Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual



ME31-XDXX0800-485

PT100 Thermal Resistance Temperature Acquisition Module

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Chapter 1 Product Introduction



1.1 Product introduction

ME31-XDXX0800-485 is a PT100 thermal resistance temperature acquisition module. It has 8 -channel PT100 temperature acquisition function . It supports RS485 communication interface and Modbus RTU standard protocol for acquisition . It can communicate with PC, configuration, PLC and other networks .

1.2 Features

- Supports 8-channel 2-wire PT100 temperature sensor acquisition;
- High resolution: 0.1℃;
- High accuracy: ±1℃;
- Wide temperature measurement range: -200~850℃;
- High-precision 16-bit ADC;
- The sensor is not connected to the identification;
- 485 isolation, power isolation, power supply anti-reverse connection, lightning surge protection;
- Support rail installation or screw installation;
- Supports various configuration software/PLC/touch screens;
- Support RS485 Modbus RTU protocol acquisition;
- Power and communication indicator lights;
- Supports rapid configuration of the host computer;
- Support custom Modbus address settings;
- Supports multiple baud rate configurations and verification configurations;

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1.3 Product application topology diagram



Serial port application topology diagram

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Chapter 2 Quick Start

Note:

This experiment needs to be carried out with the default factory parameters.

The configuration tool can be downloaded from the corresponding device model on the official website. Official website link: www.cdebyte.com

The configuration tool software is driver-free installation, just double-click the .exe file to open it and use it.

2.1 Device preparation

The following table shows the materials required for this test:

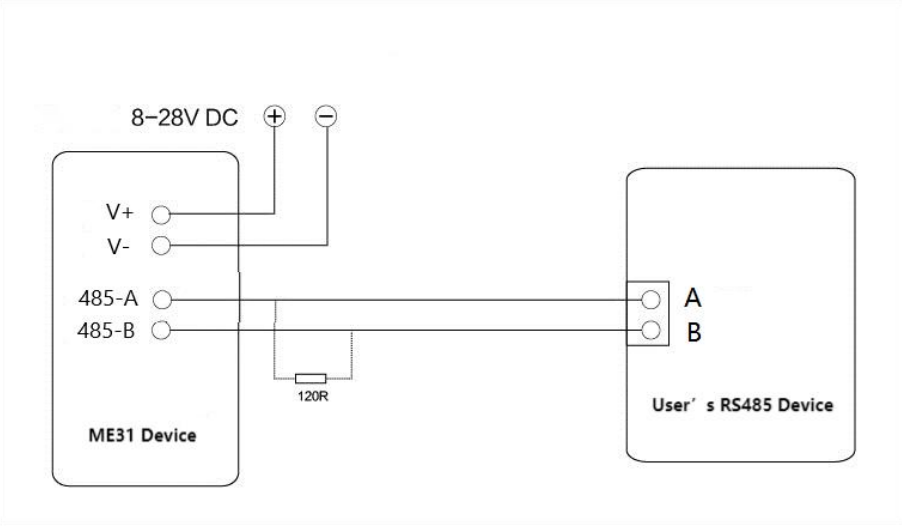
Serial number	Item	Quantity
1	ME31-XDXX0800-485	1
2	USB to RS485 converter	1
3	Host computer (can be downloaded from the official website)	1
4	PC	1
5	Power adapter (12V/1A)	1
6	Slotted screwdriver	1
7	2-wire PT100 temperature sensor	1

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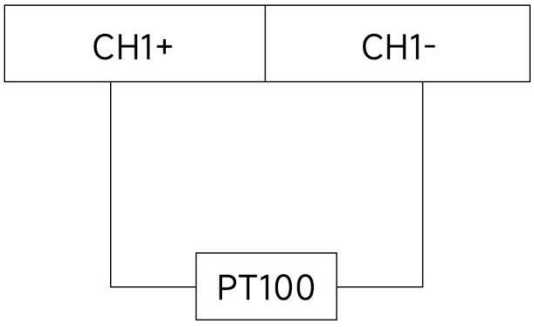
2.2 Device connection

2.2.1 Power supply and RS485 wiring method



Note: When the 485 bus high-frequency signal is transmitted, the signal wavelength is shorter than the transmission line. The signal will form a reflected wave at the end of the transmission line, interfering with the original signal. Therefore, it is necessary to add a terminal resistor at the end of the transmission line to prevent the signal from being reflected after it reaches the end of the transmission line. The terminal resistor should be the same as the impedance of the communication cable, with a typical value of 120 ohms . Its function is to match the bus impedance and improve the anti-interference and reliability of data communication.

2.2.2 PT100 sensor wiring



2-wire connection method

2.2.3 Simple use

Wiring: The computer is connected to the RS485 interface of ME31-XDXX0800-485 through USB to RS485 , A is connected to A, and B is connected to B.

