HONDE TECHNOLOGY CO.,LTD

Stainless steel rainfall sensor

(Type 485/Pulse)

RD-RG-S-0.5/0.2-RP

https://hondetec.en.alibaba.com/

1.Product Overview

This instrument is a primary instrument for precipitation measurement, and its performance meets the requirements of national standard "Precipitation Observation Requirements".

The core part of this instrument, the tipping bucket, adopts three-dimensional streamlined design, which makes the tipping bucket turn over water more smoothly, and has the functions of self-cleaning dust and easy cleaning. Pulse to 485 signal output, rainfall can be read directly, without secondary calculation, which is simple and convenient.

2. Functional characteristics

As shown in Fig. 1, this instrument consists of rain gauge shell, rain collector, funnel, tipping bucket support, tipping bucket, bearing screw, water outlet bin, sealing joint, reed tube, horizontal bubble, adjusting support plate, control box, leveling device, wiring terminal, leg bracket, rain gauge base, etc. Wherein, the rain gauge base is provided with a tipping bucket shaft, a round horizontal bubble, a reed tube bracket and a signal output terminal. Different from other tipping bucket rain gauges, the tipping bucket shaft sleeve of this instrument is an integrated positioning structure, and the tipping bucket is installed in the shaft bearing through the tipping bucket shaft. The internal structure of this instrument is assembled when it leaves the factory, and the field installation of the internal structure is unnecessary, which brings convenience to the field installation.

The tipping bucket of this instrument is of three-dimensional streamlined design, and is designed with a drooping cambered diversion tip, which is beautiful and smooth in shape, better in turning water performance and easy to clean and maintain.

Constant magnetic steel is installed on the tipping bucket of this instrument, and reed tube is installed on the reed tube support. When the instrument leaves the factory, the magnetic steel and reed tube have been adjusted at a suitable coupling distance, so that the output signal of the instrument has a certain proportional relationship with the tipping times of the tipping bucket.

When the instrument leaves the factory, the tilt angle adjusting screw of the tipping bucket has been locked at the best tilt angle base point position and the tilt angle screw has been painted with red paint. When the user installs the instrument on site, he only needs to adjust the horizontal bubble to the center position of the whole instrument according to the relevant requirements of this manual, and can put into use without

adjusting the tilt angle of the tipping bucket on site.

