katranji RS485 Transmitter and Humidity Sensor Type User Manual

Contents

1 katranji RS485 Transmitter and Humidity Sensor Type
2 Product Information
3 Product Usage Instructions
4 FAQ
5 Power Supply and Wiring
6 Chapter 3: Communication Protocol
7 Chapter 4: Modify Address and Baud Rate
8 Chapter 5: Installation Method
9 Chapter 6: Precautions
10 Chapter 7: Common Problems and Solutions
11 Documents / Resources
11.1 References

katranji RS485 Transmitter and Humidity Sensor Type

Product Information

Specifications:

- Temperature Measurement Range: [insert temperature range]
- Temperature Resolution: [insert temperature resolution]
- Temperature Measurement Accuracy: [insert temperature accuracy]
- Humidity Measurement Range: [insert humidity range]
- Humidity Resolution: [insert humidity resolution]
- Humidity Measurement Accuracy: [insert humidity accuracy]
- Response Time: [insert response time]
- Preheat Time: [insert preheat time]
- Installation Method: [insert installation method]
- Voltage: [insert voltage]
- Current Consumption: [insert current consumption]
- Service Life: [insert service life]
- Product Size: [insert product size]
- Product Weight: [insert product weight]

Features:

- This project can be equipped with an optional LED display screen.
- 128×96 high pixel display for on-site data display.

Product Usage Instructions

Installation:

1. Select a suitable location to install the transmitter and humidity sensor.
2. Ensure that the installation method is appropriate for the chosen location.

Power Connection:

1. Connect the transmitter and humidity sensor to a power source using the specified voltage.
2. Check the current consumption to ensure it is within the limits of your power source.

Data Display:

If equipped with an optional LED display screen:

1. Ensure that the LED display screen is connected properly to the transmitter and humidity sensor.
2. Follow the instructions provided with the LED display screen to configure and display the on-site data.

FAQ

Q: Can the transmitter and humidity sensor be used outdoors?

A: The transmitter and humidity sensor can be used outdoors if the installation method provides adequate protection against environmental elements.

Q: What is the response time of the product?

A: The response time of the product is [insert response time].

Q: How long is the service life of the product?

A: The service life of the product is [insert service life].

Overview

- This product uses a high-precision temperature and humidity sensor probe and a high-performance microprocessor which can accurately measure the temperature and humidity in the air and meet the application needs of customers in various industries.
- This product uses imported 485 chips and uses a 485 interface for multiple protections, which can effectively cope with the interference of surges and pulses
  on the industrial site, and has reliable communication within the range of full baud rate of 1200 – 115200, which is at the leading level in the industry.
- This product follows the standard ModBus RTU protocol and can use the upper computer software to flexibly modify the address and baud rate. This product cooperates with the 485-to-4 network module to transmit data to the cloud server.

Features

- Currently DC 12-24V wide voltage power supply, the actual DC 10-30V can still work normally, the power is less

than 1 watt.

- This project provides upper computer debugging software to modify the device address and baud rate, convenient RS485 networking RS485 interface, standard Modbus RTU protocol, can be connected with 485 to 4G/Ethernet module.
- Adopts imported big brand RS485 chips to provide multiple protections for the interface, anti-surge and anti-line connection.
- It has been confirmed by customers on site for many years that the transmission distance is more than 1200 meters (EIA International Electronics Industry Association standard).
- The district has its own intellectual property rights, holds core technology alone, and has authorized patent number: ZL202030175531.0
- This project can be equipped with an optional 0LED display screen and 128×96 high-pixel display to meet the needs of on-site data display.

