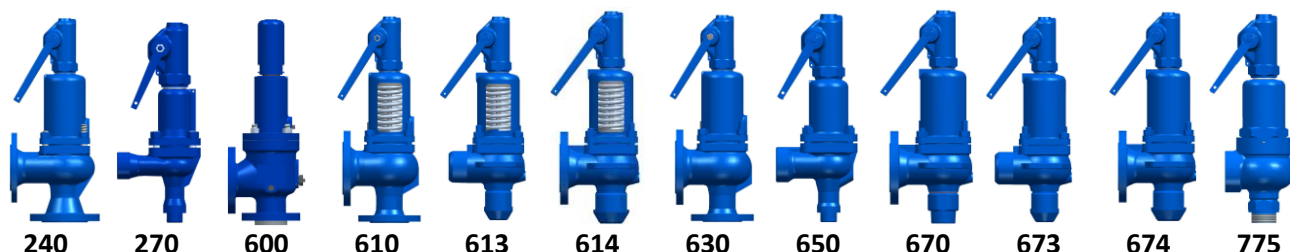


| USER MANUAL | | |
|---|--|---|
| SPRING-LOADED SAFETY VALVES zARMAK | 240, 270, 600, 610, 613, 614 630, 650, 670, 673, 674, 775 | Edition: 1/2025 Date: 20.02.2025 |

TABLE OF CONTENT

1. Principle of operation
2. Delivery condition
3. Installation of safety valves
4. Operation of safety valves
5. Adjustment of the set pressure
6. Replacing the spring
7. Replacing the gasket between the body and the cap
8. Replacing the gasket between the bonnet and the cap
9. Replacing the valve disc
10. Replacing the inlet nozzle in the figure 600 valves
11. Installing or replacing the valve bellows assembly in the figure 600 valves
12. Valve type with locking screw (test gag)
13. Spare parts list
14. Maintenance and repairs of safety valves
15. Operating disturbances and their elimination
16. Valve service discontinuity
17. Warranty



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 aided by the bell (Figure 3, item 4).

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 (does not apply to figure 600 valves marked with ASME UV). Valves are stamped on a nameplate fixed to the body and with the signs on the edge of the outlet flange.

Nameplate

For valve 240, 270, 610, 613, 614, 630, 650, 670, 673, 674, 775

| | | | | | | | | | | | |
|--------------------|---|---|-----------|---|----|------------|---|----|---------|----|--|
| EN ISO 4126-1:2013 | | | K ZETKAMA | | | UK CA 0038 | | | CE 0343 | | |
| 1 | 2 | 3 | S/G | 4 | 5 | | | | | | |
| A | 6 | 7 | h | 8 | mm | 9 | L | 10 | CDTP | 11 | |

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. For new valves: Year of production
For valves serviced directly by ZETKAMA: Year of conducting service / S
For valves serviced by an authorized service technician: Service technician's letter identifier / year of conducting service
8. The minimum lift value
9. Overpressure
10. The discharge coefficient for liquids
11. Cold Differential Test Pressure

Additionally, the outlet flange is marked with:

1. Spring number
2. Pressure range or opening pressure
3. Year of manufacture / serial number
4. Workstation number of assembler
5. Stamp of an operator performing the test

For valve 600

| | | | | |
|---------------|--|---------------|--|--------|
| K ZETKAMA | | CE 0343 | | A B |
| Serial Number | | UK CA 0038 | | |
| Date | | EN ISO 4126-1 | | |
| Type | | Size | | |
| do | | A | | |
| Lift | | | | |
| Set pressure | | Capacity | | |
| Back pressure | | | | |
| CDTP | | Temp | | |

Information stamped on the nameplate:

- A. ASME UV stamp.
- B. National Board stamp.

Set pressure is secured by sealing between the cap and bonnet.

In order to secure the valve during transport, the lever is being attached to the outlet flange with a wire, and the flow holes are being plugged. The external surfaces of the valve are painted.

In addition, the outer surfaces of the valve are painted to protect them against corrosion during transport and storage.

3. Installation of safety valves

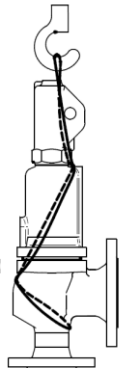
- Before the installation on the unit or pipeline, check if valve was not damaged or contaminated during transport. It is necessary to check the cleanliness of flow channels, external surfaces and end connections. Surfaces of flanges should be cleaned of preservative and of any possible impurities.



To lift safety valves during loading/unloading and assembly on the installation - use a rope tied to the body and valve cap as shown in Drawing 1. Do not lift the valve at the lifting lever.

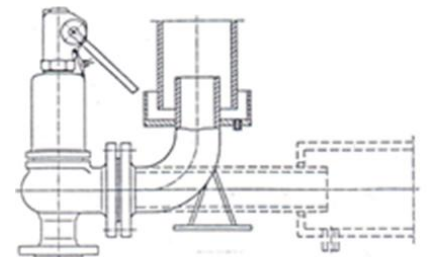


The valve should be mounted in a vertical position.



