

User Manual
80G Compact Short-Range Radar
Rangefinder

JJY-YGD38ML-18



1. Product Introduction

The compact short-range radar sensor supports multiple communication modes such as RS485 and TTL. Its minimum blind zone can be as small as 4 cm. With a higher operating frequency and shorter wavelength, it is especially suitable for liquid applications; using an antenna to transmit and receive electromagnetic waves, it offers unique advantages in high-dust and harsh-temperature environments (-40 to +75°C); the instrument is fixed by a threaded mount, making installation quick and easy.

Main advantages are as follows:

- Based on a domestic CMOS millimeter-wave RF chip, achieving a more compact RF architecture, higher signal-to-noise ratio, and smaller blind zone.
- A 5 GHz modulation bandwidth gives the product higher measurement resolution and accuracy.
- The narrowest $\pm 10^\circ$ antenna beam angle reduces the influence of installation-environment interference on the instrument and makes installation more convenient.
- With a shorter wavelength and better emission characteristics on solid surfaces, there is no need to use a universal flange for aiming.

2. Technical Parameters

Device Model	YGD38ML-18-3ML	YGD38ML-18-8ML
Communication Mode	TTL	RS485
Average Current	2.8-4.2V/10mA	5-12V/12mA
RF Pulse Current	100mA	
Sampling Frequency	20 ms / configurable	
Measurement Accuracy	±3mm	
Measurement Frequency	80GHz	
Beam Angle	±10 °	
Communication Protocol	Customizable Modbus / text protocol	
Radar Blind Zone	4 cm	
Range	0.04-2 m	
Protection Rating	IP67	
Housing Material	ABS	
Operating Temperature	-40°C~75°C	
Commissioning Method	Host computer	
Mounting Thread	M22*1.5	
Cable Length	0.3m	
Package Dimensions & Weight	Package Dimensions & Weight	
Dims & Wt.	50*70*100mm/50g	

3. Wiring Instructions

3.1 TTL Serial Communication Product Wiring Diagram

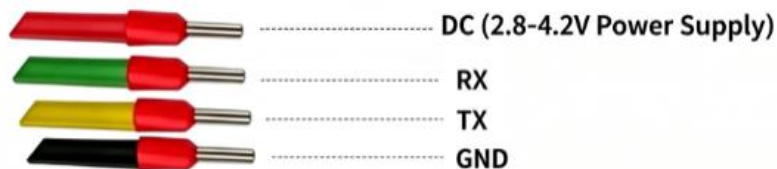


Fig. 3-1 TTL Product Wiring Diagram

Red: DC (2.8-4.2V supply) Green: RX (device receives, connect to the serial-tool TX) Yellow: TX (device transmits, connect to the serial-tool RX) Black: GND (communication must share a common ground)

485 Serial Communication Product Wiring Diagram



Fig. 3-2 485 Product Wiring Diagram

Red: DC (5-12V supply) Green: 485-B Yellow: 485-A Black: GND.

4. Structural Dimensions

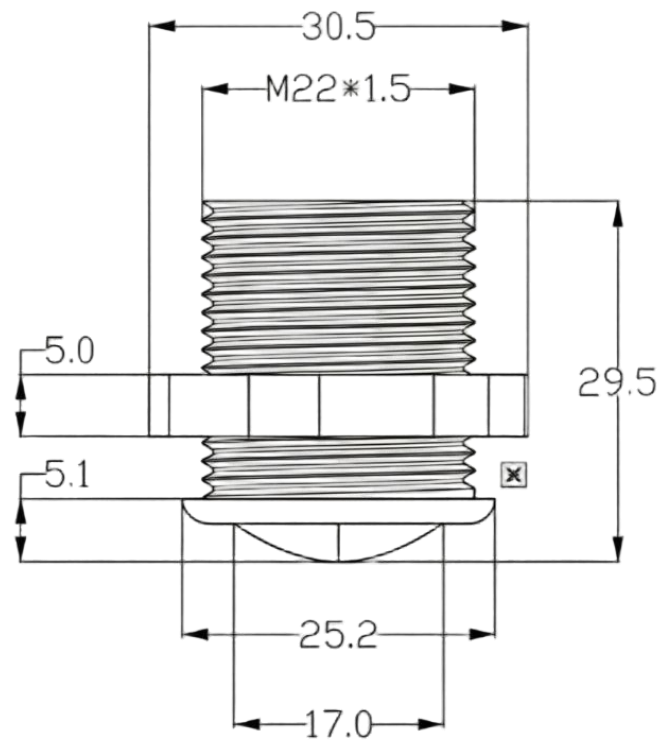


Fig. 4-1 Product Dimension Drawing

5. Installation Requirements (Must Be Followed)

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

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 obstacles such as ladders, steps, or beams within the beam angle ($\pm 10^\circ$).

