Kind Reminder:

Please read the user manual carefully before installation and debugging!

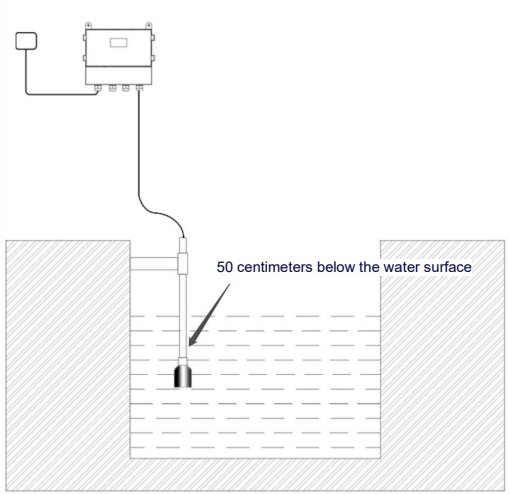
Zhejiang Lefoo Sensing Technology Co., Ltd.
Address: No. 118, Changda Road, Donghu Subdistrict, Linping District, Hangzhou, Zhejiang 311100, China
Tel: +86-571-89363666
Fax: +86-571-89363678
Email: cnsale@lefoo.com
Website: www.lefoo.cn

LEFOO

Ultrasonic Mud-Water Interface Meter

User Manual

Diagram for the Installation of Mud-Water Interface Meter



Note：

1、The sensor of the interface meter is recommended to be placed at a position ≥50cm below the water surface.

2、The sensor of the interface meter is recommended to be at least ≥150cm away from the bottom of the pool.

3、The lateral distance between the interface meter's bracket and thepool wall is recommended to be ≥50cm.

Contents

1、Introduction

We sincerely thank you for purchasing our ultrasonic mud-water interface meter! This instrument incorporates multiple patented software technologies, boasting features such as safety, cleanliness,high precision, long lifespan, stability, reliability, and easeof installation and maintenance. It is suitable for various applications in acidic, alkaline, saline, anti-corrosive, and high-temperature environments. The meter can connect to display meters or various systems via 4~20mA or RS485 (Modbus-RTU protocol or other customized protocols), providing real-time mud level data for industrial automation operations.The instrument complies with the standard of GBT11828.4-2011 and the verification regulation of JJG971-2002.

The instrument possesses the following features：

- The circuit design starts with selecting high-quality power modules from the powersupply section, utilizing components from top-tier brands, ensuring high stability and reliability, and resisting various interference waves, making it a perfect alternative to similar imported instruments.
- The intelligent sonic technology software enables intelligent echo analysis, eliminating the need for any debugging or other special steps. This technology possesses the capabilities of dynamic thinking and dynamic analysis.
- This instrument is a non-contact type, not directly in contact with the liquid, resulting in a low failure rate. The instrument offers multiple installation methods, allowing users to fully calibrate the instrument through this manual.
- All input and output lines of the instrument are equipped with lightning protection and short-circuit prevention functions.

2、Technical Specifications:

Measurement range: (0～30)m (selected based on the actual measuring range)

Blind zone: 0.3m-0.8m

Measurement accuracy: ±0.5% (full range under standard conditions)

Measurement resolution: 1mm

Pressure: Atmospheric pressure

Instrument display: Comes with an LCD to display mud level (the distance between the bottom of the tank or pool and the surface of water or other media) and mud level value (the distance between the probe surface of the instrument and the surface of mud or other sediments)

Analog output: (4～20)mA/510Ω

Digital output: ModBus-RTU protocol or customized protocol

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

Power supply voltage: DC24V or AC220V

Ambient temperature: -20℃ ～ +60℃

Protection level: Transmitter IP65, sensor IP68

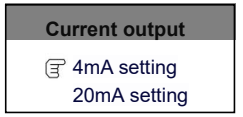
Instrument Power: <3W

Menu 2: Communication Settings (Operation Menu for Field Installation and Commissioning Personnel) as shown below

1、RS485: The communication address is defaulted to 01, the communication rate is defaulted to 9600, parity check is defaulted to no check, and the reception of logs is convenient for field engineers to use during debugging.

2、Current output setting: (4-20)mA;

Setting of (4-20)mA: 4mA generally corresponds to the zero position of the liquid (mud) level, while 20mA corresponds to the highest position of the liquid (mud) level.

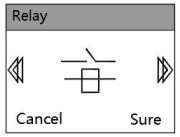


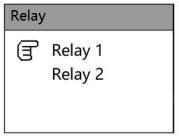
Menu Three: Relay Settings: All are set to OFF by default! (For operation by field installation and commissioning personnel)

The functions of Relay 1 and Relay 2 are to control the start or stop of the water pump in the pool through the engagement or disengagement of the relays when the mud level in the field pool rises or drops to a certain level.