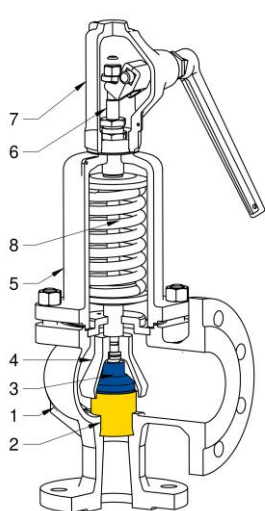
Drawing 1

- After installing the valve, loosen the lever by removing the wire.
- Pipes connected to the valve should comply with the requirements included in the surveillance provisions. Cross-section and shape of the pipes should be selected so that they do not reduce the capacity of the valve. If the medium is discharged with one pipeline from a few safety valves, free area of the flow of this pipeline should be at least equal to the total area of outlet ports flow of these valves. Moreover, the pipes should be made advantageously to the flow (gentle curves). For valves equipped with drainhole condensate drainage should be used. For valves that do not have drainhole, drain should be provided at the lowest point of the discharge pipe.
- Full-lift safety valves from the range PN40, PN63 and PN100 from DN 40 and all valve ANSIclass300 and ANSIclass600 (figure 600) has a cast support lugs at the body, used with appropriate mounting to take the reaction forces over by the outlet.
- In order to avoid reaction forces at the outlet connection of the valve, it is required to use an appropriate support to the pipeline.
- For the vapours and gases outlet port cannot be rigidly connected to the pipeline. Exemplary flexible connection of the outlet with the pipeline was shown in drawing 2.
- The valve cannot constitute a supporting structure for the equipment of the pressure device on which it is mounted, nor can it be exposed to deformations caused by incorrect installation of the medium supply and discharge conduits.
- When mounting the valve flange with the flange of the pressure equipment, use the appropriate gasket (adapted to the type of valve face and with respect to parameters and medium type).
- Flange bolts should be tightened evenly and with crisscross pattern. They should also be tightened after a certain period of operation of the valve or in the event of a leak.
- 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, 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).

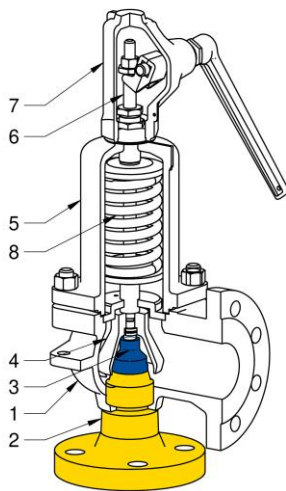


Drawing 2

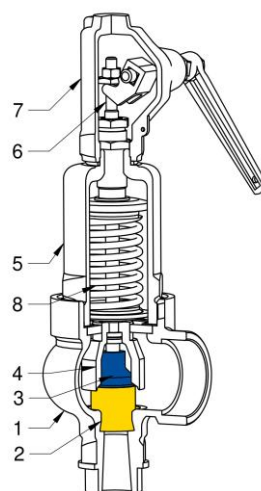
4. Operation of safety valves



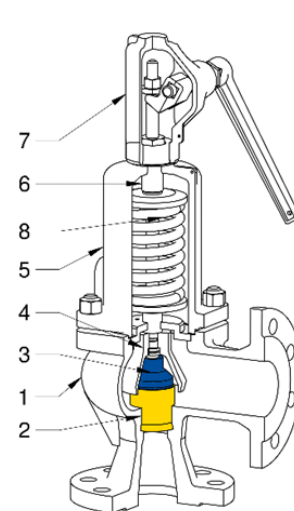
**630AC, 630CE
630FE, 630RE**



630FF, 630FG

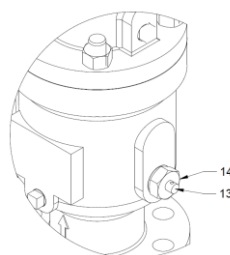
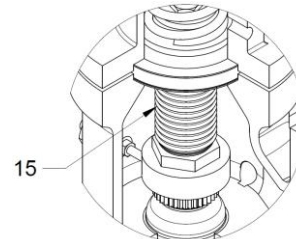
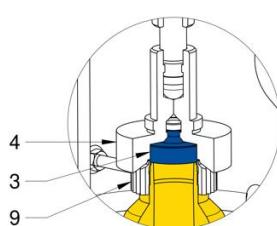
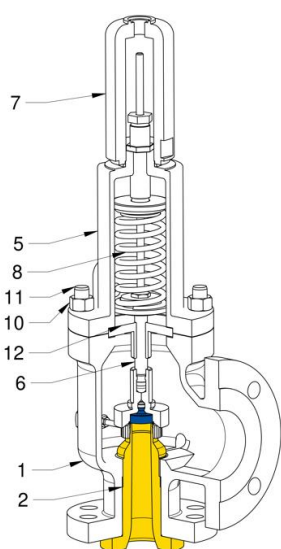


775BC



240AC, 240FE, 240RE

| | | | | | | | |
|---|--------|---|---------------------|---|------|---|--------|
| 1 | Body | 2 | Seat / Inlet nozzle | 3 | Disc | 4 | Bell |
| 5 | Bonnet | 6 | Stem | 7 | Cap | 8 | Spring |



600

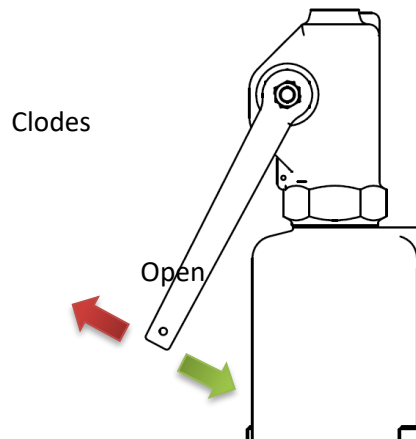
| | | | | | | | |
|----|----------------|----|---------------|----|------------------|----|--------|
| 1 | Body | 2 | Inlet nozzle | 3 | Disc | 4 | Bell |
| 5 | Bonnet | 6 | Stem | 7 | Cap | 8 | Spring |
| 9 | Adjusting ring | 10 | Body nut | 11 | Body screw | 12 | Insert |
| 13 | Locking pin | 14 | Locking screw | 15 | Bellows assembly | | |

Drawing 3

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 safety 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.



Drawing 4

Checking the safety valve operation involves lifting of the disc with a lever, running it in the direction indicated in Drawing 4. Starting the lever causes loosening of the spring force thereby allowing the minimum lift of the disc and the flow of medium.

