TLR

RADAR TRANSMITTER

Variants: TLR – P, TLR – S, TLR – D

Index

1. TLR variants

Version	Picture	Media	Process connections*	Range (m)	Output*	Electrical connections*
P		Liquid	G1 ½', FX.X	10,20,30,50	B	Cable (C01, C02, C05, C10, C50)
S		Liquid	G1 ½'', G2'', FX.X	10,20,30,50	B	Cable (C01, C02, C05, C10, C50)
D		Liquid Solid	G2'', FX.X	10,20,30	H	E01, E02

* Refers to datasheet

2. TLR -P and TLR-S / App installation and settings

Download and install app "RadarMe" from Google Play (Android) or App Store (Iphone).

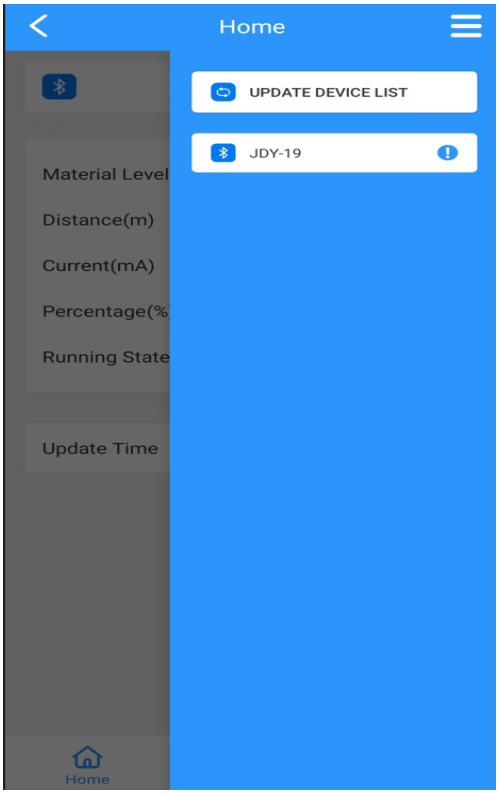
Follow these steps to link TLR to the app RadarMe:

A. Instrument connection

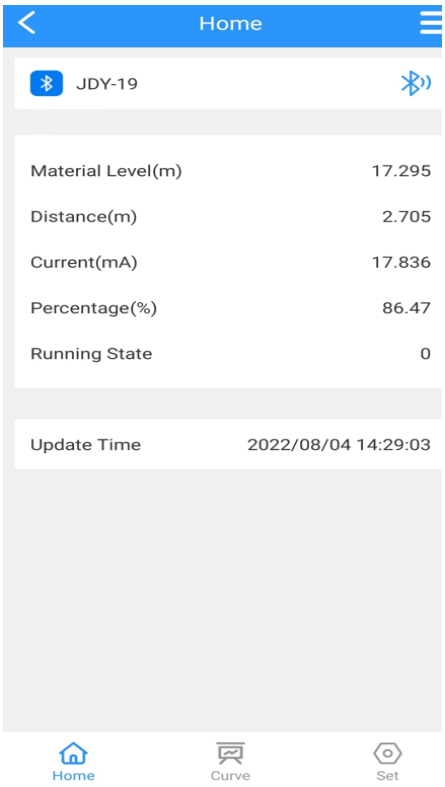
Connect the power cable to the DC 24V terminal of the instrument; Pay attention to the positive and negative poles, and do not connect them reversely.

B. Set instrument parameters

Open the mobile app to display the device connection interface. As shown in the following figure P1:



P1

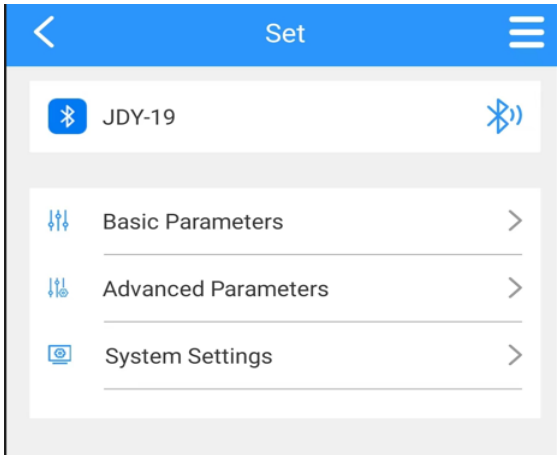


P2

Click the device name to be set directly to enter the main interface P2.

