

EYELA

**Low Temperature Circulator
Cool Ace**

CA-1116A 220V

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.

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.

Manufacturer : **Tokyo Rikakikai Co., Ltd.**
TN Koishikawa Bldg.
1-15-17 Koishikawa, Bunkyo-ku, Tokyo 112-0002 Japan
Pone: 81/3-6757-3378
Fax: 81/3-3868-6571
Web site: 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 H₂ 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.

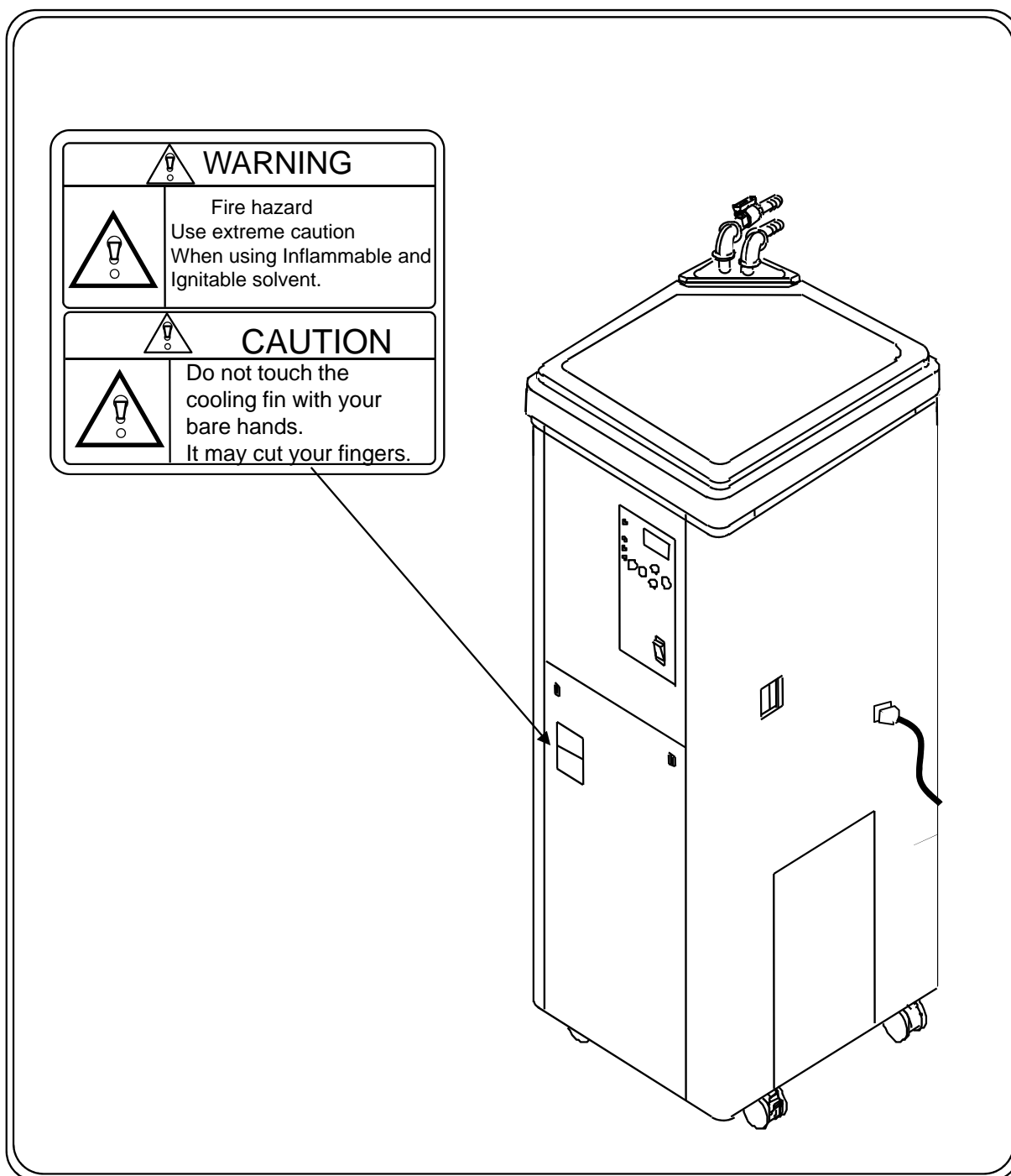
2. Warning Display on the Product


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.



Thank you for purchasing our
 product.

Introduction

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

Low Temperature Circulator
[Cool Ace] model: A-1116A

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

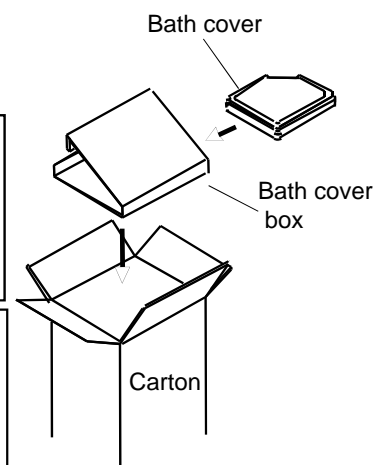
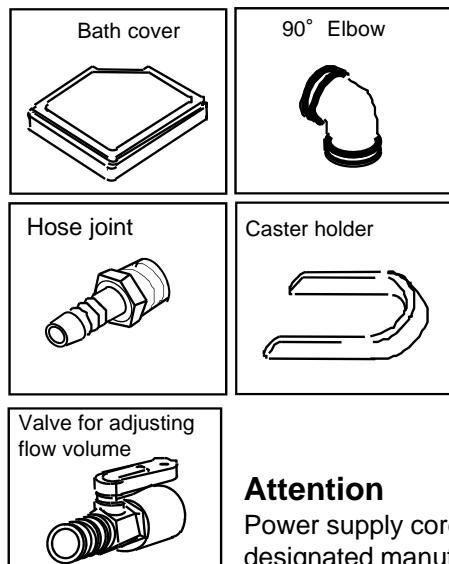
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Details of items in the package

Check the type and quantity of items before setting up.

	Item	Quantity
1	Main unit	1
2	Bath cover	1
3	90° Elbow (Rc 3/8)	2
4	Hose joint (R3/8 x Ex.Dia.10.5)	2
5	Valve for adjusting Flow volume (R3/8 x Rc3/8)	1
6	Caster holder	4
7	Power cord (applicable in European countries)	1
8	Instruction manual	1




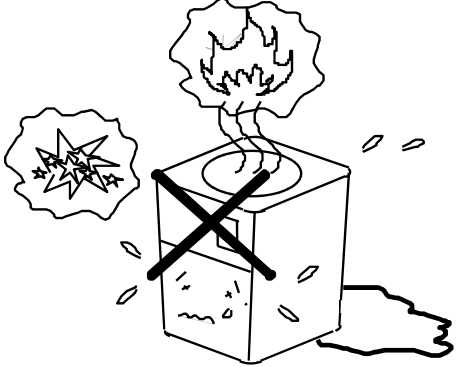

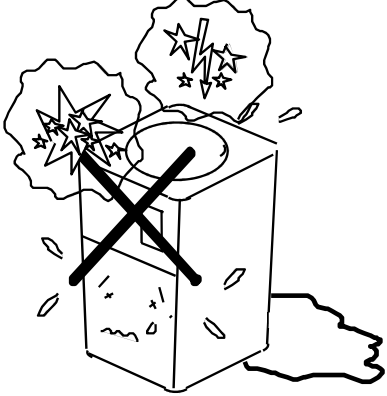

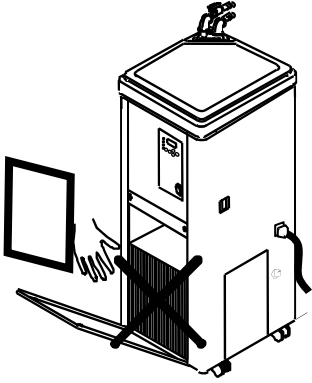

CAUTION
 Bath cover is included in a small Carton in the box.

