Temperature Control Equipment

Count on SMC for all your temperature control needs.

Chillers are products that control the temperature of heat sources in customers’ devices and equipment using temperature-controlled circulating fluid. Maintaining a fixed temperature can improve the quality, reliability and service life of devices or equipment.

Makes cooling water easily available, anytime, anywhere.

When... There is no cooling tower. Tap water is being used.

Even without a cooling tower, an air-cooled refrigerated chiller can be used to easily supply cooling water.

Less tap water used!

Dripping stops

When... There is a cooling tower, but high temperatures in summer or low (freezing) temperatures in winter make cooling water temperatures unstable.

Cooling water at a consistent temperature can be supplied regardless of the season.

When... Equipment is to be used in a laboratory or other small space.

Compact types that can be installed under or on top of desks, etc., are available. Use for physical, chemical, and analytical equipment, etc.

Can be used not only for cooling, but also for heating applications (max. 90°C)

Chillers are products that control the temperature of heat sources in customers’ devices and equipment using temperature-controlled circulating fluid. Maintaining a fixed temperature can improve the quality, reliability and service life of devices or equipment.

Thermo-cooler

Thermo-chiller

Thermo-con

Thermo-electric Bath

Chemical Thermo-con

Semi-conductors

Machine tools

Food products

Measuring devices

Physical and chemical/analytical equipment

Medical/Pharmaceutical etc.
A Chiller is equipment to control temperature of customers’ heating sources.

Chillers control fluid, such as water, and circulate the fluid to customers’ machine using a pump by controlling the output from a cooling source such as a compressor, or a heating source such as a heater. That’s why this equipment can be also called a circulator.

**Application Examples**

**Laser machining**
- Cooling of laser irradiated part

**UV curing device** (printing, painting, bonding and sealing)
- Cooling of UV lamp

**X-ray (digital) instrument**
- Temperature control of X-ray tube and X-ray light sensing part

**Electronic microscope**
- Temperature control of electron-beam irradiated part

**Laser marker**
- Cooling of laser irradiated part

**Ultra sonic wave inspection machine**
- Temperature control of ultrasonic wave laser part

**Atomizing device** (food and cosmetics)
- Temperature control of sample and device

**Linear motor**
- Temperature control of moving coil

**Packaging line** (sealing of film and paper package)
- Cooling of work pieces for bonding

**Cooling of die**
- Cooling water

**Temperature control of paint material**
- Circulating fluid

**Cooling of vacuum pump**
- Vacuum pump

**Shrink fitting machine**
- Cooling of work pieces

**Gas cylinder cabinet**
- Temperature control inside cabinet

**Concentrating equipment**
- Temperature control of concentration fluid

**Reagent cooling equipment**
- Temperature control of reagent

**Cleaning tank**
- Temperature control of cleaning tank

**Temperature control of chamber electrode**
- Dual Thermo-chiller

---

**What’s a Chiller?**

Here are some of the places chillers are used!!
Three types of cooling and heating methods (refrigerated, water-cooled, Peltier-type) can be selected for a wide range of applications.

**Refrigerated**

- Cooling capacity from 1 kW to 15 kW. For a wide range of applications
- Generates low temperatures using a refrigeration cycle.

This equipment cools the circulating fluid by performing heat exchange with low-temperature refrigerant gas, using a built-in refrigeration circuit that circulates refrigerant. Large-scale heat exchange can be handled compared with the Peltier type. There are two types of heating sources: high-temperature refrigerant gas, which is generated from the refrigeration circuit, and an electric heater. Both air-cooled and water-cooled types are available, depending on the condenser’s cooling method.

**Economy type HRG**
- Makes cooling water easily available, anytime, anywhere.
- As a replacement for a cooling tower
- Pump capacity: Max. 62 L/min

**Compact type HRS**
- Installation close to a wall is possible on both sides.

Installing extra cooling towers can be troublesome. The HRG series (air-cooled refrigeration) can be moved easily to wherever you need it, when you need it. Cooling water is supplied from the attached hose.

