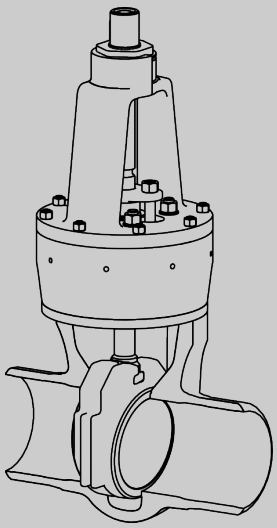
# Operating instructions

## High Pressure Gate Valves
## DSK and DSP



PERSTA

Read the instructions prior to performing any task!

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Translation of the original operating instructions
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**Information about the operating instructions**

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

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

The 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 and handling instructions.

The diagrams in these instructions are provided as examples only and may deviate from the actual version.

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

**Scope of the document**

This manual applies to the following versions of the series 700 JT and 700 CT of the high pressure gate valves DSK and DSP:

| Designation | Series | Nominal diameter (DN) [mm] | Pressure rate | Class* |
|---|---|---|---|---|
| DSK 10 | 700 JT | 50–150 | PD 10 | - |
| DSK 10 | 700 JT | 200–350/300 | PD 10 | - |
| DSK 10 | 700 JT | 350–700 | PD 10 | ≤725 |
| DSK 26 | 700 JT | 65–300 | PD 25 / PD 40 | ≤2500 |
| DSK 10–63 | 700 JT / 700 JN | 50–600 | PD 10–63 | ≤4500 |
| DSP 10–63 | 700 CT / 700 CN | 80–600 | PD 10–63 | ≤4500 |

* Assignment number in the pipe construction

**Other applicable documents**

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

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**Revision overview**

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

# Table of contents

# 1 Overview

**Overview – high pressure gate valves**

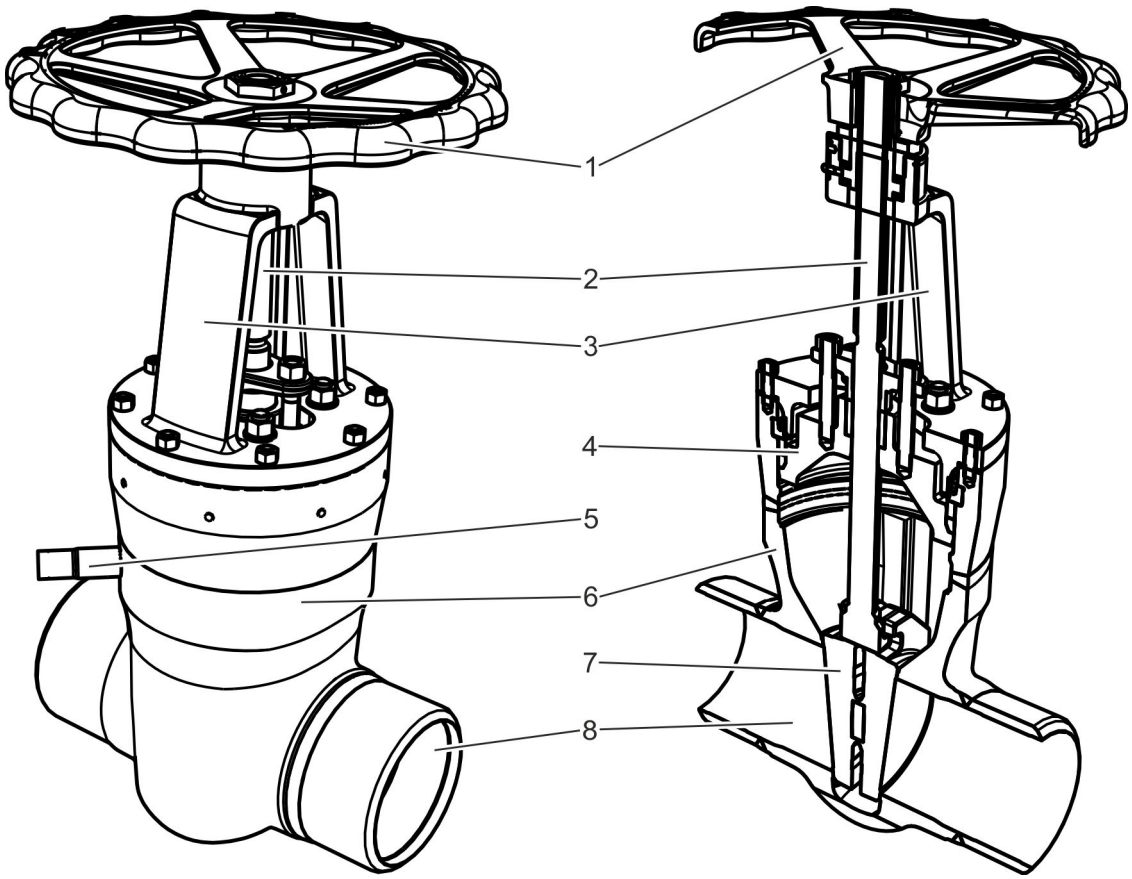


*Fig. 1: High pressure gate valve (shown here: DSK 10 series)*

1 Actuator (in the example: handwheel)
2 Stem
3 Bonnet
4 Pressure sealing bonnet
5 Nozzle for over pressure safety device (optional)
6 Body
7 Shut-off element (in the example: flexible discs)
8 Flow passage

**Brief description**

The valves called high pressure gate valves are installed in pipes. The body (Fig. 1/6) of the valve is flanged or welded in the pipe-work, depending on the version.

The shut-off element is moved up and down via the stem (Fig. 1/2).

When the shut-off element (Fig. 1/7) is moved down into the flow passage, no medium can flow through the valve. When the valve is open, the medium flows through the entire body.

See ↬ *Chapter 3 “Functional description” on page 29*.

**Shut-off element**

The models DSK and DSP differ in the type of shut-off element:

- DSK: flexible disc gate valve
- DSP: parallel discs

See ↳ *Chapter 3.3.1 “Shut-off element” on page 31*.

**Actuator variants**

The stem is moved differently depending on the version:

- manually via handwheel
- electrically
- hydraulically
- Pneumatically

See ↳ *Chapter 3.3.2 “Actuator variants” on page 33*.

**Media**

Depending on the version of the high pressure gate valve, it is suitable for use with water, steam, oil and other non-aggressive media.

**Tools**

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

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

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

**Packing extractor**
Tool for removing gland packing elements.

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

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

# 2 Safety

## 2.1 Symbols in this manual

**Safety instructions**

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

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

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

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

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

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

**Safety instructions in specific instructions**

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

Example:

1. Loosen the bolt.
2. 

**CAUTION!**
**Risk of getting trapped by the cover!**

Close the cover carefully.

3. Tighten the bolt.

## Special safety instructions

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

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

## Tips and recommendations

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

## Additional symbols

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

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

## 2.2 Intended use

Valves of the specified series (↬ *"Scope of the document" on page 3*) are designed for installation in pipes under the following conditions:

- Operation of the valve as an open/close valve.
- Operation of the valve with liquid or gaseous media, without particular corrosive, chemical or abrasive impact.
- Temperature change speeds of approx. 3–6 K/min (3–6 °C/min).
- 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.
- 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.

When using the valve in potentially explosive areas, observe instructions contained in the ignition hazard assessment GA004 and implement the measures it stipulates.

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

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

**Misuse**

**WARNING!**

**Danger in the event of misuse!**

Misuse of the valve can cause dangerous situations.

- Never use the valve in potentially explosive areas without complying with the instructions and measures contained in the ignition hazard assessment GA004.
- Do not use the valve to regulate the mass flow.
- Do not use any objects to increase the force applied when using the handwheel.
- Only operate the handwheel by hand.
- If the handwheel does not move smoothly, or if it cannot be activated, contact the manufacturer.
- Connect the pipes so that they are free of tension.
- Pay attention to the correct installation position of the valve.
- Do not use valves as an anchor point.
- Never run the electric actuators with excess torque.
- Do not exceed the number of permitted load cycles (↳ *Chapter 2.2 “Intended use” on page 11*).
- When operating a valve with:
  - an equalizing pipe
  - a bore in the disc or
  - a bore in the seat ring

  as a safety device (↳ *Chapter 2.4 “Safety devices” on page 14*), only operate the valve in one direction (↳ *“Flow direction arrow” on page 13*).

## 2.3 Safety signs

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

**WARNING!**

**Danger if signs are illegible!**

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

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

**Rating plate**

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

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

**Flow direction arrow**

Depending on the version, the flow direction is marked with an arrow on the valve.

