SIMTRUM

Optical Heating & Cryo Stages for Microscopy

User Manual

2023 V3

For customized projects please Contact us:

info@simtrum.com

Index

Optical Heating & Cryo Stages for Microscopy

Chapters

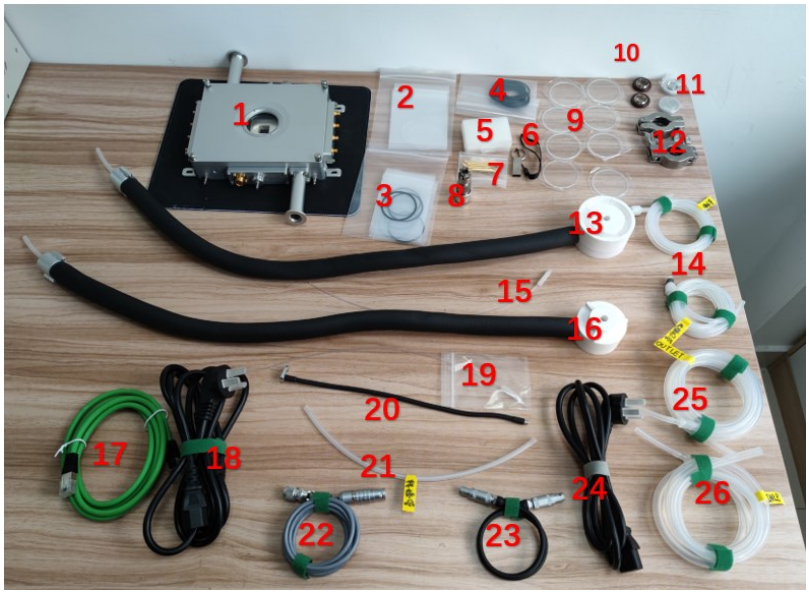
Hardware inspection and installation

1. Check the packaging

Check whether the package is complete, if it is damaged, please contact in time.

2. Package Content

01. Optical Heating & Cryo Stages x 1
02. TPX lens x 4
03. Gasket for glass x 8
04. Gasket for TPX lens x 10
05. Magnetic probe x 20 (fine)
06. USB Drive x 1 (including software installation package & operating instructions for software and hardware)
07. Fixed probe x 10 (coarse)
08. Tenpin aviation plug connector x 1
09. Quartz glass x 8
10. KF16 sealing ring x 2
11. KF16 blind plate x 2
12. KF16 clamp x 2
13. Liquid nitrogen converter x 1 (for customization)
14. Water circulation pipe x 2
15. Liquid nitrogen capillary x 1 (for customization)
16. Liquid nitrogen converter x 1 (for 2L liquid nitrogen tank)
17. LAN cable x 1
18. Double-ended power cord x 1
19. Liquid nitrogen capillary x 1 (for 2L liquid nitrogen tank)
20. Liquid nitrogen tube holder x 1
21. Adapter tube x 1 (for circulating water)
22. Temperature control communication wire x 1
23. Communication signal wire x 1
24. Single-ended power cord x 1
25. OUTLET silicone hose x 1
26. INLET silicone hose x 1
27. Semiconductor circulating water system x 1
28. Temperature controller x 1
29. Cooling controller x 1
30. 2L liquid nitrogen tank x 1
31. Allen wrench x 1
32. Window cover x 1



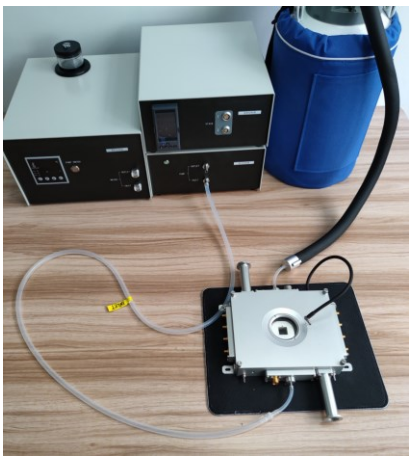
3. Hardware installation

3.1 Connect the chassis power cable, LAN cable, USB

3.2 Connect the cooling controller to the Optical Heating & Cryo Stages

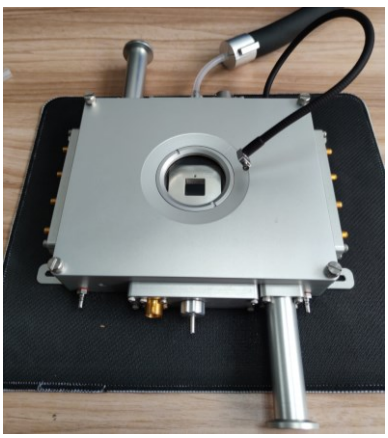
3.2.1 Install the INLET silicone tube

Connect the thick end of the INLET silicone air tube to the INLET end of the chassis and the thin end to the liquid nitrogen pipeline of the optical probe cold and hot stage.



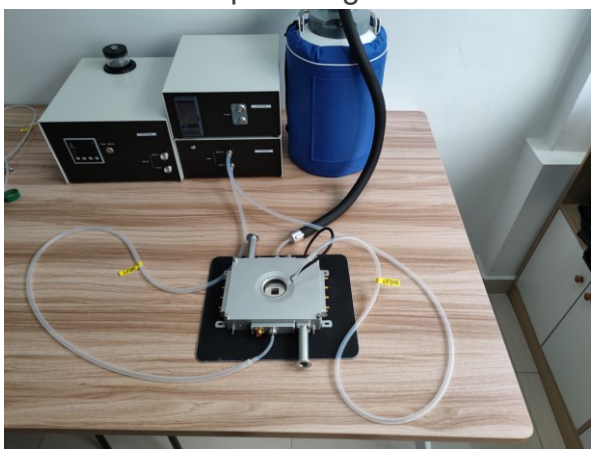
3.3 Install the Blowing bracket

Screw the blowing bracket into the side hole of the Optical Heating & Cryo Stages and adjust the binding so that it faces the window.



3.4 Install the OUTLET silicone tube

The thick end of the OUTLET silicone air tube is connected to the OUTLET end of the chassis, the thin end of the silicone air tube is inserted into the defrosting bracket, and the screw on the port is tightened to fix the silicone hose.



3.5 Connecting the LN2 adapter to the capillary

Note: After daily use, keep the capillary dry and clean to avoid water droplets or debris from blocking the capillary and affecting the flow of liquid nitrogen.

3.6 Connect the liquid nitrogen tank and the optical probe cold and hot stage (through the liquid nitrogen converter)

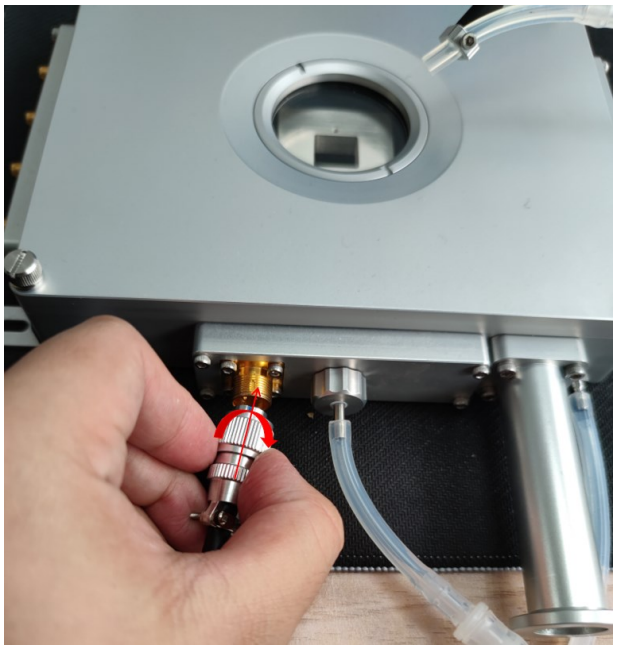
After straightening the capillary, insert it into the liquid nitrogen tank. Align the adapter with the slot of the liquid nitrogen tank.