Attention

Power supply cord , please use the thing which a designated manufacturer appoints by all means.


1 For safe operation of the unit

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

 WARNING	<p>Use with extreme caution when handling inflammable or combustible solvent.</p> <p>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.</p> 
 CAUTION	<p>Do not move the unit while liquid is in the bath.</p> <p>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.</p> 
 CAUTION	<p>Do not use cooling fin with bare hands.</p> <p>Do not touch cooling fin with bare hands while performing maintenance work. Edgy fin may cut your fingers.</p> 
 CAUTION	<p>Power supply cord, please use the thing which a designated manufacturer appoints by all means.</p>

2 Product overview

2-1 Applications

	<h3>Warning</h3>
<p>Never attempt to disassemble or modify the product. Do not use the product for any purposes other than those specified.</p> <p>Modification or use for purposes other than those specified may lead to an electric shock or a malfunction.</p>	

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. The use of optional bath cover enables circulation to the open system.

2-2 Specification

Product name		Low temperature circulator (Cool Ace)		
Model		CA-1116A		
Circulation system		Circulation for sealed system		
Performance	Temperature control range ※1	-20~+30°C		
	Accuracy of temperature control ※2	±2°C		
	Cooling capability ※3	Liquid temp.	Room temp.20°C	Room temp.35°C
		at 10°C	1050W	700W
		at 0°C	800W	430W
		at -10°C	600W	200W
Circulation Capability ※4	Max. Lifting height	9.5 / 13 m (50/60Hz)		
	Max. flow volume	12 / 14 L/min (50/60Hz)		
Configuration	Temperature control system	Refrigeration unit, ON-OFF control		
	Temperature setting·display	Sheet key digital setting , LED digital setting (minimum digit:1°C) Selecting setting or measured temperature		
	Safety features	Residual current device·excess current breaker , Over load relay holding circuit, Protection timer for refrigeration unit , Self diagnosis function for temperature controller , Thermal protector for circulation pump		
	Temperature controller	Electronic digital setting·digital display		
	Temperature sensor	Pt sensor (Pt100Ω)		
	Refrigeration unit·refrigerant	Output 650W (Rotary) · R407C		
	Bath	Whole capacity Approx.16.5ℓ Actual capacity:Approx.14ℓ Material SUS304		
	Cooling coil	Stainless (SUS316L)		
	Diameter of circulation nozzle[mm]	External diameter O.D.10.5×Bore diameter I.D 7 (R3/8)		

Product name	Low temperature circulator (Cool Ace)	
Model	CA-1116A	
SP	Range of ambient temperature	5~40°C(Indoor use only) ※5
EC	Range of ambient humidity	20~80% (Indoor use only)
·	Dimensions ※6 (main unit)	354(W)×384(D)×851(H) (excluding nozzle)
	Dimension of the bath	280 (Diameter)×270 (Depth)
	Supply voltage	AC 220V±10% 50/60Hz
	Supply power ※7	4.3A 950 VA
	Weight	Approx. 43 kg
	Operation presser max.	2.45 MPa
	Pollution degree	2
	Over voltage category	II
	Operation at a terrestrial altitude	Max 2000m above sea level

==Notice ==

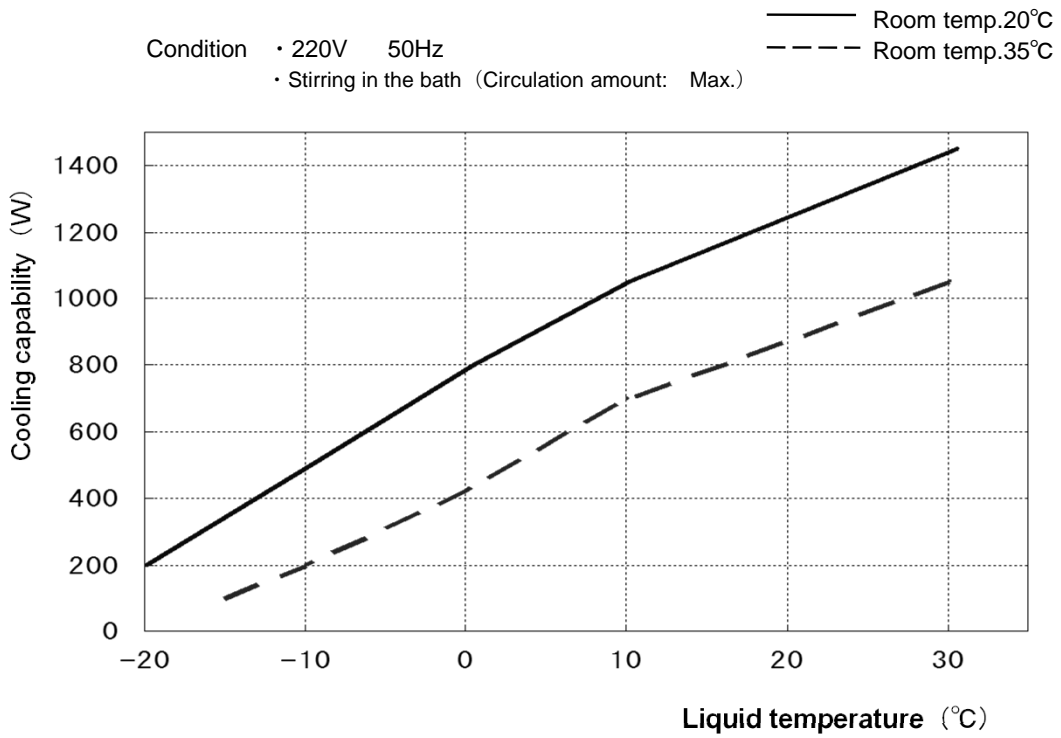
When you require to perform continuous operation of 24 hours/day under temp. of less than 0deg°C for more than one week duration.

Please contact us.

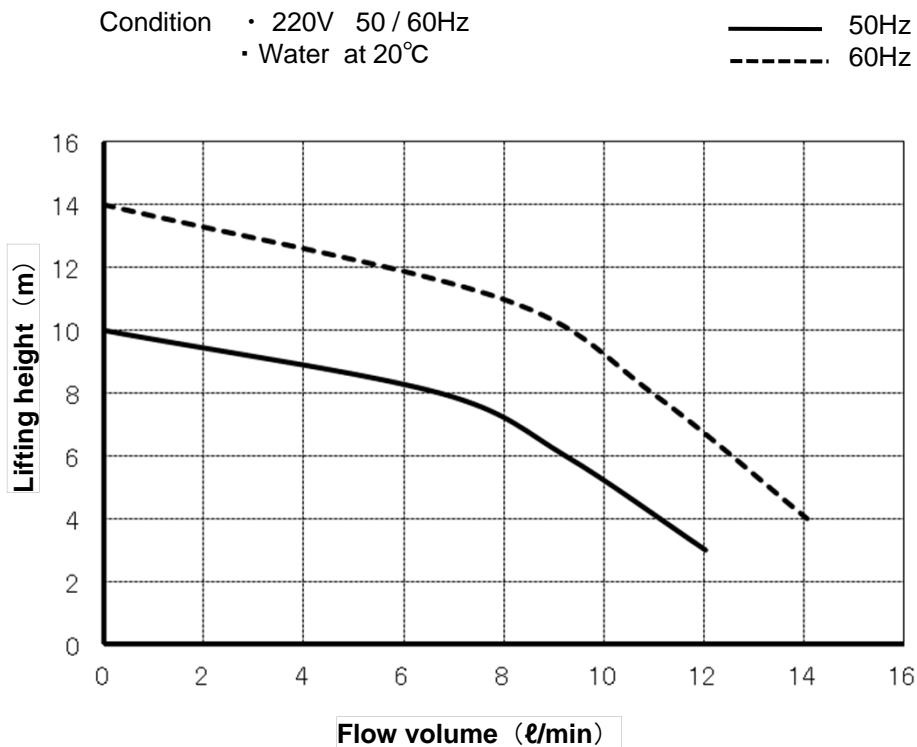
We will propose customized version of the chiller for such cases.

