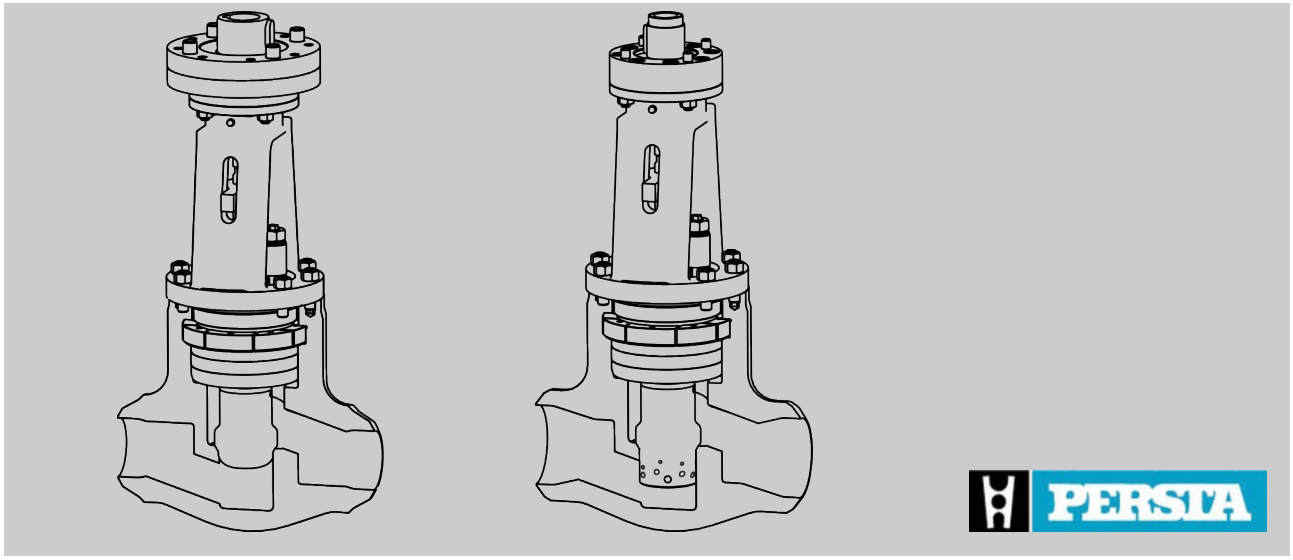
Operating instructions

High pressure globe valve
DVA and DVR



Read the instructions prior to performing any task!

Stahl-Armaturen PERSTA GmbH
Mülheimer Str. 18
59581 Warstein-Belecke, Germany
Telephone: +49 2902 762-02
Fax: +49 2902 767-03
Email: info@persta.de
Internet: www.persta.com
Translation of the original operating instructions
Dok.-Nr. 6404.DE.STD.03.2013, 2, en_GB

Information about the operating manual

These instructions enable the safe and efficient handling of the high pressure valve.

The manual is a component of the product and must be kept in the vicinity of the high pressure valve where it is available to personnel at all times.

The personnel must have carefully read and understood these instructions before starting any work. The basic prerequisite for safe work is compliance with all the specified safety notices and instructions.

In addition, the local occupational safety regulations and general safety regulations must be complied with for the high pressure valve's area of use.

The illustrations in this manual are provided as examples only and may deviate from the actual version.

Although the size and pressure ratings of the valve types vary, the information in these instructions applies generally to all valves, provided nothing to the contrary is specified.

Scope of the document

This manual applies to the following versions of the high pressure globe valves DVA and DVR:

Designation	Series	Nominal diameter (DN) [mm]	Pressure rate	Class*
DVA	200 BZ 202 BZ 204 BZ	80–250	PD 25	≤1500
DVA	200 BZ 202 BZ 204 BZ	65–200	PD 40	≤2500
DVR	210 KZ 212 KZ 214 KZ	80–250	PD 25	≤1500
DVR	210 KZ 212 KZ 214 KZ	65–200	PD 40	≤2500

* Assignment number in the pipe construction

Other applicable documents

- Ignition hazard assessment GA004
- Connection diagram provided
- Risk analysis according to Pressure Equipment Directive
- Risk analysis according to Machinery Directive
- Actuator instructions
- Technical data sheet
- Bolt tightening torques according to the website: www.persta.com
- As well as the other documents included in the delivery

Customer Service - Stahl-Armaturen PERSTA GmbH

Mülheimer Str. 18

59581 Warstein

Telephone: +49 2902 762-02

Fax: +49 2902 767-03

E-mail: info@persta.de

Revision overview

Revision number	Change/Supplemented information	Date
1	Updates to chapter *"Intended use"*.	05/05/2021

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1 Overview

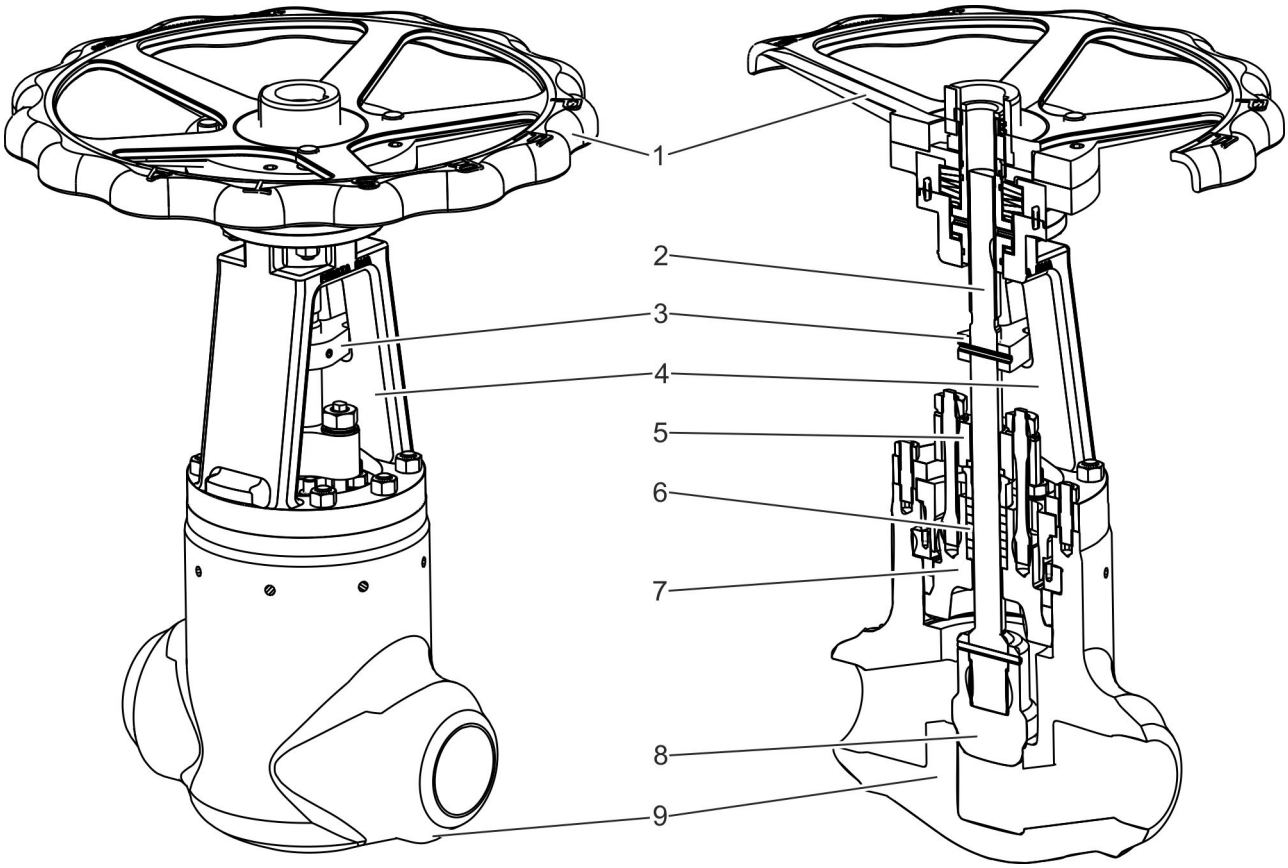


Fig. 1: High pressure globe valve (shown: model DVA)

1 Actuator (in the example: handwheel)
2 Stem
3 Anti-twist device
4 Bonnet
5 Gland follower flange
6 Gland packing
7 Cover
8 Shut-off element (shown here: throttling valve cone)
9 Body

Brief description

The valve designated as high pressure globe valve is designed for installation in pipes.

The shut-off element is

- For the DVA a throttling valve cone,
- For the DVR a regulating cone.

In the closed position, the shut-off element (Fig. 1/8) prevents the pipeline medium from flowing through the valve.

If the high pressure globe valve DVR is used for regulation, the flow of the pipeline medium is influenced by the position of the regulating cone.

The shut-off element is driven in or out via the stem (Fig. 1/2).

The body (Fig. 1/9) of the valve is flanged or welded in the pipework, depending on the version.

Actuator variants

The stem is moved differently depending on the version:

- manually via handwheel
- electrically
- hydraulically
- pneumatically

Media

Depending on the version of the high pressure globe valve, it can be used for water, steam, oil, and other non-aggressive media.

Tools

The following tools are required for the tasks described in the operating instructions:

Forklift
Forklift with sufficient load-bearing capacity for transport of valves.

Hoist
Hoist with sufficient load-bearing capacity for transporting valves and components.

Hook wrench
Hand tool for activating the threaded bush or mounted electric actuator.

Knock-out tool
Pin-like tool for driving the tension pin out of the stem.

Packing extractor
Tool for removing gland packing elements.

Pin puncher
Mandrel-like tool for punching out the segment rings.

Sling gear
Functional and approved gear for attaching valves and components on the hoist.

2 Safety

2.1 Symbols in this manual

Safety instructions

Safety instructions are indicated by symbols in this manual. The safety instructions are introduced by signal words that indicate the scope of the hazard.

DANGER!
This combination of symbol and signal word indicates a hazardous situation that, if not avoided, will result in death or serious injury.

WARNING!
This combination of symbol and signal word indicates a potentially hazardous situation that, if not avoided, may result in death or serious injury.

CAUTION!
This combination of symbol and signal word indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.

NOTICE!
This combination of symbol and signal word indicates a potentially hazardous situation that, if not avoided, may result in damage to property.

ENVIRONMENT!
This combination of symbol and signal word indicates potential hazards for the environment.

Safety instructions in specific instructions

Safety instructions may refer to specific, individual instructions. Such safety instructions are integrated into the specific instruction, so that the flow of reading is not interrupted during performance of the task. The signal words described above are used.

Example:

1. Loosen the bolt.
2. 

CAUTION!
Risk of getting trapped by the cover!

Close the cover carefully.

3. Tighten the bolt.

Special safety instructions

The following symbols are used in the safety instructions to indicate special hazards:

Warning signs	Type of danger
	Warning – high-voltage.
	Warning – danger zone.

Tips and recommendations

This symbol indicates useful tips and recommendations as well as information on efficient and trouble-free operation.

Additional symbols

The following symbols are used throughout these instructions to highlight specific instructions, results, lists, references and other elements:

Symbol	Explanation
→	Step-by-step instructions
⇨	Results of an action
↳	References to sections of these operating instructions and other applicable documents
■	Lists without a defined sequence

2.2 Intended use

High pressure globe valves of the specified DVA and DVR series are designed for installation in pipes under the following conditions:

- Valve with throttling valve cone: Normal operation of the valve as open/close valve. Brief operation of the valve as throttling valve with increased probability of wear.
- Valve with regulating cone: Operation of the valve for regulating the flow, up to completely open/closed.
- Operation of the valve with pressure via the shut-off element.
- Installation in horizontal or vertical pipes.
- Maximum number of 1000 load cycles between a depressurized state and the maximum permissible pressure PS.
- Any number of load cycles at pressure fluctuations of up to 10 % of the maximum permissible pressure PS.
- Operation of the valve with liquid or gaseous media, without particular corrosive, chemical or abrasive impact.
- Temperature change speeds of maximum 6 K/min (6°C/min).
- Generally used flow rates depending on the type of medium and the application for which the valve is used.
- Operation of the valve without additional external influences, such as pipe forces, vibrations, wind loads, earthquakes, corrosive environments, fires, traffic loads, decomposition pressures of unstable fluids.
- The valve must only be operated within the limits specified on the type plate (↯ *“Rating plate” on page 12*).
- If the valve is operated in the creep range, the valve is designed for a maximum operating time of 100,000 h. The valve must be replaced afterwards.
- No temperature increases were considered. In case of use in the hot vapour area, temperature increases must be considered according to the regulations of the operating company.
- The test pressure for a recurring test must not exceed the maximum permitted pressure PS multiplied by 1.3.
- The valve may only be operated if internal pressure loading is predominantly dormant. Additional loads (e.g. stationary thermal stress, unsteady pressure and temperature loads in case of alternating loads or pipe loads) were not considered.

Intended use includes compliance with all the information contained in this manual.

Any use that deviates from the intended use or any other form of use constitutes misuse.

Misuse

WARNING!

Danger in the event of misuse!

Misuse of the valve can cause dangerous situations.

- Do not use the valve as a throttling valve in normal operation.
- Connect the pipes so that they are free of tension.
- Pay attention to the correct installation position of the valve.
- Do not use valves as an anchor point.
- Never operate valves at temperatures near or below the freezing point of the pipeline medium.
- Do not exceed the number of permitted load cycles (*Chapter 2.2 “Intended use” on page 11*).

2.3 Safety signs

The following symbols and instruction signs are in the work area. These symbols and instruction signs refer to the immediate vicinity in which they are affixed.

WARNING!

Danger if signs are illegible!

Over time, stickers and signs can become fouled or can become illegible in some other manner, so that dangers are not recognised and necessary operating instructions cannot be complied with. This results in a danger of injury.

- Keep all safety, warning, and operating instructions that are affixed to the device in legible condition.
- Replace damaged signs or stickers immediately.

Rating plate

The rating plate is on the valve. Depending on the version, the following information is on the rating plate:

- Confirmation number
- Article number
- Year of manufacture
- Nominal diameter
- Nominal pressure/design data

Flow direction arrow

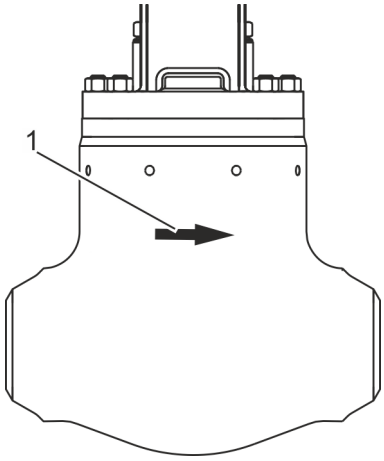


Fig. 2: Flow direction arrow

The flow direction is marked on the valve with an arrow (Fig. 2/1).

In the arrow direction, medium flows against the shut-off element from above (↳ *Chapter 2.2 “Intended use” on page 11*).