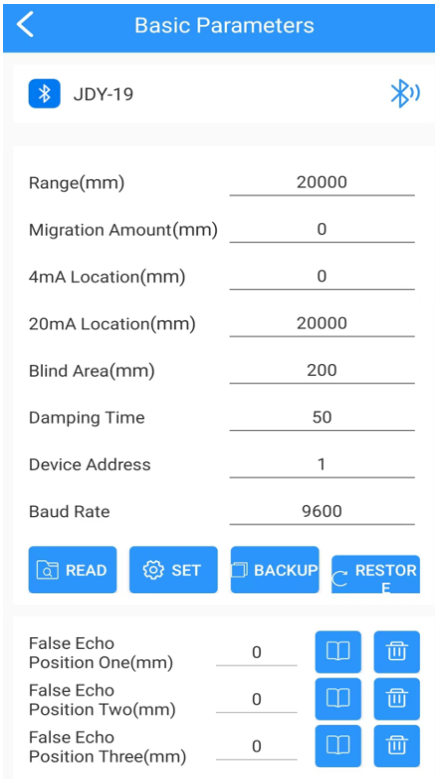
Click the "Curve" or "Set" button at the bottom of the screen to enter the echo curve interface and parameter setting interface respectively.

Click the "Set" button here to enter the parameter setting interface, as shown in the following figure P3:



P3

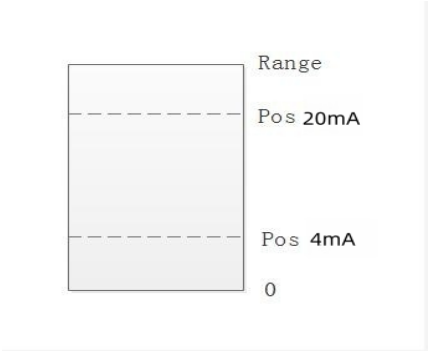
Click "Basic parameters" to enter the basic setting interface P4. As shown in the following figure.



P4

Set the "Range" according to the working condition, directly click the following digital input box to modify, and the other parameters are modified in the same way. After the parameters are modified, you need to click the "Set" button to set it before it takes effect. You can click the "Read" button to refresh the parameters.

4mA position and 20mA position must be within the range. The relationship between 4mA position, 20mA position and range is shown in the following figure p5:



P5

Note: If it appears to exceed 20mA, it is reporting an incorrect current, indicating a setting error, please check the parameter setting.

As shown in the figure, when the level is lower than 4mA, the main interface displays the level of 0, and when the level is higher than 20mA, the main interface displays the level value of 20mA.

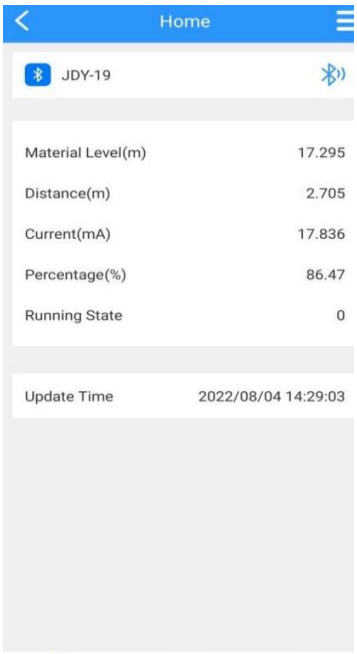
a. Basic parameters

FUNCTION	DESCRIPTION	NOTE
RANGE	Full-scale value for signal (20 mA)	
MIGRATION AMOUNT	Correction value for signal (4 mA)	
4mA LOCATION	Signal height value 4mA	
20mA LOCATION	Signal height value 20mA	
BLIND AREA	Dead Zone Height	The sensor does not read with height <100 mm
DAMPING TIME	Time for value update	
DEVICE ADDRESS	ID Modbus	
BAUD RATE	Baud rate Modbus	
FALSE ECHO POSITION ONE	Height at which you have a false echo	
FALSE ECHO POSITION TWO	Height at which you have a false echo	
FALSE ECHO POSITION THREE	Height at which you have a false echo	

