# CX-ULM-A/R

# Ultrasonic level meter

# User Manual

## General information

Ultrasonic level measuring instrument, taking the advantages of various many level measuring instruments, is a universal one characterized by total digitalized and humanized design. It has perfect level monitoring, data transmission and man-machine communication. It is featured by strong anti-interference performance; free setting of upper and lower limits and online output regulation, on-site indication, optional analog, switching value, and RS485 output and easy connection with main unit. The cover, made of waterproof engineering plastics, is small and firm with ABS probe. Therefore, it is applicable for various fields concerning level measuring and monitoring. According to the practical situation, it also can add other modules, such as RS 485, current output; it can be match with PLC better.

## Characteristics

- DC12-24V wide work voltage
- Backup and recovery parameter set
- Free adjustment of the range of analog output
- Set a filter value to remove
- Custom serial port data format
- Optional increment/difference distance measurement to measure air space or liquid level
- 1-15 transmitted pulse intensity depending on working conditions

**More choices depend on your requirement, as bellowing:**
3 NPN output
2 relay output
Voltage output
RS485output connect with PC
Explosion-proof

## Specifications

Range：3m， 8m， 10m, 12m, 15m
Blind zone：＜0.4-0.5m（different for range）

Range：20m， 25m， 30m
Blind zone：＜1-1.5m（different for range）

Measure error： 0.3%F.S
Display： LED or LCD
Display resolution：1mm

Frequency:：20～350KHz
Power: 12-24VDC
Power consumption：<1.5W
3 wire Output (optional)：
       4～20mA RL>600Ω（standard）
       1～5V\1～10V
       RS485
       3 NPN
       2 relays (AC: 5A 250V DC: 10A 24V)
2 wire Output (optional)：
       4～20mA RL>600Ω（standard）
       4～20mA +HART
Material：ABS
Dimension：Φ92mm×198mm×M60
Electrical interface：M20X1.5
Installation：M60X2 or ∅61MM
flange connection:dia.195 （DN80)
Operating surroundings：normal temperature, normal pressure
Protection degree：IP65(others optional)

## Menu operation and parameters setting

| 4.1 Setting Step | | | |
|---|---|---|---|
| The instrument is OLD display, with key operation prompts. Press **A** appears prompt interface。 according to the prompt， operation can be work. | | | |
| **4.2 Menu and Function** | | | |
| **One level** | **Two stage menu** | **Three level** | **Four level** |
| **Mounting** | **Work Mode** | **Range Mode** | |
| | | **Water Level Mode** | **Input Mounting Height** |
| | | | **Input Level Value** |
| | **Environment** | | |
| **Output** | **Analog** | **F0** | |
| | | **FS** | |
| | | **L. Regul.** | |
| | | **H. Regul.** | |
| | | **Analog Config** | |
| | **Serial** | **Address** | |
| | | **Baud Rate** | |
| | | **Check** | |
| | | **Delay** | |

| | | | |
|---|---|---|---|
| | | Serial Read And Write | |
| | | Custom Sinks | |
| | | Custom Send | |
| | Switch | No.1 D | |
| | | No.1 H | |
| | | No.2 D | |
| | | No.2 H | |
| | | No.3 D | |
| | | No.3 H | |
| | | Switch Config | |
| Display | Display Unit | | |
| | Reserved Decimal Number | | |
| | Display Conversion | | |
| | Contrast | | |
| | Display Delay | | |
| Probe | Medium | Medium Selection | |
| | | Custom Speed | |
| | Characteristic | Type | |
| | | Cycle | |
| | | Range | |
| | | Blind | |
| | | Intensity | |
| | | Gain | |
| | Filtering | | |
| | Calibration | | |
| | Amendment | Temperature Correction | |
| | | Display Correction | |
| | | Linear Correction | |
| System | Set User | User | |
| | | Admin | |
| | | Vendors | |
| | Power Consumption | Wake Up Cycle | |
| | | Work Time | |
| | | Voltage Protection | |
| | Language | | |
| | Quick Start | | |
| | Supply Voltage Correction | | |
| | CPU Clock Calibration | | |
| | Restore | | |
| | Backup | | |

