WINTERS Instruments
Excellence Since 1953

Technical Information

LRD9 series

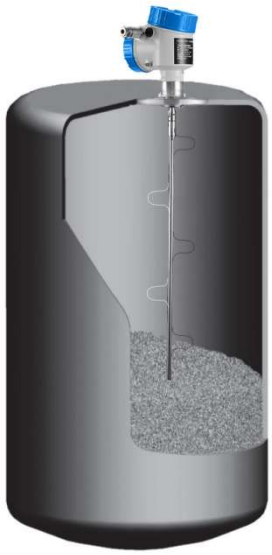
Guided wave radar level meter

Winters Instrument (Shanghai) Co., LTD

Contents

1. Product introduction

The high frequency microwave pulse emitted by the guided wave radar propagates along the detection component (steel cable or steel rod), encounters the measured medium, and causes reflection due to the sudden change of dielectric constant, and part of the pulse energy is reflected back. Transmitted pulse and reflected pulse.The time interval is proportional to the distance of the measured medium.



1.1 Product Features

(1) Due to the use of advanced microprocessor and unique EchoDiscovery echo processing technology, guided wave radar level meter can be applied to a variety of complex conditions.

(2) A variety of process connection methods and types of detection components make the LRD9 series guided wave radar level meter suitable for various complex conditions and applications. Such as: high temperature, high pressure and small dielectric constant media.

(3) Pulse working mode, guided wave radar level meter transmission power is very low, can be installed in a variety of metal, non-metal containers, no harm to the human body and the environment.

1.2 Safety Guide

The installation personnel must be professional and technical personnel (electricians, etc.) authorized by the state. The installation process strictly follows the instructions, application specifications, laws and regulations.

Installation personnel read and understand the instructions and precautions.

If the fault cannot be repaired, the device must be disabled to prevent miscommissioning. The faulty device is identified.

When the equipment needs to be installed in hazardous areas such as explosion-proof areas, it must comply with the requirements of certificates, national and local regulations. Installation specifications, connection parameters and safety guidelines listed in the explosion-proof manual must be followed.

Warning

Misoperation can result in injurysafety incidents or damage to equipment

Attention

Operational errors will result in device functionality errors

1.3 Instrument Overview

LRD901	
Applications: Liquid and solid measurement, complex process conditions Maximum range: cable: 30m/ rod: 6m Accuracy: ±3mm Process connection: G1½A /G2A /1½NPT Probe rod/cable material: stainless steel 316L Process temperature: (-40~150) ℃ Process pressure: (-0.1~4) MPa Signal output: (4~20) mA/HART Power source: two-wire system (DC24V) / Four-wire system (DC 24V/AC 220V)	
LRD902	

LRD9 Guided Wave Radar Level Meter

WINTERS Instruments
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Application: Highly corrosive liquid media Maximum range: 6m Accuracy: ±3mm Process connection: PTFE flange Probe rod material: stainless steel with PTFE PTFE rod diameter: φ10mm Process temperature: (-40~150)℃ Process pressure: (-0.1~1.6) MPa Signal output: (4~20) mA/HART Power source: two-wire system (DC24V) / Four-wire system (DC 24V/AC 220V)	
LRD903	
Applications: Liquid measurement, especially small dielectric constant liquids, complex process conditions Maximum range: 6m Accuracy: ±3mm Process connection: G1½A, G2A Probe rod/cable material: stainless steel 316L/PTFE Coaxial outer diameter: φ38mm Process temperature: (-40~150) ℃ Process pressure: (-0.1~4) MPa Signal output: (4~20) mA/HART Power source: two-wire system (DC24V) / Four-wire system (DC24V/AC 220V)	
LRD904	

Applications: liquid measurement, high temperature and high pressure conditions, complex process conditions Maximum range: cable: 30m/ bar: 6m Accuracy: ±3mm Process connection: G1½A/G2A/1½NPT Probe rod/cable material: stainless steel 316L/ ceramic Process temperature: (-40 ~ 200)℃ Process pressure: (-0.1~4) MPa Signal output: (4 ~ 20)mA/HART Power source: two-wire system (DC24V) / Four-wire system (DC 24V/AC 220V)	
LRD905	
Applications: liquid measurement, high temperature and high pressure conditions, complex process conditions Maximum range: cable: 30m/ bar: 6m Accuracy: ±3mm Process connection: G1½A /G2A/1½NPT Probe rod/cable material: stainless steel 316L/ ceramic Process temperature: (-200~400) ℃ Process pressure: (vacuum ~40) MPa Signal output: (4~20) mA/HART Power source: two-wire system (DC24V) / Four-wire system (DC 24V/AC 220V)	

2. Installation

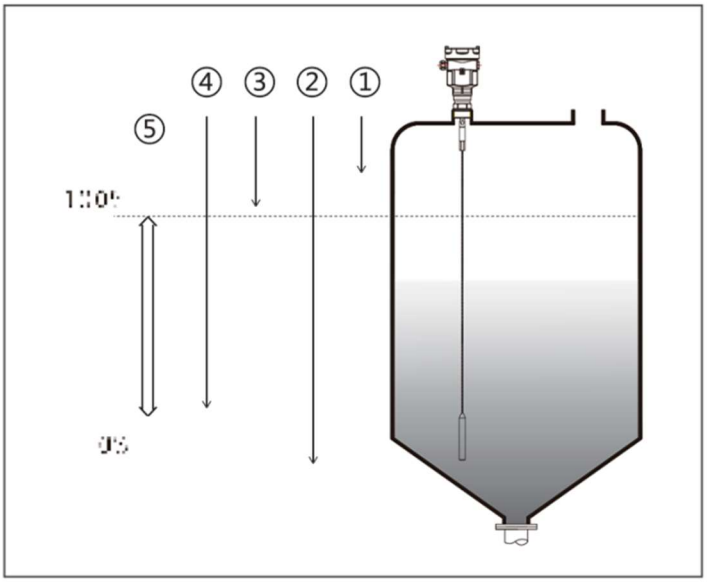
2.1 Basic Requirements

Ensure that the cable or rod does not come into contact with internal obstacles throughout the range, so installation should be as far as possible away from the tank facilities, such as: ladder, limit switch, heating equipment, bracket, etc. Care must also be taken that the cable or rod does not intersect with the feed flow.

When installing the instrument, pay attention to: the highest material level shall not enter the measurement blind area; The instrument must be kept at a

certain distance from the tank wall; The meter is installed so that the cable or rod orientation is as perpendicular as possible to the surface of the measured medium. Instruments installed in explosion-proof areas must comply with the national explosion-proof danger zone installation regulations. The intrinsically safe shell is aluminum. This type of instrument can be installed in the explosion-proof requirements of the occasion, the instrument must be grounded.

2.2 Picture Description



The reference surface for measurement is the sealing surface of the thread

1 Blind Zone Range (Menu 1.10)

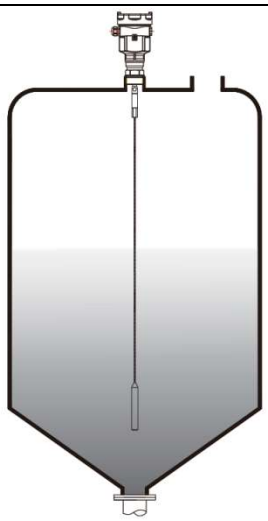
2 cable lengths (Menu 1.9)

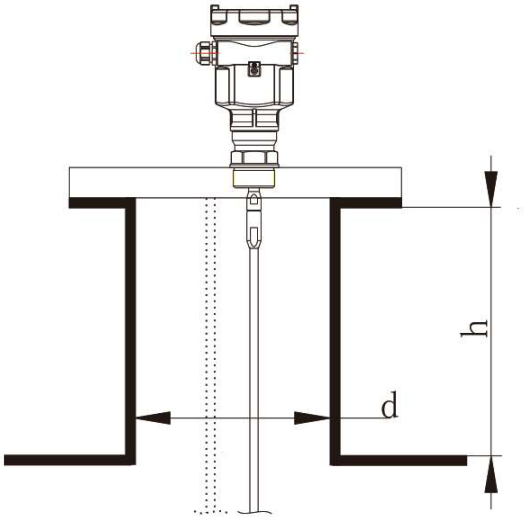
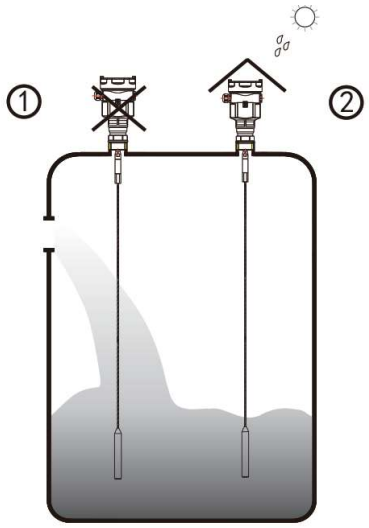
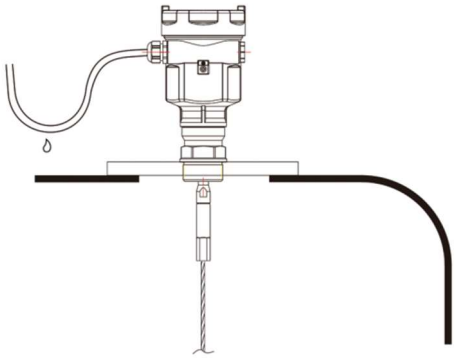
3 High Level Adjustment (Menu 1.2)

4 Low Level Adjustment (Menu 1.1)

5 Reference surface

Note: When using radar level meter, make sure that the material level meter cannot enter the measurement blind area.

	For conical containers, the best place to install the meter is in the center of the top of the container, so that the measurement can be guaranteed to the bottom of the container.

Container nozzle The length of the container nozzle is as shown below:	
	Try to avoid takeover installation or takeover h is as small as possible. When the nozzle is long, the medium container is small or the dielectric constant of the medium is small, the double rod type can be used.
Erection right or wrong	
	① Error: Do not install the meter above the inlet flow, the cable or rod should avoid the inlet flow. ② Correct attention: outdoor installation should be taken shade,rain prevention measures.
moisture-proof	
	For instruments installed outdoors or in damp indoor environments, as well as on cooling or heating tanks, in order to prevent moisture, the cable gland should be tightened and the cable should be bent downwards at the inlet. As shown in the diagram.

