Aseptic Valves

GEA Aseptomag® double chamber valve type DK / LoTo

Operating instruction (Translation from the original language)

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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 Aseptomag AG
Industrie Neuhof 28
CH-3422 Kirchberg

1.3 Customer service

Phone: +41 (0)34 426 29 29
Fax: +41 (0)34 426 29 28

service.aseptomag@gea.com
www.gea.com

1.4 EC Declaration of Incorporation

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Declaration of Incorporation

Kirchberg, 16.12.16

According 2006/42/EC from 09.06.2006, appendix II B

INCORPORATION OF PARTLY COMPLETED MACHINERY

We herewith declare that the subsequently described partly completed machine complies with the below listed essential requirements of the machine directive 2006/42/EC. The technical documentation is compiled in accordance with part B of Annex VII. In response to reasonable request the relevant technical documentation will be provided to the national authorities in printed or electronic format (PDF).

Manufacturer:	**GEA Aseptomag AG** **Industrie Neuhof 28** **CH-3422 Kirchberg**
Authorized person:	**GEA Aseptomag AG** **Engineering Department** **Industrie Neuhof 28** **CH-3422 Kirchberg**
Commercial name of the machine:	**Valve**
Machine type:	**Aseptomag® Valve Technology**
Serial number:	**xxxx yy (x = serially numbered, y = year of manufacture)**
Respective EC standard:	**2006/42/EC**
Essential requirements:	**Appendix I, section 1 and 2.1**
Applied harmonized standards:	**DIN EN ISO 12100:2010**

The commissioning of this partly completed machine is prohibited until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Machine Directive 2006/42/EC.

Reimar Gutte
Management Board
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i.A. Aron Stauffer
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2 Safety

2.1 Intended use

2.1.1 Dual-chamber valve

Aseptic double chamber valves of type DK are mix-proof stroke valves for aseptic process systems and permit the safe separation of incompatible media. The media separation is done via the integrated sterile chamber (ISB), which is separated hermetically from the atmosphere with a seal each to both product lines and via two side valves (inlet and outlet).

For safe operation, it is mandatory that the following points are observed in the different process steps:

Transfer

All side valves must be completely closed during media transfer through the main valve.

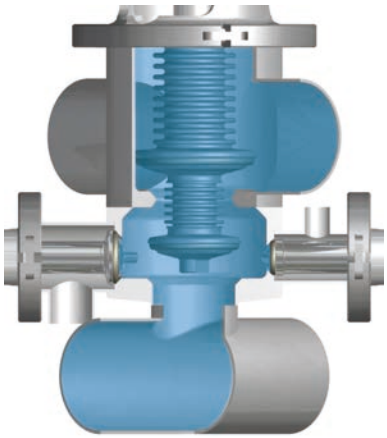


Fig.1: Transfer

Cleaning sterile chamber

After a media transfer the sterile chamber must be flushed at least with one sterile medium. After the main valve has been closed, both side valves can be put in the open position (outlet valve first) and therefore permit the flushing of the sterile chamber. The media pressure applied at the inlet side may not exceed 4 bar.

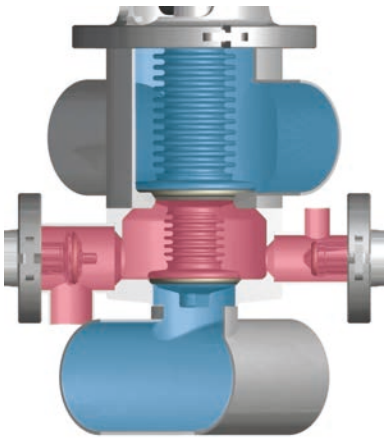


Fig.2: Sterilisation after transfer

CIP cleaning with seat venting

If seat venting is activated for a CIP cleaning (preferably in cycles) no process must be running in the opposite line. Furthermore, the outlet valve of the sterile chamber to drain the CIP medium must be open.

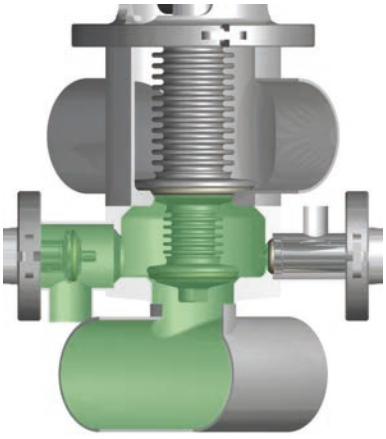


Fig.3: Cleaning valve seat A

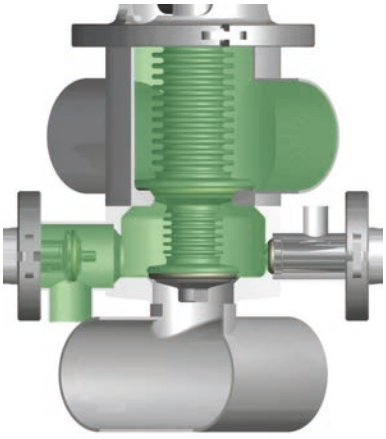


Fig.4: Cleaning valve seat B

Pressure hammers and excessive control air pressure (>8 bar) can damage the bellow. The double chamber valves DK should close against the direction of flow of the medium if possible. Should this not be possible due to technical reasons related to the plant or process, it is recommended to switch the valve without pressure. Both measures prevent pressure hammers when the valve is opened or closed.

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

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.

2.1.2 LoTo locking mechanism

Maintenance lockout according to LoTo

LoTo (Lockout-Tagout) is a safety procedure that ensures dangerous machines or systems are properly shut down and isolated from the energy supply before maintenance or repair work is carried out.

The Lockout-Tagout procedure typically involves shutting off the energy source and attaching a lock to prevent the unintended reactivation of the equipment. In addition, a tag must be attached to indicate the status and provide information about the person responsible for the lockout.

Functionality of the Aseptomag® LoTo locking mechanism

The double-chamber lockout device (1) is designed to securely isolate and lock **valve seat A** (seat A). As part of a **risk assessment,** the integration into a Lockout-Tagout procedure must be evaluated by the operator.

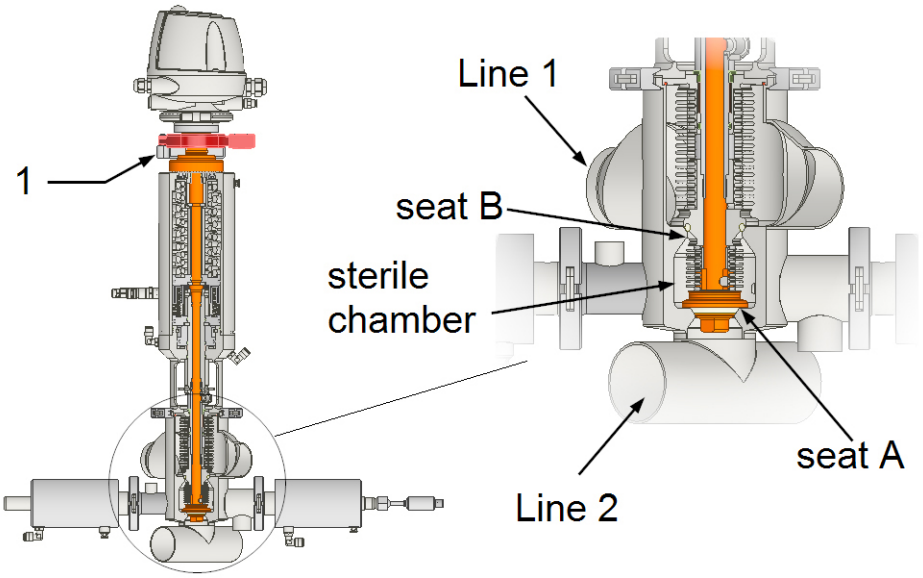


Fig.5: LoTo locking mechanism for valve seat A

2.1.3 Integration of the maintenance fuse LoTo

When integrating LoTo (Lockout-Tagout) at the double-chamber valve, **all 3 chambers** must be considered (Line 1, sterile chamber, and Line 2). Depending on the needs, additional measures must be taken alongside the isolation of Seat A. The following list serves as a guide for creating a Lockout-Tagout procedure to meet the basic safety requirements:

Standard operation			
	Line 1 Maintenance (idle)	**Line 1 production**	**Line 1 CIP /SIP**
Line 2 Maintenance (idle)	seat A = n/a seat B = n/a steam inlet = ball valve closed steam outlet = n/a	seat A = LoTo seat B = n/a steam inlet = n/a steam outlet = n/a	seat A = LoTo seat B = n/a steam inlet = n/a steam outlet = n/a
Line 2 production	 seat A = LoTo seat B = n/a steam inlet = ball valve closed steam outlet = n/a		
Line 2 CIP / SIP	seat A = LoTo seat B = n/a steam inlet = ball valve closed steam outlet = n/a		

 **Warning:** Product safety is at risk due to the shutdown of the steam seal/condensate seal!

Hint!

The condition with the steam/condensate seal deactivated must be considered in the control system design.

Shut off the steam supply line

Additional measures must be taken when maintenance or repair work is carried out on the Line 1 system above valve seat B. The prerequisite for this is the prior isolation, locking, draining, and checking of the steam supply line (shut-off valve V4):

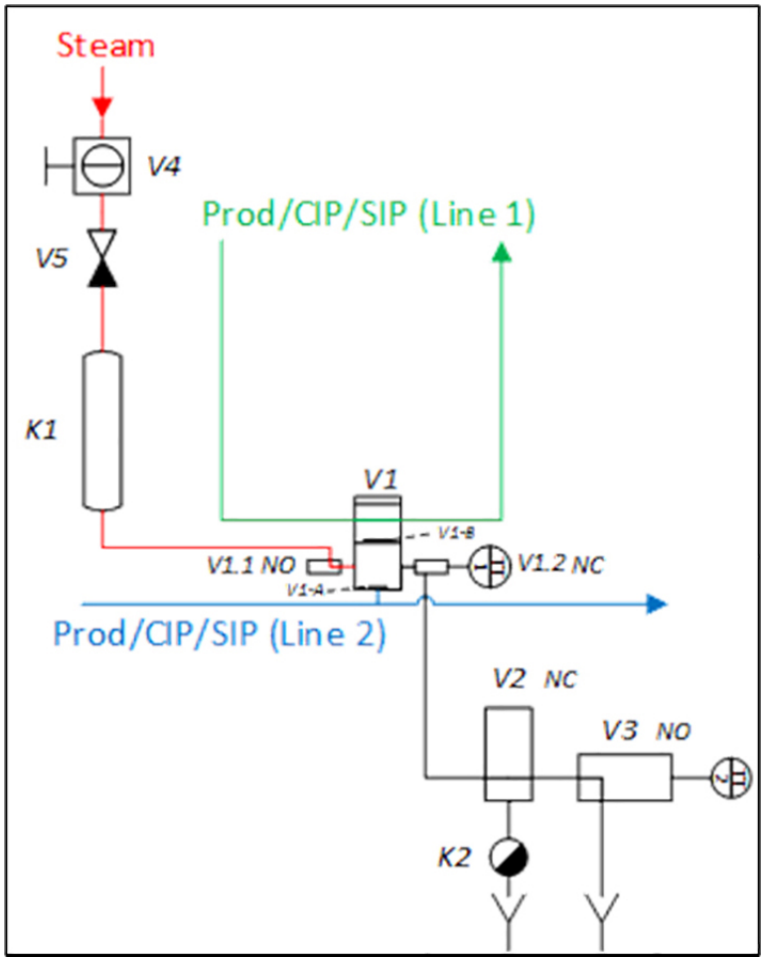


Fig.6: System components and lines

Further measures using the Block-Bleed-Block circuit

It is recommended, as part of a comprehensive Lockout-Tagout procedure, to further increase safety when dealing with hazardous energies such as steam and CIP cleaning. A Block-Bleed-Block circuit ensures that leakage does not lead to a hazard.

- Isolate and lock valve seat A using the DK LoTo locking mechanism. (V1) (**Block**)
- Isolate and lock the steam supply using the shut-off valve (V4) (**Block**)
- Keep the condensate line open to the drain and then isolate it (**Bleed**)
- Deactivate valve seat B by interrupting and isolating the compressed air supply for ventilation "C" and main stroke "D" (see Section 8.3, Page 44diagram). (**Block**)

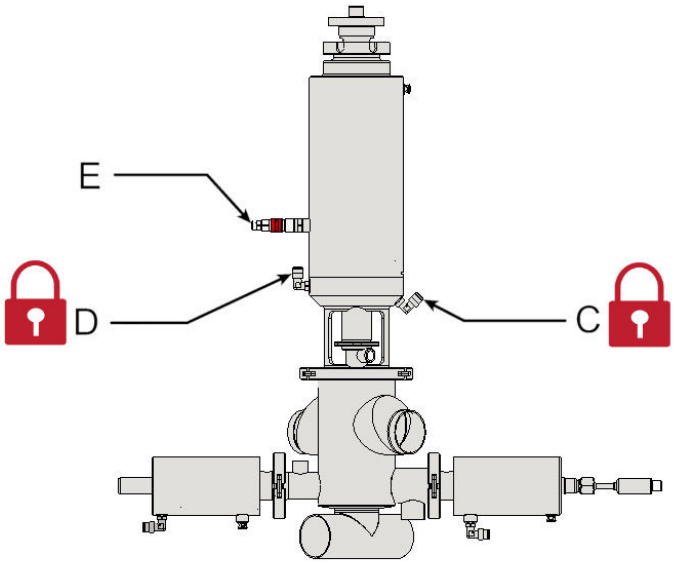


Fig.7: Seat B air connection locked

Hint!

The interrupted compressed air supply prevents accidental opening of the valve at seat B. There is no protection against opening due to high pressure or pressure surges.

The following list serves as a guide for creating a Lockout-Tagout procedure using the Block-Bleed-Block circuit:

Block-Bleed-Block operation			
	Line 1 Maintenance (idle)	**Line 1 production**	**Line 1 CIP /SIP**
Line 2 Maintenance (idle)	seat A = n/a seat B = n/a inlet = ball valve closed outlet = open	 seat A = LoTo seat B = deactivated & forced close* inlet = ball valve closed outlet = open	seat A = LoTo seat B = deactivated & forced close* inlet = ball valve closed outlet = open
Line 2 production	 seat A = LoTo seat B = deactivated inlet = ball valve closed outlet = open		
Line 2 CIP / SIP	seat A = LoTo seat B = deactivated inlet = ball valve closed outlet = open		
*due to overpressure in Line 1			

 **Warning:** Product safety is at risk due to the shutdown of the steam seal/condensate seal!

2.1.4 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.

2.1.5 Pressure equipment directive

The valve is a piece of pressure equipment (without safety function) as defined in the Pressure Equipment Directive: Directive 2014/68/EG. It is classified according to Annex II, article 4, section 3. In the event of any deviations, GEA Aseptomag AG will supply a specific Declaration of Conformity.

2.1.6 ATEX directive

Aseptomag ® valve technology can also be used in ATEX protected areas. However, the suitability of the component must be checked under consideration of the respective conditions. Additional information will be made available upon request.

2.1.7 Improper operating conditions

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

Operating the valve is not permitted if

- Persons or objects are in the danger zone.
- Safety devices are not working or were removed.
- the LoTo locking mechanism for normal operating mode is not properly secured (see Section 8.2, Page 41)
- Malfunctions have been detected on the valve.
- Damage has been detected on the valve.
- Maintenance intervals have been exceeded.
- the position of the side valves is not adjusted to the process steps.

2.2 Operator’s Duty of Care

In your capacity as operator of the facility you bear a particular responsibility for the proper and safe handling of the valve in your facility. Only use the valve when it is in perfect condition to prevent danger to persons and property.

These Operating Instructions contain the information you and your staff need for the safe and reliable operation during the entire service life of the valve. 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 allow qualified staff to work on the valve.
- The operator must authorize the staff to carry out the relevant tasks.
- Working areas and the entire environment of the valve must be neat and clean.
- The staff must wear suitable work clothing and personal protective equipment. As the operator of the facility make sure that work clothing and personal protective equipment are used.
- Instruct the staff with regard to any properties of the product which might pose a health risk and the preventative measures to be taken.
- Have a qualified first-aider on call during the operation, who can initiate the necessary first-aid measures in case of an emergency.

- Clearly define processes, lines of authority and responsibilities associated with the valve. Everybody must know what to do in case of an emergency. Instruct the staff in this respect at regular intervals.
- The signs relating to the valve must always be complete and legible. Check, clean and replace the signs as necessary at regular intervals.
- Observe the Technical Data specified and the limits of use!

