This is a General Operating and Installation Direction for component tested Valves according to Pressure Equipment Directive category IV, Modul B,D. This is for basic overview and your first information.

KÜHME prepare an order-specific instructions for your order.

Contact address of the manufacturer

KÜHME Armaturen GmbH
Am Vorort 14
D - 44894 BOCHUM
Tel.: +49 (0)234 - 29 802 - 0
Tel. (Service): +49 (0)234 - 29 802 - 31
FAX: +49 (0)234 - 29 802 - 10
e-Mail: info@kuehme.de
Internet: http://www.kuehme.de

KÜHME Armaturen GmbH
Postfach 700 350
D - 44883 BOCHUM

General Operating and Installation Direction
Electro-pneumatic Operated Safety Shut-off Devices
for gaseous and liquid fuels
according to Directive 2014/68/EU, Category IV, Module B+D

Contents

1.0 General notes on the operating direction

This operating direction includes instructions for the professional handling and the safe installation and operation of these valves.
Furthermore, this operating direction describes the function and the procedures involved in case of problems occurring.

The operating instructions apply only in association with the delivery note and the corresponding valve specification.
Before beginning all measures, the agreement of the local type designation with the designation on the rating plate of the valve is to be checked.
This matching is always to be ensured in case of ordering accessories or spare parts!

If difficulties in understanding or uncertainties should occur which cannot be solved unambiguously with the aid of this operating direction, additional information is to be requested from the manufacturer.

It is absolutely necessary that the notes and warnings in these operating instructions are considered and adhered to. The application and use of this operating direction have as prerequisite the employment of qualified personnel for the implementation and supervision of all activities. The stipulation of responsibilities and deployment, as well as monitoring, of personnel is the responsibility of the operator.
Basically, the current regional or operational safety requirements are always to be considered in case of all activities.

This operating direction must be continuously available at the place of work of the valves.

Explanations about regulatory works

KÜHME Armaturen GmbH has confirmed that the quality assurance during the development, manufacture and testing has met the requirements of the Directive 2014/68/EU, Appendix III Module H (former Pressure Device Directive 97/23/EG, valid until 18.07.2016).

The electro-pneumatic-operated safety shut-off devices correspond to the basic requirements of Directive 2014/68/EU.

KÜHME Armaturen GmbH has declared that the valves described under this operating direction represent "safety accessories", as specified by Directive 2014/68/EU, are consistent with the safety requirements of this directive and may be operationally commissioned, operated and maintained only subject to observation of this operating direction.
The valves were developed, produced and tested subject to observation of the harmonized standards DIN EN 161 class A, DIN EN 16678 class A and/or DIN EN ISO 23553-1.
This has been confirmed in a type test. The identification in accordance with 2014/68/EU, for placing on the market of these equipment throughout the member states, is therefore implemented according to Category IV Module B, D.

Notes according to the Directive 2014/34/EU (former 94/9/EG, valid until 19.04.2016) can be found in Section 2.5.

2.0 Hazard notes

2.1 Safety-relevant terms / symbols

This operating direction includes include notes on safety, warnings of hazards, instructions for handling and notes on technical interdependencies.

It is absolutely necessary that these are followed and checked in order to prevent injuries or danger to users or third parties, material damage to the system and/or environment.

The following symbols are employed for the identification of particularly important safety and warning notes:

DANGER!	WARNING! against electric voltage	ATTENTION!	NOTICE!
			
Notes on safety, whose non-observance would result in injuries to persons and/or considerable material damage	Warning whose non-observance would result in injuries to persons and/or property damage	Notes whose non-observance would result in damage and/or failure of the valve	Notes on special technical interdependencies

The observation of the installation and operating directions, as well as the technical data of corresponding attachment parts and accessories of other manufacturers (see information from product documentation), is equally vital in order to avoid faults, which, for their part, can directly or indirectly cause injuries to persons or damage to property.

Basically, non-observance of the notes on safety can lead to the invalidation any damage restitution claims.

2.2 Qualified personnel

This term defines persons who are familiar with the valve, the installation, the operational startup, the operation and the maintenance.
Furthermore, they must be provided with the qualifications corresponding to their function and activity, with respect for the operational safety ordinance.

