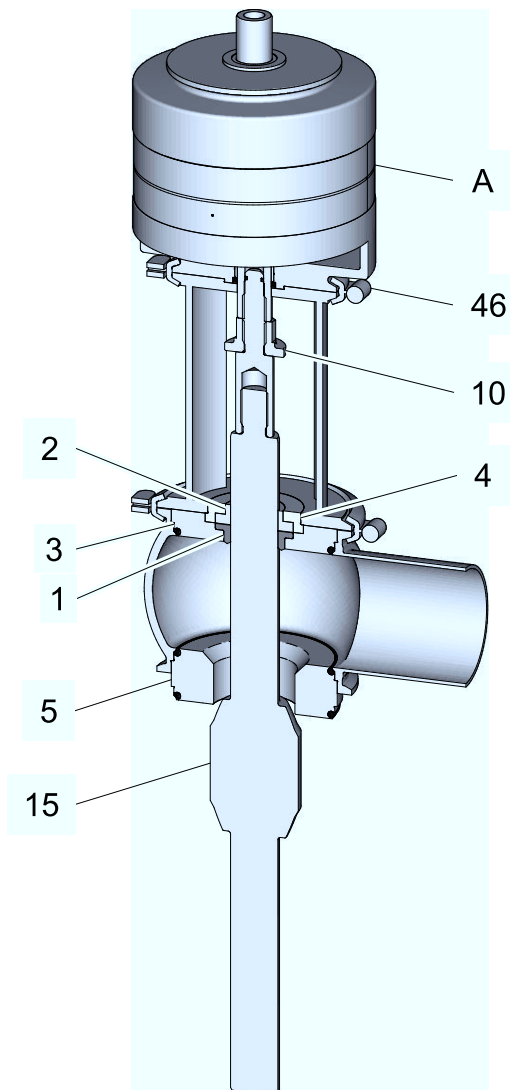


Fig.29

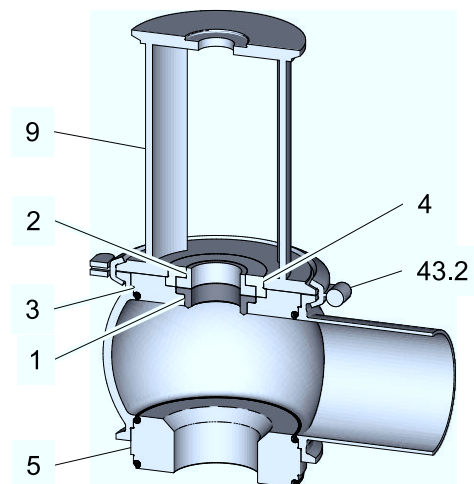


Fig.30

Notice

Sensitive valve parts

Damage to valve parts.

► Protect the valve parts against impact stress.

Carry out the following steps:

1. Remove the clamp connection (46) between actuator (A) and motor stool (9).
2. Unscrew the valve disk (15) from the actuator (A) by hand.
3. Unscrew the spacer nut (10) from the valve disk using 2 open end spanners.
4. Pull the valve disk out of the housing.

→ ! The bearing disk (4), bearing (2), sealing disk (3), sealing ring (1) and seat ring (5) must not hit the stem of the valve disk when the valve disk is withdrawn.

5. Take the actuator off.
6. Remove the seat ring (5) from the housing.
7. Remove the clamp connection (43.1) between the motor stool and the housing.
8. Remove the motor stool.
9. Take the bearing disk (4) with bearing (2) and the sealing disk (3) with sealing ring (1) out of the housing.

→ This completes removal of the valve disk.

10.5.3 Control Valve Type P - Disassembling Divert Valve X

Exposing the Lower Valve Disk

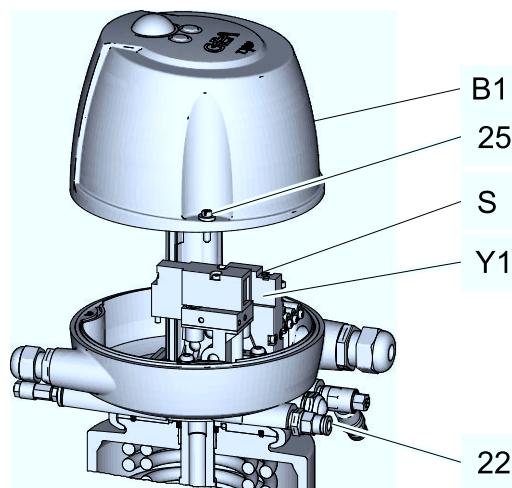


Fig.31

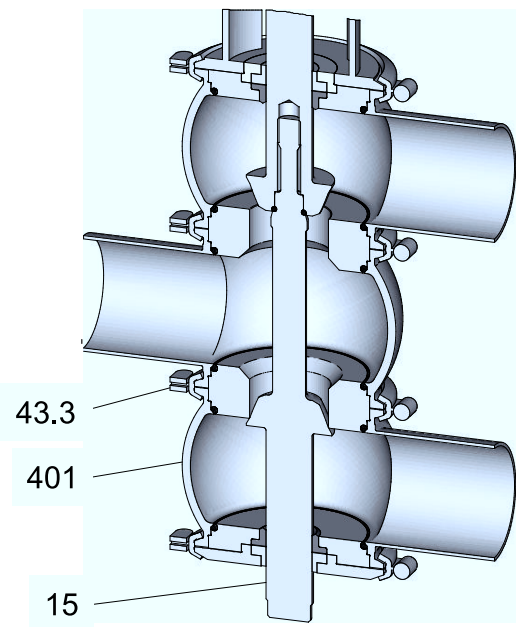


Fig.32



Warning!

Spring tension in the valve

Danger of injury when detaching the clamp connections (43.3) at 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

Sensitive parts.

Damage to these parts can result in a malfunction.

- ▶ When the valve is pulled out, the stem of the valve disk (15) must not hit the valve housing (401)!
 - ▶ Do not set the valve insert down on the valve disk but lay it down.
-

Carry out the following steps:

1. Release three cheese head screws (25) and take off the cap (B1).
2. Raise the valve disk (15):
 - Spring-closing valve (NC): pressurize the actuator with compressed air, max. 8 bar, via connection (22) by activating the solenoid valve (Y1) at the manual operation element (S).
 - Spring-opening valve (NO): Vent the actuator.
 - The valve disk (15) is raised.
3. Remove the clamp connection (43.3).
4. Withdraw the valve from the housing (401) or take the housing (401) off.
 - ! Do not set the valve insert down on the valve disk but lay it down.
 - The lower valve disk is exposed.

Remove the lower valve disk

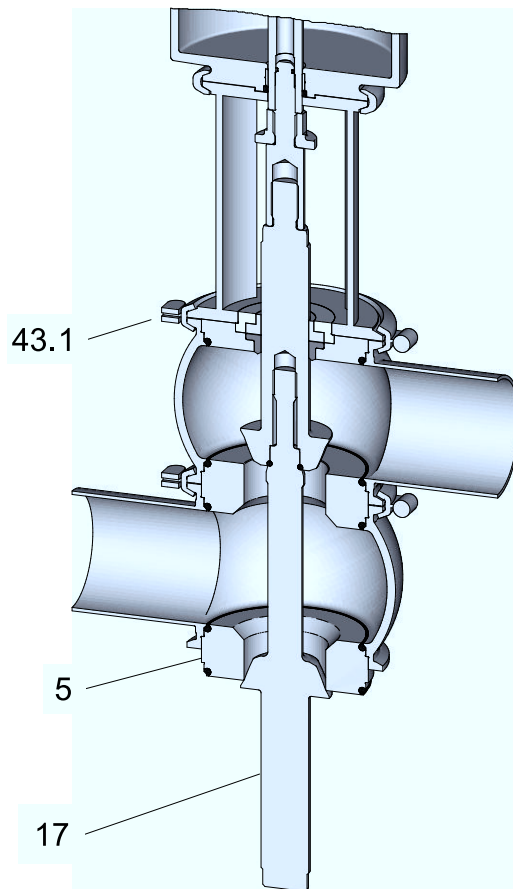


Fig.33



Warning!

Spring tension in the valve

Danger of injury when disassembling the spring-closing valve.

- Do not put your hand into the valve housing.

Notice

Seat ring (5) fitted freely in the housing.

The seat ring can hit the valve disk when the valve is moved. The sealing surfaces of the seat ring and the valve disk shaft can be damaged.

- Carefully disassemble the valve

Carry out the following steps:

1. Lower the valve disk (17):
 - Spring-closing valve (NC): Vent the actuator.
 - Spring-opening valve (NO): pressurize the actuator with compressed air, max. 8 bar.
 - The valve disk (17) is lowered.
2. Unscrew the valve disk (17) with an open end spanner.

! When unscrewing, do not reach between valve disk (17) and seat ring (5). If the air hose is torn off, the valve disk will suddenly move upwards, and your fingers can be crushed.

3. Remove the seat ring (5) from the housing.
4. Raise the valve disk:
 - Spring-closing valve (NC): pressurize the actuator with compressed air, max. 8 bar.
 - Spring-opening valve (NO): Vent the actuator.
 - Valve disk is raised.
5. Remove the clamp connection (43.1) between the motor stool and the housing.
6. Spring-closing valve (NC): Vent the actuator.
 - The lower valve disk has been removed.

Removing the Control Top

Prerequisite:

- The pneumatic and electrical connections on the plant side can remain on the control top.

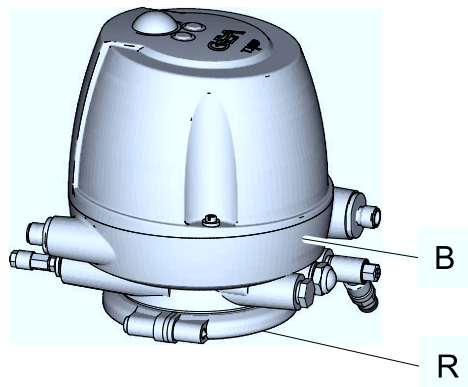


Fig.34

Notice

The permanent magnet on the switch bar is fragile.

Damage to the permanent magnet.

- Protect the permanent magnet against impact stress.

Carry out the following steps:

1. Remove the clamps (R) between control top and actuator.
 2. Pull off the control top (B) upwards.
- The control top has been taken off.



Hint!

For further information regarding the control top please refer to the Operating Instructions "Control Top T.VIS P-15".

Taking Out the Valve Insert

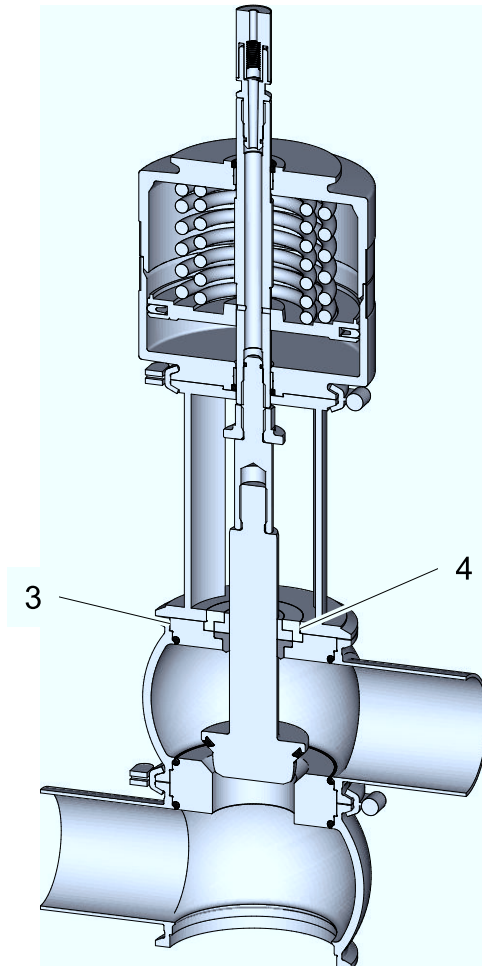


Fig.35

Notice

Sensitive valve parts.

Damage to valve parts.

- Protect the valve parts against impact stress.

Carry out the following steps:

1. Carefully pull the valve insert complete with actuator and motor stool upwards to remove it from the valve housing.

! The bearing disk (4) and the sealing disk (3) must not hit the stem of the valve disk when the valve insert is withdrawn.

→ The valve insert has been removed.

Removing the Upper Valve Disk

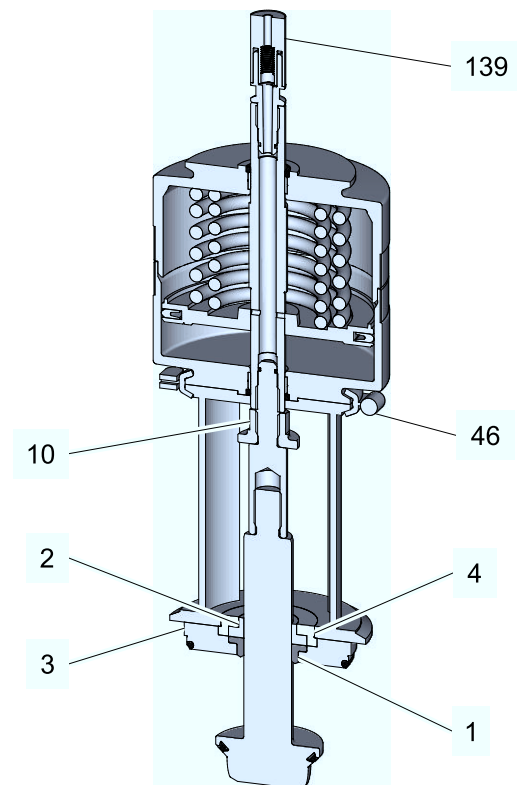


Fig.36

Notice

Sensitive valve parts.

Damage to valve parts.

► Protect the valve parts against impact stress.

Carry out the following steps:

1. Unscrew the switch bar (139).
2. Release the clamp connection (46) but do not remove it.
3. Place an open end spanner on the spacer nut (10), use a strap wrench to turn the actuator and release the valve disk.
4. Unscrew the valve disk together with the bearing disk (4), bearing (2), sealing ring (1) and sealing disk (3).
5. Unscrew the spacer nut (10) from the valve disk using two open end spanners.
6. Slide off the bearing disk (4) with bearing and the sealing disk (3) with sealing ring from the valve disk.

! The bearing disk (4) and the sealing disk (3) must not hit the stem of the valve disk. This can cause damage to the sealing surface.

7. Remove the clamp connection (46) between the motor stool and the actuator.
8. Remove the motor stool.

→ The upper valve disk has been removed.

10.6 Maintenance

10.6.1 Cleaning the Valve

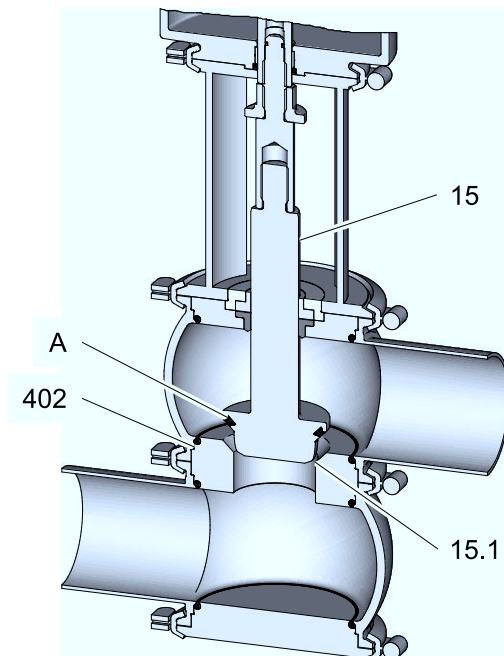


Fig.37

Notice

The stem of the valve disk (15), the housing seat (402), the valve seat (15.1) and the V-ring groove (A) are precision parts.

