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## 1. Generalities

The following operation instructions are valid for KLAUS UNION overflow valves of the series 1607, which serves a pressure limitation within a certain plant system (flow of liquids, gases and steams in pipe lines) and of course to let it through, whenever they are in OPEN status.

KLAUS UNION valves are subjected to the rules according to PED in their development and construction.

By a correct assembling, maintenance or repair we guarantee an operation free of troubles.

The manufacturer carries no responsibility for efficiency and safety of the valves, whenever these operating instructions are not observed and followed accurately.

The valves are marked, according to DIN/EN 19 (ISO 5209) as follows: nominal diameter (DN), nominal pressure (PN), body material, heat-no or specimen-no, manufacturer brand and factory number, flow direction arrow, and if necessary, admissible operating temperature and admissible operating pressure (bar).

**ATTENTION!** The valves must not be activated beyond the limits and rules indicated in the different documents (such as operation rules, purchase documents, type sheets). Operations beyond the indicated limits lead to overstrain which cannot be sustained by the valves.



A non-observance of this warning can cause injuries to persons and defects of the machines, such as:

- Injuries caused by escaped medium (cold/hot, toxic, under Pressure)
- Affect in activity or damage of the valve.

The descriptions and rules included in this operation instruction refer to standard types but are also valid for alternatives.

These operation instructions do not take into consideration:

- Any accident and incident which can arise by assembling, operation or commissioning of the valve.
- Any safety rule in relation with the place where the valve is installed. The operator is responsible for the observation of the safety rules, - also by the assembling staff.

**ATTENTION!** It is essential that the valves are handled by skilled staff that must be aware of the interactions between the valves and the system in which they are installed.

An incorrect use of a valve may cause strong consequences to the complete system, such as: The signs marked directly on the valve (such as DN) have absolutely to be considered and kept in a readable condition.

- Escape of medium
- Stop of the unit
- Affects, decreases or increases of operation or work of a system or unit.

For any further inquiries or in case of damage, please contact KLAUS UNION GmbH & Co. KG, Bochum

In case of local inquiries or orders, especially for spare parts, please indicate the production or factory serial number, the type, the model version and possibly also the year of construction.

The technical data referring to the valves can be found in their technical documentations (paragraph 4).

In case of a return transport it has to be proceeded as explained in paragraph 3 <Transport>.

## 2. Safety instructions

These operation instructions contain essential information that has to be observed by assembling, operation and commissioning of the valves.

For this reason they have to be read by the assembling staff, by the skilled staff and by the operator before the valve is assembled and put into operation and they should always be kept in the proximity of the valve.

Not only the general safety rules indicated in this main paragraph have to be observed, but also the other ones indicated in other paragraphs.

### 2.1 Indication of notes in the operation instructions

The safety warnings contained in this operation instruction, which have to be observed in order to avoid injuries to persons, are indicated by the following general and particular pictographs:

Warning!



Security signal acc. to DIN 4844 W 9

In order to avoid defects of valve efficiency and of its accessories the warning mark has to be observed:

**ATTENTION!** The signs marked directly on the valve (such as DN) have absolutely to be considered and kept in a readable condition.

### 2.2 Dangers that can result if safety instructions are not observed

If the safety instructions are not observed injuries to persons, environment and valve, or system can arise and the indemnity rights get lost.

In particular the non-observance of the safety notes can cause dangers such as:

- Break down of important functions of the valve or unit
- Failure of prescribed methods of commissioning and handling
- Danger to persons caused by electrical, mechanical and chemical impacts.
- Environmental injuries caused by a leakage of dangerous materials.

### 2.3 Working with safety consciousness

The safety instructions included in this paper, the national regulations for prevention of accidents, as well as the internal regulations referring to work, operation and safety have to be observed by the operator.

