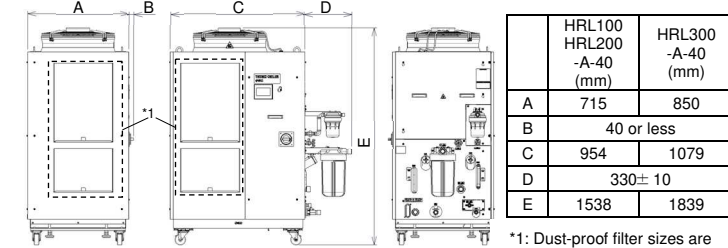
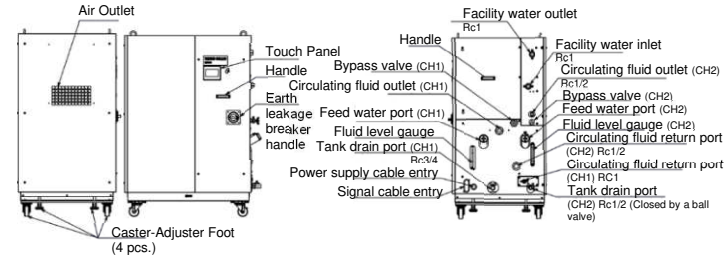


4 Name of Parts and Accessories (continued)

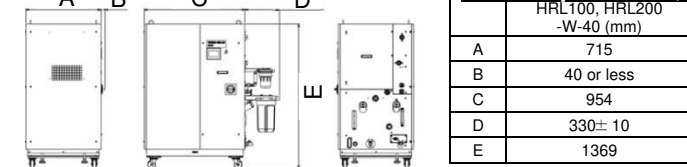


*1: Dust-proof filter sizes are different for each model size

HRL100,200-W-40



5 Transportation.



Transfer and Moving

5.1 Moving by forklift and slinging or by casters

Warning

- The product is a heavy object (Refer to 2.1 Product specification for weights).
- Moving by forklift and slinging should be done by persons who have required licenses.
- Moving the product by casters should be done by 2 persons or more.

6 Installation

6.1 Installation

Warning

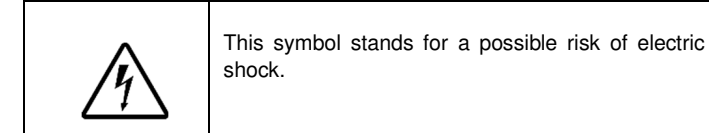
- Do not install the product unless the safety instructions have been read and understood.

6.2 Types of Hazard Labels

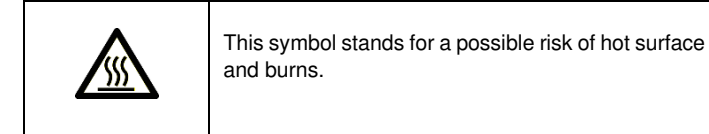
Warning

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

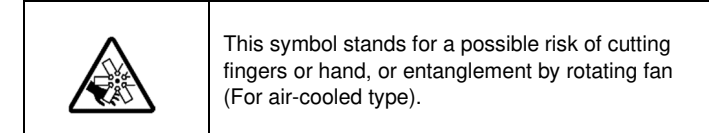
Warning related to Electricity



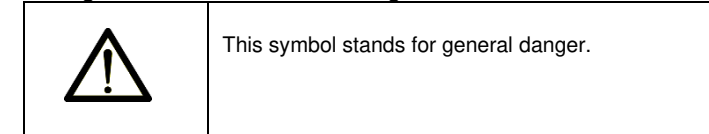
Warning related to High Temperatures



Warning related to Rotating Objects



Warning related to other General Dangers



6 Installation (continued)

6.3 Environment

Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use the product in an area of high temperature and humidity which cannot be exhausted, or where it is exposed to corrosive substances. Cooling failure can result.
- Do not use the product outdoors. If the product is exposed to rain or water splash it may cause electrical shock, fire or failure.
- Do not use in an explosive atmosphere.
- Do not install in a location exposed to direct sunlight and radiant heat.
- Do not install in a location subjected to vibration or impact.
- Do not install subjected to strong electromagnetic noise (intense electric field, intense magnetic field, or surges).
- Do not install subjected to static electricity, or conditions where static electricity can discharge to the product.
- Do not install subjected to strong high frequencies radiation.
- Do not use in locations at altitudes of 3000m or higher (except for product storage and transport), refer to the Operation Manual section '3.2.1 Environment'.
- Do not install in a location without adequate space for maintenance.

