1. Basic Information

| Item	content
Temperature test range	- 200 °Cto 650 °C (Depending on the temperature measurement performance of the matched platinum resistance)
range of working temperature	40 °C to 80 °C
Resolution	0.1
Precision	Total accuracy is maintained at 0.5 (0.05% of full scale) (Depending on the temperature measurement accuracy of the matched platinum resistance)
Setting method	Button/serial AT command
Command mode	AT command
Display method	0.36 inch digital tube display
Operating Voltage	DC 3.3-5v
Working current	<100mA
Power supply interface	MicroUSB/power port
Data communication interface	TTL header
Platinum resistance interface type	Compatible with 2 wires/3 wires/4 wires, fixed with KF850 terminals
Default platinum resistance type	PT100, if you use PT1000, you need to change the internal patch reference resistance value of the module

1. The thermostat supports PT100 platinum resistance by default. If you need to use PT1000 platinum resistance, you need to change the reference resistance of the thermostat from 402 ohms (4020) to 4.02K ohms (4021), with an accuracy of 0.1%, package 0805, please refer to the appendix wiring manual for details.

Note:

2. The thermostat is compatible with 2-wire/3-wire/4-wire platinum resistance by default. The connection methods between them and the thermostat are different. You need to change the jumper on the thermostat to switch. For the specific wiring method, refer to the appendix wiring Instructions.

2. Structural parameters

Size	37mmX62mmX21mm(L*W*H)
Fixing hole	3mm Diameter
Weight	30g
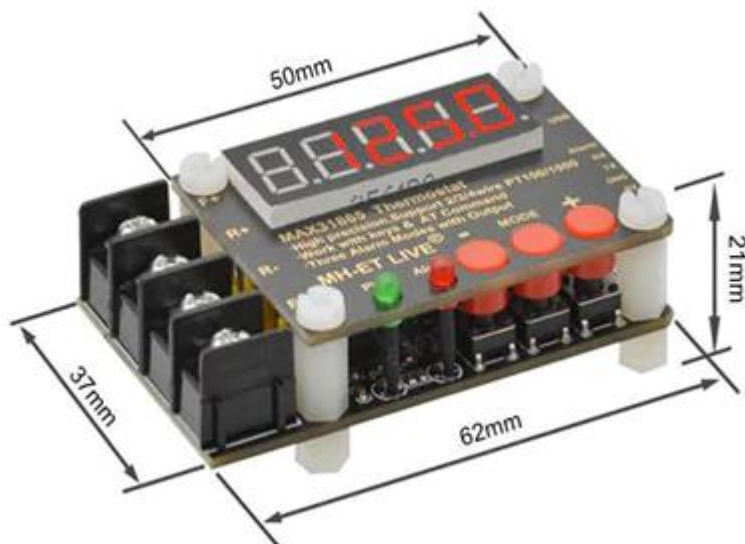
3. Button Operation Guide

Connect the platinum resistance PT100/1000 sensor as required.
After power on, the module will enter the main interface of temperature display

Real-time temperature display   **No Flicker**

Long press the MODE button to enter the setting menu switching state, and the home page enters the temperature upper limit adjustment. Click MODE to switch menu

First enter the temperature upper limit adjustment, short press or long press (the step value is different) +/- key to adjust the temperature value

Upper temperature limit   **500ms Flicker**

Click MODE to switch to the lower limit of temperature adjustment, short press or long press (the step value is different) plus and minus keys to adjust the temperature

Lower temperature limit   **500ms Flicker**

Click MODE to switch to the alarm mode selection function, click +/- keys to adjust the mode

Out of zone Alarm   **500ms Flicker**

Higher than upper limit Alarm   **500ms Flicker**

Lower limit Alarm   **500ms Flicker**

Click MODE to switch to the Baud rate selection function, click the plus and minus keys to switch the serial communication baud rate

Baud rate 9600	🔢 **96**	500ms Flicker
Baud rate 19200	🔢 **192**	500ms Flicker
Baud rate 57600	🔢 **576**	500ms Flicker
Baud rate 115200	🔢 **1152**	500ms Flicker

Click MODE again to switch back to the first temperature upper limit adjustment interface,

Long press the MODE button on any adjustment interface or wait for 8 seconds to automatically save the parameters and return to the main interface

4. Serial Communication Operation Guide:

Serial communication protocol description	
Bits per Second :	115200
Data Bits :	8
Parity :	None
Stop bits :	1
Flow control bits :	None

4.1、AT Order details

··Precautions

···All AT commands must be sent with line feed, otherwise no response, if the command is wrong, the original data will be returned;

···The relevant temperature unit in the AT command is 0.1 degrees Celsius, for example -123 represents -12.3 degrees Celsius;

···All settings will be automatically stored after being effective, and effective when power off. To change the baud rate of serial communication, the change will take effect after power off and restart, otherwise the original baud rate will be maintained.

