8S RADAR LEVEL SENSOR

Operating Manual

Version:202503

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⚠ Due to the continuous updating and upgrading process of the product, we cannot guarantee that the content covered in this manual is the latest version. However, even if this situation exists, the information provided in the manual can still meet your usage needs and will not have a substantial impact on your reference and use of the manual.

1. Products Introduction

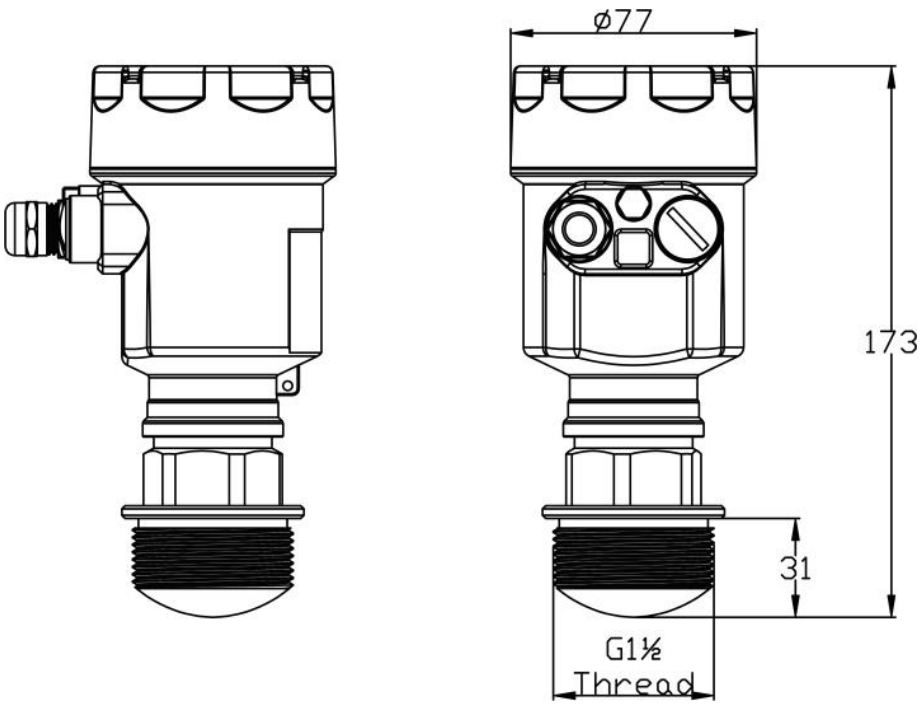
Features

The 8S is an 80G frequency-modulated continuous wave radar level gauge, which is a powerful tool for industrial level measurement. Based on the 80G FMCW technology, it can accurately measure the liquid level height. It operates in the high-frequency band with a high resolution, and the measurement accuracy can reach up to ±3mm at most. With a beam angle of 8°, it has the ability to suppress false echoes. The sensor adopts a PTFE integrated structure, which has excellent corrosion resistance.

2. Technical Specifications

Working power supply	(17~36) VDC
Working temperature	-40 ℃ -70 ℃
Cable entry	M16 * 1.5
Shell material	Engineering plastic
Protection class	IP68
Installation method	Thread/flange
Onsite operation	LCD display with 4 buttons
Communication method	RS485/HART 7 Bluetooth 5.0
Current output	4-20mA
Maximum range	15m
Measurement accuracy	Up to ± 3mm
Damping	0.2m
Beam angle	8°

3. Dimensions



4. Installation Description

4.1 Install

Power supply: Ideally, this device is powered by a DC24V power supply and can support a minimum of DC17V.

Installation precautions:

1. During installation, the radar should be installed at a position 200 millimeters away from the container wall horizontally to reduce signal interference.

2. When installing a container with a conical bottom, it should be installed in the center of the container as much as possible to measure the conical bottom.

3. During installation, please keep the device as perpendicular as possible to the measured substance to reduce errors caused by angles.

4. Do not install the equipment to the feed inlet during installation, and the installation position should be kept at a horizontal distance of more than 200 millimeters from the feed inlet.

- Keep the antenna beam free of any interference such as ladders, pipes, steps, as shown in Fig.1.

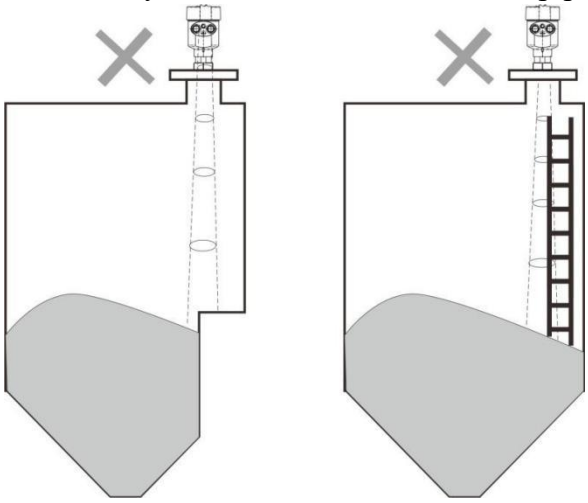


Fig.1 Example for avoiding false echo

- Moisture protection measures: For instruments installed outdoors or in damp rooms, as well as on cooling or heating tanks, tighten the cable sealing cover to prevent moisture and bend the cable downwards at the entrance.