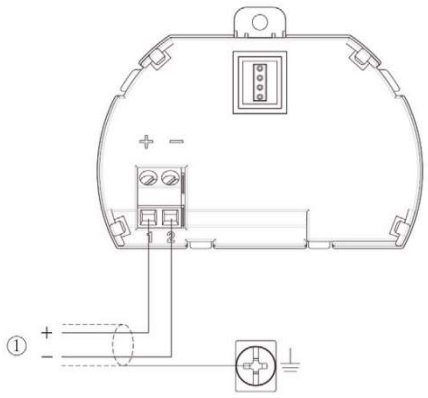
2.3 Electrical connections

- Power supply voltage

Two-wire system	Standard type	(20~28)VDC
	Intrinsic safety type	(21.6~26.4)VDC
	power dissipation	Max.22.5mA
	Allow ripple	
	≤ 100Hz	Uss＜1V
	-(100-100K) Hz	Uss＜10mV
Four-wire system	Intrinsic safety+explosion-proof	(22.8~26.4)VDC，(198~242)VAC
two-cell	power dissipation	Max.1VA，1W

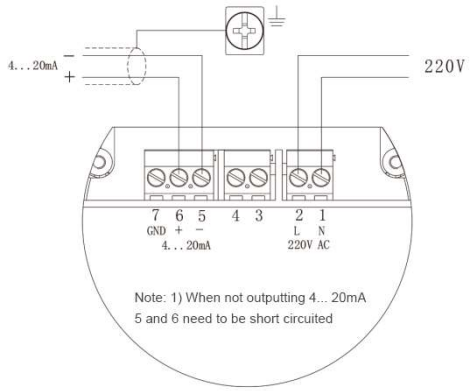
- Mode of connection

two-wire

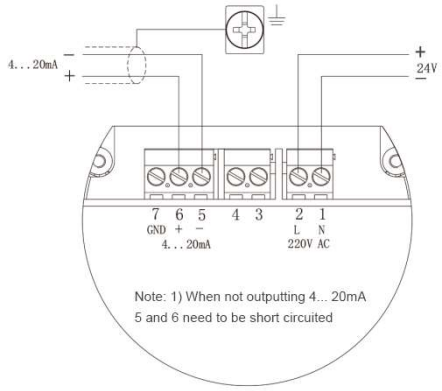


For HART two-wire system
(Electronic unit selection B)
1) Power supply and signal output

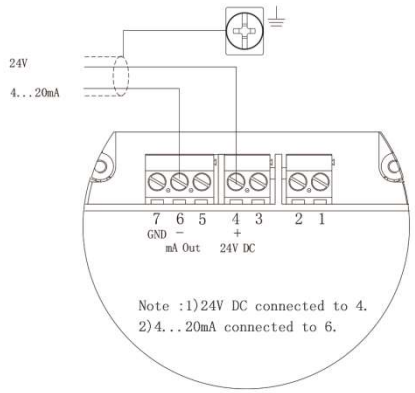
Four wires (two cells)



Wiring method: 220VAC power supply,
4... 20mA output (Electronic unit selection D)



Wiring method: 24VDC power supply,
4... 20mA output (Electronic unit selection C)



Two-wire (two-cell) : 24VDC power supply,4... 20mA output (Electronic unit selection E)

explosion-proof connection

The explosion-proof form of this product is intrinsically safe. Explosion-proof mark: Ex ia II CT1~T6Ga. The safety type guided wave radar level meter is made of die-cast aluminum housing material, and the electronic parts are made of plastic sealing structure, so as to ensure that the sparks generated when the circuit is partially faulty will not be released. The product is suitable for continuous level measurement of combustible media below Ex ia II CT1~T6Ga explosion-proof grade. This product must be powered by a safety grid when used. FBS-2 safety grid is the associated equipment of this product, and the explosion-proof form is intrinsically safe. Explosion-proof mark: [Ex ia] IIC, supply

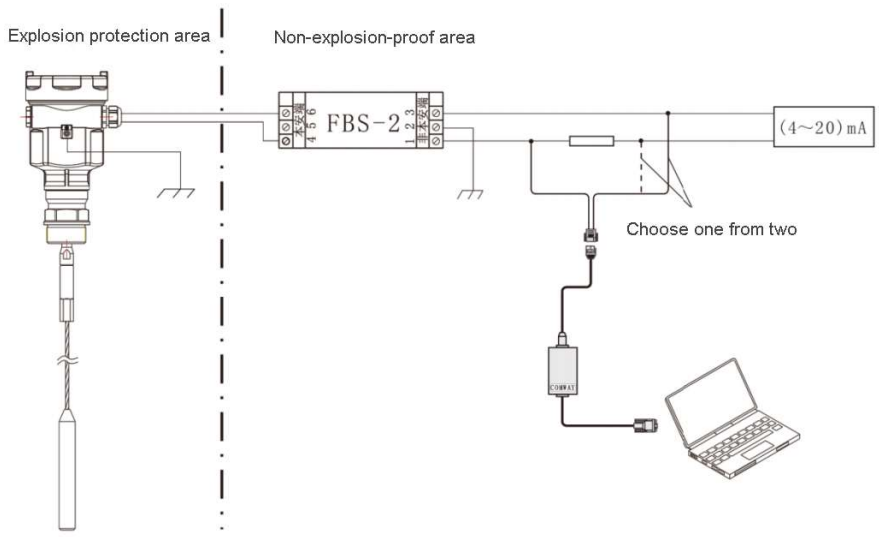
voltage (21.6 ~ 26.4) VDC, short circuit current is 135mA, working current (4 ~ 20) mA.

All cables should be shielded cables with a maximum length of 500m from the meter to the safety gate. Distributed capacitance ≤0.1uF/km, distributed inductance ≤1mH/km. The instrument must be grounded when installed. Do not use other associated equipment that has not been inspected for explosion protection.

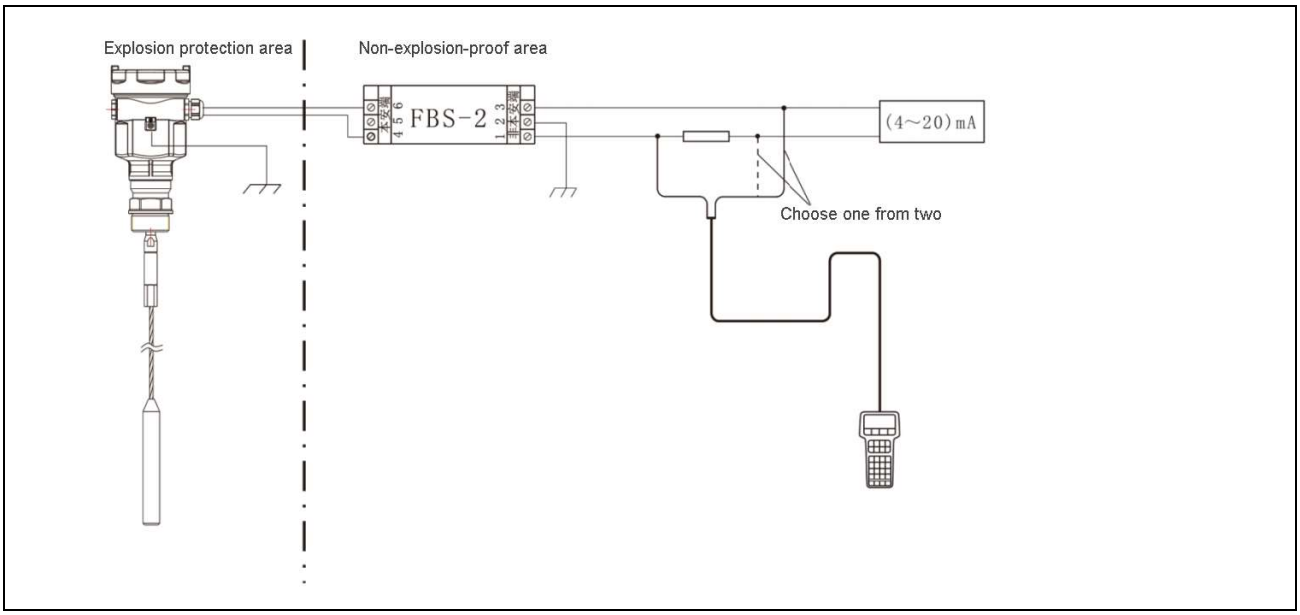
FBS-2 Safety gate parameters:

Um	Uo	Io	Co	Lo
250V AV/DC	26V	135mA	100nf	1.8mH
250V AV/DC	7V	140mA	10μf	1.8mH

Debugging software was used to debug the level meter



The level meter was debugged with HART handheld programmer



3. Operation and debugging

3.1 Debugging Method

LRD9 series guided wave radar has three debugging methods:

1 Display/Debug module (ViewPoint)

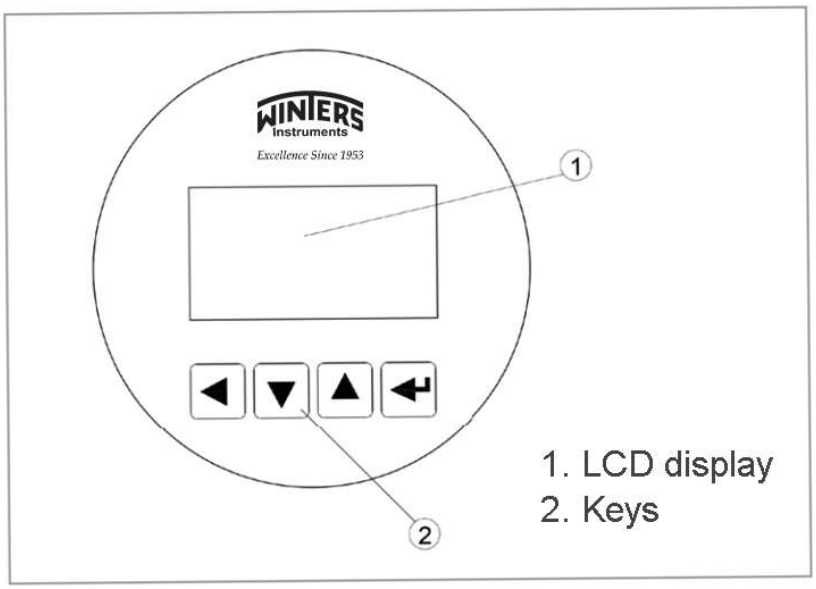
2 PC debugging software

3 HART handheld programmer

ViewPoint is a display debugging tool that can be plugged in, and the instrument can be debugged through the 4 buttons on ViewPoint.

