

High precision temperature control for every industry

# Temperature Control Equipment



# SMC Temperature Control Equipment

As a total pneumatic equipment manufacturer, SMC supplies products to a wide range of industries against a backdrop of increasing automation across the industrial sector.

We have grown to be a global company with the leading market share.

The global market we built up through sales of our pneumatic equipment has yielded customers with increasingly diverse demands. This prompted us to begin developing temperature control equipment for the semiconductor and medical industry in 1978.

In the more than 40 years since then, we have supplied the market with products tailored to quality, ease of use, energy efficiency, reliability and more.

We have further extended the core technologies developed in the course of manufacturing products for the healthcare and semiconductor industries, and now develop temperature control equipment suited to a vast array of applications.

Based on globally-oriented design principles, we are now delivering high-quality products to clients all over the world that are tailored to their local power supplies and environmental standards.

Using the global network we have built, we at SMC will continue to supply advanced technologies and services that make a positive contribution to industrial growth.

*SINCE*  
**1978**

Demand for temperature control products in the healthcare and semiconductor industries

Core technologies developed in the course of meeting this demand

Quality award winner Quality recognized by customers in the healthcare industry

High quality  
Maintaining high production/operation rates

Durable technology in components

Systems design techniques

High precision (temperature accuracy)  
Detailed machining accuracy

Refrigerant circuit control technology

Compact  
Reduced footprints in clean rooms

Compact design techniques

Energy saving

Power consumption reduction techniques

Reduced environmental impact

Regulatory compliance (RoHS, etc.)  
Low environmental impact refrigerant technology

Globally compatible

Compliance with overseas safety regulations  
Technology compatible with differing power supply voltages



Global market  
share

**37%**

Japan market  
share

**65%**

Countries/  
regions: **83**

Local service  
locations: **560**

Countries/regions  
with production facilities: **30**

Employees: **19,746**

## Company Profile

Company name	SMC Corporation
Head Office	Akihabara UDX 15F, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, JAPAN
Established	27 April 1959
Stock exchange listing	Tokyo Stock Exchange, first section
Capital stock	61 billion yen
Net sales	576.9 billion yen (consolidated)*
Net income	130.6 billion yen (consolidated)*
Number of employees	19,746 (consolidated)*
Equity ratio	89.3%*
Rating	AA [R&I (Rating and Investment Information, Inc.)]*
Purpose of business	Manufacture, processing and sales of automatic control equipment Manufacture and sales of sintered filters and various types of filtration equipment

\* As of end of March 2019

# 2019

## Technology Succession

Development of technology for  
temperature control products for  
general industry

High  
quality

High  
precision

Compact

Energy  
saving

Globally  
compatible



# 40 years of progress



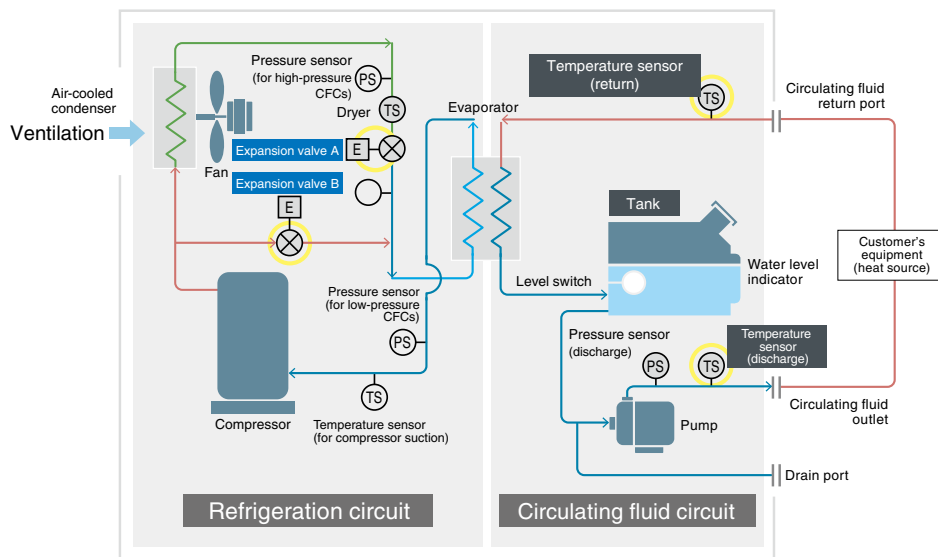
# Meeting the challenges of high precision, compactness and energy efficiency

SMC original chiller control is made possible by technology built up over many years, and this experience and technology underpins achievements such as high-precision temperature stability as well as our pursuit of compactness, space-savings and lower power costs.

