

Operating instructions

High pressure globe valves
HD91, HD92 and HD2000



Read the instructions prior to performing any task!

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Information about the operating manual

This manual enables safe and efficient handling of the high pressure valve.

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

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

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

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



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

Scope of the document

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

Designation	Series	Nominal diameter (DN) [mm]	Pressure rate	Class*
HD 91	200 JM	10–65/50	PN 320	≤1850
HD 2000	200 LM	10–65	PN 500	≤3200
HD 2000	202 LM	10–65	PN 500	≤3200
HD 2000	204 LM	10–65	PN 500	≤3200
HD 2000	200 LS	10–65	PN 500	≤3200
HD 92	200 BM	10–65	PN 630	-

* Assignment number in the pipe construction

Other applicable documents

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

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Revision overview

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

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1 Overview

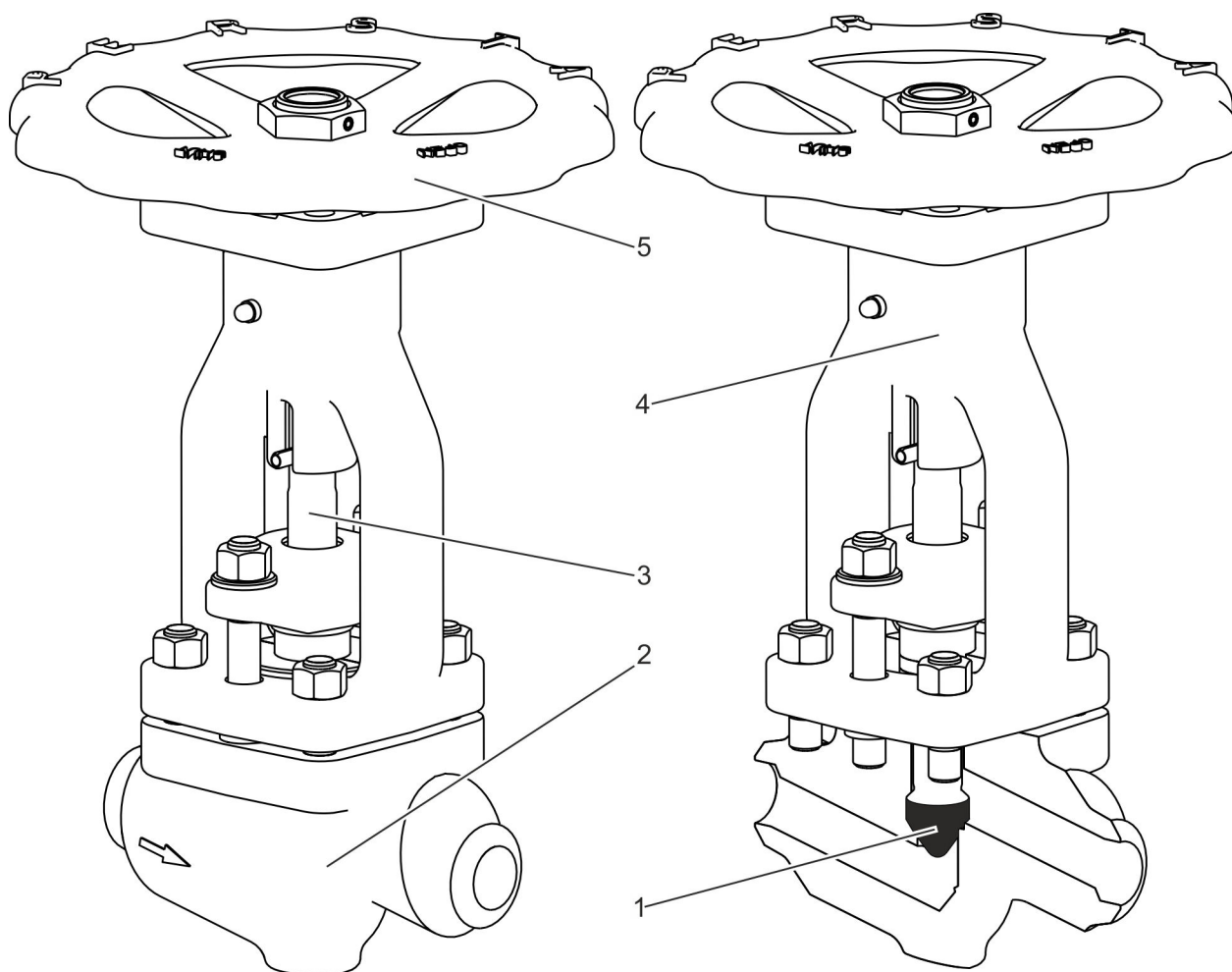


Fig. 1: Overview - high pressure globe valve

Brief description - high pressure globe valve

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

With the high pressure globe valve, depending on the version, it is possible to

- shut-off or
- regulate

the pumping medium flowing through the valve.

The body (Fig. 1/2) of the valve is flanged or welded in the pipe-work, depending on the version.

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

If the high pressure globe valve is used for regulation, the flow of the pumping medium is influenced by the position of the shut-off element.

The shut-off element is driven in or out via the stem. Depending on the version, the stem is activated (Fig. 1/3) manually via a hand-wheel (Fig. 1/4) fixed to the bonnet (Fig. 1/5), electrically, hydraulically or pneumatically.

Tools

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

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.

Mounting sleeve

Sleeve for mounting and dismantling the stem for valve versions with backseat.

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

Example:

1.  Loosen the bolt.

2. 





CAUTION!
Risk of getting pinched by the cover!

Close the cover carefully.

3.  Tighten the bolt.

Special safety instructions

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

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





Tips and recommendations



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

Additional symbols

The following symbols are used throughout this manual 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:

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

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

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

Misuse



WARNING!

Danger in the event of misuse!

Misuse of the valve can cause dangerous situations.

- Do not use the valve as a throttling valve in normal operation.
- Connect the pipes so that they are free of tension.
- Pay attention to the correct installation position of the valve (☞ *Chapter 11 “Technical data” on page 105*).
- Do not use valves as an anchor point.
- Never operate valves at temperatures near or below the freezing point of the pipeline medium.
- Do not exceed the number of permitted load cycles (☞ *Chapter 2.2 “Intended use” on page 11*).

2.3 Safety signs

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



WARNING!

Danger if signs are illegible!

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

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

Rating plate

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

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

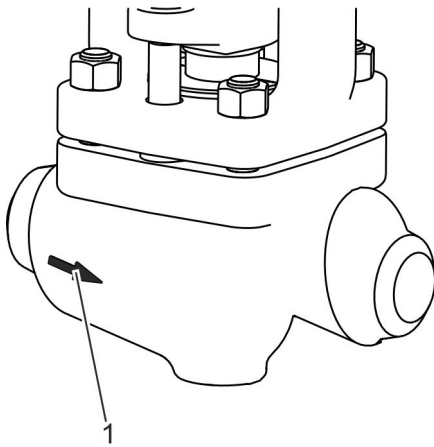
Flow direction arrow


Fig. 2: Flow direction arrow

The flow direction is marked with an arrow on the valve (Fig. 2/1).
Medium flows against the shut-off element from below in the arrow direction.

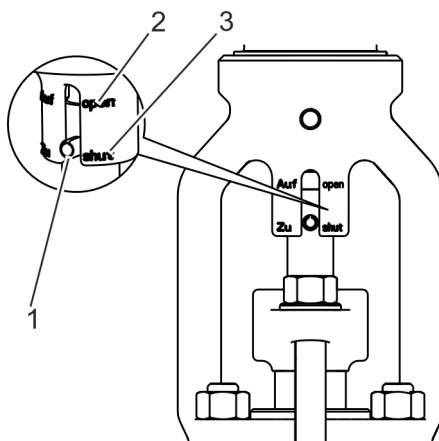
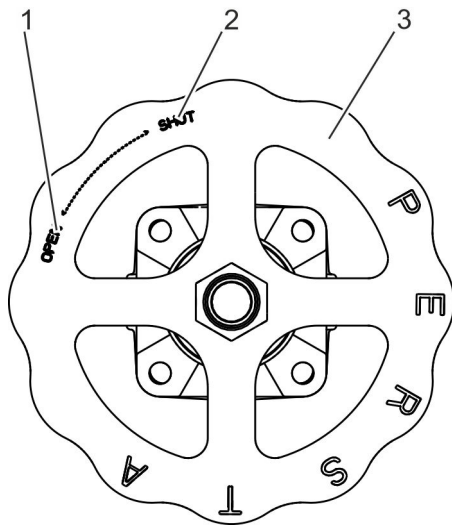
Position indicator (mechanical)


Fig. 3: Mechanical position indicator

The valve has a mechanical position indicator.

A tension pin (Fig. 3/1), which simultaneously functions as an anti-twist device of the stem, is guided within an aperture 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 direction / closing direction indication for manual actuator



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

- Open
- Shut

Fig. 4: Opening direction and closing direction indication

Customer-specific markings

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

2.4 Safety devices

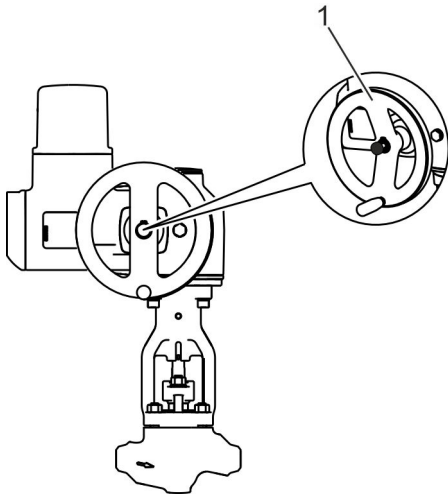
Torque switch

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 controller 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 systems.
- The operating company must obtain information about the applicable occupational health and safety regulations and, in a hazard assessment, identify the additional hazards that may exist at the installation site of the valve due to the specific working conditions. The operating company must integrate this information into operating instructions for the operation of the valve.
- The operating company must ensure that the operating instructions it has drawn up comply with the currently applicable legislation throughout the operating period of the valve and, if necessary, adapt the operating instructions.
- The operating company must clearly define and assign the responsibilities for installation, operation, fault correction, maintenance and cleaning.
- After the installation, the operating company must ensure the proper pickling of the valve.
- The operating company must provide equipment that ensures the safe transition of the valve into a depressurized state.
- The operating company must provide equipment that can completely drain the pipe sections in which the valve is installed as well as the valve itself.
- The operating company must ensure that all personnel who are to handle the valve have read and understood this manual. In addition, the operating company must train the personnel and inform them of the hazards at regular intervals.
- The operating company must provide the required protective equipment for the personnel and instruct the personnel that wearing the required protective equipment is compulsory.
- The operating company must install additional protective devices around the valve if contact with the valve can result in injuries due to the medium in the pipe system.

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

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

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

2.8 Personnel requirements



WARNING!

Danger of injury due to inadequate personnel qualification!

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

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

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

Disposal contractor

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

Forklift truck driver

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

Hydraulics Specialist

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

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

Industrial mechanic (high pressure valves)

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

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

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

Pipeline engineer

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

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

Pneumatics Specialist

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

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

Qualified electrician

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

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

Trained person (hoist)

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

Trained person (operator)

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

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

Basic requirements

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

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

Unauthorised persons



WARNING!

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

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

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

Instruction

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

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

2.9 Personal protective equipment

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

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

Description of the personal protective equipment



The personal protective equipment is described below:

Chemical resistant safety gloves

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


Industrial hard hat

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


Protective gloves

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


Protective work clothing

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


Safety footwear

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


Safety goggles

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

2.10 Spare parts

Incorrect spare parts


WARNING!
Risk of injury if the wrong spare parts are used!

