Peltier-Type

Thermoelectric Bath  Series HEB

Accurately controls the temperature of liquid in the bath.

- Temperature stability: ±0.01°C
- Temperature distribution: ±0.02°C in the bath
- Environmentally friendly and refrigerant-free
- Heaterless
- Function to detect abnormal heating and temperature sensor errors comes standard.
- Light and compact
- Greatly reduced vibration and operating noise when compared with the refrigerated type.

Applications
- Chemicals for MOCVD
- Diffusion gas
- Various samples, materials and parts
- Chemicals and liquids with high viscosity

Technical Data

- Temperature stability: ±0.01°C
- Temperature distribution: ±0.02°C
- Environmentally friendly and refrigerant-free
- Heaterless
- Function to detect abnormal heating and temperature sensor errors comes standard.
- Light and compact
- Greatly reduced vibration and operating noise when compared with the refrigerated type.

Related Products

- HEC
- HED
- HEB
- HGW
- HRG
- HRGC
- HRS
- HRZ
- HRZD
- HRW

Facility water outlet Facility water inlet

Circulating pump

Controller

W250 x H180 x D340

W200 x H332 x D207

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Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
A Peltier device (thermo-module, thermoelectric device) is a plate type element, inside which P-type semiconductors and N-type semiconductors are located alternately. If direct current is supplied to the Peltier device, heat is transferred inside the device, and one face generates heat and increases temperature while the other face sucked heat and decreases temperature. Therefore, changing the direction of the current supplied to the Peltier device can achieve heating and cooling operation. This method has a fast response and can shift quickly between heating and cooling, so temperature can be controlled very precisely.
Peltier-Type Thermoelectric Bath

Series HEB

How to Order

Combination (Controller + Liquid tank)

HEB C 002 - W A 10 -

- Shape of bath: C (Round)
- Cooling capacity: 002 (140 W)
- Radiating method: W (Water-cooled)
- Communication: A (RS-485), B (RS-232C)
- Liquid tank size: ø130 x H180
- Liquid tank:
  - Shape of bath: C (Round)
  - Cooling capacity: 002 (140 W)
  - Liquid tank size: ø130 x H180
- Option:
  - Nil
  - Rc1/4
  - N (NPT1/4)

Controller

HEBC002 - C A

- Controller
- Communication: A (RS-485), B (RS-232C)

Liquid tank

HEB C 002 - H W 10 -

- Shape of bath: C (Round)
- Cooling capacity: 002 (140 W)
- Radiating method: W (Water-cooled)
- Liquid tank size: ø130 x H180
- Liquid tank:
  - Shape of bath: C (Round)
  - Cooling capacity: 002 (140 W)
  - Liquid tank size: ø130 x H180
- Option:
  - Nil
  - Rc1/4
  - N (NPT1/4)

- The option should be specified when ordering.

Related Products:

- Approved

Technical Data
## Series HEB

### Specifications

(For details, please consult our “Product Specifications” information.)

<table>
<thead>
<tr>
<th>Model</th>
<th>HEBC002-WA10</th>
<th>HEBC002-WB10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling method</td>
<td>Peltier device (Thermo-module, Thermoelectric device)</td>
<td></td>
</tr>
<tr>
<td>Radiating method</td>
<td>Liquid tank: Water-cooled, Controller: Forcible air-cooled</td>
<td></td>
</tr>
<tr>
<td>Control method</td>
<td>Cooling/Heating automatic shift PID control</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature/humidity</td>
<td>10 to 35°C, 35 to 80°F/°R</td>
<td></td>
</tr>
<tr>
<td>Application fluid</td>
<td>Clear water, Fluorinated liquid (Fluorinert™ FC-3283, GALDEN® HT135, HT200)</td>
<td></td>
</tr>
<tr>
<td>Temperature range</td>
<td>Note 1)</td>
<td>Note 2)</td>
</tr>
<tr>
<td>Cooling capacity</td>
<td>140 W (Water)</td>
<td></td>
</tr>
<tr>
<td>Heating capacity</td>
<td>300 W (Water)</td>
<td></td>
</tr>
<tr>
<td>Temperature stability</td>
<td>±0.01°C</td>
<td>±0.02°C</td>
</tr>
<tr>
<td>Temperature distribution</td>
<td>Note 2)</td>
<td>Note 2)</td>
</tr>
<tr>
<td>Tank dimensions</td>
<td>Internal diameter ø130 x Liquid level 188 mm</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>10 to 35°C (no condensation)</td>
<td></td>
</tr>
<tr>
<td>Pressure range</td>
<td>0.5 MPa or less</td>
<td></td>
</tr>
<tr>
<td>Flow rate</td>
<td>3 to 5 L/min</td>
<td></td>
</tr>
<tr>
<td>Port size</td>
<td>IN/OUT: Rc1/4</td>
<td></td>
</tr>
<tr>
<td>Wetted parts material</td>
<td>Stainless steel 303, Stainless steel 304, FEP, A6063 (anodized)</td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>Single-phase, 100 to 240 VAC, 50/60 Hz</td>
<td></td>
</tr>
<tr>
<td>Overcurrent protector</td>
<td>10 A</td>
<td></td>
</tr>
<tr>
<td>Current consumption</td>
<td>4 A (100 VAC) to 2 A (240 VAC)</td>
<td></td>
</tr>
<tr>
<td>Alarm</td>
<td>1) Overheating of liquid tank (which activates the thermostat)</td>
<td></td>
</tr>
<tr>
<td>(With alarm output connector)</td>
<td>2) Controller output voltage reduction</td>
<td>3) Controller fan rotation stopped</td>
</tr>
<tr>
<td>Communications</td>
<td>RS-485</td>
<td>RS-232C</td>
</tr>
<tr>
<td>Weight</td>
<td>Liquid tank: Approx. 8.5 kg</td>
<td>Controller: Approx. 6.5 kg</td>
</tr>
<tr>
<td>Accessories</td>
<td>Power cable (2 m), DC cable, Signal cable (3 m each)</td>
<td></td>
</tr>
<tr>
<td>Safety standards</td>
<td>CE marking, UL (NRTL) standard</td>
<td></td>
</tr>
</tbody>
</table>