Specifications

Temperature Measurement Range	-20°C to 80°C
Temperature Resolution	0.01°C
Temperature Measurement Accuracy	±0.2°C
Humidity Measurement Range	0-100%RH
Humidity Resolution	0.01%RH
Humidity Measurement Accuracy	±2%RH
Response Time	less than 3 seconds
Preheat Time	less than 1 minute
Installation Method	Wall-mounted
Voltage	DC12V-24V
Current Consumption	‹100mN
Response Time	‹3 seconds
Service Life	more than 5 years
Product Size	115x117x45mm
Product Weight	<300g

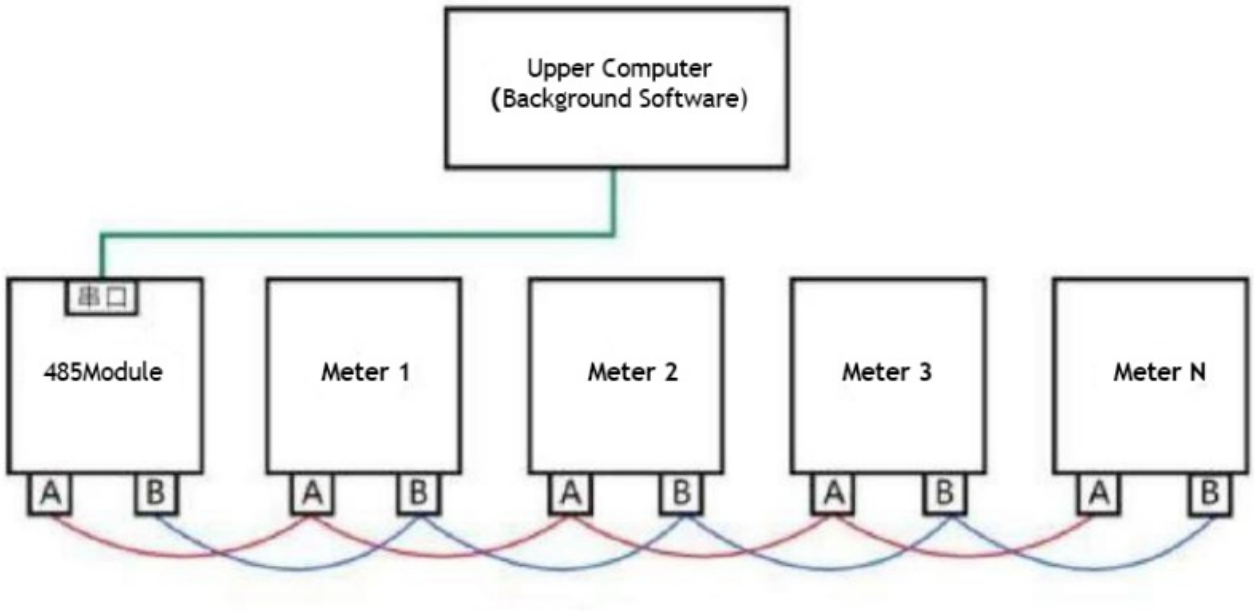
Dimensions

Product appearance display

Power Supply and Wiring

Working power supply
This product uses wide voltage DC power supply, and the actual maximum power supply range can reach 10V-30V, which is reserved for certain margin, the rated voltage DC 12V-24V generally labeled externally: rated current is less than 0.1A, and the power is less than 1W. Customers generally use DC 12V or 24V power supply, and the power supply line is long, consider the line circuit voltage drop, it is recommended to use DC 24V power.

Wiring method
The output of this product is a four-core cable, and the outer diameter of the cable is 6.5mm to 7mm, length about 1 meter. The colors of Four cores wires are red, black, yellow, and green. The red one is connected to the positive pole of the power supply, the black one is connected to the negative pole of the power supply, and the yellow one is connected to the A+ nd of the RS485 interface, and the B-end of the green ring RS485 interface. This product is RS485 output, standard ModBus protocol, and multiple sensors can be connected hand in series.



RS485 Network Wiring Diagram

Application method
This product has a variety of application methods and can be directly connected to the PLC controller or wave crystal display screen: through RS485 interface, connect to 485 to Wifi/4G/Ethernet and other network modules, and the data collected by the sensor is transmitted to the cloud database; it can also be directly connected to computers and single – chip microcomputer of secondary development.