2.3 Arbitrary modifications

Conversions and/or arbitrary changes on the valve are generally admissible only following discussion with the manufacturer and with written consent.
Original parts of the manufacturer and accessories authorized by the manufacturer form the basis for the safe operation of the valve.
The utilization of alternative component parts or arbitrary construction changes to the valve exempt the manufacturer from liability for any consequences.

2.4 Intended use

The functionality and the operational safety of these valves is guaranteed only in case of utilization according to specification.
The employment limits indicated on the rating plate may not be exceeded.
The specifications are consistent with the Pressure Device Directive 2014/68/EU.
Special additional identifications on the valve are to be considered.
Compliance with the employment limits is the responsibility of the operator.

2.5 Notes on safety relating to the ATEX Directive 2014/34/EU

(former 94/9/EG, valid until 19.04.2016)

- The valves were subjected to an inflammability analysis according to EN 13463-1:2009-07, Paragraph 5.2.
  The valves do not have its own potential source of ignition and thus does not fall into the field of application of ATEX 2014/34/EU.
  Therefore they may not be correspondingly identified as such.
- The surface temperature occurring during operation is dependent, not on the valve itself, rather on the operating conditions.
  This is to be considered in the installation.
- The valves must be grounded. The grounding can be realized in the simplest case via the pipe bolts by means of toothed washers. Otherwise, the grounding must be ensured by other means (e.g. ground wire jumpers).
- Electric accessories (solenoid valves, limit switches, etc.) must be subjected to their own, component-specific, conformity evaluation according to ATEX.
  The corresponding notes on safety and explosion protection in the respective operating instructions are to be considered in this case.
- Remark:
  If electrical accessories (solenoid valves, limit switches, etc.) of the valve are combined to a functional unit, e.g. through cabling on a sub-distribution board (terminal boxes), and this complete unit must be subjected to a conformity evaluation according to ATEX.
  The result is documented in a Declaration of Conformity and a corresponding marking is implemented.

3.0 Handling

3.1 Transport

For transport it is absolutely necessary to consider the generally applicable regulations for occupational safety and environmental protection, as well as the accident-prevention specifications.

The valve is to be left in its protective package during transport. Basically the protective caps on the inlet and outlet of the valve are to be removed only shortly before installation.

The temperature during transportation may not deviate from the indicated admissible ambient temperature.

The valve is to be protected against external influences (shock, impact, vibration).

The painting of the valve may not be damaged under any circumstances.

The transport may be implemented only by means of the lifting lugs provided, using suitable transport and lifting equipment.
The instrument air piping and its components are not lifting points and may not be used for any other purpose under any circumstances.
Attention is to be paid that these component parts are not damaged during transport and installation.

Possible damages incurred during transit are not to be reported to the Co. KÜHME Armaturen GmbH, rather they are to be reported *immediately* to the responsible goods dispatch, railway or forwarding agent, since otherwise damage compensation claims against these companies are voided.

3.2 Storage

Immediately after receipt as incoming goods, the valve is to be subjected to a visual inspection with regard to completeness and damages incurred during transit
(see also Section 10.0)

If the valve is planned for temporary or longer-term storage, this must be implemented properly.

The storage should be implemented in a clean and dry room.
In moist rooms, heating or the utilization of desiccant is necessary.

The storage temperature may not deviate from the indicated permissible ambient temperature.

With regard to the elastomers installed in the valve, compliance with the requirements, in accordance with DIN 7716 (products of rubber and caoutchouc), is referred to.

