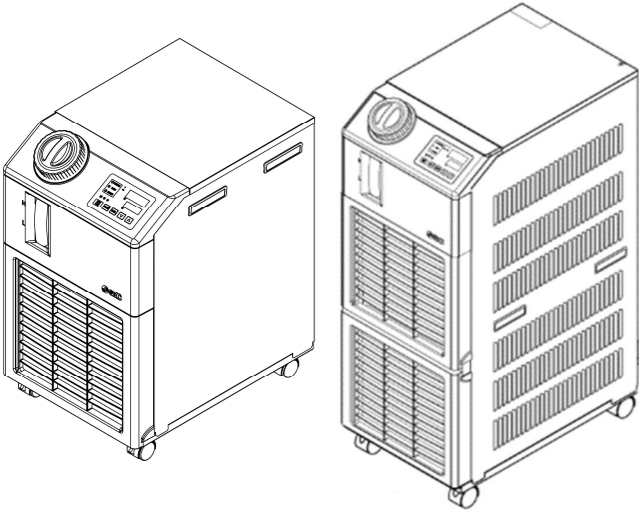




Instruction Manual  
Thermo-chiller  
HRSC012/018/024/030/040/050/060 Series



The intended use of this product is to use its 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 generates heat.

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)<sup>(1)</sup>, and other safety regulations.<sup>(1)</sup> ISO 4414: Pneumatic fluid power — General rules and safety requirements for systems and their components. ISO 4413: Hydraulic fluid power — General rules and safety requirements for systems and their components IEC 60204-1: Safety of machinery - Electrical equipment of machines. Part 1: General requirements ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

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

**Warning**

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

**Warning**



This symbol stands for a warning that **this system contains refrigerant under high pressure.**  
**Do not tamper with the system.**  
**It must be serviced by suitably qualified personnel only.**

2 Specification

2.1 Air-cooled Product Specifications

Model	HRSC	012 -A-20	018 -A-20	024 -A-20	030 -A-20	040 -A-20	050 -A-20	060 -A-20		
Cooling method		Air-cooled refrigerated type								
Temperature control method		PID control								
Refrigerant type		R744 (CO <sub>2</sub> , GWP: 1)								
Refrigerant charge	kg	0.43	0.43	0.43	0.48	0.48	0.54	0.54		
Ambient Temperature/ Humidity/Altitude <sup>*1,10/</sup>	°C	5 to 40°C, High-temperature environment specification (option): 5 to 45°C Humidity: 30 to 70% Altitude: Less than 3000m Environment: Indoor								
Installation environment										
Circulating fluid system	Circulating Fluid <sup>*2</sup>		Water, 15% ethylene glycol aqueous solution <sup>*4</sup>							
	Set temperature <sup>*1</sup>	°C	5 to 40°C							
	Cooling capacity <sup>*3</sup>	W	1300	1900	2400	3200	4200	5100	5900	
	Heating capacity <sup>*3</sup>	W	650	650	650	640	1100	1400	1300	
	Temperature stability <sup>*4</sup>		°C		±0.1					
	Pump	Rated flow (50/60Hz) <sup>*7</sup>	l/min	7 (0.13MPa) / 7 (0.18MPa)				23(0.24MPa) / 28 (0.32MPa)		
		Max. flow rate (50/60Hz)	l/min	27/29		34/40		31/42		
		Max. pump head (50/60Hz)	m	14/19				50		
		Pump output	W	200				550		
	Port size		Rc1/2"							
	Tank capacity		L	Approx. 5						
Fluid contact materials		Stainless steel, Copper (Heat exchanger brazing), Brass, Alumina ceramic <sup>*13</sup> , Carbon, PP, PE, POM, FKM, EPDM, PVC, SiC <sup>*14</sup>								
Electrical System	Power supply		Single-phase 200 to 230 VAC (50/60 Hz) Allowable voltage range ±10% (No continuous voltage fluctuation)							
	Earth Leakage breaker	Rated current	A	10	10	15	15	20	30	30
		Sensitivity current	A	30	30	30	30	30	30	30
	Rated operating current <sup>*3</sup>		mA	5.0/5.1	6.4/6.5	7.7/7.8	8.6/8.7	11.4/11.5	12.7/14	14.6/15.9
	Rated power consumption <sup>*3</sup>		kW (kVA)	0.8/0.8 (1.0/1.0)	1.0/1.0 (1.3/1.3)	1.3/1.3 (1.6/1.6)	1.3/1.4 (1.8/1.8)	1.8/1.8 (2.3/2.3)	2.1/2.4 (2.5/2.8)	2.3/2.6 (2.9/3.2)
	Noise level (50/60Hz) <sup>*8</sup>		dB(A)	60/61	60/61	60/61	62/65	64/66	65/68	66/68
Accessories		Fitting (for drain outlet) 1pc <sup>*11</sup> , Power supply connector 1pc <sup>*12</sup> , Quick Manual (with clear case) Japanese text: 1pc, English text: 1pc., Alarm code sticker Japanese text: 1pc, English text: 1pc., Power supply cable: Option (sold separately) to be ordered or prepared by user.								
Weight <sup>*9</sup>		kg	51		53		73			