The silicone gas tube end of the liquid nitrogen converter is connected to the liquid nitrogen pipeline of the Optical Heating & Cryo Stages.

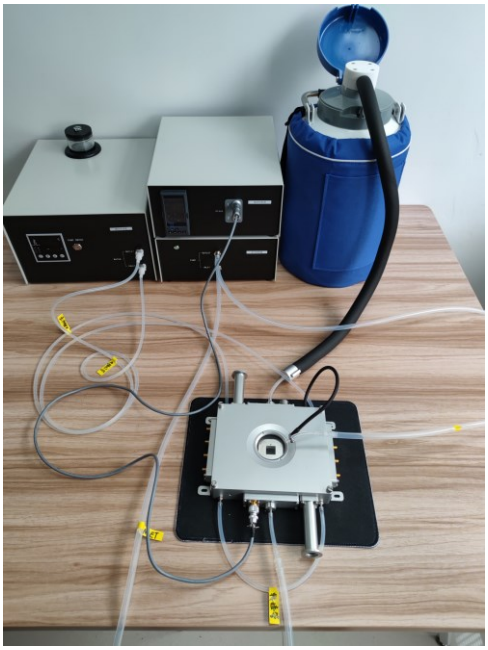
3.7 Connect the temperature controller with the Optical Heating & Cryo Stages

3.7.1 Connect the temperature control communication wire (as shown in the figure) to the interface of the Optical Heating & Cryo Stages

Align and insert the notch on the head of the temperature control communication line interface with the thread groove in the golden interface of the optical probe cold and hot table, and then tighten the outer sleeve of the temperature control communication line connector to complete the installation.



3.7.1



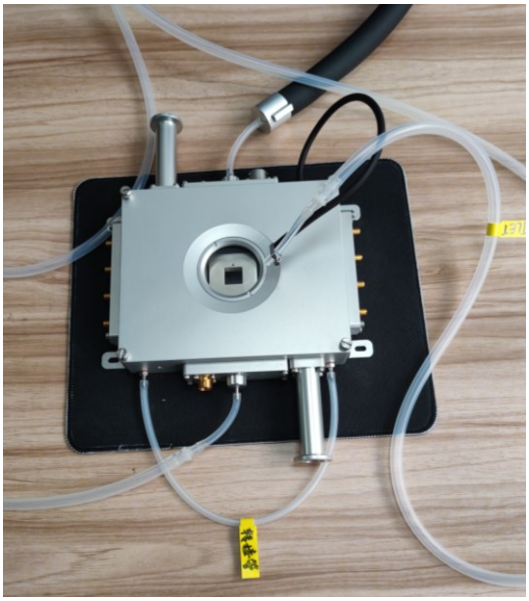
3.7.2

3.7.2 Install the temperature control communication wire and temperature controller

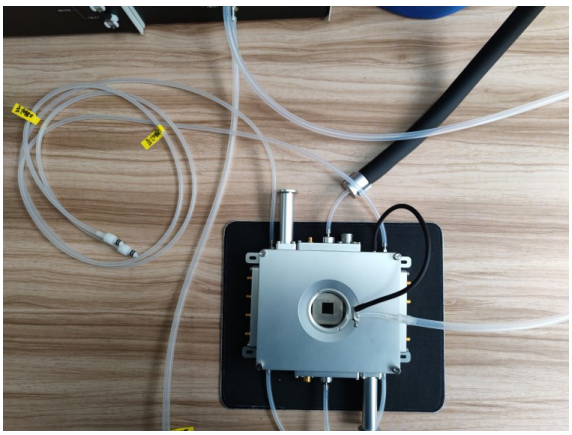
Align the red dot of the temperature control communication cable connector with the red dot of STAGE1 on the temperature controller and insert it.

3.8 Connect the semiconductor circulating water system with the Optical Heating and Cryo stage

3.8.1 Connect the circulating water transfer pipe
Connect the same side of the Optical Heating and Cryo stage with an adapter



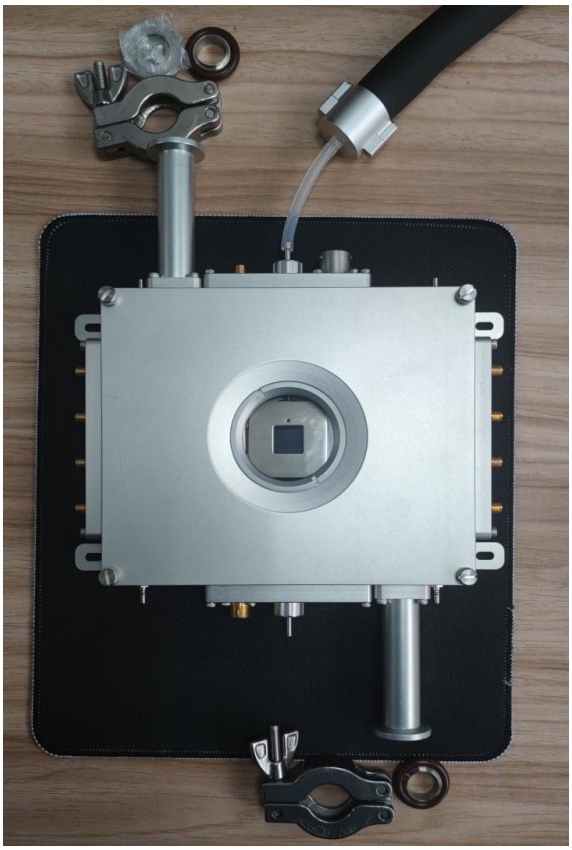
3.8.2 Connect the water circulation pipe
First, connect the hose side of the water circulation pipe to the remaining two water circulation joints on the side of the Optical Heating & Cryo stage, and insert the other ends into the INLET and OUTLET ports of the semiconductor water circulation system respectively.

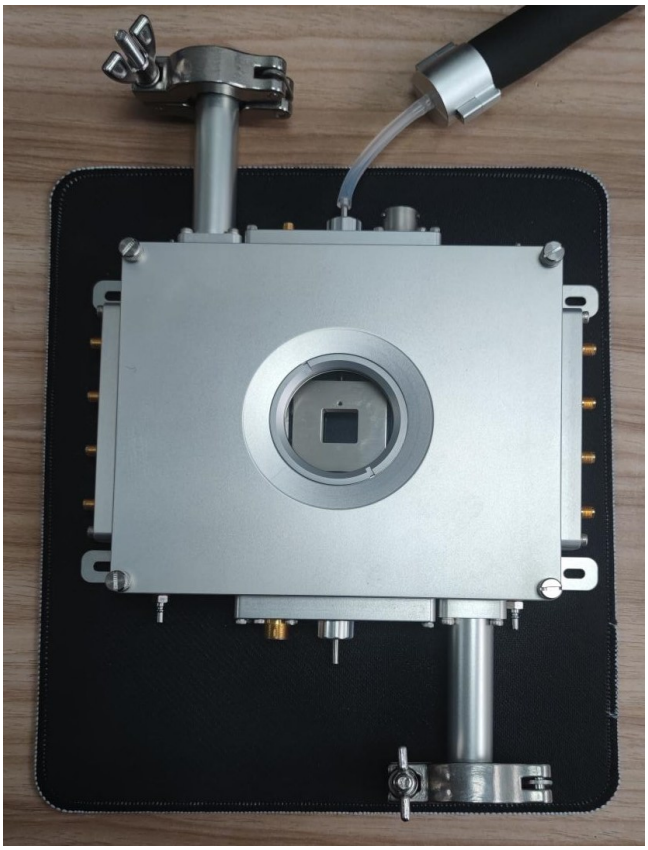


Note: The interface with the semiconductor circulating water system should be connected last to avoid water leakage during installation; there is no requirement for the order of entry and exit, and it should be ensured that the interface of the transfer pipe is on the same side of the table body.

