

1.5-inch 80 GHz Radar Level Transmitter

Model: JJY-YLD128S-1.5



1. Product Introduction

The JJY-YLD1258S-1.5 is an 80 GHz radar level / material meter supporting RS485, TTL, and 4–20 mA interfaces. The maximum measuring range reaches 40 m, with a minimum blind zone as low as 5 cm. Thanks to its higher operating frequency and shorter wavelength, the device is especially suited to solid-material applications. Its lens-based transmit/receive architecture provides unique advantages in high-dust and harsh-temperature environments (up to +75 °C). The transducer is fixed by a threaded connection, making installation simple and convenient.

Key Advantages

- **RF Architecture:** Built on a domestic CMOS millimetre-wave RF chip, delivering a more compact RF architecture, higher signal-to-noise ratio, and a smaller blind zone.
- **Bandwidth:** A 5 GHz modulation bandwidth gives the product higher measurement resolution and accuracy.
- **Beam Angle:** The narrowest $\pm 2.75^\circ$ antenna beam angle reduces the influence of the installation environment on the instrument and simplifies mounting.
- **Wavelength:** The shorter wavelength provides better reflection characteristics on solid surfaces, eliminating the need for a special universal flange for aiming.
- **Compliance:** Performance complies with the national standard DB50/T 826-2017 (General Technical Requirements for Water-Level Meters). Core components adopt a fully sealed IP68 waterproof design.

2. Technical Specifications

Parameter	RS485	4–20 mA (2-wire)
Average Current	6 mA/ DC12 V	≤ 3.6 mA DC18 V
Sampling Frequency	500 ms (config.)	1500 ms
Pulse Current	200 mA / 10 ms	30 mA / 24 V (startup)
Supply Voltage	DC 9–26 V	DC 18–26 V
Transmission Frequency	80 GHz	
Measurement Accuracy	± 1 mm	
Measuring Range	0.05–40 m	
Resolution	1 mm	
Beam Angle	$\pm 2.75^\circ$	
Configuration Method	Host PC / BLE App (CN/EN)	
Communication Protocol	Modbus / Text	
Ingress Protection	IP68	
Operating Humidity	0–95 %	
Operating Temperature	-40°C to $+75^\circ\text{C}$	
Cable Length	M12 Waterproof Cordset, 5 m	

3. Product Dimension Drawing

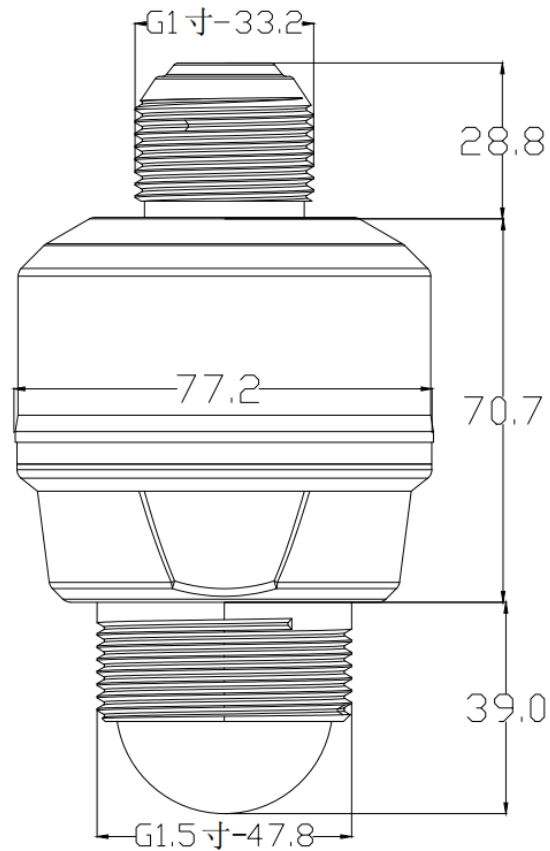


Figure 3-1. Product mechanical dimension drawing.

