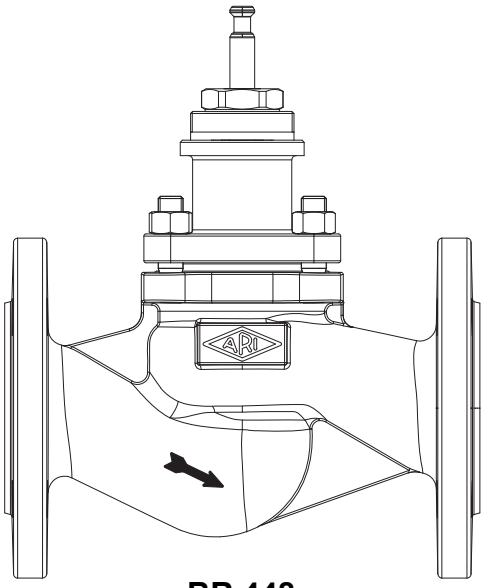
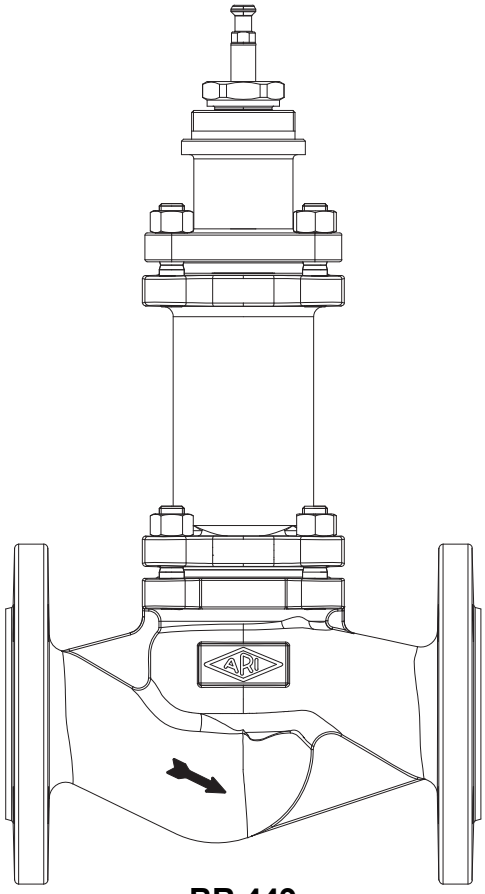
Installation and operating instructions

according to EC Directive 97/23/EC on Pressure Equipment (until 18.07.2016)
according to EU Directive 2014/68/EU on Pressure Equipment (from 19.07.2016)

Straight through control valves STEVI® 448/449



BR 448



BR 449

Contents

Rev. 0040327000 5119 englisch

- Translated original instructions -

1.0 General information on operating instructions

These operating instructions provide information on mounting and maintaining the fittings. Please contact the supplier or the manufacturer in case of problems which cannot be solved by reference to the operating instructions.

They are binding on the transport, storage, installation, start-up, operation, maintenance, repair, disposal.
You must read the operating instructions before putting the valve into operation.
The notes and warnings must be observed and adhered to.

- Handling and all work must be carried out by expert personnel or all activities must be supervised and checked.

It is the owner‘s responsibility to define areas of responsibility and competence and to monitor the personnel.

- In addition, current regional safety requirements must be applied and observed when working on the valve.

The manufacturer reserves the right to introduce technical modifications at any time.

These Operating Instructions comply with the requirements of EU Directives.

2.0 Notes on possible dangers

2.1 Significance of symbols

ATTENTION !

. . .

Warning of general danger.

2.2 Explanatory notes on safety information

In these operating and installation instructions dangers, risks and items of safety information are highlighted to attract special attention.

Information marked with the above symbol and “***ATTENTION !*** ” describe practices, a failure to comply with which can result in serious injury or danger of death for users or third parties or in material damage to the system or the environment. It is vital to comply with these practices and to monitor compliance.

All other information not specifically emphasised such as transport, installation, operating and maintenance instructions as well as technical data (in the operating instructions, product documentation and on the device itself) must also be complied with to the fullest extent in order to avoid faults which in turn can cause serious injury to persons or damage to property.

