Type 485 photosynthetically active radiation Sensor instruction manual

JXBS-3001-GHFS

Ver1.1

威海精讯畅通电子科技有限公司

Weihai JXCT Electronics Co., Ltd.

Chapter 1 Product Introduction

1.1 Product Overview

JXBS-3001-GHFS FPH photosynthetically active radiation meter is also called light quantum number. It is mainly used to measure the photosynthetically active radiation of natural light in the wavelength range of 400 ～ 700nm. It is simple to use and can be directly connected to a digital voltmeter or data collector. Use under all weather conditions.

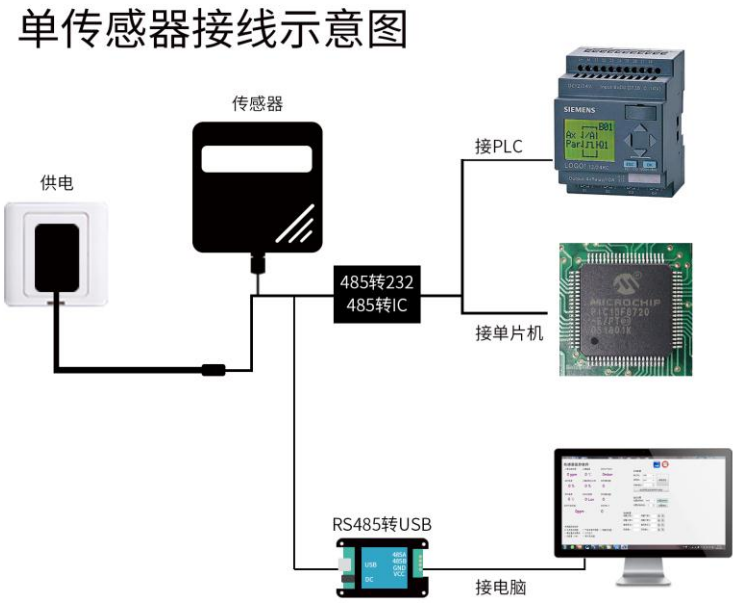
The meter uses a silicon photodetector and passes through a 400-700nm optical filter. When light is irradiated, a voltage signal is generated that is proportional to the intensity of the incident radiation, and its sensitivity is proportional to the cosine of the direct angle of the incident light. The unit is μmol / m2 · s. This table is widely used in agricultural meteorology and crop growth research.

1.2 main parameters

parameter name	Parameter content
DC powered (default)	9-24V DC
Power consumption	≤0.15W (@ 12V DC, 25 ℃)
Measuring range	0-2000w / m2
Spectral range	400-700nm
Resolution	1w / m2
output signal	RS485 output (Mondbus protocol)
working environment	-45-85 ℃ 0-100% RH
responding speed	≤5s
Cosine correction	Up to 80 ° incident angle

1.1 System framework diagram

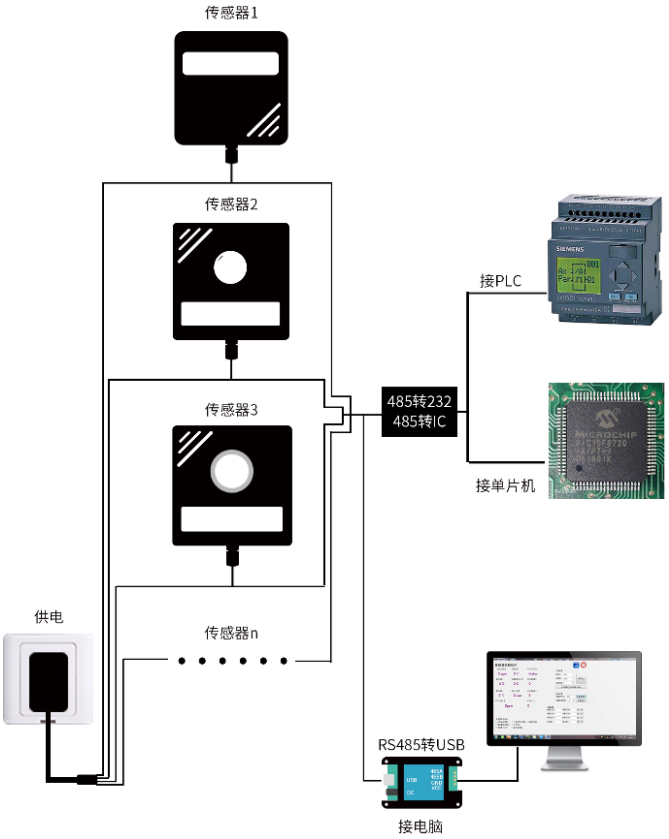
This sensor can be connected and used alone. First, it is powered by 12V DC power supply. The device can be directly connected to a PLC with a 485 interface, and can be connected to a single chip microcomputer through a 485 interface chip. Program the microcontroller and PLC through the modbus protocol specified later to cooperate with the sensor. At the same time, you can use USB to 485 to connect to the computer, and use the sensor configuration tool provided by our company for configuration and testing.



