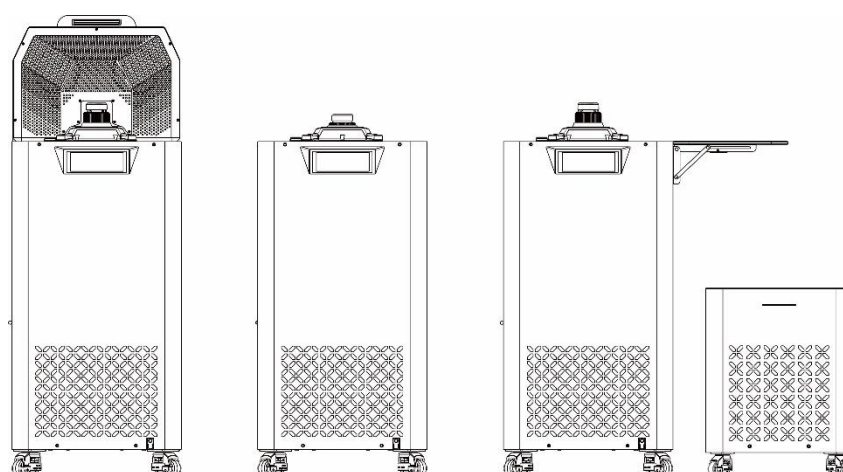


PR570 Series Standard Thermostatic Bath

User Manual



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Attentions

1. Check the liquid level of the working medium before use. The liquid level should be no more than 25mm from the upper cover. During use, the liquid should be replenished in time according to the loss of the medium.
2. After starting up, observe the operation of the stirring motor. If there is an abnormal situation such as the motor not turning, stop using it immediately and contact our company in time.
3. The refrigeration tank should be left to stand for more than 4 hours after transportation before starting up.
4. If there is a refrigeration system failure, the user unit shall not dismantle and repair it at will. It should contact our company in time and be handled by our professional personnel.
5. The power supply voltage must be guaranteed to be within $220V \pm 10\%$ and the fluctuation shall not exceed 5V, otherwise the temperature fluctuation of the thermostatic bath may not meet the technical requirements. When the voltage fluctuation is too large, it should be powered by a single-phase AC precision purified voltage-stabilized power supply.
6. The use environment should be free of conductive dust, flammable, explosive and corrosive gases, and away from open flames.

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I Overview

The PR570 series standard thermostat bath adopts PANRAN's new generation temperature control technology, with the PR2602 temperature controller as the core, using a new constant temperature and logic control algorithm, combined with a new medium circulation structure, provides with excellent temperature measurement characteristics and excellent intelligent operation experience. The full series includes products in three temperature ranges, covering a temperature range of -40°C to 300°C . Compared with traditional thermostatic baths, it has significant advantages in measurement characteristics, ease of use, networking and intelligence.

1.1 Features

- **Smaller size, larger working chamber**

PR570 series products are compact in structure. In order to calibrate more temperature sensors at the same time, all products in the series use square working chambers, and their effective working area is nearly 30% larger than that of circular working chambers of the same size. At the same time, the compact and novel structural design greatly reduces the external dimensions. Its floor space is 30% smaller than that of traditional thermostatic baths, and its volume is 40% smaller. More equipment can be placed in the same laboratory space, improving work efficiency.

- **Excellent temperature uniformity**

Temperature uniformity is the most important metrological characteristic of a constant temperature source. The use of a square working chamber brings new challenges to improving temperature uniformity. By designing a new high-torque DC stirring system and optimizing the internal structure, the working medium can be more fully mixed during the circulation process, thereby obtaining a more uniform and stable working chamber temperature field.

- **Excellent temperature fluctuation**

Circulation and heat balance structure usually have an important impact on this parameter. The PR570 series products can automatically match the stirring motor speed, heat dissipation and other parameters according to different SV and ambient temperature to achieve the optimal current working conditions. Taking the PR573 series products as an example, its temperature fluctuation is less than

0.003°C when working in the range of 50°C~100°C.

- **Wider temperature range**

The PR573 series standard thermostatic bath is equipped with an auxiliary heat dissipation system, which can adjust the heat preservation and heat dissipation capacity of the working chamber under different working conditions, so that thermal balance can be achieved in a wider temperature range. When using universal working media, the controllable temperature range can reach 50°C~300°C.

- **Constant speed heating and cooling function**

The whole series of products have the function of constant speed heating, and the A-type products have the function of constant speed cooling. The fully automatic operation of this function depends on the use of precision mechanical pumps and auxiliary cooling circuits. Taking the PR573A type product as an example, the setting range of constant speed heating and cooling is 0.1°C/min~3.0°C/min, In the range of 290°C~70°C, continuous constant speed cooling of 1°C/min can be achieved.

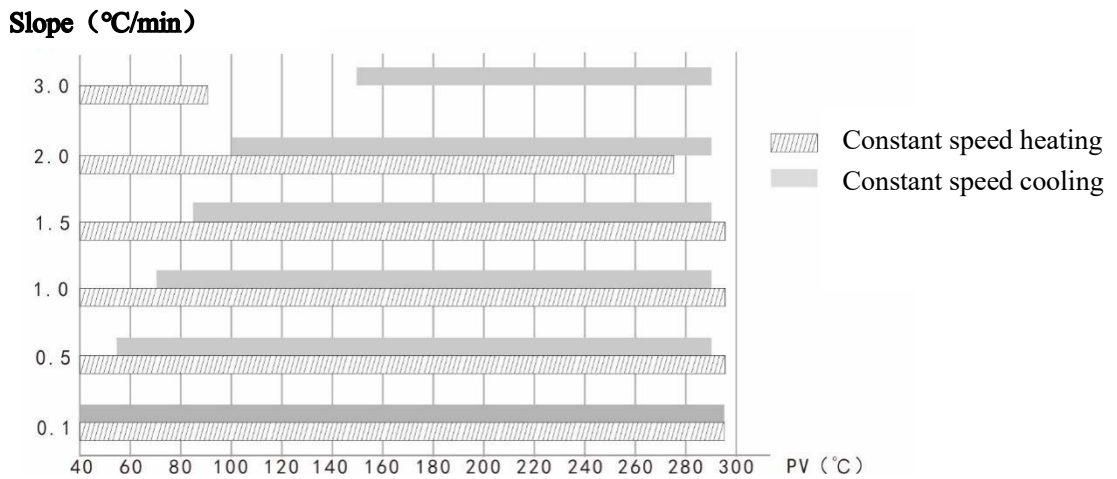


Figure 1.1 PR573A Standard thermostatic bath slope temperature heating up and cooling down working range

- **Intelligent control and safety**

□ The control core uses the fourth-generation PR2602 temperature controller developed by PANRAN, which can intelligently control the start and stop of components such as compressors, solenoid valves, power supplies, and the speed of various pumps, fans, and motors according to working conditions to achieve the best temperature control effect. The controller can monitor multiple sensors distributed in various key parts and calculate in real time whether each input parameter is within the normal range to ensure that the thermostatic bath is always in a safe operating state.

