



ORIGINAL INSTRUCTIONS



Refer to Declaration of Conformity for relevant Directives.

Instruction Manual
Thermo-chiller
HRS100/150 Series

1 Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of "Caution," "Warning" or "Danger." They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)⁽¹⁾, and other safety regulations.
⁽¹⁾ ISO 4414: Pneumatic fluid power - General rules relating to systems.
 ISO 4413: Hydraulic fluid power - General rules relating to systems.
 IEC 60204-1: Safety of machinery - Electrical equipment of machines. (Part 1: General requirements)
 ISO 10218-1: Manipulating industrial robots – Safety, etc.

This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.
 • Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
 • Keep this manual in a safe place for future reference.
 • To ensure safety of personnel and equipment the safety instructions in this manual must be observed, along with other relevant safety practices.

	Caution	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
	Warning	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	Danger	Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Warning

• **The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**
 • Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

• **Only personnel with appropriate training should operate machinery and equipment.**
 The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

• **Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**
 1) The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.

2) When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.

3) Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

• **Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**
 1) Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.

1 Safety Instructions (continue)

2) Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustions and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specification described in the product catalogue.

3) An application which could have negative effects on people, property, or animals requiring special safety analysis.

4) Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

• **Always ensure compliance with relevant safety laws and standards.** All electrical work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.

Caution

• **The product is provided for use in manufacturing industries.** The product herein described is basically provided for peaceful use in manufacturing industries. If considering using the product in other industries consult SMC beforehand and exchange specifications or a contract if necessary. If anything is unclear, contact your nearest sales branch.

2 Specifications

2.1 General Description and Intended Use

This product used a built-in pump to circulate a liquid such as water, adjusted to a constant temperature by the refrigeration circuit. This circulating liquid cools parts of customer's machine that generate heat.

2.2 Product Specifications

HRS1 * 0 - * -40-Options

Model	HRS100-A*-40*	HRS150-A*-40*	HRS100-W*-40*	HRS150-A*-40*		
Cooling method	Air-cooled refrigerated		Water-cooled refrigerated			
Refrigerant	R410A(HFC) ; 2088 (GWP)					
Quantity of refrigerant	kg	1.3	1.65	1.23	1.33	
Control method	PID control					
Ambient temperature ¹⁾	°C		-5 to 45		2 to 45	
Circulating fluid ²⁾	Tap water, Ethylene glycol aqueous solution 15%, Deionized water					
Operating temp. range ¹⁾	°C		5 to 35			
Cooling capacity ³⁾ 50/60Hz	kW		9.0/9.5	13.0/14.5	10.0/11.0	14.5/16.5
Heating capacity ³⁾ 50/60 Hz	kW		1.7/2.2	2.5/3.0	1.7/2.2	2.5/3.0
Temperature stability ³⁾	°C		±1.0			
Pump capacity	Rated flow rate 50/60Hz (outlet) ⁴⁾	L/min	42/56			
	Max. flow rate 50/60Hz	L/min	55/68			
	Max. lifting height	m	50			
Min. operating flow rate 50/60 Hz ²⁾	L/min	28/42				
Tank capacity	L	18				
Circulating fluid Outlet and Inlet port	Rc3/4 (Symbol F: G3/4, Symbol N: NPT3/4)					
Drain port	Rc1/4 (Symbol F: G1/4, Symbol N: NPT1/4)					
Automatic fluid fill function	Supply Press. range	MPa	0.2 to 0.5			
	Supply fluid range	°C	5 to 35			
	Automatic fluid fill port	Rc1/2 (Symbol F: G1/2, Symbol N: NPT1/2)				
Over flow port	Rc1 (Symbol F: G1, Symbol N: NPT1)					
Wetted material	Stainless steel, Copper (Heat exchanger brazing), Brass, Bronze, Carbon, Ceramic PTFE, PU, EPDM, PVC, NBR, PE, NR, PBT, POM, PP					
Facility water	Temperature range	°C	5 to 40			
	Pressure range	MPa	0.3 to 0.5			
	Required flow rate 50/60 Hz	L/min	---	33/34	38/40	
	Facility water pressure differential	MPa	more than 0.3			
Facility water inlet, outlet port	Rc3/4 (Symbol F: G3/4, Symbol N: NPT3/4)					
Wetted material	Stainless steel, Copper (Heat exchanger brazing), Brass, Bronze, PTFE, NBR, EPDM					
Electric system	Power supply		AC380-415V/50/60Hz 3-phase Allowable voltage fluctuation ±10%			
	Recommended earth leakage breaker ⁵⁾	Rated current	A			
		Sensitivity	mA			
	Rated operating current 50/60 Hz ⁵⁾	A	6.9/7.5	8.1/9.6	6.4/7.2	7.7/9.5
	Rated power consumption 50/60 Hz ⁵⁾	kW	3.7/4.7	4.8/6.1	3.4/4.4	4.5/6.0
	kVA	4.7/5.3	5.7/6.6	4.5/5.0	5.4/6.6	
Sound level (Front 1m / Height 1m) ³⁾	dB(A)		70	72	70	
Accessory	Alarm cord list label 2pc (English 1pc, Japanese 1pc), Operation manual 2pc (English 1pc, Japanese 1pc), Y strainer (40 meshes) 25A, Barrel nipple 25A					
Weight (dry condition)	kg	171	177	151	154	

Notes:

*1 Use 15% ethylene glycol aqueous solution if operating in a place where the circulating fluid temp. or ambient temperature is lower than 10 °C. (Note: Water-cooled: Please discharge the facility water from the facility water circuit when there is a risk of freezing.)

