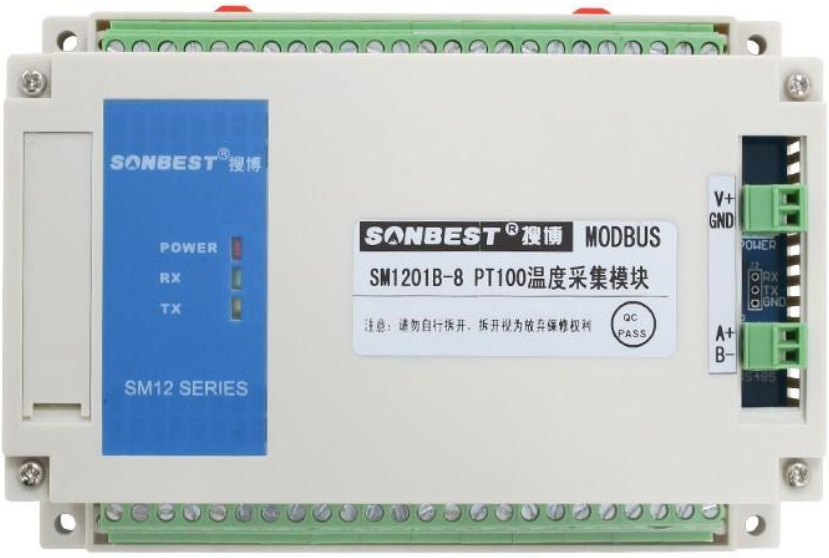
SM1201B-16

RS485 interface 16-channel PT100 temperature acquisition module

User Manual

File Version: V23.6.19



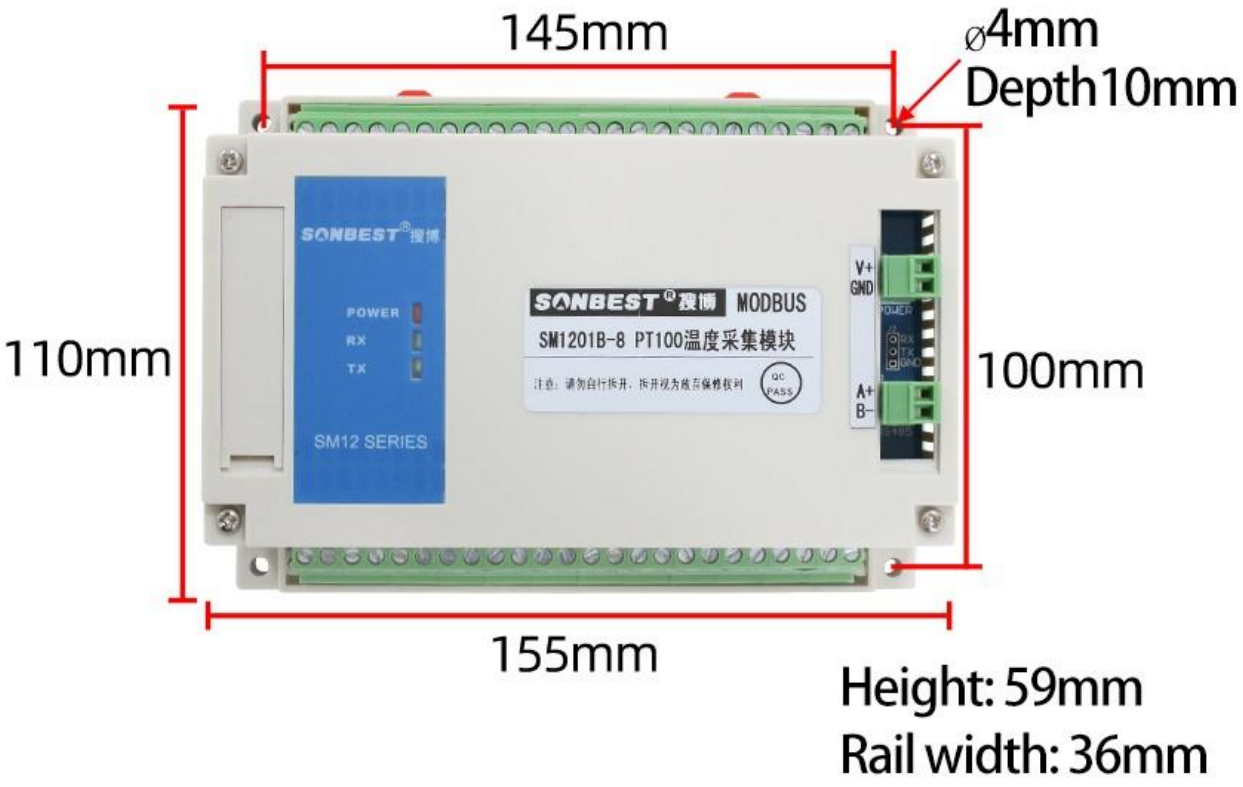
SM1201B-16 using the standard RS485 bus MODBUS-RTU protocol,easy access to PLC，DCS and other instruments or systems for monitoring temperature@16 state quantities.The internal use of high-precision sensing core and related devices to ensure high reliability and excellent long-term