4. Wiring Instructions

4.1 RS485 + Bluetooth Interface



Figure 4-2. RS485 wiring diagram.

Wire colour code: Red — DC (9–26 V supply); Green — 485-B; Yellow — 485-A; Black — GND.

4.2 Two-Wire 4–20 mA + Bluetooth Interface



Figure 4-4. Two-wire wiring diagram.

Note: The two-wire radar provides both a two-wire 4–20 mA output and an RS485 communication channel. These two modes can be switched freely via the Bluetooth mini-program, but they cannot operate simultaneously — only one mode may be active at a time.

If only the two-wire 4–20 mA output is required, connect the 24 V line (Red) and GND (Black) only.

5. Installation Requirements (Must Be Followed)

Vertical installation: keep the antenna face as perpendicular as possible to the measured material or water surface to ensure the strongest echo.

Keep away from the feed inlet: the device must not be aimed at the feed inlet to avoid interference from falling material.

No obstacles within the beam: ensure there are no ladders, steps, beams, or other obstacles within the beam angle ($\pm 2.75^\circ$).

Conical vessel: aim the beam directly at the lowest point of the tank bottom to avoid inaccurate bottom measurement caused by oblique incidence.

5.1 Installation Example - Sealed Tank Scenario

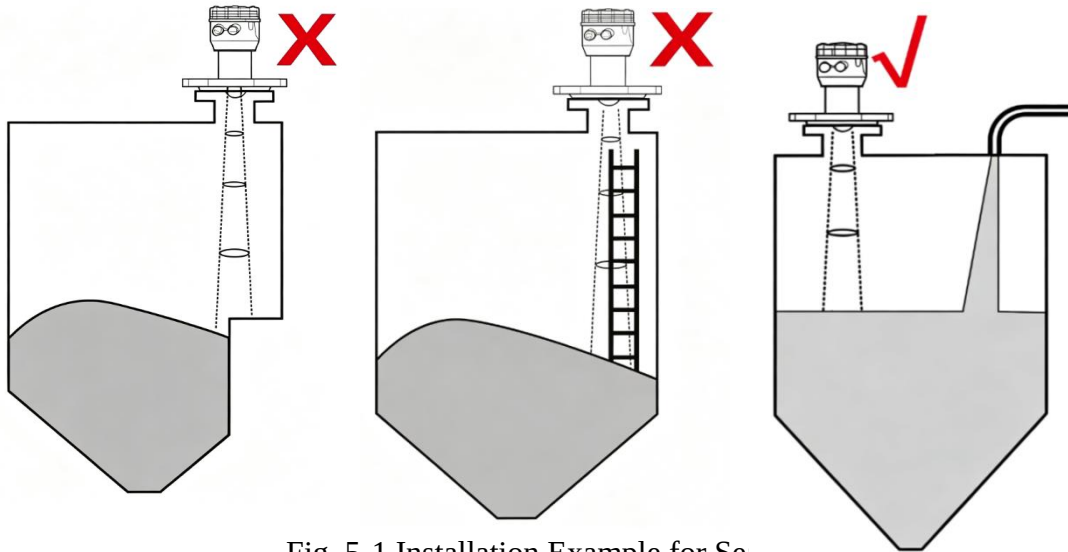


Fig. 5-1 Installation Example for Sealed Scenario

- The radar installation position must keep the beam completely clear of ladders and steps, away from the feed/discharge area, and ensure there are no interferers below.