6.4 Mounting

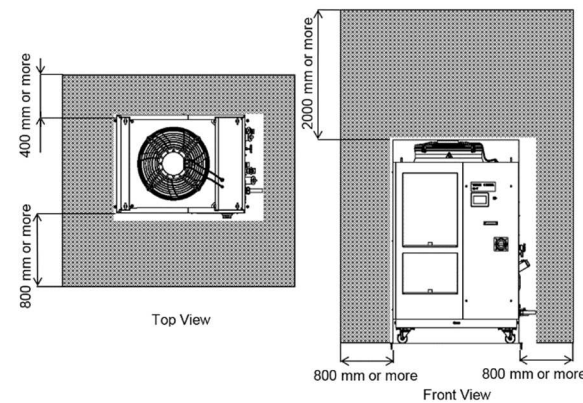
Warning

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

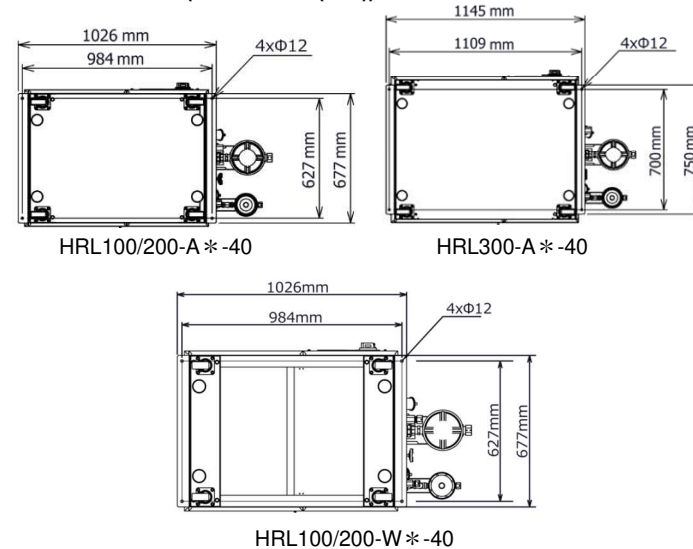
Caution

- Have enough space for ventilation for the product. Otherwise may cause a lack of cooling capacity or/and stoppage of the product.
- Have enough space for maintenance.
- Install the product on a vibration free floor.
- Prepare M10 anchor bolts that are suitable to the floor that the product will be installed. Refer to '6.6 Anchor bolts' for outline dimensions for the position of the anchor bolts.

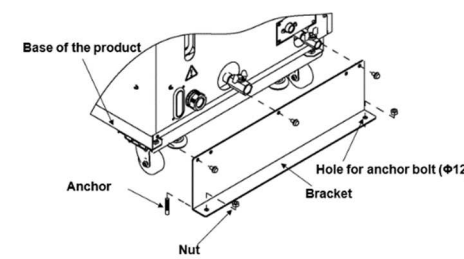
6.5 Recommended installation Space



6.6 Anchor bolts (dimensions (mm))



6 Installation (continued)

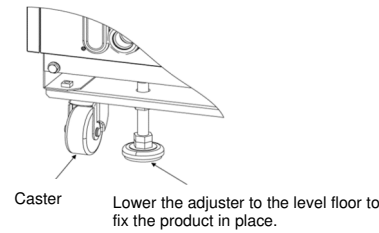


- Install this product according to the anchor bolts installed on the level floor.
- Fasten the nuts to the anchor bolts.
- Make sure that there is no looseness on all the anchor bolts and nuts.

6.6.1 Use the adjuster-foot

Caution

In case of using "Caster Adjuster-foot", be sure to use the adjuster foot to install on the floor. The adjuster foot is not earthquake-proof. If necessary make an earthquake-resistant measure on the customer side.



6.7 Piping

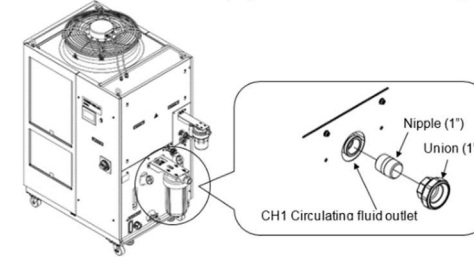
Caution

- Before piping make sure to clean up chips, cutting oil, dust etc.
- The piping should be selected with due consideration of temperature and pressure.
- Do not generate a rapid change of pressure by water hammer etc. The product and piping might be damaged.
- Hold the piping port firmly with specific wrench when tightening.