2 Specifications (continue)

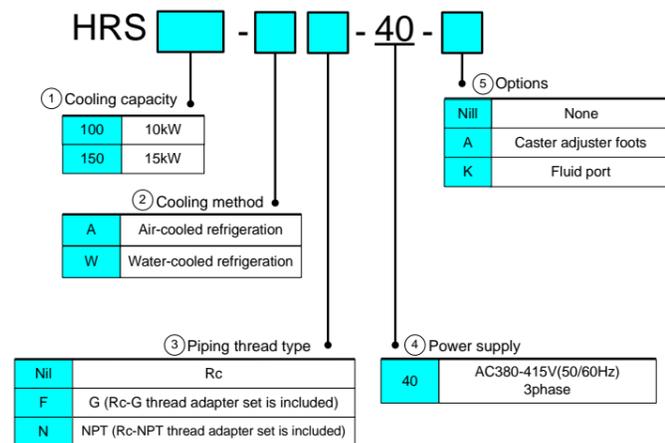
*2 Use fluid in condition below as the circulating fluid.
 Tap water: Standard of The Japan Refrigeration And Air Conditioning Industry Association (JRA GL-02-1994).
 15% ethylene glycol aqueous solution: diluted by tap water in condition above without any additives such as antiseptics.
 Deionized water: Conductivity 1µS/cm and higher (electrical resistivity 1MΩ·cm and lower).
 *3 (1) Air-cooled: Operating ambient temp.: 32 °C or Water-cooled: Facility water temp.: 32 °C, (2)Circulating fluid : Tap water, (3)Circulating fluid temp.: 20 °C, (4)Circulating fluid flow rate : Rated flow rate, (5)Power supply: AC400V.
 *4 (1) Air-cooled: Operating ambient temp.: 32 °C or Water-cooled: Facility water temp.: 32 °C, (2)Circulating fluid : Tap water, (3) Circulating fluid flow rate : Rated flow rate, (4)Power supply: AC400V.
 *5 (1) Air cooled: Operating ambient temp.: 32 °C or Water cooled: Facility water temp.: 32 °C, (2)Circulating fluid : Tap water, (3)Circulating fluid temp.: 20 °C, (4)Heat load : Same as the cooling capacity, (5)Circulating fluid flow rate: Rated flow rate, (6)Power supply : AC400V, (7)External piping length: Minimum
 *6 When circulating fluid outlet port pressure – return port pressure = 0.25MPa.
 *7 Fluid flow rate to maintain the cooling capacity. If the actual flow rate is lower than this, please install a bypass piping.

2.3 Production Serial Number Code

The production serial number code printed on the label indicates the month and year of production as per the following table:

Year	2018	2019	2020	2022	2023	2024
Month	W	X	y	...	A	B	C	...
Jan	o	Wo	Xo	yo	...	Ao	Bo	Co
Feb	P	WP	XP	yP	...	AP	BP	CP
Mar	Q	WQ	XQ	yQ	...	AQ	BQ	CQ
Apr	R	WR	XR	yR	...	AR	BR	CR
May	S	WS	XS	yS	...	AS	BS	CS
Jun	T	WT	XT	yT	...	AT	BT	CT
Jul	U	WU	XU	yU	...	AU	BU	CU
Aug	V	WV	XV	yV	...	AV	BV	CV
Sep	W	WW	XW	yW	...	AW	BW	CW
Oct	X	WX	XX	yX	...	AX	BX	CX
Nov	y	Wy	Xy	yy	...	Ay	By	Cy
Dec	Z	WZ	XZ	yZ	...	AZ	BZ	CZ

3 How to Order



4 Name of Parts and Accessories

4.1 Accessories

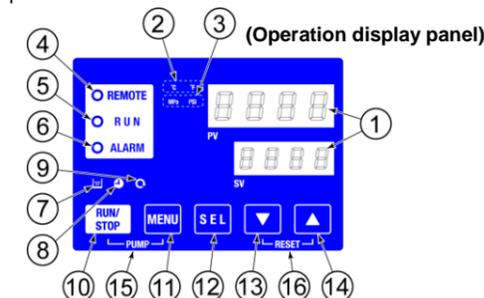
• Check the enclosed accessories with the delivered thermo-chiller.

1	Alarm cord list label (JN: 1pc, ENG: 1pc)		2pc
2	Operation manual (JN: 1pc, ENG: 1pc)		2pc
3	Y strainer (40 meshes) 20A		1pc
4	Barrel nipple 20A		1pc
5	Drain pan for pump		1pc
6	HRS1**-AF-*** G thread adapter set (HRS-EP028) HRS1**-AN-*** NPT thread adapter set (HRS-EP027) HRS1**-WF-*** G thread adapter set (HRS-EP030) HRS**-WN-*** NPT thread adapter set (HRS-EP029)		1 set

*These accessories are not explained in this manual. For details, refer to the Operation Manual attached.

4.2 Main Parts

• The names of parts used in this manual are as follows:



No	Description	Function
1	Digital display (7-segment, 4 digits)	PV Displays the temperature and pressure of the circulating fluid and alarm codes.
		SV Displays the set temperature of the circulating fluid and the set values of other menus.
2	[°C] [°F] light	Equipped with a unit conversion function. Displays the unit of display temperature (default setting °C).
3	[MPa] [PSI] light	Equipped with a unit conversion function. Displays the unit of display pressure (default setting MPa).
4	[REMOTE] light*	Enables the remote operation (start and stop) by communication. Lights up during remote operation.
5	[RUN] Light	Lights up when the product is started and in operation. Goes off when the product is stopped. Flashes during stand-by for stop or anti-freezing function, or independent operation of the pump and warming up function.
6	[ALARM] Light	Flashes with buzzer when alarm occurs. Flashes while AL25 is OFF.
7	[L] Light	Lights up when the surface of the level indicator falls below the 'L' (low) level.
8	[T] Light *	Lights up while the run timer or stop timer function is ON.
9	[A] Light *	Lights up when the product is in automatic operation.
10	[RUN/STOP] key	Makes the product start or stop.
11	[MENU] key*	Shifts from the main menu (display which shows circulating fluid temperature, pressure and etc.) to the other menus (entry of set values and monitor screen).
12	[SEL] key*	Changes the item in menu and enters the set value.
13	[▼] key	Decreases the set value.
14	[▲] key	Increases the set value.
15	[PUMP] key	When the [MENU] and [RUN/STOP] buttons are held down simultaneously, the pump starts running independently.
16	[RESET] key	Press the [▼] and [▲] keys simultaneously. This will stop the alarm buzzer and turn off the [ALARM] light.

*These lights and keys are not explained in this manual. For details, read the Operation Manual attached.

