



Rain Gauges Introduce

ABS type



Resolution : 0.2/0.5MM

Type NO.: RD-RGPBR

1. Product Description

The RD-RGPBR rain sensor is used to measure the rainfall on the ground. The rainfall flows into the tipping bucket through a receiver. When a certain amount of rainwater flows into the tipping bucket, the tipping bucket flips, emptying the rainwater in the tipping bucket, and the tipping bucket starts to receive water again. The second flipping action is converted into a pulse signal through the reed pipe and transmitted to the acquisition system. This instrument is suitable for equipping the national basic rain gauge station, encrypted automatic weather (rain gauge station) and telemetering station under various climatic and environmental conditions in various places, to complete the automatic measurement and data collection of the precipitation process.

2. Scope of application

It can be used in meteorological stations, hydrological stations, agriculture and forestry, national defense, field surveying stations and other related departments to measure precipitation, precipitation intensity and precipitation time with the rainfall recorders independently developed by our company. It can provide raw data for flood control, water supply dispatching, and water management of power station reservoirs.

3. Technical indicators

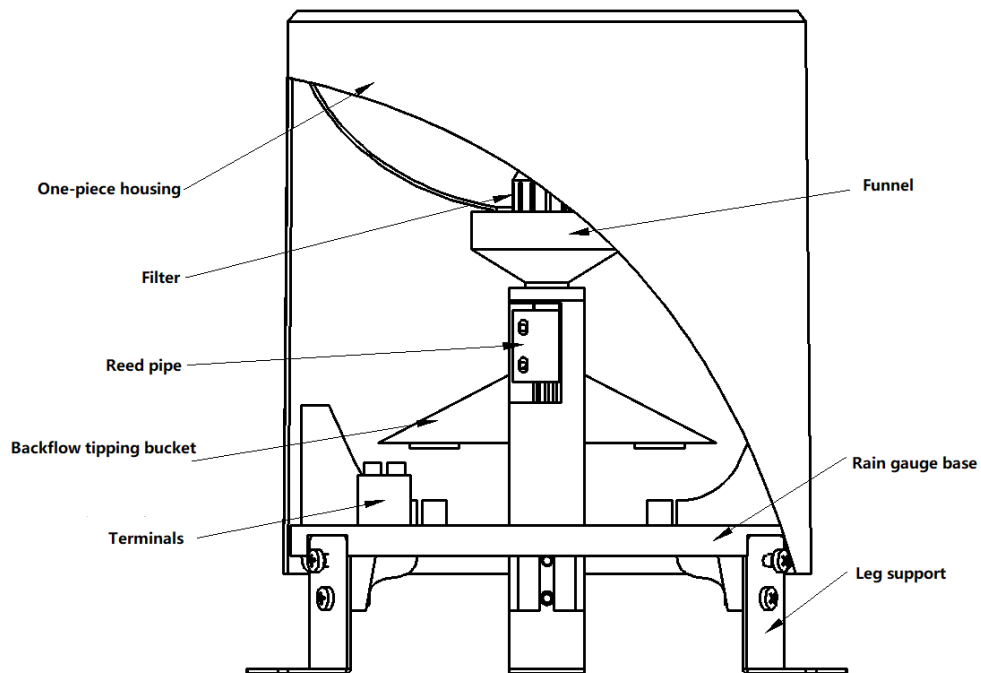
Rain inlet size	Φ200mm
Sharp edge	40~45°
Resolution	0.2mm/0.5mm (Optional)
Rain intensity range	0mm~4mm/min Maximum rain intensity allowed to pass 8mm/min
Measurement accuracy	≤±2%
Output signal	RS485 output
Way of sending	Two-way reed switch on and off signal output
Working environment	<80% (no condensation)
Relative humidity	-40~125° C
Withstand voltage	≤100V
Withstand current	≤0.5A

4. Working Principle

As shown in the figure, this instrument consists of an integrated shell, filter, funnel, reverse flow dumper, terminal block, leg bracket, reed switch, rain gauge base, etc. Among them, a tipping bucket shaft, a round horizontal bubble, a reed switch bracket and a signal output terminal are installed on the rain gauge base. Unlike other tipping bucket rain gauges, the tipping bucket sleeve of this instrument is an integrated positioning structure, and the tipping bucket is installed in the shaft bearing through the tipping bucket shaft. On-site installation brings convenience.

