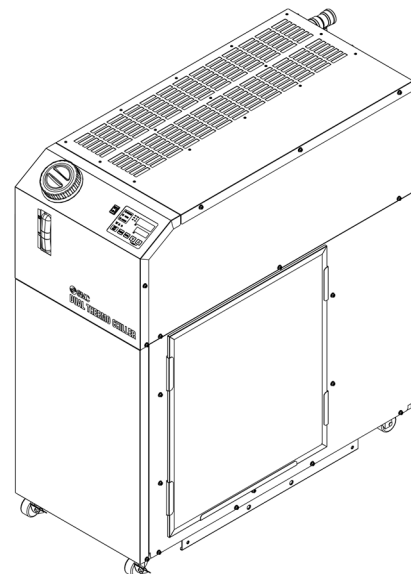




ORIGINAL INSTRUCTIONS

Instruction Manual
Thermo-chiller
HRLE090-A-20/40 Series



The intended use of this product uses 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 hazard with the labels of "Caution," "Warning," or "Danger." They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC) ⁽¹⁾, and other safety regulations.
⁽¹⁾ ISO 4414: Pneumatic fluid power - General rules relating to systems.
ISO 4413: Hydraulic fluid power - General rules relating to systems.
IEC 60204-1: Safety of machinery - Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: 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 HRLE090-A-20/40 Specifications

Table 1 HRLE090-A-20/40 Specifications

Model	HRLE090-A-20	HRLE090-A-40
Cooling Method	Air cooled type	
Refrigerant	R410A (HFC)	
Quantity of refrigerant	kg 2	
Temperature control method	PID Method	
Ambient temperature	°C 2 to 45°C	
Circulating fluid ^(note1)	Tap water, Deionized (pure) water	
Set temperature range	°C CH1: 15 to 25, CH2: CH1 +0 to 15	
Cooling capacity (Total of CH1 and 2) 50/60Hz ^(note2)	kW 8.0/9.5	
Heating capacity (Total of CH1 and 2) 50/60Hz ^(note3)	kW 2.0/2.5	
Temperature stability ^(note4)	°C CH1: ±0.1, CH2: ±0.5	
Pump capacity	Rated flow 50/60Hz ^(note5)	L/min CH1: 25/35, CH2: 2/2
	Maximum flow rate 50/60Hz	L/min 55/65
	Maximum pump head	m 50
Minimum operating flow 50/60Hz ^(note6)	L/min CH1: 25/35, CH2: 1/1	
Tank capacity (Total CH1 and 2)	L Approx. 18	
Fluid outlet, Fluid return port size	CH1: Rc1, CH2: Rc1/2	
Drain port size	Rc1/4	
Fluid contact material	Stainless steel, Copper (Heat exchanger brazing), Bronze, Carbon, FKM, PP, PE, POM, PVC, PA, EPDM	
Fluid contact material (-M)	Stainless steel (Heat exchanger brazing), SIC, Carbon, FKM, PP, PE, POM, PVC, PA, EPDM, PTFE	
Power supply	3-phase AC200V(50Hz) Allowable voltage range ±10% (No continuous voltage fluctuation)	3-phase AC380V to 415V (50/60Hz) Allowable voltage range ±10% (No continuous voltage fluctuation)
	3-phase AC200 to 230V (60Hz) Allowable voltage range ±10% (No continuous voltage fluctuation)	3-phase AC460 to 480V (60Hz) Allowable voltage range +4%/-10% (Maximum voltage is 500V and no continuous voltage fluctuation)

Table 2 HRLE090-A-20/40 Specifications Continued

Model	HRLE090-A-20	HRLE090-A-40	
Electrical system	Earth leakage breaker ^(note8)	A 30	20
	Rated current	A 30	30
	Sensitivity of leak current	mA 30	30
Rated operating current 50/60Hz	A 14/17	6.8/8.2	
Rated power consumption 50/60Hz	kW (kVA) 4.3/5.3(4.9/5.8)		
Communication function	Contact input/output, Serial RS-485		
Noise level	dB(A) 65	67	
Accessories ^(note7)	Operation manual (for installation/operation) 2pcs. (English 1pc./Japanese 1pc.), Anchor bolt brackets 2pcs. (including four M8 bolts), Cable accessory 1pc. (for communication cable)		
Weight	kg 140	140	

- (Note1) Use the water listed below.
Tap water : Water Standards of the Japan Refrigeration and Air Conditioning Industry Association(JRA GL-02-1994)
Deionized(pure) water : Electric conductance 0.4 μs/cm or more(Electrical resistivity 2.5MΩ·cm or less)
- (Note2) (1) Ambient temp.: 32°C, (2) Circulating fluid: Tap water, (3) Circulating fluid temp.: CH1: 20°C/CH2: 25°C, (4) Circulating fluid flow rate: rated flow, (5) Power supply: AC200/400V.
- (Note3) (1) Ambient temp.: 32°C, (2) Circulating fluid: Tap water, (3) Circulating fluid flow rate: rated flow, (4) Power supply: AC200/400V.
- (Note4) (1) Ambient temp.: 32°C, (2) Circulating fluid : Tap water, (3) Circulating fluid temp.: CH1 : 20°C/CH2 : 25°C, (4) Circulating fluid flow rate: rated flow, (5) Power supply: AC200/400V, (6) Piping length : Shortest, (7) Rated cooling load is applied.
- (Note5) When circulating fluid outlet port pressure = 0.5MPa.
- (Note6) Fluid flow rate to maintain the cooling capacity and to keep the circulating fluid discharge pressure to 0.5 MPa or less.
If the actual flow rate is lower than this, install a bypass piping.
- (Note7) The anchor bolt fixing brackets (including four M8 bolts) are used for fixing to wooden skids when packaging the thermo-chiller. No anchor bolt is included.
- (Note8) For 400V version, to be prepared by the user.