4 Name of Parts and Accessories (continue)

4.3 Outline Dimensions

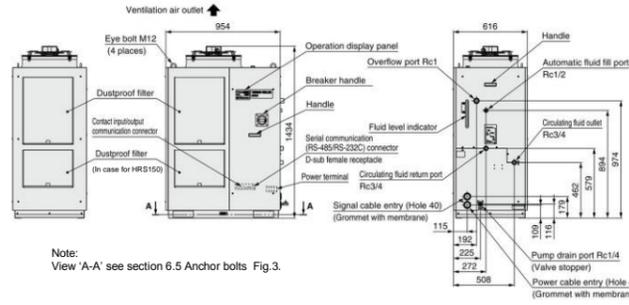


Fig.1: HRS1**-A*-40-* (Air cooled type)

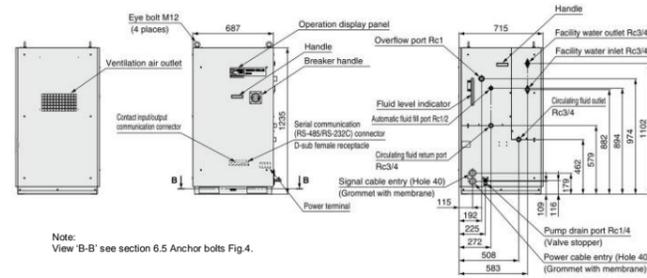


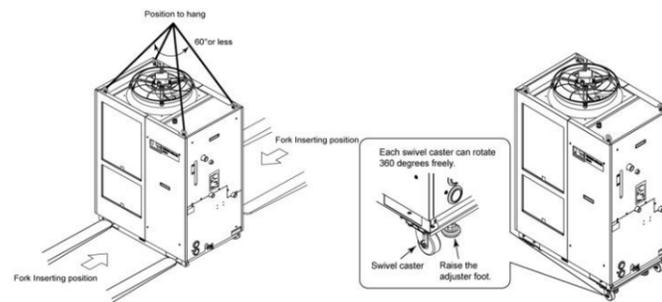
Fig.2: HRS1**-W*-40-* (Water cooled type)

5 Transportation, Transfer and Moving

5.1 Moving by forklift and slinging or by casters

Warning

- The product is a heavy object. (Refer to 3.1 Product specification for weights).
- Moving by forklift and slinging should be done by persons who have required licenses.
- Moving the product by casters should be done by 2 persons or more



6 Installation

6.1 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood.

6.2 Types of Hazard Labels

Warning

- The product has various potential hazards and they are marked with warning labels.

6 Installation (continue)

Warning related to Electricity



This symbol stands for a possible risk of electric shock.

Warning related to High Temperatures



This symbol stands for a possible risk of hot surface and burns.

Warning related to Rotating Objects



This symbol stands for a possible risk of cutting fingers or hand, or entanglement by rotating fan (For air-cooled type).

Warning related to other General Dangers



This symbol stands for general danger.

6.3 Environment

Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use the product in an area of high temperature and humidity which cannot be exhausted, or where it is exposed to corrosive substances. Cooling failure can result.
- Do not use in an explosive atmosphere.
- Do not use in locations at altitudes of 3000m or higher (except for product storage and transport), refer to the Operation Manual.
- Do not install in a location exposed to direct sunlight and radiant heat.

- Do not install in a location subject to vibration or impact.
- Do not install in locations that is exposed to the splash of water that is higher than IPX4.
- Do not expose to potential lightning strike.

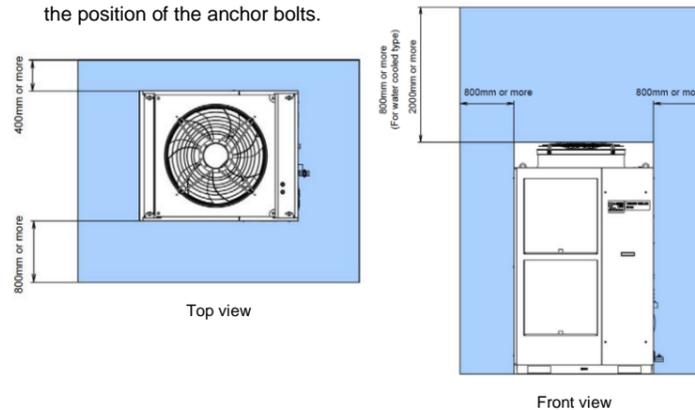
6.4 Mounting

Warning

- The Installer / End User is responsible for carrying out a noise risk assessment on the equipment after installation and taking appropriate measures as required.

Caution

- Have enough space for ventilation for the product. Otherwise may cause a lack of cooling capacity or/and stoppage of the product.
- Have enough space for maintenance.
- Install the product on a vibration free floor.
- Prepare M10 anchor bolts that are suitable to the floor that the product will be installed. Refer to '6.5 Anchor bolts' for outline dimensions for the position of the anchor bolts.



Recommend installation space

6 Installation (continue)

6.5 Anchor bolts (dimensions (mm); position view A-A, B-B)

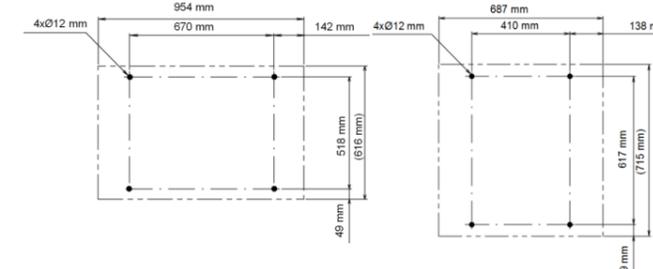
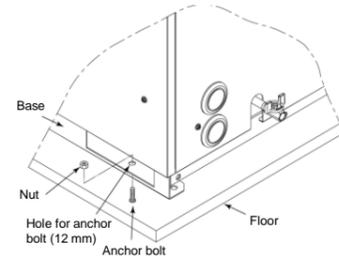


Fig.3 View 'A-A' (see Fig.1): Anchor bolts hole positions for HRS100/150-A*-40

Fig.4 View 'B-B' (see Fig.2): Anchor bolts hole positions for HRS100/150-W*-40

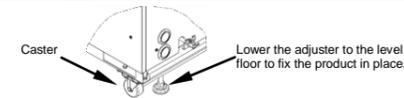


Note:

- Position product to the anchor bolts that were previously driven on the level floor.
- Fasten the nuts to the anchor bolts.
- Make sure that there is no looseness on all the anchor bolts and nuts.
- SMC Foundations bolt set [IDF-AB500] (SUS M10x50mm) is applicable. Please order separately.

