

## SC7202B

# RS485 interface with communication function PT1000 temperature controller

## User Manual

File Version: V23.6.25



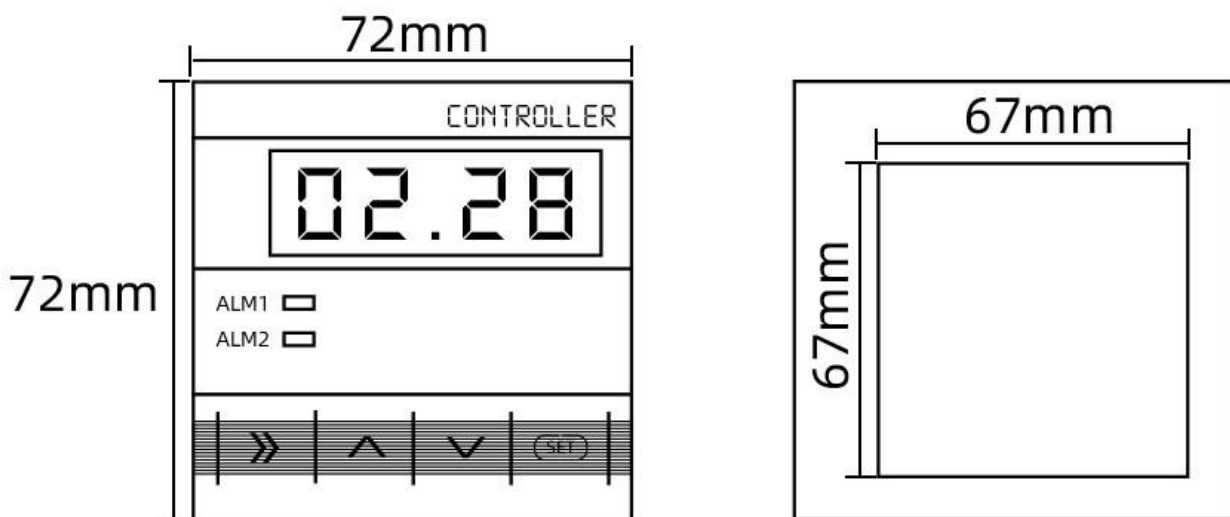
SC7202B using the standard RS485 bus MODBUS-RTU protocol, easy access to PLC, DCS and other instruments or systems for monitoring temperature state quantities. The internal use of high-precision sensing core and related devices to ensure high reliability and excellent long-term stability, can be

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	PT1000
Temperature Measurement Accuracy	± 0.3℃ (optional ±0.3℃)
Thermal Response Coefficient	10mΩ/K
The resistance of the sensor at 0 ℃	1000Ω±0.12Ω/K
The resistance of the sensor at 0-100 ℃	3.85Ω/K
Reference Execution Standards	Using EN 60751 Class B Standards
Channels	1
Wire	2-wire or 3-wire
Communication Interface	RS485
Default baud rate	9600 8 n 1
Power	AC185~265V 1A
Running temperature	-30~85℃
Working humidity	5%RH~90%RH

### Product Size



Body length: 110mm

# Wiring mode

SENSOR V+	1	VCC Red		Red	8	POWER SUPPLY AC220V  PUBLIC SIDE  RELAY 1 NORMALLY CLOSED POINT RELAY 1 NORMALLY OPEN POINT RELAY 2 NORMALLY CLOSED POINT RELAY 2 NORMALLY OPEN POINT
SENSORV-	2	DO BLUE		BLUE	9	
EMPTY FEET NULL	3	EMPTY		COM	10	
POWER SUPPLY NEGATIVE TERMINAL	4	GND Black		NC1	11	
POWER SUPPLY NEGATIVE TERMINAL	5	GND		NO1	12	
RS485B-	6	B-		NC2	13	
RS485A+	7	A+		NO2	14	

