



RS-GH-N01-1 Photosynthetically active radiation sensor V1.0

RS-GH-N01-AL

Photosynthetically active

radiation sensor

User Manual

Type 485

Document version: V1.0





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1. Product Introduction

The photosynthetically active radiation sensor adopts the photoelectric sensing principle, which can be used to measure the photosynthetically active radiation in the spectral range of 400~700nm. The sensor uses high-precision photoelectric sensing elements, wide spectrum absorption, high absorption in the range of 400-700nm, and good stability; when there is light, it generates a voltage signal proportional to the intensity of the incident radiation, and its sensitivity is less than that of the incident light. The cosine of the direct angle is proportional. The dust cover adopts special treatment to reduce dust absorption, effectively prevent environmental factors from interfering with internal components, and can more accurately measure the photosynthetic effective radiation.

The product adopts the standard Modbus-RTU 485 communication protocol, which can directly read the current photosynthetic effective radiation value, and the wiring method is simple. The appearance is small and beautiful, and the installation space is small. Products are widely used in research in meteorology, agriculture, air pollution and other fields.

1.1 Function feature

- Response spectral range 400-700nm
- Using all-aluminum shell, protection grade IP67
- With level meter and adjustment handwheel, convenient adjustment on site
- Using standard Modbus-RTU protocol
- Using high-quality cosine corrector to ensure standard cosine response
- Wide voltage power supply DC7~30V

1.2 Main technology parameter

Power supply voltage (default)	10V~30V DC
output method	485 (standard Modbus-RTU protocol)
Power consumption	0.06W
Range of temperature	-30℃~75℃
Response spectrum	400nm~700nm
Measuring range	0~2500 $\mu\text{mol}/\text{m}^2\cdot\text{s}$
Resolution	1 $\mu\text{mol}/\text{m}^2\cdot\text{s}$
Accuracy	$\pm 2\%$ (1000 $\mu\text{mol}/\text{m}^2\cdot\text{s}$,@550nm60%RH 25℃)
Reaction time	0.1s
Linearity	$\leq \pm 1\%$
Annual stability	$\leq \pm 2\%$

1.3 product model

RS-	Company code
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	GH-			Photosynthetically active radiation sensor
		N01-		485 output (standard Modbus-RTU)
			AL	Aluminum housing