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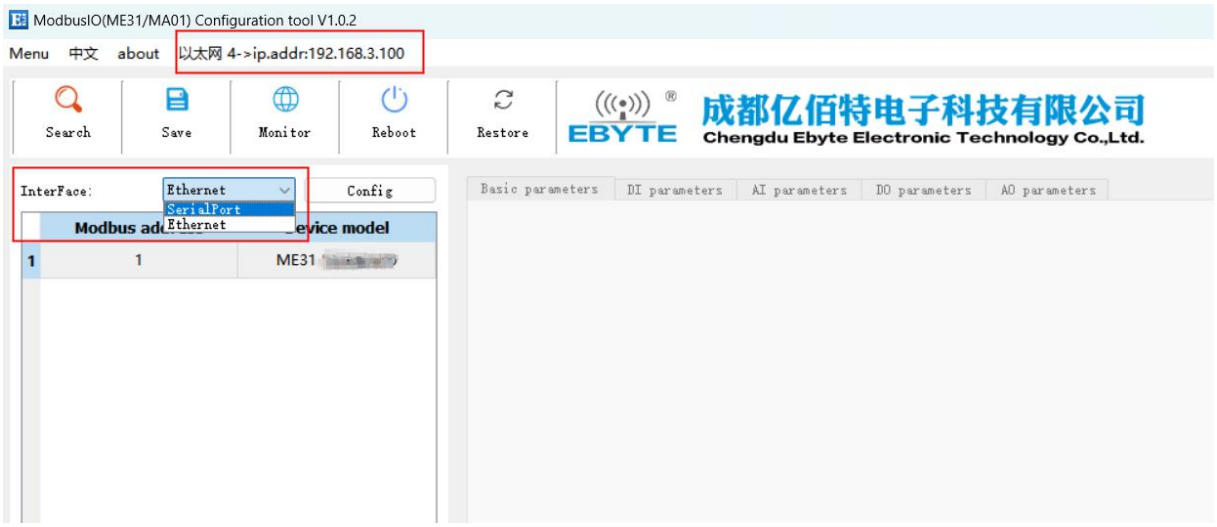
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Power supply: Use DC-12V switching power supply (DC 8~28V) to power ME31-XDXX0800-485 .

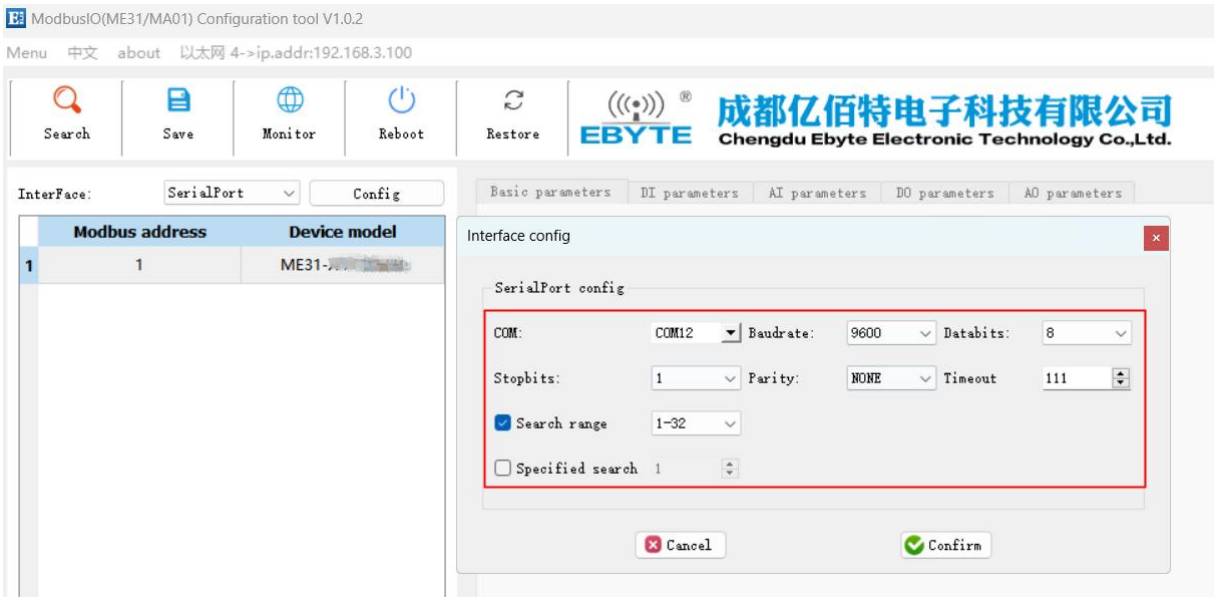
2.3 Device temperature acquisition test

Step 1: Connect the device to the host computer. Connect the device to the host computer.

