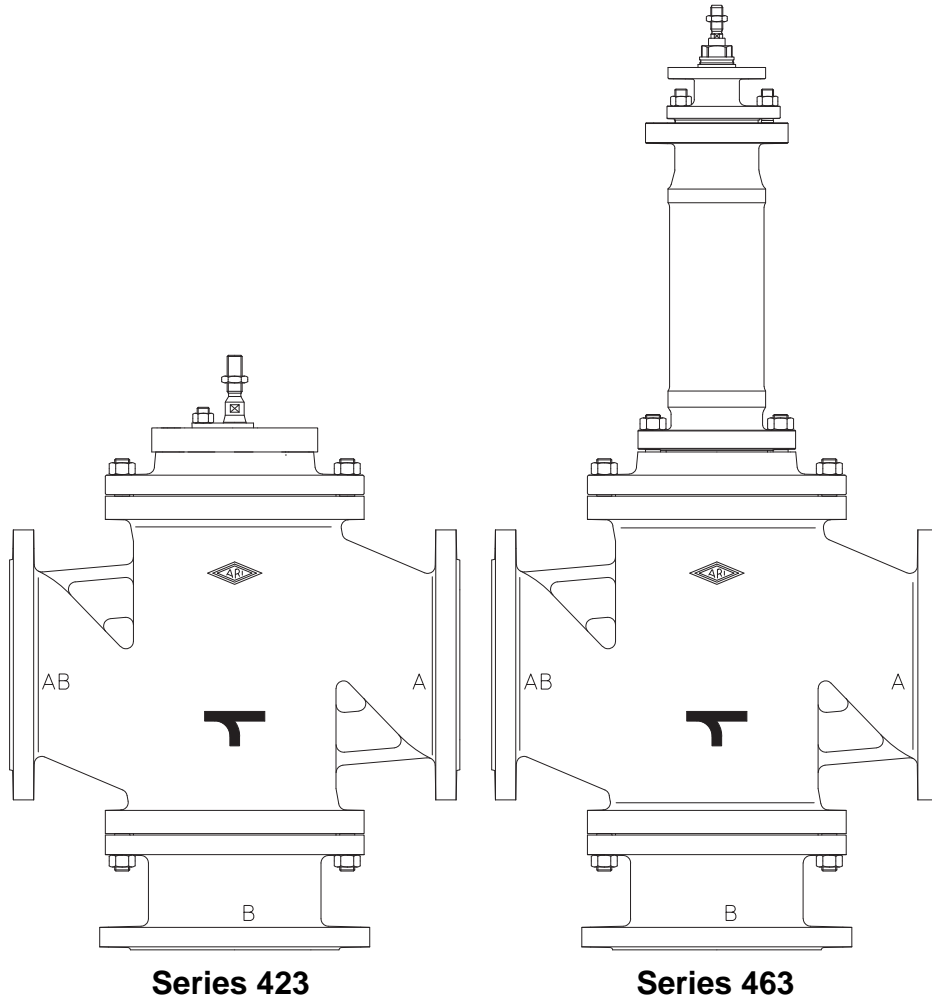


Operating and installation instructions

3-way control valves - STEVI® 423 / 463



Contents

1.0 General information on operating instructions	2-2	7.0 Care and maintenance	2-8
2.0 Notes on possible dangers	2-2	7.1 Replacement of stem sealings	2-8
2.1 Significance of symbols	2-2	7.1.1 Stuffing box packing design	2-8
2.2 Explanatory notes on safety information	2-2	7.1.2 Bellows seal design	2-9
3.0 Storage and transport	2-2	7.1.2.1 Bellows seal and mixing plug	2-9
4.0 Description	2-3	7.1.2.2 Bellows seal and diverting plug	2-10
4.1 Scope of applications	2-3	7.2 Replacement of internal parts	2-11
4.2 Operating principles	2-3	7.2.1 Replacement of plug and stem	2-11
4.3 Diagram	2-4	7.2.1.1 Mixing plug design	2-11
4.3.1 Mixing plug design	2-4	7.2.1.2 Diverting plug design	2-12
4.3.2 Diverting plug design	2-4	7.2.2 Replacement of the seat ring	2-12
4.4 Technical data	2-5	7.3 Tightening torques	2-13
4.5 Marking	2-5	7.3.1 Tightening torques for hexagon nuts	2-13
5.0 Installation	2-5	7.3.2 Tightening torques for seat rings	2-13
5.1 General notes on installation	2-5	8.0 Troubleshooting	2-13
5.2 Requirements at the place of installation	2-6	9.0 Troubleshooting table	2-14
5.3 Installation instructions concerning actuators	2-6	10.0 Dismantling the valve or the top part ...	2-15
6.0 Putting the valve into operation	2-7	11.0 Warranty / Guarantee	2-15

