

## Split Ultrasonic Level Meter



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## **1.Product description**

### **1.1 Preface**

Ultrasonic level meter is an intelligent non-contact liquid (object) level measuring instrument. Ultrasonic level meter is composed of three parts: ultrasonic probe, ultrasonic control host.

This meter adopts modular circuit design, military quality multi-layer PCB board, tight hardware structure and reasonable layout. The product adopts 18-key operation menu, supports isolated 4-20mA output, supports HART communication, built-in GPRS, GPS, 4G and other wireless data transmission, built-in 500,000 storage, supports USB storage export, and can also add modules to achieve other functions according to customer needs.

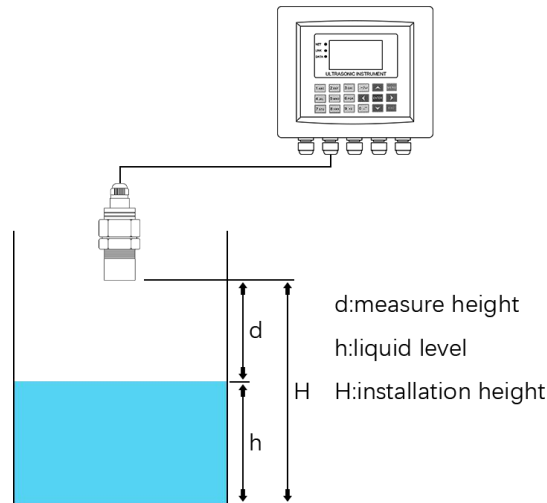
This product can meet most of the requirements of liquid level and material level measurement without contacting industrial media, and completely solves the shortcomings of winding, blockage, leakage, media corrosion and inconvenience of maintenance brought by traditional measurement methods such as pressure type, capacitor type and float type. Therefore, it can be widely used in various fields related to material level, liquid level and monitoring.

### **1.2 Product features**

- Ultrasonic non-contact level measurement, completely no effect on the measured liquid, accurate level measurement is the ideal level meter.
- Low power consumption, easy installation and positioning, it is widely used in petrochemical, metallurgy, electric power, pharmaceutical, water supply and drainage, environmental protection and other systems and industries for liquid level measurement of various media.
- Ultrasonic level meter with history flow meter recording function, can record the flow data of the past 60 hours, 30 days, 12 months, 10 years, and 500,000 items are stored in the body.
- The instrument has a comprehensive control function with four-way relay signal output, which is easy to connect with common actuators (motor, alarm, etc.).
- According to the requirements of working conditions, the probe can be selected from special models such as IP68, anti-corrosion, explosion-proof, small blind area high-precision type, ultra-low power consumption, large range, etc.
- Chinese display interface, 18-key key operation. More easy to understand menu options, more... Quickly realize man-machine communication.
- Built-in remote communication module, various communication protocols can be customized (customized when ordering).

### **1.3 Measurement principle**

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Ultrasonic level meter, is the use of ultrasonic emission, reflection of the characteristics of the fluid level measurement. The probe emits ultrasonic pulse signals to the surface of the measured medium, and the ultrasonic waves are reflected when they meet the measured medium (liquid surface) during transmission. The reflected ultrasonic signals are detected by the electronic module, processed by the processor, and the time difference between the emitted ultrasonic waves and the return waves is analyzed, which, combined with the propagation speed of the ultrasonic waves, can calculate the distance traveled by the ultrasonic waves and thus reflect the liquid level.

#### 1.4 Technical parameters

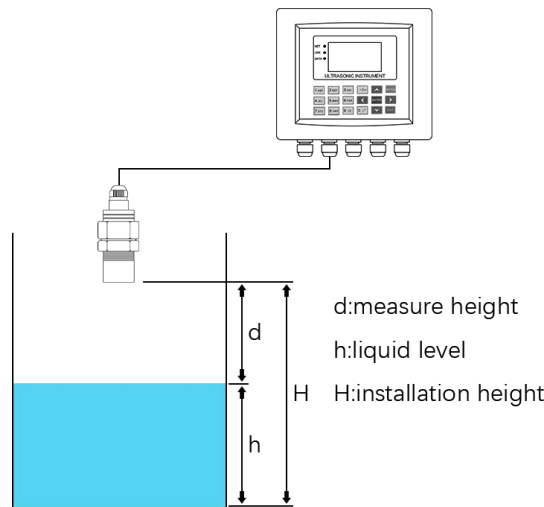
- Flow accuracy:  $\pm 0.3\%F.S$
- Ultrasonic probe (level meter) performance indicators.
  - Blind zone: 0.06~0.6m (should be different for different sensors)
  - Distance range: 1, 2 (standard), 5, 8, 10, 12, 15, 20, 25, 30, 35, 40m  
(optional high-precision small blind type or more large range type)
  - ABS material, IP65 protection level, 10m shielded cable (any length can be customized)
- Host performance indicators:
  - Chinese 3-time LCD      18-bit keyboard operation
  - IP65 protection class      M16×1.5 electrical interface
- AC 85~380V or DC 11~24V power supply Power consumption 5W
- Signal input: RS485 serial port
- Signal output: 1 way/2 ways 4-20mA (standard 1 way), 4 ways relay, RS485
- Sensor installation interface: Standard 485 interface (24V power supply)×2
- Operating environment: Normal temperature, normal pressure
- Data browsing: Quickly view the liquid level data records
- Optional functions: HART communication, U disk data export, 4G wireless transmission (optional when ordering)



