Hygienic valves

VARIVENT® 24/7 PMO tank bottom valve type MT DA

Operating instruction (Translation from the original language)

430BAL015036EN_11

engineering for a better world

gea.com

COPYRIGHT

LEGAL NOTICE

Word marks

The designations VARIVENT® and T.VIS® are protected trademarks of GEA Tuchenhagen GmbH.

TABLE OF CONTENTS

1 General Information 5
1.1 Information on the Document 5
1.1.1 Binding Character of These Operating Instructions 5
1.1.2 Notes on the Illustrations 5
1.1.3 Symbols and Highlighting 5
1.2 Manufacturer address 6
1.3 Contact 6
1.4 EU Declaration of Conformity in accordance with the EC Machinery Directive 2006/42/EC 7
1.5 Translated copy of the EU - Declaration of conformity in accordance with the Pressure Equipment Directive 2006/42/EU 8
1.6 UK Declaration of Conformity for the Delivery of Machines (Safety) dated 2008 9
2 Safety 10
2.1 Intended use 10
2.1.1 Requirements for operation 10
2.1.2 Pressure equipment directive 10
2.1.3 ATEX directive 10
2.1.4 Improper operating conditions 10
2.2 Operator’s Duty of Care 11
2.3 Subsequent changes 11
2.4 General safety instructions and dangers 12
2.4.1 Principles for safe operation 12
2.4.2 Environmental Protection 12
2.4.3 Electrical Equipment 13
2.5 Supplementary Regulations 13
2.6 Qualification of personnel 13
2.7 Safety equipment 14
2.7.1 Signage 14
2.8 Residual dangers 16
2.9 Hazard Areas 17
3 Description 19
3.1 Design 19
3.2 Functional description 21
3.2.1 Leakage-proof shut-off function 21
3.2.2 Cleaning through spreading lifting 21
3.2.3 Actuator Function 21
4 Transport and storage 22
4.1 Storage conditions 22
4.2 Transport 22
4.2.1 Scope of supply 23
5 Technical data 24
5.1 Type plate 24
5.2 Technical data 24
5.3 Resistance and permitted operating temperature of the sealing materials 26
5.4 Pipe ends - General table of measurements 27
5.5 Tool 28
5.6 Lubricants 28
5.7 Weights 28
6 Assembly and installation 29
6.1 Safety instructions 29
6.2 Notes on installation 29
6.3 Welding the housing connection into the tank 30
6.4 Welding the Housing into the Pipe 32
6.5 Pneumatic connections 33
6.5.1 Air requirement 33
6.5.2 Establishing Hose Connections 33
Hose diagram - VARIVENT 24/7 PMO tank valve MT DA with control top T.VIS 34
Hose diagram - VARIVENT 24/7 PMO tank valve MT DA with control top T.VIS and lift connection with quick-action bleeder 35
6.6 Control top T.VIS A-15 35
6.7 Electrical connection with T.VIS control top 36

6.7.1 Adjustment of the control top 36
Control top T.VIS A-15 adjustment 36
6.7.2 Adjustment of the initiators in the lantern 38
6.8 Test procedure according to PMO for valve type MT DA 47
6.8.1 Test procedure 47
6.8.2 Hardware description 49
7 Start-up 50
7.1 Safety instructions 50
7.2 Notes on commissioning 50
8 Operation and control 51
8.1 Safety instructions 51
8.2 Feedback system / signal analysis 51
9 Cleaning 52
9.1 Cleaning 52
9.1.1 Cleaning Process Examples 52
9.1.2 Cleaning effect 52
10 Maintenance 53
10.1 Safety instructions 53
10.2 Inspections 54
10.2.1 Product contact seals 54
10.2.2 Pneumatic connections 54
10.2.3 Electrical connections 54
10.3 Maintenance intervals 54
10.4 Prior to disassembly 55
10.5 Disassembling the Valve 55
10.5.1 Disconnecting the valve from the housing 55
10.5.2 Separating the valve insert from the actuator 58
10.5.3 Disassembly of the lifting actuator 59
10.6 Installation 60
10.6.1 Fitting the lifting actuator 60
10.6.2 Assembly of the valve insert 61
10.6.3 Checking the function 65
10.7 Maintenance 65
10.7.1 Cleaning the Valve 65
10.7.2 Replacing Seals 66
10.7.3 Replacing V-Ring RA 68
10.7.4 Lubricating seals and threads 69
11 Alarms 70
11.1 Malfunctions and remedies 70
12 Decommissioning 71
12.1 Safety instructions 71
12.2 Disposal 71
12.2.1 General notes 71
12.2.2 Valve Actuator Disposal 71
13 Spare parts list - 24/7 PMO tank bottom valve type MT DA 72
14 Spare parts list - lifting actuator MT DA 78
15 Dimension sheet - 24/7 PMO tank bottom valve type MT DA 80
16 Appendix 82
16.1 Lists 82
16.1.1 Abbreviations and terms 82

1 General Information

1.1 Information on the Document

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

1.1.1 Binding Character of These Operating Instructions

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

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

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

1.1.2 Notes on the Illustrations

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

1.1.3 Symbols and Highlighting

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

Danger

Warning: Fatal Injuries

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

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

Warning: Explosions

Failure to observe the warning can result in severe explosions.

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

Warning!

Warning: Serious Injuries

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

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

Caution!

Warning: Injuries

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

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

Notice

Warning: Damage to Property

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

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

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

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

   → Result of the previous operation.

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

Hint!

Further useful information.

1.2 Manufacturer address

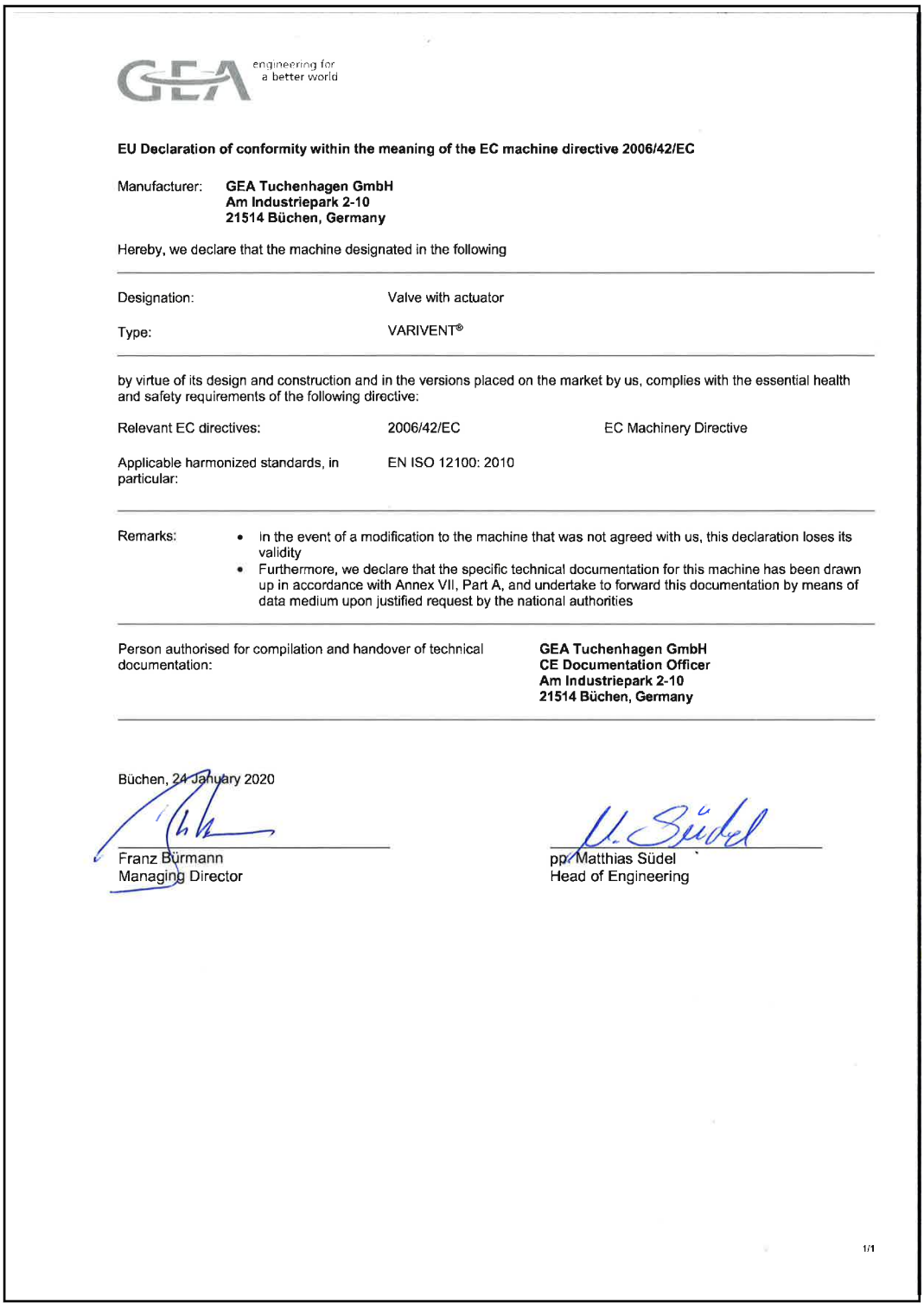
GEA Tuchenhagen GmbH
Am Industriepark 2-10
21514 Büchen

1.3 Contact

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

flowcomponents@gea.com
www.gea.com

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



GEA engineering for a better world

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

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

Hereby, we declare that the machine designated in the following

Designation:	Valve with actuator
Type:	VARIVENT®

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

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

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

Person authorised for compilation and handover of technical documentation:

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

Büchen, 24 January 2020

Franz Bürmann
Managing Director

pp. Matthias Südel
Head of Engineering

1/1

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

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

We hereby declare that the machine named below

Designation:	Valve with actuator
Type:	VARIVENT®

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

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

Remarks:

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

Person authorised for compilation and handover of technical documentation:

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

Büchen, 24 January 2020

Franz Bürmann
Managing Director

i.V. Matthias Südel
Head of Engineering

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

Engineering for a better world.

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

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

Hereby, we declare that the machine designated in the following

Designation:	Valve with actuator
Type:	VARIVENT®

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

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

Remarks:

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

GEA Importer into UK:

GEA Mechanical Equipment UK Ltd
Westfalia House
Old Wolverton Road, Old Wolverton, Milton Keynes
MK12 5PY, United Kingdom

Person authorised for compilation and handover of technical documentation:

Michael Kiely
GEA Mechanical Equipment UK Ltd
Westfalia House
Old Wolverton Road, Old Wolverton, Milton Keynes
MK12 5PY, United Kingdom

Büchen, 14 March 2023

Franz Bürmann
Managing Director

i.V. Matthias Südel
Senior Director Engineering

1/1

2 Safety

2.1 Intended use

The mixproof bottom valve MT DA (PMO) is used for the mixproof-reliant shut-off of high-quality, non-abrasive products at tank outlets.

Hint!

The manufacturer will not accept any liability for damage resulting from any use of the valve which is not in accordance with the designated use of the valve. The risk is borne solely by the operating company.

2.1.1 Requirements for operation

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

2.1.2 Pressure equipment directive

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

According to the scope of directive 2014/68/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.

2.1.3 ATEX directive

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

Refer to and observe the additional operating instructions “ATEX version valves”. For details regarding the marking of valves for potentially hazardous areas also refer to the additional operating instructions “ATEX version valves”.

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

2.1.4 Improper operating conditions

The operational reliability of the valve cannot be ensured under improper operating conditions. Therefore avoid improper operating conditions.

Operating the valve 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 valve.
- Damage has been detected on the valve.
- Maintenance intervals have been exceeded.

2.2 Operator’s Duty of Care

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

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

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

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

Hint!

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

2.3 Subsequent changes

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

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

2.4 General safety instructions and dangers

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

Nevertheless, dangers can arise from the component, if:

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

2.4.1 Principles for safe operation

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

The following principles apply for the safe operation of the component:

- The operating instructions must be kept in a fully legible form at the place where the component is used.
- Only use the component for its intended purpose.
- The component must be in working order and function properly. Check the condition of the component before starting work and at regular intervals.
- Wear tight-fitting work clothes for all types of work on the component.
- Make sure that no one can be injured by the parts of the component.
- Report malfunctions or detectable changes to the component immediately to the person in charge.
- Never touch the pipes and component when they are hot! Avoid opening the component if the process equipment is not emptied and depressurized.
- 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 personnel and by wearing personal protective equipment.

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

2.9 Hazard Areas

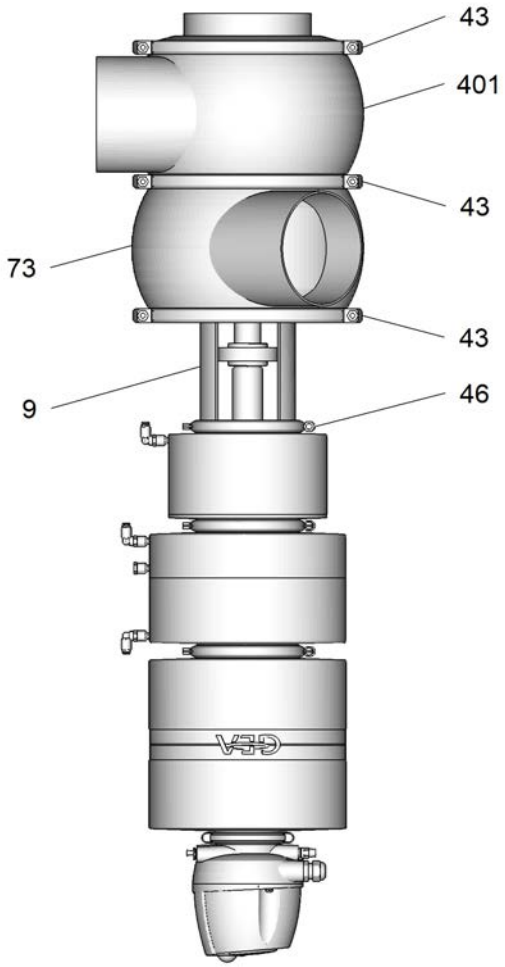


Fig.4

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. Eliminate faults without delay.
- Never reach into the lantern (9) or the valve housing (401, 73) when the valve is switching. Fingers can be crushed or cut off.
- When the hinged clamps (43, 46) between the lantern and housing of the non-actuated valve (spring-to-close version) is loosened, there is a danger of injury since the released spring pretension will suddenly lift the actuator.

  For this reason, relieve the spring tension by pressurising the actuator with compressed air – via a solenoid valve or via mounting tool see chapter “Disassembly” – before releasing the hinged clamps.
- Before starting any maintenance, servicing 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 installing the valve be sure to wear suitable protective gloves.
- During transport and assembly of the valve, always screw the control top and the switch bar out and lift the valve with the eyebolt screwed in.

