Operating instructions

Angle Type Safety Valve

Type 0681X / 06820 / 0685X

IMPORTANT

Read carefully before use.

Retain for later use.

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1 About these instructions

1.1 Principles

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

1.2 Applicable documents

Document	Contents
Catalogue page	Description of the safety 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 application

The safety valve protects the vessel and pipework systems against impermissible excessive pressure. The permissible operating conditions are specified in these operating instructions.

The 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.
- Warranty claims against HEROSE GMBH will be rejected if the HEROSE seal is broken by unauthorised companies.

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 safety valve the operating instructions must be available in their vicinity. People could be seriously injured or killed if the operating instructions are not followed.

- Read and observe the operating instructions before using the safety 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 safety valve

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

- They must be physically able to control the safety valve.
- They are able to safely carry out the work with the safety valve within the scope of these operating instructions.
- They understand the operating principles of the safety valve works within the scope of their work and can recognise and avoid the hazards associated with 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 safety 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 safety 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 thresholds for the safety valve are not adhered to, the safety 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 safety valve".
- ▶ 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 x 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.
- ▶ Stand to the side of or behind the valve during lifting.
- ▶ The outlet must be free.

Flammable media and dusts

Risk of sustaining burns!

- ▶ Avoid potential sources of ignition in the immediate vicinity of the safety valve.
- ▶ Attach warning signs.

Risk of injury due to pressure

Injury due to the valve being flung away!

- ▶ Depressurise and empty all supply lines before dismounting the valve.
- ▶ Make sure that the system is depressurised.
- ▶ Secure against being pressurised again.
- ▶ Do not bend over the valve when dismounting.

⚠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.

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 safety valves.

Risk of injury due to thermal influences!

- ▶ Insulate the safety 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.

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 safety valve diffusion-tight

Improper mounting.

Damage to the safety valve!

- ▶ Remove cover caps before mounting.
- ▶ Clean the sealing surfaces.
- ▶ Protect the body against hammering.

Painting of safety valves and pipelines.

Impairment of the function of the safety valve / loss of information!

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

Exceeding the maximum permissible operating conditions.

Damage to the safety valve!

- ▶ 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 safety valve / leak!

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

3 Transport and storage

3.1 Inspection of condition on delivery

- Inspect the safety 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 safety valve in the packaging supplied.
- The safety valve is delivered in a ready-to-operate state with the connections protected by caps.
- Protect the safety valve against shocks, hammering, vibrations and dirt.
- Adhere to a transport temperature range of –20 °C to +65 °C.

3.3 Storage

- Store the safety 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 safety valve

Refer to the respective catalogue page for further detailed information.

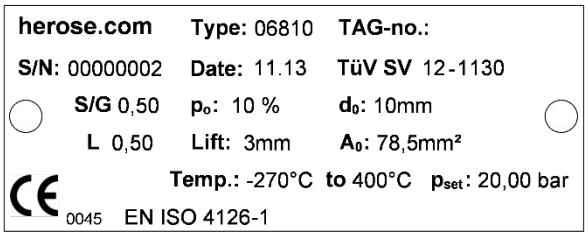
4.1 Structure

Design

Directly acting angle type safety valve, spring-loaded.

4.2 Marking

The safety valve is equipped with a marking for identification.



Explanation	
Type	06810/ 06815/ 06820/ 06850/ 06855
TAG-no.	Specified by the customer
S/N	Serial number
Date	MM.YY, month and year of manufacture
TÜV SV	Component identification number
S/G	Coefficient of discharge for vapours (S) and gases (G)
L	Coefficient of discharge for liquids (L)
p_0	Opening pressure
d_0	Narrowest flow diameter in mm
A_0	Narrowest flow area in mm²
Lift	Valve lift
Temp	Temperature range min/max
p_{set}	Test pressure
CE XXXX	CE-mark and number of the notified body
XXX	Ukraine conformity mark with the certification body's number

4.3 Intended application

Safety valves protect vessels and pipework systems against impermissible excess pressure. Safety valves represent the last line of safety for a vessel or pipework system. They should be capable of preventing impermissible excess pressure when all other upstream regulating, control and monitoring devices have failed. In order to ensure this operability, safety valves require special attention during their mounting and maintenance.

A safety valve is a piece of equipment with a safety function for protecting pressure equipment when the permissible limits are exceeded and is thus subject to Directive 2014/68/EU (Pressure equipment directive) of the European Parliament and of the Council, article 2, section 4.

