Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual



ME31-XEXX0800-485

Type K Thermocouple Temperature Acquisition Module

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1 Product Overview

1.1 Product Description



ME31-XEXX0800-485 is a K-type thermocouple temperature acquisition module with 8-channel K-type thermocouple temperature acquisition function, supports RS485 communication interface, supports Modbus RTU standard protocol for acquisition, and can communicate with PC, configuration, PLC and other networking.

1.2 Features

- Supports 8-way 2-wire type K thermocouple temperature sensor acquisition;
- High resolution: 0.1℃;
- High accuracy: ±2℃;
- Wide temperature measurement range: -200~1350℃;
- High precision 16-bit ADC;
- Sensor not accessed for identification;
- 485 isolation, power isolation, power supply anti-reverse connection, lightning surge protection;
- Support rail mounting or screw mounting;
- Support all kinds of configuration software/PLC/touch screen;
- Support RS485 Modbus RTU protocol acquisition;
- Power supply and communication indicator;
- Support upper computer quick configuration;
- Support customized Modbus address setting;
- Supports various baud rate configurations and checksum configurations;

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1.3 Product Application Topology



Serial Application Topology Diagram

2 Quick Use

Notice:

This experiment needs to be carried out by default factory parameters.

The upper computer can be downloaded from the corresponding device model in the official website, official website link: www.cdebyte.com

Configuration tool software is driver-free installation, directly double-click the .exe file to open and use.

2.1 Preparation for use

The following table shows the materials required for this test:

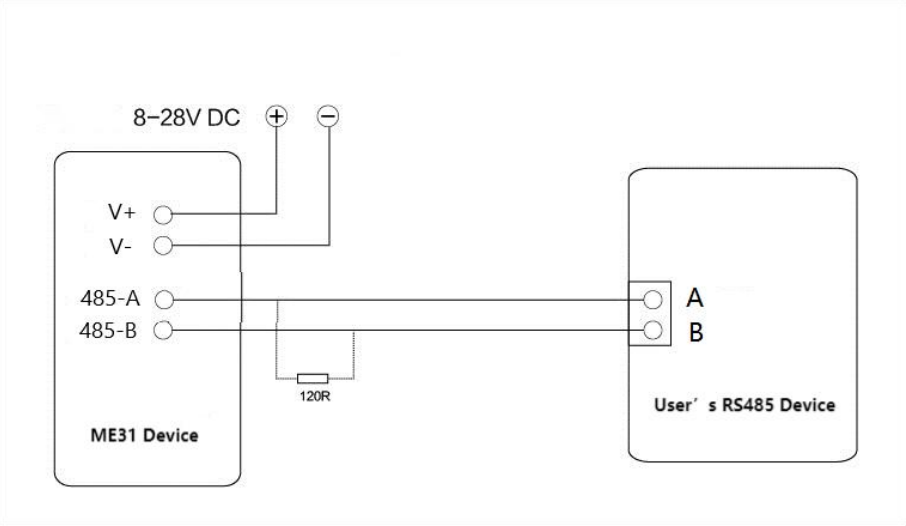
Serial Number	Component	Quantities
1	ME31-XEXX0800-485	1
2	USB to RS485 Converter	1
3	Host computer (downloadable from the official website)	1
4	computer	1
5	power adapter（12V/1A）	1
6	one-sided screwdriver	1
7	2-Wire Type K Thermocouple Temperature Sensors	1

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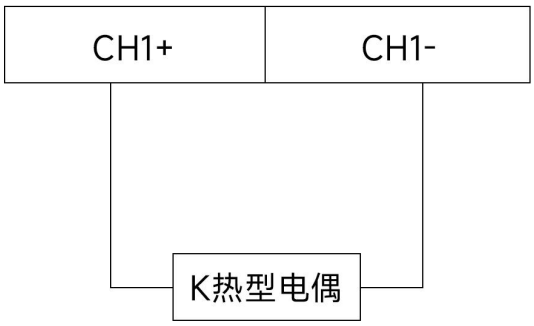
2.2 Equipment Connections

2.2.1 Power supply, RS485 wiring method



Notice： 485 bus high-frequency signal transmission, the signal wavelength relative to the transmission line is short, the signal at the end of the transmission line will form a reflection wave, interference with the original signal, so you need to add a terminating resistor at the end of the transmission line, so that the signal arrives at the end of the transmission line does not reflect. The terminating resistor should be the same as the impedance of the communication cable, the typical value is 120 ohms, and its role is to match the bus impedance, to improve the anti-jamming of the data communication and the reliability of the line.

