

# Operating instructions (Translation)

BBV1, BBV2 100 bar and higher



**Pressure relief valve BBV1-2, BBVH1-2 100 bar and higher**

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## 1 General

### 1.1 About the documentation

These operating instructions describe the installation, operation and maintenance of the following device:

**Pressure relief valve BBV1-2 100 bar and higher,**

The device is manufactured in different versions. Information about the version concerned in the individual case can be found on the device's type plate.

These operating instructions are a component of the device and must be kept accessible for the personnel near the device at all times.

If you have any questions about these operating instructions, please contact the manufacturer.

### 1.2 Manufacturer's address

Brinkmann Pumpen

K. H. Brinkmann GmbH & Co. KG

Friedrichstraße 2

DE 58791 Werdohl

**Tel:** +49 (0) 23 92 / 5006-0

**Fax:** +49 (0) 23 92 / 5006-180


**E-mail:** [sales@brinkmannpumps.de](mailto:sales@brinkmannpumps.de)

**Web:** [www.brinkmannpumps.de](http://www.brinkmannpumps.de)

### 1.3 Symbolism

 <b>DANGER</b>
Identification of an immediate hazard, which would result in death or severe bodily injury if not avoided.

 <b>WARNING</b>
Identification of a potential medium risk hazard, which would lead to death or severe bodily injury if not avoided.

 <b>CAUTION</b>
Identification of a low risk hazard, which could lead to minor or medium bodily injury if not avoided.

 <b>NOTICE</b>
Flagging of notices to prevent property damage.



Identification of basic safety instructions. Non-compliance can lead to hazards for people and the device.



Flagging of special user tips and other especially useful or important information.

## 2 Safety

### 2.1 Intended use

1. The device has been designed for operation with fluid.
2. The device may be operated in filled condition only.  
The medium must be compatible with the materials used in the device. The chemical competence is necessary for this. Be careful with ethylene oxide or other cathalytic or exothermic or self-decomposing materials. Please consult the manufacturer in cases of doubt.
3. The device may be operated only in usual industrial atmospheres. If there are any aggressive substances in the air, always ask the manufacturer.
4. Operation of the device is only permissible when complying with the operating instructions and applicable documents.  
Deviating operating conditions require the express approval of the manufacturer.
5. In case of any use of the device not according to specification, any warranty is voided.

### 2.2 Personnel qualification and training

The staff designated to assemble, operate and service the device must be properly qualified. This can be through training or specific instruction. Personnel must be familiar with the contents of this operating instructions.



Read the operating instructions thoroughly before use.

### 2.3 Basic safety instructions



1. Comply with existing regulations on accident prevention and safety at work along with any possible internal operator regulations.
2. Pay attention to the greatest possible cleanliness.
3. Wear suitable personal protection equipment.
4. Do not remove, make illegible or obliterate type plates or other references on the device.
5. Do not make any technical changes on the device.
6. Maintain and clean the device regularly.
7. Use spare parts approved by the manufacturer only.

## 2.4 Basic hazards



### DANGER

#### Hazardous fluids!

Danger of death when handling hazardous fluids.

1. Comply with the safety data sheets and regulations on handling hazardous fluids.
2. Collect and dispose of hazardous fluids so that no hazards arise for people or the environment.



### WARNING

#### Failure of load-carrying parts due to overload!

Danger of injury from flying parts.

Danger of injury from spurting fluids.

1. Depressurise the device and all connection lines before doing any work.
2. Securely prevent the restoration of pressure while working on the device.



### WARNING

#### Failure of load-carrying parts due to overload!

Danger of injury from flying parts.

Danger of injury from spurting fluids.

1. Use only connections and lines approved for the expected pressure range.
2. Securely prevent exceeding the permissible pressure, e.g. by using pressure relief valves or rupture discs.
3. Design pipework so that no tensions, e.g. caused by changes in length due to fluctuations in temperature, are transmitted to the device.



### WARNING

#### Failure of load-carrying parts due to overload!

Danger of injury from flying parts.