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



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



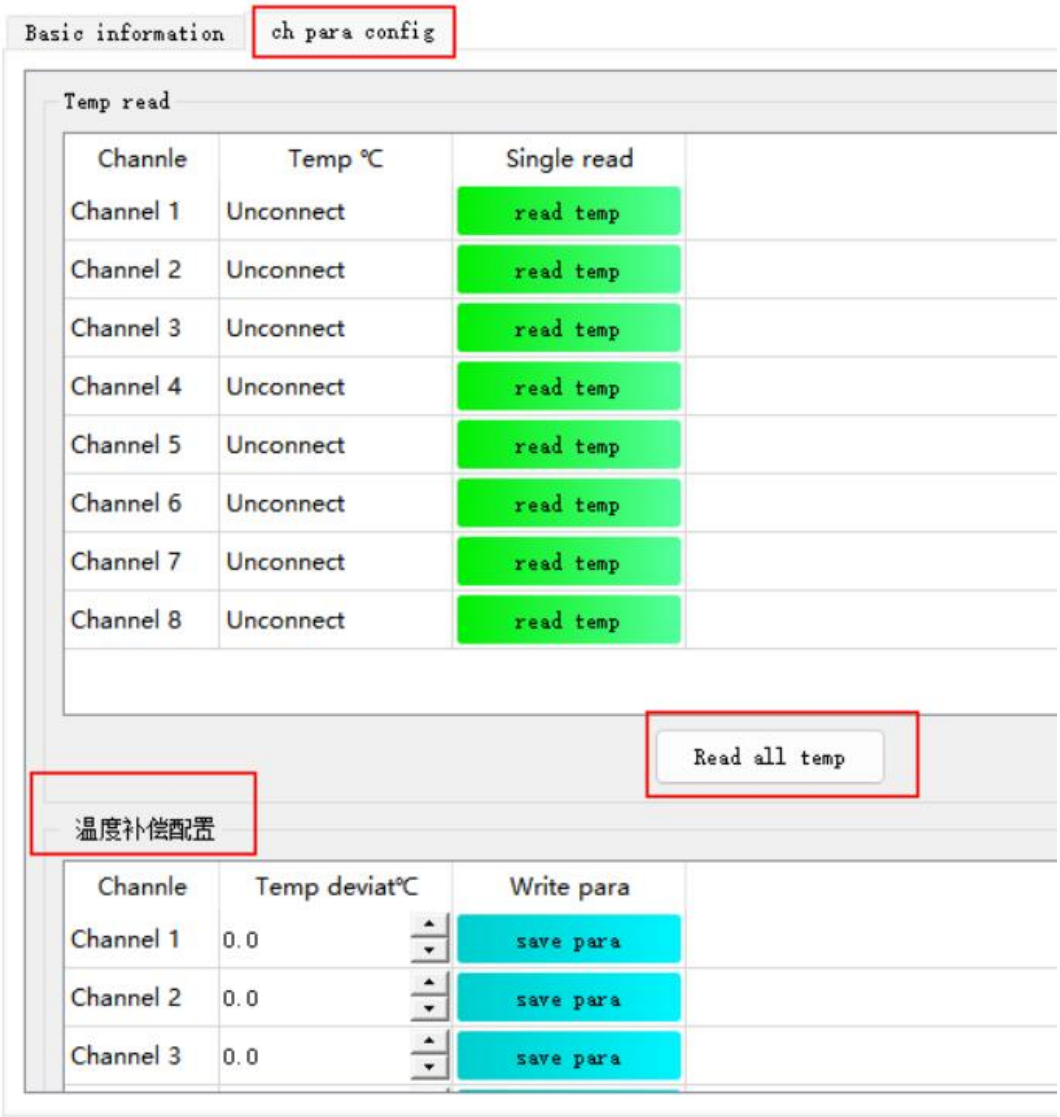
Step 2: After the search is completed, select the corresponding device

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Step 3: Click on the channel parameter configuration to see all the temperature acquisition channels of this device, and then click to read all temperatures to collect the temperature values on the channels; you can also set the temperature offset of the channel in the temperature compensation configuration. Value transfer, please see the product function introduction for specific usage details.



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Note: When clicking Read All, Read, Configuration and other operations, you can view the Modbus instructions in the log area

Log

	Date	Time	Info
1	2024-06-13	17:03:20.687	SerialPort open sucess>>COM12-9600-8-1
2	2024-06-13	17:03:20.797	Send instruction: > > 01 04 01 90 00 08 F0 1D
3	2024-06-13	17:03:20.797	Device reply: > > 01 04 10 FC 19 FC 19 FC 19 FC 19 FC 19 FC 19 FC 19 FC 19 B6 90

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Chapter 3 Technical indicators

3.1Specifications

Category	Item	Parameter
Power supply	Operating Voltage	DC8～28V
	Power indicator	Blue LED indication
Communication	Communication Interface	RS485
	baud rate	1200~115200 bps (default 9600)
	Protocol	Standard Modbus RTU protocol
MODBUS	Device address	Can be modified through Modbus instructions and host computer
Temperature acquisition	Number of ways	Route 8
	sensor type	2-wire PT100 temperature sensor
	Temperature resolution	0.1℃
	Accuracy	Normal temperature (25±5℃) conditions: ±0.1%±1℃ Full temperature (-40~85℃) conditions: ±0.5%±1℃
	Acquisition frequency	1Hz
Other	Product Size	121mm * 72mm * 34mm (length*width*height)
	product weight	1 40 ±5g
	Working temperature and humidity	-40～+85℃, 5%～95%RH (no condensation)
	Installation method	Rail installation , screw installation