The language of the debug menu is optional. After debugging, ViewPoint is generally only used for display, and the measured values can be read out very clearly through the glass window.

3.2 Display/Debug module



【 ↵ 】key

- Enter the programming state;
- Confirm the programming item;
- Confirm the parameter modification.

【 ▲ 】key

- Modify parameter values.

Shortcut key

【 ◄ 】key

displays the echo curve

【 ▼ 】key

- Select the programming item;
- Select edit parameter bits
- Parameter content is displayed.

【 ◄ 】key

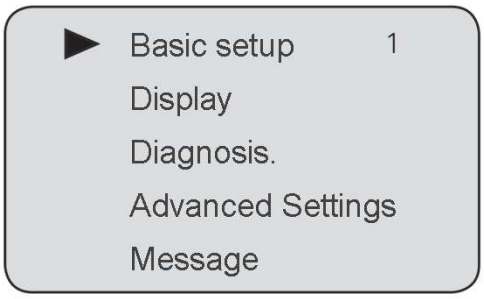
- Exit the programming state;
- Back to the top menu.

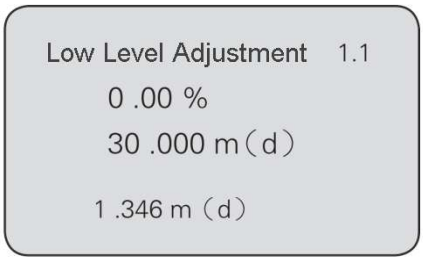
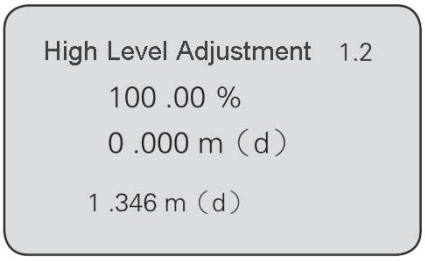
3.3 Programming Menu Description

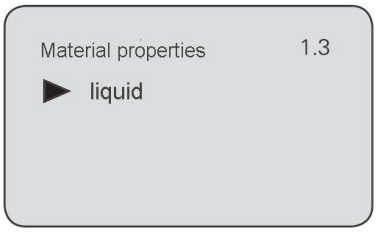
Programming submenu	
Basic setup	Basic Settings include the basic parameters of the meter: low adjustment, high adjustment, material properties, damping time, signal threshold, output mapping, scalar units, scaling, cable length setting, blind zone range, sensor label.
Display	Display content: material height, LCD contrast
diagnosis.	The contents are: measuring peak value of the instrument, measuring state, selection curve, display curve, simulation

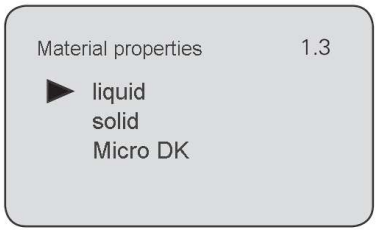
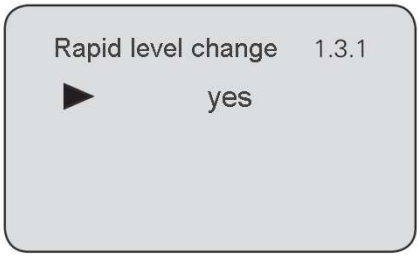
service	Includes false echoes, current output, reset, unit of measure, language, HART mode of operation, copy sensor data, cipher, distance offset, steam correction, steam correction test, steam correction adjustment
Message	Basic instrument information, such as sensor type, serial number, production date, software version

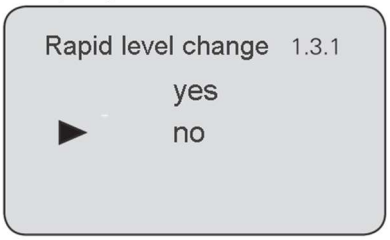
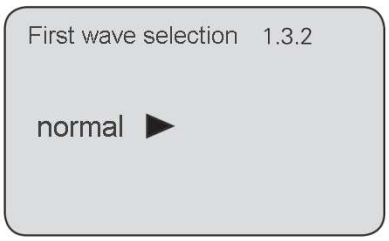
Parameter editing method	
Character/numeric parameter programming	When the menu enters the character/number programming state, the first parameter to be edited is black, at this time, you can press ▲ key to change the bit character/number, until the required character/number, press ▼, the character bit in turn black, you can program other bits, after programming, press ↵ keys to confirm programming.
Optional parameter programming	Optional parameter refers to the programming item several alternative parameter items, for the user to choose, use ▲keys to point the arrow to the required parameters, press↵ keys to confirm the programming.

Programming menu description	
1 Basic Settings	Basic Settings include the setting of main instrument parameters, such as range, material properties, damping time, etc. In the running state, press ↵key to enter the programming state, LCD display menu.  Note: The number in the upper right corner is the menu number
1.1 Low Level Adjustment	Low adjustment is used for range Settings. Together with the high level adjustment, it determines the proportion of the linear correspondence of the current output. In the main menu, when the menu number is 1, press ↵to enter

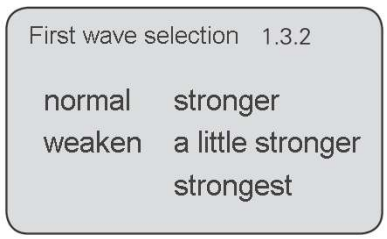
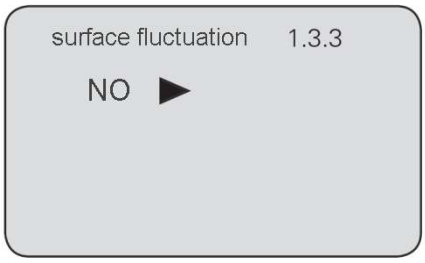
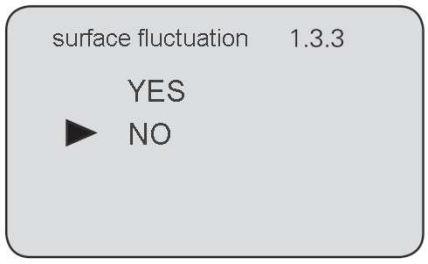
	the basic Settings submenu, LCD display  Press ↵ key to enter the programming low percentage. Edit the percentage value and distance value by referring to the character/number parameter programming method in the previous parameter editing method. After editing, press ↵ keys to confirm, press ▼ keys to give up programming.
1.2 High Level Adjustment	High adjustment is used for range Settings. Together with the low level adjustment, it determines the proportion of the linear correspondence of the current output. When the LCD menu number is 1.1, press ▼to enter the high level adjustment, LCD display.  At this point, press ↵key to program the high adjustment.
1.3 Material Properties	When the LCD menu number is 1.2, press the button to enter the material property programming, LCD display. The Material Properties menu is used to select solid, liquid or microDK, thereby further determining some other properties of the material that affect the measurement.

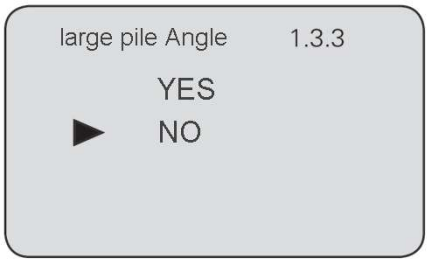
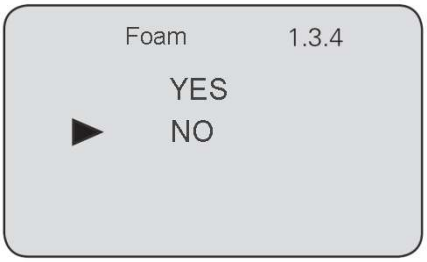
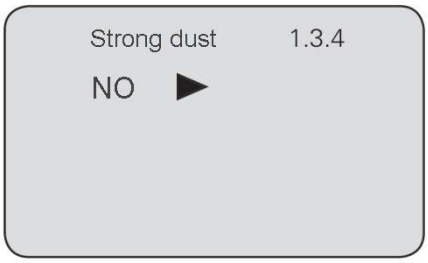
<table>
<tr><td></td><td> 

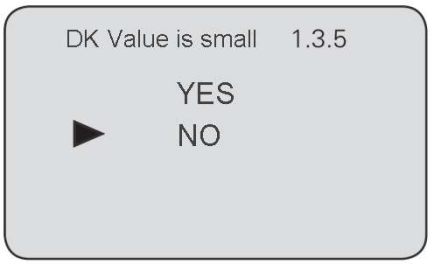

</td></tr>
<tr><td>1.3.1 Rapid level change</td><td>When the material properties choose liquid or solid, press key to enter the quick change menu, LCD display
 

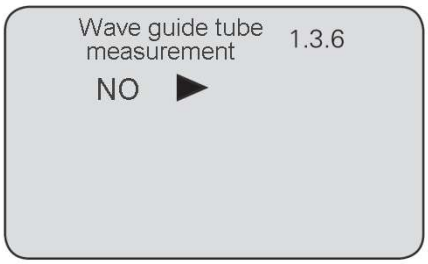
Then press key to enter the quick change menu, LCD display
 
</td></tr>
<tr><td>1.3.2 First wave selection</td><td>When the material properties choose liquid or solid, the LCD display menu is 1.3.1, use key to select the next menu to enter the first wave selection menu, LCD display
 

Press button to enter the first wave selection menu, LCD display</td></tr>
</table>

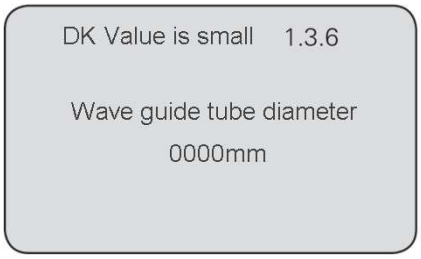
	 Press ▼ to select the treatment of the first wave. There are 5 methods: Normal: First wave amplitude is not processed (default) Attenuation: The first wave amplitude is reduced by 10dB Slightly stronger: First wave amplitude increased by 10dB Strong: the first wave amplitude is increased by 20dB Strongest: First wave amplitude increased by 40dB
1.3.3 (liquid) surface fluctuation	When the material property is liquid and the LCD menu is 1.3.2, select the next menu with ▼key to enter the surface fluctuation menu and the LCD display  Press↵keys to enter the surface fluctuation selection menu, LCD display 
1.3.3(solid) large pile Angle	When the nature of the material is liquid, the LCD menu is 1.3.2, use ▼key to select the next menu to enter the pile corner menu, the LCD display