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

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

Selecting spare parts




Spare parts recommendation in the scope of delivery

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

Before installation



Storage of spare parts

Please see  Chapter 4.4 “Storage of spare parts” on page 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
- Residue of the pipeline medium
- Pickling medium
- Anticorrosive
- With hydraulic actuator: hydraulic fluid

3 Functional description

3.1 Mode of operation of the high pressure globe valve

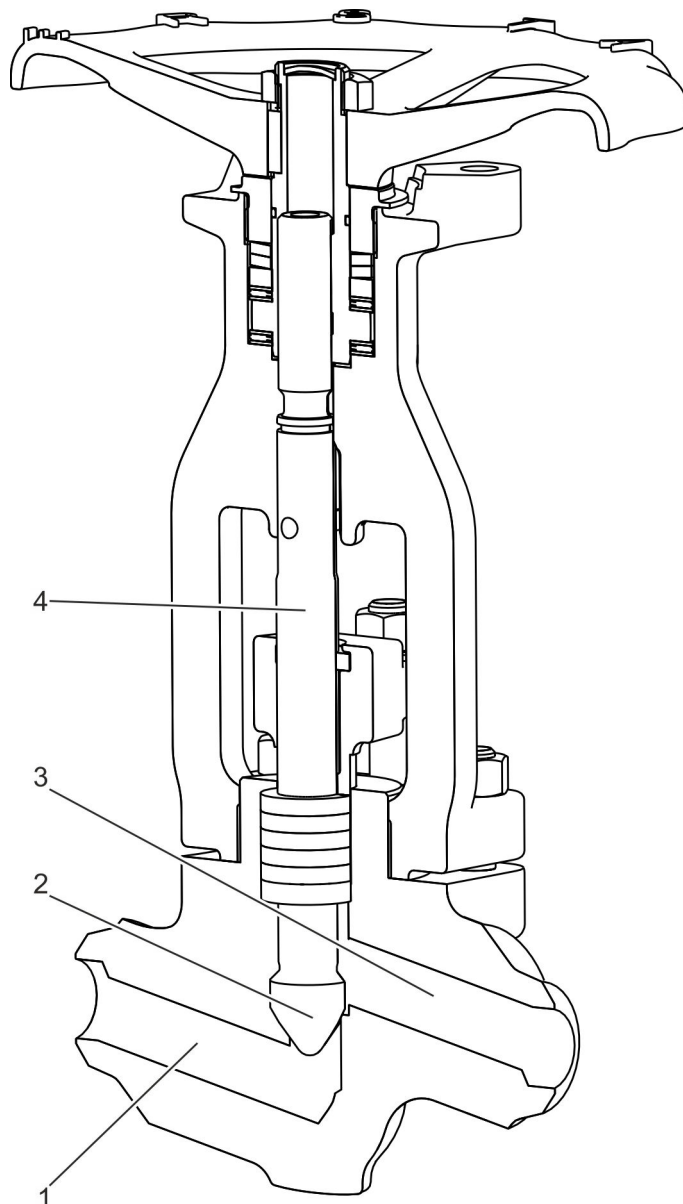


Fig. 6: Sectional view

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 shut-off element is driven to the interior of the valve via a stem (Fig. 6/4). The high pressure globe valves vary in

- type of shut-off element,
- Type of actuator,
- Type of connection,
- Shape of the body.

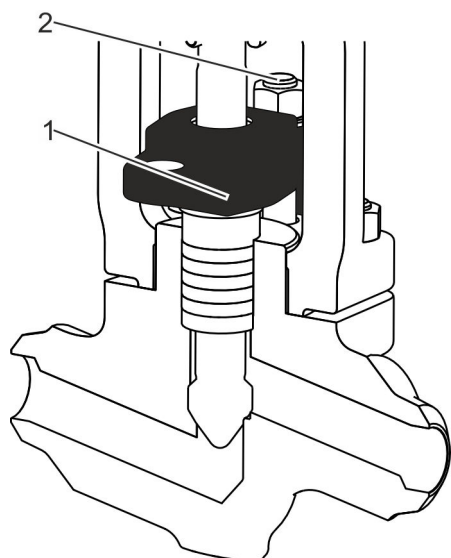
Moreover it is possible that the valve has display elements.

3.2 Versions of the high pressure globe valve

3.2.1 Seal to the outside

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

Gland packing



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

- gland follower,
- chamber ring,
- packing ring

. Through the resulting transverse forming and the axial tensioning of the packing rings, the seal of the stem against the medium is achieved.

Fig. 7: Gland packing

Versions of the packing bolts

Depending on the version, there are stud bolts (Fig. 7/2) or hinged eye bolts (high pressure globe valve HD 92).



Optional live-loaded packing

The stuffing box contact pressure can be applied via a live-loaded packing.

3.2.2 Shut-off element

Variants of shut-off elements

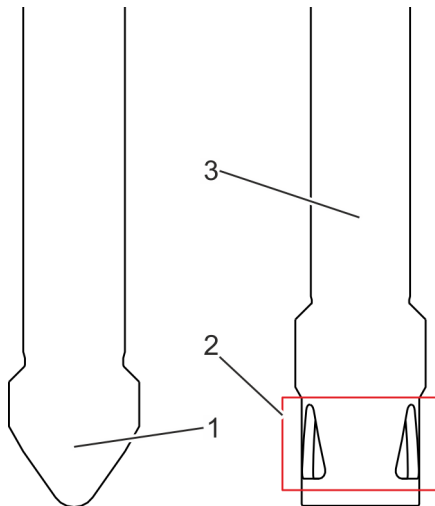


Fig. 8: Throttling valve cone and regulating cone

The high pressure globe valves can be equipped with

- a throttling valve cone (Fig. 8/1) or
- regulating cone (Fig. 8/3)

Throttling valve cone

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

Regulating cone

The regulating cone (Fig. 8/3) is used, if a valve is used to regulate the mass flow.

Depending on the position of the shut-off element, pumping medium flows through the openings in the lower area of the cone (Fig. 8/2).

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

3.2.3 Actuator variants

Manual actuator (handwheel)

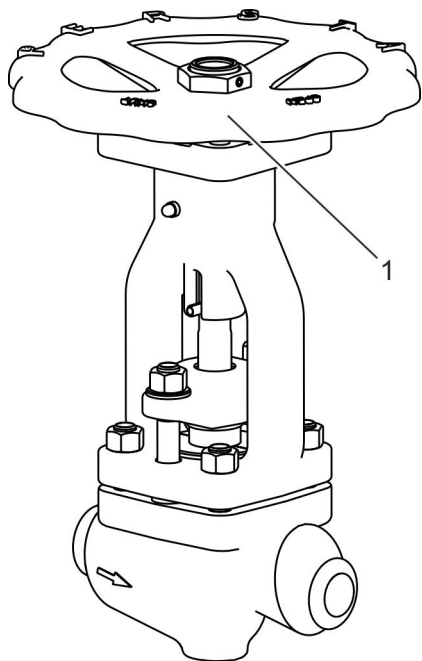


Fig. 9: Manual actuator

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

The handwheel can be attached in the following manner:

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

Electric actuator

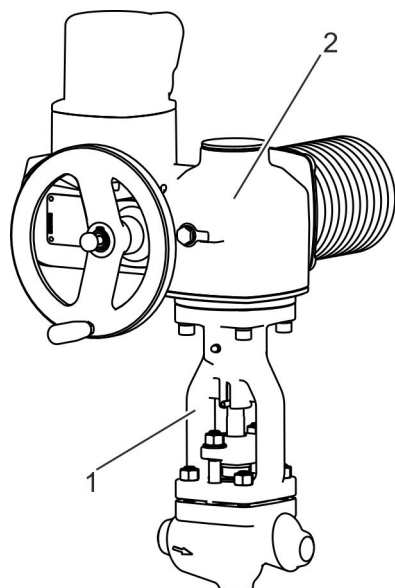


Fig. 10: Bonnet without electric actuator

With the optional electric actuator the stem is driven via an electric motor (Fig. 10/2). The electric motor is connected to the valve and the threaded bush above the bonnet (Fig. 10/1).

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

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

The electric actuator can be attached in the following manner:

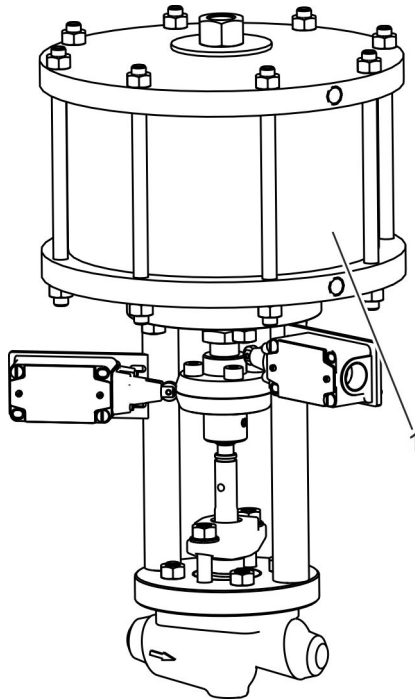
- Direct attachment of the electric actuator
- Bevel gearbox with electric actuator
- Spur gear unit with electric actuator
- Remote actuator

Hydraulic actuator

With the optional hydraulic actuator the stem is driven axially via 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



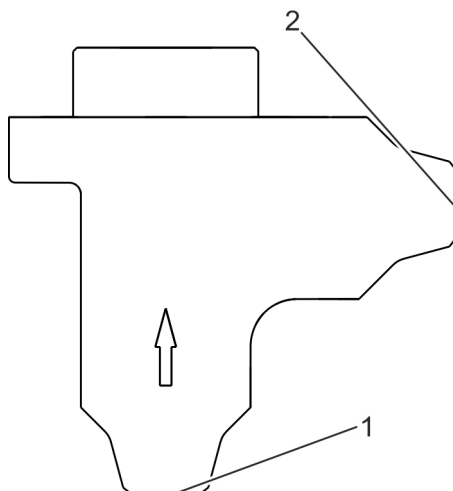
With the optional pneumatic actuator the stem is driven axially via a pneumatic piston actuator (Fig. 11/1).

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

Fig. 11: Pneumatic actuator

3.2.4 Body shape

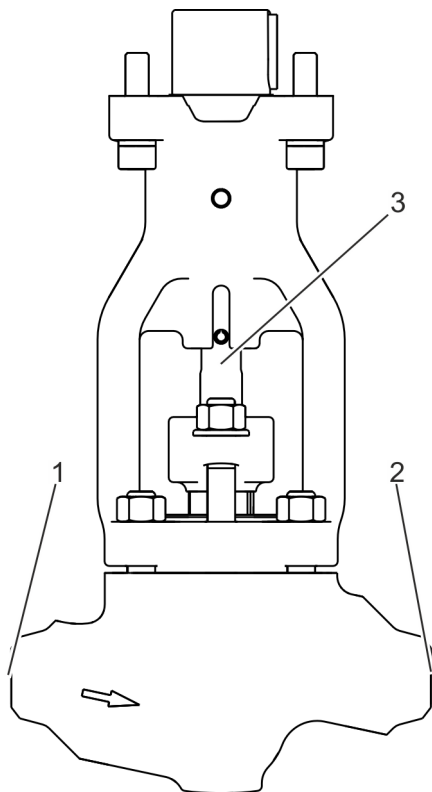
Angle pattern valve



For the version of the valve as angle pattern valve the inlet side (Fig. 12/1) is arranged at a right angle to the outlet side (Fig. 12/2).

Fig. 12: Angle pattern valve

T-pattern valve

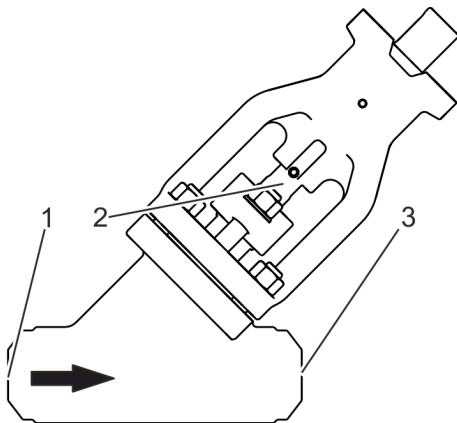


For the T-pattern valve shape the stem position (Fig. 13/3) is vertical.

