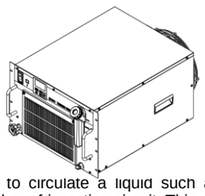
ORIGINAL INSTRUCTIONS

Instruction Manual

Thermo-chiller

HRR012/018/024/030



The intended use of 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 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 haz\ard 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: 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.

⚠ **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

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.

2 Specifications

2.1 Product specifications

HRR0＊＊-A＊-＊-Options

Model			HRR012-A-10-*	HRR018-A-10-*	HRR012-A-20-*	HRR018-A-20-*	HRR024-A-20-*	HRR030-A-20-*
Cooling method			Air-Cooled refrigerated type					
Refrigerant			R410A(HFC)					
Quantity of refrigerant		kg	0.36	0.36	0.38	0.38	0.47	0.47
Control method			PID control					
Ambient temperature*1*14			Temperature:5 to 40℃,Humidity:30 to 70%,Altitude: Less than 3000m					
Circulating fluid system	Circulating fluid*2		Tap w ater, Ethylene glycol aqueous solution 15%					
	Operating temp.range*1	℃	5 to 35*20					
	Cooling capacity(50/60Hz)*3	W	1000/1200	1600/1800	1000/1200	1600/1800	2000/2400	2500/3000
	Heating capacity(50/60Hz)*4	W	400/500		450/500		550/700	
	Temperature stability*5	℃	±0.1					
	Pump capacity(50/60Hz)*6	MPa	0.1l/min(at 7L/min)-0.3l/min(at 7L/min) Option -T/MT:0.36 l/min(at 7L/min)-0.42l/min(at 10L/min)		0.1l/min(at 7L/min)-0.3l/min(at 7L/min). Option –T : 0.42l/min(at 10L/min)-0.4l/min(at 14L/min) Option -MT : 0.32l/min(at 10L/min)-0.32l/min(at 14L/min). Option –T1: 0.28l/min(at 10L/min)-0.28l/min(at 10L/min)			
	Rated flow rate(50/60Hz)*7	L/min	7 / 7 For option –T ,-MT : 7/10		7 / 7 Option –T ,-MT : 10/14 Option-T1: 10 / 10			
	Flow display range	L/min	2 to 16					
	Electric conductivity display range	μS/cm	0.1 to 48 (Option -DM)					
	Electric conductivity setting range	μS/cm	0.5 to 45 (Option -DM)*21					
	Particle filter nominal filtration	μm	5					
	Bypass valve		Installed					
	Tank capacity	L	Approx. 4					
	Fluid outlet, fluid return port size		Rc1/2					
	Drain port size		Rc1/4,With cap					
	Leakage protection		Drain pan (With w ater leakage detector)					
	Fluid contact part material		Stainless steel,Copper brazing (Heat exchanger)*12,Brass*17, Bronze*17,SiC, Aluminum oxide ceramic,Carbon,PP,PE,POM,PA,FKM,EPDM,PVC,PPS,AS,fluoropolymer*13,ion exchange resin*22					
Electric system	Power supply*15		1phase AC100V (50/60Hz) 1phase AC135V (60Hz) Allowable voltage fluctuation±10%		1phase AC200 to 230V 50/60Hz Allowable voltage fluctuation±10%			
	Circuit protector	A	15		10 (For option -T,-MT,-T1: 15)			
	Applicable earth leakage breaker*8		Rated current: 15A Sensitivity current: 30mA		Rated current: 10A (For option -T,-MT,-T1: 15A) Sensitivity current: 30mA			
	Cable Qty x size(inculding ground)*16		3 cores ×14AWG(3 cores×2.0mm²)					
	Rated operating current(50/60Hz)	A	8.5/8.5	8.7/8.7	3.2/3.6	3.3/3.6	4.9/5.1	4.9/5.2
			For option -T,-MT					
			10.5/10.5	10.8/10.8	4.3/5.8	4.4/5.8	6.0/7.3	6.0/7.4
					For option –T1			
					5.0/5.2	5.0/5.2	5.9/6.0	5.9/6.1
	Rated power cunsumption(50/60Hz	kW (kVA)	0.7/0.8 (0.9/0.9)	0.8/0.9 (1.0/1.0)	0.6/0.7 (0.7/0.7)	0.6/0.7 (0.7/0.7)	0.8/1.0 (1.0/1.0)	0.8/1.0 (1.0/1.0)
			For option -T,-MT					
			0.9/1.0 (1.1/1.0)	1.0/1.1 (1.2/1.1)	0.9/1.2 (0.9/1.2)	0.9/1.3 (1.0/1.3)	1.2/1.6 (1.3/1.6)	1.3/1.6 (1.3/1.7)
					For option –T1			
					0.9/1.0 (1.0/1.1)	0.9/1.0 (1.0/1.1)	1.2/1.2 (1.3/1.4)	1.2/1.3 (1.3/1.5)
Communication function			Contact input / output, Serial RS-485 / RS-232C					
Noise level(50/60Hz)*9		dB	59/60	59/60	59/60	59/60	61/64	61/64
Dimensions*10		mm	W483xD550xH310				W483xD550xH399	
Accessory*19			Power supply connector,Maintenance handle for particle filter, Operation manual, Particle filter element*19					
Weight*11		kg	41		40		46	

*1: Use the product in conditions where freezing will not occur. Consult with SMC if using in a season or region where the ambient temperature will fall below zero.
*2: If tap water is used, use water which satisfies the standard of The Japan Refrigeration and Air Conditioning Industry Association (JRA GL-02-1994/Cooling water system –circulation type - make-up water).
*3: (1)Ambient temp: 25°C [For Water-Cooled type facility water temp: 25°C], (2)Circulating fluid temp.: 20°C, (3)Circulating fluid rated flow, (4)Circulating fluid: Tap water,(5)Power supply: AC100V, AC200V (6)Piping length : Shortest.
The cooling capacity will be reduced by 300W when option T, MT [High pressure pump mounted] and option T1 [Inverter pump mounted] are selected.
*4: (1) Ambient temp/facility water temp: 25°C, (2) Circulating fluid temp:20°C, (3) Circulating fluid rated flow, (4) Circulating fluid: Tap water, (5) Power supply: AC100V, AC200V (6) Piping length: Shortest.
*5: Outlet temp. when the circulating fluid flow is rated flow, and the circulating fluid outlet and the return are directly connected. Installation environment and power supply are within specification range and stable.
*6: The capacity at the thermo-chiller outlet when the circulating fluid temp. is 20℃.
*7: Fluid flow to maintain the cooling capacity and the 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.
*8: To be prepared by the customer. Use an earth 30mA: AC100V, AC200V in power supply specification.
*9: Front 1m/Height 1m/no heat load. See *3 for other conditions.
*10: Dimension between panels. Projection is not included. When option Y [With feet, and no Rack Mounting bracket] is selected, refer to operation manual [6.4. Option Y【With feet and no Rack Mounting bracket】].
*11: Weight when the circulating fluid is not included. The weight will increase by 1kg when option DM [Electric conductivity control + Applicable to deionized water piping] is selected. The weight will increase by 5kg when option T [High pressure pump] and MT [Applicable to deionized water piping + High pressure pump] are selected. The weight will decrease by 1kg when option T1, option Z.
*12: Copper and brass are not included when option M [Applicable to deionized water piping] and MT [Applicable to deionized eater piping + High pressure pump] is selected.
*13: When option DM [Electric conductivity control + Applicable to deionized water piping] is selected, these materials are included.
*14: If the altitude is 1000 m or more, please refer to operation manual "P.3-3 When Thermo-chiller installation in high altitude of 1000 meters or more".
*15: No continuous voltage fluctuation.

