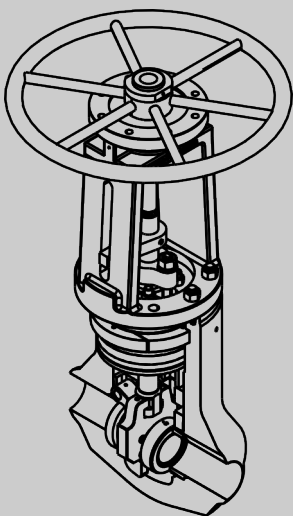


Operating instructions

High pressure stop check valve with shut-off facility

DRA



Read the instructions prior to performing any task!

Stahl-Armaturen PERSTA GmbH

Mülheimer Str. 18

59581 Warstein-Belecke

Germany

Telephone: +49 2902 762-02

Fax: +49 2902 767-03

Email: info@persta.de

Internet: www.persta.com

Translation of the original operating instructions

Dok.-Nr. 6418.DE.STD.06.2016, 2, en_GB

Information about the operating instructions

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

These instructions are a component of the product and must be kept in the vicinity of the valve where they are available to personnel at all times.

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

Furthermore, the local, state and national occupational safety regulations and general safety requirements for the area in which the valve is used apply.

The figures in these instructions are provided as examples for basic comprehension only and may deviate from the actual version.



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

Scope of the document

These manuals apply to the following versions of the high pressure stop check valve with shut-off facility DRA:

Designation	Series	Nominal diameter (DN) [mm]	Pressure rate	Class*
DRA 26	640 ST	65–300	PD 25–40	900–2500
DRA 27	640 ST	350–600	PD 10–63	600–4500

* Assignment number in the pipe construction

Other applicable documents

- GA004 ignition hazard assessment
- Connection diagram provided
- Risk analysis according to Pressure Equipment Directive
- Risk analysis as per the Machinery Directive

Customer Service - Stahl-Armaturen PERSTA GmbH

Mülheimer Str. 18
 59581 Warstein, Germany
 Phone number: +49 (0) 2902 762–900
 Fax: +49 (0) 2902 767–03
 email: info@persta.de

Tab. 1: Revision overview

Revision number	Change/supplement	Date
1	Updates to chapter <i>"Intended use"</i> .	05/05/2021

Table of contents

1	Overview	7
2	Safety	9
	2.1 Symbols in these instructions.....	9
	2.2 Intended use.....	11
	2.3 Safety signs.....	13
	2.4 Safety devices.....	15
	2.4.1 Over pressure safety device.....	15
	2.4.2 Electric actuator.....	17
	2.5 Residual risks.....	18
	2.5.1 Basic dangers at the workplace.....	18
	2.5.2 Hazards due to incorrect operation.....	19
	2.5.3 Danger due to electric current.....	19
	2.5.4 Danger due to hydraulics.....	20
	2.5.5 Dangers due to pneumatics.....	20
	2.5.6 Mechanical dangers.....	21
	2.5.7 Thermal dangers.....	21
	2.5.8 Dangers due to hazardous substances and operating materials.....	22
	2.6 Behaviour in the event of an emergency.....	24
	2.7 Responsibility of the operating company.....	24
	2.8 Personnel requirements.....	25
	2.9 Personal protective equipment.....	28
	2.10 Spare parts.....	29
	2.11 Environmental protection.....	30
3	Functional description	31
	3.1 How the high pressure stop check valve works.....	31
	3.2 External seal.....	34
	3.3 Versions of the high pressure stop check valve with shut-off facility.....	35
	3.3.1 Actuator variants.....	35
	3.3.2 Display elements.....	37
	3.3.3 Connections.....	37
4	Transport and storage	39
	4.1 Safety instructions for transport and storage.....	39
	4.2 Transport of packed items.....	40
	4.3 Storing the valve.....	42
	4.4 Storage of spare parts.....	42
5	Installation	43
	5.1 Safety instructions for installation.....	43
	5.2 Before the installation.....	45
	5.3 Installing the valve.....	45
	5.4 Connecting the power supply.....	46
	5.5 Connecting the hydraulics.....	47

5.6	Connecting the pneumatics.....	47
5.7	After the installation.....	48
5.7.1	Pickling the valve.....	49
5.7.2	Painting the valve.....	49
5.7.3	Performing the system pressure and leak tests.....	49
5.7.4	Applying thermal insulation.....	50
6	Initial start-up.....	51
6.1	Safety instructions for commissioning.....	51
6.2	Prior to initial start-up.....	53
6.3	Carrying out initial start-up.....	54
7	Operation.....	57
7.1	Safety instructions for operation.....	57
7.2	Operating the valve.....	59
7.2.1	Valve with manual actuator (handwheel).....	59
7.2.2	Valve with electric actuator.....	60
7.2.3	Valve with hydraulic or pneumatic actuator	61
7.3	Operating the valve in an emergency.....	62
7.3.1	Valve with electric actuator.....	62
7.3.2	Valve with hydraulic or pneumatic actuator.....	63
8	Maintenance.....	65
8.1	Safety instructions for maintenance.....	65
8.2	Maintenance schedule.....	69
8.3	Maintenance tasks.....	70
8.3.1	Visually checking the valve.....	70
8.3.2	Lubricating the stem.....	71
8.3.3	Replacing the gland packing.....	72
8.3.4	Replacing the gasket of the pressure sealed cover.....	81
8.3.5	Removing and checking the swing check plate.....	94
8.4	After maintenance.....	96
9	Faults and troubleshooting.....	97
9.1	Safety instructions for fault correction.....	97
9.2	Fault table.....	99
10	Removal, disposal.....	101
10.1	Safety instructions for dismantling.....	101
10.2	Removal.....	103
10.3	Disposal.....	104
11	Technical data.....	105
12	Index.....	107

1 Overview

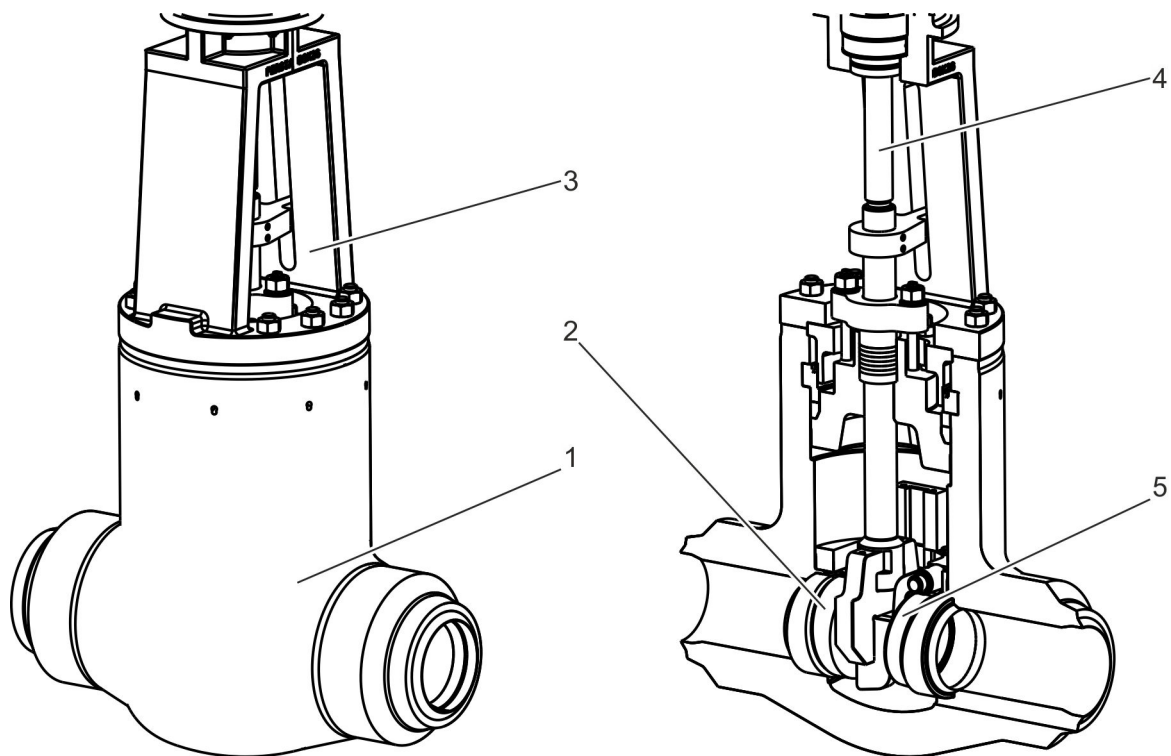


Fig. 1: High pressure stop check valve with shut-off facility

- | | | | |
|---|--------|---|-------------------|
| 1 | Body | 4 | Stem |
| 2 | Disk | 5 | Swing check plate |
| 3 | Bonnet | | |

Brief description

The valve referred to as a high pressure stop check valve with shut-off facility is designed to be installed in pipes.

The valve can be operated as a

- stop check valve or as a
- gate valve

Operation as a stop check valve

When used as a stop check valve, the stem (Fig. 1/4) is in the open position. The valve is operated as a stop check valve which lets the pipeline medium flow in one direction. Whenever the pipeline medium's direction of flow reverses, the swing check plate (Fig. 1/5) is pressed into the seat and prevents any medium from passing through.

Operation as a gate valve

When used as a gate valve, the stem (Fig. 1/4) is in the closed position. The disk (Fig. 1/2) that is pressed into the seat prevents the flow of the pipeline medium.

Actuator variants

The stem is moved differently depending on the version:

- manually or via a handwheel,
- electrically,
- hydraulically or
- pneumatically.

The actuator is connected to the stem (Fig. 1/4) on the threaded bush located above the bonnet (Fig. 1/3).

Media

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

Tools

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

Forklift

Forklift with sufficient load-bearing capacity for transporting valves.

Hoist

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

Hook wrench

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

Knock-out tool

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

Packing extractor

Tool for removing gland packing elements.

Pin puncher

Mandrel-like tool for punching out the segment rings.

Ring bolts

- Ring bolts to be screwed into the body.
- Act as suspension points of the valve on the hoist.

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 these instructions

Safety instructions

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

**DANGER!**

This combination of symbol and signal word indicates a dangerous situation that results in death or severe injuries if it is not avoided.

**WARNING!**

This combination of symbol and signal word indicates a dangerous situation that can result in death or severe injuries if it is not avoided.

**CAUTION!**

This combination of symbol and signal word indicates a hazardous situation that can result in minor or slight injuries if it is not avoided.

**NOTICE!**

This signal word indicates important but not safety-relevant information such as damage to property and the environment.

Safety instructions in specific instructions

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

Example:

1. ➤ Loosen the bolt.

2. ➤

**CAUTION!**

Risk of getting trapped by the cover!

Close the cover carefully.

3. ➤ Tighten the bolt.

Symbols in these instructions





Tips and recommendations



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

Additional symbols

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

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

2.2 Intended use

High pressure stop check valves with shut-off facility of the specified DRA series are designed for installation in pipes under the following conditions:

- Normal operation of the valve as a stop check valve: Operation as open/close valve.
- Normal operation of the valve as a gate valve: Operation as open/close valve.
- Normal operation as a gate valve by means of the full pressure rate.
- Installation in horizontal pipes.
- Installation in vertical pipes with pressure from below.
- Maximum number of 1000 load cycles between a depressurised 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 not exceeding 6 K/min (10.8 °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.
- Only operate the valve within the limits specified on the type plate (☞ *“Rating plate” on page 13*).
- If the valve is operated in the creep range, the valve is designed for a maximum operating time of 100,000 h. The valve must be replaced afterwards.
- No temperature increases were considered. In case of use in the hot vapour area, temperature increases must be considered according to the regulations of the operating company.
- The test pressure for a recurring test must not exceed the maximum permitted pressure PS multiplied by 1.3.
- The valve may only be operated if internal pressure loading is predominantly dormant. Additional loads (e.g. stationary thermal stress, unsteady pressure and temperature loads in case of alternating loads or pipe loads) were not considered.

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

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



WARNING!

Danger in the event of misuse!

Misuse of the valve can cause dangerous situations.

- Do not use the valve as a throttling valve.
- Do not operate the valve at full differential pressure.
- Connect the pipes so that they are free of tension.
- Pay attention to the correct installation position (☞ *Chapter 11 “Technical data” on page 105*) of the valve.
- Do not use valves as an anchor point.
- Never operate valves at temperatures near or below the freezing point of the pipeline medium.
- Do not exceed the number of permitted load cycles (☞ *Chapter 2.2 “Intended use” on page 11*).
- Actuation via handwheel:
 - Only operate the handwheel by hand.
 - Do not use any force-increasing components when using the handwheel.
 - If the handwheel does not move smoothly, or if it cannot be activated, contact the manufacturer.
- Electric actuator:
 - Never run the actuator with excess torque.
- If the valve is operated with an equalizing pipe as a safety device (☞ *Chapter 2.4.1 “Over pressure safety device” on page 15*), only operate the valve in one direction (☞ *“Flow direction arrow” on page 14*).

2.3 Safety signs

The following symbols and instruction signs are in the work area. They 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 risk of injury.

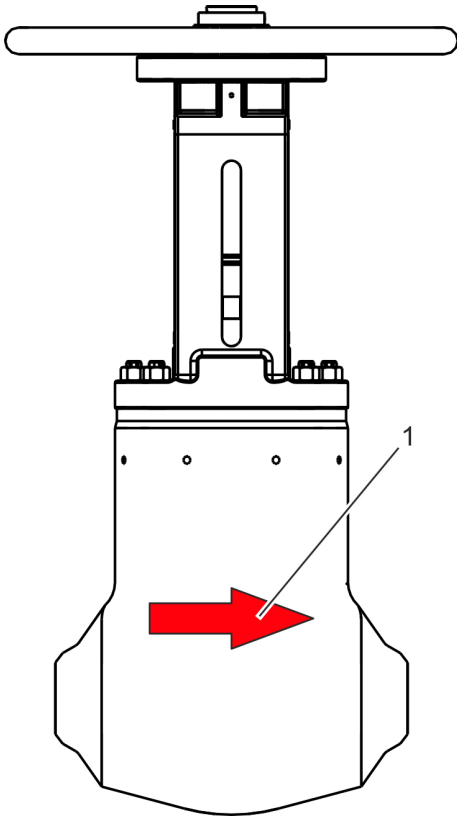
- Keep all safety, warning, and operating instructions that are affixed to the device in legible condition.
- Replace damaged signs or stickers immediately.

Rating plate

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

- Confirmation number
- Article number
- Year of manufacture
- Nominal diameter
- Nominal pressure / design data
- CRN number (if required)

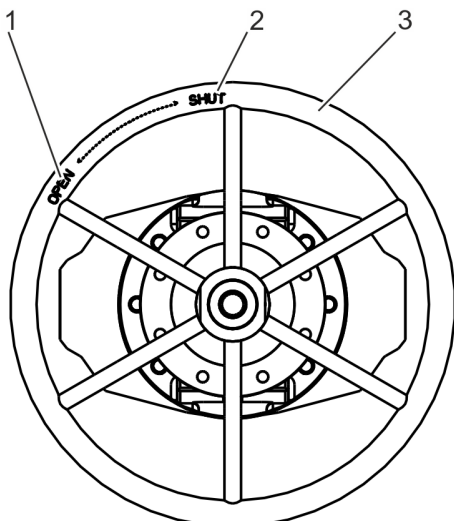
Flow direction arrow



The flow direction is marked on the valve with an arrow (Fig. 2/1).
The arrow shows the direction in which the (non-shut-off) swing check plate is pressed on by the pipeline medium and in which the medium flows through the valve.

