

# Technical Data

Piezoelectric Rain Meter

---

## CDQ-X100 Piezoelectric Type Rain Gauge

### Manual



# Technical Data

Piezoelectric Rain Meter

---

## Catalogue

Product Introduction .....	错误！未定义书签。
Technical Parameters .....	错误！未定义书签。
Product Size .....	错误！未定义书签。
Accessories .....	4
MODBUS RTU Communication Protocol .....	5
Warranty and After-sales Service .....	9

# Technical Data

Piezoelectric Rain Meter

---



## X100 Piezoelectric Rain Gauge

### ·Product Introduction

X100 piezoelectric rain gauge is a monitoring equipment developed for hydrology and water conservancy industry. Through a maintenance-free, no moving parts piezoelectric principle to measure rainfall, outdoor rainfall parameters can be realized 24 hours continuous online monitoring.

### Application

- Meteorological monitoring
- Coastal storm water monitoring
- Hydrology and water conservancy monitoring
- Agricultural meteorological monitoring
- Traffic weather monitoring
- Energy monitoring
- Commercial water demand monitoring

### Features

- Light and strong
- Easy to install
- Low power consumption
- Compact design, no moving parts
- One year warranty
- Maintenance-free

# Technical Data

Piezoelectric Rain Meter

## Technical Parameters

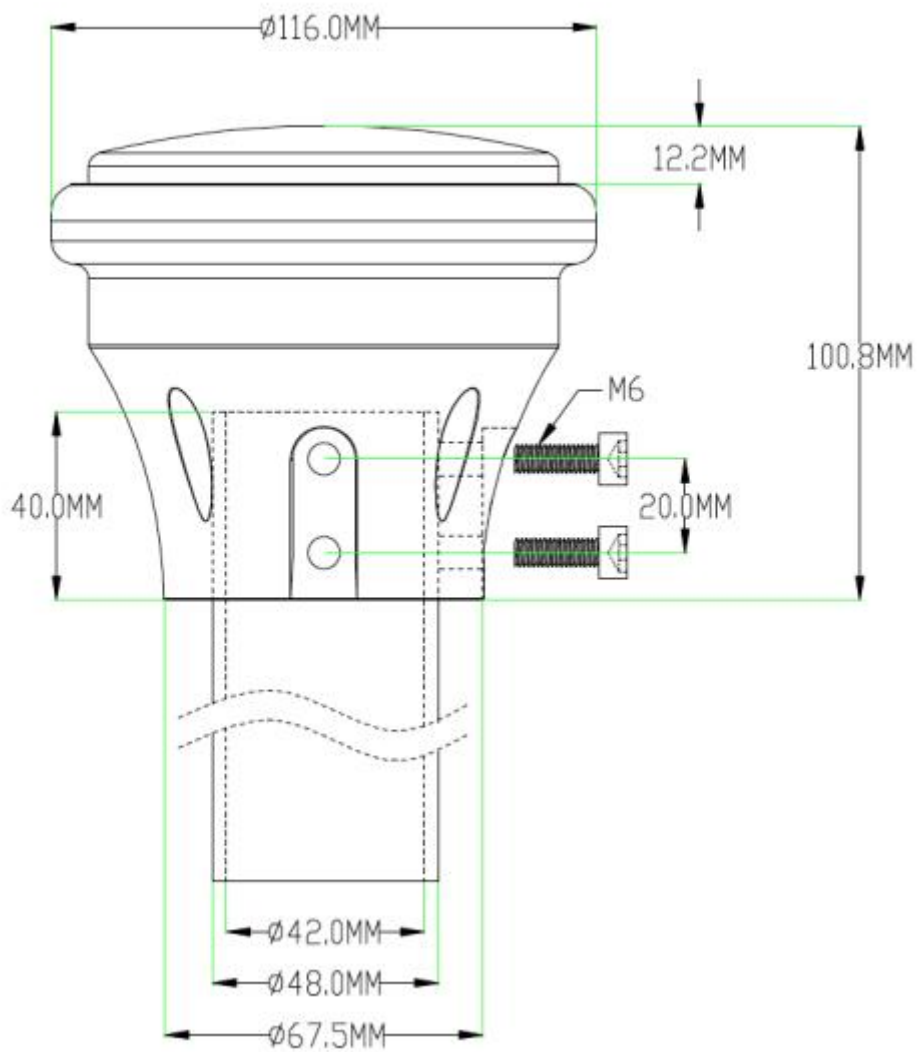
Parameters	Measuring Range	Accuracy	Resolution	Sampling frequency
Rainfall	Measurement form: piezoelectric type; Measuring range: 0-200mm/h; Resolution: 0.2mm; Sampling frequency: 1HZ			
Electrical Parameters	Power supply: DC12-24V; RS485 interface (MODBUS protocol); Power consumption <0.2W			
Optional Output	Continuous rainfall; rainfall duration;rainfall intensity;maximum rain intensity			
Maximum output frequency	Passive mode:1/S			
Operating Temperature	0°C—70°C			
Protect level	IP65			
Fixed Method	The standard product is sleeve-type fixed,see the product size drawing (optional flange fixing or bending plate fixing method)			
Fixed Bracket (additional purchased)	Optional 1.5m or 1.8m brackets			
Remarks	<p>The piezoelectric principle measures rainfall: the impact force of falling raindrops on the external surface is used to measure the size of the raindrops and calculate the rainfall. Compared with the traditional physical tipping bucket rain gauge, accuracy is its weakness. In most cases, the measurement value of the piezoelectric rain gauge will be close to the tipping bucket rain gauge, but there will be a significant deviation in special circumstances (short-term heavy rainfall) . The arc-shaped roof design does not retain rainwater and can work all day long without maintenance. Small size, no moving parts, easy to install. It is more suitable for occasions that need to be moved and cannot be maintained.</p>			