**Customer-specific markings**

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

## 2.4 Safety devices

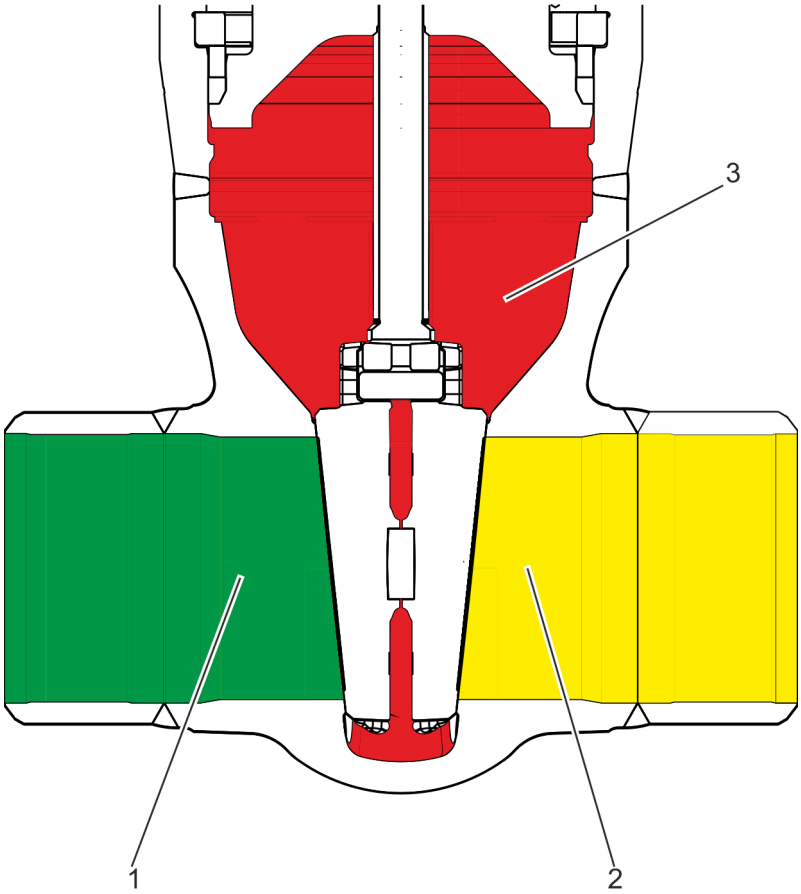


*Fig. 2: Division into “chambers”*

In the closed position, there are 3 “chambers” in the valve:

- 1st chamber: pressurized side (Fig. 2/1)
- 2nd chamber: non-pressurized side (Fig. 2/2)
- 3rd chamber: shut-off inner chamber (Fig. 2/3)

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

### Optional connection for external safety devices

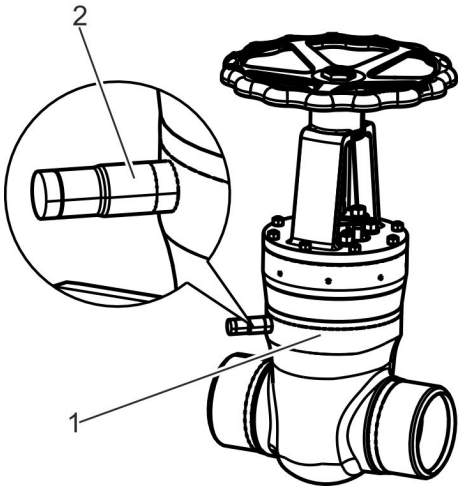


*Fig. 3: Closed nozzle on the body*

Depending on the application, the valve (Fig. 3/1) can be equipped with an external over pressure safety device by the operating company. In this regard, the valve can delivered with a sealed nozzle from the manufacturer (Fig. 3/2). The nozzle creates a connection from the outside to the 3rd chamber (Fig. 2/3). External over pressure safety devices can be attached to the nozzle (Fig. 3/2).

### External safety device: bypass with equalizing pipe

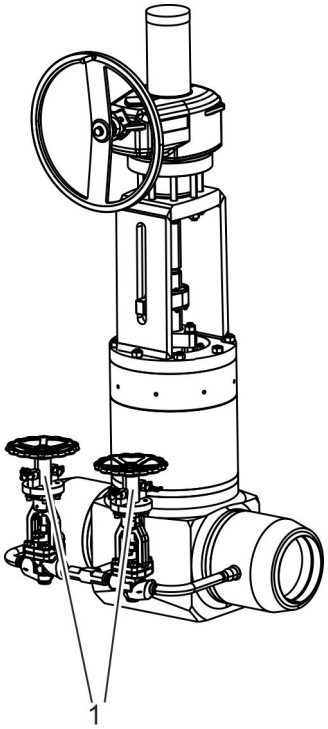


*Fig. 4: Bypass with equalizing pipe (shown here: DSK 25 50–600)*

With a bypass, additional external valves (Fig. 4/1) can establish connections between chambers (Fig. 3) within a valve that are separated from each other.

**NOTICE!**

**Risk of damage to property due to closed bypass valves!**

The high pressure 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.

### Equalizing pipe

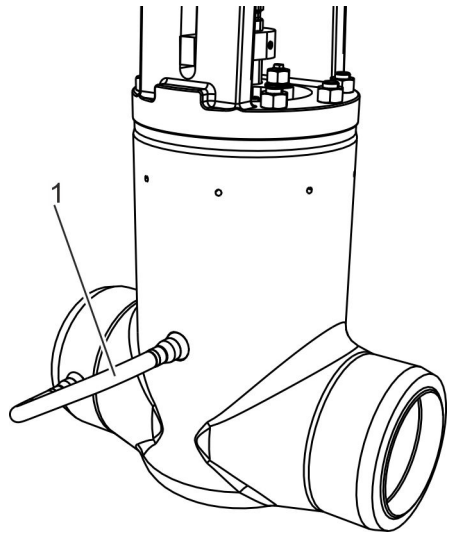


*Fig. 5: Equalizing pipe*

An equalizing pipe (Fig. 5/1) is used to create a connection between the 3rd chamber (Fig. 2/3) and the pressurised side (Fig. 2/1 of the valve.

**WARNING!**

**Risk of injury from alternating flow direction!**

There is a risk of serious injury if the specified flow direction is not complied with when an equalizing pipe is used to protect the valve.

– Only operate the valve in the permitted flow direction (↬ *“Flow direction arrow” on page 13*).

### Safety valve

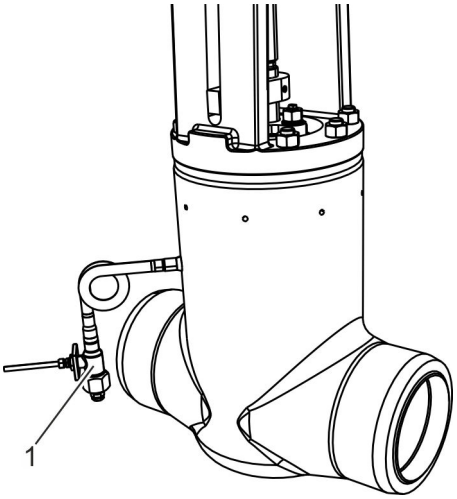


*Fig. 6: Safety valve*

A safety valve (Fig. 6/1) attached to the nozzle (Fig. 3/2) dissipates critical pressures.

### Bore in the disc

An optional bore in the disc prevents pressure in the body from exceeding the operating pressure of the valve.

**WARNING!**

**Risk of injury from alternating flow direction!**

There is a risk of serious injury if the specified flow direction is not complied with when a bore in the disc is used to protect the valve.

– Only operate the valve in the permitted flow direction (↬ *“Flow direction arrow” on page 13*).

**Bore in the seat ring**

An optional bore in the seat ring prevents pressure in the body from exceeding the operating pressure of the valve.

**WARNING!**

**Risk of injury from alternating flow direction!**

There is a risk of serious injury if the specified flow direction is not complied with when a bore in the seat ring is used to protect the valve.

– Only operate the valve in the permitted flow direction (*“Flow direction arrow” on page 13*).

**Torque switch on an electric actuator**

On an electric actuator, torque switches are installed in addition to the limit switch. The torque switches protect the valve from excessive torque.

## 2.5 Residual risks

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

### 2.5.1 Basic dangers at the workplace

**Hazardous areas**

**DANGER!**

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

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

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

**Trip hazard**

**CAUTION!**

**Danger of injury due to tripping up!**

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

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

## 2.5.2 Electric shock hazard

**Electric shock**

**DANGER!**

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

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

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

## 2.5.3 Danger due to hydraulics

**Fluid under high pressure**

**WARNING!**

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

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

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

## 2.5.4 Hazards associated with the pneumatic system

**Hazards associated with the pneumatic system**

**WARNING!**

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

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

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

## 2.5.5 Mechanical hazards

**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.

**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.

## 2.5.6 Thermal dangers

**Thermal dangers**

**WARNING!**

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

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

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

**Danger of freezing**

**WARNING!**

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

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

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

## 2.5.7 Dangers due to hazardous substances and operating materials

**Pumping medium**

**WARNING!**

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

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

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

**WARNING!**

**Pumping medium is a health hazard!**

Contact with the pumping medium can have health implications.

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

### 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.

### 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.

## 2.6 Behaviour in the event of an emergency

1. Shut off the pipe sections affected.
2. Comply with the in-house regulations.
3. Operating the valve in an emergency (*Chapter 7.3 “Operating the valve in an emergency” on page 63*).

## 2.7 Personnel requirements

**WARNING!**

**Danger of injury due to inadequate personnel qualification!**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**Basic requirements**

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

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

**Unauthorised persons**

**WARNING!**

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

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

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

**Instruction**

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

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

## 2.8 Responsibility of the operating company

**Operating company**

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

**Obligations of the operating company**

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

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

In this regard, the following applies in particular:

- The operating company is responsible for the installation and operation of the valve in the pipe.
- The operating company must ensure that any dangerous situations caused by the operating conditions are avoided by installing additional safety systems.

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

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

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

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

## 2.9 Personal protective equipment

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

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

**Description of the personal protective equipment**

The personal protective equipment is described below:

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

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

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

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

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

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

## 2.10 Spare parts

### Incorrect spare parts

**WARNING!**

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

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

– Only use genuine spare parts from Stahl-Armaturen PERSTA GmbH or spare parts approved by Stahl-Armaturen PERSTA GmbH.
– If in doubt, always contact Stahl-Armaturen PERSTA GmbH customer service (contact details on p. 4).

