Ultrasonic level transmitter

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U-ZZP-MYEN4

Preface

Thank you for purchasing Ultrasonic level transmitter. Please read this manual carefully before operating and using it correctly to avoid unnecessary losses caused by false operation.

Note

- Modification of this manual's contents will not be notified as a result of some factors, such as function upgrading.
- We try our best to guarantee that the manual content is accurate, if you find something wrong or incorrect, please contact us.
- This product is forbidden to use in explosion-proof occasions.

Version

U-ZZP-MYEN4

Contents

Chapter 1 Introduction

This manual applies to the two-wire / three-wire ultrasonic level meter. Please check the corresponding menu of the product the function and modification parameters carefully. Ultrasonic level meter is a universal level meter that has the advantages of various other level gauges to realize a fully digital and humanized design. It has perfect level measurement and control, data transmission and man-machine communication functions. This product adopts modular circuit design, military-quality multi-layer PCB board, tight hardware structure and reasonable layout. This product supports isolated 4 ~ 20mA, HART output, built-in GPRS, LORA, GPS, RF, Bluetooth and other wireless data transmission modules, and can also add modules to achieve other functions according to customer needs.

This product uses imported industrial-grade chips, digital temperature compensation and other related special integrated circuits. It has strong anti-interference ability, and can set upper and lower limit, online output adjustment arbitrarily, and has local display. The shell is made of engineering plastic ABS waterproof shell. The shell is small and quite sturdy. This product can meet most of the measurement requirements of liquid level and material level without contacting industrial media, completely solves the shortcomings of winding, clogging, leakage, medium corrosion, and inconvenient maintenance caused by traditional measurement methods such as pressure type, capacitance type, and float type level meter. Therefore, it can be widely used in various fields related to material level and liquid level measurement and control

Chapter 2 Characteristics

- DC 6-32V 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
- Capable with 3-/ 4-Wire
- 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
- 4-20mA output, 0-5V voltage output, RS485/ HART output connects with PC
- Wireless transmission: RF, GPRS, LORA, Bluetooth etc.
- PC serial port output and conversion, can be directly connected with PC unit network

Chapter 3 Parameter

Range	5,10, 15m (optional)
Blind zone	＜0.4-0.6m（different for range）
Measure error	±0.3% F. S
Display	OLED
Display resolution	1mm
Frequency	20～350KHz (differ from the model)
Power	12-24VDC, 18-28VDC (two Wire), 220VAC, build in battery
Power consumption	<1.5W
Output (optional)	4～20mA RL>600Ω(Standard), 1～5V\1～10V, RS485, 2 relays (AC 5A 250V DC 10A 24V), HART(two wire), 3-Channel NPN
Material	ABS, PP
Dimension	Φ92mm×198mm×M60/ 92mm×270mm×DN80
Electrical interface	M20X1.5
Installation	M60X2 or ∅61MM/ DN80 (Flange)
Operating surroundings	normal temperature, normal pressure
Protection degree	IP65(others optional)

Chapter 4 Operation & setting

The instrument is OLED display, with key operation instruction. Press A appears instruction interface. According to the instruction，operation can be work.

1: Users' manual Power on press A then press C twice enter the manual. (no password)

4.1.1 Examples of basic setup steps			
The instrument is displayed as an OLED display with a key operation prompt function. Press A to display the key prompt interface, just follow the prompts. The default user password is "0000" and the administrator password is "1000"			
(A) Menu, shift, return (B) Scroll down, add up (C) Confirm			
4.2 Menu and functions			
primary menu	Secondary menu	Tertiary menu	Quaternary menu
Installation settings	solid/liquid mode	solid level	Installation Height "0"
		liquid level	Enter installation Height(m)
			Enter level height(m)
	working environment		
output settings	analog value	output start	corresponds to 4mA
		output end	corresponds to 20mA
		adjust output lower limit	not changeable
		adjust output higher limit	not changeable
		virtule output	default "0"
		Analog output configeration	default "V0E0"
	Serial port	Serial port address	0~255
		Serial baud rate	900~36000
		Check Digit	
		Serial port delay	

