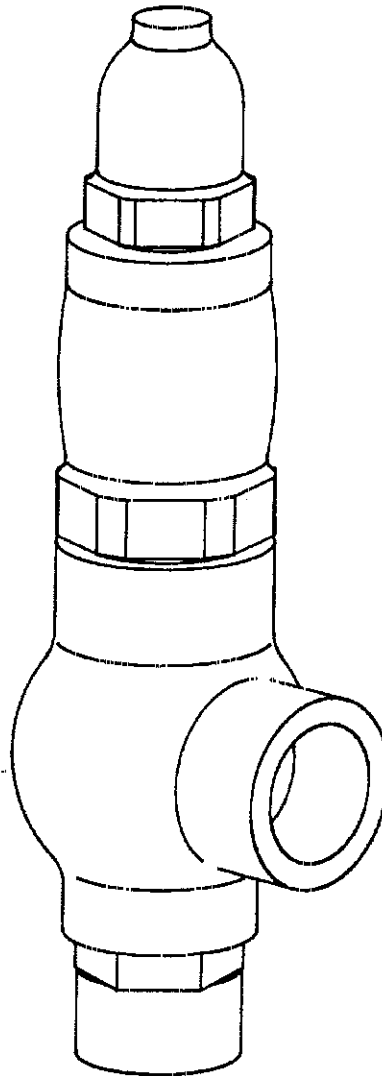


RSBD

R E S E A U



QUALITE - SECURITE



SAFETY RELIEF VALVES

**INSTALLATION AND MAINTENANCE
INSTRUCTIONS**

RSBD

SAFETY RELIEF VALVES INSTALLATION AND MAINTENANCE INSTRUCTIONS



I - VALVE DISMANTLING

- **VERY IMPORTANT** : before dismantling a safety valve on a pipe circuit or tank, it is **essential** to check that no pressure exists by purging the system. A pressure gauge reading is not a sufficient check of absence of residual pressure.

- After dismantling, check the state of seats (disc/nozzle) and eventually proceed to lapping
- Clean, degrease, dry all parts with appropriate solvent
- Use the appropriate torque value particularly for special gaskets.

1.1 - VALVES TYPE 6400-6500

- 1) Remove nuts (20). Remove cap (3) (+ if necessary nut (49))
- 2) Mark adjusting bolt (17). Loosen lock-nut (18) and (17) to relax the spring.
- 3) Remove nuts (13) and bonnet (2).
- 4) Remove spring (15) and spring washers (16) (+ if necessary bearing (34 32)).
- 5) Carefully raise assembly formed by spindle (11), guide (9), piston (8) and disc (5).
- 6) Separate guide (9) Check stage of seats.
- 7) If lapping is necessary :
 - 7.1) Drive out pin (38).
 - 7.2) Dismantle disc (5) taking care to recover ball (10)
 - 7.3) Remove screws and washers and separate deflector (type 6500 only).
 - 7.4) Proceed to lapping

1.2 - VALVES TYPE 6600

- 1) Unscrew nuts (20). Remove cap (3) (+ if necessary (49)).
- 2) Mark adjusting bolt (17). Loosen lock-nut (18) and adjusting bolt (17) to relax the spring.
- 3) Remove nuts (13) and bonnet (2).
- 4) Remove spring (15) and spring washers (16) (+ if necessary bearing (34 32))
- 5) Remove spindle (11), ball (10), guide (9) + piston (8) + disc (5) (+ if necessary bellows (60) + piston rings (37)).
- 6) Separate guide (9) (careful with piston rings (37) if present). Check the seats.
- 7) If lapping is necessary :
 - 7.1) Maintain (8) vertically and unscrew disc (5)
 - 7.2) Loosen nozzle ring screw (7). Note position of the ring (6) then unscrew.
 - 7.3) Invert valve body (1) and dismantle nozzle (4) using a drift.
 - 7.4) Proceed to lapping.

1.3 - VALVES TYPE 6900 AND 9

- 1) Unscrew cap (3) (+ if necessary (49))
- 2) Mark adjusting bolt (17). Loosen lock-nut (18) and adjusting bolt (17) to relax the spring.
- 3) Unscrew bonnet (2).
- 4) Remove spring (15) and spring washers (16).
- 5) Carefully raise assembly formed by spindle (11), ball (10), guide (9) + piston (8) and disc (5).
- 6) Separate guide (9). Check seats.
- 7) If lapping is necessary :
 - 7.1) Unscrew (11), holding (8) and remove (5).
 - 7.2) Loosen nozzle ring screw (7). Note position of the ring (6) then unscrew.
 - 7.3) Unscrew nozzle (4). Take care of gasket (25).
 - 7.4) Proceed to lapping.

