

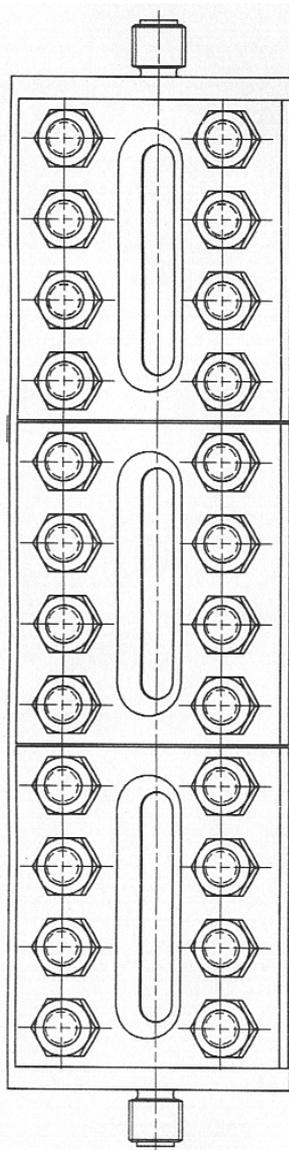
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*Installation and maintenance instructions for*

# **KLINGER**

*Bi-colour high-pressure liquid level gauges*

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**KTA**

*PN 315*

*180 bar, 356 ° C saturated steam*

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*Klinger s.r.l.  
Via De Gasperi 88  
I-20017 Mazzo di Rho, Mi*

*Telefono:0293333.1  
Fax:0293901312  
0293901313  
e-mail: [klinger@klinger.it](mailto:klinger@klinger.it)  
WEB: <http://www.klinger.it/>*

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## 1. Basic information

In steam boilers operating at a pressure above 35 bar reflex glasses are rapidly used up because of the high saturated steam temperatures. Because of such working conditions we recommend liquid level gauges with flat glasses which are protected by a mica shield on the steam side. As a further addition to our range of transparent gauges we have developed the Klinger type KTA bi colour water level gauge for extreme pressures, which may be used for steam pressures up to 180 bar and 355,5°C.

The Type KTA water level gauges are equipped with a special color - illuminator to get the following pictures result:

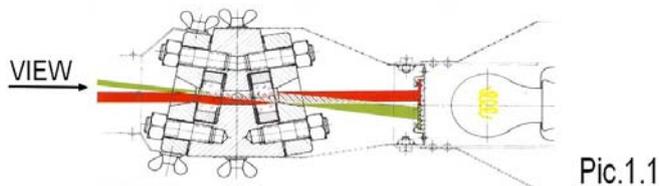
Steam space: *red* – Water space: *green*

KTA gauges, however, cannot be installed inclined, and it is likewise impossible to read the level at an angle from below.

If such gauges are mounted on elevated boilers the image has to be transmitted down to the boiler control platform by periscopic mirrors. We supply such mirrors on request.

### **Important hint:**

The illuminator housings are marked "TOP" (*Oben*), this reference mark will be always at the upper part. The Housing has always to be installed as indicated in the "Pic.1.1", to obtain the correct working and viewing of the Bicolour illuminators.



Take care of the correct camera position at TV-observations; see enclosed drawings on *page 8*.

## 2. Glass breakages and their causes

Glass breakages of KTA 28 gauges can be caused because of following circumstances:

- 2.1 Strong draughts can cause a shock-effect and break the glass. The gauge has to be screened of with a suitable equipment if it is placed outdoors or also if it is installed in closed rooms with strong draughts caused by e.g. windows, lift-doors, etc.
- 2.2 Thermal shocks resulting from incorrect blow-down or too rapid commissioning.
- 2.3 Cycling service: e.g. sudden on-loading of the gauge.
- 2.4 Distortion of the entire gauge through badly aligned boiler connection.
- 2.5 Use of graphite, Molykote etc. to prevent adhesion of the glass cushion gasket; this results in a layer of non-uniform thickness and the glass cushion gasket is also unevenly thickened.