2.2.2 Type K thermocouple sensor wiring



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2-wire connection

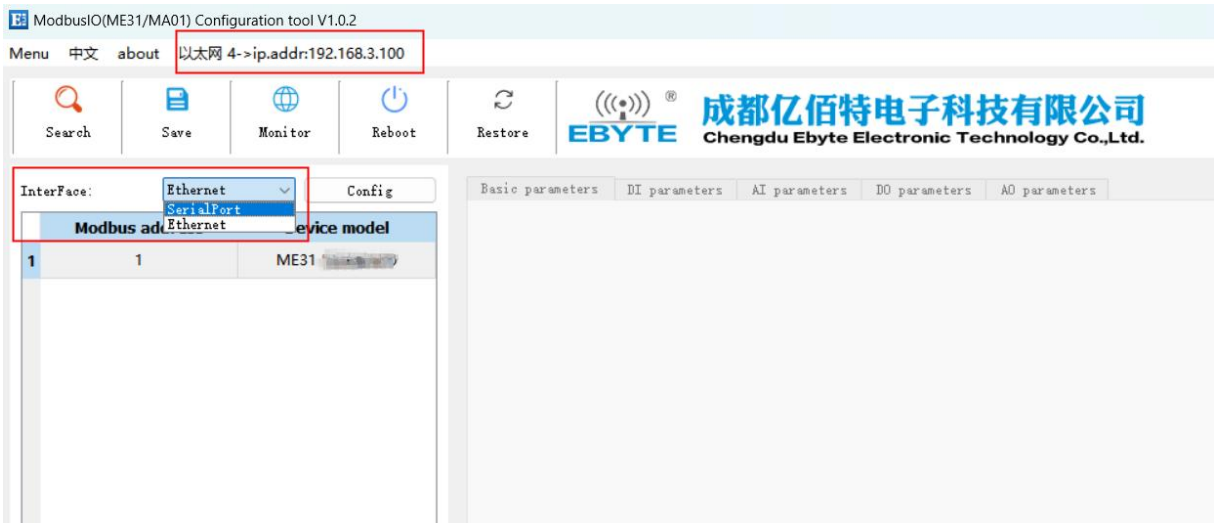
2.2.3 Simple use

Wiring: Connect the computer to the RS485 port of ME31-XEXX0800-485 via USB to RS485, A to A, B to B.
Power supply: Use DC-12V switching power supply (DC 8~28V) to power ME31-XEXX0800-485.

2.3 Device Temperature Acquisition Test

Step 1: Device Connection Upper computer connects to the device

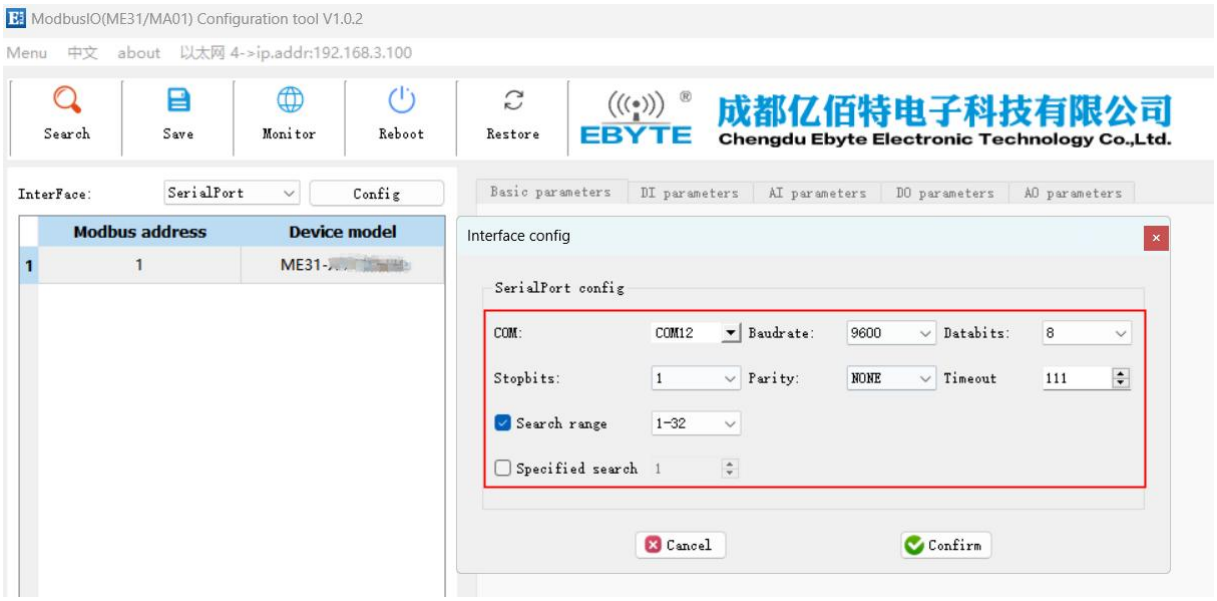
（1）First, select the interface (serial/network), this device has only RS485 interface, so we choose the serial port to configure the device.



（2）After clicking Configure, you have to select the corresponding serial port number, as well as the same baud rate, data bits, stop bits, parity bits and address segment search range as that of the device, and then search.

