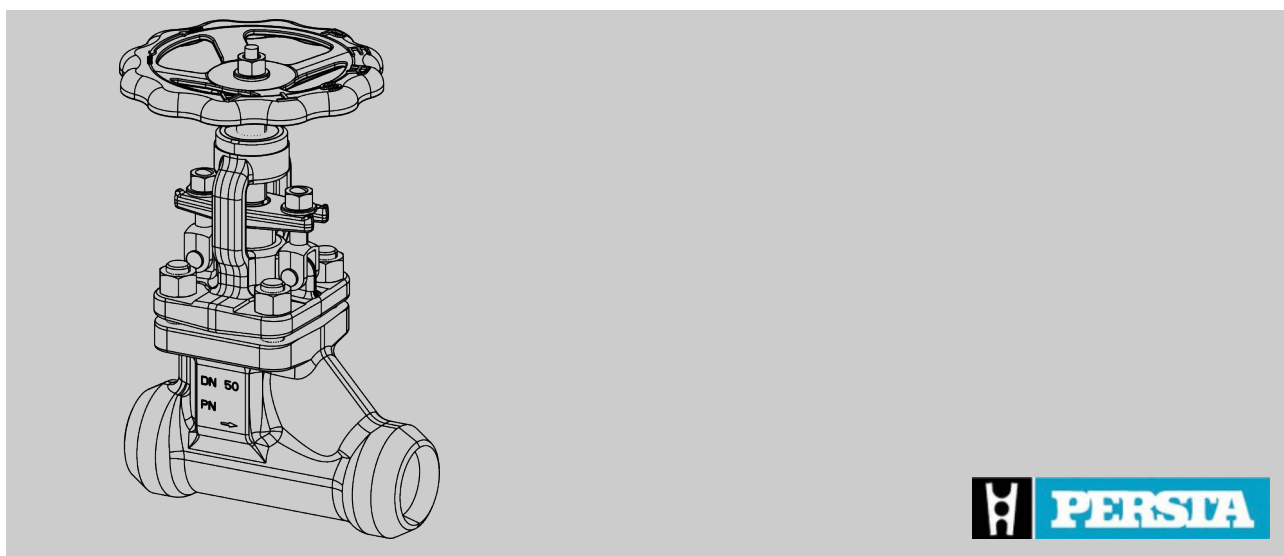


# Operating instructions

Lift check valve with shut-off facility

240 ME



Read the instructions prior to performing any task!

Stahl-Armaturen PERSTA GmbH  
Mülheimer Str. 18  
59581 Warstein-Belecke, Germany  
Telephone: +49 2902 762-02  
Fax: +49 2902 767-03  
Email: [info@persta.de](mailto:info@persta.de)  
Internet: [www.persta.com](http://www.persta.com)  
Translation of the original operating instructions  
Dok.-Nr. XXX.DE.XXX.XX.XXX, 1, en\_GB

### Information about the operating instructions

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

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

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

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

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



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

### Scope of the document

This manual applies for the following versions of the lift check valve with shut-off facility DVRA:

Designation	Series	Nominal diameter (DN) [mm]	Pressure rate	Class*
Lift check valve with shut-off facility	240 ME	10–200	PN 10–160	900
	242 ME			
Lift check valve with shut-off facility	240 MJ	10–200	PN 10–160	900
	242 MJ			

\* Assignment number in the pipe construction

### Other applicable documents

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

### Customer Service - Stahl-Armaturen PERSTA GmbH

Mülheimer Str. 18  
 59581 Warstein, Germany  
 Phone number: +49 (0) 2902 762–02  
 Fax: +49 (0) 2902 767–03  
 email: [info@persta.de](mailto:info@persta.de)

*Tab. 1: Revision overview*

Revision number	Change/supplement	Date

## Table of contents

<b>1</b>	<b>Overview</b> .....	<b>7</b>
<b>2</b>	<b>Safety</b> .....	<b>9</b>
	2.1 Symbols in this manual.....	9
	2.2 Intended use.....	11
	2.3 Safety signs.....	12
	2.4 Safety devices.....	14
	2.5 Residual risks.....	14
	2.5.1 Basic dangers at the workplace.....	15
	2.5.2 Danger due to electric current.....	15
	2.5.3 Danger due to hydraulics.....	16
	2.5.4 Dangers due to pneumatics.....	16
	2.5.5 Mechanical dangers.....	17
	2.5.6 Thermal dangers.....	17
	2.5.7 Dangers due to hazardous substances and oper- ating materials.....	18
	2.6 Behaviour in the event of an emergency.....	20
	2.7 Responsibility of the operating company.....	20
	2.8 Personnel requirements.....	22
	2.9 Personal protective equipment.....	24
	2.10 Spare parts.....	25
	2.11 Environmental protection.....	26
<b>3</b>	<b>Functional description</b> .....	<b>29</b>
	3.1 Operating principle of the lift check valve with shut-off facility.....	29
	3.2 External seal.....	31
	3.3 Versions of the lift check valve with shut-off facility....	32
	3.3.1 Shut-off element.....	32
	3.3.2 Actuator variants.....	32
	3.3.3 Body shape.....	33
	3.3.4 Display elements.....	34
	3.3.5 Connections.....	34
<b>4</b>	<b>Transport and storage</b> .....	<b>35</b>
	4.1 Safety instructions for transport and storage.....	35
	4.2 Transport of packed items.....	36
	4.3 Storage of the valve.....	37
	4.4 Storage of spare parts.....	38
<b>5</b>	<b>Installation</b> .....	<b>39</b>
	5.1 Safety instructions for installation.....	39
	5.2 Before the installation.....	41
	5.3 Installing the valve.....	41
	5.4 Connecting the power supply on an electric actuator.....	42
	5.5 Connecting the hydraulic system for hydraulic actuator.....	43

5.6	Connecting the pneumatic system for pneumatic actuator.....	43
5.7	After the installation.....	44
5.7.1	Pickling the valve.....	45
5.7.2	Painting the valve.....	45
5.7.3	Performing a system pressure test and leak test.....	45
5.7.4	Applying thermal insulation.....	46
<b>6</b>	<b>Initial start-up.....</b>	<b>47</b>
6.1	Safety instructions for commissioning.....	47
6.2	Prior to initial start-up.....	49
6.3	Carrying out initial start-up.....	50
<b>7</b>	<b>Operation.....</b>	<b>51</b>
7.1	Safety instructions for operation.....	51
7.2	Operating the valve.....	53
7.2.1	Valve with manual actuator (handwheel).....	53
7.2.2	Valve with electric actuator.....	54
7.2.3	Valve with hydraulic or pneumatic actuator .....	54
7.3	Operating the valve in an emergency.....	54
7.3.1	Valve with manual actuator (handwheel).....	54
7.3.2	Valve with electric actuator.....	55
7.3.3	Valve with hydraulic or pneumatic actuator.....	55
<b>8</b>	<b>Maintenance.....</b>	<b>57</b>
8.1	Safety instructions for maintenance.....	57
8.2	Maintenance schedule.....	62
8.3	Maintenance tasks.....	63
8.3.1	Visually checking the valve.....	63
8.3.2	Lubricating the stem.....	63
8.3.3	Replacing the gland packing.....	64
8.3.4	Dismounting and checking the stem and check valve disk.....	74
8.4	After maintenance.....	77
<b>9</b>	<b>Faults and troubleshooting.....</b>	<b>79</b>
9.1	Safety instructions for fault correction.....	79
9.2	Fault table.....	82
<b>10</b>	<b>Removal, disposal.....</b>	<b>85</b>
10.1	Safety instructions for dismantling.....	85
10.2	Dismantling.....	87
10.3	Entsorgung.....	88
<b>11</b>	<b>Technische Daten.....</b>	<b>89</b>
<b>12</b>	<b>Index.....</b>	<b>91</b>

# 1 Overview

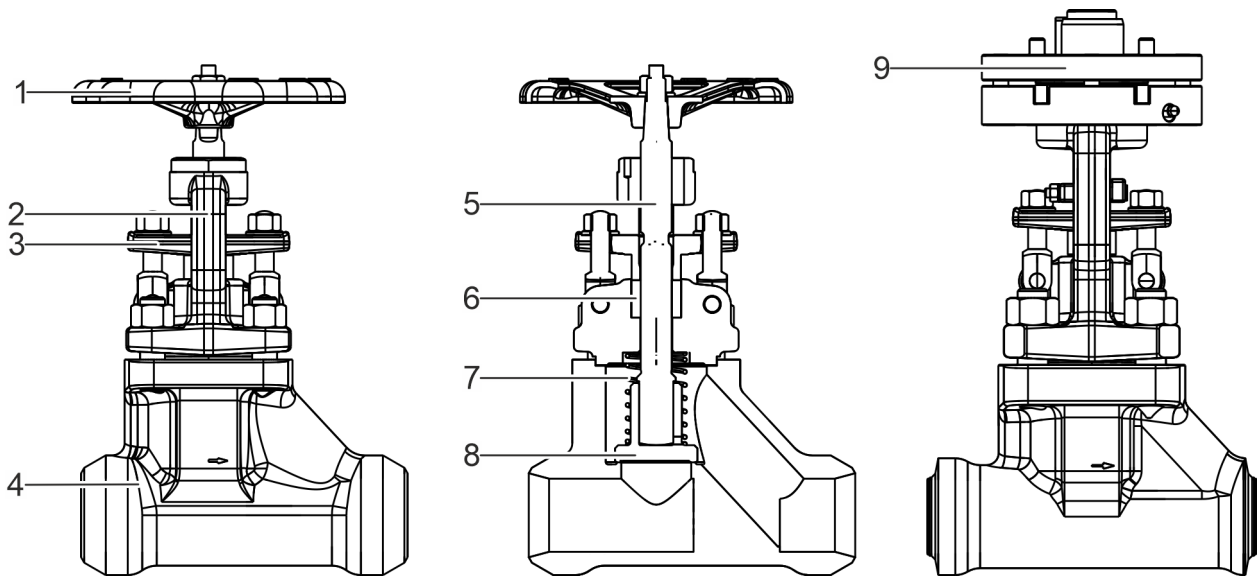


Fig. 1: High pressure lift check valve with shut-off facility

- |                         |                                       |
|-------------------------|---------------------------------------|
| 1 Handwheel             | 6 Gland packing                       |
| 2 Bonnet                | 7 Pressure spring                     |
| 3 Gland follower flange | 8 Shut-off element (check valve disk) |
| 4 Body                  | 9 Actuator flange                     |
| 5 Stem                  |                                       |

## Brief description

The valve designated as a lift check valve with shut-off facility is designed for installation in pipes.

The valve can be operated as a

- lift check valve or as a
- shut-off valve

## Operation as lift check valve

In operation as a shut-off valve the stem (Fig. 1/5) is in the open position. Through the movable check valve disk (Fig. 1/8) on the stem, the flow of the pipeline medium is only allowed in one direction within the valve.

In the other direction the check valve disk is pressed into its seat by the pipeline medium flowing back and thus the return flow is prevented.

## Operation as a shut-off valve

In operation as shut-off valve the stem is in closed position. The check valve disk pressed into the seat prevents the pipeline medium flowing through the pipe.

**Actuator variants**

The stem is moved differently depending on the version:

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

The actuator is connected to the stem (Fig. 1/5) on the actuator flange (Fig. 1/9).

**Media**

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

**Tools**

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

**Gabelstapler**

Gabelstapler mit ausreichender Tragfähigkeit zum Transport von Armaturen.

**Hoist**

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

**Hook wrench**

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

**Knock-out tool**

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

**Packing extractor**

Tool for removing gland packing elements.

**Ring bolts**

- Ring bolts to be screwed into the body.
- Serve as attachment points of the valve on the hoist.
- Included in the scope of delivery of the valve.

**Sling gear**

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

**Spacers**

Spacers for use during the separation of bonnet and body.



