

RK400-07 Tipping Bucket Rainfall Sensor User Manual



Revision Time	Reviser	Current Version	Remarks
20250822	LI	V5.0	

User Notice

Please read this manual carefully before use to ensure safe and optimal operation. Retain this manual for future reference.

Pre-Use Instructions

- Carefully review this manual and follow all operational and safety guidelines to prevent malfunctions and hazards.

Unpacking Inspection

- Upon receipt, carefully inspect the sensor device and accessories for any shipping damage.
- If damage is detected:
- Immediately notify the manufacturer and distributor.
- Retain all packaging materials for return or replacement processing.

Parts List

Item	Quantity	Remarks
Rainfall sensor	1	
Cable	1	The length depends on the order
Expansion screws	3	
Filter	1	
Bird spikes	1	Optional

1. Product Introduction

The RK400-07 Tipping Bucket Rainfall Sensor is an instrument designed to measure rainfall in natural environments. To meet the requirements of information transmission, processing, recording, and display, rainfall is converted into pulse output. This sensor is widely used in weather stations, hydrometric stations, agriculture, forestry, defense, and field monitoring stations. It provides essential data for flood prevention, water supply systems, and reservoir water management in plants.

2. Product Features

- Compact size for easy installation and use
- High accuracy and excellent stability
- Optional filter available
- Precision-engineered tipping bucket with low resistance
- Horizontal bubble level at the base for proper alignment
- Rain collector with a filter to prevent leaves and debris from clogging the opening

3. Specifications

Item	Technical Specification
Rainfall Collector	φ200mm,40-45°
Measured Rainfall Intensity	Max: 4mm/min
Allow Rainfall Intensity	Max: 10mm/min
Resolution	0.5mm
Accuracy(2mm/min)	±4%(Indoor static test, rain intensity of 2mm/min)
Maximum Load Voltage	30VDC(pulse output)
Maximum Load Current	20mA(pulse output)
Output	Reed switch pulses,RS485(12-24VDC supply)
Operating Temperature(No freeze)	0-70℃
Main Material	Collector:304SS,tipping bucket:ABS
Tipping Bucket	Single
Collector Filter	Removable filter (Prevent leaves and sundries)
Bird Spikes	Optional
Heating(Optional)	200W@220V
Weight(Unpacked)	3.5kg

4. Electrical Connections

Connector(Cable)	RS485	Connector(Cable)	Pulse
Red	V+	Brown	Signal_A
Black	V-	Blue	Signal_B
Yellow	RS485A		
Green	RS485B		

5. Product Dimensions and Installation Instructions

Unit:mm

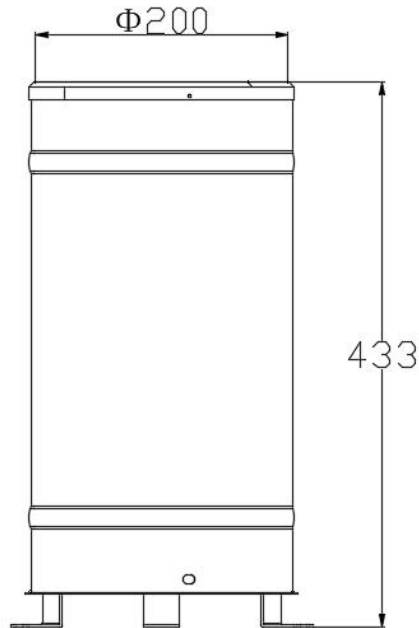


Figure 5.1
Side View with Dimensional Details

5.1 Installation Method

- 1) loosen the three fixed screw at bottom of the rain collector, then remove the collector.
- 2) Keep product horizontal by adjusting three screws on product.
- 3) Take down the fixed rubber band, reinstall the collector and then connect the cable to work normally.

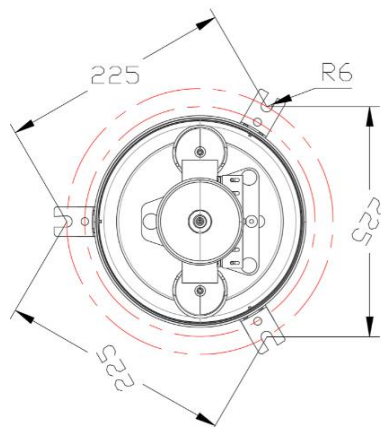


Figure 5.1.1
Bottom View with Dimensional Details

6. Communication Protocol(MODBUS-RTU)

Parameter	Value
Data Bits	8 bits
Check Bit	None
Stop Bit	1 bit
Baud Rate	9600 bps
Slave Address	0x01 (Factory Default)

6.1 Read Real-time Data

Client sends:

01 03 00 00 00 01 840A

Return:

01 03 02 00 04 B987

6.1.1 Description of Return Data Format

No.	Conception	Byte Number	Description	Remarks
1	Address block	1	Address(0x01)	0x01
2	Function code	1	Only read(0x03)	0x03
3	Number of bytes	1	0X02	2bytes
4	Data block	2	Rainfall	0x0004(2mm)
5	Check block	2		0xB9 0x87

6.2 Modify Slave Address(Address setting range: 00H to FDH)

Client sends: (Change slave address from 01H to 02H.)