2.2 Water-cooled Product Specifications

Model		HRSC	012 -W-20	018 -W-20	024 -W-20	030 -W-20	040 -W-20	050 -W-20	060 -W-20		
Cooling method			Water-cooled refrigerated type								
Temperature control method			PID control								
Refrigerant type			R744 (CO <sub>2</sub> , GWP: 1)								
Refrigerant charge			kg	0.41	0.41	0.41	0.41	0.41	0.44		
Ambient Temperature/ Humidity/Altitude <sup>*1/</sup>			°C	5 to 40°C Humidity: 30 to 70% Altitude: Less than 3000m							
Installation environment				Environment: Indoor							
Circulating fluid system	Circulating fluid <sup>*2</sup>			Water, 15% ethylene glycol aqueous solution <sup>*4</sup>							
	Set temperature <sup>*1</sup>			5 to 40°C							
	Cooling capacity <sup>*3</sup>			W	1300	1900	2400	3200	4200	5100	5900
	Heating capacity <sup>*3</sup>			W	650	650	650	600	1000	1300	1300
	Temperature stability <sup>*5</sup>			°C	±0.1						
	Pump	Rated flow (50/60Hz)	l/min	7 (0.13MPa) / 7 (0.18MPa)						23(0.24MPa) / 28 (0.32MPa)	
		Max. flow rate (50/60Hz)	l/min	27/29				34/40		31/42	
		Max. pump head (50/60Hz)	m	14/19				50			
		Output	W	200				550			
	Port size			Rc1/2"							
	Tank capacity			L	Approx. 5						
Fluid contact materials			Stainless steel, Copper (Heat exchanger brazing), Brass, Alumina ceramic <sup>*13</sup> , Carbon, PP, PE, POM, FKM, EPDM, PVC, SiC <sup>*14</sup>								
Facility Water System	Temperature range		°C	10 to 40°C							
	Pressure range		MPa	0.3 to 0.5							
	Required flow rate <sup>*10</sup>		l/min	8	12	14	15	15	16	17	
	Inlet-outlet pressure differential of facility water		MPa	0.3 or more							
	Port size			Rc3/8"						Rc1/2"	
	Fluid contact material			Stainless steel, Copper (Heat exchanger brazing), EPDM							
Electrical System	Power supply			Single-phase 200 to 230 VAC (50/60 Hz) Allowable voltage range ±10% (No continuous voltage fluctuation)							
	Earth Leakage breaker	Rated current	A	10	10	10	15	20	20	20	
		Sensitivity current	mA	30	30	30	30	30	30	30	
	Rated operating current <sup>*3</sup>		A	3.1/3.2	4.0/4.1	4.4/4.5	6.1/6.2	7.6/7.7	9.4/10.7	10.3/11.6	
	Rated power consumption <sup>*3</sup>		kW (kVA)	0.5/0.6 (0.6/0.7)	0.6/0.7 (0.7/0.8)	0.8/0.9 (0.9/1.0)	0.9/1.0 (1.3/1.3)	1.1/1.2 (1.6/1.6)	1.6/1.9 (1.9/2.2)	1.7/2.0 (2.0/2.3)	
	Noise level (50/60Hz) <sup>*8</sup>		dB(A)	60/61	60/61	60/61	62/65	64/66	65/68	66/68	
Accessories			Fitting (for drain outlet) 1pc <sup>*11</sup> , Power supply connector 1pc <sup>*12</sup> , Quick Manual (with clear case) Japanese text: 1pc, English text: 1pc., Alarm code sticker Japanese text: 1pc, English text: 1pc., Power supply cable: Option (sold separately) to be ordered or prepared by user.								
Weight <sup>*9</sup>			kg	50			53			73	

2 Specification (continued)

Notes:

- \*1 No condensation should be present.
- \*2 If tap water is used, use water that is compliant with the Water Quality Standards of the Japan Refrigeration and Air Conditioning Industry Association (JRA GL-02-1994 cooling water system - circulating type - make-up water). Refer to "Specific Product Precautions" for other usable circulating fluids.
- \*3 ①Ambient temperature: 25°C, ②Circulating fluid temperature: 20°C, ③Circulating fluid at the rated flow, ④Circulating fluid: Tap water
- \*4 Refer to the cooling capacity and heating capacity graphs.
- \*5 Use a 15% ethylene glycol aqueous solution if operating in a place where the circulating fluid temperature is 10°C or less.
- \*6 Temperature at the thermo-chiller outlet when the circulating fluid flow is at the rated flow and the circulating fluid outlet and return port are directly connected. The installation environment and power supply are within the specification range and stable.
- \*7 The capacity at the thermo-chiller outlet when the circulating fluid temperature is 20°C
- \*8 The required minimum flow rate for maintaining the cooling capacity or temperature stability. The specification of the cooling capacity and the temperature stability may not be satisfied if the flow rate is lower than the rated flow. In such a case, use a bypass piping set (sold separately).
- \*9 Front: 1 m, height: 1 m, stable with no load, other conditions → See \*3.
- \*10 Weight in the dry state without circulating fluids.
- \*11 The required flow rate when the cooling capacity load is applied at a circulating fluid temperature of 20°C, and circulating fluid rated flow and facility water of 25°C
- \*12 It is not provided for the HRSC050/060
- \*13 It is not provided for the HRSC040/050/060.
- \*14 Not included for the HRSC050/060
- \*15 When Option T is selected for HRSC012/018/024/030/040, when HRSC050/060 is selected

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	2025	2026	2027	2028	2029	2030	2031	...
Month	D	E	F	G	H	I	J	...
Jan	o	Do	Eo	Go	Ho	Io	Jo	...
Feb	P	DP	EP	GP	HP	IP	JP	...
Mar	Q	DQ	EQ	FQ	GQ	HQ	IQ	...
Apr	R	DR	ER	FR	GR	HR	IR	...
May	S	DS	ES	FS	GS	HS	IS	...
Jun	T	DT	ET	FT	GT	HT	IT	...
Jul	U	DU	EU	FU	GU	HU	IU	...
Aug	V	DV	EV	FV	GV	HV	IV	...
Sep	W	DW	EW	FW	GW	HW	IW	...
Oct	X	DX	EX	FX	GX	HX	IX	...
Nov	Y	DY	EY	FY	GY	HY	IY	...
Dec	Z	DZ	EZ	FZ	GZ	HZ	IZ	...

3 How To Order

3.1 Part Number of Product

HRSC [ ] [ ] [ ] [ ] [ ] [ ]

Cooling capacity

012	Cooling capacity 1300W
018	Cooling capacity 1900W
024	Cooling capacity 2400W
030	Cooling capacity 3200W
040	Cooling capacity 4200W
050	Cooling capacity 5100W
060	Cooling capacity 5900W

Option

Symbol	Option	012	018	024	030	040	050	060
NL	None	●	●	●	●	●	●	●
G	High-temperature environment specification <sup>*11</sup>	●	●	●	●	●	●	●
J	With automatic fluid fill function	●	●	●	●	●	●	●
T	High-pressure pump mounted <sup>*15</sup>	●	●	●	●	●	●	●

\*1 Cooling method: -A (Air-cooled refrigeration) can be chosen.  
\*2 The cooling capacity will decrease by about 300W from the value in the catalog.  
The pump has a mechanical seal and could leak depending on circulating fluid quality.  
We recommend using the particle filter kit HRS-PF003 as a preventative measure.