3.9 Install vacuum sealing ring, vacuum blind plate, vacuum clamp

As shown in the figure, a sealing ring and a blind plate are installed at one end of the Optical Heating & Cryo Stages and are locked with a clamp to achieve the effect of sealing the pipeline. Install the sealing ring and the channel of the vacuum pump at the other end and lock it with a clamp. When the vacuum pump works, the cavity of the hot and cold table realizes the vacuum environment.





4. Precautions for the use and operation of the circulating water system

4.1 After connecting the power, turn on the switch

4.2 Turn on the switch on the control panel

4.3 Click SET, click the up and down buttons to set the temperature

4.4 After setting the temperature, click SET again, and the circulating water system will perform the heating and cooling operation according to the set temperature.

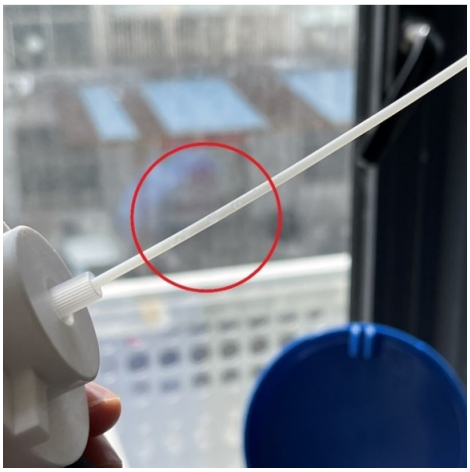
4.5 After turning on the PUMP SWITCH button, the pump will work, and the circulating water can flow into the pipeline.

4.6 To close the circulating water system, it is necessary to turn off the switch on the operation panel, turn off the PUMP SWITCH button, and disconnect the power.

5. Common Fault Recovery and Precautions

5.1. The software is regular, and the refrigeration controller is working as usual, but the temperature of the cooling and heating table is slow or unable to cool down. Check whether the gas output of the OUTLET of the refrigeration silicone tube is weakened and confirm that the fault is the blockage of the liquid nitrogen tube.

Solutions: stop the equipment, and after the liquid nitrogen tube insulation tube is partially softened, take it out and remove the liquid nitrogen tube from the hot and cold table, wait for it to return to room temperature, and remove the blocked water drops (you can use an air pump to blow it out or gently throw it out)



5.2. The liquid nitrogen tube will harden and become brittle under the influence of the refrigerating medium after normal operation. Do not swing vigorously, as it will cause rupture and damage. If you need to move the position, please wait until it returns to room temperature before operating

5.3. Do not perform rapid reverse temperature operation on the cold and hot stages at extremely low or extremely high temperatures. The best solution is:
a, There is no output from the system, let the sample stage return to room temperature naturally, and then operate.
b, Or Set the temperature back in the form of a temperature formula, the maximum temperature control speed is 10°C/min.

5.4. After the extreme high-temperature operation, do not open the upper cover before the sample chamber returns to normal temperature to prevent air from intervening to cause oxidation; after extremely low-temperature operation, do not open the upper cover before the sample chamber returns to normal temperature to prevent air from intervening to produce frost

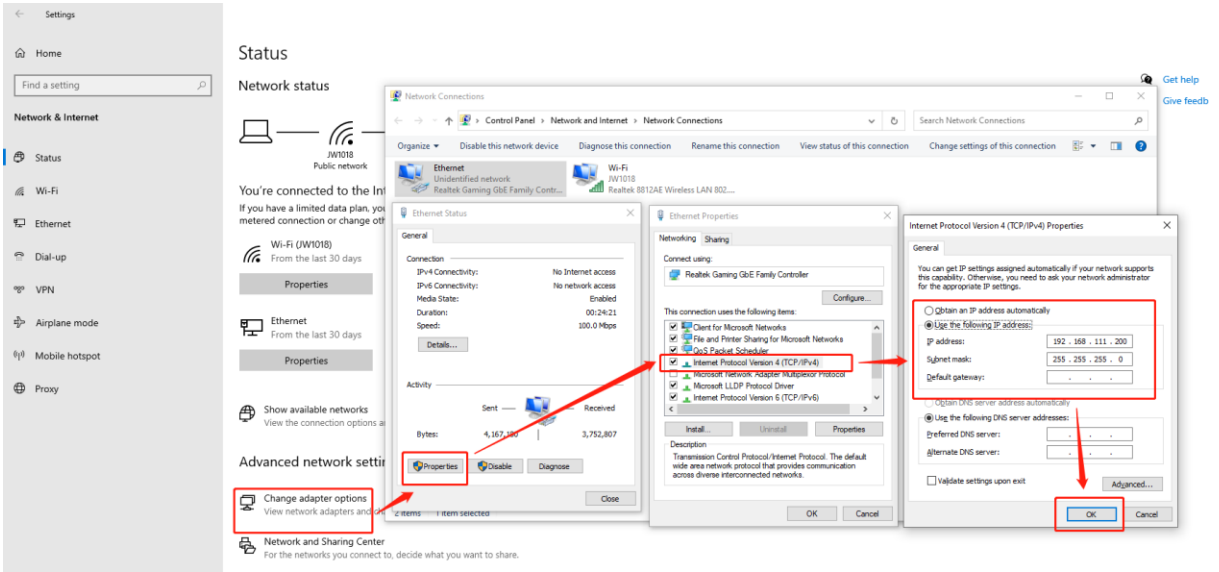
*Due to ongoing continuous product improvement, specifications are subject to change without notice.

B Software Installation

1. Modify the computer IP address and Time format

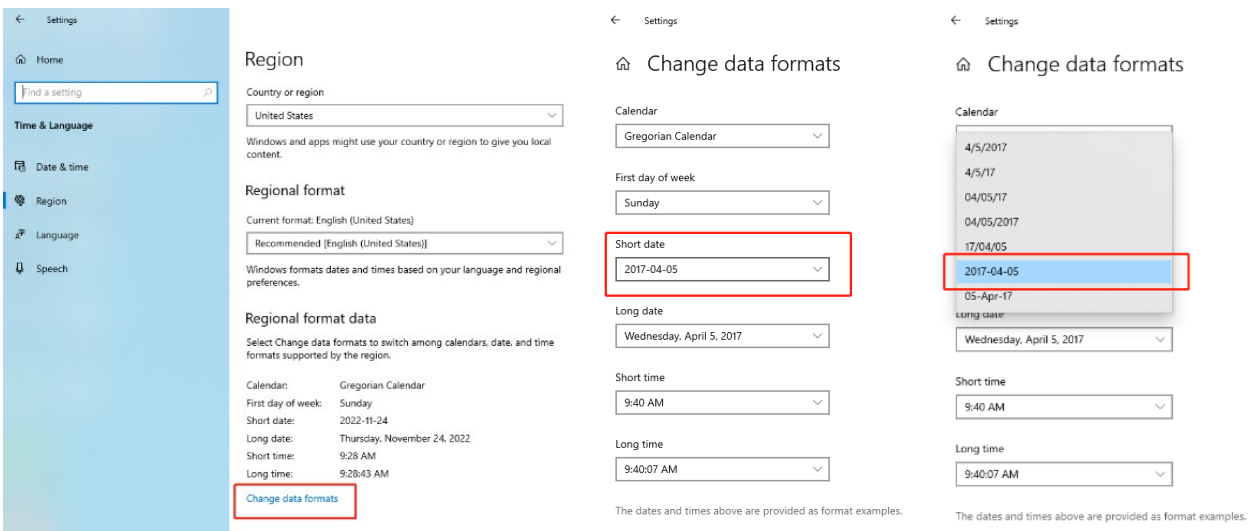
1.1 Modify the computer IP address

After the temperature controller is connected to the computer with a network cable, modify the IP address of the computer to: **192.168.111.200**. (This operation is for the normal communication operation of the temperature control software after the computer and the temperature controller IP are consistent.)



