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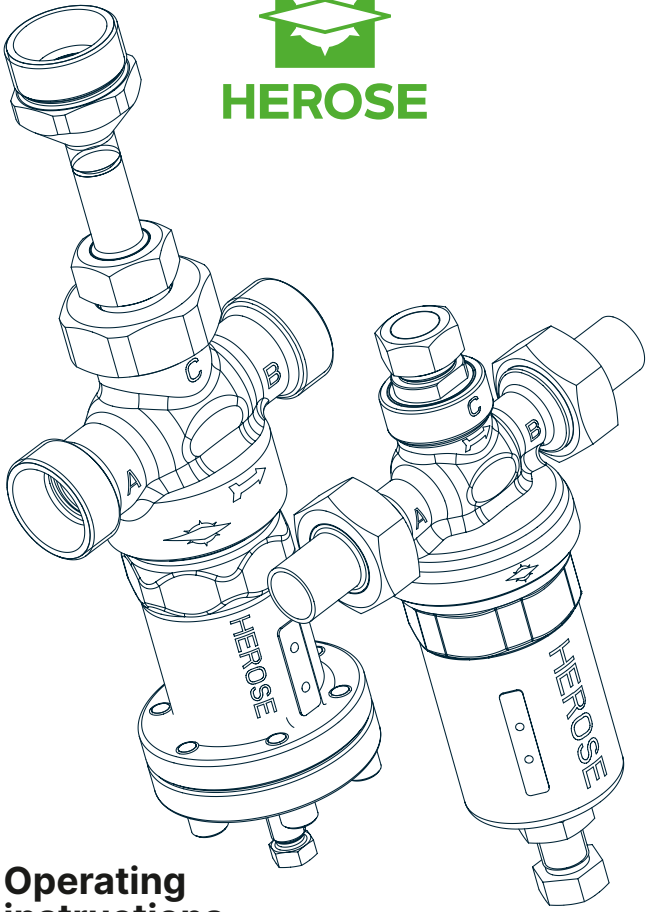
HEROSE



Operating instructions

Art.-No.: 37000.0009.0100

Important

Read carefully before use.

Retain for later use.

6th edition 05/2026

Assembly, maintenance and operating instructions

Designation
Combined pressure regulator

Model numbers
4185-1 | 4186-1 | 4182-3 | 4186-3

Table of contents

About these instructions

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

Applicable documents

Document	Contents
Catalogue page	Description of the pressure regulator

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

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

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.

Safety

Intended application
The pressure regulator is intended for installation in a pipeline or pressure vessel system for the automatic regulation of the tank pressure – both increasing and decreasing the pressure – without auxiliary energy. The permissible operating conditions are specified in these operating instructions.
The pressure regulator is suitable for the media listed in these operating instructions; see section "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.
› Warranty claims against HEROSE GMBH will be rejected if the HEROSE seal is broken by unauthorised companies.
› Safety devices must neither be made ineffective nor must their intended purpose be changed.

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 pressure regulator the operating instructions must always 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 pressure regulator.
› Retain the operating instructions and make sure they are available.
› Pass on the operating instructions to subsequent users.

Requirements for people who work with the pressure regulator
People could be seriously injured or killed if the pressure regulator is used improperly. In order to avoid accidents, all persons who work on the pressure regulator must meet the following minimum requirements:
› They are physically capable of controlling the pressure regulator.
› They can safely carry out the work with the pressure regulator within the scope of these operating instructions.
› They understand the operating principles of the pressure regulator 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.

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 pressure regulator.

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.
› 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.

Adhere to the technical thresholds
If the technical thresholds for the pressure regulator are not adhered to, the pressure regulator may sustain damage, accidents may be caused and people may be seriously injured or killed.
› Adhere to the thresholds. See section "Description of the pressure regulator".
› This product is designed for ≤ 1,000 loading cycles at pressure differences from zero to PN and any number of loading cycles at pressure differences not exceeding 0.1 x PN.

DANGER

Hazardous medium.
Escaping operating medium can lead to poisoning, burns and caustic burns!
› Wear the prescribed protective equipment.
› Provide suitable collecting containers.

Risk of injury due to pressure.
Injury due to the combined pressure regulator being flung away!
› Before dismounting the combined pressure regulator, all supply pipes must be depressurised and if necessary emptied as well.
› Make sure that the system is depressurised.
› Secure against being repressurising.
› Do not bend over the combined pressure regulator when dismounting it.