Power supply

Symbol	Power supply
20	Single-phase 200 to 230 VAC (50/60Hz)

Cooling method

A	Air-cooled refrigeration
W	Water-cooled refrigeration

Pipe thread type

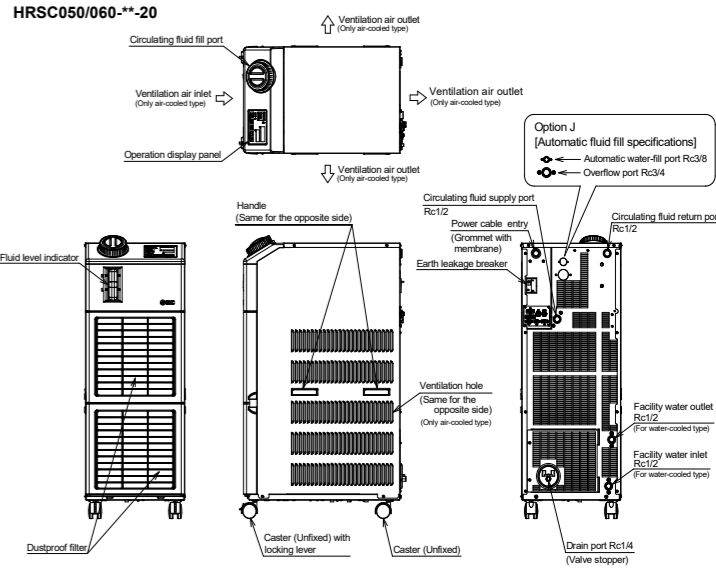
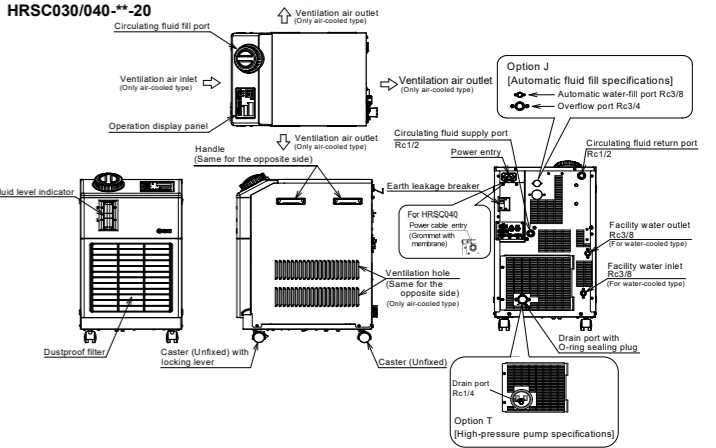
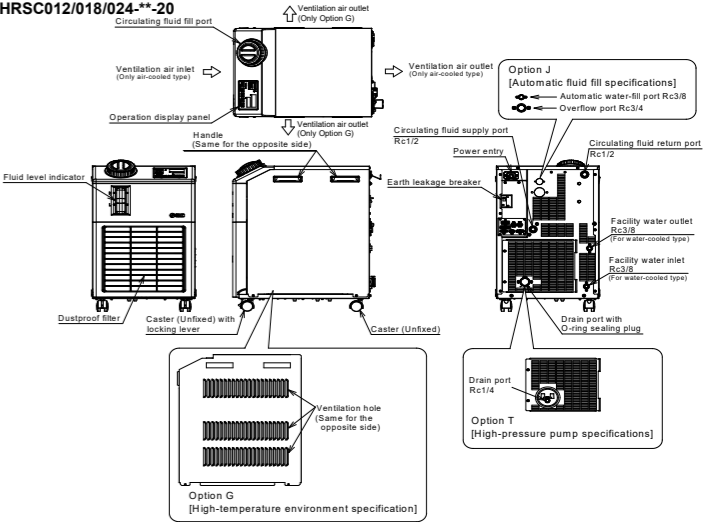
NL	Rc
F	G (with Rc-G conversion fitting set)
N	NPT (with Rc-NPT conversion fitting set)

3.2 Accessories

	Name	Picture	Quantity	HRSC 012-030	HRSC 040	HRSC 050/06 0
1	Quick manual (this manual)		Japanese Text: 1 English Text: 1 (with a clear cover)	●	●	●
2	Alarm code list label		Japanese Text: 1 English Text: 1	●	●	●
3	Power supply connector*1		1	●	-	-
4	Fitting (for drain port)*2		1	●	●	-

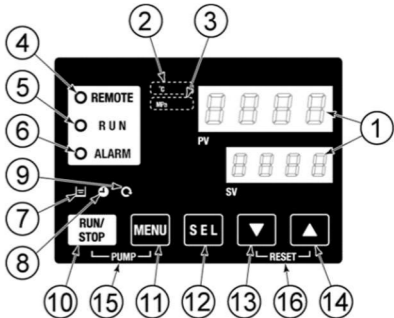
- \*1 Only included with HRSC030
- \*2 Not included with Option T (High Pressure Pump Specification).
- \* These accessories are not explained in this manual. For details, read the Operation Manual.

4 Name of Parts and Accessories






4.1 Main Parts

- The names of parts used in this manual are as follows: (Operation display panel)



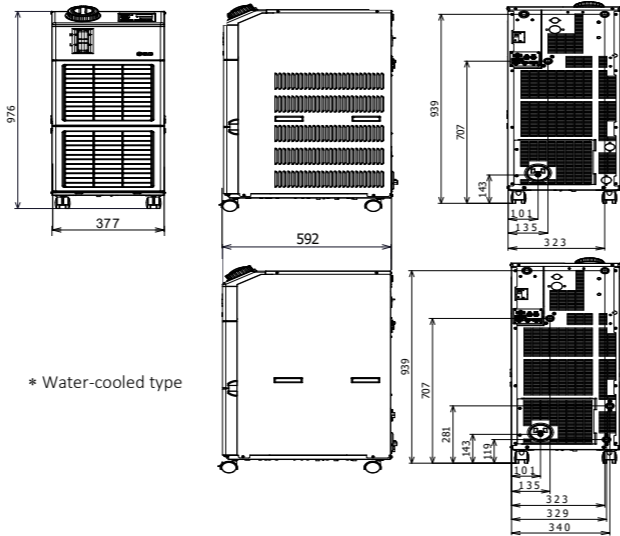
4 Name of Parts and Accessories (continued)

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 discharge temperature of the circulating fluid and the set values of other menus.
2	[°C] lamp	Displays the unit of display temperature.	
3	[MPa] lamp	Displays the unit of display pressure.	
4	[REMOTE] lamp*	Enables the remote operation (start and stop) by communication. Lights up during remote operation.	
5	[RUN] lamp	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.	
6	[ALARM] lamp	Flashes with buzzer when alarm occurs.	
7	[  ] lamp	Lights up when the surface of the level indicator falls below the LOW level.	
8	[  ] lamp*	Lights up while the run timer or stop timer function is working.	
9	[  ] lamp*	Lights up when the product is in automatic operation.	
10	[RUN/STOP] key	Makes the product start or stop.	
11	[MENU] key*	Shifts the main menu (display screen of temperature) and secret menu (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	Keep the [MENU] and [RUN/STOP] keys pressed down simultaneously. The pump starts running independently to make the product ready for start-up (release the air).	
16	[RESET] key	Keep the [▼] and [▲] keys pressed down simultaneously. This will stop the alarm buzzer and reset the [ALARM] lamp.	

\*These lamps and keys are not used in this manual. For details, read the Operation Manual attached.

