Data sheet DS/LST100-EN

LST100
Ultrasonic level transmitter for upstream oil and gas

Accurately track and measure the most expensive consumable on your site – chemicals.

Measurement made easy

Features

Keep track of your chemical usage and stock
- Track chemical use
- Monitor chemical stock levels
- Remote access with Totalflow RTU

Designed for use in chemical applications
- FM approved for Zone 1 Div 2 without barrier
- FM approved for Zone 1 Div 1 with a barrier
- Corrosion resistant

Ultra-low power consumption
- Designed for use in battery and solar applications
- Power consumption not dependent on measurement
- Low power consumption reduces cost of ownership

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Introduction

The LST100 is an ultrasonic level transmitter capable of measuring the liquid level of applications up to 10 m (30 ft.). The transmitter has a single 1 to 5 V DC analog output with RS485 digital communications. The transmitter is fitted to the top of a tank, facing down towards the material being measured.

The transmitter's microprocessor simultaneously fires an electronic pulse at the transducer and starts a timer. The transducer converts the electronic pulse to an acoustic pulse and directs it at the surface of the material being measured. When the acoustic pulse contacts the surface of the material, it is reflected back to the transducer. The transducer converts the reflected pulse to an electronic pulse and sends it to the microprocessor, which then stops the timer and determines the signal's 'time-of-flight'. By comparing the speed of sound through air with the 'time-of-flight' of the pulse, the microprocessor accurately determines the level in the tank. Powerful software removes false echoes from the signal and electronic filters remove ambient noise.

Designed for solar or battery power

The LST100 is designed to operate from a 12 V solar / battery power source.

- The instrument remains fully functional on voltages as low as 9 V, enabling it to operate seamlessly, even when batteries are running low. It is further protected from false measurements by ensuring an error state is entered with appropriate alarms. Thanks to this technology, you can trust the accuracy of the LST100 output.
- The LST100's output does not limit the power consumption to the current output as most instruments do. This means that the LST100 operates at the equivalent power consumption of a 24 V instrument at 4 mA.
- Low power consumption enables the maximum amount of instruments to run on either a solar panel or a battery power source. Reduced power consumption results in a lower cost of ownership.

Fig. 1: Solar powered level application

Reliable measurement, all the way to the top of the tank

Ultrasonic level transmitters usually have a dead zone where no measurement is possible. The LST100 is designed to enable reliable readings all the way to the top of the tank.

- The LST100, with its class-leading blanking system, can provide a highly accurate measurement to within 75 mm (3 in.) of the top of the tank when used with an optional mounting bracket.
- Most instruments would lose the measurement when it reaches the blanking distance, but the LST100 can reliably detect a ‘full tank’ condition. When a full tank is detected, an alarm is logged, and the output remains at the maximum level output.

Easy installation and configuration

The LST100 is designed to get you up and running in minutes.

- Install the LST100 quickly using the specially-designed mounting bracket.
- Configure the LST100 using the quick-start menu structure that guides you through the most important steps needed to set up a functional level measurement.
- If you have multiple tanks of the same shape and size in one location, you can easily duplicate the setup of one LST100 to an entire site. The ability to download and upload a configuration makes large scale installations a snap.

Fig. 2: LST100 mounted using the mounting bracket

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Non-contact measurement means no maintenance

ABB ultrasonic level instruments have no moving parts so nothing ever wears out – you get a maintenance-free device that delivers the highest levels of reliability throughout its operational life.

The advanced sensor design has leading beam angle and sensitivity resulting in the most reliable level instrument on today's market – even during changing seasons, high humidity conditions or flooding; the LST100 will not let you down.

Best-in-class accuracy

The LST100 includes temperature compensation to ensure class-leading accuracy at all temperatures. The speed of sound changes when temperature changes but the LST100 measures temperature and compensates automatically for changing conditions.

An easy-to-use, 2-point calibration enables the best possible accuracy in your application. By calibrating the measurement to two known good points, you'll be sure to get the most out of your instrument.

