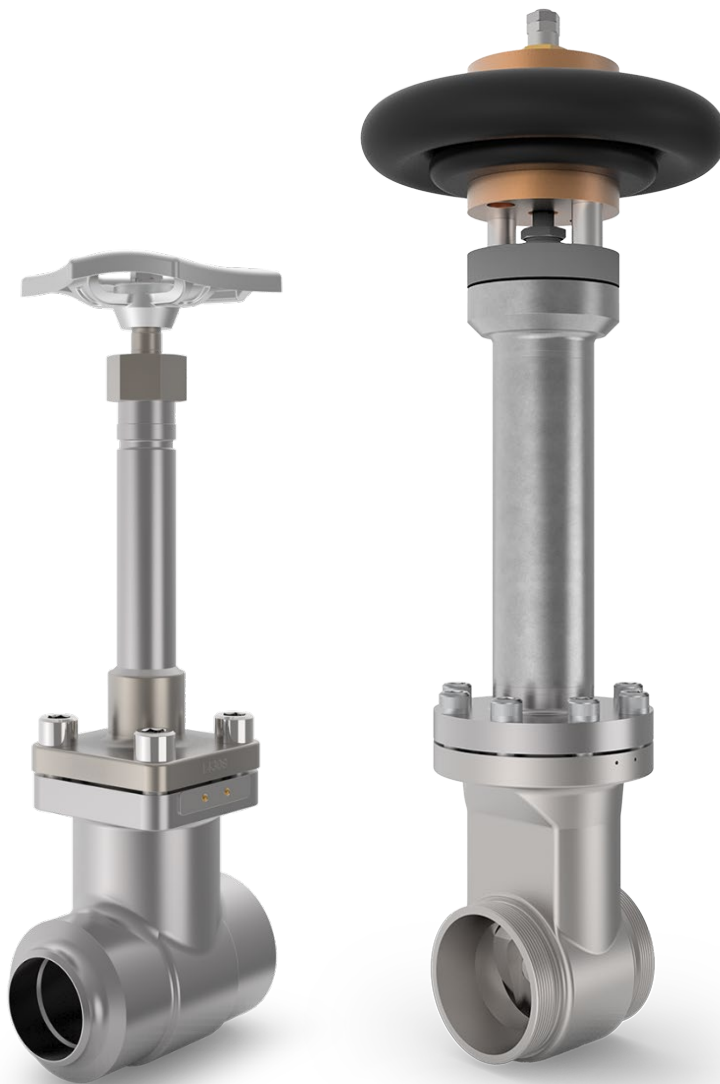


## **Operating instructions**

### **Cryogenic gate valves**

**093xx / 094xx**





### **IMPORTANT**

**Read carefully before use.**

**Retain for later use.**

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**Armaturen und Metalle**

Elly-Heuss-Knapp-Straße 12  
23843 Bad Oldesloe  
Germany

Phone: +49 4531 509 – 0  
Fax: +49 4531 509 – 120

E-mail: [info@herose.com](mailto:info@herose.com)  
Web: [www.herose.com](http://www.herose.com)

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## 1 About these instructions

### 1.1 Principles

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

### 1.2 Applicable documents

| Document       | Contents                      |
|----------------|-------------------------------|
| Catalogue page | Description of the gate 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                                                                                 |
|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
|  <b>DANGER</b>  | Identifies a hazard with a high risk level that will result in death or serious injury.     |
|  <b>WARNING</b> | Identifies a hazard with a moderate risk level that will result in death or serious injury. |
|  <b>CAUTION</b> | Identifies a hazard with a low risk level that will result in a minor or moderate injury.   |
| <b>NOTICE</b>                                                                                    | Identifies a risk to property. Damage to property may occur if this notice is ignored.      |

## 2 Safety

### 2.1 Intended application

The gate valve is intended for installation 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 gate 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 gate valve 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 gate 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 gate valve

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

- They are physically capable of controlling the gate valve.
- They can safely carry out the work with the gate valve within the scope of these operating instructions.
- They understand the operating principles of the gate 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 gate 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 gate valve and cause accidents.

- ▶ 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 gate valve are not adhered to, the gate valve may sustain damage, accidents may be caused and people may be seriously injured or killed.

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

## 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 gate valve out of its suspension.**

Danger to life from falling parts!

- ▶ Do not suspend gate 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.

### **CAUTION**

#### **Cold/hot pipelines and/or gate valves.**

Risk of injury due to thermal influences!

- ▶ Isolate the gate valve.
- ▶ Attach warning signs.

#### **Medium escaping at high speed and high/low temperature.**

Risk of injury!

