TYN02
User Manual of Photoelectric Total Solar Radiation Transmitter
Type 485



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1.Product Overview

TYN02 total solar radiation sensor adopts photoelectric principle and can be used to measure solar radiation with a spectral range of 0.3~3μm. The radiation sensor uses high-precision photosensitive elements, wide spectrum absorption, high absorption in the full spectrum range, and good stability; at the same time, a dust cover with a light transmittance of up to 95% is installed outside the sensing element, and the dust cover is specially treated to reduce dust Adsorption can effectively prevent environmental factors from interfering with internal components, and can more accurately measure solar radiation.

The product adopts the standard Modbus-RTU 485 communication protocol, which can directly read the current solar 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 solar energy utilization, meteorology, agriculture, building materials aging and air pollution and other departments to measure solar radiation energy.

1.1Features

■Using high-precision photosensitive elements, high absorption in the full spectrum range

■With level meter and adjustment handwheel, convenient adjustment on site

■Using standard Modbus-RTU protocol

■High transparent dust cover, good sensitivity, special surface treatment to prevent dust adsorption

■Wide voltage power supply DC 7~30V

1.2Technical Parameters

Power supply range	7V~30V DC
output method	485 (standard Modbus-RTU protocol)
Power consumption	0.06W
Working humidity	0%~100%RH
Operating temperature	-25℃~60℃
Measuring object	sunshine
Measuring range	0~1800W/㎡
Resolution	1W/㎡
Response time	≤10S
Nonlinear	＜±2%
Annual stability	≤±2%

1.3product model

TYN02-			Total solar radiation sensor
	N01-		485 output (standard Modbus-RTU)
		AL	Aluminum housing

2.Product installation and wiring

2.1 Pre-installation check

■One set of sensor equipment

■Black waterproof pair plug-in male connector 70cm

■Qualification certificate, warranty card

2.2 Installation method

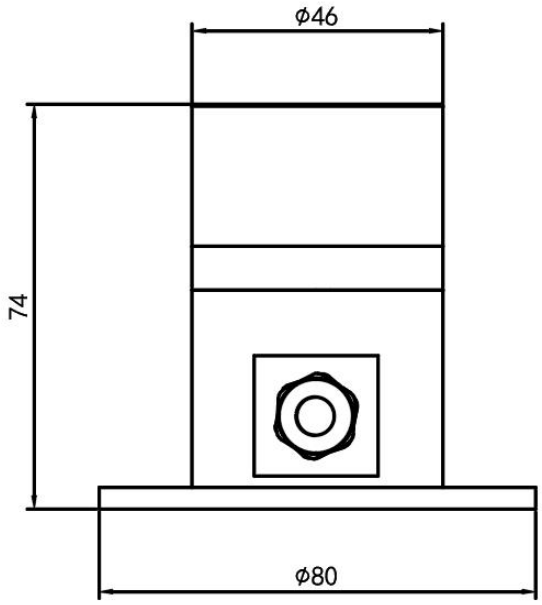
1. Use screws to pass through the mounting holes on the sensor to fix the sensor on the mounting position

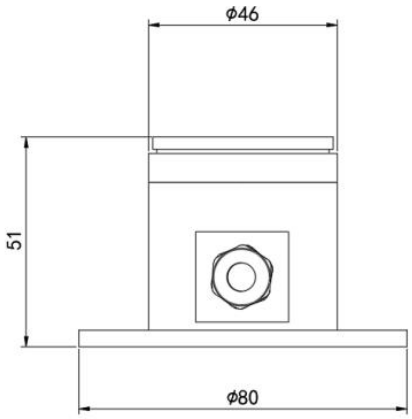
2. Make sure that the device is parallel to the ground (adjustable thumb screw and check the horizontal bubble state to determine whether it is parallel)

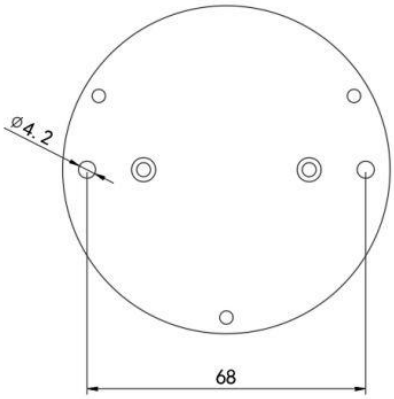
3. After the installation is complete, remove the protective



