YSR02

Flow Meter User Manual



SIBO.X INDUSTRIAL CO.,LTD.

Add: No. Building 1, No. 1, Jingshi Road, Cicheng Town Industrial Park, Jiangbei District, Ningbo City, Zhejiang, China

https://www.sbxsun.com

Email: info@sbxsun.com

Tel: +86-15958288207

1 Product Introduction

A radar flowmeter is a device that measures water flow velocity and liquid level using radar technology, then calculates flow rate through an integration model. It enables real-time measurement of water flow 24/7, with non-contact operation that minimizes environmental interference. The product includes mounting bracket options for secure installation.

The main advantages of the product are as follows:

- The hybrid-band radar enables non-contact measurement, delivering simultaneous and non-interfering outputs for flow velocity, liquid level, and flow rate. It requires minimal maintenance and is unaffected by sediment.
- IP68 waterproof design, suitable for all kinds of outdoor environments, suitable for all kinds of extreme weather conditions
- Compact and compact in appearance, with excellent cost performance
- Integrated anti-reverse, lightning, and overvoltage protection
- Supports Modbus-RTU protocol for easy system integration
- Supports mobile Bluetooth debugging for on-site maintenance

1.1 Technical Specifications

Speed range	0.05 m/s ~40m/s
rate accuracy	±0.01 m/s (radar simulator calibration)
Resolution	1mm/s
Speed measurement pitch angle (auto-compensated)	0° - 80°
Speed measurement antenna beam angle	10° *27°
range hole	20cm
Maximum range	65m
Distance measurement accuracy	±1mm
Radar beam angle	6°
Power supply range	7~28VDC
MT	0.5~2.5s
start time	<2s
working current	The current is about 120mA when the 12V normal continuous working
communication interface	RS485 (Baud rate), Bluetooth (5.2)
protocol	Modbus（9600/115200）
working temperature	-40-85°

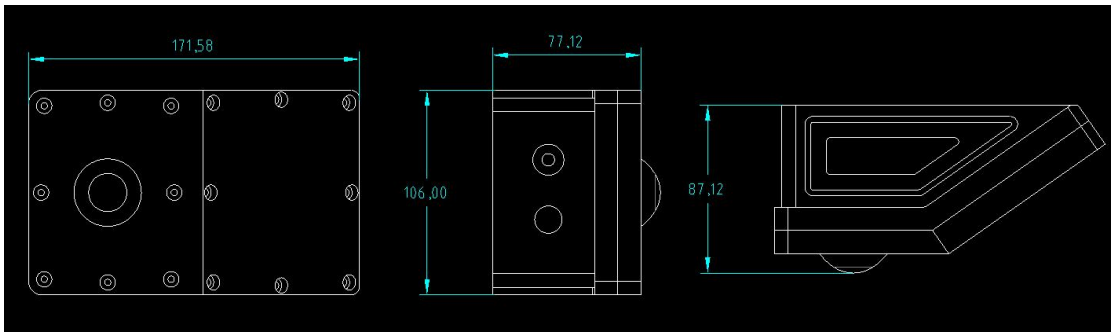
Outer shell material	alufer ， PBT
size （mm）	171.58×77.12×87.12
levels of protection	IP68
way to install	support
Surge Protection	6000V

