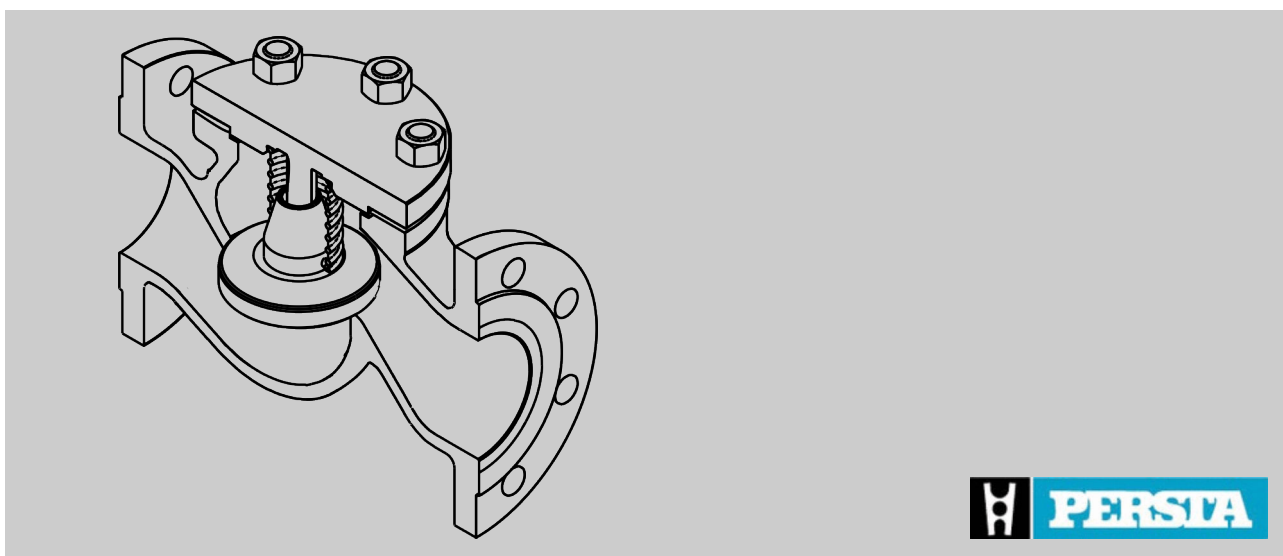


# Operating instructions

**Lift check valve**  
**240 MT**



Read the instructions prior to performing any task!

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Translation of the original operating instructions

Dok.-Nr. 6420.DE.STD.11.2016, 2, en\_GB

## Information about the operating instructions

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

These instructions are an integral part of the valve and must be kept in the vicinity of the valve so that they are available to the personnel at all times.

The personnel must have carefully read and understood these instructions before commencing any work. The basic prerequisite for safe work is compliance with all the specified safety and handling instructions.

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

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



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

## Scope of the document

This manual is valid for the following versions of the check lift valves:

Designation	Series	Nominal diameter (DN) [mm]	Pressure rate	Class*
Lift check valve	240 MT	10 – 200	PN 10 – 160	900

\* Assignment number in the pipe construction

## Other applicable documents

- Ignition hazard assessment GA004
- Connection diagram included in the delivery
- Hazard analysis as per the PED
- Risk analysis as per the Machinery Directive
- Technical data sheet
- Bolt tightening torques according to the website: [www.persta.com](http://www.persta.com)
- And other documents included in the delivery

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### Revision overview

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

## 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 Residual risks.....	13
	2.4.1 Basic dangers at the workplace.....	13
	2.4.2 Mechanical hazards.....	14
	2.4.3 Thermal hazards.....	15
	2.4.4 Hazards due to hazardous substances and operating materials.....	15
	2.5 Behaviour in the event of an emergency.....	17
	2.6 Responsibility of the operating company.....	17
	2.7 Personnel requirements.....	18
	2.8 Personal protective equipment.....	20
	2.9 Spare parts.....	21
	2.10 Environmental protection.....	23
<b>3</b>	<b>Functional description</b> .....	<b>25</b>
	3.1 Operating principle of the lift check valve.....	25
	3.2 External seal.....	26
	3.3 Shut-off element.....	27
	3.4 Connections.....	28
<b>4</b>	<b>Transport and storage</b> .....	<b>29</b>
	4.1 Safety notices for transport and storage.....	29
	4.2 Transport of packages.....	30
	4.3 Storage of the valve.....	31
	4.4 Storage of spare parts.....	31
<b>5</b>	<b>Installation</b> .....	<b>33</b>
	5.1 Safety instructions for installation.....	33
	5.2 Before the installation.....	34
	5.3 Installing the valve.....	34
	5.4 After the installation.....	35
	5.4.1 Pickling the valve.....	36
	5.4.2 Painting the valve.....	36
	5.4.3 Executing the system pressure test and leak test... 36	
	5.4.4 Applying thermal insulation.....	37
<b>6</b>	<b>Initial start-up</b> .....	<b>39</b>
	6.1 Safety instructions for initial start-up.....	39
	6.2 Prior to commissioning.....	41
	6.3 Carrying out initial start-up.....	41
<b>7</b>	<b>Maintenance</b> .....	<b>43</b>
	7.1 Safety instructions for maintenance.....	43

