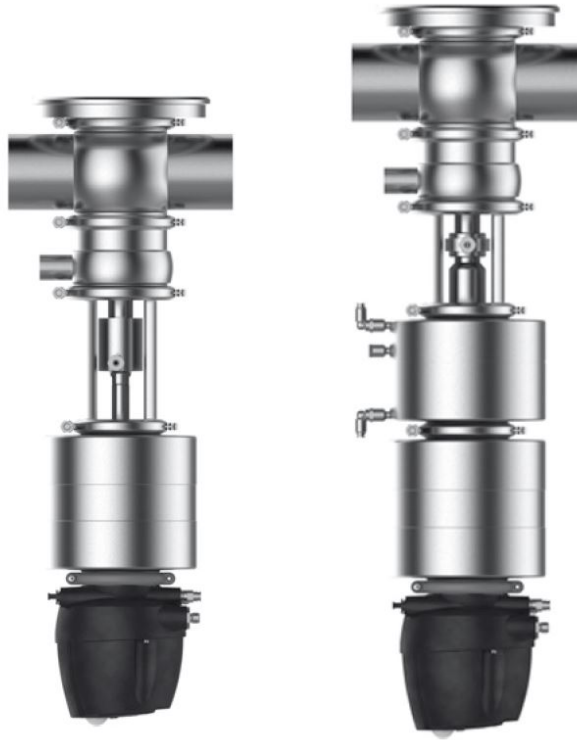




Hygienic valves

GEA VARIVENT® valve type T_R without and with lifting actuator

Operating instruction (Translation from the original language)

430BAL008420EN_2

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1 General Information

1.1 Information on the Document

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

1.1.1 Binding Character of These Operating Instructions

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

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

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

1.1.2 Notes on the Illustrations

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

1.1.3 Symbols and Highlighting

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



Danger

Warning: Fatal Injuries

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

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



Warning: Explosions

Failure to observe the warning can result in severe explosions.

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



Warning!

Warning: Serious Injuries

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

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



Caution!

Warning: Injuries

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

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

Notice

Warning: Damage to Property

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

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

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

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



Hint!

Further useful information.

1.2 Manufacturer address

GEA Tuchenhausen GmbH
Am Industriepark 2-10
21514 Büchen

1.3 Contact

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

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



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

Manufacturer: **GEA Tuchenhausen 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

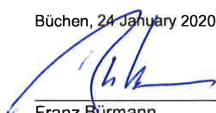
Remarks:

- 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 Tuchenhausen 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

General Information

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

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

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

We hereby declare that the machine named below

Designation: Valve with actuator

Type: VARIVENT®

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

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

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

Remarks:

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

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

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



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

Manufacturer: **GEA Tuchenhausen 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
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MK12 5PY, United Kingdom

Person authorised for compilation and handover of technical documentation: Michael Kiely
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Büchen, 14 March 2023



Franz Bürmann
Managing Director



i.V. Matthias Südel
Senior Director Engineering

2 Safety

2.1 Intended use

The mixproof bottom valves T_R, T_RL and T_RC are used for mixproof shutting off of high-quality, non-abrasive products at tank outlets.

The mixproof bottom valves T_R, T_RL and T_RC are pressure-maintaining equipment pieces (without safety function) in the sense of the Pressure Equipment Directive 97/23/EC. They are classified according to Annex II, article 3, section 3. A special declaration of conformity will be supplied in the event of any deviations.



Hint!

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

2.1.1 Requirements for operation

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

2.1.2 Pressure equipment directive

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

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

The nominal diameters smaller than DN 25 are subject to article 4, paragraph 3 of the Pressure Equipment Directive which specifies sound engineering practice. Nominal diameters $\geq$ IPS 4"; DN 125 valid for the fluid group II.

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

2.1.3 ATEX directive

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

The operation of the component is not permitted if:

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

2.2 Operator's Duty of Care

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

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

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

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



Hint!

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

2.3 Subsequent changes

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

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

2.4 General safety instructions and dangers

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

Nevertheless, dangers can arise from the component, if:

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

2.4.1 Principles for safe operation

Dangerous situations during operation can be avoided by safety-conscious and proactive behaviour of the 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 Tuchenhausen for proper disposal.
Risk of injury	Danger presented by moving or sharp-edged parts	The operator must exercise caution and prudence. For all work: • Wear suitable work clothing. • Never operate the machine if the cover panels are not correctly fitted. • Never open the cover panels during the operation. • Never reach into openings. As a precautionary measure, wear personal protective equipment in the vicinity of the valve: • Protective gloves • Safety shoes
Environmental damage	Operating materials with properties which are harmful to the environment	For all work: • Collect lubricants in suitable containers. • Dispose of lubricants in accordance with the pertinent regulations.

2.9 Danger zones

Please observe the following notes:

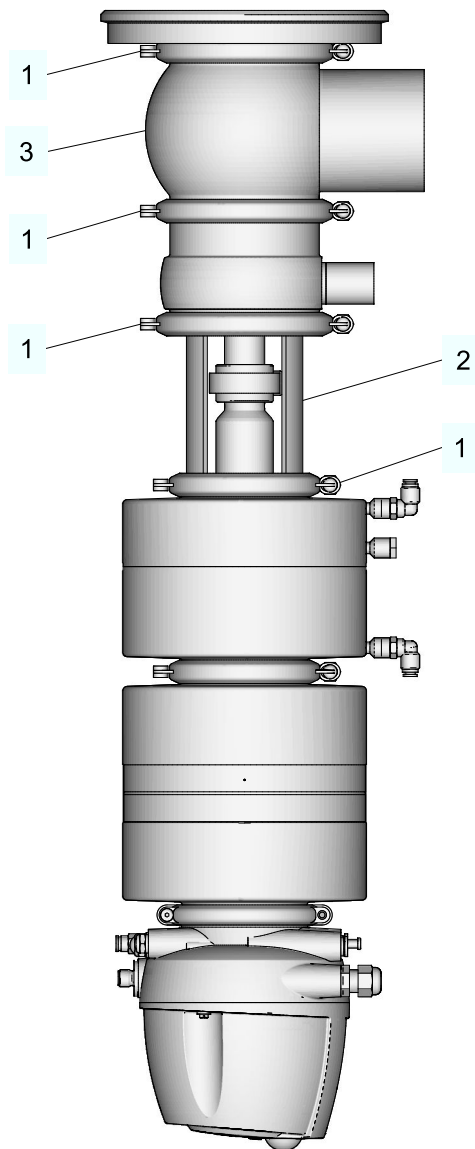


Fig.4

- In the event of malfunctions, shut down the component (disconnect from the power and air supply) and secure it against being used.
- Never reach into the lantern (2) or the valve housing (3) when the component is switching. Fingers can be crushed or cut off.
- On a spring-closing component there is danger of injury when the clamp connection (1) is opened, as the released spring pretension will suddenly lift the actuator. Therefore, release the spring tension before detaching the clamp connections (1) by supplying the actuator with compressed air or use the emergency air actuation.
- Before starting any maintenance, servicing or repair work, disconnect the component 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.

- Regularly check the electrical equipment of the component. 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. Wear suitable protective gloves when transporting and installing the component.

3 Description

3.1 Design

There are 3 design variants:

- T_R without lifting actuator and without cleaning connection
- T_R with lifting actuator and with cleaning connection
- T_RC with lifting actuator and without cleaning connection

3.1.1 Mixproof bottom valve T_R

- without lifting actuator
- with cleaning connection (bonnetd)

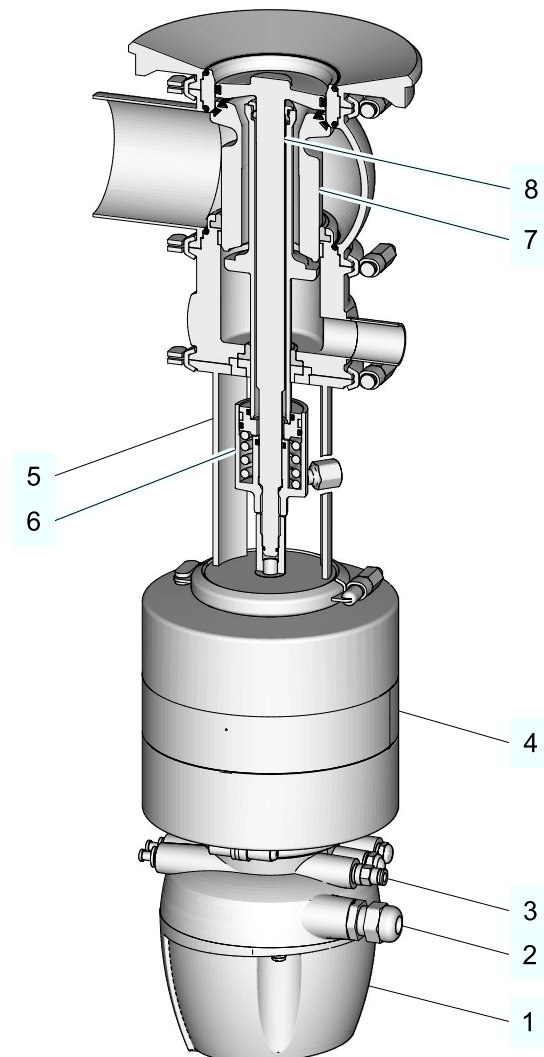


Fig.5

Design	
No.	Designation
1	Control top
2	Electrical connection for supply
3	Air connection for supply
4	Actuator
5	Lantern
6	Cleaning hood
7	Double-disk
8	Valve disk

3.1.2 Mixproof bottom valve T_RL

- with lifting actuator
- with cleaning connection

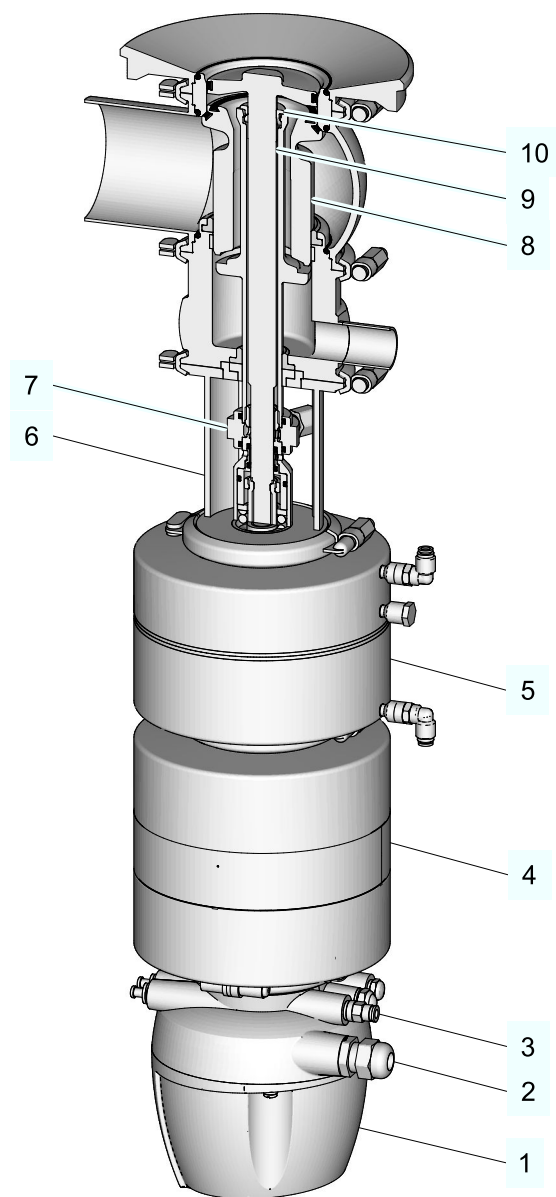


Fig.6

Design	
No.	Designation
1	Control top
2	Electrical connection for supply
3	Air connection for supply
4	Actuator
5	Lift actuator

Design	
No.	Designation
6	Lantern
7	Cleaning connection
8	Double-disk
9	Valve disk
10	Cleaning nozzle

3.1.3 Mixproof bottom valve T_RC

- with lifting actuator
- without cleaning connection (with leak indicator)

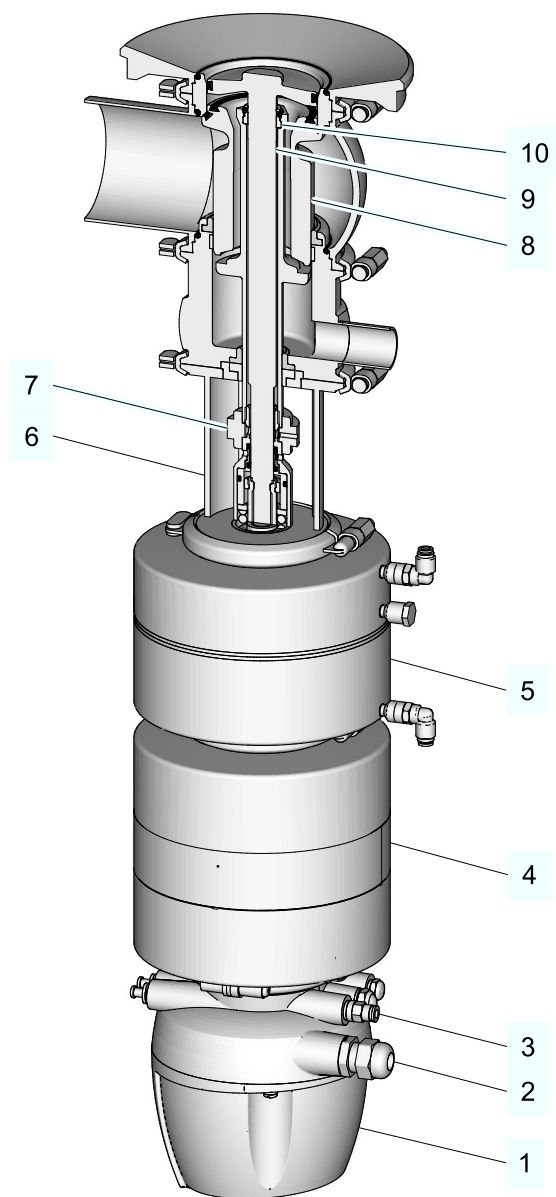


Fig.7

Design	
No.	Designation
1	Control top
2	Electrical connection supply
3	Air connection supply
4	Actuator
5	Lift actuator

Design	
No.	Designation
6	Lantern
7	Leak indicator
8	Double-disk
9	Valve disk
10	Snap seal with O-ring

3.2 Functional description

3.2.1 Leakage-proof shut-off function

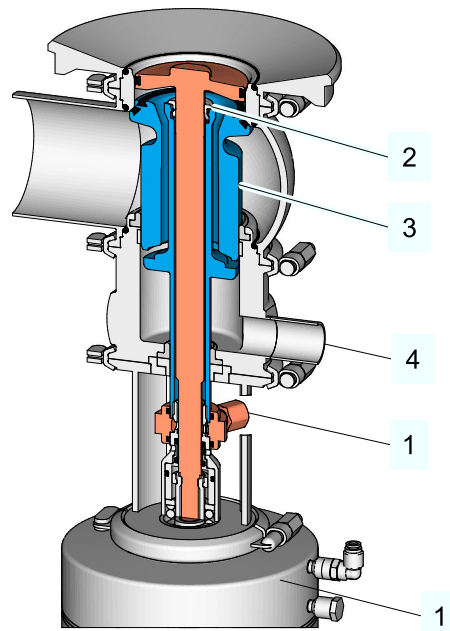


Fig.8: T_R / T_RL

With the valves T_R, T_RL and T_RC, 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 (3) and the leakage housing (4).

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.

Cleaning

A cleaning liquid is supplied to the leakage drain system via a separate cleaning connection (1) arranged in the lantern. The cleaning liquid is sprayed via a cleaning nozzle (2) in the cavity between the two valve disks. It then drains pressureless via the double-disk (3) and the drain pipe (4) of the leakage housing outside.

The leakage drain system can be cleaned independently of the opening and closing of the valve.

Cleaning fluid

- the cleaning fluid flows out of a CIP-cleaning unit
- Operating pressure:
 - min. 2 bar (29 psi)
 - max. 5 bar (72.5 psi)
- Operating temperature:
 - max. 135 °C (275 °F)

3.2.2 Cleaning by lifting

When cleaning the pipeline, the valve disk in contact with the cleaning liquid can be lifted separately. This allows the cleaning liquid to enter the leakage cavity and to clean the seats 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)

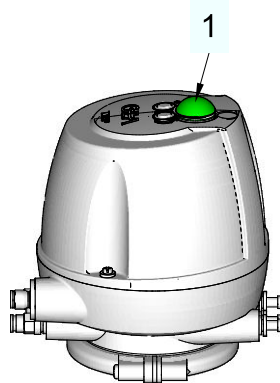


Fig.9

4 Transport and storage

4.1 Storage conditions

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

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



Hint!

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

4.2 Transport



Fig.10

For transport, the following principles apply:

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

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

4.2.1 Scope of supply

After taking delivery of the component, check if

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

5 Technical data

5.1 Type plate

The type plate clearly identifies the valve.

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

The type plate provides the following key data:

Key data of the valve	
Type	Valve type
Serial	Serial number
Material	1.4404 (AISI316L)/EPDM (FDA)
Control air pressure bar/psi	6 bar (87 psi) configuration with standard drive
Product pressure bar/psi	5 bar (72.5 psi) configuration with standard drive

5.2 Technical data

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

Technical data: Valve	
Designation	Description
Size	DN 25 to DN 150 1" to 6" OD 2" to 6" IPS
Material of product contact parts	Stainless steel 1.4404 Check corrosion resistance with respect to media and detergent
Fitting position	suspended under a tank or horizontal in the Ecomatrix Care must be taken to ensure that the valve housing, pipe system and leakage space can drain properly.

Technical data: Ambient temperatures	
Designation	Description
Ambient temperature 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.
Ambient temperature initiator	-20 to +80 °C (-4 ... +176 °F)
Product temperature and operating temperature	depending on the sealing material

Technical data: Compressed air supply, control air pressure, product pressure	
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
Control air	acc. to ISO 8573-1
• Solid particle content:	Quality class 6 Particle size max. 5 µm Particle density max. 5 mg/m ³
• Water content:	Quality class 4 max. dew point +3 °C If the unit is used at higher altitudes or at low ambient temperatures, the dew point must be adapted accordingly.
• Oil content:	Quality class 3 preferably oil free max. 1 mg oil in 1m ³ air
Control air pressure	6 bar (87 psi), max. 8 bar (116 psi) configuration with standard drive Alternative combinations of product pressure and control air pressure on request
Product pressure	5 bar (72.5 psi) configuration with standard drive

5.3 Cleaning connection

Connection for the hose	
DN 25 / 1" OD	Ø 6/4 mm
DN 40 ... 100 / 2.5" ... 4"	Ø 8/6 mm
DN 125, 150 / 6" IPS	Ø 10/8 mm

Service pressure for the optimal cleaning

- min. 2 bar (29 psi)
- max. 5 bar (72.5 psi)

The durability of the components of the cleaning connection (sealing disc, support sleeve, PTFE hose) is dependent on the style, pressure and temperature of the required medium.

Functionality of the cleaning connection

The suitability of the material for cleaning hoses depends on the type, pressure and temperature of the medium conveyed.

Medium	Max pressure		Temperature	
	[bar]	[psi]	[°C]	[°F]
Water	6	87	95	203
5% Nitric Acid	6	87	60	140
3% Sulphuric Acid	6	87	60	140
5% Nitric Acid	6	87	85	185
Steam	3	42	130	266

5.4 Resistance and permitted operating temperature of the sealing materials

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

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

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

Resistance:

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

Table of sealing resistance / permitted operating temperature				
Medium	Maximum operating temperatures	Sealing material		
		EPDM	FKM	HNBR
Alkalis up to 3%	up to 80 °C (176°F)	+	o	+
Alkalis up to 5%	up to 40 °C (104°F)	+	o	o
Alkalis up to 5%	up to 80 °C (176°F)	+	—	—
Alkalis more than 5%		o	—	—
Inorganic acids up to 3%	up to 80 °C (176°F)	+	+	+
Inorganic acids up to 5%	up to 80 °C (176°F)	o	+	o
Inorganic acids up to 5%	up to 100 °C (212°F)	—	+	—
Water	up to 100 °C (176°F)	+	+	+
Steam	up to 135 °C (275°F)	+	o	o
Steam, approx. 30 min	up to 150 °C (302°F)	+	o	—
Fuels/hydrocarbons		—	+	+
Product with a fat content of max. 35%		+	+	+
Product with a fat content of more than 35%		—	+	+
Oils		—	+	+

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

5.5 Pipe ends - General table of measurements

Dimensions for tubes in DN				
Metric DN	Outside diameter	Wall thickness	Inside diameter	Outside diameter acc. to DIN 11850
25	29	1.5	26	x
40	41	1.5	38	x
50	53	1.5	50	x
65	70	2	66	x
80	85	2	81	x
100	104	2	100	x
125	129	2	125	x
150	154	2	150	x

Dimensions for tubes in inch OD				
Inch OD	Outside diameter	Wall thickness	Inside diameter	Outside diameter acc. to BS 4825
1"	25.4	1.65	22.1	x
1 ½"	38.1	1.65	34.8	x
2"	50.8	1.65	47.5	x
2 ½"	63.5	1.65	60.2	x
3"	76.2	1.65	72.9	x
4"	101.6	2.11	97.38	x
6"	152.4	2.77	146.86	x

Dimensions for tubes in Inch IPS

Inch IPS	Outside diameter	Wall thickness	Inside diameter	Outside diameter according to DIN EN ISO 1127
2"	60.3	2	56.3	x
3"	88.9	2.3	84.3	x
4"	114.3	2.3	109.7	x
6"	168.3	2.8	162.7	x

5.6 Tool

List of tools	
Tool	Material no.
Hose cutter	407-065
V-ring insertion tool	229-109.88
Open-ended wrench, ends ground, a/f 17-19	229-119.01
Open-ended wrench, ends ground, a/f 21-23	229-119.05
Open-ended wrench, ends ground, a/f 22-24	229-119.03
Open-ended wrench, a/f 30-32	408-041
Sickle spanner for holding the carrier sleeve Ø25/Ø3 for DN 25	408-203
Sickle spanner for holding the carrier sleeve Ø30/Ø4 for DN 50-DN100	408-202
Sickle spanner for holding the carrier sleeve Ø34/Ø4 for DN 125, 6"IPS	408-204
Mandrel 6 mm	430-211
Installation mandrel	221-105.76 221-105.77
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)
Box spanner AF 32, 36, 41	
Socket for wrench, turned AF 27 (34.5)	229-119.06
Sickle spanner for tightening the carrier sleeve Ø50 / Ø5, Ø60 / Ø5	408-205
Socket for wrench, turned AF 27 (34.5)	229-119.06
Snap ring pliers for bore up to DN 100 Ø60; DN 125 / 6" IPS Ø72	
Mounting device DN 50	229-109.89
up to DN 100	229-109.90
up to DN162	229-109.91

5.7 Lubricants

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

5.8 Weights

Size	Weight [kg]	
	Valve T_R	Valve T_RL/T_RC
DN 40, 1½"	14	17
DN 50, 2"	15	17
DN 65, 2½"	25	26
DN 80, 3"	26	31
DN 100, 4"	35	40
DN 125	57	65
DN 150, 6"	71	83

6 Assembly and installation

6.1 Safety instructions

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

For installation, the following principles apply:

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

6.2 Notes on installation

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

In the Ecomatrix, the valve is installed horizontally. It must be ensured that the valve is installed tension-free. If a horizontal valve is supported, care must be taken that the tension-free state is maintained in every operating state.

It must be ensured that the vent hole in the actuator is aligned horizontally on one side.

6.3 Control head

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

6.4 Welding the housing connection into the tank

This section describes the welding procedure for the valve.

Notice

Warning: Damage to Property.

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

- When welding the housing (1) into the tank, use a welding jig (see spare parts list 231ELI006854G).
- Observe welding instructions (WPS) no. 231RLI006858E.



Hint!

When welding the housing connection T (1) into the tank, use a welding jig (see enclosed spare parts list 221MBL007030G). Observe enclosed welding instructions (WPS) no. 221RLI002244D.