## 2 Safety

### 2.1 Symbols in this manual

#### Safety instructions

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

**DANGER!**

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

**WARNING!**

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

**CAUTION!**

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


**NOTICE!**

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

#### Safety instructions in specific instructions

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

Example:

1.  Loosen the bolt.

2. 

**CAUTION!**

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

Close the cover carefully.

3.  Tighten the bolt.





## 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

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

- Normal operation of the valve as check valve: Operation as open/close valve.
- Normal operation of the valve as shut-off valve: Operation as open/close valve. Brief operation of the valve as throttling valve with increased probability of wear.
- Operation of the valve with pressure under the shut-off element.
- Installation in horizontal pipes in accordance with the flow direction (☞ *"Flow direction arrow" on page 13*).
- Installation in vertical pipes in accordance with the flow direction (☞ *"Flow direction arrow" on page 13*).
- Maximum number of 1000 load cycles between a depressurised state and the maximum permissible pressure PS.
- Any number of load cycles at pressure fluctuations of up to 10 % of the maximum permissible pressure PS.
- Operation of the valve with liquid or gaseous media, without particular corrosive, chemical or abrasive impact.
- Temperature change speeds of maximum 6 K/min (6°C/min).
- Generally used flow rates depending on the type of medium and the application for which the valve is used.
- Operation of the valve without additional external influences, such as pipe forces, vibrations, wind loads, earthquakes, corrosive environments, fires, traffic loads, decomposition pressures of unstable fluids.
- The valve must only be operated within the limits specified on the type plate (☞ *"Rating plate" on page 12*).
- If the valve is operated in the creep range, the valve is designed for a maximum operating time of 100,000 h. The valve must be replaced afterwards.
- No temperature increases were considered. In case of use in the hot vapour area, temperature increases must be considered according to the regulations of the operating company.
- The test pressure for a recurring test must not exceed the maximum permitted pressure PS multiplied by 1.3.
- The valve may only be operated if internal pressure loading is predominantly dormant. Additional loads (e.g. stationary thermal stress, unsteady pressure and temperature loads in case of alternating loads or pipe loads) were not considered.

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

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

**WARNING!****Danger in the event of misuse!**

Misuse of the valve can cause dangerous situations.

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

## 2.3 Safety signs

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

**WARNING!****Danger if signs are illegible!**

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

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

### Rating plate

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

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

**Flow direction arrow**

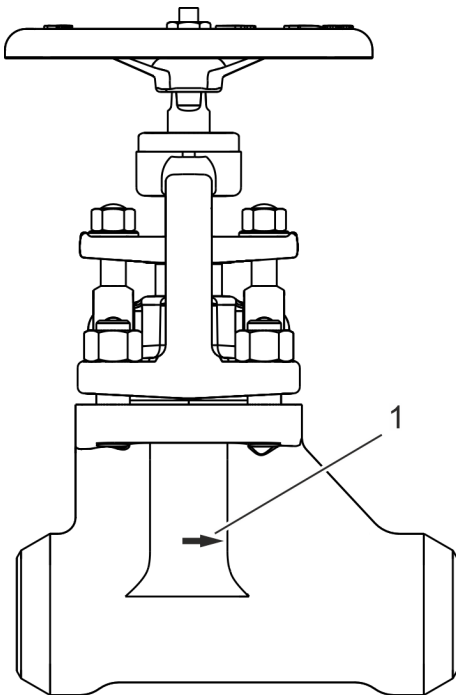


Fig. 2: Flow direction arrow

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

In the arrow direction the check valve disk can be pressed up by the pipeline medium and pipeline medium can flow through the valve.

**Opening direction / closing direction indication for manual actuator**

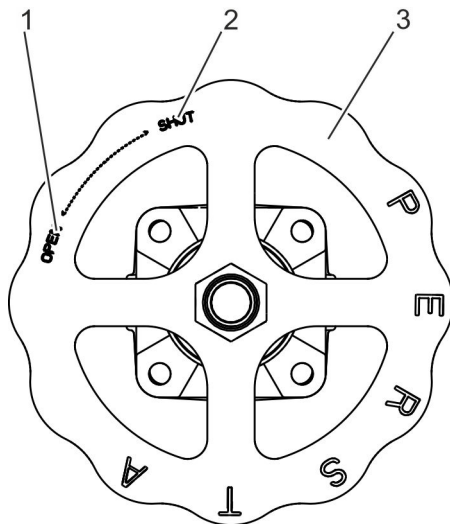


Fig. 3: Opening direction and closing direction indication

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

**Customer-specific markings**

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

## 2.4 Safety devices

### Limit switch

The opening of the valve with electric actuator is limited by a limit switch. After a permanently set distance, the actuator switches off and the valve is opened.

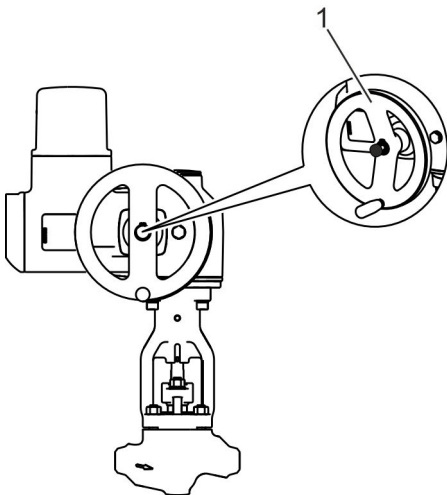
### Torque switch

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



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

### Emergency actuation of the electric actuator



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

*Fig. 4: Emergency actuation*

## 2.5 Residual risks

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

## 2.5.1 Basic dangers at the workplace

### Potentially explosive atmospheres

**DANGER!**

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

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

- Ensure that the tasks on the valve can be performed at the installation site.

### Trip hazard

**CAUTION!**

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

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

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

## 2.5.2 Danger due to electric current

### Electric current

**DANGER!**

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

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

- Before dismantling begins, switch off the power supply and disconnect it completely.
- Only have qualified electricians perform work on electrical lines and components.

### 2.5.3 Danger due to hydraulics

#### Fluid under high pressure

**WARNING!****Verletzungsgefahr durch hydraulische Energien!**

Hydraulisch angetriebene Bauteile der Armatur sowie das auslösende Überdruckventil können schwerste Verletzungen verursachen.

- Arbeiten an der hydraulischen Anlage nur durch Hydraulikfachkräfte ausführen lassen.
- Vor Beginn der Arbeiten an der hydraulischen Anlage diese vollständig drucklos machen. Druckspeicher vollständig entspannen.
- Armatur frostfrei betreiben, um Sprengen des Gehäuses zu verhindern.
- Persönliche Schutzausrüstung tragen.

### 2.5.4 Dangers due to pneumatics

#### Air under high pressure

**WARNING!****Verletzungsgefahr durch pneumatische Energien!**

Pneumatisch angetriebene Bauteile der Armatur sowie das auslösende Überdruckventil können schwerste Verletzungen verursachen.

- Arbeiten an der pneumatischen Anlage nur durch Pneumatikfachkräfte ausführen lassen.
- Vor Beginn der Arbeiten an der pneumatischen Anlage diese vollständig drucklos machen. Druckspeicher vollständig entspannen.
- Persönliche Schutzausrüstung tragen.



## 2.5.5 Mechanical dangers

### Heavy weight of the valve

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

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

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

### Danger of crushing on stems

**WARNING!****Danger of injury on moving parts!**

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

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

## 2.5.6 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.

### Risk of freezing

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

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

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

## 2.5.7 Dangers due to hazardous substances and operating materials

### Pipeline medium

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

Contact with the pumping medium can have health implications.

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

### Pickling medium

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

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

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

**Lubricating grease****WARNING!****Operating materials are a health hazard!**

Contact with operating materials/lubricants can have health implications.

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

**Anticorrosive****WARNING!****Anticorrosive is a health hazard!**

Direct contact with the anticorrosive used can have health implications.

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

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

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

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

## Increased wear




### NOTICE!



#### Material damage due to excessive use as throttling valve!

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

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

## 2.6 Behaviour in the event of an emergency

See also  Chapter 7.3 “Operating the valve in an emergency” on page 54.

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

## 2.7 Responsibility of the operating company

### Operating company

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

### Obligations of the operating company

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

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

In this regard, the following applies in particular:

- The operating company is responsible for the installation and operation of the valve in the pipe.
- The operating company must ensure that any dangerous situations caused by the operating conditions are avoided by installing additional safety systems.
- The operating company must obtain information about the applicable occupational health and safety regulations and, in a hazard assessment, identify the additional hazards that may exist at the installation site of the valve due to the specific working conditions. The operating company must integrate this information into operating instructions for the operation of the valve.

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

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

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

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

## 2.8 Personnel requirements



### **WARNING!**

#### **Risk of injury due to inadequate qualification of the personnel!**

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

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

The qualifications of personnel for the various areas of activity are set out below in this manual:

#### **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 operating company their skills in driving industrial trucks controlled by a sitting or standing operator and has been assigned to do this by the operating company 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 (for valves within the normal pressure range)**

Based on his or her specialised training, skill, experience and knowledge of the applicable standards and requirements, the industrial mechanic must be able to carry out the assigned work on installations and valves in the normal pressure range and to independently identify potential hazards and avoid them.

The operating company must have instructed the industrial mechanic on how to handle the plant and provide regular training for him or her.

The industrial mechanic must be able to independently maintain and repair installations and valves in the normal pressure range.

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

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

## Unauthorised persons



### WARNING!

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

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

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

## Training

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

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

## 2.9 Personal protective equipment

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

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

### Description of the personal protective equipment

The personal protective equipment is described below:



#### Chemically resistant protective gloves

Chemically resistant protective gloves protect the hands from aggressive chemicals.



#### Industrial hard hat

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




**Protective gloves**

Protective gloves protect the hands from friction, abrasion, cuts or deep injuries and from contact with hot surfaces.


**Protective goggles**

Protective goggles protect your eyes from flying parts and spraying liquids.


**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!**
**Verletzungsgefahr durch die Verwendung falscher Ersatzteile!**


Durch die Verwendung falscher oder fehlerhafter Ersatzteile können Gefahren für das Personal entstehen sowie Beschädigungen, Fehlfunktionen oder Totalausfall verursacht werden.

- Nur Originalersatzteile der Stahl-Armaturen PERSTA GmbH oder von der Stahl-Armaturen PERSTA GmbH zugelassene Ersatzteile verwenden.
- Bei Unklarheiten stets unseren Kundendienst (Kontakt Daten S. 4) kontaktieren.

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

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

**Storage of spare parts**

Please see  Chapter 4 “Transport and storage” on page 35 for information on storing spare parts.

**Ordering spare parts**

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

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

. See page 4 for contact details.