# Technical Data

Piezoelectric Rain Meter

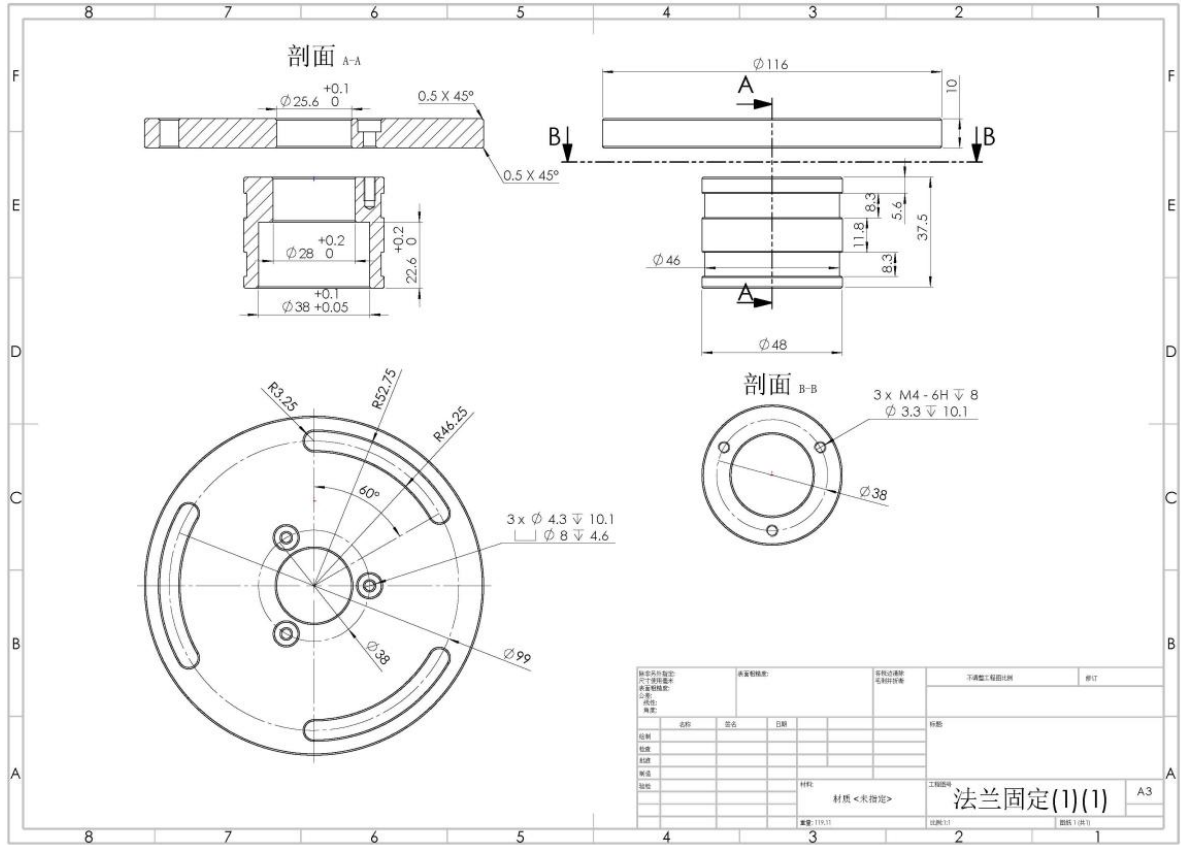
★ Specifications may be updated without prior notice

