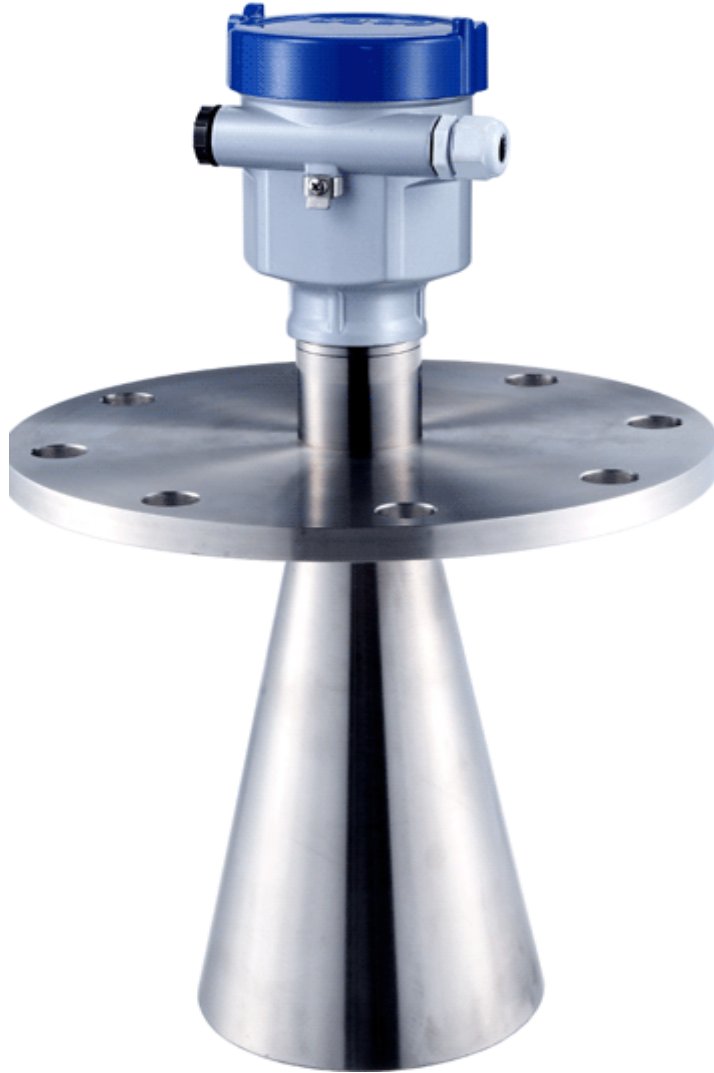


# RADER 수위계 취급설명서

Level Measurement Pulse Rader Operating Instructions

[ 6.3GHz Type : RD-51/RD-52/RD-53/RD-54]

[26GHz Type : RD-55/RD-56/RD-57/RD-58/RD-59]



주)기연 이앤아이

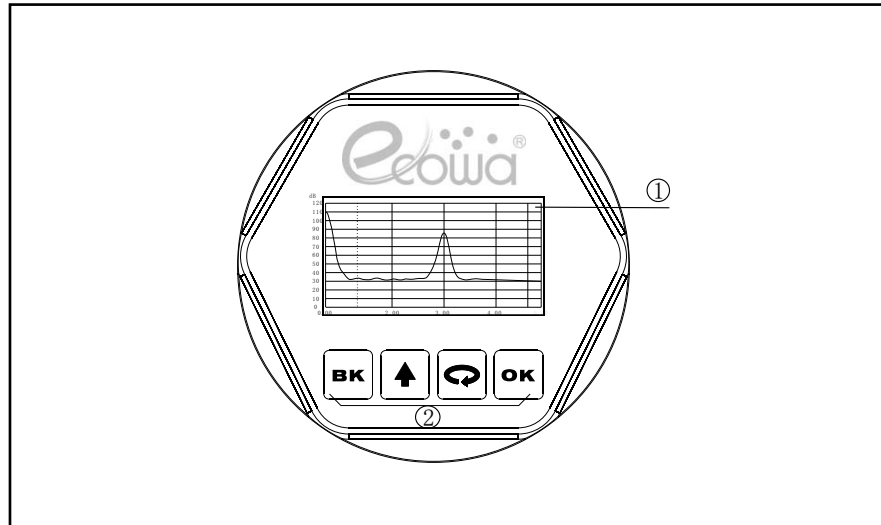
KI-YEON E & I CO., LTD.