1.2 Wiring

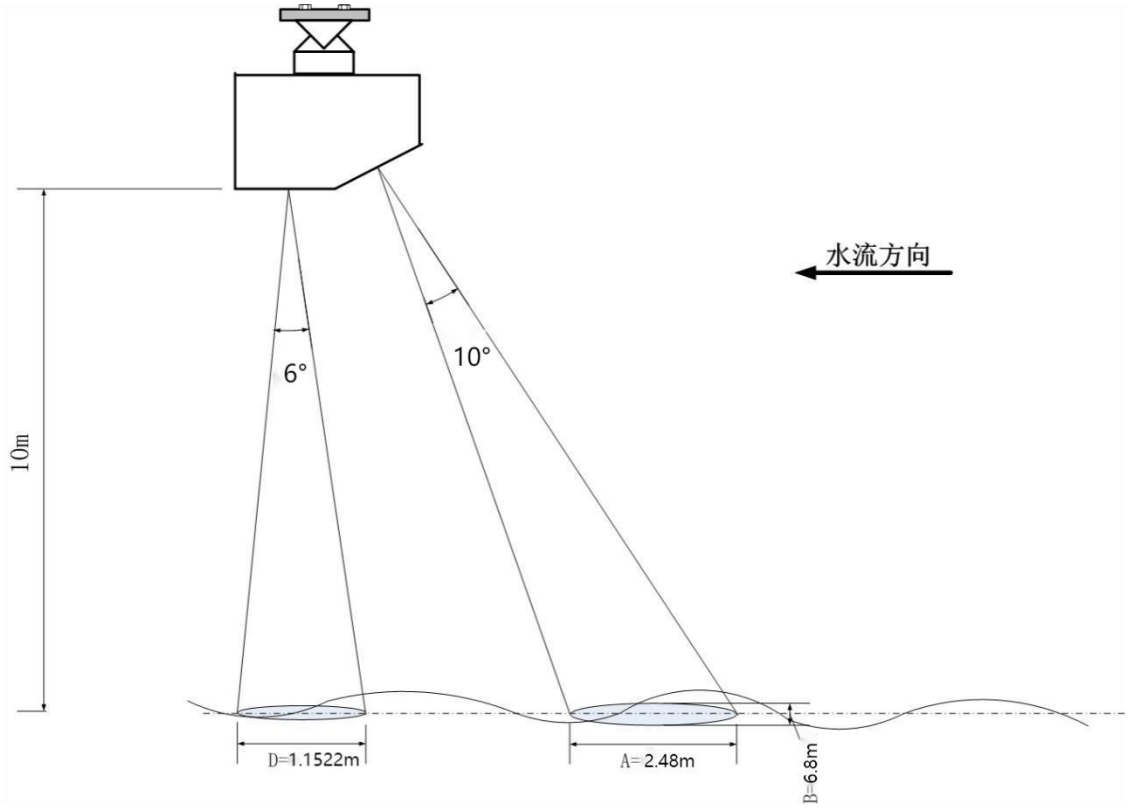


Pin color definition	Pin color definition	Pin color definition
1	1 Red power positive	1 Red power positive
2	2 blue power ground wire	2 blue power ground wire
3	3 Green RS485A (+)	3 Green RS485A (+)
4	4 Yellow RS485B (-)	4 Yellow RS485B (-)
5	5. The casing ground wire installation hole must be connected to the earth, which is important for lightning protection. If not connected, the equipment will not have lightning protection function.	

1.3 Flowmeter size



2 Precautions for flowmeter installation



Antenna beam irradiation surface parameter value (1 meter)

name	length （m）
tachometer A	0.248
tachometer B	0.68
Water level gauge diameter D	0.115

1. The two diagrams above illustrate the beam angles and illumination positions of the flowmeters 'radars for measuring water level and flow velocity. The water-level measurement radar emits a vertical beam with a 6° angle, while the flow velocity radar projects a tilted beam at 45°, covering a 10° ×27° area. During installation, ensure there are no obstructions within the radar

beam's effective range.

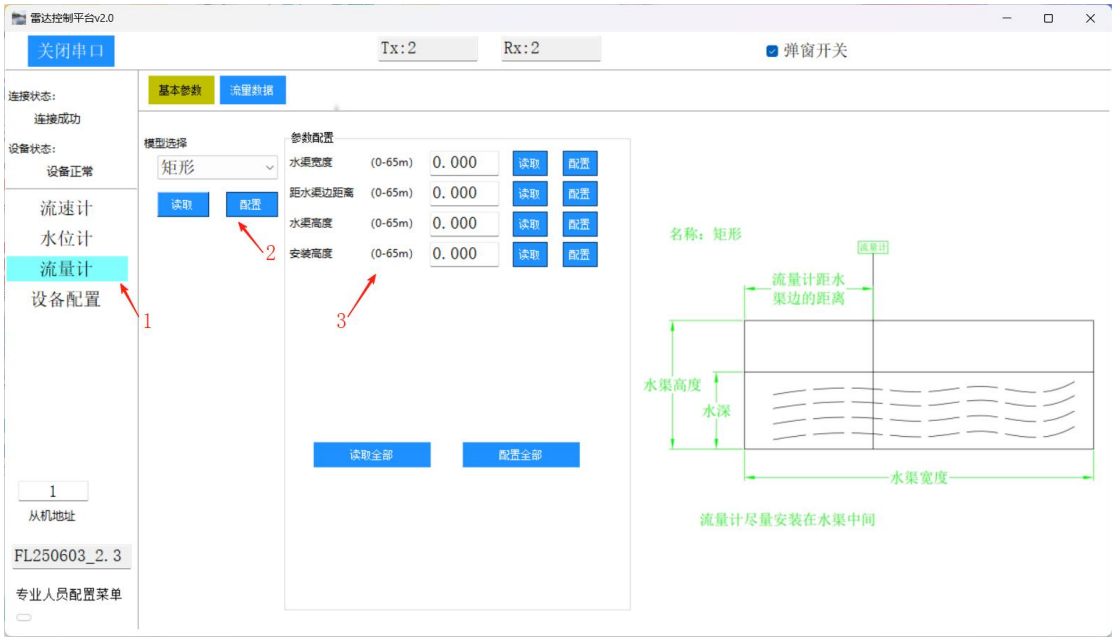
2. When installing the flow meter, install it in the reverse direction of the flow. This configuration yields clearer measurement signals and more accurate readings compared to the forward flow setup. If the measured water flow is exclusively in the reverse direction, set the "Flow Measurement Direction" parameter on the flow measurement radar to "Reverse Flow". This installation and configuration not only ensures clearer and more precise measurement signals but also minimizes interference from rain, snow, and other environmental factors.