This product can also be used in combination with

multiple sensors on a 485 bus. Please observe the "485 bus field wiring code" (see Appendix) when combining 485 buses. In theory, one bus can connect more than 16 485 sensors. If you need to connect more 485 sensors, you can use a 485 repeater to expand more 485 devices. The other end is connected to a PLC with a 485 interface and a 485 interface chip. Connect to a single chip computer, or use USB to 485 to connect to a computer, and use the sensor configuration tool provided by our company for configuration and testing.

多传感器接线示意图



Chapter 1 Hardware Connection

1.1 Equipment inspection before installation

Please check the equipment list before installing the equipment:

name	Quantity
Photosynthetically active radiation sensor	1 set
12V Waterproof Power Supply	1 (optional)
USB to 485 device	1 (optional)
Warranty card / certificate of conformity	1 serving

1.1 interface description

Wide voltage power input can be 12-24V. When wiring the 485 signal line, pay attention that the two A / B lines cannot be reversed, and the addresses between multiple devices on the bus must not conflict.

	Thread color	Description
power supply	brown	Power supply (12-24V DC)
	black	Negative power
Communication	Yellow (gray) color	485-A
	blue	485-B

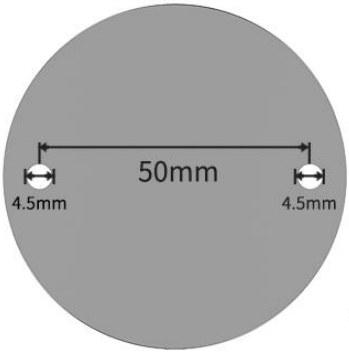
Note: Please be careful not to connect the wrong wire sequence, the wrong wiring will cause the equipment to burn out.

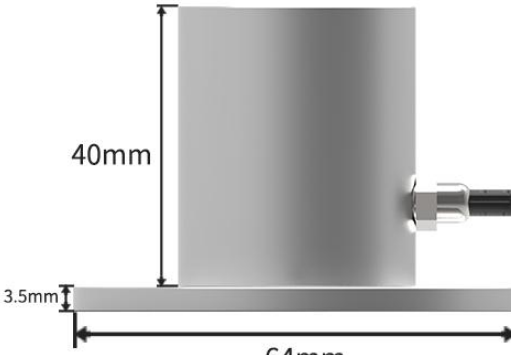
The factory provides 0.6m long wire by default, and the customer can extend the wire or connect the wires in sequence

as needed.

Note that there may not be a yellow line in the line sequence that may be provided in some factory batches. At this time, the gray line is equivalent to replace the yellow line.

1.1 Product size and installation instructions





1.2 底部

Site selection: The ideal location of the photosynthetically active radiation meter should be that there are no obstacles on the upper end of its sensing element, to ensure that there are no obstacles with elevation angles exceeding 5 ° in the orientation of sunrise and sunset, and that no shadows should fall on the sensing surface The phenomenon.

