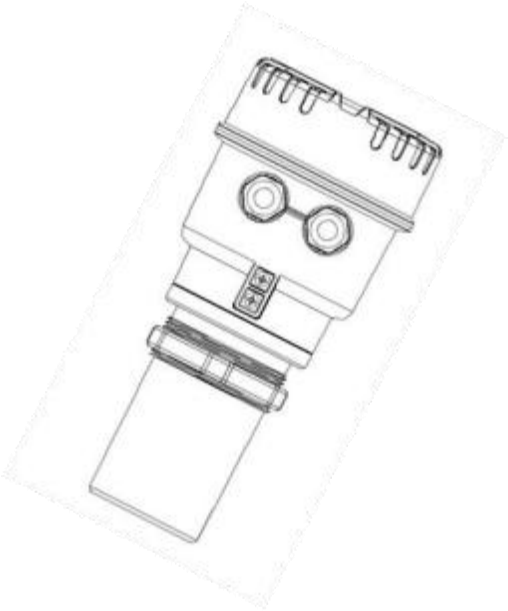
Four-wire ultrasonic level meter

Mandatory Manual



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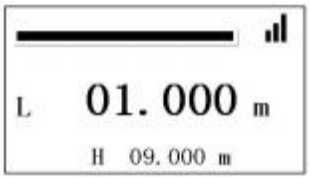
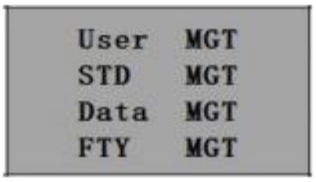
Dear Customer, when you are commissioning this meter, only the following steps are required:

Quick calibration step of instrument

1) The instrument is powered on, the instrument enters the measurement state, and the liquid crystal displays the liquid level value. As shown in the figure on the right, it indicates that the measured liquid level L is 1.000m and the distance H is 9.000m. The calibration method is described as follows:

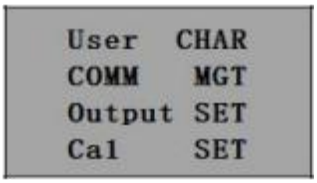


2) Press the combination **[SET] + [OK]** key, the meter can enter the parameter setting menu. As shown on the right:

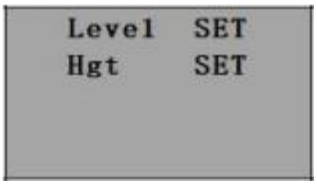


3) At this point the cursor is located at " **User Management** "Press **[OK]** Key, enter Password screen. As shown in the right:

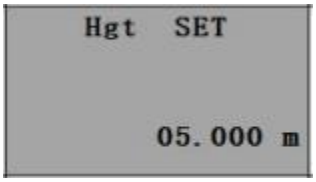
4) Press the [▲] key again to change the password to "**1 *****" and press the **[OK]** key to enter the user management menu, as shown on the right:



5) Move the cursor down to "**"Calibration settings** " by pressing the [▼] key, and enter the calibration setting menu by pressing the **[OK]** key, as shown on the right:



6) Move the cursor down to " **Height setting** " by pressing [▼] key, and enter the height setting menu by pressing **[OK]** key. This calibration value is the vertical distance value from the probe surface of the ultrasonic liquid level sensor to the bottom of the tank or the bottom of the tank, That is the entire installation height value. As shown on the right: the vertical distance from the sensor probe surface to the bottom of the tank or the tank is 10m, and the height setting value can be changed to 10.000m.



7) Last Press Combination **[SET]** + **[OK]** Key to exit the setting and return to the measurement screen.

Notes: " The height setting is consistent with and related to the "liquid level setting" function. Both are used for on-site calibration of liquid level. Only one of the two menus is required. (Typically "Height Setting")

"Height Setting" is used to set the height from the transducer (probe transmitting surface) to the bottom of the tank or pool under test, also known as the installation height setting; "Liquid Setting" is used to set the actual liquid level value in the current tank or pool. It is generally used when the installation height cannot be measured, but the actual liquid level value can be obtained.

Ⅰ. Overview

Thank you for purchasing our ultrasonic level gauge!

The instrument has a brand-new signal processing technology, with the characteristics of safety, cleanliness, high accuracy, long life, stability and reliability, convenient installation and maintenance, and simple reading. It is widely used in petroleum, chemical industry, water treatment, water conservancy, steel, coal mine, electric power and food processing industries, and is suitable for various fields such as acid, alkali, salt, anticorrosion, high temperature and explosion protection. It can be connected with various brands of PLC systems or secondary control systems through 4 ~ 20 mA or RS 485 (Modbus protocol) to provide real-time liquid level data for industrial automation.

