

Kind Reminder:

Please read the user manual carefully before installation and debugging!

Caution:

If the controller is exposed to direct sunlight, its surface temperature may exceed the specified operating range, potentially reducing display visibility.

Recommendation: In environments with strong sunlight, use a sunshade or avoid direct exposure to prevent display degradation and extend the instrument's service life.

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LEFOO

Ultrasonic Liquid Level Difference Meter

User Manual

5、Common installation instructions for ultrasonic liquid level difference meter

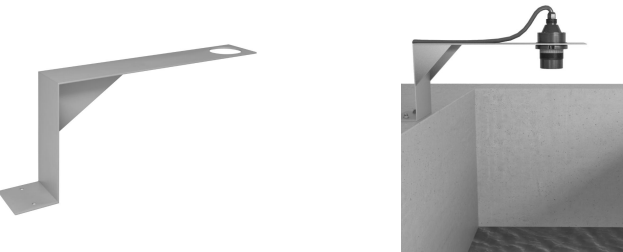
I 、 The distance between the highest liquid level in the pool and the probe surface of the instrument is greater than the blind zone of the selected instrument.

It is recommended to use an L-shaped bracket Installation method



II 、 II、 The distance between the highest liquid level in the tank and the probe surface of the instrument is less than the blind zone of the selected instrument.

It is recommended to use an Z-shaped bracket Installation method



III、 The correct installation of the ultrasonic level meter in the tank is shown in Figure 1, while the incorrect installation is shown in Figure 2.

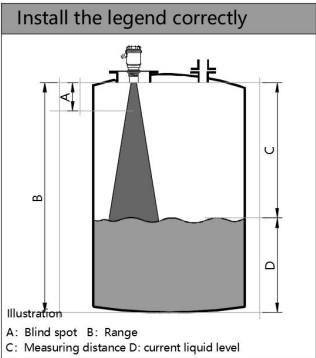


Figure 1

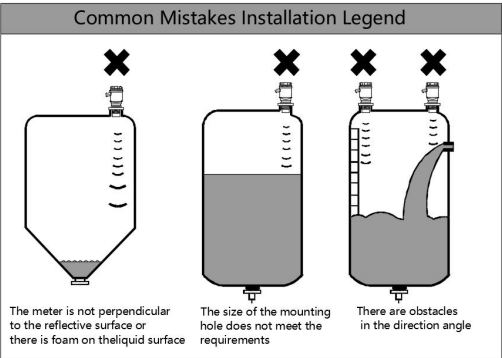


Figure 2

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1、Overview

Sincerely thank you for purchasing our company's ultrasonic liquid level gauge!

This instrument contains a number of software patent technologies, which are safe, clean, high precision, long life, stable and reliable, easy to install Easy maintenance and other features, suitable for acid, alkali, salt, anti-corrosion,high temperature and other fields.The instrument can be connected to the display meter orIn various systems,

it provides real-time liquid level data for industrial automation.The implementation standard of this instrument: GBT11828.4-2011, verification regulations: JJG971-2002. This instrument has the following characteristics:

- The circuit design selects high-quality power modules from the power supply part, selects high-end brand components, and has high and stable performance reliable, able to resist various interference waves, and can completely replace the same type of imported instruments from abroad.
- onic's intelligent technology software can perform intelligent echo analysis without any debugging and other special steps. It has the functions of dynamic thinking and dynamic analysis.
- This instrument is a non-contact instrument, not in direct contact with liquid, so the failure rate is low. The meter offers a variety of mounting In this way, the user can completely calibrate the instrument through this manual.
- All input and output lines of the instrument have protection functions against lightning and short circuit.

2、Technical indicators

Measuring range: (0 ~ 30) m (selected according to the actual measurement range)

Blind area: 0.1m

Ranging accuracy: $\pm 0.5\%$ (full range under standard conditions)

Ranging resolution: 1mm

Pressure: normal pressure

Instrument display: built-in LCD display liquid level (distance between the bottom of the pool or tank and the surface of the medium such as water)

and space height value (the distance between the probe surface of the instrument and the medium surface such as water)

Analog output: (4~20)mA/510Ω

Digital output: ModBus-RTU protocol or custom protocol

Relay output: 250AC/5A or 30VDC/2A

Power supply voltage: DC24V or AC220V

Environment temperature: -20℃ ~ +60℃

Protection level: IP65

Instrument power: <3W

Menu 2 communication settings (operation menu for on-site installation and commissioning personnel) as shown in the figure below (Figure 1)

1. Rs485: The communication address defaults to 01, the communication rate defaults to 9600, and the parity check defaults to no check. It is convenient to receive logs Used by on-site engineers during debugging.
2. Current output setting: (4-20) mA and (0-20) mA two modes, users can choose according to their needs. (4-20)mA is the common mode, 0mA or 4mA generally corresponds to 0m, and 20mA corresponds to the highest level of liquid (material).