Fig. 2: Flow direction arrow

Opening direction / closing direction indication for manual actuator



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

Fig. 3: Opening direction and closing direction indication

Customer-specific markings

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

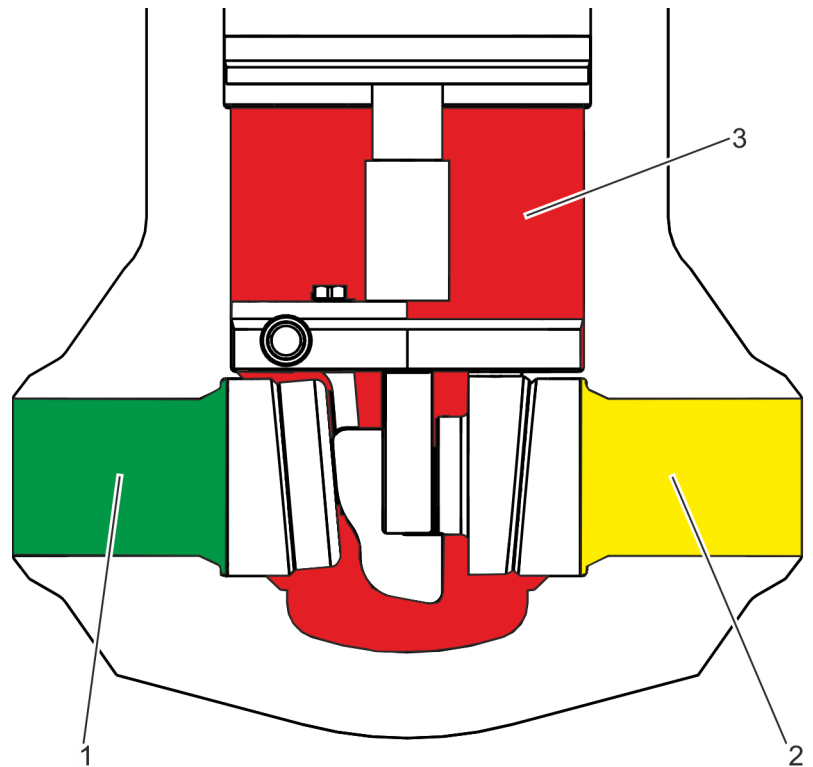
2.4 Safety devices
2.4.1 Over pressure safety device


Fig. 4: Division into “chambers”

In the closed position, there are three “chambers” in the valve:

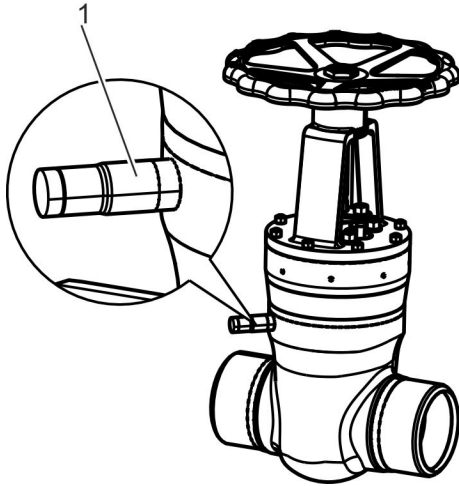
- First chamber: pressurized side (Fig. 4/1)
- Second chamber: non-pressurized side (Fig. 4/2)
- 3rd chamber: shut-off inner chamber (Fig. 4/3)



Have the 3rd chamber safeguarded against overloading by the operating company.

The valve can be secured by means of an internal or external over pressure safety device.

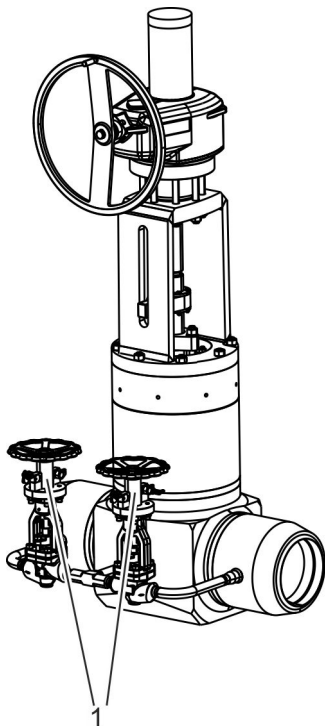
Connection for external over pressure safety device



Depending on the application, the valve can be equipped with an external over pressure safety device by the operating company. For this purpose, the valve must be ordered with an optional factory-sealed nozzle (Fig. 5/2). The nozzle creates a connection from the outside to the 3rd chamber (Fig. 4/3). External over pressure safety devices can be attached to the nozzle (Fig. 5/2).

Fig. 5: Optional nozzle on the body

Bypass with equalizing pipe



With an optional bypass with an equalizing pipe, additional external valves (Fig. 6/1) can establish connections between separate chambers (Fig. 4) within the valve.



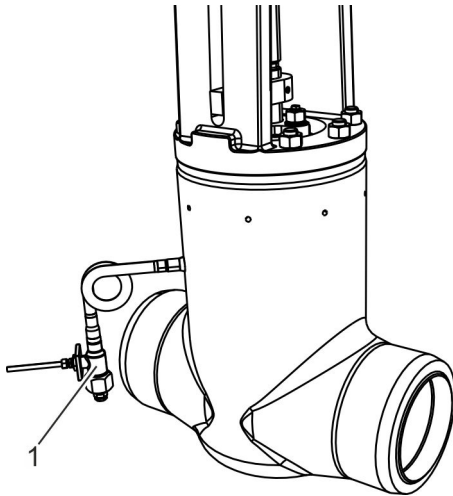
NOTICE!

Risk of damage to property due to closed bypass valves!

The valve can be damaged if both bypass valves are closed.

- Ensure that at least one of the two bypass valves is open at all times.

Fig. 6: Bypass with equalizing pipe

Safety valve


An optional safety valve (Fig. 7/1) attached to the nozzle (/2) discharges critical pressures.

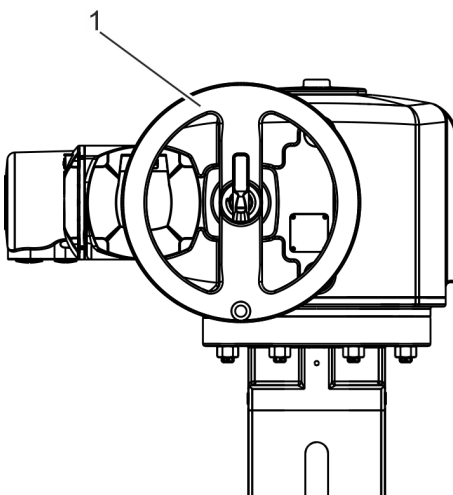
Fig. 7: Optional safety valve

2.4.2 Electric actuator
Limit switch

The opening and closing processes of the valve with electric actuator are ended by limit switches. After a permanently set distance, the actuator switches off and the valve is opened or closed.



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

Emergency actuation of the electric actuator


The optional electric actuator also has a handwheel (Fig. 8/1). If the actuator is defective or if the controller fails, the valve can be operated via the handwheel.

Fig. 8: Emergency actuation

2.5 Residual risks

The valve has been designed according to the latest technology and in compliance with the currently applicable safety requirements. Nevertheless, residual risks remain that require caution. The residual risks and the resulting conduct and measures required are listed below.

2.5.1 Basic dangers at the workplace

Potentially explosive atmospheres



DANGER!

Risk of fatal injury due to failure to comply with the rules of conduct specified for potentially explosive atmospheres!

Depending on the version, the valve can be used in potentially explosive atmospheres. There is danger to life if the rules of conduct are not complied with in these areas.

- Ensure that the tasks on the valve can be performed 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 Hazards due to incorrect operation

Incorrect operation

**WARNING!****Risk of injury due to incorrect operation of the valve!**

There is a risk of injuries caused by malfunctions of the valve if the opening and closing processes are not performed correctly.

- Correct opening process:
 - Interrupt the flow of the pipeline medium by means of measures taken by the operating company.
 - Establish a pressure equalisation between the inlet and outlet sides of the valve by means of measures taken by the operating company.
 - Operate the stem in the opening direction.
- Correct closing process:
 - Interrupt the flow of the pipeline medium by means of measures taken by the operating company.
 - Operate the stem in the closing direction.

2.5.3 Danger due to electric current

Electric current

**DANGER!****Risk of fatal injury due to electric current!**

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

- Before dismantling begins, switch off the power supply and disconnect it completely.

2.5.4 Danger due to hydraulics

Fluid under high pressure



WARNING!

Risk of injury due to hydraulic energy!

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

- Only have hydraulic specialists perform work on the hydraulic system.
- Before work on the hydraulic system begins, 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.

2.5.5 Dangers due to pneumatics

Air under high pressure



WARNING!

Risk of injury due to pneumatic energy!

Pneumatically actuated components of the valve, as well as the triggering of the overpressure valve, can cause severe injuries.

- Only have pneumatic specialists perform tasks on the pneumatic equipment.
- Before work on the pneumatic system begins, ensure that it is completely depressurised. Completely depressurise pressure accumulators.
- Wear personal protective equipment.

2.5.6 Mechanical dangers

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.

2.5.7 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.

Risk 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.

2.5.8 Dangers due to hazardous substances and operating materials

Pipeline medium



WARNING!

Pumping medium is a health hazard!

Contact with the pumping medium can have health implications.

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

Pickling medium



WARNING!

Pickling medium is a health hazard!

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

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

Lubricating grease

WARNING!
Operating materials are a health hazard!

Contact with operating materials/lubricants can have health implications.

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

Anticorrosive

WARNING!
Anticorrosive is a health hazard!

Direct contact with the anticorrosive used can have health implications.

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

Damage of sealing surfaces and slide faces



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

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

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

2.6 Behaviour in the event of an emergency

See also [Chapter 7.3](#) “Operating the valve in an emergency” on page 62.

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

2.7 Responsibility of the operating company

Operating company

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

Obligations of the operating company

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

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

In this regard, the following applies in particular:

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

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

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

- The operating company must ensure that the maintenance intervals described in these instructions are complied with.

In respect 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 an unduly high temperature.

2.8 Personnel requirements



WARNING!

Risk of injury due to inadequate qualification of the personnel!

If unqualified personnel work on the valve or remain in the danger zone of the valve, there is a risk that severe injuries and substantial damage to property may be caused.

- Only permit personnel to perform tasks for which they are qualified.
- Keep unqualified personnel away from the danger zones.

The qualifications of personnel for the various areas of activity are set out below in these instructions:

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.

Only persons who can be expected to perform their work reliably can be accepted as personnel. Persons whose ability to react is impaired, for example through drugs, alcohol or medication, are not acceptable.

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

Unauthorised persons**WARNING!****Risk of unauthorised persons sustaining fatal injuries due to the hazards in the danger zone and work area!**

Unauthorised persons who do not satisfy the requirements described here are unable to appreciate the hazards in the work area. Consequently, there is a risk of unauthorised persons sustaining severe or fatal injuries.

- Unauthorised personnel must be kept away from the danger and working areas.
- If in doubt, speak to these persons and instruct them to leave the danger zone and work area.
- Interrupt work for as long as unauthorised persons remain in the danger zone and work area.

Training

The operating company must train the personnel at regular intervals. For improved tracking, a training log must be maintained with at least the following information:

- Date of training session
- Name of the person trained
- Contents of training session
- Name of trainer
- Signatures of the trainee and the trainer

2.9 Personal protective equipment

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

During the various tasks performed on and with the valve, personnel must wear the 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 (contact details on page 4).

**Spare parts recommendation in the scope of delivery**

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

**Storage of spare parts**

Please see  Chapter 4.4 "Storage of spare parts" on page 42 for information on storing spare parts.

Ordering spare parts

Order spare parts from Stahl-Armaturen PERSTA GmbH, specifying:

- Valve type,
- Year of manufacture,
- Nominal diameter,
- Nominal pressure,
- Material,
- Article number,
- Confirmation number,
- Consignment number (if possible)

. See page 4 for contact details.

2.11 Environmental protection



NOTICE!

Risk to the environment due to the improper handling of environmentally harmful substances!

If environmentally harmful substances are handled incorrectly, particularly if they are disposed of incorrectly, significant environmental damage may result.

- Always comply with the instructions given below for handling and disposal of environmentally harmful substances.
- Comply with the operating company's guidelines for the disposal of environmentally harmful substances.
- If environmentally harmful substances are inadvertently released to the environment, take appropriate measures immediately. If in doubt, inform the responsible local authority of the damage and ask about the appropriate measures that should be taken.

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 How the high pressure stop check valve works

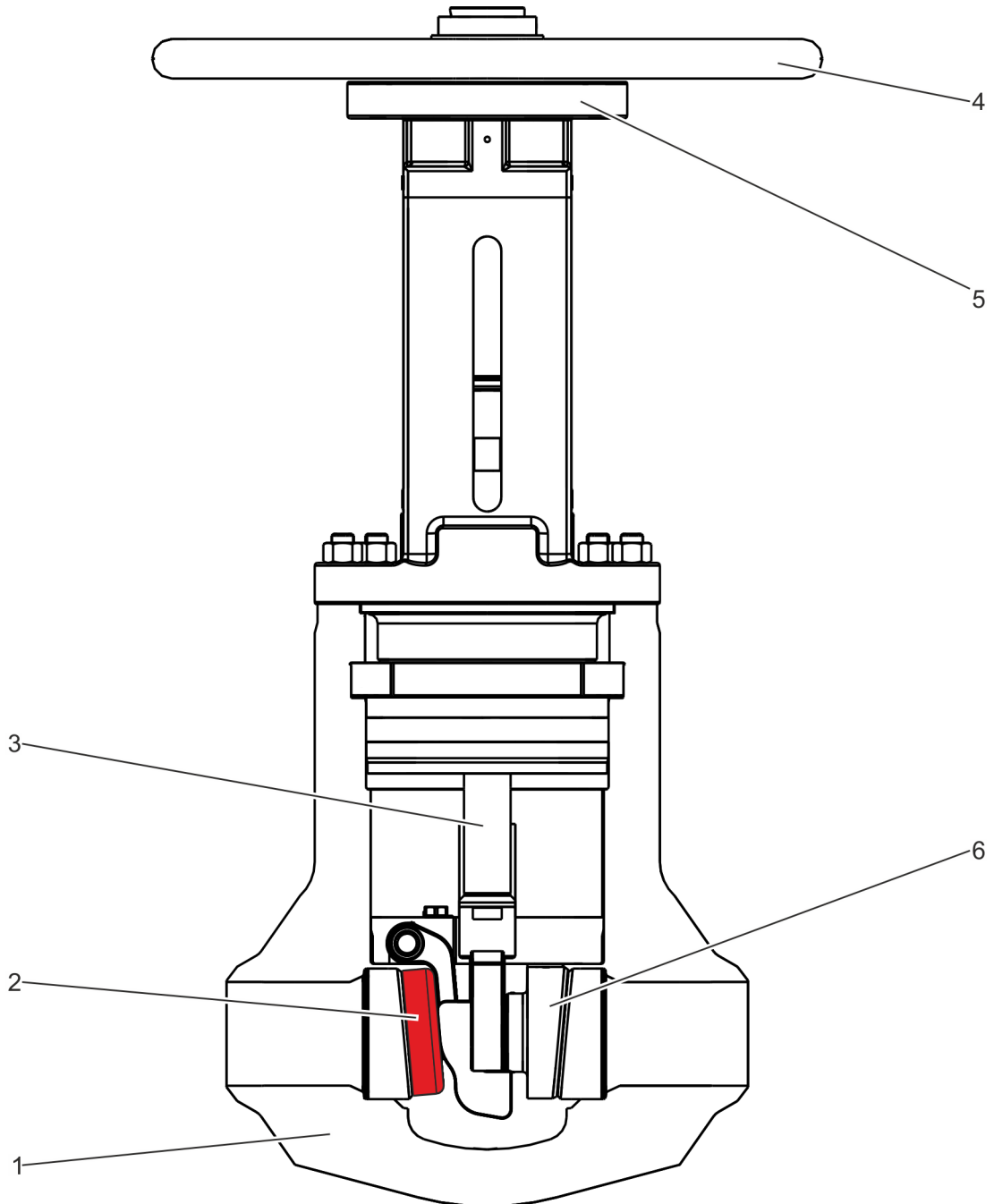


Fig. 9: Valve

- | | | | |
|---|-------------------|---|----------------------|
| 1 | Body | 4 | Actuator flange |
| 2 | Swing check plate | 5 | Handwheel (optional) |
| 3 | Stem | 6 | Disk |