10cm away from tank wall

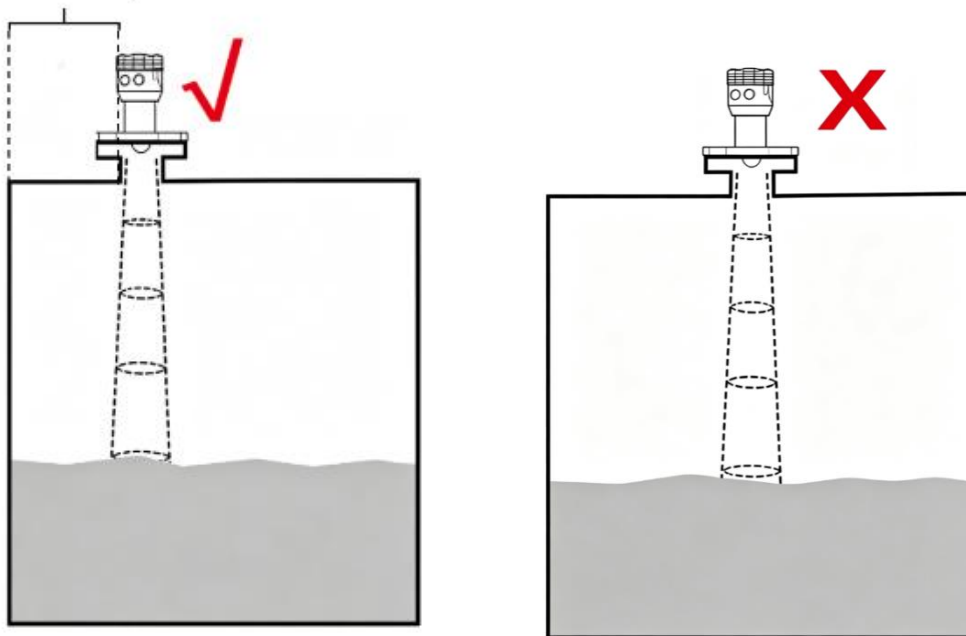


Fig. 5-2 Installation Example for Sealed Scenario

- It is recommended to keep the radar installation position about 10 cm from the tank wall (the wall must be smooth). Installing at the tank center tends to cause multiple internal reflections, resulting in secondary-echo interference.