1.4 - PILOT OPERATED VALVES - TYPE 75-76

- 1) Separate pilot and water tank (5) if any, support and pipes. **Take care of pipes.**
- 2) Screw a threaded M6 pin in the piston (5), put a washer (ND 20) and a nut in contact with the fitting (A).
- 3) Unscrew nuts (12,13) and remove assembly guide (2), piston (5), disc (4).
- 4) Check seats If lapping is necessary :
 - 4.1) Maintain assembly (2),(5),(4) vertically and unscrew (4).
 - 4.2) Invert valve body (1) and dismantle nozzle (3) using a drift (type 76).
 - 4.3) Proceed to lapping.
- 5) To change gaskets (6,7), unscrew nut (M6), spring (14) push piston (5) out
- 6) Check piston rings (8) Change if necessary.
- 7) Replace imperfect gaskets Put new gaskets in hot water to get easier assembly **Take care of fitting sence. Do not damage gaskets lips.**

1.5 - PILOT OPERATED VALVES - TYPE 86

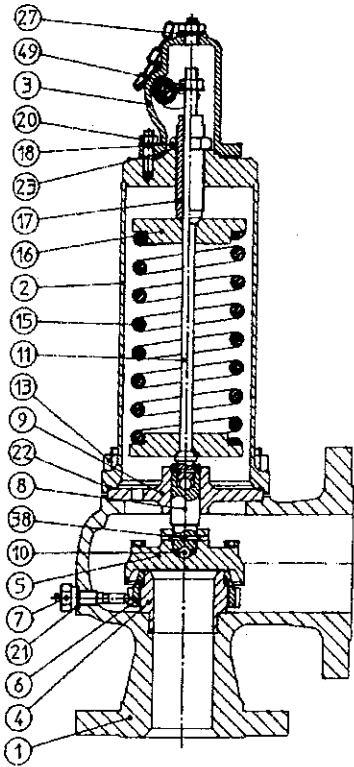
- 1) Separate pilot and water tank (s) if any, support and pipes. **Take care of pipes.**
- 2) Unscrew nuts (12,13) and remove cap (2) Take care of piston rings (8)
- 3) Remove helicoflex gasket (35) and bellows assembly (5).
- 4) Check seats. If lapping is necessary :
 - 4.1) Maintain (5) vertically and unscrew (4)
 - 4.2) Invert valve body (1) and dismantle nozzle (3) using a drift.
 - 4.3) Proceed to lapping.
- 5) Check piston rings (8). Change if necessary.

SPRING LOADED SRV

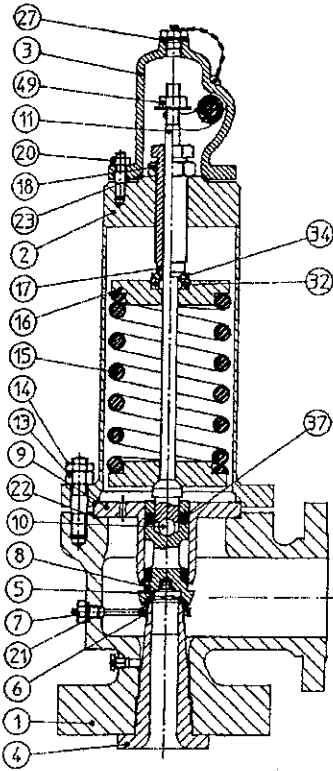
RECOMMENDED SPARE PARTS

For use same SRV

- 1 Spring (15)
- 1 Disc (5)
- 2 Sets of gaskets (21, 22, 23, 25, 27)
- 1 Ball (10)
- 1 Spindle (11)
- 1 Bellows (60)
and 1 Bellows gasket (61)
(according to SRV)

