

Level transmitter LT60FA

Submersible transmitter for level measurement in liquids



invensys®

EUROTHERM®



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

- Analogue electronics.
- Accuracy 0,35 % (option 0,2%).
- Embossed diaphragm, insensitive to particles and contact. Can easily be cleaned without deformation.
- Fixed measurement ranges.
- Withstands media temperatures up to 80 °C continuously.
- Completely casted electronics for highest possible reliability.
- Lightning protected (option). Fulfills the demands for Class 1 testing according to IEC61643-1, 5 kA (10/350 uS). This means that the transmitter can withstand a stroke of lightning close to the supply/signal cables.
- Stainless steel IP68 measurement probe with a rugged Hastelloy C 276 diaphragm (others on request).
- Well tested and approved for CE (EMC and PED).

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Types and order codes:

Order codes for different configurations of the transmitter can be found in the table below.

LT60x x x - x x x x

	Description	Suffix	Figure 1	Figure 2	Figure 3	Figure 4		
Electronics	Fixed analogue	FA						
	Lightning protection	FAL						
Diaphragm	Hastelloy C-276		4					
	Stainless steel 316L		3					
Connection	Submersible probe			0				
Span min.-max.	3,5 mH ₂ O (4°C)				1			Standard
	5 mH ₂ O (4°C)				2			On req.
	10 mH ₂ O (4°C)				3			Standard
	20 mH ₂ O (4°C)				4			Standard
	50 mH ₂ O (4°C)				5			On req.
	100 mH ₂ O (4°C)				6			On req.
Design	Atmospheric pressure					0		
Filling oil	Siliconoil						None	
Accessories	Different lenght of the cable							state m
	Threaded top G 3/4"						G	

Ordering example

Lightning protected level transmitter with submersible measuring probe, 10 m cable and range 0-10 mH₂O will have the order code: **LT60FAL-4030**

Description

LT60FA is a level transmitter for applications where pressure connection in the bottom of the vessel is not possible or desirable, for example pump pits. LT60FA consists of a 31 mm diameter measurement probe. The probe has a Hastelloy C-276 measuring diaphragm for highest corrosion resistance (other material as options). The probe is suspended in its connection cable. Standard length for the probe cable is for range 1, 2 and 3 10 m, for range 4 20 m, range 5 50 m and for range 6 100 m, but can by request be delivered in length up to 1000 m. Connection of the probe cable can be done in a connection box, BOX100 that can be delivered as an accessory. This box is equipped with an appropriate connection for the probe cable atmospheric vent tube. Its also possible to equip this box with a local display. LT60FA can as an option be delivered with a good lightning protection (see next page for description).

Function

LT60FA has a piezoresistive sensor connected to the media by means of a diaphragm and a capillary tube. The media pressure acts on the diaphragm and is transferred to the sensor through a pressure intermediate oil. Since this oil completely fills the volume between the diaphragm and the sensor the diaphragm movement is very small when the pressure changes. Since the diaphragm are embossed to the surface underneath it is very insensitive to particles and contact. The capillary tube protects the sensor from high overloads because of short pressure shocks. To obtain atmospheric pressure on the back side of the sensor (for reference pressure) it is connected to the surrounding through a capillary tube inside the probe cable. LT60FA have analogue electronics, which communicate with the outside world with 4 to 20 mA. The electronics measure and converts the output signal from the pressure dependent sensor bridge to a 4-20 mA output signal.

Lightning protection

As an option LT60FA can be equipped with lightning protection. The transmitter will then have the code LT60FAL where L indicates "Lightning protected". The lightning protection is built in at the factory. No external changes or external components are needed. This option must be made by order, it can not be built in afterwards. The protection is designed to withstand a lightning stroke near the probe and connection cables but can not withstand a direct stroke. The protection is designed to meet the demands for Class 1 testing according to IEC61643-1 5 kA (10/350 uS). This protection is normally enough in most applications. In specially exposed installations, where there is high risk for direct strokes, the protection ought to be reinforced. The lightning protection is built up as a three step protection. The pulse that enters the transmitter is caught by two varistors, three transient protection diodes and a double surge arrester. The probe cables shield must be

appropriately grounded for the protection to fulfill its purpose.

Approvals

LT60FA is CE approved according to the EU directives for pressure equipment, PED, and EMC. The pressure intermediate oil is a FDA approved silicon oil.

Connection box

A specially designed connection box can be delivered as an accessory. The box is equipped with cable glands and terminals

for connection of the probe cable and the signal/supply cable. The box can also be equipped with a local display. The box is equipped with an appropriate connection for the probe cable atmospheric vent tube. This connection does not affect the ingress protection of the box. Protection class IP67. The vent connection is design to prevent high pressure water from, for example cleaners, to enter the vent or the box.

Display

The box can be equipped with a local display. The display can show the the signal in optional engineering units, for example mWc or mH2O. Unit and limits is made to order. The display is connected in series with the signal/supply cable and is feed by the current loop.