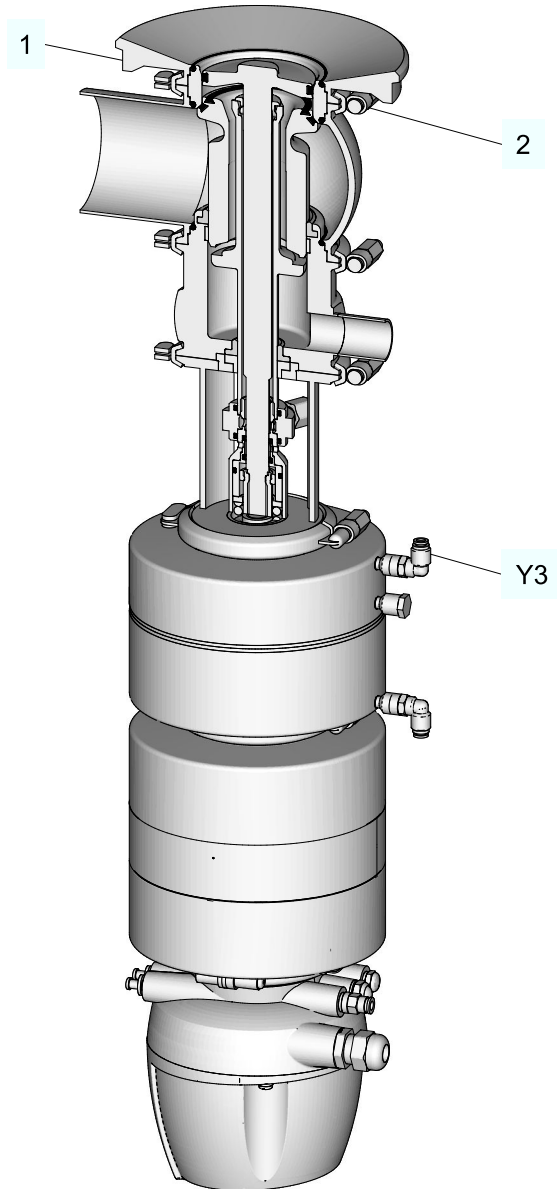


Fig.11

Carry out the following steps:

1.  **Danger**
Danger of injury due to spring preload
Danger of injury when loosening the clamp connection on the actuator or on the housing, since the released spring pretension will suddenly lift the actuator.
► Therefore, before loosening the valve housing, vent the valve disc by activating the valve drive with compressed air at Y3 (see chapter “Remove valve T_RL and T_RC” or “Remove valve T_R”).

Remove the clamp connection (2).
2. Take off the housing connection T (1).
→ Done

6.5 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

- Before releasing any pipe or hinged clamp connections: drain and, if necessary, clean or flush the pipe.
 - 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**
Danger of injury due to spring preload
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.
► Therefore, before loosening the valve housing, vent the valve disk by activating the valve drive with compressed air at Y3 (see chapter “Remove valve T_RL and T_RC” or “Remove valve T_R”).

Release the spring tension.
2. Remove the valve insert (see chapter “Valve T_RL and T_RC” or “Remove valve T_R”).
3. Weld the housing (without seal rings) tension-free into the pipe system. To this end:
4. Fit the housing into place and tack it.

5.

Notice

Welding distortions of the casing

Welding distortions cause the valve to malfunction.

► Always close the housing before welding.

Close the 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.

Insert the seals.

11. Assemble the valve.
12. Vent the actuator.
 - The valve disk is lowered.
 - Done

6.6 Pneumatic connections

6.6.1 Air requirement

Valve T		
Size	Actuator type	Air requirement (dm ³ _n / stroke) dm ³ _n at 1.01325 bar at 0 °C according to DIN 1343
DN 50	DD	0.7
DN 80	EF5	1.4
DN 100	SG5	3.2
DN 150	UK6	4.4

Valve T_R		
Size	Actuator type	Air requirement (dm ³ _n /stroke) dm ³ _n at 1.01325 bar at 0 °C according to DIN 1343
DN 40, DN 50, OD 1 ½", OD 2", IPS 2"	CD	0.42
DN 65, OD 2 ½"	DF	0.7
DN 80, OD 3", IPS 3"	DF5	0.89
DN 100, OD 4", IPS 4"	EG5	1.4
DN 125	SH6	3.16
DN 150, OD 6", IPS 6"	SK6	3.16

Valve T_RC and T_RL			
Size	Actuator type	Lift actuator	Air requirement (dm ³ _n / stroke) dm ³ _n at 1.01325 bar at 0 °C according to DIN 1343
DN 50	BD	CRLN50	0.88
DN 80	CF5	DLT5	3.44
DN 100	DG5	ELR5	2.75
DN 150	EK6Z	SLR6	5.87

6.6.2 Establishing Hose Connections

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

Tools required:

- A hose cutter

Carry out the following steps:

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

→ Establish a hose connection.

6.6.3 Hosing diagram - mixproof bottom valve T_RL/T_RC with control top T.VIS

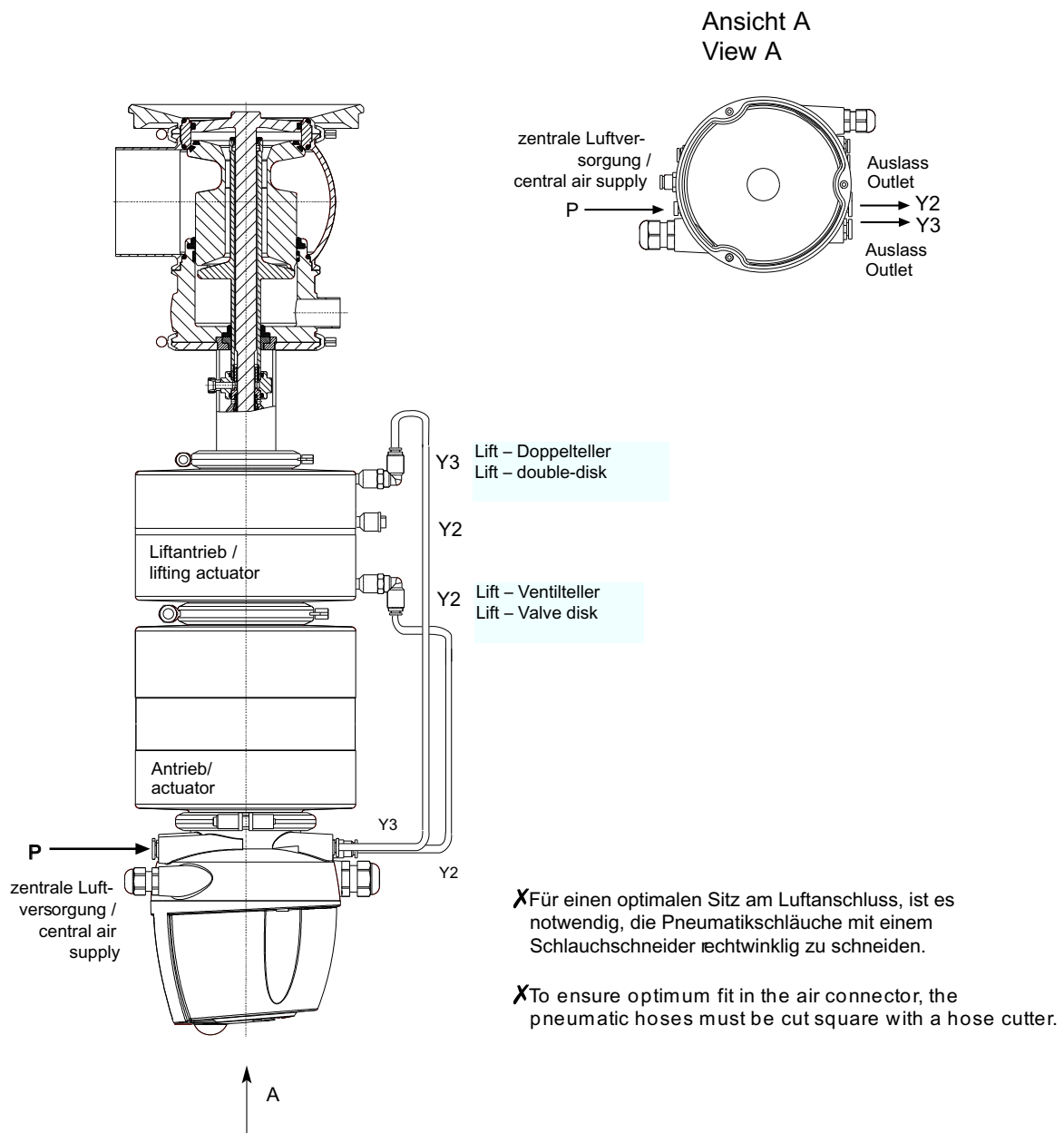


Fig.12

6.6.4 Hose connection plan - double seat valves type R and T with lift actuator without connecting top

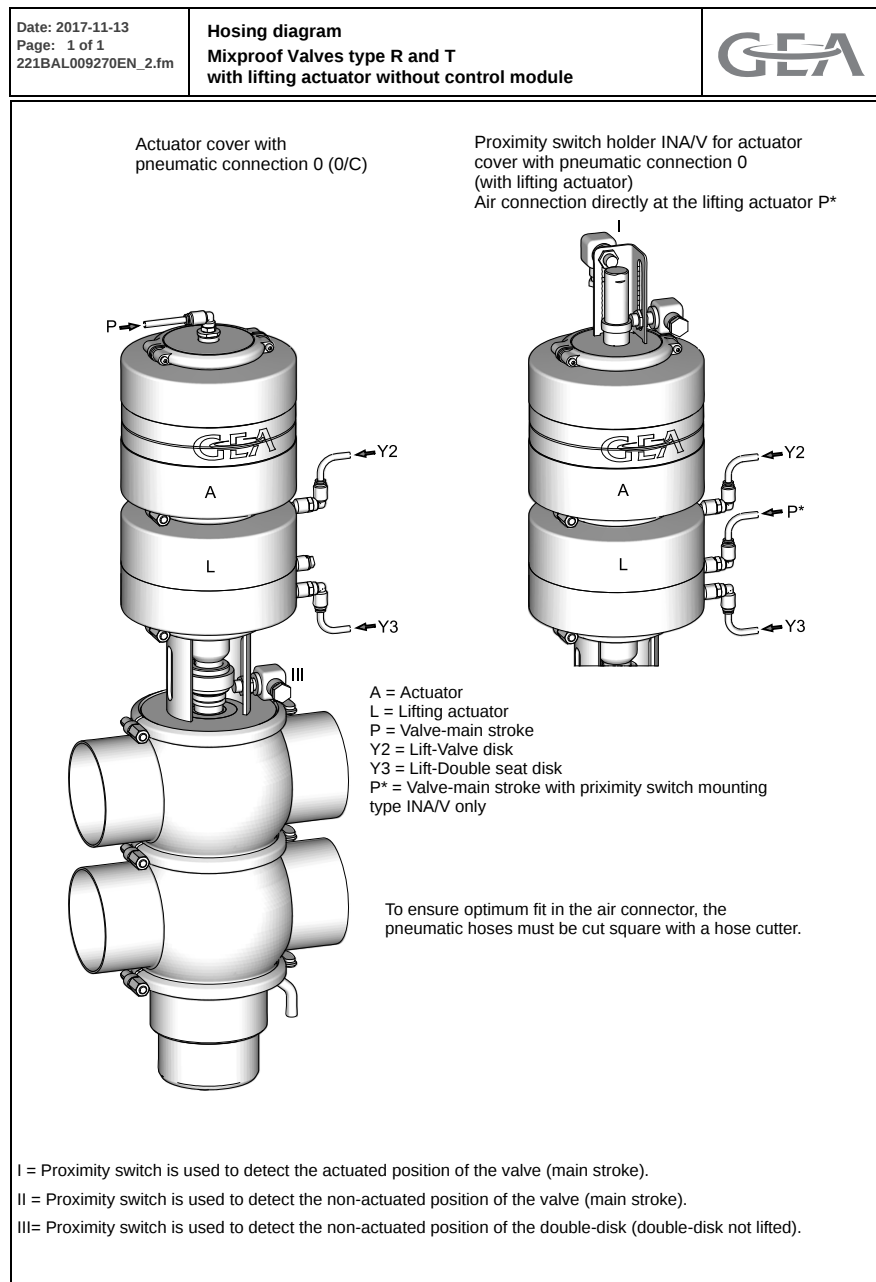


Fig.13

6.7 Electrical connections



Danger

Live parts

Electrical shock can result in serious personal injury or death.

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



Explosive gases or dusts

An explosion can result in serious personal injury or death.

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

Carry out the following steps:

1. Connect in accordance with the connection diagram and the instructions in the corresponding operating instructions.

→ Done



Hint!

The proximity switches are factory set. During transport and installation it can happen that the settings are changed, so that readjustment may be required.

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.
- Check the lift stroke of the valve disk and the double-disk for valve T_RC and T_RL.
- Clean the pipe system prior to the first product run.
- During commissioning, regularly check all sealing points for leaks. Replace defective seals.

8 Operation and control

8.1 Safety instructions

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

For operation, the following principles apply:

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

9 Cleaning

9.1 Cleaning

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

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

The cleaning effect must be checked regularly by the operator!

9.1.1 Cleaning Process Examples

Typical Cleaning Parameters in Dairy Operations

Example of a two-phase cleaning process:

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

Example of a cleaning operation in one cleaning step:

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

Typical Cleaning Parameters in Breweries

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

9.1.2 Cleaning effect

The cleaning effect depends on the following factors:

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

These factors can be combined in such a way as to make an optimal cleaning result probable.

9.1.3 Cleaning the leakage cavity

The cleaning of the leakage cavity is done by using a spray nozzle in the double-disk, which is connected to a valve seat cleaning line. Only general recommendations can be provided here with regard to regularity and duration of the spray cleaning, as the conditions prevalent at each facility, such as type of product, temperatures, cleaning media, cleaning intervals, etc. could necessitate more frequent or longer spray cleaning.

It is recommended to set the cleaning conditions in the system in a test phase, in order to save cleaning medium. To optimize cleaning of the seating, occasional checks of the valves after cleaning will determine whether the valve seats are clean.

9.1.4 Valves with lift cleaning without spray cleaning

The leakage outlet is cleaned by ventilating the upper or lower valve discs when the particular pipe is cleaned. During this process, cleaning fluid flows past the seals via a metal throttle gap in the leakage outlet and cleans the seal surfaces of the lifted valve disc and the leakage outlet.

This kind of leakage outlet cleaning process is used for sensitive media, in which the seal surfaces also need to be cleaned in order to flush away micro-organisms that may have adhered to them. This kind of cleaning is also recommended for media that adheres and crystallises.

9.1.5 Valves with lift cleaning with additional spray cleaning lifting

In addition to lift cleaning the leakage outlet can also be cleaned via a spray nozzle, independently of the pipe cleaning process, i.e. also during production.

This type of cleaning is recommended for double-seat valves used in the area of critical media, which adhere strongly, crystallise easily, and are sticky (e.g. sugar solutions) or are viscous (e.g. yoghurt). With an intermediate cleaning process via spray cleaning, products which do not flow off easily can be prevented from burning onto the leakage outlet via heat transfer before the next opportunity arises to ventilate the valve disc.

Sugar solutions or sticky media often adhere to surfaces that come in contact with product, such as the seating ring, and may crystallise there before they can be cleaned away via a lifting process. This may result in damage to the seals the next time the valve is switched. This can also be prevented by an additional spray cleaning, since these surfaces can be cleaned before the next switching procedure and also during production.

An additional short intermediate cleaning is often done after each switching procedure.

A further advantage of this cleaning method is the ability to shorten the sometimes long periods of time between two leakage outlet cleaning processes via an intermediate cleaning process, since lifting the valve disc is only possible when the product feed pipes are cleaned.

Examples for cleaning by lifting			
Medium	Duration (s)	Number of venting the valve disk	Comments
Beer	1-2	2-3	During every cleaning phase: 1. Prerinse 2. Hot caustic 3. Intermediate rinse 4. Acid 5. Rinse
Yeast	1-2	2-3	
Fruit juice	2-6	3	
Milk	2-5	3	
Yoghurt	3-5	3	

The component manufacturer can only make a recommendation on the type of cleaning with respect to cleaning agents, temperature, times and intervals, but no binding information can be given. This should be determined or defined by the operating company depending on the process.

Depending on the cleaning method (medium, concentration, temperature and contact times), the seals are affected to different degrees. This can impair the function and the service life.

9.2 Passivation

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

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

10 Maintenance

10.1 Safety instructions

Maintenance and repair

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

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

For maintenance and repair, the following principles apply:

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

Disassembly

For disassembly, the following principles apply:

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

- Disconnect all power and utility lines.
- Markings, e.g. on lines, must not be removed.
- Do not climb on the component. Use suitable access aids and working platforms.
- Mark the lines (if unmarked) prior to disassembly to ensure they are not confused when re-assembling.
- Protect open line ends with blind plugs against ingress of dirt.
- Pack sensitive parts separately.
- For longer periods of standstill, observe the storage conditions, see Section 4.1, Page 29.

10.2 Inspections

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

10.2.1 Product contact seals

Carry out the following steps:

1. Regularly check:
 - upper O-ring in the housing connection T
 - O-rings between the valve housing
 - V-ring in the valve disks
 - Seal rings on the double-disk

→ Done

10.2.2 Pneumatic connection

Carry out the following steps:

1. Check the operating pressure at the pressure reducing and filter station.
2. Regularly clean the air filter in the filter station.
3. For valve T_RC and T_RL: Check the elbow screw connection on the lifting actuator for tight fit.
4. Check the lines for kinks and leaks.
5. Check the solenoid valves for proper function.

→ Done

10.2.3 Electrical connections

Carry out the following steps:

1. Check that the cap nut on the cable gland is tight.
2. Check that the cable connections are firmly secured.

3. Check the solenoid valves for proper function.
- Done

10.3 Maintenance intervals

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

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

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

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

10.4 Prior to removal

Requirement:

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

Carry out the following steps:

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

→ Done

10.5 Remove valve T_RL and T_RC

- Unscrew the cleaning hose (2).

10.5.1 Removing the control top

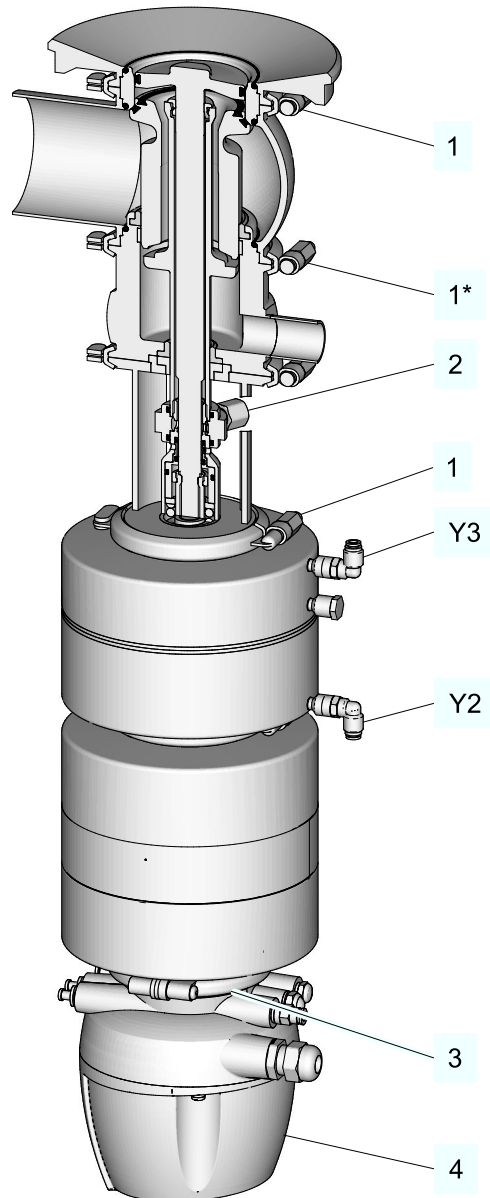


Fig. 14

Requirement:

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



Danger

Spring tension in the valve

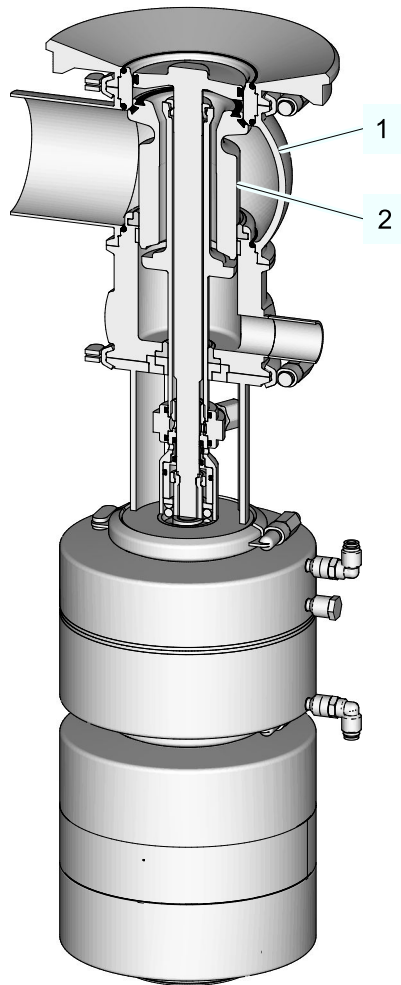
Danger of injury when detaching the clamp connection as the released spring pretension will suddenly lift the actuator.

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

Carry out the following steps:

1. Take the half rings off the control top (3).

- ### 10.5.2 Disconnecting the valve from the housing



Notice

Damage leads to malfunctions of the valve.

- ▶ When removing the valve from the pipe take care not to hit the balancer against the housing.
- ▶ Carefully disassemble the valve.

Notice

Seat ring and valve disk are precision components

Damage leads to malfunctions of the valve.

- If the valve is installed horizontally, make sure that the weight of the valve is supported during disassembly.

Carry out the following steps:

1. Pull the valve insert out of the housing (1).

→ Done

10.5.3 Separating the valve insert from the actuator

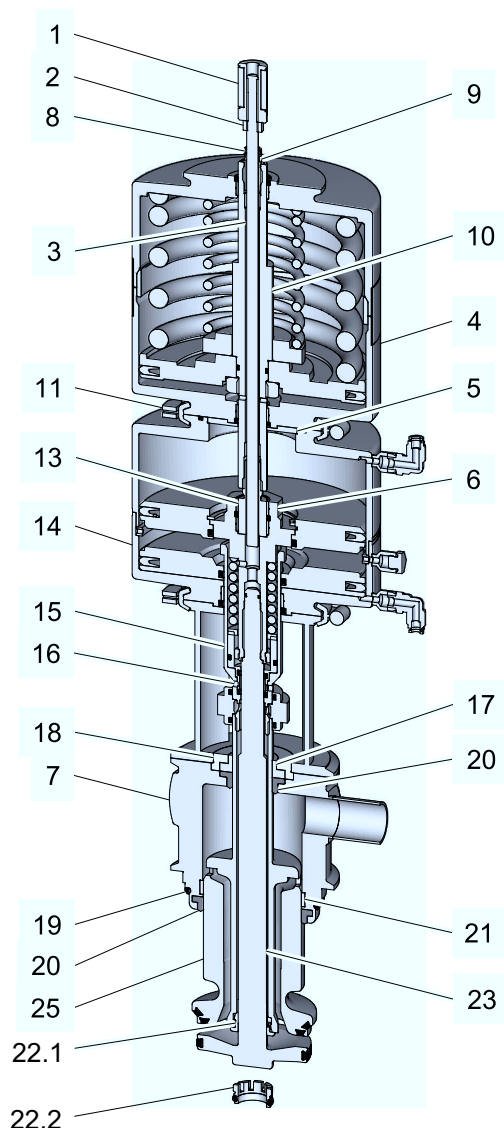


Fig.16

Carry out the following steps:

1. Screw the switch bar (3), switch bar (1) and nut (2), which are screwed together, out of the piston rod (10) using a 4 mm mandrel.

2. Remove clamp connection (11) and pull the actuator (4) with slider (9), guide ring (8), adapter (13) and sealing flange (5) out of the lifting actuator (14).
3. Hold carrier (6) with box spanner AF 36 and remove the valve disk (23).

4.

Notice

Running surfaces of the double-disk (16) are sealing surfaces

Damage leads to malfunctions of the valve.

► Carefully disassemble the valve.

Hold the carrier sleeve (15) with sickle spanner at (16) and undo the double-disk (25) with open-ended wrench or turned socket for wrench.

5. Remove the leakage housing (7) , O-ring (19), seal rings (20), bearing disk (18) and bearings (17).
6. Remove the guide ring (21).
7. For version T_RL, remove cleaning nozzle (22.1).
8. For version T_RC, remove snap seal (22.2) with O-ring.

→ Done



Hint!

Cleaning nozzle and snap seal area wear parts.

