

**Kind Reminder:**

*Please read the user manual carefully before  
installation and debugging!*

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**LEFOO** 

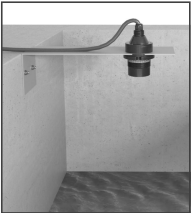
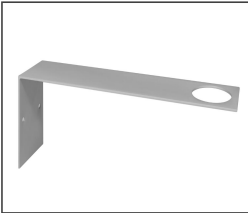
# ***Ultrasonic Level Meter |***

## ***User Manual |***

5、Common installation instructions for ultrasonic level meters

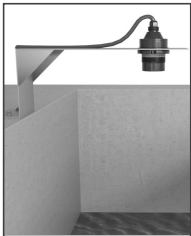
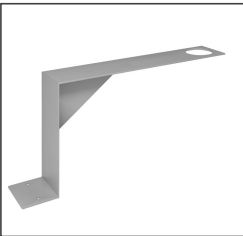
I 、The distance between the highest liquid level in the tank and the probe surface of the instrument is greater than the blind zone of the selected instrument.

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



II 、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.

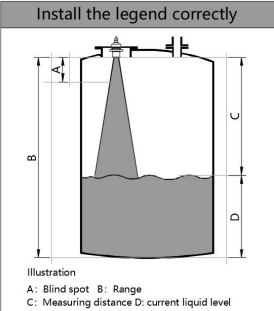


Figure 1

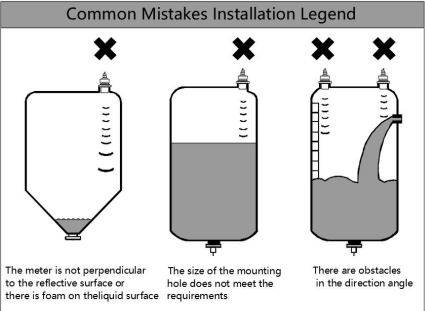


Figure 2

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1、Overview

Thank you for choosing our company's ultrasonic level meter!

This instrument includes multiple patented software technologies and has the characteristics of safety, cleanliness, high precision, long service life, stable and reliable operation, easy installation and maintenance, and is suitable for various fields such as acids, alkalis, salts, corrosion resistance, and high temperatures. This instrument can be connected to a display or various systems through 4~20mA or RS485 (Modbus-RTU protocol or other customized protocols) to provide real-time liquid level data for the automation of industrial operations.

This instrument complies with the standard GBT11828.4-2011, and the verification regulations are JJG971-2002. This instrument has the following characteristics:

- Sonic's intelligent technology software can perform intelligent echo analysis without any debugging or other special steps. This technology has the functions of dynamic thinking and dynamic analysis. The intelligent software for sound waves can perform intelligent echo analysis without any special steps or other special procedures. This technology has the function of dynamic thinking and analysis.
- This instrument is a non-contact instrument, not in direct contact with liquid, so the failure rate is low. The meter provides a variety of installation methods, and the user can completely calibrate the meter through this manual.
- All input and output lines of the instrument have lightning protection and short circuit protection functions.

2、Technical specifications

Measurement range: (0-30)m (selected based on actual measurement range)

Blind Zone: 0.3m-0.8m

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

Ranging resolution: 1mm

Pressure: atmospheric pressure

The meter shows: The instrument has a built-in LCD display which shows the liquid level (the distance between the bottom of the tank or vessel and the surface of the water or other medium) and the headspace value (the distance between the probe surface of the instrument and the surface of the water or other medium).

Analog output: (420) mA/510 $\Omega$

Digital output: ModBus-RTU protocol or custom protocol

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

Power supply voltage: DC24V or AC220V

Operating temperature: -20℃ to +60℃

Protection level: IP65/IP67

Power consumption: < 3W.