4.0 Product description

4.1 Field of application

These valves are employed as a safety quick-closing device for shutting off the fuel mass flow.
Media used:

- Gaseous fuels in accordance with Directive 2014/68/EU
- Gaseous fuels according to DVGW worksheet G 260, gas groups 1, 2 and 3
- Liquid fuels in accordance with Directive 2014/68/EU
- Liquid fuels according to DIN 51603-1*"Fuel oils - Part 1: Fuel oils EL, specifications"*

4.2 Technical data

Max. operating pressure:	valve specific (in dependence on type and nominal pressure)
Operating temperature:	-25 (*-29) bis +180 °C (*ASME/ANSI)
Ambient temperature:	-25 (*-29) bis + 80 °C (*ASME/ANSI)
Control medium:	Compressed air min. 4 bar g
Control voltage:	230 V, 50 Hz, 24 V DC and special voltages
Installation position:	arbitrary
Installation location	indoor and outdoor

4.3 Requirements

The safety shut-off devices for gaseous and liquid fuels are electro-pneumatically directly-controlled, de-energized by power of compression spring(s) closed valves, with a permissible leakage rate of:

- Leakage rate A in accordance with DIN EN 12266-1 / P12
- Leakage rate in accordance with MSS-SP-61 / 2.4
- Leakage class VI in accordance with ANSI/FCI 70-2 – 2006 (DIN IEC 60534-4)

These valves are basically flowed-through in the closing direction.

Reaction time of these valves:

- Closure time: < 1.00 s
- Opening time 0.50 - 2,00 s

This reaction time is based on control systems, whose functionalities and components are described separately in Sections 4.5 and 4.6.

4.4 Construction dimensions

The construction dimensions of the different types of safety shut-off devices for gaseous and liquid fuels can be seen in the type specific documentations.

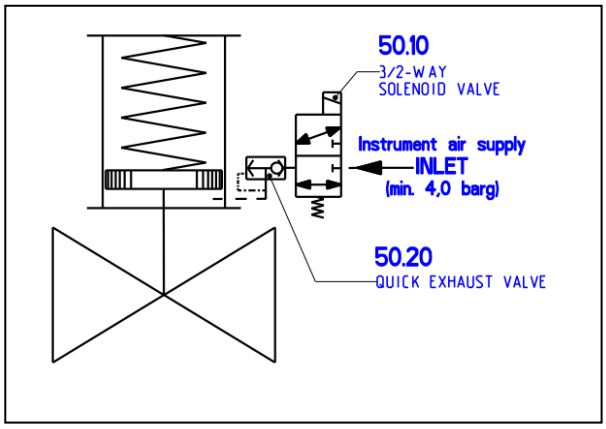
4.5 The control system

The quality of the compressed air (instrument air) made available should correspond to the recommended purity class 2, in accordance with ISO 8573-1.

Maintenance units can be dispensed with in this case.

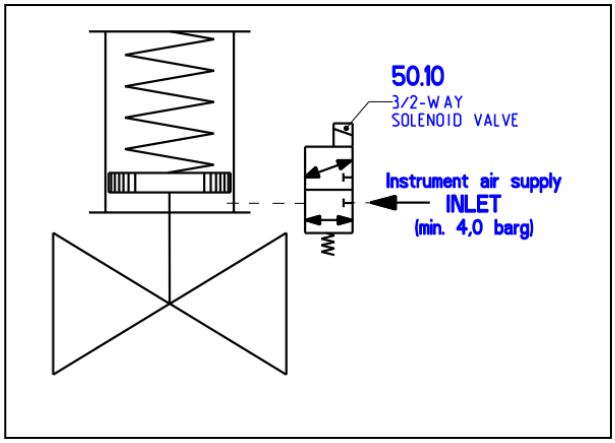
If nevertheless maintenance units are employed because of a sticking hazard of the solenoid control valves, it is to be ensured that only resin-free and acid-free oil types are employed
> viscosity 2 - 4° Engler at 20°C.

Control scheme of Safety Shut-off Device for gaseous fuels



50.10 3/2-Way Solenoid Valve
50.20 Quick-Exhaust(Venting) Valve

Control scheme of Safety Shut-off Device for liquid fuels



50.10 3/2-Way Solenoid Valve

4.6 Mode of operation

The basic requirement for the trouble-free function of the valve is the sufficient supply with compressed-air auxiliary energy.
In this case, the following parameters are to be fulfilled:
►Minimum necessary feed cross section DN 8 (Pipe ø10x1.0)
►Minimum necessary instrument air pressure = 4.0 barg

Function:

Opening with compressed air auxiliary energy

As a result of electrical actuation of the 3/2-way solenoid valve (50.10), it is switched against the force of the installed spring, and frees up the path to the piston chamber for the control medium via the quick-exhaust (venting) valve (50.20), which is directly installed at the piston.
The control medium flows into the piston chamber, moves the drive piston against the force of the compression spring(s) and opens the main valve.