2 Specifications - continued

HRR0＊＊-W＊-＊-Options

Model			HRR012-W-10-*	HRR018-W-10-*	HRR012-W-20-*	HRR018-W-20-*	HRR024-W-20-*	HRR030-W-20-*
Cooling method			Water-Cooled refrigerated type					
Refrigerant			R410A(HFC)					
Quantity of refrigerant		kg	0.25	0.25	0.25	0.25	0.4	0.4
Control method			PID control					
Ambient temperature*1*14			Temperature:5 to 40℃,Humidity:30 to 70%,Altitude: Less than 3000m					
Circulating fluid system	Circulating fluid*2		Tap w ater, Ethylene glycol aqueous solution 15%					
	Operating temp.range*1	℃	5 to 35*20					
	Cooling capacity(50/60Hz)*3	W	1000/1200	1600/1800	1000/1200	1600/1800	2000/2400	2500/3000
	Heating capacity(50/60Hz)*4	W	400/500		450/500		550/700	
	Temperature stability*5	℃	±0.1					
	Pump capacity(50/60Hz)*6	MPa	0.1l/min(at 7L/min)-0.3l/min(at 7L/min) Option –T/MT:0.36 l/min(at 7L/min)-0.42l/min(at 10L/min)		0.1l/min(at 7L/min)-0.3l/min(at 7L/min). Option –T : 0.42l/min(at 10L/min)-0.4l/min(at 14L/min) Option -MT : 0.32l/min(at 10L/min)-0.32l/min(at 14L/min). Option –T1: 0.28l/min(at 10L/min)-0.28l/min(at 10L/min)			
	Rated flow rate(50/60Hz)*7	L/min	7 / 7 For option –T ,-MT : 7/10		7 / 7 Option –T ,-MT : 10/14 Option-T1: 10 / 10			
	Flow display range	L/min	2 to 16					
	Electric conductivity display range	μS/cm	0.1 to 48 (Option -DM)					
	Electric conductivity setting range	μS/cm	0.5 to 45 (Option -DM)*21					
	Particle filter nominal filtration	μm	5					
	Bypass valve		Installed					
	Tank capacity	L	Approx. 4					
	Fluid outlet, fluid return port size		Rc1/2					
	Drain port size		Rc1/4,With cap					
	Leakage protection		Drain pan (With w ater leakage detector)					
	Fluid contact part material		Stainless steel,Copper brazing (Heat exchanger)*12,Brass*17, Bronze*17,SiC, Aluminum oxide ceramic,Carbon,PP,PE,POM,PA,FKM,EPDM,PVC,PPS,AS,fluoropolymer*13,ion exchange resin*22					
Electric system	Power supply*15		1-phase AC100V (50/60Hz) 1-phase AC115V (60Hz)		1-phase AC200 to 230V 50/60Hz			
	Circuit protector	A	15		10 (For option -T,-MT,-T1: 15)			
	Applicable earth leakage breaker*8		Rated current: 15A Sensitivity current: 30mA		Rated current: 10A (For option -T,-MT,-T1: 15A) Sensitivity current: 30mA			
	Cable Qty x size(inculding ground)*16		3 cores ×14AWG(3 cores×2.0mm²)					
	Rated operating current(50/60Hz)	A	8.5/8.5	8.7/8.7	3.2/3.6	3.3/3.6	4.9/5.1	4.9/5.2
			For option -T,-MT					
			10.5/10.5	10.8/10.8	4.3/5.8	4.4/5.8	6.0/7.3	6.0/7.4
					For option –T1			
					5.0/5.2	5.0/5.2	5.9/6.0	5.9/6.1
	Rated power cunsumption(50/60Hz	kW (kVA)	0.7/0.8 (0.9/0.9)	0.8/0.9 (1.0/1.0)	0.6/0.8 (0.7/0.8)	0.6/0.7 (0.7/0.7)	0.8/1.0 (1.0/1.0)	0.8/1.0 (1.0/1.0)
			For option -T,-MT					
			0.9/1.0 (1.1/1.0)	1.0/1.1 (1.2/1.1)	0.9/1.1 (0.9/1.2)	0.9/1.1 (0.9/1.2)	1.1/1.2 (1.4/1.4)	1.1/1.2 (1.4/1.4)
					For option –T1			
					0.9/1.0 (1.0/1.1)	0.9/1.0 (1.0/1.1)	1.0/1.1 (1.2/1.2)	1.0/1.1 (1.2/1.2)
Communication function			Contact input / output, Serial RS-485 / RS-232C					
Noise level(50/60Hz)*9		dB	59/60	59/60	59/60	59/60	61/64	61/64
Dimensions*10		mm	W483xD550xH310				W483xD550xH399	
Accessory*19			Pow er supply connector,Maintenance handle for particle filter, Operation manual, Particle filter element*19					
Weight*11		kg	40		41		45	

2 Specifications - continued

*16: No continuous voltage fluctuation.
*17: To be prepared by the customer.
*18: When option T [High pressure pump] is selected, these materials are included.
*19: (1)Ambient temp: 25°C, (2)Circulating fluid temp: 20°C, (3) Circulating fluid rated flow, (4) Circulating fluid: Tap water, (5)Power supply: AC100V, AC200V (6)Piping length: Shortest, (7)Rated cooling load is applied.
*20: When Option DM [Electric conductivity control + Applicable to deionized water piping] is selected, DI filter will be added.
Piping thread type: When F is selected, G thread adapter set will be added.
Piping thread type: When N is selected, NPT thread adapter set will be added.
Not included for options Z and Z1.
*21: 200V type manufactured befor August 2019 (Serial: XV＊＊＊) can not be set below 10℃.
*22: 200V type manufactured befor August 2019 (Serial: XV＊＊＊) can not be set below 5μS/cm.
*23: Required flow rate when a load for the cooling capacity is applied at a condition of note 3.

