

Operating instructions

Cryogenic check valve



READ CAREFULLY BEFORE USE! RETAIN FOR FUTURE REFERENCE!

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1 About these instructions

1.1 Principles

The operating instructions are part of the check valve named on the front page.




1.2 Applicable documents

Document	Contents
Catalogue page	Description of the check valve

For accessories, refer to the respective manufacturer's documentation.

1.3 Hazard levels

The warning notes are marked and classified according to the following hazard levels:

Symbol	Explanation
 DANGER	Identifies a hazard with a high risk level that will result in death or serious injury.
 WARNING	Identifies a hazard with a moderate risk level that will result in death or serious injury.
 CAUTION	Identifies a hazard with a low risk level that will result in a minor or moderate injury.
NOTICE	Identifies a risk to property. Damage to property may occur if this notice is ignored.

2 Safety

2.1 Intended use

The check valve is intended to be installed in the pipework system and its purpose is to prevent the return flow of media into the pipework system. The permissible operating conditions are specified in these operating instructions.

The check valve is suitable for the media listed in these operating instructions; see section 4.5 "Media". Operating conditions and applications deviating from these require the approval of the manufacturer.

Only media may be employed to which the materials used for the valve body and seals are resistant. Contaminated media or usage outside of the pressure and temperature specifications can lead to damage to the valve body and seals.

Avoidance of foreseeable incorrect use

- ▶ Never exceed the permissible usage limits specified in the data sheet or in the documentation with regard to pressure, temperature, etc.
- ▶ Follow all safety instructions and operating procedures in these operating instructions.

2.2 Meaning of the operating instructions

The operating instructions are to be read and followed by the responsible technical personnel before mounting and start-up. As part of the check valves the operating instructions must be available close to it. People could be seriously injured or killed if the operating instructions are not followed.

- ▶ Read and observe the operating instructions before using the check valve.
- ▶ Retain the operating instructions and make sure they are available.
- ▶ Pass on the operating instructions to subsequent users.

2.3 Requirements for persons who work with the check valve

Persons could be seriously injured or killed if the check valve is used improperly. In order to avoid accidents, all persons who work with the check valve must meet the following minimum requirements.

- They are physically capable to control the check valve.
- They can safely carry out the work with the check valve within the scope of these operating instructions.
- They understand the operating principles of the check valve within the scope of their work and are able to recognise and avoid the hazards of the work.
- They have understood the operating instructions and are able to implement the information of the operating instructions accordingly.

2.4 Personal protective equipment

Missing or unsuitable personal protective equipment increases the risk of damage to health and injuries to people.

- ▶ The following protective equipment is to be provided and worn during work:
 - Protective clothing
 - Safety shoes
- ▶ Define and use additional protective equipment depending on the application and the media:
 - Safety gloves
 - Eye protection
 - Ear protection
- ▶ Wear the specified personal protective equipment for all work on the check valve.

2.5 Additional equipment and spare parts

Additional equipment and spare parts not conforming to the manufacturer's requirements can negatively affect the operational safety of the check valve and cause accidents.

- ▶ In order to ensure operational safety, use original parts or parts that conform to the manufacturer's requirements. If in doubt, have these confirmed by the dealer or manufacturer.

2.6 Adhere to the technical thresholds

If the technical threshold values are not adhered to, the check valve may sustain damage, accidents may be caused and people may be seriously injured or killed.

- ▶ Adhere to the thresholds. See section "4 Description of the check valve".

2.7 Safety instructions

DANGER

Hazardous medium.

Escaping operating medium can lead to poisoning, burns and caustic burns!

- ▶ Wear the prescribed protective equipment.
- ▶ Provide suitable collecting containers.

Slippage of the check valve out of its suspension.

Danger to life from falling parts!

- ▶ Note the weight specifications and the centre of gravity.
- ▶ Only use suitable and approved load handling equipment.

WARNING

Harmful and/or hot/cold conveyed media, lubricants and fuels

Hazardous for persons and the environment!

- ▶ Collect and dispose of rinsing medium and any residual media.
- ▶ Wear protective clothing and a protective mask.
- ▶ Observe legal regulations regarding the disposal of harmful media.