5.2 Installation Example - Open-Area Scenario

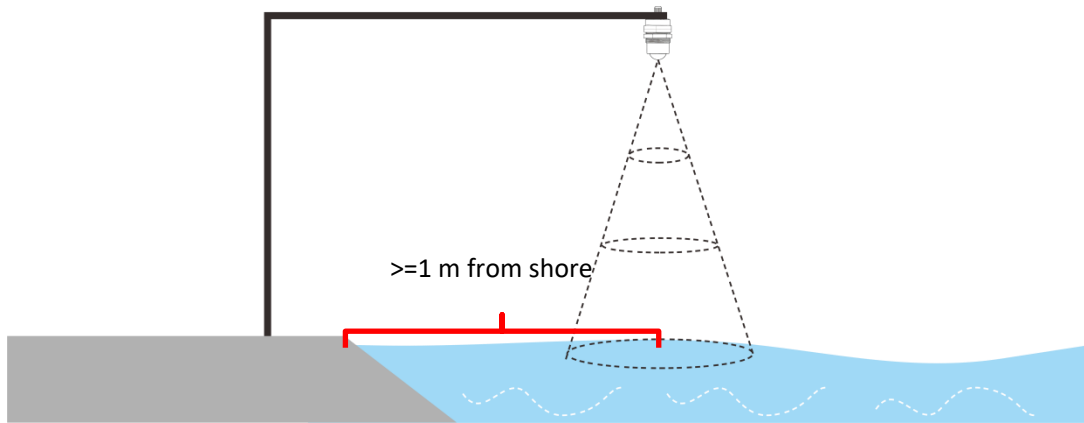


Fig. 5-3 Installation Example for Open-Area Scenario

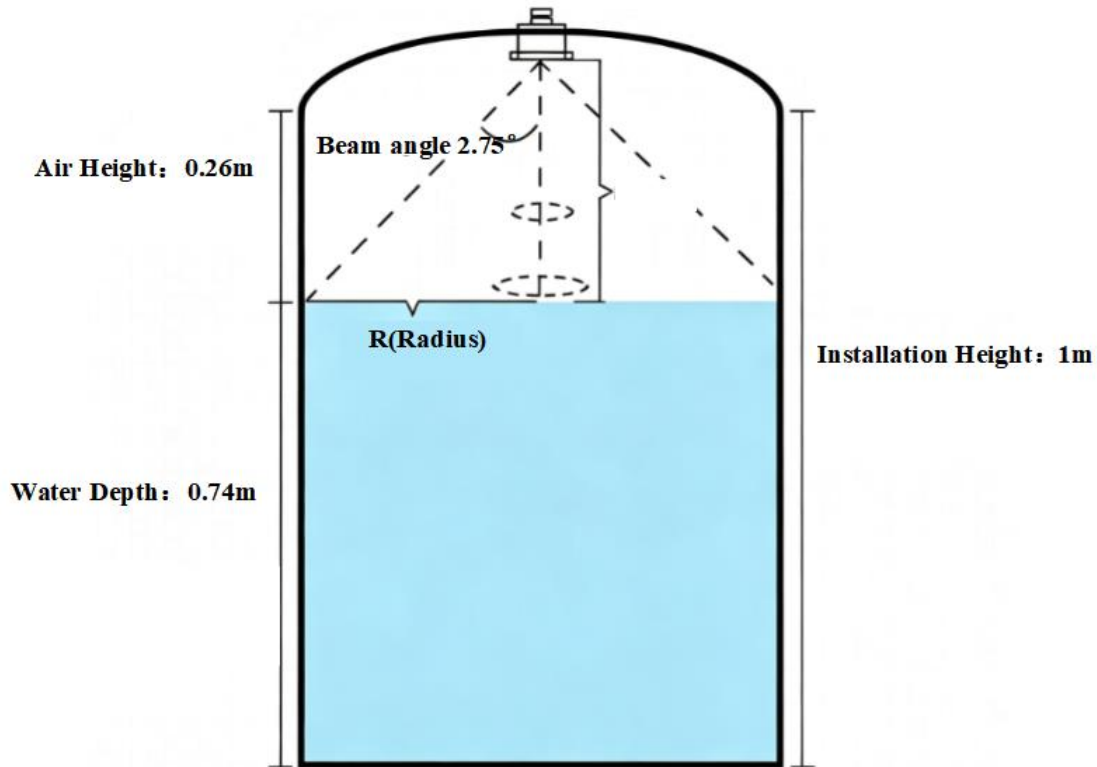
- The radar installation position should be at least 1 m from the shore. Avoid locations with large waves and heavy swell; large waves cause echo distortion and increase measurement error.
- Keep away from shore obstacles, foam, and floating objects to avoid false echoes.

6.Schematic of Technical Terms

Air height: distance from the sensor probe to the liquid surface / measured surface.

Liquid level: depth from the water surface to the tank bottom (water bed).

Installation height: distance from the sensor to the liquid bottom.