10.5.4 Removing the lifting actuator

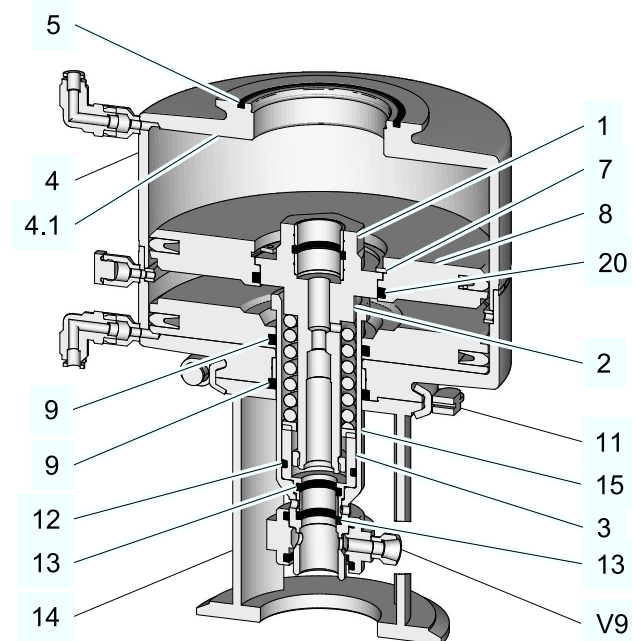


Fig.17

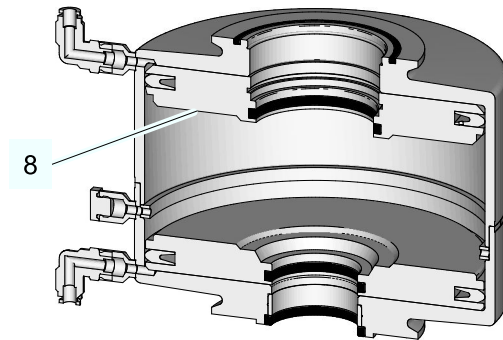


Fig.18

Carry out the following steps:

1. Pull the rinse connection (V9) off the driver sleeve (15).
 2. Place down the lift actuator (4) for disassembly.
 3. Push the piston (8) with installed carrier (2) and carrier sleeve (15) up towards the lift flange (4.1) and remove snap ring (7) with pliers from the piston (8).
 4. Push the carrier clip (1) with the carrier sleeve (15) out of the lifting actuator (4)
 5. Pull the bushing (3) out of the carrier sleeve (15), then the O-rings (12, 13) will be accessible.
 6. Remove clamp connection (11), remove lantern (14) from the lifting actuator (4).
 - O-rings (9, 5, 20) are now accessible.
- Done

10.6 Carefully disassemble the valve T_R

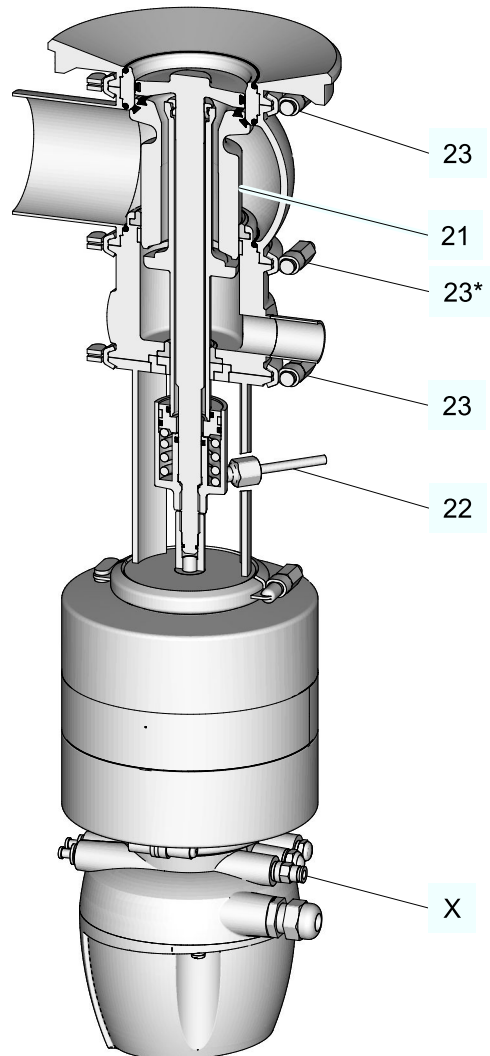


Fig.19

Carry out the following steps:

1. Unscrew the cleaning hose (22).
2. Apply compressed air to the actuator at X.

3.  **Danger**

Spring tension in the valve

Danger of injury when detaching the clamp connection as the released spring pretension will suddenly lift the actuator.

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

Remove the clamp connection (23*).

4. Vent the actuator.

→ Done

10.6.1 Disconnecting the valve from the housing

Notice

The surfaces of the balancer plugs (21) are sealing surfaces

Damage leads to malfunctions of the valve.

- ▶ When removing the valve from the pipe take care not to hit the balancer against the housing.
- ▶ Carefully disassemble the valve.

Notice

Seat ring and valve disk are precision components

Damage leads to malfunctions of the valve.

- ▶ If the valve is installed horizontally, make sure that the weight of the valve is supported during disassembly.

Carry out the following steps:

1. Pull the valve insert complete with actuator (20) out of the housing (14).
- Done

10.6.2 Removing the control top

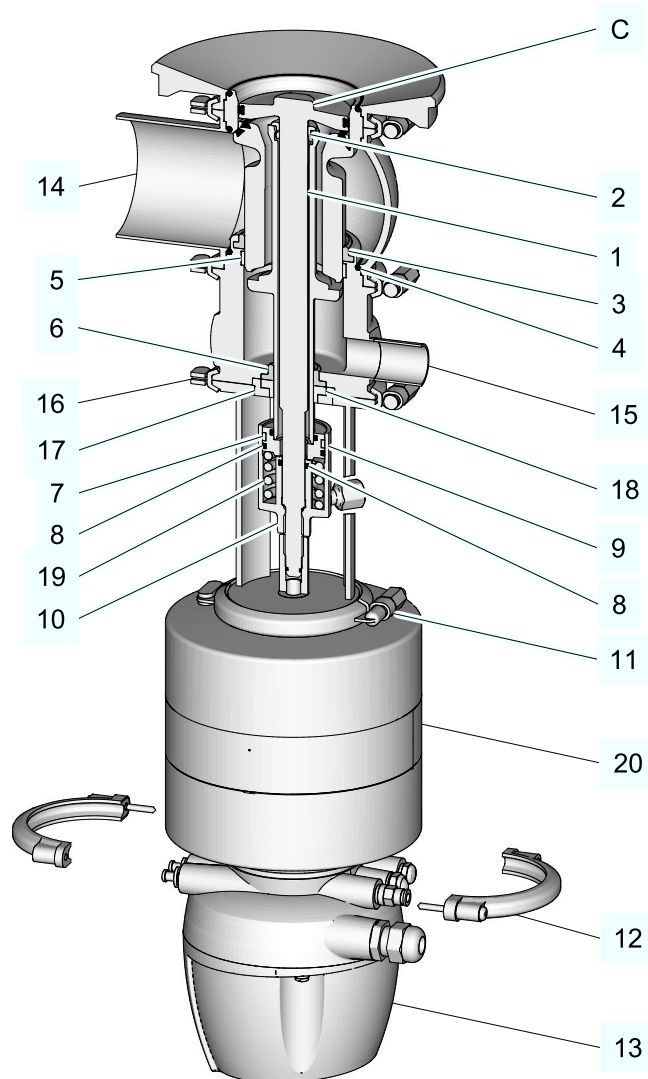


Fig.20

1. Remove the semi-rings (12).
2. Pull off control top (13).
3. Hold the actuator (20) with strap wrench and unscrew the valve disk (1) at the spanner flat C.
4. Hold the valve disk (1) at the spanner flat C and unscrew the bonnet (9) at the spanner flat (10).
5. Remove the clamp connection (16) and the individual parts (6, 17, 18).
6. Remove the guide ring (5).
7. Remove the pressure spring (19), bearing plug (7), guide ring, O-rings (8).
8. Remove the cleaning nozzle (2).

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" ()
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

10.7.2.1 Note on seal replacement

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

10.7.2.2 Replacing the V-ring

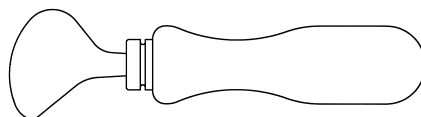


Fig.21: V-ring insertion tool

Requirement:

- 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
- Pickset

⚠ 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.

Carry out the following steps:

1. Put a tool from the pickset into the V-ring and take it out.

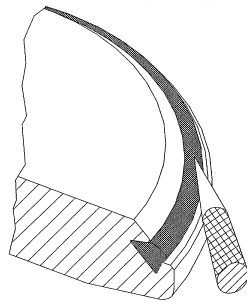


Fig.22

2. Before mounting, wet the V-ring on the side not in contact with product (rear side). Ensure that water does not drip into the V-ring groove on the valve disk.
3. Apply pressure to the valve at the connection (22).
4. Put in the V-ring. Make sure the installation position of the V-ring is correct (see illustration).

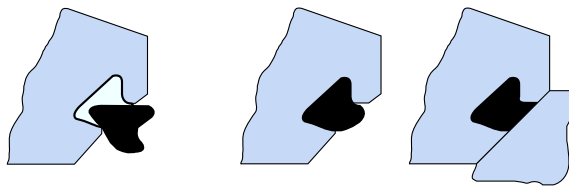


Fig.23

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

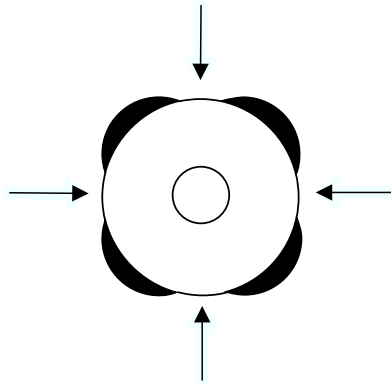


Fig.24

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



Hint!

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

10.7.2.3 Replacing V-Ring RA



Hint!

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



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 V-ring RA and take it out.

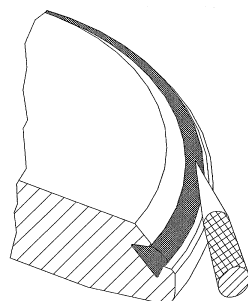


Fig.25

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 disk.

3. Put in V-ring RA.

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

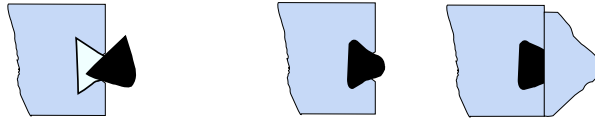


Fig.26

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

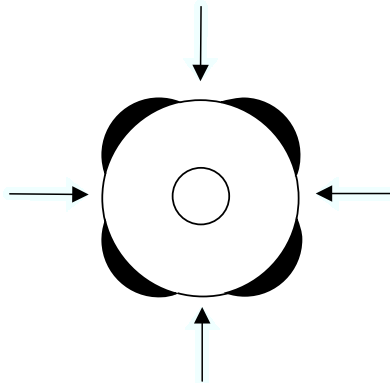


Fig.27

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.

10.7.3 Lubricating seals and threads



Caution!

Damage to seals and threads

Damage to seals and threads can result in malfunction.

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

Carry out the following steps:

1. Lightly grease the thread of the valve disc and all screws.
2. Do not grease the V-ring.
3. Grease all seals – including the O-rings at the top and bottom of the actuator piston rod – very thinly.
4. Grease the balancer.

→ Done



Hint!

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

PARALIQ GTE 703 can be ordered from GEA Tuchenhausen under material no. 413-064, and Rivolta F.L.G. MD-2 can be ordered under material no. 413-071. Using other types of grease can result in malfunctions or in premature seal failure. The warranty will also become null and void.

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

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

Running dry must be avoided!

10.8 Installation

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

10.8.1 Mount valve T_RL and T_RC

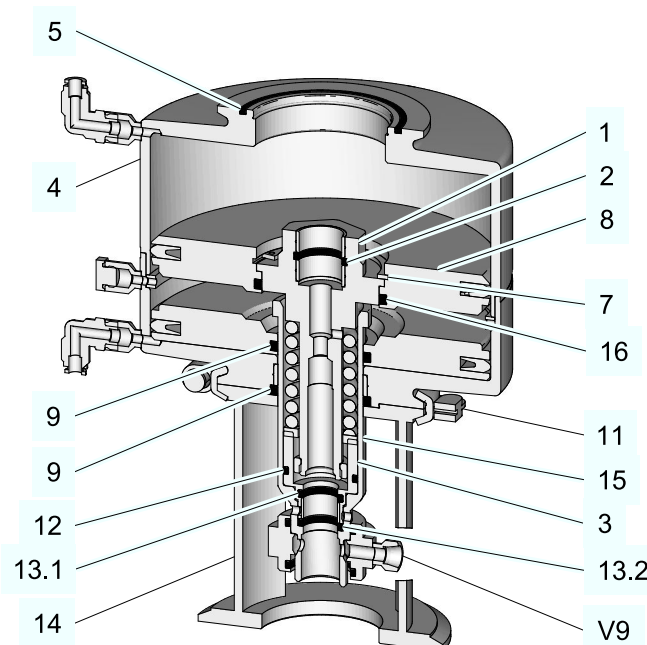


Fig.28

Carry out the following steps:

1. Fit lifting actuator LFT-RL (4) with O-rings (5, 9, 16) and fix with clamp connection (11) at the lantern (14).
2. Equip the bushing (3) with O-rings (12, 13.1) and push onto the installation mandrel. Before that place the O-ring (13.2) and push everything into the carrier sleeve (15).
3. Push the actuator (1) with O-ring (2) into the carrier sleeve (15) and pre-tension with installation mandrel and box spanner SW 36. Plug the pre-tensioned components in the lift actuator (4), fix with snap ring (7) at the piston (8) and relax.

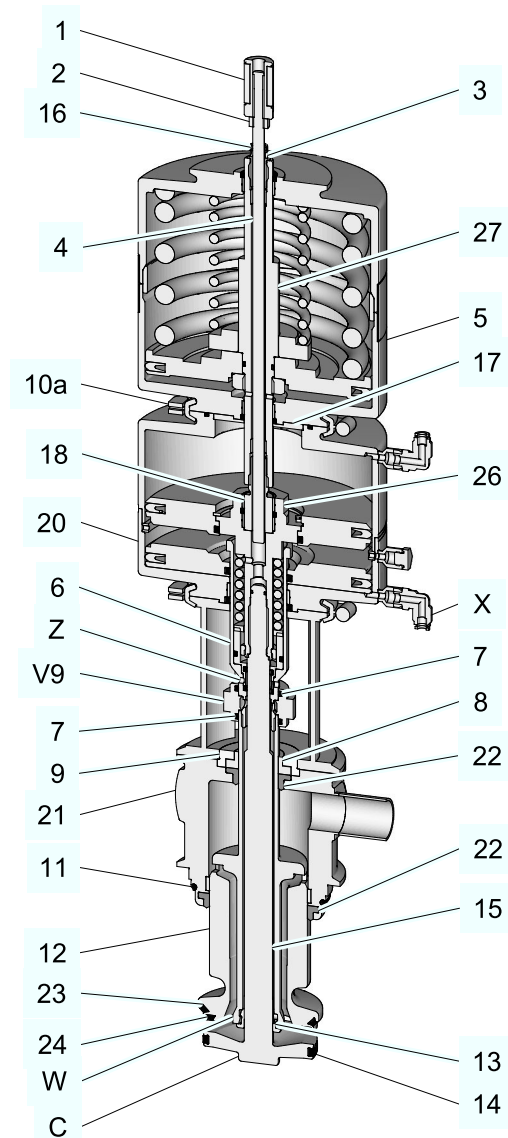


Fig.29

Carry out the following steps:

4. Fit rinse connection (V9) with O-rings (7) and push onto the driver sleeve (6).
5. **Valve T_{RL}**
Equip the double-disk (12) with V-rings (23, 24), cleaning nozzle (13), leakage housing (21), O-ring (11), seal ring (22), bearing (8), bearing disk (9)

6. **Valve T_RC**

- Equip the double-disk (12) with V-rings (23, 24), snap seal with O-ring (13), leakage housing (21), O-ring (11), seal ring (22), bearing (8), bearing disk (9).
7. Hold the carrier sleeve with sickle spanner at (Z) and tighten the double-disk with jaw wrench at (W).
8. Hold the carrier (26) with box spanner AF 36 and tighten the valve disk (15) with installed V-ring (14) at C.
9. Insert locking flange (17) in the lifting actuator (20).
10. Fix sliding block (3) with guide ring (16) using a mandrel (4 mm) at the piston rod (27) of the actuator (5).
11. Insert the actuator (5) in the lifting actuator (20) and fix with clamp connection (10).

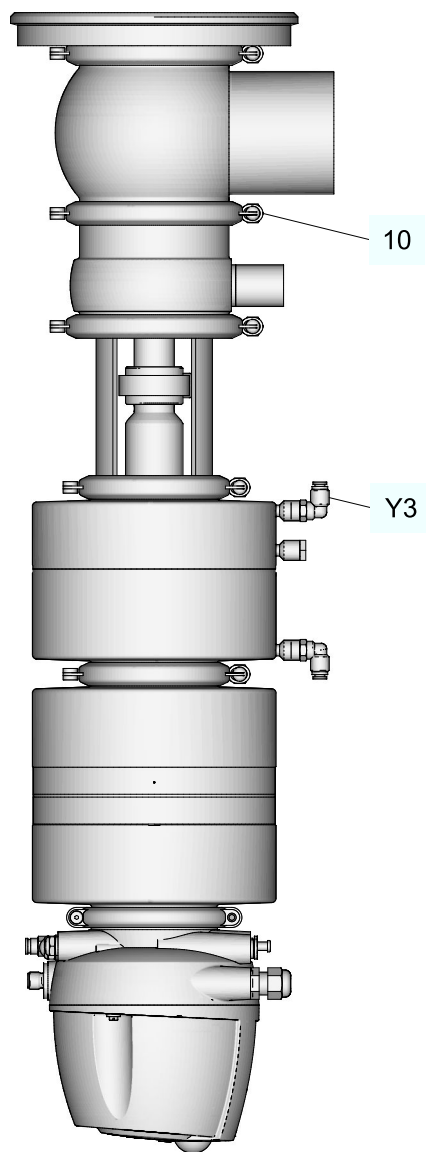


Fig.30

Notice

The valve disk and the seat ring are precision parts.

Damage to these parts can result in malfunction.

- Support the weight of the valve during assembly.

Prerequisite:

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

Carry out the following steps:

12. Actuate the lift stroke double-disk at (Y3) and carefully insert the valve insert in the housing and fix with clamp connection (10).

→ Done

10.8.2 Place the seating ring between the housings

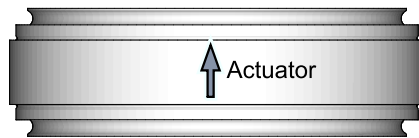


Fig.31

The seating ring should be placed with the arrow pointing to the displayed installation direction. Be extremely careful during assembly that the seating ring is properly placed between the housings so that the arrow later properly displays the direction of the drive when the valve is completely assembled.

10.8.3 Assembly valve T_R

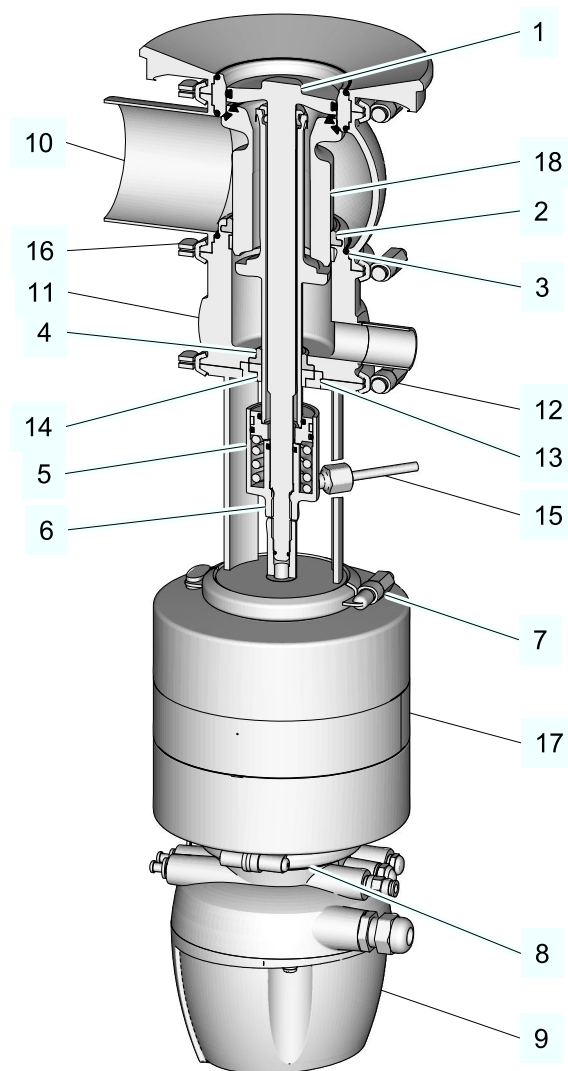


Fig.32

Carry out the following steps:

1. Connect leakage housing (11) with 1 seal ring (2, 4), O-ring (3), bearing (14) and bearing disk (13) with clamp connection (12) with lantern.
2. Insert the valve disk (1) into the double-disk (18) and put into the leakage housing (11).
3. Equip the bearing plug with O-rings and guide ring and place on double-disk (18).
4. Place bonnet (5) with O-ring and pressure spring on bearing plug.
5. Hold bonnet (5) at the spanner flat (6) and screw in valve disk (1) at the spanner flat.
6. Screw on the actuator (17).
7. Connect the control top (9) and connect with semi rings (8).

8.

Notice

The valve disk and the seat ring are precision parts.

Damage to these parts can result in malfunction.

► Support the weight of the valve during assembly.

Prerequisite:

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

Insert the valve insert cpl. with actuator (17) into the housing (10).

9. Apply compressed air to the actuator.

10. Mount the clamp connection (16).

11. Screw on the cleaning hose (15).

10.8.4 Tightening torques for the semi-rings and clamp connections

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

Tightening torques		[Nm]	[lbft]
Clamps on the control top		1	0.7
Clamp connection cast half rings	M6	9	6.6
Clamp connection cast half rings	M8	22	16.2
Cast clamps	M10	45	33

10.8.5 Checking the function

Checking the valve stroke

Carry out the following steps:

1. Control the lift stroke via the manual actuator (Y1).
2. Check the stroke of the valve (C), see valve strokes depending on size.
3. When strokes are correct, adjustment and checking of the feedback can take place.



Hint!

Please take the operating instructions for the respective control top into account for adjustment of the feedbacks.

→ The valve stroke has been tested.

Checking lifting stroke and adjusting feedback

Carry out the following steps:

1. Control the lift strokes via a manual actuator (Y2) and (Y3).
2. Check the lift stroke, see valve strokes depending on size.
3. When strokes are correct, adjustment and checking of the feedback can take place.



Hint!

Please take the operating instructions for the respective control top into account for adjustment of the feedbacks.

→ Lift stroke is checked.

Strokes depending on size

Valve T_R	
Valve size	Total stroke C [mm]
Metric	
DN 40	22
DN 50; 65	30
DN 80; 100	40
DN 125; 150	60
Inch OD	
1.5"	25
2"	30.5
2.5"	31
3"	39
4"	40
6"	60
Inch IPS	
2"	30
3"; 4"	40
6"	60

Valve T_RL/T_RC			
Valve size	Total stroke C [mm]	Lift stroke Double-disk [mm]	Lift stroke Valve disk [mm]
Metric			
DN 25	25	1 ... 2.5	6

Valve T _{RL} /T _{RC}			
Valve size	Total stroke C [mm]	Lift stroke Double-disk [mm]	Lift stroke Valve disk [mm]
DN 40	28	1 ... 2.5	6
DN 50	31	1 ... 2.5	6
DN 65	35	1 ... 2.5	6
DN 80; 100	45	1 ... 2.5	6
DN 125; 150	65	1 ... 2.5	6
Inch OD			
1"	22	1 ... 2.5	6
1.5"	21	1 ... 2.5	6
2"	31	1 ... 2.5	6
2.5"	35	1 ... 2.5	6
3"; 4"	45	1 ... 2.5	6
6"	65	1 ... 2.5	6
Inch IPS			
2"	30	1 ... 2.5	6
3"; 4"	45	1 ... 2.5	6
6"	65	1 ... 2.5	6

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.

Fault	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
	Solenoid valve defective	Replace the solenoid valve
	Valve works against a hydraulically closed pipe	Open the pipe
Double 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
Leakage in the lantern	Seal ring defective	Replace the gasket
Leakage in the leakage cavity	V-rings defective	Replace the V-rings

12 Decommissioning

12.1 Safety instructions

For shutting down, the following principles apply:

- Switch off the compressed air.
- Switch off the component with the main switch.
- Padlock the main switch (if fitted) in the off position to prevent it from being switched back on. The key to the padlock must be deposited with the person responsible until the machine is restarted.
- For longer periods of standstill, observe the storage conditions, see Chapter 4, Page 29.