Release of the lever should be made at a pressure between 75% and 85% of set pressure. Keep in mind that too frequent checking may result in damage to the sealing surfaces of the valve disc and seat and thus to a loss of tightness, and the complete lack of checking usually leads to “seizing” of the valve mechanism, what can have serious consequences.

The frequency of these activities depends primarily on:

- Conditions of exploitation, i.e. the type of medium flowing and its parameters
- 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.



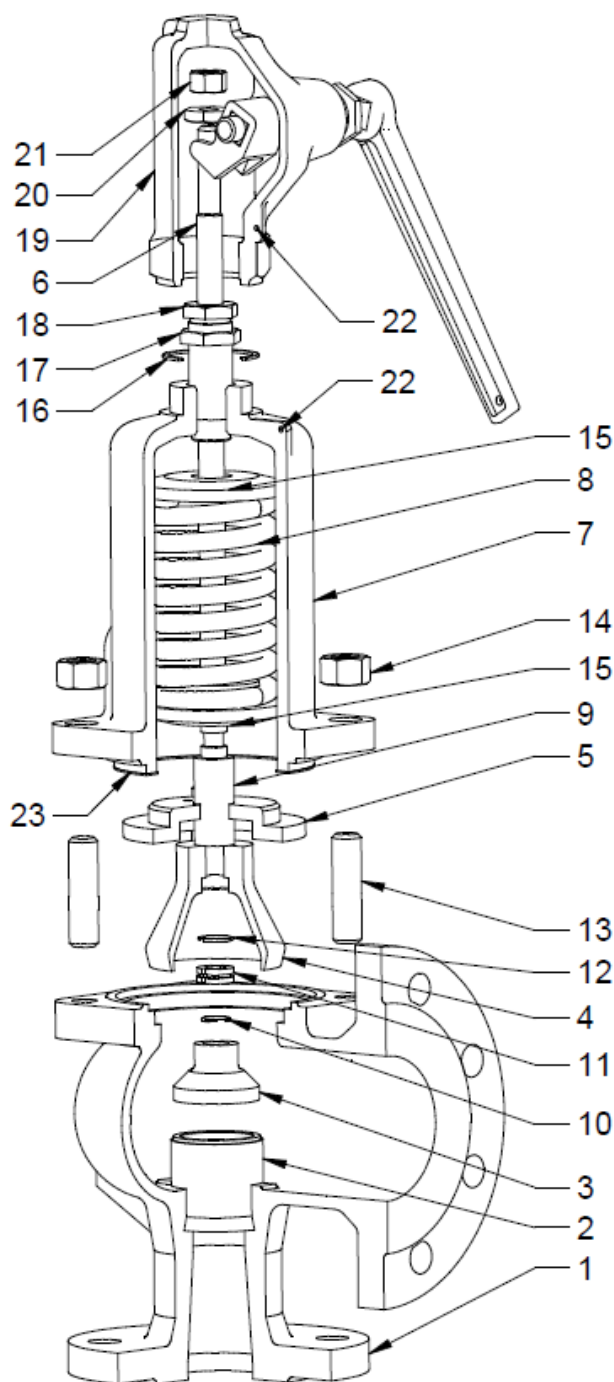
After checking of the valve, move the lever to the original position.

When checking the valve there is a possibility of contamination the sealing surfaces. In this case, again lift disc to remove these pollutions. If tightness was not obtained by this, the valve needs to be reginded from the next stop of the pressure device.

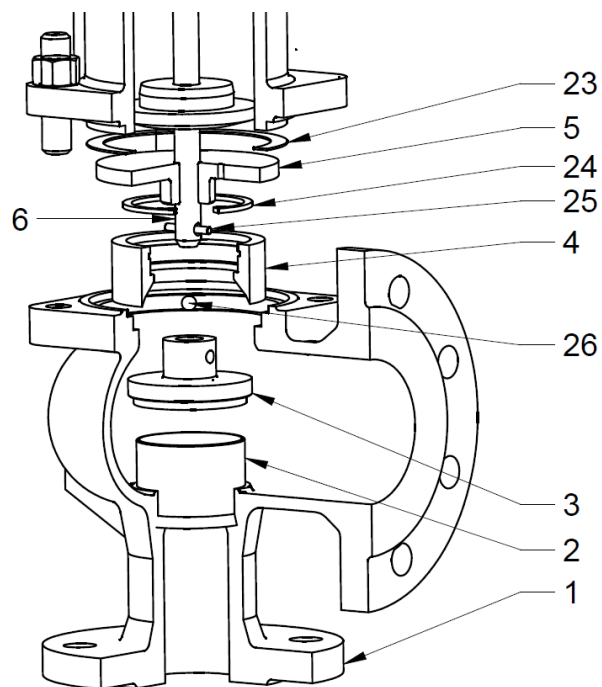
In the case of valves with soft sealing, any damage at the rubber surface of the disc requires replacement.



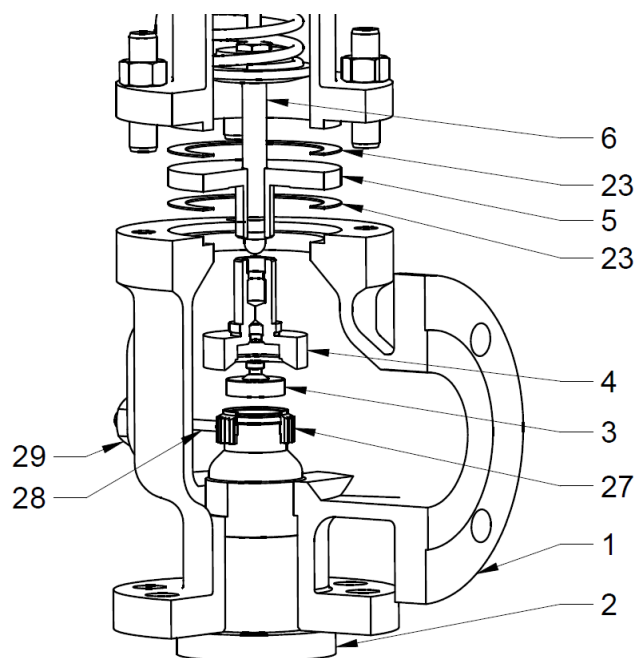
Safety valve are not designed to use as a discharge valve, and inappropriate use dismiss producer from any obligation and warranty.