5 Name of parts and Outline Dimension (Continued)

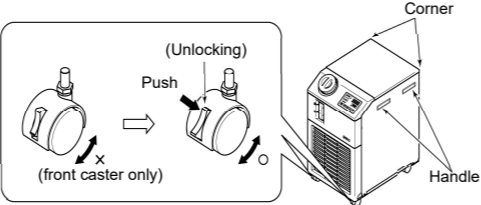
5.3 HRSC050/060-\*\*-20-\*



6 Installation

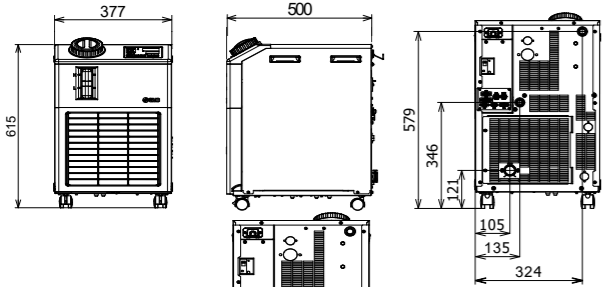
6.1 Transportation, Transfer and Moving

- 1) Be sure to unlock the caster (only at the front wheels). There is no lock function with the rear casters.
- 2) Hold the handles on the left and right and push to move.
- 3) When pushing the front of rear panel, press as the corners. Pushing at the centre can deform the panel.

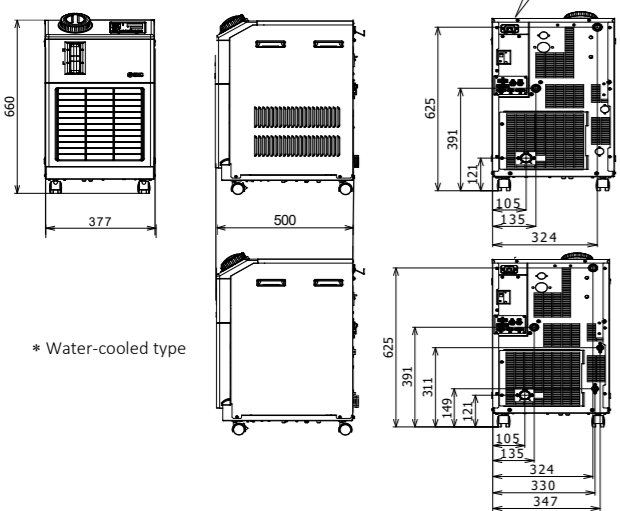


5 Name of parts and Outline Dimension

5.1 HRSC012/018/024-\*\*-20-\*



5.2 HRSC030/040-\*\*-20-\*



6.2 Installation


Warning

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


6.3 Types of Hazard Labels

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


Warning related to Electricity

	This symbol stands for a possible risk of electric shock.
---	---


Warning related to High Temperatures

	Possible risk of hot surface and burns.
---	---


Warning related to Rotating Objects

	Possible risk of cutting fingers or hand, or entanglement by rotating fan (For air-cooled type).
---	--

Warning related to High Pressure Refrigerant

	This symbol stands for a warning that this system contains refrigerant under high pressure. Do not tamper with the system. It must be serviced by suitably qualified personnel only.
---	--

Warning related to other General Dangers

	This symbol stands for general danger.
---	--

6.4 Environment

The product must **not** be operated, installed, stored or transported in the following conditions. Potential malfunction or damage to the product may occur if these instructions are disregarded.

Location that is exposed to corrosive gas, organic solvent, chemical solution, or flammable gas (the product is not flame-proof).

- Location that is outside.
- Location that is exposed to water, water vapour, steam, salt water or oil.
- Location that is exposed to dust or powder material.
- Location that is exposed to corrosive gas, organic solvent, chemical solution, or flammable gas (the product is not flame-proof).
- Location where the ambient temperature is out of the following range:  
In transportation and in transport (no circulating fluid in piping): 0 to 50°C  
In operation: 5 to 40°C (Option G [High temperature environment]: 5 to 45°C)

6 Installation (continued)

- Location where the ambient humidity is out of the following range or where condensation occurs.  
In transportation and storage 15 to 85%.  
In operation: 30 to 70%  
(Option G [High-temperature environment specification]: 30 to 70°C)
- Location that is exposed to direct sunlight or heat radiation.
- Location that is near heat sources and poor ventilation.
- Location that is subjected to abrupt changes in temperature.
- Location that is subjected to strong electromagnetic noise (intense electric field, intense magnetic field, or surges).
- Location that is subjected to static electricity, or conditions where static electricity can discharge to the product.
- Location that is subjected to strong high frequencies radiation (microwaves).
- Location that is subjected to potential lightning strike.
- Location where the product is affected by strong vibrations or impacts.
- Environment that applies external force or weight causing damage to product.
- Location without adequate space for maintenance.
- Location where it is directly exposed to rain or snow
- Place of Pollution Degree “1” or “2” (IEC60664-1).
- Location at altitude of 3000m or higher (except during product storage and transport).
- The heat radiation efficiency of the devices in the product will be less at altitudes of 1000m or higher. The maximum ambient temperature at which the chiller can be used and the cooling capacity will lower at higher altitudes, according to the table below.

Please select the thermo-chiller considering the descriptions.

1. Max ambient temp.: Max Ambient temp. depends on chiller altitude.
2. Cooling capacity coefficient: The product's cooling capacity will decrease relative to the cooling capacity coefficient.

Please select the thermo-chiller considering the following conditions:

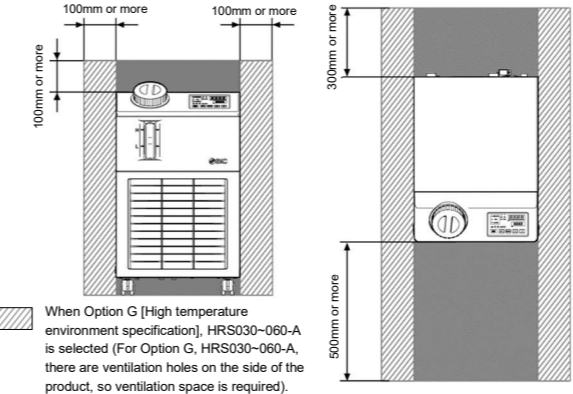
Altitude [m]	1. Max Ambient Temp. [°C]		2. Cooling capacity coefficient
	Product of 40°C	Product of 45°C (High ambient. Option G )	
<1000m	40°C	45°C	1.00
<1500m	38°C	42°C	0.85
<2000m	36°C	38°C	0.80
<2500m	34°C	35°C	0.75
<3000m	32°C	32°C	0.70

6.5 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.**

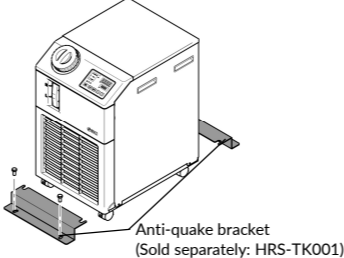
- 1) Select a hard flat and level surface suitable to support the weight of the product and which will reduce the effect of vibration.
- 2) Install the product so the operation panel is easily visible and accessible, electrical and fluid connections can be easily made at the rear of the product, and the air inlet and outlet vents are clear of obstructions. After moving into position, lock the front caster wheels again.