2 Specifications continued

2.2 Product Serial Number Code

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

Table 3 Production Serial Number Codes

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

Warning

Special products (-X) might have specifications different from those shown in this section. Contact SMC for specific drawings.

3 How to Order

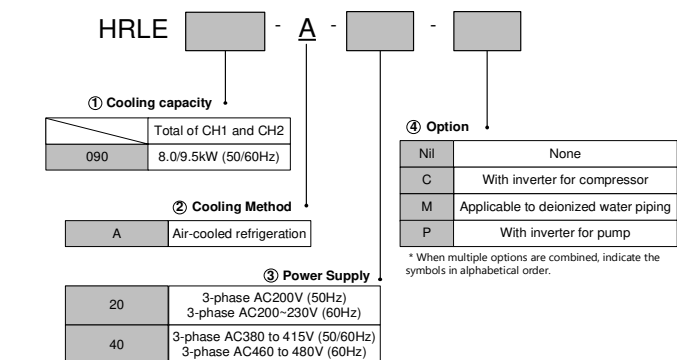


Figure 1 How to Order

4 Outline Dimensions

4.1 Dimensions of HRLE090-A-20/40

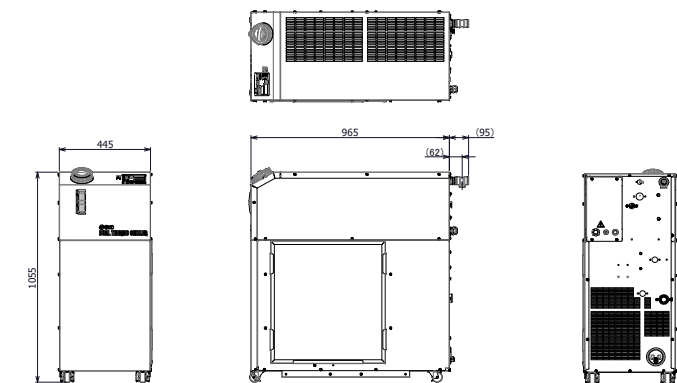


Figure 2 HRLE090-A-20/40 Dimensions

5 Names of Parts and Accessories

5.1 Accessories Table

Table 4 Accessories Table

No.	Name	Quantity	Image
1	Operation Manual	2 copy (English 1 pc. / Japanese 1 pc.)	
2	Cable accessory *Use this function when using the communication function.	1 pc.	
3	Anchor brackets *The anchor bolts are not attached.	2 pcs.	

5 Names of Parts and Accessories Continued

5.2 Function of Each Part

Table 5 Names and Functions of Each Part

Name	Function
Power supply switch	Power ON / OFF of the product.
Operation display panel	Runs and stops the product and performs settings such as for the circulating fluid temperature.
Fluid level gauge	Indicates the circulating fluid level of the tank. Confirm the level is between "H" and "L".
Product Label	Shows the product information such as model number and serial number.
Circulating fluid outlet port	The circulating fluid is discharged from the outlet port.
Circulating fluid return port	The circulating fluid returns to the return port.
Drain port	This drain port is for draining the circulating fluid in the tank and pump.
Dust-proof filter	Inserted to prevent dust or contamination from getting directly on the air-cooled condensers. Clean the filter periodically.
Power cable entry	Insert the power cable into the power cable entry and connect it to the breaker.
Communication cable entry	Insert the communication cable into the communication cable entry and connect it to the communication terminal.
Communication terminal	

5.3 Operation Panel

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

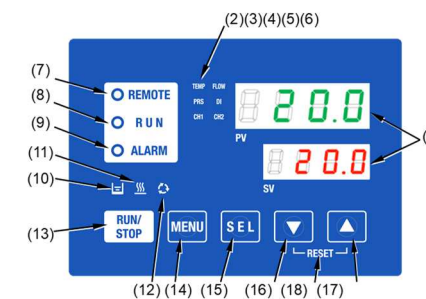


Figure 3 Operation Display Panel

Table 6 Operation Panel Functions

No.	Name	Function
(1)	Digital display (7 segments, 4 digits)	PV Upper line: Displays the temperature and pressure of the circulating fluid, alarm codes and other menu items (codes). SV Lower line: Displays the set temperature of the circulating fluid and the set values of other menu items.
(2)	[TEMP] light	Turns ON when the temperature is indicated by (1). The indicated value is in (°C).
(3)	[PRS] light	Turns ON when the pressure is indicated by (1). The indicated value is in (MPa).
(4)	[FLOW] light	Not used in this product.
(5)	[DI] light	Turns ON when Electric conductivity is indicated by (1). The indicated value is in (μS/cm).
(6)	[CH1/CH2] light	Turns on the CH that is digitally displayed.
(7)	[REMOTE] light	Allows remote operation (start and stop) via the communication function. Turns ON when operation mode is set to DIO or SERIAL.
(8)	[RUN] light	Turns ON when the product is started and in operation. Turns OFF when the product is stopped. Blinks during stand-by for stop or during anti-freezing operation.
(9)	[ALARM] light	Blinks with an alarm sound if an alarm should occur.