The inlet side (Fig. 13/1) is on an axis with the outlet side (Fig. 13/2) of the valve.

Fig. 13: T-pattern valve

Y-pattern valve



For the Y-pattern valve the stem position (Fig. 14/2) is not vertical.

The inlet side (Fig. 14/1) is on an axis with the outlet side (Fig. 14/3) of the valve.

Fig. 14: Y-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 display indicates whether the valve position is open or closed.

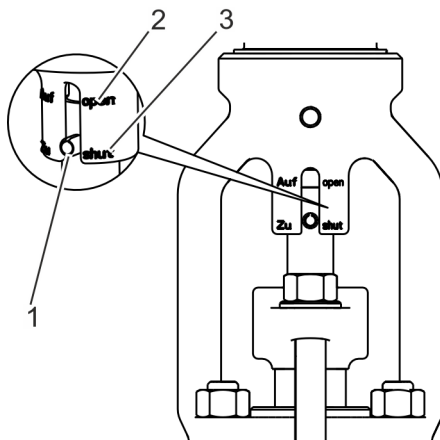
Position indicator (mechanical)


Fig. 15: Mechanical position indicator

The valve has a mechanical position indicator (Fig. 15).

The anti-twist device (pin or claw, Fig. 15/1) fitted to the stem marks the position of the shut-off element on the scale integrated on the bonnet (Fig. 15/2 and 3).

3.3 Connections

Connection in the pipe

Depending on the version the high pressure globe valve can be mounted in the pipe, as a

- Butt-weld valve,
- Flanged valve,
- Socket weld valve,
- Special connection valve

Electrical connections

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



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

Hydraulic connections

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



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

Pneumatic connections

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



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

4 Transport and storage

4.1 Safety notices for transport and storage

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



WARNING!

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

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

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

Suspended loads



WARNING!

Danger of injury due to suspended loads!

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

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

Improper transport



NOTICE!

Material damage due to improper transport!

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

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

4.2 Transport of packages

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

Transporting individual valves

Personnel:	■ Trained person (hoist)
Protective equipment:	■ Industrial hard hat
	■ Protective gloves
	■ Safety footwear
Special tool:	■ Sling gear
	■ Hoist

1. ▶



DANGER!
Unmarked attachment points!

Fasten valve onto the hoist with suitable sling gear.

2. ▶

Slowly lift the valve and identify the position of the centre of gravity.

3. ▶

Transport the valve as close to the ground as possible.

4. ▶

After setting down the valve, safeguard it from falling over.

Transport on a pallet

Personnel:	■ Forklift truck driver
	■ Trained person (hoist)
Protective equipment:	■ Industrial hard hat
	■ Protective gloves
	■ Safety footwear
Special tool:	■ Sling gear
	■ Hoist
	■ Forklift

1. ▶

Ensure that the valve is fixed in place on the pallet.

2. ▶

Transport the pallet to the installation location.

3. ▶

Unload heavy valves from the pallet with a suitable hoist and further transport.

4.3 Storage of the valve

Storage of the valve

Store valves under the following conditions:

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



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

4.4 Storage of spare parts



NOTICE!

Material damage due to reduced service life if stored incorrectly!

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

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

5 Installation

5.1 Safety notices for installation

Electric shock

**DANGER!****Risk of fatal injury from electric shock!**

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

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

Fluid under high pressure

**WARNING!****Danger of injury due to hydraulic energy!**

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

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

Hazards associated with the pneumatic system

**WARNING!****Danger of injury due to pneumatic energy!**

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

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

Faulty installation



WARNING!

Danger due to incorrectly installed valve!

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

- Pay attention to the correct flow direction of the valve (☞ *“Flow direction arrow” on page 13*).
- Pay attention to the correct installation position of the valve (☞ *Chapter 11 “Technical data” on page 105*).
- For valves with an actuator or transmission, ensure that the stem position is vertical.
- In special case and if the stem position is not vertical:
 - Prop up the actuator on the valve head.
 - Ensure that the actuator can follow the position the changes of the pipe.
- For butt-weld valves
 - Prior to welding on, open the valve completely,
 - Fasten the welding counterpole on the body, if possible in the vicinity of the welding point,
 - Execute the welding and the subsequent heat treatment in compliance with the valid welding regulations,
 - Partially execute the thermal treatment.

Wrong screw tightening torque



WARNING!

Danger due to the wrong screw tightening torque!

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

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

Faulty alignment of the valve



NOTICE!

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

Faulty alignment can result in malfunctions of the overall system.

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

5.2 Before the installation

- | | |
|-----------------------|----------------------------|
| Personnel: | ■ Pipeline engineer |
| Protective equipment: | ■ Protective work clothing |
| | ■ Protective gloves |
| | ■ Industrial hard hat |
| | ■ Safety footwear |

1. ➤ Check design parameters and material.
2. ➤ Pay attention to the installation position.
3. ➤ Pay attention to the flow direction.
4. ➤ For butt-weld valves, completely open the butt-weld valve.
5. ➤ Remove any protective caps and preservation agent from the valve.
6. ➤ Ensure that there are no objects or materials in the interior of the valve.

5.3 Installing the valve

- | | |
|-----------------------|----------------------------|
| Personnel: | ■ Pipeline engineer |
| | ■ Trained person (hoist) |
| Protective equipment: | ■ Protective work clothing |
| | ■ Protective gloves |
| | ■ Industrial hard hat |
| | ■ Safety footwear |
| Special tool: | ■ Sling gear |
| | ■ Hoist |

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

For electric actuators, connect the power supply

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

5.4 For electric actuators, connect the power supply

- Personnel: ■ Qualified electrician
- Protective equipment: ■ Protective work clothing
■ Safety footwear

Prerequisite:

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

1. ▶



Terminal diagram and operating manual are located on the actuator.

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

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

5.5 For a hydraulic actuator, connecting the hydraulic system

- Personnel: ■ Hydraulics Specialist
- Protective equipment: ■ Safety goggles
■ Protective work clothing
■ Safety footwear

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

5.6 For a pneumatic actuator, connecting the pneumatic system

- Personnel: ■ Pneumatics Specialist
- Protective equipment: ■ Safety goggles
■ Protective work clothing
■ Safety footwear

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

5.7 After the installation

Harmful substances



WARNING!

Pickling medium is a health hazard!

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

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



WARNING!

Gloss paint is a health hazard!

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

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



WARNING!

Anticorrosive is a health hazard!

Direct contact with the anticorrosive used can have health implications.

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

5.7.1 Pickling the valve



It is possible to pickle the valve in many ways.

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

- Personnel: ■ Pipeline engineer
- Protective equipment: ■ Safety goggles
 ■ Protective work clothing
 ■ Chemical resistant safety gloves
 ■ Safety footwear

1. ➤ During the pickling process, completely open the valve.
2. ➤ For valves with backseat: Drive the stem into the backseat.
3. ➤ Properly pickle the valve.
4. ➤ Close the valve half way after the pickling process.
5. ➤ Completely remove the pickling medium by rinsing.
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 Executing the system pressure test and leak test

- Personnel: ■ Pipeline engineer
- Protective equipment: ■ Industrial hard hat
 ■ Safety goggles
 ■ Protective work clothing
 ■ Protective gloves
 ■ Safety footwear

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

4. ➤ For longer idle periods after the hydrostatic pressure test, replace the anticorrosive in consultation with the manufacturer.

5.7.4 Applying thermal insulation



System-specific equipment

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

- | | |
|-----------------------|----------------------------|
| Personnel: | ■ Pipeline engineer |
| Protective equipment: | ■ Safety goggles |
| | ■ Protective work clothing |
| | ■ Protective gloves |
| | ■ Safety footwear |

1. ➤ If necessary, have the thermal insulation attached by the operating company.
2. ➤ Ensure that all operating elements and stuffing box areas remain permanently accessible and controllable.

The insulation must only reach the upper edge of the bonnet flange (Fig. 16, red arrow).

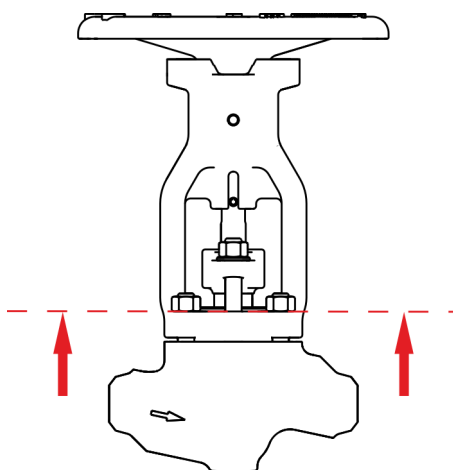


Fig. 16: Upper edge of the insulation

6 Commissioning

6.1 Safety notices for commissioning

Danger of freezing

**WARNING!****Danger of injury due to pipes shattering at freezing temperatures!**

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

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

Pumping medium

**WARNING!****Danger of injury due to pumping medium under pressure!**

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

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

**WARNING!****Pumping medium is a health hazard!**

Contact with the pumping medium can have health implications.

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

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



WARNING!

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

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

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

Thermal dangers



WARNING!

Danger of injury due to high/low temperatures!

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

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

Danger of crushing on stems



WARNING!

Danger of injury on moving parts!

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

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

Wrong screw tightening torque**WARNING!****Danger due to the wrong screw tightening torque!**

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

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

6.2 Prior to commissioning

- Personnel: ■ Pipeline engineer
- Protective equipment: ■ Industrial hard hat
 ■ Safety goggles
 ■ Protective work clothing
 ■ Protective gloves
 ■ Safety footwear

1. ➤ Ensure that the overall system is released for operation.
2. ➤ Fully open the valve by turning the handwheel counterclockwise (Fig. 17/1).
3. ➤ Fully close the valve by turning the handwheel clockwise (Fig. 17/2).
4. ➤ Repeat step 2–3 several times.

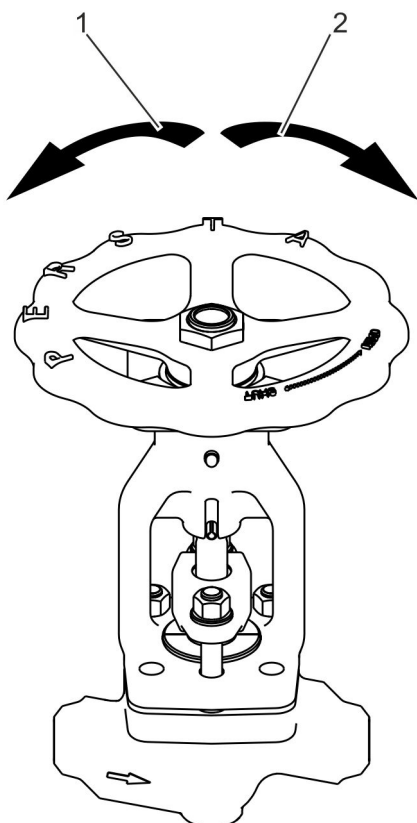


Fig. 17: Valve: Top view

Valve with electric, hydraulic or pneumatic actuator

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

6.3 Executing the commissioning process

Personnel:	<ul style="list-style-type: none"> ■ Pipeline engineer ■ Industrial mechanic (high pressure valves)
Protective equipment:	<ul style="list-style-type: none"> ■ Industrial hard hat ■ Safety goggles ■ Protective work clothing ■ Protective gloves ■ Safety footwear

1. ➤



WARNING!

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

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

2. ➤ Check the stuffing box area for leaks.

3. ➤ Check the pipe connection flanges for leaks.

