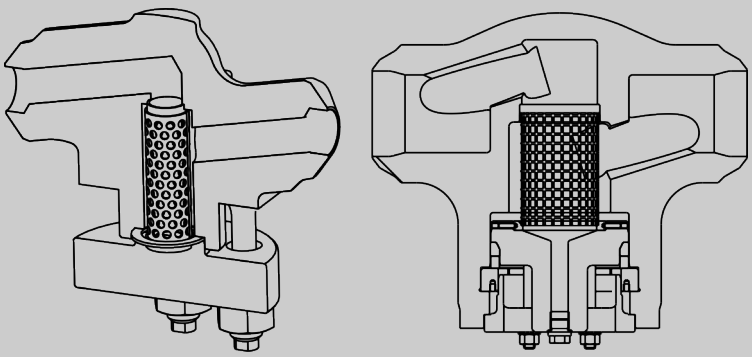
# Operating instructions

## High pressure strainer
## 990 ST/990 SF



Read the instructions prior to performing any task!

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

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

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

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

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

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

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

**Scope of the document**

This manual applies to the following versions of the series 990 ST/990 SF of the high pressure strainer:

| Designation | Series | Nominal diameter (DN) [mm] | Pressure rate | Class* |
|---|---|---|---|---|
| High pressure strainer | 990 ST | 10–65 | PN 500 | ≤ 3200 |
| High pressure strainer | 990 SF | 80–250 | PD 25/40 | ≤ 2500 |

*Assignment number in the pipe construction

**Other applicable documents**

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

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*Tab. 1: Revision overview*

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

# Table of contents

# 1 Overview

**High pressure strainer 990 ST**

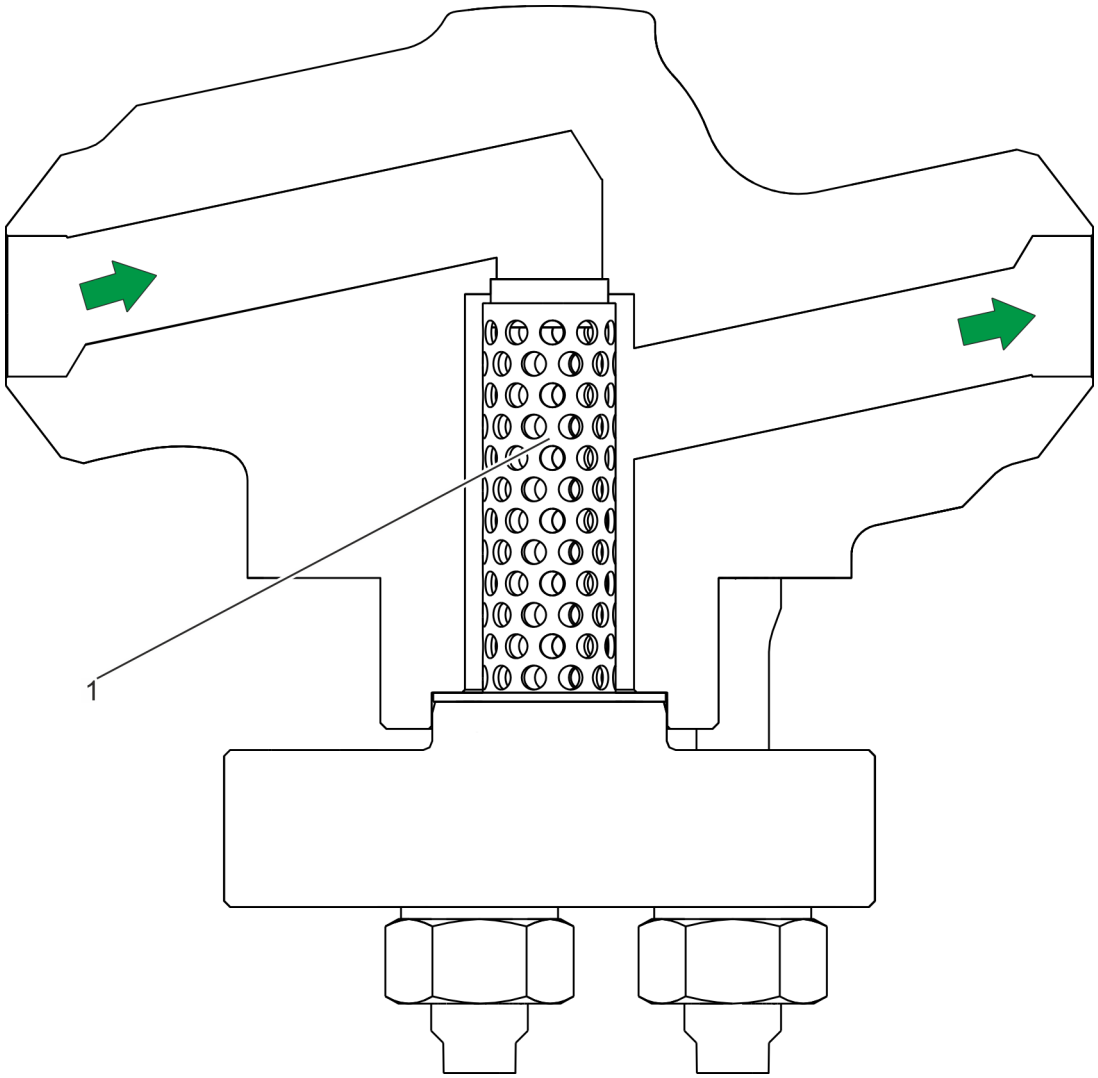



*Fig. 1: High pressure strainer 990 ST*

**High pressure strainer 990 SF**

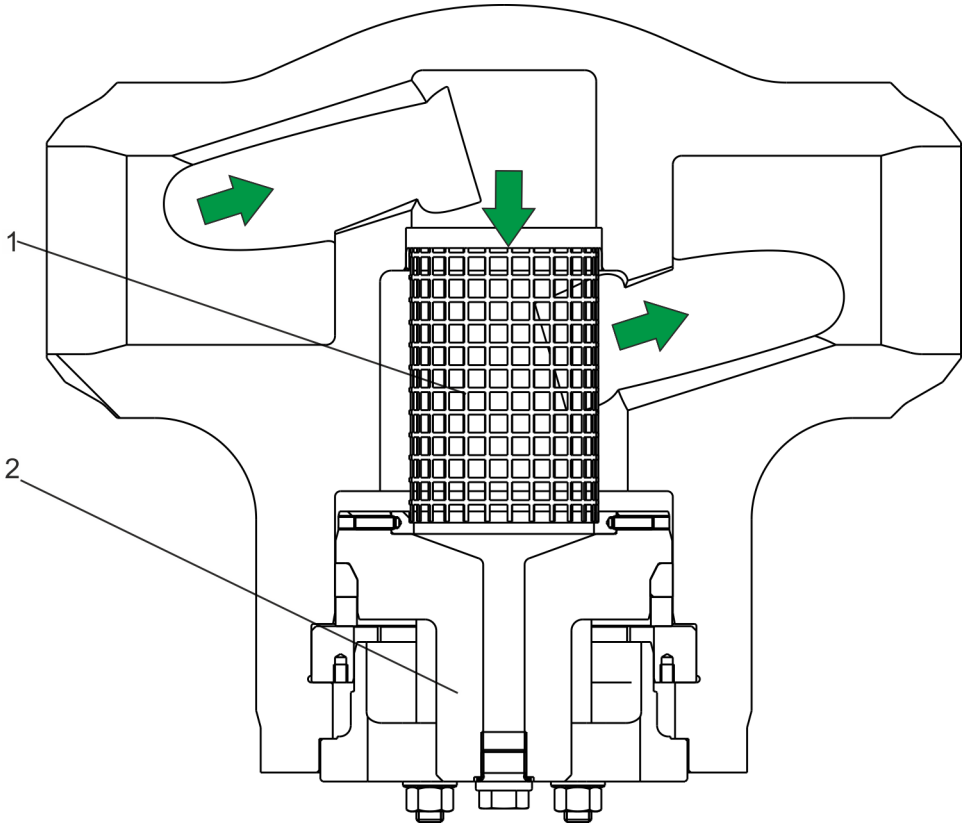



*Fig. 2: High pressure strainer 990 SF*

**Brief description - high pressure strainer**

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

By using the high pressure strainer, foreign objects in the pumping medium are retained in the screen (Fig. 1/1, Fig. 2/1).

