

Operating instructions

Cryogenic globe valves 11C01



IMPORTANT

Read carefully before use.

Retain for later use.

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Table of contents

1	About these instructions	EN	1
2	Safety	EN	1
3	Transport and storage	EN	4
4	Description of the valves	EN	4
5	Assembly	EN	8
6	Operation	EN	12
7	Maintenance and service	EN	12
8	Disassembly and disposal	EN	14

1 About these instructions

1.1 Principles

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

1.2 Applicable documents

Document	Contents
Data sheet	Description of the valves

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

1.3 Hazard levels

Warnings are identified and classified into 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 valves are intended for mounting in a pipeline or pressure tank system in order to block media or allow them to pass through within the permissible operating conditions. The permissible operating conditions are specified in these operating instructions.

The valves are 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.

Valves with a control plug as the obturator may not be used in a plant as end-of-line valves (last valve before the atmosphere).

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 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 valves.
- ▶ 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 valves

There is a danger of serious injury or death if the valves are used incorrectly. In order to avoid accidents, all persons who work with the valves must meet the following minimum requirements.

- ▶ They are physically capable to control the valves.
- ▶ They can safely carry out the work with the globe valves within the scope of these operating instructions.
- ▶ They understand the operating principles of the valves 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 valves.

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 pressure regulator 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 for the valves are not adhered to, the valves may sustain damage, accidents may be caused and people may be seriously injured or killed.

- ▶ Adhere to the thresholds. See chapter "4. Description of globe valves".
- ▶ This product is designed for ≤ 500 loading cycles at pressure differences from zero to PN and any number of loading cycles at pressure differences not exceeding $0.1 \times \text{PN}$.

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 globe valve out of its suspension.

Danger to life from falling parts!

- ▶ Do not suspend globe valves by the handwheel.
- ▶ 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.

Installation of the valve in the installation position 45° – 180°.

Overloading of the musculoskeletal system due to constrained posture!

Risk of injury due to improper installation!

- ▶ Wear suitable PPE (helmet, gloves, safety shoes, etc.)
- ▶ It is recommended to use a small scaffolding when installing the valve at a height of > 1 m.
- ▶ Use suitable installation/lifting aids.

Flushing connection:

- ▶ The connection must be made to a suitable exhaust air system or the flushing connection must be blanked off.

Uncontrolled increase in pressure in the valve due to failure of the vacuum isolation.

Failure of the vacuum isolation may result in a sudden increase in pressure in the valve.

- ▶ The inlet and outlet of the valve must be protected separately on the plant side by appropriate safety devices
- ▶ Emptying the media chamber in case of planned aeration of the vacuum chamber

CAUTION

Cold/hot pipelines and/or globe valves.

Risk of injury due to thermal influences!

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

Medium escaping at high speed and high/low temperature.

Risk of injury!

- ▶ Wear the prescribed protective equipment.

Uncontrolled opening of the vacuum chamber can lead to injuries due to vacuum

- ▶ Wear personal protective equipment (gloves, safety glasses)
- ▶ The vacuum chamber must be aerated in a controlled manner before disassembly

MLI film may catch fire when welding

- ▶ When welding in the valve, the MLI film must be protected by suitable means against heat and flying sparks. (e.g. cover with protective mats or similar)

NOTICE

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

Valve body leaking or broken!

- ▶ 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 the valves with diffusion-tight material.

Improper handling.

Leak or damage to the valves!

- ▶ Do not store tools and/or other objects on the valves.
- ▶ Do not use tools to increase the torque of the handwheel.

Impermissible stress.

Damage to the control mechanism!

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

Painting of valves and pipelines.

Impairment of the function of the valves / loss of information!

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

Exceeding the maximum permissible operating conditions.

Damage to the globe valve!

- ▶ The maximum permissible working 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 globe valve!

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

Incorrect earthing during welding work in the pipeline.

Damage to the globe valve (burned spots)!