Closing by spring force without compressed air auxiliary energy

As a result of electrical disconnection (switching off, failure or interruption of the current energy) of the 3/2-way solenoid valve (50.10), it is switched by force of installed spring to venting position and enables the simultaneous switchover function of the quick-exhaust (venting) valve (50.20) by pressure impulse of the control medium in the drive.
The quick-exhaust (venting) valve likewise switches to venting position and frees up its especially dimensioned cross-section.
The compressed control medium in the drive piston is ventilated, the main valve closes by the force of the compression springs.

Special design at outdoor installation

An installed instrument-air feedback generates a closed system and prevents the influence of external influences (moisture, dirt, aggressive atmosphere etc.).

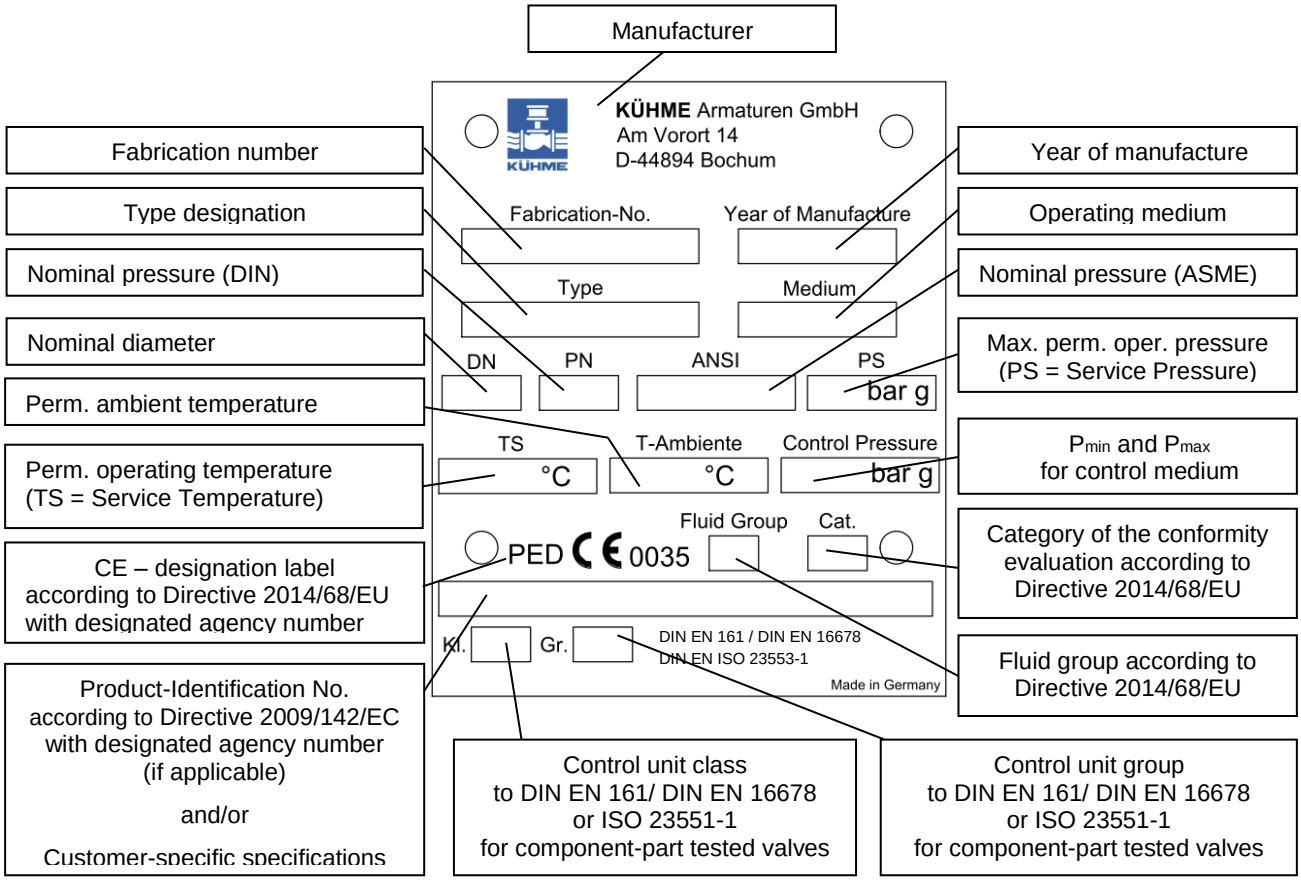
4.7 Marking

On the casing/body of the valve are located the following identifications:

- Nominal diameter
- Nominal pressure (PN or class designation)
- Material of the casing/body
- Name of the manufacturer
- Melt designation
- Flow-through directional arrow

The identification is implemented in cast, forged or impressed characters.

On the rating plate of the valve, the following specifications are located:



The rating plate material is stainless steel and it is labeled by means of an engraving device.
It is fixed on the structure of the valve with rivets on a sign holder.

Further specifications are to be taken from the valve specification as necessary.

Remark: See also Section 1.0 > explanations about regulatory works

5.0 Installation

5.1 General installation instructions

Secure operation of the valve is guaranteed only when it is installed by qualified, personnel professional, subject to observation of these directions.
Compliance with the operational safety ordinance and the professional employment of protective equipment and tools are prerequisite in this case.

5.2 Designations relating the installation location

The planner and the operator are responsible for the conception of the installation position and the installation location of the valve. The transport routes to the installation location are also in their area of responsibility.
Sufficient open space is to be provided for installation, operation, maintenance and repair. As well as a secure placement possibility for the valve, the installation location should offer the possibility of the secure use of transport and lifting equipment.

5.3 Installation notes

As well as the generally-applicable installation directives, the following points are to be considered:

