Ultrasonic Level Sensor

User Manual



1. Overview

Thank you for choosing our ultrasonic level sensor!
The instrument contains a number of patented technologies, with safety, sanitary, high precision, long life, stable and reliable, easy installation and maintenance, etc., suitable for acid, alkali, salt, anti-corrosion, high temperature and other fields.

The instrument can be connected to the display meter or various DCS,PLC systems through 4~20mA or RS485(Modbus protocol or other customized protocols), provide real-time liquid level data for industrial automation.

This instrument has the following features:

patented acoustic wave intelligent technology software can carry out intelligent echo analysis without any debugging and other special steps, this technology has the function of dynamic thinking and dynamic analysis.

Our company has the acoustic intelligent patent technology, so that the accuracy of the instrument is greatly improved, the liquid level accuracy can reach 0.3%, can resist all kinds of interference waves.

This instrument is a non-contact instrument, no direct contact with the liquid, so the failure rate is low. The instrument can be installed in a variety of ways, and the user can calibrate the instrument through this manual.

All the input and output lines of the instrument have the protection function of lightning protection and short circuit protection.

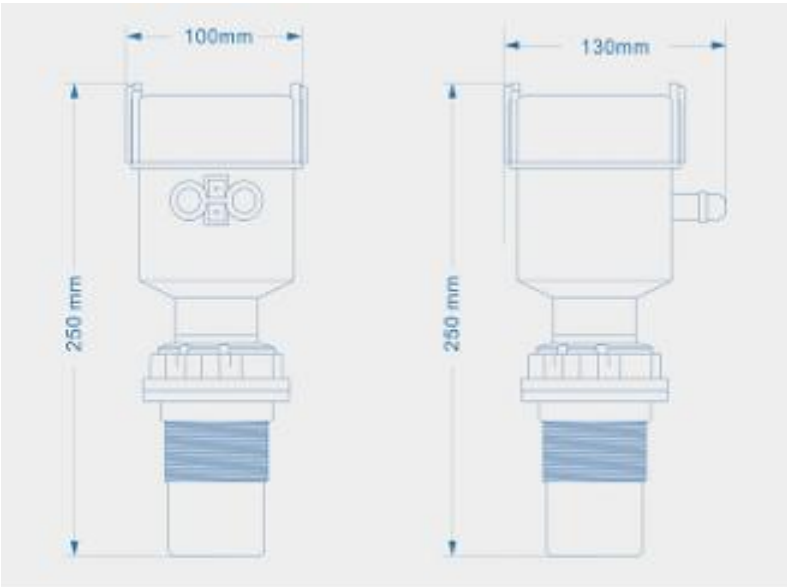
2. Technical Indicators

Measuring range: 0 ~ 15m
Blind area: 0.35m/10m; 0.5 m / 15 m
Range accuracy: 0.25%-0.5% (standard conditions)
Range resolution: 1mm
Pressure: Below 4 bar
Instrument display: with LCD display showing level & distance
Analog output: 4 ~ 20mA
Digital output: RS485, Modbus protocol or custom protocol
Power supply voltage: DC24V/AC220V, built-in lightning protection device
Ambient temperature: -20℃ ~ +60℃
Protection class: IP65

3. Instrument Installation

3.1 Overall dimensions of the instrument

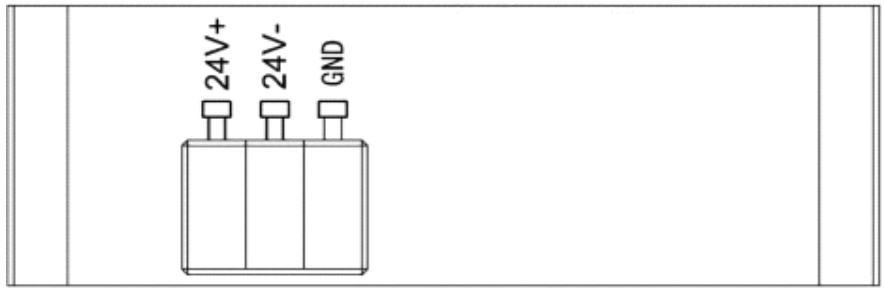
Thread of Probe:10m M60*2/G2.0, 15m M78*2

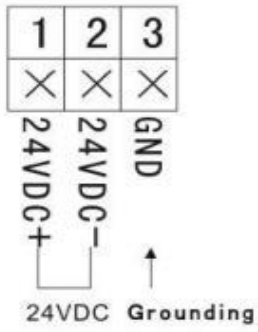


Installation:
In the open area, use bracket; closed area, use thread or flange.
Please keep perpendicular between probe and surface of liquid.