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

3 Transport and storage

3.1 Inspection of condition on delivery

- ▶ Inspect the valves 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 valves in the packaging supplied.
The valves are delivered ready to operate with body ends protected by cover caps.
- ▶ Protect the valves against hammering, impacts, vibrations and dirt.
- ▶ Adhere to a transport temperature range of -20°C to $+65^{\circ}\text{C}$.

3.3 Storage

- ▶ Store the valves 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 $+65^{\circ}\text{C}$.

4 Description of the valves

Refer to the respective catalogue page for further detailed information.

4.1 Structure

Design

Non-automatically opening and closing gate valve.

Component	Design
Body	Straight type, angle type, diagonal type With and without vacuum isolation
Bonnet	Flanged, inside stem thread Flanged, without stem thread
Operating mechanism	Non-rising stem Rising stem
Obturator	Disc with seal made of non-metallic materials
Stem bushing	Not self-sealing, packing gland, bellows
Body end	with welding end with welded pipes

4.2 Valving marking

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

Symbol	Explanation
DNXXX	Nominal diameter
PNXXX	Rated working pressure (max. permissible working pressure)
-XXX°C +XXX°C	Temperature, min. / max.
	Manufacturer's mark "HEROSE"
e.g. 01/19	Year of construction MM/YY
12345	Type
01234567	Serial no.
e.g. EN1626, EN13709	Standard
CE XXXX	CE-mark and number of the notified body
Π XXX	Pi-mark and number of the notified body
 XXX	Conformity mark for Ukraine and certification body
O ₂	suitable for oxygen applications
e.g. 1.4571	Material

Following item refers to the presentation in 4.6 Materials.

To ensure that the markings (DN, PN, min./max. temperature, flow direction marking and material designation) applied to the body (item 8 in section 4.6) remain visible even after the valve body has been insulated, these markings are also applied to the flange (item 4 in section 4.6). However, the batch number of the body material is not applied to the flange.

Since the body material (item 8) differs from the material from which the flange (item 4) was made, the correct flange material and the associated material batch number are also marked on the flange. Based on the combined specification of flange material and the associated material batch number, the correct flange material remains identifiable.

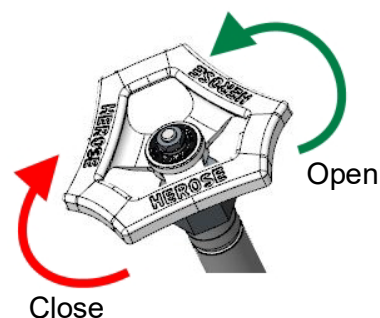
4.3 Intended use

Globe valves are used for shutting off and/or throttling media. Install globe valves so that the stem is vertical, and the type of the medium enters under the cone.

The globe valves are opened or closed by turning the handwheel or operating the actuator.

NOTICE! Tools for increasing handwheel torque are not allowed.

Detailed user information for actuator powered globe valves must be readily available.



4.4 Operational data

Globe valve	Nominal pressure	Temperature	Max. operating pressure
11C01.A001	PN63	-269°C to +80°C	63 bar
11C01.A001 (DN80)	PN25	-269°C to +80°C	25 bar
11C01.A002	PN50	-255°C to +120°C	50 bar
11C01.A003	PN25	-269°C to +80°C	25 bar
11C01.A004	PN25	-255°C to +120°C	25 bar
11C01.A009	PN63	-269°C to +80°C	63 bar
11C01.A010	PN50	-255°C to +120°C	50 bar

When properly sized, non-return valves function flawlessly as intended.

Based on experience, the valve's minimum working range should be 50% of its total capacity for gases and 40% for fluids.

Lower flow rates can cause unstable behaviour, excessive noise and even component failure.