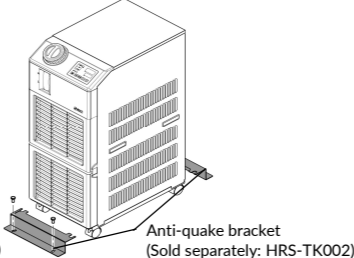
- 3) After moving, lock the front casters again.

- 4) Fix the product to the floor or base using the anti-quake bracket (sold separately).

HRSC012~040-\*\*-20-\*



HRSC050~060-\*\*-20-\*



6 Installation (continued)

6.6 Piping

Caution

- Connect piping firmly. Incorrect piping might cause leakage of supplied or drained leakage and wet surrounding area and facility.
- Pay attention not to allow dust, foreign materials to enter water circuit during piping
- Select piping with consideration of pressure and temperature to prevent bursting.
- Hold piping port firmly with specific wrench when tightening.

Name	Port size*1	Recommended tightening torque	Recommended proof pressure for piping
Circulating fluid supply	Rc1/2	28 to 30N·m	0.4MPa more
Circulating fluid return	Rc1/2	28 to 30N·m	0.4MPa more
Facility water inlet *2	Rc3/8 *3 Rc1/2 *4	22 to 24N·m (Rc3/8) 28 to 30N·m (Rc1/2)	1.0MPa more (Facility water pressure 0.3 to 0.5 MPa)
Facility water outlet *2	Rc3/8 *3 Rc1/2 *4	22 to 24N·m (Rc3/8) 28 to 30N·m (Rc1/2)	
Automatic water-fill port *5	Rc3/8	22 to 24N·m	1.0MPa more (Automatic water-fill pressure 0.2 to 0.5MPa)
Overflow port *5	Rc3/4	28 to 30N·m	Inside diameter 19mm more of piping

\*1 For NPT and G thread, use a conversion connector available as an accessory separately.

\*2 For water-cooled type.

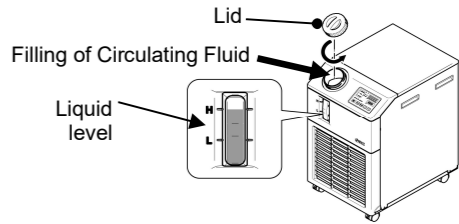
\*3 Model: HRSC012/018/024/030/040-\*\*-20

\*4 Model: HRSC050/060-\*\*-20

\*5 For automatic fluid filling [Option J]

6.7 Filling the Circulating Fluid

- 1) Check that the drain port is closed with a plug or valve to prevent the circulating fluid from draining into the surrounding area.
- 2) Turn the lid for the circulating fluid fill port counterclockwise to open, and fill the circulating fluid up to “H” of the level indicator scale.
- 3) After filling to the specified level, turn the lid clockwise to close.



Note: this example shows the model “HRSC024-A-20”.

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

6.8.1 Preliminary Preparation for Wiring

- 1) Prepare the cable and individual socket or earth leakage breaker shown in the table below.
- 2) Strip the sheath from both ends of the cable.
- 3) Disassemble the power supply connector (supplied as an accessory) and mount one end of the cable to the L, N and E terminals and reassemble the power supply connector.
- 4) Connect the other end of the cable to a crimped terminal that is connectable to the secondary side of the ground leakage breaker.

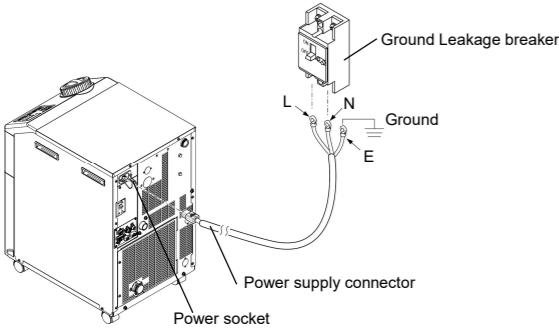
6 Installation (continued)

HRSC model	Power supply voltage	Cable qty.x size	Earth leakage breaker		
			Rated voltage [V]	Rated current [A]	Sensitivity of leak current [mA]
HRSC012-A/W-20 HRSC018-A/W-20 HRSC024-W-20	1-phase 200-230V AC 50/60Hz	3 x 14AWG (3 cores x 2.0mm²) *	200, 230	10	30
HRSC024-A-20 HRSC030-A/W-20				15	30
HRSC012/018/024/030-A/W-20-T (Option T is selected)		3 cores x 12AWG (3 cores x 3.5mm²) *		15	30
HRSC040-A/W-20 HRSC050-W-20 HRSC060-W-20		3 cores x 10AWG (3 cores x 5.5mm²) *		20	30
HRSC050-A-20 HRSC060-A-20		3 cores x 10AWG (3 cores x 5.5mm²) *		30	30
(*) Including ground					

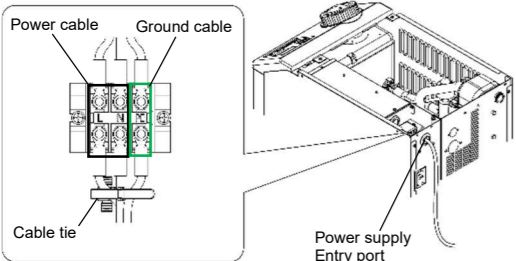
6.9 Wiring of Power Supply

- 1) Insert the power connector to the power socket. (For HRSC040-060 models, connect the power cable to the terminal block).
- 2) Connect the plug or crimped terminal to the individual grounded socket or the secondary side of the ground leakage breaker and grounding.
- 3) Turn on the breaker of the main power supply.

HRSC012~030



HRSC040~060

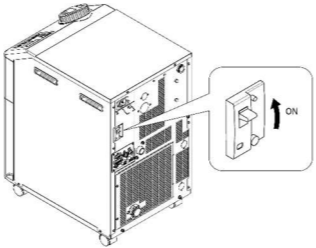


7 Start, Stop and Temperature Settings

7.1 Preliminary Preparation for Start-up

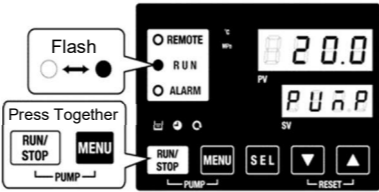
7.1.1 Supply of Power

- 1) Turn on the power switch.  
⇒ The initial screen (HELLO screen) is displayed for approx. 8 seconds on the operation display panel. Then the display changes to the main screen, which displays the circulating fluid outlet temperature.