**2.11 Environmental protection****NOTICE!****Risk to the environment due to the improper handling of environmentally harmful substances!**

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

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

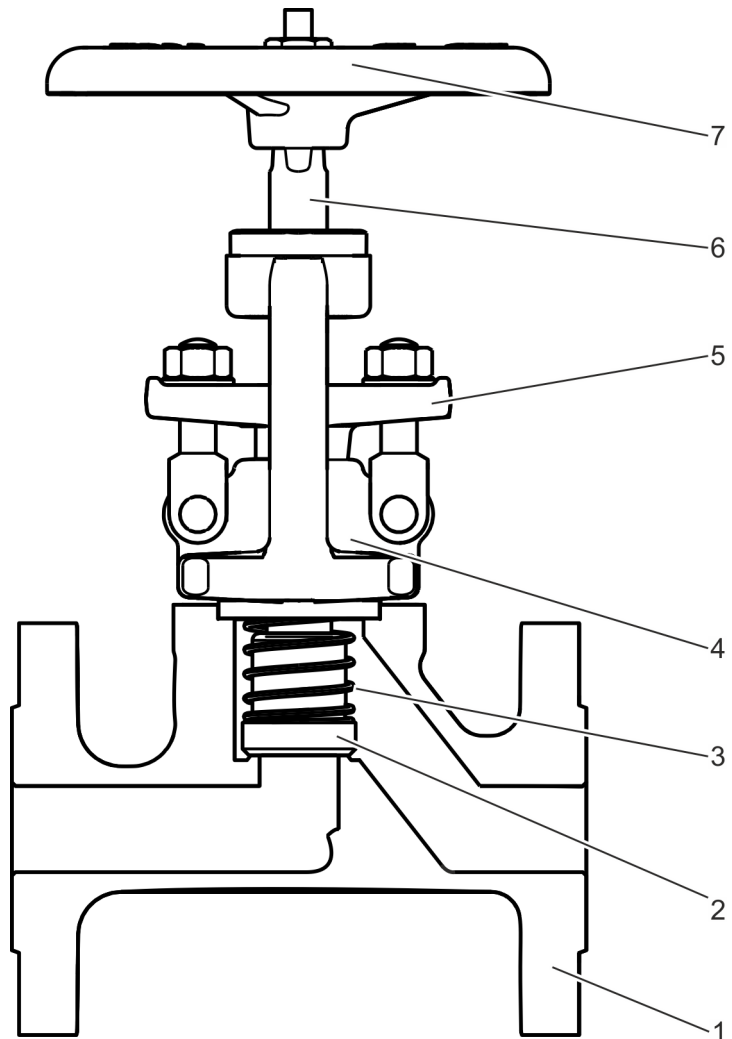
**The following environmentally harmful substances are used:**

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



### 3 Functional description

#### 3.1 Operating principle of the lift check valve with shut-off facility



*Fig. 5: Valve*

- 1 Body
- 2 Check valve disk
- 3 Pressure spring
- 4 Bonnet
- 5 Gland follower flange
- 6 Stem
- 7 Handwheel

Operating principle of the lift check valve with shut-off facility

### Operation as lift check valve

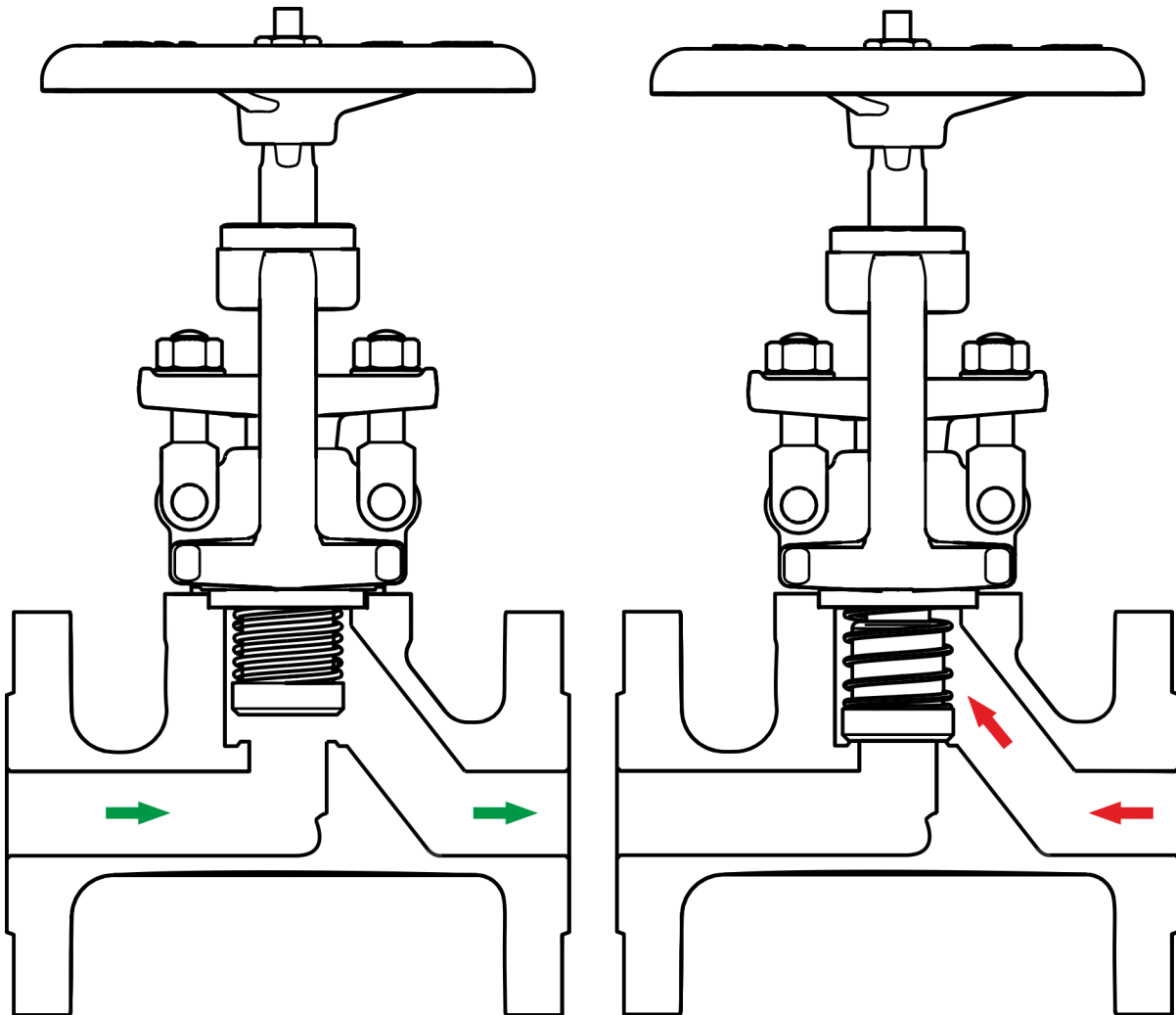


Fig. 6: Operation as lift check valve

For operation of the valve as a shut-off valve (Fig. 6) the stem is in the open position.

As soon as medium enters the valve in the flow direction (→) and under sufficiently high pressure, this pushes the check valve disk upwards against the spring force of the pressure spring and medium flows through the body.

If the flow direction of the pipeline medium reverses (←) or falls below a pressure limit, the check valve disk closes the valve (supported by the spring force of the pressure spring).

### Operation as a shut-off valve

For operation of the valve as shut-off valve the stem is in closed position.

In the closed state the stem presses the check valve disk into the seat. In this status the inlet side is separated from the outlet side of the valve.

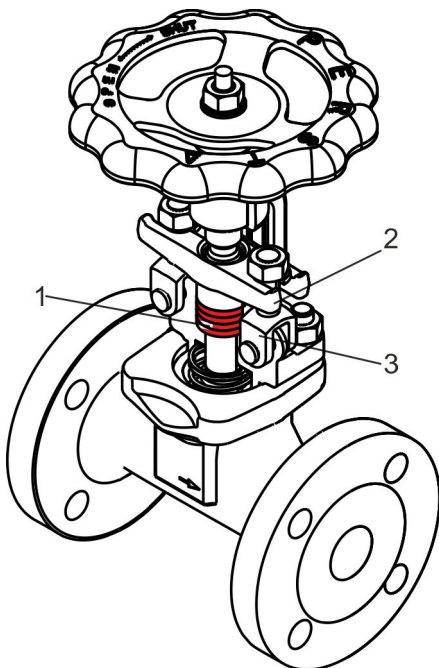
The lift check valves with shut-off facility vary in:

- Type of actuator (↪ *Chapter 3.3.2 “Actuator variants” on page 32*),
- Type of connection (↪ *Chapter 3.3.5 “Connections” on page 34*) and
- Body shape (↪ *Chapter 3.3.3 “Body shape” on page 33*).

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

## 3.2 External seal

### Gland packing



The gland packing seals the stem off against the environment.

For this purpose, the gland follower flange (Fig. 7/2) is pressed onto the sealing elements (Fig. 7/1) by means of stud bolts or hasp screws (Fig. 7/3):

- Gland follower
- Chamber ring
- Packing ring

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



#### **Optional life loaded packing**

*The packing compression can be applied via a life loaded packing.*



#### **Versions of the packing bolts**

*Depending on the version, there are hinged eye-bolts or stud bolts.*

Fig. 7: Gland packing

### 3.3 Versions of the lift check valve with shut-off facility

#### 3.3.1 Shut-off element

##### Check valve disk

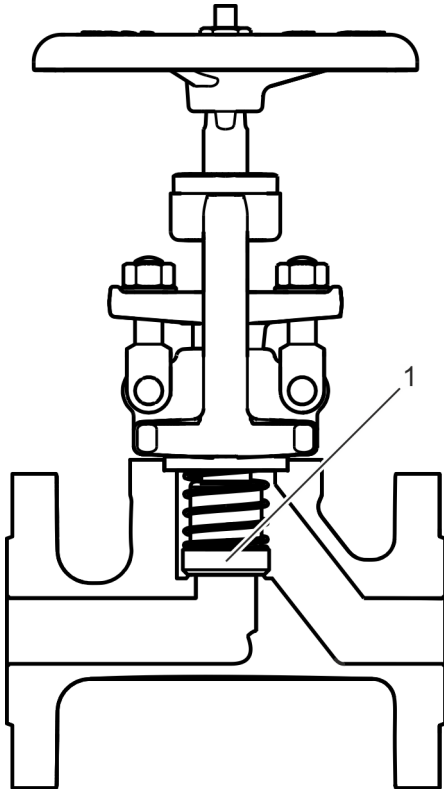


Fig. 8: Check valve disk

The check valve disk (Fig. 8/1) is movable on the stem. Depending on the mode in which the valve is used,

- the check valve disk separates the inlet side from the outlet side or
- the check valve disk allows the pipeline medium to flow through in one direction and prevents flow in the other direction.

The check valve disk is guided through a feather key and a milled feather key groove on the stem.

#### 3.3.2 Actuator variants

The possible actuator variants are shown below.



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

##### Manual actuator (handwheel)

The stem is driven manually with the handwheel.

The handwheel can be attached in the following manner:

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



### Electric actuator

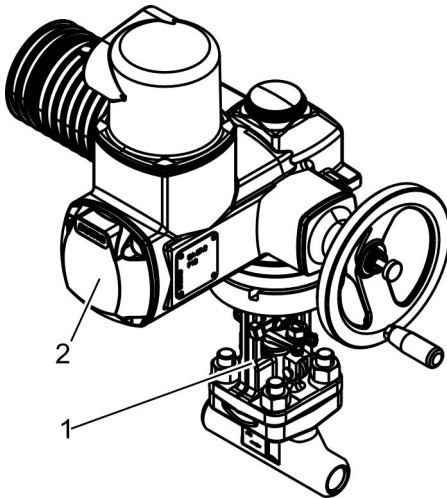


Fig. 9: Electric actuator

### Hydraulic actuator

With the optional electric actuator (Fig. 9/1) the stem is driven via an electric motor. The electric motor is connected to the valve above the bonnet.

The electric actuator is driven

- in the open direction via a limit switch
  - in the closed direction via a torque switch
- switch.

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

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

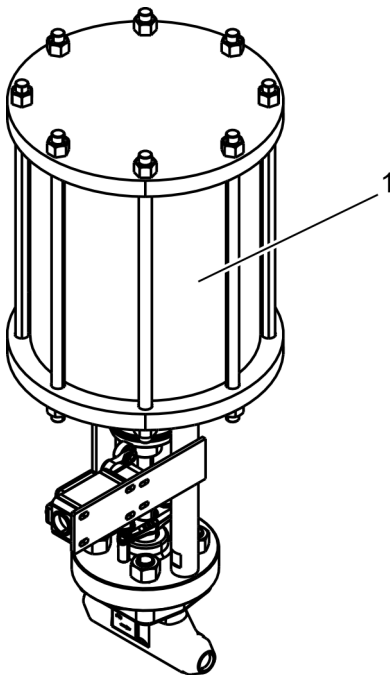


Fig. 10: Pneumatic actuator

With the optional pneumatic actuator the stem is driven via a pneumatic piston actuator (Fig. 10). The pneumatic actuator is connected to the valve above the bonnet.

