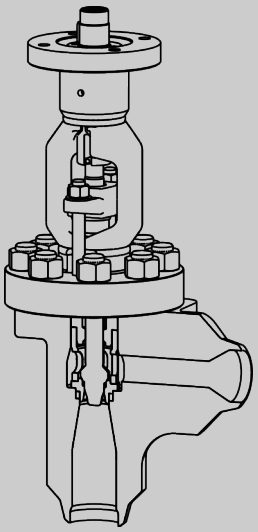
Operating instructions

Blow down valve
KAV



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. 6421.DE.STD.02.2022, 1, en_GB

Information about the operating instructions

This manual enables safe and efficient handling of the blow down valve.

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

The personnel must have carefully read and understood these instructions before performing any tasks. The basic prerequisite for safe work is compliance with all the specified safety instructions and other instructions in this manual.

Furthermore, the local occupational safety regulations and general safety requirements must be complied with for the area in which the blow down valve is used.

The figures in these instructions are provided as examples for basic comprehension 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 blow down valve:

Designation	Series	Nominal diameter (DN) [mm]	Pressure rating*
KAV	202 FJ	50 – 65	-

* Pressure rating depends on operator requirements, request from PERSTA if required

Other applicable documents

- GA004 ignition hazard assessment
- Connection diagram provided
- Hazard analysis according to the Pressure Equipment Directive
- Hazard analysis according to the Machinery Directive
- Actuator instructions
- Technical data sheet
- Screw tightening torques according to the website: www.persta.com
- As well as 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/supplement	Date

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1 Overview

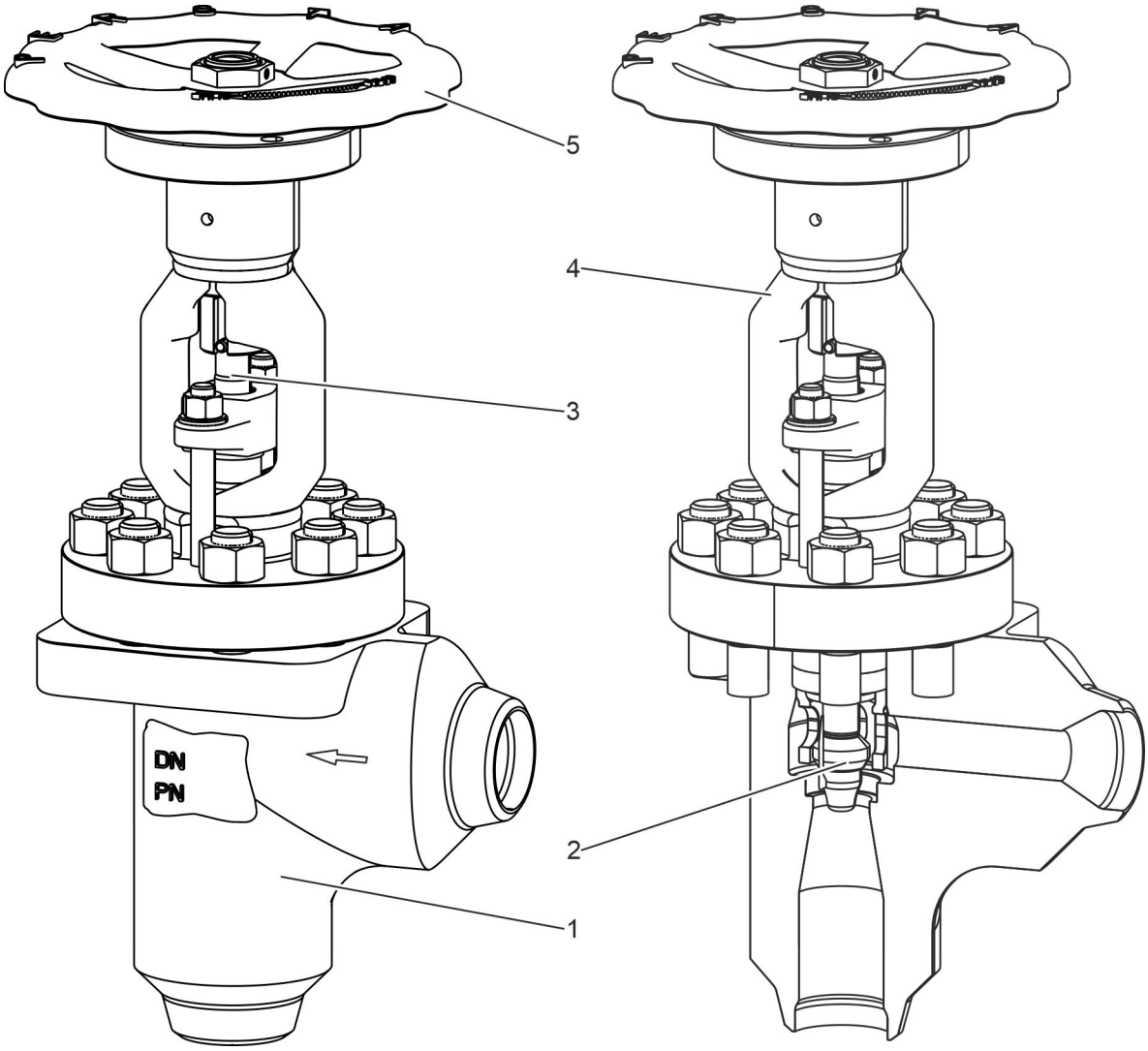


Fig. 1: Overview of blow down valve

Brief description of blow down valve

The valve referred to as blow down valve is designed for installation in pipes.

With the blow down valve, depending on the version, it is possible to

- shut-off or
- regulate

the pipeline medium flowing through the valve.

The body (Fig. 1/1) of the valve is flanged or welded into the pipe, depending on the version.

In the closed position, the shut-off element (Fig. 1/2) prevents the pipeline medium from flowing through the valve.

If the blow down valve is used for regulation, the flow rate of the pipeline medium is influenced by the position of the shut-off element.

The shut-off element is moved in or out via the stem. Depending on the version, the stem (Fig. 1/3) is actuated manually via a handwheel (Fig. 1/5) attached to the bonnet (Fig. 1/4), electrically, hydraulically or pneumatically.

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.

Removal device
The removal device allows the body insert and the sealing elements to be removed for maintenance of the valve.

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

Spacers
Spacers for use during the separation of bonnet and body.

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 the conduction of the task. The signal words described above are used.

Example:

1. Loosen the screw.
2. 

   CAUTION!
   Risk of entrapment at the cover!

   Close the cover carefully.

3. Tighten the screw.

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 actions
	References to sections of these operating instructions and other applicable documents
■	Lists without a defined sequence

2.2 Intended use

Valves of the specified series are designed for installation in pipes under the following conditions:

- Normal operation of the valve as open/close valve. Brief operation of the valve as throttling valve with increased probability of wear.
- 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 or chemical 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.
- Operation of the valve only within the limits specified on the rating plate (↳ *'Rating plate' on page 12*).
- No temperature allowances were taken into account. When used 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 the internal pressure load 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 taken into account.
- If the valve is operated in the creep range, the valve is designed for a maximum operating time of 100,000 hrs. The valve must be replaced afterwards.

Intended use includes compliance with all the information included 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 (*Chapter 11 'Technical data' on page 97*).
- 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

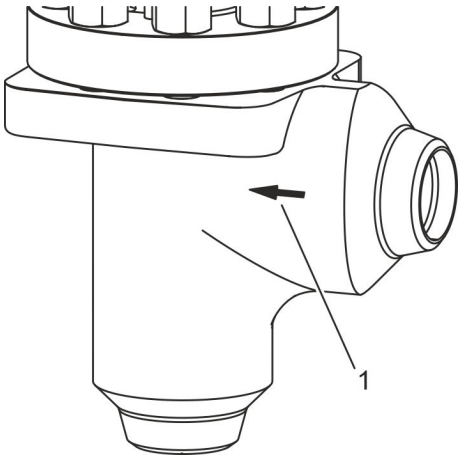


Fig. 2: Flow direction arrow

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

In the arrowed direction, the medium flows to the shut-off element from above.

Position indicator (mechanical)

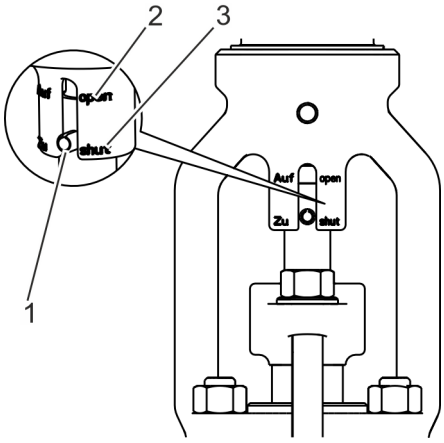


Fig. 3: Mechanical position indicator

The valve has a mechanical position indicator.

A tension pin (Fig. 3/1), which also works as an anti-twist device of the stem, is guided within a recess in the bonnet. Depending on the position of the shut-off element in the body, the tension pin (Fig. 3/1) indicates the “Open" (Fig. 3/2) or “Closed" (Fig. 3/3) position.

