

RADAR LEVEL SENSOR

Manual Book (Ver: 2.1)

Catalogue

1. Product introduction	3
1.1 Product Overview	3
1.2.Scope of application	3
1.2.1.Measured medium	3
1.2.2.Ambient temperature	4
1.2.3.Protection grade	4
1.3 Technical parameter	4
1.4 Outline structure drawing	5
2. Product installation instructions	6
2.1 Check the product before installation	6
2.2 Radar level sensor installation	6
2.3 Matters needing attention	8
3. Radar commissioning instructions	8
3.1 Interface description	8
3.2 APP Operation instruction	9
4. Maintenance and repair	13
5.Fault handling	13

1. Product introduction

1.1 Product Overview

77-81Ghz frequency modulated continuous wave (FMCW) radar products (also known as millimeter wave radar) adopt the millimeter wave band with higher frequency than Ku band radar, It has a more compact RF architecture, a higher signal-to-noise ratio, a smaller dead zone, and a narrower beam Angle. The product has better anti-interference ability and penetration ability. The product is compact and easy to install, offering two installation modes of thread and bracket installation (can also be customized according to the field environment).

The main advantages of this series are as follows:

- ◆ The RSLD-08 series radar has a maximum operating bandwidth of 5GHZ, which is a product with higher measurement separation rate and measurement accuracy
- ◆ The narrowest beam Angle of 3°, the anti-interference ability is stronger, and the installation requirements are lower
- ◆ 80GHZ high frequency radar has shorter wavelength ($\approx 3\text{mm}$) and higher detection accuracy
- ◆ Support a variety of output modes (RS485, 4-20mA, Bluetooth), debugging and maintenance more convenient
- ◆ Provide one-to-one customized service for OEM customers

1.2.Scope of application

1.2.1.Measured medium

In general, the dielectric constant of the measured medium is required to be greater than 4, so that it can have a good reflection cross section.

1.2.2.Ambient temperature

The ambient temperature range of radar level sensor is: $-20\text{ }^{\circ}\text{C} \sim +70\text{ }^{\circ}\text{C}$.
In areas with strong sunlight, it is recommended to install the instrument in a cool place or use a sunshade, which can not only avoid the excessive temperature in the instrument caused by exposure to the sun, but also provide good ventilation and heat dissipation.

1.2.3.Protection grade

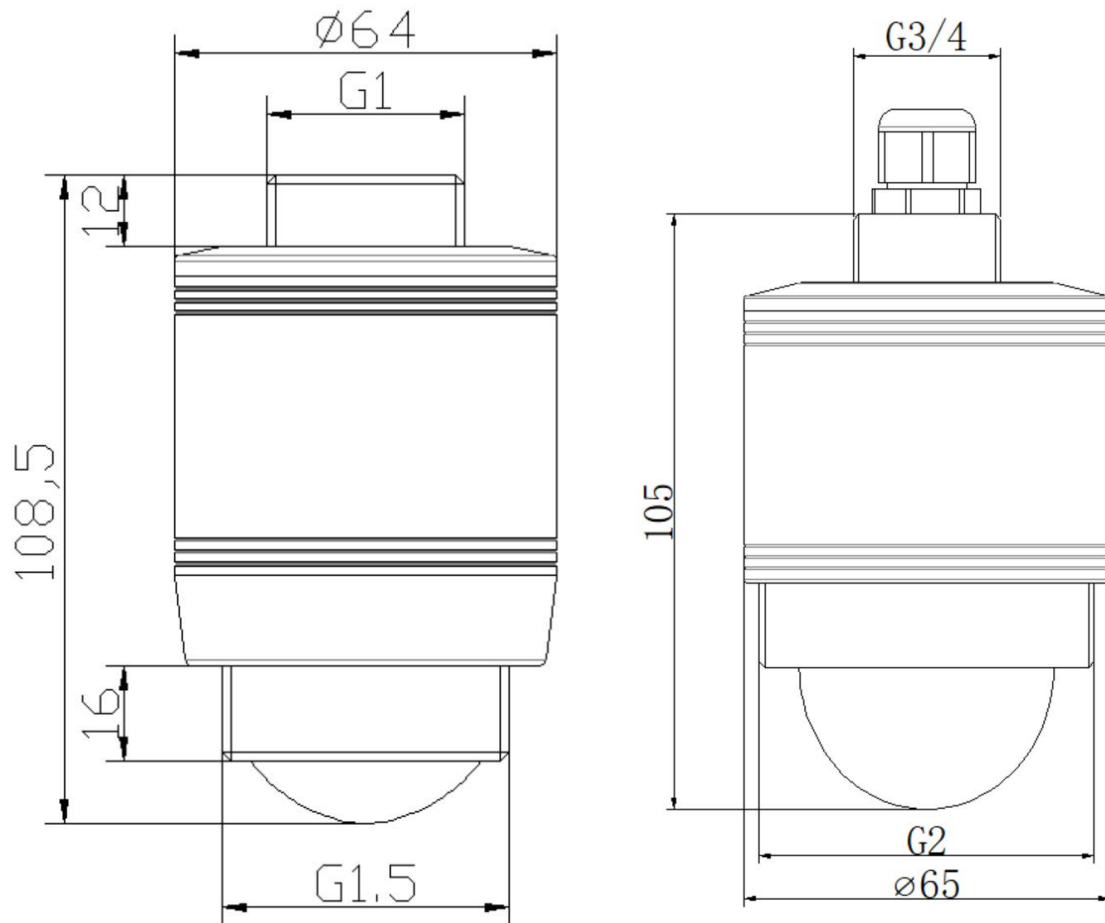
Waterproof and dust proof grade: IP67.