2.2 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:

Month \ Year		2021	2022	2023	….	2025	2026	2027	….
		Z	A	B	….	D	E	F	….
Jan	o	Zo	Ao	Bo	….	Do	Eo	Fo	….
Feb	P	ZP	AP	BP	….	DP	EP	FP	….
Mar	Q	ZQ	AQ	BQ	….	DQ	EQ	FQ	….
Apr	R	ZR	AR	BR	….	DR	ER	FR	….
May	S	ZS	AS	BS	….	DS	ES	FS	….
Jun	T	ZT	AT	BT	….	DT	ET	FT	….
Jul	U	ZU	AU	BU	….	DU	EU	FU	….
Aug	V	ZV	AV	BV	….	DV	EV	FV	….
Sep	W	ZW	AW	BW	….	DW	EW	FW	….
Oct	X	ZX	AX	BX	….	DX	EX	FX	….
Nov	y	Zy	Ay	By	….	Dy	Ey	Fy	….
Dec	Z	ZZ	AZ	BZ	….	DZ	EZ	FZ	….

3 How to order

HRR ☐ - A ☐ - ☐ - ☐

① Cooling Capacity

012	1000W/1200W (50/60Hz)
018	1600W/1800W (50/60Hz)
024*1	2000W/2400W (50/60Hz)
030*1	2500W/3000W (50/60Hz)

1* Only power supply -20(200V type) can be selected

② Cooling Method

A	Air-cooled type refrigeration

③ Piping thread type

Null	Rc
F	G (Rc-G conversion fitting included)
N	NPT (Rc-NPT conversion fitting included)

④ Power supply

10	Single phase 100VAC (50/60Hz) Single phase 115VAC (60Hz)
20	1-phase AC200~230V (50/60 Hz)

⑤ Option*2

Nill	None
DM	Electric conductivity control DI water (Pure water) piping
M	DI water (Pure water) piping
T	High pressure pump
T1*3	Inverter pump mounted
U*4	UL Standard
Y	With feet and no Rack Mounting bracket
Z*5	No flow sensor, no water leakage sensor, no particle filter, no bypass valve, no retaining clip
Z1*5	No flow sensor, no retaining clip

*2 Selecting multiple options must be alphabetical order.
*3 Only power -20(200V type) can be selected.
UL certification is pending.
If option T is selected, Option T1 cannot be selected.
*4 Power supply -10 (100V type) is UL certified as standard.
*5 Only Z or Z1 can be selected.

HRR ☐ - W ☐ - ☐ - ☐ U

① Cooling Capacity

012	1000W/1200W (50/60Hz)
018	1600W/1800W (50/60Hz)
024*1	2000W/2400W (50/60Hz)
030*1	2500W/3000W (50/60Hz)

1* Only power supply -20(200V type) can be selected

② Cooling Method

W	Water-cooled refrigeration

③ Piping thread type

Null	Rc
F	G (Rc-G conversion fitting included)
N	NPT (Rc-NPT conversion fitting included)

④ Power supply

10	Single phase 100VAC (50/60Hz) Single phase 115VAC (60Hz)
20	1-phase AC200~230V (50/60 Hz)

⑤ Option*2

Nill	None
DM	Electric conductivity control DI water (Pure water) piping
M	DI water (Pure water) piping
T	High pressure pump
T1*3	Inverter pump mounted

⑤ Option*2

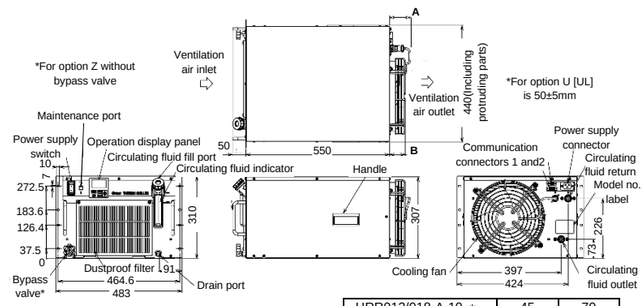
Y	With feet and no Rack Mounting bracket
Z*4	No flow sensor, no water leakage sensor, no particle filter, no bypass valve, no retaining clip
Z1*4	No flow sensor, no retaining clip

*2 Selecting multiple options must be alphabetical order.
*3 Only power -20(200V type) can be selected.
UL certification is pending.
If option T is selected, Option T1 cannot be selected.
*4 Only Z or Z1 can be selected.

4 Name of Parts and Accessories

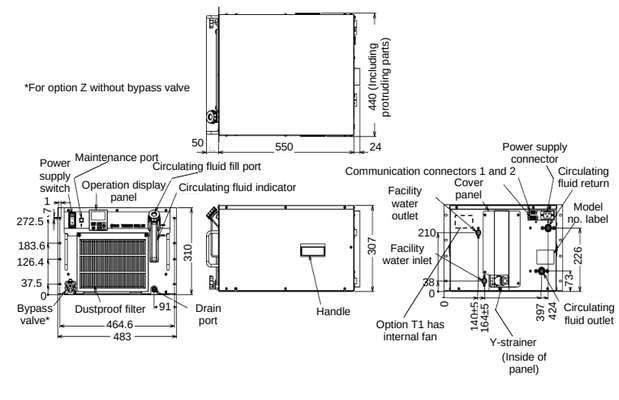
4.1 Outline Dimensions

4.1.1 HRR012/018-A＊-10/20-＊ (Air-cooled type)

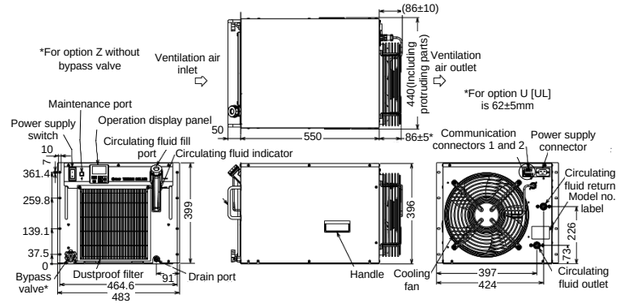


HRR012/018-A-10-＊	45	70
HRR012/018-A-20-＊	61	80
HRR012/018-A-20-U	50	80

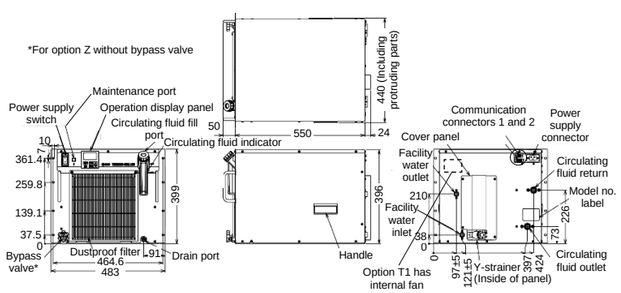
4.1.2 HRR012/018-W＊-10/20-＊ (Water-cooled type)