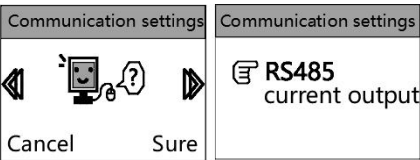


Figure 1

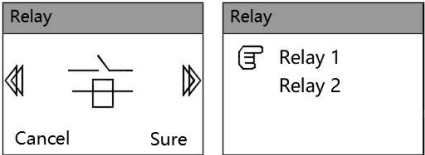


Figure 2

Menu three Relay settings: the default is off! (On-site installation and commissioning personnel operation menu) as shown below (Figure 2)

The function of relay 1 and relay 2 is that when the water level (liquid level) in the on-site pool rises or falls to a certain level, the instrument can control the water pump in the pool to start or stop by pulling in or disconnecting the relay.

I . If the depth of the pool is 6 meters, drain water when the water level reaches 4 meters, and stop when the water level reaches 1 meter! The settings are as follows: Upper limit (represents high liquid level)

Set it to 4 meters, set the lower limit (representing low liquid level) to 1 meter, action logic: open → close, control mode: double limit alarm;

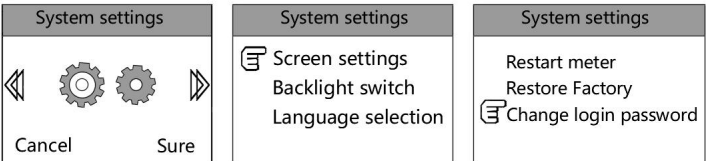
II . Water enters when the water level reaches 1 meter, and stops when the water level reaches 4 meters! The settings are as follows: Upper limit (represents high liquid level)

Set it to 4 meters, set the lower limit (representing low liquid level) to 1 meter, action logic: close→open, control mode: double limit alarm;

Menu 4 record query function is to record the power-on time of the meter

Menu 5 system settings

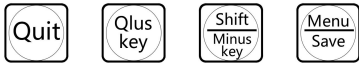
1. Set the brightness and contrast of the screen; 2. Set the backlight time of the screen; 3. Choose Chinese or English; 4 and 5. Restart the instrument and restore factory settings 6. You can set the login password to enter the menu by yourself (modification is risky! If you must modify it, please remember the password!)



Menu 6 advanced functions (dedicated menu for engineer debugging, do not enter!)

4、Instrument debugging

4.1 keyboard description



Menu\Save key: When the instrument needs to be set, press this key to enter the menu, after changing the instrument parameters, press the save key.

Plus key: scroll up the menu key or the plus key to change the size of the number.

Shift\minus key: When changing the data of different digits, press this key to shift, or scroll down to use the menu key. Escape key: After completing the required menu settings, press the Escape key to return to the main interface of the instrument.

4.2 Menu Settings

I 、Enter the menu steps:

After pressing the menu key, **** will appear on the left , The first * is flashing, press the plus key to change to 1**, Press the menu key again to enter the menu .(Figure 1)

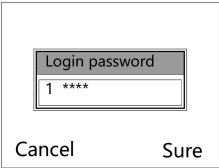


Figure 1

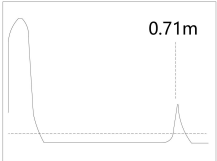


Figure 2

II. Echo mode:

When the meter is in the mode of displaying liquid level and empty height, press the shift key, and the current measurement status will appear

The following echo curve is shown in Figure 2. Press the plus key to return to the liquid level and empty height mode. (Figure 2)

Menu 1: Installation settings (operation menu for on-site installation and commissioning personnel)

(Figure 3)

1. Installation height: the position when the on-site water level and other media are zero (generally refers to the bottom of the pool or the bottom of the tank, etc.) to the probe surface of the instrumentthe vertical distance between;
2. Distance unit: m (meter), cm (centimeter), mm (millimeter) and in (inch), which can be set by users according to their needs;
3. Damping setting: automatic filtering and damping time (generally automatic filtering is enough, it is not recommended to turn off automatic filtering);
4. Transmission period: 100ms-999ms, the default is 500ms, the shorter the time, the faster the transmission speed;
5. Blind zone adjustment: the default is 10cm. If you need to modify it, it is recommended to operate it under the guidance of an engineer.