2.3Equipment size







2.4Wiring

	Line color	Description
power supply	brown	Power supply（7~30V DC）
	black	Negative power supply
Communicati on	green	485-A
	blue	485-B

3.Configuration software installation and use

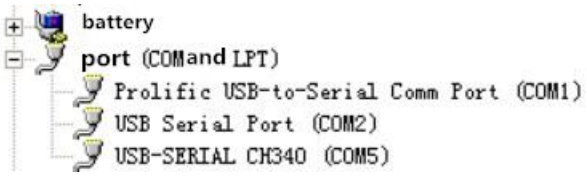
3.1 Software selection

Open the package and select "Debug Software"---"485 Parameter Configuration Software" to find 

Open it。

3.2 parameter settings

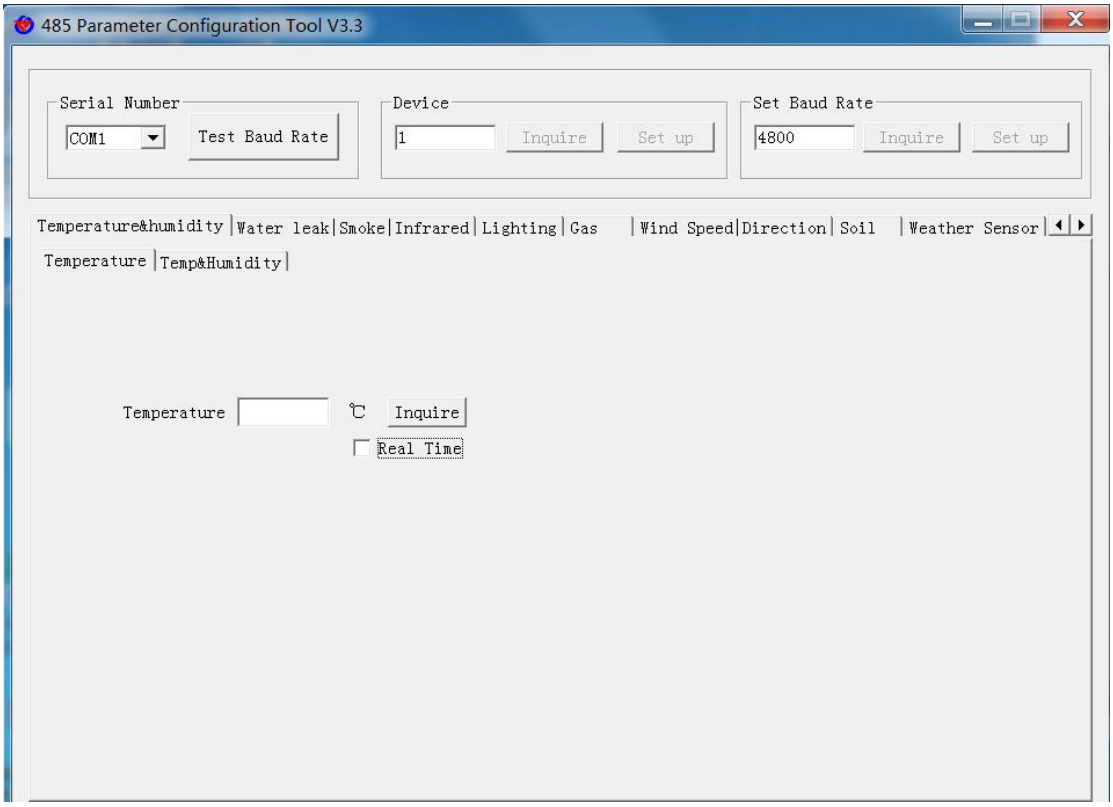
①. Select the correct COM port (check the COM port in "My Computer—Properties—Device Manager—Port"). The following figure lists the driver names of several different 485 converters.



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, you can query the current function status of the device.