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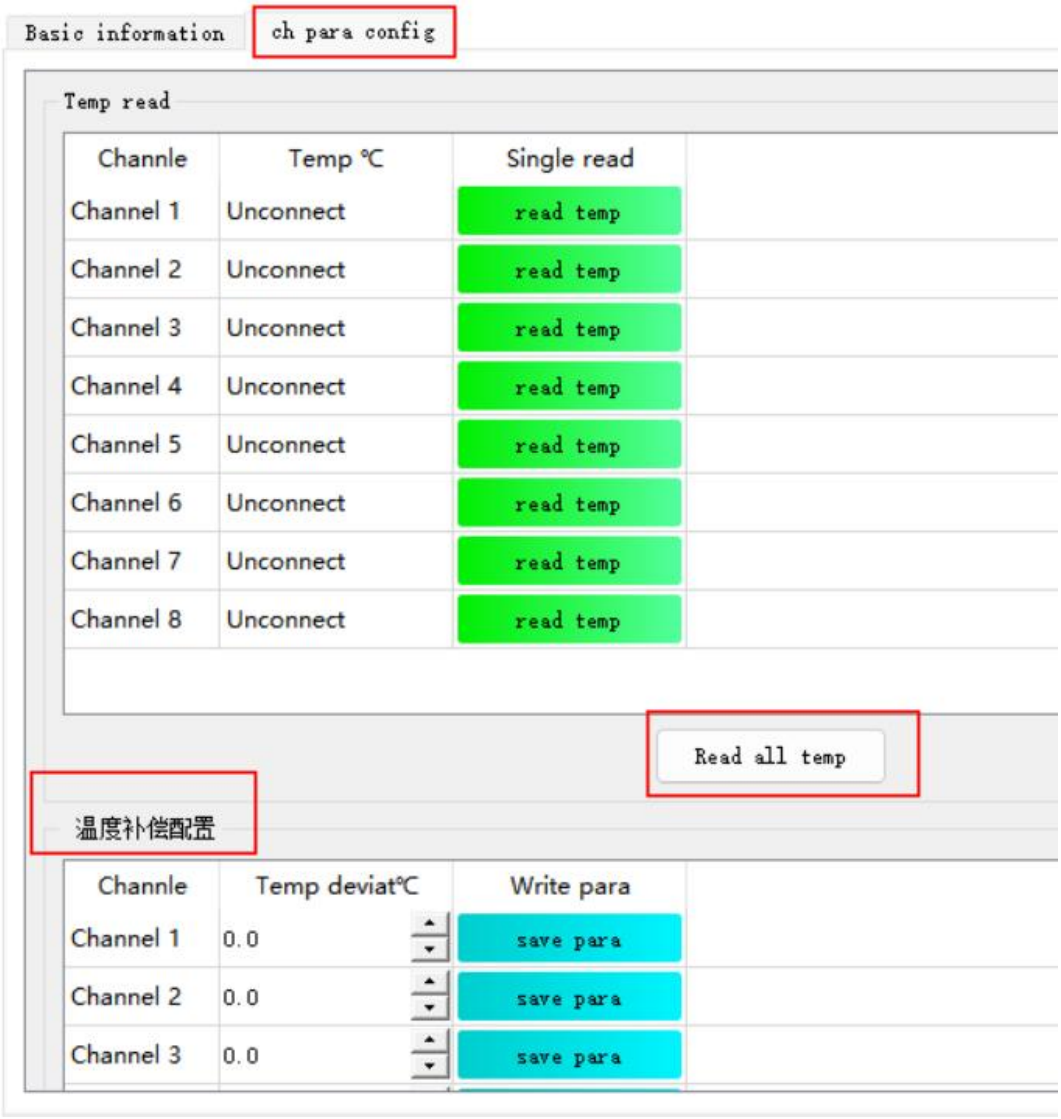
Step 2: Once the search is complete, select the corresponding device



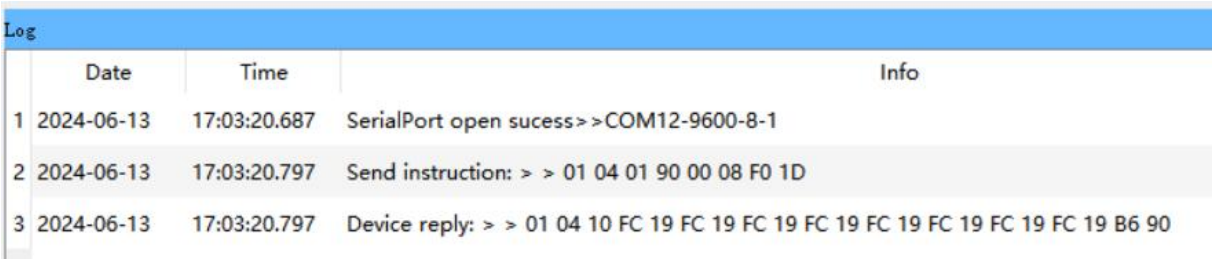
Step 3: Click on the channel parameter configuration, you can see all the temperature acquisition channels of this device, and then click on the read all the temperature, you can collect the temperature value on the channel; you can also set the temperature offset value of the channel in the configuration of temperature compensation, the specific use of details can be seen in the product function description.

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Note: Modbus commands can be viewed in the log area when clicking Read All, Read, Configure, etc.



3 Technical indicators

3.1 Specification

Type	Name	Parameters

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Power Supply	operating voltage	DC8～28V
	power indicator	Blue LED indication
Communication	communication interface	RS485
	baud rate	1200~115200bps (default 9600)
	communication protocols	Standard Modbus RTU protocol
MODBUS	device address	Modifiable via Modbus commands, host computer
Temperature acquisition	number of routes	8-way
	Sensor type	2-Wire Type K Thermocouple Temperature Sensors
	Temperature resolution	0.1℃
	accuracy	Normal temperature (25±5°C) condition: ±0.2%±2°C Full temperature (-40~85°C) conditions: ±0.5%±2°C
	Acquisition frequency	1Hz
Others	Product Size	121mm * 72mm * 34mm (Length*Width*Height)
	Product weight	140 ±5 g
	Working temperature and humidity	-40 ～ +85℃、5% ～ 95%RH（condensationless）
	Installation method	Guide rail mounting, screw mounting