3.2 Device default parameters

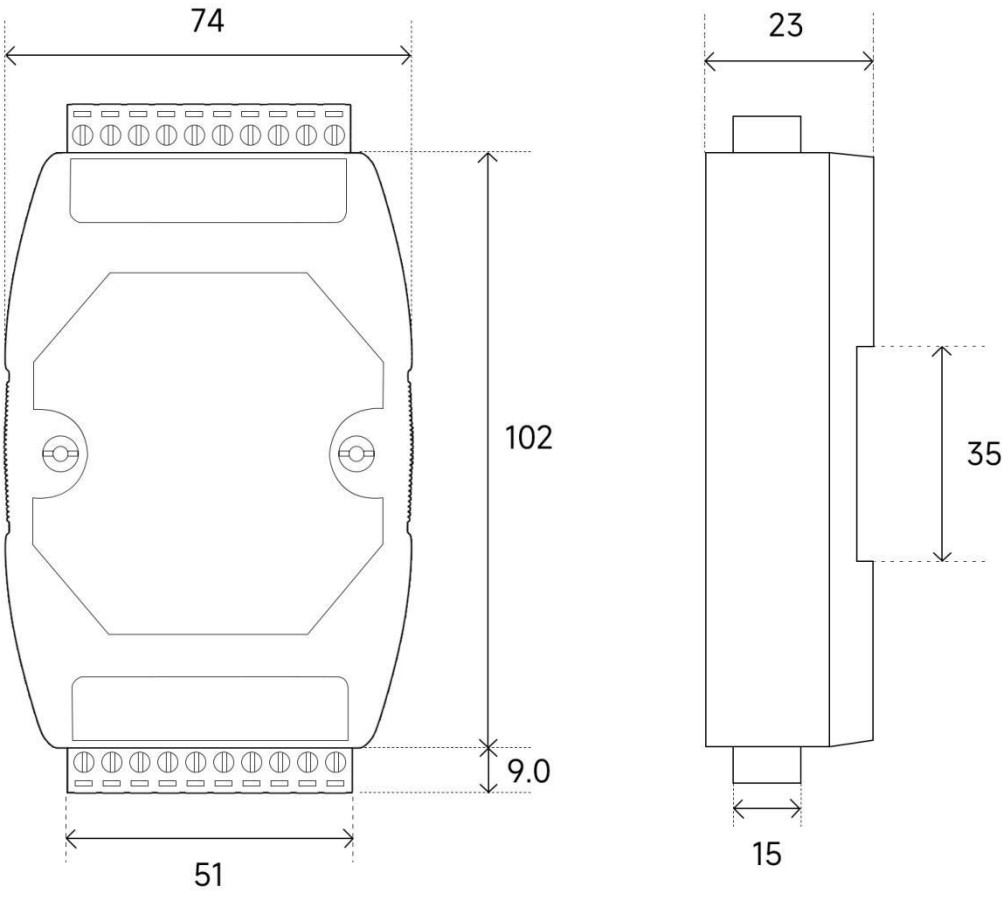
Category	Item	Parameter
Serial port parameters	baud rate	9600bps (8 types)
	Verification method	None
	data bits	8
	Stop bit	1
MODBUS parameters	Modbus master-slave	Slave machine

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	address	1

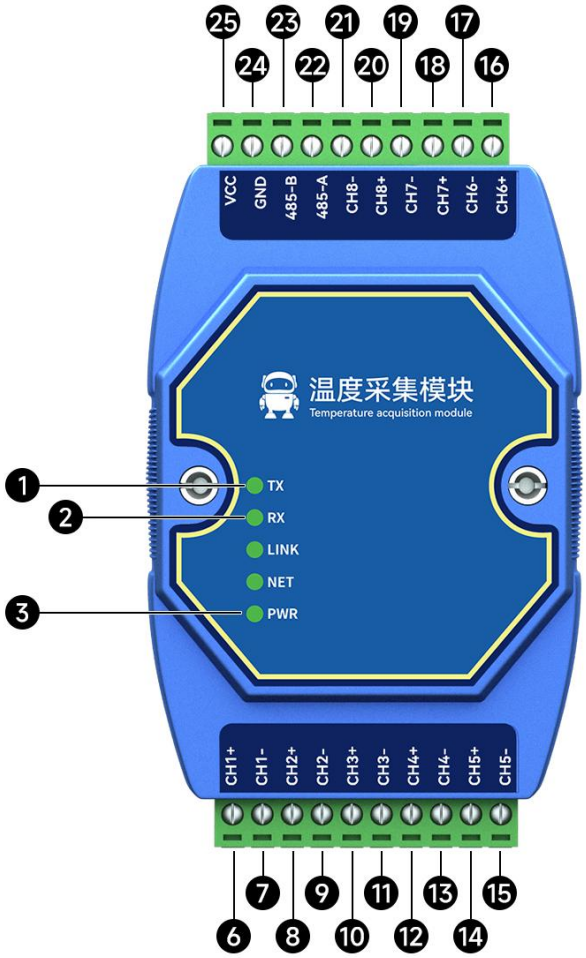
3.3 Mechanical Dimensional Drawing



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3.4 Port and indicator light description



Serial number	Label	Description
1	TX(LED)	Serial port sending data indicator light
2	RX(LED)	Serial port receiving data indicator light
3	PWR(LED)	Power input indicator light
4	CH1+	The first PT100 temperature acquisition channel, PT100 positive input, 5.08mm Phoenix terminal.
5	CH1-	The first PT100 temperature acquisition channel, PT100 negative input, 5.08mm Phoenix terminal.
6	CH2+	The second PT100 temperature acquisition channel, PT100 positive input, 5.08mm Phoenix terminal.
7	CH2-	The second PT100 temperature acquisition channel, PT100 negative input, 5.08mm Phoenix terminal.
8	CH3+	The third PT100 temperature acquisition channel, PT100 positive input,