Before beginning any work, the confirmation of the release concerning pressure, temperature and electric voltage for the appropriate pipeline section must always have been first implemented.

Only immediately before the installation, the protective package of the valve, pipe close-off caps and other safety devices are to be removed.

Accessible interior compartments of the pipe and the valve, as well as their surfaces and function parts, are to be carefully cleaned.

The installation of the valve is to be checked with regard to flow-direction (flow-direction arrow on the casing).

The installation of the valve is to be checked with regard to installation location (permissible mounting position).

The valve must be installed free from stress loading and moments.
It is absolutely necessary to avoid that any pipework forces occurring are transferred as shear, bending or torsion forces to the valve.
The valve must never be used as a fixed point!

Flanged valves

Pipe and valve flanges must align with each other.
The connection flanges must agree with those of the valve.
The seal is to be centered carefully between the flanges.
The prescribed tightening torques of the bolt fastenings are to be considered (seal-type-specific).

Weld-in valves

Pipe and valve welding ends must align with each other.
The dimensions of the welding ends of the connecting pipe must agree with the dimensions of the valve welding ends.
During welding-in process, attention is to be paid to the highest level of cleanliness. No contamination may penetrate into the casing since otherwise damage can be caused to the sealing surfaces or to the cone and spindle guidance.
In addition, it should be ensured as far as possible during the welding procedure that the intermediate layer temperature of max. +200°C is not exceeded, in order to minimize the effect of welding stresses on the component part.
If this cannot be ensured, the complete valve top frame as well as the internal parts of the valve, are to be removed professionally before start oft welding-in procedure.
After the welding-in process, the valve body and the pipe are to be cleaned carefully so that no foreign bodies are present any longer. The assembly of the valve is implemented only after the cooling down of the casing.

Welding procedures and weld filler metals, as well as weld data, are to be stipulated on site by the corresponding parties responsible.

In case of construction work operations in the environment of the valve, it is to be protected against damage and contamination.

On completion of the assembly work, the valve is to be subjected to a visual inspection with regard to damage and completeness.
The paint coating of the valve may not indicate damage under any circumstances; otherwise an instant repair of the paintwork is necessary.