Drawing 5



Drawing 6



Drawing 7

5. Adjustment of the set pressure



The pressure may be adjusted by an authorized person, i.e. Authorized Technician and Inspector of a Notified Body (UDT, TUV). To change the response pressure or replace the springs, the seal must be removed, which causes the warranty to expire.

In the case of Figure 600 valves marked with the ASME UV mark, the setting can only be changed by the manufacturer.

Set pressure of the valve can be adjusted only within the range of the provided spring, for this purpose, as shown in Drawing 5:

1. Remove the seal between the cap assembly (19) and bonnet (7)
2. Lift the handle all the way in the close direction (see drawing 4)

3. Unscrew the cap assembly (19)
4. Loosen the lock nut (17)
5. Turn the adjusting screw (18) to achieve the required pressure for the opening. in order to protect the surface of the sealing, while turning an adjusting screw hold the stem (6) with the lifting nut (21) preventing it from rotation
6. Lock the lock nut (17)
7. Turn the cap assembly (19) don't forget about new gasket (16)

6. Replacing the spring



The spring can be replaced by an authorized person, i.e. an Authorized Service Technician and an Inspector of the Notified Body (UDT, LRQA). To replace the springs, the seal must be removed, which voids the warranty.

For Figure 600 valves marked with the ASME UV mark, the spring may only be changed by the manufacturer.

The spring should be replaced as described below in accordance with Drawing 5:

1. Remove the seal between cap assembly (19) and bonnet (7)
2. Raise the handle as far as it will go in the "Close" direction (see drawing 4)
3. Unscrew the cap assembly (19)
4. Loosen the lock nut (17)
5. Turn the adjusting screw (18) until the spring is completely relieved. In order to protect the surface of the sealing, while turning an adjusting screw hold the stem (6) with the lifting nut (21) preventing it from rotation
6. Unscrew the nuts (14) securing the bonnet (7) to the body (1). In the case of stud bolts (13) of the same length, the nuts (14) should be unscrewed evenly and alternately. In the case of stud bolts (13) of different heights, first unscrew the nuts (14) on the shorter bolts, and then unscrew the nuts on the longer bolts evenly, alternately.
7. Remove the bonnet (7) by marking the location of the screw hole in the bonnet with the corresponding stud bolt.
8. Dismantle the upper spring plate (15)
9. Relace the spring (8) for the new one.
10. Install the upper spring plate (15)
11. Replace the gasket (23) between the body (1) and bonnet (7) for the new one (in the case of figure 600 valves, there are two gaskets between the body and insert and bonnet and insert)
12. Place the bonnet (7) on the studs (13)
13. Screw the nuts (14) securing the body (1) with bonnet (7). In the case of stud bolts (13) of the same length, the nuts (14) should be screwed in evenly and alternately. In the case of stud bolts (13) of different heights, first screw in the nuts (14) on the longer bolts evenly and alternately, and then screw in the nuts on the shorter bolts.
14. Turn the adjusting screw (18) to achieve the required opening pressure. In order to protect the contact surfaces, while turning, hold the stem (6) by the nut (21) to prevent it from turning.
15. Lock nut (17)
16. Assemble the cap assembly (19) don't forget about new gasket (16)

7. Replacing the gasket between the body and the cap



To replace the gasket, the seal (22) between the body and the bonnet must be removed, which will void the warranty. In the case of valves covered by warranty, these activities must be performed by the manufacturer or a person designated by it or an institution with appropriate authorizations.

Replacing the gasket (23) should be carried out in accordance with the rules presented in item 6 regarding the replacement of the spring in the scope of points 1 – 7 and 11 – 16.

8. Replacing the gasket between the bonnet and the cap



To replace the gasket, the seal (22) between the bonnet and the cap, which will void the warranty. In the case of valves covered by warranty, these activities must be performed by the manufacturer or a person designated by it or an institution with appropriate authorizations.

1. Remove the seal between the cap assembly (19) and the bonnet (7)
2. Raise the handle as far as it will go in the "Close" direction (see picture 4)
3. Unscrew the cap assembly (19)
4. Replace the gasket (16) with a new one
5. Screw on the cap assembly (19)

9. Replacing the valve disc



To replace the valve disc, the seal (22) between the bonnet and the cap, which will void the warranty. In the case of valves covered by warranty, these activities must be performed by the manufacturer or a person designated by it or an institution with appropriate authorizations.