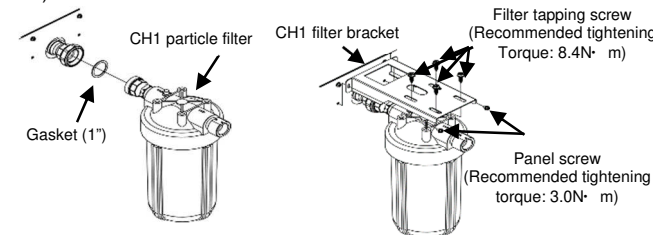
6.7.1 Installation of particle filters:

6.7.1.1 Installation of CH1 Particle Filter.

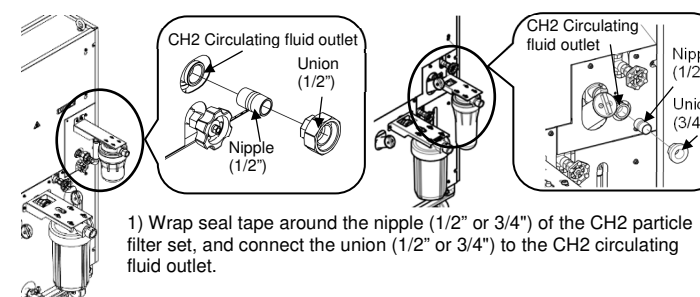
- Wrap seal tape around the nipple (1") of the CH1 particle filter set, and connect the union (1") to the CH1 circulating fluid outlet.



- Insert the gasket (1") and install CH1 particle filter.
- Install CH1 filter bracket.
- Remove filter case to fit filter element.



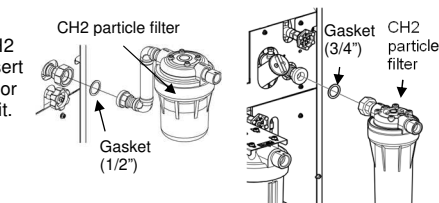
6.7.1.2 Installation of CH2 Particle Filter.



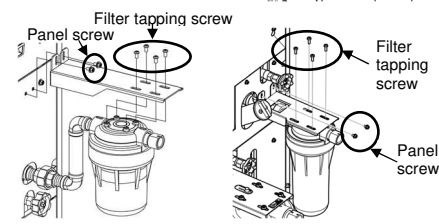
- Wrap seal tape around the nipple (1/2" or 3/4") of the CH2 particle filter set, and connect the union (1/2" or 3/4") to the CH2 circulating fluid outlet.

6 Installation (continued)

- Attach the CH2 particle filter. Insert the gasket (1/2" or 3/4") and install it.



- Attach the CH2 filter bracket.



6.7.2 Piping Port Size

CH No.	Description	Port size	Recommended tightening torque	Recommended piping specification	
CH1	Circulating fluid outlet port	Chiller side	1" union	178 to 185N·m	--
		Filter side	Rc1 ¹	36 to 38N·m	1.0 MPa or more
	Circulating fluid return port		Rc1 ²	36 to 38N·m	1.0 MPa or more
	Tank drain port	Rc3/4 ²	28 to 30N·m	--	
CH2	Circulating fluid outlet port	Chiller side	1/2" union	64 to 70N·m	--
		Option: T3	3/4" union ³	106 to 115N·m	
	Filter side	Rc1/2 ¹	20 to 25N·m	0.8 MPa or more	
	Option: T3	Rc3/4 ^{1,3}	28 to 30N·m		
Circulating fluid return port		Rc1/2 ²	20 to 25N·m	0.8 MPa or more	
	Option: T3	Rc3/4 ^{2,3}	28 to 30N·m		
Tank drain port		Rc1/2 ²	20 to 25N·m	--	
	Option: T3	Rc1/4 ^{2,3}	8 to 12N·m		
-	Facility water inlet ⁴	Rc1	36 to 38N·m	1.0 MPa or more	
-	Facility water outlet ⁴	Rc1	36 to 38N·m	1.0 MPa or more	