12.2 Disposal

12.2.1 General notes

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

The component consists of the following materials:

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

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

12.2.2 Valve Actuator Disposal



Danger

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

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

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

Carry out the following steps:

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

13 Spare parts list - Mixproof bottom valve T_R

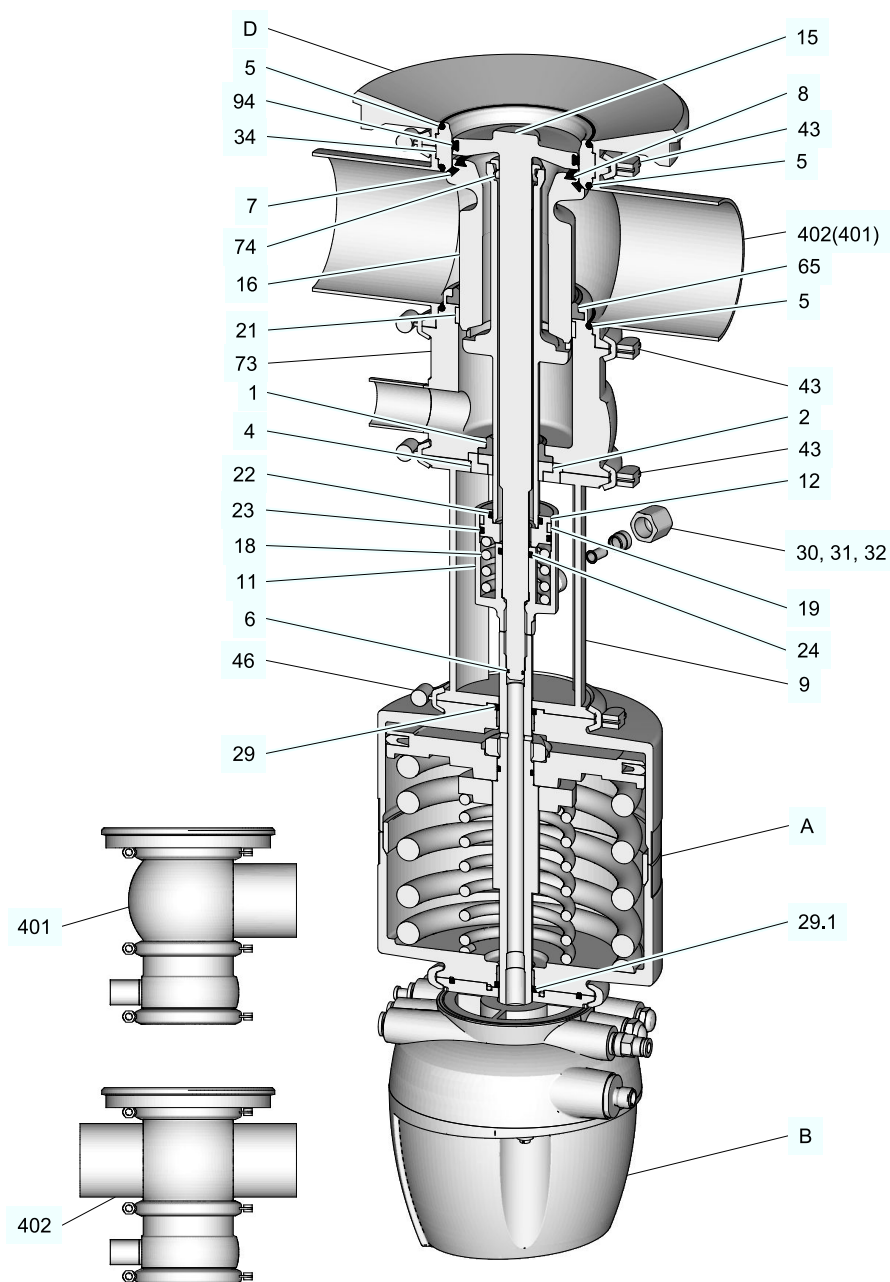


Fig.33

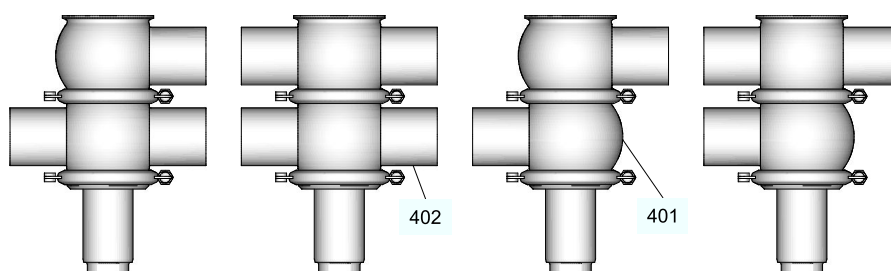


Fig.34

[illegible]

Data/date: 2016-09-09 Seite / Page 3 von / of 5		Ersatzteilliste / Spare parts list Doppelsitz-Bodenventil T_R Mixproof Bottom Valve T_R						
221ELI001635G_9.DOC								
Pos. Item	Benennung / Designation	Werkstoff Material	1 ½" OD	2" OD	2 ½" OD	3" OD	4" OD	6" OD
Dichtungssatz / sealing set *		EPDM FKM HNBR	221-000834 221-000835 --	221-000834 221-000835 --	221-000836 221-000837 --	221-000836 221-000837 --	221-000838 221-000839 221-004242	221-002827 221-002828 --
¹⁾ 1	Dichtring / sealing ring *	EPDM FKM HNBR	924-085 924-083 924-313	924-085 924-083 924-313	924-085 924-083 924-313	924-085 924-083 924-313	924-085 924-083 924-313	924-088 924-087 --
¹⁾ 2	Lager / bearing Lager 3A / bearing 3A	PTFE/Kohle SUSTA-PVDF	935-002 935-099	935-002 935-099	935-002 935-099	935-002 935-099	935-002 935-099	935-003 935-102
4	Lagerscheibe / bearing disk		1.4301 221-142.03	221-142.03	221-142.03	221-142.03	221-142.03	221-142.04
¹⁾ 5	O-Ring / O-ring *	EPDM FKM HNBR	930-144 930-171 930-633	930-144 930-171 930-633	930-150 930-176 930-634	930-150 930-176 930-634	930-156 930-178 930-863	930-260 930-259 --
¹⁾ 6	O-Ring / O-ring *	NBR	930-004	930-004	930-004	930-004	930-004	930-007
¹⁾ 7**	V-Ring / V-ring *	EPDM FKM HNBR	932-021 932-033 932-088	932-021 932-033 932-088	932-024 932-035 932-090	932-024 932-035 932-090	932-028 932-039 932-100	932-042 932-041 --
¹⁾ 8**	V-Ring / V-ring *	EPDM FKM HNBR	932-019 932-032 932-084	932-019 932-032 932-084	932-023 932-034 932-089	932-023 932-034 932-089	932-027 932-038 932-099	932-045 932-044 --
9	Laterne / lantern		1.4301 221-121.07	221-121.07	221-121.08	221-186.04	221-186.05	221-121.22
11	Reinigungshaube / bonnet		1.4404 221-146.01	221-146.01	221-146.01	221-146.01	221-146.01	221-146.02
12	Widerlager / thrust bearing		1.4301 221-403.02	221-403.02	221-403.02	221-403.02	221-403.02	221-403.03
15	Ventilteller T_R / valve disk T_R		1.4404 221-000673	221-000666	221-000650	221-000680	221-000644	221-001937
16	Doppelteller T_R / double disk T_R		1.4404 221-000676	221-000669	221-000663	221-000679	221-000647	221-004817
18	Druckfeder / pressure spring		1.4310 931-002	931-002	931-280	931-280	931-280	931-093
¹⁾ 19	Führungsring / rod guide ring	Turcite	935-021	935-021	935-021	935-021	935-021	935-025
¹⁾ 21	Führungsring / rod guide ring	Turcite	935-056	935-056	935-042	935-042	935-043	935-072
¹⁾ 21	Führungsring 3A / rod guide ring 3A	MF6	935-117	935-117	935-113	935-113	935-114	935-118
¹⁾ 22	O-Ring / O-ring *	EPDM FKM HNBR	930-243 930-244 930-640	930-243 930-244 930-640	930-243 930-244 930-640	930-243 930-244 930-640	930-243 930-244 930-640	930-356 930-357 --
¹⁾ 23	O-Ring / O-ring* *	EPDM FKM HNBR	930-246 930-247 930-631	930-246 930-247 930-631	930-246 930-247 930-631	930-246 930-247 930-631	930-246 930-247 930-631	930-266 930-265 --
¹⁾ 24	O-Ring / O-ring* *	EPDM FKM HNBR	930-235 930-162 930-638	930-235 930-162 930-638	930-235 930-162 930-638	930-235 930-162 930-638	930-235 930-162 930-638	930-268 930-164 930-639
¹⁾ 29	O-Ring / O-ring *	NBR	930-026	930-026	930-026	930-026	930-026	930-035
¹⁾ 29.1	O-Ring / O-ring *	NBR	930-026	930-026	930-026	930-026	930-026	930-026
30	Überwurfmutter / cap nut		1.4571 933-456	933-456	933-456	933-456	933-456	933-482
31	Schneidring / cutting ring		1.4571 933-455	933-455	933-455	933-455	933-455	933-481
32	Stützhülse / support sleeve		1.4571 933-382	933-382	933-382	933-382	933-382	933-385
34	Sitzring D / seat ring D		1.4404 221-402.01	221-402.01	221-402.03	221-402.03	221-402.02	221-402.05
43	Klemmverbindung KL Clamp joint KL		1.4401 221-507.04	221-507.04	221-507.09	221-507.09	221-507.11	221-507.14
46	Klemmverbindung KL Clamp joint KL		1.4401 221-507.06	221-507.06	221-507.06	221-507.06	221-507.06	221-507.11
47	Sechskantmutter / hex. nut		1.4305 912-036	912-036	912-036	912-036	912-036	912-036
¹⁾ 65	Dichtring / sealing ring *	EPDM FKM HNBR	924-305 924-307 924-333	924-305 924-307 924-333	924-296 924-308 924-331	924-296 924-308 924-331	924-254 924-309 924-332	924-261 924-320 --
73	Leckagegehäuse / leaking housing		1.4404 221-000665	221-000665	221-000641	221-000641	221-000643	221-002137
¹⁾ 74	Reinigungsdüse / cleaning nozzle	PVDF	221-334.01	221-334.01	221-334.02	221-334.02	221-334.02	221-334.03
¹⁾ 94	V-Ring RA / V-ring RA *	EPDM FKM HNBR	221-365.07 221-365.10 221-365.18	221-365.07 221-365.10 221-365.18	221-365.08 221-365.11 221-365.20	221-365.08 221-365.11 221-365.20	221-365.09 221-365.12 221-365.19	221-365.16 221-365.17 --
401	Gehäuse V1 / housing V1		1.4404 221-101.28	221-101.29	221-101.30	221-101.31	221-101.32	221-101.72
402	Gehäuse V2 / housing V2		1.4404 221-102.53	221-102.54	221-102.55	221-102.56	221-102.57	221-102.58
A	Antrieb / actuator		Siehe Ersatzteilliste für Antrieb VARIVENT® / see spare parts list for actuator VARIVENT®					
B	Anschlusskopf / control module T.VIS Anschlusskopf S / Control module S		Siehe Ersatzteilliste für Anschlusskopf T.VIS / see spare parts list for control module T.VIS Siehe Ersatzteilliste für Anschlusskopf S / see spare parts list for control module S					
D	Gehäuseanschluss T / housing connection T		Siehe Ersatzteilliste/Maßblatt für Gehäuseanschluss T / see spare parts list/dimension sheet of housing connection T					
Fett RIVOLTA F.L.G. MD-2 100g Tube nicht im Dichtungssatz enthalten / Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set				413-136				
* im Dichtungssatz sind die Pos. 1, 5, 6, 7, 8, 22, 23, 24, 29, 29.1, 65 und 94 enthalten . / * In the sealing set are according items 1, 5, 6, 7, 8, 22, 23, 24, 29, 29.1, 65 and 94. Die mit ¹⁾ gekennzeichneten Pos. sind Verschleißteile. / Items marked with ¹⁾ are wearing parts. ** Pos. 7 und 8 nicht fetten / Do not grease item 7 and 8								

Pos. Item	Benennung / Designation	Werkstoff Material	2" IPS	3" IPS	4" IPS	6" IPS
Dichtungssatz / sealing set *		EPDM FKM HNBR	221-000834 221-000835 --	221-000836 221-000837 --	221-000838 221-000839 221-004242	221-002827 221-002828 --
¹⁾ 1	Dichtring / sealing ring *	EPDM FKM HNBR	924-085 924-083 924-313	924-085 924-083 924-313	924-085 924-083 924-313	924-088 924-087 --
¹⁾ 2	Lager / bearing Lager 3A / bearing 3A	PTFE/Kohle SUSTA-PVDF	935-002 935-099	935-002 935-099	935-002 935-099	935-003 935-102
4	Lagerscheibe / bearing disk	1.4301	221-142.03	221-142.03	221-142.03	221-142.04
¹⁾ 5	O-Ring / O-ring *	EPDM FKM HNBR	930-144 930-171 930-633	930-150 930-176 930-634	930-156 930-178 930-863	930-260 930-259 --
¹⁾ 6	O-Ring / O-ring *	NBR	930-004	930-004	930-004	930-007
¹⁾ 7	V-Ring / V-ring *	EPDM FKM HNBR	932-021 932-033 932-088	932-024 932-035 932-090	932-028 932-039 932-100	932-042 932-041 --
¹⁾ 8	V-Ring / V-ring *	EPDM FKM HNBR	932-019 932-032 932-084	932-023 932-034 932-089	932-027 932-038 932-099	932-045 932-044 --
9	Laterne / lantern	1.4301	221-121.02	221-186.02	221-186.03	221-121.05
11	Reinigungshaube / bonnet	1.4404	221-146.01	221-146.01	221-146.01	221-146.02
12	Widerlager / thrust bearing	1.4301	221-403.02	221-403.02	221-403.02	221-403.03
15	Ventilteller T_R / valve disk T_R	1.4404	221-002072	221-002073	221-002074	221-001937
16	Doppelteller T_R / double disk T_R	1.4404	221-002061	221-002064	221-002067	221-002516
18	Druckfeder / pressure spring	1.4310	931-002	931-280	931-280	931-093
¹⁾ 19	Führungsring / rod guide ring	Turcite	935-021	935-021	935-021	935-025
¹⁾ 21	Führungsring / rod guide ring	Turcite	935-056	935-042	935-043	935-072
¹⁾ 21	Führungsring 3A / rod guide ring 3A	MF6	935-117	935-113	935-114	935-118
¹⁾ 22	O-Ring / O-ring *	EPDM FKM HNBR	930-243 930-244 930-640	930-243 930-244 930-640	930-243 930-244 930-640	930-356 930-357 --
¹⁾ 23	O-Ring / O-ring* *	EPDM FKM HNBR	930-246 930-247 930-631	930-246 930-247 930-631	930-246 930-247 930-631	930-266 930-265 --
¹⁾ 24	O-Ring / O-ring* *	EPDM FKM HNBR	930-235 930-162 930-638	930-235 930-162 930-638	930-235 930-162 930-638	930-268 930-164 930-639
¹⁾ 29	O-Ring / O-ring *	NBR	930-026	930-026	930-026	930-026
¹⁾ 29.1	O-Ring / O-ring *	NBR	930-026	930-026	930-026	930-026
30	Überwurfmutter / cap nut	1.4571	933-456	933-456	933-456	933-482
31	Schneidring / cutting ring	1.4571	933-455	933-455	933-455	933-481
32	Stützhülse / support sleeve	1.4571	933-382	933-382	933-382	933-385
34	Sitzring D / seat ring D	1.4404	221-402.01	221-402.03	221-402.02	221-402.05
43	Klemmverbindung KL Clamp joint KL	1.4401	221-507.04	221-507.03	221-507.11	221-507.14
46	Klemmverbindung KL Clamp joint KL	1.4401	221-507.06	221-507.09	221-507.06	221-507.11
47	Sechskantmutter / hex. nut	1.4305	912-036	912-036	912-036	912-036
¹⁾ 65	Dichtring / sealing ring *	EPDM FKM HNBR	924-305 924-307 924-333	924-296 924-308 924-331	924-254 924-309 924-332	924-261 924-320 --
73	Leckagegehäuse / leaking housing	1.4404	221-000665	221-000641	221-000643	221-002137
¹⁾ 74	Reinigungsdüse / cleaning nozzle	PVDF	221-334.01	221-334.02	221-334.02	221-334.03
¹⁾ 94	V-Ring RA / V-ring RA *	EPDM FKM HNBR	221-365.07 221-365.10 221-365.18	221-365.08 221-365.11 221-365.20	221-365.09 221-365.12 221-365.19	221-365.16 221-365.17 --
401	Gehäuse V1 / housing V1	1.4404	221-101.37	221-101.35	221-101.36	221-101.17
402	Gehäuse V2 / housing V2	1.4404	221-102.62	221-102.59	221-102.60	221-102.17
A	Antrieb / actuator		Siehe Ersatzteilliste für Antrieb VARIVENT® / see spare parts list for actuator VARIVENT®			
B	Anschlusskopf T.VIS / control module T.VIS Anschlusskopf S / Control module S		Siehe Ersatzteilliste für Anschlusskopf T.VIS / see spare parts list for control module T.VIS Siehe Ersatzteilliste für Anschlusskopf S / see spare parts list for control module S			
D	Gehäuseanschluss T / housing connection T		Siehe Ersatzteilliste/Maßblatt für Gehäuseanschluss T (nicht für 6" IPS) / see spare parts list/dimension sheet of housing connection T (not for 6" IPS)			
Fett RIVOLTA F.L.G. MD-2 100g Tube nicht im Dichtungssatz enthalten / Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set			413-136			
* im Dichtungssatz sind die Pos. 1, 5, 6, 7, 8, 22, 23, 24, 29, 29.1, 65 und 94 enthalten . / * In the sealing set are according items 1, 5, 6, 7, 8, 22, 23, 24, 29, 29.1, 65 and 94. Die mit ¹⁾ gekennzeichneten Pos. sind Verschleißteile. / Items marked with ¹⁾ are wearing parts. ** Pos. 7 und 8 nicht fetten / Do not grease item 7 and 8						

Dichtungen für VARIVENT® Doppelsitzventil Typ T_R								
Seals for VARIVENT® Mixproof Valve Type T_R								
Pos Item	Stück Qty	Bezeichnung Designation	Werkstoff Material	DN 40/50 1 1/2"/2"	DN 65/80 2 1/2"/3"	DN 100 4"	DN125	DN150 6"
1	1	Dichtring Seal ring	Ø	28	28	28	35	35
			EPDM	924-085	924-085	924-085	924-088	924-088
			FKM	924-083	924-083	924-083	924-087	924-087
			HNBR	924-313	924-313	924-313	--	--
5	4	O-Ring O-ring	Ø	60x3	85x4	113x4	138x4	158x5
			EPDM	930-144	930-150	930-156	930-372	930-260
			FKM	930-171	930-176	930-178	930-409	930-259
			HNBR	930-633	930-634	930-863	--	--
6	1	O-Ring O-ring	Ø	8x1,6	8x1,6	8x1,6	9x3	9x3
			NBR	930-004	930-004	930-004	930-007	930-007
**7	1	V-Ring V-ring	Ø	52-6	76-6	104-6	128-6	148-6
			EPDM	932-021	932-024	932-028	932-060	932-042
			FKM	932-033	932-035	932-039	932-062	932-041
			HNBR	932-088	932-090	932-100	--	--
**8	2	V-Ring V-ring	Ø	44-6	68-6	96-6	120-6	140-6
			EPDM	932-019	932-023	932-027	932-059	932-045
			FKM	932-032	932-034	932-038	932-063	932-044
			HNBR	932-084	932-089	932-099	--	--
22	1	O-Ring O-ring	Ø	28x3	28x3	28x3	35x3	35x3
			EPDM	930-268	930-268	930-268	930-356	930-356
			FKM	930-164	930-164	930-164	930-357	930-537
			HNBR	930-639	930-639	930-639	--	--
23	1	O-Ring O-ring	Ø	38x3	38x3	38x3	56x3	56x3
			EPDM	930-246	930-246	930-246	930-266	930-266
			FKM	930-247	930-247	930-247	930-265	930-265
			HNBR	930-631	930-631	930-631	--	--
24	1	O-Ring O-ring	Ø	16x3	16x3	16x3	22x3	22x3
			EPDM	930-235	930-235	930-235	930-268	930-268
			FKM	930-162	930-162	930-162	930-164	930-164
			HNBR	930-638	930-638	930-638	930-639	930-639
29	1	O-Ring O-ring	Ø	20x3	20x3	20x3	25x3	25x3
			NBR	930-026	930-026	930-026	930-035	930-035
29.1	1	O-Ring O-ring	Ø	20x3	20x3	20x3	20x3	20x3
			NBR	930-026	930-026	930-026	930-026	930-026
65	1	Dichtring Seal ring	Ø	46	69	97	122	142
			EPDM	924-305	924-296	924-254	924-262	924-261
			FKM	924-307	924-308	924-309	924-319	924-320
			HNBR	924-333	924-331	924-332	--	--
**94	1	V-Ring RA / V-ring RA	Ø	54.3	78.5	106.5	131.5	151.5
			EPDM	221-365.07	221-365.08	221-365.09	221-365.14	221-365.16
			FKM	221-365.10	221-365.11	221-365.12	221-365.15	221-365.17
			HNBR	221-365.18	221-365.20	221-365.19	--	--
Dichtungssatz kpl. Seal set cpl.			Werkstoff Material	DN 40/50 1 1/2"/2"	DN 65/80 2 1/2"/3"	DN 100 4"	DN125	DN150 6"
			EPDM	221-000834	221-000836	221-000838	221-001121	221-002827
			FKM	221-000835	221-000837	221-000839	221-001122	221-002828
			HNBR	--	--	221-004242	--	--
Fett RIVOLTA F.L.G. MD-2 100g Tube nicht im Dichtungssatz enthalten / Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set					413-136			
** Pos. 7, 8 und 94 nicht fetten / Do not grease item 7, 8 and 94								
Lagerungshinweis: Lagerung gemäß DIN 7716 relative Luftfeuchtigkeit ca. 65%, Temperatur 15-25° C und lichtgeschützt Storage Instruction: Storage acc. DIN 7716 relative humidity of air approx. ca. 65%, temperature between 15-25° C (59-77° F), storage to be light protected Beim Austausch der Dichtungen die Hinweise der Betriebsanleitung beachten! Observe the operating instructions when replacing the seals!								
429-015								