stability,can be customized RS232,RS485,CAN,4-20mA,DC0~5V\10V,ZIGBEE,Lora,WIFI,GPRS and other output methods.

Technical Parameters

Technical parameter	Parameter value
Brand	SONBEST
Temperature measurement range	-50℃ to +100℃ (optional with other ranges)
Detecting Core Devices	PT100
Temperature Measurement Accuracy	± 0.5℃ (0.5FS)
Thermal Response Coefficient	10mΩ/K
The resistance @ ℃	1000Ω±0.12Ω/K
The resistance rate	0.385Ω/K
Reference Standards	Using EN 60751 Class B Standards
Channels	8
Communication Interface	RS485
Default baud rate	9600 8 n 1
Power	DC9~24V 1A
Running temperature	-30~85℃
Working humidity	5%RH~90%RH

Product Size



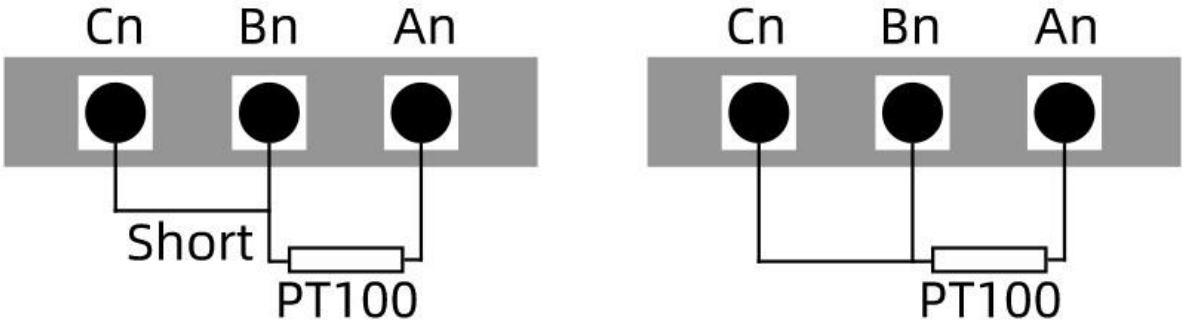
Connection mode

WIRING

V+	PWR+	A1	Pt100 Signal line A
V-	PWR-	B1	Pt100 Signal line B
A+	RS485 A+	C1	Pt100 Signal line C
B-	RS485 B-	.....	
		A8	Pt100 Signal line A
		B8	Pt100 Signal line B
		C8	Pt100 Signal line C

※Note: When wiring, connect the positive and negative poles of the power supply first, and then connect the signal wire

Two-wire system and three-wire system wiring method:



Two-wire connection Three-wire connection

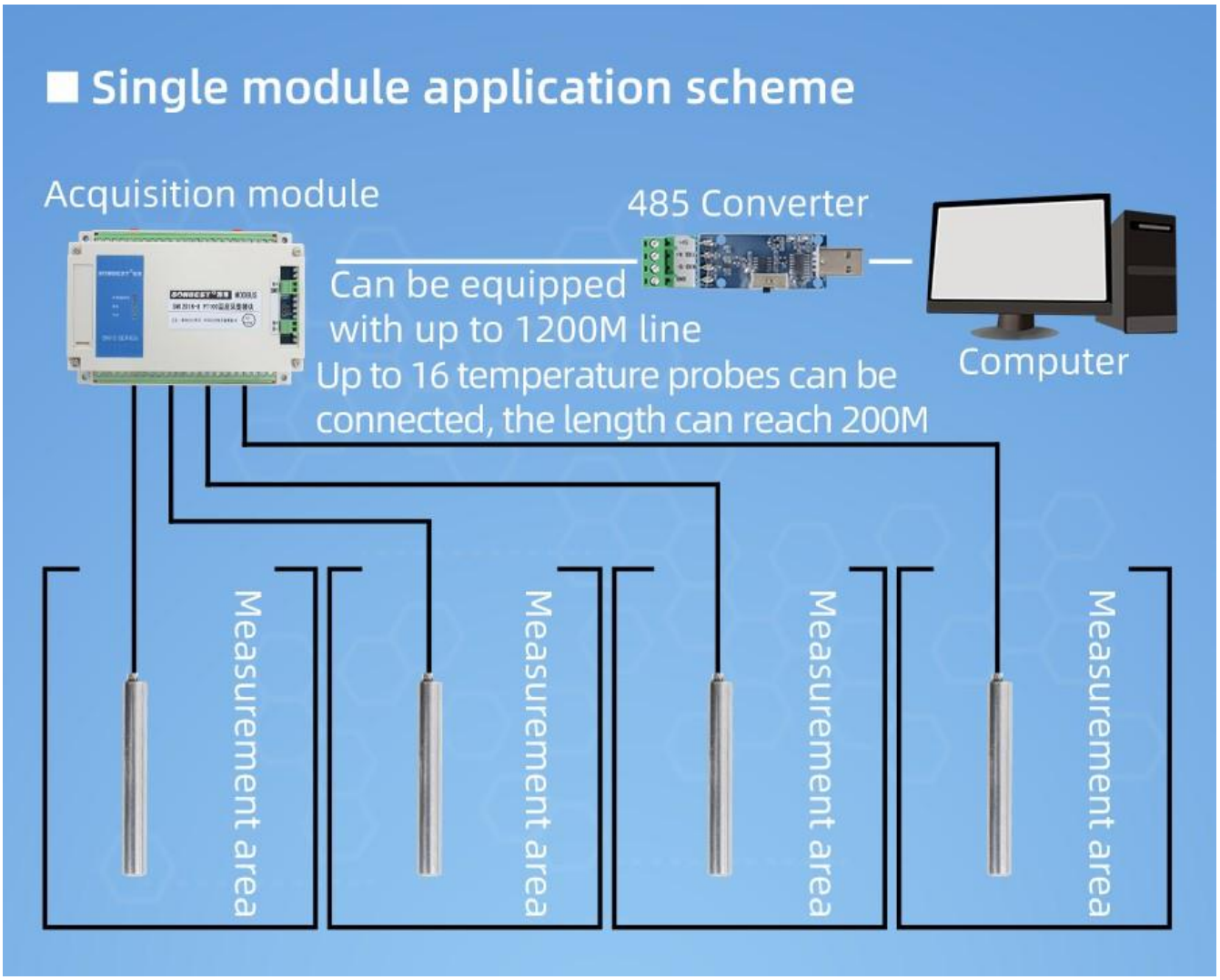
Wiring instructions

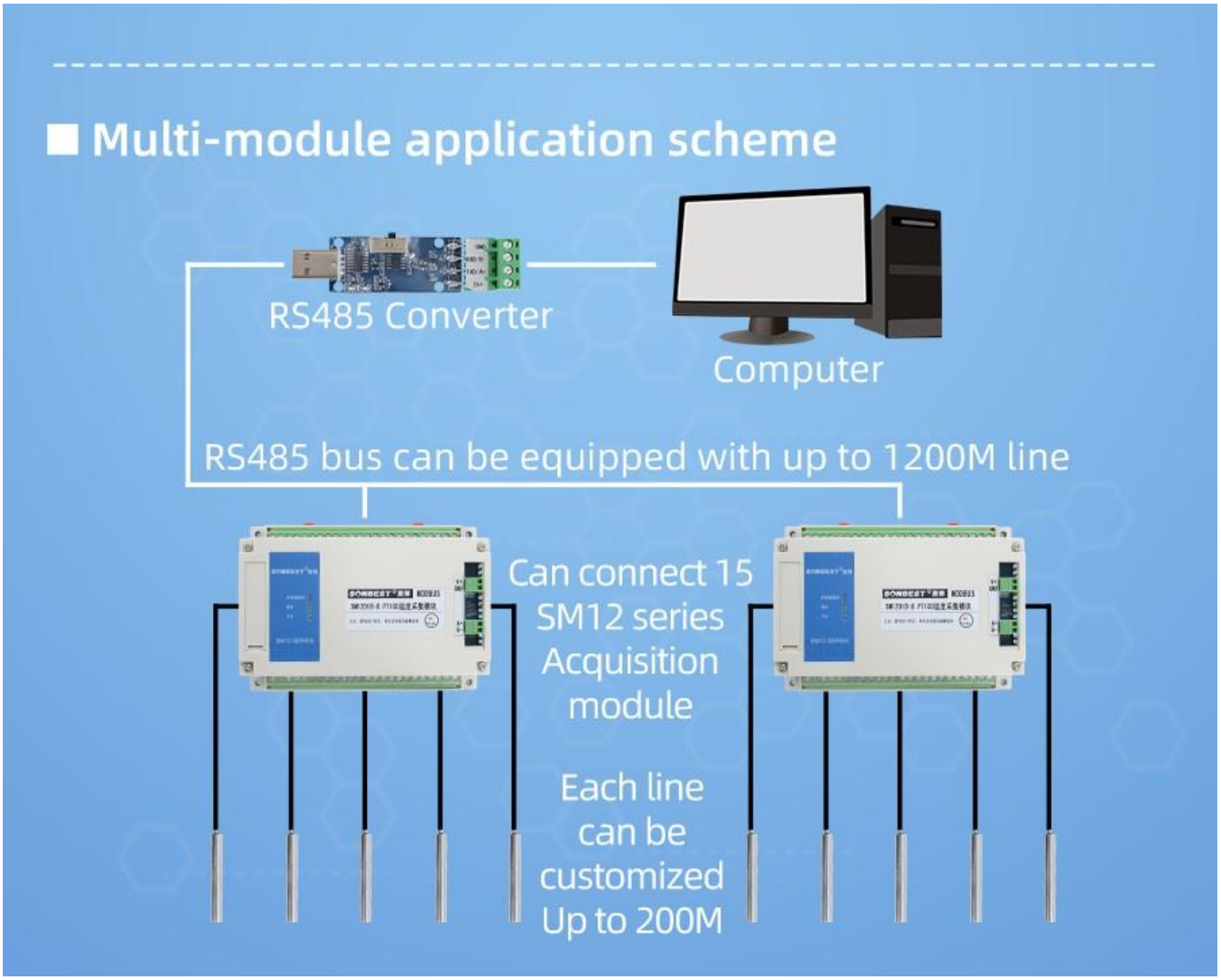
In the case of broken wires, wire the wires as shown in the figure. If the product itself has no leads, the core color is for reference.

How to use?

The temperature collection module can be widely used in indoor temperature measurement fields such as granary warehouses, heat