- Understanding plant growth and development and conducting certain research on it
- Prevent infection and pests
- Rational control of fertilizer and watering usage

## Forward

Welcome to use our foliage temperature and humidity sensor, in order to better use the equipment, we recommend that you carefully read through the product manual before use.

Our company has been in continuous exploration and research and development, without prior notice, we reserve the right to improve some performance and design.

## Knowledge-related

- The level of humidity on the surface of plant leaves has an important effect on their infection with pathogens. High humidity on the surface of leaves is easily infected by bacteria or fungi, and during this period, if the leaves are completely wet, the pathogens will be further infected, and when the pathogens are infected for a long period of time, the structure of the leaves will be destroyed.

- If the temperature and humidity of the plant leaf surface can be detected for a long time, it can not only prevent bacterial or fungal infection, but also control the holding time of pesticide droplets for pest control, so as to take relevant protective measures for plants or crops. So the study of foliar temperature and humidity sensors has the following important significance:

## Product Description

This leaf surface temperature and humidity sensor is compact, stable, and highly sensitive, and is an important tool for studying leaf surface temperature and humidity, preventing infections, insect pests, and spray irrigation control. It accurately monitors trace water or ice crystal residues through changes in the dielectric constant of the leaf surface, and because it includes temperature detection, it can distinguish whether water or ice crystals are detected.

The appearance simulates the real leaf design, so it can more accurately reflect the real environmental conditions on the leaf surface. The product adopts RS485 output, the protocol can be customized, and can be extended with additional environmental monitoring elements such as atmospheric temperature and humidity, illuminance and so on.

## Parameters

| Leaf surface temperature and humidity sensor | |
| --- | --- |
| Power supply method | Municipal electricity |
| Supply Voltage | DC 12V-24V |
| Communication method | RS485 |
| Power Consumption | Peak power consumption 120mW |
| | Standby power consumption 72mW |
| Baud rate | 9600bps |

| Temperature range | -40—80℃ |
|---|---|
| Temperature accuracy | ±0.5℃ |
| Humidity Range | 0—100%RH |
| Humidity Accuracy | ±5%RH |
| Working Environment | -40—85℃ |

The default baud rate is 9600bps, the protocol and baud rate can be customized.

## Product Features

● Fast response, stable performance, high sensitivity

● can detect fog, dew, ice and rainfall humidity range

● sealed waterproof, can be used in multiple sites

● low power consumption, can be long-term uninterrupted detection

● Easy to install, the foliage temperature and humidity sensor is easy to install, just place the sensor next to the crops or leaves, use a non-metallic wire to pass through the small holes at the front of the foliage sensor, hang it on the branches and trunks of the tree through the line, and fix the device to the branches or stalks with a wire or a line, that is, the installation is complete.

## Wiring Method

A four-core wire is left at the bottom of the sensor for connection to external devices, with the following wiring sequence:
Red -------------- Power + (12-24V)
Yellow --------------485+
Blue --------------485-
Black -------------GND

## MODBUS-RTU communication protocols

I. Serial Port Format

Data bits: 8 bits

Stop bit: 1 or 2 bits

Parity bit: None

Baud rate 9600bps, two communication intervals of 1000ms or more.

II、Communication Format

[1] Write device address

Send: 00 10 Adress CRC (5 bytes)

Return: 00 10 CRC (4 bytes)

Note: 1. The address bit of the Read/Write Address command must be 00.

2. Adress is 1 byte, the range is 0-255.

Example:

Send: 00 10 01 BD C0

Return: 00 10 00 7C

[2] Read device address

Send: 00 20 CRC (4 bytes)

Return: 00 20 Adress CRC (5 bytes)

Explanation: Adress is 1 byte, the range is 0-255.

Example: Send 00 20 00 68

Return: 00 20 01 A9 C0

[3] Reading real-time data

Send: Adress 03 00 00 00 02 CRC

Explanation: As shown in the figure below:

| coding | Function Definition | Description |
|---|---|---|
| Adress | Station number (address) | Device unique address |
| 03 | Function Code | Fixed value 0x03 |
| 00 00 | Starting address | First register number read |
| 00 02 | Read Points | 2 elements |
| CRC | CRC check code, front low and back high | Low before high after |

Return：Adress 03 04 XX XX XX XX YY YY

Description：

| NO. | meaning (implicit in a phrase) | bytes | Description |
|---|---|---|---|
| 1 | Address field | 1 | Address |
| 2 | Opcode | 1 | Read only (0x03) |
| 3 | Data Length Field | 1 | Data Length |
| 4 | Data field | 2 | Temperature: 0x7FFF meter invalid/not connected |
| | | 2 | Humidity: 0x7FFF meter invalid/not connected |
| 5 | Checksum field | 2 | Low before high after |

**Note: After parsing the data with one decimal place you need to divide by 10.**

**Example:**

**Send: 01 03 00 00 00 02 C4 0B**

**Return : 01 03 04 00 B4 01 10 BA 49**

**Note: 00 B4 converted to hexadecimal is 180, after parsing the data, with a decimal point need to divide by ten, the actual temperature is 18.0 ℃, 01 10 converted to hexadecimal is 272, after parsing the data, with a decimal point need to divide by ten, the actual humidity is 27.2%.**

**P. S. Steps for calculating the CRC code:**

1. Preset the 16-bit register to hexadecimal FFFF (i.e., all ones). Call this register the CRC register;

2.2. Isolate the first 8-bit data with the lower bit of the 16-bit CRC register and put the result in the CRC register;

3, shift the contents of the register right one bit (towards the low bit), fill the highest bit with 0, and check the shifted out bit after the right shift;

4. If the shifted-out bit is 0: repeat step 3 (right-shift one bit again)

If the shifted out bit is 1: the CRC register is iso-or with the polynomial A001 (1010 0000 0000 0001);

5. Repeat steps 3 and 4 until it is shifted right 8 times so that the entire 8-bit data is all processed;

6, Repeat steps 2 through 5 for the next 8-bit data processing;

7, the final CRC register obtained is the CRC code;

8 、 When putting the CRC result into the

information frame, the high and low bits will be exchanged, with the low bit coming first.

**After Sales & Service**

The unit has no moving parts and does not require complex routine maintenance on site.

If the user opens the equipment by himself or damages the security seal on it, he will not enjoy our quality guarantee.

In the unlikely event that something goes wrong with the equipment, our staff can be contacted to analyze and answer questions;

If the equipment needs to be returned, please pack the instrument carefully according to the original package and mail it to our company with the detailed failure manual of the instrument.

**Contact Us**

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