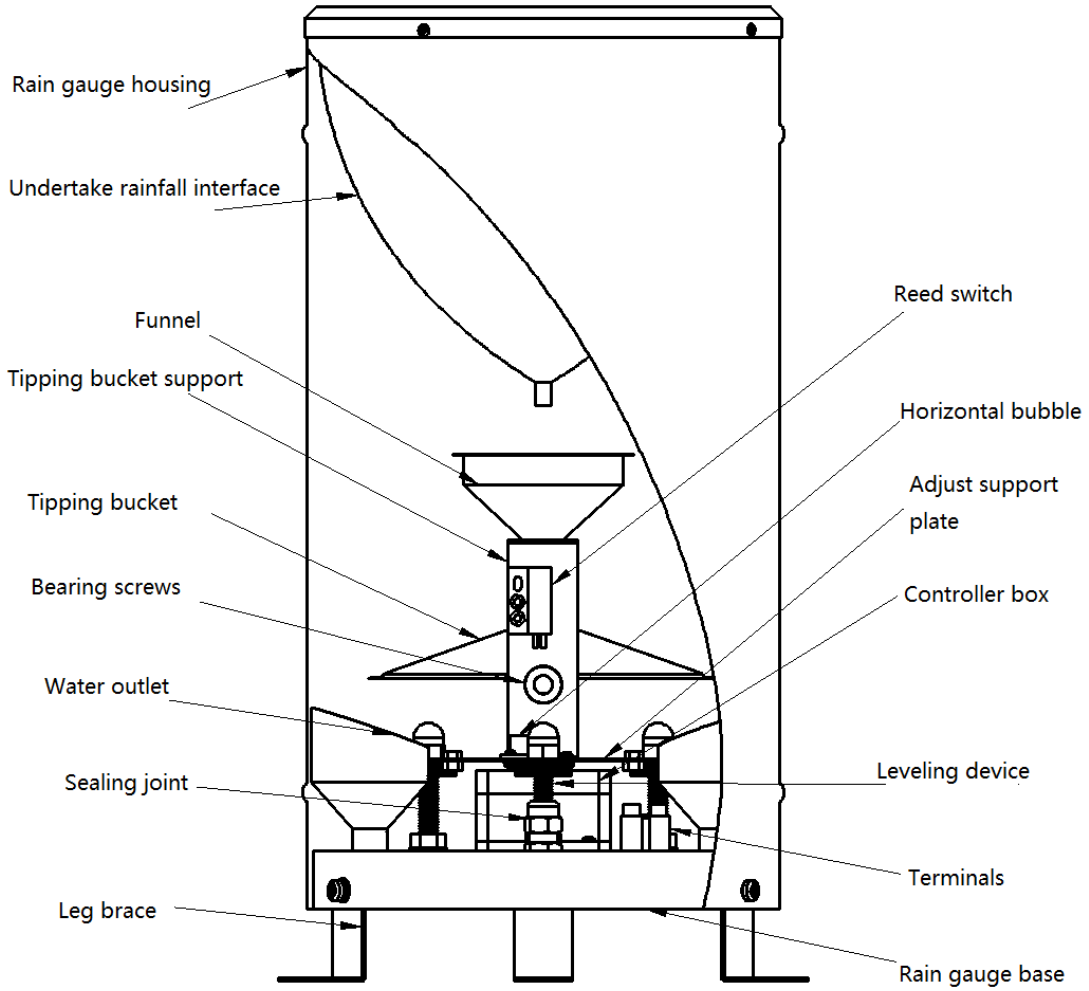

Figure 1

3. Main technical indicators

1. Rain bearing diameter: φ 200 mm;;

2. Acute angle of cutting edge: 40 ~ 45

3. Resolution: 0.2 mm/ 0.5 mm (Optional)

4.Measurement accuracy: ≤ 3% (indoor artificial precipitation, subject to the displacement of the instrument itself)

5. Rain intensity range: 0mm ~ 4mm/min (the maximum allowable rain intensity is 8mm/min)

6. Communication mode: 485 communication (standard MODBUS-RTU protocol)/Pulse

7. Power supply range: 4.5 ~ 30V Maximum power consumption: 0.24 W operating environment:

8. Ambient temperature: 0 ~ 50 ℃ Relative humidity: < 95% (40 ℃)

4. Pre-installation inspection of equipment

1. Take the instrument out of the packing box, check it carefully against the packing list in the instruction manual, and check whether the equipment accessories are complete.

2. Read the product instruction manual and product certificate carefully.

3. Check whether the appearance of the instrument is damaged, especially whether the tipping bucket is in good condition, and pay attention to properly placing the tipping bucket to prevent bumping the shaft tip of the tipping bucket shaft and the arc-shaped water diversion tips at both ends of the tipping bucket, and do not touch the inner wall of the tipping bucket with fingers to avoid fouling the tipping bucket and damaging the accuracy of the instrument.

4. Unscrew the three screws at the bottom of the equipment, take the stainless steel outer cylinder, cut off the tie that fixes the tipping bucket, and then install the outer cylinder to complete the preparation.

5. Interface Description

The power supply interface is a wide voltage power supply input of 4.5-30V. When connecting 485 signal lines, pay attention to the fact that two lines A\ B cannot be connected in reverse, and the addresses among multiple devices on the bus cannot conflict.