		Serial read and write status	
		Custom receive protocol	
		Custom sending protocol	
	Switch	1 Channel D value	Default unit（m）
		1 Channel H value	Default unit（m）
		2 Channel D value	Default unit（m）
		2 Channel H value	Default unit（m）
		3 Channel D value	Default unit（m）
		3 Channel H value	Default unit（m）
		Switch output configuration	
Display settings	unit		
	Retain decimal places		
	Show conversion		
	Contrast		
	Off display delay		
Prob settings	Medium	Choose the Medium	
		enter sound speed	
	Probe characteristics	Measurement period	
		Blind Zone	Not recommended to modify
		Emission intensity	
		Receive gain	
		Sampling threshold	
	Filtering		

	Parameter correction	Temperature correction	
		Display correction	
		Linear correction	Not recommended to modify
		Sonic boom	
System settings	user settings	User password modification	
		Administrator password modification	
	Low power settings	Wake up cycle	
		operating hours	
		Low voltage protection	
	Language	Chinese、English	
	Reset		
The custom configuration format is as follows: Example: H; M40u8;			
Note: Use ";" to separate different sentences. Configure parameters in the form of keywords + numbers.			
The available keywords are: H means to communicate in hexadecimal mode; the characters in "" double quotes are sent directly; M digital menu (character mode: d decimal places, l reserved data length; Hex mode: u8 single byte, u16 Double byte, u32 four bytes); T time format; S string menu; Y system characters; E check mode (E1 XOR E2 CRC low bit first E3 CRC high bit first).			
Clear the custom protocol menu, this machine will only support Modbus_RTU and AT command format.			
AT command format description: read menu item AT + MENU + menu number? \ R \ n			
Write menu item AT + MENU + menu number = xxxx \ r \ n			
Save parameter AT + EEPROM = WRITE \ r \ n			
Read parameter AT + EEPROM = READ \ r \ n			
Restore parameter AT + EEPROM = RECOVERY \ r \ n			

Read data from SD card AT + DATA? \ R \ n
\ r \ n is the carriage return and line feed character on the keyboard.

Menu of two-wire ultrasonic level transmitter

4.1.2Examples of basic setup steps
he instrument is displayed as an OLED display with a key operation prompt function. Press A to display the key prompt interface, just follow the prompts. The default user password is "0000" and the administrator password is "1000"
(A) Menu, shift, return   (B) Scroll down, add up   (C) Confirm
4.2 Menu and other functions

primary menu	Secondary menu	Tertiary menu	Quaternary menu	Remarkes
User login				"0000"
Administrator login				"1000"
Installation settings	solid/liquid mode	solid level		Installation Height"0"
		liquid level	Enter installation Height(m)	Enter installation Height(m)
			Enter level height(m)	Enter level height(m)
	working enviroment			Open or closed
output settings	analog value	output start		corresponds to 4mA
		output end		corresponds to 20mA

		adjust output lower limit		not changeable
		adjust output higher limit		not changeable
		virtule output		default "0"
		Analog output configeration		default "V0E0"
		Config		
	Serial port	Serial port address		HARTDevice address
		Serial read and write status		
Display settings	unit			
	Retain decimal places			
	Show conversion			
	Contrast			
	Off display delay			
Prob settings	Medium	Choose the Medium		Not recommended to modify
		enter sound speed		
	Probe characteristics	Measurement period		
		Blind Zone		

		Emission intensity		
		Receive gain		
		Sampling threshold		
	Filtering			
	Parameter correction	Temperature correction		Not recommended to modify
		Display correction		
		Linear correction		
		Sonic boom		

Chapter 5 Installation & precaution

5.1 Sensor installation

- Sensor should be placed where there is no obstacle between emission surfaces and measured liquid, it also should be far away from feeding throats, chart 1.