1.3 Technical parameter

Radar Level Sensor	Two-wire
Max range	5m、10m、15m、20m
Error	$\pm 2\text{mm}$
Beam Angle	$\pm 3^{\circ}$
Migration	$\pm 9.9\text{m}$
Signal output	4 ~ 20mA、RS485、NB-IoT
Power supply	DC 24V
Ambient temperature	$-20^{\circ}\text{C} \sim +70^{\circ}\text{C}$
Ambient humidity	(0% ~ 95%) RH
Protection grade	IP67
Display	Mobile Phone APP
material	ABS+PC, Aluminium alloy, 304
Weight	0.5KG
Sizes	Refer to picture
Mounting hole thread	Thread & bracket

1.4 Outline structure drawing

- The radar structure is shown in the figure



P 1

2. Product installation instructions

2.1 Check the product before installation

- (1) Take the instrument out of the packing case, check the equipment accessories carefully against the packing list.
- (2) Please read this manual before installing the radar level sensor.
- (3) Check the appearance of the instrument for damage, especially whether the instrument is intact, and pay attention to the proper placement of the instrument.

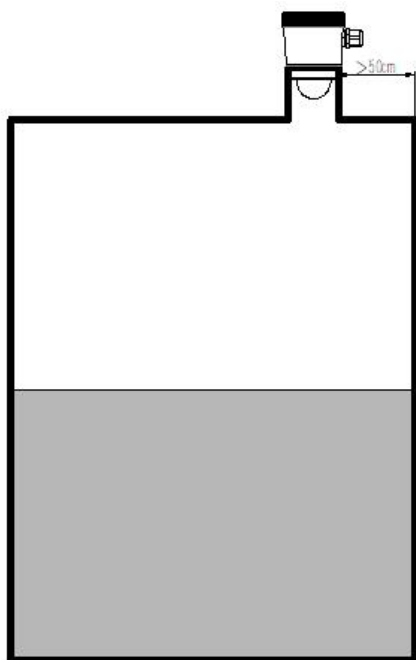
2.2 Radar level sensor installation

Preparatory work

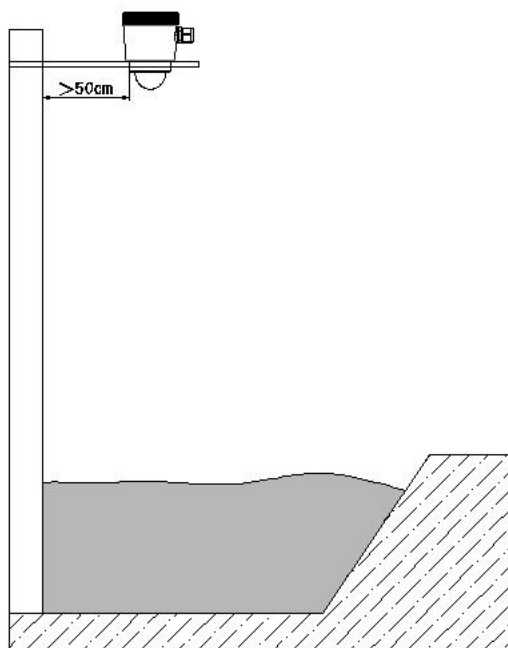
- Understand the internal structure and pipeline layout of the tank, and obtain the information of tank diameter and max range.
- Tools required: Flat-head screwdriver (3*75mm) , wrench , DC 24V power.