◆ Produce Size:

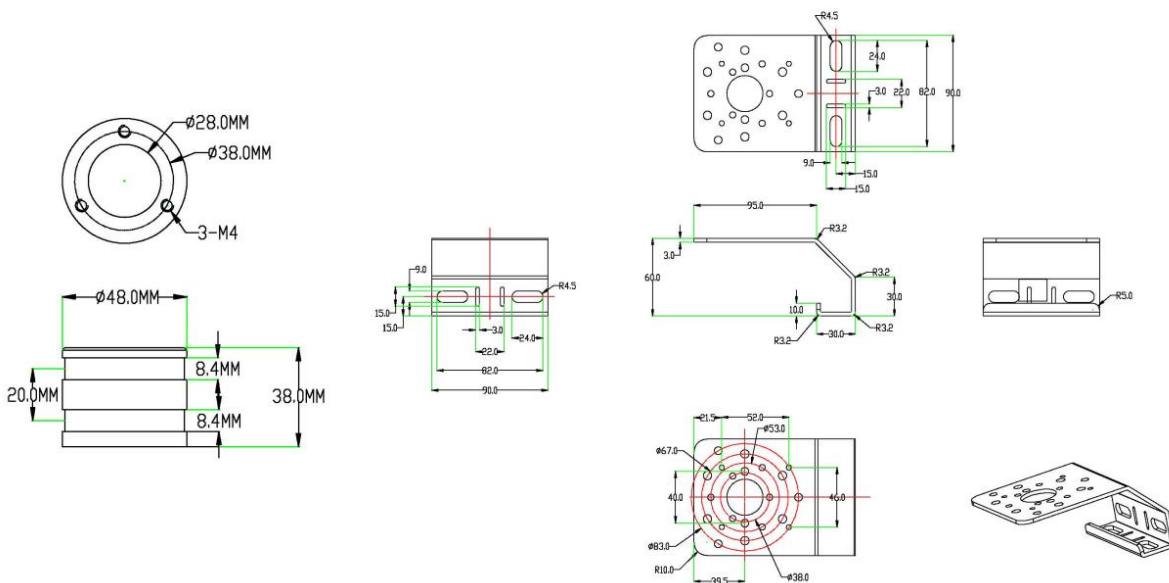


# Technical Data

Piezoelectric Rain Meter



Bending plate fixing method:



# Technical Data

Piezoelectric Rain Meter

## MODBUS RTU COMMUNICATION PROTOCOL

Baud rate: 9600

Data bits: 8

Stop bit: 1

Check bit: None

### 1.1 CRC Instruction:

Among all the following instructions, the two bytes of CRC16 in MODBUS RTU protocol are as follows: the low byte comes before and the high byte comes after.

In the following instructions, the assumed sensor address is 0xFF (the default sensor address is FF).

### 1.2 Return error code rule:

When receive error instruction (including CRC16 validation error), no error codes will be returned. It is considered to be a failure, when there is no return data in 200ms after the instruction is issued. Upper computer may resend instruction.

### 1.3 Standard MODBUS register specification

Special Notice:

The quantity or length of the register in Modbus is two bytes with 16 bits as a unit (the high byte comes first, and the low bytes follows), instead of one byte with 8 bits as a unit.