Operation as a stop check valve

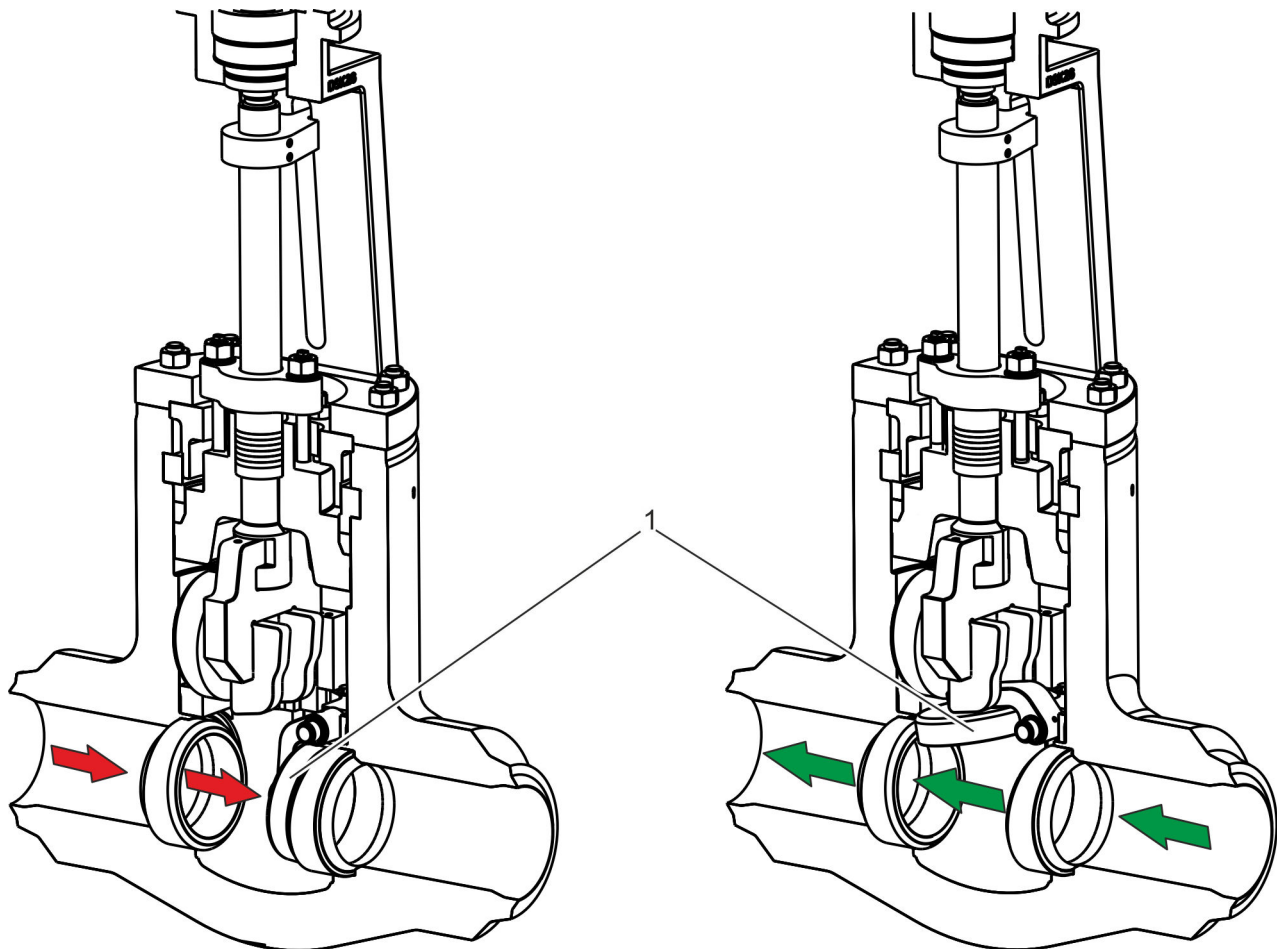


Fig. 10: Stem open

The stem is in the open position in order to operate the valve as a stop check valve (Fig. 10).

As soon as the medium enters the valve in the flow direction (Fig. 10/➡) and sufficiently high pressure is built up, the swing check plate (Fig. 10/1) is pushed upward and the medium flows through the body.

When the flow direction of the medium reverses (Fig. 10/⬅), the swing check plate (Fig. 10/1) closes the valve.

Operation as a gate valve

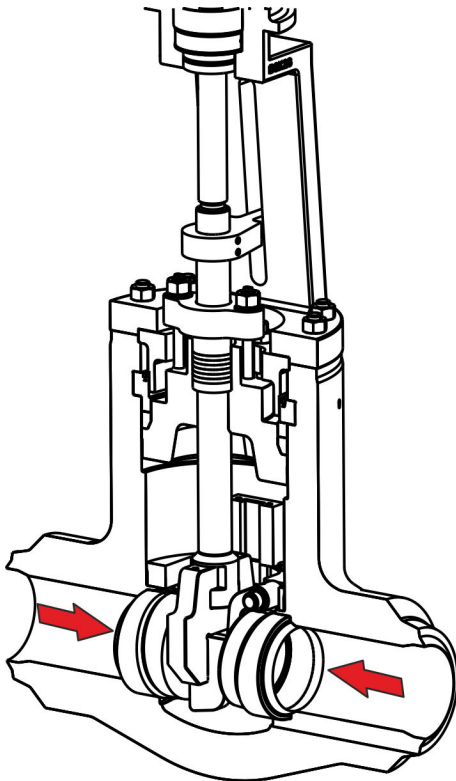


Fig. 11: Stem closed

To operate the valve as a gate valve, the stem is in the closed position.

In the closed state, the closed disk prevents the medium from flowing through the valve. On the other hand, the disk mechanism prevents the swing check plate from being swung upwards. This creates a double barrier (Fig. 11/◀) and the inlet side is separated from the outlet side of the valve.

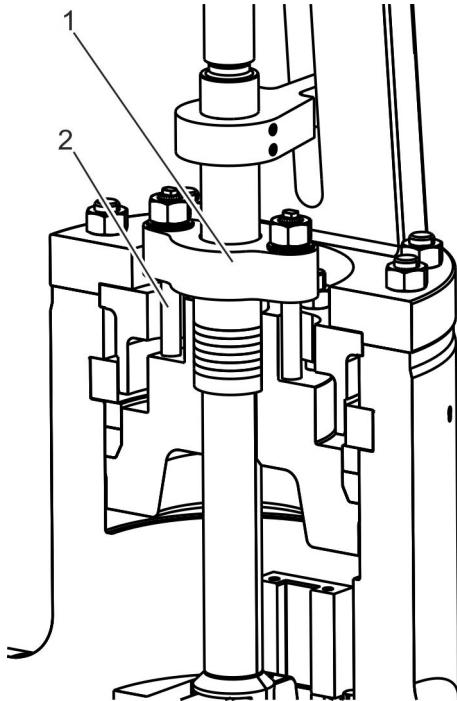
The high pressure stop check valves with shut-off facility differ in terms of:

- Type of actuator used (☞ *Chapter 3.3.1 "Actuator variants" on page 35*) and
- Type of connection (☞ *Chapter 3.3.3 "Connections" on page 37*) and

Moreover, it is possible that the valve has display elements.

3.2 External seal

Gland packing



The gland packing seals the stem off against the environment.

For this the gland follower flange (Fig. 12/1) is pressed onto the sealing elements using stud bolts (Fig. 12/2)

- Gland follower
- Packing ring

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



Optional life loaded packing

Packing compression can be applied via a life loaded packing.

Fig. 12: Gland packing

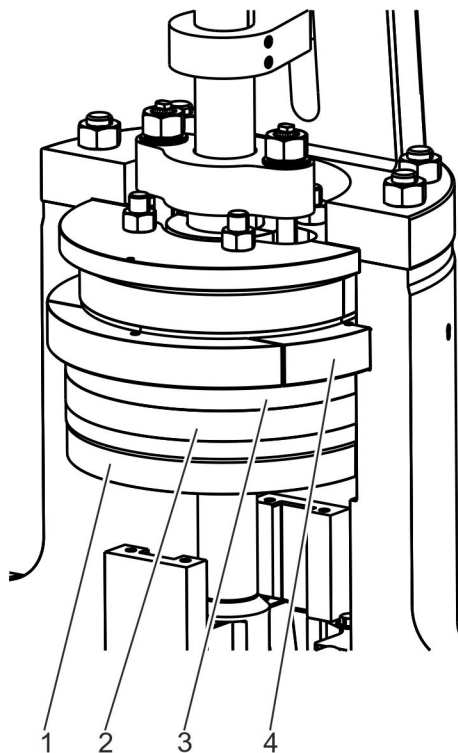
Pressure sealing bonnet


Fig. 13: Pressure sealing bonnet

The body is sealed from the environment by the pressure sealing bonnet.

An axial force is generated through the internal pressure in the body. This axial force acts on the elastic gasket ring (Fig. 13/2) via the cover (Fig. 13/1). The elastic gasket experiences transverse deformation as a result of the axial force and seals against the body in the radial direction.

The axial force generated by the internal pressure is transmitted to the segment ring (Fig. 13/4), which consists of several parts, via the support ring (Fig. 13/3). The segment ring transmits the force with positive fit to the body of the valve.

The required sealing force is not generated by the screws, but by the internal pressure. The screws are only used to pretension the sealing connection and are only hand tightened in operation.

3.3 Versions of the high pressure stop check valve with shut-off facility

3.3.1 Actuator variants

The possible actuator variants are shown below.



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

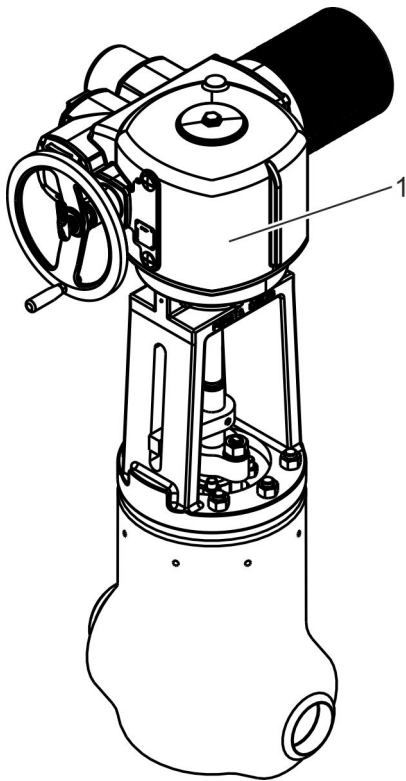
Manual actuator (handwheel)

The stem is driven manually with the handwheel.

The handwheel can be attached in the following manner:

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

Electric actuator



With the optional electric actuator (Fig. 14/1) the stem is driven via an electric motor. The electric motor is connected to the valve above the bonnet.

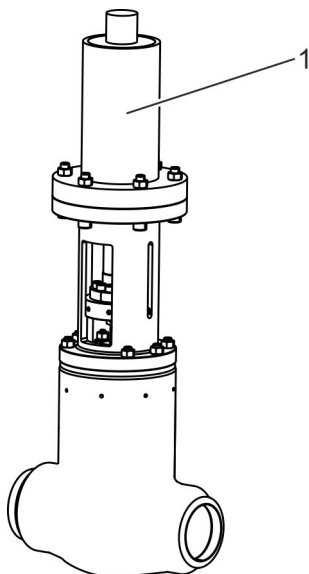
The opening or closing procedures of the valve are completed using limit switches.

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

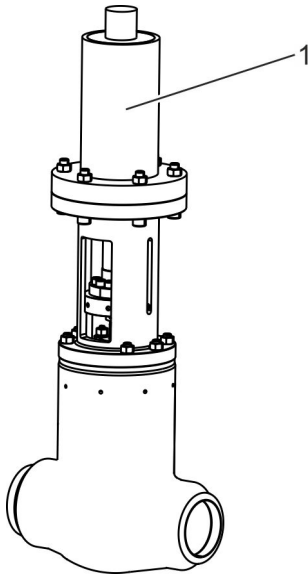
Fig. 14: Electric actuator

Hydraulic actuator



The stem is driven by a hydraulic piston actuator using the optional hydraulic actuator (Fig. 15/1). The hydraulic actuator is connected to the valve above the bonnet.

Fig. 15: Hydraulic actuator

Pneumatic actuator

Fig. 16: Pneumatic actuator

The stem is driven by a pneumatic piston actuator using the optional pneumatic actuator (Fig. 16/1). The pneumatic actuator is connected to the valve above the bonnet.

3.3.2 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)

The position of the valve is shown by the position of the anti-twist device within the guide on the bonnet.

When the valve is closed, the anti-twist device moves downwards within the guide on the bonnet.

When the valve is opened, the anti-twist device moves upwards within the guide on the bonnet.

3.3.3 Connections
Connection in the pipe

Valves can be mounted in the pipe as

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

Electrical connections

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



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

Hydraulic connections

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



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

Pneumatic connections

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



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

4 Transport and storage

4.1 Safety instructions for transport and storage

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.

Improper transport



NOTICE!

Damage caused by improper transport!

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

- When unloading the valves on delivery, as well as during in-house transportation, proceed carefully and pay attention to the symbols and instructions on the packaging.
- If available: Use the provided ring bolts and ring nuts.
- Protect valves from impact.
- Do not throw the valves.
- Only remove the packaging just before installation.

Damage of the seat



NOTICE!

Material damage from transporting the valve in the open position!

The seat can be damaged if the swing check plate is not fixed in place in one position in the body when transporting the valve in the open position (position of the stem in operation as a stop check valve).

- Completely close the stem before transporting the valve.

4.2 Transport of packed items

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

Transporting individual valves

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

1. ➤



NOTICE!
Damage of the seat!

Ensure that the stem is in the closed position (☞ *“Operation as a gate valve” on page 60*).

2. ➤



DANGER!
Unmarked attachment points!

Attach valve to the hoist with suitable sling gear.

3. ➤

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

4. ➤

Transport the valve as close to the ground as possible.

5. ➤

After setting down the valve, secure it against falling over.

Transport on a pallet

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

1. ➤



NOTICE!
Damage of the seat!

Ensure that the stem is in the closed position (☞ *“Operation as a gate valve” on page 60*).

2. ➤

Make sure that the valve is fixed in place on the pallet.

3. ➤ Transport the pallet to the installation location.
4. ➤ Unload and continue transporting heavy valves from the pallet with a suitable hoist.

4.3 Storing the valve

Storage requirements

Store a valve under the following conditions:

- Store valve in closed status (delivery status).
- Do not store outdoors.
- Store it in a dry and dust-free environment.
- Do not expose it to any aggressive media.
- Protect it from direct sunlight.
- Avoid mechanical vibrations.
- Storage temperature: 15–35 °C (59–95 °F).
- Relative humidity: max. 60%.
- Check the condition of the protective caps attached at the factory. Replace protective caps if necessary.
- When storing valves for longer than 3 months, check the general condition of all parts and the packaging on a regular basis. Touch up or reapply preservation agent as required.



There may be storage instructions affixed to the packed items that exceed the requirements set out in these instructions. Comply with these instructions accordingly.

4.4 Storage of spare parts



NOTICE!