The fineness of filtration of the screen can be increased or reduced depending on the mesh width of the screen.

Depending on its type, the high pressure strainer is supplied with a pressure sealing bonnet (Fig. 2/2).

**Tools**

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

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

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

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

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

# 2 Safety

## 2.1 Symbols in this manual

**Safety instructions**

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

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

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

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

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

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

**Safety instructions in specific instructions**

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

Example:

1. Loosen the bolt.
2. **CAUTION!**
   **Risk of getting trapped by the cover!**

   Close the cover carefully.
3. Tighten the bolt.

## Special safety instructions

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

| Warning signs | Type of danger |
|---|---|
|  | Warning – 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:

- Upright installation of the valve.
- Operation of the valve with liquid or gaseous media, without particularly corrosive, chemical or abrasive influences.
- Temperature change speeds of maximum 6 K/min (6°C/min).
- Maximum number of 1000 load cycles between a depressurised state and the maximum permissible pressure PS.
- Any number of load cycles at pressure fluctuations of up to 10 % of the maximum permissible pressure PS.
- Generally used flow rates depending on the type of medium and the application for which the valve is used.
- Operation of the valve without additional external influences, such as pipe forces, vibrations, wind loads, earthquakes, corrosive environments, fires, traffic loads, decomposition pressures of unstable fluids.
- Operation of the valve only within the limits specified on the rating plate (*“Rating plate” on page 14*).
- 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.
- Pay attention to the correct installation position of the valve.
- Do not exceed the number of permitted load cycles (↳ *Chapter 2.2 “Intended use” on page 13*).
- 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.

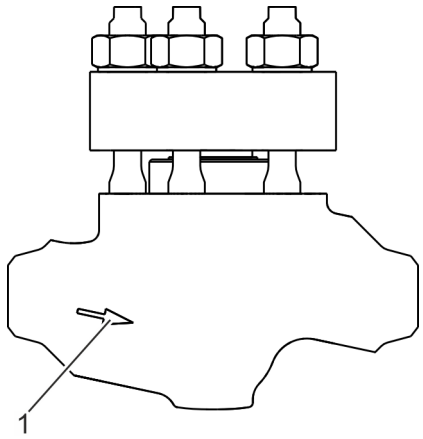
- Keep all safety, warning, and operating instructions that are affixed to the device in legible condition.
- Replace damaged signs or stickers immediately.

**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**




The flow direction is marked with an arrow on the valve (Fig. 3/1).

*Fig. 3: Flow direction arrow*

**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**

**WARNING!**

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

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

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

## 2.4.3 Thermal dangers

**Thermal dangers**

**WARNING!**

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

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

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

**Danger of freezing**

**WARNING!**

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

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

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

## 2.4.4 Hazards due to hazardous substances and operating materials

**Harmful pumping 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.

**Anticorrosive**

**WARNING!**

**Anticorrosive is a health hazard!**

Direct contact with the anticorrosive used can have health implications.

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

**Damage of sealing surfaces and slide faces**

**NOTICE!**

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

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

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

## 2.5 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 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.

## 2.7 Personnel requirements

**WARNING!**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

## Basic requirements

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

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

## Unauthorised persons

**WARNING!**

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

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

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

## Instruction

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

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

## 2.8 Personal protective equipment

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

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

**Description of the personal protective equipment**

The personal protective equipment is described below:

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

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

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

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

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

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

## 2.9 Spare parts

### Wrong spare parts

**WARNING!**

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

Using the wrong or defective spare parts may expose the personnel to the risk of injury and the plant to the risks of damage, malfunction or total failure.

- Only use original spare parts from Stahl-Armaturen PERSTA GmbH or spare parts approved by Stahl-Armaturen PERSTA GmbH.
- If you have any questions or if anything is unclear, always contact our customer service organisation (↬ *"Customer Service - Stahl-Armaturen PERSTA GmbH" on page 4*).

### 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 33 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)

(↬ *"Customer Service - Stahl-Armaturen PERSTA GmbH" on page 4*).

## 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 environmentally harmful substances are used:**

- Residue of the pipeline medium
- Pickling medium
- Anticorrosive

# 3 Functional description

## 3.1 Mode of operation of the high pressure strainer

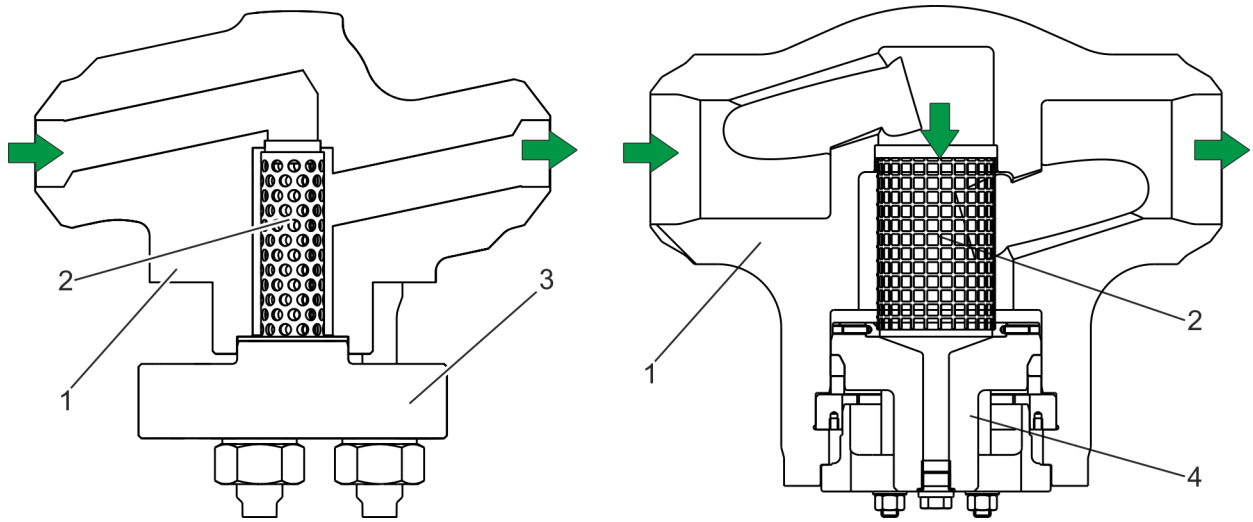



*Fig. 4: Sectional view of high pressure strainer (with pressure sealing bonnet on right)*

➡ Flow direction

In the body (Fig. 4/1) there is a replaceable screen cylinder (Fig. 4/2) between the inlet and outlet side of the valve.

As soon as medium flows through the valve in the flow direction (➡), foreign objects contained in the medium with a grain size greater than the screen mesh width, remain in the screen cylinder.

The filtering of the foreign objects can be adapted by changing the screen. To replace the screen cylinder (Fig. 4/2), the cover (Fig. 4/3) or pressure sealing bonnet (Fig. 4/4) needs to be dismounted.