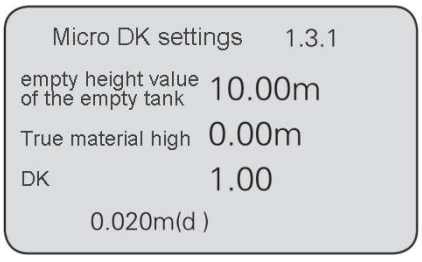
	 Press button to enter the first wave selection menu, LCD display 
1.3.4 (liquid) foam	When the LCD menu is 1.3.3, use key to select the next menu to enter the liquid level foam menu, LCD  Press button again to enter the liquid foam selection menu, LCD display 
1.3.4 (solid) strong dust	When the LCD menu is 1.3.3, select the next menu with key to enter the dust strong selection menu, LCD  Then press key to enter the dust strong selection menu, LCD display

	
1.3.5 DK Value is small	When the liquid crystal display 1.3.4, press ↵ key to enter the DK value adjustment setting menu, the liquid crystal display  Press ↵ key again to enter DK value adjustment menu, LCD display  Press ▼ key to select "Yes" for the measurement setting of DK value hours, and the LCD display is as follows. At this time, an accurate empty height value of the empty tank needs to be manually input, which is used to judge the position of the tank bottom to reduce the reflection of the tank bottom 
1.3.6 (liquid) wave guide tube setting	When the LCD menu is 1.3.5, press ↵ key to enter the wave guide tube setting menu, LCD display

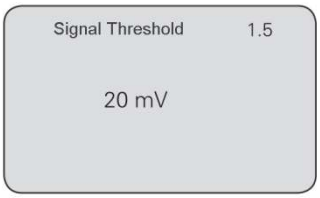
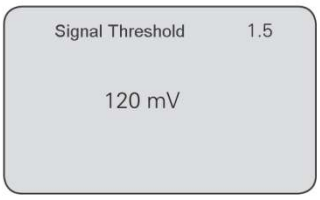
<table>
<tr>
<td></td>
<td>


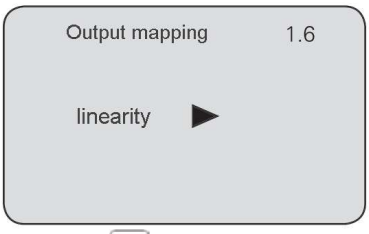
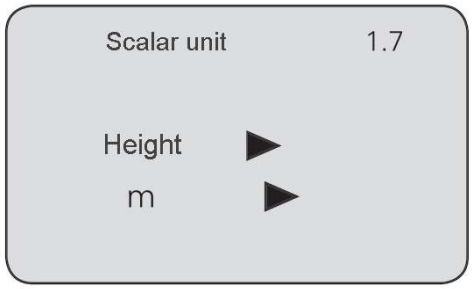
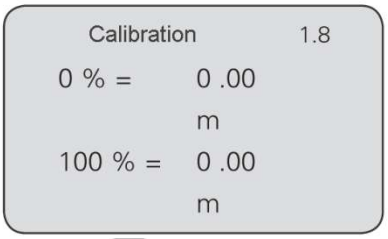
Press ↵ key to enter the wave guide tube measurement menu, LCD display

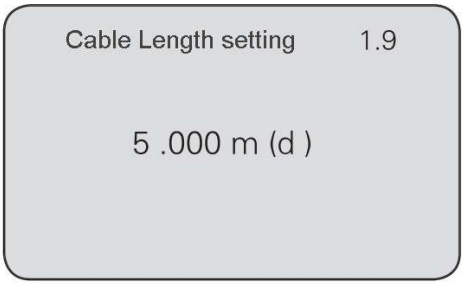
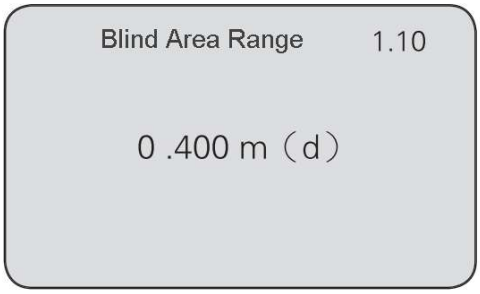

Press ▼ key to select "Yes", press ↵ key to enter the wave guide tube diameter setting menu, LCD display


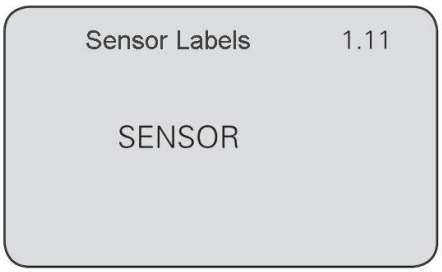
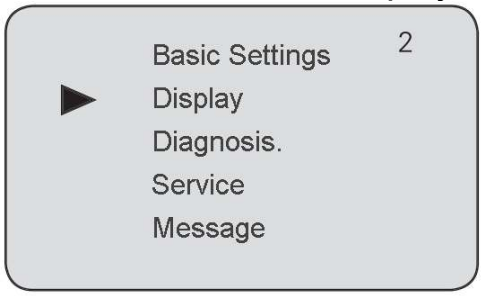
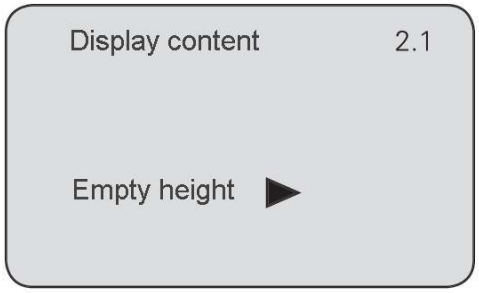
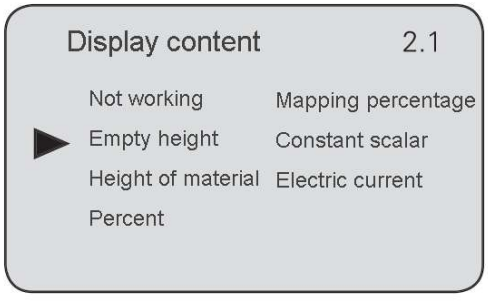
Note: The wave guide tube setting can only be valid if the wave guide tube is present.
</td>
</tr>
<tr>
<td>1.3.1 Micro DK</td>
<td>
When the material property is micro DK, press ↵ key to enter the LCD display set by Micro DK


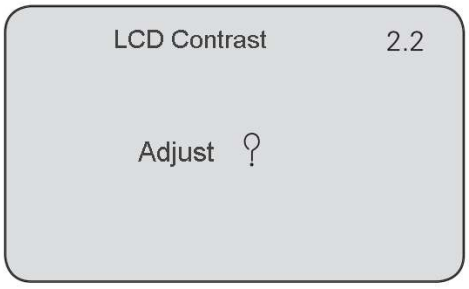
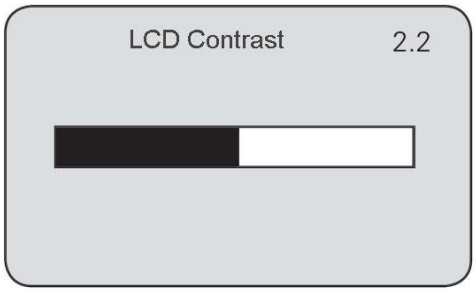
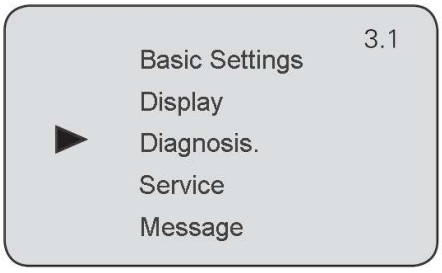
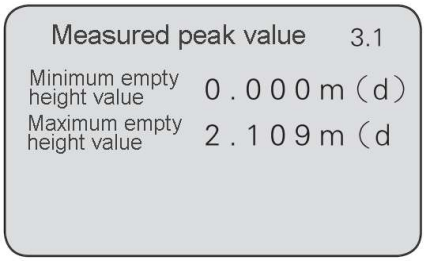
When the material property is micro DK, it is generally used for dielectric constant less than 1.4, when the direct echo of the medium surface is very weak, or can not be measured, and the material level height can be measured by the reflection method at the bottom of the tank, then two of the following parameters need to be entered: 1. Empty height of empty can, the value of empty height of empty can or container. 2. The real material height or the dielectric constant of the substance to be measured, the
</td>
</tr>
</table>

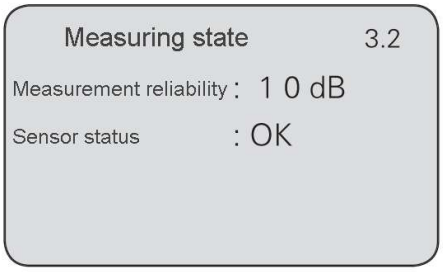
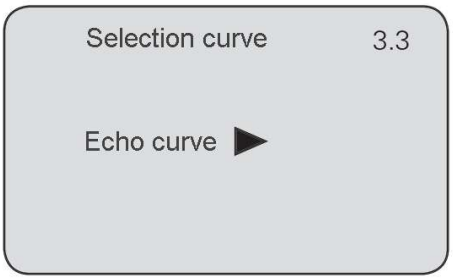
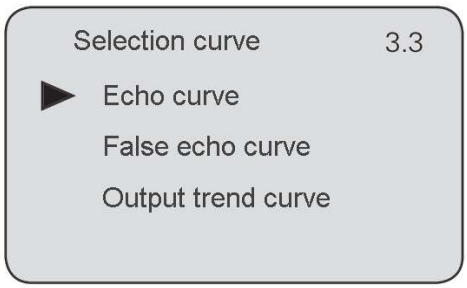
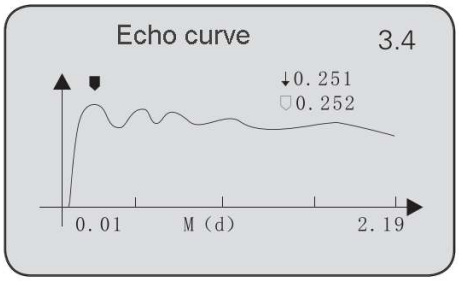
	two parameters are related, enter one of them. The accuracy of the above parameters directly affects the accuracy value of the measurement results. Note: The selection of "micro DK" should be careful, and most of the measurements are inappropriate. When the "micro DK" is selected, the system determines whether to use direct echo method or bottom reflection method to obtain the measurement results according to the echo situation.
1.4Damping time	When the LCD menu number is 1.4, press ▼ key to enter the damping time setting menu, LCD display  Press ↵ key to enter the parameter editing state, character/number parameter programming method to edit, press ↵ keys to confirm
1.5 Signal Threshold	The Signal Threshold menu is used to set the effective echo amplitude noise tolerance. When the LCD menu number is 1.4, press ▼ key to enter the signal threshold programming, LCD display   See above for optional parameter programming methods to set values. Press ↵ to confirm the edit. Note: This parameter must be adjusted by a professional according to the echo intensity.