Material damage due to reduced service life if stored incorrectly!

A shortened service life may result from incorrect storage of the soft-sealing spare parts.

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

5 Installation

5.1 Safety instructions for installation

Electric current

**DANGER!****Risk of fatal injury due to electric current!**

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

- Only have qualified electricians perform work on electrical lines and components.

Air under high pressure

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

Pneumatically actuated components of the valve can cause severe injuries.

- Only have pneumatic specialists perform tasks on the pneumatic equipment.
- Before work on the pneumatic system begins, ensure that it is completely depressurised. Completely depressurise pressure accumulators.
- Wear personal protective equipment.

Fluid under high pressure

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

The hydraulically-powered components of the valve can cause severe injuries.

- Only have hydraulic specialists 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.

Faulty installation



WARNING!

Risk of injury due to incorrectly installed valve!

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

- Pay attention to the flow direction of the valve (☞ *“Flow direction arrow” on page 14*).
- Pay attention to the installation position of the valve (☞ *Chapter 11 “Technical data” on page 105*).
- In the case of valves with an actuator or transmission, ensure that the stem position is vertical.
- In special cases and if the stem position is not vertical:
 - Support the actuator on the valve head.
 - Ensure that the actuator can follow the position changes of the pipe.
- With butt-weld valves
 - Prior to welding on, open the valve completely
 - Fasten the welding counterpole on the body, if possible in the vicinity of the welding point
 - Perform welding and subsequent heat treatment in compliance with the applicable welding regulations
 - Perform partial thermal treatment.

Incorrect bolt tightening torques



WARNING!

Hazard due to wrong tightening torques!

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

- Do not undo the threaded connections on the valve.
- For maintenance work or if the threaded connections have come loose, you can find the tightening torques
 - by contacting Stahl-Armaturen PERSTA GmbH customer service (see p. 4 for contact details) and specifying the serial number, or
 - by referring to the manufacturer’s website (address on page 2).

Incorrect alignment of the valve



NOTICE!

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

An incorrect alignment can result in the entire plant malfunctioning.

- Install the valve in accordance with the flow direction arrow (↻ “Flow direction arrow” on page 14) and the flow direction in the pipe.

5.2 Before the installation

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

1. ➤ Check the design parameters and material.
2. ➤ Pay attention to the installation position (↻ *Chapter 11 “Technical data” on page 105*).
3. ➤ Pay attention to the flow direction.
4. ➤ Remove any protective caps and preserving agents from the valve.
5. ➤ Make sure that there are no objects or materials inside the valve.

5.3 Installing the valve

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

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

5. ▶ Check butt-welding ends and flange sealing surfaces for damage and cleanness.
6. ▶ Centre the connection flanges.
7. ▶ Use connection elements and sealing elements made of permissible materials.
8. ▶ Weld or flange-mount the valve in the correct flow direction and installation position (☞ *Chapter 11 "Technical data" on page 105*) based on the type of connection used.
9. ▶ Bolt all the flange bores together with the connection elements using the permissible tightening torque.
10. ▶ For valves with actuators or transmissions (electric/hydraulic/pneumatic), ensure that the stem position is vertical.
11. ▶ For a different installation position, support the actuator and ensure that the actuator can follow the position changes of the pipe.
12. ▶ Make sure that the pipe and valve are sealed.

5.4 Connecting the power supply

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

Prerequisite: Make sure that the on-site power supply is switched off and secured against an unintentional restart.

1. ▶



The terminal diagram and operating instructions 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 by means of suitable cable routing.
3. ▶ Protect the cable against contact with hazardous substances and operating materials.
4. ▶ Install the cable so that stumbling hazards are avoided.

5.5 Connecting the hydraulics

- 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 by means of suitable routing.
4. ➤ Protect the hydraulic line against contact with hazardous substances and operating materials.
5. ➤ Install the lines so that stumbling hazards are avoided.

5.6 Connecting the pneumatics

- 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. ➤ Route 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.

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.

5.7.1 Pickling the valve



The pickling of the valve can be performed in several 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. ➤ Properly pickle the valve.
2. ➤ Completely remove the pickling medium by flushing it out.
3. ➤ 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 qualified personnel paint the valve.

5.7.3 Performing the system pressure and leak tests

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

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



Plant-specific equipment

Depending on the plant, it may be necessary to equip the pipe and/or the valve with a thermal insulation.

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

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

The insulation must only reach the upper edge of the body (Fig. 17, red arrow).

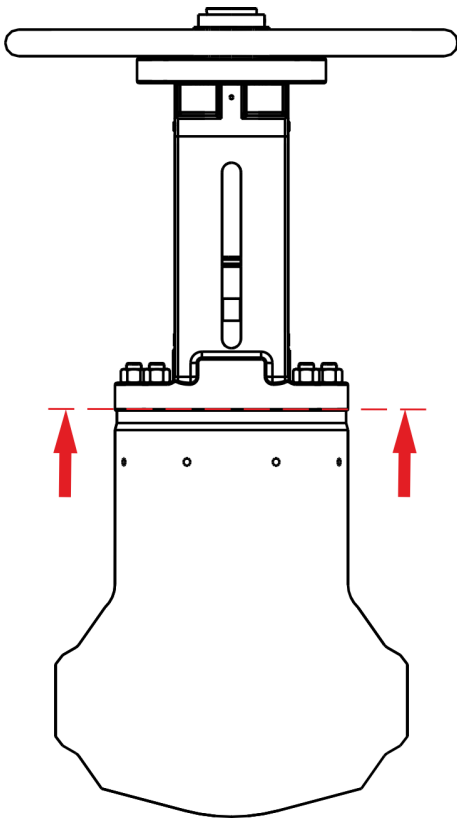


Fig. 17: Upper edge of the insulation

6 Initial start-up

6.1 Safety instructions for commissioning

Risk of freezing

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

If components shatter at freezing temperatures, severe injuries may be caused by fluid being expelled under high pressure.

- Make sure that the valve is drained completely before it is taken out of service.

Escaping pipeline medium

**WARNING!****Risk of injury due to pressurised pipeline medium!**

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

- Do not undo the threaded connections.
- If threaded connections are loose, inform the operating company and have the relevant pipe section shut off.
- If threaded connections are loose, have the cause clarified and rectified. If necessary, have the manufacturer check the valve.

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 result in injuries and impermissible deformations of the valve and reduction of the total service life.

- Comply with the heating-up times/cooling times (maximum 6 K/min (10.8 °F/min)).
- If in doubt consult 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!

Risk of injury from contact with moving parts!

There is a risk of injury from contact with moving parts (stems/anti-twist devices).

- During operation, do not touch moving parts.

Incorrect bolt tightening torques



WARNING!

Hazard due to wrong tightening torques!

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

- Do not undo the threaded connections on the valve.
- For maintenance work or if the threaded connections have come loose, you can find the tightening torques
 - by contacting Stahl-Armaturen PERSTA GmbH customer service (see p. 4 for contact details) and specifying the serial number, or
 - by referring to the manufacturer's website (address on page 2).

6.2 Prior to initial start-up

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

Requirement: The entire plant has been approved for operation.

Valve with manual actuator

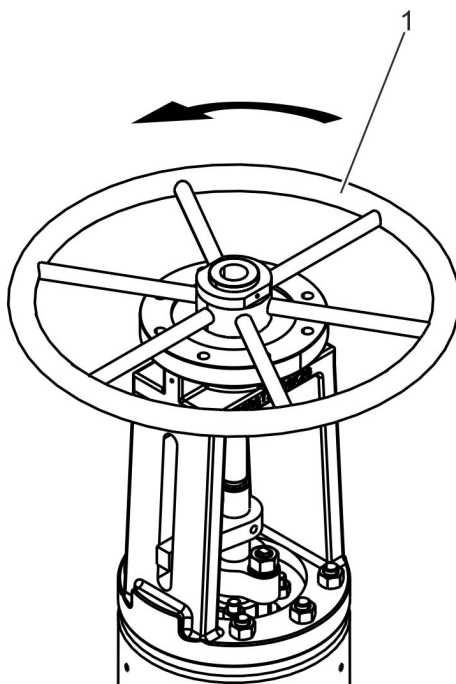


Fig. 18: Opening the valve

1. ➤ Turn the handwheel (Fig. 18/1) anticlockwise.
 - ⇒ The valve will be operated as a stop check valve.

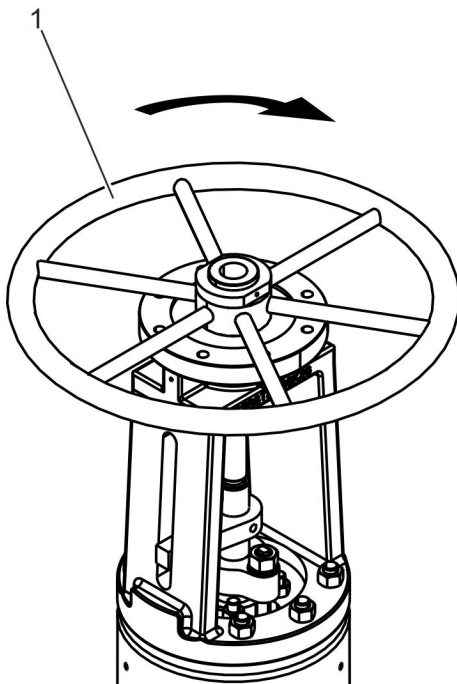


Fig. 19: Closing the valve

Valve with electric, hydraulic or pneumatic actuator

2. ▶ Turn the handwheel (Fig. 19/1) clockwise.
⇒ The valve will be operated as a gate valve.
3. ▶ Repeat steps 1 and 2 several times.

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

6.3 Carrying out initial start-up

- | | |
|-----------------------|---|
| 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 |

Requirement: The entire plant has been approved for operation.

1. ▶



WARNING!

Failure to comply with the heating/cooling times!

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

2. ▶ Check the stuffing box for leaks.
3. ▶ If necessary, retighten the stuffing box as specified by the manufacturer.

4. → Check the pressure sealing bonnet for leaks.
5. → Check the pipe connection flanges for leaks, if necessary retighten as specified by the system planner.

Initial start-up



Carrying out initial start-up

7 Operation

7.1 Safety instructions for operation

Thermal dangers


WARNING!
Danger of injury due to high/low temperatures!

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

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

Pressurised components


WARNING!
Risk of injury due to pressurised pipeline medium!

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

- Do not undo the threaded connections.
- If threaded connections are loose, inform the operating company and have the relevant pipe section shut off.
- If threaded connections are loose, have the cause identified and rectified. If necessary have the manufacturer check the valve.
- Never vent the valve via the pressure-sealing cover, but via the venting device instead.

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 result in injuries and impermissible deformations of the valve and reduction of the total service life.

- Comply with the heating-up times/cooling times (max. 6 K/min (10.8 °F/min)).
- If in doubt consult the manufacturer.

Improper operation



WARNING!

Risk of injury due to incorrect operation of the valve!

There is a risk of injuries caused by malfunctions of the valve if the opening and closing processes are not performed correctly.

- Correct opening process:
 - Interrupt the flow of the pipeline medium by means of measures taken by the operating company.
 - Establish a pressure equalisation between the inlet and outlet sides of the valve by means of measures taken by the operating company.
 - Operate the stem in the opening direction.
- Correct closing process:
 - Interrupt the flow of the pipeline medium by means of measures taken by the operating company.
 - Activate the stem in the closing direction.

Improper operation of the hand-wheel



WARNING!

Danger of injury due to force-increasing objects!

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

- Do not use any force-increasing components when using the handwheel.
- Only operate the handwheel by hand.
- If the handwheel does not move smoothly, or if it cannot be activated, lubricate the stem thread and bearing (↪ *Chapter 8.3.2 “Lubricating the stem” on page 71*) and if necessary, contact the manufacturer.

7.2 Operating the valve

7.2.1 Valve with manual actuator (handwheel)

Operation as a stop check valve

- | | |
|-----------------------|-----------------------------|
| Personnel: | ■ Trained person (operator) |
| Protective equipment: | ■ Industrial hard hat |
| | ■ Safety goggles |
| | ■ Protective work clothing |
| | ■ Protective gloves |
| | ■ Safety footwear |

Opening the valve completely

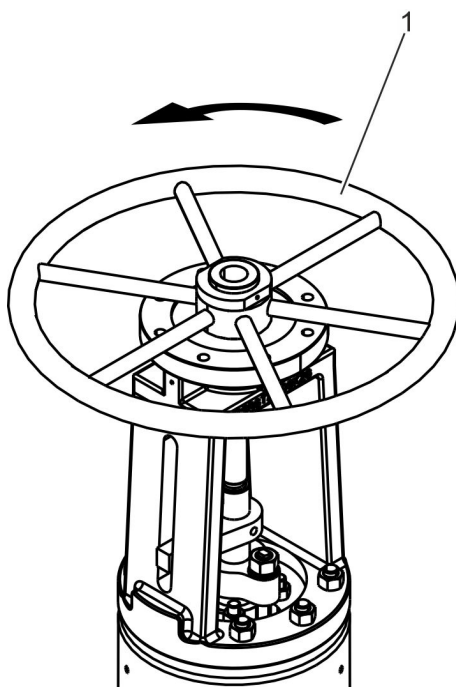


Fig. 20: Opening the valve

1. ➔



WARNING!
Valve malfunction!

Interrupt the flow of the pipeline medium using operator-sided measures.

2. ➔ Create pressure compensation between the input and output side of the valve using operator-sided measures.

3. ➔ Turn the handwheel (Fig. 20/1) anticlockwise.

⇒ The stop check valve can be opened by the pipeline medium flowing in the flow direction.

Operation as a gate valve

- Personnel: ■ Trained person (operator)
- Protective equipment: ■ Industrial hard hat
■ Safety goggles
■ Protective work clothing
■ Protective gloves
■ Safety footwear

Closing the valve completely

1. ➤



WARNING!
Valve malfunction!

Interrupt the flow of the pipeline medium using operator-sided measures.

⇒ The stop check valve closes.

2. ➤

Turn the handwheel (Fig. 21/1) clockwise: The valve is closed.

⇒ The stop check valve is pressed into the seat and completely shuts off the valve.

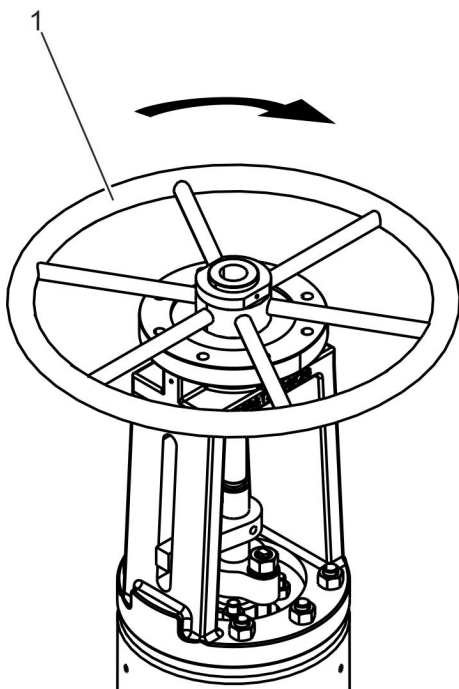


Fig. 21: Closing the valve



Pressure can be applied to both sides of the valve.

7.2.2 Valve with electric actuator

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



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

7.2.3 Valve with hydraulic or pneumatic actuator

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



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

7.3 Operating the valve in an emergency

7.3.1 Valve with electric actuator



Coupling/uncoupling the handwheel

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

- Personnel: ■ Trained person (operator)
- Protective equipment: ■ Industrial hard hat
 ■ Safety goggles
 ■ Protective work clothing
 ■ Protective gloves
 ■ Safety footwear

Requirement: The electric actuator cannot be used.

1. ➤ Safeguard the affected system area.