Our extensive product range caters to a wide range of industries and machine types.

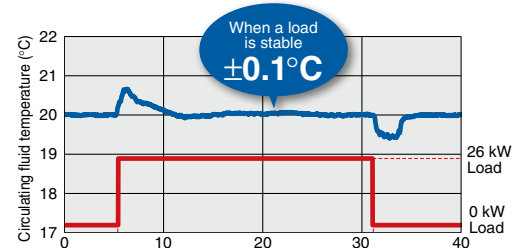
## High precision Compact

Control technology offering temperature stability of  $\pm 0.1^\circ\text{C}$



**Point** A combination of precise control in expansion valve A for cooling and expansion valve B for heating yields excellent temperature stability.

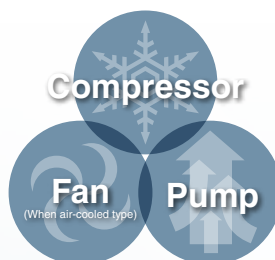
**Point** Since the refrigeration circuit is controlled by the signals from 2 temperature sensors (for return and discharge), precise temperature control of the circulating fluid can be achieved. Therefore, there is no need for a tank with a large capacity to absorb the circulating fluid temperature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



## Energy Saving, Reducing Power Consumption

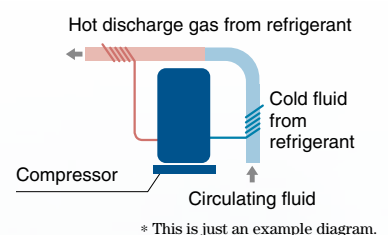
### Triple inverter control technology

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



### Circulating fluid can be heated without a heater.

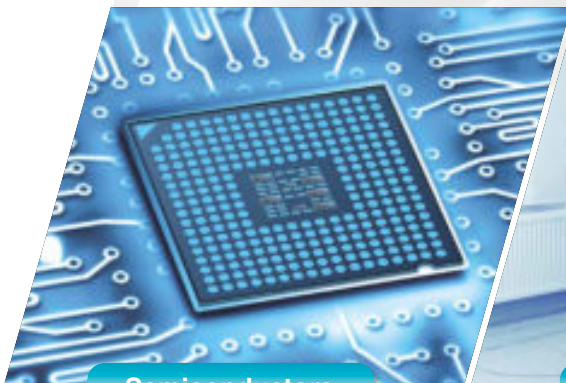
Hot discharge gas from refrigerant is recycled for heating. No heater is required, which helps to save energy.



### Product Lines

General Purpose			Refrigeration type	High Performance		
<ul style="list-style-type: none"> <li>Cooling capacity 1.3 to 28 kW</li> <li>Temperature stability <math>\pm 0.1^\circ\text{C}</math> to <math>\pm 2.0^\circ\text{C}</math></li> <li>Set temperature range 5 to 35/40<math>^\circ\text{C}</math></li> <li>Air/water-cooled refrigeration type</li> </ul>			<ul style="list-style-type: none"> <li>Cooling capacity 1 to 10 kW</li> <li>Temperature stability <math>\pm 0.1^\circ\text{C}</math></li> <li>Set temperature range -20<math>^\circ\text{C}</math> to 90<math>^\circ\text{C}</math></li> <li>Water-cooled refrigeration type</li> </ul>			
Thermo-chillers	Rack mount		Dual type	Thermo-chillers	Dual	
HRSE/HRSH	type HRR		HRL	HRZ	thermo-chillers	