1. Remove the seal between the cap assembly (19) and the bonnet (7)
2. Raise the handle as far as it will go in the "Close" direction (see picture 4)
3. Unscrew the cap assembly (19)
4. Loosen the lock nut (17)
5. Turn the adjusting screw (18) until the spring is completely relieved. In order to protect the contact surfaces, while turning, hold the stem (6) with the lifting nut (21) preventing it from rotation
6. Unscrew the nuts (14) securing the bonnet (7) to the body (1). In the case of stud bolts (13) of the same length, the nuts (14) should be unscrewed evenly and alternately. In the case of stud bolts (13) of different heights, first unscrew the nuts (14) on the shorter bolts, and then unscrew the nuts on the longer bolts evenly, alternately.
7. Remove the bonnet (7) by marking the location of the screw hole in the cap with the corresponding stud bolt
8. Remove the upper spring plate (15), the spring (8) and the lower spring plate (15)
9. Holding the valve stem (6) pull out the entire valve closing system:
 - **For valves 240, 270, 610, 613, 614, 630, 650, 670, 673, 674 (according to drawing 5 - valves in versions 01-08)** - insert (5), sleeve (9), bell (4), split ring (11) with spring ring (12), disc (3) with retaining ring (10)
 - a) Remove the old disc (3) by pulling it firmly while holding the valve stem (6).
 - b) Install (if not already installed) a new retaining ring (10) into the new disc
 - c) Press the new disc (3) onto the valve stem
 - **For valves 240, 270, 630 (according to drawing 6 - valves in versions 51-58)** - insert (5), bell (4), split ring (11) with a Seger ring (24), disc (3) with ball (26) and locking pin (25)
 - a) Remove the insert (5)
 - b) Drive the locking pin (25) out of the disc (3)
 - c) Replace the disc (3) with a new one, taking care of the stabilizing ball (26)
 - d) Install new locking pin (25)
 - e) Install the insert (5)
 - **For valves 600 (according to drawing 7)**
 - a) Pull out the stem (6), insert (5), bell (4) and disc (3) assembly
 - b) Unscrew the damaged disc (3) from the bell (4) and then screw in the new one until it "falls in"
 - c) Install the stem (6), insert (5), bell (4) and disc (3) assembly
10. Install the entire valve closing system
11. Install the lower spring plate (15), the spring (8) and the upper spring plate (15)
12. Replace the gasket (23) between the body (1) and the bonnet (7) with a new one
13. Place the bonnet (7) on the studs (13)
14. Screw the nuts (14) securing the body (1) with bonnet (7). In the case of stud bolts (13) of the same length, the nuts (14) should be screwed in evenly and alternately. In the case of stud bolts (13) of different heights,

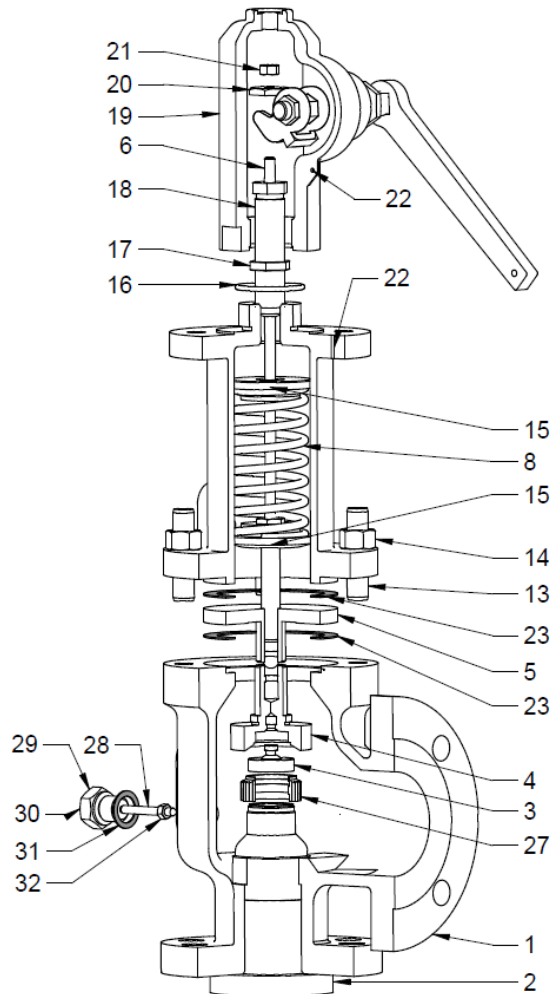
first screw in the nuts (14) on the longer bolts evenly and alternately, and then screw in the nuts on the shorter bolts.

15. Turn the adjusting screw (18) to achieve the required opening pressure. In order to protect the contact surfaces, while turning, hold the stem (6) by the nut (21) to prevent it from turning
16. Lock nut (17)
17. Assemble the cap assembly (19) don't forget about new gasket

10. Replacing the inlet nozzle in the figure 600 valves



To replace the valve inlet nozzle, the seal (22) between the bonnet and the cap and the seal (30) securing the adjusting ring must be removed, which will invalidate the warranty in any case. In the case of valves covered by warranty, these activities must be performed by the manufacturer or a person designated by it or an institution with appropriate authorizations

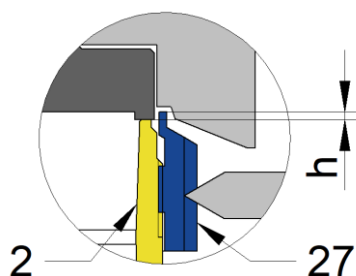


Drawing 8

1. Remove the seal between the cap assembly (19) and the bonnet (7)
2. Raise the handle as far as it will go in the "Close" direction (see picture 4)
3. Unscrew the cap assembly (19)
4. Loosen the lock nut (17)
5. Turn the adjusting screw (18) until the spring is completely relieved. In order to protect the contact surfaces, while turning, hold the stem (6) with the lifting nut (21) preventing it from rotation
6. Unscrew the nuts (14) securing the bonnet (7) to the body (1). In the case of stud bolts (13) of the same length, the nuts (14) should be unscrewed evenly and alternately. In the case of stud bolts (13) of different heights, first unscrew the nuts (14) on the shorter bolts, and then unscrew the nuts on the longer bolts evenly, alternately.
7. Remove the bonnet (7) by marking the location of the screw hole in the cap with the corresponding stud bolt
8. Remove the gasket (23) between the cap (7) and the insert (5)
9. Remove the entire closing system: stem (6), spring plates (15), spring (8), insert (5), bell (4) and disc (3)
10. Remove the gasket (23) between the body (1) and the insert (5)
11. On the body assembly, remove the seal (30) on the adjustment ring (27)
12. Unscrew the locking screw (29) together with the securing pin (28) to such a distance that the adjustment ring (27) is unlocked
13. Measure the distance between the nozzle contact area (2) and the upper edge of the adjusting ring (27) as shown in Figure 8
14. Unscrew the adjusting ring (27) from the nozzle (27)
15. Unscrew the nozzle (2) from the body (1)