## 2.4 Safety instructions for the operator / user

- When ever some hot or cold valve parts (f. ex. Casing parts or handwheel) may cause any danger, these parts have to be protected in a way that they are protected from contacts.
- The contact protection for moving parts (such as coupling) must not be taken away while the machine is working.
- Leakages (f. ex. in spindle gaskets) of dangerous conveyed materials (explosive, toxic, hot) have to be removed in a way that no danger to persons or environment can arise. Legal determinations must be respected.
- Injuries by electrical energy have to be excluded (please find details to this point in the VDE and local power supply enterprise regulations).

## 2.5 Safety instructions for commissioning, inspection and assembly works

It must be provided that all commissioning, inspection and assembly works are executed by skilled staff, who must have previously studied these operation instructions.

Basically when any kind of work on a valve is executed, the valve has to be cooled down and free of pressure and the evaporation temperature of the medium must be lower than the temperature of all parts it gets in contact with.

Also basically, works on a valve have to be executed when it is stopped. The procedure to stop a valve operation is described in this paper and has absolutely to be observed.

Valves which get in touch with health injuring media have to be decontaminated.

Immediately after the work is done, all safety and protection devices have to be put into position or operation again. Before putting the valve into operation again, the points referring to paragraph 6 <putting into operation> have to be observed.

## 2.6 Arbitrary reconstruction and manufacture of spare parts

Reconstructions or modifications of the valve are only acceptable under agreement with the manufacturer. The use of original spare parts and by the manufacturer authorized accessories promotes safety. If any damage is caused by using other parts the liability for the consequences can be cancelled.

## 2.7 Inadmissible operation modes

A safe operation is only guaranteed if the valve is used according to the determinations included the „generalities“ of this operation instruction. The limits included in the technical documentation must not be exceeded.

# 3. Transport and storage

## 3.1 Transport

The valves are delivered in a closed condition and its connecting holes are shut up by cover caps. See that valves are not thrown or exposed to hard crushes.

Valves will be supplied as ready for operation.

**ATTENTION!** During transportation and storage valves have to be closed. Connecting holes have to be shut up by suitable means (cover caps, foils) in order to avoid any damage to the valve seats.

**ATTENTION!** In order to avoid damages the valves must not be hanging on the hand wheel, or on a possible connected motor or on any other accessory.

Please refer to at the “rise prescriptions“ on page 7!

Valve weights are indicated in the corresponding manufacturer documents (type sheet paragraph 4.1 <corresponding documents>, acknowledgement)

After delivery, respectively before assembly the valves have to be inspected in order to exclude any transportation damage.

## 3.2 Storage

The storage has to be effected in a way that it can work perfectly even after a longer storage period.

For this purpose it is necessary

- To keep the valve closed (in order to protect the seat facings)
- To take measures against soiling (dust, sand, mortar, respectively building materials), frost and corrosion (e.g. using plastic foils).

When storing valves with soft gaskets (of elastomer) the storage regulations for elastomer (DIN 7716) have to be observed:

- The store must be dry, free of dust and moderately ventilated. Store temperature should not go over 25°C.,
- Stocks on hand have to be used up in order to avoid long Storage periods,
- As already mentioned above, the valves have to be in „closed“ position during the storage. However the soft closure elements should be shut with little power, in order to avoid a rush aging of the elastomer.

## 4. Description / documents

The following pictures represent some examples for the principle valve construction. Pictures and information referring to particular construction series can be found in the corresponding type sheets.

### 4.1 Overview: corresponding documents

#### 4.1.1 Overflow valve (TA-Luft)

Straight seat type, with bellow and slot cone, top guided, spring loaded, closed spring pipe and gas tightened cap, pressure adjustable by rising hand wheel, loose handwheel will be supplied separately,  
connecting flanges acc. to EN 1092-1 (DIN 2501)  
flange facing acc. to EN 1092-1 (DIN 2526)  
face-to-face acc. to EN 558-1 (DIN 3202)

| Type | PN    | Material | Drawing Nr.      |
|------|-------|----------|------------------|
| 1607 | 10-40 | 1.0619   | 1607.100-400.040 |
| 1607 | 10-40 | 1.4308   | 1607.100-400.202 |
| 1607 | 10-40 | 1.4408   | 1607.100-400.205 |

Furthermore project-oriented valve data sheets of series 1607 are relevant.