Damage to these parts can result in a malfunction.

► Handle the valve with care!

Notice

Damage to the valve

Damage to these parts can result in a malfunction.

► Observe the safety information sheets issued by the detergent manufacturers!

► Only use detergents which are non-abrasive and not aggressive towards stainless steel.

Carry out the following steps:

1. Disassemble the valve, see Section 10.5, Page 40.
2. Carefully clean the individual parts.

→ Done

10.6.2 Replacing Seals

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.

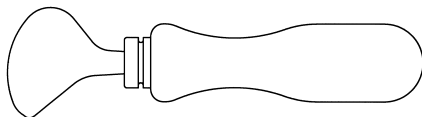


Fig.38: V-ring insertion tool

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.

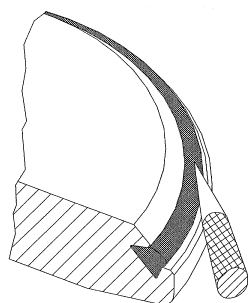


Fig.39

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. Put in the V-ring. Make sure the installation position of the V-ring is correct (see illustration).

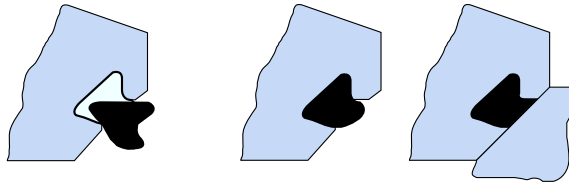


Fig.40

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

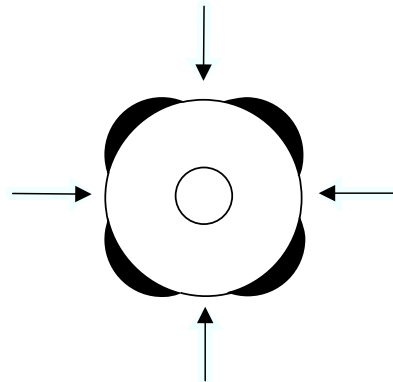


Fig.41

5. Insert the V-ring evenly.
 6. 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 a malfunction.

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

Carry out the following steps:

1. 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 Tuchenhausen recommends Rivolta F.L.G. MD-2 and PARALIQ GTE 703. These lubricants are approved for foodstuff and are resistant to beer froth. They have the NSF-H1 (USDA H1) registration.

They do not affect the taste or the consistency of the products and are compatible with the seals in contact with product. PARALIQ GTE 703 can be ordered from GEA Tuchenhausen under material no. 413-064, and Rivolta F.L.G. MD-2 can be ordered under material no. 413-071.

Using other types of grease can result in malfunctions or in premature seal failure. The warranty will also become null and void.

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

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

Running dry must be avoided!

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 Installing the valve



Caution!

Danger of injury by spring force being released on valves with spring-closing actuator action (valve U – spring-closing).

You can sustain injuries to your fingers when you put your hand into a valve with spring-closing action if the valve has not been opened beforehand.

► Before screwing in the valve disk, pretension the actuator using an emergency manual actuator (H) or pressurize it with compressed air using assembly tool HBV.

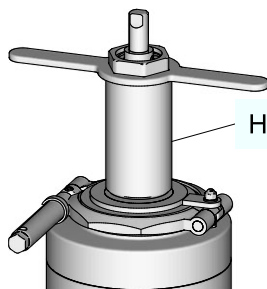


Fig.42: Emergency manual actuator (H)

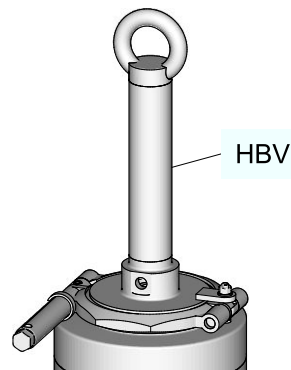


Fig.43: Assembly tool (HBV)

Seat Rings

Pay attention that the seat rings are positioned correctly:

Soft sealing valve disks: inclined seating surface must face the valve disk (A).

Metallically sealing valve disks: pointed edge must face the valve disk (B).

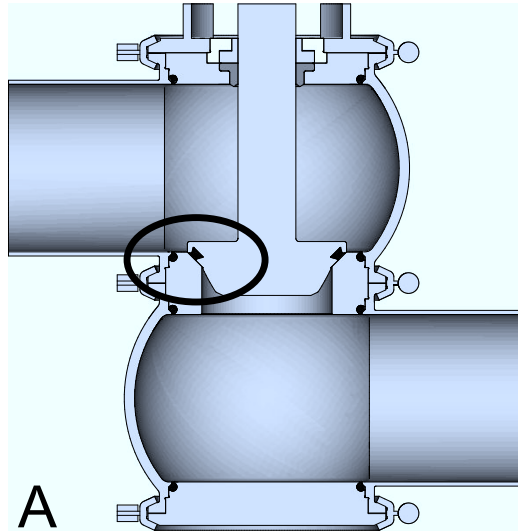


Fig.44

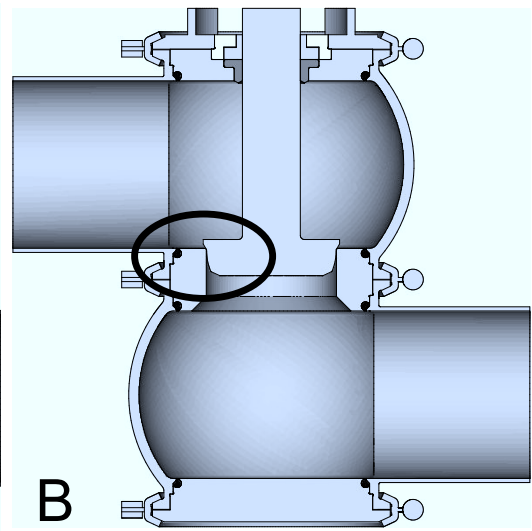


Fig.45

Spacer nut

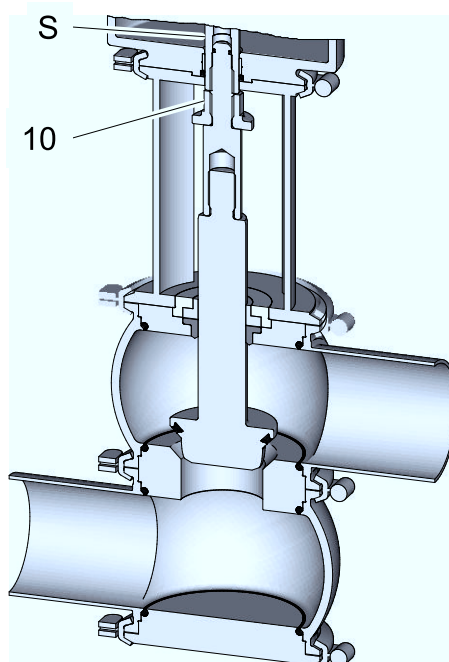


Fig.46

Lock the spacer nut (10) against the actuator rod (S).

10.7.2 Torques for the Clamps and Clamp Connections

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

Tightening torques required			
Torques		[Nm] [lbft]	[Nm] [lbft]
Clamps on the control top		1	0.7
Clamp connection cast half rings	M6	9	6.6
Clamp connection cast half rings	M8	22	16.2
Cast clamps	M10	45	33
Lower valve disk (divert valve X)	DN 25 - DN 50 OD 1" - OD 2"	24	17.7
	DN 65 - DN 100 OD 2.5" - OD 4"	58	42.8
	DN 150 OD 6"	70	51.6

10.7.3 Checking the function

Setting the valve stroke

Carry out the following steps:

1. Actuate the valve with compressed air.
2. Check stroke of the valve in accordance with the "Valve stroke" (see table).

→ The stroke is set.

Strokes Depending on Size

Valve Stroke		
Valve size	Valve stroke [mm]	
	N / 3-stage seat	N / W
Metric		
25		15
40		15
50		15
65		15
80		15
100		15/30
125		30
150		30
Inch OD		
1"		15

Valve Stroke		
Valve size	Valve stroke [mm]	
	N / 3-stage seat	N / W
1.5"		15
2"		15
2.5"		15
3"		15
4"		15/30
6"		30
Inch IPS		
2"		15
3"		15
4"		15/30
6"		30

11 Alarms

11.1 Malfunctions and remedies

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

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

12 Decommissioning

12.1 Safety instructions

For shutting down, the following principles apply:

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

12.2 Disposal

12.2.1 General notes

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

The component consists of the following materials:

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

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

12.2.2 Valve Actuator Disposal



Danger

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

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

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

Carry out the following steps:

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

13 Spare parts list - VARIVENT control valve type P P_F/P_J

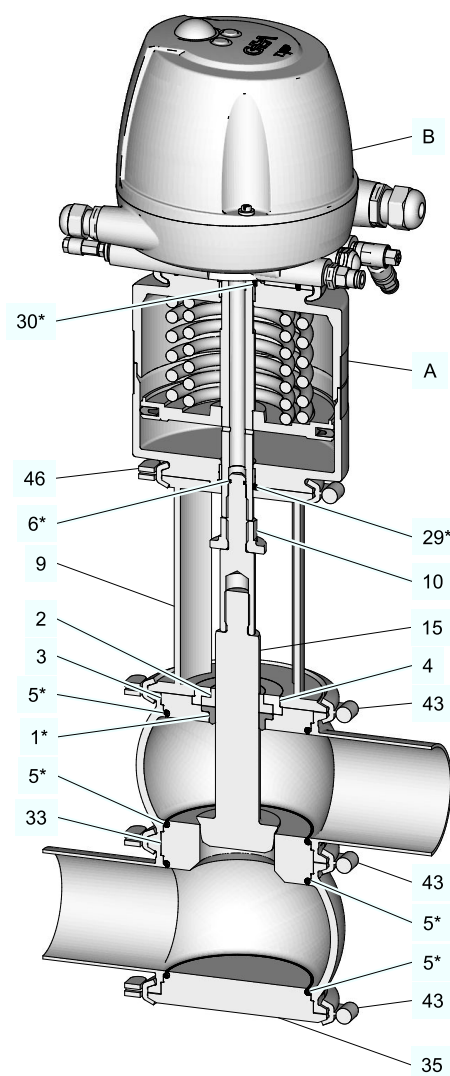


Fig.47: Metallic seal

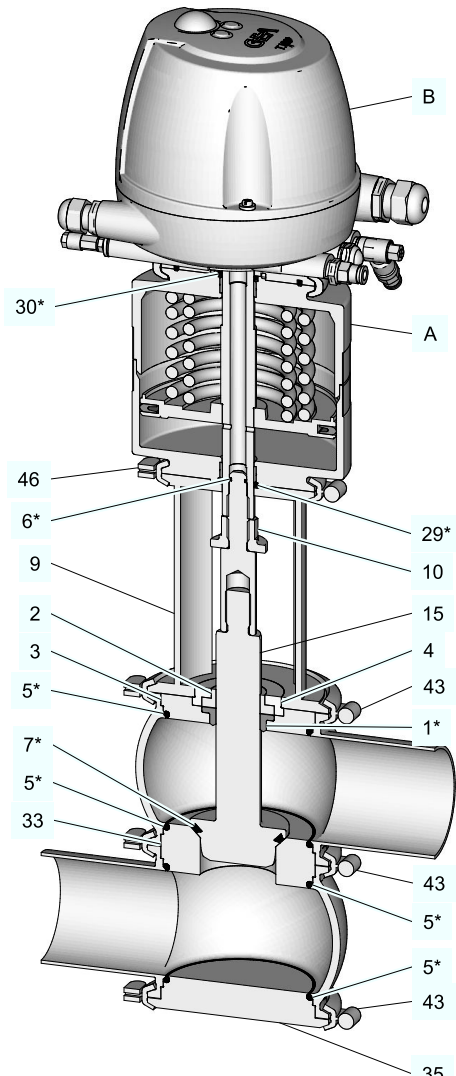


Fig.48: Soft sealing

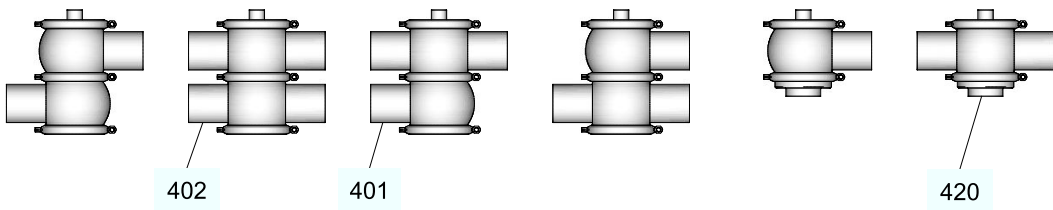


Fig.49: Housing combinations

Spare parts list, item 1-5, metric sizes (DN25 - DN 65)						
Item	Designation	Material	DN 25	DN 40	DN 50	DN 65
1*	Seal ring	EPDM	924-084	924-084	924-084	924-085
		FKM	924-082	924-082	924-082	924-083
		HNBR	924-311	924-311	924-311	924-313
2*	Bearing	PTFE/carbon	935-001	935-001	935-001	935-002
	Bearing, 3A	SUSTA-PVDF	935-098	935-098	935-098	935-099
3	Seal disk	1.4404	221-141.01	221-141.02	221-141.02	221-141.03
4	Bearing disc	1.4301	221-142.01	224-142.02	221-142.02	221-142.03
5*	O-ring	EPDM	930-309	930-144	930-144	930-150
		FKM	930-168	930-171	930-171	930-176
		HNBR	930-632	930-633	930-633	930-634
6*	O-ring	NBR	930-004	930-004	930-004	930-004
Items marked with an * are wearing parts						

Spare parts list, item 1-5, metric sizes (DN 80 - DN 150)						
Item	Designation	Material	DN 80	DN 100	DN 125	DN 150
1*	Seal ring	EPDM	924-085	924-085	924-088	924-088
		FKM	924-083	924-083	924-087	924-087
		HNBR	924-313	924-313	--	--
2*	Bearing	PTFE/carbon	935-002	935-002	935-003	935-003
	Bearing, 3A	SUSTA-PVDF	935-099	935-099	935-102	935-102
3	Seal disk	1.4404	221-141.03	221-141.04	221-141.07	221-141.05
4	Bearing disc	1.4301	221-142.03	221-142.03	221-142.04	221-142.04
5*	O-ring	EPDM	930-150	930-156	930-372	930-260
		FKM	930-176	930-178	930-409	930-259
		HNBR	930-634	930-863	--	--
6*	O-ring	NBR	930-004	930-004	930-007	930-007
Items marked with an * are wearing parts						