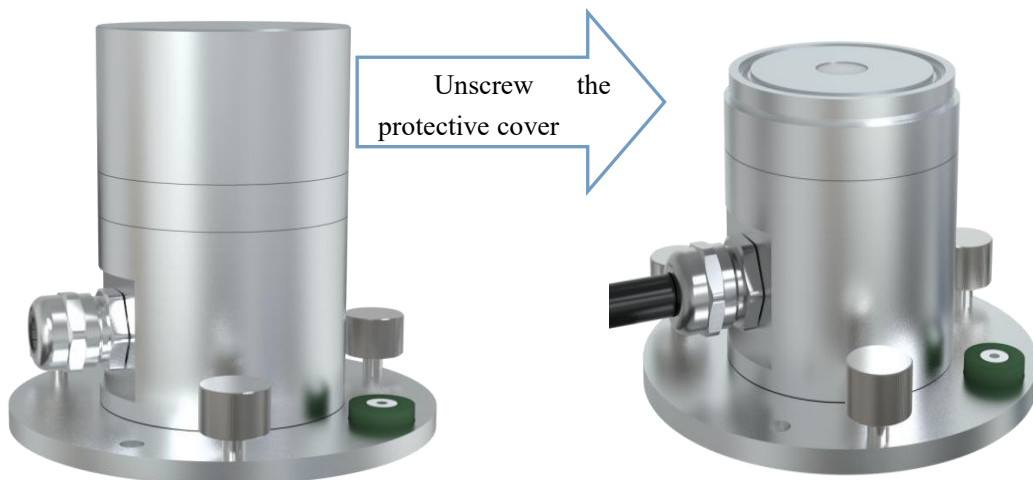
2.Product installation and wiring

2.1 Check before the device installation

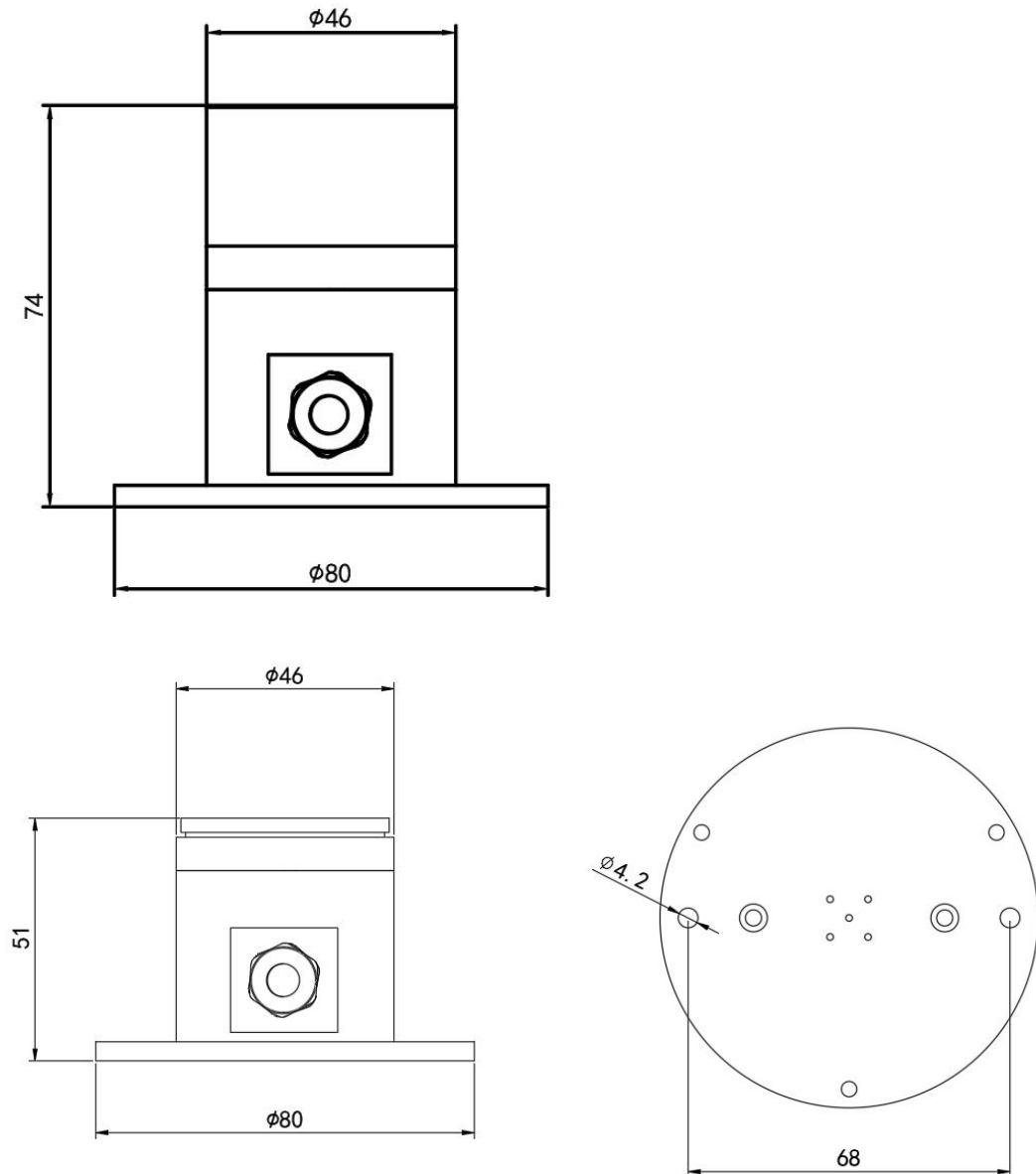
- Main equipment
 - Black waterproof pair plug cord 70cm
 - Qualification certificate, warranty card
- 2.2 Joggle instruction

2.2 Installation method

1. Use screws to pass through the mounting holes on the sensor to fix the sensor on the mounting bracket
 2. Make sure that the equipment is parallel to the ground (adjustable thumb screw and check the state of the horizontal bubble to determine whether it is parallel)
 3. After the installation is complete, remove the protective cover
3. Configuration Software Installation and Application



2.3 Equipment size (unit: mm)



2.4 Field wiring instructions

	Line color	Description
Power	brown	Power supply(7-30V DC)
	black	Power supply negative
Output	green	485-A
	blue	485-B

3. Configuration software installation and use

3.1 Software selection

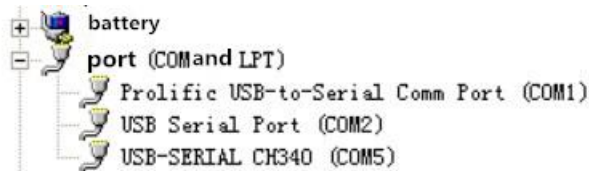
Open the data package, select "Debugging Software" --- "485 Parameter Configuration



Software", find and open it.