Conical vessels: Try to aim the beam directly at the lowest point of the tank bottom; avoid oblique incidence that causes inaccurate bottom measurement.

5.1 Installation Example — Sealed Tank Scenario

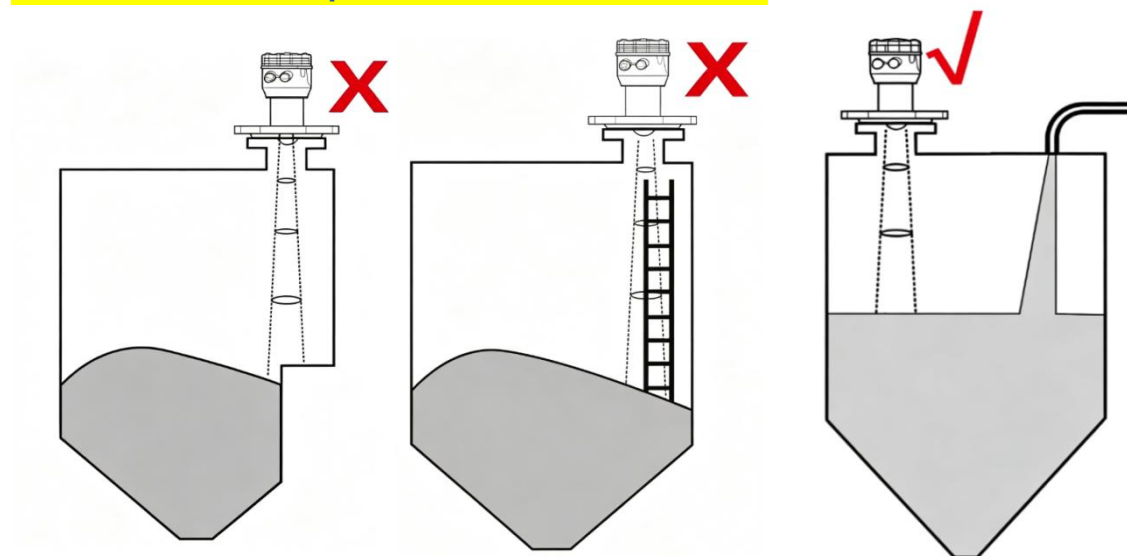


Fig. 5-1 Installation Example for Sealed Scenario

- The radar installation position must keep the beam completely clear of ladders and steps, and away from the feed and material-drop zone, ensuring no interference below.