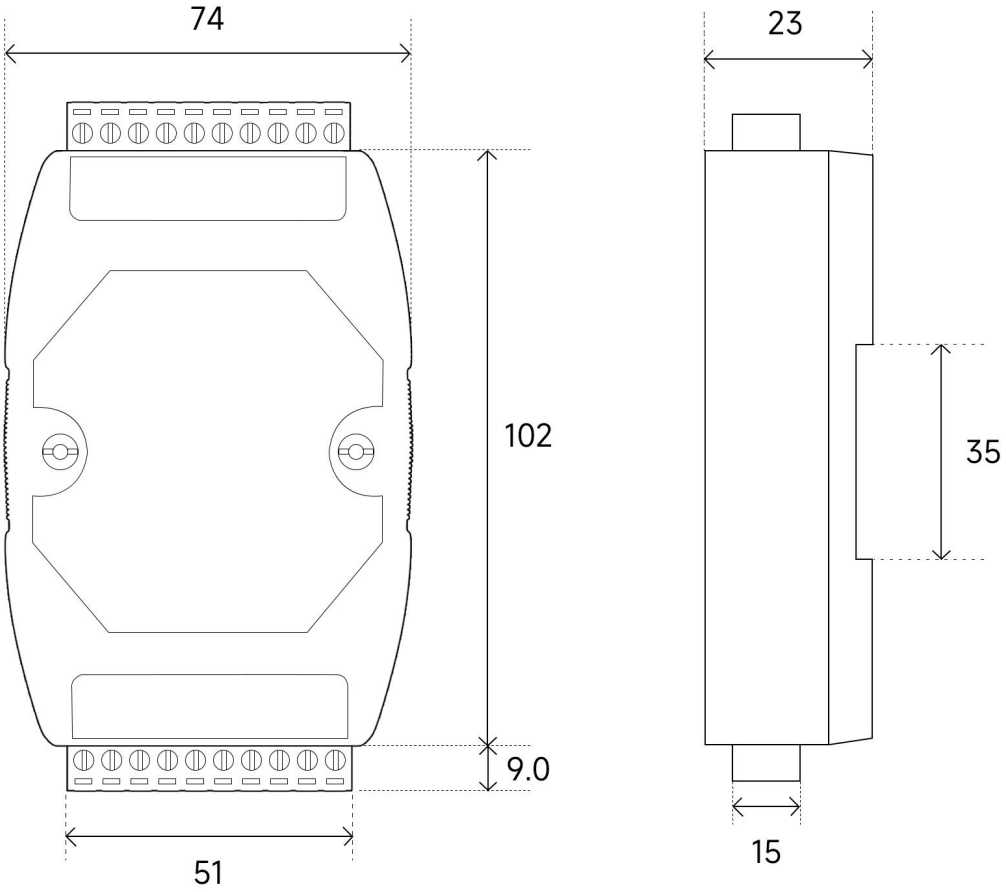
3.2 Device Default Parameters

Type	Name	Parameters
serial port parameter	baud rate	9600bps（8 types）
	Calibration Methods	None
	data bit	8
	stop bit	1
MODBUS Parameters	Modbus master-slave	Slave
	Address	1

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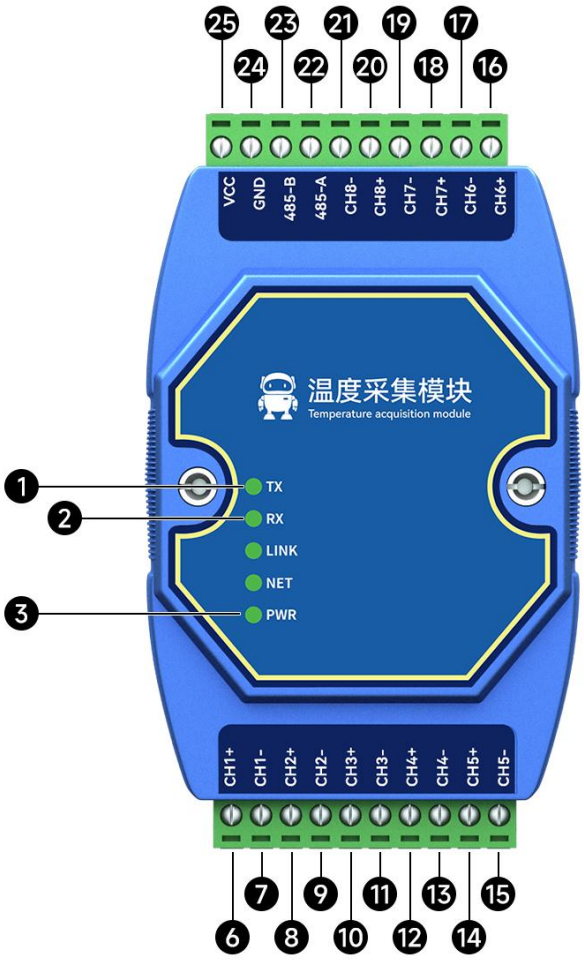
3.3 Mechanical Dimension Drawings



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3.4 Port and Indicator Description



Serial number	Labels	Instructions
1	TX（LED）	Serial Send Data Indicator
2	RX（LED）	Serial Receive Data Indicator
3	PWR（LED）	Power input indicator
4	CH1+	1st K-Type Thermocouple Temperature Acquisition Channel, K-Type Thermocouple Positive Input, 5.08mm Phoenix Terminal.
5	CH1-	1st K-Type Thermocouple Temperature Acquisition Channel, K-Type Thermocouple Negative Input, 5.08mm Phoenix Terminal.
6	CH2+	2nd K-Type Thermocouple Temperature Acquisition Channel, K-Type Thermocouple Positive Input, 5.08mm Phoenix Terminal.
7	CH2-	2nd K-Type Thermocouple Temperature Acquisition Channel, K-Type Thermocouple Negative Input, 5.08mm Phoenix Terminal.
8	CH3+	3rd type K thermocouple temperature acquisition channel, type K thermocouple positive input, 5.08mm phoenix terminal.