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

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

### Selecting spare parts

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

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

### Before installation

***Storage of spare parts***

*Please see ↳ Chapter 7.3 “Operating the valve in an emergency” on page 63 for information on storing spare parts.*

### Ordering spare parts

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

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

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

## 2.11 Environmental protection

**ENVIRONMENT!**

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

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

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

**Substances used**

**The following environmentally harmful substances are used:**

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

# 3 Functional description

## 3.1 Mode of operation of the high pressure gate valve

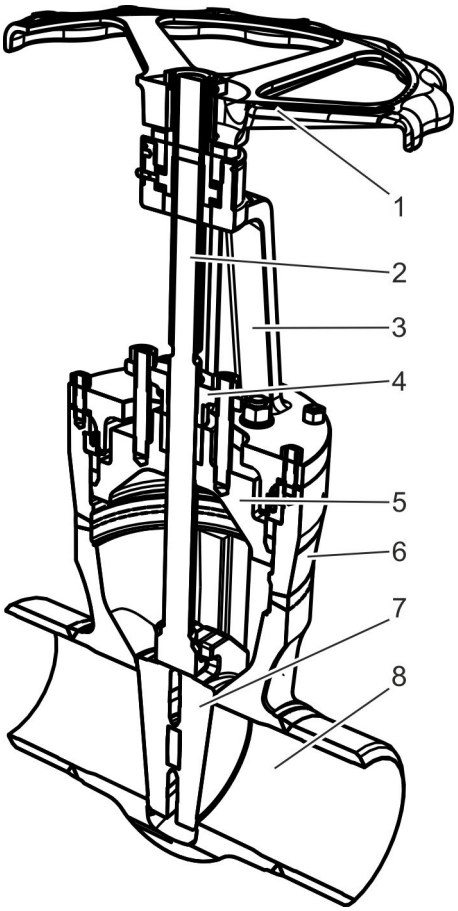


*Fig. 7: Section view (shown: Series DSK 10)*

1 Actuator (shown here: Handwheel)
2 Stem
3 Bonnet
4 Gland packing
5 Pressure sealing bonnet
6 Body
7 Shut-off element (shown here: flexible discs)
8 Flow passage

In the closed state the shut-off element (Fig. 7/7) prevents the medium flowing through the valve.

The shut-off element is driven to the interior of the valve via the stem (Fig. 7/2). If the shut-off element is open, medium flows through the entire cross section of the body.

High pressure gate valves DSK and DSP vary in the following components:

- Type of shut-off element
- Type of actuator
- Type of connection

Depending on the type, optional display elements can be attached to the high pressure gate valve (↬ *Chapter 3.3.3 “Display elements” on page 36*).

## 3.2 Seal to the outside

### Gland packing

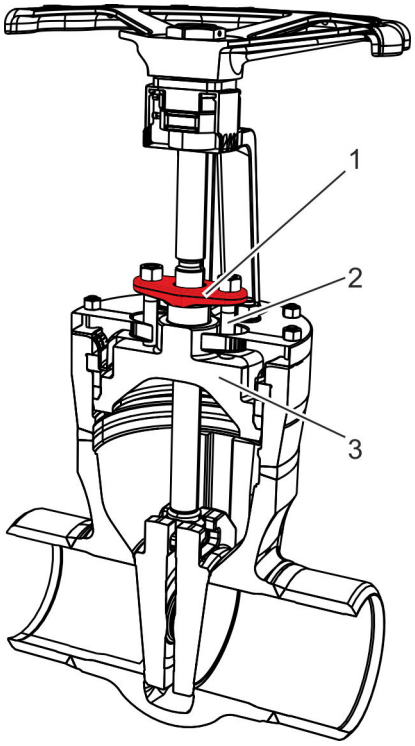


*Fig. 8: Gland packing*

The gland packing seals the stem against the environment.

The gland follower flange (Fig. 8/1) is pressed onto the sealing elements using stud bolts (Fig. 8/2):

- Gland follower
- Chamber ring
- Packing ring

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

***Live-loaded packing***

*Optionally a live-loaded packing can be used to ensure uniform contact pressure.*

**Pressure sealing bonnet**

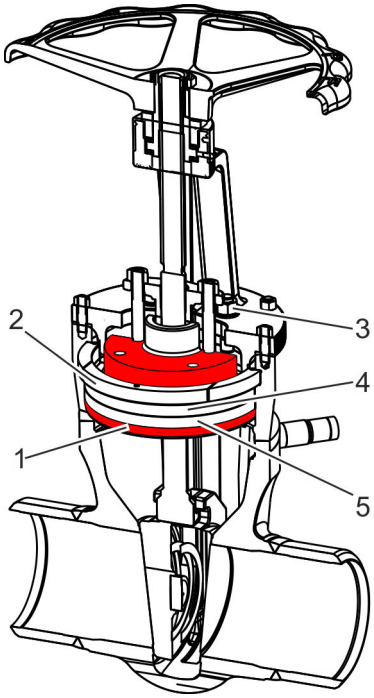


*Fig. 9: Pressure sealing bonnet*

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

An axial force is generated through the internal pressure in the body. This axial force acts on the elastic gasket ring (Fig. 9/5) via the cover (Fig. 9/1 and Fig. 8/3). 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 is transmitted to the segment ring (Fig. 9/2), which consists of several parts, via the support ring (Fig. 9/4). The segment ring transmits the force with positive fit to the body of the valve.

The required sealing force is not generated by the screws, rather it is generated by the internal pressure in the 3rd chamber (↬ *Chapter 2.4 “Safety devices” on page 14*). The screws (Fig. 9/3) are only used to pre-tension the sealing connection and in operation are only tightened hand tight.

## 3.3 Versions of the high pressure gate valve

### 3.3.1 Shut-off element

Models DSK and DSP vary in the type of shut-off element: For the DSK version flexible discs are used as shut-off elements, for the DSP version parallel discs are used.

The two possible shut-off elements (discs) are shown below.

### Flexible disc system (DSK)

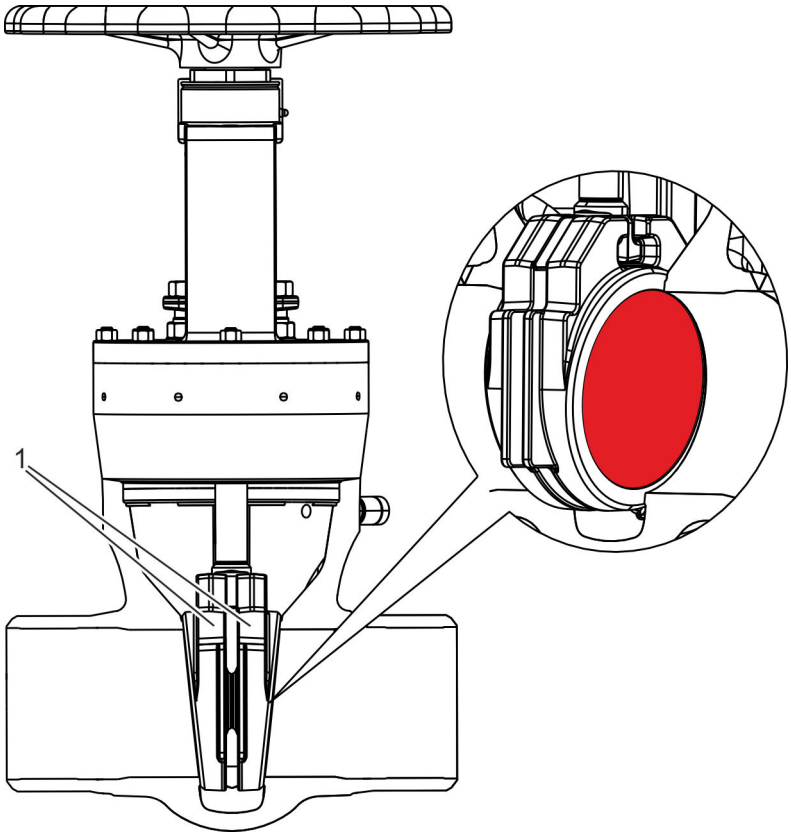


*Fig. 10: Flexible disc system (shown: DSK 10 50–150)*

For the DSK version flexible discs are used as shut-off elements.

Two wedge-shaped discs (Fig. 10/1) are fastened to the lower end of the stem, and are guided into the body in grooves or strips. In the closed position the discs seal the flow passage in the body and prevent the medium from flowing through.