- **Rich software functions**

In addition to displaying and setting real-time temperature, curves, fluctuations and temperature control parameters, it also provide many practical functions, such as full-screen display function, which can clearly observe the current real-time temperature at a long distance; cloud metering function, which can remotely view the current operating status through the mobile phone APP, and can set reminder functions according to parameters such as temperature and fluctuations.

- **A wide range of optional accessories**

Meet the differentiated needs of users. A sensor turnover rack is designed on the left side of the working chamber to facilitate the temporary placement of calibrated sensors. In addition, various flanges are standard to cope with calibrated sensors with different needs. The jacks of the flanges can be used to lock the sensors at three points without additional fixing measures. PR5701 aluminum folding workbench, PR5702 aluminum three-axis fixing fixture, and PR5703 fume extraction assembly are also optional to solve the problems of fixing, placement space and high-temperature fume exhaust of non-standard sensors.

1.2 Technical Parameters

1.2.1 General Technical Parameters

Item\Model	PR571A	PR571B	PR572B	PR573A	PR573B
Constant speed heating	●	●	●	●	●
Constant speed cooling	●			●	
Temperature control range	-40°C~100°C		-10°C~100°C	(RT+20°C)~300°C (Note 1)	
Working medium	Antifreeze		Antifreeze	Methyl silicone oil	
Physical dimension (H×L×W)	1150mm×516mm×516mm (Note 2)		1130mm×516mm×516mm	1150mm×516mm×516mm	
Weight (Excl Medium)	120kg (Note 2)	105kg	100kg	115 kg	100kg
Rated Power	3.6kW		3.1kW	2.3kW	
Working chamber size (H×L×W)	450mm×130mm×130mm (Maximum height at center 530mm)				
Display	6.8-inch industrial touch screen with a resolution of 1280x480 pixels				
Working environment	Operating temperature range: (5 ~ 35)°C, non-condensing				
Power supply	220VAC±10%, 50Hz				

Note 1: The minimum temperature that can be set for PR573 is 35°C.

Note 2: The dimensions and weight do not include the PR5711 cooling component.

1.2.2 Temperature Specifications (Note 1)

Item\Model	PR571A/B	PR572B	PR573A/B
Temperature control accuracy	0.05°C+0.07%RD		
Temperature uniformity (Note 2)	0.002°C~0.005°C@ -40°C 0.001°C~0.005°C@ 0°C 0.002°C~0.007°C@ 100°C	0.002°C~0.003°C@ 0°C 0.002°C~0.003°C@ 100°C	0.001°C~0.002°C@ 50°C 0.002°C~0.004°C@100°C 0.004°C~0.008°C@300°C
Temperature fluctuation /10min	0.004°C~0.007°C@ -40°C 0.004°C~0.007°C@ 0°C 0.003°C~0.005°C@ 100°C	0.003°C~0.004°C@ 0°C 0.004°C~0.005°C@ 100°C	0.002°C~0.003°C@ 50°C 0.003°C~0.005°C@100°C 0.004°C~0.007°C@200°C 0.006°C~0.010°C@300°C
Heating time	0°C~50°C 25min -40°C~0°C 20min	0°C~50°C 25min	23°C~100°C 30min 100°C~300°C 90min
Type A cooling time	90°C~50°C 21min 50°C~0°C 38min	/	300°C~200°C 12min 200°C~100°C 28min

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	0°C~40°C 80min		100°C~50°C 23min
Type B cooling time (Note 3)	45°C~0°C 35min 0°C~40°C 80min	45°C~0°C 40min	300°C~200°C 15min 300°C~100°C 85min 300°C~50°C 195min

Note 1: The test environment temperature for the above technical parameters is 23°C.

Note 2: The maximum value of vertical and horizontal temperature uniformity, including the four corners of the working chamber. The uniformity is slightly affected by the external environment and power supply quality.

Note 3: When cooling down PR573B, it is necessary to ensure that the oil level in the auxiliary oil tank is not lower than the lower limit, and the medium temperature is the same as the room temperature. No manual intervention is required during the cooling process.