The tipping bucket of this instrument is a three-dimensional streamlined design, and is designed with a drooping arc surface guide tip, which has a beautiful and smooth appearance, better tipping performance, and easy cleaning and maintenance.

The tipping bucket of this instrument is equipped with a constant magnet steel, and the reed switch holder is equipped with a reed switch. When the instrument leaves the factory, both the magnet and the reed switch have been adjusted at an appropriate coupling distance, so that the output signal of the instrument and the number of flipping buckets have a definite ratio relationship.



5. Product model

RD-				Company name	
	RG-			Rain gauge	
		PB-		Black ABS material	
			P	Pulse output	
			R	RS485 output	
				02	0.2mm
				05	0.5mm

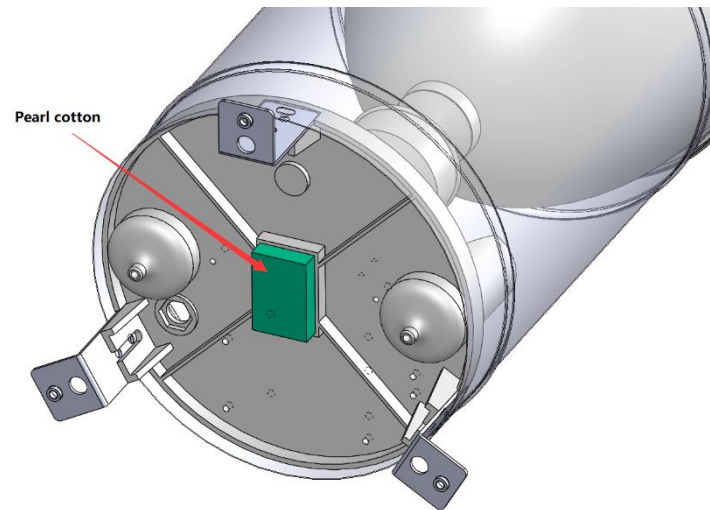
6. Product appearance and size



7. Installation

1. Check the appearance of the instrument for damage, especially check whether the tipping bucket is intact, and pay attention to properly placing the tipping bucket to prevent damage to the tip of the tipping bucket shaft and the arc-shaped water tip at both ends of the tipping bucket, and do not touch the inner wall of the tipping bucket with your fingers. Avoid fouling the tipping bucket to damage the accuracy of the instrument.
2. Unscrew the three screws at the bottom of the equipment, take the stainless steel outer tube, cut off the cable tie that fixes the tipping bucket, and then install the outer tube. The preparation is complete.
3. Take out the pearl cotton block at the bottom of the instrument, and then install the matching block to

the bottom of the instrument.

