OPERATING INSTRUCTIONS

Original instructions

Aseptic Valves

GEA VESTA® XL shut-off valve Type H_A

GEA Tuchenhagen GmbH
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Word marks

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1 General Information

1.1 Information on the Document

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

1.1.1 Binding Character of These Operating Instructions

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

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

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

1.1.2 Notes on the Illustrations

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

1.1.3 Symbols and Highlighting

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

Danger

Warning: Fatal Injuries

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

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

Warning: Explosions

Failure to observe the warning can result in severe explosions.

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

Warning!

Warning: Serious Injuries

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

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

Caution!

Warning: Injuries

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

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

Notice

Warning: Damage to Property

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

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

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

1. First step in a sequence of operations.
2. Second step in a sequence of operations.

   → Result of the previous operation.

→ The operation is complete, the goal has been achieved.

Hint!

Further useful information.

1.2 Manufacturer address

GEA Tuchenhagen GmbH
Am Industriepark 2-10
21514 Büchen

1.3 Contact

Tel.:+49 4155 49-0
Fax:+49 4155 49-2035

flowcomponents@gea.com
www.gea.com

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

EU Declaration of conformity within the meaning of the EC machine directive 2006/42/EC

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

Hereby, we declare that the machine designated in the following

Designation:	Valve with actuator
Type:	VESTA® H_A, H_A/I, H_A/T

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

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

Remarks:

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

Person authorised for compilation and handover of technical documentation:

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

Büchen, 19 September 2023

Tatjana Fischer
Managing Director

pp. Stephan Dirks
Head of Engineering

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GEA INTERNAL

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

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

We hereby declare that the machine named below

Designation:	Valve with actuator
Type:	H_A, H_A/I, H_A/T

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

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

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

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

Büchen, 19 September 2023

Tatjana Fischer Managing Director	i.V. Stephan Dirks Head of Engineering

2 Safety

2.1 Intended use

The valve is intended only for the described purpose. Using the device for any other purpose is considered contrary to its designated use. GEA will not accept any liability for resulting damage: the risk lies entirely with the operator.

2.1.1 Intended Purpose

The VESTA XL H_A shut-off valve is used for opening and closing pipeline sections.

It offers maximum process safety and product quality for aseptic and sterile working processes.

Notice

Warning of damage to property/loss of product

VESTA valves can be used for 2-way processes. The bellows reach their maximum lifespan when the valve is installed in the valve-opening flow direction.

Operating against the valve-opening flow direction can cause pressure differentials greater than 3 bar / 43.5 psi, leading to pressure surges. Pressure hammers and excessive control air pressures can destroy the bellows.

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

The valve is monitored, controlled and operated by the customer's installation.

The VESTA XL H_A shut-off valve is a piece of pressure equipment (without safety function) in the sense of the pressure equipment: Directive 2014/68/EU. They are classified according to Annex II, article 3, section 3. A special declaration of conformity will be supplied in the event of any deviations.

2.1.2 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.

2.1.3 Pressure equipment directive

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

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

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

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

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

2.1.4 Use in potentially explosive atmospheres (ATEX)

In areas with an explosive atmosphere, only valves suitable for use in such areas may be used.

Refer to and observe the additional instruction manual “Hygienic valves ATEX models”. For details regarding the marking of valves for use in potentially explosive areas also refer to the additional instruction manual “Hygienic valves ATEX models”.

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

2.1.5 Improper operating conditions

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

The operation of the component is not permitted if:

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

2.2 Operator’s Duty of Care

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

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

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

- Only qualified personnel may work on the component.
- The operating company must authorize personnel to carry out the relevant tasks.
- Order and cleanliness must be maintained at the work stations and in the entire area surrounding the component.

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

Hint!

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

2.3 Subsequent changes

Unauthorized modifications and alterations that compromise the safety of the valve are not permitted. Protective devices and safety systems may not be bypassed, arbitrarily removed, or made inoperative. Only use original spare parts and accessories approved by the manufacturer.

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

The user may only operate the valve when it is in a flawless condition.

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

The operating and maintenance personnel must possess the appropriate qualifications for these tasks. They must receive specific training on potential hazards and be familiar with and adhere to the safety instructions mentioned in the documentation. Electrical work should only be carried out by qualified electrical personnel.

2.7 Safety equipment

2.7.1 Signs

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

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

Signs on the component	
Sign	**Meaning**
	Explosion-hazarded zones warning

2.8 Residual dangers

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

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

Residual dangers on the valve and measures		
Danger	**Cause**	**Measure**
	Danger due to escaping media at the leakage hole	• Effectively disconnect all components. • Effectively prevent switching on. • Pipes must be depressurised.
Environmental damage	Operating materials with properties which are harmful to the environment	For all work: • Collect lubricants in suitable collecting vessels. • Dispose of lubricants in accordance with the pertinent regulations.

2.9 Danger zones

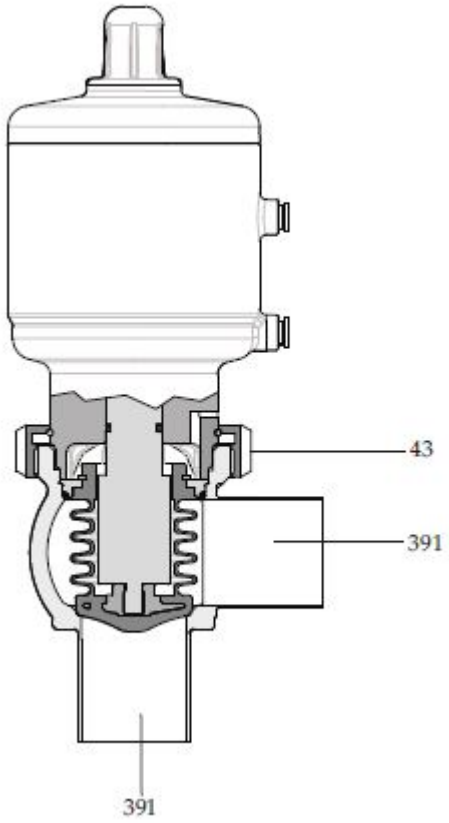

Fig.1: Danger zone at the valve

Please observe the following notes:

- In the event of malfunctions, shut down the valve (disconnect from the power and air supply) and secure it against being used.

  Remedy the malfunction immediately.
- Never reach into the valve housing (391).

- When releasing the grooved cap nut (43) of the non-actuated valve (spring-to-close version) there is a risk of the bellows and the round thread of the grooved cap nut being damaged.

  Before detaching the cap nut (43), release the spring tension by supplying the actuator with compressed air.

→ The valve is opened.

- The housing sockets have very sharp edges. When transporting and installing the valve be sure to wear suitable protective gloves.