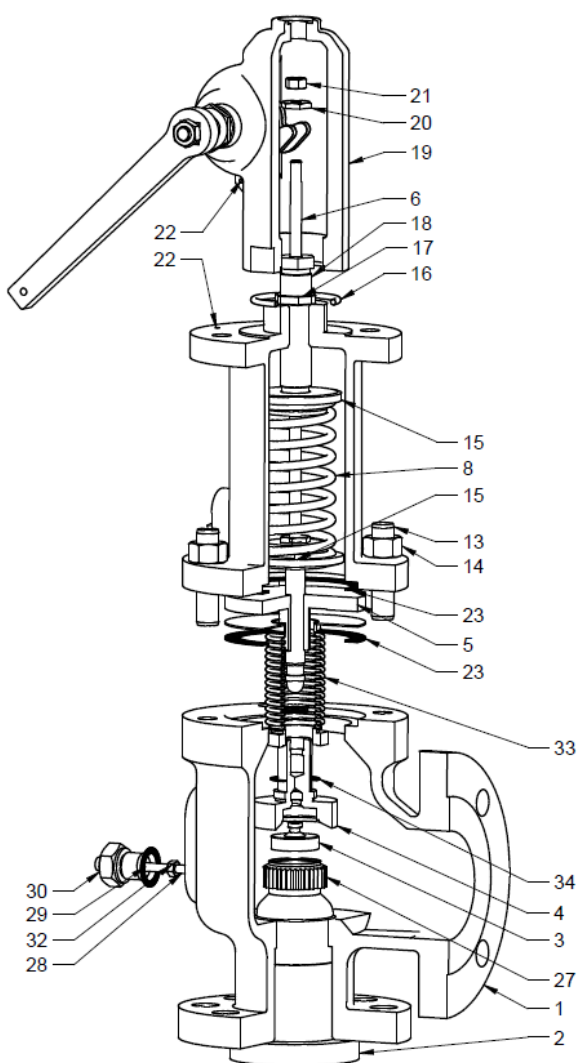
Taking a measurement and then reflecting this value on a new nozzle guarantees that the guaranteed capacity of the safety valve remains unchanged



Drawing 8

16. Screw the new nozzle (2) into the body (1), remembering to replace the gasket between the body and the nozzle and between the locking screw (29) and the body with new ones.
17. Screw the adjusting ring (27) onto the nozzle (2) and adjust it to the height determined in accordance with point 13
18. Assemble the valve in the reverse order in accordance with points 1 - 13, remembering to **replace all gaskets in the valve with new ones**

11. Installing or replacing the bellows assembly in the figure 600 valves



1. Remove the seal between the cap assembly (19) and the bonnet (7)
2. Raise the handle as far as it will go in the "Close" direction (see picture 4)
3. Unscrew the cap assembly (19)
4. Loosen the lock nut (17)
5. Turn the adjusting screw (18) until the spring is completely relieved. In order to protect the contact surfaces, while turning, hold the stem (6) with the lifting nut (21) preventing it from rotation
6. Unscrew the nuts (14) securing the bonnet (7) to the body (1). In the case of stud bolts (13) of the same length, the nuts (14) should be unscrewed evenly and alternately. In the case of stud bolts (13) of different heights, first unscrew the nuts (14) on the shorter bolts, and then unscrew the nuts on the longer bolts evenly, alternately.
7. Remove the cap (7) by marking the location of the screw hole in the cap with the corresponding stud bolt
8. Remove the gasket (23) between the cap (7) and the insert (5)
9. Unscrew the bell assembly (4) with the disc (3)
10. Place the travel limit bushing (if equipped) on the stem under the insert.
11. Screw the bellows assembly (33) onto the bell assembly (4) with the disc (3), hanging the gasket (34) between them (34)
12. Assemble the valve in the reverse order in accordance with points 1 - 10, remembering to **replace all gaskets in the valve with new ones.**

12. Valve type with locking screw (test gag)

Applies to valve types: 240, 270, 600, 610, 613, 614, 630, 650, 670, 673, 674

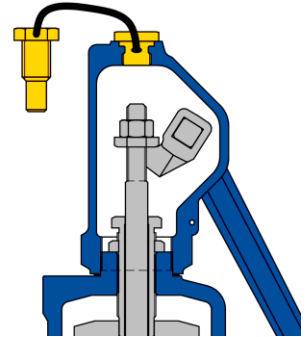
Upon customer request, ZETKAMA safety valves can be supplied with a locking screw (test gag). These valves are factory-delivered with a screwed-in plug and a separately attached locking screw, along with a complete set of gaskets.

If the locking screw (test gag) needs to be used, follow these steps:

1. Unscrew the plug from the valve cap.
2. Remove the old gasket installed during the initial or last assembly.
3. Screw in the locking screw (no gasket is required).

To reinstall the protective plug:

1. Unscrew the locking screw (test gag) from the valve cap.
2. Install a new gasket provided with the factory-new valve.
3. Screw in the protective plug.



After completing the pressure test, the locking screw (test gag) must be removed.