4. ➤ If necessary, recheck tightening torque in accordance with the manufacturer's/system planner's specifications.

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!

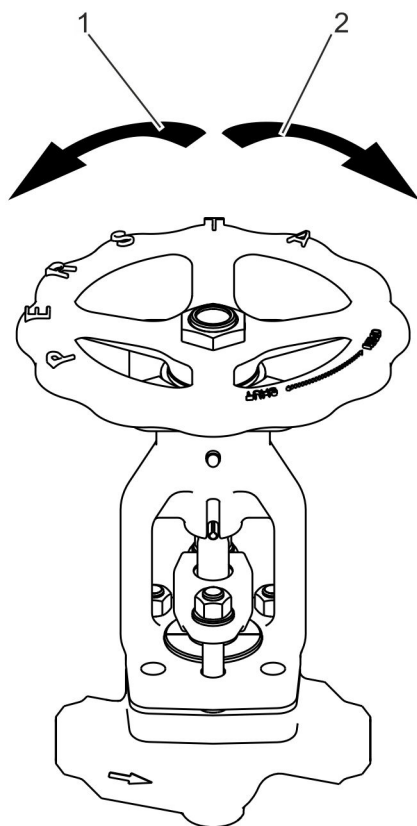
Excessive use of the valve as throttling valve can result in malfunction and material damage due to overstressing of the components.

- 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: | <ul style="list-style-type: none"> ■ Industrial mechanic (high pressure valves) ■ Trained person (operator) |
| Protective equipment: | <ul style="list-style-type: none"> ■ Industrial hard hat ■ Safety goggles ■ Protective work clothing ■ Protective gloves ■ Safety footwear |



- Activate handwheel on the valve:
- Turn clockwise (Fig. 18/2): Close valve.
 - Turn counterclockwise (Fig. 18/1): Open valve.

Fig. 18: Manual actuator: Activating the handwheel

Operating a valve with electric actuator



Valve is operated through the higher-level or local control system.

Operating the valve in an emergency

Operating a valve with hydraulic or pneumatic actuator



Valve is operated through the higher-level or local control system.

7.3 Operating the valve in an emergency



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

Activating 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

→ Operate the handwheel.

- Turn clockwise (Fig. 19/2): Close valve.

- Turn counterclockwise (Fig. 19/1): Open valve.

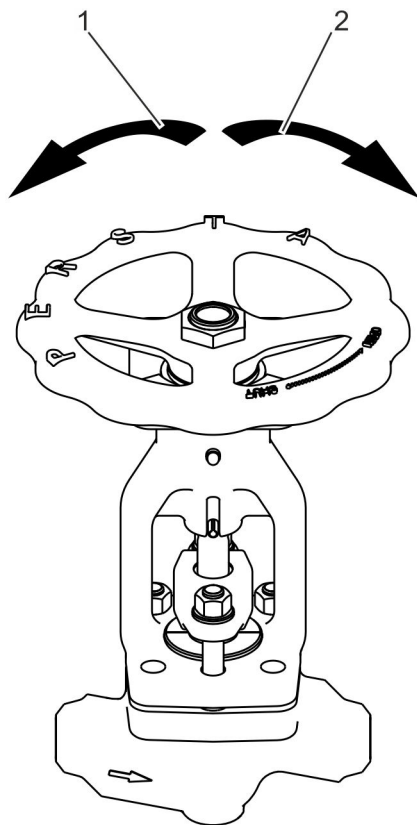


Fig. 19: Manual actuator: Activating the handwheel in an emergency

Activating a valve with electric actuator in an emergency



Coupling/uncoupling the handwheel

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

- | | |
|-----------------------|---|
| Personnel: | <ul style="list-style-type: none"> ■ Industrial mechanic (high pressure valves) ■ Trained person (operator) |
| Protective equipment: | <ul style="list-style-type: none"> ■ Industrial hard hat ■ Safety goggles ■ Protective work clothing ■ Protective gloves ■ Safety footwear |

Prerequisite:

- The electric actuator cannot be used.
1. ➤ Safeguard the affected system area.
 2. ➤ Couple the handwheel (Fig. 20/3).
 3. ➤ Operate the handwheel.
 - Turn clockwise (Fig. 20/2): Close valve.
 - Turn counterclockwise (Fig. 20/3): Open valve.

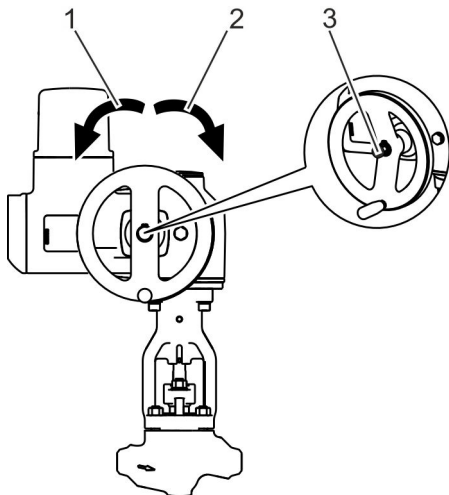


Fig. 20: Electric actuator: Activating the handwheel in an emergency (shown: HD 2000)

Activating a valve with hydraulic or pneumatic actuator in an emergency



Activating a hydraulic or pneumatic actuator in an emergency

See the documentation for the hydraulic or electric actuator for information on emergency activation 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 previously used sealing elements!**

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

After each dismantling of the stem

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

Damage of sealing surfaces and slide faces



NOTICE!

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

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

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

Increased wear



NOTICE!

Material damage due to excessive use as throttling valve!

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

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

8.2 Maintenance schedule

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

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

Interval	Maintenance work	Personnel
Depending on activation frequency, operating and ambient conditions/specified by the operating company	Check the valve visually for leaks (↪ <i>Chapter 8.3.1 “Visually checking the valve” on page 67</i>)	Trained person (operator)
	Lubricate the stem and bearing (↪ <i>Chapter 8.3.2 “Lubricating moving parts (stem thread)” on page 68</i>)	Trained person (operator)
Use as throttling valve: depending on activation frequency, operating and ambient conditions/specified by the operating company	Check the stem for increased wear (↪ <i>Chapter 8.3.4 “Dis-mounting and checking the stem” on page 89</i>)	Industrial mechanic (high pressure valves)
Every six months	Activate valve (open/close, ↪ <i>Chapter 7.2 “Operating the valve” on page 57</i>)	Trained person (operator)
Depending on duration of use, operating and ambient conditions	Replacing the gland packing (↪ <i>Chapter 8.3.3 “Replacing the gland packing” on page 69</i>)	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 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. ▶



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

For electric actuator: Couple the handwheel.

3. ▶



Comply with the instructions in the manufacturer's documentation for the hydraulic/pneumatic actuator.

For pneumatic and hydraulic actuator: Operate the valve via the controller.

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. 21/1).

6. ▶ Completely close valve.

7. ▶ Repeat step 4–6 several times.

8. ▶



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

For electric actuator: Uncouple the handwheel.

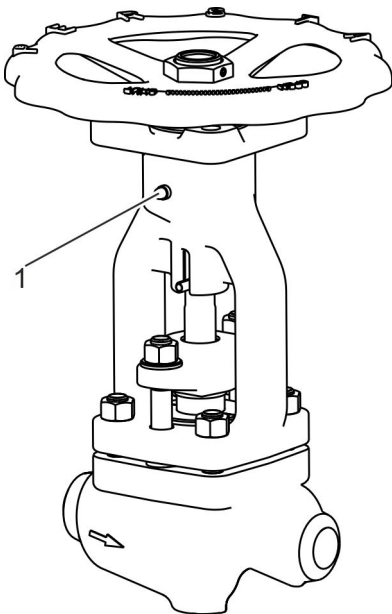


Fig. 21: Version with lubricating nipple

8.3.3 Replacing the gland packing

Procedure with manual actuator (handwheel)

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

Personnel:	<ul style="list-style-type: none"> ■ Industrial mechanic (high pressure valves) ■ Trained person (hoist)
Protective equipment:	<ul style="list-style-type: none"> ■ Industrial hard hat ■ Safety goggles ■ Protective work clothing ■ Protective gloves ■ Safety footwear
Special tool:	<ul style="list-style-type: none"> ■ Knock-out tool ■ Hoist ■ Sling gear ■ Spacers

Prerequisites:

- The valve must be cooled/heated-up to ambient temperature.
- Depressurised status must have been established.
- For all other actuator types: The actuator must have been dismounted.
- The valve must have been driven into the middle position.

Dismounting the bonnet

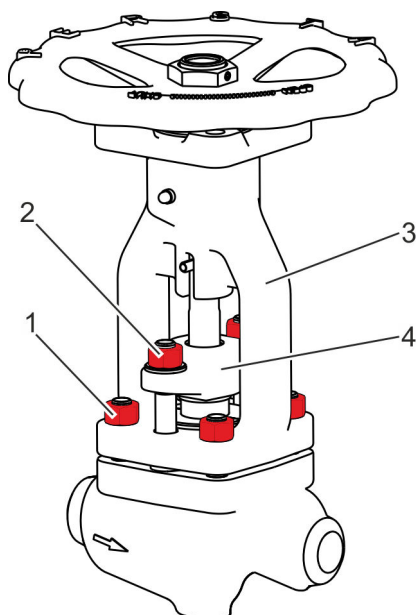


Fig. 22: Removing nuts

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

4. →



WARNING!

Danger of injury due to pressurised valve!

Loosen and remove the nuts (Fig. 22/1) on the bonnet (Fig. 22/3).

5. → Loosen and remove the nuts including washers (Fig. 22/2) on the gland follower flange (Fig. 22/4).

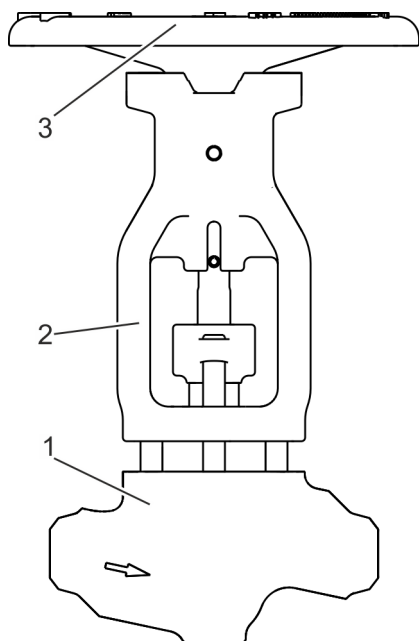


Fig. 23: Activating the handwheel

6. ▶ Activate the handwheel (Fig. 23/3) in the close direction.
 - ⇒ The bonnet (Fig. 23/2) lifts off of the body (Fig. 23/1).

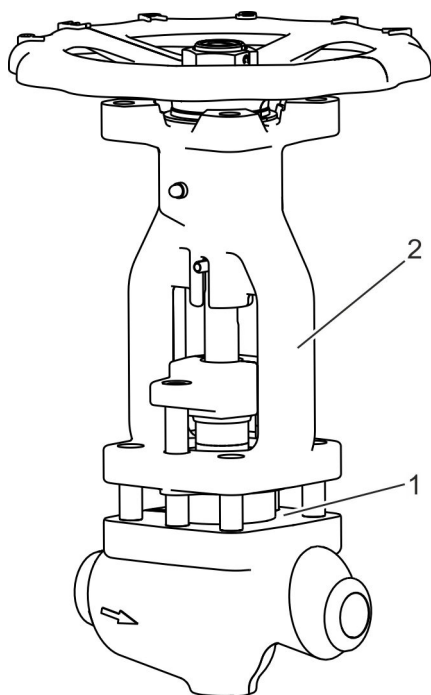


Fig. 24: Positioning the nuts

7. ▶ Position two spacers of the same height opposite each other between the body (Fig. 24/1) and the bonnet (Fig. 24/2).
8. ▶ Activate the handwheel in the open direction.
 - ⇒ The bonnet will be lowered onto the spacers.
9. ▶ Ensure that the bonnet rests on the spacers parallel to the body.
10. ▶ Activate the handwheel in the open direction.
 - ⇒ The gland packing will be partially pulled out of the body.