3 Description

3.1 Design

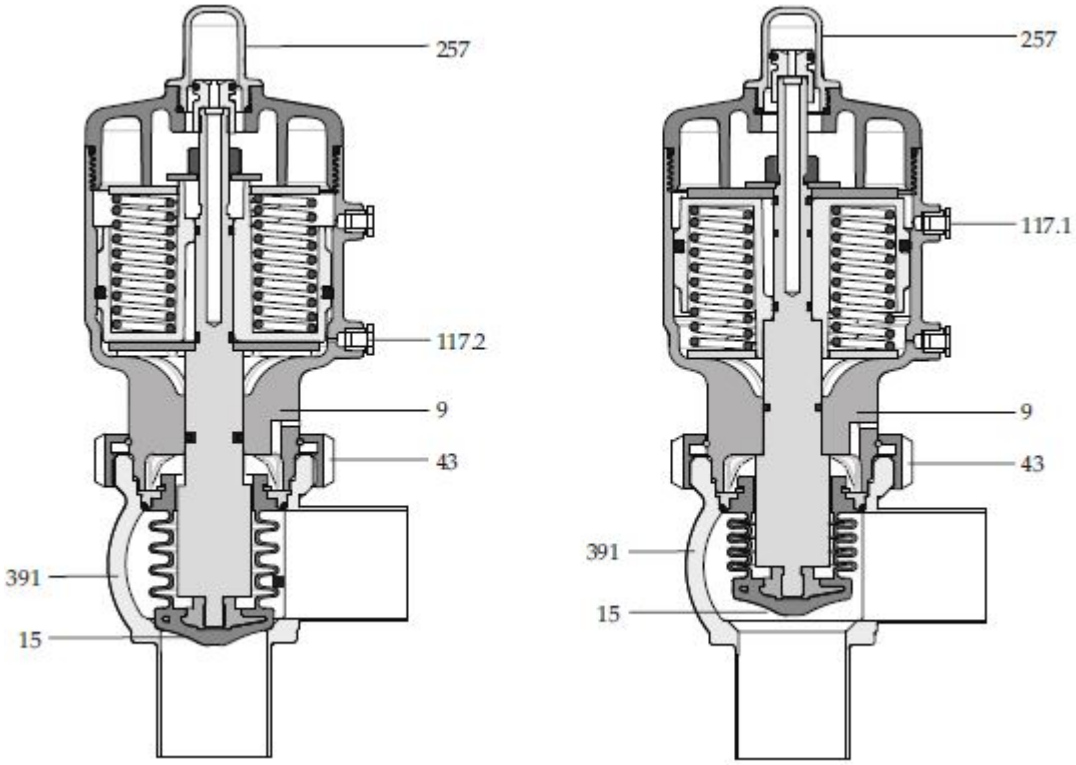

Fig.2: Design valve VESTA XL H_A - Spring-closing valve NC (left) and Spring-opening valve NO (right)

Design	
No.	**Designation**
257	Position indicator
117.1	Air connection NO
117.2	Air connection NC
9	Lantern
15	Bellows
43	Cap nut
391	Valve housing

4 Transport and storage

4.1 Scope of supply

On receipt of the valve check whether

- the information on the nameplate (if included in the order scope) matches the details provided in the ordering and delivery documents,
- the equipment is complete and all components are in good order.

Externally visible transport damage and / or missing packages must be indicated immediately on the freight note with the delivering forwarder. Written recourse must be taken immediately against the freight forwarder by the recipient and Tuchenhagen must be informed about the process.

Claims must be submitted within six days to the freight forwarder for transport damage that is not recognized immediately. The recipient will bear the cost of any damage claimed beyond this point.

4.2 Transport

⚠ Warning!

Warning: unsuitable lashing equipment

Only use suitable hoist and slings for transporting the package units/valves.

► Observe the graphic symbols on the packaging.
► Carefully transport the valve to avoid damage caused by impact or careless loading and unloading.

4.3 Storage conditions

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

If the valve has been exposed to temperatures ≤ 0°C during transportation or storage, it must be stored in a dry place to protect it from damage. We recommend that the valve should be stored at a temperature of ≥ 5 °C for a period of 24 hours prior to any handling (removal of the housing / activation of actuators) so that any ice crystals formed by condensation water can melt.

5 Technical data

5.1 Type plate

The type plate clearly identifies the valve.

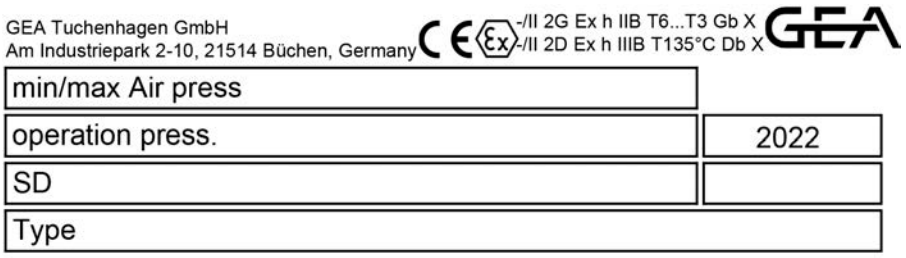

Fig.3: Type plate

The type plate provides the following key data:

Key data of the valve	
Control air pressure bar/psi	n.a.
Product pressure bar/psi	6.0/87
SD	Serial number
Type	Shut-off valve H_A

5.2 Technical data

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

Technical data: Valve	
Designation	**Description**
Size	DN 40 to DN 50 1.5" OD to 2" OD ISO 42,4 to ISO 60,3
Material of product contact parts Housing Bellows	Stainless steel 1.4435 / AISI 316L PTFE-resistant against almost all media
Material of parts that do not come into contact with product Plastic drives Stainless steel drives	Polyphenylene sulphide (PPS) 1.4301 / AISI 304
Surface finish Inside	$R_a \leq 0.8$ µm, optional $R_a \leq 0.4$ µm, optional electropolished
Outside	$R_a \leq 1.6$ µm

Technical data: Valve	
Designation	**Description**
Fitting position	Any position, if valve and pipe system can drain properly
Application	For fluid and gas-like media

Technical data: Ambient temperatures	
Designation	**Description**
Ambient temperature	0 to +60 °C, standard
Product temperature and operating temperature	0 to +135 °C (depending on product pressure)
Sterilisation temperature	short-term +150°C, maximum for 30 minutes
	For continuous temperatures >80°C, plastic pneumatic or manual actuators should be replaced every 24 months.
Product pressure	max. 6 bar (87 psi) standard ISO 60,3 max. 5 bar (72.5 psi) depending on the operating temperature

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 pressure Drive - NC spring-closing Drive - NO spring-opening	min. 5 bar, max. 8 bar See table in the chapter ‘Pneumatic connection’
Control air	acc. to ISO 8573-1:2010
- Solid particle content	Quality class 6 Particle size max. 5 µm Particle density maximum 5 mg/m^3

Technical data: Compressed air supply	
Designation	**Description**
- Water content	Quality class 4, maximum dew point +3 °C If the unit is used at higher altitudes or at low ambient temperatures, an accordingly lower dew point is required.
- Oil content	Quality class 3, preferably oil free, maximum 1 mg oil to 1 m^3 air

5.3 Resistance of the sealing materials

The resistance of sealing materials depends on the type and temperature of the medium conveyed. The exposure time can adversely affect the service life of the seals. The sealing materials meet the requirements of the respective directives for the food industry and the pharmaceutical industry. See material certificates for more information.

Resistance:

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

Seal resistance PTFE		
Medium	**Temperature**	**Sealing material (general operation temperature)**
		PTFE
Alkalis up to 3%	up to 80 °C (176°F)	+
Alkalis up to 5%	up to 40 °C (104°F)	+
Alkalis up to 5%	up to 80 °C (176° F)	+
Alkalis more than 5%		+
Inorganic acids up to 3%	up to 80 °C (176°F)	+
Inorganic acids up to 5%	up to 80 °C (176°F)	+
Inorganic acids up to 5%	up to 100 °C (212°F)	+
Water	up to 80 °C (176°F)	+
Steam	up to 135 °C (275° F)	+
Steam, approx. 30 minutes	up to 150 °C (320°F)	+
Fuels/hydrocarbons		+
Product with a fat content of max. 35%		+

Seal resistance PTFE		
Medium	**Temperature**	**Sealing material (general operation temperature)**
		PTFE
Product with a fat content of more than 35%		+
Oils		+

5.4 Pipe ends - General table of measurements

The following information refers to pipe ends. More measurements can be found in the measurement tables in .

Hint!

The valves are also available in smaller nominal sizes, see the operating instructions "GEA VESTA shut-off valves type H_A".

