### Thermo-chiller Variations

<table>
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<tr>
<th>Series</th>
<th>Features</th>
<th>Cooling method</th>
<th>Temperature stability</th>
<th>Cooling capacity kW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thermo-chiller Standard type</strong>&lt;br&gt;HRS Series</td>
<td>With this chiller, cooling water can be obtained anywhere it is required because of easy installation and easy operation. For a wide range of applications, such as laser machine tools, analytical equipment, LCD manufacturing equipment, mold temperature control, etc.</td>
<td>Air-cooled/refrigeration</td>
<td>±0.1°C</td>
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</tr>
<tr>
<td><strong>Thermo-chiller Standard type</strong>&lt;br&gt;HRS-R Series</td>
<td>Compact: W 377 x H 615 x D 500 mm, 40 kg (HRS120/180/240)</td>
<td>Air-cooled/refrigeration</td>
<td>±0.5°C</td>
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<tr>
<td><strong>Thermo-chiller Standard type</strong>&lt;br&gt;HRS090 Series</td>
<td>Timer operation function, Low liquid level protection, Power failure auto-restart, Anti-freezing operation function, etc.</td>
<td>Air-cooled/refrigeration</td>
<td>±1.0°C</td>
<td></td>
</tr>
<tr>
<td><strong>Thermo-chiller Standard type</strong>&lt;br&gt;HRS100/150 Series</td>
<td>No heater is required, as the circulating fluid is heated using only the heat exhausted by the refrigerating circuit. Low-noise design: 70 dB(A) (HRS100/150)</td>
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<tr>
<td><strong>Thermo-chiller Inverter type</strong>&lt;br&gt;HRSH090 Series</td>
<td>Power consumption reduced by 53% Complete with energy-saving triple inverter!</td>
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<tr>
<td><strong>Thermo-chiller Inverter type</strong>&lt;br&gt;HRSH Series</td>
<td>Complete with energy-saving triple inverter! Outdoor installation: IPX4 Max. ambient temperature: 45°C</td>
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<td>±0.1°C</td>
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<tr>
<td><strong>Thermo-chiller Basic type</strong>&lt;br&gt;HRSE Series</td>
<td>Simple function and performance Thermo-chiller of the basic type Complete with energy-saving triple control Reduces power consumption by 33% Compact and lightweight: 32 kg (100 VAC) Maintenance-free: Magnet pump Low-noise design: 55 dB(A)</td>
<td>Air-cooled/refrigeration</td>
<td>±2.0°C</td>
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<tr>
<td><strong>Thermo-chiller Rack mount type</strong>&lt;br&gt;HRR Series</td>
<td>Mountable in a 19-inch rack Space can be saved by mounting multiple pieces of equipment together in a single rack Comes with a built-in bypass valve and particle filter as standard Built-in DI filter (option) specifications Performance and functions: Equivalent to the HRS Series</td>
<td>Air-cooled/refrigeration</td>
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<tr>
<td><strong>Dual Channel Refrigerated Thermo-chiller for Lasers</strong>&lt;br&gt;HRL Series</td>
<td>Temperatures for 2 fluid channel systems can be controlled individually by one chiller Space saving, Footprint 22% reduction Reducing wiring One power supply system for 2 channels Energy saving Power consumption reduced by 30% Touch panel</td>
<td>Air-cooled/refrigeration</td>
<td>DK1: ±0.1°C</td>
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</tr>
<tr>
<td><strong>Thermo-chiller High-performance type</strong>&lt;br&gt;HRZ Series</td>
<td>Suitable for semiconductor processing equipment with a wide variety of features, such as high-temperature stability, a wide temperature range, failure diagnosis, external communication, etc. Suits to the short innovation cycle of semiconductor equipment, Capable of responding flexibly to changes in the process conditions Compliant with various safety standards It is possible to select the inverter type Energy saving is achieved through use of a DC inverter compressor.</td>
<td>Air-cooled/refrigeration</td>
<td>±0.1°C</td>
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<tr>
<td><strong>Thermo-chiller High-performance inverter type</strong>&lt;br&gt;HRZD Series</td>
<td>Temperate in 3 systems can be controlled separately by one chiller Double inverter type: Substantially more energy is saved by using a DC inverter refrigerator and inverter pump Space saving: Footprint reduced by 23% Reduced wiring, piping, and labor: Single power cable, Single facility-water piping system</td>
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<tr>
<td><strong>Water-cooled Thermo-chiller High-performance type</strong>&lt;br&gt;HRW Series</td>
<td>Direct heat exchanger for in plant circulating fluid Can control the temperature over a wide range since a compressor is not required Suitable for semiconductor processing equipment with a wide variety of features, such as high-temperature stability, a wide temperature range, failure diagnosis, external communication, etc. It is possible to select the inverter type.</td>
<td>Water-cooled type</td>
<td>±0.3°C</td>
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### Table of Specifications