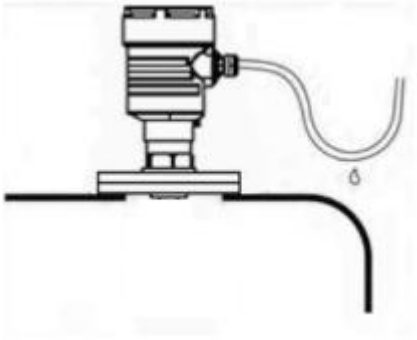


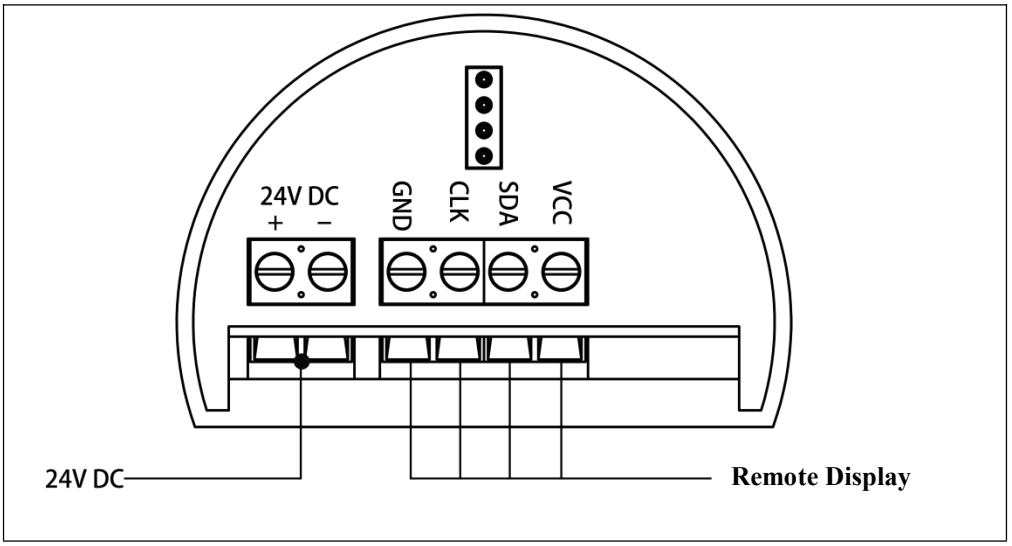
Fig.2 Moisture protection

4.2 Wiring

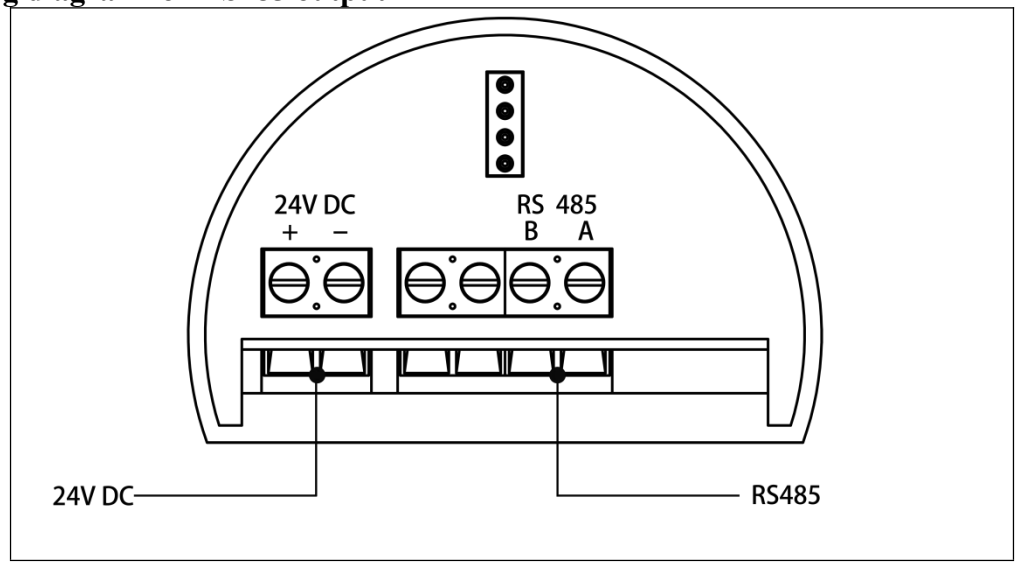
For the instrument's cable inlet, it is recommended to use a single multi-core cable with a wire diameter of 4-8mm. The diameter of a single core is 24-14AWG (2.5mm²). Use a flat-blade screwdriver with a width of 2-3mm as the tool, and the screw torque should be 5.0Kgf.cm. Connect the wires according to the definition of the label in the following figure.

Attention: The voltage of the main power supply must be within a reasonable range to avoid permanent damage.

4.2.1 Wiring diagram for two-wire current output



4.2.2 Wiring diagram for RS485 output



4.3 Debugging

- Set Min. and Max. adjustment parameters according to the actual environment, refer to sections 5.2.1 and 5.2.2.
- Set damping based on material fluctuations, refer to section 5.2.4.

- Set blind zone set to facilitate normal measurement, refer to section 5.2.8.
- Set the current output mode, usually 4-20mA output mode, refer to section 5.5.2.
- At this point, the device should be able to work normally. If you need to adjust other parameters, please refer to Chapter 5.

⚠ **Attention: After all function debugging is completed, tighten the gland head at the instrument cover and cable, and do a good job of waterproofing.**

5. Menu Parameter Description

5. 1 List of menu parameters

	Menu item	Parameter range	Description
Basic Settings	**1.0 Min. Adjustment**	**0-16m**	The farthest distance that needs to be measured, a range value of current output
	1.1 Max. Adjustment	**0-16m**	The closest distance that needs to be measured is another range value of the current output.
	1.2 Medium	**Liquid/ Demonstration**	
	1.3 Damping	**0-100s**	The higher the value, the slower the response. Generally set 5.
	1.4 Sensor Tag	**DAR**	
	1.5 Scaled	**Linear/ Nonlinear/ Volume Scalar/ MassScalar**	
	1.6 Scaled Value	/	
	1.7 Range Set	**0-16m**	Farthest measurement distance value
	1.8 Blind Zone Set	**0-15m**	Areas without measurement
	1.9 Feed Rate	**0-999m/s**	
	1.10 OverlimitOutput	**Min.Adjustment/ Max.Adjustment**	
Display	**2.0 Display Content**	**Distance/ Space/ Level/ Scaled/ Current/ Percent**	Display content of LCD measurement interface
	2.1 Language	**Chinese/English/Spanish/Russian/Korean**	The language displayed on the LCD screen
	2.2 Measuring Unit	**ft/m/in/cm/mm**	Measuring unit of LCD measurement interface
	2.3 Temperature Unit	**℃/℉/K**	Temperature unit of LCD measurement interface
Diagnosis	**3.0 Peak Value**	/	The maximum and minimum values of historical measurements
	3.1 Measure Status	/	Measure the decibel and internal temperature values of the signal
	3.2 History Curve	**Total Time/ Show Curve**	
Service	**4.0 False echo**	**Update/ Delete**	Suppress the impact of interference signals on normal measurements.
	4.1 Current output	**Output Mode:** 4-20mA/20-4mA **Fail Current:** Keep/ 20.5mA/ 22.0mA/ 3.9mA **Min Current:** 3.9mA/4mA	Choose whether the current output is from Min. Adjustment to Max. Adjustment or from Max. Adjustment to Min. Adjustment. The value of current output when the instrument malfunctions. Minimum current output
	4.2 Reset	**Factory Reset/ Peak Reset**	

