ULM-8920
Ultrasonic Level Meter Transmitter

Operation manual

V1.1

Foreword

Thank you for using ULM-8920 Ultrasonic Level Meter Transmitter! Please read this introduction carefully before installation, correct sensor installation and parameter setting will use the performance and advantage of the product in the best way, bringing you a good using experience.

This instrument is a precision process analysis and control instrument, and it should be installed, operated and repaired by trained personnel or other personnel who understand and grasp this professional knowledge.

If you meet some difficulties in the process of the installation and using, please inquire Technical Support Department in time.

After unpacking, please be sure to check the complete set of list and the actual product you received, if there is anything missing or damaged, please contact in time.

The manufacturer promises seriously:

1. If quality problems appear within one year from the date of purchase, you will receive free product repair or replacement of a new instrument.
2. No matter in what way you get this product, manufacturer provides eternal technical maintenance as a promise for the sold instruments.

3. Damages to the product caused by the following reasons are not within the scope of the warranty:

A、Misconnection with high voltage power source or damage caused

by flooding;

B、 Damage caused by privately refitting and improper use;

C、 Collateral damage because of the improper selection of model;

D、Damage caused by going beyond the using conditions of the product;

E、 All physical damage caused by the improper pressure;

F、Failure appears because storage and transportation are not in accordance with the stipulations of storage or transportation conditions (reference standard SJ/T10463-93);

G、 All damage caused by force majeure ;

H、Consumable materials need to purchase separately.

 When this symbol appears in the manual, it means that something about safety, installation, product function and using should be paid special attention!

Content

1、Overview

ULM-8920 Ultrasonic Level Meter Transmitter has advantages of cost-effective and general-use .This product uses the latest ASIC related imports of industrial grade microcontroller and wide input voltage regulator, etc.Related ASIC,with the modular design of the circuit;top multi-layer PCB board;compact layout reasonable hardware design to ensure that the measured data and a stable and reliable information processing.You can add modules to achieve other functions (such as: Bluetooth, GPRS communications, etc.) according to customer demand so that the product has a very high compatibility and vitality.

Non-contact detection method, more health, more resistant to moisture, dust, high temperature, corrosive gas and other harsh environments.

Therefore, this product can be widely applied to the material level, liquid level measurement and control ,etc..

1.1 Performance characteristics

☆ voltage range wide, DC voltage (9-32) V;

☆ two-channel semiconductor photoelectric switch control output

☆ can be set to any output starting and ending;

☆ manually set the digital filter ;

☆ set emission intensity according condition;

☆ a serial communication, better compatibility with different scene.

1.2 Measure principle

Ultrasonic sensors emit ultrasonic waves under control of the microprocessor.Ultrasonic wave reflected by the measuring surface and then received by the sensor, this procedure can be an ultrasonic wave propagation time t, due to the propagation of acoustic waves in the same medium speed c is fixed depending on the medium, the distance between the surface and the sensor of the measuring emission port s according to the formula: s = ct / 2. If the level / thickness measurement applications, the distance H emission sensor port at the bottom of the container is constant, the liquid / thickness h according to the formula: h = H-s.

1.3 Application fields

It widely used in liquid-level measurement and material-level in the oil, paper, mining, power plants, chemical industry, water treatment plants, waste water purification, pharmaceutical, agricultural pumping, environmental monitoring, sewage treatment and other fields .