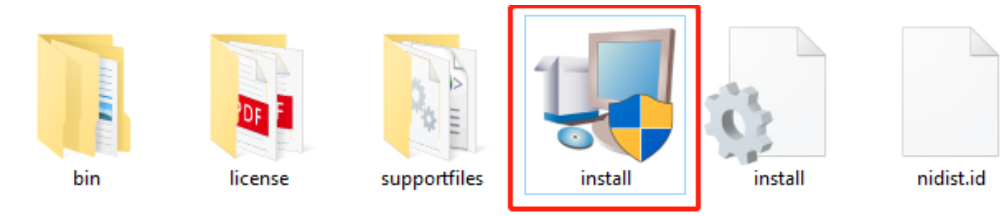
1.2 Modify the computer time format

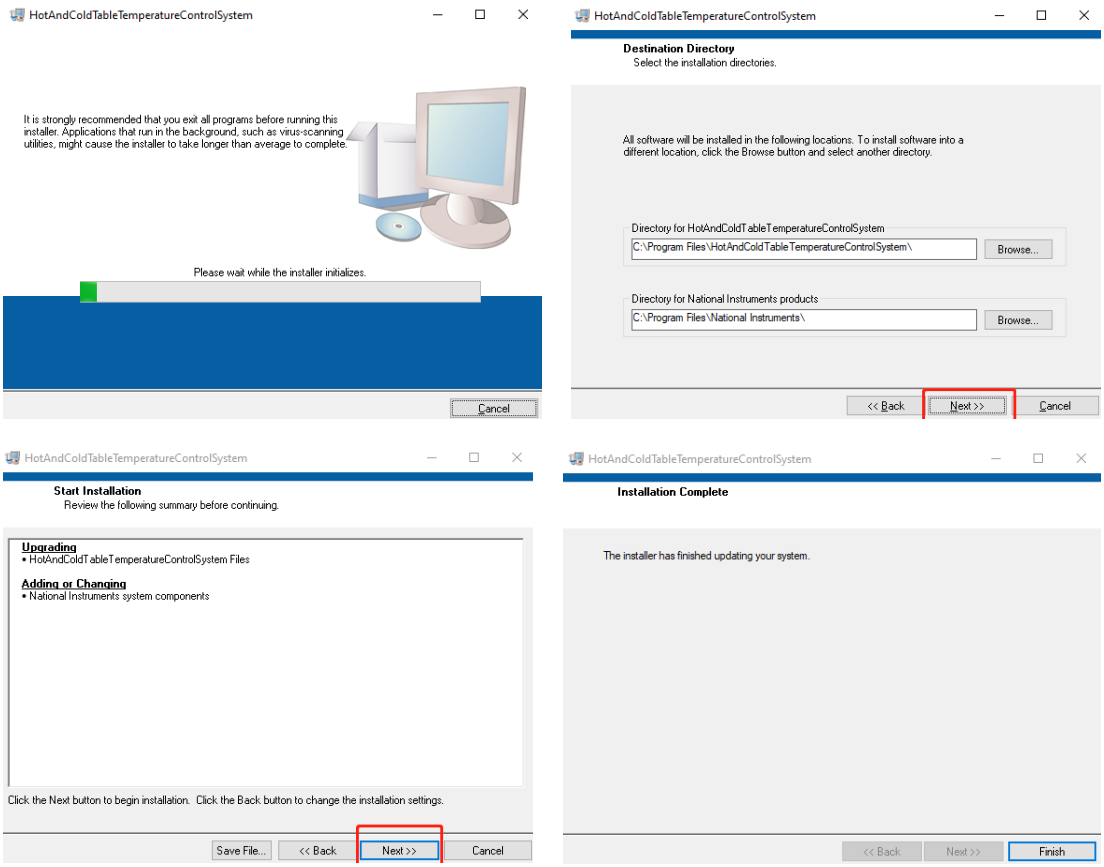
In the computer settings, modify the format of the short time and change it to the year - month-day (XXXX-XX-XX) format.



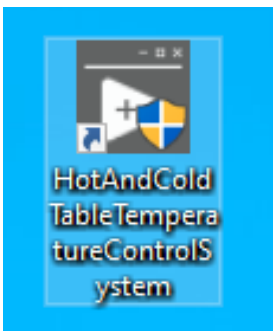
2. Install temperature control software

Download the software to the local computer, click the install application program, and complete the installation of the temperature control software as required.



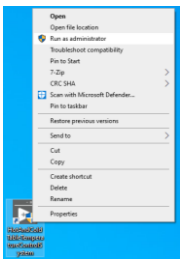


After the installation is complete, the computer desktop will automatically generate the icon of the temperature control software.



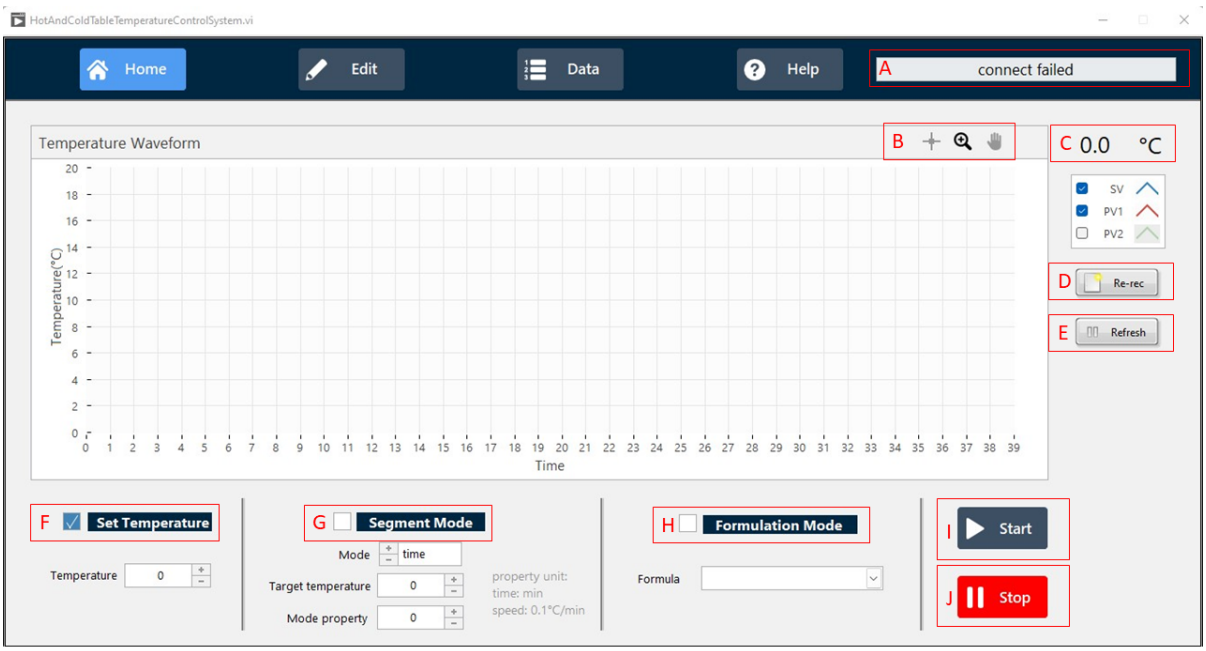
3. Temperature control software introduction

