

USER MANUAL		
SPRING-LOADED SAFETY VALVES zARMAK	782V (ex. 782)	Edition: 07/2016 Date: 01.07.2016

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Figure 782

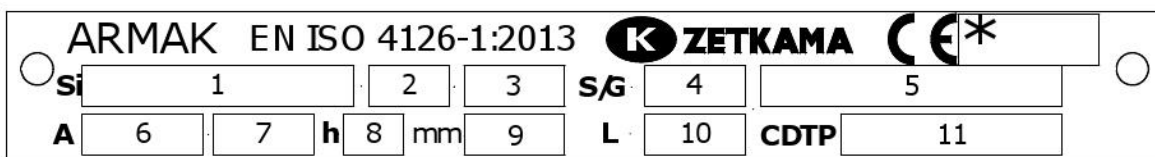
1. Principle of operation

The purpose of the safety valve is to protect the equipment and installation against excessive pressure above the pressure limit.

When the force coming from the pressure acting on the disc surmount with the force from the spring, the valve starts to open. A further increase in the pressure, required for the particular design of the valve, causes its full opening.

2. Delivery condition

Supplied valves are tested and set for the required opening pressure or, when ordered for range, for the upper pressure of the range. After the pressure adjustment, adjustment screw is locked, which prevents it from possible loosening, for example, in the case of vibrations and thus against the dysregulation of the valve.



Nameplate

Symbols:

1. Type of safety valve
2. Bore diameter
3. Spring number
4. The discharge coefficient for vapours and gases
5. Set pressure or set pressure range
6. Flow area
7. Year of manufacture
8. The minimum lift value
9. Overpressure
10. The discharge coefficient for liquids
11. Cold Differential Test Pressure

* Notified body number

Valves are stamped on a nameplate fixed to cylindrical part of the body or written with other permanent method on the cylindrical part of the body.

Additionally, at the inlet nozzle is stamped with:

- PN (according to DN)
- opening pressure or pressure range
- serial number / year
- Workstation number of assembler
- Stamp of an operator performing the test

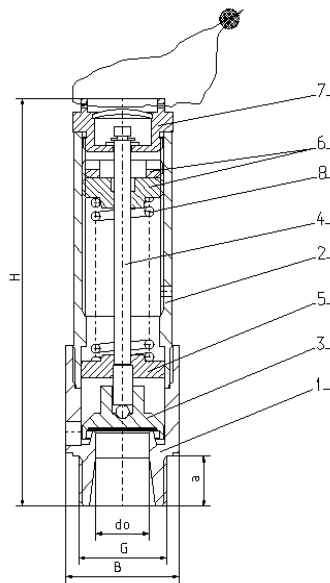
The set pressure is sealed sealing at the top of the spindle above the upper lifting screw plug.

3. Installation of safety valves

- Before the installation on the unit or pipeline, check if valve was not damaged or contaminated during transport or storage. It is absolutely necessary to check the cleanliness of flow channels, external surfaces and end connections. Any impurities must be removed.
- **The valve should be installed in vertical position** and the place of installation should predict outflow of the medium directly to the surroundings.
- **Immediately before starting the unit/ pressure system, mounted safety valve must be manually opened-closed (as in the case of checking the valve operation). Repeat this each time before starting the unit/system after a long standstill. Failure to do so may be the cause of "sticking" of the plug rubber to the inlet nozzle and thus the first opening pressure will be higher than the set one.**
- Pipe transporting medium to the valve should comply with the requirements included in the surveillance provisions. Cross-section and the shape of the pipe should be selected so as not to cause excessive flow resistance (pressure drop above the limit values) and therefore unstable operation of the valve, and not to reduce valve capacity.
- Mounting place of the valve should be easily accessible, good lighted and protected from external influences. If the safety valve is mounted outdoors, it must be protected against frost and rain.
- When mounted near the platforms for service staff, they must be in compliance with the provisions of Health and Safety Regulations (blowing valve should not be a threat to the health and life of people).

4. Operation of safety valves

Figure 1



Item	Element
1.	Nozzle
2.	Cap
3.	Disc
4.	Spindle
5.	Spring plate
6.	Adjustment screw
7.	Lifting screw plug
8.	Spring

Safety valves that serve as important elements of the devices and pressure systems require particularly careful and competent service. Any operational gasp may cause damage to the valve mechanism, and consequently lead to the total failure of the pressure system. Therefore, during the operation, pay special attention to:

- Proper setting of safe valve, suitable for the operating parameters of the equipment being protected.
- Proper protection of the valve mechanism against arbitrary regulation and the possibility of damage.
- Periodically verification of correct operation of the valve, in accordance with the requirements of surveillance.
- proper maintenance and repair management.