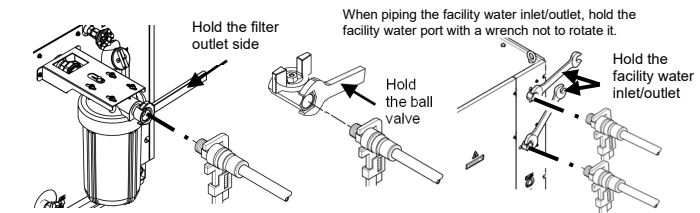
*1: When the piping thread type "F (G thread)" or "N (NPT thread)" is selected, it becomes "G thread" or "NPT thread".
 *2: When the piping screw type "F (G thread)" or "N (NPT thread)" is selected, a conversion joint is included.
 *3: Option T3 "CH2 High-Pressure Pump Mounted". For details refer to the operation manual 'Chapter 6 Option'.
 *4: For water-cooled type

6.7.3 Connecting to the Circulating fluid port and Drain Port.

Caution

Without using a wrench to hold either the circulating fluid outlet's filter side fitting or the drain port's ball valve, the fitting or the ball valve may rotate. This could cause fluid leakage and/or product malfunction. Ensure the filter side fitting and ball valve of the drain port is held securely.

- Circulating fluid port: To pipe to the circulating fluid outlet, hold the filter outlet side fitting with a wrench. Do not rotate the wrench.
- Drain port: To pipe the pump drain port, hold the ball valve of the drain port with a wrench. Do not rotate the wrench.



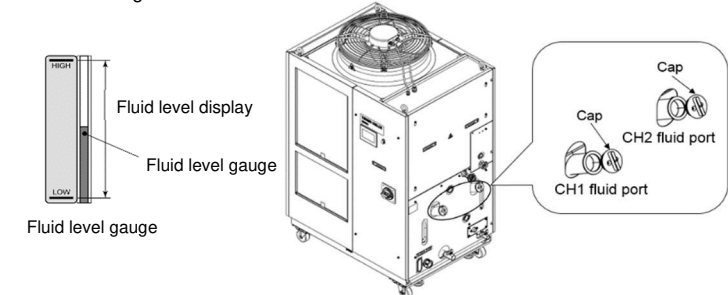
6.7.4 Installation of the DI filter.

Is not explained in this manual. Please refer to the Operation Manual "8.4.2 Replacing the DI filter".

6.8 Filling of Circulating Fluid

Caution

- When deionized water is used the conductivity should be 1μS/cm or higher (Electrical resistivity: 1MΩ·cm or lower).
- Confirm that the fluid level is between "High" and "Low" level of the fluid level gauge for CH1 and CH2.
- Check drain port is closed by the valve to prevent the supply circulating fluid from draining out.



6 Installation (continued)

6.9 Wiring of Power Supply Cable

Warning

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

Caution

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

6.9.1 Preliminary Preparation for Wiring

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

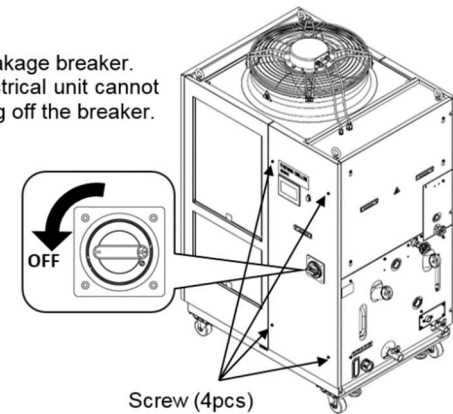
Model	Power supply voltage	Terminal block screw diameter	Proposed crimp terminal	Cable specification *1	Earth leakage breaker	
					Rated current [A]	Sensitivity of leak current [mA]
HRL100-A*-40	3 phase 380-415 VAC 50/60 Hz	M5	R5.5-5	4 cores x 5.5mm ² (4 cores x AWG10) *including ground	20	30
HRL200-A*-40					30	
HRL100/200- W*-40					30	
HRL300-A*-40	3 phase 460-480 VAC 60 Hz	R8-5	4 cores x 8mm ² (4 cores x AWG8) *including ground	40	30	
	40					

*1: 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.

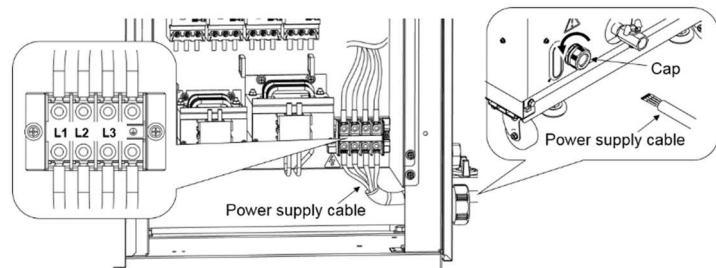
6.9.2 Wiring of Power Supply

- Turn off the breaker handle.
- Remove 4 screws to remove the front panel.
- Hold the handle and pull up the front panel of the electrical unit, and remove.