3.0 Storage and transport

ATTENTION !

- Protect against external force (like impact, vibration, etc.).

- Valve mountings such as actuators, handwheels, hoods must not be used to take external forces, e.g. they are not designed for use as climbing aids, or as connecting points for lifting gear.

- Suitable materials handling and lifting equipment should be used. See data sheet for weights.

- The valve, and especially its connection parts, must be protected from damage whenever it is set down or placed in storage.

- Proper storage is essential to ensure correct functioning of the valve, particularly the sealing elements.

- At -20°C to +65°C.
- The paint is a base coat to protect against corrosion during transportation and storage. Do not damage paint protection.

4.0 Description

4.1 Scope of applications

Valves are used for „controlling the flow of liquids, gases and vapours in chemical and other processing plants and for plant engineering“.

ATTENTION !

- Refer to the data sheet for applications and possibilities.

- For the limits of use, refer mainly to the information on the valve itself. Supplementary information can be found in the order confirmation as well as on the data sheet.

- Certain media require or preclude the use of special materials. You must check the resistance of these materials. The planner and the system owner are responsible for ensuring that suitable materials are used.

- The valves are designed for standard operating conditions. If conditions exceed these requirements, e.g. aggressive or abrasive media or if the equipment is used in hazardous areas, the higher requirements should be stated when ordering.

- Careful selection and sizing of the valve based on the anticipated operating conditions is essential for low-noise, low-vibration operation.

- Armaturen sind nur in technisch einwandfreiem Zustand zu betreiben.

- Dangerous substances should be handled in accordance with the relevant safety regulations.

The information complies to:

Pressure Equipment Directive 97/23/EC (until 18.07.2016)
Pressure Equipment Directive 2014/68/EU (from 19.07.2016)

It is the responsibility of the machine planner to ensure compliance.
The special markings on the valve must be taken into account.

Refer to the data sheet to see which materials are used in standard versions.

Please contact the supplier or the manufacturer if you have any questions.

4.2 Operating principles

The control valves are especially suitable for actuation by pneumatic or electrical actuators.

The plug type depends on the application. For information on the plug type, refer to the order confirmation, the nameplate or the data sheet.

The flow direction is indicated by an arrow on the valve body.

The medium flows through the plug against the closing direction as standard.

In certain applications the medium may need to flow in the closing direction, in which case additional forces are produced. The actuator design should take account of this.

ATTENTION !

- Do not insert any objects into the valve.

- If actuators or peripheral devices are used, you must observe the separate operating instructions issued by the manufacturer.

4.3 Diagram

Refer to the data sheet resp. order documentation for drawings and detail drawings.