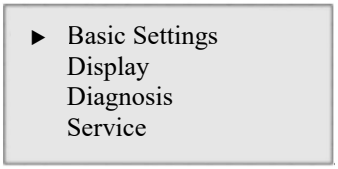
	4.3 Par backup	**Data Backup/ Data Reading**	After making parameter backups, the backed up parameters can be restored by reading them.
	4.4 Password	**Disable/ Enable**	When turned on, the menu is protected and requires a password for modification. If you forget your password, you can obtain the unlock password from the manufacturer through the serial number.
	4.5 Local address	**HART：0-15；RS485：1-254**	Hart is effective for two-wire instruments. Hart and RS485 are effective for four-wire instruments.
	4.6 Offset distance	**±10.000m**	Datum Shift
	4.7 Current simulation	**3.8-22mA**	Current output test
	4.8 Current calibration	**4mA /20mA calibration**	Fine tune the current output value.
	4.9 TVT level	**N dB**	TVT curve height adjustment
Info	**5.0 Sensor Type**	**TR-80GFXC**	Fixed value, non modifiable
	5.1 Serial Number	**XXXXXXX**	7-digit number, one machine, one code
	5.2 Date	**YYYY-MM-DD**	Date of instrument production
	5.3 Software Version	**xx.xx.xx**	Software identification mark
Serial port setting (Only 485 instrument is valid)	**6.0 Baud**	**1200--2000000**	The speed of RS485 communication
	6.1 Parity	**None/Odd/Even**	RS485 communication checksum selection
	6.2 Stop Bit	**1/1.5/2**	RS485 communication stop bit selection

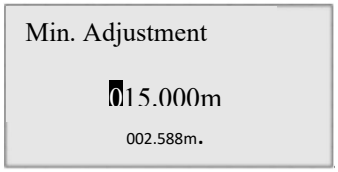
5. 2 Basic settings menu introduction

5.2.1 Min. Adjustment

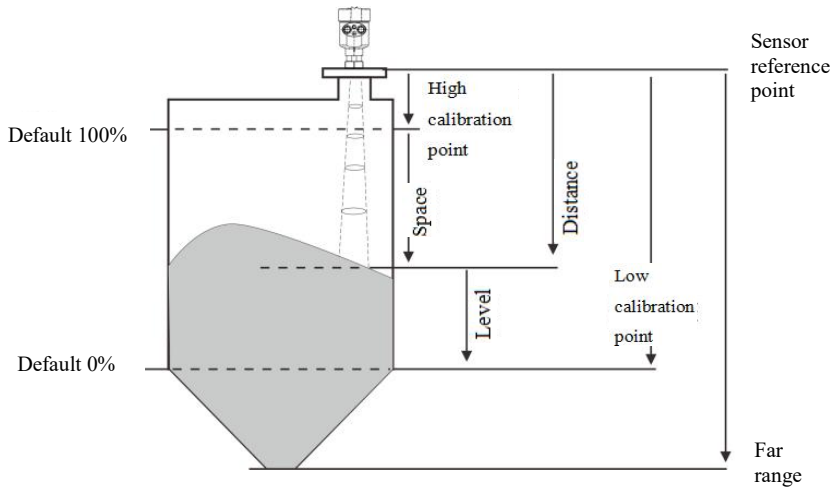
Display of button operations: After pressing the [OK] button on the main interface, you will enter the menu interface. On this interface, find the basic settings interface and press the [OK] button to enter the basic settings interface. In the basic settings interface, press the [▸] button to find the min adjustment interface. Press the [OK] button again on this interface to enter the parameter settings interface. You can adjust according to the required parameters.

Graphic and text instructions: Set the min adjustment to 15 m.





Meaning of the parameter: The min adjustment corresponds to the empty position, as shown in the following figure.



5.2.2 Max. Adjustment

Display of button operations: Press the [OK] button on the main interface to enter the menu interface. In this interface, locate the basic settings interface and press the [OK] button to enter the basic settings interface. In the basic settings interface, use the [▸] buttons to find the max adjustment interface. Press the [OK] button again in this interface to enter the parameter settings interface. You can adjust the parameters according to your needs.

Graphic and text instructions: It is basically the same as 5.2.1.

Parameter meaning: The max adjustment corresponds to the position when it is full of materials.

5.2.3 Medium

Display of button operations: After pressing the [OK] button on the main interface, you will enter the menu interface. On this interface, find the Basic Settings interface and press the [OK] button to enter the Basic Settings interface. In the Basic Settings interface, press the [▸] buttons to find the Medium interface. Press the [OK] button again on this interface to enter the parameter settings interface. You can adjust the parameters according to your needs.

Graphic and text instructions: Set the medium to Liquid.

▸ Basic Settings Display Diagnosis Service	Medium ▸ Liquid Demonstration

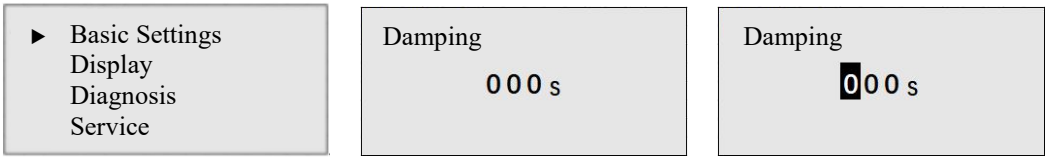
Note: The parameters under the Medium (such as the dielectric constant of the liquid) can be selected according to your needs.

5.2.4 Damping

Display of button operations: Press the [OK] button on the main interface, and you will enter the menu interface. On this interface, find the Basic Settings interface and press the [OK] button to enter the Basic Settings interface. In the Basic Settings interface, press the [▸] buttons to find the Damping interface. Press the [OK] button again on this interface to enter the parameter settings interface. You can adjust the

parameters according to your needs.

Graphic and text instructions: Set the damping time to 0 s.

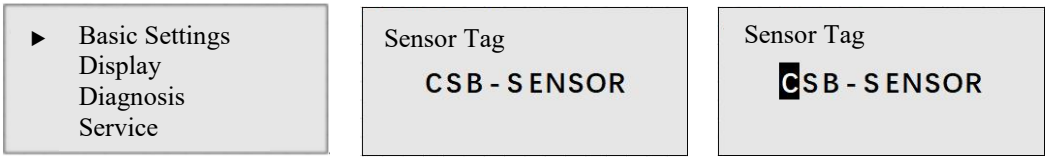


Meaning of the parameter: The larger the damping time is set, the stronger the anti-interference ability of the signal will be. For example, setting the damping to 5 s can change an instantaneous change into a slow change.