## 3.2 External seals

### 3.2.1 High pressure strainer 990 ST

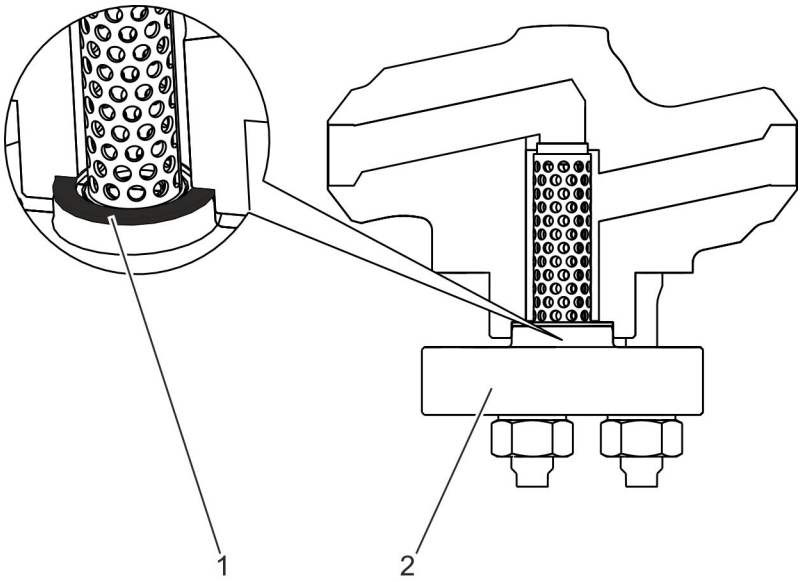



*Fig. 5: High pressure strainer 990 ST: External seals*

The body is sealed against the environment via the gasket ring (Fig. 5/1).

The required sealing force is generated by the tension of the stud bolts in the body.

This force is transmitted via the cover (Fig. 5/2) to the underlying gasket ring (Fig. 5/1).

### 3.2.2 High pressure strainer 990 SF

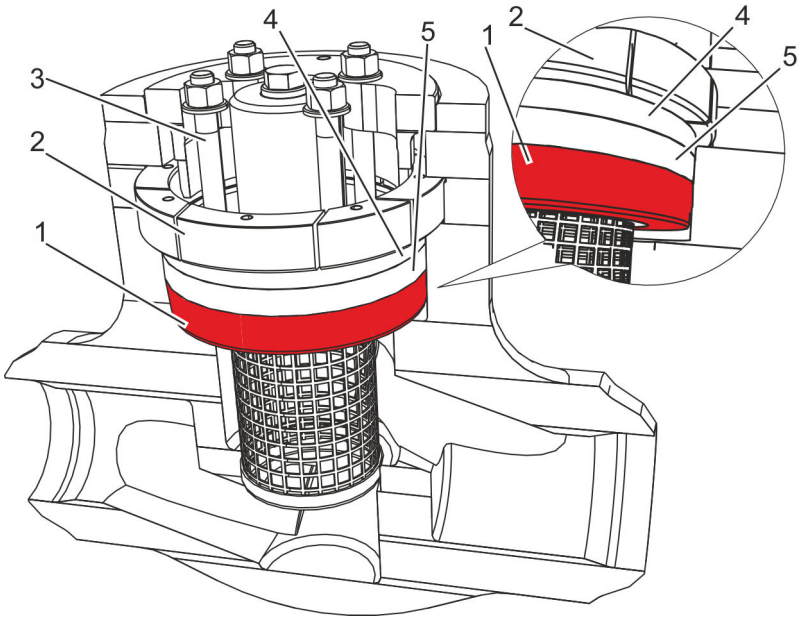



*Fig. 6: High pressure strainer 990 SF: External seals*

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

An axial force is generated through the internal pressure in the body. This axial force acts on the elastic gasket ring (Fig. 6/5) via the cover (Fig. 6/1). The elastic gasket experiences transverse deformation as a result of the axial force and seals against the body in the radial direction.

The axial force is transmitted to the segment ring (Fig. 6/2), which consists of several parts, via the support ring (Fig. 6/4). The segment ring transmits the force with positive fit to the body of the valve.

The required sealing force is not generated by the screws, rather it is generated by the internal pressure in the body. The screws (Fig. 6/3) are only used to pre-tension the sealing connection and in operation are only tightened hand tight.

## 3.3 Screen cylinder

### 3.3.1 High pressure strainer 990 ST

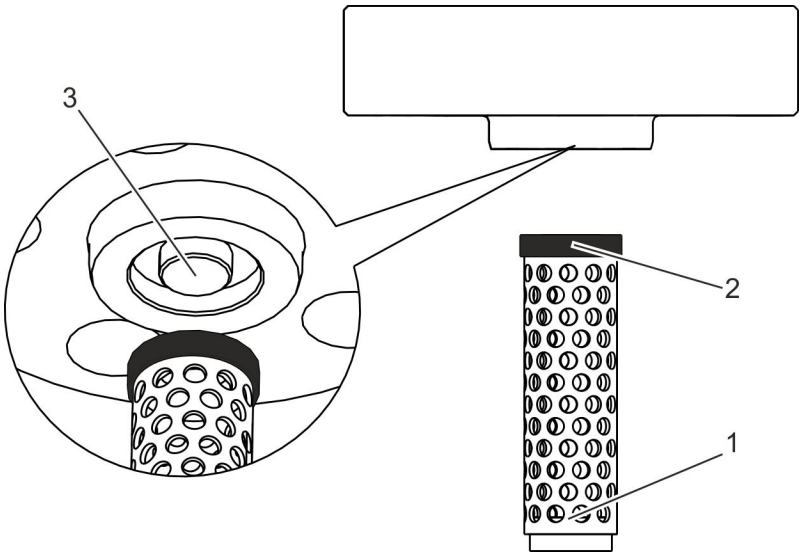



*Fig. 7: Screen cylinder*

The entire screen unit consists of

- the screen cylinder (Fig. 7/1) and
- the packing ring (Fig. 7/2).

The screen cylinder is centred in the cover (Fig. 7/3).

To seal the screen cylinder against the cover, a packing ring (Fig. 7/2) is also mounted. This prevents pumping medium from flowing through the body between cover and screen cylinder, without foreign objects being retained.

### 3.3.2 High pressure strainer 990 SF

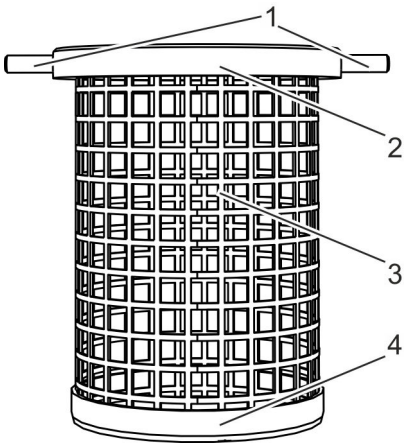



*Fig. 8: Screen cylinder (990 SF)*

The high pressure strainer 990 SF's entire screen unit consists of

- the upper centring ring (Fig. 8/2) with 2 threaded pins (Fig. 8/1),
- the screen cylinder (Fig. 8/3) and
- the lower centring ring (Fig. 8/4).