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 fittings.
Risk of injury due to thermal influences!
› Insulate fittings.
› 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 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 fittings with diffusion-tight material

Improper mounting.
Damage to the pressure regulator!
› Remove cover caps before mounting.
› Clean the sealing surfaces.
› Protect the body against hammering.

Painting of fittings and pipelines.
Functional impairment of the pressure regulator / 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 pressure regulator as a foothold.

Exceeding the maximum permissible operating conditions.
Damage to the pressure regulator!
› The maximum permissible working pressure must not be exceeded, and the minimum and maximum allowable working temperatures must be observed.

Particles and other contaminants in the conveyed medium.
Damage to the pressure regulator / internal leak!
› Remove particles/contaminants from the conveyed medium.
› It is recommended to install strainers / dirt filters in the pipework system.

Transport and storage

Inspection of condition on delivery
› Inspect the pressure regulator 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.

Transportation
› Transport the valve in the packaging supplied.
The pressure regulator is delivered ready to operate with lateral connections protected by cover caps.
› Protect the pressure regulator against shocks, impacts, vibrations and dirt.
› Adhere to a transport temperature range of –20 °C to +65 °C.

Storage
› Store the 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.

Description of the pressure regulator

Refer to the respective catalogue page for further detailed information.

Structure
Design
Pressure control valve without auxiliary energy.

Component	Design
Body	Straight-type, input A - output B, Output C central, perpendicular to axis A-B

Marking

The 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. 01/18	Year of construction MM/YY
e.g. 12345	Type
e.g. 01234567	Serial no.
CE xxxx	CE-mark and number of the notified body
e.g. CF8 / 1.4308	Material

Intended application

The HEROSE combined pressure regulator is for the automatic regulation of pressure in stationary tanks used for liquefied cryogenic technical gases. Without additional auxiliary energy, the combined pressure regulator aims to maintain a predefined set operating pressure despite the operation of the tank and temperature influences in the tank.
In addition to the pressure build-up and the pressure relief/overflow functions, the combined pressure regulator has a safety function that protects the pipeline and its components on the inlet side.

Pressure build-up function
If the tank pressure falls below the set operating pressure, the combined pressure regulator opens in order to restore the set operating pressure.
Flow direction A→B

Pressure relief / overflow function
If the tank pressure exceeds the set operating pressure by 0.5 bar, the overflow function of the combined pressure regulator trips in order to restore the set operating pressure.
Flow direction B→C

Safety function
The safety function limits the pressure difference between the inlet side A and the outlet side B to max. 5.5 bar. An impermissible pressure increase in the pipeline section before the combination pressure regulator can thus be prevented.
Flow direction A→B+C

Operational data

Type	Nominal pressure	Temperature		Environment		K_v-value	C_v-value
		Min.	Max.	Min.	Max.		
4185-1	PN50	–196 °C	+65 °C +60 °C (O2)	-40 °C	+65 °C	1,5 m³/h	1,7 gal/min
4186-1			+200 °C +60 °C (O2)			1,2 m³/h	1,4 gal/min
4182-3			+65 °C +60 °C (O2)			3,2 m³/h	3,7 gal/min
4186-3						3,2 m³/h	3,7 gal/min

Type	Operating pressure ranges	Safety function set pressure	Overflow function set pressure
4185-1	1 – 12 bar 6 – 24 bar 16 – 38 bar	pressure difference $p_A - p_B \leq 5{,}5$ bar	Working pressure range +0.5 bar
4186-1			
4182-3	2 – 10 bar 8 – 22 bar 20 – 38 bar		
4186-3			