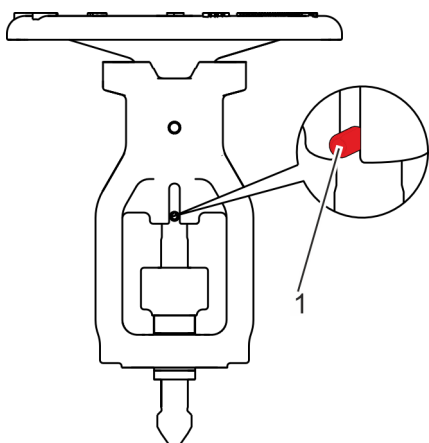


Fig. 25: Taking off the bonnet

- 11.** Detach the complete bonnet including the stem and gland packing from the housing with the hoist.
- 12.** Remove the spacers from the body.
- 13.** Ensure that no spacers have fallen into the body.

Dismounting the stem

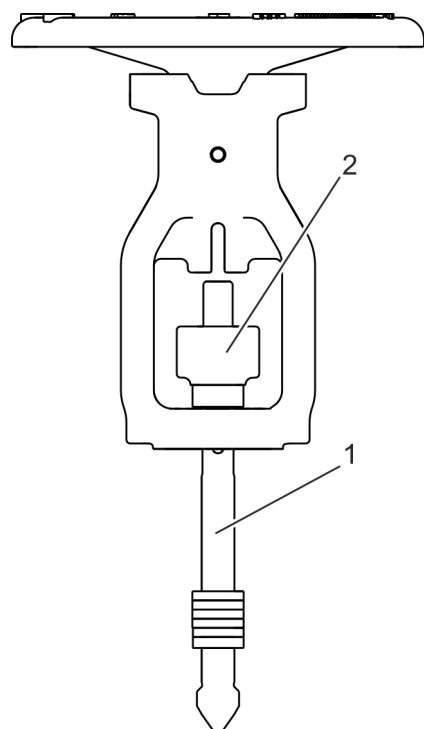


Fig. 26: Unscrewing the stem

- 14.** Drive the anti-twist device (Fig. 25/1) out of the stem with the knock-out tool.
- 15.** Unscrew the stem (Fig. 26/1) from the threaded bush.
- 16.** Take the gland follower flange (Fig. 26/2) off of the stem.
- 17.** Carefully remove the stem (Fig. 26/1) from the disc.

Removing the gland packing

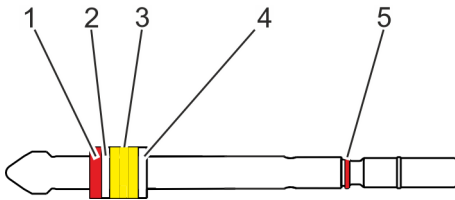


Fig. 27: The stem varies with stuffing box elements (number of packing rings varies)

Cleaning the stem

- 18.▶ Take the O-ring (Fig. 27/5) off of the stem.
- 19.▶ Take the chamber ring (Fig. 27/4) off of the stem.
- 20.▶ Take the packing ring (Fig. 27/3) off of the stem.
- 21.▶ Take the chamber ring (Fig. 27/2) off of the stem.
- 22.▶ Take the bottom ring (Fig. 27/1) off of the stem.

23.▶



NOTICE!

Material damage due to the mechanical processing of support surfaces!

Remove the residues of the bottom ring, O-ring, chamber ring and packing rings from the stem.

24.▶



WARNING!

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



Chamber rings are equipped with a metal cap on one side, or are marked with a white dot.

If present: Remove the white dot from the chamber ring.

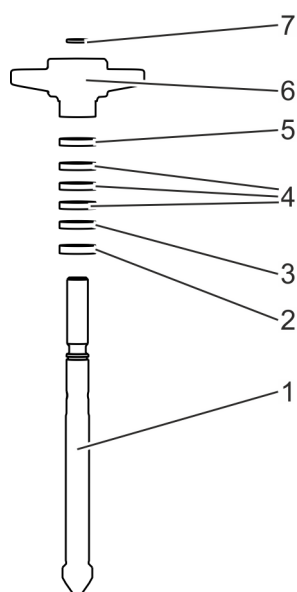
Mounting the gland packing


Fig. 28: Mounting the gland packing
(number of packing rings varies)

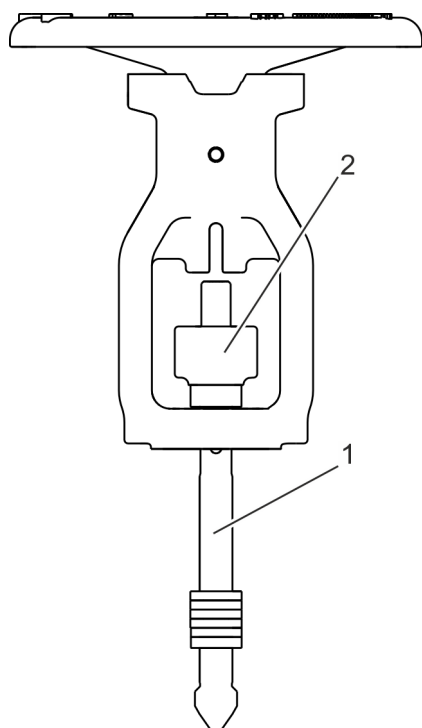
Mount the stem


Fig. 29: Screwing in the stem

- 25. ➤ Fit the bottom ring (Fig. 28/2) on the stem (Fig. 28/1).
- 26. ➤ If a chamber ring (Fig. 28/3) with a metal cap is used, fit the chamber ring (Fig. 28/3) onto the stem (Fig. 28/1) with the metal cap aligned to the bottom ring (Fig. 28/2).

27. ➤



Number of packing rings varies.

Fit the packing rings (Fig. 28/4) on the stem.

- 28. ➤ If a chamber ring (Fig. 28/5) with a metal cap is used, fit the chamber ring (Fig. 28/5) onto the stem (Fig. 28/1) with the metal cap aligned to the gland follower flange (Fig. 28/6).
- 29. ➤ Fit the O-ring (Fig. 28/7) on the stem.

30. ➤ Insert the stem (Fig. 28/1) into the bonnet.

31. ➤ Fit the gland follower flange (Fig. 28/6) on the stem.

32. ➤



Pay attention to the left-hand thread.

Screw the stem (Fig. 29/1) into the threaded bush on the handwheel.

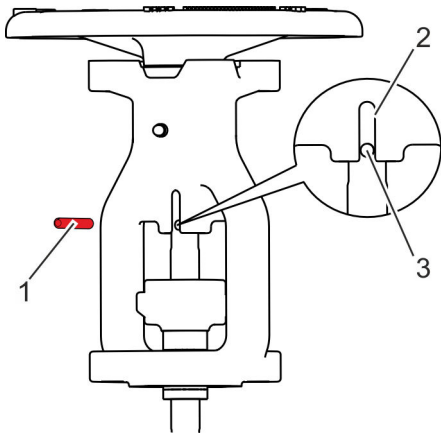


Fig. 30: Aligning the anti-twist device

- 33.▶ Ensure that the anti-twist device (Fig. 30/1) is fitted in the bore (Fig. 30/3) of the stem and can be driven in the aperture (Fig. 30/2) on the bonnet.
- 34.▶ Mount the anti-twist device (Fig. 30/1) in the stem.
- 35.▶ Bring the stem into the OPEN position.

36.▶ **NOTICE!**
Material damage due to the mechanical processing of support surfaces!

Completely remove the residues of the gland packing in the body.

Mounting the bonnet

- 37.▶ Fasten the bonnet onto the hoist with suitable sling gear.
- 38.▶ Lift the bonnet above the body.
- 39.▶

39.▶ **NOTICE!**
Material damage due to careless lowering of the cone into the body!

Introduce the stem into the body.

- 40.▶ Fit the bonnet (Fig. 31/2) onto the stud bolts on the body (Fig. 31/1).

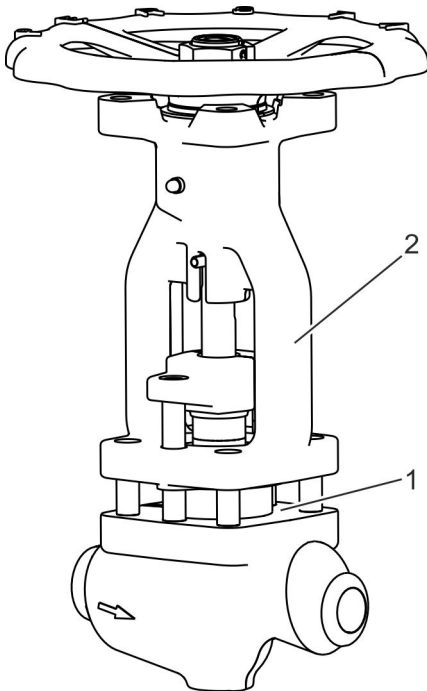


Fig. 31: Fitting on the bonnet

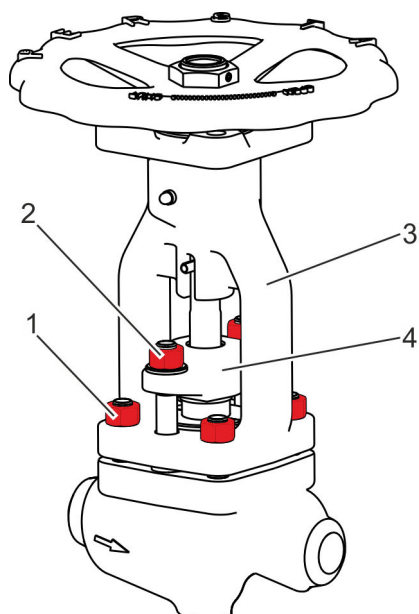


Fig. 32: Screwing on nuts

- 41. Loosely screw the nuts (Fig. 32/1) with the stud bolts into the body.
- 42. Fit the gland follower flange (Fig. 32/4) onto the stud bolts in the body.
- 43. Fit washers onto the stud bolts for the threaded connection of the gland follower flange.
- 44. Loosely screw together the nuts (Fig. 32/2) with the stud bolts into the body.

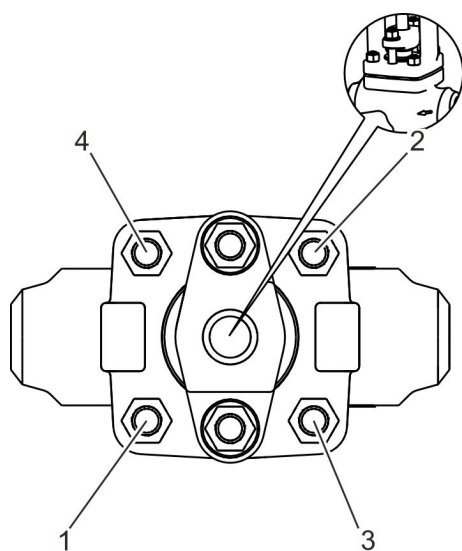


Fig. 33: Tightening the nuts in a cross pattern

45.



WARNING!

Danger of injury due to the wrong tightening torque!

Tighten the nuts on the bonnet in a cross pattern (Fig. 33/1–4) as specified by the manufacturer.