## Catering to a wide range of industries and equipment



Semiconductors



Medical



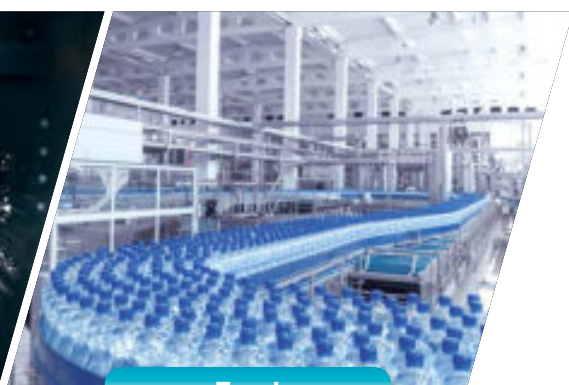
Lasers



Welding



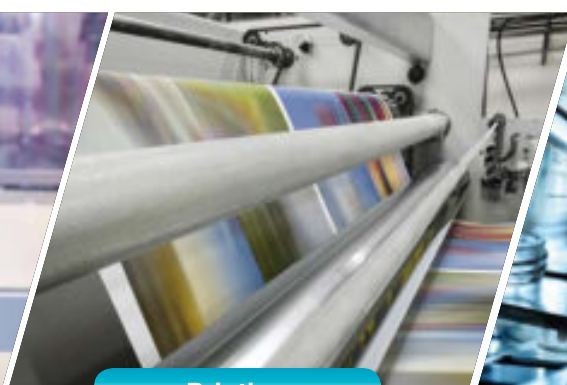
Machine tool



Food



FPD



Printing



Physical and Chemical

### Water-cooled type

#### Refrigerant-free type

- Cooling capacity  
2 to 30 kW
- Temperature stability  
 $\pm 0.3^{\circ}\text{C}$
- Set temperature range  
 $20^{\circ}\text{C}$  to  $90^{\circ}\text{C}$

Thermo-chillers  
HRW



### Peltier type

#### High precision

- Cooling capacity  
140 to 1200 W
- Temperature stability  
 $\pm 0.01^{\circ}\text{C}$  to  $\pm 0.03^{\circ}\text{C}$
- Set temperature range  
 $10^{\circ}\text{C}$  to  $60^{\circ}\text{C}$

Thermo-con  
HEC/HECR



#### Direct control of chemical liquid temperature

- Cooling capacity  
300 to 750 W
- Temperature stability  
 $\pm 0.1^{\circ}\text{C}$
- Set temperature range  
 $-10^{\circ}\text{C}$  to  $60^{\circ}\text{C}$

Chemical thermo-con  
HED





# Technology Development Capability to Meet Customers' Needs

With "Customer First" as our motto, we are working to create highly reliable products through wide-ranging technology development from component parts upwards. This development includes improving performance, quality and endurance, high functionality, multi-functionality, compactness, new refrigerants and compliance with international standards.

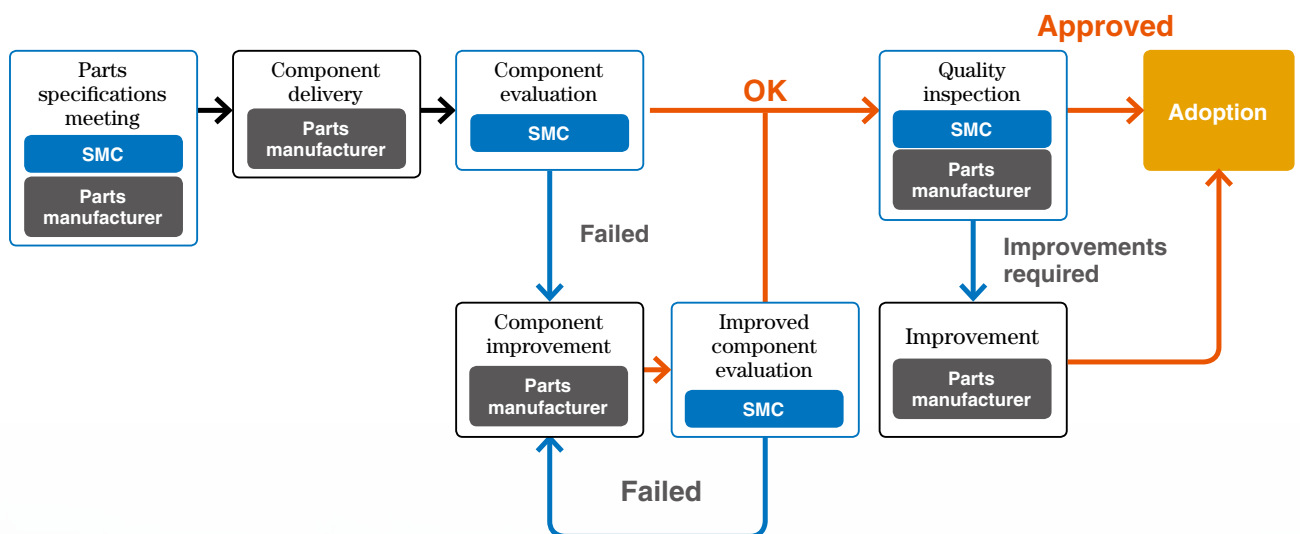
## Design Quality

Identifying specifications that meet customer requirements

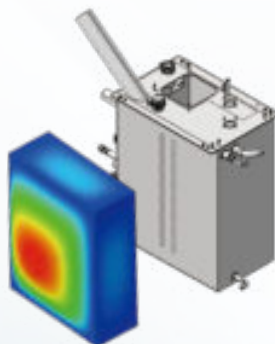
Developing components that meet customers' requirements