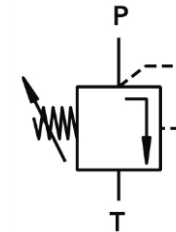
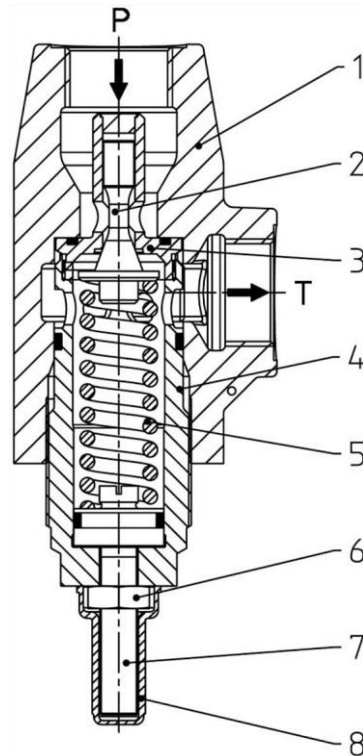
Danger of injury from spurting fluids.

1. Consider the permissible pressure setting range of the valve.
2. Check the pressure setting (the valve must not block).

### 3 Device description

#### 3.1 Functional principle

Pressure relief valves of the BBV1-2 series are directly operated seat valves and are used to safeguard low-pressure hydraulic circuits.



**Explanation**

- 1 Housing
- 2 Valve cone
- 3 Valve seat
- 4 Threaded bush
- 5 Compression spring
- 6 Hexagonal nut
- 7 Adjustment screw
- 8 Protective cap

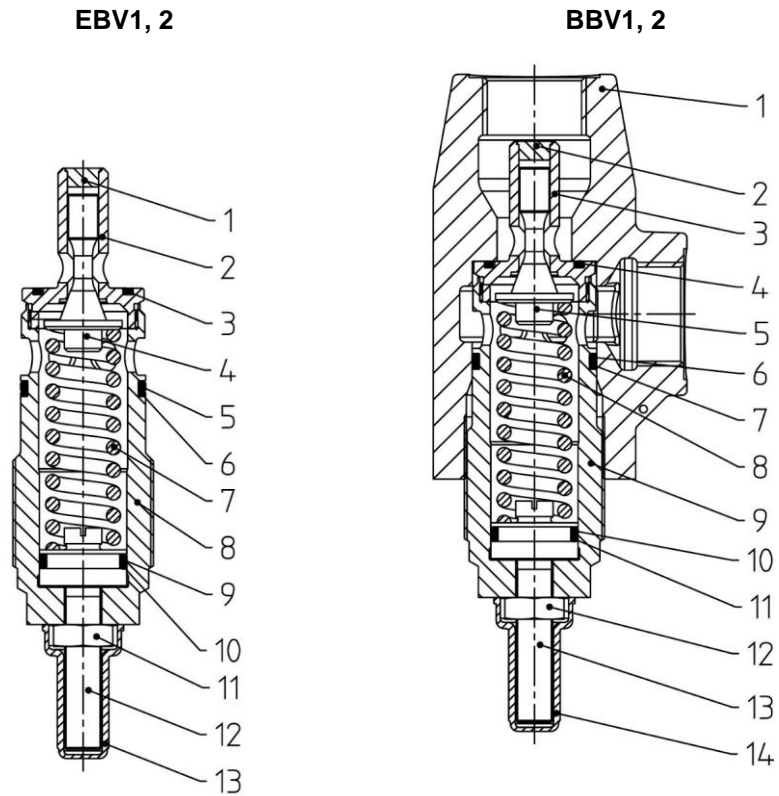
The valve cone is pressed by the compressed spring into the valve seat, which blocks Pressure connection (P) from Tank connection (T). When the response pressure is reached by adjusting with the setscrew, the valve cone releases the fluid flow to the tank connection.

The valve should preferably be mounted vertical, with the adjustment screw facing down.

The flow direction is marked with an arrow on the unit housing. It is always implemented from the pressure port (P) to the tank connector (T).