Features

Stable and reliable: We select high-quality modules from the power supply part in circuit design, select highly stable and reliable devices for the procurement of key components, and can completely directly replace foreign imported instruments.

Software technology: Acoustic intelligent technology software can perform intelligent echo analysis without any debugging and other special steps, and has the function of dynamic thinking and dynamic analysis.

High accuracy: The acoustic intelligent technology owned by our company greatly improves the accuracy of ultrasonic level meter, the accuracy of liquid level reaches ± 0.3%, and has the field anti-interference function.

Low failure rate, easy installation and maintenance: This instrument is a non-contact instrument and does not have direct contact with liquid. Therefore, the failure rate is low. Instrumentation provides a variety of installation methods and can be fully calibrated through this manual.

Multiple protection: The protection level of instrument reaches IP65; the circuit parts have isolation protection function, respectively, so as to prevent short circuit, lightning strike and other damage to the whole set of instrument.

Legal Disclaimer

This product, from the date of initial purchase and delivery, has a warranty period of one year if there are defects in raw materials and production processes, but such products shall be operated under normal storage, use and maintenance conditions and in accordance with the instructions for use.

All products included in the product sold to the original purchaser that are not owned by the company include only the warranties, if any, provided by the specific supplier, and the company assumes no liability for such products.

THIS WARRANTY IS GIVEN ONLY TO THE PURCHASER AND IS NOT TRANSFERABLE. This warranty does not apply to any product damaged as a result of misuse, negligence, accident or abnormal operating conditions. Consumable parts are not covered by this warranty.

Products covered by this warranty shall not be used in the event of any defect to prevent further damage. The purchaser must immediately report any defects to the company, otherwise this warranty will not apply.

If, after an inspection, the Company certifies that the Product is a material or manufacturing defect, it may, at its sole discretion, repair or replace any such defective Product free of charge, provided that such Product is returned to the Company within such period of one year.

The Company has no obligation or liability for any defect other than the aforesaid.

This product is exempt from other express or implied warranties. We hereby waive specific Implied warranties of merchantability and fitness for use.

The Company shall not be liable for any direct, indirect, special, accidental or consequential loss or damage based on contract, civil or any other legal theory.

II. Technical indicators

Measuring range: 0-15m (a large number of programs can be customized, blind area: 0.35m ~ 0.5m);

ranging accuracy: 0.5%;

Power supply voltage: DC12V, DC24V/AC220V built-in lightning protection device;
host display: LCD display (resolution 1 mm);

Analog output: 4 ~ 20 mA (Optional 1- 2 Circuit relay output);

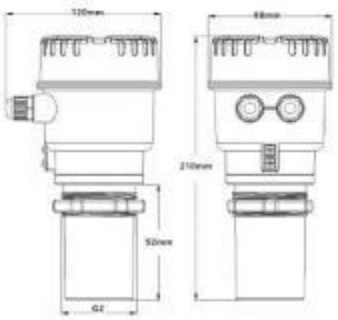
pressure resistance of sensor: < 0.1MPa; IP65;

Digital Output: RS 485 (Modbus) Agreement;

Ambient temperature: -40℃ ~ 80℃;

III. Instrument installation

1. instrument dimensions (height)



(Integrated dimension figure)

3. instrument installation principles:

A. The distance from the transmitting surface of the transducer to the lowest liquid level shall be less than the range of the optional instrument.

B. The distance from the transmitting surface of the transducer to the highest liquid level shall be greater than the blind area of the instrument selected.

C. The emitting surface of the transducer should be parallel to the liquid surface.

D. The installation position of transducer shall avoid the position where the liquid level such as inlet and outlet directly below has sharp fluctuation as far as possible.

E. If the wall or tank wall is not smooth, the instrument needs to leave the wall or tank wall for more than 0.5m.

F. If the distance from the emission surface of the transducer to the highest liquid level is less than the blind area of the selected instrument, an extension tube needs to be added. The extension tube needs to be vertical to the liquid level, and the inner wall should be kept smooth.

4. installation precautions

A. The instrument enclosure must be reliably connected to earth.

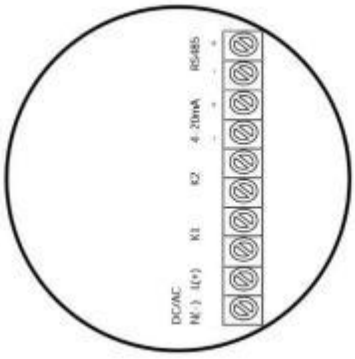
B. Cord, cable protection tube, to pay attention to prevent excessive water.

C. Although the instrument itself has lightning protection components, when used in the torpedo area, a special lightning protection device is additionally installed at the inlet and outlet terminals of the instrument.