Hint!

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

2.3 Subsequent changes

You should never make any technical modifications to the valve. Otherwise you will have to undergo a new conformity process in accordance with the EC Machinery Directive on your own.

In general, only original spare parts supplied by GEA Aseptomag AG should be fitted. This ensures the reliable and economical operation of the valve.

2.4 General safety instructions and dangers

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

Nevertheless, dangers can arise from the component, if:

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

2.4.1 Principles for safe operation

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

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

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

- Observe the accident prevention regulations and all local regulations.

2.4.2 Environmental Protection

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

For environmental protection the following principles apply:

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

2.4.3 Electrical Equipment

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

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

2.5 Supplementary Regulations

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

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

2.6 Qualification of Staff

This section contains information about the qualifications that staff working on the valve must have.

Operating and maintenance staff 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 staff to carry out any work on explosion-protected equipment. 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:

- Vocational training as a specialist who can work on the valve independently.
- Sufficient instruction to work on the valve under the supervision and direction of a qualified specialist.

Each member of staff must meet the following requirements to be allowed to work on the valve:

- Personal qualification for the relevant task.
- Sufficient professional qualification for the relevant task.
- Instructed with regard to the function of the valve.
- Instructed with regard to the operating sequences of the valve.
- 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.

For work to be carried out on the valve the following user groups are distinguished:

User groups	
Staff	**Qualifications**
Operating staff	Adequate instruction and sound knowledge in the following areas: • Function of the valve • Valve operating sequences • What to do in case of an emergency • Lines of authority and responsibilities with respect to the task
Maintenance staff	Adequate instruction as well as sound knowledge of the design and function of the valve. Sound knowledge in the following areas: • Mechanical equipment • Electrical equipment • Pneumatic system Authorization with regard to safety engineering standards to carry out the following tasks: • Setting devices into operation • Earthing of devices • Marking of devices The relevant certificates of qualification must be submitted before work can be carried out on ATEX certified machines.

2.7 Safety equipment

2.7.1 Signs

Hazardous locations on the component are marked by warning labels. The signs and instructions on the component must always be legible. Any illegible signs must be replaced immediately.

Signs on the valve	
Sign	**Meaning**
	Sticker with warning on spring tension on side valve.
	Warning: risk of crushing. Attached on both sides of the lantern.

2.7.2 Intervention protection for LoTo locking mechanism

In normal operating mode, the threaded ring of the LoTo locking mechanism must be tightened onto the lower stop with the specified torque to prevent access to the moving parts. A corresponding label is located on the stop:

Fig.8: Note – Stop

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.

Residual dangers on the valve and measures		
Danger	**Cause**	**Measure**
Risk of injury	• Danger presented by moving or sharp-edged parts • Danger due to escaping media with properties that are dangerous to health	Effectively prevent unauthorised persons from manipulating the valve. 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 and cleaning solutions in suitable containers. • Dispose of lubricants and cleaning solutions in accordance with the pertinent regulations.

2.9 Danger zones

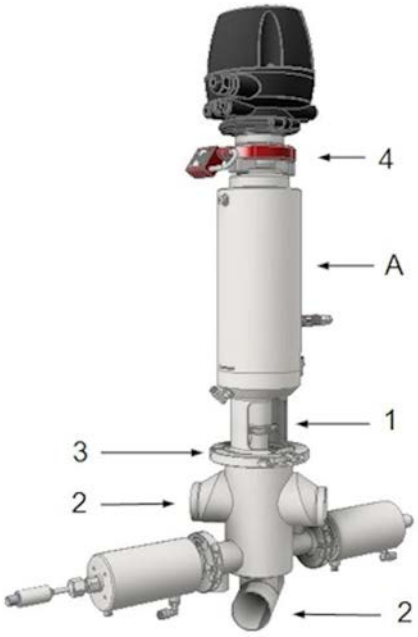


Fig.9

Please observe the following notes:

- In the event of malfunctions, shut down the valve (disconnect from the power and air supply) and secure it against being used.
- Never reach into the lantern (1) or the valve housing (2) when the valve is switching. There is a danger of injury to fingers.
- Never touch the lantern (4) while the threaded ring is loosened during the installation of the LoTo locking mechanism. Operating the valve poses a risk of finger injury.
- With a closed valve there is danger of injury when the clamp (3) is opened since the released closing pressure will suddenly lift the actuator. Therefore, release the closing pressure by opening the valve before detaching the clamp (3) by supplying the actuator (A) with compressed air.
- Before starting any maintenance, servicing or repair work, disconnect the valve from the power supply and secure it against inadvertently being switched back on again.
- Only allow a qualified electrician to carry out any work on the electrical power supply.
- Check the electrical equipment of the valve at regular intervals. Immediately remedy loose connections and molten cables.
- If work on live parts cannot be avoided, call in a second person, who can operate the main switch in case of an emergency.
- The housing sockets have very sharp edges. When transporting and installing the valve be sure to wear suitable protective gloves.

3 Description

3.1 Design of the valve

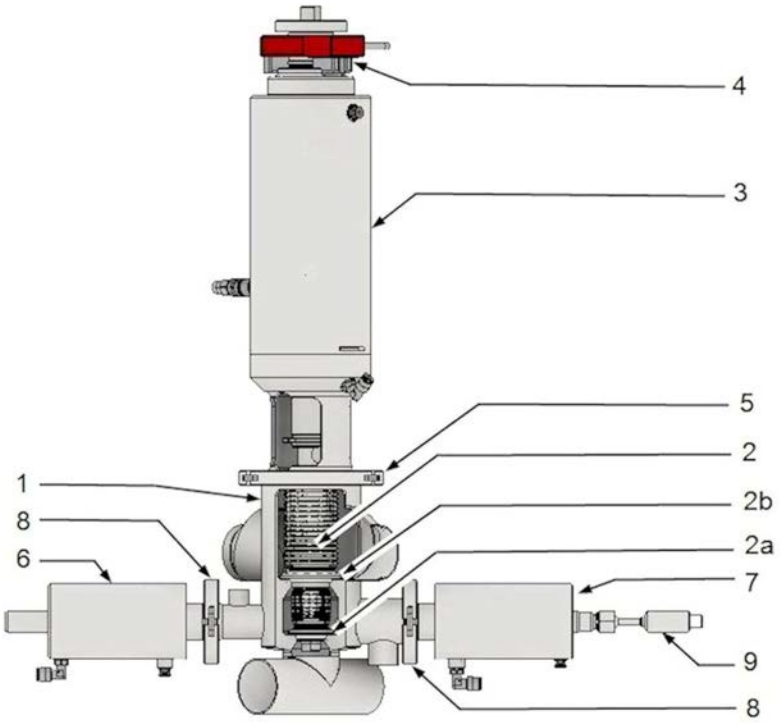


Fig.10: Main components on the valve

Key	
No.	**Designation**
1	Housing
2	Internal assembly
2a	*Valve seat A*
2b	*Valve seat B*
3	Actuator
4	Locking mechanism seat A LoTo
5	Clamp (safety device)
6	Inlet valve (side valve)
7	Outlet valve (side valve)
8	Clamp to side valve (safety installation)
9	*Temperature sensor (optional)*

3.2 Valve Identification

Reference numbers from the following number systems are assigned to each part of components from GEA Aseptomag AG. The reference numbers can be used to clearly identify a component and its composition.

Number (example)	Designation	Description
0001 14	Serial valve number	The valve serial number is the easiest and most definite way to identify a component from GEA Aseptomag AG. This number is unique and allows all components installed at the time of delivery to be identified. The first four digits represent a chronological, ascending number, the last two digits provide information about the year of manufacture. The valve's serial number is indicated on a round white sticker affixed to the actuator.
0001 14	Serial number main components	The serial number has the same structure as the valve's serial number, but it is placed on the relevant main component (housing, internal assembly, actuator) by laser marking / stamping.
V-50-1001	Drawing number	The drawing number is a combination of two groups. The digits in front of the hyphen refer to where the components belong to. The next four numbers describe the part in more detail. For this purpose, the main component groups of a valve are assigned to various groups: • V-xx-0xxx = entire valves • V-xx-1xxx = valve housings • V-xx-2xxx = internal assemblies • V-xx-3xxx = actuators • V-xx-4xxx = feedback units / accessories

Each of these main components is marked and can be uniquely identified.

! Other markings on components of the valve, such as on connectors, arise from the production process and are not relevant.

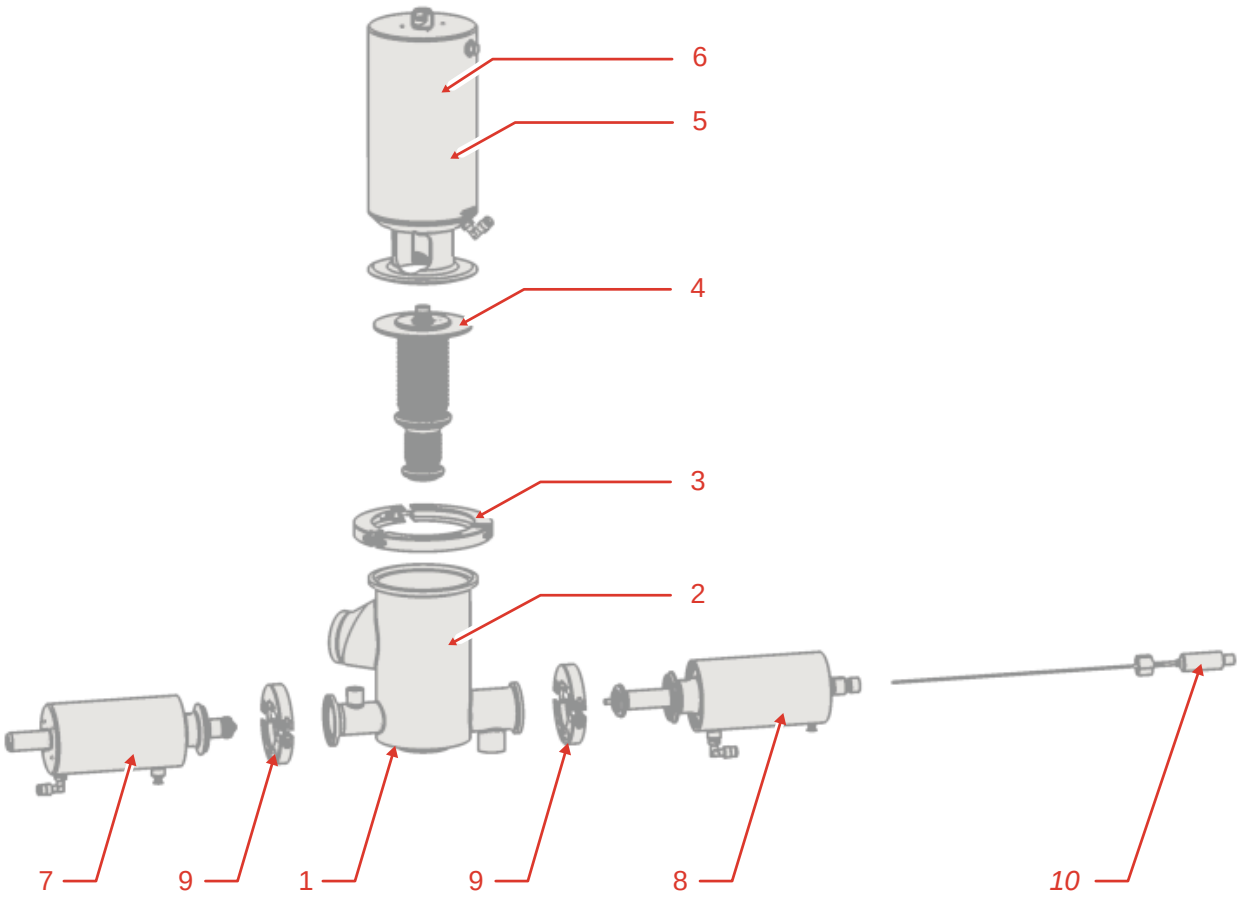


Fig.11: Designations on the valve

Key			
No.	**Example**	**Position**	**Details**
1	V50-1235 1.4435 TC 333937	Valve housing	Drawing number of valve housing Material and re-stamping details
2	0548 10	Valve housing	Serial number of valve housing
3	V-50-1004	Clamp	Number of clamp drawing
4	V-50-2245 1424 10	Internal assembly	Drawing number of internal assembly Serial number of internal assembly
5	1216 10	Actuator	Sticker with valve serial number
6	PA100/50 NC V-50-3000 0977 10	Actuator	Designation of actuator Number of actuator drawing Serial number of actuator
7	PA60-15 DK OR NO V15-3050 0812 10	Inlet valve	Designation of actuator Number of actuator drawing Serial number of actuator

Key			
No.	**Example**	**Position**	**Details**
8	PA60/25 DK OR NC PT V25-3121 0813 10	Outlet valve	Designation of actuator Number of actuator drawing Serial number of actuator
9	V-15-1004		Number of clamp drawing
10	*TR31-K-Z-TT*	*Temperature sensor*	*Type designation*

3.3 Sealing Concepts

3.3.1 "Shrink-on Fit" Version

- Undivided valve disc
- GEA Aseptomag standard
- For hard sealing materials such as TEFASEP, PTFE or reinforced PTFE

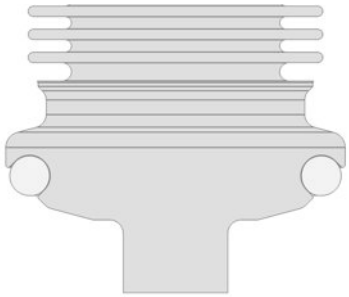


Fig.12: system “shrunk-on” seat A

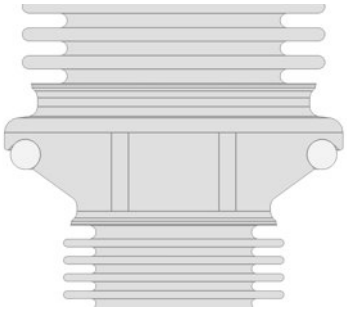


Fig.13: system “shrunk-on” seat B

3.3.2 System “divisible”

Valve seat seals

TVT	Divisible valve disc, valve seat seal TEFASEP
TVE	Divisible valve disc, valve seat seal EPDM (form seal)

Concept for hard sealing materials

- Divisible valve disc
- GEA Aseptomag option for seat A
- For hard sealing materials like TEFASEP (TVT)
- Additional elastomer O-ring behind the valve seat seal

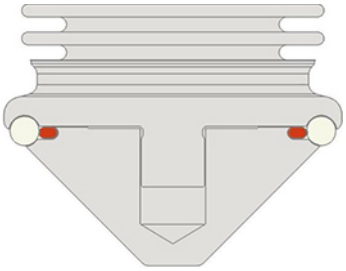


Fig.14: "Divisible" version - for hard sealing materials

Concept for elastomer sealing materials

- Divisible valve disc
- GEA Aseptomag option for seat A
- For elastomer sealing materials such as EPDM (TVE)
- Form-gasket with moulded-on retention flag

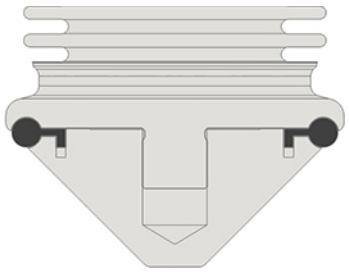


Fig.15: "Divisible" version - for elastomer sealing materials

4 Transport and storage

4.1 Storage conditions

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

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

Hint!

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

4.2 Transport

For transport, the following principles apply:

- 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 (if fitted) 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

On receipt of the valve check whether

- the details on the main valve components 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 Technical data

Operating data (for valve with sealing materials Tefasep and silicone)	
Max. operating temperature	150 °C (302 °F)
Max. sterilisation temperature	160 °C (320 °F) for max. 30 min.
Max. product pressure	6 bar (others on request)
Max. media pressure of sterile chamber	< 4 bar (if main valve is closed)
Control air pressure, actuator	6 bar, max. 8 bar
Nominal pressure	10 bar

Materials	
Parts in contact with product	1.4404 (AISI 316L) 1.4435 (AISI 316L) 1.4571 (AISI 316TI)
Actuator (exterior area)	1.4301 (AISI 304) 1.4305 (AISI 304)
Valve seat seal (product-contacting)	TEFASEP PTFE EPDM
Seal (product-contacting)	Silicone EPDM FEP silicone
Other materials in accordance with the valve specification.	