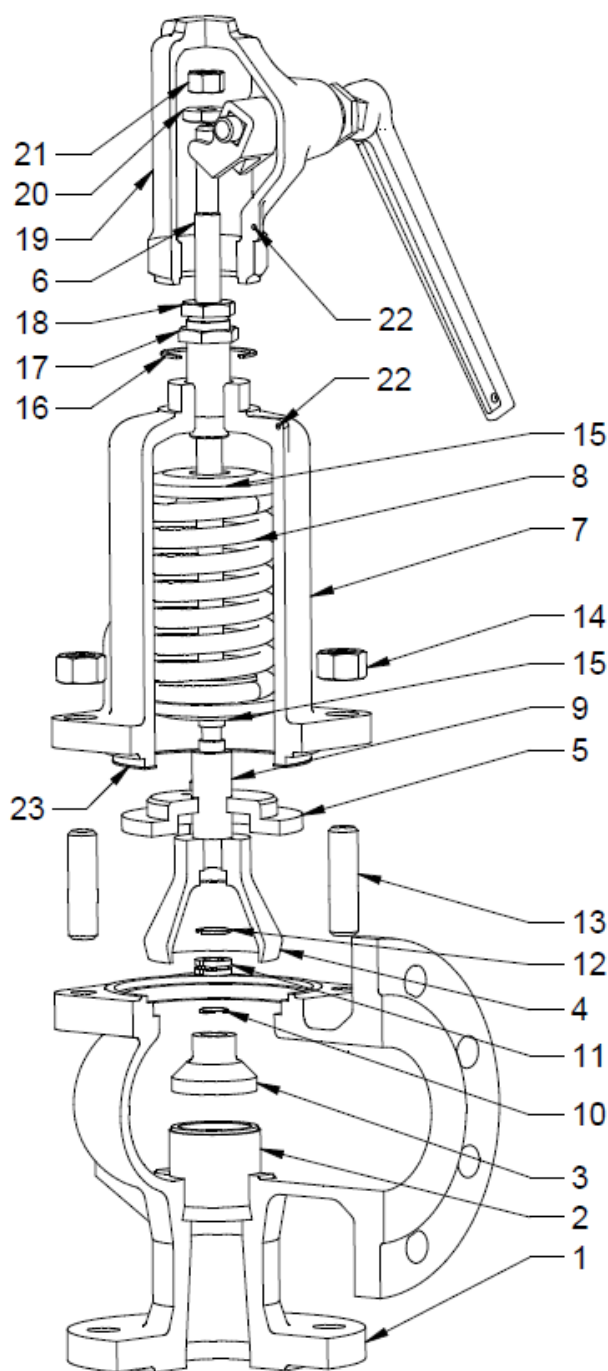
Failure to remove it will prevent the valve from operating in case of pressure buildup before the safety valve, which means the installation will not be protected.



For gas-tight valve types, it is essential to install a new gasket supplied or recommended by the manufacturer. The plug with the new gasket should be tightened to 30 Nm torque.

13. Spare parts list

Applies to valves 240, 270, 610, 613, 614, 630, 650, 670, 673, 674



Repair kit 1

- 16 Seal between bonnet and cap
Acid-resistant gasket with graphite filling
- 23 Gasket between body and bonnet
Graphite gasket

Repair kit 2

- 3 Disc
- 10 Disc retaining ring
- 16 Seal between bonnet and cap
Acid-resistant gasket with graphite filling
- 23 Gasket between body and bonnet
Graphite gasket

Repair kit 3

- 3 Disc
- 4 Bell
- 6 Stem
- 10 Disc retaining ring
- 11 Split ring
- 12 Spring ring
- 16 Seal between bonnet and cap
Acid-resistant gasket with graphite filling
- 23 Gasket between body and bonnet
Graphite gasket

Repair kit 4

- 3 Disc
- 4 Bell
- 5 Insert
- 6 Stem
- 9 Sleeve
- 10 Disc retaining ring
- 11 Split ring
- 12 Spring ring
- 13 Stud bolts (pins)
- 14 Nut of stud bolts
- 15 Spring plates (Upper and lower)
- 16 Seal between bonnet and cap
Acid-resistant gasket with graphite filling
- 17 Lock nut
- 18 Adjusting screw
- 20 Stop nut
- 21 Stem nut
- 23 Gasket between body and bonnet
Graphite gasket

Spring (8)

For purchase it is necessary to specify the number (if there such a possibility exists) or the valve type, DN and setting (opening start pressure) of the valve.

Cap assembly (19)

When purchasing it is necessary to specify the valve type and its DN.

There is the option of buying a leverless cap and a cap with a sealed lever.

In case of ordering a cap with a locking screw (test gag), it should be noted in the order.

14. Maintenance and repair of safety valves

In order to ensure correct operation of safety valves, the following conditions must be met:

- valve disc cannot set slantwise to the valve seat
- sealing surfaces of the seat and disc should ensure tight closure of the valve;
- All cooperating moving parts of 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.



In the case of valves working at hard conditions (such as high temperature and / or pressure above 4.0 MPa) you should take into account the need for revision of the valve after each opening.



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.

15. 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 flange has not been removed prior to installation of the valve | Remove inlet flange protective 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. |
| | incorrect installation of the valve - the flow of the medium is opposite with the direction marked on the valve body | Install the valve correctly, in accordance with the indications of manufacturer's instructions. |
| | Locking screw (test gag) is installed | Remove locking screw (test gag) and plug the hole in cap. (point 12 of the instruction) |
| | Too high set pressure, 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. |
| | backpressure not taken into consideration (in case of conventional valve, i.e. unbalanced) | For stable superimposed backpressure - set the differential pressure. For variable superimposed backpressure - apply bellows compensating backpressure |

| | | |
|--|--|---|
| | | changes In each case, follow manufacturer's instructions and with matters requiring clarification - consult the manufacturer's technical advisor. |
| | Sticky medium | Use the valve with bellows and a heating jacket, optionally incorporate security plate into the system. |
| | Freezing or solidifying medium | The body 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. |
| No repeatability of valve opening pressure (conventional valves, ie. unbalanced) | Variable superimposed backpressure | Replace conventional safety valve with the valve with bellows compensating superimposed backpressure changes. |
| checking of safety 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. |
| | Lever wire used for transport is not removed. | Remove the lever wire. |
| | 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 and outlet 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. |
| | Lever not in neutral position (in case of closed valves and low pressures) | Move the lever to the neutral position. |
| | 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. If it is possible - apply valve with soft seal on the valve disc, which has a lower sensitivity to grit in |