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



4.letter of agreement

4.1 Basic communication parameters

Code	8-bit binary

Data bit	8 digits
Parity bit	no
Stop bit	1 person
Error check	CRC (redundant cyclic code)
Baud rate	2400bit/s, 4800bit/s, 9600 bit/s can be set, the factory default is 4800bit/s

4.2 Data frame format definition

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

Initial structure ≥ 4 bytes of time

Address code = 1 byte

Function code = 1 byte

Data area = N bytes

Error check = 16-bit CRC code

End structure ≥ 4 bytes of time

Address code: is the address of the transmitter, which is unique in the communication network (factory default 0x01).

Function code: The instruction function of the command sent by the host. The transmitter can use function code 0x03 (read register data) 0x06 (write register).

Data area: The data area is the specific communication data. Note that the 16-bit data high byte is in front!

CRC code: Two-byte check code.

Host inquiry frame structure:

address code	function code	Register start address	Register length	Check code low	Check code high
1 byte	1 byte	2 bytes	2 bytes	1 byte	1 byte

Slave response frame structure：

address code	function code	Effective number of bytes	Data area	Second data area	Nth data area	Check code
1 byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes	2 bytes

4.3Register address

Register	content	Operation	Scope and definition

address			
0000 H	Solar radiation value	Read only	actual value
0052H	Deviation	Read and write	Solar radiation deviation value (0~1800)
07D0 H	Device address	Read and write	1~254 (factory default 1)
07D1H	Device baud rate	Read and write	0 means 2400

4.4 Communication protocol example and explanation

4.4.1Read current solar radiation value

Inquiry frame: read numerical function code 03/04

address code	function code	starting address	Data length	Check code low	Check code high
0x01	0x03	0x00 0x00	0x00 0x01	0x84	0x0A

Response frame

address code	function code	Returns the number of valid bytes	Solar radiation value	Check code low	Check code high
0x01	0x03	0x02	0x00 0x64	0x9B	0xAF

Solar radiation value:

0064(Hexadecimal) =100=> Solar radiation value=100W/㎡

4.4.2Write deviation value

Inquiry frame: write numerical function code 06/10

address code	function code	Register address	Modify value	Check code low	Check code high
0x01	0x06	0x00 0x52	0x00 0x0A	0xA8	0x1C

Response frame

address code	function code	Register address	Modify value	Check code low	Check code high
0x01	0x06	0x00 0x52	0x00 0x0A	0xA8	0x1C

Write the current solar radiation deviation value

000A (Hexadecimal) =10=> Solar radiation deviation value = 10W/㎡ The deviation

value is 10W/㎡

4.4.3Modify current address

Inquire frame (modify current address is 0x02)

address code	function code	starting address	Modify value	Check code low	Check code high
0x01	0x06	0x07 0xD0	0x00 0x02	0x08	0x86

Response frame

address code	function code	starting address	Modify value	Check code low	Check code high
0x01	0x06	0x07 0xD0	0x00 0x02	0x08	0x86

4.4.4Modify the current baud rate

Inquiry frame (assuming a modified baud rate of 9600)

address code	function code	starting address	Modify value	Check code low	Check code high
0x01	0x06	0x07 0xD1	0x00 0x02	0x59	0x46

Response frame

address code	function code	starting address	Modify value	Check code low	Check code high
0x01	0x06	0x07 0xD1	0x00 0x02	0x59	0x46

4.4.5Query current address

Inquiry frame:：

address code	function code	starting address	Data length	Check code low	Check code high
0xFF	0x03	0x07 0xD0	0x00 0x02	0x91	0x59

Response frame

address code	function code	Returns the number of valid bytes	address	Check code low	Check code high	address code
0xFF	0x03	0x04	0x00 0x01	0x00 0x01	0x50	0x50

The real address of the device 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 only after the wiring is checked correctly
3. The sensor is a precision device, please do not disassemble the protective transparent

cover at will

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. The 485 bus is disconnected, or the A and B wires are connected reversely

3. Check whether the power supply meets the markings

4. Equipment damage

6. Product Maintenance

1. The dust cover should be kept clean and clean, wipe it regularly with a soft cloth

2. There should be no water in the dust cover. If it encounters heavy rain, snow, ice and other long-term weather, it is recommended to cover it.