4.1.3 HRR024/030-A＊-20-＊ (Air-cooled type)



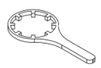
4.1.4 HRR024/030-W＊-20-＊ (Water-cooled type)



4 Name of Parts and Accessories - continued

4.2 Accessories

Check the enclosed accessories with the delivered thermo-chiller.

1	Operation manual	2 copies (English 1 copy/ Japanese 1 copy)	
2	Power supply connector	1 pc.	
3	Maintenance handle for particle filter	1 pc.	
4	Particle filter element	1 pc.	
5	For option DM DI filter	1 pc.	
6	For HRR□-AF-20-＊ G thread adapter set	1 set	
	For HRR□-AN-20-＊ NPT thread adapter set	1 set	

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

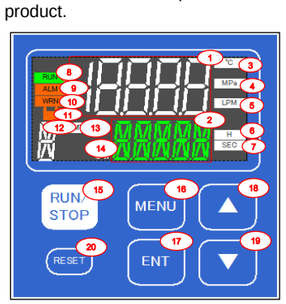
4.3 Function of parts

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

Name	Name
Operation display panel	Runs and stops the product and performs settings such as the circulating fluid temperature.
Fluid level gauge	Indicates the circulating fluid level of the tank.
Power supply switch	Shuts off the power supply to the internal eqipment of product.
Model label	Shows the part number of the product.
Circulating fluid outlet port	The circulating fluid flows out from the outlet port.
Circulating fluid return port	The circulating fluid returns to the return port.
Drain port	Port to drain the circulating fluid out of the tank.
Power supply connector	Connect the power cable to the Power supply connector accessory, and then plug it in.
Communication connector CN1,CN2	Use for contact input / output, serial communication.
Facility water inlet (For water-cooled type)	A facility water inlet to which the facility water is fed through piping. The pressure of facility water should be in a range of 0.3 to 0.5MPa.
Facility water outlet (For water-cooled type)	A facility water outlet from which the facility water returns to the user's machine through piping.

4.3.1 Operation Display Panel

The operation panel on the front of the product controls the basic operation of the product.



4 Name of Parts and Accessories - continued

No	Name	Function
1	Digital display (7 segment, 5 digits)	Displays the temperature, pressure and flow rate of the circulating fluid and the set values of other menus.
2	Digital display (11 segment, 5 digits)	Displays the discharge temperature of the circulating fluid and the set values of other menus.
3	[°C] lamp	Lights up when temperature is displayed on the digital display.
4	[MPa] lamp	Lights up when pressure is displayed on the digital display part.
5	[LPM] lamp	Lights up when flow rate is displayed on the digital display part.
6	[H] lamp	Lights up when time is displayed on the digital display section.
7	[SEC] lamp	Lights up when seconds are displayed on the digital display section.
8	[RUN] lamp	Lights up when the product is started and in operation.
9	[ALM] lamp	Lights up when a fault occurs. (This product will stop.)
10	[WRN] lamp	Lights up when a warning occurs. (This product will continue operation.)
11	⊟ lamp	Lights up when [AL.01 Tank level drop failure] or [AL.02 Tank level drop] alarm is generated.
12	Digital display (11 segment, 1 digits)	[X] is displayed when maintenance notification is generated.
13	[RMT] Lamp	Lights up during remote operation by communication function.
14	[KEYLOCK] lamp	Lights up when key lock setting is active.
15	［RUN/STOP］ key	Press and hold for 1 second to start or stop.
16	[MENU] key	Switching of each menu and cancellation of setting values.
17	[ENT] key	Switch to setting mode and set values.
18	[▲] key	Move item upward or increase the set value.
19	[▼] key	Move item downward or decrease the set value.
20	[RESET] key	Reset the alarm.

5 Installation

5.1 Installation

Warning

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

5.2 Hazard Labels

Warning

- 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

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.

5.3 Environment

Warning

- 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.

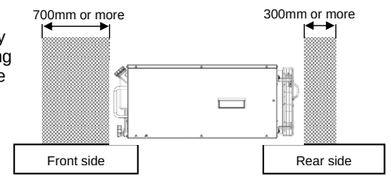
5 Installation - continued

- Location that is outside.
- Location that is exposed to steam, saltwater 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 explosion-proof.)
- Location where the ambient temperature is out of the following range: In transportation and in storage 0 to 50°C (with no water or circulating fluid in piping). During operation 5 to 40°C
- 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%
- Location that is exposed to direct sunlight or heat radiation.
- Location that is near heat sources and poor in 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 at altitude of 3000m or higher (except during product storage and transport).
- Location where the product is affected by strong vibrations or impacts. Condition that applies external force or weight causing the product to be damaged.
- Location without adequate space for maintenance as required.

5.4 Installation and Maintenance Space

Caution

Leave enough space for the ventilation for the product. Otherwise it may cause a lack of cooling capacity or/and stoppage



Required ventilation for Air-cooled type

Model	Heat radiation (kW)	Required ventilation amount (m^3/min)	
		Differential temp. of 3°C between inside and outside of installation area	Differential temp. of 6°C between inside and outside of installation area
HRR012-A-10/20-＊	Approx.2	40	20
HRR018-A-10/20-＊	Approx.4	70	40
HRR024-A-20-＊	Approx.5	90	50
HRR030-A-20-＊	Approx.6	100	60

Required ventilation for Water-cooled type

Model	Heat Radiated (kW)	Facility water temp. range °C	Required facility water flow rate L/min		
			Facility water temp.		
			25°C	32°C	40°C
HRR012-W-10/20-＊	Approx.2	5 to 40 (rating 25)	8	12	20
HRR018-W-10/20-＊	Approx.4		12	15	23
HRR024-W-20-＊	Approx.5		14	17	25
HRR030-W-20-＊	Approx.6		15	18	26

5.5 Mounting

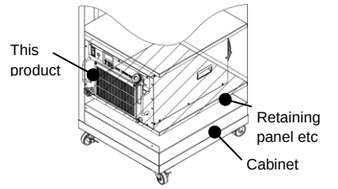
Warning

- 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. When mounting the product to a cabinet, use a design which shall hold the weight at the bottom. Ensure safety with transportation test if the product is to be installed on a transportation device such as a trailer. Mount the product using the fixing holes in the front of the product. Use M5, M6 screws (bolts) or equivalent to fix the product.