Chapter 3: Communication Protocol

Serial port parameters:

Baud Rate	9600
Data Bit	8 people
Stop Position	1 position
Check Bit	No Verification

Remark

- The above are only the factory default settings, in which the device address is 01-252 and the baud rate is 1200-115200 “1200/2400/4800/9600/19200/38400/115200), check digit (no check, odd Verification, even parity) can be changed independently according to customer needs.
- To change the device address and baud rate, please refer to Chapter 4 of this product manual and use the free debugging software and modify with one click
  [strongly recommended; please refer to Chapter 5 if you are concerned, use the serial port and 485 Instruction change (one share is not recommended, only professional and technical personnel can use).
- To change the check digit, please refer to Chapter 5 of this product manual and issue the 485 command to modify it.

Register address

- The address of the temperature register is 01, and the hexadecimal notation is 01H. If it starts with 4000, it is 40002;
- The address of the humidity register is 02, the hexadecimal value is 02H, and if it starts with 4000, it is 40003.

Notice: PLC or touch screen reading, the register address starts with 4000, relative to the sensor itself because the sensor register starts from 0, and the PLC register 4000x starts from 40001 half the beginning.
In PLC, the data mode is 16-bit unsigned integer type, and the register is maintained.

Data reading instructions and analysis methods:

Read data separately

The instruction to read the temperature separately is, 010300010001D5CA:
The instruction read the humidity separately is, 01030002000125Ch:
The returned data format is: 010302 ABCD EFGH, where 010302 fixed format remains unchanged.
The 4 characters of the ABCD position are temperature or humidity values, and the EFGH position is Modbus CRC-16 Check code.

Read temperature and temperature data at once
The read instruction is, 01030001000295CB
The returned data format is 010304 ABCD EFGH UVWX, where 010304 fixed format is not change, the ABCD position is the temperature value, the EFGH position is the humidity value, the UVWX position is Modbus CRC-16 check code.
Note: For the specific meaning of each character in the read command and return command, please refer to Section 3.5, Communication Protocol Discuss.

Data conversion method

Temperature data conversion method
Temperature data is saved in register 01 (01 is decimal, hexadecimal is 01H), and the data conversion method is:
Temperature = (numeric value in register 01 -2000) /100.

Example:
If the value stored in register 01 is 0x12C0, the decimal value corresponding to 16-bit format 12C0 is 4800, then temperature = (4800-2000) /100=28C.

Humidity Data Conversion Method
Humidity data is stored in register 02 (02 is decimal, hexadecimal is 02H), and the data conversion method is:

Watt = value in register 02/100.

Example:
If the value saved in register 02 is 0x12C1, the decimal value corresponding to 16-bit format 12C0 is 4801, then shallowness =4801/100=48.01%

Communication:
The sensor follows the standard ModBus RTU protocol, and the sensor readings are saved in a 16-bit holding register. The digital format is unsigned integer type, and the function code for reading data is 03.
Upper computer reading sensor data query frame format

Device Address	Function Code	Register Starting Address	No. of Registers	CRC Low Bit	CRC High Bit
1 byte	1 Byte	2 Byte	2 Byte	1 Byte	1 Byte

Example: For example, the data sent by the host computer is 01 03 00 01 00 02 95 CB (16 format

- 01 is the device's factory default address 0x01،
- 03 is the RS485 function arsenic – weekly fetch register,
- 00 01 is the starting address of the register to be read -0x01,
- 00 02 is the number of registers to be read -2,
- 95 is the low bit of 16-bit CRC,
  CB is a 16-bit CRC high

The lower computer device responds to the upper computer and returns sensor data. Response format:

Device Address	Function Code	Sensor Data Length	Sensor Data 2N Bytes	CRC Low Level	CRC High Level
1 byte	1 Byte	2 Byte	2 Byte	1 Byte	1 Byte

N is the number of read registers that store sensor data. Example: For example, the data returned by the lower computer is: 01030407D101F4AB69 [hexadecimal]