4.4 Operational data

Type	d_0	Pressure range [1]	Max. back pressure	Temperature	Medium
0681x	4 mm	260 to 800 bar	10 %	–60 °C to +85 °C	See section “4.5 Media”
	6 mm	30 to 550 bar	10 %	–270 °C to +400 °C	
	10 mm	0,5 to 180 bar	15 %	–270 °C to +400 °C	
06820	4 mm	260 to 1.200 bar	10 %	–60 °C to +85 °C	
	6 mm	30 to 550 bar	10 %	–270 °C to +400 °C [2]	
0685x	10 mm	0,5 to 250 bar	15 %	–270 °C to +400 °C [3]	
	14 mm	0,2 to 200 bar	15 %	–270 °C to +400 °C	
	18 mm	0,5 to 110 bar	15 %	–270 °C to +400 °C	

1) When the valve disc is implemented with a sealing plate, the sealing plate material (soft material seal) must be considered in relation to the pressure and temperature (see details on the catalogue page). Further information is to be taken from the TÜV-Verband (German Technical Inspection Agency) component test sheet.
2) When the safety valve 06820 is made of material 1.4462, the temperature range is from -40 °C up to +250 °C.
3) If resistance to intercrystalline corrosion is required, an application temperature of 300 °C for the cast steel type 1.4408 must not be exceeded (AD 2000 data sheet W 5, section 2.6).

4.5 Media

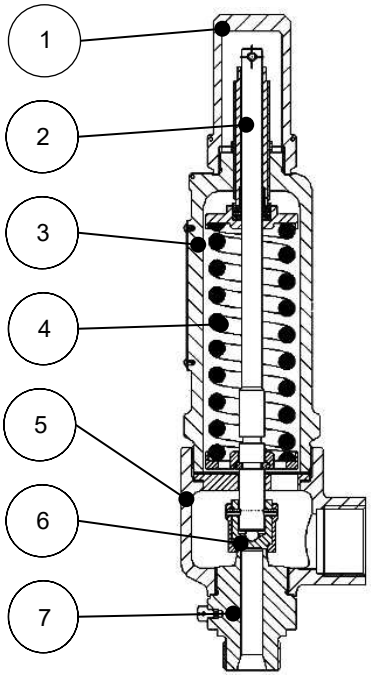
Gases, cryogenic liquefied gases and their gas mixtures, such as:

Name			
Argon	Chlorotrifluoromethane	Ethane	Dinitrogen monoxide
Ethylene	Ethylene, acetylene / propylene mix		Helium
Carbon dioxide	Carbon monoxide	Krypton	Air [1]
Methane/natural gas with a high methane content (LNG)		Neon	Petroleum gases (LPG)
Trifluoromethane	Hydrogen	Xenon	

1) Highly compressed air facilitates the ignition of materials. A pressure of more than 600 bar is therefore not recommended without a thorough risk analysis.

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

4.6 Materials



Part no.	Name	Material
1	Cap, lifting cap	1.4408 / 1.4404 / 1.4462
2	Stem	1.4404 / 1.4462
3	Spring cap	1.4408 / 1.4404 / 1.4462
4	Spring	1.4571 / 2.4469
5	Body	1.4408 / 1.4404 / 1.4462
6	Obturator	1.4571 / NBR / FKM / VESPEL / 1.4462 / PEEK
7	Seat insert	1.4571 / 1.4462 / 1.4404

4.7 Scope of delivery

- Safety valve
- Operating instructions

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

Other assembly steps may be necessary depending on the plant and type of safety valve. In the following instructions only the major assembly steps are summarised. The instructions are intended only for coarse orientation. The gasket manufacturer's data must be observed. Safety valves that are subject to special cleaning regulations may only be unpacked shortly before assembly. When unpacking, it must be ensured that the packaging is intact up to this point and that the safety valve is not contaminated. In addition, it must be ensured that the cleanliness requirements are also met during the assembly and that the safety valve is not contaminated.

5.1 Installation position

- Vertical with spring cap upwards
- From 20 bar up to 300 bar in the horizontal installation position, with the outlet facing downwards.

5.2 Fitting Notice

- Use suitable tools.
  - ☐ Open-ended spanners
  - ☐ Torque wrench
- Clean tools before fitting
- Open the packaging only directly before the mounting.
- Only install the safety valve if the maximum working pressure and usage conditions correspond to the marking on the safety valve. Take note of the p-t curve of the valve on the catalogue page and the resulting areas of use.
- Remove protective caps or covers before mounting.
- Check the safety valve for dirt and damage.
  DO NOT install damaged or dirty safety valves.
- Remove any dirt and residues from the pipeline in order to avoid leaks.
- Use the entire usable thread length for mounting; at least four thread pitches.
- Avoid damaging the connections.
- The sealing surfaces must remain clean and intact.
- Seal the safety valve using suitable seals.
- No sealant (sealing tape, liquid sealing tape) may enter the safety valve.
- 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 safety valve. Observe reaction forces.
- The safety valve is supported by the pipework system.
- The safety valve must be protected against dirt and damage during construction work.
- Check leak-tightness after completion of mounting.

Tightening torques

The tightening torques specified by the manufacturer are maximum permissible values at room temperature and with uniform thread mating. The real torque to be used depends on the screw-in conditions in the plant and must be specified by the plant operating company.