10cm away from tank wall

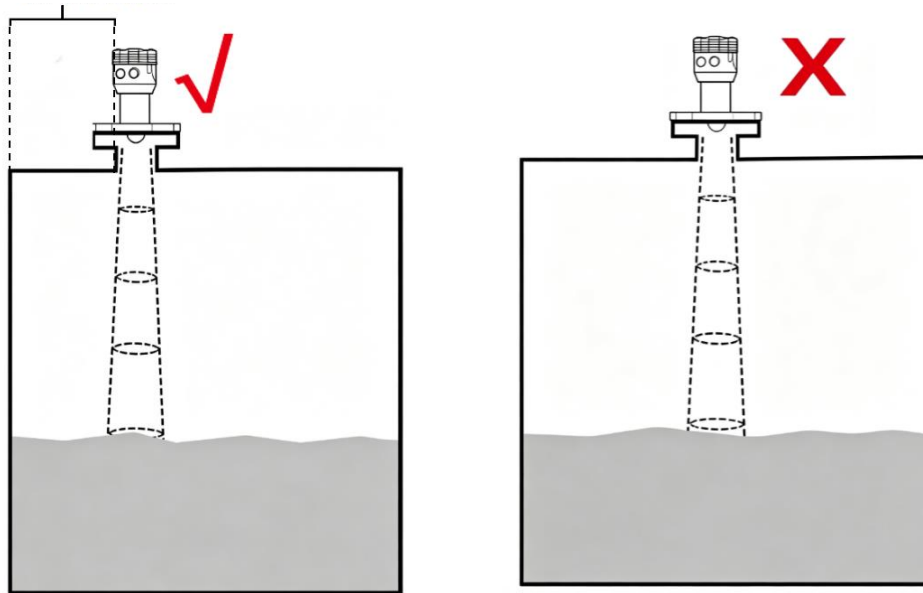


Fig. 5-2 Installation Example for Sealed Scenario

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

5.2 Installation Example — Open Scenario

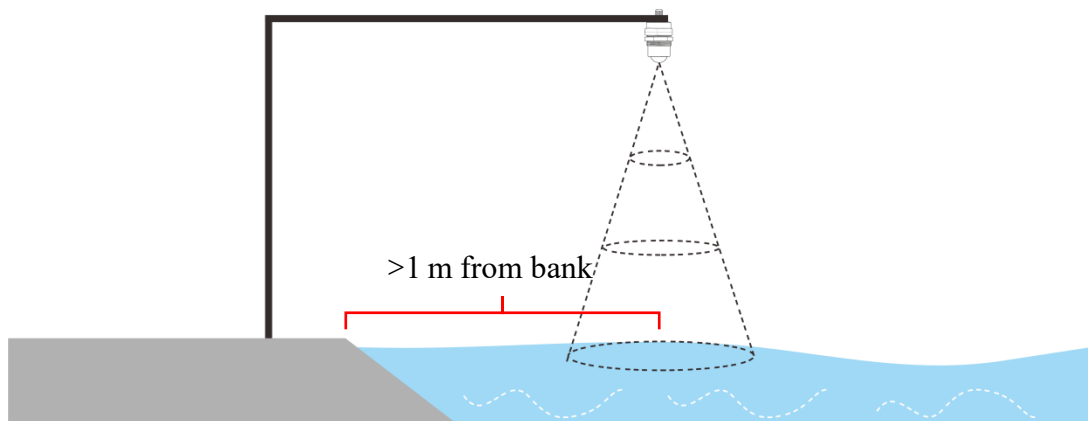


Fig. 5-3 Installation Example for Open Scenario

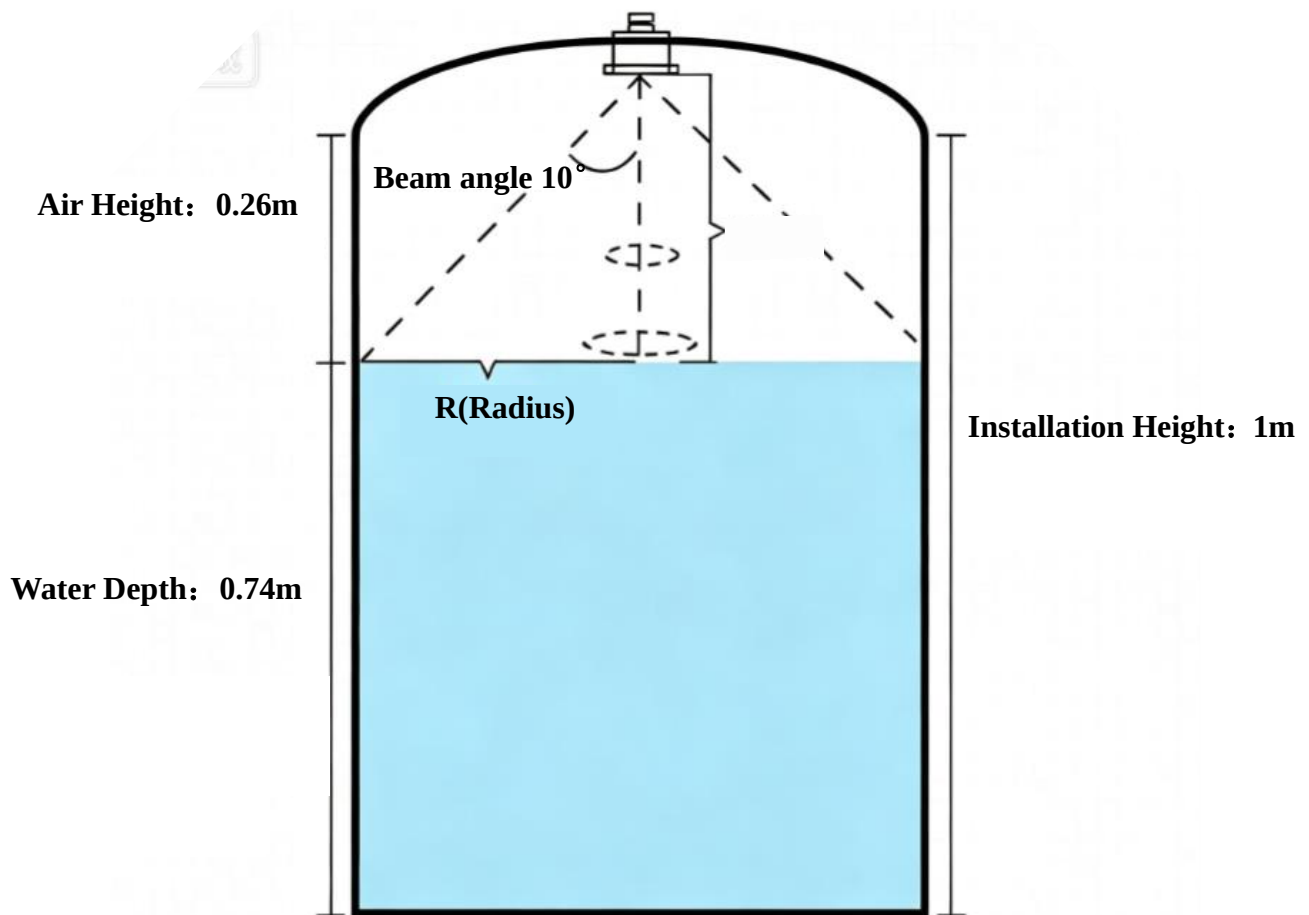
- The radar installation position should be at least 1m from the bank, and the mounting point should avoid areas with large waves or heavy surging, as large waves cause echo distortion and increased measurement error.
- Keep away from bank obstacles, foam, and floating objects to avoid false echoes.