- ※ 1 · Heater is not equipped.
· Temperature control not available when the ambient temperature is low, unloaded and high temperature setting.
- ※ 2 Condition
 - Room temperature 20°C · Water 14ℓ · Circulation flow Max. · Setting 5~30°C
 - Heat load Less than 90% of cooling capability (displayed capability)
 - Power source AC 220V 50Hz
 - In some cases the accuracy differs depending on room temperature, supply power, type of refrigerant, the condition of stirring in the bath and etc.
- ※ 3 Condition
 - Room temperature 20°C · Circulation volume Max. · Supply power: AC 220V 50Hz
 - Cooling capability is ±10% of displayed capability.
 - Cooling capability differs depending on room temperature, supply power, voltage, type of refrigerant, condition of stirring in the bath and etc.
- ※ 4 Condition
 - Water temperature 20°C · Supply power / voltage AC 220V 50Hz
 - Circulation capability is ±10% of displayed capability.
 - Circulation capability differs depending on the type of secondary refrigerant.
- ※ 5 In order to guarantee the performance of the instrument described in this manual ambient temperature must be within the range from 5 to 35°C.
- ※ 6 External dimension does not include protrusion.
- ※ 7 When voltage is dipped during operation, the unit may indicate " A14 " may be on the control panel and then quit operation. However, this is not a fault of the unit.

2-3 Cooling capability curve (Reference)

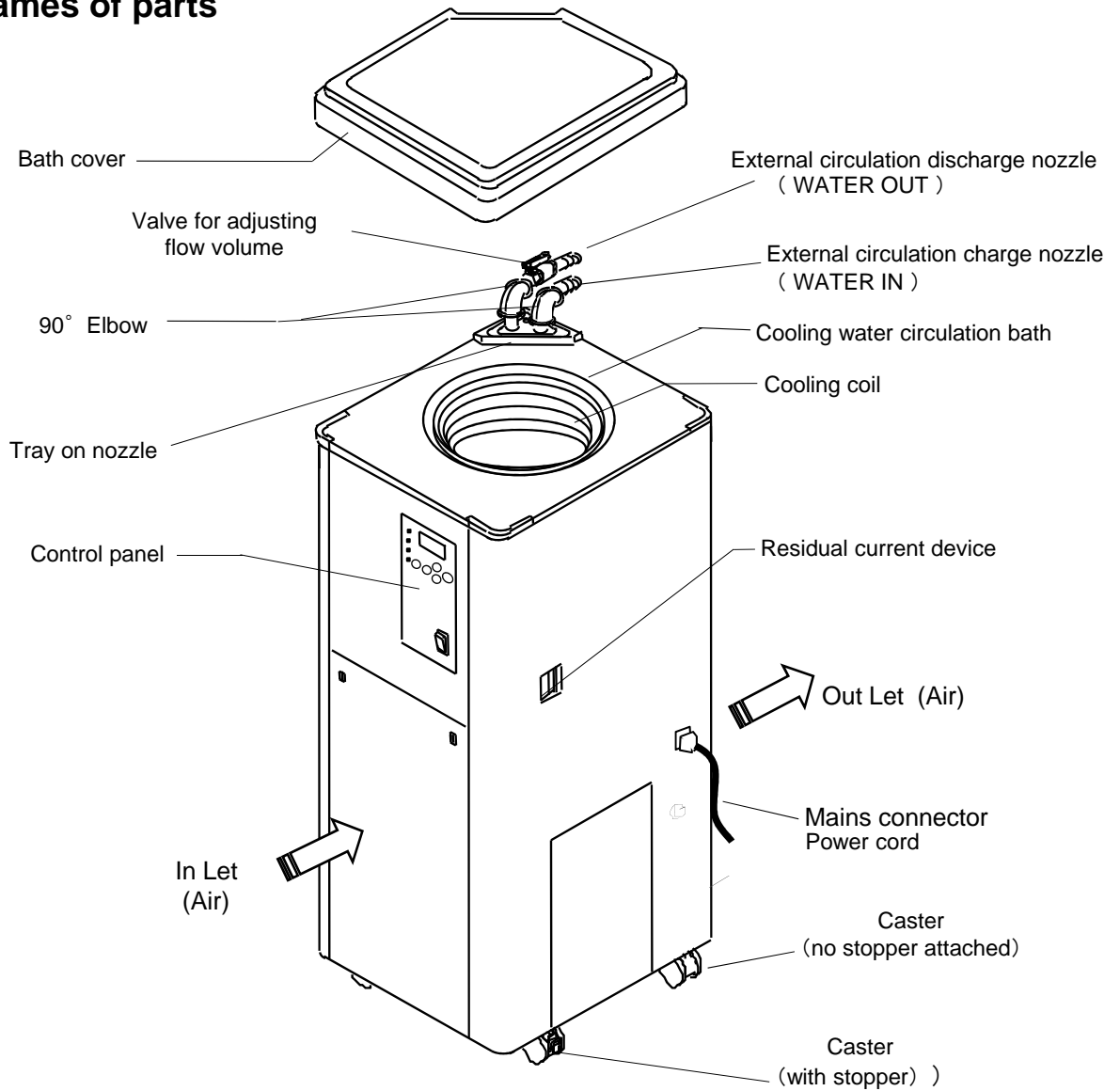


2-4 Circulation capability (Reference)

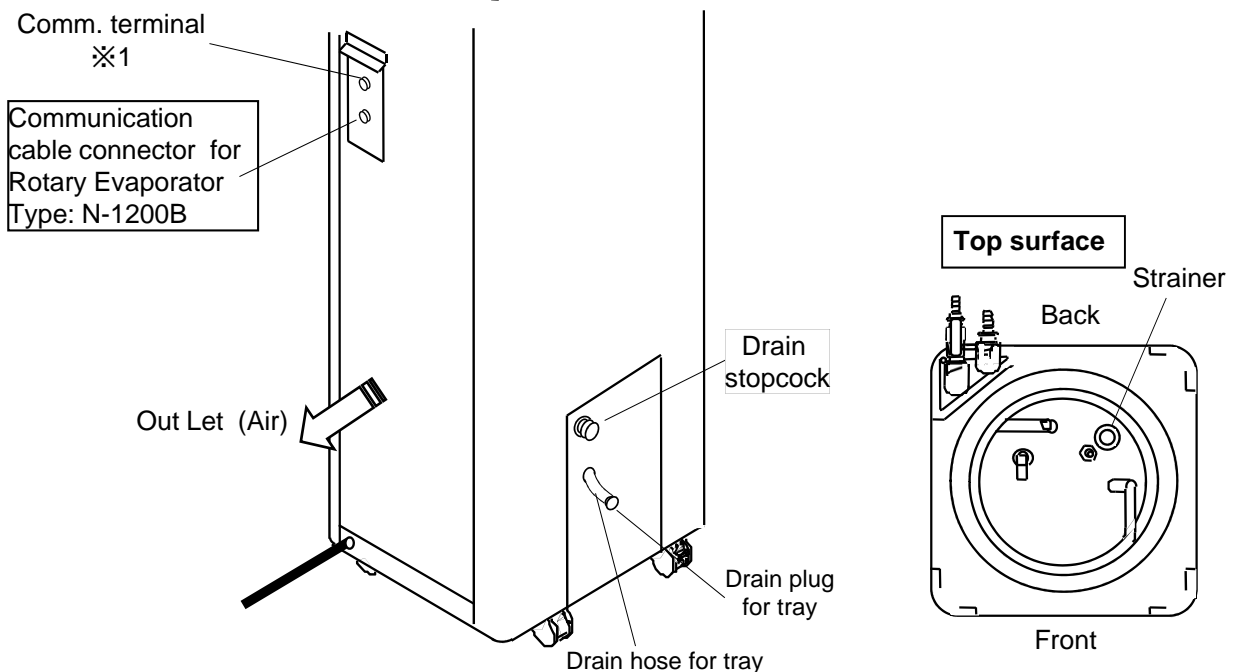


* Circulation capability differs depending on diameter of nozzle, piping, type of solvent and other conditions.
 * If you conduct sealed operation for circulation pump, it may cause malfunction on the pump.