Surface finish	
Inside areas in contact with product	Surface roughness R_a ≤ 0.8 µm (standard)
Outer surfaces	Metal blank fine turned and/or polished
Inside areas (with the exception of the metal bellows) in contact with product can be electropolished/passivated or ground on request. These methods will bring up surface roughness to R_a ≤ 0.6 µm / 0.4 µm.	

Resistance of sealing materials	
Product contact seals	All sealing materials in the product contact area are suitable for applications in the food industry. The durability of the sealing materials depends on the type, temperature and contact time of the conveyed media. The final assessment of the suitability of the material is therefore the sole responsibility of the plant operator, even if the materials meet all common guidelines of the food industry (for further information see material certificates).

Compressed air supply	
Compressed air supply	6 bar, compressed air filtered (at least 0,5 µm), oil-free.

Cleaning	
Cleaning	The valve is suitable for CIP cleaning (Cleaning in Place)
Recommended cleaning speed in the valve	At least 2 m/s

Sterilisation	
Sterilisation	The valve is suitable for SIP sterilisation (Sterilisation in Place)
Sterilisation with	Hot water, max. 160 °C (320 °F) Steam, max. 160 °C (320 °F) Chemicals (e.g. H_2O_2)

6 Assembly and installation

6.1 Safety instructions

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

For installation, the following principles apply:

- Only properly qualified staff is allowed to install, assemble and set the valve into operation.
- Ensure that adequate working and traffic areas are available at the place of installation.
- Observe the maximum load-bearing capacity of the installation surface.
- Observe the transport instructions and markings on the part(s) to be transported.
- Remove any nails protruding from transport crates immediately after opening the crate.
- Under no circumstances should anyone stand under a suspended load.
- During assembly, the valve safety devices might not be working effectively.
- Reliably secure sections of the plant which have already been connected against inadvertently being switched on.

6.2 Notes on installation

The valve must be installed so that the housing can drain on its own.

The divert valve housing at the side valve must (if it exists) be connected to the pipe system via removable connections.

To prevent damage, make sure that

- the valve is installed in the pipe system free of tension and
- no foreign materials (e.g. tools, bolts, lubricants) are left in the system.
- the valve is installed so that the flow is directed against the valve disc.
- the valve is ideally installed in vertical position.

6.3 Welding In a Valve with Pipe Connection

6.3.1 Welding In and Installing a Valve

This section describes how you weld in a valve with pipe connection.

Prerequisite:

- For valves with welding ends: Actuator and internal assembly have been removed, see Section 10.6, Page 60.

⚠ Caution!

Danger of injury due to spring force being released

You can sustain injuries to your fingers when you put your hand into a valve if the valve has not been moved to the open position beforehand.

► Before starting any work, bring the valve to the "open" position.
► Wear protective gloves for all work.
► Always exercise caution and prudence.

⚠ Caution!

If pipes contain liquids, these can spurt out when the pipes are opened.

Danger of injury as a result of hot or aggressive liquids.

► Drain all pipe system elements that lead to the valve location and, if necessary, clean or rinse them.
► Separate the pipe section in which the valve is to be fitted from the rest of the piping system to prevent medium from entering again.

Carry out the following steps:

1. Saw the pipe ends flat and square, deburr and degrease them.
2. Prepare the component housing so that the component housing can be welded into position free from stress and distortion.
3. Prepare the welding procedure: use the 141 TIG (tungsten inert gas) welding method with butt weld. I-joint according to DIN8532; hand or orbital weld.
4. Connect the forming gas.
5. Tack the component housing at several points distributed around the circumference under forming gas (ensure forming gas supply).

   ! Adjoining welding ends must not be separated by a gap. Otherwise the corrosion resistance of the welded joint and the pipe will be reduced when forming gas flows out.
6. Weld the housing into the pipe system.

→ The valve has been welded in and installed.

6.3.2 Welding post-treatment

Interior

Post-welding treatment in the interior is not necessary.

Exterior area

Depending on the requirements, post-treatment in the exterior area consists of:

- pickling,
- grinding,
- brushing,
- polishing.

6.4 Pneumatic connections

6.4.1 Overview switching positions

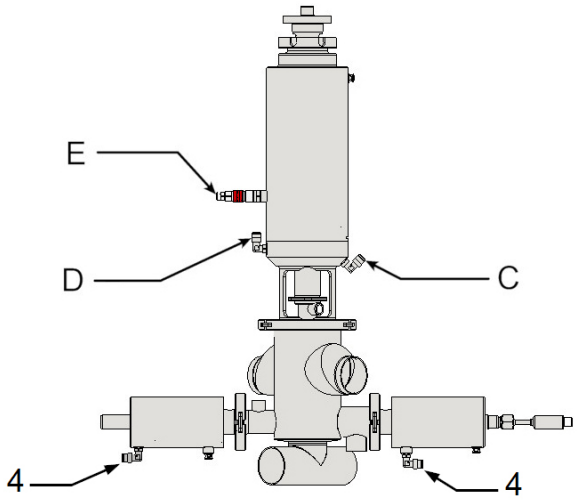


Fig.16: Air connections valve version EA

Function	Valve seat	Air connection
Open	“A“ + “B“	"D"
Venting	“A“	"E"
Venting	“B“	"C"
Control	Side valve	"4"

→ Information on mounting the valve, see Section 3.1, Page 25.

6.4.2 Air requirement

The air requirement depends on the type of actuator fitted. The following tables show guideline values at an air pressure supply of 6 bar per valve size and the corresponding actuator size used as a standard.

Air requirement for DK EA for spring-to-close actuators (NC)				
Nominal width of valve	**Actuator**	**Air requirements [dm³]**		
		Total stroke	**Venting seat A**	**Venting seat B**
DN25 / 1"OD	PA80/25 EA	0.6	0.8	0.2
DN40 / 1½"OD	PA100/ 50 EA	1.0	1.3	0.3
DN50 / 2"OD	PA100/ 50 EA	1.1	1.3	0.3
DN65 / 2½"OD	PA135/65 EA	2.8	2.6	0.8
DN80 / 3"OD	PA180/80 EA	6.3	4.9	1.2
DN100 / 4"OD	PA180/100 EA	6.2	4.7	1.2
DN125	PA255/125-150 EA	17.0	14.0	2.8

Air requirement DK EA for actuators NC and NO of the side valve				
Valve	**associated side valve**			
Nominal width	**Nominal width**	**Actuator**	**Air requirements [dm³]**	
			direction of action NC	**direction of action NO**
DN25 / 1"OD	DN15/15	PA50	0.2	0.1
DN40 / 1½"OD	DN15/25	PA60	0.6	0.5
DN50 / 2"OD	DN15/25	PA60	0.6	0.5
DN65 / 2½"OD	DN15/25	PA60	0.6	0.5
DN80 / 3"OD	DN15/25	PA60	0.6	0.5
DN100 / 4"OD	DN15/25	PA60	0.6	0.5
DN125	DN15/25	PA60	0.6	0.5

6.4.3 Establishing the Compressed Air Supply

A prerequisite for the reliable operation of the valve is that the compressed air hoses are cut exactly square.

Tools required:

- A hose cutter

Carry out the following steps:

1. Depressurize the pneumatic connection at the place where you are working.
2. Use the hose cutter to cut the pneumatic hoses square.
3. Connect a hose to the valve.

→ The compressed air supply has been established.

6.5 Electrical connections

Prerequisite:

- The valve has been fitted correctly, see Section 10.6, Page 60.

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 control top diagram and the instructions in the corresponding operating instructions for the T.VIS control top or other models.

→ The valve has been connected electrically.

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 Guideline for lockout-tagout procedure

Preparation and training:

- Ensure that all employees involved in the Lockout-Tagout procedure are properly trained and authorised.

Identification of energy sources:

- Identify all energy sources that will be blocked during the work, which must be discharged and isolated.

Shutting down and blocking:

- Shut down the system according to the established procedures.
- Block the energy sources using padlocks, lockout devices, or other appropriate safety mechanisms.

Discharging (bleed):

- Discharge all stored energy to ensure that no potentially hazardous residual energy is present.

Verification:

- Ensure that all energy sources are actually blocked and discharged by performing visual and physical checks.

Performing the work:

- Once the systems are secured, authorized personnel can begin maintenance or repair work.

Releasing the lockout (unlock):

- After completing the work, remove the lockout devices and reactivate the energy sources when the system is ready to be put back into operation.

7.3 Notes on commissioning

Before starting commissioning observe the following:

- Make sure that there are no foreign materials in the system.
- Actuate all positions of the valve once by applying compressed air.
- When TEFASEP is used as a sealing material, the valve must be sterilised before the first product run and briefly brought to the closed position immediately after sterilisation to ensure optimum tightness. For detailed information, see Section 9.2, Page 48
- Clean and sterilise 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 staff.

For operation, the following principles apply:

- Monitor the valve during the 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 place of installation of the valve must be adequately ventilated at all times.
- Structural alterations of the valve are not permitted. Immediately report any changes on the valve to the person responsible.
- Always keep danger zones clear. Do not leave any objects in the danger zone. Only allow persons to enter the danger zone when the machine is de-energized.
- Regularly check that all emergency stop devices are working correctly.

8.2 Locking mechanism LoTo - seat A

Hint!

- Every employee participating in the LOTO procedure must be properly trained and authorized.
- Before maintenance or repair work begins, it must be ensured that all locking mechanisms are properly installed and function effectively.
- It is strictly forbidden to remove padlocks or locking mechanisms unless this is done as part of the LOTO unlocking procedure by the authorized responsible person.

8.2.1 Unlock seat A

Tools required:

- Flexible head spanner Ø60-90mm
- Torque wrench
- Hook wrench adapter for torque wrench

Carry out the following steps:

1. Loosen the threaded ring with a joint wrench and manually screw it onto the upper thread.

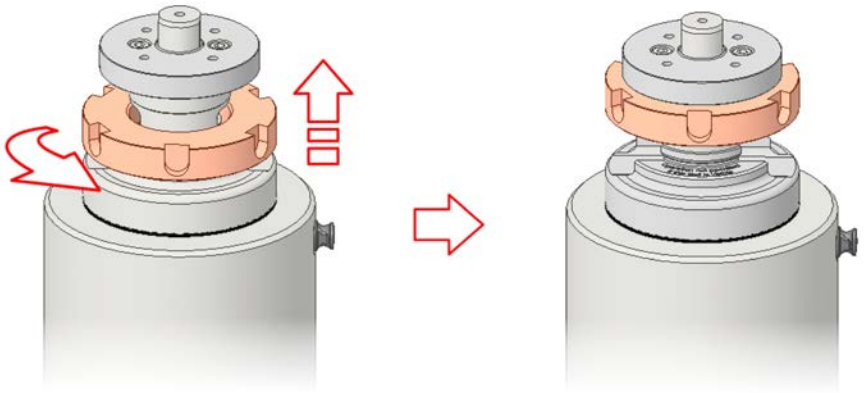


Fig.17: Loosen the threaded ring

2. Insert the locking bolt fully into the valve axis until it stops.

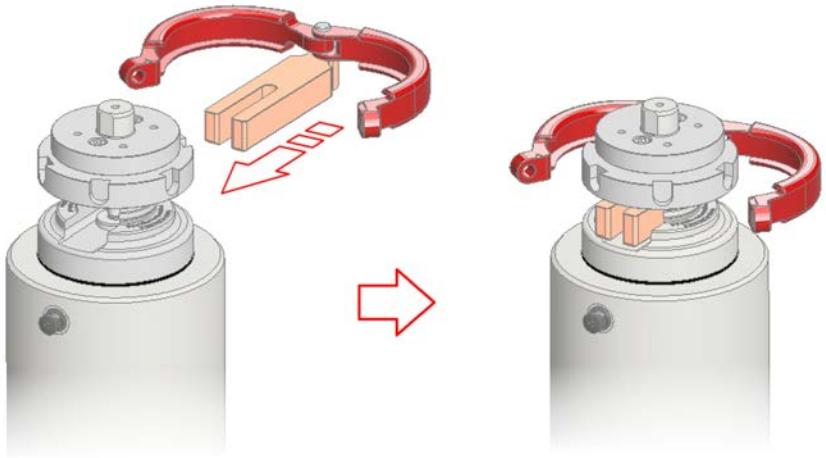


Fig.18: Insert the locking bolt

3. Tighten the threaded ring onto the locking bolt with the specified torque (20 Nm). Due to the extended lever of the hook wrench adapter, the **setting value** on the scale of the torque wrench is **15 Nm!**

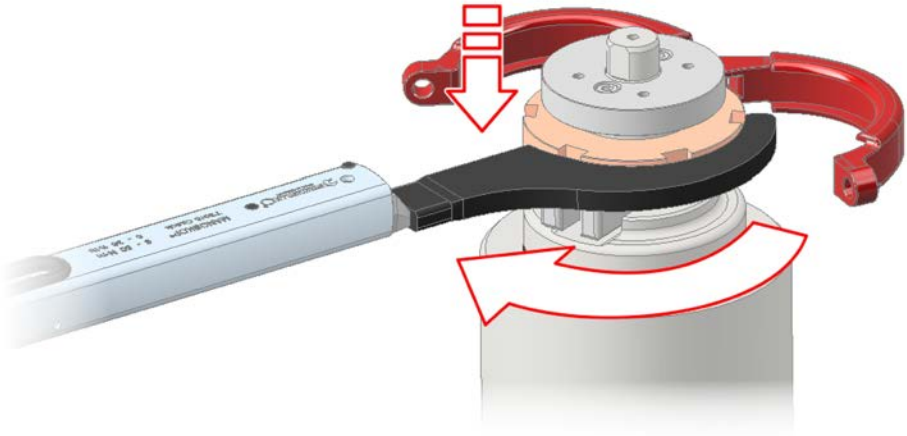


Fig.19: Tighten the threaded ring

4. Close the shackle and install the padlock.

Fig.20: Lock the locking mechanism

→ Seat A is locked, and the locking mechanism is secured.

8.2.2 Unlock seat A - restore normal operations

Tools required:

- Flexible head spanner Ø60-90mm
- Torque wrench
- Hook wrench adapter for torque wrench

The valve seat A is unlocked in reverse order, similar to the previous section.

Carry out the following steps:

1. Open and remove the padlock.
2. Open the shackle.

3. Loosen threaded ring with a universal joint wrench.
4. Remove locking pin.
5. Tighten the threaded ring on the lantern using the torque hook wrench with the specified torque (20 Nm). Due to the extended lever of the hook wrench adapter, the **setting value** on the scale of the torque wrench is **15 Nm!**

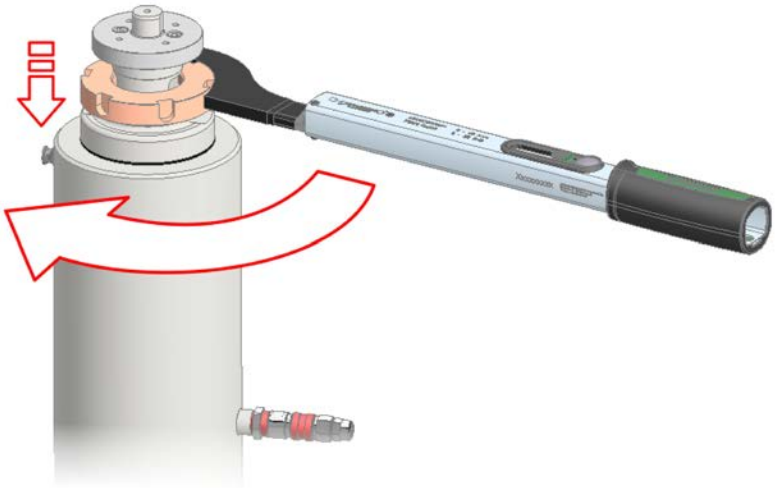


Fig.21: Affix threaded ring

Hint!

Safety during normal operation is only ensured when the threaded ring is tightened.

→ Valve seat A is unlocked, and the valve is ready for normal operation again.