Developing highly reliable components

### Developing components cooperatively with parts manufacturers



Component parts development



Tank assessments (withstand pressure testing and deformation simulations)



Pump assessments (endurance testing)

Environmental testing laboratories



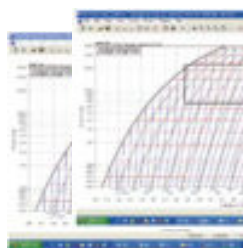
Developing temperature control equipment that meets customers' requirements

Reliability assessments (compliance with international standards, etc.)

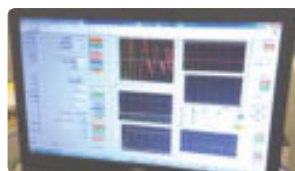
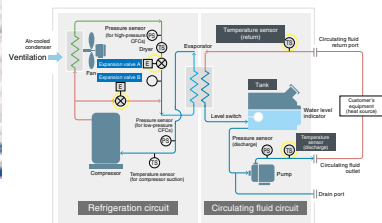
Extremely reliable components providing high precision temperature control and energy efficient design techniques



EMC testing (safety standards compliance testing)



Simulation-based design of cooling temperature/capability



Temperature control data measurement testing



Discharge testing

Compact design techniques achieving multi-functionality in a limited space



Rack mount chillers that are compact and allow front access



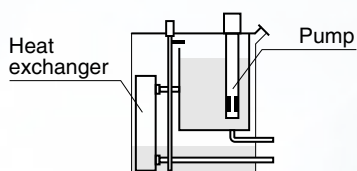
Temperature control testing / life testing



Transportation vibration testing



Noise testing



Space savings achieved by an all-in-one tank with a built-in pump and heat exchanger



# Integrated production system for the production of high-quality products

We have built a system that ensures that high-quality parts are supplied, made or shipped in any process. High reliability is ensured by 100% inspections. A dedicated temperature control equipment factory provides manufacturing consistency.

## Manufacturing Quality



### Accredited work

Basic tasks such as screw fastening, gas welding, pressing, plate metal machining, wiring, adhesion, soldering, pressure bonding, brazing, refrigerant gas replenishment (recovery), assembly, inspection, finishing



## Factory (Yamatsuri 1st Factory)

The processes from parts machining and assembly through to inspection and shipping are all concentrated in the Yamatsuri 1st factory (site area: approx. 320,000 m<sup>2</sup>; total floor space: approx. 80,000 m<sup>2</sup>) with a unique SMC integrated development and production system that ensures production efficiency.