1.4 Technical specification

Model	ULM-8920
Measurement range	3m（The longer can be customized ）
Dead zone	0.3m（can be customized ）
Resolution	0.001m
Accuracy	±0.3%×FS or ±2mm(max)

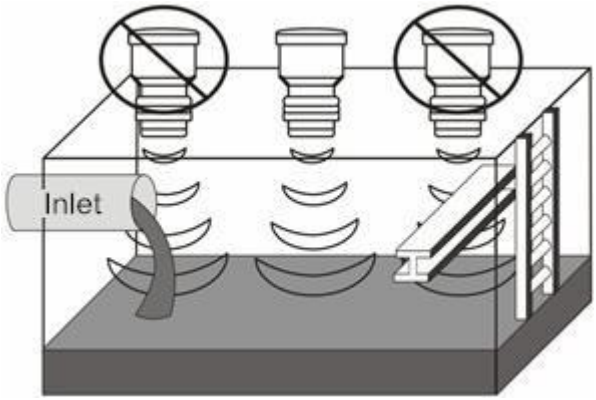
Display	4 LED	
Transmitting Output	No.of channel	Single channel (4~20)mA
	Loop resistance	RL > 600Ω
Commmunication port	RS-485（Modbus protol）	
Control output	No.of Channel	Double channels
	Electrical contact	Semiconductor photoelectric relay 50mA（Max），AC/DC 30V
Working power source	Power supply	DC (12~24)V
	Power Consumption	≤1.5W
Working environment	Temperature:(0~50) ℃; Relative humidity: ≤85%RH(none condensation)	
Storage environment	Temperature:(-40~85) ℃; Pressure: Normal ; Relative humidity: ≤85%RH(none condensation)	
Protection	IP65	
Dimension size	90mm×200mm×(M60)	
Installation method	Installation hole M60×2	

2、Installation

2.1 Normal installation

Ultrasonic probe produced a certain conical wave front propagation from the surface of the probe out,In this area, there should be no obstacle object and the installation location should be away from the inlet. Installation position of the probe should be chosen position no obstacle exists between the emission surface and the probe .

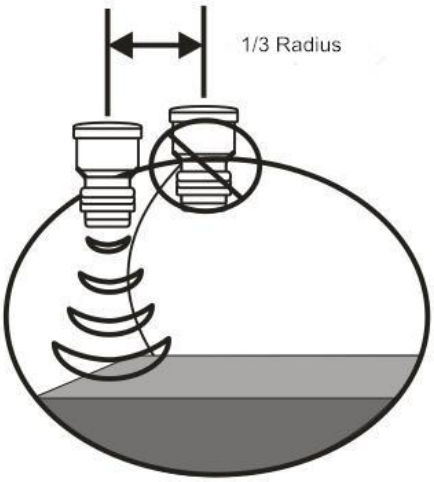
As the follow showing :

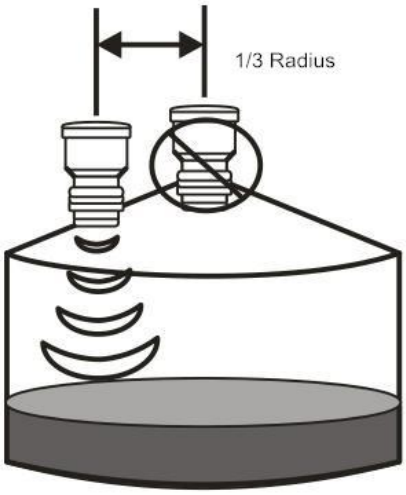


2.2 Special installation

When installing probe you need consider the shape of the container, some non-rectangular container secondary echoes.Such problems are mainly concentrated in the top of the cone and spherical containers.This particular shape can be emitted echo refocusing and amplified erroneous readings.Select the correct position can be effectively reduced this effect.

