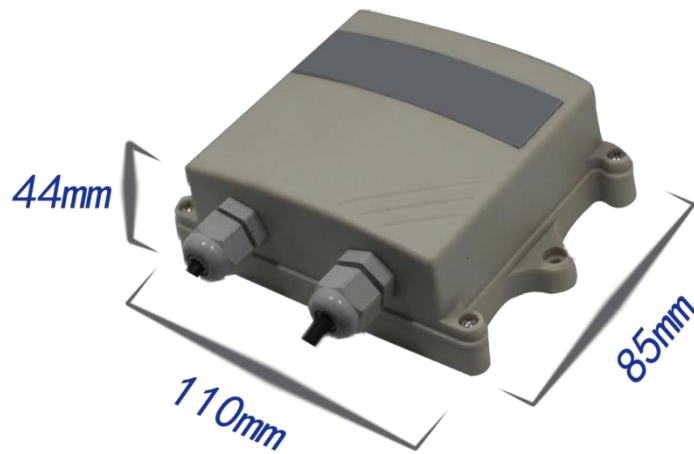


7-in-1 Environmental Monitoring Transmitter User Manual

(PN: RK485)



1. Product description

1.1 Description

The product is a wall-mounted high-grade enclosure with a protection grade of IP65, rain and snow proof and good air permeability. The circuit uses imported industrial-grade microprocessor chips, high-precision temperature sensors, and environmental monitoring sensors. Ensure product reliability. This product adopts a particle sintered probe sheath, and the probe is directly connected to the shell and has a beautiful appearance. The output signal type is divided into RS485, which can realize long-distance transmission. The standard modbus protocol supports secondary development.

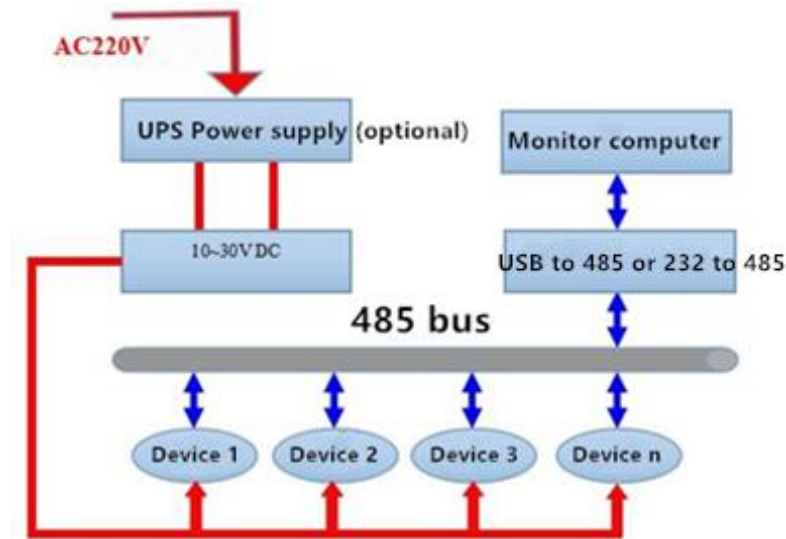
1.2 Features

- Accurate measurement.
- Using dedicated 485 circuit, the communication is stable.
- 9~36V wide voltage range power supply, complete specifications and easy installation.

1.3 Main technical parameters:

Category	Measurement resolution	Measuring range	Measurement accuracy
eCO ₂		400ppm~5000ppm	±25%
eCH ₂ O	1ug/m ³	0ug~2000ug/m ³	±25%
TVOC	1ug/m ³	0ug~50000ug/m ³	±25%
PM _{2.5}	1ug/m ³	0ug/m ³ ~999ug/m ³	±10%
PM ₁₀	1ug/m ³	0ug/m ³ ~1000ug/m ³	±10%
Temperature	0.01°C	-40°C~125°C	±0.3°C (25°C)
Humidity	0.04%	0~100%	±3%RH (25°C)
Physical interface	ZH2.54 female seat		
Output Data	WIFI or RS485		
Operating Voltage	DC 9-32V		
Working current	≤200mA		
Preheat time	2 minutes (only CO ₂ , CH ₂ O and TVOC need to be preheated, other parameters will be displayed when power is on)		
Working temperature	0°C~50°C		
Working humidity	≤95%RH		
Protocol	RS485 (Modbus protocol)		
Installation method	Wall-mounted		
Service life	5 years (in air)		