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<td>Water-cooled type</td>
<td>±0.3°C</td>
<td></td>
</tr>
<tr>
<td>Temperature range setting °C</td>
<td>Pump capacity</td>
<td>Pump type</td>
<td>Power supply</td>
<td>Circulating fluid</td>
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<td>−30</td>
<td>40 L/min</td>
<td>Magnet pump (Mechanical seal pump for high-pressure pump mounted type)</td>
<td>Single-phase 200 VAC (50 Hz) Single-phase 200 to 230 VAC (50/60 Hz)</td>
<td>Tap water Deionized water Ethylene glycol aqueous solution (15%)</td>
</tr>
<tr>
<td>−30</td>
<td>40 L/min</td>
<td>Mechanical seal pump</td>
<td>3-phase 200 VAC (60 Hz) 3-phase 380 to 415 VAC (50/60 Hz)</td>
<td>Tap water Deionized water Ethylene glycol aqueous solution (15%)</td>
</tr>
<tr>
<td>−30</td>
<td>130 L/min</td>
<td>Immersion pump</td>
<td>3-phase 380 to 415 VAC (50 Hz) 3-phase 460 to 480 VAC (60 Hz)</td>
<td>Tap water Deionized water Ethylene glycol aqueous solution (15%)</td>
</tr>
<tr>
<td>−30</td>
<td>60 L/min</td>
<td>Mechanical seal pump</td>
<td>3-phase 200 VAC (60 Hz) 3-phase 200 to 230 VAC (50/60 Hz)</td>
<td>Tap water Deionized water Ethylene glycol aqueous solution (15%)</td>
</tr>
<tr>
<td>−30</td>
<td>180 L/min</td>
<td>Immersion pump</td>
<td>3-phase 200 VAC (50 Hz) 3-phase 380 to 415 VAC (50/60 Hz) 3-phase 460 to 480 VAC (60 Hz)</td>
<td>Tap water Deionized water Ethylene glycol aqueous solution (15%)</td>
</tr>
<tr>
<td>−30</td>
<td>25 L/min</td>
<td>Magnet pump</td>
<td>Single-phase 100 VAC (50 Hz) Single-phase 200 VAC (50/60 Hz) Single-phase 230 VAC (50/60 Hz)</td>
<td>Tap water Ethylene glycol aqueous solution (15%)</td>
</tr>
<tr>
<td>−30</td>
<td>21 L/min</td>
<td>Magnet pump (Mechanical seal pump for high-pressure pump mounted type)</td>
<td>Single-phase 100 VAC (50 Hz) Single-phase 200 VAC (50/60 Hz) Single-phase 230 VAC (50/60 Hz)</td>
<td>Tap water Ethylene glycol aqueous solution (15%)</td>
</tr>
<tr>
<td>[CH1]</td>
<td>180 L/min</td>
<td>Immersion pump</td>
<td>3-phase 200 VAC (50 Hz) 3-phase 200 to 230 VAC (60 Hz)</td>
<td>Tap water Deionized water Ethylene glycol aqueous solution (15%)</td>
</tr>
<tr>
<td>[CH2]</td>
<td>16 L/min</td>
<td>Canned pump</td>
<td>3-phase 200 VAC (50 Hz) 3-phase 200 to 230 VAC (60 Hz)</td>
<td>Tap water Deionized water Ethylene glycol aqueous solution (15%)</td>
</tr>
</tbody>
</table>