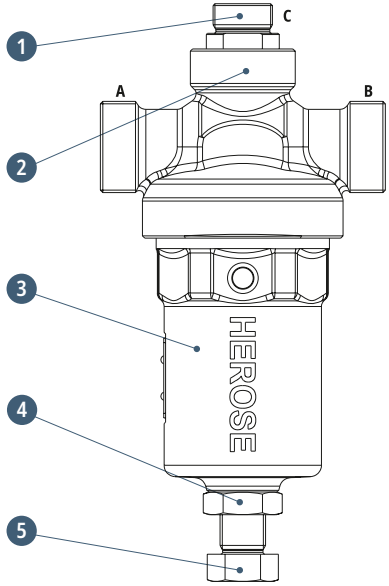
Media

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

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

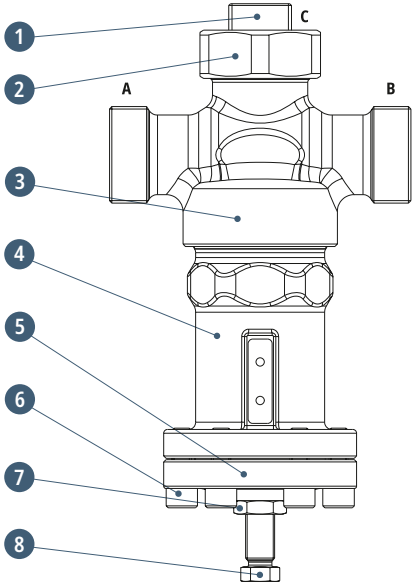
The use of other media is only permitted after consultation with the manufacturer.

4185-1 / 4186-1



Nr.	Name	Material 4185-1	Material 4186-1
1	Connecting nipple	CC493K	1.4571
2	Body	CW617N	1.4308/CF8
3	Spring cap		1.4408/CF8M
4	Locknut 30 mm AF	A2-035	
5	Adjusting screw 27 mm AF	1.4301	

4182-3 / 4186-3



No.	Name	Material 4182-3	Material 4186-3
1	Connecting nipple	CC493K	1.4571
2	Union nut	1.4301	
3	Body	CC491K	1.4308/CF8
4	Spring cap	1.4408/CF8M	
5	Flange cover	1.4308/CF8	
6	Allen screw M8	A2-70	
7	Locknut 19 mm AF	A2-70	
8	Adjusting screw 14 mm AF	1.4301	

Scope of delivery
› Valve
› Operating instructions

Dimensions and weights
See catalogue page.

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.

Assembly

Installation position
With regard to the installation position, pay attention to the arrow showing the flow direction. Installation of the pressure regulator in vertical position. The outlet "C" points vertically upwards.

Fitting Notice
› Use suitable tools.
  » Open-ended spanners
  » Torque wrench
› Clean tools before fitting
› Open the packaging only directly before the mounting. Free of oil and grease for oxygen (O2).
  Valves for oxygen are permanently marked with "O2".
  Observe the HEROSE information sheet on 'oxygen applications'.
› Only install the valve if the maximum working pressure and operating conditions of the plant correspond to the marking on the pressure regulator.
› Plant must be designed for the maximum set pressure of the pressure regulator's safety function.
› Remove protective caps or covers before mounting.
› Inspect the valve for contamination and damage. **Do not** install a damaged or dirty valve.
› Remove any dirt and residues from the pipeline and valve in order to prevent leaks.
› Avoid damaging the connections.
  The sealing surfaces must remain clean and intact.
› Seal the valve with suitable seals.
  No sealant (sealing tape, liquid sealing tape) may enter the valve.
  Respect the suitability for use with O2.
› Connect pipelines in a force-free and torque-free manner.
  Stress-free mounting.
› To ensure trouble-free operation, no impermissible static, thermal or dynamic stresses may be transmitted to the valve. Observe reaction forces.
› Temperature-dependent changes in length in the pipework system must be compensated with expansion joints.
› The pressure regulator is supported by the pipework system.
› The pressure regulator must be protected against dirt and damage during construction work.
› Check the leak-tightness.