Only on completion of all work (incl. all necessary electrical and electro-pneumatic connections > BTA control valve, limit switches), may the signal for the release requirement be implemented for the appropriate pipeline section.

After complete installation of the valve, including the pneumatic control system and the cabling of all electrical consumers, the functional behavior of the valve is always to be checked before the **test phase operation and the operational startup**.

6.0 Operation

6.1 Before beginning every operational startup

Before every operational startup of a new system, or restart of operation of a system after repairs or conversions, the following are to be ensured:

- ✓ A proper completion of all installation and assembly work!
- ✓ Operational startup by qualified personnel only
- ✓ The attachment and repair maintenance of existing safety devices
- ✓ The correct functional setting of the valve

6.2 Initial startup

Before initial startup of a system, the following are to be considered:

- ✓ Basically the regional safety regulations are always to be considered
- ✓ Specifications relating to material, pressure, temperature and direction of flow are to be checked against the system plan of the piping system
- ✓ Residues in pipes and valves (soil, shot beads, etc.) result in seal leakage and/or damage
- ✓ A seal test of the valve is to be implemented

6.3 Operational shutdown

Before operational shutdown of a system, the following is to be considered:

- ✓ Basically the regional safety regulations are always to be considered

6.4 Restart of operation after maintenance

In case of restart of operation of the valve after a longer standstill, removal or maintenance, it is to be ensured that the following activities are implemented again:

- ✓ Work steps according to 5.3 (Installation notes)
- ✓ Work steps according to 6.1 (Before every operational startup)
- ✓ Work steps according to 6.2 (Initial startup)

7.0 Troubleshooting / Fault detection and remedying

7.1 Fault detection

In case of faults in the function and/or the operating characteristics, the first step is always to check whether the installation and adjusting work has been implemented and completed in accordance with these operating instructions.

The specifications relating to materials, pressure, temperature, direction of flow and supply voltage are to be compared with the system plan of the piping system. Furthermore, it is to be checked whether the in-service conditions correspond to the technical data indicated in the valve specification and on the rating plate.

In case of fault location, it is absolutely necessary to consider and follow the safety regulations.

In case of faults which cannot be remedied based on the notes on possible causes and their elimination in accordance with the table below under Point "7.2 Fault location plan", it is absolutely necessary to consult the manufacturer.

7.2 Troubleshooting plan / Fault location plan

CAUTION!

- Before installation and repair work, Section 10.0 is to be considered!

- With reference to necessary installation and repair work, the separate, specific installation and maintenance instructions are to be considered!

- In case of restart of operation, Section 6.4 is to be considered!

In case of faults which cannot be remedied based on the notes on possible causes and their elimination in accordance with the following table, it is absolutely necessary to consult the manufacturer.

Fault / Symptom	Possible cause	Remedial actions
No flow-through		
> Valve functional disturbance:	- Closed valve? (see "Valve does not open")	- Open valve (by means of drive)
> System functional disturbance:	- Flange or other coverings were not removed?	- Remove flange or other coverings
Low flow-through		
> Valve functional disturbance:	- Valve not opened completely? (see "Valve does not open") - Dirt accumulation in valve?	- Open valve (by means of drive) - Verification/cleaning of the valve
> System functional disturbance:	- Plug in the piping system?	- Verification of the piping system

