

**EYELA****Low Temperature  
Circulator****Cool Ace****CA-1330**

# Instruction Manual

**IMPORTANT**

This instruction manual is designed to use the product safely with keeping its best performance.

**Be sure to read “Safety precautions” before use.**

Please keep this manual in a place easily accessible to every users.

**Tokyo Rikakikai Co., Ltd.**

## FORWARD

Thank you very much for your kind patronage of EYELA.  
Get to know your EYELA products, but before using, to be sure to read this manual well.  
EYELA cannot be held responsible for the malfunctions resulting from the use of EYELA  
Products other than as specified in this manual.

### WARRANTY

EYELA products are warranted against defects in materials and workmanship for a period of year following the date of shipments.

EYELA will make repairs or replacements free of charge upon return to the factory, Transportation paid, of the defective item except following cases.

This warranty does not cover finishes nor dose it cover damage resulting from accident, misuse, abuse, tampering, servicing performed or attempted by unauthorized service agency.

The consumable parts are not warranted even if they are within the warranty period.

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**Web site: [www.eyelaworld.com](http://www.eyelaworld.com)**

### LIABILITY DISCLAIMER

Liability to Tokyo Rikakikai Co., Ltd. For any defect in this instrument is limited to the Invoiced price of the defective instrument.

Tokyo Rikakikai Co., Ltd. Has no control over the set up, use, connection to other Equipment, or data generated by means of EYELA products.

Therefore in no event shall Tokyo Rikakikai Co., Ltd.be liable for any incidental or Consequential damages , losses, or liability which may result from improper use of its Products, either in connection with other equipment or in the generation, reporting, or Application of data and results.

### SERVICE

1. Before asking our service agency, check your instrument again with trouble shooting on this manual.
2. We shall repair the instrument subject to WARRANTY CLAUSE
3. Ask our authorized service agency for repairing.

# IMPORTANT SAFETY INFORMATION

## 1. Warning signal word

The unit is not of an explosion-proof construction. Take extreme care for handling flammable samples or organic solvents not to spill them.



The unit uses H<sub>2</sub> gas and shall be installed and operated in a draft chamber.

This product will be used with part it is hot because of its functions and features.

This product includes glass parts which might break and cause personal injury or other accidents if handled inappropriately.

To ensure the safety, this manual defines the information on such matters as requiring particular care in the safety as follows in terms of the importance and risk and attaches the alert mark and signal word.

It is recommended to follow the instruction to ensure the safe use of the product.

Alert mark Signal word	Definition
 Warning	Wrong handling is assumed to cause the possibility of the death or heavy injury of the user.
 Caution	Wrong handling is assumed to cause the risk of injury of the operator or physical damages.

We have undertaken thorough verification concerning the possible occurrence of risk in the course of use of the product, but prediction of all and every kind of risk is extremely difficult. Namely, cautions contained in this manual are not necessarily all of possible risks.

However, if the product is operated according to the procedure described in this manual, the safe operation and work is ensured. Be sure to pay utmost care during handling of the product to prevent accident or failure of the product.

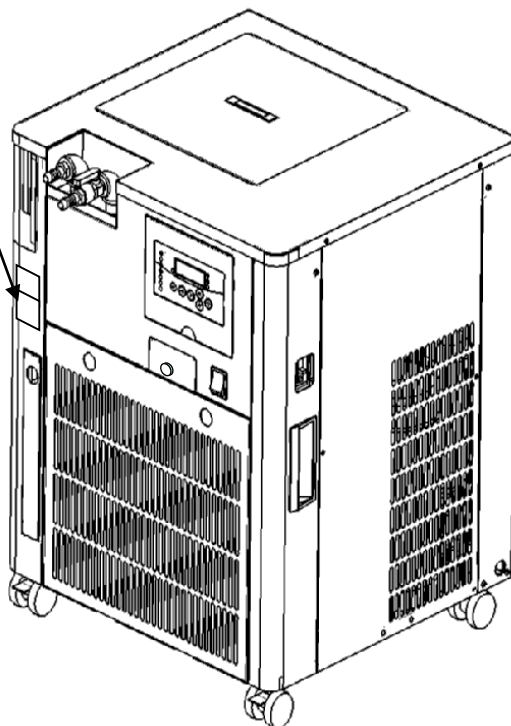
## 2. Warning Display on the Product

For particularly important warning instructions, the warning label is provided to the product main body.

The labelling position is shown below.

When using the product, be sure to pay due attention to the description of the warning.

- ※ If damaged and illegible, be sure to change the warning label to the new one.  
Send the request for the new label to us.



## Introduction

This instruction manual explains installation, operation, troubleshooting, maintenance and inspection, and discarding procedures for the

Always read this manual before use to ensure familiarization of the product.

### Low Temperature Circulator [Cool Ace] model: CA-1330

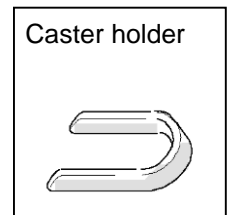
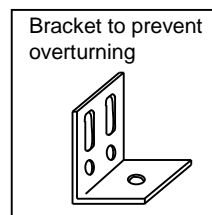
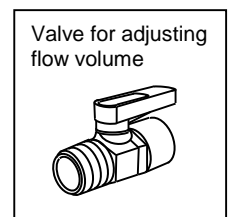
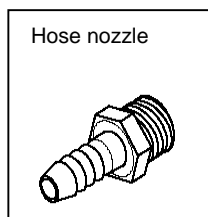
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## Details of items in the package

Check the type and quantity of items before setting up.

	Item	Qty
1	Main unit	1
2	Valve for adjusting Flow volume ( R3/8 x Rc3/8 )	1
3	Hose nozzle ( R3/8 × O.D.Φ10.5 )	2
4	Caster holder	2
5	Bracket to prevent overturning	2
6	Instruction manual	1



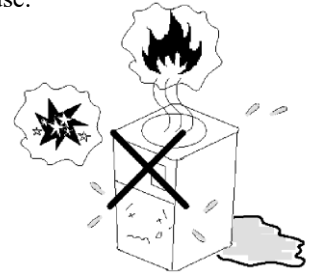
**This product is not designed with explosion-proof structure.  
Use with extreme caution when handling it.**



**WARNING**

**Use with extreme caution when handling  
inflammable or combustible solvent.**

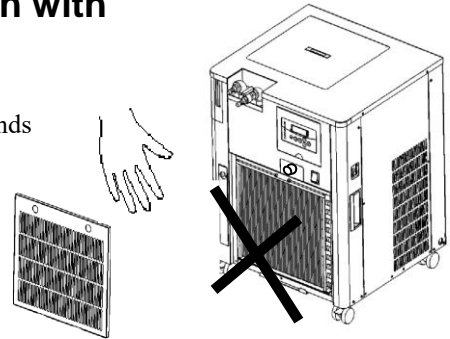
If you leave inflammable or combustible solvent (ethanol and etc.) at room temperature or higher (lower for some solvent), it may evaporate and catch fire with some fire sources, and cause a fire and explode. Ventilate the space well before use.



**CAUTION**

**Do not touch cooling fin with  
bare hands.**

Do not touch cooling fin with bare hands while performing maintenance work. Edgy fin may cut your fingers.



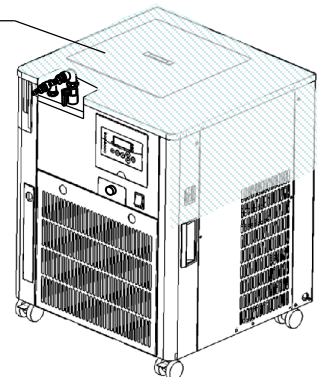
**CAUTION**

**The top and exhaust port be heated to high  
temperatures during operation.  
Do not touch them.**

When used under a table at the room temperature of 30°C or more, the top and sides of the product may be heated with exhaust heat to high temperatures.

Do not touch them to prevent burn.

Hatched portions (top and sides)  
Heated to high temperatures.



## 2 Product overview

### 2-1 Applications



#### Warning

**Never attempt to disassemble or modify the product.**

**Do not use the product for any purposes other than those specified.**

Modification or use for purposes other than those specified may lead to an electric shock or a malfunction.

This is a cooling water circulator, which cools water by means of the refrigerator inside the bath and circulates cooling water by means of the circulation pump to the outside to cool the evaporator, reactor, the heating portion of various mechanical units. This product is of a low-floor type and can be stored in a space under a table. This is capable of cooling two 1L type evaporators simultaneously.

### 2-2 Specification

Product name		Low temperature circulator (Cool Ace)
Model		CA-1330
Circulation system		Circulation for sealed system
Performance	Temperature control range ※1	-20°C~+20°C
	Accuracy of temperature control	±2.0°C~
	Cooling capability※2	1050W at 10°C
	External circulation Capability※3 (50/60Hz)	Max. flow volume
Max. lifting height		9.5/13m
Functions	Temperature control system	Refrigeration unit, ON-OFF control
	Temperature setting • display	Sheet key digital setting, LED digital setting (minimum digit: 1°C)
	Safety features	Residual current device • excess current breaker, Self-diagnosis function of the temperature controller, Over load relay holding circuit, Protection timer for refrigeration unit, Thermal protector for circulation pump, High pressure switch of the refrigeration unit
	Optional parts	External sensor terminal, communication terminal (for NVC3000)
Configuration	Temperature controller	Electronic digital setting • digital display
	Temperature sensor	Pt sensor (Pt100Ω)
	Refrigeration unit • refrigerant	Air cooling type 650W • R407C
	Cooling coil	Copper (Nickel coating)
Spec.	External circulation nozzle	External diameter: 10.5 × Bore diameter: 7 (R3/8)
	Bath material, dimensions and capacity	SUS304, W270 × H270 × D175 [mm], (MAX 12.8L, liquid capacity approx. 10L)
Operating ambient temperature		5~35°C
Dimensions (main unit) (mm) ※4		W460 × D430 × H570
Mass		Approx. 48kg
Power input • rated power		5A 1.1kVA AC220V ± 10% 50/60Hz
Operation pressure max.		2.55MPa
Pollution degree		2
Over voltage category		II
Operation at a terrestrial altitude		Max 2000m above sea level

※ The performance is for the room temperature of 20°C, the rated supply voltage, 50 Hz, and the no-load state.

※1 For the room temperature of 35°C, the set temperature range can be up to -10°C.

※2 The cooling capacity is ± 10% of the listed capacity.

※3 The circulation capacity is ± 10% of the listed capacity.