5 Names of Parts and Accessories Continued

Table 7 Operation Panel Functions Continued

No.	Name	Function
(10)	[L] light	Lights ON when the fluid level falls below the "L" (low) level.
(11)	[SSS] light	Lights ON when the anti-freezing function is enabled. The [RUN] light (8) blinks during anti-freezing operation.
(12)	[R] light	Not used in this product.
(13)	[RUN/STOP] key	Makes the product start or stop.
(14)	[MENU] key	Goes from the main menu (display screen showing circulating fluid temperature, pressure, etc.) to the other menus (entry of setting values and monitor screens).
(15)	[SEL] key	Changes the items in a menu and enters the value of a setting.
(16)	[▼] key	Decreases the set value.
(17)	[▲] key	Increases the set value.
(18)	[RESET] key	Press the [▼] and [▲] keys simultaneously. This will stop the alarm sound and reset the "ALARM" light.

6 Transportation, Transfer and Moving

Caution

- Do not set this system on its side during transportation. Oil in the compressor drains into the refrigerant pipe, which causes lubricant shortages, leading to damage to the compressor.
- Drain the remaining fluid out of the pipe as much as possible. The remaining fluid may spill if disregarded.
- Exercise caution not to damage the panel and piping with the forklift when transporting the system.

6.1 Transporting with a Forklift

Warning

- This is a heavy product. (Weight: About 140kg)
- Moving the Thermo-chiller by forklift or slinging should be done by licensed persons.
- Forklift insertion positions are on either left or right side of this system. Do not insert the from the front or the rear.

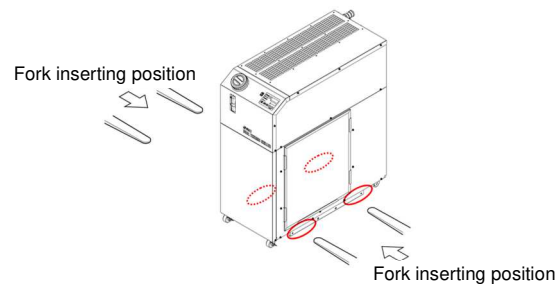


Figure 4 Fork inserting and slinging positions

6.2 Transporting with Caster

Warning

- This is a heavy product. (Weight: About 140kg)
- Moving the product on casters should be done by at least 2 people. Use special caution during transportation when the floor is on an incline.

Caution

Release the caster lock and push the corner of the product. Do not grip the piping or the handles of the panel, as it may cause damage to the product.

7 Installation

7.1 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood.
- Do not set up the product in places possibly exposed to leakage of flammable gas. Should any flammable gas get near the product, the product may cause a fire.

Caution

- Keep the product upright on a rigid and flat floor which can support the weight of the product and take measures to prevent the product from tipping over. Improper installation may cause water leakage, tipping, damage to the product or injure the operator.
- Keep the ambient temperature of the product between 2 to 45 °C. Operation outside of this ambient temperature range may cause a malfunction of the product. Operating the product in an ambient temperature of 45 °C or higher may reduce the heat discharging efficiency of the heat exchanger and the safety device may trigger, resulting in the product stopping.
- The installer/end user is responsible for carrying out an acoustic noise risk assessment on the equipment after installation and taking appropriate measures as required.

7.2 Environment

Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures more than the product's specifications.
- This product is not designed for clean room usage. The pump and ventilating fan inside the product generate particles.
- The product must be operated or stored in the following conditions. Potential malfunction or damage to the product may occur if these instructions are disregarded.

- Locations where there is no liquid that exceeds the conditions required for the degrees of protection IPX4 may splash on the product.
- Locations where the product is not subject to dust, salt water, oil, steam, etc.
- Locations where there are no particles or dust.
- Locations where there are no corrosive gases, solvents, or combustible gases. (The product is not explosion-proof.)
- Locations that are not exposed to direct sunlight or heat radiation.
- Locations where the ambient temperature is between 2 to 45 °C during operation. Places with an ambient humidity of 30-70%.
- Locations where the ambient temperature is between 0 to 50 °C while the product is stored. (with no water or circulating fluid in the piping)
- Locations where the temperature does not change substantially.
- When water droplets form due to condensation, measures should be taken by the user.
- Locations not subject to strong electromagnetic noise. (No intense electric fields, intense magnetic fields, or surges).
- Locations not subject to static electric sparks, or places where static electricity cannot discharge to the product.
- Locations where high frequencies are not generated.
- Locations where damage does not occur due to lightning (surges).
- Locations where the product will not be affected by strong vibrations or impacts.
- Locations where a force strong enough to deform the product is not applied.
- Locations where the product is not affected by exhaust air or exhaust heat from other equipment.
- Locations where generated particles/heat from the product do not affect the surrounding environment or equipment.
- Locations with adequate space for maintenance as required. (For the space for maintenance, refer to the Operation Manual.)

7 Installation Continued

7.3 Location

Caution

- This product exhausts heat using the fan mounted to this product.
- If the product is operated with insufficient air ventilation, the internal temperature can exceed 45 °C, which can cause overloaded operation, which will affect the performance and life of the product.
- To prevent this, ensure that suitable ventilation is available (see below).

7.4 Installation of Multiple Products

- Keep sufficient space between products so that the air vented from one product will not be taken in by other products.