- ▶ Wear the prescribed protective equipment

### **NOTICE**

#### **Impermissible stress due to operating conditions and extensions / added structures.**

Leakage or rupture of the gate 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 gate valve with diffusion-tight material

#### **Improper handling.**

Leaking gate valve or damage to the gate valve!

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

#### **Painting of gate valves and pipelines.**

Functional impairment of the gate valves / loss of information!

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

#### **Impermissible stress**

Damage to the control mechanism!

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

#### **Exceeding the maximum permissible operating conditions.**

Damage to the gate 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.

#### **Particles and other contaminants in the conveyed medium.**

Damage to the valve / internal leak!

- ▶ Remove particles/contaminants from the conveyed medium.
- ▶ It is recommended to install strainers / dirt filters in the pipework system.

#### **Incorrect earthing during welding work in the pipeline.**

Damage to the gate valve (burned spots)!

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

## **3 Transport and storage**

### **3.1 Inspection of condition on delivery**

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

### 3.3 Storage

- ▶ Store the gate 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  $-20\text{ }^{\circ}\text{C}$  to  $+65\text{ }^{\circ}\text{C}$ .

## 4 Description of the gate valve



For detailed information, please visit  
<https://products.herose.com/> and enter the  
 product model number in the search field.

### 4.1 Structure

#### Design

Non-automatic opening and closing gate valve, with handwheel or actuator depending on the model.

| Component           | Design                                                                                                                                    |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Body                | Straight-type                                                                                                                             |
| Bonnet              | Flanged, internal stem thread,<br>Flanged, without stem thread                                                                            |
| Operating mechanism | Rising stem                                                                                                                               |
| Obturator           | multi-part obturator with gasket                                                                                                          |
| Stem bushing        | Non self-sealing, packing gland                                                                                                           |
| Body end            | with soldering end<br>with welding end<br>with threaded end (G; R; NPT; M)<br>with flanged connection<br>with welded-in/soldered-in pipes |

### 4.2 Marking

The gate valve is provided with an individual valving marking for identification.

| Symbol                                                                                   | Explanation                                                |
|------------------------------------------------------------------------------------------|------------------------------------------------------------|
| DNxxx                                                                                    | Nominal diameter                                           |
| PNxxx                                                                                    | Rated working pressure (max. permissible working pressure) |
| $-xxx^{\circ}\text{C}$ $+xxx^{\circ}\text{C}$                                            | Temperature                                                |
|       | Manufacturer's mark "HEROSE"                               |
| 01/18                                                                                    | Year of construction MM/YY                                 |
| 12345                                                                                    | Type                                                       |
| 01234567                                                                                 | Serial no.                                                 |
| EN1626                                                                                   | Standard                                                   |
|  _xxx | CE-mark and number of the notified body                    |
|  _xxx | PI-mark and number of the notified body                    |
| e.g. CF8 / 1.4308                                                                        | Material                                                   |

### 4.3 Intended application

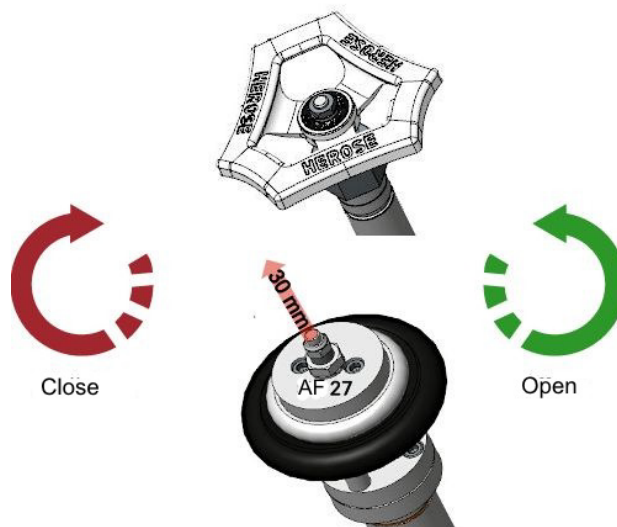
The gate valves are one-sided sealing valves that shut off the media in the flow direction. The gate valve is closed or opened by turning the handwheel.

Gate valves with an actuator are driven by a compressed air supply, e.g. via an 8,0 mm hose, with a recommended working pressure of 6,0 bar, max. 10,0 bar. The gate valve is opened by the supply air and closed by the spring. A reverse mode of operation is not possible.

#### Emergency actuation:

The gate valve is opened by 30.0 mm by turning the 27 mm adjusting screw directly above the actuator in the counter clockwise direction; turning it clockwise closes the gate valve.