5.2.5 Sensor Tag

Display of button operations: After pressing the [OK] button on the main interface, you will enter the menu interface. On this interface, find the Basic Settings interface and press the [OK] button to enter the Basic Settings interface. In the Basic Settings interface, press the [▶] buttons to find the Sensor Tag interface. Press the [OK] button again on this interface to enter the Parameter Settings interface. You can adjust the parameters according to your needs.

Graphic and text instructions: Set the sensor tag as CSB-SENSOR.



5.2.6 Scaled

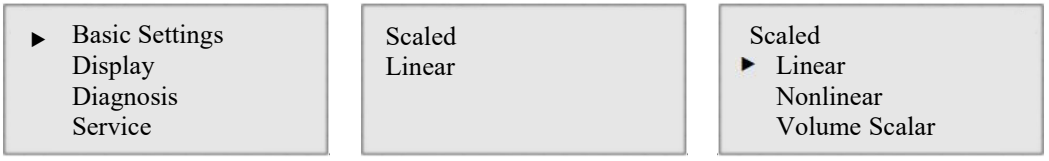
Note: After setting the Scaled, you need to set the display content as the Scaled so that the specified Scaled value can be displayed on the main interface.

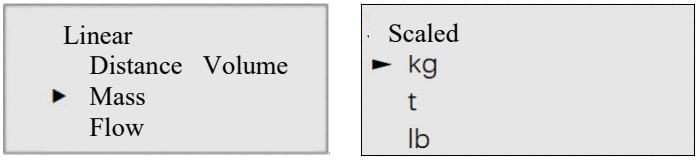
5.2.6.1 Linear

Principle of linear: After the user sets the unit of linear and the scaled values for 0% and 100%, the scaled value will be output in the form of the scaled according to the percentage of the current material level.

Display of button operations: Press the [OK] button on the main interface to enter the menu interface. On this interface, find the Basic Settings interface and press the [OK] button to enter the Basic Settings interface. In the Basic Settings interface, press the [▶] buttons to find the Scaled interface. On this interface, find the Linear interface and press [OK] to enter the linear, and then set the Scaled unit according to the required scaled unit. The scaled value of the linear can be set in the item of the scaled value in the basic settings.

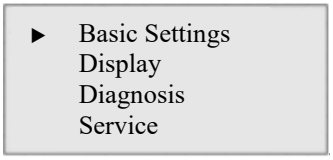
Graphic and text instructions for the unit of linear: Set the unit of linear calibration as kg.

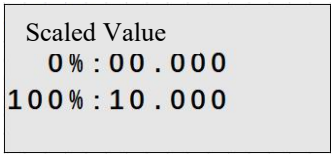


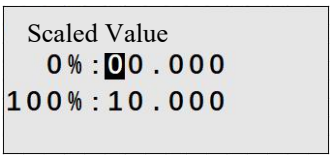


Graphic and text instructions for the scaled values: Set the scaled value for 0% as 0, and the scaled

value for 100% as 10.







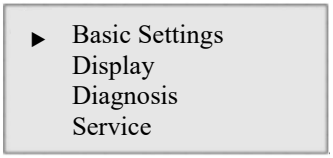
5.2.6.2 Nonlinear

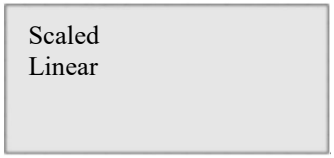
Display of button operations: After pressing the [OK] button on the main interface, you will enter the menu interface. On this interface, find the Basic Settings interface and press the [OK] button to enter the Basic Settings interface. In the Basic Settings interface, press the [►] buttons to find the scaled interface. On this interface, find the Nonlinear interface and press the [OK] button to set the scaled mode as nonlinear.

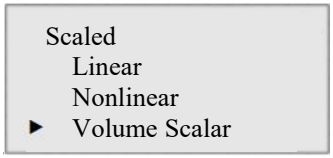
5.2.6.3 Volume Scalar

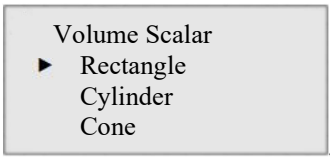
Display of button operations: After pressing the [OK] button on the main interface, you will enter the menu interface. On this interface, find the Basic Settings interface and press the [OK] button to enter the Basic Settings interface. In the Basic Settings interface, press the [►] buttons to find the Scaled interface. On this interface, find the Volume Scalar interface and press the [OK] button to enter the Volume Scalar interface. Calibrate the volume according to the shape of the current container corresponding to the volume scalar shape. After entering, set the corresponding parameters and press the [OK] button to complete the setting of the volume Scalar parameters.

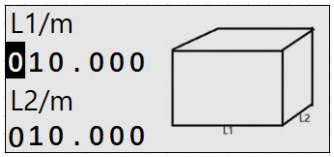
Graphic and text instructions: Set the volume scalar as rectangular, and set the parameter L1 as 10 m and L2 as 10 m.











5.2.7 Range Set

Display of button operation: Press the [OK] button on the main interface to enter the menu interface. On this interface, find the Basic Settings interface and press the [OK] button to enter the Basic Settings interface. In the Basic Settings interface, press the [►] buttons to find the Range Set interface. Press the [OK] button again on this interface to enter the parameter settings interface. You can adjust the parameters according to your needs.

Graphic and text instructions: It is basically the same as 5.2.1.

Meaning of parameters: The measuring range limits the maximum values of various parameters, and the echo area exceeding the measuring range will not be selected.

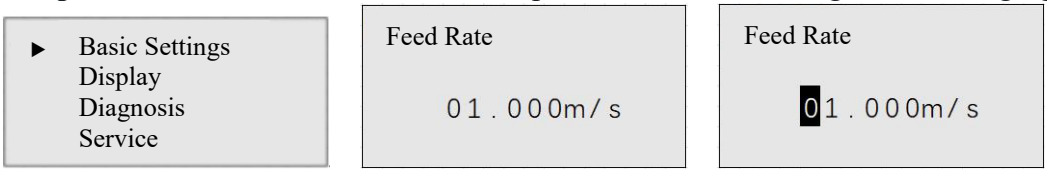
5.2.8 Blind Zone Set

Display of button operations: After pressing the [OK] button on the main interface, you will enter the menu interface. On this interface, find the Basic Settings interface and press the [OK] button to enter the Basic Settings interface. In the Basic Settings interface, press the [►] buttons to find the Blind Zone Set

interface. Press the [OK] button again on this interface to enter the parameter settings interface. You can adjust the parameters according to your needs.
Graphic and text instructions: It is basically the same as 5.2.1.
Meaning of the parameter: The function of the blind zone set is to exclude the echo area smaller than the blind zone from being selected.