서울시 양천구 신월6동 559-2

TEL : (02)2607-6375(대표) FAX : (02)2607-6376

**Display/Adjustment**

Adjustments can be done with four buttons on the view point. Optional menu languages are available. View point is only used for display after adjustments. Measurement results would be displayed on the LCD.

**Display/Adjustment Module**

1 LCD      2 Adjustment Keypad

[ OK ] Keypad

- Enter programming mode;
- Confirm programming options;
- Confirm modifications to parameters.

[ ↻ ] Keypad

- Choose programming options;
- Choose the digit of parameters to edit;
- Display the contents of parameters.

[ ↑ ] Keypad

- Modify parameter values.
- Choose display mode

[ BK ] Keypad

- Programming mode exit;
- Return to higher menu level.

Shortcut

[ BK ] Display Echo wave

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Program instruction      Adjustments parameter settings and testings can be done by the four keys on View Point.

Program Menu Structure      Menu Structure is shown in the appendix. Turn to next menu item pointed by right arrow with **OK**. Turn to next menu item pointed by down arrow with **↻**. Turn to left item with **BK**.

### Program Submenu

Basic settings      Basic adjustment for the Sensor are included in this menu. They are min. adjustment, max. adjustment, medium, damping time, Mapping curve, scaled units, scaling, near blanking and sensor tag.

Display      In this menu you can setup the sensor display mode and adjust B/W contrast for LCD.

Diagnostic      In this menu you can check and test the sensor. You can view the measurement peak values, measurement status, echo-curve and Simulation.

Service      In this menu you can store false echo curve and current output, units of measurement, language, rest HART operation mode, copy sensor data and PIN.

Info      The information of sensor including sensor type, serial number, date of manufacture, software version.

Program operation      Enter program mode by press **OK**. press **OK** after each parameter editing. Otherwise the modification will be abandoned. Press **BK** to quit program status.

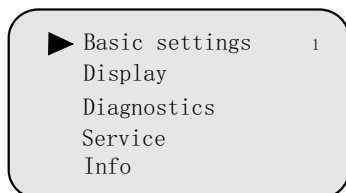
### Parameters editing

Parameter editing      The first digit of the edited parameter will be displayed in black background on entering parameter editing. Modify the digit with **▲**. Then you can edit next digit with **↻**. After editing, press **OK** to confirm and store the modification.

Optional item programming      Some settings can be done by selecting one of several optional items with **↻** and confirming with **OK**.

### Program menu instruction

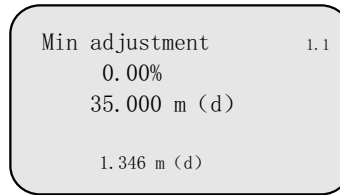
1 Basic settings      Basic settings are basic setup of the sensor, such as min/max adjustment, medium, damping and etc. To bring the sensor to program mode from run mode, press **OK**. Then the menu is displayed as below



Note :The menu item number is displayed on the top right corner.

1.1 Min. adjustment

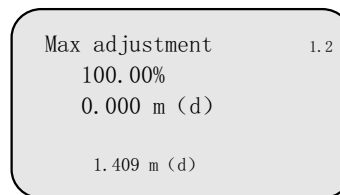
The item is one of the two setting points that regulates the linear scaled current output. At main menu(the menu number is 1). Select Basic settings with **↶** and confirm with **OK**. Now the Min. Adjustment is displayed on LCD. the menu item number is 1.1.



Press **OK**, you can edit the percentage value. Press **OK** again, you confirm the modification, and further more you can edit the corresponding distance value. See parameter edition to learn how to edit parameters.

1.2 Max. adjustment

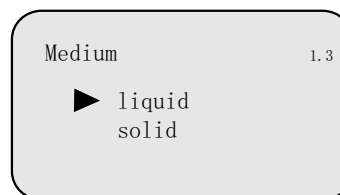
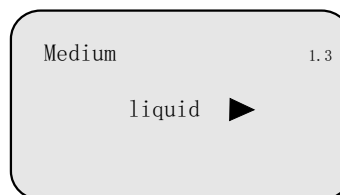
The item is one of the two setting points that regulates the linear scaled current output. Pushing **↶** enter this menu when the menu item number is 1.1. LCD displays as below



Press **OK**, you can edit the percentage value. Press **OK** again, you confirm the modification, and further more you can edit the corresponding distance value. See parameter edition to learn how to edit parameters.

1.3 Medium

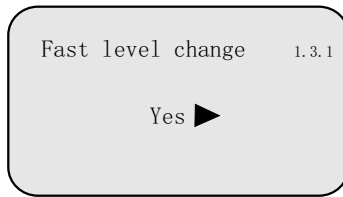
Pushing **↶** enter this menu when the menu item number is 1.2. LCD displays as below Each medium has different reflective properties. This menu is used to set the medium to be solid or liquid. Further more, make sure other relative factors.