14 Spare parts list - Mixproof bottom valve T_RC (DN 25)

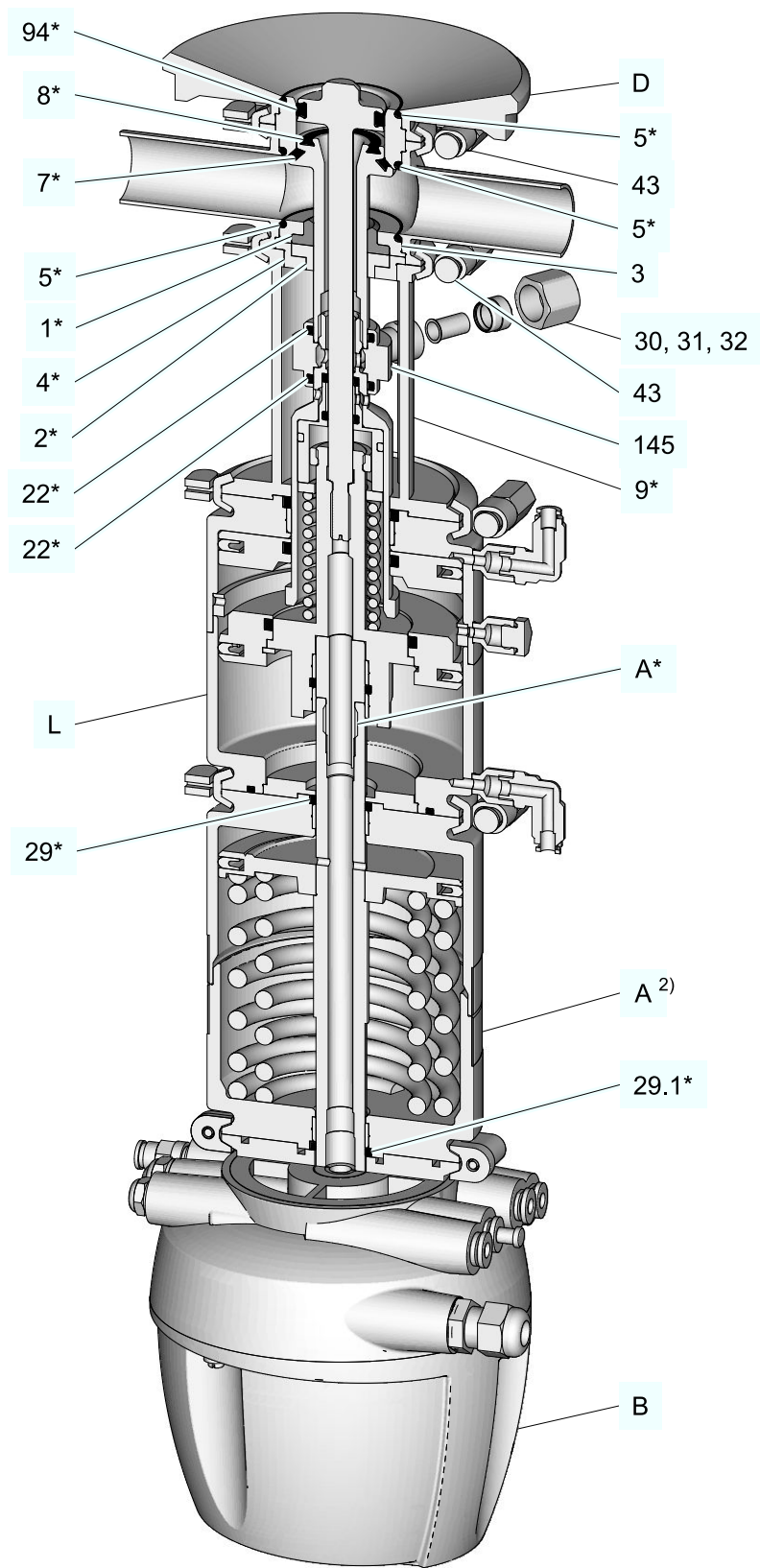


Fig.35

Datum/date: 2016-06-28 221ELI004791G_4.DOC	Ersatzteilliste / Spare parts list Doppelsitz-Bodenventil T_RC Mixproof Bottom Valve T_RC	
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Pos. Item	Benennung / Designation	Werkstoff Material	Sach-Nr. / Part no.	
			DN 25	1" OD
	Dichtungssatz kpl. / Sealing set cpl.	EPDM FKM HNBR	221-002613 221-002614 221-004342	221-002613 221-002614 221-004342
1	Dichtring / seal ring *	EPDM FKM HNBR	924-084 924-082 924-311	924-084 924-082 924-311
2	Lager / bearing Lager 3A / bearing 3A	PTFE/Kohle SUSTA- PVDF	935-001 935-098	935-001 935-098
3	Dichtscheibe / seal disk	1.4404	221-141.01	221-141.01
4	Lagerscheibe / bearing disk	1.4301	221-142.01	221-142.01
5	O-Ring / O-ring *	EPDM FKM	930-309 930-168	930-309 930-168
6	O-Ring / O-ring *	NBR	930-004	930-004
**7	V-Ring / V-ring *	EPDM FKM	932-046 932-030	932-046 932-030
**8	V-Ring / V-ring *	EPDM FKM	932-017 932-029	932-017 932-029
9	Laterne / lantern	1.4301	221-236.21	221-236.20
15	Ventilteller R / valve disk R	1.4529	221-001931	221-001931
16	Doppelteller / double valve disk	1.4529	221-238.31	221-238.31
22	O-Ring / O-ring *	EPDM FKM HNBR	930-268 930-164 930-639	930-268 930-164 930-639
29	O-Ring / O-ring *	NBR	930-026	930-026
29.1	O-Ring / O-ring *	NBR	930-026	930-026
30	Überwurfmutter / cap nut	1.4571	933-482	933-482
31	Schneidring / cutting ring	1.4571	933-481	933-481
32	Stützhülse / support sleeve	1.4571	933-385	933-385
34	Sitzring / seat ring	1.4404	221-402.06	221-402.06
43	Klappring / hinged clamp	1.4401	701-074	701-074
45	Sechskantmutter / hex. nut	A2	912-035	912-035
46	Klappring / hinged clamp	1.4401	701-073	701-073
47	Sechskantmutter / hex. nut	1.4305	912-036	912-036
**94	V-Ring RA / V-ring RA *	EPDM FKM	221-365.13 221-365.21	221-365.13 221-365.21
145	Leckageauslauf / leakage outlet	1.4301	221-512.02	221-512.02
401	Gehäuse V1 / housing V1	1.4404	221-101.19	221-101.27
402	Gehäuse V2 / housing V2	1.4404	221-102.41	221-102.52
A	Antrieb / actuator	siehe Ersatzteilliste/Maßblatt für VARIVENT Antrieb / see spare parts list/dimension sheet of actuator VARIVENT		
A*	Adapter LFT-R/ adapter LFT-R	EN AW- 6082 T6	221-614.01	221-614.01
B	Steuerkopf T.VIS / control top T.VIS	siehe Ersatzteilliste für Steuerkopf T.VIS see spare parts list of control top T.VIS		
L	Lifantrieb T / lifting actuator T	siehe Ersatzteilliste für Lifantrieb T / see spare parts list for lifting actuator T		
D	Gehäuseanschluss T / housing connection T	siehe Ersatzteilliste/Maßblatt für Gehäuseanschluss T / see spare parts list/dimension sheet of housing connection T		
Fett RIVOLTA F.L.G. MD-2 100g Tube nicht im Dichtungssatz enthalten / Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set			413-136	

* Die mit * gekennzeichneten Pos. sind Verschleißteile. / Items marked with * are wearing parts.

** Pos 7, 8 und 94 nicht fetten / ** Do not grease item 7, 8 and 94

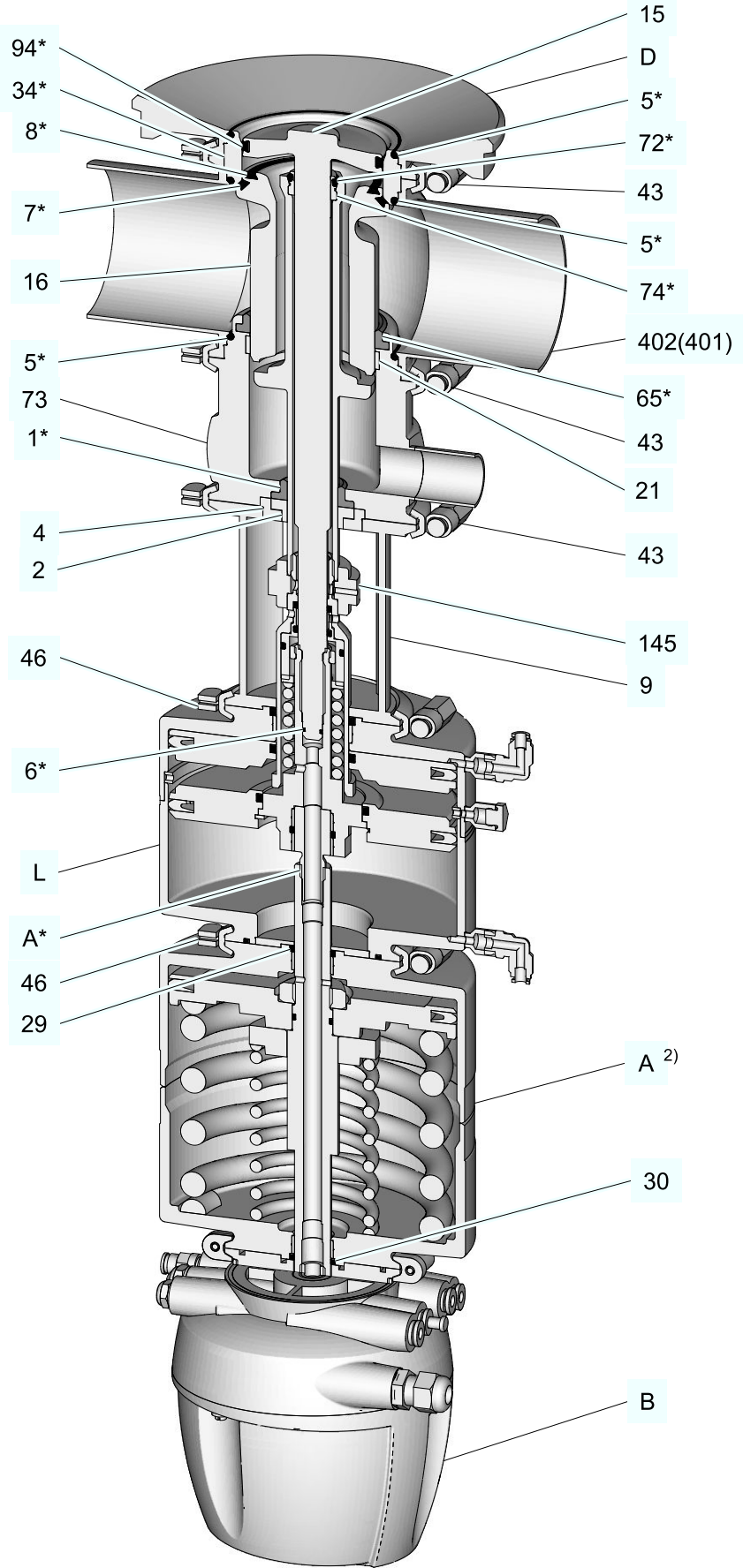
A²⁾ Wenn ein Antrieb als Ersatzteil bestellt wird, muss der Adapter (A*) zusätzlich bestellt und montiert werden.

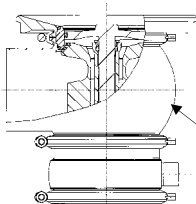
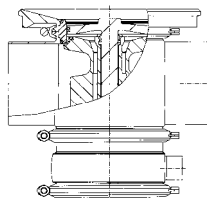
A²⁾ When ordering an actuator as a spare part, the adapter (A*) must be ordered and fitted in addition.

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15 Spare parts list - Mixproof bottom valve T_RC (DN 40 - DN 150)



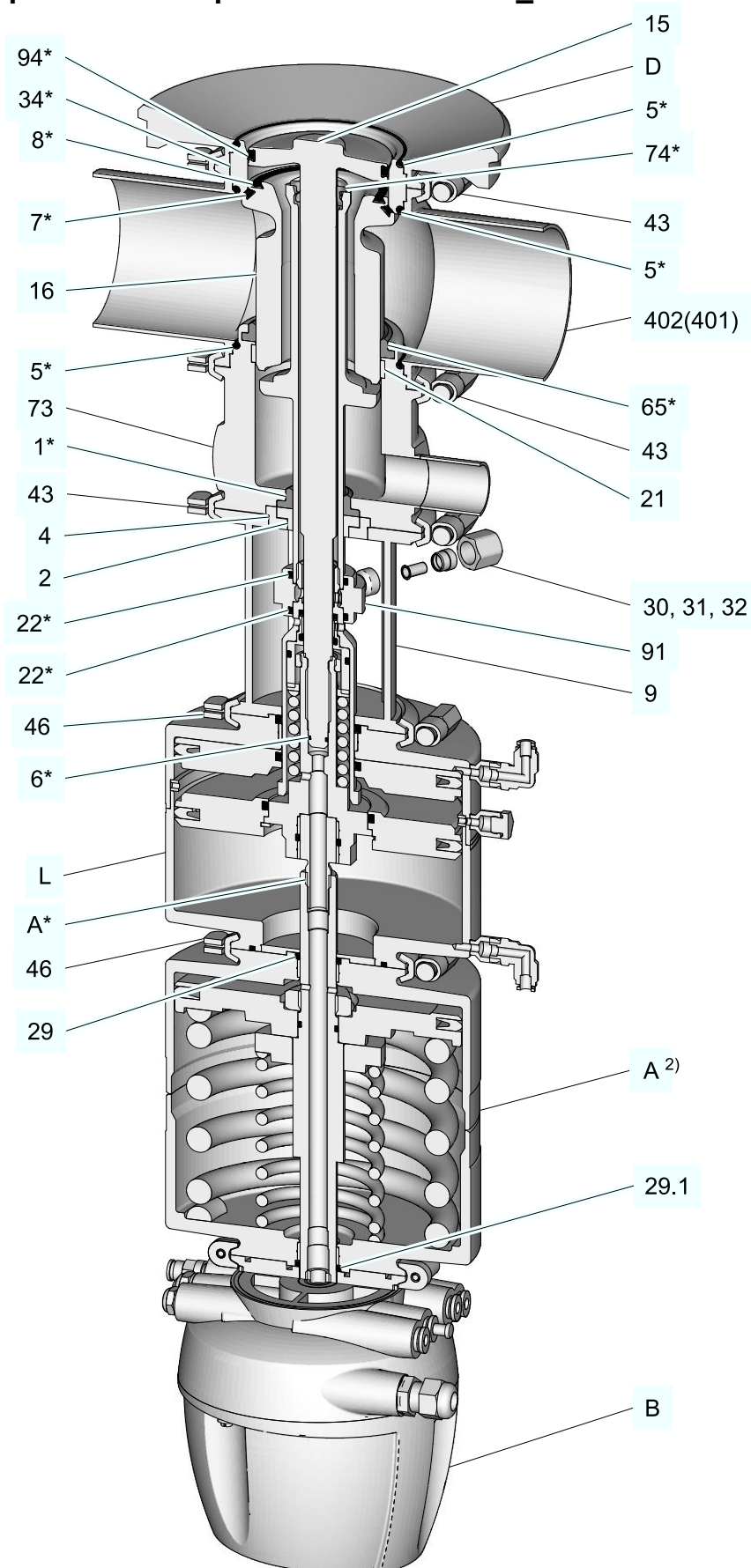
Data/date: 2021-10-12 Seite / Page 2 von / of 5 221ELI001636D_14			Ersatzteilliste / Spare parts list Doppelsitz-Bodenventil T_RC Mixproof Bottom Valve T_RC						
Pos Item	Benennung / Designation	Werkstoff Material	DN 40	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150
Dichtungssatz / sealing set *		EPDM FKM HNBR	221-000822 221-000823 221-004495	221-000822 221-000823 221-004495	221-000824 221-000825 221-004306	221-000824 221-000825 221-004306	221-000826 221-000827 221-004255	221-001123 221-001124 --	221-002829 221-002830 --
¹⁾ 1	Dichtring / sealing ring *	EPDM FKM HNBR	924-085 924-083 924-313	924-085 924-083 924-313	924-085 924-083 924-313	924-085 924-083 924-313	924-085 924-083 924-313	924-088 924-087 --	924-088 924-087 --
¹⁾ 2	Lager / bearing Lager 3A / bearing 3A	PTFE/Kohle SUSTA-PVDF	935-002 935-099	935-002 935-099	935-002 935-099	935-002 935-099	935-002 935-099	935-003 935-102	935-003 935-102
4	Lagerscheibe / bearing disk	1.4301	221-142.03	221-142.03	221-142.03	221-142.03	221-142.03	221-142.04	221-142.04
¹⁾ 5	O-Ring / O-ring *	EPDM FKM HNBR	930-144 930-171 930-633	930-144 930-171 930-633	930-150 930-176 930-634	930-150 930-176 930-634	930-156 930-178 930-863	930-372 930-409 --	930-260 930-259 --
¹⁾ 6	O-Ring / O-ring *	NBR	930-004	930-004	930-004	930-004	930-004	930-007	930-007
¹⁾ 7**	V-Ring / V-ring *	EPDM FKM HNBR	932-021 932-033 932-088	932-021 932-033 932-088	932-024 932-035 932-090	932-024 932-035 932-090	932-028 932-039 932-100	932-060 932-062 --	932-042 932-041 --
¹⁾ 8**	V-Ring / V-ring *	EPDM FKM HNBR	932-019 932-032 932-084	932-019 932-032 932-084	932-023 932-034 932-089	932-023 932-034 932-089	932-027 932-038 932-099	932-059 932-063 --	932-045 932-044 --
9	Laterne DL / lantern DL	1.4301	221-236.16	221-236.01	221-236.02	221-236.24	221-236.04	221-236.06	221-236.32
15	Ventilteller T_R / valve disk T_R	1.4404	221-000673	221-000666	221-000650	221-000680	221-000644	221-001108	221-001937
16	Doppelteller T_R / double disk T_R	1.4404	221-000676	221-000669	221-000663	221-000679	221-000647	221-001107	221-004817
¹⁾ 21	Führungsring / rod guide ring	Turcite	935-056	935-056	935-042	935-042	935-043	935-044	935-072
¹⁾ 21	Führungsring 3A / rod guide ring 3A	MF6	935-117	935-117	935-113	935-113	935-114	935-115	935-118
29	O-Ring / O-ring *	NBR	930-026	930-026	930-026	930-026	930-026	930-035	930-035
30	O-Ring / O-ring *	NBR	930-026	930-026	930-026	930-026	930-026	930-026	930-026
34	Sitzring R / seat ring R	1.4404	221-402.01	221-402.01	221-402.03	221-402.03	221-402.02	221-402.04	221-402.05
43	Klemmverbindung KL / Clamp joint KL	1.4401	221-507.04	221-507.04	221-507.09	221-507.09	221-507.11	221-507.13	221-507.14
46	Klemmverbindung KL / Clamp joint KL	1.4401	221-507.06	221-507.06	221-507.06	221-507.06	221-507.06	221-507.11	221-507.11
¹⁾ 65	Dichtring / sealing ring *	EPDM FKM HNBR	924-305 924-307 924-333	924-305 924-307 924-333	924-296 924-308 924-331	924-296 924-308 924-331	924-254 924-309 924-332	924-262 924-319 --	924-261 924-320 --
¹⁾ 72	O-Ring / O-ring *	EPDM FKM HNBR	930-610 930-662 930-646	930-610 930-662 930-646	930-611 930-663 930-647	930-611 930-663 930-647	930-611 930-663 930-647	930-612 930-664 930-648	930-612 930-664 930-648
73	Leckagegehäuse T_R / leaking housing T_R	1.4404	221-000665	221-000665	221-000641	221-000641	221-000643	221-001110	221-002137
¹⁾ 74	Schnappdichtung D_C / snap sealing D_C *	PVDF	221-000522	221-000522	221-000523	221-000523	221-000523	221-000524	221-000524
¹⁾ 94**	V-Ring RA / V-ring RA *	EPDM FKM HNBR	221-365.07 221-365.10 221-365.18	221-365.07 221-365.10 221-365.18	221-365.08 221-365.11 221-365.20	221-365.08 221-365.11 221-365.20	221-365.09 221-365.12 221-365.19	221-365.14 221-365.15 --	221-365.16 221-365.17 --
145	Leckanzeiger / leakage indicator	1.4301	221-237.43	221-237.43	221-237.43	221-237.43	221-237.43	221-237.44	221-237.44
401	Gehäuse V1 / housing V1	1.4404	221-101.21	221-101.22	221-101.05	221-101.06	221-101.07	221-101.18	221-101.66
402	Gehäuse V2 / housing V2	1.4404	221-102.43	221-102.44	221-102.05	221-102.06	221-102.07	221-102.29	221-102.09
A	Antrieb / actuator		Siehe Ersatzteilliste für Antrieb VARIVENT® / see spare parts list for actuator VARIVENT®						
A*	Adapter / adapter LFT-R	EN AW-6082 T6	221-614.01	221-614.01	221-614.01	221-614.01	221-614.01	221-614.02	221-614.02
B	Steuerkopf T.VIS / control top T.VIS		Siehe Ersatzteilliste für Steuerkopf T.VIS / see spare parts list for control top T.VIS						
	Steuerkopf S / control top S		Siehe Ersatzteilliste für Steuerkopf S / see spare parts list for control top S						
L	Lifantrieb T / lifting actuator T		Siehe Ersatzteilliste für Lifantrieb T / see spare parts list for lifting actuator T						
D	Gehäuseanschluss T / housing connection T		Siehe Ersatzteilliste/Maßblatt für Gehäuseanschluss T (nicht für DN 125 und DN 150) / see spare parts list/dimension sheet of housing connection T (not for DN 125 and DN 150)						
Fett RIVOLTA F.L.G. MD-2 100g Tube nicht im Dichtungssatz enthalten / Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set			413-136						
Die mit * gekennzeichneten Pos. sind im Dichtungssatz enthalten. / Items marked with * are completely contained in sealing set. Die mit ¹⁾ gekennzeichneten Pos. sind Verschleißteile / Items marked with ¹⁾ are wearing parts. ** Pos. 7 und 8 nicht fetten / Do not grease item 7 and 8 A ²⁾ Wenn ein Antrieb als Ersatzteil bestellt wird, muss der Adapter (A*) zusätzlich bestellt und montiert werden.									
Gehäusekombinationen / Housing configurations						401			
						402			

Data/date: 2021-10-12 Seite / Page 3 von / of 5 221ELI001636D_14		Ersatzteilliste / Spare parts list Doppelsitz-Bodenventil T_RC Mixproof Bottom Valve T_RC						
Pos. Item	Benennung / Designation	Werkstoff Material	1 ½" OD	2" OD	2 ½" OD	3" OD	4" OD	6" OD
Dichtungssatz / sealing set *		EPDM FKM HNBR	221-000822 221-000823 221-004495	221-000822 221-000823 221-004495	221-000824 221-000825 221-004306	221-000824 221-000825 221-004306	221-000826 221-000827 221-004255	221-002829 221-002830 --
¹⁾ 1	Dichtring / sealing ring*	EPDM FKM HNBR	924-085 924-083 924-313	924-085 924-083 924-313	924-085 924-083 924-313	924-085 924-083 924-313	924-085 924-083 924-313	924-088 924-087 --
¹⁾ 2	Lager / bearing Lager 3A / bearing 3A	PTFE/Kohle SUSTA-PVDF	935-002 935-099	935-002 935-099	935-002 935-099	935-002 935-099	935-002 935-099	935-003 935-102
4	Lagerscheibe / bearing disk	1.4301	221-142.03	221-142.03	221-142.03	221-142.03	221-142.03	221-142.04
¹⁾ 5	O-Ring / O-ring*	EPDM FKM HNBR	930-144 930-171 930-633	930-144 930-171 930-633	930-150 930-176 930-634	930-150 930-176 930-634	930-156 930-178 930-863	930-260 930-259 --
¹⁾ 6	O-Ring / O-ring*	NBR	930-004	930-004	930-004	930-004	930-004	930-007
¹⁾ 7**	V-Ring / V-ring*	EPDM FKM HNBR	932-021 932-033 932-088	932-021 932-033 932-088	932-024 932-035 932-090	932-024 932-035 932-090	932-028 932-039 932-100	932-042 932-041 --
¹⁾ 8**	V-Ring / V-ring*	EPDM FKM HNBR	932-019 932-032 932-084	932-019 932-032 932-084	932-023 932-034 932-089	932-023 932-034 932-089	932-027 932-038 932-099	932-045 932-044 --
9	Laterne DL / lantern DL	1.4301	221-236.18	221-236.08	221-236.09	221-236.23	221-236.19	221-236.32
15	Ventilteller T_R / valve disk T_R	1.4404	221-000673	221-000666	221-000650	221-000680	221-000644	221-001937
16	Doppelteller T_R / double disk T_R	1.4404	221-000676	221-000669	221-000663	221-000679	221-000647	221-004817
¹⁾ 21	Führungsring / rod guide ring	Turcite	935-056	935-056	935-042	935-042	935-043	935-072
¹⁾ 21	Führungsring 3A / rod guide ring 3A	MF6	935-117	935-117	935-113	935-113	935-114	935-118
29	O-Ring / O-ring*	NBR	930-026	930-026	930-026	930-026	930-026	930-035
30	O-Ring / O-ring*	NBR	930-026	930-026	930-026	930-026	930-026	930-026
34	Sitzring R / seat ring R	1.4404	221-402.01	221-402.01	221-402.03	221-402.03	221-402.02	221-402.05
43	Klemmverbindung KL / Clamp joint KL	1.4401	221-507.04	221-507.04	221-507.09	221-507.09	221-507.11	221-507.14
46	Klemmverbindung KL / Clamp joint KL	1.4401	221-507.06	221-507.06	221-507.06	221-507.06	221-507.06	221-507.11
¹⁾ 65	Dichtring / sealing ring*	EPDM FKM HNBR	924-305 924-307 924-333	924-305 924-307 924-333	924-296 924-308 924-331	924-296 924-308 924-331	924-254 924-043 924-332	924-261 924-320 --
¹⁾ 72	O-Ring / O-ring*	EPDM FKM HNBR	930-610 930-662 930-646	930-610 930-662 930-646	930-611 930-663 930-647	930-611 930-663 930-647	930-611 930-663 930-647	930-612 930-664 930-648
73	Leckagegehäuse T_R / leaking housing T_R	1.4404	221-000665	221-000665	221-000641	221-000641	221-000643	221-002137
¹⁾ 74	Schnappdichtung D_C / snap sealing D_C	PVDF	221-000522	221-000522	221-000523	221-000523	221-000523	221-000524
¹⁾ 94**	V-Ring RA / V-ring RA*	EPDM FKM HNBR	221-365.07 221-365.10 221-365.18	221-365.07 221-365.10 221-365.18	221-365.08 221-365.11 221-365.20	221-365.08 221-365.11 221-365.20	221-365.09 221-365.12 221-365.19	221-365.16 221-365.17 --
145	Leckanzeiger / leakage indicator	1.4301	221-237.43	221-237.43	221-237.43	221-237.43	221-237.43	221-237.44
401	Gehäuse V1 / housing V1	1.4404	221-101.28	221-101.29	221-101.30	221-101.31	221-101.32	221-101.72
402	Gehäuse V2 / housing V2	1.4404	221-102.53	221-102.54	221-102.55	221-102.56	221-102.57	221-102.58
A	Antrieb / actuator		Siehe Ersatzteilliste für Antrieb VARIVENT® / see spare parts list for actuator VARIVENT®					
A*	Adapter / adapter LFT-R	EN AW-6082 T6	221-614.01	221-614.01	221-614.01	221-614.01	221-614.01	221-614.02
B	Steuerkopf T.VIS / control top T.VIS Steuerkopf S / control top S		Siehe Ersatzteilliste für Steuerkopf T.VIS / see spare parts list for control top T.VIS Siehe Ersatzteilliste für Steuerkopf S / see spare parts list for control top S					
L	Lifantrieb T / lifting actuator T		Siehe Ersatzteilliste für Lifantrieb T / see spare parts list for lifting actuator T					
D	Gehäuseanschluss T / housing connection T		Siehe Ersatzteilliste/Maßblatt für Gehäuseanschluss T / see spare parts list/dimension sheet of housing connection T					
Fett RIVOLTA F.L.G. MD-2 100g Tube nicht im Dichtungssatz enthalten / Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set			413-136					
Die mit * gekennzeichneten Pos. sind im Dichtungssatz enthalten. / Items marked with * are completely contained in sealing set. Die mit ¹⁾ gekennzeichneten Pos. sind Verschleißteile / Items marked with ¹⁾ are wearing parts. ** Pos. 7 und 8 nicht fetten / Do not grease item 7 and 8 A²⁾ Wenn ein Antrieb als Ersatzteil bestellt wird, muss der Adapter (A*) zusätzlich bestellt und montiert werden.								