Opening direction / closing direction indication for manual actuator

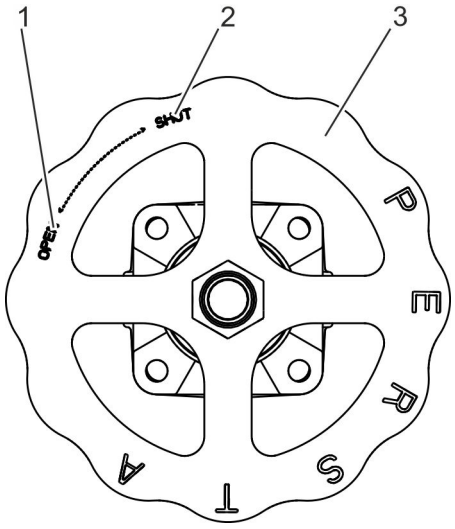


Fig. 3: Opening direction and closing direction indication

The handwheel (Fig. 3/3) shows the opening (Fig. 3/1) and closing directions (Fig. 3/2).

- Open
- Shut

Customer-specific markings

Additional markings (e.g. max. temperature limits) are available on customer request.

2.4 Safety devices

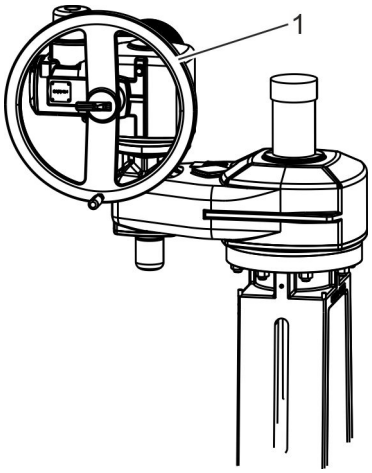
Limit switch

The opening process of the valve with electric actuator is ended via limit switches. After a permanently set distance the actuator switches off and the valve is opened.

Torque switch

With an optional electric actuator, in addition to the limit switch, torque switches are also mounted. At a permanently set torque, the actuator shuts down and the valve is closed. This protects the valve from excessive torque.

Emergency actuation of the electric actuator



The optional electric actuator also has a handwheel (Fig. 4/1). If the actuator is defective or if the controller fails, the valve can be operated via the handwheel.

Fig. 4: Emergency actuation

2.5 Residual risks

The valve has been developed and manufactured to the state-of-the-art and in accordance with generally accepted rules of safety. Nevertheless residual risks remain that require careful handling. The residual risks and the resulting behaviours and measures are listed below.

2.5.1 Basic dangers at the workplace

Hazardous areas

DANGER!

Life-threatening danger due to failure to comply with the rules of behaviour specified for hazardous areas!

Depending on the version the valve can be used in hazardous areas. There is life-threatening danger if the rules of behaviour are not complied with within these areas.

– Ensure that tasks on the valve can be executed at the installation site.

Trip hazard

CAUTION!

Danger of injury due to tripping up!

There is a danger of fall injuries in the area of use of the valve.

– Install cable and connection lines in such a manner that there are no trip hazards.

2.5.2 Electric shock hazard

Electric shock

DANGER!

Risk of fatal injury from electric shock!

There is a risk of fatal injury when touching live components of the actuator. Switched-on electrical components can execute uncontrolled movements and can cause serious injuries.

– Prior to starting work, switch off the supply of electricity and definitively disconnect it.
– Only have an electrician perform tasks on electrical lines and components.

2.5.3 Danger due to hydraulics

Fluid under high pressure

WARNING!

Danger of injury due to hydraulic energy!

Hydraulically-powered components of the valve, as well as the triggering of the overpressure valve can cause severe injuries.

– Only have specialised personnel perform tasks on the hydraulic system.
– Prior to starting the tasks on the hydraulic system ensure that it is completely depressurised. Completely depressurise pressure accumulators.
– Operate the valve in a frost-free environment to prevent the body from bursting.
– Wear personal protective equipment.

2.5.4 Hazards associated with the pneumatic system

Hazards associated with the pneumatic system

WARNING!

Danger of injury due to pneumatic energy!

Pneumatically-powered components of the valve, can cause severe injuries.

- Only have pneumatic specialists perform tasks on the pneumatic equipment.
- Prior to starting the tasks on the pneumatic equipment ensure that it is completely depressurised. Completely depressurise pressure accumulators.
- Wear personal protective equipment.

2.5.5 Mechanical hazards

Heavy weight of the valve

WARNING!

Danger of injury due to the heavy weight of the valve!

The heavy weight of the valve, and of its components, can result in severe injuries.

- Transport valves with a suitable hoist or forklift.
- Don not lift valves via the handwheel.
- Do not lift valves via the actuator.
- If possible, lift valves via the bonnet.
- Use approved and functional sling gear.
- Safeguard valves and components from falling over.

Danger of crushing on stems

WARNING!

Danger of injury on moving parts!

Danger of injury exists on moving parts (stems/ anti-twist devices).

- When the valve is in operation do not grasp moving parts.
- Wear personal protective equipment.

2.5.6 Thermal dangers

Thermal dangers

WARNING!

Danger of injury due to high/low temperatures!

Depending on the insert of the valve or of the pipe, injuries can occur due to the high or low temperature of the components.

- When working on components or activating final control equipment, wear protective equipment: Protective gloves, protective goggles.
- Prior to performing tasks on these components, allow them to cool down/warm up to ambient temperature.
- Have the protective insulation provided by the operating company attached.

Danger of freezing

WARNING!

Danger of injury due to pipes shattering at freezing temperatures!

As a result of pipes shattering at freezing temperatures, severe injuries can be caused by fluid under high pressure.

- Ensure that the valve is completely empty before it is taken out of service.
- Never operate valves at temperatures close to, or below the freezing point of the pumping medium.

2.5.7 Dangers due to hazardous substances and operating materials

Pumping medium

WARNING!

Danger of injury due to pumping medium under pressure!

In operating status, as well as in decommissioned status, depending on the version of the valve, injuries can occur due to medium escaping under high pressure.

- Do not unscrew threaded connections.
- If threaded connections are loose, inform the operating company and have the pipe section in question shut-off.
- If threaded connections are loose have the cause for this clarified and eliminated. If necessary have the manufacturer check the valve.

WARNING!

Pumping medium is a health hazard!

Contact with the pumping medium can have health implications.

- Handle pumping medium in accordance with the instructions in the manufacturer's safety data sheet.
- Wear protective equipment: Protective gloves, safety footwear, protective goggles, protective work clothing.
- Soak up escaped pumping medium without delay and dispose of it in an environmentally responsible manner.

Pickling medium

WARNING!

Pickling medium is a health hazard!

Direct contact with the pickling medium used can have health implications.

- Handle pickling medium in accordance with the instructions in the manufacturer's safety data sheet.
- Wear protective equipment: Protective gloves, safety footwear, protective goggles, protective work clothing.
- Soak up escaped pickling medium without delay and dispose of it in an environmentally responsible manner.

Lubricating grease

WARNING!

Operating materials are a health hazard!

Contact with operating materials/lubricants can have health implications.

- Handle operating materials and lubricants in accordance with the instructions in the manufacturer's safety data sheet.
- Wear personal protective equipment: Protective gloves, safety footwear, protective goggles, protective work clothing.
- Soak up escaped operating materials/lubricants without delay and dispose of them in an environmentally responsible manner.

Anticorrosive

WARNING!

Anticorrosive is a health hazard!

Direct contact with the anticorrosive used can have health implications.

- Handle anticorrosive in accordance with the instructions in the manufacturer's safety data sheet.
- Wear protective equipment: Protective gloves, safety footwear, protective goggles, protective work clothing.
- Soak up escaped anticorrosive without delay and dispose of it in an environmentally responsible manner.

Damage of sealing surfaces and slide faces

NOTICE!

Damage of sealing surfaces and slide faces due to the metallic processing of sealing surfaces and slide faces!

The metallic processing of sealing surfaces and slide faces and valve parts can result in material damage and malfunctions of the valve.

- Sealing surfaces and slide faces of gaskets must not be
  - scratched with a scraper,
  - processed with wire brushes.
- Sealing surfaces and slide faces must be
  - pulled off with emery cloth,
  - processed with suitable abrasive tools or
  - scraped off with plastic tools/wooden tools.

Increased wear

NOTICE!

Material damage due to excessive use as throttling valve!

Excessive use of the valve as throttling valve can result in malfunction and material damage due to overstressing of the components.

- Only use the valve briefly as throttling valve.
- In normal operation use the valve as open/close valve.
- Have the maintenance and replacement intervals shortened by the operating company depending on the use of the valve.

2.6 Behaviour in the event of an emergency

See also *Chapter 7.3 “Operating the valve in an emergency” on page 57*.

1. Shut off the pipe sections affected.
2. Comply with the in-house regulations.

2.7 Responsibility of the operating company

Operating company

The operating company is the company that operates the valve for commercial or economic purposes itself or that provides it to a third party for use, and that, during operation, bears the legal product responsibility for protection of the user, personnel or third parties.

Obligations of the operating company

The valve is used commercially. The operating company of the valve is therefore subject to the legal occupational health and safety obligations.

In addition to the safety instructions in this manual, the local occupational health and safety, accident prevention and environmental protection regulations that apply to the valve’s area of application must be observed.

In this regard, the following applies in particular:

- The operating company is responsible for the installation and operation of the valve in the pipe.
- The operating company must ensure that any dangerous situations caused by the operating conditions are avoided by installing additional safety systems.
- The operating company must obtain information about the applicable occupational health and safety regulations and, in a hazard assessment, identify the additional hazards that may exist at the installation site of the valve due to the specific working conditions. The operating company must integrate this information into operating instructions for the operation of the valve.
- The operating company must ensure that the operating instructions it has drawn up comply with the currently applicable legislation throughout the operating period of the valve and, if necessary, adapt the operating instructions.
- The operating company must clearly define and assign the responsibilities for installation, operation, fault correction, maintenance and cleaning.
- After the installation, the operating company must ensure the proper pickling of the valve.
- The operating company must draw up an emergency stop concept for the overall system: specifying whether opening or closing of the valve is necessary in an emergency.
- The operating company must provide devices that ensure the safe transition of the valve into a depressurised state.

- The operating company must provide equipment that can completely drain the pipe sections in which the valve is installed as well as the valve itself.
- The operating company must ensure that all personnel who are to handle the valve have read and understood this manual. In addition, the operating company must train the personnel and inform them of the hazards at regular intervals.
- The operating company must provide the required protective equipment for the personnel and instruct the personnel that wearing the required protective equipment is compulsory.
- The operating company must install additional protective devices around the valve if contact with the valve can result in injuries due to the medium in the pipe system.

The operating company is also responsible for keeping the valve in proper working order at all times. Therefore, the following applies:

- The operating company must ensure that the maintenance intervals described in these instructions are complied with.
- When using the valve as a throttling valve, the operating company must ensure that the valve is checked for signs of wear on a regular basis.

In the case of valves with different pipe connections on the inlet and outlet sides, the operating company must ensure that when opening the valve the respective pipe connection is not exposed to unduly high pressure or unduly high temperatures.

2.8 Personnel requirements

WARNING!

Danger of injury due to inadequate personnel qualification!

If unqualified personnel perform tasks on the machine or are present in the danger zone, dangers occur that can cause severe injury and significant material damage.

– Only have activities performed by personnel who are qualified to perform these activities.
– Keep unqualified personnel away from the danger zones.

In this manual the qualifications of personnel for the various activity areas are cited below:

Disposal contractor
A disposal contractor is a company qualified in accordance with local regulations to collect, transport, store, handle, recycle or dispose of waste and recyclables.

Forklift truck driver
The forklift truck driver has demonstrated to the operator their skills in driving industrial trucks controlled by a sitting or standing operator and has been assigned to do this by the operator in writing.

Hydraulics Specialist
The Hydraulics Specialist is trained for the special area of responsibility he is involved with and knows the relevant standards and regulations.

Based on his technical training and experience, the Hydraulics Specialist can perform work on hydraulic systems and can recognise and avoid potential hazards himself.

Industrial mechanic (high pressure valves)
Based on their specialised training, skills, experience and knowledge of the applicable standards and provisions, the industrial mechanic is able to carry out the work assigned to them on installations and valves in the high pressure area and to independently identify potential hazards and avoid them.

They have been instructed by the operator on how to handle the plant and receive regular training.

The industrial mechanic is capable of maintaining and repairing installations and valves in the high pressure area independently.

Pipeline engineer
Based on their specialised training, skills, experience and knowledge of the applicable standards and provisions, the pipeline engineer is able to carry out the work assigned to them and to independently identify potential hazards and avoid them.

The pipeline engineer is able to install valves safely and properly in the pipework.

Pneumatics Specialist
The Pneumatics Specialist is trained for the special area of responsibility he is involved with and knows the relevant standards and regulations.

Based on his technical training and experience, the Pneumatics Specialist can perform work on pneumatic systems and can recognise and avoid potential hazards himself.

Qualified electrician
The qualified electrician is able to execute tasks on electrical equipment and independently detect and avoid any possible dangers thanks to his training, expertise and experience, as well as knowledge of all applicable regulations.

The qualified electrician has been specially trained for the work environment in which he is active and is familiar with all relevant standards and regulations.

Trained person (hoist)
The trained person (hoist) has been instructed, and can provide evidence of this, by the operator on how to handle the hoist and sling gear and the potential hazards associated with improper behaviour.

Trained person (operator)
The trained person (operator) has been instructed, and can provide evidence of this, by the operating company on how to handle the plant and the potential hazards associated with improper behaviour. This knowledge will be refreshed in regular training provided by the operating company. The trained person (operator) is familiar with the content of this manual.

The trained person (operator) is familiar with the operating company's plant and the associated hazards. They are assigned with operating the plant by the operating company.

Basic requirements

Only persons from whom it is expected that they reliably perform their work are approved as personnel. Persons whose capacity to react is impaired, for example, through drugs, alcohol, or medication are not approved as personnel.

Comply with the age-specific and job-specific regulations that apply at the site of implementation when selecting personnel.

Unauthorised persons

WARNING!

Risk of fatal injury for unauthorised persons due to hazards in the danger zone and work area!

Unauthorised persons who do not satisfy the requirements described here are not aware of the hazards in the work area. Consequently there is a danger of severe or fatal injuries for unauthorised persons.

- Keep unauthorised persons away from the danger zone and work area.
- If in doubt, speak to these persons and instruct them to leave the danger zone and work area.
- Interrupt tasks as long as unauthorised persons are present in the danger zone and work area.

Instruction

The operating company must instruct personnel on a regular basis. For better tracking an instruction log must be maintained with at least the following content:

- Date of the instruction
- Name of the instructed person
- Content of the instruction
- Name of the instructor
- Signatures of the instructed person and of the instructor

2.9 Personal protective equipment

Personal protective equipment is used to protect personnel from impairments to health and safety at work.

During the various tasks performed on and with the machine, personnel must wear personal protective equipment, to which special reference is made in the individual sections of this manual.

Description of the personal protective equipment

The personal protective equipment is described below:

Chemical resistant safety gloves
Chemical resistant safety gloves are intended to protect hands against aggressive chemicals.

Industrial hard hat
Industrial hard hats protect the head from falling objects, swinging loads and impacts on stationary objects.