Installation needs to pay attention to two points:

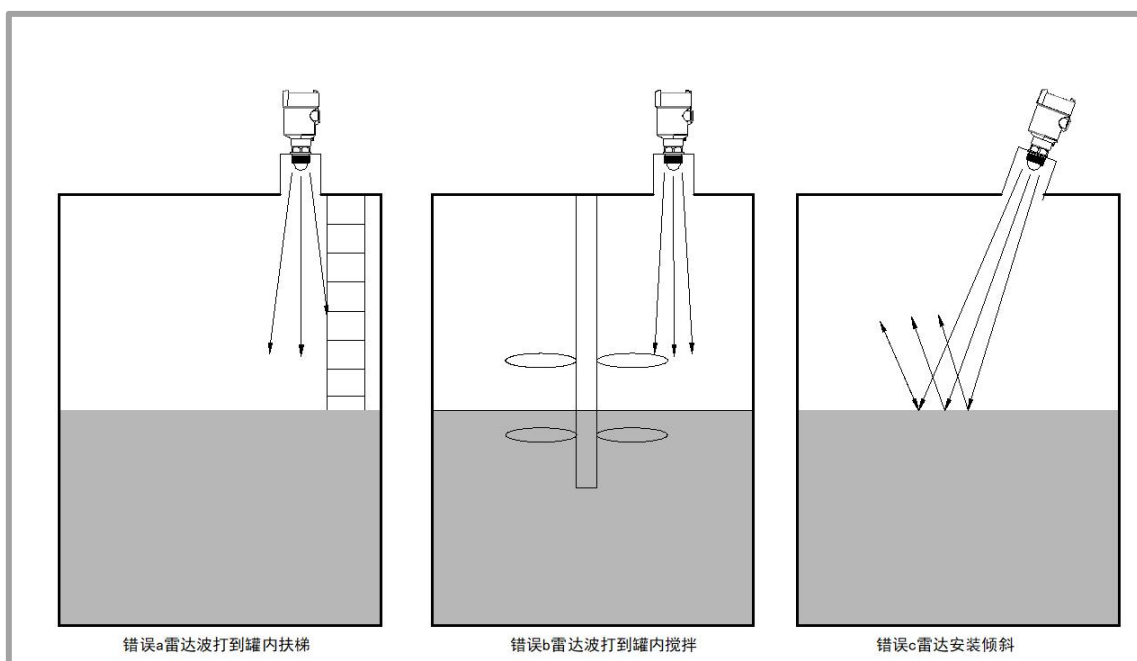
- (1) Ensure that the instrument is perpendicular to the measured liquid level
- (2) Avoid the radar beam Angle irradiation to the jammer, resulting in false echoes, affecting the measurement accuracy