Opening / closing direction indication for manual actuator

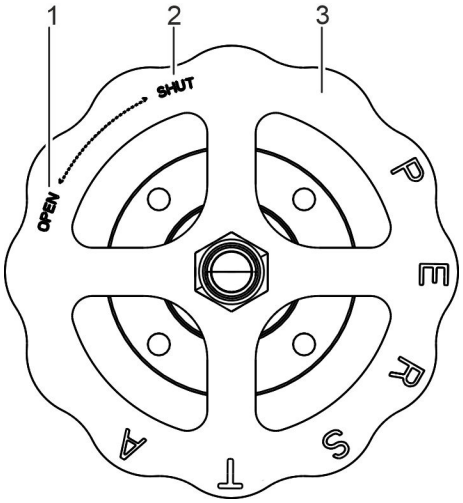


Fig. 4: Opening and closing direction indication

The handwheel (Fig. 4/3) indicates the opening (Fig. 4/1) and closing directions (Fig. 4/2).

- Open
- Shut

Customer-specific markings

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

2.4 Safety devices

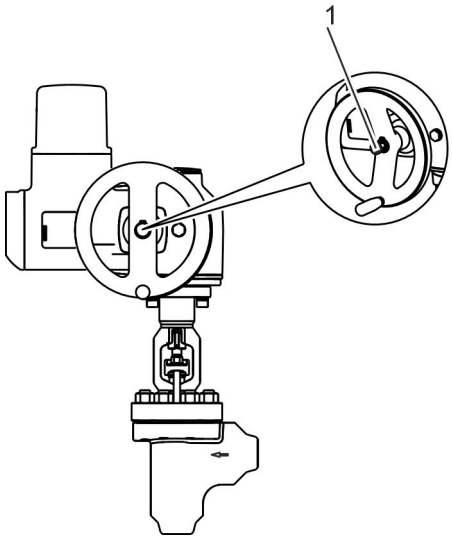
Torque switch

The closing of the valve with electric actuator is limited by a torque switch. At a permanently set torque, the actuator shuts down and the valve is closed.

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.

Emergency actuation of the electric actuator



The electric actuator also has a handwheel (Fig. 5/1). If the actuator is defective or if the control system fails, the valve can be operated via the handwheel.

Fig. 5: 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 Hazards 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.

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

1. Shut off the pipe sections affected.
2. Comply with the plant 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 devices.
- 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 provide equipment that ensures the safe transition of the valve to 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 the hands from friction, abrasion, cuts or deep injuries and 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 (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 39 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
- Residues of the pipeline medium
- Pickling medium
- Anti-corrosive
- With hydraulic actuator: Hydraulic fluid

3 Functional description

3.1 Operating principle of the blow down valve

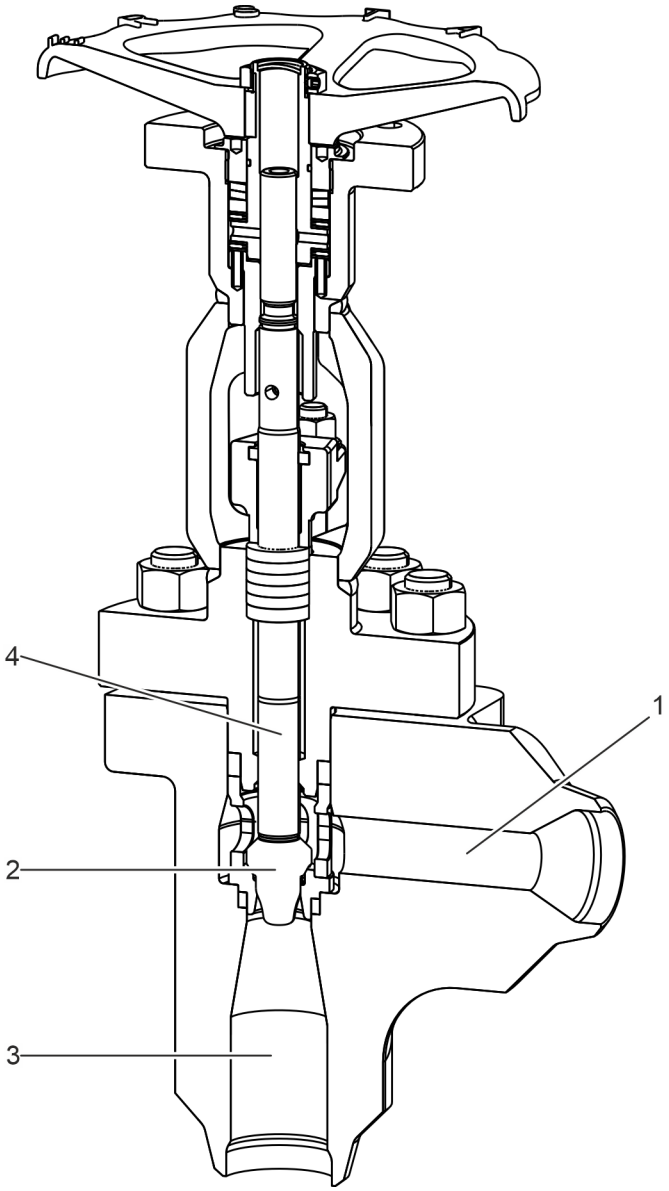


Fig. 6: Sectional view

In the closed state, the shut-off element (Fig. 6/2) separates the inlet side (Fig. 6/1) from the outlet side (Fig. 6/3) of the valve. The flow to the shut-off element must always take place from above. The shut-off element is moved in the interior of the valve via a stem (Fig. 6/4). The blow down valves deviate in

- type of actuator and
- type of connection.

It is also possible that the valve has display elements.

3.2 Versions of the blow down valve

3.2.1 External seal

The sealing of the stem against the environment is shown below.

Gland packing

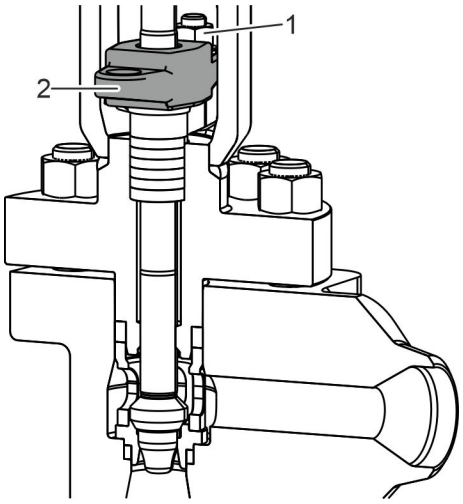


Fig. 7: Gland packing

The gland packing seals the stem off against the environment. For this the gland follower flange (Fig. 7/2) is pressed using stud bolts (Fig. 7/1) on to the sealing elements

- gland follower,
- chamber ring and
- packing ring

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

Cover gasket

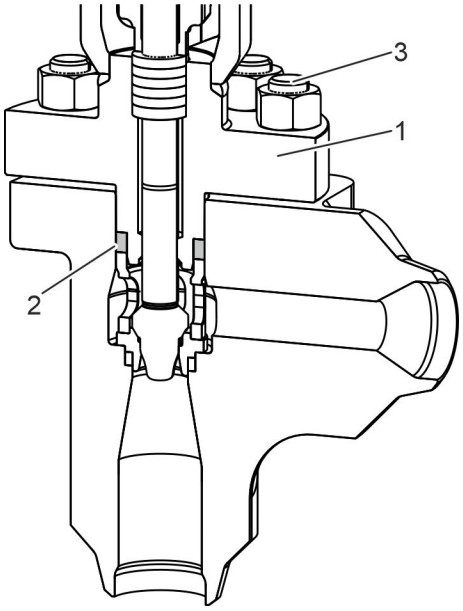


Fig. 8: Cover gasket

The cover gasket additionally seals off the body against the environment For this, the cover (Fig. 8/1) engages in the body due to its shape and presses against a gasket ring (Fig. 8/2). The cover is fastened to the body by stud bolts (Fig. 8/3).

3.2.2 Shut-off element

Throttling valve cone

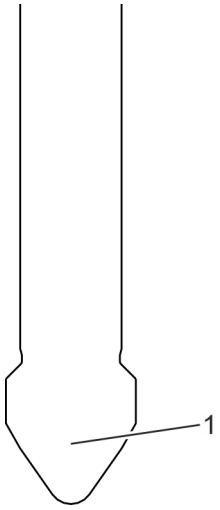


Fig. 9: Throttling valve cone

The blow down valve is equipped with a throttling valve cone (Fig. 9/1).

The throttling valve cone (Fig. 9/1) is used, if a valve is used in open/close operation.