# Installation and precaution

## 5.1 Sensor installation

   **5.1.1** Sensor should be placed where there is no obstacle between emission surfaces and measured liquid, it also should be far way from feeding throats, **chartⅠ.**

   **5.1.2** Tank shape should be considered. Some type of container will bring second echo, especially conical and spherical tank. A good installation place will solve the problem, **chart Ⅱ.**
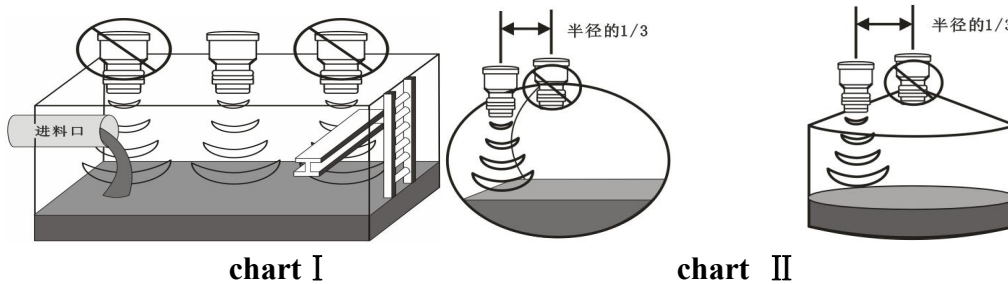


**chartⅠ**                    **chart Ⅱ**

   **5.1.3** Lever meter can be installed by flange or ∅61 hole, whatever installation way, make sure the sensor bottom through the installation hole or flange, **chartⅢ.**
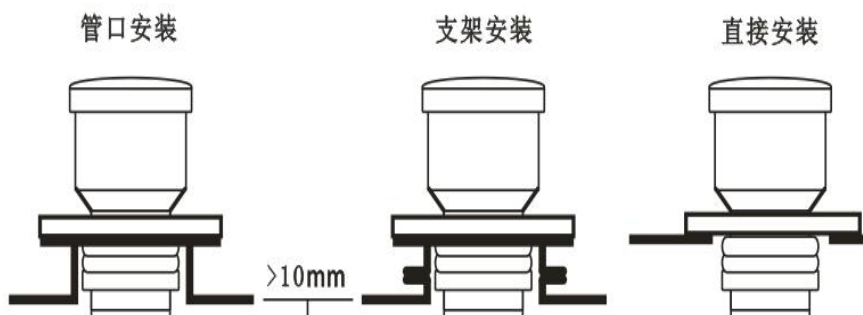


**5.1.4** If the liquid to be measured has sewage, afloat impurities or fluctuation, use a waveguide and the diameter of the waveguide should over 120mm, **chartⅣ**
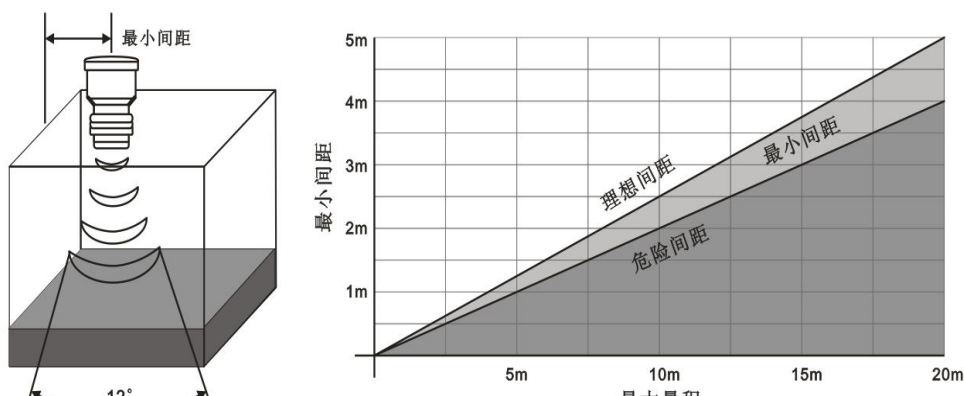
### 5.2 Work mode