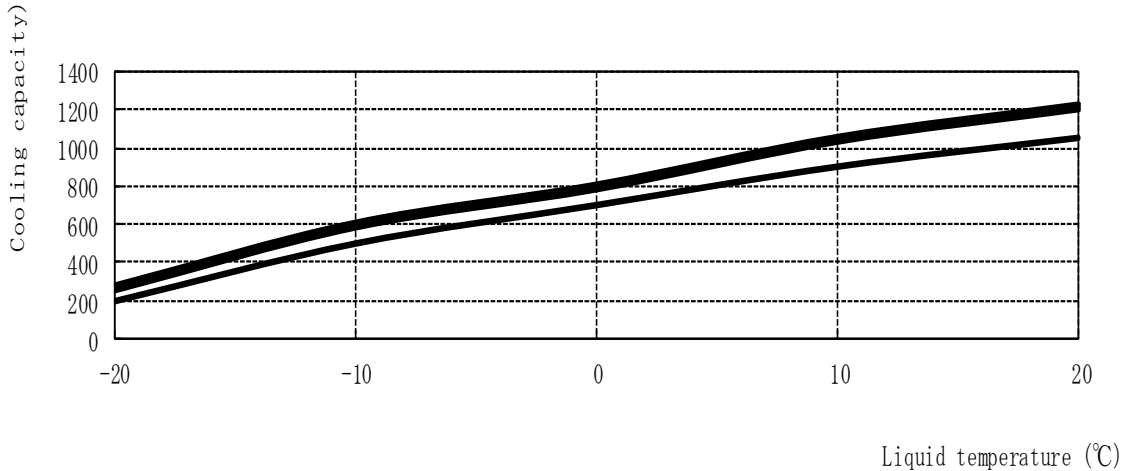
※4 Power cord and other projections not included

## 2-3 Data (reference)

### ■ Cooling capacity curve

Conditions • 220V 50Hz Room temperature at 20°C  
 • Circulation rate maximum

Installed outside the of table  
 Installed under the table



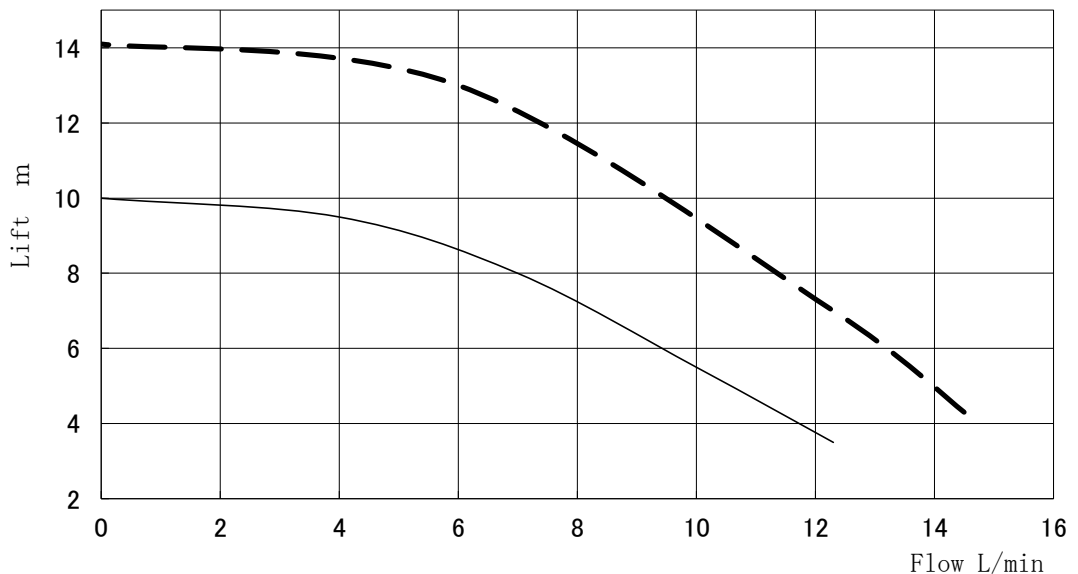
- The cooling capacity is  $\pm 10\%$  of the listed capacity.
  - The capacity shown above is for the unit proper.
  - The cooling capacity is degraded by about 14% when the unit is installed under the table as compared to the case of installation outside the range of table.
- The cooling capacity is degraded by 26% at -20°C.

※Measurement conditions for installation under the table: The unit is covered for 5 cm in the backside, 3 cm on the top, 40 cm on the right side, and the left side.

### ■ Pump circulation capacity

Conditions • 220V  
 • Circulation solution Water  
 • Room temperature 20°C  
 • Nozzle outside diameter  $\Phi 10.5\text{mm}$

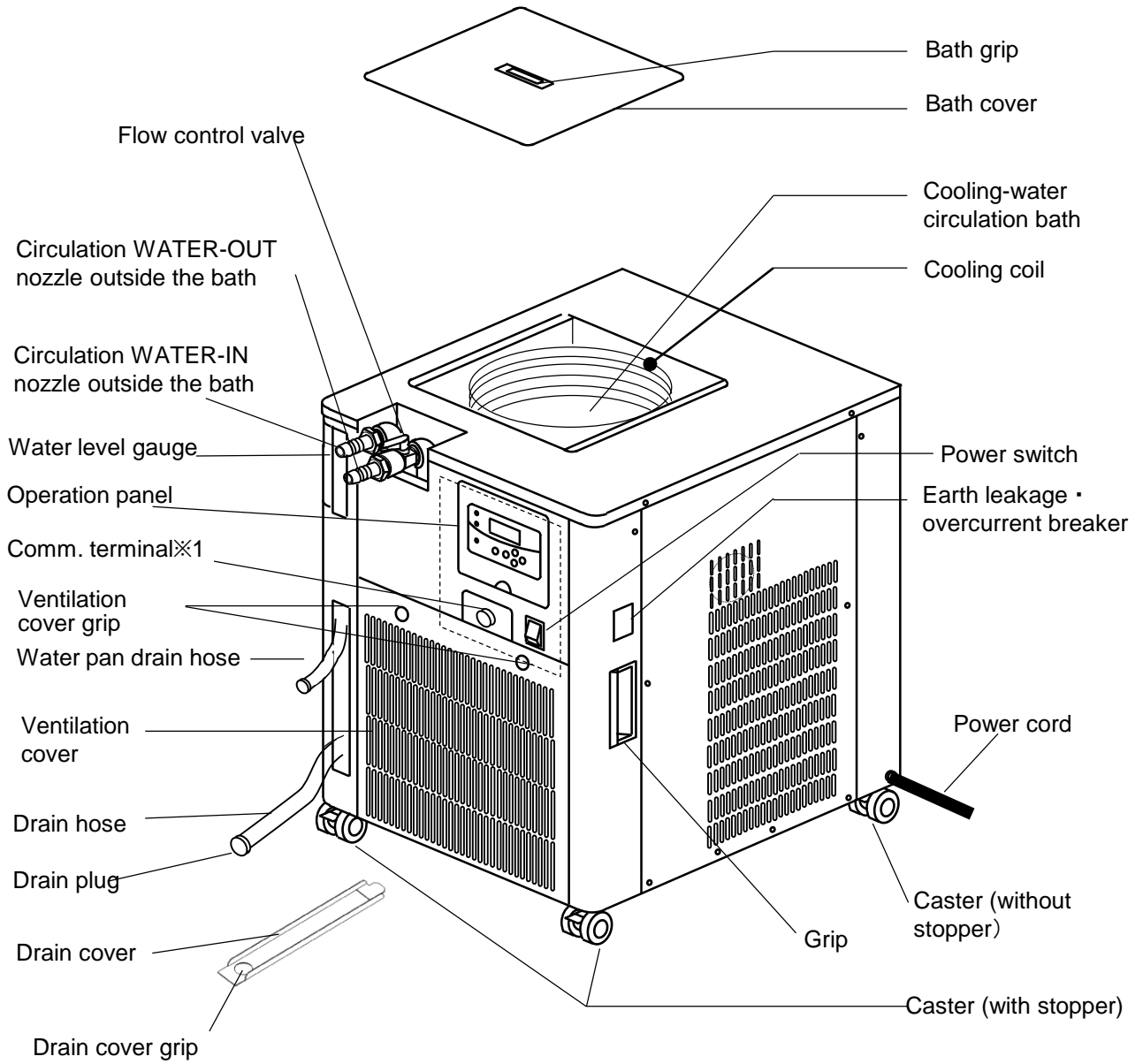
50Hz  
 60Hz



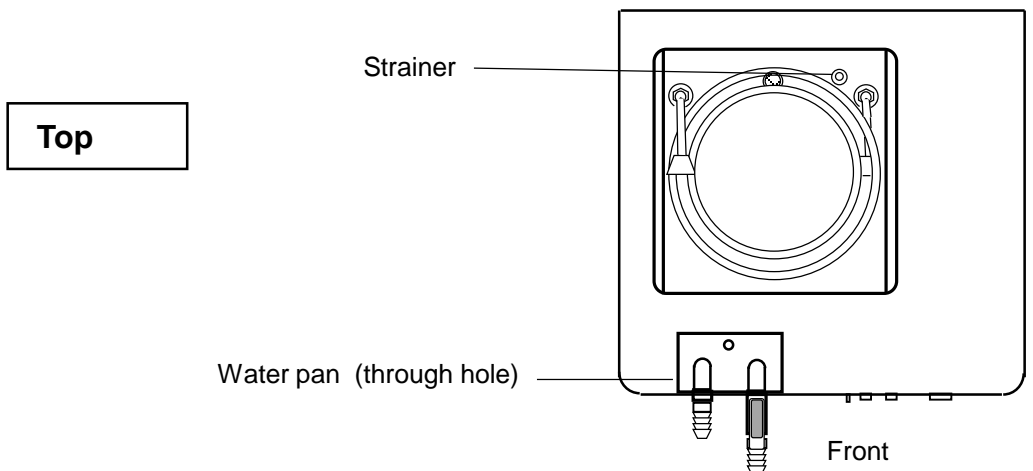
- The circulation capacity is  $\pm 10\%$  of listed capacity.
- The listed capacity is for the unit proper.