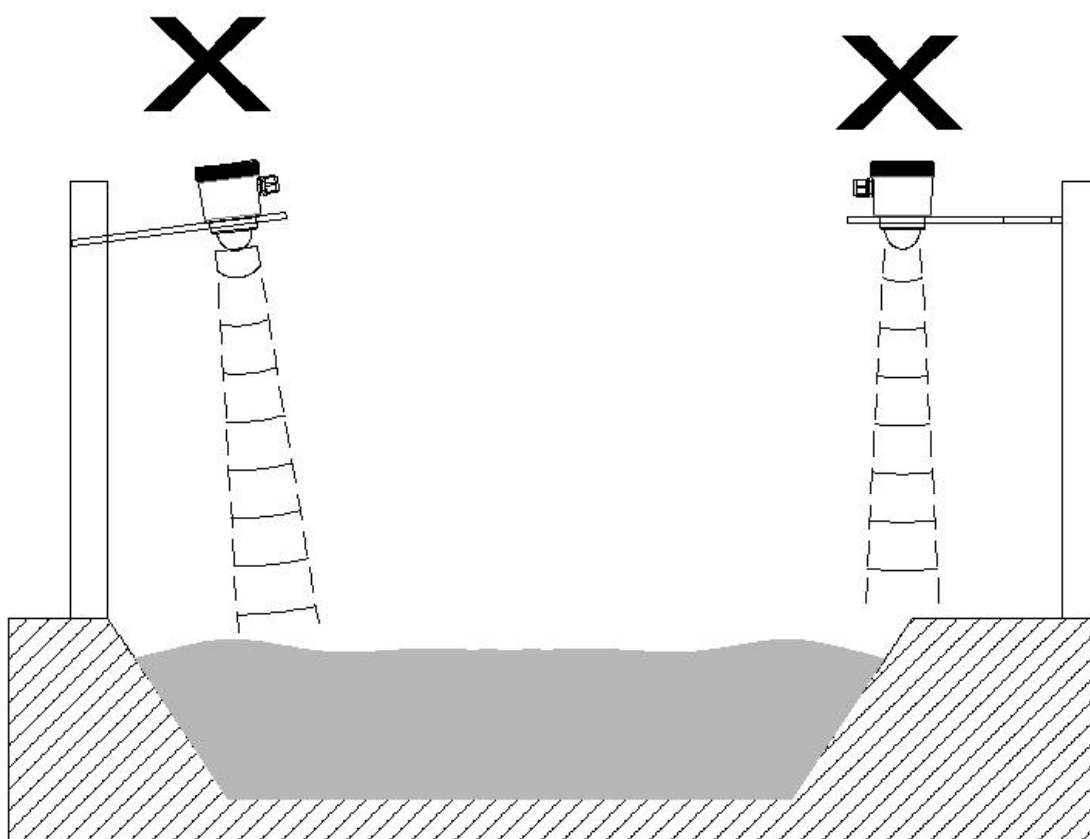
P2-a Storage tank installation diagram



P2-b River level installation diagram



P3 Storage tank installation error diagram



P4 The river water level is incorrectly installed

2.3 Matters needing attention

After installing the meter, keep it fixed to avoid meter jitter.

- 1.The maximum distance from the instrument to the liquid level is higher than 30cm
2. The distance between the instrument and the tank, the edge of the pool and the edge of the river is greater than 50cm.
- 3.It is preferred to install the instrument in the position where the liquid level fluctuates less (try not to install it in the position where the liquid level fluctuates more, such as the liquid inlet and the liquid outlet).

3. Radar commissioning instructions

3.1 Interface description

Lead wire	Explain
Red (+)	DC24V Positive of power supply
Blue (-)	DC24V Negative of power supply
Yellow (A)	RS - 485 communication positive
Green (B)	RS - 485 communication negative

3.2 APP Operation instruction

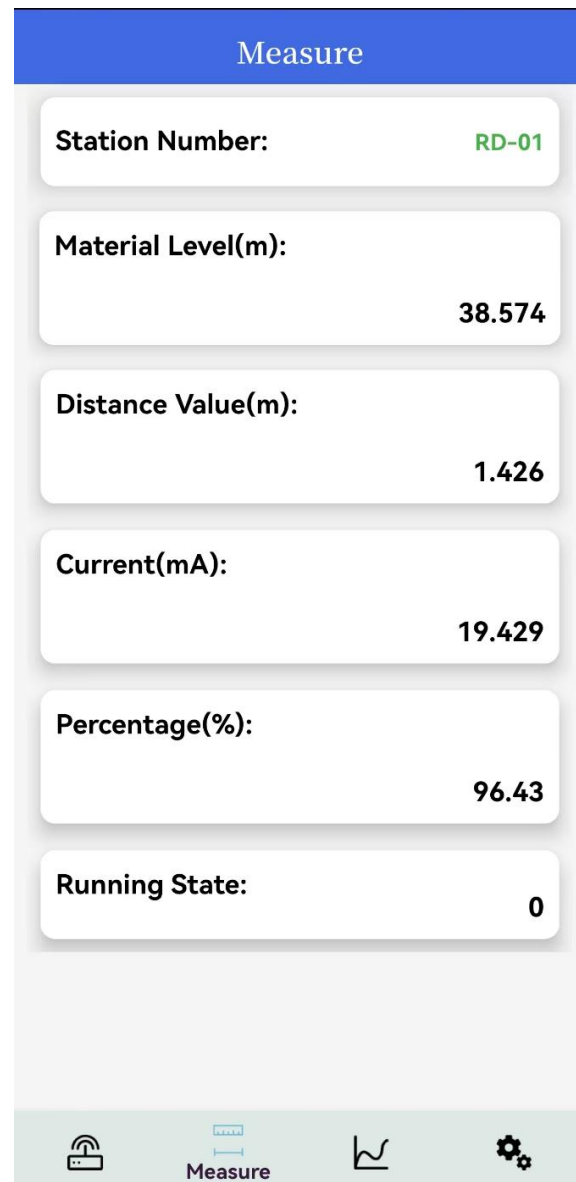
- a. Open the mobile App (P5), display the Bluetooth connection interface (P6), click our device name to connect.
- b. Click "Measure" to enter the device measurement status interface (P7), which will display the device connection status and liquid level measurement data.
- c. Click "curve" to enter the curve interface (P8), which will display the measurement target waveform and related status parameters in real time.
- d. Click "Set" to enter the setting interface (P9), you can modify various parameters of the radar (radar professionals are required).
- e. Click "Range" and "Hihg Level" in User Settings to set the actual measuring range on site, and click "Set" to save(P10).