## 2. Structure and use of the instrument

### 2.1 Structure of the instrument

This ultrasonic level meter is composed of main unit and ultrasonic probe. It is simple to install and easy to operate. Its composition structure is shown in Figure 2-1.:



Main machine: display time, relay status, liquid level, distance between probe and liquid level, current ambient temperature, output signal and other related information.

Ultrasonic probe: detects the depth of liquid in the measuring tank.

### 2.2 Basic settings of the instrument

Once the meter is installed, simply set the mounting height of the probe and the meter is ready for normal operation.

#### 2.2.1 Installation height setting

Installation height, according to the number of positions and probe range, choose the appropriate installation height.

## 3. Commissioning and Installation

### 3.1 Keyboard input

Before the measurement starts, just complete the installation as required, make the basic parameter settings, and then power on for normal measurement.

18-key keyboard input, the basic functions of the keys are shown in Table 1, and the keys are shown in the figure.

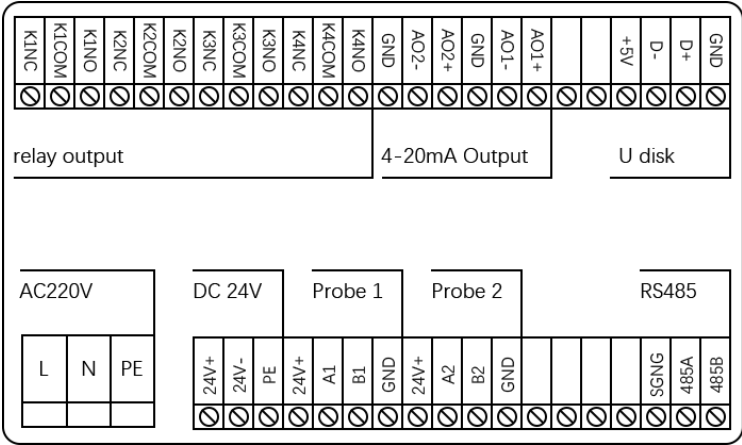


Table 1

|                                                                                   |                   |                             |                                                                                                                                                                        |                       |                         |
|-----------------------------------------------------------------------------------|-------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------|
|  | Menu Back         | Key entry<br>Password entry |                                                                                       | Cancellation          | Back to previous level  |
|  | Left move key     | Cursor move left            |                                                                                       | Symbols               | Enter symbols           |
|  | Right move key    | Cursor move right           |                                                                                       | '0'                   | '0' input key           |
|  | Make sure to save | Make sure, save Go to menu  | <br> | Up and down selection | Up and down select menu |

3.2 Instrument Connection

Note: Please connect correctly according to the wiring definition to avoid incorrect connection causing improper operation and damage to the instrument.