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9	CH3-	3rd type K thermocouple temperature acquisition channel, type K thermocouple negative input, 5.08mm phoenix terminal.
10	CH4+	4th K-Type Thermocouple Temperature Acquisition Channel, K-Type Thermocouple Positive Input, 5.08mm Phoenix Terminal.
11	CH4-	4th K-Type Thermocouple Temperature Acquisition Channel, K-Type Thermocouple Negative Input, 5.08mm Phoenix Terminal.
12	CH5+	5th K-Type Thermocouple Temperature Acquisition Channel, K-Type Thermocouple Positive Input, 5.08mm Phoenix Terminal.
13	CH5-	5th K-Type Thermocouple Temperature Acquisition Channel, K-Type Thermocouple Negative Input, 5.08mm Phoenix Terminal.
14	CH6+	6th K-Type Thermocouple Temperature Acquisition Channel, K-Type Thermocouple Positive Input, 5.08mm Phoenix Terminal.
15	CH6-	6th K-Type Thermocouple Temperature Acquisition Channel, K-Type Thermocouple Negative Input, 5.08mm Phoenix Terminal.
16	CH7+	7th K-Type Thermocouple Temperature Acquisition Channel, K-Type Thermocouple Positive Input, 5.08mm Phoenix Terminal.
17	CH7-	7th K-Type Thermocouple Temperature Acquisition Channel, K-Type Thermocouple Negative Input, 5.08mm Phoenix Terminal.
18	CH8+	8th K-Type Thermocouple Temperature Acquisition Channel, K-Type Thermocouple Positive Input, 5.08mm Phoenix Terminal.
19	CH8-	8th type K thermocouple temperature acquisition channel, type K thermocouple negative input, 5.08mm phoenix terminal.
20	485-A	A of the serial port is connected to the A connector of the external device, 5.08mm Phoenix terminal.
21	485-B	The B of the serial port is connected to the B connector of the external device, 5.08mm phoenix terminal.
22	V-	Power input negative, DC 8V~28V, 5.08mm phoenix terminal.
23	V+	Positive power input, DC 8V~28V, 5.08mm Phoenix terminal.

4 Product Features

4.1 Temperature Acquisition

4.1.1 Type K thermocouple temperature acquisition

This product uses input registers to save the collected temperature value, the input registers are read-only registers, the value in each register is a 16-bit signed integer or floating point value, and a fixed one decimal point is used to indicate the actual collected temperature value. The sampling frequency is 1Hz.

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4.1.2 Plastic values, floating point values for temperature acquisition

There are two ways to read the temperature values collected by the device:
（1） Read the temperature shaping value and convert it directly to get the temperature value. Temperature shaping value register start address is 0x0190, register type is input register, read function code is 0x04. The value returned by this method one register represents 1 channel. The method of calculating the temperature value is
-2000~13500 corresponds to -200~1350℃.
Temperature value = Reading value / 10 ℃.
Note: Temperature data is uploaded as complementary code when the temperature is lower than 0℃.
Temperature: 0xFFCE = -50 → Temperature = -5.0 °C

（2） To read the temperature floating point value, use the IEE754 conversion tool to convert the hexadecimal data to floating point number to get the input temperature. The temperature floating point value register start address is 0x01C2, register type is input register, read function code is 0x04. This method returns two registers to represent 1 channel.

4.2 Temperature offset value

Temperature value = actual temperature acquisition value + temperature offset value.
The register type of the temperature offset value is a holding register with address 0x2328; the value stored in the register divided by 10 is the temperature offset value (e.g., if the value in the register is 85, then the temperature offset is 8.5°C).
Temperature offset value range: -10.0~10.0℃ (-100~100) (accurate to one decimal point).

4.3 Customizing Module Information

4.3.1 Modbus Address

The device address defaults to 1 and supports modification of the address, which ranges from 1 to 247.

4.3.2 Module Name

Users can configure the device name for differentiation according to their needs, supporting English, numeric format, up to 20 bytes.

4.3.3 Serial port parameter

Used to set parameters for serial port communication:
Default parameters:
Baud rate:9600(03);
Data Bit:8bit.

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Stop bit:1bit.
Parity bit:NONE(00).

(1) Baud rate:

Baud rate code value table	
0x0000	1200
0x0001	2400
0x0002	4800
0x0003 （default）	9600
0x0004	19200
0x0005	38400
0x0006	57600
0x0007	115200

(2) Parity bits

Parity bits	
0x0000(default)	NONE
0x0001	ODD
0x0002	EVEN

4.4 Sensor not accessed for identification

The device supports sensor connection status detection. When no sensor is connected, the value stored in the register is 0xFC19 (corresponding to the signed integer -999)

5 MODBUS Parameter Configuration

5.1 Temperature Value Register List

Register Function	register address	Register Type	quantities	operation	Data Range/Remarks	Related Function Codes
Temperature integer value	0x0190	input register	8	R	16-bit Integer	R：0x04
floating point temperature value	0x01C2	input register	16	R	32-bit floating point	R：0x04
Temperature offset shaping value	0x2328	holding register	8	RW	16-bit Integer	R：0x03 W：0x06、0x10

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5.2 Module Related Registers

Register function	Register address	Register Type	Quantities	Operation	Data Range/Remarks	Related Function Codes
module address	0x07E8	holding register	1	RW	Modbus address. 1 to 247 configurable address	R：0x03 W：0x06
Module Model	0x07D0	holding register	12	R	Get current model number	R：0x03
Firmware version	0x07DC	holding register	1	R	Get firmware version number	R：0x03
Module name	0x07DE	holding register	10	RW	Customized Module Names	R：0x03 W：0x10
Module Reboot	0x07EA	holding register	1	W	Write any value to restart	W：0x06
Restore factory parameters	0x07E9	holding register	1	W	Write random values to restore factory parameters	W：0x06
serial port baud rate	0x0834	holding register	1	RW	See the baud rate code table. Default is 9600 (0x0003)	R：0x03 W：0x06、0x10
serial port parity bit	0x0836	holding register	1	RW	0x0000 no checksum (default) 0x0001 odd parity 0x0002 even parity	R：0x03 W：0x06、0x10