As the follow showing :



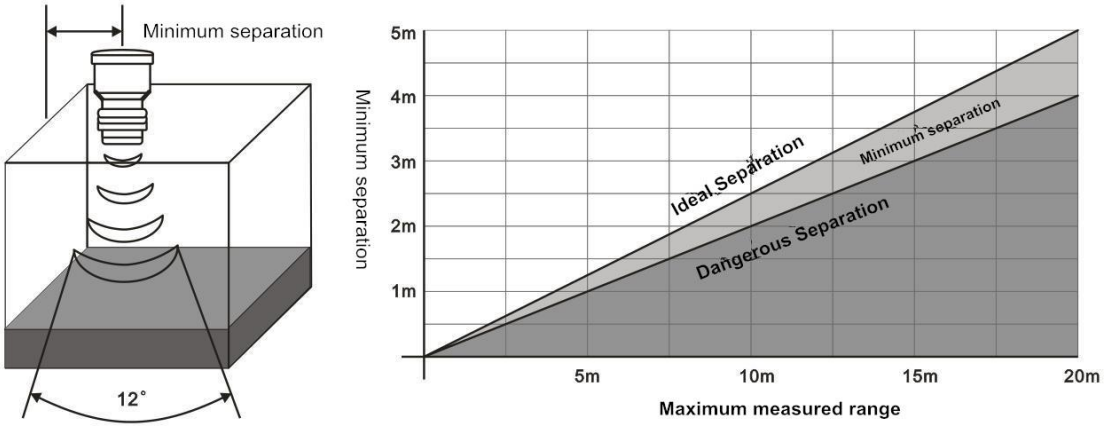


2.3 Installation Connection

Sensors can be installed with standard M60×2 thread.

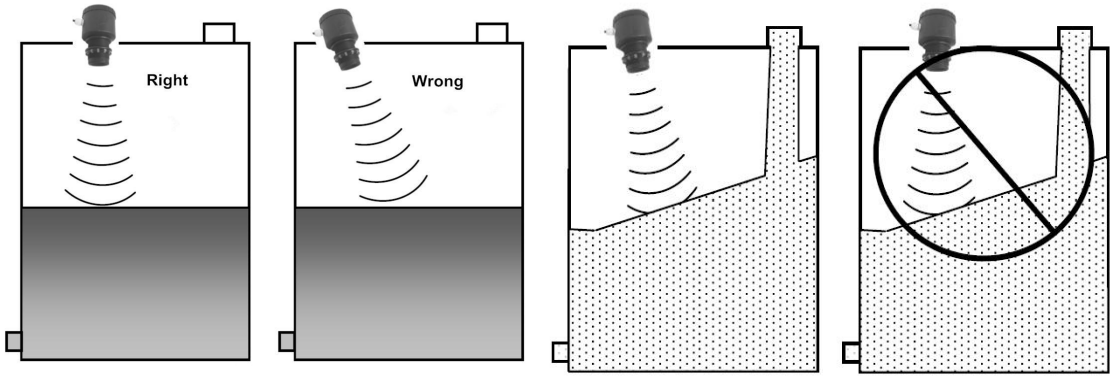
2.4 Probe installation distance

Installation of the probe emits sound waves should be avoided and the container wall intersection of reflection,The distance between the probe and the vessel wall should be within the "ideal spacing" area as the follow showing ;If you install distance less than the distance from the "ideal spacing" area under the lower limit,the probe should be installed in the "minimum interval" area.If the distance from the side wall of the probe is in "dangerous pitch" area,the accuracy of the measured value of the instrument will not be guaranteed.



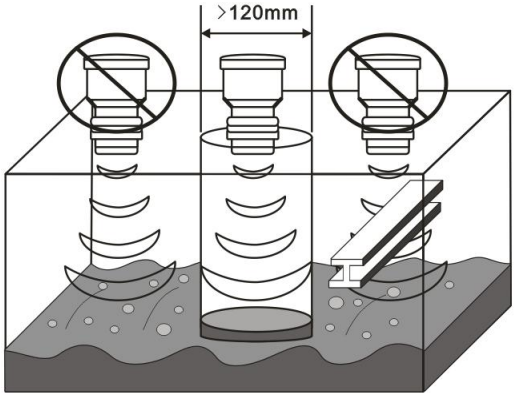
2.5 Probe installation Position

When measuring, the probe should be installed vertically material surface, and avoid the inlet.As the follow showing :