### 3.3.3 Body shape

#### T-pattern

For the T-pattern the stem position is vertical.

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

**Angle pattern valve**

If the valve is designed as an angle pattern valve, the inlet side is arranged at a right angle to the outlet side.

**3.3.4 Display elements****Position indicator (visualised)**

A position indicator is available for the valve as an option. The display indicates whether the valve position is open or closed.

**3.3.5 Connections****Connection in the pipe**

Valves can be mounted in the pipe as

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

**Electrical connections**

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



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

**Hydraulic connections**

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



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

**Pneumatic connections**

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



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

## 4 Transport and storage

### 4.1 Safety instructions for transport and storage

#### Heavy weight of the valve

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

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

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

#### Suspended loads

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

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

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

#### Improper transport

**NOTICE!****Damage caused by improper transport!**

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

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

## Damage of the seat



### NOTICE!

#### Material damage due to transport of the valve in open status!

By transporting the valve in the open state (position of the stem in operation as check valve) the seat can be damaged if the check valve disk is not fixed in place in one position in the body.

- Completely close the stem before transporting the valve.

## 4.2 Transport of packed items

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

### Transporting individual valves

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

1. ▶



### NOTICE!

#### Damage of the seat!

Ensure that the stem is in the closed position (↪ *Chapter 7.2 "Operating the valve" on page 53*).

2. ▶



### DANGER!

#### Unmarked attachment points!

Attach valve to the hoist with suitable sling gear.

3. ▶

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

4. ▶

Transport the valve as close to the ground as possible.

5. ▶

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

## Transport on a pallet

- |                       |  |
|-----------------------|--|
| Personnel:            | <ul style="list-style-type: none"> <li>■ Forklift truck driver</li> <li>■ Trained person (hoist)</li> </ul>                            |
| Protective equipment: | <ul style="list-style-type: none"> <li>■ Industrial hard hat</li> <li>■ Safety footwear</li> <li>■ Protective work clothing</li> </ul> |
| Special tool:         | <ul style="list-style-type: none"> <li>■ Hoist</li> <li>■ Gabelstapler</li> <li>■ Sling gear</li> </ul>                                |

1. ➤



**NOTICE!**  
**Damage of the seat!**

Ensure that the stem is in the closed position (☞ *Chapter 7.2 "Operating the valve" on page 53*).

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

## 4.3 Storage of the valve

### Storage of the valve

Store a valve under the following conditions:

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



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

## 4.4 Storage of spare parts



### **NOTICE!**

**Material damage due to reduced service life if stored incorrectly!**

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

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

## 5 Installation

### 5.1 Safety instructions for installation

#### Electric 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.

#### Air under high pressure

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

Pneumatically actuated components of the valve can cause severe injuries.

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

## Faulty installation



### WARNING!

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

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

- Pay attention to the correct flow direction of the valve (☞ *Chapter 2.3 “Safety signs” on page 12*).
- Pay attention to the correct installation position of the valve (☞ *Chapter 11 “Technische Daten” on page 89*).
- In the case of valves with an actuator or transmission, ensure that the stem position is vertical.
- In special cases and if the stem position is not vertical:
  - Support the actuator on the valve head.
  - Ensure that the actuator can follow the position changes of the pipe.
- With butt-weld valves
  - Prior to welding on, open the valve completely
  - Fasten the welding counterpole on the body, if possible in the vicinity of the welding point
  - Perform welding and subsequent heat treatment in compliance with the applicable welding regulations
  - Perform partial thermal treatment.

## Wrong bolt tightening torques



### WARNING!

#### Gefahr durch falsche Anzugsmomente!

Die Anzugsmomente der Schraubverbindungen an der Armatur sind vom Hersteller berechnet und angewandt worden. Es kann zu Gefahren durch Lösen und erneutes Anziehen mit falsch gewählten Anzugsmomenten kommen.

- Schraubverbindungen an der Armatur nicht lösen.
- Bei Wartungsarbeiten oder losen Schraubverbindungen Anzugsmomente
  - unter Angabe der Seriennummer beim Stahlarmaturen PERSTA GmbH-Kundendienst (Kontakt Daten S. 4) erfragen oder
  - auf der Webseite des Herstellers (Adresse auf S. 2) nachschlagen.



**Incorrect alignment of the valve**

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

An incorrect alignment can result in the entire plant malfunctioning.

- Install the valve in accordance with the flow direction arrow (☞ *Chapter 2.3 “Safety signs” on page 12*) and the flow direction in the pipe.

## 5.2 Before the installation

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

1. ➤ Check the design parameters and material.
2. ➤ Pay attention to the installation position.
3. ➤ Pay attention to the flow direction.
4. ➤ Remove any protective caps and preserving agents from the valve.
5. ➤ Make sure that there are no objects or materials inside the valve.

## 5.3 Installing the valve

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

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

Connecting the power supply on an electric actuator

5. ▶ Check butt-welding ends and flange sealing surfaces for damage and cleanness.
6. ▶ Centre the connection flanges.
7. ▶ Use connection elements and sealing elements made of permissible materials.
8. ▶ Depending on the type of connection, weld or flange the valve in the correct flow direction and installation position.
9. ▶ Bolt all the flange bores together with the connection elements using the permissible tightening torque.
10. ▶ For valves with actuators or transmissions (electric/hydraulic/pneumatic), ensure that the stem position is vertical.
11. ▶ For a different installation position, support the actuator and ensure that the actuator can follow the position changes of the pipe.
12. ▶ Make sure that the pipe and valve do not leak.

## 5.4 Connecting the power supply on an electric actuator

Personnel: ■ Qualified electrician

Requirement:

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

1. ▶



***Terminal diagram and operating instructions are located on the actuator.***

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

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

## 5.5 Connecting the hydraulic system for hydraulic actuator

Personnel: ■ Hydraulics Specialist

Protective equipment: ■ Protective goggles

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

## 5.6 Connecting the pneumatic system for pneumatic actuator

Personnel: ■ Pneumatics Specialist

Protective equipment: ■ Protective goggles

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

## 5.7 After the installation

### Harmful substances

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

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

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

**WARNING!****Gloss paint is a health hazard!**

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

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

### Anticorrosive

**WARNING!****Anticorrosive is a health hazard!**

Direct contact with the anticorrosive used can have health implications.

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

### 5.7.1 Pickling the valve



*The pickling of the valve can be performed in several ways.*

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

- Personnel: ■ Pipeline engineer
- Protective equipment: ■ Protective goggles  
■ Protective work clothing  
■ Chemically resistant protective gloves  
■ Safety footwear

1. ▸ Pickle the valve correctly.
2. ▸ Completely remove the pickling medium by flushing it out.
3. ▸ Ensure that the pickling medium is completely flushed out of the dead spaces in the valve.

### 5.7.2 Painting the valve



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

*Use suitable (compatible) painting systems.*

### 5.7.3 Performing a system pressure test and leak test

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

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

### 5.7.4 Applying thermal insulation


**Plant-specific equipment**

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

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

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

The insulation must only reach the upper edge of the body (Fig. 11, red arrow).

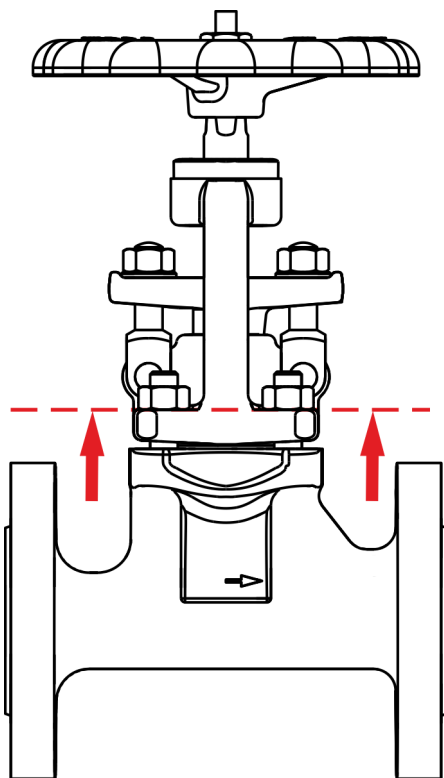


Fig. 11: Upper edge of the insulation

## 6 Initial start-up

### 6.1 Safety instructions for commissioning

#### Risk of freezing

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

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

- Make sure that the valve is drained completely before it is taken out of service.
- Never operate the valve at temperatures near or below the freezing point of the pipeline medium.

#### Austretendes Rohrleitungsmedium

**WARNING!****Verletzungsgefahr durch unter Druck stehendes Rohrleitungsmedium!**

Sowohl im Betrieb als auch im Außerbetriebszustand kann es je nach Ausführung der Armatur zu Verletzungen durch unter Hochdruck austretendes Medium kommen.

- Schraubverbindungen nicht lösen.
- Bei losen Schraubverbindungen Betreiber informieren und betreffenden Rohrleitungsabschnitt absperren lassen.
- Bei losen Schraubverbindungen Ursache hierfür abklären lassen und beseitigen. Ggf. Armatur durch den Hersteller überprüfen lassen.

#### Pipeline medium

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

Contact with the pumping medium can have health implications.

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

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

Insufficient heating-up times/cooling times may result in injuries and impermissible deformations of the valve and reduction of the total service life.

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

**Thermal dangers****WARNING!****Danger of injury due to high/low temperatures!**

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

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

**Quetschgefahr an Spindeln****WARNING!****Verletzungsgefahr an bewegten Teilen!**

An bewegten Teilen (Spindeln/Verdrehsicherungen) besteht die Gefahr von Verletzungen.

- Im Betrieb nicht an bewegte Teile fassen.



**Wrong bolt tightening torques**

**WARNING!**
**Gefahr durch falsche Anzugsmomente!**

Die Anzugsmomente der Schraubverbindungen an der Armatur sind vom Hersteller berechnet und angewandt worden. Es kann zu Gefahren durch Lösen und erneutes Anziehen mit falsch gewählten Anzugsmomenten kommen.

- Schraubverbindungen an der Armatur nicht lösen.
- Bei Wartungsarbeiten oder lösen Schraubverbindungen Anzugsmomente
  - unter Angabe der Seriennummer beim Stahlarmaturen PERSTA GmbH-Kundendienst (Kontakt Daten S. 4) erfragen oder
  - auf der Webseite des Herstellers (Adresse auf S. 2) nachschlagen.

**6.2 Prior to initial start-up**

- |                       |   |
|-----------------------|---|
| Personnel:            | <ul style="list-style-type: none"> <li>■ Pipeline engineer</li> <li>■ Industrial mechanic (for valves within the normal pressure range)</li> </ul>  |
| Protective equipment: | <ul style="list-style-type: none"> <li>■ Protective work clothing</li> <li>■ Protective gloves</li> <li>■ Safety footwear</li> <li>■ Industrial hard hat</li> <li>■ Protective goggles</li> </ul> |

## Requirement:

- The entire plant has been approved for operation.

**Valve with manual actuator**

1. ➤ Bring the stem into the open position by turning the hand-wheel anticlockwise.
2. ➤ Bring the stem into the closed position by turning the hand-wheel clockwise.
3. ➤ Repeat steps 1–2 several times.

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

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

### 6.3 Carrying out initial start-up

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

Requirement:

- The entire plant has been approved for operation.

1. ➤



**WARNING!**

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

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

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

## 7 Operation

### 7.1 Safety instructions for operation

#### Thermal dangers

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

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

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

#### Pressurised components

**WARNING!****Verletzungsgefahr durch unter Druck stehendes Rohrleitungsmedium!**

Sowohl im Betrieb als auch im Außerbetriebzustand kann es je nach Ausführung der Armatur zu Verletzungen durch unter Hochdruck austretendes Medium kommen.