5.3 Examples of Modbus Command Operations

5.3.1 Modbus RTU acquisition

Read the temperature value at device address 0x01, channel 1

Example:

01	04	01 90	00 01	30 1B
Modbus address	function code	register first address	Read the temperature value of the 1st channel	CRC check digit

After sending the above command to the device over the 485 bus, the device will return the following values (e.g., reading a temperature of 30.0°C)：

01	0	02	01 2C	B9 7D
Modbus address	function code	Number of bytes of data	Returned temperature value data	CRC check digit

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Additional functions can be tested with the commands in the following table：

Function (function code)	commands
Read the temperature of the 1st channel (0x04)	01 04 01 90 00 01 30 1B
Read 1~8 way temperature (0x04)	01 04 01 90 00 08 F0 1D

Notes:

The input registers read for the demo case are engineering quantities (16-bit integer values, 32-bit floating point values can also be obtained by reading the 0x01C2 register).

The actual temperature value captured is obtained by converting the value read from the input register to decimal and dividing by 10.

6 Quick start with the host computer

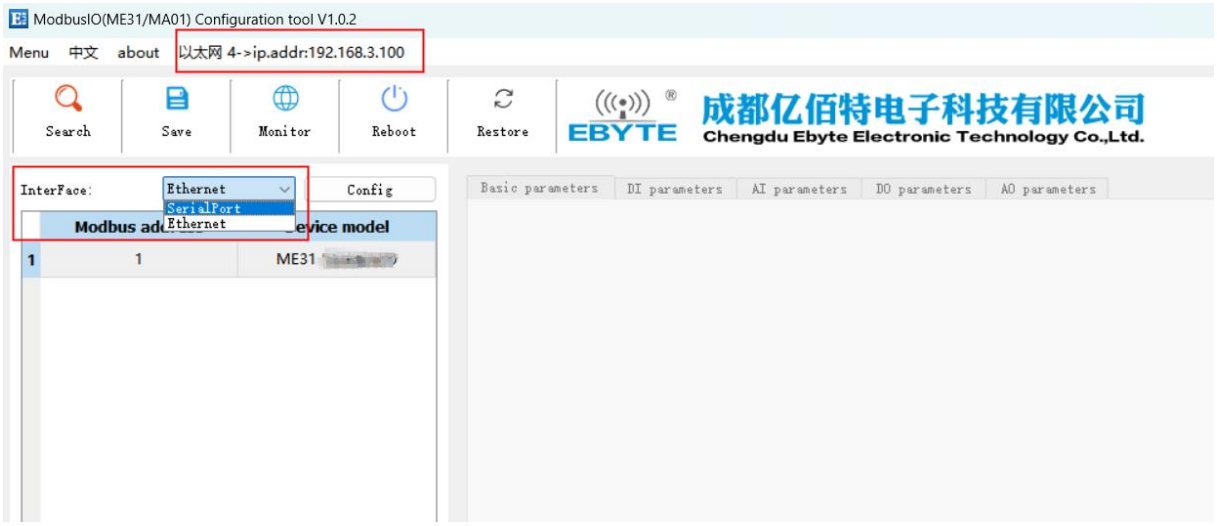
The upper computer can be downloaded from the corresponding device model in the official website, official website link: https://www.ebyte.com/product-class.aspx

Configuration tool software is driver-free installation, directly double-click the .exe file to open that is used!

6.1 Temperature acquisition and monitoring

Step 1: The host computer connects to the device

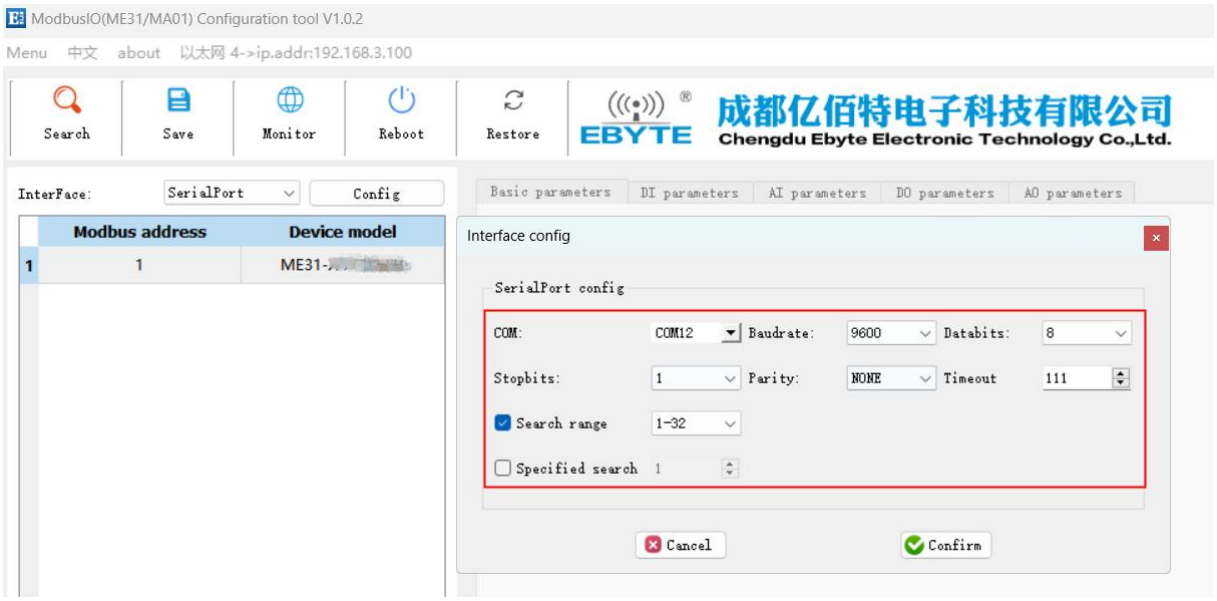
（1）First, select the interface (serial/network), this device only RS485 interface, so we choose the serial interface to configure the device



（2）After clicking Configure, you have to select the corresponding serial port number, as well as the same baud rate, data bits, stop bits, parity bits and address segment search range as that of the device, and then search.