⚠️ WARNING

Risk of injury if maintenance work is done incorrectly!

Incorrect maintenance can lead to serious injury and considerable material damage.

- ▶ Before the start of work, ensure there is sufficient room for doing the work.
- ▶ Ensure the space around the work is tidy and clean! Parts and tools in loose piles or lying around are hazard sources.
- ▶ If parts have been removed, take care to assemble correctly and re-install all attachment items.
- ▶ Before putting back into service, ensure:
 - All maintenance work has been carried out and completed.
 - There are no persons in the hazard area.
 - All covers and safety devices are installed and operating correctly.

⚠️ CAUTION

Cold/hot pipelines and/or check valves.

Risk of injury due to thermal influences!

- ▶ Insulate the check valves.
- ▶ Attach warning signs.

Medium escaping at high speed and high/low temperature.

Risk of injury!

- ▶ Wear the prescribed protective equipment

NOTICE

Impermissible stresses arising from operating conditions and extensions / added structures.

Leakage or rupture of the check valve body!

- ▶ Provide suitable support.
- ▶ Additional loads, such as traffic, wind or earthquakes, are not explicitly taken into account by default and require separate sizing.

Condensation in air conditioning, cooling and refrigeration plants.

Icing!

Blocking of the actuation mechanism!

Damage due to corrosion!

- ▶ Insulate check valves with diffusion-tight material

Improper handling.

Leaking check valve or damage to the check valve!

- ▶ Do not store tools and/or other objects on the check valve.

Painting of check valves and pipelines.

Functional impairment of the check valve / loss of information!

- ▶ Protect stem, synthetic material parts and type plate against the application of paint.

Impermissible stress.

Damage to the control mechanism!

- ▶ Do not use the check valve as a foothold.

Exceeding the maximum permissible operating conditions.

Damage to the check valve!

- ▶ The maximum permissible operating pressure must not be exceeded, and the minimum and maximum allowable working temperatures must be observed.
- ▶ Create the welding/soldering seam stepwise so that the warming in the middle of the body does not exceed the maximum permissible operating temperature.

Welding beads, scale and other contaminants.

Damage to the check valve!

- ▶ Take appropriate measures against contamination.
- ▶ Remove contaminants from the pipes.

Incorrect earthing during welding work in the pipeline.

Damage to the check valve (burned spots)!

- ▶ Remove bonnet during welding.
- ▶ When carrying out electric welding work, do not use functional parts of the check valves for earthing.

3 Transport and storage

3.1 Inspection of condition on delivery

- ▶ Inspect the check valve for damage upon receipt.
In case of transport damage, determine and document the precise extent of the damage, and report it immediately to the supplying dealer/carrier and the insurer.

3.2 Transportation

- ▶ Transport the check valve in the packaging supplied.
The check valve is delivered ready to operate with lateral connections protected by cover caps.
- ▶ Protect the check valve against hammering, impacts, vibrations and dirt.
- ▶ Adhere to a transport temperature range of -20 °C to +65 °C.

3.3 Storage

- ▶ Store the check valve in a clean and dry place.
- ▶ Make use of a desiccant or heating in damp storerooms to prevent the formation of condensation.
- ▶ Adhere to a storage temperature range of -20 °C to +65 °C.

4 Description of the check valve

Refer to the respective catalogue page for further detailed information.

4.1 Structure



Design

Automatic opening and closing, straight-type check valve.

Component	Design
Body	Straight-type
Bonnet	Flanged, without spindle bushing
Obturator	Disc with seal made of non-metallic materials
Body end	with soldering end with welding end with threaded end (G; R; NPT; M) with flanged connection with welded-in/soldered-in pipes

4.2 Valving marking

The check valves are provided with an individual marking for identification.

Symbol	Explanation
DN.....	Nominal diameter
PN.....	Rated working pressure (max. permissible operating pressure)
-.....°C +.....°C	Temperature, min. / max.
	Manufacturer's mark "HEROSE"
01/18	Year of construction MM/YY
12345	Type
01234567	Serial no.
EN1626	Standard
 0045	CE-mark and number of the notified body
e.g. CF8 / 1.4308	Material

4.3 Intended use

The purpose of check valves is to prevent the return flow of media into pipework systems.