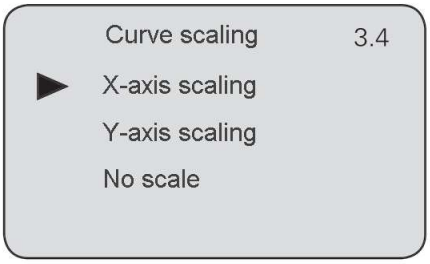
1.6 Output Mapping	The output map is used to choose between a nonlinear output map and a linear map that has been set by the host computer. When the LCD menu number is 1.5, press ▼ key to enter the output mapping editing menu, LCD display  Press ↵key to enter the parameter selection state, use ▼ keys to select linear or other optional mapping methods, such as linear, cone, etc., press ↵ keys to confirm after editing.。
1.7 Scalar unit	When linear output mapping is selected, it is used to select different display units. When the LCD menu number is 1.6, press▼ key to enter the fixed scalar unit setting menu, LCD display  Press ↵ key to enter the parameter selection state, use ▼ to select different dimensions, press↵ key to confirm, and further select the corresponding display unit, and then use ↵key to confirm。
1.8 Calibration	When the LCD display 1.7, press▼key to enter the calibration setting menu, LCD display  Press ↵ key, the parameter field is black, use ▲ keys to set the decimal point position, use↵ keys to confirm, 0% of the corresponding parameter field is black, use▲ and▼ keys to set parameters, press↵ keys to

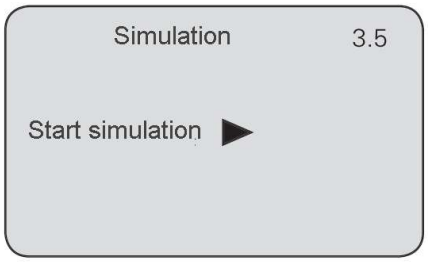
	confirm, use the same method to set 100% of the corresponding value.
1.9 Cable Length setting	In order to get the correct measurement results, it is necessary to set the measuring range of the instrument. When the menu number is displayed as 1.8, press ▼key to enter the range setting menu, LCD display.  Press↵ key to enter the cable length setting, refer to the character/number parameter programming method in the previous parameter editing method to edit the distance value. After editing, press ↵ keys to confirm, press ◄ keys to give up programming.
1.10 Blind Area Range	When there is a fixed obstacle near the mounting thread of the sensor surface that interferes with the measurement, and the maximum material height will not reach the obstacle, the blind zone range setting function can be used to avoid measurement errors. When the LCD menu number is 1.9, press ▼ key to enter the blind zone range setting menu, LCD display  Press↵ to enter the parameter editing state, and press ↵to confirm after editing.
1.11 Sensor Labels	When the LCD menu is 1.10, press ▼key to move the menu to the sensor Note menu, LCD display

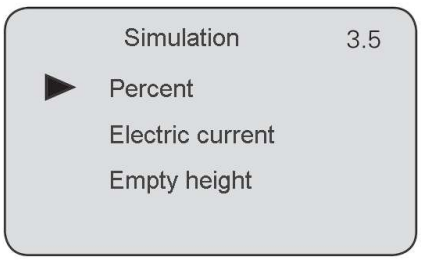
	 Press ↵ to enter the parameter editing state. After editing, press ↵ to confirm. This concludes the Basic Settings menu.
2 Display	This function is used for display mode programming. When the LCD displays the main menu, press ▼ key to move the arrow to the display item  Press ↵ key to enter the display mode programming, LCD display
2.1 Display Content	 The parameter that represents the current display content is the empty height, that is, the empty height value measured by the meter display. Press ↵ key to enter the editing state, LCD display  Press ▼ to move the arrow to the desired parameter, and press ↵ to confirm。

2.2 LCD Contrast	When the LCD menu number is 2.1, press ▼ to enter the LCD contrast adjustment menu, LCD display  Press ↵ to enter the adjustment state  Use the ▲ key and ▼ keys to increase or decrease the contrast, then use the OK key to confirm the adjustment and save the result
3 Diagnosis	The diagnostic function is used to test the working state of the instrument and its components and to debug the system.
3.1 Measuring Peak Value	The peak shows the empty peak value during the measurement. This parameter can be cleared by using 4.3 Reset in the service menu. When the LCD displays the main menu, press ▼ key, move the arrow to the diagnosis item, LCD display  Press ↵ key to enter, LCD display 

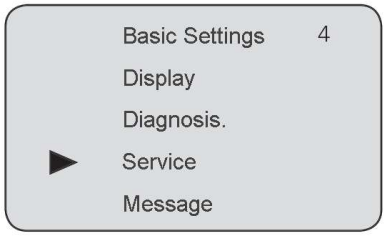
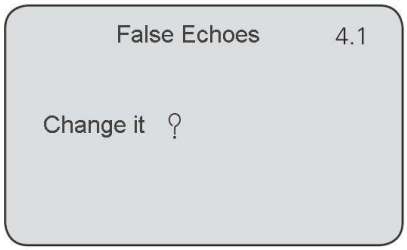
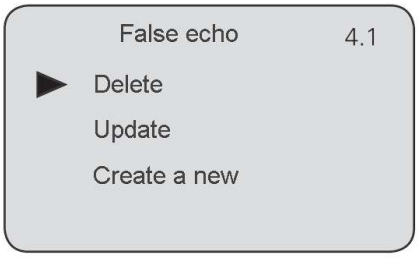
3.2 Measurement Status	When the LCD menu number is 3.1, press ▼ key to enter the diagnostic measurement state and display the working status of the sensor 
3.3 Selection curve	When the LCD menu number 3.2, press ▼ key to enter the waveform curve selection function, LCD display  To select other curves, press ↵ key to enter the select curve menu, LCD display  Use the key to move the arrow to the curve you want to display and press ↵ to confirm the selection。
3.4 Echo Curve	When the LCD menu number 3.3 is displayed, press the ▼ key to display the selected curve.  Curve scaling function Curve scaling is used to magnify the curve in the timeline and amplitude for clearer viewing. When the LCD

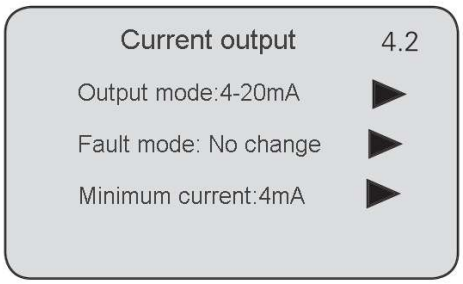
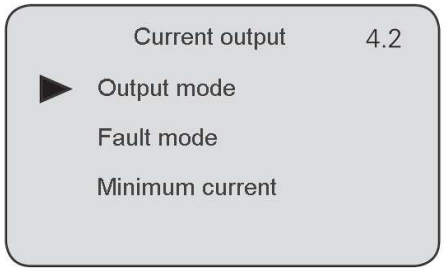
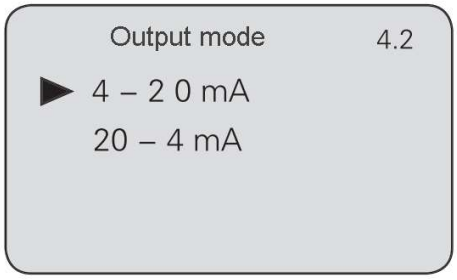
<table>
<tr><td></td><td>curve is displayed, press ↵ key to enter the curve scaling edit menu. Liquid crystal display
 

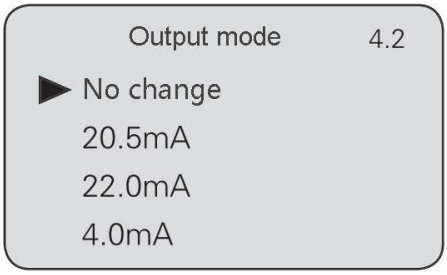
Use ▼ key to move the arrow, select the zoom direction or not zoom, press ↵ keys to confirm.
When x axis scaling is selected, press ▲ keys to move the starting point line to the desired position, and press ↵ keys to confirm; Press ▲ again to move the end point to the desired position, press ↵ to confirm, and then the curve of the selected area will be enlarged to the full screen. Press ◄ to exit the curve display.</td></tr>
<tr><td>3.5 Simulation</td><td>Simulation function is 4... Simulation output of 20mA current. It is used to check whether the current output function of the instrument is normal, and can also be used for system debugging. When the LCD menu number is 3.4, press ▼ key to enter the simulation state, LCD display
 

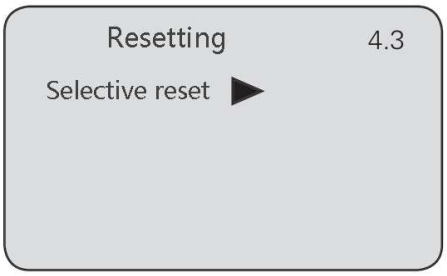
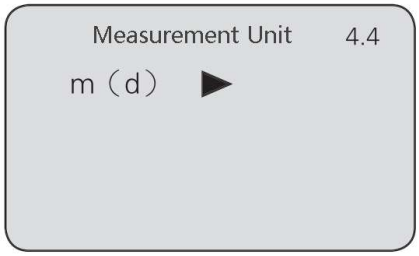
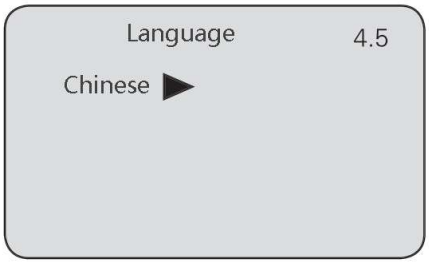
Key Confirm emulation function, LCD display
 