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		5.08mm Phoenix terminal.
9	CH3-	The third PT100 temperature acquisition channel, PT100 negative input, 5.08mm Phoenix terminal.
10	CH4+	The 4th PT100 temperature acquisition channel, PT100 positive input, 5.08mm Phoenix terminal.
11	CH4-	The 4th PT100 temperature acquisition channel, PT100 negative input, 5.08mm Phoenix terminal.
12	CH5+	The 5th PT100 temperature acquisition channel, PT100 positive input, 5.08mm Phoenix terminal.
13	CH5-	The 5th PT100 temperature acquisition channel, PT100 negative input, 5.08mm Phoenix terminal.
14	CH6+	The 6th PT100 temperature acquisition channel, PT100 positive input, 5.08mm Phoenix terminal.
15	CH6-	The 6th PT100 temperature acquisition channel, PT100 negative input, 5.08mm Phoenix terminal.
16	CH7+	The 7th PT100 temperature acquisition channel, PT100 positive input, 5.08mm Phoenix terminal.
17	CH7-	The 7th PT100 temperature acquisition channel, PT100 negative input, 5.08mm Phoenix terminal.
18	CH8+	The 8th PT100 temperature acquisition channel, PT100 positive input, 5.08mm Phoenix terminal.
19	CH8-	The 8th PT100 temperature acquisition channel, PT100 negative input, 5.08mm Phoenix terminal.
20	485-A	A of the serial port is connected to interface A of the external device, 5.08mm Phoenix terminal.
21	485-B	The B of the serial port is connected to the B interface of the external device , 5.08mm Phoenix terminal.
22	V-	Negative pole of power input terminal, DC 8V~28V, 5.08mm Phoenix terminal.
23	V+	Positive power input terminal, DC 8V~28V, 5.08mm Phoenix terminal.

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Chapter 4 Product function introduction

4.1Temperature acquisition

4.1.1 PT100 temperature acquisition

This product uses input registers to save the collected temperature values. The input registers are read-only registers . The values in each register are 16-bit signed integers or floating point values. A fixed decimal point is used to represent the actual collected temperature value. Sampling frequency 1Hz .

4.1.2 Integer value and floating point value of temperature acquisition

the temperature value collected by the device :

(1) Read the temperature shaping value and directly convert it to the temperature value . The starting address of the temperature shaping value register is 0x0 190 , the register type is input register, and the read function code is 0x0 4 . The value returned by this method is one register representing 1 channel. The method for calculating the temperature value is

-2000~8500 corresponds to -200 ~ 850℃ .

Temperature value = reading value / 10 ℃

Note: When the temperature is lower than 0℃, the temperature data is uploaded in the form of complement code.

Temperature: 0xFFCE=-50→temperature=-5.0℃

(2) Read the temperature floating point value and use the IEE754 conversion tool to convert the hexadecimal data into floating point numbers to obtain the input temperature. The starting address of the temperature floating point value register is 0x0 1 C 2 , the register type is input register, and the read function code is 0x04. This method returns two registers representing 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 , and the address is 0x 2328 ; the value stored in the register divided by 10 is the temperature offset value (for example, 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 place).

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1.3 Custom module information

4.3.1 Modbus address

The device address defaults to 1 and supports modification of the address. The address range is 1-247.

4.3.2 Module name

Users can configure the device name for differentiation according to their own needs. It supports English and numeric formats, up to 20 bytes.

4.3.3 Serial port parameters

Parameters used to set serial communication:

Default parameters:

Baud rate: 9600 (03);

Data bits: 8bit;

Stop bit: 1bit;

Check digit: 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) Check Digit:

Check Digit	
0x0000 (default)	NONE
0x0001	ODD
0x0002	EVEN

4.4 The sensor is not connected for identification

The device supports sensor connection status detection. When the sensor is not connected, the value stored in the register is 0xFC19 (corresponding to the signed integer -999).

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Chapter 5 MODBUS Parameter Configuration

5.1 Temperature value register list

Register function	Register address	Register type	Number	Operate	Data range/remarks	Related function codes
Temperature integer value	0x0 190	input register	8	R	16-bit integer type	R:0x04
Temperature floating point value	0x0 1 C 2	input register	16	R	32-bit floating point	R:0x04
Temperature offset shaping value	0x2328	holding register	8	RW	16-bit integer type	R:0x03 W: 0x06, 0x10

5.2 Module related registers

Register function	Register address	Register type	Number	Operate	Data range/remarks	Related function codes
module address	0x07E8	holding register	1	RW	Modbus address, 1 ～ 247 configurable addresses	R:0x03 W: 0x06
Module model	0x07D0	holding register	12	R	Get current model	R:0x03
Firmware version	0x07DC	holding register	1	R	Get firmware version number	R:0x03
module name	0x07DE	holding register	10	RW	Custom module name	R:0x03 W: 0x10
module restart	0x07EA	holding register	1	W	Write any value and 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 baud rate code table, Default is 9600 (0x0003)	R:0x03 W: 0x06, 0x10
Serial port check digit	0x0836	holding register	1	RW	0x0000 no verification (default) 0x0001 odd parity 0x0002 even parity	R:0x03 W: 0x06, 0x10

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5.3 Examples of Modbus command operation instructions

5.3.1 Modbus RTU acquisition

1. Read the temperature value of channel 1 of device address 0x01

For example:

01	04	0 1 9 0	00 01	30 1B
Modbus address	function code	Register first address	Read the temperature value of channel 1	CRC check code

After sending the above command to the device through the 485 bus , the device will return the following value (for example, the temperature read is 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 code

Other functions can be tested through the commands in the following table :

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

Note:

The input register read by the demonstration case is the engineering quantity (16-bit integer value, 32-bit floating point value can also be obtained by reading the 0x01C2 register) .