Menu 2 Communication settings (operation menu for on-site installation and commissioning personnel)

- 1、Rs485: The communication address is set to default as 01, communication speed is set to default as 9600, parity check is set to default as none. The receive log is for the convenience of the on-site engineer during debugging.
- 2、Current output setting: (4-20)mA;
- (4-20)mA setting: 4mA generally corresponds to the zero position of the liquid (material) level, and 20mA corresponds to the highest position of the liquid (material) level. ( Figure 1)

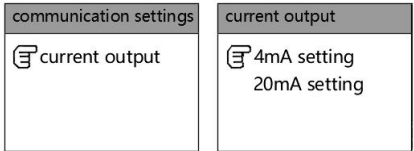


Figure 1

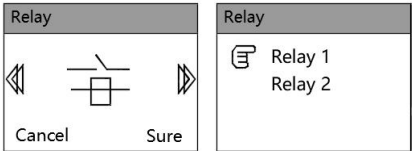


Figure 2

Menu3 Relay settings: the default is off! (On-site installation and commissioning personnel operation menu)

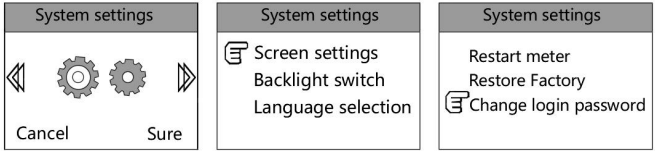
The function of relay 1 and relay 2 is that when the water level (liquid level) in the on-site pool rises or falls to a certain level, the instrument can control the water pump in the pool to start or stop by pulling in or disconnecting the relay.

- 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; ( Figure 2)

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 .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 (Figure 1)

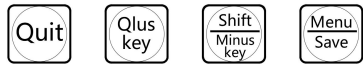


Figure 1

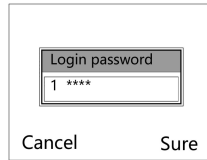


Figure 2

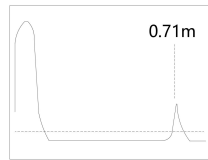


Figure 3

**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 number size.

**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 2

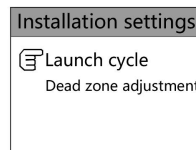
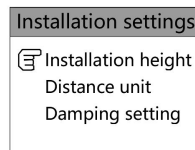
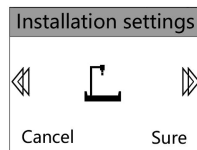
II 、 Echo Mode:

When the instrument is in the mode of displaying liquid level and empty height,

Press the shift key, and the echo curve in the current measurement state will appear. Figure 3 press plus key Return to level and empty height mode again.

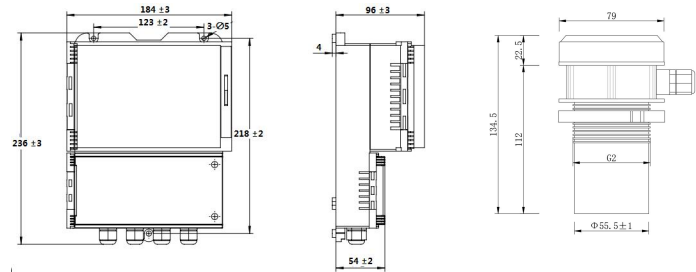
Menu 1: Installation settings (operation menu for on-site installation and commissioning personnel) as shown in the figure below

- 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 instrument the vertical Distance between;
- Distance unit:** m (meter), cm (centimeter), mm (millimeter) and in (inch), which can be set by users according to their needs;
- Damping setting:** automatic filtering and damping time (generally automatic filtering is enough, it is not recommended to turn off automatic filtering);
- Transmission period:** 100ms-999ms, the default is 500ms, the shorter the time, the faster the transmission speed;
- 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.



#### 3、instrument installation

##### 3.1 Dimensions of the instrument

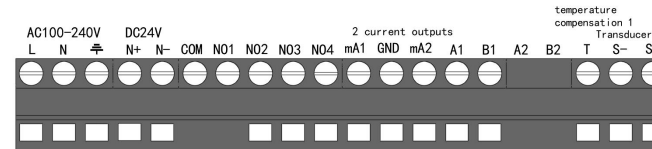


Transmitter

Sensor

Installation method: In an open environment, the bracket installation method is generally used (the bracket should be installed horizontally), and a round hole with a diameter of 60mm is opened on the bracket, and the instrument probe is put in, and then the instrument comes with a nut, from bottom to top Tighten; the tank body at normal temperature and pressure is generally installed with a flange, and a round hole with a diameter of 60mm or a G2 thread is opened in the middle of the blind plate (keep the horizontal state when installing the blind plate) to fix the ultrasonic liquid level gauge.