2-5 Names of parts



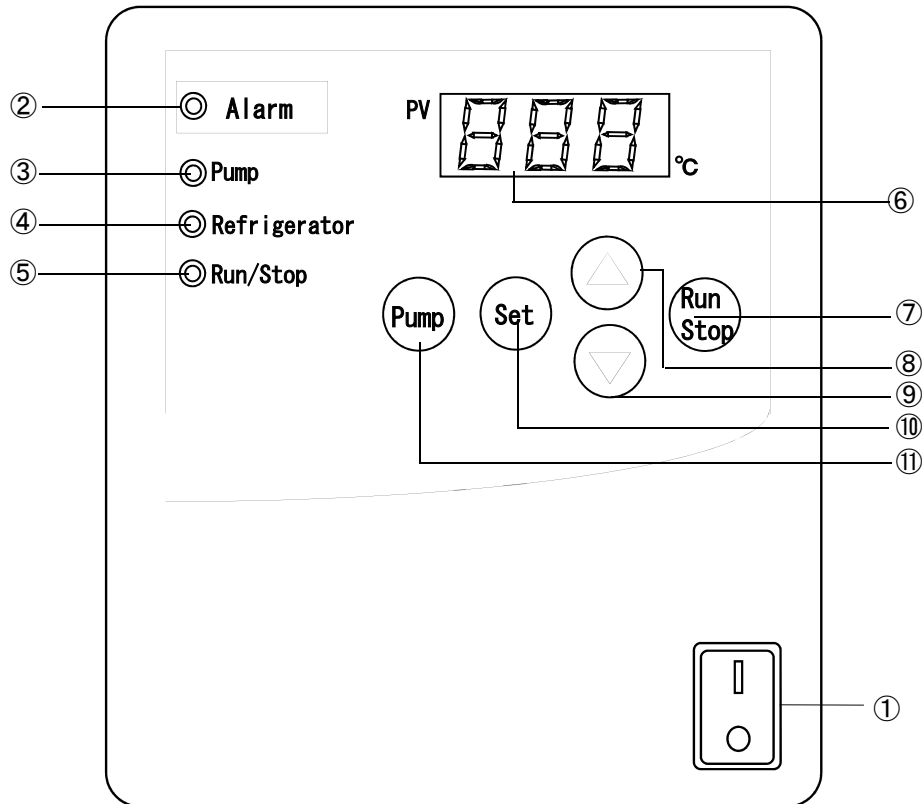
Back surface



※1 This can be connected to the vacuum controller, Type NVC-3000 for use.

3 Names and functions of operating portion

3-1 Control panel



No	Name	Function
①	Power switch	Turns on and off the power.
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.

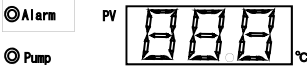
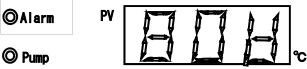
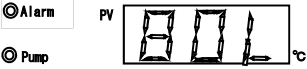
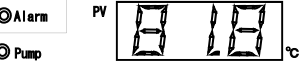
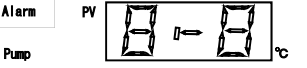
3-2 Safety · alarm features

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"> • Electric leakage hazard occurs, or excess current flows.
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"> • Ambient temperature exceeds 40°C. • Heat load was too heavy for cooling capability, which made the temperature in the bath rise. • Dirt adheres to air filter. • Fan for refrigeration unit does not work.
Protection circuit 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"> • Refrigeration unit started up with over loaded. • Power and voltage variation exceeds the rated value ($\pm 10\%$). • Ambient temperature exceeds 40°C. • Heat load was too heavy for cooling capability, which made the temperature in the bath rise. • Dirt adheres to air filter. • Fan for refrigeration unit does not work.
Thermal protector for circulation pump	Circulation pump performs over heat operation and stops operation. (Recovers when the pump is cooled down.)	<ul style="list-style-type: none"> • Over heat operation of circulation pump • Circulation liquid has high viscosity. • Foreign substance is sucked in. • Ambient temperature exceeds 40°C. • Piping resistance is high. (Valve is closed and etc.)
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"> • Temperature controller is in abnormal status because of noise and etc. • Ambient temperature exceeds 40°C.

Alarm features

Alarm name	Alarm display and operation	Cause
<p>Sensor alarm</p>	<ul style="list-style-type: none"> Alarm is displayed Alarm LED illuminates The control is stopped and the circulation pump stops.  <p>LED ON</p>	<p>Operation conditions</p> <ul style="list-style-type: none"> Temperature sensor is disconnected or short-circuited.
<p>Temperature upper limit alarm</p>	<ul style="list-style-type: none"> Alternate display of the alarm and the measured temperature Alarm LED illuminates The control is stopped and the circulation pump stops.  <p>Alternate display of the alarm and the measured temperature</p>	<p>Operation conditions</p> <ul style="list-style-type: none"> The temperature around the sensor exceeds the upper limit. <p>Canceling the alarm</p> <ul style="list-style-type: none"> Alarm can be cancelled by pressing the Set key with the measured temperature lower than the set upper limit. <p>※Default upper limit: +80°C ※The user can change the set upper limit. (Refer to P.19, 5-3. Operation of the User Set Mode.)</p>
<p>Temperature lower limit alarm</p>	<ul style="list-style-type: none"> Alternate display of the alarm and the measured temperature Alarm LED illuminates The control is stopped and the circulation pump stops.  <p>Alternate display of the alarm and the measured temperature</p>	<p>Operation conditions</p> <ul style="list-style-type: none"> The temperature around the sensor exceeds the lower limit. <p>Canceling the alarm</p> <ul style="list-style-type: none"> Alarm can be cancelled by pressing the Set key with the measured temperature higher than the set lower limit. <p>※Default upper limit : -50°C ※The user can change the set lower limit. (Refer to P.19, 5-3. Operation of the User Set Mode.)</p>
<p>Refrigeration unit alarm</p>	<ul style="list-style-type: none"> Alarm message blinks. Alarm LED illuminates The control is stopped and the circulation pump stops.  <p>Blinks</p>	<p>Operation conditions</p> <ul style="list-style-type: none"> Refrigeration unit high pressure switch works or the refrigeration unit overload relay works. <p>Canceling the alarm</p> <ul style="list-style-type: none"> The alarm can be canceled with the [Set] key when the refrigerator high-pressure switch or the refrigerator overload relay is reset.
<p>Alarm for recovery from power failure</p>	<ul style="list-style-type: none"> Alternate display of the alarm and the measured temperature Alarm LED illuminates Power failure recovery function ON ... Recovery to the state immediately before Power OFF Power failure recover function OFF...Control, pump circulation OFF  <p>Alternate display of the alarm and the measured temperature</p>	<p>Operation conditions</p> <ul style="list-style-type: none"> During the temperature control operation with setting Power Failure Recovery function, [On] or [OFF], the power was off and switched on. <p>Canceling the alarm</p> <ul style="list-style-type: none"> The alarm can be canceled with the [Set] key. <p>※The user can change the ON/OFF selection of power failure recovery function. (Refer to the user set mode operation method of P.19. , 5-3. Operation of the User Set Mode.)</p>