3.1 Run the software as an administrator



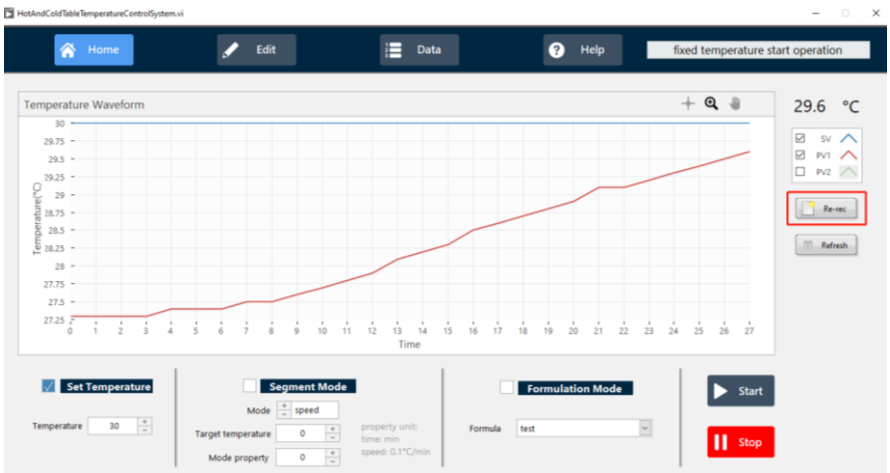
3.2 Introduction to software UI (function points)

Home Page-:

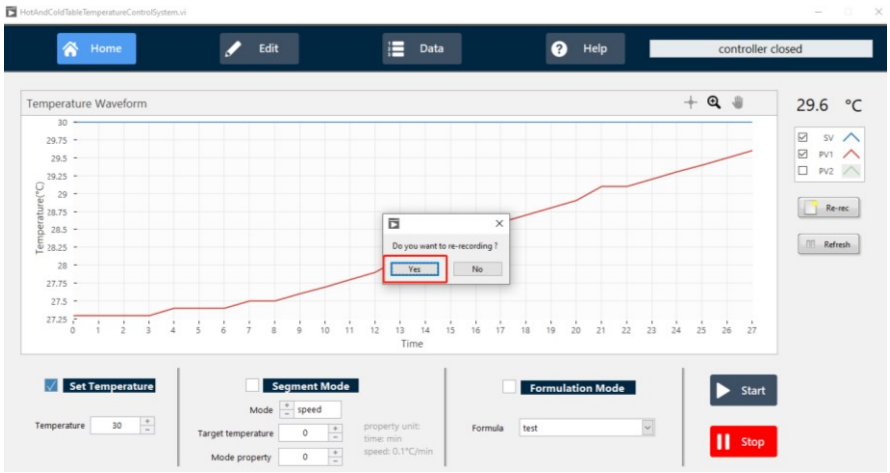


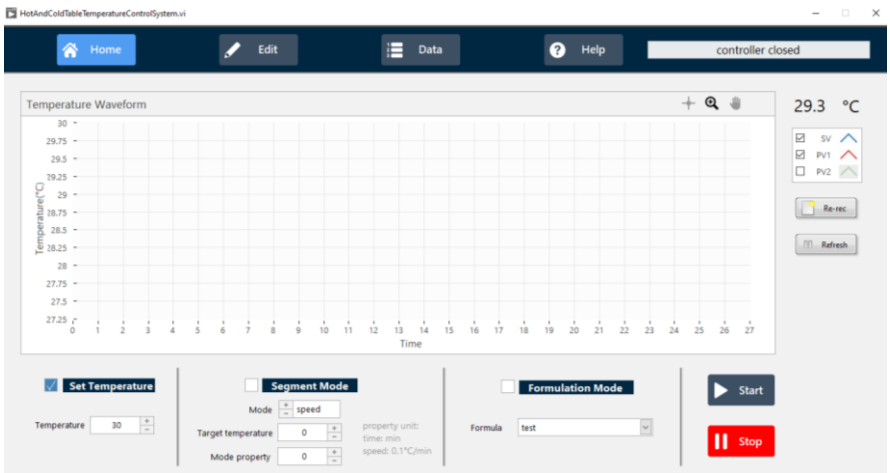
A Connection Status
B Curve display & control
C Real-time temperature
D Data re-recording / Clearing the current interface graph*
E Interface Curve Control
F Fixed Point temperature control
G Program temperature control
H Formulation mode (combination of multi-segment program segments)
I Start temperature control
J Stop temperature control

* Re-rec Features

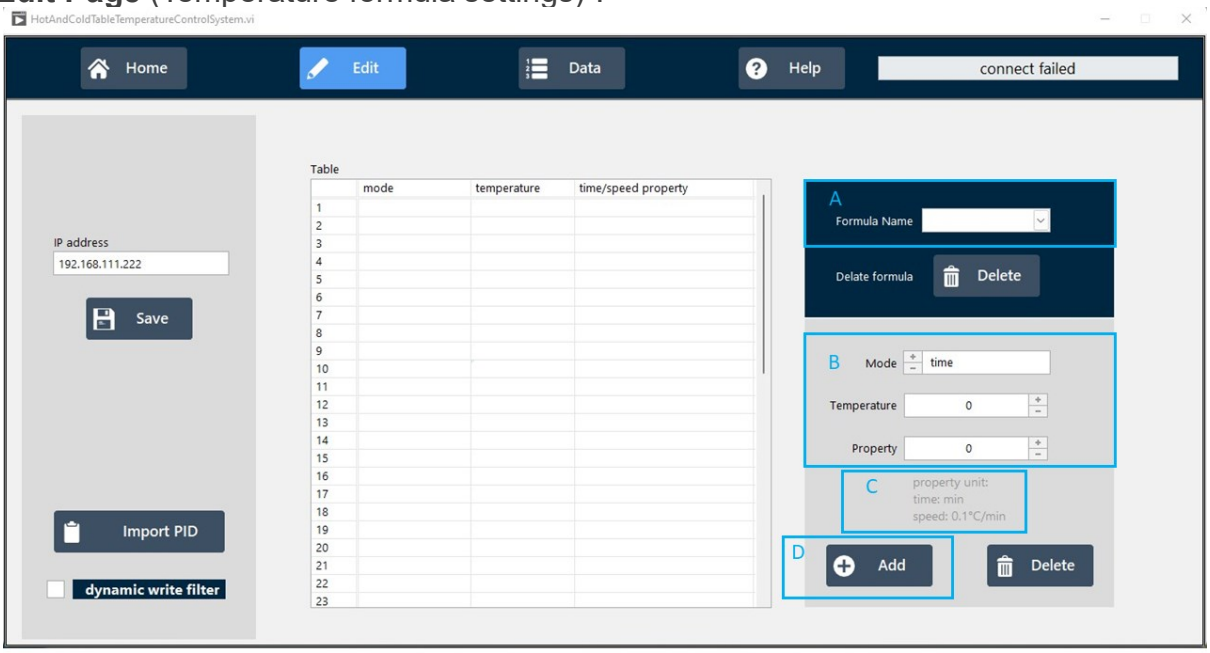


After clicking the Re-rec button, the current data will be re-recorded, and the current interface graph will be cleared.