3 Description

3.1 Design

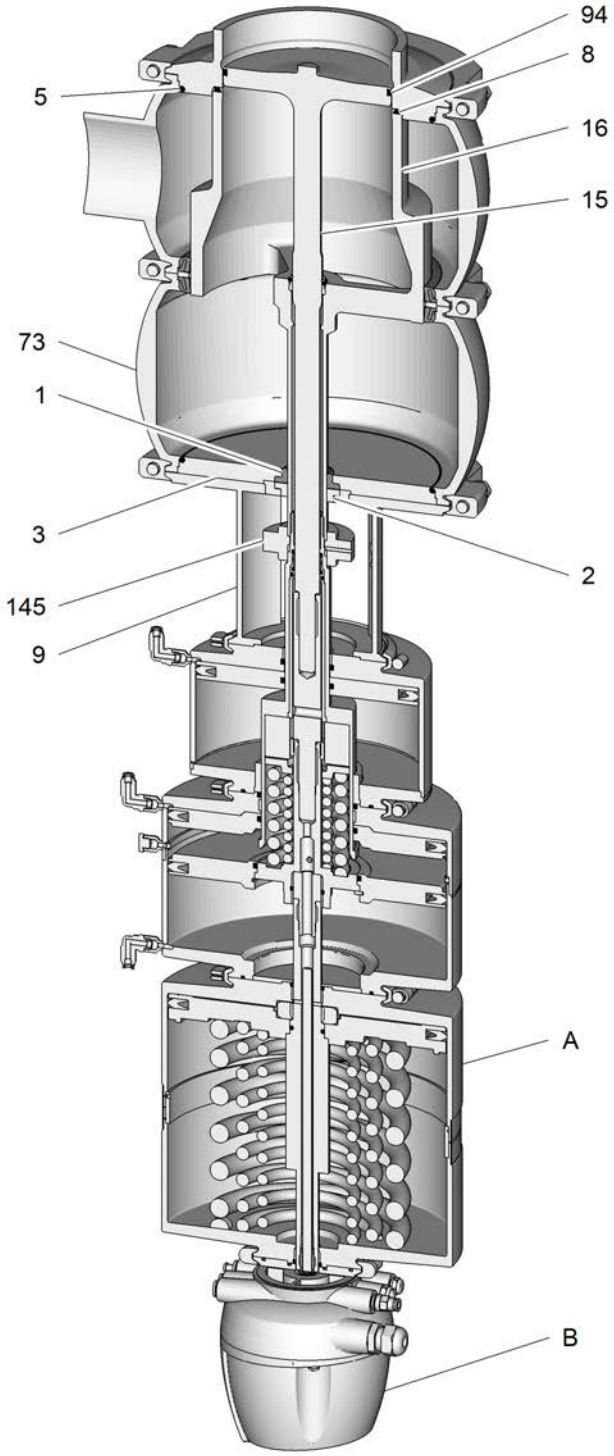


Fig.5

Design with lift, without cleaning connection (with leakage indicator)			
No.	**Designation**	**No.**	**Designation**
A	Actuator	9	Lantern
B	Control top	15	Valve plate M_T
1	Seal ring	16	Mixproof disk M_T
2	Bearing	73	Leakage housing
3	Seal disk	94	V-ring RA
5	O-ring	145	Leak indicator
8	V-ring		

Hint!

See spare parts drawing for housing configuration

3.2 Functional description

3.2.1 Leakage-proof shut-off function

The valves MT DA (PMO) are equipped with a radial valve disk seal.

With the valves MT DA (PMO), the tank and the valve housing are closed by one valve seat each.

The chamber between the two valve disks is connected to the open air via the double-disk (16) and the leakage housing (73).

In the event of seal damage, the leaking fluid can safely flow into the open. Defective seals can thus easily be detected. Under normal operating conditions, the penetration of liquids from the tank into the pipeline or vice versa is excluded.

3.2.2 Cleaning through spreading lifting

During cleaning of the pipeline, the valve disks in contact with the cleaning liquid can be moved apart. This allows the cleaning liquid to enter the leakage cavity and clean the seal between the valve disks and the leakage cavity.

3.2.3 Actuator Function

The actuator is of the spring-closing type (Z). The valve is closed 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)

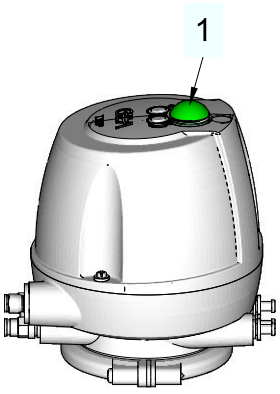


Fig.6

4 Transport and storage

4.1 Storage conditions

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

If, during transport or storage, the valve is going to be exposed to temperatures ≤ 0°C, it must be dried beforehand and suitable measures must be taken to protect it from damage.

Hint!

We recommend that the valve should be stored at a temperature of ≥ 5 °C for a period of 24 hours prior to any handling (disassembling the housings / activation of actuators) so that any ice crystals formed by condensation water can melt.

4.2 Transport

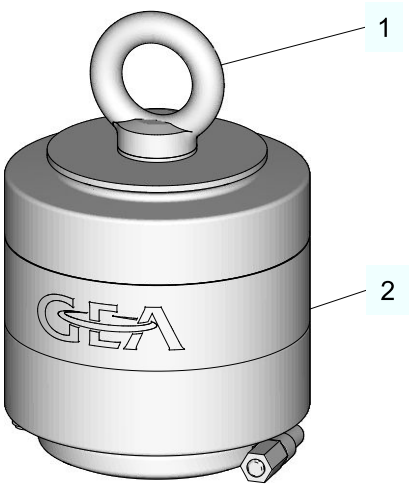


Fig.7

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.

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 GEA must be informed about the process. Claims must be submitted within 6 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.

5 Technical data

5.1 Type plate

The type plate clearly identifies the valve.

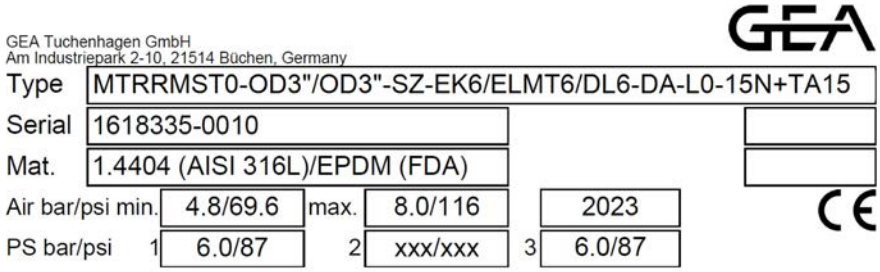


Fig.8

The type plate provides the following key data:

Key data of the valve	
Type	Mixproof valve MT DA
Serial	Serial number
Material	1.4404 (AISI 316L) / EPDM (FDA)
Control air pressure bar/psi	4.8-8 bar
Product pressure bar/psi	max. 6 bar

5.2 Technical data

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

Technical data: Valve	
Designation	**Description**
Size	2.5" to 6" OD
Material of product contact parts	Stainless steel 1.4404 Check corrosion resistance with respect to media and detergent
Fitting position	Suspended under a tank or horizontal in the SmartConnect

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 (5 °F) no solenoid valves in the control top > +50 °C(122 °F) no solenoid valves in the control top
Proximity switch	-20 to +80 °C (-4 ... +176 °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 +/- 0.1 mm Inside Ø 4 mm
- Inch	Material PA Outside Ø 6.35 mm +/- 0.1 mm Inside Ø 4.3 mm
Product pressure*	2.5": max. 6 bar (87 psi) 3" to 4": max. 6 bar (87 psi) 6": max. 3 bar (43 psi)
CIP pressure	max. 2 bar (29 psi) pressure applied at the valve disk lift
Control air pressure	2.5" 4 bar to 8 bar (58 psi to 116 psi) 3" to 4" 4 bar to 8 bar (58 psi to 116 psi) 6" 4 bar to 7 bar (58 psi to 101 psi)
Control air	acc. to ISO 8573-1
- Solid particle content:	Quality class 6 Particle size max. 5 µm Part density max. 5 mg/m³
- 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.

Technical data: Compressed air supply	
Designation	**Description**
- Oil content:	Quality class 3, preferably oil free, max. 1 mg oil in 1m³ air
* Specifications for 6 bar control air pressure	

5.3 Resistance and permitted operating temperature of the sealing materials

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

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

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

Resistance:

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

Table of sealing resistance / permitted operating temperature			
Medium	**Maximum operating temperatures**	**Sealing material**	
		EPDM	**FKM**
Alkalis up to 3%	up to 80 °C (176°F)	+	o
Alkalis up to 5%	up to 40 °C (104°F)	+	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	+
Inorganic acids up to 5%	up to 100 °C (212°F)	–	+

Table of sealing resistance / permitted operating temperature			
Medium	**Maximum operating temperatures**	**Sealing material**	
		EPDM	**FKM**
Water	up to 100 °C (176°F)	+	+
Steam	up to 135 °C (275°F)	+	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)
* The general resistance of the material does not correspond to the maximum operating temperature.	

5.4 Pipe ends - General table of measurements

Dimensions for tubes in inch OD				
Inch OD	**Outside diameter**	**Wall thickness**	**Inner diameter**	**Outer diameter according to BS 4825**
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

5.5 Tool

Tool	Material no.
Hose cutter	407-065
V-ring insertion tool	229-109.88
Open-ended wrench, ends ground, a/f 13-17	408-036
Jaw wrench, ends ground, a/f 30-32	408-041
Jaw wrench, ends ground, a/f 36-41	408-042
Sickle spanner for holding the carrier sleeve Ø 30/32 (Ø4 mm) tight	408-202
Sickle spanner for tightening the carrier sleeve Ø45/50 (Ø5 mm)	408-205
Sickle spanner for holding the carrier sleeve Ø58/62 (Ø5 mm) tight	408-206
Box spanner SW 36	408-208
Cotter pin driver	403-211
Eyebolt	221-104.98
Installation mandrel to install the bushing in the driver sleeve	221-105.94 (DN 25 to DN 100) 221-105.95 (DN 125/6" IPS)
Snap ring pliers for hole Ø 60 (J3)	408-483

5.6 Lubricants

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

5.7 Weights

Size	Weight [kg]
2.5" OD	approx. 45
3" OD	approx. 66.5
4" OD	approx. 74.5
6" OD	approx. 142

6 Assembly and installation

6.1 Safety instructions

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

For installation, the following principles apply:

- Only properly qualified staff is allowed to install, assemble and set the valve into operation.
- 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.
- During assembly, the valve safety devices might not be working effectively.
- Reliably secure sections of the plant which have already been connected against inadvertently being switched on.

6.2 Notes on installation

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.

Fitting position

The valve is installed suspended under the tank. Care must be taken to ensure that the valve housing, pipe system and leakage space (L) can drain properly.

If the valve is installed horizontally, care must be taken that the valve is installed without tension.

If a horizontal valve is supported, care must be taken that the tension-free state is maintained in every operating state.

For horizontal installation the smooth housing connection (MS) and a divisible actuator are needed in order to fulfill 3A requirements.

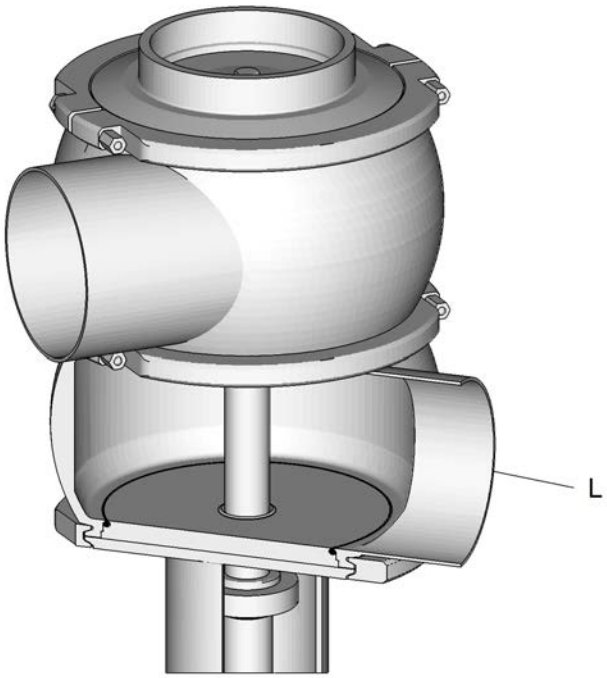


Fig.9: L= outlet leakage housing

6.3 Welding the housing connection into the tank

Hint!

A welding jig (see attached spare parts lists) may have to be used to weld the housing connection into the tank. The valid welding procedure specification (WPS) (attached) for the housing connection selected must be heeded.

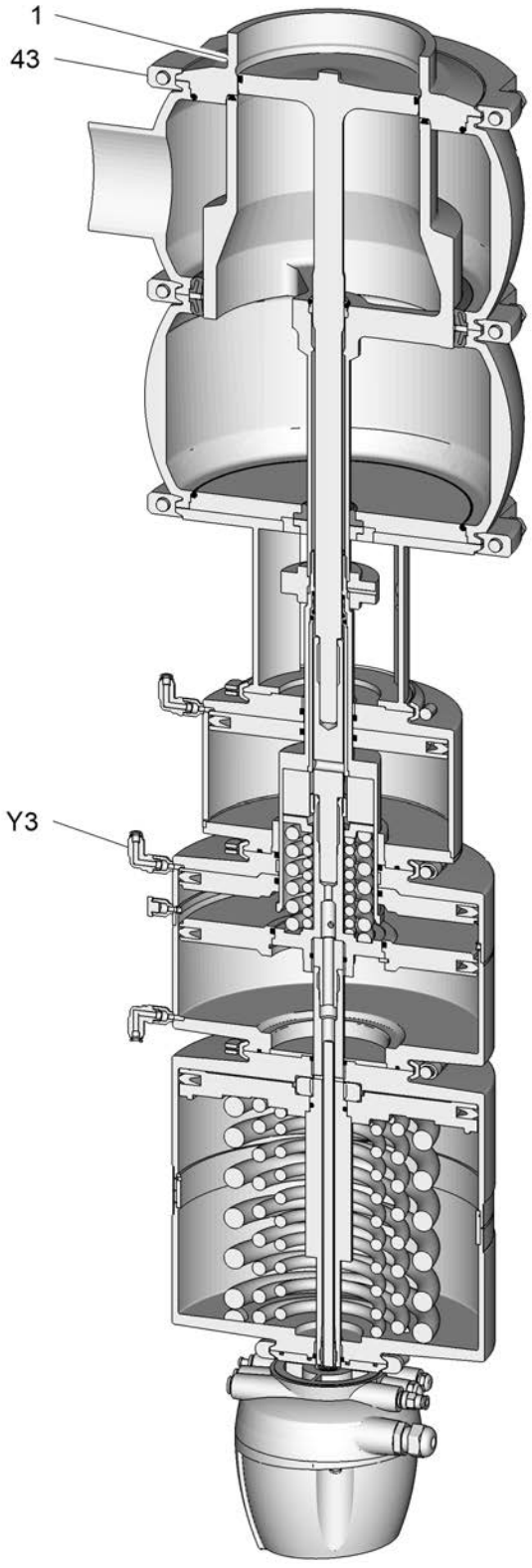


Fig.10

Danger

Spring pretension

Danger of injury when loosening the hinged clamps on the actuator or on the housing, since the released spring pretension will suddenly lift the actuator.

► For this reason, crack the valve disk by actuating the valve actuator with compressed air at Y3 (see chapter “Disassembly”) before loosening the valve housing.

Carry out the following steps:

1. Remove the hinged clamp (43).
2. Take off the housing connection T (1).

→ Done

6.4 Welding the Housing into the Pipe

This section describes the procedure to fit the valve.

Caution!

Liquids in pipes

Danger of injury due to liquid spraying out

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

Prerequisite:

- Prior to welding, all internals must be removed from the valve housing.