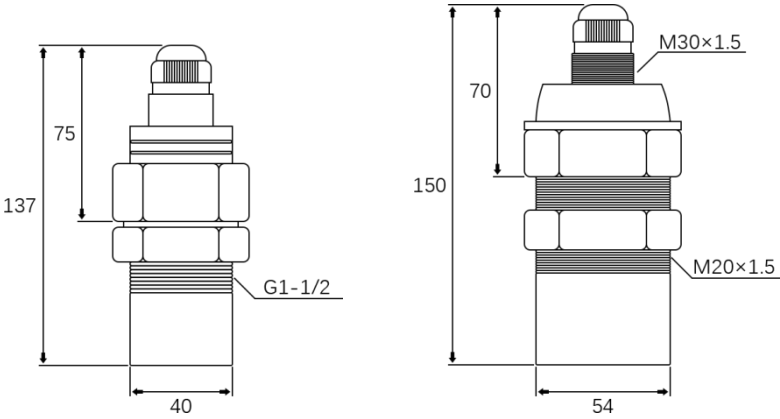


3.3 Installation of the instrument

3.3.1 Installation of ultrasonic probe (level meter)

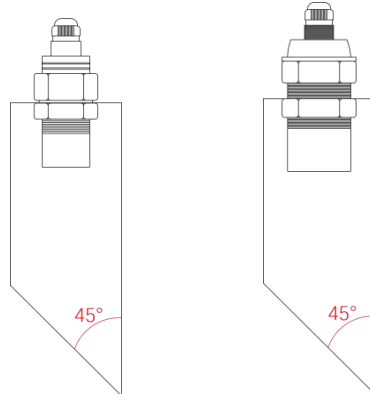
Conventional installation

The ultrasonic probe (level meter) is equipped with a fixed screw ring, which is pre-determined in the installation position or on the bracket mounting hole. Adjust the ultrasonic probe installation angle and tighten the upper screw ring.。



### Waveguide method installation

In by the site environment, small amount of water tank and other special circumstances, ultrasonic level meter level detection will now fluctuate data detection inaccuracy, often a fixed value and other phenomena. The effective way to avoid this phenomenon, is to add the installation of wave guide tube.

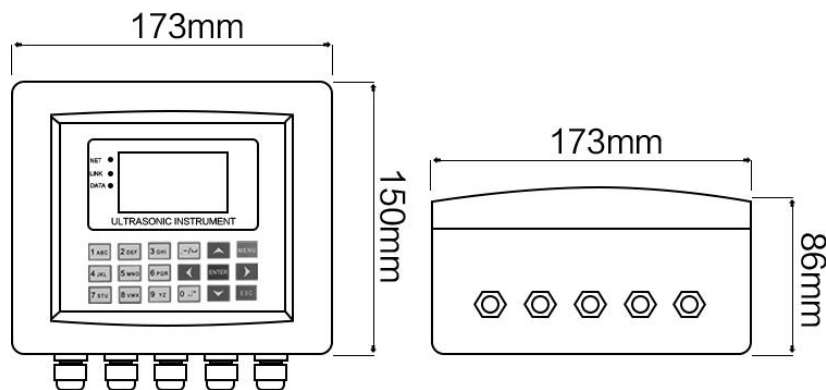


Wave guide pipe can be used PVC, PP and other plastic pipes, smooth inside, inner diameter > 100MM, length to reach into the amount of water tank shall prevail, the front end should be cut into 45 ° bevel, the port is neat and burr-free.

### 3.3.2 Mainframe Installation

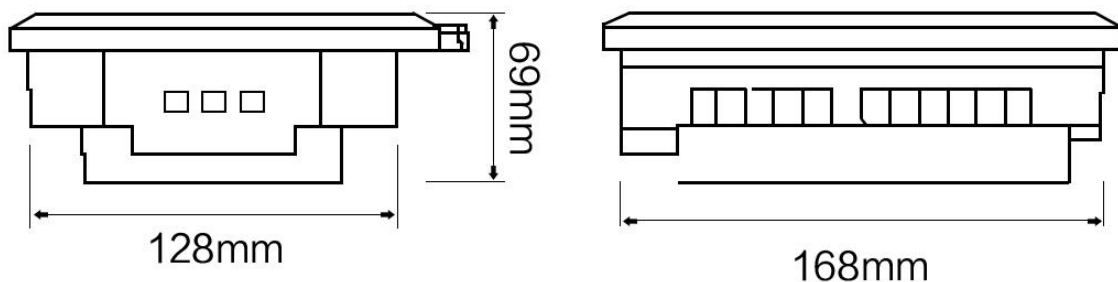
The host has embedded and wall-mounted two types of installation

Host form factor 176×150×86mm:



### Embedded installation

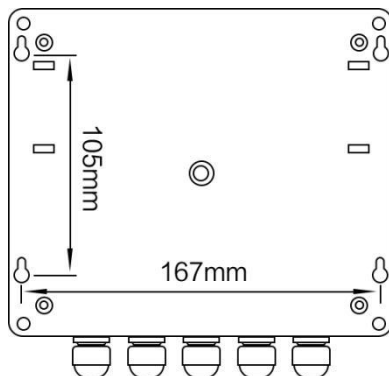
Embedded installation opening size 160×126mm.



### Wall-mounted installation

The product is designed with four quick wall mounting holes, just fix the screws according to the wall mounting fixing points and then hang the product. Wall mounting hole distance is 167×105mm

Note: The probe (level meter) should be installed with the product debugged before fixing. In order to prolong the service life of the meter, the meter should be well protected from the sun and water.