Option A [Caster Adjuster-foot kit] (HRS-KS002/KS003)

Caution



Caution

6.6 Piping

- Before piping make sure to clean up chips, cutting oil, dust etc.
- The piping should be selected with due consideration of temperature and pressure.

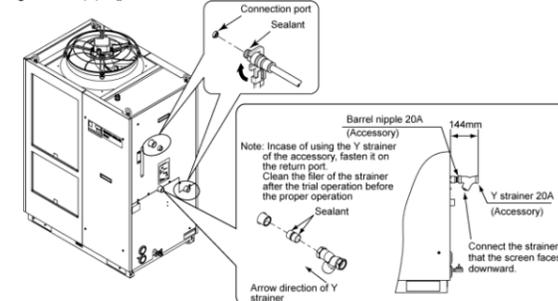
- Do not generate a rapid change of pressure by water hammer etc. The product and piping might be damaged.
- Hold the piping port firmly with specific wrench when tightening.

Tighten fittings to the specified tightening torque.

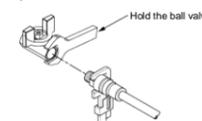
Name	Port size	Recommended tightening torque	Recommended piping specification
Circulating fluid Outlet port	Rc3/4	28 to 30 N·m	1.0MPa and more
Circulating fluid return port	Rc3/4	28 to 30 N·m	1.0MPa and more
Facility water Inlet port	Rc3/4	28 to 30 N·m	1.0MPa and more. (Supply puresure : 0.3 to 0.5MPa)
Facility water Outlet port	Rc3/4	28 to 30 N·m	1.0MPa and more. (Automatic fluid -fill pressure : 0.2 to 0.5MPa)
Automatic fluid fill port	Rc1/2	20 to 25 N·m	1.0MPa and more (Automatic fluid -fill pressure : 0.2 to 0.5MPa)
Overflow port	Rc1	36 to 38 N·m	ID25mm and more Length 5m and less
Pump drain port	Rc1/4	8 to 12 N·m	---

*1 Water cooled type only

Tighten the piping to each connection as follows below:



When piping the pump drain port, hold the ball valve of the drain port with a wrench not to rotate it.



6 Installation (continue)

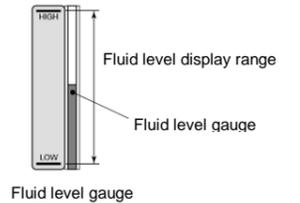
6.7 Filling of Circulating Fluid

Caution

- When the set circulating fluid temperature and/or the ambient temperature is lower than 10°C, use 15% aqueous solution of Ethylene Glycol. Tap water may freeze in the Thermo-chiller, leading to malfunction. Additives such as antiseptics cannot be used.
- If deionized water is used, the conductivity should be 1µS/cm or higher (Electrical resistivity: 1MΩ·cm and lower).
- Confirm that the fluid level is between "High" and "Low" level of the fluid level gauge.
- Connect the piping from the overflow port to the sump pit to drain the excessive fluid from the tank.
- Check drain port is closed by the valve to prevent the supply circulating fluid from draining out.

6.7.1 Auto fluid-fill function

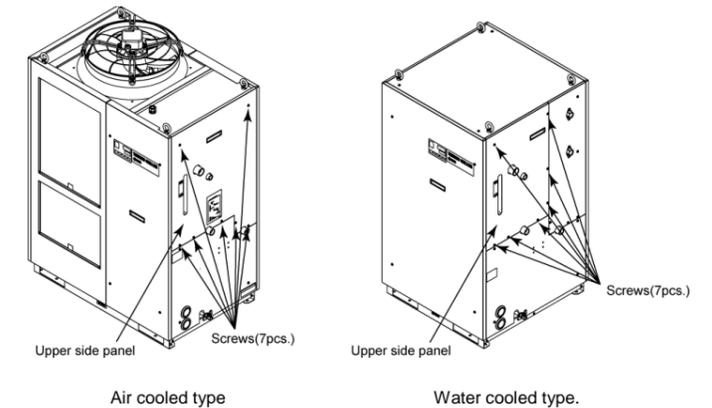
- Open the fluid supply valve that is connected to the automatic water fill port.
- Fluid supply starts and stop automatically with ball tap in the tank.



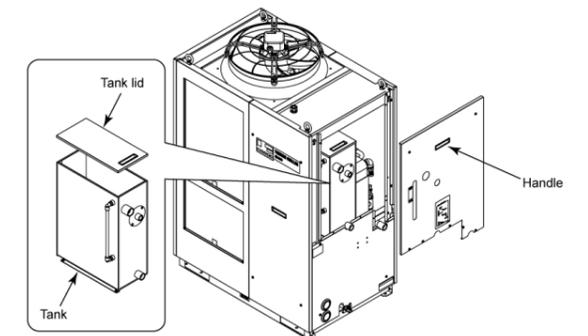
Fluid level gauge

6.7.2 Fill of fluid without using the auto fluid-fill function

- Remove the screws (7 pcs) to remove the right side upper panel.

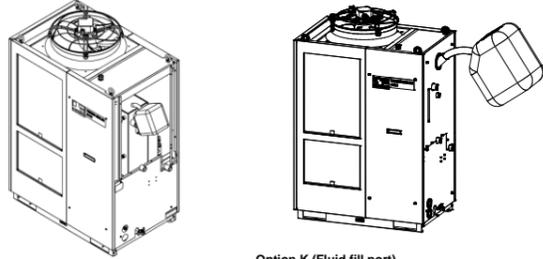


- Hold the handle and lift the upper right side panel, and, remove panel. Remove the tank lid on top the tank.



6 Installation (continue)

3. Fill the circulating fluid in the fluid port



Example: Filling the fluid to the port.

Option K (Fluid fill port)
Open cap of the fluid port and fill with circulating fluid.