Protective gloves
Protective gloves protect hands from friction, abrasion, puncture wounds, or deeper injuries, as well as from contact with hot surfaces.

Protective work clothing
Protective work clothing is tight-fitting work clothing with low resistance to tearing, with tight sleeves, and without projecting parts.

Safety footwear
Safety footwear protects the feet from crushing injuries, falling parts and slipping on a slippery substrate.

Safety goggles
The protective goggles protect the eyes from flying parts and liquid splashes.

2.10 Spare parts

Incorrect spare parts

WARNING!

Risk of injury if the wrong spare parts are used!

Using the wrong or defective spare parts may pose a hazard for personnel, or result in damage, malfunctions or even total failure.

– Only use genuine spare parts from Stahl-Armaturen PERSTA GmbH or spare parts approved by Stahl-Armaturen PERSTA GmbH.
– If you have any questions or if anything is unclear, always contact our customer service organisation (contact details on page 3).

Selecting spare parts

Spare parts recommendation in the scope of delivery

The spare parts recommendation is included in the scope of delivery of the valve.

Before installation

Storage of spare parts

Please see ↳ Chapter 4.4 “Storage of spare parts” on page 37 for information on storing spare parts.

Ordering spare parts

Order spare parts from Stahl-Armaturen PERSTA GmbH, with specification of

- valve type,
- Year of manufacture,
- Nominal diameter,
- Nominal pressure,
- Material,
- Article number,
- Confirmation number,
- Consignment number

(if possible). See page 3 for contact details.

2.11 Environmental protection

ENVIRONMENT!

Hazards for the environment due to improper handling of environmentally-harmful substances!

If environmentally-harmful substances are handled incorrectly, particularly if they are disposed of incorrectly, significant environmental damage can occur.

– Always comply with the instructions cited below for handling and disposal of environmentally-harmful substances.
– Comply with the guidelines for disposal of environmentally hazardous substances issued by the operating company.
– If environmentally-harmful substances inadvertently get into the environment, immediately implement suitable measures. If in doubt, inform the responsible municipal authorities of the damage and ask about suitable measures that should be implemented.

Substances used

The following environmentally harmful substances are used:

- Lubricant for stem and bearing
- Residue of the pipeline medium
- Pickling medium
- Anticorrosive
- With hydraulic actuator: hydraulic fluid

3 Functional description

3.1 Mode of operation of the high pressure globe valve

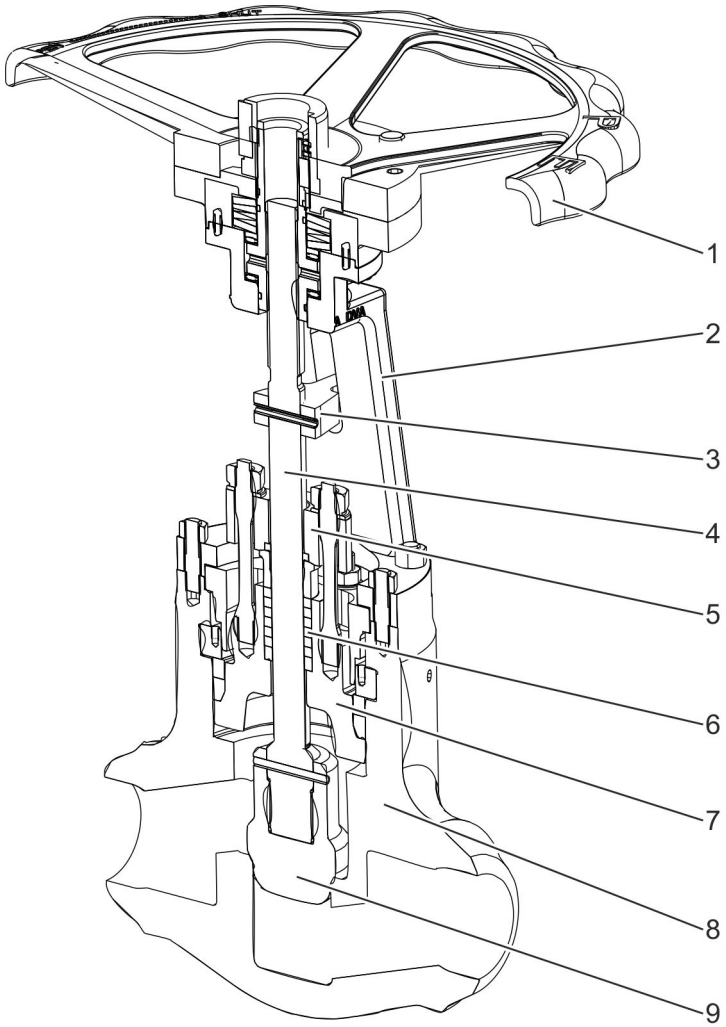


Fig. 5: High pressure globe valve (shown: Model DVA)

1 Actuator (shown here: Handwheel)
2 Bonnet
3 Anti-twist device
4 Stem
5 Gland follower flange
6 Gland packing
7 Cover
8 Body
9 Shut-off element (shown here: Throttling valve cone)

In the closed state the shut-off element (Fig. 5/9) separates the inlet side from the outlet side of the valve. The shut-off element is driven to the interior of the valve via a stem (Fig. 5/4).

The high pressure globe valves vary in:

- Type of shut-off element,
- Type of actuator,

- Type of connection,
- Shape of the body.

Moreover it is possible that the valve has display elements.

3.2 Seal to the outside

Gland packing

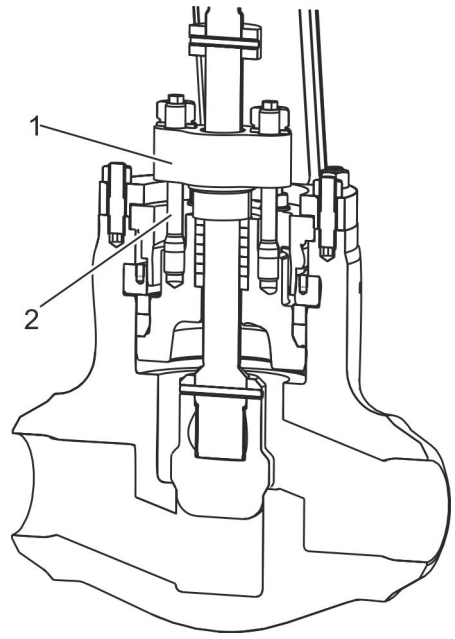


Fig. 6: Gland packing

The gland packing seals the stem against the environment.

For this the gland follower flange (Fig. 6/1) is pressed onto the sealing elements using stud bolts (Fig. 6/2)

- Gland follower
- Chamber ring
- Packing ring

The resulting transverse deformation and the axial tensioning of the packing rings causes the stem to be sealed against the medium.

Optional live-loaded packing

The packing compression can be applied via a live-loaded packing.

Pressure sealing bonnet

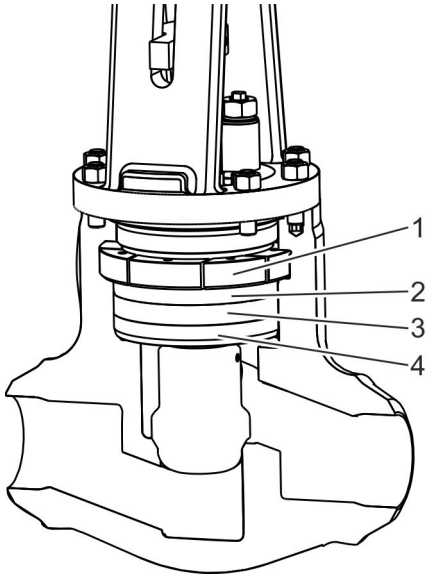


Fig. 7: Pressure sealing bonnet

The body is sealed against the environment via the pressure sealing bonnet.

An axial force is generated through the internal pressure in the body. This axial force acts on the elastic gasket ring (Fig. 7/3) via the cover (Fig. 7/4). The elastic gasket experiences transverse deformation as a result of the axial force and seals against the body in the radial direction.

The axial force generated by the internal pressure is transmitted to the segment ring (Fig. 7/1), which consists of several parts, via the support ring (Fig. 7/2). The segment ring transmits the force with positive fit to the body of the valve.

The required sealing force is not generated by the screws, rather it is generated by the internal pressure. The screws are only used to pre-tension the sealing connection and in operation are only tightened hand tight.

3.3 Versions of the high pressure globe valve

3.3.1 Shut-off element variants

Variants of shut-off elements

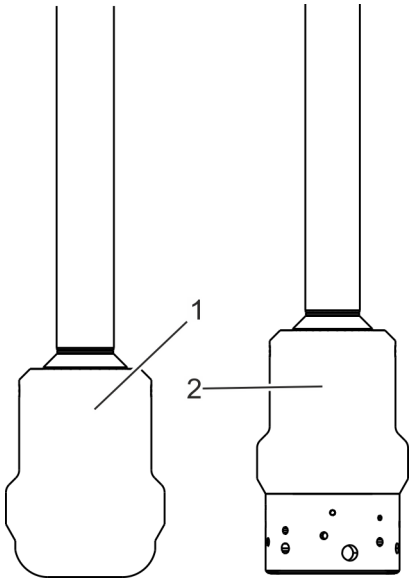


Fig. 8: Throttling valve cone and regulating cone

The high pressure globe valves can be equipped with

- a throttling valve cone (Fig. 8/1) or
- regulating cone (Fig. 8/2)

.

Throttling valve cone

The throttling valve cone (Fig. 8/1) is used, if a valve is used in open/close operation.

Regulating cone

The regulating cone (Fig. 8/2) is used, if a valve is used to regulate the mass flow.

Depending on the position of the shut-off element pumping medium flows through the openings in the lower area of the cone.

At the highest position of the regulating cone in the body the flow is at its maximum.

3.3.2 Actuator variants

The possible actuator variants are shown below.

See the scope of delivery of the valve for additional information.

Manual actuator (handwheel)

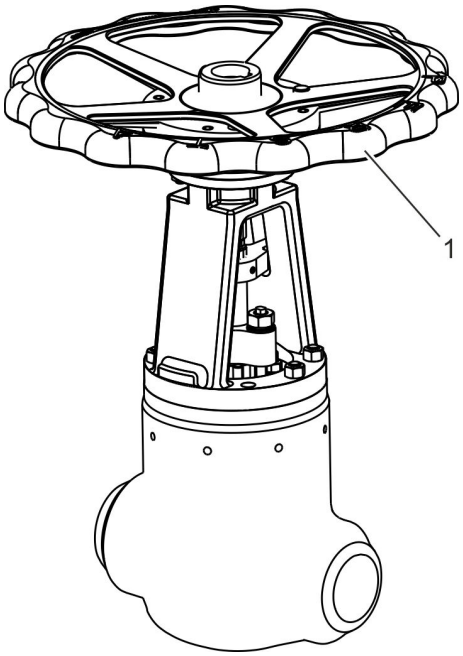


Fig. 9: Manual actuator

The stem is driven manually with the handwheel (Fig. 9/1).

The handwheel can be attached in the following manner:

- Direct attachment
- Bevel gearbox with handwheel
- Spur gear unit with handwheel
- Remote actuator

Electric actuator

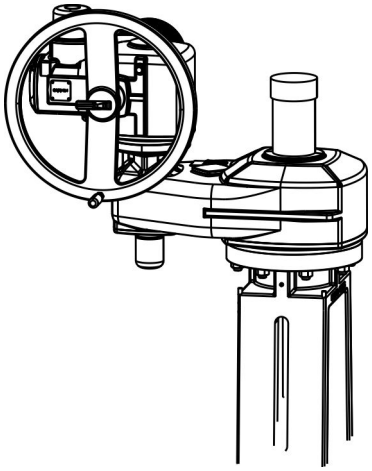


Fig. 10: Electric actuator

With the optional electric actuator (Fig. 10) the stem is driven via an electric motor. The electric motor is connected to the valve above the bonnet.

The electric actuator is adjusted in the close and open direction via limit switches by the manufacturer.

Downstream torque switches are installed for safety (*Chapter 2.4 “Safety devices” on page 13*).

The electric actuator can be attached in the following manner:

- Direct attachment of the electric actuator
- Bevel gearbox with electric actuator
- Spur gear unit with electric actuator
- Remote actuator

Hydraulic actuator

With the optional hydraulic actuator the stem is driven via a hydraulic piston actuator. The hydraulic actuator is connected to the valve above the bonnet.

Pneumatic actuator

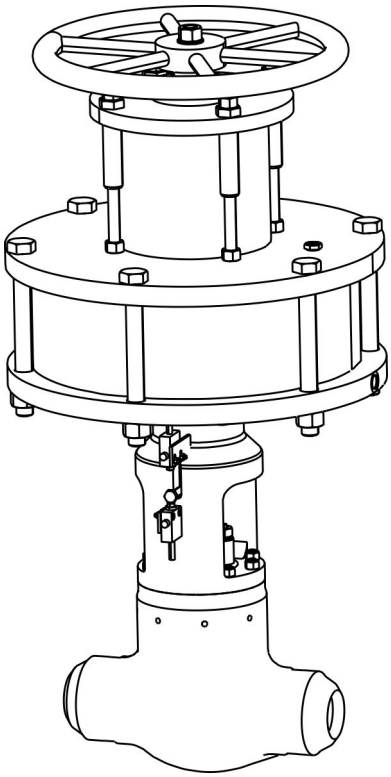


Fig. 11: Pneumatic actuator

With the optional pneumatic actuator (Fig. 11) the stem is driven via a pneumatic piston actuator. The pneumatic actuator is connected to the valve above the bonnet.

3.3.3 Body shape

Angle pattern valve

For the version of the valve as an angle pattern valve, the inlet side is arranged at a right angle to the outlet side.

T-pattern valve

For the T-pattern valve the stem position is vertical.

The inlet side is on an axis with the outlet side of the valve.

Y-pattern valve

For the Y-pattern valve the stem position is not vertical.

The inlet side is on an axis with the outlet side of the valve.

3.3.4 Display elements

Position indicator (visualised)

An electrical position indicator (limit switch or inductive proximity switch) is optionally available for the valve. The display indicates whether the valve position is open or closed.

Position indicator (mechanical)

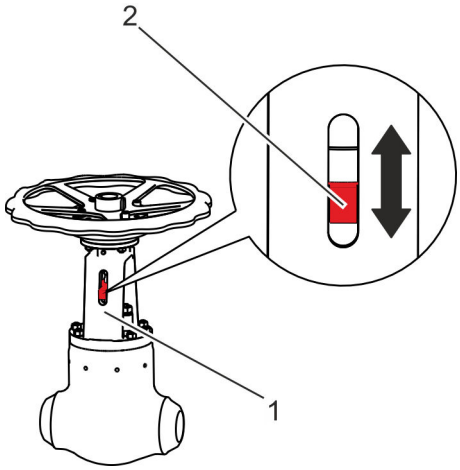


Fig. 12: Position indicator (mechanical)

The position of the valve is shown via the position of the anti-twist device (Fig. 12/2) within the guide on the bonnet (Fig. 12/1).

If the valve is closed, the anti-twist device (Fig. 12/2) moves downward within the guide on the bonnet (Fig. 12/1).