Ⅰ、Assuming that the depth of the pool is 6 meters, the water is drained when the mud level reaches 4 meters, and the pump stops when the mud level reaches 1 meter. The settings are as follows: Set the upper limit (representing the high mud level) to 4 meters, set the lower limit (representing the low mud level) to 1 meter, action logic: disconnect → close, control mode: dual limit alarm;

Ⅱ、 The water flows into the pool when the mud level reaches 1 meter, and the pump stops when the mud level reaches 4 meters. The settings are as follows: Set the upper limit (representing the high mud level) to 4 meters, set the lower limit (representing the low mud level) to 1 meter, action logic: close → disconnect, control mode: dual limit alarm.





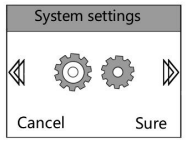
Menu 4: Record Query The function is to record the power-on time of the instrument.

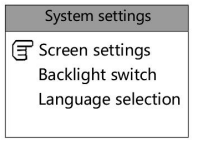
Menu 5: System Settings

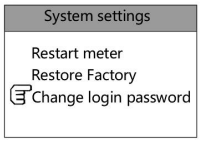
1、Set the brightness and contrast of the screen;； 2、Set the backlight duration of the screen;

3、Choose Chinese or English; 4 and 5. Restart the instrument and restore factory settings;

6、Set your own login password for entering the menu (Modification is risky! If you must modify it, please make sure to remember the password!)



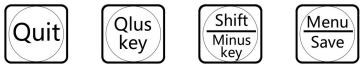




Menu 6: Advanced Functions (Exclusive for Engineers' Debugging,Do Not Enter!)

4、Instrument Debugging

4.1 Keyboard Instructions



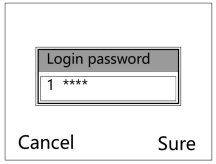
Menu/Save Button: When the instrument needs to be set, press this button to enter the menu. After changing the instrument parameters, press the Save button.

Increase Button: Scrolls up through the menu options or used as the increment button to change the size of a number.

Shift/Decrease Button: When changing data in different positions, press this button to shift the position or scroll down through the menu options.

Exit Button: After completing the necessary menu settings, press the Exit button to return to the main interface of the instrument.

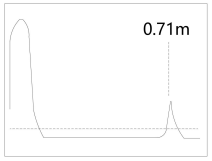
4.2 Menu Settings



Ⅰ. Steps to enter the menu:

Press the menu button, and then ** will appear. The first * on the left is flashing. Press the plus button to change it to 1***. Press the menu button again to enter the menu. As shown in the figure.**

Ⅱ、Echo mode:



When the instrument is displaying the mud level and liquid level, press the shift button, and the echo curve graph under the current measurement status will appear. As shown in the figure. Press the plus button to return to the mud level and liquid level mode.

Menu 1: Installation Settings (Operation Menu for Field Installation and Commissioning Personnel) as follows:

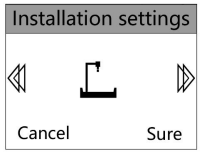
1、 Installation Height: Vertical distance between the position where the medium such as mud level is zero (generally refers to the bottom of the tank or the bottom of the pool, etc.) and the probe surface of the instrument;

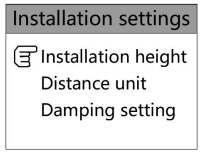
2、 Distance Unit: m (meter), cm (centimeter), mm (millimeter) and in (inch), users can set them according to their needs;

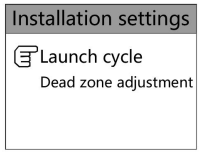
3、 Damping Settings: Automatic filtering and damping time (automatic filtering is generally recommended, it is not recommended to turn off automatic filtering);

4、 Transmission Period: 100ms-999ms, the default is 500ms, the shorter the time, the faster the wave transmission speed;

5、 Blind Area Adjustment: The default is 30cm, if you need to modify it, it is recommended to operate under the guidance of the engineer.

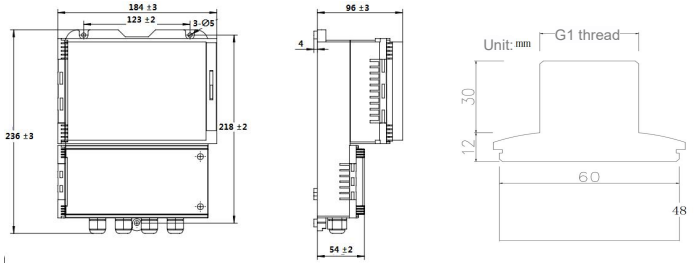






3、Instrument installation

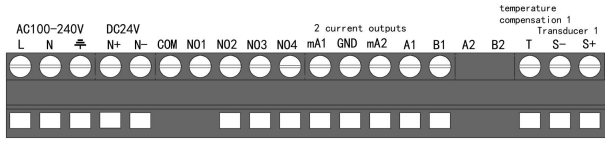
3.1Dimensions of instrument



Transmitter **Sensor**

Installation method: In an open environment, the bracket installation method is generally adopted (the bracket should be kept horizontal during installation). The lower end of the bracket is threaded with the sensor. For tanks under normal temperature and pressure, bracket installation or suspension installation is also adopted. A round hole with a diameter of not less than 60mm should be opened in the middle of the blind plate (the blind plate should be kept horizontal during installation) to ensure that the bracket or cable can pass through smoothly and fix the sensor.