1.3 Appearance

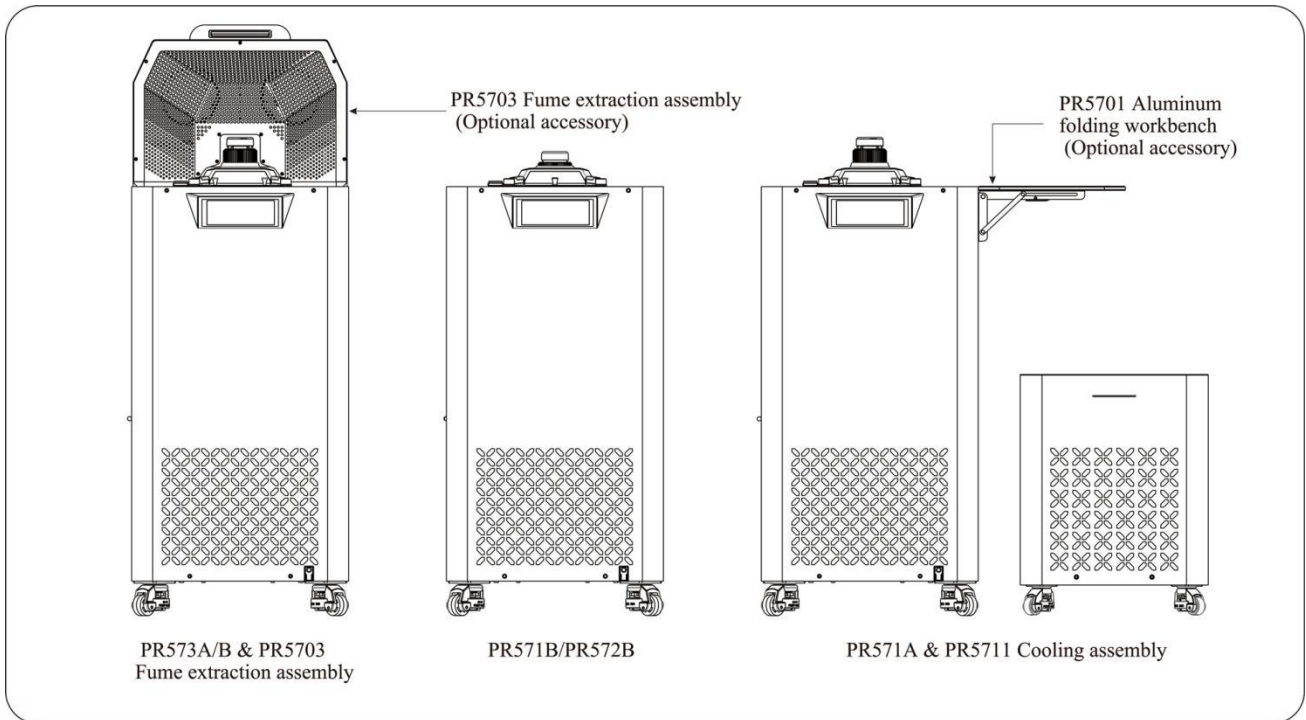


Figure 1.2 PR570 Series Standard Thermostatic Bath Overall Appearance

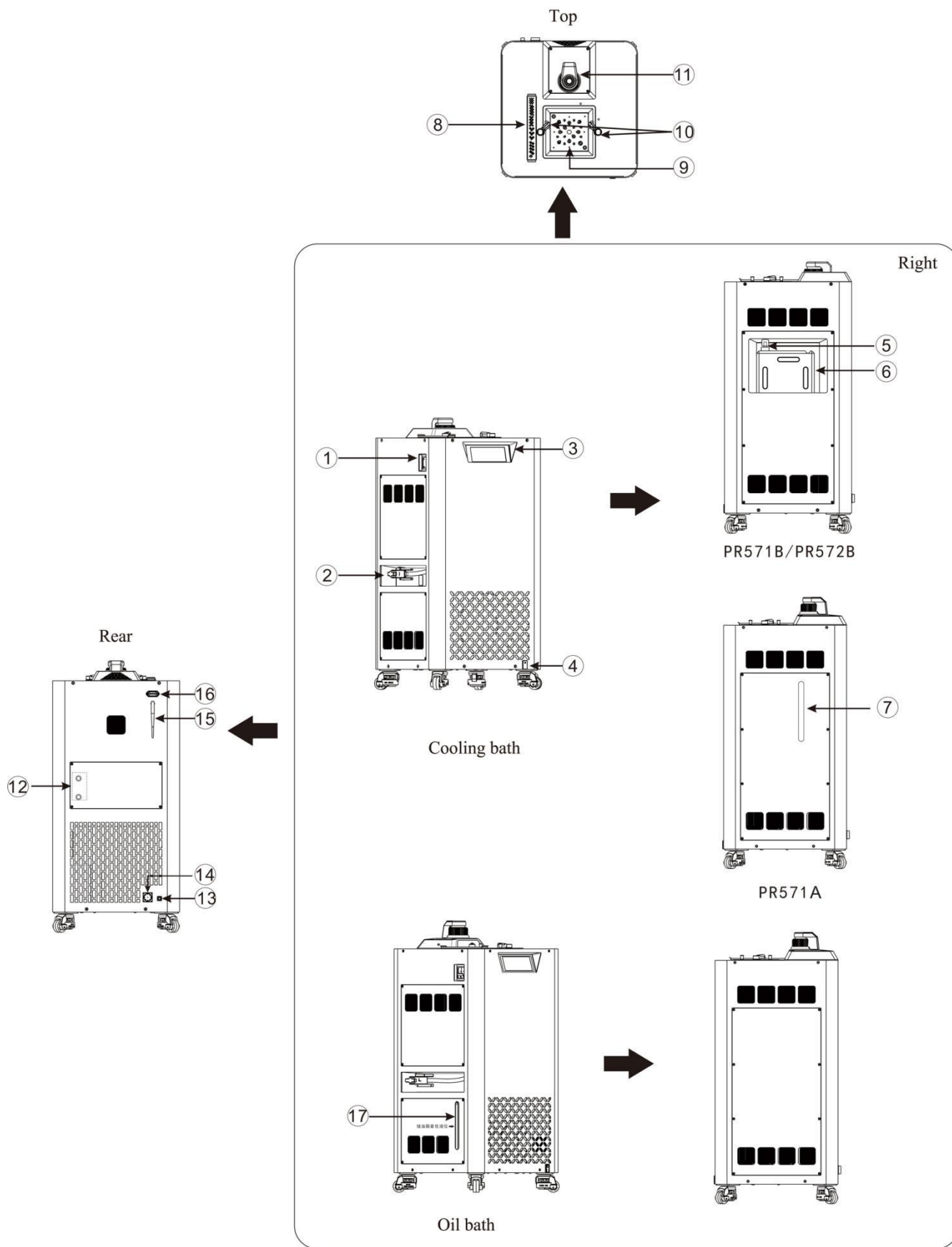


Figure 1.3 Appearance details

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No.	Name	Remarks
1	Main power switch	
2	Drain valve, drain hose	
3	LCD display	
4	Signage plate	Red: oil bath; Light blue: cooling bath (-10~100)°C; Dark blue: cooling bath (-40~100)°C
5	Overflow hose	Only for PR571B/PR572B cooling bath
6	Small oil storage tank	
7	Liquid level indicator	Only for PR571A, indicates the liquid level in the tank
8	Sensor turnover rack	Used for temporary placement of sensors, including a variety of opening specifications, suitable for sensors of different diameters
9	Working chamber, flange	
10	Flange locking device	For fixing flange
11	Stirring motor	
12	Medium circulation interface	Only for PR571A, used to connect PR5714 cooling component to realize medium circulation
13	Communication interface	
14	Power interface	
15	WiFi antenna	
16	Accessory power interface	On PR573A/B, used to power the PR5703 Fume extraction assembly On PR571A, used to power the PR5704 cooling unit
17	Liquid level indicator	Only on PR573A/B oil bath, indicating the liquid level in the oil tank.