b. Advanced parameters

FUNCTION	DESCRIPTION	NOTE
CURRENT SIMULATION	Full-scale value for signal (20 mA)	
TAG.NO	Correction value for signal (4 mA)	
THRESHOLD VALUE	DO NOT MODIFY	
THRESHOLD AMPLITUDE	DO NOT MODIFY	
ECHO WINDOW	DO NOT MODIFY	
RATE OF LAVEL CHANGE	DO NOT MODIFY	
FIXED OFFSET	DO NOT MODIFY	
GAIN MODE	DO NOT MODIFY	
GAIN ONE	DO NOT MODIFY	
GAIN TWO	DO NOT MODIFY	
FALSE WAVE THRESHOLD	DO NOT MODIFY	
ECHO WIDTH	DO NOT MODIFY	
POWER	DO NOT MODIFY	
POWER ONE	Selection of the correct measurement wave	The instrument always considers the first echo as a disturbance, but if the real height is the first echo then the value must be set to 0

c. Complete manual



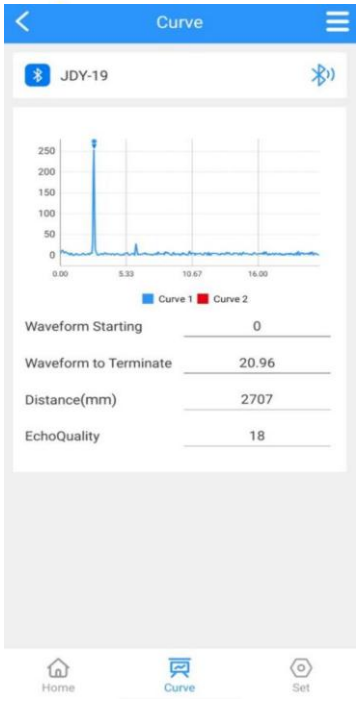
Home

Material Level: Liquid Level Value

Distance: The distance from radar level sensor to the liquid surface.

Current: Analog signal output corresponding to liquid level

Percentage: The percentage of liquid level and max range **Running State**: Working stage, 0 is work well, 1 is error.

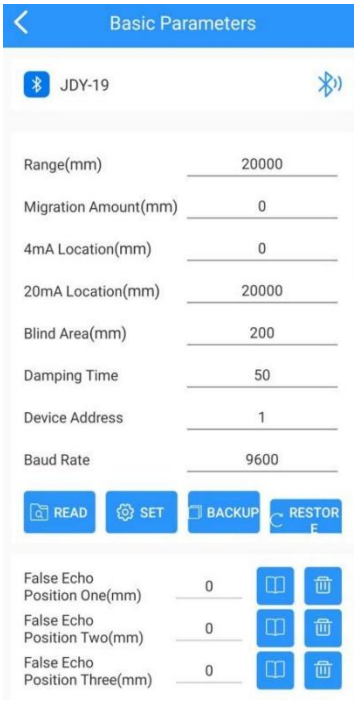


Curve

Waveform Starting: The starting position of the waveform

Waveform to terminate: The stopping position of the waveform **Distance**: The distance from radar sensor to the liquid surface.

Echo Quality: The quality of Echo, unit is DB.



Basic Parameters

Range: Max Measure range

Migration Amount: Range less then max measure range

4mA Location: The liquid level value corresponding to 4mA

20mA Location: The liquid level value corresponding to 20mA

Blind Area: Areas that cannot be measured by radar sensor.

Damping Time: The speed at which the actual liquid level is displayed on the screen, the longer the damping time value, the slower the response.

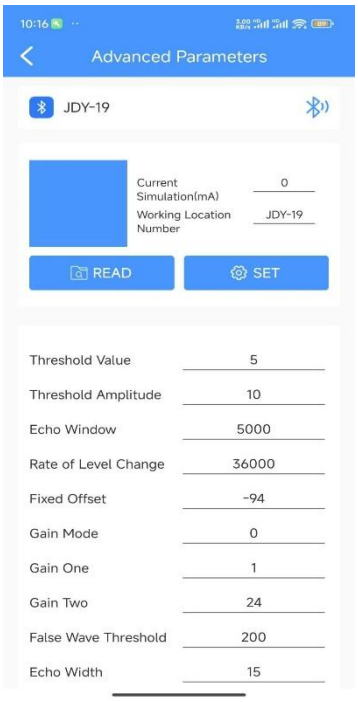
Device Address: Device No. It can be modified.