2. ➤

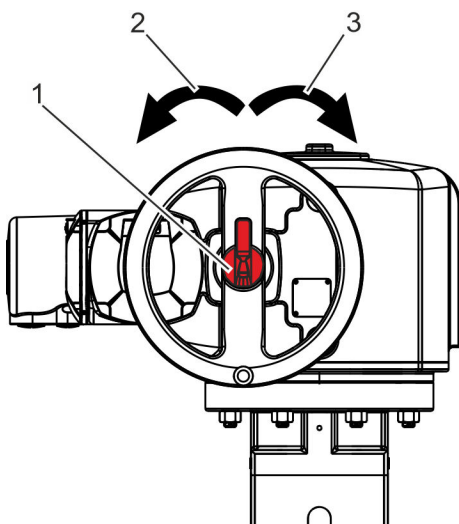


WARNING!
Valve malfunction!

Interrupt the flow of the pipeline medium using operator-sided measures.

⇒ The stop check valve closes.

Closing the valve completely



3. ➤ Couple the handwheel (Fig. 22/1).

4. ➤ Turn the handwheel clockwise (Fig. 22/3).

⇒ The stop check valve is pressed into the seat and completely shuts off the valve.

Fig. 22: Handwheel on the electric actuator

Opening the valve completely

5. ➤ Create pressure compensation between the input and output side of the valve using operator-sided measures.

Operating the valve in an emergency > Valve with hydraulic or pneumatic actuator

6. ➤ Couple the handwheel (Fig. 22/1).
7. ➤ Turn the handwheel anticlockwise (Fig. 22/2).
 - ⇒ The stop check valve can be opened by the pipeline medium flowing in the flow direction.

7.3.2 Valve with hydraulic or pneumatic actuator



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

Operation



Operating the valve in an emergency > Valve with hydraulic or pneumatic actuator

8 Maintenance

8.1 Safety instructions for maintenance

Safeguard against restart

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

Through unauthorized switch-on of the energy supply during maintenance there is 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.

Electric current

**DANGER!****Risk of fatal injury due to electric current!**

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

- Only have qualified electricians perform work on electrical lines and components.

Air under high pressure

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

Pneumatically actuated components of the valve can cause severe injuries.

- Only have pneumatic specialists perform tasks on the pneumatic equipment.
- Before work on the pneumatic system begins, ensure that it is completely depressurised. Completely depressurise pressure accumulators.
- Wear personal protective equipment.

Fluid under high pressure



WARNING!

Risk of injury due to hydraulic energy!

The hydraulically-powered components of the valve can cause severe injuries.

- Only have hydraulic specialists 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!****Risk of injury due to the heavy weight of the valve!**

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

- Transport valves and the associated components with a suitable hoist or forklift.
- Do 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.
- Secure valves and components against 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.

Incorrect bolt tightening torques



WARNING!

Hazard due to wrong tightening torques!

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

- Do not undo the threaded connections on the valve.
- For maintenance work or if the threaded connections have come loose, you can find the tightening torques
 - by contacting Stahl-Armaturen PERSTA GmbH customer service (see p. 4 for contact details) and specifying the serial number, or
 - by referring to the manufacturer's website (address on page 2).

Incorrect spare parts



WARNING!

Risk of injury if the wrong spare parts are used!

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

- Only use genuine spare parts from Stahl-Armaturen PERSTA GmbH or spare parts approved by Stahl-Armaturen PERSTA GmbH.
- If you have any questions or if anything is unclear, always contact our customer service (contact details on page 4).

Defective sealing elements



WARNING!

Risk of injury due to installation of previously used sealing elements!

Previously used sealing elements may cause injuries due to escaping pipeline medium.

After each dismantling of the stem,

- use, depending on the version, a new bottom ring,
- 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 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.

Environmental protection

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

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

8.2 Maintenance schedule

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

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

Interval	Maintenance work	Personnel
Depending on frequency of operation, operating and ambient conditions/ specified by the operating company	Check the valve visually for leaks (☞ Chapter 8.3.1 “Visually checking the valve” on page 70)	Trained person (operator)
	Lubricate the stem and bearing (☞ Chapter 8.3.2 “Lubricating the stem” on page 71)	Trained person (operator)
	Check the swing check plate, stem, and body for increased wear (☞ Chapter 8.3.5 “Removing and checking the swing check plate” on page 94)	Industrial mechanic (high pressure valves)

Interval	Maintenance work	Personnel
Every six months	Activate stem (open/close)	Trained person (operator)
Depending on duration of use, operating and ambient conditions	Replace the gland packing (↪ <i>Chapter 8.3.3 “Replacing the gland packing” on page 72</i>)	Industrial mechanic (high pressure valves)
	Replace the cover gasket (↪ <i>Chapter 8.3.4 “Replacing the gasket of the pressure sealed cover” on page 81</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 for leaks.
2. ▶ Check the cover for leaks.
3. ▶ Check the pipe connection flanges for leaks.
4. ▶ Check for abrasion in the stem thread.
5. ▶ Check for abrasion in the threaded bush.

8.3.2 Lubricating the stem

- Personnel: ■ Trained person (operator)
- Protective equipment: ■ Industrial hard hat
 ■ Safety goggles
 ■ Protective work clothing
 ■ Protective gloves
 ■ Safety footwear

Requirements:

- The valve has cooled down/warmed up to ambient temperature.
- A depressurised state must have been established.

1. → Protect the stuffing box area from the lubricant.

2. →



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

With electric actuator: Couple the handwheel.

3. →



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

For pneumatic actuator: Couple the handwheel.

4. →



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

With hydraulic actuator: Operate the valve via the controller.

5. → Open the valve completely.

6. → Depending on the version:

- Grease the stem thread with a brush.
- If a lubricating nipple is available: Grease the stem thread and bearing via the lubricating nipple.

7. → Completely close valve.

8. → Repeat steps 5–7 several times.

9. →



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

With electric actuator: Uncouple the handwheel.

10.



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

For pneumatic actuator: Uncouple the handwheel.

8.3.3 Replacing the gland packing

Valve with manual actuator

Personnel: ■ Industrial mechanic (high pressure valves)

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

Special tool: ■ Packing extractor

Requirements:

- The valve has cooled down/warmed up to ambient temperature.
- A depressurised state must have been established.
- The valve has been moved to the middle position.

Detaching the anti-twist device

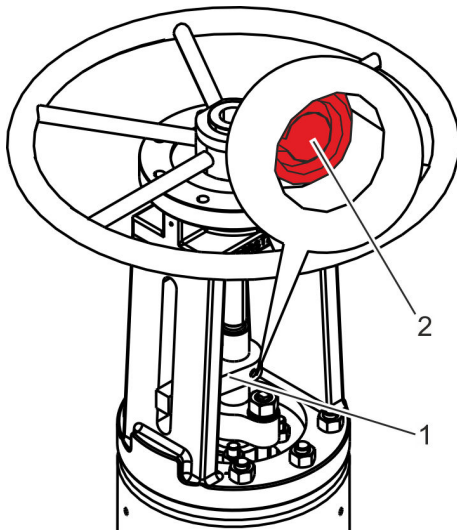


Fig. 23: Detaching the anti-twist device

1. → If an anti-twist device (Fig. 23/1) is available: Knock the clamping pin (Fig. 23/2) out of the anti-twist device.

Removing the bonnet

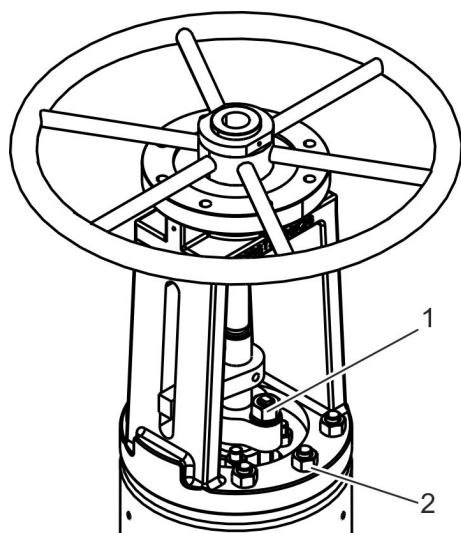


Fig. 24: Removing nuts

2. →



WARNING!
Heavy components!



NOTICE!
Incorrect slinging!

Attach the bonnet to the hoist using appropriate sling gear.

3. →

Use the hoist to secure the bonnet from falling off of the body.

4. →

Make sure that bonnet and body cannot be lifted by the hoist.

5. →



WARNING!
Risk of injury due to pressurised valve!

Unscrew and remove nuts (Fig. 24/2) from the bonnet.

6. →

Unscrew the nuts (Fig. 24/1) from the gland follower flange and remove together with the washers.

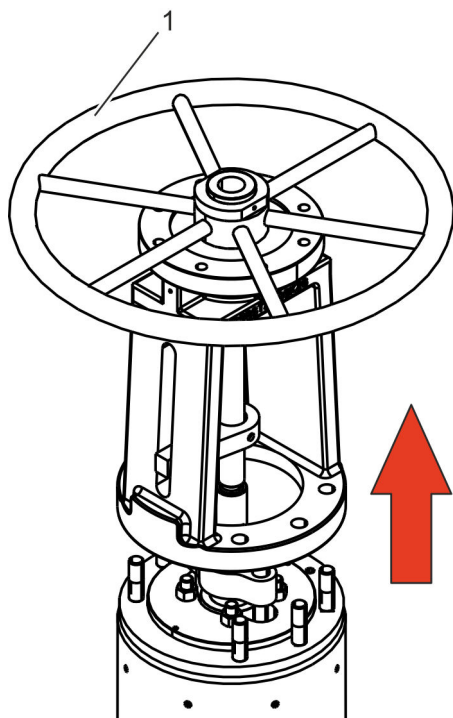


Fig. 25: Taking off the bonnet

7. → Move the handwheel (Fig. 25/1) in the closing direction.
⇒ The bonnet lifts off of the body.
8. → Use a hoist to remove the bonnet and the anti-twist device from the stem.

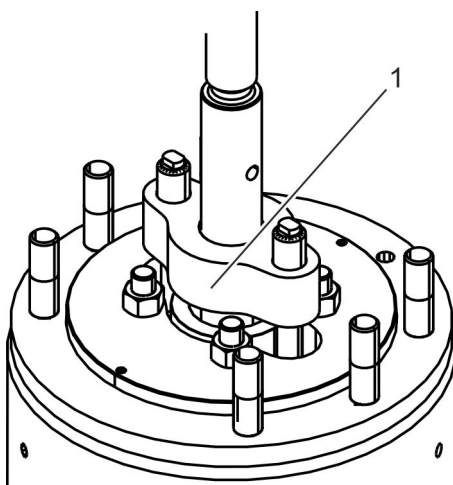



Fig. 26: Removing the gland follower flange

9. →  **WARNING!**
Risk of injury due to escaping medium!

Take off the gland follower flange (Fig. 26/1) above the stem and lift upwards.

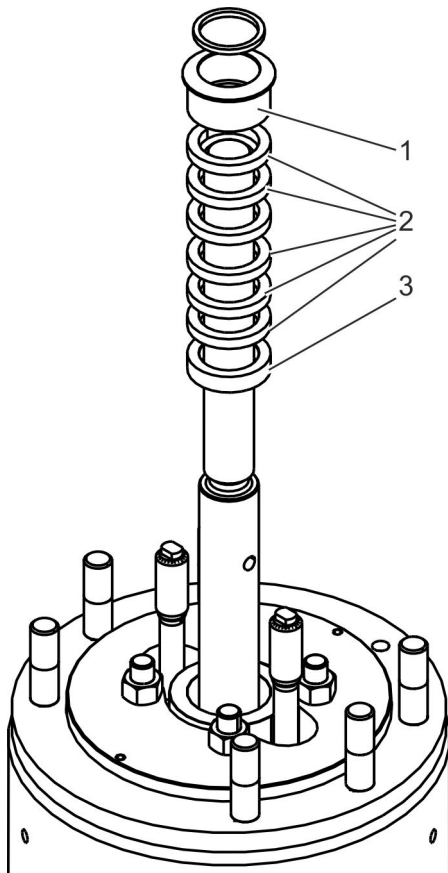
Replacing the gland packing


Fig. 27: Removing the gland packing

10. Use the packing extractor to remove the gland packing which is comprised of the gland follower (Fig. 27/1), packing ring (Fig. 27/2) and the base ring (Fig. 27/3).
11. Completely remove any residue from the gland packing.
12. Carefully clean the emptied packing chamber and the gland contact parts.

Inserting the gland packing

13.


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

Attach the guide sleeve or base ring (Fig. 27/3) onto the stem.

14.


Number of packing rings varies.

Attach the packing rings (Fig. 27/2) onto the stem.

15. Attach the gland follower (Fig. 27/1) onto the stem.

Performing final tasks

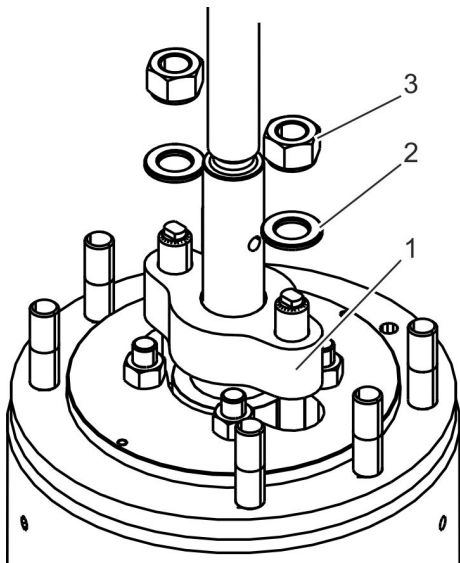


Fig. 28: Mounting the gland follower flange

- 16. ▶ Attach the gland follower flange (Fig. 28/1) and bolt uniformly using washers (Fig. 28/2) and nuts (Fig. 28/3) in accordance with the manufacturer's specifications.

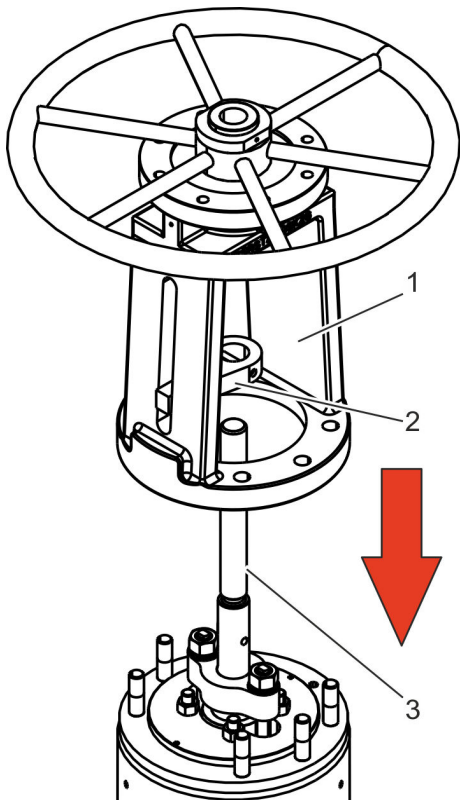


Fig. 29: Bonnet and anti-twist device

- 17. ▶ Use a hoist to attach the bonnet (Fig. 29/1) together with the anti-twist device (Fig. 29/2) onto the stem (Fig. 29/3).
- 18. ▶ Fit the bonnet (Fig. 29/1) onto the stud bolts in the body.

