Level Transmitter LT10

Electronic submersible level transmitter for level measurement in liquids.

Electronic transmitter with submersible measuring probe in stainless steel for level measurement in vessels where pressure connection in the bottom is not possible or desirable. For example 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 be easily changed.

Lightning protected.
Meets the demands for Class 1 testing according to IEC61643-1, 5 kA (10/350 uS).
This means that the transmitter can withstand a lightning hit close to the transmitters signal/ supply cables.

EMC proof construction.

Media temperatures up to 80°C (176°F).

New piezoresistive sensor technology.
Reduces temperature dependance and deviation.

Simple maintenance and calibration.
All adjustments are done in the electronic housing.
(No adjustments are done in the measuring probe.)

CE

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.

Kråketorpsgatan 10 C,
SE-431 53 MÖLNDAL.
Tfn +46 (0)31 23 54 80
Fax +46 (0)31 22 40 83.

EUROTHERM DANMARK A/S
Generatorvej 8D 1, TV,
DK-2730 HERLEV.
Tfn +45 70 23 46 70
Fax +45 70 23 46 60.

Pasteursvej 1,
DK-8600 SILKEBORG.
Tfn +45 70 23 46 70
Fax +45 70 23 46 60.

EUROTHERM AS
Postboks 227,
N-1326 LYSAKER.
Vollsveien 13 D,
Tfn +47 67 59 21 70
Fax +47 67 11 83 01.

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

Order codes

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

LT10 x x - x x x x

	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: In production during 2002

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, for exampel pump pits.
LT10 is constructed with a innovative 2-sensor technology.
LT10 has a submersible measuring probe with diameter 31 mm. 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 cable is connected to the electronic housing where all electronics are placed.
Connection of signal/supply cables are done in the electronic housing.
LT10 is equipped with the best possible protection against EMC and lightning.

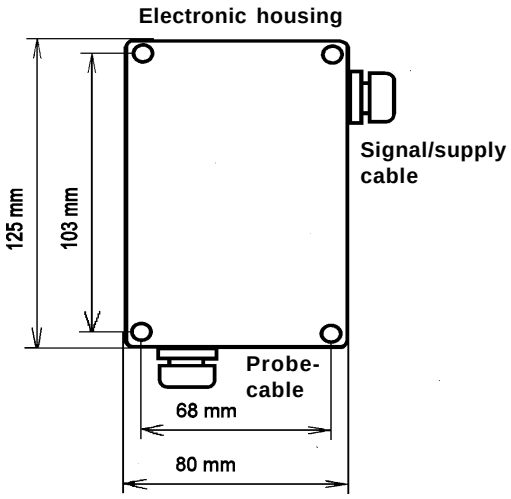
Function

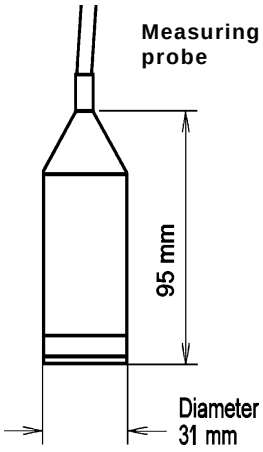
LT10 measuring probe measures the liquid level with a piezoresistive absolute pressure sensor connected to the diaphragm. This level will then fluctuate with the atmospheric pressure variation. To compensate for this variation there is another absolute pressure sensor, placed in the electronic housing and connected to the surronding 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 faults because of plugging or condensation.
The probe cable is also easier to lenghten/shorten for the user.

Attentions

Never place the electronic housing 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 submerse 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 that the cable entry for the probe cable is directed downwards.

Outline





Connection and adjustment

The signal/supply cable is 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 straps, 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 straps.

If the transmitter is standard calibrated at delivery the adjustment possibilities are (without changing strap 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.