Pay only for the functions you need

Most products on the market are designed to be used in a large variety of conditions. This results in expensive instruments with more functionality than is needed for most applications.

For cost-sensitive applications (for example, chemical tank level measurement), this means most instruments available today are not cost-effective. With LST100, you pay only for the functionality you need.

Specification

Measurement

Range
0.85 to 20 ft / 1.15 to 30 ft

Beam angle (at –3dB)
5° (20 ft version) / 7° (30 ft version)

Accuracy
±1/2 in. or 0.25% of full span (largest of the two)

Repeatability
±0.25 % of measurement range

Mechanical data

Housing material
PVDF

Dimensions
Height – 122 mm (4.8 in.) minimum (excluding glands)
Diameter – 78 mm (3.07 in.) – excluding glands

Weight
1.0 kg (2.2 lb)

Cable entry type
One 1/2 in. threaded bore for cable gland, directly on housing
Supplied with 1 x 1/2 in. NPT cable gland

Electrical data

Terminals
9 terminals for power supply and communication purposes accommodating wire cross sections of up to 1 in. (14 AWG)

Power supply
3 terminals for power supply (PE/+/–): The LST100 operates from 9 to 16 V DC and is protected against reversed polarity.

Analog output (1 to 5 V)
2 terminals for analog output (+/–): 1 to 5 V related to level, or full compensation for temperature effects

RS485 communication
2 terminals for RS485 communication (+/–): RS485 communication for setting parameters, monitoring measurement results and diagnostics messages

Option for connecting ground
2 terminals as a jumper switch for ground earth. Connection the transducer to ground is optional and is done using this jumper.

Environmental data

Hazardous area approvals
Intrinsic Safety type of protection:
Approval according to FM US and Canada
IS Class 1 Div 1/GP ABCD- CL II/ DIV 1/ GP EFG, CL 1, Zone 1,
'Non Incentive' type of protection:
Approval according to FM US and Canada
NI Class 1 Div 2/GP ABCD- DIP CL II/ DIV 2/ GP EFG, CL 1, Zone 2, AExnA IIC T6; IP66/67.

Electromagnetic compatibility (EMC)
Meets requirements of EN 61326
Overvoltage strength (with surge protection): 2 kV
(in acc. with IEC 61000-4-5)

Temperature
–40 to 185 °F, according to EN 60068-2-14, 1K/min, 100 cycles

Humidity
Relative humidity: Up to 100 %
Condensation, icing: Not permissible

Pressure
Measurement functional from –4 to 44 psi (–0.25 to 3.0 bar)

Vibration resistance
Acceleration up to 1 g at frequencies of up to 2,000 Hz (according to IEC 60068-2-64).

Humid and dusty atmospheres (degree of protection)
LST100 is dust and sand-proof and protected against immersion effects as defined by EN 60529 (1989) to IP 66/67 or by NEMA 4X.

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Ordering information

Ultrasonic level transmitter	ab	cd	efg	hi	jk	lm	no
	LST100/						
Explosion protection certification							
cFMus energy limited, Class 1 Division 2		F3					
cFMus intrinsically safe Class 1 Division 1 including energy limited (Division 2)		F4					
Sensor type and range							
Corrosion-resistant transducer, range 10 m (approx. 30 ft)			C10				
Corrosion-resistant transducer, range 6 m (approx. 20 ft)			C06				
Process connection type							
1½ in. universal thread (NPT and BSP compatible)				U5			
1½ in. universal thread (NPT and BSP compatible) including 4 in. mounting bracket				U6			
2 in. universal thread (NPT and BSP compatible)				U2			
Housing material / cable glands							
PVDF / 1 piece 1/2 in. NPT, cable gland mounted					N1		
Power supply							
9 to 16 V DC						B1	
Output signal							
RS485 digital communication including 1 to 5 V analog output							R1

Notes

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