### Sensor wiring on the left

- (1)RED      SENSOR V+
- (2)BLUE      SENSOR V-
- (4)BLACK      POWER SUPPLY NEGATIVE TERMINAL

### Right power supply AC220V wiring

- (8)RED      POWER SUPPLY POSITIVE
- (9)BLUE      POWER SUPPLY NEGATIVE TERMINAL

**※NOTE: WHEN WIRING, THE POSITIVE AND NEGATIVE POLES ARE SUPPLIED FIRST, AND THE SIGNAL LINE IS CONNECTED LATER**

### Wiring instructions

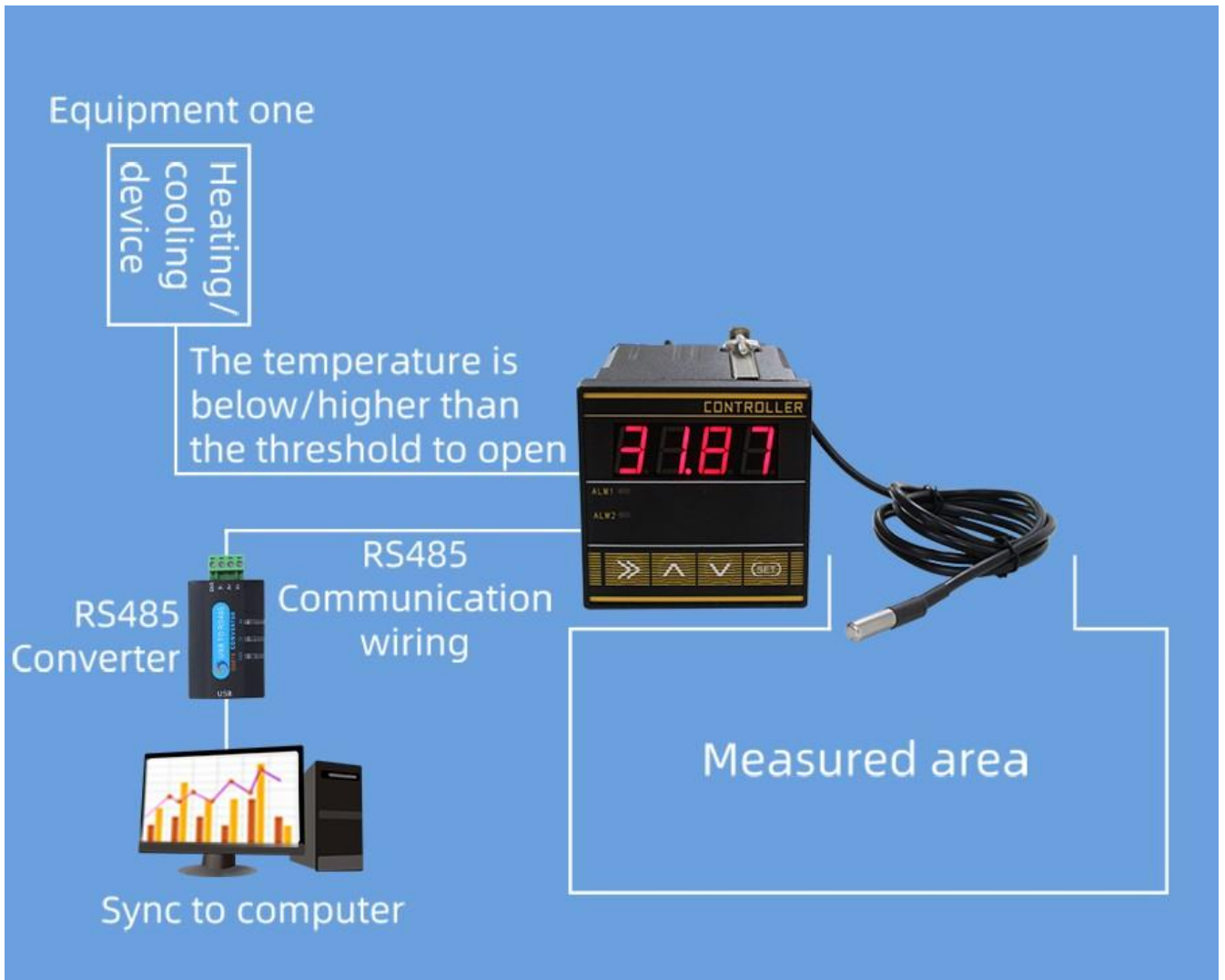
In the case of broken wires, wire the wires as shown in the figure. If the product itself has no leads, the core color is for reference.