source heat pumps, computer room workshops, libraries, museums, offices, archives, etc.

Application solution

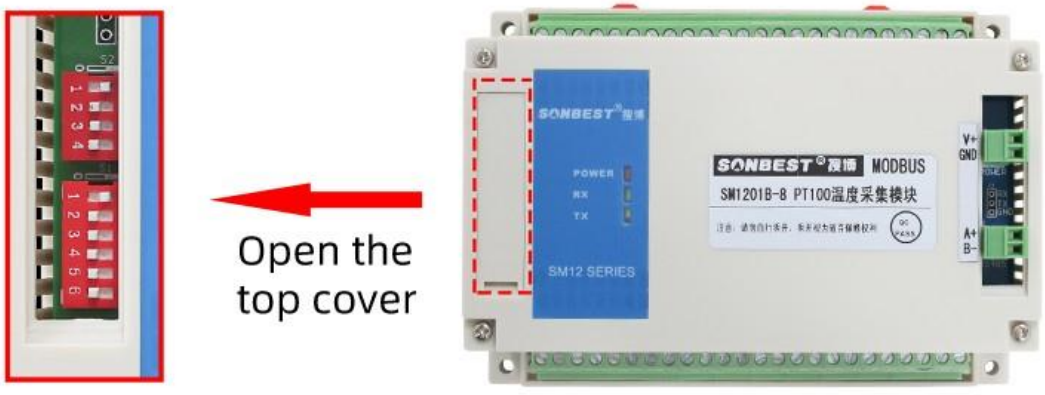

Single module application scheme
Acquisition module
485 Converter
Can be equipped with up to 1200M line
Up to 16 temperature probes can be connected, the length can reach 200M
Computer
Measurement area
Measurement area
Measurement area
Measurement area