### 3.2 Basic design

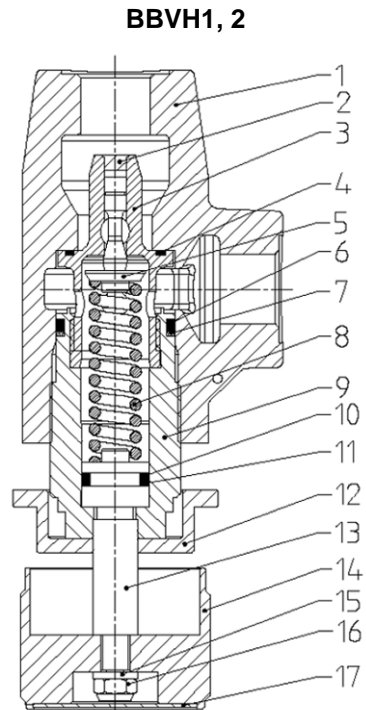


**Explanation**

- 1. Damping plugs
- 2. Valve seat
- 3. O-Ring
- 4. Valve cone
- 5. O-Ring
- 6. Support ring
- 7. Compression spring
- 8. Threaded bush
- 9. O-Ring
- 10. Support ring  
(only NG 20)
- 11. Hexagonal nut
- 12. Adjustment screw
- 13. Protective cap

**Explanation**

- 1. Housing
- 2. Damping plugs
- 3. Valve seat
- 4. O-Ring
- 5. Valve cone
- 6. O-Ring
- 7. Support ring
- 8. Compression spring
- 9. Threaded bush
- 10. O-Ring
- 11. Support ring  
(only NG 20)
- 12. Hexagonal nut
- 13. Adjustment screw
- 14. Protective cap



**Explanation**

- |                       |                                  |
|-----------------------|----------------------------------|
| 1. Housing            | 10. O-Ring                       |
| 2. Damping plugs      | 11. Support ring<br>(only NG 20) |
| 3. Valve seat         | 12. Check nut                    |
| 4. O-Ring             | 13. Adjustment screw             |
| 5. Valve cone         | 14. Twist grip                   |
| 6. O-Ring             | 15. Washer                       |
| 7. Support ring       | 16. Hexagonal nut                |
| 8. Compression spring | 17. Washer                       |
| 9. Threaded bush      |                                  |

## 4 Technical data

### 4.1 General

General information BBV1, 2		
<b>Design</b>		Seat valve, directly operated
<b>Fixing type</b>		Screw-in valve / Pipeline installation Connection KP 1 ( <b>BBV1, 2</b> )
		<b>BBV1, 2 R 5</b> Whitworth pipe thread G ¾
		<b>BBV1, 2 D 1</b> Tank connection: Whitworth pipe thread G ½
<b>Type of damping</b>		Valve cone with damper
<b>Mounting position</b>		preferably vertical, pressure set screw facing down
<b>Max. flow capacity</b>	$Q_{max.}$	See <a href="#">section 4.2 "Permissible pressure range"</a>
<b>Operating pressure</b>	$p$	
<b>Nominal pressure</b>	$p_N$	
<b>Pressure setting ranges</b>	$p_{v \text{ min.}}$	
	$p_{v \text{ max.}}$	
<b>Viscosity</b>	$v_{min}$	1 mm <sup>2</sup> /s
	$v_{max}$	600 mm <sup>2</sup> /s
<b>Fluid temperature</b>	$\vartheta_m$	See <a href="#">section 4.3 "Permissible temperature range"</a>
<b>Ambient temperature</b>	$\vartheta_u$	
<b>Material</b>		See <a href="#">section 4.4 "Material data"</a>
<b>Filtering</b>		Filter porosity: max. 20 µm for very hard particles 1.000 – 10.000 HV max. 50 µm for hard particles 50 – 70 HRC. max. 60 µm for middle hard particles < 50 HRC See the pollution classifications diagram in the screw pumps catalog
<b>Permissible media</b>		Oil and water based coolant according to the operating instructions in the screw pumps catalog
<sup>(1)</sup> Pipe thread: ISO 228-1		

## 4.2 Permissible pressure range

### 4.2.1 Operating pressure

Nominal size	Nominal pressure	Inlet pressure		Outlet pressure
	$p_N$ [bar]	$p_{e \text{ min.}}$ [bar]	$p_{e \text{ max}}$ [bar]	$p_{R \text{ max}}$ [bar]
10	400	15	410	210

### 4.2.2 Layout pressure setting range - flow rate BBV1, 2

Pressure stage	Pressure setting ranges [bar]		Flow [l/min]	
	$p_{v \text{ min.}}$	$p_{v \text{ max.}}$	$Q_{\text{max.}}$	
			at $p_{v \text{ max.}}$	
200	10	200		60
150		150		55

## 4.3 Permissible temperature range

Sealing material	Fluid temperature $\vartheta_m$ <sup>(1)</sup>	
	$\vartheta_{m \text{ min}}$ [°C]	$\vartheta_{m \text{ max}}$ [°C]
FKM	-15	80

<sup>(1)</sup> Comply with media-specific properties.