Note: Turn off the earth leakage breaker. The front panel of the electrical unit cannot be removed without turning off the breaker.



- Loosen the power cable outlet cap and insert the power cable.
- Connect the power supply cable and ground cable as shown below:



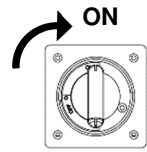
- Connect an over current protection to the power cable connected to the equipment to avoid hazard.

7 Start, Stop and Temperature Settings

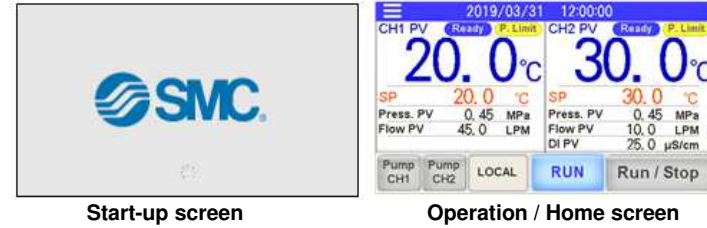
7.1 Preliminary Preparation for Start-up

7.1.1 Supply of Power

- Turn on the breaker handle.



- The 'Startup' screen first appears on the touch panel and then switches to the 'Operation / Home' screen.

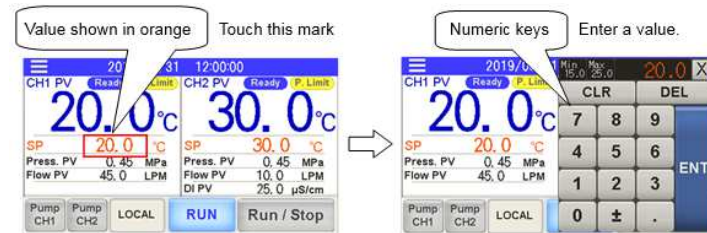


7.1.2 Preparation of circulating fluid

- Touch [Pump CH1] button or [Pump CH2] button on the touch panel. Pump operates independently while pressing the [Pump CH1 / Pump CH2] button. [Pump CH1 / Pump CH2] button (blue) lights up during independent pump operation. The circulating fluid is then supplied to user's device and the piping to bleed the air inside the piping.
- If the fluid level in the tank drops, an alarm is activated and "AL02 CH1 Low Level WRN" or "AL04 CH2 Low Level WRN" is displayed on the screen.
- Supply circulating fluid in the range between HIGH and LOW to turn off the alarm. After supplying the circulating fluid, press [Alarm Reset] button to turn off the alarm. The displayed alarm will be turned off.
- Touch [Menu] (menu key) to display the menu. When [Home] button is pressed, the home screen will be displayed.

7.1.3 Temperature Setting

- Press the [SP] value on the touch panel (home screen) to display numeric keys to set the circulating fluid set temperature. Enter the set temperature for CH1 and CH2.

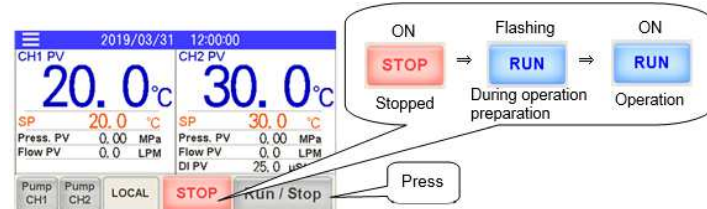


7.2 Start of the Product

- Press [Run / Stop] button on the home screen.

CH1 and CH2 will start the operation.

The operating condition display switches from [STOP] to [RUN] and flashes during the operation preparation. The display turns on [RUN] when it starts operating.



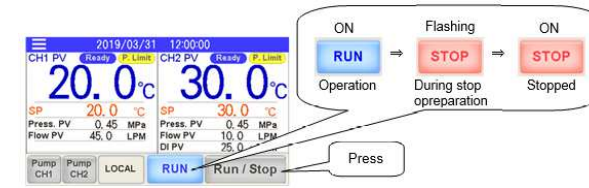
7 Start, Stop and Temperature Settings (continued)

7.3 Stop of the Product

- Press [Run / Stop] button on the home screen.

