User Manual of RC-113M Thermostat

PID Heating Controller

(Version 21.08.04GEN)

Based on the PID arithmetic, the 113M thermostat can dynamically adjust the output current intensity by the SCR (Silicon-Controlled Rectifier), which means the power of the heating component also changes little by little, it makes the temperature change gradually instead of sharply

This PID temperature controller could effectively reduce the irreversible damage caused by temperature shock; With a high accuracy 50KΩ sensor, the accuracy as high as 0.1°C during 25°C ~ 42°C.

The typical applications are for incubator and laboratory scientific experiments.

1. Package

Controller: 1PCS	Manual: 1PCS		Sensor: 1PCS
Slide Clips: 2PCS	Waterproof Cover: 1PCS		

2. Specification

|	
Input Power	220V AC ± 10% 50/60HZ; (110V Option)
Maximum current	2 A under 220V AC, max power 500W.
Sensor	NTC, 25°C /50 KΩ, sensor cable 100cm.
	Wire: φ2.1mm*2m; sensor size: φ4mm*20 mm
Protection Class	IP65 to the front panel
Storage	-10°C ~ 60°C, RH < 90%, without condensation
Measurable Range:	-10°C ~ +100°C
Controllable Range:	-15°C ~ +110°C
Precision:	**0.1°C**
Accuracy:	± 0.1°C between 25°C to 42°C, ± 1°C in other range
Rated Power:	≤ 1.5W

3. Environmental Information

Recyclable

The package's material is 100% recyclable. Just dispose of it through specialized recyclers.

The electro components can be recycled if it is disassembled for specialized companies.

Please do not burn or throw the controllers in domestic garbage. Observe the respective law in your region concerning the environmentally responsible manner of disposing of its devices.

4. Appearance & Operation

4.1. Front Panel & Icon
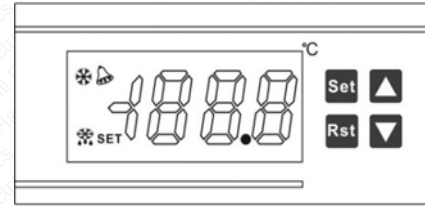
Under normal status

- When screen light, hold the [Rst] button for 3s to **turn off** the display, But please learn that it **dims the screen but does not power off** the controller.
- When the screen is dark, press the [Rst] key to light on the screen.

Indicator / Character in Display

Indicator	Meaning	On	Hide	Wink
🔔	Alarm	N/A	Ok	Sensor wiring error
♨	Heating status	Working	Stop heating	N/A
SET	Setting status	N/A	Non-setting	On Setting
❄ ✳	Useless on this unit (the digital tube was used on many controllers)			

More operates & setting, please reference 6.0 on next page

4.2. Dimension and Installation
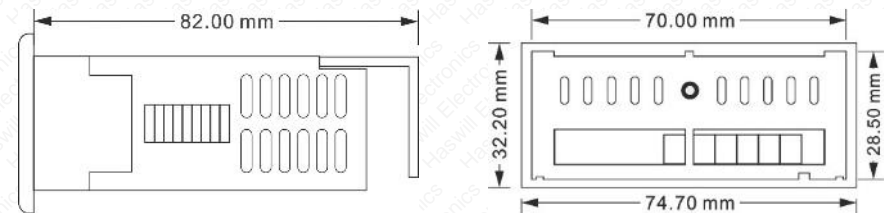
A. Suggested amount dimension: 71.0*29.0*85.0mm (W*H*D)

B. Detach the slide fasteners, put the controller into the hole, wiring follow diagram;

C. Install the fasteners and install the waterproof cover.

D. Please **avoid** installing in the below environments:
- Relative humidity > 90%, have condensation
- The places that temperature <-10°C or >60°C;
- The places that have inflammable and explosives;
- Strong vibration or struck
- Exposed to the continuous water mist spraying;
- Exposed to the dust;
- Exposure to corrosive and pollution gas (e.g., the gas, smoke, or salt fog);
- Wireless electromagnetic interference or strong magnetic fields (near to transmitting antenna or switch board room);