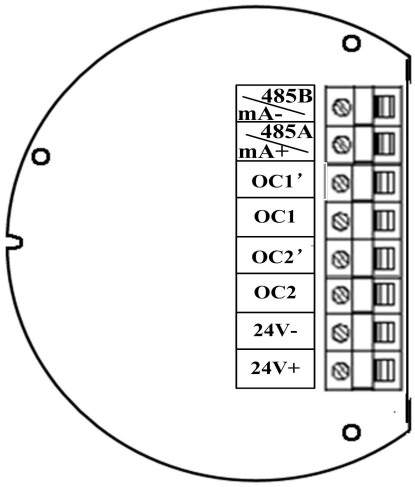


2.6 Waveguide installation

Ultrasonic measurement for quiet wave of liquid surface for best results, if the liquid surface debris, air bubbles or greater volatility, should be retrofitted waveguide. Waveguide diameter should be greater than 120mm, and no joints. As the follow showing :



2.7 Terminal definition



Terminal Wiring Instructions:

24V+	Power supply，DC24V+
24V-	Power supply ，DC24V-
OC2/OC2’	Photoelectric second switch control outputs
OC1/OC1’	photoelectric first switch control outputs
mA+/485A	（4～20）mA output +/RS-485 output A
mA-/485B	（4～20）mA output -/RS-485 output B

RS485 communication mode and mA meter mode is selected by DIP switch inside the transmitter converts the (1,2) to ON DIP switch on (3,4) allocated to OFF, it represents mA mode; the DIP switch dial onto the (1,2) OFF, (3,4) allocated to oN, which represents RS485 mode..

Note: When dialing the code switch, you must interrupt the power supply, or the instrument will be burnt out .