### *3. Glass corrosion and its causes*

- 3.1 *Blow down was not carried out in accordance with our instructions (see section 5.6): the mica was exposed to the full force of the steam jet.*
- 3.2 *Excessive torque: The gasket is thereby stressed beyond its mechanical resistance, flows outwards and inwards consequently tears or crushes the gasket. For torque per bolt please see section 5.5.*
- 3.3 *The mica shield is too thin; minimum thickness: 0,5 – 0,6 mm*
- 3.4 *As a natural product, mica has greater quality fluctuations than industrially manufactured products. Although we have strict quality control tests a hair-crack may occur in a shield which becomes noticeable only after start-up.*
- 3.5 *The mica glass protector with venting orifice protects the glass against draughts and acts as a thermal insulator. It is installed between the cover plate and the glass cushion gasket. **This mica must not be installed on the side of the glass in contact with the water.** Only the thicker mica without orifice may be used here.*

### *4. Basic information on glass service-life*

- 4.1 *The worst enemy of micas and glasses is cycling service. The constant on- and off-loading of the boiler leads to glass breakages and rapid wear on the micas. The period of service-life of micas, glasses and sealing elements depends on Pressure, Temperature and continuous operation. Normally wearing parts maintain approximately 5-6 months at an operation-pressure lower than 110 bar or approximately 3-4 months at an operation-pressure higher than 111 bar.*

*Before re-commissioning it is definitely advisable to change glasses and micas, at the same time the gaskets- and spacer strips should also be renewed!*

*For example it is quite impossible to cut out replacement micas oneself with scissors. Micas prepared in this way are damaged and totally unusable.*

- 4.2 *During mounting great value should be set on cleanness. All points in section 6 should be precisely observed.*
  - 4.3 *Strong draughts should be prevented, because they can cause a shock-effect on the glasses. (see also "glass breakages and their causes", section 2.1, Page 3)*
  - 4.4 *Leaks have to be isolated immediately on the proper position.*
  - 4.5 *The glasses have to be changed if they get dull to stop the corrosion of glasses. Glass corrosion in indicators which are designed for high pressures can have immeasurable consequences*
  - 4.6 *The instructions for blow-down procedure (section 5.6) should be precisely observed.*
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## 5. Installation instructions

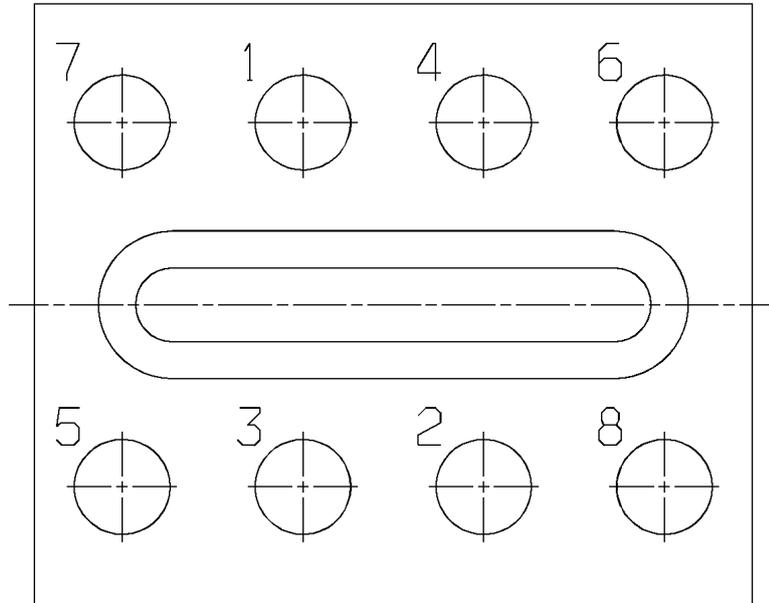
A sudden rise of temperature (thermal shock) in the gauge can adversely affect the service life or the performance of the glasses or micas. When the entire plant is being taken to service there is a slow rise in pressure and temperature. Provided that the valves are open, there is no danger for gauges and micas. If, however, a gauge is dismantled for repair purposes and subsequently installed on a working boiler the following re-commissioning procedure is recommended:

- 5.1 Shut lower gauge valve, open drain valve and upper gauge valve so far that sufficient steam can enter to thoroughly heat the gauge – the condensate running down the glasses should be carefully observe (Warming-up time about 50 – 60 min)
  - 5.2 Shut drain valve – the gauge now fills with condensate.
  - 5.3 Open upper gauge valve fully.
  - 5.4 Open lower gauge valve fully.
  - 5.5 After initial commissioning (also after replacement of stuffing box or glass) the cover plate nuts should be re-tightened in a cross-wise sequence with a torque wrench (150Nm cold, 120 Nm from 120° upwards) The hexagon nuts of the mounting screws on the boiler flanges, stuffing box retainer flanges and valve bonnet should likewise be retightened. Leakages which occur during service should be stopped by retightening at the appropriate glass section
  - 5.6 The service life of the micas and hence of the glasses can be favourably influenced y correct blow-down procedure. This is carried out as following:  
Shut upper gauge valve and open the drain valve for a short time.  
The water in the gauge body is thereby extracted without the inside if the gauge body being completely relieved of pressure. When the drain valve shuts again the water is again pressed upwards in the gauge body. This opening and shutting of the drain valve should be repeated several times so that the water level in the gauge body rises and falls. This procedure cleans the mica of deposits. By shutting the upper and lower gauge valves and subsequently opening the drain valve, the gauge body can be completely emptied of water. To clean the bore of the upper gauge valve, the gauge should be completely emptied as described above, the drain valve should then be shut and the upper gauge valve opened. Before a further blow-down the upper gauge valve must under *all circumstances* be shut and the procedure described above must be repeated.  
This procedure ensures the maximum possible protection of the micas, which are highly stressed by the boiler pressure and the blow-down procedure. To protect the micas further the period between bow-down should be made as long as possible, this naturally depends on the boiler water.
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## *6. Dismantling- and mounting instructions for gauge valves and drain valve*

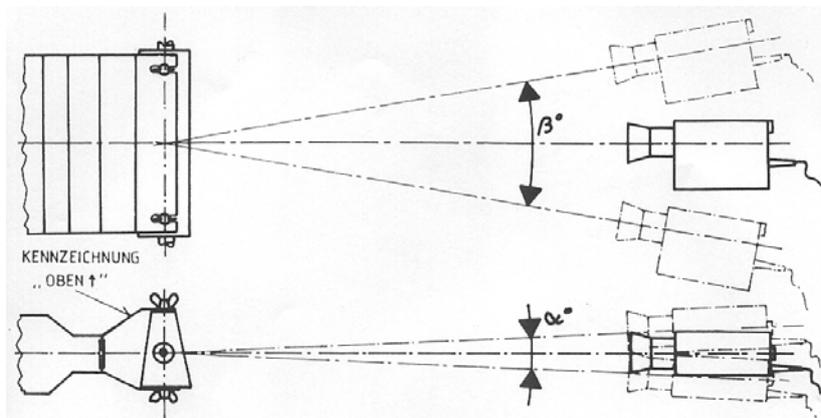
- 6.1 *Replacement of glasses and micas.*
  - 6.2 *Shut gauge valves – empty gauge body by opening drain valve – disconnect electrical supply, remove securing screws for illuminator and lift off illuminator.*
  - 6.3 *Unbolt oval flanges and lift off gauges.*
  - 6.4 *Unscrew hexagon nuts from cover plates and dismantle gauge.*
  - 6.5 *Check centre-piece and cover plates with straight edge. There must be no unevenness caused by corrosion or excessive stress. Scrupulous attention should be paid to cleanliness during assembly.*
  - 6.6 *There must be no traces of the pervious cushion gasket on the cover plate – please clean carefully.*
  - 6.7 *There should be no traces of pervious sealing gasket in the glass recess of the centre-piece – please clean carefully.*
  - 6.8 *Clean sealing gasket with a clean cloth and place in the glass recess of the centre-piece – do not use lubricants etc.*
  - 6.9 *Place mica shield on the sealing gasket and mica protector on mica.*
  - 6.10 *Carefully clean glass holder of traces of pervious mica protector (if necessary with a fine emery paper) and place in the recess in the centre-piece, the smooth surface must face towards the mica protector, the surface with the **pressure relief notch** towards the cover plate.*
  - 6.11 *Insert transparent glass – it must lie loosely within the glass recess and be capable of slight displacement in all directions.*
  - 6.12 *Clean cushion gasket with a clean cloth and place it on the transparent glass.*
  - 6.13 *Place spacer strips (4), glass protector (8) (mica with venting orifice - taking care that the venting orifice is at the lower end of the glass) and cover plate (2) on top of one another and secure firmly with hexagon nuts (the threads of the stud bolts should previously be lubricated with **Molykote thread grease 1000**). Since the upper surface of the centre-piece does not lie horizontally during the assembly (this results from its wedge form). It may happen that the spacer strips move out of position before they are correctly clamped by the cover plate. This can be prevented by slightly bending the spacer strips and thereby clamping them between cover plate and centre-piece. The nuts must be tightened with a torque wrench in the sequence shown on page 7, the torque being increased step-wise (for example: 30, 60, 90, 120 and finally 150 Nm).*
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*Mounting order of cover-plate screws*