Spare parts list - VARIVENT control valve type P P_F/P_J

Spare parts list V-ring, lantern, spacer nut, metric sizes (DN 25 - DN 65)							
Item	Designation	K _{VS} value	Material	DN 25	DN 40	DN 50	DN 65
7*	V-ring	0.1	EPDM FKM FFKM HNBR				
		0.16					
		0.25		932-064	--	--	--
		0.4		932-073	--	--	--
		0.63		932-120	--	--	--
		1		932-083	--	--	--
		1.6					
		2.5					
		4					
		6.3	EPDM	932-017	932-017	--	--
			FKM	932-029	932-029	--	--
			FFKM	932-111	932-111	--	--
			HNBR	932-085	932-085	--	--
		10.0	EPDM	932-017	932-017	932-017	--
			FKM	932-029	932-029	932-029	--
			FFKM	932-111	932-111	932-111	--
			HNBR	932-085	932-085	932-085	--
		16.0	EPDM	--	932-046	932-046	--
			FKM	--	932-030	932-030	--
			FFKM	--	932-110	932-110	--
			HNBR	--	932-087	932-087	--
		25.0	EPDM	--	932-019	932-019	932-019
			FKM	--	932-032	932-032	932-032
			FFKM	--	932-113	932-113	932-113
			HNBR	--	932-084	932-084	932-084
		35.0	EPDM	--	--	932-021	932-021
			FKM	--	--	932-033	932-033
			FFKM	--	--	932-114	932-114
			HNBR	--	--	932-088	932-088
		40.0	EPDM	--	--	932-021	932-021
			FKM	--	--	932-033	932-033
			FFKM	--	--	932-114	932-114
			HNBR	--	--	932-088	932-088
		60.0	EPDM	--	--	--	932-023
			FKM	--	--	--	932-034
			FFKM	--	--	--	932-115
			HNBR	--	--	--	932-089
9	Lantern	--	1.4301	221-121.01	221-121.02	221-121.02	221-121.03
10	Spacer nut	--	1.4305	221-147.02	221-147.02	221-147.02	221-147.01

Spare parts list V-ring, lantern, spacer nut, metric sizes (DN 80 - DN 150)							
Item	Designation	K _{VS} value	Material	DN 80	DN 100	DN 125	DN 150
7*	V-ring	35.0	EPDM	932-021	--	--	--
			FKM	932-033	--	--	--
			FFKM	932-114	--	--	--
			HNBR	932-088	--	--	--
		40.0	EPDM	932-021	--	--	--
			FKM	932-033	--	--	--
			FFKM	932-114	--	--	--
			HNBR	932-088	--	--	--
		60.0	EPDM	932-023	932-023	--	--
			FKM	932-034	932-034	--	--
			FFKM	932-115	932-115	--	--
			HNBR	932-089	932-089	--	--
		80.0	EPDM	932-024	932-025	--	--
			FKM	932-035	932-036	--	--
			FFKM	932-116	--	--	--
			HNBR	932-090	(932-101)	--	--
		100	EPDM	--	932-025	932-025	--
			FKM	--	932-036	932-036	--
			FFKM	--	--	--	--
			HNBR	--	(932-101)	(932-101)	--
		160	EPDM	--	932-028	932-028	--
			FKM	--	932-039	932-039	--
			FFKM	--	932-119	932-119	--
			HNBR	--	932-100	932-100	--
		200	EPDM	--	--	932-059	932-059
			FKM	--	--	932-063	932-063
			FFKM	--	--	--	--
			HNBR	--	--	--	--
		260	EPDM	--	--	932-060	932-045
			FKM	--	--	932-062	932-044
			FFKM	--	--	--	--
			HNBR	--	--	--	--
		360	EPDM	--	--	--	932-042
			FKM	--	--	--	932-041
			HNBR	--	--	--	--
9	Lantern	--	1.4301	221-121.03	221-121.04	221-121.06	221-121.22
10	Spacer nut	--	1.4305	221-147.01	221-147.01	221-147.06	221-147.06

Spare parts list valve disk SFM, equal percentage, metallic seal, metric sizes (DN 25 - DN 65)						
Item	K _{VS} value	Material	DN 25	DN 40	DN 50	DN 65
15	0.1	1.4404	221-005980	--	--	--
	0.16	1.4404	221-005982	--	--	--
	0.25	1.4404	221-005984	--	--	--
	0.4	1.4404	221-005986	--	--	--
	0.63	1.4404	221-005988	--	--	--
	1	1.4404	221-005991	--	--	--
	1.6	1.4404	221-005993	--	--	--
	2.5	1.4404	221-005995	--	--	--
	4.0	1.4404	221-005997	--	--	--
	6.3	1.4404	221-005999	221-006000	--	--
	10	1.4404	221-005473	221-005479	221-005483	--
	16	1.4404	--	221-005480	221-005485	--
	25	1.4404	--	221-005481	221-005487	221-005492
	35	1.4404	--	--	221-005489	221-005493
	40	1.4404	--	--	221-005491	221-005494
	60	1.4404	--	--	--	221-005495
	80	1.4404	--	--	--	--
	100	1.4404	--	--	--	--
	160	1.4404	--	--	--	--
	200	1.4404	--	--	--	--
	260	1.4404	--	--	--	--
	360	1.4404	--	--	--	--

Spare parts list valve disk SFM, equal percentage, metallic seal, metric sizes (DN 80 - DN 150)						
Item	K _{VS} value	Material	DN 80	DN 100	DN 125	DN 150
15	0.1	1.4404	--	--	--	--
	0.16	1.4404	--	--	--	--
	0.25	1.4404	--	--	--	--
	0.4	1.4404	--	--	--	--
	0.63	1.4404	--	--	--	--
	1	1.4404	--	--	--	--
	1.6	1.4404	--	--	--	--
	2.5	1.4404	--	--	--	--
	4.0	1.4404	--	--	--	--
	6.3	1.4404	--	--	--	--
	10	1.4404	--	--	--	--
	16	1.4404	--	--	--	--
	25	1.4404	--	--	--	--
	35	1.4404	221-005496	--	--	--
	40	1.4404	221-005498	--	--	--
	60	1.4404	221-005499	221-005501	--	--
	80	1.4404	221-006002	221-006004	--	--

Spare parts list valve disk SFM, equal percentage, metallic seal, metric sizes (DN 80 - DN 150)						
Item	K _{VS} value	Material	DN 80	DN 100	DN 125	DN 150
	100	1.4404	--	221-006006	221-006009	--
	160	1.4404	--	221-006008	221-006010	--
	200	1.4404	--	--	221-006011	221-006013
	260	1.4404	--	--	221-006012	221-006014
	360	1.4404	--	--	--	221-006015

Spare Parts List Valve Disk SFM/DF, Equal Percentage, Metallic Seal, Metric Sizes (DN 80 - DN 150)						
Item	K _{VS} value	Material	DN 80	DN 100	DN 125	DN 150
15	0.1	1.4404	--	--	--	--
	0.16	1.4404	--	--	--	--
	0.25	1.4404	--	--	--	--
	0.4	1.4404	--	--	--	--
	0.63	1.4404	--	--	--	--
	1	1.4404	--	--	--	--
	1.6	1.4404	--	--	--	--
	2.5	1.4404	--	--	--	--
	4.0	1.4404	--	--	--	--
	6.3	1.4404	--	--	--	--
	10	1.4404	--	--	--	--
	16	1.4404	--	--	--	--
	25	1.4404	--	--	--	--
	35	1.4404	--	--	--	--
	40	1.4404	--	--	--	--
	60	1.4404	--	--	--	--
	80	1.4404	--	--	--	--
	100	1.4404	--	221-006202	221-006204	--
	160	1.4404	--	221-006203	221-006205	--
	200	1.4404	--	--	221-006206	221-006220
	260	1.4404	--	--	221-006207	221-006221
	360	1.4404	--	--	--	221-006222

Spare parts list valve disk SJM, linear, metallic seal, metric sizes (DN 25 - DN 65)						
Item	K _{VS} value	Material	DN 25	DN 40	DN 50	DN 65
15	0.1	1.4404	221-006074	--	--	--
	0.16	1.4404	221-006076	--	--	--
	0.25	1.4404	221-006078	--	--	--
	0.4	1.4404	221-006080	--	--	--
	0.63	1.4404	221-006082	--	--	--
	1	1.4404	221-006084	--	--	--
	1.6	1.4404	221-006086	--	--	--
	2.5	1.4404	221-006088	--	--	--
	4.0	1.4404	221-006090	--	--	--
	6.3	1.4404	221-006092	221-006093	--	--
	10	1.4404	221-005886	221-005887	221-005891	--
	16	1.4404	--	221-005888	221-005899	--
	25	1.4404	--	221-005889	221-005901	221-005912
	35	1.4404	--	--	221-005903	221-005913
	40	1.4404	--	--	221-005905	221-005914
	60	1.4404	--	--	--	221-005915
	80	1.4404	--	--	--	--
	100	1.4404	--	--	--	--
	160	1.4404	--	--	--	--
	200	1.4404	--	--	--	--
	260	1.4404	--	--	--	--
	360	1.4404	--	--	--	--

Spare parts list valve disk SJM, linear, metallic seal, metric sizes (DN 80 - DN 150)						
Item	K _{VS} value	Material	DN 80	DN 100	DN 125	DN 150
15	0.1	1.4404	--	--	--	--
	0.16	1.4404	--	--	--	--
	0.25	1.4404	--	--	--	--
	0.4	1.4404	--	--	--	--
	0.63	1.4404	--	--	--	--
	1	1.4404	--	--	--	--
	1.6	1.4404	--	--	--	--
	2.5	1.4404	--	--	--	--
	4.0	1.4404	--	--	--	--
	6.3	1.4404	--	--	--	--
	10	1.4404	--	--	--	--
	16	1.4404	--	--	--	--
	25	1.4404	--	--	--	--
	35	1.4404	221-005916	--	--	--
	40	1.4404	221-005917	--	--	--
	60	1.4404	221-005918	221-005920	--	--
	80	1.4404	221-006094	221-006096	--	--

Spare parts list valve disk SJM, linear, metallic seal, metric sizes (DN 80 - DN 150)						
Item	K _{VS} value	Material	DN 80	DN 100	DN 125	DN 150
	100	1.4404	--	221-006098	221-006101	--
	160	1.4404	--	221-006100	221-006102	--
	200	1.4404	--	--	221-006103	221-006105
	260	1.4404	--	--	221-006104	221-006106
	360	1.4404	--	--	--	221-006107

Spare parts list valve disk SJM/DF, linear, metallic seal, metric sizes (DN 80 - DN 150)						
Item	K _{VS} value	Material	DN 80	DN 100	DN 125	DN 150
15	0.1	1.4404	--	--	--	--
	0.16	1.4404	--	--	--	--
	0.25	1.4404	--	--	--	--
	0.4	1.4404	--	--	--	--
	0.63	1.4404	--	--	--	--
	1	1.4404	--	--	--	--
	1.6	1.4404	--	--	--	--
	2.5	1.4404	--	--	--	--
	4.0	1.4404	--	--	--	--
	6.3	1.4404	--	--	--	--
	10	1.4404	--	--	--	--
	16	1.4404	--	--	--	--
	25	1.4404	--	--	--	--
	35	1.4404	--	--	--	--
	40	1.4404	--	--	--	--
	60	1.4404	--	--	--	--
	80	1.4404	--	--	--	--
	100	1.4404	--	221-006226	221-006228	--
	160	1.4404	--	221-006227	221-006229	--
	200	1.4404	--	--	221-006230	221-006232
	260	1.4404	--	--	221-006231	221-006233
	360	1.4404	--	--	--	221-006234

Spare parts list valve disk SFW, equal percentage, soft sealing, metric sizes (DN 25 - DN 65)						
Item	K _{VS} value	Material	DN 25	DN 40	DN 50	DN 65
15	0.1	1.4404	221-005444	--	--	--
	0.16	1.4404	221-005922	--	--	--
	0.25	1.4404	221-005924	--	--	--
	0.4	1.4404	221-005926	--	--	--
	0.63	1.4404	221-005928	--	--	--
	1	1.4404	221-005930	--	--	--
	1.6	1.4404	221-005932	--	--	--
	2.5	1.4404	221-005934	--	--	--
	4.0	1.4404	221-005936	--	--	--
	6.3	1.4404	221-005938	--	--	--
	10	1.4404	221-005446	221-005447	221-005451	--
	16	1.4404	--	221-005448	221-005453	--
	25	1.4404	--	221-005449	221-005405	221-005459
	35	1.4404	--	--	221-005456	221-005460
	40	1.4404	--	--	221-005458	221-005461
	60	1.4404	--	--	--	221-005462
	80	1.4404	--	--	--	--
	100	1.4404	--	--	--	--
	160	1.4404	--	--	--	--
	200	1.4404	--	--	--	--
	260	1.4404	--	--	--	--
	360	1.4404	--	--	--	--

Spare parts list valve disk SFW, equal percentage, soft sealing, metric sizes (DN 80 - DN 150)						
Item	K _{VS} value	Material	DN 80	DN 100	DN 125	DN 150
15	0.1	1.4404	--	--	--	--
	0.16	1.4404	--	--	--	--
	0.25	1.4404	--	--	--	--
	0.4	1.4404	--	--	--	--
	0.63	1.4404	--	--	--	--
	1	1.4404	--	--	--	--
	1.6	1.4404	--	--	--	--
	2.5	1.4404	--	--	--	--
	4.0	1.4404	--	--	--	--
	6.3	1.4404	--	--	--	--
	10	1.4404	--	--	--	--
	16	1.4404	--	--	--	--
	25	1.4404	--	--	--	--
	35	1.4404	221-005463	--	--	--
	40	1.4404	221-005464	--	--	--
	60	1.4404	221-005465	221-005467	--	--
	80	1.4404	221-005940	221-005942	--	--

Spare parts list valve disk SFW, equal percentage, soft sealing, metric sizes (DN 80 - DN 150)						
Item	K _{VS} value	Material	DN 80	DN 100	DN 125	DN 150
	100	1.4404	--	221-005944	221-005947	--
	160	1.4404	--	221-005946	221-005948	--
	200	1.4404	--	--	221-005949	221-005951
	260	1.4404	--	--	221-005950	221-005952
	360	1.4404	--	--	--	221-005953

Spare parts list valve disk SFW/DF, equal percentage, soft sealing, metric sizes (DN 80 - DN 150)						
Item	K _{VS} value	Material	DN 80	DN 100	DN 125	DN 150
15	0.1	1.4404	--	--	--	--
	0.16	1.4404	--	--	--	--
	0.25	1.4404	--	--	--	--
	0.4	1.4404	--	--	--	--
	0.63	1.4404	--	--	--	--
	1	1.4404	--	--	--	--
	1.6	1.4404	--	--	--	--
	2.5	1.4404	--	--	--	--
	4.0	1.4404	--	--	--	--
	6.3	1.4404	--	--	--	--
	10	1.4404	--	--	--	--
	16	1.4404	--	--	--	--
	25	1.4404	--	--	--	--
	35	1.4404	--	--	--	--
	40	1.4404	--	--	--	--
	60	1.4404	--	--	--	--
	80	1.4404	--	--	--	--
	100	1.4404	--	221-006190	221-006192	--
	160	1.4404	--	221-006191	221-006193	--
	200	1.4404	--	--	221-006194	221-006196
	260	1.4404	--	--	221-006195	221-006197
	360	1.4404	--	--	--	221-006198

Spare parts list valve disk SJW, linear, soft sealing, metric sizes (DN 25 - DN 65)						
Item	K _{VS} value	Material	DN 25	DN 40	DN 50	DN 65
15	0.1	1.4404	221-006035	--	--	--
	0.16	1.4404	221-006037	--	--	--
	0.25	1.4404	221-006039	--	--	--
	0.4	1.4404	221-006041	--	--	--
	0.63	1.4404	221-006043	--	--	--
	1	1.4404	221-006045	--	--	--
	1.6	1.4404	221-006047	--	--	--
	2.5	1.4404	221-006049	--	--	--
	4.0	1.4404	221-006051	--	--	--
	6.3	1.4404	221-006053	221-006054	--	--
	10	1.4404	221-005612	221-005613	221-005617	--
	16	1.4404	--	221-005614	221-005619	--
	25	1.4404	--	221-005615	221-005621	221-005640
	35	1.4404	--	--	221-005624	221-005652
	40	1.4404	--	--	221-005630	221-005653
	60	1.4404	--	--	--	221-005654
	80	1.4404	--	--	--	--
	100	1.4404	--	--	--	--
	160	1.4404	--	--	--	--
	200	1.4404	--	--	--	--
	260	1.4404	--	--	--	--
	360	1.4404	--	--	--	--