- 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 2.
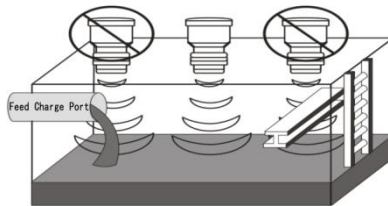
Figures 1
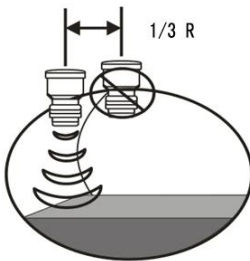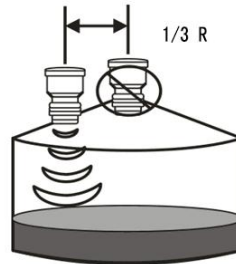
Figures 2   **Figures 3**

- Lever meter can be installed by flange or ϕ61 hole, whatever installation way, make sure the sensor bottom through the installation hole or flange, chart 3.
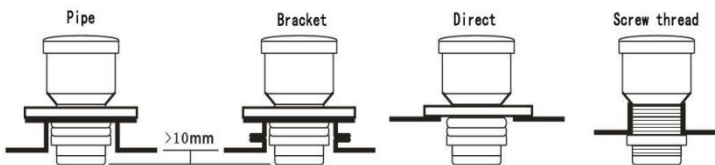
Figures 3

● If the liquid to be measured has sewage, afloat impurities or fluctuation,use a waveguide and the diameter of the waveguide should over 120mm,chart 5
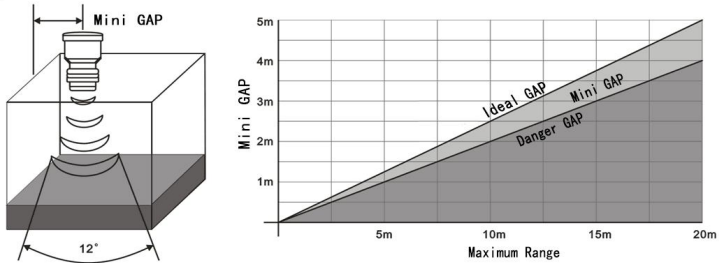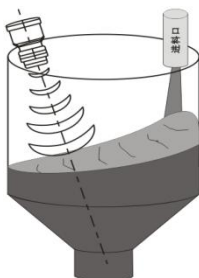

Figures 5

● In the measurement of solid materials, the probe needs to be typically installed at a distance from the side wall 1/3 of the container wall to the center feed inlet. When the material piles up, it will form a cone. The installation positions of the probes shown in Figures 6 and 7 will give a reading of the average level. This average level is the level height when the material is leveled. This is true for conical stacking or concave stacking surfaces that occur during unloading.

The average level height measured by this installation is only correct for cylindrical containers and the inlet is at the centerline of the container. For containers of other shapes or feed ports that are not in the middle, the installation of the probe should be in accordance with the requirements of the user and should meet the foregoing requirements.
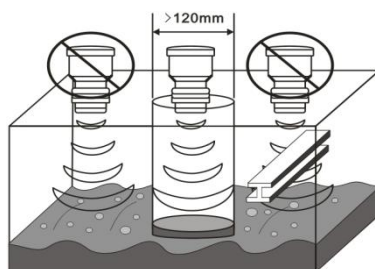
● For a liquid with a calm surface without waves, ultrasonic measurement will obtain the best results. If there are debris, bubbles or large fluctuations on the surface of the liquid, a wave guide should be installed. The diameter of the waveguide should be greater than 120mm, and there is no joint. As shown in Figure 8
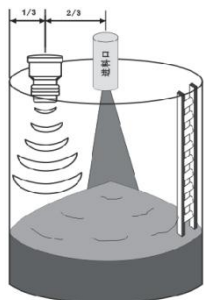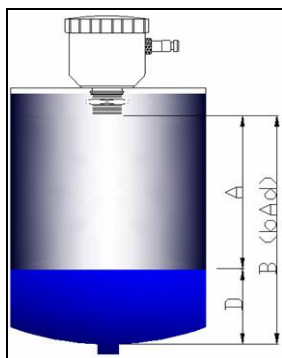
Figures 6 **Figures 7** **Figures 8**

5.2 Work mode

Figures 9

● 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）.