7.5 Ventilation

- For a facility having a large installation area (that can vent the air naturally): Make an air outlet in a wall at a high level and an air inlet in a wall at a low level to allow for adequate airflow.
- For a facility having a small installation area (that cannot vent the air naturally): Make a forced air exhaust vent in a wall at a high level and an air inlet in a wall at a low level.
- Using a duct to exhaust the air: If the indoor site cannot accept the exhausted air from the product or it is air conditioned, ventilate by installing a duct on the ventilation air outlet of the product. Do not fasten the duct directly onto the ventilation air outlet of the product. Install it at least the duct's diameter away from the outlet. Use a fan for the duct for which the ventilation resistance of the duct has been considered.
- Do not install it in an enclosed location.

Table 8 Amount of heat radiation and required ventilation

Model No.	Heat radiation kW	Required amount of ventilation [m³/min]	
		Differential temp. of 3 °C between the inside and outside of the installation area	Differential temp. of 6 °C between the inside and outside of the installation area
HRLE090-A-20/40-※	Approximately 18	305	155

7.6 Installation and Maintenance Space

Caution

- Make sure there is enough space for ventilation of the product. Otherwise it may cause a lack of cooling capacity or stoppage of the product.
- Ensure there is enough space for maintenance.

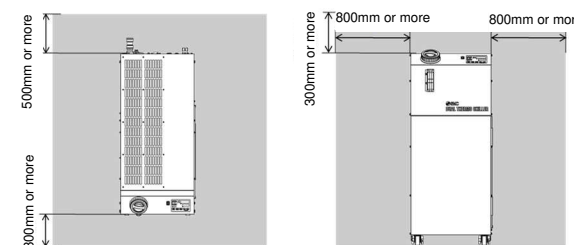


Figure 5 Installation space

7.7 Installation Procedure

Caution

- Install the product on a level, vibration-free floor.
- Prepare M10 anchor bolts that are suitable for the material of the floor that the product will be installed on.
- Drive the anchor bolts in at least two places on the left and right sides of the product (four places in total). Refer to operation manual "9.3 Dimensions" for the dimensions for the positions of the anchor bolts.

7.7.1 How to mount the product

- Move the product to the installation area
- Lock all casters

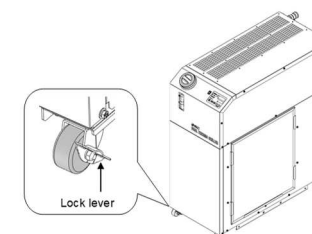


Figure 7 Locking Casters

7 Installation Continued

7.7.2 Fixture

Use the fixtures and holding screws currently used for holding the product to the wooden box to secure the product to the floor using anchor bolts.

- Install anchor bolts on a level floor with the dimensions below.

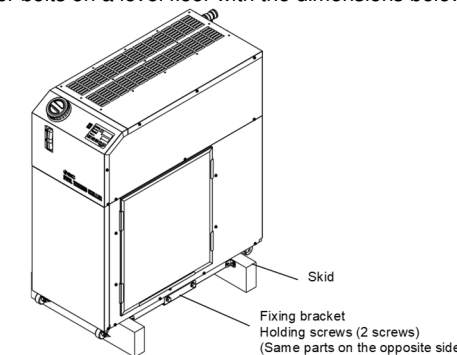


Figure 8 Fixtures and holding screws

- Set the fixtures from the top of the anchor bolts
- Set hexagon screws to the anchor bolts and screw the holding screws into the product to secure the product to the floor. The fixtures are mounted to the front and rear surface of the product (2 places).

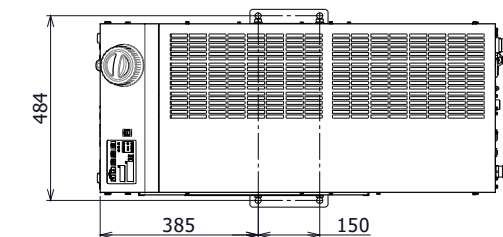


Figure 9 Installation of anchor bolts

Note: SMC Foundations bolt set "IDF-AB500" (Stainless Steel M10 x 50 mm) is applicable. Please order separately.

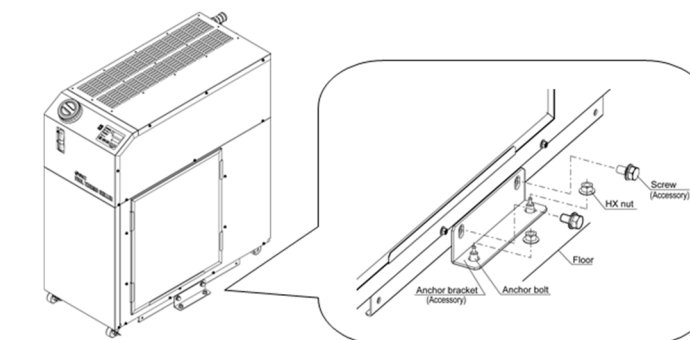


Figure 6 Securing to the floor

7.8 Electrical Wiring

Warning

- Do not modify the internal electrical wiring of the product. Incorrect wiring may cause electric shock or fire. Also, modifying the internal wiring will void the product's warranty.
- NEVER connect the ground to a water line, gas pipe or lightning conductor.
- The electrical facilities should be installed and wired in accordance with local laws and regulations of each country by a person who has knowledge and experience.
- Be sure to shut off the user's power supply before any wiring work. Wiring with the product energized is strictly prohibited.
- The wiring must be conducted using cables complying with "Table 9" and be firmly secured to the product to prevent the external force of the cables from being applied to the terminals. Incomplete wiring, or improper securing of wiring, may cause electric shock or excessive heat and fire.
- Ensure that an earth leakage breaker is used in the power supply of the product. See "Table 9".