	7.2 Maintenance schedule.....	46
	7.3 Visually check the valve.....	47
	7.4 Replace the gasket ring.....	48
<b>8</b>	<b>Faults and troubleshooting.....</b>	<b>51</b>
	8.1 Safety notices for fault correction.....	51
	8.2 Fault table.....	53
<b>9</b>	<b>Removal, disposal.....</b>	<b>55</b>
	9.1 Safety instructions for dismantling.....	55
	9.2 Removal.....	57
	9.3 Disposal.....	58
<b>10</b>	<b>Index.....</b>	<b>59</b>

# 1 Overview

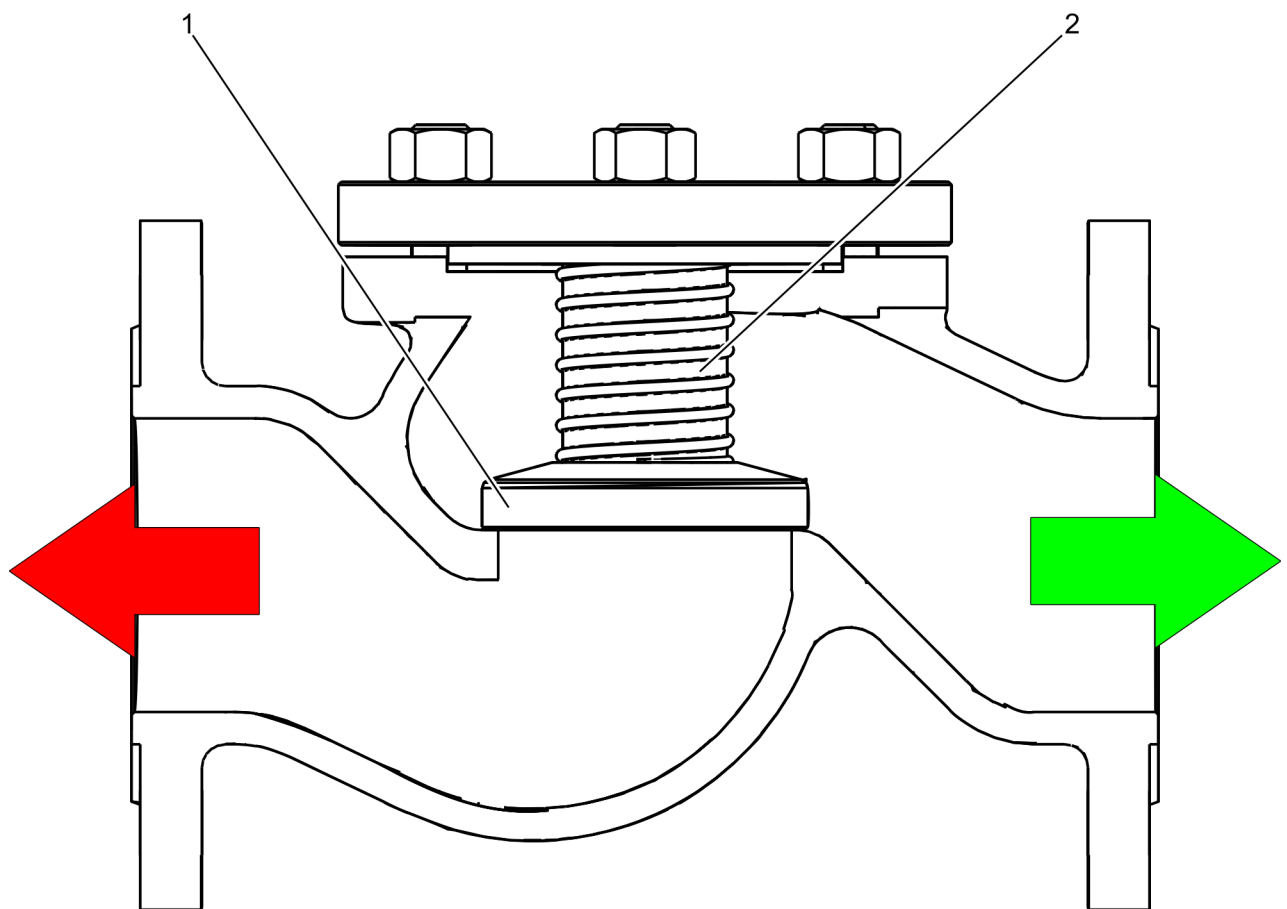


Fig. 1: Lift check valve 240 MT

## Brief description of the lift check valve

The valve designated as a lift check valve is designed for installation in pipes.

The lift check valve ensures that the medium can flow in only one direction (Fig. 1/➡) within the pipe.

In the other direction (Fig. 1/⬅), the check valve disk (Fig. 1/1) within the valve is pressed into its seat by the medium flowing back and by a pre-tensioned spring (Fig. 1/2), preventing any return flow.

### Tools

The following tools are required for the work described in this manual:

#### **Forklift**

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

#### **Hoist**

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

#### **Sling gear**

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



## 2 Safety

### 2.1 Symbols in this manual

#### Safety instructions

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

**DANGER!**

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

**WARNING!**

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

**CAUTION!**

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

**NOTICE!**

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


**ENVIRONMENT!**

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

#### Safety instructions in specific instructions

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

Example:

1.  Loosen the bolt.

2. 




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

Close the cover carefully.

3.  Tighten the bolt.

## Special safety instructions

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

Warning signs	Type of danger
	Warning – danger zone.