Dimensions for tubes in DN				
Metric DN	**Outside diameter**	**Wall thickness**	**Inside diameter**	**Outside diameter according to DIN 11866 series A**
40	41	1.5	38	x
50	53	1.5	50	x

Dimensions for tubes in inch OD				
Inch OD	**Outside diameter**	**Wall thickness**	**Inside diameter**	**Outside diameter acc. to DIN 11866 series C**
1.5"	38.1	1.65	34.8	x
2"	50.8	1.65	47.5	x

Dimensions for tubes in ISO				
ISO	**Outside diameter**	**Wall thickness**	**Inside diameter**	**Outside diameter according to DIN 11866 series B**
43.4	42.4	2	38.4	x
48.3	48.3	2	44.3	x
60.3	60.3	2	56.3	x

5.5 Tool

Tool	Material no.
Hose cutter	407-065
Screwdriver, blade width 4.0	--
Ring or jaw wrench sanded down SW 17 + 21	229-119.01 229-119.05

Tool	Material no.
External insertion pliers Form B - angled jaws 90°, Size A31	9065839
Sickle spanner Ø 110/115	--
Sickle spanner Ø 135/145	--
Sickle spanner Ø 90/90	408-200
Flexible head spanner	408-146
Mounting tool	229-000033

5.6 Lubricants

Lubricants	
Designation	**Material no.**
Rivolta F.L.G. MD-2	413-071
PARALIQ GTE 703	413-064
Cassida P1	413-134

5.7 Weights

Weights	
Size	**Weight [kg] with pneumatic actuator**
Metric	
DN 40	5.2
DN 50	5.5
Inch OD	
OD 1.5"	5.2
OD 2"	5.5
ISO	
ISO 42.4	5.2
ISO 48.3	5.5
ISO 60.3	5.6
See also dimensional sheet in the appendix	

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

Ensure that

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

6.3 Valve with detachable pipe connection elements

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

6.4 Pneumatic connection

6.4.1 Air requirement

The air requirement depends on the type of actuator fitted. The following table show reference values.

6.4.2 Drive - spring-closing

Air requirement for spring-to-close actuators (NC)				
Nominal width of valve	**Actuator Ø**	**Air pressure maximum**	**Air pressure minimum**	**Air requirement at**
	[mm]	**[bar] / [psi]**	**[bar] / [psi]**	**[dm³N]**
DN 40 / 1 1/2" OD	120	8 / 116	5 / 72	0.3
DN 42.4/ ISO 48.3				
DN 50 / 2" OD	120	8 / 116	5 / 72	0.3
ISO 60.3	120	8 / 116	5 / 72	0.3

6.4.3 Drive - Spring-opening

Air requirement for spring-to-open actuators (NO)				
Nominal width of valve	**Actuator Ø**	**Air pressure maximum**	**Air pressure minimum**	**Air requirement**
	[mm]	**[bar] / [psi]**	**[bar] / [psi]**	**[dm³N]/stroke**
DN 40 / 1 1/2" OD	120	5.5 / 80	5 / 72	0.3
DN 42.4/ ISO 48.3				
DN 50 / 2" OD	120	5.5 / 80	5 / 72	0.3
ISO 60.3	120	5.5 / 80	5 / 72	0.3

6.4.4 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.

6.5 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 precautions

Initial commissioning

For initial commissioning, the following principles apply:

- Carry out protective measures against dangerous contact voltages in accordance with the applicable regulations.
- The components must be fully assembled and properly 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 a modification of the components a reassessment of residual risks is required.

Commissioning

For commissioning, the following principles apply:

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

7.2 Notes on commissioning

- Make sure that there are no foreign objects in the system.
- Actuate the valve once by applying compressed air.
- Clean the pipe system before moving products for the first time.
- During commissioning, check regularly that none of the seals leak.
  Replace defective seals.

8 Operation and control

8.1 Safety precautions

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!

9.2 Passivation

Before commissioning a plant, passivation is usually 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.

9.3 Sterilisation

The valve is suitable for SIP sterilisation (sterilisation in place).

The permissible sterilisation media and temperatures for the various sealing materials are listed in the resistance table, see . Other sterilisation media (e.g. H_2O_2) must be approved by the manufacturer.

Hint!

VESTA® bellows achieve optimal sealing only after an initial SIP cleaning.

- Medium: saturated steam
- Temperature: 135 °C (275 °F)
- Switching: clockwise during the SIP process

The valve must be brought to the closed position for a brief period (min. 3 seconds) immediately SIP cleaning. During commissioning, regularly check all sealing points for leaks. Exchange defective seals and repeat the SIP process.

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 .

10.2 Inspections

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

10.2.1 Product contact seals

- Check the bellows at regular intervals.

10.2.2 Pneumatic connection

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.
   Note: When the control top is mounted, it must be actuated.

→ Done

10.2.3 Electrical connections

- Check that the proximity switch connections are clean.

10.3 Servicing intervals

To ensure the highest operational reliability of the valves, all wearing parts should be replaced at longer intervals. Keep an adequate supply of all wearing parts (bellows and seals) in your spare parts stock.

In practice, the actual maintenance intervals can only be determined by the user since they depend on the operating conditions.

Examples of relevant process parameters are:

- daily period of use,
- switching frequency,
- type and temperature of the product,

- type and temperature of the cleaning solution,
- ambient conditions.

If there is still no or too little information available for the definition of practically-orientated maintenance intervals, the reference values listed in the following table can be considered as a basis. The following information is based on the experience of GEA Flow Components and applies to installations working in a 2-shift operation.

Servicing intervals	
Component	**Measure**
Maintenance activities to be performed once a month	
Valve	Visual check without dismantling
Maintenance activities to be performed after 3 months	
Product contact seals	Media temperature 60...130 °C (140...266 °F)
	Seal replacement
Actuator	Function check
Valve	Function check
Feedback	Function check
Pneumatic connections	Check of mechanical parts and visual inspection of condition – leak test
Electrical connections	Visual inspection
Maintenance activities to be performed once a year	
Product contact seals	Media temperature < 60 °C (< 140 °F)
	Seal replacement
Actuator	Mechanical & visual inspection of condition
Valve	Check of mechanical parts and visual inspection of condition – function test
Feedback	Check of mechanical parts and visual inspection of condition – function test
Pneumatic connections	Check of mechanical parts and visual inspection of condition – function test
Electrical connections	Check of mechanical parts and visual inspection of condition

10.4 Disassembling the Valve

10.4.1 Prior to removal

Requirement:

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

Carry out the following steps:

1. Drain all pipe system elements that lead to the valve and, if necessary, clean or rinse them.
2. Block control air if it is not required for removal.
3. Disconnect the power supply.
4. Take the valve out of the pipe section, with all housings and housing connections if possible.

→ Done

10.4.2 Removing the mounting for proximity switches

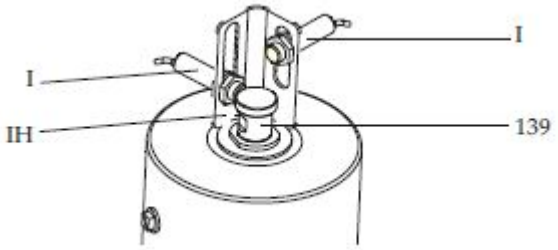

Fig.4: Proximity switches and mounting for proximity switch

Before removing the proximity switches (I), switch off voltage and disconnect electrical connection of the proximity switches.

Carry out the following steps:

1. Dismantle the proximity switches (I).
2. First unscrew switch rod (139), and then unscrew mounting for the proximity switch (IH) (SW 27).

10.4.3 Removing the valve insert

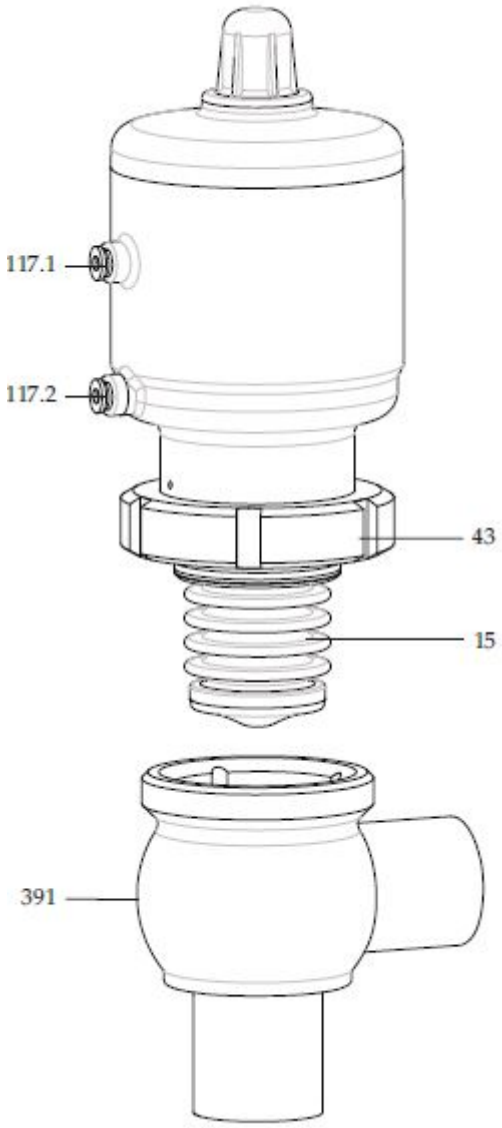

Fig.5: Valve insert with bellows

⚠ Warning!