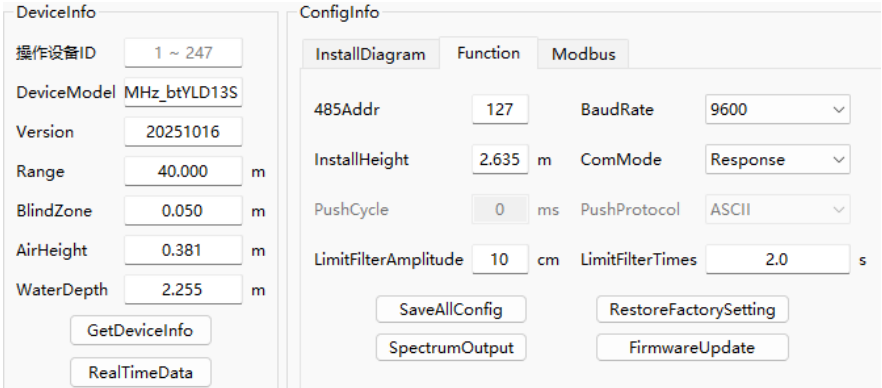
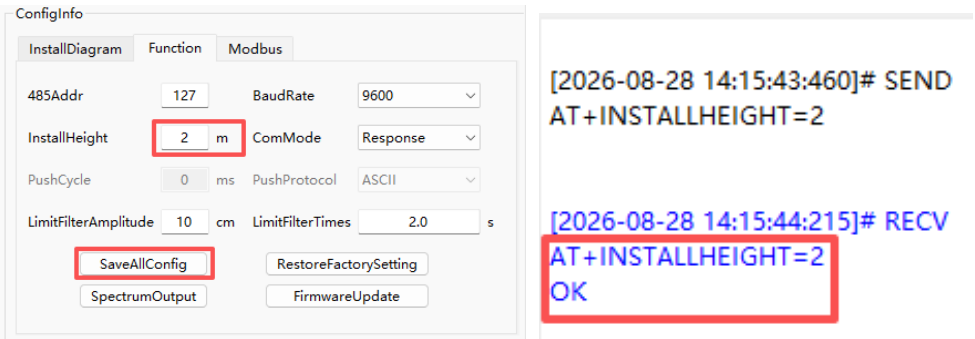


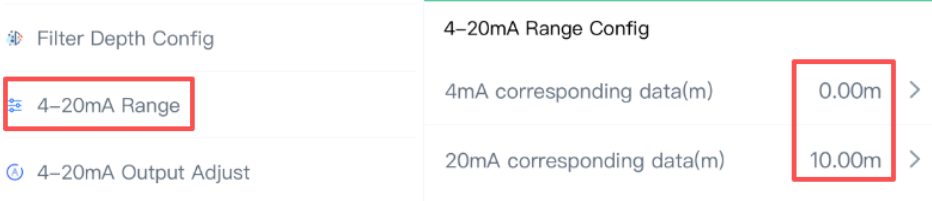
Measurement height formula: $H = R(\text{Radius}) / \tan(\text{Beam angle})$

Example: $H = R / \tan 2.75^\circ$

Fig. 6-1 Beam Parameter Principle Diagram

7. PC Software Quick Configuration

Step 1	Power-on check: radar with TTL communication requires DC 2.8-3.0V power; radar with RS485 or three-wire communication requires DC 9-26V; two-wire 4-20mA communication requires 18-26V.
Step 2	Set the installation height on the host computer: (1) Open the host computer software and enter the device communication configuration interface. Select the USB serial port currently connected to the radar (if no port appears, check the driver); the default baud rate is 9600, then complete the hardware connection.  (2) Click "Detect Current Device"; when the PC shows the radar information, communication with the radar is successful.  (3) Configure the installation height parameter. As shown, set the installation height to 2 m, click "Save All Config", and upon reply "ok" the parameter is set successfully. Installation height = water depth + Air height. Installation height: distance from the tank bottom to the sensor probe. Real-time Air height: distance from the sensor probe to the water surface.  TTL and RS485 devices are done after the above configuration; 4-20mA devices need to complete the following steps:

Step 3	Configure the 4-20mA corresponding range: (1) Search for the "宇宙物联" mini-program in WeChat, enable Bluetooth and location permissions, and tap "Search Bluetooth"; (2) Tap the discovered Bluetooth device and enter the connection password "2016"; (3) Tap "4-20mA Range Configuration" and set the value for 4mA and the value for 20mA. For example, as shown, 4mA corresponds to 0m and 20mA corresponds to 10m. 
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8. Bluetooth Mini-Program Quick Configuration

Step 1	Power-on confirmation: For radar using 485 communication, connect DC 9-26V; for radar using 2-wire communication, connect DC 20-26V.
Step 2	(1) Search for the "宇宙物联" mini-program in WeChat, enable Bluetooth and location permissions, and tap "Search Bluetooth"; (2) Confirm that the "Air Height" distance displayed on the mini-program home page is correct. Air Height: distance from the sensor probe to the water surface. (3) Tap "Water Level Configuration", then tap "Set Water Depth" and set the current water depth value. Water Depth: the distance from the bottom to the water surface; Installation Height: the distance from the sensor probe to the bottom; After setting the water depth, the device automatically calculates the installation height.