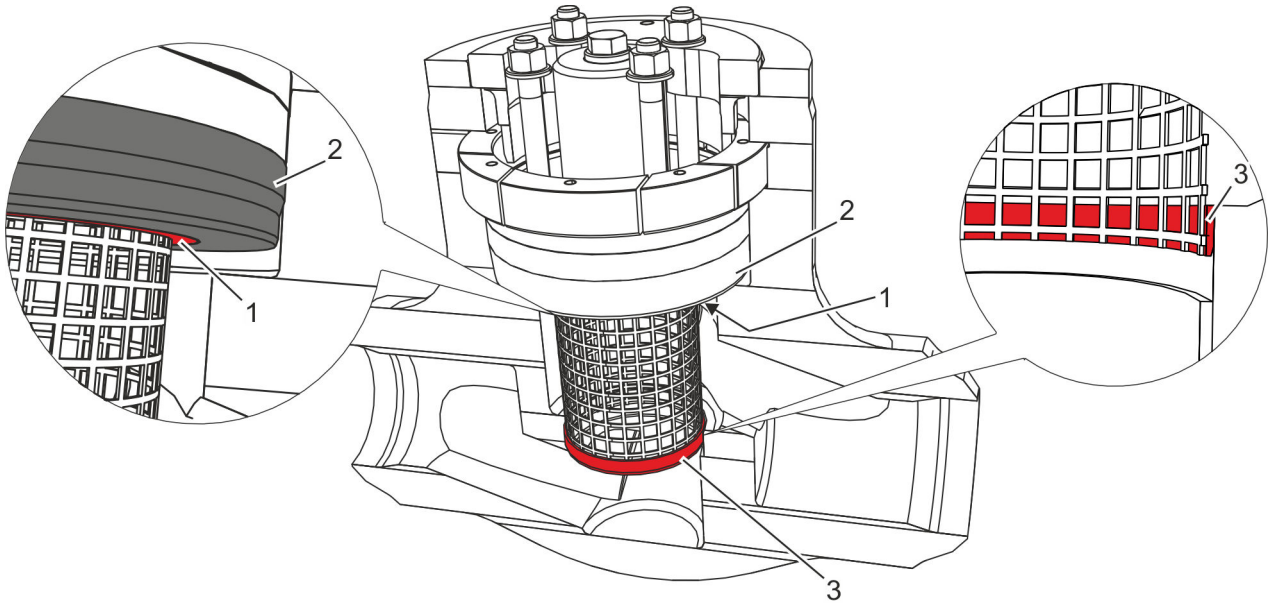



*Fig. 9: Fastening the screen cylinder (990 SF)*

The screen cylinder is bolted to the cover (Fig. 9/2) using the two threaded pins (Fig. 8/1).

The upper (Fig. 9/1) and lower centring ring (Fig. 9/3) seal the screen cylinder, thus preventing the pumped medium from flowing through the body between cover and screen cylinder without foreign objects being retained.

## 3.4 Connections

**Connection in the pipe**

Depending on the version the high pressure strainer can be mounted in the pipe, as

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

# 4 Transport and storage

## 4.1 Safety instructions for transport and storage

**Heavy weight**

**WARNING!**

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

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

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

**Suspended loads**

**WARNING!**

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

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

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

**Improper transport**

**NOTICE!**

**Material damage due to improper transport!**

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

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

## 4.2 Transport of packages

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

### Transporting individual valves

Personnel:
- Trained person (hoist)

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

Special tool:
- Sling gear
- Hoist

1. Fasten valve onto the hoist with suitable sling gear.
2. Slowly lift the valve and identify the position of the centre of gravity.
3. Transport the valve as close to the ground as possible.
4. After setting down the valve, safeguard it from falling over.

### Transport on a pallet

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

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

Special tool:
- Sling gear
- Hoist
- Forklift

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

## 4.3 Storage of the valve

### Storage of the valve

Store valves under the following conditions:

- Store valve in closed status (delivery status).
- Do not store outdoors.
- Store in a dry and dust-free location.
- Do not expose to any aggressive media.
- Protect from direct sunlight.
- Avoid mechanical vibrations.
- Storage temperature: 15–35°C.

- Relative humidity: max. 60%.
- Check the status of the protective caps attached in the factory. Replace protective caps if necessary.
- When storing for longer than 3 months, check the general condition of all parts and the packaging on a regular basis. Touch up or reapply anti-corrosion agents as needed.

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

## 4.4 Storage of spare parts

**NOTICE!**

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

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

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

Storage of spare parts

# 5 Installation

## 5.1 Safety notices for installation

**Faulty installation**

**WARNING!**

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

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

- Pay attention to the flow direction of valves.
- In respect of 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 of the threaded connections on the valve have been calculated and applied by the manufacturer. Hazards can occur due to unscrewing and subsequent tightening if the wrong tightening torques are used.

- Do not unscrew the threaded connections on the valve.
- In respect of maintenance work or if the threaded connections have become loose, obtain the tightening torques by:
  - Contacting Stahl-Armaturen PERSTA GmbH customer service (↬ *“Customer Service - Stahl-Armaturen PERSTA GmbH” on page 4*), specifying the serial number, or
  - Referring to the manufacturer’s website (address on page 2).

## 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 flow direction (*"Flow direction arrow" on page 15*).
3. Remove any protective caps and preserving agents from the valve.
4. Ensure that there are no objects or materials in the interior of the valve.

## 5.3 Installing the valve

Personnel:
- Pipeline engineer
- Trained person (hoist)

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

Special tool:
- Sling gear
- Hoist

1. Prepare the respective pipe section for the installation.
2. Use a hoist (*"Transporting individual valves" on page 32*) 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. If possible, align the valve so that contaminants can fall out of the valve when dismounting the cover.
9. Depending on the type of connection, weld or flange the valve in the correct flow direction and installation position.
10. Bolt all the flange holes together with the connection elements using the permissible tightening torque.
11. Ensure that the pipe and valve do not leak.

## 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

***System-specific equipment***

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

Personnel:
- Pipeline engineer

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

→ If necessary have the thermal insulation fitted by the operating company.

# 6 Commissioning

## 6.1 Safety notices for commissioning

**Danger of freezing**

**WARNING!**

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

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

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

**Pressurised escaping pumping medium**

**WARNING!**

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

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

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

**Harmful pumping 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 lead to impermissible deformations of the valve and reduction of the total service life.

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

### Thermal dangers

**WARNING!**

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

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

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

### Wrong tightening torques

**WARNING!**

**Hazard due to wrong tightening torques!**

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

– Do not unscrew the threaded connections on the valve.
– In respect of maintenance work or if the threaded connections have become loose, obtain the tightening torques by:
  – Contacting Stahl-Armaturen PERSTA GmbH customer service (↳ *“Customer Service - Stahl-Armaturen PERSTA GmbH” on page 4*), specifying the serial number, or
  – Referring to the manufacturer’s website (address on page 2).

**Incorrectly aligning the valve**

**NOTICE!**

**Malfunction of the valve by failing 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 15*) 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 Executing the commissioning process

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

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

Prerequisite:

- The overall system must be released for operation.

1. **WARNING!**

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

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

# 7 Maintenance

## 7.1 Safety instructions for maintenance

**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.

**Harmful pumping 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.

### Pressurised components

**WARNING!**

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

Tasks on pressurised components can result in serious injuries.

– Establish depressurised status before working on the valve.

### Heavy weight

**WARNING!**

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

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

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

### 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 tightening torques

**WARNING!**

**Hazard due to wrong tightening torques!**

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

- Do not unscrew the threaded connections on the valve.
- In respect of maintenance work or if the threaded connections have become loose, obtain the tightening torques by:
  - Contacting Stahl-Armaturen PERSTA GmbH customer service (↳ *"Customer Service - Stahl-Armaturen PERSTA GmbH" on page 4*), specifying the serial number, or
  - Referring to the manufacturer's website (address on page 2).

### Wrong spare parts

**WARNING!**

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

Using the wrong or defective spare parts may expose the personnel to the risk of injury and the plant to the risks of damage, malfunction or total failure.

- Only use original spare parts from Stahl-Armaturen PERSTA GmbH or spare parts approved by Stahl-Armaturen PERSTA GmbH.
- If you have any questions or if anything is unclear, always contact our customer service organisation (↳ *"Customer Service - Stahl-Armaturen PERSTA GmbH" on page 4*).

### Falling cover

**WARNING!**

**Danger of injury due to falling cover!**

The valve can be installed overhead. There is danger of injury when dismounting the cover.