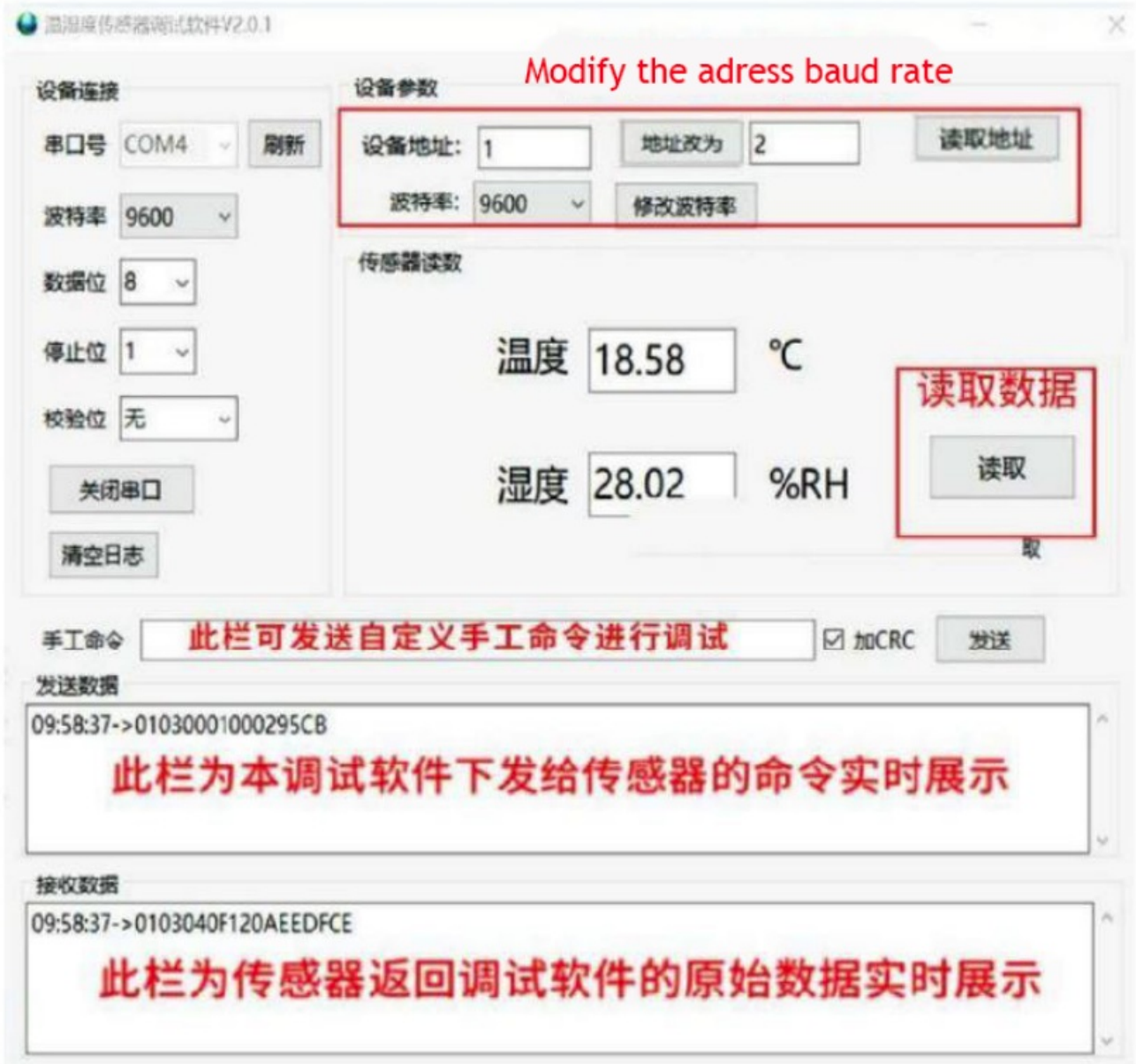
- 01 is the device address to which the returned data frame belongs -0x01,
- 03 is the RS485 function arsenic – weekly fetch holding register,
- 04 is the number of bytes of sensor data -4,
- 07 D1 is the temperature data, converted to decimal, it is 2001,
- 01F4 is the humidity data converted to decimal, which is 500.
- AB is the low bit of 16-bit CRC,
- 69 is the high bit of 16-bit CRC.