Product installation: Users are advised to check the delivered products for damage caused by transportation before installation, and they

should contact the manufacturer in time. FPH photosynthetic radiation meter has 2 screw holes and is equipped with 2 stainless steel screws. First, the photosynthetically active radiation meter is firmly fixed on the support, the horizontal position is adjusted, and it is fastened, and then the output wire is connected to the data collector box, and then it can be observed.

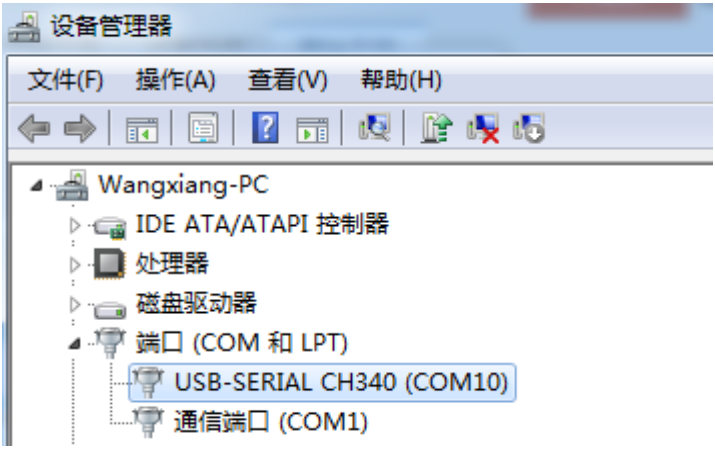
Product maintenance: Continuous working photosynthetically active radiometer is checked at least once a week. The content of the inspection mainly depends on whether the cosine correction film is clean. If ice, snow, dust, etc. appear, try to remove these deposits.

Chapter 2 Configuration Software Installation and Use

Our company provides matching "sensor monitoring software", which can conveniently use a computer to read the parameters of the sensor, and at the same time flexibly modify the device ID and address of the sensor.

2.1 Connect the sensor to the computer

After correctly connecting the sensor to the computer via USB to 485 and providing power, you can see the correct COM port in the computer (see the COM port in "My Computer-Properties-Device Manager-Port").

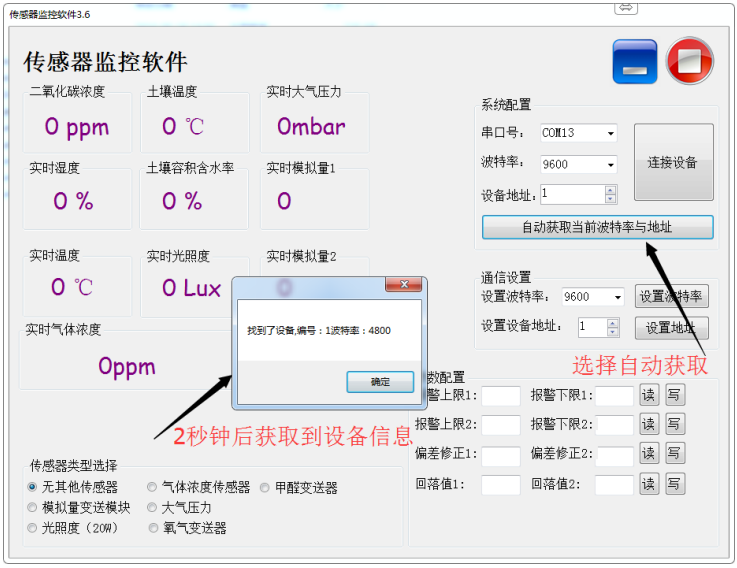


As shown in the figure above, your serial number is COM10 at this time, please remember this serial port, you need to fill in this serial number in the sensor monitoring software.

If the COM port is not found in the device manager, it means that you have not plugged in the USB to 485 or the driver is not installed properly. Please contact the technician for help.

1.3 Use of sensor monitoring software

The configuration interface is shown in the figure. First, obtain the serial port number and select the correct serial port according to the method in section 3.1, and then click Automatically obtain the current baud rate and address to automatically detect all devices and baud rates on the current 485 bus. . Please note that when using software to obtain automatically, you need to ensure that there is only one sensor on the 485 bus.