8.3 Air lock seat B

Accidental opening of valve seat B can be prevented by shutting off both air connections D and C:

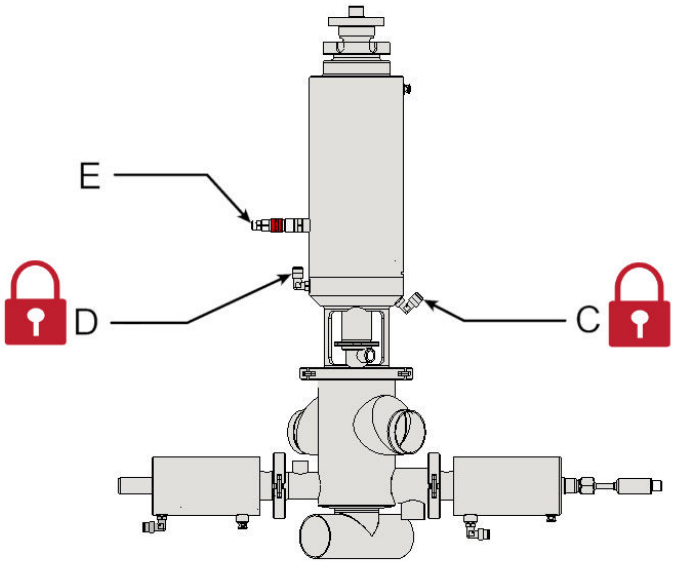
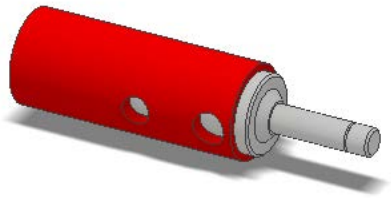
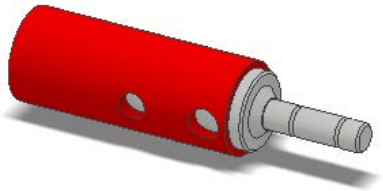
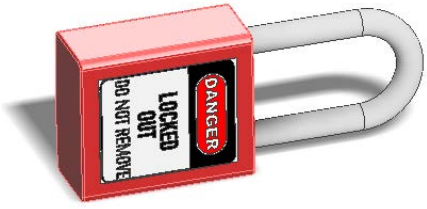


Fig.22: Shut off the seat B air connections

The required locking plugs “Air Lock” are not included in the delivery. These can be purchased separately:

Fuse element for air connection Ø 6 mm		Art. No. 1925.50018
Fuse element for air connection ¼“ (Ø 6.35 mm)		Art. No. 1925.50019
Padlock		Art. No. 5050.53907

Hint!

The interrupted compressed air supply prevents accidental opening of the valve at seat B. There is no protection against opening due to high pressure or pressure surges.

With the instructions explained below, the complete air supply to the valve can be blocked by locking the air supply (P).

Caution!

Risk of injury

Pulling off an air supply hose whilst under compressed air can lead to injuries.

► Ensure that the air supply is shut off before disconnecting air supply hoses.

8.3.1 Lock the seat B air connection

Carry out the following steps:

1. Turn off the air supply and remove the air hose from the air connection (P).

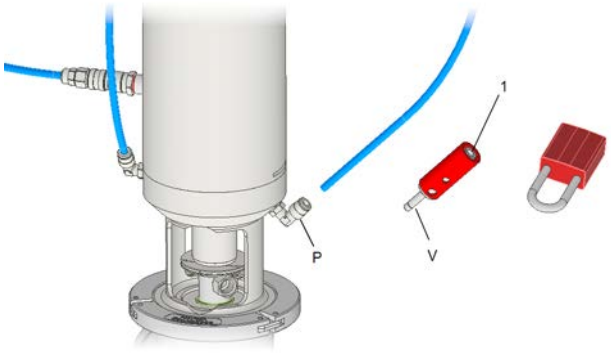


Fig.23: Preparing the lock plug

2. Insert the loosened air hose into the blind connection (1).
3. Insert the pneumatic locking connector (V) into the air connection (P).
4. Slide the inner sleeve (2) over the air connection.

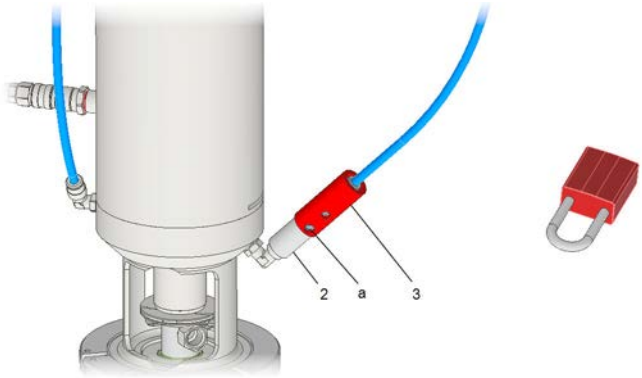


Fig.24: Mounting the lock plug

5. Turn sleeves (2) or (3) until the opening (a) is accessible.

6. Lock sleeves (2) and (3) against each other. To this end, push the shackle of a LoTo lock through opening (a) and lock.
7. Repeat this process for the other air connection.

→ The air supply of the valve is locked.

8.3.2 Unlock the seat B air connection

Carry out the following steps:

1. Remove U-lock.

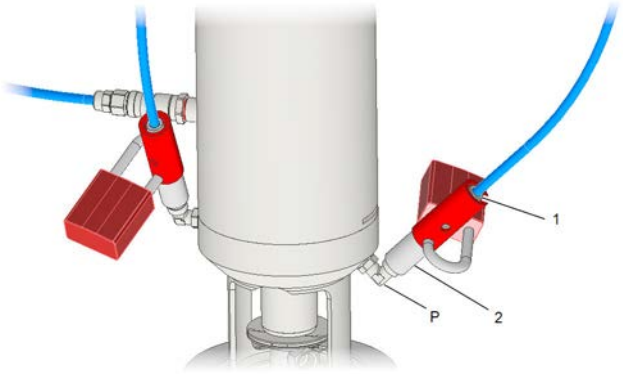


Fig.25: Air connections with locking plug

2. Push the sleeve (2) forwards.
3. Pull off the locking connector.
4. Pull off air hose from blind connection (1).
5. Insert the air hose into the air connection (P)
6. Repeat this process for the other air connection.

→ The air supply of the valve is unlocked.

9 Cleaning

9.1 Cleaning

The valve is suitable for CIP (Cleaning in Place); recommended cleaning speed in the valve is at least 2 m/s.

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

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

The cleaning effect must be checked regularly by the operator!

9.2 Sterilisation

The valve is suitable for SIP sterilisation (sterilisation in place). The following data applies for valves equipped with TEFASEP® and silicone sealing materials.

Sterilisation is possible with:

- Hot water, max. 160 °C (320 °F)
- Steam at max. 160 °C (320 °F) for 20 to 30 min
- Chemicals (e.g. H_2O_2)

Hint!

When TEFASEP® valve seat seals are used, hot sterilization is mandatory. Steam sterilization allows the seal to be perfectly fitted into the valve seat, thus ensuring optimum sealing against the maximum closing pressure specified.

Operating conditions for steam sterilization:

- Medium: saturated steam
- Temperature: >121 °C (250 °F)
- Holding time: 20 … 30 min

The valve must be placed in the closed position immediately after steam sterilization for a short period (minimum 5 seconds). During commissioning, regularly check all sealing points for leaks. Replace defective seals and repeat the sterilization process.

9.3 Passivation

Before commissioning a plant, passivation is commonly carried out for long pipes and tanks. Valve blocks are usually excepted from this.

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

The ultimate temperatures, chemicals, concentrations and contact time to be used must be determined by the plant operator along with its chemical supplier.

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 31.

10.2 Inspections

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

10.2.1 Bellows

Carry out the following steps:

1. Check the leakage openings for contamination and continuous leakage of fluids.

→ The bellows has been checked.

10.2.2 Piston rod seal

Carry out the following steps:

1. Check the lantern for contamination and continuous leakage of fluids on the housing side.

→ Piston rod seal is checked.

10.2.3 Pneumatic connections

Carry out the following steps:

1. Check the operating pressure at the pressure reducing and filter station.
2. Clean the air filter at regular intervals.
3. Check that the air hoses sit firmly in the air connections.
4. Check the lines for kinks and leaks.

→ The pneumatic connection has been checked.

10.2.4 Electrical connections

Carry out the following steps:

1. Check that the proximity switches are positioned correctly and the connections are clean.

→ The electrical connection has been checked.

10.3 Maintenance intervals

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

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

Examples of relevant process parameters are:

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

If information regarding the definition of practical-oriented maintenance intervals is not available or is insufficient, the guideline values listed in the "Maintenance" chapter can be referred. This information is based on empirical values for GEA Flow Components and relates to installations working in two-shift operation.

10.4 List of tools

List of tools (in alphabetical order)			
Tool	**Figure**	**Intended Purpose**	**Material Number GEA Aseptomag AG**
Pressurising tool AZ & NC DN 10 - DN 80	 Fig.26	Valves AZ & NC DN 10 - DN 80 Inspection of metal bellows	0980.50003 S-12-0010
Pressurising tool AZ & NC DN 80 - DN 100	 Fig.27	Valves AZ & NC DN 80 - DN 100 Inspection of metal bellows	0980.50074 S-12-0455

List of tools (in alphabetical order)			
Tool	**Figure**	**Intended Purpose**	**Material Number GEA Aseptomag AG**
Pressurizing tool EA DN 40 - DN 100	 Fig.28	Valves EA DN 40 - DN 100 Inspection of metal bellows	0980.10001 S-12-0313
Torque wrench	 Fig.29	Assemble internal assembly EA & divisible valve disc	0980.50333 S-12-0883
Jaw insert SW13	 Fig.30	Side valve PA50	0980.50304
Jaw insert SW17	 Fig.31	Side valve PA50	0980.50304

List of tools (in alphabetical order)			
Tool	**Figure**	**Intended Purpose**	**Material Number GEA Aseptomag AG**
Pressure control valve Ø 6 mm	 Fig.32	Inspection of metal bellows	9999.10090
Flexible head spanner Ø60-90mm, Pin Ø 5.5mm	 Fig.33	PA80-135 Remove/fit assembly spring Loosen LoTo threaded ring	0980.10009 S-12-0332
Flexible head spanner Ø95-155mm, Pin Ø 6mm	 Fig.34	PA180-PA210 Remove/fit assembly spring	0980.50131 S-12-0568
Hand-operated press	 Fig.35	PA50 - 60 NC/NO Remove/fit PA	5050.55469 S-12-0406
Hook wrench adapter to torque wrench	 Fig.36	Tighten the LoTo threaded ring	0980.50384 S12-0960

List of tools (in alphabetical order)			
Tool	**Figure**	**Intended Purpose**	**Material Number GEA Aseptomag AG**
Oven (no microwave, min. temp. 140 °C)	 Fig.37	Preheat hard valve seat seals	0981.50016 S-12-0084
Hex socket key SW4	 Fig.38	Remove / mount cover plate LoTo locking mechanism	0980.50113 S-12-0546
Hex socket key AF5	 Fig.39	Valves DN 10 - DN 65 Tighten/release clamp	0980.50121 S-12-0554
Hex socket key AF6		Valves DN 80 - DN 150 Tighten/release clamp	0980.50122 S-12-0555
Ratchet, square socket drive ½"	 Fig.40	Release divisible valve disks Dismantle / mount LoTo locking mechanism	0980.50124 S-12-0557
Mounting tool DN 25 DK TV	 Fig.41	DN 25 TV Loosen / tighten divisible valve disks	5050.53497 S12-0434
Mounting tool DN 40 + 50 DK TV		DN 40 + 50 TV Loosen / tighten divisible valve disks	5050.51255 S-12-0111
Mounting tool DN 65 + 80 DK TV		DN 65 + 80 TV Loosen / tighten divisible valve disks	5050.51256 S-12-0024

List of tools (in alphabetical order)			
Tool	**Figure**	**Intended Purpose**	**Material Number GEA Aseptomag AG**
Mounting tool DN 100 DK TV	 Fig.42	DN 100 TV Loosen / tighten divisible valve disks	5050.51257 S-12-0102
Mounting tool Spring assembly PA100-180 EA	 Fig.43	PA100-180 EA Remove/insert spring package	0981.50015 S12-0211
Mounting tool Spring package PA210-255 EA		PA210-255 EA Remove/insert spring package	0981.50014 S12-0212
Mounting tool Bushing PA50-60 NC/NO	 Fig.44	Assemble piston rod seal side valve PA50 - 60 (side valve) assemble/disassemble	5050.50988 S-12-0233
Mounting tool Clamping piece PA30-210	 Fig.45	PA30-210 Hold cylinder	5050.51064 S-12-0005
Mounting tool Clamping piece PA255	 Fig.46	PA255 Hold cylinder	5050.55468 S-12-0405

List of tools (in alphabetical order)			
Tool	**Figure**	**Intended Purpose**	**Material Number GEA Aseptomag AG**
Mounting tool O-ring	 Fig.47	Remove/fit seals	5050.51258 S-12-0162
O-ring cutter heated	 Fig.48	Disassemble hard, shrunk valve seat seals	0980.50022 S-12-0083
Slotted screwdriver Size 1	 Fig.49	PA80AZ - PA180AZ Remove circlip from actuator base	--
Slotted screwdriver Size 4		PA80-255 Fit assembly spring	--
Spanner adapter SW10	 Fig.50	DN 25 EA Loosen / tighten internal assembly DN 25 EA TV Loosen / tighten divisible valve disks	0980.10153 S-12-0505
Spanner adapter SW13	 Fig.51	DN 40 - 100 EA Loosen / tighten internal assembly DN 40 EA TV Loosen / tighten divisible valve disks	5050.51604 S-12-0140

List of tools (in alphabetical order)			
Tool	**Figure**	**Intended Purpose**	**Material Number GEA Aseptomag AG**
Spanner adapter AF17	 Fig.52	DN 50 - 65 EA TV Loosen / tighten divisible valve disks	5050.51605 S-12-0097
Spanner adapter SW30	 Fig.53	DN 80 - 100 EA TV Loosen / tighten divisible valve disks	5050.51606 S12-0107
Vice with soft jaws or equivalent protective jaws	 Fig.54	For divisible internal assemblies and actuators	--
Protective gloves, heat-resistant	 Fig.55	Remove/fit hard valve seat seals	--
Hexagonal pin insert 4mm ½"	 Fig.56	Loosen / mount LoTo locking mechanism	0980.50387 S12-0963

List of tools (in alphabetical order)			
Tool	**Figure**	**Intended Purpose**	**Material Number GEA Aseptomag AG**
Seeger circlip pliers Inside diameter 40-100 mm, angled tip, 90°	 Fig.57	PA50 - 60 NC/NO Remove/fit PA	0980.50108 S-12-0541
Shut-off valve Ø 6 mm	 Fig.58	Inspection of metal bellows	9999.10091
Socket wrench bit AF14, square drive ½"	 Fig.59	DN 10 - 100 TV Release divisible valve disks	0980.00009 S-12-0663
Socket wrench bit AF17, square drive ½"	 Fig.60	DN 25 EA Loosen / tighten internal assembly	0980.00010 S-12-0664
Socket wrench bit AF22, square drive ½"		DN 50 - 100 EA Loosen / tighten internal assembly	0980.00011 S-12-0665
Extension socket wrench 255mm ½"	 Fig.61	Loosen / mount LoTo locking mechanism	0980.50386 S-12-0962
Centring rod Ø15 / Ø20	 Fig.62	Centre LoTo locking mechanism	0980.50388 S12-0964

10.5 Prior to disassembly

Prerequisite:

- Make sure that while work is being performed on the open valve 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, and also depressurize them.
2. Shut off the control air supply.
3. Disconnect the power supply.

→ Disassembly has been prepared.

10.6 Disassembling and Assembling the Valve

10.6.1 Removing the valve

Tools required:

- Hex socket key

⚠ Caution!

Danger of injury due to spring force being released

You can sustain injuries to your fingers when you put your hand into a valve if the valve has not been moved to the open position beforehand.

► Before starting any work, bring the valve to the "open" position.
► Wear protective gloves for all work.
► Always exercise caution and prudence.

⚠ Caution!

Danger of injury due to media escaping after removing the clamp

You can sustain injuries to your entire body if you open a valve that is still under pressure from the medium.

► Ensure that the valve is no longer under medium pressure before removing the clamp.
► Wear suitable protective clothing for all work.
► Always exercise caution and prudence.

Hint!

The side valve version “UV” deviates from the side valve standard “AV” insofar as it has an additional valve housing, the “divert valve housing”. The following work steps show both versions.