4.4 Operational data

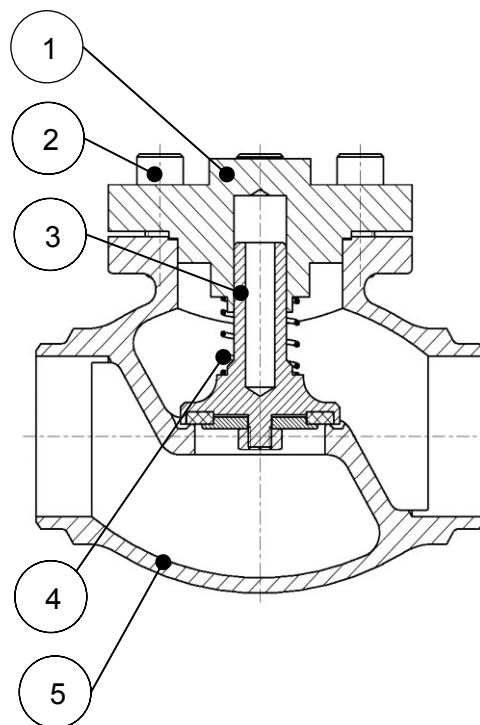
Check valve	Nominal pressure	Temperature	Opening pressure	Max. operating pressure
05411	PN50	-196 °C to +120 °C	Approx. 0.1 bar	50 bar
05412	PN50	-196 °C to +120 °C		50 bar
05413	PN50	-196 °C to +120 °C		50 bar
05414	PN50 (DN100 = PN40 DN150 = PN25/40 DN200 = PN25)	-196 °C to +120 °C		50 bar (DN100 = 40 bar DN150 = 25 bar/40 bar DN200 = 25 bar)
05415	PN50	-196 °C to +120 °C		50 bar
05416	PN50 (DN100=PN40 DN150=PN25/40)	-196 °C to +120 °C		50 bar (DN100 = 40 bar DN150 = 25 bar/40 bar)
05417	PN50	-196 °C to +120 °C		50 bar
05418	PN40 Class 150 Class 300	-196 °C to +120 °C		40 bar Class 150 Class 300
05419	PN40 Class 150 Class 300	-196 °C to +120 °C		40 bar Class 150 Class 300
05614	PN50	-196 °C to +120 °C		50 bar
05714	PN50 (DN100=PN40 DN150=PN25)	-255 °C to +120 °C		50 bar (DN100 = 40 bar DN150 = 25 bar)
05717	PN50	-255 °C to +120 °C		50 bar
05719	PN40 Class 150 Class 300	-255 °C to +120 °C		40 bar Class 150 Class 300

4.5 Media

Suitable for vapours, gases, cryogenic liquefied gases and their gas mixtures, such as:

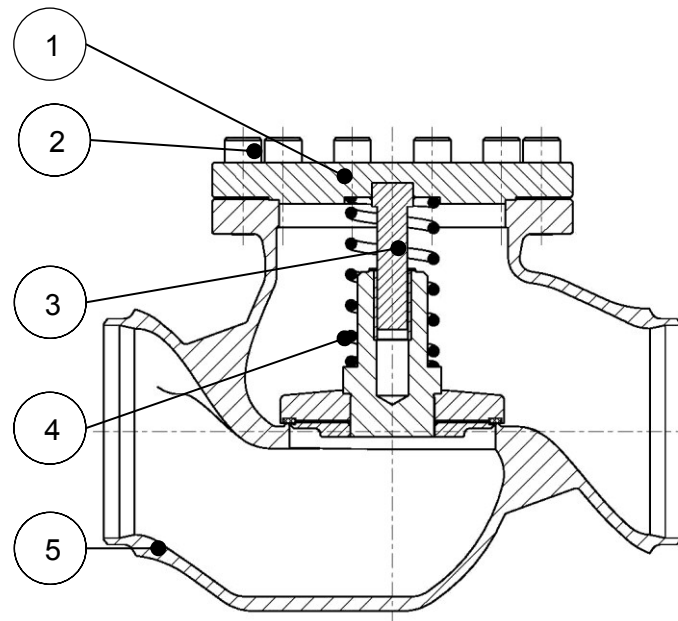
Name
Argon,
Chlorotrifluoromethane
Nitrous oxide,
Ethane,
Ethylene,
Carbon dioxide,
Carbon monoxide,
Krypton,
LNG,
LPG,
Methane,
Oxygen,
Nitrogen,
Trifluoromethane,