### How to use?

Intelligent temperature controllers are used in the anti-condensation protection and environmental protection of high and low voltage switch cabinets, terminal boxes, box-type substations, and can also be used in granaries, warehouses, pharmacies, and factories where high temperature environment requirements are required.



### Application solution



# DETAILED BUTTON

Standard MODBUS-RTU protocol, the default baud rate is 9600, invalid verification, 8 data bits, software can change parameters such as threshold, and real-time query of temperature data through RS485



- » : Use the selection key when setting
- ^ : Up key
- ∨ : Down key
- SET : Set key

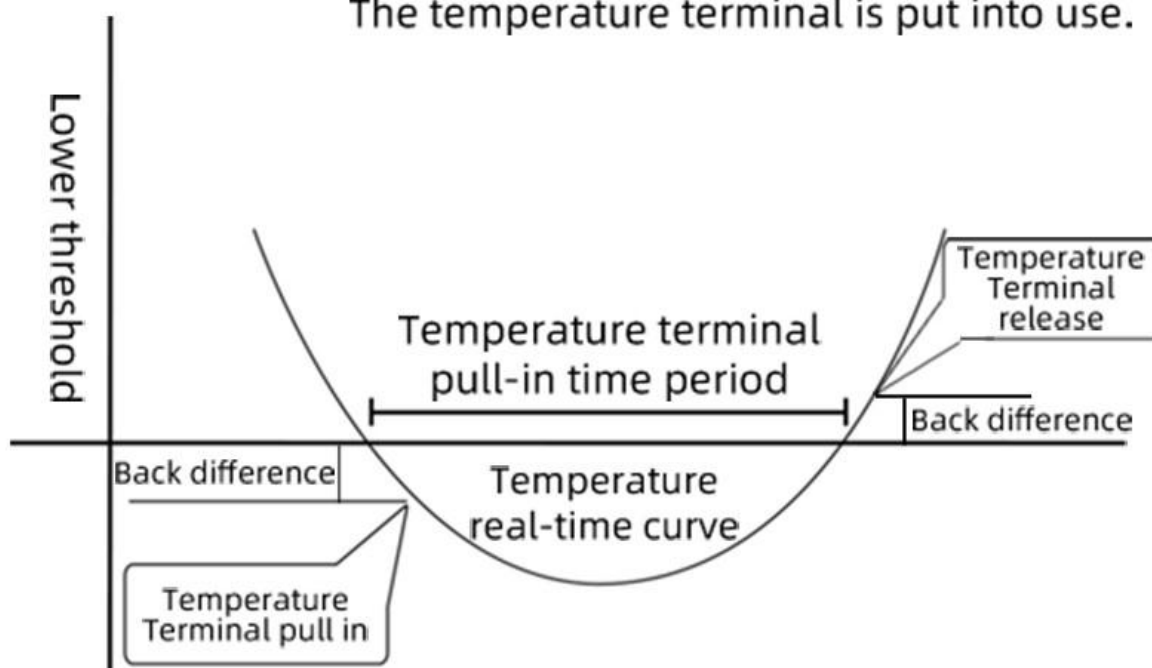


## KEY OPERATION

- ◆ Short press SET and then release to enter the temperature upper limit threshold setting  
Press "»" to select the position, press "Λ" and "V" to adjust the value  
Relay 1 will act when the value is lower than the offline threshold  
Upper threshold: minimum temperature 0, maximum 99
- ◆ Press the second SET to enter the temperature lower limit threshold setting  
Press "»" to select the position, press "Λ" and "V" to adjust the value  
Relay 2 will act when the value is higher than the upper limit threshold  
Lower threshold: minimum temperature -50, maximum 99
- ◆ Press SET for the third time to enter the control hysteresis setting  
Press "»" to select the position, press "Λ" and "V" to adjust the value  
Return difference: minimum temperature 0, maximum 10
- ◆ Press the fourth SET to save the data

# CONTROL MODE AND PROCESS

Mode 1: Action below the lower limit threshold  
The temperature terminal is put into use.