Spare parts list valve disk SJW, linear, soft sealing, metric sizes (DN 80 - DN 150)						
Item	K _{VS} value	Material	DN 80	DN 100	DN 125	DN 150
15	0.1	1.4404	--	--	--	--
	0.16	1.4404	--	--	--	--
	0.25	1.4404	--	--	--	--
	0.4	1.4404	--	--	--	--
	0.63	1.4404	--	--	--	--
	1	1.4404	--	--	--	--
	1.6	1.4404	--	--	--	--
	2.5	1.4404	--	--	--	--
	4.0	1.4404	--	--	--	--
	6.3	1.4404	--	--	--	--
	10	1.4404	--	--	--	--
	16	1.4404	--	--	--	--
	25	1.4404	--	--	--	--
	35	1.4404	221-005655	--	--	--
	40	1.4404	221-005656	--	--	--
	60	1.4404	221-005657	221-005684	--	--
	80	1.4404	221-006055	221-006057	--	--

Spare parts list valve disk SJW, linear, soft sealing, metric sizes (DN 80 - DN 150)						
Item	K _{VS} value	Material	DN 80	DN 100	DN 125	DN 150
	100	1.4404	--	221-006059	221-006062	--
	160	1.4404	--	221-006061	221-006063	--
	200	1.4404	--	--	221-006064	221-006066
	260	1.4404	--	--	221-006065	221-006067
	360	1.4404	--	--	--	221-006068

Spare parts list valve disk SJW/DF, linear, soft sealing, metric sizes (DN 80 - DN 150)						
Item	K _{VS} value	Material	DN 80	DN 100	DN 125	DN 150
15	0.1	1.4404	--	--	--	--
	0.16	1.4404	--	--	--	--
	0.25	1.4404	--	--	--	--
	0.4	1.4404	--	--	--	--
	0.63	1.4404	--	--	--	--
	1	1.4404	--	--	--	--
	1.6	1.4404	--	--	--	--
	2.5	1.4404	--	--	--	--
	4.0	1.4404	--	--	--	--
	6.3	1.4404	--	--	--	--
	10	1.4404	--	--	--	--
	16	1.4404	--	--	--	--
	25	1.4404	--	--	--	--
	35	1.4404	--	--	--	--
	40	1.4404	--	--	--	--
	60	1.4404	--	--	--	--
	80	1.4404	--	--	--	--
	100	1.4404	--	221-006211	221-006213	--
	160	1.4404	--	221-006212	221-006214	--
	200	1.4404	--	--	221-006215	221-006217
	260	1.4404	--	--	221-006216	221-006218
	360	1.4404	--	--	--	221-006219

Spare parts list, items 29 and 30, metric sizes (DN 25 - DN 65)						
Item	Designation	Material	DN 25	DN 40	DN 50	DN 65
29*	O-ring	NBR	930-026	930-026	930-026	930-026
30*	O-ring	NBR	930-026	930-026	930-026	930-026
Items marked with an * are wearing parts						

Spare parts list, items 29 and 30, metric sizes (DN 80 - DN 150)						
Item	Designation	Material	DN 80	DN 100	DN 125	DN 150
29*	O-ring	NBR	930-026	930-026	930-035	930-035
30*	O-ring	NBR	930-026	930-026	930-026	930-026
Items marked with an * are wearing parts						

Spare parts list seat ring, metric sizes (DN 25 to DN 65)						
Item	K _{VS} value	Material	DN 25	DN 40	DN 50	DN 65
33	0.1	1.4404	221-107,102			
	0.16	1.4404	221-107,102			
	0.25	1.4404	221-107,102			
	0.4	1.4404	221-107.81			
	0.63	1.4404	221-107.81			
	1	1.4404	221-107.81			
	1.6	1.4404	221-107.24			
	2.5	1.4404	221-107.24			
	4	1.4404	221-107.24			
	6.3	1.4404	221-107.25	221-107.27		
	10	1.4404	221-107.25	221-107.27	221-107.27	
	16	1.4404	--	221-107.28	221-107.28	
	25	1.4404	--	221-107.29	221-107.29	221-107.31
	35	1.4404	--	--	221-107.30	221-107.32
	40	1.4404	--	--	221-107.30	221-107.32
	60	1.4404	--	--	--	221-107.33

Spare parts list seat ring, metric sizes (DN 80 to DN 150)						
Item	K _{VS} value	Material	DN 80	DN 100	DN 125	DN 150
33	35	1.4404	221-107.32	--	--	--
	40	1.4404	221-107.32	--	--	--
	60	1.4404	221-107.33	221-107.35	--	--
	80	1.4404	221-107.34	221-107.36	--	--
	100	1.4404	--	221-107.36	221-107,103	--
	160	1.4404	--	221-107.37	221-107,104	--
	200	1.4404	--	--	221-107.89	221-107.40
	260	1.4404	--	--	221-107.39	221-107.41
	360	1.4404	--	--	--	221-107,105

Spare parts list, items 35, 43, 46, 401 and 402, metric sizes (DN 25 - DN 65)						
Item	Designation	Material	DN 25	DN 40	DN 50	DN 65
35	Blanking plate	1.4404	221-144.01	221-144.02	221-144.02	221-144.03
43	Clamp join KL	1.4401	221-507.02	221-507.04	221-507.04	221-507.09
46	Clamp join KL	1.4401	221-507.06	221-507.06	221-507.06	221-507.06
401	Housing V1	1.4404	221-101.19	221-101.21	221-101.22	221-101.05
402	Housing V2	1.4404	221-102.41	221-102.43	221-102.44	221-102.05

Spare parts list, items 35, 43, 46, 401 and 402, metric sizes (DN 80 - DN 150)						
Item	Designation	Material	DN 80	DN 100	DN 125	DN 150
35	Blanking plate	1.4404	221-144.03	221-144.04	221-144.06	221-144.05
43	Clamp join KL	1.4401	221-507.09	221-507.11	221-507.13	221-507.14
46	Clamp join KL	1.4401	221-507.06	221-507.06	221-507.11	221-507.11

Spare parts list, items 35, 43, 46, 401 and 402, metric sizes (DN 80 - DN 150)						
Item	Designation	Material	DN 80	DN 100	DN 125	DN 150
401	Housing V1	1.4404	221-101.06	221-101.07	221-101.18	221-101.66
402	Housing V2	1.4404	221-102.06	221-102.07	221-102.29	221-102.09

Spare parts list housing connection S, metallic seal, metric sizes (DN 25 - DN 65)						
Item	K _{VS} value	Material	DN 25	DN 40	DN 50	DN 65
420	0.1	1.4404	221-407,103	--	--	--
	0.16	1.4404	221-407,103	--	--	----
	0.25	1.4404	221-407,103	--	--	--
	0.4	1.4404	221-131.33	--	--	--
	0.63	1.4404	221-131.33	--	--	--
	1	1.4404	221-131.33	--	--	--
	1.6	1.4404	221-131.20	--	--	--
	2.5	1.4404	221-131.20	--	--	--
	4	1.4404	221-131.20	--	--	--
	6.3	1.4404	221-131.97	221-131.91	--	--
	10	1.4404	221-131.97	221-131.91	221-132,104	--
	16	1.4404	--	221-131.90	221-131.99	--
	25	1.4404	--	221-131.96	221-132.51	221-131.92
	35	1.4404	--	--	221-132.46	221-132.56
	40	1.4404	--	--	221-132.46	221-132.56
	60	1.4404	--	--	--	221-131.28

Spare parts list housing connection S, metallic seal, metric sizes (DN 80 - DN 150)						
Item	K _{VS} value	Material	DN 80	DN 100	DN 125	DN 150
420	35	1.4404	221-132,105	--	--	--
	40	1.4404	221-132,105	--	--	--
	60	1.4404	221-132.53	221-131.09	--	--
	80	1.4404	221-131.80	221-131.83	--	--
	100	1.4404	--	221-131.83	221-132,108	--
	160	1.4404	--	221-131.81	221-132,109	--
	200	1.4404	--	--	221-407.77	221-132,107
	260	1.4404	--	--	221-004629	221-132,110
	360	1.4404	--	--	--	221-132,111

Spare parts list housing connection S, for V-ring seal, metric sizes (DN 25 - DN 65)						
Item	K _{VS} value	Material	DN 25	DN 40	DN 50	DN 65
420	0.1	1.4404	221-407,115	--	--	--
	0.16	1.4404	221-407,115	--	--	--
	0.25	1.4404	221-407,115	--	--	--
	0.4	1.4404	221-131.19	--	--	--
	0.63	1.4404	221-131.19	--	--	--
	1	1.4404	221-131.19	--	--	--
	1.6	1.4404	221-131.94	--	--	--

Spare parts list - VARIVENT control valve type P P_F/P_J

Spare parts list housing connection S, for V-ring seal, metric sizes (DN 25 - DN 65)						
Item	K _{VS} value	Material	DN 25	DN 40	DN 50	DN 65
	2.5	1.4404	221-131.94	--	--	--
	4	1.4404	221-131.94	--	--	--
	6.3	1.4404	221-407.97	221-407.99	--	--
	10	1.4404	221-407.97	221-407.99	221-407,104	--
	16	1.4404	--	221-407.60	221-407.61	--
	25	1.4404	--	221-407.63	221-407.56	221-132.16
	35	1.4404	--	--	221-131.95	221-132.92
	40	1.4404	--	--	221-131.95	221-132.92
	60	1.4404	--	--	--	221-407.58

Spare parts list housing connection S for V-ring seal, metric sizes (DN 80 - DN 150)						
Item	K _{VS} value	Material	DN 80	DN 100	DN 125	DN 150
420	35	1.4404	221-407,105	--	--	--
	40	1.4404	221-407,105	--	--	--
	60	1.4404	221-407.59	221-407.81	--	--
	80	1.4404	221-407.57	221-131.02	--	--
	100	1.4404	--	221-131.02	221-407,106	--
	160	1.4404	--	221-131.21	221-407,107	--
	200	1.4404	--	--	221-132.17	221-407,109
	260	1.4404	--	--	221-407,108	221-407.87
	360	1.4404	--	--	--	221-407,111

Spare parts list items A and B, metric sizes									
Item	Designation	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150
A	Actuator	See spare parts list/dimensions sheet for VARIVENT® actuator							
B	Control top T.VIS® P-15	See spare parts list for control top T.VIS® P-15							

Spare parts list item 1-5, inch OD								
Item	Designation	Material	1"	1.5"	2"	2.5"	3"	4"
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
Items marked with an * are wearing parts								

Spare parts list V-ring, lantern, spacer nut, inch OD									
Item	Designation	K _{VS} value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
7*	V-ring	0.1	EPDM FKM FFKM HNBR	932-064 932-073 932-120 932-083	--	--	--	--	--
		0.16							
		0.25							
		0.4							
		0.63							
		1							
		1.6							
		2.5							
		4							
		6.3	EPDM	932-017	932-017	--	--	--	--
			FKM	932-029	932-029	--	--	--	--
			FFKM	932-111	932-111	--	--	--	--
			HNBR	932-085	932-085	--	--	--	--
		10	EPDM	932-017	932-017	932-017	--	--	--
			FKM	932-029	932-029	932-029	--	--	--
			FFKM	932-111	932-111	932-111	--	--	--
			HNBR	932-085	932-085	932-085	--	--	--
		16	EPDM	--	932-046	932-046	--	--	--
			FKM	--	932-030	932-030	--	--	--
			FFKM	--	932-110	932-110	--	--	--
			HNBR	--	932-087	932-087	--	--	--
		25	EPDM	--	932-019	932-019	932-019	--	--
			FKM	--	932-032	932-032	932-032	--	--
			FFKM	--	932-113	932-113	932-113	--	--
			HNBR	--	932-084	932-084	932-084	--	--
		35	EPDM	--	--	932-021	932-021	932-021	--
			FKM	--	--	932-033	932-033	932-033	--

Spare parts list - VARIVENT control valve type P P_F/P_J

Spare parts list V-ring, lantern, spacer nut, inch OD									
Item	Designation	K _{VS} value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
			FFKM	--	--	932-114	932-114	932-114	--
			HNBR	--	--	932-088	932-088	932-088	--
		40	EPDM	--	--	932-021	932-021	932-021	--
			FKM	--	--	932-033	932-033	932-033	--
			FFKM	--	--	932-114	932-114	932-114	--
			HNBR	--	--	932-088	932-088	932-088	--
		60	EPDM	--	--	--	932-023	932-023	932-023
			FKM	--	--	--	932-034	932-034	932-034
			FFKM	--	--	--	932-115	932-115	932-115
			HNBR	--	--	--	932-089	932-089	932-089
		80	EPDM	--	--	--	--	932-024	932-025
			FKM	--	--	--	--	932-035	932-036
			FFKM	--	--	--	--	932-116	--
			HNBR	--	--	--	--	932-090	(932-101)
		100	EPDM	--	--	--	--	--	932-025
			FKM	--	--	--	--	--	932-036
			FFKM	--	--	--	--	--	--
			HNBR	--	--	--	--	--	(932-101)
		160	EPDM	--	--	--	--	--	932-028
			FKM	--	--	--	--	--	932-039
			FFKM	--	--	--	--	--	932-119
			HNBR	--	--	--	--	--	932-100
9	Lantern	--	1.4301	221-121.01	221-121.07	221-121.07	221-121.08	221-121.08	221-121.09
10	Spacer nut	--	1.4305	221-147.02	221-147.02	221-147.02	221-147.01	221-147.01	221-147.01

Spare parts list valve disk SFM, equal percentage, metallic seal, inch OD								
Item	K _{VS} value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
15	0.1	1.4404	221-005979	--	--	--	--	--
	0.16	1.4404	221-005981	--	--	--	--	--
	0.25	1.4404	221-5983	--	--	--	--	--
	0.4	1.4404	221-005985	--	--	--	--	--
	0.63	1.4404	221-005987	--	--	--	--	--
	1	1.4404	221-005990	--	--	--	--	--
	1.6	1.4404	221-005992	--	--	--	--	--
	2.5	1.4404	221-005994	--	--	--	--	--
	4	1.4404	221-005996	--	--	--	--	--
	6.3	1.4404	221-005998	221-006000	--	--	--	--
	10	1.4404	221-005472	221-005479	221-005482	--	--	--
	16	1.4404	--	221-005480	221-005484	--	--	--
	25	1.4404	--	221-005481	221-005486	221-005492	--	--
	35	1.4404	--	--	221-005488	221-005493	221-005496	--
	40	1.4404	--	--	221-005490	221-005494	221-005498	--
	60	1.4404	--	--	--	221-005495	221-005499	221-005500
	80	1.4404	--	--	--	--	221-006002	221-006005
	100	1.4404	--	--	--	--	--	221-006003
	160	1.4404	--	--	--	--	--	221-006007
	200	1.4404	--	--	--	--	--	--
	260	1.4404	--	--	--	--	--	--
	360	1.4404	--	--	--	--	--	--