- Schraubverbindungen nicht lösen.
- Bei losen Schraubverbindungen Betreiber informieren und betreffenden Rohrleitungsabschnitt absperren lassen.
- Bei losen Schraubverbindungen Ursache hierfür abklären lassen und beseitigen. Gegebenenfalls Armatur durch den Hersteller überprüfen lassen.

### Pipeline medium

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

Contact with the pumping medium can have health implications.

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

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

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

Insufficient heating-up times/cooling times may result in injuries and impermissible deformations of the valve and reduction of the total service life.

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

### Improper operation of the hand-wheel

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

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

- Do not use any force-increasing components when using the handwheel.
- Only operate the handwheel by hand.
- If the handwheel does not move smoothly, or if it cannot be activated, lubricate the stem thread and bearing (↪ *Chapter 8.3.2 "Lubricating the stem" on page 63*) and if necessary, contact the manufacturer.

**Increased wear**

**NOTICE!**
**Material damage due to excessive use as throttling valve!**

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

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

## 7.2 Operating the valve

### 7.2.1 Valve with manual actuator (handwheel)

#### Operation as lift check valve

Personnel:	<ul style="list-style-type: none"> <li>■ Industrial mechanic (for valves within the normal pressure range)</li> </ul>
Protective equipment:	<ul style="list-style-type: none"> <li>■ Protective work clothing</li> <li>■ Protective gloves</li> <li>■ Safety footwear</li> <li>■ Industrial hard hat</li> <li>■ Protective goggles</li> </ul>

#### Open the valve completely

- Turn the handwheel anticlockwise.
- ⇒ The check valve disk can be opened by the pipeline medium flowing in the flow direction.

#### Operation as a shut-off valve

Personnel:	<ul style="list-style-type: none"> <li>■ Industrial mechanic (for valves within the normal pressure range)</li> </ul>
Protective equipment:	<ul style="list-style-type: none"> <li>■ Protective work clothing</li> <li>■ Protective gloves</li> <li>■ Safety footwear</li> <li>■ Industrial hard hat</li> <li>■ Protective goggles</li> </ul>

#### Close the valve completely

- Turn the handwheel clockwise: The valve is closed.
- ⇒ The check valve disk is pressed into the seat and completely shuts off the valve.

## 7.2.2 Valve with electric actuator

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



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

## 7.2.3 Valve with hydraulic or pneumatic actuator

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



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

## 7.3 Operating the valve in an emergency

### 7.3.1 Valve with manual actuator (handwheel)



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

Personnel:	■ Industrial mechanic (for valves within the normal pressure range)
Protective equipment:	■ Protective work clothing
	■ Protective gloves
	■ Safety footwear
	■ Industrial hard hat
	■ Protective goggles

- ➔ Turn the handwheel.
- Turning it clockwise: closes the valve.
  - Turning it anticlockwise: Operation of the valve as check 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 (for valves within the normal pressure range)

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

Requirement:

■ The electric actuator cannot be used.

**1.** ➤ Safeguard the affected system area.

**2.** ➤ Couple the handwheel.

**3.** ➤ Turn the handwheel.

■ Turning it clockwise: closes the valve.

■ Turning it anticlockwise: Operation of the valve as check valve.

### 7.3.3 Valve with hydraulic or pneumatic actuator



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

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



## 8 Maintenance

### 8.1 Safety instructions for maintenance

#### Safeguard against restart

**DANGER!****Lebensgefahr durch unbefugtes Wiedereinschalten!**

Durch unbefugtes Wiedereinschalten der Energieversorgung während der Wartung besteht für die Personen in der Gefahrenzone die Gefahr schwerer Verletzungen bis hin zum Tod.

- Vor Beginn der Arbeiten alle Energieversorgungen abschalten und gegen Wiedereinschalten sichern.
- Anlagenbereich sichern.

#### Air under high pressure

**WARNING!****Verletzungsgefahr durch pneumatische Energien!**

Pneumatisch angetriebene Bauteile der Armatur sowie das auslösende Überdruckventil können schwerste Verletzungen verursachen.

- Arbeiten an der pneumatischen Anlage nur durch Pneumatikfachkräfte ausführen lassen.
- Vor Beginn der Arbeiten an der pneumatischen Anlage diese vollständig drucklos machen. Druckspeicher vollständig entspannen.
- Persönliche Schutzausrüstung tragen.

#### Fluid under high pressure

**WARNING!****Verletzungsgefahr durch hydraulische Energien!**

Hydraulisch angetriebene Bauteile der Armatur sowie das auslösende Überdruckventil können schwerste Verletzungen verursachen.

- Arbeiten an der hydraulischen Anlage nur durch Hydraulikfachkräfte ausführen lassen.
- Vor Beginn der Arbeiten an der hydraulischen Anlage diese vollständig drucklos machen. Druckspeicher vollständig entspannen.
- Armatur frostfrei betreiben, um Sprengen des Gehäuses zu verhindern.
- Persönliche Schutzausrüstung tragen.

### 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.

**Hohes Gewicht der Armatur****WARNING!****Verletzungsgefahr durch hohes Gewicht der Armatur!**

Durch das hohe Gewicht der Armatur sowie deren Bauteile kann es zu schweren Verletzungen kommen.

- Armaturen und deren Bauteile durch geeignetes Hebezeug oder Gabelstapler transportieren.
- Armaturen nicht am Handrad anheben.
- Armaturen nicht am Antrieb anheben.
- Armaturen, wenn möglich, am Bügelaufsatz anheben.
- Zugelassene und funktionsfähige Anschlagmittel verwenden.
- Armaturen und Bauteile gegen Umfallen sichern.

**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!****Gefahr durch falsche Anzugsmomente!**

Die Anzugsmomente der Schraubverbindungen an der Armatur sind vom Hersteller berechnet und angewandt worden. Es kann zu Gefahren durch Lösen und erneutes Anziehen mit falsch gewählten Anzugsmomenten kommen.

- Schraubverbindungen an der Armatur nicht lösen.
- Bei Wartungsarbeiten oder lösen Schraubverbindungen Anzugsmomente
  - unter Angabe der Seriennummer beim Stahlarmaturen PERSTA GmbH-Kundendienst (Kontaktdaten S. 4) erfragen oder
  - auf der Webseite des Herstellers (Adresse auf S. 2) nachschlagen.

### Incorrect spare parts

**WARNING!****Verletzungsgefahr durch die Verwendung falscher Ersatzteile!**

Durch die Verwendung falscher oder fehlerhafter Ersatzteile können Gefahren für das Personal entstehen sowie Beschädigungen, Fehlfunktionen oder Totalausfall verursacht werden.

- Nur Originalersatzteile der Stahl-Armaturen PERSTA GmbH oder von der Stahl-Armaturen PERSTA GmbH zugelassene Ersatzteile verwenden.
- Bei Unklarheiten stets unseren Kundendienst (Kontaktdaten S. 4) kontaktieren.

### Defective sealing elements

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

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

After each dismantling of the stem,

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

**De-tensioning of spring elements****CAUTION!****Danger of injury due to spring elements!**

Spring elements that are de-tensioned can cause injuries when maintenance tasks are performed.

Depending on the version there is a spring element between the check valve disk and the stem (in the flange of the check valve disk).

- Carefully remove the stem from the check valve disk.
- Prior to mounting, ensure that the spring is intact and properly positioned in the flange of the check valve disk.
- Wear personal protective equipment: Protective goggles.

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

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

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

**Increased wear****NOTICE!****Material damage due to excessive use as throttling valve!**

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

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

**Environmental protection**

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

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

**8.2 Maintenance schedule**

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

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

Interval	Maintenance work	Personnel
Use as an open/close valve in operation as a shut-off valve or check valve: depending on the activation frequency, operating and ambient conditions/specified by the operating company	Check the valve visually for leaks ( ↗ Chapter 8.3.1 “Visually checking the valve” on page 63)	Industrial mechanic (for valves within the normal pressure range)
	Lubricate the stem and bearing ( ↗ Chapter 8.3.2 “Lubricating the stem” on page 63)	Industrial mechanic (for valves within the normal pressure range)
Use as a throttling valve and in operation as a shut-off valve: depending on the activation frequency, operating and ambient conditions/specified by the operating company	Check the check valve disk, stem and body for increased wear ( ↗ Chapter 8.3.4 “Dismounting and checking the stem and check valve disk” on page 74)	Industrial mechanic (for valves within the normal pressure range)
Every six months	Activate stem (open/close)	Industrial mechanic (for valves within the normal pressure range)
Depending on duration of use, operating and ambient conditions	Replace the gland packing ( ↗ Chapter 8.3.3 “Replacing the gland packing” on page 64)	Industrial mechanic (for valves within the normal pressure range)

## 8.3 Maintenance tasks

### 8.3.1 Visually checking the valve

Personnel: ■ Industrial mechanic (for valves within the normal pressure range)

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

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

### 8.3.2 Lubricating the stem

Personnel: ■ Industrial mechanic (for valves within the normal pressure range)

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

Requirements:

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

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

2. ➤



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

With electric actuator: Couple the handwheel.

3. ➤



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

For pneumatic actuator: Couple the handwheel.

**4.**


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

With hydraulic actuator: Operate the valve via the controller.

**5.**

Open the valve completely.

**6.**

Depending on the version:

- Grease the stem thread with a brush
- Grease stem thread and bearing via lubricating nipple

**7.**

Completely close valve.

**8.**

Repeat steps 5–7 several times.

**9.**


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

With electric actuator: Uncouple the handwheel.

**10.**


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

For pneumatic actuator: Uncouple the handwheel.

### 8.3.3 Replacing the gland packing

#### Valve with manual actuator

Personnel:

- Industrial mechanic (for valves within the normal pressure range)

Protective equipment:

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

Special tool:

- Packing extractor

Requirements:

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

#### Removing the bonnet

**1.**

Attach bonnet to the hoist with suitable sling gear.

**2.**

Use the hoist to safeguard the bonnet (Fig. 12/4) from falling off of the body.



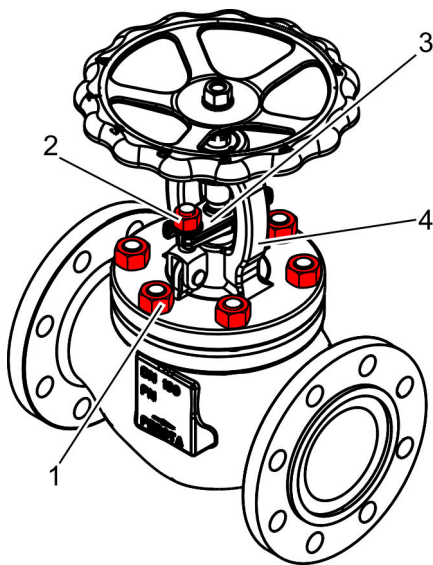


Fig. 12: Removing nuts

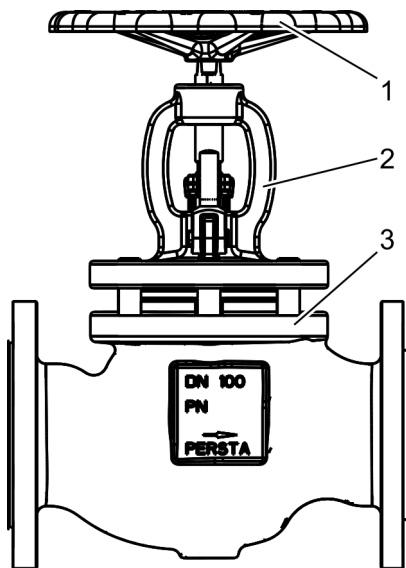


Fig. 13: Turning the handwheel

3. ➤ Ensure that the bonnet (Fig. 12/4) and body cannot be lifted by the hoist.

4. ➤



**WARNING!**

**Risk of injury due to pressurised valve!**

Loosen and remove the nuts (Fig. 12/1) on the bonnet (Fig. 12/4).

5. ➤ Loosen and remove the nuts including washers (Fig. 12/2) on the gland follower flange (Fig. 12/3).