Sealing material	Ambient temperature $\vartheta_u$	
	$\vartheta_{u \text{ min.}}$ [°C]	$\vartheta_{u \text{ max.}}$ [°C]
FKM	-15	60

## 4.4 Material data

Nominal size	Fixing type	Material			
		Housing	Seal	Compression spring	Other materials
10	R	EN-GJL-250	FKM	Spring steel	Steel

R = Pipe valve

## 4.5 Dimensions

Dimensions of the device can be found in the relevant technical data sheets.

## 5 Transport and storage

### 5.1 General

- After receipt, check the device for transport damages.
- If transport damage is noticed, report this immediately to the manufacturer and the carrier. The device must then be replaced or repaired.
- Dispose of packing material and used parts in accordance with the local stipulations.

### 5.2 Storage

The device's function is tested in the plant with mineral hydraulic oil. Then all connections are closed. The remaining residual oil preserves the interior parts for up to 6 months.

Metallic exposed exterior parts are protected against corrosion by suitable conservation measures, also up to 6 months.

In case of storage, a dry, dust-free and low-vibration environment is to be ensured. The device is to be protected against influences from weather, moisture and strong fluctuations of temperature. The recommended storage conditions are to be adhered to.

Below the permissible ambient temperature  $\vartheta_u$  elastomer seals lose their elasticity and mechanical loading capacity, since the glass transition temperature is fallen below. This procedure is reversible. A force action on the device is to be avoided in case of storage below the permissible ambient temperature  $\vartheta_u$ .

When storing for a long period of time (> 6 months), treat all surfaces at risk of corrosion again with suitable preserving agents.

If high air humidity or aggressive atmospheres are expected, take additional corrosion-preventing measures.



Storage in corrosion protection bags (VCI) maximum of 6 months.



#### NOTICE

##### **Corrosion/chemical impact**

Improper storage can render the device useless.


1. Protect endangered surfaces by means of suitable conservation measures.
2. Comply with recommended storage conditions.

**Recommended storage conditions**

1. Storage temperature: 5 °C - 25 °C
2. Relative air humidity: < 70 %
3. Protect elastomer parts from light, especially direct sunlight.
4. Protect elastomer parts from oxygen and ozone.
5. Comply with maximum storage times of elastomeric parts:
  - 5 Years: AU (Polyurethane rubber)
  - 7 Years: NBR, HNBR, CR
  - 10 Years: EPM, EPDM, FEP/PTFE, FEPM, FKM, FFKM, VMQ, FVMQ

## 6 Installation


### 6.1 Safety instructions for installation


DANGER

**Hazardous fluids!**

Danger of death when handling hazardous fluids.


1. Comply with the safety data sheets and regulations on handling hazardous fluids.
2. Collect and dispose of hazardous fluids so that no hazards arise for people or the environment.


WARNING

**Failure of load-carrying parts due to overload!**

Danger of injury from flying parts.  
 Danger of injury from spurting fluids.

1. Depressurise the device and all connection lines before doing any work.
2. Securely prevent the restoration of pressure while working on the device.


WARNING

**Failure of load-carrying parts due to overload!**

Danger of injury from flying parts.  
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1. Use only connections and lines approved for the expected pressure range.
2. Securely prevent exceeding the permissible pressure, e.g. by using pressure relief valves or rupture discs.
3. Design pipework so that no tensions, e.g. caused by changes in length due to fluctuations in temperature, are transmitted to the device.

## 6.2 Mechanical installation

### 6.2.1 Preparation

- Check the device for transport damage and dirt.
- Remove existing preservatives.
  - Use only those cleaning agents that are compatible with the materials used in the device.
  - Do not use cleaning wool.
- Compare the environmental and ambient conditions at the place of installation to the permissible conditions.
  - Expose the device only to small vibrations, see IEC 60034-14.
  - Secure sufficient access for maintenance and repair.