4 Installation

4-1 Installation environment



CAUTION

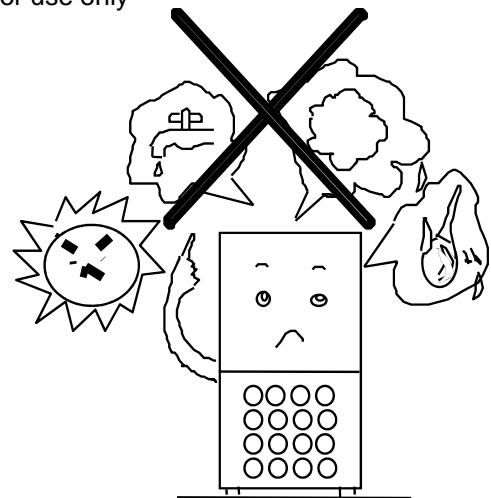
Be careful about the environment of installation. In particular, pay due attention on the location, air conditioning, and ventilation.

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.

Select the installation site that meets the following conditions.

- No direct sun light
- Ambient temperature must be from 5 to 40°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 conditions



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.



CAUTION

Do not block up an operation side and the power supply .

In the area of operation side, power supply cord, Residual current device, please secure space to use a product safely to operate it anytime.



CAUTION

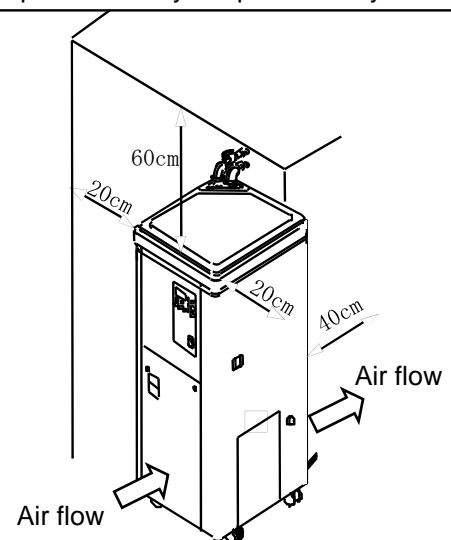
Do not place anything on top of the product.



CAUTION

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

CA-1116A Approx. 43 kg



* Do not block air flow orifice.

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.

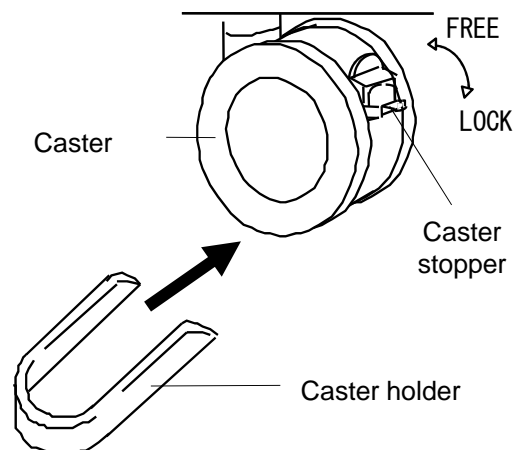
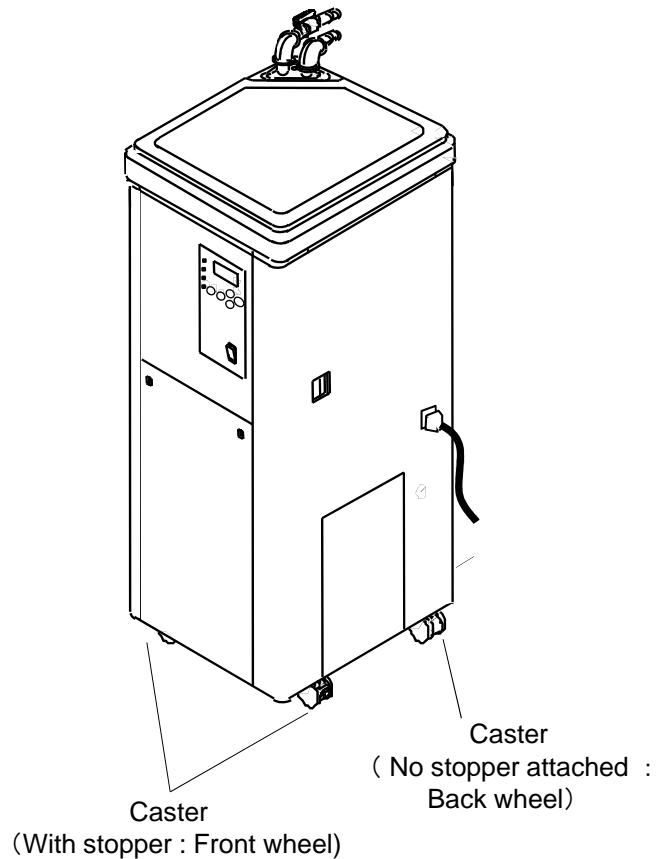
- (1) Unlock the lock of the stopper of the caster. If you press and lift the lever of caster's stopper, lock can be unlocked (Only front two casters have stoppers).

- (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.


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


- (4) Put supplied caster holders (4 pieces) into the caster to fix. Push the caster stopper's lever up to lock.





4-4 Utility connection

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

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

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

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

 WARNING
<p>Do not use power supply cord except the manufacturer designation</p> <p>Inappropriate connection may cause a fire or electric shock hazard.</p>

<p>Power supply cord can be used Manufacturer : HRS-CMC ELECTRONICS CO.,LTD. Type: H05VV-F3G1.0mm2(203+EF-28) Ampere rating 10A ,Voltage rating 250V Non-rewirable plug.</p> <p>Do not mind in other makers either, but, please choose the thing in line with a rating condition on a ground pole.</p>

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

Product model	Power supply to connect	
	Voltage	Capacity
CA-1116A	220V	10A

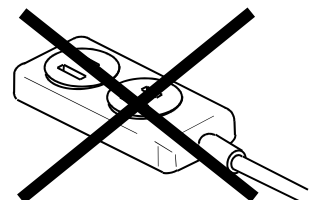
- (2) Check the type of outlet at the installation site.
 (Do not connect the mains connector yet.)
 If the outlet has earth terminal, mains connector can be connected.

Specification of Power Cord

Length	Thickness (Outer dia.)	Power plug	Cross-sectional area of cable
2m	Approx.7mm	With earth 3-pole	1.0mm ²

* The grounding adaptor is not supplied with this unit.

Do not use branching socket when connecting to power source.



5 Operation

5-1 Preparation



CAUTION

Bore diameter of the hose joint must be larger than 6mm. Use the hose at appropriate length.

When using hose joint that is not supplied with the product, the bore diameter of the joint must be larger than 6mm. Use the hose at appropriate length. When the piping resistance is strong, cooling capability or temperature distribution in the circulation bath will be worsen because of small quantity of circulation water.



CAUTION

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

Materials of the system interior include stainless steel, brass (plating), fluorine resin, polyacetal (POM), silicon rubber, modified polyphenylene ether (PPO), ethylene propylene rubber (EPDM), isotropic ferrite, ceramic, high-density carbon, special nitrile rubber (NBR), flame-retardant PBT resin (polyethylene terephthalate).