### Assembly



100%  
inspection

Cooling  
capacity  
inspection



Finishing  
/Packing



Warehouse



High-quality  
products shipped

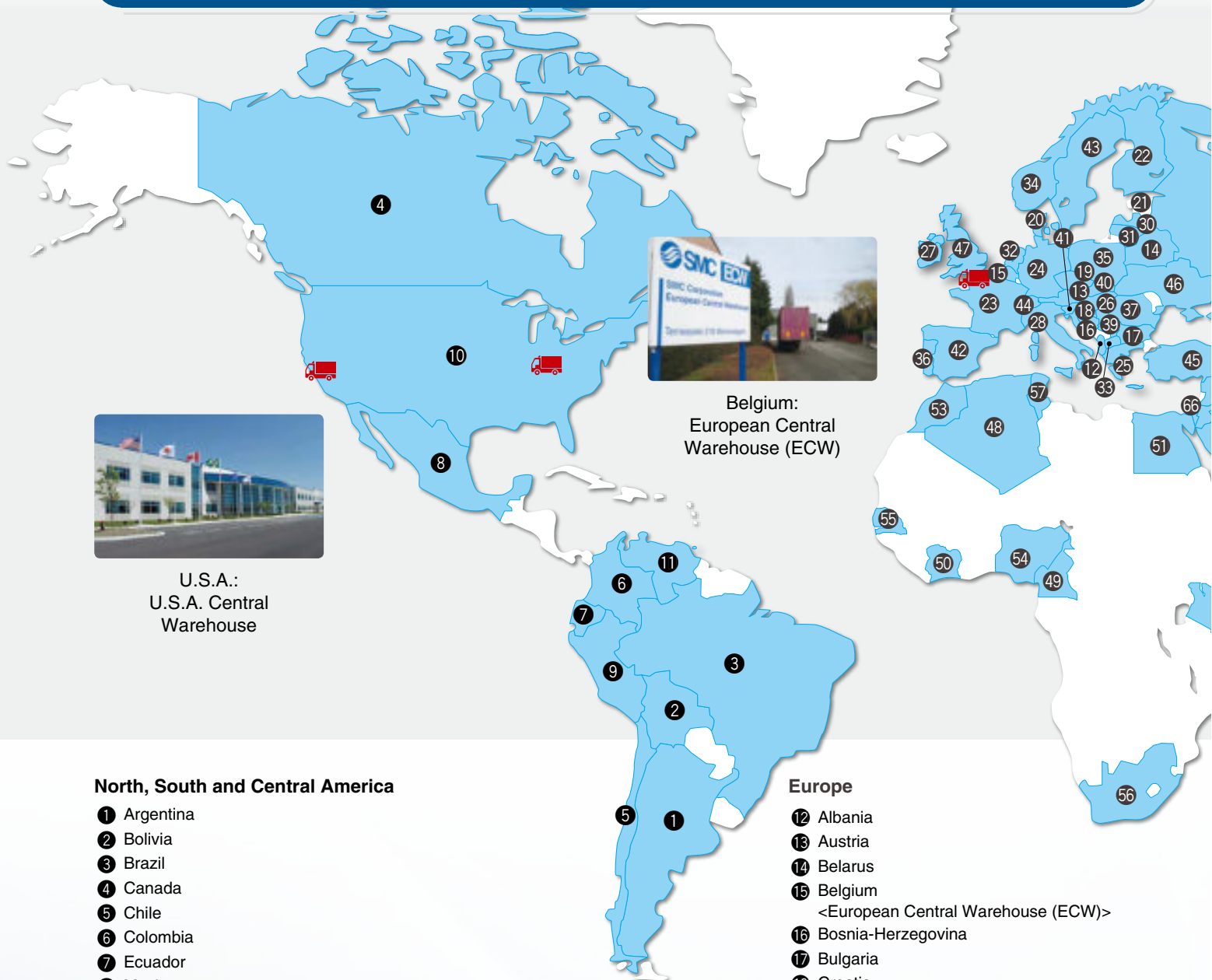
Assembly  
by multi-skilled staff

100% inspection for other  
items such as pump perfor-  
mance and safety functions

# Global Network Services

SMC has built a network of highly localized supply systems all over the world, working with some 560 local offices and agents in a total of 83 countries and regions in all the major nations of Asia, Oceania, America and Europe.

SMC supply system providing exhaustive coverage in every major country around the world



## North, South and Central America

- ① Argentina
- ② Bolivia
- ③ Brazil
- ④ Canada
- ⑤ Chile
- ⑥ Colombia
- ⑦ Ecuador
- ⑧ Mexico
- ⑨ Peru
- ⑩ United States of America <U.S.A. Central Warehouse>
- ⑪ Venezuela

## Europe

- ⑫ Albania
- ⑬ Austria
- ⑭ Belarus
- ⑮ Belgium <European Central Warehouse (ECW)>
- ⑯ Bosnia-Herzegovina
- ⑰ Bulgaria
- ⑱ Croatia
- ⑲ Czech Republic
- ⑳ Denmark
- ㉑ Estonia
- ㉒ Finland
- ㉓ France
- ㉔ Germany
- ㉕ Greece
- ㉖ Hungary
- ㉗ Ireland
- ㉘ Italy

- \* Icons indicate a central warehouse or logistics center.
- \* SMC critical products are warehoused at each facility.
- \* Countries and regions are listed alphabetically in each area.