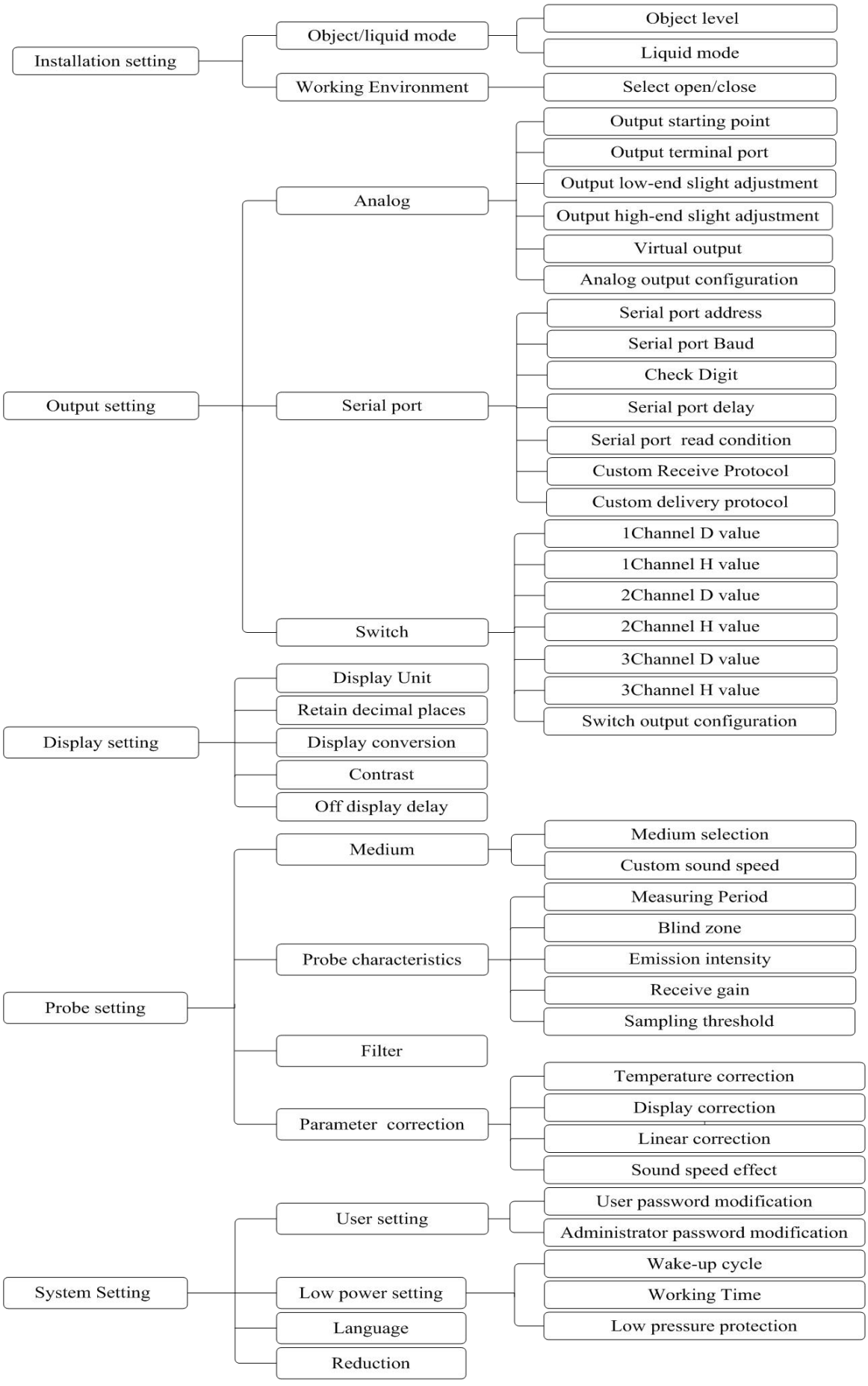
3、Debugging

3.1 Key operation

Key symbols	Name	Function
	Select key	1. parameter setting state circularly select thousand, hundred, tenth, units' digit; 2. return up one level or back to the main interface;
	Multiply key	1.parameter setting state adjust numerical value of the selected digits; parameter setting state up and down Select key;
	Confirm key	1.enter user login interface; 2.confirm to save parameter, pass into the next menu.

3.2 Menu Settings

In normal operation,click  key, enter to the user login interface, click  key, enter to the password input interface, The default user password is 0000. Clicking  key can switch normal user and administrator permission before inputting the password. The default engineer password is 1000, after inputting, enter to the menu interface, menu content as follows:


Installation setting
Object/liquid mode
Object level
Liquid mode
Working Environment
Select open/close
Output setting
Analog
Output starting point
Output terminal port
Output low-end slight adjustment
Output high-end slight adjustment
Virtual output
Analog output configuration
Serial port
Serial port address
Serial port Baud
Check Digit
Serial port delay
Serial port read condition
Custom Receive Protocol
Custom delivery protocol
Switch
1Channel D value
1Channel H value
2Channel D value
2Channel H value
3Channel D value
3Channel H value
Switch output configuration
Display setting
Display Unit
Retain decimal places
Display conversion
Contrast
Off display delay
Probe setting
Medium
Medium selection
Custom sound speed
Probe characteristics
Measuring Period
Blind zone
Emission intensity
Receive gain
Sampling threshold
Filter
Parameter correction
Temperature correction
Display correction
Linear correction
Sound speed effect
System Setting
User setting
User password modification
Administrator password modification
Low power setting
Wake-up cycle
Working Time
Low pressure protection
Language
Reduction

