

# Peltier-Type Air-Thermo

## HEA100 Series



RoHS

Compact air temperature controller  
using peltier element

# Air-Thermo

HRHS
HRHS 090
HRHS 100/150
HRSH 090
HRSH
HRSE
HRZ
HRZD
HRW
HECR
HEC
HEB
HED
HEA
IDH

**Compact and lightweight high precision temperature controller**

- Setting range: 0 to 50°C, stability:  $\pm 0.1^\circ\text{C}$
- Has extensive self-diagnosis function

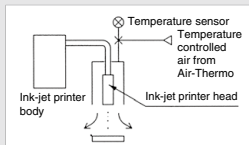
**One-touch attachable temperature sensor**

**LCD display panel with backlight**

**No cooling water required**

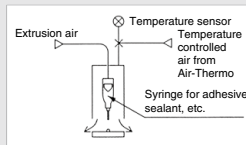


**Most suitable for local temperature control and small volume temperature control**



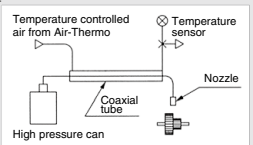
**Ink-jet printer head**

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



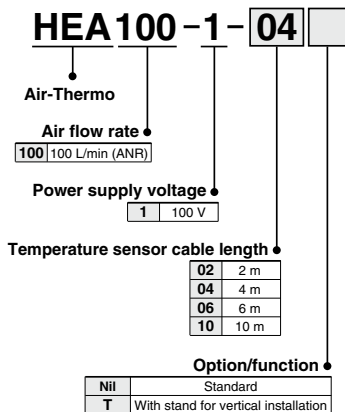
**Canned adhesive, sealant, grease, etc.**

# Peltier-Type Air-Thermo HEA100

RoHS



## How to Order



## Specifications

Model	HEA100-1
Temperature setting range	0.0 to 50.0°C
Set accuracy	±0.2°C
Stability	±0.1°C (Varies depending on the operating conditions.)
Cooling/Heating capacity	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 Cooling capacity: 22 W, Heating capacity: 74 W
Constant temperature air flow rate	20 to 200 L/min (ANR)
Constant temperature air inlet pressure	Maximum working pressure: 0.1 MPa Withstand pressure: 0.15 MPa
Piping for constant temperature air	Resin tube with an outer diameter of 8 mm (polyurethane, nylon, etc.), piping length: 5 m or less
Temperature sensor	Platinum resistance temperature sensor (Pt 100 Ω 3-wire), cable length: 10 m or less
Temperature sensor holding method	Inserting sensor into ø8 One-touch fittings
Power supply	100 ±10% VAC, 3 A, 50/60 Hz
Overcurrent protection	Circuit protector 10 A
Main functions	Auto-tuning, Offset, Sensor fine adjustment, Fault alarm functions
Display	LCD display panel (with backlight)
Remote control	Remote control of the operation of the thermo-module (24 VDC, 10 mA, A contact input)
Alarm output	Output shutdown alarm: Relay output (C contact, 24 VDC, 1 A) Upper/lower temperature limit alarm: Relay output (C contact, 24 VDC, 1 A)
Ambient temperature/humidity	0 to 40°C, 35 to 85% RH (No condensation)
Quality of ambient air	Good environment free of corrosive gas, solvent, such as thinner, or dust
Cooling	Coercive air cooling (Both controller and heat exchanger)
Color of panel coating	White
Mass	Controller: approx. 4 kg, Heat exchanger: approx. 5 kg
Serial communication function	RS-485 (communication items: set temperature, measured temperature, offset value and alarm description)
Accessories	Temperature sensor ..... 1      Operation Manual ..... 1 Temperature sensor cable ..... 1 Power cable ..... 1

## 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 - Inlet temperature: 30°C  
Air-Thermo outlet temperature: 18.5°C (cooling)  
50 Hz area

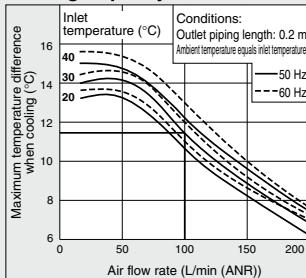
### Air flow under the above conditions

First, obtain the maximum temperature difference when cooling.

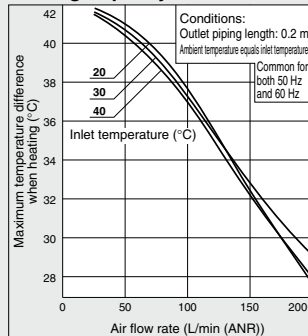
The maximum temperature difference when cooling:  
 $30 - 18.5 = 11.5^\circ\text{C}$

The diagram titled "Cooling Capacity" to the right indicates that, when the inlet temperature is 30°C in a 50 Hz area, an air flow rate of up to 100 L/min (ANR) is possible. However, allow for the absorption of heat by the piping between the Air-Thermo outlet and the location where the air is used. Note that the air flow rate varies depending on the operating pressure and the piping diameter and length.

### Cooling Capacity



### Heating Capacity



## Principle and Structure

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.

Figure 1. Principle of Thermo-module

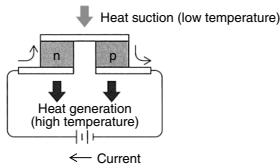
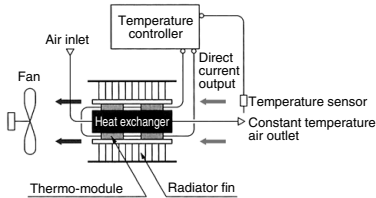


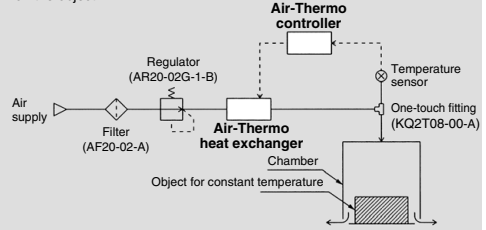
Figure 2. Structure of Air-Thermo



## Piping Connection Method Example

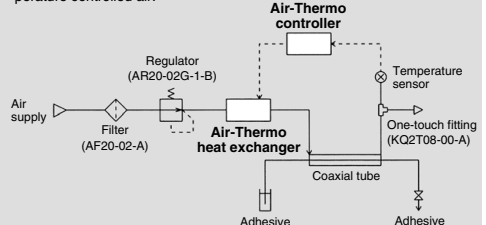
### Blowing the temperature controlled air around the object

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.



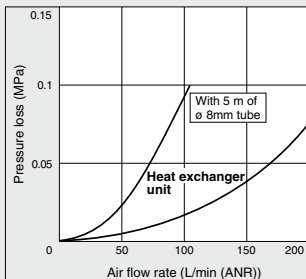
### Controlling the temperature of adhesive

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.



- 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.

## Pressure Loss of Constant Temperature Air



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

## Caution on Handling

### 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 AF series 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.

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