## Tips and recommendations



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

## Additional symbols

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

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

## 2.2 Intended use

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

- Operation of the valve as an open/close valve.
- 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).
- Operation of the valve with liquid or gaseous media, without particular corrosive, chemical or abrasive impact.
- Temperature change speeds not exceeding 6 K/min (6 °C/min).
- No more than 1000 load cycles between the depressurised state and the maximum permissible pressure PS.
- Any number of load cycles at pressure fluctuations of up to 10 % of the maximum permissible pressure PS.
- Generally used flow rates depending on the type of medium and the application for which the valve is used.
- Operation of the valve without additional external influences, such as pipe forces, vibrations, wind loads, earthquakes, corrosive environments, fires, traffic loads, decomposition pressures of unstable fluids.
- Operation of the valve only within the limits specified on the rating 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.

## Misuse



### WARNING!

#### Danger in the event of misuse!

Misuse of the valve can cause dangerous situations.

- Connect the pipes so that they are free of tension.
- Observe the correct installation position of the valve (correct flow direction, ↺ “Flow direction arrow” on page 13).
- Do not exceed the number of permitted load cycles (↺ Chapter 2.2 “Intended use” on page 11).
- Do not use valves as an anchor point.
- Never operate valves at temperatures near or below the freezing point of the pipeline medium.

## 2.3 Safety signs

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



### WARNING!

#### Danger if signs are illegible!

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

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

## Rating plate

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

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

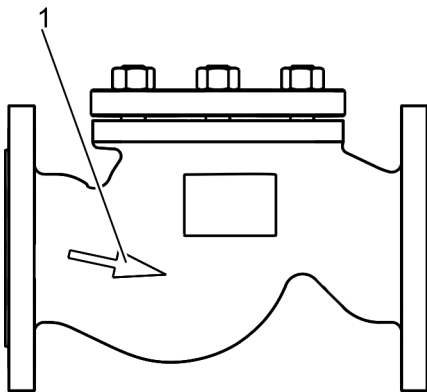
**Flow direction arrow**


Fig. 2: Flow direction arrow

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

A pipeline medium flowing in the arrow direction opens the lift check valve and flows through the valve.

**Customer-specific markings**

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

## 2.4 Residual risks

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

### 2.4.1 Basic dangers at the workplace

**Hazardous areas**

**DANGER!**

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

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

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

## Trip hazard



### CAUTION!

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

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

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

## 2.4.2 Mechanical hazards

### Heavy weight of the valve



### WARNING!

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

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

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

### Spring elements



### WARNING!

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

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

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

### 2.4.3 Thermal hazards

#### Thermal dangers

**WARNING!****Risk of injury due to high or low temperatures!**

Depending on the application for which the valve or pipe is used, injuries may occur due to the high or low temperature of the components.

- When working on components or using adjusting equipment, wear protective equipment: Protective gloves, safety goggles.
- Before working on these components, allow them to cool down or warm up to the ambient temperature.
- Have thermal insulation attached by the operating company.

#### 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.

### 2.4.4 Hazards due to hazardous substances and operating materials

#### Pipeline medium

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

Depending on the version of the valve, injuries can be caused by the medium escaping under pressure, irrespective of whether the system is in operation or not.

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



### **WARNING!**

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

Contact with the pumping medium can have health implications.

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

## Pickling medium



### **WARNING!**

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

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

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

## Anticorrosive



### **WARNING!**

#### **Anticorrosive is a health hazard!**

Direct contact with the anticorrosive used can have health implications.

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



## 2.5 Behaviour in the event of an emergency

1. ➤ Shut off the pipe sections affected.
2. ➤ Comply with the plant regulations.

## 2.6 Responsibility of the operating company

### Operating company

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

### Obligations of the operating company

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

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

In this regard, the following applies in particular:

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

- The operating company must provide the required protective equipment for the personnel and instruct the personnel that wearing the required protective equipment is compulsory.
- The operating company must install additional protective devices around the valve if contact with the valve can result in injuries due to the medium in the pipe system.

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

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

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

## 2.7 Personnel requirements



### **WARNING!**

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

If unqualified personnel work on the valve or remain in the danger zone of the valve, this creates hazardous situations where severe injuries and substantial damage to property may occur.

- 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 operator their skills in driving industrial trucks controlled by a sitting or standing operator and has been assigned to do this by the operator in writing.

#### **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.

**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

## 2.8 Personal protective equipment

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

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

### Description of the personal protective equipment



The personal protective equipment is described below:

#### **Chemical resistant safety gloves**

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


**Industrial hard hat**

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


**Protective gloves**

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


**Protective work clothing**

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


**Safety footwear**

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


**Safety goggles**

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

## 2.9 Spare parts

### Incorrect spare parts


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

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

- Only use genuine spare parts from Stahl-Armaturen PERSTA GmbH or spare parts approved by Stahl-Armaturen PERSTA GmbH.
- If you have any questions or if anything is unclear, do not hesitate to contact our customer service department (contact details on page 3).

### Selecting spare parts




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

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

### Before installation



#### **Storage of spare parts**

*Please see  Chapter 4.4 “Storage of spare parts” on page 31 for information on storing spare parts.*

### Ordering spare parts

Order spare parts from Stahl-Armaturen PERSTA GmbH.

Provide the following information:

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

Contact details, see p. 3.

