

Level transmitter LT10

Submersible transmitter for level measurement in liquids.



Level transmitter with submersible probe in stainless steel for level measurement in vessels where pressure connection in the bottom is not possible or desirable. E.g. pump pits, reservoirs or plastic tanks.

- **New innovative 2-sensor technology** for stable long term measurement. No reference tube is needed in the measuring probe cable.
- **Easily lengthened/shortened probe cable.**
As there is no reference tube in the probe cable the length can easily be changed.
- **Lightning protected.**
Meets the demands for Class 1 testing according to IEC61643-1, 5 kA (10/350 μ S).
This means that the transmitter can resist a lightning stroke near the signal/supply cables.
- **EMC proof construction.**
- **Media temperatures up to 80°C (176°F).**
- **New piezoresistive sensor technology.**
Reduces temperature dependence and deviation.
- **Simple maintenance and calibration.**
All adjustments are done in the connection box.
(No adjustments are done in the measuring probe.)



invensys®

EUROTHERM®

EUROTHERM AB
Lundavägen 143,
SE-212 24 MALMÖ.
Tfn +46 (0)40 38 45 00
Fax +46 (0)40 38 45 45.

Box 664,
SE-645 59 STRÄNGNÄS.
Nordfeldts väg 9,
Tfn +46 (0)152 241 30
Fax +46 (0)152 241 38.

EUROTHERM FINLAND
Kristiinankatu 9,
FIN-20100 TURKU.
Tfn +358 22 50 60 30
Fax +358 22 50 32 01.

www.eurotherm.se
www.eurotherm.nu

Order codes

The transmitters order codes for different configurations can be found from the table below.

LT10 x x - x x x x

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	Descripton	Suffix	Figure 1	Figure 2	Figure 3	Figure 4		
Electronics	Analogue 4-20 mA	A						
	HART *1	H						
Diaphragm	Hastelloy C-276		4					
Connection	Submersible probe			0				
Span min.-max.	4,2-35 kPa				2			
	12-100 kPa				3			
	24-200 kPa				4			
Design	Atmospheric pressure					0		
Filling liquid	Silicon oil						Empty	
Accessories	Other lenght of the probe cable							order m
	Foot for the probe							Pxxxxx

Ordering example

Level transmitter with submersible measuring probe, 10 m cable and calibrated range 0-1,5 m water level will have the order code: **LT10A-4020** with calibrated range 0-1,5 mH₂O

*1: Pending

Description

LT10 is a completely new type of level transmitter for applications where pressure connection in the bottom of the vessel is not possible or desirable, e.g. pump pits.

LT10 is constructed with a innovative 2-sensor technology with a submersible 31 mm diameter measuring probe. The probe has a Hastelloy C diaphragm for highest corrosion resistance. The probe hangs in its cable. The cables standard length is 10 m but can on request be delivered in length up to 60 m.

The probe and signal/supply cables are connected to the electronic housing where all electronics are placed.

LT10 is equipped with the best possible protection against EMC and lightning.

Function

LT10 measures the liquid level with a piezoresistive absolute pressure sensor connected to the diaphragm. This level will then fluctuate with the atmospheric pressure variation. To compensate for this variation there is another absolute pressure sensor, placed in the electronic housing and connected to the surrounding atmosphere. The electronics uses this measurement to compensate the measured liquid level for the

atmospheric pressure variations. See function on page 2.

The benefit of this technique is that the measurement will be more accurate because there is no need for a reference tube in the probe cable. This tube has often caused big errors because of plugging or condensation. The probe cable is also easier to lengthen/shorten for the user.

To consider

Never place the connection box direct on a cold or damp wall, leave a gap.

Use round signal/supply cable and tighten the cable feed through firmly. Make sure that the electronic housing cover is tight.

