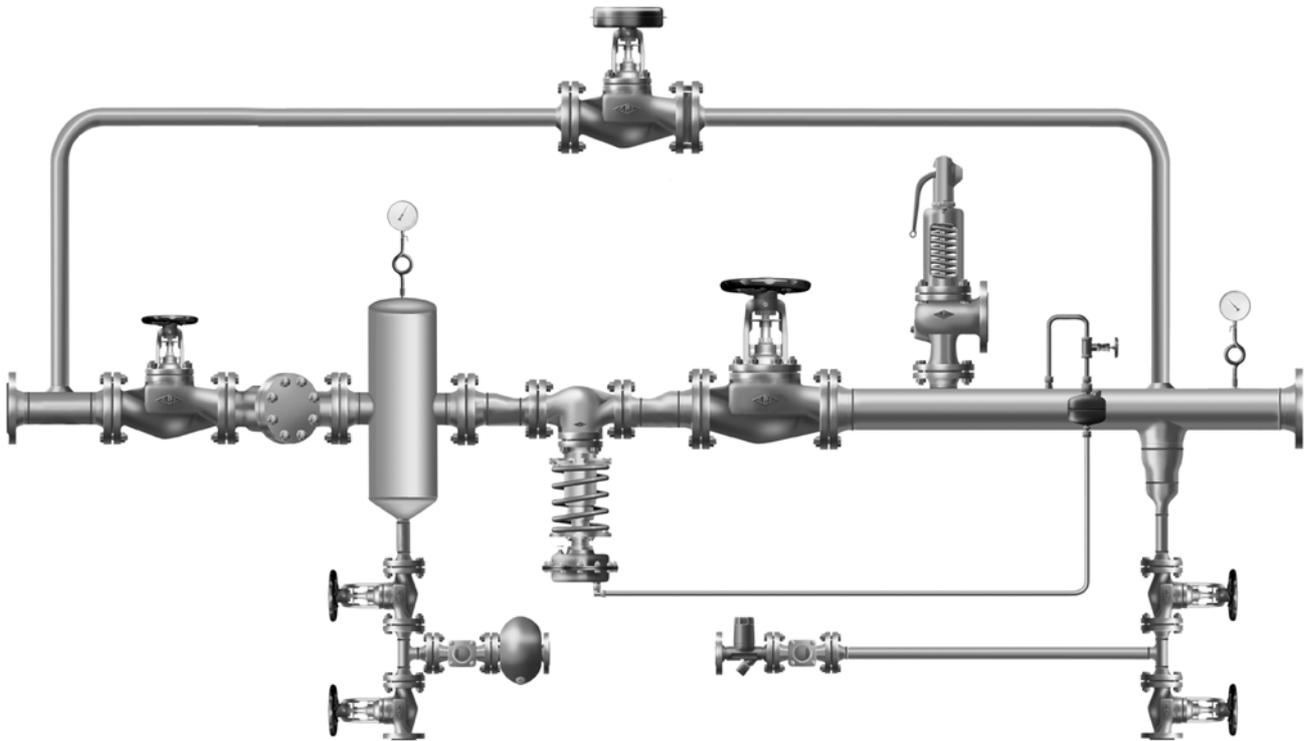


Operating and installation instructions

Pressure reducing station

ARI-PREsys® (Type PRS)



(Illustration example)

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1.0 General information on operating instructions

These operating instructions provide information on mounting and maintaining the pressure reducing station. Please contact the supplier or the manufacturer in case of problems which cannot be solved by reference to the operating instructions.

They are binding on the transport, storage, installation, start-up, operation, maintenance and repair.

The notes and warnings must be observed and adhered to.

- Handling and all work must be carried out by expert personnel or all activities must be supervised and checked.

It is the owner's responsibility to define areas of responsibility and competence and to monitor the personnel.

- In addition, current regional safety requirements must be applied and observed when taking the fittings out of service as well as when maintaining and repairing them.

The manufacturer reserves the right to introduce technical modifications at any time.

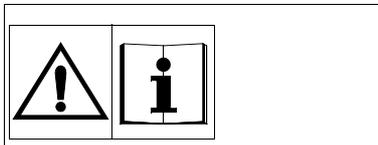
These Operating Instructions comply with the requirements of EU Directives and are only valid in connection with the plant specification sheets. The operating an installation instructions of all components must be observed.