| | | |
|--|---|---|
| | | the seat. Follow manufacturer's instructions. |
| | 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 |
| | 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 safety valve with a new one. |
| Safety valve opens at a pressure lower than at adjusted set pressure | With the cold setting of a valve, appropriate temperature adjustment was not included. (in case of valves used for media of 100°C and higher) | Revise opening pressure, observing the guidelines and recommendations of the manufacturer. |
| | High spring relaxation at the working conditions (for valves at upper limit for medium and temperature / pressure) | Consult the manufacturer-replace the spring, according to the guidelines and recommendations of the manufacturer. If possible- apply the valve with open bonnet construction (better cooling of a spring) or / and with cooling section. When such situation reoccurs – replace the valve with a new one, intended for a use in higher temperature range. |
| | 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. |
| | The valve is set to the differential pressure (considering the presence of superimposed backpressure) when the backpressure don't exist | Regulate setting of the valve. 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. |
| Sudden increases in pressure (pulsations) | Incorrect positioning of the safety valve at 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. |
| Crack in the flange of safety valve body | Transport defect | Replace safety valve |
| | defect of the material | Replace safety valve |
| | Installation errors | Replace safety valve. Strictly follow manufacturer's instructions and the requirements of the relevant provisions in terms of requirements for installation of safety valves – do not induce stress during installation. |

| | | |
|---|---|---|
| | Forces like bending, or torque act on safety valve. | Replace safety valve. When designing the installation check the manufacturer's instructions and the requirements of the relevant provisions of supervision institutions in the requirements for pipes connected to the safety valve, taking into account all the possible reaction forces occurring at the outlet, provide for appropriate support, do not let the valve to be a supporting structure for the other elements of the installation. Consider the possibility to use safety valves with support lugs. |
| 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. |
| | Built-up backpressure occurring in the discharge line at the blow out from the valve - exceeds the value allowed by the manufacturer (10 ÷ 15% of the set pressure) -e.g. too long outlet pipe, its diameter is too small, rapid changes in the direction of flow, the use of silencers, etc. | If it is not possible to introduce changes to the construction of discharge line, reducing built-up backpressure - apply valve with bellow compensation |
| | Excessive fluctuation of the superimposed backpressure at the outlet of the valve (in the case of the conventional valve i.e. unbalanced) | Apply valve with bellow resistant to influence of changing superimposed backpressure. |
| | Too large construction lift of closing element (e.g. in case of full stroke safety valves used for fluids) | Apply safety valve of characteristics adjusted to this type of fluids, or- if the manufacturer enables such construction- reduce the construction lift of the full lift valve to the value indicted by the manufacturer. |
| | Incorrectly 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 installation requirements | Reselect the valve considering the required capacity and replace it with a proper one. |
| Safety 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. |
| | 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 | Use of safety valve of the open construction in contrary to the safety regulations and manufacturer's instructions (e.g. near the platforms for service staff) | If the operational parameters allow it - replace the valve with the one with closed bonnet and if it is not possible—install proper protecting covers. |
| | Use of safety valve without external tightness test confirmed by the manufacturer | Use valve with gastight construction, that is with external tightness test of the valve. |
| | Use of valve in which sealing is not adequate to the properties and parameters of medium. | Replace sealing in the operating valve with the adequate one (after consulting the manufacturer) or replace the entire valve. |
| | Incorrect discharge of medium from the safety valve | In case of steams and gases, the discharging pipe should be directed upwards, enabling safe discharge, minding that outlet end connector cannot be rigidly connected to the pipeline. In addition, in each case, the safety valve outlet flange (free discharge into the environment) or drain line 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. |
| | Incorrect drainage medium form the valve and form the discharge pipe. | Eliminate the incorrectness in the drainage line, following the requirements of supervising institutions regulations and indications and recommendations of the manufacturer. |
| Condensate in the expansion chamber of the safety valve | Improper drainage installation - discharging fluid from the safety valve, improper drainage installation, clogged drainage system | Eliminate the incorrectness in the discharge and drainage installations. In the lowest point of discharge installation it is required to apply drainage guarantying effective discharge of residual condensate. If the manufacturer of the safety valve offers the version with drainage of the expansion chamber of valve body – it should also be considered to use such a valve. |
| 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 speed through the use of larger safety valve. It should be checked, 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 directly behind the valve and screening of the valve (noise barriers). |

| | | |
|--|--|--|
| | | While designing the outlet pipes fitted with silencers, static and dynamic interaction of flow stream flowing through the silencer should be taken into account. Silencer body should not interfere with effective operation of safety valve and additional pressure drops should be taken under consideration while calculating the discharge, and drainage pipes of the valve. In each case it should be considered not to exceed the value of backpressure allowed by the manufacturer of the safety valve. |
|--|--|--|

16. Valve service discontinuity

All obsolete and dismantled valves must not be disposed with household waste. ZETKAMA valves are made of materials which can be re-used and should be delivered to designated recycling centers.

17. 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 require agreement between the valve manufacturer and the buyer. The manufacturer reserves the right to introduce technical changes resulting from the improvement of design and manufacturing technology. Failure by the user to comply with the provisions and instructions contained in this manual releases the manufacturer from any obligations and warranties.

- The guarantee does not cover an assembly of third party spare parts and design changes made by the user, as well as changes in set pressure and natural wear and tear.
- The user should inform ZETKAMA about latent defects of the product immediately after they are found.
- The complaint must be made in writing.



The warranty is lost if the seal between the cap and the bonnet of the safety valve is broken.



In the case of type 600 valves, the warranty is also lost if the seal on the adjustment ring is damaged (the seal is placed between the locking pin and the locking screw).

Address for correspondence:

ZETKAMA Sp. z o.o.
ul. 3 Maja 12
57-410 Ścinawka Średnia
Tel: +48 74 865 21 11
www.zetskama.com