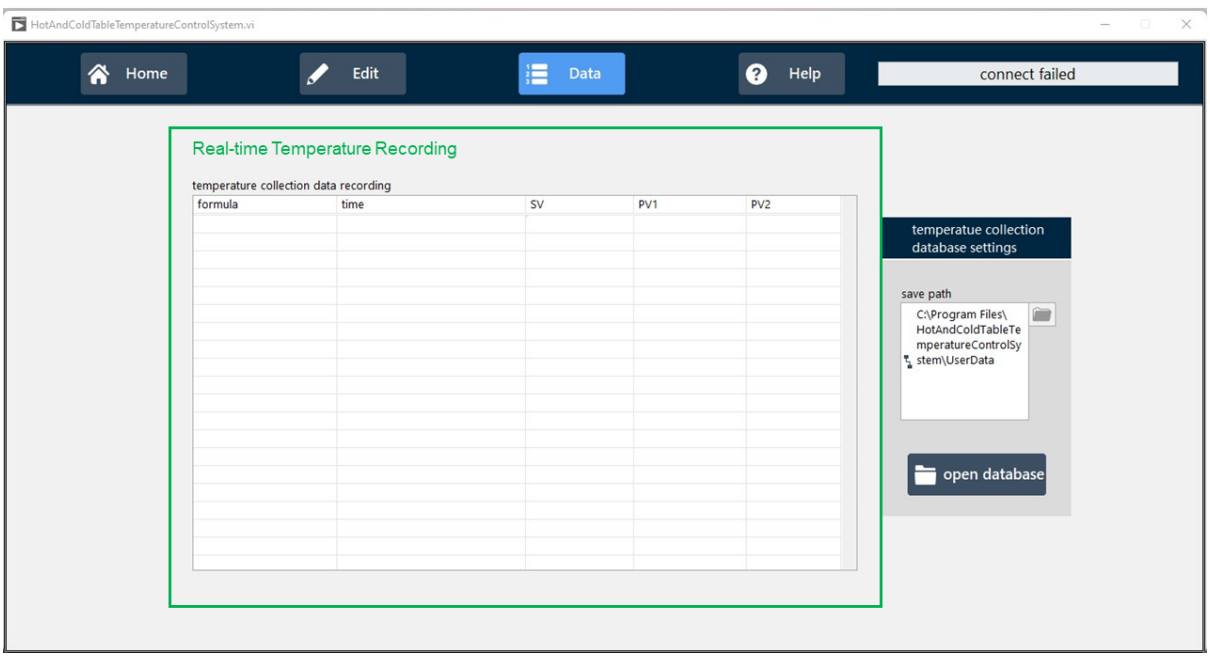


Edit Page (Temperature formula settings)-:



A Write the name and create a new formular
B Formula parameter setting
C Pay attention to the parameter unit
D After setting the parameters, click “Add” to complete the setting

Data Page-:

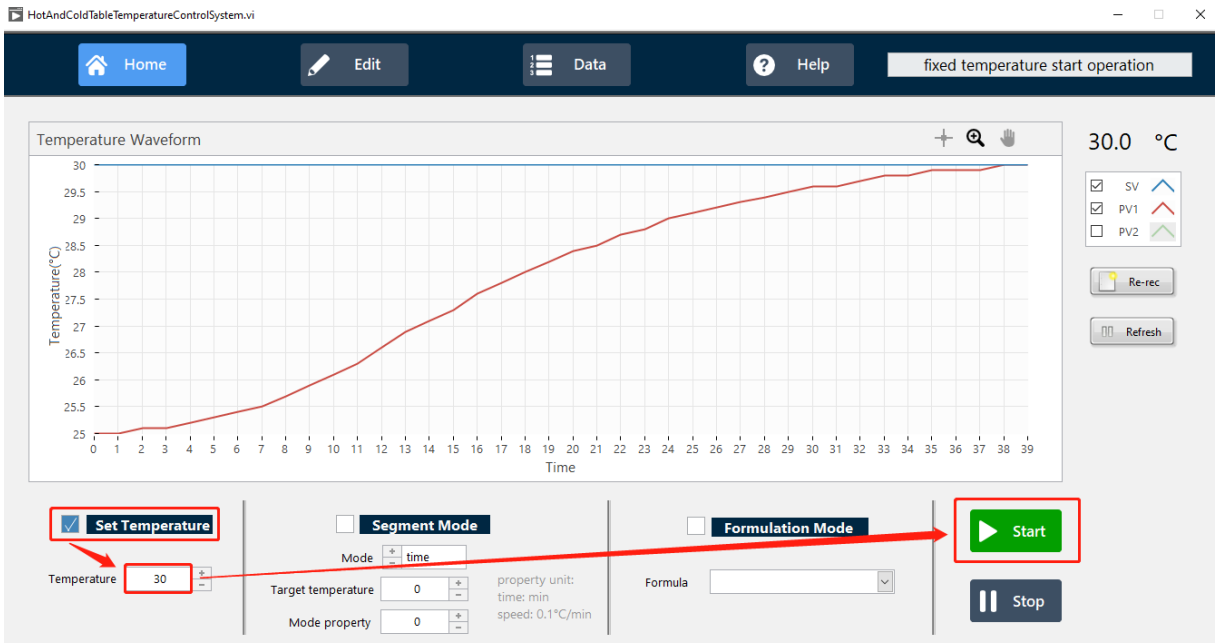


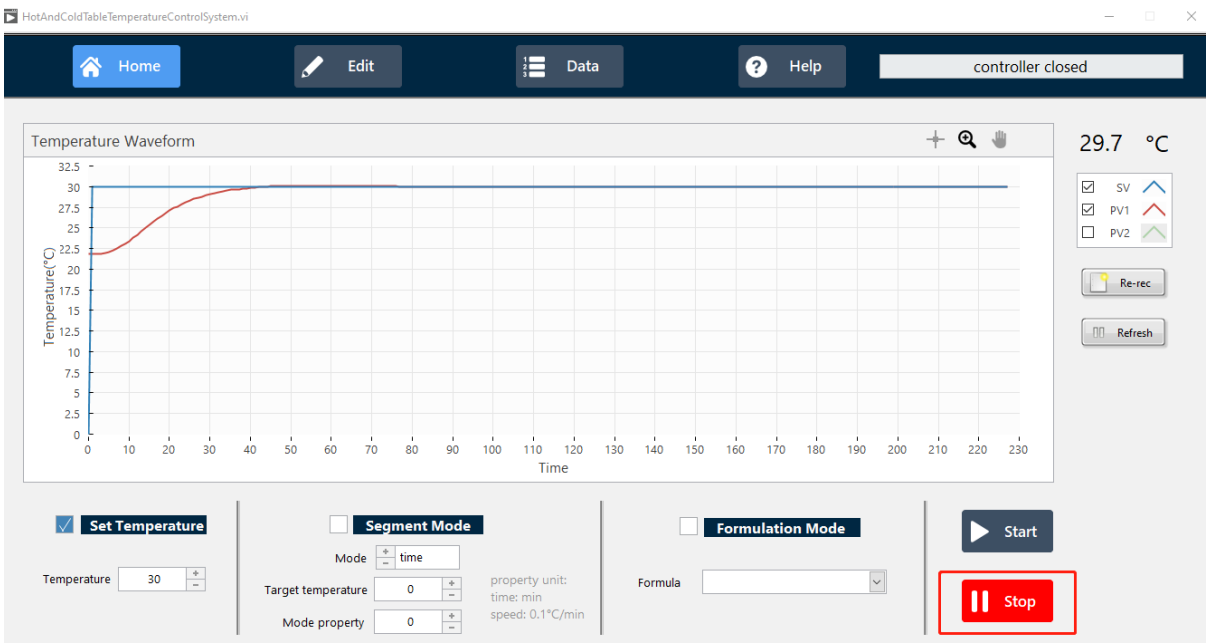
* Record real-time temperature only when using software to start temperature control.