Slave id	Function code	Address_H	Address_L	New id_H	New id_L	CRC_L	CRC_H
0x01	0x06	0x00	0x00	0x00	0x02	0x08	0x0B

Response:

Slave id	Function code	Address_H	Address_L	New id_H	New id_L	CRC_L	CRC_H
0x01	0x06	0x00	0x00	0x00	0x02	0x08	0x0B

Note:If you forget the original address, you should use the broadcast address(FEH) (ensure that no other devices on the bus at this time).

6.3 Clear The Rainfall Value(Restart the sensor can also be clear)

Client sends:

Slave id	Function code	Address_H	Address_L	New id_H	New id_L	CRC_L	CRC_H
0x01	0x06	0x00	0x08	0x00	0x00	0x08	0x08

Response:

Slave id	Function code	Address_H	Address_L	New id_H	New id_L	CRC_L	CRC_H
0x01	0x06	0x00	0x08	0x00	0x00	0x08	0x08

7. Working Process

Rainfall is captured in the 200mm diameter collector funnel and is directed through a delivery pipe to fill a divided ABS injection molded tipping bucket device. The bucket is pivoted through its center and has a preset calibration to tip for 0.2 mm of rainfall. When the bucket is “full”, it pivots and empties - this action magnetically closes and opens a reed switch, sending a pulse signal to the data logger or electronic counter. Through this tipping “seesaw” action, the other side of the bucket is aligned to receive the flow from the delivery pipe. This recording and tipping cycle continues with rainfall.

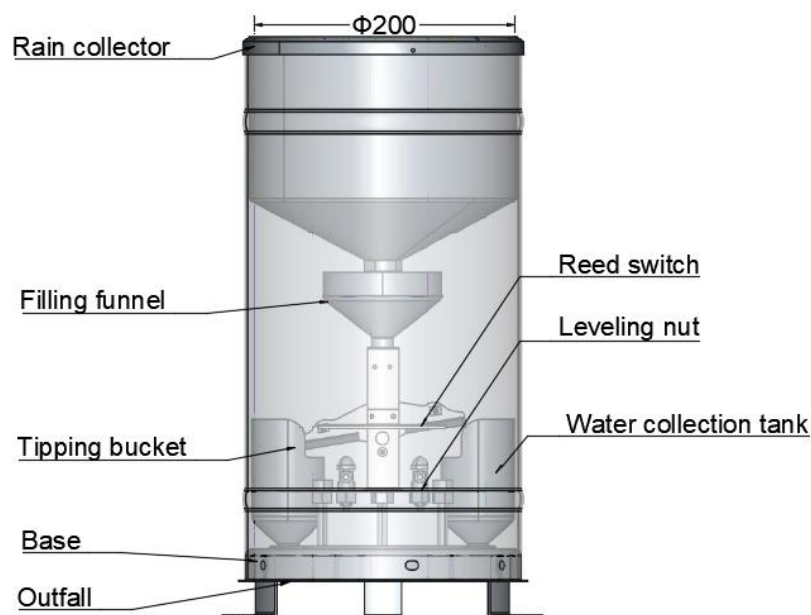


Figure 7.1
Internal Structure Diagram

8. Precautions

Package and Model Verification

- Ensure the packaging is intact and verify the sensor model and specifications match your purchased product.

Powered Wiring Prohibition

- Do not connect wires while powered. Only energize the sensor after confirming correct wiring.

Component Modification Restriction

- Do not alter factory-soldered components or pre-connected wires.

Installation Precautions

- Sensors should be installed in open and flat areas, away from obstacles such as buildings, trees, walls, etc.
- Accurate leveling must be achieved using a spirit level during installation.

Prevent Blockage

- Regularly inspect and clean the entrance of the funnel to prevent it from being blocked by leaves, insects, etc., which may prevent rainwater from flowing in.

Precision Handling Requirement

The sensor is a precision device. Avoid:

- Unauthorized disassembly
- Structural components are strictly prohibited from being compressed under stress

Note: Unauthorized modifications void the warranty.

9. Troubleshooting

Incorrect Output Signals (Analog/RS232/RS485):

- Verify wiring correctness and secure connections.
- Check if the serial port is occupied or malfunctioning.
- Confirm serial port settings (baud rate, data/stop bits) match device requirements.

Persistent Issues:

- Contact the manufacturer if the above steps fail to resolve the problem.

10. Product Maintenance

Maintenance and Safety

- Regularly clean and inspect the sensor to maintain performance.
- Do not expose the sensor to extreme temperatures, moisture, or corrosive substances unless explicitly specified.
- Unauthorized disassembly, modification, or repairs may void the warranty and lead to malfunctions.

Troubleshooting Protocol

- In case of malfunction, refer to the troubleshooting section of this manual.
- Do not attempt unauthorized disassembly or repairs.
- Contact the manufacturer's after-sales department directly for technical support.

11. Warranty Terms

This product comes with a one-year warranty, starting from the date of delivery. Within twelve months, the Company shall be responsible for free repair or replacement of any failure caused by sensor quality issues (non-human damage). Fees will be charged for repairs or replacements after the warranty period expires.

 Complies with applicable CE directives.

Manual subject to change without notice.

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