Carry out the following steps:

1. **Danger**

   Risk of injury through spring pretension

   Danger of injury when opening the hinged clamps on the actuator or on the housing of the non-activated valve as the released spring pretension will suddenly lift the actuator.

   ► Therefore, before loosening the valve housing, lift the valve disk by activating the valve drive with compressed air at Y3 (see chapter “Disassembly”).

   Release the spring tension.
2. Remove valve insert (see chapter “Disassembly”).
3. Weld the housing (without seal rings) into the pipe system, ensuring that the connection is free of stress by:
4. Fit the housing into place and tack it.

5. **Notice**

   Welding distortions of the housing

   Welding distortions cause the valve to malfunction.

   ► Always close the housing before welding.

   Close housing.

6. Flush the housing with forming gas from the inside to push the oxygen out of the system.
7. Use the TIG welding with pulse method.
8. Weld the housing into the pipe system; use welding filler if necessary.
9. Passivate the seam after welding.
10. **Hint!**

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

    Fit the seals.

11. Assemble the valve.
12. Vent the actuator.

    → The valve disk is lowered.

→ Done

6.5 Pneumatic connections

6.5.1 Air requirement

The air requirement for the switching operations depends on the actuator type.

Size	Actuator type	Air requirement (dm^3_n/stroke) (dm^3_n at 1.01325 bar at 0° C acc. to DIN 1343 for total stroke*)	Air requirement (dm^3_n/stroke) (dm^3_n at 1.01325 bar at 0° C acc. to DIN 1343 for lifting the double-disk in the main stroke (DA-Lift)	Lift	
				VT	DT
2.5"	DG5/CLMT5/CL5-DA	1.75	0.35	0.67	0.19
3", 4"	EK6/ELMT6/DL6-DA	4.45	1.28	2.30	0.40
6"	SN6/SLMT6/EL6-DA	7.46	2.05	3.60	0.90
* dm^3_n at 1.01325 bar; at 0°C; according to DIN 1343					

6.5.2 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.

6.5.2.1 Hose diagram - VARIVENT 24/7 PMO tank valve MT DA with control top T.VIS

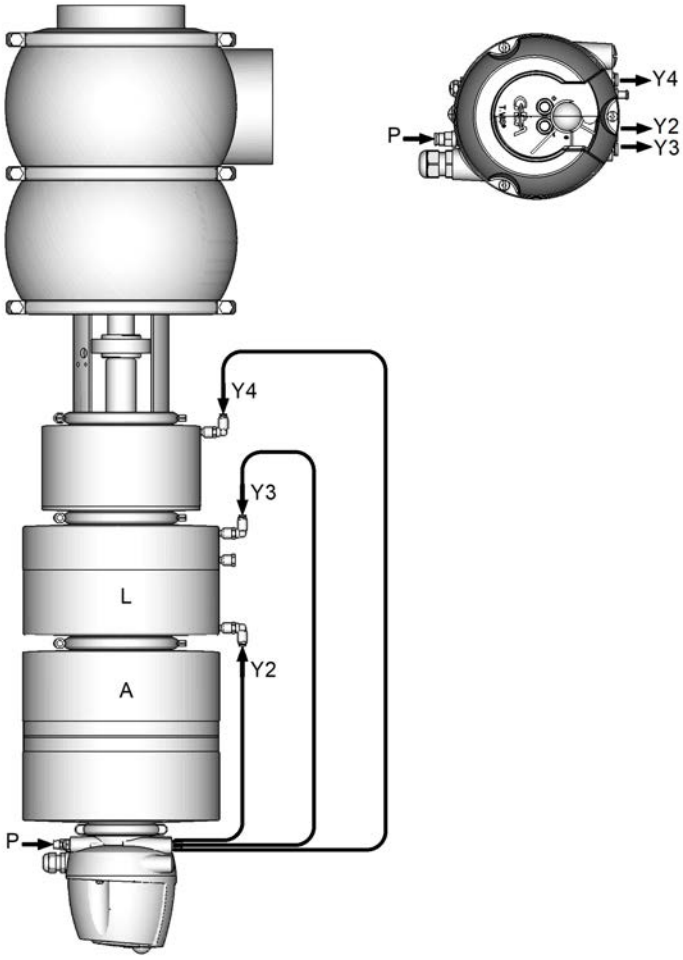


Fig.11

Hint!

For an optimal fit at the air connection, it is necessary to cut the pneumatic hoses at a right angle with the hose cutter.

6.5.2.2 Hose diagram - VARIVENT 24/7 PMO tank valve MT DA with control top T.VIS and lift connection with quick-action bleeder

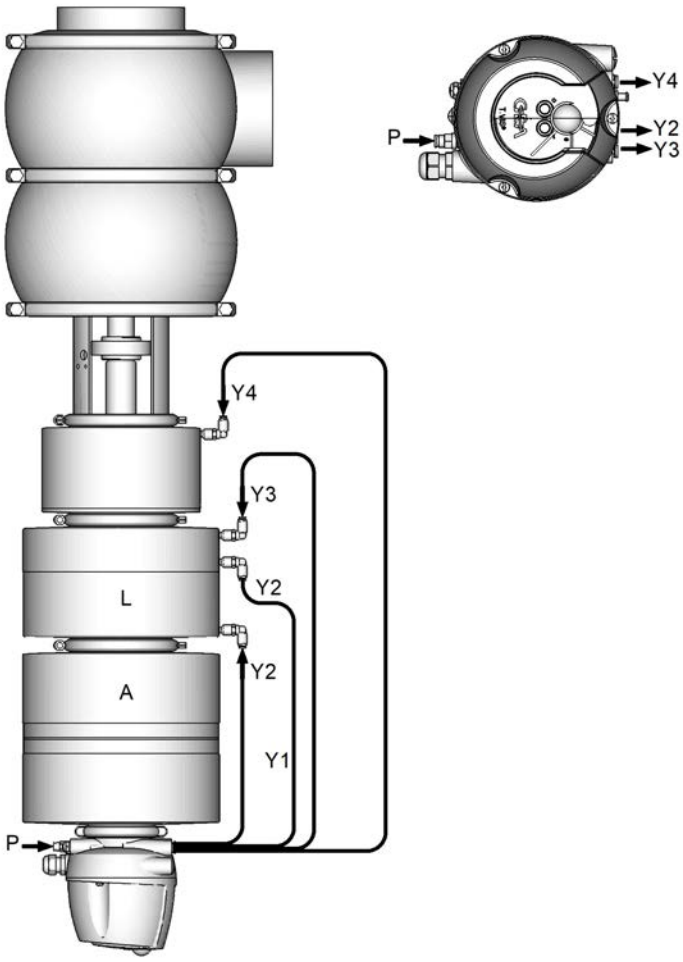


Fig.12

Hint!

For an optimal fit at the air connection, it is necessary to cut the pneumatic hoses at a right angle with the hose cutter.

6.6 Control top T.VIS A-15

Tighten all three screws on the hood to prevent dust and splashwater penetration into the control top.

When the valve M with lifting actuator is used in connection with the T.VIS A-15, the LEFF function in the control top may not be activated.

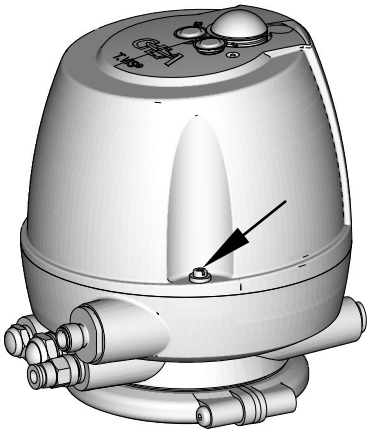


Fig.13

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 Operating Instructions for T.VIS control tops.

→ Done

Hint!

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

6.7.1 Adjustment of the control top

Electrical wiring:

→ See operating instructions for control top T.VIS A-15, chapter 6.4.2 (430BAL010699)

6.7.1.1 Control top T.VIS A-15 adjustment

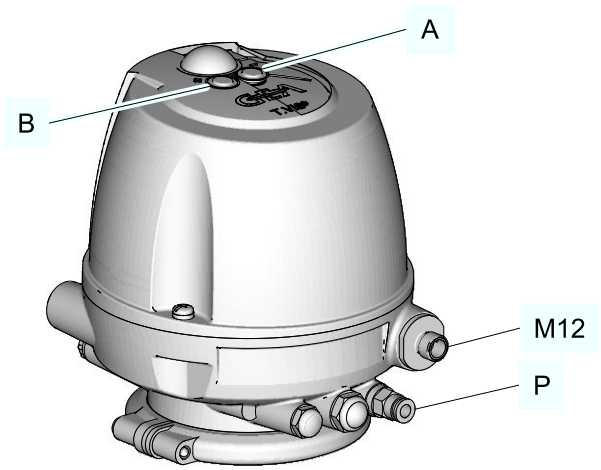


Fig.14

⚠ Warning!

Risk when actuating the valve, if there is fluid in the valve.

Fluids can leak or become mixed in the pipes.

► Ensure that there is no fluid in the valve.

Carry out the following steps:

1. Connect the control air line to the control top T.VIS A-15 (connection P).
2. Switch on the control top by connecting the power supply to the M12 plug connector.
3. Within 30 seconds after activation, press the two black buttons (A, B) on the control button for 3 to 7 seconds at the same time.

   → The setup is carried out automatically. This process lasts approx. 90 seconds. Do not press any buttons during setup. Regardless of whether and in what colours the LED shines or flashes.

   → As soon as the LED shines permanently green, the setup is completed and the valve is operational.

⚠ Caution!

Changing the default settings of the control top

The default settings (signal damping / tolerance) of the control top are changed by pressing the buttons during the setup.

► Do not press any buttons during the setup.

Hint!

In case of incorrect operation or when adjusting the default setting of the control top, please refer to the operating instructions of the T.VIS A-15

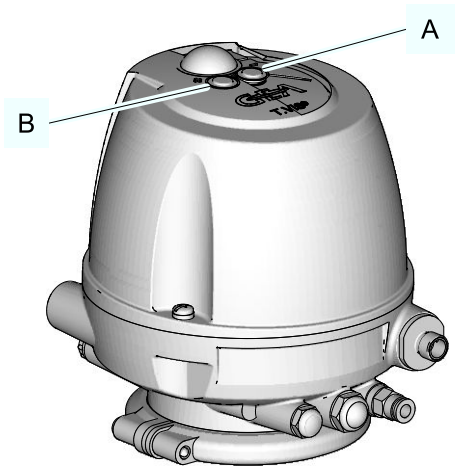


Fig.15

→ Done

Hint!

Refer to the chapter ‘Troubleshooting’ in the operating instructions for T.VIS A-15, if the LED does not shine green permanently after two minutes.

6.7.2 Adjustment of the initiators in the lantern

Hint!

Only in combination with T.VIS A-15.

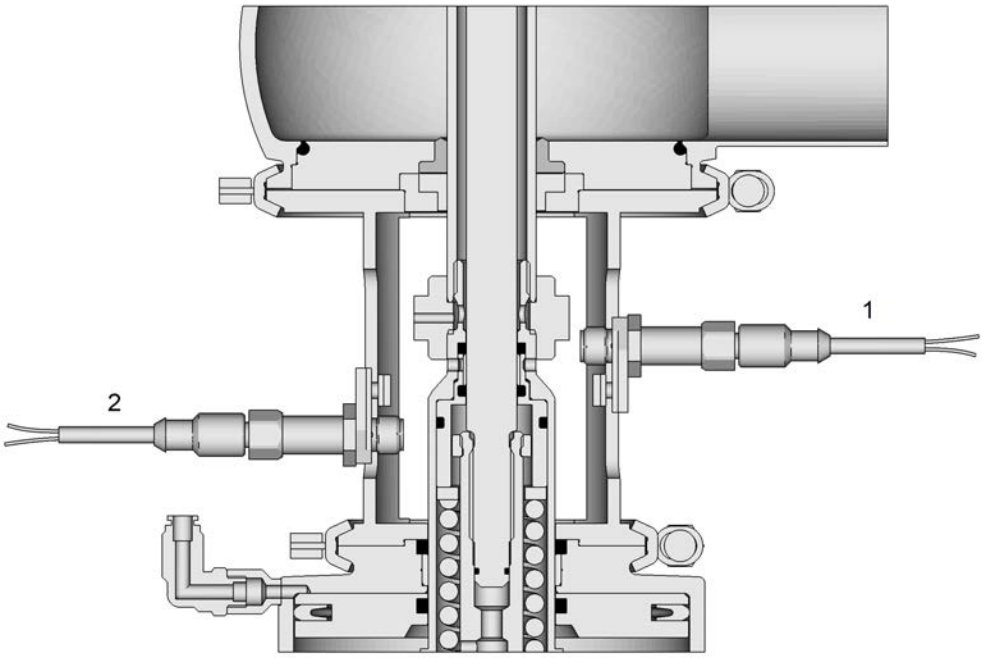


Fig.16: 1 = Initiator / 2 = Initiator

The valve type MT DA contains tow initiators located in the lantern. Initiator 1 monitors the rest position of the double-disk resp. records the position of the double-disk when it leaves this position. Initiator 2 records the double-disk in the spreading lift position resp. the lifted double-disk during the valve main stroke.

⚠ Danger

Risk during assembly of initiators 1 und 2 during valve actuation.

Unintentional actuation or stopping of the valve can lead to serious injuries!

► If the valve is actuated unintentionally, the valve moves to the end position.
► If the valve is stopped unintentionally (e.g. due to unintentional control signal or lack of supply air), the valve moves back to the rest position.
► Do not reach into the lantern during assembly of initiators 1 and 2.

Fitting the proximity switch holder

Requirement:

The valve has to be in the non-actuated rest position for adjustment of initiator 1.

To adjust initiator 2, please actuate the valve to the main stroke position.

Carry out the following work steps for initiators 1 and 2:

1. Position the proximity switch nut (2) against the slot (4.1) in the lantern (4) from the inside and use one finger to hold it in position.

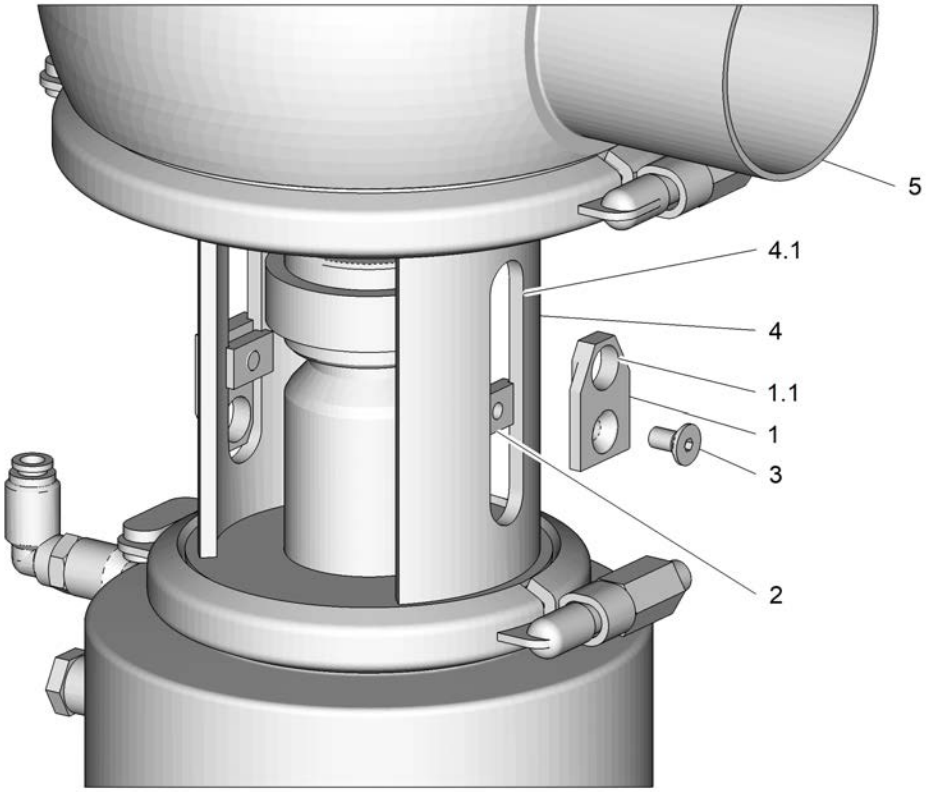


Fig.17

2. Attach the sliding piece (1) with the countersunk screw (3) with the assembly borehole (1.1) in the direction shown pointing toward the housing (5).
3. Tighten the proximity switch nut (2) with the countersunk screw (3).