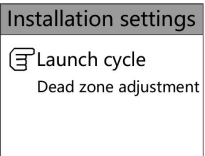
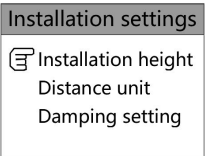
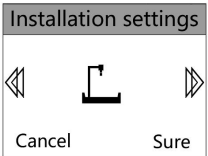
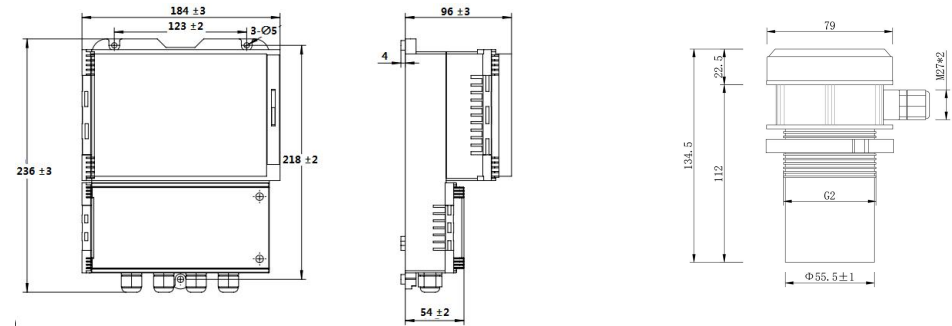


Figure 3

Instrument installation

3.1 Dimensions of the instrument

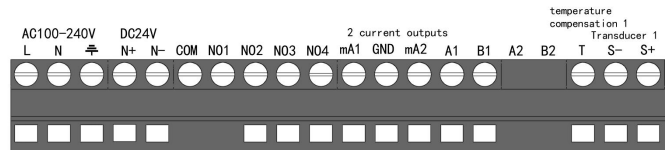


Transmitter

sensor

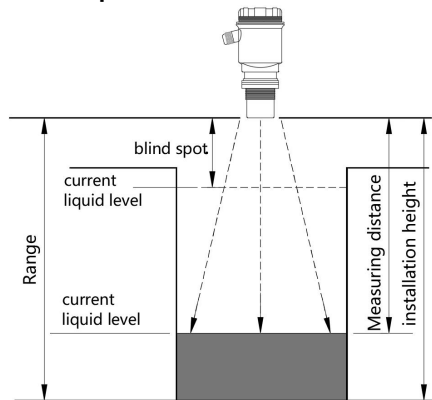
Installation method: In an open environment, the bracket installation method is generally used (keep the bracket in a horizontal position when installing). Open a round hole with a diameter of 60mm on the bracket, put the instrument probe in, and then use the nut that comes with the instrument, from bottom to top. Tighten; tanks at normal temperature and pressure are generally installed with flanges, and a round hole with a diameter of 60mm is opened in the middle of the blind plate (keep it horizontal when the blind plate is installed) or a G2 thread is opened to fix the ultrasonic liquid level difference meter.

3.2 The instrument terminals are as shown below



- I . L and N on the circuit board are connected to the AC220V on site;
- II . The grounding mark port on the circuit board needs to be well connected to the on-site earth to prevent static electricity and surges;
- III. IN+, IN- (DC24V) on the circuit board: connect to the external DC power supply DC (12-28)V, power 3W, pay attention to the positive and negative poles when wiring;
- IV. mA1 and GND on the circuit board: they are the first (4-20) mA output. Pay attention to the positive and negative poles when wiring;
- V . COM and NO1 on the circuit board correspond to relay 1 in the menu, and COM and NO2 on the circuit board correspond to relay 2 in the menu;
- VI. A1 and B1 on the circuit board: represent the first Rs485 output, A1 is the positive pole and B1 is the negative pole;
- VII. T on the circuit board: is the red cable connected to the probe wire;
- S- on the circuit board: is the shielded wire of the black heat shrink tube connected to the probe wire
- S+ on the circuit board: It is the white high-frequency cable connected to the probe wire.