6.8 Wiring of Power Supply Cable

Warning

- The electrical facilities should be installed and wired in accordance with local laws and regulations of each country and by the person who has knowledge and experience.
- Check the power supply. Operation with voltages, capacities, frequencies and cable sizes other than those specified can cause heat, fire and electrical shock.
- Wire with an applicable cable size and terminal.
- Be sure to shut off the user's power supply. Wiring with the product energized is strictly prohibited.

Caution

- Use an individual socket or earth leakage breaker.
- Be sure to provide grounding. Incomplete grounding can cause failure and electrical shock.
- When panel is removed or mount, be sure to wear protective shoes and gloves to prevent injury with the edge of the panel.

6.8.1 Preliminary Preparation for Wiring

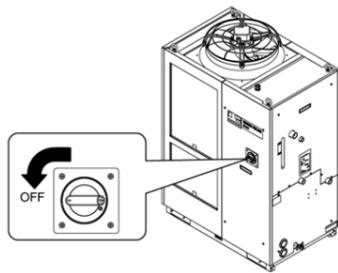
Prepare the power supply shown in the following table. For the

connection between the product and power supply, use the power supply cable and earth leakage breaker shown below:

Model	Power supply voltage	Terminal block screw diameter	Recommend crimp terminal	Cable qty. x size	Earth leakage breaker	
					Rated current [A]	Sensitivity of leak current [mA]
HRS100-A*-40-*	AC380-415V 50/60Hz 3 phase	M5	R5.5-5	4 cores x AWG10 (4 cores x 5.9mm ²) *including ground	20	30
HRS100-W*-40-*						
HRS150-A*-40-*						
HRS150-W*-40-*						

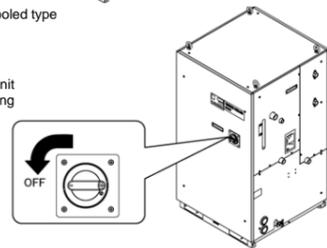
6.8.2 Wiring of Power Supply

- Turn off the breaker handle.
- Remove four screws to remove the front panel.
- Hold the handle and pull up the front panel of the electrical unit, and remove.



Air cooled type

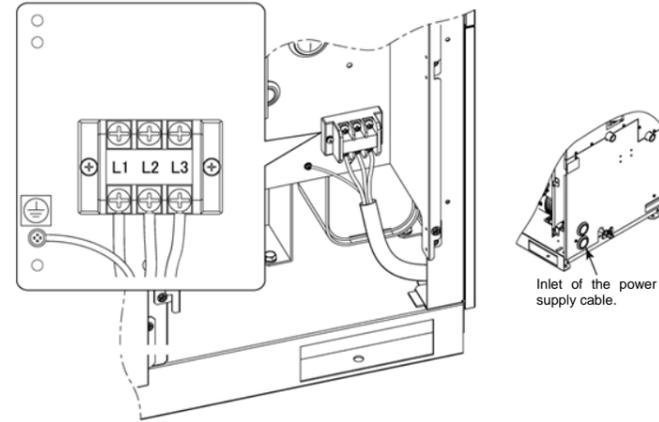
Note:
Please turn off the breaker handle.
The front panel of the electrical unit cannot be removed without turning off the breaker.



Water cooled type

6 Installation (continue)

4) Connect the power supply cable and ground cable as shown below:



Inlet of the power supply cable.

* Connect over current protection to the user's side (primary side) to avoid hazard.

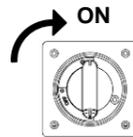
7 Start, Stop and Temperature Settings

7.1 Preliminary Preparation for Start-up

7.1.1 Supply of Power

1) Turn on the breaker handle.

→ The initial screen (HELLO) will be displayed for approx. 8 seconds on the operation panel. Then the display changes to the main screen which displays the circulating fluid outlet temperature.



7.1.2 Preparation of circulating fluid

- Press the [PUMP] key ([RUN/STOP] key and [MENU] key simultaneously). The [RUN] lamp flashes and only the pump continues the operation. This operation allows the discharge of the circulating fluid, and enables checking leakage from the piping and air release.
- At this time, the fluid level can lower and cause the alarm "AL01; Low tank level", which will lead to the stop of the product.
- In that case, check that there is no leakage from the user's piping, fill the circulating fluid as specified in "6.7 Filling of Circulating Fluid" and take necessary actions in "8. Reset Alarms".
- Repeat steps 1) to 3) until the alarm ("AL01; Low tank level") is no longer generated.

7.1.3 Temperature Setting

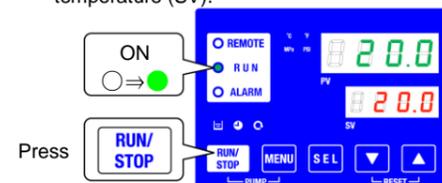
1) Press the [▼] and [▲] keys to change the SV to the required value.



7.2 Start of the Product

1) Press the [RUN/STOP] key on the operation panel.

→ The [RUN] LED (green) turns on and the product starts running. The circulating fluid discharge temperature (PV) is controlled to the set temperature (SV).

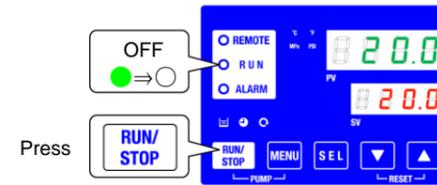


7 Start, Stop and Temperature Settings (continue)

7.3 Stop of the Product

1) Press the [RUN/STOP] key on the control panel.

⇒ The [RUN] LED flashes (green) and continues the operation until the product is ready to stop. After approx. 20 seconds, the [RUN] LED goes off and the product stops.



8 Reset Alarms

Caution

- Should some errors occur, the [ALARM] lamp flashes (in red) and the buzzer sounds to inform the user of the 'Error'.
- The alarm code will be displayed on the operation panel so that the cause can be checked on "Troubleshooting".



Example:
"AL01"
"Low level in tank"

- Before resetting the alarm, read the "Causes and Remedies" of "Troubleshooting" and eliminate the cause as explained. Otherwise, the same alarm may be repeated.
- As accessories, the alarm code list label are enclosed. Stick the label to the panel to check the contents of alarm codes.

8.1 Reset of alarm

- Press the [RESET] key ([▼] and [▲] keys simultaneously).
⇒ The buzzer and then [ALARM] lamp (red) go off.