**Parallel disc system (DSP)**

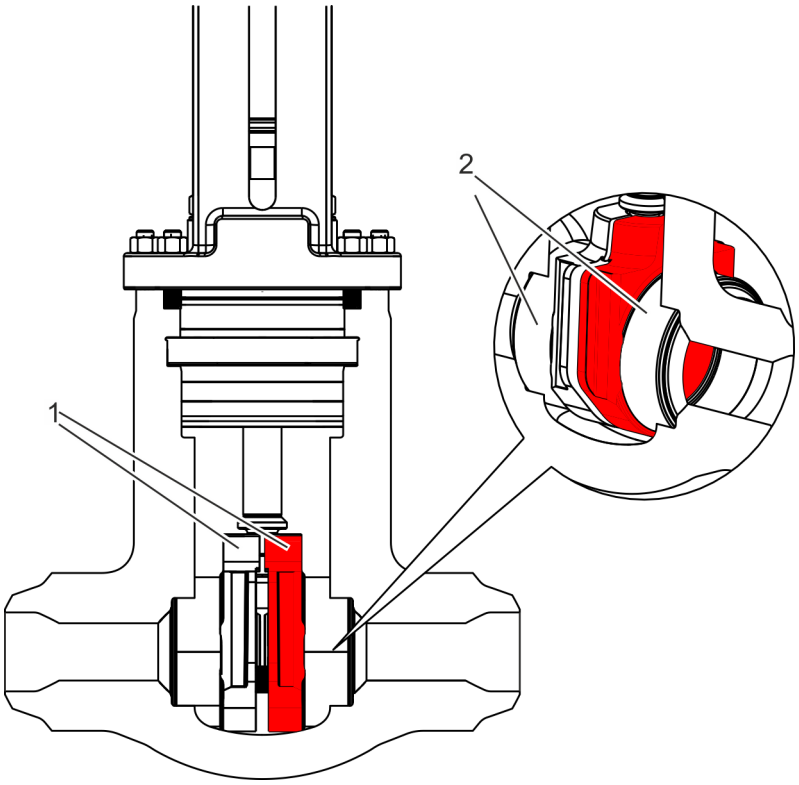


*Fig. 11: Parallel disc system (shown: Series DSP 26)*

For the DSP version parallel discs are used as shut-off elements.

Two parallel discs (Fig. 11/1) are attached to the lower end of the stem. In the closed position the discs seal the flow passage in the body and prevent the medium from flowing through. In this process the discs are pressed against the seat (Fig. 11/2) by the internal pressure and the spring elements.

## 3.3.2 Actuator variants

The stem is driven differently depending on the version:

- manually via handwheel
- electric
- hydraulic
- pneumatic

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

### Manual actuator (handwheel)

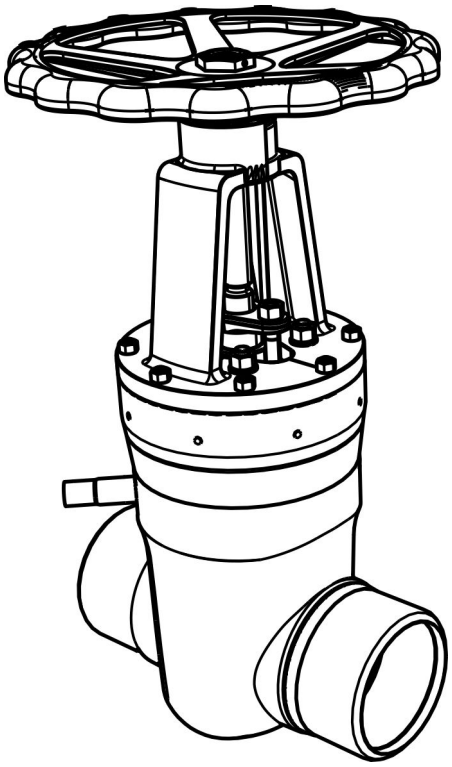

*Fig. 12: Manual actuator*

The stem is driven manually with the handwheel.

The handwheel can be attached in the following manner:

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

### Electric actuator

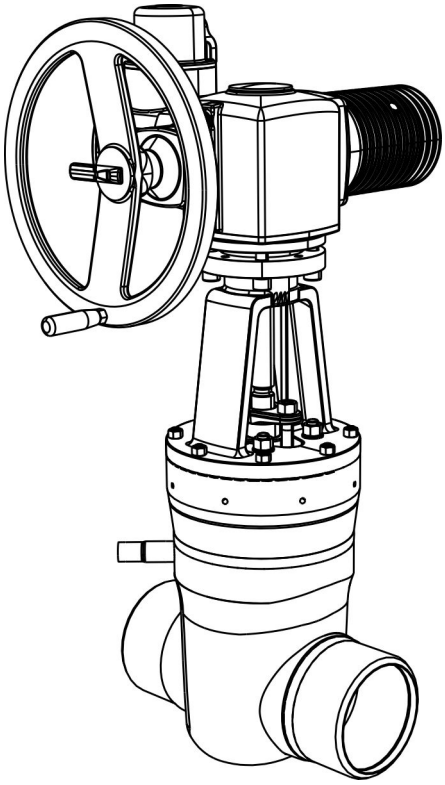

*Fig. 13: Electric actuator*

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

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

Downstream torque switches are installed for safety.

The electric actuator can be attached in the following manner:

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

### Hydraulic actuator

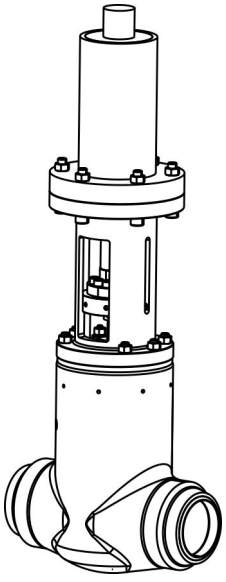

*Fig. 14: Hydraulic actuator*

With the optional hydraulic actuator the stem is driven via a hydraulic piston actuator.

The hydraulic actuator is connected to the valve above the bonnet.

**Pneumatic actuator**

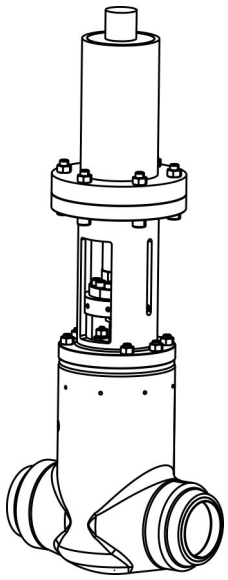

*Fig. 15: Pneumatic actuator*

With the optional pneumatic actuator the stem is driven via a pneumatic piston actuator.

The pneumatic actuator is connected to the valve above the bonnet.

### 3.3.3 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)**

For series

- DSK / DSP 10 DN 350–700
- DSK / DSP 16–63 (all DN)

the mechanical position indicator is standard equipment.

For series

- DSK 10 DN 50–300
- DSP 10 DN 50–300

the mechanical position indicator is optionally available.

### 3.3.4 Connections

**Connection in the pipe**

Valves can be mounted in the pipe as

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

.

**Electrical connections**

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

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

**Hydraulic connections**

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

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

**Pneumatic connections**

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

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

# 4 Transport and storage

## 4.1 Safety instructions for transport and storage

**Heavy weight of the valve**

**WARNING!**

**Risk of injury due to the heavy weight of the valve!**

The heavy weight of the valve and its components can cause severe injuries.

- Transport valves with a suitable hoist or forklift.
- Use approved and functioning sling gear.
- Secure valves and components against falling over.

**Suspended loads**

**WARNING!**

**Danger of injury due to suspended loads!**

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

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

**Improper transport**

**NOTICE!**

**Material damage due to improper transport!**

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

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

## 4.2 Transport of packages

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

### Transporting individual valves

Personnel:
- Trained person (hoist)

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

Special tool:
- Sling gear
- Hoist

1. 

**DANGER!**
**Unmarked attachment points!**

Fasten valve onto the hoist with suitable sling gear.

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

### Transport on a pallet

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

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

Special tool:
- Sling gear
- Hoist
- Forklift

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

## 4.3 Storage of the valve

**Storage of the valve**

Store valves under the following conditions:

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

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

## 4.4 Storage of spare parts

**Soft-sealing spare parts**

**NOTICE!**

**Material damage through reduced service life due to incorrect storage!**

Incorrect storage of soft-sealing spare parts can reduce the service life.

– Store soft-sealing elements, plastics or lubricants in a dry location at room temperature where they are protected against light.
– Before using spare parts, check that they are undamaged.
– Refer to the additional specifications on storage and inspection provided by the manufacturers of spare parts.
– Do not use damaged, porous or deformed spare parts.

### Metal spare parts

**NOTICE!**

**Material damage through reduced service life due to incorrect storage!**

Incorrect storage of metal spare parts can reduce the service life.

- Regularly treat metal spare parts with anti-corrosive oil.
- Before using spare parts, check that they are undamaged.
- Do not use rusted spare parts.

# 5 Installation

## 5.1 Safety instructions for installation

**Electric shock**

**DANGER!**

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

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

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

**Fluid under high pressure**

**WARNING!**

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

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

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

**Hazards associated with the pneumatic system**

**WARNING!**

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

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

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

### Faulty installation

**WARNING!**

**Risk of injury due to incorrectly installed valve!**

A faulty installation can cause injuries or result in the malfunction of the gate valve.

- Pay attention to the flow direction of valves.
- When operating a valve with:
  - an equalizing pipe
  - a bore in the disc or
  - a bore in the seat ring

  as a safety device (↳ *Chapter 2.4 “Safety devices” on page 14*), only operate the valve in one direction (↳ *“Flow direction arrow” on page 13*).
- Pay attention to the correct installation position of the valve.
- For valves with an actuator or transmission, ensure that the stem position is vertical.
- In special cases and if the stem position is not vertical:
  - 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.

**Wrong 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 the Stahl-Armaturen PERSTA GmbH customer service (see p. 4 for contact details) and providing the serial number or
  - by referring to the manufacturer's website (see p. 4).