5 Installation - continued

2. In the case of Air-cooling type, this product sucks air from the front and discharges it to the back. Please do not block the suction and the discharge air. Please do not install in a sealed place.



5.6 Piping

Caution

- Before connecting piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1 thread exposed on the end of the pipe/fitting.
- Tighten fittings to the specified tightening torque.

5.6.1 Piping port size

Name	Port size	Recommended tightening torque	Recommended proof pressure for piping
Circulating fluid outlet port	Rc1/2*1	28 to 30N・m	0.4MPa or more*2
Circulating fluid return port	Rc1/2*1	28 to 30N・m	0.4MPa or more*2
Facility water inlet port *3	Rc3/8	22 to 24N・m	1.0MPa or more (Supply pressure: 0.3 to 0.5MPa)
Facility water outlet port *3	Rc3/8	22 to 24N・m	

*1 For NPT and G thread, use a conversion connector available as an accessory separately.
*2 In the case of option T and T1, 1.0MPa or more.
*3 For water-cooled type.

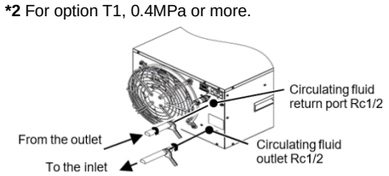
5.6.2 How to connect piping

Caution

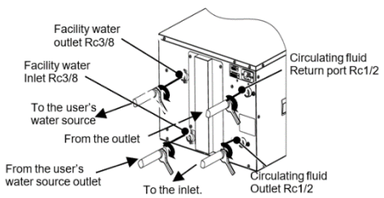
Make piping so that the circulating fluid always flows. The product will break down if it is operated with no circulating fluid flowing.

1. Ensure that the power source and the power supply of the product is turned off (or the power plug is disconnected).

2. This product generates an alarm*1 and stops running when the circulating fluid flow rate becomes 2 L/min or less. Please make piping that flows more than 2 L/min. In addition, this product generates an alarm and stops when the circulating fluid discharge pressure becomes 0.5 MPa*2 or more.
   - ***1*** For options Z and Z1 no alarm is generated. For models with options T1 and Z or T1 and Z1, the alarm will occur at less than 7L/min.
   - ***2*** For option T1, 0.4MPa or more.



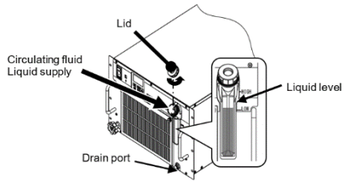
3. Connect the circulating fluid return port with the user's machine outlet.
4. Connect the circulating fluid discharge port with the user's machine inlet.
5. In the case of the Water-cooled type, please also connect the facility water piping inlet and outlet of the customer's water source



5 Installation - continued

5.7 Fill of circulating fluid

1. Ensure that the power source and the power supply of the product is turned off.
2. Check the drain port is plugged to prevent the supplied circulating fluid from draining out.
3. Open the circulating fluid inlet cap by turning it counter clockwise and fill the circulating fluid within the range from Low to High shown on the
4. level gauge. Use tap water which satisfies the water quality standard or a 15% aqueous solution of ethylene glycol.
5. After filling to the specified level, turn the lid clockwise to close.



5.8 Wiring of the power supply

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.
- Do not modify the internal electrical wiring of the product. Incorrect wiring may cause electrical shock or fire. Also, modifying the internal wiring will void the product's warranty.
- Do not connect the ground to water line, gas pipe or lightening conductor.
- Use a power supply of over voltage category 3 (IEC60664-1). For the product operation in the UL compliant conditions, please refer to "5.8.2 Installation/Operation in accordance with the UL standard".

Caution

- Be sure to shut off the user's power supply. Wiring with the product energized is strictly prohibited.
- Ensure a stable power supply with no voltage surges.

5.8.1 Power supply specifications, power supply cable and earth leakage breaker

Table 1. Power supply cable and earth leakage breaker

Model (High pump head [Option])	Power supply voltage	Cable qty. x size	Recommended earth leakage breaker	
			Rated current (A)	Sensitivity of leak current (mA)
HRR012-A/W-10-＊	1-phase AC100 (50/60Hz) 1-phase AC115V (60Hz)	3 cores x 14AWG (3 cores x 2.0mm²) (including ground)	15	30
HRR018-A/W-10-＊				
HRR012-A/W-20-＊	1-phase 200-230V AC (50/60Hz)		10	30
HRR018-A/W-20-＊				
HRR024-A/W-20-＊				
HRR030-A/W-20-＊				
HRR012-A/W-20-＊T＊			15	30
HRR018-A/W-20-＊T＊				
HRR024-A/W-20-＊T＊				
HRR030-A/W-20-＊T＊				
HRR012-A/W-20-＊T1＊				
HRR018-A/W-20-＊T1＊				
HRR024-A/W-20-＊T1＊				
HRR030-A/W-20-＊T1＊				

5.8.2 Installation/operation in accordance with the UL standard (for optional UL compliant model)

Operation of optional UL models (HRR012/018/024/030-A/W-10/20-□U) in the UL compliant conditions, the conditions shown below must be satisfied:

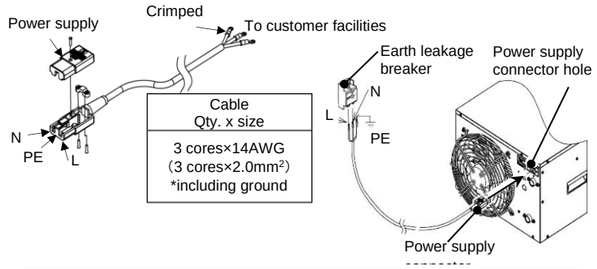
- Use power supply of overvoltage category 2 (transient overvoltage 2500V or less) *1

*1 When using a power supply in the overvoltage category 3, take measures such as mounting an isolation transformer between the product and the power supply or keep the transient overvoltage of the power supply to 2500V or less by using a varistor, etc.