If the valve is opened, the anti-twist device (Fig. 12/2) moves upward within the guide on the bonnet.

3.3.5 Connections

Connection in the pipe

Valves can be mounted in the pipe as

- Butt-weld valves
- Flanged valves
- Special connection valves

.

Electrical connections

A connection for the customer-provided power supply is provided on the electric actuator.

Information on connection is provided in the operating manual for the electric actuator.

Hydraulic connections

Connections for the customer-provided hydraulic supply are provided on the flanges or on the control valves on the hydraulic piston actuator.

Information on connection is provided in the operating manual for the hydraulic actuator.

Pneumatic connections

Connections for the customer-provided pneumatic supply are provided on the flanges or on the control valves on the pneumatic piston actuator.

Information on connection is provided in the operating manual for the pneumatic actuator.

4 Transport and storage

4.1 Safety notices for transport and storage

Danger of injury due to the heavy weight of the valve!

WARNING!

Danger of injury due to the heavy weight of the valve!

The heavy weight of the valve, and of its components, can result in severe injuries.

- Transport valves with a suitable hoist or forklift.
- If possible, lift valves via the bonnet.
- Use approved and functional sling gear.
- Safeguard valves and components from falling over.

Suspended loads

WARNING!

Danger of injury due to suspended loads!

Suspended loads can cause dangerous situations that can result in severe injuries.

- Do not step under suspended loads.
- Wear protective equipment: Industrial hard hat, safety footwear.
- Transport loads as close to the ground as possible.
- Only use approved sling gear and hoists.
- Ensure that hoist and sling gear have sufficient load-bearing capacity.

Improper transport

NOTICE!

Material damage due to improper transport!

Valves can fall or tip over if transported improperly. This can cause considerable material damage.

- When unloading valves at delivery, as well as for inner-company transport, proceed carefully and pay attention to the symbols and instructions on the packaging.
- If present: Use the provided ring bolts and ring nuts.
- Protect valves from impacts.
- Do not throw valves.
- Only remove the packaging just before installation.

4.2 Transport of packages

Depending on the size, valves are delivered individually or on a pallet.

Transporting individual valves

Personnel:
- Trained person (hoist)

Protective equipment:
- Industrial hard hat
- Protective gloves
- Safety footwear

Special tool:
- Sling gear
- Hoist

1. 

DANGER!
Unmarked attachment points!

Fasten valve onto the hoist with suitable sling gear.

2. Slowly lift the valve and identify the position of the centre of gravity.
3. Transport the valve as close to the ground as possible.
4. After setting down the valve, safeguard it from falling over.

Transport on a pallet

Personnel:
- Forklift truck driver
- Trained person (hoist)

Protective equipment:
- Industrial hard hat
- Protective gloves
- Safety footwear

Special tool:
- Sling gear
- Hoist
- Forklift

1. Ensure that the valve is fixed in place on the pallet.
2. Transport the pallet to the installation location.
3. Unload heavy valves from the pallet with a suitable hoist and further transport.

4.3 Storage of the valve

Storage of the valve

Store valves under the following conditions:

- Store valve in closed status (delivery status).
- Do not store outdoors.
- Store in a dry and dust-free location.
- Do not expose to any aggressive media.
- Protect from direct sunlight.
- Avoid mechanical vibrations.
- Storage temperature: 15–35°C.
- Relative humidity: max. 60%.
- Check the status of the protective caps attached in the factory. Replace protective caps if necessary.
- When storing for longer than 3 months, check the general condition of all parts and the packaging on a regular basis. Touch up or reapply anti-corrosion agents as needed.

It may be the case that storage instructions are affixed to the packages that extend beyond the requirements cited here. Comply with these instructions accordingly.

4.4 Storage of spare parts

NOTICE!

Material damage due to reduced service life if stored incorrectly!

Due to incorrect storage of soft-sealing spare parts, the service life may be reduced.

– Store soft-sealing elements, plastics or lubricants in a dry location at room temperature where they are protected against light.

5 Installation

5.1 Safety notices for installation

Electric shock

DANGER!

Risk of fatal injury from electric shock!

There is a risk of fatal injury when touching live components of the actuator. Switched-on electrical components can execute uncontrolled movements and can cause serious injuries.

- Prior to starting work, switch off the supply of electricity and definitively disconnect it.
- Only have an electrician perform tasks on electrical lines and components.

Fluid under high pressure

WARNING!

Danger of injury due to hydraulic energy!

Hydraulically-powered components of the valve, as well as the triggering of the overpressure valve can cause severe injuries.

- Only have specialised personnel perform tasks on the hydraulic system.
- Prior to starting the tasks on the hydraulic system ensure that it is completely depressurised. Completely depressurise pressure accumulators.
- Operate the valve in a frost-free environment to prevent the body from bursting.
- Wear personal protective equipment.

Hazards associated with the pneumatic system

WARNING!

Danger of injury due to pneumatic energy!

Pneumatically-powered components of the valve, can cause severe injuries.

- Only have pneumatic specialists perform tasks on the pneumatic equipment.
- Prior to starting the tasks on the pneumatic equipment ensure that it is completely depressurised. Completely depressurise pressure accumulators.
- Wear personal protective equipment.

Faulty installation

WARNING!

Danger due to incorrectly installed valve!

Faulty installation can result in injuries due to malfunction of the valve.

- Pay attention to the correct flow direction of the valve (*“Flow direction arrow” on page 13*).
- Pay attention to the correct installation position of the valve.
- For valves with an actuator or transmission, ensure that the stem position is vertical.
- In special cases and if the stem position is not vertical:
  - Prop up the actuator on the valve head.
  - Ensure that the actuator can follow the position the changes of the pipe.
- For butt-weld valves
  - Prior to welding on, open the valve completely,
  - Fasten the welding counterpole on the body, if possible in the vicinity of the welding point,
  - Execute the welding and the subsequent heat treatment in compliance with the valid welding regulations,
  - Partially execute the thermal treatment.

Wrong screw tightening torque

WARNING!

Danger due to the wrong screw tightening torque!

The tightening torques of the threaded connections on the valve have been calculated and applied by the manufacturer. Hazards can occur due to unscrewing and subsequent tightening if the wrong tightening torques are used.

- Do not unscrew threaded connections on the valve.
- For maintenance tasks or when unscrewing threaded connections, contact
  - Stahl-Armaturen PERSTA GmbH customer service (contact details p. 3) to request the tightening torques, specifying the serial number, or
  - refer to the manufacturer’s website (address on page 2).

Faulty alignment of the valve

NOTICE!

Malfunction of the valve due to failure to comply with the flow direction!

Faulty alignment can result in malfunctions of the overall system.

– Install the valve in accordance with the flow direction arrow (*“Flow direction arrow” on page 13*) and the flow direction in the pipe.

5.2 Before the installation

Personnel:
- Pipeline engineer

Protective equipment:
- Protective work clothing
- Protective gloves
- Industrial hard hat
- Safety footwear

1. Check design parameters and material.
2. Pay attention to the installation position.
3. Pay attention to the flow direction (*“Flow direction arrow” on page 13*).
4. For butt-weld valves: Open the valve completely.
5. Remove any protective caps and preservation agent from the valve.
6. Ensure that there are no objects or materials in the interior of the valve.

5.3 Installing the valve

Personnel:
- Pipeline engineer
- Trained person (hoist)

Protective equipment:
- Protective work clothing
- Protective gloves
- Industrial hard hat
- Safety footwear

Special tool:
- Sling gear
- Hoist

1. Prepare the respective pipe section for the installation.
2. Use a hoist to bring the valve into the installation position.
3. Ensure that the customer-provided pipes are free of tension.

4. Ensure that the customer-provided pipes are free of external forces and torques.
5. Check butt-welding ends and flange sealing surfaces for damage and cleanliness.
6. Centre the connection flange.
7. Use connection elements and sealing elements made of permissible materials.
8. Depending on the type of connection, weld in or flange on the valve in the correct flow direction and installation position.
9. Screw fasten all flange bores with connection elements using the permissible tightening torque.
10. For valves with actuators or transmissions (electric/hydraulic/pneumatic), ensure that the stem position is vertical.
11. For a different installation position, prop up the actuator and ensure that the actuator can follow the position changes of the pipe.
12. Ensure the seal of the pipe and the valve.

5.4 For electric actuators, connect the power supply

Personnel:
- Qualified electrician

Protective equipment:
- Protective work clothing
- Safety footwear

Prerequisite:

- Ensure that the customer-provided power supply is switched off and safeguarded against being switched on again.

1. 

Terminal diagram and operating manual are located on the actuator.

Connect the electric actuator of the valve to the customer-provided power supply in accordance with the provided terminal diagram.

2. Avoid mechanical stress of the cable through suitable installation.
3. Protect the cable against contact with hazardous substances and operating materials.
4. Install the cable in such a manner that there are no trip hazards.

5.5 For a hydraulic actuator, connecting the hydraulic system

Personnel:
- Hydraulics Specialist

Protective equipment:
- Safety goggles
- Protective work clothing
- Safety footwear

1. Switch off the customer-provided hydraulic supply and safeguard it from being switched on again.
2. Connect the hydraulic actuator of the valve to the customer-provided hydraulic supply in accordance with the provided connection plan.
3. Avoid mechanical stress of the hydraulic line through suitable installation.
4. Protect the hydraulic line against contact with hazardous substances and operating materials.
5. Install lines in such a manner that there are no trip hazards.

5.6 For a pneumatic actuator, connecting the pneumatic system

Personnel:
- Pneumatics Specialist

Protective equipment:
- Safety goggles
- Protective work clothing
- Safety footwear

1. Switch off the customer-provided pneumatic supply and safeguard it from being switched on again.
2. Connect the pneumatic actuator of the valve to the customer-provided pneumatic supply in accordance with the provided connection plan.
3. Avoid mechanical stress of the pneumatic line through suitable installation.
4. Protect the pneumatic line against contact with hazardous substances and operating materials.
5. Install lines in such a manner that there are no trip hazards.

5.7 After the installation

Harmful substances

WARNING!

Pickling medium is a health hazard!

Direct contact with the pickling medium used can have health implications.

- Handle pickling medium in accordance with the instructions in the manufacturer's safety data sheet.
- Wear protective equipment: Protective gloves, safety footwear, protective goggles, protective work clothing.
- Soak up escaped pickling medium without delay and dispose of it in an environmentally responsible manner.

WARNING!

Gloss paint is a health hazard!

Direct contact with the gloss paint used can have health implications.

- Handle gloss paint in accordance with the instructions in the manufacturer's safety data sheet.
- Wear protective equipment: Protective gloves, safety footwear, protective goggles.

WARNING!

Anticorrosive is a health hazard!

Direct contact with the anticorrosive used can have health implications.

- Handle anticorrosive in accordance with the instructions in the manufacturer's safety data sheet.
- Wear protective equipment: Protective gloves, safety footwear, protective goggles, protective work clothing.
- Soak up escaped anticorrosive without delay and dispose of it in an environmentally responsible manner.

5.7.1 Pickling the valve

It is possible to pickle the valve in many ways.

Ensure that the operating company's specialised personnel pickle the valve.

Personnel:
- Pipeline engineer

Protective equipment:
- Safety goggles
- Protective work clothing
- Chemical resistant safety gloves
- Safety footwear

1. Open the valve completely during the pickling process.
2. Properly pickle the valve.
3. Close the valve half way after the pickling process.
4. Completely remove the pickling medium by rinsing.
5. Ensure that the pickling medium is completely flushed out of the dead spaces in the valve.

5.7.2 Painting the valve

Ensure that the operating company's specialised personnel paint the valve.

Use suitable (compatible) painting systems.

5.7.3 Executing the system pressure test and leak test

Personnel:
- Pipeline engineer

Protective equipment:
- Industrial hard hat
- Safety goggles
- Protective work clothing
- Protective gloves
- Safety footwear

1. Execute tests in accordance with local regulations.
2. Release the pipe after successful tests.
3. For longer idle periods after the hydrostatic pressure test, completely open the valve.
4. For longer idle periods after the hydrostatic pressure test, replace the anticorrosive in consultation with the manufacturer.

5.7.4 Applying thermal insulation

System-specific equipment
Depending on the system, it may be necessary to equip the pipe or the valve with thermal insulation.

Personnel:
- Pipeline engineer

Protective equipment:
- Safety goggles
- Protective work clothing
- Protective gloves
- Safety footwear

1. If necessary have the thermal insulation fitted by the operating company.
2. Ensure that all operating elements, as well as stuffing box areas and overpressure safety devices remain permanently accessible and controllable.

   The insulation must only reach the upper edge of the body (Fig. 13, red arrow).

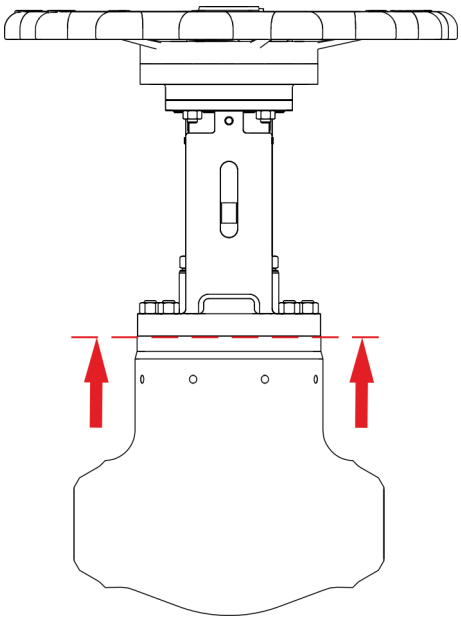


Fig. 13: Upper edge of the insulation

6 Commissioning

6.1 Safety notices for commissioning

Danger of freezing

WARNING!

Danger of injury due to pipes shattering at freezing temperatures!

As a result of pipes shattering at freezing temperatures, severe injuries can be caused by fluid under high pressure.

– Ensure that the valve is completely empty before it is taken out of service.
– Never operate valves at temperatures close to, or below the freezing point of the pumping medium.

Pumping medium

WARNING!

Danger of injury due to pumping medium under pressure!

In operating status, as well as in decommissioned status, depending on the version of the valve, injuries can occur due to medium escaping under high pressure.

– Do not unscrew threaded connections.
– If threaded connections are loose, inform the operating company and have the pipe section in question shut-off.
– If threaded connections are loose have the cause for this clarified and eliminated. If necessary have the manufacturer check the valve.

WARNING!

Pumping medium is a health hazard!

Contact with the pumping medium can have health implications.

– Handle pumping medium in accordance with the instructions in the manufacturer’s safety data sheet.
– Wear protective equipment: Protective gloves, safety footwear, protective goggles, protective work clothing.
– Soak up escaped pumping medium without delay and dispose of it in an environmentally responsible manner.

Failure to comply with the heating-up times/cooling times

WARNING!

Danger of injury due to failure to comply with the heating-up times/cooling times!

Insufficient heating-up times/cooling times may lead to impermissible deformations of the valve and reduction of the total service life.

– Comply with the heating-up times/cooling times (max. 6 K/min (6 °C/min)).
– If in doubt consult with the manufacturer.

Thermal dangers

WARNING!