2.0 Notes on possible dangers

2.1 Significance of symbols



Warning of general danger.



Non-compliance with operating instructions is dangerous!
Read the operating instructions before installation, operation, maintenance or disassembly and adhere to them strictly.

2.2 Explanatory notes on safety information

In these Operating and Installation Instructions dangers, risks and items of safety information are highlighted to attract special attention.

Information marked with the above symbol and "**ATTENTION!**" describe practices, a failure to comply with which can result in serious injury or danger of death for users or third parties or in material damage to the system or the environment. It is vital to comply with these practices and to monitor compliance.

All other information not specifically emphasised such as transport, installation, operating and maintenance instructions as well as technical data (in the operating instructions, product documentation and on the device itself) must also be complied with to the fullest extent in order to avoid faults which in turn can cause serious injury to persons or damage to property.

3.0 Storage and transport



ATTENTION !

- Protect against external force (like impact, vibration, etc.).
- Components such as actuators, handwheels, hoods must not be used to take external forces, e.g. they are not designed for use as climbing aids, or as connecting points for lifting gear.
- Suitable materials handling and lifting equipment should be used.
See plant specification sheet for weights.

- At -20°C to +65°C (valid for empty systems.)

4.0 Description

4.1 Scope of applications

The pressure reducing station are used for „pressure regulation of liquids, steam, gases and vapours in the procedure and process technic as well as in the plant manufacture“.



ATTENTION !

- Refer to the plant specification sheet for applications, limits on use and possibilities.
- Certain media require or preclude the use of special materials.
- The plant is designed for standard operating conditions. If conditions exceed these requirements, e.g. aggressive or abrasive media, the operator should state the higher requirements when ordering.
- Valves made from cast iron are not authorised for use in systems subject to TRD 110.

The information complies to the Pressure Equipment Directive 2014/68/EU.

It is the responsibility of the system operator to ensure compliance.

The special markings on the pressure reducing station and its components must be taken into account.

Refer to the plant specification sheet to see which materials are used in standard versions.

Please contact the supplier or the manufacturer if you have any questions.

4.2 Operating principles

The pressure reducing station is a direct acting proportional regulator for regulating the pressure of fluid, gas and vapour media of Fluid Group II pursuant to Pressure Equipment Directive 2014/68/EU. No auxiliary energy is needed.

In a pressureless state the valves (pos. 4 and 6) before and behind the pressure reducing valve are fully open, the bypass valve (pos. 8) is closed. The media passes through the plant from the inlet to the outlet. The pressure behind the pressure reducing valve is converted to the actuator over the control line (see Fig. 1).

For operating pressures above the allowable actuator temperature, for media (e.g. water for steam) a water seal pot is inserted in the control line.

The downstream pressure is converted over the actuator diaphragm of the pressure reducing valve in a force working in the disc closing direction. The spring force is attained in the spindle over a pin and coupling and is opposed through the diaphragm force, therefore works in the disc open direction. When both forces are equal, the valve is balanced, and the downstream pressure is maintained constant.

When the downstream pressure is altered the disc either „opens“ or „closes“.