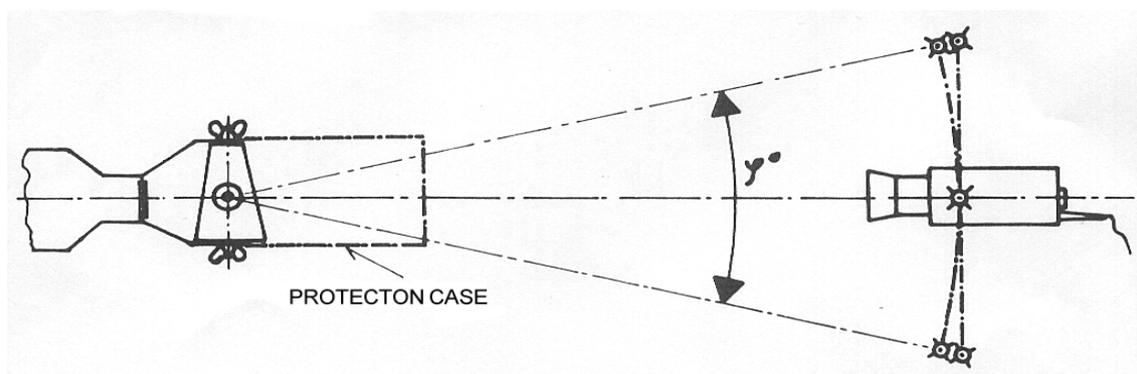


## 7. Installation of camera for observation by TV

- 7.1 The camera must be installed at the same level as the centre point of the gauge and be should be rotating to all sides.
- 7.2 The camera should be mounted at a distance of approximately 2.5m to 5m from the gauge.
- 7.3 After loosening the two oval flanges a preliminary setting can be achieved by slightly rotating the gauge body. The connection should then be retightened. Fine adjustment – i.e. making the water level visible on the monitoring screen, is only possible after the gauge is taken into service since it is only then that steam and water spaces exist. Since the gauge can no longer be moved, adjustment must be made through a moveable camera. As with mirror (periscopic) observation the use of radio communication set would be ideal since this permits direct contact between the monitoring centre and the gauge.



The gauge and the camera must be good positioned to get a brilliant and optimal ability to read off. The angle  $\beta^\circ$  max. should be  $\pm 10^\circ$  and  $\alpha^\circ$  max. should be  $\pm 2^\circ$ . It makes no difference which optics is used for the camera. Because the exact positioning of the gauge is so difficult the tripod of the camera should have a adjustment-clearance-room of  $\rho \pm 15^\circ$ .



If the amount of extraneous light incidence (e.g. sunlight) is high the read off can be proofed with a protection case. It can be jammed with the screws which hold the lighting case.

## ***8. Storage instructions***

*In accordance with DIN 3230 sheet 1, gauges should be stored in enclosed rooms in a non-aggressive atmosphere and be protected against dampness and dirt.*

### ***IMPORTANT NOTE***

*Spare parts like gaskets, packings, etc. must be stored in dry, cool rooms.*

#### ***Guaranty:***

*Glasses, gaskets and micas are wearing parts so we can give you no guaranty.*

*The service-life in operation is depending on factors which are not influenced by the manufacturer.*

*These factors are: Pressure, temperature, continuous operation, discontinuous operation and chemical combination of the water.*

*We recommend to storage a complete set of wearing parts, original from Klinger at the first initiation of the liquid level gauge (e.g. For a KTA 3 x I gauge you need 6 complete sets with glasses, gaskets, mica, etc.)*