For details, refer to the Web Catalog.
## Peltier-type Thermo-con Variations

<table>
<thead>
<tr>
<th>Series</th>
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<th>Cooling capacity kW</th>
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<tbody>
<tr>
<td><strong>Thermo-con Rack mount type</strong>&lt;br&gt;<strong>HECR Series</strong>&lt;br&gt;<img src="HECR.png" alt="Image" /></td>
<td>● Mountable in a 19-inch rack&lt;br&gt;Saves space by allowing multiple pieces of equipment to be mounted together in a rack.&lt;br&gt;● Learning control function&lt;br&gt;● Low vibration, Low noise&lt;br&gt;<strong>Air-cooled Peltier-type</strong>&lt;br&gt;±0.01 to 0.03°C</td>
<td></td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td><strong>Thermo-con</strong>&lt;br&gt;<strong>HEC Series</strong>&lt;br&gt;<img src="HEC.png" alt="Image" /></td>
<td>● For applications requiring high-precision temperature control&lt;br&gt;● High-precision, refrigerant-free temperature control equipment that uses a Peltier device&lt;br&gt;● Simple structure and high reliability&lt;br&gt;● Can easily be built into equipment due to its compact and low-vibration design&lt;br&gt;<strong>Air-cooled Peltier-type</strong>&lt;br&gt;±0.01 to 0.03°C</td>
<td></td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td><strong>Thermoelectric Bath</strong>&lt;br&gt;<strong>HEB Series</strong>&lt;br&gt;<img src="HEB.png" alt="Image" /></td>
<td>● High-precision temperature control bath with a Peltier device&lt;br&gt;● Compact and low noise&lt;br&gt;● Minimal up-down temperature distribution with a unique agitation method&lt;br&gt;<strong>Round type Peltier-type water-cooled</strong>&lt;br&gt;±0.01°C</td>
<td></td>
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<tr>
<td><strong>Made to Order</strong></td>
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<td>0.1</td>
</tr>
<tr>
<td><strong>Chemical Thermo-con</strong>&lt;br&gt;<strong>HED Series</strong>&lt;br&gt;<img src="HED.png" alt="Image" /></td>
<td>● Heat exchanger for direct temperature control that uses a Peltier device&lt;br&gt;● Compatible with a wide range of chemical liquids through the use of a fluororesin heat exchanger&lt;br&gt;<strong>Water-cooled Peltier-type</strong>&lt;br&gt;±0.1°C</td>
<td></td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td>Temperature range setting °C</td>
<td>Pump capacity</td>
<td>Pump type</td>
<td>Power supply</td>
<td>Circulating fluid</td>
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<td>-----------------------------</td>
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<tr>
<td>0 to 60°C</td>
<td>6 L/min</td>
<td>Magnet pump</td>
<td>Single-phase 100 to 240 VAC (50/60 Hz) 0.2 to 0.8 kW Single-phase 200 to 240 VAC (50/60 Hz) 1 kW, 1.2 kW</td>
<td>Tap water Ethylene glycol aqueous solution (20%)</td>
</tr>
<tr>
<td>0 to 60°C</td>
<td>10 L/min</td>
<td>Magnet pump</td>
<td>Single-phase 100 to 240 VAC (50/60 Hz)</td>
<td>Tap water Ethylene glycol aqueous solution (20%)</td>
</tr>
<tr>
<td>10 to 60°C</td>
<td>23 L/min</td>
<td>Magnet pump</td>
<td>Single-phase 100 to 240 VAC (50/60 Hz) 0.1 kW, 0.3 kW Single-phase 200 to 220 VAC (50/60 Hz) 0.6 kW, 1.2 kW</td>
<td>Fluorinated fluid Tap water</td>
</tr>
<tr>
<td>-15 to 60°C</td>
<td>—</td>
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<td>Single-phase 100 to 240 VAC (50/60 Hz)</td>
<td>Fluorinated fluid Tap water</td>
</tr>
<tr>
<td>0 to 60°C</td>
<td>—</td>
<td>—</td>
<td>Single-phase 200 to 220 VAC (50/60 Hz)</td>
<td>Tap water Ethylene glycol aqueous solution (50%)</td>
</tr>
</tbody>
</table>

For details, refer to the Web Catalog.

