

Two-wire ultrasonic level meter/level meter



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1.Overview

Ultrasonic level meter / liquid level meter is a kind of level meter that has absorbed the advantages of many kinds of level meters at home and abroad. It is a universal level meter with full digitalization and humanized design concept, which has perfect level measurement and control function. It has perfect level measurement and control function, data transmission function and human-machine interaction function. This product adopts imported industrial-grade chips, digital temperature compensation, etc...related special integrated circuits. With strong anti-interference, can be set arbitrarily upper and lower limit nodes and online output adjustment, and with a field display, the shell uses engineering plastic ABS waterproof shell, the shell is small and quite strong. By the thousand for non-contact detection method, more hygienic than other instruments, can meet most of the liquid level, material level measurement requirements, completely solve the pressure type, capacitance type, float type and other traditional measurement methods brought about by winding, blockage, leakage, media corrosion, maintenance inconvenience and other shortcomings. Therefore, it can be widely used in various fields related to material level and liquid level measurement and control.

The product adopts OLED display, high-definition Chinese and English menu interface, the display with self-illumination to make up for the normal debugging in poor light environment, the product adds HART protocol communication support to make up for the shortcomings of the two-wire meter without data output, and can communicate directly with HART field instruments.

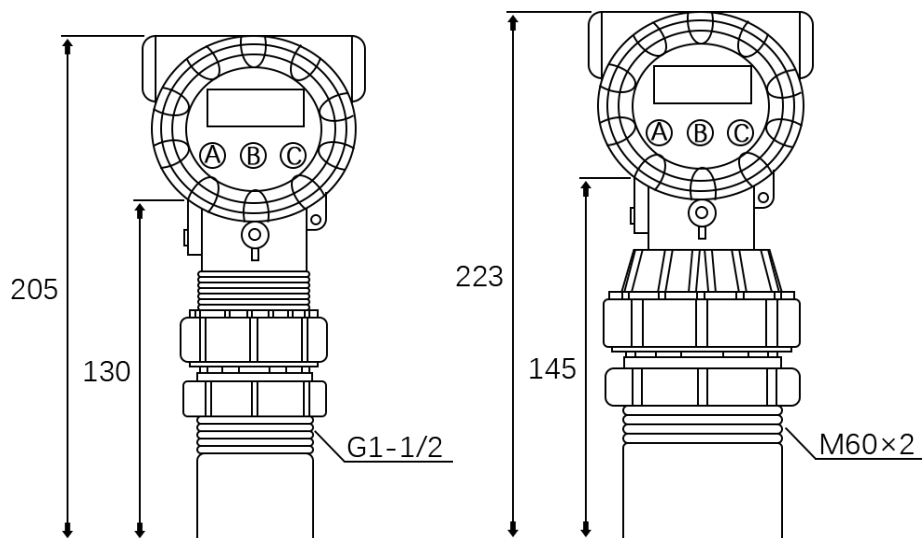
2.Product Features

- Wide range of voltage adaptation, can work in 18~28V DC voltage
 - Backup and restore setting function
 - Multiple physical quantities can be measured
 - Adjustable analog output function
 - Full range start and end point can be set arbitrarily
 - Value-added/differential distance measurement options for both distance and level measurement
 - Digital filtering, dynamic echo recognition, etc.
 - Optional HART communication component
 - English and Chinese menu display with self-illumination
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3. Main technical parameters

- Range: 5, 8, 10, 12, 15, 20, 25, 30, 35, 40m (optional when ordering)
- Blind zone: <0.3-0.5m (varies with range)
- Error: 0.3% F.S (0.5mm accuracy can be customized)
- Display: OLED Chinese and English menu (with self-illumination)
- Minimum display resolution: 1mm (customizable resolution 0.1mm)
- Keyboard: three light patch keys
- Operating frequency: 20~350KHz (varies according to model specifications)
- Power supply: DC18~28V
- Power consumption: <0.6W
- Output mode: 4-20mA RL>600Ω (standard), 4-20mA+HART
- Material of instrument: ABS engineering plastic
- Mounting interface: M60X2 thread with large gong ring, G1-1/2 pipe thread with large gong ring (47mm diameter), DN80 flange
- Operating environment: Normal temperature, normal pressure
- Protection level: IP65 (higher protection level can be customized)
- Explosion-proof grade: EXia IICT6 Ga (optional)