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 and repair.

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 taking the fittings out of service as well as when maintaining and repairing them.

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



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

	<p>ATTENTION!</p> <ul style="list-style-type: none">- 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 catalog sheet for weights.
---	--

- 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, limits on use and possibilities.
- Certain media require or preclude the use of special materials.
- The valves are designed for standard operating conditions. If conditions exceed these requirements, e.g. aggressive or abrasive media, the operator should state the higher requirements when ordering.
- Valves made from grey cast iron are not authorised for use in systems subject to TRD 110.

The information complies to the Pressure Equipment Directive 2014/68/EU.

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 catalogue 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.

Depending on the mode of operation, two different execution methods are possible:

1. Execution with mixing plug
2. Execution with diverting plug

The execution with the mixing plug is the standard execution method.

This execution method is to be chosen when the valve is also employed as a mixer (2 entrances, 1 exit.)

In exceptional cases, the execution with the mixing plug can also be employed as a diverting plug (1 entrance, 2 exits). This requires, however, low differential pressures and stable propulsion.

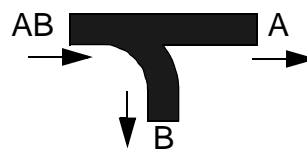
The execution method with the diverting plug is only to be employed with the operation of diverting.

Explanation:

Mixing operation



Diverting operation



4.3 Diagram

4.3.1 Mixing plug design

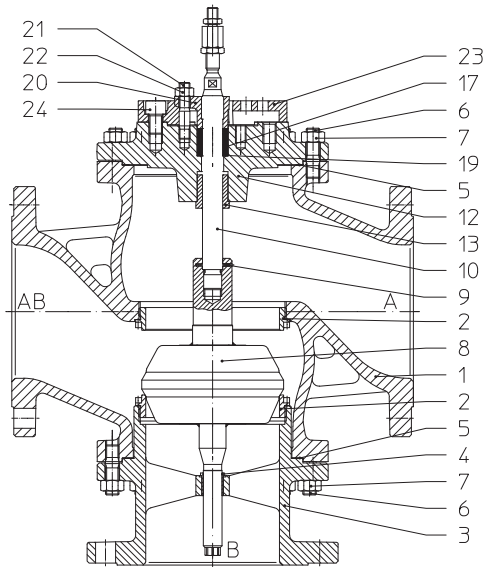


Fig. 1: Series 423

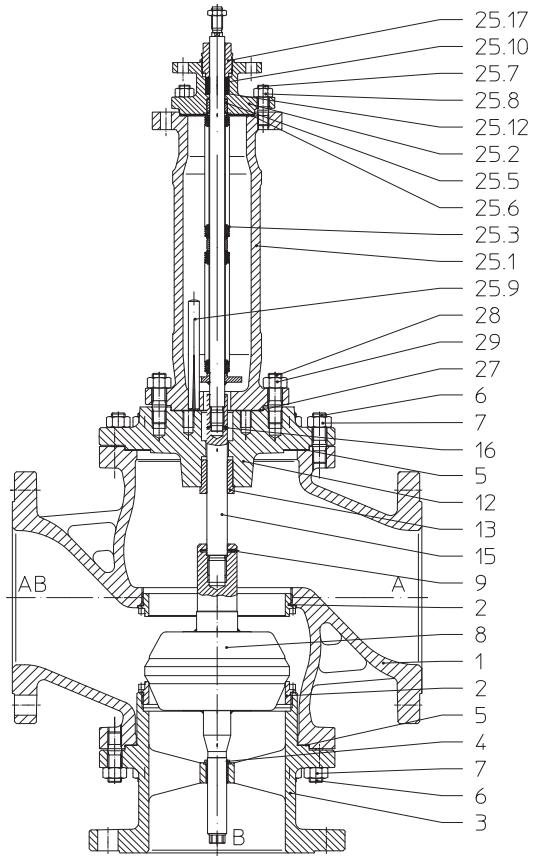


Fig. 2: Series 463

4.3.2 Diverting plug design

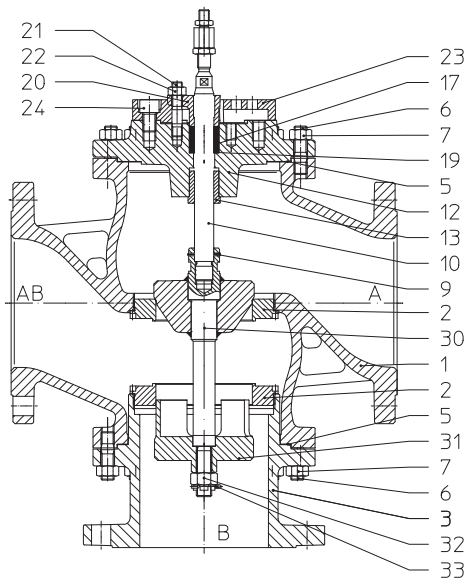


Fig. 3: Series 423

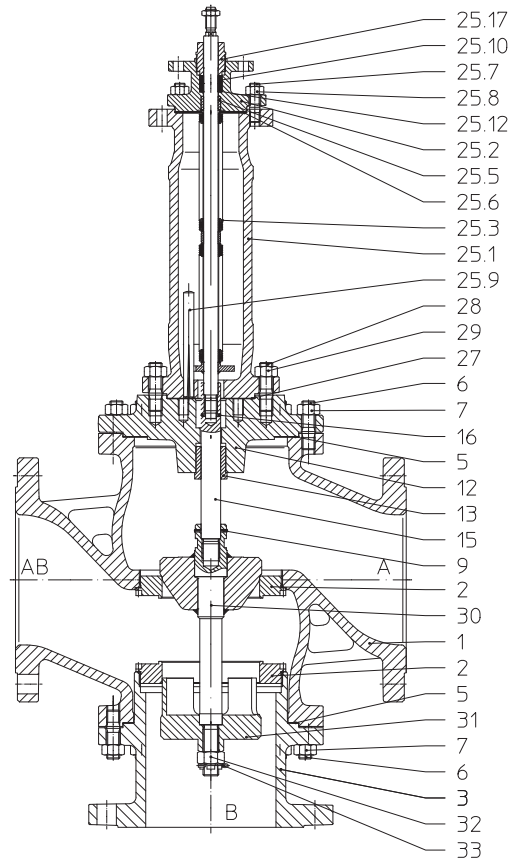


Fig. 4: Series 463

4.4 Technical data

for

- **Principal dimensions**

- **Pressure-temperature-ratings, etc.** refer to datasheet.