## 2.10 Environmental protection



### **ENVIRONMENT!**

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

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

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

### **Substances used**

**The following substances harmful to the environment occur during handling of the valve:**

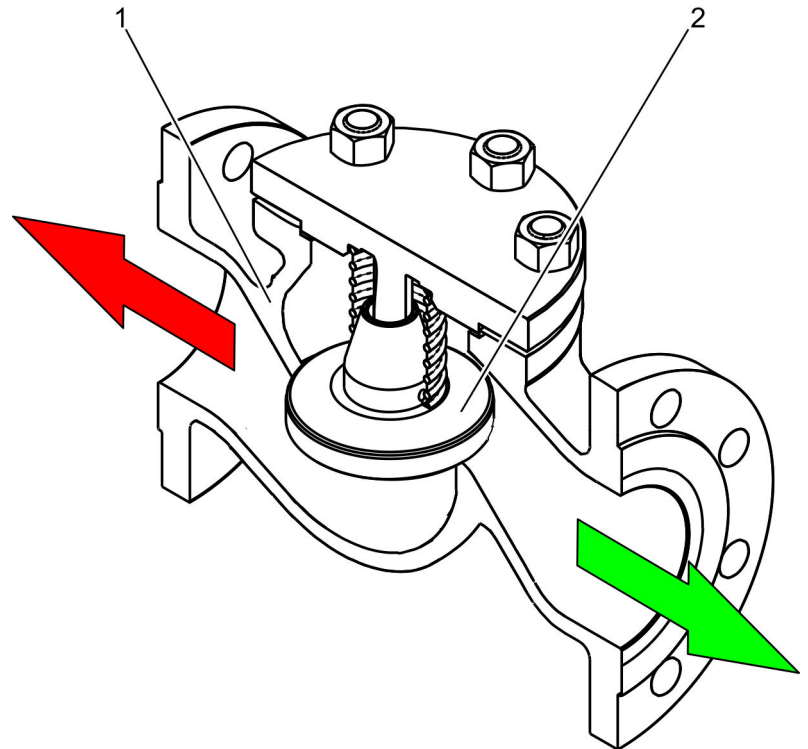
- Residue of the pipeline medium
- Pickling medium
- Anticorrosive







### 3 Functional description


#### 3.1 Operating principle of the lift check valve




*Fig. 3: Sectional view - lift check valve*

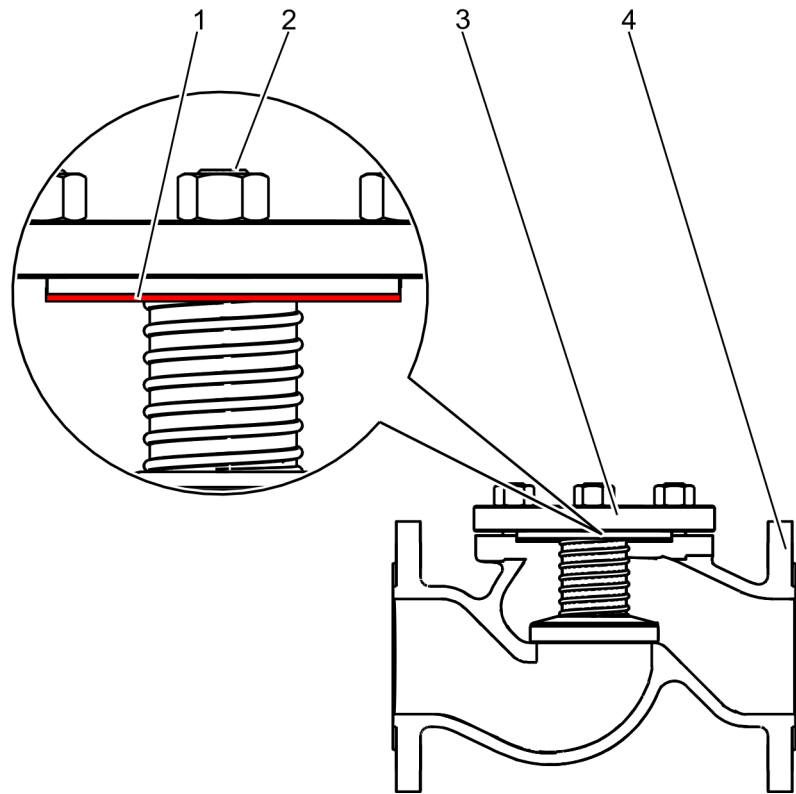
-  Flow direction
-  Return flow direction blocked

In the body (Fig. 3/1) a check valve disk (Fig. 3/2) separates the inlet from the outlet side of the valve.

As soon as medium enters the valve in the flow direction () and under sufficient high pressure, it pushes the check valve disk upward and medium flows through the body.

When the flow direction of the pipeline medium is reversed () the check valve disk closes the valve.