Carry out the following steps:

1. Bring the valves to the "open" position.

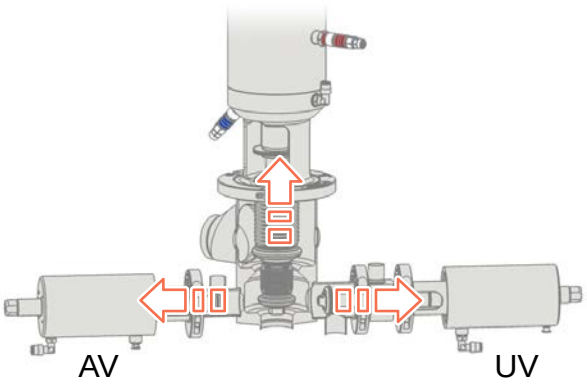


Fig.63: Apply valves NC

2. Side valve UV: disconnect pipe connection to switch housing.

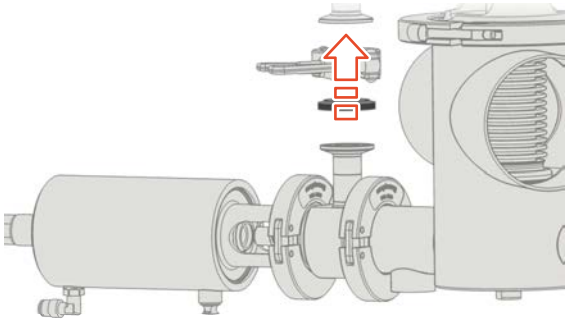


Fig.64: Separate pipe connection

! Ensure that all pipe connections for the divert valve housing have been removed before carrying out the next step.

3. Release the clamp of the side valve with a suitable *hex socket key* but do not unhook the screw yet.

   ! For side valve of UV model, loosen only the clamp closer to the main valve.

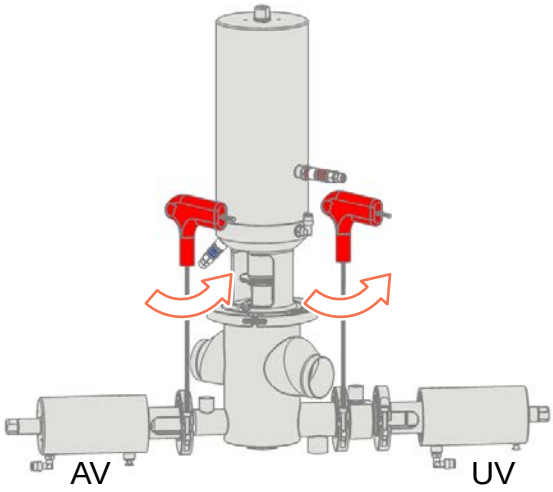


Fig.65: Loosen clamp screw to the side valve

! Ensure that you can move the clamp by hand and without much effort before carrying out the next step. If this is not the case, carefully hit the clamp segments with a plastic mallet until the pressure is released and the clamp can easily be moved afterwards.

4. Secure the valve insert of the side valve against sagging and falling down, and carefully remove the clamp from the side valve. Carefully remove the valve insert.

   ! Do not damage the sealing surface on the valve housing.

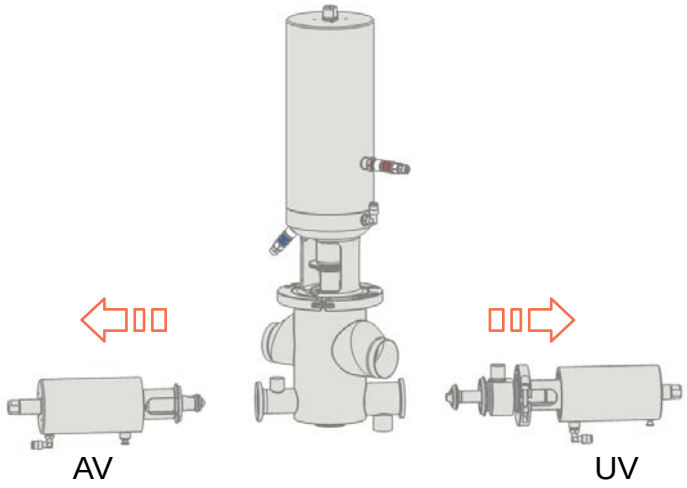


Fig.66: Remove valve insert

5. Release the clamp of the main valve with a suitable *hex socket key*, but do not unhook the screw yet.

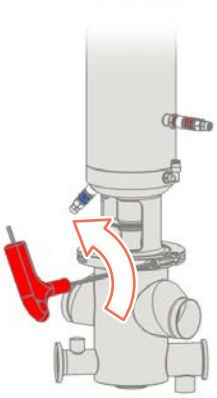


Fig.67: Loosening the clamp screw

! Ensure that you can move the clamp by hand and without much effort before carrying out the next step. If this is not the case, carefully hit the clamp segments with a plastic mallet until the pressure is released and the clamp can easily be moved afterwards.

6. Carefully take off the clamp from the valve.
7. Carefully lift the actuator with the internal assembly out of the housing.

   ! Do not damage the sealing surface on the valve housing.

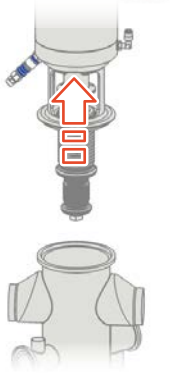


Fig.68: Removing actuator and internal assembly

→ Internal assembly, actuator and side valves are now separated from the housing.

10.6.2 Installing the valve

Hint!

Pay attention to the following point when assembling the valve:

- Thoroughly clean all parts and check for damage.

Tools required:

- Hex socket key

Carry out the following steps:

1. Install the valve in the reverse order of disassembly, see Section 10.6.1, Page 60.

   ! Note “Torques for clamp”, see Section 10.6.3, Page 63

2. Test the function of the valve after installing.

   ! Every possible position must be activated and held for 3-5 seconds to assure proper assembly and sealing.

→ The valve has been assembled.

10.6.3 Torques for clamp

Clamp screw thread size	Recommended torque [Nm]
M6	10
M8	20

10.7 Disassemble and assemble the side valves

10.7.1 Overview disassembly / assembly side valve

- Disassemble and assemble inside part (side valve) - versions "LVD" and "UV", see Section 10.7.2, Page 64.
- Disassemble and assemble piston rod seal (side valve) - version "LVD" and "UV", see Section 10.7.3, Page 66.

- Disassemble and assemble inside part (side valve) - version “AV” is included in the disassembly / assembly instructions of drive PA50/PA60 (side valve).
- Disassemble and assemble drive PA50/PA60 (side valve), see Section 10.7.4, Page 68.
- Disassemble and assemble piston rod seal (side valve) - version "AV", see Section 10.7.5, Page 73.
- Disassemble and assemble valve seat seal (side valve) according to the valve seat seal of the main valve, see Section 10.9, Page 79.

10.7.2 Disassemble and assemble inside part (side valve) - versions "LVD" and "UV"

10.7.2.1 Disassemble piston rod seal (side valve) - versions "LVD" and "UV"

Requirement:

- The side valve cover has been separated from the housing, see Section 10.6.1, Page 60.

Tools required:

- Open-ended wrench

Carry out the following steps:

1. Bring the side valve to the "closed" position.
2. Screw valve axle out of the piston rod.

   ! If a temperature sensor is installed, unscrew it beforehand with care from the piston rod.

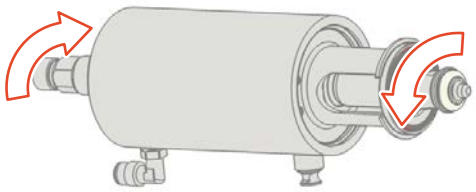


Fig.69: Releasing valve axis

3. Remove components of inside part:

   → Valve axle and valve cover for version LVD

   → Valve axle for version UV

   Remove the housing seal without a tool.

   ! Do not damage sealing surface of valve cover / divert valve housing.

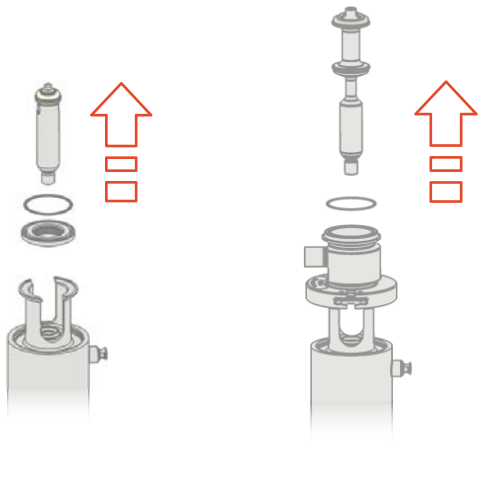


Fig.70: Remove components of inside part

→ The internal LVD has been disassembled.

4. Side valve UV: Loosen clamp with *Allen key* and remove.

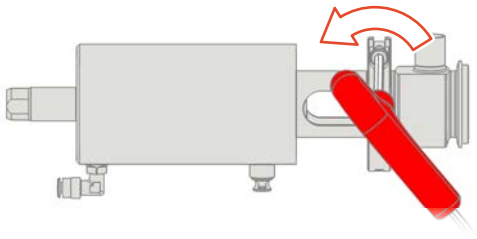


Fig.71: Remove clamp

5. Side valve UV: Remove divert valve housing and valve cover. Remove the housing seal without a tool.

   ! Do not damage the sealing surfaces on the divert valve housing and on the valve cover.

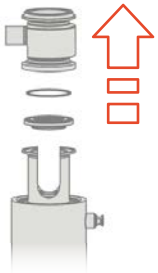


Fig.72: Remove valve components

→ Inside part of UV has been disassembled.

10.7.2.2 Assemble piston rod seal (side valve) - version "LVD" and "UV"

Hint!

Pay attention to the following point when assembling the valve:

- Thoroughly clean all parts and check for damage.

Tools required:

- Torque wrench with open-jawed spanner

Carry out the following steps:

1. Install the internal assembly in the reverse order of disassembly, see Section 10.7.2.1, Page 64.

   ! Grease well the valve axle of the inside part at the thread and 5 mm of the adjoining axle to prevent possible corrosion.

   ! Screw in the inside part by hand carefully and twisting slightly until the metallic stop into the piston rod of the pneumatic actuator, and tighten with *torque open-jawed spanner* to 40 Nm (15 Nm for actuator side valve PA50).

   !Side valve UV: See table "Torques for clamp", see Section 10.6.3, Page 63.

→ The internal assembly has been assembled.

10.7.3 Disassemble and assemble piston rod seal (side valve) - version "LVD" and "UV"

10.7.3.1 Disassemble piston rod seal (side valve) - version "LVD" and "UV"

Requirement:

- Inside part side valve LVD or UV is dismantled, see Section 10.7.2, Page 64.

Tools required:

- Slotted screwdriver

Carry out the following steps:

1. Place the valve cover on a solid surface.
2. Position the tip of the *slotted screwdriver* in the groove of the inbuilt piston rod seal. Apply an even vertical downward pressure on the *screwdriver*. At the same time, move the rod inside using the thumb of the other hand, thereby pushing the seal out of the groove.

   ! Pay attention not to damage the surface of the groove.

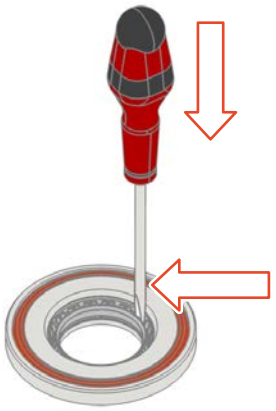


Fig.73: Loosen the piston rod seal

3. Insert the *slotted screwdriver* in the generated gap between piston rod seal and valve cover and remove the seal from the groove using lever movement.

   ! Pay attention not to damage the surface of the groove.

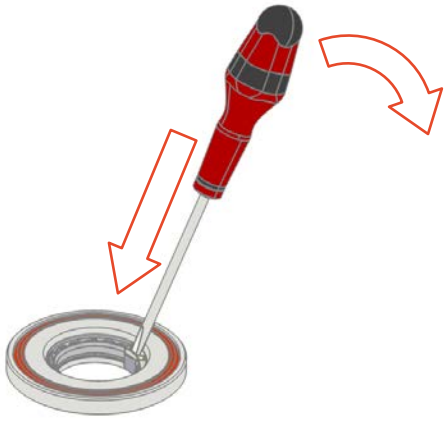


Fig.74: Remove piston rod seal

→ Piston rod seal side valve is dismantled.

10.7.3.2 Assemble piston rod seal (side valve) - version "LVD" and "UV"

Tools required:

- Food-grade lubricant PARALIQ GTE 703
- Object with flat, smooth surface (if available, the assembly tool *sleeve PA50-60 NC/NO* is recommended))
- New piston rod seal

Carry out the following steps:

1. Grease piston rod seal on the external surfaces with food-grade lubricating grease.
2. Position piston rod seal well centred above groove opening of the valve cover and put it on a solid, horizontal ground.

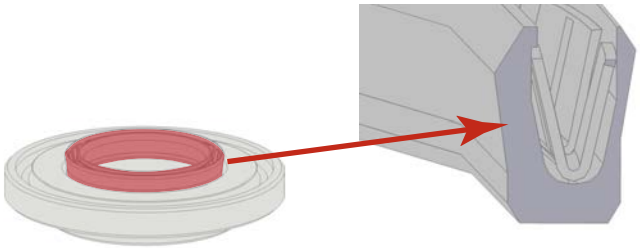


Fig.75: Position the piston rod seal

3. Position the *flat object* with the contact face downwards onto the piston rod seal. Using the palm of your hand, push the *object* all the way down in a straight line. The seal is inserted in the opening.

   ! Using your free hand, fix the valve cover and provide additional guidance for the flat *object*.

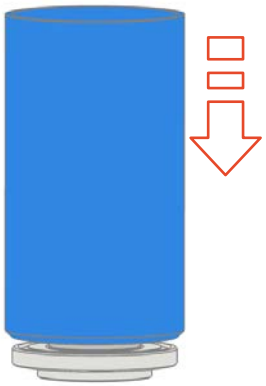


Fig.76: Insert piston rod seal

4. Using your thumbs, push the piston rod seal downwards in the opening simultaneously on both sides until it engages in the seal groove.

→ Piston rod seal side valve is installed.

10.7.4 Disassemble and assemble actuator PA50/PA60 (side valve)

10.7.4.1 Disassembling Actuator PA50/PA60 (side valve)

⚠ Caution!

Danger of injury due to spring force being released

You may be injured if the spring tension is released in an uncontrolled manner, causing actuator parts to be moved or thrown around rapidly.

► Load and unload the spring in a controlled and slow manner.
► Wear protective gloves for all work.
► Always exercise caution and prudence.

Tools required:

- Hand-operated press
- Seeger circlip pliers
- Assembly tool for bushing PA50-60 NC/NO
- Mounting tool for O-ring

Hint!

The side valve versions "LVD" and "UV" differ from shown actuator "AV" insofar as the piston rod is divisible; i.e. the upper part with the valve seat (the valve axle) was already removed, see Section 10.7.2.1, Page 64.

Carry out the following steps:

1. Press the base of the actuator downwards, using the *hand-operated press* with the *bushing* .

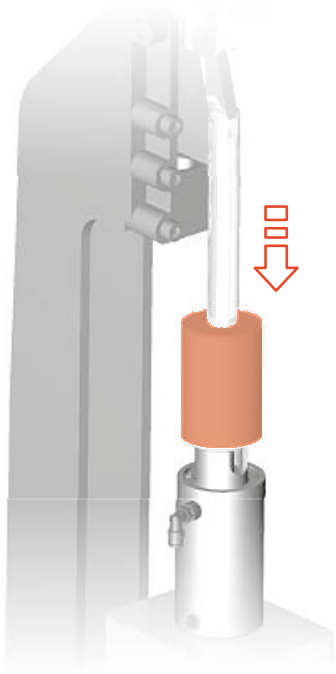


Fig.77: Lowering actuator base

2. Remove the circlip from the actuator base using the *Seeger circlip pliers*.

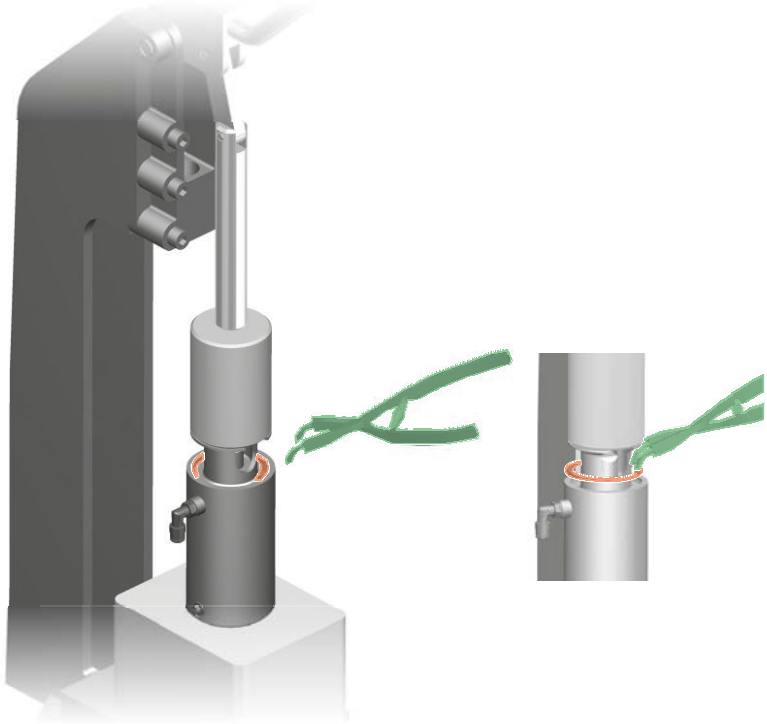


Fig.78: Removing the circlip

3. Slowly remove pressure from the actuator base.

! For side valve “LVD” and “UV”: The bottom part of the actuator is pressed upwards by the pressure spring when pressure is removed and can be taken out.