## 5.2 Before the installation

Personnel:
- Pipeline engineer

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

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

## 5.3 Installing the valve

Personnel:
- Pipeline engineer
- Trained person (hoist)

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

Special tool:
- Sling gear
- Hoist

1. Prepare the respective pipe section for the installation.
2. Use a hoist to bring the valve into the installation position.
3. Ensure that the customer-provided pipes are free of tension.
4. Ensure that the customer-provided pipes are free of external forces and torques.
5. Check butt-welding ends and flange sealing surfaces for damage and cleanliness.
6. Centre the connection flange.
7. Use connection elements and sealing elements made of permissible materials.
8. Depending on the type of connection, weld in or flange on the valve in the correct flow direction and installation position.
9. Screw fasten all flange bores with connection elements using the permissible tightening torque.
10. Ensure the seal of the pipe and the valve.

## 5.4 Attaching additional safety devices

*Have the operating company ensure the installation of additional safety devices (↳ Chapter 2.4 “Safety devices” on page 14).*

*See the information in the documentation provided for the safety devices.*

## 5.5 For electric actuators, connect the power supply

Personnel:
- Qualified electrician

Protective equipment:
- Protective work clothing
- Safety footwear

Prerequisite:

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

1. ***Terminal diagram and operating manual are located on the actuator.***

   Connect the electric actuator of the valve to the customer-provided power supply in accordance with the provided terminal diagram.
2. Avoid mechanical stress of the cable through suitable installation.
3. Protect the cable against contact with hazardous substances and operating materials.
4. Install the cable in such a manner that there are no trip hazards.

## 5.6 For a hydraulic actuator, connecting the hydraulic system

Personnel:
- Hydraulics Specialist

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

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

## 5.7 For a pneumatic actuator, connecting the pneumatic system

Personnel:
- Pneumatics Specialist

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

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

## 5.8 After the installation

**Harmful substances**

**WARNING!**

**Pickling medium is a health hazard!**

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

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

**WARNING!**

**Gloss paint is a health hazard!**

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

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

**WARNING!**

**Anticorrosive is a health hazard!**

Direct contact with the anticorrosive used can have health implications.

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

### 5.8.1 Pickling the valve

*The valve can be pickled 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. Open the valve completely during the pickling process.
2. Pickle the valve correctly.
3. Close the valve half way after the pickling process.
4. Completely remove the pickling medium by flushing it out.
5. Ensure that the pickling medium is completely flushed out of the dead spaces in the valve.

### 5.8.2 Painting the valve

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

*Use suitable (compatible) painting systems.*

### 5.8.3 Executing a system pressure test and leak test

**Changing the flow direction**

**WARNING!**

**Risk of injury by changing the flow direction!**

When protecting the valve with:

– an equalizing pipe,
– a bore in the disc or
– a bore in the seat ring

there is a risk of serious injury if the specified flow direction is not observed.

– Only operate the valve in the permitted flow direction (*“Flow direction arrow” on page 13*).

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 agent in consultation with the manufacturer.

### 5.8.4 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:
- Safety goggles
- Protective work clothing
- Protective gloves
- Safety footwear

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

   The insulation must not exceed the upper edge of the body (Fig. 16, red arrow).

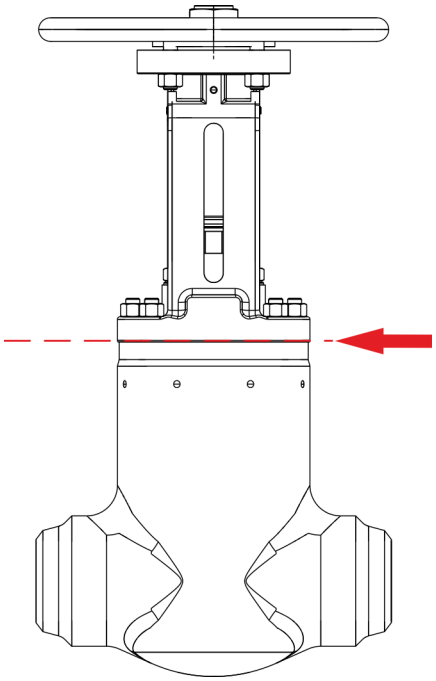

*Fig. 16: Upper edge of the insulation*

# 6 Initial start-up

## 6.1 Safety instructions for commissioning

**Danger of freezing**

**WARNING!**

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

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

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

**Faulty aeration and venting**

**WARNING!**

**Danger of injury due to faulty aeration and venting!**

Faulty aeration and venting can result in severe injuries due to loss of stability of the valve.

– Do not aerate or vent the valve by loosening the gland seal.
– If provided, have the manufacturer attach venting devices.
– If provided, vent the valve via customer-provided devices.

**Unscrewing pressurised threaded connections**

**WARNING!**

**Danger of injury due to pressurised threaded connections!**

Depending on the version of the valve, both in an operating and decommissioned state, injuries can occur due to an escaping medium.

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

### Pumping medium

**WARNING!**

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

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

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

**WARNING!**

**Pumping medium is a health hazard!**

Contact with the pumping medium can have health implications.

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

### 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 injury due to misuse**

**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 activate the handwheel by hand.
– If the handwheel does not move smoothly, or if it cannot be activated, lubricate the stem thread and bearing (↳ *Chapter 8.3.4 “Lubricating moving parts (stem thread)” on page 81*). If necessary contact the manufacturer.

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

**WARNING!**

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

Insufficient heating-up times/cooling times may lead to impermissible deformation of the valve and reduce the service life.

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

**Moving parts**

**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.

## 6.2 Prior to commissioning

Personnel:
- Pipeline engineer

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

Prerequisites:

- The overall system must be released for operation.

**Valve with manual actuator**

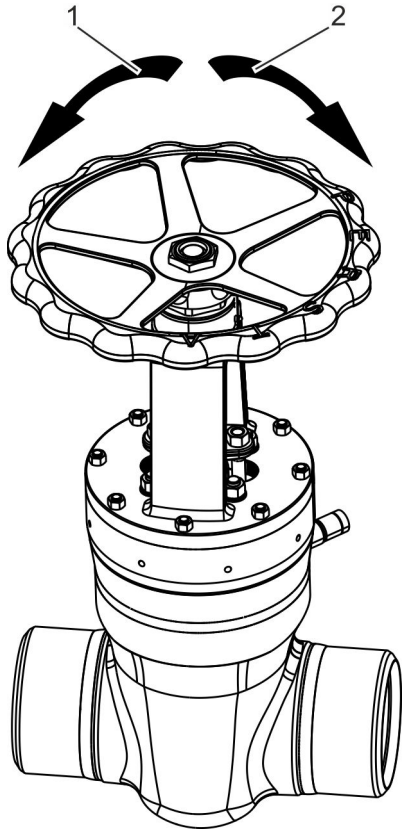


*Fig. 17: Valve: Top view*

1. Fully open the valve by turning the handwheel counterclockwise (Fig. 17/1).
2. Fully close the valve by turning the handwheel clockwise (Fig. 17/2).
3. Repeat step 1–2 several times.

**Valve with electric, hydraulic or pneumatic actuator**

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

## 6.3 Executing the commissioning process

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

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

Prerequisites:

- The overall system must be released for operation.

1. 

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

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

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

# 7 Operation

## 7.1 Safety instructions for operation

**Thermal dangers**

**WARNING!**

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

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

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

**Pumping medium**

**WARNING!**

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

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

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

**WARNING!**

**Pumping medium is a health hazard!**

Contact with the pumping medium can have health implications.

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

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

**WARNING!**

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

Insufficient heating-up times/cooling times may lead to impermissible deformation of the valve and reduce the service life.

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

**Improper operation of the handwheel**

**WARNING!**

**Danger of injury due to force-increasing objects!**

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

– Do not use any force-increasing components when using the handwheel.
– Only activate the handwheel by hand.
– If the handwheel does not move smoothly, or if it cannot be activated, lubricate the stem thread and bearing (↳ *Chapter 8.3.4 “Lubricating moving parts (stem thread)” on page 81*) and if necessary, contact the manufacturer.

## 7.2 Operating the valve

### 7.2.1 Valve with manual actuator (handwheel)

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

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

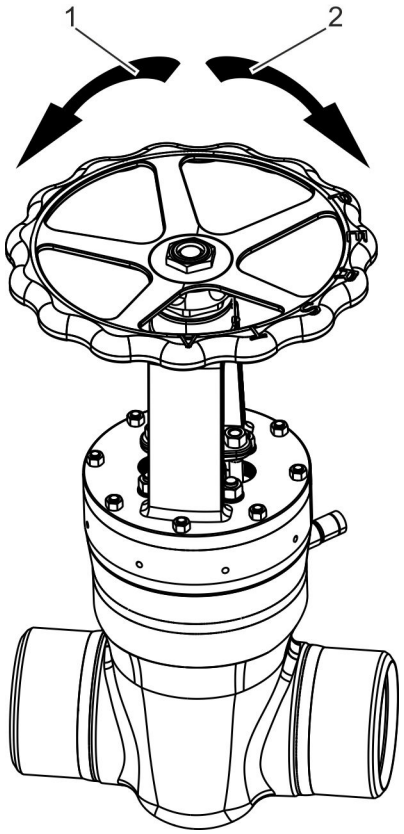


*Fig. 18: Activating handwheel (shown: Series DSK 10 with optional nozzle)*

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

### 7.2.2 Valve with electric actuator

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

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

### 7.2.3 Valve with hydraulic or pneumatic actuator

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

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

## 7.3 Operating the valve in an emergency

### 7.3.1 Valve with manual actuator (handwheel)

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

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

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

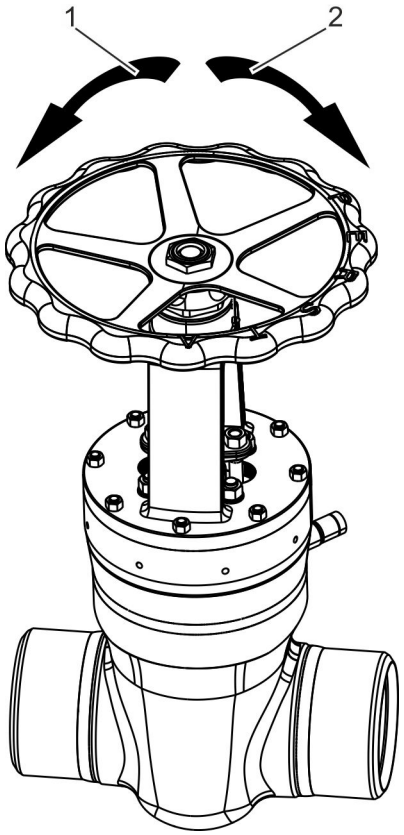


*Fig. 19: Manual actuator: Activating the handwheel in an emergency (shown here: DSK 10 with optional nozzle)*

→ Operate the handwheel.
- Turning clockwise (Fig. 19/2): closes the valve.
- Turning anticlockwise (Fig. 19/1): opens the valve.