6. ➤ Turn the handwheel (Fig. 13/1) in the closing direction ("Shut").

⇒ The bonnet (Fig. 13/2) is lifted off of the body (Fig. 13/3).

7. ➤ Position two spacers of the same height opposite each other between the body (Fig. 13/3) and the bonnet (Fig. 13/2).

8. ➤ Turn the handwheel (Fig. 13/1) in the opening direction ("Open").

⇒ The bonnet (Fig. 13/2) is lowered onto the spacers.

9. ➤ Ensure that the bonnet (Fig. 13/2) rests on the spacers parallel to the body (Fig. 13/3).

10. ➤ Turn the handwheel (Fig. 13/1) in the opening direction.

⇒ The gland packing is partially pulled out of the body.

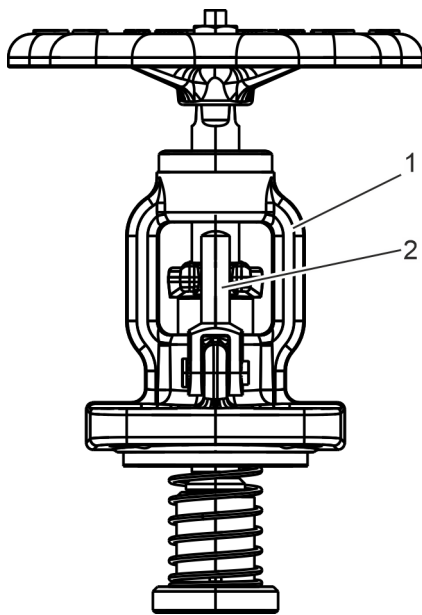


Fig. 14: Taking off the bonnet

- 11.** ▶ Detach the complete bonnet (Fig. 14/1) including the stem (Fig. 14/2) and gland packing from the body with the hoist.
- 12.** ▶ Remove the spacers from the body.
- 13.** ▶ Ensure that no spacers have fallen into the body.

#### Replacing the cover gasket

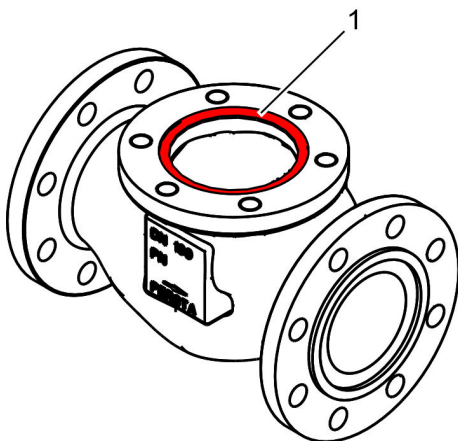
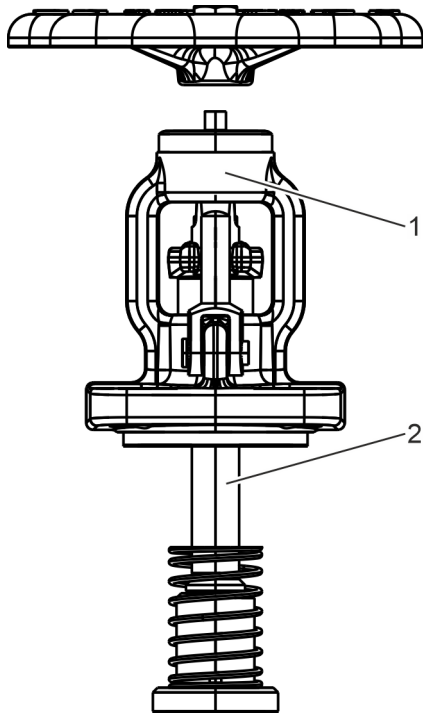


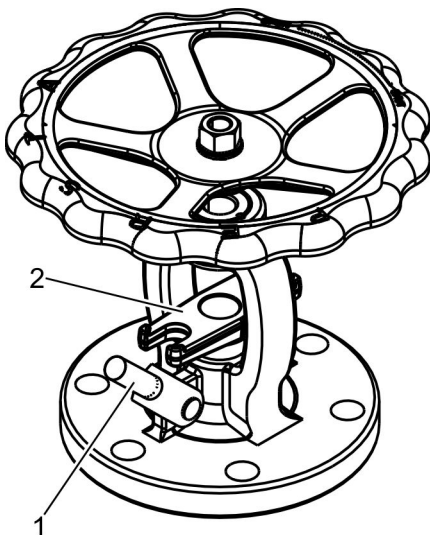
Fig. 15: Cover gasket

- 14.** ▶ Remove the cover gasket (Fig. 15/1).
- 15.** ▶ Remove any residues from the groove in the body.
- 16.** ▶ Insert the new cover gasket (Fig. 15/1) in the groove on the body.

**Removing the stem**


17. ➤ Unscrew the stem (Fig. 16/2) from the threaded bush.
18. ➤ Remove the stem from the bonnet (Fig. 16/1).

Fig. 16: Unscrewing the stem

**Removing the gland packing**


19. ➤ Turn down the packing bolts (Fig. 17/1).
20. ➤ Remove the gland follower flange (Fig. 17/2).

Fig. 17: Turning down the packing bolts

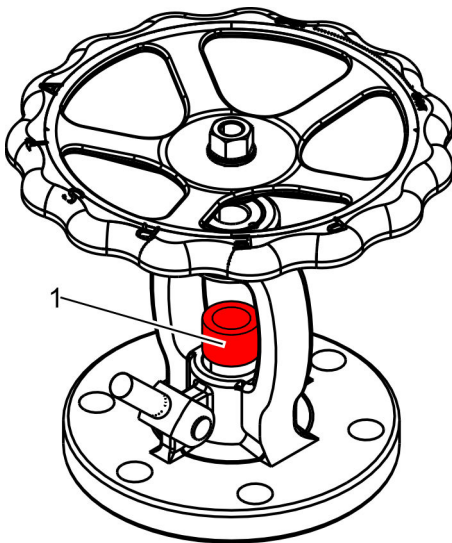


Fig. 18: Removing stuffing box elements

#### Cleaning the stem

21. Use a packing extractor to remove the stuffing box elements (Fig. 18/1).

22.



#### NOTICE!

**Risk of damage due to mechanical work on the contact surfaces!**

Remove any residue from the packing elements on the stem.

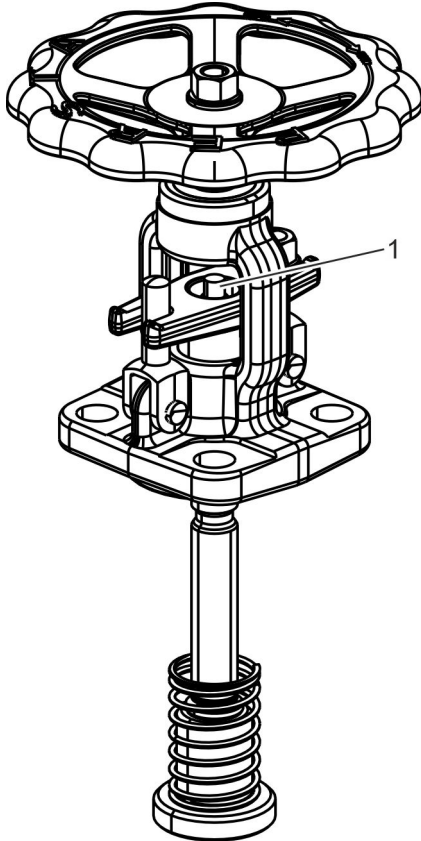
**Mounting the stem**


Fig. 19: Screwing in the stem

**Mounting the bonnet**

- 23.▶ Insert the stem (Fig. 19/1) into the bonnet.
- 24.▶ Insert new stuffing box elements into the emptied and cleaned packing chamber.
- 25.▶ Attach the gland follower flange to the stem.
- 26.▶



***Gland follower flange tightened too firmly***

Screw gland follower flange with washers loosely onto the packing bolts.

- 27.▶



***Pay attention to the left-hand thread.***

Screw the stem into the threaded bush on the handwheel.

- 28.▶ If there is an anti-twist device: Mount the anti-twist device in the stem.
- 29.▶ Move the shut-off element into the OPEN position.

- 30.▶ Fasten the bonnet to the hoist with suitable sling gear.
- 31.▶ Lift the bonnet above the body.
- 32.▶



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

Insert the stem into the body.

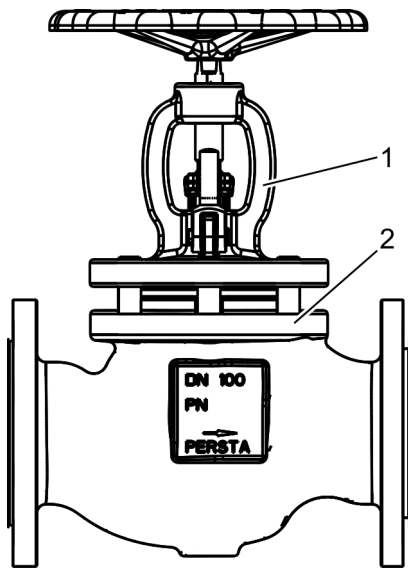


Fig. 20: Fitting the bonnet

33. ➤ Fit the bonnet (Fig. 20/1) onto the stud bolts on the body (Fig. 20/2).

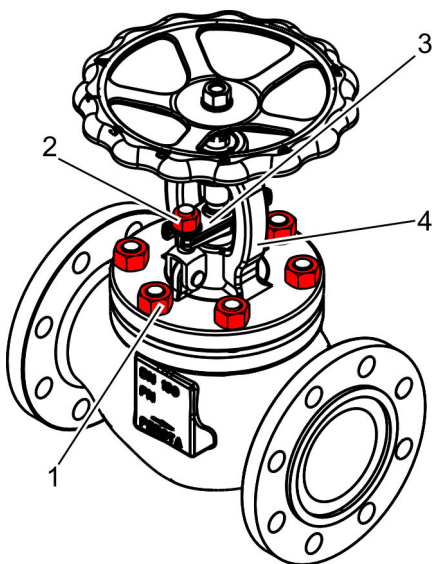


Fig. 21: Screwing on nuts

34. ➤ Loosely screw the nuts (Fig. 21/1) with the stud bolts into the body.

35. ➤



**WARNING!**  
Risk of injury due to incorrect tightening torques!

Tighten the nuts (Fig. 21/1) on the bonnet (Fig. 21/4) cross-wise as specified by the manufacturer.

36. ➤



**WARNING!**  
Risk of injury due to incorrect tightening torques!

Tighten the nuts (Fig. 21/2) on the gland follower flange (Fig. 21/3) as specified by the manufacturer.

## Procedure for electric, pneumatic or hydraulic actuator

The procedure for an electric actuator is described below.



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



**Use a hook wrench after removing the actuator**

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

Personnel:

- Industrial mechanic (for valves within the normal pressure range)
- Qualified electrician
- Trained person (hoist)

Protective equipment:

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

Special tool:

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

Requirements:

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

1. ▶



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

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

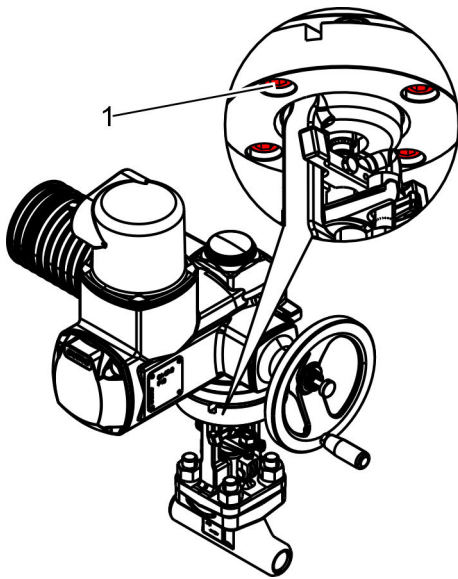


Fig. 22: Removing the bolts

2. ➤ Undo the bolts (Fig. 22/1) for the electric actuator and remove them along with the washers.
3. ➤ Take off the electric actuator and store it outside the work area.