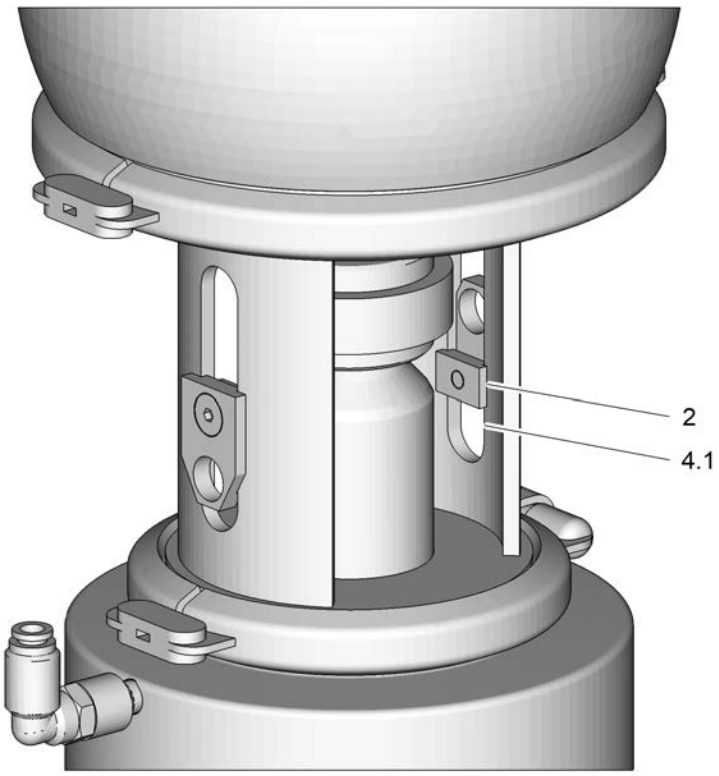


Fig.18

→ Done

Adjusting the proximity switch holder

Carry out the following steps:

1. Screw the adjusting mandrel (6) into the proximity switch holder until it reaches the upper edge of the leakage indicator (7).

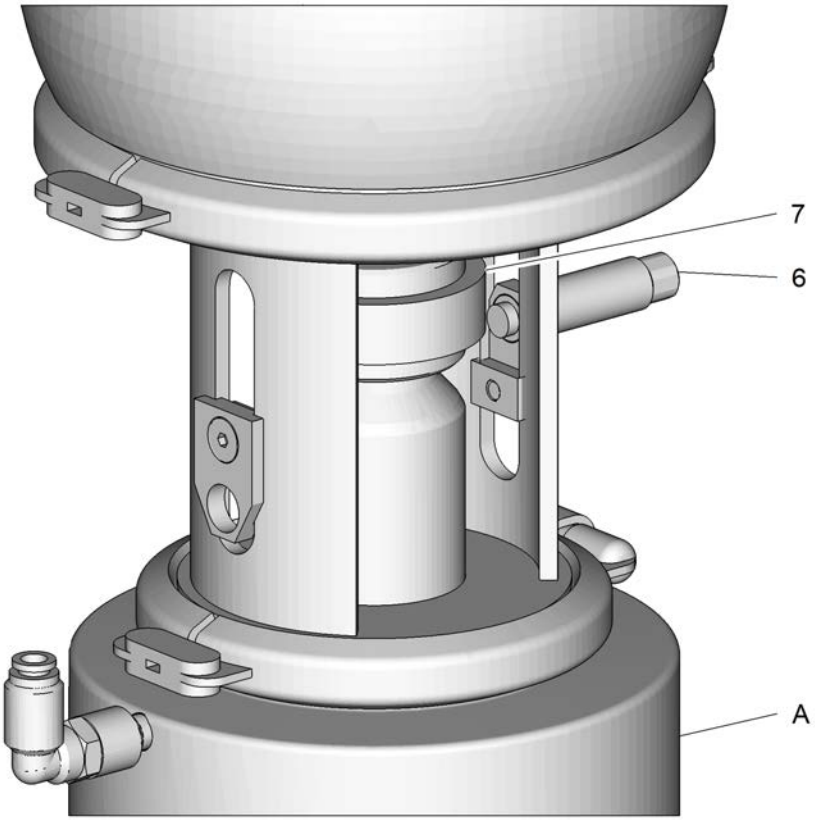


Fig.19

2. Position the proximity switch holder by slightly loosening the countersunk screw in the lantern recess in such a way that the tip of the adjusting mandrel (6) is resting on the collar of the leakage indicator facing the drive (A), see Figure 20.
3. Tighten the proximity switch holder with the countersunk screw (3).

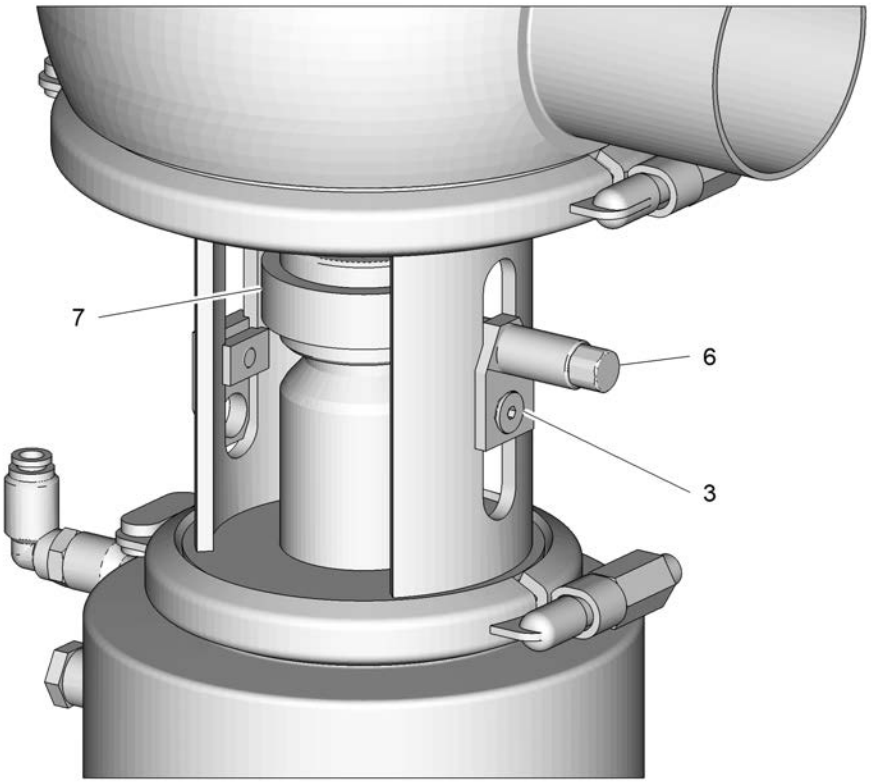


Fig.20

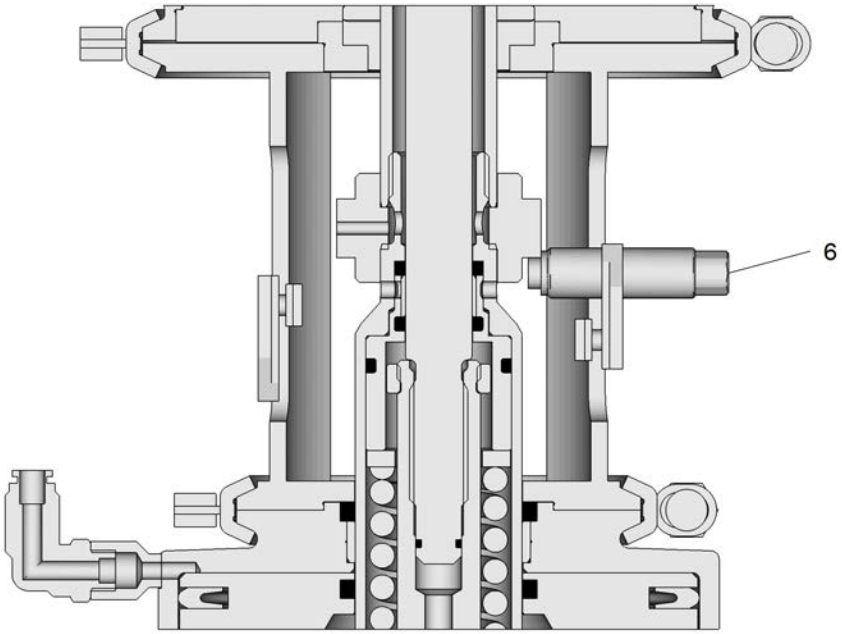


Fig.21

→ Done

Fitting the proximity switch

Carry out the following steps:

1. Remove the adjusting mandrel (6).
2. Screw in the proximity switch M12 (8) together with the counter nut (11) into the proximity switch holder (12) up to the leakage indicator (7).

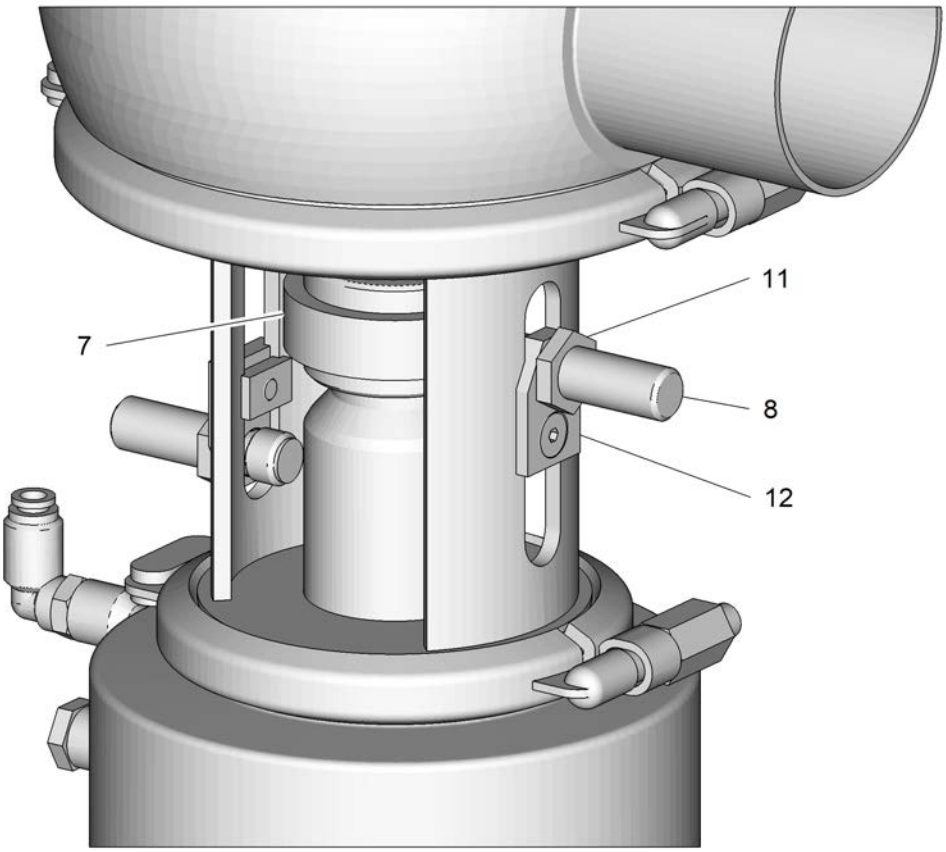


Fig.22

→ Done

Adjusting the proximity switch

Carry out the following steps:

1. Unscrew the proximity switch (8) by one full turn (360°) to set the gap (a) by 0.5 to 1.0 mm.

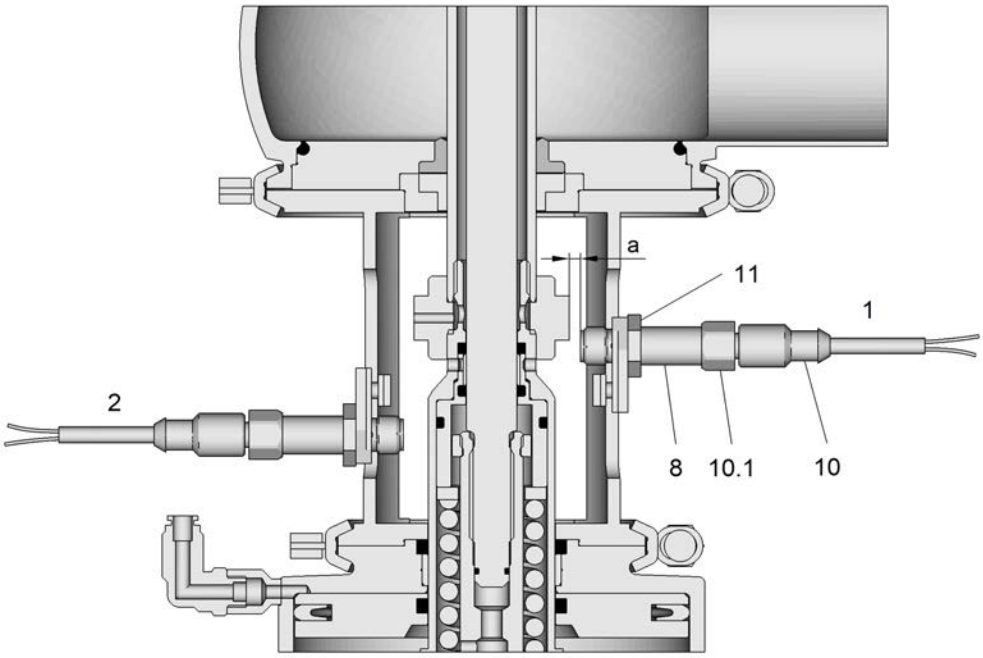


Fig.23: 1 = Initiator / 2 = Initiator

2. Tighten the counter nut (11).
3. Attach the connector (10), that is already connected electrically to the control panel, on the proximity switch using the cap nut M12 (10.1). The LED on the proximity switch must now be lit in operating mode.

   → Done

6.8 Test procedure according to PMO for valve type MT DA

Purpose

With test procedure 1, a controller checks if the sensor systems which detect and confirm the closed position of the upper and lower seats of the PMO - valve (in accordance with PMO Item 15p (B)- point 1. b. (2)) are correct and are functioning properly.

With test procedure 2, the controller checks if the overriding control system (PLC) of the PMO valve (type MT DA) is closed effectively during an active CIP process.

6.8.1 Test procedure

Please refer to chapter 6.8.2 for an explanation of the required hardware.

