Compact and lightweight high precision temperature controller
- Setting range: 0 to 50°C, stability: ±0.1°C
- Has an auto-tuning function that automatically sets the optimal control condition
- Equipped with communications function with a computer
- Has extensive self-diagnosis function

One-touch attachable temperature sensor

LCD display panel with backlight

No cooling water required

Most suitable for local temperature control and small volume temperature control

Ink-jet printer head
For preventing ink of an ink-jet printer from clogging the head

Syringe-type adhesive, sealant, etc.
For constantly applying a quantity of adhesive or sealant and for constantly filling IC packages with a quantity of agent

Canned adhesive, sealant, grease, etc.
The outlet air temperature (set temperature) of the Air-Thermo varies depending on the constant temperature air flow rate, inlet temperature and/or ambient temperature. The relationship between the maximum temperature difference when cooling or heating and the flow rate is illustrated in the diagram to the right.

(Example) Ambient temperature \( \approx \) inlet temperature: 30 °C

Air-Thermo outlet temperature: 18.5 °C (cooling)

First, obtain the maximum temperature difference when cooling.

The maximum temperature difference when cooling: 30 – 18.5 = 11.5 °C

Inserting sensor into all One-touch fittings (Series KQ2)

Air flow under the above conditions

First, obtain the maximum temperature difference when cooling.

The maximum temperature difference when cooling: 30 – 18.5 = 11.5 °C

Inserting sensor into all One-touch fittings (Series KQ2)

How to Order

HEA100-1-04

Air-Thermo

Air flow rate

Power supply voltage

Temperature sensor cable length

Option/function

Table: Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>HEA100-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature setting range</td>
<td>0.0 to 50.0°C (depending on the flow rate)</td>
</tr>
<tr>
<td>Set accuracy Stability</td>
<td>20 to 30°C: ±0.5°C or less, 0.0 to 50.0°C: ±1°C or less (including sensor accuracy) ±0.1°C or less</td>
</tr>
<tr>
<td>Cooling/Heating capacity</td>
<td>Conditions: Both constant temperature air inlet and ambient temperature: 23°C, Constant temperature air flow rate: 100 l/min (ANR), Power supply frequency: 50 Hz, Heating capacity: 22 W, Heating capacity: 74 W</td>
</tr>
<tr>
<td>Constant temperature air inlet pressure</td>
<td>20 to 200 l/min (ANR) (depending on the set temperature)</td>
</tr>
<tr>
<td>Piping for constant temperature air</td>
<td>Maximum working pressure: 0.1 MPa, Withstand pressure: 0.15 MPa</td>
</tr>
<tr>
<td>Temperature sensor holding method</td>
<td>Thermistor, cable length: 10 m or less</td>
</tr>
<tr>
<td>Temperature sensor cable length</td>
<td>Inserting sensor into all One-touch fittings (Series KQ2)</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>100 ±10% VAC, 3 A, 50/60 Hz</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>Fuse, 4 A</td>
</tr>
<tr>
<td>Main functions</td>
<td>Auto-tuning, Offset, Sensor fine adjustment, Fault alarm functions</td>
</tr>
<tr>
<td>Display</td>
<td>LCD display panel (with backlight)</td>
</tr>
<tr>
<td>Remote control</td>
<td>Remote control of the operation of the thermo-module (24 VDC, 10 mA, A contact input)</td>
</tr>
<tr>
<td>Alarm output</td>
<td>Output shutdown alarm; Relay output (C contact, 24 VDC, 100 mA or less)</td>
</tr>
<tr>
<td>Upper/lower temperature limit alarm</td>
<td>Relay output (C contact, 24 VDC, 100 mA or less)</td>
</tr>
<tr>
<td>Ambient temperature/humidity</td>
<td>0 to 40°C, 35 to 85% RH (No condensation)</td>
</tr>
<tr>
<td>Quality of ambient air</td>
<td>Good environment free of corrosive gas, solvent, such as thinner, or dust</td>
</tr>
<tr>
<td>Cooling Mass</td>
<td>Coercive air cooling (Both controller and heat exchanger)</td>
</tr>
<tr>
<td>Color of panel coating</td>
<td>Munsell 10Y8/0.5</td>
</tr>
<tr>
<td>Mass</td>
<td>Controller: approx. 4 kg, Heat exchanger: approx. 5 kg</td>
</tr>
<tr>
<td>Serial communication function</td>
<td>RS-485 (communication items: set temperature, measured temperature, offset value and alarm description)</td>
</tr>
</tbody>
</table>

| Accessories | Temperature sensor HEA-P-ST-01
| Temperature sensor cable HEA-P-CS-01
| Power cable HEA-P-CP-02 |

Cooling/Heating Capacity

The outlet air temperature (set temperature) of the Air-Thermo varies depending on the constant temperature air flow rate, inlet temperature and/or ambient temperature. The relationship between the maximum temperature difference when cooling or heating and the flow rate is illustrated in the diagram to the right.

