

ASSEMBLY-  
AND OPERATING INSTRUCTIONS  
REFLECTION INDICATOR RI 32



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# **1 APPLICATION**

SCALA level indicators are used for the direct optical indication of the filling level of liquids especially in boilers and tanks.

Level indicators used in bypass configuration can be used with any type of liquid as long as the liquid and the materials of the indicator do not show any chemical reaction. The level indicator has a direct connection to the liquid inside the boiler or tank and therefore shows the filling level accordingly. The valves provided allow safe operations under all regular operating circumstances. The level indicators may be used for all types of liquids, temperatures and pressures within the specified safe application area. Please read type plate for reference. Liquids that cause deposits or incrustation must not be used in order to maintain proper level reading.

## **ATTENTION:**

In case the used liquid is water and there is a risk of freezing the glass covers can be damaged! Do not operate under these conditions or use proper heating!

### **1.1 SAFE APPLICATION:**

All SCALA level indicators are measurement equipment and must be handled and used accordingly. Legal regulations for safe operation apply in most countries and it is the customer's obligation to operate and use SCALA products following these rules. For the assembly and mounting of SCALA products to customer's equipment engineering level knowledge is needed. As a customer it is your responsibility to comply with technical standards and regulations when integrating SCALA into your equipment.

As a SCALA manufacturer we care for the application of safety standards and technical regulations as well as the legal regulations that apply when manufacturing SCALA. All other responsibilities must be cared for by the end user.

If nothing otherwise has been specified SCALA must be used for static application only.

SCALA is not intended for use under harmful vibrations or oscillations. If your equipment or environment is prone to vibrations proper dampening means must be used.

### **1.2 WARRANTY**

All parts as well as SCALA itself are manufactured and tested according to renowned technical standards. LBBZ offers legal warranty for its products and spares offering exchange parts and spares in the rare case of premature failure or malfunction.

Excluded from warranty are glass covers, mica plates, gaskets and seals as these are wearing parts. Also excluded from warranty are valves and valve parts that are damaged by hard particles from contaminated liquid. Only pure liquids must be used!

Application and maintenance regulations must be followed! Before commissioning it is your responsibility to check if SCALA complies with intended use and application! We are not liable for damages that result from wrong application!

### **1.3 DISPOSAL**

The operator of SCALA has the legal obligation to care for proper disposal of SCALA and its parts according to local regulations and laws after ending the use of SCALA.

## 2 FUNCTION

### 2.1 REFLECTION INDICATOR WITH WINDOWS ACCORDING TO DIN 7081

Light coming from the same direction as your line of sight hits the curves of the window. In case there is no liquid in contact with the carved window the light gets reflected. Therefore you see a light bar in areas with no liquid. In case the window is in contact with a liquid the light does not get reflected but enters the liquid and is absorbed. Therefore you see a dark bar in areas with a liquid. The level of the liquid is therefore visible as a dark bar, the empty or gaseous area above the level of the liquid is visible as a light bar.



empty (white)

partly filled with liquid (blue)

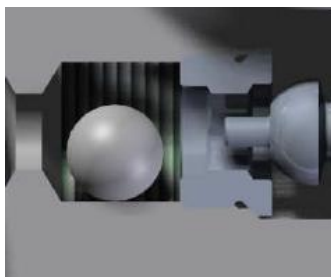
## 3 ASSEMBLY

SCALA Reflection Level Indicators in their base configuration are made of the level indicator itself, the shut-off valves with safety valves and a drain valve.

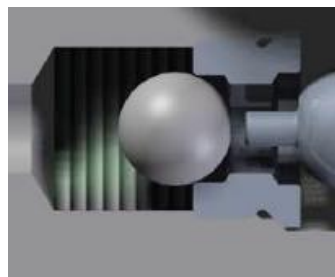
All the following images are symbolic and more or less schematic and show the principal design rather than a specific custom made level indicator. SCALA comes in many variants and lengths and indicator window lengths, too much to show here. Drain valves also come in many possible variations and designs according to customer needs. Pipe joints and connections are also available in any custom design you may wish such as e.g. weld connector or flange. Level indicator length, window length, number of stacked indicators, gap between indicators, total length of SCALA and the material can be customised. You will receive a drawing with all important measures together with your purchase confirmation.

### 3.1 AUTOMATIC SAFETY VALVES

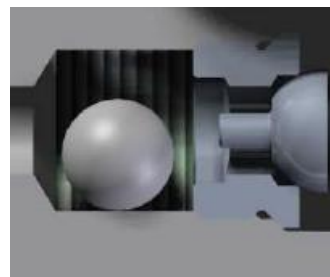
All valves contain additional automatic safety valves. In case of a broken window or fully opened shut-off valves the automatic safety valves prevent excess loss of liquid. The main part of these safety valves is a tiny ball that can close a bore.



Position of ball during normal operation



Position of ball when window or mica is broken



Position of ball before commissioning

In case the window is broken the resulting flow of liquid moves the ball from its rest position to the bore pressing it tight on the hole if the pressure difference exceeds 0.5 bar. As long as the liquid causes a pressure the ball will prevent the liquid from draining. The manual valves can be shut and the window can be replaced.

**ATTENTION:** When closing the manual valves the pressure is reduced causing the automatic ball valve to open for a short time. It is therefore possible that small amounts of liquid or hot steam may escape while shutting off! Therefore always wear protective goggles and clothes when operating the valves during repairs!!