1.4 System framework



2. Equipment installation instructions

2.1 Inspection before equipment installation

Equipment List:

- 1 temperature and humidity transmitter equipment
- Certificate of conformity, warranty card, calibration report, etc.
- 2 expansion plugs, 2 self-tapping screws
- USB to 485 (optional)
- 485 terminal resistance (gift for multiple devices)

2.2 Installation method

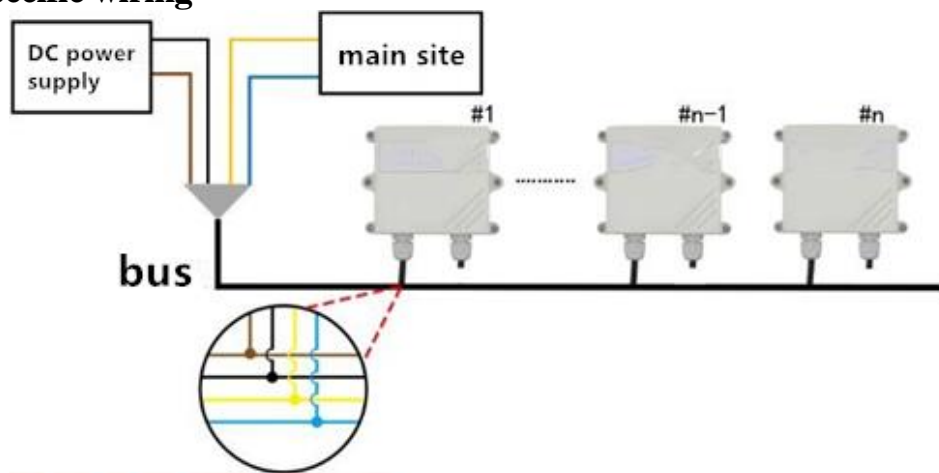


Special Note:

- 1) There are certain specification requirements for 485 line field wiring.
For details, please refer to the data package "485 Equipment Field Wiring Manual".
- 2) When the device is connected to the 485 bus, ensure that the addresses of multiple devices will not be repeated.

2.3 Wiring instructions**Power and 485 signal**

Wide voltage power input is 10~30V. When wiring the 485 signal wire, pay attention to the two wires A\B not reversed, and the addresses of multiple devices on the bus cannot conflict.