5 Installation - continued

5.9 Preparation for operation

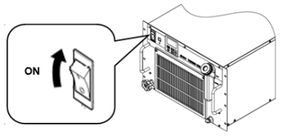
1. Prepare the cable and individual socket or earth leakage breaker shown in the Table 1.
2. Strip the sheath from both ends of the cable.
3. Disassemble the power supply connector (supplied as an accessory) and mount one end of the cable to the L, N and PE terminals and reassemble the power supply connector.
4. Connect the other end of the cable to the crimped terminals that are connectable to the power supply facility.
5. Insert the power supply connector to the power supply connector socket.
6. Connect the crimped terminals to the secondary side of the earth leakage breaker and grounding on the power supply facility.



6 Start, Stop and Temperature Settings

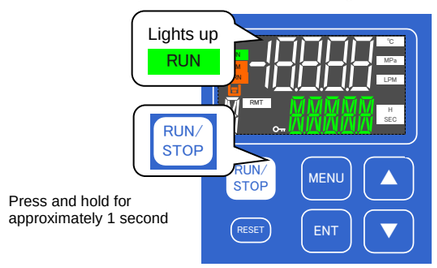
6.1 Starting the product

1. Supply power to the product.
   Turn on the power switch. The operation display panel lights up. At this point, the product is in the "Stopped" state (Please note that operation is started after the power is turned on when the operation signal is sent in the remote setting state).



2. Set the circulating fluid temperature. When you press the "ENT" key, the set temperature (lower part of the numerical value display: green) flashes. Press the [▲] [▼] key to set the target temperature, then press the "ENT" key to set.
   (Flashing ends when set.) Please refer to various setting / display in operation manual.

3. Press and hold [RUN / STOP] key for 1 second. The [RUN] lamp lights up and operation starts.
   * When you operate for the first time after piping, the circulating fluid in the tank decreases until the circulating fluid is filled in the piping. (An alarm occurs when the liquid level falls below "LOW".) When the circulating fluid in the tank decreases, repeat "Circulating liquid supply" procedure so that the liquid level is within the range from LOW to HIGH.



- *30 seconds after start of operation, if the circulating fluid flow rate is less than 2 L / min, an alarm occurs and the product stops. Ensure that the circulating fluid flow rate will be 2 L / min or more. ＊ In the case of option Z, Z1, the alarm of the flow rate decrease does not generate. Make piping so that the circulating fluid always flows. The product will break down if it is operated with no circulating fluid flowing.
- *For options Z and Z1 no alarm is generated. For models with options T1 and Z or T1 and Z1, the alarm will occur at less than 7L/min.

6 Start, Stop and Temperature Settings - continued

- *When using option T, if the circulating fluid discharge pressure becomes 0.5 MPa or more, an alarm occurs and this product stops. Refer to operation manual "4.3 Adjustment of bypass valve" and make it to 0.5 MPa or less.
- *For option T1, an alarm will occur, and the product will stop when the circulating fluid discharge pressure exceeds 0.4 MPa. Refer to operation manual "4.3 Bypass valve adjustment" or "Pump output setting value" and "5.4.2 Main menu" set it to 0.4MPa or less. The factory default pump output setting is 90%.

6.1.1 Restart When an Alarm is Generated

This product has two types of operation depending on the alarm being generated. The restart is different depending on the operation mode.

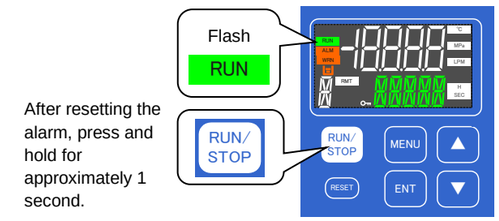
[1] When the following alarm occurs, this product stops.

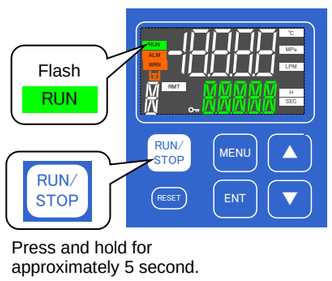
AL01：Low level in tank AL09：Circulating fluid discharge pressure rise(Select from WRN/ FLT) AL17：flow rate failure(Not generated for options Z and Z1.) AL18：High circulating fluid discharge temp AL19：High circulating fluid return temp. AL21：High circulating fluid discharge pressure AL22：Low circulating fluid discharge pressure	AL24：Memory abnormal AL25：Contact input 1 signal detection(Select from OFF/ WRN/ FLT) AL26：Contact input 2 signal detection(Select from OFF/ WRN/ FLT) AL27：forced a stop AL30： refrigerant circuit abnormal AL31：sensor abnormal AL32： controller abnormal

After resetting the alarm, when resuming operations press and hold the [RUN／STOP] key for approximately 1 second. (Refer to "Chapter 7 Alarm Notification and Troubleshooting of the operation manual")

2] When alarms except those shown above are generated the compressor stops, and the circulating fluid pump continues running for a fixed time (The time to run the pump can be set within the range of "0 to 9999 seconds". The factory setting is "0 seconds").

At this time, the "RUN" lamp flashes.
In case of resetting the alarm (Refer to 7.3 "What to do when an alarm occurs" in the operation manual) while the pump is operating, pressing the "RUN / STOP" key once (1 second) causes the compressor to operate and the operation of the product will resume.
(This operation only occurs when this function is set. For details, refer to 5.3.6 Alarm Setting menu in the operation manual)



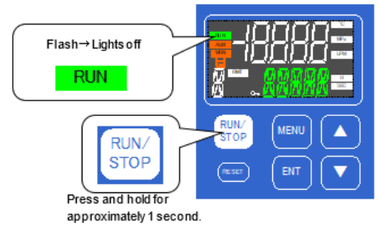


To stop the product when only the pump is running, press and hold the [RUN／STOP] key for approximately 5 seconds. (When this operation is performed,

6.1.2 Stopping the product

Press and hold the [RUN / STOP] key for 1 second.
[RUN] lamp goes out and operation stops.
*It takes about 10 seconds of operation to prepare to stop before it stops. During the stopping preparation the [RUN] lamp flashes.

6 Start, Stop and Temperature Settings - continued



Caution

Except in case of an emergency, do not turn OFF the breaker before the thermo-chiller stops operation completely.

7 Maintenance

7.1 General Maintenance

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.