Query instruction	Function	Remarks	
AT+T?	Read temperature	Reading*0.1=Actual Value	
AT+A?	Check whether the alarm	0	No Alarm
		1	Alarm
AT+TH?	Upper temperature limit	Reading*0.1=Actual Value	
AT+TL?	Lower temperature limit	Reading*0.1=Actual Value	
AT+BAUD?	Query baud rate	96	9600
		192	19200
		576	57600
		1152	115200
AT+ALARM?	Query alarm mode	0	Out of range
		1	Above the upper limit
		2	Below the lower limit

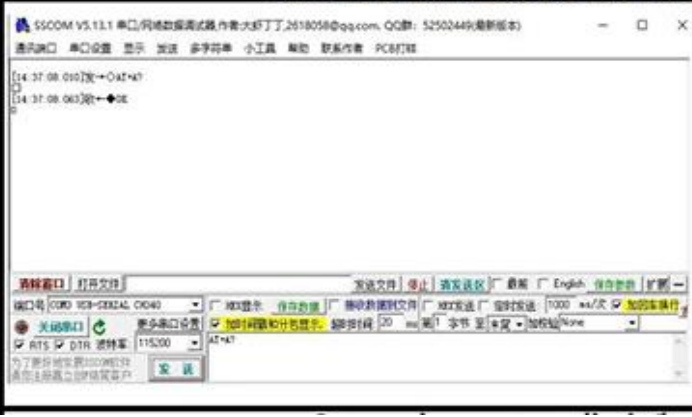| Query instruction	Function	Remarks
AT+TH=Actual Temperaturex10	Set the upper limit temperature	Actual Temperaturex10
AT+TL=Actual Temperaturex10	Set lower limit temperature	Actual Temperaturex10
AT+BAUD=1152(Restart to take effect)	Set Baud Rate	Same Query
AT+ALARM=1	Set Alarm Mode	Same Query

4.2. Serial debugging instructions

4.2.1 Hardware

To connect to a computer, a USB-to-TTL serial port module is required. Note that TX is connected to the RX of the serial port module, and RX is connected to the TX of the serial port module.
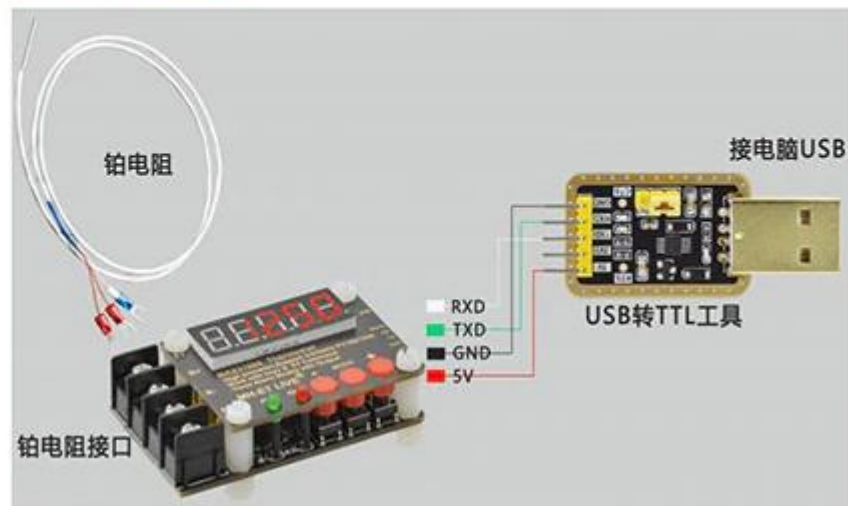
4.3.2 Serial port software debugging

After connecting with the USB to TTL module, plug the serial port module into the computer USB port. Make sure to find the corresponding COM port after installing the driver of the serial port module. Open the serial port debugging software, set the baud rate to the module's default 115200 (if the baud rate is over, you need to select the current baud rate), and the serial port software's sending settings should enable "carriage return and line feed". Select "Timestamp and Subcontract Display" as required. Finally, open the serial port and send the corresponding commands according to the AT command table to complete a complete debugging process. The following is a demonstration of the serial communication process.

| Read temperature value		
	Reply to "OK" and "308"	Current temperature 30.8°C
Query the alarm status (whether it alarms)		
	Reply "OK" and "0"	Currently there is no alarm, "1" means alarm
Query alarm upper limit/lower limit		
	Reply to "OK" and "324"	The current upper temperature limit is 32.4°C; the same is true for the lower temperature limit query.