For the component descriptions:
- **Series Features Cooling**: Method, Temperature stability, Cooling capacity kW, Temperature range setting °C.
- **Mounting Type**: Rack mount type, HE series.
- **Temperature Control**: High-precision, Refrigerant-free, Simple structure, Compact and low vibration, Can easily be built into equipment.
- **Fluid Types**: Tap water, Ethylene glycol aqueous solution (20%), Fluorinated fluid, Tap water, Deionized water, Chemical liquid.
- **Environment**: Indoor use.
- **International Standards**: CE, UL (Excluding HEC006, 012).

[Diagram of pump type and capacity]
## Accessories List

### Outline

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<th>Accessories List</th>
<th>HRS</th>
<th>HRS-R</th>
<th>HRS60</th>
<th>HRS100/150</th>
<th>HRS200</th>
<th>HRS60/90</th>
<th>HRSE</th>
<th>HAR</th>
<th>HRL</th>
<th>HRZ</th>
<th>HWH</th>
<th>HECR</th>
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<td>ON/OFF control</td>
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<td>Drain pan (With water leakage sensor)</td>
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<td>Drain pan set (With water leakage sensor)</td>
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### Additional Notes

- **Standard**: Standard feature
- **Option**: Optional feature
- **Optional accessories**: Optional accessory

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<td>1 Some models</td>
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<td>2 Only when option Y is selected</td>
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<td>3 Only CH2</td>
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</table>

### Technical Details

- **Temperature Control**: With casters and adjuster feet
- **Particle filter set**: This set can be used to filter foreign matter from the circulating fluid. (Nominal filtration rating: 5 μm, 75 μm)
- **With fluid fill port**: Water can be supplied from the external fluid fill port.
- **With automatic water fill function**: By opening the user’s stopcock (for water), water can be supplied automatically via the built-in solenoid valve, ball tap, etc.
- **Anti-quake bracket**: This bracket can be used to reduce product damage in the case of an earthquake. An anchor bolt suitable for the flooring material should be prepared separately by the user.
- **With earth leakage breaker with handle**: This product comes equipped with an earth leakage breaker with handle which is compliant with international standards (safety standards).
- **Drain pan set (With water leakage sensor)**: This drain pan can be used to detect leakage before it happens. [For the HRS (1.1 to 9 kW) and HRSH (9 kW) types] Be sure to install and wire in combination with the attached water leakage sensor.
- **Particle filter set**: This filter (Filtration: 20 μm) can be used to eliminate any dust which is contained in the circulating fluid circuit.
- **With flow sensor/flow switch**: Sufficient levels of circulating fluid are necessary for retaining a stable temperature. The built-in level switch can be used to detect the liquid level in the tank and inform you of refills.
- **With automatic water fill function**: By opening the user’s stopcock (for water), water can be supplied automatically via the built-in solenoid valve, ball tap, etc.
- **Relief valve set**: This product prevents abnormal rises in circulating fluid pressure.
- **With flow sensor/flow switch**: Sufficient levels of circulating fluid are necessary for retaining a stable temperature. The built-in flow sensor and flow switch can be used to detect the flow rate, which is then displayed on the display panel. Adjustments can be made after the value has been confirmed.
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<tr>
<th>Outline</th>
<th>HRS</th>
<th>HRS-B</th>
<th>HRS090</th>
<th>HRS110/150</th>
<th>HRS200</th>
<th>HRS290</th>
<th>HRSH</th>
<th>HRS-E</th>
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* Only CH2

### Communication Functions

- **RS-232C**: The standard model can be used for one-on-one communication with a PC, etc. Refer to the separate Operation Manual (Communication function) for more details.
- **RS-485**: The standard model can be used to communicate with the master computer together with other terminal devices. Refer to the separate Operation Manual (Communication function) for more details.
- **Analog communication**: A method of communicating with external devices using voltage output (0 to 10 V). This enables the output of PV values (measured temperature, etc.) and the reception of SV values (set temperature, etc.).
- **DeviceNet communication**: This product has a communication function (With DeviceNet communication function) which allows for the use of open networks owned by Open DeviceNet Vendor Association, Inc.
- **Digital I/O (Contact input/output)**: Input and output signals such as alarm signals, operation signals, etc. can be retrieved by the user's sequence control device. Refer to the separate Operation Manual (Communication function) for more details.
- **With external switch inlet**: This product comes equipped with an input terminal for the retrieval of the user's sequence control ON/OFF signals (external switch).