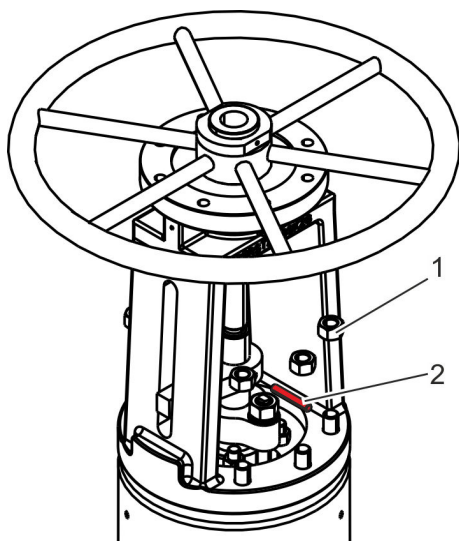


Fig. 30: Screw-connecting the bonnet

Mounting the anti-twist device

19. ▶



WARNING!
Risk of injury due to incorrect tightening torques!

Screw the nuts (Fig. 30/1) onto the stud bolts in a crosswise sequence according to the manufacturer's specifications.

20. ▶

If there is an anti-twist device: Mount the anti-twist device using the tension pin (Fig. 30/2).

Valve with electric, hydraulic or pneumatic actuator

The following describes how to use the stem when the valve is equipped with an electric actuator which is dismantled for maintenance.



Observe the instructions in the documentation provided by the manufacturer on mounting and dismantling the pneumatic or hydraulic actuator.



Use a hook wrench after dismantling the actuator

- To operate the stem, use a hook wrench instead of the handwheel that is provided with the manual actuator.*
- Place the hook wrench on the flange of the threaded bush.*

Personnel:	<ul style="list-style-type: none">■ Qualified electrician■ 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
Special tool:	<ul style="list-style-type: none">■ Knock-out tool■ Sling gear■ Hook wrench

Requirements:

- The valve has cooled down/warmed up to ambient temperature.
- A depressurised state must have been established.
- The valve must have been moved 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.

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

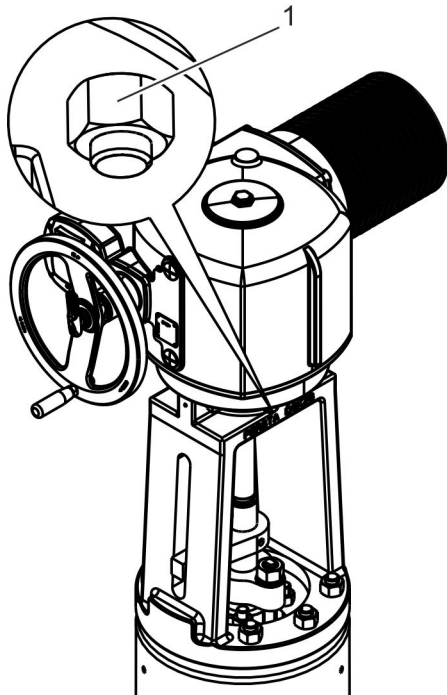


Fig. 31: Removing the bolts

2. ➔ Unscrew and then remove the fastening screws (Fig. 31/1) of the electric actuator.
3. ➔ Remove the electric actuator (Fig. 31/2) and store it outside the work area.

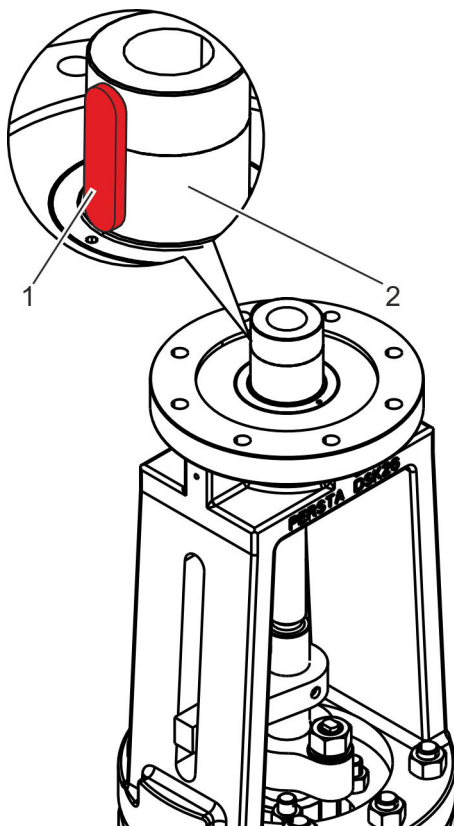


Fig. 32: Removing the feather key

4. ➔ Remove the feather key (Fig. 32/1) from the feather key groove of the hub (Fig. 32/2).

5. ➔



Use a hook wrench instead of the hand-wheel.

Perform steps 1–18 from  “Valve with manual actuator” on page 72.

6. ➔ Insert the feather key (Fig. 32/1) into the feather key groove on the hub (Fig. 32/2).

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 inserted into the receptacle on the electric actuator.

9. ➔



WARNING!
Falling actuator!



Make sure that the seat of the feather key is correct.

Lower the electric actuator onto the flange on the bonnet so that it is secured from falling down.

10. Bolt the electric actuator onto the bonnet (Fig. 33/1).

11.



WARNING!
Risk of injury due to incorrect tightening torques!

Tighten the nuts (Fig. 33/1) as specified by the manufacturer.

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

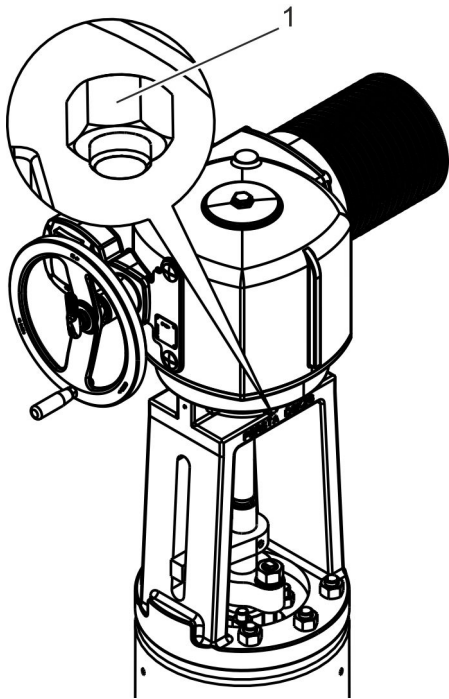


Fig. 33: Fastening the electric actuator

8.3.4 Replacing the gasket of the pressure sealed cover

Valve with manual actuator

Personnel:	<ul style="list-style-type: none"> ■ 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
Special tool:	<ul style="list-style-type: none"> ■ Packing extractor ■ Pin puncher ■ Hoist ■ Spacers ■ Ring bolts

Prerequisites:

- The valve has cooled down/warmed up to ambient temperature.
- A depressurised state must have been established.
- The valve has been moved to the middle position.

1. ➔ Perform work steps 1–9 of the “Replace gland packing” (↪ *Chapter 8.3.3 “Replacing the gland packing” on page 72*) maintenance task.
2. ➔ For the version with clamping lid (Fig. 34/2): Unscrew and remove the nuts (Fig. 34/1).

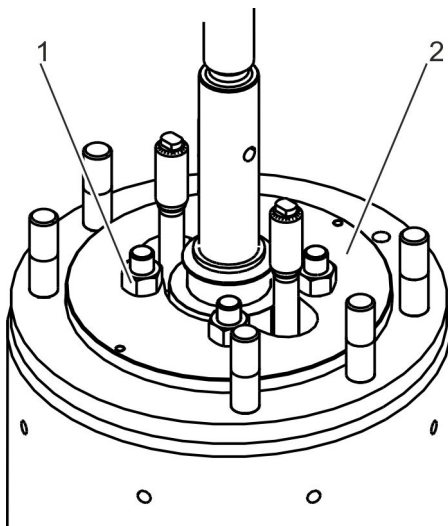
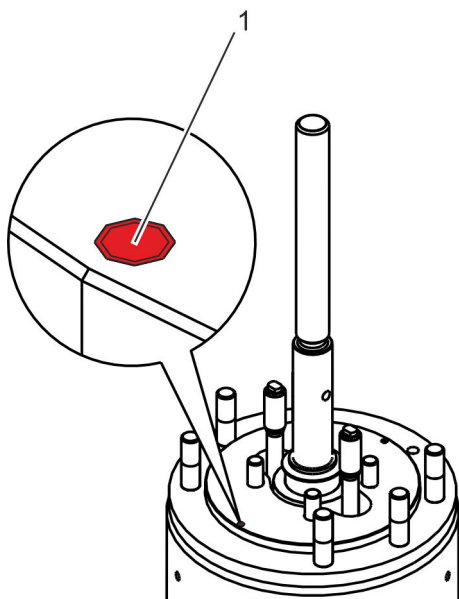
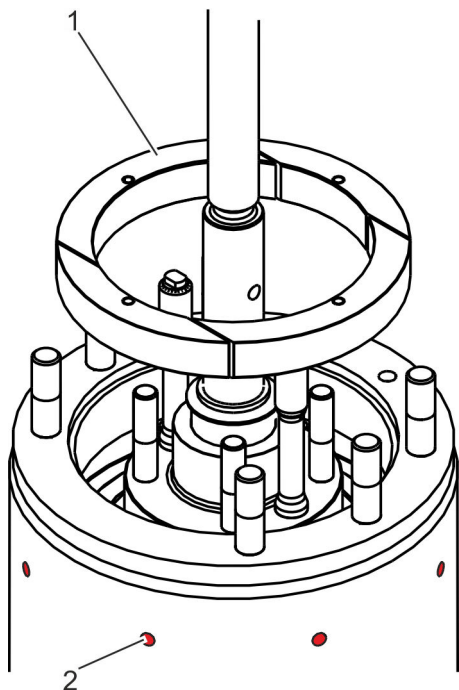


Fig. 34: Unscrewing the nuts from the clamping lid



3. ➤ Screw the ring bolts into the 2 bores (Fig. 35/1) of the clamping lid.
4. ➤ Attach ring bolts to the hoist with suitable sling gear.
5. ➤ Remove the clamping lid from the body via the stem.

Fig. 35: Removing the clamping lid



7. ➤ Use the pin puncher to knock the segments (Fig. 36/1) inwards through the outer ejection bores (Fig. 36/2) and remove them.

Fig. 36: Removing segment rings

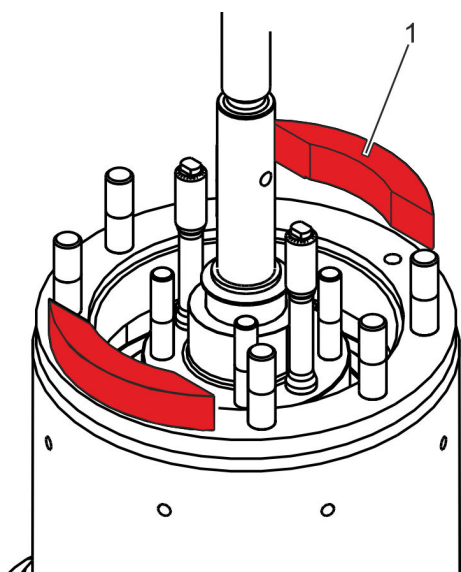


Fig. 37: Removing the spacers

8. → Position two spacers (Fig. 37/1) of the same height opposite each other on the body.

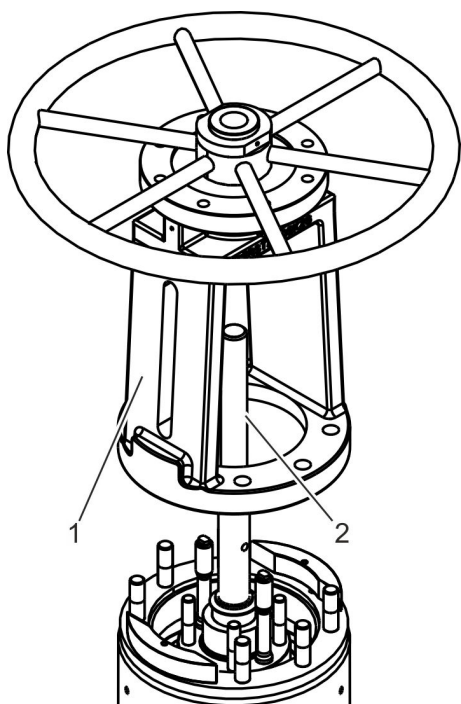


Fig. 38: Mounting the bonnet

9. →



NOTICE!
Incorrect slinging!

Attach the bonnet (Fig. 38/1) onto the hoist and fit it onto the stem (Fig. 38/2).

10. → Screw the stem into the threaded bush on the bonnet.

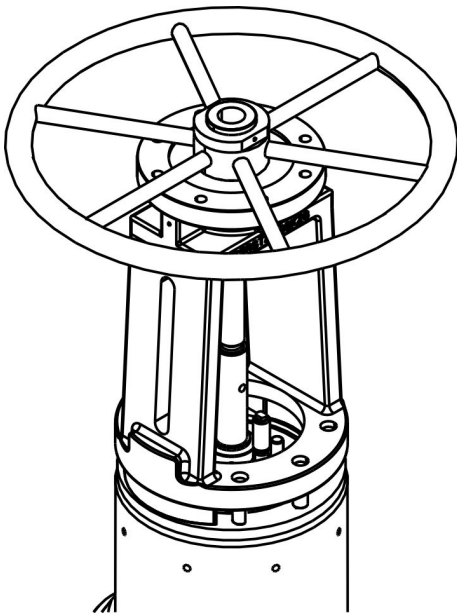


Fig. 39: Opening the valve

11. ▶ Open the valve completely.
⇒ The bonnet is lowered onto the spacers (Fig. 39).
12. ▶ Make sure that the bonnet rests on the spacers parallel to the body.
13. ▶ Close the valve completely.
⇒ The cover is pulled out.

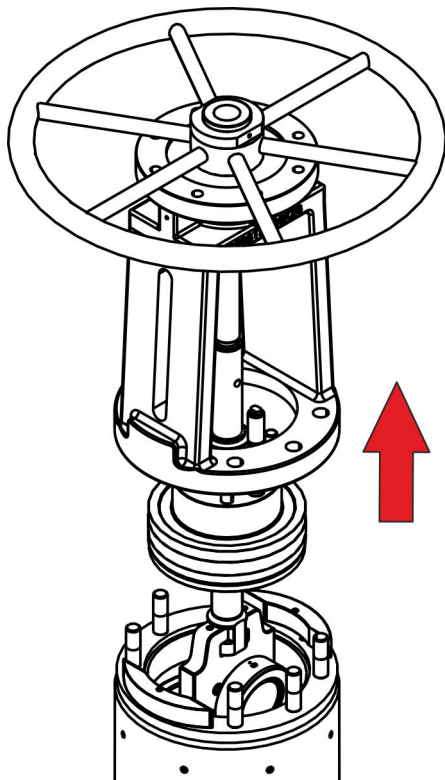



Fig. 40: Removing the bonnet together with the stem

14. ▶  **WARNING!**
Danger of injury due to heavy components!

Remove the complete bonnet including the stem and cover from the body (Fig. 40) with the hoist.
15. ▶ Remove spacers.
16. ▶ Make sure that no spacers have fallen into the body.

- 17.** ➤ Unscrew the stem (Fig. 41/1) from the threaded bush on the bonnet (Fig. 41/2).