Injuries due to preloaded spring

When loosening the lock nut (43) of the open valve, there is a risk of serious injuries and potential damage to the round thread due to the released spring preload.

► Depending on the type of actuator, release the spring preload by pressurizing or depressurizing.

Notice

Warning of damage to property/loss of product

When pulling the valve insert out of the housing (391), the bellows (15) may be damaged by striking against the housing.

► Therefore, carefully remove the valve insert from the housing and do not place it on the bellows. To prevent damage, always place the
► bellows on a clean and soft surface.

Release spring preload

1. **Spring-closing valve NC:**
   Ventilate the valve at (117.2).
   The bellows (15) are raised.
2. **Spring-opening valve NO:**
   Depressurize the valve at (117.1).
   The bellows (15) are raised.

Remove valve insert

1. Loosen the lock nut (43) using a hook spanner.
2. Carefully remove the valve insert out of the housing (391).

10.4.4 Remove bellows

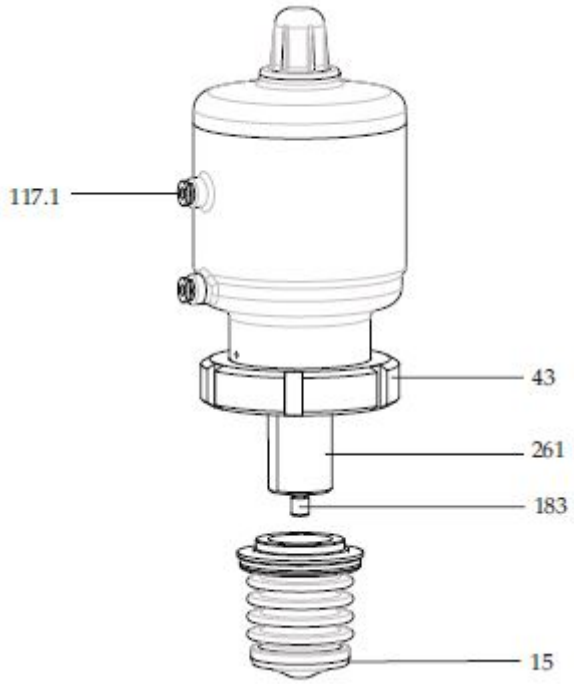

Fig.6: Stretch bellows for spring-opening valve NO

⚠ Warning!

Injuries due to preloaded spring

When removing the bellows from the spring-opening valve NO, there is a risk of serious injuries due to the released spring preload.

► Ventilate the valve at (117.1).
► The bellows will stretch.

Carry out the following steps:

→ Unscrew bellows (15) from the valve stem (183) using a piece of paper towel or a piece of leather.

→ If necessary, vent the valve again.

10.4.5 Disassemble visual position indicator and cover

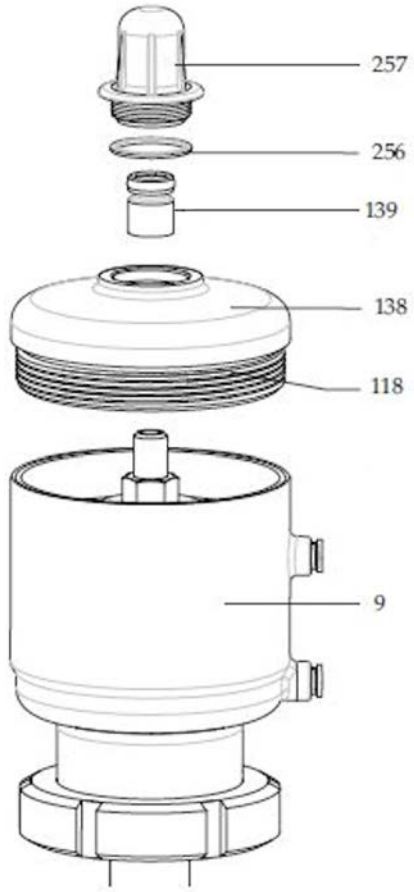

Fig.7: Visual position indicator

Carry out the following steps:

1. Unscrew hood (257) and remove O-ring (256).
2. Dismantle adapter (139).
3. Detach cover (138) from the lantern (9) using assembly tool, part no. 229-000033, and unscrew.
4. Removing the O-ring (118).

10.4.6 Disassembling the Actuator

Spring-closing valve NC

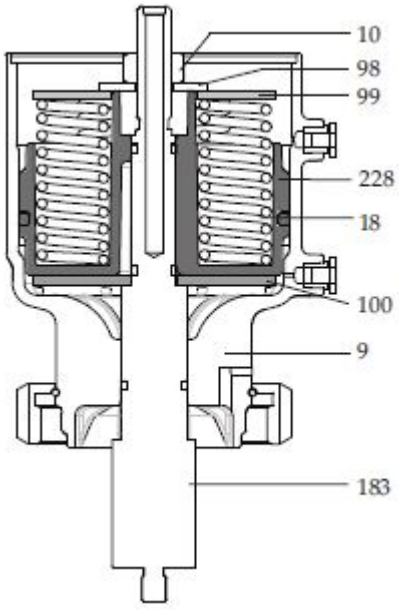

Fig.8: Drive spring-closing valve NC

1. Clamp rod (183) in a vice with aluminium protective jaws.
2. Unscrew the nut (10). As a result, the springs (18) are relaxed.
3. Pull the rod (183) down and out of the lantern (9).
4. Remove disk (98), disk (99), piston (228), and disk (100) from the lantern (9).

Spring-opening valve NO

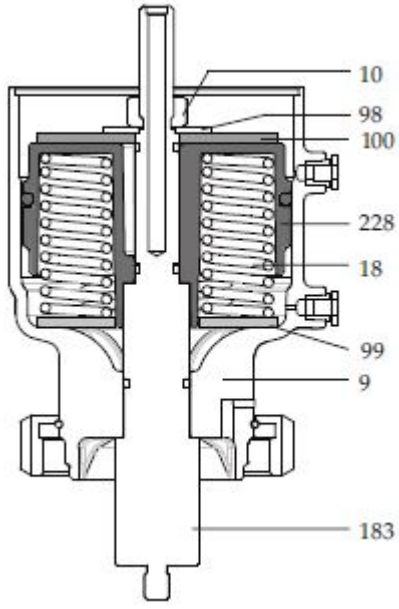

Fig.9: Drive spring-opening valve NO

1. Clamp rod (183) in a vice with aluminium protective jaws.

2. Unscrew the nut (10). As a result, the springs (18) are relaxed.
3. Pull the rod (183) down and out of the lantern (9).
4. Remove disk (98), disk (100), piston (228), and disk (99) from the lantern (9).

10.4.7 Removing the bellows

Fig.10: Removed valve seat

⚠ Warning!

Spring tension in spring-opening valve (NO)

Danger of injury.

► Do not put your hand into the valve housing.
► Before removing the valve insert, pressurise connection (22) with air.

⚠ Warning!

In the case of a removed valve insert, (NC) and (NO), there is a risk of injury at point (16).

There is a risk of crushing or clamping.

► Do not reach into the gap at point (16)!

Carry out the following steps:

1. Unscrew bellows (15) from the valve rod.

→ This completes removal of the bellows.