### 3.2 External seal



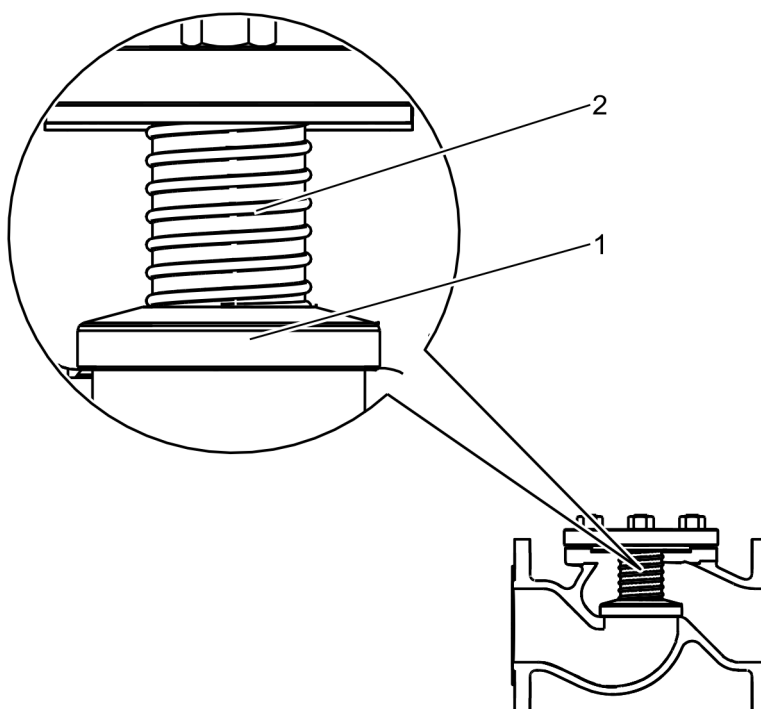
*Fig. 4: External seal*

The gasket ring (Fig. 4/1) seals the body (Fig. 4/4) against the environment.

The required sealing force is generated by the tension of the stud bolts (Fig. 4/2) in the body.

This tension is transmitted via the check valve cover (Fig. 4/3) to the underlying gasket ring (Fig. 4/1).

### 3.3 Shut-off element



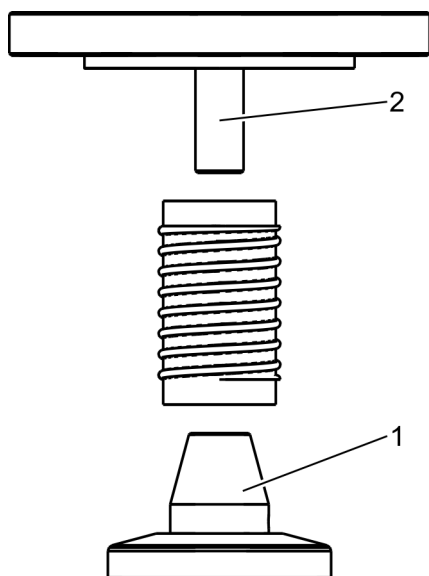
*Fig. 5: Shut-off element*

The entire shut-off element consists of the following components:

- Check valve disk (Fig. 5/1)
- Pressure spring (Fig. 5/2)

At the top end the check valve disk (Fig. 6/1) is guided through the guide bush (Fig. 6/2) of the check valve cover.

The pre-tension of the pressure spring (Fig. 5/2) causes the check valve disk to be pressed into its seat in normal condition (no medium in the pipe, or pressure of the medium too low), separating the valve's inlet side from its outlet side.



*Fig. 6: Guide bush*

### 3.4 Connections

#### Connection in the pipe

Depending on the version, the lift check valve can be mounted in the pipe as

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

## 4 Transport and storage

### 4.1 Safety notices 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.
- Use approved and functional sling gear.
- Safeguard valves and components from falling over.

#### Suspended loads

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

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

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

#### Improper transport

**NOTICE!****Material damage due to improper transport!**

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

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

### 4.2 Transport of packages

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

#### Transporting individual valves

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

1. ▶



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

Fasten valve onto the hoist with suitable sling gear.

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

#### Transport on a pallet

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

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

### 4.3 Storage of the valve

#### Storage requirements

Store valves under the following conditions:

- Do not store them 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
- 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 through reduced service life due to incorrect storage!**

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

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





## 5 Installation

### 5.1 Safety instructions for installation

#### Faulty installation

**WARNING!****Danger due to incorrectly installed valve!**

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

- Pay attention to the flow direction for valves.
- For butt-weld valves
  - Fasten the welding counterpole on the body, if possible in the vicinity of the welding point,
  - Execute the welding and the subsequent heat treatment in compliance with the valid welding regulations,
  - Partially execute the thermal treatment.

#### Wrong tightening torques

**WARNING!****Hazard due to wrong tightening torques!**

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

- Do not undo the threaded connections on the valve.
- For maintenance work or if the threaded connections have come loose, you can find the tightening torques
  - by contacting Stahl-Armaturen PERSTA GmbH customer service (see p. 4) with reference to the serial number or
  - by referring to the manufacturer's website (see p. 3).

#### Incorrect alignment of the valve

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

An incorrect alignment can result in the entire plant malfunctioning.

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

## 5.2 Before the installation

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

1. ► Check the design parameters and material.
2. ► Remove any protective caps and preserving agents from the valve.
3. ► Pay attention to the flow direction (☞ *“Flow direction arrow” on page 13*).
4. ► Make sure that there are no objects or materials inside the valve.

## 5.3 Installing the valve

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

1. ► Prepare the respective pipe section for the installation.
2. ► Use a hoist (☞ *“Transporting individual valves” on page 30*) to bring the valve into the installation position.
3. ► Ensure that the customer-provided pipes are free of tension.
4. ► Ensure that the customer-provided pipes are free of external forces and torques.
5. ► Check butt-welding ends and flange sealing surfaces for damage and cleanliness.
6. ► Centre the connection flange.
7. ► Use connection elements and sealing elements made of permissible materials.
8. ► Depending on the type of connection, weld in or flange on valve in the correct flow direction and installation position.
9. ► Screw fasten all flange bores with connection elements using the permissible tightening torque.
10. ► Ensure the seal of the pipe and the valve.