Baud rate: Default Baud Rate is 9600

False Echo Position One: The location of the first false echo. If you know the Location of the obstacle and input the level value, the system will automatically block this false echo.

False Echo Position Two: The location of the second false echo. If you know the location of the obstacle and input the level value, the system will automatically block this false echo.

False Echo Position Three: The location of the third false echo. If you know the location of the obstacle and input the level value, the system will automatically block this false echo.



Advanced Parameters

Threshold Value: The setting parameters used to distinguish between signals and noise. It is recommended to use default parameters.

Threshold Amplitude: The threshold value used to distinguish between signal and noise, with a minimum parameter setting of no less than 6. It is recommended to use default parameters.

Echo Window: Represent setting an area centered around the echo signal, only searching for echo signals within the area, and echo signals outside the area are invalid. It is recommended to use default parameters.

Rate of Level Change: Indicates the maximum allowable level change rate for each detection. It is recommended to use default parameters.

Fixed Offset: It is recommended to use the default automatic gain mode and not modify it.

Gain Mode: The gain mode is divided into manual adjustment signal gain mode and automatic adjustment signal gain mode, when gain model=0, it is in automatic gain mode, Gain model=1, in manual gain mode Automatic gain can be automatically adjusted based on the strength of the ADC signal.

It is recommended to use the default automatic gain mode and not modify it.

Gain One: The signal gain control value in the TIA gain chip is between 0-3, and manual adjustment is not required in automatic gain mode. It is recommended to use default parameters.

Gain Two: The signal gain control value in the VGA gain chip is between 0-24, and manual adjustment is not required in automatic gain mode. It is recommended to use default parameters.

False Wave Threshold: Used in conjunction with false echo position: The false wave threshold only takes effect when the false echo position is specified. The false wave threshold is a multiplier coefficient used to filter the height of false echoes. It is recommended to use default parameters.

Echo Width: Default parameters are not recommended for modification.

Power: When Power is configured to 0, the PGA gain is adjusted first, and the TIA gain is not automatically increased. It is recommended to use the default of 0. It is recommended to use default parameter

3. Modbus

General commands:

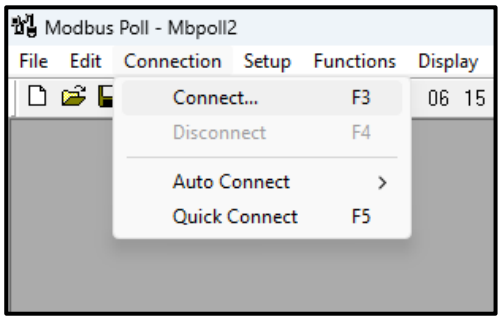
MODBUS COMMUNICATION PARAMETERS		
FUNCTION	**DESCRIPTION**	**NOTE**
BAUDRATE	9600	Default
SLAVE ID	1	Default
DATA BIT	8	
PARITY	None	
STOP BIT	1	

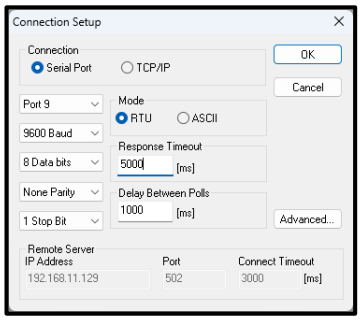
REGISTRI COMUNICAZIONE MODBUS			
REGISTRY	**DESCRIPTION**	**TYPE**	**NOTE**
0002H	Current Level	16 bit unsigned integer	R - [mm]
0003H	Measure Range	16 bit unsigned integer	RW - [mm]
0004H	Base Offset	16 bit signed integer	RW - [mm]
0005H	Baudrate	16 bit unsigned integer	RW - [bps]
0006H	Device ID	16 bit unsigned integer	RW - [1-255]