By converting the value read from the input register into decimal and then dividing it by 10 , the actual temperature value collected is obtained .

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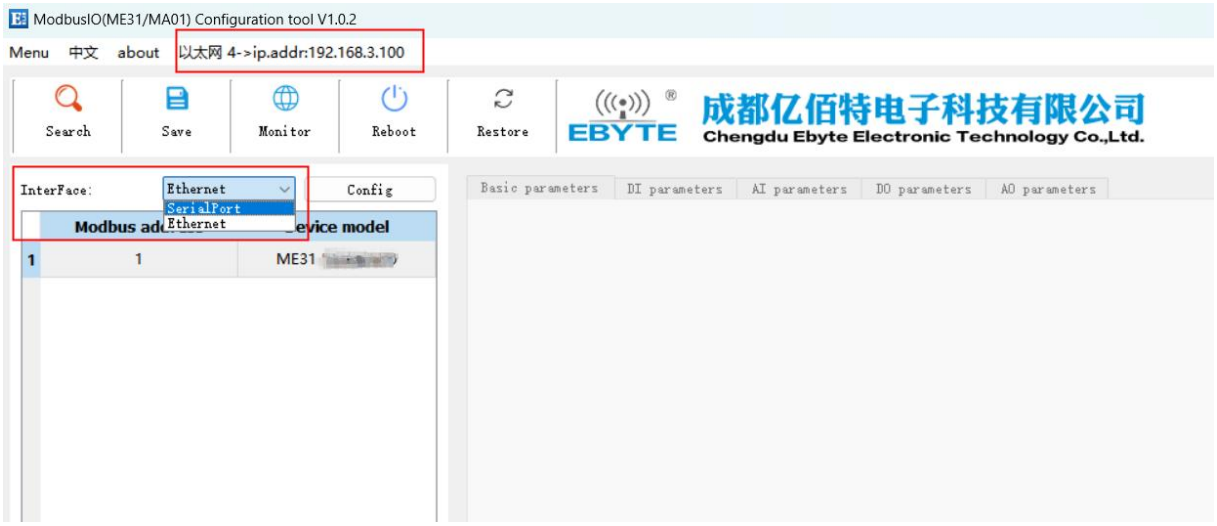
Chapter 6 Quick Start of Configuration Tool

The configuration tool can be downloaded from the corresponding device model on the official website. Official website link: https://www.ebyte.com/product-class.aspx
The configuration tool software is driver-free installation, just double-click the .exe file to open it and use it.

6.1 Temperature acquisition and monitoring

Step 1: Configuration tool connected to the device

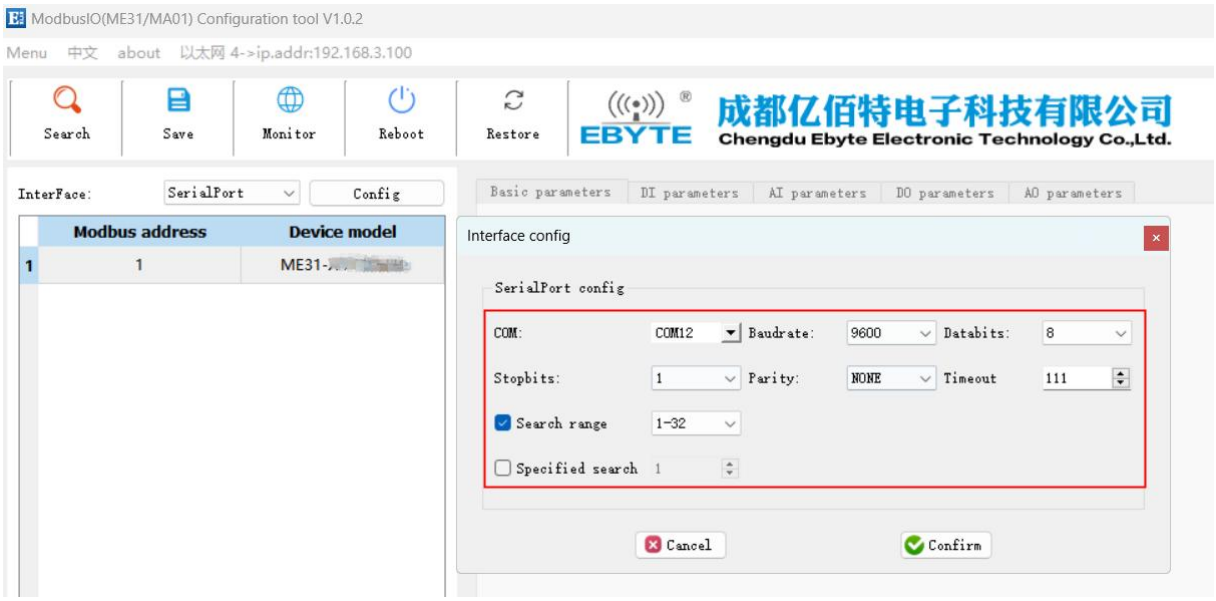
（1）First select the interface (serial port/network port). This device only has an RS485 interface, so we choose the serial port to configure the device .