### For Special Applications

- **Applicable to deionized water piping**: Easy-to-dissolve copper type materials are not used for the wetted parts of the circulating fluid circuit. Select this when using the deionized water with a conductivity of 1 mS/cm or more (1 μS/cm or less).
- **High-pressure pump mounted**: A built-in pump with a high lifting height (discharge pressure) is used. Consider the piping resistance of the user's equipment and check beforehand whether the required flow can be provided by the product.
- **High-temperature environment specification**: This product makes use at ambient temperatures of up to 45°C possible.
- **DI control kit/Electric resistance control set**: This product can be used to display, maintain, and control the electric resistivity of the circulating fluid (deionized water). The function differs according to the model. Refer to the Operation Manual for details.
- **Electric conductivity control set**: This set can be used to display and control the electric conductivity of the circulating fluid.
- **DI filter set**: It is possible to retain the level of electric resistance by flowing the circulating fluid through the ion replacement resin (DI filter).
- **Insulating material for DI filter**: Insulating the DI filter helps prevent reduced cooling capacity due to condensation and reduced heating capacity due to radiation.
- **Bypass piping set**: Sufficient levels of circulating fluid are necessary for retaining a stable temperature. If the levels are insufficient, open this bypass piping to secure the flow rate.
- **Separately-installed power transformer**: Installing this transformer where the user's power voltage differs will allow for the conversion of the current.
- **Snow protection hood**: This is a stainless steel snow protection hood for air-cooled chillers. According to the mounting direction of the snow protection hood, four ventilation directions—front, rear, left, and right—can be selected.
- **4-port manifold**: 4-branching the circulating fluid allows for a maximum of 4 temperature controls with 1 thermo-chiller unit.

### Circulating Fluid

- **60% ethylene glycol aqueous solution**: The ethylene glycol type circulating fluid can be used as is. The fluid can be used even when diluted to 15%.
- **Ethylene glycol aqueous solution concentration meter**: This meter can be used to control the condensation of ethylene glycol solution regularly.

---

**: Standard  ◇: Option  ★: Optional accessories**
SMC’s Unique Chiller Control
A Challenge to Downsizing

Temperature stability $\pm 0.1^\circ$C / Compact

A precision temperature control method which utilizes expansion valves and temperature sensors allowed for the realization of a product with a high temperature stability of $\pm 0.1^\circ$C and a small-size tank.

**Refrigeration circuit**
- The compressor compresses the refrigerant gas and discharges high-temperature, high-pressure refrigerant gas.
- In the case of air-cooled refrigeration, the high-temperature, high-pressure refrigerant gas is cooled down by fan ventilation in the air-cooled condenser, where it is then liquefied. In the case of water-cooled refrigeration, the refrigerant gas is cooled by the facility water in the facility water circuit in the water-cooled condenser, where it is then liquefied.
- The liquefied high-pressure refrigerant gas expands and its temperature lowers when it passes through expansion valve A, where it vaporizes after receiving heat from the circulating fluid in the evaporator.
- The vaporized refrigerant gas is sucked into the compressor and compressed again.
- When heating the circulating fluid, the high-pressure, high-temperature refrigerant gas is bypassed into the evaporator by expansion valve B to heat the circulating fluid.

**Point** The combination of the precise control of expansion valve A for cooling and expansion valve B for heating allows for high temperature stability.

**Circulating fluid circuit**
- After the circulating fluid discharged from the pump is heated or cooled by the user’s equipment, it returns to the thermo-chiller.
- The circulating fluid is controlled to remain at a set temperature by the refrigeration circuit. It will then be discharged to the user’s equipment side again by the thermo-chiller.

**Point** Since the refrigeration circuit is controlled by the signals from 2 temperature sensors (for return and discharge), precise temperature control of the circulating fluid can be achieved. Therefore, there is no need for a tank with a large capacity to absorb the circulating fluid temperature difference, as high temperature stability can be achieved even with a small-size tank. This also contributes to space saving.