Fault / Symptom	Possible cause	Remedial actions
Valve does not open		
> System functional disturbance:	- Operating pressure too high?	- Compare operating pressure with the information indicated on the rating plate
> Supply functional disturbance:	- Instrument air generally present? - Min. required instrument air present? - Leakage in instrument air connection system?	- Verification of the supply - Min. required instrument air (see spec.) - Check screwed connections for sealing
> Functional disturbance (50.10) 3/2-Way solenoid valve:	- Control voltage existing? - Correct control voltage present? - Cabling correct / fixed? - Fault in control?	- Verification of the supply - Test specifications on magnet (see spec.) - Test connection / cable break - Verification (control station)
> Functional disturbance (50.20) Quick-exhaust(venting) valve:	- Switchover functionality existing? - Valve seat leakage, inner sealing, seal-ring? - Defect at piston, damage (grooves)?	- Verification of the function - Check and change as appropriate - Check and rework or replace
> Functional disturbance Drive piston	- Drive piston leakage, external sealing? - Static O-ring at piston pipe - Dynamic/static sealing at spindle - Drive piston leakage, inner sealing? - Piston sealing elements - O-ring at spindle/piston - Damage at piston pipe (grooves)	- Technical verification - Check and change as appropriate - Check and change as appropriate - Technical verification - Check and change as appropriate - Check and change as appropriate - Check and rework or replace
> Functional disturbance hydraulic opening delay	*If existent, see separate description!*	
> Functional disturbance Actuator element	- Defect in the drive spindle? Damage (grooves) - Defect at inner parts of valve Damages in general	- Check technical verification and repair if necessary - Check technical verification, rework or replace
Valve does not close		
> Functional disturbance System:	- Operating pressure too high?	- Compare operating pressure with information indicated on the rating plate
> Functional disturbance (50.10) 3/2-Way solenoid valve:	- Switches the solenoid valve to venting? - Mechanical/electrical defect? - Fault in control?	- Technical verification - Separate test of the solenoid valve - Verification (control station)
> Functional disturbance (50.20) Quick-exhaust(venting) valve:	- Switchover functionality existing? - Defect at the piston/piston pipe (grooves)	- Verification of the function - Check and rework or replace
> Functional disturbance: Drive piston	- Defect at drive piston? Defective / break of closing spring(s) Damage at piston pipe (grooves)	- Technical verification Check and change if necessary Check and rework or replace
> Functional disturbance hydraulic opening delay:	*If existent, see separate description!*	
Valve does not close sealed = no inner sealing		
> In the valve seating area:	- Dirt accumulation in the valve seat area? - Actuator element sealing defective?	- Open valve and clean seat area - Check valve seat for damage and regrind if necessary - Check valve cone seal and replace if necessary
> In the valve inner area:	- Defect at components in general?	- Technical verification Check and rework or replace
No external sealing		
> On the housing lid:	- Cover not tightened professionally - Cover sealing (O-ring) defective	- Verification of alignment / centering - Verification of bolts (tightening torque) - Check and change if necessary
> On the spindle sealing:	- Spindle sealing system defective? (leakage test on test connection) - Stainless steel bellow or automatic seal set - Downstream elastomer sealing elements - Valve spindle (damage / grooves)	- Technical verification check and change if necessary check and change if necessary check and rework or replace

Fault / Symptom	Possible cause	Remedial actions
Functionality		
Valve closes too slowly	➢ Basically see "Valve does not close"	
> Functional disturbance (50.10) 3/2-Way solenoid valve:	- Solenoid valve vent soiled? - Magnet fatigued?	- Technical verification / clean - Verification of the reaction time
> Functional disturbance (50.20) Quick-exhaust(venting) valve:	- Inner soiling?	- Technical verification / clean
> Functional disturbance Drive piston:	- Fatigue of the close spring(s)?	- Technical verification / replacement
> Functional disturbance actuator element:	- Increased friction at valve inner parts / spindle?	- Technical verification
Valve opens too slowly	➢ Basically see "Valve does not open"	
> Supply functional disturbance:	- Instrument air supply soiled?	- Technical verification / clean
> Functional disturbance (50.10) 3/2-Way solenoid valve:	- Transition soiled? - Magnet fatigued?	- Technical verification / clean - Verification of the reaction time
> Functional disturbance (50.20) Quick-exhaust(venting) valve:	- Leakage?	- Technical verification / clean
> Functional disturbance Drive piston:	- Increased friction?	- Technical verification / replacement
> Functional disturbance Actuator element:	- Increased friction at valve inner parts / spindle?	- Technical verification
No setting signaling		
> Functional disturbance Mechanism:	- Limit switch spindle triggered / defective (break)? - Is(Are) switching element(s) adjusted?	- Technical verification Fixing or replacing - Element(s) new adjustment
> Functional disturbance Limit switch:	- Limit switch defective? - Cabling correct / fixed? - Fault in control?	- Replace limit switches - Test connection / cable breakdown - Verification (control station)

8.0 Dismantling of the valve

In addition to the generally applicable installation directives and the operational safety ordinance, the following conditions are to be kept:

Before beginning any work, the confirmation of the release concerning pressure, temperature and electric voltage for the appropriate pipeline section must always have been first implemented.