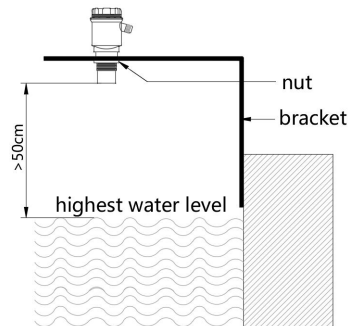
3.3 Meaning of installation parameters



As shown in the figure, the measurement method of the instrument: start timing from the sending sound wave pulse of the instrument to the time reflected from the surface of the receiving medium
Until the pulse, multiply half of this time by the speed of sound, which is the measurement distance,
(installation height – measurement distance = current liquid level);
I . The installation height should be less than the measuring range;
II . The blind area of the instrument refers to the area where the instrument cannot measure near the probe.
The distance between the highest liquid level on site and the probe should be greater than the blind area;
III. The wave sent by the probe is in the shape of a trumpet, that is, there is a direction angle. When installing, try to choose an open space. The lower part of the instrument
There should be no other obstacles, and the place below the meter should avoid places where the liquid level fluctuates violently, such as the inlet and outlet.

3.4 Precautions for instrument installation

(1) The distance from the probe emitting surface to the highest liquid level should be greater than the blind area of the purchased instrument.



(2) If the liquid level in the pool or tank fluctuates violently and it is inconvenient to install a seeding tube, please purchase a range that is the pool height orAn ultrasonic liquid level gauge that is 2.5 times the height of the filling.

3) If the distance from the probe emitting surface to the highest liquid level is less than the blind area of the purchased instrument, an extension tube is required, and the diameter of the extension tube is $\geq 150\text{mm}$, length 0.2m-0.5m, vertical installation, smooth inner wall, the hole on the tank body should be larger than the inner diameter of the extension pipe.

(Figure 1)

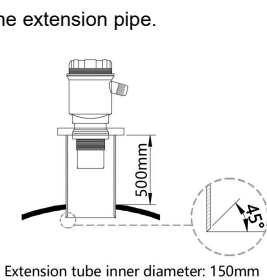


Figure 1

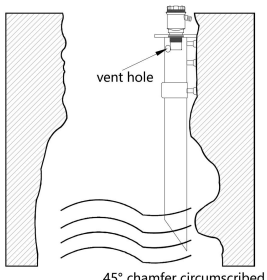


Figure 2

4) If the wall of the pool or tank is uneven, there are other obstacles, the water surface fluctuates violently, and there are foams or other impurities on the water surface, the meter needs to follow the guide pipe, or connect the pipe to the bottom of the pool or tank. Leave a gap to make the liquid level in the extension pipe equal to the liquid level in the pool or tank. On the extension pipe, install a few small holes near the probe so that the air in the pipe can communicate with the outside of the pipe! (Figure 2)

5) For flange installation on tanks at normal temperature and pressure, the probe surface of the instrument is best exposed in the tank, as shown in Figure 3; if it is not possible in the field environment, the diameter of the pipe fixing the flange is shown in Figure 4 and Figure 5, and the length h is between 100mm-300mm The larger the h value, the larger the corresponding d value.

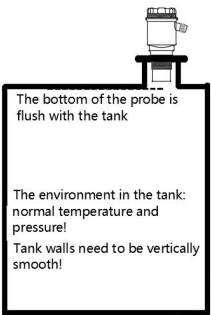


Figure 3

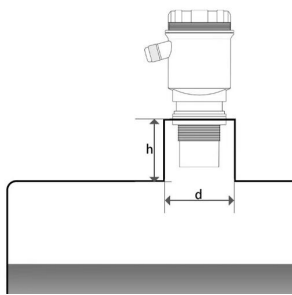


Figure 4

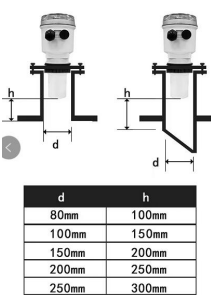


Figure 5

d	h
80mm	100mm
100mm	150mm
150mm	200mm
200mm	250mm
250mm	300mm

6) When the instrument is used in a particularly hot or cold place, that is, when the ambient temperature may exceed the working requirements of the instrument, it is recommended to Add anti-high and low temperature devices around the liquid level gauge.