Ozone transmitter
User Manual
(Type 485)

Document version：V2.1

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1. product description

1.1 product description

O3 is widely used in water disinfection, food processing and purification, food storage and preservation, medical hygiene and household disinfection and purification. In ozone application, a certain concentration of ozone is an important parameter to ensure disinfection effect, save energy and prevent pollution. However, if the ozone concentration in the environment is too high, it will cause harm to the human body, so it is very necessary to effectively monitor the ozone concentration.

The transmitter adopts electrochemical technology to measure the concentration of O3, the response is quick and sensitive, and the ozone concentration can be reliably detected. Use 485 communication, standard ModBus-RTU communication protocol, communication address and baud rate can be set, the longest communication distance is 2000 meters. The equipment is powered by 10-30V wide voltage, and the protection level of the shell is high, which can adapt to various harsh conditions on site.

1.2 Features

1. Adopt high-sensitivity gas detection probe imported from the United States, and use high-performance signal acquisition circuit, which can accurately measure the ppm level O3 concentration, the signal is stable, and the accuracy is high.

2. The product uses a wall-mounted waterproof shell, which is easy to install and has a high protection level.

1.3 Main Specifications

Power supply	10~30V DC
Average power consumption	0.1W
output signal	485（ModBus-RTU）
Temperature measurement range	-40℃~80℃
Temperature accuracy	±0.5℃
Humidity measurement range	0~100%RH
Humidity accuracy	±3%RH
Ozone measurement range	0~10.00ppm、0~100ppm
Operating temperature	-10℃～55℃
Working humidity	15%RH-90％RH（No condensation）
Working pressure	91~111Kpa
Data update time	1s

Repeatability	≤2%
stability	≤7% signal value / year
Response time	≤180S
Preheat time	≥5 minutes
Resolution	Range 0 ~ 10ppm: 0.01ppm
	Range 0 ~ 100ppm: 0.1ppm
Accuracy	0`10ppm: ±6%FS (@5ppm, 25℃, 50%RH)
	0`100ppm: ±6%FS (@50ppm, 25℃, 50%RH)
Zero drift	±1%FS

All the above specifications are measured under the environment conditions: temperature 20 ℃, relative humidity 50% RH, 1 atmosphere, and the gas concentration to be measured does not exceed the sensor range.

1.4product model

Ozone transmitter selection:

RS-					Company code
	O3-				Ozone transmitter
		N01-			RS485 Modbus protocol）
			2-		Wall-mounted king character shell
			OLED-		Wall-mounted king-shaped shell with OLED display
				10P	Range 0~10ppm
				100P	Range 0~100ppm

Ozone temperature and humidity three-in-one transmitter selection:

RS-			Company code
	O3WS-		Ozone concentration temperature and humidity

				three-in-one transmitter
		N01-		RS485 （Modbus protocol）
			2-	Wall-mounted king character shell
			10P	Range0~10ppm
			100P	Range0~100ppm