9 Maintenance

9.1 General Maintenance

Warning

- Do not operate switches, etc. with wet hands and do not touch the electrical parts such as the power supply plug. It might cause electric shock.
- Do not splash water directly on the product and do not wash with water. It might cause electric shock and fire, etc.
- Do not touch the fins directly when cleaning the dustproof filter. It might cause injury.
- Remount all panels removed for inspection or cleaning. As this might cause injury or electric shock if the product is operated without the panels.

Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- Before performing maintenance, turn off the power supply. After installation and maintenance, turn on power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.

9 Maintenance (continue)

9.2 Control of Circulating Fluid Quality

Warning

- Use specified circulating fluids only. If other fluids are used, they may damage the product or result in dangerous hazards.
- When using fresh tap water ensure that it satisfies the water standard shown in the Operation Manual.

9.3 Daily Check

Caution

- Check each item of "Daily checklist", and if any error is seen, stop the operation of the product and turn off the user's power supply, and service the product.

Daily checklist

Item	Description of checking	
Installation condition	Check the installation conditions of the product.	There is no heavy object on the product or excessive force on the piping.
		Temperature and humidity are within the specified range of the product.
Fluid leakage	Check the connected part of piping	There is no circulating fluid leakage from the connected part of piping.
Fluid amount	Check the liquid level indicator.	The circulating fluid must enter the scale of "H".
Operation panel	Check the display.	The numbers on the display are clear.
		The [RUN/STOP] and [MENU], [SEL], [▼], [▲] buttons operate properly.
Circulating fluid temperature	Check on the operation panel.	There is no problem for use.
Circulating fluid flow rate	Check on the operation panel.	There is no problem for use. If flow rate decreasing, please check and clean the Y-strainer.
Operating conditions	Check the operation condition.	There is no abnormal noise, vibration, smell and smoke.
Facility water (water cooled type)	Facility water condition	Temperature, pressure and flow rate are within the specified range of the product.

9.4 Monthly Check

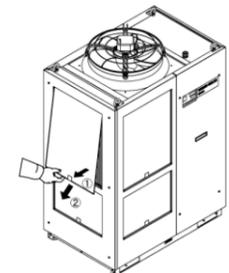
Cleaning of air vent (Air-cooled type)

Caution

- If the air ventilation of the product have clogged with dust or debris, heat radiation performance reduces. This results in the reduction of cooling performance, and may stop the operation.

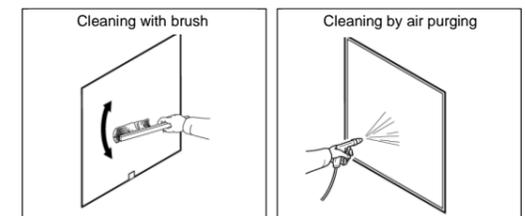
9.4.1 Removal of the Dustproof Filter

- The dust-proof filters are installed on the front and left side of the product. In total there are four filters with the same shape.
- The dustproof filters can be removed as shown in the below drawing. Care should be taken not to deform or scratch the air-cooled condenser.



9.4.2 Cleaning of Filter

- Clean the dust filter with a long bristled brush or by air purging.



- Mount the dustproof filter in reverse order of removal.

9 Maintenance (continue)

9.5 Inspection Every 3 Months

9.5.1 Replacement of Circulating Fluid

- Replace the exiting circulating fluid with new circulating fluid periodically. Otherwise algae or decompose may occur.
- In case of using the Y strainer (accessory), clean the screen mesh in the strainer when exchanging the circulating fluid.
 - Ensure that there is no circulating fluid left in the product, customer's machine and piping.
 - Remove the cap cover of the strainer and take out the screen mesh and clean with detergent or/and purge by air. Take care not to damage the screen mesh.
 - Do not use any chlorinated detergents and cleansers.

9.5.2 Replacement of Facility Water (Water cooled type)

- Clean the facility water source and replace the facility water.

Caution

- If there is foreign matter or clogging in the screen mesh, the pressure loss will become large and may break the screen mesh.

9.6 Inspection for winter season

Caution

- The power supply should be 'ON' for these functions. Otherwise these functions cannot start.
- Anti-freezing function:** To prevent the circulating fluid freezing during winter, this function operates pump automatically to heat the circulating fluid by the pump's heat radiation. (For details refer to operation manual)
- Warming up function:** During winter or night, this function operates pump automatically to heat the circulating fluid by the pump's heat radiation to keep the circulating fluid temperature around the warming up function set temperature. (For details refer to operation manual)
- Anti-snow coverage function (air cooled type):** To prevent the snow coverage on the ventilation air outlet of the fan in winter, this function operates fan automatically. (For details refer to operation manual)
- Freezing of the facility water:** Discharge the facility water circuit when there is fear of a freeze (Refer to 12.7.2).

9.7 Draining of the Circulating Fluid and Facility Water

Warning

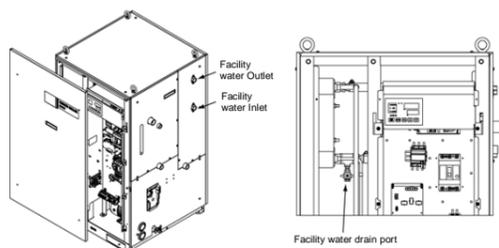
- Before draining the circulating fluid, stop the user's equipment and release the residual pressure.
- Before draining the facility water (Water-cooled type), stop the equipment for the facility water, or facility water circuit to release the residual pressure.

9.7.1 Draining of the circulating fluid

- Turn OFF the breaker of the user's power supply.
- Close the valve that is connected to the auto-fill port.
- Open the ball valve of the pump drain port and drain the circulating fluid.
- Ensure the circulating fluid has been completely drained from the product, user's machine and piping, and, then purge air from the circulating fluid outlet port of the product.
- Close the ball valve after discharging the circulating fluid.

9.7.2 Draining of facility water (Water-cooled type)

- Turn OFF the breaker of the user's power supply.
- Stop supplying the facility water and make sure there is no pressure in the facility water piping.
- Remove the inlet and outlet facility water piping.
- Open the front panel of the electrical unit, and open the air release valve to discharge the facility water.
- After draining the facility water close the facility water drain valve and mount the front panel.