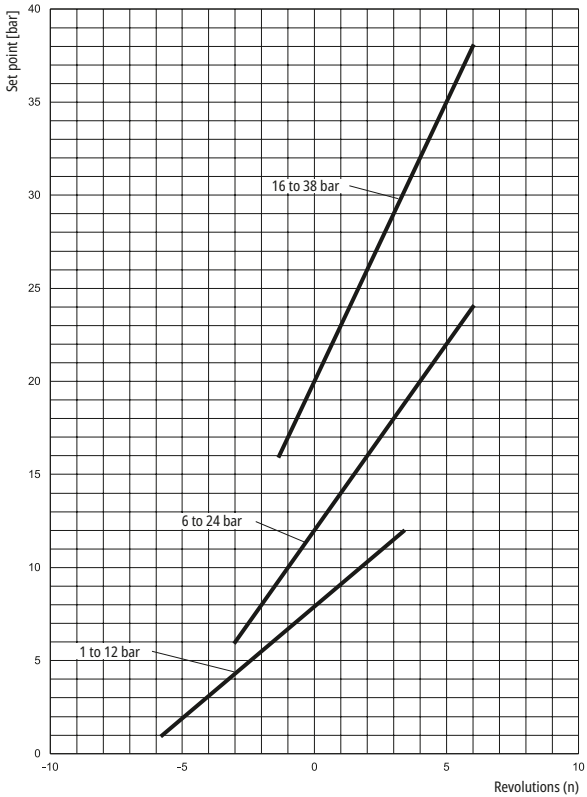
Tightening torques

Connection	Thread	Max. perm. tightening torque
A	M40x2, G11/4, 11/4" NPT	100 Nm
B	M40x2, G11/4, 11/4" NPT	100 Nm
C	M26x1, G3/4, 3/4" NPT	80 Nm

Operation

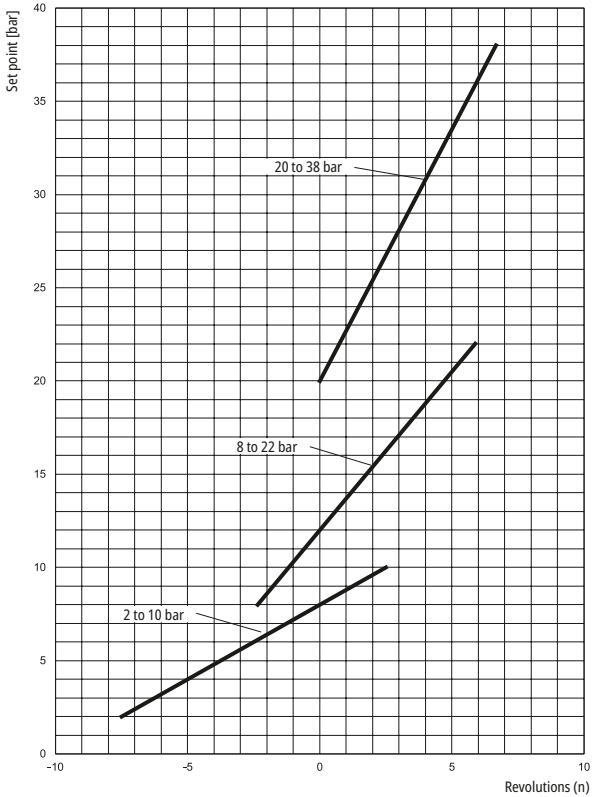
In the delivery state the combined pressure regulator is preset to an operating pressure setpoint (see "setting diagrams"). At the customer's request the combined pressure regulator will be preset to a specific operating pressure. The adjusting screw of the combined pressure regulator must be adjusted in order to set or correct an operating pressure setpoint:
› To set the operating pressure setpoint, loosen the locknut and adjust the adjusting screw accordingly.
  » Clockwise rotation
    Operating pressure setpoint is increased
  » Counter clockwise rotation
    Operating pressure setpoint is reduced
› Secure the adjusting screw with the locknut after setting the desired operating pressure setpoint.
  » The change of the setpoint per revolution of the screw is to be taken either from the table or from the "setting diagrams".
  » When using manometers in the plant system, it is recommended to set the combined pressure regulator with the help of the manometer. If the system does not offer this option, the operating pressure setpoint can be set on the basis of the "setting diagrams".
  » The maximum permissible pressure loss in the supply lines to the pressure regulator may not exceed 3 % of pressure difference between the set pressure and external back pressure on the valve.

Setting diagram 4185-1 / 4186-1



Operating pressure ranges	1-12 bar	6-24 bar	16-38 bar
Preset operating pressure	8 bar	12 bar	20 bar
Change in the operating pressure per revolution	1,2 bar/n	2 bar/n	3 bar/n

Setting diagram 4182-3 / 4186-3



Operating pressure ranges	2-10 bar	8-22 bar	20-38 bar
Preset operating pressure	8 bar	12 bar	20 bar
Change in the operating pressure per revolution	0.8 bar/n	1.7 bar/n	2.7 bar/n

Maintenance and service

Safety during cleaning

› Take note the specifications in the safety data sheet, the general health and safety regulations, and the HEROSE information sheet 'oxygen applications' if degreasers are used for process-related reasons when cleaning bearing parts, couplings and other precision components.