The details for the menu setting：

Menu Item	Function
Height setting	Set the current actual fill level, according to the distance actually measured liquid level and set the gauge to calculate the total height from the bottom, used to calculate the real-time level;
Filter constant	Digital filtering;larger filter value ,smaller fluctuations
Control output	Separated set OC1 and OC2,The two channels normally open and normally closed operation to lift the value of value;
Level value	Set the Corresponded range to 4mA and 20mA
Baud rate/address	Set the baud rate and address of RS485;
Contrast	Set the screen contrast ;
Back light setting	Set the backlight normally on and delay close or delay off time;
Password Setting	Set the user login password (engineering universal user password is 1999);
Language selection	Set the Chinese /English display
Manufacturer info	View the manufacturer's information
Note: Totalizer factor, dividing the value of the probe range, probe blind, emission intensity, probe type, receive gain, temperature correction, display correction, linearity correction; channel III;4mA Calibration, 20mA calibration menu for the reference parameter;the customer can not set the 4mA Calibration, 20mA calibration	

4、Precautions for use

1. In order to obtain accurate and stable measurement values, before using level meter,It’s better be powered warmed up for 15 minutes;

2. When measuring / reflective interface in the blind spot, level meter showing the value of a meaningless random values;

3. To improve the level meter life, after installation, commissioning and observation is complete, tighten the protection cover to prevent moisture or dust into the internal level meter.When field use, please set up above the awning at the level meter and the conduct mine processing;

4. As Level Instrument sensitivity is very high, the level meter installation

can not too close to the noise, and the electromagnetic interference.If the ambient air flow volume, temperature and humidity is not within range,temperature changes too fast and unstable installation (sharp shock, shaking), etc. will affect the stability level meter, level meter even shorten life;

5. When using a level meter in a small space, level instrument rear (with the probe pointing in the opposite direction) of the non-measurement object such as a wall / obstacle of wall surface should be acoustic treatment to prevent multiple reflections of sound waves caused by diffraction interference, so that level meter is not working properly.

5、Fault diagnosis

Analysis of Normal Faults

Phenomenon	Possible factors	Elimination methods
Power-on instruments no display	A.Not get power supply; B.Instrument is damaged during storage or transportation C. the voltage too high or too low	A Check whether there is DC 24V voltage among input terminal of the instrument. B.Please contact the after-sale C. Correct voltage,If still not work ,please contact the after-sale.
After run a period of time no display	A.Entered the standby state of low consumption B. Disturbed	A. Press any key to wake up display B. If press any button is invalid please reset , if the fault persists or very frequently, please contact the after-sale .
Measured value does not change against the distance change	A. The power supply voltage is too low, the probe is not action B. The probe or the module be damaged	A.As required voltage supply; B.Please contact the after-sale
Measured value show not instability	A.Level meter installation skew B. Emission intensity is set incorrectly C. There are more than two	A. The level meter to adjust to the measurement axis perpendicular to the plane; B. Inner (3 ~ 5) m range, strength can

	level meter at work, interfere with each other D. Environmental electromagnetic interference is too large E. Channel-related parameters are changed	be set to 2 to 5; C. Increasing the spatial distance or the direction of approach eliminates mutual interference; D. Shielding the source of interference; E. Please contact the after-sale.
Measured value exceeds the range or blind	A.Operating range exceed the level meter range B. Measuring in blind C. High dust, high foam or high steam environments, reflection interference	A. Adjust the level meter operating range; B. Adjusting the level meter operating range; C.Adjust the application environment.
Measurement error reaches more than a dozen centimeters	A. Mounted not be vertically, causing multiple reflections B. Installation location close to the vessel wall, halfway acoustic reflex C. Installation location setting error	A. Adjust the level meter operating range; B. Adjusting the level meter operating range; C.Fixed height setting parameters.
(4~20)mA output abnormal	A. Load resistance is too large B. Output of the start and end sets exception C. Poor power rectifier and filter	A. Reduce the load resistance; B. Adjust the output setting start and end; C. Replace stable voltage source.
No communication	A. RS-485 the A, B reversed B. Communication setting with the host is inconsistent	A. Correct wiring; B. Setting Level Communication parameters.

6、Complete set

Ultrasonic level meter transmitter One set (with the Protective cover)

Operating instrument One copy

Certificate One piece