Spare parts list valve disk SFM/DF, equal percentage, metallic seal, inch OD									
Item	K _{VS} value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD	6" OD
15	0.1	1.4404	--	--	--	--	--	--	--
	0.16	1.4404	--	--	--	--	--	--	--
	0.25	1.4404	--	--	--	--	--	--	--
	0.4	1.4404	--	--	--	--	--	--	--
	0.63	1.4404	--	--	--	--	--	--	--
	1	1.4404	--	--	--	--	--	--	--
	1.6	1.4404	--	--	--	--	--	--	--
	2.5	1.4404	--	--	--	--	--	--	--
	4	1.4404	--	--	--	--	--	--	--
	6.3	1.4404	--	--	--	--	--	--	--
	10	1.4404	--	--	--	--	--	--	--
	16	1.4404	--	--	--	--	--	--	--
	25	1.4404	--	--	--	--	--	--	--
	35	1.4404	--	--	--	--	--	--	--
	40	1.4404	--	--	--	--	--	--	--
	60	1.4404	--	--	--	--	--	221-006243	--
	80	1.4404	--	--	--	--	--	221-006244	--

Spare parts list - VARIVENT control valve type P P_F/P_J

Spare parts list valve disk SFM/DF, equal percentage, metallic seal, inch OD									
Item	K _{VS} value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD	6" OD
	100	1.4404	--	--	--	--	--	221-006245	--
	160	1.4404	--	--	--	--	--	221-006246	--
	200	1.4404	--	--	--	--	--	--	221-006247
	260	1.4404	--	--	--	--	--	--	221-006248
	360	1.4404	--	--	--	--	--	--	221-006249

Spare parts list valve disk SJM, linear, metallic seal, inch OD								
Item	K _{VS} value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
15	0.1	1.4404	221-006073	--	--	--	--	--
	0.16	1.4404	221-006075	--	--	--	--	--
	0.25	1.4404	221-006077	--	--	--	--	--
	0.4	1.4404	221-006079	--	--	--	--	--
	0.63	1.4404	221-006081	--	--	--	--	--
	1	1.4404	221-006083	--	--	--	--	--
	1.6	1.4404	221-006085	--	--	--	--	--
	2.5	1.4404	221-006087	--	--	--	--	--
	4	1.4404	221-006089	--	--	--	--	--
	6.3	1.4404	221-006091	221-006093	--	--	--	--
	10	1.4404	221-005885	221-005887	221-005890	--	--	--
	16	1.4404	--	221-005888	221-005892	--	--	--
	25	1.4404	--	221-005889	221-005900	221-005912	--	--
	35	1.4404	--	--	221-005902	221-005913	221-005916	--
	40	1.4404	--	--	221-005904	221-005914	221-005917	--
	60	1.4404	--	--	--	221-005915	221-005918	221-005919
	80	1.4404	--	--	--	--	221-006094	221-006095
	100	1.4404	--	--	--	--	--	221-006097
	160	1.4404	--	--	--	--	--	--
	200	1.4404	--	--	--	--	--	--
	260	1.4404	--	--	--	--	--	--
	360	1.4404	--	--	--	--	--	--

Spare parts list valve disk SJM/DF, linear, metallic seal, inch OD									
Item	K _{VS} value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD	6" OD
15	0.1	1.4404	--	--	--	--	--	--	--
	0.16	1.4404	--	--	--	--	--	--	--
	0.25	1.4404	--	--	--	--	--	--	--
	0.4	1.4404	--	--	--	--	--	--	--
	0.63	1.4404	--	--	--	--	--	--	--
	1	1.4404	--	--	--	--	--	--	--
	1.6	1.4404	--	--	--	--	--	--	--
	2.5	1.4404	--	--	--	--	--	--	--
	4	1.4404	--	--	--	--	--	--	--
	6.3	1.4404	--	--	--	--	--	--	--
	10	1.4404	--	--	--	--	--	--	--
	16	1.4404	--	--	--	--	--	--	--
	25	1.4404	--	--	--	--	--	--	--
	35	1.4404	--	--	--	--	--	--	--
	40	1.4404	--	--	--	--	--	--	--
	60	1.4404	--	--	--	--	--	221-006257	--
	80	1.4404	--	--	--	--	--	221-006258	--

Spare parts list - VARIVENT control valve type P P_F/P_J

Spare parts list valve disk SJM/DF, linear, metallic seal, inch OD									
Item	K _{VS} value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD	6" OD
	100	1.4404	--	--	--	--	--	221-006259	--
	160	1.4404	--	--	--	--	--	221-006260	--
	200	1.4404	--	--	--	--	--	--	221-006261
	260	1.4404	--	--	--	--	--	--	221-006262
	360	1.4404	--	--	--	--	--	--	221-006263

Spare parts list valve disk SFW, equal percentage, soft sealing, inch OD								
Item	K _{VS} value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
15	0.1	1.4404	221-005443	--	--	--	--	--
	0.16	1.4404	221-005921	--	--	--	--	--
	0.25	1.4404	221-005923	--	--	--	--	--
	0.4	1.4404	221-005925	--	--	--	--	--
	0.63	1.4404	221-005927	--	--	--	--	--
	1	1.4404	221-005929	--	--	--	--	--
	1.6	1.4404	221-005931	--	--	--	--	--
	2.5	1.4404	221-005933	--	--	--	--	--
	4	1.4404	221-005935	--	--	--	--	--
	6.3	1.4404	221-005937	221-005939	--	--	--	--
	10	1.4404	221-005445	221-005447	221-005450	--	--	--
	16	1.4404	--	221-005448	221-005452	--	--	--
	25	1.4404	--	221-005449	221-005454	221-005459	--	--
	35	1.4404	--	--	221-005455	221-005460	221-005463	--
	40	1.4404	--	--	221-005457	221-005461	221-005464	--
	60	1.4404	--	--	--	221-005462	221-005465	221-005466
	80	1.4404	--	--	--	--	221-005940	221-005941
	100	1.4404	--	--	--	--	--	221-005943
	160	1.4404	--	--	--	--	--	221-005945
	200	1.4404	--	--	--	--	--	--
	260	1.4404	--	--	--	--	--	--
	360	1.4404	--	--	--	--	--	--

Spare parts list valve disk SFW/DF, equal percentage, soft sealing, inch OD									
Item	K _{VS} value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD	6" OD
15	0.1	1.4404	--	--	--	--	--	--	--
	0.16	1.4404	--	--	--	--	--	--	--
	0.25	1.4404	--	--	--	--	--	--	--
	0.4	1.4404	--	--	--	--	--	--	--
	0.63	1.4404	--	--	--	--	--	--	--
	1	1.4404	--	--	--	--	--	--	--
	1.6	1.4404	--	--	--	--	--	--	--
	2.5	1.4404	--	--	--	--	--	--	--
	4	1.4404	--	--	--	--	--	--	--
	6.3	1.4404	--	--	--	--	--	--	--
	10	1.4404	--	--	--	--	--	--	--
	16	1.4404	--	--	--	--	--	--	--
	25	1.4404	--	--	--	--	--	--	--
	35	1.4404	--	--	--	--	--	--	--
	40	1.4404	--	--	--	--	--	--	--
	60	1.4404	--	--	--	--	--	221-006263	--
	80	1.4404	--	--	--	--	--	221-006237	--

Spare parts list - VARIVENT control valve type P P_F/P_J

Spare parts list valve disk SFW/DF, equal percentage, soft sealing, inch OD									
Item	K _{VS} value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD	6" OD
	100	1.4404	--	--	--	--	--	221-006238	--
	160	1.4404	--	--	--	--	--	221-006239	--
	200	1.4404	--	--	--	--	--	--	221-006240
	260	1.4404	--	--	--	--	--	--	221-006241
	360	1.4404	--	--	--	--	--	--	221-006242

Spare parts list valve disk SJW, linear, soft sealing, inch OD								
Item	K _{VS} value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
15	0.1	1.4404	221-006034	--	--	--	--	--
	0.16	1.4404	221-006036	--	--	--	--	--
	0.25	1.4404	221-006038	--	--	--	--	--
	0.4	1.4404	221-006040	--	--	--	--	--
	0.63	1.4404	221-006042	--	--	--	--	--
	1	1.4404	221-006044	--	--	--	--	--
	1.6	1.4404	221-006046	--	--	--	--	--
	2.5	1.4404	221-006048	--	--	--	--	--
	4	1.4404	221-006050	--	--	--	--	--
	6.3	1.4404	221-006052	221-006054	--	--	--	--
	10	1.4404	221-005611	221-005613	221-005616	--	--	--
	16	1.4404	--	221-005614	221-005618	--	--	--
	25	1.4404	--	221-005615	221-005620	221-005640	--	--
	35	1.4404	--	--	221-005622	221-005652	221-005655	--
	40	1.4404	--	--	221-005629	221-005653	221-005656	--
	60	1.4404	--	--	--	221-005654	221-005657	221-005659
	80	1.4404	--	--	--	--	221-006055	221-006056
	100	1.4404	--	--	--	--	--	221-006058
	160	1.4404	--	--	--	--	--	221-006060
	200	1.4404	--	--	--	--	--	--
	260	1.4404	--	--	--	--	--	--
	360	1.4404	--	--	--	--	--	--

Spare parts list valve disk SJW/DF, linear, soft sealing, inch OD									
Item	K _{VS} value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD	6" OD
15	0.1	1.4404	--	--	--	--	--	--	--
	0.16	1.4404	--	--	--	--	--	--	--
	0.25	1.4404	--	--	--	--	--	--	--
	0.4	1.4404	--	--	--	--	--	--	--
	0.63	1.4404	--	--	--	--	--	--	--
	1	1.4404	--	--	--	--	--	--	--
	1.6	1.4404	--	--	--	--	--	--	--
	2.5	1.4404	--	--	--	--	--	--	--
	4	1.4404	--	--	--	--	--	--	--
	6.3	1.4404	--	--	--	--	--	--	--
	10	1.4404	--	--	--	--	--	--	--
	16	1.4404	--	--	--	--	--	--	--
	25	1.4404	--	--	--	--	--	--	--
	35	1.4404	--	--	--	--	--	--	--
	40	1.4404	--	--	--	--	--	--	--
	60	1.4404	--	--	--	--	--	221-006250	--
	80	1.4404	--	--	--	--	--	221-006251	--

Spare parts list valve disk SJW/DF, linear, soft sealing, inch OD									
Item	K _{VS} value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD	6" OD
	100	1.4404	--	--	--	--	--	221-006252	--
	160	1.4404	--	--	--	--	--	221-006253	--
	200	1.4404	--	--	--	--	--	--	221-006254
	260	1.4404	--	--	--	--	--	--	221-006255
	360	1.4404	--	--	--	--	--	--	221-006256

Spare parts list items 29 and 30, inch OD									
Item	Designation	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD	
29*	O-ring	NBR	930-026	930-026	930-026	930-026	930-026	930-026	930-026
30*	O-ring	NBR	930-026	930-026	930-026	930-026	930-026	930-026	930-026

Items marked with an * are wearing parts

Spare parts list seat ring, inch OD									
Item	K _{VS} value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD	
33	0.1	1.4404	221-107.102	--	--	--	--	--	
	0.16	1.4404	221-107.102	--	--	--	--	--	
	0.25	1.4404	221-107.102	--	--	--	--	--	
	0.4	1.4404	221-107.81	--	--	--	--	--	
	0.63	1.4404	221-107.81	--	--	--	--	--	
	1	1.4404	221-107.81	--	--	--	--	--	
	1.6	1.4404	221-107.24	--	--	--	--	--	
	2.5	1.4404	221-107.24	--	--	--	--	--	
	4	1.4404	221-107.24	--	--	--	--	--	
	6.3	1.4404	221-107.25	221-107.27	--	--	--	--	
	10	1.4404	221-107.25	221-107.27	221-107.27	--	--	--	
	16	1.4404	--	221-107.28	221-107.28	--	--	--	
	25	1.4404	--	221-107.29	221-107.29	221-107.31	--	--	
	35	1.4404	--	--	221-107.30	221-107.32	221-107.32	--	
	40	1.4404	--	--	221-107.30	221-107.32	221-107.32	--	
	60	1.4404	--	--	--	221-107.33	221-107.33	221-107.35	
	80	1.4404	--	--	--	--	221-107.34	221-107.36	
	100	1.4404	--	--	--	--	--	221-107.36	
	160	1.4404	--	--	--	--	--	221-107.37	

Spare parts list items 35, 43, 46, 401 and 402, inch OD									
Item	Designation	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD	
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 join KL	1.4401	221-507.02	221-507.04	221-507.04	221-507.09	221-507.09	221-507.11	
46	Clamp join KL	1.4401	221-507.06	221-507.06	221-507.06	221-507.06	221-507.06	221-507.06	
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	

Spare parts list housing connection S, inch OD								
Item	K _{VS} value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
420	0.1	1.4404	221-132,114	--	--	--	--	--
	0.16	1.4404	221-132,114	--	--	--	--	--
	0.25	1.4404	221-132,114	--	--	--	--	--
	0.4	1.4404	221-407.95	--	--	--	--	--
	0.63	1.4404	221-407.95	--	--	--	--	--
	1	1.4404	221-407.95	--	--	--	--	--
	1.6	1.4404	221-132.50	--	--	--	--	--
	2.5	1.4404	221-132.50	--	--	--	--	--
	4	1.4404	221-132.50	--	--	--	--	--
	6.3	1.4404	221-407.09	221-132.48	--	--	--	--
	10	1.4404	221-407.09	221-132.48	221-132,113	--	--	--
	16	1.4404	--	221-407.65	221-131.68	--	--	--
	25	1.4404	--	221-131.93	221-132.49	221-407.73	--	--
	35	1.4404	--	--	221-131.98	221-407.20	221-407.23	--
	40	1.4404	--	--	221-131.98	221-407.20	221-407.23	--
	60	1.4404	--	--	--	221-132,112	221-407.74	221-407.86
	80	1.4404	--	--	--	--	221-004872	221-132.52
	100	1.4404	--	--	--	--	--	221-132.52
	160	1.4404	--	--	--	--	--	221-132,106

Spare parts list housing connection S for V-ring seal, inch OD								
Item	K _{VS} value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
420	0.1	1.4404	221-407,114	--	--	--	--	--
	0.16	1.4404	221-407,114	--	--	--	--	--
	0.25	1.4404	221-407,114	--	--	--	--	--
	0.4	1.4404	221-407.94	--	--	--	--	--
	0.63	1.4404	221-407.94	--	--	--	--	--
	1	1.4404	221-407.94	--	--	--	--	--
	1.6	1.4404	221-131.24	--	--	--	--	--
	2.5	1.4404	221-131.24	--	--	--	--	--
	4	1.4404	221-131.24	--	--	--	--	--
	6.3	1.4404	221-131.85	221-131.86	--	--	--	--
	10	1.4404	221-131.85	221-131.86	221-407,113	--	--	--
	16	1.4404	--	221-407.66	221-407.79	--	--	--
	25	1.4404	--	221-131.87	221-407.70	221-131.89	--	--
	35	1.4404	--	--	221-407.72	221-132.38	221-132.36	--
	40	1.4404	--	--	221-407.72	221-132.38	221-132.36	--
	60	1.4404	--	--	--	221-131.84	221-407.64	221-407.75
	80	1.4404	--	--	--	--	221-407,110	221-131.88
	100	1.4404	--	--	--	--	--	221-131.88
	160	1.4404	--	--	--	--	--	221-407,112

Spare parts list - VARIVENT control valve type P P_F/P_J

Item	Designation	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
A	Actuator	See spare parts list/dimensions sheet for VARIVENT® actuator					
B	Control top T.VIS® P-15	See spare parts list for control top T.VIS® P-15					