3.2.3 Actuator variants

Manual actuator (handwheel)

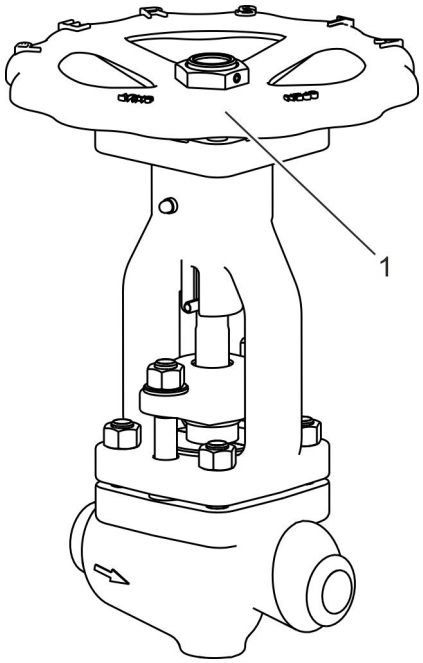


Fig. 10: Manual actuator

The stem is driven manually using the handwheel (Fig. 10/1).

The handwheel can be attached in the following way:

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

Electric actuator

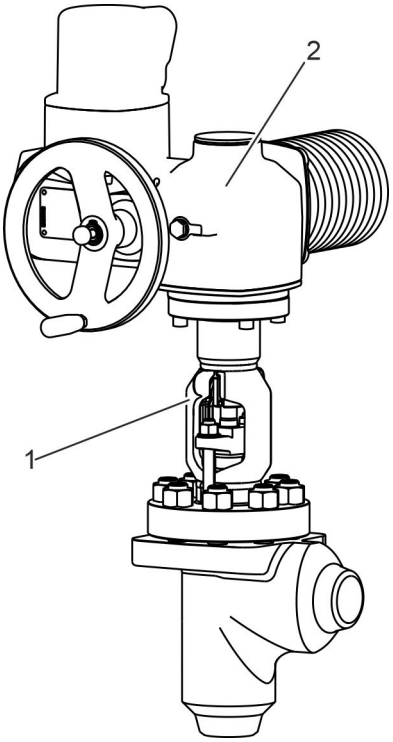


Fig. 11: Bonnet without electric actuator

With the optional electric actuator, the stem is driven by an electric motor (Fig. 11/2). The electric motor is connected to the valve and the threaded bush above the bonnet (Fig. 11/1).

The electric actuator is adjusted in the opening direction via limit switches by the manufacturer.

The electric actuator is adjusted in the closing direction via torque.

The electric actuator can be attached in the following manner:

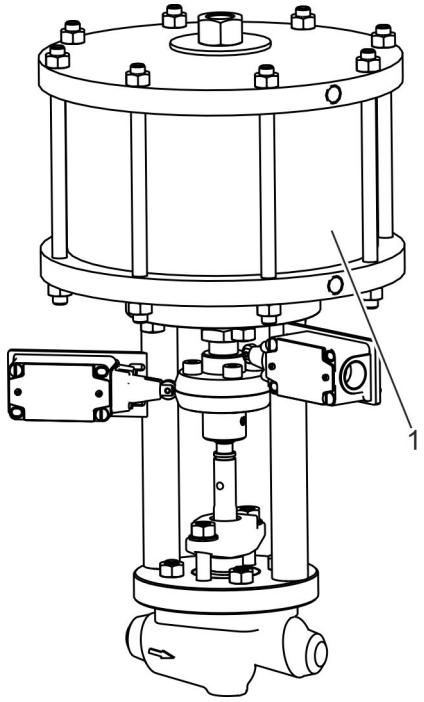
- Direct attachment of the electric actuator
- Bevel gearbox with electric actuator
- Spur gearbox with electric actuator
- Remote actuator

Hydraulic actuator

With the optional hydraulic actuator, the stem is driven axially by a hydraulic piston actuator.

The hydraulic actuator is connected to the bonnet. Valve stem and piston rod are equipped with adjustable coupling pieces.

Pneumatic actuator



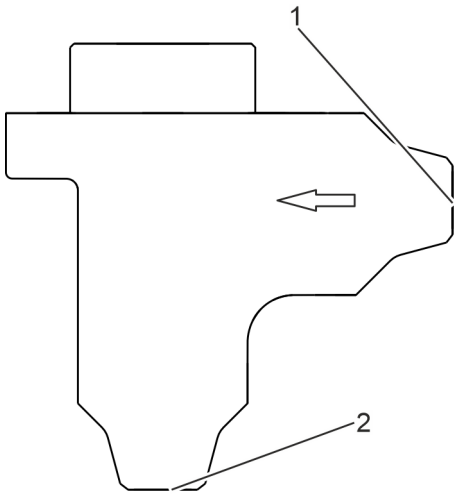
With the optional pneumatic actuator, the stem is driven axially by a pneumatic piston actuator (Fig. 12/1).

The pneumatic actuator is connected to the bonnet. Valve stem and piston rod are equipped with adjustable coupling pieces.

Fig. 12: Pneumatic actuator

3.2.4 Body shape

Angle pattern valve



With the version of the valve as an angle pattern valve, the inlet side (Fig. 13/1) is arranged at right angles to the outlet side (Fig. 13/2).

Fig. 13: Angle pattern valve

3.2.5 Display elements

Position indicator (visualised)

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

Position indicator (mechanical)

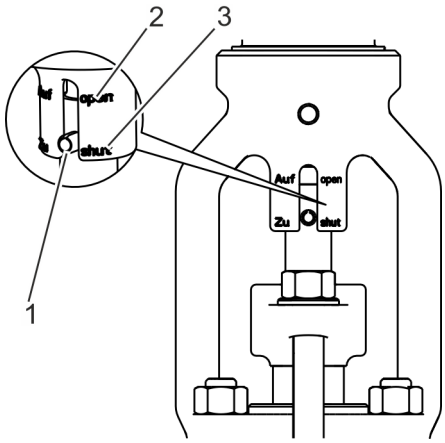


Fig. 14: Mechanical position indicator

The valve has a mechanical position indicator (Fig. 14).

The anti-twist device (pin or claw, Fig. 14/1) attached to the stem marks the position of the shut-off element on the scale integrated on the bonnet (Fig. 14/2 and 3).

3.3 Connections

Connection in the pipe

Depending on the version, the blow down valve can be mounted in the pipe as

- butt-weld valve,
- flanged valve,
- socket weld valve or
- special connection valve

.

Electrical connections

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

Information on the connection is provided in the operating instructions 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 the connection is provided in the operating instructions 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 the connection is provided in the operating instructions 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 packed items

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

Transporting individual valves

Personnel:
- Trained person (hoist)

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

Tool:
- Sling gear
- Hoist

1. 

DANGER!
Unmarked attachment points!

Attach valve to 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, secure it against falling over.

Transport on a pallet

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

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

Tool:
- Sling gear
- Hoist
- Forklift

1. Make sure that the valve is fixed in place on the pallet.
2. Transport the pallet to the installation location.
3. Unload and continue transporting heavy valves from the pallet with a suitable hoist.

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 instructions 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!

Risk of injury due to incorrectly installed valve!

A faulty installation may result in injuries due to a malfunction of the valve.

- Pay attention to the flow direction of the valve (↬ *'Flow direction arrow' on page 13*).
- Pay attention to the installation position of the valve (↬ *Chapter 11 'Technical data' on page 97*).
- With valves with an actuator or transmission, ensure that the stem position is vertical.
- In special cases and if the stem position is not vertical:
  - Support the actuator at the valve head.
  - Ensure that the actuator can follow the position changes of the pipe.
- With 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
  - Perform welding and subsequent heat treatment in compliance with the applicable welding regulations
  - Perform partial 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).

Incorrect alignment of the valve

NOTICE!

Malfunction of the valve due to failure to observe the flow direction!

An incorrect alignment can result in the entire system malfunctioning.

– 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 the design parameters and material.
2. Pay attention to the installation position.
3. Pay attention to the flow direction.
4. With butt-weld valves, completely open the butt-weld valve.
5. Remove any protective caps and preservation agents from the valve.
6. Make sure that there are no objects or materials inside 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

Tool:
- Sling gear
- Hoist

1. Prepare the respective pipe section for installation.
2. Use a hoist to bring the valve into the installation position.
3. Make sure that the on-site pipes are free of tension.
4. Make sure that the on-site pipes are free of external forces and torques.

5. Check butt-welding ends and flange sealing surfaces for damage and cleanness.
6. Centre the connection flanges.
7. Use connection elements and sealing elements made of approved materials.
8. Depending on the type of connection, weld or flange the valve in the correct flow direction and installation position.
9. Screw all the flange bores together with the 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. In the event of a different installation position, support the actuator and ensure that the actuator can follow the position changes of the pipe.
12. Make sure that the pipe and valve are sealed tight.

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

Pickling of the valve can be performed in several ways.

Ensure that pickling of the valve is performed by the operating company's qualified personnel.

Personnel:
- Pipeline engineer

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

1. During the pickling process, completely open the valve.
2. For valves with backseat: Drive the stem into the backseat.
3. Pickle the valve correctly.
4. Half-close the valve after the pickling process.
5. Completely remove the pickling medium by flushing it out.
6. 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 Performing the system pressure and leak tests

Personnel:
- Pipeline engineer

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

1. Perform the tests in accordance with the local regulations.
2. Release the pipe after successful tests.
3. In the event of long idle periods after the hydrostatic pressure test, completely drain the valve.

4. In the event of long idle periods after the hydrostatic pressure test, replace the anticorrosive agent in consultation with the manufacturer.