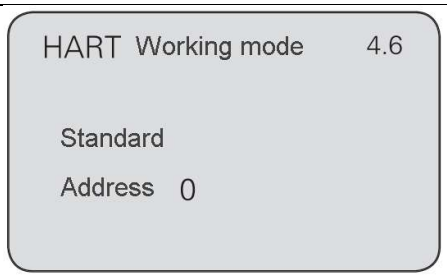
Press ▼ key to select the current output mapping mode, press ↵ key to confirm, enter the corresponding setting menu, complete the value setting, press ↵ key to confirm, at this time, the current output simulation value.
Note: Description of three alternative menu items
Percentage: Output current at a given percentage</td></tr>
</table>

	value. For example, 100% corresponds to the output of 20mA and 0% corresponds to the output of 4mA. Current: Output current according to the given current value. For example, 16.6mA corresponds to 16.6mA output. Is determined by 1.1 Low adjustment, 1.2 High Adjustment and 1.6 Output mapping)
4 Services	More specialized functions are included in the service menu for use by trained personnel. It mainly includes false echo learning, current output, reset and instrument parameter saving. When the LCD displays the main menu, press ▼ key, move the arrow to the service item, the LCD displays 
4.1 False Echoes	When a fixed obstacle interferes with the measurement, the false echo learning can be used to overcome its influence. When the main menu is displayed and the menu number is 4, press ↵ to enter the service submenu, LCD  Press ↵ key, LCD display  To update/create a false echo curve, press ▼ key, move the arrow to the required bar, press ↵ key to confirm, the LCD display please wait, the instrument to learn the false echo, complete back to the false echo learning menu. Note: The difference between updating false echo

	curve and creating new false echo curve: the false echo curve of the new false echo curve after the true echo is cleared to zero, while the false echo curve of the updated false echo curve after the true echo remains unchanged.
4.2 Current Output	This parameter is used to set the current output mode In the LCD menu number 4.1, press ▼ key, LCD display  Press ↵key, LCD display 
Output mode	Output Mode Select 4-20mA or 20-4mA output mode. 4-20mA indicates that low material level corresponds to 4mA, high material level corresponds to 20mA; 20-4mA indicates that the low material level corresponds to 20mA, and the high material level corresponds to 4mA. In the LCD current output menu 4.2, press ▼ key, move the arrow to the output mode, press ↵key to confirm the LCD display  Press ▼to select the desired Settings, and press ↵ to confirm the selection.

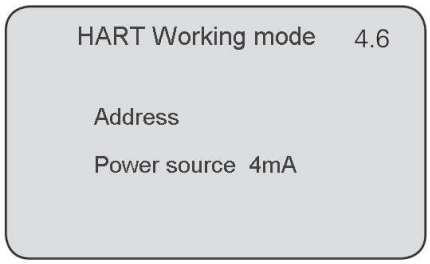
Failure mode	Failure mode is used to select 20.5mA or 22mA without changing the output current when there is a fault alarm. In the LCD current output menu 4.2, press ▼ key, move the arrow to fault mode, press ↵ key to confirm the LCD display  Press ▼ to select the desired Settings, and press ↵ to confirm the selection.
Minimum current	Minimum current The minimum output current is 4mA or 3.9mA. In the LCD current output menu 4.2, press ▼ key, move the arrow to the minimum current, press ↵ key to confirm the LCD display  Press ▼ to select the desired Settings, and press ↵ to confirm the selection.
4.3 Resetting	Reset function Resets instrument parameters. There are four reset functions: basic Settings, factory Settings, and peak measurement. The basic setting is to restore the parameters in the basic setting of the instrument to the default setting of the factory; Factory Settings Restore all instrument parameters to factory default Settings; Measurement peak reset is to reset the measurement peak in the diagnosis. When the liquid crystal display current output (menu number 4.2), press ▼ key to enter the reset function, the liquid crystal display

	 Press ↵ to enter the reset selection menu, and select the corresponding reset function item as required.
4.4 Measurement Unit	The unit of measurement provides the user with the choice of using metric or imperial measurement. When the LCD reset menu (menu number 4.3), press ▼ key to enter the measurement unit setting menu, LCD display  Press ↵ to enter the menu of measurement unit selection. You can select the corresponding measurement unit according to your needs。
4.5 Language	Language provides users with two language options: Chinese and English. When the LCD display measuring unit (menu number 4.4), press ▼ key to enter the language setting function, LCD display  Press ↵ to enter the language selection menu and select the desired language.
4.6 HART working mode	When two or more instruments are connected to the upper computer using HART communication, this function is required to set the instrument to multi-point operation mode. When the LCD displays the language menu (menu number 4.5), press ▼ key to enter the HART working mode menu, LCD display



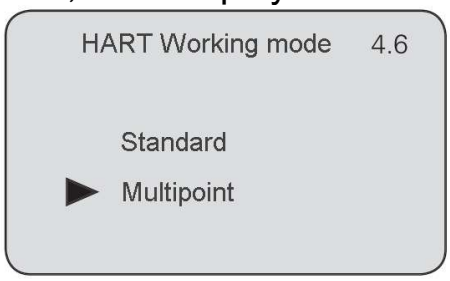
Press ↵ key to enter the HART mode setting interface, LCD display

If the HART working mode is selected as multi-point, the display is as follows:

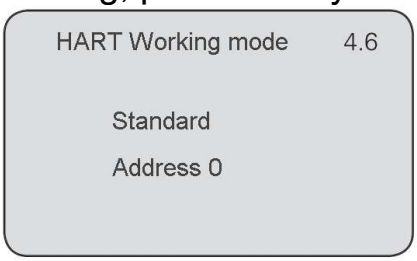


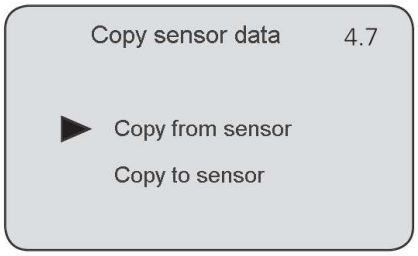
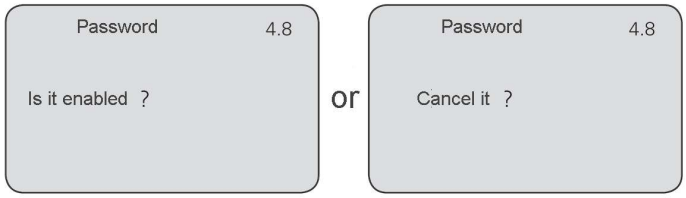
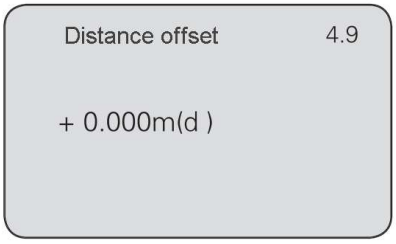
The address can be changed from 1 to 15. Working power supplies are available in two 4mA and 8mA options.

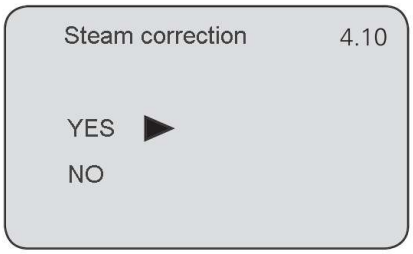
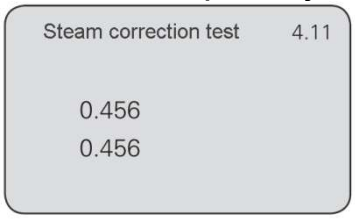
Press ↵ key to enter the HART mode setting interface, LCD display

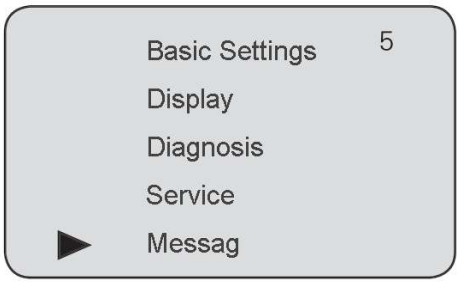
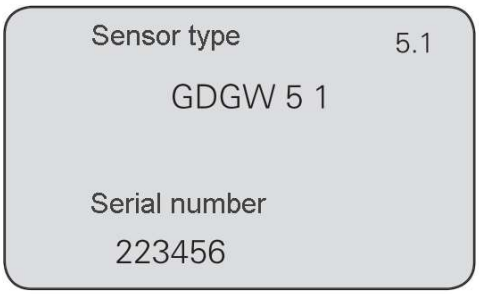


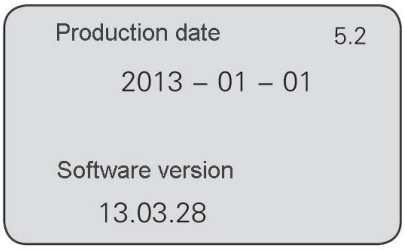
Select standard or multipoint mode with ▼ key. When standard mode is selected, the local address is specified as 0; If you select multi-point mode, press ↵ keys to enter the address setting menu, and set the address to 1-15. After editing, press ↵ keys to confirm.