4.5 Marking

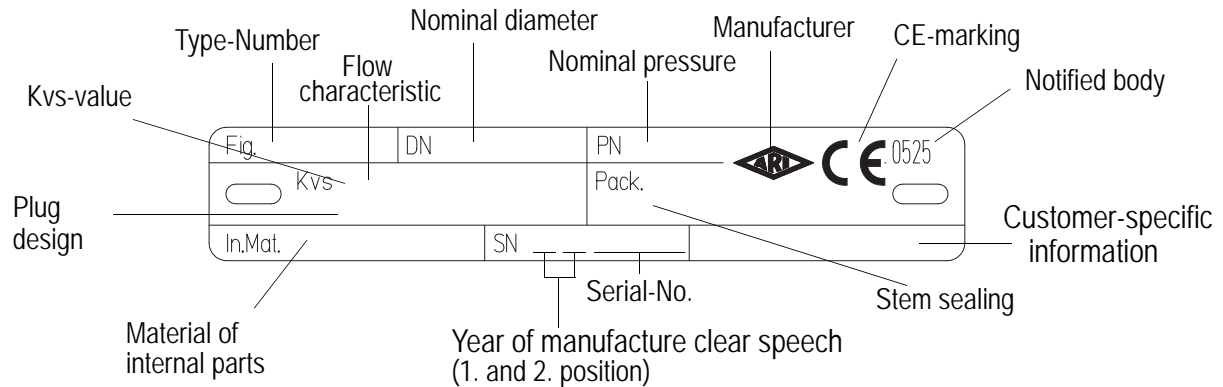


Fig. 5

Address of manufacturer: refer to item 11.0 Warranty / Guarantee

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 !

- 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).
- 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. 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.

- 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 behind 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.

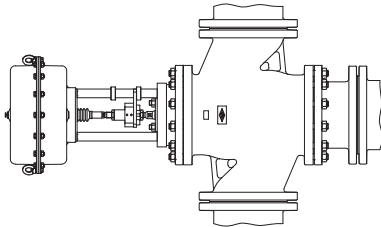


Fig. 6: Pipeline vertically

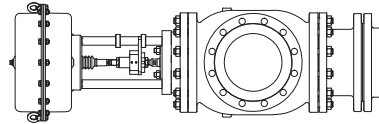


Fig. 7: Pipeline horizontally

Safe actuator weights for a horizontal installation position with reference to the stem, without structural support, are as follows:

55 kg for DN 200-250

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 DN upstream and 6 x DN downstream of the valve.

5.3 Installation instructions concerning actuators

Normally, control valves are supplied complete with actuator fitted.

It is not permitted to mantle / dismantle actuators with valves operating at service conditions (temperature and pressure) the actuators must be assembled as describe in the operating instructions during conversion and maintenance.

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 must be taken into account:

Series 423
59kN for DN 200-250

Series 463
37kN for DN 200-250

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 ($> 50\text{ °C}$) or low ($< 0\text{ °C}$) 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.

7.0 Care and maintenance

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

7.1 Replacement of stem sealings

7.1.1 Stuffing box packing design

Stuffing box packings (pos. 17) require maintenance.

If leaks develop, immediately tighten hexagon nuts (pos. 22) gradually until the packing (pos. 17) stops leaking.

The service life of stuffing box packings (pos. 17) can be increased by checking regularly leakage.

If leaks can no longer be stopped by tightening the nuts, a new packing ring (pos. 17) must be inserted into the gland.

Replacement of stuffing box packings:



ATTENTION !

Refer to item 10.0 and 11.0 before dismantling the valve.

- Remove the actuator. (Refer to operating instructions for actuator!)
- Insert the new packing ring as shown in the Fig. 8.