4. Product Dimensions



5.Menu operation and parameter setting

5.1 Example of basic setup steps		
This instrument is indicated as OLED display with key operation prompt function		
Press the A key to appear the key prompt interface according to the	User Password	“00000”
	Administrator password	“10000”
A	B	C
Menu, Shift, Return	Turning down, adding numbers	Confirmation

5.2 Menus and their functions			
First level menu	Second level menu	Third level menu	Description
Installation settings	Mounting height	Enter mounting height	Unit m
	Working Environment	Environment settings	Open/closed
Output Settings	Analog	Output starting point	Corresponds to 4mA
		Output ending point	Corresponds to 20mA
	HART	HART address	HART communication address
	Analog output adjustment	Low-end adjustment	Prohibit modification
		High-end adjustment	Prohibit modification
Display Settings	Display units		M、CM、MM、yard foot、inch、NULL
	Retain decimal		Fractional digits
	Show conversions		
	Contrast Ratio		0-9
	Off display delay		Unit s
Probe settings	Medium	Medium Selection	Prohibit modification
		Sound velocity	
		Temperature coefficient	
	Probe characteristics	Measurement period	
		Blind zone	
		Emission intensity	
		Receiving gain	

		Sampling threshold	
	Filtering	Filter mode	
	Parameter Correction	Temperature correction	Prohibit modification
		Maximum Gain	
System settings	User Settings	User Password	Change password
		Administrator password	
	Low power setting	Wake-up cycle	Prohibit modification
		Working hours	
		Low voltage protection	
	Language		Chinese/ENGLISH
	Reduction		Restore parameters

6.Installation method and precautions for use

6.1 Probe installation

6.1.1 The probe generates both an ultrasonic pulse wave and a detection echo, which propagates from the surface of the probe in a certain conical wavefront. In this area, there should be no obstruction and away from the inlet. The installation position of the probe should be chosen in a position where there is no obstacle between the emitting surface of the probe and the medium to be measured. See Figure 1.

6.1.2 The shape of the vessel needs to be considered when installing the probe. If the probe is not installed correctly, a certain shape of the vessel will produce secondary echoes. This type of problem is mainly concentrated in the conical shape as well as the top of the spherical tank. This particular shape can refocus and amplify the emitted echoes to produce false readings. Choosing the correct mounting position can solve this problem. Please see Figure 2.

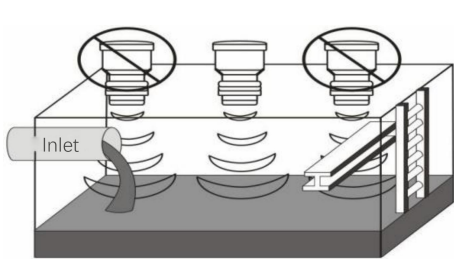


Figure 1

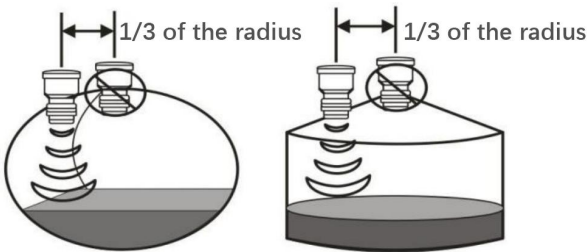


Figure 2

6.1.3 The probe can be mounted either by flange or by standard M60 x 2 thread (the mounting interface is subject to the actual product). Whether flanged or threaded, or with or without the optional tapered barrel, it should be ensured that the bottom of the probe protrudes from the bottom of the process interface. Figure 3 illustrates the proper mounting method.