5.2.9 Feed Rate

Display of button operations: Press the [OK] button on the main interface to enter the menu interface. On this interface, find the Basic Settings interface and press the [OK] button to enter the Basic Settings interface. In the Basic Settings interface, press the [►] buttons to find the Feed Rate interface. Press the [OK] button on this interface to enter. After the setting is completed, press the [OK] button again to finish the setting.
Graphic and text instructions: Set the speed of material feeding and discharging to 1 m/s.



Meaning of the parameter: By setting the Feed Rate, the anti-interference ability can be improved. If the change speed of the target distance exceeds the speed threshold, it indicates that there is an anomaly in the currently detected target, which may be an interference signal. The device will continuously detect and output the position of the real target.

5.2.10 OverlimitOutput

Display button operation: After pressing the [OK] button on the main interface, you will enter the menu interface. In this interface, find the basic settings interface and press the [OK] button to enter the basic settings interface. In the basic settings interface, press the [►] buttons to find the overlimit output settings interface. Press [OK] in this interface to enter the settings for overlimit output. After the settings are completed, press [OK] to finish the settings. The parameters can be selected for Max. adjustment and Min. adjustment. The function of this item is as follows: When no target is detected within the Min. value range, the device can output the Max. adjustment value or the Min. adjustment value according to the selected parameters.

5. 3 Display menu introduction

5.3.1 Display Content

Display of button operations: After pressing the [OK] button on the main interface, you will enter the menu interface. On this interface, find the Display interface and press the [OK] button to enter the Display interface. In the Display interface, press the [►] buttons to find the Display Content interface. On this interface, you can set the display content according to the content you need to display. The content that can be set includes distance, space, level, scaled, current, and percent.

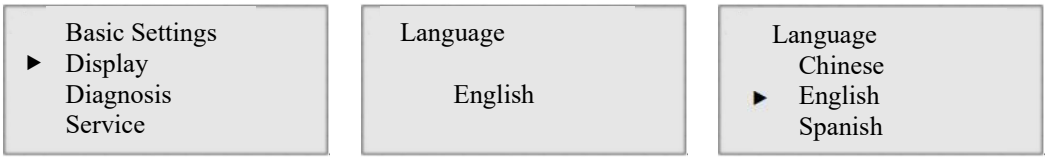
Graphic and text instructions: Set the display content as the distance.

Meaning of the parameter: By setting the display content, the corresponding value can be shown on the main interface, and this value will also correspond to the item of "primary variable" in the HART standard communication protocol.

5.3.2 Language

Display of button operations: After pressing the [OK] button on the main interface, you will enter the menu interface. On this interface, find the Display interface and press the [OK] button to enter the Display interface. In the Display interface, press the [▶] buttons to find the Language interface. On this interface, you can set the language according to your needs. The languages that can be set include Chinese, English, Spanish, Russian, and Korean.

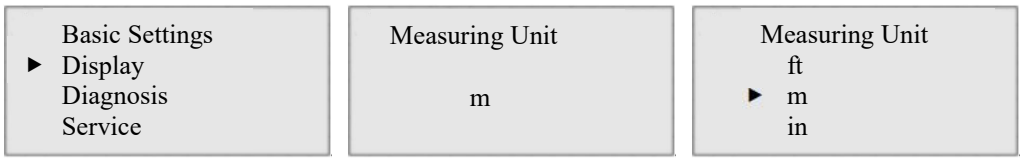
Graphic and text instructions: Set the language as English.



5.3.3 Measuring Unit

Display of button operations: After pressing the [OK] button on the main interface, you will enter the menu interface. On this interface, find the Display interface and press the [OK] button to enter the Display interface. In the Display interface, press the [▶] buttons to find the Measuring Unit interface. On this interface, you can set the unit according to the required unit. The units that can be set include ft, m, in, cm, and mm.

Graphic and text instructions: Set the measuring unit as m.



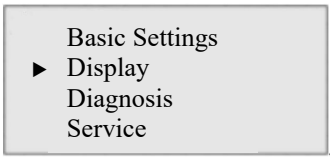
Note: After setting the measuring unit, the parameters related to the unit (such as the min and max adjustment values, the range set, etc.) will all use this unit.

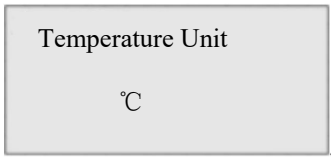
Meaning of the parameter: By setting the measuring unit, the distance measurement unit can be changed.

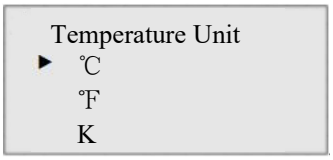
5.3.4 Temperature Unit

Display of button operations: Press the [OK] button on the main interface, and you will enter the menu interface. On this interface, find the Display interface and press the [OK] button to enter the Display interface. In the Display interface, press the [▶] buttons to find the Temperature Unit interface. On this interface, you can set the unit according to the required temperature unit. The units that can be set include ℃, ℉, and K.

Graphic and text instructions: Set the temperature unit as℃.







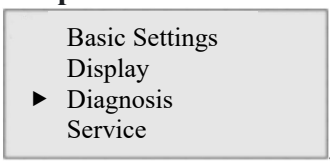
Meaning of the parameter: By setting the temperature unit, the temperature unit can be changed in the measuring interface.

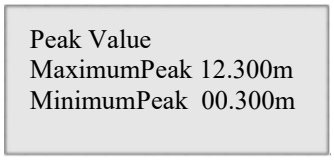
5. 4 Diagnosis menu introduction

5.4.1 Peak Value

Display of button operations: Press the [OK] button on the main interface to enter the menu interface. On this interface, find the Diagnosis interface and press the [OK] button to enter the Diagnosis interface. In the Diagnosis interface, press the [►] buttons to find the Peak Value interface. On this interface, you can view the maximum and minimum peak values.

Graphic and text instructions: View the measurement peak values.