3.PC Host Usage Guide

1. Open the host computer, select the corresponding device, choose the corresponding port baud rate, and enter the host computer. For example, see the figure below.



2. Select the flowmeter. Set the cross section parameters according to the river channel.



3. After setting the cross-section parameters, read the measured values.



[Speed range] See the table below for details.

Parameter Name	velocity range
Parameter range (m/s)	0~66
Windows default （m/s）	16.5

Option details	Choosing the appropriate range helps improve the measurement accuracy. When the water flow speed exceeds the optimal measurement range of the corresponding range, the measurement accuracy decreases slightly, but it does not affect the overall use. Generally, 16.5m/s is the default range, which is the most widely applicable.
Special matters	This parameter does not refer to the instrument's far-end or near-end measurement limits, but is used to define the algorithm area.

[Uniform Speed Count] See the table below for details.

Parameter Name	Average speed
Parameter range	2~50
Windows default	20
Option details	The number of real-time measurement speeds accumulated when calculating the average measurement speed using the moving average algorithm. The larger this value is, the more stable the average measurement speed is. The larger this value is, the more resistant to interference.
Special matters	When there is no water flow and the test environment is noise, the measured real-time speed varies greatly. When this value is set to a larger value, the average measured speed is easier to maintain 0 when there is no water or the water does not flow.

See the table below for the specific meaning of the offset slope K value.

Parameter Name	Offset slope K value
Parameter range	1~5
Windows default	1
Option details	A compensation value for instantaneous flow velocity correction.
Special matters	The K value is a multiple relationship.

See the table below for the specific meaning of the [Offset Slope B Value].

Parameter Name	Offset slope B value
Parameter range (m/s)	-3~+3
Windows default （m/s）	0
Option details	A compensation value for instantaneous flow velocity correction.
Special matters	The B value is a plus-minus relationship.

[Rain interference] See the table below for details.

Parameter Name	Rainy Day Interference
Parameter range	Turn on/off
Windows default	open
Option details	When the rain interference option is enabled, the impact of rain on downstream measurement can be greatly reduced (rain does not affect upstream measurement).
Special matters	Enabled by default.

[Energy saving mode] See the table below for details.

Parameter Name	Energy-saving mode
Parameter range	0~50
Windows default	0
Option details	After completing a measurement, the device can turn off part of the circuit to significantly reduce power consumption. Wait (set value * 5s) before turning on the circuit for measurement.
Special matters	The default value is 0, which does not save energy.

[Measurement Direction] See the table below for details.

Parameter Name	Measurement direction
Parameter range	Uncertain/With the current/Against the current
Windows default	indeterminacy
Option details	When you select "Uncertain", the device automatically determines the direction of flow of the measured liquid. When you select "Withflow", the device only measures the object or liquid moving in the direction of flow, so that the object or liquid moving in the direction of flow will not interfere with the measurement.
Special matters	Install in the reverse direction first.

[Range Setting] See the table below for details.

Parameter Name	Range setting
Parameter range	0-65 meters
Windows default	31 meters
Option details	Read and set the range of the water level gauge in the flowmeter. When setting, the lower adjustment should be 1 meter larger than the lower adjustment.
Special matters	The setting should be adjusted 1 meter larger than the lower position.

[Low-level adjustment] See the table below for the specific meaning.