#### 5.2.1 Measure liquid level

B（Installation Height）is the distance from bottom of container to sensor surface，A is the distance between sensor surface and liquid surface，**D** is the height of liquid，D= B（Installation Height）-A，display value is bottom of container to liquid surface（D）.

#### 5.2.2 Measure air distance

Set **BD** =0，display value is distance from sensor surface to liquid surface（**A**）.

#### 5.3 Environment and Filtering

This instrument default dynamic filtering, to avoid the filter interference of mixing, tank walls, and other fixed bars. But for totally enclosed smal space or other easily formed secondary echo environment, it's not reliable When the display value is about twice the actual value regularly, change "**Environment**"to"**Closed**"。
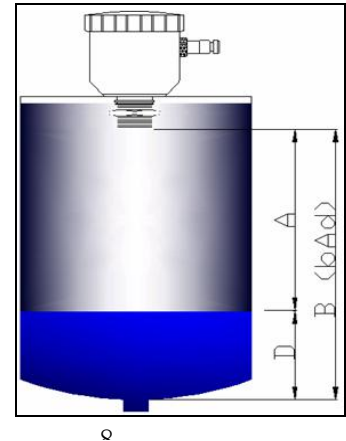
**5.4** DC12V power is better. When it's from switch power, the DC negative must contact ground. Refer to the tags attached on the instrument for wiring. In order to keep it working reliable and display precise , please electrify ＞15 minutes before work. When operated outdoors, it should be placed under a sun screen to avoid direct under sunshine and rain. Lightning proof measures should also be taken out door.