Danger of injury due to high/low temperatures!

Depending on the insert of the valve or of the pipe, injuries can occur due to the high or low temperature of the components.

– When working on components or activating final control equipment, wear protective equipment: Protective gloves, protective goggles.
– Prior to performing tasks on these components, allow them to cool down/warm up to ambient temperature.
– Have the protective insulation provided by the operating company attached.

Danger of crushing on stems

WARNING!

Danger of injury on moving parts!

Danger of injury exists on moving parts (stems/ anti-twist devices).

– When the valve is in operation do not grasp moving parts.

Wrong screw tightening torque

WARNING!

Danger due to the wrong screw tightening torque!

The tightening torques of the threaded connections on the valve have been calculated and applied by the manufacturer. Hazards can occur due to unscrewing and subsequent tightening if the wrong tightening torques are used.

- Do not unscrew threaded connections on the valve.
- For maintenance tasks or when unscrewing threaded connections, contact
  - Stahl-Armaturen PERSTA GmbH customer service (contact details p. 3) to request the tightening torques, specifying the serial number, or
  - refer to the manufacturer’s website (address on page 2).

6.2 Prior to commissioning

Personnel:
- Pipeline engineer

Protective equipment:
- Industrial hard hat
- Safety goggles
- Protective work clothing
- Protective gloves
- Safety footwear

Prerequisites:

- The overall system must be released for operation.

Valve with manual actuator

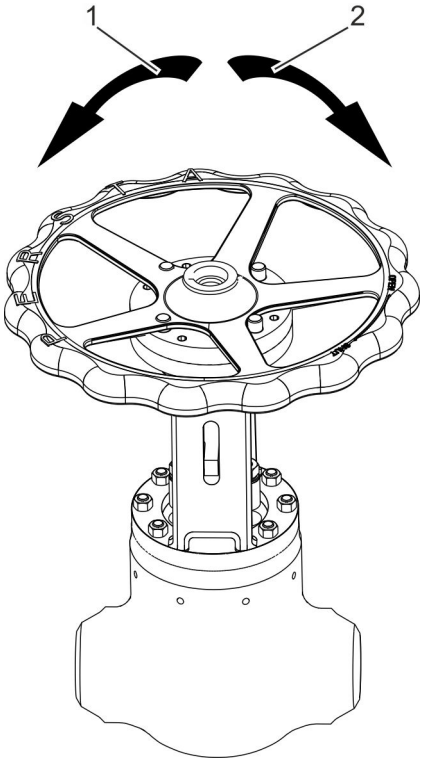


Fig. 14: Valve: Top view

1. Fully open the valve by turning the handwheel counterclockwise (Fig. 14/1).
2. Fully close the valve by turning the handwheel clockwise (Fig. 14/2).
3. Repeat step 1–2 several times.

Valve with electric, hydraulic or pneumatic actuator

4. Open and close valve several times through the higher-level or local control system.

6.3 Executing the commissioning process

Personnel:
- Pipeline engineer
- Industrial mechanic (high pressure valves)

Protective equipment:
- Industrial hard hat
- Safety goggles
- Protective work clothing
- Protective gloves
- Safety footwear

Prerequisites:
- The overall system must be released for operation.

1. 

WARNING!
Failure to comply with the heating-up times/cooling times!

In compliance with the system-specific heating-up/cooling speed, fill the pipe or open the shut-off pipe section.

2. Check the stuffing box for leaks.
3. If necessary, retighten the stuffing box as specified by the manufacturer.
4. Check the pressure sealing bonnet for leaks.
5. Check the pipe connection flanges for leaks, if necessary retighten as specified by the system planner.

7 Operation

7.1 Safety instructions for operation

Thermal dangers

WARNING!

Danger of injury due to high/low temperatures!

Depending on the insert of the valve or of the pipe, injuries can occur due to the high or low temperature of the components.

- When working on components or activating final control equipment, wear protective equipment: Protective gloves, protective goggles.
- Prior to performing tasks on these components, allow them to cool down/warm up to ambient temperature.
- Have the protective insulation provided by the operating company attached.

Pumping medium

WARNING!

Danger of injury due to pumping medium under pressure!

In operating status, as well as in decommissioned status, depending on the version of the valve, injuries can occur due to medium escaping under high pressure.

- Do not unscrew threaded connections.
- If threaded connections are loose, inform the operating company and have the pipe section in question shut-off.
- If threaded connections are loose have the cause for this clarified and eliminated. If necessary have the manufacturer check the valve.

WARNING!

Pumping medium is a health hazard!

Contact with the pumping medium can have health implications.

- Handle pumping medium in accordance with the instructions in the manufacturer's safety data sheet.
- Wear protective equipment: Protective gloves, safety footwear, protective goggles, protective work clothing.
- Soak up escaped pumping medium without delay and dispose of it in an environmentally responsible manner.

Failure to comply with the heating-up times/cooling times

WARNING!

Danger of injury due to failure to comply with the heating-up times/cooling times!

Insufficient heating-up times/cooling times may lead to impermissible deformations of the valve and reduction of the total service life.

– Comply with the heating-up times/cooling times (max. 6 K/min (6 °C/min)).
– If in doubt consult with the manufacturer.

Improper operation of the handwheel

WARNING!

Danger of injury due to force-increasing objects!

By using force-increasing objects (rods/tubes) as levers for actuating the handwheel, injuries can occur due to damage of components in the force flow.

– Do not use any force-increasing objects to activate the handwheel.
– Only activate the handwheel by hand.
– If the handwheel does not move easily, or if it cannot be activated, lubricate the stem thread and bearing (*Chapter 8.3.2 “Lubricating moving parts (stem thread)” on page 66*) and if necessary, contact the manufacturer.

Increased wear

NOTICE!

Material damage due to excessive use as throttling valve!

Excessive use of the valve as throttling valve can result in malfunction and material damage due to overstressing of the components.

– Only use the valve briefly as throttling valve.
– In normal operation use the valve as open/close valve.
– Have the maintenance and replacement intervals shortened by the operating company depending on the use of the valve.

7.2 Operating the valve

7.2.1 Valve with manual actuator (handwheel)

Personnel:
- Industrial mechanic (high pressure valves)
- Trained person (operator)

Protective equipment:
- Industrial hard hat
- Safety goggles
- Protective work clothing
- Protective gloves
- Safety footwear

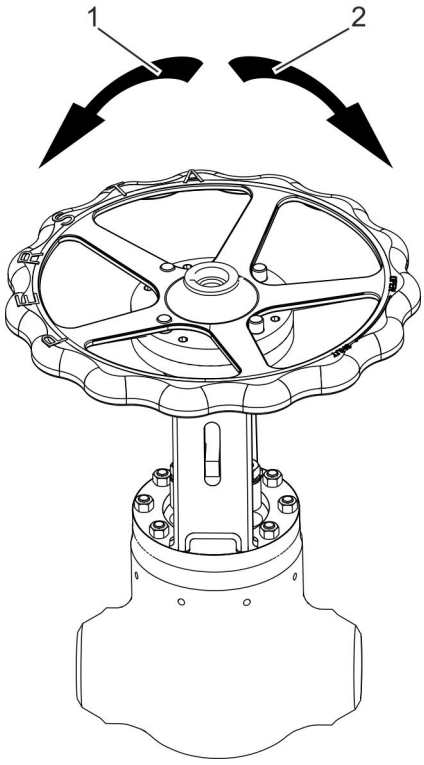


Fig. 15: Activating the handwheel

→ Activate handwheel on the valve:
- Turn clockwise (Fig. 15/2): Close valve.
- Turn counterclockwise (Fig. 15/1): Open valve.

7.2.2 Valve with electric actuator

The valve is operated by the higher-level control system or the local control system.

See the scope of delivery of the valve for additional information.

7.2.3 Valve with hydraulic or pneumatic actuator

The valve is operated by the higher-level control system or the local control system.

See the scope of delivery of the valve for additional information.

7.3 Operating the valve in an emergency

7.3.1 Valve with manual actuator (handwheel)

Comply with the operating company's instructions concerning behaviour in the event of an emergency.

Personnel:
- Industrial mechanic (high pressure valves)
- Trained person (operator)

Protective equipment:
- Industrial hard hat
- Safety goggles
- Protective work clothing
- Protective gloves
- Safety footwear

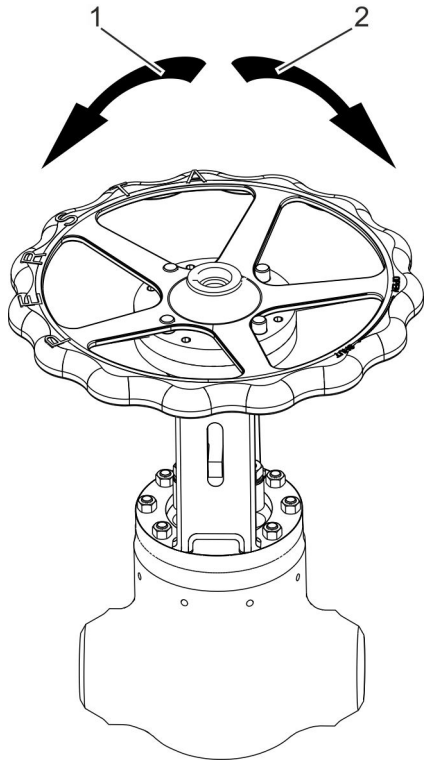


Fig. 16: Manual actuator: Operating the handwheel in an emergency

→ Turn the handwheel.
- Turning clockwise (Fig. 16/2): Closes the valve.
- Turning anticlockwise (Fig. 16/1): Opens the valve.

When using a throttling valve cone, the flow rate of the pipeline medium is increased during opening, or is reduced during closing of the valve.

7.3.2 Valve with electric actuator

Coupling/uncoupling the handwheel

See the operating manual of the actuator for information on coupling and uncoupling the handwheel for operating the valve in an emergency.

Personnel:
- Industrial mechanic (high pressure valves)
- Trained person (operator)

Protective equipment:
- Industrial hard hat
- Safety goggles
- Protective work clothing
- Protective gloves
- Safety footwear

Requirement:

- The electric actuator cannot be used.

1. Safeguard the affected system area.
2. Couple the handwheel (Fig. 17/1).
3. Turn the handwheel.
   - Turning clockwise (Fig. 17/2): Closes the valve.
   - Turning anticlockwise (Fig. 17/3): Opens the valve.

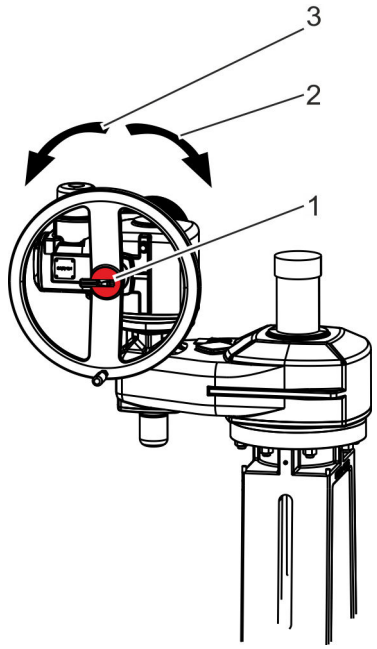


Fig. 17: Electric actuator: Operating the handwheel in an emergency

When using a throttling valve cone, the flow rate of the pipeline medium is increased during opening, or is reduced during closing of the valve.

7.3.3 Valve with hydraulic or pneumatic actuator

See the operating manual of the actuator for information on operating the valve in an emergency.

8 Maintenance

8.1 Safety instructions for maintenance

Safeguard against restart

DANGER!

Life-threatening danger due to unintended restart!

The unauthorised switch-on of the energy supply during work poses a danger of severe or fatal injuries for persons in the danger zone.

– Prior to beginning work, switch off all energy supplies and safeguard them from being switched on again.
– Safeguard the system area.

Hazards associated with the pneumatic system

WARNING!

Danger of injury due to pneumatic energy!

Pneumatically-powered components of the valve, can cause severe injuries.

– Only have pneumatic specialists perform tasks on the pneumatic equipment.
– Prior to starting the tasks on the pneumatic equipment ensure that it is completely depressurised. Completely depressurise pressure accumulators.
– Wear personal protective equipment.

Fluid under high pressure

WARNING!

Danger of injury due to hydraulic energy!

Hydraulically-powered components of the valve, as well as the triggering of the overpressure valve can cause severe injuries.

– Only have specialised personnel perform tasks on the hydraulic system.
– Prior to starting the tasks on the hydraulic system ensure that it is completely depressurised. Completely depressurise pressure accumulators.
– Operate the valve in a frost-free environment to prevent the body from bursting.
– Wear personal protective equipment.

Improperly executed maintenance tasks

WARNING!

Danger of injury due to improperly executed maintenance tasks!

Improper maintenance can cause severe injury or significant material damage.

- Before starting tasks:
  - ensure that there is adequate free space for installation,
  - ensure that the valve is depressurised,
  - ensure that the valve is cooled-down/ warmed-up to ambient temperature,
  - Ensure that the upstream and downstream system for the valve are reliably sealed.
- Ensure order and cleanliness at the installation location! Loosely stacked components or components and tools that are lying about can cause accidents.
- Comply with the following before restarting the system:
  - Ensure that all maintenance tasks have been properly executed and concluded in accordance with the instructions in this manual.
  - Ensure that nobody is in the danger zone.
  - Ensure that all covers and protective devices are installed correctly and that they function properly.

Pressurised components

WARNING!

Danger of injury due to pressurised components!

Tasks on pressurised components can result in serious injuries.

- Establish depressurised status before working on the valve.

Heavy weight of the valve

WARNING!

Danger of injury due to the heavy weight of the valve!

The heavy weight of the valve, and of its components, can result in severe injuries.

- Transport valves with a suitable hoist or forklift.
- Don not lift valves via the handwheel.
- Do not lift valves via the actuator.
- If possible, lift valves via the bonnet.
- Use approved and functional sling gear.
- Safeguard valves and components from falling over.

Thermal dangers

WARNING!

Danger of injury due to high/low temperatures!

Depending on the insert of the valve or of the pipe, injuries can occur due to the high or low temperature of the components.

- When working on components or activating final control equipment, wear protective equipment: Protective gloves, protective goggles.
- Prior to performing tasks on these components, allow them to cool down/warm up to ambient temperature.
- Have the protective insulation provided by the operating company attached.

Wrong screw tightening torque

WARNING!

Danger due to the wrong screw tightening torque!

The tightening torques of the threaded connections on the valve have been calculated and applied by the manufacturer. Hazards can occur due to unscrewing and subsequent tightening if the wrong tightening torques are used.

- Do not unscrew threaded connections on the valve.
- For maintenance tasks or when unscrewing threaded connections, contact
  - Stahl-Armaturen PERSTA GmbH customer service (contact details p. 3) to request the tightening torques, specifying the serial number, or
  - refer to the manufacturer's website (address on page 2).

Wrong spare parts

WARNING!

Danger of injury if the wrong spare parts are used!

Using the wrong or defective spare parts may result in dangers for personnel and damage, malfunction or total machine failure.