## 4.2 Parts index

Pos. Denomination

|      |                           |
|------|---------------------------|
| 1    | Body                      |
| 2    | Cone guide bushing        |
| 3    | Handwheel, loose          |
| 4    | Interim piece             |
| 5    | Bellow insert             |
| 6    | Forcing lever             |
| 7    | Spring seat               |
| 8    | Spring seat               |
| 9    | Adjusting spindle         |
| 10   | Spring bonnet             |
| 11   | Gas cap                   |
| 13   | Gasket                    |
| 14.1 | Gasket                    |
| 14.2 | Gasket                    |
| 15   | Bolt                      |
| 16   | Bolt                      |
| 17   | Bolt                      |
| 18   | Nut                       |
| 19   | Nut                       |
| 20   | Gasket                    |
| 23   | Bolt                      |
| 24   | Nut                       |
| 25   | Locking screw with collar |
| 26   | Sealing ring              |
| 97   | Spring                    |

## 4.3 Function mode

Overflow valves consist of the pressure retaining parts: body (1), interim piece (4), bellow insert (5) and spring bonnet (10) as well as the functional unit.

Body (1) and interim piece (4) are connected by the stud bolts (15) and hex. nuts (18) and are sealed up outside by the gasket (13).

The bellow insert (5) consists essentially of the disk, bellow and an interim wafer. The body seat (1) and bellow insert (5) are made of stainless steel.

The desired overflow pressure can be set by means of the hand wheel (3). This setting will pre-stress the spring (97) by the adjusting spindle (9). This Pressurising affects, by the forcing lever (6) on the disk (bellow insert 5) and accords to the responded pressure.

The maximum set pressure will be fixed by a locking nut at the adjusting spindle.

When exceeding the set overflow pressure, the disk opens and moves inside the cone guide bushing (2).

By dissipate of the mass flow over the freed cross section at the disk (bellow insert 5), the pressure of the system will be reduced. If the set pressure is undercut, the disk will close (bellow insert). By the forcing lever (6) the spring power affects on the rounded sealing surface of the disk; itself will be pressed on the body seat and sealed the passageway.

The sealing for the outside:

- Normal operation:  
beyond the body (1), body gasket (13), the interim piece (4), the bellow insert (5), the spring bonnet (10) and the gaskets (14.1).
- With a damaged bellow (Disturbance):  
the fluids pour into the spring bonnet (10). The spring bonnet is sealed by the gaskets (14.2), (20) and the gas cap (11). The locking screw (25) acts for the possibility of controlling.