## 5.4 After the installation

### Harmful substances

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

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

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

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

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

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

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

Direct contact with the anticorrosive used can have health implications.

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

### 5.4.1 Pickling the valve



*It is possible to pickle the valve in many ways.*

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

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

1. ▶ Properly pickle the valve.
2. ▶ Completely remove the pickling medium through rinsing.
3. ▶ Ensure that the pickling medium is completely flushed out of the dead spaces in the valve.

### 5.4.2 Painting the valve



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

*Use suitable (compatible) painting systems.*

### 5.4.3 Executing the system pressure test and leak test

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

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

#### 5.4.4 Applying thermal insulation

**Plant-specific equipment**

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

Personnel: ■ Pipeline engineer

Protective equipment: ■ Safety goggles  
■ Protective work clothing  
■ Protective gloves  
■ Safety footwear

- 1.** ➤ If necessary have the thermal insulation fitted by the operating company.
- 2.** ➤ Make sure that the check valve cover is permanently accessible and capable of being monitored.



## 6 Initial start-up

### 6.1 Safety instructions for initial start-up

#### Danger of freezing

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

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

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

#### Pipeline medium

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

Depending on the version of the valve, injuries can be caused by the medium escaping under pressure, irrespective of whether the system is in operation or not.

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

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

Contact with the pumping medium can have health implications.

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

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



#### **WARNING!**

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

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

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

### Thermal hazards



#### **WARNING!**

#### **Risk of injury due to high or low temperatures!**

Depending on the application for which the valve or pipe is used, injuries may occur due to the high or low temperature of the components.

- When working on components or using adjusting equipment, wear protective equipment: Protective gloves, safety goggles.
- Before working on these components, allow them to cool down or warm up to the ambient temperature.
- Have thermal insulation attached by the operating company.

### Faulty alignment of the valve



#### **NOTICE!**

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

An incorrect alignment can result in the entire plant malfunctioning.

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



## 6.2 Prior to commissioning

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

➔ Ensure that the overall system is released for operation.

## 6.3 Carrying out initial start-up

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

Requirement:

- The entire plant has been approved for operation.

1. ➔



**WARNING!**

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

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

2. ➔ Examine the check valve cover for leaks.

3. ➔ Check the pipe connection flanges for leaks.

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

## Initial start-up



Carrying out initial start-up

## 7 Maintenance

### 7.1 Safety instructions for maintenance

#### Improperly executed maintenance tasks


**WARNING!**
**Risk of injury due to improperly executed maintenance tasks!**

Improper maintenance can cause severe injuries and significant damage to property.

- Before starting the 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 systems for the valve are reliably sealed.
- Ensure that the working area is clean and tidy! Loosely stacked components or components and tools that are lying about may cause accidents.
- Comply with the following before restarting the system:
  - Ensure that all maintenance tasks have been properly performed and completed in accordance with the instructions in this manual.
  - Ensure that no persons are in the danger zone.
  - Ensure that all covers and safety devices are installed correctly and that they are working properly.

#### Pipeline medium


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

Depending on the version of the valve, injuries can be caused by the medium escaping under pressure, irrespective of whether the system is in operation or not.

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



**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.

### 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.

### Spring elements



**WARNING!**

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

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

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

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

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

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

**Thermal hazards****WARNING!****Risk of injury due to high or low temperatures!**

Depending on the application for which the valve or pipe is used, injuries may occur due to the high or low temperature of the components.

- When working on components or using adjusting equipment, wear protective equipment: Protective gloves, safety goggles.
- Before working on these components, allow them to cool down or warm up to the ambient temperature.
- Have thermal insulation attached by the operating company.

**Wrong tightening torques****WARNING!****Hazard due to wrong tightening torques!**

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

- Do not undo the threaded connections on the valve.
- For maintenance work or if the threaded connections have come loose, you can find the tightening torques
  - by contacting Stahl-Armaturen PERSTA GmbH customer service (see p. 4) with reference to the serial number or
  - by referring to the manufacturer's website (see p. 3).

### Incorrect spare parts



#### **WARNING!**

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

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

- Only use original spare parts from Stahl-Armaturen PERSTA GmbH or spare parts approved by Stahl-Armaturen PERSTA GmbH (☞ “Ordering spare parts” on page 22).
- If in doubt, contact Stahl-Armaturen PERSTA GmbH customer service (contact details on p. 4).



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

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

### Damage to sealing surfaces and slide faces



#### **NOTICE!**

##### **Risk of damage to sealing surfaces and slide faces due to metallic processing!**

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

- Sealing surfaces and slide faces of gaskets must not be
  - scratched with scrapers,
  - brushed with wire brushes.
- Sealing surfaces and slide faces must be
  - dressed using a fine emery cloth,
  - machined with suitable grinding tools or
  - scraped off with plastic or wooden tools.

## 7.2 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. Contact Stahl-Armaturen PERSTA GmbH customer service (contact details on p. 3) if you have any questions concerning maintenance work and intervals.

Interval	Maintenance work	Personnel
Depending on frequency of operation, operating and ambient conditions/ specified by the operating company	Check the valve visually for leaks (☞ <i>Chapter 7.3 “Visually check the valve” on page 47</i> )	Trained person (operator)
Depending on duration of use, operating and ambient conditions	Replace the gasket ring (☞ <i>Chapter 7.4 “Replace the gasket ring” on page 48</i> )	Industrial mechanic (for valves within the normal pressure range)

### 7.3 Visually check the valve

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

**1.** ➤ Check the cover for leaks.

**2.** ➤ Check the pipe connection flanges for leaks.

## 7.4 Replace the gasket ring

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

Requirements:

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

1. ➤ Evenly unscrew the nuts on the check valve cover (Fig. 7/1).
2. ➤ Remove nuts.