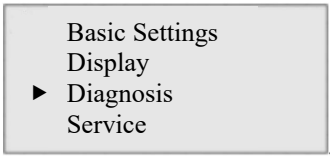


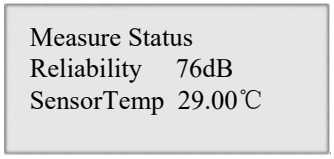
Note: This parameter reflects the maximum and minimum peak values measured during the measurement, and its parameters cannot be set through the LCD.

5.4.2 Measure Status

Display of button operations: Press the [OK] button on the main interface to enter the menu interface. On this interface, find the Diagnosis interface and press the [OK] button to enter the Diagnosis interface. In the Diagnosis interface, press the [►] buttons to find the Measure Status interface. On this interface, you can view the current measurement dB value and the temperature of the sensor. The dB value reflects the intensity of the current signal, and the sensor temperature is the internal temperature of the current device.

Graphic and text instructions: View the measurement status.





Note: This parameter cannot be set through the LCD, it can only be viewed through it.

5.4.3 History Curve

Display of button operations: After pressing the [OK] button on the main interface, you will enter the menu interface. On this interface, find the Diagnosis interface and press the [OK] button to enter the Diagnosis interface. In the Diagnosis interface, press the [►] buttons to find the History Curve interface. After finding the Total Time option in this interface and pressing the [OK] button, you can set how long a curve you want to display from the current time. After finding the Show Curve option in this interface and pressing the [OK] button, the curve can be displayed according to the currently set total time.

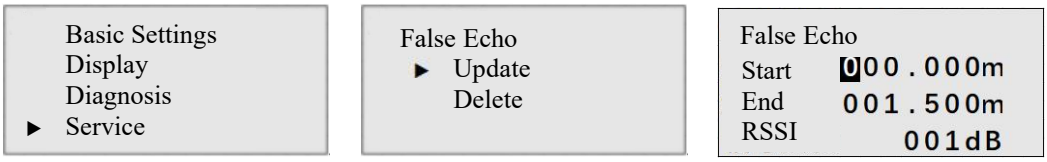
Note: The ordinate of the historical curve represents the measuring range. When the measuring range changes, the maximum value of the ordinate will also change to the corresponding measuring range.

5. 5 Service menu introduction

5.5.1 False Echo

Display of button operations: Press the [OK] button on the main interface, and you will enter the menu interface. On this interface, find the Service interface and press the [OK] button to enter the Service interface. In the Service interface, press the [►] buttons to find the False Echo interface. Then, perform the update or delete operation of the false echo learning according to your needs.

Graphic and text instructions: Update the false echo learning.



Meaning of the parameter: By setting two values for the start and the end, the device can learn about the distance segment with false echoes. After the learning is completed, the wrong waveform will be encapsulated, so that the device will not search for the wrong waveform for distance measurement. The display is as shown in the figure.

⚠ When there is a real liquid level surface, the learning area should not cover it. There is a default value for the signal intensity inside, and generally, 0 dB is sufficient.

Diagram before False echo learning

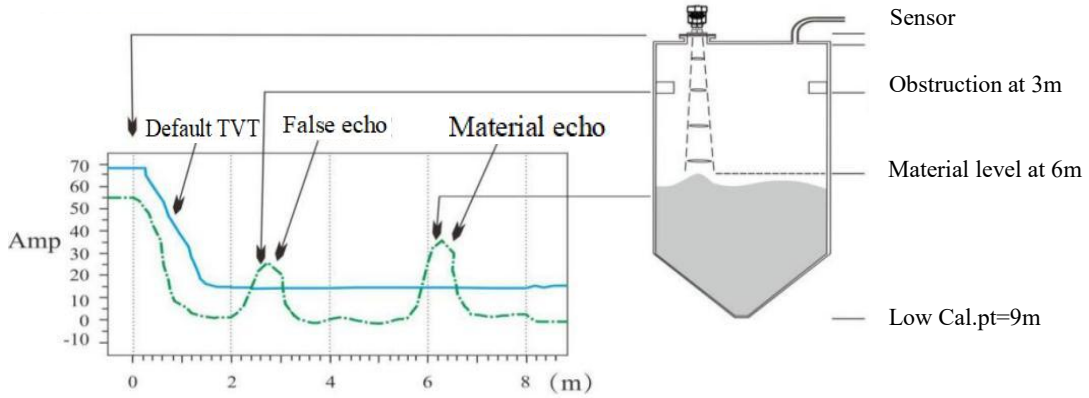
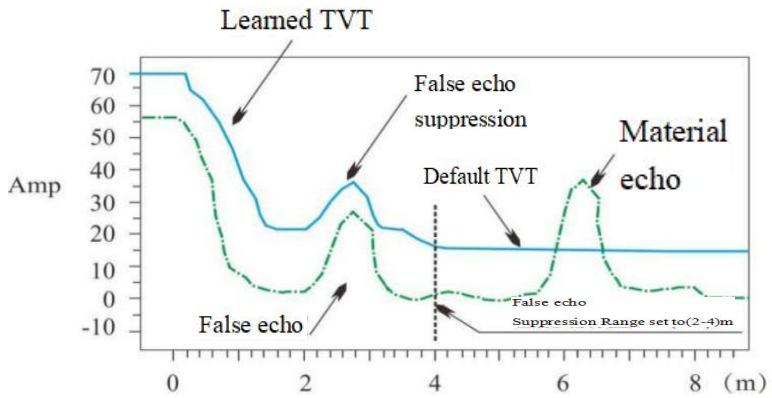


Diagram after False echo learning

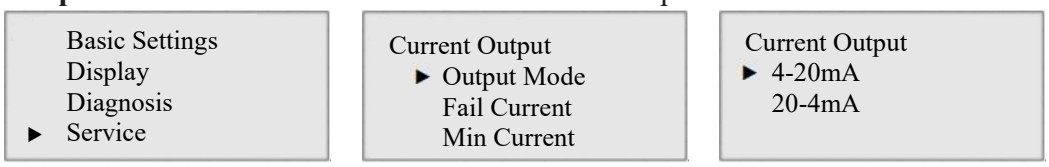


5.5.2 Current Output

5.5.2.1 Output Mode

Display of button operations: Press the [OK] button on the main interface to enter the menu interface. On this interface, find the Service interface and press the [OK] button to enter the Service interface. In the Service interface, press the [►] buttons to find the Current Output interface. Press the [OK] button on this interface, then select the current output and set the output mode to either 4-20mA or 20-4mA.

Graphic and text instructions: Set the current output mode to 4-20mA.