Spare parts list items 1-5, inch IPS						
Item	Designation	Material	2" IPS	3" IPS	4" IPS	6" IPS
1*	Seal ring	EPDM	924-084	924-085	924-085	924-088
		FKM	924-082	924-083	924-083	924-087
		HNBR	924-311	924-313	924-313	--
2	Bearing	PTFE/carbon	935-001	935-002	935-002	935-003
	Bearing, 3A	SUSTA-PVDF	935-098	935-099	935-099	935-102
3	Seal disk	1.4404	221-141.02	221-141.03	221-141.04	221-141.05
4	Bearing disc	1.4301	221-142.02	224-142.03	221-142.03	221-142.04
5*	O-ring	EPDM	930-144	930-150	930-156	930-260
		FKM	930-171	930-176	930-178	930-259
		HNBR	930-633	930-634	930-863	--
6*	O-ring	NBR	930-004	930-004	930-004	930-007
Items marked with an * are wearing parts						

Spare parts list V-ring, lantern, spacer nut, inch IPS							
Item	Designation	K _{VS} value	Material	2" IPS	3" IPS	4" IPS	6" IPS
7*	V-ring	10	EPDM	932-017	--	--	--
			FKM	932-029	--	--	--
			FFKM	932-111	--	--	--
			HNBR	932-085	--	--	--
		16	EPDM	932-046	--	--	--
			FKM	932-030	--	--	--
			FFKM	932-110	--	--	--
			HNBR	932-087	--	--	--
		25	EPDM	932-019	--	--	--
			FKM	932-032	--	--	--
			FFKM	932-113	--	--	--
			HNBR	932-084	--	--	--
		35	EPDM	932-021	932-021	--	--
			FKM	932-033	932-033	--	--
			FFKM	932-114	932-114	--	--
			HNBR	932-088	932-088	--	--
		40	EPDM	932-021	932-021	--	--
			FKM	932-033	932-033	--	--
			FFKM	932-114	932-114	--	--
			HNBR	932-088	932-088	--	--
		60	EPDM	--	932-023	932-023	--
			FKM	--	932-034	932-034	--
			FFKM	--	932-115	932-115	--
			HNBR	--	932-089	932-089	--
		80	EPDM	--	932-024	932-025	--
			FKM	--	932-035	932-036	--
			FFKM	--	932-116	--	--

Spare parts list V-ring, lantern, spacer nut, inch IPS							
Item	Designation	K _{VS} value	Material	2" IPS	3" IPS	4" IPS	6" IPS
		100	HNBR	--	932-090	(932-101)	--
			EPDM	--	--	932-025	--
			FKM	--	--	932-036	--
			FFKM	--	--	--	--
			HNBR	--	--	(932-101)	--
		160	EPDM	--	--	932-028	--
			FKM	--	--	932-039	--
			FFKM	--	--	932-119	--
			HNBR	--	--	932-100	--
		200	EPDM	--	--	--	932-059
			FKM	--	--	--	932-063
			FFKM	--	--	--	--
			HNBR	--	--	--	--
		260	EPDM	--	--	--	932-045
			FKM	--	--	--	932-044
			FFKM	--	--	--	--
			HNBR	--	--	--	--
		360	EPDM	--	--	--	932-042
			FKM	--	--	--	932-041
			HNBR	--	--	--	--
9	Lantern	--	1.4301	221-121.12	221-121.10	221-121.11	221-121.05
10	Spacer nut	--	1.4305	221-147.02	221-147.01	221-147.01	221-147.06

Spare parts list valve disk SFM, equal percentage, metallic seal, inch IPS						
Item	K _{VS} value	Material	2" IPS	3" IPS	4" IPS	6" IPS
15	0.1	1.4404	--	--	--	--
	0.16	1.4404	--	--	--	--
	0.25	1.4404	--	--	--	--
	0.4	1.4404	--	--	--	--
	0.63	1.4404	--	--	--	--
	1	1.4404	--	--	--	--
	1.6	1.4404	--	--	--	--
	2.5	1.4404	--	--	--	--
	4	1.4404	--	--	--	--
	6.3	1.4404	--	--	--	--
	10	1.4404	221-00	--	--	--
	16	1.4404	221-00	--	--	--
	25	1.4404	221-00	--	--	--
	35	1.4404	221-00	221-00	--	--
	40	1.4404	221-00	221-00	--	--
	60	1.4404	--	221-00	221-00	--
	80	1.4404	--	221-00	221-00	--

Spare parts list valve disk SFM, equal percentage, metallic seal, inch IPS						
Item	K _{VS} value	Material	2" IPS	3" IPS	4" IPS	6" IPS
	100	1.4404	--	--	221-00	--
	160	1.4404	--	--	221-00	--
	200	1.4404	--	--	--	221-00
	260	1.4404	--	--	--	221-00
	360	1.4404	--	--	--	221-00

Spare parts list valve disk SJM, linear, metallic seal, inch IPS						
Item	K _{VS} value	Material	2" IPS	3" IPS	4" IPS	6" IPS
15	0.1	1.4404	--	--	--	--
	0.16	1.4404	--	--	--	--
	0.25	1.4404	--	--	--	--
	0.4	1.4404	--	--	--	--
	0.63	1.4404	--	--	--	--
	1	1.4404	--	--	--	--
	1.6	1.4404	--	--	--	--
	2.5	1.4404	--	--	--	--
	4	1.4404	--	--	--	--
	6.3	1.4404	--	--	--	--
	10	1.4404	221-00	--	--	--
	16	1.4404	221-00	--	--	--
	25	1.4404	221-00	--	--	--
	35	1.4404	221-00	221-00	--	--
	40	1.4404	221-00	221-00	--	--
	60	1.4404	--	221-00	221-00	--
	80	1.4404	--	221-00	221-00	--
	100	1.4404	--	--	221-00	--
	160	1.4404	--	--	221-00	--
	200	1.4404	--	--	--	221-00
	260	1.4404	--	--	--	221-00
	360	1.4404	--	--	--	221-00

Spare parts list valve disk SFW, equal percentage, soft sealing, inch IPS						
Item	K _{VS} value	Material	2" IPS	3" IPS	4" IPS	6" IPS
15	0.1	1.4404	--	--	--	--
	0.16	1.4404	--	--	--	--
	0.25	1.4404	--	--	--	--
	0.4	1.4404	--	--	--	--
	0.63	1.4404	--	--	--	--
	1	1.4404	--	--	--	--
	1.6	1.4404	--	--	--	--
	2.5	1.4404	--	--	--	--
	4	1.4404	--	--	--	--
	6.3	1.4404	--	--	--	--
	10	1.4404	221-00	--	--	--
	16	1.4404	221-00	--	--	--
	25	1.4404	221-00	--	--	--
	35	1.4404	221-00	221-00	--	--
	40	1.4404	221-00	221-00	--	--
	60	1.4404	--	221-00	221-00	--
	80	1.4404	--	221-00	221-00	--
	100	1.4404	--	--	221-00	--
	160	1.4404	--	--	221-00	--
	200	1.4404	--	--	--	221-00
	260	1.4404	--	--	--	221-00
	360	1.4404	--	--	--	221-00

Spare parts list valve disk SJW, linear, soft sealing, inch IPS						
Item	K _{VS} value	Material	2" IPS	3" IPS	4" IPS	6" IPS
15	0.1	1.4404	--	--	--	--
	0.16	1.4404	--	--	--	--
	0.25	1.4404	--	--	--	--
	0.4	1.4404	--	--	--	--
	0.63	1.4404	--	--	--	--
	1	1.4404	--	--	--	--
	1.6	1.4404	--	--	--	--
	2.5	1.4404	--	--	--	--
	4	1.4404	--	--	--	--
	6.3	1.4404	--	--	--	--
	10	1.4404	221-00	--	--	--
	16	1.4404	221-00	--	--	--
	25	1.4404	221-00	--	--	--
	35	1.4404	221-00	221-00	--	--
	40	1.4404	221-00	221-00	--	--
	60	1.4404	--	221-00	221-00	--
	80	1.4404	--	221-00	221-00	--
	100	1.4404	--	--	221-00	--
	160	1.4404	--	--	221-00	--
	200	1.4404	--	--	--	221-00
	260	1.4404	--	--	--	221-00
	360	1.4404	--	--	--	221-00

Spare parts list items 29 and 30, inch IPS						
Item	Designation	Material	2" IPS	3" IPS	4" IPS	6" IPS
29*	O-ring	NBR	930-026	930-026	930-026	930-025
30*	O-ring	NBR	930-026	930-026	930-026	930-026
Items marked with an * are wearing parts						

Spare parts list seat ring, inch IPS						
Item	K _{VS} value	Material	2" IPS	3" IPS	4" IPS	6" IPS
33	10	1.4404	221-107.27	--	--	--
	16	1.4404	221-107.28	--	--	--
	25	1.4404	221-107.29	--	--	--
	35	1.4404	221-107.30	221-107.32	--	--
	40	1.4404	221-107.30	221-107.32	--	--
	60	1.4404	--	221-107.33	221-107.35	--
	80	1.4404	--	221-107.34	221-107.36	--
	100	1.4404	--	--	221-107.36	--
	160	1.4404	--	--	221-107.37	--
	200	1.4404	--	--	--	221-107.40
	260	1.4404	--	--	--	221-107.41
	360	1.4404	--	--	--	221-107,105

Spare parts list items 35, 43, 46, 401 and 402, inch IPS						
Item	Designation	Material	2" IPS	3" IPS	4" IPS	6" IPS
35	Blanking plate	1.4404	221-144.02	221-144.03	221-144.04	221-144.05
43	Clamp join KL	1.4401	221-507.04	221-507.03	221-507.11	221-507.14
46	Clamp join KL	1.4401	221-507.06	221-507.09	221-507.06	221-507.11
401	Housing V1	1.4404	221-101.37	221-101.35	221-101.36	221-101.17
402	Housing V2	1.4404	221-102.62	221-102.59	221-102.60	221-102.17

Spare parts list housing connection S, inch IPS						
Item	K _{VS} value	Material	2" IPS	3" IPS	4" IPS	6" IPS
420	0.1	1.4404	--	--	--	--
	0.16	1.4404	--	--	--	--
	0.25	1.4404	--	--	--	--
	0.4	1.4404	--	--	--	--
	0.63	1.4404	--	--	--	--
	1	1.4404	--	--	--	--
	1.6	1.4404	--	--	--	--
	2.5	1.4404	--	--	--	--
	4	1.4404	--	--	--	--
	6.3	1.4404	--	--	--	--
	10	1.4404	--	--	--	--
	16	1.4404	--	--	--	--
	25	1.4404	221-407.88	--	--	--
	35	1.4404	--	--	--	--
	40	1.4404	--	--	--	--
	60	1.4404	--	--	221-407,102	--
	80	1.4404	--	--	--	--
	100	1.4404	--	--	--	--
	160	1.4404	--	--	--	--

Item	K _{VS} value	Material	2" IPS	3" IPS	4" IPS	6" IPS
420	0.1	1.4404	--	--	--	--
	0.16	1.4404	--	--	--	--
	0.25	1.4404	--	--	--	--
	0.4	1.4404	--	--	--	--
	0.63	1.4404	--	--	--	--
	1	1.4404	--	--	--	--
	1.6	1.4404	--	--	--	--
	2.5	1.4404	--	--	--	--
	4	1.4404	--	--	--	--
	6.3	1.4404	--	--	--	--
	10	1.4404	--	--	--	--
	16	1.4404	--	--	--	--
	25	1.4404	--	--	--	--
	35	1.4404	--	--	--	--

Spare parts list - VARIVENT control valve type P P_F/P_J

Item	K _{VS} value	Material	2" IPS	3" IPS	4" IPS	6" IPS
	40	1.4404	--	--	--	--
	60	1.4404	--	--	221-407,101	--
	80	1.4404	--	--	--	--
	100	1.4404	--	--	--	--
	160	1.4404	--	--	--	--
	200	1.4404	--	--	--	221-132.86
	260	1.4404	--	--	--	221-407.80
	360	1.4404	--	--	--	--

Item	Designation	2" IPS	3" IPS	4" IPS	6" IPS
A	Actuator	See spare parts list/dimensions sheet for VARIVENT® actuator			
B	Control top T.VIS® P-15	See spare parts list for control top T.VIS® P-15			

14 Spare parts list - VARIVENT control valve type P, divert valve W/X

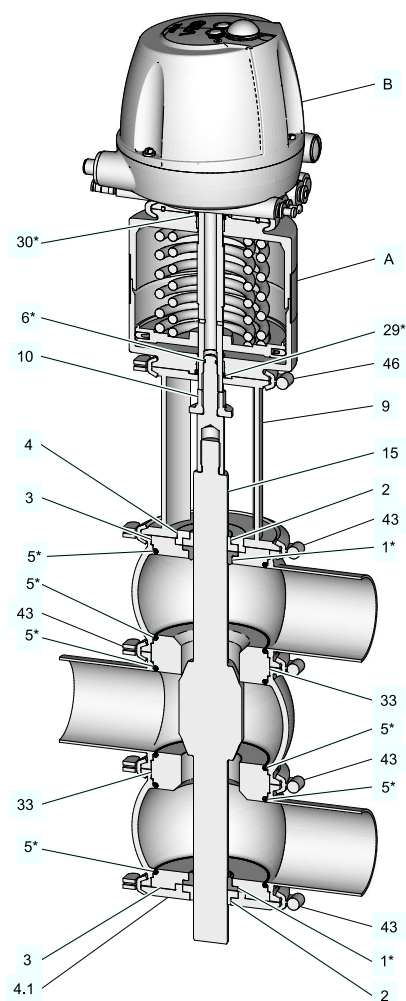


Fig.50

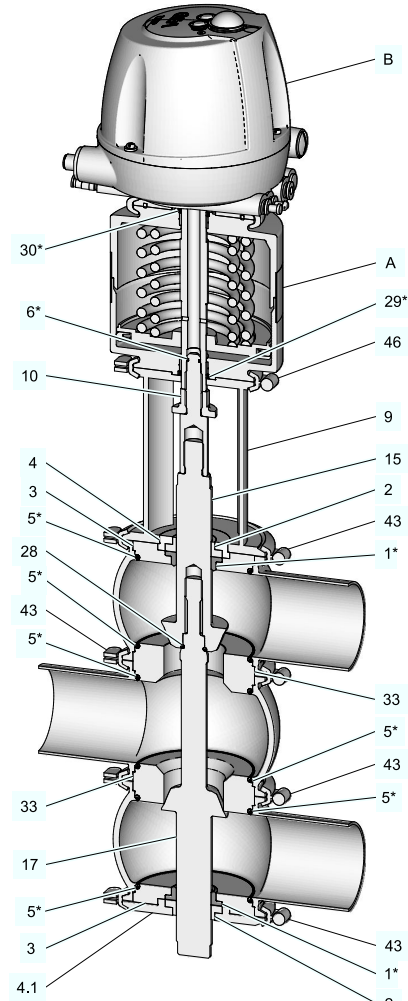


Fig.51

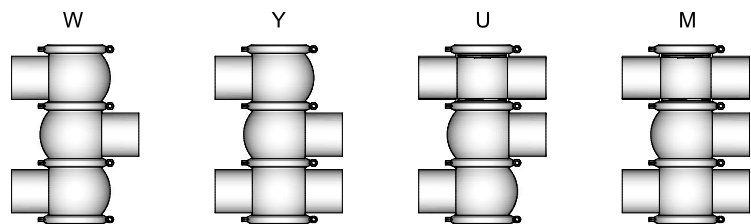


Fig.52

Spare parts list items 1-10, metric sizes								
Item	Designation	Material	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100
1*	Sealing 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