4.5 Media

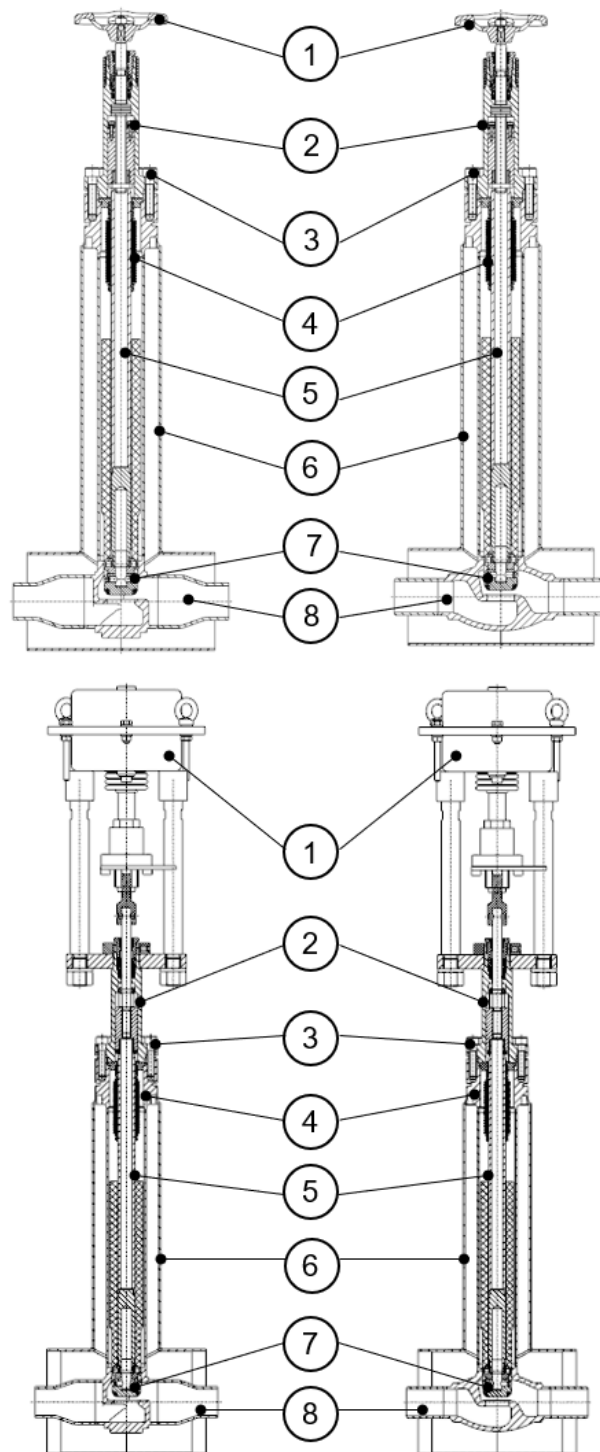
Gases, cryogenic liquefied gases and their gas mixtures, such as:

Name		
Argon	Chlorotrifluoromethane	Nitrous oxide
Ethane	Ethylene	Helium
Carbon dioxide	Carbon monoxide	Krypton
LNG	LPG	Air
Methane	Neon	Oxygen
Nitrogen	Trifluoromethane	Hydrogen
Xenon		
Ethylene, acetylene/propylene mixture* (with at least 71.5 % ethylene, max. 22.5% acetylene and max. 6 % propylene)		

* Only in conjunction with stem sealing by means of a bellows.

The use of other media is only permitted after consultation with the manufacturer.

4.6 Materials



Part no.	Name	Material
1	Handwheel / Actuator	1.4409 / divers
2	Bonnet	1.4404
3	Screws	A4-70 / A4-80
4	Flange	1.4404 / 1.4571
5	Stem	1.4571
6	Vacuum jacket	1.4404
7	Obturator	1.4571 / PCTFE
8	Body	1.4571 / 1.4409

4.7 Scope of delivery

- ▶ Globe valve.
- ▶ Operating instructions.
- ▶ Seals

4.8 Dimensions and weights

See data sheet.