● 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 small 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"**.
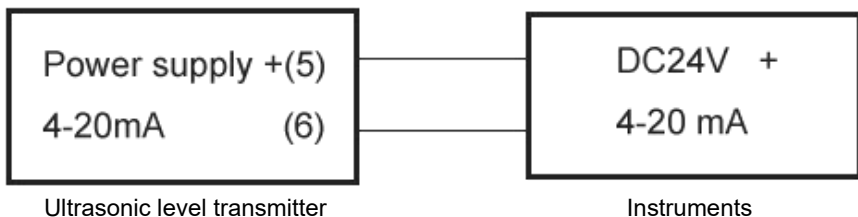
5.4 Power supply

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.
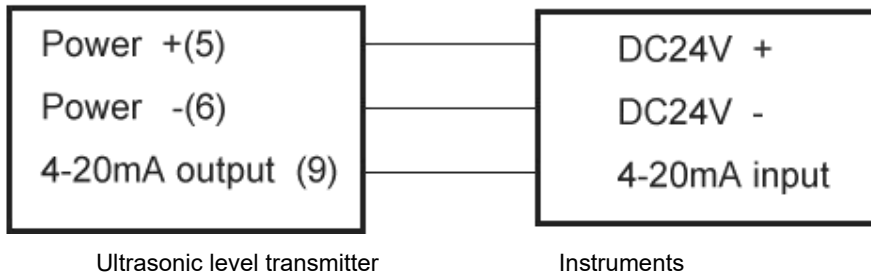
Chapter 6 Wiring

- When wiring, the number on the terminals are correspond to the number on the label (more details see 6.5)
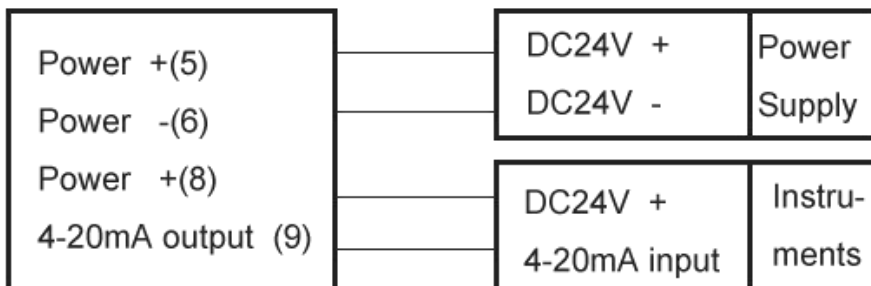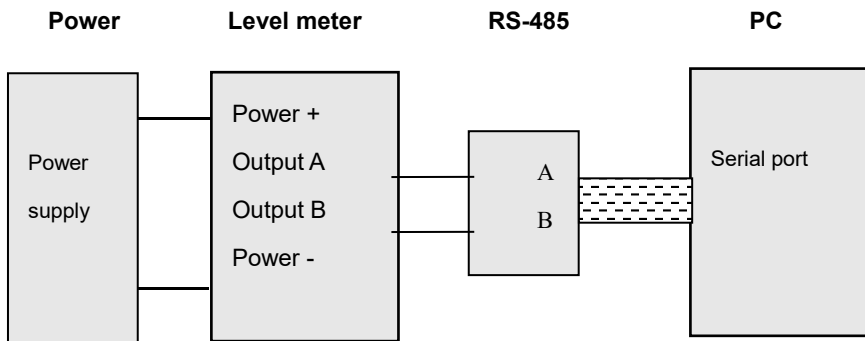- Wiring diagram of current (voltage) output connecting with secondary instrument
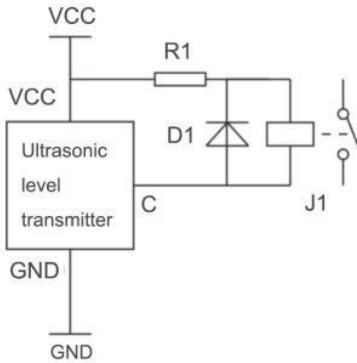
Two wire

| Power supply +(5) 4-20mA (6) | DC24V + 4-20 mA |
| Ultrasonic level transmitter | Instruments |