### 6.2.2 Screw-in valve

- Screw the screw-in valve into the designated housing with the specified torque.
  - Do not damage seals during assembly.

Tightening torques [Nm]		
Nominal size	Pressure stage [bar]	
	≤ 200	
10	100 ±5	



Select the material and dimensions of the planned housing to ensure sufficient safety for all conceivable operating conditions.

### 6.2.3 Pipeline installation

- Install the device preferably vertical with the pressure adjustment screw facing down.
- Take measures against accidental touching of hot surfaces (> 60 °C).



## 6.3 Connection lines

### 6.3.1 General



#### WARNING

##### Failure of load-carrying parts due to overload!

Danger of injury from flying parts.

Danger of injury from spurting fluids.

1. Use only connections and lines approved for the expected pressure range.
2. Securely prevent exceeding the permissible pressure, e.g. by using pressure relief valves or rupture discs.
3. Design pipework so that no tensions, e.g. caused by changes in length due to fluctuations in temperature, are transmitted to the device.



##### Additional connections

1. Provide measurement connections for pressure and temperature as close as possible to device.
2. If necessary, provide a facility to fill or empty the device and the line system.
3. If necessary, provide a facility to vent the device and the line system.

### 6.3.2 Mounting Connection lines



Position of the device connections: See [chapter 3 "Device description"](#)

- Clean all lines.
  - Do not use cleaning wool.
  - Pickle and flush welded pipes.
- Remove the protective plugs.
- Mount the lines.
  - Comply with the manufacturer's information.
  - Do not use any sealing materials such as hemp, Teflon tape or putty.

## 7 Operation start-up

### 7.1 Safety instructions for start-up

**DANGER****Hazardous fluids!**

Danger of death when handling hazardous fluids.

1. Comply with the safety data sheets and regulations on handling hazardous fluids.
2. Collect and dispose of hazardous fluids so that no hazards arise for people or the environment.

**WARNING****Failure of load-carrying parts due to overload!**

Danger of injury from flying parts.

Danger of injury from spurting fluids.

1. Consider the permissible pressure setting range of the valve.
2. Check the pressure setting (the valve must not block).

**CAUTION****Hot surfaces!**

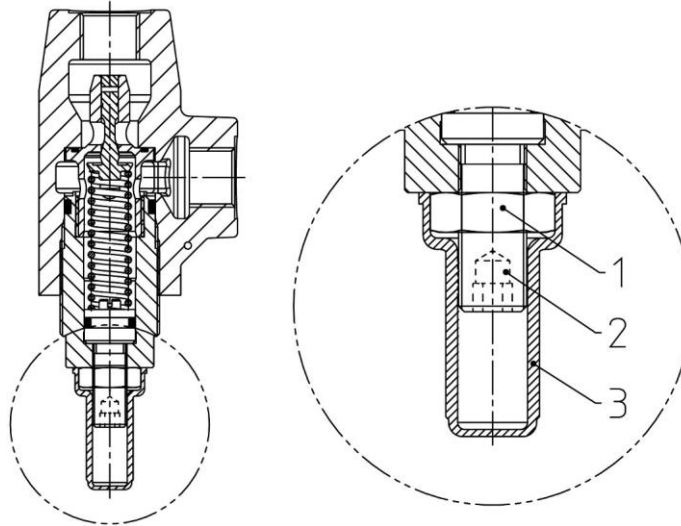
Burn injury to skin if touched.

1. Wear protective gloves at temperatures  $\geq 48^{\circ}\text{C}$ .

## 7.2 Pressure setting

The response pressure of the device is factory set to the mean value of each pressure stage. If applicable, the pressure setting must be adapted during commissioning.