5.7.4 Applying thermal insulation

Plant-specific equipment

Depending on the plant, it may be necessary to give the pipe and/or the valve a 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. Make sure that all operating elements and gland areas remain permanently accessible and can always be checked.

   The insulation may only reach the upper edge of the bonnet flange (Fig. 15, red arrows).

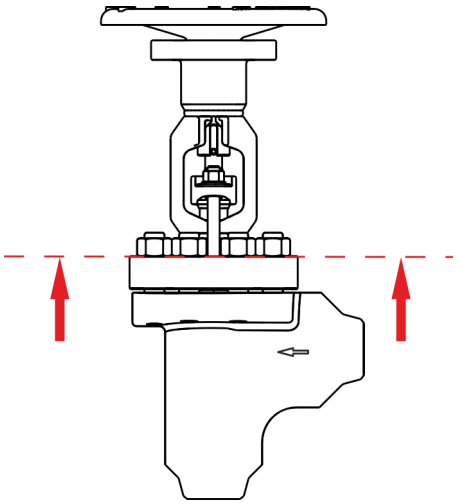


Fig. 15: Upper edge of the insulation

6 Initial start-up

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 Before initial start-up

Personnel:
- Pipeline engineer

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

1. Make sure that the entire plant has been released for operation.

2. Fully open the valve by turning the handwheel anti-clockwise (Fig. 16/1).

3. Fully close the valve by turning the handwheel clockwise (Fig. 16/2).

4. Repeat step 2–3 several times.

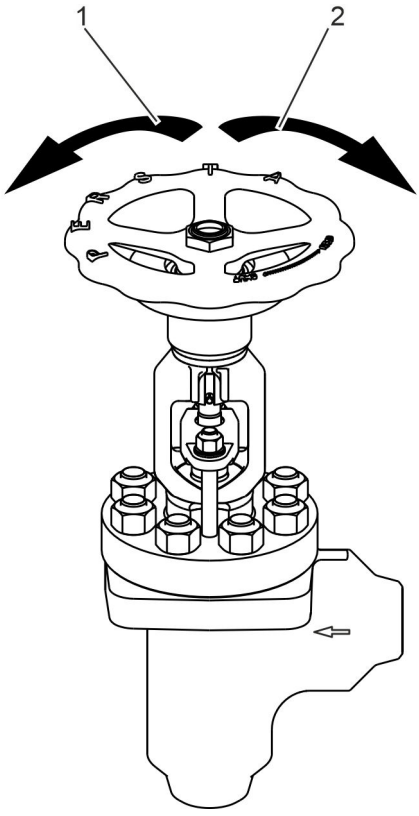


Fig. 16: Valve: Top view

Valve with electric, hydraulic or pneumatic actuator

5. Open and close the valve several times using the higher-level or local control system.

6.3 Carrying out initial start-up

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

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

1. 

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

Fill the pipe or open the shut-off pipe section in accordance with the plant-specific heating/cooling speed.

2. Check the stuffing box area for leaks.
3. Check the area of the cover gasket for leaks.
4. Check the pipe connection flanges for leaks.
5. If necessary, recheck the tightening torques in accordance with the manufacturer's/system planner's specifications.

Carrying out initial start-up

7 Operation

7.1 Safety instructions for operation

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.

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.

Improper operation of the handwheel

WARNING!

Danger of injury due to force-increasing objects!

Through the use of 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 and if necessary, contact the manufacturer (contact details p.3).

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

Operating a valve with manual actuator

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

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

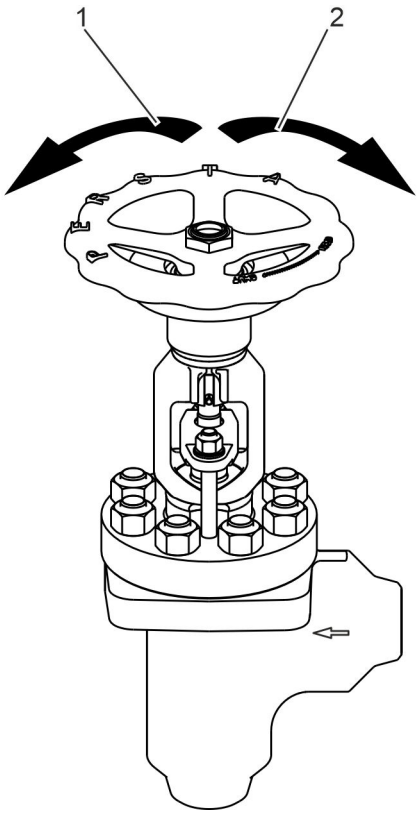


Fig. 17: Manual actuator: Turning the handwheel

→ Turn the handwheel on the valve:
- Turn clockwise (Fig. 17/2): Closes the valve.
- Turn anticlockwise (Fig. 17/1): Opens the valve.

Operating a valve with electric actuator

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

Operating a valve with hydraulic or pneumatic actuator

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

7.3 Operating the valve in an emergency

Comply with the operating company's instructions concerning what to do in an emergency.

Operating a valve with manual actuator 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

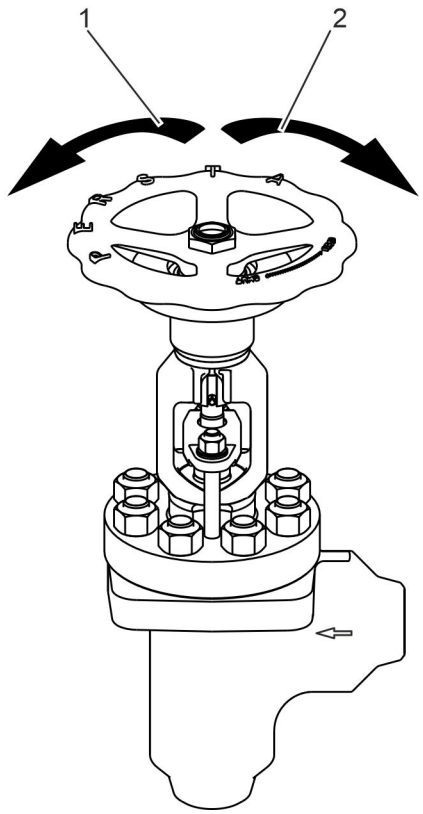


Fig. 18: Manual actuator: Using the handwheel in an emergency

→ Turn the handwheel.
- Turn clockwise (Fig. 18/2): Closes the valve.
- Turn anticlockwise (Fig. 18/1): Opens the valve.

Operating a valve with electric actuator in an emergency

Coupling/uncoupling the handwheel

See the documentation of the electric actuator for information on coupling and uncoupling the handwheel for emergency operation of the valve.

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. Cordon off the affected plant area.
2. Couple the handwheel (Fig. 19/3).
3. Turn the handwheel.
   - Turn clockwise (Fig. 19/2): Closes the valve.
   - Turning anticlockwise (Fig. 19/3): Opens the valve.

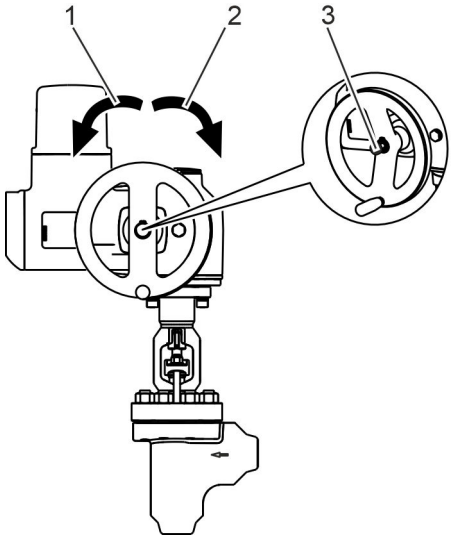


Fig. 19: Electric actuator: Using the handwheel in an emergency

Operating a valve with hydraulic or pneumatic actuator in an emergency

Operating a hydraulic or pneumatic actuator in an emergency

See the documentation for the hydraulic or electric actuator for information on emergency operation of the valve.

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 used sealing elements!

Used sealing elements may cause injuries due to pipeline medium escaping.

After each dismantling of the stem,

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

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.

8.2 Maintenance schedule

The maintenance tasks required for optimum and trouble-free valve operation are described in the sections below.

If regular inspections indicate increased wear, the required maintenance intervals must be reduced in accordance with the actual signs of wear. For questions concerning maintenance tasks and intervals, contact Stahl-Armaturen PERSTA GmbH Customer Service (contact details on page 3).

Interval	Maintenance work	Personnel
Depending on frequency of operation, 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 67*)	Trained person (operator)
Use as throttling valve: depending on frequency of operation, operating and ambient conditions/ specified by the operating company	Check the stem, body insert and sealing elements for increased wear (↬ *Chapter 8.3.4 'Removing and checking the stem and body insert' on page 80*)	Industrial mechanic (high pressure valves)
Every six months	Operate the valve (open/close, ↬ *Chapter 7.2 'Operating the valve' on page 57*)	Trained person (operator)
Depending on duration of use, operating and ambient conditions	Replace the gland packing (↬ *Chapter 8.3.3 'Replacing the gland packing' on page 68*)	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 area for leaks.
2. Check the area between the cover and the body for leaks.
3. Check the pipe connection flanges for leaks.