7.1.2 Circulating Fluid Preparation

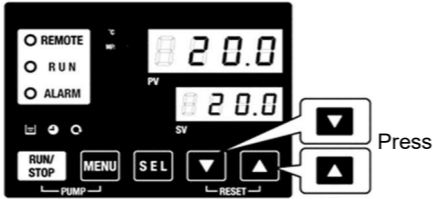
- 1) Press the [PUMP] key ([RUN/STOP] key and [MENU] key simultaneously). The [RUN] lamp flashes and the pump operates independently. This operation allows the discharge of the circulating fluid and enables checking leakage from the piping and air release.



- 2) 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.
- 3) In that case, check that there is no leakage from the user's piping, fill the circulating fluid as specified in "5.6 Filling of Circulating Fluid" and take necessary actions in "7. Alarms".

7.1.3 Temperature Setting

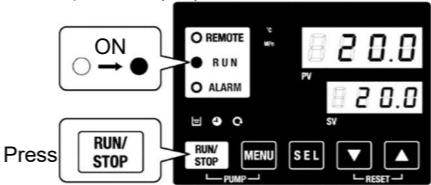
- 1) Press the [▼] and [▲] keys to change the SV to the required value.



Example: "Set value of circulating fluid discharge temperature" 20.0°C (Default value)

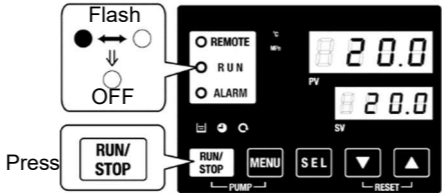
7.2 Starting the Product

- 1) Keep the [RUN/STOP] key pressed for approx. 2 seconds.  
⇒ The [RUN] lamp lights up (in green) and the product starts running. The circulating fluid discharge temperature (PV) is controlled to the set temperature (SV).



7.3 Stopping the Product

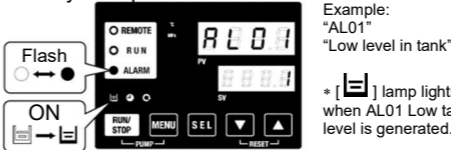
- 1) Keep the [RUN/STOP] key pressed for approx. 2 seconds.  
⇒ The [RUN] lamp flashes (in green) and continues the operation until the product is ready to stop. After approx. 15 seconds, the [RUN] lamp goes off and the product stops.



8 Alarms

Caution

- Should some error 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. See alarm list in section 8 – "Troubleshooting".
- Before resetting the alarm, read the "Causes and Remedies" of "Troubleshooting" and eliminate the cause explained there. Otherwise, the same alarm may be repeated.



Example: "AL01" "Low level in tank"

\* [ ] lamp lights only when AL01 Low tank level is generated.

- As accessories, the clear cover (for this manual) and alarm code list label are enclosed. Resetting of alarm

- 1) 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.

9.2 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.
- Refer to Section 2 Product specifications for specified circulating fluid. Clean the tank, circulating fluid circuit, and change the circulating fluid in the tank if any problems are found during the regular check. Even if no problems are found, it is recommended to change the fluid once every 3 months in case evaporation of the fluid causes concentration of impurities.

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.
Fluid leakage	Check the connected part of piping	Temperature and humidity are within the specified range of the product. There is no circulating fluid leakage from the connected part of piping.
Fluid amount	Check the liquid level indicator.	The circulating fluid must enter between the scales of "H" and "L".
Operation panel	Check the display.	The numbers on the display are clear.
Operation panel	Check the function.	The [RUN/STOP] and [MENU], [SEL], [▼], [▲] buttons operate properly.
Circulating Fluid temperature	Check on the operation panel.	There is no problem for use.
Operating conditions	Check the operation condition.	There is no abnormal noise, vibration, smell and smoke.

9 Maintenance (continued)

9.4 Monthly Check

Caution

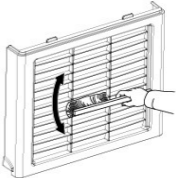
- If the air ventilation of the product have clogged with dust or debris, heat radiation performance reduces. This results in the reduction of cooling performance, and may stop the operation because the safety device is triggered. Shut off the power supply of the product when performing cleaning, maintenance or inspection. Otherwise, it might cause electric shock, injury or burn, etc.
- Replace all panels removed for inspection or cleaning. It might cause injury or electric shock if it is operated with the panel removed or opened.

9.4.1 Removal of the Dustproof Filter

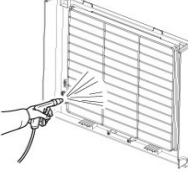
- 1) The dustproof filter is installed at the lower part of the front face of the thermo-chiller. It is mounted with a magnet. Pull out the lower part of the side surface of the dustproof filter.
- 2) When the magnet comes off, pull the dustproof filter downwards to remove. Care should be taken not to deform or scratch the air-cooled condenser.

9.4.2 Cleaning of Filter

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



Clean with brush



Clean with air purge

- 2) Mount the dustproof filter in reverse order of removal.

9.5 Inspection every 3 Months

Item	Description of checking	
Power Supply	Check the power supply voltage.	Make sure the supply voltage is within the specification range.
Circulating fluid	Replace the circulating fluid periodically.	<ul style="list-style-type: none"><li>• Ensure that the circulating fluid has not been contaminated and that there is no algae growth.</li><li>• Circulating fluid inside the tank must be clean and there must not be foreign matter inside.</li><li>• Use clean water or pure water for the ethylene glycol solution.</li><li>• It is recommended to replace the circulating fluid every 3 months when periodic maintenance is performed.</li></ul>

9.6 Inspection every 6 months

Caution

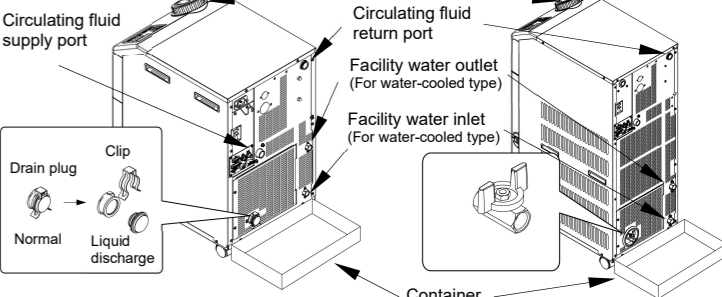
- It is impossible to prevent the leakage from the mechanical seal completely because of its structure. Although the leakage is described as 3cc/hr or less (reference value) based on JIS standards.
  - The recommend lifetime of the mechanical seal before needing replacement is 6000 to 8000 hours (usually 1 year).
- 9.6.1 Check for water leakage from pump
- Remove the panel and check the mechanical seal of the pump for excessive leakage. If the leakage is found, replace the mechanical seal. Order the mechanical seal described in '7.9 Consumable parts' in the operation manual.

