



Formaldehyde transmitter User manual (Type 485)

Document version:V1.0





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1.product description

1.1product description

The formaldehyde transmitter designed by our company adopts electrochemical sensor with high measurement accuracy, fast response, long service life and long stability. The output resolution of the device can reach 0.01ppm, and it can be monitored online for 24 hours. Smart homes, air fresheners, air conditioners, etc. require long-term online monitoring of formaldehyde concentrations in industries or equipment.

The device adopts wide voltage 10-30V DC power supply, 485 signal output, standard Modbus-RTU communication protocol, ModBus address can be set, baud rate can be changed, communication distance is up to 2000 meters.

1.2Features

- Range 0-5ppm, other ranges can also be customized.
- High measurement accuracy and repeatability up to $\pm 2\%$.
- 485 communication interface standard ModBus-RTU communication protocol, address, baud rate can be set, the communication distance is up to 2000 meters.
- Optional high-quality OLED display, the value can be directly viewed on the spot, and the night can be clearly displayed.
- On-site power supply adopts 10~30V DC wide voltage power supply, which can adapt to various DC power supplies in the field.
- The product adopts wall-mounted waterproof case, which is easy to install and has high protection level and can be applied to harsh environment.

1.3Main Specifications

Power supply	10~30V DC
output signal	485
Power consumption	0.12W
Temperature measurement range	-40° C~+80° C
Humidity measurement range	0~100%RH
Temperature accuracy	$\pm 0.5^{\circ}$ C
Humidity accuracy	$\pm 3\%$ RH
Operating temperature	-20~50° C
Working humidity	15~90% RH without condensation
Pressure range	91~110Kpa
Stability (months)	$\leq 7\%$ signal value/year



Response time	≤35S
Formaldehyde zero drift (-20~40° C)	≤±0.5ppm
Repeatability	≤2% output value
Service life	≥24 months
Precision	±5% FS (@1ppm,25°C, 50%RH)
Resolution	0.01ppm

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

1.4product model

Formaldehyde concentration transmitter selection:

RS				Company code	
	CH2O-			Formaldehyde transmitter	
		N01-			485 (Modbus protocol)
				2-	Wall-mounted king shell
				OLED-	Wall-mounted king shell with OLED display
					5P

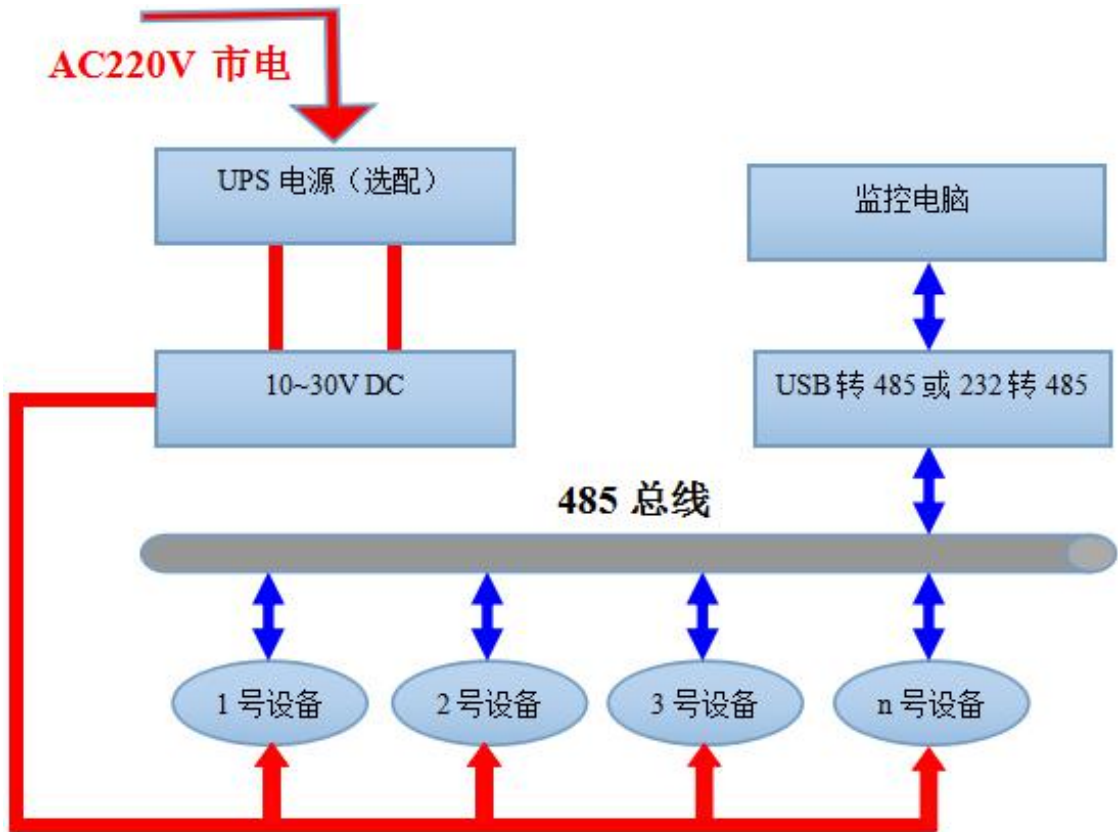
Formaldehyde temperature and humidity three-in-one transmitter selection:

RS				Company code	
	CH2OWS-			Formaldehyde temperature and humidity three-in-one transmitter	
		N01-			485 (Modbus protocol)
			2-	Wall-mounted	



					king shell
				5P	Corresponding range 0~5ppm model

1.5 System framework





2. Equipment installation instructions

2.1 Equipment inspection before installation

Equipment List:

- Formaldehyde transmitter equipment 1
- Self-tapping screws (2), expansion plugs (2)
- Product certificate, warranty card, wiring instructions, etc.
- USB to 485 (optional)

2.2 Installation step description



2.3 Interface Description

Wide voltage power input can be 10~30V. When wiring the 485 signal line, note that the A\B lines cannot be connected in reverse, and the addresses between multiple devices on the bus cannot conflict.

	Line color	Description
power supply	brown	Power supply (10~30V DC)
	black	Negative power supply
Communication	yellow	485-A
	blue	485-B

2.4 485 Field wiring instructions

When multiple 485 models are connected to the same bus, there are certain requirements for field wiring. For details, please refer to the 485 Equipment Field Wiring Manual in the data package.

3. Configuration software installation and use

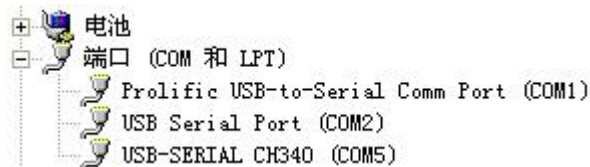
3.1 Software selection

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 ("My Computer - Properties - Device Manager - Port" to view the COM port). The following figure lists the drive names of several different 485 converters.



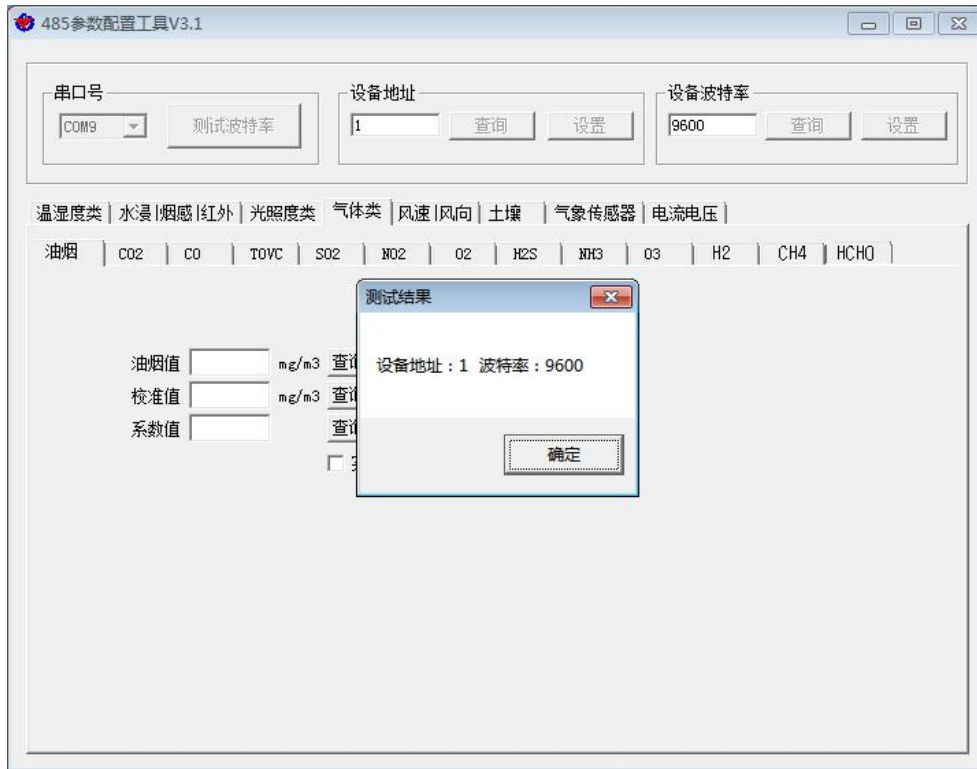
2. Connect only one device and power on separately. Click the test baud rate of the software. The software will test the baud rate and address of the current device. The default baud rate is 4800 bit/s and the default address is 0x01.