China:  
Logistics Center  
in Beijing



China:  
Logistics Center  
in Hong Kong



China:  
Logistics Center  
in Guangzhou



China:  
Logistics Center  
in Shanghai



Korea:  
Korea Central  
Warehouse (KCW)



Thailand:  
Bang Pa-In Central  
Warehouse



Singapore:  
Jurong Headquarters

- 29 Kazakhstan
- 30 Latvia
- 31 Lithuania
- 32 Netherlands
- 33 North Macedonia
- 34 Norway
- 35 Poland
- 36 Portugal
- 37 Romania
- 38 Russia
- 39 Serbia
- 40 Slovakia
- 41 Slovenia
- 42 Spain
- 43 Sweden
- 44 Switzerland
- 45 Turkey
- 46 Ukraine
- 47 United Kingdom

#### Africa

- 48 Algeria
- 49 Cameroon
- 50 Cote d'Ivoire
- 51 Egypt
- 52 Kenya
- 53 Morocco
- 54 Nigeria
- 55 Senegal
- 56 South Africa
- 57 Tunisia

#### Asia/Oceania

- 58 Australia
- 59 Bahrain
- 60 Bangladesh
- 61 Cambodia
- 62 China: <Beijing/Shanghai/  
Guangzhou Logistics Center>
- 63 Hong Kong  
<Hong Kong Logistics Center>
- 64 India
- 65 Indonesia
- 66 Israel
- 67 Japan

- 68 Korea:  
<Korean Central Warehouse (KCW)>
- 69 Kuwait
- 70 Malaysia
- 71 Myanmar
- 72 New Zealand
- 73 Oman
- 74 Pakistan
- 75 Philippines
- 76 Qatar
- 77 Saudi Arabia
- 78 Singapore <Jurong Headquarters>
- 79 Sri Lanka
- 80 Taiwan
- 81 Thailand:  
<Bang Pa-In Central Warehouse>
- 82 United Arab Emirates
- 83 Vietnam

# Global Engineering Network

We have Technical Centers at 5 locations worldwide that are collaborating to develop advanced technologies and comprehensive expertise that we use to address customers' needs by supplying outstanding products and services. We also listen carefully to our customers around the world and use their feedback in our product development and quality improvement programs.

## Technical Support

The ideal temperature control equipment for any customer differs depending on the industry they work in, their equipment and the applications in which it is used. At SMC, we consult closely with our customers prior to installation and provide hands-on support to help them choose the product that is right for them.

### 1. Performance testing

Each individual product is subjected to a range of performance tests. Through our commitment to high quality, we have achieved temperature regulation that is stable regardless of the environment.



### 2. Selection support

We offer technical advice to ensure that customers choose the best possible equipment for their operating conditions.



### 3. Loan service

This service allows customers considering a purchase to carry out tests using sample products provided for real-world evaluations.



# SMC's Global Engineering Network



**We have established Technical Centers in the U.S.A., Europe, China and Japan.**

**Engineering staff 1,600**

## U.S.A.

### UTC (U.S. Technical Center)

The UTC is enhancing its engineering capabilities in order to more quickly respond to the needs of the North American market through product development and the provision of technical services. There are currently around 140 employees tasked with dealing with the various needs of customers in the region.



## United Kingdom

### ETC (European Technical Centre)

Around 70 experienced staff members from various European countries work together to provide a wide range of services and to quickly relay accurate information regarding the various needs of our customers.



## Germany

### GTC (German Technical Centre)

Located at the heart of European industry in Germany, the GTC and its 80 employees support our product development and technical services in the region, responding quickly to customer requirements and issues.



## China

### CTC (China Technical Center)

With around 120 employees, the CTC provides a structure for product development and technical support that can respond quickly to the diverse needs of our customers in the various industries and regions of China.



## Japan

### JTC (Japan Technical Center)

The JTC is staffed with 1,200 employees and is the core facility for SMC research and development. It produces new products for the global market based on customers' current and future needs.



# Global Maintenance Network

Our Chiller Support Teams maintain an inventory of maintenance parts and deal swiftly and appropriately with maintenance issues such as repairs and replacements.

With our global high-quality after sales service, customers can rest assured after purchasing our product.

## Service Quality



U.S.A.