Test procedure 1

With test procedure 1, the inspector lifts the seats of the upper double-disk and lower valve disk and checks if the sensor system correctly detects the closed position of the respective closed valve seat.

Step 1

Requirement:

- The valve must be in the closed position. This can be recognised by the green LED of the control head.

Step 2 - Lifting of the valve disk

Carry out the following steps:

Hint!

The valve disk lift can be deselected in the case of the MT DA, as cleaning occurs during the main lift during the DA lifting process. Individual lifting of the valve disk is not possible in this case.

In this case, this test step cannot be carried out.

1. Activate the lifting process of the lower seat (valve-disk) by controlling the solenoid valve Y2 via the PLC.

   → When the seat moves downwards (lift strokes acc. to chapter 10.6.3), the green LED on the top of the control top will turn off to indicate that the control top no longer detects the lower seat (valve-disk) as closed position.

   → If the green LED does not turn off, the control top is NOT set correctly and the adjustment procedure must be repeated as described, see Section 6.7.1, Page 36.

Step 3 - Lifting of the double-disk

2. Activate the lifting process of the upper seat (double-disk) by controlling the solenoid valve Y3 via the PLC.

→ When the double-disk moves upwards (lift strokes acc. to chapter 10.6.3), the yellow LED on the proximity switch S3 on the lantern will turn off to indicate that the proximity switch S3 no longer detects the upper seat (double-disk) as closed position.

→ If the yellow LED does not turn off, the proximity switch is NOT set correctly and the adjustment procedure must be repeated as described, see Section 6.7.2, Page 38

→ Done

Test procedure 2

With test procedure 2, the controller checks the interlock of the superordinate control system (PLC), via the manually forced opening of a valve disk while a CIP circuit is active in the opposite housing. In this case, the CIP pump or the pressure of the CIP feeder should deactivated.

Notice

When carrying out test procedure 2, proceed with great caution!

There is the risk of the CIP liquid mixing with product if the control system interlocks are not activated effectively.

► Make sure that there is no product in the housing opposite the CIP circuit during the test duration.

Step 1

Requirement:

- Make sure that the valve being tested is part of an active CIP circuit programme and determine which housing (upper or lower) of the valve is supplied with CIP liquid.

Step 2

Carry out the following steps:

Hint!

The valve disk lift can be deselected in the case of the MT DA, as cleaning occurs during the main lift during the DA lifting process. Individual lifting of the valve disk is not possible in this case.

In this case, this test step cannot be carried out.

1. If the upper housing is part of the active CIP circuit:

→ Activate the lifting process of the lower seat (valve disk) by controlling the solenoid valve Y2 on the PLC.

2. If the lower housing is part of the active CIP circuit:

→ Activate the lifting process of the upper seat (valve disk) by controlling the solenoid valve Y3 on the PLC.

Step 3

3. If the superordinate control system (SPS) is locked properly, the CIP pump or the pressure of the CIP feeder is deactivated.

→ If the CIP pump or the pressure of the CIP feeder is not deactivated, the system should be switched off immediately and the interlock of the superordinate control (SPS) investigated.

→ Done

6.8.2 Hardware description

There are three solenoid valves located on the valve in the control top T.VIS A-15 or T.VIS M-15.

1. Y1 - Main control of the valve
2. Y2 - Activation of the ventilation of the lower seat
3. Y3 - Activation of the ventilation of the upper seat

The closed position of the lower seat (valve disk) is detected by a position measuring system. The correct setting of this system, to detect the closed position of the lower seat (valve disk), can be found at Section 6.7, Page 36.

The sensitivity of the position measuring system is 0.1 mm.

The closed position of the upper seat (double-disk) is detected by the externally mounted proximity switch S3 of the lantern. The correct setting of this initiator, to detect the closed position of the upper seat (double-disk), can be found at Section 6.7, Page 36.

The sensitivity of the position measuring system is also 0.1 mm.

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.
- Check the lifting stroke of the valve disk and the double-disk.
- 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.

8.2 Feedback system / signal analysis

Hint!

The purpose of the proximity switch is to monitor the spread lift rest position, in the end position of the valve main stroke.

When the main stroke is actuated, the signal of the proximity switch S3 is not relevant and does not need to be analysed from a process aspect.

The feedback of the end position of the valve (main lift) is sent to the PLC via the S2 signal.

Overview of the feedback signals									
Feedback system		**Activation**				**Electric feedback**			
		Solenoid valve				**Signal**			
		Y1	**Y2**	**Y3**	**Y4**	**S1**	**S2**	**S3**	**S4**
Start position	Valve closed	0	0	0	0	1	0	1	1
End position	Valve opened	1	0	0	0	0	1	1	0
Seat lift	Lower valve disk	0	1	0	0	0	0	1	1
Seat lift	Upper valve disk	0	0	1	0	1	0	0	1
Seat lift	Spread lift	1	0	0	1	0	1	0	0

→ Analysis S4 available for T.VIS A-15.

→ The double-disk is queried via S3 when the seat of the valve disk is cleaned.

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.

10 Maintenance

10.1 Safety instructions

Maintenance and repair

Before starting any maintenance and repair work on the electrical devices of the valve, carry out 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 allow qualified staff to carry out maintenance or repair work on the valve.
- Before starting any maintenance or repair work, the valve must be switched off and secured against being switched back on. 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 valve. 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 magnetic separator 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 allow qualified staff to disassemble the valve.
- Before starting disassembly, the valve must be switched off and secured against being switched back on. 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 valve. Use suitable access aids and working platforms.
- Mark the lines (if unmarked) prior to disassembly to ensure they are not confused when re-assembling.
- Protect open line ends with blind plugs against ingress of dirt.
- Pack sensitive parts separately.
- For longer periods of standstill, observe the storage conditions, see Section 4.1, Page 22.

10.2 Inspections

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

10.2.1 Product contact seals

Carry out the following steps:

1. Regularly check:
   - upper gasket
   - O-rings between the valve housings
   - V-ring in the valve disks
   - lower gasket

→ 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 union nut on the cable gland is tight
2. Check cable connections at the luster terminal.

→ Done

10.3 Maintenance intervals

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

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

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

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

10.4 Prior to disassembly

Prerequisite:

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

Carry out the following steps:

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

→ Done

10.5 Disassembling the Valve

10.5.1 Disconnecting the valve from the housing

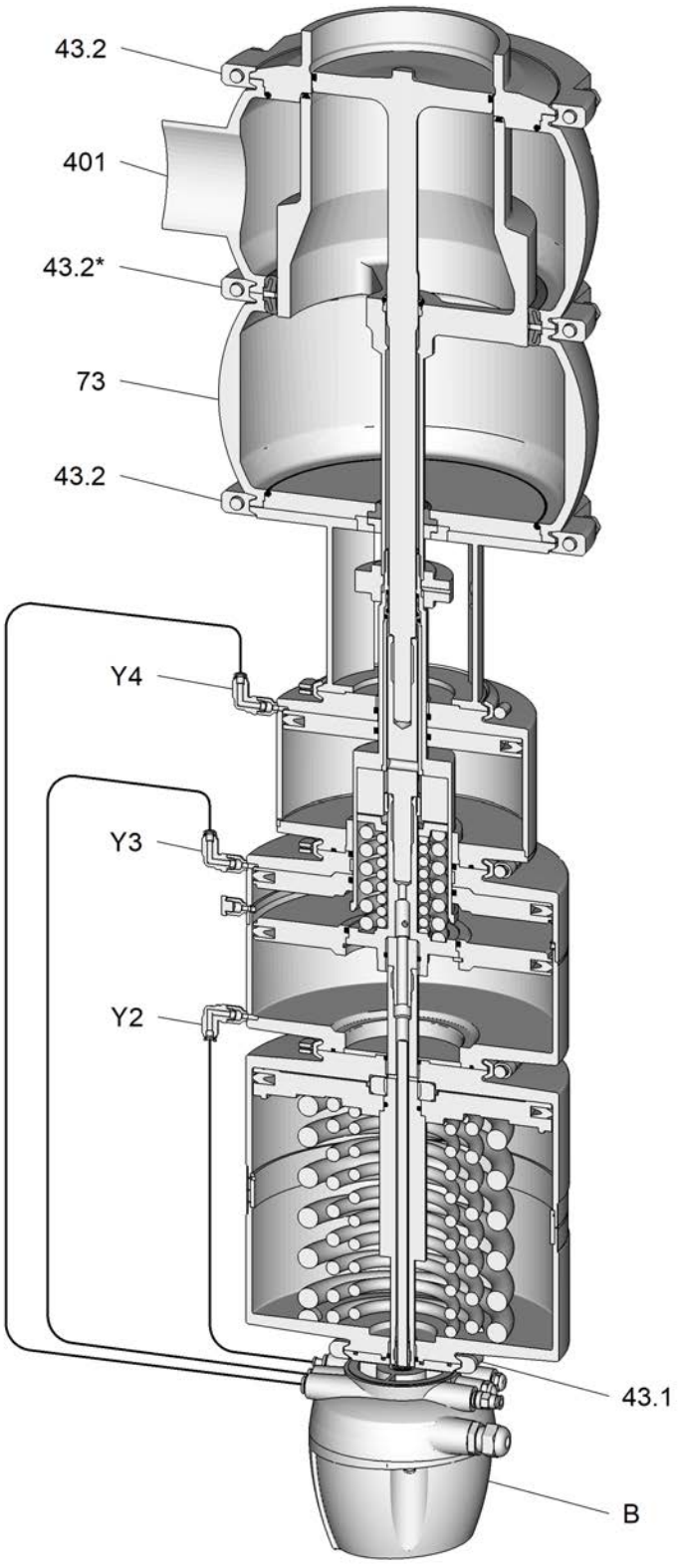


Fig.24: Y2= Lift valve disk M_T / Y3= Lift double-disk M_T

1. Take the half rings off the control top (43.1).

Hint!

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

2. Loosen the pneumatic connections (Y4, Y3, Y2) on the lifting actuator.
3. Pull the control top (B) off.
4. **Warning!**

   Spring pretension

   Danger of injury when loosening the hinged clamps (43.2) on the housing of the non-actuated valve, since the released spring pretension will suddenly lift the actuator.

   ► For this reason, relieve the tension on the spring by pressurising the actuator with compressed air before releasing the hinged clamps.

   Pressuris actuator at (Y3).
5. Take off the hinged clamp (43.2*).
6. Vent the actuator.
7. **Notice**

   Damage

   With a valve that is installed horizontally, make sure that the weight of the valve is supported during disassembly to avoid damage to the seat ring and valve disk.

   ► Carefully disassemble the valve.

   Pull the valve insert out of the housings (402, 73).

→ Done

10.5.2 Separating the valve insert from the actuator

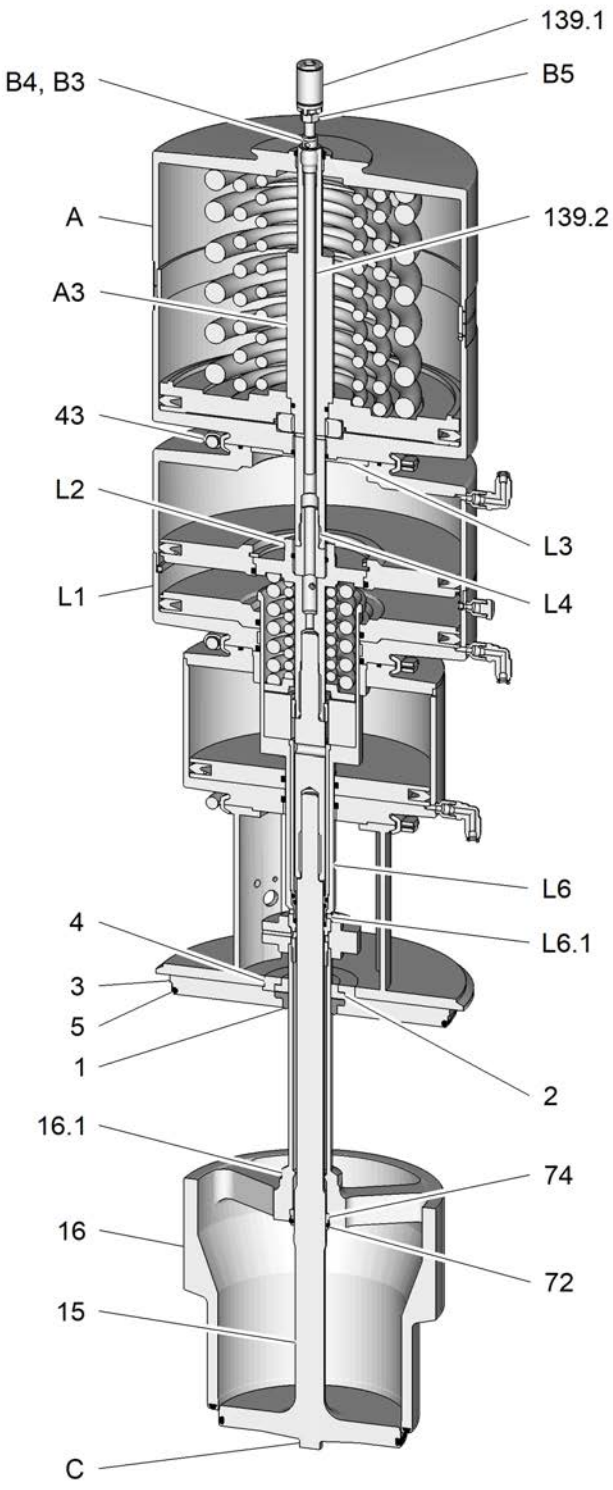


Fig.25

1. Screw the switch bar (139.1), switch bar (139.2) and nut (B5) which are screwed together out of the piston rod (A3) using a 4 mm mandrel.
2. Remove the hinged clamp (43) and pull the actuator (A) with slider (B3), guide ring (B4), adapter (L4) and sealing flange (L3) out of the lifting actuator (L1).
3. Hold carrier (L2) with box spanner a/f 36 and screw the valve disk (15) out at (C).
4. **Notice**

   The contact surfaces of the double-disk (16) are sealing surfaces and may not be damaged.

   Damage to these parts can result in malfunction.

   ► Screw the valve disk carefully apart.

   Hold the carrier sleeve (L6) with sickle spanner at (L6.1) and loosen the double-disk (16) with jaw wrench at (16.1).
5. Strip the seal disk (3) with O-ring (5), bearing disk (4), bearing (2) and seal ring (1) off the double-disk (16).
6. Disassemble the snap seal (74) with O-ring (72). The snap seal is a wearing part.

