## Product introduction

Piezoelectric rain gauge adopts piezoelectric ceramic kinetic energy rainfall monitoring, which can be identified according to the strength of raindrops falling and hitting. It can monitor from light rain to heavy rain, measure and calculate a single raindrop, and then calculate the rainfall.

Raindrops are affected by the weight of raindrops and air resistance during the falling process, and the speed when they reach the ground is a constant speed. According to P=mv, the weight of raindrops can be obtained by measuring the impact, and then the continuous rainfall can be obtained.

Piezoelectric rain gauges have no mechanical parts and are more rugged, sensitive and reliable than traditional rain gauges. The product is easy to install, the data is accurate, and it can accurately monitor heavy rain.

## Features

●Adopt industrial-grade 32-bit processor, with faster calculation speed and more stable performance;
●Arc-shaped design structure, anti-fouling and anti-sticking coating, self-cleaning, rainwater can be washed away immediately, no manual on-site maintenance is required;
●Integrated integrated design, small size, without any exposed parts;
●High data accuracy and reliable measurement;
●Small and light, strong structure, easy to carry and transport;
●No special requirements on the installation environment, no physical level required;
●On-site calibration is not required, and the measurement can be done after installation.

The sensor is suitable for rainfall measurement, agricultural irrigation, meteorological environment monitoring, meteorological disaster monitoring, automatic rain sensing system and other fields.

## Wiring method

| Line color | Definition |
|---|---|
| Red | + |
| Black | - |
| Yellow | 485+ |
| Blue | 485- |

## Technical Parameters

| | |
|---|---|
| Power supply | DC 12-24V |
| Output | RS485（MODBUS Protocol） |
| Range | 0～8mm/min |
| Accurac | ±4%（Daily cumulative rainfall） |

| | |
|---|---|
| Resolution | 0.01mm |
| Power consumption | The average current is less than 5mA（12V） |
| Working environment | -40℃～80℃，0～100%RH |
| IP rate | IP66 |
| Installation method | Pole fixing, integrated base installation box, pouring foundation, etc. |

## Installation

Choosing a suitable installation location is very important to the measurement of the sensor. In order not to affect the measurement accuracy of the sensor, please install it according to the following requirements.

1. The piezoelectric rain gauge adopts the top wire installation method, and the piezoelectric rain gauge must be installed on the top of the column to avoid up and down vibration when installed on the side arm. The rain sensor should be installed horizontally on a bracket more than 500mm away from the ground.

2. The rain sensor is installed in an open area with no shelter around it. (Avoid obstacles around the piezoelectric rain gauge to block the rain or splash back on the rain gauge, which will affect the rain gauge's monitoring of rainfall.)

3. The piezoelectric rain gauge should be installed away from the vibration source. (Around the installation of the instrument, try to avoid the construction site, which is prone to continuous vibration and noise.)

4. There must be no holes on the columns and brackets to avoid vibration caused by strong winds forming whistles.

5. Stay away from high-voltage towers, high-power radio transmission base stations or high-power electrical equipment that may already generate static electricity.

6. The signal and power cables should be routed reasonably, and should be arranged in the column tube as much as possible. The external cables must be bound and fixed, and there must be no hanging and shaking.

## MODBUS-RTU Communication protocol

1. Serial port format
Data bits: 8 bits
Stop bit: 1 or 2 bits
Check digit: none
Baud rate: 9600bps, the interval between two communications is more than 1000ms.
2. Communication format
【1】Read device address
Send → 00 20 CRC (4 bytes)
Return ←00 20 Address CRC (5 bytes)
Example: send 00 20 00 68
return 00 20 01 A9 C0
【2】Write device address
Send → 00 10 Address CRC (5 bytes)
Return ←00 10 CRC (4 bytes)
Note: 1. The address bit of the read/write address command must be 00.

2. Address is 1 byte, the range is 0-255.
Example: send 00 10 01 BD C0
return 00 10 00 7C
【3】Read rainfall data
Send→Address 03 00 00 00 01 CRC
Description: As shown in the figure below:

| Code | Bytes | Meaning | Description |
|---|---|---|---|
| Address | 1 | Device Address | Device Unique Address 0-255 |
| 03 | 1 | opcode | Fixed value 0x03 |
| 00 00 | 2 | Register start number | First register number read |
| 00 01 | 2 | Read the number of registers | Read 1 parameter |
| CRC16 | 2 | CRC16 Check | Low Front High Back |

Return ←Address 03 02 **00 02** CRC
(Return data 00 02, resolution 0.01, that is, the rainfall is 0.02mm)
【4】Modify device read mode
Send→Address 06 00 09 00 00 CRC
Set to rain accumulation output mode.
Send→Address 06 00 09 00 01 CRC
Set to rain reading zero clearing mode.
【5】Manually clear rainfall data
Send→Address 06 00 08 00 00 CRC
Back←Address 06 00 08 00 00 CRC

Attachment: Steps to calculate CRC code:

1. The preset 16-bit register is hexadecimal FFFF (that is, all 1). Call this register the CRC register;
2. XOR the first 8-bit data with the low bit of the 16-bit CRC register, and put the result in the CRC register;
3. Shift the content of the register to the right by one bit (towards the lower bit), fill the highest bit with 0, and check the lowest bit;
4. If the lowest bit is 0: repeat step 3 (shift again)
If the lowest bit is 1: XOR the CRC register with the polynomial A001 (1010 0000 0000 0001);
5. Repeat steps 3 and 4 until the right shift is 8 times, so that the entire 8-bit data has been processed;
6. Repeat steps 2 to 5 to process the next 8-bit data;
7. The final CRC register is the CRC code;
8. When putting the CRC result into the information frame, exchange the high and low bits, with the low bits first.

## Notice

1. Please check whether the packaging is intact, and check whether the product model is consistent with the selected model;
2. Do not connect live wires, and power on after the wiring is completed and checked;
3. The length of the sensor wire will affect the output signal of the product. When using it, do not change the components or wires that have been welded when the product leaves the factory. If you need to change it, please contact the manufacturer;
4. The sensor is a precision device. When using it, please do not disassemble it by yourself, or touch the surface of the sensor with sharp objects or corrosive liquids, so as not to damage the product;
5. Please keep the inspection certificate and certificate of conformity, and return it with the product when repairing.

## Contact Us

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