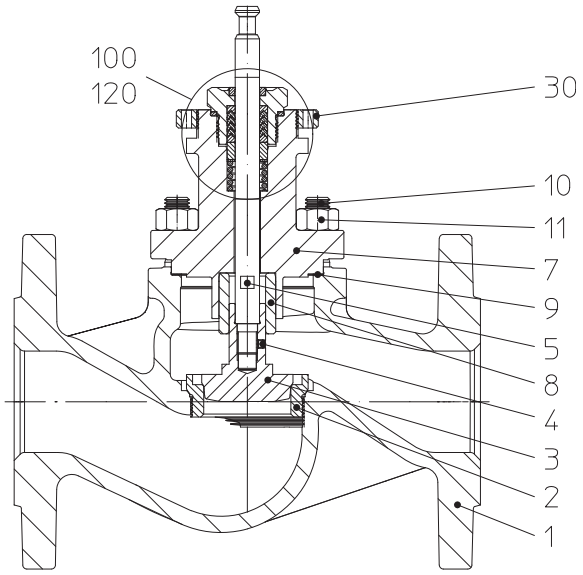


Fig. 1: BR 448 DN15-100

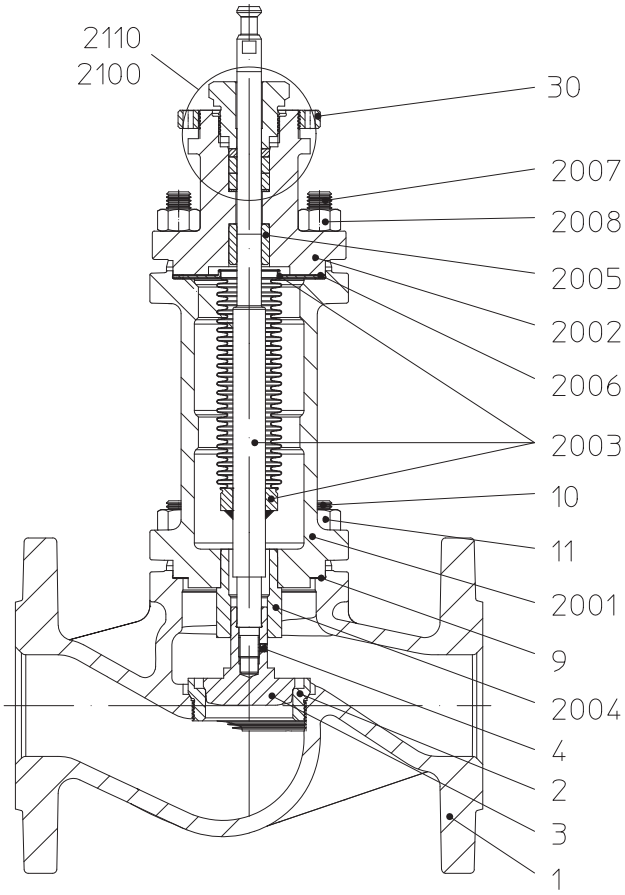


Fig. 2: BR 449 DN15-100

Pos.	Description
1	Body
2	Seat ring
3	Plug
4	Thread pin
5	Stem
7	Bonnet
8	Guide bushing
9	Gasket
10	Stud
11	Hexagon nuts
30	Central nut
100	V-ring unit set
120	EPDM sealing set

Pos.	Description
2001	Bellows housing
2002	Bonnet
2003	Stem- / Bellows unit
2004	Guide bushing
2005	Guide bushing
2006	Gasket
2007	Stud
2008	Hexagon nuts
2110	Packing rings set
2100	V-ring unit set

4.4 Technical data

f.ex.

- Principal dimensions,

- **Pressure-temperature-ratings, etc.** refer to data sheet.