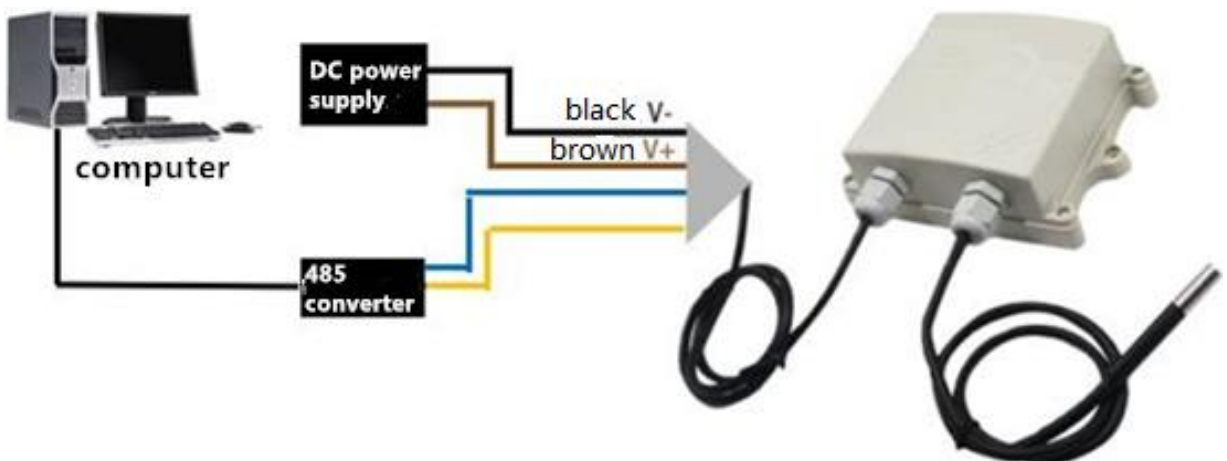
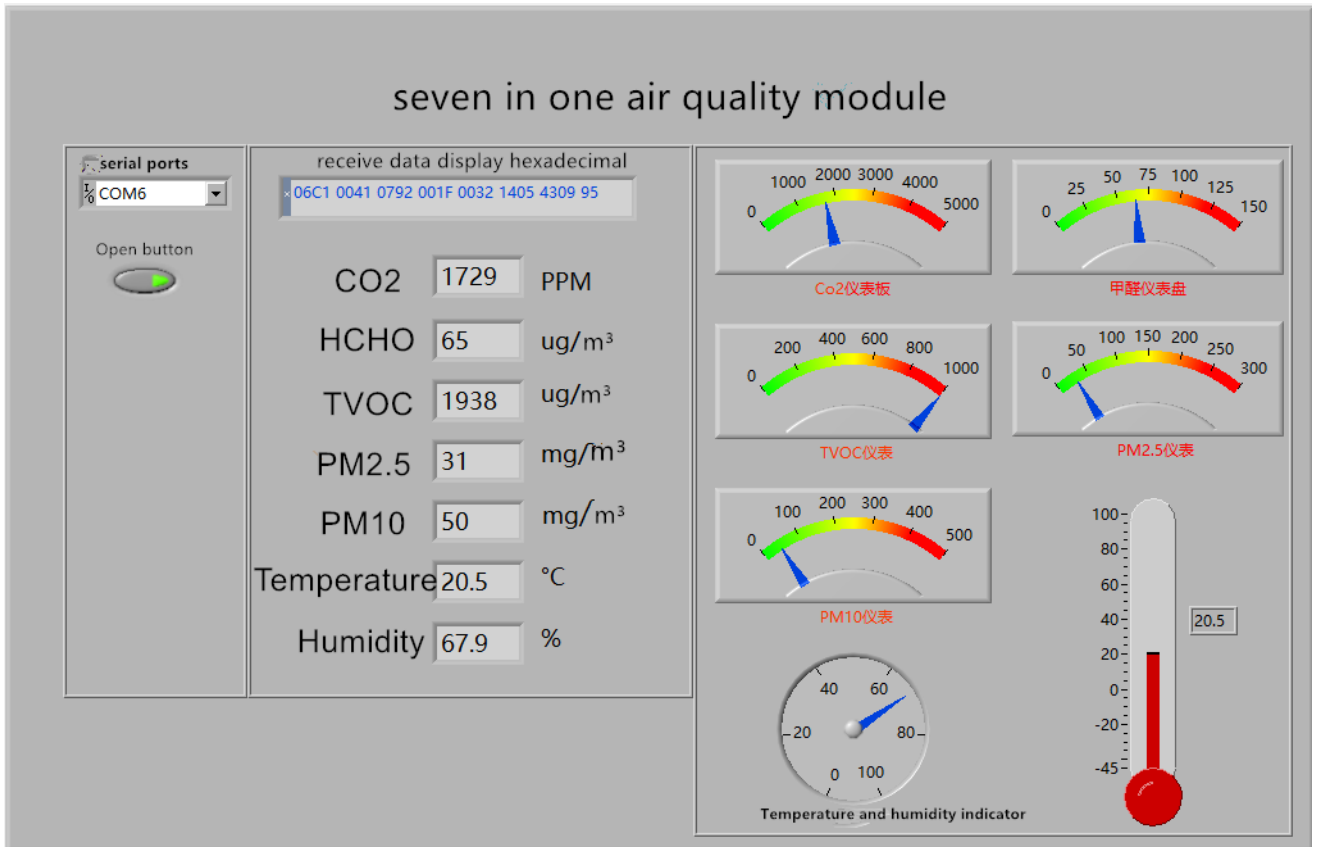
2.4 Specific wiring