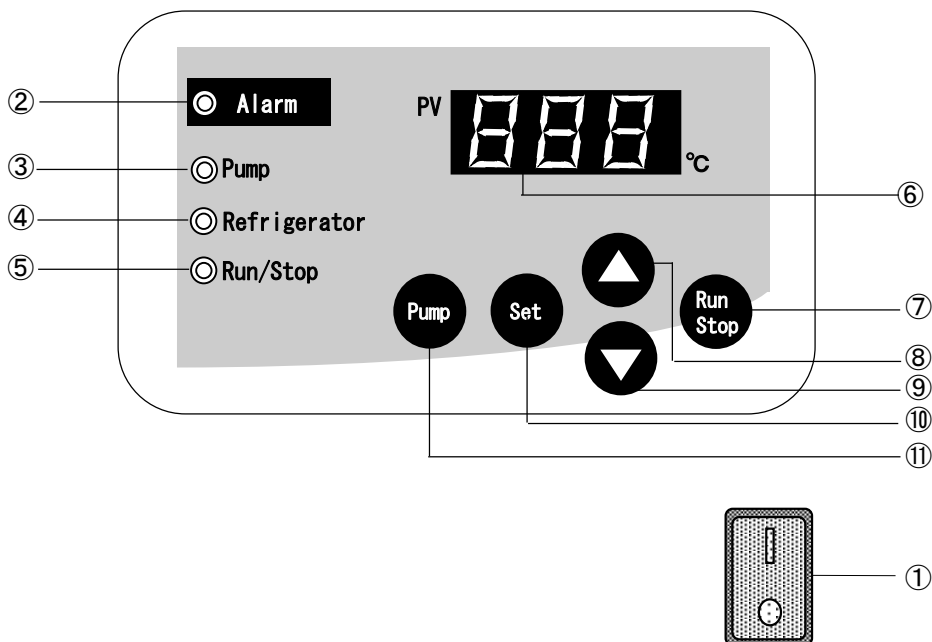
## 2-4 Name of parts



※1 This product can be connected with the vacuum controller, Model NVC-3000.



## 3-1 Control panel



No	Name	Function
①	Power switch	Turns on and off the power. ※Interlocked with ON/OFF of the service outlet.
②	Alarm LED	Lights up when alarm happens.
③	Circulation pump LED	Lights up when turning on circulation pump switch.
④	Refrigeration unit LED	Lights up when turning on refrigeration switch.
⑤	Control status indicating LED	Lights up when the control is on.
⑥	Display	Displays temperature or alarms.
⑦	Run/Stop Key	Starts or stops the control.
⑧	▲ Key	Increases the value of temperature in increments of 1°C by one press at the temperature setting display. The continuous pressing of key increases the value continuously.
⑨	▼ Key	Decreases the value of temperature in decrements of 1°C by one press at the temperature setting display. The continuous pressing of key decreases the value continuously.
⑩	Set Key	Changes the display of setting the value and measured value. At the setting value display, the changed setting value is decided. At the alarm display, the alarm display is cleared and it changes to the normal display.
⑪	Pump Key	Turns on or off the circulation pump.

## 3-2 Safety · alarm features






This product is equipped with the following safety features and alarm features.

If you face any trouble, please refer to “Troubleshooting” on page 24 and follow the instruction.

Safety features
-----------------

Safety device	Operation	Reasons why the device works.
Residual current device	Power is turned off.	<ul style="list-style-type: none"> <li>• Electric leakage hazard occurs, or excess current flows.</li> </ul>
High-pressure switch for refrigeration unit	Pressure rises abnormally while the refrigeration unit is operated, and alarm LED lights up, which stop running refrigeration unit.	<ul style="list-style-type: none"> <li>• Ambient temperature exceeds 35°C.</li> <li>• Heat load was too heavy for cooling capability, which made the temperature in the bath rise.</li> <li>• Dirt adheres to air filter.</li> <li>• Fan for refrigeration unit does not work.</li> </ul>
Protection function for refrigeration unit's over load	Refrigeration unit operates with over loaded (over heated), which made Alarm LED light up and stop refrigeration unit.	<ul style="list-style-type: none"> <li>• Refrigeration unit started up with over loaded.</li> <li>• Low supply voltage</li> <li>• Ambient temperature exceeds 35°C.</li> <li>• Heat load was too heavy for cooling capability, which made the temperature in the bath rise.</li> <li>• Dirt adheres to air filter.</li> <li>• Fan for refrigeration unit does not work.</li> </ul>
Thermal protector for circulation pump	Circulation pump performs over heat operation and stops operation. (Recovers when the pump is cooled down.)	<p>Over heat operation of circulation pump</p> <ul style="list-style-type: none"> <li>• Circulation liquid has high viscosity.</li> <li>• Foreign substance is sucked in.</li> <li>• Ambient temperature exceeds 35°C.</li> <li>• Piping resistance is high. (Valve is closed and etc.)</li> </ul>
Self-diagnosis function for temperature controller	Temperature controller gets in Abnormal status, which made alarm light up and stopped all the controls. The device recovers naturally if the trouble can be sorted out.	<ul style="list-style-type: none"> <li>• Temperature controller is in abnormal status because of noise and etc.</li> <li>• Ambient temperature exceeds 35°C.</li> </ul>

## Alarm features

Alarm name	Alarm display and operation	Cause
Sensor alarm	<ul style="list-style-type: none"> <li>▪ Alarm is displayed</li> <li>▪ Alarm LED illuminates</li> <li>▪ The control is stopped and the circulation pump stops.</li> </ul> <div style="text-align: center;">  <p>LED ON</p> </div>	<p><b>Operation conditions</b></p> <ul style="list-style-type: none"> <li>▪ Temperature sensor is disconnected or short-circuited.</li> </ul>
Temperature Upper limit alarm	<ul style="list-style-type: none"> <li>▪ Alternate display of the alarm and the measured temperature</li> <li>▪ Alarm LED illuminates</li> <li>▪ The control is stopped and the circulation pump stops.</li> </ul> <div style="text-align: center;">  <p>Alternate display of the alarm and the measured temperature</p> </div>	<p><b>Operation conditions</b></p> <ul style="list-style-type: none"> <li>▪ The temperature around the sensor exceeds the upper limit.</li> </ul> <p><b>Canceling the alarm</b></p> <ul style="list-style-type: none"> <li>▪ Alarm can be cancelled by pressing the Set key with the measured temperature lower than the set upper limit.</li> </ul> <p>※Default upper limit : +80°C          ※The user can change the set upper limit. (Refer to P.21, 5-3. Operation in the User Setting Mode.)</p>
Temperature lower limit alarm	<ul style="list-style-type: none"> <li>▪ Alternate display of the alarm and the measured temperature</li> <li>▪ Alarm LED illuminates</li> <li>▪ The control is stopped and the circulation pump stops.</li> </ul> <div style="text-align: center;">  <p>Alternate display of the alarm and the measured temperature</p> </div>	<p><b>Operation conditions</b></p> <ul style="list-style-type: none"> <li>▪ The temperature around the sensor exceeds the lower limit.</li> </ul> <p><b>Canceling the alarm</b></p> <ul style="list-style-type: none"> <li>▪ Alarm can be cancelled by pressing the Set key with the measured temperature higher than the set lower limit.</li> </ul> <p>※Default upper limit : -50°C          ※The user can change the set lower limit. (Refer to P.21, 5-3. . Operation in the User Setting Mode.)</p>
Refrigeration unit alarm	<ul style="list-style-type: none"> <li>▪ Alarm message blinks.</li> <li>▪ Alarm LED illuminates</li> <li>▪ The control is stopped and the circulation pump stops.</li> </ul> <div style="text-align: center;">  <p>Blinks</p> </div>	<p><b>Operation conditions</b></p> <ul style="list-style-type: none"> <li>▪ Refrigeration unit high pressure switch works or the refrigeration unit overload relay works.</li> </ul> <p><b>Canceling the alarm</b></p> <ul style="list-style-type: none"> <li>▪ The alarm can be canceled with the [Set] key when the refrigerator high-pressure switch or the refrigerator overload relay is reset.</li> </ul>
Alarm for recovery from power failure	<ul style="list-style-type: none"> <li>▪ Alternate display of the alarm and the measured temperature</li> <li>▪ Alarm LED illuminates</li> <li>▪ Power failure recovery function ON ... Recovery to the state immediately before Power OFF</li> <li>Power failure recover function OFF...Control, pump circulation OFF</li> </ul> <div style="text-align: center;">  <p>Alternate display of the alarm and the measured temperature</p> </div>	<p><b>Operation conditions</b></p> <ul style="list-style-type: none"> <li>▪ During the temperature control operation with setting Power Failure Recovery function, [On] or [OFF], the power was off and switched on.</li> </ul> <p><b>Canceling the alarm</b></p> <ul style="list-style-type: none"> <li>▪ The alarm can be canceled with the [Set] key.</li> </ul> <p>※The user can change the ON/OFF selection of power failure recovery function. (Refer to P.21, 5-3. Operation in the User Setting Mode.)</p>

### 4-1 Installation environment



#### CAUTION

Be careful about the environment of installation. In particular, pay due attention on the location, air conditioning, and ventilation.

Since air-cooled type refrigeration unit is equipped with this product, heat is exhausted from the unit.

Select the installation site that can be ventilated well so that the ambient temperature won't rise because of exhausted heat. Using the product in high ambient temperature may worsen the operation efficiency or cooling capability. Also, refrigeration unit will be hot and operate under high pressure, which may cause malfunction.

- No direct sun light
- Ambient temperature must be from 5 to 35°C.
- Well-ventilated.
- No inflammable solid or liquid or gas around the unit.
- No dew condensation
- Lesser humidity and no dripping on the unit.
- Lesser dust
- Level and stable  
(Check the weight of the product during operation.)
- Indoor use only

### 4-2 Installation condition



#### CAUTION

#### Keep enough space around the unit.

To keep the best performance of the product, leave the space between product and wall, ceiling plane. The distance between the product and wall, ceiling plane must be longer than the one mentioned in the right picture.

- ※ Keep a distance of 3 cm or more between the unit backside and the wall surface and 3 cm or more between the unit top and the ceiling.
- ※ The unit can be used with one of left or right side blocked. In such an event, be sure to keep a distance of 40 cm or more between one of unit sides and the wall surface.  
(※ For use at the room temperature of 30°C or below, the unit can be used if a distance of 10 cm is secured between one side and the wall surface.)
- ※ Install the unit so that its front (with a ventilation port) does not come under the table. (See the table on P.10)
- ※ With the unit installed with its side covered 40 cm under the table, the cooling capacity is degraded by maximum 14% as compared with the case of installation outside the range of table.  
At the -20°C setting, the cooling capacity is degraded by maximum 25%.



#### CAUTION

Do not place anything on top of the product.



#### CAUTION

**The exhaust temperature of the unit may exceed 60°C in certain cases.**



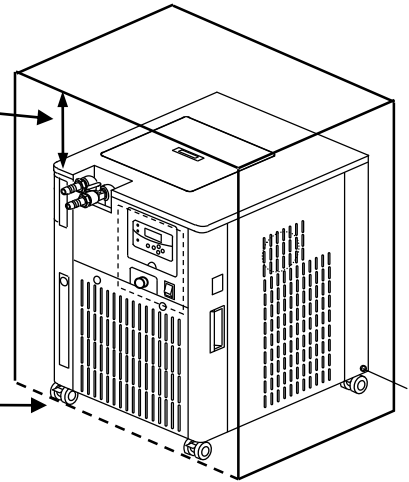
## CAUTION

Be careful during transport of the product because it is heavy.

CA-1330 Approx. 48kg

3cm or more

Install the unit with its front matched to the broken line.