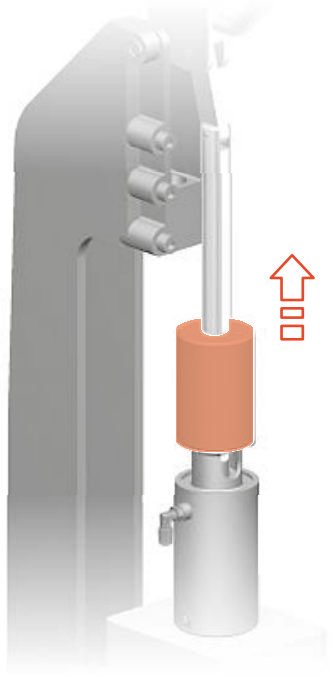


Fig.79: Removing pressure from the actuator base

4. Side valve "LVD" and "UV" with actuator NO: Carefully draw the compression spring out of the cylinder.

Fig.80: Lift out spring

5. Pull out the components of the inside part and actuator at the piston rod out of the cylinder by turning slightly.

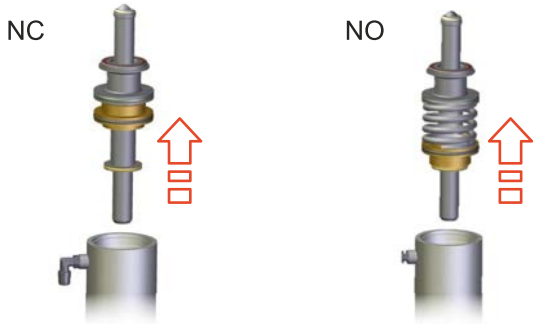


Fig.81: Lift out the actuator components

6. Pull the bottom circlip out of the groove and remove both parts of the lock washer from the piston rod.

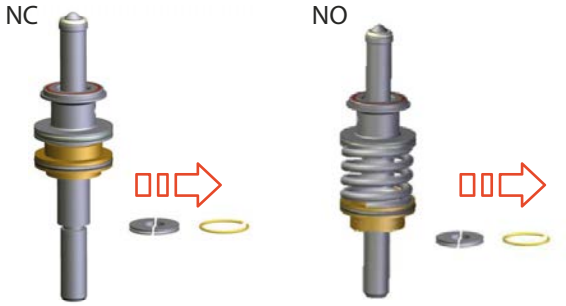


Fig.82: Removing bottom securing elements

7. Carefully slip off the actuator components from the piston rod.

   ! Pay attention to the alignment of the piston disk (asymmetrical design) already when disassembling.

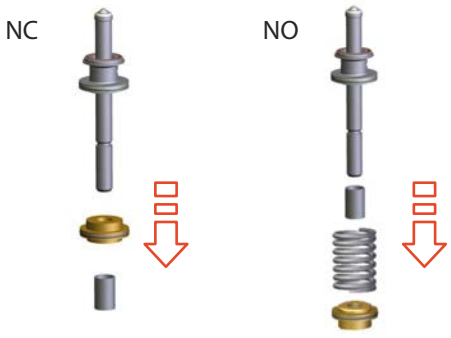


Fig.83: Pulling off actuator components

8. Pull the upper circlip out of the groove and remove both parts of the lock washer from the piston rod.

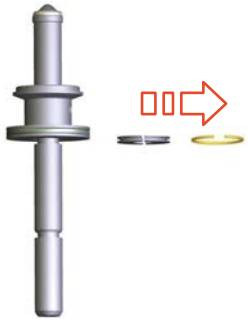


Fig.84: Remove upper securing elements

9. Side valve "AV": Pull the bottom part of the actuator from the piston rod.

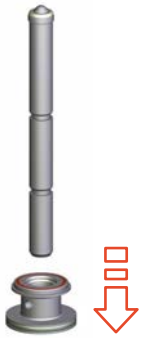


Fig.85: Pull off the bottom part of the actuator

10. Actuator NC: Carefully draw the compression spring out of the cylinder.

Fig.86: Lift out spring

→ Actuator PA50/PA60 has been removed.

10.7.4.2 Installing Actuator PA50/PA60

Hint!

Pay attention to the following points when installing the actuator:

- Replace all visible seals.
- Thoroughly clean and check the interior cylinder contact surfaces, O-ring grooves, piston rod and piston disc.
- When changing the seals, do not damage the seal groove.
- Use only replacement seals from the seal set indicated in the list of spare parts.
- Grease all seals and the associated contact surfaces with the food-grade lubricant PARALIQ GTE 703.

Carry out the following steps:

1. The actuator PA50/PA60 is assembled in the reverse order of disassembly, see Section 10.7.4.1, Page 68.

Hint!

Seals in the product-contacting area are generally not lubricated. To facilitate assembly (better gliding properties and securing against turning), this type of elastomer seal may, however, be wetted using a food-grade lubricant.

! Wetting elastomer seals is not permitted when they are used in ATEX applications!

→ Actuator PA50/PA60 is mounted.

10.7.5 Dismantle and mount piston rod seal (side valve) - version “AV”

10.7.5.1 Dismantle piston rod seal (side valve) - version “AV”

Requirement:

- Actuator PA50/PA60 (side valve) is dismantled, see Section 10.7.4.1, Page 68.

Tools required:

- Slotted screwdriver

Carry out the following steps:

1. Place the bottom part of the actuator on a solid surface.
2. Position the tip of the *slotted screwdriver* in the groove of the inbuilt piston rod seal. Apply an even vertical downward pressure on the *screwdriver*. At the same time, move the rod inside using the thumb of the other hand, thereby pushing the seal out of the groove.

   ! Pay attention not to damage the surface of the groove.

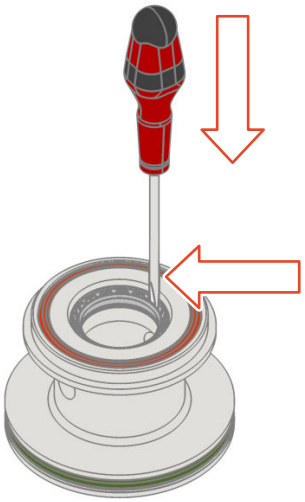


Fig.87: Loosen the piston rod seal

3. Insert the *slotted screwdriver* in the generated gap between piston rod seal and bottom part of actuator and remove the seal from the groove using lever movement.

   ! Pay attention not to damage the surface of the groove.

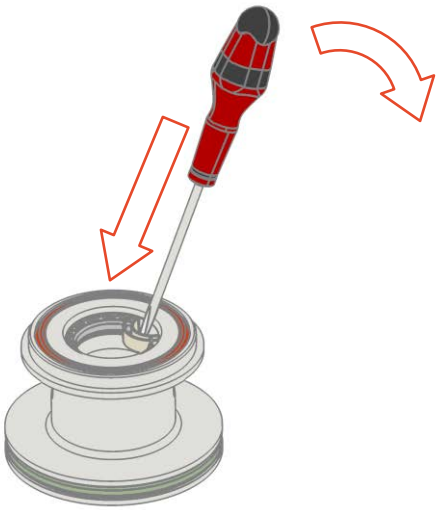


Fig.88: Remove piston rod seal

→ Piston rod seal side valve is dismantled.

10.7.5.2 Mount piston rod seal (side valve) - version “AV”

Tools required:

- Food-grade lubricant PARALIQ GTE 703
- Object with flat, smooth surface (if available, the assembly tool *sleeve PA50-60 NC/NO* is recommended)
- New piston rod seal

Carry out the following steps:

1. Grease piston rod seal on the external surfaces with food-grade lubricating grease.
2. Position piston rod seal well centred above groove opening of the actuator bottom part and put it on a solid, horizontal ground.

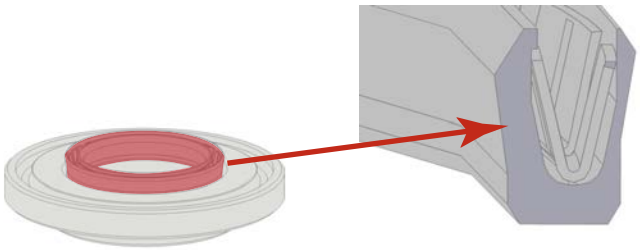


Fig.89: Position the piston rod seal

3. Position the *flat object* with the contact face downwards onto the piston rod seal. Using the palm of your hand, push the *object* all the way down in a straight line. The seal is inserted in the opening.

   ! Using your free hand, fix the bottom part of the actuator and provide additional guidance to the *flat object*.

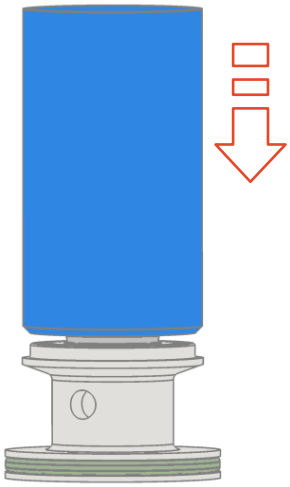


Fig.90: Insert piston rod seal

4. Using your thumbs, push the piston rod seal downwards in the opening simultaneously on both sides until it engages in the seal groove.

→ Piston rod seal side valve is installed.

10.8 Disassemble and assemble the internal assembly “EA”

10.8.1 Disassemble internal assembly “EA”

⚠ Caution!

Danger of injury due to valve parts moved by compressed air!

You can sustain injuries to your fingers when you put your hand into the valve while it is switching.

► Wear protective gloves for all work.
► Always exercise caution and prudence.

Notice

Risk of damage to the metal bellow from torsion

The metal bellow can get damaged, if forces other than those described in these assembly instructions are used on the internal assembly.

► Follow the instructions in this manual conscientiously.
► Always exercise caution and prudence.

Requirement:

- Internal assembly and actuator have been separated from the housing, see Section 10.6.1, Page 60

Tools required:

- Vice with smooth jaws or equivalent type of protected jaws
- Ratchet with square socket drive ½"
- Socket wrench bit
- Spanner adapter

Carry out the following steps:

1. Put the actuator in “closed” position (connection 1 ▲ D venting).
2. Clamp the pneumatic actuator at the width across flats of the piston rod into the *vice*.

   ! Do not damage piston rod!

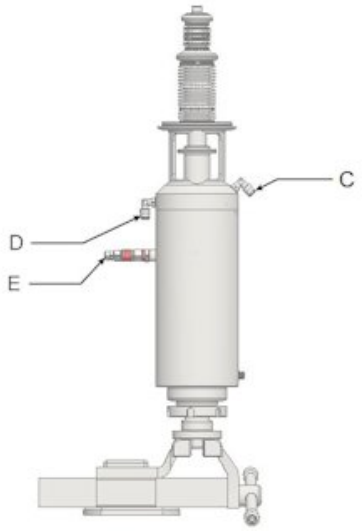


Fig.91: Clamping the actuator

3. Connection 2 ⏏ C of the actuator. Lift the circlip out of the groove and pull the lock washer out from the piston rod.

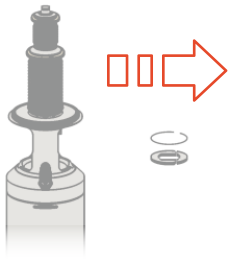


Fig.92: Removing fuse elements

4. Position the *spanner adapter* with *socket for wrench* at the width across flats of the internal assembly, loosen and carefully screw out from the piston rod of the pneumatic actuator.

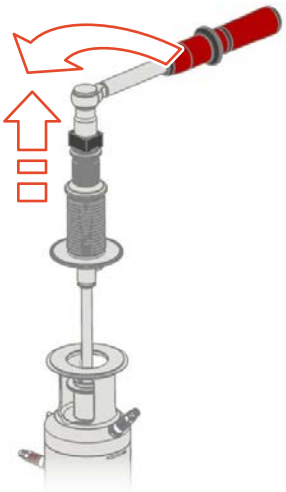


Fig.93: Loosening internal assembly

5. Remove the housing seal without a tool.

   ! Do not damage the sealing surfaces on the housing and internal assembly.

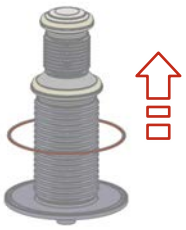


Fig.94: Removing housing seal

→ The internal assembly has been removed.

10.8.2 Assemble internal assembly "EA"

Hint!

Pay attention to the following points when assembling the internal assembly:

- Thoroughly clean all parts and check for damage.
- Replace all dismantled seals.
- When changing the seals, do not damage the seal groove.
- Use only replacement seals from the seal set indicated in the list of spare parts.

  Seals in the product-contacting area are generally not lubricated. To facilitate assembly (better gliding properties and securing against turning), this type of elastomer seal may, however, be wetted using a food-grade lubricant.

! Wetting elastomer seals is not permitted when they are used in ATEX applications!

Tools required:

- Vice with smooth jaws or equivalent type of protected jaws
- Torque wrench with wrench socket
- Spanner adapter

Carry out the following steps:

1. Install the internal assembly in the reverse order of disassembly, see .

   ! Grease well the valve axle of the inside part at the thread and 5 mm of the adjoining axle to prevent possible corrosion.

   ! Insert the inside part by hand carefully and twisting slightly until the metallic stop into the piston rod of the pneumatic actuator, and tighten with *torque wrench*.

   ! Note table “Torques for valve axles DK EA”, see Section 10.8.3, Page 79.

   ! Align the yoke opening of the bottom part of the actuator to the leakage socket of the internal assembly by turning the entire actuator. It is strictly forbidden to position forces at the internal assembly!

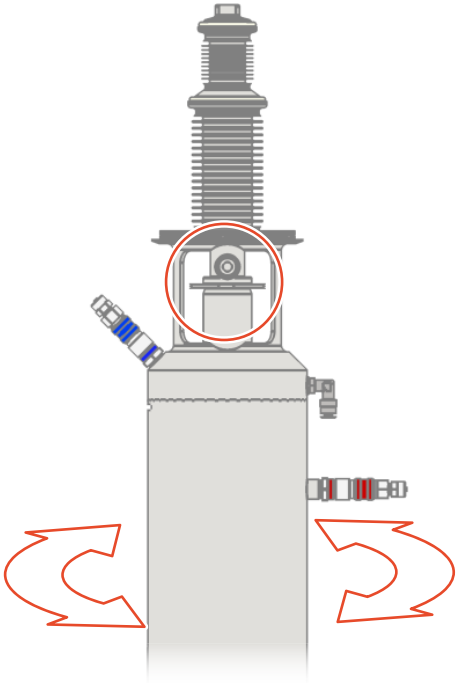


Fig.95: Align yoke opening with the leakage socket

→ The internal assembly has been assembled.

10.8.3 Torques for EA Valve Axes

Valve size	Thread size of valve axes	Torque [Nm]
DN25	M8 x 1	15
DN40	M12 x 1.25	40
DN50	M12 x 1.25	40
DN65	M12 x 1.25	40
DN80	M12 x 1.25	40
DN100	M12 x 1.25	40
DN125	M16 x 1.5	60

10.9 Removing and Installing the "Shrunk-on" Valve Seat Seal

10.9.1 Removing the "Shrink-on Fit" Valve Seat Seal

For information on valve seat seals, see Section 3.3, Page 29

Tools required:

- O-ring cutter
- Heat-resistant protective gloves

⚠ Caution!

Health hazard due to toxic fumes!

The *O-ring cutter* cuts the seal with a hot metal tip. At temperatures of more than 300 °C, toxic fumes can be released.

► Avoid directly inhaling the fumes.

⚠ Caution!

Risk of injury due to hot and sharp-edged parts!

The *O-ring cutter* cuts the seal with a hot metal tip. This process heats up the seal and possibly also metal parts of the valve.