4.6 Materials



DN 10 - 150

Part no.	Name	Material
1	Cap	CC493K; 1.4301; 1.4404
2	Bolts	A2-70; A4-70
3	Obturator	CW614N; 1.4301; 1.4404; Hostafon TF4215; TFM 1600; TFM 1700
4	Spring	CW452K; 1.4571
5	Body	CC491K; 1.4308; 1.4409



DN 200

Part no.	Name	Material
1	Cap	1.4301; 1.4404
2	Bolts	A2-70; A4-70
3	Obturator	1.4301; 1.4404; PTFE; PCTFE; PTFE/carbon
4	Spring	1.4571
5	Body	1.4308; 1.4409

4.7 Scope of delivery

- Check valve
- Operating instructions
- Replacement seal

4.8 Dimensions and weights

- ▶ See catalogue page.

4.9 Lifetime

The user is obligated to use Herose products only for their intended purpose.

In this case, a technical service life may be assumed in accordance with the underlying product standards (e.g. EN1626 for shut-off valves and EN ISO 4126-1 for safety valves).

The technical service life can be restarted several times through the exchange of wearing parts within the context of the maintenance intervals, and lifetimes of more than 10 years can be achieved.

If products are stored for a period exceeding 3 years, then the synthetic material components and elastomer sealing elements fitted to the product should be replaced as a precautionary measure before mounting and use.

5 Assembly

5.1 Installation position

≤ DN150

With regard to the installation position, pay attention to the arrow showing the flow direction. When mounting the check valve in a horizontal pipeline, a vertical position of the obturator is recommended (cover facing upwards) or an inclination of up to 65° from the vertical.

DN200

With regard to the installation position, pay attention to the arrow showing the flow direction. When mounting the check valve in a horizontal pipeline, a vertical position of the obturator is recommended (cover facing upwards) or an inclination of up to 45° from the vertical.

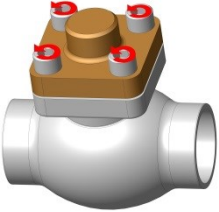
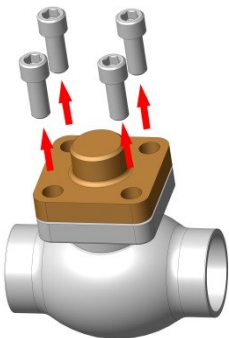
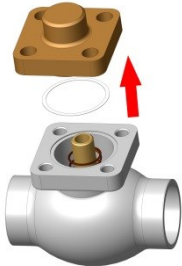
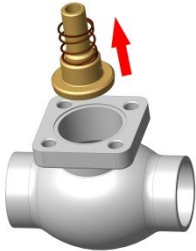


5.2 Notices regarding the mounting

- ▶ Use suitable tools.
 - Allen keys of sizes 6, 8, 10, 14, 19;
 - Open-ended spanners;
 - Torque wrench;
 - TIG welding machine;
 - Oxy-fuel welding machine;
- ▶ Clean tools before the mounting.
- ▶ Use suitable transport and lifting equipment for the mounting.
- ▶ Open the packaging only directly before the mounting. Freedom from oil and grease for oxygen (O₂).
Check valves for oxygen are permanently marked with "O₂".
- ▶ Only install the check valve if the maximum operating pressure and operating conditions of the plant correspond to the valving marking on the check valve.
- ▶ Remove protective caps or covers before mounting.
- ▶ Check the check valve for dirt and damage.
DO NOT install damaged or dirty check valves.
- ▶ Remove dirt and residues from the pipeline and check valve in order to prevent leaks.
- ▶ Avoid damaging the connections.
The sealing surfaces must remain clean and intact.
- ▶ Seal the check valve with suitable seals.
No sealant (sealing tape, liquid sealing tape) may enter the check valves.
Respect the suitability for use with O₂.
- ▶ Connect pipelines in a force-free and torque-free manner.
Stress-free mounting.
- ▶ In order to ensure trouble-free operation, no impermissible static, thermal or dynamic stresses may be transmitted to the check valve. Observe reaction forces.
- ▶ Temperature-dependent changes in length in the pipework system must be compensated with expansion joints.
- ▶ The check valve is supported by the pipework system.
- ▶ The check valve must be protected against dirt and damage during construction work.
- ▶ Check the leak-tightness.