4.7 Copying Sensor Data	To copy sensor data, there are two submenus: Copy from Sensor and Copy to sensor. This function is used to protect the instrument parameters. When the technician has set the instrument parameters according to the working environmental conditions, the set parameters can be saved using the copy from the sensor function, and in case the instrument parameters are accidentally modified, it can be copied to the sensor to restore it. When the LCD display HART working mode (menu number 4.6), press ▼ key to enter the copy sensor data function, LCD display  With ▼ key, select the desired menu, press ↵ keys to confirm the selection and perform the function
4.8 Password	The password is used to protect the instrument parameters. After the password function is enabled, you need to enter the password when changing any instrument parameter. Once you enter the correct password, the password protection function is disabled and the instrument parameter can be modified. When the LCD copy sensor data menu (menu number 4.7), press ▼ key to enter the password function, the LCD display  Press ↵ to enable the password function and set or disable the password function  The distance offset setting is used to modify the measurement error of the instrument as the difference

	between the actual empty height value and the displayed empty height value. When the LCD display number menu (menu number 4.8) is displayed, press ▼ key to enter the distance offset menu setting Press ↵key to set the distance offset
4.10 Steam correction	Steam correction function: It is specially used in guided wave radar to measure high temperature water vapor (general temperature greater than 150℃) under the working condition, because high temperature water vapor will affect the propagation speed of electromagnetic wave and then produce measurement deviation, so the measurement results need to be corrected, the function of this menu is to open the steam correction function. When the LCD display distance deviation (menu number 4.9), press▼key to enter the steam correction menu, the LCD display is as follows:  With▼key, select 'Yes' and' No 'to turn on the steam correction function, press↵keys to confirm the selection and perform the function. After steam correction 'Yes' is selected, the function of automatic compensation and correction of high temperature water level at different temperatures can be realized by cooperating with the 4.11 menu.
4.11 Steam correction test	The steam correction test function is used in conjunction with the steam correction (menu 4.10). When the liquid crystal displays the steam correction (menu No. 4.10), press the button to enter the steam correction test menu, and the liquid crystal displays as follows:  The values in the first row are required to store the

	steam correction parameters in advance, The second line of data is the radar vapor correction parameter obtained from the current measurement. Press ↵ key to store the current vapor correction parameter. The realization of the steam correction function is to manually store the value of this steam correction parameter when the water temperature is low (generally less than 100 ° C). When the temperature rises, this parameter will change with the influence of water vapor, so as to use this parameter to achieve the purpose of correcting the water level measurement, therefore, pay special attention to the low temperature storage of the "steam correction parameter" after the radar installation, when the temperature rises, do not store this parameter, otherwise it can not achieve the purpose of correction.
5 Messages	The information menu includes basic information about the production of the instrument, such as product serial number, production date, software version number, etc. When the LCD displays the main menu, press ▼ key, move the arrow to the information item, the LCD displays  Press ↵ key to enter the information display function, LCD display  Press ▼ key, LCD display



Method 1:

Example 1: The echo curve is displayed as follows:

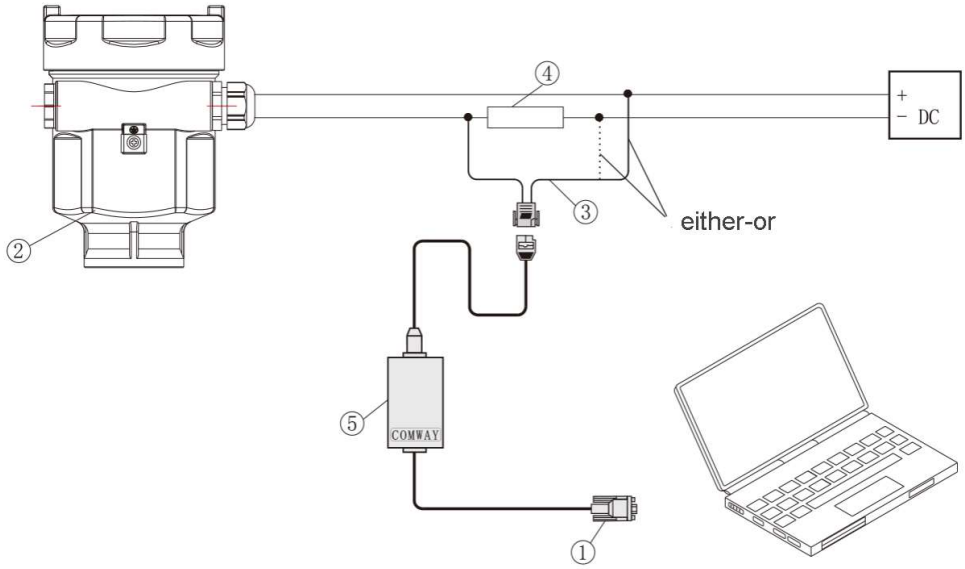
1. Press ↵ to enter the programming state, and the LCD screen displays the main menu of programming;
2. Select the submenu: Use ▼ keys to point the arrow to the diagnostic submenu 3, and 3 is displayed in the upper right corner of the display.
3. Press ↵ to confirm. The diagnostic submenu 3.1 displays the measurement peak values: minimum and maximum empty height.
4. Press the ▼ key to enter the next programming item, showing the measurement form 3.2: measurement reliability, sensor status, sensor temperature;
5. Press the ▼ key again to enter the Select Curve submenu 3.3. If the parameter item of this menu is "Echo curve", go to the eighth item below;
6. Press ↵ to enter the parameter selection menu.
7. Use the ▼ key to move the arrow and select "Echo Curve"; Press ↵ key to confirm;
8. Press ▼ to display echo curve 3.4;
9. Press ↵ to enter the curve scaling menu;
10. Press ▼ to select X-axis scaling and press ↵ key to confirm;
11. Press ▲ to move the starting point line to the desired position, and press ↵ to confirm;
12. Press ▲ to move the end point line to the desired position, press ↵ to confirm, then the curve of the selected area will be enlarged to the full screen;
13. Press ◄ keys continuously; Until it returns to the running state.

Method two:

In the main interface, press ◄ key directly to display the shortcut of echo curve.

3.4 Debugging of the upper machine

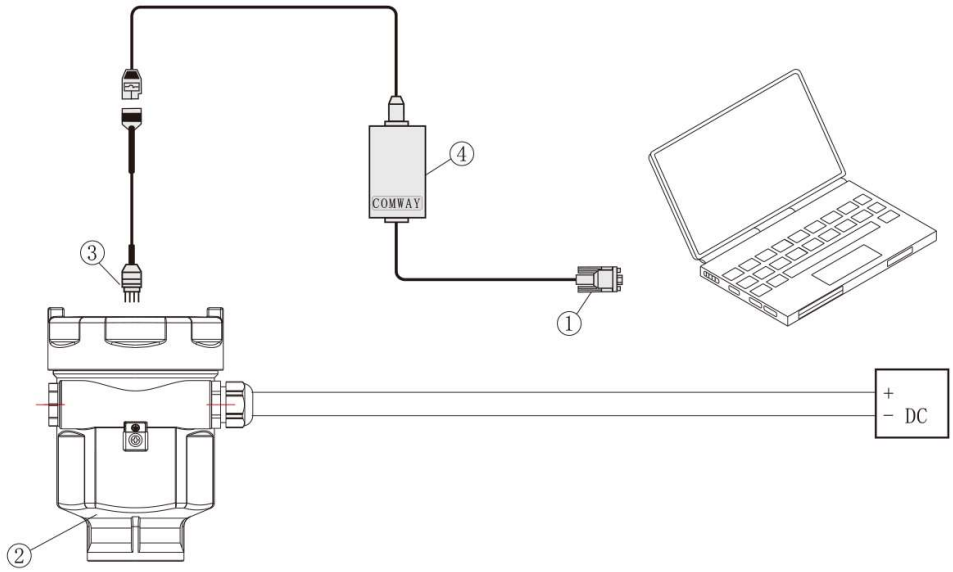
Connect to the upper machine through HART



1: RS232 interface /USB interface; 2: LRD9 series;

3: HART adapter for COMWAY converter; 4:250 ohm resistance; 5: COMWAY converter

Connect to the upper machine through I²C

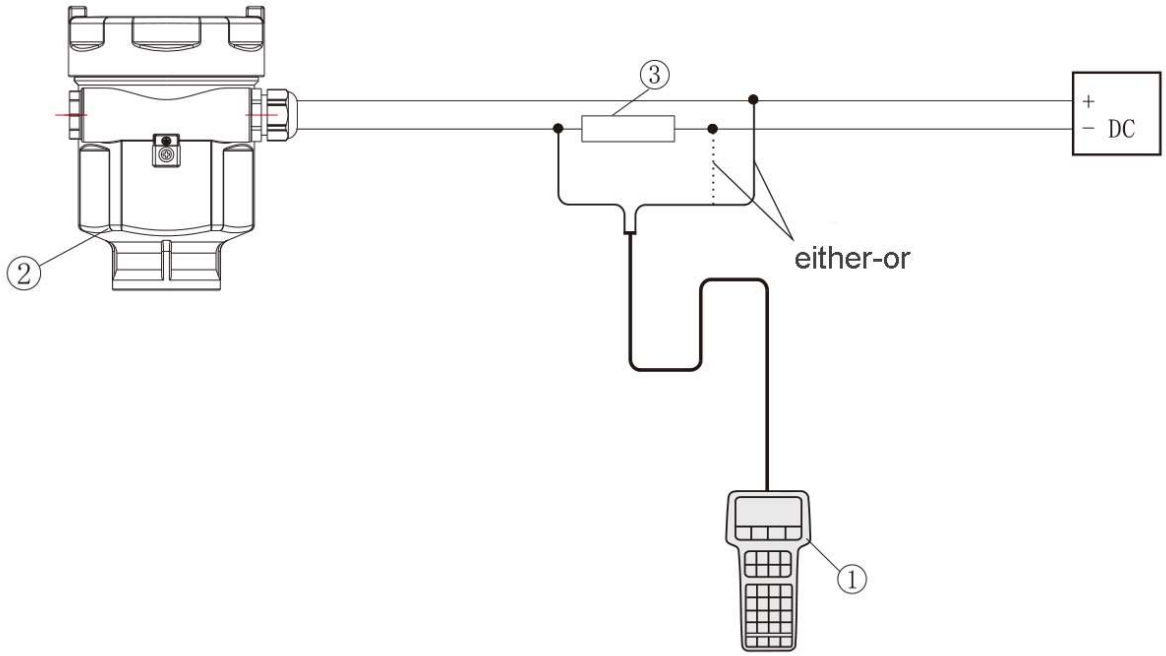


1: RS232 interface /USB interface; 2: LRD9 series;