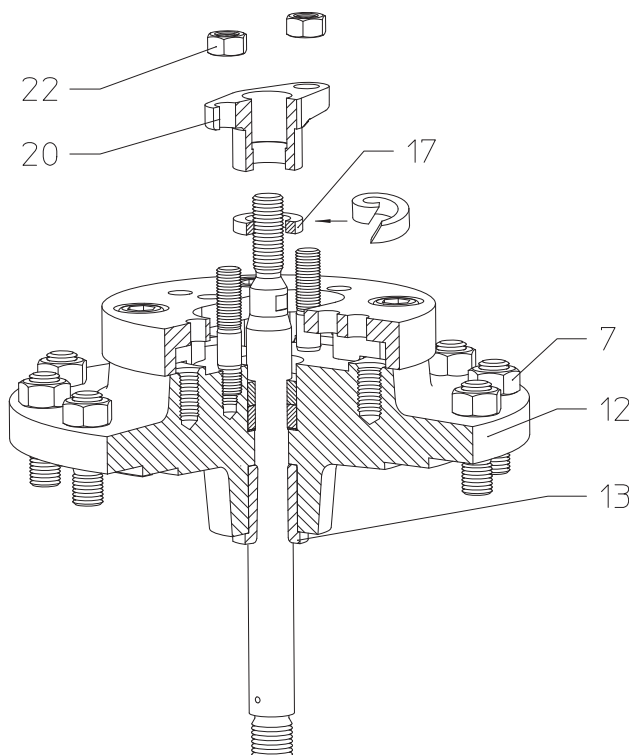


Fig. 8: Stuffing box packing

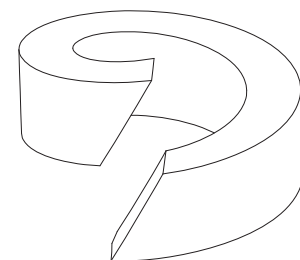


Fig. 9: Split packing ring

If a split packing ring is used, cut with a chamfer as shown in Fig. 9.

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

7.1.2 Bellows seal design

If the stem leaks the bellows seal (pos. 25.3) is defective. The leak can initially be stopped by tightening the screw joint (pos. 25.17) respectively sleeve nut (pos. 25.16).

Stem and bellows seal (pos. 20.3) can only be replaced together.

Replacement of bellows seals:



ATTENTION !

Refer to item 10.0 and 11.0 before dismantling the valve.

- Remove the actuator. (Refer to operating instructions for actuator!)
- Slacken screw joint (pos. 20.17) respectively sleeve nut (pos. 20.16) by about one turn.
- Loose nuts (pos. 29).
- Lift bellows housing (pos. 25.1).
- Drive pin (pos. 16) out with a drift.

7.1.2.1 Bellows seal and mixing plug

- Loose nuts (pos. 7 bottom).
- Detach the bottom flange (pos. 3).
- Unscrew plug (pos. 8) with adapter (pos. 15).
- Loose nuts (pos. 29).
- Detach bellows assembly (pos. 25).
- Loose nuts (pos. 25.8).
- Detach stuffing box housing (pos. 25.13) resp. mounting bonnet (pos. 25.2).
- Extract stem-/bellows unit (pos. 25.3) from the bellows housing (pos. 25.1).
- Bolt new parts together and drill them.
- Replace 2 gaskets (pos. 25.6) and 2 gaskets (pos. 5).
- Assemble in reverse order.



ATTENTION !

- Ensure that the torsion lock is correctly positioned when inserting new stem/bellows unit. Introduce the grooved pin (pos. 25.9) into the torsion lock groove. Make sure it runs smoothly!

- Secure with nuts (pos. 7, 25.8 and 29) and tighten them crosswise.
(For tightening torques refer to point 7.3.1.)
- Tighten screw joint (pos. 25.17) respectively sleeve nut (pos. 25.16) gradually up to tightness of the stuffing box packing (pos. 25.10).