	Thread color	Description
Power supply	Brown	Positive power supply (10~30V DC)
	Black	Power negative
Communication	Yellow	485-A
	Blue	485-B

3. Configuration software installation and use

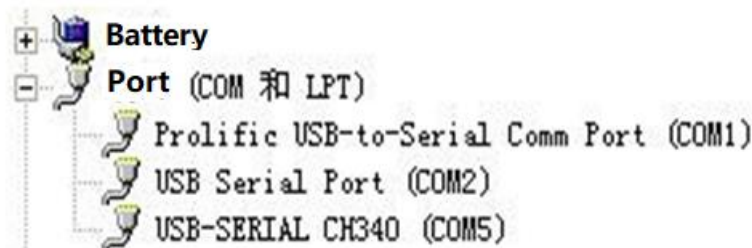
3.1 Software selection

Pass the dedicated software test



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.



②Connect only one device separately 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 9600bit/s, and the default address is 0x01. Support 4800, 9600, 19200, 38400, 115200

The address range is 01~255, address 0 is the broadcast address.

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

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

4. Communication protocol

4.1 Basic communication parameters

Code	8-bit binary
Data bit	8-bit
Parity bit	No
Stop bit	8-bit
Error checking	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

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

Initial structure \geq 4 bytes time

Address code = 1 byte

Function code = 1 byte

Data area = N bytes

Error check = 16-bit CRC code

Time to end structure \geq 4 bytes

Address code: the address of the transmitter, which is unique in the communication network (factory default 0x01). Function code: the command function instruction issued by the host, this transmitter only uses function code 0x03 (read register data).

Data area: The data area is the specific communication data, pay attention to the high byte of 16bits data first! CRC code: two-byte check code.

Host query frame structure:

Address code	Function code	Register start address	Register length	Check code low bit	Check code high bit
1 byte	1 byte	2 byte	2 byte	1 byte	1 byte

Slave machine response frame structure:

Address code	Function code	Effective bytes	Data first area	Second data area	Data area N	Check code
1 byte	1 byte	1 byte	2 byte	2byte	2 byte	2 byte

4.3 Register address

Register address	PLC or configuration address	content	operating
0000 H	40001	Humidity	Read only
0001 H	40002	Temperature	Read only
0002 H	40003	CO2	Read only
0003 H	40004	HCHO	Read only
0004 H	40005	TVOC	Read only
0005 H	40006	PM2.5	Read only
0006 H	40007	PM10	Read only
0007 H	40008	address	Read/write
0008 H	40009	Communication baud rate	Read/write

4.4 Communication protocol example and explanation

Example: Read the temperature and humidity value of the device address 0x01

Inquiry frame (hexadecimal):

Address code	Function code	Initial address	Data length	Check code low bit	Check code high bit
0x01	0x03	0x00 0x00	0x00 0x02	0xC4	0x0B

Response frame (hexadecimal): (For example, the temperature is -10.1°C and the humidity is 65.8%RH)

Address code	Function code	Returns the number of valid bytes	Humidity value	Temperature value	Check code low bit	Check code high bit
0x01	0x03	0x04	0x02 0x92	0xFF 0x9B	0x5A	0x3D

Temperature calculation:

When the temperature is lower than 0 °C, the temperature data is uploaded in the form of complement code.

Temperature: FF9B H (hexadecimal) = -101 => temperature = -10.1°C

Humidity calculation:

Humidity: 292 H (hexadecimal) = 658 => Humidity = 65.8%RH5.

Common problems and solutions

Possible reasons why the device cannot connect to the PLC or computer:

- 1) The computer has multiple COM ports, the selected port is incorrect
- 2) The device address is wrong, or there are devices with duplicate addresses (the factory default is all 1).
- 3) The baud rate, check method, data bit, stop bit are wrong.
- 4) The 485 bus is disconnected, or the A and B wires are connected reversely
- 5) If there are too many equipments or too long wiring, power supply should be nearby, add 485 booster, and add 120Ω terminal resistance.
- 6) USB to 485 driver is not installed or damaged
- 7) The equipment is damaged.

Wall-mounted shell: 110×85×44mm