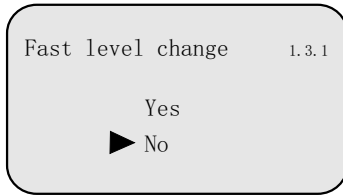
Move arrow with **↶**.solid or liquid can be selected . Pushing **OK** will confirm the selection and enter Fast level change submenu.

1.3.1 Fast level change

Pushing **OK** will enter this menu when it is liquid or solid selection menu and menu item number is 1.3. LCD displays as below



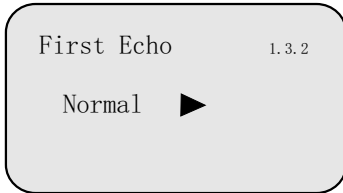
Push **OK** enter Fast level change confirmation. LCD displays as below



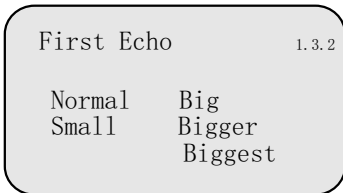
Move arrow with to Select Yes or No for Fast level change. Then confirm the selection with **OK**.

### 1.3.2 First Echo

When medium is chosen as liquid or solid, LCD menu is 1.3.1, press to choose next menu. LCD displays as below:



Press **OK** to enter First Echo menu. LCD displays as below:



Press to choose the way to set First echo. There are five ways:

Normal: No adjustments on first echo

Small: Decrease first echo by 10dB

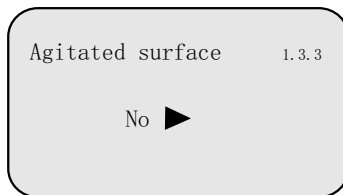
Big: Increase first echo by 10dB

Bigger: Increase first echo by 10dB

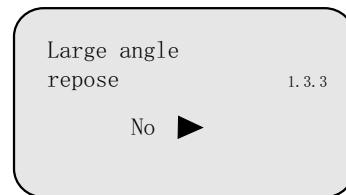
Biggest: Increase first echo by 40dB

### 1.3.3 (Liquid) Agitated surface

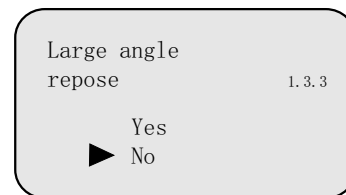
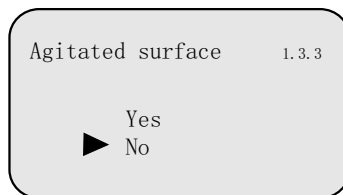
When measure medium is liquid, LCD menu is 1.3.2, press to choose next menu and enter Agitated surface. LCD displays as below:



or



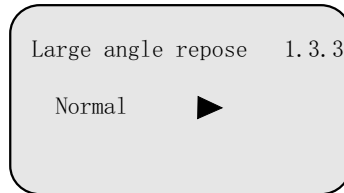
or



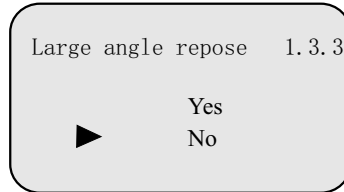
Press **OK** to enter Agitated surface menu.

When measure medium is solid, LCD menu is 1.3.2, press **↻** to choose next menu and enter Large angler repose. LCD displays as below:

1.3.3 (Solid) Large angler repose

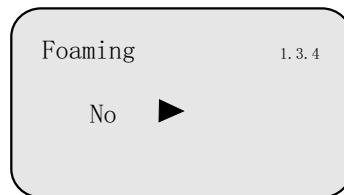


Press **OK** to enter Large angler repose menu.