1.4 Accessories

Model		PR571A	PR571B	PR572B	PR573A	PR573B
Standard accessories	Square flange	•	•	•	•	•
	Round flange	•	•	•	•	•
	PR5711Cooling components	•				
	Fluorine hose (φ10*1Meter)	2 Pieces				
	Small oil tank		2 Pieces	2 Pieces		
	Dust cover	•	•	•	•	•
	Cable tie and bracket	•	•	•	•	•
	Three-core power cord (7Meter)	•	•	•	•	•
Optional	PR5702 Aluminum three-axis fixture	○	○	○	○	○
	PR5701 Aluminum folding workbench	○	○	○	○	○
	PR5703 Fume extraction assembly				○	○

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PR5704	Four-grid thermometer calibration flange	○	○	○		
PR5705	Water triple point bottle fixing flange	○	○	○		

Note: ●Standard accessories ○Optional accessories

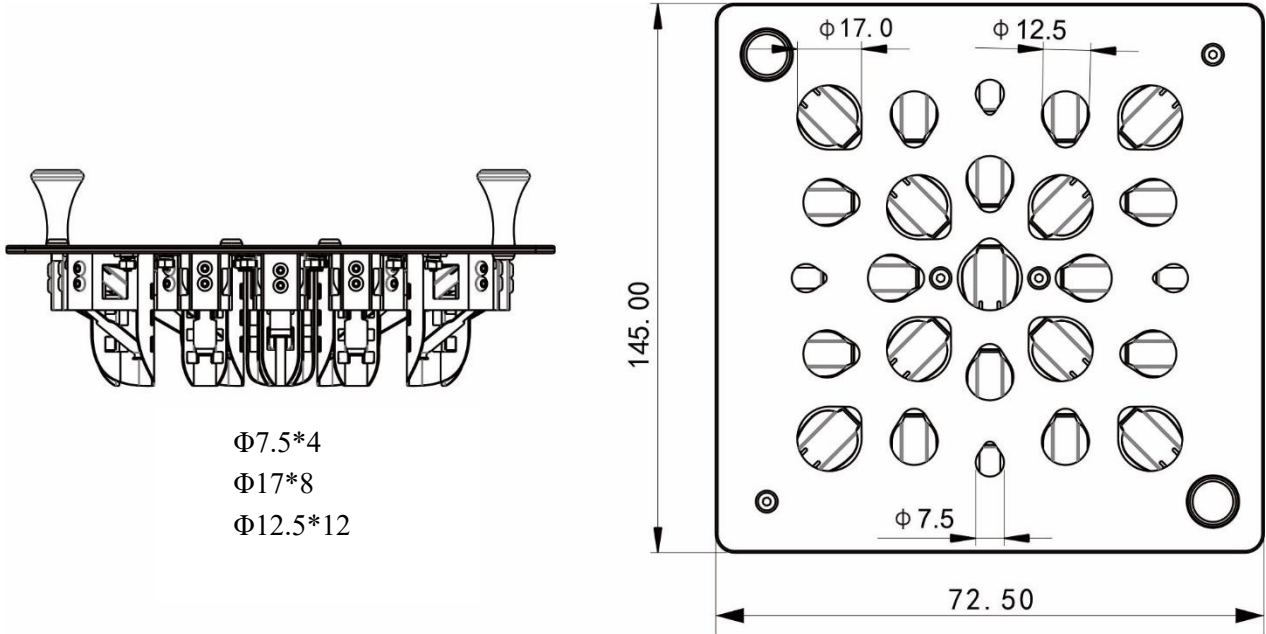


Figure 1.4 Square flange opening diagram

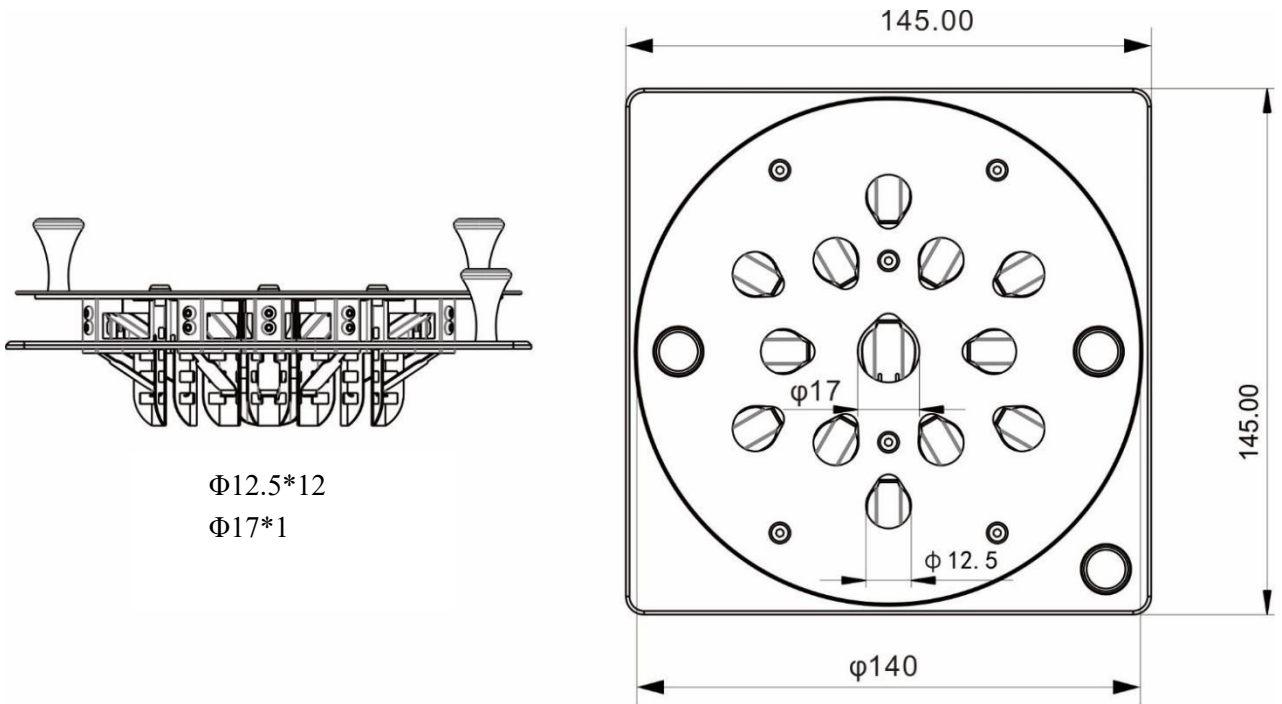

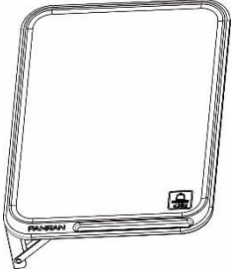
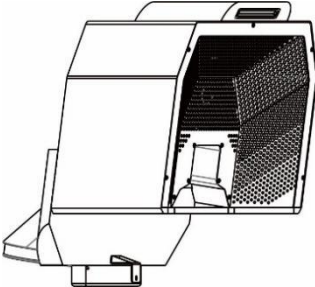
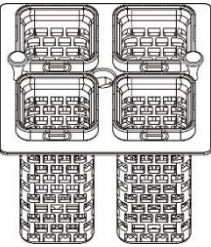
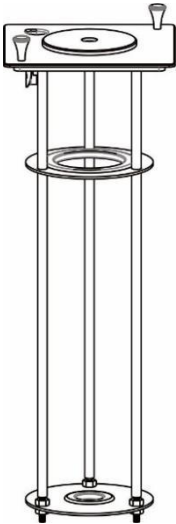