Checking the safety valve operation involves lifting of the disc by unscrewing the lifting screw plug (pos. 7) rising the spindle. When purging hold the valve with “27” key and then unscrew the lifting screw plug [7] rising the spindle, and thus release medium. To re-close the valve, tighten the lifting screw plug [7] until feeling the resistance. Release of the lever should be made at a pressure between 75% and 85% of set pressure.

The frequency of these activities depends primarily on:

- Conditions of exploitation, i.e. the type of medium flowing and its parameters and properties,
- The specifics of the technological process.
- Place of installation.
- environment.

It should also be correlated with the overhaul and repair of pressure equipment / installations that protects the valve. Very important is the experience of the user. Determining the periods of checking the safety valve is the responsibility of the designer of installation.

The valve plug is rubber, and therefore the valve is less sensitive to impurities derived from the medium or from the system. In case of valve leakage, check the valve rubber surface condition. If damage is found at the contact with the sealing surface of the valve seat or caused by the process of aging of the rubber compound, the disc should be replaced.

Safety valve are not designed to use as a discharge valve, and inappropriate use dismiss producer from any obligation and warranty.

5. Maintenance and repair of safety valves

In order to ensure correct operation of safe valves, the following conditions must be meet:

- sealing surfaces of the seat and disc should ensure tight closure of the valve;
- all cooperating moving parts of the valve mechanism should maintain movability in operating conditions.

In order to maintain these conditions the valves should be periodically inspected and renovated. Inspections of safety valves should be conducted by persons with adequate authorisation. While the repairs should be first carried out by the manufacturer of the safety valve or at authorized service centres, or by the user's service teams having appropriate permissions.

ATTENTION

In addition to the recommendations included in these instructions, the requirements and recommendations resulting from the surveillance provisions of the country in which safety valve is operated also apply.

6. Causes of operating disturbances and their elimination

Disturbance	Possible causes	Elimination
Safety valve does not work - no flow or slight flow	Protective cap of the inlet nozzle has not been removed prior to installation of the valve	Remove inlet nozzle cap.
	Mechanical components left in the system – they blocked the flow of the medium into the valve	Remove the valve from the system and clean inlet of the valve.
	Too high pressure of valve setting, inadequate to the requirements of secured installation	If the required pressure is within the scope of spring mounted on the valve- set the safety valve to the required pressure, if it is outside the scope of spring mounted - replace the spring with the appropriate one and set the required pressure. In each case, act in compliance with manufacturer's instructions. If the required pressure does not fall within the scope of the safety valve type mounted - replace the valve with the appropriate type, with set pressure adjusted to the required pressure.
	Freezing or solidifying medium	The housing and the pipes should be kept in a state incapable freezing or solidifying of media - apply the heating.
	"Seizing" of the sealing surfaces of the seat and valve disc preventing their separation at the set pressure	If the properties of the medium and the operating conditions do not exclude such possibility - appropriate frequency of inspections and repairs of the safety valve must be adapted, and the time of valve check provided in the operating records of protected device / system should be strictly observed.
Purging of safe valve is not possible	Inlet pressure is lower than 75% of the set pressure	check the safety valve with a proper pressure – follow manufacturer's instructions.
	Damages within the lifting unit	Inspect the lifting unit and when necessary replace damaged parts to new ones.