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

With regard to the installation position, pay attention to the arrow showing the flow direction. When mounting the globe valve in a horizontal pipeline, a vertical position of the operating mechanism or an inclination of up to 45° from the vertical is recommended.

5.2 Notices regarding assembly and disassembly

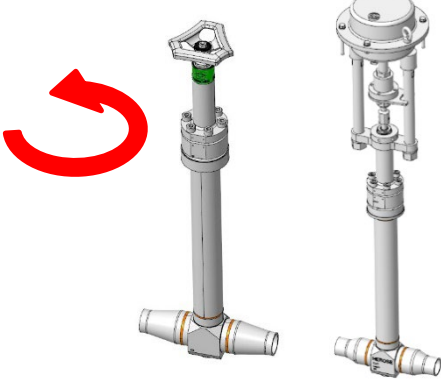
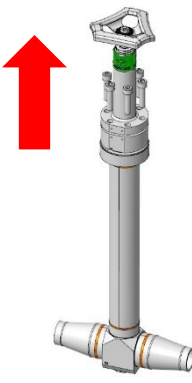
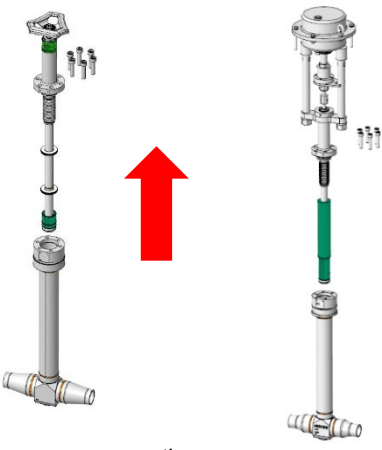
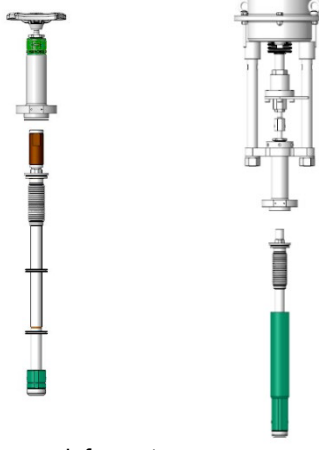
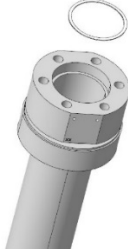
- ▶ Use suitable tools.
 - ☐ Allen keys of sizes 5, 6 and 8
 - ☐ Open-ended spanners
 - ☐ Torque wrench
 - ☐ Welding machine
- ▶ Oxygen-tested HD lubricant for oxygen-bearing globe valves and systems
Recommendation: "Klüberalfa YV93-302" from company "Klüber Lubrication" and "Fomblin® M60" from company "Solvay"
- ▶ Clean tools before the mounting.
- ▶ Use suitable transport and lifting equipment for the mounting.
- ▶ Open the packaging only directly before the mounting. Free of oil and grease for oxygen (O₂).
Globe valves for oxygen are permanently marked with "O₂".
Take note of the HEROSE information sheet "O₂ instructions".
- ▶ Only install the globe valve if the maximum operating pressure and operating conditions of the plant correspond to the valving marking on the globe valve.
- ▶ Remove protective caps or covers and sealing plugs (applicable to versions with flushing connection) before installation.
- ▶ Check the globe valve for dirt and damage. DO NOT install damaged or dirty globe valves.
- ▶ Avoid damaging the body end. The sealing surfaces must remain clean and intact.
- ▶ Seal the globe valve with suitable seals.
No sealant (sealing tape, liquid sealing tape) may enter the globe 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 globe valve. Observe reaction forces.
- ▶ Temperature-dependent changes in length in the pipework system must be compensated with expansion joints.
- ▶ The globe valve is supported by the pipework system.
- ▶ Detailed user information for actuator powered globe valves and attachments with safety function (sensors, switches, solenoid valves, etc.) must be readily available.
- ▶ Driven valves: Mounting/dismantling the bonnet in the centre position of the actuator.
- ▶ The globe valve must be protected against dirt and damage during construction work.
- ▶ Check the leak-tightness.
- ▶ Observe the warning notices when assembling or disassembling vacuum isolations.
- ▶ When welding in the valves with vacuum isolation, make sure that the MLI film is not damaged or contaminated by the grinding or welding work. Form sufficiently.