5. Wiring Diagram

A. One 50K NTC sensor is attached and does need not distinguish positive or negative.

B. The input voltage must be within the voltage value marked in the diagram ±10% value.

C. Don't wire any Resistive Load or cooling device like a fan with this controller, or the SRC could be damaged.

D. **Load Power ≤ Voltage of load * Max current of Relay (2A)**

(≤ 440 Watt for 220V, ≤ 264Watt for 110V)

E. There is a fuse inside, and you must disassemble the controller from the front panel before replacing a new fuse.
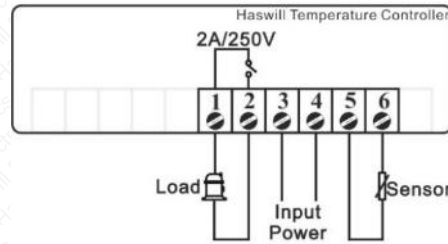
6. Configuration

6.1. Code and Function Menu

Code	Function	Min	Max	Default	Steps
F0 1	Lower Limit for SP (°C)	- 10.0	SP	- 10.0	1.0
F02	Upper Limit for SP (°C)	SP	100.0	100.0	1.0
F03	Calibration (°C)	-07.0	07.0	00.0	0. 1

- SP (Set-Point): indicates the ideal/aim temperature value user wishes to keep around; there is no hysteresis/return difference in this unit. Please do not try to find it.

6.2. How to Set the SP value (Aim Temperature Set Point)?

Please follow the below steps to config the SP value,

Step1 Assure power on, press and release the 🔲 key, changeable data on the screen, and the "SET" font blinks.

Step2 Now press the 🔼 or 🔽 keys to get your aim value;

A. Hold on the 🔼 or 🔽 keys and do not release is **fast forward** function;

B. The length of the steps is 0.1°C;

C. The editable range between lower (F0 1) and higher (F02) limit.

- F0 1: Lower Limit for SP:
  The bottom line for the SP value that users could set; not indicates the top limits, which will trigger the high-temperature alarm.

- F02: Upper Limit for SP:
  The top line of SP value that users could set; not indicates the bottom limits, which will trigger the low-temperature alarm.

Step3 Press the 🔲 to save the new data or leave it alone for 5s; the device automatically saves data.

6.3. When will the load/heater works?

It is lasting working from the power on; the SRC (Silicon-Controlled Rectifier) offers electricity to the heater and auto-adjusts the output electric current according to [the difference between measured temperature value and aim value].

6.4. How to correct measured temperature?

Exist gap/distance between the measured temperature and the actual temperature is very common, especial the first time launch this controller; the gaps could be corrected by setting the value in F03

F03 = Real Temperature - Measured Temperature

6.5. How to configure new parameters or change the SP limitation?

Step1 hold on the 🔲 key for 3s, and the display appears F0 1

Step2 Now press the 🔼 or 🔽 keys to select the code you want to update;

Step3 Press the 🔲 key to see the existing value; then press the 🔼 or 🔽 keys to get the aimed value;

Step4 Press the 🔲 key to memorize the just configured value and return to the menu. **Repeat operation from Step2- 4 to adjust other parameters;**

Step5 Press the 🔲 key to save data and quit setting mode back to normal monitor status or leave it alone; the new value will be saved automatically in 15s.

7. Error & Alarm

When an alarm occurs, you will find the 🔔 icon flashing on the screen and buzzer screams, and they will not disappear until all problems were solved.

Code	Possible Reasons	Solution
EE.E	Circuit of sensor short or open	Fix it or replace a sensor.
	Sensor Temperature >110°C or Sensor Temperature < -15°C	Check the room temperature where the sensor is placed, and then change the power status of the load manually if necessary.
EE.H	Sensor Temperature >110°C	
EE.L	Sensor Temperature < -15°C	