**High-performance type HRZ/HRZD**
- Dual Thermo-chiller, HRZD series can control temperature for two systems separately by one chiller.
- Energy-saving thanks to reduced wiring, piping and labor, and double inverter type.
- Temperature control of chamber electrode

**Space-saving**
- Footprint reduced by 23%

**HRZ010 2 units**

**HRZD020 1 unit**

**HRG**
- Makes cooling water easily available, anytime, anywhere.
- As a replacement for a cooling tower

**HRS**
- Installation close to a wall is possible on both sides.

**HRZ/HRZD**
- Dual Thermo-chiller, HRZD series can control temperature for two systems separately by one chiller.
- Energy-saving thanks to reduced wiring, piping and labor, and double inverter type.
- Temperature control of chamber electrode

**Economy type HRG**

- Makes cooling water easily available, anytime, anywhere.
- As a replacement for a cooling tower

**Compact type HRS**

- Installation close to a wall is possible on both sides.

Installing extra cooling towers can be troublesome. The HRG series (air-cooled refrigeration) can be moved easily to wherever you need it, when you need it. Cooling water is supplied from the attached hose.

**High-performance type HRZ/HRZD**

- Dual Thermo-chiller, HRZD series can control temperature for two systems separately by one chiller.
- Energy-saving thanks to reduced wiring, piping and labor, and double inverter type.
- Temperature control of chamber electrode
**Heat exchanger for cooling circulating fluid**

In-plant cooling water circulation facility such as cooling tower, etc. This equipment cools the circulating fluid by directly exchanging it with the cooling water in the plant. This can be used at room temperature or higher, and also used when there is a cooling water circulation facility. Large-scale heat exchange can be performed using less energy, and the device has a compact body since a compressor is not required. An electric heater is used for heating.

---

**Peltier device**

A Peltier device is a plate type element, inside which P-type semiconductors and N-type semiconductors are located alternately. Therefore, changing the direction of the current supplied to the Peltier device can achieve heating and cooling operation. Temperature can be controlled very precisely because this method has a fast response and can switch quickly.
Thermoelectric Bath

Accurately controls the temperature of liquid in the bath.
Temperature stability: ±0.01°C
Temperature distribution in the bath: ±0.02°C

Application Examples

- **Semiconductor**
  Evaporation of chemicals for MOCVD, temperature control of diffusion gas

- **Various tests**
  Thermal test with immersion

- **Physical and chemical analysis**
  Temperature control of various samples, materials and parts

- **Various chemical processes**
  Indirect temperature control of chemicals and liquids with high viscosity

Chemical Thermo-con

Fluororesin heat exchanger allows direct temperature control for chemicals!!
Industry-leading withstand pressure 0.35 MPa!!
Temperature range

For a wide range of applications such as mold installation and easy operation.

For a wide range of applications such as laser machine tool, analytical equipment, LCD manufacturing equipment, mold temperature control, etc.

For a wide range of applications such as mold temperature control, laser machine tool, analytical equipment, LCD manufacturing equipment, etc.

Ideal for export equipment (single-phase 200 to 230 V)