5.3 Welding / soldering

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

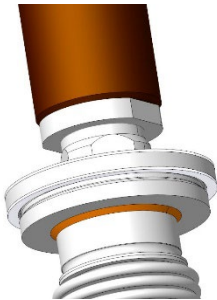
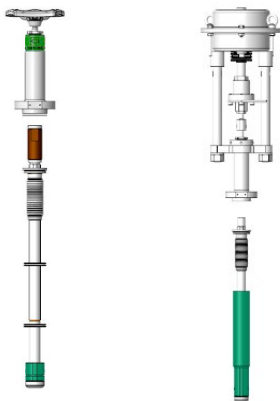
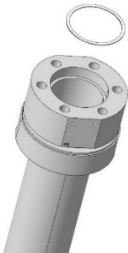
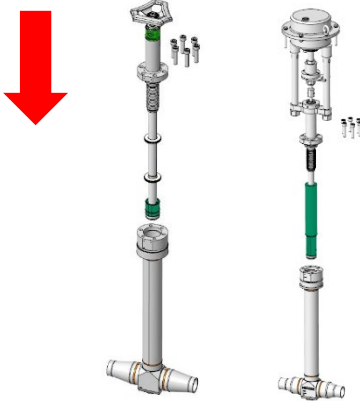
Without bellows / bellows at top.

Before welding / soldering

1.  ► Loosen the screws ► Direction of rotation: counter clockwise	2.  ► Remove the screws
3.  ► Remove upper section	4.  ► Detach top work from stem ► Notice: Left-hand thread ► Remove seal from anti-rotation device
5.  ► Take out the seal and dispose of it	6.  ► Weld / solder in the body

Without bellows / bellows at top.

After welding / soldering

1.  ► Place new seal on anti-rotation device	2.  ► Fit top work ⚠ Do not damage seal ► Screw stem as far as possible into top work. Caution: Left-hand thread ► Check for ease of movement
3.  ► Insert seal	4.  ► Insert the pre-attached hollow stem subassembly into the housing. ► Screw stem as far upwards into the top work as possible so that the cone is not resting in the housing. ► Check for the correct placement of the seals. ⚠ Do not damage seal

5.

- ▶ Wet the screw threads with HD lubricant
Recommendation: Fomblin® M60
- ▶ Tighten the screws to the specified tightening torque in a criss-cross pattern
- ▶ Direction of rotation: clockwise

7.

Nominal size	Bonnet/ Body	Cap bolt
DN10 – 25	15 Nm	M6
DN10 – 40	30 Nm	M8
DN50	50 Nm	M10
DN80	20 Nm	M10

- ▶ Bonnet / body tightening torques

6.

- ▶ Assembly sequence for the screws

8.

- ▶ Check the leak-tightness

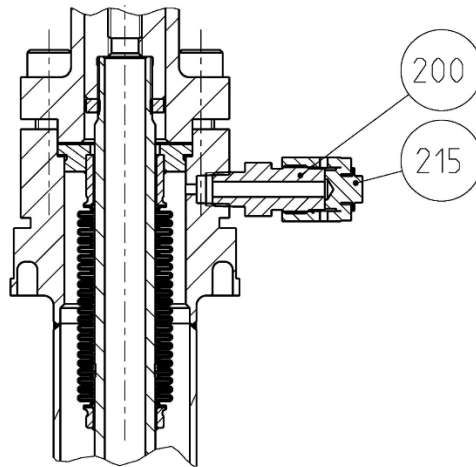
5.4 Flushing connection

- ▶ The installation and tightness of the flushing connection in the valve body are the responsibility of the contracting construction company or operating company.
- ▶ The assembly instructions must be followed according to the T.F.F.T. method ('turns from finger tight'). In the FullX series, this is 2-3 turns.
- ▶ This means:
 - ☐ Tighten the thread by hand and then turn the tool 2-3 times.
 - ☐ Teflon tape is recommended as a sealing material.