Three Wire

Power +(5)	DC24V +
Power -(6)	DC24V -
4-20mA output (9)	4-20mA input

Ultrasonic level transmitter   Instruments

Four Wire

Power +(5)	DC24V +	Power
Power -(6)	DC24V -	Supply
Power +(8)	DC24V +	Instru-
4-20mA output (9)	4-20mA input	ments

Serial output connecting with PC

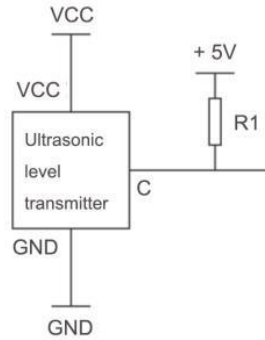| **Power**	**Level meter**	**RS-485**	**PC**
Power supply	Power + Output A Output B Power -	A B	Serial port

NPN output wiring diagram

Conventional relay   TTL output

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

Wiring definition

Definition of three (four) wire system wiring

Please follow the logo characters on the terminal of the machine to connect!!!

Wiring definition	Terminal	Equipped
Power Supply	⑤ DC12~24V+	●YES / ●NO
	⑥ DC12~24V-	
	⑩ AC220V(L)	□YES / ●NO
	⑪ AC220V(N)	
Current output	⑨ 4~20mA+ (Three-wire system)	□YES / □NO
	⑥ 4~20mA- (Four-wire System）	
Serial output	③ RS485(A)	□YES / □NO
	④ RS485(B)	
NPN switch output	① N1	□YES / □NO
	② N2	□YES / □NO
Relay control output Ⅰ	① J1_COM	□YES / □NO
	② J1_NO	
Relay control output Ⅱ	⑩ J2_COM	□YES / □NO
	⑪ J2_NO	

Definition of two wire system wiring

Wiring definition	Terminal	Equipped
Power Supply	⑤ DC18~28V	□YES / □NO
Current output	⑥ 4~20mA	□YES / □NO
Groud	⑦ ⏚	£YES / £NO

Chapter 7 Troubleshooting

1. Not working, no display, no sound
Possible reasons:
① Power is not connected or "+""-"polarities are connected reversely
② Too low voltage resulting no working or too high resulting damage
Solutions：
① Check to ensure correct wiring as instructed.
② Use 12-24V DC supply, or contact with distributor
2. No display, sensor has sound
Possible reasons：
① Turning off
② Connected to high voltage, damaging display chip
Solutions:
①　Press "B" to turn on display;
②　contact with distributor.
3. With sound and display, but the values not change with distance
Possible reasons:
③ Too low input voltage
④ Sensor or power driver damaged
Solutions:
③ 12-24V DC supply
④ Contact with distributor
4. With display ,but value is irregular fluctuation
Possible reasons:
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
Solutions:
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
Possible reasons:
⑥ Non vertical installation, leading to multiple reflection
⑦ installed too close to wall, sonic wave reflected   midway
⑧ check "BD"
⑨ check temperature display
Solutions:
① Adjust installation positions several times.
② correctly set **"BD"**
③ adjust temperature (**"TE"**) to proper value.
6. Abnormal current output
Possible reasons:
① Too large load resistance
② FS, AL or AH changed.
③ undesired supply rectification and filtering
④ electrify time is not enough
Solutions:
① Lower load resistance
② readjust parameter
③ replace with DC regulated supply with larger capacity
④ electrify > 15 minutes before work
7. Abnormal RS485 output

Possible reasons:
① Reverse connecting of A and B
② incorrect parameter of serial ports, its not match with main uni
Solutions:
①   Change wiring,
②   reset parameter, same with main unit
8. Abnormal control output
Possible reasons:
①Wrong parameter. Setting
②external current-limiting resistor too large
③external current-limiting resistor too small, damaging the level meter
Solutions:
①Reset parameter
②decrease current-limiting resistor
③ contact with distributor