Query the current baud rate

	Reply to "0K" and "1152"	The current baud rate is "115200"

Query the current alarm mode
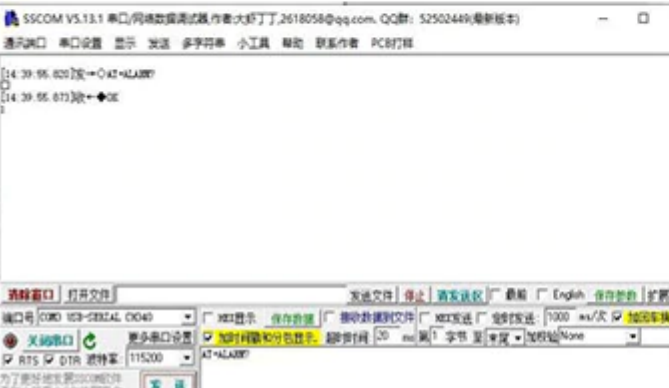
	Reply "0K" and "1"	The current alarm mode is "1", which means "above the upper limit" alarm

Set alarm upper/lower limit

	Sending "AT+TH=350" means setting the upper limit of temperature to 35`C, replying "OK" means setting is successful

Set the baud rate, restart the power to take effect	
	Sending "AT+BAUD=96" means setting the baud rate to 9600, and replying "OK" means setting is successful
Set Alarm Mode	
	Sending "AT+ALARM=1" means setting the alarm mode to 1, which means "above the upper limit" alarm, and replying "OK" means the setting is successful

5. Host computer

5.1 Hardware connection

To connect to a computer, a serial port module with USB to TTL level is required. Note that TX is connected to the RX of the serial port module, and RX is connected to the TX of the serial port module. . Refer to section 4.1.1 for details.

5.2 Host computer debugging

After connecting with the USB to TTL module, plug the serial port module into the computer USB port. Make sure to install the driver of the serial port module, find and confirm the COM port corresponding to the module.
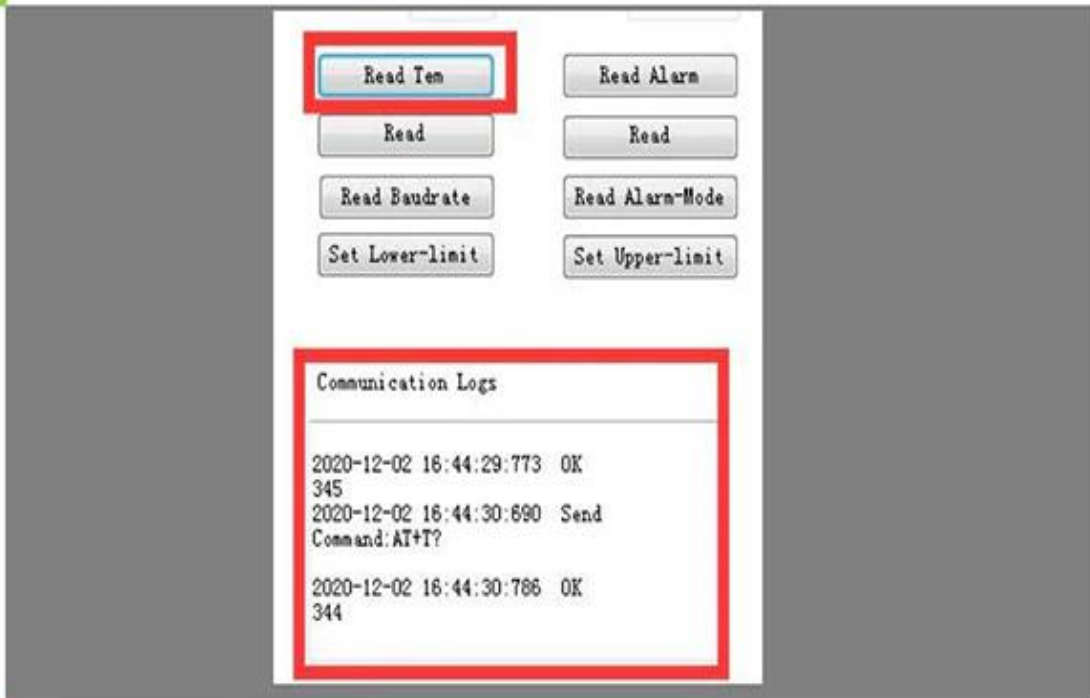
1	Open the host computer software, connect for the first time, set the baud rate to the default 115200, and then click to open the COM port;

2	Click to read temperature, and check whether the communication log has prompted OK and temperature value (actual temperature*10) to confirm that the communication started normally;

3	Select the desired alarm mode and click the button, fill in the upper and lower temperature limits (actual values), and click the set button to set the lower and upper temperature limits of the module.

| 4 | Fill in the appropriate maximum and minimum values of the Y axis in the graph display interface, in degrees Celsius. Enable the real-time recording and alarm line as required, and you can see the real-time temperature measurement status display curve. Blue is the real-time temperature value, red is the upper temperature limit, and green is the lower temperature limit. The temperature record supports query and export. When changing the upper and lower temperature limits and alarm mode, the alarm line needs to be refreshed. Note that the alarm curve chart below only supports query, not real-time recording. The button of the alarm mode and the real-time temperature display frame, the color of the normal temperature is green, when the alarm temperature is reached, the color of these buttons will change to red. |