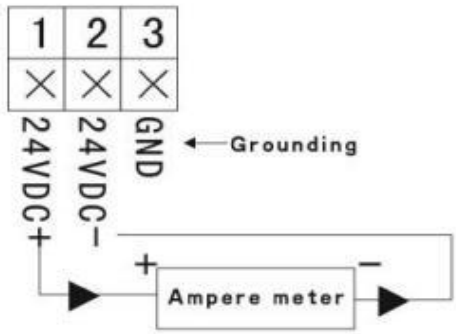
3.2 Wiring：

Two-Wire System





Wiring Diagram of Two-wire System



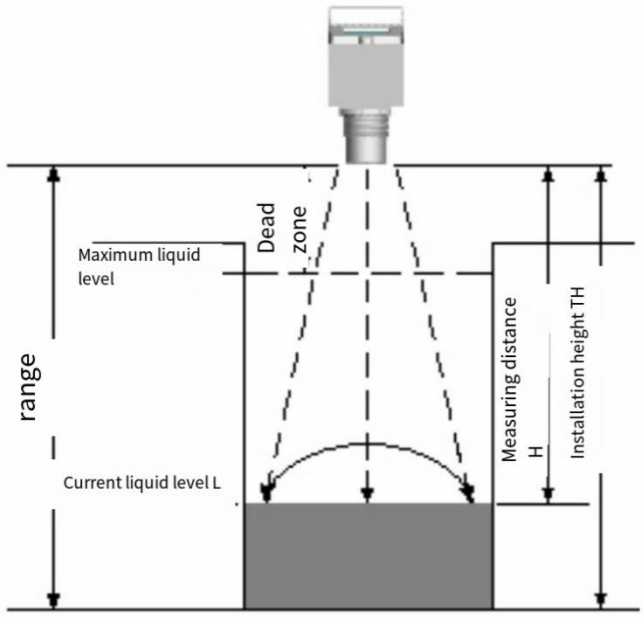
Ampere Meter Diagram of Two-wire System

Four-Wire System

1	2	3	4	5	6	7	8	9	10
×	×	×	×	×	×	×	×	×	×
RL2	CM2	RL1	CM1	B+	A-	IO-	IO+	V-	V+
↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Relay2	COM2	Relay1	COM1	485 Output		Current Output		24V DC	

Please specify 220VAC or DC24V , output signal when placing order; ; The two relays are respectively: dry contact one is the first circuit, dry contact two is the second circuit.

3.3 Parameter interpretation:



As shown above figure, the probe of the instrument sends a wave to the liquid level and reflects it back to the probe. After the probe receives the wave, the time from sending to receiving the wave is calculated, and the measuring distance H is obtained. The installation height of the instrument “TH” minus the measuring distance H will get the current liquid level “L”.
Measuring range should set a little greater than installation height “TH”.
Instrument blind area refers to the area where the instrument can not be measured near the probe, the maximum liquid level and the probe distance should be greater than the blind area, for example, the blind area is 0.3m, then the liquid level and the probe distance must be greater than 0.3m.
The probe wave is a diffusion process, that is, there is a Beam Angle, pay attention to the installation to avoid obstacles, otherwise there maybe unwanted wave affect measuring results.

3.4 Instrument Installation Rules

1) The distance from the probe launching surface to the lowest liquid level should be less than the range of the optional instrument.
2) The distance from the probe launching surface to the highest liquid level should be greater than the blind area of the optional instrument.
3) The transmitting surface of the probe should be parallel to the liquid surface.
4) The installation position should try to avoid inlet and outlet etc where medium may fluctuating.
5) If the wall of the pool or tank is not smooth, the installation position of the instrument should be more than 0.3m away from the wall of the pool or tank.
6) If the distance from the probe to the highest liquid level is less than the blind area, it is necessary to install an extension tube, the extension tube diameter is greater than 120mm, the length is 0.35m ~ 0.50m, the vertical installation, the inner wall is smooth, the hole on the tank should be greater than the inner diameter of the extension tube. Or pass the pipe to the bottom of the tank, the diameter of the pipe is greater than 80mm, and the hole at the bottom of the pipe is left to keep the liquid