**NOTICE!** Tools for increasing handwheel torque are not allowed.



### 4.4 Operational data

| Valve | Nominal pressure | Temperature        | Actuator working pressure | Max. actuator working pressure |
|-------|------------------|--------------------|---------------------------|--------------------------------|
| 093xx | PN50             | -196 °C to +120 °C | 6 bar                     | 10 bar                         |
| 094xx |                  |                    |                           |                                |

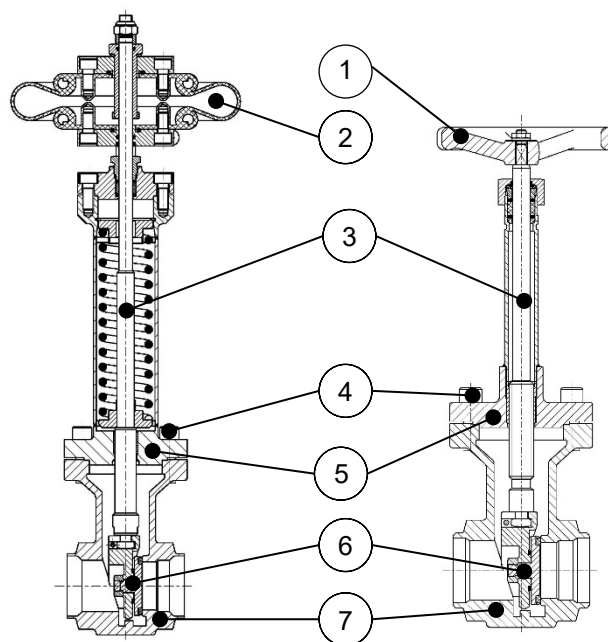
### 4.5 Media

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

| Name                        |                        |                |                 |
|-----------------------------|------------------------|----------------|-----------------|
| Argon                       | Chlorotrifluoromethane | Nitrous oxide  | Ethane          |
| Ethylene                    | Helium                 | Carbon dioxide | Carbon monoxide |
| Liquid krypton, deep-cooled | LNG                    | LPG            | Air             |
| Methane                     | Neon                   | Oxygen         | Nitrogen        |
| Trifluoromethane            | Hydrogen               | Xenon          |                 |

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

## 4.6 Materials



| Part no. | Name      | Material                                      |
|----------|-----------|-----------------------------------------------|
| 1        | Handwheel | Aluminium alloy                               |
| 2        | Actuator  | Rubber                                        |
| 3        | Stem      | 1.4301                                        |
| 4        | Bolts     | A2-70                                         |
| 5        | Bonnet    | 1.4308 / 1.4541 / 1.4301 / 1.4306             |
| 6        | Obturator | 1.4571 / 1.4305 / CW614N / PTFE / PTFE/carbon |
| 7        | Body      | 1.4308                                        |

## 4.7 Scope of delivery

- Valve
- Operating instructions
- Seals

## 4.8 Dimensions and weights



For detailed information, please visit  
<https://products.herosse.com/> and enter the  
 product model number in the search field.

## 4.9 Lifetime

The user is obligated to use HEROSE products 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 installing the gate valve in a horizontal pipeline, a vertical position of the stem is recommended with the handwheel at the top or an inclination of up to 45° from the vertical.

### 5.2 Fitting Notice

- ▶ Use suitable tools.
  - ☐ Allen keys of sizes 6, 8, 10, 14, 19;
  - ☐ Open-ended spanners;
  - ☐ Torque wrench;
  - ☐ Pipe wrench;
  - ☐ TIG welding machine;
  - ☐ Oxy-fuel welding machine;
- ▶ Clean tools before fitting.
- ▶ Use suitable transport and lifting equipment for the mounting.
- ▶ Open the packaging only directly before the mounting. Free from oil and grease for oxygen (O<sub>2</sub>) Gate valves for oxygen are permanently labelled with "O<sub>2</sub>". Take note of the HEROSE information sheet "O<sub>2</sub> instructions".
- ▶ Only install the gate valve if the working pressure and operating conditions of the plant correspond to the valving marking on the gate valve.
- ▶ Remove protective caps or covers before mounting.
- ▶ Check the gate valve for dirt and damage. DO NOT install damaged or dirty gate valves.
- ▶ Avoid damaging the connections. The sealing surfaces must remain clean and intact.
- ▶ Seal the gate valve with suitable seals. No sealant (sealing tape, liquid sealant) may enter the gate valve. Respect the suitability for use with O<sub>2</sub>.
- ▶ Connecting flanges must line up with each other.
- ▶ Tighten the bolts crosswise to the permissible torque Use all of the flange holes provided for the flange connection.
- ▶ 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 gate valve. Observe reaction forces.
- ▶ Temperature-dependent changes in length in the pipework system must be compensated with expansion joints.
- ▶ The gate valve is supported by the pipework system.
- ▶ The gate valve must be protected against dirt and damage during construction work.
- ▶ Remove any transport locks such as blocking bushing (optional).
- ▶ Check the leak-tightness.