- Only use original spare parts from Stahl-Armaturen PERSTA GmbH or spare parts approved by Stahl-Armaturen PERSTA GmbH.
- If you have any questions or if anything is unclear, always contact our customer service organisation (contact details on page 3).

Spare parts recommendation in the scope of delivery

The spare parts recommendation is included in the scope of delivery of the valve.

Pumping medium

WARNING!

Danger of injury due to pumping medium under pressure!

In operating status, as well as in decommissioned status, depending on the version of the valve, injuries can occur due to medium escaping under high pressure.

- Do not unscrew threaded connections.
- If threaded connections are loose, inform the operating company and have the pipe section in question shut-off.
- If threaded connections are loose have the cause for this clarified and eliminated. If necessary have the manufacturer check the valve.

WARNING!

Pumping medium is a health hazard!

Contact with the pumping medium can have health implications.

- Handle pumping medium in accordance with the instructions in the manufacturer's safety data sheet.
- Wear protective equipment: Protective gloves, safety footwear, protective goggles, protective work clothing.
- Soak up escaped pumping medium without delay and dispose of it in an environmentally responsible manner.

Defective sealing elements

WARNING!

Danger of injury due to the use of previously used sealing elements!

Previously used sealing elements can cause injuries due to escaping pumping medium.

After each dismantling of the stem

- depending on the version, use a new bottom ring,
- new chamber rings,
- new packing rings, and
- a new O-ring.

Damage of sealing surfaces and slide faces

NOTICE!

Damage of sealing surfaces and slide faces due to the metallic processing of sealing surfaces and slide faces!

The metallic processing of sealing surfaces and slide faces and valve parts can cause material damage and valve malfunction.

- Sealing surfaces and slide faces of gaskets must not be
  - scratched with a scraper,
  - processed with wire brushes.
- Sealing surfaces and slide faces must be
  - pulled off with emery cloth,
  - processed with suitable abrasive tools or
  - scraped off with plastic tools/wooden tools.

Increased wear

NOTICE!

Material damage due to excessive use as throttling valve!

Excessive use of the valve as a throttling valve can result in malfunction and material damage due to overstressing of the components.

- Only use the valve briefly as a throttling valve.
- In normal operation use the valve as an open/close valve.
- Have the maintenance and replacement intervals shortened by the operating company depending on the use of the valve.

Environmental protection

ENVIRONMENT!

Comply with the following instruction concerning environmental protection for maintenance tasks:

- On all lubrication points that are lubricated by hand, remove the escaping, used, or excess grease and dispose of it in accordance with the valid local regulations.
- Collect replaced oils in suitable containers and dispose of them in accordance with the applicable local statutory regulations.

8.2 Maintenance schedule

Maintenance tasks are described in the sections below that are required for optimal and trouble-free valve operation.

If regular inspections indicate increased wear, the required maintenance intervals must be reduced appropriately in accordance with the actual indications of wear. For questions concerning maintenance tasks and intervals, contact Stahl-Armaturen PERSTA GmbH customer service.

Interval	Maintenance work	Personnel
Use as an open/close valve: depending on activation frequency, operating and ambient conditions/ specified by the operating company	Check the valve visually for leaks (↳ *Chapter 8.3.1 “Visually checking the valve” on page 66*)	Trained person (operator)
	Lubricate the stem and bearing (↳ *Chapter 8.3.2 “Lubricating moving parts (stem thread)” on page 66*)	Trained person (operator)
Use as throttling valve: depending on activation frequency, operating and ambient conditions/specified by the operating company	Check the stem for increased wear (↳ *Chapter 8.3.5 “Dismounting and checking the stem” on page 80*)	Trained person (operator)
Every six months	Activate valve (open/close, ↳ *Chapter 7.2.1 “Valve with manual actuator (handwheel)” on page 55*)	Trained person (operator)
Depending on duration of use, operating and ambient conditions	Replacing the gland packing (↳ *Chapter 8.3.3 “Replacing the gland packing” on page 68*)	Industrial mechanic (high pressure valves)
	Replace the cover gasket (↳ *Chapter 8.3.4 “Replacing the gasket of the pressure sealing bonnet” on page 75*)	Industrial mechanic (high pressure valves)

8.3 Maintenance tasks

8.3.1 Visually checking the valve

Personnel:
- Trained person (operator)

Protective equipment:
- Industrial hard hat
- Safety goggles
- Protective work clothing
- Protective gloves
- Safety footwear

1. Check the stuffing box for leaks.
2. Check the cover for leaks.
3. Check the pipe connection flanges for leaks.
4. Check for abrasion in the stem thread.
5. Check for abrasion in the threaded bush.

8.3.2 Lubricating moving parts (stem thread)

Personnel:
- Trained person (operator)

Protective equipment:
- Industrial hard hat
- Safety goggles
- Protective work clothing
- Protective gloves
- Safety footwear

Prerequisites:
- The valve must be cooled/heated-up to ambient temperature.
- Depressurised status must have been established.

1. Protect the stuffing box area from the lubricant.
2. *Comply with the instructions in the manufacturer's documentation for the electric actuator.*

   For electric actuator: Couple the handwheel.
3. *Comply with the instructions in the manufacturer's documentation for the hydraulic/pneumatic actuator.*

   For a hydraulic/pneumatic actuator: Operate the valve via the controller.
4. Open the valve completely.

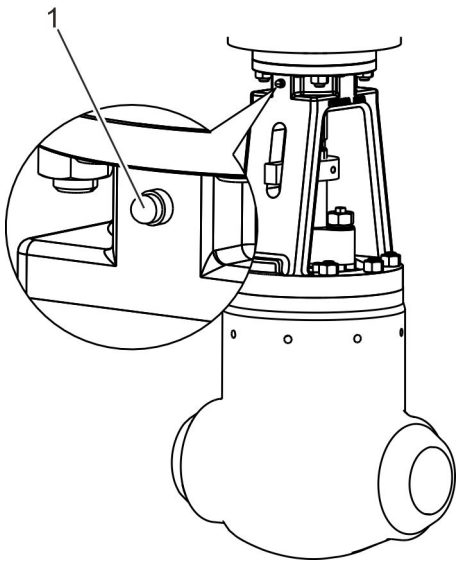


Fig. 18: Lubricating nipple

5. Depending on the version:

- Grease the stem thread with a brush.
  Or:
- Grease stem thread and bearing via lubricating nipple (Fig. 18).

6. Completely close valve.

7. Repeat step 4–6 several times.

8.

Comply with the instructions in the manufacturer's documentation for the electric actuator.

For an electric actuator: Uncouple the handwheel.

8.3.3 Replacing the gland packing

8.3.3.1 Manual actuator

Personnel:
- Industrial mechanic (high pressure valves)
- Trained person (hoist)

Protective equipment:
- Industrial hard hat
- Safety goggles
- Protective work clothing
- Protective gloves
- Safety footwear

Special tool:
- Hoist
- Packing extractor

Prerequisites:

- The valve must be cooled/heated-up to ambient temperature.
- Depressurised status must have been established.
- The valve must have been driven into middle position.

Detaching the anti-twist device

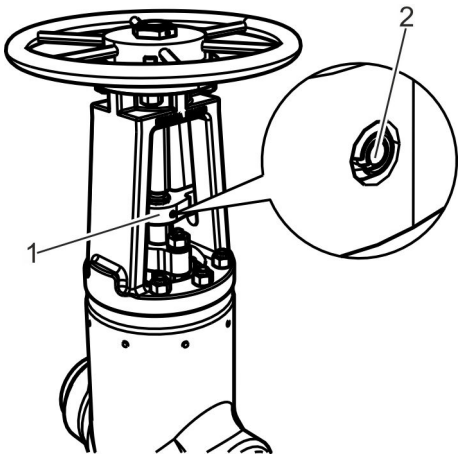


Fig. 19: Detaching the anti-twist device

1. If the anti-twist device is present: Loosen and remove the tension pin (Fig. 19/2) of the anti-twist device (Fig. 19/1).

Dismounting the bonnet

2. Attach bonnet to the hoist with suitable sling gear.
3. Use the hoist to safeguard the bonnet from falling off of the body.
4. Ensure that the bonnet and body cannot be lifted by the hoist.

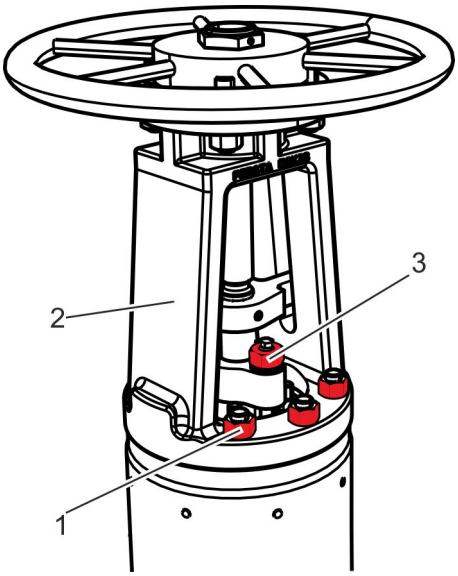


Fig. 20: Removing nuts

5. **WARNING!**
Danger of injury due to pressurised valve!

Loosen and remove the nuts (Fig. 20/1) on the bonnet.

6. Loosen and remove the nuts (Fig. 20/3) including washers on the gland follower flange.

7. Activate the handwheel in the close direction (↬ *Chapter 7.2.1 “Valve with manual actuator (handwheel)” on page 55*).

   ⇨ The bonnet (Fig. 20/2) lifts off of the body.

8. Lift off the bonnet (Fig. 20/2) and if applicable the anti-twist device (Fig. 19/1) upwards.

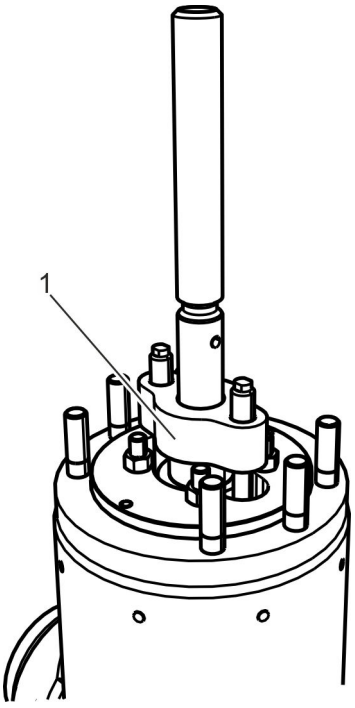


Fig. 21: Gland follower flange

9. **WARNING!**
Danger of injury due to escaping medium!

Lift off the gland follower flange (Fig. 21/1) upwards.

10. Use the packing extractor to remove the gland packing.

11. For gland packing elements with metal caps (chamber ring): Fully dismount the cover (↬ *Chapter 8.3.4 “Replacing the gasket of the pressure sealing bonnet” on page 75*).

Cleaning

12. Completely remove the residues of the gland packing.

13. Carefully clean the emptied packing chamber and stuffing box press-on parts.

Insert gland packing

14. Insert new gland packing into the packing chamber.

Execute concluding tasks

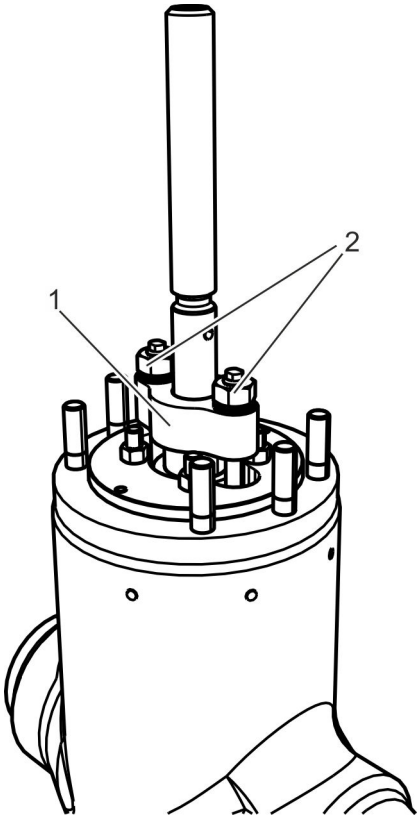


Fig. 22: Mounting the gland follower flange

15. Attach the gland follower flange (Fig. 22/1) and bolt on uniformly with nuts (Fig. 22/2) as specified by the manufacturer.

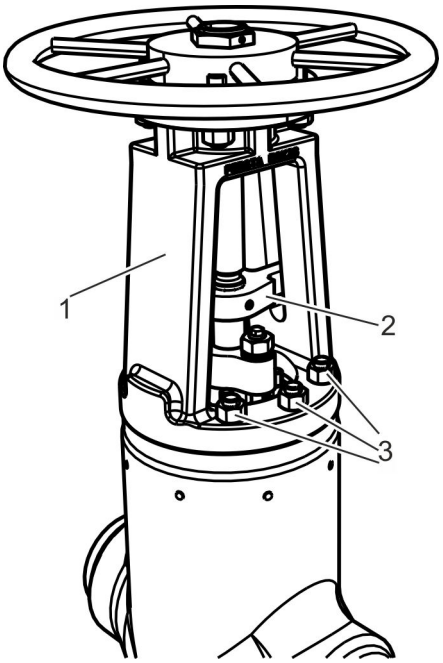


Fig. 23: Bonnet and anti-twist device

16. Mount the bonnet (Fig. 23/1) and the anti-twist device (Fig. 23/2).

WARNING!

Danger of injury due to the wrong tightening torque!

17. Attach the fastening screws (Fig. 23/3) of the bonnet and tighten in a cross pattern as specified by the manufacturer.

Mounting the anti-twist device

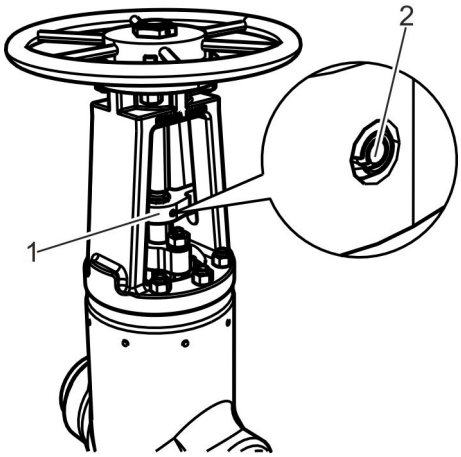


Fig. 24: Fastening the anti-twist device

18. If the anti-twist device is present: Mount the tension pin (Fig. 24/2).

8.3.3.2 Electric, pneumatic or hydraulic actuator

The procedure for an electric actuator is described below.

Comply with the instructions in the documentation provided by the manufacturer for mounting and dismounting the pneumatic or hydraulic actuator.

Obtain the assistance of specialised pneumatic or hydraulic personnel.

Use a hook wrench after dismounting the actuator

- *To activate the stem, use a hook wrench instead of the handwheel that is present with the manual valve.*
- *Place the hook wrench on the flange of the threaded bush.*

Personnel:	■ Industrial mechanic (high pressure valves) ■ Qualified electrician ■ Trained person (hoist)
Protective equipment:	■ Industrial hard hat ■ Safety goggles ■ Protective work clothing ■ Protective gloves ■ Safety footwear
Special tool:	■ Hoist ■ Knock-out tool ■ Sling gear ■ Hook wrench

Prerequisites:

- The valve must be cooled/heated-up to ambient temperature.
- Depressurised status must have been established.
- The valve must have been driven into the middle position.
- The electrical system must be switched off and safeguarded against being switched on again.