4.3 System arrangement - Pressure reducing station

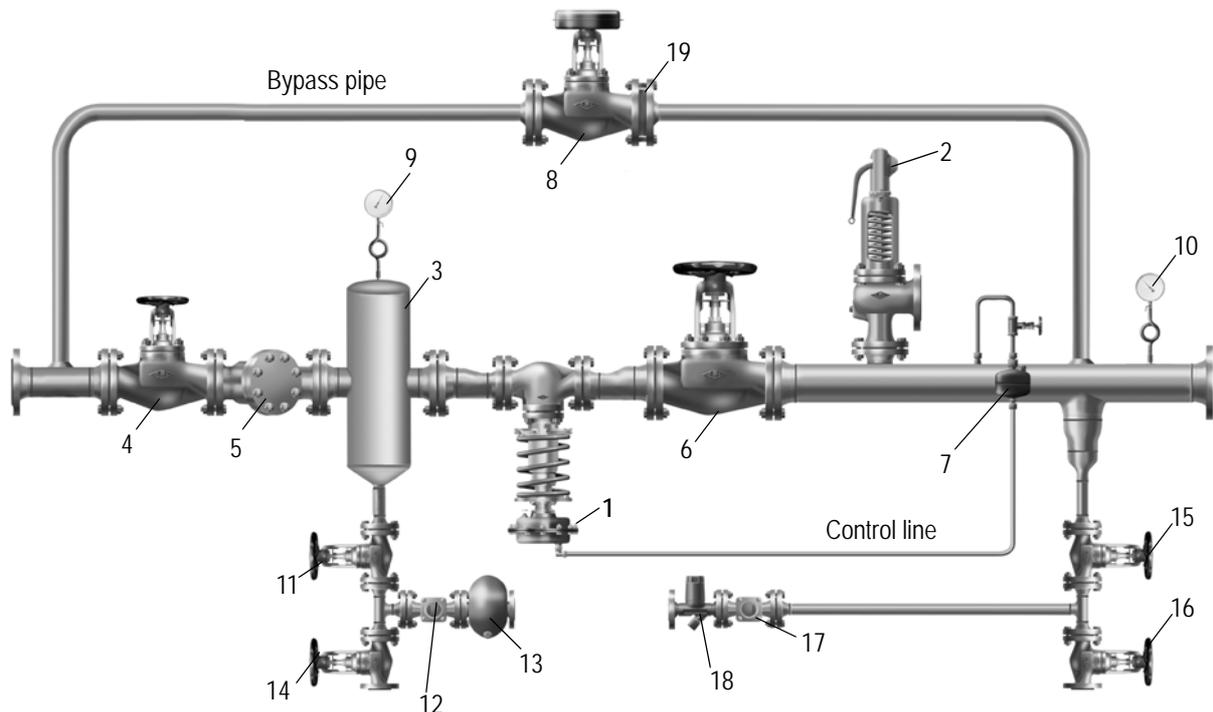


Fig. 1

4.3.1 Parts

Pos.	Designation
1	Pressure reducing valve ARI-PREDU
2	Safety valve ARI-SAFE
3	Separator
4	Stop valve ARI-FABA-Plus
5	Strainer
6	Stop valve ARI-FABA-Plus
7	Water seal pot
8	Stop valve with regulating plug, cap and lead-sealing FABA-Plus
9	Upstream manometer P_1
10	Downstream manometer P_2
11	Stop valve ARI-FABA-Plus
12	Sight glass
13	Ball float steam trap ARI-CONA S
14	Stop valve ARI-FABA-Plus
15	Stop valve ARI-FABA-Plus
16	Stop valve ARI-FABA-Plus
17	Sight glass
18	Bimetallic steam trap ARI-CONA B
19	Orifice plate

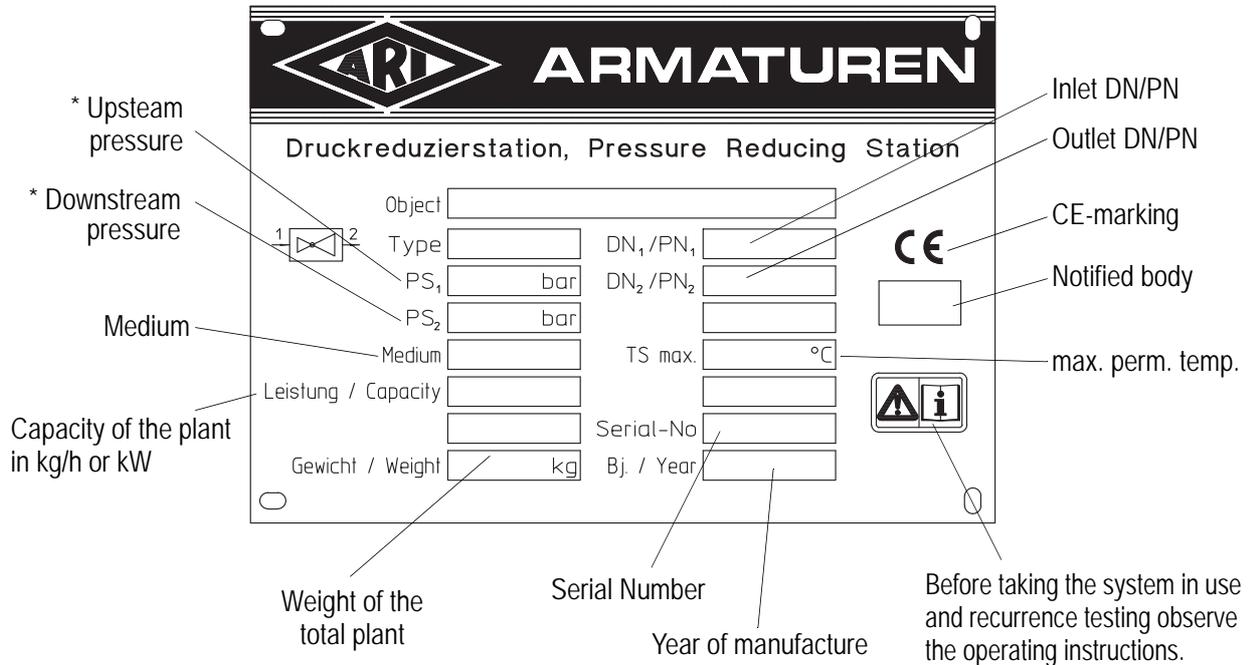
Material, dimensions, size (nominal diameter, etc.) see plant specification sheet.