Multi-module application scheme
RS485 Converter
Computer
RS485 bus can be equipped with up to 1200M line
Can connect 15 SM12 series Acquisition module
Each line can be customized Up to 200M

SETTING

In the application, it is sometimes necessary to use multiple machines in a network connection, and the device addresses in the network cannot be the same, so the user changes the device address, and the address range is 1-63. The change of the device address of this device is realized by the code switch S1. The dial switch to "ON" means "1", and the "digital terminal" means "0". The relationship between segments 1-6 of the dial switch S1 and the address is shown in the following table:

DIP switch S1 (the number marked on the DIP switch is the segment number)						Device address
Segment 6	Segment 5	Segment 4	Segment 3	Segment 2	Segment 1	
0	0	0	0	0	1	1
0	0	0	0	1	0	2
0	0	0	0	1	1	3
...	...	...	...	...	...	...
1	1	1	1	1	1	63



The default device address is 1, and the dial position is shown in the figure.

Note: The device must be restarted (power off) to set the new device address to take effect

Product List

SM1201B-16
Temperature acquisition module

Warm reminder card

Certificate of conformity

Communication Protocol

The product uses RS485 MODBUS-RTU standard protocol format, all operation or reply commands are hexadecimal data. The default device address is 1 when the device leaves the factory, and the module or NON-Recorder default baud rate is 9600,8,n,1 ,but data recorder default baud rate is 115200 .

1. Read data (function code 0x03)

Inquiry frame (hexadecimal), sending example: query 1 data of 1# device, the upper computer sends the command: 01 03 00 00 00 08 44 0C .

Address	Function Code	Start Address	Data Length	Check Code
01	03	00 00	00 08	44 0C

For the correct query frame, the device will respond with data: 01 03 10 00 88 00 00 00 00 00 00 00 00 00 00 00 00 00 6C 3F , response format:

Address	Function Code	Length	Data 1	Data 2	Data 3	Data 4	Data 5	Data 6			
01	03	10	00 79	00 7A	00 7B	00 7C	00 7D	00 7E			

Data description: The data in the command is hexadecimal, take data 1 as an example, 00 79 is converted to decimal value as 121, assuming the data magnification is 100, then the real value is 121/100=1.21, Others and so on.

2. Common data address table

Configuration Address	Register Address	Register Description	Data Type	Value Range

40001	00 00	temperature	Read Only	0~65535
40002	00 01	temperature	Read Only	0~65535
40003	00 02	temperature	Read Only	0~65535
40004	00 03	temperature	Read Only	0~65535
40005	00 04	temperature	Read Only	0~65535
40006	00 05	temperature	Read Only	0~65535
40007	00 06	temperature	Read Only	0~65535
40008	00 07	temperature	Read Only	0~65535
40009	00 08	temperature	Read Only	0~65535
40010	00 09	temperature	Read Only	0~65535
40011	00 0A	temperature	Read Only	0~65535
40012	00 0B	temperature	Read Only	0~65535
40013	00 0C	temperature	Read Only	0~65535
40014	00 0D	temperature	Read Only	0~65535
40015	00 0E	temperature	Read Only	0~65535
40016	00 F	temperature	Read Only	0~65535
40101	00 64	Model Code	Read/Write	0~65535
40102	00 65	total number of measuring points	read/write	1~20
40103	00 66	device address	read/write	1~249
40104	00 67	baud rate	read/write	0~6
40105	00 68	communication mode	read/write	1~4
40106	00 69	protocol type	read/write	1~10

3 Read and modify device address

(1) Read or query device address

If you don't know the current device address and there is only one device on the bus, you can query the device address through the commandFA 03 00 66 00 01 71 9E .