7 Installation Continued

- Use a power supply suitable for the specifications of the product. Use a power supply of overvoltage category 3 (IEC60664-1).
- Be sure to connect the ground connection.
- Ensure that a lock out facility is available on the power supply.
- Each product must have its own separate connection to the power supply. Mixing wiring with other equipment is risky and may cause electric shock or fire. Never attempt to do this.
- Ensure that no harmonics are superimposed on the power supply. (Do not use an inverter, etc.)
- Supply a steady power supply which is not affected by surges or distortion. If the voltage rise rate (dv/dt) at zero crossing exceeds 40 V/200 μsec, it may cause a malfunction.

7.8.1 Power Supply Specifications, Power Supply Cable and Earth Leakage Breaker

Prepare the power supply shown in the following table. For the connection between the product and power supply, use the power supply cable and earth leakage breaker shown below. An earth leakage breaker must be mounted to a position where the breaker is easily accessible and close to the Thermo-chiller.

Table 9 Power supply cable and earth leakage (Recommended)

Model	Power supply voltage	Terminal block screw diameter	Crimp terminal	Cable qty. x size	Earth leakage breaker	
					Rated current [A]	Sensitivity of leak current [mA]
HRLE090-A-20	3 phase 200VAC (50Hz) 3 phase 200-230VAC (60Hz)	M5	R5.5-5	4 cores x 5.5 mm ² (4 cores x AWG10) * including ground	30	30
HRLE090-A-40	3 phase 380-415VAC (50Hz) 3 phase 460-480VAC (60Hz)	M8	R5.5-8		20	

* Cable specifications are examples for when using the product at a continuous allowable operating temperature of 70 °C, with an operating voltage of 600 V and two kinds of plastic insulated wires at an ambient temperature of 30 °C. Please select the proper size cables according to the actual condition.

7.8.2 Grounding

Be sure to ground the product (PE). Do not share the ground with equipment that generates strong noise or high frequencies. Grounding class: D-class grounding (with a ground resistance of 100 Ω or less)

7.9 Preparation and Wiring of Power Supply Cable

Warning

- The electrical facilities should be installed and wired in accordance with local laws and regulations of each country by a person who has knowledge and experience.
- Check the power supply. Operation with voltages, capacities, and frequencies other than the specified values can cause fire and electric shock.
- Wire with an applicable cable size and terminals. Forced mounting with a cable or terminals of an unsuitable size may result in heat generation or fire.
- Be sure to lock out and tag out the breaker of the facility power supply (user's power supply) before wiring.
- Be sure to connect the power supply cable from the product side first, and then connect the breaker of the facility power supply (the user's power supply facility).

Caution

- When the panel is removed or mounted, be sure to wear protective gloves to prevent injury with the edge of the panel.

Power Supply Cable Wiring

1. Remove the 4 screws to allow removal of the power supply terminal cover on the back of the product.
2. Insert the power supply cable and ground cable through the power supply cable entry of the power supply terminal cover (cable accessory).

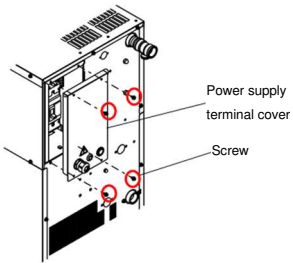


Figure 10 Removal of power supply terminal cover

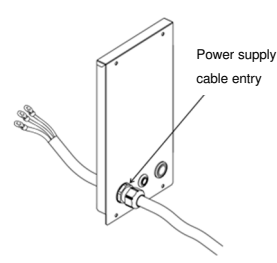


Figure 11 Power supply cable entry

7 Installation Continued

3. Connect the power supply cable and ground wire as shown in the figure below.

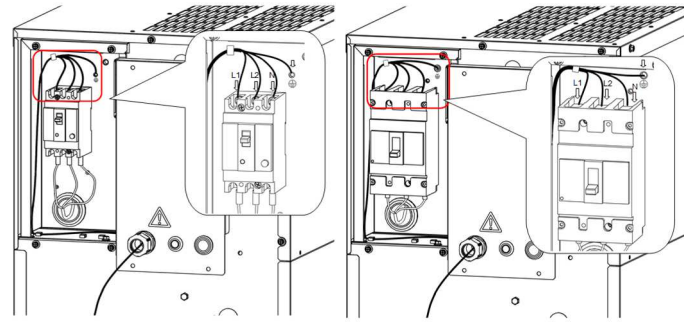


Figure 12 Cable wiring (200V)

Figure 13 Cable wiring (400V)

7.10 Piping

Caution

- Connect piping firmly. Incorrect piping might cause leakage of supplied or drained fluid getting the area wet, causing malfunction of the product or other facilities.
- Use caution to not allow dust and foreign matter to enter the water circuit, etc. during piping work.
- During piping work, residual liquid may drip from the circulating fluid circuit. Prepare a basin close to the piping connection to catch the residual liquid.
- Securely connect the piping at the piping port with a pipe wrench when tightening.
- The piping should be selected with due consideration of pressure and temperature.
- Incorrect piping can burst while in service.
- Use non-corrosive materials for parts that come in contact with circulating fluid. Using materials, such as aluminium or iron, that tend to rust or corrode for parts that come in contact with fluid may not only cause clogs in the circulating fluid circuits and leakage of the circulating fluid, but also leakage of refrigerant (CFC), causing unexpected problems. When using these kinds of materials, the customer needs to implement some preventive measures against rust and corrosion.