1.5 System framework diagram
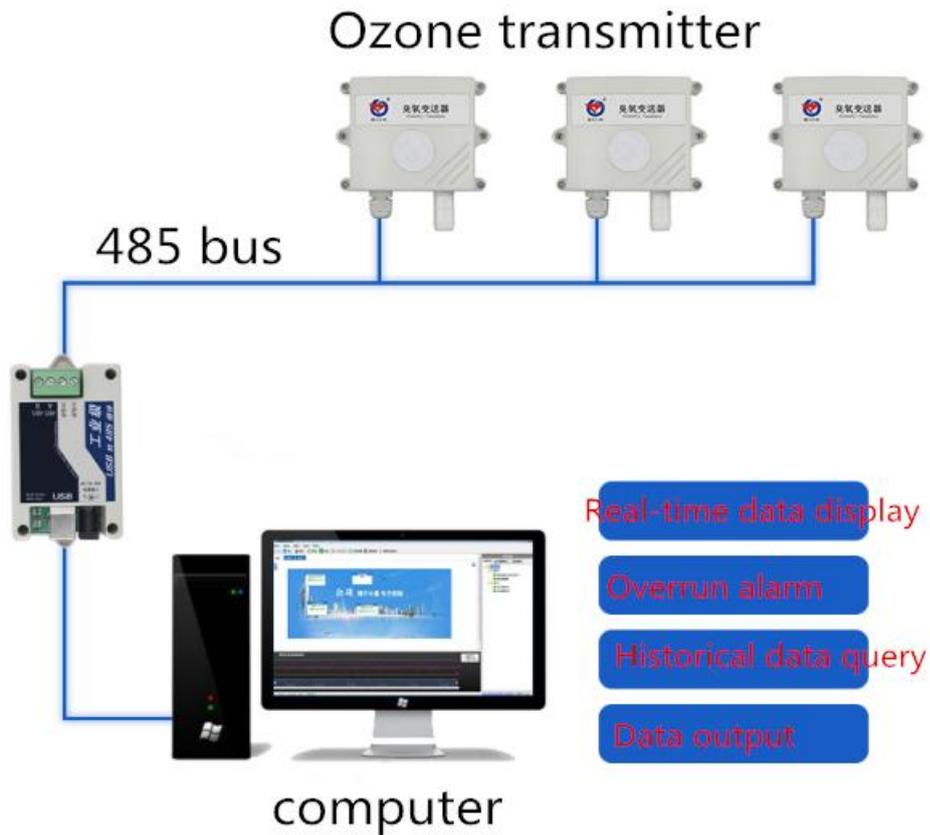
System solution block diagram

2. Equipment installation instructions

2.1 Check before installation

Equipment List:

1. One O3 transmitter device

2. Self-tapping screws (2 pcs), expansion plugs (2 pcs)

3. Product certificate, warranty card, wiring instructions, etc.

4. USB to 485 (optional)

2.2 Instructions for installation steps

▲ drilling   ▲ The expansion plug is placed in the hole   Self-tapping screw
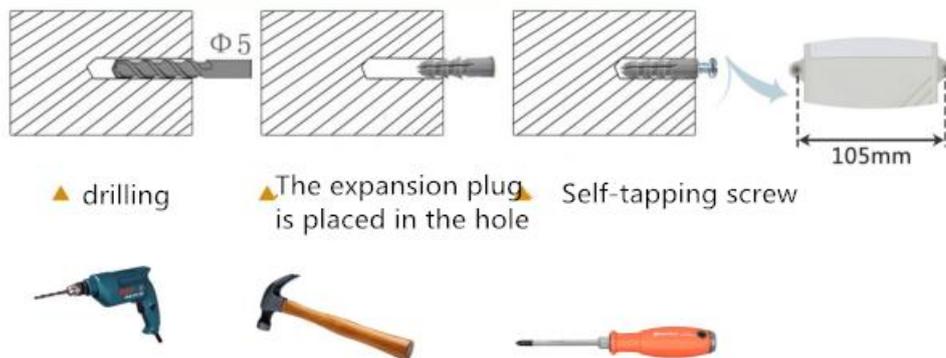
2.3 Interface Description

Wide voltage power input can be 10 ~ 30V. When connecting the 485 signal line, please note that the two lines A \ B cannot be reversed, and the addresses of multiple devices on the bus must not conflict.

	Thread color	Explanation
power supply	brown	Power is positive（10~30V DC）
	black	Negative power supply
Communication	yellow	485-A
	blue	485-B

