Operating and maintenance instruction

HP check valve 9/16" 2.0 (6200 bar / 90,000 psi)

Operating and maintenance instruction

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Scope of application

The present operating and maintenance instruction is valid for the HP check valve 9/16" 2.0 (6200 bar / 90,000 psi).

- 918200-P
- 918210-P

Inhaltsverzeichnis

1 General

1.1 Information on use of the operation and maintenance instruction

The present operation and maintenance instruction is part of the product. It must be read and understood by all the persons working with the HP check valve before operating. The manual must be stored within spitting distance as well as always accessible to the persons, working with the HP check valve.

Should you have any questions regarding the content of the manual, please contact the manufacturer directly.

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1.2 Scope of delivery

The individual parts contained in the shipment can be gathered from the set list in the appendix A (technical drawing and part list). Upon receipt, the shipment has to be checked for integrity. Possible detected defectives must be reported immediately to the manufacturer.

1.3 Warranty claim

The ALLFI AG grants warranty for the shipped parts as followed:

- Material- and manufacturer faults of 12 months from date of delivery or
- Defects within the first 2'000 hours of operation

Following spare parts are excluded from the warranty:

- Case
- Lock Screw
- Valve Seat
- Valve Bolt

1.4 Disclaimer

ALLFI AG refuses any claims of liability (material damages, physical injury, as well as disruption of operation), that are a result of disregarding this operating and maintenance instruction.

For example, the damage as a consequence of:

- Inadmissible application of the HP check valve
- Defective maintenance
- The disregard of operation instructions
- Chemical and electrolytical influences
- Use of parts, spare parts, or accessory from a third-party manufacturer
- Arbitrary modifications
- Not sufficient qualified staff

The disregard of all these instructions happens on exclusive risk and exclusive responsibility of the client. The ALLFI AG is not liable for any production downtimes.

2 Security

2.1 Declaration of symbols

This operating and maintenance instruction contains important notes and symbols, which are to be considered and followed. These are:

DANGER

Points to a danger situation. If not avoided, death or heavy injuries are the consequence.

WARNING

Points to a danger situation. If not avoided, death or heavy injuries could be the consequence.

CAUTION

Points to a danger situation. If not avoided, light or medium body injuries could be the consequence.

NOTE

Danger with the consequence of property damage.

Danger symbol without key word: Additional notes

2.2 General warning notes

Using of the HP check valve, the following warnings are to be considered.

The specified warnings are not only restricted to the operation with the maximal permissible operating pressure of 6200 bar / 90‘000 psi. They are also valid on work with reduced operation pressures!

DANGER

Danger of cutting of extremities on contact with water jet

The contact with the high kinetic energy performing water jet can have the consequence of cutting of extremities or lead to other injuries.

Therefore:

- Just operate the machine when nobody stands in the danger zone of the water jet.
- Never touch the water jet, not even with personal protective equipment.

On all injuries in connection of the water jet, alarm the emergency doctor immediately.

CAUTION

Danger of breathing difficulties and stimulations of the skin and eyes by released solid particles or dust.

When machining certain material, solid particles and dust can float in the air, which can cause breathing difficulties and stimulations of the skin and eyes.

Therefore:

- Ventilate the workroom well
- Carry necessary protection wear if required (protection glasses, breathing mask, gloves, …)

Additionally, the rules and regulations of the working place are to be followed to prevent injuries!

2.3 Intended use

The intended use consists in:

- in blocking a flow direction of water with a pressure up to 6200 bar / 90,000 psi
- in static application (small pressure fluctuations)
- The fixed installation (no hand guidance) of the HP check valve at the machine
- If provisions against flying fragments or a leaking liquid with high pressure are made.
- If exclusively water is used as working fluid (see *4 General technical data*).
- If the technical limits are respected.

2.4 Inadmissible use

As an inadmissible use of the HP check valve counts amongst others:

- The use of other working of any kind fluids than water.
- Any kind of adding admixtures to the water
- Closing any of the pressure relief holes
- Excessive application of the HP check valve e.g., large pressure fluctuation
- Exceedance of the permitted limits
- Operating the HP check valve with demounted or disabled technical protection facility

All further from the intentional application deviating applications of the HP check valve are inadmissible. Should you have questions, please contact the manufacturer directly.

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2.5 Residual risks

The residual risks have to be reduced by the manufacturer or the operator of the complete machine, in which the HP check valve is built in, as far as possible reasonably practicably.