- Do not generate a rapid change in pressure with a water hammer, etc. Internal parts of the chiller and/or the piping may be damaged.

Table 10 Piping port size

Name	Port size	Recommended tightening torque	Recommended piping specifications
Circulating fluid outlet port (CH1)	Rc1	36 to 38 N·m	1.0 MPa or more
Circulating fluid return port (CH2)	Rc1/2	28 to 30 N·m	1.0 MPa or more
Drain port	Rc1/4	8 to 12 N·m	-

7.11 Circulating Fluid Supply

Turn the tank lid counterclockwise to open. Supply the circulating fluid up to the "H" mark on the fluid level indicator. Use tap water which satisfies the water quality standard shown in Operation Manual "section 8.1" or deionized water (pure water).

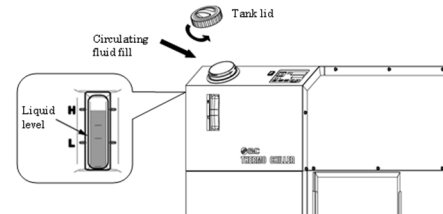


Figure 14 Adding circulating fluid

Caution

- When deionized water is used, the conductivity should be 0.4 μS/cm or higher (Electrical resistivity: 2.5 MΩ·cm or lower).
- Check that the drain port is closed with the valve to prevent the supplied circulating fluid from draining out.
- Supply recirculating fluid up to the "H" mark of the tank.
- Operation will stop when the fluid level falls lower than "L".

8 Starting the Product

8.1 Before Starting

Check the following points before starting the product.

- Installation state
 - Check that the product is installed horizontally.
 - Check that there are no heavy objects on the product, and the external piping is not applying excessive force to the product.
- Connection of cables
 - Check that the power, ground, and communication signal cables (to be supplied by the user) are correctly connected.
- Circulating fluid piping
 - Check that the circulating fluid piping is correctly connected to the inlet and outlet.
- Fluid level gauge
 - Confirm that the fluid level is between the "H" and "L" levels of the fluid level gauge.

8.2 Preparation for Start

8.2.1 Power Supply

1. Turn ON the breaker of the user's power supply. (Make sure that the breaker on the back of the product is turned on.)
2. Turn on the power supply switch on the front surface.

When the product is switched ON correctly, the operation panel display operates as shown below:

- The initial screen (HELLO screen) is displayed on the operation display panel. Then, the display changes to the main screen which shows the circulating fluid outlet temperature. * When an alarm is generated, the alarm screen appears.
- The current circulating fluid temperature is displayed as PV on the digital display.
- The set circulating fluid temperature is displayed as SV on the digital display.

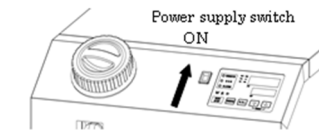


Figure 15 Turning on the Power Supply

8.2.2 Setting of Circulating Fluid Temperature

Press the [▼] or [▲] key on the operation panel to change the SV to the required value.

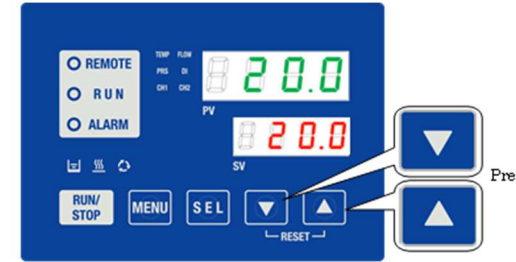


Figure 16 Setting the circulating fluid temperature

8.3 Operation Start and Stop

8.3.1 Starting the Product

Caution

- Allow at least 5 minutes before restarting the product.

Press the [RUN/STOP] key on the operation panel. The [RUN] light (green) turns ON and the product starts running. The circulating fluid discharge temperature (PV) is controlled at the set temperature (SV)

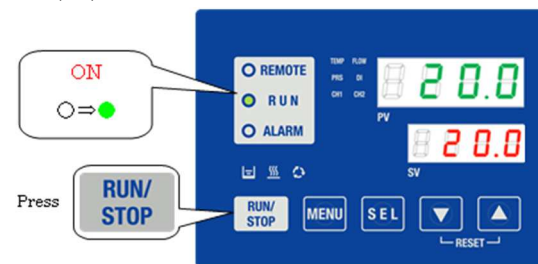


Figure 17 Starting the product

8 Starting the Product Continued

8.3.2 Stopping the Product

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

The [RUN] light on the operation panel blinks green and continues operation to prepare to stop. After approximately 20 seconds, the [RUN] light turns OFF and the operation stops completely.

2. Turn off the power supply switch. Turn OFF the user's power supply (power supply breaker) as needed.

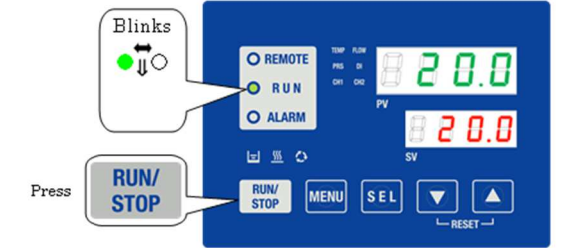


Figure 18 Stopping the product

Caution

- Do not turn OFF the breaker before the Thermo-chiller stops operation completely except in an emergency. It may damage the product.

9 Alarm Notification and Troubleshooting

9.1 Alarm Notification

The product alerts the user in the order shown below when an alarm is generated.