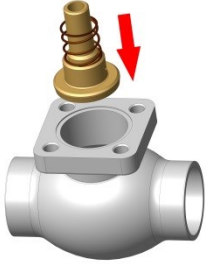
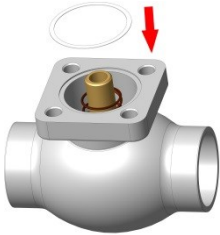
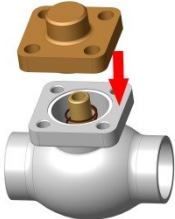
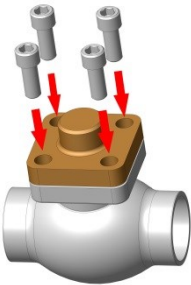
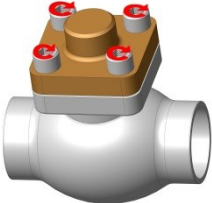
5.3 Welding / soldering

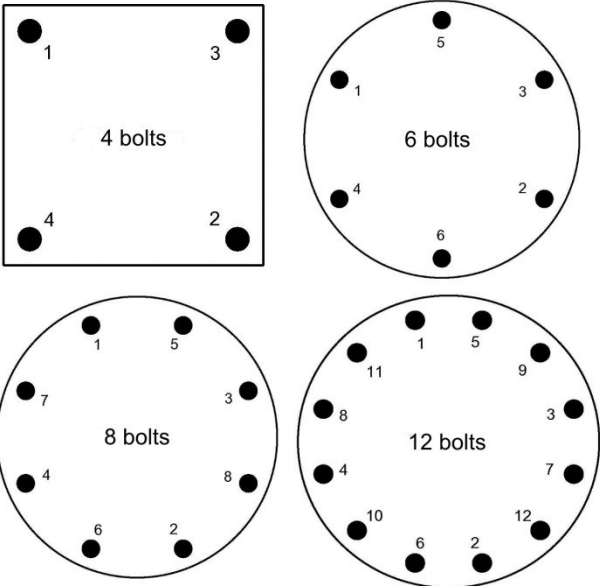
Welding / soldering of the check valves and any heat treatment that may be required are the responsibility of the contracting construction company or operating company.

■ Before welding / soldering

	<ul style="list-style-type: none"> ▶ Loosen the bolts Direction of rotation: counter clockwise
	<ul style="list-style-type: none"> ▶ Remove the bolts
	<ul style="list-style-type: none"> ▶ Remove bonnet and seal
	<ul style="list-style-type: none"> ▶ Remove the obturator
	<ul style="list-style-type: none"> ▶ Dispose of the seal
	<ul style="list-style-type: none"> ▶ Weld / solder in the body


■ After welding / soldering

	<p>▶ Insert the obturator</p>
	<p>▶ Insert a new seal</p>
	<p>▶ Assemble the bonnet ⚠ Do not damage the seal</p>
	<p>▶ Assemble the bolts</p>
	<p>▶ Tighten the bolts to the specified tightening torque in a criss-cross pattern Direction of rotation: clockwise</p>