Operation phase	Damage	Danger	Reason	(possible) measures
Operation	Body injuries	Leaking liquids under high pressure (e.g. at pressure relief holes)	Ignoring the torque	Follow the torque
			Damaged sealing faces	Regular supervision
			Busted/Cracked connections and high pressure components as a result of defects	Protective wall as a technical protective measure
		Flying fragments	Ignoring the torque	Follow the torque
			Damaged sealing faces	Regular supervision
			Busted/Cracked connections and high pressure components as a result of defects	Protective wall as a technical protective measure

2.6 Safety arrangement

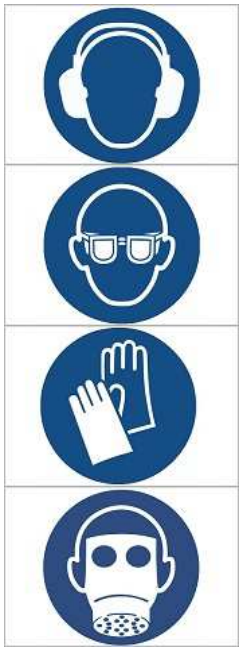
The manufacturer or the operator of the full machine, in which the HP check valve is built in, has to arrange for the following necessary safety arrangements:

- Safety arrangement toward flying fragments or leaking liquid under high pressure
- Emergency stop arrangement for shut down the operation progress
  - ➔ Active: Manually triggered by the operator
  - ➔ Passive: Automatically triggered by:
    - failure of the high-pressure components or massive operating errors

Danger for the operator will arise if safety protections are not functionally, not followed or evaded anytime. The operator has to ensure the functionality of the safety protections anytime.

2.7 Personal protection equipment

The operator must offer his staff following protection equipment while he's working



Ear protector against:
- Noise emissions

Wear protection glasses against:
- Drizzle and dust particles
- Flying Fragments

Hand guards against:
- Sharp edges at components
- Intrusion of micro particles into the skin

Inhalation protection against:
- Breathing in dust, micro particles, and drizzle

2.8 Qualification of the staff

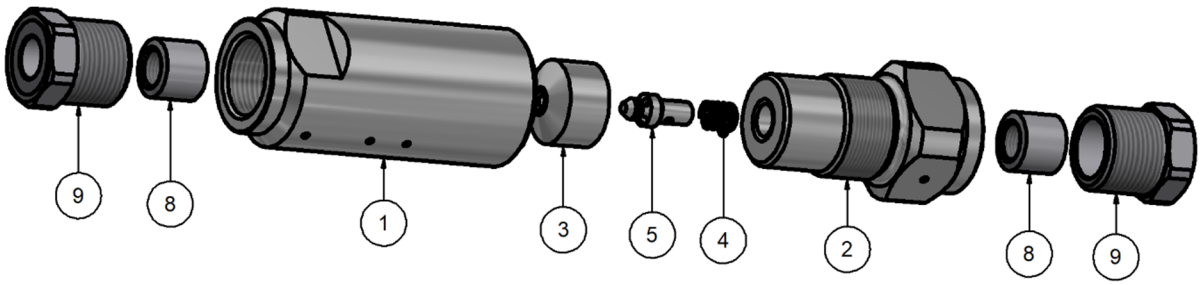
The HP check valve may only be operated and maintenance by verifiable trained staff.

3 Structure and function

3.1 Structure

The HP check valve allows the flow of water only in the marked direction. A spring-loaded gate element prevents flow in the opposite direction. In the direction of flow, the closing element is lifted from its seat and releases the flow.

The explosion view of the HP check valve is shown below.



Legend 918200-P:

Item	Qty.	Description	Part- Number
1	1	Case 9/16"	918201-P
2	1	Lock Screw 9/16"	918202-P
3	1	Valve Seat 9/16"	918203-P
4	1	Spring	021040
5		Valve bolt 9/16"	918205-P
8	2	Collar 9/16"	719100
9	2	Gland Nut 9/16"	709100-P

3.2 Function

The HP check valve is a valve that allows water to flow only in the specified direction. In the opposite direction, the valve is blocked by a closing element. The flow resistance in the direction of flow is almost zero (see: 4 General technical data).

3.3 Accessories

			
Article:	Torque Wrench	Spanner	DX Paste
Article no:	000468	Width across flat 22 – 000272 Width across flat 17 – 000339 Width across flat 11/16" – 000629 Width across flat 13/16" – 000519	051055
Function:	Tighten screws with a specific torque		Greasing screw connections and metallic contact areas

4 General technical data

Maximal working pressure: 6200 bar / 90,000 psi

Connection tube diameter: HP tube 9/16“

Maximal working temperature: 50 °C

Maximal stocking temperature: 60 °C

Weight: ca. 2.05 kg

Requested water quality

Water parameter	Unit	Value
Electrical Conductivity	µS/cm	100 – 450
PH-value	-	7.0 - 8.5
Total hardness	°dH	2.0 - 10.0
Carbonate hardness (Acid capacity pH 4.3)	°dH	2.0 - 10.0
Degree of alkalinity pH 8.2	mmol/l	0 - 0.25

Chloride	mg/l	≤ 50
Iron	mg/l	≤ 0.2
Manganese	mg/l	≤ 0.05
Copper	mg/l	≤ 2.0
Silicate	mg/l	≤ 5.0
(Filtrate-) solid content	mg/l	≤ 350

Data as dimensions can be found in the technical drawing in appendix A (shipped with product).