3. Modify the address and baud rate according to the needs of use, and query the current functional status of the device.

4. If the test is not successful, please re-check the equipment wiring and 485 driver installation.

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

6, note: this software can only set 2400bit / s, 4800bit / s, 9600bit / s three baud rate



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 \geq 4 bytes of time

Address code = 1 byte

Function code = 1 byte

Data area = N bytes

Error check = 16-bit CRC code

End structure \geq 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, 0x10 (write register data).

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

4.3 Register address

Single formaldehyde equipment (other registers are the same)

Register address	PLC or configuration address	content	operating	Scope and definition
0000 H	40001	Formaldehyde concentration	Read only	Expand 100 times upload
0002 H	40003			

Formaldehyde temperature and humidity integrated equipment

Register address	PLC or configuration address	content	operating	Scope and definition
0000 H	40001	Humidity value	Read only	0~1000 (the value after expanding 10 times)
0001 H	40002	Temperature value	Read only	-400~800 (the value after expanding 10 times)
0002 H	40003	Formaldehy	Read	Increase the value after



		de concentration	only	100 times
0032 H	40051	Temperature calibration value	Read and write	Data is expanded 10 times and then written
0035 H	40054	Humidity calibration value	Read and write	Data is expanded 10 times and then written
0038 H	40057	Formaldehyde calibration value	Read and write	Data is expanded by 100 times and then written
07D0 H	42001	Device address	Read and write	1~255 (factory default 1)
07D1H	42002	Device baud rate	Read and write	0 for 2400 1 for 4800 2 represents 9600

4.4 Communication protocol example and explanation

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

Inquirer frame (for example: address is 0x01 baud rate is 4800)

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

Response frame

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

4.4.2 Change address

Inquiry frame (assuming the modified address is 0x02 Note: After the address is modified, the device needs to be powered off to restart the device)

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

Response frame

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

4.4.3 Modify the baud rate of address 0x01

Inquirer frame (assuming the modified baud rate is 9600. Note: After modifying the address, you need to power off and restart the device)



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

Response frame

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

4.4.4 Read the formaldehyde value of device address 0x01

Inquiry frame (single-formaldehyde device can read 00 register or 02 register, 3-in-1 device can only read 02 register)

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

Response frame

address code	function code	Returns the number of valid bytes	CH2O value	Check code low	Check code high
0x01	0x03	0x02	0x00 0x01	0x9B	0xAF

formaldehyde:

0001 (hexadecimal) = 1 => CH₂O = 0.01ppm

4.4.5 Reading the temperature, humidity and formaldehyde value of the device address 0x01

Inquiry frame:

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

Response frame

address code	function code	Number of bytes	Humidity value	Temperature value	CH ₂ O	Check code low	Check code high
0x01	0x03	0x06	0x01 0x67	0xFF 0xB5	0x00 0x01	0xD7	0x5E

Temperature: When the temperature is below 0 ° C, the temperature is uploaded in complement form.

FFB5 H (hex) = -75 => temperature = -7.5° C

humidity:

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



Formaldehyde:

0001 (hexadecimal) =1=> Formaldehyde = 0.01 ppm

4.5 Formaldehyde measurement unit ppm and mg/m³ conversion relationship

At standard atmospheric pressure, the conversion is based on the following conversion formula and is only applicable to the calculation of formaldehyde:

1ppm=1.341mg/m³ 1mg/m³=0.746ppm

5. Common problems and solutions

Device cannot connect to PLC or computer

possible reason:

- 1) The computer has multiple COM ports, and the selected port is incorrect.
- 2) The device address is incorrect, or there is a device with a duplicate address (all the factory defaults to 1).
- 3) Baud rate, check mode, data bit, stop bit error.
- 4) The host polling interval and the waiting response time are too short and need to be set to more than 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, the power should be supplied nearby, add 485 enhancer, and increase the resistance of 120 Ω terminal.
- 7) The USB to 485 driver is not installed or damaged.
- 8) Equipment damage.

6. Contact information

Shandong Renke Control Technology Co., Ltd.

Address: 2 / 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.cn Or: eniot.0531yun.cn

Web QR:



7. Document history

V1.0 document creation

8. Appendix: Housing dimensions

Overall size: 110 × 85 × 44mm