Data/date: 2021-10-12 Seite / Page 4 von / of 5 221ELI001636D_14		Ersatzteilliste / Spare parts list Doppelsitz-Bodenventil T_RC Mixproof Bottom Valve T_RC				
Pos Item	Benennung / Designation	Werkstoff Material	2" IPS	3" IPS	4" IPS	6" IPS
Dichtungssatz / sealing set *		EPDM FKM HNBR	221-000822 221-000823 221-004495	221-000824 221-000825 221-004306	221-000826 221-000827 221-004255	221-002829 221-002830 --
¹⁾ 1	Dichtring / sealing ring *	EPDM FKM HNBR	924-085 924-083 924-313	924-085 924-083 924-313	924-085 924-083 924-313	924-088 924-087 --
¹⁾ 2	Lager / bearing Lager 3A / bearing 3A	PTFE/Kohle SUSTA-PVDF	935-002 935-099	935-002 935-099	935-002 935-099	935-003 935-101
4	Lagerscheibe / bearing disk	1.4301	221-142.03	221-142.03	221-142.03	221-142.04
¹⁾ 5	O-Ring / O-ring *	EPDM FKM HNBR	930-144 930-171 930-633	930-150 930-176 930-634	930-156 930-178 930-863	930-260 930-259 --
¹⁾ 6	O-Ring / O-ring *	NBR	930-004	930-004	930-004	930-007
¹⁾ 7**	V-Ring / V-ring *	EPDM FKM HNBR	932-021 932-033 932-088	932-024 932-035 932-090	932-028 932-039 932-100	932-042 932-041 --
¹⁾ 8**	V-Ring / V-ring *	EPDM FKM HNBR	932-019 932-032 932-084	932-023 932-034 932-089	932-027 932-038 932-099	932-045 932-044 --
9	Laterne DL / lantern DL	1.4301	221-236.01	221-236.24	221-236.04	221-236.05
15	Ventilteller T_R / valve disk T_R	1.4404	221-002072	221-002073	221-002074	221-001937
16	Doppelteller T_R / double disk T_R	1.4404	221-002061	221-002064	221-002067	221-002516
¹⁾ 21	Führungsring / rod guide ring	Turcite	935-056	935-042	935-043	935-072
¹⁾ 21	Führungsring 3A / rod guide ring 3A	MF6	935-117	935-113	935-114	935-118
29	O-Ring / O-ring *	NBR	930-026	930-026	930-026	930-035
30	O-Ring / O-ring *	NBR	930-026	930-026	930-026	930-026
34	Sitzring R / seat ring R	1.4404	221-402.01	221-402.03	221-402.02	221-402.05
43	Klemmverbindung KL / Clamp joint KL	1.4401	221-507.04	221-507.03	221-507.11	221-507.14
46	Klemmverbindung KL / Clamp joint KL	1.4401	221-507.06	221-507.09	221-507.06	221-507.11
¹⁾ 65	Dichtring / sealing ring *	EPDM FKM HNBR	924-305 924-307 924-333	924-296 924-308 924-331	924-254 924-309 924-332	924-261 924-320 --
¹⁾ 72	O-Ring / O-ring *	EPDM FKM HNBR	930-610 930-662 930-646	930-611 930-663 930-647	930-611 930-663 930-647	930-612 930-664 930-648
73	Leckagegehäuse T_R / leaking housing T_R	1.4404	221-000665	221-000641	221-000643	221-002137
¹⁾ 74	Schnappdichtung D_C / snap sealing D_C *	PVDF	221-000522	221-000523	221-000523	221-000524
¹⁾ 94**	V-Ring RA / V-ring RA *	EPDM FKM HNBR	221-365.07 221-365.10 221-365.18	221-365.08 221-365.11 221-365.20	221-365.09 221-365.12 221-365.19	221-365.16 221-365.17 --
145	Leckanzeiger / leakage indicator	1.4301	221-237.43	221-237.43	221-237.43	221-237.44
401	Gehäuse V1 / housing V1	1.4404	221-101.37	221-101.35	221-101.36	221-101.17
402	Gehäuse V2 / housing V2	1.4404	221-102.62	221-102.59	221-102.60	221-102.17
A	Antrieb / actuator		Siehe Ersatzteilliste für Antrieb VARIVENT® / see spare parts list for actuator VARIVENT®			
A*	Adapter / adapter LFT-R	EN AW-6082 T6	221-614.01	221-614.01	221-614.01	221-614.02
B	Steuerkopf T.VIS / control top T.VIS		Siehe Ersatzteilliste für Steuerkopf T.VIS / see spare parts list for control top T.VIS			
	Steuerkopf S / Control top S		Siehe Ersatzteilliste für Steuerkopf S / see spare parts list for control top S			
L	Lifantrieb T / lifting actuator T		Siehe Ersatzteilliste für Lifantrieb T / see spare parts list for lifting actuator T			
D	Gehäuseanschluss T / housing connection T		Siehe Ersatzteilliste/Maßblatt für Gehäuseanschluss T (nicht für 6" IPS) / see spare parts list/dimension sheet of housing connection T (not for 6" IPS)			
Fett RIVOLTA F.L.G. MD-2 100g Tube nicht im Dichtungssatz enthalten / Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set			413-136			
Die mit * gekennzeichneten Pos. sind im Dichtungssatz enthalten. / Items marked with * are completely contained in sealing set. Die mit ¹⁾ gekennzeichneten Pos. sind Verschleißteile / Items marked with ¹⁾ are wearing parts. ** Pos. 7 und 8 nicht fetten / Do not grease item 7 and 8 A²⁾ Wenn ein Antrieb als Ersatzteil bestellt wird, muss der Adapter (A*) zusätzlich bestellt und montiert werden.						

Data/date: 2021-10-12 Seite / Page 5 von / of 5 221ELI001636D_14		Ersatzteilliste / Spare parts list Doppelsitz-Bodenventil T_RC Mixproof Bottom Valve T_RC						
Dichtungen für VARIVENT® Doppelsitzventil Typ T_RC Seals for VARIVENT® Mixproof Valve Type T_RC								
Pos Item	Stück Qty	Bezeichnung Designation	Werkstoff Material	DN 40/50 1 1/2"/2"	DN 65/80 2 1/2"/3"	DN 100 4"	DN125	DN150 6"
1	1	Dichtring Seal ring	Ø	28	28	28	35	35
			EPDM	924-085	924-085	924-085	924-088	924-088
			FKM	924-083	924-083	924-083	924-087	924-087
			HNBR	924-313	924-313	924-313	--	--
5	4	O-Ring O-ring	Ø	60x3	85x4	113x4	138x4	158x5
			EPDM	930-144	930-150	930-156	930-372	930-260
			FKM	930-171	930-176	930-178	930-409	930-259
			HNBR	930-633	930-634	930-863	--	--
6	1	O-Ring O-ring	Ø	8x1,6	8x1,6	8x1,6	9x3	9x3
			NBR	930-004	930-004	930-004	930-007	930-007
**7	1	V-Ring V-ring	Ø	52-6	76-6	104-6	128-6	148-6
			EPDM	932-021	932-024	932-028	932-060	932-042
			FKM	932-033	932-035	932-039	932-062	932-041
			HNBR	932-088	932-090	932-100	--	--
**8	2	V-Ring V-ring	Ø	44-6	68-6	96-6	120-6	140-6
			EPDM	932-019	932-023	932-027	932-059	932-045
			FKM	932-032	932-034	932-038	932-063	932-044
			HNBR	932-084	932-089	932-099	--	--
29	1	O-Ring O-ring	Ø	20x3	20x3	20x3	25x3	25x3
				930-026	930-026	930-026	930-035	930-035
30	1	O-Ring O-ring	Ø	20x3	20x3	20x3	20x3	20x3
				930-026	930-026	930-026	930-026	930-026
65	1	Dichtring Seal ring	Ø	46	69	97	122	142
			EPDM	924-305	924-296	924-254	924-262	924-261
			FKM	924-307	924-308	924-309	924-319	924-320
			HNBR	924-333	924-331	924-332	--	--
72	1	O-Ring O-ring	Ø	46	69	97	122	142
			EPDM	930-610	930-611	930-611	930-612	930-612
			FKM	930-662	930-663	930-663	930-664	930-664
			HNBR	930-646	930-647	930-647	930-648	930-648
74	1	Schnappdichtung Snap seal	Ø	DN 50	DN 100	DN 100	6"	6"
			PVDF					
**94	1	V-Ring RA / V-ring RA	Ø	54.3	78.5	106.5	131.5	151.5
			EPDM	221-365.07	221-365.08	221-365.09	221-365.14	221-365.16
			FKM	221-365.10	221-365.11	221-365.12	221-365.15	221-365.17
			HNBR	221-365.18	221-365.20	221-365.19	--	--
Dichtungssatz kpl. Seal set cpl.			Werkstoff Material	DN 40/50 1 1/2"/2"	DN 65/80 2 1/2"/3"	DN 100 4"	DN125	DN150 6"
			EPDM	221-000822	221-000824	221-000826	221-001123	221-002829
			FKM	221-000823	221-000825	221-000827	221-001124	221-002830
			HNBR	221-004495	221-004306	221-004255	--	--
Fett RIVOLTA F.L.G. MD-2 100g Tube nicht im Dichtungssatz enthalten / Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set				413-136				
** Pos. 7 und 8 nicht fetten ** Pos. 7 und 8 nicht fetten / Do not grease item 7 and 8								
Lagerungshinweis: Lagerung gemäß DIN 7716 relative Luftfeuchtigkeit ca. 65%, Temperatur 15-25° C und lichtgeschützt Storage Instruction: Storage acc. DIN 7716 relative humidity of air approx. ca. 65%, temperature between 15-25° C (59-77° F), storage to be light protected Beim Austausch der Dichtungen die Hinweise der Betriebsanleitung beachten! Observe the operating instructions when replacing the seals!								
429-040								

16 Spare parts list - Mixproof bottom valve T_RL



Datum / date: 2021-10-12 Seite / Page 2 von / of 5 221ELI003637G_12	Ersatzteilliste / Spare parts list Doppelsitz-Bodenventil T_RL Mixproof Bottom Valve T_RL	
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Pos. Item	Benennung / Designation	Werkstoff Material	DN 40	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150
	Dichtungssatz / sealing set *	EPDM FKM HNBR	221-000828 221-000829 221-004208	221-000828 221-000829 221-004208	221-000830 221-000831 221-004211	221-000830 221-000831 221-004211	221-000832 221-000833 221-004212	221-001125 221-001126 --	221-002831 221-002833 --
¹⁾ 1	Dichtring / sealing ring *	EPDM FKM HNBR	924-085 924-083 924-313	924-085 924-083 924-313	924-085 924-083 924-313	924-085 924-083 924-313	924-085 924-083 924-313	924-088 924-087 --	924-088 924-087 --
¹⁾ 2	Lager / bearing Lager 3A / bearing 3A	PTFE/Kohle SUSTA-PVDF	935-002 935-099	935-002 935-099	935-002 935-099	935-002 935-099	935-002 935-099	935-003 935-102	935-003 935-102
4	Lagerscheibe / bearing disk	1.4301	221-142.03	221-142.03	221-142.03	221-142.03	221-142.03	221-142.04	221-142.04
¹⁾ 5	O-Ring / O-ring *	EPDM FKM HNBR	930-144 930-171 930-633	930-144 930-171 930-633	930-150 930-176 930-634	930-150 930-176 930-634	930-156 930-178 930-863	930-372 930-409 --	930-260 930-259 --
¹⁾ 6	O-Ring / O-ring *	NBR	930-004	930-004	930-004	930-004	930-004	930-007	930-007
¹⁾ 7**	V-Ring / V-ring *	EPDM FKM HNBR	932-021 932-033 932-088	932-021 932-033 932-088	932-024 932-035 932-090	932-024 932-035 932-090	932-028 932-039 932-100	932-060 932-062 --	932-042 930-041 --
¹⁾ 8**	V-Ring / V-ring *	EPDM FKM HNBR	932-019 932-032 932-084	932-019 932-032 932-084	932-023 932-034 932-089	932-023 932-034 932-089	932-027 932-038 932-099	932-059 932-063 --	932-045 932-044 --
9	Laterne DL / lantern DL	1.4301	221-236.16	221-236.01	221-236.02	221-236.24	221-236.04	221-236.06	221-236.26
15	Ventilteller T_R / valve disk T_R	1.4404	221-000673	221-000666	221-000650	221-000680	221-000644	221-001108	221-001937
16	Doppelteller T_R / double disk T_R	1.4404	221-000373	221-000669	221-000663	221-000679	221-000647	221-001107	221-004817
¹⁾ 21	Führungsring / rod guide ring	Turcite	935-056	935-056	935-042	935-042	935-043	935-044	935-072
¹⁾ 21	Führungsring 3A / rod guide ring 3A	MF6	935-117	935-117	935-113	935-113	935-114	935-115	935-118
¹⁾ 22	O-Ring / O-ring *	EPDM FKM HNBR	930-243 930-244 930-640	930-243 930-244 930-640	930-243 930-244 930-640	930-243 930-244 930-640	930-243 930-244 930-640	930-356 930-357 --	930-356 930-357 --
29	O-Ring / O-ring *	NBR	930-026	930-026	930-026	930-026	930-026	930-035	930-035
29.1	O-Ring / O-ring *	NBR	930-026	930-026	930-026	930-026	930-026	930-026	930-026
30	Überwurfmutter / cap nut	1.4571	933-456	933-456	933-456	933-456	933-456	933-482	933-482
31	Schneidring / cutting ring	1.4571	933-455	933-455	933-455	933-455	933-455	933-481	933-481
32	Stützhülse / support sleeve	1.4571	933-382	933-382	933-382	933-382	933-382	933-385	933-385
34	Sitzring / seat ring	1.4404	221-402.01	221-402.01	221-402.03	221-402.03	221-402.02	221-402.04	221-402.05
43	Klemmverbindung KL Clamp joint KL	1.4401	221-507.04	221-507.04	221-507.09	221-507.09	221-507.11	221-507.13	221-507.14
46	Klemmverbindung KL Clamp joint KL	1.4401	221-507.06	221-507.06	221-507.06	221-507.06	221-507.06	221-507.11	221-507.11
¹⁾ 65	Dichtring / sealing ring *	EPDM FKM HNBR	924-305 924-307 924-333	924-305 924-307 924-333	924-296 924-308 924-331	924-296 924-308 924-331	924-254 924-309 924-332	924-262 924-319 --	924-261 924-320 --
73	Leckagegehäuse T_R / leaking housing T_R	1.4404	221-000665	221-000665	221-000641	221-000641	221-000643	221-001110	221-002137
¹⁾ 74	Reinigungsdüse / cleaning nozzle	PVDF	221-334.01	221-334.01	221-334.02	221-334.02	221-334.02	221-334.03	221-334.03
91	Reinigungsanschluss / cleaning connection	1.4301	221-237.08	221-237.08	221-237.08	221-237.08	221-237.08	221-237.25	221-237.25
¹⁾ 94**	V-Ring RA / V-ring RA *	EPDM FKM HNBR	221-365.07 221-365.10 221-365.18	221-365.07 221-365.10 221-365.18	221-365.08 221-365.11 221-365.20	221-365.08 221-365.11 221-365.20	221-365.09 221-365.12 221-365.19	221-365.14 221-365.15 --	221-365.16 221-365.17 --
401	Gehäuse V1 / housing V1	1.4404	221-101.21	221-101.22	221-101.05	221-101.06	221-101.07	221-101.18	221-101.66
402	Gehäuse V2 / housing V2	1.4404	221-102.43	221-102.44	221-102.05	221-102.06	221-102.07	221-102.29	221-102.09
A	Antrieb / actuator	Siehe Ersatzteilliste für Antrieb VARIVENT® / see spare parts list for actuator VARIVENT®							
A*	Adapter LFT-R / adapter LFT-R	EN AW-6082 T6	221-614.01	221-614.01	221-614.01	221-614.01	221-614.01	221-614.02	221-614.02
B	Steuerkopf T.VIS / control top T.VIS Steuerkopf S / Control top S	Siehe Ersatzteilliste für Steuerkopf T.VIS / see spare parts list for control top T.VIS Siehe Ersatzteilliste für Steuerkopf S / see spare parts list for control top S							
L	Lifantrieb T / lifting actuator T	Siehe Ersatzteilliste für Lifantrieb T / see spare parts list for lifting actuator T							
D	Gehäuseanschluss T / housing connection T	Siehe Ersatzteilliste/Maßblatt für Gehäuseanschluss T (nicht für DN 125 und DN 150) / see spare parts list/dimension sheet of housing connection T (not for DN 125 and DN 150)							
Fett RIVOLTA F.L.G. MD-2 100g Tube nicht im Dichtungssatz enthalten / Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set					413-136				

Die mit * gekennzeichneten Pos. sind im Dichtungssatz enthalten. / Items marked with * are completely contained in sealing set.

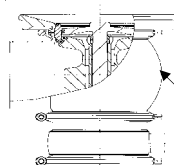
Die mit ¹⁾ gekennzeichneten Pos. sind Verschleißteile / Items marked with ¹⁾ are wearing parts.

** Pos. 7, 8 und 94 nicht fetten / Do not grease item 7, 8 and 94

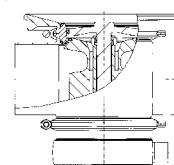
A²⁾ Wenn ein Antrieb als Ersatzteil bestellt wird, muss der Adapter (A*) zusätzlich bestellt und montiert werden.

A²⁾ When ordering an actuator as a spare part, the adapter (A*) must be ordered and fitted in addition.

Gehäusekombinationen / Housing configurations



401



402

Datum / date: 2021-10-12 Seite / Page 3 von / of 5 221ELI003637G_12		Ersatzteilliste / Spare parts list Doppelsitz-Bodenventil T_RL Mixproof Bottom Valve T_RL						
Pos. Item	Benennung / Designation	Werkstoff Material	1 ½" OD	2" OD	2 ½" OD	3" OD	4" OD	6" OD
Dichtungssatz / sealing set *		EPDM FKM HNBR	221-000828 221-000829 221-004208	221-000828 221-000829 221-004208	221-000830 221-000831 221-004211	221-000830 221-000831 221-004211	221-000832 221-000833 221-004212	221-002831 221-002833 --
¹⁾ 1	Dichtring / sealing ring *	EPDM FKM HNBR	924-085 924-083 924-313	924-085 924-083 924-313	924-085 924-083 924-313	924-085 924-083 924-313	924-085 924-083 924-313	924-085 924-083 924-313
¹⁾ 2	Lager / bearing Lager 3A / bearing 3A	PTFE /Kohle SUSTA-PVDF	935-002 935-099	935-002 935-099	935-002 935-099	935-002 935-099	935-002 935-099	935-002 935-099
4	Lagerscheibe / bearing disk	1.4301	221-142.03	221-142.03	221-142.03	221-142.03	221-142.03	221-142.03
¹⁾ 5	O-Ring / O-ring *	EPDM FKM HNBR	930-144 930-171 930-633	930-144 930-171 930-633	930-150 930-176 930-634	930-150 930-176 930-634	930-156 930-178 930-863	930-156 930-178 930-863
¹⁾ 6	O-Ring / O-ring *	NBR	930-004	930-004	930-004	930-004	930-004	930-004
¹⁾ 7**	V-Ring / V-ring *	EPDM FKM HNBR	932-021 932-033 932-088	932-021 932-033 932-088	932-024 932-035 932-090	932-024 932-035 932-090	932-028 932-039 932-100	932-028 932-039 932-100
¹⁾ 8**	V-Ring / V-ring *	EPDM FKM HNBR	932-019 932-032 932-084	932-019 932-032 932-084	932-023 932-034 932-089	932-023 932-034 932-089	932-027 932-038 932-100	932-027 932-038 932-100
9	Laterne DL / lantern DL	1.4301	221-236.18	221-236.08	221-236.09	221-236.23	221-236.19	221-236.32
15	Ventilteller T_R / valve disk T_R	1.4404	221-000673	221-000666	221-000650	221-000680	221-000644	221-001937
16	Doppelteller T_R / double disk T_R	1.4404	221-000676	221-000669	221-000663	221-000679	221-000647	221-004817
¹⁾ 21	Führungsring / rod guide ring	Turcite	935-056	935-056	935-042	935-042	935-043	935-043
¹⁾ 21	Führungsring 3A / rod guide ring 3A	MF6	935-117	935-117	935-113	935-113	935-114	935-114
¹⁾ 22	O-Ring / O-ring *	EPDM FKM HNBR	930-243 930-244 930-640	930-243 930-244 930-640	930-243 930-244 930-640	930-243 930-244 930-640	930-243 930-244 930-640	930-243 930-244 930-640
29	O-Ring / O-ring *	NBR	930-026	930-026	930-026	930-026	930-026	930-035
29.1	O-Ring / O-ring *	NBR	930-026	930-026	930-026	930-026	930-026	930-026
30	Überwurfmutter / cap nut	1.4571	933-456	933-456	933-456	933-456	933-456	933-456
31	Schneidring / cutting ring	1.4571	933-455	933-455	933-455	933-455	933-455	933-455
32	Stützhülse / support sleeve	1.4571	933-382	933-382	933-382	933-382	933-382	933-382
34	Sitzring D / seat ring D	1.4404	221-402.01	221-402.01	221-402.03	221-402.03	221-402.02	221-402.02
43	Klemmverbindung KL	1.4401	221-507.04	221-507.04	221-507.09	221-507.09	221-507.11	221-507.14
46	Klemmverbindung KL	1.4401	221-507.06	221-507.06	221-507.06	221-507.06	221-507.06	221-507.11
¹⁾ 65	Dichtring / sealing ring*	EPDM FKM HNBR	924-305 924-307 924-333	924-305 924-307 924-333	924-296 924-308 924-331	924-296 924-308 924-331	924-254 924-309 924-332	924-261 924-320 --
73	Leckagegehäuse / T_R Leaking housing T_R	1.4404	221-000665	221-000665	221-000641	221-000641	221-000643	221-000643
¹⁾ 74	Reinigungsdüse / cleaning nozzle	PVDF	221-334.01	221-334.01	221-334.02	221-334.02	221-334.02	221-334.02
91	Reinigungsanschluss / cleaning connection	1.4301	221-237.08	221-237.08	221-237.08	221-237.08	221-237.08	221-237.08
¹⁾ 94**	V-Ring RA / * V-ring RA	EPDM FKM HNBR	221-365.07 221-365.10 221-365.18	221-365.07 221-365.10 221-365.18	221-365.08 221-365.11 221-365.20	221-365.08 221-365.11 221-365.20	221-365.09 221-365.12 221-365.19	221-365.09 221-365.12 221-365.19
401	Gehäuse V1 / housing V1	1.4404	221-101.28	221-101.29	221-101.30	221-101.31	221-101.32	221-101.72
402	Gehäuse V2 / housing V2	1.4404	221-102.53	221-102.54	221-102.55	221-102.56	221-102.57	221-102.58
A	Antrieb / actuator		Siehe Ersatzteilliste für Antrieb VARIVENT® / see spare parts list for actuator VARIVENT®					
A*	Adapter LFT-R / adapterLFT-R	EN AW- 6082 T6	221-614.01	221-614.01	221-614.01	221-614.01	221-614.01	221-614.02
B	Steuerkopf T.VIS / control top T.VIS Steuerkopf S / control top S		Siehe Ersatzteilliste für Steuerkopf T.VIS / see spare parts list for control top T.VIS Siehe Ersatzteilliste für Steuerkopf S / see spare parts list for control top S					
L	Lifantrieb T / lifting actuator T		Siehe Ersatzteilliste für Lifantrieb T / see spare parts list for lifting actuator T					
D	Gehäuseanschluss T / housing connection T		Siehe Ersatzteilliste/Maßblatt Gehäuseanschluss T / see spare parts list/dimension sheet housing connection T					
Fett RIVOLTA F.L.G. MD-2 100g Tube nicht imDichtungssatz enthalten / Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set					413-136			
Die mit * gekennzeichneten Pos. sind im Dichtungssatz enthalten. / Items marked with * are completely contained in sealing set. Die mit ¹⁾ gekennzeichneten Pos. sind Verschleißteile / Items marked with ¹⁾ are wearing parts. ** Pos. 7, 8 und 94 nicht fetten / Do not grease item 7, 8 and 94 A ²⁾ Wenn ein Antrieb als Ersatzteil bestellt wird, muss der Adapter (A*) zusätzlich bestellt und montiert werden. A ²⁾ When ordering an actuator as a spare part, the adapter (A*) must be ordered and fitted in addition.								