Always use the circulation solution that does not affect these substances. Otherwise, these substances will be corroded progressively, resulting in damage to the parts of circulation route. Do not use the ultra-pure water or ion-exchanged water because they dissolve CO₂ gas in air to become acid, readily corroding metals of the circulation route.

1. Connecting piping and hose

- (1) Push 90° elbow into two nozzles (seal tape is rolled around nozzle, hose joint and valve).
- (2) Fix the elbow tightly and push hose joint (WATER IN), valve for adjusting water volume and hose joint (WATER OUT) into it.
* Set the parts by following (1) and (2) in order.
In case that you set the joint first, the elbow can be connected to nozzle.



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

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

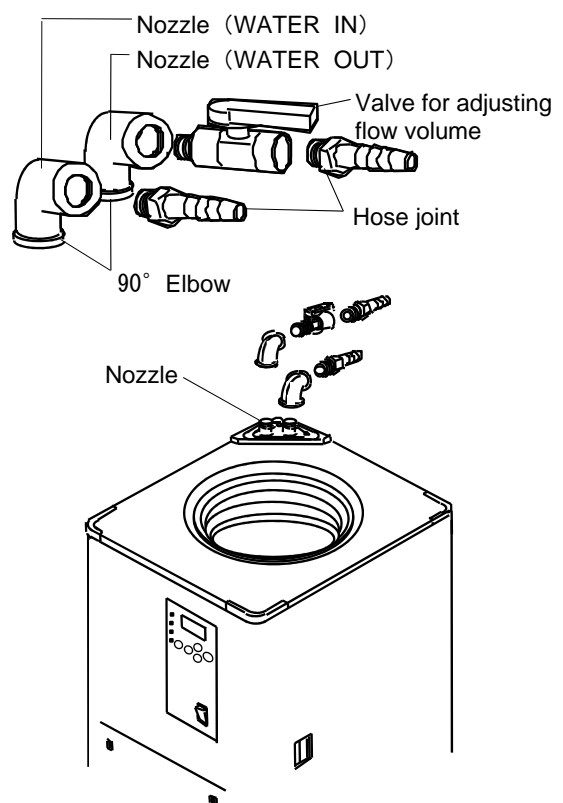
Buckled or crushed hose may cause faulty cooling of a counterpart unit or hose disconnection from the nozzle, resulting in water leakage.



CAUTION

Do not conduct closed operation or idling of circulation pump.

These operation may cause malfunction.



Setting nozzles (WATER IN AND OUT)

- (3) Connect hose (Bore diameter: 9mm) to WATER-OUT nozzle, WATER-IN nozzle and the device that to be cooled down (sealed type). Fix the hose with hose band (Hose and hose band is not supplied with the product). Choose the hose that can resist the solvents that has appropriate pressure and heat resistance.

※Cold insulation hose is a consumable product. Life of the hose differs depending on the use condition, so please check it regularly and replace it with new one if needed.

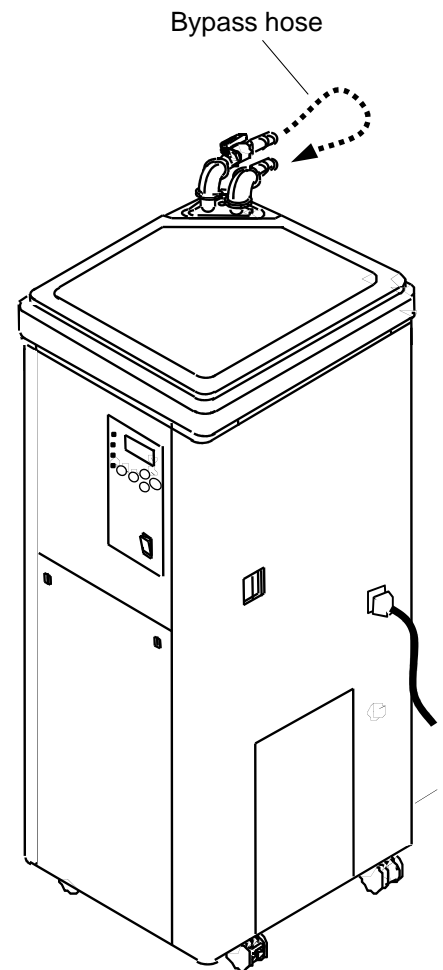
CAUTION

When you circulate a low temperature liquid, please connect it with the hose which did an insulation for prevention of dew condensation and frostbite.

In any case, please fix it in a hose band so that a hose does not fall out .

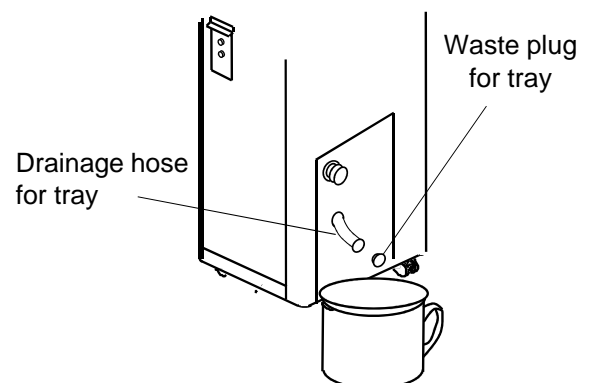
Using the unit as a low temperature bath

When using the unit as a low temperature bath, connect bypass hose to both WATER-OUT and IN nozzle. If you should turn on circulation pump in this status, the bath will be stirred, which makes cooling efficiency worse. Fix the hose band tightly (hose and hose band is not supplied with the product).



2. Connecting drainage hose for tray

Remove the stopcock of drainage hose for tray and set the vessel for receiving the drained water. When the condensation is built up so often or humidity is so high, tray will receive more quantity of water. So check the tray regularly and drain the water especially in the summer time.



* The vessel for receiving drain water is not supplied with this unit.

3. Filling cool water

- (1) Make sure that drain stopcock is attached to drain hose.
- (2) Fill the water (approx. 14ℓ) to soak cooling coil into low temperature circulation bath.
※Please put a water in the circulation bath slowly.

Do not use pure water

Use tap water or softened tap water.
Do not use pure water or ion exchanged water.
These types of water solve carbon dioxide in the air into acid solution, which could corrode the metal of circulation route.
Also, pin hole of cooling coil or circulation pump may be impaired because of the use of these water.

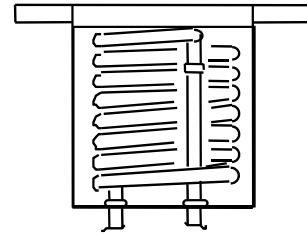
- * Use antifreeze if you use the unit at $+7^{\circ}\text{C}$ or lower. However, if you use ethylene glycol or Nybrine, the viscosity will be higher in low temperature, which makes temperature distribution in the bath worse.
In such a case, mix the moderate amount of water (Make sure the freezing temperature when the liquid is concentrated.)

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

- (3) Make sure that water-out valve for adjusting flow volume is closed.
- (4) Set the bath cover on the main unit.