→ Done

10.5.3 Disassembly of the lifting actuator

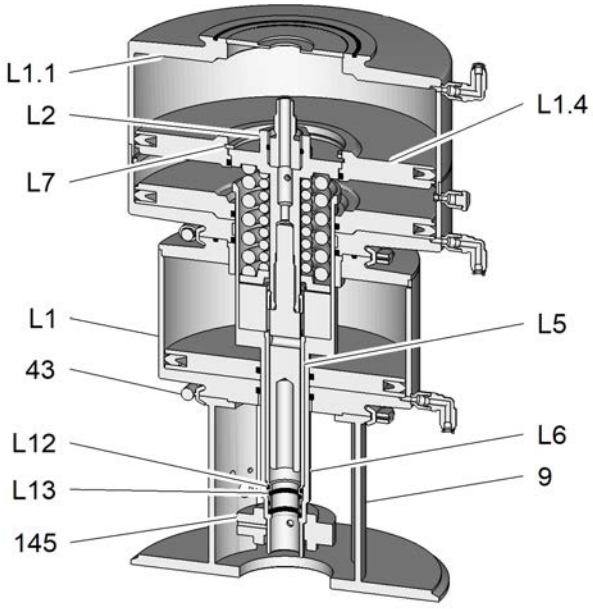


Fig.26

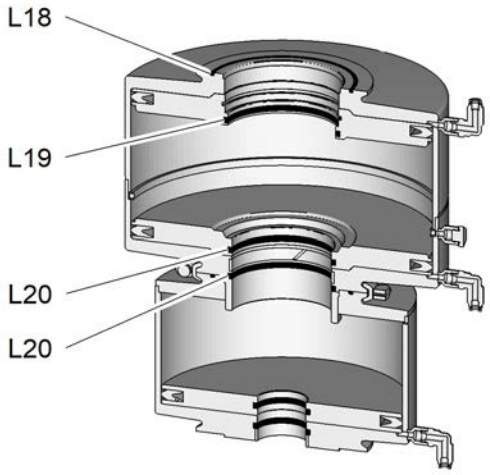


Fig.27

Carry out the following steps:

1. Pull the leakage indicator (145) off the carrier sleeve (L6).
2. Set the lifting actuator (L1) down for disassembly.
3. Push the piston (L1.4) with installed carrier (L2) and carrier sleeve (L6) up towards the lift flange (L1.1) and use pliers to remove the circlip (L7) from the piston (L1.4).
4. Slide the carrier (L2) and the carrier sleeve (L6) out of the lifting actuator (L1).
5. Pull the bushing (L5) out of the carrier sleeve (L6), then the O-rings (L12, L13) will be accessible.
6. Remove the hinged clamp (43), pull the lantern (9) off the lifting actuator (L1).
7. The O-rings (L18, L19, L20) are now accessible.

→ Done

10.6 Installation

10.6.1 Fitting the lifting actuator

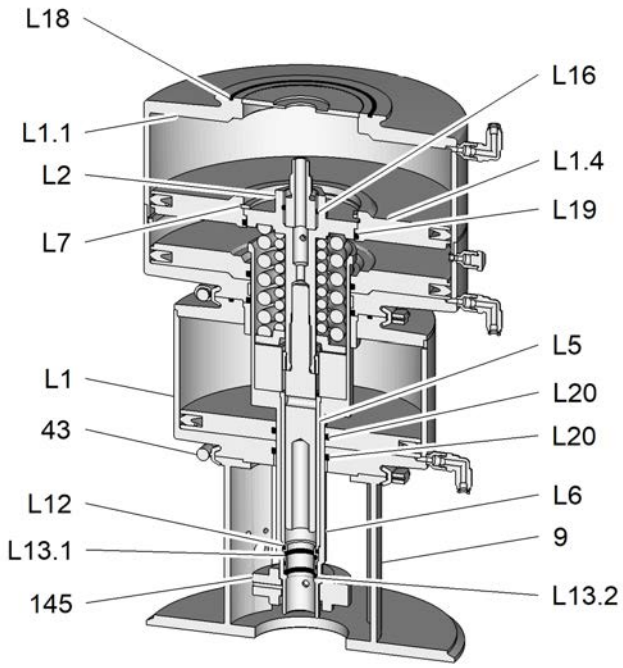


Fig.28

1. Equip lifting actuator LFT-R (L1) with O-rings (L18, L19, L20) and fix with hinged clamp (43) at the lantern (9).
2. Equip the bushing (L5) with O-rings (L12, L13.1) and push onto the installation mandrel. Before that, place the O-ring (13.2) and push everything into the carrier sleeve (L6).
3. Push the carrier (L2) with O-ring (L16) into the carrier sleeve (L6) and pre-tension with installation mandrel (part no. 221- 105.76) and box spanner a/f 36. Plug the pre-tensioned components into the lifting actuator (L1), fix with snap ring (L7) at the piston (L1.4) and relax.
4. Push the leakage indicator (145) onto the carrier sleeve (L6).

→ Done.

10.6.2 Assembly of the valve insert

Requirement:

Lifting actuator is installed.

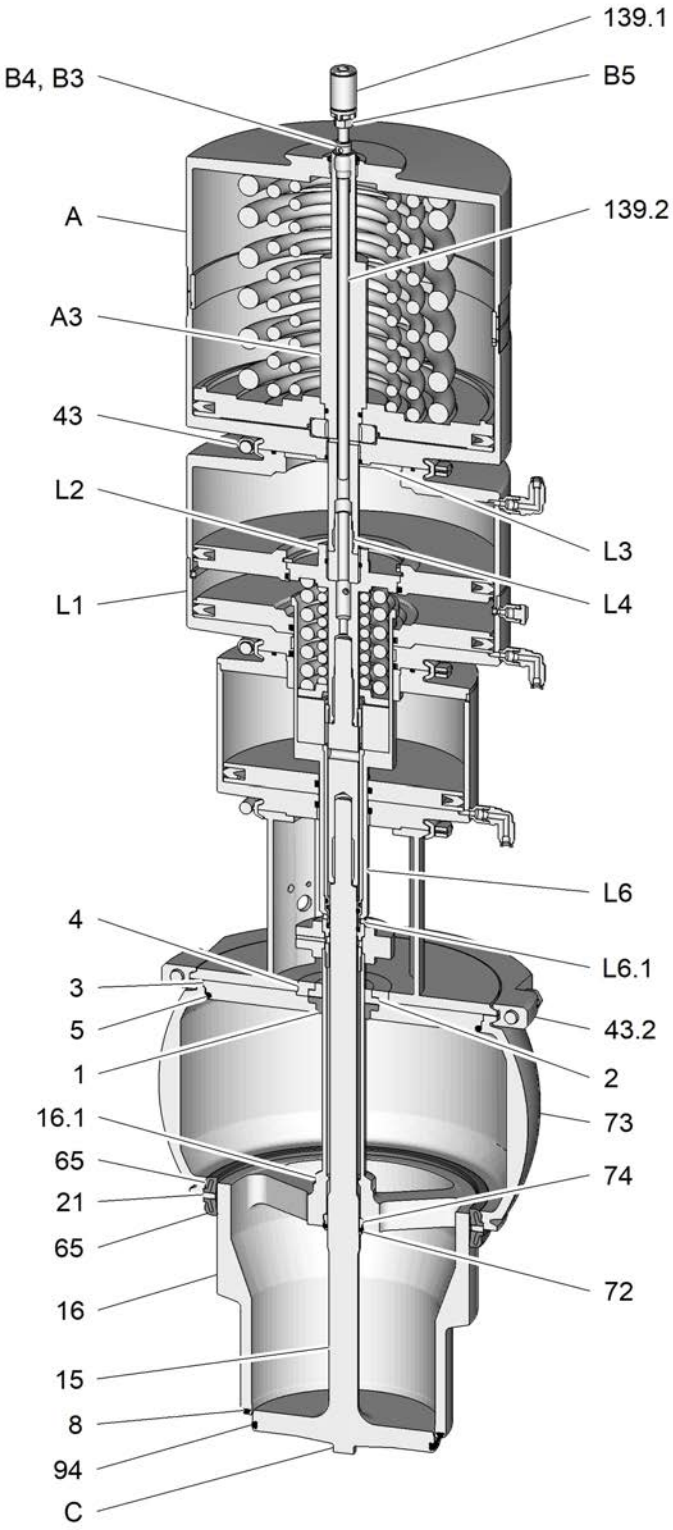


Fig.29

1. Equip the double-disk (16) with V-ring (8), snap seal (74) with O-ring (72), seal disk (3), O-ring (5), seal ring (1), bearing (2), bearing disk (4).

2. Hold the carrier sleeve (L6) with sickle spanner at (L6.1) and tighten the double-disk with jaw wrench at (16.1).
3. Hold the carrier (L2) with box spanner a/f 36 and tighten the valve disk (15) with installed V-ring RA (94) at C.
4. Insert the sealing flange (L3) into the lift drive (L1).
5. Do not grease the threads of adapter (L4) and piston rod (A3)! Use a face spanner to tightly screw the adapter (L4) into the piston rod (A3) of the actuator (A) on the piston side.
6. Fix sliding block (B3) with guide ring (B4) using a mandrel (4 mm) at the piston rod (A3) of the actuator (A).
7. Insert the actuator (A) into the lifting actuator (L1) and fix with hinged clamp (43).
8. Push the switch bar (139.1) through the piston rod (139.2) and counter against the valve disk (15), see spare parts list/dimension sheet switch bar (annex).
9. Fasten the housing (73) with hinged clamp (43.2) to the lantern.
10. Slide the balancer plug (92) with O-ring (5), seals (65), guide ring (21) onto the double-disk (16).
11. **Notice**

    Damage to the seat ring and the valve disk with the valve installed horizontally

    Faulty function of the valve

    ► Support the weight of the valve during installation to prevent damage.

Hint!

The opening of the lantern must point downwards with a valve installed horizontally (idle).

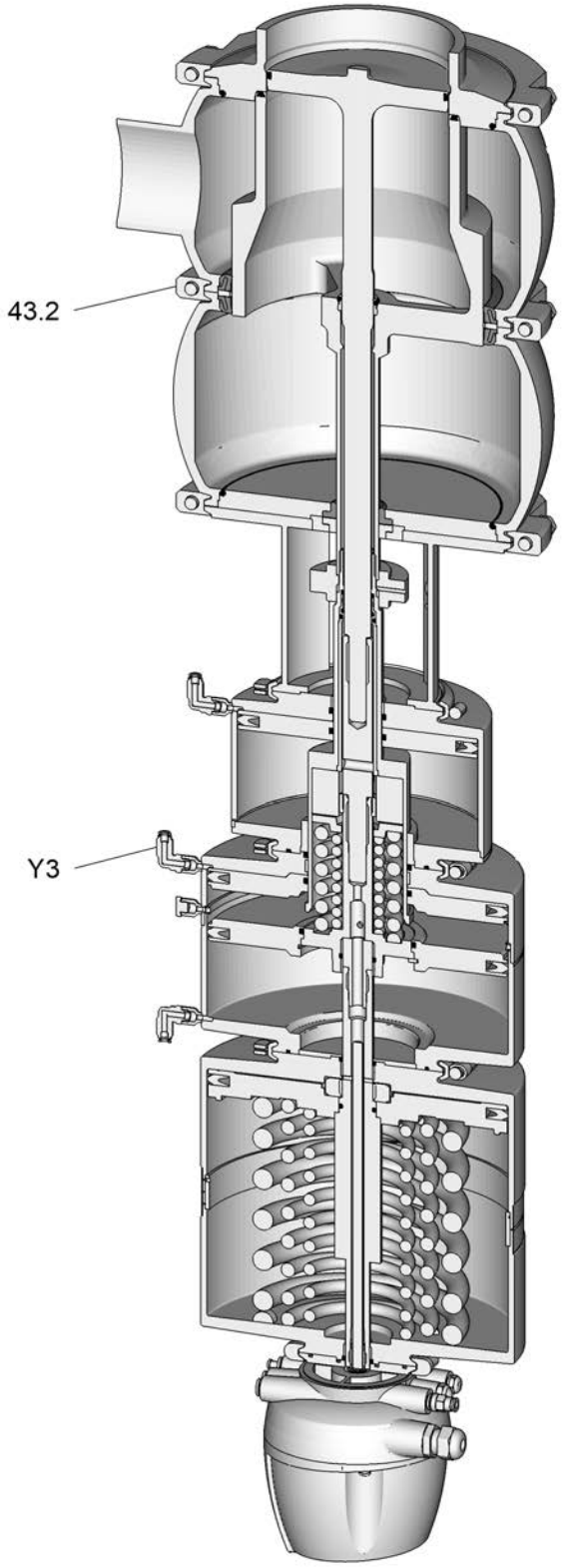


Fig.30

Actuate the lift stroke double-disk at (Y3) and carefully insert the valve insert in the housing and fix with snap ring (43.2).

→ Done.

10.6.3 Checking the function

T.VIS control top

Carry out the following steps:

1. Actuate the valve with compressed air.
2. Check the function of the initiators, adjust if necessary.

→ The stroke is set.

Lifting strokes

- It is not necessary to set the lifting strokes.

Valve size	Total stroke C mm	Lift stroke Double-disk mm	Valve disk mm
Inch OD			
2.5"	45	1 … 2.5	6
3"	65	1 … 2.5	4.5
4"	65	1 … 2.5	4.5
6"	65	1 … 2.5	6

10.7 Maintenance

10.7.1 Cleaning the Valve

Notice

The stem of the valve disk, the housing seat, the valve insert and the V-ring groove 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.
► Use only cleaning mediums which do not damage the materials of the control top (PPE, PA).

Carry out the following steps:

1. Valve disassembly, see “Valve disassembly” (Section 10.5, Page 55)

2. Carefully clean the individual parts.

→ Done

Hint!

Observe the safety data sheets supplied by the detergent manufacturers.

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

10.7.2 Replacing Seals

Hint!

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

Replacing the V-Ring

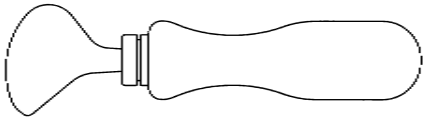


Fig.31: V-ring insertion tool

Prerequisite:

- Insert V-Ring 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.

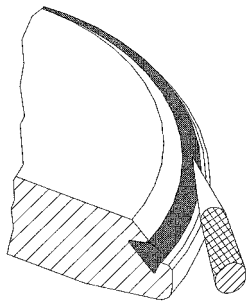


Fig.32

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).

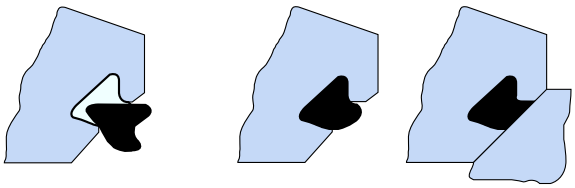


Fig.33

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

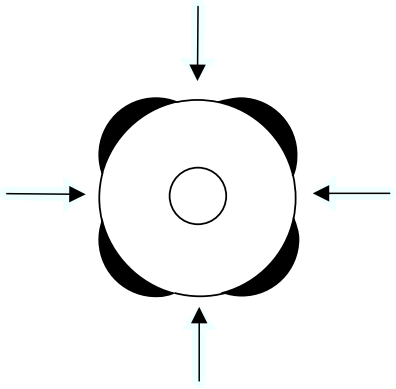


Fig.34

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.

10.7.3 Replacing V-Ring RA

Hint!

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

⚠ Caution!

Danger of injury!

The scriber can slip off when the V-ring RA 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 V-ring RA and take it out.

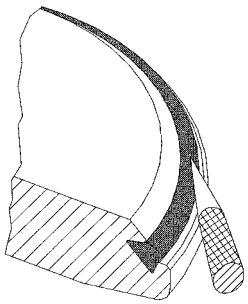


Fig.35

2. Before fitting, wet V-ring RA 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 disc.
3. Put in V-ring RA.

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

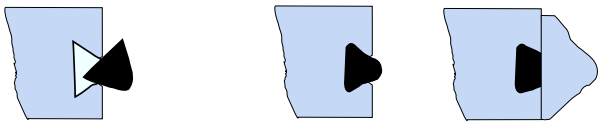


Fig.36

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

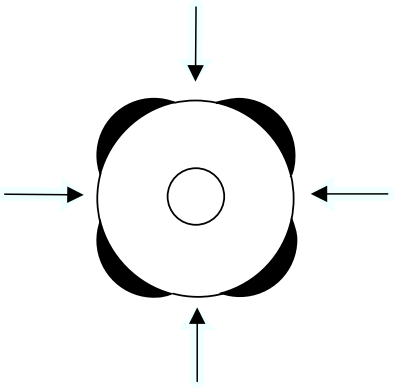


Fig.37

5. Insert V-ring RA 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.

10.7.4 Lubricating seals and threads

Caution!