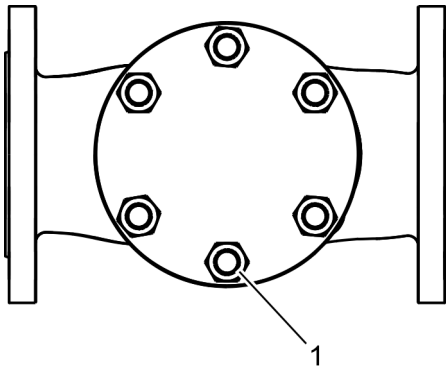


Fig. 7: Unscrew nuts (number of nuts/stud bolts can vary)

3. ➤ **WARNING!**  
Danger of injury due to de-tensioning of pressure springs!

Depending on the version of the valve, carefully lift the return valve cover (Fig. 8/2) and its shut-off element (Fig. 8/1) up off the stud bolts together with a second person.

4. ➤ Check components for damage, replace if necessary.

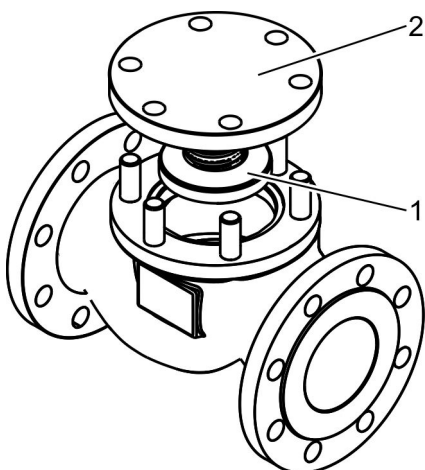


Fig. 8: Removing the shut-off element



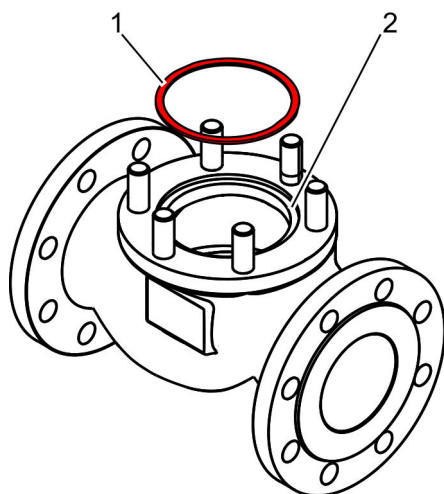


Fig. 9: Removing the gasket ring

5. ➔ Remove the gasket ring (Fig. 9/1) from the groove (Fig. 9/2) in the body.

6. ➔ Completely remove the residues of the gasket ring.

7. ➔



**NOTICE!**

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

Make sure that all contact surfaces are metallically bright and undamaged.

8. ➔ Insert the new gasket ring (Fig. 9/1) into the groove (Fig. 9/2) in the body.

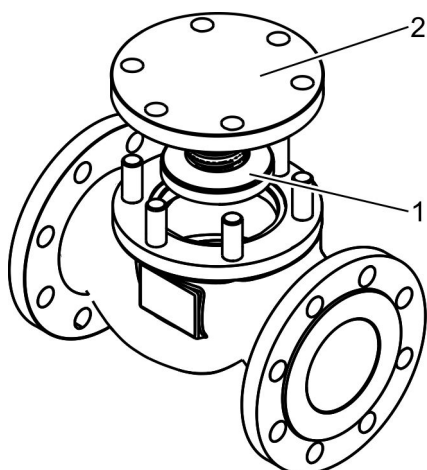


Fig. 10: Inserting the shut-off element

9. ➔ Depending on the version of the valve, carefully lift the return valve cover (Fig. 10/2) and its shut-off element (Fig. 10/1) onto the stud bolts of the body with the help of a second person.

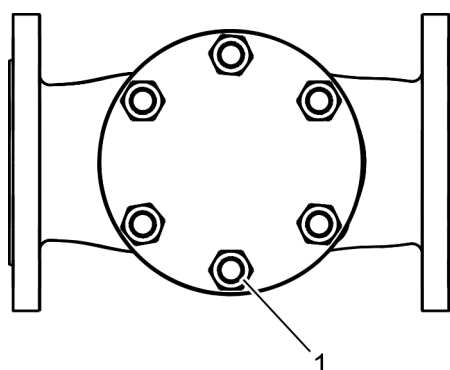


Fig. 11: Tightening nuts in a cross pattern (number of nuts/stud bolts can vary)

10. ➔ Screw nuts (Fig. 11/1) loosely onto the stud bolts of the body.

11. ➔



**WARNING!**

**Hazard due to wrong tightening torques!**

Tighten the nuts (Fig. 11/1) crosswise with the prescribed tightening torque.

12. ➔ Carry out the work for initial start-up (☞ Chapter 6.3 “Carrying out initial start-up” on page 41).

