

PR570 Series Standard Thermostatic Bath

PANRAN Measurement & Calibration Technology Co., Ltd.

PANRAN

1 Overview

The PR570 series standard thermostat 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 Appearance



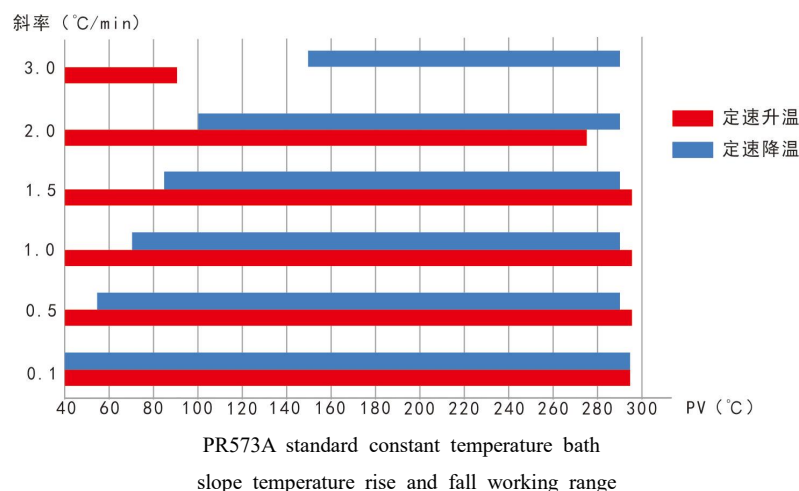
PR570 Series Standard Thermostatic Bath
Front View

1.2 Main Features

- Smaller size, larger capacity;
- Constant speed temperature rise and fall function (Type A);
- Excellent temperature uniformity and temperature fluctuation;
- Standard constant temperature oil tank temperature control range covers 50°C~300°C;
- The fourth-generation PR2602 controller realizes highly intelligent control;
- Full-screen display mode is convenient for observing real-time temperature from a distance;
- Supports PANRAN Smart Metering APP, which can remotely view the current working conditions;
- Rich optional accessories to meet the differentiated needs of users;
- Real-time monitoring of multiple parameters to improve operation safety.

1.3 Technical 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 $50^{\circ}\text{C}\sim 100^{\circ}\text{C}$.
- 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 $50^{\circ}\text{C}\sim 300^{\circ}\text{C}$.
- 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 $0.1^{\circ}\text{C}/\text{min}\sim 3.0^{\circ}\text{C}/\text{min}$, and the temperature range supporting the rate of $1.0^{\circ}\text{C}/\text{min}$ can cover $70^{\circ}\text{C}\sim 290^{\circ}\text{C}$.

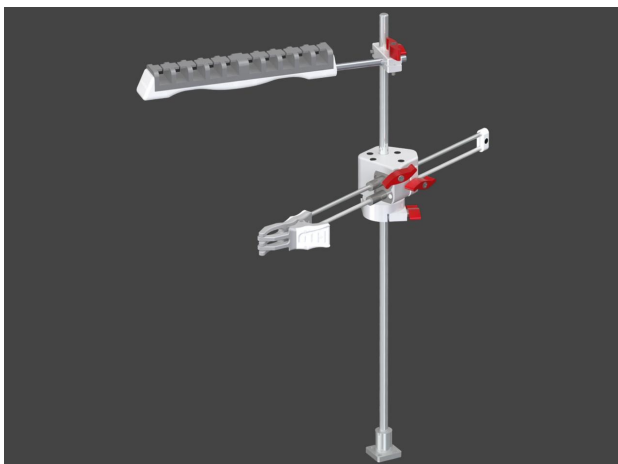


- Intelligent control and safety. The control core uses the fourth-generation PR2602 temperature controller developed by PANRAN, which can intelligently control the start and stop of components such as compressors, solenoid valves, power supplies, and the speed of various pumps, fans, and motors according 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 to 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.

1.4 Main function list

| Software Features | Hardware Features |
|--|--|
| <ul style="list-style-type: none"> ■ Setting and display of temperature control parameters such as PV and SV ■ Temperature control parameter self-tuning function ■ Real-time temperature and power curve display ■ Temperature fluctuation calculation ■ Custom alarm temperature upper and lower limits ■ Automatic/manual medium replenishment ■ Full screen display mode ■ Safety alarm based on temperature and power ■ Water triple point bottle freezing system (PR571, PR572) | <ul style="list-style-type: none"> ■ Square working chamber ■ Self-priming gear pump for medium replenishment ■ DC speed regulating motor for stirring ■ Auxiliary cooling system ■ Sensor turnover rack ■ Various flanges ■ Stirring motor and oil tank over-temperature protection switch ■ Optional parts |