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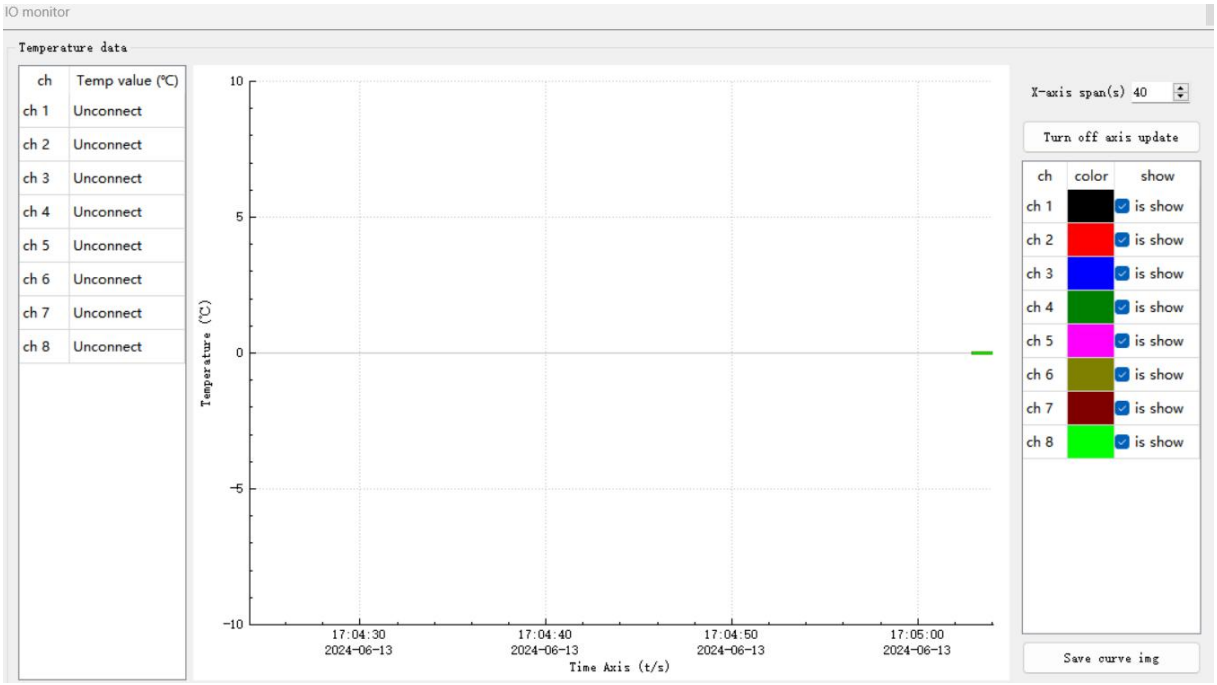
Step 2: Select the corresponding device



Step 3: Click on the device online, you can enter the temperature value collection and monitoring, the following is the collection of temperature screen display

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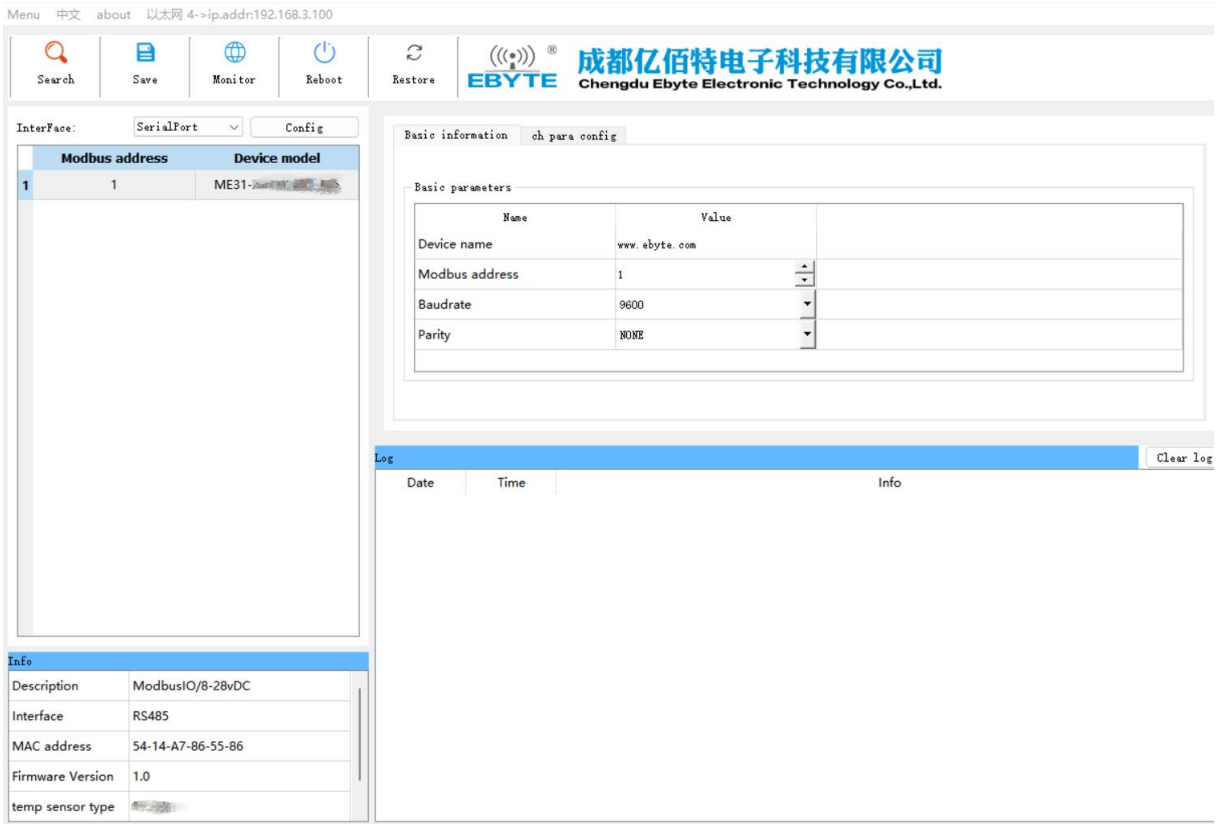
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6.2 Parameter Configuration Interface