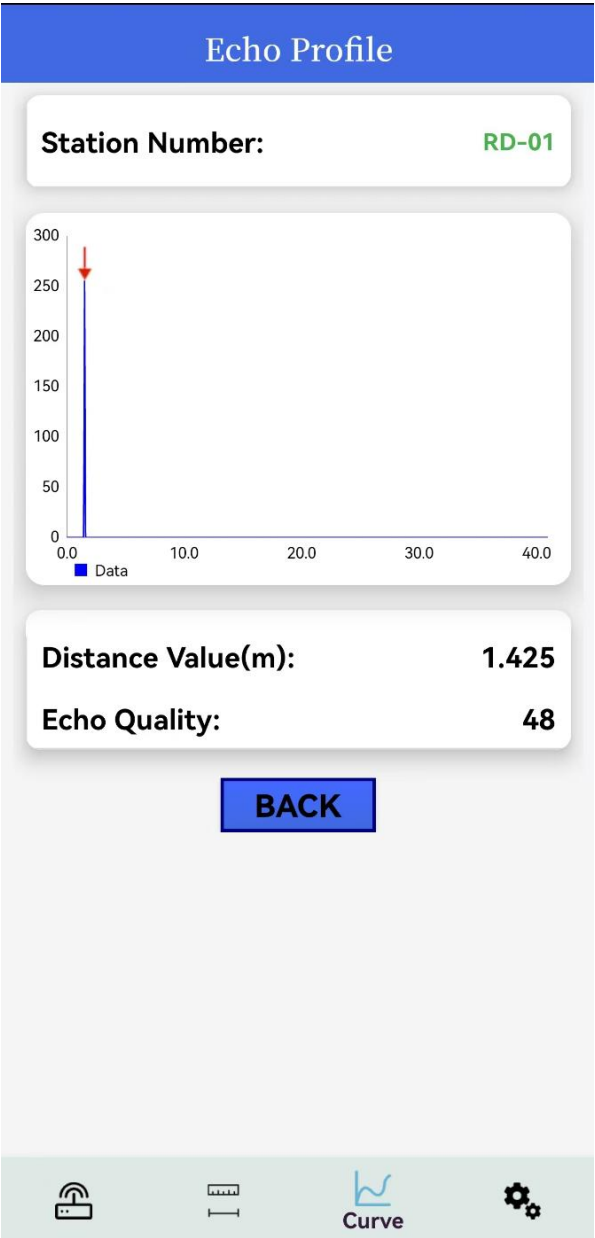
P5



P6 Device connection interface



P7 Measurement status interface



P8 Waveform interface

Parameter

Station Number: RD-01

- User Set >>
- System Set >>
- Measurement Set >>
- False echo set >>
- Restore Factory Set >>

Set

P9 Setting interface

Parameter

User Set

Range(mm):	40000
Offset(mm):	0
Low Level(mm):	0
High Level(mm):	40000
Blind(mm):	100
Output Mode:	0
Damp Time:	30
Device Address:	1
Baud Rate:	9600

READ

SET



P10 Setting Range

4. Maintenance and repair

- Pay attention to keeping the radar sensor clean, and try to be waterproof, moisture-proof, corrosion-proof, 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 ambient 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 sensor should be detected regularly. (the detection cycle is determined by the user according to the specific situation).

5. Fault handling

Trouble	Cause	Solution
No display	Wiring error	Check whether the wiring is correct.
	Power supply error	Check whether the DC 24V voltage and current meet the requirements.
Unstable indication	Weak echo	Try angle calibration or rotate the radar installation position.
	Strong electromagnetic interference	Ground or shield the radar sensor.
	Too much fluctuation	Change the installation position of the radar or reduce the fluctuation of the object to be measured.