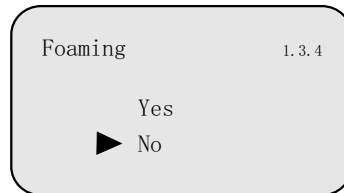


1.3.4 (Liquid) Foaming

Pushing **↻** will enter this menu when the menu item number is 1.3.3 . LCD displays as below

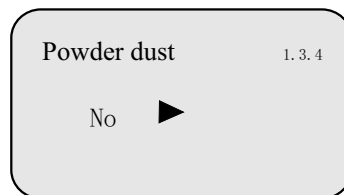


Push **OK**,enter the submenu of Foaming/Powder dust confirmation. LCD displays as below

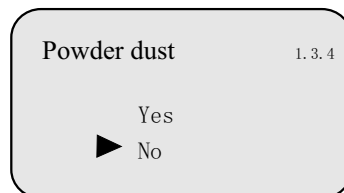


1.3.4 (Solid) Powder dust


Pushing **↻** will enter this menu when the menu item number is 1.3.3 . LCD displays as below

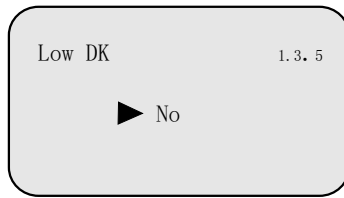


Push **OK**,enter the submenu of Foaming/Powder dust confirmation. LCD displays as below

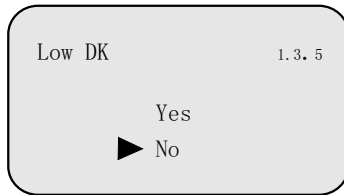



1.3.5 Low DK

Pushing  will enter this menu when the menu item number is 1.3.4 . LCD displays as below




Push **OK**, enter the submenu of Low DK confirmation. LCD displayed below

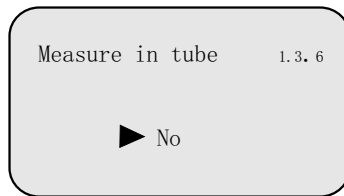


Move arrow with  to Select Yes or No for medium with Low DK . Then confirm with **OK**.

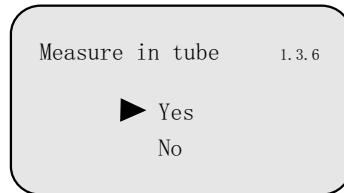
1.3.6 Measuring in tube

When measurement is carried through a tube, that is limited for the liquid medium, the tube diameter must be set in menu Measure in tube so as to rectify the measuring error.

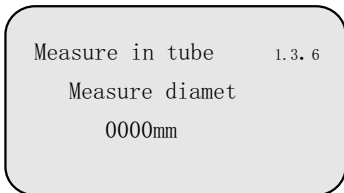
Pushing  will enter this menu when the menu item number is 1.3.5 . LCD displays as below



Push **OK**, enter the submenu of Measure in tube confirmation. LCD displays as below



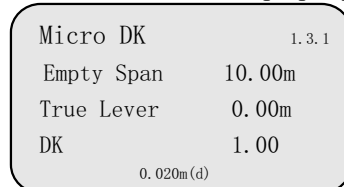
If the selection Yes is confirmed by **OK**, the diameter of the tube will be required. LCD displays as below



press **OK**, the value can be edited.

1.3.1 Micro DK


When choose Micro **OK** as medium property, press OK to enter Micro DK setting.

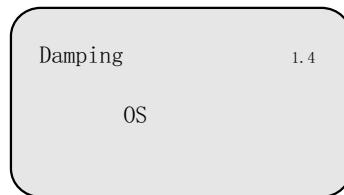


Normally when electronic constant is smaller than 1.4, the direct echo from the medium is low and hard to detect. However by measuring the echo reflected from the base of the vessel, the height of the medium can be measured. Two parameters are needed to be entered here.  
1. Height of empty vessel. 2. True medium height or medium electronic constant, these two parameters are related, entering either one is accepted. The precision of parameters will affect the precision of the measurement.

Notes: it should be taking cautions while applying the function, Micro DK. When applying this function the system will decide whether use direct echo or echo from the base to take the measurement.


#### 1. 4 Damping

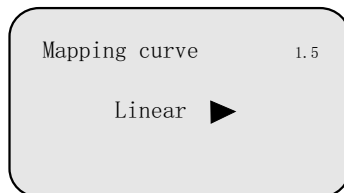
Pushing  will enter this menu when the menu item number is 1.3 . LCD displays as below




Press **OK**, enter editing menu. See parameter edition to learn how to edit the parameter. To confirm the modification with **OK**, give up with **BK**.


#### 1. 5 Mapping curve

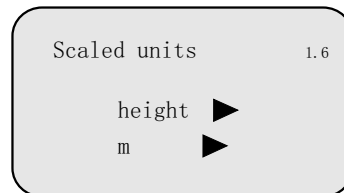
This menu define the correlation between the measured value and the current output. linear or non-linear mapping can be selected in this menu. For the non-linear correlations, parameter setting must be done by a computer previously. Pushing  will select this menu when the menu item number is 1. 4. LCD displays as below



Press **OK**, enter editing menu.  
Move arrow with  to Select linear or non-linear . Then confirm with **OK**.