## The opening and closing process of temperature control equipment

Temperature terminal pull-in action conditions:

measured value < lower limit threshold - return difference

Temperature terminal release action condition:

measured value > lower limit threshold + return difference value

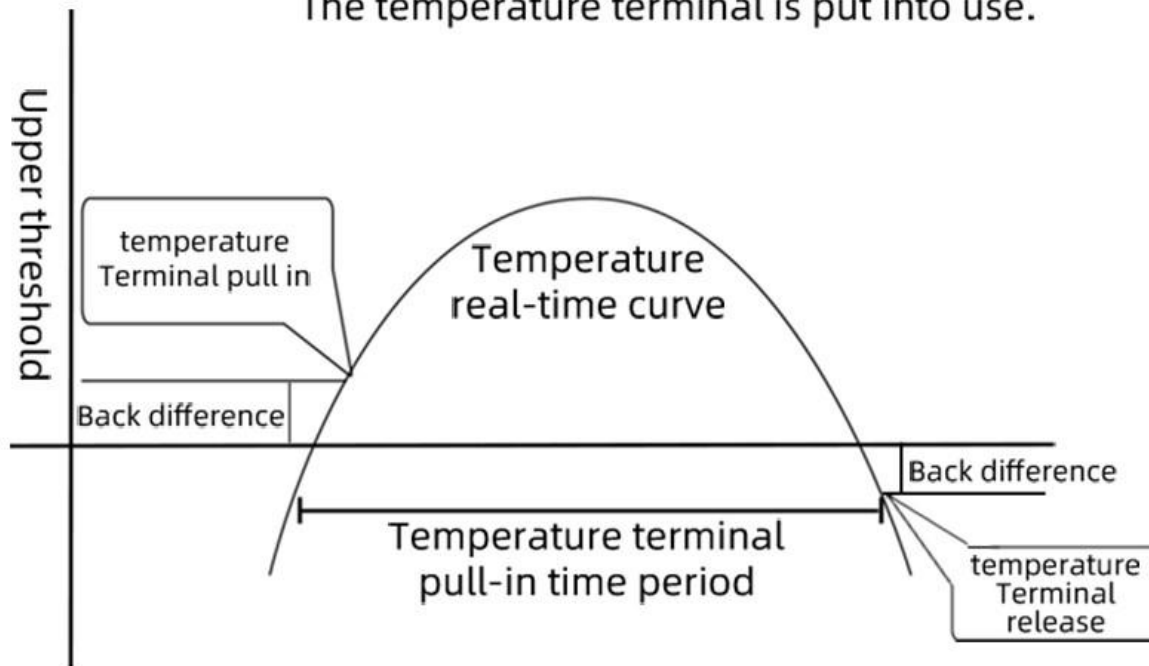
※As shown in the figure above, when the measured value is lower than the lower limit threshold minus the difference, the internal temperature of the controller

The terminal pulls in to turn on the device; when the measured value rises to the lower limit threshold and adds back the difference, the temperature

The degree terminal is disconnected and the device is turned off.



Mode 2: Action above the upper limit threshold  
The temperature terminal is put into use.



## The opening and closing process of temperature control equipment

The temperature terminal pull-in action condition:

measured value > upper limit threshold + return difference value

Temperature terminal release conditions:

measured value < upper limit threshold - return difference

※As shown in the figure above, when the measured value is higher than the upper limit threshold and the difference is added back, the internal temperature of the controller

The terminal pulls in to turn on the device; when the measured value drops to the upper limit threshold and subtracts the difference, the temperature

The degree terminal is disconnected and the device is turned off.

### Product List



PT1000 temperature controller  
(Including power supply, sensor)



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 01 84 0A .

Address	Function Code	Start Address	Data Length	Check Code
01	03	00 00	00 01	84 0A

For the correct query frame, the device will respond with data: 01 03 02 00 79 79 A6 , response form at:

Address	Function Code	Length	Data 1	Check Code
01	03	02	00 79	79 A6

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	Register Address	Register	Data Type	Value Range
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Address		Description		
40001	00 00	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 command FA 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.

## Disclaimer

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**Contact Us**

Company: Shanghai Sonbest Industrial Co., Ltd

Address: Building 8, No.215 North east road, Baoshan District, Shanghai, China

Web: <http://www.sonbest.com>

Web: <http://www.sonbus.com>

SKYPE: soobuu

Email: [sale@sonbest.com](mailto:sale@sonbest.com)

Tel: 86-021-51083595 / 66862055 / 66862075 / 66861077