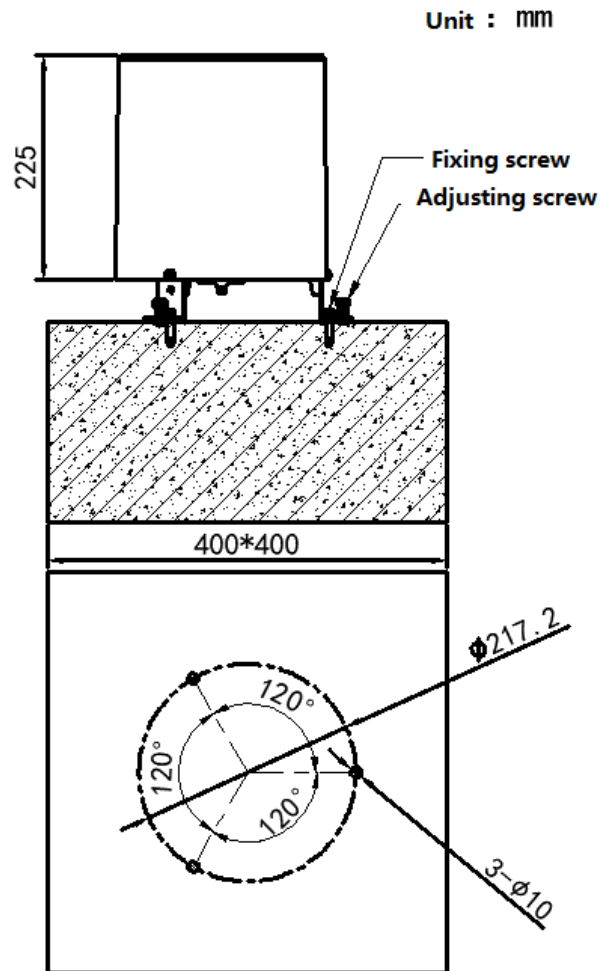


4. Production and installation base

As shown in the figure: when installing the outdoor ground and roof, the cement installation foundation should be made according to the size and requirements of the figure below, and the plane of the cement foundation should be horizontal. The size of the cement installation foundation is generally a 40cm×40cm square base with a height of not less than 30cm or a circular base with a diameter of 40cm. It is required that the distance between the height of the rain-bearing opening of the instrument and the ground level is 70cm, and that no shelters higher than the rain-bearing opening of the instrument are allowed within 3 to 5 meters around the opening of the instrument.

5. Install fixed instruments and adjust the level of the rain-bearing outlet

Drill 3 mounting holes with a depth of 8-10cm in diameter 10 on the cement foundation according to the size shown in the figure below, place the expansion bolts in the mounting holes, lock them with lock nuts, and then install the instrument base on the 3 height-adjusting support nuts. Adjust the height of the support nut and measure whether the ring mouth is in a horizontal state with a level, and finally fix the instrument with the upper lock.



8. Simulated precipitation experiment

This instrument has been subjected to artificial precipitation simulation precipitation tests before leaving the factory, and the relationship curve between rain intensity and accuracy shown in Figure 6 has been compiled according to the factory inspection records for users' reference. After the indoor installation is completed, the user generally does not need to perform artificial precipitation simulation tests, and can be directly installed and used outdoors.

If the measurement accuracy of the instrument is found to be out of tolerance during the operation of the instrument, the artificial precipitation test should be performed again and the

instrument should be re-adjusted. The method is as follows:

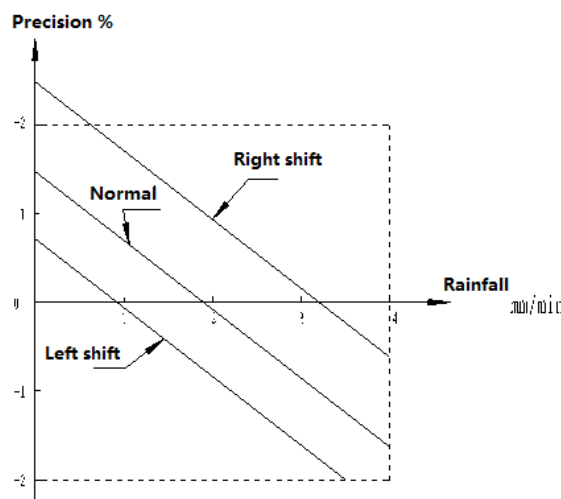
A: Test tools: 1 special rain gauge, 1 small dropper;

B: Check before the test

Before the test, remove the stainless steel outer cylinder to check whether the horizontal bubble of the instrument is in the center, whether the tipping bucket is flexible and free from jamming, and whether the waterway is unblocked, and then fully wet the rain-bearing port and the water diversion funnel with clean water;

C: Water injection test

Use the two-speed drip method to check the accuracy of the instrument measurement, the method is: Use a special rain measuring cylinder to measure 10mm of clear water, and slowly pour it into the tipping bucket through the water diversion funnel. When the tipping bucket is about to be turned over, stop the water injection, and then use a dropper to suck up some clear water in the measuring cylinder, drop by drop into the tipping bucket until the tipping bucket is turned over, Repeated tests in turn, record the number of tipping bucket flips and water consumption; if the tipping bucket flips 20 times and the water consumption is 9.7~9.85mm, it can be deemed that the base point of the tipping angle of the instrument is normal and does not need to be adjusted; when the pouring volume > 9.85mm, it is indicated that the tilt angle of the tipping bucket is too large and the curve moves to the left, the height of the adjustment screw should be appropriately increased; when the pouring volume is less than 9.7mm, it means that the tilt angle of the tipping bucket is too small and the curve moves to the right, and the height of the adjustment screw should be appropriately lowered; generally speaking, the left and right adjustment screws should be rotated each One lap can change the accuracy by about 3 to 4%.