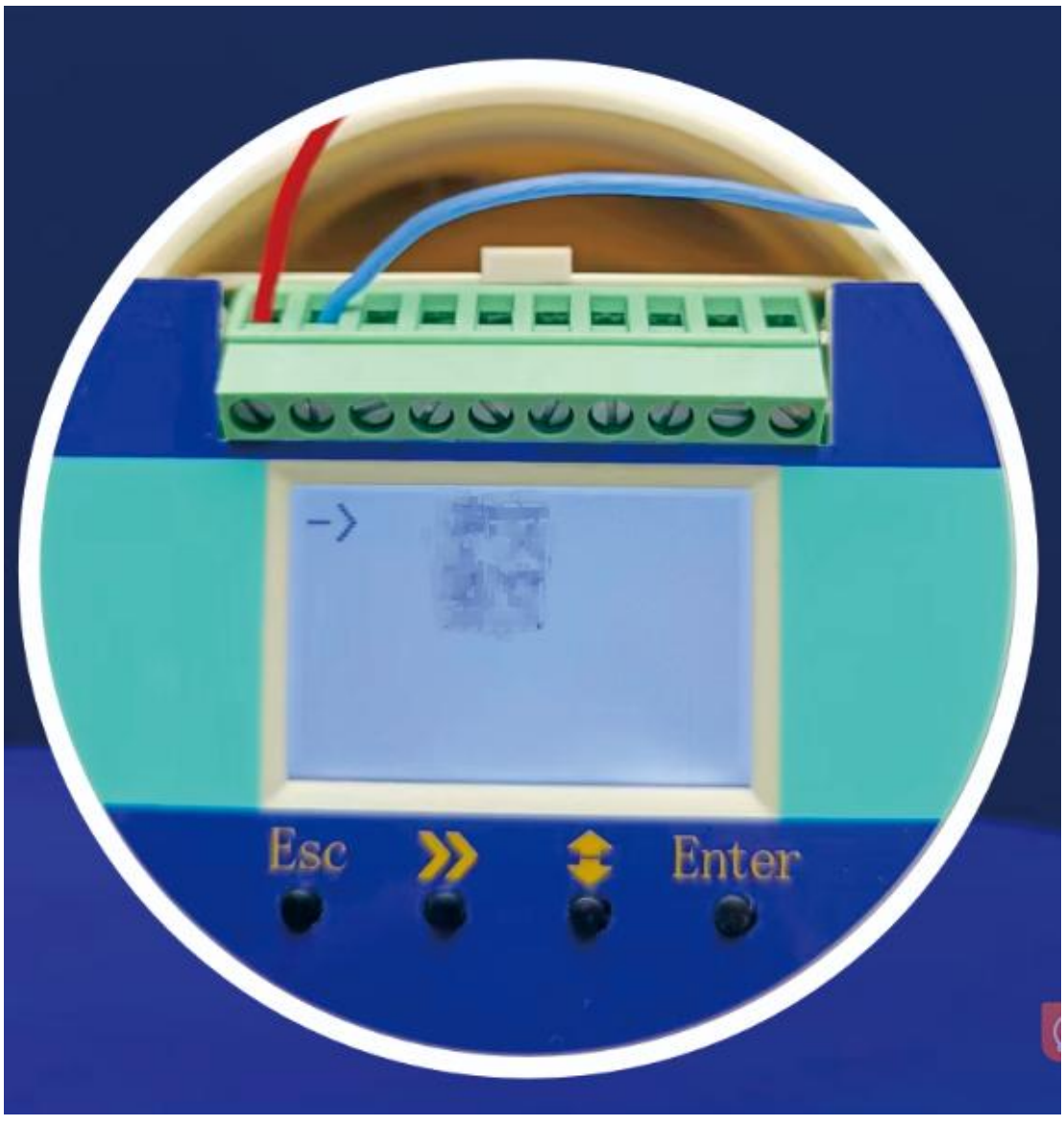
level in the extended pipe equal to that in the tank.

3.5 Installation Precautions

1) The instrument is installed outdoors. It is recommended to install a sun visor to extend the service life of the instrument..
2) Protection tube of wire and cable should be sealed right and avoid water ingression.
3) Although the instrument itself has a lightning protection device, when the instrument is used in lightning frequently area, it is recommended to extra special lightning protection device at the inlet and outlet end of the instrument.
4) If the instrument is used in a particularly hot and cold place, that is, when the ambient temperature may exceed the working requirements of the instrument, it is recommended to equip with protection.

4. Instrument Debugging

4.1 keypad description



【ESC】Button: Press【ESC】 back to previous menu.
【》】Button ： Press【》】to move to right option or up option.
【↕】Button： Press 【↕】 to get a value from 0 to 9 circularly or move to down option
【Enter】Button: Press【Enter】access to menu or Press【Enter】to save the setting.