## 4-3 Installation



## CAUTION

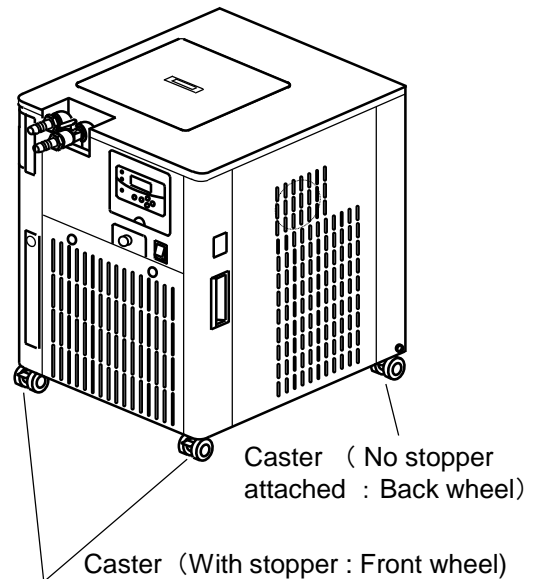
**Do not incline the main unit more than 15°**

As refrigeration unit is equipped with the main unit, do not lay down the product or incline it more than 15° when carrying.

- (1) Unlock the lock of the stopper of the caster.  
If you press and lift the lever of caster's stopper, lock can be unlocked (Only front two casters have stoppers).

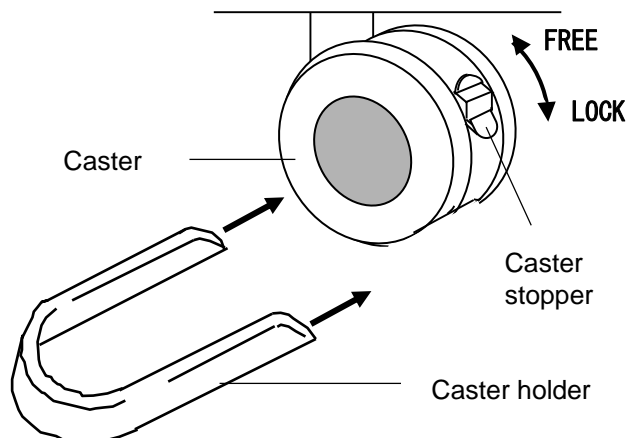
- (2) Move the unit to the installation site.

- ※ Traveling over steps or surface irregularities may cause extreme impact on the casters, possibly resulting in damage. To avoid such an event, lift up the product for traveling.  
Traveling of the unit with refrigerant left in it requires utmost care because the adequate water level is close to the top of the unit. In such an event, water may overflow during traveling.



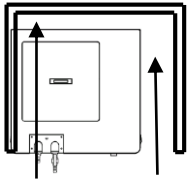
- (3) At installation site, lock caster's stopper.  
Holding down the lever of caster can lock the stopper.

- (4) Put supplied caster holders (2 pieces) into the caster to fix.  
These holders fix and prevent the caster from rotation and swiveling.



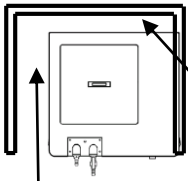
**Typical installation**

**Good**



5cm or more 40cm or more

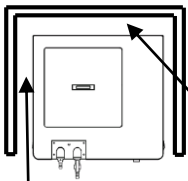
※ 3 cm or more secured between the unit top and the ceiling.



5cm or more

40cm or more

※ 3 cm or more secured between the unit top and ceiling

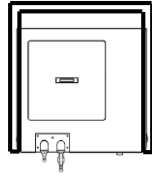


5cm or more

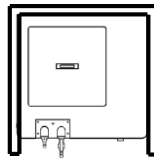
40cm or more

※ 3 cm or more secured between the unit top and ceiling

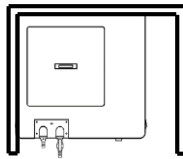
**No good**



※ Right and left sides blocked

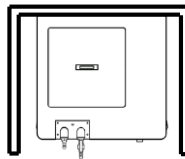


※ Both sides and backside blocked

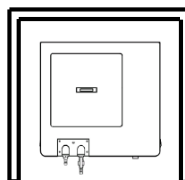


※ Sides and backside blocked

※ Both right and left sides not to be blocked



※ Backside blocked



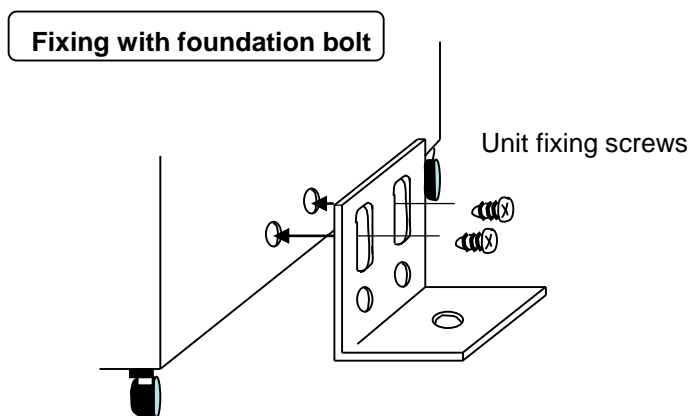
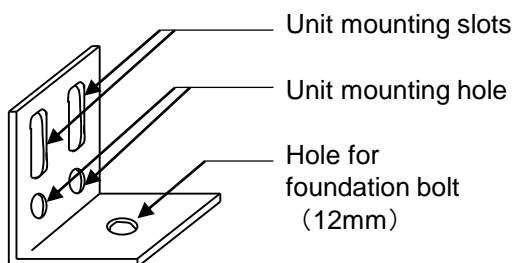
※ Unit front coming under the table

## 4-4 Using the bracket to prevent overturning

This bracket to prevent overturning is for fixing as an earthquake countermeasure and for securing the unit for assembling.

Fixing is made by means of bolts applied to the unit and floor surface.


※ Foundation bolts (for M10) are to be provided by the customer. The bracket has not been attached before shipment.





※ Secure the bracket to prevent overturning to the unit in a direction shown in the figure.




## 4-5 Utility connection

 <b>WARNING</b>
<p><b>Check the voltage, phase and capacity of power source before connecting.</b></p> <p>Inappropriate connection may cause a fire or electric shock hazard.</p>

 <b>WARNING</b>
<p><b>Do not use the branching socket or table tap.</b></p> <p>Over-current may cause cable burn, fire.</p>

 <b>WARNING</b>
<p><b>The unit must be earthed.</b></p> <p>Without grounding the unit, the product may cause electric shock hazard.</p>

 <b>CAUTION</b>
<p><b>Remove the dirt on the grounding adapter, outlet and mains connector.</b></p> <p>Dirt on these parts may cause tracking or fire.</p>

- (1) Check the voltage, phase and capacity of the power source. Required power source is as shown in right table.

Model	Required power source	
	Voltage	Capacity
CA-1330	AC 220V Single phase	15A

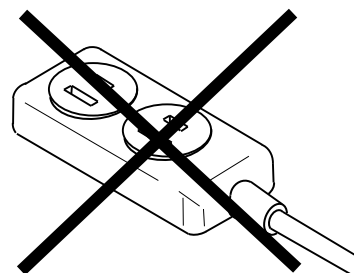
- (2) Check the type of outlet at the installation site.

(Do not connect the mains connector yet.)  
If the outlet has earth terminal, mains connector can be connected.

Length	Thickness (O.D.)	Mains plug	Cable cross-sectional area
2.8m	About 9mm	3-pronged with earth terminal	1.5mm <sup>2</sup>

\* The grounding adaptor is not supplied with this unit.

Do not use branching socket when connecting to power source.



# 5 Operation

## 5-1 Preparation



### WARNING

#### Use extreme caution when using combustible or inflammable solvent.

If you leave combustible or inflammable solvent (ethanol and etc.) out at room temperature or higher (lower for some solvent), it may evaporate and catch fire with some ignition source, and cause explosion.

Ventilate the space well while using these solvent.



### CAUTION

#### Use the circulation refrigerant that does not affect the circulation route material inside the unit.

Materials of the system interior include copper (plating), stainless steel, brass (plating), Teflon, silicon rubber, Noryl resin, chloroprene rubber, Duracon, and polypropylene. Always use the circulation solution that does not affect these substances.



### CAUTION

#### Do not conduct closed operation or idling of circulation pump.

These operation may cause malfunction.



### CAUTION

#### Do not reduce the piping size or elongate the hose for use.

When using hose join that is not supplied with the product, the bore diameter of the joint must be larger than 6mm. Use the hose at appropriate length. High piping resistance causes decrease in the circulation rate, which in turn causes failure of sufficient mixing inside the bath. In such an event, the cooling efficiency may decrease and the temperature distribution inside the bath may become unsatisfactory. Excess load may also be applied to the refrigerator and the circulation pump, resulting in failure.



### CAUTION

#### Do not use the pure water

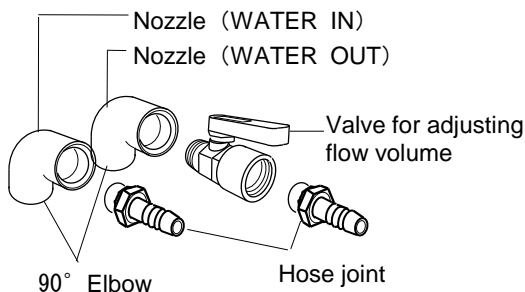
By nature, pure water with higher purity elutes the material of parts in contact, and if used, may cause troubles such as delamination of paints, pump failure, etc. Always use either tap water or softened tap water.



### CAUTION

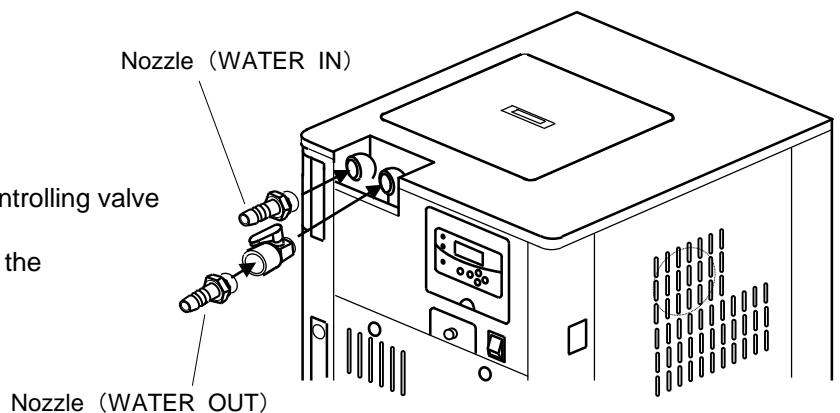
#### Lead the hose around while taking care not to allow it to be buckled or crushed.