9. 1. RS485 signal (default address 01):

Standard Modbus-RTU protocol, baud rate: 9600; check digit: none; data bit: 8; stop bit: 1

2. Register address

Register address	Content	Operation (hexadecimal)	Scope content and definition
0000H	Rainfall value	03/06	The rainfall value is 10 times larger than the actual value
07D0H	Device address	03/06	1~254 (factory default 1)
07D1H	Device baud rate	03/06	0 is 2400 1 is 4800 2 is 9600

3. Modbus instruction example

(1) Modify the address, for example: change the address of the transmitter with address 1 to 2, host → slave

Original address	Function code	Register address low	Register address high	New address low	New address high	CRC16 low	CRC16 high
0X01	0X06	0X07	0XD0	0X00	0X02	0X08	0X86

If success, the slave will send: 01 06 07 D0 00 02 08 86

(2). Query data

Query the current accumulated rainfall value, which refers to the accumulated rainfall value since power-on, host → slave

Address	Function code	Start register address high	Start register address low	Register length high	Register length low	CRC16 low	CRC16 high
0X01	0X03	0X00	0X00	0X00	0X01	0X84	0X0A

Send back:

Address	Function code	Returns the number of valid bytes	Rainfall value		CRC16 low	CRC16 high
0X01	0X03	0X02	0X00	0X0A	0X38	0X43

Current rainfall value: (Uploaded value is expanded by 10 times)

000A (hexadecimal system) = 10 (decimal system) → rainfall value: 1.0mm

(3) Clear rainfall data

Host → slave

Address	Function code	Start register address high	Start register address low	Register length high	Register length low	CRC16 low	CRC16 high
0X01	0X06	0X00	0X00	0X00	0X5A	0X09	0XF1

If success, it will feedback:01 06 00 00 00 5A 09 F1

(4) Modify the Baud rate

For example, change the 4800 to 9600, Host → slave

Address	Function code	Start register address high	Start register address low	Modify value high	Modify value low	CRC16 low	CRC16 high
0X01	0X06	0X07	0XD1	0X00	0X02	0X59	0X46

If success, it will feedback:01 06 07 D1 00 02 59 46

(5) Inquiry the sensor address

When the address is forgotten, the following function codes can be used to query the address.

Host → slave

Address	Function code	Start register address high	Start register address low	Register length high	Register length low	CRC16 low	CRC16 high
0XFF	0X03	0X07	0XD0	0X00	0X01	0X91	0X59

Feedback:

Address	Function code	Returns the number of valid bytes	Address low	Address high	CRC16 low	CRC16 high
0XFF	0X03	0X02	0X00	0X01	0X50	0X50

So the present sensor address is 01.

10. Daily maintenance and maintenance

1. The instrument has been outdoors for a long time and the operating environment is very harsh. Therefore, the inner wall of the rain-bearing port of the instrument should be wiped with a soft cloth frequently to keep the rain-bearing port clean. When the instrument is not in use for a long time, a cover should be placed on the ring mouth of the instrument to protect the rain-bearing mouth; the instrument must be cleaned once a month for long-term operation, and must be cleaned once every three months;

2. The tipping bucket is a key component of the instrument, which directly affects the measurement accuracy of the instrument. Over time, a little dust or oil will be deposited on the inner wall of the tipping bucket. Therefore, the tipping bucket should be cleaned. When cleaning, the inner wall of the tipping bucket can be repeatedly rinsed with clean water or gently brushed with a degreasing brush. It is strictly forbidden to scrub the inner wall of the tipping bucket with hands or other objects.