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

1. Protect the stuffing box area from the lubricant.
2. *Pay attention to the manufacturer's documentation of the electric actuator.*

   With electric actuator: Couple the handwheel.
3. *Pay attention to the manufacturer's documentation of the hydraulic/pneumatic actuator.*

   With pneumatic and hydraulic actuator: Operate the valve via the control system.
4. Open the valve completely.
5. Depending on the version:
   - Grease the stem thread with a brush.
   - Grease stem thread and bearing via lubricating nipple (Fig. 20/1).
6. Close the valve completely.
7. Repeat step 4–6 several times.
8. *Pay attention to the manufacturer's documentation of the electric actuator.*

   With electric actuator: Uncouple the handwheel.

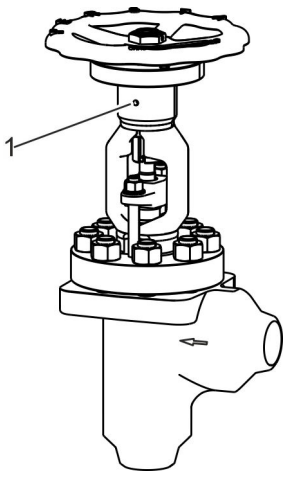


Fig. 20: Version with lubricating nipple

8.3.3 Replacing the gland packing

Procedure with manual actuator (handwheel)

The replacement of the gland packing for a valve version with manual actuator (handwheel) is described below.

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

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

Tool:
- Knock-out tool
- Hoist
- Sling gear
- Spacers

Requirements:

- The valve has cooled down/warmed up to ambient temperature.
- A depressurised state has been established.
- For all other actuator types: The actuator has been removed.
- The valve has been moved to the middle position.

Removing the bonnet

1. Attach the bonnet to the hoist using appropriate sling gear.
2. Use the hoist to secure the bonnet from falling off of the body.
3. Make sure that bonnet and body cannot be lifted by the hoist.

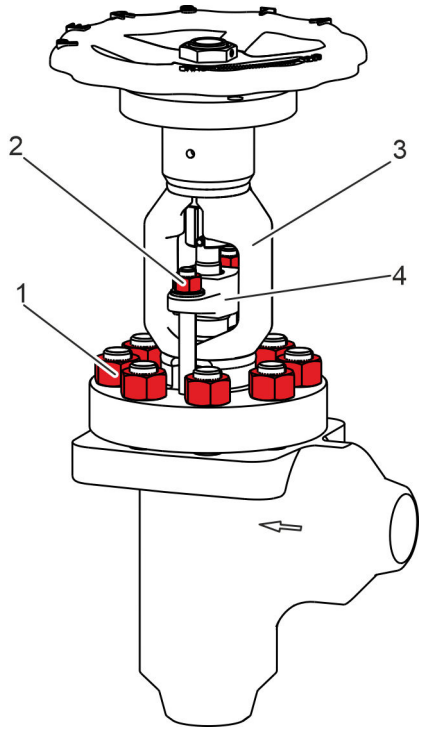


Fig. 21: Removing nuts

4.

WARNING!
Risk of injury due to pressurised valve!

Loosen and remove the nuts (Fig. 21/1) on the bonnet (Fig. 21/3).

5. Loosen and remove the nuts including washers (Fig. 21/2) on the gland follower flange (Fig. 21/4).

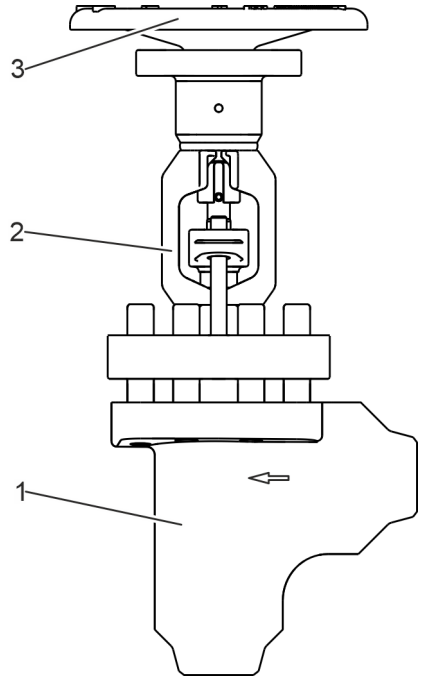


Fig. 22: Turning the handwheel

6. Turn the handwheel (Fig. 22/3) in the closing direction.

⇨ The bonnet (Fig. 22/2) lifts off of the body (Fig. 22/1).

7. Remove the complete bonnet including the stem and gland packing from the body with the hoist.

Replacing the cover gasket

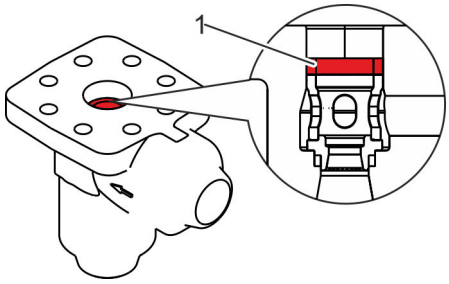


Fig. 23: Removing the cover gasket

8. Remove the cover gasket (Fig. 23/1).

9. Remove residues from the body.

Removing the stem

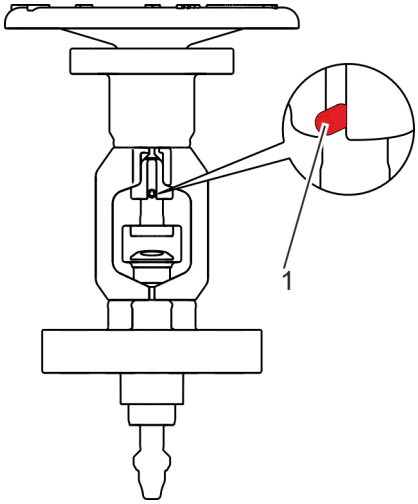


Fig. 24: Removing the anti-twist device

10. Drive the anti-twist device (Fig. 24/1) out of the stem with the knock-out tool.

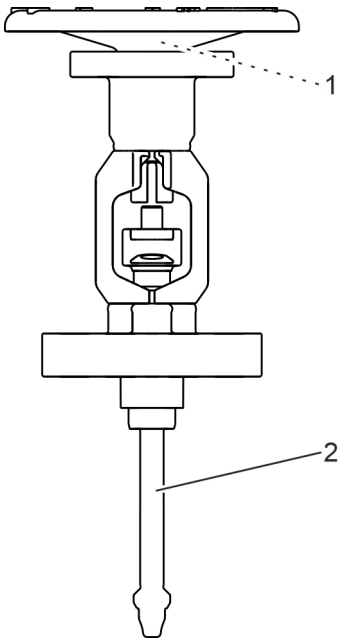


Fig. 25: Unscrewing the stem

11. Unscrew the stem (Fig. 25/2) from the threaded bush (Fig. 25/1).
12. Remove the stem from the bonnet.

Removing the gland packing

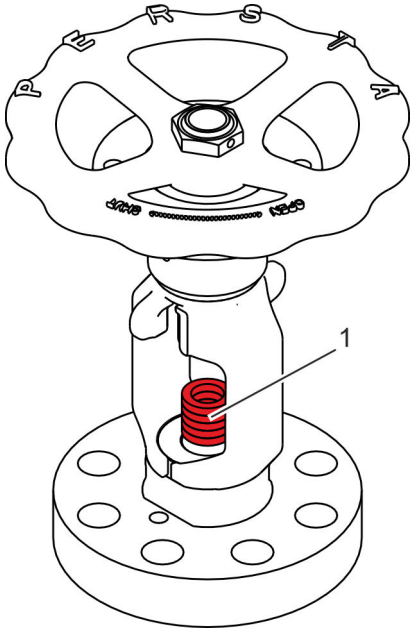


Fig. 26: Removing stuffing box elements

13. Remove the gland follower flange.
14. Use a packing extractor to remove the stuffing box elements (Fig. 26/1).

Cleaning the stem

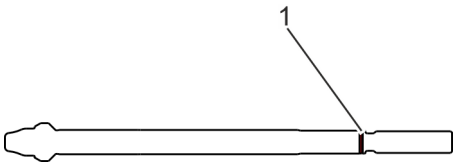


Fig. 27: Replacing the O-ring

15. Remove the O-ring (Fig. 27/1) from the stem.
16. **NOTICE!**
    Material damage from machined support surfaces!

    Remove any residues from the packing elements on the stem.
17. Fit a new O-ring on the stem.