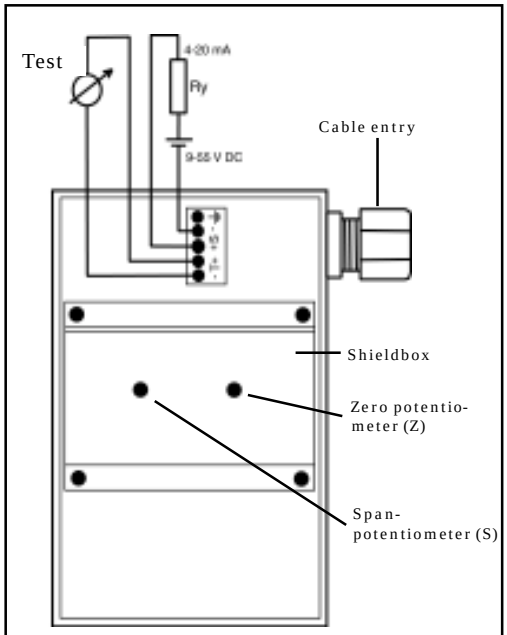
Setting the time constant

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

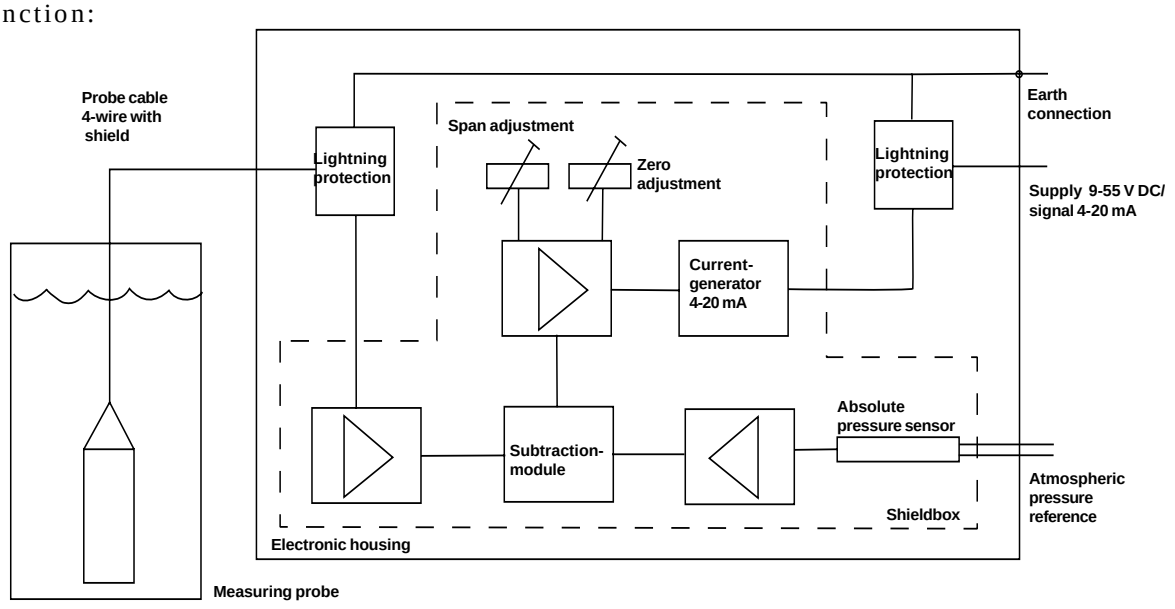
Upon delivery, the transmitter is adjusted according to the specific requirements from the customer. Adjustment may be needed after beeing repaired or as maintenance and can be done according to position 1-6 below. Note that it is only necessarily to adjust zero, according to position 4 below, at new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

1. Connect the transmitter to power supply.
2. Put the strap in the position that correspond to desired calibration area, concering zero and measure range.
3. To measure the output signal, connect a low resistance (R< 6 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.



LT10 connection and setting

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 ºC, at max. measuring range: Zero point +/-0,01% per ºC. Span +/-0,01% per ºC.
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 mm²
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 ºC (-4 to +176ºF)	**Electrical safety:**	Meets the EN60204-1
Time constant:	Switchable between 0,1 s (as delivered) and 3 s	**Electrical interference:**	Meets the EN50081-1/2 and EN50082-1/2
Media temperature:	Max +80 ºC. (+176ºF)	**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).

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