图 1.5 Round flange opening diagram

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Optional Accessories

No.	Name & Description	Exterior	Use
1	PR5702 Aluminum three-axis fixture		Fixing standard thermometer or large weight sensors.
2	PR5701 Aluminum folding workbench		Expand the thermostatic bath table area (520*350mm) .
3	PR5703 Fume extraction assembly		Replaces the function of range hood, can vent air in four directions.
4	PR5704 Four-grid thermometer calibration flange		Calibrating a Liquid-in-Glass Thermometer.
5	PR5705 Water triple point bottle fixing flange		Special flange for fixing water triple point bottle.

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1.5 Regulations and Specifications

No.	Regulations/Specifications Code	Regulations/Specifications Code Name
1	JJF 1030-2010	Technical Performance Test Specification for Constant Temperature Baths
2	JJG 229-2010	Verification regulation of industry platinum and copper resistance thermometers
3	JJF 1637-2017	Calibration specification for base metal thermocouples
4	JJF 1262-2010	Calibration specification for sheathed thermocouples
5	JJG 130-2011	Verification regulation of liquid-in-glass thermometers for working
6	JJG 161-2010	Standard mercury-in-glass thermometers
7	JJF 1908-2021	Calibration specification for bimetallic thermometers
8	JJF 1909-2021	Calibration specification for filled system thermometers
9	JJG 1162-2019	Calibration specification of the clinical electronic thermometers
10	JJG 111-2019	Liquid-in-class glass thermometers

II Instructions

2.1 Flange Installation & Removal

The flange locking device is used to fix the flange. Place the flange in the groove on the working chamber, rotate the flange fixing device inward to fix the flange, and rotate it in the opposite direction to remove the flange.

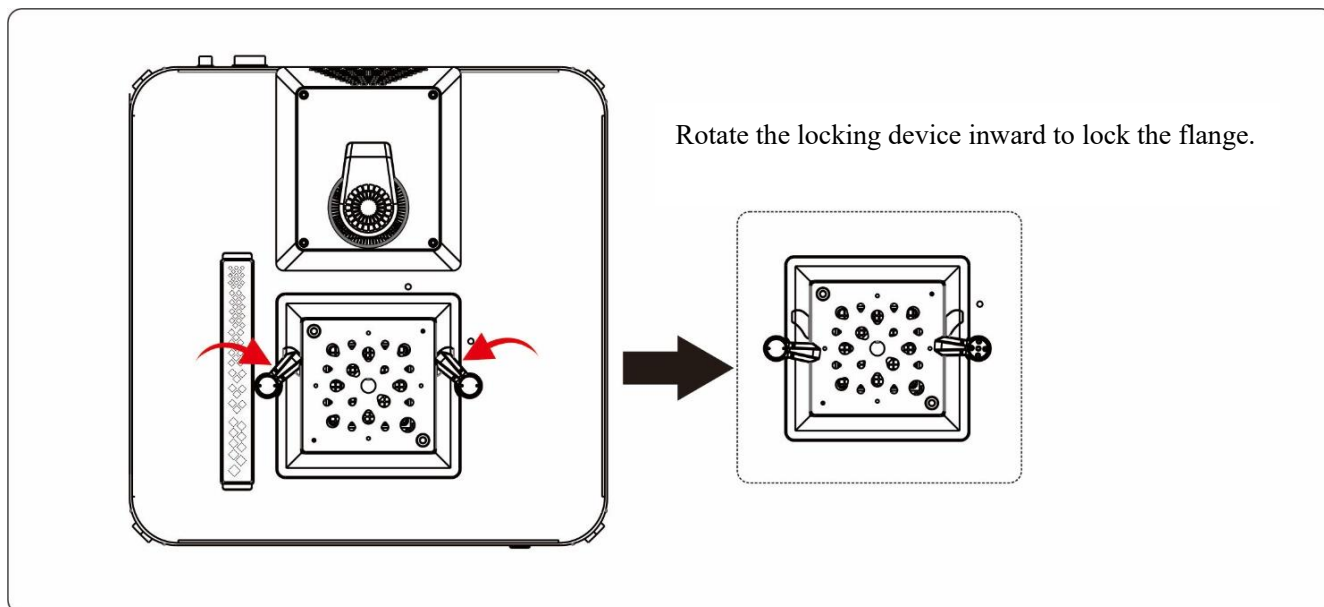


Figure 2.1 Flange fixing

2.2 Sensor Turnover Rack Use

The sensor turnover rack is used to temporarily place the sensor to be tested. The turnover rack consists of two parts: the sensor plug-in plate and the drain chamber. The sensor plug-in plate contains a variety of opening specifications, which are suitable for sensors of different diameters. The drain chamber has a depth of 440mm. When there is a lot of liquid in the drain chamber, it can be taken out and cleaned. The operation method is shown in Figure 2.2.