4.5 Marking

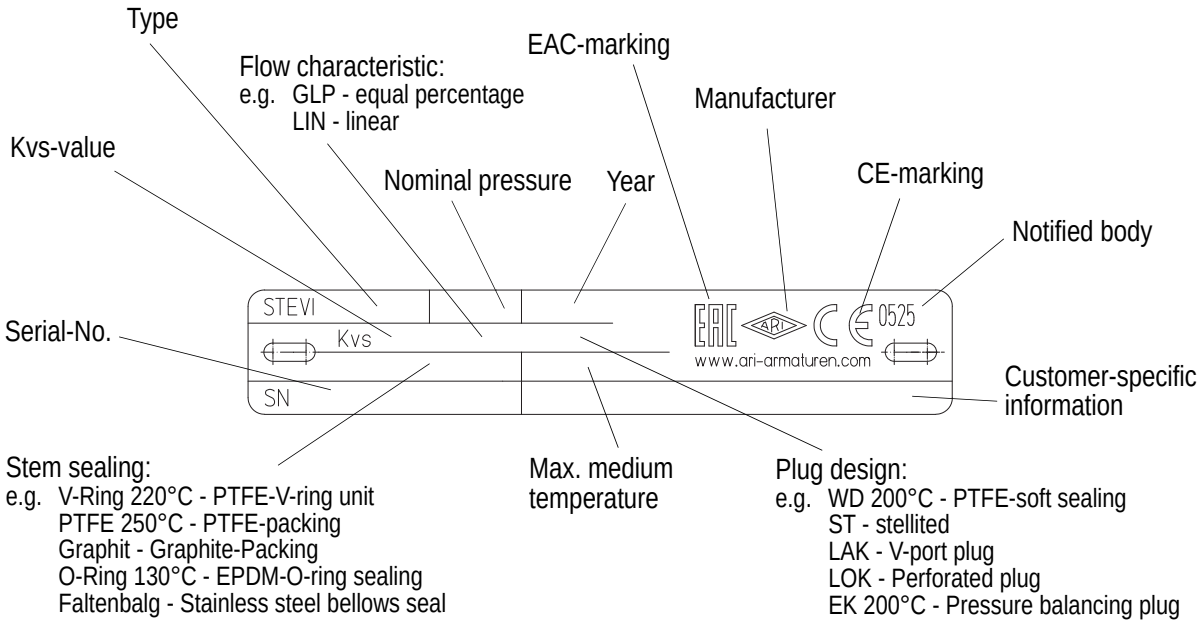


Fig. 3

Address of manufacturer: refer to item 12.0 Warranty / Guarantee

According to the Pressure Equipment Directive table 6, annex II, valves without safety function are only allowed to bear the CE-marking DN32 onwards.

5.0 Installation

5.1 General notes on installation

The following items should be taken into account besides the general principles governing installation work:

ATTENTION !

- With actuators mounted, you must disconnect the power supply before starting work and secure it against accidental switching on, to prevent any risk of injury from moving parts. Danger of crushing!

- Remove flange covers if present.

- The interior of valve and pipeline must be free from foreign particles.

- Note installation position with reference to flow, see mark on valve.

- Steam line systems should be designed to prevent water accumulation.

- Lay pipelines so that damaging transverse, bending and torsional forces are avoided.

- Protect valves from dirt during construction work.

- Connection flanges must mate exactly.

- Connecting bolts for pipe flanges should be mounted preferably from the counter flange side (hexagon nuts from the valve side).
At DN15-32: If valves should be mounted directly to valves, the upper flange connecting bolts should be preferably executed with studs and hexagon nuts on both sides.

- Valve mountings such as actuators, handwheels, hoods must not be used to take external forces, e.g. they are not designed for use as climbing aids, or as connecting points for lifting gear.

- Suitable materials handling and lifting equipment should be used. During assembly work, ensure that the valve is adequately secured.
Refer to data sheet for weights.

- Keep the thread and shaft of the stem free from paint.

- Centre gaskets between the flanges.

- Strainers or filters should be installed before the valves.

- If the piping system is treated in a circulation pickling tank, an adapter must be fitted in place of the valve for the duration of the pickling and rinsing process.

- The unmounted valve may only be operated if all safety precautions are observed. Danger of crushing!

- Flooding of the valve is not permissible.

- The valves are not approved for subsurface installation.

- Planners / construction companies or operators are responsible for positioning and installing products.
- The valves are designed for application, not influenced from weather.
- For application outside or in adverse environments like corrosion-promoting conditions (sea water, chemical vapours, etc.), special constructions or protective measures are recommended.

5.2 Requirements at the place of installation

The place of installation should be easily accessible and provide ample space for maintenance and removing the actuator. Stop valves should be installed before and after the control valve to enable maintenance working without draining the piping system. The valve should preferably installed vertically with the actuator at the top. Inclined or horizontal installation without supports is permissible only with light actuators.
For this installation position, the two distance columns (or joke) have to be above each other in the vertical plane:

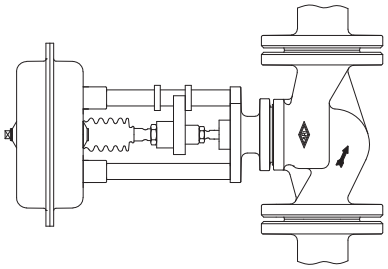


Fig. 4: Pipeline vertically

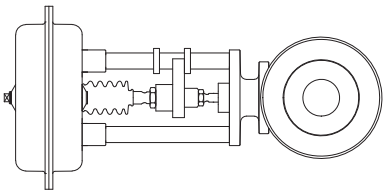


Fig. 5: Pipeline horizontally

Permissible actuator weights for valves with unsupported horizontal stems:

20 kg for DN 15 - 32

25 kg fot DN 40 - 65

35 kg for DN 80-100

The pipes must be lagged to protect the actuators from excessive heat. Sufficient space must be left for the maintenance of the stem packing.

To ensure that the control valves function correctly, the pipe run should be straight for at least 2 x n.d. upstream and 6 x n.d. downstream of the valve.