## 5.3 Welding / soldering

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

In the case of valves with pipes that are already soldered into/onto the inlet and outlet, the bonnet can remain in the body. It is necessary here for the valve to be in the open position and that the forming gas flows through in the flow direction.

During this procedure, make sure that no dirt gets into the interior.

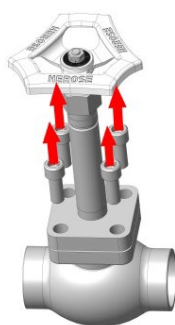
### Before welding / soldering



- ▶ Lifting screw, 27 mm AF, loosen to the stop
- ▶ Direction of rotation: counter clockwise



- ▶ Loosen the bolts
- ▶ Direction of rotation: counter clockwise



- ▶ Remove the screws



- ▶ Remove bonnet and seal

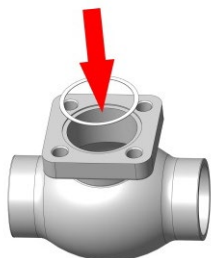


- ▶ Dispose of the seal



- ▶ Weld / solder in the body

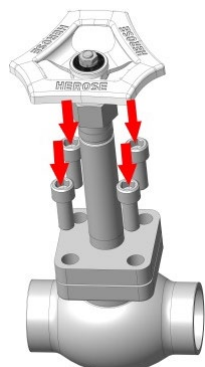
## After welding / soldering



- Insert a new seal



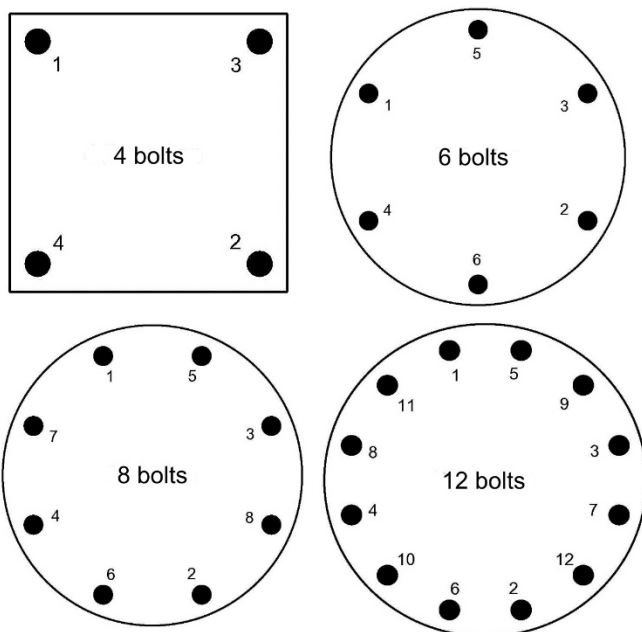
- Assemble the bonnet
- ⚠ Do not damage the seal



- Tighten the bolts



- Cross tighten the bolts to the specified torque
- Direction of rotation: clockwise



► Assembly sequence for the screws

| Nominal diameter | Tightening torque | Cylinder bolt |
|------------------|-------------------|---------------|
| DN25             | 50 Nm             | M10           |
| DN40             | 70 Nm             | M12           |
| DN50             | 70 Nm             | M12           |
| DN65             | 90 Nm             | M12           |
| DN80             | 110 Nm            | M16           |
| DN100            | 130 Nm            | M16           |

► Bonnet / body tightening torques



► Lifting screw, 27 mm AF, screw in to the stop.  
► Direction of rotation: clockwise



► Check the leak-tightness

## 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 gate valve in order to prevent leaks.

## 6.2 Safe handling under operating conditions

After fully opening the valve, it must be turned back about half a turn by the operator.  
This is necessary in order to avoid the occurrence of thermal stresses in the stem thread.