D. When the instrument is used in a particularly hot and cold place, that is, the ambient temperature may exceed or be lower than the ambient temperature of the instrument in normal use, it is necessary to add high and low temperature devices to the instrument to prevent the instrument from aging in advance and affecting the normal use.

IV. Instrument Wiring

Unscrew the wiring board of LCD display enclosure and see the instrument, as shown in the following figure:



(Integrated wiring panel)

Column Description:

Explanation	TERMINALS	Explanation	TERMINALS
Instrument Power Supply	L (+), N (-) D C/AC	Relay Output	K 1, K 2 (Two ways optional) Non-standard
RS 485	RS 485 (+, -)	Analog Output	4-20 mA (+, -)

Note: a. instrument power supply: AC220V or DC24V according to the user's choice, DC24V power supply please pay attention to the positive and negative poles;

b. 4 ～ 20 mA current output, the maximum load shall be less than 500Ω;

c. relay output is configured according to user requirements; (non-standard)

e. RS 485 protocol output, pay attention to the positive and negative poles when wiring.

V. Instrument Operating Instructions

1. instrument key: the main structural composition is shown in the right figure:

2. key description: during the use of the instrument, all operations are mainly operated by keys. It includes the setting, debugging and calibration of the machine. The keyboard is composed of 4 keys. The keyboard is described as follows:

[SET] : Set/Return key. When the instrument is in normal operation, press combination **[SET]** + **[OK]** The key can enter the parameter setting menu; in the menu, press this key to exit the menu at the same level and return to the previous menu.

[▲] : Up and Add keys. In the menu, this key is used as the up key; when changing the data, this key is used as the addition key; at the same time, when changing the data, press **[SET]** + **[▲]** The key moves the cursor left.

【▼】 : Flip down and subtract keys. In the menu, the key is used as the flip key; when changing the data, the key is used as the subtraction key; and when changing the data, press **【SET】**+**【▼】** The key moves the cursor to the right.

[OK]: Confirm/Exit key. In the menu, this key is used as the confirmation key; press combination when all data is changed **[SET]** + **[OK]** Key to exit the Settings screen.

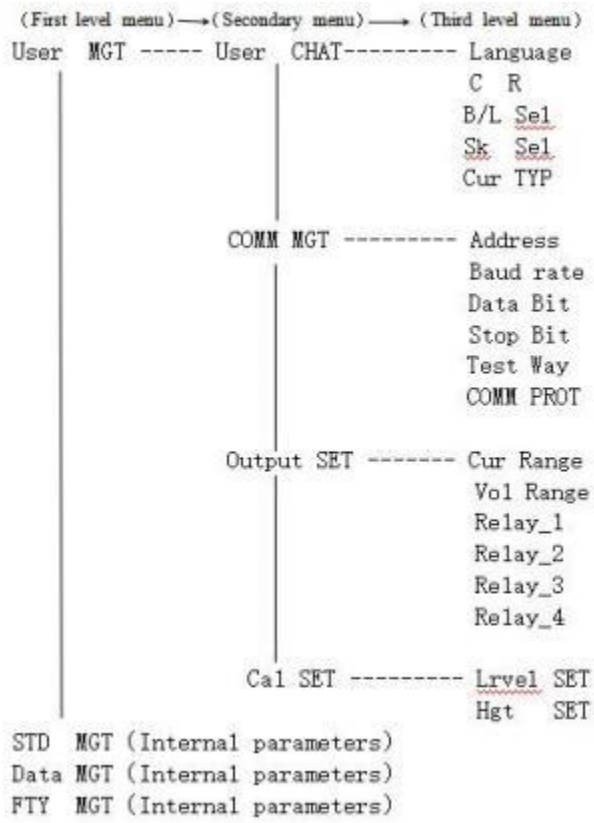
VI. Menu

1. Menu Frame

The instrument is divided into three levels of menu,

Push **[OK]** Key to lower level Menu, press [**SET**] key Return to the parent menu.

Structures as in Right:



2. Menu Description

The menu "User Management" is used when the user debugs and calibrates the instrument. Password entry is required when entering the secondary menu **"1*"** The secondary menus are "User Personality", "Communication Management", "Output Management" and "Calibration Settings". Enter three-level menu, the user can make change according to the actual working conditions and functional requirements of the site:

Language: The instrument provides two language options: Chinese and English.

Contrast: Meter display contrast is adjustable, usually based on the brightness of the field environment.

Backlight Selection: The instrument backlight can be selected to be bright or the backlight is lit when there is a key operation.

Skin selection: The instrument has two display modes, which can select display empty height (namely distance) or scale height (namely actual object and liquid level measurement value). The default is scale height when leaving factory.

Current type: The instrument provides two current output types, 0-10 mA and 4-20 mA.