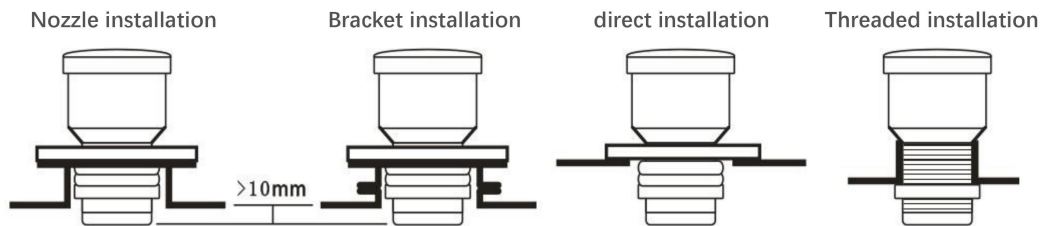


Figure 3

6.1.4 The probe should be installed to avoid its emission of acoustic channels and the vessel wall to maintain the ideal area as shown in Figure IV. Figure IV shows the range and probe installation distance from the vessel wall area, if the installation distance is less than the ideal area under the line specified distance, the probe should be installed in the "minimum spacing" area. If the mounting distance from the side wall is still below the "minimum spacing" line, the transmitter will likely not measure the level correctly. See Figure 4

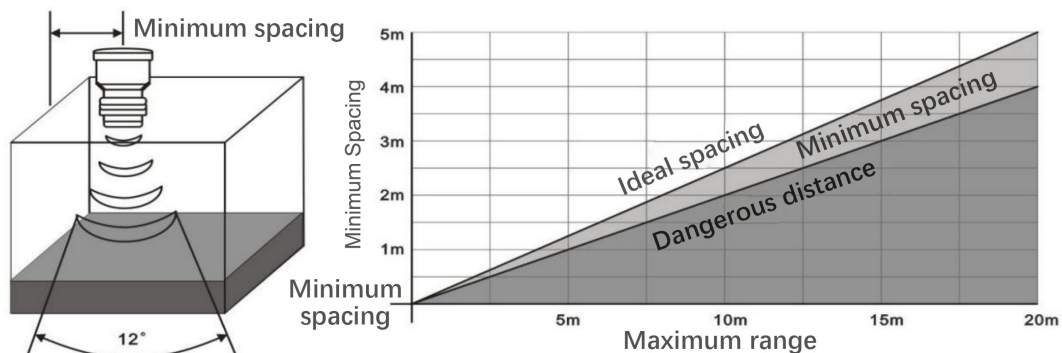


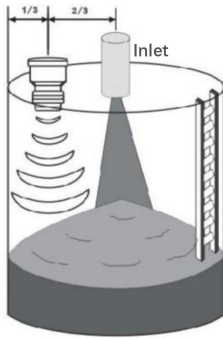
Figure 4

6.1.5 In solids measurement the probe needs to be typically mounted 1/3 of the way from the side wall to the center inlet. This will form a cone when the material accumulates. The probe mounting position shown in Figures 5 and 6 will give an average level reading, which is the height of the level when the material is stacked flat. This is true for conical piles or concave pile surfaces that occur during discharge.

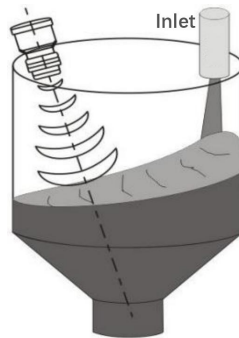
The average level measured in this installation is only correct for cylindrical vessels with the inlet at the

centerline of the vessel. For other shapes of vessels or where the inlet is not in the middle, the probe should be installed according to the user's requirements and should comply with the aforementioned requirements.

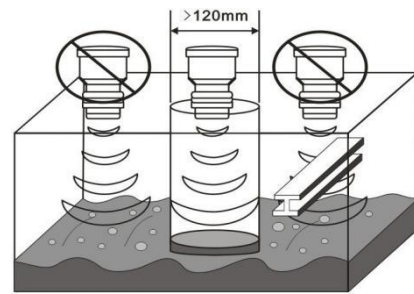
6.1.6 The ultrasonic measurement will get the best results when the surface of the liquid is calm and wave-free. If the surface of the liquid has debris, bubbles or large fluctuations, a wave guide tube should be installed. The diameter of the wave guide tube should be greater than 120mm, and there is no joint. As Figure 7



Figures 5



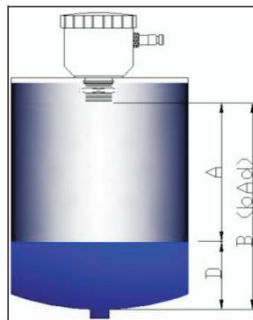
Figures 6



Figures 7

6.2 Working mode

This product has a level mode (measuring empty height) and a liquid level mode (measuring difference), and the level mode is used directly without any setting. The difference between liquid level mode and level mode is as follows



6.2.1 In liquid level mode

The installation position (B) is the total height from the bottom of the tank to the probe end of the level meter, A is the distance from the probe end to the liquid level, and D is the height of the liquid level, i.e. $D = B \text{ (installation position)} - A$. When using this function the level meter displays the value of the liquid level (D).