Parameter Name	Lower adjustment
Parameter range	0-65 meters
Windows default	30 meters
Option details	The read and set low adjustment of the water level gauge in the flowmeter can be understood as the installation height.
Special matters	The lower adjustment of the water level gauge = water depth + air height, where air height is the distance between the water surface measured by the water level gauge and the flowmeter.

[High-level adjustment] See the table below for the specific meaning.

Parameter Name	Top adjustment
Parameter range	0-65 meters
Windows default	0 meters

Option details	This feature is reserved and does not require setup.
Special matters	This feature is reserved and does not require setup.

[Blind Spot Range] See the table below for details.

Parameter Name	Blind spot range
Parameter range	0-65 meters
Windows default	0.2 meters
Option details	Read and set the blind zone range of the flowmeter's water level gauge.
Special matters	Set the number of meters from the probe down to the range where no object is measured.

[Distance Offset] See the table below for details.

Parameter Name	Distance Offset
Parameter range	-10 to 10 meters
Windows default	-0.06 meters
Option details	Set the distance offset to correct the deviation between the ideal and actual measurements.
Special matters	Factory calibration is good and no changes are needed.

4. Installation

I Installation Requirements

1. Requirements for water flow conditions

- Select straight channels/rivers with regular cross-sections and hardened surfaces;
- Installation is prohibited in the following areas: sharp bends, downstream of gates, waterfalls, rock piles, sewage outlets, and vortex recirculation zones.
- There are no extensive underwater aquatic plants or mud protrusions; avoid the beam striking debris.

2. Strict requirement for unobstructed beam coverage

- Radar waves cannot penetrate channel walls, railings, tree branches, or floating objects.
- The maximum water level during the flood season must be at least 0.5 m above the equipment bottom to prevent spray from submerging the sensor.

3. Avoid electromagnetic interference

- Keep away from high-voltage cables, frequency converters, water pump motors, and metal barriers to prevent microwave signal interference or drift.

II. Specifications for Installation Height and Angle

1. Installation Height (vertical distance from the probe to water surface)

- Recommendation: 1−8 m; higher distances result in weakened echoes and reduced accuracy.

2. Horizontal Installation

- The device comes with a bubble level; adjust it so the bubble is centered.

III. Installation Requirements for Braces and Foundations

1. Support material: Hot-dip galvanized steel pipe/304 stainless steel, rust-resistant and windproof;
2. Field pole installation: The concrete foundation depth shall be ≥0.8 m; in permafrost areas, install equipment only after 7 days of curing within the super-freezing layer.
3. Bridge wall mounting: Avoid expansion joints; secure with chemical anchors to prevent displacement due to wind or vibration.
4. Avoid slight movement of the stent, as vibration may cause continuous fluctuations in flow velocity data.

IV. Specifications for Electrical Systems, Lightning Protection, and Water Resistance

1. Power supply: Use dedicated power supply; sharing power with high-power pumps is prohibited.
2. Communication cable (RS485): A 0.75 mm^2 double-core shielded cable, with power and communication conduits routed separately in the same conduit; the shielding layer is grounded at one end.
3. Cable interface: Tighten the aviation connector, apply waterproof adhesive, and bend the cable downward into a drip bend to prevent rainwater from backflowing into the equipment;
4. Lightning protection grounding (must be installed outdoors)
The support frame, flowmeter housing, and RTU terminal are all connected to a common ground.

V. Key Points for Commissioning and Inspection After Installation

1. After power-on, verify that the voltage is normal and no error alarms are detected;
2. Check the echo signal strength; if weak, fine-tune the height/angle;
3. Input section parameters of the channel (width, distance from the canal bank, cross-sectional shape, etc.);
4. Compare and calibrate the flow rate using a manual flowmeter, then make corrections to the instrument;
5. Set sampling intervals: 1 minute per cycle for flood control, and 5 minutes per cycle for routine monitoring.

VI. Common Errors and Prohibited Operations

1. The radar beam strikes the canal wall and rocks along the bank at an angle;
2. The viewing angle is tilted, the bracket is unstable, and the water level during flood season exceeds the equipment height;
3. The cable is suspended without any fixation, and there are no waterproof droplets or bends;
4. Installed in areas with turbulence, downstream of gates, at bends, at discharge outlets, in drop zones, in recirculation zones, or where obstacles are present below;
5. Not grounded, and routed in the same conduit as power cables.

PROHIBITED INSTALLATION AREAS