Buckled or crushed hose may cause faulty cooling of a counterpart unit or hose disconnection from the nozzle, resulting in water leakage.



### Connecting pipe and hose

- (1) Screw hose joint, flow amount controlling valve hose joint into the unit.  
(The seal tape is wrapped around the hose joint and the valve.)



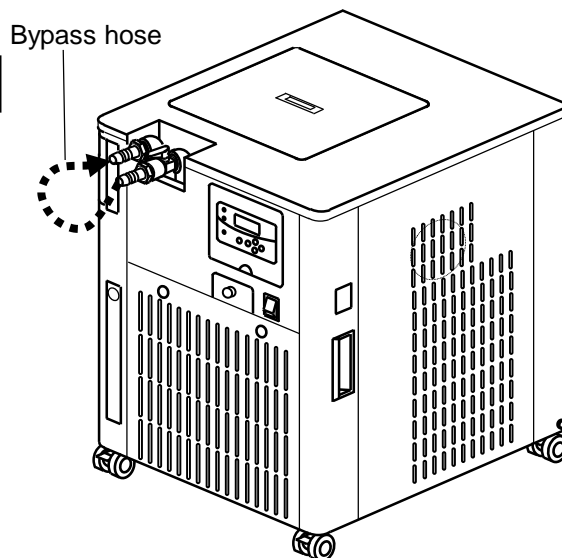
- (2) Connect hose (bore diameter: 9mm) to external circulation discharging nozzle, water-in nozzle, device for cooling (closing-up style) and etc. Fix the hose tightly with hose band so that it won't be slipped.  
(Hose and hose band are not included.)

※Use the hose that has appropriate withstanding pressure, heat-resistant and appropriate material, which can not be soaked in solvent.  
Also, the material of hose should not be bended or squashed when pulling it around the unit.

### Using the unit as an stand-alone low temp. bath

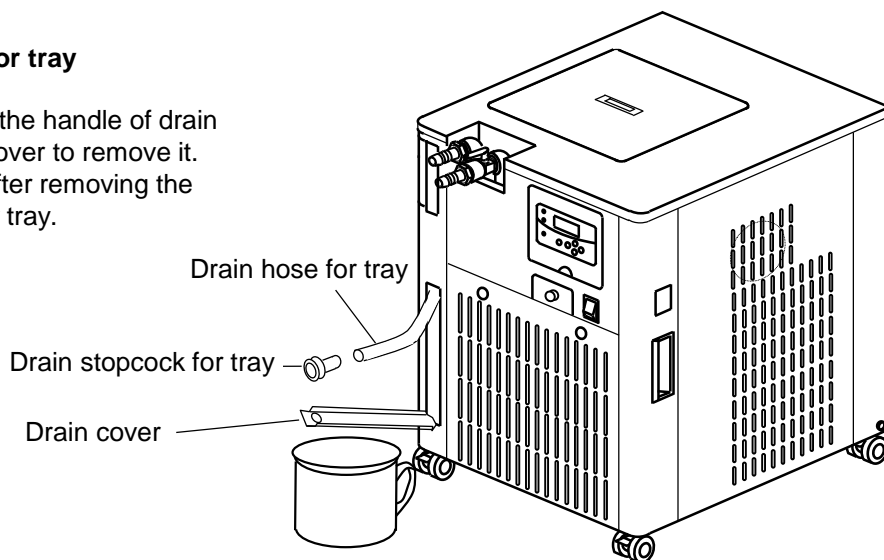
When using the unit as a stand-alone low temp. bath, Connect bypass hose to discharge and water-in nozzle. If you turn on circulating pump switch in this status, stirring will be performed in the bath and cooling capacity will be worsened.

Fix the hose tightly with hose band so that it won't be Slipped ( hose and hose band are not included ).



### Drainage from drain hose for tray

Check the tray regularly. Pull the handle of drain cover softly and pick up the cover to remove it. Then, drain away the water after removing the stopcock of the drain hose for tray.



※Container to catch discharged water is not included.

## Filling the cooling water

- (1) Confirm that the drain plug has been applied and remove the bath cover/ Fill water.

### Do not use the pure water

Always use either tap water or softened tap water.

By nature, pure water with higher purity elutes the material of parts in contact, and if used, may cause troubles such as delamination of paints, pump failure, etc.

- ※ Use the antifreezing solution when the unit is to be used at  $+5^{\circ}\text{C}$  or below. Note that ethylene glycol or Nybrine, if used, may have the higher viscosity within the low temperature range, resulting in reduction of the circulation amount or activation of the safety device of circulation pump. Never use them at 100% concentration. (Be sure to confirm the temperature range of antifreezing solution because the freezing temperature differs depending on the concentration.)

- ※ The use of water at the set temperatures around  $+5^{\circ}\text{C}$  may cause freezing of the cooling coil, resulting in deterioration of the cooling capacity.

- ※ Make sure that there's no foreign substance in circulation liquid, which will cause malfunction.

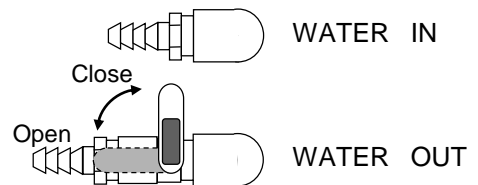
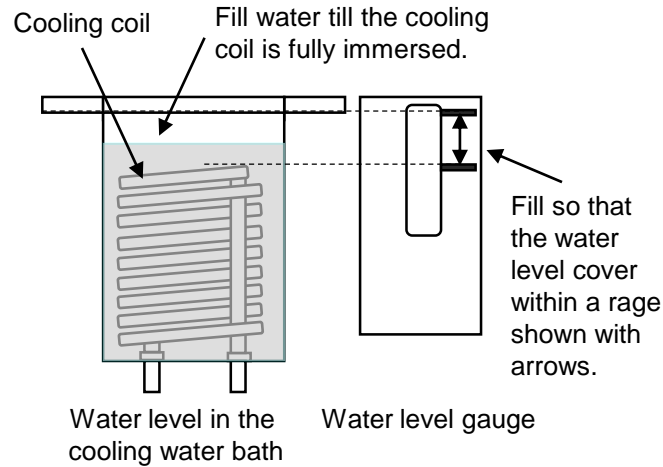
- (2) Make sure that water-out valve for adjusting flow volume is closed.

- (3) Set the bath cover on the main unit.

## Connecting mains plug

Make sure that power switch is turned off and plug the mains plug into AC outlet.

Do not move the unit while liquid is in the bath. This product is not in waterproof structure. There is fear of electric shock and an unexpected accident.



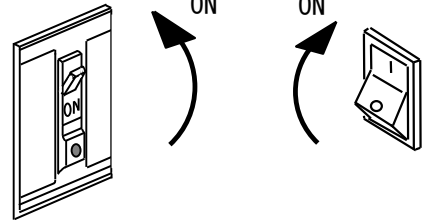
Valve for adjusting flow volume

## 5-2 How to operate the unit

Turn ON the earth leakage breaker and the power switch.

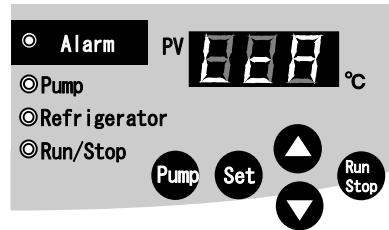
Earth leakage ·  
overcurrent  
breaker

Power switch

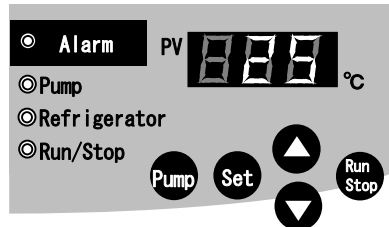


The display shows initially “LcA” for about one second, then the measured temperature.

Initial display



Initial display for 1 second  
and shows the measured  
temperature

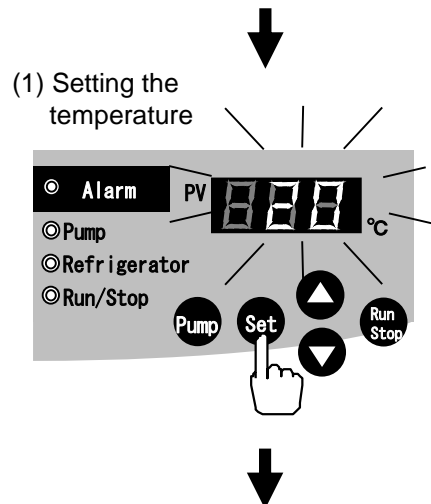


### 1. Setting the temperature

The set temperature can be changed regardless of whether the pump is running or stopped.

- (1) Press [set] key. The displayed value on the temperature indicator blinks and temperature can be set (setting mode).

\* Factory default value is 20°C. However, if you have already used the unit, the value you set at previous time will be displayed.



(2) Press [▲] or [▼] key to set the temperature.

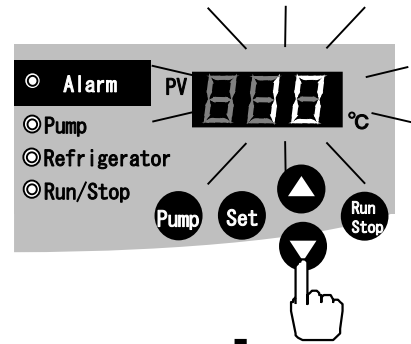
- \* Holding down the [▲] and [▼] key can increase/decrease the value continuously and pressing the key can increase / decrease the value by 1°C.

(3) Press the [Set] key.

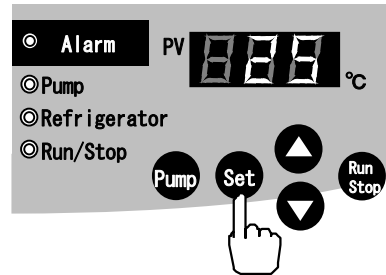
The displayed set temperature (flashing) is acknowledged, and the measured temperature is displayed.

- \* When any key is not pressed for 30 seconds or more during temperature setting, the measured temperature is displayed again. In this event, the display does not reflect the changed value and the display returns to the previous set temperature.

(2) Change the setting temperature



(3) Decide the setting temperature



## 2. Starting operation

(1) Press the [Pump] key. The circulation pump will start.

- The “Pump LED (Pump)” illuminates.
- After turning on the Pump switch, open the flow control valve gradually. The external circulation will start. Please check the leakage at the connecting parts of hoses.

\* The circulation pump is not linked to the [Run/Stop] key.

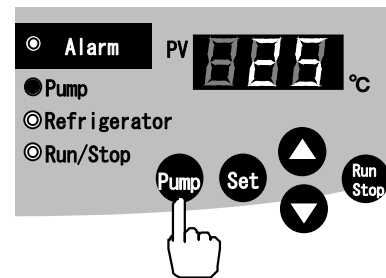
\* Closing valve for adjusting flow volume while operating the circulation pump may cause malfunction (closed operation of the pump).