5.3 Assembly requirements for fitting the valve to the pipeline

Please note that only qualified persons using appropriate equipment and working in accordance with the generally accepted rules of sound engineering practice are allowed to fit the valve to the pipeline. The responsibility for this lies with the system owner.

For information on the type of valve connection, refer to the order confirmation or the data sheet.

Valves with butt weld ends must be welded in the closed position.

ATTENTION !

If the valve is installed in a hazardous area, it must be properly earthed (e.g. with cable bridges). Local safety and explosion protection regulations must be observed. Protective measures must be in place if the valve is operated in a hazardous area.

The responsibility for this lies with the system owner.

5.4 Installation instructions concerning actuators

Normally, control valves are supplied complete with actuator fitted.

ATTENTION !

- It is not permitted to mantle / dismantle actuators with valves operating and service conditions (temperature and pressure).
- The actuators must be assemble as describe in the operating instructions during conversion and maintenance.
- *The actuator and any peripheral devices must be properly connected in conformity with all applicable regulations.*
- *For valve-specific restrictions, refer to the order confirmation and the data sheet.*
- *Actuator-specific restrictions are described in the actuator documentation and must be observed.*

During assembly work, the plug is not be turned on its seating at closing pressure.

ATTENTION !

Care must be taken with the bellow type valves when actuators are mounted or removed.
(Hold the valve-stem against turning with an open-end wrench!)

When retrofitting actuators, the maximum permissible force for valve actuation according to data sheet must be taken into account.

6.0 Putting the valve into operation

ATTENTION !

- *Before putting the valve into operation, check material, pressure, temperature and direction of flow.*
- *Regional safety instructions must be adhered to.*
- *Residues in piping and valves (dirt, weld beads, etc.) inevitably lead to leakage.*
- *Touching the valve when it is operating at high (> 50 °C) or low (< 0 °C) media temperatures can cause injury.*
  Affix warning notice or protective insulation as appropriate!

Before putting a new plant into operation or restarting a plant after repairs or modification, always make sure that:

- *All works has been completed!*
- *The valve is in the correct position for its function.*
- *Safety devices have been attached.*
- *Avoid inadmissible temperature or pressure increases (thermal shock) when putting a new valve into operation or restarting an existing valve.*
- *Water or steam hammer must be prevented when putting a new valve into operation or restarting an existing valve, as well as during operation, because this could cause a valve malfunction.*
- *Avoid extreme changes in the temperature of the medium during operation (thermal shock).*

The responsibility for ensuring that the valve is put into operation correctly lies with the system owner.

7.0 Care and maintenance

Maintenance and maintenance intervals have to be defined by the operator according to the service conditions.

ATTENTION !

- With actuators mounted, you must disconnect the power supply and secure it against accidental switching on, to prevent any risk of injury from moving parts. Danger of crushing!

- Valves and valve parts should only ever be cleaned using agents which do not corrode or otherwise damage the material, coatings and sealing elements.

Maintenance activity	**Remarks**	**Recommended maintenance interval**
Clean the valve stem with a soft cloth	Depending on the degree of fouling	Every 10,000 strokes
Check the gland seal	Non-spring-loaded gland seals and „normal“ conditions	Every 10,000 strokes
	Non-spring-loaded gland seals and „difficult“conditions • Problematic media • Large temperature changes during operation • Vibration • Unfavourable mounting position	Every 5,000 strokes
	Spring-loaded gland seals and „normal“ conditions	Every 100,000 strokes
	EPDM-sealing and „normal“ conditions	Every 100,000 strokes
	Spring-loaded gland seals and „difficult“ conditions • Problematic media • Large temperature changes during operation • Vibration • Unfavourable mounting position	Every 10,000 strokes
Actuators		As specified by the manufacturer
Peripheral devices		As specified by the manufacturer

7.1 Replacement of stem sealings

7.1.1 PTFE V-ring unit design

PTFE V-ring unit (pos. 12) consisting of:

1 backing ring
4 sealing rings
1 cover ring

Owing to the installed compression spring (pos. 15), this stem packing is self-adjusting.
If the stem starts leaking, the ring pack is worn out and must be replaced.

Replacement of PTFE V-ring units:

ATTENTION !

Refer to item 10.0 and 11.0 before dismantling the valve.