10.5 Maintenance

10.5.1 Cleaning the valve

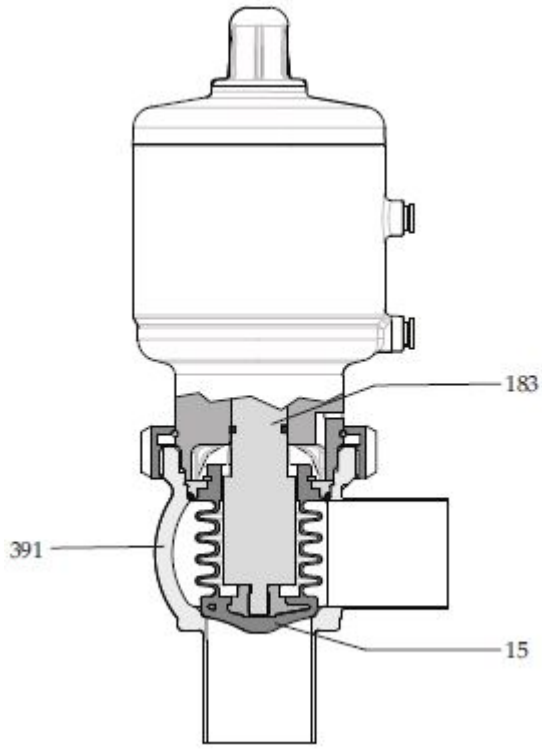

Fig.11: Precision areas on the valve

Notice

Malfunction of the valve due to damaged precision parts

The bellows (15), housing (391), and valve stem are precision areas. They may not be damaged!

► Handle the valve with care!

Notice

Malfunction of the valve due to damaged parts

Observe the safety information sheets issued by the detergent manufacturers!

► Only use cleaning agents that do not corrode or abrade stainless steel, PTFE, PPS, and the sealing materials used. It is recommended to replace the actuator after 20 years.

Carry out the following steps:

1. Disassemble the valve, see Section 10.4, Page 33.
2. Carefully clean the individual parts.

10.5.2 Replacing wear parts

Fig.12: Wear parts VESTA valve H_A

Hint!

Always use genuine spare parts!

Carry out the following steps:

1. Replace faulty bellows (15).
2. Replace all the other seals identified in the illustration.
   - (6) O-Ring,
   - (118) O-Ring,
   - (186) O-Ring,
   - (226) O-Ring,
   - (256) O-Ring.

Hint!

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

10.6 Installation

10.6.1 Assembling the actuator

Spring-closing valve NC

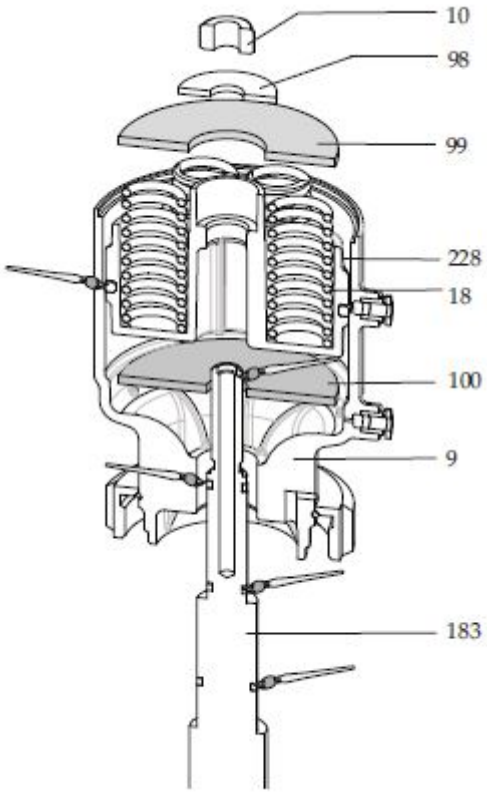

Fig.13: Lubrication points spring-closing valve NC

Carry out the following steps:

1. Push the sleeve (183) from downwards into the lantern (9).
2. Slide disk (100) with small bore onto the valve stem (183).
3. Insert piston (228) with springs (18) into the lantern.
4. Insert disk (99) with the large bore onto the piston (228).
5. Mount disk (98) and nut (10) onto the valve stem.
6. Tighten and secure nut (10). This will preload the springs.

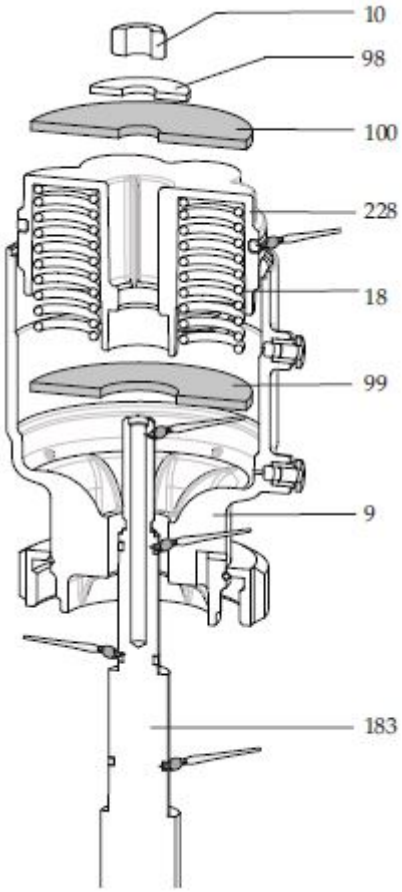

Fig.14: Lubrication points for spring-opening valve NO

Carry out the following steps:

1. Slide stem (183) into the lantern (9) from below.
2. Insert disk (99) with large bore into the lantern (9).
3. Insert piston (228) with springs (18) into the lantern.
4. Slide disk (100) with the small bore onto the valve stem.
5. Mount disk (98) and nut (10) onto the valve stem.
6. Tighten and secure nut (10). This will preload the springs.

10.6.2 Mount visual position indicator and cover

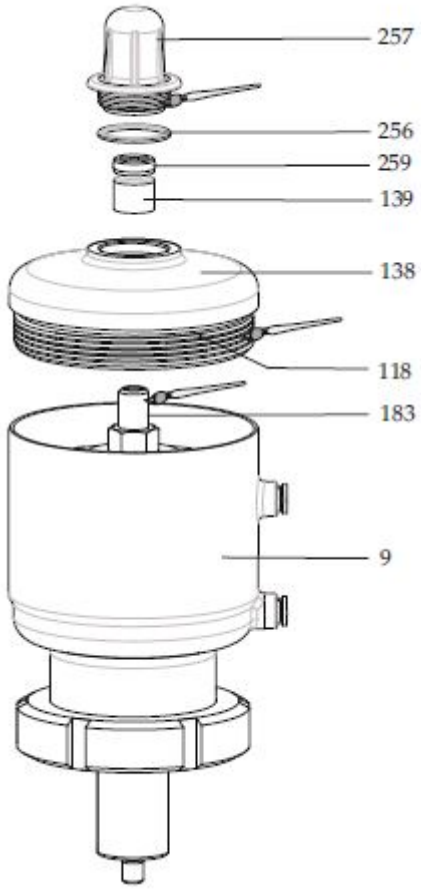

Fig.15: Lubrication points of visual position indicator and cover

Carry out the following steps:

1. Install O-ring (118) in the cover (138).
2. Screw cover (138) onto the lantern (9) using assembly tool, part no. 229-000033.
3. Screw adapter (139) onto the valve stem (183).
4. Insert O-ring (256) into the hood (257).
5. Screw hood (257) onto the cover (138).

→ Visual position indicator is mounted.

10.6.3 Mounting the bellows

Fig.16

Warning!

Risk of injury by spring force being released on valves with spring-opened actuation (NO) and spring-closing actuation (NC)

You can sustain serious injuries to your fingers when you put your hand into the valve housing.

► Do not put your hand into the valve housing.

Warning!

In the case of a removed valve insert, (NC) and (NO), there is a risk of injury at point (16).

There is a risk of crushing or clamping.

► Do not reach into the gap at point (16)!

Notice

Sensitive valve parts

Damage to the valve parts can result in leakage problems and malfunction.

► Protect the valve parts against impact stress.