9.7 Draining of the Circulating Fluid

Warning

- Stop the customer device and release the residual pressure before discharging the circulating fluid.
- Before discharging the facility water, in case of water-cooled refrigerated type, stop the equipment for the facility water, or stop the facility water circuit to release the residual pressure.

- 1) Place a container with a capacity of approx. 10L underneath the drain outlet.



- 2) Remove the tank lid.
- 3) <HRSC012/018/024/030/040-□□-20>  
Remove the drain plug on the drain port on the piping to discharge the fluid. An O ring is used for the drain plug. Take care not to damage the O ring.  
<HRSC050/060-□□-20>  
Open the ball valve at the drain opening to drain the liquid.

9 Maintenance (continued)

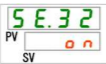
- 4) Confirm that a sufficient amount of the circulating fluid has been drained from the user's machine and piping and apply air purge from the circulating fluid return port.
- 5) <HRSC012/018/024/030/040-□□-20>  
After discharging the circulating fluid in the tank, refit the drain plug, clip and close the tank lid.  
<HRSC050/060-□□-20>  
After discharging the circulating fluid in the tank, close the ball valve and attach the tank lid.

<For the water-cooled refrigeration chiller, drain the facility water according to the procedures from 6 to 8.>

⚠ Caution

Just removing the facility water piping does not discharge the facility water completely.

- 6) Remove the piping of the outlet of the facility water.
- 7) Press the [SEL] key 31 times. Maybe the SE32 image should show OFF.



The digital display will show the setting screen for forced opening/closing of the proportional valve. Use the [▲] key to change it to “ ”.

- 8) After confirming that the discharged water has been fully discharged, turn off the forced opening/closing of the proportional valve that was set in step 7.
- 9) Install plugs at the circulating liquid supply/return ports and heat radiation water inlet/outlet (in the case of water-cooled refrigeration type) of the product. Refer to operation manual Fig. 8.4-2.

9.8 Consumable Parts

Description	Part No.	Remark
Dustproof filter	HRS-S0001	For spare
Mechanical seal set	HRG-S0211	HRSC012/018/024/030/040-**-20-** For option T (High head pump) For HRSC050/060-**-20

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.

10.2 Alarm code list and Troubleshooting.

Code	Description	Operation	Cause/Remedy (Press Reset after fixing error)
AL01	Low level in tank	Stop <sup>1</sup>	The fluid level has fallen below the level indicator. Fill the circulating fluid.
AL02	High circulating fluid discharge temperature.	Stop	•Ensure that the minimum circulating fluid flow rate is maintained. •Check that the ambient temperature, facility water temperature, and/or headload are within specification.
AL03	Circulating fluid discharge temperature rise	Continued <sup>1</sup>	•Wait until the circulating fluid temperature decreases.
AL04	Circulating fluid discharge temperature	Continued <sup>1</sup>	Check the ambient temperature and supplied circulating fluid temperature are within specification.
AL05	High circulating fluid return temperature	Stop	•Ensure that the minimum circulating fluid flow rate is at least 7l/min or more. •Check that the ambient temperature, facility water temperature, and/or head load are within specification.
AL06	High circulating fluid discharge pressure	Stop	Check the fluid circuit for closed valves, obstructive bends, or foreign object blockages.
AL07	Abnormal pump operation	Stop	Restart and check the pump is operating.
AL08	Circulating fluid discharge pressure rise	Continued <sup>1</sup>	Check the user's piping for bends, pinching or blockage by foreign matters.
AL09	Circulating fluid discharge pressure drop	Continued <sup>1</sup>	• Restart and check the pump is operating. • Ensure that the tank level is within the appropriate range.

10 Troubleshooting (continued)

Code	Description	Operation	Cause/Remedy (Press Reset after fixing error)
AL10	High compressor suction temperature	Stop	• Check the temperature of the circulating fluid returning to the product. • Check heat load is within specification.
AL11	Low compressor intake temperature	Stop	• Check the circulating fluid flows. • Check the circulating fluid in the evaporator is not frozen. • Use a 15% ethylene glycol aqueous solution if operating with a set temperature lower than 10°C.
AL12	Low super heat temperature	Stop	• Check the temperature of the circulating fluid returning to the product. • Check that the heat load is within specification.
AL13	High compressor discharge pressure (sensor)	Stop	Check that the ambient, facility water temperature and heat load are within specification.
AL14	High compressor discharge pressure (switch)	Stop	
AL15	Refrigerant circuit pressure (high pressure side) drop	Stop	• Check the ambient temperature is within the specified range. • Possible leak detected. Request a service.
AL16	Refrigerant circuit pressure (low pressure side) rise	Stop	Check that the ambient, facility water temperature and heat load are within specification.
AL17	Refrigerant circuit pressure (low pressure side) drop	Stop	• Check that the circulating fluid is flowing. • Possible leak detected. Request a service.
AL18	Compressor overload	Stop	Wait 10 minutes and restart, then check the compressor is operating.
AL19	Communication error <sup>2</sup>	OFF <sup>1</sup>	The request message from the host computer not received. Send it again.
AL20	Memory Error	Stop	Controller error detected. Power off the device and restart. Ask for service if issue continues.

Code	Description	Operation	Cause/Remedy (Press Reset after fixing error)
AL22	Circulating fluid supply temperature sensor abnormality	Stop	Temperature sensor short-circuit or open-circuit detected. Request sensor service.
AL23	Circulating fluid return temp. sensor failure	Stop	
AL24	Compressor intake temp. sensor failure	Stop	
AL25	Circulating fluid supply pressure sensor abnormality	Stop	Pressure sensor short-circuit or open-circuit detected. Request sensor service.
AL26	Compressor discharge pressure sensor abnormality	Stop	
AL27	Compressor suction pressure sensor abnormality	Stop	
AL28	Pump maintenance	Continued	Regular maintenance is due. Recommended to request inspection/service of the component.
AL29 <sup>3</sup>	Fan motor maintenance <sup>*3</sup>	Continued	•Refer to "0 Accumulated time reset function".
AL30	Compressor maintenance	Continued	Every 20,000 hours (Option T: Every 8,000 hours)*2
AL31	Contact input1 signal detection	Stop <sup>1</sup>	Contact input is detected.
AL32	Contact input 2 signal detection	Stop <sup>1</sup>	
AL33	Fluid leakage	Stop <sup>1</sup>	• Check that the leakage sensor is connected. • Liquid leakage detected. Find and repair leak location.
AL34	Electric resistivity /conductivity rise	OFF*1	Electrical resistivity / conductivity is larger than the set value. If an electrical conductivity sensor is used, replace the DI filter.
AL35	Electric resistivity /conductivity drop	OFF*1	Electrical resistivity / conductivity is smaller than the set value. If an electrical conductivity sensor is used, replace the DI filter.