4. Operating Instructions for Temperature Control Software

4.1 Fixed point temperature control

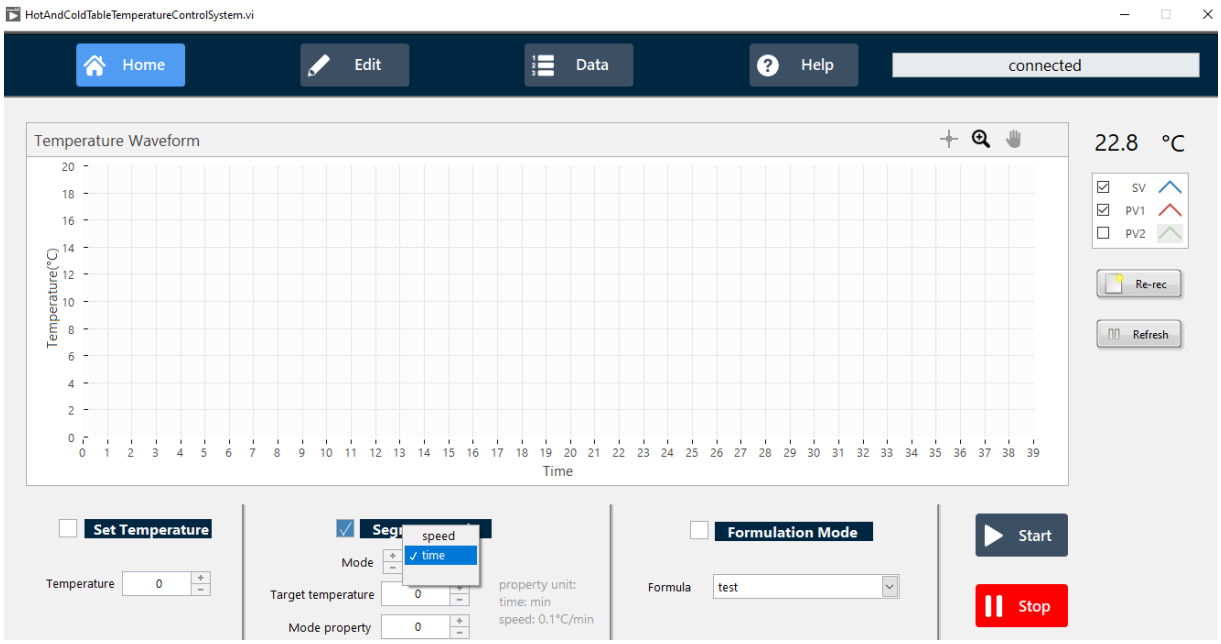
Main interface → check to set fixed-point temperature control → input target temperature → click Start to start temperature control; click Stop to stop temperature control. (The figure below is a schematic diagram of the fixed-point temperature control setting at 30 °C)



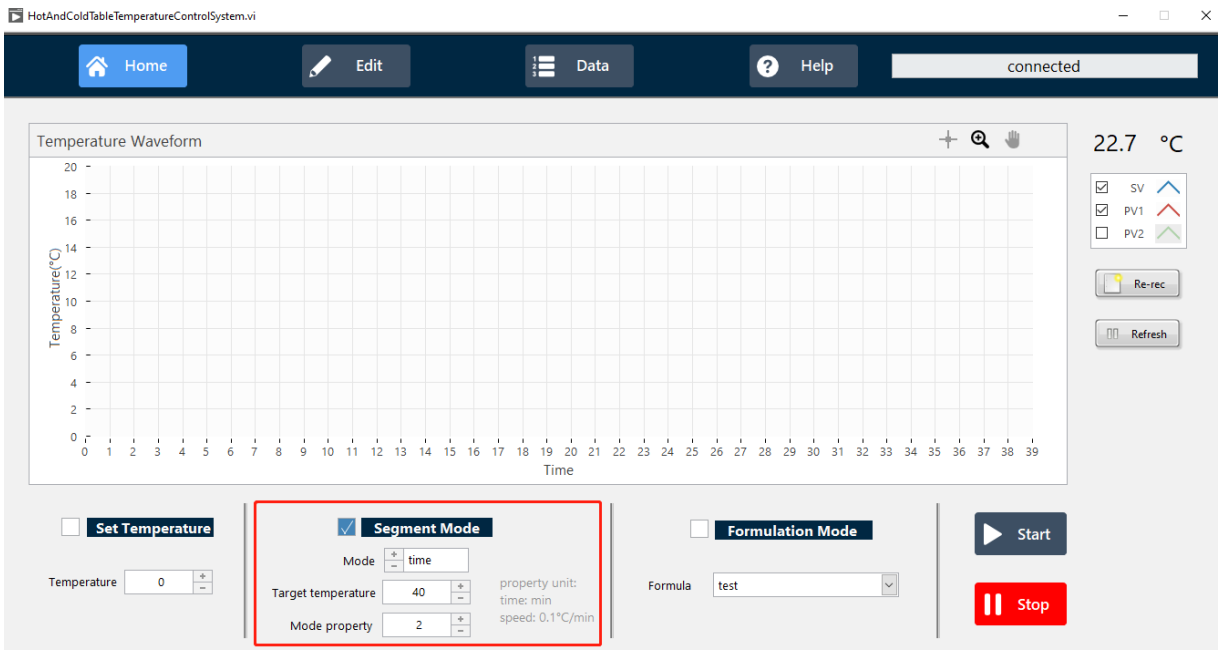


4.2 Program temperature control

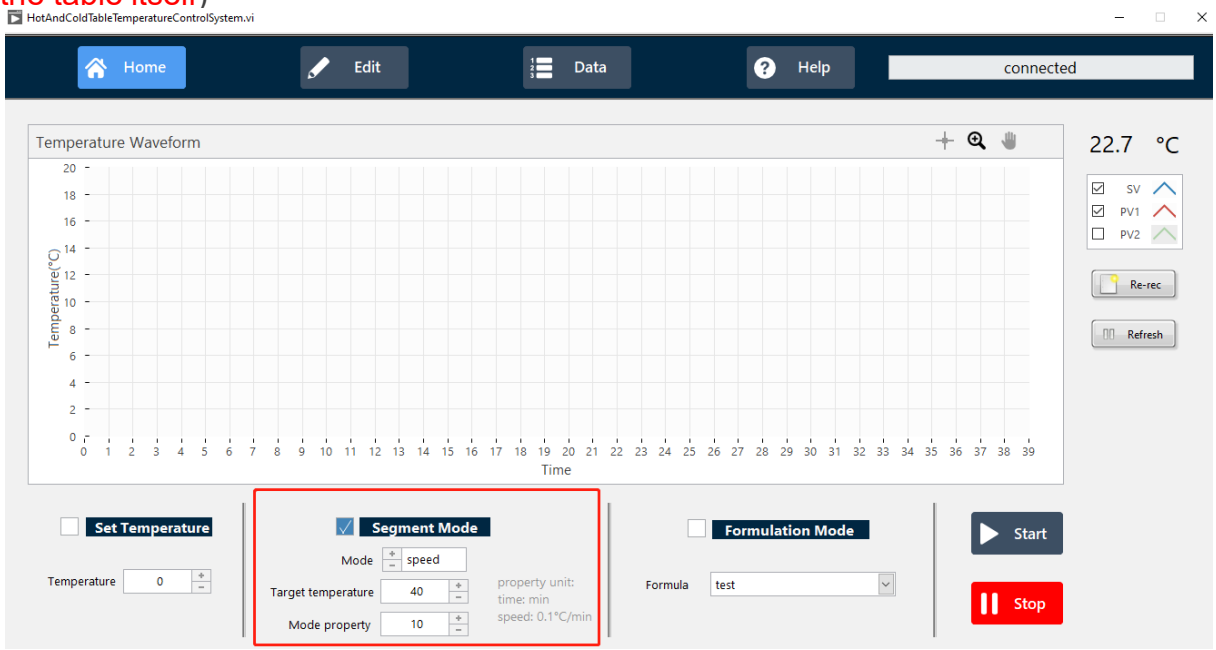
4.2.1 Main interface → check the setting program segment temperature control → select the mode (speed: constant speed / time: fixed time) → set the target temperature and mode parameters (when setting the mode, pay attention to the parameter unit - fixed time: min; constant speed: 0.1 ℃ /min) → click Start to start the program segment temperature control, click Stop Temperature control can be stopped.