1.

See the manufacturer's documentation for the attachment points on the electric actuator.

Depending on the size and weight, have a second person or hoist with suitable sling gear hold the electric actuator in position.

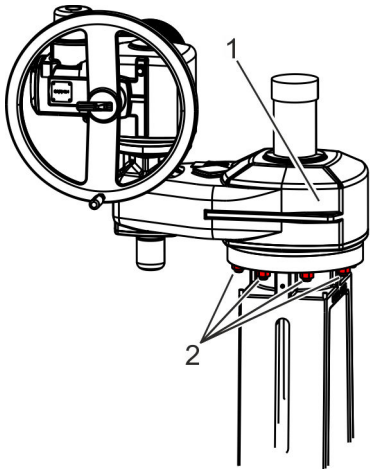


Fig. 25: Removing the screws

2. Unscrew the fastening screws (Fig. 25/2) of the electric actuator (Fig. 25/1) and remove them together with the washers.
3. Take off the electric actuator (Fig. 25/1) and store it outside of the work area.

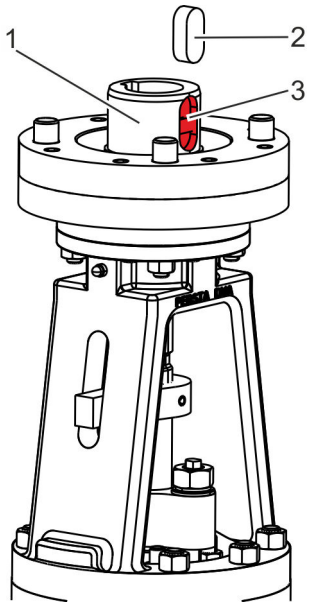


Fig. 26: Removing the feather key

4. Remove the feather key (Fig. 26/2) from the feather key groove (Fig. 26/3) of the hub (Fig. 26/1).
5. ***Use a hook wrench instead of the hand-wheel.***

   Carry out steps 1–15 from *Chapter 8.3.3.1 “Manual actuator” on page 68*.

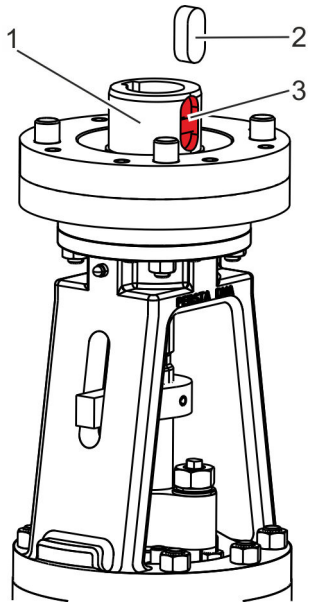


Fig. 27: Inserting the feather key

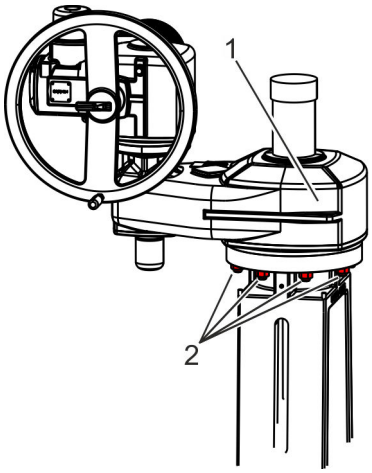


Fig. 28: Fastening the electric actuator

6. Insert the feather key (Fig. 27/2) into the feather key groove (Fig. 27/3) on the hub (Fig. 27/1).

7. ***See the manufacturer's documentation for the attachment points on the electric actuator.***

   Have a second person or use a hoist and suitable sling gear to position the electric actuator above the flange on the bonnet.

8. Align the hub so that the feather key can be introduced into the receptacle on the electric actuator.

9. ***Ensure that the feather key is properly seated.***

   Lower the electric actuator onto the flange on the bonnet.

10. Fix the electric actuator (Fig. 28/1) to the bonnet using screws (Fig. 28/2) and washers.

11. **WARNING!**
    Danger of injury due to the wrong tightening torque!

    Tighten the screws (Fig. 28/2) as specified by the manufacturer.

12. Establish the electrical connection as specified in the manufacturer's documentation for the electric actuator.

8.3.4 Replacing the gasket of the pressure sealing bonnet

Personnel:	■ Industrial mechanic (high pressure valves) ■ Trained person (hoist)
Protective equipment:	■ Industrial hard hat ■ Safety goggles ■ Protective work clothing ■ Protective gloves ■ Safety footwear
Special tool:	■ Packing extractor ■ Pin puncher ■ Hoist

Prerequisites:

- The valve must be cooled/heated-up to ambient temperature.
- Depressurised status must have been established.
- The valve must have been driven into the middle position.

1. Carry out work steps 1–9 of the maintenance task "Replacing the gland packing" (*Chapter 8.3.3.1 “Manual actuator” on page 68*).

2. For the version with clamping lid: Unscrew and remove the nuts (Fig. 29/1).

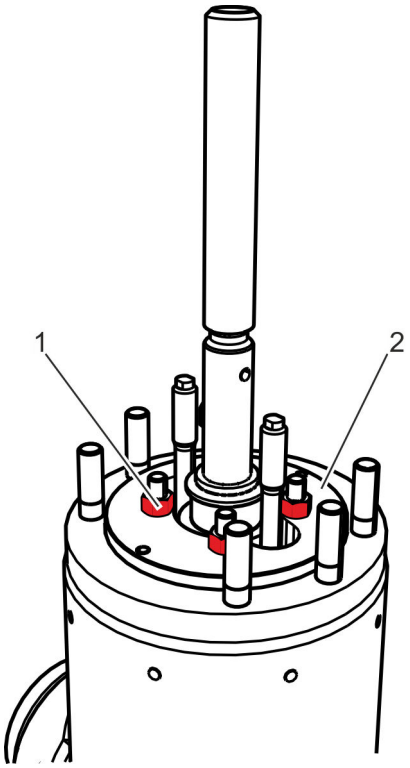


Fig. 29: Unscrewing the nuts from the clamping lid

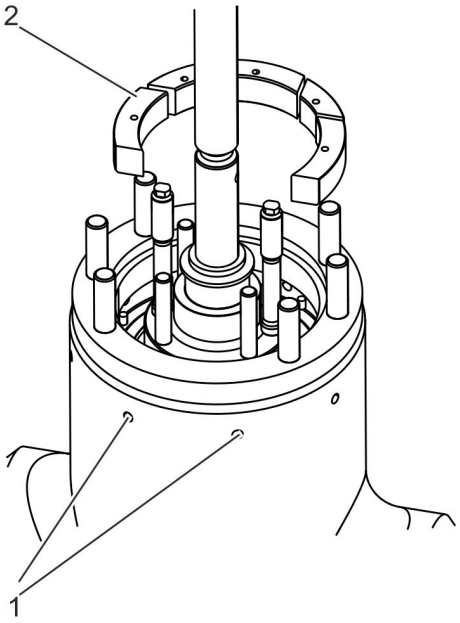


Fig. 30: Removing segments

3. Using the pin puncher, punch the segments (Fig. 30/2) into the interior and through the outer ejection bores (Fig. 30/1).
4. Remove the segments (Fig. 30/2).
5. Place the bonnet with threaded bush on the stem (turn).
6. Place two segments between body and bonnet.
7. Open the valve completely.
   ⇨ The cover is pulled out.
8. Close valve and take off bonnet.
9. Remove segments.

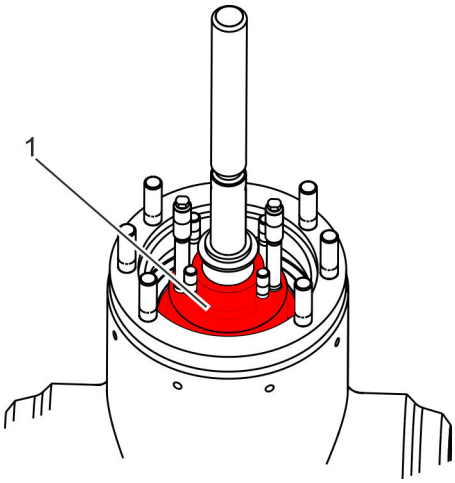


Fig. 31: Taking off the cover upward

10.

WARNING!

Danger of injury due to heavy components!

With a suitable hoist, take the cover (Fig. 31/1) with any inserted gland packing, support ring and gasket ring, upward and out of the body.

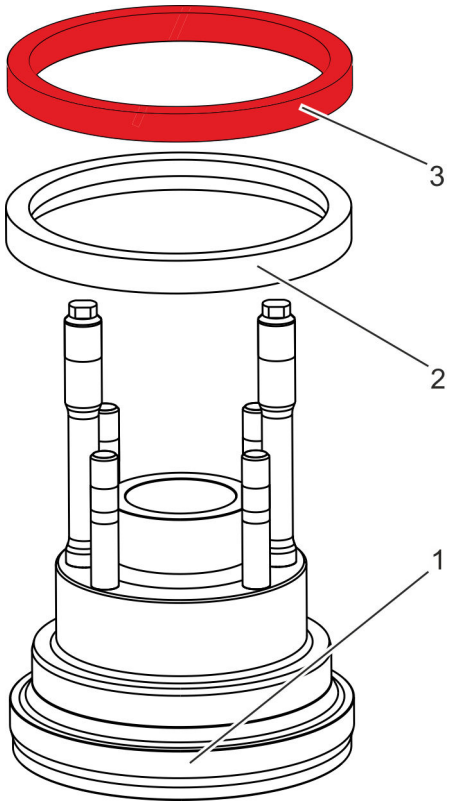


Fig. 32: Removing the support ring and gasket ring

11. Lift the support ring upwards (Fig. 32/3) off of the cover (Fig. 32/1).
12. Lift the gasket ring upwards (Fig. 32/2) off of the cover (Fig. 32/1).
13. Carefully remove the residues of the gasket ring.
14. **NOTICE!**
    Material damage due to the mechanical processing of support surfaces!

    Ensure that all support surfaces are metallic bare and undamaged.
15. Dismounting the gland packing (*Chapter 8.3.3.1 “Manual actuator” on page 68*/work steps 10–13).

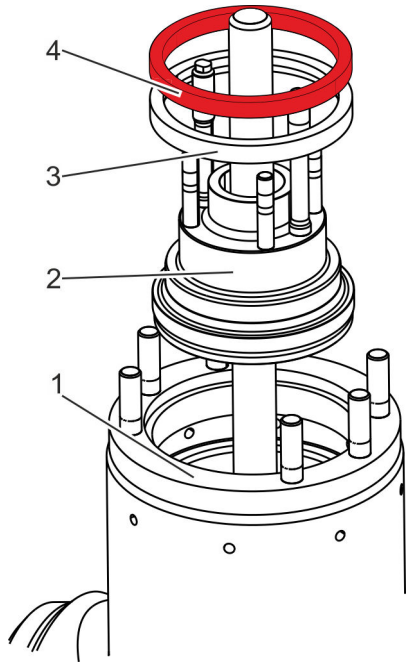


Fig. 33: Inserting cover

16. **WARNING!**
    Danger of injury due to heavy components!

    With a suitable hoist, insert the cover (Fig. 33/2) into the body (Fig. 33/1).
17. Mount the new gasket ring (Fig. 33/3).
18. Place the support ring (Fig. 33/4) on the gasket ring (Fig. 33/3).

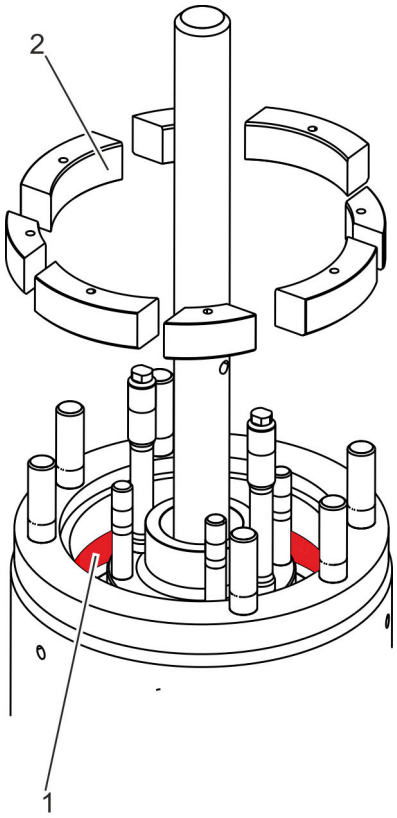


Fig. 34: Inserting segments

19. Insert segments (Fig. 34/2) into the body groove (Fig. 34/1).

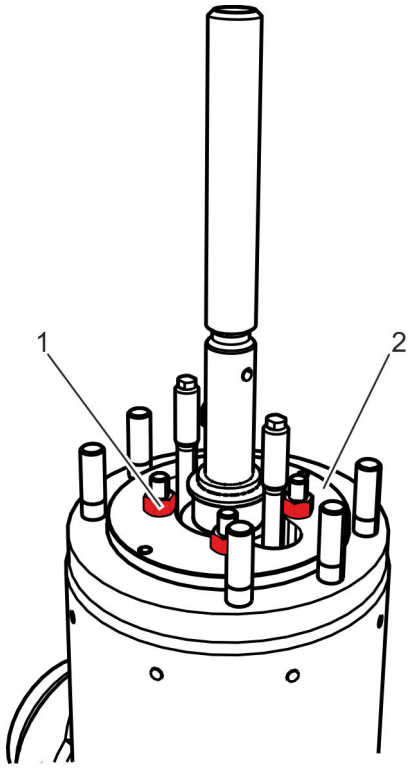


Fig. 35: Screw fastening the nuts of the clamping lid

20. If present, place the clamping lid (Fig. 35/2) on from above.

21.

WARNING!
Danger of injury due to the wrong tightening torque!

Screw the clamping lid (Fig. 35/2) in a cross pattern with nuts (Fig. 35/1) on the stud bolts.

⇨ The cover seal will be pre-tensioned.

22. Carry out work steps 15–18 of the maintenance task "Replacing the gland packing" (*Chapter 8.3.3.1 “Manual actuator” on page 68*).

8.3.5 Dismounting and checking the stem

Personnel:	■ Industrial mechanic (high pressure valves) ■ Trained person (hoist)
Protective equipment:	■ Industrial hard hat ■ Safety goggles ■ Protective work clothing ■ Protective gloves ■ Safety footwear
Special tool:	■ Sling gear ■ Hoist

1. Carry out work steps 1–10 of the maintenance task "Replacing the gasket of the pressure sealing bonnet" (*Chapter 8.3.4 “Replacing the gasket of the pressure sealing bonnet” on page 75*).

2. Attach the stem to the hoist with suitable sling gear.

3.

WARNING!
Danger of injury due to the stem falling!

Using the hoist, lift the stem (Fig. 36/2) out of the body (Fig. 36/1).