Device Address	Function Code	Start Address	Data Length	Check Code
FA	03	00 66	00 01	71 9E

FA means 250 is the general address, when you don't know the address, you can use 250 to get the real device address, 00 66 is the device address register.

For the correct query command, the device will respond, for example, the response data is: 01 03 02 00 01 79 84, and its format parsing is shown in the following table:

Device Address	Function Code	Start Address	Model Code	Check Code
01	03	02	00 01	79 84

In the response data, the first byte 01 represents the real address of the current device.

(2) Change device address

For example, if the current device address is 1 and we want to change it to 02, the command is: 01 06 00 66 00 02 E8 14 .

Device Address	Function Code	Register Address	Target Address	Check Code
01	06	00 66	00 02	E8 14

After the change is successful, the device will return the information: 02 06 00 66 00 02 E8 27 , and its

format analysis is shown in the following table:

Device Address	Function Code	Register Address	Target Address	Check Code
02	06	00 66	00 02	E8 27

In the response data, after the modification is successful, the first byte is the new device address. Generally, after the device address is changed, it will take effect immediately. At this time, the user needs to change the query command of his software accordingly. .

4 Read and modify baud rate

(1) Read baud rate

The default factory baud rate of the device is 9600. If you need to change it, you can change it according to the following table and the corresponding communication protocol. For example, to read the baud rate ID of the current device, the command is: 01 03 00 67 00 01 35 D5 , the format is parsed as follows.

Device Address	Function Code	Start Address	Data Length	Check Code
01	03	00 67	00 01	35 D5

Read the baud rate code of the current device. Baud rate code: 1 is 2400; 2 is 4800; 3 is 9600; 4 is 19200; 5 is 38400; 6 is 115200.

For the correct query command, the device will respond, for example, the response data is: 01 03 02 00 03 F8 45, and its format analysis is shown in the following table:

Device Address	Function Code	Data Length	Baud Rate Code	Check Code
01	03	02	00 03	F8 45

According to the baud rate code, 03 is 9600, that is, the baud rate of the current device is 9600.

(2) Change the baud rate

For example, change the baud rate from 9600 to 38400, that is, change the code from 3 to 5, the command is: 01 06 00 67 00 05 F8 16 .

Device Address	Function Code	Register Address	Target Baud Rate	Check Code
01	06	00 67	00 05	F8 16

Change the baud rate from 9600 to 38400, that is, change the code from 3 to 5. The new baud rate will take effect immediately, and the device will lose response at this time, and the baud rate of the device needs to be checked accordingly Modified.

5 Read and modify correction value

(1) Read correction value

When there is an error between the data and the reference standard, we can reduce the display error by adjusting the correction value. The correction difference can be modified in a range of plus or minus 1000, that is, the value range is 0-1000 or 64535 -65535. For example, when the displayed value is too small by 100, we can correct it by adding 100. The command is: 01 03 00 6B 00 01 F5 D6 . In the command, 100 is hexadecimal 0x64 ;If you need to reduce it, you can set a negative value, such as -100, the corresponding hexadecimal value is FF 9C, the calculation method is 100-65535=65435, and then converted to hexadecimal, it is 0x FF 9C. Device The correction value starts from 00 6B. We take the first parameter as an example to illustrate. When there are multiple parameters, the correction value is read and modified in the same way.

Device Address	Function Code	Start Address	Data Length	Check Code
01	03	00 6B	00 01	F5 D6

For the correct query command, the device will respond, for example, the response data is: 01 03 02 00 64 B9 AF, and its format parsing is shown in the following table:

Device Address	Function Code	Data Length	Correction Value	Check Code
01	03	02	00 64	B9 AF

In the response data, the first byte 01 represents the real address of the current device, and 00 6B is the first state correction value register. If the device has multiple parameters, other parameters operate in the same way as this The same, generally temperature and humidity have this parameter, and lighting generally does not have this parameter.

(2) Change the correction value

For example, if the current state is too small, we want to add 1 to its real value, and add 100 to the current value. The correction operation command is: 01 06 00 6B 00 64 F9 FD .

Device Address	Function Code	Register Address	Target Address	Check Code
01	06	00 6B	00 64	F9 FD

After the operation is successful, the device will return the information: 01 06 00 6B 00 64 F9 FD , after the successful change, the parameters will take effect immediately.

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