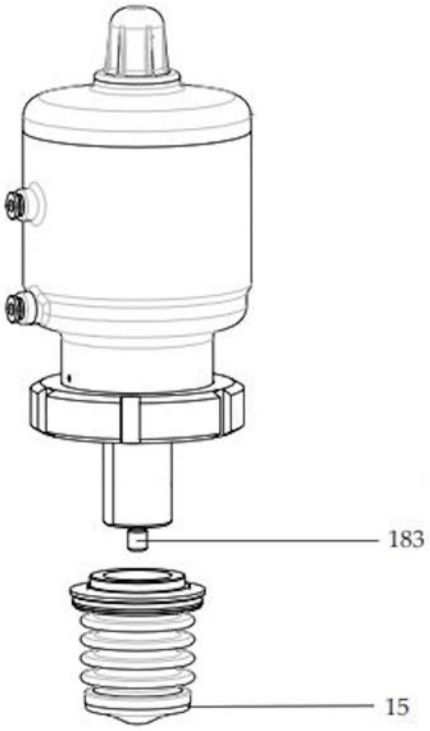

Fig.17

Carry out the following steps:

1. Install bellows (15) on valve disk (183).

→ This completes installation of the bellows.

10.6.4 Installing the valve insert

Notice

Damage to the bellows

The sealing membrane (D) on the bellows must not be damaged during installation.

► For the installation of the valve insert, the actuator must be in the open position: Indicated visibly on the position indicator.

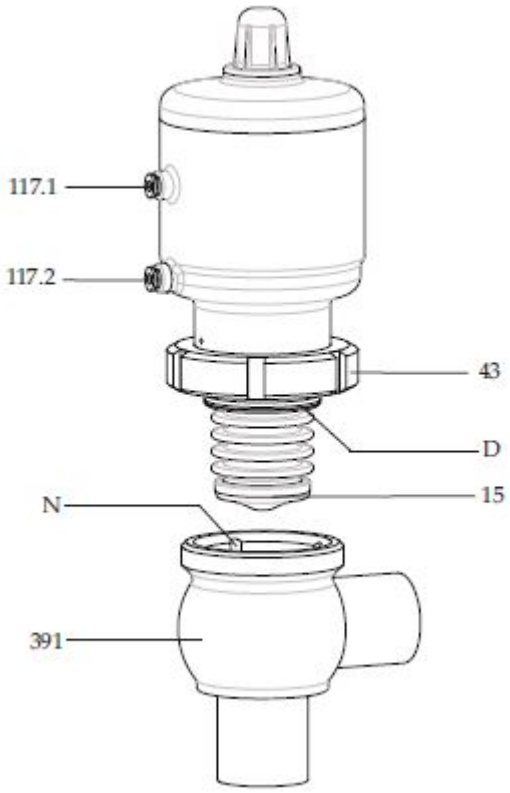

Fig.18: Installing the valve insert

Spring-closing valve NC

1. Air out the valve via connection 117.2. The bellows (15) are raised.

Spring-opening valve

1. Air out the valve via connection 117.1. The bellows (15) are raised.

10.6.5 Checking the function

Checking the value stroke

Carry out the following steps:

1. Actuate the valve with compressed air.
2. When the connection head is removed, verify the valve stroke. If necessary, readjust the proximity initiators.

Valve stroke		
Valve size	**Valve stroke H [mm]**	**Valve stroke H [Inch]**
DN 40	11.5	0.45
DN 50	13.5	0.53
OD 1.5"	8.5	0.31
OD 2"	11	0.43
ISO 42.4	11.5	0.45
ISO 48.3	9.5	0.37
ISO 60.3	14	0.55

11 Alarms

11.1 Malfunctions and remedies

Notice

Warning of damage to property/loss of product

Ignoring malfunctions may cause considerable damage to property and loss of product.

► In the event of malfunctions, immediately deactivate the valve and secure it against inadvertent reactivation.

Malfunctions may only be remedied by qualified staff, who must observe the safety precautions.

Fault	Cause	Remedy
Valve does not work	Fault in the controller	Check the system configuration
	No compressed air or compressed air too low	Check the compressed air supply Check air hoses for free passage and air tightness
	Fault in the electrical system	Check actuation / external controller and routing of electrical lines
	Actuator leaking	Replacing seals
Valve does not close tight	Dirt/foreign material between valve seat and bellows	Clean valve housing and bellows
	Seat area in the housing damaged	Replace the housing
	PTFE bellows defective	Replace PTFE bellows
Valve closes too slowly	O-rings in the actuator and control top are dry (friction losses)	Grease O-rings
Medium leaks from the housings	Bellows are not fitted correctly or the sealing lip at the bellows is damaged	Fit the bellows correctly or replace if damaged
Switch-point has changed	Leaky	Check leak-tightness

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 18.

12.2 Disposal

12.2.1 General notes

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

The component consists of the following materials:

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

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

13 Spare parts list - VESTA XL shut-off valve H_A

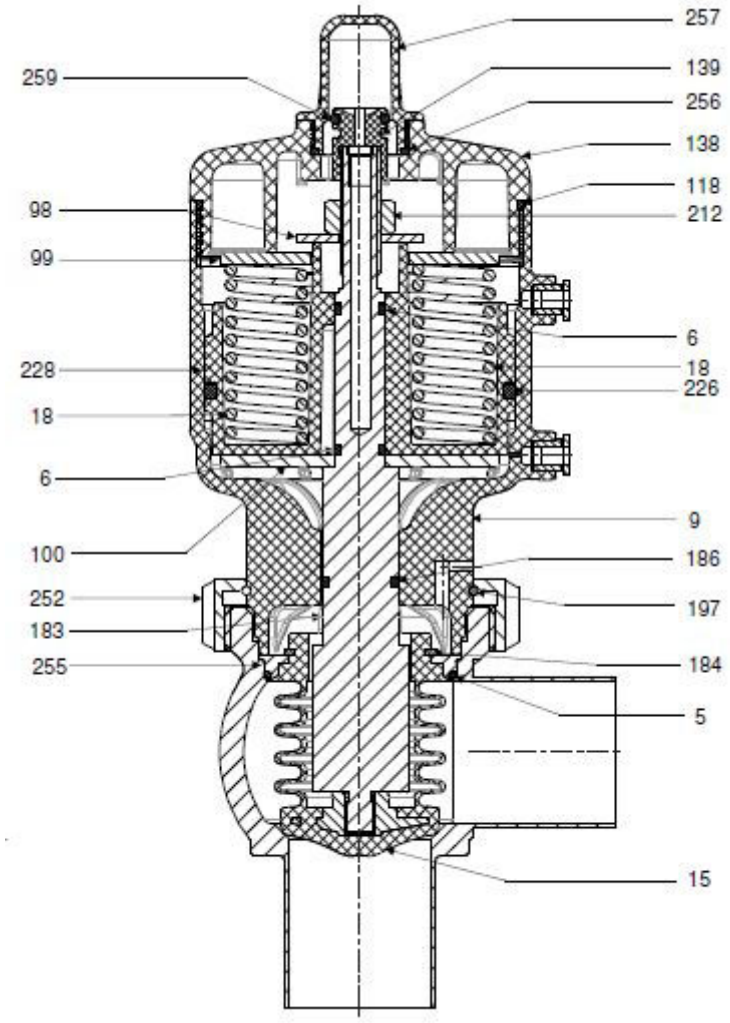

Fig.19: Valve VESTA XL H_A

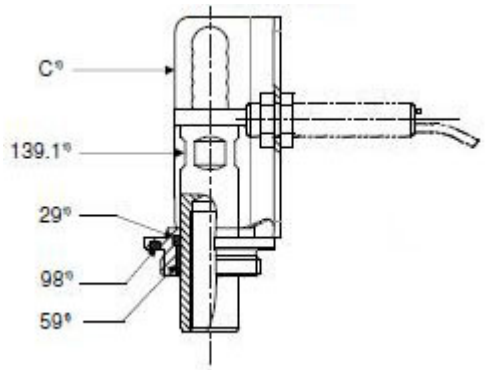

Fig.20: Initiator admission ECO-E

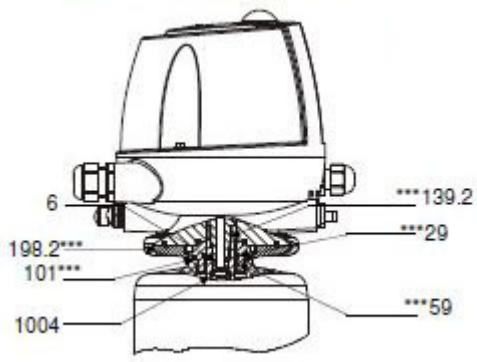

Fig.21: Control top T.VIS M-1 and P-20

1)	Mounting for proximity switch ECO-E cpl.			221-643.05
Item		**Designation**	**Material**	**Material no.**
1)	C	Initiator admission ECO-E	1.4301	221-643.04
	6.1	O-ring	NBR	930-005
	29**	O-ring	NBR	930-026
	59	Plain bearing	IGLIDUR-G	704-041
	98**	O-ring	NBR	930-046
	139.1	Switch bar	1.4305	221-003142
***	**Control top T.VIS M-1 and P-20**			
Item		**Designation**	**Material**	**Material no.**
198.2	Installation base compl. for T.VIS M-1 and P-20			221-589.32
	29	O-ring	NBR	930-026
	59	Plain bearing	IGLIDUR-G	704-041
	101	O-ring	NBR	930-046
139.2	Switch bar compl. for T.VIS M-1		1.4305	221-643.07
	6	O-ring	NBR	930-004
	99	Ring T.VIS	Noryl/GFN2	221-002396
1004	Adapter		1.4305/NBR	221-589.57
Optional control top T.VIS V-20 - see spare parts list for control top T.VIS V-20				