**Facility water circuit**
- For water-cooled refrigeration HRS-W-
  - The water-regulating valve opens and closes to keep the refrigerant gas pressure consistent. The facility water flow rate is controlled by the water-regulating valve.
5 Advantages of SMC Thermo-chillers

**HRS/HRSH/HRR Series**

### 1. Lightweight, Compact

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<tr>
<th>Model</th>
<th>Size (mm)</th>
<th>Weight</th>
<th>Cooling capacity (60Hz)</th>
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<td>W 377 x H 615 x D 500</td>
<td>40 kg</td>
<td>1300 W</td>
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<td>HRS018</td>
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<td>1900 W</td>
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<td>HRS024</td>
<td>W 377 x H 676 x D 592</td>
<td>53 kg</td>
<td>2400 W</td>
</tr>
<tr>
<td>HRS030</td>
<td>W 377 x H 976 x D 592</td>
<td>69 kg</td>
<td>3200 W</td>
</tr>
<tr>
<td>HRS040</td>
<td>W 377 x H 1080 x D 970</td>
<td>73 kg</td>
<td>4200 W</td>
</tr>
<tr>
<td>HRS050</td>
<td>W 377 x H 976 x D 592</td>
<td></td>
<td>5100 W</td>
</tr>
<tr>
<td>HRS060</td>
<td>W 377 x H 1080 x D 970</td>
<td>136 kg</td>
<td>5900 W</td>
</tr>
<tr>
<td>HRS090</td>
<td></td>
<td></td>
<td>9000 W</td>
</tr>
</tbody>
</table>

**Same width for all models: 377 mm**

### Rack Mount Type **HRR Series**

- Height: 305 mm shorter
- Volume: 28% reduction

- **HRR012**
  - Height: 305 mm
  - Volume: 28% reduction

- **HRS012**
  - Height: 305 mm
  - Volume: 28% reduction
2 Energy Saving

Triple inverter
The inverter respectively controls the number of motor rotations of the compressor, fan and pump depending on the load from the user’s equipment.

Inverter pump
Power reducing effect of the inverter pump

<table>
<thead>
<tr>
<th>Non-inverter chiller</th>
<th>Pump/1.1 kW</th>
<th>Compressor + Fan + Others/4 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inverter pump</td>
<td>Pump/0.6 kW</td>
<td>Compressor + Fan + Others/1.8 kW</td>
</tr>
</tbody>
</table>

Operating ratio: Ratio of 9.5 kW (with heat load) to 0 kW (without heat load) Operating ratio: 50%, with heat load of 9.5 kW all the time

Common conditions for non-inverter and triple inverter:
- Ambient temperature: 32°C
- Circulating fluid temperature: 20°C
- Circulating fluid flow rate: 35 L/min at 0.3 MPa (60 Hz)
- Heat load: 9.5 kW

Conditions for non-inverter chiller: Continuous operation of the compressor which can cool down 9.5 kW at 60 Hz. The pump shall be same as that of the HRSH.

Inverter
Power consumption reduced by 53% compared with a non-inverter (HRS090)

With the inverter, it is possible to operate with the same performance even with the power supply of 50 Hz.

Circulating fluid pressure adjustable
Discharge pressure of the circulating fluid can be set with the operation panel. The inverter pump automatically controls the discharge pressure to the set pressure without adjusting the bypass piping¹ under various piping conditions. Power consumption can be reduced by this control.

(1) Bypass piping is required depending on the flow rate.

When the product is used with the flow path switched for maintenance, the pressure adjusting function controls the discharge pressure to be stable. (Secure the specified minimum flow for each branch circuit.)
3 Heating Function

Circulating fluid can be heated without a heater.

The heating method, which uses discharged heat, makes a heater unnecessary.

- Ambient temperature: 5°C
- Power supply: 200 V 60 Hz
- Circulating fluid flow rate: 125 L/min at 0.5 MPa
- External piping: Bypass piping

Power supply (24 VDC) available

Power can be supplied from the terminal block on the rear side to external switches, etc.

Outdoor installation IPX4

IP (International Protection) is the industrial standard for “Degrees of protection provided by outer defensive enclosures of electric equipment (IP Code)” according to IEC 60529 and JIS C 0920.

IPX4: No harmful influence by water splash is acceptable from every direction.