	 Water Level Config  Filter Depth Config  4-20mA Range	 Water Level Config Set water depth 0.500 > Installation height 2.657 >
	For example, as shown above: setting water depth to 0.5m automatically calculates the installation height as 4.989m	

9. Common Parameter Settings

Requirement	Setting Command
Set Mounting Type	AT+INSTALLTYPE=1 (Conventional mounting=0, Suspended mounting=1)
Enable Nearest Peak	AT+NEARESTPEAK=1 (Off=0, On=1)
Set Blind Zone	AT+BLINDZONE=x (x is the value to be set, unit m, minimum blind zone 5cm)
Set Sliding-Window Filter	AT+SLIDWINFILTERNUM=4 (Saves the latest 4 sampled data points, averages them for output, and filters out spikes)
Set Amplitude-Limiting Filter	AT+LIMITFILTEROFXCM=10cm,30\n
Set Radar Transmit Power	AT+RFPOWER=1,5 (1,5 means auto-adjust transmit power; 1,1 means use power level 1)

10. Troubleshooting

Phenomenon	Possible Causes and Remedies
Device cannot communicate	(1) If it is a radar with 485 communication, use a multimeter to check whether the voltage is within 9-26V. (2) If it is a radar with TTL communication, use a multimeter to check whether the voltage is within 2.8-3.0V. Verify the wiring: (3) For TTL devices, connect device TX to serial RX and device RX to serial TX (cross-connection). For 485 devices, connect 485-A to A and 485-B to B. (4) Confirm the baud rate: The device default baud rate is 9600; please ensure the baud rates match. (5) Verify the serial tool: Short the serial tool's TX to RX and A to B respectively and perform a loopback test to confirm the tool's send/receive function works properly.
Values occasionally jump erratically	Appropriately increase the duration (e.g. 45s) Send command: AT+LIMITFILTEROFXCM=10cm,90\n
Blind zone displayed	(1) Check whether the installation is vertical; ensure the measured surface is outside the blind zone (5cm). (2) Enable suspended mounting and set the blind zone to 0.3m (recommended for open environments).
Prompt: insufficient echo energy	(1) Confirm the installation is vertical; (2) Check whether there are obstacles, floating objects, foam, etc. around the installation position; (3) Ensure the measured surface is flat; severe fluctuation or turbulence causes echo energy attenuation.
Fixed interference object present	Eliminate the fixed interference by learning the false echo.
Air height value often too large	(1) There may be false echoes (tank wall, obstacles); (2) adjust the installation position; Enable the nearest peak function.
Air height value	(1) There may be false echoes (tank wall, obstacles); adjust the installation

often too small	position; (2) Eliminate the fixed interference by learning the false echo.
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Precautions

- The supply voltage must not exceed the range shown in the wiring diagram. AC power is strictly prohibited.
- Always disconnect power before wiring and installation; do not plug or unplug while powered.
- The radar can penetrate clothing, plastic, acrylic sheets, wood, glass, etc. Pay attention to the measured substance.
- When measuring liquids, the medium's dielectric constant is generally greater than 2.5. Too low a dielectric constant tends to cause weak echoes, abnormal measurement, or direct penetration of the liquid.
- During installation, keep the probe perpendicular to the medium surface and avoid the tank wall, nozzles, and internal obstacles.
- Do not disassemble the device yourself; if a fault occurs, contact the manufacturer's technical support.