4.4 Technical data - remarks

for

- **Principal dimensions,**
- **Material, capacity, etc.** refer to plant specification sheet.

4.5 Marking



* PS₁ = max. permissible upstream pressure
(Set pressure of the safety valve for the upstream system)

* PS₂ = max. permissible downstream pressure
(Set pressure of the safety valve for the downstream part. Part of the pressure reducing station)

Fig. 2: Marking of the plant

Address of manufacturer: refer to item 12.0 Warranty / Guarantee

According to the Pressure Equipment Directive appendix 2, table 7 and table 2 the pressure reducing station is only allowed to be CE-marked ≥ category I.

5.0 Installation

5.1 General notes on installation

The following points should be taken into account besides the general principles governing installation work:



ATTENTION !

- Remove flange covers if present.
- The interior of the pressure reducing station must be free from foreign particles.
- Note installation position with reference to flow, see mark on the pressure reducing station.
- Steam line systems should be designed to prevent water accumulation.
- Lay pressure reducing stations so, that damaging transverse, bending and torsional forces are avoided.
- Protect pressure reducing stations from dirt during construction work.
- Connection flanges must mate exactly.
- Connecting bolts for pipe flanges should be mounted preferably from the counter flange side (hexagon nuts from the valve side).
At DN15-32: If valves should be mounted directly to valves, the upper flange connecting bolts should be preferably executed with studs and hexagon nuts on both sides.
- Components such as actuators, handwheels, hoods must not be used to take external forces, e.g. they are not designed for use as climbing aids, or as connecting points for lifting gear.
- Suitable materials handling and lifting equipment should be used.
See plant specification sheet for weights.
- In case of a damaged diaphragm of the pressure reducing valve dangerous media (hot condensate, steam etc.) can escape out of the vent hole (screw plug), so connect with a pipe to a safe place.
- We have intended to use a safety valve with an open bonnet for steam. the possibility of danger through steam escaping must be observed.

- Planners / construction companies or operators are responsible for positioning and installing the pressure reducing station.
- The stations are designed for application, not influenced from weather.
- For application outside or in adverse environments like corrosion-promoting conditions (sea water, chemical vapours, etc.), special constructions or protective measures are recommended.
- Before installing the pressure reducing station rinse and clean the total system otherwise the seat / disc of the valves will be damaged and the control hole will be blocked.
- Centre packings between the flanges.

5.2 Requirements at the place of installation

The place of installation should be easily accessible and provide ample space for maintenance and removing the actuator.

Refer to a system sample under point 4.3 where the pressure reducing station with all components is shown. The pressure reduction should be near to the users.

When isolating of the piping, do not isolate the spring room, the actuator, the water seal pot and the control line.

5.3 Control line, flow restrictor, water seal pot of the pressure reducing valve



ATTENTION !

- Install water seal pot for temperature in excess of 100°C (NBR-diaphragm) or 130°C (EPDM-diaphragm).
- The existing water seal pot must be filled complete (steam, with water) until the water runs out of the bleed plug from the actuator (see Fig. 3). can be filled with the help of the supplied funnel.
- Only when the pressure reducing valve in the pressure reducing station shows unstable working, the supplied flow restrictor must be built in between actuator and control line.