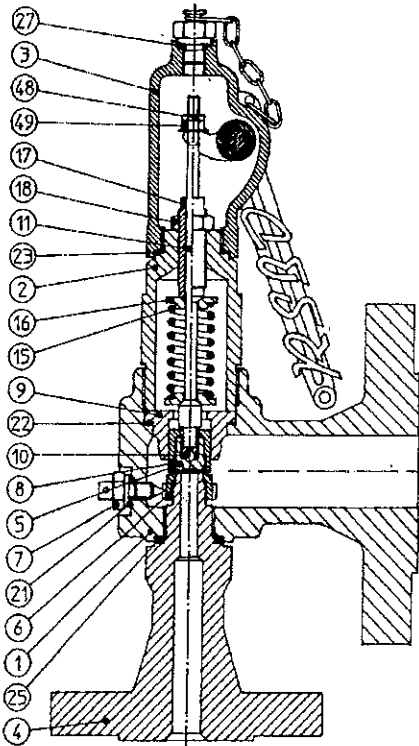
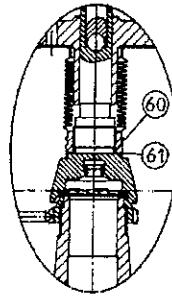


TYPE 6500

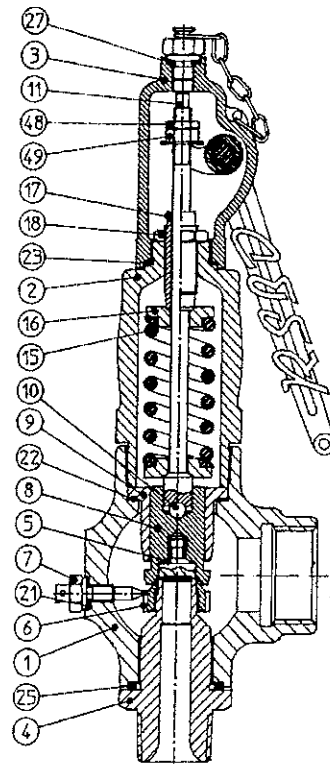


TYPE 6600

TYPE 6600 with bellows



TYPE 6900



TYPE 9

(see instructions 6600 + 6900)

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SAFETY RELIEF VALVES INSTALLATION AND MAINTENANCE INSTRUCTIONS



II - LAPPING

- If a safety valve begins to leak after openings, it should be reconditioned by lapping of the disc and nozzle seats.
- This operation must be carried out by skilled labour. If this is not possible, the valve should be returned to us or to an approved repairing company (network QS for instance, see chapter III.).
- **The disc must never be lapped on its seat (or nozzle).**
- Before lapping, check that the parts are free from pitting or burrs which may damage the hone or leave traces on completion of the lapping operation. Otherwise, repairing on lathe machine is necessary - (0,5 To 1 mm on each part stellite or not) in order To respect the profile and the perfect perpendicularity between tight surface and the main axis of the piece.
- Parts must be strictly cleaned before lapping

HAND LAPPING

DISC : Spread a light coating of lapping paste on the hone. Make a rapid movement in the form of a figure 8, until you get a clean surface. Add lapping paste from time to time. The whole surface of the seating should have an even appearance with no trace of scoring. Clean the disc and the hone with a solvent. For finishing use a much finer grained paste. Proceed as above, but check aspect after 10 minutes. Repeat the operation (do not recoat the hone just spread the remainder of the paste with a finger) until you obtain an uniform and glazed seat. clean the disc and the hone with a solvent and dry them

NOZZLE : put the nozzle on a flat area, seat upward, and proceed as above.

MACHINE LAPPING : use lapping paste diluted in oil. Surface brightness can only be obtained by hand lapping. Machine lapping requires dismantling of nozzle and disc

III - SPARE PARTS

After an intensive use, according to working conditions, a safety valve will require reconditioning. This work should be done by use or by an authorized member of network "Quality-security" (QS).

However, in order that the user can arrange for reconditioning of the safety valve as quickly as possible we recommend to order spare parts with the valves. Only original parts shall be used.

IMPORTANT : on the nameplate of the valve and on all documents from RSBD, you can find valve part-number and internal record number. Those two references are **necessary** in case of order of spares. **They must be found easily.**

IV - REFITTING VALVES

- Fit new set of of gaskets when refitting valves.
 - Parts to be assembled should be absolutely clean, degreased and dried.
 - All threads should be coated with lubricant to facilitate assembly and prevent seizing.
- We recommend the use of a molybdene bisulphide (MOS₂) dry lubricant, spray-applied.
- Proceed in the opposite of dismantling.
 - Lower disc onto nozzle with greatest care and release gently to avoid damage on seats
 - Take care of gaskets with lips, piston rings, pipes or flexibles.
 - Fit nozzle ring and adjusting bolt using marks made on dismantling.
 - Fees tanks and dome of the valve with water for pilote operated valves on steam.