CH1 and CH2 will stop the operation.

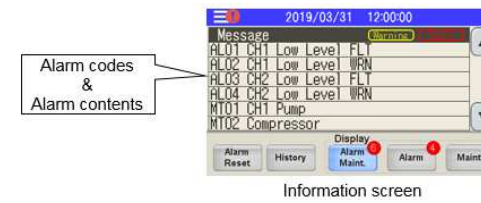
The operating condition display switches from [RUN] to [STOP] and flashes during the operation preparation. The display turns on [STOP] when it starts operating.



8 Alarms

The product makes notification in the order shown below when any alarm is generated.

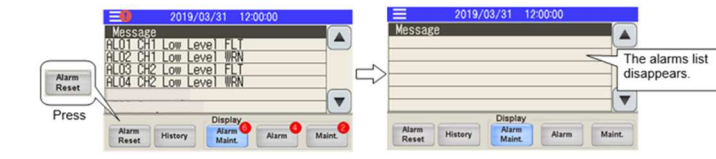
- The screen automatically moves to the "Information" screen and displays alarm codes with their contents. (Refer Operation manual section "5.4.4 Information screen" for the operation method of "Information" screen.)



- When an alarm occurs, this product operates in two ways depending on the content of the alarm:
 - Operation continuation alarm: When an alarm occurs, this product continues to operate. The alarm content will display "WRN".
 - Operation stop alarm: When an alarm occurs, this product stops. The alarm content will display "FLT".

8.1 Reset of alarm

- Press the button [Alarm Reset]
- The alarm is reset.



Caution

- Before resetting the alarm, read the "Causes and Remedies" of "10.1 Troubleshooting" and eliminate the cause as explained. Otherwise, the same alarm may be repeated.

9 Maintenance

9.1 General Maintenance

Warning

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

Caution

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

9 Maintenance (continued)

9.2 Control of Circulating Fluid Quality

Warning

- Use specified circulating fluids only. If other fluids are used, they may damage the product or result in dangerous hazards.
- When using tap water ensure that it satisfies the water standard shown in the Operation Manual.
- When deionized water is used, the conductivity should be 1.0 μS/cm or higher (Electrical resistivity: 1 MΩ·cm or lower).

9.3 Daily Check

Caution

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

Daily checklist

Item	Description of checking	
Installation condition	Check the installation conditions of the product.	Check that there is no heavy object on the product or excessive force applying to the piping.
		Temperature should be within the specification range of the product.
		Make sure the ventilation grilles are not obstructed. (For air-cooled type)
Fluid leakage	Check the connected part of piping	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.
Touch panel	Check the indications on the display.	The display on the screen is clear.
Circulating fluid temperature	Check on the touch panel.	There should be no problem during operation.
Circulating fluid discharge pressure	Check on the touch panel.	There should be no problem during operation.
Circulating fluid flow rate	Check on the touch panel.	There should be no problem during operation. If flow rate becomes low, check for clogging in the particle filters.
Operating conditions	Check the operation condition.	There should be no abnormality with noise, vibration, smell, or generation of smoke.
Facility water (for-watercooled type)	Check the facility water condition.	Check that the temperature, pressure and flow rate are within specification ranges.

9.4 Monthly Check

Item	Contents of check	
Ventilating condition (air cooled type)	Clean the ventilating grilles.	Make sure the ventilating 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.

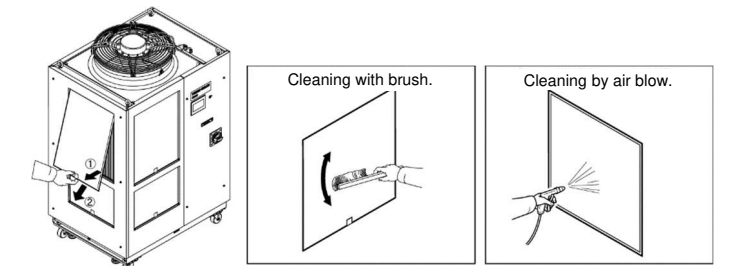
Cleaning of air vent (Air-cooled type)

Caution

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

9.4.1 Removal of the Dustproof Filter (For air-cooled type)

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



9.4.2 Cleaning of Filter

- Clean the dust filter with a long bristled brush or by air purging.
- Mount the dustproof filter in reverse order of removal.