4.2.2 The meaning of the figure is below: set the mode of fixed time, it takes 2 minutes from the current temperature to reach the target temperature of 40 °C. (Note: Do not exceed the heating and cooling rate of the table itself)

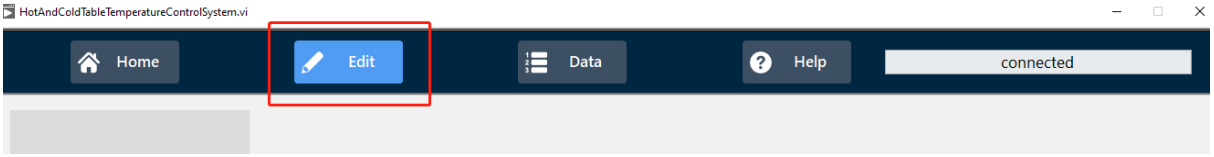


4.2.3 The meaning of the figure below is: set the mode of constant speed, from the current temperature to the target temperature of 40 °C at a temperature control rate of 10 x0.1°C/min, that is, 1°C / min. (Note: Do not exceed the heating and cooling rate of the table itself)

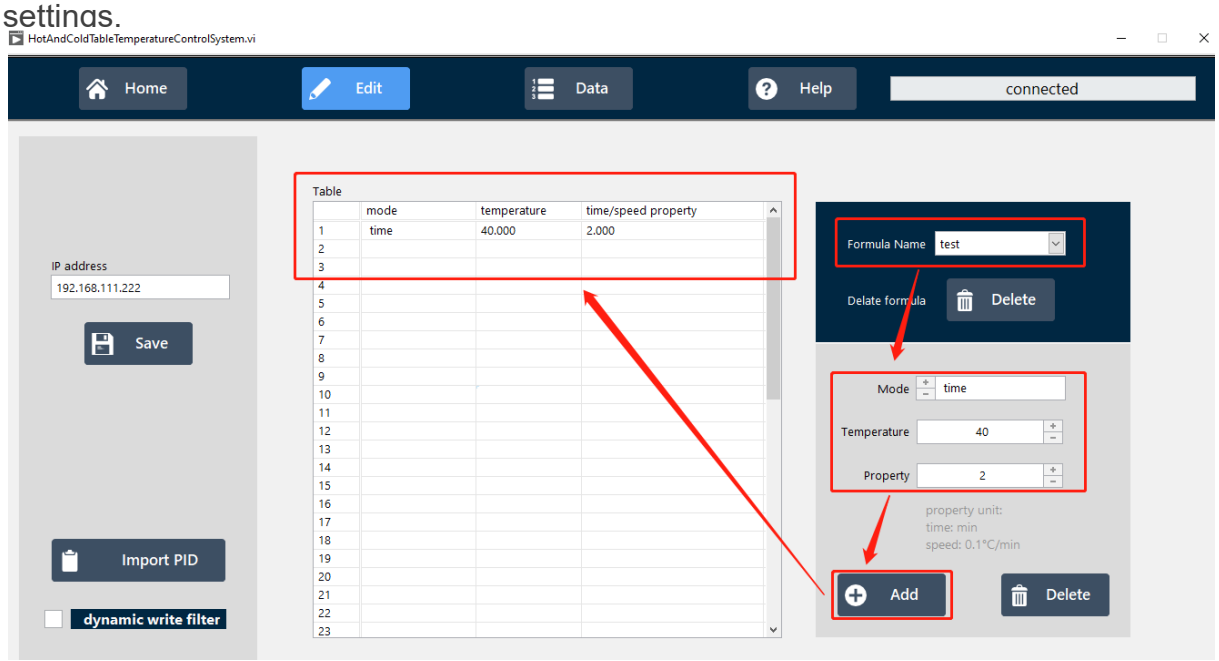


4.3 Formulation Mode (Combination of multi-segment program segments)

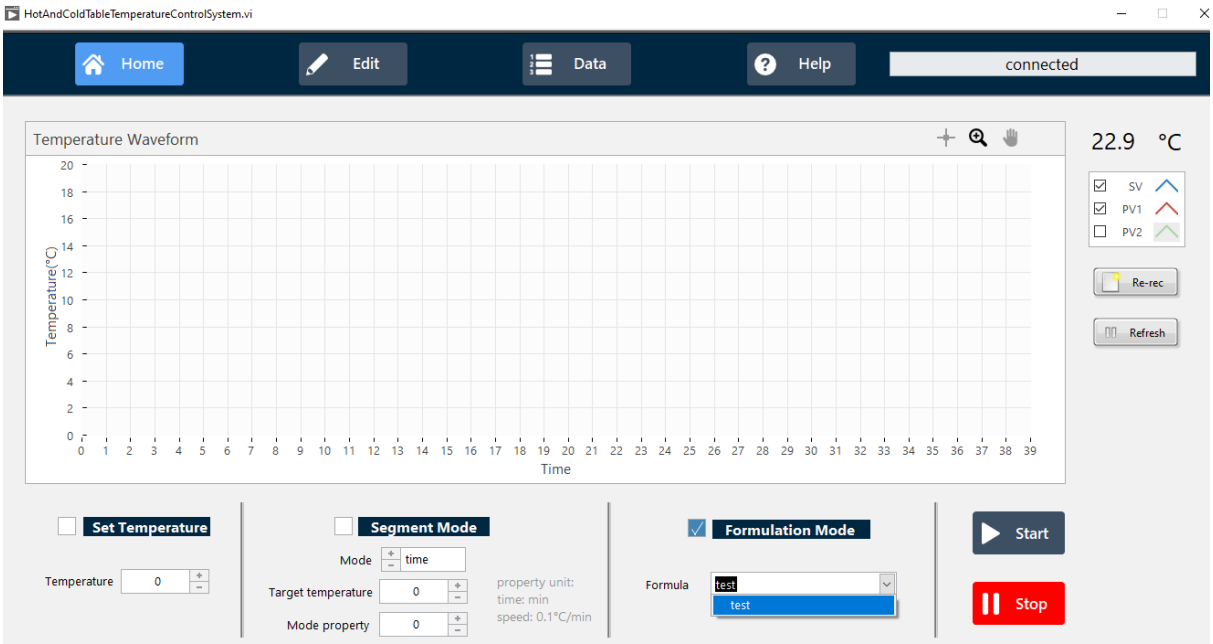
4.3.1 Click Edit on the menu bar to enter the formula settings



4.3.2 After writing the formula name, press Enter to complete the name setting → select the mode, fill in the temperature and parameters (consistent with the program segment temperature control setting method) → click Add → complete the formula settings.



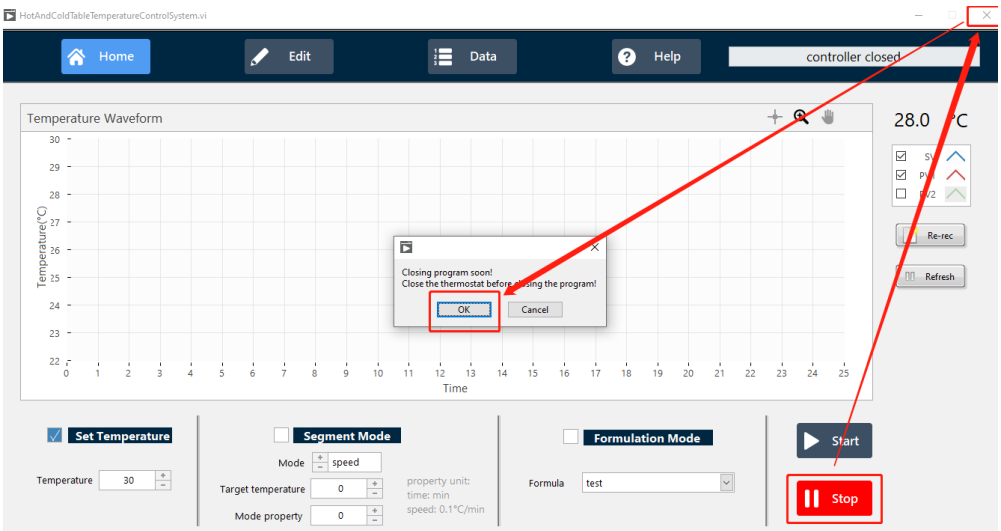
4.3.3 Main interface → check formulation mode, select the name of the formula that has been set → click Start to start temperature control in formulation mode, and click Stop to stop temperature control.



5 Exit the program

After clicking Stop, click the Close button.

And confirm that the temperature controller shows that it stops working (M-0.0% appears)



SIMTRUM Singapore
Telephone: +65 6996 0391
Email: info@simtrum.com

SIMTRUM China
Telephone: +86 150 0085 3620
Email: sales@simtrum.cn

www.simtrum.com