Item	Designation	Material	DN 40	DN 50	1.5" OD	2" OD	ISO 42.4	ISO 48.3	ISO 60.3
Bellows N_A/P compl. *		--	221-540.16	221-540.17	221-540.16	221-540.17	221-540.16	221-540.17	221-540.32
Bellows ATEX N_A/P compl. *		--	221-003971	221-003972	221-003971	221-003972	221-003971	221-003972	--
Seal set cpl. **		NBR	221-003893	221-003893	221-003893	221-003893	221-003893	221-003893	221-003893
5 *	O-ring	EPDM	930-784	930-784	930-784	930-784	930-784	930-784	930-784
6**	O-ring	NBR	930-012	930-012	930-012	930-012	930-012	930-012	930-012
9	Lantern H_A	PPSGV40	221-002738	221-002738	221-002738	221-002738	221-002738	221-002738	221-002738
9.1 *	Lantern H_A/3A	PPSGV40	221-004669	221-004669	221-004669	221-004669	221-004669	221-004669	221-004669
9.2 *	Lantern H_A/M	1.4301	221-002762	221-002762	221-002762	221-002762	221-002762	221-002762	221-002762
15*	Bellows N_A/P	TFM1705/ 1.4301	221-540.03	221-540.04	221-540.03	221-540.04	221-540.03	221-540.04	221-540.22
	Bellows ATEX N_A/P	TMOF0040/ 1.4301	221-540.34	221-540.25	221-540.34	221-540.25	221-540.34	221-540.25	--
18	Compression spring	1.4310/2.2	931-292	931-292	931-292	931-292	931-292	931-292	931-292
98	Ring	A2	921-136	921-136	921-136	921-136	921-136	921-136	921-136
99	Ring	1.4301	221-002976	221-002976	221-002976	221-002976	221-002976	221-002976	221-002976
100	Ring	1.4301	221-002977	221-002977	221-002977	221-002977	221-002977	221-002977	221-002977
118**	O-ring	NBR	930-119	930-119	930-119	930-119	930-119	930-119	930-119
138	Cover	PPSGV40	221-002739	221-002739	221-002739	221-002739	221-002739	221-002739	221-002739
139	Adapter H_A	PA/black	221-002985	221-002985	221-002985	221-002985	221-002985	221-002985	221-002985
183	Rod H_A	1.4305	221-002989	221-002980	221-002989	221-002980	221-002989	221-002980	221-002980
184 *	Retaining ring	1.4310	917-121	917-121	917-121	917-121	917-121	917-121	917-121
186	O-ring	NBR	930-029	930-029	930-029	930-029	930-029	930-029	930-029
197	Snap ring	1.4310	917-175	917-175	917-175	917-175	917-175	917-175	917-175
212	Hexagon nut	A2	910-151	910-151	910-151	910-151	910-151	910-151	910-151
226**	O-ring	NBR	930-113	930-113	930-113	930-113	930-113	930-113	930-113
228	Piston	POM GV30 black	221-002747	221-002747	221-002747	221-002747	221-002747	221-002747	221-002747
252	Cap nut H_A	1.4301	221-002978	221-002978	221-002978	221-002978	221-002978	221-002978	221-002978
255 *	Pressure disk N_A/P	1.4301	221-544.02	221-544.02	221-544.02	221-544.02	221-544.02	221-544.02	221-544.02
256**	O-ring	NBR	930-041	930-041	930-041	930-041	930-041	930-041	930-041
257	Hood H_A	PSU	221-002748	221-002748	221-002748	221-002748	221-002748	221-002748	221-002748
259	O-ring	MVQ yellow	930-018	930-018	930-018	930-018	930-018	930-018	930-018
Standard housing combinations									
391	Housing HLA	1.4435	221-002704	221-002717	221-002719	221-002706	221-002834	221-002705	221-002707
392	Housing HTA	1.4435	221-002887	221-002885	221-002884	221-002889	221-002886	221-002888	221-002890
393	Housing HBA	1.4435	221-002721	221-002720	221-002843	221-002845	221-002867	221-002844	221-002847
394	Housing HCA	1.4435	221-002860	221-002737	221-002861	221-002862	221-002866	221-002859	221-002858

The pos.* 5, 15, 184 and 255 are included in bellows complete.
** The pos. 6, 118, 226 and 256 are all included in the seal set complete.
* 9.1 3A Lantern only for plastic
* 9.2 Lantern in stainless steel (also for 3A and ATEX)