PARAMETER	COMMAND
REED	0x03
WRITE	0x010

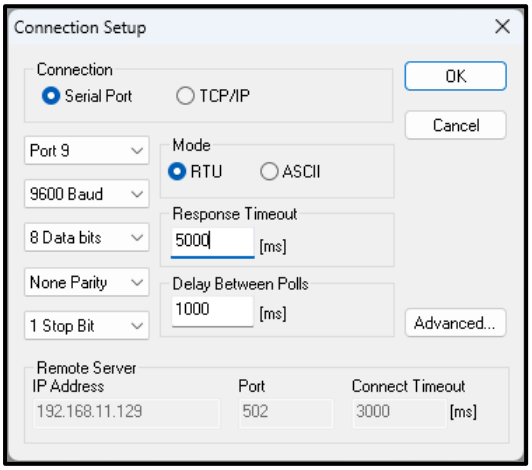
a. Modbus serial port - Modbus Poll

1. Connection → Connect…





2. Set:

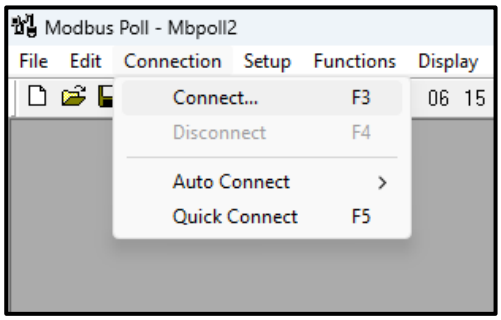


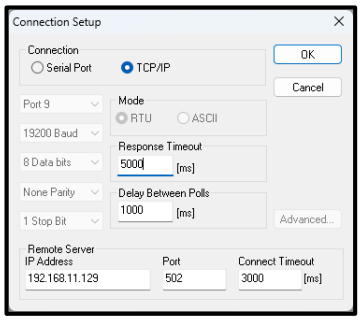
Connection: Serial Port
Port: select COM
Baud Rate: 9600 default
Data bits: 8 default
Parity: None default
Stop bit: 1 default
Mode: RTU
Response Time: 5000
Delay Between Polls: 1000

Then Click OK.

b. Modbus TCP/IP - Modbus Poll

1. Connection → Connect…

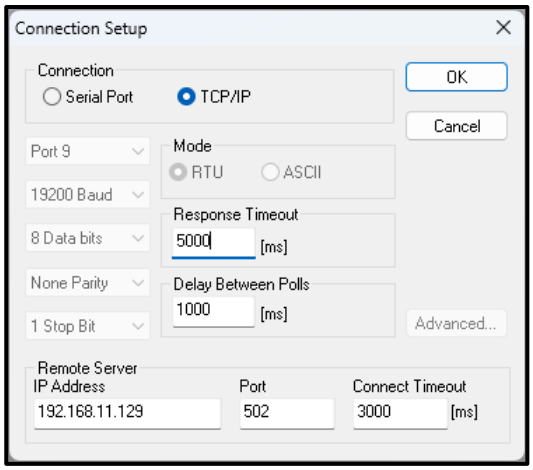




2. Set:

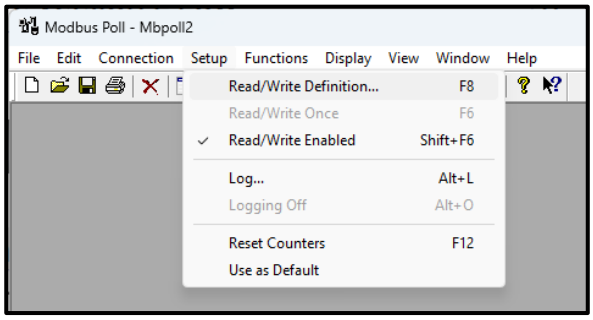
Connection: TCP/IP
Response Time: 5000
Delay Between Polls: 1000
IP Adress: 192.168.xxx.xxx
Poll: 502 default

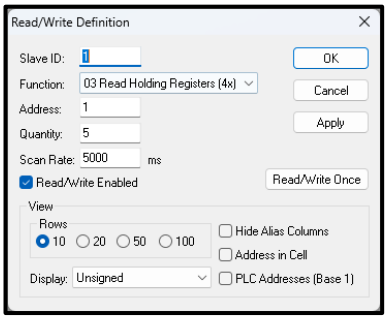
Then Click OK.