- The [ALARM] light blinks.
- The alarm sound sounds.
- The alarm number is displayed in the PV window on the digital display.
- Contact signal of the contact input/output communication is output.
- You can read the alarm status using serial communication.
- This product has two types of operation depending on the alarm.

During operation of the product, some of the alarms stop its operation and some of them do not stop operation with an alarm.

Refer to Operation Manual "Table 7-1 Alarm codes and troubleshooting". When the operation stops due to an alarm, you cannot restart the operation until the alarm is reset.

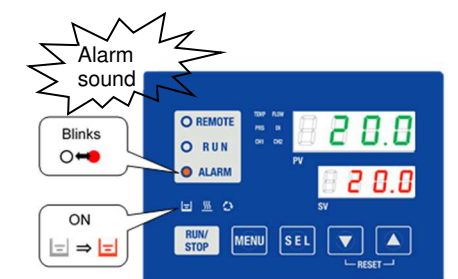


Figure 19 Alarm Identification

* The [AL] light turns ON only when the "AL01 Low level in tank" alarm is generated.

When multiple alarms are generated, the alarm codes are displayed one by one by pressing the [SEL] key.

The total alarm number shown in the SV window on the digital display.

When alarms are generated in the order of AL16, AL03, and AL02:

The alarm code displayed on the operation panel is AL02, AL03 and AL16 are displayed by pressing the [SEL] key.

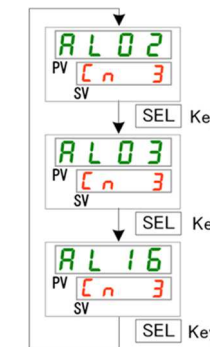


Figure 20 Alarm Display Example

9 Alarm Notification and Troubleshooting Continued

9.2 Alarm Sound Stop

An alarm sounds to notify the user when an alarm is generated. How to stop the alarm sound is explained below.

- Confirm that the alarm display screen is shown. The alarm sound can be stopped only on this screen.
- Press the [▼] and [▲] buttons simultaneously.
- The alarm sound stops.
- Alarm sounds can be set not to make sound. Refer to Operation Manual "5.7.2 Alarm sound setting."
- If this procedure is performed when the cause of the alarm has been eliminated before stopping the alarm sound, the alarm will be reset at the same time.



Figure 21 Stopping Alarm Sound

* The [AL] light turns ON only when the "AL01 Low level in tank" alarm is generated.

9.3 Troubleshooting

9.3.1 Alarm Details, Causes, and Troubleshooting

Troubleshooting method varies depending on which alarm has been generated. Refer to Operation Manual "Table 7-1 Alarm codes and troubleshooting" for handling.

- Confirm that the alarm display screen is shown.
- Alarms can only be reset on this screen.
- Press the [▼] and [▲] buttons simultaneously.
- The alarm is reset.
- The [ALARM] light turns OFF.
- The operation panel displays the circulating fluid temperature and the set circulating fluid temperature.
- Contact signal output for contact input/output communication stops.



Figure 22 Resetting Alarm

- (Refer to the Operation Manual Communication Function for details.)
- * The [AL] light turns ON only when the "AL01 Low level in tank" alarm is generated.

10 Maintenance

10.1 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.

10 Maintenance Continued

- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.
- Do not disassemble the product, unless required by installation or maintenance instructions.

10.2 Quality Control of Circulating Fluid and Facility Water

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 table below. If the water quality standards are not met, clogging or leakage in the facility may occur.

10.3 Inspection and Cleaning

10.3.1 Daily Check Items

Table 11 Daily Check Items and Contents

Item	Content of check	Content of check
Installation conditions	Check the installation condition of the product.	<ul style="list-style-type: none"> • Check that there is no heavy object on the product or excessive force being applied to the piping. • The temperature should be within the specification range of the product. • Make sure the ventilation grille is not obstructed. (Air-cooled type)
Fluid leakage	Check the connected parts of the piping.	Check that there is no fluid leakage from the connected parts of the piping.
Amount of circulating fluid	Check the fluid level meter.	The fluid level should be between the "H" and "L" levels of the fluid level meter.
Operation panel	Check the indications on the display. Check the functionality.	Numbers shown on the display should be clear and legible. Check that the buttons, [RUN/STOP], [MENU], [SEL], [▼], 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.
Operating condition	Check the operating condition of the product.	<ul style="list-style-type: none"> • There should be no abnormalities involving noise, vibration, smell, or generation of smoke. • There should be no active alarm signals.

10.3.2 Monthly Check Items

Table 12 Monthly Check Items and Contents

Item	Content of check	Content of check
Ventilating condition (Air-cooled type)	Clean the ventilation grille.	Make sure the ventilation grille is not clogged with dust, etc.

Cleaning the Ventilation Grille

Caution

If the fins of the air-cooled condenser become clogged with dust or debris, heat radiation performance declines. This will result in a reduction of the cooling performance and may stop the operation if the safety device is triggered.

Clean the dust-proof filters with a long-bristled brush or by blowing air to prevent the fins from being deformed or damaged.

Removal of the Dust-Proof Filter

1. A dust-proof filter is installed on the right side of the product.

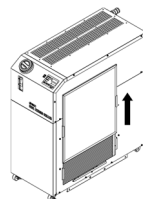


Figure 23 Removing Dust-Proof Filter

2. Raise the dust-proof filter as shown below. Care should be taken not to deform or scratch the air-cooled condenser (fins) while removing the filter.