## Wiring diagrams

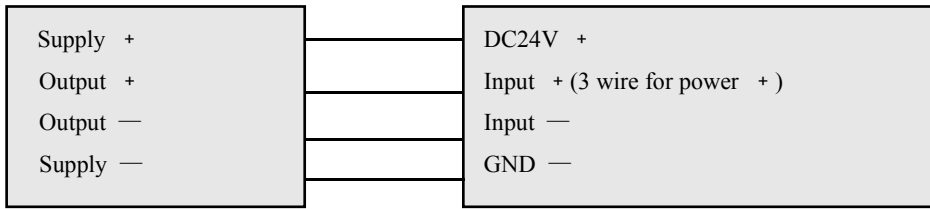**6.1** Refer to the tags attached on the instrument for wiring.
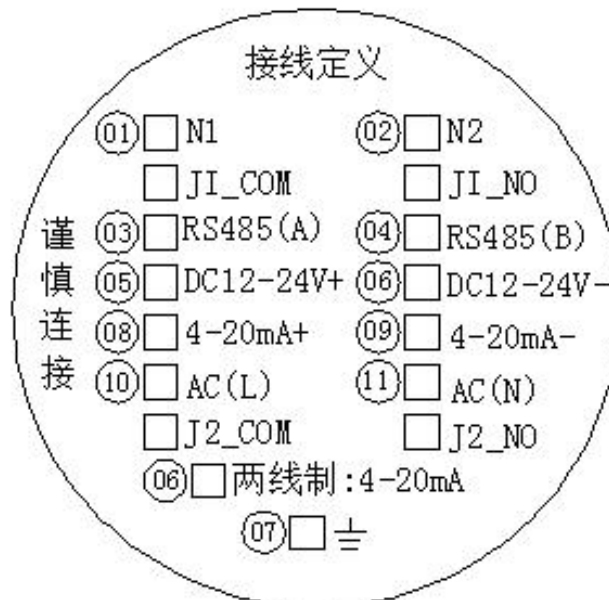
**6.2** Wiring diagram of current (voltage) output connecting with secondary instrument
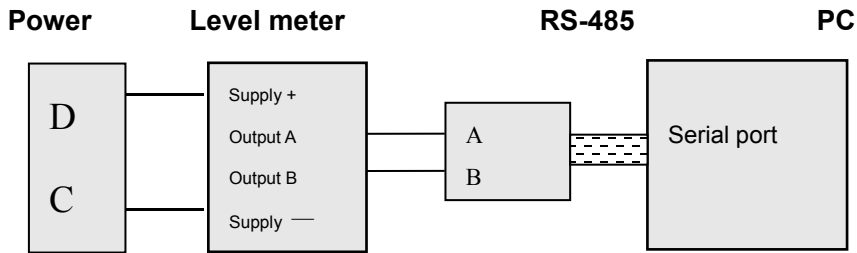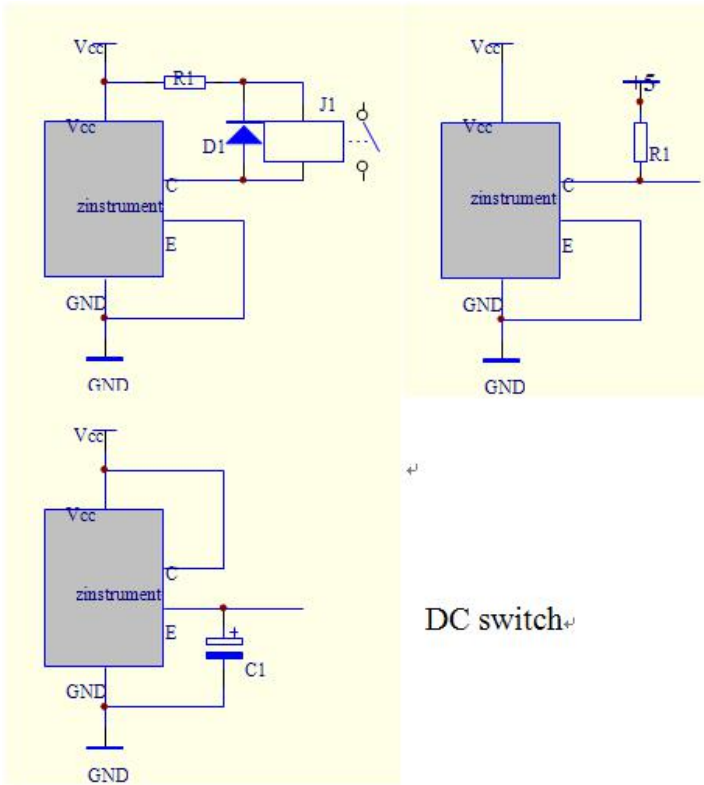
| Level meter | | Secondary instrument |
|---|---|---|

| Supply  + | | DC24V  + |
| Output  + | | Input  + (3 wire for power  + ) |
| Output — | | Input — |
| Supply — | | GND — |

## 6.3 serial output connecting with PC

**Power**    **Level meter**                **RS-485**          **PC**

| D C | | Supply +<br>Output A<br>Output B<br>Supply — | | A<br>B | | Serial port |

## 6.4 NPN output wiring diagram

**Conventional relay**              **TTL output**



DC switch

## Relay output setting：

This instrument has 2 relays or 3 NPN output. When uses relay control, it must be set control point: D and H. D for relay start point, H for relay end point. X for display value. It works as follows:

When D < H

| X < D close | D | D<X<H retain | H | X > H Disconnect |
|---|---|---|---|---|
| | | | | |

when D > H

| X > D close | D | D>X>H retain | H | X < H Disconnect |
|---|---|---|---|---|
| | | | | |