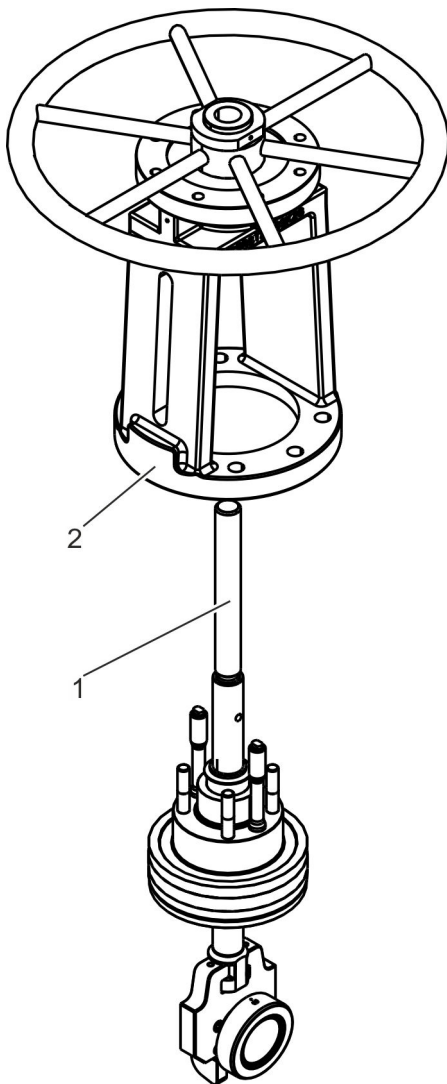


Fig. 41: Unscrewing the stem

Removing the gland packing

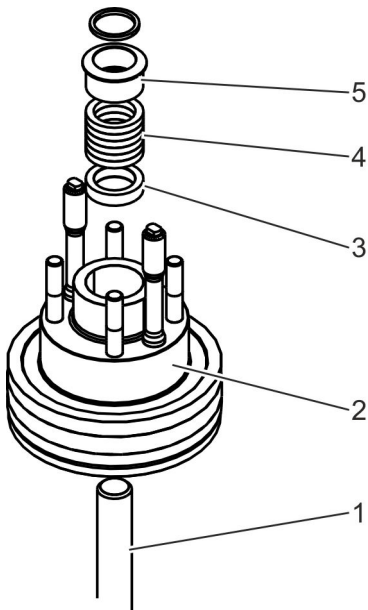


Fig. 42: Stem with packing and cover elements

18. ▶ Remove the gland follower (Fig. 42/5) from the stem (Fig. 42/1).
19. ▶ Remove the packing ring (Fig. 42/4) from the stem (Fig. 42/1).
20. ▶ Remove the guide sleeve or base ring (Fig. 42/3) from the stem (Fig. 42/1).

Removing the cover

21. ▶ Remove the cover (Fig. 42/2) from the stem (Fig. 42/1).

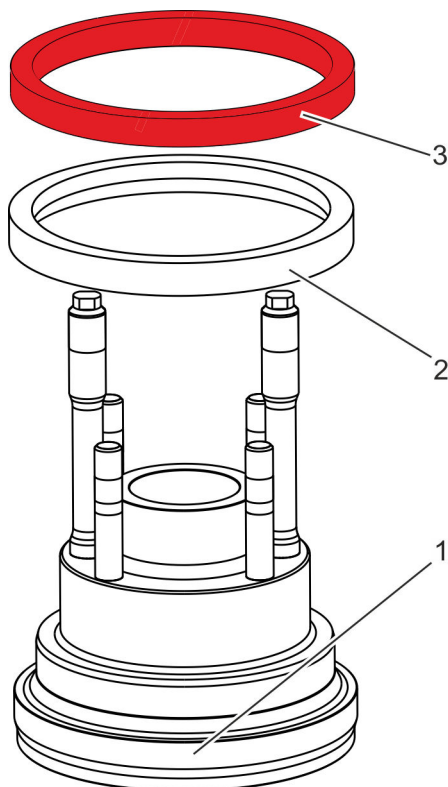


Fig. 43: Removing the support ring and gasket ring

Cleaning

22. Lift the support ring (Fig. 43/3) up off the cover (Fig. 43/1).
23. Lift the gasket ring (Fig. 43/2) up off the cover (Fig. 43/1).

24.



NOTICE!
Material damage from machined support surfaces!

Make sure that all support surfaces are bare metal surfaces and undamaged.

25. Completely remove any residue from the gland packing.
26. Carefully clean the emptied packing chamber and stuffing box press-on parts.
27. Carefully remove the residues from the gasket ring.

Mounting the stem

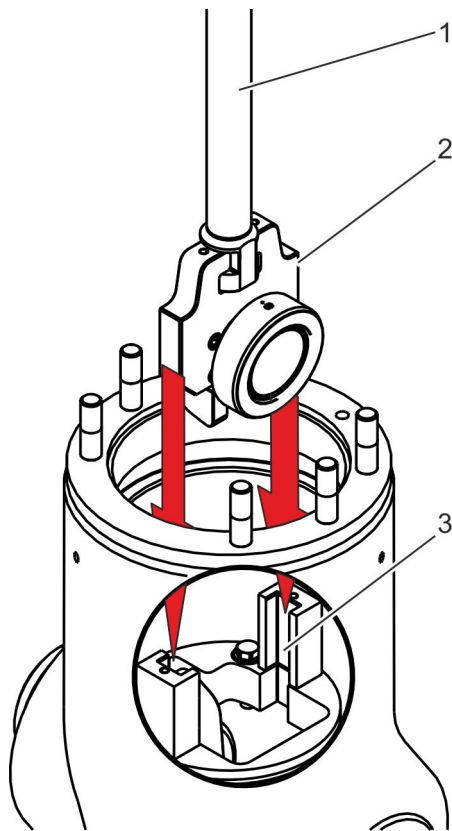
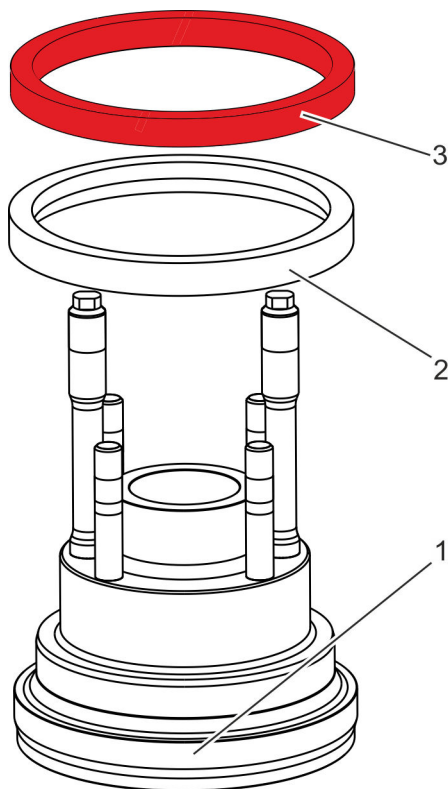


Fig. 44: Mounting the stem

- 28.** ▶ Lift the stem (Fig. 44/3) into the body.
- 29.** ▶ Make sure that the disk holders (Fig. 44/2) slide into the guides (Fig. 44/3) in the retaining ring (mounted in the body).
- 30.** ▶ Make sure that the disk has the correct seat in the body.



- 31.** Place the new gasket ring (Fig. 45/2) on the cover (Fig. 45/1).
- 32.** Place the support ring (Fig. 45/3) on the gasket ring (Fig. 45/2).

Fig. 45: Mounting the gasket ring and support ring

Mount cover

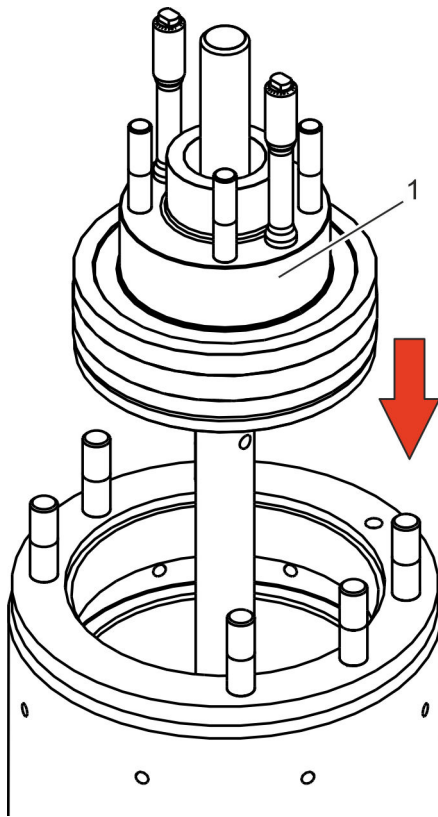


Fig. 46: Mount cover

33. Attach the cover (Fig. 46/1) onto the stem.

Inserting the gland packing

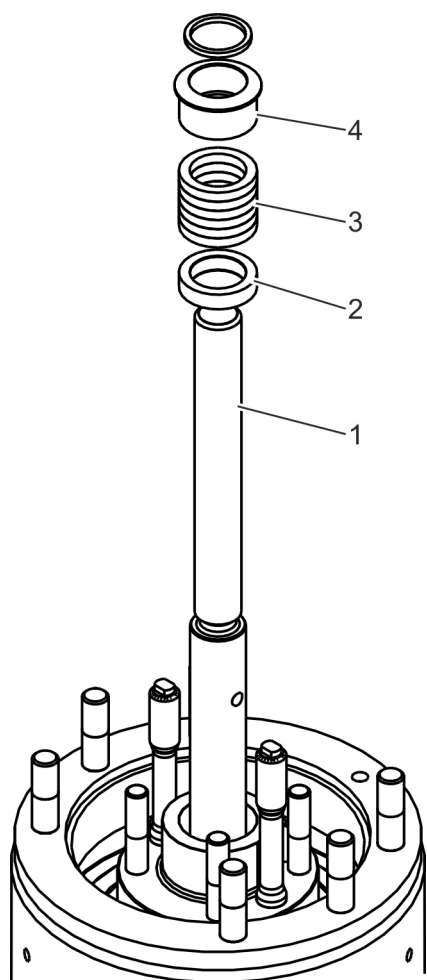


Fig. 47: Mounting the stuffing box elements

34. ➤



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

Attach the guide sleeve or base ring (Fig. 47/2) onto the stem (Fig. 47/1).

35. ➤

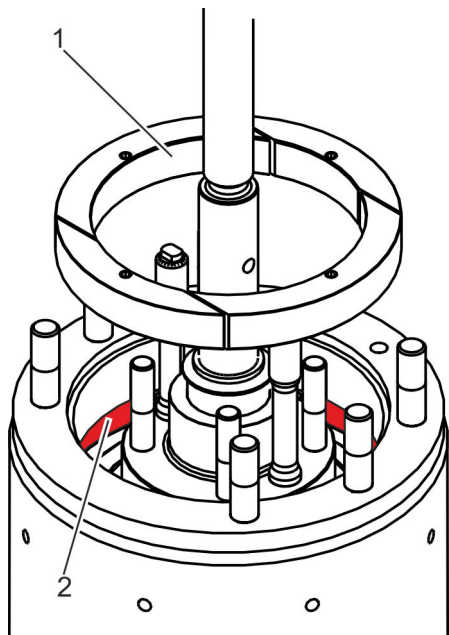


Number of packing rings varies.

Attach the packing rings (Fig. 47/3) onto the stem (Fig. 47/1).

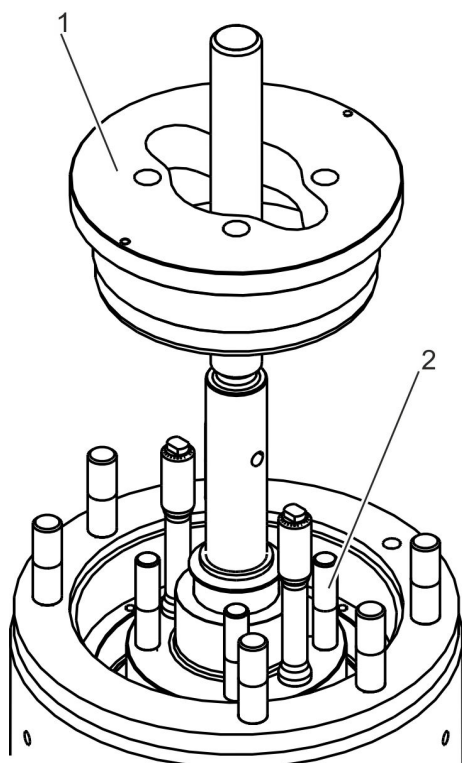
36. ➤

Attach the gland follower (Fig. 47/4) onto the stem (Fig. 47/1).



- 37.** Insert the segments (Fig. 48/1) into the body groove (Fig. 48/2) in the body.

Fig. 48: Inserting the segment rings



- 38.** If available, use a hoist to attach the clamping lid (Fig. 49/1) from above onto the stem and onto the stud bolts (Fig. 49/2) in the cover.

Fig. 49: Mounting the clamping lid

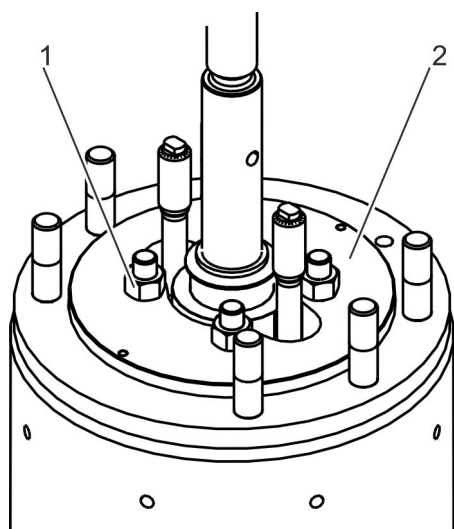


Fig. 50: Bolting the clamping lid

Valve with electric, hydraulic or pneumatic actuator

39.



WARNING!
Risk of injury due to incorrect tightening torques!

Screw the clamping lid (Fig. 49/2) crosswise with nuts (Fig. 49/2) onto the stud bolts.

⇒ The cover seal will be pre-tensioned.

40.

Perform work steps 16–20 of the “Replace gland packing” (↪ Chapter 8.3.3 “Replacing the gland packing” on page 72) maintenance task.



Proceed as described in ↪ “Valve with electric, hydraulic or pneumatic actuator” on page 78 when using an electric, hydraulic or pneumatic actuator.

8.3.5 Removing and checking the swing check plate

- | | |
|-----------------------|--|
| Personnel: | ■ Industrial mechanic (high pressure valves) |
| Protective equipment: | ■ Industrial hard hat |
| | ■ Safety goggles |
| | ■ Protective work clothing |
| | ■ Protective gloves |
| | ■ Safety footwear |
| Special tool: | ■ Sling gear |
| | ■ Hoist |
| | ■ Ring bolts |

Removing the cover

1. ➤ Remove the cover as described in [Chapter 8.3.4](#) "Replacing the gasket of the pressure sealed cover" on page 81/steps 1–27.
2. ➤ Bend the washers (Fig. 51/3) straight.

Unscrew the fastening screws (Fig. 51/2) and remove them together with the washers (Fig. 51/3) from the retaining ring (Fig. 51/1).