## 4.Menu List

### 4.1Ultrasonic Level Meter General Settings Menu List

(See Exhibit IV for detailed menu list)

| First level menu        | Second level menu       | Third level menu           | Instructions                       |
|-------------------------|-------------------------|----------------------------|------------------------------------|
| Ultrasonic measurements | Probe settings          | Installation height        | Installation height of the sensor  |
|                         |                         | Filter mode                | None, rapid, fast, average, stable |
|                         | Detailed probe settings | Measurement period         | Prohibit adjustment                |
|                         |                         | Probe range                |                                    |
|                         |                         | Probe blind zone           |                                    |
|                         |                         | Emission intensity         |                                    |
|                         |                         | Acceptance gain            |                                    |
|                         |                         | Sampling threshold         |                                    |
|                         |                         | Temperature correction     |                                    |
|                         |                         | Display correction         |                                    |
| Output settings         | Current settings        | Output 1 start point (4mA) | 4mA corresponding value            |
|                         |                         | Output 1 end point (20mA)  | 20mA corresponding value           |
|                         | Serial output           | Serial port address        | Factory default: 1                 |
|                         |                         | Serial port baud rate      | Factory default: 9600              |
|                         |                         | Calibration method         | Factory default: No calibration    |
|                         | Switch output           | 1 channel D value          |                                    |
|                         |                         | 1 channel H value          |                                    |
|                         |                         | 2 channel D value          |                                    |
|                         |                         | 2 channel H value          |                                    |
|                         |                         | 3 channel D value          |                                    |
|                         |                         | 3 channel H value          |                                    |
|                         |                         | 4 channel D Value          |                                    |
|                         |                         | 4 channel H value          |                                    |



|                  |                               |                                |                                                 |
|------------------|-------------------------------|--------------------------------|-------------------------------------------------|
|                  | Current adjustment            | Output 1 low end trim          | Corresponding to 4mA<br>(adjustment forbidden)  |
|                  |                               | Output 1 high end trim         | Corresponding to 20mA<br>(adjustment forbidden) |
| Data acquisition | Timed acquisition             |                                |                                                 |
|                  | Upper limit acquisition alarm |                                |                                                 |
|                  | Lower limit acquisition alarm |                                |                                                 |
| System settings  | Language settings             | Language                       | Chinese、 ENGLISH                                |
|                  | Time settings                 | Date settings                  |                                                 |
|                  |                               | Time settings                  |                                                 |
|                  | Display settings              | Contrast ratio                 |                                                 |
|                  |                               | Back lighting delay            |                                                 |
|                  | Power settings                | Low voltage automatic shutdown |                                                 |
|                  | Data management               | Backing up data                |                                                 |
|                  |                               | Restore parameters             |                                                 |
|                  |                               | Clear memory                   |                                                 |
|                  | Change password               | User Password                  |                                                 |
| Historical data  | Time-sharing statistics       |                                |                                                 |
|                  | Timed records                 |                                |                                                 |
|                  | Alarm records                 |                                |                                                 |
|                  | Power outage records          |                                |                                                 |

## 4.2 Ultrasonic level meter common menu settings

### 4.2.1 Installation height setting

① Press  under the measurement display screen to display the input password, the default password '00000'.

② Press  to enter the Menu Main Menu screen, the first item is Ultrasound Measurement and is checked in the checkbox.

③ Press  to enter the ultrasound measurement, the first item is the probe setting and is checked in the checkbox.

④ Press  to enter Probe setting, the first menu item is Mounting Height and is checked by the checkbox..

⑤ Press  to enter the mounting height, the second line shows the original value of the mounting height. The default is '4'.

⑥ Press the numeric keypad or   to enter the data.

⑦ Press  to confirm the settings and exit setup.

⑧ Press  three times to return and select whether to save.

⑨ Press  to confirm to save and enter the display screen.

### 4.2.2 Output start and end point settings

① Press  under the measurement display screen to display the input password, default password '00000'.

② Press  to enter the menu main menu screen, the first item is ultrasound measurement and is selected in

the checkbox.