Leak at sealing surface	Incorrect transport or storage - wrong position during transport and storage, protective cap from the inlet of the valve have fallen out and thus the impurities entered into the valve	During transport and storage follow manufacturer's instructions. If the inner part of the valve has been polluted, it need to be cleaned before installing the valve in the system in order to avoid damage to the sealing surfaces.
	Working pressure is higher than 90% of set pressure. There is no corresponding relationship between the set pressure and the working pressure.	Working pressure has to be lower than 90% of set pressure. For correct pressures for safety valve use values recommended by manufacturer.
	Vibrations of the safety valve	Diagnose the cause of these vibrations, and if possible - remove the source. If the vibrations cannot be prevented mount appropriate damping systems. If the chattering of the valve is due to incorrect valve selection (see "Vibration") - analyse the accuracy of the valve selection and if necessary replace it.
	Medium pollutions, foreign substances between the disc and seat	Shortly lift valve disc to remove any impurities, and if it does not bring the expected results – take off the valve and perform regeneration of the sealing surfaces of the seat and the disc or replace it with new one
	Corrosion of elements directly in contact with the medium, which is the result of improper valve selection in respect of material	Replace the valve with the construction appropriate to the medium according to resistance of used materials or apply safety valve system with a bursting disc
Leaky seat of the safety valve	The deformation caused by stresses of the installation. Valve bodies can get deformed due to excessive load transferred from the pipes, causing, among others, leaking.	Diagnose and eliminate the causes of stress. If the deformations of valve body are permanent- replace the safety valve with a new one.
	Other causes of leaks on the seat.	Depending on the reason diagnosed - according to the indications and decision of the manufacturer - replace the defective parts or replace the safe valve with a new one.
Safety valve opens at a pressure lower than at adjusted set pressure	Slight damage or contamination of the sealing surface of the seat / disc	Remove the valve, check the sealing surfaces and, if necessary - make regeneration according to the manufacturer's instructions and recommendations.
Sudden increases in pressure (pulsations)	Incorrect positioning of the safety valve with respect to pressure source	Analyse positioning of the safety valve at pressure source. Safety valve should be installed in such a distance from pressure source that protects it from the pressure pulsations.
Vibrations	Too high flow resistance in the supply line - pressure loss in the supply line exceeds 3% (set pressure of safety valve)	Reduce flow resistance in the supply line. If this is not possible, for some reasons - consider the possibility of a safety valve with damper. Effectiveness of this valve construction is possible in particular conditions – clarify with the manufacturer.

	Wrong characteristic of the safety valve in the protected installation	Analyse this matter, taking into consideration special conditions. If such adjustment is not possible- replace the valve with a new one with a proper characteristics.
	The valve was designed with too large capacity in relation to the requirements of protected installation.	Analyse the selection of safety valve – apply smaller valve, respectively to the required capacity.
	ncorrectly made welds on connecting pipes, too small gaskets on inlet and outlet or gaskets placed incorrectly (non-centrally) disrupting the flow	Eliminate incorrectness
Pressure in installation still rising despite open safety valve	Inadequate selection of the safety valve – too small capacity of the valve in relation to the device/system requirements	Reselect the valve considering the required capacity and replace it with a proper one.
Safe valve constantly releases medium	Valve spring is broken – as a result of corrosive medium or destroyed by a different factor	Replace the spring or the entire safety valve. In case of steam – consider the possibility of applying valve with open bonnet.
	“hangs” of the valve (the valve opened but did not close)	Diagnose the cause of the “hangs” If it is not possible to eliminate the reason- replace the valve.
	Very large damage to the surface of sealing, e.g. as the result of long-term leakage, crack of seat, “pitting” due to the medium	Replace the valve with a new one.
	Valve spring is broken – as a result of corrosive medium or destroyed by a different factor	Replace the spring or the entire safety valve. In case of steam – consider the possibility of applying valve with open bonnet.
	Pressure do not fall down to closing pressure	Preserve adequate ratio between working and closing pressure according to ISO-4126-1
Crew injuries at discharge condition and external medium leakage	Incorrect realization of medium discharge from the safety valve	In each case, the safety valve must be positioned so that the flowing medium does not pose a threat to the environment. Follow the requirements of supervising institutions regulations and indications and recommendations of the manufacturer.
Noise emissions above the limit value (in case of discharge of steams and gasses)	Significant flow rates at medium discharge from the safety valve	In the case of minor exceedances of limit values - consider the possibility of reducing the flow rate through the use of larger safety valve. It should be noted, however, that "oversizing" of the valve did not cause the instability of its work (see "vibrations"). In most cases it is necessary to apply silencer (noise barriers).

7. Warranty

ZETKAMA grants quality warranty with assurance for proper operation of its products, providing that assembly of them is done according to the user's manual and they are operated according to technical conditions and parameters

described in ZETKAMA's catalogue cards. Warranty period is 18 months starting from assembly date, however not longer than 24 months from the sales date.

Other warranty terms are to be agreed between the manufacturer of the valve and the purchaser. **The manufacturer reserves the right to introduce technical changes as the result of improving construction and manufacturing technology.** Failure to comply by the user with the regulations and indications included in this user's manual shall exempt the manufacturer from any liability and warranty.

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