Cleaning the Dust-Proof Filter

Clean the dust-proof filters with a long-bristled brush or by blowing air.

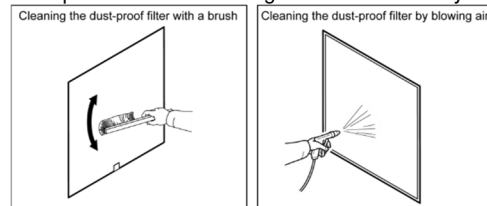


Figure 24 Methods to Clean the Dust-Proof Filter

Mounting the Dust-Proof Filter

Reassemble the filter in the reverse order to removal.

10 Maintenance Continued

10.3.3 Content of 3-month Inspections

Table 13 Items and Contents of 3-month Inspections

Item	Content of check	Content of check
Power supply	Check the power supply voltage.	Make sure the supply voltage is within the specification range.
Circulating fluid	Replace the circulating liquid (clean water) periodically.	<ul style="list-style-type: none"> • 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 in it. • The quality of the [clean water/pure water] must be within the range shown in Operation Manual "Table 8-1 Water quality criteria for clear water (tap water)". • It is recommended to replace the circulating fluid every 3 months when periodic maintenance is performed.

10.3.4 6-month Inspections

Caution

- Leakage from the mechanical seal: It is impossible to prevent leakage from the mechanical seal completely because of its structure. The leakage is 3 cc/hr or less.
- The recommend lifetime of the mechanical seal before needing replacement is 6000 to 8000 hours.

Remove the panel and inspect if there is abnormal leakage from the pump. If any leakage is found, the mechanical seal needs to be replaced. Order the mechanical seal described in "10.4 Consumables" as a service part.

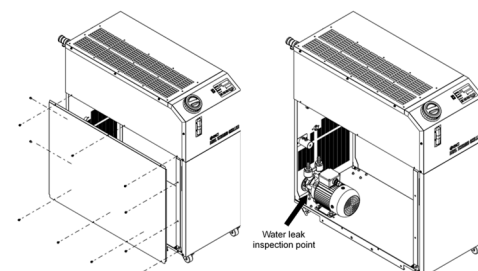


Figure 25 Water Leak Inspection Point

10.3.5 Inspection During Winter Season

Caution

Keep the power supply ON for this function. This function does not operate when the power is OFF.

- Anti-freezing function

This function prevents the circulating fluid from freezing while operation of the product is stopped in the winter season with heat generated by automatically operating the pump. When there is a possibility of the circulating fluid freezing due to changes in the installation or operating environment (e.g., season, weather), set this function ON in advance.

* For more details, refer to Operation Manual "5.6.6 Anti-Freezing Function Setting".

10.4 Consumables

Table 14 Consumables Parts

Part No.	Name	Qty.	Remarks
IDF-S0535	Dust-proof filter	1	1 piece is used per unit
HRG-S0211	Mechanical seal set	1	1 set is used per unit
HRR-DF001	DI filter	1	1 piece is used per unit

10.5 Operation Stop for an Extended Period of Time

If the product will not be operated for an extended period or there is a possibility of freezing in the wintertime, take the measures according to the instructions shown below.

1. Turn OFF the earth leakage breaker of the user's power supply. (Turn off the power supply switch and the breaker in the panel.)

2. Discharge all the circulating fluid completely from the product. Refer to "10.5.1 Discharge of the Circulating Fluid" for how to discharge the circulating fluid.

3. After discharging the circulating fluid, cover the product with a sheet before storing the product. (The sheet should be prepared by the user.)

10 Maintenance Continued

10.5.1 Discharge of the Circulating Fluid

Warning

- Before discharging the circulating fluid, stop the user's equipment and release the residual pressure.

Caution

- For relocation or long-term storage, drain as much of the residual liquid in the piping as possible. Residual liquid may drip during movement or installation.

1. Turn OFF the earth leakage breaker of the user's power supply.
2. Open the ball valve at the drain port and discharge the fluid.
3. Confirm that all the circulating fluid has been discharged completely from the product and from the user's facility and piping, and then purge the circulating fluid port of the product with air.
4. Close the ball valve after discharging the circulating fluid in the tank.

11 Limitations of Use

11.1 Limited Warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

Caution

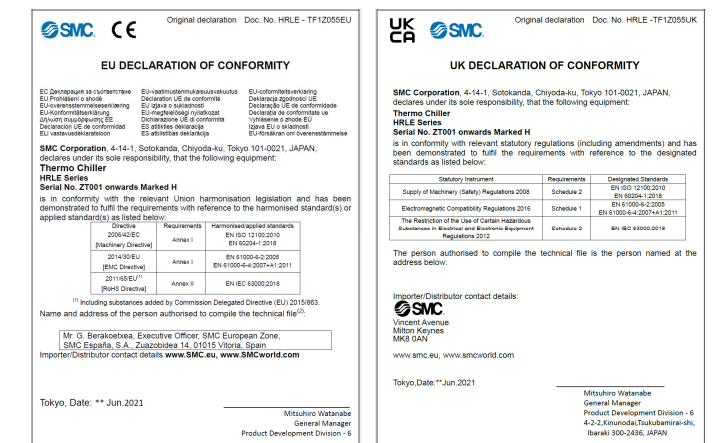
Refer to 'Section 2. Specifications' for the product limitations of use.

12 Product Disposal

This product shall 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

Below are sample Declaration of Conformities (DoC) used for this product.



14 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
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