Note 1) GALDEN® is a trademark of Solvay Solexis and Fluorinert™ is a trademark of 3M. For other fluids, please contact SMC.

Note 2) Determined under the following conditions: water as the recirculating fluid, set temperature 25°C, facility water temperature 25°C, flow rate 3 L/min, ambient temperature 25°C, and sealed from outside air with a lid.

Note 3) Differs depending on the operating conditions.

Note 4) An appropriate range is from 3 to 5 L/min. To prevent damage to the radiating system, do not supply a flow over the maximum flow rate of 8 L/min.

Note 5) When the temperature is set high, the liquid temperature inside of the liquid tank and the temperature inside of the thermostat could differ greatly depending on the heating mode at start-up, and the Thermostat could then begin operating and stop the output. Confirm that there is no problem by carrying out an operating test beforehand.

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Peltier-Type/Thermoelectric Bath Series HEB

Cooling Capacity

Heating Capacity

Pressure Loss in Facility Water Circuit

The values shown on the performance chart are not guaranteed, but typical. Allow margins for safety when selecting the model.

Parts Description

<table>
<thead>
<tr>
<th>RUN LED</th>
<th>TROUBLE LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank</td>
<td></td>
</tr>
<tr>
<td>Display/Operation panel</td>
<td>DC connector</td>
</tr>
<tr>
<td>Signal connector</td>
<td>Facility water outlet</td>
</tr>
<tr>
<td>Facility water inlet</td>
<td>Fan</td>
</tr>
<tr>
<td>Alarm output connector</td>
<td>Communication connector</td>
</tr>
<tr>
<td>Power switch</td>
<td>Power connector</td>
</tr>
</tbody>
</table>

Technical Data

Related Products

Approved

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Series HEB

Dimensions

Liquid tank

Internal dimensions of liquid tank

Controller

Approved

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### Connectors

#### Water Bath and Controller Connection

**Nanaboshi Electric Mfg. Co., Ltd.:**
- **NJC-245-RM UL CSA**
  - DC connector (male connector)
  - Signal connector (male connector)

**Hirose Electric Co., Ltd.:**
- **CDA-15P**
  - Holding screw M2.6

#### Power Cable Connection

**Nanaboshi Electric Mfg. Co., Ltd.:**
- **NJC-245-RM UL CSA**
  - DC connector (male connector)
  - Signal connector (male connector)

**Hirose Electric Co., Ltd.:**
- **CDA-15S**
  - Female connector

#### Power cable

**Connector side**
- **IEC60320 C-14 or equivalent**
  - Male connector

**Signal cable**
- **Male connector**
  - **IEC60320 C-13 or equivalent**
  - Female connector

#### Alarm output connector

**Hirose Electric Co., Ltd.:**
- **CDE-9P**
  - Holding screw M2.6

**Fitting connector:** CDE-9S or equivalent

#### Communication connector

**Hirose Electric Co., Ltd.:**
- **CDE-9S**
  - Holding screw M2.6

**Fitting connector:** CDE-9P or equivalent

### Maintenance

Maintenance of this unit is performed only in the form of return to and repair at SMC's site. As a rule, SMC will not conduct on-site maintenance. Separately, the following parts have a limited life and need to be replaced before the life ends.