- Remove actuator. (Refer to operating instructions for actuator!).
- When replacing PTFE V-ring unit (pos. 12), make sure that the parts are installed in the correct order and positions (refer to Fig. 6).
- Gasket (pos. 17) must be replaced..

Damaged stems must also be replaced (refer to item 7.1.2), for instructions) since a new ring pack will soon start leaking again if the stem is damaged.

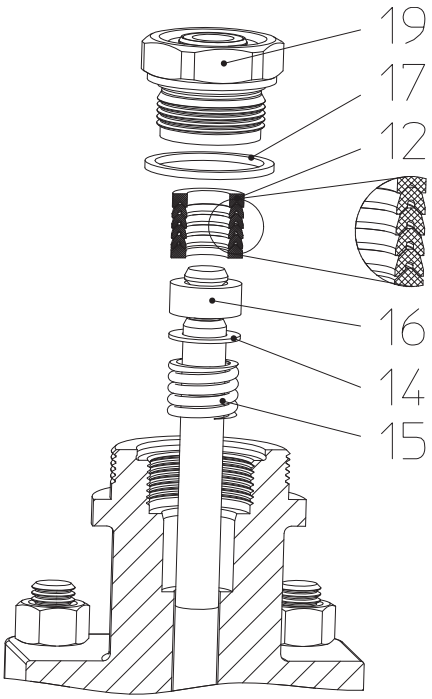


Fig. 6:
V-ring unit

7.1.2 EPDM sealing design

This sealing system can be used for water and steam up to 130°C operating temperature. Owing to the elastomer material, the sealing rings are self-sealing and maintenance free.

If the stem starts leaking, the seal is worn out and must be replaced.

Replacement of EPDM sealing rings:

> ***ATTENTION !***
>
> ***Refer to item 10.0 and 11.0 before dismantling the valve.***

- Remove actuator.
  (Refer to operating instructions for actuator!).
- To replace the sealing elements, you must replace the complete screw joint including the integral seals (pos. 20)
- Sealing ring (pos. 17) must be replaced.

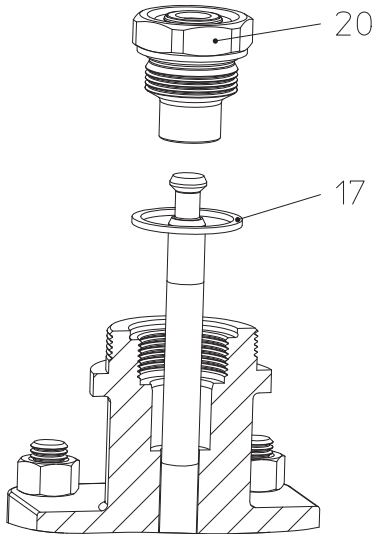


Fig. 7:
EPDM sealing

Damaged stems must also be replaced (refer to item 7.2for instructions) since a new ring pack will soon start leaking again if the stem is damaged.

7.1.3 Bellows seal design

If the stem leaks, the bellows seal (pos. 2003) is defective. The leak can initially be stopped by tightening the screw joint (pos. 2017).

Stem and bellows (pos. 2003) can only be replaced together.

Replacement of bellows seals:

> ***ATTENTION !***
>
> ***Refer to item 10.0 and 11.0 before dismantling the valve.***

- Remove actuator.
  (Refer to operating instructions for actuator!)
- Loose nuts (pos. 11).
- Detach bellows assembly.
- Slacken screw joint (pos. 2017) by about one turn.
- Press stem/bellows unit (pos. 2003) down.
- Unscrew thread pin (pos. 4).
- Unscrew plug (pos. 3).
- Loose nuts (pos. 2008).
- Detach bonnet (pos. 2002).
- Extract stem/bellows unit (pos. 2003) from the bellows housing (pos. 2001).
- Fit and bolt new parts together.
- Replace 2 gaskets (pos. 2006) and 1 gasket (pos. 9).
- Assemble in reverse order.
- Secure with nuts (pos. 11 and 2008) and tighten them crosswise. (For tightening torques refer to item 7.3.1).
- Tighten slightly the screw joint (pos. 2017) of the stuffing box packing (pos. 2010).
  Ensure low-friction movement.