3.2 Parameter setting

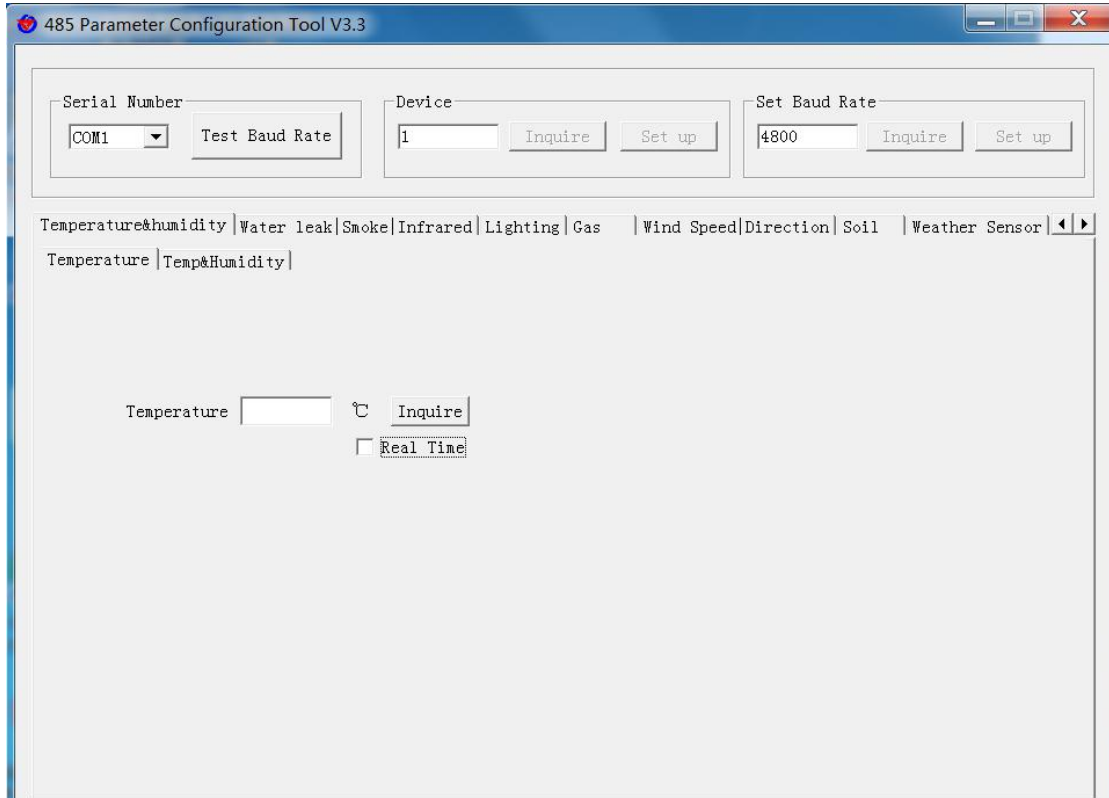
①. Select the correct COM port (check the COM port in "My Computer — Properties — Device Manager — Port"). The following figure lists the driver names of several different 485 converters.



② Connect only one device alone and power it on, click the test baud rate of the software, the software will test the baud rate and address of the current device, the default baud rate is 4800bit/s, and the default address is 0x01.

③. Modify the address and baud rate according to the needs of use, and at the same time query the current function status of the device.

④. If the test is unsuccessful, please recheck the equipment wiring and 485 driver installation.



4.Communication Agreement

4.1 Communication basic parameter

Code	8 bit binary system
Data Bit	8 bit
Odd-even Revision Bit	None
Stop Bit	1bit
Incorrect Revision	CRC (Redundant cyclic codes)
Baud Rate	2400bit/s, 4800bit/s, 9600 bit/s options, the factory default 4800bit/s

4.2 The concept of data frame format

Apply Modbus-RTU communication rules, the format below:

Initial structure ≥ 4 byte time

Address code = 1 byte

Function code = 1 byte

Data area = N byte

Incorrect revision = 16 byte CRC code



Ending structure ≥ 4 byte time

Address code: the address of the transmitter, and will be the only (factory default 0x01) in the communication net..

Function code : the order function orders from host computer, this transmitter only uses function code 0x03(reading register date).

Data area : data area is the specific communication data, attention 16bits data high byte in front!

CRC code: two byte revision code.