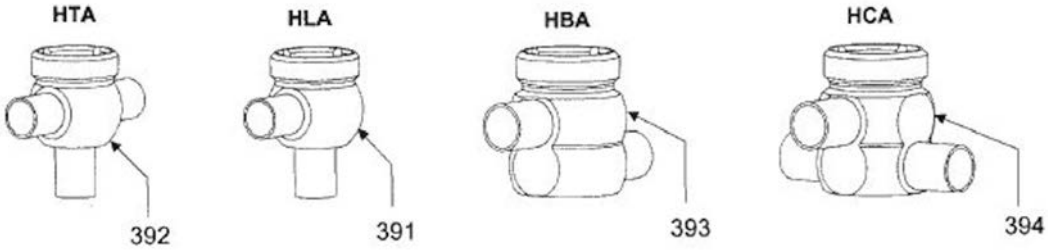

Fig.22: Standard housing combinations

14 Dimension sheet - VESTA XL shut-off valve H_A

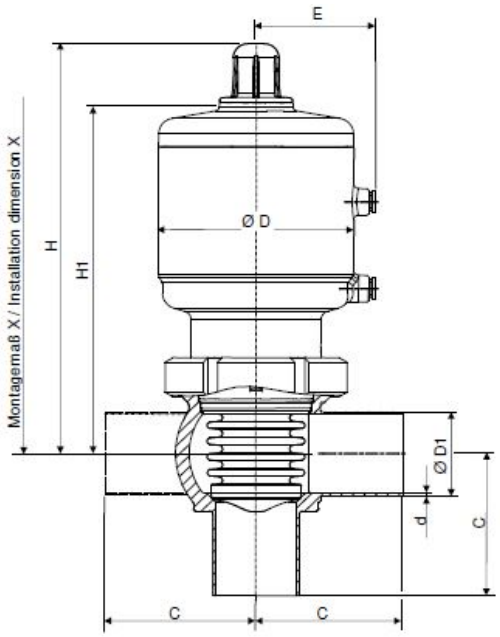

Fig.23

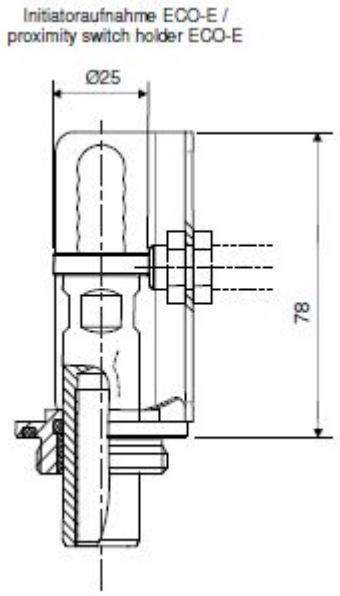

Fig.24: Initiator admission ECO-E

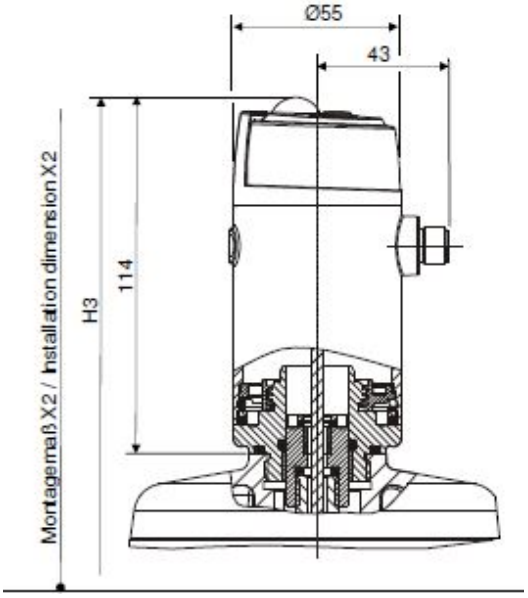

Fig.25: Control top T.VIS V-20

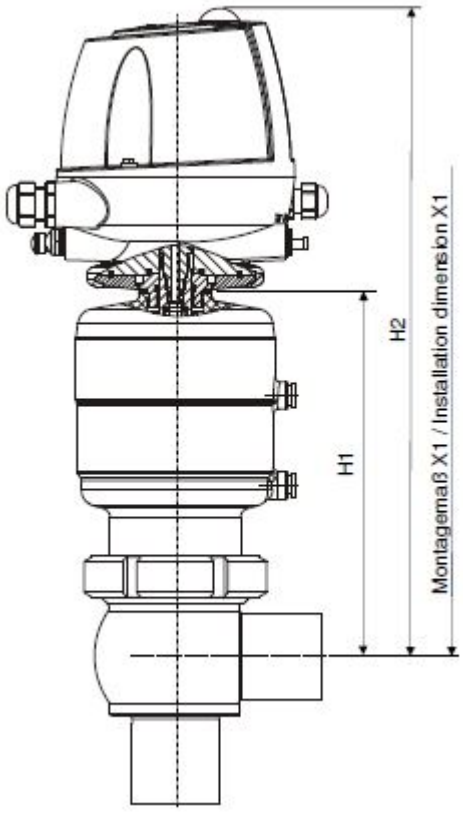

Fig.26: Control Top T.VIS M-1

Dimension		DN40	DN50
A	[mm]	58	58
C	[mm]	90	90
Ø D	[mm]	120	120
Ø D1	[mm]	41	53
d	[mm]	1.5	1.5
S	[mm]	74	74
H	[mm]	254	260
H1	[mm]	217	223
H2 with T.VIS M-1	[mm]	391	397
H3 with T.VIS V-20	[mm]	331	337
X	[mm]	331	348
X1 with T.VIS M-1	[mm]	468	485
X2 with T.VIS V-20	[mm]	401	404
Stroke S	[mm]	11.5	13.5
Weight HLA/HTA	[kg]	5.2	5.5
Weight HBA/HCA	[kg]	6.9	7.0

Dimension		1.5"OD	2"OD
A	[mm]	51	57
C	[mm]	90	90
Ø D	[mm]	120	120
Ø D1	[mm]	38.1	50.8
d	[mm]	1.65	1.65
S	[mm]	74	74
H	[mm]	252	259
H1	[mm]	221	221.5
H2 with T.VIS M-1	[mm]	395	395.5
H3 with T.VIS V-20	[mm]	335	335.5
X	[mm]	325	345
X1 with T.VIS M-1	[mm]	468	481.5
X2 with T.VIS V-20	[mm]	405	405.5
Stroke S	[mm]	8.5	11
Weight HLA/HTA	[kg]	5.2	5.5
Weight HBA/HCA	[kg]	6.8	7.4

Dimension		ISO 42.4	ISO 48.3	ISO 60.3
A	[mm]	52	55	64
C	[mm]	90	90	90
Ø D	[mm]	120	120	120
Ø D1	[mm]	42.4	48.3	60.3
d	[mm]	2	2	2
S	[mm]	74	74	74
H	[mm]	254	257	263
H1	[mm]	217	220	226
H2 with T.VIS M-1	[mm]	391	394	400
H3 with T.VIS V-20	[mm]	331	334	340
X	[mm]	331	341	356
X1 with T.VIS M-1	[mm]	468	478	493
X2 with T.VIS V-20	[mm]	401	404	410
Stroke S	[mm]	11.5	9.5	14
Weight HLA/HTA	[kg]	5.2	5.5	5.6
Weight HBA/HCA	[kg]	6.9	7.3	7.7

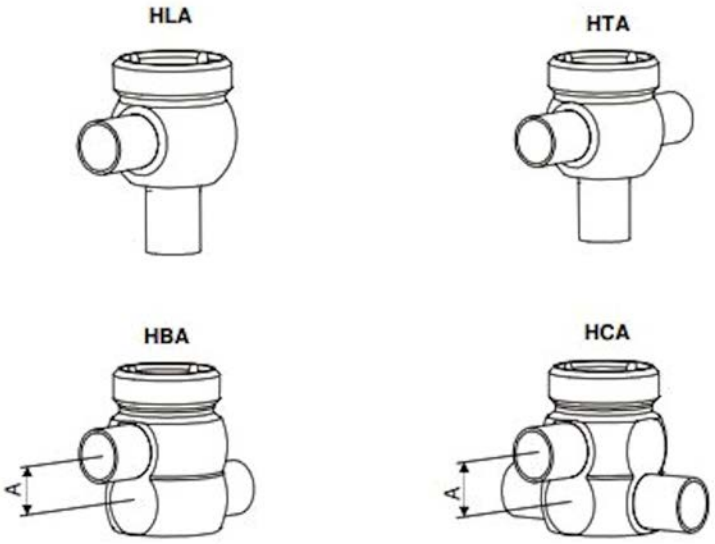

Fig.27

15 Appendix

15.1 Lists

15.1.1 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 [bar_g/psi_g] unless explicitly specified otherwise.
approx.	approximately
°C	Unit of measurement of temperature [degree Celsius]
CIP	Cleaning in place
D-tec	Stem diaphragm technology
dm3 n	Unit of measurement of volume [cubic decimetre] standard volume (standard litres)
DN	DIN nominal width
DIN	German standard issued by DIN (Deutsches Institut für Normung e.V., German Institute for Standardization)
EN	European Standard
EPDM	Material designation, Brief 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]
IP	Protection class
ISO	International Standard of the International Organization for Standardization
kg	Unit of measurement of weight [kilogram]
kN	Unit of measurement of force [kilonewton]
Kv value	Flow coefficient [m³/s] 1 KV = 0.86 x Cv
l	Unit of measurement of volume [litre]
max.	maximum
mm	Unit of measurement of length [millimetre]
µm	Unit of measurement of length [micrometre]
M	Metric

Abbreviation	Explanation
NC	normally closed Air-to-close/spring-to-open action
Nm	Unit of measurement of work [newton metre] SPECIFICATION FOR THE TORQUE: 1 Nm = 0.737 lbft Pound-Force (lb) + Feet (ft)
NO	normally open Spring-to-close/air-to-open action
PA	Polyamide
PE-LD	Low-density polyethylene
psi	Anglo-American unit of measurement for pressure [pound-force per square inch] All pressure data expressed in [bar/psi] is assumed to be gauge pressure [barg/psig] unless explicitly specified otherwise.
PTFE	Polytetrafluoroethylene
SET-UP	Self-learning installation During commissioning and maintenance, the SET-UP procedure carries out all the necessary settings for the generation of messages.
SIP	Sterilization in place
AF	Indicates the size of spanners [width across flats]
TEFASEP gold	Sealing material for the valve seat seal
T.VIS	Tuchenhagen valve information system
V AC	Volt alternating current
V DC	Volt direct current
W	Unit of measurement of power [Watt]
Inch	Unit of measurement of length in the Anglo-American language area
Inch OD	Tube measurement according to British Standard (BS), outside diameter

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