### Pressure setting for actuation type: A for precise adjustment



1 Hexagonal nut

2 Adjustment screw

3 Protective cap

- Remove the protective cap
- Remove hexagon nut
- Set the response pressure using the adjusting screw
  - clockwise = Higher response pressure
  - counterclockwise = Lower response pressure
- Tighten hexagonal nut
- Put on the protective cap



### WARNING

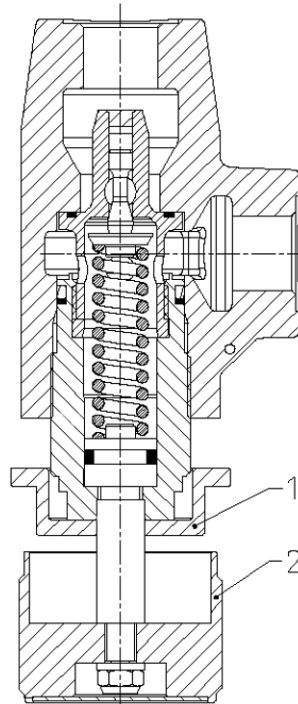
#### Failure of load-carrying parts due to overload!

Danger of injury from flying parts.

Danger of injury from spurting fluids.

1. Consider the permissible pressure setting range of the valve.
2. Check the pressure setting (the valve must not block).

**Pressure setting for actuation type: B with knob**



1 Check nut

2 Twist grip

- Loosen the lock nut
- Set the response pressure with the adjusting screw
  - clockwise = Higher response pressure
  - counterclockwise = Lower response pressure
- Secure the twist grip with a lock nut



**WARNING**

**Failure of load-carrying parts due to overload!**

Danger of injury from flying parts.

Danger of injury from spurting fluids.

1. Consider the permissible pressure setting range of the valve.
2. Check the pressure setting (the valve must not block).

### 7.3 Further operation start-up

- Open existing shut-off elements upstream and downstream of the device.
- Vent the system at the highest possible point.
- Check the operating data such as:
  - Response pressure
  - System pressure (as close as possible to device)
  - Fluid temperature (as close as possible to device)
  - ...
- Document the operating data of the initial start-up for later comparison.
- Check the device for leaks.
- Check all threaded connections for leaks and retighten if necessary.



Existing venting and drain plugs must always be closed during operation according to specification.

## 8 Removal

### 8.1 Safety instructions for removal



#### **DANGER**

##### **Hazardous fluids!**

Danger of death when handling hazardous fluids.

1. Comply with the safety data sheets and regulations on handling hazardous fluids.
2. Collect and dispose of hazardous fluids so that no hazards arise for people or the environment.



#### **WARNING**

##### **Failure of load-carrying parts due to overload!**

Danger of injury from flying parts.

Danger of injury from spurting fluids.

1. Depressurise the device and all connection lines before doing any work.
2. Securely prevent the restoration of pressure while working on the device.



#### **CAUTION**

##### **Hot surfaces!**

Burn injury to skin if touched.

1. At temperatures  $\geq 48^{\circ}\text{C}$  the device must be allowed to cool down first.

---

## 8.2 General

- Depressurise and de-energize the system.
- Close existing shut-off elements upstream and downstream of the device.
- Open existing drain elements and loosen connection lines. Collect and dispose of discharging medium so that no hazard arises for persons or environment.
- Dismantle the device.
- Clean the device.
- Close the device connections and lines to prevent dirt penetration.

## 9 Maintenance

### 9.1 Safety instructions for maintenance

**DANGER****Hazardous fluids!**

Danger of death when handling hazardous fluids.

1. Comply with the safety data sheets and regulations on handling hazardous fluids.
2. Collect and dispose of hazardous fluids so that no hazards arise for people or the environment.

**WARNING****Failure of load-carrying parts due to overload!**

Danger of injury from flying parts.

Danger of injury from spurting fluids.

1. Depressurise the device and all connection lines before doing any work.
2. Securely prevent the restoration of pressure while working on the device.

**CAUTION****Hot surfaces!**

Burn injury to skin if touched.

1. At temperatures  $\geq 48^{\circ}\text{C}$  the device must be allowed to cool down first.



## 9.2 Maintenance work



### Checking and documentation of the operating data

Regular checking and documentation of all operating data such as pressure, temperature, current consumption, degree of filter soiling, etc. contributes to early problem detection.

- Perform maintenance according to specification.
- Replace defective and worn components.
- If required, request spare parts lists and assembly drawings from the manufacturer.
- Document the type and scope of the maintenance work along with the operating data.
- Compare the operating data with the values of the first commissioning. Determine the cause in case of major non-compliances (> 10 %).
- Dispose of packing material and used parts in accordance with the local stipulations.



### Barriers and instructions

All barriers and warning signs removed during this must be attached to their original position on completing maintenance and/or repairs.