Then click the connected device to get the sensor data information in real time.

If your device is a gas concentration sensor, select "Gas concentration sensor" at the sensor type, "Formaldehyde transmitter" for the formaldehyde sensor, "Analog transmission module" for the analog transmitter, and "Atmospheric pressure" for the atmospheric pressure sensor. "Sensor", select "Illuminance 20W" for light sensor, "O2 transmitter" for oxygen sensor, and select "No other sensor" for other sensors.

1.3 Modify the baud rate and device ID

In the case of disconnecting the device, click the device baud rate and set the address in the communication settings to complete the relevant settings. Please note that after setting, please restart the device, and then the address can be found after "automatically obtain the current baud rate and address" And

the baud rate has been changed to the address and baud rate you need.

If you need to modify the baud rate and address using the modbus instruction, you can refer to the appendix "How to modify the baud rate and address using the modbus instruction".

Chapter 2 Communication Protocols

2.1 Basic communication parameters

parameter	content
coding	8-bit binary
Data bit	8-bit
Parity bit	no
Stop bit	1 person
Wrong calibration	CRC lengthy cyclic code
Baud rate	2400bps / 4800bps / 9600bps can be set, factory default is 9600bps

1.3 Data frame format definition

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

Time for initial structure ≥ 4 bytes

Address code = 1 byte

Function code = 1 byte

Data area = N bytes

Error check = 16-bit CRC

Time to end structure ≥ 4 bytes

Address code: It is the function instruction of the transmitter. This transmitter only uses function code 0x03 (reading register data).

Data area: The data area is the specific address, which is unique in the communication network (factory default 0x01).

Function code: The command communication data sent by the host, pay attention to the high byte of the 16bits data first!

CRC code: two-byte check code.

Inquiry frame

address code	function code	Register start address	Register length	Low check bit	Check code high
1 byte	1 byte	2 bytes	2 bytes	1 byte	1 byte

Response frame

address code	function code	Number of valid bytes	First data area	Second data area	Nth data area
1 byte	1 byte	2 bytes	2 bytes	2 bytes	2 bytes

1.3 Register Address

Register address	PLC configuration address	content	operating
0006H	40007	Photosynthetically active radiation (1w / m2)	Read-only
0100H	40101	Device address (0-252)	Read and write
0101H	40102	Baud rate (2400/4800/9600)	Read and write

1.4 Communication protocol examples and explanations

Read the photosynthetically active radiation value at device address 0x01

Inquiry frame

address code	function code	initial address	Data length	Low check bit	Check code high
0x01	0x03	0x00 0x06	0x00 0x01	0x64	0x0B

Response frame (eg 71 μ mol / m2 • s of photosynthetically active radiation)

address code	function code	Returns the number of valid bytes	Data area	Low check bit	Check code high
0x01	0x03	0x02	0x00 0x47	0xD8	0x15

Calculation of photosynthetically active radiation:

0047H (hexadecimal) = 71 => photosynthetically active radiation = 71 w / m2

Chapter 2 Appendix

2.1 Product Supplementary Manual

"485 Equipment Field Wiring Manual": Describes the 485 product wiring guidelines, please review and follow the guidelines, otherwise it may cause unstable communication and other conditions.

"Revision of Temperature and Humidity Deviation of 485 Sensor": Describes how to confirm and adjust the temperature and humidity deviation when you feel the temperature and humidity deviation.

"Modbus Modification of Device Baud Rate and Address Using Modbus": describes the use of modbus instructions to

modify the baud rate and slave number if software is not used.

"How to use a single-chip microcomputer for 485 communication": Describes how to use 51 single-chip microcomputers to read sensor information and popularize some basic knowledge.

"How to calculate CRC16": Describes how to calculate CRC16 in the modbus RTU protocol and an example C language program.

1.4 Warranty and After Sales

The warranty terms follow the sensor after-sales terms of Weihai Jingxun Changtong Electronic Technology Co., Ltd. For the sensor host circuit part, the warranty is two years, the gas probe is one year, and the accessories (shell / plug / cable, etc.) are three months.