9 Maintenance (continue)

9.8 Consumable Parts

Part No.	Description	Qty	Remark
HRS-S0213	Dust-proof filter (Lower)	1	HRS150-A: 2pcs used per unit
HRS-S0214	Dust-proof filter (Upper)	1	HRS100/150-A: 2 pcs used per unit
HRS-S0307	Mechanical seal set	1	1 set used per unit

10 Troubleshooting

10.1 Troubleshooting

The troubleshooting method depends on which alarm has been generated. Refer to the "Alarm code list and Troubleshooting".

Warning

- In the event of an unexpected problem or malfunction, switch off the product and investigate the cause. If the cause of the problem cannot be determined, do not use the product, but contact SMC for assistance.

Alarm code list and Troubleshooting

Code	Description	Operation	Cause/Remedy (Press the reset key after eliminating the cause.)
AL01	Low level in tank	A.RUN	The fluid level of the level indicator has fallen. Fill or add the circulating fluid.
AL02	High circulating fluid discharge temp.	A.STP	·Check that the ambient temperature, facility water specifications and heat load are within the specified ranges.
AL03	Circulating fluid discharge temp. rise	A.RUN	·Check circulating flow rate to keep minimum operating flow rate by check monitor menu. ·Check the value of R5.04 . ·Wait until the circulating fluid temperature lowers.
AL04	Circulating fluid discharge temp. drop	A.RUN	·Check that the filled circulating fluid temperature is within the specified range. ·Check the value of R5.06 .
AL05	High circulating fluid return temp.	A.STP	·Check that the circulating fluid flows. ·Check that the heat load is within the specified range.
AL06	High circulating fluid discharge pressure.	A.STP	Check that there is no bend, collapse and clog on/in the external piping.

Code	Description	Operation	Cause/Remedy (Press the reset key after eliminating the cause.)
AL07	Abnormal pump Operation.	A.STP	The pump does not operate. Check that the pump thermal operation switch is operated. Refer to Operation manual [6.3.3 How to release the pump thermal trip].
AL08	Circulating fluid discharge pressure rise.	A.STP	Check that there is no bending, collapse, or clogging with the external piping. "EEEE" shown on the PI display in the check monitor menu indicates short-circuit or broken wire of the pressure sensor in the circulating fluid circuit. Ask for the service for the pressure sensor.
AL09	Circulating fluid discharge pressure drop	A.STP	Restart and check if the pump runs. In case of displaying EEEE on the PI display of the main display and check monitor menu, the pressure sensor of the circulating fluid circuit has a malfunction. Ask for service.
AL10	High compressor suction temp.	P.RUN	·Check the returned circulating fluid temperature. ·Check that the heat load is within the specified range.
AL11	Low compressor suction temp.	P.RUN	·Check that the circulating fluid flows.
AL12	Low super heat temperature	P.RUN	·Use 15% ethylene glycol aqueous solution with the set temperature lower than 10°C.
AL13	High compressor discharge pressure	P.RUN	Check that the ambient temperature, facility water, and heat load satisfy the specifications.
AL15	Refrigerant circuit pressure (high pressure side) drop	P.RUN	Refrigerant circuit failed. Ask for service for the refrigerant circuit.
AL16	Refrigerant circuit pressure (low pressure side) rise	P.RUN	Check that the ambient temperature, facility water, and heat load satisfy the specifications.
AL17	Refrigerant circuit pressure (low pressure side) drop	P.RUN	·Check that the circulating fluid flows. ·It is possible that refrigerant is leaking. Ask for the service.
AL18	Compressor running failure	P.RUN	Restart and check if the compressor runs after leaving for 10 minutes.
AL19	Communication error	OFF	No request message is sent from the host computer. Send message again.
AL20	Memory error	A.STP	Controller failure. Ask for service.
AL21	DC line fuse cut	A.STP	Fuse for the power supply output of the contact input/output connector has blown. ·Ask for service for the fuse of the output voltage circuit. ·Check that there is no incorrect wiring and the current load is within the specified range.

10 Troubleshooting (continue)

Code	Description	Operation	Cause/Remedy (Press the reset key after eliminating the cause.)
AL22	Circulating fluid discharge temp. sensor failure	A.STP	Short circuit or broken wire of the temperature sensor. Ask for service for the temperature sensor.
AL23	Circulating fluid return temp. sensor failure	A.STP	
AL24	Compressor suction temp. sensor failure	P.RUN	
AL25	Circulating fluid discharge pressure sensor failure	A.STP	Short circuit or broken wire of the pressure sensor. EEEE is displayed on the PI display of the main display and check monitor display. Ask for service for the pressure sensor.
AL26	Compressor discharge pressure sensor failure	P.RUN	Short-circuit or broken wire of the pressure sensor of the refrigerant circuit. Ask for service for the pressure sensor.
AL27	Compressor suction pressure sensor failure	P.RUN	
AL28 ³	Pump maintenance	OFF	Notices of periodical maintenances. Ask for services of the pump, fan and/or compressor. Each periodical time can reset by 5.E.15 , 5.E.16 and 5.E.17 .
AL29 ¹	Fan maintenance	OFF	Every 30,00h
AL30	Compressor maintenance	OFF	Every 30,00h
AL31	Contact input 1 signal detection	A.STP	Contact input is detected.
AL32	Contact input 2 signal detection	A.STP	
AL37	Compressor discharge temp. sensor failure	P.RUN	Malfunction of the temperature sensor occurred. Ask for service.
AL38	Compressor discharge temp. rise	P.RUN	Check that the ambient temperature, facility water specifications and heat load are within the specified ranges.
AL40 ¹	Dust-proof filter maintenance	OFF	Notice of the periodical maintenance. Clean the dust-proof filter. This periodical time can reset by 5.E.30 . This alarm can be turned OFF with the menu R5.29 . 1 to 9999h (R5.31)
AL41	Power stoppage	A.STP	The power was shut off during operation. Restart after checking the power supply.
AL42	Compressor waiting	A.RUN	Waiting for the compressor to be ready for operation. Wait for a while. The alarm will be reset automatically after starting operation.
AL43 ¹	Fan breaker trip	P.RUN	Release the fan breaker trip refer to the operation manual.