Max. cooling capacity

15 kW

5 kW

5 kW

5 kW

5 kW

15 kW

10 kW

9.5 kW x 2

30 kW

600 W

1.2 kW

140 W

750 W

Air-cooled refrigeration, Water-cooled refrigeration

Air-cooled refrigeration, Water-cooled refrigeration

Air-cooled refrigeration, Water-cooled refrigeration

Water-cooled refrigeration

Water-cooled refrigeration

Water-cooled refrigeration

Water-cooled refrigeration

Water-cooled refrigeration

Water-cooled refrigeration

±0.01°C

±0.01°C

±0.01°C

±0.1°C

±0.3°C

±0.01°C

±0.01°C

±0.01°C

±0.5°C

±0.1°C

±0.1°C

±0.1°C

±0.1°C

±0.1°C

±0.5°C

±0.1°C

±0.1°C

±0.1°C

5 to 62 L/min

5 to 62 L/min

5 to 60 L/min

6 to 40 L/min

6 to 40 L/min

6 to 40 L/min

6 to 40 L/min

10 to 40 L/min

10 to 40 L/min

10 to 40 L/min

5 to 10 L/min

1 to 10 L/min

3 to 23 L/min

—

—

1 to 10 L/min

3 to 23 L/min

—

—

Clear water, Deionized water, Ethylene glycol aqueous solution

Clear water, Deionized water, Ethylene glycol aqueous solution

Clear water, Deionized water, Ethylene glycol aqueous solution

Clear water, Deionized water, Ethylene glycol aqueous solution

Clear water, Deionized water, Ethylene glycol aqueous solution

Clear water, Deionized water, Ethylene glycol aqueous solution

Clear water, Deionized water, Ethylene glycol aqueous solution

Clear water, Deionized water, Ethylene glycol aqueous solution

Clear water, Deionized water, Ethylene glycol aqueous solution

Clear water, Deionized water, Ethylene glycol aqueous solution

Flexible refrigeration, Air-cooled / Without compressor

Flexible refrigeration, Air-cooled / Without compressor

Flexible refrigeration, Air-cooled / Without compressor

Flexible refrigeration, Air-cooled / Without compressor

Flexible refrigeration, Air-cooled / Without compressor

Flexible refrigeration, Air-cooled / Without compressor

Flexible refrigeration, Air-cooled / Without compressor

Flexible refrigeration, Air-cooled / Without compressor

Flexible refrigeration, Air-cooled / Without compressor

Flexible refrigeration, Air-cooled / Without compressor

Flexible refrigeration, Air-cooled / Without compressor

Flexible refrigeration, Air-cooled / Without compressor
### Pressure Switch

**2-Color Display**
- High-Precision Digital Pressure Switch **ISE80**
  - Stainless diaphragm
  - IP65
  - VCR®, Swagelok® compatible fittings can be selected.

**Pressure Sensor for General Fluid** **PSE56**
- Wetted parts: Stainless steel 316L
- IP65
- VCR®, Swagelok® compatible fittings can be selected.

### Industrial Filter

**Quick Change Filter** **FQ1**
- Port size: Rc1/2, 3/4, 1
- Filtration flow rate: Max. 30 L/min
- No tools required
- Takes only 60 seconds for element replacement.

**Industrial Filter Series** **FGD**
- Port size: Rc3/8, 1/2, 3/4
- Filtration flow rate: Max. 60 L/min
- HEPO element, Membrane element

### Flow Switch

**Digital Flow Switch for Water** **PF3W**
- Integrated with temperature sensor
  - Set flow rate range (L/min): 0.5 to 4, 2 to 16, 5 to 40, 10 to 100
  - Three-color display, two-screen display
  - IP65 compliant
  - Grease-free

**Digital Flow Switch for Deionized Water and Chemicals** **PF2D**
- 4-Channel Flow Monitor **PF2□200**
  - Set flow rate range (L/min): 0.4 to 4, 1.8 to 20, 4.0 to 40
  - Material
    - Body sensor: New PFA
    - Tube: Super PFA

### Fittings and Tubing

**S Coupler** **KK**
- Applicable tube O.D.: ø3.2 to ø16
- Port size: M5 to 25A (3/4)

**S Coupler/Stainless Steel (Stainless Steel 304) KKA**
- Port size: 6A to 50A (1/8 to 11/2)

**Stainless Steel 316 One-touch Fittings** **KQG2**
- Applicable tube O.D.: ø3.2 to ø16

**Stainless Steel 316 Insert Fittings** **KFG2**
- Applicable tube O.D.: ø4 to ø16

**Metal One-touch Fittings** **KQB2**
- Applicable tube O.D.: ø3 to ø25

**Fluoropolymer Fittings** **LQ**
- Applicable tube O.D.: ø3 to ø25

<table>
<thead>
<tr>
<th>Series</th>
<th>Material</th>
<th>O.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>Nylon</td>
<td>ø4 to ø16</td>
</tr>
<tr>
<td>TU</td>
<td>Polyurethane</td>
<td>ø4 to ø16</td>
</tr>
<tr>
<td>TH</td>
<td>FEP (fluoropolymer)</td>
<td>ø4 to ø12</td>
</tr>
<tr>
<td>TD</td>
<td>Modified PTFE (soft fluoropolymer)</td>
<td>ø4 to ø12</td>
</tr>
<tr>
<td>TL</td>
<td>Super PFA</td>
<td>ø4 to ø19</td>
</tr>
</tbody>
</table>

### Specifications

- **SMC Corporation**
  - Akihabara UDX 15F, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, JAPAN
  - Phone: 03-5207-8249  Fax: 03-5296-5362
  - http://www.smcworld.com
  - © 2011 SMC Corporation  All Rights Reserved

*Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.*