Damage to seals and threads

Damage to seals and threads can result in malfunction.

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

Carry out the following steps:

1. Lightly grease the thread of the valve disk and all screws.
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
3. Grease the balancer.

→ Done

Hint!

GEA Tuchenhagen recommends Rivolta F.L.G. MD-2 and PARALIQ GTE 703. These lubricants are approved for foodstuff and are resistant to beer froth. They have the NSF-H1 (USDA H1) registration. They do not affect the taste or the consistency of the products and are compatible with the seals in contact with product.

PARALIQ GTE 703 can be ordered from GEA Tuchenhagen under 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 Tuchenhagen if required.

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

Running dry must be avoided!

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 precautions.

Malfunction	Cause	Remedy
Valve does not work	Fault in the controller	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
	Valve works against a hydraulically closed pipe	Open the pipe
	O-ring in the actuator defective	Replace the O-ring
Double-seat disk oscillates during lifting or does not open	Air pressure too low	Increase air pressure
	Product pressure too high	Reduce product pressure
Valve does not close	Dirt/foreign material between valve seat and valve disk	Clean valve housing and valve seat
Valve closes too slowly	O-rings in the 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

12 Decommissioning

12.1 Safety instructions

For shutting down, the following principles apply:

- Switch off the compressed air.
- Switch off the valve via the main switch.
- Padlock the main switch (if fitted) in the off position to prevent it from being switched back on. The key to the padlock must be deposited with the person responsible until the machine is restarted.
- For longer periods of standstill, observe the storage conditions, see Section 4.1, Page 22.

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 valve is made of the following materials:

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

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

12.2.2 Valve Actuator Disposal

⚠ Danger

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

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

► Never open the actuator.
► GEA Tuchenhagen accepts unopened actuators and arranges for proper disposal free of charge.

Carry out the following steps:

1. Remove the actuator.
2. Pack the actuator safely and send it to GEA Tuchenhagen GmbH.

→ Done

13 Spare parts list - 24/7 PMO tank bottom valve type MT DA

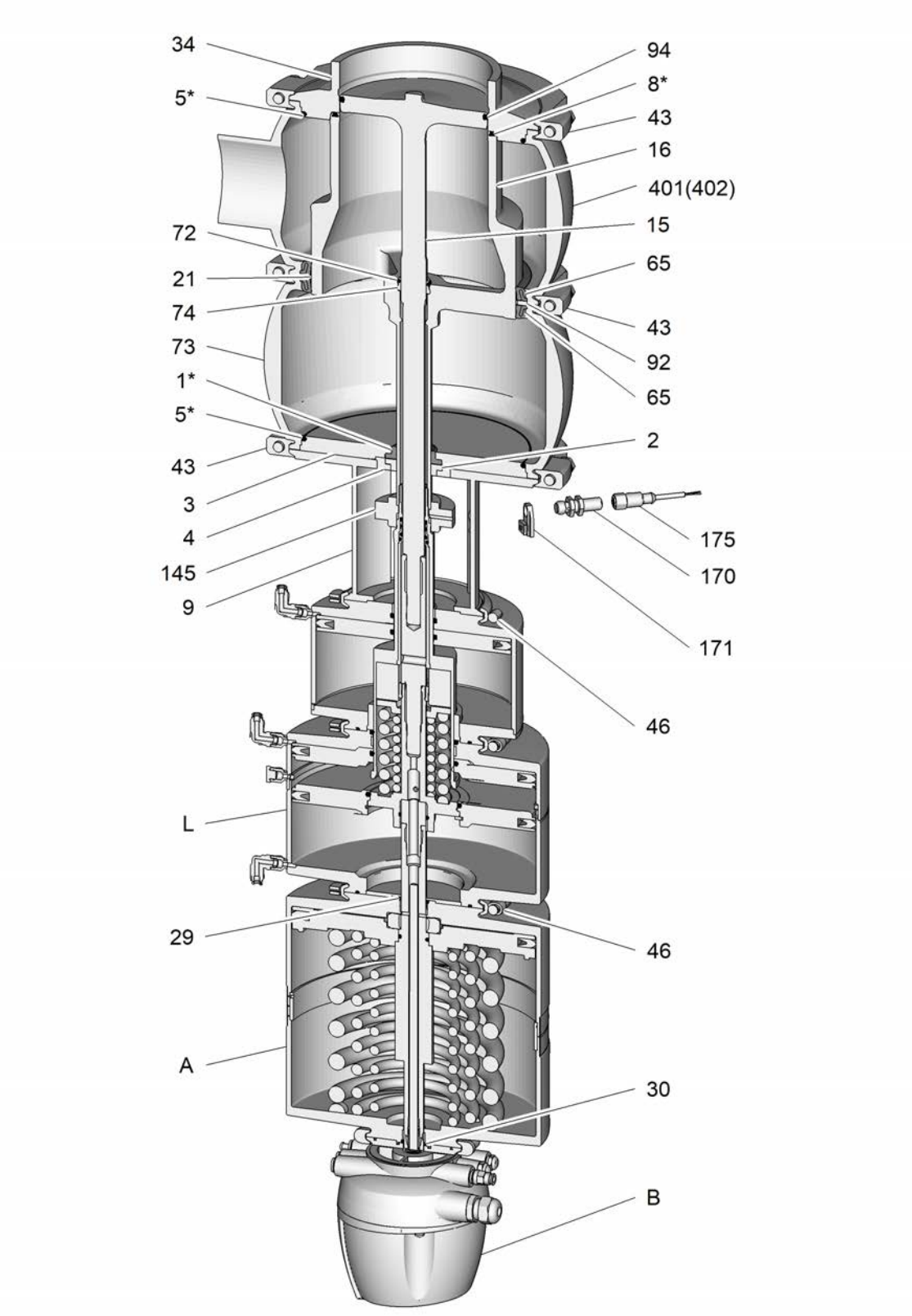


Fig.38

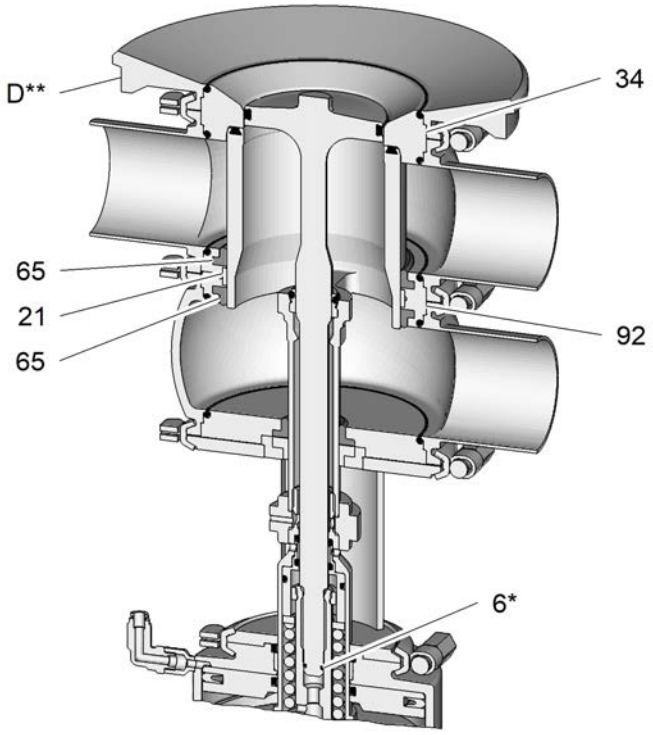


Fig.39: **D - only with clamped seat ring variant MT

Item	Designation	Material	2.5" OD	3" OD	4" OD	6" OD
Seal set complete 1)		EPDM	221-003858	221-003859	221-003860	221-003861
		FKM	221-003863	221-003864	221-003865	221-003866
1*	Seal ring	EPDM	924-085	924-088	924-088	924-088
		FKM	924-083	924-087	924-087	924-087
2	Bearing, 3A	PEEK	935-099	935-102	935-102	935-102
3	Seal disk	1.4404	221-141.04	221-141.27	221-141.07	221-141.31
4	Bearing disc	1.4301	221-142.03	221-142.04	221-142.04	221-142.04
5*	O-ring	EPDM	930-156	930-156	930-372	930-845
		FKM	930-178	930-178	930-409	930-842
6*	O-ring	NBR	930-004	930-007	930-007	930-007
**8*	V-ring	EPDM	932-025	932-025	932-059	932-042
		FKM	932-036	932-036	932-063	932-041
9	Lantern MT-DA	1.4301	221-575.48	221-575.47	221-575.46	221-575.45
15	Valve plate M_T	1.4404	221-701.02	221-701.03	221-701.04	221-701.09
16	Double-disk M_T	1.4404	221-702.02	221-702.03	221-702.04	221-702.09
21	Guide ring 3A	MF6	935-114	935-114	935-141	935-096
29	O-ring	NBR	930-026	930-035	930-035	930-035
30	O-ring	1.4571	930-026	930-026	930-026	930-026
34	Housing connection	1.4404	See table 'Selectable tank or housing connections"			
43	Clamp join KL	1.4401	221-507.11	221-507.11	221-507.13	221-507.32
46	Clamp join KL	1.4401	221-507.06	221-507.11	221-507.11	221-507.11
65	Seal ring	EPDM	924-254	924-254	221-367.05	221-367.16
		FKM	924-309	924-309	221-367.10	221-367.23
72	O-ring	EPDM	930-611	930-612	930-612	930-612
		FKM	930-663	930-664	930-664	930-664
73	Housing V1		221-101.75	221-101.70	221-101.73	221-101.80
74	Snap seal		221-000523	221-000524	221-000524	221-000524
92	Balancer closure M_T	1.4404	221-660.01	221-660.01	--	--
	Bearing disc		--	--	221-142.07	221-142.09
**94	V-ring RA	EPDM	221-365.08	221-365.08	221-365.09	221-365.16
		FKM	221-365.11	221-365.11	221-365.12	221-365.17
145	Leak indicator	1.4301	221-237.43	221-237.44	221-237.44	221-237.44
401	Housing V1	1.4404	221-101.75	221-101.70	221-101.73	221-101.80
402	Housing V2	1.4404	221-102.81	221-102.47	221-102.79	221-902.41
A	Actuator VARIVENT®	See spare parts list/dimensions sheet for VARIVENT® actuator				
B	Control top T.VIS®	See parts list for control top T.VIS®				
L	Lifting actuator T	--	221-609.73	221-609.60	221-609.60	221-609.67
L***	Lifting actuator L-S (with quick-action bleeder)	--	--	221-609.69	221-609.69	221-609.70
170	Initiator	1.4404	505-098	505-098	505-098	505-098
171	Holder proximity switch/ Slider	1.4301	221-105.26	221-105.26	221-105.26	221-105.26
175	Round plug connector	--	508-031	508-031	508-031	508-031

Item	Designation	Material	2.5" OD	3" OD	4" OD	6" OD
Grease RIVOLTA F.L.G. MD-2 100g tube not included in the seal set.				413-136		

1) Pos.1, 5, 6, 8, 29, 30, 65, 72, 74 and 94 are not included in the seal set.
Items marked with an * are wearing parts.
** Do not grease Item 8
*** Lifting actuators with quick-action bleeder require a separate version of the T.VIS control top TA15.../A.

Pos. 34 / Selectable tank or housing connections:

Size 2"

Designation	Material no.	Material	Welding in procedure specification	Welding in jig
Housing connection M_T/MG	221-706.01	1.4404	221RLI007301	--
Housing connection M_T/MS	221-706.04	1.4404	221RLI007301	--
Housing connection M_T/MN	221-706.09	1.4404	221RLI007301	--
Seat ring M_T with pos. D:	221-703.01	1.4404	--	--
- Housing connection T	221-409.08	1.4404	221RLI002244	229-104.13
- Housing connection U	221-149.03	1.4404	221RLI002533	229-104.93
- Housing connection T-S	221-409.27	1.4404	221RLI013844	229-104.31
- Housing connection U-S	221-149.31	1.4404	221RLI013845	229-104.93

Size 2.5" / 3"

Designation	Material no.	Material	Welding in procedure specification	Welding in jig
Housing connection M_T/MG	221-706.02	1.4404	221RLI007301	--
Housing connection M_T/MS	221-706.05	1.4404	221RLI007301	--
Housing connection M_T/MN	221-706.10	1.4404	221RLI007301	--
Seat ring M_T with pos. D:	221-703.02	1.4404	--	--
- Housing connection T	221-409.09	1.4404	221RLI002244	229-104.19
- Housing connection U	221-149.04	1.4404	221RLI002533	229-104.94
- Housing connection T-S	221-409.28	1.4404	221RLI013844	229-104.32
- Housing connection U-S	221-149.32	1.4404	221RLI013845	229-104.94

Size 4"

Designation	Material no.	Material	Welding in procedure specification	Welding in jig
Housing connection M_T/MG	221-706.03	1.4404	221RLI007301	--
Housing connection M_T/MS	221-706.06	1.4404	221RLI007301	--
Housing connection M_T/MN	221-706.11	1.4404	221RLI007301	--
Seat ring M_T with pos. D:	221-703.03	1.4404	--	--
- Housing connection T	--	--	--	--
- Housing connection U	221-149.10	1.4404	221RLI002533	229-104.95
- Housing connection T-S	--	--	--	--
- Housing connection U-S	221-149.33	1.4404	221RLI013845	229-104.95

Size 6"				
Designation	**Material no.**	**Material**	**Welding in procedure specification**	**Welding in jig**
Housing connection M_T/MG	221-706.21	1.4404	221RLI015142	229-104.108
Housing connection M_T/MS	221-706.08	1.4404	221RLI015142	229-104.106
Housing connection M_T/MN	221-706.20	1.4404	221RLI015142	229-104.106

* Welding procedure specification can also be borrowed on request

Selection name	
Value	**Designation**
MN	Groove variant
MG	Graded variant
Brass	Spread lift/smooth variant
MT	Clamped seat ring