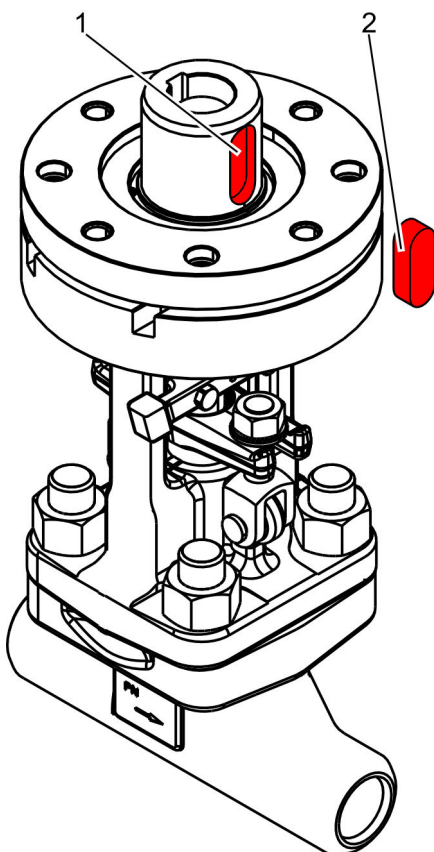


Fig. 23: Removing the feather key

4. ➤ Remove the feather key (Fig. 23/2) from the feather key groove (Fig. 23/1) of the threaded bush.

5. ➤



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

Carry out steps 1–36 ↗ “Valve with manual actuator” on page 64.

## Mounting the electric actuator

6. ➤ Insert the feather key into the feather key groove on the hub.



7. ➤



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

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

8. ➤

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

9. ➤



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

Lower the electric actuator onto the flange on the bonnet.

10. ➤

Fasten the electric actuator to the bonnet using bolts (Fig. 24/1) and washers.

11. ➤



**WARNING!**  
**Risk of injury due to incorrect tightening torques!**

Tighten the bolts as specified by the manufacturer.

12. ➤

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

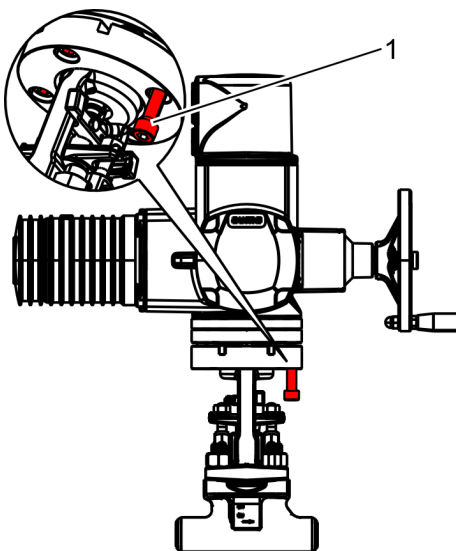


Fig. 24: Fastening the electric actuator

### 8.3.4 Dismounting and checking the stem and check valve disk

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

Requirements:

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

#### Removing the bonnet

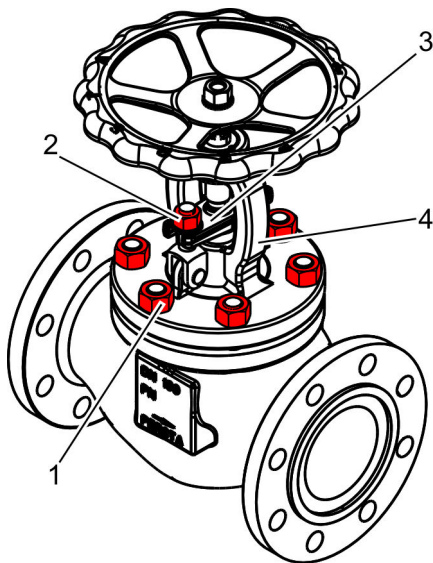



Fig. 25: Removing nuts

1. ➤ Attach bonnet to the hoist with suitable sling gear.
2. ➤ Use the hoist to safeguard the bonnet (Fig. 25/4) from falling off of the body.
3. ➤ Ensure that the bonnet (Fig. 25/4) and body cannot be lifted by the hoist.

4. ➤  **WARNING!**  
Risk of injury due to pressurised valve!

Loosen and remove the nuts (Fig. 25/1) on the bonnet (Fig. 25/4).

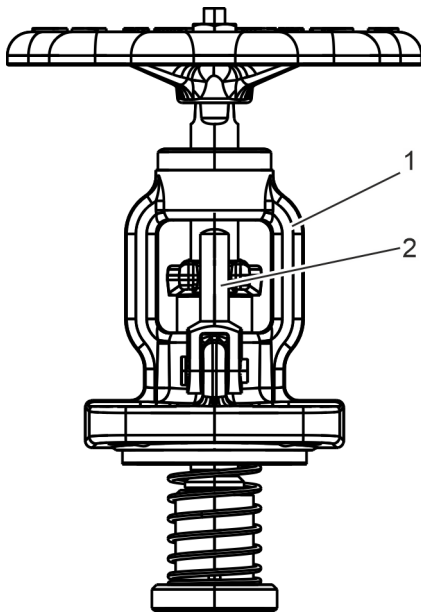


Fig. 26: Taking off the bonnet

5. ▶ Detach the complete bonnet (Fig. 26/1) including the stem (Fig. 26/2) from the body with the hoist.

### Removing the stem

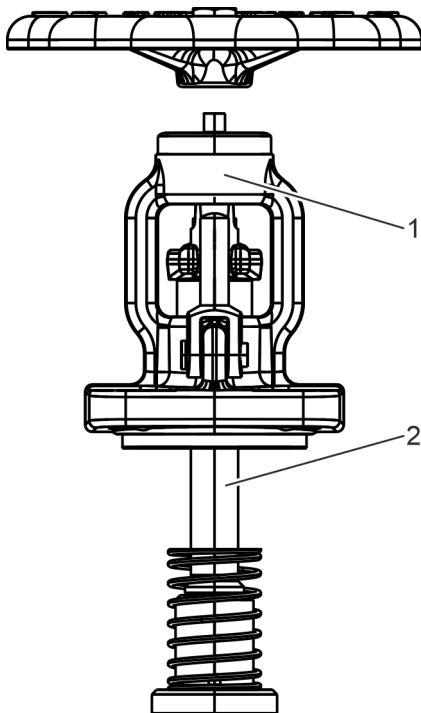


Fig. 27: Unscrewing the stem

6. ▶ Unscrew the stem (Fig. 27/2) from the threaded bush.
7. ▶ Remove the stem from the bonnet (Fig. 27/1).
8. ▶ Pull the check valve disk off the stem with the pressure spring if necessary.
9. ▶ Check the stem, check valve disk and pressure spring for wear.
10. ▶ If necessary replace the old components with new ones or have them machined by a specialised external company.
11. ▶ Put the check valve disk and, if necessary, the pressure spring, on the stem.

12. ▶



**Pay attention to the left-hand thread.**

Guide the stem through the bonnet and screw it into the threaded bush on the handwheel.

13. ▶ If there is an anti-twist device: Mount the anti-twist device in the stem.
14. ▶ Move the shut-off element into the OPEN position.
15. ▶ Fasten the bonnet to the hoist with suitable sling gear.
16. ▶ Lift the bonnet above the body.

17.▶

**NOTICE!**  
Risk of material damage due to careless lowering of the check valve disk into the body!

Insert the check valve disk into the body.

18.▶ Fit the bonnet (Fig. 28/1) onto the stud bolts on the body (Fig. 28/2).

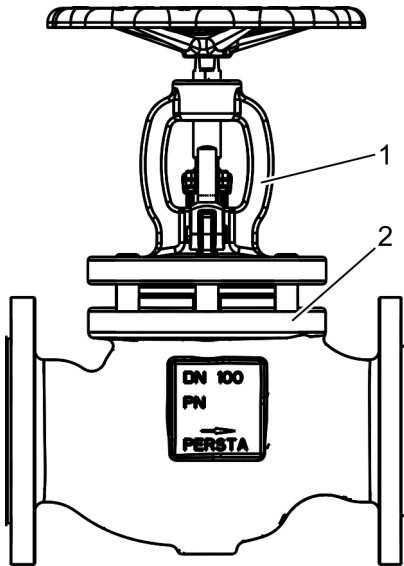


Fig. 28: Fitting the bonnet

19.▶ Loosely screw the nuts (Fig. 29/1) with the stud bolts into the body.

20.▶

**WARNING!**  
Risk of injury due to incorrect tightening torques!

Tighten the nuts (Fig. 29/1) on the bonnet (Fig. 29/4) cross-wise as specified by the manufacturer.

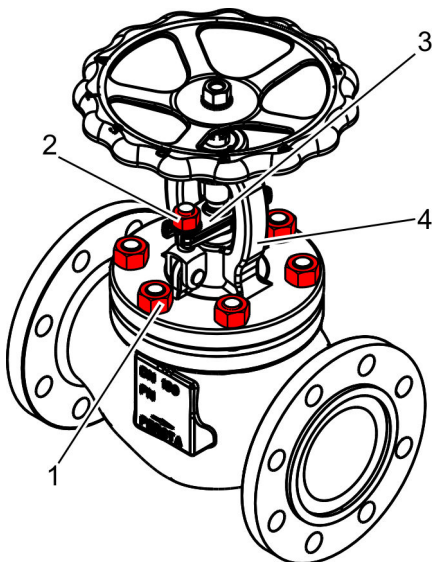


Fig. 29: Screwing on nuts

## 8.4 After maintenance

### Perform final check

Personnel: ■ Industrial mechanic (for valves within the normal pressure range)

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

Requirement:

- The maintenance tasks have been completed.
- 1. ▶ Apply the permissible test pressure to the valve.
- 2. ▶ Make sure that the valve does not leak.
- 3. ▶ If necessary, recheck tightening torques in accordance with the manufacturer's specifications.
- 4. ▶ Retighten the nuts hand tight.
- 5. ▶ Carry out the work for initial start-up (☞ *Chapter 6 "Initial start-up" on page 47*).



## 9 Faults and troubleshooting

### 9.1 Safety instructions for fault correction

#### Improperly executed fault correction tasks

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

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

- For faults that require intervention, only correct them after you have ensured that
  - the system area in question is secured
  - the valve is depressurised
  - the valve has cooled-down/warmed-up to ambient temperature.
- If in doubt, obtain the assistance of experienced persons or contact Stahl-Armaturen PERSTA GmbH Customer Service.
- Comply with the following before restarting the system:
  - Ensure that all fault correction tasks have been properly performed and concluded in accordance with the instructions in this manual.
  - Ensure that no persons are in the danger zone.
  - Ensure that all covers and safety systems are installed correctly and that they function properly.

#### Safeguard against restart

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

The unauthorised reactivation of the energy supply while faults are identified and rectified poses a risk of severe or fatal injuries for persons in the danger zone.

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

### Electric current

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

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

- Before dismantling begins, switch off the power supply and disconnect it completely.
- Only have qualified electricians perform work on electrical lines and components.

### Air under high pressure

**WARNING!****Verletzungsgefahr durch pneumatische Energien!**

Pneumatisch angetriebene Bauteile der Armatur sowie das auslösende Überdruckventil können schwerste Verletzungen verursachen.

- Arbeiten an der pneumatischen Anlage nur durch Pneumatikfachkräfte ausführen lassen.
- Vor Beginn der Arbeiten an der pneumatischen Anlage diese vollständig drucklos machen. Druckspeicher vollständig entspannen.
- Persönliche Schutzausrüstung tragen.

### Fluid under high pressure

**WARNING!****Verletzungsgefahr durch hydraulische Energien!**

Hydraulisch angetriebene Bauteile der Armatur sowie das auslösende Überdruckventil können schwerste Verletzungen verursachen.