- When dismounting, do not completely unscrew screws until the cover has been safeguarded against falling.
- Have a second person safeguard the cover from falling.
- Wear personal protective equipment: Safety footwear, hard hat.

### Screen cylinder falling out

**CAUTION!**

**Danger of injury due to the screen cylinder falling out!**

When dismounting/mounting the cover, injuries due to the screen cylinder falling out can occur.

- Carefully lift the cover.
- When lifting, safeguard the screen cylinder against falling out.
- Set the cover down with the screen cylinder pointing upward.

### Damage of sealing surfaces and slide faces

**NOTICE!**

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

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

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

### Incorrectly inserted packing ring

**NOTICE!**

**Malfunction of the valve due to incorrectly inserted packing ring!**

An incorrectly inserted packing ring cause leaks between screen cylinder and cover.

- Mount packing ring in the guide bush in the cover with the metal cap in the direction of the screen cylinder.
- Replace packing ring each time the screen cylinder is dismounted.

## 7.2 Maintenance schedule

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

If regular inspections indicate increased wear, the required maintenance intervals must be shortened appropriately in accordance with the actual indications of wear. For questions concerning maintenance tasks and intervals, contact Stahl-Armaturen PERSTA GmbH customer service (↬ *"Customer Service - Stahl-Armaturen PERSTA GmbH" on page 4*).

| Interval | Maintenance work | Personnel |
|---|---|---|
| Depending on activation frequency, operating and ambient conditions/specified by the operating company | Clean the screen cylinder (↬ *Chapter 7.3.2 "Cleaning the screen cylinder" on page 50*). | Industrial mechanic (high pressure valves) |
| | Replace the screen cylinder (↬ *Chapter 7.3.4 "Replacing the screen cylinder." on page 59*). | Industrial mechanic (high pressure valves) |
| | Check the valve visually and check for leaks (↬ *Chapter 7.3.1 "Visually checking the valve" on page 49*). | Trained person (operator) |
| Depending on duration of use, operating and ambient conditions | Replace the gasket ring (↬ *Chapter 7.3.3 "Replacing the gasket ring" on page 52*). | Industrial mechanic (high pressure valves) |
| | 990 SF:<br>Replace the gasket ring (↬ *Chapter 7.3.3.2 "Replacing the high pressure strainer 990 SF's gasket ring" on page 55*). | Industrial mechanic (high pressure valves) |

## 7.3 Maintenance tasks

### 7.3.1 Visually checking the valve

Personnel:
- Trained person (operator)

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

1. Check the cover for leaks.
2. Check the pipe connection flanges for leaks.

## 7.3.2 Cleaning the screen cylinder

### 7.3.2.1 Cleaning the high pressure strainer 990 ST's screen cylinder

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

Prerequisites:

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

1. 

**WARNING!**
**Falling cover!**

Carry out work according to *Chapter 7.3.3.1 "Replacing the high pressure strainer 990 ST's gasket ring" on page 52*, step 1–5.

⇨ In installations with the cover facing downwards, filtered material will fall out of the screen cylinder.

2. In installations with the cover facing upwards, upend the screen cylinder.

⇨ The filtered material will fall from the screen cylinder.

3. Carry out work according to *Chapter 7.3.3.1 "Replacing the high pressure strainer 990 ST's gasket ring" on page 52*, step 6–14.

### 7.3.2.2 Cleaning the high pressure strainer 990 SF's screen cylinder

**In installations with the cover facing downwards**

Personnel:
- Industrial mechanic (high pressure valves)

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

Prerequisites:
- The valve must have been cooled/heated-up to ambient temperature.
- A depressurised state must have been established.

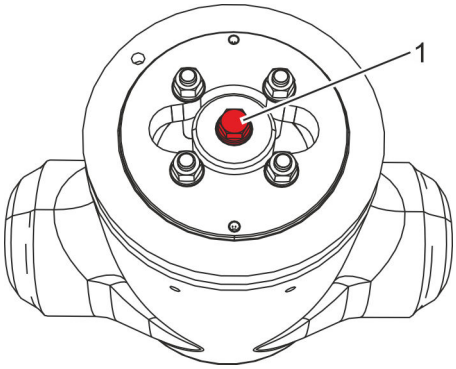



*Fig. 10: Cleaning the screen cylinder*

→ Unscrew and remove the central bolt (Fig. 10/1).

⇨ In installations with the cover facing downwards, filtered material will fall out of the body.

**In installations with the cover facing upwards**

Personnel:
- Industrial mechanic (high pressure valves)

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

Prerequisites:
- The valve must have been cooled/heated-up to ambient temperature.
- A depressurised state must have been established.

**1.** → Carry out work according to ↳ *Chapter 7.3.3.2 "Replacing the high pressure strainer 990 SF's gasket ring" on page 55*, step 1–6.

**2.** → Remove the filtered material from the body (vacuum off if necessary).

**3.** → Carry out work according to ↳ *Chapter 7.3.3.2 "Replacing the high pressure strainer 990 SF's gasket ring" on page 55*, step 7–17.

## 7.3.3 Replacing the gasket ring

### 7.3.3.1 Replacing the high pressure strainer 990 ST's gasket ring

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

Prerequisites:

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

**Dismounting the cover**

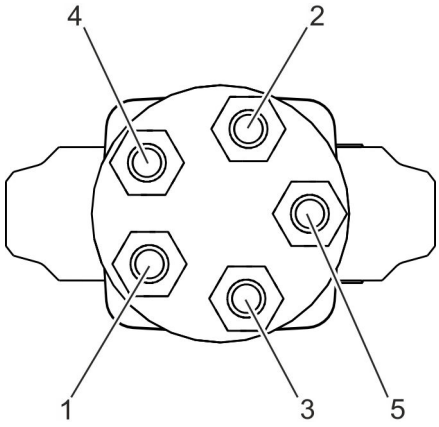



*Fig. 11: Unscrew nuts (number of nuts/stud bolts can vary)*

1. Have a second person safeguard the cover from falling.
2. **WARNING!**
   **Falling cover!**

   Unscrew the nuts on the cover (Fig. 11/1–5).
3. Remove nuts.
4. **CAUTION!**
   **Screen cylinder falling out!**

   Depending on the version of the valve, together with a second person, carefully take cover off of the stud bolts.

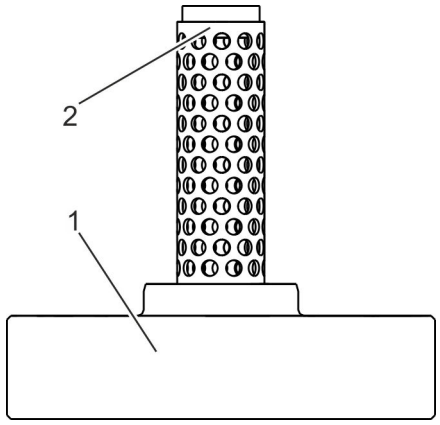



*Fig. 12: Setting the cover down*

5. Set the cover (Fig. 12/1) down so that the screen cylinder (Fig. 12/2) faces upwards.

### Replacing the gasket ring

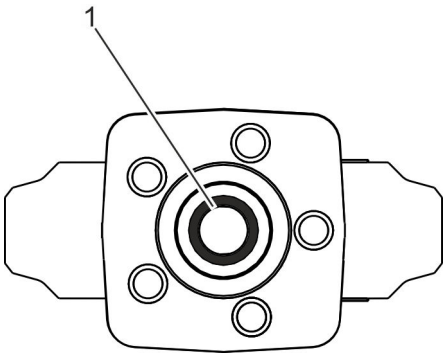



*Fig. 13: Removing the gasket ring*

6. Carefully remove the gasket ring (Fig. 13/1) from the body.
7. **NOTICE!**
   **Risk of damage due to mechanical work on the contact surfaces!**

   Ensure that all support surfaces are blank metal and undamaged.
8. Completely remove the residues of the gasket ring.
9. Insert new gasket ring in the body.