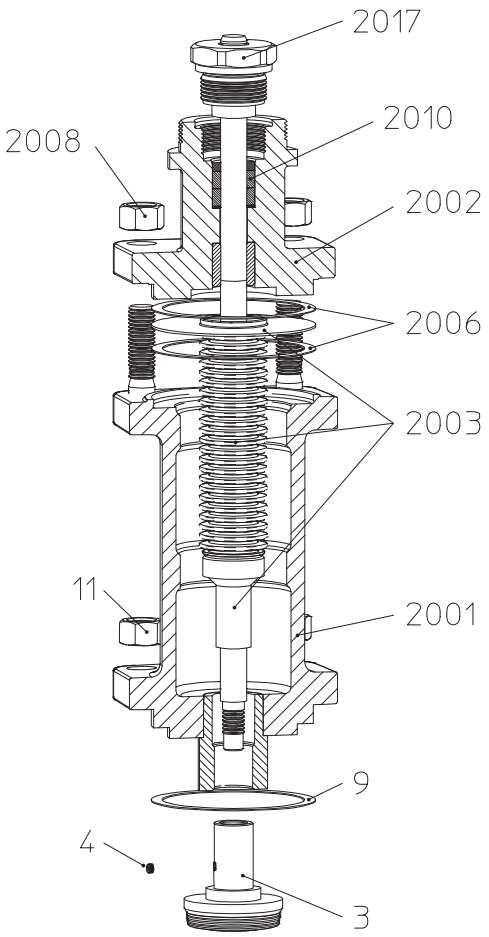


Fig. 8: Series 449

7.2 Replacement of internal parts

7.2.1 Replacement of plug and stem

ATTENTION !

Refer to item 10.0 and 11.0 before dismantling the valve.

- Remove actuator.
  (Refer to operating instructions for actuator!).

Series 448:

- Loose nuts (pos. 11).
- Detach bonnet (pos. 7).
- Slacken screw joint (pos. 19 or pos. 20) by about 1 turn.
- Extract plug/stem assembly (pos. 3 and 5).
- Replace gasket (pos. 9)
- Assemble in reverse order.
- Secure with nuts (pos. 11) and tighten them crosswise. (For tightening torques refer to item 7.3.1).

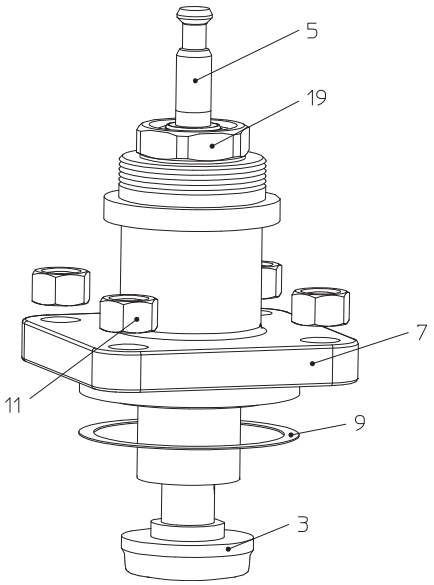


Fig. 9: Series 448

Series 449:

For replacement of plug and stem with bellows sealing (Series 449) refer to item 7.1.3.

7.2.2 Replacement of the seat ring

ATTENTION !

Refer to item 10.0 and 11.0 before dismantling the valve.

- Remove actuator.
  (Refer to operating instruction for actuator!).
- Loose nuts (pos. 11).
- Detach valve top part.
- Unscrew seat ring (pos. 2) with a special wrench (can be obtained from the manufacturer).
- Clean thread and seat ring taper in body (pos. 1).
- Replace respectively recondition and clean seat ring (pos.2).
- Apply sealing taper (body / seat ring) with suitable lubricant (e.g. Epple 37).
- Install seat ring (pos. 2). (For tightening torques refer to item 7.3.2).
- Replace gasket (pos. 9).
- Assemble valve top part.
- Secure with nuts (pos. 11) and tighten them crosswise.
  (For tightening torques refer to item 7.3.1).