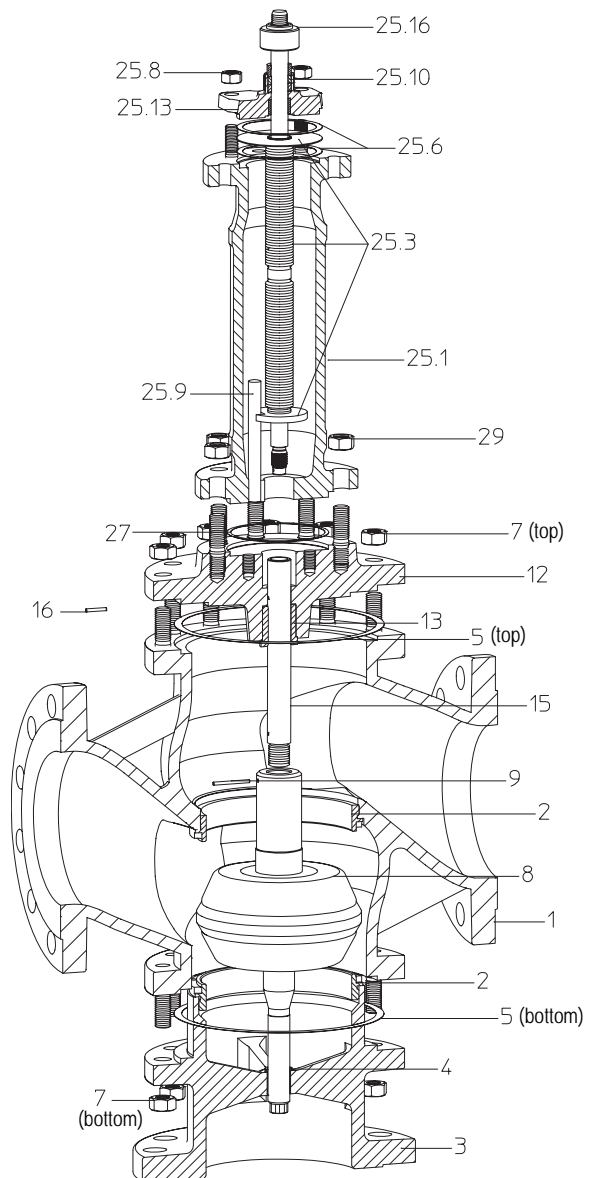



Fig. 10: Series 463 with mixing plug

7.1.2.2 Bellows seal and diverting plug

- Remove the cotter pin (pos. 33).
- Unscrew castle nuts (pos. 32).
- Detach V-port plug (pos. 31).
- Loose nuts (pos. 7 top).
- Detach bellows assembly (pos. 25) incl. stuffing box housing (pos. 12).
- Loose nuts (pos. 25.8).
- Detach stuffing box housing (pos. 25.13) resp. mounting bonnet (pos. 25.2).
- Extract stem/bellows unit (pos. 25.3) from the bellows housing (pos. 25.1).
- Bolt new parts together and drill them.
- Replace 2 gaskets (pos. 25.6) and 2 gaskets (pos. 5).
- Assemble in the reverse order.



ATTENTION !

- Ensure that the torsion lock is correctly positioned when inserting new stem/bellows unit. Introduce the grooved pin (pos. 25.9) into the torsion lock groove. Make sure it runs smoothly!

- Secure with nuts (pos. 7, 25.8 and 29) and tighten them crosswise.
(For tightening torques refer to point 7.3.1.)
- Tighten screw joint (pos. 25.17) respectively sleeve nut (pos. 25.16) gradually up to tightness of the stuffing box packing (pos. 25.10).