\* Do not open the valve immediately. It may cause leaking or damage on the hose or glassware because of pressure on the circulation route.

\* Flow volume can be adjusted by the valve roughly. Use antifreeze when the circulation water volume is less and the unit is frozen over.

\* However, if you decrease the circulation water volume, it may worsen the condition of stirring in the bath and temperature distribution.

(1) Starting operation of the circulation pump



### Caution

Do not perform closed operation of circulation pump

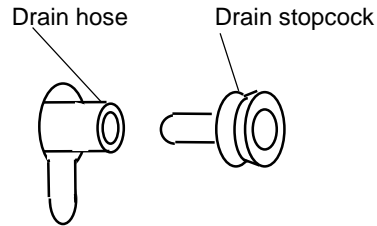
Closed operation put 127.5kPa(1.3kg/cm<sup>2</sup>) (60Hz) pressure on internal piping, which may cause malfunction, or leaking from the connecting part or disassemble the piping.

## Removing air from the pump

If you do not circulate the liquid, pump may suck the air. In such a case, release the air from the pump.

- \* If you supply water to circulation system, water level of low temperature circulation bath will be lowered. So refill the water. Add water till the cooling coil is immersed completely.
- \* If the cooling coil is exposed while the unit works, cooling capability will be worsened.

Make sure that cooling liquid flows from drain after removing drain stopcock, and attach the stopcock again. After that, turn on and off the circulation pump switch for a few times to release the air.



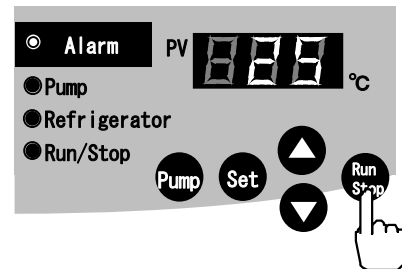
- \* Except the case of releasing the air from the pump, do not turn on and off each switch quickly. If you do so, switches will be damaged and cause malfunction.

(2) Press the [Run/Stop] key. Temperature control starts.

- " Control Status LED (Run/Stop)" illuminates.
- The refrigeration unit is ON at the setting temperature +0.5°C. While the freezer is on, "Refrigeration unit LED (Refrigerator)" stays on. The refrigeration unit will turn off when the measured temperature falls below setting temperature -1.4 °C. The refrigeration unit LED (Refrigerator) goes off.

- \* Soon after starting the refrigeration unit, the cooling capacity is low and the bath temperature may rise by recirculating liquid to the circulation line. As it works for a while, its cooling capacity becomes normal. Please observe for about 30 minutes whether it cools or not before judging it as failure.

(2) Starting control



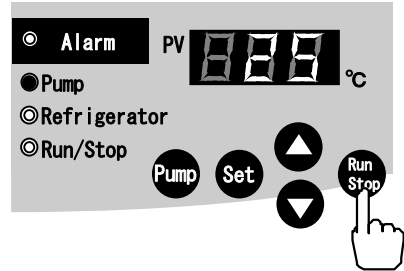
## Protection timer for refrigeration unit

When the refrigerator is stopped once, the refrigerator does not operated for about 120 seconds even when the measured temperature is high by about 0.5 °C or more.

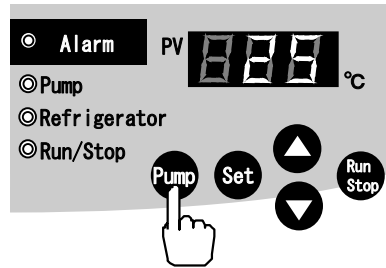
### 3. Stopping operation

- (1) Press the [Run/Stop] key. Operation will stop.
    - Control Status [Run/Stop] LED will go off.
  - ※ If you turn off the mains switch without terminating the control, the unit resumes the control automatically by turning on the mains switch.
  - ※ The power failure recovery function has been set to ON before shipment.
- (2) Close the valve for adjusting flow volume
- (3) Press the [Pump] key. The circulation pump will stop.
    - The Circulation pump [ Pump] LED will go off.
- ※ If you turn off the mains switch without stopping the circulation pump, it resumes the operation of the circulation pump automatically by turning on the mains switch.
  - ※ The power failure recovery function has been set to ON before shipment.
  - ※ If you do not operate this unit for a long time, turn off the power switch and mains switch and disconnect the mains plug from AC outlet.
  - ※ Drain the liquid from the bath, piping line and the circulation pump.

#### (1) Stopping operation



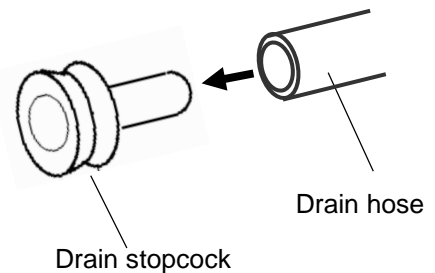
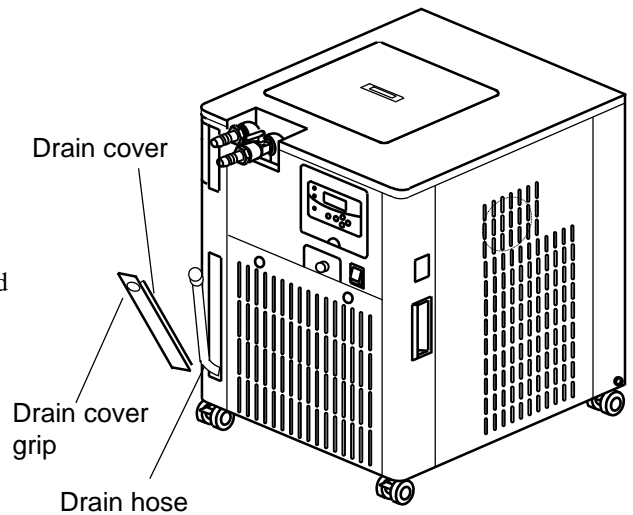
#### (2) Stopping pump



### 4. After operation

Drain the liquid from the unit.

- (1) Pull the drain cover lightly toward yourself, and lift and remove the cover.
- (2) Take out the drain hose and remove the drain cock stopper to drain the liquid.



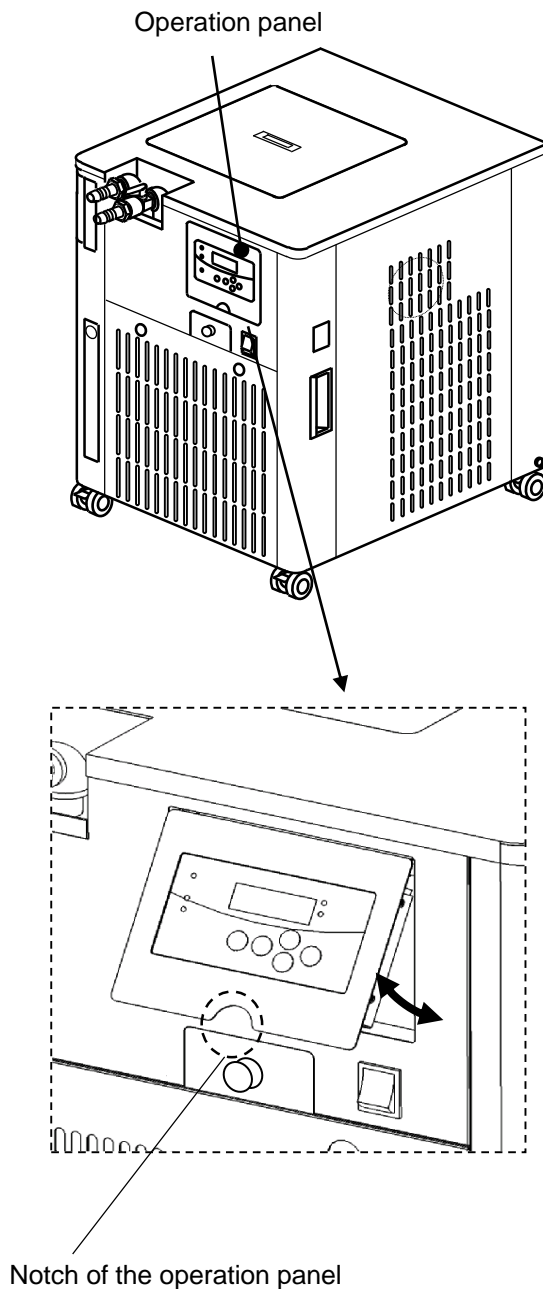
<span style="font-size: 1.2em; font-weight: bold; margin-left: 10px;">Caution</span>
<h4>Treatment after operation</h4>
<p>After operation, drain the liquid from the tank to remove Impurities and avoid generating scale or stain. Also drain the liquid from circulation container or lines if you do not use the unit for a long time. If you use this unit without changing the liquid, the circulation line may be clogged by impurities and It may cause the troubles. Please change the liquid periodically.</p>



## 5.Adjusting the operation panel

For this unit, the panel surface can be adjusted in angles.  
Adjust the panel surface according to the use conditions.

- (1) Insert a finger into a notch of operation panel and pull the panel toward yourself.
  - (2) The panel is moved as shown in the figure. Adjust the panel to an easy-to-view position.
- ※ When operating the operation panel in an angled state, perform key operation while holding the panel with hand. If the panel is not held with hand, it becomes so unstable as to make key operation difficult.



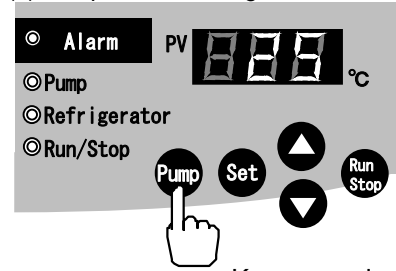
## 5-3 Operation in the user setting mode

In the user setting mode, the upper and lower limit temperatures for the upper and lower limit alarm [AOH] and [AOL] and the power failure recovery function can be set.

### \* Transfer to the user setting mode

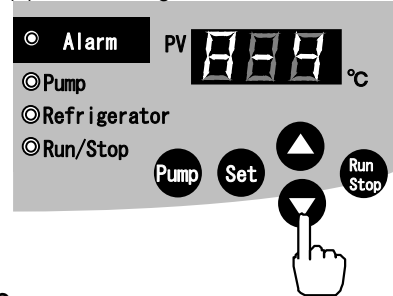
- (1) Keep pressing the [Set] key in the temperature measurement screen (the current temperature display ON).
- (2) Keep pressing the key for about 3 seconds, the display changes to the user setting item screen, ([A-4] lamp ON)
- (3) Press the [▲] and [▼] keys to select the item:
  - [A-4] Sets the power failure recovery function
  - [AOH] Sets the temperature for the upper limit alarm
  - [AOL] Sets the temperature for the lower limit alarm.