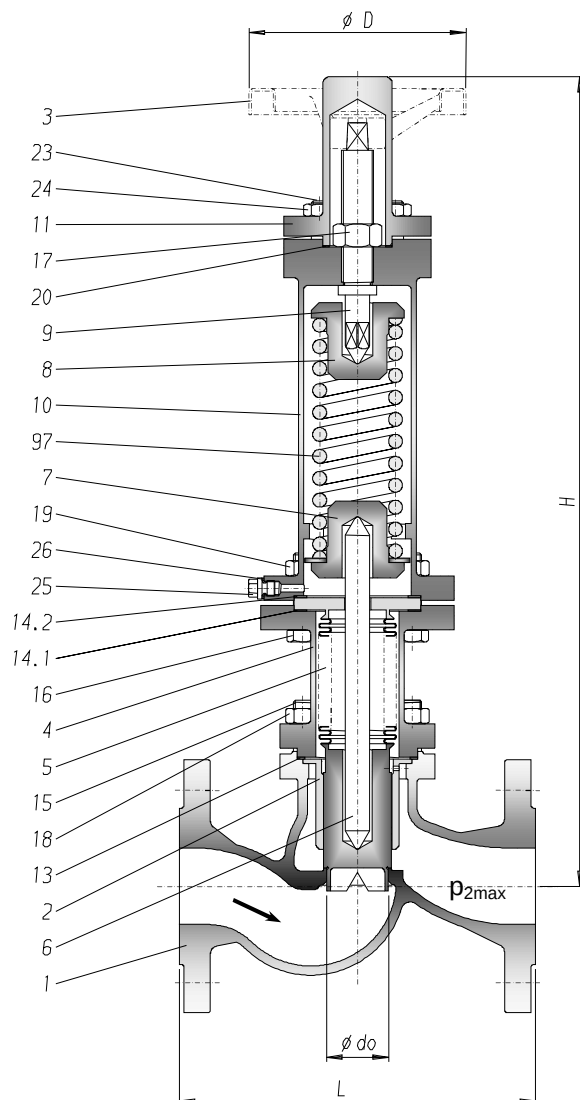
## 4.4 Application limits

**ATTENTION!** Depending on the materials the pressure temperature graduations (rating tables) of the respective materials are to be taken in consideration. Moreover, application is limited depending on the choice of the seal material and it is influenced by the material combination of the connecting elements (bolts and nuts).

For the **application area acc. to TA-Luft**, we refer to RWTÜV certification from 03.08.1999 under consideration of the statement from 31.07.1999, file number 9.8.1-952/99; commission number 20350747.

Depending on the choice of the seal material; following maximum temperature ranges will be limited:

- GYLON Standard Style 3501 E: max. +250°C
- GYLON Blau Style 3504: max. +250°C
- GYLON Weiß Style 3510: max. +150°C



## 4.5 Dimensioning

The dimension of the overflow valve will be established on the dependence of the mass flow to the differential pressure.

The flow rate diagram for fluids (RT-4.0530) will provide for the approximate design.

It shows the possible mass flow with 10-15 % overrun of the responded pressure.

## 4.6 Alternatives / accessories

- Double-walled bellows (back pressure  $p_{2max} = 25 \text{ bar}$ )
- Heating jacket

## 5. Installation

### 5.1 Generalities

**ATTENTION!** The pipeline has to be installed in a way that injurious shearing and bending forces during installation and activity are kept away from the valve bodies (1). This is to avoid leakiness and destruction of the body.

**ATTENTION!** The streaming on the exit of the valve must not be blocked by any shut off valve. The pipeline has to be free wheeled into the suction side of the pump or into the tank

**ATTENTION!** Before installation the cover caps have to be removed from the connecting holes. The flange facings must be clean and undamaged. Before installation the strippable varnishes have to be removed. The flange gaskets must be well centralized.

Only bolts and gaskets of admissible materials must be used. For the flange connection all flange drill holes have to be used.



When varnishing the pipelines, no bolts and nuts, stems, stuffing boxes and accessories must be painted (function affects). During any construction work the valves have to be protected from dust,

sand and any other construction material. (Please cover with suitable means).

Valve hand wheels, by-passes and all other adjacent parts must not be used as steps.



Valves and pipe lines working in high temperatures ( $>50^{\circ}\text{C}$ ) or low ( $<0^{\circ}\text{C}$ ) must be protect from touch by insulating. Alternatively the danger must be indicated by warning boards on the valve side.

### 5.2 Installation position

The overflow valve has to be installed with a vertical spring bonnet (hanging or standing), observing the flow direction.

**ATTENTION!** Horizontal Installation will cause increased friction.

Between disk and cone guide bushing and will impact the function of the overflow valve.

## 6. Operation / putting into and out of operation

(Refer to indications in paragraph 5 <installation>)

## 6.1 Operation / putting into operation

Before putting the valve into operation its material, pressure and temperature data have to be compared with the operation terms of the pipe line.



Eventually appearing shock pressures (water hammer) should not exceed the maximal admissible pressure. Protective measures have to be provided.

The line system of new plants and especially after repair works has to be flushed in order to remove harmful solid matters, respectively bead of weld.