Mounting the stem

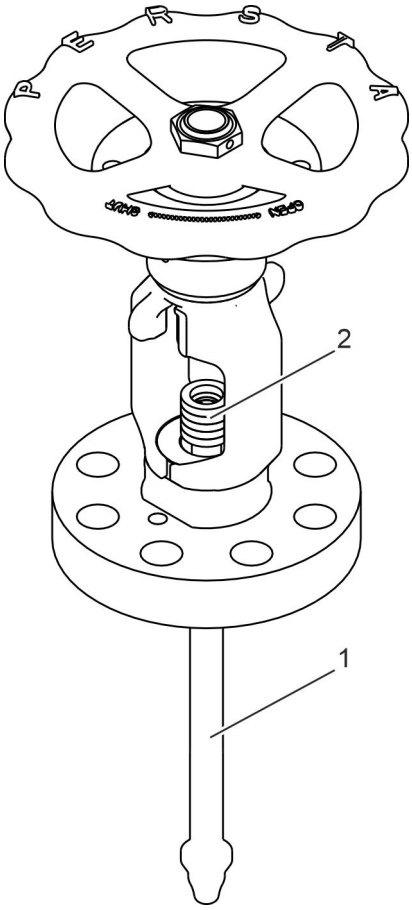


Fig. 28: Screwing in the stem

18. Insert the stem (Fig. 28/1) into the bonnet.
19. Insert new stuffing box elements (Fig. 28/2) into the emptied and cleaned packing chamber.

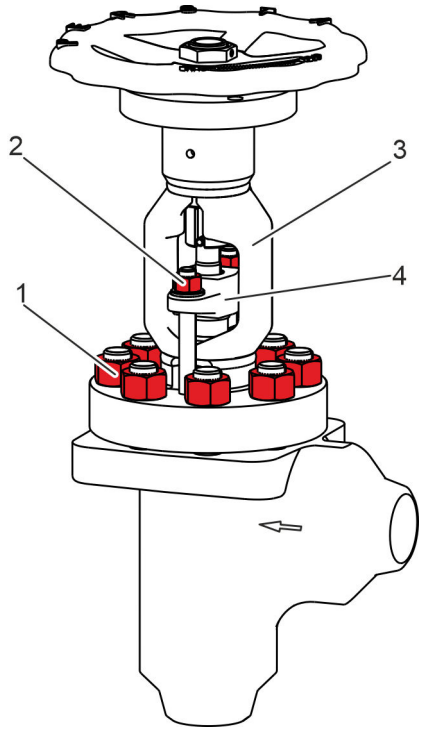


Fig. 29: Screwing on nuts

20. Fit the gland follower flange (Fig. 29/4) on the stem.

21. Fit the gland follower flange (Fig. 29/4) on to the stud bolts in the body.

22. Fit washers on to the stud bolts for the threaded connection of the gland follower flange.

23. Loosely screw together the nuts (Fig. 29/2) with the stud bolts in the body.

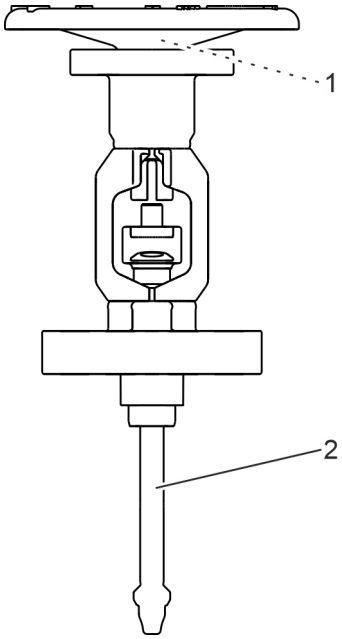


Fig. 30: Screwing in the stem

24.

Pay attention to the left-hand thread.

Screw the stem (Fig. 30/1) into the threaded bush on the handwheel.

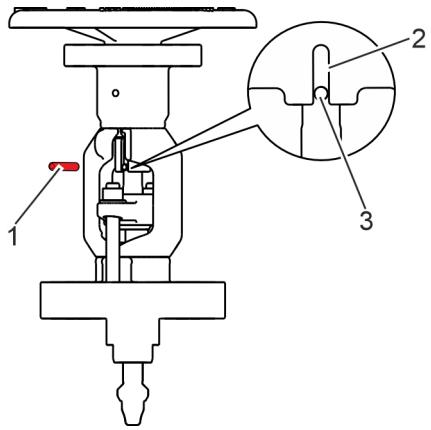


Fig. 31: Aligning the anti-twist device

25. Make sure that the anti-twist device (Fig. 31/1) is fitted in the bore (Fig. 31/3) of the stem and can be driven into the recess (Fig. 31/2) on the bonnet.
26. Mount the anti-twist device (Fig. 31/1) in the stem.
27. Move the stem into the OPEN position.

Mounting the bonnet

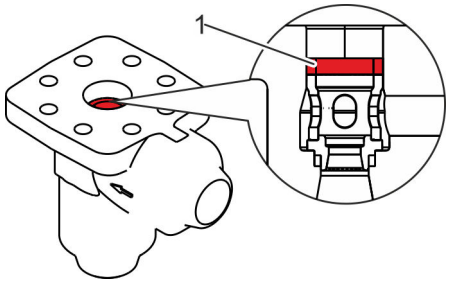


Fig. 32: Inserting the cover gasket

28. Fasten the bonnet to the hoist with suitable sling gear.
29. Insert the new cover gasket (Fig. 32/1) into the body.
30. Insert stud bolts into the body and tighten them.
31. Lift the bonnet over the body.
32.

NOTICE!

Risk of material damage due to careless lowering of the cone into the body!

Insert the stem into the body.

33. Fit the bonnet (Fig. 33/2) on to the stud bolts on the body (Fig. 33/1).

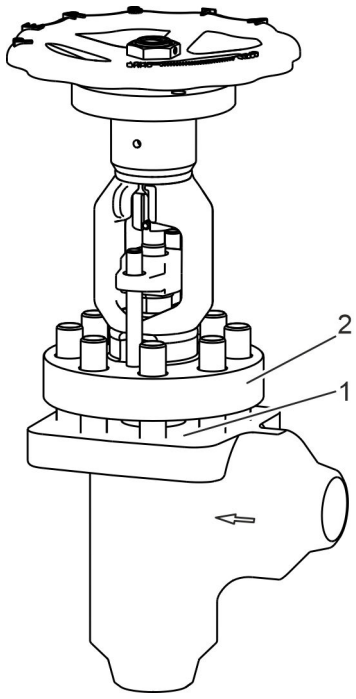


Fig. 33: Fitting the bonnet

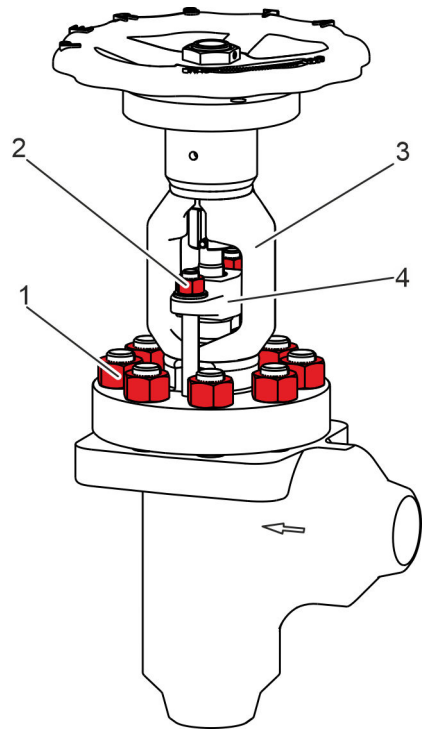


Fig. 34: Screwing on nuts

34. Loosely screw the nuts (Fig. 34/1) with the stud bolts into the body.

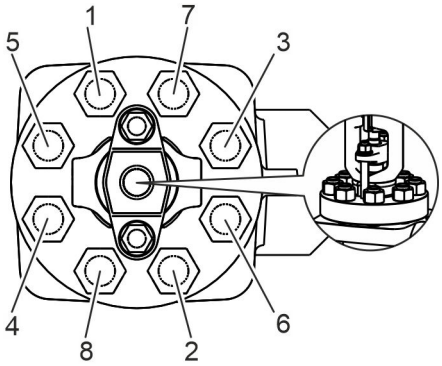


Fig. 35: Tightening the nuts crosswise

35.

WARNING!

Risk of injury due to incorrectly selected tightening torques!

Tighten the nuts on the bonnet crosswise (Fig. 35/1–8) while approaching the tightening torque step-by-step:

Step 1 - 30 % of the tightening torque specified by PERSTA.

Step 2 - 60 % of the tightening torque specified by PERSTA.

Step 3 - 100 % of the tightening torque specified by PERSTA.

After each step, check the gap dimension between cover and body and the tightening torque all around and retighten nuts if necessary.

The angular offset of the axes of the body and stem must not exceed 1°.

36. Check that the tightening torque of all screws is reached.

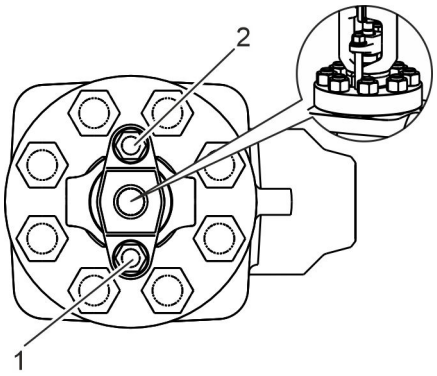


Fig. 36: Tightening the nuts on the gland follower flange

37. **WARNING!**
Risk of injury due to incorrectly selected tightening torques!