(1) Temperature setting screen



Keep pressing for about 3 seconds

(2) User setting item screen



### \* Transfer to the temperature measuring screen

Keep pressing the [Set] key for about 2 seconds in the user setting mode, the display changes to the temperature setting screen. (The current temperature display ON)

## 5-3-1. Setting the power failure recovery function

By setting the Power failure recovery function, you can select the re-start condition whether the temperature control and the pump start after power recovers or they do not re-start even after the power recovers.

A-4 setting	Function	Power recovery Alarm
on	When Power recovers, the temperature control and the pump re-start with the parameters that were set up just before power failure.	Displayed
cnt	When Power recovers, the temperature control and the pump re-start with the parameters that were set up just before power failure.	Not Displayed
oFF	When Power recovers, the temperature control and the pump stop no matter what the parameters were set just before power failure.	Displayed
dls	When Power recovers, the temperature control and the pump stop no matter what the parameters were set just before power failure.	Not Displayed

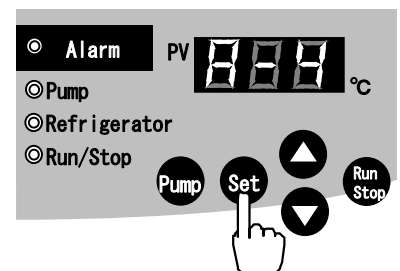
- (1) When selected, [A-4] and press the [Set], the parameter is shown just before power failure. ([A-4] is lighted.)

[on] ... Power recovery function, ON ( The alarm is displayed.)  
 [cnt] ... Power recovery function, ON ( The alarm is not displayed.)  
 [oFF]...Power recovery function, OFF ( The alarm is displayed.)  
 [dls] ... Power recovery function, OFF ( The alarm is not displayed.)

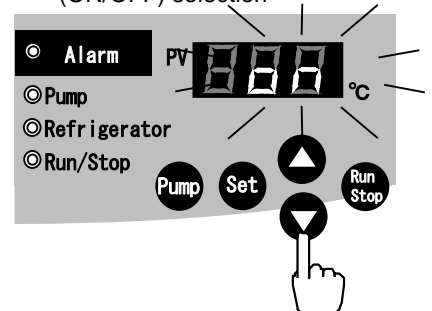
- ※ The setting was [on] when delivered.
- ※ Only when it was [on] or [off], the power recovery Alarm is shown.

- (2) With the keys, [▲],[▼], select the Power recovery function setting. (setting position was blinked.)
- (3) When pressing the key, [Set], the display shows the user set parameters and the setting of the Power recovery function was finished. ([A-4] is lighted.)

(1) User setting item screen



(2) Power failure recovery function (ON/OFF) selection



### 5-3-2. Setting the upper limit alarm

(1) During selection of the upper limit alarm setting item ([AOH] display ON), pressing the [Set] key causes display of the upper limit set value.

(Upper limit set value flashing)

(2) Press the ▲ and ▼ keys to set the upper limit.

The set value increases by 1 C each time the [▲] key is pressed.

The set value decreases by 1 C each time the [▼] key is pressed.

(The set value increases/decreases continuously when the key is kept pressing.)

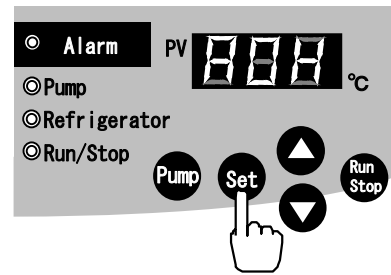
\* Upper limit setting range: -50°C ~ 80°C

\* The upper limit has been set to "80 °C" before shipment.

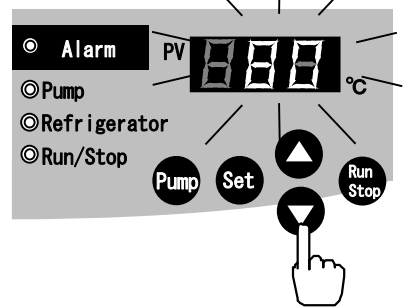
(3) Press the [Set] key, and the display changes to the user setting item screen, in which the upper limit setting can be set.

([AOH] display ON)

(1) User setting item screen



(2) Temp. upper limit setting screen



### 5-3-3. Setting the lower limit alarm

(1) During selection of the lower limit alarm setting item ([AOL] display ON), pressing the [Set] key causes display of the lower limit set value.

(Lower limit set value flashing)

(2) Press the ▲ and ▼ keys to set the lower limit.

The set value increases by 1 C each time the [▲] key is pressed.

The set value decreases by 1 C each time the [▼] key is pressed.

(The set value increases/decreases continuously when the key is kept pressing.)

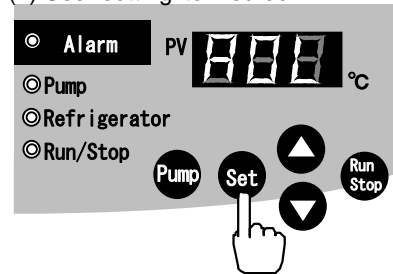
\* Lower limit setting range: -50°C ~ 80°C

\* The lower limit has been set to "-50°C" before shipment.

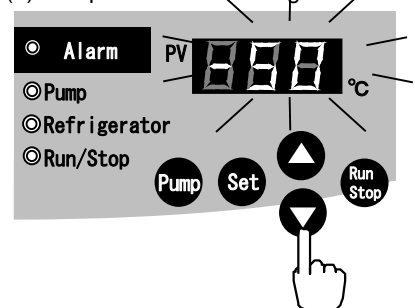
(3) Press the [Set] key, and the display changes to the user setting item screen, in which the lower limit setting can be set.

([AOL] display ON)

(1) User setting item screen



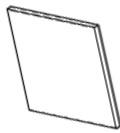






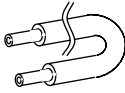
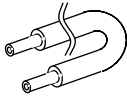


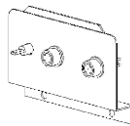
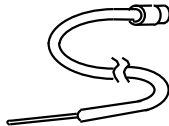
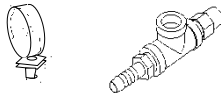


(2) Temp. lower limit setting screen



## 6

## Consumption parts/Optional accessories

## Consumption parts/Optional accessories

① Filter 			② Drain stopcock 			③ Ball valve 			④ 90° elbow 		
Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty
217950	CA-1320	1	148850	CA,NCB	1	247190	R3/8×Rc3/8	1	217760	Rc 3/8	1
			⑥ Metal nozzle set 			⑦ Circulation nozzle A 			⑧ Silicon hose 		
Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty
			See the table below	AL type	2 each	See the table below	A type	1	112720	I.D.Φ9	5m
									144170	I.D.Φ12	5m
⑨ Insulated hose for one-touch connector 			⑩ Insulated hose set 			⑪ Backward nozzle  ※ Used to allow the metallic nozzle set to face backward position.			⑫ Additional piping for backward setting  ※ Used to allow the rotary elbow to face backward.		
Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty
244940	O.D.Φ10	2m				216570	CA-BN	2	255620	CA-1320	1
244950	O.D.Φ10	5m	See the table below	-	1						
⑬ External sensor terminal 			⑭ External temp. sensor 			⑮ Pressure gauge 			⑯ Flow meter 		
Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty
271170	HRC-4	1	114220	STP-100	1	210610	CA-P2	1	210600	CA-F2	1
⑰ Communication cab 											
Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty
269450	COM-0.5M	1									
269460	COM-1M	1									
269470	COM-2M	1									

## ■ ⑩ Insulated hose set

(This can prevent dewing on the hose surface.)

Length	Cat.No.			
	1m	2m	5m	
I.D.	Φ9	112690	112700	174420
	Φ12	113280	143330	174440
	Φ15	113290	143340	174460

## ■ ⑥ Metal nozzle set

Model	Nozzle O.D. (material)	Cat.No.
AL-1	φ10.5(brass)	242420
AL-2	φ13.5(brass)	243950
AL-3	φ16(brass)	243960
AL-6	φ10.5 (SUS)	243970
AL-8	φ13.5 (SUS)	243980
AL-9	φ16 (SUS)	243990

## ■ ⑦ Circulation nozzle A

Model	Nozzle O.D. (material)	Cat.No.
A-1	φ10.5R3/8(brass)	113110
A-2	φ13.5R3/8 (brass)	113120
A-3	φ16R3/8 (brass)	113130
A-6	φ10.5R3/8 (SUS)	227630

※ The insulated hose is made of chloroprene.  
The hose is one consumables. Since the hose degradation and aging differ depending on the use conditions, check the hose regularly and replace if necessary.

# 7 Troubleshooting

If you face the trouble that is not addressed in this manual, please contact your local dealer or closest customer service center.

Trouble	Cause of trouble	Countermeasure
Earth leakage breaker is activated when the power switch is turned ON.	Earth leakage	Stop operation and contact your local dealer or closest customer service center.
	Overcurrent	
Circulation not made even when the power switch is turned ON (No display on the temperature controller)	Power is not supplied.	Turn on the breaker of distribution board.
	Mains connector is not plugged into outlet or not plugged into outlet completely.	Plug main connector after turning off residual current device and power switch.
	Residual current device is turned off.	Turn the residual current device on.
	Residual current device is impaired.	Stop operation and contact your local dealer or closest customer service center.
	Temperature controller is impaired.	
	Power switch is impaired.	
Refrigeration unit does not work.	The refrigerator protective timer is operating.	To protect the refrigerator, it cannot be turned ON for 120 sec once it is turned OFF.
	High-pressure switch for refrigeration unit or over load relay protection Circuit works.	The thermal load on the refrigerator is extremely large. Reduce the load.
		Use the unit where the ambient temperature is lower than 35°C.
		P.8 Refer to “Installation Conditions.”
	Refrigeration unit is impaired.	Stop operation and contact your local dealer or closest customer service center.
Water level lowers and cooling coil is exposed, which makes the unit perform over load operation.	Fill circulation liquid in low temperature circulation bath.	
The temperature does not reach the set value.	The external temperature sensor is left uninstalled outside the bath.	Install the external temperature sensor inside the bath.
	Setting temperature is not appropriate.	Check the setting temperature.
	Refrigeration unit does not work.	Stop operation and contact your local dealer or closest customer service center.
	Fan for refrigeration unit does not work.	
	Gas is leaking.	
	Refrigeration unit is impaired.	
	Temperature controller is impaired.	Reduce the heat load on the refrigerator, which is too large.
	Too large heat generation load	
	Excessively high room temperature	
Dirt adheres to the filter of refrigeration unit.	Clean the filter. (Refer to the section “Maintenance and checkup”)	