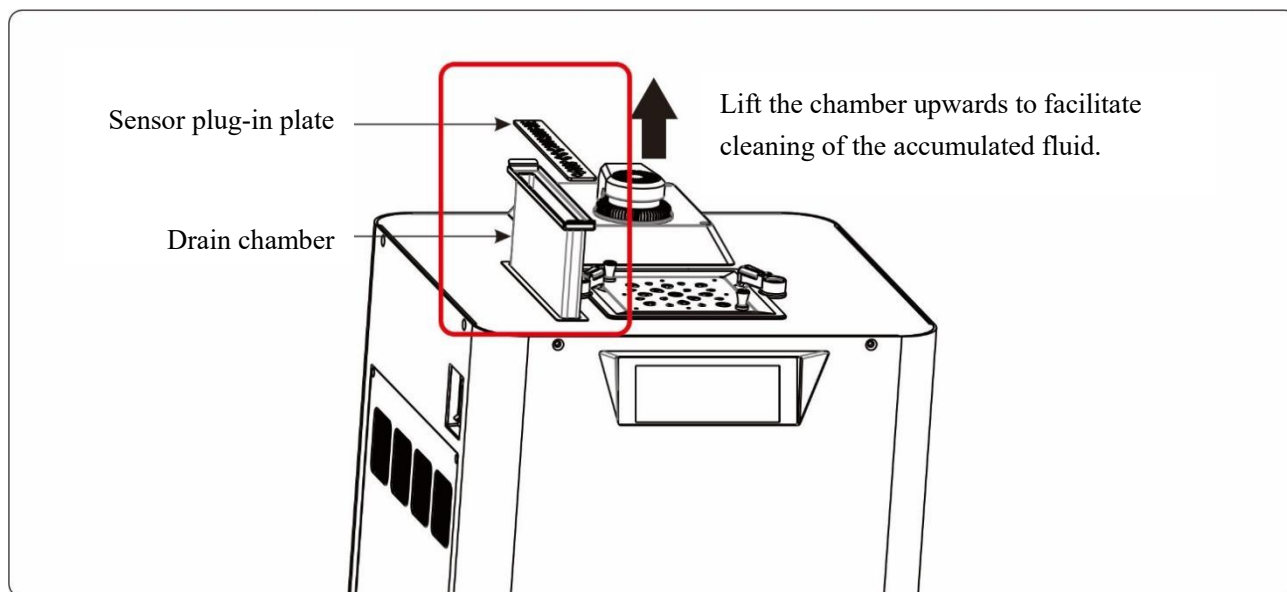


Figure 2.2 Sensor turnover rack structure

2.3 General Operation for the Oil Bath

- Add the medium

Switch off the drain valve, remove the flange and add the medium into the working chamber. After filling, the medium will automatically overflow into the oil storage tank. Add until the liquid level in the oil storage tank reaches the marked optimal level. The optimal position is shown in Figure 2.3.

- Medium refill

Before each use, check the liquid level in the working chamber to ensure that the liquid level is no more than 25mm away from the lower surface of the flange. If the liquid level is low, click the "Refill" button on the screen to refill the working chamber.

- Rapid cooling

The method of rapid cooling is to extract the low-temperature medium from the oil tank and replace the high-temperature medium in the working chamber to achieve the purpose of rapid cooling. By clicking "Refill" on the screen, the medium from the oil tank is extracted into the working chamber in small quantities and multiple times. The extracted low-temperature medium is mixed with the original high-temperature medium in the working chamber and overflows into the oil tank. This cycle is repeated to achieve the purpose of rapid cooling.

- Medium drainage

When the medium needs to be replaced or the oil tank level is too high, drain the oil as follows:

- 1) Connect the hose to an external container.
- 2) Switch on the drain valve to release the working chamber medium, and click "Refill" on the screen to pump the oil tank medium into the working chamber and release it together. The position of the drain valve and hose is shown in Figure 2.3.

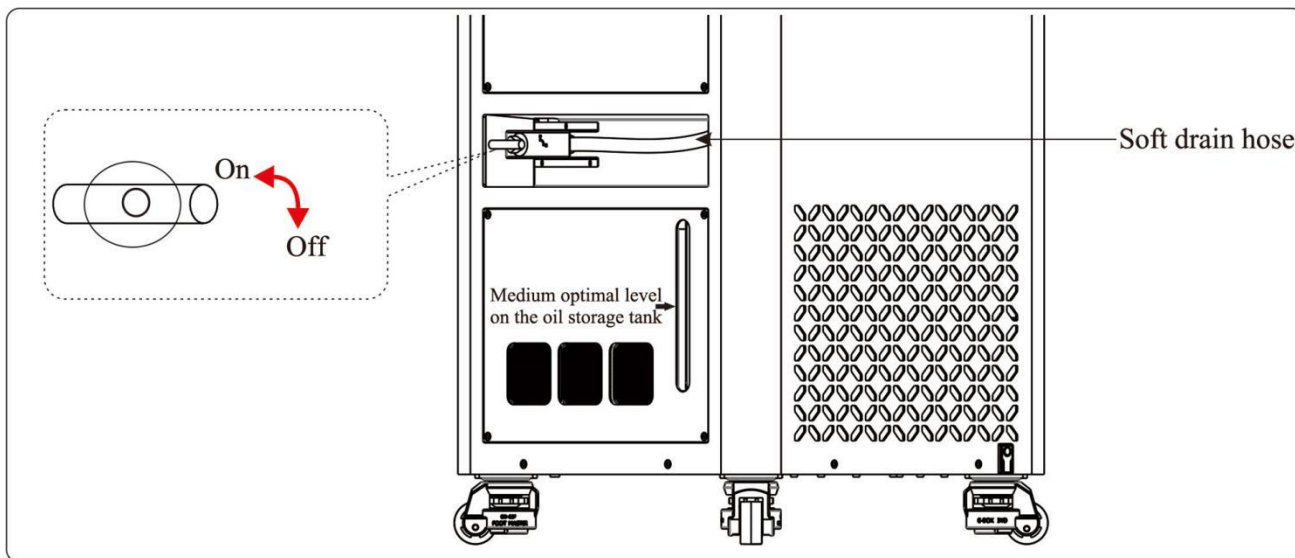


Figure 2.3 Drain valve and oil tank location

2.4 PR571B/PR572B General Operation for the Cooling Bath

- Add the medium

- 1) Switch off the drain valve and make sure the small oil storage tank is placed under the overflow hose on the right.
- 2) Remove the flange and add the medium into the working chamber until the liquid level is no more than 25mm from the lower surface of the flange.

Note: Some of the medium will overflow during the heating process. Make sure that the liquid level in the overflow tank is no higher than one-third of the total capacity during use.