10 Troubleshooting (continued)

Code	Description	Operation	Cause/Remedy (Press Reset after fixing error)
AL36	Electric resistivity /conductivity sensor error	Continued	Check if the resistivity/conductivity sensor is connected. There may be short circuit or open wire of the resistivity /conductivity sensor. Replace the sensor.
AL37	Compressor discharge temperature sensor abnormality.	Stop	Temperature sensor short-circuit or open-circuit detected. Request sensor service.
AL38	Compressor discharge temperature rise.	Stop	Check that the ambient temperature is within specified temperature range.
AL46	Compressor inverter error	Stop	Check for power supply system abnormalities (e.g ground fault, short-circuit, voltage fluctuation, abnormal phase-to-phase voltage, open phase, surge). Power off the device and restart. If issue continues, request service.
AL52	Ambient temperature abnormality <sup>*3</sup>	Continued*1	Check that the ambient temperature is within the specified range.
AL53	Facility water inlet temperature abnormality <sup>*4</sup>	Continued*1	Check that the facility water temperature is within the specified range.
AL55	Facility water outlet temperature rise*4	Continued*1	• Check that the temperature and flow rate of the customer's facility water system.
AL56	Facility water outlet temperature high*4	Stop	• Check that the heat load is with the appropriate range.
AL57	Ambient temperature sensor abnormality <sup>*3</sup>	Stop	Temperature sensor short-circuit or open-circuit detected. Request sensor service.
AL58	Facility water inlet temperature sensor abnormality <sup>*4</sup>	Stop	
AL59	Facility water outlet temperature sensor abnormality*4	Stop	

Code	Description	Operation	Cause/Remedy (Press Reset after fixing error)
AL60	Internal communication error	Stop	Check for power supply system abnormalities. (e.g ground fault, short-circuit, voltage fluctuation, abnormal phase-to-phase voltage, open phase, surge). Power off the device and restart. If the issue continues, request service.
AL61	Power supply abnormality	Stop	
AL62	Compressor inverter parameter error	Stop	
AL63	Compressor inverter communication error	Stop	

Alarm code list notes:

- 1: This is the factory default setting. The customer can change the setting. For details, refer to "5.14 Alarm customize function" in the operation manual.
- 2: Notice on mechanical seal replacement. Mechanical seal replacement is limited to 2 times. If the cumulative operation time of the pump exceeds 20,000 hours, please consider asking pump inspection service.
- 3: This alarm does not occur on water-cooled refrigeration model.
- 4: This alarm does not occur on air-cooled refrigeration model.

10.3 Other Errors

The causes and remedies for failures that are not indicated by alarm numbers as shown in 'Alarm code list and Troubleshooting' table.

Content of Failure	Cause	Remedy
The operation panel displays nothing	The power supply switch is not turned on.	Turn on the power supply switch.
	Failure of power supply switch	Replace the power supply switch.
	No power supply. (Breaker is not on)	Supply the power.
	Trip of breaker due to short-circuit and current leakage	Repair the short-circuit or current leaking part.
The [RUN] LED does not light up even when the [RUN/STOP] switch is pressed.	Communication mode is set.	Check the presence of communication setting.
	Failure of the [RUN] LED	Replace the controller.
	Failure of the [RUN/STOP] switch	Replace the controller.

11 Limitations of Use

11.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

⚠ Caution

Refer to Section 2. 'Specifications' for the product limitations of use.

12 Product Disposal

This product should not be disposed of as municipal waste. Check your local regulations and guidelines to dispose this product correctly, in order to reduce the impact on human health and the environment.

13 Declaration of Conformity

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

SMC CE

Original declaration

Doc. No. HRSC-TF224-083EU

EU DECLARATION OF CONFORMITY

is in conformity with the relevant Union harmonisation legislation and has been demonstrated to fulfil the requirements with reference to the harmonised standard(s) or applied standard(s) as listed below:

Directive	Requirements	Harmonised/applied standard(s)
2006/42/EC (Machinery Directive)	Annex I	EN ISO 12100:2010 EN ISO 14126:2018
2014/53/EU (EMC Directive)	Annex I	EN 61000-6-2:2005 EN 61000-6-4:2007+A1:2011
2011/65/EU (RoHS Directive)	Annex II	EN IEC 60900:2018

Signature and address of the person authorised to compile the technical file<sup>(1)</sup>:  
[Mr. Luca Mingi, General Manager, SMC Italia S.p.A., Via della Doria, 100/101, 00187, Roma, Italy]  
Importer/Distributor contact details: www.SMC.eu, www.SMCworld.com

Tokyo, Date: 27 DEC 2024

M. Watanabe

Signature of the person authorised to compile the technical file<sup>(2)</sup>:  
[Mr. Watanabe, General Manager, SMC Europe, Ltd., 4-2-3, Kinosaki, Takatsuki-shi, Osaka 590-4505, JAPAN]

SMC Corporation declares in conformity with the requirements of the applicable EU harmonisation legislation and has been demonstrated to fulfil the requirements with reference to the designated standards as listed below:

Statutory Instrument	Requirements	Designated Standard(s) Technical Specification
Supply of Machinery (Safety) Regulations 2008	Schedule 2	EN ISO 12100:2010
Electromagnetic Compatibility Regulations 2012	Schedule 2	EN 61000-6-2:2005 EN 61000-6-4:2007+A1:2011
The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulation 2012	Schedule A1	EN IEC 60900:2018

Importer/Distributor contact details:  
[SMC Europe, Ltd., 4-2-3, Kinosaki, Takatsuki-shi, Osaka 590-4505, JAPAN]  
www.smc.eu, www.smcworld.com

The person authorised to compile the technical file is the person named at the address below:  

Tokyo, Date: 27 DEC 2024

M. Watanabe

Signature of the person authorised to compile the technical file<sup>(2)</sup>:  
[Mr. Watanabe, General Manager, SMC Europe, Ltd., 4-2-3, Kinosaki, Takatsuki-shi, Osaka 590-4505, JAPAN]