2.4 485 field wiring instructions

When multiple 485 type devices are connected to the same bus, there are certain requirements for field wiring. For details, please refer to the "485 Device Field Wiring Manual" in the data package.
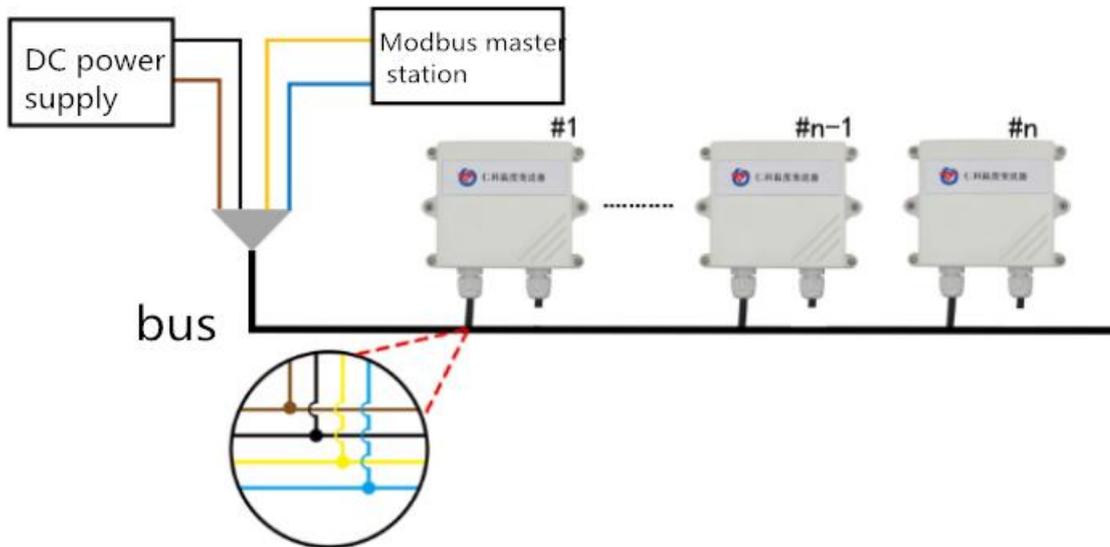
# 3. Configuration software installation and use

3.1Software selection

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

Software"，turn up Just open。

3.2 parameter settings

①、 Select the correct COM port ("COM" in "My Computer-Properties-Device Manager-Port" to

view the COM port). The following figure lists the driver names of several different 485 converters.
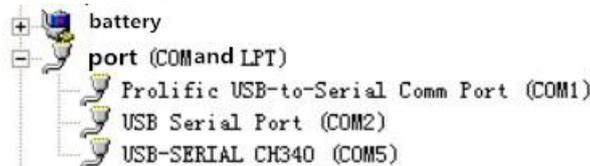
② Only connect one device and power it on, click the test baud rate of the software, the

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

can query the current functional status of the device.

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

⑤ Click the corresponding gas, you can directly view the current real-time value of the

gas

⑥Note: This software can only set three baud rates of 2400bit / s, 4800bit / s, 9600bit / s

4. letter of agreement

4.1 Communication basic parameters

Coding	8-bit binary
Data bit	8 bit
Parity bit	no
Stop bit	1 person
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:

Time of initial structure ≥ 4 bytes

Address code = 1 byte

Function code = 1 byte

Data area = N bytes

Error check = 16-bit CRC code

End structure time ≥ 4 bytes

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

Function code: instruction function instruction issued by the host, the transmitter uses function codes 0x03 (read register data) 0x06, 0x10 (write register data)

Data area: The data area is specific communication data, pay attention to the high byte of 16bits data first!

CRC code: two-byte check code.

Host inquiry frame structure：

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

Slave response frame structure：

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

4.3 Register address

Single ozone device (same for other registers)

Register address	PLC or configuration address	Content	Support function code	Scope and definition
0000 H	40001	Ozone concentration (Register 0 and register 2 are the same, the user can choose one according to the actual situation)	0x03/0x04	Values in the selected model range (0 ~ 100ppm, the original value, 0 ~ 10ppm is the value after 100 times expansion)
0002 H	40003			

Ozone temperature and humidity integrated equipment

Register address	PLC or configuration address	content	Support function code	Scope and definition
0000 H	40001	Humidity value	0x03/0x04	0~1000 (original value)
0001 H	40002	Temperature value	0x03/0x04	-400~800 （original value）
0002 H	40003	Ozone concentration	0x03/0x04	Values in the selected model range (0 ~ 100ppm are original value, 0 ~ 10ppm is the value after enlarge 100 times)
0032 H	40051	Temperature calibration value	0x03/0x04/0x06/0x10	Write after expanding 10 times
0035 H	40054	Humidity calibration value	0x03/0x04/0x06/0x10	Write after expanding 10 times
0038 H	40057	Ozone calibration value	0x03/0x04/0x06/0x10	When the range is 10ppm, write after expanding 100 times, and when the range is 100ppm, it is original value
07D0 H	42001	Device address	0x03/0x04/0x06/0x10	1 ~ 255 (factory default 1)
07D1H	42002	Device baud rate	0x03/0x04/0x06/0x10	0 for 2400bit/s 1 for 4800bit/s 2 for 9600bit/s 3for 19200bit/s 4 for 38400bit/s 5for 57600bit/s 6 for115200bit/s 7for 1200bit/s