Tighten the nuts on the gland follower flange (Fig. 36/1 and 2) as specified by the manufacturer.

38. If present, mount the actuator as specified by the manufacturer and adjust the end positions.

Procedure for 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 removing the pneumatic or hydraulic actuator.

Use a hook wrench after removing the actuator

– *To operate the stem, use a hook wrench instead of the handwheel that is provided with the manual actuator.*
– *Position 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

Tool:
- Knock-out tool
- Hoist
- Sling gear
- Hook wrench
- Spacers

Requirements:

- The valve has cooled down/warmed up to ambient temperature.
- A depressurised state has been established.
- The valve has been moved to the middle position.
- The electrical system has been switched off and safeguarded against being switched on again.

1.

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

Have a second person or hoist with suitable sling gear hold the electric actuator in position based on its size and weight.

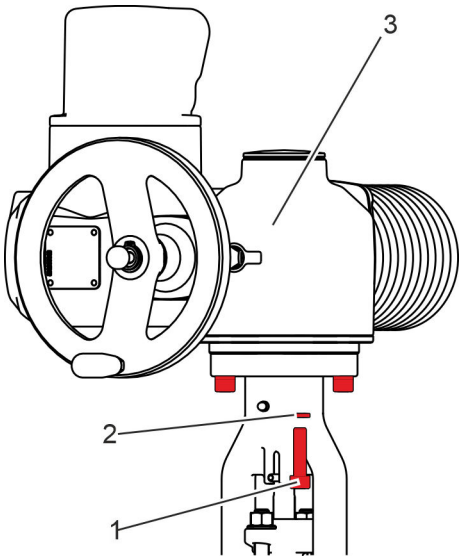


Fig. 37: Removing the screws

2. Unscrew the fastening screws (Fig. 37/1) of the electric actuator (Fig. 37/3) and remove them together with the washers (Fig. 37/2).

3. Take off the electric actuator (Fig. 37/3) and store it outside the work area.

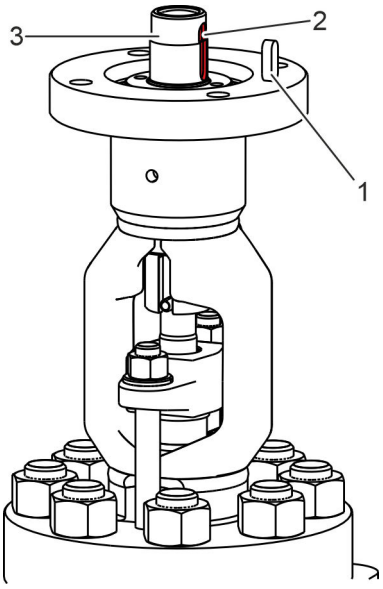


Fig. 38: Removing the feather key

4. Remove the feather key (Fig. 38/1) from the feather key groove (Fig. 38/2) of the hub (Fig. 38/3) of the threaded bush.

5.

Use a hook wrench instead of the hand-wheel.

Perform steps 1–38 from *'Procedure with manual actuator (handwheel)' on page 68*.

Mounting the electric actuator

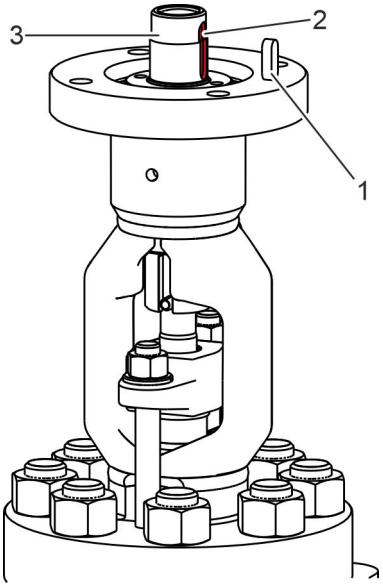


Fig. 39: Inserting the feather key

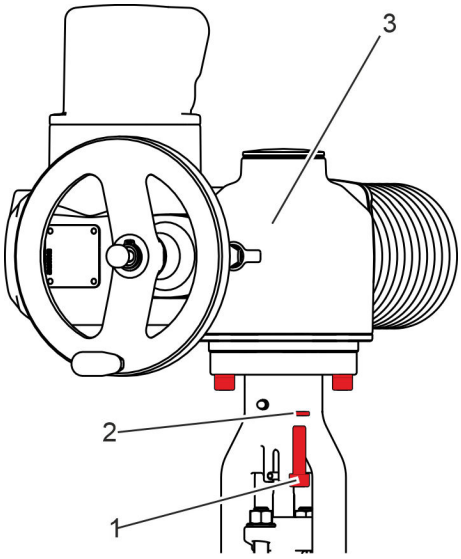


Fig. 40: Fastening the electric actuator

6. Insert the feather key (Fig. 39/1) into the feather key groove (Fig. 39/2) on the hub (Fig. 39/3).

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 over the flange on the bonnet.

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

9.

Make sure that the feather key is properly seated.

Lower the electric actuator on to the flange on the bonnet.

10. Fasten the actuator (Fig. 40/3) to the bonnet using screws (Fig. 40/1) and washers (Fig. 40/2).

11.

WARNING!
Risk of injury due to incorrectly selected tightening torques!

Tighten the screws (Fig. 40/1) as specified by the manufacturer.

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

8.3.4 Removing and checking the stem and body insert

Procedure with manual actuator (handwheel)

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

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

Tool:
- Sling gear
- Hoist
- Removal device

Requirements:
- The valve has cooled down/warmed up to ambient temperature.
- A depressurised state has been established.
- For all other actuator types: The actuator has been removed.
- The valve has been moved to the middle position.

Removing the bonnet and stem

1. Perform work steps 1–17 of the “Replace gland packing” (*‘Procedure with manual actuator (handwheel)’ on page 68*) maintenance task.

Checking the stem

2. Check the stem and cone for wear.
3. If necessary, replace the old stem with a new stem or have it machined by a specialised external company.

Removing the body insert

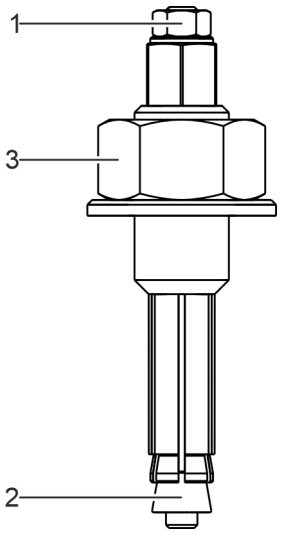


Fig. 41: Preparing the removal device

4. Release the tension of the removal device via clamping nut (Fig. 41/1) und clamping cone (Fig. 41/2).
5. Turn the nut (Fig. 41/3) upwards towards the clamping nut (Fig. 41/1).

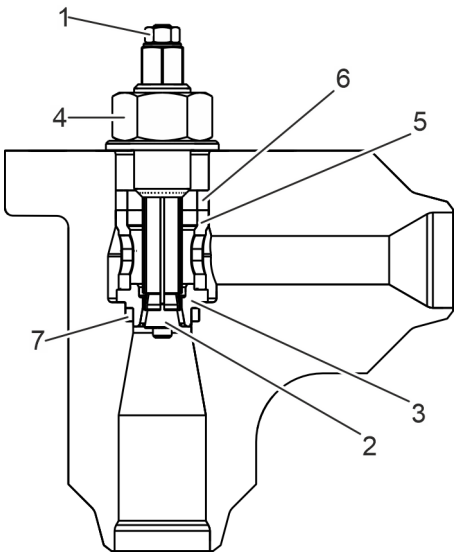


Fig. 42: Removing the body insert

6. Insert the removal device into the body (Fig. 42).
7. Tighten the clamping nut (Fig. 42/1) to clamp the sealing cone (Fig. 42/2) with the seat ring (Fig. 42/3).
8. Tighten the nut (Fig. 42/4) to release the seat ring (Fig. 42/3) together with the body insert (Fig. 42/5) and the gasket ring (Fig. 42/6) of the cover gasket from the body.
9. Pull the removal device with seat ring, body insert and gasket ring out of the body.
10. Remove the gasket ring (Fig. 42/7) from the body.
11. Loosen the clamping nut (Fig. 42/1) and remove the seat ring, body insert and gasket ring from the removal device.

Cleaning and checking the body insert

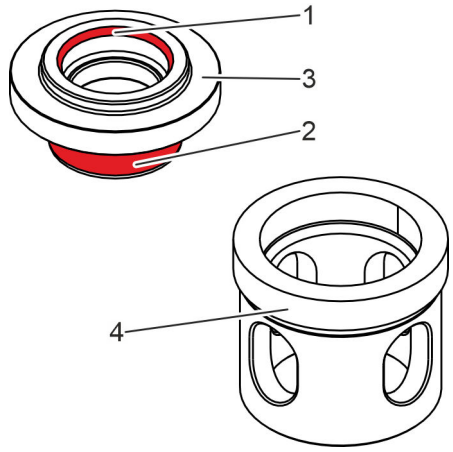


Fig. 43: Body insert and sealing faces on the seat ring

12. Remove residues of the pipeline medium and the sealing elements from the body.
13. Check the body insert (Fig. 43/4) for wear.
14. Checking the sealing faces (Fig. 43/1 and 2) on the seat ring (Fig. 43/3) for wear and roughness. R_{max} = 3 µm.
15. If necessary, regrind sealing faces with fine sandpaper (grain < 220).