Datum / date: 2021-10-12 Seite / Page 4 von / of 5 221ELI003637G_12		Ersatzteilliste / Spare parts list Doppelsitz-Bodenventil T_RL Mixproof Bottom Valve T_RL				
Pos. Item	Benennung / Designation	Werkstoff Material	2" IPS	3" IPS	4" IPS	6" IPS
Dichtungssatz / sealing set *		EPDM FKM HNBR	221-000828 221-000829 221-004208	221-000830 221-000831 221-004211	221-000832 221-000833 221-004212	221-002831 221-002833 --
¹⁾ 1	Dichtring / sealing ring *	EPDM FKM HNBR	924-085 924-083 924-313	924-085 924-083 924-313	924-085 924-083 924-313	924-088 924-087 --
¹⁾ 2	Lager / bearing Lager 3A / bearing 3A	PTFE/Kohle SUSTA-PVDF	935-002 935-099	935-002 935-099	935-002 935-099	935-003 935-102
4	Lagerscheibe / bearing disk	1.4301	221-142.03	221-142.03	221-142.03	221-142.04
¹⁾ 5	O-Ring / O-ring *	EPDM FKM HNBR	930-144 930-171 930-633	930-150 930-176 930-634	930-156 930-178 930-863	930-260 930-259 --
¹⁾ 6	O-Ring / O-ring *	NBR	930-004	930-004	930-004	930-007
¹⁾ 7**	V-Ring / V-ring *	EPDM FKM HNBR	932-021 932-033 932-088	932-024 932-035 932-090	932-028 932-039 932-100	932-042 930-041 --
¹⁾ 8**	V-Ring / V-ring *	EPDM FKM HNBR	932-019 932-032 932-084	932-023 932-034 932-089	932-027 932-038 932-099	932-045 932-044 --
9	Laterne DL / lantern DL	1.4301	221-236.01	221-236.24	221-236.04	221-236.05
15	Ventilteller T_R / valve disk T_R	1.4404	221-002072	221-002073	221-002074	221-001937
16	Doppelteller T_R / double disk T_R	1.4404	221-002061	221-002064	221-002067	221-002516
¹⁾ 21	Führungsring / rod guide ring	Turcite	935-056	935-042	935-043	935-072
¹⁾ 21	Führungsring 3A / rod guide ring 3A	MF6	935-117	935-113	935-114	935-118
¹⁾ 22	O-Ring / O-ring *	EPDM FKM HNBR	930-243 930-244 930-640	930-243 930-244 930-640	930-243 930-244 930-640	930-356 930-357 --
29	O-Ring / O-ring *	NBR	930-026	930-026	930-026	930-035
29.1	O-Ring / O-ring *	NBR	930-026	930-026	930-026	930-026
30	Überwurfmutter / cap nut	1.4571	933-456	933-456	933-456	933-482
31	Schneidring / cutting ring	1.4571	933-455	933-455	933-455	933-481
32	Stützhülse / support sleeve	1.4571	933-382	933-382	933-382	933-385
34	Sitzring / seat ring	1.4404	221-402.01	221-402.03	221-402.02	221-402.05
43	Klemmverbindung KL Clamp joint KL	1.4401	221-507.04	221-507.03	221-507.11	221-507.14
46	Klemmverbindung KL Clamp joint KL	1.4401	221-507.06	221-507.09	221-507.06	221-507.11
¹⁾ 65	Dichtring / sealing ring *	EPDM FKM HNBR	924-305 924-307 924-333	924-296 924-308 924-331	924-254 924-309 924-332	924-261 924-320 --
73	Leckagegehäuse T_R / leaking housing T_R	1.4404	221-000665	221-000641	221-000643	221-002137
¹⁾ 74	Reinigungsdüse / cleaning nozzle	PVDF	221-334.01	221-334.02	221-334.02	221-334.03
91	Reinigungsanschluss / cleaning connection	1.4301	221-237.08	221-237.08	221-237.08	221-237.25
¹⁾ 94**	V-Ring RA / V-ring R_A *	EPDM FKM HNBR	221-365.07 221-365.10 221-365.18	221-365.08 221-365.11 221-365.20	221-365.09 221-365.12 221-365.19	221-365.16 221-365.17 --
401	Gehäuse V1 / housing V1	1.4404	221-101.37	221-101.35	221-101.36	221-101.17
402	Gehäuse V2 / housing V2	1.4404	221-102.62	221-102.59	221-102.60	221-102.17
A	Antrieb / actuator		Siehe Ersatzteilliste für Antrieb VARIVENT® / see spare parts list for actuator VARIVENT®			
A*	Adapter LFT-R / adapter LFT-R	EN AW-6082 T6	221-614.01	221-614.01	221-614.01	221-614.02
B	Steuerkopf T.VIS / control top T.VIS Steuerkopf S / control top S		Siehe Ersatzteilliste für Steuerkopf T.VIS / see spare parts list for control top T.VIS Siehe Ersatzteilliste für Steuerkopf S / see spare parts list for control top S			
L	Lifantrieb T / lifting actuator T		Siehe Ersatzteilliste für Lifantrieb T / see spare parts list for lifting actuator T			
D	Gehäuseanschluss T / housing connection T		Siehe Ersatzteilliste/Maßblatt für Gehäuseanschluss T (nicht für 6"IPS) / see spare parts list/dimension sheet of housing connection T (not for 6"IPS)			
Fett RIVOLTA F.L.G. MD-2 100g Tube nicht im Dichtungssatz enthalten / Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set			413-136			
Die mit * gekennzeichneten Pos. sind im Dichtungssatz enthalten. / Items marked with * are completely contained in sealing set. Die mit ¹⁾ gekennzeichneten Pos. sind Verschleißteile / Items marked with ¹⁾ are wearing parts. ** Pos. 7, 8 und 94 nicht fetten / Do not grease item 7, 8 and 94 A ²⁾ Wenn ein Antrieb als Ersatzteil bestellt wird, muss der Adapter (A*) zusätzlich bestellt und montiert werden. A ²⁾ When ordering an actuator as a spare part, the adapter (A*) must be ordered and fitted in addition.						

Datum / date: 2021-10-12 Seite / Page 5 von / of 5 221ELI003637G_12	Ersatzteilliste / Spare parts list Doppelsitz-Bodenventil T_RL Mixproof Bottom Valve T_RL	
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Dichtungen für VARIVENT® Doppelsitz-Bodenventil Typ T_RL Seals for VARIVENT® Mixproof Bottom Valve Type T_RL								
Pos. Item	Stück Qty	Benennung / Designation	Werkstoff Material	DN40/50 1½"/2"	DN65/80 2½"/3"	DN100 4"	DN125	DN150 6"
1	1	Dichtring Seal ring	Ø	28	28	28	35	35
			EPDM	924-085	924-085	924-085	924-088	924-088
			FKM	924-083	924-083	924-083	924-087	924-087
			HNBR	924-313	924-313	924-313	--	--
5	3	O-Ring O-ring	Ø	60x3	85x4	113x4	138x4	158x5
			EPDM	930-144	930-150	930-156	930-372	930-260
			FKM	930-171	930-176	930-178	930-409	930-259
			HNBR	930-633	930-634	930-863	--	--
6	1	O-Ring O-ring	Ø	8x1,6	8x1,6	8x1,6	9x3	9x3
			NBR	930-004	930-004	930-004	930-007	930-007
**7	1	V-Ring V-ring	Ø	52-6	76-6	104-6	128-6	140-6
			EPDM	932-021	932-024	932-028	932-060	932-042
			FKM	932-033	932-035	932-039	932-062	932-041
			HNBR	932-088	932-090	932-099	--	--
**8	1	V-Ring V-ring	Ø	44-6	68-6	96-6	120-6	140-6
			EPDM	932-019	932-023	932-027	932-059	932-045
			FKM	932-032	932-034	932-038	932-063	932-044
			HNBR	932-084	932-089	932-100	--	--
22	2	O-Ring O-ring	Ø	28x3	28x3	28x3	35x3	35x3
			EPDM	930-243	930-243	930-243	930-356	930-356
			FKM	930-244	930-244	930-244	930-357	930-357
			HNBR	930-640	930-640	930-640	--	--
29	1	O-Ring / O-ring	Ø	20x3	20x3	20x3	25x3	25x3
			NBR	930-026	930-026	930-026	930-035	930-035
29.1	1	O-Ring / O-ring	Ø	20x3	20x3	20x3	20x3	20x3
			NBR	930-026	930-026	930-026	930-026	930-026
65	1	Dichtring Seal ring	Ø	46	69	97	122	142
			EPDM	924-305	924-296	924-254	924-262	924-261
			FKM	924-307	924-308	924-309	924-319	924-320
			HNBR	924-333	924-331	924-332	--	--
**94	1	V-Ring RA V-ring RA	Ø	54-7	78-7	106-7	131-7	151-7
			EPDM	221-365.07	221-365.08	221-365.09	221-365.14	221-365.16
			FKM	221-365.10	221-365.11	221-365.12	221-365.15	221-365.17
			HNBR	221-365.18	221-365.20	221-365.19	--	--
Dichtungssatz kpl. Seal set cpl.			Werkstoff Material	DN40/50 1½"/2"	DN65/80 2½"/3"	DN100 4" IPS	DN125	6" IPS
			EPDM	221-000828	221-000830	221-000832	221-001125	221-002831
			FKM	221-000829	221-000831	221-000833	221-001126	221-002833
			HNBR	221-004208	221-004211	221-004212	--	--
Fett RIVOLTA F.L.G. MD-2 100g Tube nicht im Dichtungssatz enthalten / Grease RIVOLTA F.L.G. MD-2 100g tube not included in the sealing set				413-136				

**** Pos. 7, 8 und 94 nicht fetten / Do not grease item 7, 8 and 94**

Lagerungshinweis: Lagerung gemäß DIN 7716

relative Luftfeuchtigkeit ca. 65%, Temperatur 15-25° C und lichtgeschützt

Storage Instruction: Storage acc. DIN 7716

relative humidity of air approx. ca. 65%, temperature between 15-25° C (59-77° F), storage to be light protected

Beim Austausch der Dichtungen die Hinweise der Betriebsanleitung beachten!

Observe the operating instructions when replacing the seals!

429-033

17 Spare parts list - lifting actuator T

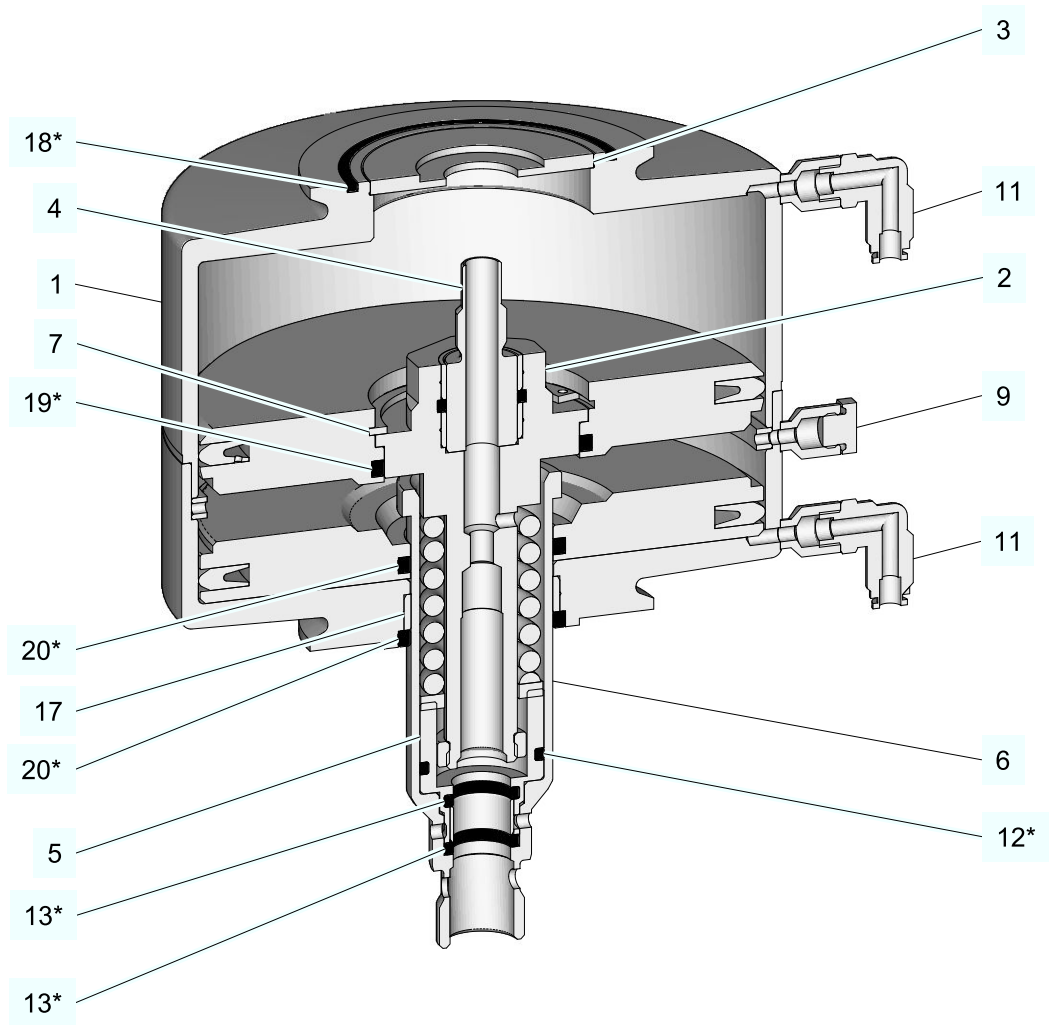


Fig.38

Item	Designation	Material	DN 25	1" OD	DN 40		DN 50	
Lifting actuator complete 1)			BLR 25	BLR 22	BLRN 40	CLRN 40	BLRN 50	CLRN 50
			221-609.08	221-609.09	221-609.22	221-609.23	221-609.25	221-609.26
1	Lifting actuator LFT-B	--	221-605.01	221-605.01	221-605.01	221-605.02	221-605.01	221-605.02
2	Actuator LFT-R	--	221-622.08	221-622.07	221-622.10	221-622.10	221-622.02	221-622.02
3	Sealing flange LFT-R	3.2315.T6	221-613.03	221-613.03	221-613.03	221-613.03	221-613.04	221-613.04
4	Adapter LFT-R	3.2315.T6	221-614.01	221-614.01	221-614.01	221-614.01	221-614.01	221-614.01
5	Bush LFT-B/cpl.	1.4305+ IGLIDUR-G	221-616.01	221-616.01	221-616.02	221-616.02	221-616.02	221-616.02
6	Actuator sleeve LFT-B	1.4301	221-617.01	221-617.01	221-617.02	221-617.02	221-617.02	221-617.02
7	Retaining ring	3.2315.T6	917-179	917-179	917-179	917-179	917-179	917-179
9	Locking screw	1.4571	922-316	922-316	922-316	922-316	922-316	922-316
11 1)	Elbow screw-in plug connection 6-1/8"	Brass/nickel-plated	933-475	933-475	933-475	933-475	933-475	933-475
	Elbow screw-in plug connection 6.35-1/8"	Brass/nickel-plated	933-979	933-979	933-979	933-979	933-979	933-979
12*	O-ring	NBR	930-041	930-041	930-041	930-041	930-041	930-041
13*	O-ring	EPDM	930-311	930-311	930-235	930-235	930-235	930-235
		FKM	930-335	930-335	930-162	930-162	930-162	930-162
17	Plain bearing	IGLIDUR-G	704-057	704-057	704-057	704-057	704-057	704-057
	Guide ring	TURCITE	--	--	--	--	--	--
18*	O-ring	NBR	930-850	930-850	930-850	930-850	930-850	930-850
19*	O-ring	NBR	930-848	930-848	930-848	930-848	930-848	930-848
20*	O-ring	NBR	930-242	930-242	933-242	933-242	933-242	933-242
Sealing set Lift-LR NBR+EPDM			221-528.111	221-528.111	--	--	--	--
Sealing set Lift-LR NBR+FKM			221-528.112	221-528.112	--	--	--	--
Sealing set Lift-LR NBR+EPDM			--	--	221-528.113	221-528.113	221-528.113	221-528.113
Sealing set Lift-LR NBR+FKM			--	--	221-528.114	221-528.114	221-528.114	221-528.114
Items marked * are included in the sealing set T cpl.								
1) Item 11 is not included in the assemblies and must be ordered separately.								

Spare parts list - lifting actuator T

Item	Designation	Material	DN 65	DN 80 DN 100	DN 125 6" IPS
Lifting actuator complete 1)			CLT	DLT 5	ELR 6
			221-609.34	221-609.35	221-609.15
1	Lifting actuator LFT-B	–	221-605.02	221-605.04	221-605.07
2	Actuator LFT-R	–	221-622.04	221-622.05	221-622.06
3	Sealing flange LFT-R	3.2315.T6	221-613.01	221-613.01	221-613.02
4	Adapter LFT-R	3.2315.T6	221-614.01	221-614.01	221-614.02
5	Bush LFT-B/cpl.	1.4305+ IGLIDUR-G	221-616.02	221-616.02	221-616.03
6	Actuator sleeve LFT-B	1.4301	221-617.02	221-617.03	221-617.04
7	Retaining ring	1.4310	917-179	917-179	917-154
9	Locking screw	1.4404	922-316	922-316	922-316
11 1)	Elbow screw-in plug connection 6-1/8"	Brass/nickel-plated	933-475	933-475	933-475
	Elbow screw-in plug connection 6.35-1/8"	Brass/nickel-plated	933-979	933-979	933-979
12*	O-ring	NBR	930-041	930-041	930-052
13*	O-ring	EPDM	930-235	930-235	930-268
		FKM	930-162	930-162	930-164
17	Plain bearing	IGLIDUR-G	704-057	704-057	704-057
	Guide ring	TURCITE	--	--	935-015
18*	O-ring	NBR	930-850	930-850	930-107
19*	O-ring	NBR	930-848	930-848	930-849
20*	O-ring	NBR	930-242	930-242	930-249
Sealing set Lift-LR NBR+EPDM			221-528.113	221-528.113	--
Sealing set Lift-LR NBR+FKM			221-528.114	221-528.114	--
Sealing set Lift-LR NBR+EPDM			--	--	221-528.115
Sealing set Lift-LR NBR+FKM			--	--	221-528.116
Items marked * are included in the sealing set T cpl.					
1) Item 11 is not included in the assemblies and must be ordered separately.					

18 Dimension Sheet - VARIVENT® Double Seat-Bottom Valve T_R

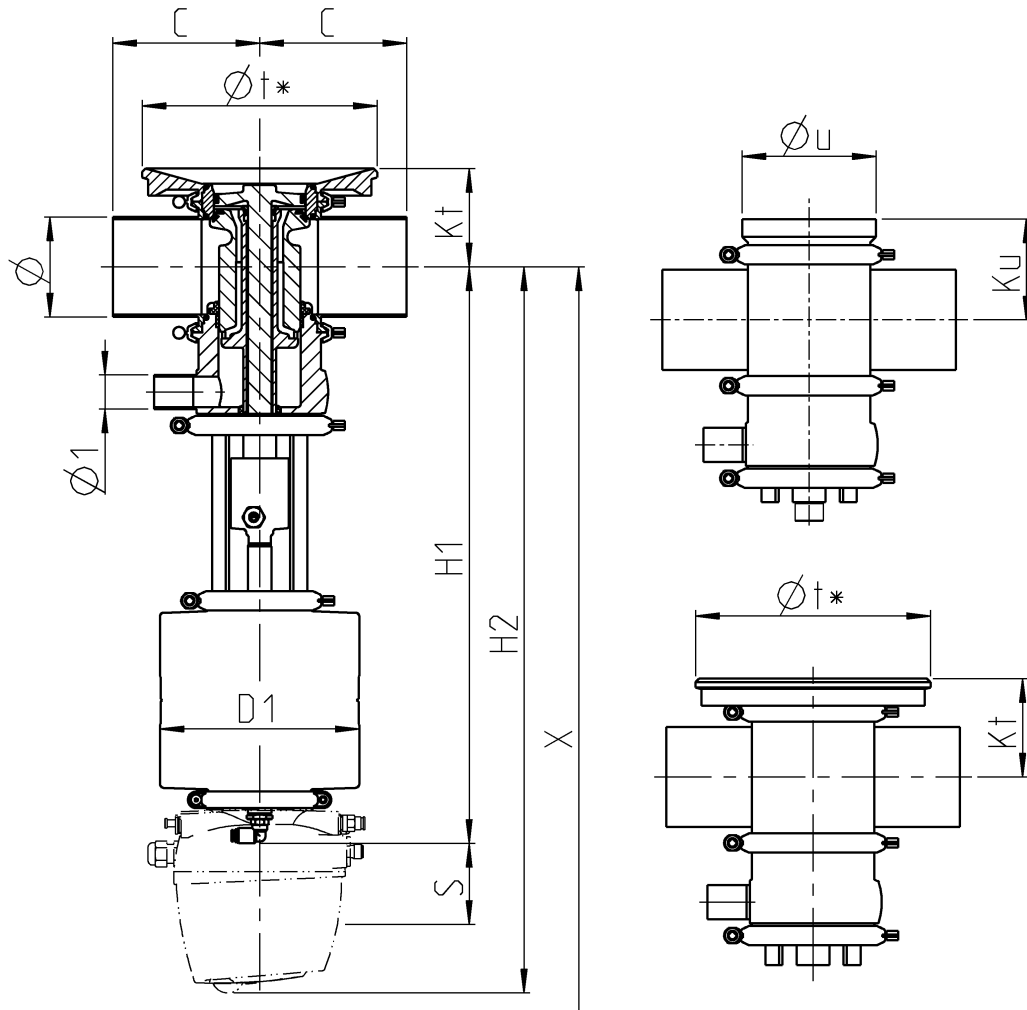


Fig.39

Dimension Sheet - VARIVENT® Double Seat-Bottom Valve T_R

Nominal Width	Tube	Tube Leakage	Housing	Actuator	Dimension			Housing Connection U		Housing Connection T		Valve	
	Ø [mm]	Ø1 [mm]	C [mm]	D 1 [mm]	H 1 [mm]	H 2 [mm]	Expansion X [mm]	Ku [mm]	Ø u [mm]	Kt [mm]	Ø t* [mm]	Stroke [mm]	Weight [kg]
DN 40	41.0 x 1.50	23 x 1.5	90	135	415	544	649	56.0	85 x 2.0	55.5	165	22	14
DN 50	53.0 x 1.50	23 x 1.5	90	135	421	550	655	62.0	85 x 2.0	61.5	165	30	15
DN 65	70.0 x 2.00	29 x 1.5	125	170	461	590	765	78.0	114 x 2.5	76.0	200	30	25
DN 80	85.0 x 2.00	29 x 1.5	125	170	488	617	792	85.5	114 x 2.5	83.5	200	40	26
DN 100	104.0 x 2.00	29 x 1.5	125	210	488	617	792	95.0	154 x 2.0	92.5	225	40	35
DN 125	129.0 x 2.00	41 x 1.5	150	261	652	781	1011	107.5	184 x 3.0	--	--	60	57
DN 150	154.0 x 2.00	41 x 1.5	150	261	676	805	1035	120.0	212 x 4.0	--	--	60	71
OD 1.5"	38.1 x 1.65	23 x 1.5	90	135	416	545	650	54.5	85 x 2.0	54.0	165	22	14
OD 2"	50.8 x 1.65	23 x 1.5	90	135	422	551	656	60.8	85 x 2.0	60.3	165	31	15
OD 2.5"	63.5 x 1.65	29 x 1.5	125	170	465	594	769	75.0	114 x 2.5	73.0	200	31	24
OD 3"	76.2 x 1.65	29 x 1.5	125	170	491	620	795	81.5	114 x 2.5	79.5	200	39	26
OD 4"	101.6 x 2.11	29 x 1.5	125	210	490	619	794	93.8	154 x 2.0	91.3	225	41	36
OD 6"	152.4 x 2.77	41 x 1.5	150	261	675	804	1034	118.5	212 x 4.0	--	--	60	71
IPS 2"	60.3 x 2.00	23 x 1.5	114.3	135	425	554	659	65.5	85 x 2.0	65.0	165	30	16
IPS 3"	88.9 x 2.30	29 x 1.5	152.5	170	490	619	794	87.5	114 x 2.5	85.5	200	40	28
IPS 4"	114.3 x 2.30	29 x 1.5	152.5	210	493	622	797	100.0	154 x 2.0	97.5	225	40	38
IPS 6"	168.2 x 2.77	41 x 1.5	152.5	261	670	799	1029	126.0	212 x 4.0	--	--	60	72
* The maximum permitted tank wall thickness is 8 mm.													