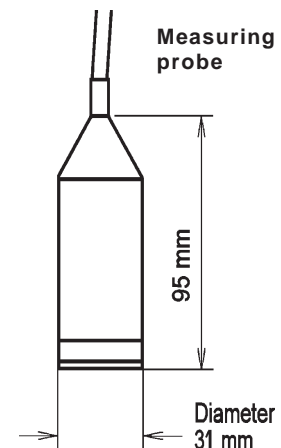
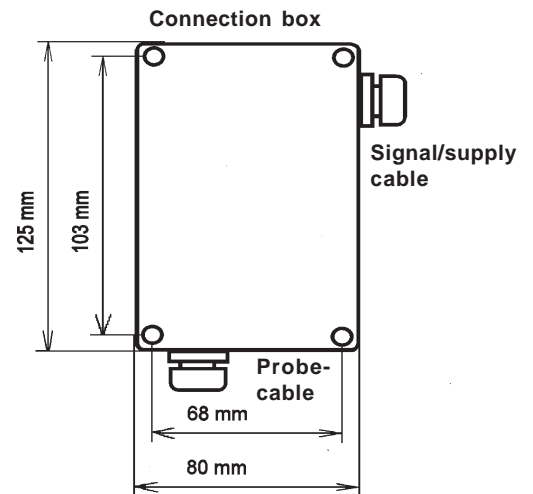
Make sure not to mechanically damage the diaphragm.

Do not submerge the probe so that it stands on the bottom.

Note that the highest media temperature is +80°C (+176°F).

Always place the electronic housing so the cable entry for the probe cable is directed downwards.

Outline



Connection and adjustment

The signal/supply cable are connected to the terminals marked S +/- . Always connect the earth terminal as well.

T +/- is used as a test terminal. A low impedance current meter can be connected which shows the output current.

Zero, span and time constant can be adjusted with jumpers, under the shielding box inside the electronic housing, and potentiometers through holes in the shielding box.

See instructions on the shielding box for placing of jumpers.

If the transmitter is standard calibrated at delivery the adjustment possibilities are (without changing jumper position):

Zero -5 % to +18 %.

Span +50 % to +100 %.

The time constant is set to 0,1 s at delivery.

Settings of LT10:

Zero and span are set with straps and potentiometers, see figure.

Setting the time constant

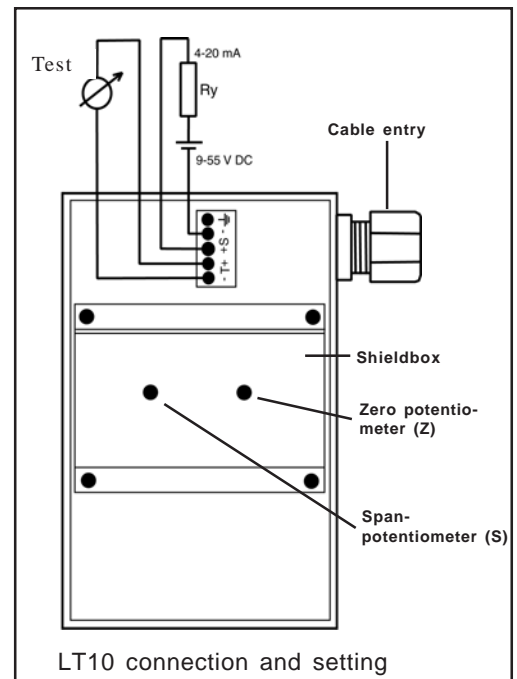
The time constant of the transmitter is selected with a jumper on the printed circuit board. The time constant can be set to 0.1 sec or 3 sec.

Use the long time constant when it is necessary to suppress noise and interference in the measuring signal.