## 4 COMMISSIONING

Reflective level indicators SCALA are made according to general applicable technical regulations and the demand and need of the customer. You should always check that the requirements and regulations of your equipment fit those of SCALA. Consult the operating manual of your installations first!

Before assembly

- Check all equipment for damages or defects
- Check correct orientation of SCALA (top and bottom are indicated!)
- Check distances and measures of boiler or tank and those of SCALA, max. tolerance +/- 1 mm, SCALA and tank must fit!
- Check availability of tools (torque wrench ?)

### 4.1 MECHANICAL ASSEMBLY

- Remove covers from flanges
- Fix preassembled SCALA unit strain-free at boiler tank equipment
- When using hoists or other lifting gear use fabric hoist only to prevent damage!

### 4.2 COMMISSIONING

#### 4.2.1 GENERAL OPERATING INSTRUCTIONS

SCALA is equipped with manual shut-off valves. All shut-off valves have additional automatic safety valves included. When commissioning the manual valves must be opened slowly so that the liquid can fill the level indicator without causing the automatic safety valves to shut off. As soon as equalisation of pressure between SCALA and boiler/tank is reached the manual valves must be fully opened in order to reduce pressure on valve gasket.

## **4.2.2 COMMISSIONING OF SCALA AND BOILER TOGETHER**

- Check that drain valve is fully closed. Fully open top valve and lower valve.
- Fill in liquid
- Check for leaks and pull tight screws, nuts and bolts accordingly

## **4.2.3 COMMISSIONING UNDER HIGH TEMPERATURE AND PRESSURE**

In order to avoid excessive strain heat up slowly !

- Follow environmental and health regulations !
- Drain valve and manual valves must be closed
- Connect drain pipe to drain valve. Make sure drain pipe is not blocked
- Fully open drain valve
- Slowly open top manual valve to avoid automatic shut-off valve action
- Heat up SCALA by means of streaming steam until operating temperature is reached

## **5 MAINTENANCE**

Level indicators must be checked regularly. Check windows for cracks, scratches, marks, spots since some liquids may pit the windows. Check all screws, nuts and bolts for tight fit.

## **6 REPAIRS**

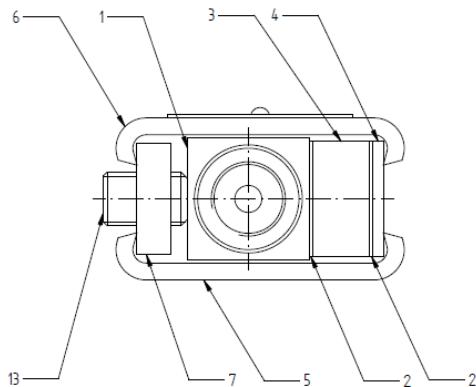
**ATTENTION:** Exchange of windows by trained staff only! On each window exchange operation check sealing surfaces for scratches. Be sure to use only correct window type and quality! Borosilicate glass according to DIN 7081 only for safety reasons!

As a safety precaution we strongly recommend original spares from LBBZ!

### **6.1 EXCHANGE OF WINDOW**

- Depressurise system
- Open drain valve, drain liquid from level indicator ( do not let harmful liquids get into the environment!)
- Remove sheet metal covers from top and bottom of indicator
- Unscrew big screws from back plate until back gets loose
- Remove thick side plates
- Remove defective window, gasket and padding
- Clean sealing surfaces, check for grooves and scratches, only unaffected surfaces avoid leaking

- Assemble new gasket, new window (grooves must be on the side facing the liquid) and padding
- Attach thick side plates and back plate
- Turn all screws until they make proper contact, turn again entire row in three steps until a torque of 50 Nm is established on each screw
- Recommission level indicator as described in 4.2.2 or 4.2.3



- |    |                         |
|----|-------------------------|
| 1  | Main Body Housing       |
| 2  | Gasket/Padding          |
| 3  | Reflective Window       |
| 4  | Pressure Plate          |
| 5  | Side Plate              |
| 6  | Side Plate              |
| 7  | Threaded Pressure Plate |
| 13 | Screws                  |

## 7 SAFETY INSTRUCTIONS

- The operator of this equipment should read and understand the functions and application of level indicators and the technical details of his own equipment in order to avoid any unsafe operation. Read instructions and if in doubt ask manufacturer
- To avoid accidents or harm follow proper safety measures
- Wear protective safety glasses
- Wear protective gloves
- Use protective wear
- In order to increase safety and to add further safety during maintenance operations we recommend additional shut-off valves between boiler/tank and level indicator valves
- As a precaution regular checks must be done especially looking for leaks and wear on the windows
- The maintenance interval should fit the expected wear and should be shorter in case of a rough operating environment
- For better safety all maintenance and operation should be carried out by trained staff only!

## 8 SAFETY MEASURES

**ATTENTION:** In case of a leak while under pressure the level indicator must be shut-off instantly from the boiler/tank.

# Manufacturers Declaration

Manufacturer Declaration of Application of Regulation 97/23/EG

We, the company LBBZ

LBBZ GmbH  
Gutenbergstr. 29  
D-52511 Geilenkirchen

Herewith declare that the products

**SCALA RI**

are pressurised equipment parts manufactured according to Art.3, Abs.3 of best practice engineering regulation 97/23/EG due to the low pressure / volume product. These products must not carry any CE sign according to regulation 97/23/EG .

Manufactured according to these standards:

TRD, DIN EN 12952-7, AD2000, ASME Boilers



Geilenkirchen, 01.12.2012