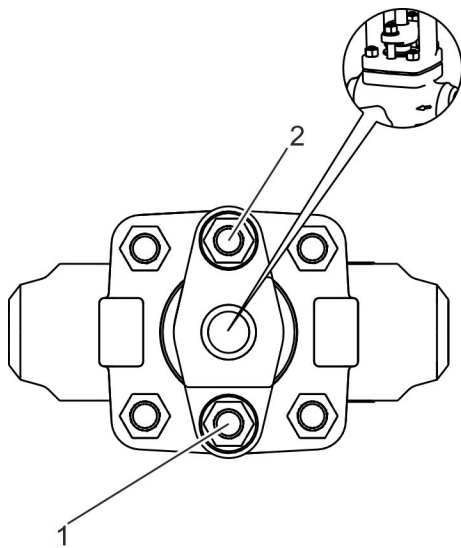


Fig. 34: Tightening the nuts on the gland follower flange

46.▶



WARNING!

Danger of injury due to the wrong tightening torque!

Tighten the nuts to the gland follower flange (Fig. 34/1 and 2) as specified by the manufacturer.

47.▶

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 dismantling the pneumatic or hydraulic actuator.



Use a hook wrench after dismantling the actuator

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

- | | |
|-----------------------|---|
| Personnel: | <ul style="list-style-type: none"> ■ Industrial mechanic (high pressure valves) ■ Qualified electrician ■ Trained person (hoist) |
| Protective equipment: | <ul style="list-style-type: none"> ■ Industrial hard hat ■ Safety goggles ■ Protective work clothing ■ Protective gloves ■ Safety footwear |
| Special tool: | <ul style="list-style-type: none"> ■ Knock-out tool ■ Hoist ■ Sling gear ■ Hook wrench ■ Spacers |

Prerequisites:

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

1.



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

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

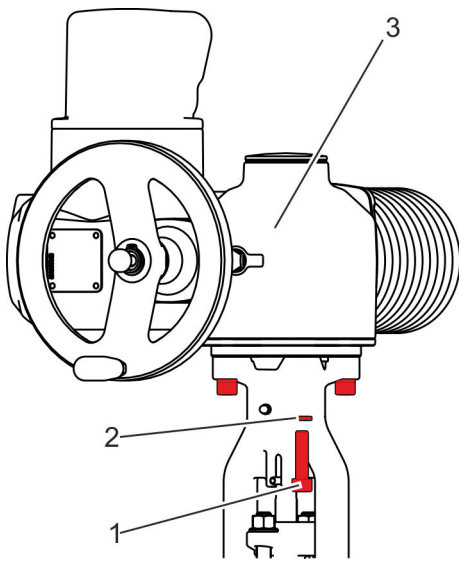


Fig. 35: Removing the screws

2. ➤ Unscrew the fastening screws (Fig. 35/1) of the electric actuator (Fig. 35/3) and remove them together with the washers (Fig. 35/2).
3. ➤ Take off the electric actuator (Fig. 35/3) and store it outside of the work area.

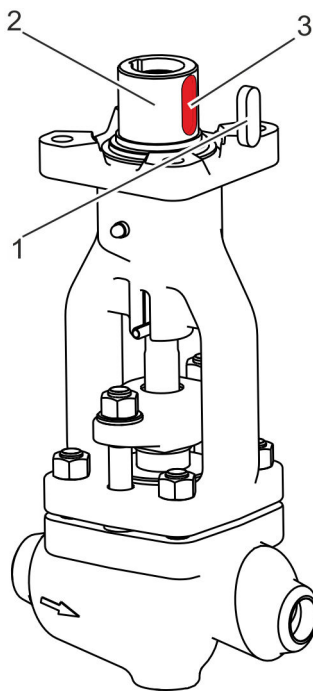


Fig. 36: Removing the feather key

4. ➤ Remove the feather key (Fig. 36/1) from the feather key groove (Fig. 36/3) of the hub (Fig. 36/2) of the threaded bush.

5. ➤



Use a hook wrench instead of the handwheel.

Carry out steps 1–46 from  “Procedure with manual actuator (handwheel)” on page 69.

Mounting the electric actuator

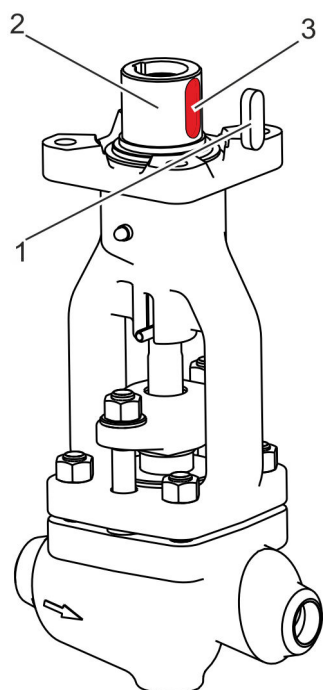


Fig. 37: Inserting the feather key

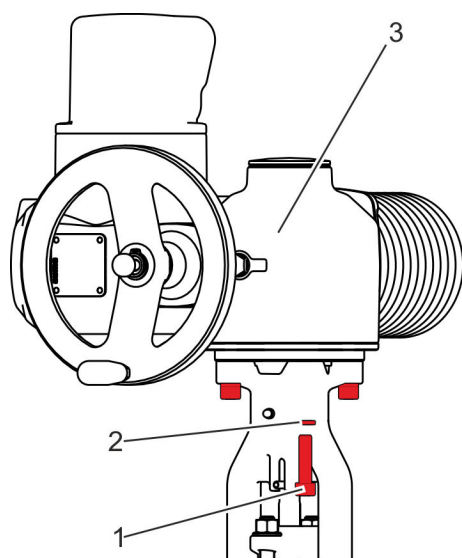


Fig. 38: Fastening the electric actuator

6. ➔ Insert the feather key (Fig. 37/1) into the feather key groove (Fig. 37/3) on the hub (Fig. 37/2).

7. ➔



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

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

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

9. ➔



Ensure that the feather key is properly seated.

Lower the electric actuator onto the flange on the bonnet.

10. ➔ Fix the actuator (Fig. 38/3) to the bonnet using screws (Fig. 38/1) and washers (Fig. 38/2).

11. ➔



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

Tighten the screws (Fig. 38/1) as specified by the manufacturer.

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

Procedure for valves with backseat (series 200 LS)

Replacement of the gland packing for a version of the valve with backseat as well as manual actuator (handwheel) is described below.



For versions with an electric, pneumatic or hydraulic actuator, activate the stem for the following functions as described in [☞](#) “Procedure for electric, pneumatic or hydraulic actuator” on page 77.

- | | |
|-----------------------|---|
| Personnel: | <ul style="list-style-type: none"> ■ Industrial mechanic (high pressure valves) ■ Qualified electrician ■ Trained person (hoist) |
| Protective equipment: | <ul style="list-style-type: none"> ■ Industrial hard hat ■ Safety goggles ■ Protective work clothing ■ Protective gloves ■ Safety footwear |
| Special tool: | <ul style="list-style-type: none"> ■ Knock-out tool ■ Sling gear ■ Hoist ■ Mounting sleeve |

Prerequisites:

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

1. →



WARNING!
Danger of injury due to pressurised valve!

Loosen and remove the nuts including washers (Fig. 39/1) on the gland follower flange (Fig. 39/2).

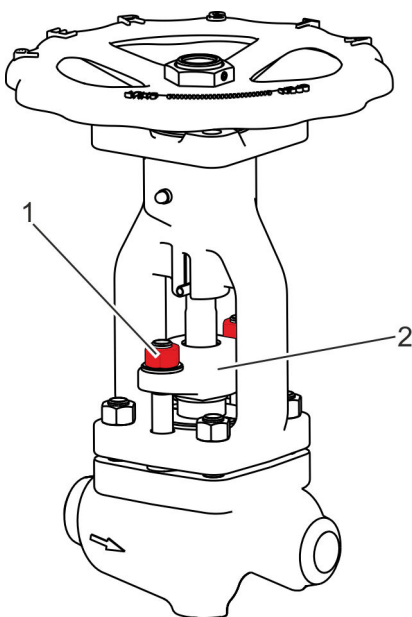


Fig. 39: Removing nuts

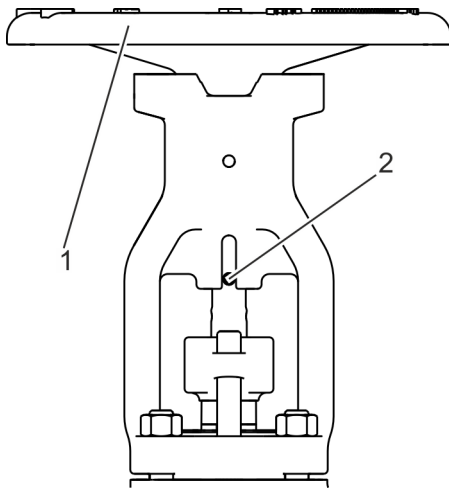


Fig. 40: Closing the valve

2. ➤ Activate the handwheel (Fig. 40/1) in the close direction.
3. ➤ Drive the anti-twist device (Fig. 40/2) out of the stem with the knock-out tool.

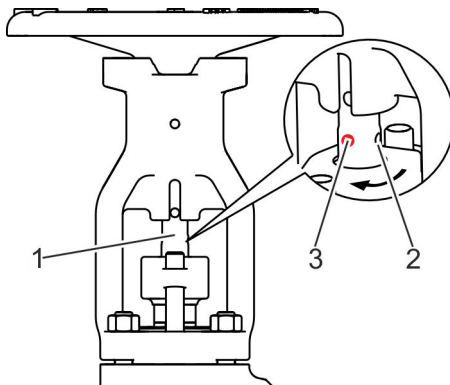


Fig. 41: Turning the stem 90 degrees

4. ➤ Insert the knock-out tool in the bore (Fig. 41/2).
5. ➤ Turn the stem (Fig. 41/1) by 90°, until the bore (Fig. 41/2) is aligned to the front (Fig. 41/3).
6. ➤ Use the knock-out tool to safeguard the stem (Fig. 41/1) against twisting, in the bore aligned to the front (Fig. 41/3).
7. ➤ Activate the handwheel in the open direction.
8. ➤ Open the valve completely.
9. ➤ Remove the knock-out tool from the bore.

Dismounting the bonnet and gland follower flange

10. ➤ Attach bonnet to the hoist with suitable sling gear.
11. ➤ Use the hoist to safeguard the bonnet from falling off of the body.
12. ➤ Ensure that the bonnet and the body cannot be lifted by the hoist.

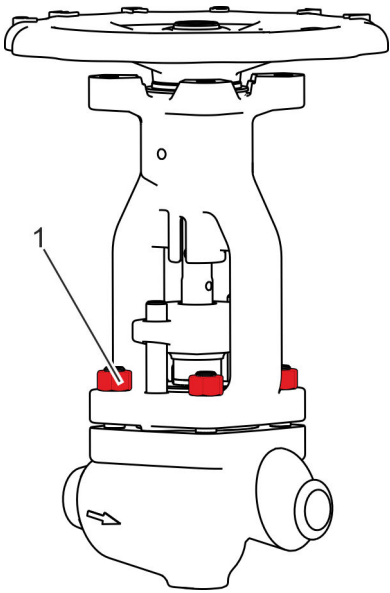


Fig. 42: Remove the nuts on the bonnet

13. Loosen and remove the nuts (Fig. 42/1) on the bonnet.

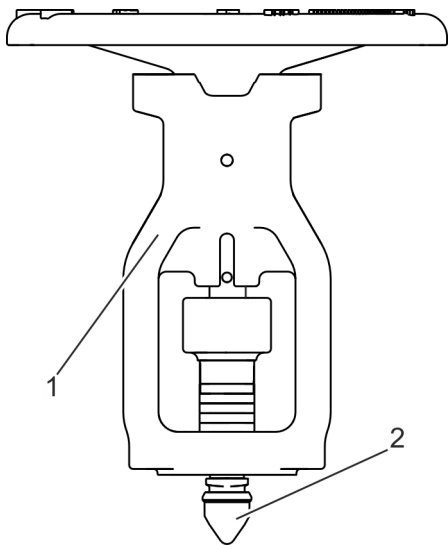


Fig. 43: Taking off the bonnet

14. Detach the bonnet (Fig. 43/1) with mounted gland follower flange and stem, from the body.

15. Unscrew the stem (Fig. 43/2) from the threaded bush on the handwheel.

Removing the gland packing

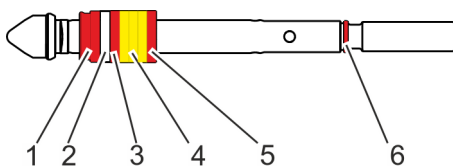


Fig. 44: Stem with stuffing box elements

16. Take the O-ring (Fig. 44/6) off of the stem.

17. Take the chamber ring (Fig. 44/5) off of the stem.

18. Take the packing ring (Fig. 44/4) off of the stem.

19. Take the chamber ring (Fig. 44/3) off of the stem.

20. Take the bottom ring (Fig. 44/2) off of the stem.

21. Take the backseat ring (Fig. 44/1) off of the stem.

22. ▶



NOTICE!
Material damage due to the mechanical processing of support surfaces!