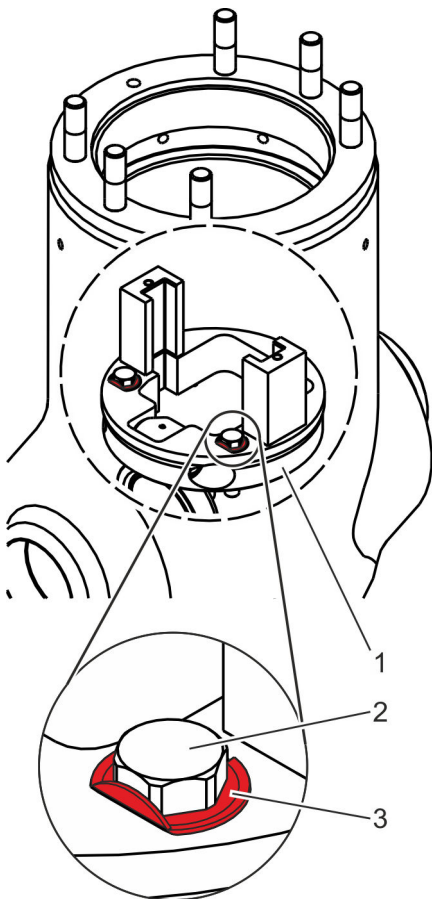


Fig. 51: Phantom view of the body

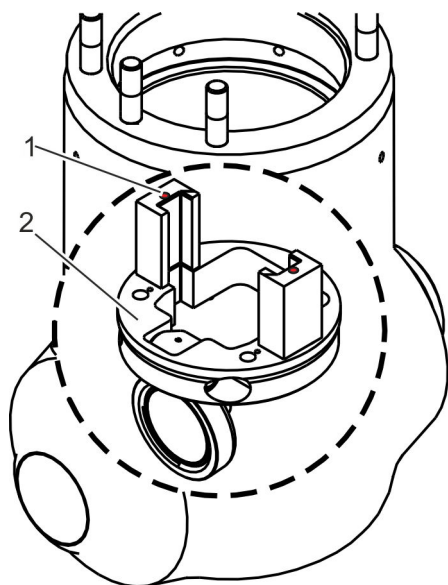


Fig. 52: Phantom view of the body:
Screwing in the ring bolts

Mounting the retaining ring

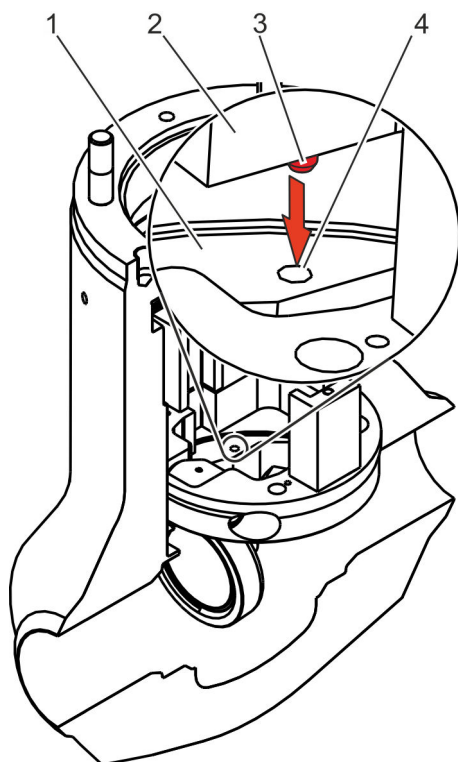


Fig. 53: Positioning the retaining ring

3. → Screw the ring bolts into the two boreholes (Fig. 52/1) of the guides on the retaining ring (Fig. 52/2).

4. → Attach ring bolts to the hoist with suitable sling gear.

5. →



WARNING!

Danger of injury due to heavy components!

Carefully lift the retaining ring (Fig. 52/2) including the swing check plate up and out of the body.

6. → Set down the retaining ring (Fig. 52/2) including the swing check plate outside of the body.

7. → Examine the swing check plate for wear.

8. → If necessary, replace the old components with new components or have them machined by an external specialist company.

9. → Use the ring bolts and hoist to carefully lift the retaining ring (Fig. 52/2) including the swing check plate into the body.

10. → Positioning the retaining ring: Insert pins (Fig. 53/3, 2 pieces) in the retaining ring (Fig. 53/2) into the boreholes (Fig. 53/4, 2 pieces) in the body.

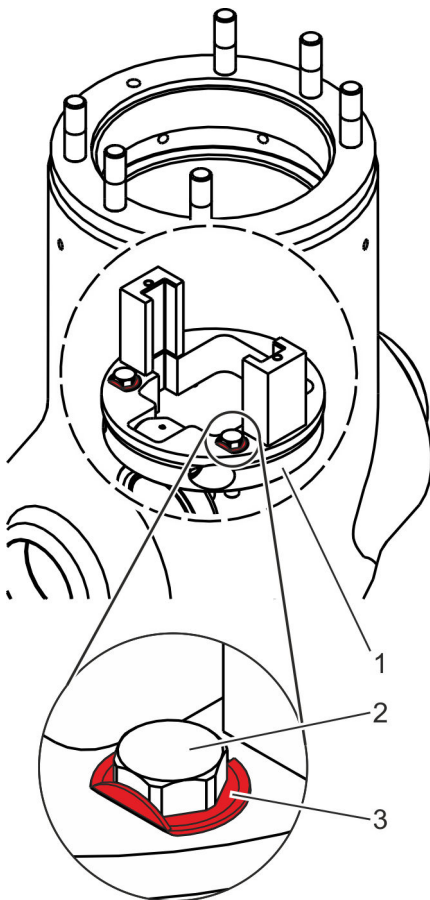


Fig. 54: Fastening the retaining ring

8.4 After maintenance

Perform final check

11. Loosely fasten the retaining ring (Fig. 54/1) with new washers and (Fig. 54/3) and screws (Fig. 54/2) in the body.

12.



WARNING!

Risk of injury due to incorrect tightening torques!

Tighten the screws (Fig. 54/2) with the prescribed tightening torque.

13. Bend the washers (Fig. 54/3) on one side.

⇒ The screws (Fig. 54/2) cannot become loose.

14. Mount the previously dismantled component assemblies as described in [Chapter 8.3.4 "Replacing the gasket of the pressure sealed cover"](#) on page 81/step 28–40.

Personnel: Industrial mechanic (high pressure valves)

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

Requirement: The maintenance tasks have been completed.

- 1.** Apply the permissible test pressure to the valve.
- 2.** Make sure that the valve does not leak.
- 3.** If necessary, recheck tightening torques in accordance with the manufacturer's specifications.
- 4.** Retighten the nuts hand tight.
- 5.** Carry out the work for initial start-up ([Chapter 6.3 "Carrying out initial start-up"](#) on page 54).

9 Faults and troubleshooting

9.1 Safety instructions for fault correction

Improperly executed fault correction tasks

**WARNING!****Danger of injury due to improper fault correction!**

Improperly executed fault correction tasks can cause severe injuries and significant damage to property.

- 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 performed and concluded in accordance with the instructions in this manual.
 - Ensure that no persons are in the danger zone.
 - Ensure that all covers and safety systems are installed correctly and that they function properly.

Safeguard against restart

**WARNING!****Life-threatening danger due to unauthorised restart!**

The unauthorised reactivation of the energy supply while faults are identified and rectified poses a risk 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.

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.

Harmful pipeline medium



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.

Conduct in the event of dangerous faults

In general, the following applies:

- 1.** ➤ For faults that pose a direct hazard risk to persons or property, immediately trigger an Emergency Stop.
- 2.** ➤ Determine the cause of the fault.
- 3.** ➤ If correction of the fault requires work in the danger zone, secure the system area in question, and depressurise the valve.
- 4.** ➤ Have faults that affect the safe operation of the valve corrected by the manufacturer.

9.2 Fault table

Fault description	Cause	Remedy	Personnel
Leakage of the shut-off element	Solids in the medium that have damaged the seat	Grind the seats, if necessary have damaged components replaced.	Industrial mechanic (high pressure valves)
	Deformation of the seat surface due to an impermissibly high tension on the valve or due to thermal tension	Grind the seats, if necessary have damaged components replaced. Check actuator setting. Determine the cause of the deformation and have it rectified.	Industrial mechanic (high pressure valves)
	Erosion or corrosion, e.g. due to improper selection of valve nominal diameter or valve material	Have the design of the valve checked.	Industrial mechanic (high pressure valves)
	Torque switch is defective	Have the torque switch checked. Prior to readjustment consult with Stahl-Armaturen PERSTA GmbH customer service.	Qualified electrician
	Incorrect actuator setting: Shut-off element not firmly enough in the seat	Set the actuator correctly.	Industrial mechanic (high pressure valves)
	Stem or disk worn	Remove stem. Check the stem and disk for wear (☞ <i>Chapter 8.3.4 "Replacing the gasket of the pressure sealed cover" on page 81</i>).	
End position of the actuator not reached	Incorrect actuator setting	Set the actuator correctly.	Industrial mechanic (high pressure valves)
	Valve bearing, stem thread, lift stop or inner parts of the valve are defective	Replace the damaged parts.	Industrial mechanic (high pressure valves)
	Stuffing box has been overtightened	Tighten the stuffing box correctly, if necessary replace the gland packing (☞ <i>Chapter 8.3.3 "Replacing the gland packing" on page 72</i>).	Industrial mechanic (high pressure valves)
	Moving parts insufficiently lubricated	Lubricate the moving parts (☞ <i>Chapter 8.3.2 "Lubricating the stem" on page 71</i>).	Industrial mechanic (high pressure valves)
Leakage of the gland packing	Insufficient maintenance	Shut off the pipe section affected. Retighten the gland follower flange with the tightening torque specified by the manufacturer. If necessary pack or repack the stuffing box (☞ <i>Chapter 8.3.3 "Replacing the gland packing" on page 72</i>).	Industrial mechanic (high pressure valves)

Fault description	Cause	Remedy	Personnel
Leakage of the gland packing	Destruction of the stuffing box due to the use of a packing material without sufficient media or temperature resistance	Shut off the pipe section affected. Replace the stuffing box with a suitable packing set (↪ Chapter 8.3.3 "Replacing the gland packing" on page 72).	Industrial mechanic (high pressure valves)
	Wear of the packing material	Shut off the pipe section affected. Replace the stuffing box (↪ Chapter 8.3.3 "Replacing the gland packing" on page 72).	Industrial mechanic (high pressure valves)
Valve does not function	Electric actuator does not function	Check electric actuator as specified in the manufacturer's documentation.	Qualified electrician
	Hydraulic actuator does not function	Check hydraulic actuator as specified in the manufacturer's documentation.	Hydraulics Specialist
	Pneumatic actuator does not function	Check pneumatic actuator as specified in the manufacturer's documentation.	Pneumatics Specialist
Malfunction of the valve	Limit switch (for optional electric, pneumatic or hydraulic actuator) is defective	Have the limit switch checked. Prior to readjustment consult with Stahl-Armaturen PERSTA GmbH customer service.	Qualified electrician
	Torque switch (with optional electric, pneumatic or hydraulic actuator) is defective	Have the torque switch checked. Prior to readjustment consult with Stahl-Armaturen PERSTA GmbH customer service.	Qualified electrician
Jerky lifting movement	Gland packing is too tight	Readjust the gland packing. If necessary replace the gland packing (↪ Chapter 8.3.3 "Replacing the gland packing" on page 72).	Industrial mechanic (high pressure valves)

10 Removal, disposal

10.1 Safety instructions for dismantling

Electrical system

**DANGER!****Risk of fatal injury due to electric current!**

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

- Before dismantling begins, switch off the power supply and disconnect it completely.

Danger due to hydraulics

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

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

- Only have hydraulic specialists perform work on the hydraulic system.
- Before work on the hydraulic system begins, 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.

Dangers due to pneumatics

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

Pneumatically actuated components of the valve, as well as the triggering of the overpressure valve, can cause severe injuries.

- Only have pneumatic specialists perform tasks on the pneumatic equipment.
- Before work on the pneumatic system begins, ensure that it is completely depressurised. Completely depressurise pressure accumulators.
- Wear personal protective equipment.

Improper dismantling



WARNING!

Risk 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 injuries.

- Before work begins, ensure that there is sufficient free space.
- Handle open, sharp-edged components carefully.
- Make sure that the working area is clean and tidy! Loosely stacked components or components and tools that are lying about may 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, consult Stahl-Armaturen PERSTA GmbH customer service

Heavy weight



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.

10.2 Removal

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

Requirements:

- The relevant pipe section is shut off.
 - Valve is in depressurised state.
 - Valve has been drained.
 - With electric actuator:
 - Power supply is switched off and physically disconnected.
 - With hydraulic or pneumatic actuator:
 - Ensure that the customer-provided hydraulic/pneumatic supply is switched off and safeguarded against being switched on again.
 - Hydraulic lines/pneumatic lines are in a depressurised state.
 - Hydraulic lines/pneumatic lines are removed from the actuator of the valve.
- 1.** ➤ Hold the valve in position with a suitable hoist.
 - 2.** ➤ Disconnect pipes on inlet side and outlet side from the valve.

3. ➤ Remove any supports, if necessary.
4. ➤ Use a suitable hoist to remove the valve from the pipe and set it down so that it is secured against falling over.
5. ➤ Clean the assemblies and components as required, and 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 the disassembled components as follows:

- Scrap the metals.
- Hand in the plastic elements for recycling.
- Sort and dispose of all the other components according to the properties of their materials.



NOTICE!

Danger for the environment due to improper disposal!

Risks for the environment can arise due to improper disposal.

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

11 Technical data



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

12 Index

1, 2, 3 ...

3rd chamber 15

A

Abrasion 70

Actuator 35

 Electric 36

 Hydraulic 36

 Manual 35

 Pneumatic 37

Actuator variants 35

Anti-twist device 31, 72

B

Bonnet 72, 81

Brief description 7

Butt-weld valve 37

Bypass with equalizing pipe 16

C

Checking for leaks 70

Clamping lid 72, 81

Closing process 17

Conclude maintenance 96

Connection for over pressure safety device 16

Corrosion 99

Cover 81

D

Dimensions 105

Dismantling 103

Disposal 104

E

Electric actuator 36

 Connecting 46

 operating in an emergency 62

 removing 78

Emergency 24, 62

Emergency operation 62

Environmental protection 30

Erosion 99

External over pressure safety device 16

F

Fault table 99

Flanged valve 37

Flow direction 14

Forklift 8

Functional description 31

G

Gasket ring 35

Gate valve 7

Gland follower 34

Gland follower flange 34, 72

Gland packing 34

 Leaks 99

 Life loaded packing 34

 replacing 72

H

Handwheel 35, 59, 60

Heating times / cooling times 54

Hoist 8

Hook wrench 8

Hydraulic actuator

 Connecting 47

 removing 78

Hydraulic supply 38

Hydrostatic pressure test 49

I

Inductive proximity switch 37

Initial start-up

 Carrying out 54

 preparing 53

Inlet side 31

Intended use 11

Intervals for maintenance tasks 69

K		
Knock-out tool	8	
L		
Leak test	49	
Leaks	99	
Life loaded packing	34	
Limit switch	17, 37	
Lubricating bearing	71	
Lubricating nipple	71	
M		
Maintenance schedule	69	
Manual operation		
Gate valve	60	
Stop check valve	59	
Marking on handwheel	14	
Media	8	
Mode of operation	31	
Mount/dismount actuator	72	
N		
Nozzle	15, 16	
O		
Opening process	17	
Operating company	24	
Operating modes	7	
Operating pressure	15	
Order numbers	29	
Outlet side	31	
Over pressure safety device	15	
P		
Packing compression	34	
Packing extractor	8	
Packing ring	34	
Personal protective equipment	28	
Personnel	25	
Pickling	49	
Pickling medium	49	
Pin puncher	8	
Pneumatic actuator		
Connecting	47	
removing	78	
Pneumatic supply	38	
Position indicator	37	
Power supply	37	
Preparing for the installation	45	
Pressure sealing bonnet	35, 81	
Protective equipment	28	
R		
Rating plate	13	
Replacing the seal	81	
Residual risks	18	
S		
Safety devices	15	
Safety signs	13	
Safety valve	17	
Scale	37	
Seal	34	
Segment ring	35	
Shattering caused by freezing temperatures	22	
Signs	13	
Sling gear	8	
Spare parts	29	
Spare parts order	29	
Special connection valve	37	
Stem	31	
lubricating	71	
removing	94	
Stem thread	70	
Stop check valve	7	
Storage	42	
Support ring	35	
Swing check plate		
checking	94	
Detaching	94	
Symbol	13	

Symbols	
in the manual	9
System pressure test	49
T	
Technical data	105
Thermal insulation	50
Thermal tensions	99
Threaded bush	70
Tightening torques	105
Tools	8
Training	27
Transporting the pallet	41
U	
Use	11
V	
Valve	
installing	45
Insulation	50
operating	59, 60
painting	49
Pickling	49
Storing	42
transporting	40
Visual inspection	70
Visual inspection	70
W	
Weights	105