Trouble	Cause of trouble	Countermeasure
Cool water does not circulate.	Thermal protector of circulation pump works.	If the cooling liquid is high-viscosity antifreeze, water it down or change the liquid to the one that has low viscosity.
	Air included	Remove the drain plug and confirm that cooling water flow out through the drain port. Then, attach the drain plug and turn ON/OFF the pump switch two to three times to purge air.
	Valve for adjusting discharge volume is closed.	Open the valve for adjusting discharge volume.
	Dirt adheres to the strainer of low temperature circulation bath.	Remove the dirt.
Circulation volume is small.	Hose is crushed.	Stretch the hose.
Alarm for sensor is activated. • Alarm LED illuminates • "F01" illuminates	The temperature sensor is either disconnected or short-circuited.	Stop operation and contact your local dealer or closest customer service center.
	External temperature sensor (option) used	Selector switch of external sensor not set correctly: • IN : Internal sensor control • OUT: External temperature sensor control  Sensor connector not connected or connector dislodged
Alarm for refrigeration unit is activated. • ALARM LED illuminates • "A14" blinks.	High-pressure switch for refrigeration unit or over load relay holding circuit for refrigeration unit works.	• Set the ambient temperature at 35°C or lower. • If the heat load is out of cooling capability, reduce the load. • Check the fan for refrigeration unit. • Check the power and voltage.
Upper temperature limit alarm happens. • Alarm LED illuminates • "A0H" and measured temp. displayed alternately.	Measured temperature exceeds the upper limit.	After confirming that the bath temperature falls below the measurable range, press the [Set] key to clear the alarm.
Lower temperature limit alarm happens. • Alarm LED illuminates • "A0L" and measured temp. displayed alternately.	Measured temperature exceeds the lower limit.	When temperature rises above the measurable range, press the [Set] key to clear the alarm.
Power failure recovery alarm issued • Alarm LED ON • "A-4" and measured temp. displayed alternately.	The power was off during the temperature control under setting the power recovery function, [on] or [oFF] and power switch was on.	[Press the [Set] key. Alarm can be canceled. Refer to the manual, P.21 and set up necessary functions.
Bath internals is frozen at +5°C or higher.	Poor circulation and bath is not stirred sufficiently because of pressure loss of piping and etc.	• Open the valve for adjusting discharge volume • Use antifreeze.
• Temperature setting cannot be made. • Abnormal indication	• Temperature controller is in abnormal status because of noise and etc. • Ambient temperature exceeds 35°C.	Change the power supply and operate the unit. If alarm continues, stop operation and contact your local dealer or closest customer service center.

## 8 Maintenance • checkup

### 8-1 Operation test for residual current device



#### WARNING

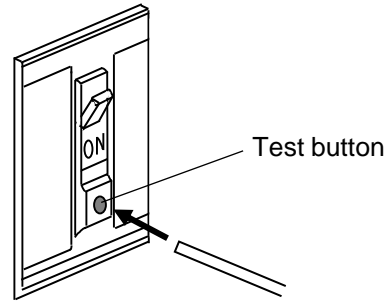
#### Conduct operation test for residual current device.

If residual current device does not work properly, electric shock hazard occurs when a short is caused. So please conduct the test more than once in a month.

Plug the main connector and push the test button of the device with thin stick while the mains switch is turned on.

The condition is normal if the device works and the mains switch is turned off.

※ If correct operation is not achieved, stop immediately and contact the dealer or the closest service center. Accident such as earth leakage may occur.



### 8-2 Cleaning and caring the product



#### WARNING

#### Do not disassemble the unit.

Some parts in the unit are under electric pressure and high temperature. So disassembling the unit may cause electric shock or cause users physical injury.



#### CAUTION

#### Do not touch cooling fin with bare hands.

Do not touch cooling fin with bare hands when conducting maintenance work. Edgy fin may cut your hands.



#### CAUTION

#### Use appropriate product for cleaning and caring the product in proper way.

When cleaning and caring the product, do not pour water directly on the external and internal part of the unit, and also do not use cleanser, thinner, petrol, lamp oil, acid and related products. These products may cause Electric shock or damage the unit.



#### WARNING

#### Unplug the mains connector when cleaning and caring the product.

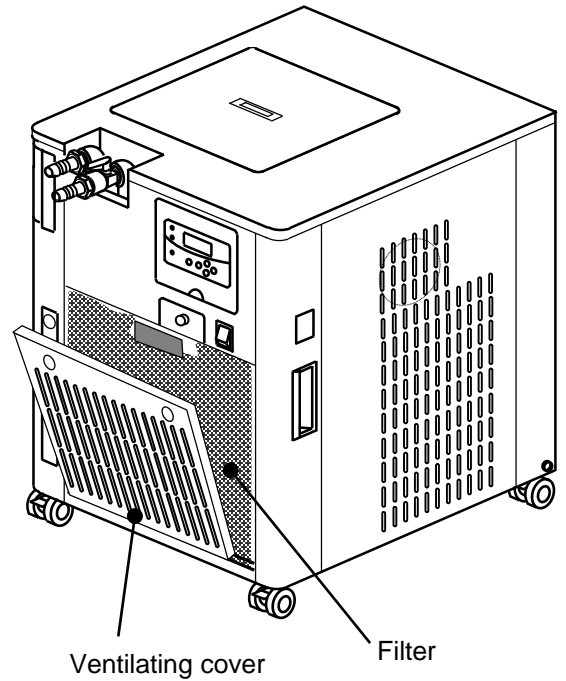
When cleaning and caring the product, turn off the power switch and residual current breaker and unplug the mains connector from outlet for preventing electric shock or damage on the product.

## 1. Cleaning air filter

Clogged filter worsens cooling capability, and may cause malfunction.

Condition of the filter differs depending on the environment and operating time, however, check and clean the filter regularly.

- (1) Turn off residual current device and power switch and unplug the mains connector from outlet.
- (2) Hold the grip of ventilation cover in the front and pull it lightly toward yourself to remove. Remove the filter.
- (3) Tap the filter lightly to remove the dirt and wash it. (If the filter has greasy dirt, use mild detergent).
- (4) Dry the filter after washing it. (Never use the dryer, etc. because the filter may be molten under heat.)
- (5) After cleaning of the filter, install it by reversing the removal procedure.



## 2. . Cleaning strainer

Remove the cover on top of the unit and carry out inspection and cleaning of the strainer in the bottom of bath regularly. Drain water from the circulation bath beforehand.

## 3. Cleaning the product

For cleaning main unit, use wet soft cloth after wringing water. For greasy dirt, use mild detergent and wipe it off with soft cloth.

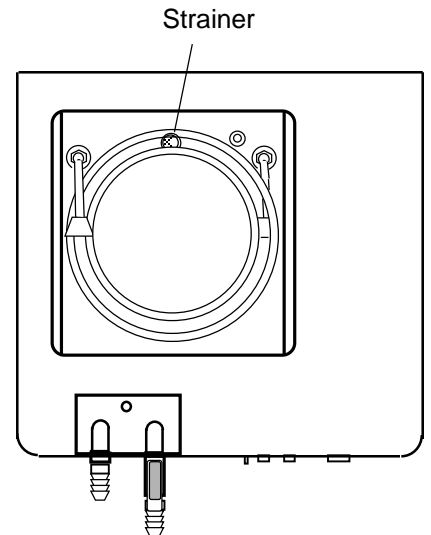
## 4. Checking the piping

Before and after use, be sure to check the piping system for any water leakage, looseness, and deterioration of hose.

Deterioration and aging of the circulation hose vary depending on the use condition. Check and replace if necessary.

## 5. Changing the circulation water

Be sure to change the circulation water regularly (once a month). When the unit is not to be used for a long time, be sure drain water from the bath. Corrosion of stored water may cause scale and fungi, resulting in clogging, piping corrosion, or rusting.





# 9 Disposal of the product

When disposing the product, please follow the instructions as below.

## Main components and disposal instructions

Model	Component	Weight	Dimensions	Method for disposing
CA-1330	Main unit	Approx. 48kg	460(W)×430(D)×570(H) mm	Contact waste disposer
	Refrigerating HFCs gas to be charged in the refrigerator	—	—	For disposing HFCs gas, contact waste disposer.

- \* Confirm the type and amount of Teflon by referring to the serial number plate attached to the product body.
- \* Dispose packing materials by separating each type of material.

## Material of main parts

Main component	Main part	Main component part	Main material
Main unit	Package	Package plate	Zinc electroplating plywood (SECC,SEHC)
		Bath	Stainless (SUS304)
		Caster	Cold-reduced carbon steel ,Nylon (SPCC,PA6)
		Ventilation cover	Zinc electroplating plywood (SECC)
		Control panel	Zinc electroplating plywood (SECC)
		Membrane sheet	Polyethylene terephthalate (PET)
		Screws	Stainless
	Cooling cycle part	Refrigeration unit	Steel (Fe) 、Copper (Cu) 、Electromagnetic steel plate
		Condenser	Aluminum (Al) 、copper pipe for air conditioning refrigerant (CUT) 、Zinc electroplating plywood
		Evaporator (Cooling coil)	copper pipe for air conditioning refrigerant (CUT)
		Pipes	copper pipe for air conditioning refrigerant (CUT)
		Insulation material for pipe	Ethylene · Propylene rubber (EPDM)
	Water circulating system	Circulation pump	Polyphenylene ether (PPO) 、ceramic、high density carbon, isotropic ferrite,Steel
		Pipes	Silicon (tube) 、POM (joint)
		Insulation material for pipe	Ethylene · Propylene rubber (EPDM)
	Heat insulator for bath		Rigid urethane foam
	Electrical part	Basal plate condenser, relay	Glass epoxy resin, steel, copper
		Switch, residual current device	Polyester resin, steel, copper
		Power cord, wires	Vinyl, soft copper
		Fan for refrigeration unit	Aluminum (Al)
		Comm. terminal	Phosphor bronze, Steel plate (Fe) Brass, Poly Butylene Terephthalate(PBT)
		Motor	Zinc alloy (ZDC) ,brass
Bath cover		SUS304 , Brass	
Nozzle's tray		SUS304	
Circulating		Valve , Nozzle, Elbow	Brass _PTFE _ABS , Brass , SUS304
Air filter			Polyurethane (PUR)
Drainage plug		Drain , tray	Polyacetal (POM) , polyethylene (PE)

## 10 After-sale Services

1. In case the product does not function satisfactorily, check first by referring to the page on troubleshooting to see if this is actually a trouble.
2. If the product remains unsatisfactory even after checking, contact the shop from which the user has purchased the product or the service center described in the manual and request repair.
3. Repair during the guarantee period will be made according to the guarantee stipulations.
4. After expiration of the guarantee period, the charged repair will be made at the customer's request.

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