Replace the gasket ring

## 8 Faults and troubleshooting

### 8.1 Safety notices 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, consult experienced persons or Stahl-Armaturen PERSTA GmbH customer service (contact details on p. 4).
- Comply with the following before restarting the system:
  - Ensure that all fault correction tasks have been properly performed and concluded in accordance with the instructions in this manual.
  - Ensure that nobody is in the danger zone.
  - Ensure that all covers and safety systems are installed correctly and that they function properly.

#### Thermal dangers

**WARNING!****Risk of injury due to high or low temperatures!**

Depending on the application for which the valve or pipe is used, injuries may occur due to the high or low temperature of the components.

- When working on components or using adjusting equipment, wear protective equipment: Protective gloves, safety goggles.
- Before working on these components, allow them to cool down or warm up to the ambient temperature.
- Have thermal insulation attached by the operating company.

### Pipeline medium



#### **WARNING!**

#### **Risk of injury due to pressurised pumped medium!**

Depending on the version of the valve, injuries can be caused by the medium escaping under pressure, irrespective of whether the system is in operation or not.

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



#### **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.

## 8.2 Fault table

Fault description	Cause	Remedy	Personnel
Leakage of the check valve cover	Sealing gasket is defective	Replace the gasket ring (↪ <i>Chapter 7.4 "Replace the gasket ring" on page 48</i> ).	Industrial mechanic (for valves within the normal pressure range)
Leakage of the shut-off device	Solid matter in the medium that has damaged the seat	Grind the seats, have damaged components replaced if necessary.	Industrial mechanic (for valves within the normal pressure range)
	Deformation of the seat surface through thermal tensions	Grind the seats, have damaged components replaced if necessary. 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 the wrong selection of nominal valve width or valve material	Have the design of the valve checked.	Industrial mechanic (for valves within the normal pressure range)

Fault table

## 9 Removal, disposal

### 9.1 Safety instructions for dismantling

#### 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 starting work, ensure that there is sufficient free space.
- Handle exposed, 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 can cause accidents.
- Dismantle components properly. Pay attention to the high dead weight of some of the components. If necessary, use hoists.
- Secure the components so that they do not fall down or fall over.
- If in doubt, consult Stahl-Armaturen PERSTA GmbH customer service (contact details on p. 4).

#### 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.
- 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.

### Pipeline medium



#### **WARNING!**

##### **Risk of injury due to pressurised pumped medium!**

Depending on the version of the valve, injuries can be caused by the medium escaping under pressure, irrespective of whether the system is in operation or not.

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



#### **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.



## Spring elements


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

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

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

## 9.2 Removal

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 (operator)</li> <li>■ Trained person (hoist)</li> <li>■ Disposal contractor</li> </ul>
Protective equipment:	<ul style="list-style-type: none"> <li>■ Industrial hard hat</li> <li>■ Safety goggles</li> <li>■ Protective work clothing</li> <li>■ Protective gloves</li> <li>■ Safety footwear</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.

- 1.** ➤ Hold the valve in position with a suitable hoist (☞ *“Transporting individual valves” on page 30*).
- 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.

### 9.3 Disposal

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

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



#### **ENVIRONMENT!**

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

Hazards for the environment can occur due to improper disposal.

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

## 10 Index

### B

Brief description . . . . .	7
Butt-weld valve . . . . .	28

### C

Check valve disk . . . . .	27
Connection . . . . .	28

### D

Dismantle the pressure spring . . . . .	48
Dismantle the shut-off element . . . . .	48
Disposal . . . . .	58

### E

Emergency situation . . . . .	17
Environmental protection . . . . .	23

### F

Fault table . . . . .	53
Flanged valve . . . . .	28
Flow direction . . . . .	13
Freezing temperatures can shatter pipes . .	15, 39

### G

Gasket ring . . . . .	26, 48
-----------------------	--------

### H

Heating times / cooling times . . . . .	41
Hydrostatic pressure test . . . . .	36

### I

Initial start-up	
Carrying out . . . . .	41
Installing the valve . . . . .	34
Intended use . . . . .	11

### L

Leak test . . . . .	36
Leakages . . . . .	53
Leaks	
Cover . . . . .	53

Shut-off device . . . . .	53
---------------------------	----

### M

Maintenance schedule . . . . .	46
Markings . . . . .	12
Misuse . . . . .	11

### O

Operating company . . . . .	17
Operating principle . . . . .	25
Order numbers . . . . .	22

### P

Painting the valve . . . . .	36
Personal protective equipment . . . . .	20
Personnel . . . . .	18
Pickling . . . . .	36
Pickling medium . . . . .	36
Pickling the valve . . . . .	36
Preparing for commissioning . . . . .	41
Preparing for the installation . . . . .	34
Pressure spring . . . . .	27
Protective equipment . . . . .	20

### R

Rating plate . . . . .	12
Removal . . . . .	57
Replace the gasket . . . . .	48
Residual risks . . . . .	13

### S

Safety signs . . . . .	12
Seal . . . . .	26
Shut-off element . . . . .	27
Signs . . . . .	12
Spare parts . . . . .	21, 22, 46
Spare parts order . . . . .	22
Special connection valve . . . . .	28
Storage . . . . .	31

<b>Symbols</b>	
in the manual . . . . .	9
On the valve . . . . .	13
System pressure test . . . . .	36
<b>T</b>	
Tools . . . . .	8
Training . . . . .	20
Transporting a pallet . . . . .	30
<b>U</b>	
Use . . . . .	11
<b>V</b>	
Valve	
insulation . . . . .	37
Storing . . . . .	31
transport . . . . .	30
Visual inspection . . . . .	47