

External Ultrasonic Liquid Level Meter



Description

The **External Ultrasonic Liquid Level Meter** applies advanced signal processing technology and high-speed signal processor. It overcomes the obstacle of tank wall thickness and ultimately achieves non-contact measurement of liquid height in hermetic tanks. The ultrasonic sensor (probe) is designed to be mounted at the bottom of the tank externally without the need of drilling any holes on the tank so that easy assembly is, hence, realized and the measurement will not interrupt the normal operation of the liquid tank. It is suitable to acquire accurate liquid level measurement for high pressure hermetically tank containing toxic, strong acid, strong alkali and various kinds of pure liquids. Note that the meter has no special requirement of medium or material of tank, and it is explosion proof. Therefore it has wide application under various conditions.



Features

- Non contact measurement of liquid level
- Self calibration
- Infrared debugging during working
- Self test
- One-key recovery
- On-site display and remote transmitting

Working Principle

The system kernel of the meter is based on ultrasonic processing technology which can achieve super high speed digital signal processing. After processing the measurement, result of liquid level is precise enough so that it is unnecessary to further apply CPU analyzing, comparing or judging. Hence the results are directly transmitted to NVRAM to be stored and displayed. Additionally, the meter can output 4~20mA standard signal or transmit measurement results to computer (or secondary meter) via RS-485 port.

As shown in diagram I, during the process of measuring liquid level, the modulated acoustic signal is transmitted from the probe and echoed from the liquid surface(The echoed signal is detected by probe.). The echoed signal, after going through preprocessing - signal processing - postprocessing in the CPU, provides the accurate reflection time t , which is used to calculate the liquid level through a build-in mathematical model:

$$h = act/2$$

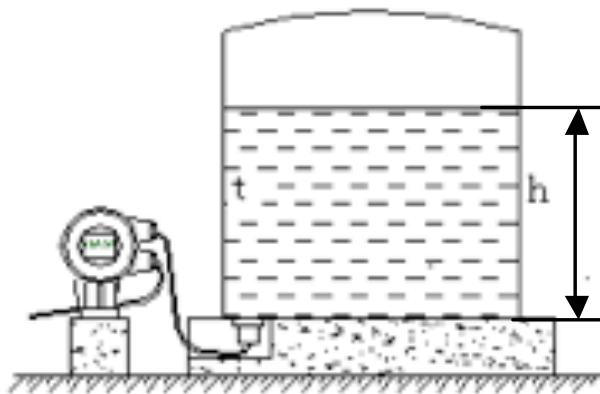
h : Liquid height

a : Correction factor

c : Ultrasound velocity during transmitting in the liquid

t : Time duration between transmission and reception of the ultrasound

signal



Parameters

Measuring range	3m,5m,10m,20m,30m
Display resolution	1mm
Short time repetition rate	1mm
Measuring error	1% _r ~1% (Excessive wall thickness and instability of pressure and temperature may affect measurement precision.)
Span shift	±10 m
Current output	4~20mA, Max load 750Ω
Communication interface	RS-485, IrDA
Ambient temperature for operation panel	-50℃~+70℃ (-58°F -158°F)
Ambient temperature for ultrasonic probe	-50℃~+120℃ (-58°F -248°F) (Probe with wider temperature range is available)
Ambient humidity	15%~100%RH
Explosion proof mark	Exd II CT6
Housing ingress protection	IP 66
Liquid level display	6 digits OLED display (Unit: m)

Application Requirement

1. Medium purity degree

- Liquid should not contain densed foam.
- There should not be excessive suspension in the liquid, such as crystallized particles.
- There should not be excessive precipitation in the tank.

2. Viscosity of medium

When the dynamic viscosity is less than 10mPa•S, the meter can operate normally; If the dynamic viscosity is between 10mPa•S and 30mPa•S, the measuring range of the meter may decrease; the meter can not operate if the dynamic viscosity is above 30mPa•S.

Note: An increase of temperature will result in the decrease of viscosity. Since temperature variation has more obvious effect on most of liquids with high viscosity, liquid temperature should be taken into consideration when high viscosity liquid is being measured.

3. Requirement for target tank

- Material: The tank wall where probe is to be installed should be made of hard material which can well transmit signal. Typical tank materials are carbon steel, stainless steel, various kinds of hard metal, glass fiber-reinforced plastics, epikote, ceramics, glass, ebonite and other composite materials and so on. If the tank wall is made of multilayers of different materials, the innerlayers should be compact without bubble or air. Typical multi-layer structures are: lining of vulcanized ebonite, epikote, stainless steel and titanium for instance. Both the internal and external tank walls should be smooth.
- Tank wall thickness: 2~70mm
- Tank type: spherical tank, horizontal tank, vertical tank and so on.

Selection Guide

HS-2000				
	A	Non Explosion-proof		
	B	Explosion-proof		
	T	For Special Medium		
		3	3m Measuring Range	
		5	5m	
		10	10m	
		20	20m	
		30	30m	
		S	Common (Single probe: ultrasonic sensor)	
		D	Self-Calibration(Double probe: ultrasonic sensor)	
Remark	Special meter is used for measurement of special medium and also for explosion proof spot.			

E.g. HS-2000B-10-S refers to one-probe explosion proof ultrasonic liquid meter with 10-meter measuring range.

For nearly 20 years, Smagall has designed and manufactured a broad range of liquid level meters, switches, fluxgate sensor series and magnetic sensor calibrating and testing system. We design, manufacture and market the best level measurement and control instruments for petrol and hazardous chemical applications.



Our Main Customers



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