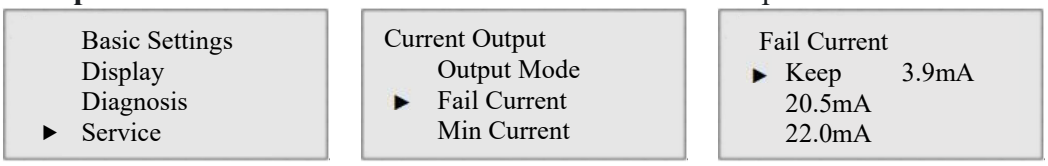


Meaning of the parameter: Setting the current output mode allows for switching between the forward and reverse current output.

5.5.2.2 Fail Current

Display of button operation: Press the [OK] button on the main interface to enter the menu interface. On this interface, find the Service interface and press the [OK] button to enter the Service interface. In the Service interface, press the [►] buttons to find the Current Output interface. Press the [OK] button on this interface, then select the Fail Current item and set the fail current as keep / 20.5mA / 22.0mA / 3.9mA.

Graphic and text instructions: Set the fail current to keep.

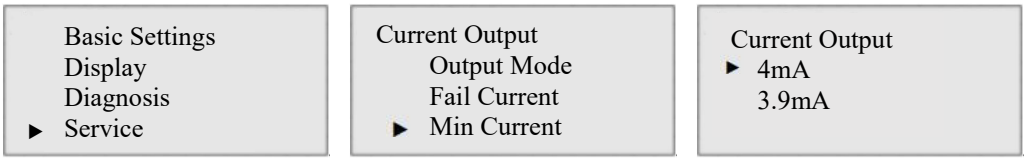


Meaning of the parameter: Setting the fail current allows the corresponding current to be output when a fault occurs.

5.5.2.3 Min Current

Display of button operations: Press the [OK] button on the main interface to enter the menu interface. On this interface, find the Service interface and press the [OK] button to enter the Service interface. In the Service interface, press the [►] buttons to find the Current Output interface. Press the [OK] button on this interface, then select the Min Current item and set the minimum current to either 3.9mA or 4.0mA.

Graphic and text instructions: Set the minimum current to 4mA.



Meaning of the parameter: The output current value shall not be less than the set value of the mini current

5.5.3 Reset

Display of button operations: Press the [OK] button on the main interface to enter the menu interface. On this interface, find the Service interface and press the [OK] button to enter the Service

interface. In the Service interface, press the [▸] buttons to find the Reset interface. After pressing the [OK] button, enter the Reset Selection interface. Find the Factory Reset, press the [OK] button, after waiting for a period of time, the reset will be completed.

Graphic and text instructions: Reset to factory settings.

Meaning of the parameter: Restore to factory settings.

5.5.4 Par Backup

Display of button operations: Press the [OK] button on the main interface, and you will enter the menu interface. On this interface, find the Service interface and press the [OK] button to enter the Service interface. In the Service interface, press the [▸] buttons to find the Par Backup interface. After entering this interface, you can perform parameter backup or reading according to your needs.

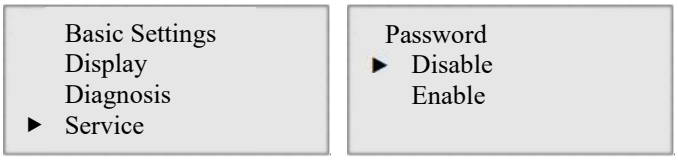
Graphic and text instructions: Data backup.

Meaning of the parameter: After setting the data backup, the currently configured parameters can be backed up, so as to prevent the previous state from being unrecoverable in case external personnel make changes.

5.5.5 Password

Display of button operations: Press the [OK] button on the main interface to enter the menu interface. On this interface, find the Service interface and press the [OK] button to enter the Service interface. In the Service interface, press the [▸] buttons to find the Password interface. After entering, you can set to enable the password or disable the password.

Graphic and text instructions: Enable the password.



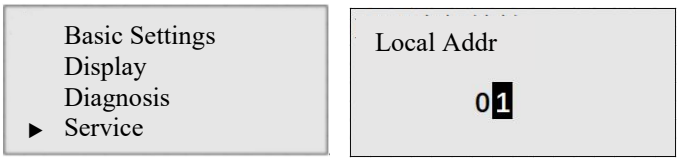
Meaning of the parameter: After setting the password, when most parameters in the device's menu bar need to be reset, the specified password will be required to be entered.

⚠ When you forget the unlocking password, request the unlocking password from the manufacturer. You need to provide the device's serial number when making the request.

5.5.6 Local Address

Display of button operations: After pressing the [OK] button on the main interface, you will enter the menu interface. In this interface, find the service interface and press the [OK] button to enter the service interface. In the service interface, press the[▸] buttons to find the local address interface. After entering, you can set the local HART address to a value between 0 and 15 according to your needs. This address is related to HART communication. When the HART address is set to a value other than 0, the device will only be able to output a current of 4mA, and at this time, the device is in the calibration state. The address of RS485 can be set to a value between 1 and 255.

Graphic and text instructions: Set the local HART address to 1.

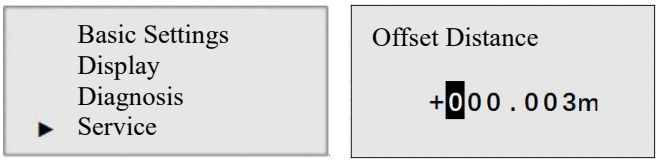


Meaning of the parameter: After setting the local HART address, the command sent via the HART standard protocol needs to be consistent with the local address. It mainly functions in the communication mode of multiple devices on a single bus.

5.5.7 Offset Distance

Display of button operations: Press the [OK] button on the main interface to enter the menu interface. On this interface, find the Service interface and press the [OK] button to enter the Service interface. In the Service interface, press the [▸] buttons to find the Offset Distance interface. After entering, you can set the offset according to your needs. The set value is the difference between the radar measured value and the actual value. If the measured value is greater than the actual value, enter a - sign. On the contrary, enter the + sign. For example, the actual value is 7.555m, while the radar measurement value is 7.558m. The offset is set to+0.003m.

Graphic and text instructions: Set the offset to +0.003m.



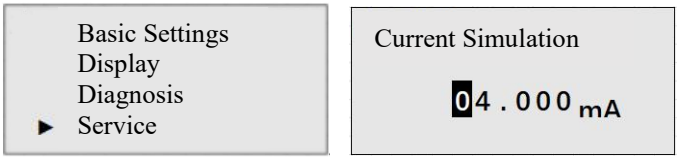
Meaning of the parameter: By setting the offset distance, the distance measurement can be calibrated. So that the radar can measure more accurate.