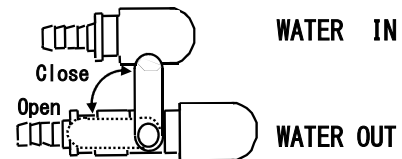
4. Connecting mains plug

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



Water level of the cooling water circulator bath

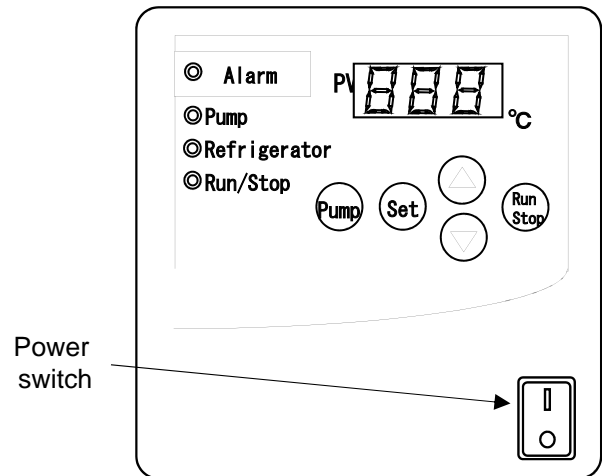
- ※ Do not move the unit , after filling liquid in the bath.



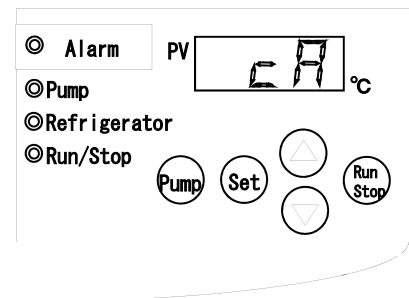
Valve for adjusting flow volume

5-2 How to operate the unit

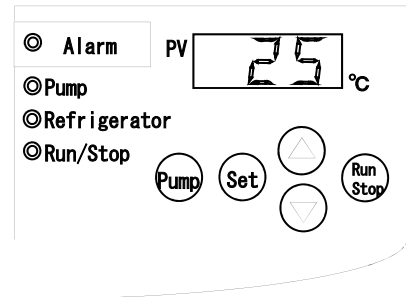
Turn ON the Residual current device and the power switch.
The display shows initially "cA" for about one second, then the measured temperature.



Initial display



Initial display for 1 second and shows the measured temperature



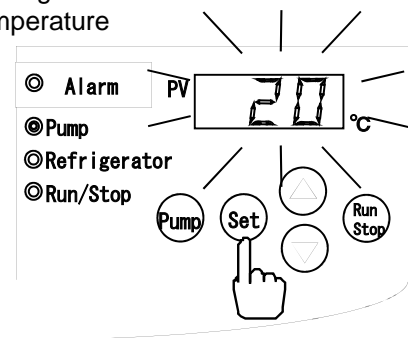
1. Setting the temperature

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.

(1) Setting the temperature



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

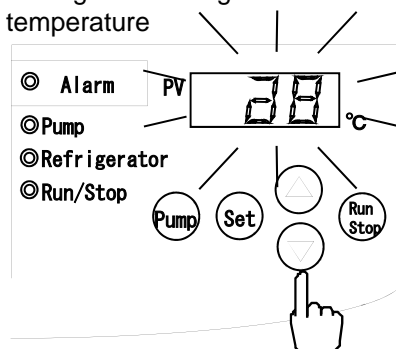
- * Holding down the [▲] and [▼] key can increase/decrease the value continuously and pressing the key can increase / decrease the value by 1°C.

(3) Press the [Set] key.

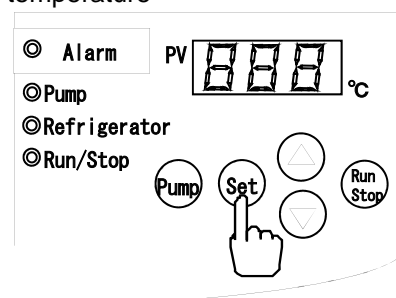
The displayed set temperature (flashing) is acknowledged, and the measured temperature is displayed.

- * 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



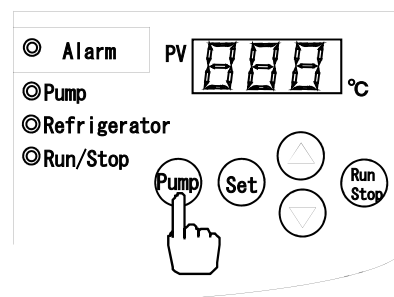
2. Starting operation

(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

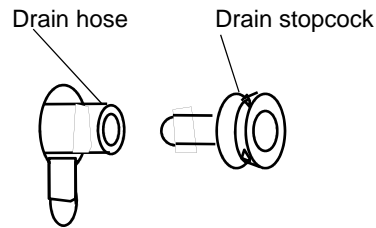
Closed operation put
93.1kPa(0.95kg/cm² at 50Hz)
127.5kPa(1.3kg/cm² at 60Hz) pressure on
internal piping, which may cause malfunction,
or leaking from the connecting part or
disassemble the piping.

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.

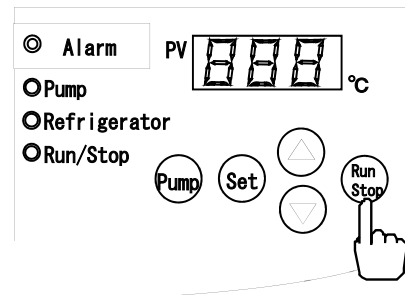


- * Except the case of releasing the air from the pump, do not turn on and off each switch quickly. If you do so, switches will be damaged and cause malfunction.

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

- " Control Status LED (Run/Stop) " illuminates.
- The refrigeration unit is ON at the setting temperature +2°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 -2 °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



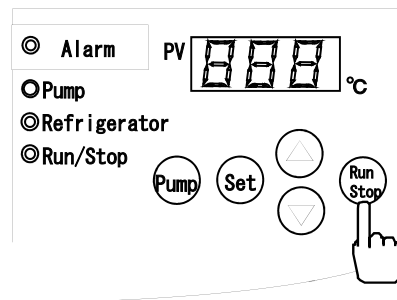
Protection timer for refrigeration unit

When the refrigerator is stopped once, the refrigerator does not operated for about 80 seconds even when the measured temperature is high by about 2 °C or more.

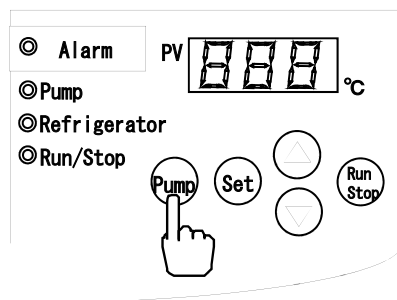
3. Stopping operation

- (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



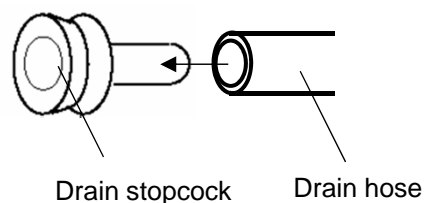
4. After operation

Drain the liquid from the unit.

- (1) Take out the drain hose and remove the drain cock stopper to drain the liquid.

 Caution
Treatment after operation
<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>

Drain hose¹⁾



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.

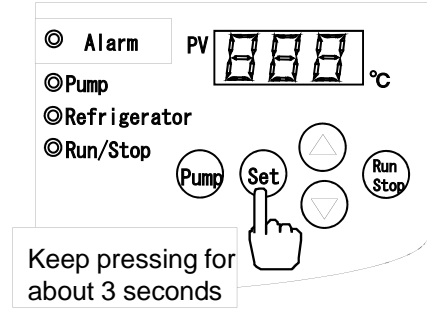
* Transfer to the user setting mode

- (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 ON/Off of the power failure recovery function
 [AOH] Sets the temperature for the upper limit alarm
 [AOL] Sets the temperature for the lower limit alarm.