### Mounting the cover

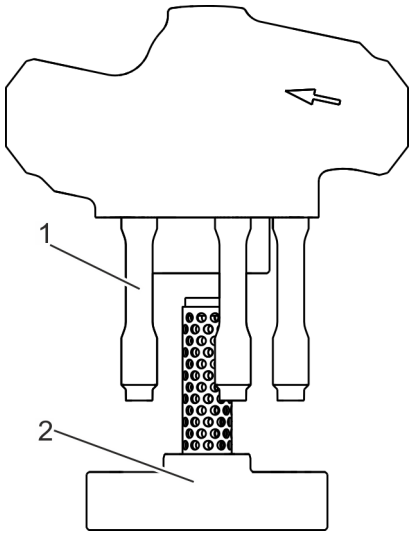



*Fig. 14: Attaching the cover*

10. **WARNING!**
    **Falling cover!**

    **CAUTION!**
    **Screen cylinder falling out!**

    With a second person, fit the cover (Fig. 14/2) onto the stud bolts (Fig. 14/1) of the body.
11. Have a second person safeguard the cover from falling.

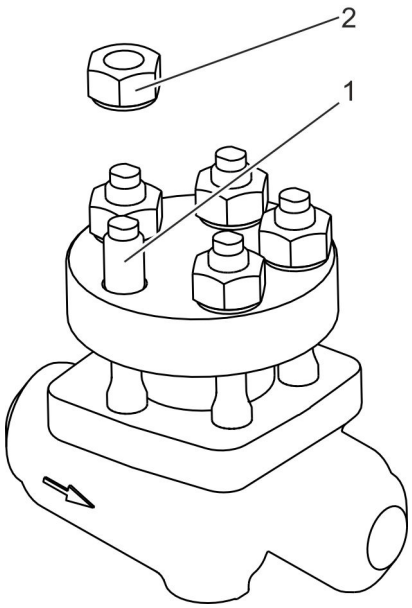



*Fig. 15: Attaching the nuts*

**12.** Loosely screw the nuts (Fig. 15/2) onto the stud bolts (Fig. 15/1).

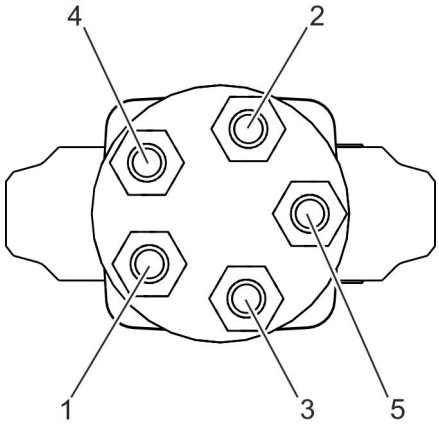



*Fig. 16: Tightening nuts in a cross pattern (number of nuts/stud bolts can vary)*

**13.**

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

Tighten the nuts (Fig. 16/2) with the prescribed tightening torque in a cross pattern (Fig. 16/1–5).

**14.** Carry out the tasks for commissioning (*Chapter 6 “Commissioning” on page 41*).

### 7.3.3.2 Replacing the high pressure strainer 990 SF's gasket ring

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

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

Special tool:
- Hoist
- Sling gear
- Pin puncher

Prerequisites:
- The valve must have been cooled/heated-up to ambient temperature.
- A depressurised state must have been established.

**Dismounting the clamping lid**

1. Have a second person secure the lid and lid components against falling.

2. **WARNING!**
**Falling lid components!**

Unscrew and remove the clamping lid's nuts (Fig. 17/2).

3. Take off the clamping lid.

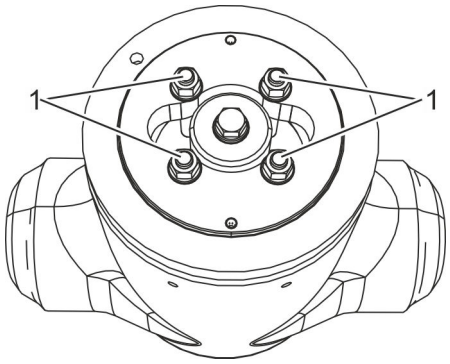



*Fig. 17: Unscrewing the nuts from the clamping lid*

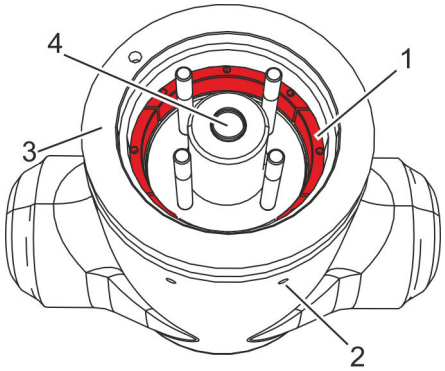



*Fig. 18: Removing the segment ring*

4. Using the pin puncher, punch the segment ring's segments (Fig. 18/1) into the interior through the outer ejection bores (Fig. 18/2).

5. Remove the segments (Fig. 18/1).

6. **WARNING!**
**Danger of injury due to heavy components!**

With a suitable hoist, lift the cover out of the body (Fig. 18/3)together with the gasket ring, support ring and screen cylinder (Fig. 19/1–4).

## Replacing the gasket ring

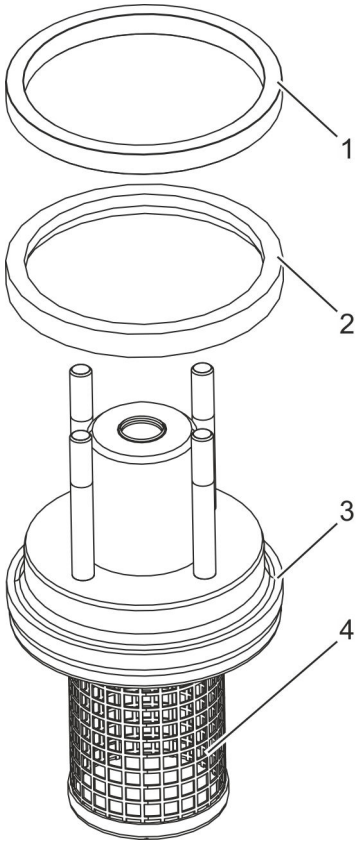



*Fig. 19: Support ring, gasket ring, cover, screen cylinder*

1 Support ring
2 Gasket ring
3 Cover
4 Screen cylinder

7. Lift the support ring (Fig. 19/1) off the cover (Fig. 19/3).
8. Lift the gasket ring (Fig. 19/2) off the cover (Fig. 19/3).
9. Carefully remove the residues of the gasket ring.
10. 

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

Ensure that all support surfaces are blank metal and undamaged.

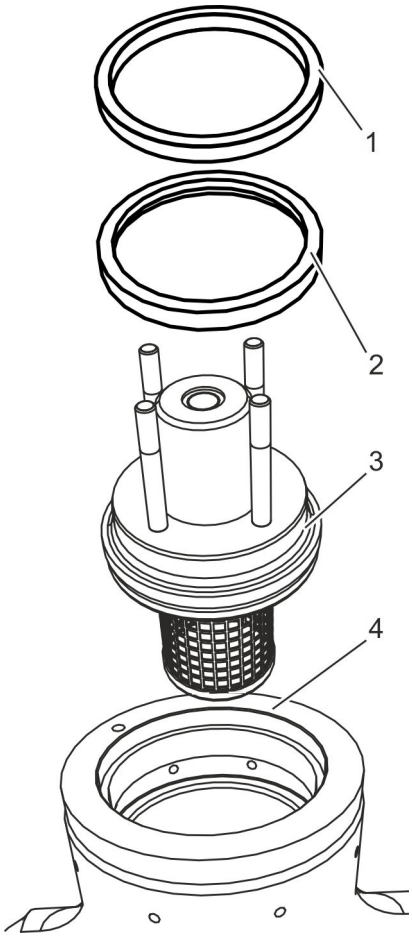



*Fig. 20: Inserting cover*

**11.** **WARNING!**
**Danger of injury due to heavy components!**

With a suitable hoist, insert the cover (Fig. 20/3) into the body (Fig. 20/4).