V - CHECKING OF SET PRESSURE AND TIGHTNESS

- Set safety valves on a suitable test bench and with calibrated manometers.
- For safety valves on gases, set with dry, oil-free air or nitrogen.
- For safety valves on liquids, set with water or air.

SET PRESSURE :

- To obtain a clean opening on a bench without flow capacity, it is necessary to put the nozzle ring at the upper position and then 2 notches down.
- For cold set pressure, add percentage corresponding to working temperature of the valve (+ 67° To 120° = + 1 % . . .) (+121 To + 200° = + 2 %) (+ 201° To + 315° = + 3 %) (+ 316° To + 430° = + 4%) (+ 431° To + 450° = +5%).
- For a conventionnal spring loaded safety valve with constant backpressure, set at the required set pressure minus the value of the backpressure
- For a balanced spring loaded safety valve, just set at the required set pressure.
- In any case it is possible to modify withing ± 10 % the original set pressure.

For bigger modification, consult RSBD. But we recommend to consult RSBD for all modifications of working conditions.

IMPORTANT : to modify the set pressure, decrease the inlet pressure of more than 50 %

TIGHTNESS TEST :

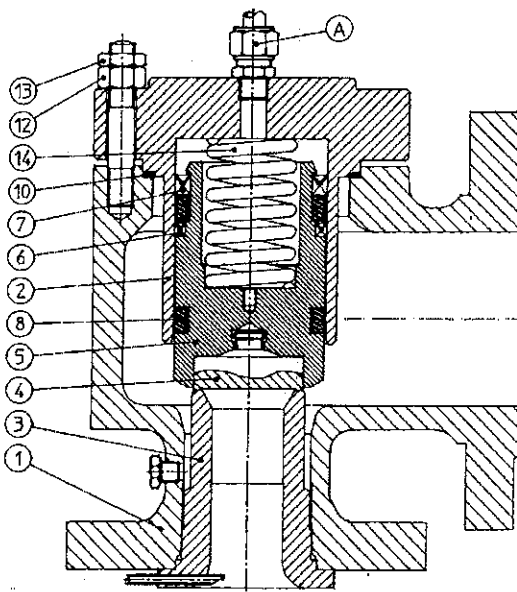
- This check is done according to standard API 527 or Kellog M24-152.
- Close all holes in the bonnet with plastic tapes.
- After 3 or 4 openings, reduce the pressure to 90% of the set pressure, close the outlet and measure the leakage according to the standard
- After set pressure and leakproof test, readjust nozzle ring according to manufacturer data

PILOT OPERATED SRV

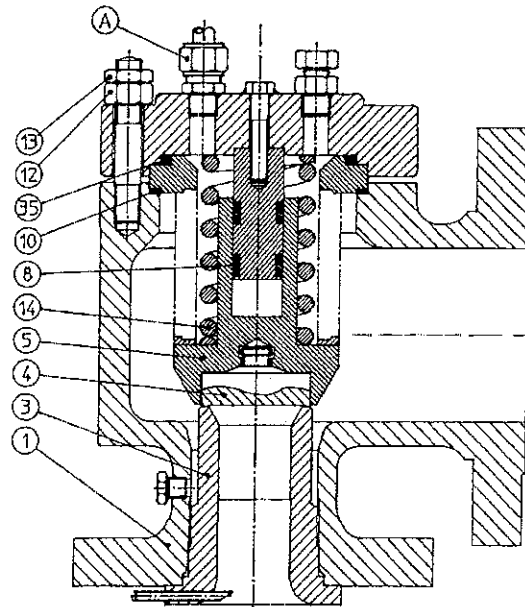
RECOMMENDED SPARE PARTS

For four same SRV

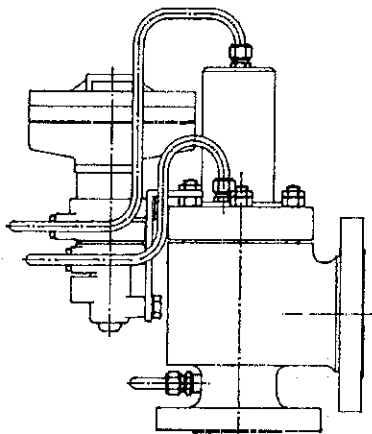
- 2 Sets of gaskets (6.7.10) or (10.35)
- 1 Disc (4)
- 1 Set of guide rings (8)
- 1 Bellows (5) (Type 86)
- 1 Pilot detector
(SRV with DGS)