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

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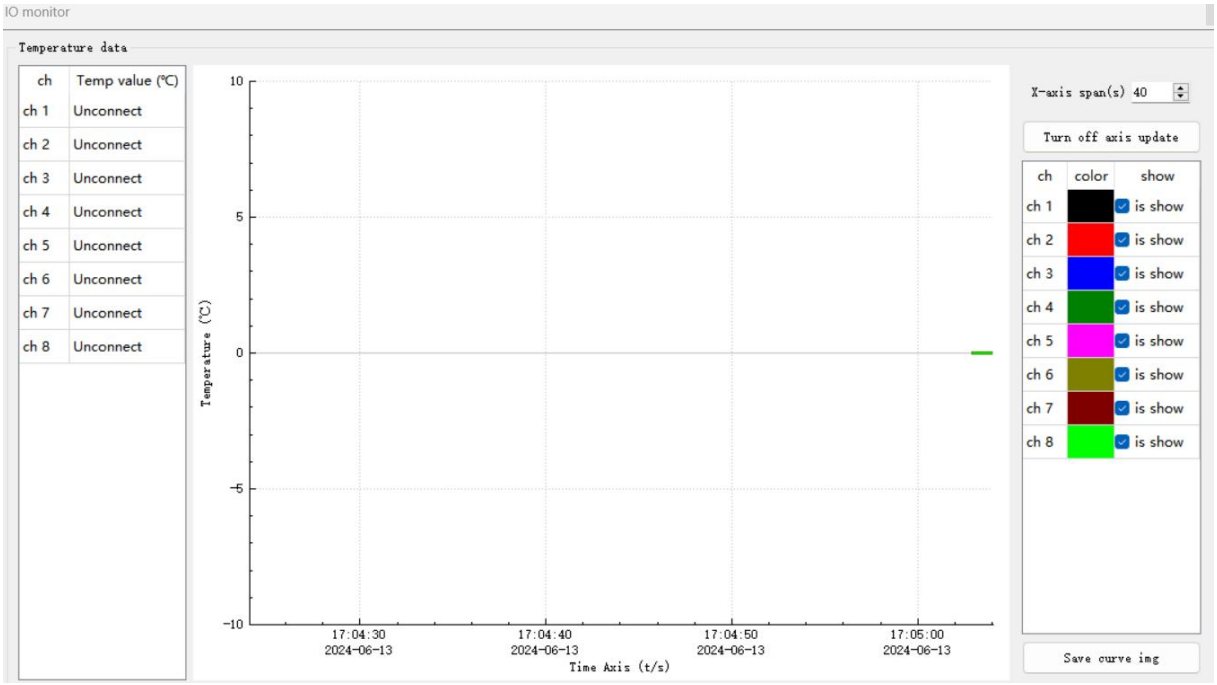
Step 2: Select the corresponding device



Step 3: Click the device online to enter the temperature value acquisition and monitoring. The following is a display of the temperature acquisition screen.

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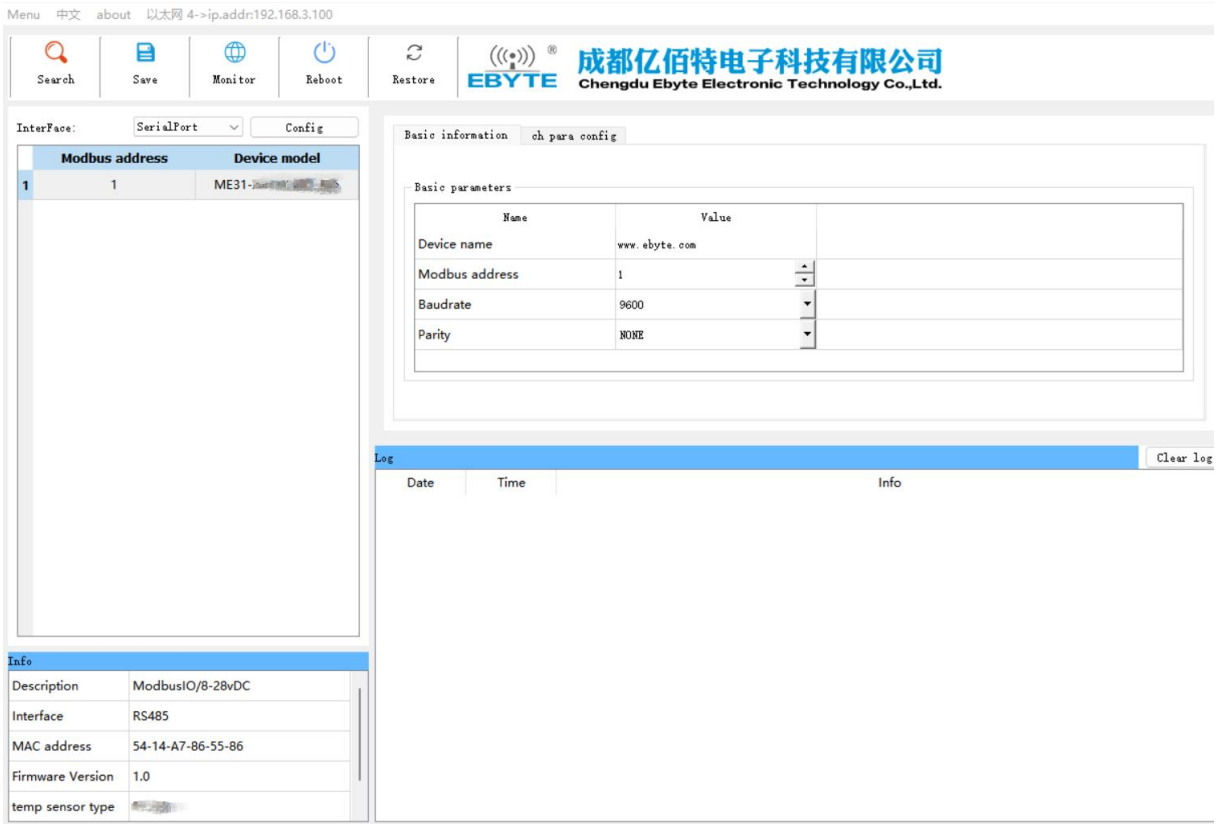
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6.2 Parameter configuration interface