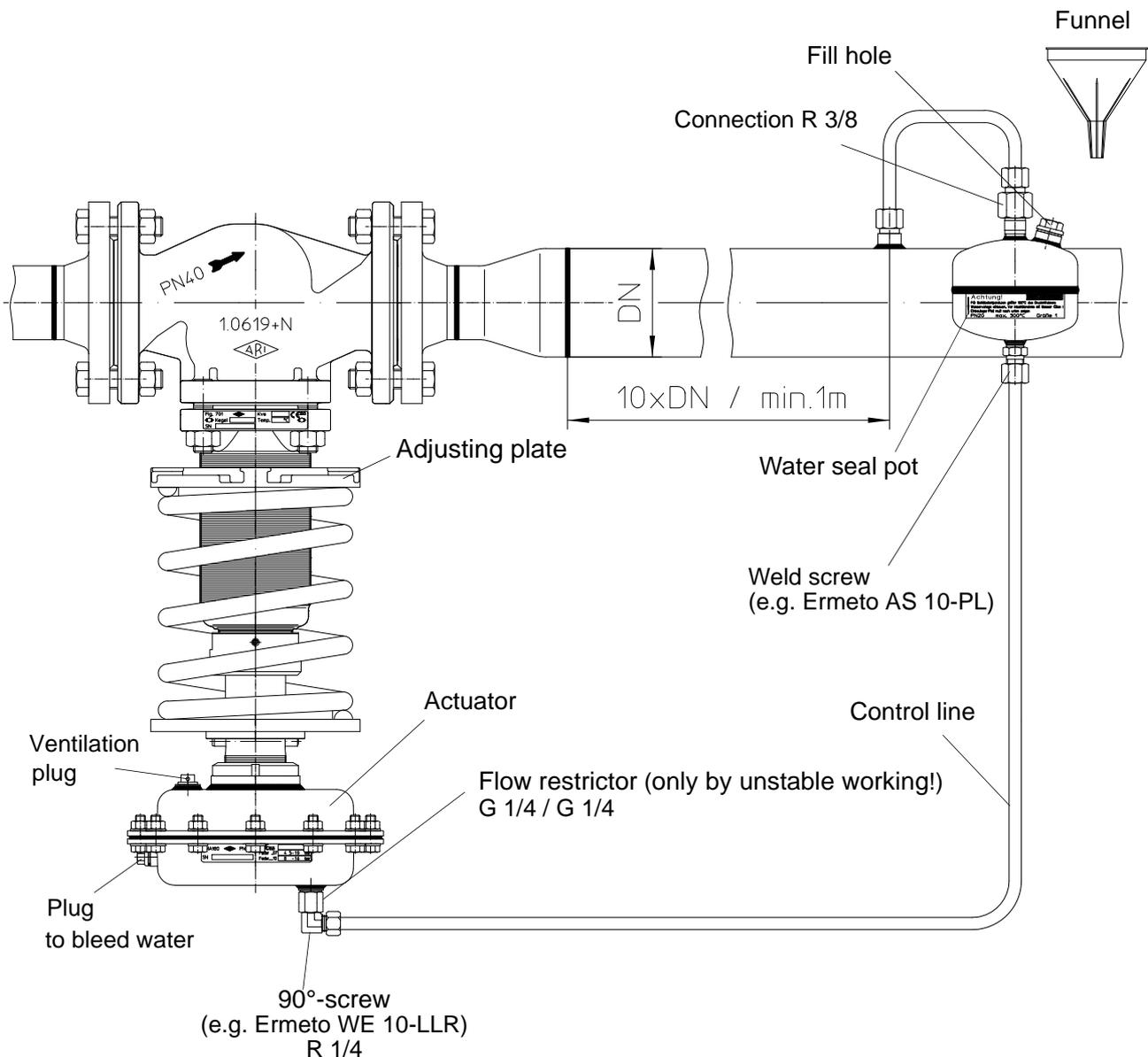


Fig. 3

5.4 Strainer



ATTENTION !