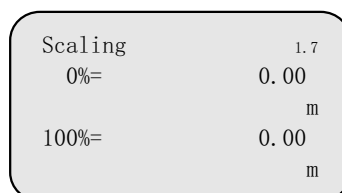
#### 1. 6 Scaled units

The unit of the scaled output value can be set in this menu. Pushing  will enter this menu when the menu item number is 1.5. LCD displays as below



#### 1. 7 Scaling

Pushing **OK** to enter the editing menu, see parameter editing for the value editing. Press **OK** to confirm the modification.

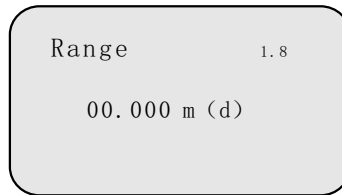




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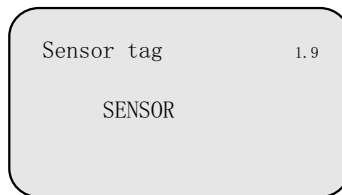
### 1. 8 Range

Measure range should be set in order to get accurate result. When menu is 1.8, press **↩** key to enter Range. LCD displays as below:  
Press **OK** key to enter, please see appendix as reference. When finishing editing parameter, press **OK** key to confirm, or press BK to cancel.



### 1. 9 Sensor tag

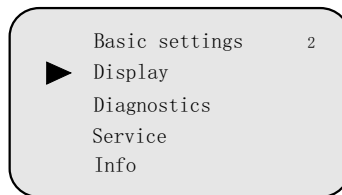
In the menu Sensor TAG you edit a 11-digit measurement loop designation. The character set comprises: Letters from A-Z and Numbers from 0-9.



See Optional item programming to edit the tag name.

## 2 Display

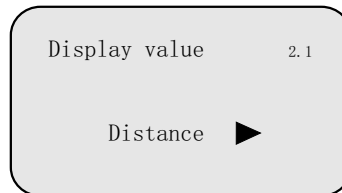
This menu is used to set display mode. Pushing **↩** will select this menu when the main menu item number is 1. LCD displays as below



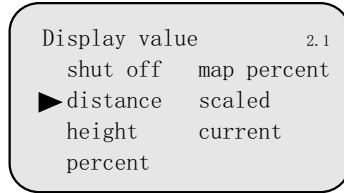
Push **OK**, you get

### 2. 1 Display value

Enter display mode set with **OK**. LCD displays as below



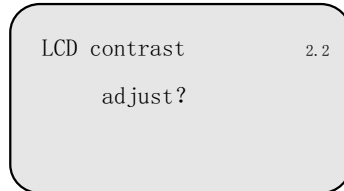
Push **OK**, you can select different display types of the measured value as shown below



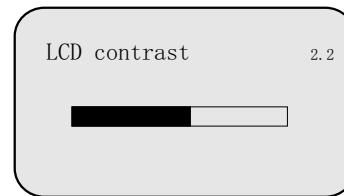
Move arrow to point to the type you want, confirm it with **OK**.

### 2. 2 LCD contrast adjustment

Pushing **↻** will enter this menu when the menu item is 2. 1. LCD displays as below



Adjust the B/W contrast by pressing **OK**, LCD Displays as below

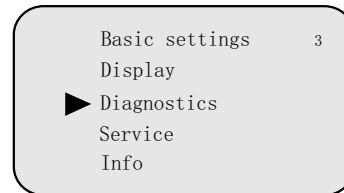


Increase contrast with **▲**, decrease contrast with **↻**.confirm with **OK**.

### 3 Diagnostics

The running status of the sensor can be provided by the menu Diagnostics, and furthermore sensor testing can be done.

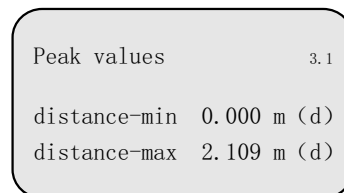
Pushing **↻** to select this menu when the main menu item number is 2. LCD displays as below



Push **OK**, you get

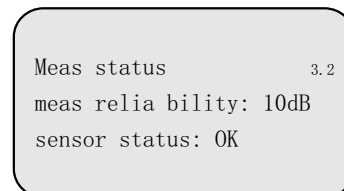
#### 3. 1 Peak values

Peak values record the maximal and mininoal distance. The records can be cleared to zero at menu 4.4.