4.4 Communication protocol example and explanation

4.4.1 Read the address and baud rate of the device with address 0x01

Inquiry frame (for example: the address is 0x01 and the baud rate is 4800)

address code	function code	initial address	Data length	Check digit low	Check digit high
0x01	0x03	0x07 0xD0	0x00 0x02	0xC4	0x86

Reply frame

address code	function code	Effective bytes	Baud rate	address	Check digit low	Check digit high
0x01	0x03	0x04	0x00 0x01	0x00 0x01	0x6A	0x33

4.4.2 Change address

Inquiry frame (assuming that the modified address is 0x02 Note: after modifying the address, power off and restart the device)

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

Reply frame

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

4.4.3 Modify the baud rate at address 0x01

Inquiry frame (assuming that the baud rate is modified to 9600. Note: after modifying the address, power off and restart the device)

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

Reply frame

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

4.4.4 Read the O3 value of device address 0x01

Inquiry frame (single ozone device can read 00 register or 02 register, three-in-one device can only read 02 register)

address code	function code	initial address	Data length	Check digit low	Check digit high
0x01	0x03	0x00 0x02	0x00 0x01	0xD1	0x25

Reply frame

address code	function code	Returns the number of valid bytes	O3value	Check digit low	Check digit high
0x01	0x03	0x02	0x01 0xF4	0x9C	0x53

O3：

For devices with a range of 0 to 10 ppm, the ozone concentration value is the value after the expansion of 100 (resolution 0.01 ppm):

01F4 (Hexadecimal) = 500 => O3 = 5ppm

For devices with a range of 0 to 100 ppm, the ozone concentration value is the value after 10 times expansion (resolution 0.1 ppm)

01F4 (Hexadecimal) = 500 => O3 = 50ppm

4.4.5 Read the temperature and humidity and O3 value of device address 0x01

Inquiry frame

address code	function code	initial address	Data length	Check digit low	Check digit high
0x01	0x03	0x00 0x00	0x00 0x03	0x05	0xD0

Reply frame

address code	function code	Bytes	Humidity value	Temperature value	O3value	Check digit low	Check digit high
0x01	0x03	0x06	0x01 0x67	0xFF 0xB5	0x01 0xF4	0x3E	0x79

Temperature: When the temperature is lower than 0 ℃, the temperature is uploaded as a complement.

FFB5 H (Hexadecimal) = -75 => Temperature = -7.5 ℃

humidity:

167 H (hex) = 359 => humidity = 35.9% RH

O3: (equipment with a range of 0 ~ 10ppm)

1F4H (Hexadecimal) = 500 => O3 = 5.00 ppm

4.5 O3 Conversion relationship between measurement unit ppm and mg / m3

The conversion formula is based on 25 ° C and 1 atmosphere: X ppm = (Y mg / m3) (24.45) / (molecular weight) or Y mg / m3 = (X ppm) (molecular weight) /24.45

Only for calculating O3:

1ppm=1.96mg/m3   1mg/m3=0.51ppm

5. Common problems and solutions

The device cannot be connected to a PLC or computer

possible reason:

1) The computer has multiple COM ports, and 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) Baud rate, check mode, data bit, stop bit error.

4) The host's polling interval and waiting time for answering are too short, and both need to be set above 200ms.

5) The 485 bus is disconnected, or the A and B lines are reversed.

6) If the number of devices is too large or the wiring is too long, power should be supplied nearby, and a 485 booster should be added, and 120Ω terminal resistance should be added.

7) The USB to 485 driver is not installed or damaged.

8) The equipment is damaged.

6. Contact information

Shandong Renke Control Technology Co., Ltd.

Address: 10/ F, East Block, Building 8, Shun Tai Plaza, High-tech Zone, Jinan City, Shandong Province

Post code: 250101

Phone: 400-085-5807

Website: www.renkeer.com

Cloud platform address: en.0531yun.com

Web QR:

7. Document History

V1.0 document creation.

V2.0 modify the selection table.

V2.1 Modify product selection.

V2.1 Modify product parameters

8. Appendix: Shell dimensions

Overall size: 110 × 85 × 44mm