Main computer enquires frame structure

Address Code	Function Code	Register Origin Address	Register Length	Revision Code in Low Position	Revision Code in High Position
1byte	1byte	2bytes	2bytes	1byte	1byte

Accessorial computer replying frame structure:

Address Code	Function Code	Effectiveness Byte NO.	Data Area One	Data Area Two	Data Area N	Revision Code in Low Position	Revision Code in High Position
1byte	1byte	1byte	2bytes	2bytes	2bytes	1byte	1byte

4.3 Register address

Register Address	content	Operation	Scope and definition
0000 H	Photosynthetically effective radiation value	Read only	actual value
00052 H	Deviation	Read and write	Real value (16-bit signed)
07D0 H	Address register	Read and write	1~254 (factory default 1)
07D1H	Baud rate register	Read and write	0 is 2400; 1 is 4800; 2 is 9600



4.4 Communication agreement example and explaining

4.4.1 reading the value of temperature and humidity in device address 0x01

enquiry frame: Read numerical function code 03/04

Address Code	Function Code	Origin Address	Data Length	Revision Code in Low Position	Revision Code in High Position
0x01	0x03	0x00 0x00	0x00 0x01	0x84	0x0A

Replication frame:

Address Code	Function Code	Return Byte Number	Effective radiation real-time value	Revision Code in Low Position	Revision Code in High Position
0x01	0x03	0x02	0x00 0x64	0x 9B	0xAF

Photosynthetically effective radiation value:

0064(Hexadecimal) =100=> Photosynthetic active radiation value=100 $\mu\text{mol}/\text{m}^2 \cdot \text{s}$

4.4.2 Write deviation value

Enquiry frame: Write numerical function code 06/10

Address Code	Function Code	Origin Address	Modify value	Revision Code in Low Position	Revision Code in High Position
0x01	0x06	0x00 0x52	0x00 0x0A	0xA8	0x1C

Replication frame:

Address Code	Function Code	Origin Address	Modify value	Revision Code in Low Position	Revision Code in High Position
0x01	0x06	0x00 0x52	0x00 0x0A	0xA8	0x1C

Write current deviation value of photosynthetically active radiation

000A (hexadecimal system) =10=> The deviation value of photosynthetically active radiation

$n = 10 \mu\text{mol}/\text{m}^2 \cdot \text{s}$ The deviation value is $10 \mu\text{mol}/\text{m}^2 \cdot \text{s}$

4.4.3 Modify current address

enquiry frame: (Modify the current address to 0x02)



Address Code	Function Code	Origin Address	Modify value	Revision Code in Low Position	Revision Code in High Position
0x01	0x06	0x07 0xD0	0x00 0x02	0x08	0x86

Replication frame:

Address Code	Function Code	Origin Address	Modify value	Revision Code in Low Position	Revision Code in High Position
0x02	0x06	0x07 0xD0	0x00 0x02	0x08	0xB5

4.4.4 Modify the current baud rate

Enquiry frame: (Assuming the modified baud rate is 9600)

Address Code	Function Code	Origin Address	Modify value	Revision Code in Low Position	Revision Code in High Position
0x01	0x06	0x07 0xD1	0x00 0x02	0x59	0x46

Replication frame:

Address Code	Function Code	Origin Address	Modify value	Revision Code in Low Position	Revision Code in High Position
0x01	0x06	0x07 0xD1	0x00 0x02	0x59	0x46

4.4.5 Query current address baud rate

enquiry frame:

Address Code	Function Code	Origin Address	Data Length	Revision Code in Low Position	Revision Code in High Position
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0xFF	0x03	0x07 0xD0	0x00 0x02	0x91	0x59
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Replication frame:

Address Code	Function Code	Origin Address	Data Length	Revision Code in Low Position	Revision Code in High Position	Baud rate
0x01	0x03	0x02	0x00 0x01	0x79	0x84	0x00 0x01

The real address of the device read is 01, and the baud rate is 0x01, which is 4800.

5. Precautions and troubleshooting

Precautions:

1. When the customer receives the product, please confirm the product model, etc.
2. Do not wire with power on, and power on can only be done after the wiring is checked and correct
3. The sensor is a precision device, please do not disassemble it by yourself when using it to avoid damage to the product

troubleshooting:

1. If the read value shows 0, check whether there is a light source, and check whether the product protective cover is removed
2. Please check whether the 485 wiring is correct and whether the wiring is reversed
3. The device address is wrong, or there are devices with duplicate addresses (the factory default is 1)
4. Check whether the power supply meets the mark
5. Equipment damage.

6. Product Maintenance

1. The surface should be kept smooth and clean, regularly wiped with a soft cloth
2. Regularly check whether it is level and whether the screws are loose

7. Contact Information

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Shandong Province

Post code: 250101

Phone: 400-085-5807

Website: www.renkeer.com

Cloud platform address: en.0531yun.cn Or: eniot.0531yun.cn



Web QR:



8. Document History

V1.0 Document building.