User shall ensure that the address and quantity of register in command are confined within the range specified by the system. Otherwise, the output of the sensor will be unpredictable. Users shall ensure that the MODBUS command complies with the requirements of this manual in the software design of the upper computer, the minimum query cycle supported is 1S/time

### Input register: read with function code 03

Address	Operation	Contents	Note
0x0001	Read-only	Continuous rainfall, a hexadecimal number magnified 10 times, such as 0x0193 means continuous rainfall 403/10=40.3MM	
0x0002	Read-only	Rainfall duration, hexadecimal number, such as 0x0077 means the rainfall time is 119 minutes	
0x0003	Read-only	Rain intensity, a hexadecimal number magnified 10 times, such as 0x0036 means rain intensity 5.4mm/h	
0x0004	Read-only	Maximum rain intensity, a hexadecimal number magnified 10 times, such as 0x0072 means the maximum rain intensity is	

# Technical Data

Piezoelectric Rain Meter

		11.4mm/h	
<p>Note: The rainfall is a continuous accumulated amount and can be cleared to 0 by sending a command regularly. The clear command can simultaneously clear the values of continuous rainfall, rainfall duration, rain intensity, and maximum rain intensity.</p>			

## 1.4 Communication example

The following is an example of how to use Modbus RTU commands to access system registers:

1. Read multiple input registers (6 real-time data) commands

Send: FF 03 00 01 00 04 00 17

FF	03	00 01	00 04	00 17
System address	Function code	Register address	Register number	CRC16 check bit generated automatically by software

Answer: FF 03 08 01 93 00 77 00 36 00 72 54 D9

FF	03	08	01 93 00 77 00 36 00 72	54 D9
System address	Function code	Number of bytes in data segment	Data segment data	CRC16 check bit

Analytical data

$$0x0193 = 0x01 * 256 + 0x93 = 403$$

$$\text{Continuous rainfall} = 403/10 = 40.3\text{mm}$$

$$0x0077 = 256 + 0x77 = 119$$

$$\text{Rainfall duration} = 119\text{min}$$

$$0x0036 = 0x36 = 54$$

$$\text{Rain intensity} = 54/10 = 5.4\text{mm/h}$$

$$0x0072 = 0x72 = 114$$

$$\text{Maximum rain intensity} = 114/10 = 11.4\text{mm/h}$$

# Technical Data

Piezoelectric Rain Meter

## 2、Read single input register command

Send: FF 03 00 01 00 01 C0 14

FF	03	00 01	00 01	C0 14
System address	Function code	Register address	Register number	CRC16 check bit generated automatically by software

Answer: FF 03 02 01 93 D0 6D

FF	03	02	01 93	D0 6D
System address	Function code	Number of bytes in data segment	Data segment data	CRC16 check bit

Analytical data

$$0x0193 = 0x01 * 256 + 0x93 = 403$$

$$\text{Continuous rainfall} = 403/10 = 40.3\text{mm}$$

## 3、Read address register command

Send: 00 03 00 00 00 01 85 DB

00	06	00 00	00 01	85 DB
	Function code	Register address	Register number	CRC16 check bit generated automatically by software

Answer: 00 03 02 00 01 44 44

00	03	02	00 01	44 44
	Function code	Number of bytes in data segment	Data segment data	CRC16 check bit

# Technical Data

Piezoelectric Rain Meter

## 4、 Modify the internal register (system address) command (change the address to 0x33)

Send: 00 06 00 00 00 33 C8 0E

00	06	01 00	00 33	C8 0E
	Function code	Register address	New address	CRC16 check bit

Answer: 00 06 00 00 00 33 C8 0E (It indicates that the modification was successful)

00	06	00 00	00 33	C8 0E
	Function code	Start address	New address	CRC16 check bit

## 5、 Rainfall clear 0 command

Send: 00 06 01 07 00 00 38 26

00	06	01 07	00 00	38 26
	Function code	Register address	Rainfall clear 0	CRC16 check bit

Answer: 00 06 01 07 00 00 38 26 (It indicates that the modification was successful)

00	06	01 07	00 00	38 26
	Function code	Start address	Rainfall clear 0	CRC16 check bit

Note: Continuous rainfall is not automatically cleared and is always accumulated, the rainfall can be cleared by powering off and restarting or sending a clearing command (the 00 06 01 07 00 00 38 26 command can be issued regularly to clear 0)

## 6、 Read latitude and longitude information

Send AT+GPS#

Reply

GPS:36.12345,N;114.12345,E;2019-01-01,D;10:20:00,T;0040.2,H#

Supplementary protocol:(default device address is FF)

Baud rate (register address 0x0102)

00-06 respectively represent 2400、 4800、 9600、 19200、 38400、 57600、 115200

# Technical Data

Piezoelectric Rain Meter

---

**00 06 01 02 00 02 A9 E6 (set the baud rate to 9600,non-professionals do not change it)**