The medium / valve must have cooled down.

The system must be emptied.

There must be information available about the operating medium in the form of a safety data sheet.
The personal protective equipment prescribed is to be ensured.
In case of corrosive, aggressive or toxic media, the piping system is first to be vented.
Piping systems for aggressive, explosion-hazard or fire-hazard media are to be flushed or blown out with inert or neutralizing media.

The compressed air supply is basically to be shut off.

Electrical cables are basically to be disconnected.

The dismantling of the valve is to be carried out by qualified personnel only.

9.0 General maintenance instructions

The KÜHME electro-pneumatic operated safety shut-off devices are designed on the basis of constructive implementation for maintenance-free operation.
As a result of the cased construction, there is no access from the stem guide to outside, so that no external influences can be effective and the thus constant frictional forces are maintained for a secure method of operation.

On the basis of DIN EN 12952-7, the DVGW Code of Practice G 495 and the Reports relating to the SIL Certification, KÜHME Armaturen GmbH recommends the following intervals for the ***predetermined care / maintenance****:*

- ***Every six months > Inspection > Test for external leakage***

Remark: The check of the stem sealing (automatic sealed-set system) is possible at the provided test connection (see sectional drawing) by painting with Nekal.
With occurring low level of leakage, the damage removal should be implemented as fast as possible by existing maintenance personnel or by the manufacturer. However, operation can be maintained by renewed closure of the test connection by means of locking screw and sealing ring (G1/8 DIN ISO 228) **on a short-term basis.**

- ***Annually > Function test > Test the opening and closing function***
  Remark: including inspection

- ***Every 3 years > Maintenance on site or in the manufacturing works > Dismantling of the valve***
  Remark:
  - Inner inspection
  - Replacement of all sealing elements
  - Functional and sealing test

- ***Every 9 years > General revision in the manufacturing works***

Note: For the maintenance of the SIL certification, after a period of 10 years (plus 1,5 years storage time prior to operational startup) a general revision in the manufacturing works is prescribed.

Remark: In particular (exceptional) cases, the maintenance on site can be implemented by the manufacturer or by specialist personnel, trained by the manufacturer under the supervision of a KUEHME supervisor.

According to operating conditions, a **status-oriented maintenance** is necessary, where the recommended intervals must be shortened.
Dependent on the operating conditions (medium, temperature, number of switching cycles, degree of pollution, environmental impacts etc.), the intervals are to be stipulated for the status-oriented maintenance by the operator.

Before beginning any maintenance work, the valve is to be taken out of operation according to the instructions under Section 6.2.
Furthermore, all precautions in accordance with Section 8.0 are to be adhered to.

10.0 Guarantee / Warranty

The scope and period of the guarantee is given in the issue of the General Standard Terms and Conditions of KÜHME Armaturen GmbH" valid at the time of the delivery or, deviating from this, is indicated in the purchase contract itself.

We give a guarantee for the absence of defects corresponding to the respective state of the art and the confirmed intended purpose.

No warranty claims and/or damage restitution claims can be made for damages which have arisen for the reasons referred to below:

- Lack of knowledge or non-observance of these operating and installation directions
- Non-observance of the accident-prevention specifications
- Installation, operation and maintenance by unqualified personnel
- Inappropriate handling of the valve
- Non-observance of the valid standards and the relevant regulatory works

Damages which are caused during operation, as a result of in-service conditions deviating from the valve specification or other agreements, are likewise not subject to the guarantee.

Inappropriate maintenance, modifications of the valve, the installation of external parts, change of the construction, as well as natural wear, are excluded from the guarantee.

Justified complaints will be dealt with through post-treatment work directly by KÜHME Armaturen GmbH or by specialist companies instructed by KÜHME Armaturen GmbH.

Claims over and above the guarantee are excluded.

A claim for replacement delivery does not exist.