Chapter 4: Modify Address and Baud Rate

Host computer debugging software interface
We provide PC debugging software for free, which can connect the sensor to the sensor through the 485 to serial

port/USB module.
Enter the computer and view the sensor readings on the computer. The most important thing is that you can modify the transmission with one click through the debugging software.
The router's address and baud rate.

Special Instructions:
In the manual command bar of the software, check Add CRC and click Send. In the Send Data field below, it will be displayed.
The display shows the completed command with CRC added, and the customer does not need to manually calculate the Modbus RTU-16 CRC check code.



Modify address and baud rate through debugging software
As shown in the host computer debugging interface in the figure above, the device address and baud rate can be modified through the host computer debugging software change.

Modify device address
Modification Steps:

1. In the box behind the device address, manually enter the current address of the sensor.
2. Change the address to the box at the back and manually enter the address you want to change to. 3. Click Change Address to, and the device address is modified;

3. Click Read Address. The box behind the device address will display the successfully modified address. Example: If the current address of the sensor is 01 and you want to change it to 02, enter 01 in the box behind the device address. Change the address to 02 in the box behind, click Change address to, and the device address will be changed to 02.

Detailed Description

- After the devices are connected, click the Get Address button first. At this time, the shackle behind the device address will be displayed. The current address of the sensor. Observe the box at the bottom of the software that receives data. If there is no window, at the same time, return to teach broom, a communication timeout will appear after 3 seconds, which means that the line is not connected well and the communication is not good. It doesn't make sense. To modify the address and baud rate, the operation can only be performed when communication is normal.
- There is a box behind the device address. After clicking to read the address, the current address of the sensor is displayed in the cabinet. The number above must be the same as the actual address of the sensor so that the debugging software can work properly. Therefore, generally before reading data and modifying serial port parameters, it is best to click once to obtain the address button.
- Change the address to the box behind the button, which is the address we want to modify. For example, we want to change the device If the address is changed from the current 1 to 2, then enter 2 in the box after the address is changed to, and then click on the address. Change address to button. After clicking Finish, the sensor will automatically restart. After 3 seconds, the address will be It has been changed to 2. At this time, click Read Address. The number displayed in the box behind the device address button is 2. It means the address modification is successful.
- Note: The box after "Device Address" is used when the debugging software issues instructions to the sensor. The address needs to be consistent with the sensor address for normal communication; click Logic to get the address and device address.
- The following box will automatically change to the current address of the sensor. Change the address to the box behind the button, it is the address we want to modify. The numbers in the box can be entered manually. Click "Address" after changing it to ", the host computer sends a command to the sensor and changes the address of the sensor to "address changed to "the number in the box in front of the button."

Modify baud rate

1. The baud rate under the serial port number in the device connection section of the upper left corner of the

software needs to be selected and sensed. Only when the current baud rate of the device is consistent can the communication be normal.

2. The number in the box behind the device address directly above the software must match the current location of the sensor. Only when the addresses are consistent can normal communication be possible.
3. The baud rate under the device address just above the software is the baud rate we want to modify. Click to modify the baud rate, and the modification is successful. It will take effect after the sensor is powered off and restarted.
4. After modifying the baud rate, you need to select and modify the baud rate under the letter in step 1. Only when the serial port is opened can normal communication be achieved.
   Example: Modify the device address 03 and the Tong sensor with a baud rate of 9600 to a baud rate of 19200 [device address] 03 Keep calm , as follows:

Detailed Description

- Then click the Logical Address button and make sure that the Receive Data column in the lower half of the software has return data, so as to correct
- Click the drop-down box in front of the “Modify Baud Rate” button, select the baud rate you want to modify, and then click the “Modify Baud Rate” button. After 3 seconds, the sensor’s baud rate has been modified. When the sensor is powered off, the warning will take effect.
- Since the current serial port parameters of the host computer are still before modification, and the sensor baud rate has been modified, at this time, the baud rate of the host computer and the baud rate of the sensor are inconsistent, so at this time, the host computer is Unable to communicate with the sensor. The solution is: click the “Close Serial Port” button in the software, and click on “Omit” In the “Baud Rate” drop-down box under the slogan “, select the baud rate modified by Liu Cai, and then click “Open” Open the serial port, then the baud rate of the debugging software is consistent with the baud rate of the sensor. Can communicate normally.
- Note: The baud rate in front of the “Modify Baud Rate” button is set for modification. Click “Modify Baud Rate” and the software will issue a command to modify the sensor’s baud rate to the number you selected: The baud rate under “Serial Port” is used to set the current serial port parameters of the host computer debugging software. It must be consistent with the sensor to enable communication.

