



# Tower-Sens

**Non-contact long range  
Level Measurement**



# Non-contact Measurement Technique

## Principle of Measurement

Gamma radiation is attenuated as it passes through matter. This attenuation is measured by a highly sensitive scintillation detector. If the type of radiation, the wall thickness and the path of radiation are constant, the attenuation of radiation will only be affected by a change in level. In this manner, the level can be measured reliably and without contact – irrespective of pressure, temperature, viscosity, color and all chemical properties.

Consequently, radiometric measuring gauges manifest a very high level of operational safety and are maintenance-free, even under difficult operating and ambient conditions.

## Detectors

The incident radiation creates so-called scintillation light flashes in the rod detector. The number of flashes is proportional to the intensity of the radiation. A high sensitivity photomultiplier, combined with the electronics connected downstream, converts these flashes into electrical pulses, and based on this, the exact level is determined.

The major benefit is the high sensitivity of large-volume scintillation detectors which enables the use of minimum source-activities as a consequence.

## Tower-Sens Highlights

Each Tower-Sens consists of a basic module and several extension modules. In addition to the scintillator rod, the basic module includes the entire electronic measuring equipment including the communication interfaces. An extension module consists of a scintillator rod encapsulated in stainless steel and is coupled optically and mechanically with the basic module or another extension module. Thus, measuring ranges of up to 8 m can be covered by a single measuring electronics.

The scintillator rods used in Tower-Sens have a diameter of 2 inches and are characterized by high sensitivity and long life cycle.

## Simple and fast

### Assembly

- fastening system with clamps
- self-centering
- reliable and straight forward coupling

## Naturally stable

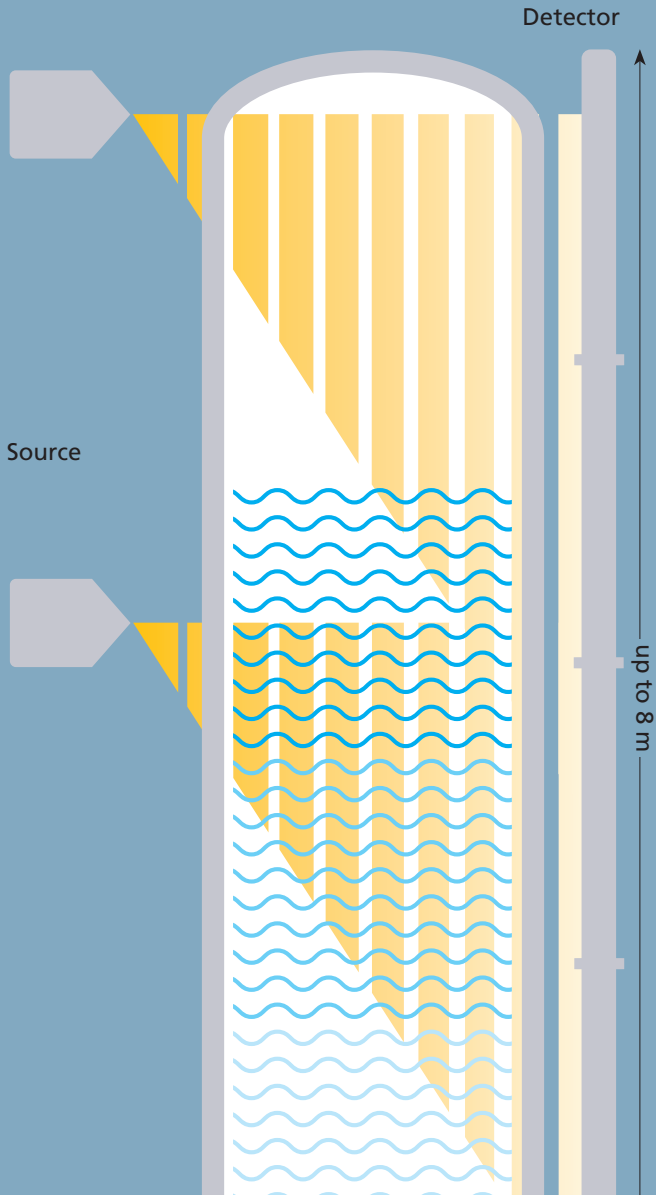
### The patented method for automatic drift compensation

- compensates influences of temperature
- utilizes the naturally existing radiation
- always reliable
- consistently high sensitivity



# Tower-Sens – The Solid Solution

Continuous level measurement  
over a measuring range of up to 8 meters



The Tower-Sens is a rod detector based on the well-known level gauging system LB 490 Uni-Probe. It has been designed specifically to monitor large measuring ranges.

With only one electronic unit and only one flameproof-housing, the Tower-Sens is significantly more economical than systems comprising several short, cascading detectors. Moreover, the wiring efforts and the risk of complete system failure are drastically reduced.

The combination of good value, reliability, accuracy and low source activity make the Tower-Sens the ideal solution for measuring ranges exceeding a length of 2 meters.