4. Set the stem down outside of the body.

5. Remove the sling gear from the stem.

6. Check the stem and cone for wear.

7. If necessary replace the old stem with a new stem or have it machined by a specialised external company.

8. Attach stem to the hoist with suitable sling gear.

9.

WARNING!
Danger of injury due to the stem falling!

Lift the stem (Fig. 36/2) using the hoist into the body (Fig. 36/1).

10. Ensure that the cone is properly seated in the body.

11. Remove the sling gear from the stem.

12. Carry out work steps 11–22 of the maintenance task "Replacing the gasket of the pressure sealing bonnet" (*Chapter 8.3.4 “Replacing the gasket of the pressure sealing bonnet” on page 75*).

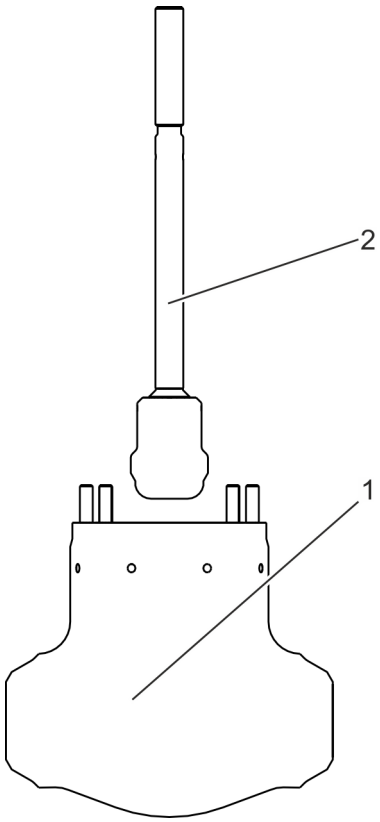


Fig. 36: Removing the stem out of the body

8.4 After maintenance

Executing final tests after replacement

Personnel:
- Industrial mechanic (high pressure valves)

Protective equipment:
- Industrial hard hat
- Safety goggles
- Protective work clothing
- Protective gloves
- Safety footwear

Prerequisite:
- Maintenance tasks are concluded.

1. Charge the valve with permissible test pressure.
2. Ensure that the valve does not leak.
3. If necessary, recheck tightening torque in accordance with the manufacturer's specifications.
4. Retighten clamping lid nuts hand tight.
5. Perform commissioning work (↪ *Chapter 6.3 "Executing the commissioning process" on page 51*).

After maintenance

9 Faults and fault correction

9.1 Safety notices for fault correction

Electric shock

DANGER!

Risk of fatal injury from electric shock!

There is a risk of fatal injury when touching live components of the actuator. Switched-on electrical components can execute uncontrolled movements and can cause serious injuries.

– Prior to starting work, switch off the supply of electricity and definitively disconnect it.
– Only have an electrician perform tasks on electrical lines and components.

Safeguard against restart

DANGER!

Life-threatening danger due to unintended restart!

The unauthorised switch-on of the energy supply during work poses a danger of severe or fatal injuries for persons in the danger zone.

– Prior to beginning work, switch off all energy supplies and safeguard them from being switched on again.
– Safeguard the system area.

Improperly executed fault correction tasks

WARNING!

Danger of injury due to improper fault correction!

Improperly executed fault correction tasks can cause severe injury and significant material damage.

- For faults that require intervention, only correct them after you have ensured that
  - the system area in question is secured
  - the valve is depressurised
  - the valve has cooled-down/warmed-up to ambient temperature.
- If in doubt, obtain the assistance of experienced persons or contact Stahl-Armaturen PERSTA GmbH Customer Service.
- Comply with the following before restarting the system:
  - Ensure that all fault correction tasks have been properly executed and concluded in accordance with the instructions in this manual.
  - Ensure that nobody is in the danger zone.
  - Ensure that all covers and protective devices are installed correctly and that they function properly.

Thermal dangers

WARNING!

Danger of injury due to high/low temperatures!

Depending on the insert of the valve or of the pipe, injuries can occur due to the high or low temperature of the components.

- When working on components or activating final control equipment, wear protective equipment: Protective gloves, protective goggles.
- Prior to performing tasks on these components, allow them to cool down/warm up to ambient temperature.
- Have the protective insulation provided by the operating company attached.

Pumping medium

WARNING!

Danger of injury due to pumping medium under pressure!

In operating status, as well as in decommissioned status, depending on the version of the valve, injuries can occur due to medium escaping under high pressure.

- Do not unscrew threaded connections.
- If threaded connections are loose, inform the operating company and have the pipe section in question shut-off.
- If threaded connections are loose have the cause for this clarified and eliminated. If necessary have the manufacturer check the valve.

WARNING!

Pumping medium is a health hazard!

Contact with the pumping medium can have health implications.

- Handle pumping medium in accordance with the instructions in the manufacturer's safety data sheet.
- Wear protective equipment: Protective gloves, safety footwear, protective goggles, protective work clothing.
- Soak up escaped pumping medium without delay and dispose of it in an environmentally responsible manner.

Hazards associated with the pneumatic system

WARNING!

Danger of injury due to pneumatic energy!

Pneumatically-powered components of the valve, can cause severe injuries.

- Only have pneumatic specialists perform tasks on the pneumatic equipment.
- Prior to starting the tasks on the pneumatic equipment ensure that it is completely depressurised. Completely depressurise pressure accumulators.
- Wear personal protective equipment.

Fluid under high pressure

WARNING!

Danger of injury due to hydraulic energy!

Hydraulically-powered components of the valve, as well as the triggering of the overpressure valve can cause severe injuries.

- Only have specialised personnel perform tasks on the hydraulic system.
- Prior to starting the tasks on the hydraulic system ensure that it is completely depressurised. Completely depressurise pressure accumulators.
- Operate the valve in a frost-free environment to prevent the body from bursting.
- Wear personal protective equipment.

Behaviour if there are dangerous faults

The following always applies:

1. For faults that pose an imminent danger to personnel or material assets, immediately trigger the emergency stop function.
2. Determine the fault cause.
3. If correction of the fault requires work in the danger zone, secure the system area in question, and depressurise the valve.
4. Have faults that affect the safe operation of the valve corrected by the manufacturer.

9.2 Fault table

Fault description	Cause	Remedy	Personnel
Leakage of the shut-off element	Solids in the medium that have damaged the seat	Grind the seat, if necessary have damaged parts replaced.	Industrial mechanic (high pressure valves)

Fault description	Cause	Remedy	Personnel
Leakage of the shut-off element	Deformation of the seat surface due to impermissible high tensioning of the valve or through thermal tensions	Grind the seat, if necessary have damaged parts replaced. Check actuator setting. Determine the cause of the deformation and have it eliminated.	Industrial mechanic (high pressure valves)
	Erosion or corrosion, e.g. due to the wrong selection of nominal valve width or valve material	Have the design of the valve checked.	Industrial mechanic (high pressure valves)
	Torque switch is defective	Have the torque switch checked. Prior to readjustment consult with Stahl-Armaturen PERSTA GmbH customer service.	Qualified electrician
	Incorrect actuator adjustment: Shut-off element not firmly enough in the seat	Correctly adjust the actuator.	Industrial mechanic (high pressure valves)
	Stem or cone is worn due to overlong use as throttling valve	Dismount stem. Check the stem and cone for wear (↬ *Chapter 8.3.5 “Dismounting and checking the stem” on page 80*).	Industrial mechanic (high pressure valves)
End position of the actuator not reached	Incorrect actuator adjustment	Correctly adjust the actuator.	Industrial mechanic (high pressure valves)
	Valve bearing, stem thread, lift stop or inner parts of the valve are defective	Replace damaged parts.	Industrial mechanic (high pressure valves)
	Stuffing box is tightened too tightly	Tighten the stuffing box correctly, if necessary replace the gland packing (↬ *Chapter 8.3.3 “Replacing the gland packing” on page 68*).	Industrial mechanic (high pressure valves)
	Moving parts insufficiently lubricated	Lubricate the moving parts (↬ *Chapter 8.3.2 “Lubricating moving parts (stem thread)” on page 66*).	Trained person (operator)
Leakage of the gland packing	Insufficient maintenance	Shut off the pipe section affected. Retighten the gland follower flange with the tightening torque specified by the manufacturer. If necessary pack or repack the stuffing box (↬ *Chapter 8.3.3 “Replacing the gland packing” on page 68*).	Industrial mechanic (high pressure valves)

Fault table

Fault description	Cause	Remedy	Personnel
Leakage of the gland packing	Destruction of the stuffing box due to the use of packing material without sufficient media or temperature resistance	Shut off the pipe section affected. Replace the stuffing box with a suitable packing kit (↳ *Chapter 8.3.3 “Replacing the gland packing” on page 68*).	Industrial mechanic (high pressure valves)
	Wear of the packing material	Shut off the pipe section affected. Replace the stuffing box (↳ *Chapter 8.3.3 “Replacing the gland packing” on page 68*).	Industrial mechanic (high pressure valves)
Valve does not function	Electric actuator does not function	Check electric actuator as specified in the manufacturer’s documentation.	Qualified electrician
	Hydraulic actuator does not function	Check hydraulic actuator as specified in the manufacturer’s documentation.	Hydraulics Specialist
	Pneumatic actuator does not function	Check pneumatic actuator as specified in the manufacturer’s documentation.	Pneumatics Specialist
Malfunction of the valve	Limit switch (for optional electric, pneumatic or hydraulic actuator) is defective	Have the limit switch checked. Prior to readjustment consult with Stahl-Armaturen PERSTA GmbH customer service.	Qualified electrician
	Torque switch (for optional electric, pneumatic or hydraulic actuator) is defective	Have the torque switch checked. Prior to readjustment consult with Stahl-Armaturen PERSTA GmbH customer service.	Qualified electrician
Jerky lift movement	Gland packing is too firm	Readjust gland packing. If necessary replace the gland packing (↳ *Chapter 8.3.3 “Replacing the gland packing” on page 68*)	Industrial mechanic (high pressure valves)

10 Dismantling, disposal

10.1 Safety notice for dismantling and disposal

Electric shock

DANGER!

Risk of fatal injury from electric shock!

There is a risk of fatal injury when touching live components of the actuator. Switched-on electrical components can execute uncontrolled movements and can cause serious injuries.

- Prior to starting work, switch off the supply of electricity and definitively disconnect it.
- Only have an electrician perform tasks on electrical lines and components.

Improper dismantling

WARNING!

Danger of injury due to improper dismantling!

Stored residual energy, sharp-edged components, points and corners on or in the valve, or on the required tools can cause serious injury.

- Prior to starting work ensure that there is adequate free space.
- Handle open, sharp-edged components carefully.
- Ensure order and cleanliness at the workstation! Loosely stacked components or components and tools that are lying about can cause accidents.
- Dismantle components properly. Pay attention to the high dead weight of some of the components. If necessary use hoists.
- Secure the components so that they do not fall down or fall over.
- If anything is unclear obtain the assistance of Stahl-Armaturen contact PERSTA GmbH customer service (contact details p. 3).

Heavy weight of the valve

WARNING!

Danger of injury due to the heavy weight of the valve!

The heavy weight of the valve, and of its components, can result in severe injuries.

- Transport valves with a suitable hoist or forklift.
- Don not lift valves via the handwheel.
- Do not lift valves via the actuator.
- If possible, lift valves via the bonnet.
- Use approved and functional sling gear.
- Safeguard valves and components from falling over.

Suspended loads

WARNING!

Danger of injury due to suspended loads!

Suspended loads can cause dangerous situations that can result in severe injuries.

- Do not step under suspended loads.
- Wear protective equipment: Industrial hard hat, safety footwear.
- Transport loads as close to the ground as possible.
- Only use approved sling gear and hoists.
- Ensure that hoist and sling gear have sufficient load-bearing capacity.

Fluid under high pressure

WARNING!

Danger of injury due to hydraulic energy!

Hydraulically-powered components of the valve, as well as the triggering of the overpressure valve can cause severe injuries.

- Only have specialised personnel perform tasks on the hydraulic system.
- Prior to starting the tasks on the hydraulic system ensure that it is completely depressurised. Completely depressurise pressure accumulators.
- Operate the valve in a frost-free environment to prevent the body from bursting.
- Wear personal protective equipment.

Hazards associated with the pneumatic system

WARNING!

Danger of injury due to pneumatic energy!

Pneumatically-powered components of the valve, can cause severe injuries.

- Only have pneumatic specialists perform tasks on the pneumatic equipment.
- Prior to starting the tasks on the pneumatic equipment ensure that it is completely depressurised. Completely depressurise pressure accumulators.
- Wear personal protective equipment.

Pumping medium

WARNING!

Danger of injury due to pumping medium under pressure!

In operating status, as well as in decommissioned status, depending on the version of the valve, injuries can occur due to medium escaping under high pressure.

- Do not unscrew threaded connections.
- If threaded connections are loose, inform the operating company and have the pipe section in question shut-off.
- If threaded connections are loose have the cause for this clarified and eliminated. If necessary have the manufacturer check the valve.

WARNING!

Pumping medium is a health hazard!

Contact with the pumping medium can have health implications.

- Handle pumping medium in accordance with the instructions in the manufacturer’s safety data sheet.
- Wear protective equipment: Protective gloves, safety footwear, protective goggles, protective work clothing.
- Soak up escaped pumping medium without delay and dispose of it in an environmentally responsible manner.

10.2 Dismantling

Personnel:	■ Industrial mechanic (high pressure valves) ■ Forklift truck driver ■ Trained person (operator) ■ Trained person (hoist) ■ Disposal contractor
Protective equipment:	■ Industrial hard hat ■ Safety goggles ■ Protective work clothing ■ Protective gloves ■ Safety footwear
Special tool:	■ Hoist ■ Sling gear

Prerequisites:

- The pipe section in question is shut-off.
- Valve is in depressurised status.
- Valve is emptied.
- For electric actuator:
  - Power supply is switched off and physically disconnected.
- For hydraulic or pneumatic actuator:
  - Ensure that the customer-provided hydraulic/pneumatic supply is switched off and safeguarded against being switched on again.
  - Hydraulic lines/pneumatic lines are in depressurised status.
  - Hydraulic lines/pneumatic lines are removed from the actuator of the valve.

1. Hold the valve in position with a suitable hoist (↳ *"Transporting individual valves" on page 36*).
2. Disconnect pipe inlet side and outlet side from the valve.
3. If necessary remove the existing supports.
4. Use a suitable hoist to remove the valve from the pipe and set it down so that it is safeguarded against falling over.
5. Properly clean assemblies and components and take them apart.

   In this process comply with local occupational health and safety regulations.

10.3 Disposal

If a return or disposal agreement has not been concluded, then recycle dismantled components:

- Scrap metals.
- Recycle plastic elements.
- Sort and dispose of all other components according to material condition.

ENVIRONMENT!

Hazards for the environment due to improper disposal!

Hazards for the environment can occur due to improper disposal.

– Have electrical scrap and electronic components, hydraulic oil, lubricants and other auxiliary materials recycled or disposed of by approved specialist companies.
– If in doubt, contact the local authorities or specialist disposal companies for information regarding the environmentally responsible disposal.

Disposal

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