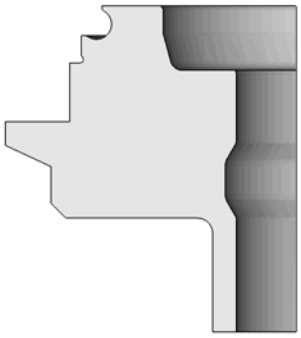


Fig.40: Variant MN

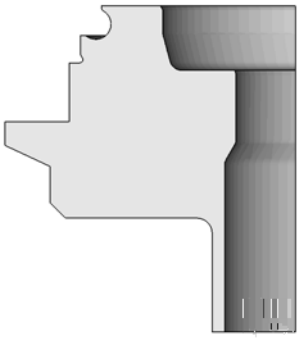


Fig.41: Variant MG

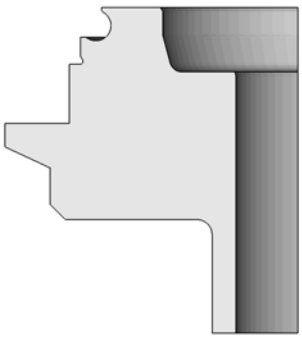


Fig.42: Variant MS

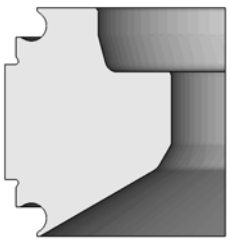


Fig.43: Variant MT

Sealing sets for 24/7 PMO tank bottom valve MT DA							
Item	**Qty.**	**Designation**	**Material**	**2.5"**	**3"**	**4"**	**6"**
1	1	Seal ring	Ø	28	35	35	35
			EPDM	924-085	924-088	924-088	924-088
			FKM	924-083	924-087	924-087	924-087
5	5	O-ring	Ø	113x4	113x4	138x4	204x5
			EPDM	930-156	930-156	930-372	930-845
			FKM	930-178	930-178	930-409	930-842
6	1	O-ring	Ø	8x1.6	9x3	9x3	9x3
			NBR	930-004	930-007	930-007	930-007
**8	2	V-ring	Ø	81-6	81-6	120-6	148-6
			EPDM	932-025	932-025	932-059	932-042
			FKM	932-036	932-036	932-063	932-041
29	1	O-ring	Ø	20x3	25x3	25x3	25x3
			NBR	930-026	930-035	930-035	930-035
30	1	O-ring	Ø	20x3	20x3	20x3	20x3
			NBR	930-026	930-026	930-026	930-026
65	2	Seal ring	Ø	97	97	DN125	8" IPS
			EPDM	924-254	924-254	221-367.05	221-367.16
			FKM	924-309	924-309	221-367.10	221-367.23
72	1	O-ring	Ø	22x3.5	28x3.5	28x3.5	28x3
			EPDM	930-611	930-612	930-612	930-612
			FKM	930-663	930-664	930-664	930-664
74	1	Snap seal	Ø	23x3	23x3	29x3	29x3
			PVDF	221-000523	221-000524	221-000524	221-000524
**94	1	V-ring RA	Ø	DN80/65	DN80/65	DN100	6" IPS
			EPDM	221-365.08	221-365.08	221-365.09	221-365.16
			FKM	221-365.11	221-365.11	221-365.12	221-365.17
Seal set complete			Material	2.5"	3"	4"	6"
			EPDM	221-003858	221-003859	221-003860	221-003861
			FKM	221-003863	221-003864	221-003865	221-003866
Grease RIVOLTA F.L.G. 100g tube not included with seal set. ** Do not grease item 8 and 94						413-136	
Advice on storage: storage in accordance with DIN 7716 Relative humidity approx. 65%, temperature 15-25°C and protected from light When replacing seals, observe the instructions in the instruction manual! **429-066**							

14 Spare parts list - lifting actuator MT DA

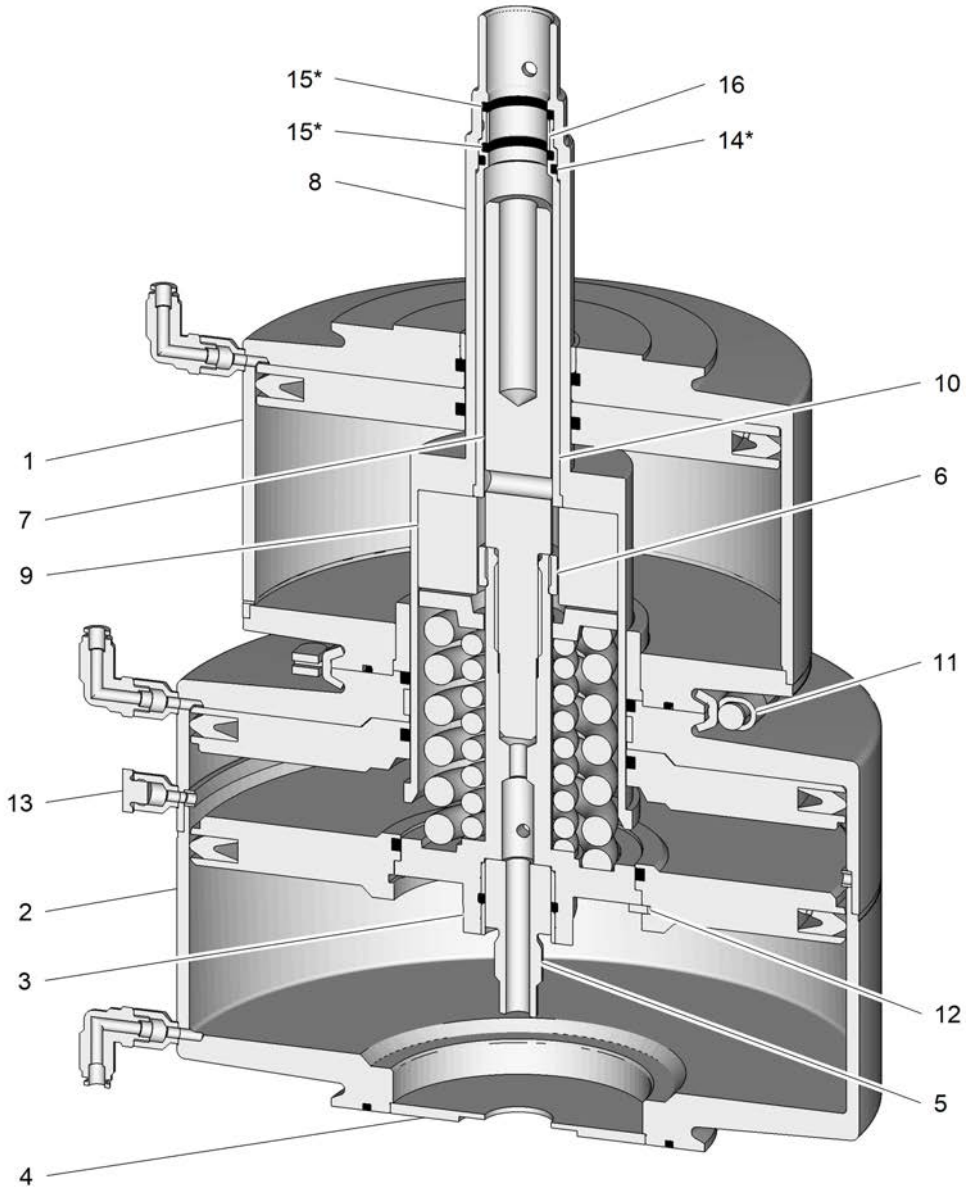
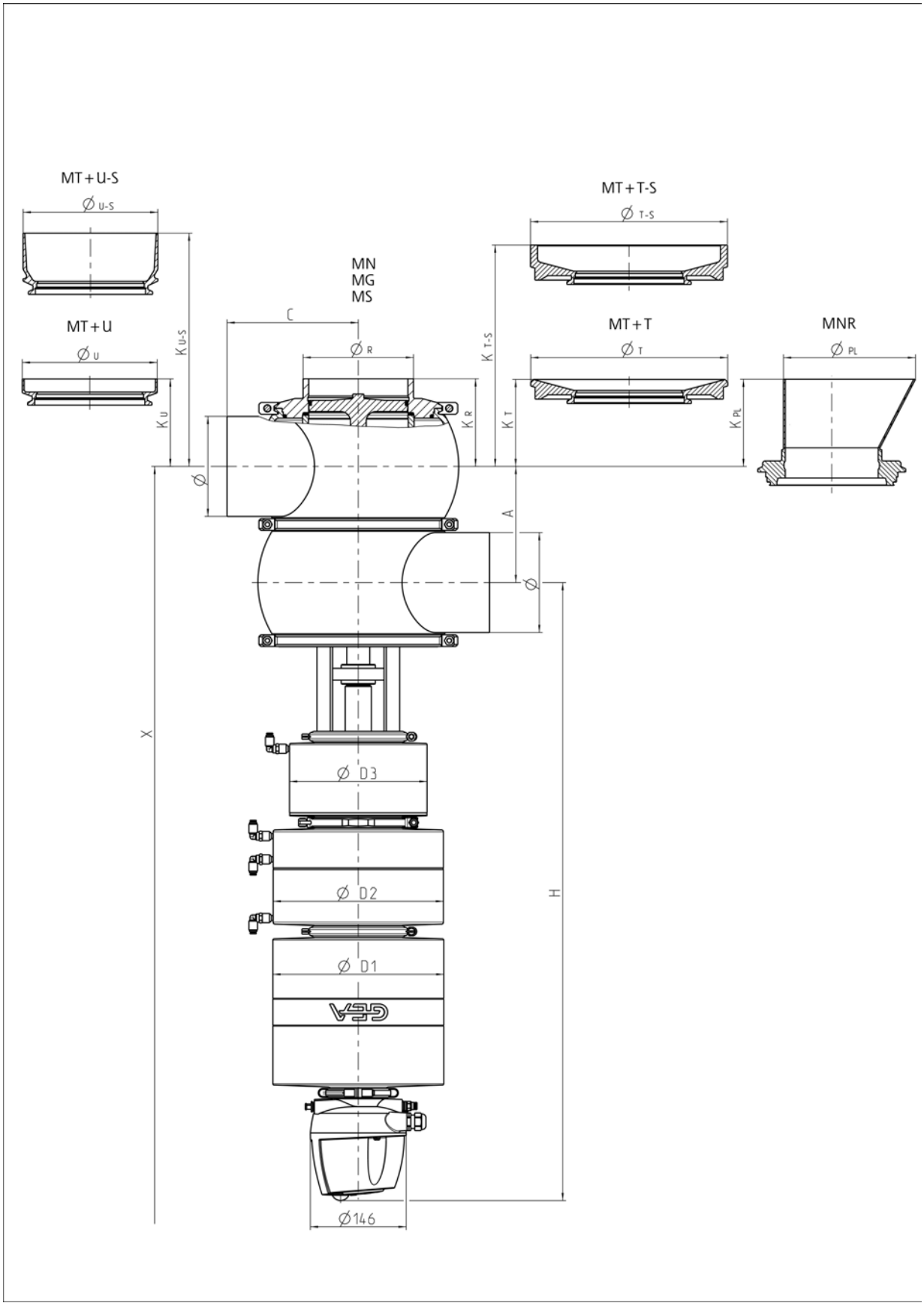


Fig.44

Item	Designation	Material	2.5" OD	3" OD	4" OD	6" OD
Lifting actuator MT-DA 23 complete 1)			221-609.73	221-609.60	221-609.60	221-609.67
1	Lifting actuator MT-23 DA	--	221-605.32	221-605.33	221-605.33	221-605.37
2	Lifting actuator LFT-MT-23	--	221-605.22	221-605.21	221-605.21	221-605.38
3	Carrier LFT-MT	--	221-622.23	221-622.14	221-622.14	221-622.22
4	Sealing flange LFT-MT	EN AW-6082 T6	221-613.01	221-613.02	221-613.02	221-613.12
5	Adapter LFT-	EN AW-6082 T6	221-614.01	221-614.04	221-614.04	221-614.02
6	Bushing DA-23	1.4305	221-200004	221-007203	221-007203	221-007701
7	Rod DA-23	1.4305	221-200005	221-007236	221-007236	221-007697
8	Carrier sleeve LFT-MT	1.4305	221-617.15	221-617.11	221-617.11	221-617.13
9	Bushing DA-23	1.4305	221-200003	221-007235	221-007235	221-007702
10	Bushing LFT-MT	1.4305	221-616.08	221-616.12	221-616.12	221-616.14
11	Clamp join KL	--	221-507.06	221-507.11	221-507.11	221-507.11
12	Retaining ring	1.4122	917-179	917-154	917-154	917-211
13	Locking screw	1.4404	922-316	922-316	922-316	922-316
14*	O-ring	NBR	930-041	930-035	930-035	930-035
15*	O-ring	EPDM	930-235	930-268	930-268	930-268
16	Plain bearing	IGLIDUR-G	704-043	704-038	704-038	704-038
Seal set Lift-LR DN40/100 NBR+EPDM						
Seal set Lift-LR DN40/100 NBR+ FKM						
Seal set Lift-LR DN125/150 NBR+EPDM						
Seal set Lift-LR DN25/150 NBR+ FKM						

Items marked * are not included in the lifting actuator MT cpl.
1) Item 11 is not included in the assemblies and must be ordered separately.

15 Dimension sheet - 24/7 PMO tank bottom valve type MT DA



Dimension	2.5" OD	3" OD	4" OD	6" OD
A	90	103	127,5	177
C	125	125	150	175
Ø	63,5 x 1,6	76,2 x 1,65	101,6 x 2,11	152,4 x 2,77
Ø D1	170	210	210	260
Ø D2	135	210	210	260
Ø D3	135	170	170	210
Ø R	88,9	88,9	114,3	168,3
Ø PL	101,6	101,6	150,8	--
Ø T	225	225	--	--
Ø T-S	225	225	--	--
Ø U	154	154	184	--
Ø U-S	154	154	184	
H	621	890,5	903	942
K_R	73	79,5	92	133,5
K_{PL}	109,5	116,0	170,0	--
K_T	73	79,5	--	--
K_{T-S}	90,5	97	--	--
K_U	75	81,5	93	--
K_{U-S}	115	121,5	133	--
X	900	1141	1153	1290
Stroke	45	65	65	65
Control air pressure	min. 4,8 bar(70 psi)			
Product pressure spring closing	max. 6 bar			max. 3 bar
Product pressure air opening	max. 6 bar			max. 3 bar
Weight	45	66,5	74,5	142
Small piece size valve opened	25	44	44	39
Small piece size valve closed	25	31	31	50

16 Appendix

16.1 Lists

16.1.1 Abbreviations and terms

Abbreviation	Explanation
BS	British Standard
bar	Unit of measurement of pressure [bar] All pressure data expressed in [bar/psi] is assumed to be gauge pressure [barg/psig] unless explicitly specified otherwise.
approx.	approximately
°C	Unit of measurement of temperature [degree Celsius]
dm^3_n	Unit of measurement of volume [cubic decimetre] Standard volume (standard litre)
DN	DIN nominal width
DIN	German standard issued by DIN (Deutsches Institut für Normung e.V., German Institute for Standardization)
EN	European Standard
EPDM	Material designation Short designation according to DIN/ISO 1629: Ethylene Propylene Diene Rubber
°F	Unit of measurement of temperature [degree Fahrenheit]
FKM	Material designation, short designation according to DIN/ISO 1629: Fluorine rubber
h	Unit of measurement of time [hour]
HNBR	Material designation Short designation according to DIN/ISO 1629: Hydrogenated Acrylonitrile Butadiene Rubber
IP	Protection class
ISO	International standard issued by the International Organisation for Standardisation
kg	Unit of measurement of weight [kilogram]
kN	Unit of measurement of force [kilonewton]
Kv value	Flow coefficient [m³/s] 1 KV = 0,86 x Cv
l	Unit of measurement of volume [litre]
max.	maximum
mm	Unit of measurement of length [millimetre]
µm	Unit of measurement of length [micrometre]

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

engineering for
a better world

We live our values.

Excellence · Passion · Integrity · Responsibility · GEA-versity

GEA Group is a global engineering company with multi-billion euro sales and operations in more than 50 countries. Founded in 1881, the company is one of the largest providers of innovative equipment and process technology. GEA Group is listed in the STOXX® Europe 600 Index.

GEA Germany

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

Tel +49 (0)4155 49 0
Fax +49 (0)4155 49 2035

info@gea.com
gea.com