### Parts Life Expectation

<table>
<thead>
<tr>
<th>Description</th>
<th>Expected life</th>
<th>Possible failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circulating pump</td>
<td>3 to 5 years</td>
<td>The circulating fluid cannot be fed due to worn bearing and/or insufficient capacity of electrolytic capacitor, which results in temperature controlling failure.</td>
</tr>
<tr>
<td>Fan</td>
<td>5 to 10 years</td>
<td>The capacity of the fan towers due to the end of lubricating performance of the bearing, which results in increase of internal temperature of the Controller. The overheat protective function at the inside of the power supply starts, the output stops and the display goes off.</td>
</tr>
<tr>
<td>DC power supply</td>
<td>5 to 10 years</td>
<td>Abnormal voltage is generated and the display goes off due to insufficient capacity of electrolytic capacitor.</td>
</tr>
</tbody>
</table>

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Series HEB
Specific Product Precautions 1
Be sure to read this before handling. Refer to back page 1 for Safety Instructions and back pages 2 to 5 for Temperature Control Equipment Precautions.

⚠️ Warning
1. The catalog shows the specifications of the Thermoelectric Bath.
   1. Check detailed specifications in the separate “Product Specifications”, and evaluate the compatibility of the Thermoelectric Bath with customer’s system.
   2. The Thermoelectric Bath is equipped with a protective circuit independently, but the whole system should be designed by the customer to ensure safety.

⚠️ Warning
1. Thoroughly read the Operation Manual.
   Read the Operation Manual completely before operation, and keep this manual available whenever necessary.

⚠️ Warning
1. Avoid using the Thermoelectric Bath in an environment where it could be splashed by fluids (including mist) such as water, salt water, oil, chemicals, or solvents.
2. The Thermoelectric Bath is not designed for clean room usage.
   It generates dust from the pump inside the tank and the cooling fan in the controller.
3. Low molecular siloxane can damage the contact of the relay.
   Use the Thermoelectric Bath in a place free from low molecular siloxane.
4. Reserve a space of 50 mm or more at the ventilation hole of the controller.

⚠️ Caution
1. Do not use fluids other than those described in the specification.
   Otherwise, the pump will be overloaded and may break. If such a fluid is used, please contact SMC beforehand.
2. The Thermoelectric Bath must not be operated without circulating fluid.
   The pump breaks by empty driving.
3. The circulating fluid may evaporate, lowering the level in the tank.
   Significant reduction of the fluid level can break the circulating pump as well as causing the performance to deteriorate. Use with appropriate liquid level at all times.
4. The pump can be broken by foreign objects entering the circulating pump.
   Control to prevent any foreign object from entering the fluid. If the fluid is fluorinated liquid and it is set to a temperature below freezing point, steam from the atmosphere will form ice (frost) when entering the fluid. Be sure to remove this ice (frost) regularly.
5. If water is used for the circulating fluid, set its temperature to over or more 5°C to prevent it from being frozen.

⚠️ Caution
1. The maximum operating pressure of facility water is 0.5 MPa.
   If this value is exceeded, the internal piping of the tank can break, causing leakage of facility water.
2. Do not supply a flow rate of 8 L/min or more which can break the facility water piping.
3. Appropriate range of the flow rate of the facility water is 3 to 5 L/min.
   Flow rate higher than this range will not slightly affect the cooling and heating capacity. However, a flow rate below 3 L/min will reduce the cooling and heating capacity significantly.

⚠️ Caution
1. The set value can be written to EEPROM, but only up to approx. 100,000 times.
   In particular, pay attention to how many of times the writing is performed using the communication function.
Series HEB
Specific Product Precautions 2
Be sure to read this before handling. Refer to back page 1 for Safety Instructions and back pages 2 to 5 for Temperature Control Equipment Precautions.

Maintenance

⚠️ Warning

1. Prevention of electric shock and fire
   Do not operate the switch with wet hands. Also, do not operate the Thermoelectric Bath with water or fluid left on it.

2. Action in the case of error
   If any error such as abnormal sounds, smoke, or bad smell occurs, cut off the power at once, and stop supplying facility water. Please contact SMC or a sales distributor to repair the Thermoelectric Bath.

3. Regular inspection
   Check the following items at least once a month. The inspection must be done by an operator who has sufficient knowledge and experience.
   a) Check of displayed contents.
   b) Check of temperature, vibration and abnormal sounds in the body of the Thermoelectric Bath.
   c) Check of the voltage and current of the power supply system.
   d) Check for leakage and contamination of the recirculating fluid and intrusion of foreign objects to it.
   e) Check radiation air flow condition and temperature.
   f) Check for leakage, quality change, flow rate and temperature of facility water.