## Trouble shooting

| 1, Not working，no display, no sound |
|---|
| Probable reason: |
| ① Power is not connected or "+""-"polarities are connected reversely |
| ② Too low voltage resulting no working or too high resulting damage |
| Remedy: |
| ① Check to ensure correct wiring as instructed. |
| ② Use 12-24V DC supply, or contact with distributor |
| 2, No display, sensor has sound |
| Probable reason: |
| ① Turning off |
| ② Connected to high voltage, damaging display chip |
| Remedy: |
| ① Press "B" to turn on display; |
| ②contact with distributor. |
| 3, With sound and display, but the values not change with distance |
| ① Too low input voltage |
| ② Sensor or power driver damaged |
| Remedy |
| ①12-24V DC supply |
| ②Contact with distributor |
| 4, With display ,but value is irregular fluctuation |
| Probable reason |
| ① Deflective   installation |
| ② improper setting of pulse intensity, leading to great   residual vibration or diffraction |
| ③ more than 2 instruments work together, interfering each other |

| |
|---|
| ④ too much electromagnetic disturbance in working area |
| ⑤ There are bubbles or debris on liquid |
| Remedy |
| ① Adjust the axis of sensor vertical to surface to be measured |
| ② in general, range of 1-3m, transmit intensity is 2-5 |
| ③ try to eliminate interference |
| ④ find out disturbance source and shield |
| ⑤ eliminate bubbles or debris |
| 5, Big error |
| Probable reason |
| ①Non vertical installation, leading to multiple reflection　②installed too close to wall,　sonic wave reflected　midway③ check **"BD"**④ check　temperature　display |
| Remedy |
| ①Adjust installation positions several times.② correctly set **"BD"**　③adjust temperature (**"TE"**) to proper value. |
| 6, Abnormal current output |
| Probable reason |
| ①Too large load resistance ②**FS, AL or AH** changed. ③ undesired supply rectification and filtering　④ electrify time is not enough |
| Remedy |
| ①Lower load resistance ②readjust parameter③ replace with DC regulated supply with larger capacity ④electrify ＞15 minutes before work |
| 7, Abnormal RS485 output |
| Probable reason |
| ①Reverse connecting of A and B ②incorrect parameter of serial ports, its not match with main　unit |
| Remedy |
| ① Change wiring, ②reset parameter, same with main unit |
| 8, Abnormal control output |
| Probable reason |
| ①Wrong parameter. Setting ②external current-limiting resistor too large ③external current-limiting resistor too small, damaging the level meter |
| Remedy |
| ① Reset parameter |
| ②decrease current-limiting resistor ③ contact with distributor |

# Manufacturer Certificate

**Mode** : _____

**Item No.**： _____

Main specification

Sense range：FS= __10__ m

Unusable area：≤□400mm；■500mm；□1000mm □other_____

Accuracy：■±0.25％×max range；□±2mm；□other_____

Display　resolution：1mm

Output：□0-20mA；■4-20mA；□0-5V；□1-5V；

　　　□ 0-10V；□1-10V；■RS485；□other

Working temperature：■normal；□-10-60℃；□other

Working pressure：■normal；□other

Working humidity：≤80%RH

Storage temperature：-40—85℃

Storage humidity：≤70%RH

Working voltage：12-24V　DC

Normal power consumption：＜1.5W

Inspected by：

Delivery date

# Guarantee log

| Purchaser | | Telephone | |
|---|---|---|---|
| Address | | Post code | |
| Product | | Type | |
| Item No. | | Delivery date | |
| Repair record | | | |
| Notes | 1. According to **THREE GUARANTEES,** When there are problems with the product under correct operation, it can be refunded, changed and repaired free of charge within one week, three months and one year respectively from the day it was bought.<br>2. For the problems caused by improper use, only the cost of material will be charged.<br>3. The product can not be dismantled or unsealed without manufacturer's agreement; otherwise the repair service is not available.<br>4. The freight out and home in relation to repair will be paid by customer. | | |