6 Operation

6.1 Prior to start-up

- ▶ Check the following points prior to start-up:
 - ☐ All mounting and installation work are completed.
 - ☐ If fitted: The blocking bushing was removed prior to start-up.
 - ☐ 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 globe valve in order to prevent leaks.
 - ☐ For valve designs with a flushing connection, ensure that the sealing plug has been removed and that the enclosed flushing connection (see position 200 / 215 in the image below) has been correctly installed – as described in section 5.4.



7 Maintenance and service

7.1 Safety during cleaning

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

7.2 Maintenance

The maintenance and inspection intervals must be defined by the operating company according to the operating conditions and the national regulations.

The manufacturer's general recommendations for the maintenance and inspection of the globe valves are given in the table below and are based on the national standards of the country of manufacture.

Inspection and maintenance intervals

Recommended intervals		
Description	Interval	Scope
Inspection	During start-up	▶ Visual inspection ☐ of the globe valve for damage; ☐ of the valving marking for legibility; ☐ Installation position; ▶ Leak-tightness ☐ at the packing gland; ☐ between bonnet and body; ☐ of the valve seat; ▶ Test the opening and closing functions of the globe valve.
Functional testing	Testing and maintenance according to the respective local legal regulations. In Germany, for example, according to the Industrial Safety Ordinance	▶ Test the opening and closing functions of the globe valve including a visual inspection.
External inspection	Testing and maintenance according to the respective local legal regulations. In Germany, for example, according to the Industrial Safety Ordinance	▶ Function and tightness test including visual check.
Internal inspection	Every 5 years or ≥ 500 loading cycles	▶ Replacement of all sealing elements if the tightness test, functional test and visual inspection yield negative results.
Strength test	Every 10 years	▶ Replacement of all sealing elements, including a function, leak and pressure test as well as an inspection.

7.3 Maintenance instructions gland nut

According to DIN EN 1626, the leak rate must be less than $14 \text{ mm}^3/\text{s}$ (for flammable liquids less than $10 \text{ mm}^3/\text{s}$). The stem seal is maintenance-free and cannot be retightened.

7.4 Fault table

Fault	Cause	Remedy
Leak at the stem	Gland nut loose	▶ Retighten the gland nut
	Packing gland defective	▶ Replace the packing gland
	Fit on the stem damaged	▶ Replace the stem
Leak between bonnet and body	Bonnet loose	▶ Tighten the screws to the specified tightening torque
	Seal damaged	▶ Replace seal
Leak in the seating	Foreign bodies between obturator and seating	▶ Remove foreign body / flush the system
	Seating damaged	▶ Replace the body
	Sealing surface of obturator damaged	▶ Replace the obturator
Body leaking	Discontinuity/gas cavity open	▶ Replace the body

Fault	Cause	Remedy
Globe valve does not open / close	Gland nut overtightened	► Loosen the gland nut Tightness must still be ensured
	Thread seized	► Replace bonnet
	Actuator not working	► Check energy supply to the actuator

7.5 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.

7.6 Returns / complaints

Use the Service form in case of returns/complaints.



Contact in case of service:
 Herose.com → Service → Complaints
 E-mail: service@herose.com
 Phone: +49 4531 509 – 500
 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 valve must be at ambient temperature.
- Aerate / flush the pipework system in the case of corrosive and aggressive media.

8.2 Disposal

1. Dismount the valves.
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.