► When removing the valve seat, always wear *heat-resistant protective gloves*.

Carry out the following steps:

1. Place the heated metal tip of the *O-ring cutter* at right angles on the valve seat to be removed.
2. Cut through the valve seat seal at one point using the *O-ring cutter*.

   ! Pay attention not to damage the edge of the radial groove.

Fig.96: Cut through valve seat seal

3. Take out the cut valve seat seal.

→ The valve seat seal has been removed.

10.9.2 Fitting the “Shrink-on Fit” Valve Seat Seal

Hint!

Pay attention to the following points when assembling the valve seat seal:

- Thoroughly clean all parts and check for damage.
- Replace all dismantled seals.
- When changing the seals, do not damage the seal groove.
- Use only replacement seals from the seal set indicated in the list of spare parts.

! Valve seat seals made of hard sealing materials must not be greased!

Tools required:

- Oven (no microwave)
- Heat-resistant protective gloves

Carry out the following steps:

1. Heat new valve seat seal *in oven* .
   - Temperature: 140 °C (guideline value)
   - Time: 3 - 5 minutes (guideline value)

   ! Ensure that the seal can be deformed along the circumference without much effort. The required heating time depends on the respective *oven* and can vary accordingly.

Fig.97: Oven

2. Use both thumbs to press the heated valve seat seal into the radial groove at one point.

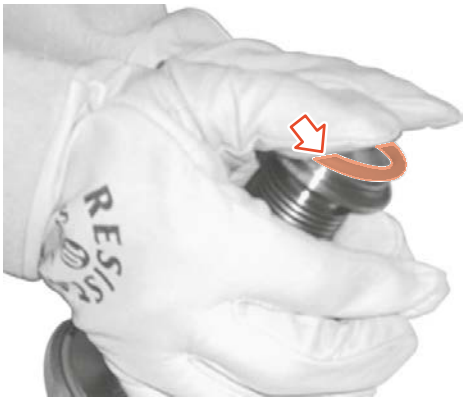


Fig.98: Place the valve seat seal into the groove

3. Then use both thumbs/palms to press the valve seat seal in place in the radial groove.

   ! Make sure the valve seat seal "clicks" into the radial groove. The audible clicking noise indicates that the seal has been fitted correctly.

   ! The valve may not be totally leak-proof after a new TEFASEP® valve seat seal has been fitted. The valve seat seal will adjust itself optimally to the sealing surfaces only after the first sterilisation of the valve (see Chapter 9, Page 48). Afterwards it will ensure perfect sealing up to the maximum closing pressure or vacuum.

Fig.99: Mounting the valve seat seal

→ The valve seat seal is still too rigid and cannot be mounted?

– Reheat the valve seat seal as described in the previous instruction step.

→ When mounting the valve seat seal, the seal does not "click" into place any more?

The valve seat seal has been overheated and can no longer be used.

– Repeat the operation with a new valve seat seal.

– Observe the data specified for heating the valve seat seal.

→ The valve seat seal has been fitted.

10.10 Removing and Installing the "Divisible System" Valve Seat Seal (seat A)

10.10.1 Disassemble the valve seat seal “system divisible” - valve version “EA”

Notice

Risk of damage to the metal bellow from torsion

The metal bellow can get damaged, if forces other than those described in these assembly instructions are used on the internal assembly.

► Follow the instructions in this manual conscientiously.
► Always exercise caution and prudence.

For information on valve seat seals see Section 3.3, Page 29.

Tools required:

- Ratchet with square socket drive ½"
- Socket wrench bit
- Spanner adapter
- Assembly tool DK TV
- Vice

Carry out the following steps:

1. Clamp assembly tool *assembly tool* in *in vice.* Push the internal assembly at the socket surface of the valve disc into the *assembly tool*. Position the *spanner adapter* on the nut of the valve disc.

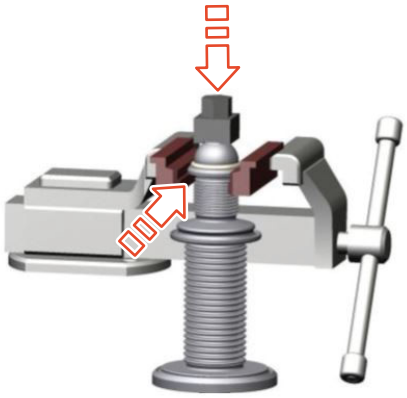


Fig.100: Clamping internal assembly

2. Place the *ratchet* with *the wrench socket* on the *spanner adapter* and loosen the nut of the valve disc.

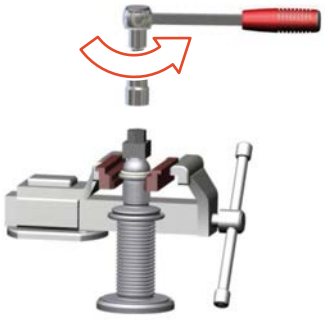


Fig.101: Loosen the nut of the valve disc

3. Remove the seals from the internal assembly:
   → Seat seal (no. 1)
   → Valve disc seal on version TVT (no. 2)

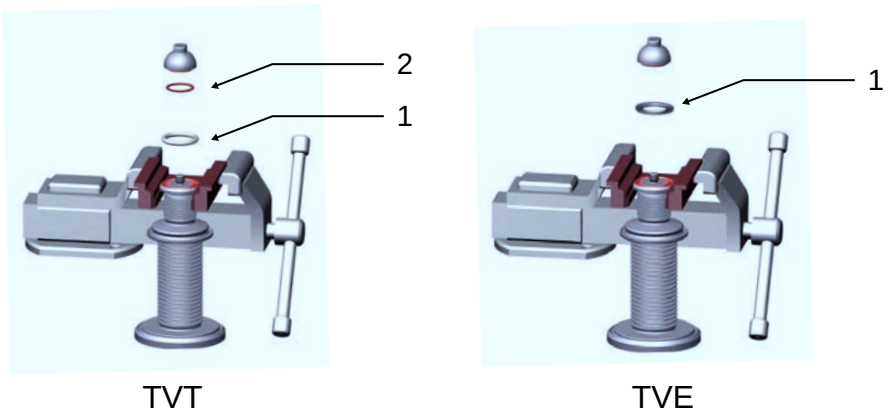


Fig.102: Remove seal

TVT	Divisible valve disc, valve seat seal TEFASEP
TVE	Divisible valve disk, valve seat seal EPDM (form seal)

→ The valve seat seal has been removed.

10.10.2 Assemble the valve seat seal “system divisible” - valve version “EA”

Tools required:

- Torque wrench with wrench socket
- Spanner adapter
- Assembly tool DK TV
- Vice
- Food-grade lubricant PARALIQ GTE 703

Carry out the following steps:

1. The screwed-on valve seat seal is fitted in the reverse order of removal, see Section 10.10.1, Page 82.

   ! Prepare thermoplastic valve seat seals (TEFASEP, PTFE, ...) in the *heater* see Section 10.9.2, Page 80.

   ! Valve seat seals made of hard sealing materials must not be greased.

   ! A light film of food-grade lubricant must be applied to elastomer valve seat seals before fitting.

   ! Note table “Torques for divisible valve disks”, see Section 10.10.3, Page 84.

→ The valve seat seal has been fitted.

Hint!

Wetting elastomer seals is not permitted when they are used in ATEX applications!

10.10.3 Torques for Divisible Valve discs

Valve size	Thread size of valve disc	Torque [Nm]
DN15	M6	9
DN25	M8 x 1	20
DN40	M10 x 1.25	50
DN50	M12 x 1.25	60
DN65	M12 x 1.25	60
DN80	M12 x 1.25	60
DN100	M12 x 1.25	60

10.11 Carrying out the "Internal assembly" leak test

10.11.1 Bubble Test

Hint!

Observe the inspection interval! The metal bellows must be checked for leaks as part of the annual maintenance using the *pressurizing tool* .

Notice

Risk of damage to the metal bellow from torsion

The metal bellow can get damaged, if forces other than those described in these assembly instructions are used on the internal assembly.

► Follow the instructions in this manual conscientiously.
► Always exercise caution and prudence.

Tools required:

- Pressurizing tool EA
- Compressed air supply
- Shut-off valve Ø 6 mm
- Pressure control valve Ø 6 mm
- Water bath

Carry out the following steps:

1. Screw on the *pressurizing tool* manually until the stop.

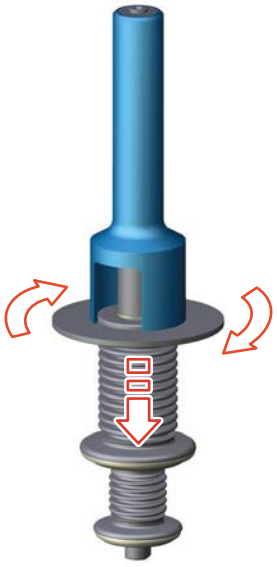


Fig.103: Screw on the pressurizing tool

2. Loosen the *pressurizing tool* until leakage socket of internal assembly lies in opening.

Fig.104: Align opening with the leakage socket

3. Tighten *adapter G1/4“* by hand with internal assembly.

Fig.105: Screw adapter

4. Apply max. 3 bar of compressed air to the *pressurizing tool* .

   ! Air pressures > 3 bar can damage the metal bellows.

5. Immerse the internal assembly in a water bath for approx. 30 seconds.

   ! While the internal assembly is immersed, check the internal assembly for leaks. Leakages will be indicated by air bubbles appearing on the surface.

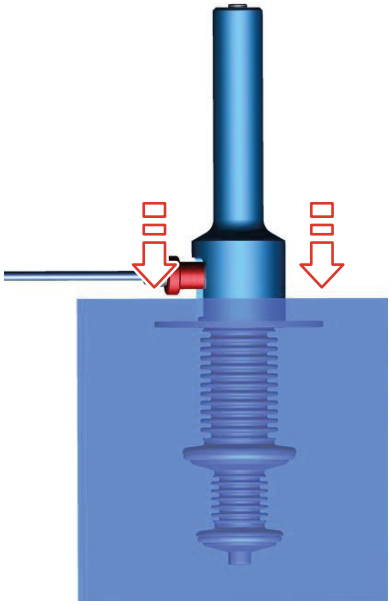


Fig.106: Water bath

6. Remove the internal assembly from the *pressurizing tool* in reverse order.

→ This completes the leak test.

10.12 Disassembling and Assembling Actuator PA80EA - PA255EA

10.12.1 Disassembling the actuator PA80EA - PA255EA

Tools required:

- Flexible head spanner
- Slotted screwdriver
- Mounting tool clamping piece
- Mounting tool for spring package
- Mounting tool for O-ring
- Vice

Preparing removal

Carry out the following steps:

1. Bring the actuator to the non-actuated position.
2. Remove the feedback unit.
3. Attach the *clamping device assembly tool* to the back of the actuator.

Fig.107: Attaching clamping piece

4. Clamp the actuator at the *clamping piece* into the *vice* .

Fig.108: Clamping the actuator

→ Disassembly has been prepared

Removing assembly spring

Carry out the following steps:

1. Turn the actuator base counter-clockwise using a *flexible head spanner*, see illustration.

   ! Rotate the actuator base until the assembly spring begins to move out of the slot in the cylinder.

Fig.109: Releasing assembly spring

2. Turn the actuator base clockwise using the *flexible head spanner* .

   ! Rotate the actuator base until the assembly spring can be removed.

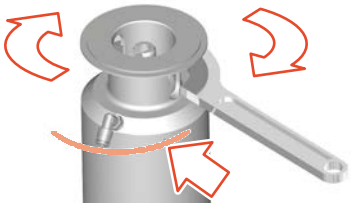


Fig.110: Unscrewing assembly spring

→ Assembly spring has been removed.

Dismantling the PA80EA - PA255EA actuator

Carry out the following steps:

1. Lift off the actuator base from the cylinder.

Fig.111: Removing actuator base

2. Pull the spring assembly upwards at the piston rod out of the cylinder.

Fig.112: Lifting out top spring assembly

3. Use the *assembly tool for the spring package* to pull the bottom spring assembly upwards out of the cylinder.

Fig.113: Lifting out bottom spring assembly

4. Lift the circlip out of the groove with a *slotted screwdriver* and remove it.

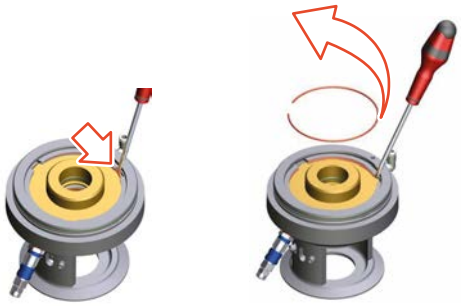


Fig.114: Removing circlip

5. Take the buffer segments out of the actuator base.

Fig.115: Removing fuse elements

6. Lift the piston disc out of the actuator base.

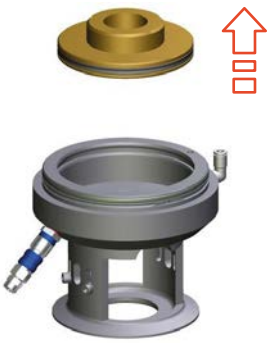


Fig.116: Lifting out the piston disc

→ Actuator has been dismantled into its individual parts.

! Opening the spring assembly is prohibited for safety reasons.

→ Actuator PA80EA - PA255EA has been removed.

10.12.2 Mounting the actuator PA80EA - PA255EA

Hint!

Pay attention to the following points when installing the actuator:

- Replace all visible seals.
- Thoroughly clean and check the interior cylinder contact surfaces, O-ring grooves, piston rod and piston disc.
- When changing the seals, do not damage the seal groove.
- Use only replacement seals from the seal set indicated in the list of spare parts.
- Grease all seals and the associated contact surfaces with the food-grade lubricant PARALIQ GTE 703.

Assembling the PA80EA - PA255EA actuator

Carry out the following steps:

1. Assemble the actuator in the reverse order of disassembly, see Section 10.12.1, Page 87.

→ Actuator has been assembled.

Installing the assembly spring

Tools required:

- Flexible head spanner
- Slotted screwdriver

Carry out the following steps:

1. Align the actuator base relative to the cylinder housing so that the hole in the base is visible through the slot in the cylinder.

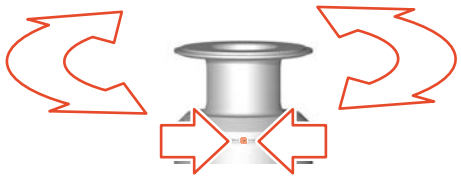


Fig.117: Aligning hole to slot

2. Insert the angled part of the assembly spring into the hole of the actuator base.

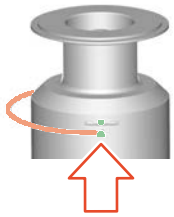


Fig.118: Hooking in the assembly spring

3. Turn the actuator base 360° counter-clockwise using a *flexible head spanner* .

   → The assembly spring is pulled into the cylinder.

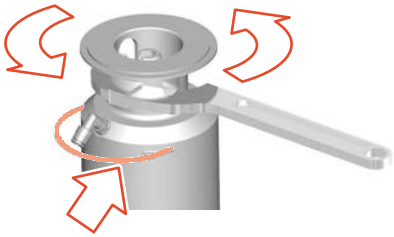


Fig.119: Screwing in the assembly spring

4. As soon as both open ends of the assembly spring are visible in the slot area, the beginning of the assembly spring must be pressed into the hole in the actuator base with a *slotted screwdriver*.

   ! Carefully continue to turn the actuator base at the same time.

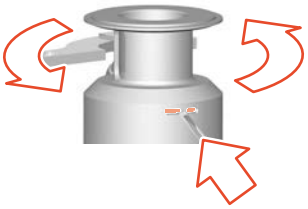


Fig.120: Fastening the assembly spring

   → The assembly spring moves out of the hole when it reaches the slot in the cylinder and actuator base was turned further?

   – Continue to turn the actuator base counter-clockwise using the *flexible head spanner* until the hole is again located underneath the position pin of the assembly spring and the pin can be pressed in again with the *slotted screwdriver*.

5. Position the compressed air connection centrally over the slot in the cylinder.

Fig.121: Placing the air connection

→ Assembly spring has been fitted.

→ Actuator PA80EA - PA255EA is mounted.

10.13 Removing/dismantling LoTo locking mechanism

10.13.1 Dismantling LoTo locking mechanism

Tools required:

- Ratchet, square socket drive ½"
- Extension socket wrench 255mm ½"
- Hexagonal pin insert 5mm ½"
- Hex key, SW4

Carry out the following steps:

1. Disassemble the mounting spring, motor sub-assembly, and both spring packages according to the instructions Section 10.12.1, Page 87.
2. Using a crowbar, extension, and hexagonal pin insert, loosen the fastening screws and remove the cylinder.