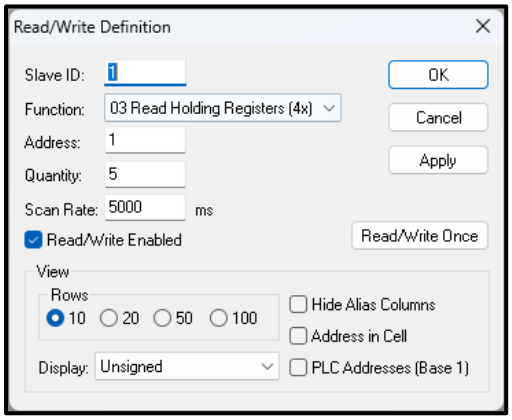
c. READING

1. Setup → Reed/Write Definition…



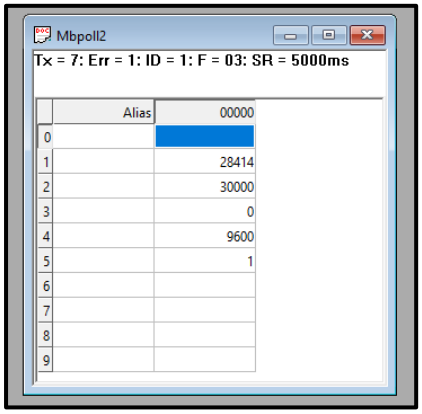


2. Set:



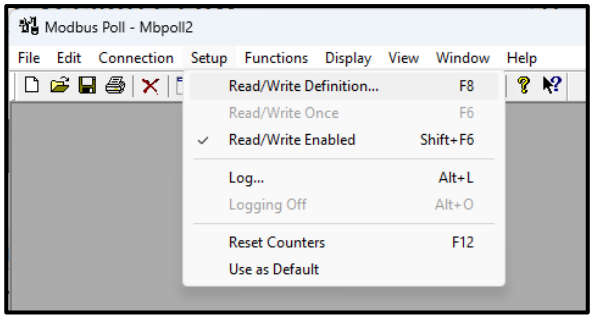
Slave ID: 1 default
Function: 03 Read Holding Register
Address: 1
Quantity: 5
Scan Rate: 5000

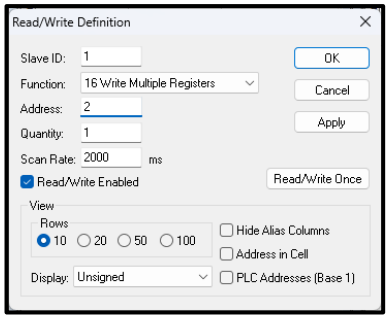
Then Click OK.



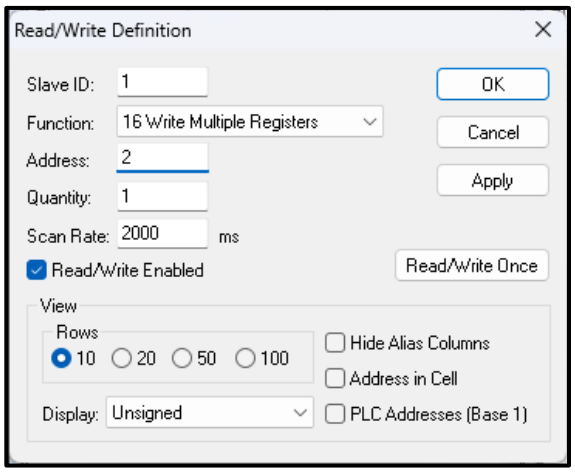
d. MODIFY

1. Setup → Reed/Write Definition…





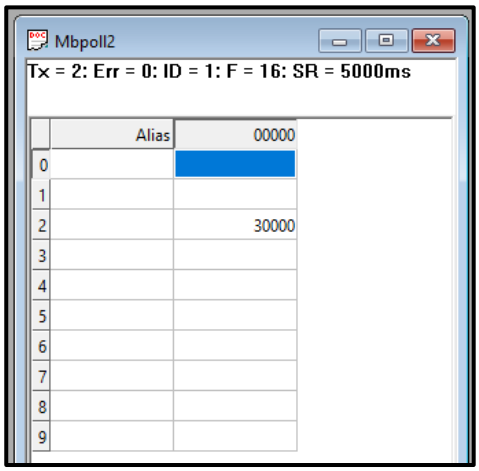
2. Set:

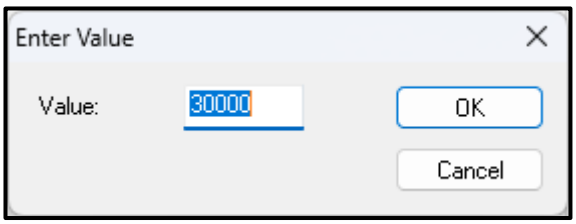


Salve ID: 1 default
Function: 16 Write Multiple Registers
Address: 2
Quantity: 1

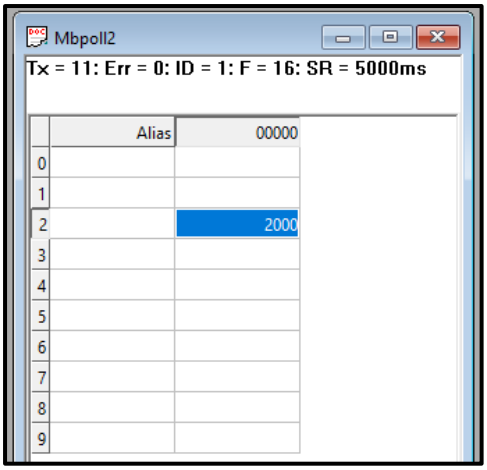
Then Click OK.

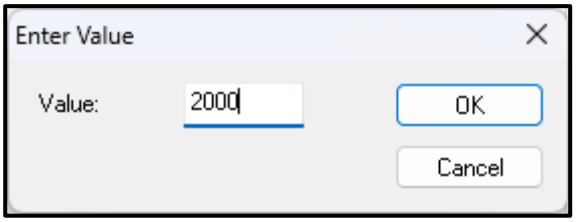
3. Double click on the cell with the default value





4. Change the value to the desired range and press OK



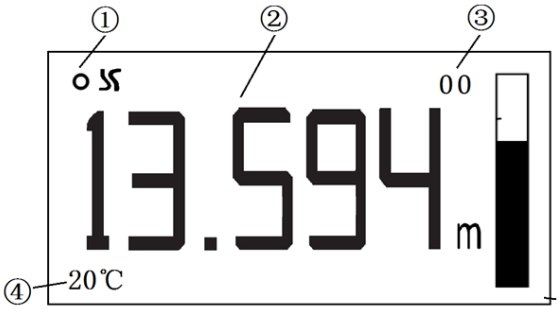


4. TLR-D / Setup

a. Buttons and display overview

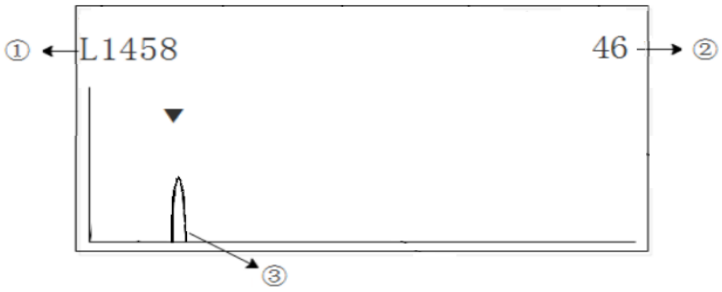
Key	Function
ESC	Back / Enter echo wave interface
UP	Up shift/ Increase key
DN	Down shift / Decrease key
OK	OK key / Enter setting parameter interface

Main display interface:



①	Work instructions	Flashing reminder when working
②	Level display	Level value（m/mm/cm/inch/ft）
③	Error code	00：No error（Does not show error） 01：No target detected 02：Level value jumped 08：Communication error
④	Temperature	Display the temperature value when the temperature display function is turned on.

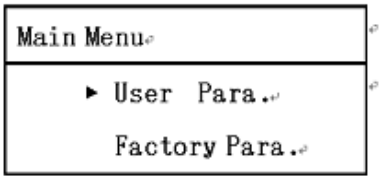
Wave display interface:



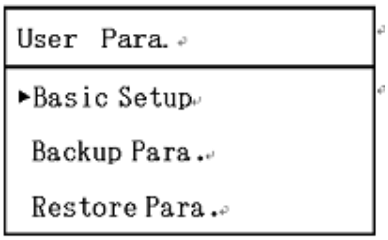
①	Gap value
②	Echo quality
③	Echo position

b. Setup

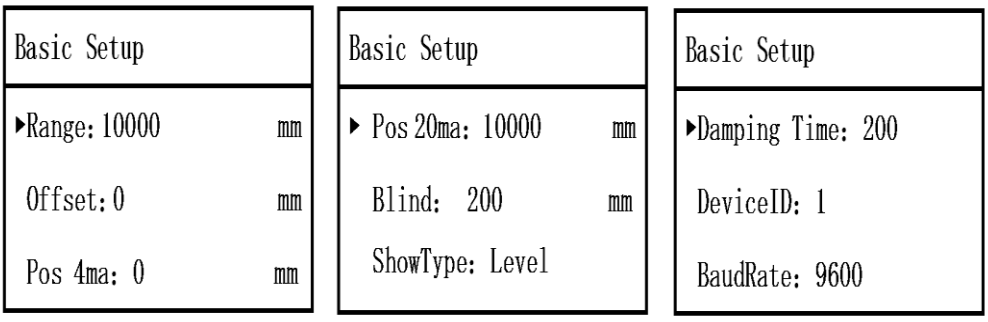
Facing the display window of the instrument, press the "**OK**" button, the transmitter will display "**Main menu**":



Press the "**OK**" button to enter the "**User Para**".



Press "**OK**" button to enter "**Basic Setup**".



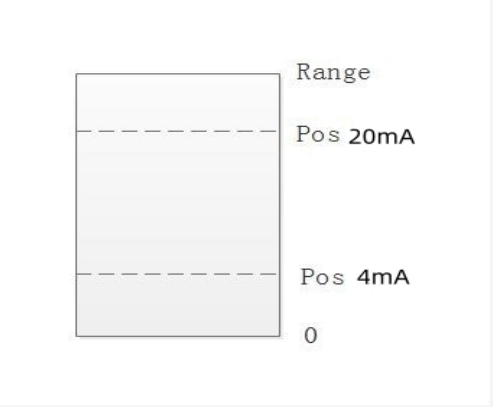
Set the "**Range**" according to the working conditions, press **"OK"**, after the range value is reversed, use the "**Upshift**"and"**Downshift**" button to input the range value, and then press the **"OK"** button to confirm.
Press **"Downshift"** button to select **"Offset"**, press "**OK**" to reverse the migration value, enter the migration value, and press "**OK**" to confirm.
The same steps can be used to modify:

"**Pos: 4ma**"
"**Pos: 20ma**"
"**Blind area**"
"**Damping Time**".

After the modification, press the "**Backspace**" key to return to the "**User Para**" interface.

When the display type is set to level, the main interface shows the actual level value. When the display type is set to Ullage, the main interface displays the Ullage measured by the radar. Set the display type as required.

Pos:4ma and **Pos:20ma** must be within the range. The relationship between the 4mA position, 20mA position and the range is shown in the figure below:



If the level lower than **Pos: 4ma**, the main interface shows that the level is 0, and if the level higher than **Pos: 20ma**, the main interface shows that the level is **Pos:20ma**.

c. Fault handling

Errors	Reason	Solution
No display	Power supply error	Check whether the DC 24V voltage and current meet the requirements.
	Wiring error	Check if the wiring is correct.
Value unstable*	Too much fluctuation	Change the installation position of the radar or reduce the fluctuation of the object to be measured.
	Weak Signal	Try angle calibration or rotate the radar installation position.
	Strong electromagnetic interference	Connect the instrument to the ground or shield.

*Typical error codes:

E01: Liquid level not found

E02: Liquid level jump is too large

E04: Abnormal capacitor charging

E40: Screen communication failure

E08: Actual liquid level does not match 4-20mA position (high, low).

5. General maintenance

- We highly recommend keeping the radar sensor clean, and trying to keep it in a waterproof, moisture-proof, corrosion-proof place, and avoid being violently collided and hit by other objects.
- Avoid direct sunlight on the main body of the radar sensor, keep away from heat sources and pay attention to ventilation. If the ambient temperature exceeds the rated temperature, corresponding cooling protection measures should be taken.
- When the ambience temperature is too low, the instrument protection box or other protective devices can be used for antifreeze protection and pay attention to keeping the radar dry.
- Radar sensors should be detected regularly. (The detection cycle is determined by the user according to the specific situation).