Spare parts list - VARIVENT control valve type P, divert valve W/X

Spare parts list items 1-10, metric sizes								
Item	Designation	Material	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100
3	Sealing disk	1.4404	221-141.01	221-141.02	221-141.02	221-141.03	221-141.03	221-141.04
4	Bearing disk	1.4301	221-142.01	224-142.02	221-142.02	221-142.03	221-142.03	221-142.03
4.1	Bearing disk	1.4301	221-142.15	221-142.10	221-142.10	221-142.11	221-142.11	221-142.12
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
9	Motor stool	1.4301	221-121.01	221-121.02	221-121.02	221-121.03	221-121.03	221-121.04
10	Spacer nut	1.4305	221-147.02	221-147.02	221-147.02	221-147.01	221-147.01	221-147.01
Items marked with an * are wearing parts								

Spare parts list item 15, divert valve W, linear, metallic seal, metric sizes									
Item	Designation	K _v value	Material	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100
15	Valve disk W	6.3	1.4404	221-006109	--	--	--	--	--
		16	1.4404	--	221-006110	--	--	--	--
		25	1.4404	--	--	221-006111	--	--	--
		35	1.4404	--	--	--	221-006112	--	--
		60	1.4404	--	--	--	--	221-006113	--
		100	1.4404	--	--	--	--	--	221-006114

Spare parts list item 15, divert valve X - valve disk X1, linear, metallic seal, metric sizes									
Item	Designation	K _v value	Material	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100
15	Valve disk X1	6.3	1.4404	221-006121	--	--	--	--	--
		16	1.4404	--	221-006122	--	--	--	--
		25	1.4404	--	--	221-006123	--	--	--
		35	1.4404	--	--	--	221-006124	--	--
		60	1.4404	--	--	--	--	221-006125	--
		100	1.4404	--	--	--	--	--	221-006126

Spare parts list item 17, divert valve X - valve disk X2, linear, metallic seal, metric sizes									
Item	Designation	K _v value	Material	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100
17	Valve disk X2	6.3	1.4404	221-762.29	--	--	--	--	--
		16	1.4404	--	221-762.30	--	--	--	--
		25	1.4404	--	--	221-762.31	--	--	--
		35	1.4404	--	--	--	221-762.32	--	--
		60	1.4404	--	--	--	--	221-762.33	--
		100	1.4404	--	--	--	--	--	221-762.34

Item	Designation	Material	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100
28	O-ring		13 x 3	13 x 3	15 x 3	15 x 3	15 x 3	15 x 3
		EPDM	930-001	930-001	930-276	930-276	930-276	930-276
		FKM	930-009	930-009	930-277	930-277	930-277	930-277
		HNBR	930-002	930-002	930-627	930-627	930-627	930-627

Spare parts list - VARIVENT control valve type P, divert valve W/X

Spare parts list items 29 and 30, metric sizes								
Item	Designation	Material	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100
29*	O-ring	NBR	930-026	930-026	930-026	930-026	930-026	930-026
30*	O-ring	NBR	930-026	930-026	930-026	930-026	930-026	930-026

Spare parts list item 33, metric sizes									
Item	Designation	K _v value	Material	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100
33	Seat ring	6.3	1.4404	221-107.25	--	--	--	--	--
		16	1.4404	--	221-107.28	--	--	--	--
		25	1.4404	--	--	221-107.29	--	--	--
		35	1.4404	--	--	--	221-107.32	--	--
		60	1.4404	--	--	--	--	221-107.33	--
		100	1.4404	--	--	--	--	--	221-107.36

Spare parts list items 43, 46, 401 and 402, metric sizes								
Item	Designation	Material	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100
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
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

Spare parts list items A and B, metric sizes								
Item	Designation	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100	
A	Actuator	See spare parts list/dimensions sheet for VARIVENT® drive						
B	Control top T.VIS® P-15	See spare parts list for control top T.VIS® P-15						

Spare parts list item 1-0, inch OD								
Item	Designation	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
1*	Sealing 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	Sealing disk	1.4404	221-141.01	221-141.02	221-141.02	221-141.03	221-141.03	221-141.04
4	Bearing disk	1.4301	221-142.01	224-142.02	221-142.02	221-142.03	221-142.03	221-142.03
4.1	Bearing disk	1.4301	221-142.15	224-142.10	221-142.10	221-142.11	221-142.11	221-142.12
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
9	Motor stool	1.4301	221-121.01	221-121.07	221-121.07	221-121.08	221-121.08	221-121.09
10	Spacer nut	1.4305	221-147.02	221-147.02	221-147.02	221-147.01	221-147.01	221-147.01
Items marked with an * are wearing parts								

Spare parts list item 15, divert valve W, linear, metallic seal, inch OD									
Item	Designation	K _v value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
15	Valve disk W	6.3	1.4404	221-006115	--	--	--	--	--
		16	1.4404	--	221-006116	--	--	--	--
		25	1.4404	--	--	221-006117	--	--	--
		35	1.4404	--	--	--	221-006118	--	--
		60	1.4404	--	--	--	--	221-006119	--
		100	1.4404	--	--	--	--	--	221-006120

Spare parts list item 15, divert valve X - valve disk X1, linear, metallic seal, inch OD									
Item	Designation	K _v value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
15	Valve disk X1	6.3	1.4404	221-006127	--	--	--	--	--
		16	1.4404	--	221-006122	--	--	--	--
		25	1.4404	--	--	221-006123	--	--	--
		35	1.4404	--	--	--	221-006124	--	--
		60	1.4404	--	--	--	--	221-006125	--
		100	1.4404	--	--	--	--	--	221-006126

Spare parts list item 17, divert valve X - valve disk X2, linear, metallic seal, inch OD									
Item	Designation	K _v value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
17	Valve disk X2	6.3	1.4404	221-762.35	--	--	--	--	--
		16	1.4404	--	221-762.36	--	--	--	--
		25	1.4404	--	--	221-762.37	--	--	--
		35	1.4404	--	--	--	221-762.38	--	--
		60	1.4404	--	--	--	--	221-762.39	--
		100	1.4404	--	--	--	--	--	221-762.40

Spare parts list - VARIVENT control valve type P, divert valve W/X

Spare parts list item 28, divert valve X, inch OD								
Item	Designation	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
28	O-ring		13 x 3	13 x 3	15 x 3	15 x 3	15 x 3	15 x 3
		EPDM	930-001	930-001	930-276	930-276	930-276	930-276
		FKM	930-009	930-009	930-277	930-277	930-277	930-277
		HNBR	930-002	930-002	930-627	930-627	930-627	930-627

Spare parts list items 29 and 30, inch OD								
Item	Designation	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
29*	O-ring	NBR	930-026	930-026	930-026	930-026	930-026	930-026
30*	O-ring	NBR	930-026	930-026	930-026	930-026	930-026	930-026

Items marked with an * are wearing parts

Spare Parts List Seat Ring, Inch OD									
Item	Designation	K _y value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
33	Seat ring	6.3	1.4404	229-107.25	--	--	--	--	--
		16	1.4404	--	229-107.28	--	--	--	--
		25	1.4404	--	--	229-107.29	--	--	--
		35	1.4404	--	--	--	229-107.32	--	--
		60	1.4404	--	--	--	--	229-107.33	--
		100	1.4404	--	--	--	--	--	229-107.36

Spare parts list items 43, 46, 401 and 402, inch OD								
Item	Designation	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
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
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

Item	Designation	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
A	Actuator	See spare parts list/dimensions sheet for VARIVENT® drive					
B	Control top T.VIS® P-15	See spare parts list for control top T.VIS® P-15					

15 Spare parts list - VARIVENT control valve type P 3-stage seat K

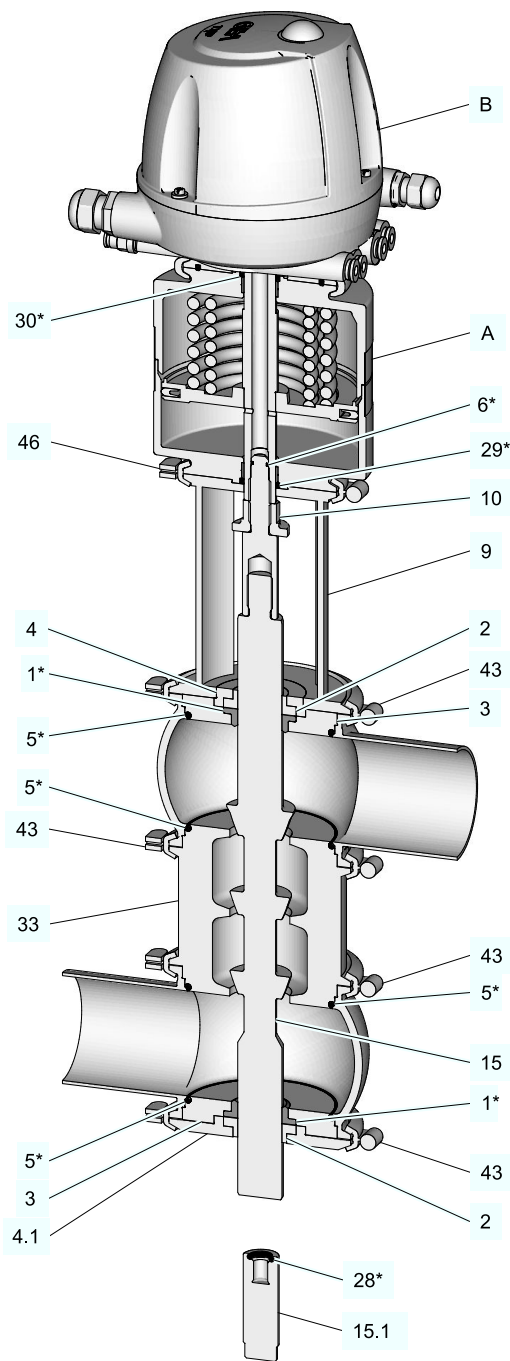


Fig.53

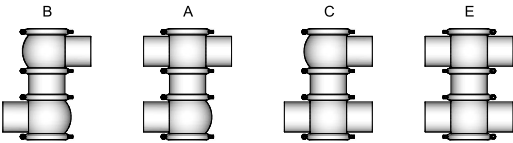


Fig.54

Spare parts list - VARIVENT control valve type P 3-stage seat K

Metric sizes	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100
Inch OD	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
a	12	12	12	15	15	15
h	28	51	51	75	75	85
l	52	75	75	105	105	115

Spare parts list items 1-10, metric sizes								
Item	Designation	Material	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100
1*	Sealing 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	Sealing disk	1.4404	221-141.01	221-141.02	221-141.02	221-141.03	221-141.03	221-141.04
4	Bearing disk	1.4301	221-142.01	224-142.02	221-142.02	221-142.03	221-142.03	221-142.03
4.1	Bearing disk	1.4301	221-142.15	221-142.10	221-142.10	221-142.11	221-142.11	221-142.12
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
9	Motor stool	1.4301	221-121.01	221-121.02	221-121.02	221-121.03	221-121.03	221-121.04
10	Spacer nut	1.4305	221-147.02	221-147.02	221-147.02	221-147.01	221-147.01	221-147.01
Items marked with an * are wearing parts								

Spare parts list item 15, 3-stage seat, linear, metallic seal, metric sizes									
Item	Designation	K _V value	Material	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100
15	Valve disk SJM-3S	2.3 3x K _V 4	1.4404	221-006144	--	--	--	--	--
		5.8 3x K _V 10	1.4404	--	221-006139	--	--	--	--
		9.2 3x K _V 16	1.4404	--	--	221-006140	--	--	--
		14.4 3x K _V 25	1.4404	--	--	--	221-006142	--	--
		23.1 3x K _V 40	1.4404	--	--	--	--	221-006141	--
		34.6 3x K _V 60	1.4404	--	--	--	--	--	221-006143
15.1	Valve disk SJM-3S	2.3 3x K _V 4	1.4404	221-005334	--	--	--	--	--

Item	Designation	Material	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100
28*	O-ring (11 x 3)	EPDM	930-311	--	--	--	--	--
		FKM	930-335	--	--	--	--	--
		HNBR	930-803	--	--	--	--	--
Items marked with an * are wearing parts								

Spare parts list items 29 and 30, metric sizes								
Item	Designation	Material	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100
29*	O-ring	NBR	930-026	930-026	930-026	930-026	930-026	930-026
30*	O-ring	NBR	930-026	930-026	930-026	930-026	930-026	930-026
Items marked with an * are wearing parts								

Spare parts list item 33, 3-stage seat, metric sizes									
Item	Designation	K _V value	Material	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100
33	3-stage seat	2.3 3x K _V 4	1.4404	229-168.35		--	--	--	--
		5.8 3x K _V 10	1.4404	--	229-168.36	--	--	--	--
		9.2 3x K _V 16	1.4404	--	--	229-168.37	--	--	--
		14.4 3x K _V 25	1.4404	--	--	--	229-168.38	--	--
		23.1 3x K _V 40	1.4404	--	--	--	--	229-168.34	--
		34.6 3x K _V 60	1.4404	--	--	--	--	--	229-168.39

Spare parts list items 43, 46, 401 and 402, metric sizes								
Item	Designation	Material	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100
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
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

Spare parts list items A and B, metric sizes							
Item	Designation	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100
A	Actuator	See spare parts list/dimensions sheet for VARIVENT® drive					
B	Control top T.VIS® P-15	See spare parts list for control top T.VIS® P-15					

Spare parts list - VARIVENT control valve type P 3-stage seat K

Spare parts list item 1-0, inch OD								
Item	Designation	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
1*	Sealing 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	Sealing disk	1.4404	221-141.01	221-141.02	221-141.02	221-141.03	221-141.03	221-141.04
4	Bearing disk	1.4301	221-142.01	224-142.02	221-142.02	221-142.03	221-142.03	221-142.03
4.1	Bearing disk	1.4301	221-142.15	224-142.10	221-142.10	221-142.11	221-142.11	221-142.12
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
9	Motor stool	1.4301	221-121.01	221-121.07	221-121.07	221-121.08	221-121.08	221-121.09
10	Spacer nut	1.4305	221-147.02	221-147.02	221-147.02	221-147.01	221-147.01	221-147.01
Items marked with an * are wearing parts								

Spare parts list item 15, 3-stage seat, linear, metallic seal, inch OD									
Item	Designation	K _V value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
15	Valve disk SJM-3S	2.3 3x K _V 4	1.4404	221-006145	--	--	--	--	--
		5.8 3x K _V 10	1.4404	--	221-006139	--	--	--	--
		9.2 3x K _V 16	1.4404	--	--	221-006146	--	--	--
		14.4 3x K _V 25	1.4404	--	--	--	221-006142	--	--
		23.1 3x K _V 40	1.4404	--	--	--	--	221-006141	--
		34.6 3x K _V 60	1.4404	--	--	--	--	--	221-006147
15.1	Valve disk SJM-3S	2.3 3x K _V 4	1.4404	221-005334	--	--	--	--	--

Spare parts list item 28, divert valve X, inch OD								
Item	Designation	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
28*	O-ring (11 x 3)	EPDM	930-311	--	--	--	--	--
		FKM	930-335	--	--	--	--	--
		HNBR	930-803	--	--	--	--	--
Items marked with an * are wearing parts								

Spare parts list items 29 and 30, inch OD								
Item	Designation	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
29*	O-ring	NBR	930-026	930-026	930-026	930-026	930-026	930-026
30*	O-ring	NBR	930-026	930-026	930-026	930-026	930-026	930-026
Items marked with an * are wearing parts								