*A strainer is installed before the pressure reducing valve, with the sieve sideways (with the medium steam) to avoid the collection of condensate.
The strainer must be cleaned from time to time.*

5.5 Safety valve

The safety valve must be installed with an outlet pipe, so that if media should flow, it is purged safety. The piping must be dimensioned that the permissible back pressure doesn't exceed 10% of the set pressure. When 10% is exceeded consult the manufacturer.



ATTENTION !

The system part behind the pressure reducing valve (downstream pressure side), the control line and actuator is protected against excess pressure. The necessary safety valve is dimensioned so that by max. possible upstream pressure, by fully open pressure reducing valve, the max. possible capacity must be blown of by the safety valve.

The set pressure must be conform to the system part with the lowest nominal pressure. An adequate distance must exist between the set downstream pressure and the safety valve set pressure (min. 25% x P2).

The bypass valve in the system is secured against misuse through a lead seal. Before using the bypass valve, close the stop valves before and behind the pressure reducing valve.

If not secured that the open bypass line works parallel to the pressure reducing valve, the capacity rating for the safety valve must include the extra capacity. The manufacturer must be consulted in case a necessary change of valve is needed.

6.0 Putting the valve into operation / Operation



ATTENTION !

- The operating safety ordinance (in germany: BetrSichV) must be observed.
- Before the test pressure of the system is done, the ball float steam trap CONA S, the safety valve and the pressure reducing valve must be protected.
- Before putting the valve into operation, check material, pressure, temperature and direction of flow.
- Regional safety instructions must be adhered to.
- Residues in piping and valves (dirt, weld beads, etc.) inevitably lead to leakage.
- Touching the valve when it is operating at high ($> 50^{\circ}\text{C}$) or low ($< 0^{\circ}\text{C}$) media temperatures can cause injury.
Affix warning notice or protective insulation as appropriate!
- The water seal pot is available for media temperatures over 100°C (NBR-diaphragm) or 130°C (EPDM-diaphragm).
- The water seal pot is completely filled (by steam with water) and the actuator is bled by the plug (see Fig. 3).

Before putting a new plant into operation or restarting a plant after repairs or modification, always make sure that:

- All works has been completed!
- The valves are in the correct position for its function.
- Bypass valve closed and sealed.
- Safety devices have been attached.
- Valves 14 and 16 must be closed before and during the working system.

The operation is then as follows:

- Open manometer valve.
- Open valves (pos. 11 and 15).
- Close valves pos. 14 and 16).
- If present open the stop valve in the control line.
- Slacken spring by turning adjusting plate (pos. 17) to the left.
- Open valves (pos. 6 behind the pressure reducing valve).
- Now open slowly the stop valve (pos. 4 heat up the piping) then open until the full P_1 pressure is reached.
- Pressure reducing valve closes by min. P_2 rise.
- Now pre-tension spring by turning adjusting plate (pos. 17) to the right (size 19 spanner - clockwise) until the desired downstream pressure is obtained (for possible downstream pressure see type plate on the plant), if downstream pressure is too high, slacken spring by turning adjusting plate (pos. 17) to the left (anti clockwise).
- To set the pressure reducing valve, the flow must exist.
- Now the pressure reducing valve is ready for use.



ATTENTION !

- Squashing of finger between the spring coils and in the area of the pin in the head piece when the valve lift is moving.
- When in use high flow noise can occur.

- In case steam exists on the P_2 side please contact the manufacturer.
- In no case is steam hammer allowed in the system.
- The bypass valve is only allowed to be opened when the stop valves, downstream, upstream are closed (manual service).
- Manual operation only under supervision.
- When no flow is required, the stop valve before the pressure reducing valve must be closed.
- The pressure reducing station is only allowed to be used acc. to the given data. See plant specification sheet. (Correction to new data, consult manufacturer.)

7.0 Care, maintenance and taking out of operation

The operating safety ordinance (in germany: BetrSichV) must be observed. Regional safety instructions must be adhered, too.

Before the test pressure of the system is done, the ball float steam trap CONA S, the safety valve and the pressure reducing valve must be protected.

Maintenance and maintenance-intervals have to be defined by the system operator according to the requirements.



ATTENTION !

- To blow down, the valves 14 and 16 are allowed to be shortly opened only with a fitted protection piping.
Danger through steam exit!
- Before taking out of operation observe point 10.0!

Taking out of operation in reverse order, see point „6.0 Putting the valve into operation / Operation“.