- Arbeiten an der hydraulischen Anlage nur durch Hydraulikfachkräfte ausführen lassen.
- Vor Beginn der Arbeiten an der hydraulischen Anlage diese vollständig drucklos machen. Druckspeicher vollständig entspannen.
- Armatur frostfrei betreiben, um Sprengen des Gehäuses zu verhindern.
- Persönliche Schutzausrüstung tragen.



### Thermal dangers



#### **WARNING!**

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

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

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

### Harmful pipeline medium



#### **WARNING!**

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

Contact with the pumping medium can have health implications.

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

### Conduct in the event of dangerous faults

In general, the following applies:

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

## 9.2 Fault table

Fault description	Cause	Remedy	Personnel
Leakage of the shut-off element	Solids in the medium that have damaged the seat	Grind the seats, if necessary have damaged components replaced.	Industrial mechanic (for valves within the normal pressure range)
	Deformation of the seat surface due to an impermissibly high tension on the valve or due to thermal tension	Grind the seats, if necessary have damaged components replaced. Check actuator setting. Determine the cause of the deformation and have it rectified.	Industrial mechanic (for valves within the normal pressure range)
	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 (for valves within the normal pressure range)
	Torque switch is defective	Have the torque switch checked. Prior to readjustment consult with Stahl-Armaturen PERSTA GmbH customer service.	Qualified electrician
	Incorrect actuator setting: Shut-off element not firmly enough in the seat	Set the actuator correctly.	Industrial mechanic (for valves within the normal pressure range)
	Stem or cone is worn due to overlong use as throttling valve	Remove stem. Check the stem and cone for wear (☞ <i>Chapter 8.3.4 "Dismounting and checking the stem and check valve disk" on page 74</i> ).	Industrial mechanic (for valves within the normal pressure range)
End position not reached	Actuator setting not correct in case of electric, hydraulic or pneumatic actuator	Set the actuator correctly.	Industrial mechanic (for valves within the normal pressure range)
	Valve bearing, stem thread, lift stop or inner parts of the valve are defective	Replace the damaged parts.	Industrial mechanic (for valves within the normal pressure range)
	Stuffing box has been overtightened	Tighten the stuffing box correctly, if necessary replace the gland packing (☞ <i>Chapter 8.3.3 "Replacing the gland packing" on page 64</i> ).	Industrial mechanic (for valves within the normal pressure range)
	Moving parts insufficiently lubricated	Lubricate the moving parts (☞ <i>Chapter 8.3.2 "Lubricating the stem" on page 63</i> ).	Industrial mechanic (for valves within the normal pressure range)
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.	Industrial mechanic (for valves within the normal pressure range)

Fault description	Cause	Remedy	Personnel
Leakage of the gland packing	Insufficient maintenance	If necessary pack or repack the stuffing box ( ↪ Chapter 8.3.3 "Replacing the gland packing" on page 64).	
	Destruction of the stuffing box due to the use of a packing material without sufficient media or temperature resistance	Shut off the pipe section affected. Replace the stuffing box with a suitable packing set ( ↪ Chapter 8.3.3 "Replacing the gland packing" on page 64).	Industrial mechanic (for valves within the normal pressure range)
	Wear of the packing material	Shut off the pipe section affected. Replace the stuffing box ( ↪ Chapter 8.3.3 "Replacing the gland packing" on page 64).	Industrial mechanic (for valves within the normal pressure range)
Valve does not function	Electric actuator does not function	Check electric actuator as specified in the manufacturer's documentation.	Qualified electrician
	Hydraulic actuator does not function	Check hydraulic actuator as specified in the manufacturer's documentation.	Hydraulics Specialist
	Pneumatic actuator does not function	Check pneumatic actuator as specified in the manufacturer's documentation.	Pneumatics Specialist
Malfunction of the valve	Limit switch (for optional electric, pneumatic or hydraulic actuator) is defective	Have the limit switch checked. Prior to readjustment consult with Stahl-Armaturen PERSTA GmbH customer service.	Qualified electrician
	Torque switch (with optional electric, pneumatic or hydraulic actuator) is defective	Have the torque switch checked. Prior to readjustment consult with Stahl-Armaturen PERSTA GmbH customer service.	Qualified electrician
Jerky lifting movement	Gland packing is too tight	Readjust the gland packing. If necessary replace the gland packing ( ↪ Chapter 8.3.3 "Replacing the gland packing" on page 64).	Industrial mechanic (for valves within the normal pressure range)



## 10 Removal, disposal

### 10.1 Safety instructions for dismantling

#### Electrical system

**DANGER!****Lebensgefahr durch elektrischen Strom!**

Bei Kontakt mit spannungsführenden Bauteilen des Antriebs besteht Lebensgefahr. Eingeschaltete elektrische Bauteile können unkontrollierte Bewegungen ausführen und zu schwersten Verletzungen führen.

- Vor Beginn der Demontage die elektrische Versorgung abschalten und endgültig abtrennen.

#### Danger due to hydraulics

**WARNING!****Verletzungsgefahr durch hydraulische Energien!**

Hydraulisch angetriebene Bauteile der Armatur sowie das auslösende Überdruckventil können schwerste Verletzungen verursachen.

- Arbeiten an der hydraulischen Anlage nur durch Hydraulikfachkräfte ausführen lassen.
- Vor Beginn der Arbeiten an der hydraulischen Anlage diese vollständig drucklos machen. Druckspeicher vollständig entspannen.
- Armatur frostfrei betreiben, um Sprengen des Gehäuses zu verhindern.
- Persönliche Schutzausrüstung tragen.

#### Dangers due to pneumatics

**WARNING!****Verletzungsgefahr durch pneumatische Energien!**

Pneumatisch angetriebene Bauteile der Armatur sowie das auslösende Überdruckventil können schwerste Verletzungen verursachen.

- Arbeiten an der pneumatischen Anlage nur durch Pneumatikfachkräfte ausführen lassen.
- Vor Beginn der Arbeiten an der pneumatischen Anlage diese vollständig drucklos machen. Druckspeicher vollständig entspannen.
- Persönliche Schutzausrüstung tragen.

### Improper dismantling

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

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

- Before work begins, ensure that there is sufficient free space.
- Handle open, sharp-edged components carefully.
- Make sure that the working area is clean and tidy! Loosely stacked components or components and tools that are lying about may cause accidents.
- Dismantle components properly. Pay attention to the high dead weight of some of the components. If necessary, use hoists.
- Secure the components so that they do not fall down or fall over.
- If anything is unclear, consult Stahl-Armaturen PERSTA GmbH customer service

### Heavy weight

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

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

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

**Suspended loads**

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

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

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

**10.2 Dismantling**

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

**Requirements:**

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

4. ➤ Use a suitable hoist to remove the valve from the pipe and set it down so that it is secured against falling over.
5. ➤ Clean the assemblies and components as required, and take them apart.

In doing so, comply with local occupational health and safety regulations.

### 10.3 Entsorgung

Sofern keine Rücknahme- oder Entsorgungsvereinbarung getroffen wurde, zerlegte Bestandteile der Wiederverwertung zuführen:

- Metalle verschrotten.
- Kunststoffelemente zum Recycling geben.
- Übrige Komponenten nach Materialbeschaffenheit sortiert entsorgen.



#### **NOTICE!**

#### **Gefahr für die Umwelt durch falsche Entsorgung!**

Durch falsche Entsorgung können Gefahren für die Umwelt entstehen.

- Elektroschrott, Elektronikkomponenten, Schmier- und andere Hilfsstoffe von zugelassenen Fachbetrieben entsorgen lassen.
- Im Zweifel Auskunft zur umweltgerechten Entsorgung bei der örtlichen Kommunalbehörde oder speziellen Entsorgungsfachbetrieben einholen.



## 11 Technische Daten



*Technische Daten dem Lieferumfang der Armatur entnehmen.*



## 12 Index

### A

Abmessungen . . . . .	89
Abrasion . . . . .	63
Actuator . . . . .	32
Electric . . . . .	33
Hydraulic . . . . .	33
Manual . . . . .	32
Pneumatic . . . . .	33
Actuator variants . . . . .	32
Angle pattern valve . . . . .	34
Anti-twist device . . . . .	64
Anzugsmomente . . . . .	89

### B

Behaviour in the event of an emergency . . . . .	54
Bonnet . . . . .	64
Brief description . . . . .	7
Butt-weld valve . . . . .	34

### C

Chamber ring . . . . .	31
Check valve disk . . . . .	32
checking . . . . .	74
removing . . . . .	74
Checking for leaks . . . . .	63
Closing process . . . . .	14
Conclude maintenance . . . . .	77
Corrosion . . . . .	82

### D

Dismantling . . . . .	87
-----------------------	----

### E

Electric actuator . . . . .	33
Connecting . . . . .	42
operating in an emergency . . . . .	55
removing . . . . .	71
Emergency . . . . .	20, 54
Entsorgung . . . . .	88
Environmental protection . . . . .	26
Erosion . . . . .	82

### F

Fault table . . . . .	82
Flanged valve . . . . .	34
Flow direction . . . . .	13
Forklift . . . . .	8
Freezing temperatures can shatter pipes . . . . .	18
Functional description . . . . .	29

### G

Gewichte . . . . .	89
Gland follower . . . . .	31
Gland follower flange . . . . .	31, 64
Gland packing . . . . .	31
Leaks . . . . .	82
Life loaded packing . . . . .	31
replacing . . . . .	64

### H

Handwheel . . . . .	32, 53
Heating times / cooling times . . . . .	50
Hoist . . . . .	8
Hook wrench . . . . .	8
Hydraulic actuator	
Connecting . . . . .	43
removing . . . . .	71
Hydraulic supply . . . . .	34
Hydrostatic pressure test . . . . .	45

### I

Inductive proximity switch . . . . .	34
Initial start-up	
Carrying out . . . . .	50
preparing . . . . .	49
Inlet side . . . . .	29
Intended use . . . . .	11
Intervals for maintenance tasks . . . . .	62

### K

Knock-out tool . . . . .	8
--------------------------	---

<b>L</b>			
Leak test	45	Preparing for the installation	41
Leaks	71, 82	Protective equipment	24
Life loaded packing	31	<b>R</b>	
Lift check valve	7	Rating plate	12
Limit switch	14, 34	Replacing the gland packing	71
Lubricating bearing	63	Residual risks	14
Lubricating nipple	63	<b>S</b>	
<b>M</b>		Safety signs	12
Maintenance schedule	62	Seal	31
Manual operation		Shut-off element	32
Lift check valve	53	shut-off valve	7
shut-off valve	53	Signs	12
Marking on handwheel	13	Sling gear	8
Media	8	Spare parts	25, 26
Metal cap	64	Spare parts order	26
Mount/dismount actuator	64	Special connection valve	34
<b>O</b>		Stem	29
Opening process	14	checking	74
Operating company	20	lubricating	63
Operating modes	7	removing	74
Operating principle	29	Stem thread	63
Order numbers	26	Storage	37
Outlet side	29	Symbol	12
<b>P</b>		Symbols	9
Packing compression	31	System pressure test	45
Packing extractor	8	<b>T</b>	
Packing ring	31	T-pattern	33
Personal protective equipment	24	Technische Daten	89
Personnel	22	Thermal insulation	46
Pickling	45	Thermal tensions	82
Pickling medium	45	Threaded bush	63
Pin puncher	8	Tools	8
Pneumatic actuator		Torque switch	14
Connecting	43	Training	24
removing	71	Transporting the pallet	37
Pneumatic supply	34	<b>U</b>	
Position indicator	34	Use	11
Power supply	34		

**V**

## Valve

installing . . . . .	41
Insulation . . . . .	46
operating . . . . .	53
painting . . . . .	45

Pickling . . . . .	45
Storing . . . . .	37
transporting . . . . .	36
Visual inspection . . . . .	63
Visual inspection . . . . .	63