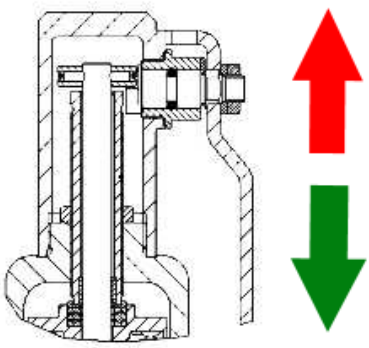
Type	Material	Thread	Max. tightening torque [Nm]								
			External thread						Internal thread		
			G	NPT	R; Rc	M	16 UN	14 NPS	G	NPT	R; Rc
06810 06815 06820 06850 06855	1.4408	1/2"							60	160	130
		3/4"							90	210	210
		1"							200	490	420
		1 1/4"							320	800	780
		1 1/2"							400	800	810
		2"							590	1,600	1,800
	1.4571 1.4404	1/2"	120	170	140				50		
		3/4"	220	280	250			260	90	270	240
		1"	370	520	440						
		1 1/4"	1,200	890	860						
		1 1/2"	1,400	1,100	1,000						
		M40x2				180					
		13/16"					120				
	1.4462	1/2"	330								
		3/4"	590						250		

6 Operation

- The maximum permissible pressure drop in the supply lines to the safety valves may not exceed the 3% pressure difference between the response pressure and superimposed back pressure on the safety valve.
- Vibrations are to be avoided.
- Check the following points prior to start-up:
  - ☐ All mounting and installation work are completed.
  - ☐ Compare the material, pressure, temperature and installation position with the layout plan for the pipework system.
  - ☐ Dirt and residues have been removed from the pipeline and safety valve in order to prevent leaks.

6.1 Liftability (manual actuation for testing)

- Liftable safety valves are equipped with an appropriate device above the spring cap.
- Liftable safety valves can be made to open at ≥85 % of the set pressure without aids.
- Typical lifting cases are initial commissioning, after breaks in operation and functional testing; the procedure is as follows:



2. Pull the lifting lever away from the spring cover until blow-off of the operating medium is clearly audible.

1. Release the lifting lever again.

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 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 safety 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		
Inspection	**Interval**	**Scope**
Inspection	During start-up	▶ Visual inspection ☐ of the valve for damage; ☐ of the valving marking for legibility; ☐ for absence of damage to the sealing ▶ Leak-tightness ☐ Union of the valve seat; ▶ If existent, actuation of the lifting device.
Functional testing	Inspection and maintenance in accordance with the respective legal regulations. In Germany, for example, according to the Operational Safety Ordinance	▶ If present, test of lifting device including 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 ≥ 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 by the manufacturer including functional, leak-tightness, pressure test and inspection.

7.3 Fault table

Fault	Cause	Remedy
Safety valve does not respond	Covers have not been removed;	▶ Remove covers.
	Test pressure too high;	▶ Replace the safety valve.
	Back pressure not taken into account;	▶ Replace the safety valve.
Not liftable	Pressure below 85% of the set pressure;	▶ Lifting in the range ≥ 85 % of the set pressure without aids.
Leak in the seating	Foreign bodies between cone and seating, contaminated medium;	▶ Remove foreign bodies by briefly lifting / flush the system or replace the safety valve.
	Seating damaged;	▶ Replace the safety valve.
	Cone seal damaged;	▶ Replace the safety valve.
	Safety valve has chattered;	▶ See “Chattering”.
Damage to the inlet/outlet	Transport damage;	▶ Replace the safety valve.
	Wrong connecting thread / tightening torque too high;	▶ Replace the safety valve.
	Impermissible forces such as bending or torsional forces are being transmitted;	▶ Install stress-free.
Shock waves	Safety valve not mounted at the highest point;	▶ Install the safety valve at the highest point.
	water not drained correctly or at all;	▶ Attach water drain according to regulations.
Constantly blowing off	Spring corroded by impermissible medium and broken;	▶ Replace the safety valve.
	System pressure too high	▶ Replace the safety valve.
	Seal damaged;	▶ Replace the safety valve.
Chattering	Pressure drop in the inlet line >3%;	▶ Reduce resistance through chamfer or radius in the connecting socket; choose a larger one if necessary. ▶ Shorter inlet line. ▶ Incorrect safety valve; exchange it.
	Seals for inlet and outlet connector too small or not installed centrally;	▶ Change conditions.
	Safety valves are too powerful;	▶ choose smaller safety valves.
	Outlet line too long or diameter too small;	▶ Use a larger nominal diameter or a back-pressure-compensating stainless steel bellows. The max. height is to be specified by the manufacturer.
	Inlet or outlet connector too small;	▶ Dimensions must be larger than the nominal inlet or outlet diameter.
	Back pressure higher than 3%;	▶ Use back-pressure-compensating stainless steel bellows. The max. height is to be specified by the manufacturer.
Inadequate capacity	Safety valves dimensioned incorrectly for the plant conditions;	▶ Re-dimension and replace the safety valve.
	Safety valves not being used in accordance with the applicable regulations;	▶ Change conditions.

7.4 Spare parts

Repairs to the safety valves 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.

7.5 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
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 the safety 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 safety 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.