Remove the residues of bottom ring, backseat ring, O-ring, chamber ring and packing rings from the stem.

23. ▶



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

Fit the new backseat ring (Fig. 45/2) on the stem (Fig. 45/1).

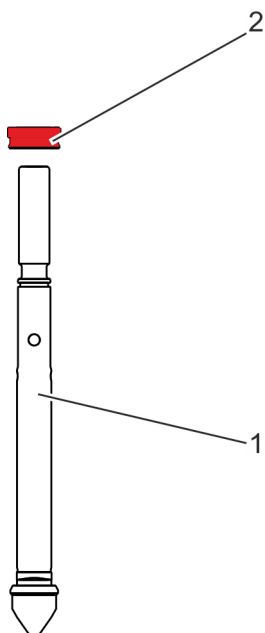


Fig. 45: Mounting the backseat ring

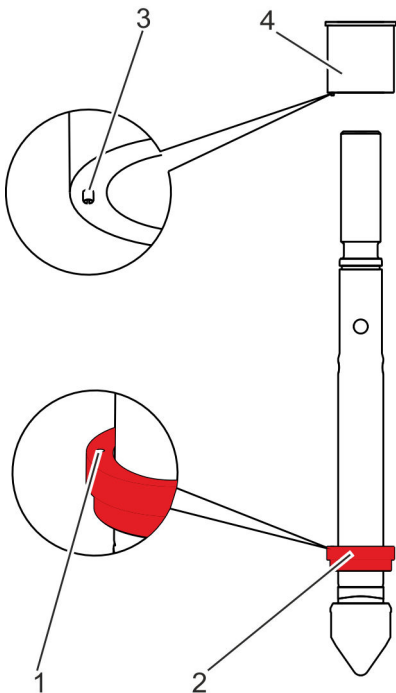


Fig. 46: Fitting on the mounting sleeve

- 24.** ▶ Fit the mounting sleeve (Fig. 46/4) on the stem.
- 25.** ▶ Insert the centring pin (Fig. 46/3) of the mounting sleeve (Fig. 46/4) in the centring bore (Fig. 46/1) of the backseat ring (Fig. 46/2).
- 26.** ▶ Insert the stem into the body.

Mounting the bonnet and gland follower flange

- 27.** ▶ Attach bonnet to the hoist with suitable sling gear.
- 28.** ▶ Screw the gland follower flange and bonnet onto the stem.
- 29.** ▶ Fit the bonnet onto the stud bolts on the body.
- 30.** ▶ Fit the gland follower flange onto the stud bolts on the body.
- 31.** ▶ Loosely screw together the bonnet and nuts (Fig. 47/1) onto the stud bolts in the body.

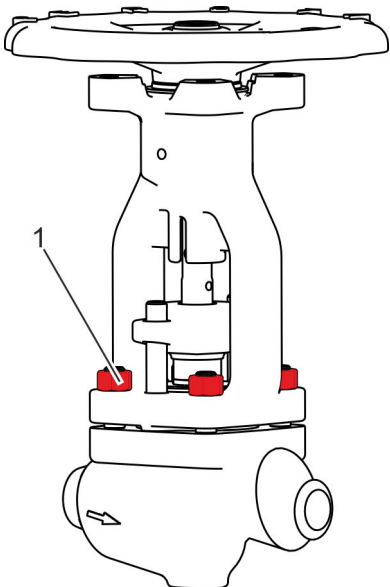


Fig. 47: Screw fastening the bonnet

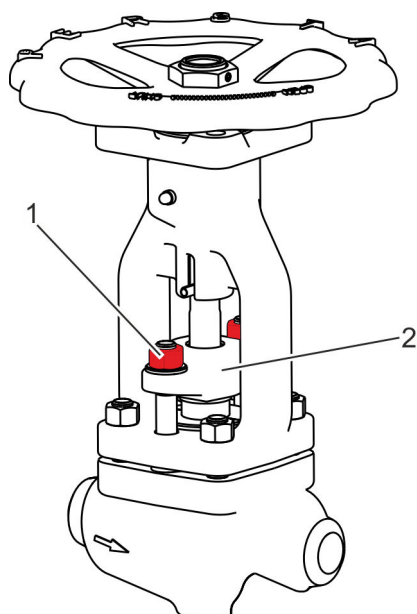


Fig. 48: Screw fastening the gland follower flange

Dismounting the bonnet and gland follower flange

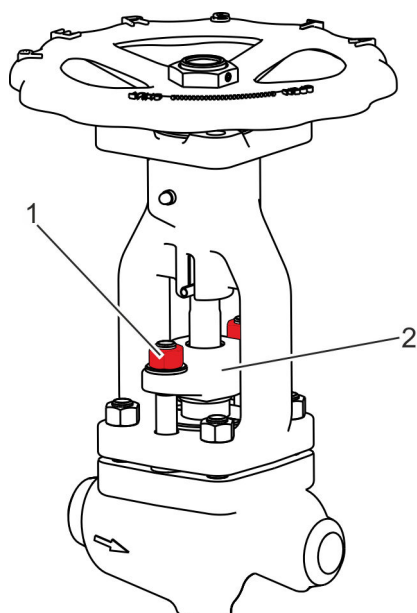


Fig. 49: Unscrewing the threaded connections on the gland follower flange

32. Loosely screw together the gland follower flange (Fig. 48/2) with washers and nuts (Fig. 48/1) onto the stud bolts in the body.
33. Remove the sling gear from the bonnet.
34. Align the mark on the mounting sleeve with the marking bore on the body.
35. Brace the backseat ring with mounting sleeve, gland follower flange, stud bolts and nuts.
36. Ensure that the gap between the body and mounting sleeve is not greater than 1.5 mm.
37. Use the knock-out tool to safeguard the stem against twisting.
38. Activate the handwheel in the open direction.
 - ⇒ The stem will be driven upward.
39. Activate the handwheel with a maximum manual force of 400 N.
 - ⇒ The backseat ring is beaded.
40. Offload the stem in the middle position.
41. Attach the bonnet to the hoist with suitable sling gear.
42. Use the hoist to safeguard the bonnet from falling off of the body.
43. Ensure that the bonnet and body cannot be lifted by the hoist.
44. Loosen and remove the nuts including washers (Fig. 49/1) on the gland follower flange (Fig. 49/2).

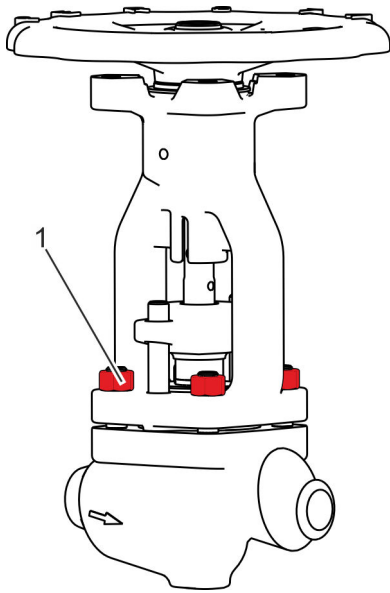


Fig. 50: Unscrewing the threaded connections on the bonnet

- 45. ▶ Loosen and remove the nuts (Fig. 50/1) on the bonnet.
- 46. ▶ Activate the handwheel in the close direction and completely close valve.
- 47. ▶ Take the bonnet and gland follower flange off of the body with the hoist.
 - ⇒ The stem remains in the body.
- 48. ▶ Take the mounting sleeve off of the stem.
- 49. ▶



WARNING!

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



Chamber rings are equipped with a metal cap on one side, or are marked with a white dot.

If present: Remove the white dot from the chamber ring.

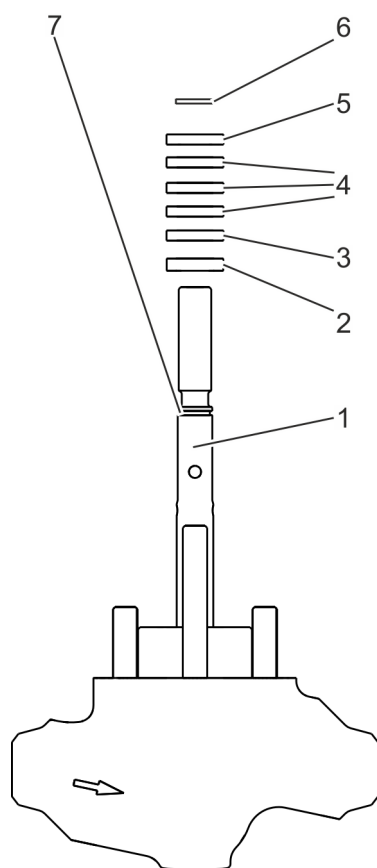
Mounting the gland packing


Fig. 51: Mounting the packing
(number of packing rings varies)

Mounting the bonnet and gland follower flange

- 50.** Fit the bottom ring (Fig. 51/2) on the stem (Fig. 51/1).
- 51.** If a chamber ring (Fig. 51/3) with a metal cap is used, fit the chamber ring (Fig. 51/3) onto the stem (Fig. 51/1) with the metal cap aligned to the bottom ring (Fig. 51/2).

52.


Number of packing rings varies.

Fit the packing rings (Fig. 51/4) on the stem.

- 53.** If a chamber ring (Fig. 51/5) with a metal cap is used, fit the chamber ring (Fig. 51/5) onto the stem with the metal cap aligned to the O-ring (Fig. 51/6).
- 54.** Fit the O-ring (Fig. 51/6) on the stem and slide it into the intended groove (Fig. 51/7).

- 55.** Mount the bonnet and gland follower flange as described in step 27–33.