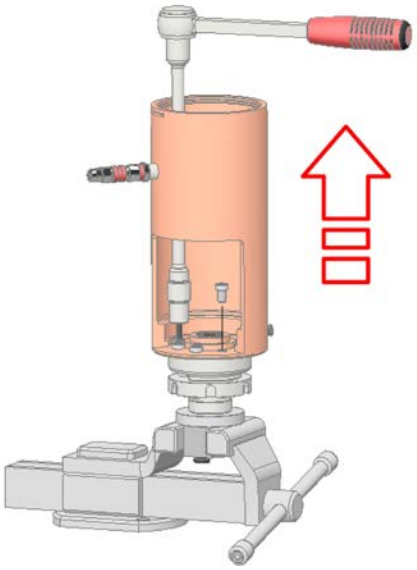


Fig.122: Remove LoTo locking mechanism

3. Swing out the lantern and remove the mounting tool

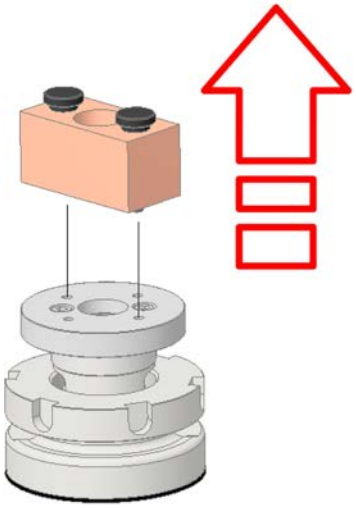


Fig.123: Lantern mounting tool

4. Disassemble the cover plate locking mechanism with an internal hex key SW4.

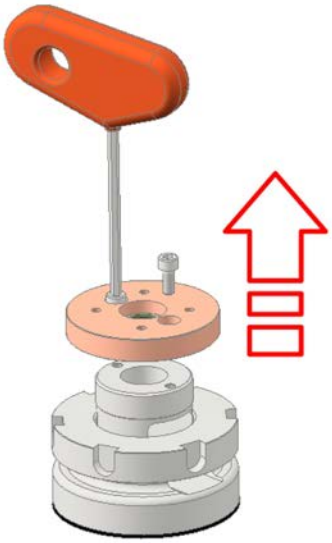


Fig.124: Disassemble the cover plate

→ The LoTo lockout device is disassembled.

10.13.2 Mounting the LoTo locking mechanism

Hint!

Pay attention to the following points when installing the actuator:

- Replace all visible seals.
- Thoroughly clean and check the interior cylinder contact surfaces, O-ring grooves, piston rod and piston disc.
- When changing the seals, do not damage the seal groove.
- Use only replacement seals from the seal set indicated in the list of spare parts.
- Grease all seals and the associated contact surfaces with the food-grade lubricant PARALIQ GTE 703.

Tools required:

- Torque wrench
- Extension socket wrench 255mm ½"
- Hexagonal pin insert 5mm ½"
- Hex key, SW4
- Mounting tool clamping piece
- Centring rod for locking mechanism

Carry out the following steps:

1. Mounting the cover plate of the locking mechanism using a hex key SW4.

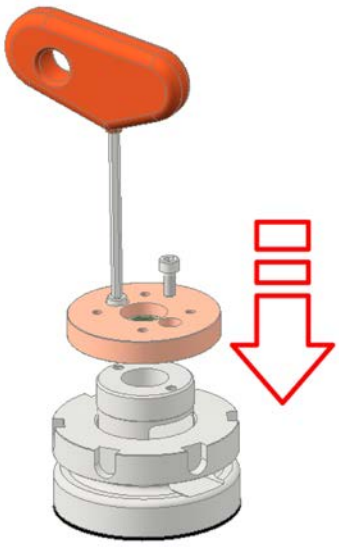


Fig.125: Mounting the cover plate

2. Check the centering with centring rod and readjust, if necessary.

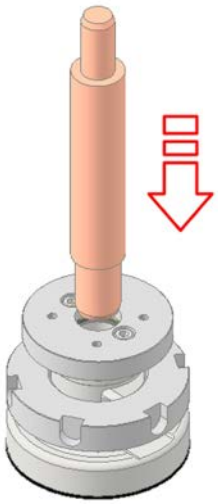


Fig.126: Check the centering

3. Attaching the mounting tool on the locking mechanism.

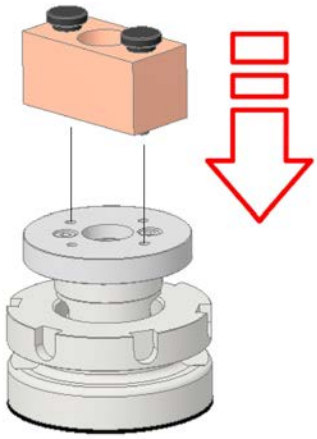


Fig.127: Attaching the mounting tool

4. Clamp the lantern in the vice.

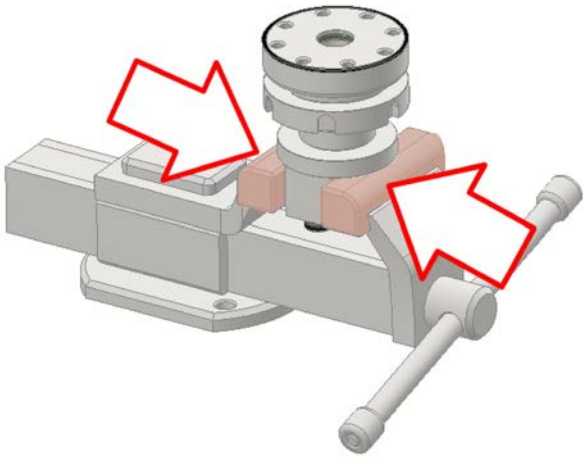


Fig.128: Clamping the lantern

5. Positioning the drive cylinder and inserting the centring rod.

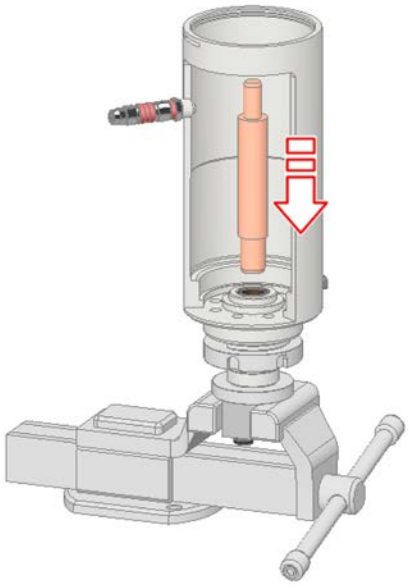


Fig.129: Inserting the centring rod

6. Tighten the screws with a torque of 15 Nm. Then remove the centring rod.

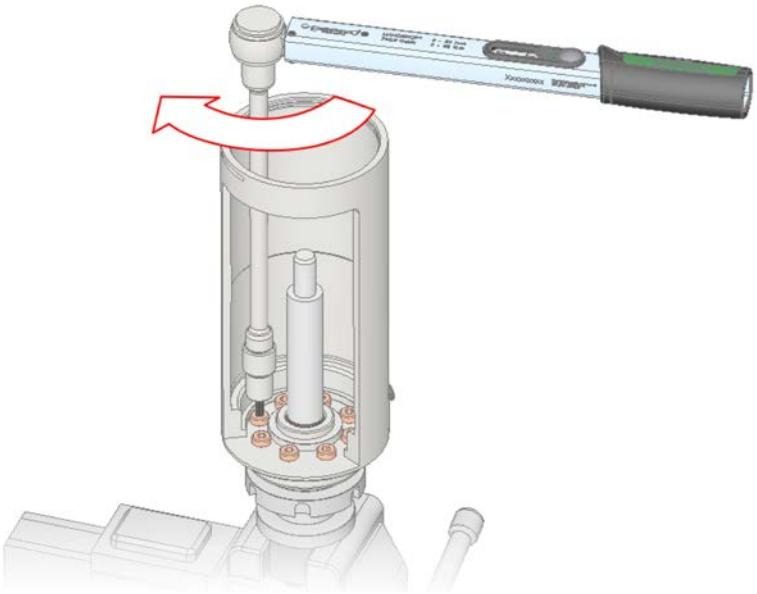


Fig.130: Tightening the screws

→ The LoTo locking mechanism is installed.

For the complete assembly of the drive, continue with the work steps according to the Section 10.12.2, Page 91 instructions.

10.14 Maintenance

Well-planned maintenance is essential to ensure a long service life of the valve. Observe the following maintenance intervals. Prepare maintenance activities well:

- Keep a maintenance log for the valve.
- Use the statistical analyses for your plant to plan maintenance intervals.

Only allow qualified maintenance staff to carry out maintenance work.

Hint!

Prior to any work on the open valve, ensure that it has stopped operation, see Section 10.5, Page 59.

The following information and values are based on the experience of GEA Flow Components and apply for installations working in 2-shift operation.

Activities to be performed once a month	
Component	**Activity to be performed**
Valve	Visual inspection

Activities to be performed after 3 months (only after initial commissioning or after a process change)	
Component	**Activity to be performed**
Product contact seals	Check of mechanical parts and visual inspection of condition
Internal assembly with bellows	Check of mechanical parts and visual inspection of condition Leak test of bellows (bubble test)
Actuator	Function check
Valve	Function check
Feedback	Function check
Pneumatic connections	Check of mechanical parts and visual inspection of condition Leak test
Electrical connections	Visual inspection

Activities to be performed once a year	
Component	**Activity to be performed**
Product contact seals	Seal replacement
Internal assembly with bellows	Check of mechanical parts and visual inspection of condition Leak test of bellows (bubble test)
Actuator	Check of mechanical parts and visual inspection of condition Function check
Valve	Check of mechanical parts and visual inspection of condition Function check
Feedback	Check of mechanical parts and visual inspection of condition Function check
Pneumatic connections	Check of mechanical parts and visual inspection of condition Leak test
Electrical connections	Check of mechanical parts and visual inspection of condition

Activities to be performed every 5 years	
Component	**Activity to be performed**
Actuator	Maintenance including seal replacement

10.15 Checking the Feedback Unit

After completing maintenance work, check the function of the feedback unit and readjust it if necessary.

10.15.1 Setting the Feedback Unit

Carry out the following steps:

1. Adjust the proximity switch for detecting the non-actuated position.
2. Actuate the valve with compressed air.

   → For information on air connections see Section 6.4, Page 36.

   If provided, adjust the initiator for the actuated position. For reference regarding the stroke to be expected see the “Valve Stroke“ table Section 10.15.2, Page 100.

→ The feedback unit has been set.

Hint!

If a control head is available, the specifications of the respective operating instructions must be observed.

10.15.2 Valve Stroke

Strokes depending on the size (basic, theoretical values on drawing)				
	Valve stroke [mm]			
		Seat venting		
Size	EA	Seat A	Seat B	Side valve
DN25 / 1"OD	5.5	1.5	1.5	5.5
DN40 / 1½"OD	10	1.5	1.5	24.5
DN50 / 2"OD	13.5	1.5	1.5	24.5
DN65 / 2½"OD	16.5	1.5	1.5	24.5
DN80 / 3"OD	23	2.5	1.5	24.5
DN100 / 4"OD	23	1.5	1.5	24.5

11 Alarms

11.1 Malfunctions and remedies

Notice

Warning of damage to property/loss of product

Ignoring malfunctions may cause considerable damage to property and loss of product. The safe operation of the valve in the event of a malfunction can no longer be taken for granted and in the worst case can result in a loss of sterility in the process.

► Make sure that malfunctions are quickly identified and promptly fixed.

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. For malfunctions not listed in the table below, contact the manufacturer.

Malfunction	Cause	Remedy
Medium is leaking from the clamp.	The housing seal is not fitted correctly or damaged.	Fit the housing seal correctly or replace it if damaged.
Medium is leaking from the leakage holes of the internal assembly.	The bellows at the internal assembly is defective due to pressure shocks or cavitation.	• Replace the complete internal assembly. • Send the defective internal assembly to the manufacturer for repair. • Check process.
Medium leaks from leakage hole of the side valve.	• Medium originates from product side: piston rod seal leaks. • Medium originates from actuator: actuator seals leak.	• Replace the seals. • Check seal running surfaces.
During pressure testing of the internal assembly, air escapes from the metal bellows.	The bellows on the internal assembly are defective.	• Replace the complete internal assembly. • Send the defective internal assembly to the manufacturer for repair.
Leak at the valve seat.	• The valve seat seal is not fitted correctly or damaged. • Product deposits on the valve seat.	• Fit the valve seat seal correctly or replace it if damaged. • Check the housing.

Malfunction	Cause	Remedy
The maximum valve stroke is not reached when the valve is actuated pneumatically.	Leakage in the actuator.	• Check the sealing surfaces in the actuator for damage. • Replace the seals.
Valve feedback not correct.	• The feedback unit is not fitted correctly. • The proximity switch is not in the correct position or is defective. • Fault in the power supply.	• Check that the feedback unit has been fitted correctly. • Check the position of the proximity switch and re-adjust if necessary. • Check the wiring.
Actuator is filling with water.	• Unfavourable fitting position of the vent screw on the actuator. • Unfavourable effect of the exterior cleaning of the plant.	• If possible, position the vent screw so that it faces downwards. • When the valve is installed in the vertical position, ensure that the vent screw faces away from the cleaning direction if possible.
The TEFASEP valve seat seal is not tight after commissioning or maintenance.	• The valve seat seal has not been fitted correctly. • With new seal: The valve has not been actuated during/immediately after sterilization.	• Fit the valve seat seal properly. • Actuate the valve during/ immediately after sterilisation.

12 Decommissioning

12.1 Safety instructions

For shutting down, the following principles apply:

- Switch off the compressed air.
- Switch off the valve via the main switch.
- Padlock the main switch (if fitted) in the off position to prevent it from being switched back on. The key to the padlock must be deposited with the person responsible until the machine is restarted.
- For longer periods of standstill, observe the storage conditions, see Section 4.1, Page 31.

12.2 Disposal

12.2.1 General notes

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

The valve is made of the following materials:

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

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

13 Appendix

13.1 Lists

13.1.1 Abbreviations and terms

Abbreviation	Explanation
°	Symbol for the grade of a scale [degrees] All degree data is assumed to be angle degrees unless explicitly specified otherwise.
°C	Unit of measurement of temperature [degree Celsius]
°F	Unit of measurement of temperature [degree Fahrenheit]
AISI	American Iron and Steel Institute; material designation
ATEX	Atmosphères Explosibles Directive of the European Union on explosion protections
bar	Unit of measurement of pressure [bar] All pressure data is assumed to be gauge pressure [barg] unless explicitly specified otherwise.
CFR	Code of Federal Regulations; collection of US federal regulations
DIN	German standard issued by DIN (Deutsches Institut für Normung e.V., German Institute for Standardisation)
dm^3	Unit of measurement of volume [cubic decimetre under standard conditions]
DN	DIN nominal width
EA	Singe ventilation of both valve seats
EN	European Standard
EPDM	Ethylene Propylene Diene Rubber Material designation, short designation according to DIN/ISO 1629
FDA	U.S. Food and Drug Administration Food monitoring and drug administration in the USA
FEP	Fluorinated ethylene propylene; material designation, short name
H_2O_2	Hydrogen peroxide; chemical formula
ISO	International Standard of the International Organization for Standardization
LoTo	Lockout-Tagout
ACSC	Air-closing/spring-opening; direction of action air
m/s	Unit of measurement of speed/velocity [metres per second]
min.	Unit of measurement of time [minute]
mm	Unit of measurement of length [millimetre]
µm	Unit of measurement of length [micrometre]

Abbreviation	Explanation
NC	Normally Closed; direction of action spring-closing/air-opening
Nm	Unit of measurement of work [newton metre] Specification for the torque: 1 Nm = 0.737 lbft Pound-Force (lb) + Feet (ft)
NO	normally open; direction of action air-closing/spring-opening
OD	Outside diameter; short name for outside diameter for inch tubes according to DIN 11866-C
PA	Pneumatic actuator
PTFE	Polytetrafluoroethylene Material designation, short designation according to DIN/ISO 1629
SW	Width across flats; indicates the size of spanners
T.VIS	Tuchenhagen valve information system
TEFASEP	Sealing material for the valve seat seal
TV	Divisible valve disk; to valve seat seal system “divisible”
TIG	Tungsten inert gas welding

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