**12.** Mount the new gasket ring (Fig. 20/2).

**13.** Place the support ring (Fig. 20/1) on the gasket ring (Fig. 20/2).

### Mounting the clamping lid

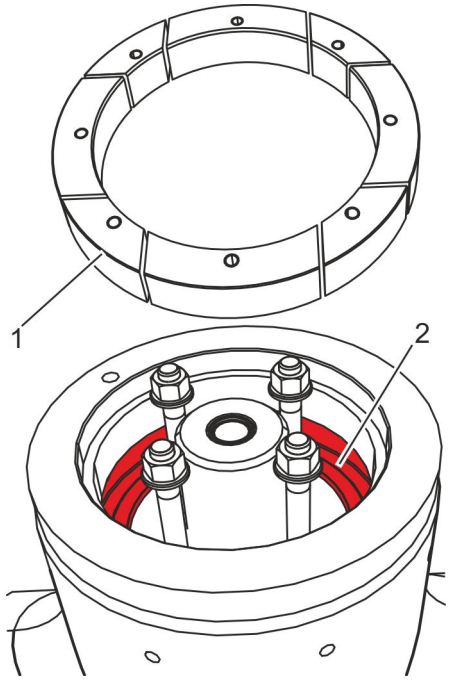



*Fig. 21: Inserting segments*

**14.** Insert the segment ring's segments (Fig. 21/1) into the body groove (Fig. 21/2).

**15.** Insert the clamping lid.

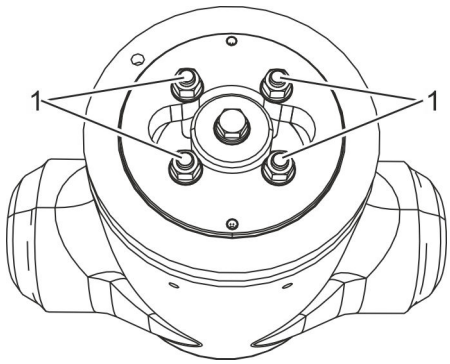



*Fig. 22: Fastening the clamping lid*

**16.**

**WARNING!**

**Risk of injury due to wrong tightening torques!**

Screw the clamping lid tight in a cross pattern using the nuts (Fig. 22/1).

⇨ The cover seal will be pre-tensioned.

**17.** Carry out the tasks for commissioning (↬ *Chapter 6 "Commissioning" on page 41*).

## 7.3.4 Replacing the screen cylinder.

### 7.3.4.1 Replacing the high pressure strainer 990 ST's screen cylinder

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

Protective equipment:
- Safety footwear

Special tool:
- Hoist
- Sling gear

Prerequisites:

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

1. Carry out work according to ↬ *Chapter 7.3.3.1 "Replacing the high pressure strainer 990 ST's gasket ring" on page 52*, step 1–9.

   ⇨ Cover is removed and sealing gasket has been replaced.

**Dismounting the screen cylinder**

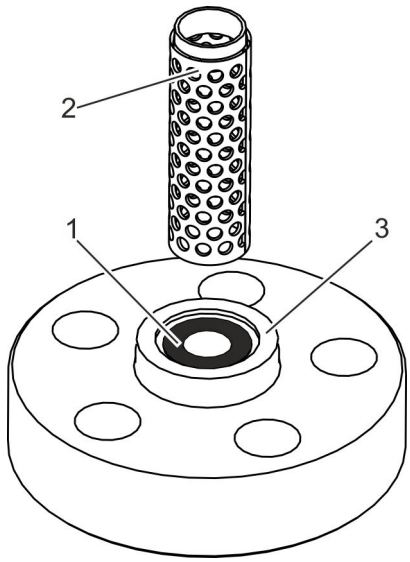



*Fig. 23: Dismounting the screen cylinder*

2. Remove the screen cylinder (Fig. 23/2) from the centring element (Fig. 23/3) of the cover.
3. Remove the packing ring (Fig. 23/1) from the cover.
4. Completely remove the residues of the packing ring.
5. **NOTICE!**
   **Risk of damage due to mechanical work on the contact surfaces!**

   Ensure that all support surfaces are blank metal and undamaged.

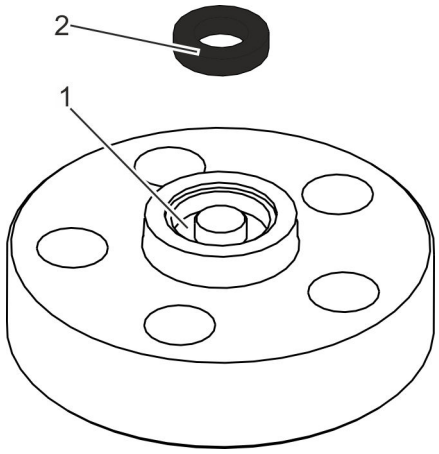



*Fig. 24: Inserting the packing ring*

6. **NOTICE!**
**Malfunction of the valve due to incorrectly inserted packing ring!**

Insert the new packing ring (Fig. 24/2) with metal cap towards the screen cylinder, into the centring element (Fig. 24/1) in the cover.

**Mounting the screen cylinder**

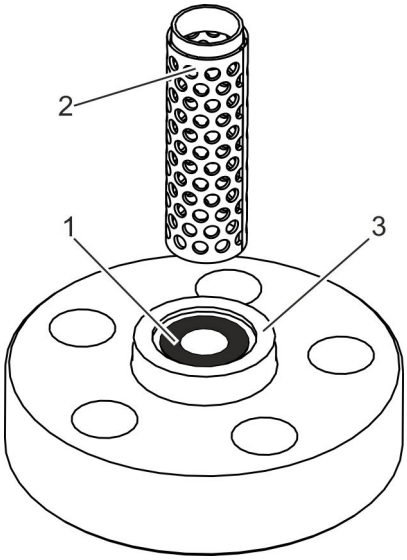



*Fig. 25: Mounting the screen cylinder*

7. Insert the new screen cylinder (Fig. 25/2) in the centring element (Fig. 25/3) of the cover on the mounted packing ring (Fig. 25/1).
8. Ensure that the longitudinal seam on the screen cylinder (Fig. 25/2) is not aligned in the outlet direction of the body.
9. Carry out work according to *Chapter 7.3.3.1 “Replacing the high pressure strainer 990 ST’s gasket ring” on page 52*, step 10–14.

*Better flow-through is achieved with a longitudinal seam of the screen cylinder that is not aligned in the outlet direction of the valve.*

### 7.3.4.2 Replacing the high pressure strainer 990 SF's screen cylinder

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

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

Special tool:
- Hoist
- Sling gear
- Pin puncher

Prerequisites:

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

**1.** Carry out work according to *Chapter 7.3.3.2 "Replacing the high pressure strainer 990 SF's gasket ring" on page 55*, step 1–6.

⇨ The clamping lid has been removed. The cover has been removed together with the screen cylinder.