19 Dimension sheet - VARIVENT® Mixproof bottom valve T_RL / T_RC

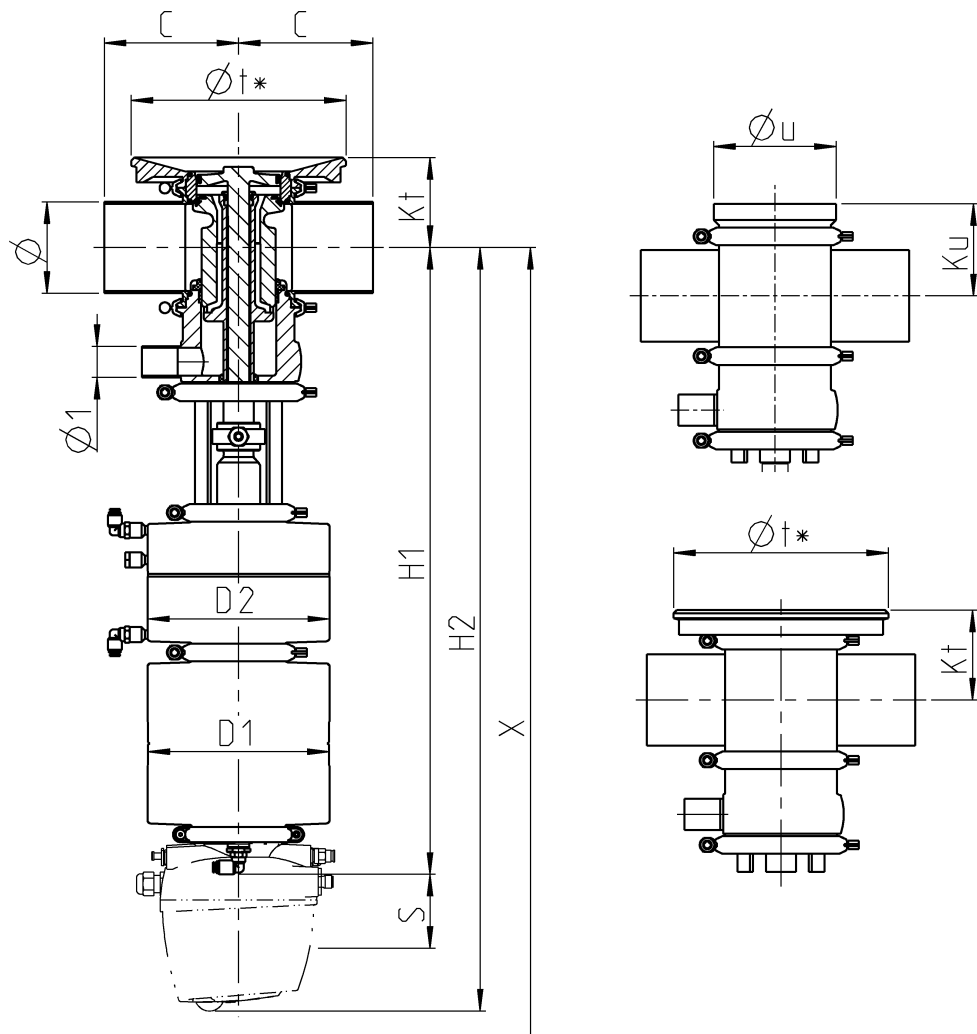


Fig.40

Dimension sheet - VARIVENT® Mixproof bottom valve T_RL / T_RC

Nominal width	Pipe	Pipe Leakage	Housing	Actuator		Size			Housing connection U		Housing connection T		Valve	
	Ø [mm]	Ø1 [mm]	C [mm]	D 1 [mm]	D 2 [mm]	H 1 [mm]	H 2 [mm]	Removal X [mm]	Ku [mm]	Ø u [mm]	Kt [mm]	Ø t* [mm]	Stroke [mm]	Stroke [kg]
DN 40	41.0x1.50	23x1.5	90	110	110	506	635	740	56.0	85x2.0	55.5	165	22	17
DN 50	53.0x1.50	23x1.5	90	110	110	504	633	738	62.0	85x2.0	61.5	165	30	17
DN 65	70.0x2.00	29x1.5	125	135	135	514	643	818	78.0	114x2.5	76.0	200	30	26
DN 80	85.0x2.00	29x1.5	125	170	170	581	710	885	85.5	114x2.5	83.5	200	40	34
DN 100	104.0x2.00	29x1.5	125	170	170	481	610	785	95.0	154x2.0	92.5	225	40	40
DN 125	129.0x2.00	41x1.5	150	210	210	760	889	1119	107.5	184x3.0	--	--	60	65
DN 150	154.0x2.00	41x1.5	150	210	210	784	913	1143	120.0	212x4.0	--	--	60	83
1.5"OD	38.1x1.65	23x1.5	90	110	110	507	636	741	54.5	85x2.0	54.0	165	22	17
2"OD	50.8x1.65	23x1.5	90	110	110	505	634	739	60.8	85x2.0	60.3	165	31	17
2.5"OD	63.5x1.65	29x1.5	125	135	135	517	646	821	75.0	114x2.5	73.0	200	31	26
3"OD	76.2x1.65	29x1.5	125	170	170	585	714	889	81.5	114x2.5	79.5	200	39	33
4"OD	101.6x2.11	29x1.5	125	170	170	582	711	886	93.8	154x2.0	91.3	225	41	40
6"OD	152.4x2.77	41x1.5	150	210	210	786	915	1145	118.5	212x4.0	--	--	60	79
2"IPS	60.3x2.00	23x1.5	114.3	110	110	507	636	741	65.5	85x2.0	65.0	165	30	19
3"IPS	88.9x2.30	29x1.5	152.5	170	170	583	712	887	87.5	114x2.5	85.5	200	40	36
4"IPS	114.3x2.30	29x1.5	152.5	170	170	586	715	890	100.0	154x2.0	97.5	225	40	43
6"IPS	168.2x2.77	41x1.5	152.5	210	210	778	907	1137	126.0	212x4.0	--	--	60	80
* The maximum wall thickness of the tank can be 8 mm.														

20 Dimension sheet - VARINLINE® / VARILINE® housing connection T and T-S

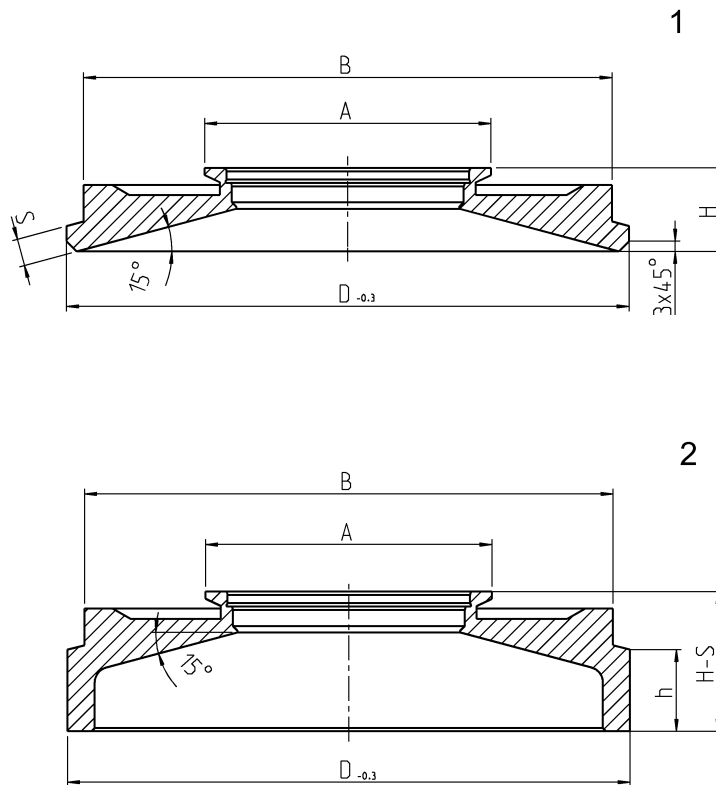


Fig.41: 1= housing connection flange T / 2= housing connection flange T-S

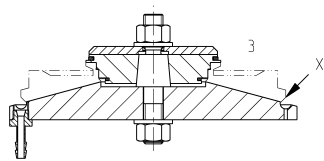


Fig.42: 3=welding jig / X=1. Welding

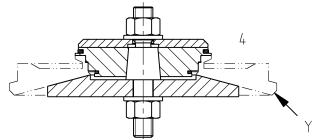


Fig.43: 4=welding jig for housing connection T Y= 2.welding

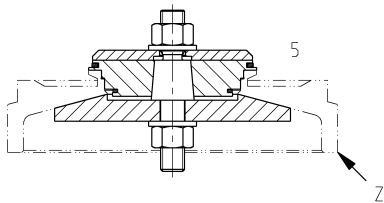
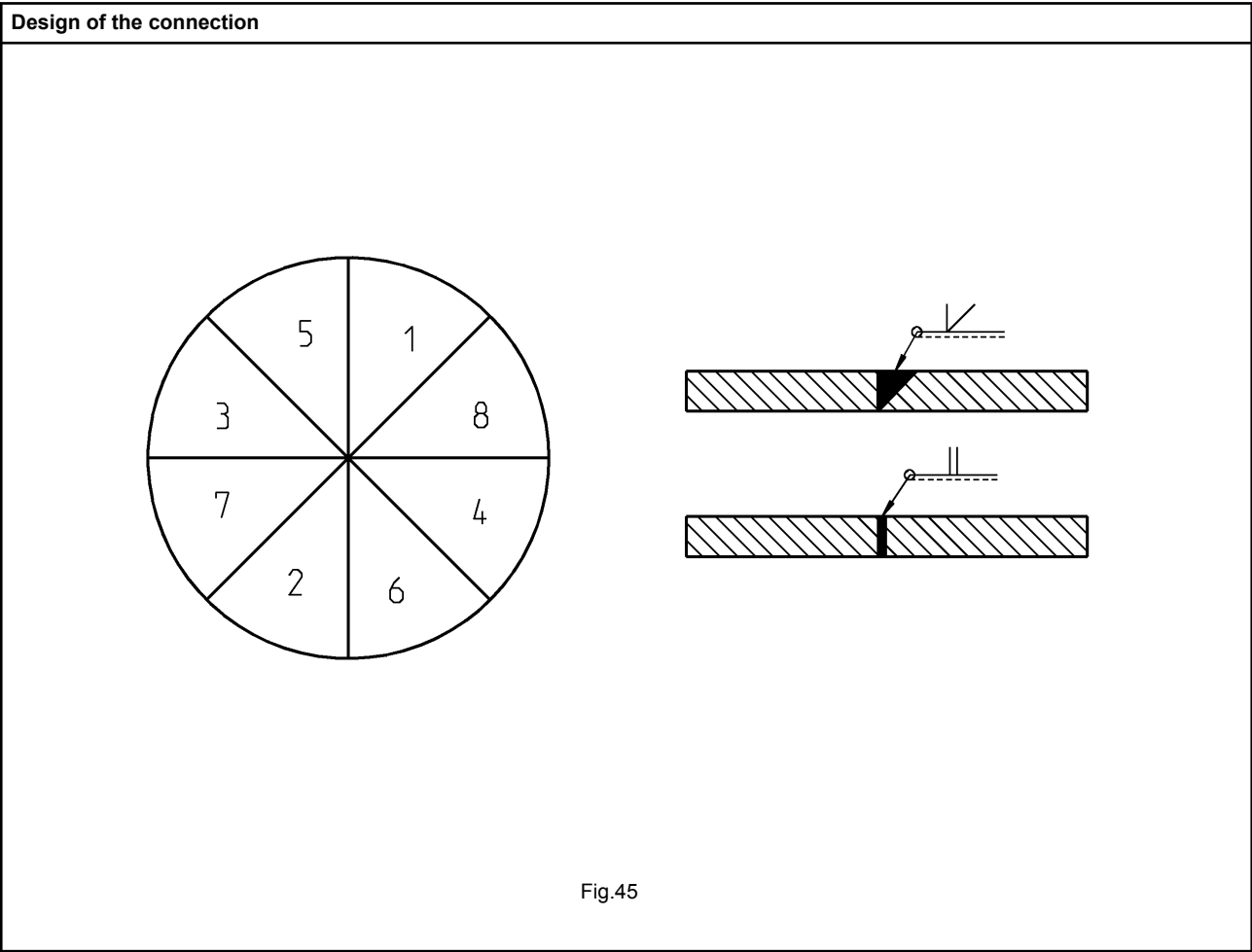


Fig.44: 5=welding jig for housing connection flange T-S / Z=welding

Designation	Material	Material no.				
		DN 15	DN 25 1"	DN 50/40 2"/1.5"	DN 80/65 3"/2.5"	DN 100 4"
Housing connection flange T	1.4404 / 3.1	221-409.14	221-409.12	221-409.07	221-409.08	221-409.09
	1.4435 / 3.1	--	--	221-409.11	--	221-409.16
Housing connection flange T-S	1.4404 / 3.1	--	221-409.26	221-409.15	221-409.27	221-409.28
		Dimensions in mm				
A		Ø 52.7	Ø 66	Ø 84	Ø 115	Ø 142
B		--	Ø 135	Ø 155	Ø 190	Ø 215
D _{-0.3}		Ø 105	Ø 145	Ø 165	Ø 200	Ø 225
H		22	24	24.5	28	27.5
H-S		--	41	41	45	45
S (max.)		8	8	8	8	8
h		--	25	25	25	25
		Required welding jig cpl.				
Order size		15	25	50/40	80/65	100
Material no. for housing connection flange T		--	229-104.01	229-104.07	229-104.13	229-104.19
Material no. for housing connection flange T-S		--	229-104.29	229-104.30	229-104.31	229-104.32
Welding jig T/RENT		--	229-104.25	229-104.26	229-104.27	229-104.28
Welding jig T-S/RENT		--	229-104.80	229-104.81	229-104.82	229-104.83

21 Welding instructions housing connection T - DN 25, DN 50/40, DN 80/65, DN 100

Preparatory information	
Location	Büchen
Welding method of the manufacturer	141 (WIG pulse)
Document no.	WPSAnschIT1004
Welder	certified according to DIN EN 287-1 and AD-2000 leaflet HP3
Welding process	141 DIN EN ISO 4063 pulsed
Type of preparation	Mechanical
Type of cleaning	Brushing or staining
Type of seam	Single-bevel groove and square groove
Specification of base materials	1.4404; 1.4435; 316L
Workpiece thickness [mm]	t = 2 to t = 8
Outside diameter [mm]	145; 165; 200; 225
Joint preparation	Zero gap between flange containers
Welding position	PA (flat position) PD (overhead)



Information about the welding sequence						
Bead	Process	Additional material Ø (mm)	Current (A)	Voltage (V)	Type of current/polarity electrode	Welding speed [cm/min]
Root	141	1.5; 1.6	50 - 60	10 - 14	=/-	3 - 7
Cover pass	141	1.2; 1.6	50 - 60	10 - 14	=/-	3 - 7
2,3,4,etc. top layers	141	1.2; 1.6	105 - 125	10 - 14	=/-	3 - 7

Information about the welding sequence	
Additional material	in agreement with the technical expert
Inert gas	DIN EN ISO 14175-I1
Root protection/forming gas	DIN EN ISO 14175-I1
Flow rates (l/min)	Inert gas: 13 - 15
	Root protection: 10 - 20
Interpass temperature	T < 30°C

Welding sequence plan

You may only apply the pulse welding method.

Prerequisite: Welding may only be carried out only using a valve block that is connected to the forming gas (see dimension sheet VARIVENT / VARINLINE housing connection T and T-S).

Carry out the following steps:

1. Tack additionally with eight each on opposition positions.
2. With the assembly of the fixture, first set the segment clamp from outside and fix it.
3. Position the respective plate in from the inside of the tank (max. tightening torque of the fixture nuts, 60Nm).
4. Cool the welding wire quickly with water after each welding procedure.
5. Weld the root without additives where possible and top layer with additives (number of top layers depending on the material thickness).
6. Replace the fixture plate with a smaller plate before welding the inside.
7. Remove the fixture only after the component temperature is < 30°C.

Manufacturer / stamp	Location	Datum	Signature (welding supervisor)

22 Dimension sheet - VARIVENT® / VARINLINE® housing connection U and U-S

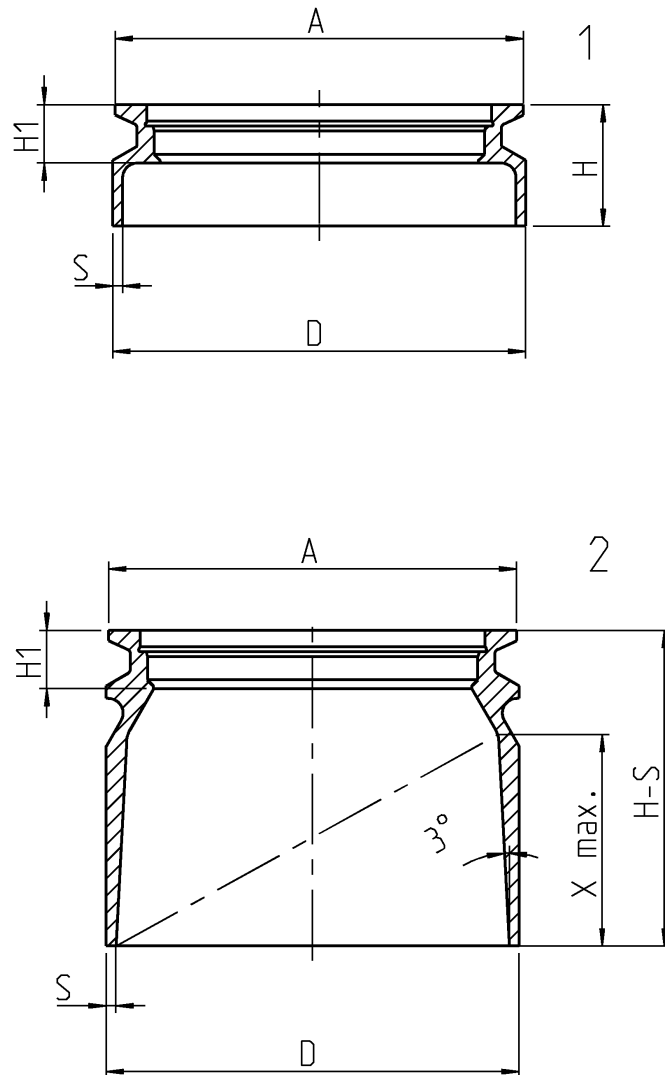


Fig.46: 1=housing connection U / 2=housing connection U-S

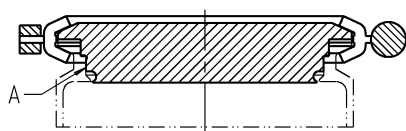


Fig.47: A=closure

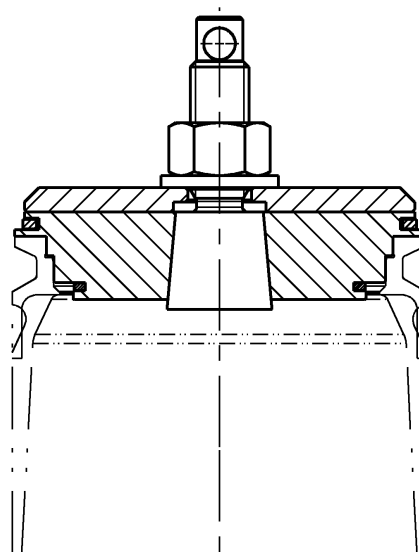


Fig.48: Welding device

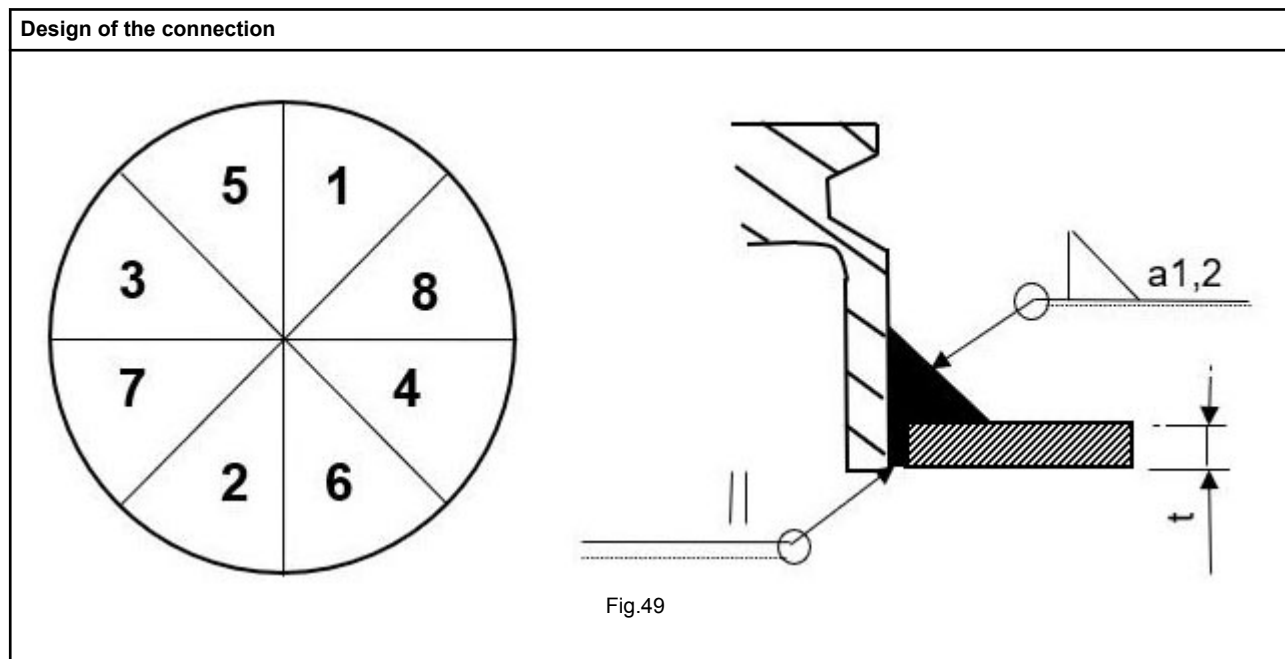
Designation	Material	Material no.					
		DN 25 1"	DN 50/40 2"/1.5"	DN 80/65 3"/2.5"	DN 100 4"	DN 125	DN 150 6"
Housing connection flange U	1.4404 / 3.1	221-149.01	221-149.02	221-149.03	221-149.04	221-149.10	221-149.06
Housing connection flange U-S	1.4404 / 3.1	221-149.29	221-149.30	221-149.31	221-149.32	221-149.33	221-149.28
	1.4435 / 3.1	--	221-149.18	--	--	--	--
		Dimensions in mm					
A		Ø 66	Ø 84	Ø 115	Ø 142	Ø 169	Ø 193
D		Ø 70	Ø 85	Ø 114	Ø 154	Ø 184	Ø 212
H		25	25	30	30	30	30
H1		12	12	15	15	15	15
H-S		65	65	70	70	70	70
S		2	2	2.5	2	3	4
X max.		40	40	40	40	40	30
		permissible pressure in bar					
		16	16	16	10	10	10
Item	Material	Required seal					
A	1.4404	221-144.01	221-144.02	221-144.03	221-144.04	221-144.06	221-144.05
		Required welding jig cpl.					
Welding jig U cpl.		229-104.91	229-104.92	229-104.93	229-104.94	229-104.95	229-104.96
Welding jig U/RENT cpl.		229-104.97	229-104.98	229-104.99	229-104.100	229-104.101	229-104.102

Attention!

When welding in the housing connection, welding instructions 221RLI002533 and 221RLI013845 must be observed.

23 Welding instructions housing connection U - 50/40; 80/65; 100; 125; 6"IPS

Preparatory information	
Location	Büchen
Welding method of the manufacturer	141 (WIG pulse)
Document no.	
Welder	tested in accordance with ISO 9606-1
Welding process	141 DIN EN ISO 24063 pulsed
Type of preparation	Mechanical
Type of cleaning	degreasing
Type of seam	HV seam, fillet weld
Specification of base materials	1.4404; 1.4435; 316L
Workpiece thickness [mm]	t = 2 to t = 4
Outside diameter [mm]	70; 85; 114; 154; 184; 212
Joint preparation	Gap between flange-container max. 0.2 mm
Welding position	PA (flat position) PD (overhead)



Information about the welding sequence						
Bead	Process	Additional material Ø (mm)	Current (A)	Voltage (V)	Type of current/ polarity electrode	Welding speed [mm/min]
Root	141	1	80 - 100	10 - 14	=/-	60 - 75
Cover pass	141	1.2; 1.6	80 - 100	10 - 14	=/-	40 - 60

Information about the welding sequence	
Additional material	in agreement with the technical expert
Inert gas	DIN EN ISO 14175-I1
Root protection/forming gas	DIN EN ISO 14175-I1
Flow rates [l/min]	Inert gas: 10 - 15
	Forming gas: 10 - 20
Interpass temperature	T < 30°C

Welding sequence plan

You may only apply the pulse welding method.

Prerequisite: Welding may only be carried out only using a valve block that is connected to the forming gas (see spare parts list and dimension sheet housing connection U).

Carry out the following steps:

1. Tack additionally with eight each on opposition positions.
2. With the assembly of the fixture, first set the segment clamp from outside and fix it.
3. Position the respective plate in from the inside of the tank (max. tightening torque of the valve block nuts, 40Nm).
4. Cool the welding wire quickly with water after each welding procedure.
5. Weld the root without additives where possible and top layer with additives (number of top layers depending on the material thickness).
7. Remove the fixture only after the component temperature is < 30°C.

Manufacturer / stamp	Location	Datum	Signature (welding supervisor)

24 Appendix

24.1 Lists

24.1.1 Abbreviations and terms

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

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



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