Although the set pressure is adjust and proved factory-provided, changes by transport and installation could not be excluded.

At the starting up the set pressure has to be proved and maybe readjusted to the existing system. Installation of a manometer on site, before and after the valve, will provide the needed information.

## 6.2 Valve disassembly

Before dismantling from the pipe line or before commissioning and repair works are made directly on the valve, more precisely:

-before removing the ring nut for repair the valve has to be completely discharged from pressure and has to be cooled down until the evaporation temperature of the medium is lower than all the chambers getting in contact with it.

Then any scald can be excluded.



**ATTENTION!** Opening a valve under pressure is a lethal danger!

In case those toxic or easily inflammable mediums are conveyed, or mediums the residues of which in contact with humidity of the air can lead to corrosion damages, the valve has to be drained and flushed, respectively ventilated.

If necessary, protecting clothes and protective masks have to be worn.

Due to the installation position the residual liquid possibly remained in the valve and has to be drained off and correctly disposed.

Before a possible transportation the valves has to be exactly rinsed and drained.

## 7. Commissioning / Maintenance

### 7.1 Safety notes

During all commissioning and maintenance works on the valves the following safety notes as well as the general indications under paragraph 2 <safety> must be observed.

**ATTENTION!** In any case, also in emergency, only suitable spare parts and tools have to be used, otherwise a perfect function is not guaranteed.

### 7.2 Maintenance

The valves are constructed in almost all of their parts maintenance-free. Materials for sliding parts are chosen which cause a very minimal wear. In order to improve operation safety and to minimize repair costs, all valves, specially those ones which are seldom put into operation or are hard to get to, should be regularly tested.

The operator is responsible to determine the convenient test and maintenance intervals depending on the application of the valve.

The safety notes of Art. 2, 7.1 and 8 has to be followed.

### 7.2.1 Adjustment of the set pressure

The set pressure  $p_0$  can be adjusted according the spring range (see nameplate). Following proceeding has to be considered:

1. Loosing Hexagon nuts (24) and shorten the gas cap (11).
2. Handwheel (3) has to be stuck on the conical square of the adjusting spindle (9).
3. Loosing the lock nut (17) and screwing some parts of the threat.
4. Adjustment of the set pressure:
  - a) Raising:  
By clockwise rotation of the handwheel (3) the spring (97) will be preloaded.
  - b) Decreasing:  
By left-hand rotation of the handwheel (3) the spring (97) will be relaxed.
5. Screwing the lock nut (17).
6. Moving off the handwheel (3).
7. Controlling the gasket (20); maybe exchange. Considering on cleaned sealing surfaces.
8. Putting on the gas cap (11)
9. Screwing nuts (24) on the stud bolts (23). The nuts have to be tightening crosswise.

### 7.2.2 Changing of the bellow insert

**ATTENTION!** Only original spare parts must be used.

1. At first the overflow valve must be put out of operation. See Art. 6.2
2. Loosing the hexagon nuts (24) and removing the gas cap (11).
3. Spring (97) has to be completely relaxed. See Art. 7.2.1 <Adjustment of the set pressure>.
4. Loosing carefully the bolted connection (16, 19). Spring could be energized!
5. While removing the spring bonnet (10) non fixed parts have to be considered; spring seats (7, 8), spring (97).
6. Removing forcing lever (6).
7. Uncasing the bellow insert (5).

If the disk shows any damages at the periphery or the sealing surfaces, the cone guide bushing (2) and the body seat (1) should be also controlled and changed and respectively reworked. For this the interim piece (4) must be disassembled by loosening the hexagon nuts (18).

Before insertion of the new cone guide bushing (2), the free movement of the guide bushing has to be improved with the disk (5).

While insertion, the correct sitting of the cone guide (2) has to be considered.

8. Renewing of the gasket (13). Considering of cleaned surfaces.
9. Putting on the interim piece (4). The nuts (18) have to be tightening crosswise. Equally.
10. Renewing of the gasket (14.1). Considering of cleaned surfaces.
11. Installing the bellow insert (5). Before installing, the bellow insert has to be proved of external damages.
12. The forcing lever (6) has to be laid into the bellow insert (5).