Line color	Description	Line color	Description
Brown thread	Positive power supply	Yellow line	485A
Black line	Power negative	Blue line	485B

6. Outdoor installation and commissioning

1. Fabrication and installation foundation

Outdoor ground and roof installation, should be in accordance with the size and requirements of Figure 2, cement installation foundation, cement foundation plane should be horizontal. The size of cement installation foundation is generally a square base of 40cm × 40cm 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 port of the instrument and the ground plane should be 70cm, and no shelter higher than the rain-bearing port of the instrument should be allowed within 3 ~ 5 meters around the mouth of the instrument.

2. Install fixed instruments and adjust the level of rain socket

According to the dimensions in Fig. 2, punch three installation holes with a depth of 8 ~ 10cm in φ 10 on the cement foundation, place the expansion bolt in the installation hole, lock it with a locking nut, then install the instrument base on three height-adjusting support nuts, measure whether the ring mouth is in a horizontal state by adjusting the height of the support nuts and using a level ruler, and finally fix the instrument with a locking.

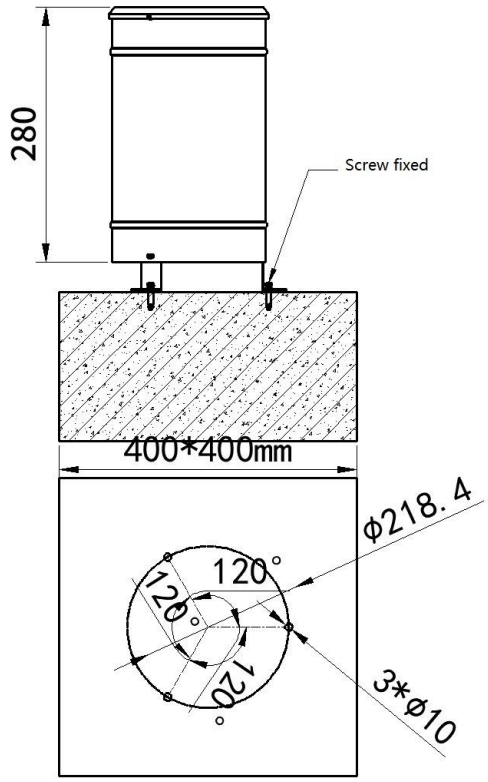

Figure 2

7. Communication Protocols

1. Basic Communication Parameters

Code	8-bit binary
Data bit	8-bit
Parity bit	None
Stop bit	1-bit
Error check	CRC (Redundant Cyclic Code)
Baud rate	2400bit/s, 4800bit/s and 9600 bit/s can be set, and the factory default is 4800bit/s

2. Data Frame Format Definition

Modbus-RTU communication protocol is adopted, and the format is as follows:

Time of initial structure ≥ 4 bytes

Address code = 1 byte

Function code = 1 byte

Data area = N bytes

Error check = 16-bit CRC code

End the time of structure ≥ 4 bytes

Address code: It is the address of the transmitter, which is unique in the communication network (factory default 0x01).

Function code: The host instruction function indication, this transmitter only uses the function code 0x03 (read register data).

Data area: Data area is specific communication data, pay attention to 16bits data high bytes in front!

CRC code: Two-byte check code.

Host query frame structure:

Address code	Function code	Register start address	Register length	Low bit of check code	High bit of check code
1 byte	1 byte	2 bytes	2 bytes	1 byte	1 byte

Slave response frame structure:

Address code	Function code	Number of valid bytes	Data area one	Second data area	Nth data area	Check code
1 byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes	2 bytes

3. 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	Equipment baud rate	03/06	0 for 2400 1 for 4800 2 for 9600

8. Communication Protocol Examples and Explanations

1. Query current rainfall value

Inquiry frame:

Address code	Function code	Start register	Data length	Low bit of check code	High bit of check code
0x01	0x03	0x00 0x00	0x00 0x01	0x84	0x0A

Answer frame:

Address code	Function code	Returns the number of valid bytes	Rainfall value	Low bit of check code	High bit of check code
0x01	0x03	0x02	0x00 0x0A	0x38	0x43

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

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

2. Clearing rainfall data

Inquiry frame:

Address code	Function code	Start register	Clear command	Low bit of check code	High bit of check code
0x01	0x06	0x00 0x00	0x00 0x5A	0X09	0XF1

Answer frame:

Address code	Function code	Start register	Clear command	Low bit of check code	High bit of check code
0x01	0x06	0x00 0x00	0x00 0x5A	0X09	0XF1

3. Modify current address

Interrogation frame: (If the current address is 01, the address to be modified is 02)

Address code	Function code	Start address	Modified value	Low bit of check code	High bit of check code
0x01	0x06	0x07 0xD0	0x00 0x02	0x08	0x86

Answer frame:

Address code	Function code	Start address	Modified value	Low bit of check code	High bit of check code
0x01	0x06	0x07 0xD0	0x00 0x02	0x08	0x86

4. Modify current baud rate

Inquiry frame: (If the current baud rate is 4800, it will be modified to 9600)

Address code	Function code	Start address	Modified value	Low bit of check code	High bit of check code
0x01	0x06	0x07 0xD1	0x00 0x02	0x59	0x46

Answer frame:

Address code	Function code	Start address	Modified value	Low bit of check code	High bit of check code
0x01	0x06	0x07 0xD1	0x00 0x02	0x59	0x46

5. Enquiry Address

When the user forgets the address, the following function code can be used to query the address. Inquiry frame:

Address code	Function code	Start address	Data length	Low bit of check code	High bit of check code
0xFF	0x03	0x07 0xD0	0x00 0x01	0x91	0x59

Answer frame

Address code	Function code	Returns the number of valid bytes	Address	Low bit of check code	High bit of check code
0xFF	0x03	0x02	0x00 0x01	0x50	0x50

The read address code is the real address of the device: 01

9. Maintenance and Maintenance

1. Daily Maintenance

This instrument has been outdoors for a long time, and its use environment is quite harsh. Therefore, the inner wall of the rain-bearing mouth of the instrument should be wiped with soft cloth frequently to keep the rain-bearing mouth clean. If foreign bodies such as leaves are found in the rain-bearing mouth, they should be cleaned in time to keep the waterway unblocked. When the instrument is not used for a long time, it should be covered with an upper cover to protect the rain bearing port;

Long-term work of instruments generally needs to be cleaned once a month and once every three months;

2. Cleaning of tipping bucket

The tipping bucket is the key component of this instrument, which directly affects the measurement accuracy of the instrument. Over time, the inner wall of the tipping bucket will deposit a little dust or oil pollution, so the tipping bucket should be cleaned. When cleaning, the inner wall of the tipping bucket can be washed repeatedly with clear water or brushed gently with degreasing brush. It is strictly forbidden to wash the inner wall of the tipping bucket by hand or other objects.

10. Frequently Asked Problems and Solutions

This paper lists the possible general fault phenomena, causes and troubleshooting methods of the instrument.

Manifestation form of central station	Rainfall sensor failure	Solution
You can't get a few when it rains	It shows that the rainfall sensor has no signal output or the transmission line is faulty Reed tube failure The distance between magnetic steel and reed tube is too far The bonding wire falls off or the signal wire is broken or the signal wire is connected backwards The tipping bucket is stuck Instrument blockage	Lower station inspection Replacement Adjustment Repair Exclude Clear
There is a big difference between the amount of rainfall received during rainfall and the specific rain gauge	The tilting base point of the rainfall sensor is out of balance, but the error is generally less than 10% The position of magnetic steel and reed tube is not good, which causes good and bad, so that some signals are missed	Re-titration adjustment base point Adjust distance The objective situation is so, the instrument is faultless
The central station keeps raining, but the actual situation is not raining	Check whether the socket is flooded, which often happens after heavy rain	Treat inlet water and reseal it

Note: In the above table, all the fault phenomena listed are not necessarily the fault of the rain gauge itself. After checking the fault of the instrument itself and troubleshooting, we should also check whether there are faults in the transmission line, data acquisition device and other equipment of the instrument, and troubleshoot them one by one.