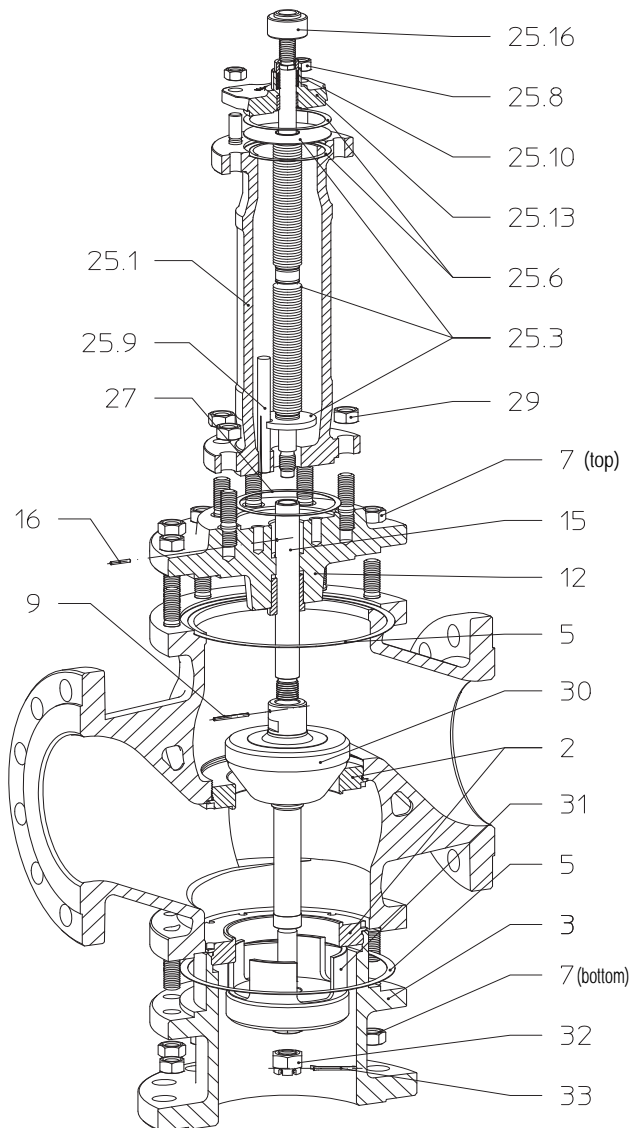


Fig. 11: Series 463 with diverting plug

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 the actuator. (Refer to operating instructions for actuator!)
- Slacken nuts (pos. 22) by about 2-3 turns.

7.2.1.1 Mixing plug design

Series 423

- Loose nuts (pos. 7).
- Detach bottom flange (pos. 3).
- Remove plug (pos. 8) with stem (pos. 10).
- Drive pin (pos. 9) out with a drift.
- Unscrew plug (pos. 8).
- Bolt new parts together, drill and pin them.
- Replace 2 gaskets (pos. 5).
- Assemble in reverse order.
- Secure with nuts (pos. 11) and tighten them crosswise.
(For tightening torques refer to point 7.3.1)

Series 463

Item 7.1.2 describes how to change mixing plug and stem in valves with a bellows seal (series 463).

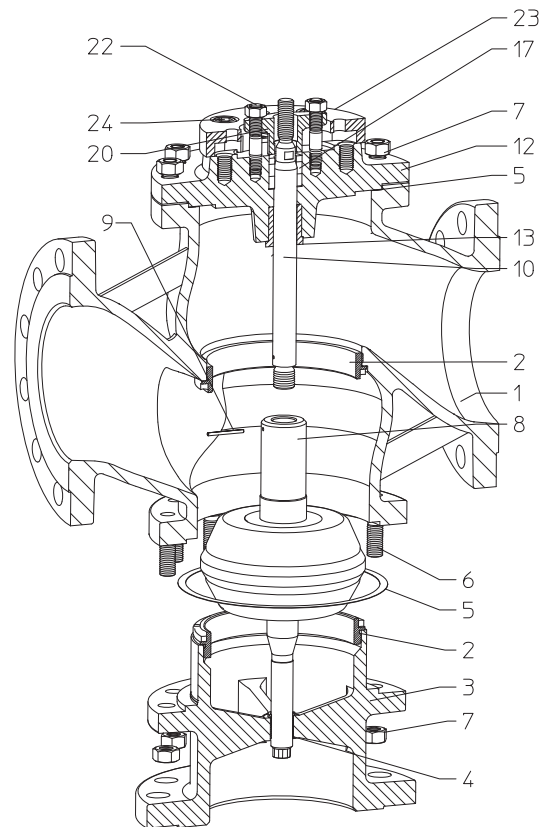


Fig. 12: Series 423 with mixing plug

7.2.1.2 Diverting plug design

Series 423

- Remove the cotter pin (pos. 33).
- Unscrew castle nuts (pos. 32).
- Unscrew V-port plug (pos. 31).
- Loose nuts (pos. 7).
- Detach stuffing box housing (pos. 12).
- Extract plug (pos. 30) and stem (pos. 10).
- Drive pin (pos. 9) out with a drift.
- Unscrew plug (pos. 30).
- Bolt new parts together, drill and pin them.
- Replace 2 gaskets (pos. 5).
- Assemble in the reverse order.
- Secure with nuts (pos. 7) and tighten them crosswise.
(For tightening torques refer to point 7.3.1)

Series 463

Item 7.1.2 describes how to change diverting plug and stem in valves with a bellows seal (series 463).