United Kingdom



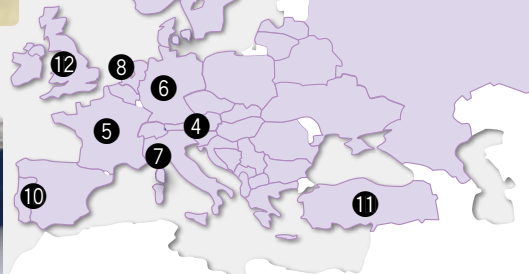
Netherlands



Mexico



1



Germany



Spain

## Rapid responses from our parts inventory

We stock replacement parts in the form of sub-assemblies, reducing the time required to replace parts in products such as heat exchangers, compressors and pumps







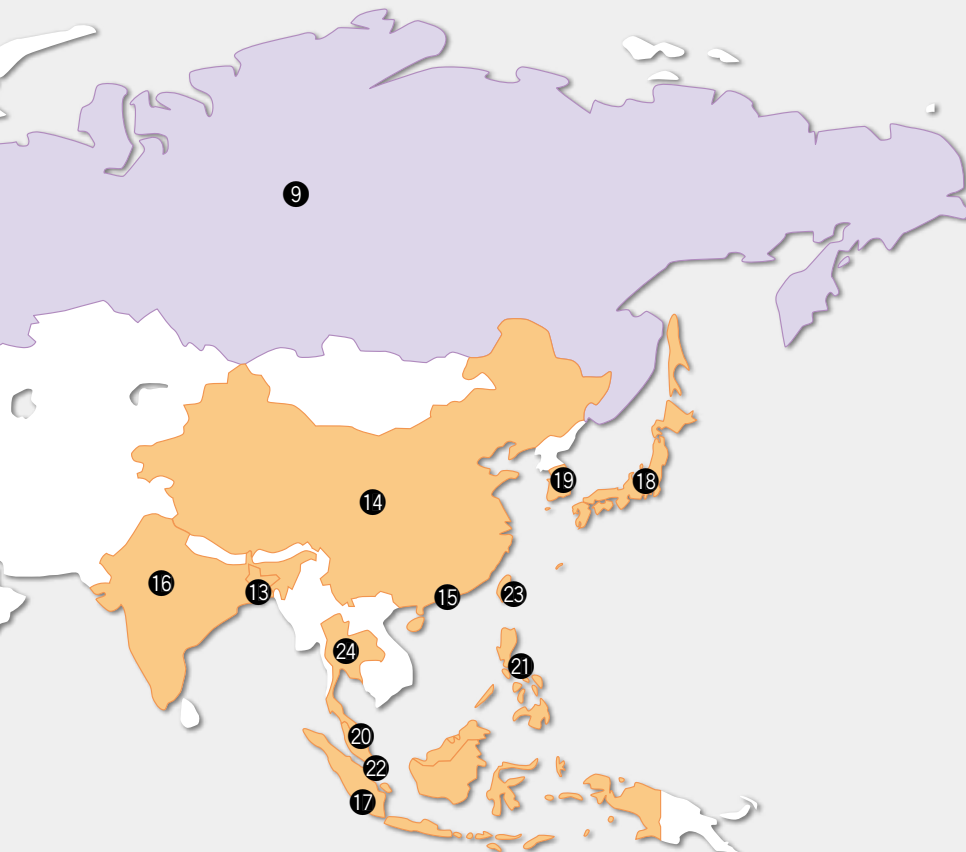
China (Beijing area)



China (Shanghai area)



China (Guangzhou area)



#### North, South and Central America

- ① Brazil
- ② Mexico
- ③ United States of America

#### Europe

- ④ Austria
- ⑤ France
- ⑥ Germany
- ⑦ Italy
- ⑧ Netherlands
- ⑨ Russia
- ⑩ Spain/Portugal
- ⑪ Turkey
- ⑫ United Kingdom

#### Asia

- ⑬ Bangladesh
- ⑭ China (Beijing/Shanghai/Guangzhou area)
- ⑮ Hong Kong
- ⑯ India
- ⑰ Indonesia
- ⑱ Japan
- ⑲ Korea
- ⑳ Malaysia
- ㉑ Philippines
- ㉒ Singapore
- ㉓ Taiwan
- ㉔ Thailand



Singapore



Taiwan



\* Countries and regions are listed alphabetically in each area

## Reliable Maintenance System

### Global training in service techniques

So that our Chiller Support Teams can provide high-quality maintenance services, education and training is conducted in each country.



Complete maintenance documentation



Training in progress

## SMC Corporation

Akihabara UDX 15F,  
4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, JAPAN  
Phone: 03-5207-8249 Fax: 03-5298-5362  
<https://www.smcworld.com>  
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D-SZ

1st printing YQ printing YQ 14350KY Printed in Japan.