##### 3.2 The terminal of the instrument is as shown in the figure below



The description of the binding post is as follows:

- L and N on the circuit board are connected to the AC220V on site;
- The ground sign port on the circuit board needs to be well connected to the site ground to prevent static electricity and surge;
- IN+, IN- on the circuit board (DC24V): connect to the external DC power supply DC (12-28) V, power 3W, pay attention to the positive and negative poles when wiring;
- mA1 and GND on the circuit board: it is the first (4-20) mA output, pay attention to the positive and negative poles when wiring;
- COM and N01 on the circuit board correspond to relay 1 in the menu, and COM and N02 on the circuit board correspond to relay 2 in the menu;
- A1 and B1 on the circuit board: indicate the first Rs485 output, A1 is positive and B1 is negative;
- T on the circuit board: it is the red cable connected to the probe line;
- S- on the circuit board: it is the shielding wire of the black heat shrinkable sleeve connected to the probe wire
- S+ on the circuit board: It is a white high-frequency cable connected to the probe line.

3.3 Meaning of installation parameters (Figure 1)

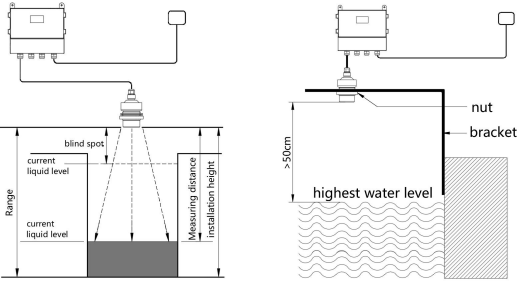


Figure 1

Figure 2

The measurement method of the instrument: start timing from the sending sound wave pulse of the instrument to the reflection of the receiving medium surface. Until the return pulse, multiply the half of this time by the speed of sound, which is the measured distance, (installation height - measured distance= current 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 dead zone;
- III . The wave sent by the probe is trumpet-shaped, that is, it has a direction angle. When installing, try to choose an open space. The lower part of the instrument is empty. There should be no other obstacles in between, and the lower part of 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. (Figure 2)
- 2) If the liquid level in the pool or tank fluctuates violently and it is inconvenient to install a guide tube, please choose a range that is the pool height or an 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)

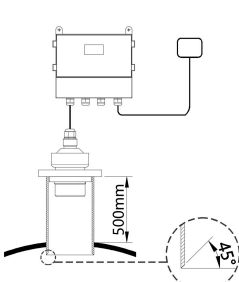


Figure 1

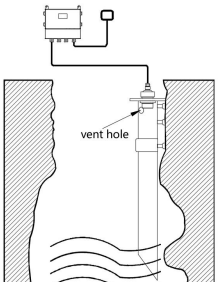


Figure 2

- 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, with a pipe diameter  $\geq 110\text{mm}$ . Leave a gap at the bottom of the pipe so that the liquid level in the extension pipe is equal to the liquid level in the pool or tank. On the extension pipe, near the probe, open a few small holes 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 1; if it is not possible in the field environment, the diameter of the pipe fixing the flange is shown in Figure 2 and Figure 3, and the length h is between 100mm-300mm. The larger the h value, the larger the corresponding d value.

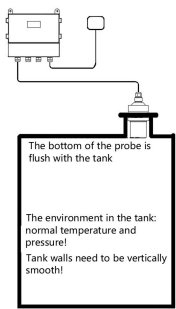


Figure 3

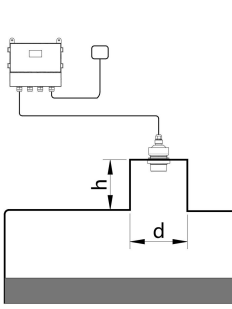


Figure 4

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

Figure 5

- 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 install high and low temperature protection devices around the liquid level instrument.