Protection of the electrical unit: IP54

The board and electric parts are located inside the electrical box, where they can be protected from dust particles and water splashing.
4 Easier Maintenance

Easy maintenance with the check display of the operation panel

Alarm codes can be used for the notification of upcoming recommended maintenance. The codes notify you when it’s time to check the pump and fan. Helpful for facility maintenance.

Check display
The internal temperature, pressure, and operating time of the product are displayed.

Applicable models
Standard type/ HRS012 to 060
Standard type/ HRS-R
Standard type/ HRS090
Standard type/ HRS100/150
Inverter type/ HRSH090
Inverter type/ HRSH100 to 300

Reduced maintenance hours for the pump
A mechanical sealless immersion pump is used.
As the pump has no external leakage of the circulating fluid, a periodic check of the pump leakage and replacement of the mechanical seal are not necessary. There is no need to exhaust the circulating fluid when removing the pump.

5 Global Compatibility

No transformers required
(Europe, Asia, Oceania, Central and South America)

 Transformers are not required even when used overseas.

Applicable models
Standard type/ HRS012 to 060
Standard type/ HRS-R
Standard type/ HRS090
Standard type/ HRS100/150
Inverter type/ HRSH090
Inverter type/ HRSH100 to 300
Basic type/ HRSE
Rack mount type/ HRR

Conforming to international standards

* Refer to the variations table.
High-performance Type HRZ/HRZD/HRW Series

- Dual Thermo-chiller can control temperature for two systems separately by one chiller. Energy saving thanks to reduced wiring, piping and labor, and double inverter type.
- Temperature stability: ±0.1°C, temperature range from –20°C to +90°C. Full array of features and equipment.
- A double inverter type is also available, saving energy more effectively through use of a DC inverter compressor and an inverter pump.
- Circulating fluid: Fluorinated fluid, Ethylene glycol aqueous solution 60%, Tap water/Deionized water
- Water-cooled type: Refrigerant-free and energy saving type using no compressor (HRW)

Dual Channel Refrigerated Thermo-chiller for Lasers HRL Series

- Temperatures for 2 fluid channel systems can be controlled individually by one chiller.
- Temperature stability: ±0.01 to 0.03°C
- Temperature distribution in the bath: ±0.02°C
- Accurately controls the temperature of liquid in the bath.
- Temperature stability: ±0.01°C
- Temperature distribution in the bath: ±0.02°C

Peltier-type Thermo-con Lineup

Thermo-con HECR/HEC Series
- Temperature stability: ±0.01 to 0.03°C
- Rack mount type HECR Series

Chemical Thermo-con HED Series
- A fluoro resin heat exchanger allows for the direct temperature control of chemical liquids.
- Industry-leading withstand pressure: 0.35 MPa

Thermoelectric Bath HEB Series
- Accurately controls the temperature of liquid in the bath.
- Temperature stability: ±0.01°C
- Temperature distribution in the bath: ±0.02°C

This equipment precisely controls the temperature of the fluid in the constant temperature tank. Users can control the temperature by placing a container in the tank.

INR
Made to Order
Temperature Control Equipment: Applications According to Industry

**Applications**

**Semiconductor**

**Etching**
- HEC p. 440
- HECR p. 414
- HRZ p. 344
- HRW p. 384

**CMP**
- HEC p. 440
- HECR p. 414
- HED p. 486
- HRZ p. 344
- HRW p. 384

**Coater/Developer**
- HEC p. 440
- HECR p. 414
- HRZ p. 344
- HRW p. 384

**Testers**
- HRS p. 24
- HRW p. 384
- HRZH p. 222
- HRZ p. 344
- HRR p. 282

**Cleaning machines**
- Temperature control of cleaning solution
- HEC p. 440
- HECR p. 414
- HED p. 486
- HRS p. 24
- HRSH p. 222

**Gas cylinder cabinets**
- HRS p. 24
- HRSH p. 222

**Cleaning machines (Hydrocarbon-based)**
- HED p. 486

**Cooling of vacuum pumps**
- HRS p. 24
- HRSH p. 222

**Temperature control of chamber electrode**
- CH1
- Dual Thermo-chiller
- CH2
## Temperature Control Equipment: Applications According to Industry

### Applications

#### Laser

**Laser beam machines/Laser welding machines**
- Cooling of the laser oscillation part and power source
- Laser oscillator