Spare Parts List Seat Ring, Inch OD									
Item	Designation	K _V value	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
33	3-stage seat K	2.3 3x K _V 4	1.4404	229-168.35	--	--	--	--	--
		5.8 3x K _V 10	1.4404	--	229-168.36	--	--	--	--
		9.2 3x K _V 16	1.4404	--	--	229-168.37	--	--	--
		14.4 3x K _V 25	1.4404	--	--	--	229-168.38	--	--
		23.1 3x K _V 40	1.4404	--	--	--	--	229-168.34	--
		34.6 3x K _V 60	1.4404	--	--	--	--	--	229-168.39

Spare parts list items 43, 46, 401 and 402, inch OD								
Item	Designation	Material	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
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
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

Item	Designation	1" OD	1.5" OD	2" OD	2.5" OD	3" OD	4" OD
A	Actuator	See spare parts list/dimensions sheet for VARIVENT® drive					
B	Control top T.VIS® P-15	See spare parts list for control top T.VIS® P-15					

16 Dimensions sheet - VARIVENT control valve type P P_F/P_J

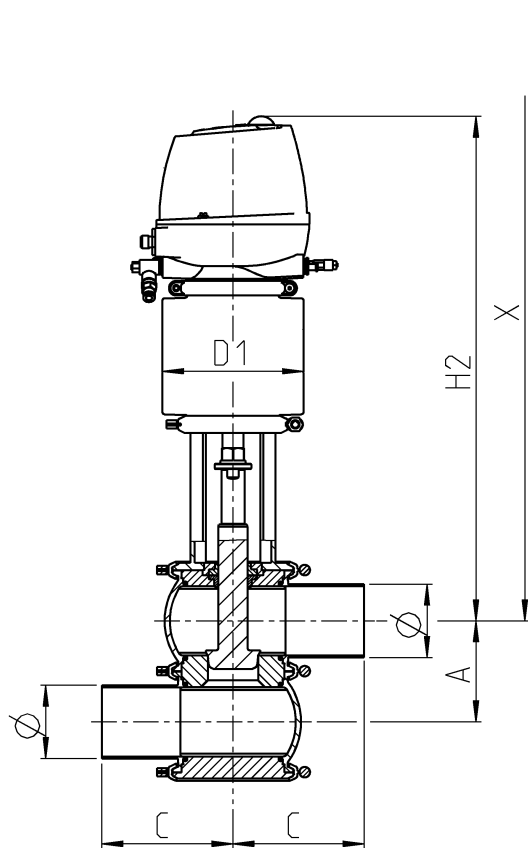


Fig.55: Metallic seal

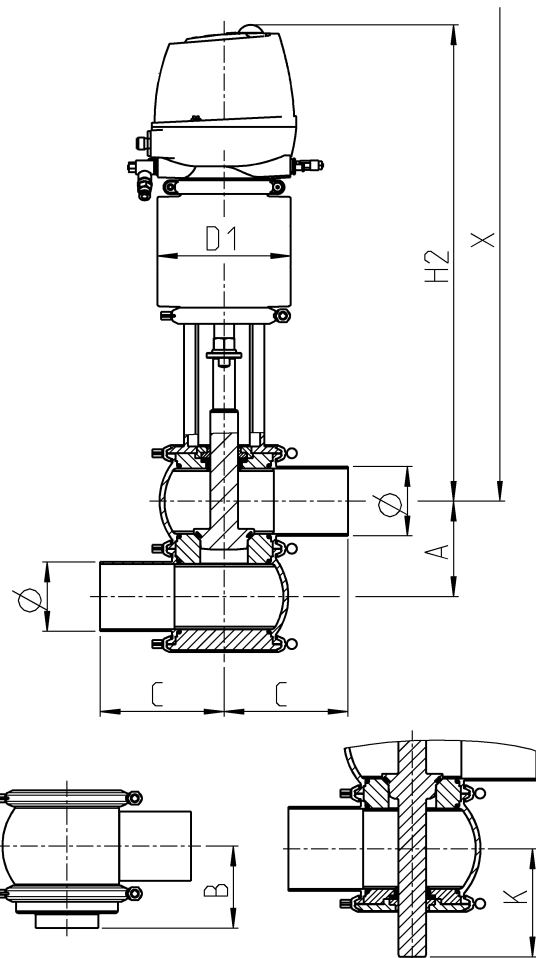


Fig.56: Soft sealing

	Pipe	Housing			Actuator*	Dimensions*		Valve*	
Nominal-width	Ø (mm)	A (mm)	B (mm)	C (mm)	D1 (mm)	H2 (mm)	Expansion X (mm)	Stroke S (mm)	Weight (kg)
DN 25	29.0 x 1.50	50.0	58	90	99	423.0	508	15	6
DN 40	41.0 x 1.50	62.0	64	90	110	464.0	514	15	7
DN 50	53.0 x 1.50	74.0	70	90	110	470.0	520	15	7
DN 65	70.0 x 2.00	96.0	83	125	135	481.0	626	15	11
DN 80	85.0 x 2.00	111.0	90	125	170	519.0	634	15	11
DN 100	104.0 x 2.00	130.0	100	125	210	714.0	643	15	16
DN 125	129.0 x 2.00	155.0	112	150	260	784.0	884	30	39
DN 150	154.0 x 2.00	180.0	125	150	260	708.0	908	30	50
OD 1"	25.4 x 1.65	46.0	56	90	99	421.0	506	15	6
OD 1.5"	38.1 x 1.65	59.0	62	90	110	466.0	516	15	7
OD 2"	50.8 x 1.65	71.5	69	90	110	472.0	522	15	7
OD 2.5"	63.5 x 1.65	90.0	80	125	135	485.0	630	15	11
OD 3"	76.2 x 1.65	103.0	86	125	170	522.0	637	15	11
OD 4"	101.6 x 2.11	127.5	99	125	210	616.0	645	15	17
OD 6"	152.4 x 2.77	177.0	123	150	260	706.5	907	30	50
IPS 2"	60.3 x 2.00	81.0	73	114.3	110	467.0	517	15	7
IPS 3"	88.9 x 2.30	115.0	92	152.5	135	487.0	632	15	11
IPS 4"	114.3 x 2.30	140.0	105	152.5	135	493.0	638	15	17
IPS 6"	168.2 x 2.70	192.0	131	152.5	260	702.0	902	30	50
* Dimensions apply to the standard design of the spring-closing actuator with a control air pressure of 5 bar and the largest possible K _{VS} value of the nominal diameter.									

17 Dimensions sheet - VARIVENT control valve type P, divert valve W/X

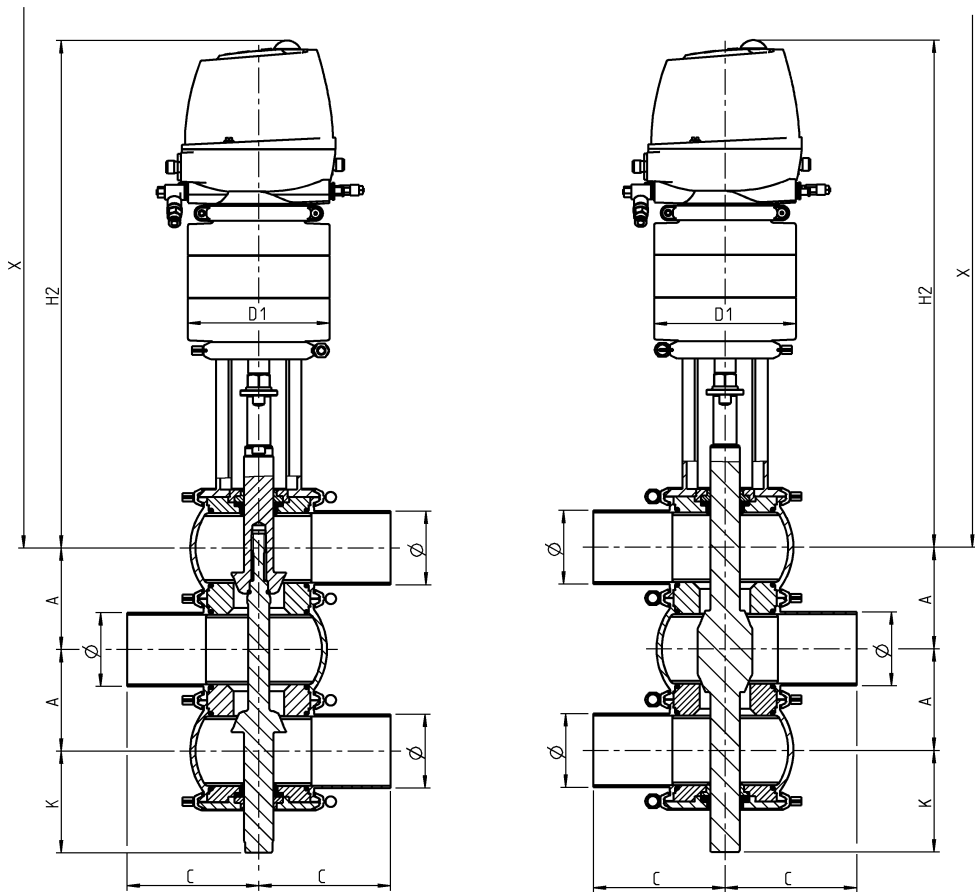


Fig.57

Dimensions sheet - VARIVENT control valve type P, divert valve W/X

	Pipe	Housing			Actuator*	Dimensions*		Valve*	
Nominal-width	Ø (mm)	A (mm)	C (mm)	C (mm)	D1 (mm)	H2 (mm)	Expansion X (mm)	Stroke S (mm)	Weight (kg)
DN 25	29.0 x 1.50	50.0	90	73.5	110	458.0	692	15	9
DN 40	41.0 x 1.50	62.0	90	80.0	110	464.0	704	15	10
DN 50	53.0 x 1.50	74.0	90	85.5	110	470.0	716	15	11
DN 65	70.0 x 2.00	86.0	125	101.5	135	481.0	868	15	23
DN 80	85.0 x 2.00	111.0	125	110.0	170	519.0	914	15	22
DN 100	104.0 x 2.00	130.0	125	133.5	170	538.0	957	15	33
OD 1"	25.4 x 1.65	46.0	90	71.5	110	456.0	688	15	9
OD 1.5"	38.1 x 1.65	59.0	90	78.5	110	466.0	705	15	10
OD 2"	50.8 x 1.65	71.5	90	84.5	110	472.0	717	15	11
OD 2.5"	63.5 x 1.65	90.0	125	98.5	135	485.0	869	15	23
OD 3"	76.2 x 1.65	103.0	125	105.0	170	522.0	912	15	21
OD 4"	101.6 x 2.11	127.5	125	132.5	170	540.0	958	15	32
* Dimensions apply to the standard design of the spring-closing actuator with a control air pressure of 5 bar.									

18 Dimensions sheet - VARIVENT control valve type P 3-stage seat K

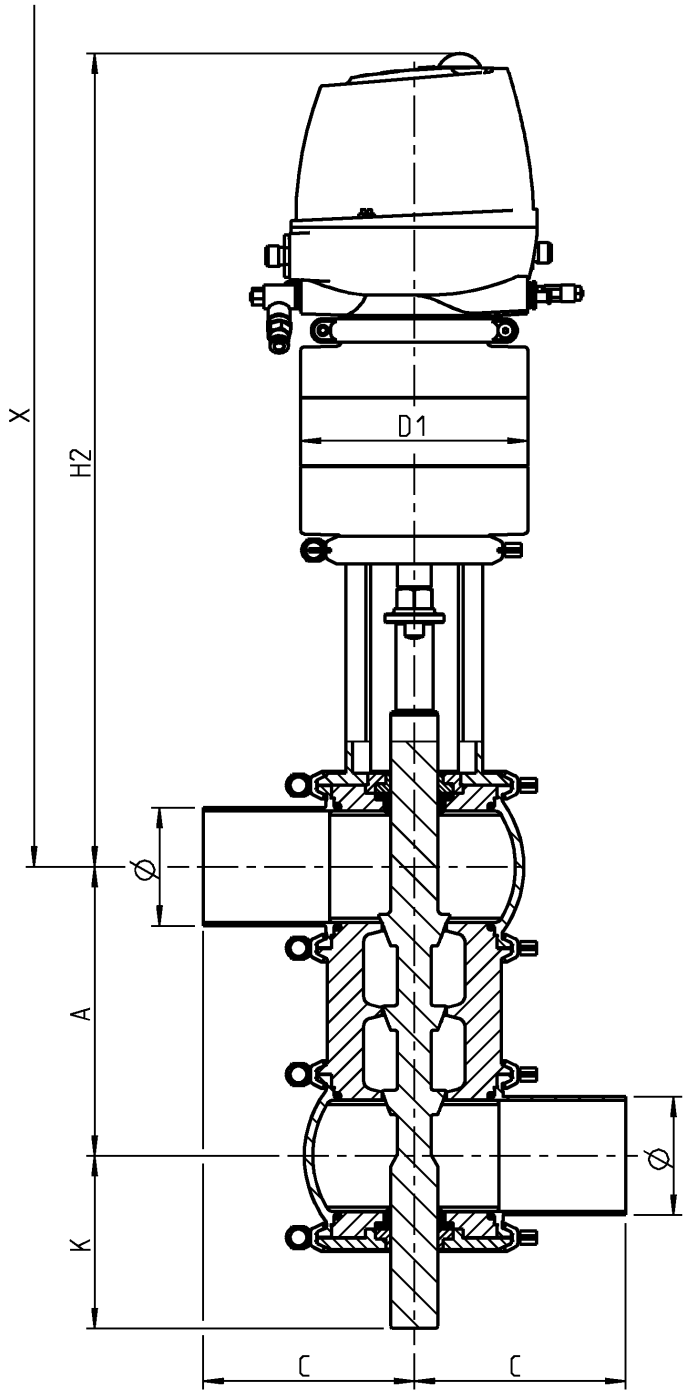


Fig.58

Dimensions sheet - VARIVENT control valve type P 3-stage seat K

	Pipe	Housing			Actuator*	Dimensions*		Valve*	
Nominal-width	Ø (mm)	A (mm)	C (mm)	C (mm)	D1 (mm)	H2 (mm)	Expansion X (mm)	Stroke S (mm)	Weight (kg)
DN 25	29.0 x 1.50	77.5	90	75	99	423.0	611	15	6
DN 40	41.0 x 1.50	112.5	90	81	99	429.0	646	15	9
DN 50	53.0 x 1.50	124.5	90	87	110	470.0	693	15	9
DN 65	70.0 x 2.00	170.5	125	105	110	481.0	806	15	15
DN 80	85.0 x 2.00	185.5	125	114	135	489.0	823	15	17
DN 100	104.0 x 2.00	214.5	125	120	170	528.0	878	15	24
OD 1"	25.4 x 1.65	73.5	90	75	99	421.0	609	15	6
OD 1.5"	38.1 x 1.65	109.5	90	81	99	431.0	648	15	9
OD 2"	50.8 x 1.65	122.0	90	87	110	472.0	695	15	9
OD 2.5"	63.5 x 1.65	164.5	125	105	110	485.0	810	15	15
OD 3"	76.2 x 1.65	177.5	125	114	135	492.0	826	15	17
OD 4"	101.6 x 2.11	212.0	125	120	170	530.0	880	15	25
* Dimensions apply to the standard design of the spring-closing actuator with a control air pressure of 5 bar.									

19 Appendix

19.1 Lists

19.1.1 Abbreviations and terms

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

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



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