6.2.2 In object level mode

Installation position (B) = 0, the level meter display value when using this function is the distance from the end of the level meter probe to the liquid level (A).

6.3 Operating environment and filtering

The machine is enabled by default with dynamic filtering function, which can actually filter out the interference that cannot be avoided by stirring, tank wall, crossbar and other fixed objects. However, it is not always reliable for the completely enclosed small space or other environment where secondary echoes are easily formed. When the displayed value is about two times of the actual value, the "Working Environment" menu value should be changed to "Enclosed".

6.4 Instrument power supply

The power supply is recommended to be supplied by a DC regulated power supply of 24V or more than 2W. If a switching power supply is used to supply DC, the negative DC power supply must be connected to earth. For installation and wiring, please refer to the manual or the label on the body of the level meter and the number marked inside the cover. To ensure the stability of the machine and the accuracy of the analog output, please power on for >15 minutes to warm up before normal use. Tighten the back cover to prevent water or dust from entering. When working in the field, please put a sunshade over the level meter to avoid direct sunlight and rain, and lightning protection measures should be taken.

7.Commonly encountered phenomena and how to deal with them

Serial No.	Doubtful phenomena	Possible causes of the quandary	Difficult phenomenon handling method
1	No work after power on, no display, no sound from sensor	①The power supply is not connected, or the positive and negative poles are reversed. ②The voltage is too low, the level meter is not working or too high, the instrument is bad.	①Check the wiring and connect the wires according to the manual. ②Use 12~24V DC power supply, contact your dealer.
2	Sensor with working sound, no display	①Program off display operation has been carried out ②Power supply voltage is too low ③High voltage has been connected and the display chip has been damaged	①Press B to turn on the display. ②Contact your dealer.
3	There is a display with sound, but the number does not change with the distance	①The input voltage is too low, and the ultrasonic level meter is working normally at the end. ②The sensor or power driver of the ultrasonic level meter has been damaged.	①Use 12-24V DC power supply. ②Contact with distributor.
4	There is a display, there is a sound, the measured value jumps randomly or the value does not change with the distance	①The level meter mounting table is skewed. ②Improperly set pulse intensity, resulting in large aftershock or diffraction. ③Two or more level meters are working, causing mutual interference. ④The electromagnetic interference in the working condition area is too large. ⑤ There are bubbles or debris on the liquid surface.	①Adjust the sensor axis to the vertical of the target screen. ②Generally range within 1~3m and transmit pulse intensity of 2~5. ③Try to eliminate mutual interference. ④Find out the source of interference and flatten out the interference. ⑤ Eliminate air bubbles and debris on the liquid surface.
5	The sensor has sound, the display shows blind area or	①The range of the level meter is exceeded. ②The measuring surface is too close to the probe. ③Inappropriately used in high dust, high foam,	①The actual range of the environmental level meter is adjusted to within the working range of the level meter.

	over range	high steam environment or working temperature is too high or too low; Improper pulse strength setting	②Adjust the application environment to the required range. ③Modify the intensity of the transmitting pulse until the display is stable.
6	The sensor has a sound, the level display value error of more than ten centimeters	① Installation is not vertical, resulting in multiple reflections. ②The installation is too close to the tank wall and the sound waves are reflected in the middle. ③Check whether the setting of "installation height" of the differential value is correct. ④Check if the display value of temperature is normal.	①Please adjust the mounting position repeatedly. ②Set the "mounting height" value correctly. ③If the temperature difference is large, adjust the "temperature correction" value to the correct value.。
	4-20mA output is not normal; high, low, jumpy	①The load resistance is too large. ②The range "range end" is modified, output trim parameter "output low end trim" or "output high end trim" is modified. ③The power supply rectification and filtering is not good. ④Insufficient power-on time.	①Reduce the load resistance. ②Re-adjust the relevant parameters by yourself. ③Replace the DC voltage regulator with larger capacity. ④Power on >15 minutes to warm up.