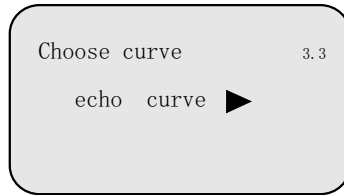
#### 3. 2 Meas. Status (measure)

Pushing **↻** to display measuring status when the menu item is 3.1 . LCD displays as below

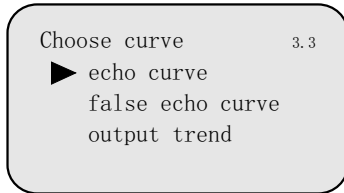


3. 3 Choose curve (echo curve)


At this menu, different curves can be selected to be displayed at menu 3. 4, when the menu item is 3.2 press . you get



Pushing **OK** to select the curve. There are three curves: echo curve, False echo curve and Output trend curve .

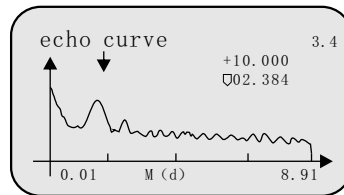



3. 4 Curve



Pushing  will display the selected curve when the menu item is 3.3 . LCD displays as below

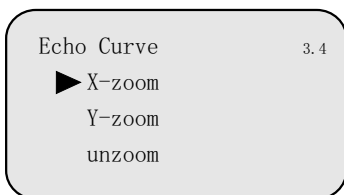
Curve zoom

When the curve is displayed, pushing **OK** will enter Curve Zoom function menu.




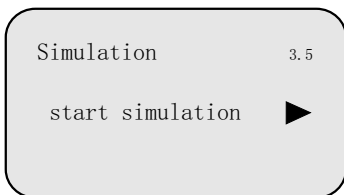
Move arrow with ,select menu item for X/ Y axis zoom or unzoom. Then Confirm with **OK**.

For X axis zoom pushing  to mark the start position for zoom, then confirm with **OK**. Pushing  again to mark the end position for zoom and confirm with **OK**. The selected area of the curve will be shown on the whole screen. Exit zoom with **BK**.

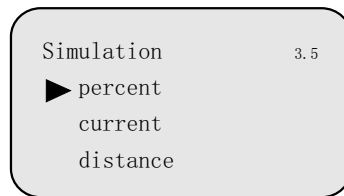



3. 5 Simulation

Simulation is used to simulate the 4~20mA current output. By current output simulation the accuracy and linearity of the current output can be checked. And the system testing can be carried out. Push  to enter Simulation menu when the menu item number is 3.4 . LCD displays as below



Pushing **OK** enter Simulation mode selection menu . LCD displays as below



Pushing  select the Simulation mode. Then confirm with **OK**. The corresponding value will be required and then simulation starts.

#### Three types of simulations

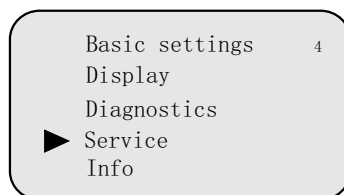
Percent : the output current is decided by a percent value : 100% is relative to 20mA, 0% is relative to 4mA.

Current: the output current is regulated by a current value.

Distance: the output current is decided by a distance value .The current output depends on Min. adjustment (see 1.1) , Max adjustment (see 1.2) and Mapping (see 1.5)

## 4 Service

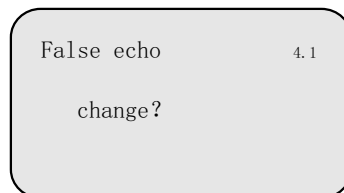
This menu with professional functions can only be used by trained technicians. They are False echo storage, Reset, sensor settings back up Password setting and etc.



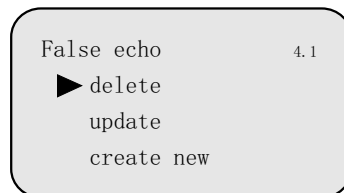
### 4.1 False echo

High sockets or vessel installations, e.g. struts or agitators as well as buildup and weld joints on the vessel walls cause interfering reflections which can impair the measurement. A false echo storage detects and marks these false echoes, so that they are no longer taken into account for the level measurement. A false echo memory should be created with empty vessel so that all potential interfering reflections will be detected.

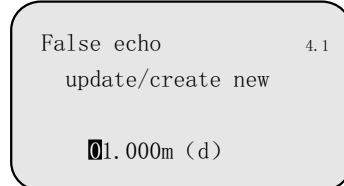
Pushing **OK** will enter this menu when the menu item is 4 . LCD displays as below.



Then push **OK**, LCD displays as below



With  select Update/Create new/Delete a false echo, confirm with **OK**.