7.2 Inspection and Cleaning

Warning

- Do not operate with wet hands and do not touch the electrical parts such as the connecter. It might cause electric shock.
- Do not touch the fins directly when cleaning the dustproof filter. It might cause injury.
- Shut off the power supply of the product when performing cleaning, maintenance, or inspection. It might cause electric shock, injury or burn,
- Replace all panels removed for inspection or cleaning. It might cause injury or electric shock if it is operated with the panel removed or open.

7.2.1 Control of Circulating Fluid Quality

Warning

Use specified fluids only. If other fluids are used, they may damage the product, causing fluid leakage, or result in hazards such as electric shock or leakage of electricity.
When using clear water (tap water), ensure that it satisfies the water quality criteria shown in the operation manual.

Caution

Replace the circulating fluid and/or the facility water if any problems are found in the regular check. Even if no problems are found, some of the water in the tank evaporates and impurity concentration in the circulating fluid increases. Replace the circulating fluid on the tank once in every 3 months. (Please refer to operation manual table 8-1 for quality criteria of clean water)

7.2.2 Daily check

Check the items listed in the table on the next page. If any abnormality is found, stop the operation of the product and turn the power supply OFF, and ask for service.

Daily Check Items	Contents of check	
Installation condition	Check the installation conditions of the product.	• Check that there is no heavy object on the product or excessive force applied to the piping. • Temperature should be within the specification range of the product. • Make sure the ventilation grille is not obstructed. (For air-cooled type).
Fluid leakage	Check the installation conditions of the product.	• Check that there is no fluid leakage from the connected parts of the piping.
Amount of circulating fluid	Check the liquid level indicator.	• Fluid level should be between "HIGH" and "LOW" levels of the fluid level meter.
Operation panel	Check the indications on the display.	• The numbers shown on the display should be clear and legible.

7 Maintenance - continued

Daily Check Items	Contents of check	
Operation panel	Check the functionality.	Check that the keys, [RUN/STOP], [MENU], [ENT], [▼], and [▲], operate correctly.
Circulating fluid temperature	Check on the operation panel.	There should be no problem for operation.
Circulating fluid discharge pressure	Check on the operation panel.	There should be no problem for operation.
Circulating fluid flow rate	Check the operating condition of the product (except option Z, Z1)	There should be no problem for operation. If the flow rate is decreasing, check the particle filter for contamination, and if it is dirty, replace the element.
Operating condition	Check the operation condition.	• There should be no abnormality with noise, vibration, smell, or generation of smoke. • There should be no active alarm signal.
Facility water (for water-cooled type)	Check the facility water condition.	Temperature, flow rate and pressure are within the specified range. If the flow rate is decreasing, check the Y type strainer for clogging and clean the strainer.
Ventilating condition (for Air-cooled type)	Check the condition of the ventilation grille.	• Make sure the ventilation grille is not obstructed.

7.2.3 Monthly check

Item	Contents of check	
Ventilating condition (air cooled type)	Clean the ventilation grilles.	Make sure the ventilation grilles are not clogged with dust, etc.
Facility water (water cooled type)	Check the facility water.	Make sure the facility water is clean and contains no foreign matter.

7.3 Cleaning of air vent

Caution

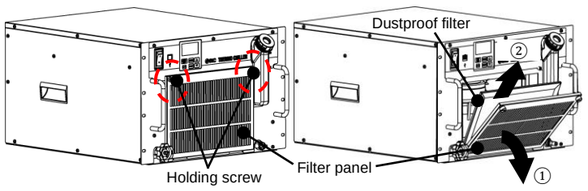
If the dustproof filter at the ventilation inlet is clogged with dust or debris, heat radiation performance declines. This will result in a reduction of cooling performance and may stop the operation because the safety device is triggered.

7.3.1 Cleaning of filter.

Use a long-bristled brush or air gun to clean the filter.

7.3.2 Cleaning dustproof filter

1. The dustproof filter is installed in the inside of the filter panel at the front of the product.
2. Loosen the filter panel holding screws by using a cross slot screwdriver.
3. There is a dustproof filter inside the filter panel. Remove the dustproof filter.



7.3.3 Mounting of the dustproof filter

Reassemble the filters in the reverse order to the removing procedure. (Recommended tighten torque of filter panel holding screws: 1.5 N · m)

7 Maintenance - continued

7.4 Inspection every 3 months

Item	Contents of check	
Power supply	Check the power supply voltage.	- Make sure the supply voltage is within the specification range.
Circulating fluid	Replace the circulating water periodically. Clean the tank.	- Ensure that the water has not been contaminated and that there is no algae growth. - Circulating water inside the tank must be clean and there must not be foreign matter inside. - Use clean water or pure water. The water quality must be within the range shown in Table 8-1 of operation manual. * It is recommended to replace the circulating fluid every 3 months when periodic maintenance is performed.
	Density control (When using 15% concentration ethylene glycol aqueous solution)	- Density must be within the range of 15 % +5/-0.
Facility water (For water-cooled type)	Check the water quality.	- Ensure that the water is clean and contains no foreign matter. Also check that the water has not been contaminated and there is no algae growth. - The water quality must be within the range shown in Table 8-1 of operation manual.

7.4.1 Replacement of circulating fluid

- Replace the circulating fluid with new clean fluid periodically, or it may get algae or decompose.
- Circulating fluid to be supplied in the tank should satisfy the water quality specified in the operation manual (“Table 8-1: Quality criteria for clean water (tap water)”)
- Make sure that the concentration of ethylene glycol aqueous solution is 15%+5/0 when 15% ethylene glycol solution is used.
- If the particle filter element is dirty, replace the element see operation manual (8.4.1 Replacing Particle Filter.).

7.4.2 Cleaning of the facility water system (Water cooled type)

- Clean the customer's facility water system and replace facility water.
- Facility water quality must satisfy the criteria specified in operation manual (“Table 8-1 Quality criteria for clean water (tap water)”).
- Check the strainer and clean it if it is dirty. Refer to operation manual "Cleaning of Y - strainer".

Caution

If there is foreign matter accumulated or clogging in the facility water system, pressure loss increases with less flow rate, and it may damage the screen mesh.

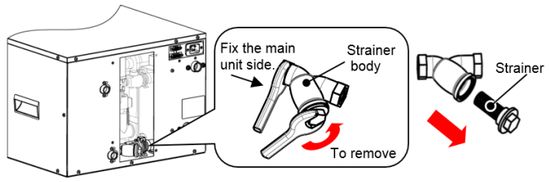
7.4.3 Cleaning of Y- strainer

When cleaning Y-strainer, facility water must be discharged. Refer to operation manual “8.3.2 Discharge of the facility water “for further instructions.