### 7.3.2 Valve with electric actuator

***Coupling/uncoupling the handwheel***

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

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

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

Requirement:

- The electric actuator cannot be used.

1. Safeguard the affected system area.
2. Couple the handwheel (Fig. 20/1).
3. Turn the handwheel.
   - Turning clockwise (Fig. 20/2): Closes the valve.
   - Turning anticlockwise (Fig. 20/3): Opens the valve.

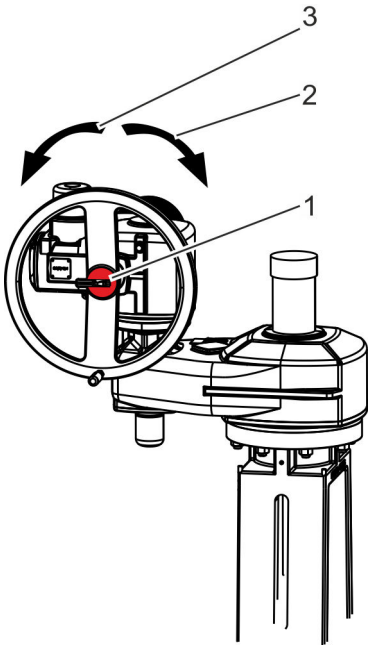


*Fig. 20: Electric actuator: Using the handwheel in an emergency (shown here: DSK 26 PD 25 65–300)*

### 7.3.3 Valve with hydraulic or pneumatic actuator

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

# 8 Maintenance

## 8.1 Safety instructions for maintenance

**Safeguard against restart**

**DANGER!**

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

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

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

**Improperly executed maintenance tasks**

**WARNING!**

**Danger of injury due to improperly executed maintenance tasks!**

Improper maintenance can cause severe injury or significant material damage.

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

### Pressurised components

**WARNING!**

**Danger of injury due to pressurised components!**

Tasks on pressurised components can result in serious injuries.

– Establish depressurised status before working on the valve.

### Heavy weight of the valve

**WARNING!**

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

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

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

### Thermal dangers

**WARNING!**

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

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

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

### Wrong 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 the Stahl-Armaturen PERSTA GmbH customer service (see p. 4 for contact details) and providing the serial number or
  - by referring to the manufacturer's website (see p. 4).

### 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 in doubt, always contact Stahl-Armaturen PERSTA GmbH customer service (contact details on p. 4).

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

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

### Pumping medium

**WARNING!**

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

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

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

**WARNING!**

**Pumping medium is a health hazard!**

Contact with the pumping medium can have health implications.

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

### Damage of sealing surfaces and slide faces

**NOTICE!**

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

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

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

**Environmental protection**

**ENVIRONMENT!**

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

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

## 8.2 Maintenance schedule

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 (see p. 4 for contact details).

| Interval | Maintenance work | Personnel |
|---|---|---|
| Depending on frequency of operation, operating and ambient conditions/ specified by the operating company | Lubricate the stem and bearing (↯ *Chapter 8.3.4 “Lubricating moving parts (stem thread)” on page 81*) | Trained person (operator) |
| | Check the valve visually for leaks (↯ *Chapter 8.3.1 “Visually checking the valve” on page 72*) | Trained person (operator) |
| Every six months | Operate valve (open/close) | Trained person (operator) |
| Depending on duration of use, operating and ambient conditions | Replace the gland packing (↯ *Chapter 8.3.2 “Replacing the gland packing” on page 72*) | Industrial mechanic (high pressure valves) |
| | Replace the cover gasket (↯ *Chapter 8.3.3 “Replacing the gasket of the pressure sealing bonnet” on page 77*) | 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 Replacing the gland packing

Personnel:
- Industrial mechanic (high pressure valves)

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

Special tool:
- Packing extractor

Prerequisites:

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

- An existing actuator must have been dismounted.
- The valve must have been driven into the middle position in order to empty the 3rd chamber and to offload the shut-off element (discs).

### Detaching the anti-twist device

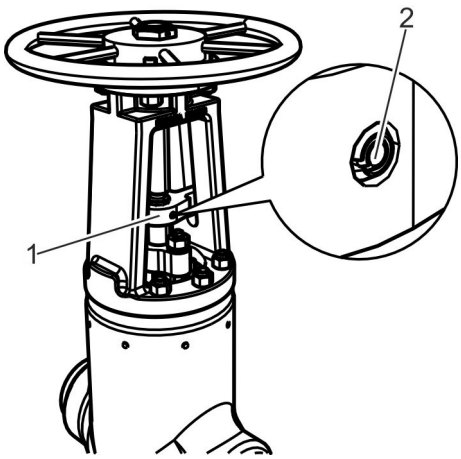


*Fig. 21: Detaching the anti-twist device*

1. If the anti-twist device is present: Detach the fastening (Fig. 21/2) of the anti-twist device (Fig. 21/1).

### Removing the gland packing

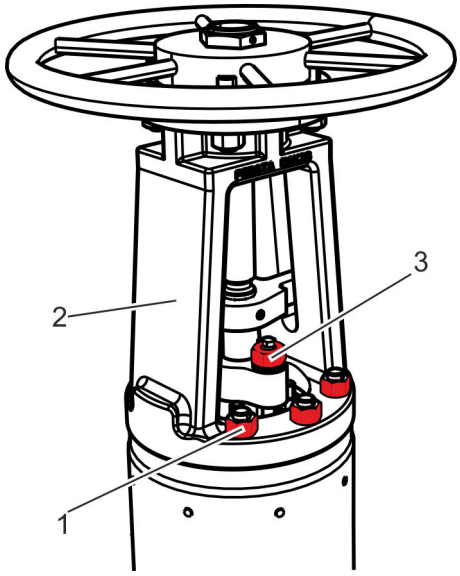


*Fig. 22: Removing the bonnet and packing bolt*

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

   Unscrew the nuts (Fig. 22/1) and remove together with the washers.
3. Unscrew and remove the gland nuts (Fig. 22/3).
4. Actuate the handwheel in the close direction, until the threaded bush is screwed down from the stem thread.
5. Lift off the bonnet (Fig. 22/2) and if applicable the anti-twist device upwards.

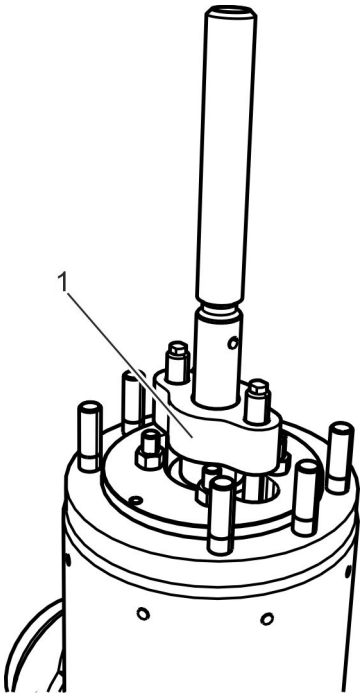


*Fig. 23: Gland follower flange*

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

Lift off the gland follower flange (Fig. 23/1) upwards.

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

8. For gland packing elements with metal caps (chamber ring): Fully dismount the cover (*Chapter 8.3.3 “Replacing the gasket of the pressure sealing bonnet” on page 77*).

**Cleaning**

9. Completely remove the residues of the gland packing.

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

**Insert gland packing**

11. Insert new gland packing into the packing chamber.

**Execute concluding tasks**

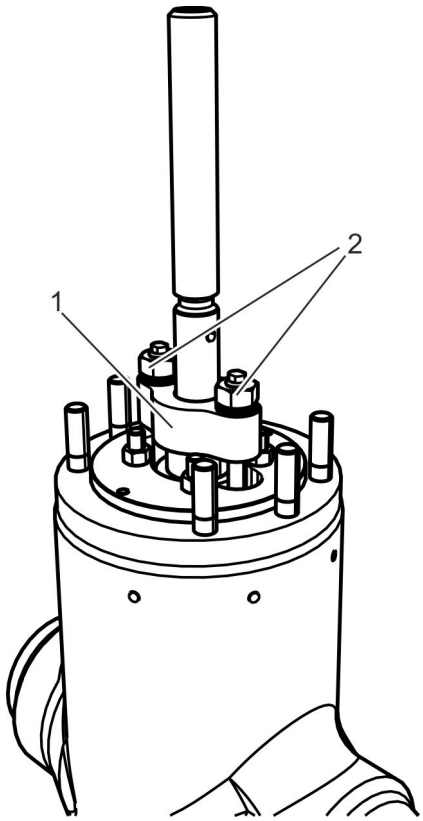


*Fig. 24: Mounting the gland follower flange*

**12.** Attach the gland follower flange (Fig. 24/1) and bolt on uniformly with nuts (Fig. 24/2) as specified by the manufacturer.