Send instructions through the serial port to modify the address, baud rate, and check digit

- The sensor uses the 06-function code to modify the sensor address, baud rate and check digit, and write after modification.
- It is stored in the internal Flash of the sensor and will not be lost after power off and restart. (For changing the baud rate to 115200, Ji needs to adopt Use function code 16)

- For the debugging software we provide, you can directly enter the 485 command in the command field to issue it. When checked,
- After “Add CRC” above, you can send it directly without entering the CRC check code. The software will automatically calculate the CRC, which is better than
  It is more convenient and recommended to use.

Population
Modify the address of Shi Lie Build and use the method in Chapter 4 2.1 to modify the device address, simple one
It is not easy to make mistakes, and it is not recommended to use the manual commands in this chapter to modify it.
Modify the sum of the device address as;
Current device address +06+002F+00+ the address you want to modify + CRC check code

Example:

1. If the current sensor address is 01, change its address to 02, and the sum is: 0106002F000239C2 01 is the current device address
    1. 06 is the function code, 00 2F is the register 47 that saves the sensor address ‹2F is hexadecimal, converted to decimal is 47), 00 02 is to change the address to 2 39 €2 is CRC Check code. Sensor response: 01 06 002F 0002 39C2
2. If the current device address of the sensor is 3 and you want to change the address to 9, the command is: 03 06 00 2F 00 09 +CRC check code
    1. Here 03 is the current address of the device, and 09 is the address you want to change it to.
    2. The CRC check code is the data before the CRC check code in the command, calculated based on the Modbus CRC-16 formula.
    3. Yes, you can also use our software to manually issue commands through the command line. After checking the box to add CRC, the error will not occur when issuing commands.
    4. A CRC needs to be entered, and the software will automatically calculate it.

Modify the Baud Rate (it is recommended to use the method in Chapter 4 2.2 to modify the baud rate, which is simple and not easy to make mistakes. It is recommended to use the serial port manual commands in this chapter to modify.
The baud rate occupies the holding register, respectively 45 (0x2D) and 46 (Ox2E), which register What is saved in the device 45 is the high bit of the baud rate (only useful when the baud rate is 115200, the baud rate is from 1200-38400, the values in register 45 are all 0

1. Modify the baud rate to any one of 1200-38400, and the format of issuing the command is:
   Device address 06 +002E + baud rate you want to modify + CRC check code
2. To modify the baud rate to 115200, the command that needs to be issued is: Device address +10+002D+0002+04+0001+C200+CRC check code

Example:

- Project “Change the baud rate of the sensor to 4800 (0x12 C0), and let: 0106002E12C0 B533
- 01 is the address, 06 is the function code, 00 2B is the register that stores the baud rate, 12 C0 is to be modified

- The baud rate is 4800 (hexadecimal), and E5 33 is the CRC check code.
- Sensor response: 0106002E12C0 E533
- To “change the baud rate to 115200, you need to use function code 16, and the command is:
- 0110002D0002040001C200308E
- 01 device address, 10 is function code 16 (0x10), 00 2D is the starting address of the written register (45),
- 00 02 is the number of registers written, 04 is the number of bytes, 0001 C200 is 115200 in hexadecimal, 30 8E
- For CRC check.
- Sensor response: 0110002D0002D1C1