Checking the body for wear and washout

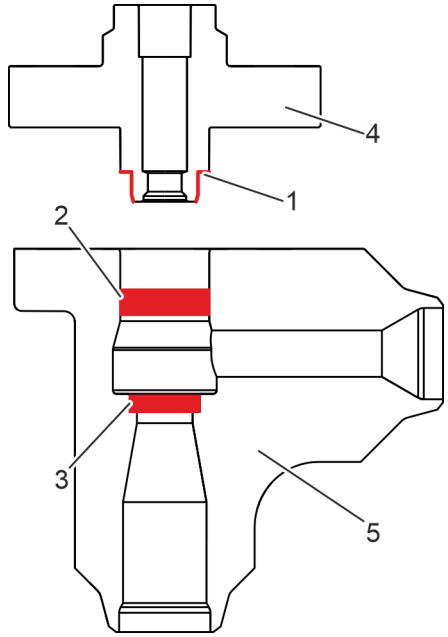


Fig. 44: Checking the sealing faces

16. Clean the sealing faces (Fig. 44/1 to 3) on the cover (Fig. 44/4) and in the body (Fig. 44/5) thoroughly.
17. Check the sealing faces on the cover and in the body for damage and the absence of burrs.
18.

NOTICE!

Damage due the metallic machining of the sealing faces!

If necessary, slightly rework the sealing faces with suitable means (e.g. polishing cotton wool or emery cloth).

Inserting the body insert and sealing elements

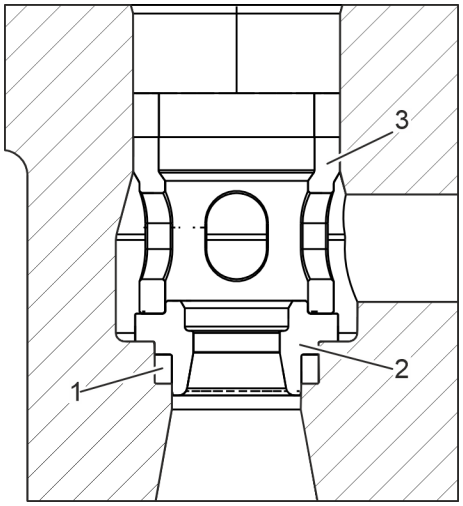


Fig. 45: Inserting the body insert and sealing elements

19. Insert the gasket ring (Fig. 45/1) in the body.
20. Mount the seat ring (Fig. 45/2) and body insert (Fig. 45/3).

Mounting the stem and bonnet

21. Perform work steps 18–38 of the “Replace gland packing” (↬ *‘Procedure with manual actuator (handwheel)’ on page 68*) maintenance task.

Procedure for electric, pneumatic or hydraulic actuator

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

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

Tool:
- Sling gear
- Hoist
- Knock-out tool
- Spacers
- Hook wrench

1. Perform work steps 1–4 of the “Replace gland packing" (*‘Procedure for electric, pneumatic or hydraulic actuator’ on page 77*) maintenance task.

2. *Use a hook wrench instead of the hand-wheel.*

   Perform work steps 1–17 of the “Replace gland packing” (*‘Procedure with manual actuator (handwheel)’ on page 68*) maintenance task.

Remove and check the body, sealing elements and stem

3. Perform work steps 2–21 from *‘Procedure with manual actuator (handwheel)’ on page 80*.

Mounting the bonnet and stem

4. Perform work steps 18–38 of the “Replace gland packing” (*‘Procedure with manual actuator (handwheel)’ on page 68*) maintenance task.

Mounting the actuator

5. Perform work steps 6–12 of the “Replace gland packing” (*‘Procedure for electric, pneumatic or hydraulic actuator’ on page 77*) maintenance task.

8.4 After maintenance

After maintenance has been completed, carry out work for initial start-up (*Chapter 6.3 ‘Carrying out initial start-up’ on page 53*).

After maintenance

9 Faults and troubleshooting

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
Leaks of the shut-off device	Solid matter in the medium that has damaged the seat	Grind the seats, if necessary have damaged components replaced.	Industrial mechanic (high pressure valves)
	Deformation of the seat surface due to an impermissibly high tension on the valve or due to thermal tension	Grind the seats, if necessary have damaged components replaced. 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)

Fault description	Cause	Remedy	Personnel
Leaks of the shut-off device	Shut-off element does not close tightly	Remove the stem (↯ *Chapter 8.3.3 'Replacing the gland packing' on page 68*/step 1–17) and have Stahl-Armaturen PERSTA GmbH Customer Service (contact details on page 3) or a specialised external company determine the cause and eliminate it.	Industrial mechanic (high pressure valves)
	Stem or cone is worn due to overlong use as throttling valve	Remove stem. Check the stem and cone for wear (↯ *Chapter 8.3.4 'Removing and checking the stem and body insert' on page 80*).	Industrial mechanic (high pressure valves)
End position not reached	Actuator setting (with optional electric, pneumatic or hydraulic actuator) is incorrect	Set the actuator correctly.	Industrial mechanic (high pressure valves)
	Valve bearing, stem thread, lift stop or inner parts of the valve are defective	Replace the damaged parts.	Industrial mechanic (high pressure valves)
	Stuffing box has been overtightened	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 67*).	Trained person (operator)
Leakage of the stuffing box	Insufficient maintenance	Shut off the relevant pipe section. Retighten the gland follower flange to the tightening torque specified by the manufacturer. If necessary, replace the stuffing box (↯ *Chapter 8.3.3 'Replacing the gland packing' on page 68*).	Industrial mechanic (high pressure valves)
	Destruction of the stuffing box due to the use of a packing material without sufficient media or temperature resistance	Shut off the relevant pipe section. Replace the stuffing box with a suitable packing set (↯ *Chapter 8.3.3 'Replacing the gland packing' on page 68*).	Industrial mechanic (high pressure valves)
	Packing material wear	Shut off the relevant pipe section. Replace the stuffing box (↯ *Chapter 8.3.3 'Replacing the gland packing' on page 68*).	Industrial mechanic (high pressure valves)
Leakage between cover and body	Cover gasket wear	Shut off the relevant pipe section. Replace the cover gasket.	Industrial mechanic (high pressure valves)

Fault table

Fault description	Cause	Remedy	Personnel
Valve without function (with optional electric, pneumatic or hydraulic actuator)	Electric actuator without function	Check electric actuator as specified in the manufacturer's documentation.	Qualified electrician
	Hydraulic actuator without function	Check hydraulic actuator as specified in the manufacturer's documentation.	Hydraulics Specialist
	Pneumatic actuator without function	Check pneumatic actuator as specified in the manufacturer's documentation.	Pneumatics Specialist
Malfunction of the valve	End contacts (with optional electric, pneumatic or hydraulic actuator) are defective	Have the end contacts checked. Prior to readjustment, consult Stahl-Armaturen PERSTA GmbH Customer Service (contact details on page 3).	Qualified electrician
	Torque switch (with optional electric, pneumatic or hydraulic actuator) is defective	Have the torque switch checked. Prior to readjustment, consult Stahl-Armaturen PERSTA GmbH Customer Service (contact details on page 3).	Qualified electrician
	Limit switch (with optional electric, pneumatic or hydraulic actuator) is defective	Have the limit switch checked. Prior to readjustment, consult Stahl-Armaturen PERSTA GmbH Customer Service (contact details on page 3).	Qualified electrician
Jerking lifting movement	Gland packing is too tight	Readjust gland packing, replace if necessary (↪ *Chapter 8.3.3 'Replacing the gland packing' on page 68*).	Industrial mechanic (high pressure valves)

10 Removal, 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 Removal

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

Tool:
- Hoist
- Sling gear

Requirements:

- The relevant pipe section is shut off.
- Valve is in depressurised state.
- Valve has been drained.
- With electric actuator:
  - Power supply is switched off and physically disconnected.
- With hydraulic or pneumatic actuator:
  - Make sure that the customer-provided hydraulic/pneumatic supply is switched off and safeguarded against being switched on again.
  - Hydraulic lines/pneumatic lines are in a depressurised state.
  - Hydraulic lines/pneumatic lines have been removed from the actuator of the valve.

1. Hold the valve in position with a suitable hoist (*Chapter 4.2 'Transport of packed items' on page 38*).
2. Disconnect pipes on inlet side and outlet side from the valve.
3. Remove any supports.
4. Use a suitable hoist to remove the valve from the pipe and set it down so that it is secured against falling over.
5. Clean the assemblies and components as required, and disassemble them.

   In doing so, comply with the 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

11 Technical data

See the scope of delivery of the valve for the technical data.

12 Index

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