Step 1: For connecting devices, refer to " Temperature Acquisition "

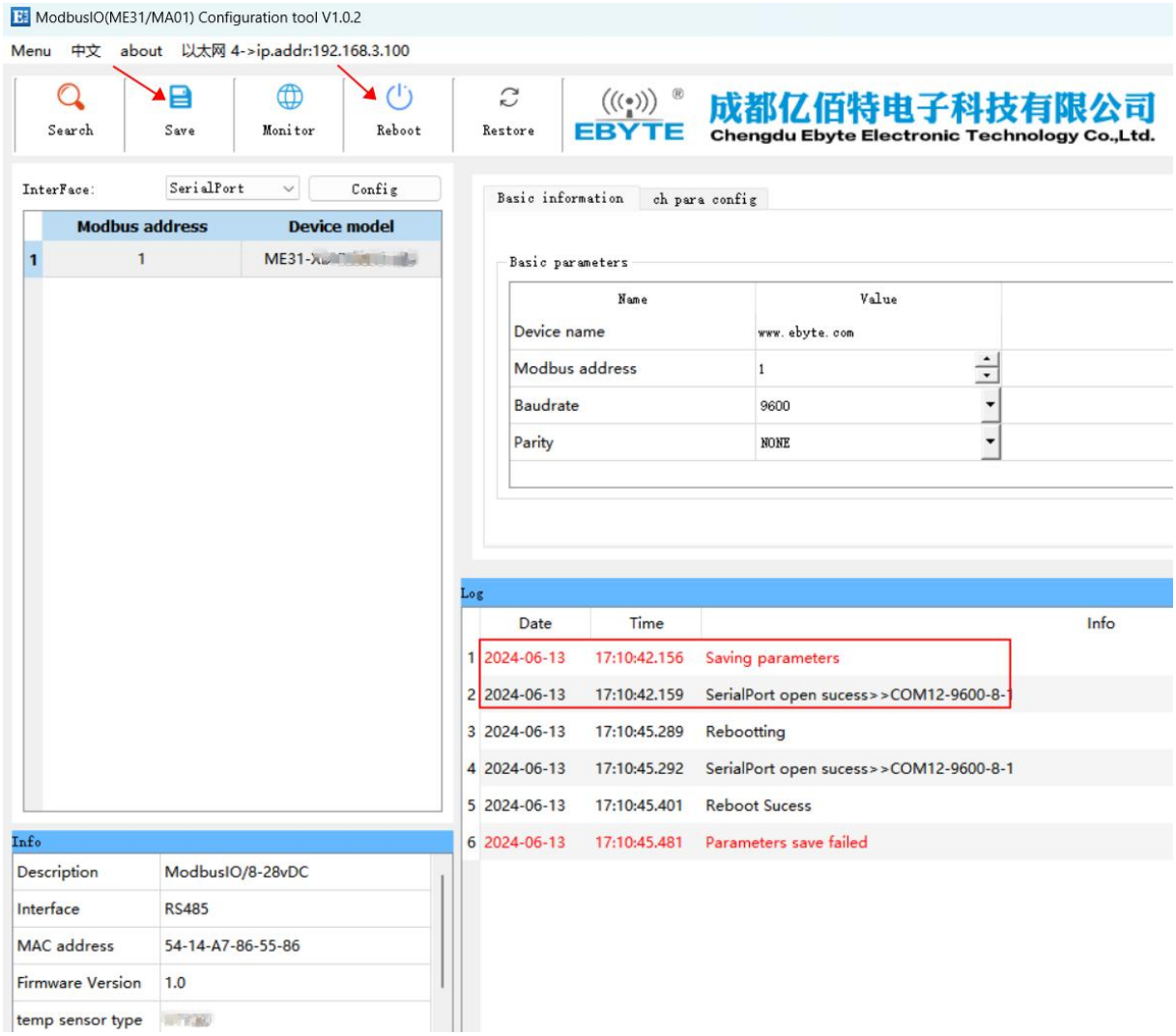
Step 2: Device parameters and temperature offset value parameters can be configured



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Step 3: After configuring the parameters, click to download the parameters. When you see the prompt message in the log output that the parameters have been saved successfully, click to restart the device. After the device restart is completed, the modified parameters will take effect.



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Revision history

Version	Revision date	Revision Notes	Maintenance man
1.0	2023-4-15	First edition manual	LT

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