## 9.3 Maintenance instructions

The following information provides recommendations on maintenance work and maintenance intervals for the device being used.

Depending on the actually occurring loads in operation, the type, scope and interval of the maintenance work can deviate from the recommendations. The equipment builder/operator shall write an obligatory maintenance plan.



Within the framework of preventive maintenance, it is appropriate to replace wear parts before reaching the wear limit.

With corresponding expertise and sufficient equipment, the replacement can be carried out by the equipment builder/operator. Please consult the manufacturer about this.



### Warranty

In case of improper implementation, any warranty is voided.

Maintenance recommendations Pressure relief valve			
Interval	Maintenance work	Employees	Duration approx. [h]
<b>Firstly: after max. 24 h</b>	Inspection: Valve function	1	1
	Inspection: Response pressure		
	Inspection: System pressure		
	Inspection: Fluid temperature		
	Inspection: Device temperature		
	Inspection: Check potential equalisation for firm seating and functionality (if existing)		
	Inspection: Condition of operating fluid		
<b>Daily</b>	Audiometric monitoring: Unusual noise	1	0.1
	Cleaning: Remove dust deposits and dirt with a moist cloth		
	Visual inspection: Leakages		
<b>3000 Operating hours --- Rotational direction monitoring of the motor, e.g. with a rotating field instrument. After 12 months</b>	Inspection: Valve function	1	1
	Inspection: Response pressure		
	Inspection: System pressure		
	Inspection: Fluid temperature		
	Inspection: Device temperature		
	Inspection: Condition of operating fluid		
<b>As required</b>	Replace: Seals	1	1

## 10 Repairs

### 10.1 Safety instructions for repair



#### DANGER

##### **Hazardous fluids!**

Danger of death when handling hazardous fluids.

1. Comply with the safety data sheets and regulations on handling hazardous fluids.
2. Collect and dispose of hazardous fluids so that no hazards arise for people or the environment.



#### WARNING

##### **Failure of load-carrying parts due to overload!**

Danger of injury from flying parts.

Danger of injury from spurting fluids.

1. Depressurise the device and all connection lines before doing any work.
2. Securely prevent the restoration of pressure while working on the device.



#### CAUTION

##### **Hot surfaces!**

Burn injury to skin if touched.

1. At temperatures  $\geq 48^{\circ}\text{C}$  the device must be allowed to cool down first.

## 10.2 General

### The repairs covers:

1. Troubleshooting  
Determination of damage, pinpointing and localisation of the damage cause.
2. Elimination of damage  
Elimination of the primary causes and replacement or repair of defective components. The repair is generally made by the manufacturer.

### Repairs by manufacturer

- Before returning the device, fill in the *return notification* form. The form can be filled in online and is available as a pdf file download.



### Device contains hazardous material

If the device was operated with dangerous liquids, it must be cleaned before the return. If this should not be possible, the safety data sheet of the hazardous material is to be provided beforehand.

### Repair by equipment builder/operator

If corresponding expertise and sufficient equipment is available, the equipment builder/operator can also make the repairs. Please consult the manufacturer about this.

- If required, request spare parts lists and assembly drawings from the manufacturer.
- Use spare parts approved by the manufacturer only.
- Dispose of packing material and used parts in accordance with the local stipulations.



### Warranty

In case of improper implementation, any warranty is voided.



### Barriers and instructions

All barriers and warning signs removed during this must be attached to their original position on completing maintenance and/or repairs.

### 10.3 Detecting and eliminating failures

Failure		Potential causes	Possible measures
1	<b>Increased noise</b> <i>Mechanical vibrations</i>	Air in the spring chamber	Bleed system
2	<b>Response pressure too high</b>	Valve cone tight or jammed (Contaminated medium)	Clean the device
			Replace the device
			Provide filtration
3	<b>Valve does not respond</b>	Valve blocked	Adjust valve Comply with the adjustment range
4	<b>Leakages</b> <i>Seal failure</i>	Poor maintenance	Comply with maintenance plan Replace seals
		Mechanical damage	Replace seals
		Thermal overload	Check the operating datas Replace seals
		Corrosion/chemical impact	Check the material compatibility Replace seals
<b>Consult the manufacturer for all unidentifiable failures.</b>			