**Detaching the screen cylinder from the cover**

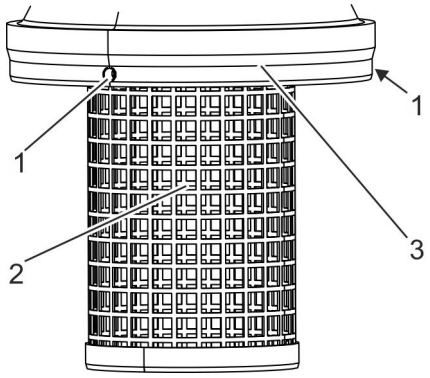



*Fig. 26: Fastening the screen cylinder*

**2.** Unscrew the threaded pins (Fig. 26/1).

**3.** Detach the screen cylinder (Fig. 26/2) from the cover (Fig. 26/3).

*The centring rings are permanently attached to the screen cylinder and cannot be replaced separately.*

**4.**

**NOTICE!**

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

Ensure that all support surfaces are blank metal and undamaged.

### Inserting the screen cylinder into the cover

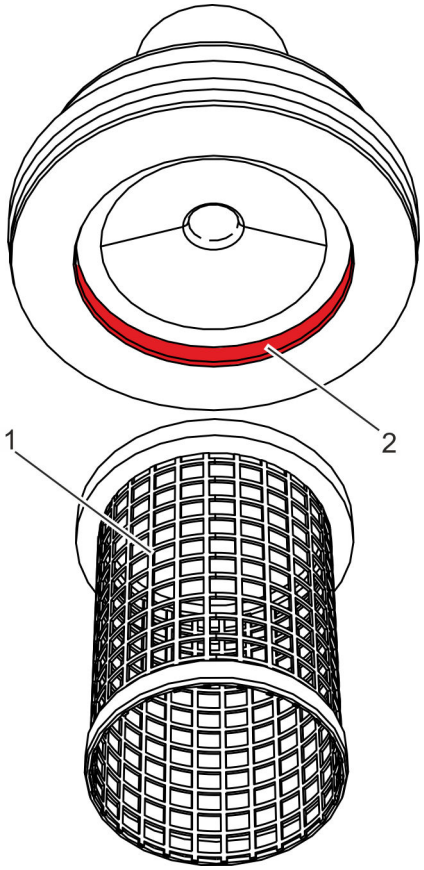



*Fig. 27: Mounting the screen cylinder*

**5.** Insert the new screen cylinder (Fig. 27/1) into the cover's centring element (Fig. 27/2).

When doing so, pay attention to the position of the two threads for fastening the screen cylinder.

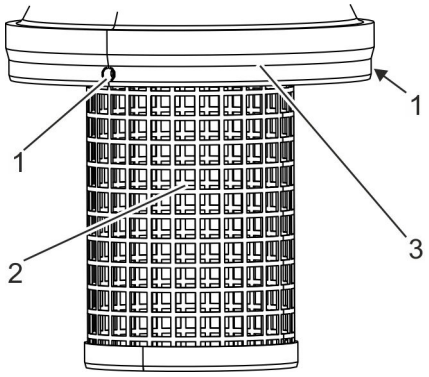



*Fig. 28: Fastening the screen cylinder*

**6.** Fasten the screen cylinder (Fig. 28/2) to the cover (Fig. 28/3) using the threaded pins (Fig. 28/1).

**7.** Carry out work according to *Chapter 7.3.3.2 "Replacing the high pressure strainer 990 SF's gasket ring" on page 55*, step 7–17.

⇨ The clamping lid is mounted and the gasket ring has been replaced.

## 7.3.5 Executing final tests on the sealed pressure sealing bonnet

**Executing final tests after replacement**

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

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

Prerequisite:

- Replacement of the parts has been concluded.

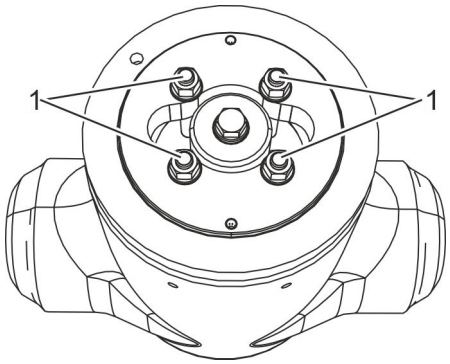



*Fig. 29: Clamping lid*

1. Subject the valve to the permissible test pressure.
2. Ensure that the valve does not leak.
3. If necessary, recheck tightening torque in accordance with the manufacturer’s specifications.
4. Retighten the clamping lid’s nuts (Fig. 29/1) by hand.

# 8 Faults and fault correction

## 8.1 Safety notices for fault correction

**Safeguard against restart**

**DANGER!**

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

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

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

**Improperly executed fault correction tasks**

**WARNING!**

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

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

– For faults that require intervention, only correct them after you have ensured that
  – the system area in question is secured
  – the valve is depressurised
  – the valve has cooled-down/warmed-up to ambient temperature.
– If in doubt, obtain the assistance of experienced persons or contact Stahl-Armaturen PERSTA GmbH Customer Service (↳ *“Customer Service - Stahl-Armaturen PERSTA GmbH” on page 4*).
– Comply with the following before restarting the plant:
  – Ensure that all fault correction tasks have been properly executed and concluded in accordance with the instructions in this manual.
  – Ensure that nobody is in the danger zone.
  – Ensure that all covers and safety systems are installed correctly and that they function properly.

### Thermal dangers

**WARNING!**

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

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

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

### Pumping medium

**WARNING!**

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

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

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

**WARNING!**

**Pumping medium is a health hazard!**

Contact with the pumping medium can have health implications.

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

**Behaviour if there are dangerous faults**

The following always applies:

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

## 8.2 Fault table

| Fault description | Cause | Remedy | Personnel |
|---|---|---|---|
| Leakage of the cover | Sealing gasket is defective | Replace the gasket ring (↳ *Chapter 7.3.3 “Replacing the gasket ring” on page 52*). | Industrial mechanic (high pressure valves) |
| Pumping medium is contaminated | Screen mesh width is too large | Dismounting the screen cylinder (↳ *Chapter 7.3.4 “Replacing the screen cylinder.” on page 59*). Insert new screen cylinder with smaller mesh width. | Industrial mechanic (high pressure valves) |
| | Pumping medium passes through the valve between packing ring and cover: Packing ring is defective or inserted incorrectly | Replacing the packing ring (↳ *Chapter 7.3.4.1 “Replacing the high pressure strainer 990 ST’s screen cylinder” on page 59*). | Industrial mechanic (high pressure valves) |
| Differential pressure between the inlet side and outlet side of the valve is greater than 2 bar | Screen cylinder is fouled | Replace the screen cylinder (↳ *Chapter 7.3.4 “Replacing the screen cylinder.” on page 59*). | Industrial mechanic (high pressure valves) |
| | Wrong flow direction | Install the correct flow direction (↳ *“Flow direction arrow” on page 15*). | Industrial mechanic (high pressure valves) |

Fault table

# 9 Dismantling, disposal

## 9.1 Safety notice for dismantling and disposal

**Pumping medium**

**WARNING!**

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

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

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

**WARNING!**

**Pumping medium is a health hazard!**

Contact with the pumping medium can have health implications.

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

### Improper dismantling

**WARNING!**

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

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

- Prior to starting work ensure that there is adequate free space.
- Handle open, sharp-edged components carefully.
- Ensure 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 anything is unclear, obtain the assistance of Stahl-Armaturen PERSTA GmbH customer service (*“Customer Service - Stahl-Armaturen PERSTA GmbH” on page 4*).

### Heavy weight

**WARNING!**

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

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

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

**Suspended loads**

**WARNING!**
**Danger of injury due to suspended loads!**
Suspended loads can cause dangerous situations that can result in severe injuries.

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

## 9.2 Dismantling

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

Prerequisites:

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

1. Hold the valve in position with a suitable hoist (*"Transporting individual valves" on page 32*).
2. Disconnect pipe inlet side and outlet side from the valve.
3. If necessary remove the existing supports.
4. Use a suitable hoist to remove the valve from the pipe and set it down so that it is safeguarded against falling over.
5. Properly clean assemblies and components and take them apart.

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

## 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

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## V