Modify the Check Digit

- The sensor calibration bits are divided into odd calibration, even calibration and no calibration. The factory default is no calibration.
- If you need to change the check bit configuration of the sensor, you can use the following command:
- Configure the parity bit to no parity
- The sum is: device address +06+002C0000+CRC check code
- Taking the sensor device address as 1 as an example, the host computer issues a command to the sensor:
- 01 06 00 2C 00 00 48 03
- The sensor will also return data 01 06 00 2C 00 00 48 03.
- The above command, the part in red, is the part modified according to the actual situation, that is: device address 01,
- It can be changed to the current actual device address; the check code is 48 03, which needs to be changed as the device address changes.
- Configure the parity bit to odd parity and let be: device address +06+002C0001+CRC
- Taking the sensor device address as 2 as an example, the host computer issues a command to the sensor: 02 06 00 2C 00 0189 F0
- The sensor will also return data 02 06 00 2C 00 01 89 F0.
- The above command, the part in red, is the part modified according to the actual situation, that is: device address 02,
- It can be changed to the current actual device address; the check code is 89 PO, which needs to be changed as the device address changes.
- Project “Configure the parity bits to even parity and let be: device address +06+002C0002+CRC
- Taking the sensor device address as 1 as an example, the host computer issues a sum command to the sensor: 01 06 00 2C 00 02C9 C2
- The sensor will also return data 01 06 00 2C 00 02 C9 C2.
- The above command, the part in red, is the part modified according to the actual situation, that is: device address o1,
- It can be changed to the current actual device address; the check code C9 C2 needs to change as the device address changes.

Chapter 5: Installation Method

- This product is wall-mounted. The hole spacing is 105mm. True diameter 3mm screws can be used. The specific dimensions of the product can be

- Refer to Chapter 1.4: Product Dimensions.
- When this product is installed indoors, it can also use a ceiling-mounted casing and a ceiling-mounted internal circuit.
- And the temperature and humidity probe is exactly the same as the wall-mounted installation. Please contact the salesperson if necessary.

Chapter 6: Precautions

This product is powered by DC DCL2-24y and cannot be directly connected to 220V

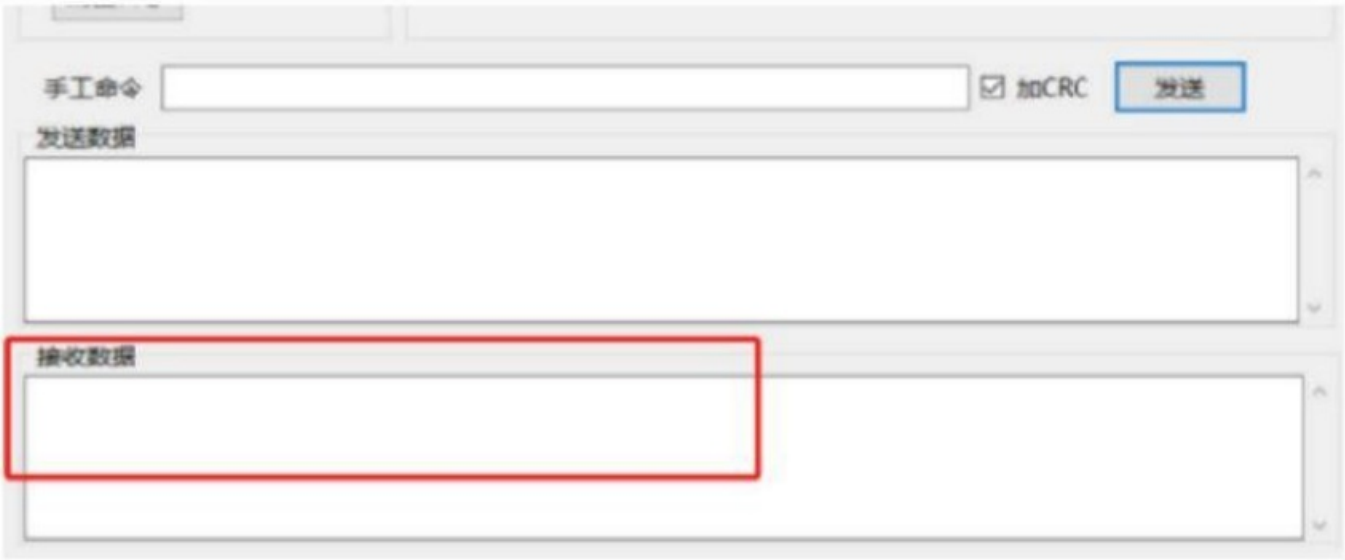
AC power. No
Otherwise, the product may be burned.