When you select update create / new, you are asked to input a distance value for the real echo. Then push **OK** to confirm it and to start the operation. It will take some time to store the false echo.

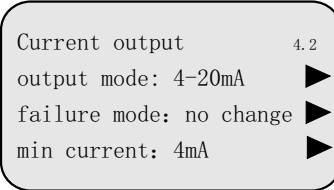
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Note : Check the distance to the product surface. Because if an incorrect (too large) value is entered, the existing level will be saved as false signal. The filling level would then no longer be detectable in this area.

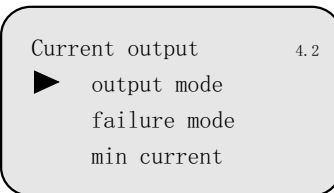
#### 4. 2 Current output

Setup the current output mode.

Pushing  will enter this menu when the menu item is 4.1 LCD displays as below

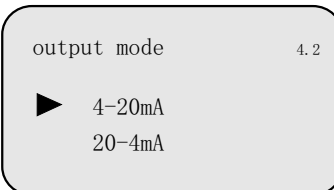



With **OK** you get




#### Output mode

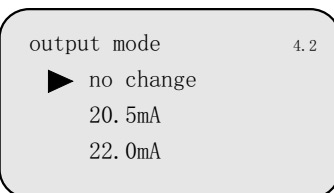
Select output current as 4-20mA or 20-4mA. 4-20mA mean the Min. level is corresponding to 4mA and the Max. level is corresponding to 20mA. 20-4mA mean the Min. Level is corresponding to 20mA and the Max. level is corresponding to 4mA. When the arrow points at output mode, push **OK** you get




Push , you select the item you want and confirm with **OK**.

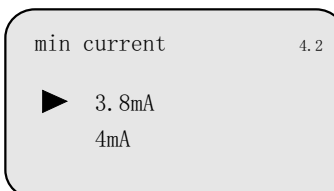
#### Failure mode


Setup the output current on sensor error. Three status are available. When the arrow points at output mode, push , you get item failure mode and confirm with **OK**. you get



#### Min. current

Setup the minimal output current is 4mA or 3.8mA. When the arrow points at fail mode, push , you get min. current menu. Confirm with **OK**. you get



Select the item you want with  and confirm with **OK**.

#### 4. 3 Reset

With the reset function, modified settings are reset. Three subfunctions are available:

## Basic settings


-Reset settings modified with View Point to the default values.

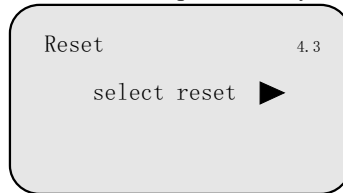
## Factory settings

-Reset special settings as well as basic settings to default values.

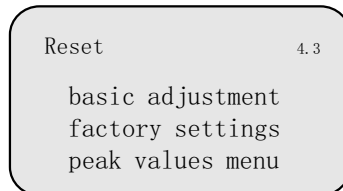
## Peak measured values

-Reset the min./max. level records.

When the menu item is 4. 2, push , you get



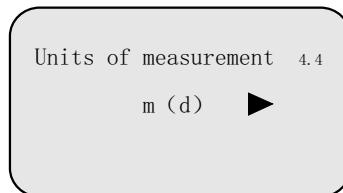
Push **OK**, LCD displays as below



Select the item with  confirm with **OK**.

#### 4. 4 Units of measure

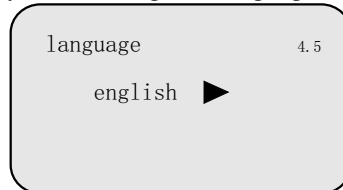
Two sets of measure system units are available. The metric system and the British system.



Push **OK**, to edit it.

#### 4. 5 Language

In this menu you can change the language. English and Chinese are available.

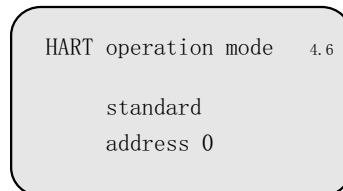


Push **OK**, to change it.

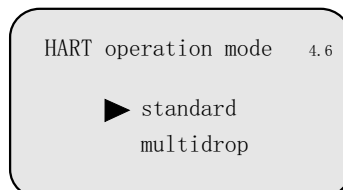
#### 4. 6 HART operation mode

HART offers standard and multidrop mode. The standard mode with the fixed address 0 means output of the measured value as 4...20 mA signal. In multidrop mode, up to 15 sensors can be operated on one two-wire cable.