(Example) Ambient temperature \( \approx \) inlet temperature: 30 °C

Air-Thermo outlet temperature: 18.5 °C (cooling)

Air flow under the above conditions

First, obtain the maximum temperature difference when cooling.

The maximum temperature difference when cooling: 30 – 18.5 = 11.5 °C

Note that the air flow rate varies depending on the operating pressure and the piping diameter and length.
The compressed air is supplied to the heat exchanger of the Air-Thermo through a filter and regulator. Guide the air from the heat exchanger to the part to be temperature controlled through a resin tube with an outer diameter of 8 mm, install a One-touch T-fitting for 8 mm on the part to be temperature controlled, and insert a temperature sensor there. The temperature controlled air will pass the sensor and blow out on the object.

Connect the heat exchanger and the adhesive discharge outlet with a coaxial tube, and pass the temperature controlled air through the outer tube. The influence of the ambient air can be prevented by the temperature controlled air.

Adjust the flow rate by the regulator. (However, the operating pressure must be 0.1 MPa or less.)

The part numbers in parentheses indicate recommended products from SMC.

A thermo-module (thermo-electric device) applies the Peltier effect, which occurs when connecting two types of thermo-electric elements (p- and n- types) as shown in Figure 1 and passing direct current (a heat absorbing phenomenon occurs at one junction and a heat generating phenomenon at the other). By changing the direction of the current, heat suction and heat generation can also be switched.

A thermo-module is sandwiched between a heat exchanger and a radiator fin as shown in Figure 2, and the heat exchanger is supplied with air obtained by inflating compressed air to make the temperature of the air constant while the radiator fin is supplied with the ambient air using a fan. A temperature sensor is installed at the constant temperature air outlet part and a temperature controller measures the temperature. The temperature controller controls the direct current to the thermo-module according to the deviation from the set temperature to keep the outlet temperature of the constant temperature air at the set temperature.

Blowing the temperature controlled air around the object

The compressed air is supplied to the heat exchanger of the Air-Thermo through a filter and regulator. Guide the air from the heat exchanger to the part to be temperature controlled through a resin tube with an outer diameter of 8 mm, install a One-touch T-fitting for 8 mm on the part to be temperature controlled, and insert a temperature sensor there. The temperature controlled air will pass the sensor and blow out on the object.

Controlling the temperature of adhesive

Connect the heat exchanger and the adhesive discharge outlet with a coaxial tube, and pass the temperature controlled air through the outer tube. The influence of the ambient air can be prevented by the temperature controlled air.

Pressure Loss of Constant Temperature Air

<table>
<thead>
<tr>
<th>Pressure loss (kPa)</th>
<th>Air flow rate (l/min (ANR))</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.15</td>
<td>With 5 m of ø8mm tube</td>
</tr>
<tr>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

* Since the maximum operating pressure is 0.1 MPa, use with the piping length and flow rate at or below the condition.

Pressure of supply air

The withstand pressure of the heat exchanger requires that the operating pressure be 0.1 MPa or less. Be sure to install a regulator before use.

Quality of supply air

If the heat exchanger becomes dirty, the performance will be deteriorated. Be sure to use an air filter series AF from SMC or its equivalent. Also, use dry air whose dew-point temperature is below the set temperature.

Flow rate of supply air

For stable temperature control, the flow rate must be under constant conditions. If the air flows intermittently in such a case as an air gun is used, the temperature cannot be controlled.

Start-up time

Though the constant temperature air can be temperature controlled in a short time, the temperature change of the parts around the outlet takes time. Therefore, allow for a sufficient warming up time.

Ambient Environment

Avoid use in locations where water, oil or other liquid is splashed, where there is dust and where there are corrosive gases or solvents. Also, avoid use in locations where there are strong electromagnetic noises and where electrostatic discharges occur. Do not block the heat radiating air inlet and outlet on either the controller or heat exchanger, or obstruct the flow. Note that setting the set temperature to low may cause condensation on the piping. Also note that if the radiator fin becomes dirty, the performance will be deteriorated.
HEA100

Dimensions

Heat exchanger

- Constant temperature air outlet Rc 1/4
- Heat radiating air outlet

Dimensions with the stand for vertical installation of the heat exchanger (Option)

Controller

- Display panel part
- Heat radiating air suction port
- Power switch

Temperature sensor part dimensions

Temperature sensor mounting dimensions