## Quality and volume

### The Scintillator

- 2 inch diameter
- incoming radiation will actually be detected
- up to 10-fold count rate compared to 1 inch systems
- high transparency results in good light conductivity
- high light yield

## Extremely solid

### The Housing

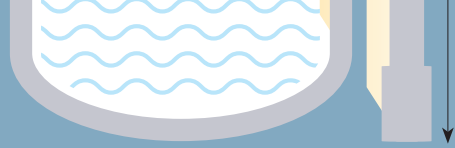
- 100% stainless steel
- resistant to the most adverse operating conditions
- extremely long service life

## Highly sensitive and yet robust

### The Photomultiplier



up to 8 m



- 2 inch diameter
- large measurement area
- high light quality
- in-sensitive to electromagnetic interferences
- vibration-protected mounting

## System highlights

- Constant high measurement accuracy over the entire measuring range, even under varying ambient temperatures
- Virtually maintenance-free
- Reliable for many years
- Low source activity due to the high sensitivity
- Minimum radiation protection stipulations
- Unrivalled in price and performance

## Simple handling

The construction of the individual modules ensures simple and safe handling during transport and during installation on site. The coupling joints are protected against dirt and humidity. Linking two modules reliably by means of quick-release fasteners is foolproof.

## Field-tested system

Calibration, communication and operation of the Tower-Sens is simple and identical with that of the LB 490 Uni-Probe. This system is technically mature and has been proven world-wide.



## Versatile configuration

- The Communication Electronics
- tried and tested a thousand times
  - selectable communication systems (HART, profibus, fieldbus, etc.)





## Committed to technological leadership

Berthold Technologies was established in 1949 and is located in Bad Wildbad, in the Black Forest in Germany. Since then, Berthold has been developing superior non-contacting measurement systems, including ground-breaking achievements such as the radiometric level switch and the continuous level gauge for difficult operating and environmental conditions.

The bottom line of Berthold Technologies' success and growth has been and still is research and development which has always focused on our customers' needs.

Berthold Technologies' process control division offers one of the most comprehensive product lines for non-contact monitoring of process parameters.

Berthold Technologies sets the standards world-wide through technological leadership and provides customized measurement solutions – from project planning right up to the start of operation.

## Source with shielding

Radioactive sources for industrial applications are principally tightly encapsulated in solid stainless steel capsules so that contamination is ruled out. Any activation of the product being measured is also impossible.

The shieldings surrounding the source have a lockable radiation exit channel directed towards the detector; this ensures that the operating personnel are not exposed to any unacceptable level of radiation.



up to 8 m

# Technical Data Tower-Sens LB490

## Operating data

Power Supply	95 – 250 VAC, 50 – 60 Hz, 15 VA Option: 18 – 32 VDC / 24 VAC $\pm 10\%$ $\pm 15\%$ , 15 W
Storage temperature	- 40... + 55°C (233...328 K)

## Electronics

CPU	- data backup with EEPROM - self-monitoring through watch-dog timer - continuous monitoring of the hardware
-----	---

## Signal output (HART, fieldbus or profibus)

### HART

Standard:	0/4 – 20 mA, insulated either active max. impedance: 120 – 500 Ohm or passive (12 V...24 V) max. impedance 12 V: 250 Ohm max. impedance 24 V: 500 Ohm HART interface for digital measured value transfer and parameter setting Continuously monitored current output (patent pending)
Option:	Intrinsically safe current output, passive power supply: 12...30 V, voltage drop < 3.5 V 20 m signal cable (blue), pre-assembled, C <sub>i</sub> 3.36 nF, L <sub>i</sub> 13.65 H

### Profibus PA

Standard:	Interface for profibus PA 0/4 – 20 mA current output, can be used parallel, e.g. for indication on site Alternative: Profibus PA can be switched over to HART communication
Option:	Intrinsically safe profibus PA-connection, 20 m signal cable (blue), pre-assembled

### Fieldbus Foundation

Standard:	Interface for Fieldbus Foundation 0/4 – 20 mA current output, can be used parallel, e.g. for indication on site Alternative: Fieldbus Foundation can be switched over to HART communication
Option:	Intrinsically safe Fieldbus Foundation connection, 20 m signal cable (blue), pre-assembled

## Other inputs and outputs

1 digital input	Hold signal
1 relay contact SPDT	Failure signal Max. 5 A at 250 VAC or 30 VDC
3 relay contacts SPDT	either for: - Hold signal - max. alarm - min. alarm - detector temperature - interference radiation Max. 5 A at 250 VAC or 30 VDC Change-over contacts
RS232	for software update
RS485	for cascading up to 8 detectors

## Cable connections

Fittings	4 ea. 3/4 inch, NPT
Fitting as option	3/4 inch NPT to metric M20 Other adapters on request
Wire cross-section	Max. 1.5 mm <sup>2</sup>

## Rod detectors

Scintillator	Plastic scintillator, 5 cm diameter With automatic drift compensation
Case material	Stainless steel 1.4301
Temperature stability	$\pm 0.5\%$

## Basic module

Sensitive detector length	Weight	Weight with water cooling
1000 mm	approx. 20 kg	approx. 27 kg
2000 mm	approx. 26 kg	approx. 41 kg

## Extension module

Sensitive detector length	Weight	Weight with water cooling
2000 mm	approx. 17 kg	approx. 32 kg

Flame-proof enclosure		Operating temperature
Class	II 2 GD EEx d IIB/IIC T6 IP 66 T80°C	-40 °C ...+50 °C
FM/CSA:	Class I, Division 1, Group A, B, C, D Class II, Division 1, Group E, F, G NEMA 4X	-50 °C ...+50 °C
Optional:	Intrinsically safe signal output	-20 °C ...+50 °C
ATEX:	II 2(1) GD EEx d[ia] IIB/IIC T6 IP66 T80°C	
		Option: water cooling

Source and shieldings see separate brochure. Subject to change without prior notice.



Your local dealer



BERTHOLD TECHNOLOGIES GmbH & Co. KG · P.O. Box 100163 · D-75312 Bad Wildbad, Germany  
Phone +49 7081 177-0 · Fax +49 7081 177-100 · industry@berthold.com · www.Berthold.com