

## circulation heating thermostat with cooling function

Circulation heating thermostat has the function of rapid refrigeration and high-efficiency heating, and transports temperature control medium, such as heat-conducting oil or coolant to the external equipment through the closed-circuit circulation method to realize precise temperature control.

### Circulation Heating Thermostat

The circulation heating thermostat integrates refrigeration, heating, circulation pump group, and intelligent control module, with options for air-cooled or water-cooled cooling methods. It is ideal for high-precision thermal management in applications such as reaction kettle temperature control, new material testing, chip heat treatment, and industrial process temperature regulation. Stable operation from  $-40^{\circ}\text{C}$  to  $+200^{\circ}\text{C}$ , PID program temperature control, data export, and remote communication functions meet the needs of automated production and scientific research.

### Core Features

1. **Wide-temperature operation capability:** Covers  $-40^{\circ}\text{C}$  to  $+200^{\circ}\text{C}$ , suitable for low-temperature gel reactions and high-temperature cracking.



2. **Highly integrated modular structure:** Integrates cooling, heating, circulation, and control systems in one compact, efficient unit.
3. **Flexible cooling mode:** Supports air-cooled and water-cooled condenser forms; users select based on site conditions.
4. **High-definition touch screen control:** 7-inch true color touch screen, intuitive operation, data curve display, and operation record function.
5. **Program temperature control ability:** Supports 120 groups of temperature control programs, each with 100 temperature segments, allowing linear and gradient temperature rise and fall.
6. **Automatic protection mechanisms:** Over-temperature, over-current, overload, delayed start, high-voltage protection, and more for safe operation.
7. **Remote communication and integration:** RS485 interface compatible with MODBUS RTU, connectable to upper systems (DCS, SCADA) for centralized control.
8. **Expansion vessel design:** Built-in expansion vessel and liquid level monitoring automatically respond to heat-carrying medium volume changes, ensuring stable circulation.
9. **Wide adaptation to heat conduction mediums:** Supports water, ethanol, silicone oil, and other fluids for diverse application requirements.

## System Principle

1. **Refrigeration Principle:** Built-in rolling rotor hermetic compressor rapidly cools the heat-carrying body via condenser, capillary throttling, and plate evaporator. Plate heat exchanger is compact and efficient. Air-cooled type uses finned condenser; water-cooled uses coaxial heat exchanger.
2. **Heating Principle:** Special flange-type electric heater for thermal oil provides high power density and fast response, ensuring uniform temperature distribution.
3. **Circulation and Expansion Mechanism:** Shielded pump suitable for high/low temperatures delivers continuous medium flow. 304 stainless steel piping with insulation prevents heat loss/corrosion. Expansion vessel absorbs volume fluctuations; liquid level monitor ensures stable operation.
4. **Control Logic:** PID algorithm adjusts temperature output in real time, supports temperature curve setting, fixed-value, and program control. Software supports data recording, curve display, USB export, and remote communication.

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| <b>Model</b>           | <b>HC10-4(W)</b> | <b>HC10-10(W)</b> | <b>HC10-12(W)</b> |
|------------------------|------------------|-------------------|-------------------|
| Temperature range      | -40°C to +200°C  |                   |                   |
| Temperature stability  | ±0.5°C           |                   |                   |
| Overall power          | 5.7kw            | 11.1kw            | 18.6kw            |
| Cooling power at 200°C | 3kw              | 6kw               | 12kw              |
| Cooling power at 100°C | 3kw              | 6kw               | 8.6kw             |
| Cooling power at 25°C  | 2.4kw            | 4.5kw             | 5.8kw             |
| Cooling power at -10°C | 1.4kw            | 4.2kw             | 4.5kw             |
| Cooling power at -20°C | 1.2kw            | 3.2kw             | 3.5kw             |
| Cooling power at -30°C | 0.85kw           | 2kw               | 2kw               |
| Cooling power at -40°C | 0.25kw           | 1.1kw             | 1.1kw             |
| Heater Rated Power     | 3kw              | 6kw               | 12kw              |

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|---|------------------------------|-------------------|-------------------|
| Cooling method                            | air cooling or water cooling |                   |                   |
| refrigerants                              | R404A                        |                   |                   |
| Circulation pump Flow rate                | 30L per minute               |                   | 45L per minute    |
| Circulation pump Pressure                 | 1bar                         |                   | 1.4bar            |
| Circulation Interface Size                | R3/4                         |                   |                   |
| Maximum viscosity of heat-carrying medium | 30cp                         |                   |                   |
| Noise level                               | 65db                         |                   |                   |
| communication interface                   | usb, RS485                   |                   |                   |
| protection class                          | IP20                         |                   |                   |
| contamination level                       | 2                            |                   |                   |
| Environmental temperature                 | 5°C to 35°C                  |                   |                   |

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|-------------------------------|------------------------------|------------------------|------------------------|
| Power supply                  | 380Vac, 50Hz, 3 phase        |                        |                        |
| Current                       | 10.5A                        | 20A                    | 33A                    |
| Electrical Connection Methods | three-phase four-wire system |                        |                        |
| External dimensions           | 640Wx860Dx1270H<br>mm        | 750Wx1100Dx1420H<br>mm | 750Wx1100Dx1420H<br>mm |
| Weight                        | 205kg                        | 330kg                  | 360kg                  |