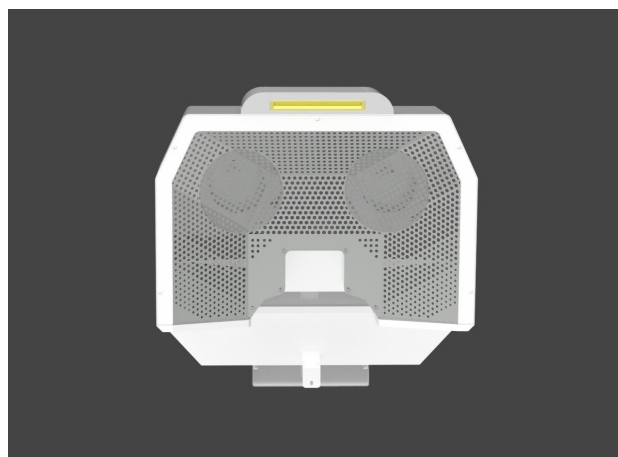
1.5 Other details



Cable harness and bracket with PR5702 aluminum three-axis fixture



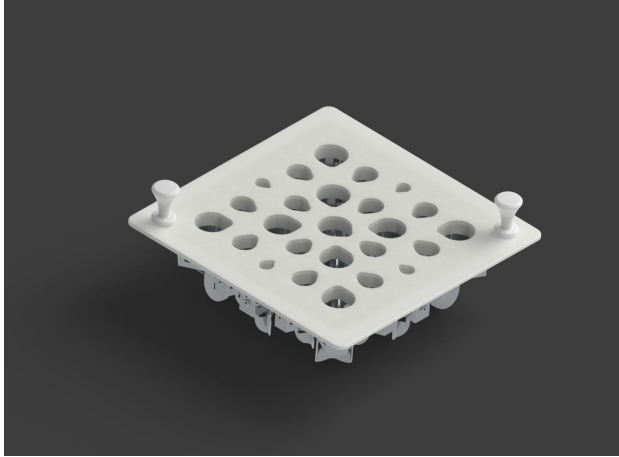
PR5701 Aluminum folding workbench (520mm×350mm)



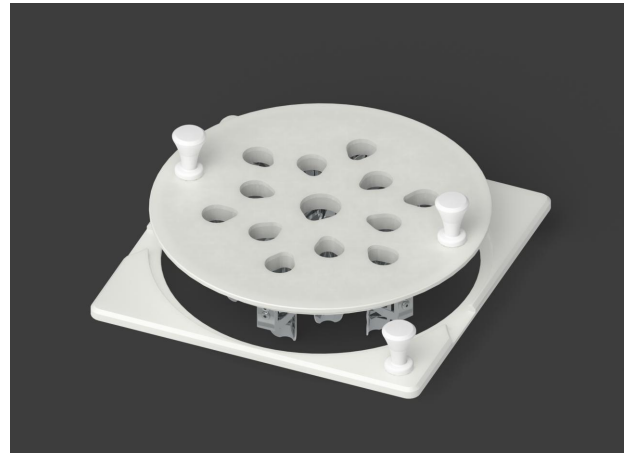
PR5703 Fume extraction assembly



PR5704 Four-grid thermometer calibration flange



Refrigeration tank square flange



Refrigeration tank round flange



Installation effect diagram of optional accessories for PR573A/B (PR5703 fume extraction assembly, PR5702 aluminum three-axis fixture, PR5701 aluminum folding workbench)



PR5703 fume extraction assembly working effect demonstration



PR571A standard constant temperature bath and PR5711 cooling assembly



PR571B Standard Constant Temperature Bath

2 Technical Parameters

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.

2.2 Temperature Specifications (Simple) (Note 1)

| Item\Model | PR571A/B | PR572B | PR573A/B |
|--|--|----------------|---|
| Temperature control accuracy | 0.05°C+0.07%RD | | |
| Temperature uniformity <small>(Note 2)</small> | 0.006°C@ -40°C 0.006°C@ 0°C 0.008°C@ 100°C | 0.004°C | 0.003°C@ 50°C 0.005°C@100°C 0.010°C@300°C |
| Temperature stability /10min | 0.008°C@ -40°C 0.008°C@ 0°C 0.006°C@ 100°C | 0.006°C | 0.003°C@ 50°C 0.005°C@100°C 0.010°C@300°C |
| Constant speed heating and cooling rate | (0.1~1.0) °C/min | / | (0.1~3.0) °C/min |
| 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 0°C~-40°C 80min | / | 300°C~200°C 12min 200°C~100°C 28min 100°C~50°C 23min |
| Type B cooling time <small>(Note 3)</small> | 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.

2.3 Temperature Specifications (Detailed) (Note 1)

| Item\Model | PR571A/B | PR572B | PR573A/B |
|--|--|--|--|
| Temperature control accuracy | 0.05°C+0.07%RD | | |
| Temperature uniformity <small>(Note 2)</small> | 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 stability /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 0°C~-40°C 80min | / | 300°C~200°C 12min 200°C~100°C 28min 100°C~50°C 23min |
| Type B cooling time <small>(Note 3)</small> | 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. Supporting accessories

| Model | | PR571A | PR571B | PR572B | PR573A | PR573B |
|---|---|----------|----------|----------|----------|----------|
| Standard accessories | Square flange | ● | ● | ● | ● | ● |
| | Round flange | ● | ● | ● | ● | ● |
| | PR5711 Cooling components | ● | | | | |
| | Fluorine hose (φ10*1Meter) | 2 Pieces | | | | |
| | Small oil tank | | 2 Pieces | 2 Pieces | | |
| | Cable tie and bracket | ● | ● | ● | ● | ● |
| | Bamboo clamp | 5 Pieces | 5 Pieces | 5 Pieces | 5 Pieces | 5 Pieces |
| | Three-core power cord (7Meter) | ● | ● | ● | ● | ● |
| Optional accessories | PR5702 Aluminum three-axis fixture | ○ | ○ | ○ | ○ | ○ |
| | PR5701 Aluminum folding workbench | ○ | ○ | ○ | ○ | ○ |
| | Dust cover | ○ | ○ | | | |
| | PR5703 Fume extraction assembly | | | | ○ | ○ |
| | PR5704 Four-grid thermometer calibration flange | ○ | ○ | ○ | | |
| | PR5705 Water triple point bottle fixing flange | ○ | ○ | ○ | | |
| Note: ●Standard accessories ○Optional accessories | | | | | | |