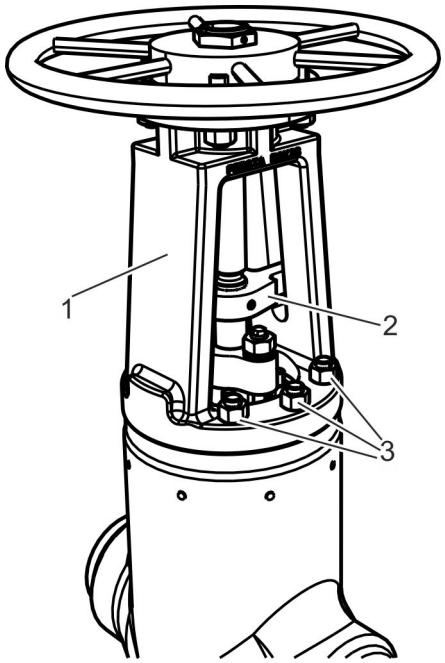


*Fig. 25: Bonnet and anti-twist device*

13. Mount the bonnet (Fig. 25/1).

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

Attach the fastening screws (Fig. 25/3) of the bonnet and tighten in a cross pattern as specified by the manufacturer.

**Mounting the anti-twist device**

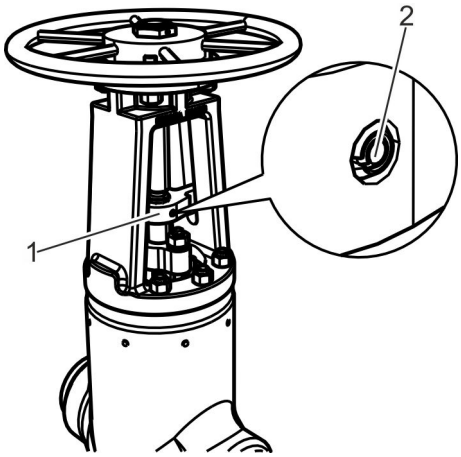


*Fig. 26: Fastening the anti-twist device*

15. If the anti-twist device is present: Mount the anti-twist device (Fig. 26/2).

16. If an actuator is present: Mount the actuator as specified by the manufacturer and adjust the end positions.

### 8.3.3 Replacing the gasket of the pressure sealing bonnet

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

Prerequisites:

- The valve must be cooled/heated-up to ambient temperature.
- Depressurised status must have been established.
- The valve must be driven into middle position, to empty the 3rd chamber and to offload the discs.

**1.** Carry out work steps 1–5 of the maintenance task "Replacing the gland packing" (↬ *Chapter 8.3.2 “Replacing the gland packing” on page 72*).

**2.** For the version with clamping lid (Fig. 27/2): Unscrew and remove the nuts (Fig. 27/1).

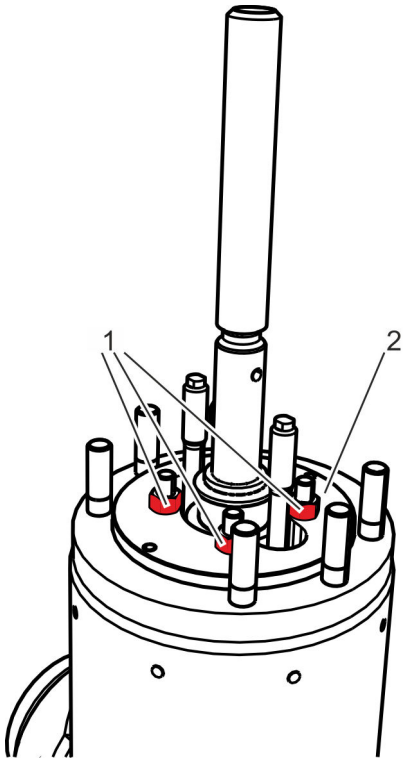


*Fig. 27: Unscrewing the nuts from the clamping lid*

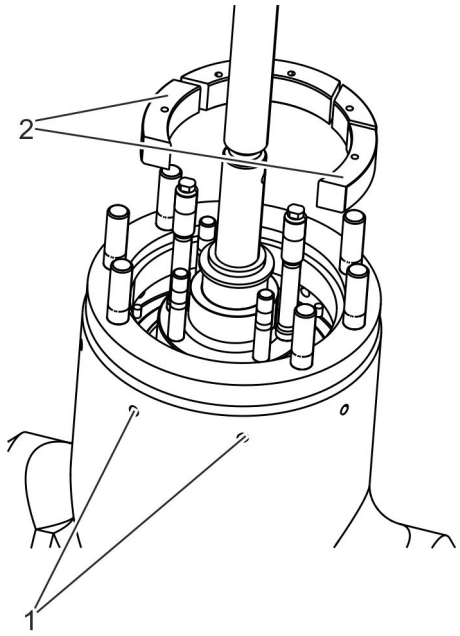


*Fig. 28: Removing segments*

3. Using the pin puncher, punch the segments (Fig. 28/2) into the interior and through the outer ejection bores (Fig. 28/1).
4. Remove the segments (Fig. 28/2).
5. Place the bonnet with threaded bush on the stem (turn).
6. Place 2 segments between the body and the bonnet.
7. Open the valve completely.
   ⇨ The cover is pulled out.
8. Close the valve and remove the bonnet.
9. Remove the segments.

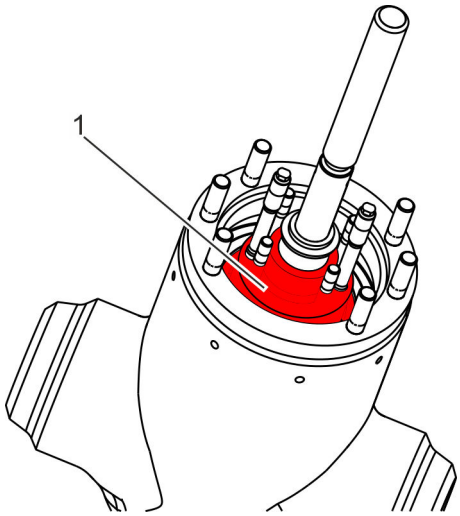


*Fig. 29: Taking off the cover upward*

10.

**WARNING!**

**Danger of injury due to heavy components!**

With a suitable hoist, take the cover (Fig. 29/1) with any inserted gland packing, support ring and gasket ring, upward and out of the body.

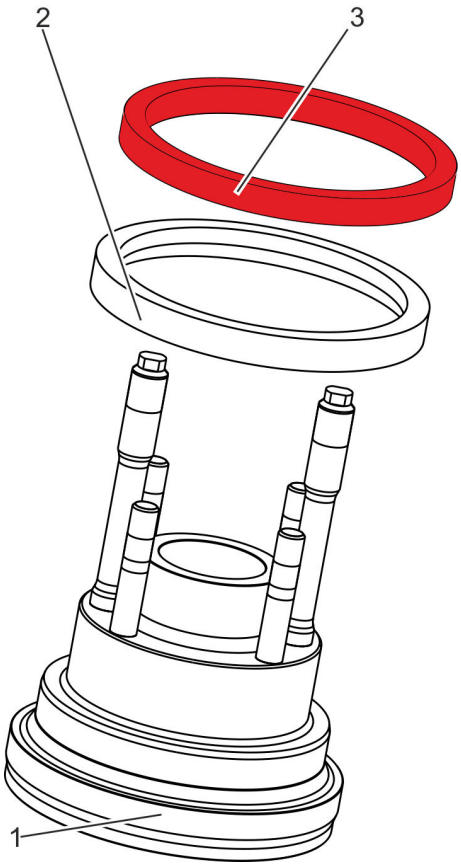


*Fig. 30: Removing the support ring and gasket ring*

**11.** Lift the support ring upwards (Fig. 30/3) off of the cover (Fig. 30/1).

**12.** Lift the gasket ring upwards (Fig. 30/2) off of the cover (Fig. 30/1).

**13.** Carefully remove the residues of the gasket ring.

**14.**

**NOTICE!**

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

Ensure that all support surfaces are metallic bare and undamaged.

**15.** Dismounting the gland packing (*Chapter 8.3.2 “Replacing the gland packing” on page 72*).

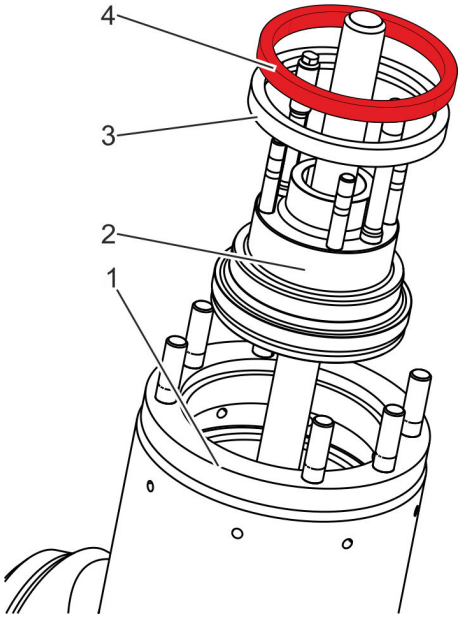


*Fig. 31: Inserting cover*

**16.**

**WARNING!**

**Danger of injury due to heavy components!**

With a suitable hoist, insert the cover (Fig. 31/2) into the body (Fig. 31/1).