Step 1: Connect the device and refer to "Temperature Acquisition".

Step 2: You can configure the device parameters, temperature offset value parameters

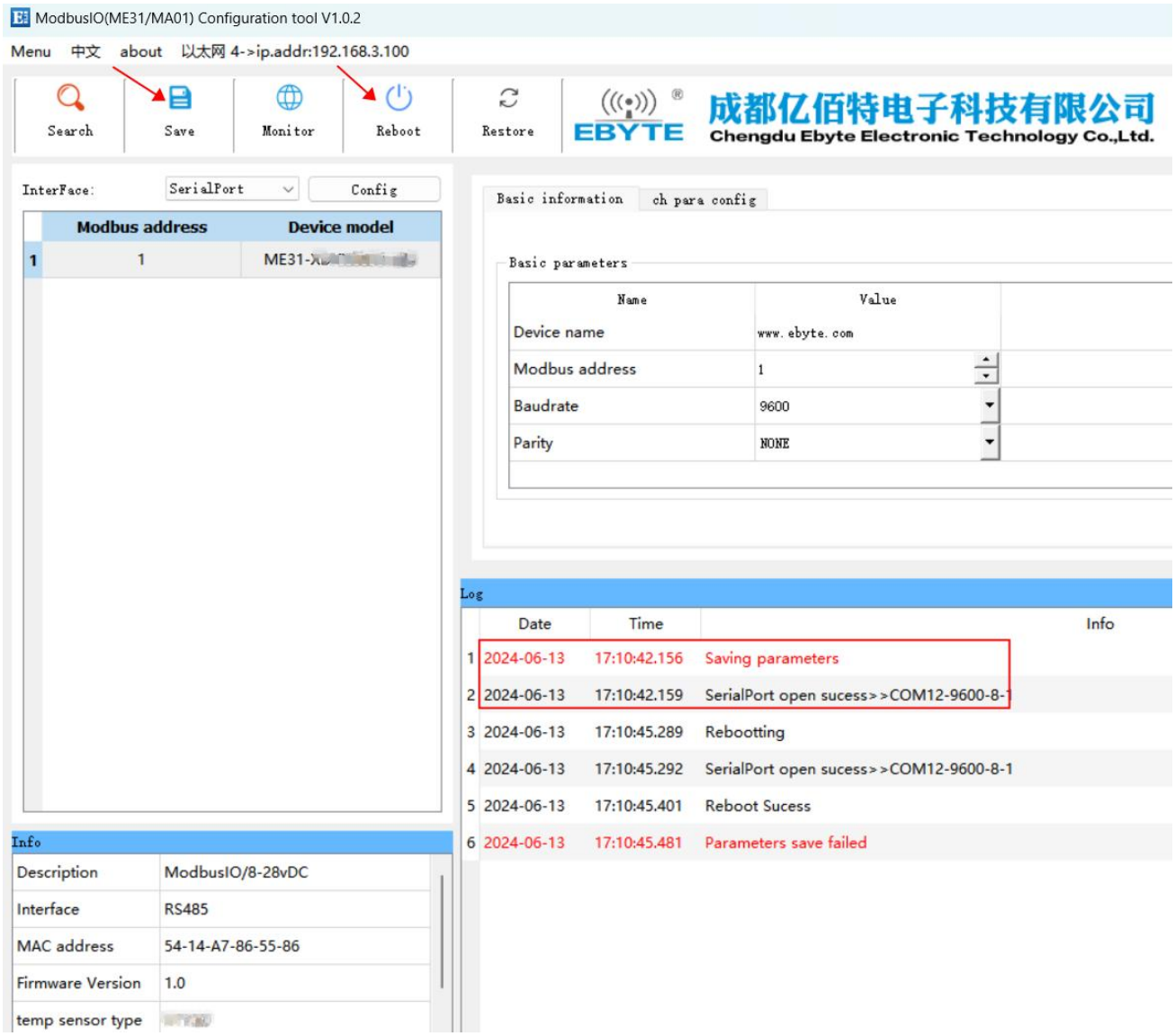


Step 3: After you have configured the parameters, click Download Parameters, and after you see the message in the log

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output that the parameters are saved successfully, click Reboot Device, and after the device reboot is completed, the modified parameters will take effect.



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Revision history

Version	Revision date	Revised description	Maintainer
1.0	2023-4-15	First edition	LT

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