## 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.

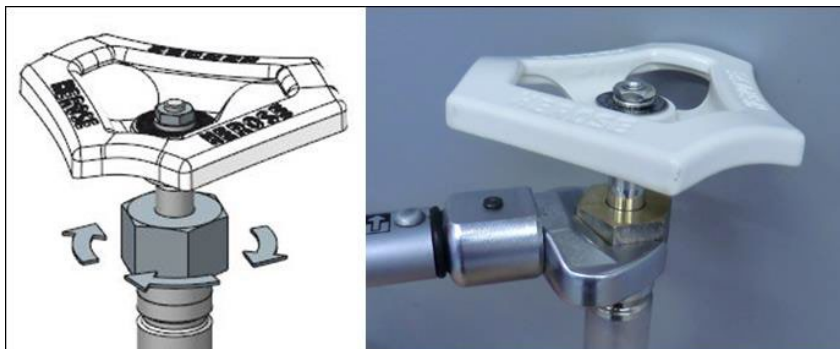
The manufacturer's general recommendations for the maintenance and inspection of the valve are given in the table below and are based on the national standards of the country of manufacture.

#### Inspection and maintenance intervals

| Recommended intervals |                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description           | Interval                                                                                                                                                  | Scope                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Inspection            | During start-up                                                                                                                                           | <ul style="list-style-type: none"> <li>▶ Visual inspection <ul style="list-style-type: none"> <li><input type="checkbox"/> of the gate valve for damage;</li> <li><input type="checkbox"/> of the valving marking for legibility;</li> <li><input type="checkbox"/> Installation position;</li> </ul> </li> <li>▶ Leak-tightness <ul style="list-style-type: none"> <li><input type="checkbox"/> at the packing gland;</li> <li><input type="checkbox"/> between bonnet and body;</li> <li><input type="checkbox"/> of the valve seat;</li> </ul> </li> <li>▶ Test the opening and closing functions of the gate valve.</li> </ul> |
| Functional testing    | Inspection and maintenance in accordance with the respective legal regulations.<br>In Germany, for example, according to the Operational Safety Ordinance | <ul style="list-style-type: none"> <li>▶ Test the opening and closing functions of the gate valve including a visual inspection.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| External inspection   | Inspection and maintenance in accordance with the respective legal regulations.<br>In Germany, for example, according to the Operational Safety Ordinance | <ul style="list-style-type: none"> <li>▶ Function and tightness test including visual inspection.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Internal inspection   | Every 5 years or $\geq 500$ loading cycles                                                                                                                | <ul style="list-style-type: none"> <li>▶ Replacement of all sealing elements if the tightness test, functional test and visual inspection yield negative results.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Strength test         | Every 10 years                                                                                                                                            | <ul style="list-style-type: none"> <li>▶ Replacement of all sealing elements, including a function, leak and pressure test as well as an inspection.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

### 7.3 Maintenance instruction - packing gland nut

In accordance with DIN EN 1626 the leakage rate must be less than 14 mm<sup>3</sup>/s (in the case of combustible fluids less than 10 mm<sup>3</sup>/s). To achieve and maintain a lower leakage rate of 0,1 mm<sup>3</sup>/s. After 50 cycles it is recommended to tighten the glands nuts of HEROSE valves with a torque wrench and to the torque corresponding to the table.



#### Torque

| Valve nominal size | Torque        |       |
|--------------------|---------------|-------|
|                    | RG (gunmetal) | SS    |
| DN10               | 13 Nm         | 13 Nm |
| DN15               | 13 Nm         | 13 Nm |
| DN20               | 13 Nm         | 13 Nm |
| DN25               | 13 Nm         | 13 Nm |
| DN32               | 13 Nm         | 13 Nm |
| DN40               | 13 Nm         | 13 Nm |
| DN50               | 13 Nm         | 13 Nm |
| DN65               | 13 Nm         | 15 Nm |
| DN80               | 13 Nm         | 15 Nm |
| DN100              | 13 Nm         | 15 Nm |
| DN150              | 13 Nm         | 15 Nm |
| DN200              |               | 15 Nm |

RG ≙ gunmetal

SS ≙ stainless steel

## 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 bolts to the specified torque             |
|                                  | Seal damaged                          | ► Replace seal                                          |
| Leak in the seating              | Foreign body between cone and seating | ► Remove foreign body / flush the system                |
|                                  | Seating damaged                       | ► Replace the body                                      |
|                                  | Cone seal damaged                     | ► Replace the cone                                      |
| Body leaking                     | Discontinuity/gas cavity open         | ► Replace the body                                      |
| Gate valve does not open / close | Gland nut overtightened               | ► Loosen gland nut<br>► Tightness must still be ensured |
|                                  | Thread seized                         | ► Replace bonnet                                        |
|                                  | Actuator not working                  | ► Check supply of energy 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](mailto: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 gate 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 gate 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.