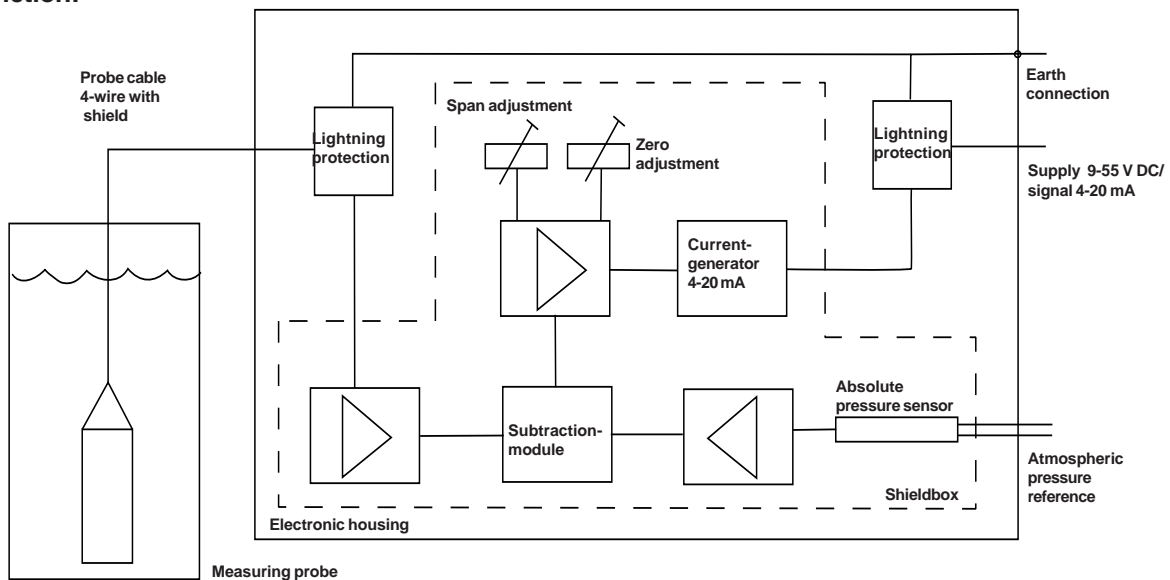
Adjustment

Upon delivery, the transmitter is adjusted according to the specific requirements from the customer. Adjustment may be needed after being repaired or as maintenance and can be done according to position 1-6 below. Note that it is only necessarily to adjust zero, according to position 4 below, at new installations.

1. Connect the transmitter to power supply.
2. Put the jumper in the position that correspond to desired calibration area, concerning zero and measure range.
3. To measure the output signal, connect a low resistance ($R < 6 \text{ ohm}$) amperemeter to the test terminal.
4. Connect the pressure which shall constitute the *minimum* measuring value. Adjust the zero value using the screw Z until the output signal has a reading of 4.00 mA.
5. Connect the pressure which shall constitute the *maximum* measuring value. Adjust the measuring span using the screw S until the output signal has a reading of 20.00 mA.
6. Repeat position 4 and 5 at least once because zero and span slightly depends on each other.



Function:



Technical data LT10

Type:	Electronic level transmitter with analogue electronics	Supply voltage:	9-55 V DC
Function:	Submersible measuring probe with separate electronic housing. Piezoresistive 2-sensor technology.	External series resistance:	R kohm = (Supply voltage -9)/20.
Operating range:	From -5% to 100% of the max. pressure range value	Series resistance dependant:	Less than +/- 0,1%
Measuring span:	Adjustable from 15% to 100% of the max. pressure range value	Supply voltage dependant:	Less than +/- 0,1 %
Zero point:	Adjustable from -5% to 100% of the max. pressure range value	Temperature dependance:	In temperature range 0-55 °C, at max. measuring range: Zero point +/-0,01% per °C. Span +/-0,01% per °C.
Overloading:		Long term stability:	Less than 0,1 % per year.
	35 kPa: Max 250 kPa	Repeatability:	Less than +/- 0,1 % of measuring span.
	100/200 kPa: Max 500 kPa	Deviation:	Less than +/- 0,2 % of measuring span. (Including non-linearities, hysteresis and repeatability)
Material:		Installation:	See text.
	Diaphragm: Hastelloy C-276	Electrical connection:	Internal terminal block.
	Related parts: Stainless steel 1.4435	Max wire area:	2,5 mm ²
	Electronic housing: Casted alloy with polyuretan paint (green).	Cable entry:	Pg11 for 5-12 mm round cable.
Probe cable:	Helukabel TPE 4x0,5, shielded, polyuretan (black).	Protection class:	IP68 for measuring probe and IP65 for electronic housing.
Ambient temperature:	-20 to +80 °C (-4 to +176°F)	Electrical safety:	Meets the EN60204-1
Time constant:	Switchable between 0,1 s (as delivered) and 3 s	Electrical interference:	Meets the EN61326-1-2-3
Media temperature:	Max +80 °C. (+176°F)	Weight:	Approximately 1500 g
Output signal:	4-20 mA, two-wire connection. Signal proportional to the level. Max current at overload 25 mA.	Lightning protection:	Class 1 testing according to IEC61643-1. 5kA (10/350 uS).