TYPE 76

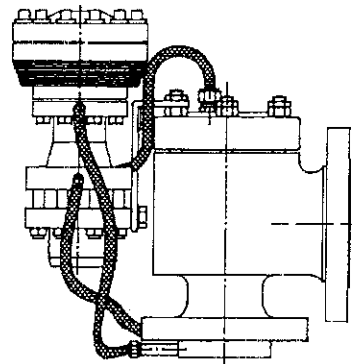


TYPE 86



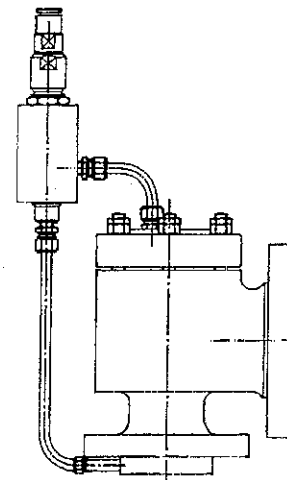
**PILOTS
DCS**

(ex : type 75 with 1 water tank)



**PILOT
DCM240**

type 86 SRV)



**PILOT
DGS**

(ex : type 76 SRV)

**MAINTENANCE : SKILLED LABOUR, ONLY IN OUR PLANT
SETTING : SKILLED LABOUR, TRAINED BY US.**

**MAINTENANCE : STANDARD EXCHANGE
SETTING : SKILLED LABOUR, TRAINED BY US**

VI - SPRING LOADED SAFETY VALVE : SET OF THE NOZZLE-RING

- To obtain clean opening and working, original adjustment of the nozzle-ring may be changed. This is available only on compressible fluids
- If the safety valve blows out, or closes too quickly the nozzle ring is too low. Raise ring by one notch and repeat this procedure till correct working.
- If the safety valve closes too slowly or not tight, important leak, the nozzle ring must be lowered by one notch Repeat this procedure till correct working

IMPORTANT : Do not act unless the inlet pressure has been lowered till 50% of the set pressure

VII - INSTALLATION INSTRUCTIONS

This chapter reminds briefly specifications from standard NFE 29-421 and API RP 520. In any case refer to those standards and to applicable regulation.

7.1 - INLET PIPE SYSTEM

- It should be as short as possible. The safety valve must be installed as near as possible from the vessel to protect It must never be installed on a pipe with smaller diameter than it.
- Valves should be protected from vibrations set up by the installation.
- Shut-off pressure drop assessed between flow source conditions and the location of the valve should not exceed 3% of the valve set pressure This pressure drop being calculated under actual flow conditions

7.2 - ESPACE PIPE SYSTEM

- Nominal diameter of the outlet pipe must be higher than the one of the valve outlet.
- **The valve should not support the escape pipe system.** Any stress set up by the system is a cause of leakage and troubles during working.
- On liquids, the valve must discharge downwards.
- On gases and steam, the discharge should be upwards.

In the case of steam, it is essential that a drain be fitted at the lowest part of the elbow. The connecting bend to the vertical pipe should be fitted as close as possible to the valve outlet flange. Bolted to the valve, radius must be higher than 2.5 D. Each safety valve should have its own individual escape. Unless, the outlet manifold section should be not less than the total section of all valves outlet orifices. The sum of the generated backpressure shall be less than the lowest available backpressure.

- The generated back pressure admissible, usually calculated with maxi flow capacity of the valve is limited to 10% of the set pressure. It may be 50% for balanced valves. The admissible back pressure may be more important for pilot operated valves

7.3 - GENERAL RECOMMANDATIONS

- Be sure that covers have been taken off
- Handle the valve carefully to not damage flanges and threads. Pipes and vessels containing the fluid, must be cleaned carefully to eliminate dust and metallic particles. Interposition of such particles between seat and disc will create strong damages Small leakage will cause a bad working and erosion of seat as quick as the pressure is high.
- The safety valve should be installed in a vertical position Wearing of guide will be less then For low pressure valves this is of highest importance The valve must always be accessible and easily portable Working space around is required.

VIII - STORAGE

- It is recommended that valves be stored in a area and protected from weather, dust, sand or other similar contamination sources; in their original packing whenever possible
- Banks and plastic covers shall not be removed until actual assembly commences
- Protect flange gasket seatings and threads from damage by impact. Handle carefully