3.2 The wiring terminals of the instrument are shown in the following figure.



Explanation of terminals is as follows：

Ⅰ. L and N on the circuit board are connected to the AC220V power supply at the site;

Ⅱ. The grounding symbol port on the circuit board requires a good connection to the ground at the site to prevent static electricity and surge;

Ⅲ. IN+ and IN- (DC24V) on the circuit board are connected to an external DC power supply of DC(12-28)V, 3W power, pay attention to the positive and negative poles when wiring;

Ⅳ. mA1 and GND on the circuit board are for the first channel of (4-20)mA output, pay attention to the positive and negative poles when wiring;

Ⅴ. COM and N01 on the circuit board correspond to Relay 1 in the menu, while COM and N02 correspond to Relay 2 in the menu;

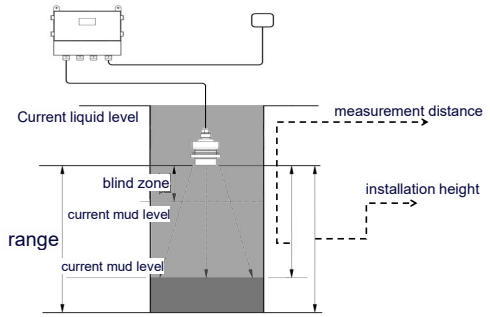
Ⅵ. A1 and B1 on the circuit board indicate the first Rs485 output channel, where A1 is the positive pole and B1 is the negative pole;

Ⅶ. T on the circuit board is connected to the red cable of the probe wire;

S- on the circuit board is connected to the shielded wire of the black heat shrink tube of the probe wire;

S+ on the circuit board is connected to the white high-frequency cable of the probe wire.

3.3 Installation Parameter Meanings



As shown in the figure, the measuring method of the instrument is: Starting from the time when the instrument sends out a sonic pulse, to the time when it receives the pulse reflected back from the media surface, the distance is measured by multiplying half of this time by the speed of sound. (Installation height - Measured distance = Current mud level);

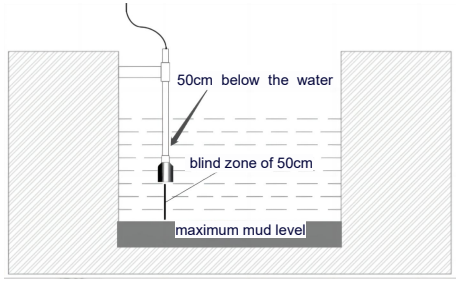
I. The installation height should be less than the measurement range;

II. The blind zone of the instrument refers to the area near the probe where the instrument cannot measure. The distance between the highest mud level on site and the probe should be greater than the blind zone;

III. The wave emitted by the probe is in a horn shape, meaning it has a directional angle. During installation, it is recommended to choose an open space as much as possible. There should be no other obstacles in the space below the instrument. The instrument should avoid positions with drastic fluctuations in the liquid level, such as the inlet and outlet of materials.

3.4 Precautions for Instrument Installation

1）The distance from the probe emission surface to the highest mud level should be greater than the blind zone of the selected instrument.

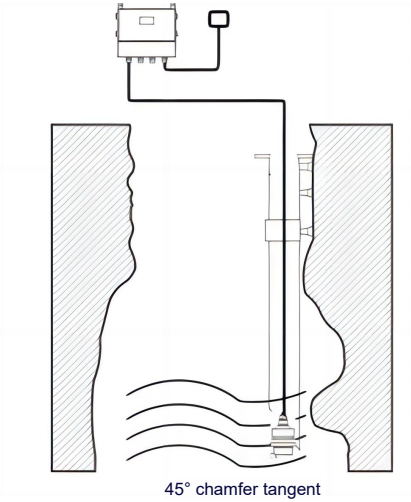


2）If the mud level in the tank or pond fluctuates severely and it is inconvenient to install a guide pipe, please select an ultrasonic mud level meter with a range 2.5 times the height of the tank or pond.

3）If the distance from the probe emission surface to the highest mud level is less than the blind zone of the selected instrument, measures must be taken to meet the installation requirements, either by raising the water level or lowering the mud level. It is essential to ensure that the distance between the sensor emission surface and the highest mud level is greater than the blind zone of the instrument. Otherwise, once the mud level enters the blind zone, the instrument will be unable to measure normally.

4）If the wall of the tank or pond is uneven, there are other obstacles, or the water surface fluctuates violently, the instrument needs to be installed with a waveguide tube, or the tube needs to be extended to the bottom of the tank or pond. The pipe diameter should be ≥150mm, and a gap should be left at the bottom of the pipe to allow the liquid level in the extension tube to be equal to the liquid level inside the tank or pond.

As shown in the figure below: The instrument sensor is measured within the waveguide tube, which can effectively avoid the interference of obstacles on the instrument measurement.



6）When the instrument is used in extremely hot or cold places, where the ambient temperature may exceed the working requirements of the instrument, it is recommended to install high and low temperature protection devices around the mud level meter.