This product adopts a port protection circuit internally. Within the power supply DC 12-24V range, the power supply Reverse connection or connecting the power cord to the RS485 signal line will not cause damage to the product, but it is still recommended.

Users should use it with caution to avoid unnecessary hazards.

Chapter 7: Common Problems and Solutions

Data failure, communication timeout
This product is mass-produced and shipped. It has undergone strict testing before leaving the factory. Generally speaking, it will not be shipped.
Present basic 485 communication issues. When there is a communication failure, you can consider passing the sensor through 485
Connect the fixed port/USB module to the computer, use the PC debugging software we provide, and click “Read Address” Click the “Address” button and observe the “Receive Data” box at the bottom of the software interface, as shown in the figure below



There are several possible phenomena as follows:

The “box normally displays the sensor’s own device address 01 (default 01, if the customer has modified it, If the value modified by the customer is displayed, it means that the sensor power supply is working normally and the hardware circuit wiring is correct.
often. Continue testing, click the “Read” button, and the following situations will occur:

- Display sensor data is normal (in line with daily readings, not super large or random) It is said that the sensor is working normally in the country.
  Not connected well, the line is loose. If the customer displays a communication failure when connecting to the PLC, it may be that the PLC settings are incorrect.
  Indeed.
- The sensor display data jumps randomly (does not comply with the policy logic, for example, the previous reading is single digit, and the next reading is single digit)

The first time is hundreds and tens, and the next time is several digits, and the whole is jumping randomly), or the data box below is received Directly displays communication failure

- The area overlap may be insufficient. There is a problem with the 485 to USB/serial converter used by the customer, resulting in garbled communication. (Most The communication failure is all due to this month)
- “Maybe the check bit is wrong, you can try to change the debugging software “Open the serial port” “Check” above

“Check whether the reading is normal.

- “(2)” Click the “Read Address” button, and the communication timeout is displayed in the bottom box of the debugging software.
- Yes_Check whether the power supply is normal. If possible, you can use a multimeter to measure the power supply voltage.
  - “Confirm whether the selected serial port number is correct COM1, CDM2
  - Plug and unplug the 485 to USB/serial port module, make sure the module is plugged in properly
  - Verify 485 to USB/serial port module Yes No Correct & Special note, based on long-term customer feedback, this situation is always due to 485
  - There is a problem with converting USB/serial port module.

The number displayed in the three-box) is not the device address of the sensor, but a number will be displayed

- It may be that the customer has modified the baud rate, and the baud rate is incorrect. You can try to change the debugging software to “omitted”
  Check the “Baud Rate” below the slogan “Baud Rate” to see if the reading is normal.
- It may be that the check digit is wrong. You can try to change the “check digit” on “Open Serial Port” and see. Is the displayed address normal?
- The displayed number is FF or 00, check whether the A and B lines of the 485 interfaces are connected in reverse, and they are not connected.
  On the contrary, there may be a problem with the 485 to USB/serial module.

PLC communication Failure
It can be done as 7.1 above. If data fails and communication times out, convert the sensor through 485 to USB/serial port module.
block to the computer for troubleshooting.
PLC communication failure has the following possibilities:

1. The line is not connected properly, the wiring is loose, or the power supply is not supplied.
2. In the PLC parameter settings, the baud rate or check digit is incorrect.
3. In the PLC settings, when polling, the time interval of the polling setting is too short, and the response of the previous polling is

   Answer: No reply yet, the next polling command has been sent out; when a problem occurs, you can consider it Test by setting the polling interval to 1 second.

Documents / Resources

	katranji RS485 Transmitter and Humidity Sensor Type [pdf] User Manual RS485, RS485 Transmitter and Humidity Sensor Type, Transmitter and Humidity Sensor Type, Humidity Sensor Type, Sensor Type

References

- User Manual