7.3 Tightening torques

7.3.1 Tightening torques for hexagon nuts

M10	=	20 - 30 Nm
M12	=	35 - 50 Nm
M16	=	80 - 120 Nm

7.3.2 Tightening torques for seat rings

DN 15/20	=	70 Nm
DN 25/32	=	100 Nm
DN 40	=	130 Nm
DN 50	=	160 Nm
DN 65	=	330 Nm
DN 80	=	400 Nm
DN 100	=	500 Nm

! Refer to operating instructions for actuator concerned for installing actuators !

8.0 Removing the valve from the pipeline

ATTENTION !

The following points must be observed:

- Pressureless pipe system.

- Medium must be cool.

- Plant must be drained.

- Purge piping systems in case of caustic, inflammable, aggressive or toxic media.

- With actuators mounted, you must disconnect the power supply and secure it against accidental switching on, to prevent any risk of injury from moving parts. Danger of crushing!

9.0 Disposal

ATTENTION !

- The valve must be completely emptied of all residues and properly disposed of. Residual medium in the valve can represent a health or safety hazard.

10.0 Troubleshooting

In the event of malfunction or faulty operating performance check that the installation and adjustment work has been carried out and completed in accordance with these Operating Instructions.

ATTENTION !

- In the event of a safety relevant malfunction the valve must be taken out of operation and the cause of the malfunction removed in the proper way.

- It is essential that the safety regulations are observed when identifying faults.

If malfunctions cannot be eliminate with the help of the following table **„11.0 Troubleshooting table“** the supplier or manufacturer should be consulted.

11.0 Troubleshooting table

ATTENTION !

- read item 8.0 and 11.0 prior to dismantling and repair work !
- read item 6.0 before restarting the plant !

Fault	Possible cause	Corrective measures
No flow	Valve closed	Open valve (using actuator)
	Flange covers not removed	Remove flange covers
Little flow	Valve not sufficiently open	Open valve (using actuator)
	Dirt sieve clogged	Clean / replace sieve
	Piping system clogged	Check piping system
	Kvs value of valve unsuitable	Fit valve with higher Kvs value
Valve stem moves in jerks	Stuffing box sealing too tight (for valves with graphite packings)	Slacken screw joint (Pos. 2017) slightly. Valve must nor start leaking!
	Valve plug slightly seized owing to solid dirt particles	Clean internals, smooth rough spots
Valve stem or plug cannot be moved	Seating and plug clogged with dirt, especially with V-port and perforated plugs	Clean seating and plug with suitable solvent
	Valve plug seized in seating or guide owing to deposits or dirt in medium	Replace plug and seating; use parts made from different material if necessary
Valve stem leaking	PTFE V-ring unit damaged or worn	Replace ring pack (Pos. 12) ; see service and repair instructions
	EPDM sealing damaged or worn	Replace screw joint (Pos. 20); see service and repair instructions
	Bellows defective in valves with bellow seal	Replace bellows unit; see service and repair instructions
Leakage too high when valve is closed	Sealing surfaces of plug eroded or worn	Replace plug; see service and repair instructions
	Sealing edge of seating damages or worn	Replace seating; see service and repair Instructions, fit strainer if necessary
	Seating and/or plug dirty	Clean internals of valve; fit dirt sieve if necessary
	Pneumatic actuator not completely vented; spring force not fully effective	Vent actuator air chamber completely
	Actuator not powerful enough	Install more powerful actuator, check service data

12.0 Warranty / Guarantee

The extent and period of warranty cover are specified in the "Standard Terms and Conditions of Albert Richter GmbH & Co. KG“ valid at the time of delivery or, by way of departure, in the contract of sale itself.

We guarantee freedom of faults in compliance with state-of-the-art technology and the confirmed application.

No warranty claims can be made for any damage caused as the result of incorrect handling or disregard of operating and installation instructions, datasheets and relavant regulations.

This warranty also does not cover any damage which occurs during operation under conditions deviating from those laid down by specifications or other agreements.

Justified complaints will be eliminated by repair carried out by us or by a specialist appointed by us.

No claims will be accepted beyond the scope of this warranty. The right to replacement delivery is excluded.

The warranty shall not cover maintenance work, installation of external parts, design modifications or natural wear.

Any damage incurred during transport should not be reported to us but *rather* to the competent cargo-handling depot, the railway company or carrier company immediately or else claims for replacements from these companies will be invalidated.

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