Address: The ID number at which the meter communicates.

Baud rate: The communication time meter provides multiple baud rates, 300, 600, 1200, 2400, 4800, 9600, 14400, 19200 and 38400; data bits: the data bits of the meter include 5 bits, 6 bits, 7 bits and 8 bits.

Stop bit: The stop bit of instrument includes 1 bit, 1.5 bits and 2 bits.

Calibration method: The instrument provides calibration method, including no calibration, odd calibration, even calibration, mark bit and blank bit.

Communication protocol: MODBUS-RTU protocol is adopted by default.

Current range: The setting of instrument output range when the instrument provides current output. For example, when the current output of 4-20 mA is selected for the instrument, 4 mA corresponds to the water level of 0 m, and 20 mA corresponds to the upper limit of the output range of the instrument.

Voltage range: The setting of voltage output range when the instrument provides voltage output. Relay I ~ Relay IV: The instrument can provide four-way relay output. The specific setup description is as follows:

Symbol meaning: <: less than symbol; >: more than symbol; &: with, indicating that both conditions need to be met; |: or, indicating that one of the two conditions is met; N: only the former condition, the latter is not displayed; Λ: the former condition is the relay suction condition (generally used for pump-on), the latter condition is the relay open condition (generally used for pump-off), mainly used for drainage well and inlet well control.

Example: a If it is required to close when the liquid level is less than 1m: < 01.00; if the "<" symbol is changed to ">" symbol, it means that the relay is closed when the liquid level is greater than 1m;

b If it is required that the liquid level shall be closed when it is less than 1m or more than 8m: < 01.00 | > 08.00;

c If the drainage well, open the pump to drain when the water level rises to 8 m, and stop the pump when the water is drained to 2 m, with the following settings: > 08.00 Λ < 02.00.

d If the water level drops to 1 m, the pump needs to be started and the water level enters 8 m, stop the pump, and set as follows: < 01.00 Λ > 08.00.

The menu "Calibration management" is the internal parameter of the factory, which is used in the instrument test. Generally, the internal parameters of the instrument have been all set when it leaves the factory, and there is no need to modify the special operating conditions.

The menu "Data Management" is a factory internal parameter and is not required in the field.

The menu 'Factory Management' is a factory internal parameter and field changes are not valid.

VII. Additional Instructions

1. equipment and accessories provided by the manufacturer

Serial No.	Equipment or accessory name	Unit	Quantity	Remarks
1	Converter and sensor	Set	1	
2	Instructions for use and certificate	Pieces	1	
5	Accessories	Piece	Optional	Flange or Stent (Non-Standard)

2. conditions required for on-site installation

Serial No.	Internal capacity	Remarks
1	Instrument Power Supply	According to the actual power supply mode of instrument
2	Overpressure, overcurrent and lightning protection devices	Key allocation is required in Dorei area
3	Steel Tape	Used for calibration
4	Cable protection tube and connecting hose	Select according to field use environment
6	Temperature protection box/cabinet	CONFIGURATION IF ENVIRONMENTAL TEMPERATURE IS OUT OF RANGE

3. return receipt of ultrasonic level gauge warranty card

User Name			
Contact address			
Contact Person		Contact number	
Product model		Product No.	
Date of acceptance		Person responsible for installation	

4. description of ultrasonic level gauge warranty card

Product model		Product No.	
Date of acceptance		Person responsible for installation	

5. warranty policy:

User presents warranty card when servicing. In case of any failure due to normal use within the warranty period, the warranty card may be used to enjoy the prescribed free warranty; warranty period: the warranty period of the company's products shall be subject to lifelong maintenance within 12 months from the ex-factory date.

6. spare parts for product manufacturers:

THE PRODUCT OR ITS PARTS EXCEED THE FREE WARRANTY PERIOD.

Hardware failure due to use environment not meeting product use requirements.

Malfunction or damage caused by poor power environment or foreign matter entering device.

The failure to operate according to the use methods and precautions written in the operation manual, resulting in failure and loss.

Faults and losses caused by natural factors such as lightning and water fires due to non-resistances.

Failure or damage caused by unauthorized disassembly and repair, unauthorized modification or abuse.

7. restrictions: Please properly keep the warranty card as the warranty voucher.

The interpretation authority of this warranty card is vested in the Company, and the Company has the right to modify the contents of this card without prior notice.

Cautions

Do not vigorously shake or bump the device during use and transport. Avoid oil stains and various chemicals contaminating the probe surface and damaging the surface. During the transportation and storage, the ambient temperature of the instrument shall not be lower than -40℃ and higher than + 80℃, the relative humidity shall not be greater than 85%, and the surrounding environment is free of corrosive gas and strong electromagnetic field; the original packing box must be used during the transportation.

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