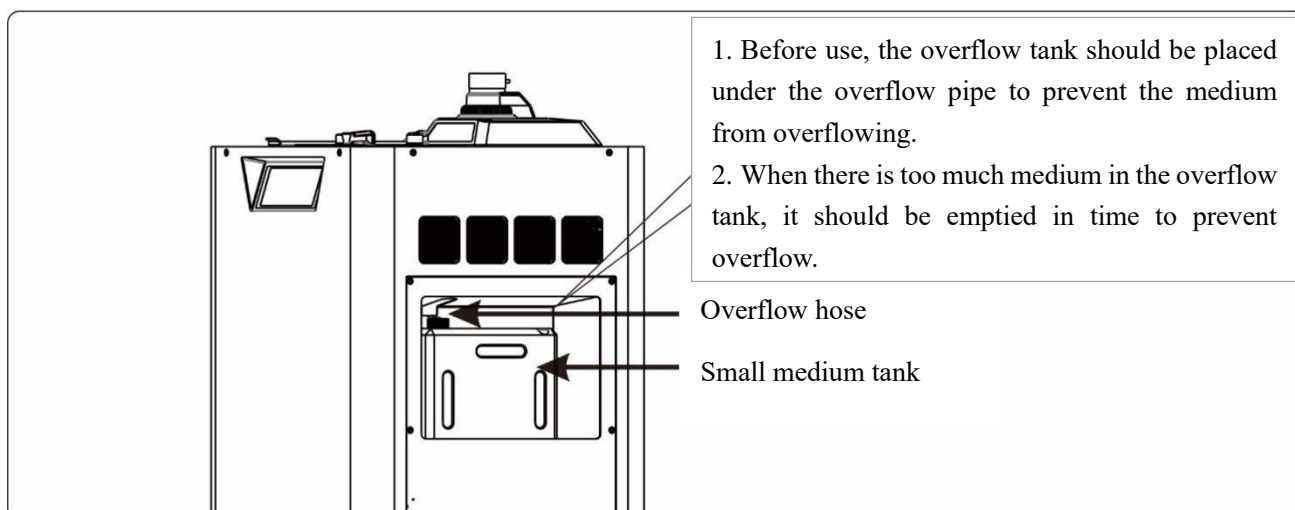


Figure 2.4 Detail of cooling bath overflow hose and overflow tank

- Medium refill

Before each use, check the liquid level in the working chamber to ensure that the liquid level is no more than 25mm away from the lower surface of the flange. If the liquid level is low, add an appropriate amount of medium. During use, replenish the medium in time according to the loss of the medium. The replenishment method is the same as "Add medium" above.

- Medium drainage

- 1) Connect the hose to an external container.
- 2) The working chamber medium can be released by switching on the drain valve. The position of the cooling bath drain valve is the same as that of the oil bath, as shown in Figure 2.3.

2.5 PR571A General Operation for the Cooling Bath

- Connection with PR5711 rapid cooling component

The PR571A standard thermostatic bath consists of two parts: the main thermostatic bath and the PR5711 rapid cooling device, which are connected by a special fluororubber hose. The device has the function of constant speed heating and cooling. The circulating pump outputs the high-temperature medium from the thermostatic bath to the rapid cooling component, and inputs the cooled low-temperature medium into the thermostatic bath to achieve rapid and constant speed cooling, as shown in Figure 2.5.

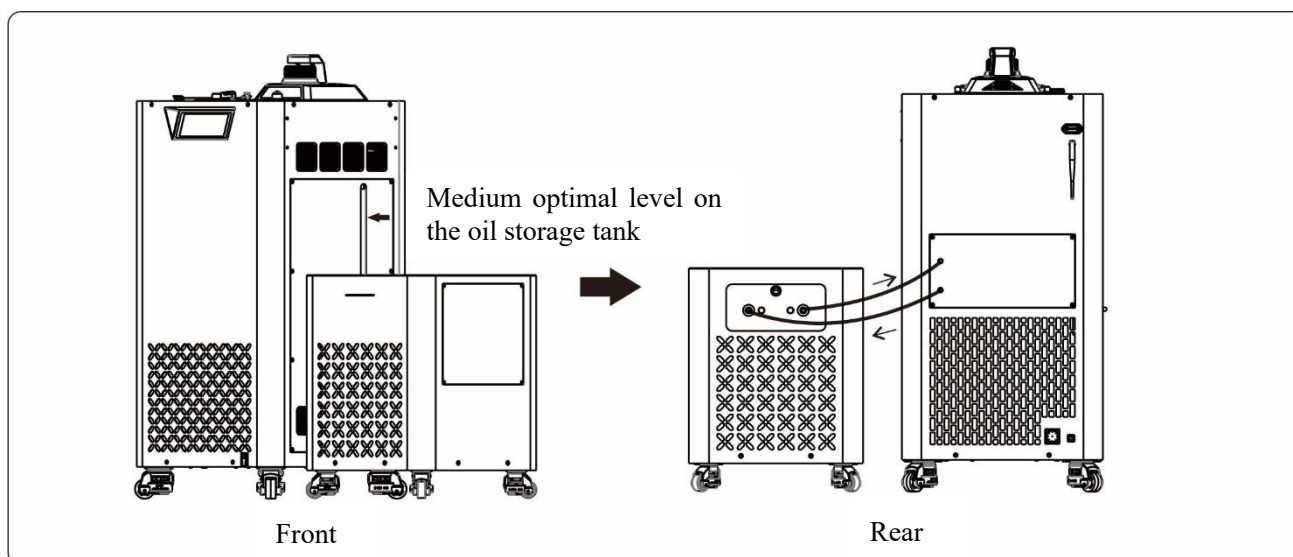


Figure2.5 PR571A Graphics

- Add the medium

Switch off the drain valve, remove the flange and add the medium into the working chamber. After filling, the medium will automatically overflow into the liquid storage tank. Add until the liquid level in the liquid storage tank reaches the marked optimal level. The optimal position is shown in Figure 2.5.

- Medium refill

Before each use, check the liquid level in the working chamber to ensure that the liquid level is no more than 25mm away from the lower surface of the flange. If the liquid level is low, click the "Refill" button on the screen to refill the working chamber.

- Medium drainage

- 1) Connect the hose to an external container.
- 2) The working chamber medium can be released by switching on the drain valve. The position of the cooling bath drain valve is the same as that of the oil bath, as shown in Figure 2.3.

III Basic Operating Instructions

3.1 Main Interface Introduction

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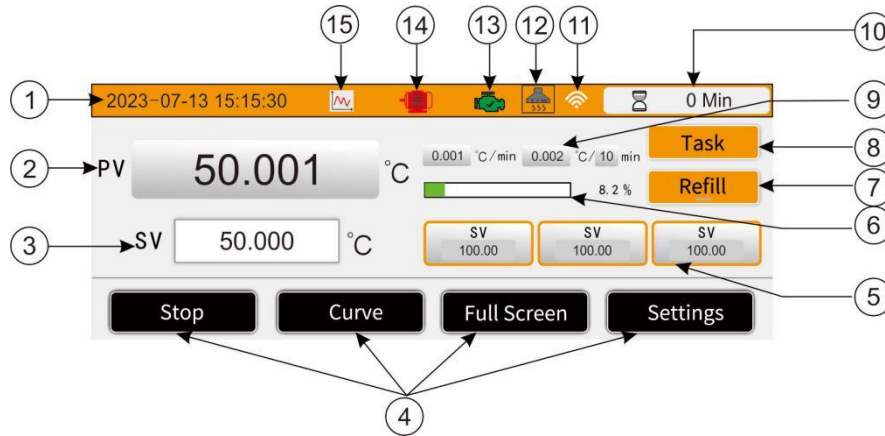