**Transmission cable connector for fiber laser**

**Laser marker**
- Cooling of the laser irradiated part
- Secondary battery manufacturing processes
- Laser welding and cutting

**3D metal printers**

**Machining centers**
- Cooling of the spindle

**Injection molding**

### Machine Tools
Temperature Control Equipment: Applications According to Industry

### Applications

#### Welding Machines

**Arc welding machines**

Cooling of the torch

- HRS p.24
- HR p.282

**Resistance welding machines**

(spot welding)

Cooling of the welding head electrodes, transformers and transistors (thyristors)

- HRS p.24
- HRSH p.222
- HRR p.282

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**High-frequency induction heating equipment**

Cooling of the heating coils, high-frequency power source and around inverters

- HRS p.24
- HRSH p.222
- HRR p.282

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#### Food Products/Packaging Machines

**Packaging lines (sealing of film and paper package)**

Cooling of workpieces for bonding

- HRS p.24
- HRSH p.222
- HRR p.282

**Atomizing devices (food and cosmetics)**

Temperature control of sample and device

- HEC p.440
- HECR p.414
- HRS p.24
- HRSH p.222
- HRR p.282

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#### Medical

**X-ray (digital) instrument**

Temperature control of the X-ray tube and X-ray light sensing part

- HEC p.440
- HECR p.414
- HRS p.24
- HRSH p.222
- HRR p.282

**MRI**

- HRS p.24
- HRR p.282

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#### Physical and Chemical

**Temperature control of adhesive and paint materials**

- HEC p.440
- HECR p.414
- HEBR p.474
- HRS p.24
- HRSH p.222
- HRR p.282

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#### Printing

**Printing machines**

Temperature control of the roller

- HRS p.24
- HRSH p.222
- HRR p.282
### Circulating Fluid/Facility Water Line Equipment

#### Circulating Fluid Line

- **Terminal block**
- **Power supply (24 VDC) available**
- **Particle Filter**
  - Circulating fluid return port
  - Y-strainer
  - Bypass valve
  - Flow Switch
  - Pressure Switch
  - Fittings and Tubing
  - User’s equipment

#### Facility Water Line (Water-cooled)

- **Terminal block**
- **Power supply (24 VDC) available**
- **Pressure Switch**
  - Facility water outlet
  - Facility water inlet
  - Flow Switch
  - Pressure Switch
  - Fittings and Tubing
  - User’s equipment
  - For the control of pressure and flow rate: The digital display makes these aspects visible.

### Flow Switch: Monitors the flow rate and temperature of the circulating fluid and facility water

- **3-Color Display Digital Flow Switch for Water**
  - PF3W

- **3-Color Display Electromagnetic Digital Flow Switch**
  - LFE

- **Digital Flow Switch for Deionized Water and Chemical Liquids**
  - PF2D

- **4-Channel Flow Monitor**
  - PF2D 200

### Pressure Switch: Monitors the pressure of the circulating fluid and facility water

- **2-Color Display High-Precision Digital Pressure Switch**
  - ISE80

- **Pressure Sensor for General Fluids**
  - PSE56

- **Pressure Sensor Controller**
  - PSE200A, 300A, 300AC

### Particle Filter

- **User’s equipment**

### Fittings

- **S Coupler**
  - KK

- **Metal One-touch Fittings**
  - KQB2

- **Stainless Steel 316 Insert Fittings**
  - KFG2

- **S Coupler/Stainless Steel (Stainless Steel 304)**
  - KKA

- **Stainless Steel 316 One-touch Fittings**
  - KQG2

- **Fluoropolymer Fittings**
  - LQ

### Tubing

- **Series**
- **Material**
  - T: Nylon
  - TU: Polyurethane
  - TH: FEP (Fluoropolymer)
  - TD: Modified PTFE (Soft fluoropolymer)
  - TL: Super PFA
  - TLM: PFA

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By SMC
Global Maintenance Network

Quick, careful response to customers’ needs is possible thanks to a solid inventory of maintenance parts and an experienced chiller support team capable of conducting repairs and replacements. As SMC’s high-quality services are available to customers all over the world, you can rest assured that you’ll have our continued support long after purchase.

* The names of countries and regions listed in each area are alphabetically indexed.