5.5.8 Current simulation and calibration

5.5.8.1 Current Simulation

Display of button operations: Press the [OK] button on the main interface, and you will enter the menu interface. On this interface, find the Service interface and press the [OK] button to enter the Service interface. In the Service interface, press the [▸] buttons to find the Current Simulation interface. After entering, you can output the corresponding simulated current according to your needs. You can operate with 5.5.8.2 current calibration.

Graphic and text instructions: Current simulation at 4mA.

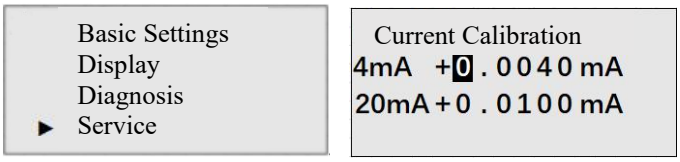


Meaning of the parameter: Output the specified simulated current, which can also be used for the calibration of 4mA and 20mA currents.

5.5.8.2 Current Calibration

Display of button operations: Press the [OK] button on the main interface to enter the menu interface. On this interface, find the Service interface and press the [OK] button to enter the Service interface. In the Service interface, press the [►] buttons to find the Current Calibration interface. Set the corresponding calibration values according to the offsets corresponding to the simulated current outputs of 4mA and 20mA.

Graphic and text instructions: Set the calibration offset for 4mA to 0.004mA and the calibration offset for 20mA to 0.01mA.

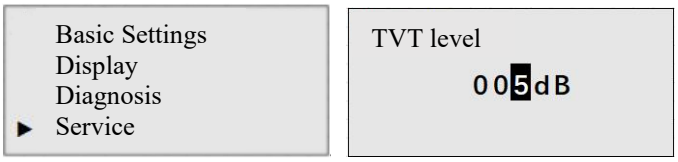


Meaning of the parameter: After setting the current calibration, the current will more accurate.

5.5.9 TVT level

Display of button operations: Press the [OK] button on the main interface to enter the menu interface. On this interface, find the Service interface and press the [OK] button to enter the Service interface. In the Service interface, press the [►] buttons to find the TVT Level interface. Then, you can set the TVT Level value according to your needs. After setting the TVT Level to N dB, the envelope curve will be raised by N dB overall.

Graphic and text instructions: Set the TVT margin to 5dB.



Meaning of the parameter: After setting the TVT Level, the entire envelope curve will be shifted upward by NdB.

5.6 Info menu introduction

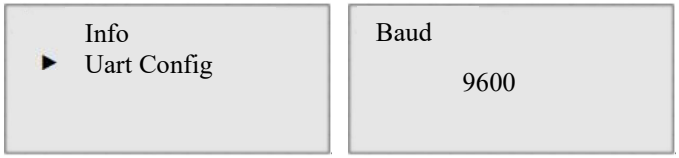
Display of button operations: Press the [OK] button on the main interface to enter the menu interface. On this interface, find the Info interface and press the [OK] button to enter the Info interface. In the Info interface, press the [►] buttons to view the relevant content.

Meaning of the parameter: You can view some basic information of the current device, such as Sensor Type, Serial Number, Date(date of manufacture), and Software Version.

5.7 UartConfig menu introduction (this parameter is not available for two-wire instruments)

5.7.1 Baud

Meaning of the parameter: Adjust the communication rate of the RS485 output. Available settings: 1200, 2400, 4800, 9600, 14400, 19200, 38400, 56000, 115200, 256000, 460800, 500000, 512000, 600000, 750000, 921600, 1000000, 1500000, 2000000 bps.



5.7.2 Parity

Meaning of the parameter: Set the parity check method for UART data. Available options: None, Odd, Even.

5.7.3 Stop bits

Meaning of the parameter: It is the flag indicating the end of data transmission in UART communication. Available options: 1, 1.5, 2.

6. Fault Parameter Description

Alarm Code	Triggering Reason	Solution
E020	The antenna has an abnormal contact, or there is an abnormal communication with the antenna.	Check whether the wiring of the circuit board is in good condition; check whether there are many interfering signals around; contact the manufacturer.

7. Register List

7. 1 Read variable values

Address	Function code	Register address	Number	CRC	Instruction
01	03	0000	0001	840A	**Space (Unit: cm)**
01	03	0001	0001	D5CA	**Space (Unit: mm)**

01	03	0002	0001	25CA	**Level (Unit: cm)**
01	03	0003	0001	740A	**Level (Unit: mm)**
01	03	0024	0002	8400	**Space (Float32)**
01	03	0026	0002	25C0	**Level (Float32)**
01	03	0028	0002	4403	**Distance (Float32)**
01	03	0022	0002	6401	**Current (Float32)**
01	03	002A	0002	E5C3	**Temperature (Float32)**
01	03	002C	0002	05C2	**Percentage (Float32)**

7.2 Common parameter register

Parameter	**Register address**	**Function code**	**Data type**	**Instruction**
Medium	0x003E	0x03,0x10	uint16	0x2000:Liquid 0x4000 Demonstration
Damping	0x0040	0x03,0x10	Float32	
Blind zone set	0x0042	0x03,0x10	Float32	
Range set	0x0044	0x03,0x10	Float32	
Min. Adjustment	0x0046	0x03,0x10	Float32	
Max. Adjustment	0x0048	0x03,0x10	Float32	
Offset distance	0x0050	0x03,0x10	Float32	
The shape of solid material particles	0x0080	0x03,0x10	uint16	0：Powder 1：Micro particles2：Large particles
The dielectric constant of the liquid material	0x0081	0x03,0x10	uint16	0：<3 1：3-10 2：>10
Working mode of liquid materials	0x0082	0x03,0x10	uint16	0: Default mode 1: Fast stirring 2: Medium-speed stirring 3: Slow stirring
Baud rate	0x1705	0x03,0x10	uint16	0-1200 1-2400 2-4800 3-9600 4-14400 5-19200 6-38400 7-56000 8-115200 9-256000 10-460800 11-500000 12-512000 13-600000 14-750000 15-921600 16-1000000 17-1500000 18-2000000
Address	0x1706	0x03,0x10	uint16	1-254
Parity and stop bit	0x1707	0x03,0x10	uint16	Parity (high 8 bits): 0: No parity 1: Odd parity 2: Even parity Stop bit (low 8 bits): 0: 1 stop bit 1: 1.5 stop bits 2: 2o stop bits