► Assembly sequence for the bolts

Nominal diameter	RB-bonnet/ RB-body [Nm]	RB-bonnet/ SS-body [Nm]	SS-bonnet/ SS-body [Nm]	Cheesehead screw
DN 10	19	19 25	30	M8
DN 15	19	19 25	30	M8
DN 20	37	44	50	M10
DN 25	37	44	50	M10
DN 32	41	45	50	M10
DN 40	51	60	70	M12
DN 50	49	50	50	M10
DN 65	-	80	90	M12
DN 80	-	90	110	M16
DN 100	-	110	130	M16
DN 150	-	130	130	M16
DN 200	-	-	130	M24



► Check the leak-tightness

6 Operation

- Check the following points prior to start-up:
 - All mounting and installation work are completed.
 - The safety guards are in place.
 - Compare the material, pressure, temperature and installation position with the layout plan for the pipework system.
 - Remove dirt and residues from the pipeline and check valve in order to prevent leaks.

7 Maintenance and service

7.1 Safety during cleaning

- ▶ Take note of the specifications in the safety data sheet and the general occupational health and safety rules if degreasers are used for process-related reasons for the cleaning of bearing parts, unions and other precision parts.

7.2 Maintenance

The maintenance intervals must be defined by the user according to the operating conditions. The recommendations for the functional checking of the check valves are to be taken from section 7.2.1 "Inspection and maintenance intervals" in these operating instructions.

7.2.1 Inspection and maintenance intervals

Recommended intervals		
Description	Interval	Scope
Inspection	▶ During start-up	<ul style="list-style-type: none"> ■ Visual inspection <ul style="list-style-type: none"> <input type="checkbox"/> of the check valve for damage; <input type="checkbox"/> of the valving marking for legibility; ■ Leak-tightness <ul style="list-style-type: none"> <input type="checkbox"/> Between cover and body; <input type="checkbox"/> of the valve seat; ■ Test the opening and closing functions of the check valve.
Functional testing	▶ Annually	<ul style="list-style-type: none"> ■ Test the opening and closing functions of the check valve including a visual inspection.
External inspection	▶ Every 2 years	<ul style="list-style-type: none"> ■ Check of function and tightness test including visual check.
Internal inspection	▶ Every 5 years	<ul style="list-style-type: none"> ■ Replacement of all sealing elements, including a function and tightness test as well as a visual inspection.
Hydraulic test	▶ Every 10 years	<ul style="list-style-type: none"> ■ Replacement of all sealing elements, including a function and tightness test as well as an inspection.

7.3 Fault table

Fault	Cause	Remedial action
<ul style="list-style-type: none"> ■ Leak between bonnet and body 	Bonnet loose Seal damaged	<ul style="list-style-type: none"> ▶ Retighten the bonnet bolts ▶ Replace seal
<ul style="list-style-type: none"> ■ Leak in the seating 	Foreign body between cone and seating Seating damaged Cone seal damaged	<ul style="list-style-type: none"> ▶ Remove foreign body / flush the system ▶ Replace the body ▶ Replace the cone
<ul style="list-style-type: none"> ■ Body leaking 	Discontinuity/gas cavity open	<ul style="list-style-type: none"> ▶ Replace the body
<ul style="list-style-type: none"> ■ Check valve does not open / close 	Cone stuck	<ul style="list-style-type: none"> ▶ Replace the bonnet and cone

7.4 Spare parts

We require the following details for your spare part orders:

- article no. of the spare part package,
- desired delivery quantity,
- dispatch and delivery address,
- desired method of dispatch.

7.5 Returns / complaints

Use the Service form in case of returns/complaints.



Contact in case of service:
 Herose.com › Service › Product service › Complaints
 E-mail: service@herose.com
 Fax: +49 4531 509 – 9285

8 Disassembly and disposal

8.1 Notices regarding the disassembly

- ▶ Take note of all national and local safety requirements.
- ▶ The pipework system must be depressurised.
- ▶ The medium and check valve must be at ambient temperature.
- ▶ Aerate / flush the pipework system in the case of corrosive and aggressive media.

8.2 Disposal

1. Dismantle the check valve.
 - ▶ Collect greases and lubricating fluids during dismantling.
2. Separate the materials:
 - Metal
 - Synthetic material
 - Electronic scrap
 - Greases and lubricating fluids
3. Carry out a sorted disposal of the materials.