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## *Safety Instructions*

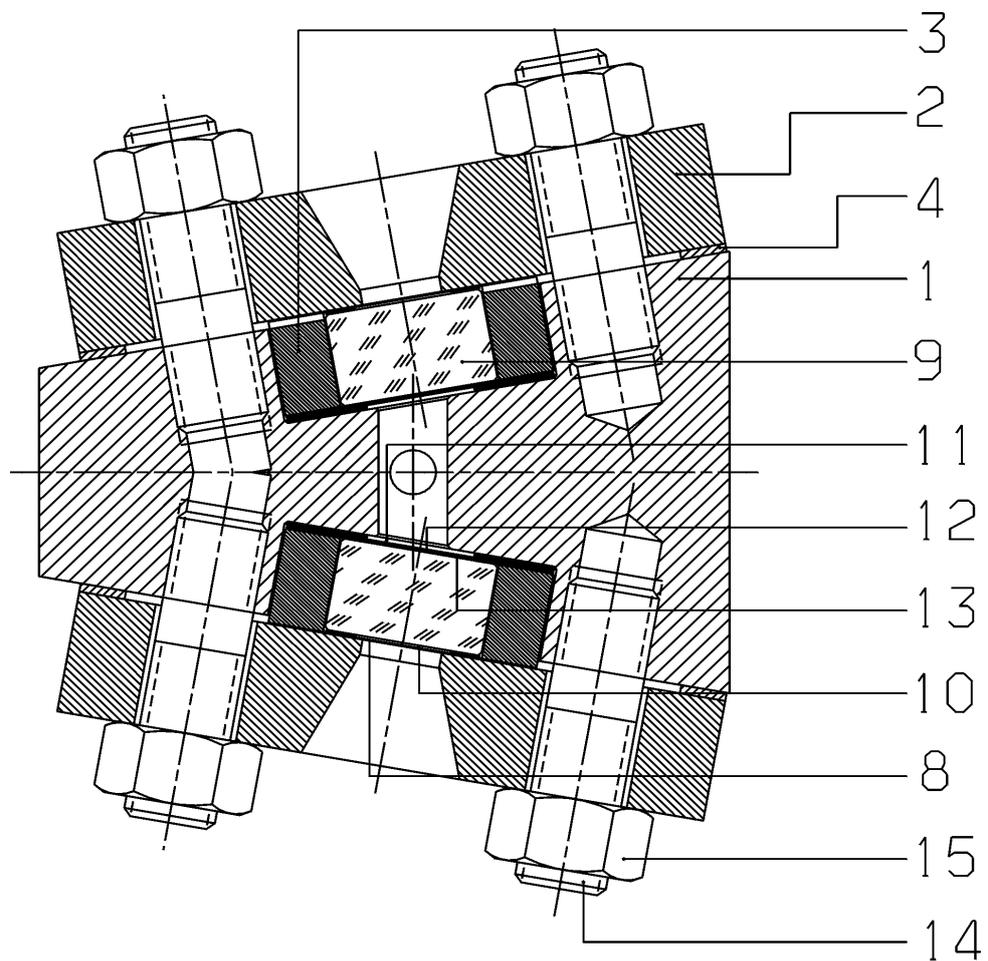
*In general the using of this valves is without any risks. For this it is necessary to act with enough care.*

- *For the respective application of the valves please take care of the **Safety Directions** for pressure/temperature limits and the selection of materials in the relevant product catalogue.*
- *Do not unlighted any screws on pressure tightening parts, unless advised and described in the **Assembly Instructions and Handling Regulations**.*
- *The Assembling as well as handling should be done only by qualified people.*
- *Please do make sure that all connecting pieces are well tightened again, if you had to unlighted them before.*
- *Do not open any screws with violence.*
- *ATTENTION – when opening and closing drain cocks – DANGER caused by leakage of Medium.*

*This Assembly Instructions and Handling Regulations has to be passed over to the people working with this valves.*

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### High pressure 2-colour liquid level gauge KTA 28



<i>Part</i>	<i>Name</i>	<i>Material</i>
1	Centre-piece	Ck 45N
2	Cover plate	Ck 45N
3	Glass holder	Sint C11
4	Spacer strip	1.4401
8	Glass protector	Stained A quality
9	Gauge glass	Bor-Silikat
10	Cushion gasket	Graphite
11	Sealing gasket	G-SLS
12	Mica shield	V4 quality
13	Protector	Graphite
14	Stud bolt	1.7709
15	Hexagon nut	24CrM05