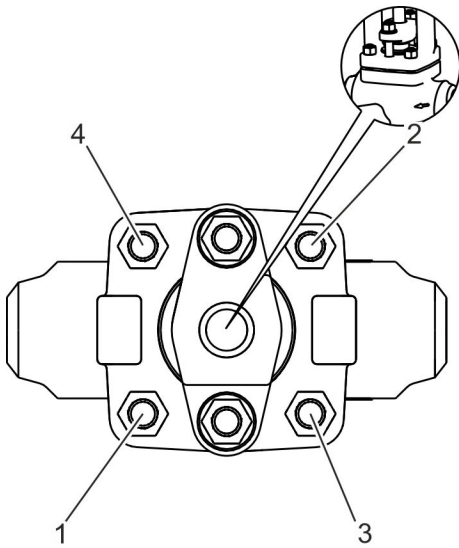


Fig. 52: Tightening the nuts in a cross pattern

56. Tighten the nuts on the bonnet in a cross pattern with the prescribed tightening torque (Fig. 52/1–4).

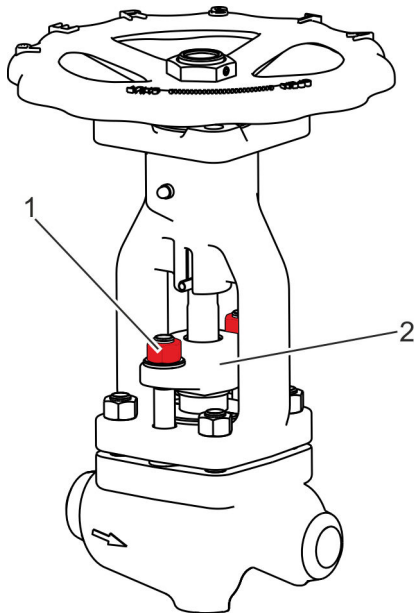
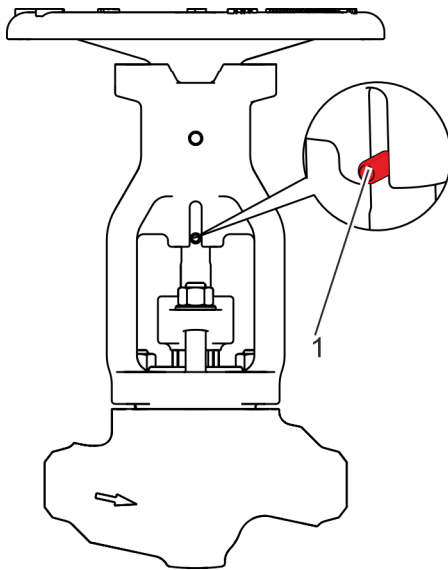


Fig. 53: Tightening the nuts on the gland follower flange

57. Tighten the nuts (Fig. 53/1) on the gland follower flange (Fig. 53/2) with the prescribed tightening torque.



58. ▶ Mount the anti-twist device (Fig. 54/1).

Fig. 54: Mounting the anti-twist device

8.3.4 Dismounting and checking the stem

Procedure with manual actuator (handwheel)

Personnel:	<ul style="list-style-type: none"> ■ Industrial mechanic (high pressure valves) ■ Trained person (hoist)
Protective equipment:	<ul style="list-style-type: none"> ■ Industrial hard hat ■ Safety goggles ■ Protective work clothing ■ Protective gloves ■ Safety footwear
Special tool:	<ul style="list-style-type: none"> ■ Sling gear ■ Hoist

- 1.** ▶ Carry out work steps 1–23 of the maintenance task "Replacing the gland packing" (☞ "Procedure with manual actuator (handwheel)" on page 69).
- 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.
- 4.** ▶ Carry out work steps 24–47 of the maintenance task "Replacing the gland packing" (☞ "Procedure with manual actuator (handwheel)" on page 69).

Procedure for electric, pneumatic or hydraulic actuator

Personnel:	<ul style="list-style-type: none">■ Industrial mechanic (high pressure valves)■ Trained person (hoist)
Protective equipment:	<ul style="list-style-type: none">■ Industrial hard hat■ Safety goggles■ Protective work clothing■ Protective gloves■ Safety footwear
Special tool:	<ul style="list-style-type: none">■ Sling gear■ Hoist■ Knock-out tool■ Spacers■ Hook wrench

1. → Carry out work steps 1–4 of the maintenance task "Replacing the gland packing" (☞ *"Procedure for electric, pneumatic or hydraulic actuator" on page 77*).

2. →



Use a hook wrench instead of the handwheel.

Carry out work steps 1–23 of the maintenance task "Replacing the gland packing" (☞ *"Procedure with manual actuator (handwheel)" on page 69*).

3. → Check the stem and cone for wear.

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

5. → Carry out work steps 24–46 of the maintenance task "Replacing the gland packing" (☞ *"Procedure with manual actuator (handwheel)" on page 69*).

6. → Carry out work steps 6–12 of the maintenance task "Replacing the gland packing" (☞ *"Procedure for electric, pneumatic or hydraulic actuator" on page 77*).

**Procedure for valves with backseat
(series 200 LS)**

Personnel:	<ul style="list-style-type: none"> ■ Industrial mechanic (high pressure valves) ■ Trained person (hoist)
Protective equipment:	<ul style="list-style-type: none"> ■ Industrial hard hat ■ Safety goggles ■ Protective work clothing ■ Protective gloves ■ Safety footwear
Special tool:	<ul style="list-style-type: none"> ■ Sling gear ■ Hoist ■ Knock-out tool ■ Mounting sleeve

1. → Carry out work steps 1–22 of the maintenance task "Replacing the gland packing" (↗ *"Procedure for valves with backseat (series 200 LS)" on page 80*).
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.
4. → Carry out work steps 23–58 of the maintenance task "Replacing the gland packing" (↗ *"Procedure for valves with backseat (series 200 LS)" on page 80*).

8.4 After maintenance

After maintenance has been completed, carry out commissioning work (↗ *Chapter 6.3 "Executing the commissioning process" on page 53*).

After maintenance

9 Faults and fault correction

9.1 Safety notices for fault correction

Electric shock

**DANGER!****Risk of fatal injury from electric shock!**

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

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

Safeguard against restart

**DANGER!****Life-threatening danger due to unintended restart!**

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

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

Improperly executed fault correction tasks



WARNING!

Danger of injury due to improper fault correction!

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

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

Thermal dangers



WARNING!

Danger of injury due to high/low temperatures!

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

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

Pumping medium



WARNING!

Danger of injury due to pumping medium under pressure!

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

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



WARNING!

Pumping medium is a health hazard!

Contact with the pumping medium can have health implications.

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

Hazards associated with the pneumatic system



WARNING!

Danger of injury due to pneumatic energy!

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

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

Fluid under high pressure



WARNING!

Danger of injury due to hydraulic energy!

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

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

Behaviour if there are dangerous faults

The following always applies:

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

9.2 Fault table

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

Fault description	Cause	Remedy	Personnel
Leakage of the shut-off device	Deformation of the seat surface due to impermissible high tensioning of the valve or through thermal tensions	Grind the seat, if necessary have damaged parts replaced. 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)
	Shut-off element does not close	Dismount the stem (☞ <i>Chapter 8.3.4 "Dismounting and checking the stem" on page 89/step 1–17</i>) and determine the cause for malfunction and have it eliminated by Stahlarmaturen PERSTA GmbH customer service (contact details p. 3) or an external specialised company.	Industrial mechanic (high pressure valves)
	Stem or cone is worn due to overlong use as throttling valve	Dismount stem. Check the stem and cone for wear (☞ <i>Chapter 8.3.4 "Dismounting and checking the stem" on page 89</i>).	Industrial mechanic (high pressure valves)
End position not reached	Actuator setting (for optional electric, pneumatic or hydraulic actuator) is incorrect	Correctly adjust the actuator.	Industrial mechanic (high pressure valves)
	Valve bearing, stem thread, lift stop or inner parts of the valve are defective	Replace damaged parts.	Industrial mechanic (high pressure valves)
	Stuffing box is tightened too tightly	Tighten the stuffing box correctly, if necessary replace the gland packing (☞ <i>Chapter 8.3.3 "Replacing the gland packing" on page 69</i>).	Industrial mechanic (high pressure valves)
	Moving parts insufficiently lubricated	Lubricate the moving parts (☞ <i>Chapter 8.3.2 "Lubricating moving parts (stem thread)" on page 68</i>).	Trained person (operator)
Leakage of the stuffing box	Insufficient maintenance	Shut off the pipe section affected. Retighten the gland follower flange with the tightening torque specified by the manufacturer. If necessary replace the stuffing box (☞ <i>Chapter 8.3.3 "Replacing the gland packing" on page 69</i>).	Industrial mechanic (high pressure valves)

Fault description	Cause	Remedy	Personnel
Leakage of the stuffing box	Destruction of the stuffing box due to the use of packing material without sufficient media or temperature resistance	Shut off the pipe section affected. Replace the stuffing box with a suitable packing kit (☞ <i>Chapter 8.3.3 "Replacing the gland packing" on page 69</i>).	Industrial mechanic (high pressure valves)
	Wear of the packing material	Shut off the pipe section affected. Replace the stuffing box (☞ <i>Chapter 8.3.3 "Replacing the gland packing" on page 69</i>).	Industrial mechanic (high pressure valves)
Actuator does not function (for optional electric, pneumatic or hydraulic actuator)	Electric actuator does not function	Check electric actuator as specified in the manufacturer's documentation.	Qualified electrician
	Hydraulic actuator does not function	Check hydraulic actuator as specified in the manufacturer's documentation.	Hydraulics Specialist
	Pneumatic actuator does not function	Check pneumatic actuator as specified in the manufacturer's documentation.	Pneumatics Specialist
Malfunction of the valve	End contacts (for optional electric, pneumatic or hydraulic actuator) are defective	Have the end contacts checked. Prior to readjustment consult with Stahl-Armaturen PERSTA GmbH customer service (contact details p. 3).	Qualified electrician
	Torque switch (for optional electric, pneumatic or hydraulic actuator) is defective	Have the torque switch checked. Prior to readjustment consult with Stahl-Armaturen PERSTA GmbH customer service (contact details p. 3).	Qualified electrician
	Limit switch (for optional electric, pneumatic or hydraulic actuator) is defective	Have the limit switch checked. Prior to readjustment consult with Stahl-Armaturen PERSTA GmbH customer service (contact details p. 3).	Qualified electrician
Jerky lift movement	Gland packing is too firm	Readjust gland packing, replace if necessary (☞ <i>Chapter 8.3.3 "Replacing the gland packing" on page 69</i>).	Industrial mechanic (high pressure valves)

10 Dismantling, disposal

10.1 Safety notice for dismantling and disposal

Electric shock

**DANGER!****Risk of fatal injury from electric shock!**

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

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

Improper dismantling

**WARNING!****Danger of injury due to improper dismantling!**

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

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

Heavy weight of the valve



WARNING!

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

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

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

Suspended loads



WARNING!

Danger of injury due to suspended loads!

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

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

Fluid under high pressure



WARNING!

Danger of injury due to hydraulic energy!

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

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

Hazards associated with the pneumatic system



WARNING!

Danger of injury due to pneumatic energy!

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

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

Pumping medium



WARNING!

Danger of injury due to pumping medium under pressure!

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

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



WARNING!

Pumping medium is a health hazard!

Contact with the pumping medium can have health implications.

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

10.2 Dismantling

Personnel:	<ul style="list-style-type: none"> ■ Industrial mechanic (high pressure valves) ■ Forklift truck driver ■ Trained person (operator) ■ Trained person (hoist) ■ Disposal contractor
Protective equipment:	<ul style="list-style-type: none"> ■ Industrial hard hat ■ Safety goggles ■ Protective work clothing ■ Protective gloves ■ Safety footwear
Special tool:	<ul style="list-style-type: none"> ■ Hoist ■ Sling gear

Prerequisites:

- The pipe section in question is shut-off.
 - Valve is in depressurised status.
 - Valve is emptied.
 - For electric actuator:
 - Power supply is switched off and physically disconnected.
 - For hydraulic or pneumatic actuator:
 - Ensure that the customer-provided hydraulic/pneumatic supply is switched off and safeguarded against being switched on again.
 - Hydraulic lines/pneumatic lines are in depressurised status.
 - Hydraulic lines/pneumatic lines are removed from the actuator of the valve.
1. ► Hold the valve in position with a suitable hoist (☞ *“Transporting individual valves” on page 38*).
 2. ► Disconnect pipe inlet side and outlet side from the valve.
 3. ► If necessary remove the existing supports.
 4. ► Use a suitable hoist to remove the valve from the pipe and set it down so that it is safeguarded against falling over.
 5. ► Properly clean assemblies and components and take them apart.

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

10.3 Disposal

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

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



ENVIRONMENT!

Hazards for the environment due to improper disposal!

Hazards for the environment can occur due to improper disposal.

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

11 Technical data



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

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