5 Installation and commissioning

General installation hints:

- Absolute cleanliness of the pipes is important before connection.
- Follow the steps below for installation.

  Before startup and after inspection or maintenance, check the water tightness

⚠ WARNING

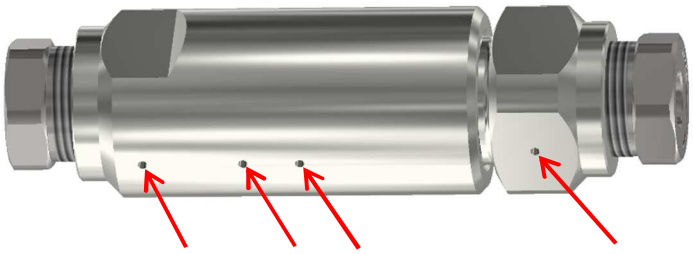
Risk of injury by forbidden closing of the pressure relief holes.

By closing the pressure relief holes, the HP check valve may burst.

Therefore:

- Do not close pressure relief holes.

Positions of the pressure relief holes:



NOTE

Property damage as a result of pitting

Not or insufficient greased threads or contact areas can pit.

Therefore:

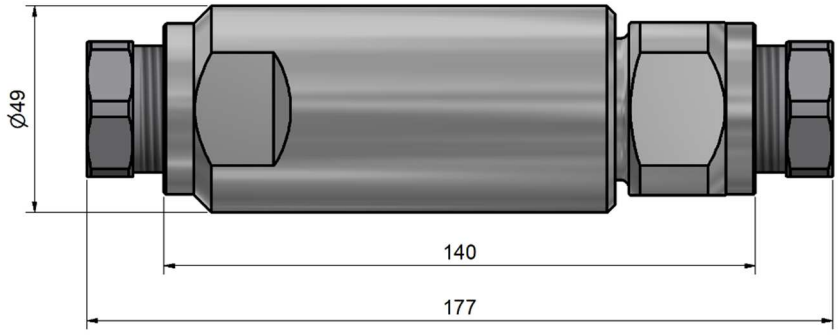
Always grease threads and all metallic contact areas with DX Paste (Article no. 051055).

NOTE
Material damage or leakage as a result of fouling Fouling components, especially at threads, can lead to leakages and damage. **Therefore:** Pay attention to the cleanliness of the components while maintaining.

NOTE
Property damage as a result of leakages On consistent leakage, consequential damage may occur. **Therefore:** Immediately eliminate leakages (see chapter 8 „Faults and Troubleshooting”).

5.1 Installation at the machine

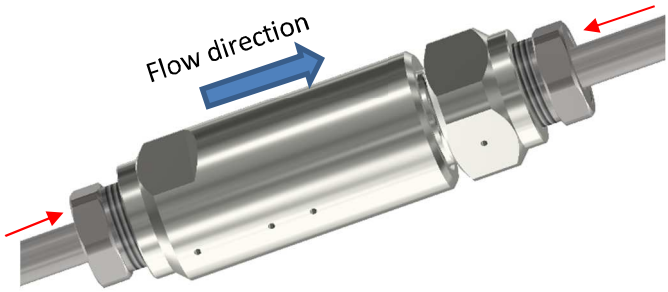
The HP check valve is being fixed at the HP-tubes; therefore the tubes must be fixed with pipe clamps near the HP check valve.



During installation, pay attention that none of the pressure relief holes is closed!

Consider flow direction → see appendix A (drawing that is shipped with the product)

	1. Slide on gland nut over the HP-tube
	2. Screw the collar to the HP-tube (left-handed thread). There must be 1 or 2 convolutions visible between conus and the pressure ring.

	3. Connect the HP pipes and tighten them (torque, see appendix A). Use open end fitting AF 32 (000503). **Attention:** Observe flow direction
	4. Check the tightness of the HP check valve

6 Deinstallation

Before deinstalling the HP check valve, release pressure from the HP-tubes and protect against an unexpected re-pressurizing.

	1. Unscrew HP tubes

7 Maintenance, Service and Repair

The HP check valve must be disconnected for maintenance service, and repair work according to chapter 6.

Release pressure of the HP-tubes before opening and protect against re-pressurize.

NOTE

Material damage or leakage as a result of fouling

Fouling at the components, especially at threads, can lead to leakages and damage.