Connection and adjustment

Connection

The probe cables consists of 2 wires, shield and a vent tube. The wires are colour marked:

White	Signal/supply +
Brown	Signal/supply -
Shield	Ground
Vent tube	Atmosphere

On the Vent tube there is a Fluid filter mounted to prevent moisture and water to enter.

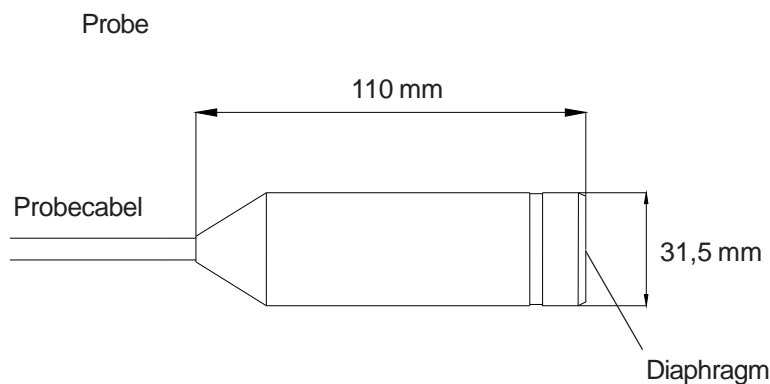
Size

Probe size:	
Diameter	31 mm
Lenght	110 mm

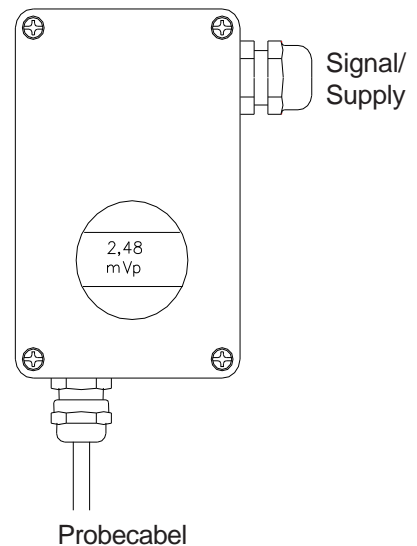
Cable:	
Lenght (standard)	
for range 1, 2, 3	10 m
range 4	20 m
range 5	50 m
range 6	100 m
(option up to 60 m)	
Diameter	6 mm
Area	0,5 mm ²
Vent tube (diam.)	2,3 mm

To consider

Don't expose the diaphragm to unnecessary damage (even though its very robust and insensitive). Dont descend the probe so that it stands on the bottom of the vessel. Highest media temperature is +80°C. Make sure that the vent tube is connected to the surrounding atmosphere without the risk for plugging. Make sure that the luid filter always is mounted. Fasten the probe appropriately if the media is turbulent or flowing. As an option the probe can be delivered with a threaded, G3/4" top for fastening in a pipe etc.



BOX100 (accessory)



Technical data LT60FA:

Type:	Electronic submersible level transmitter with analogue electronics	Series resistance:	$R_{kohm} = (Supply\ voltage - 8)/20$.
Function:	Directly connected transmitter with piezoresistive sensor	Series resistance dependance:	Better than +/- 0,1%
Operating range:	From 0% to 100% of upper sensorlimit	Supply voltage dependance:	Better than +/- 0,1%
Span:	Fixed ranges see page 2	Temperature dependance:	From 0 to 80 degrees C.
Zero:	0 mH2O fixed (4 mA+/-0,35%)	Zero:	Max +/-0,01% per degree C
Overload:	3,5 mH2O: Max 25 mH2O	Span:	Max +/-0,01% per degree C
	5 mH2O: Max 40 mH2O	Long time stability:	Better than 0,08 % per year.
	10 mH2O: Max 40 mH2O	Vibration dependance:	
	20 mH2O: Max 60 mH2O	Perpendicular to the diaphragm:	Max +0,3 kPa/G
	50 mH2O: Max 300 mH2O	Parallell to the diaphragm:	Max +0,02 kPa/G
	100 mH2O: Max 300 mH2O	Repeatability:	Better than +/- 0,1% of max range.
Material:	Diaphragm: Hastelloy C-276/Stainless steel 316L (certain coatings on request)	Accuracy:	Better than +/- 0,35% of max range (including nonlinearity, hysteresis and repeatability).*1
	Other media touched parts: Stainless steel SS2353	Electrical connection:	Lose wires
	Cable: Polyurethane	Wire area:	0,5 mm ²
Ambient temperature:	-20 to +80 degrees C	Encapsulation:	IP68
Damping:	1 s fixed	Electrical safety:	According to EN 60204-1
Media temperature:	Max 80 degrees C	EMC:	According to EN 61326-1-2-3
Output:	4-20 mA, two wire connection, signal proportional to the pressure. Max current at overload 28 mA.	PED:	According to 97/23/EG
Supply:	8-36 V DC	Lightning protection (option):	Class 1 testing according to IEC61643-1. 5kA (10/350 uS).
Filling liquid:	AK100, food approved siliconoil (FDA approval)	Weight:	600 g including 10 m cable.

*1 Option accuracy 0,2%