Code	Description	Operation	Cause/Remedy (Press the reset key after eliminating the cause.)
AL45	Compressor over current	P.RUN	Check that there is no power failure such as ground fault, short circuit, voltage fluctuation, abnormal interphase voltage, open phase, surge.
AL47	Pump over current	A.STP	Release the compressor or pump thermal trip refer operation manual [6.3.2 How to release the thermal replay trip and circuit protector]
AL49 ²	Internal unit fan failure	A.RUN	Internal unit fan failure. Ask for service for the internal fan.
AL50	Incorrect phase error	A.STP	The phase of the power line is connected by incorrect phase.
AL51	Phase board over current	A.STP	Check that there is no power failure such as ground fault, short circuit, voltage fluctuation, abnormal interphase voltage, open phase, surge. Release the circuit protector thermal trip refer operation manual [6.3.2 How to release the thermal replay trip and circuit protector]

Note:

- *1: Water cooled type does not generate this alarm.
- *2: Air cooled type does not generate this alarm.
- *3: Mechanical seal replacement is limited to 2 times.

A.STP: Compressor, pump and fan stop operation.
A.RUN: Compressor, pump and fan stop operation continues operation.
P.RUN: Compressor and fan stop operation, and, pump continues operation.
OFF: This alarm will not be generated.

*Fan operation is stop only for the Air-cooled type.

10.2 Other Errors

The causes and remedies for failures that are not indicated by alarm numbers are shown in the following table:

Content of Failure	Cause	Remedy
The operation panel displays nothing.	The breaker of the user's power supply or/and the breaker is not turned ON.	Turn ON the breaker.
	The breaker of the user's power supply or the optional breaker has failed.	Replace the breaker.
	No power supply. (e.g. Breaker(s) in the power supplying route has not been turned ON.)	Supply the power.
	The breaker for the user's facility or the optional breaker has tripped due to short-circuit or leakage of electricity.	Repair the short-circuited part or the electricity leaking part.

10 Troubleshooting (continue)

Content of Failure	Cause	Remedy
The [RUN] LED does not light up even when the [RUN/STOP] switch is pressed.	Communication has been set.	Check if the communication setting has been set. Change the communication setting to 'Local mode'.
	Failure of the [RUN] LED	Replace the controller.
	Failure of the [RUN/STOP] switch.	Replace the controller.

11 Declaration of Conformity

11.1 Below is a sample Declaration of Conformity (DoC) used for this product. An actual DoC will be supplied with each product.



12 Contacts

AUSTRIA	SMC Pneumatik GmbH, Girakstrasse 8, AT-2100 Korneuburg
BELGIUM	SMC Pneumatics N.V./S.A. Nijverheidsstraat 20, B-2160 Wommelgem
BULGARIA	SMC Industrial Automation Bulgaria EOOD, Business Park Sofia, Building 8-6th floor, BG-1715 Sofia

CROATIA	SMC IndustrijskaAutomatikad.o.o. ZagrebačkaAvenija 104, 10 000 Zagreb
CZECH REP.	SMC Industrial Automation CZ s.r.o. Hudcova 78a, CZ-61200 Brno
DENMARK	SMC Pneumatik A/S, Egeskovvej 1, DK-8700 Horsens
ESTONIA	SMC Pneumatics Estonia OÜ, Laki 12, EE-10621 Tallinn
FINLAND	SMC Automation Oy, PL72, Tiistinniityntie 4, SF-02031 Espoo
FRANCE	SMC France, 1, Boulevard de Strasbourg, Parc Gustave Eiffel, Bussy Saint Georges, F-77607 Marne La ValléeCedex 3
GERMANY	SMC Deutschland GmbH, Boschring 13-15, 63329 Egelsbach
GREECE	SMC Italia Hellas Branch, Anagenisios 7-9-P.C. 14342 N.Philadelphia, Athens
HUNGARY	SMC Hungary IpariAutomatizálásiKft. Torbágy u. 19, HU-2045 Törökbálint
IRELAND	SMC Pneumatics (Ireland) Ltd. 2002 Citywest Business Campus, Naas Road, Saggart, Co. Dublin
ITALY	SMC Italia S.p.A. Via Garibaldi 62, I-20061 Carugate, (Milano)
LATVIA	SMC Pneumatics Latvia SIA, Dzelzavas str. 120g, Riga, LV-1021,
LITHUANIA	UAB "SMC Pneumatics", Oslo g. 1, LT-04123 Vilnius
NETHERLANDS	SMC Pneumatics B.V. De Ruyterkade 120, NL-1011 AB Amsterdam
NORWAY	SMC Pneumatics Norway AS, Vollsveien 13 C, GranfosNæringspark, N-1366 Lysaker
POLAND	SMC Industrial Automation, Polska Sp z o.o. 02-826 Warszawa, ul. Poloneza 89
PORTUGAL	SMC Sucursal Portugal, S.A. Rua De Eng Ferreira Dias 452 4100-246, Porto
ROMANIA	SMC Romania S.r.l. Str.Frunzei 29, Sector 2, Bucharest
RUSSIA	SMC Pneumatik LLC. Business centre, building 3, 15 Kondratjevskij prospect, St.Petersburg, 195197
SLOVAKIA	SMC PriemyselnáAutomatizáciaSpols.r.o. Fantranská 1223, Teplickanadvahom, 01301
SLOVENIA	SMC IndustrijskaAvtomatikad.o.o. Mirnskecesta 7, SLO-8210 Trebnje
SPAIN	SMC España S.A. Zuazobidea 14, 01015 Vitoria
SWEDEN	SMC Pneumatics Sweden AB, Ekhangsvägen 29-31, SE-141 71 Segeltorp
SWITZERLAND	SMC Schweiz AG, Dorfstrasse 7, Postfach, 8484 Weisslingen,
TURKEY	SMC PnömatikSanayiTicaretveServis A.Ş. GülbaharCaddesi, Aydin Plaza, No: 9/4 Güneşli – 34212, Istanbul
UK	SMC Pneumatics (U.K.) Ltd. Vincent Avenue, Crownhill, Milton Keynes, Buckinghamshire MK8 0AN

SMC Corporation

URL : <http://www.smcworld.com> (Global) <http://www.smceu.com> (Europe)
 SMC Corporation, Akihabara UDX15F, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 100 0021
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