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

Description	Interval	Scope
Inspection	During start-up	› Visual inspection » of the valve for damage » of the valving marking for legibility › Leak-tightness » between body and spring cover of the connections » Check of the operating pressure set point
Functional testing	Inspection and maintenance in accordance with the respective legal regulations. In Germany, for example, according to the Operational Safety Ordinance	› Check of the operating pressure set point including a visual inspection
External inspection	Inspection and maintenance in accordance with the respective legal regulations. In Germany, for example, according to the Operational Safety Ordinance	› Function and tightness test including visual inspection
Internal inspection	Every 5 years or ≥ 1,000 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

Fault table

Fault	Cause	Remedy
Combined pressure regulator leaking	Bellows leaking due to contaminated medium	› Install / clean dirt trap › Replace combined pressure regulator
Leak between body and spring cover	Seal damaged	› Replace combined pressure regulator
	Diaphragm damaged	› Replace combined pressure regulator
Connection "C" leaking	Union nut / connecting nipple loose	› Tighten to the specified torque » Union nut 120 Nm » Connecting nipple 100 Nm
	Seal damaged	› Replace combined pressure regulator
Incorrect set pressure	Preset to defined operating pressure setpoint	› Set desired operating pressure as described in "setting diagrams"
	Operating pressure setpoint shifted	› Restore the operating pressure as described in "setting diagrams"
	Combined pressure regulator incorrectly configured for the plant conditions	› Reconfigure and replace the combined pressure regulator
Tank pressure is not restored	Operating pressure setpoint shifted	› Restore the operating pressure as described in "setting diagrams"
	Combined pressure regulator incorrectly configured for the plant conditions	› Reconfigure and replace the combined pressure regulator

Fault	Cause	Remedy
Overflow function does not trip	Operating pressure setpoint shifted	› Restore the operating pressure as described in "setting diagrams"
	Combined pressure regulator incorrectly configured for the plant conditions	› Reconfigure and replace the combined pressure regulator
Safety function does not trip	Operating pressure setpoint shifted	› Restore the operating pressure as described in "setting diagrams"
	Combined pressure regulator incorrectly configured for the plant conditions	› Reconfigure and replace the combined pressure regulator
Damage to the inlet/ outlet	Transport damage	› Replace combined pressure regulator
	Wrong connecting thread / tightening torque too high	› Replace combined pressure regulator
	Impermissible forces such as bending or torsional forces are being transmitted	› Install stress-free
Reduced flow rate	Screens contaminated	› Clean / exchange screens

Spare parts

Repairs to the combined pressure regulator may be carried out only by HEROSE or by specialist workshops authorised by HEROSE and monitored by the regulatory authorities, using only original spare parts.

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

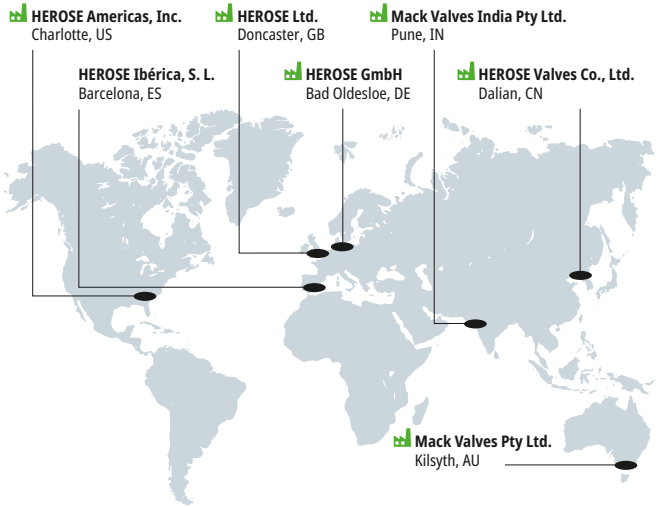
Disassembly and disposal

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.

Disposal

› Dismantle the valve.
Collect greases and lubricating fluids during dismantling.
› Separate the materials:
» Metal
» Synthetic material
» Electronic scrap
» Greases and lubricating fluids
› Carry out a sorted disposal of the materials.



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products.herose.com/manuals

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