4.2 Parameter setting

4.2.1

For 2-wire instrument's parameters, set "Measuring Range"and "20mA" only. There is no need to set other menus. If you want to set them, please contact the manufacturer, otherwise the data maybe distorted, resulting in abnormal data.

4-wire instrument's parameter setting "Measuring Range" and "20mA Height", relay setting and communication setting are explained separately, other menus do not need to be set, if you want to set, please contact the manufacturer,otherwise the data maybe distorted, resulting in abnormal data.

4.2.2 20mA Height

Press【Enter】, 【↕】 to get 1000 which is the password;
Press【Enter】and get to User Setup;
Press【Enter】 once, 【↕】 button twice, to get to Current setup;
Press 【↕】 move to 20mA Height;
Press【Enter】and Use 【》】【↕】set to right value.

4.2.3 Measuring Range（TH）

Press【Enter】, 【↕】 to get 1000 which is the password;
Press【Enter】and get to User Setup;
Press【Enter】and get to Measuring Range;
Press【Enter】and Use 【》】【↕】set to right value.

4.2.4 Modbus Communication（Local address and baud rate Settings）

You can reset the address and baud rate of the local device as required. Do not set or

plug the serial cable when the instrument interacts with the upper computer (heat engine state)! It is best to restart the instrument after setting up! (The host computer needs to make corresponding changes to the parameter changes of the instrument)

RS485(Modbus format) Example Command line (hexadecimal) :

01 03 00 00 00 03 05 CB

Command definition (in sequence) :

01 is the instrument address (can be changed according to the actual address, the factory default is 01);

03 for the execution of the read command (function code), the user does not need to modify it;

00 00 00 03 indicates the high and low bits of the start address of the register to be read and the high and low bits of the length of the register. The user does not need to modify this part ;

05 CB is the 16-bit CRC check code before the low byte (this instrument supports the low-byte CRC check in the first 16 bits);

RS485(Modbus protocol format) received data format (hexadecimal, letters represent example data,not real data) :

01 03 06 aa aa bb bb cc cc xx xx

Data format interpretation (in sequence) :

01 is the address of the instrument (it will be changed according to the actual address, the factory default is 01);

03 indicates the read command (function code);

06 is the length of the data read (the meter reads the liquid level, distance and temperature at one time);

“aa aa “data indicates the liquid level data (16-bit unsigned integer data is divided into two 8-bit unsigned integer data, with the high byte first), and the unit is mm after decimal conversion.

“bb bb” data is distance data (16-bit unsigned shaping data is split into two 8-bit unsigned integer data, with the high byte in front), and the unit is mm after decimal conversion.

“cc cc” data is temperature (16-bit signed integer data is split into two 8-bit unsigned integer data, high byte before, pay attention to the temperature bit has a signed number, after conversion need to be calculated according to signed integer data!) After the decimal number is converted, the data needs to be divided by 10 to obtain the actual temperature, the unit is Celsius;

“xx xx “is the CRC check code after verification (this instrument supports low bytes in the first 16 bits of CRC check);

4.2.5 Relay Setting (4-wire ultrasonic)

Press【Enter】, 【↕ 】 to get 1000 which is the password;
Press【Enter】and get to User Setup;
Press【Enter】once and 【↕ 】 four times and get to relay
Press【Enter】and Relay one or Relay two setting;
Pressure 【Enter】and Use 【》】【↕ 】set to ideal condition.

Four symbols "&", "|", "N", and "∧" can be selected.
Meaning of symbols:
< : less than symbol
> : greater than symbol
& : and, indicates that both conditions must be met.
| : or, one of the two conditions can be met.
N: Only the former condition is functioned, and the latter condition is not functioned.
∧ : The former condition is the relay closed (generally used to switch on pump), and the latter condition is the relay Open (generally used to switch off pump), Mainly used for drainage and water inlet control.

4.3.1（DispMode）

Default text display currently, new feature is developing.

4.3.2 Language

This instrument supports English and Chinese, you can select the language through this setting.

Warranty Policy: The warranty period of our products is twelve months from the date of receipt of goods.

The following conditions are not covered by the free warranty:

1)The product or its parts are out of the free warranty period.
2)Hardware failure caused by the use of the environment does not meet the requirements of the product.
3)Failure or damage caused by wrong power supply or foreign objects ingress the device.
4)Faults caused by failure to operate according to the instructions and precautions written in the operating manual.
5)Faults caused by irresistible natural factors such as lightning, water fire, etc.
Failure or damage caused by unauthorized dismantling and repair or unauthorized modification or abuse.