8.0 Troubleshooting

In the event of malfunction or faulty operating performance check that the installation and adjustment work has been carried out and completed in accordance with these Operating Instructions.



ATTENTION !

It is essential that the safety regulations are observed when identifying faults.

If malfunctions cannot be eliminate with the help of the following table “9.0 Troubleshooting table”, the supplier or manufacturer should be consulted.

9.0 Troubleshooting table



ATTENTION !

- read point 10.0 and 12.0 prior to dismantling and repair work !
- read point 5.0 and 6.0 before restarting the plant !

Fault	Possible cause	Corrective measures
No flow	Flange covers not removed	Remove flange covers
Little flow	Dirt sieve clogged	Clean / replace sieve
	Piping system clogged	Check piping system
	Kvs value of valve unsuitable	Fit valve with higher Kvs value; Consult manufacturer
Downstream pressure rises quickly when the users are turned off	Seat/disc leakage of the pressure reducing valve, very dirty	Change valve or, if necessary, seat/plug
	Control line or flow restrictor blocked	Clean control line or flow restrictor
	Diaphragm of the pressure reducing valve is defect	Change diaphragm
	Vent plug of the pressure reducing valve is blocked	Open hole in the vent plug screw
	Valve in the control line closed	Open valve in the control line
	Actuator of the pressure reducing valve is not fitted proper	Loosen lock nut. Tighten actuator; Fix lock nut
	Bypass line not closed proper	Close bypass line
	Pressure reducing valve defect	Change pressure reducing valve
Media comes out of the vent plug hole of the pressure reducing valve	Diaphragm leaking	Change diaphragm
Flange broken	Damage during transport	Change damaged part
	Flange bolts not evenly tightened	Change damaged part
	Transfer of unsafe forces such as bending or torsional forces	Install free of tension
Downstream pressure can not be adjusted in the full capacity range	Valve sized to small	Install valve with larger Kvs-value; Consult manufacturer
	Valve setting is wrong	Set valve properly
Pressure reducing valve doesn't regulate	Control line or flow restrictor blocked	Clean control line or flow restrictor.
	Diaphragm defect	Change diaphragm.
	Control line is connected to the vent plug hole	Fix control line pipe to the control pipe connection
Downstream pressure unstable	Flow restrictor not installed	Install flow restrictor
Media exit out of the bonnet of the pressure reducing valve (at the spindle leakage)	Pressure reducing valve bellow defect	Change pressure reducing valve
Downstream pressure can't be altered	Manometer defect	Change manometer
	Valve closed in the control line	Open valve in the control line
Valve stem of the pressure reducing valve moves in jerks	Valve plug slightly seized owing to solid dirt particles	Change pressure reducing valve
Unsafe rise in downstream pressure	Safety valve or outlet blocked	Remove test gag or blind flanges

10.0 Dismantling



ATTENTION !

The following points must be observed:

- *Pressureless pipe system.*
- *Medium must be cool.*
- *Plant must be drained.*
- *Purge piping systems in case of caustic, inflammable, aggressive or toxic media.*
- *The operating an installation instructions of all components must be observed.*

11.0 Disposal

Disposal of this product or parts of it must be carried out according to the following guidelines:

Use the local public or private waste collection service.

12.0 Warranty / Guarantee

The extent and period of warranty cover are specified in the "Standard Terms and Conditions of Albert Richter GmbH & Co. KG" valid at the time of delivery or, by way of departure, in the contract of sale itself.

We guarantee freedom of faults in compliance with state-of-the-art technology and the confirmed application.

No warranty claims can be made for any damage caused as the result of incorrect handling or disregard of operating and installation instructions, datasheets and relevant regulations.

This warranty also does not cover any damage which occurs during operation under conditions deviating from those laid down by specifications or other agreements.

Justified complaints will be eliminated by repair carried out by us or by a specialist appointed by us.

No claims will be accepted beyond the scope of this warranty. The right to replacement delivery is excluded.

The warranty shall not cover maintenance work, installation of external parts, design modifications or natural wear.

Any damage incurred during transport should not be reported to us but *rather* to the competent cargo-handling depot, the railway company or carrier company immediately or else claims for replacements from these companies will be invalidated.



Technology for the Future.

GERMAN QUALITY VALVES

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