3: I²C adapter for COMWAY converter; 4: COMWAY converter

3.5 HART Handheld Editor

It can be programmed with HART handheld programmer



1: HART handheld programmer; 2: LRD9 series; 3:250 ohms resistance

4. Maintenance and repair

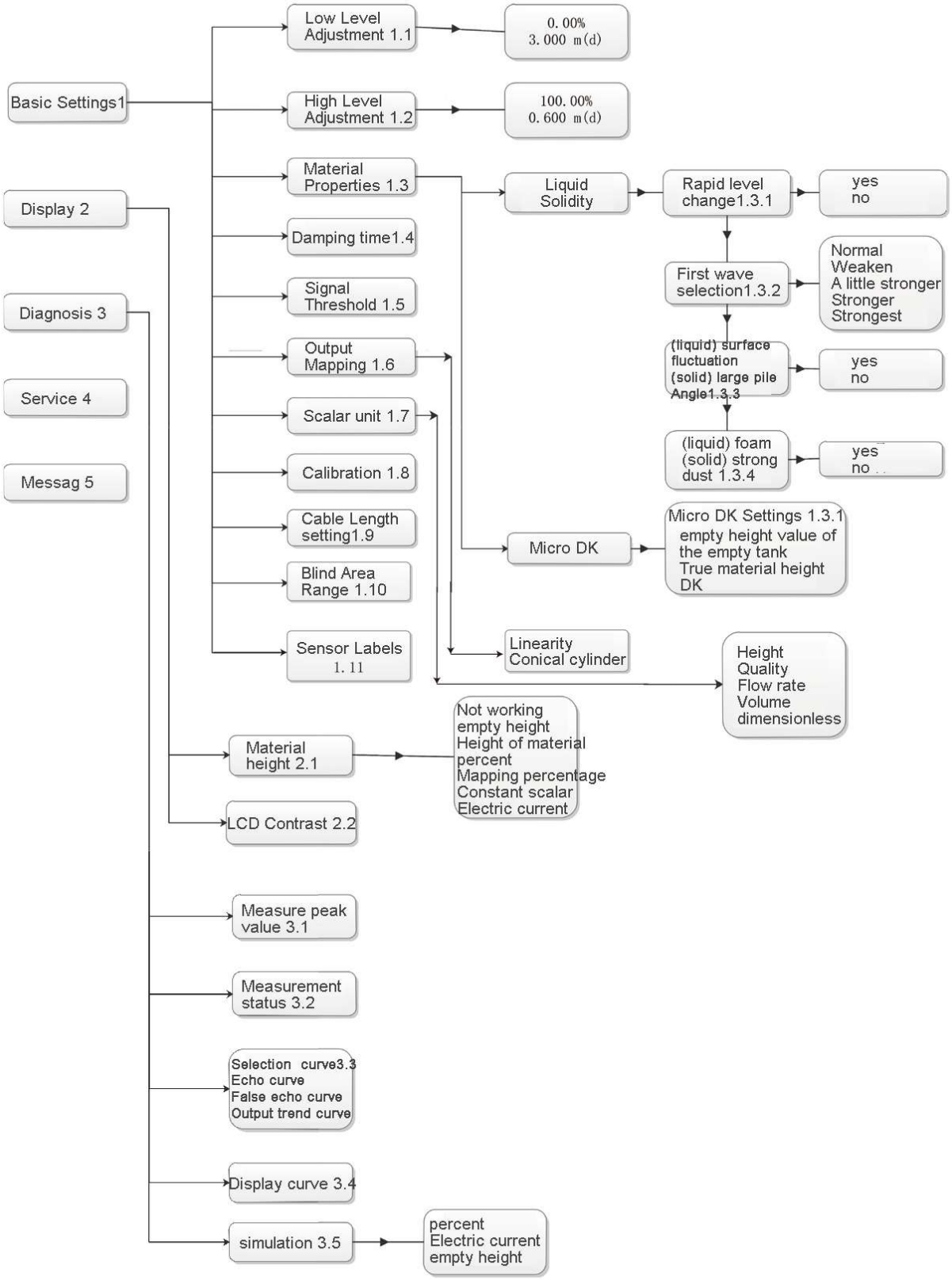
4.1 Meter Cleaning

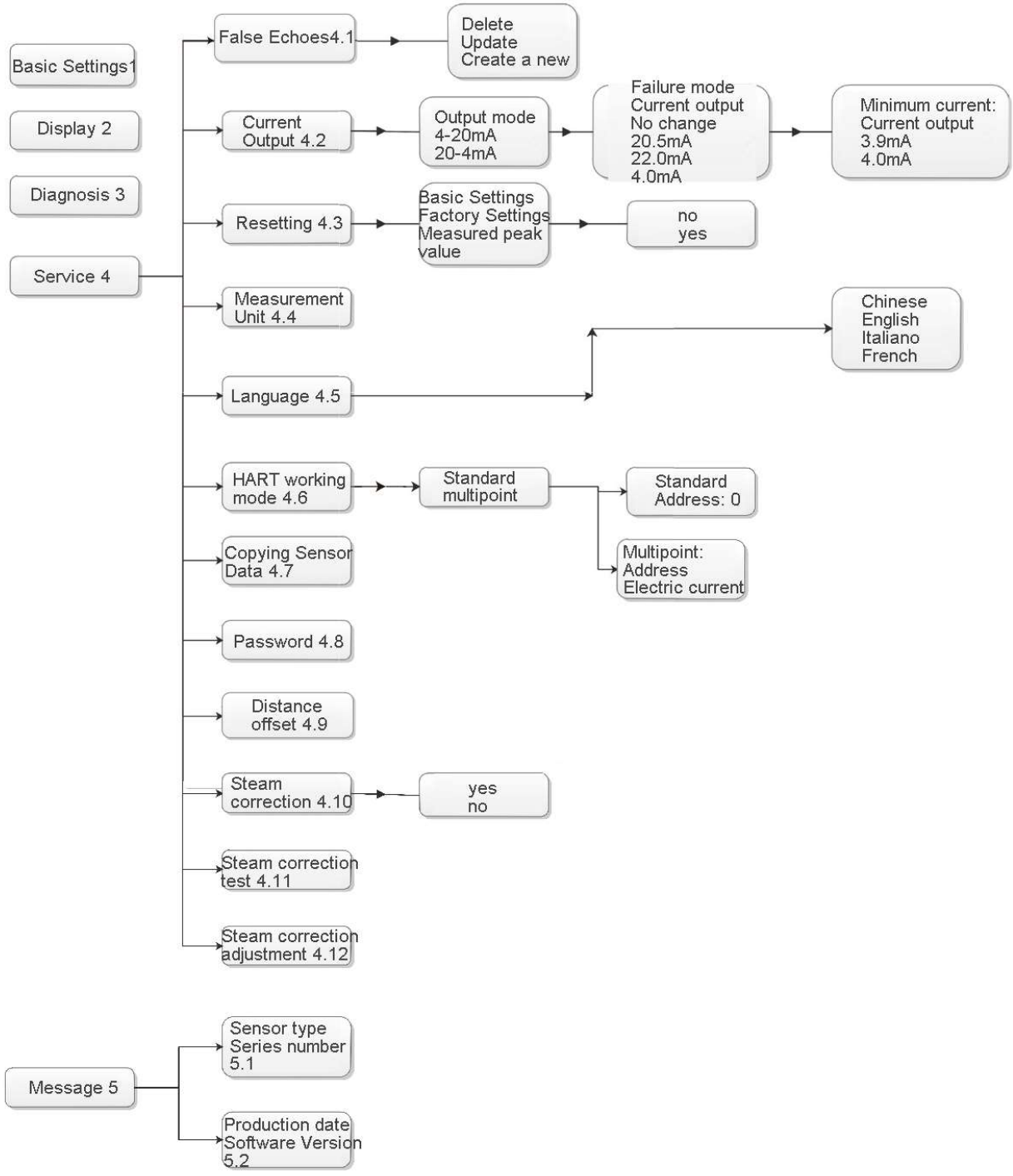
When cleaning the instrument case, attention should be paid to the use of cleaning tools to protect the surface of the housing and the sealing ring from damage. When the sensor is attached, wipe it with a soft cloth as much as possible and avoid using sharp objects or hard objects to clean the sensor surface.

4.2 Basic Maintenance

The meter has a modular design and can be repaired according to 06 fault records or the module can be replaced. After replacing a module, reset the system initialization parameters. Other location faults or technical problems can be contacted by the company.

5. Schedule


Basic Settings1
Low Level Adjustment 1.1
0. 00%
3. 000 m(d)
High Level Adjustment 1.2
100. 00%
0. 600 m(d)
Material Properties 1.3
Liquid Solidity
Rapid level change1.3.1
yes
no
First wave selection1.3.2
Normal
Weaken
A little stronger
Stronger
Strongest
(liquid) surface fluctuation
(solid) large pile Angle1.3.3
yes
no
(liquid) foam
(solid) strong dust 1.3.4
yes
no
Damping time1.4
Signal Threshold 1.5
Output Mapping 1.6
Scalar unit 1.7
Calibration 1.8
Cable Length setting1.9
Blind Area Range 1.10
Sensor Labels 1. 11
Micro DK
Micro DK Settings 1.3.1
empty height value of the empty tank
True material height
DK
Linearity
Conical cylinder
Height
Quality
Flow rate
Volume
dimensionless
Display 2
Material height 2.1
Not working
empty height
Height of material
percent
Mapping percentage
Constant scalar
Electric current
LCD Contrast 2.2
Diagnosis 3
Measure peak value 3.1
Measurement status 3.2
Selection curve3.3
Echo curve
False echo curve
Output trend curve
Display curve 3.4
Service 4
simulation 3.5
percent
Electric current
empty height
Messag 5


Basic Settings1
Display 2
Diagnosis 3
Service 4
False Echoes4.1
Delete
Update
Create a new
Current Output 4.2
Output mode
4-20mA
20-4mA
Failure mode
Current output
No change
20.5mA
22.0mA
4.0mA
Minimum current:
Current output
3.9mA
4.0mA
Resetting 4.3
Basic Settings
Factory Settings
Measured peak value
no
yes
Measurement Unit 4.4
Language 4.5
Chinese
English
Italiano
French
HART working mode 4.6
Standard multipoint
Standard Address: 0
Multipoint:
Address
Electric current
Copying Sensor Data 4.7
Password 4.8
Distance offset 4.9
Steam correction 4.10
yes
no
Steam correction test 4.11
Steam correction adjustment 4.12
Message 5
Sensor type
Series number
5.1
Production date
Software Version
5.2

LRD9

Guided Wave Radar Level Meter

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