- ③ Press  twice to check the output settings.
- ④ Press  to enter the output settings, the first item is current output and is checked in the selection box.
- ⑤ Press  to enter the current output, the first item is the start point of output 1 and is checked by the selection box.
- ⑥ Press  to enter the start point of Output 1. The second line shows the original value of the start point of Output 1.
- ⑦ Press the numeric keypad or   to enter the corresponding value of 4mA.
- ⑧ Press the numeric keypad and enter the corresponding value of 4mA.
- ⑨ Press  to confirm the setting.
- ⑩ Press  to return to the previous level, the first item is the start point of output 1 and is checked by the selection box.
- ⑪ Press  to check the output 1 end point.
- ⑫ Press  to enter the Output 1 end point. The second line shows the original value of the Output 1 end point.
- ⑬ Press the numeric keypad or   to enter the corresponding value of 20mA.
- ⑭ Press  to confirm the setting.
- ⑮ Press  three times to return and select whether to save.
- ⑯ Press  to confirm to save and enter the display screen.

#### 4.2.3 Switch output settings

- ① Press  under the measurement display screen to display the input password, the default password '00000'.
  - ② Press  to enter the menu main menu screen, the first item is ultrasound measurement and is selected in the checkbox.
  - ③ Press  twice to select the output setting.
  - ④ Press  to enter the output setting, the first item is current output and is checked by the selection box.
  - ⑤ Press  twice to select the switch output.
  - ⑥ Press  into the switch output, the first item is the 1-channel D value and is checked by the selection box.
  - ⑦ Press  to enter the 1-channel D value, and the second line shows the original value of the 1-channel D value.
  - ⑧ Press the numeric keypad or   to enter the corresponding data.
  - ⑨ Press  to confirm the setting.
  - ⑩ Press  to return to the previous level, where the first item is a 1-channel D value and is checked by the selection box.
  - ⑪ Press  to select 1 channel H value.
  - ⑫ Press  to enter one channel of H-values, the second line shows the original value of 1 channel of H-values.
  - ⑬ Press the numeric keypad or   to enter the corresponding data.
  - ⑭ Press  to confirm the setting.
  - ⑮ Press  three times to return and select whether to save.
  - ⑯ Press  to confirm the save well to enter the display screen.
  - ⑰ For other channels, just follow the above steps and select the corresponding menu settings.
-

#### 4.2.4 Shortcut key operation

From the main page, you can directly press the function shortcut key to access the specified function

|       |                                                                            |
|-------|----------------------------------------------------------------------------|
| Key 0 | Manual recording                                                           |
| Key 2 | Operational status (running time, measurement period, installation height) |
| Key 3 | Signal status                                                              |
| Key 7 | View data                                                                  |
| Key 8 | Power outage inquiry                                                       |

### 5. Relay output settings

There are 4 groups of relay outputs in this machine. When using relay control, you need to set the relay control point.

The D value is the relay start point and the H value is the relay stop point.

The operation is shown in the following diagram (assuming the display value is X):

**When the set D value is less than the H value:**

|                            |               |                             |               |                                |
|----------------------------|---------------|-----------------------------|---------------|--------------------------------|
| X less than D value closed | D-value point | D value < X < H value saved | H-value point | X is larger than H value break |
|----------------------------|---------------|-----------------------------|---------------|--------------------------------|

**When the set D value is greater than the H value:**

|                              |               |                             |               |                                  |
|------------------------------|---------------|-----------------------------|---------------|----------------------------------|
| X larger than D value closed | D-value point | D value > X > H value saved | H-value point | X less than H value disconnected |
|------------------------------|---------------|-----------------------------|---------------|----------------------------------|



## 6.Common problems and how to deal with them

Please deal with the malfunction during use as follows.

After treatment, the fault still exists or other phenomena appear, please contact our after-sales service personnel.

| Serial No. | Phenomenon                          | Possible reasons                                                             | Processing method                                                                                        |
|------------|-------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| 1          | None displayed                      | Not energized or DC power supply, output load is too large                   | Check the power connector, check the load, and check whether there is still power for the battery backup |
| 2          | Displayed, no measurement data      | Signal input not connected<br>Measurement turned off, parameter error        | Check input signal cable<br>Check software settings, system restore                                      |
| 3          | Clock inaccuracy                    | Not aligned or clock crystal deviation                                       | Go to the administration menu to retune                                                                  |
| 4          | No signal output or abnormal output | Wrong setting of relevant parameters<br>Current load resistance is too large | Check software settings, system restore<br>Current load resistance should be <300                        |
| 5          | Serial port communication exception | Wiring error or different settings of master and slave                       | Check RS485 wiring, check software settings                                                              |
| 6          | Display system error                | Setting parameters are missing                                               | System restore, reset all parameters                                                                     |
| 7          | Display input error                 | Error in input data                                                          | Check the data                                                                                           |
| 8          | Show USB error                      | USB flash drive is bad                                                       | USB flash drive replacement                                                                              |