**17.** Mount the new gasket ring (Fig. 31/3).

**18.** Place the support ring (Fig. 31/4) on the gasket ring (Fig. 31/3).

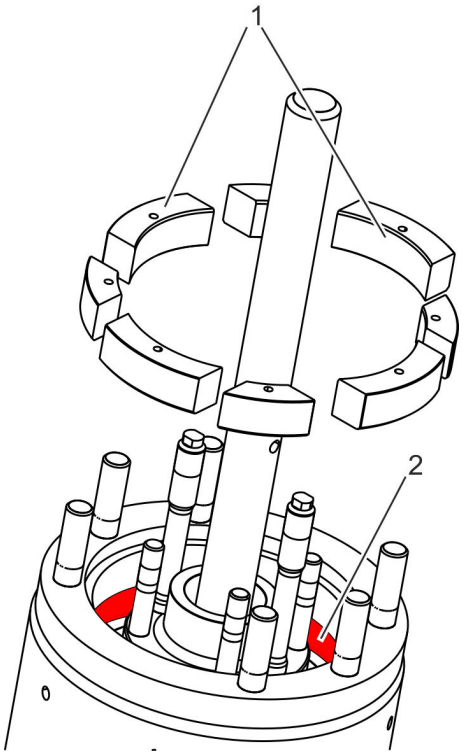


*Fig. 32: Inserting segments*

**19.** Insert segments (Fig. 32/1) into the body groove (Fig. 32/2).

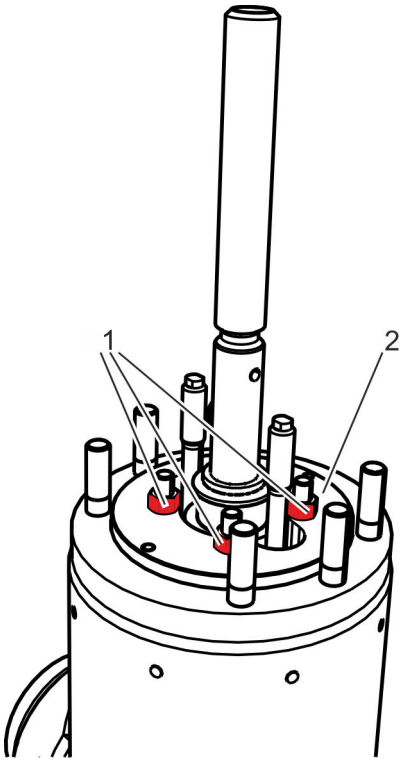


*Fig. 33: Screw fastening the nuts of the clamping lid*

**20.** If present, place the clamping lid (Fig. 33/2) on from above.

**21.**

**WARNING!**

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

Screw the clamping lid (Fig. 33/2) in a cross pattern with nuts (Fig. 33/1) on the stud bolts.

⇨ The cover seal will be pre-tensioned.

**22.** Carry out work steps 12–16 of the maintenance task "Replacing the gland packing" (↬ *Chapter 8.3.2 “Replacing the gland packing” on page 72*).

**Executing final tests after replacement**

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

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

Prerequisite:
- Replacement of the seal is concluded.

1. Charge the valve with permissible test pressure.
2. Ensure that the valve does not leak.
3. If necessary, recheck tightening torque in accordance with the manufacturer's specifications.
4. Tighten the clamping screws of the cover hand tight.

## 8.3.4 Lubricating moving parts (stem thread)

Personnel:
- Trained person (operator)

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

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

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

   For an electric actuator: Couple the handwheel.

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

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

4. Open the valve completely.
5. Depending on the version:
   - Grease the stem thread with a brush
   - Grease stem thread and bearing via lubricating nipple
6. Completely close valve.
7. Repeat step 4–6 several times.
8. *Comply with the instructions in the manufacturer's documentation for the electric actuator.*

   For electric actuator: Uncouple the handwheel.

## 8.4 After maintenance

**Executing final tests after replacement**

| | |
|---|---|
| Personnel: | ■ Industrial mechanic (high pressure valves) |
| Protective equipment: | ■ Industrial hard hat<br>■ Safety goggles<br>■ Protective work clothing<br>■ Protective gloves<br>■ Safety footwear |

Prerequisite:

- Maintenance tasks are concluded.

1. Charge the valve with permissible test pressure.
2. Ensure that the valve does not leak.
3. If necessary, recheck tightening torque in accordance with the manufacturer's specifications.
4. Retighten clamping lid nuts hand tight.
5. Perform commissioning work (*Chapter 6.3 "Executing the commissioning process" on page 57*).

# 9 Faults and troubleshooting

## 9.1 Safety notices for fault correction

**Electric shock**

**DANGER!**

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

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

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

**Safeguard against restart**

**DANGER!**

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

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

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

### Improperly executed fault correction tasks

**WARNING!**

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

Improperly executed fault correction tasks can cause severe 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, consult experienced persons or Stahl-Armaturen PERSTA GmbH customer service (contact details on p. 4).
- 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 nobody is in the danger zone.
  - Ensure that all covers and safety systems are installed correctly and that they function properly.

### Thermal dangers

**WARNING!**

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

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

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

### Pumping medium

**WARNING!**

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

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

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

**WARNING!**

**Pumping medium is a health hazard!**

Contact with the pumping medium can have health implications.

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

### Hazards associated with the pneumatic system

**WARNING!**

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

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

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

**Fluid under high pressure**

**WARNING!**

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

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

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

**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. In case of faults that prevent the safe operation of the valve: Consult Stahl-Armaturen PERSTA GmbH customer service (contact details on p. 4).

## 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 seat, 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) |

| Fault description | Cause | Remedy | Personnel |
|---|---|---|---|
| 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 (↳ *Chapter 8.3.2 “Replacing the gland packing” on page 72*). | Industrial mechanic (high pressure valves) |
| | Moving parts insufficiently lubricated | Lubricate the moving parts (↳ *Chapter 8.3.4 “Lubricating moving parts (stem thread)” on page 81*). | Trained person (operator) |
| Leakage of the gland packing | Insufficient maintenance | Shut off the pipe section affected. Retighten the gland follower flange with the tightening torque specified by the manufacturer. If necessary pack or repack the stuffing box (↳ *Chapter 8.3.2 “Replacing the gland packing” on page 72*). | Industrial mechanic (high pressure valves) |
| | Destruction of the stuffing box due to the use of a packing material without sufficient media or temperature resistance | Shut off the pipe section affected. Replace the stuffing box with a suitable packing set (↳ *Chapter 8.3.2 “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 8.3.2 “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 | End contacts are defective | Have the end contacts checked.<br>Prior to readjustment, consult Stahl-Armaturen PERSTA GmbH customer service (see p. 4 for contact details). | Qualified electrician |
| | Torque switch is defective | Have the torque switch checked.<br>Prior to readjustment, consult Stahl-Armaturen PERSTA GmbH customer service (see p. 4 for contact details). | Qualified electrician |

Fault table

| Fault description | Cause | Remedy | Personnel |
|---|---|---|---|
| Jerky lifting movement | Gland packing is too tight | Readjust gland packing, replace if necessary (↳ *Chapter 8.3.2 “Replacing the gland packing” on page 72*). | Industrial mechanic (high pressure valves) |

# 10 Dismantling, disposal

## 10.1 Safety notice for dismantling and disposal

**Electric shock**

**DANGER!**

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

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

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

**Improper dismantling**

**WARNING!**

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

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

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

### Heavy weight of the valve

**WARNING!**

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

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

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

### Suspended loads

**WARNING!**

**Danger of injury due to suspended loads!**

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

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

### Spring elements

**WARNING!**

**Danger of injury due to spring elements within the valve!**

When opening the valve, danger of injury exists due components released from tension.

- Uniformly detach the check valve cover from the stud bolts.
- Slowly take off the check valve cover.
- Wear protective equipment: Wear a hard hat, safety footwear, protective goggles.

**Fluid under high pressure**

**WARNING!**

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

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

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

**Hazards associated with the pneumatic system**

**WARNING!**

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

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

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

**Pumping medium**

**WARNING!**

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

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

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

**WARNING!**

**Pumping medium is a health hazard!**

Contact with the pumping medium can have health implications.

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

## 10.2 Dismantling

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

Prerequisites:

- The pipe section in question is shut-off.
- Valve is in the depressurised status.
- Valve is emptied.

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

1. Hold the valve in position with a suitable hoist (*“Transporting individual valves” on page 40*).
2. Disconnect pipe inlet side and outlet side from the valve.
3. If necessary remove the existing supports.
4. Use a suitable hoist to remove the valve from the pipe and set it down so that it is safeguarded against falling over.
5. Properly clean assemblies and components and take them apart.

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

## 10.3 Disposal

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

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

**ENVIRONMENT!**

**Hazards for the environment due to improper disposal!**

Hazards for the environment can occur due to improper disposal.

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

Disposal

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## V