13. Renewing of the gasket (14.2). Considering of cleaned surfaces.
14. Build up again the spring bonnet (10) with spring seats (7, 8) und spring (97) and fix with the bolted connection (16, 19). Considering the right seat of the gasket (14.1).
15. The valve has to pass another pressure test. See Art. 7.3. < Valve mounting >.
16. The adjustment of the set pressure has to be executed according Art. 7.2.1 <Adjustment of the set pressure>.

### 7.3 Valve mounting

After reassembling and before putting into operation the valves have to be subjected to a strength- and tightness-test acc. to EN-12266 (DIN 3230 Part 3).

**ATTENTION!** The maximum allowed pressure  $p_{2max}$  has to be followed absolutely! (see name plate).

## 8. Troubles and their elimination

### 8.1 Generalities

All repair and maintenance works have to be done with suitable tools and original spare parts.

The safety notes in par. 2 and 7 have to be observed.

### 8.2 Troubles / Elimination

For any further inquiries or in case of damage, please contact KLAUS UNION GmbH & Co. KG, Bochum.

- ☞ Porosity of closing device
- ☞ Retightening of the bolting at the body (1) / interim piece (4), stud bolts (15) with the hexagon nuts (18).
- ☞ Retightening of the bolting at the interim piece (4) / spring bonnet (10), bolts (16) with the nuts (19).
- ☞ Retightening of the bolting at the spring bonnet (10) / gas cap (11), bolts (23) with hexagon nuts (24).

**ATTENTION!** Screws have to be tightened crosswise, gradually, and equally.

- ☞ Renewing of the gaskets
  - gasket (13): body (1)/interim piece (4)
  - gasket (14.1 u. 14.2): interim piece (4) / spring bonnet (10)
  - gasket (20): spring bonnet (10)/gas cap(11)

Before inserting a new sealing ring or gasket the sealing surfaces must be carefully cleaned.

**ATTENTION!** No additional auxiliary sealing means have to be used for asbestos-free sealing rings or gaskets. For non-sticking coating only means explicitly recommended by the seal manufacturer have to be used.

### 8.2.1 Overpressure inside the spring bonnet

Normally the spring bonnet is unpressurized. But per thermal ascendancies (solar irradiation, service temperature, etc.) the pressure could be easy raised.

The interior space of the spring seat (10) could be checked by carefully loosening of the locking screw (25).



However should be fluids leaked out of the opening, the bellow insert is damaged.

The valve has to be directly put out of operation. See Art.6 <Operation / putting into and out of operation>.

### ◆ Heavy noise development

Beating noises of the disk were created by the abrupt pressure reduction. The mass flow was dissipated too fast.

The valve was oversized. Check of design and available process data.

- ☞ Decreasing of the set pressure. Valve opened earlier.
- ☞ Avoiding of pulsating mass flows. (installation of a up streaming memory)
- ☞ Raising of the dissipate mass flow

### ◆ Incorrect pressure increase on the Inlet

The evacuative mass flow is too big. The valve is low sized. Check of design and available process data.

- ☞ Minimize the set pressure. The valve will open earlier.
- ☞ Check the pressure on the outlet. By decreasing the backpressure the differential pressure will be increase. Hereby a bigger mass flow could be dissipated.

### ◆ Incorrect pressure increase on the Outlet

The pipeline has to be filed in that way, that a free drainage is warranted. No shut off valve should be installed behind the overflow valve.

- ☞ Checking of Pipeline guidance and installations. Warranted the free drainage.

## 9. Lifting a valve for installation in horizontal pipe lines (examples)

Picture 1

The lifting belts 1 and 2 must be twisted round the body. In order to keep the valve in the shown position and to prevent falling vertically, the two lifting belts should lead to the hook through the handwheel arms.

Picture 1