Warning

Before discharging the facility water, stop operation of the user’s equipment and release the residual pressure. Wear protective equipment like gloves to avoid getting injured like cutting hand by sharp edge of panel.

1. Discharge the facility water. Refer to operation manual "8.3.2 Discharge of the facility Water".
2. The strainer is installed on the back of the product. Remove the strainer using a tool such as a spanner. When removing the strainer, product should be fixed to not move.



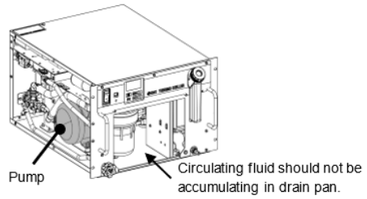
3. Clean the strainer.
4. After cleaning, please install the strainer by the reverse procedure.
5. Install the cover panel.

7 Maintenance - continued

7.5 Inspection every 6 months

7.5.1 Check for water leakage from pump (For option T [High pressure pump])

- Remove the filter panel and check the pump for excessive leakage. If the leakage is found, replace the mechanical seal.
- 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.
- The recommend lifetime of the mechanical seal before needing replacement is 6000 to 8000 hours (usually 1 year)



Leak Check

8 Troubleshooting

8.1 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 No.	Description	Initial value	Display Unit		Cause/Remedy (Press the reset key after eliminating the cause.)
			Upper stage (White)	Lower Stage (Green)	
AL01	Low level in tank	FLT	AL01	LOW⇒LEVEL⇒FLT	Fluid level has fallen, add circulating fluid.
AL02	Low level in tank	WRN	AL02	LOW⇒LEVEL⇒WRN	
AL04	Water leakage *1	WRN*2	AL04	WATER⇒LEAK	Circulating fluid leakage inside unit is suspected.
AL05	Pump Inverter error*3	WRN	AL05	Pump ⇒ INV	Check the installation environment. Clean the duct filter.
AL06	Internal fan stop*4	WRN	AL06	FAN ⇒ ERROR	Check for fan rotation.
AL09	Circulating fluid discharge pressure rise	FLT*5	AL09	HIGH⇒PRESS	Piping resistance increased. Check valve opening, blockage of piping, clogging of filter.
AL10	Flow rate reduction*6	WRN*2	AL10	LOW⇒FLOW⇒WRN	
AL11	Ambient temperature range *7	OFF*2	AL11	AMB⇒TEMP⇒OUT	Check the installation environment. Clean the dust filter.
AL12	Electric conductivity rise*8	WRN*9	AL12	DI⇒ERROR	Replace the DI filter.
AL13	NOT TEMP READY	OFF*2	AL13	TEMP⇒READY⇒ERROR	Overloaded, cooling failure, insufficient circulating fluid flow rare, large fluctuation of the heat load, etc. Increase the flow rate through the chiller. (Adjust the by-pass valve)
AL14	Circulating fluid temperature range rise	OFF*2	AL14	TEMP⇒OUT.HI	
AL15	Circulating temperature range drop	OFF*2	AL15	TEMP⇒OUT.LO	
AL17	Low flow rate *10	FLT*2	AL17	LOW⇒FLOW⇒FLT	Display flow rate: 2 LPM or less, piping is thin, external valve closed, pinching or blockage of piping or clogging of filter.
AL18	High circulating fluid discharge temp.	FLT	AL18	TEMP⇒FLT	Discharge temperature 45°C or higher. Overload, cooling failure, insufficient flow rate, etc. Increase the chiller flow rate. (Adjust the bypass valve)
AL19	High circulating fluid return temp.	FLT	AL19	RET⇒TEMP⇒FLT	Return temperature: 45°C or higher. Insufficient flow rate, overload etc. Increase the chiller flow rate. (Adjust the bypass valve)

8 Troubleshooting - continued

Alarm No.	Description	Initial value	Display Unit		Cause/Remedy (Press the reset key after eliminating the cause.)
			Upper stage (White)	Lower Stage (Green)	
AL21	High circulating fluid discharge pressure	FLT	AL21	HIGH⇒PRESS⇒FLT	Displayed pressure: 0.6MPa (Option T1, 0.45MPa) or higher. Connect piping so that the pressure is 0.5MPa (Option T1, 0.4MPa) or less. Adjust the bypass valve
AL22	Low circulating fluid discharge pressure	FLT	AL22	LOW⇒PRESS⇒FLT	Displayed pressure:0.03MPa or less. Check that the pump has not stopped.
AL24	Memory error	FLT	AL24	MEM⇒ERROR	Turn off the power supply switch and restart. If the error occurs again, ask for service.
AL25	Contact input 1 signal detection	FLT*2	AL25	INP1⇒ERROR	Contact input has been detected.
AL26	Contact input 2 signal detection	FLT*2	AL26	INP2⇒ERROR	
AL27	Forced stop	FLT	AL27	FORCE⇒STOP	Isolated operation of the pump is stopped (press “RUN/STOP” key for 5 seconds)
AL28	Notice for maintenance	OFF*2	AL28	MANT⇒ALARM	Notice for maintenance, perform maintenance for part for which alarm is generated.
AL29	Communication error	WRN*2	AL29	COMM⇒ERROR	No request message from the host computer. Try to send request message again.
AL30	Compressor circuit error	FLT	AL30	REF⇒ERROR⇒0000	Error occurred in the refrigerated circuit. Ask for service.
AL31	Sensor error	FLT	AL31	SENS⇒ERROR⇒0000	An error occurred in a sensor. Ask for service.
AL32	Controller error	FLT	AL32	CTRL⇒ERROR⇒0000	An error occurred in the controller. Ask for service.

Notes:
*1 Not generated for option Z
*2 Selectable from OFF / WRN / FLT
*3 Only option T1
*4 Only Water-cooled type and option T1
*5 Selectable from WRN / FLT
*6 Not generated for option Z and Z1
*7 Only air-cooled type can be set.
*8 Option DM [With electric conductivity control function, DI water (pure water) piping] only. When entering the range, the alarm is released automatically.
*9 Selectable from OFF / WRN.
*10 Not generated for options Z and Z1. Models that include both options T1 and Z or Z1, it occurs at 7L/min or less.

9 Limitations of Use

9.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

Caution

Refer to ‘Section 2.1 Product Specification’ for the product limitations of use.

10 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.

11 Contacts

Refer to www.smcworld.com or www.smc.eu for your local distributor/importer.

SMC Corporation

URL : https:// www.smcworld.com (Global) https:// www.smc.eu (Europe)
SMC Corporation, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, Japan

Template DKP50047-F-085M