6. Terminology Diagram

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

Water Depth: distance from the tank bottom / water bottom to the liquid surface

Installation Height: distance from the sensor probe to the tank bottom / water bottom;

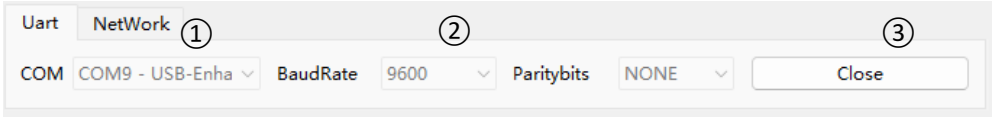


Measurement height formula: $H = R(\text{Radius}) / \tan(\text{Beam angle})$

Example: $H = R / \tan 10^\circ$

Fig. 6-1 Beam Parameter Principle Schematic

7. PC Software Quick Configuration

Step 1	Power-on check: for TTL-communication radars, supply DC 2.8-4.2V; for 485-communication radars, supply DC 5-12V.
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 host computer displays the radar information, communication with the radar is successful.

(3) Configure the installation height parameter. As shown, set the installation height to 2m, click "Save All Configurations", and upon the 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.

Step 3

Confirm whether the current empty-height distance or current water depth matches reality; once verified, commissioning is complete.

8. Common Parameter Settings

Requirement	Setting Command
Set Installation Mode	AT+INSTALLTYPE=1\n (Conventional installation = 0, Suspended installation = 1)
Enable Nearest Frequency Point	AT+NEARESTPEAK=1\n (Off = 0, On = 1)
Set Blind Zone	AT+BLINDZONE=x\n (x is the value to set; minimum blind zone 4 cm)
Set Sliding-Window Filter	AT+SLIDWINFILTERNUM=4\n (Saves the latest 4 sampled data points, averages them before output to filter out glitches)
Set Amplitude-Limiting Filter	AT+LIMITFILTEROFXCM=10cm,30\n
Set Radar Emission Power	AT+RFPOWER=1,5\n (1,5 means auto-adjust transmit power; 1,1 means use power level 1)

Suspended installation: directly shields the distance of about 20 cm downward from the probe; suitable for open-environment installation.

Conventional installation: for material/water level that may rise close to or even touch the radar probe antenna, e.g. material bins, tanks, etc.

9. Common Troubleshooting

Symptom	Possible Cause and Handling
Device cannot communicate	(1) For a 485-communication radar, use a multimeter to check whether the voltage is within the 5-12V range. (2) For a TTL-communication radar, use a multimeter to check whether the voltage is within the 2.8-4.2V range. (3) Confirm correct wiring: for TTL devices, connect device TX to serial-tool RX and device RX to serial-tool 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 confirm the baud rates match. (5) Confirm the serial tool: short the serial tool's TX to RX and A to B respectively, and perform a loopback test to verify that the serial tool's own transmit/receive function is normal.
Values occasionally jump randomly	Appropriately increase the duration (e.g. 50 s) Send command: AT+LIMITFILTEROFXCM=10cm,250\n
Blind zone displayed	(1) Check that the installation is vertical; confirm the measured surface is outside the blind zone (4 cm). (2) Enable suspended installation and set the blind zone to 0.3 m (recommended for open environments).
Prompt: insufficient echo energy	(1) Confirm the installation is vertical; (2) Confirm whether there are interferers such as floating objects and foam around the installation position; (3) Confirm the measured surface is flat - severe fluctuation or turbulence causes echo-energy attenuation;
Fixed interferer present	Eliminate the fixed interference by learning the false echo.
Empty-height value often too large	(1) There may be a false echo (tank wall, obstacles); adjust the installation position; (2) Enable the nearest frequency point.

Empty-height value often too small	(1) There may be a false echo (tank wall, obstacles); adjust the installation position; (2) Eliminate the fixed interference by learning the false echo.
Device data responds slowly	Send the following commands to disable filtering: (1) Disable amplitude-limiting filter: AT+LIMITFILTEROFXCM=10,0\n (2) Disable sliding-window filter: AT+SLIDWINFILTERNUM=0\n

10. Precautions

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