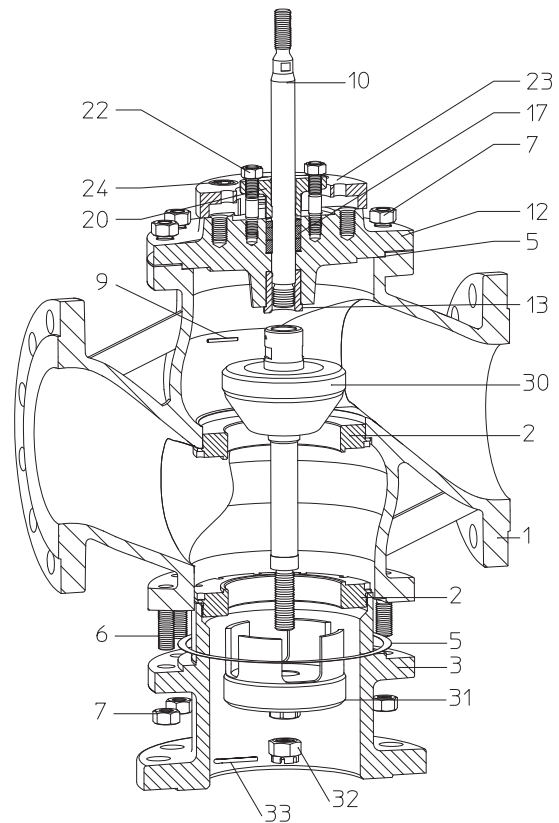


Fig. 13: Series 423 with diverting plug

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 instructions for actuator!)
- Remove plug as described in item 7.2.1.
- Unscrew seat rings (pos. 2 top and bottom) with a special wrench (can be obtained from the manufacturer).
- Clean thread and sealing taper in body (pos. 1) respectively bottom flange (pos. 3) and apply with suitable lubricant.
- Replace respectively recondition seat rings (pos. 2 top and bottom).
- Install seat rings (pos. 2 top and bottom). (For tightening torques refer to item 7.3.2.)
- Replace 2 gaskets (pos. 5).
- Assemble in reverse order.
- Secure with nuts (pos. 7) 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

M 12	=	35 - 50 Nm
M 16	=	80 - 120 Nm
M 20	=	150 - 200 Nm
M 24	=	340 - 410 Nm

7.3.2 Tightening torques for seat rings

DN 200	=	3300 Nm
DN 250	=	3850 Nm

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

8.0 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 !

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

If malfunctions cannot be eliminated with the help of the following table

“**9.0 Troubleshooting table**”, the supplier or manufacturer should be consulted.

9.0 Troubleshooting table



ATTENTION !

- read item 10.0 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
Stem moves in jerks	Stuffing box sealing too tight (for valves with graphite packings)	Tighten packing box flange (pos. 20) resp. nuts (pos. 22) slightly; valve must not start leaking
	Valve plug slightly seized owing to solid dirt particles	Clean internals, smooth rough spots
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; refer to item 7.2
Stem leaking	In valves with packed stuffing boxes, tighten screw joint (pos. 22)	Tighten packing box flange (pos. 20) resp. nuts (pos. 22); replace packing if necessary; refer to item 7.1.1
	Bellows defective in valves with bellow seal	Replace bellows unit; refer to item 7.1.2
Leakage too high when valve is closed	Sealing surfaces of plug eroded or worn	Replace plug; refer to item 7.2
	Sealing edge of seating damages or worn	Replace seating; refer to item 7.2
	Seating and/or plug dirty.	Clean internal parts of the valve
	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
Stem "hammers"	flow in the closing direction	Compare the plug operation (mixing- or diverting plug) with the application and if necessary exchange the fittings or increase actuator force

10.0 Dismantling the valve or the top part



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.*

11.0 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 relevant 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.



Technology for the Future.

GERMAN QUALITY VALVES

ARI-Armaturen Albert Richter GmbH & Co. KG, D-33750 Schloß Holte-Stukenbrock

Telephone (+49 5207) 994-0 Telefax (+49 5207) 994-158 or 159

Internet: <http://www.ari-armaturen.com> E-mail: info.vertrieb@ari-armaturen.com