In this menu you determine the HART mode and enter the address for multidrop.



Push **OK**, you can select HART operation mode.

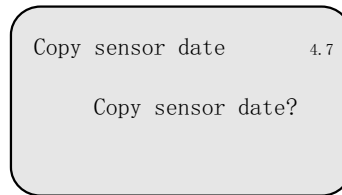


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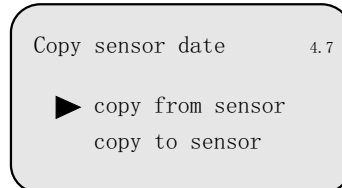
The default setting is standard mode with address 0.

#### 4.7 Copy sensor data

In this menu you can back up the sensor settings so as to restore them when necessary.



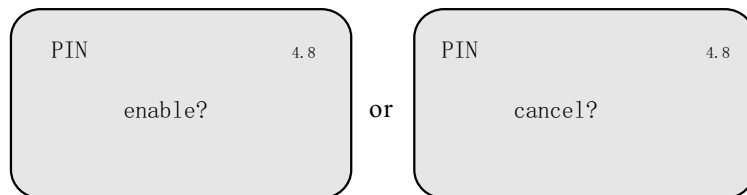
Push **OK**, LCD displays below



Copy from sensor means to save the sensor settings and copy to sensor means to restore the sensor settings.

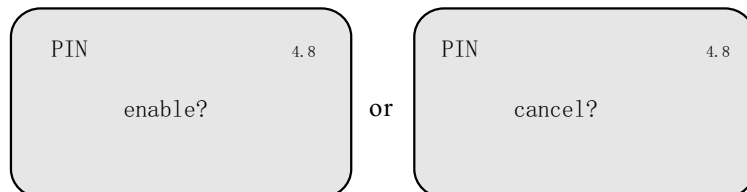
#### 4.8 PIN

In this menu, the PIN is activated/inactivated permanently. Entering a 4-digit PIN protects the sensor data against unauthorized access and unintentional modifications.



#### 4.9 Distance Adj

In this menu, the PIN is activated/inactivated permanently. Entering a 4-digit PIN protects the sensor data against unauthorized access and unintentional modifications.



Distance Adj. is used to correct the difference between the measured value and actual distance. When menu is 4.8, press **■** to enter Distance Adj. LCD displays as below:  
Press **OK** to enter setting.

## 5 Info


In this menu the most important sensor information can be displayed:

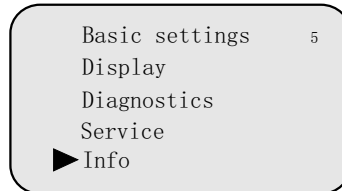
Sensor type, e.g. GDRD51

Serial number: 6-digit number, e.g. 123456

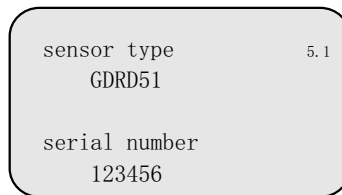
Date of manufacture, e.g. 2006-01-01

Software version, e.g. 06.08.28

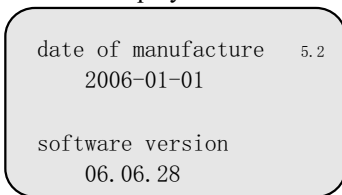
Pushing  will select this menu when the main menu item number is 4. LCD displays as below











Then pushing **OK** enter the Info display menu. LCD displays as below



Pushing  LCD displays as below



Example: To display echo curve do as follow:

- 1、 Push **OK** to enter program status. Main menu is displayed on LCD.
- 2、 Push  twice to select Diagnostics submenu item.
- 3、 Push **OK** to enter the submenu menu number is 3.1.
- 4、 Push  to enter next menu, the menu number is 3.2.
- 5、 Push  again ,the menu number is 3.3.
- 6、 Push **OK** to enter the curve select menu (3.3).
- 7、 Set arrow to point to Echo Curve with .
- 8、 Push **OK** to confirm.
- 9、 Push , the echo curve will be shown. Menu number is 3.4.
- 10、 Push **OK** to enter curve zoom menu.
- 11、 Push  to select X zoom.
- 12、 Push **OK** to confirm.
- 13、 Push  to mark the start position.
- 14、 Push **OK** to confirm.
- 13、 Push  to mark the end position.
- 14、 Push **OK** to confirm. The area of the curve you select will be shown on the whole screen.
- 15、 Push **BK** several times to return to run state.

Note: Shortcut key **BK** can display echo curve on measurement mode, but it has no zoom functions.



Appendix