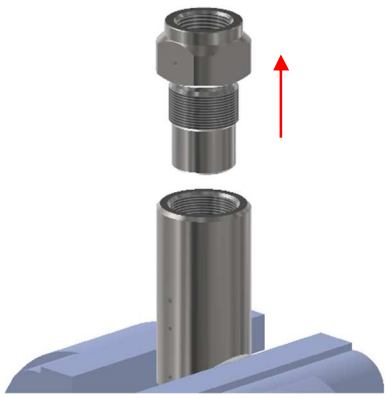
Therefore:

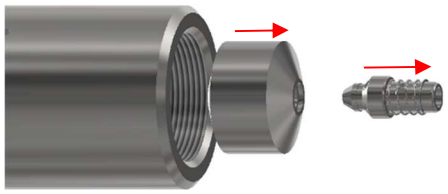
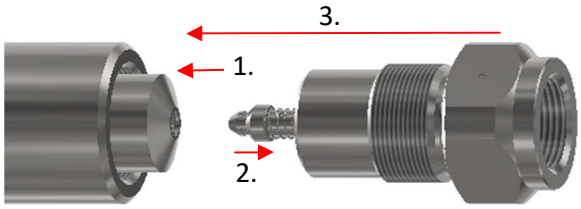
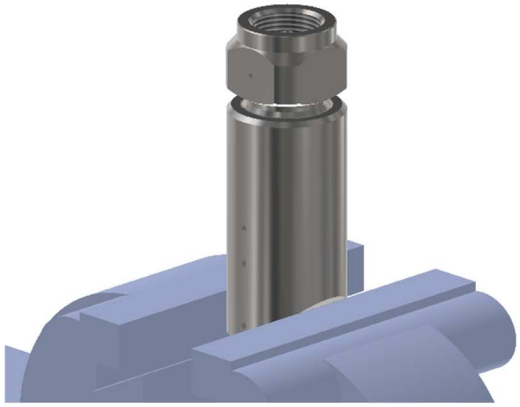
Pay attention to the cleanliness of the components while maintaining.

NOTE
Possible damage as a result of direct transfer of the torque to the HP-tubes When loosen or tighten the gland nut without fixing the case, the torque is being transferred directly to the conus of the HP-tube. Thus, the conus can take damage. **Therefore:** - Fix up the case/screw plug during loosening or tightening the screw.

NOTE
Property damage as a result of pitting Not or insufficient greased threads or contact areas can pit. **Therefore:** Always grease threads and all metallic contact areas with DX Paste (Article no. 051055).

7.1 Removal of valve seat, valve bolt and spring

1		1. Remove the HP check valve from the machine according to chapter 6
2		1. Clamp the HP check valve in the vise at the Case (pos. 1, AF 41). **Caution:** Use protective jaws
3		1. Loosen screw plug (pos. 2) with open-end wrench AF 41 and unscrew it.

4		1. Remove the check valve from the vice. 2. Remove valve seat, valve bolt and spring.
5		1. Insert a new valve seat into case 2. Insert new valve bolt and a new spring into screw plug. 3. Screw plug (pos. 2) into case.
6		1. Clamp the HP check valve in the vise at the case (pos. 1, AF 41). **Caution:** Use protective jaws. 2. Tighten the screw plug (pos. 2) to the specified torque (torque, see appendix A).
7		1. Fit the check valve in the machine according to chapter 5.1.

8 Faults and Troubleshooting

Before uninstalling the HP check valve, release pressure from the HP-tubes and protect against an unexpected re-pressurizing.

Caution: After any troubleshooting, check the water tightness of the HP check valve.

GEFAHR

Danger from cracked component and water leakage under high pressure.

If one-part (whether housing, screw plug or change seat) cracks, the others have also reached the end of their life and must be replaced.

Therefore:

- If the housing, the screw plug, or the change seat breaks, the complete HP check valve must be replaced.

8.1 Leakage of the HP check valve:

Pos.	Cause of the leakage	Action	Chapter
1 & 4	Screw connection high pressure tube not tight	Tighten screw connection	5.1
		Check sealing surfaces on HP tube and case / screw plug. If parts are damaged, rework or replace them.	
2	Sealing point between case and valve seat not tight	Check tightening torque	7.4
		Valve seat or case cracked. → Replace complete HP check valve	8
3	Sealing point between valve seat and screw plug not tight	Check tightening torque	7.4
		Valve seat or screw plug cracked. → Replace complete HP check valve	8

8.2 Further troubleshoot:

Malfunction	Cause of the leakage	Action	Chapter
HP check valve is not tight in closing direction. It heats up on the outlet side	Debris jams the valve bolt	Disassemble and clean the HP check valve	7.1
	Sealing point on valve bolt and valve seat damaged	Replace valve seat, valve bolt and spring	7.1

9 Recycling

The HP check valve is made of metal. All the metal parts can be recycled.