Figure 3.1 Main interface of standard thermostatic bath

No.	Description
1	Date and time
2	PV: current measurement value, click °C to switch units (°C/Ω) .
3	SV: set value, can be entered manually.
4	Touch screen buttons.
5	SV1, SV2, SV3, 3 groups of SV preset values. Click to change the SV value.
6	Displays the proportion of heating power to full power.
7	Manual refill button. Automatic refilling when starting operation, when fast and constant speed cooling completed, the button turns gray. (Only PR573A/B, PR571A have this function)
8	Task button, click to enter task mode.
9	Stability: The absolute value of the difference between the maximum and minimum values every minute and every ten minutes.
10	Temperature control timing setting, click to set the temperature control start time.
11	Wireless Wifi Sign: Wifi connected; Wifi disconnected
12	Range hood sign: Click to turn on or off the range hood and range hood light. (This function is only available on PR573A/B)
13	Stirring motor status: Motor working properly; Motor working abnormally. Click the sign to view the current current value of the motor. If the current value is too large, it indicates that the motor has a large working resistance, which proves that the medium viscosity is too high and the medium should be replaced in time.
14	Gear pump sign: When the temperature of the liquid passing through the gear pump is detected to be too high, an alarm will appear. (This function is only available for PR573A/B)
15	Slope temperature control, click to turn on or off slope temperature control and set the temperature control rate.

3.2 Settings

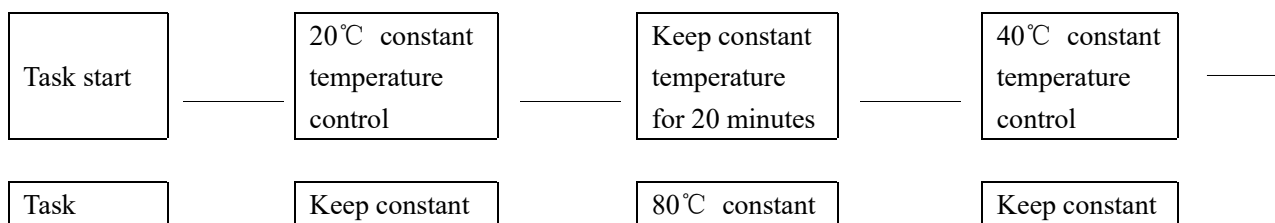
In the main interface as shown in Figure 3.1, click the "Settings" button to enter the settings interface. The detailed setting items and ranges of the settings interface are shown in the table below:

Setting items	Description	Parameter setting range
Parameter settings	Set PID parameters for different temperature ranges and 3 groups of SV preset values	
Alarm settings	Set the upper and lower limit temperatures for the alarm. When the alarm value is exceeded, an alarm will be triggered.	-9999~9999
Temperature control	Temperature control parameters	(0~9.99) °C/ (1~10) min
	Smart medium refill	Set whether to turn on smart medium refill and the refill time.
	Range hood operating temperature	Range hood automatic start temperature (oil bath only)
Advanced settings	For factory debugging, password required to enter.	
Task settings	Set the basic parameters of the task mode.	
System settings	Time	Date and time settings Format: 20??-??-?? ??:??:??
	Address	Communication address settings 0~999
	Language	Language settings 中文/English
	UOM	Temperature unit setting °C/F/K
	Brightness	Screen brightness setting 8 levels in total, increasing from left to right
	Full screen standby	Time limit for automatic standby without operation. 0 to 20 minutes

3.3 Task Mode

Click the task button on the main interface of Figure 3.1 to enter the task mode. After startup, the system will intelligently control the temperature of the thermostat according to the temperature point preset in the task setting.

For example, the task preset is shown in Figure 3.2, and the execution process will be as follows;



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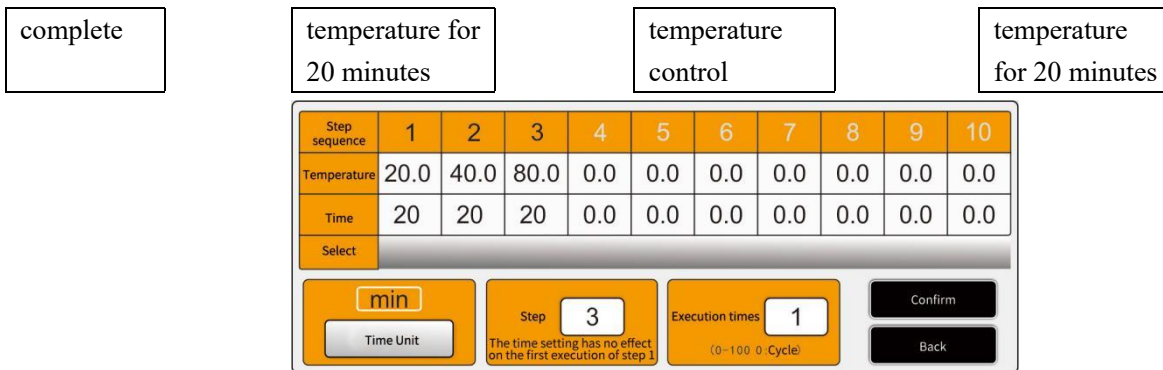


Figure 3.2 Task setting parameters

3.4 Temperature control curve

In Figure 3.1, click "Curve" to enter the temperature control curve interface, which can display the time-temperature curve (red) and the time-power curve (blue), and can intuitively show the entire temperature control process.

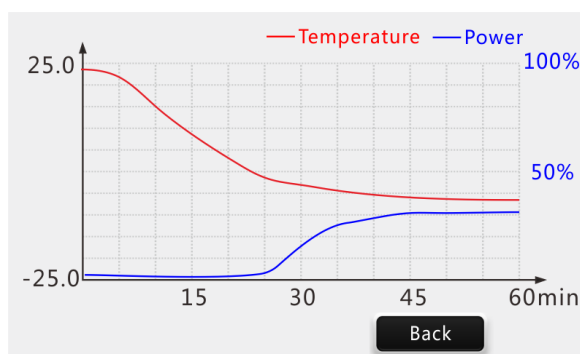


Figure 3.3 Temperature control curve

3.5 Slope temperature control

PR571A can achieve constant speed heating and cooling within the range of 100°C~-10°C, and PR573A can achieve constant speed heating and cooling within a limited temperature range (constant speed setting range see Figure 1.1). Click in Figure 3.1 to set the temperature control rate. The slope setting interface is shown as Figure 3.4. The temperature control rate of the cooling bath can be set in the range of 0.1°C/min to 1°C/min, and the temperature control rate of the oil bath can be set in the range of 0.1°C/min to 3°C/min.



Figure 3.4 Slope temperature control