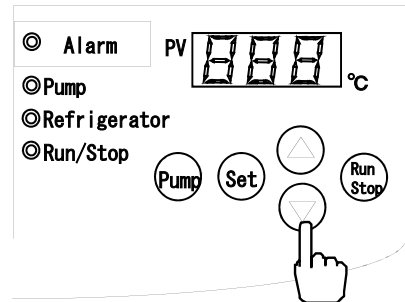
* Transfer to the temperature measuring screen

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)

(1) Temperature setting screen



(2) User setting item screen



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.)

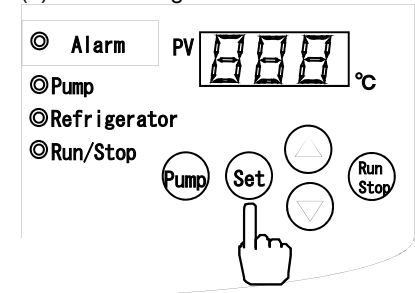
※ The setting was [on] when delivered.

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

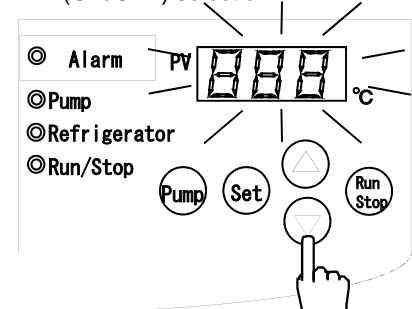
- (2) With the keys, [▲],[▼], select the Power recovery function setting. (setting position was blinked.)

- (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

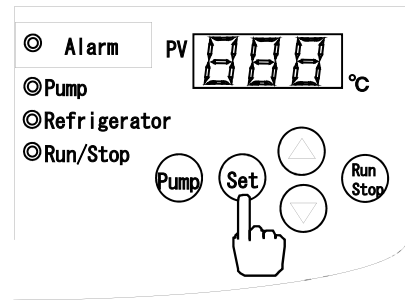


5-3-2. Setting the upper limit alarm

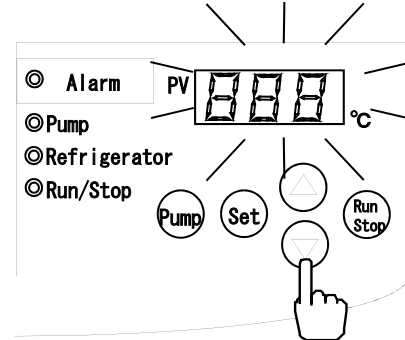
- (1) During selection of the upper limit alarm setting item ([AOH] display ON), pressing the [Set] key causes display of the upper limit set value.
(Upper limit set value flashing)
- (2) Press the ▲ and ▼ keys to set the upper limit.
The set value increases by 1 °C each time the [▲] key is pressed.
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

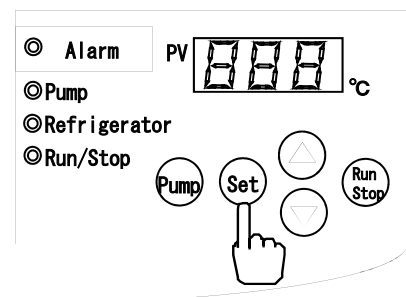


5-3-3. Setting the lower limit alarm

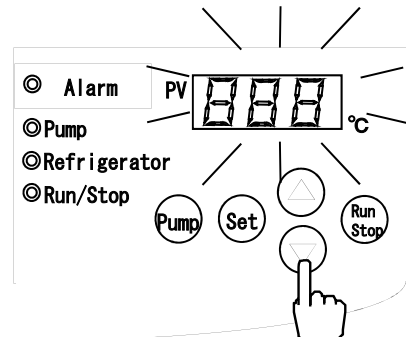
- (1) During selection of the lower limit alarm setting item ([AOL] display ON), pressing the [Set] key causes display of the lower limit set value. (Lower limit set value flashing)
- (2) Press the ▲ and ▼ keys to set the lower limit.
The set value increases by 1 °C each time the [▲] key is pressed.
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





5-4 Optional Accessories

5-4-1 Circulation to open system

1. Preparation

- (1) Remove the 90° elbow and hose nozzle from the return side and install the attached SUS elbow (3/8). Screw in the hose coupling with the outside diameter of 16 mm.

- (2) Attach the tube (bore diameter: 9mm) to WATER-OUT nozzle and also, attach other tube (bore diameter: 15mm) to WATER-IN nozzle to connect to external open bath. Fix the hose with hose band.

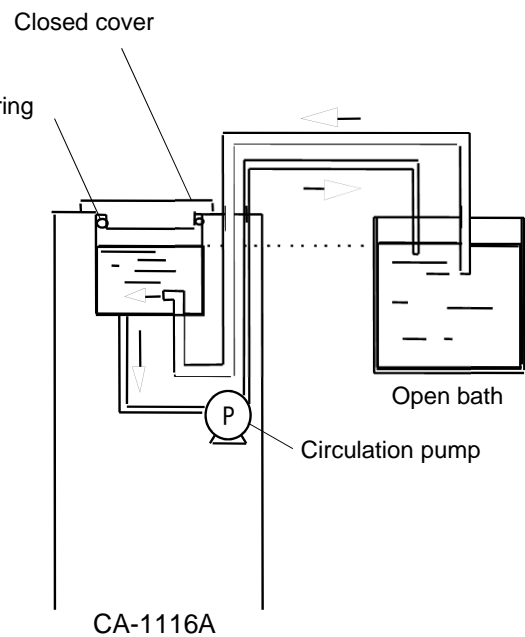
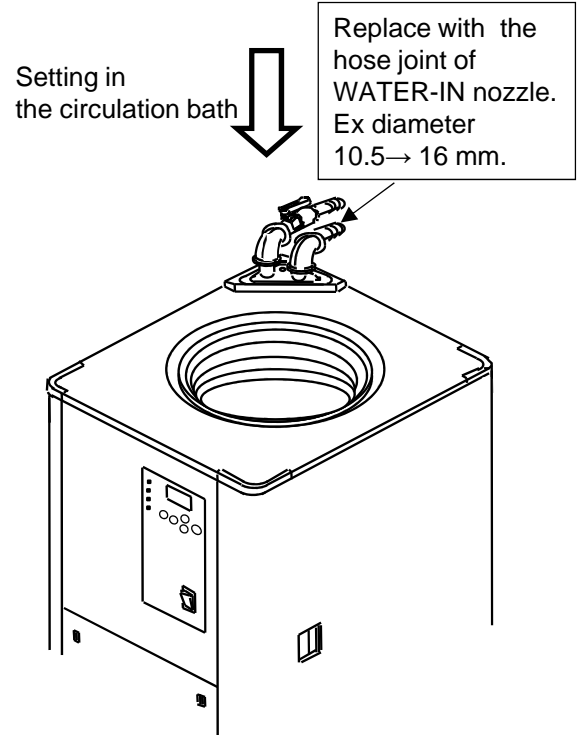
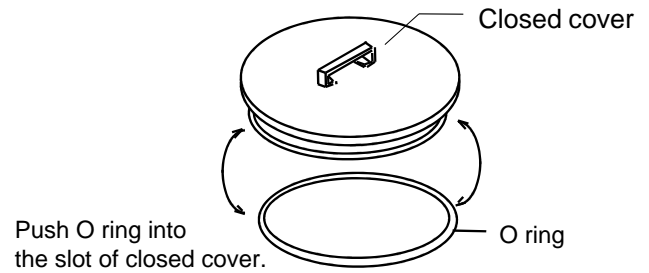
Required hose		
WATER-IN nozzle		I. D. 15mm
WATER-OUT nozzle		I. D. 9mm

- (3) Make sure that drain stopcock is attached and fill the water in the bath until cooling coil is covered with the water (approx. 14ℓ). Also, pour appropriate quantity of water in the external open bath.

* When using the unit at +7°C or lower, use antifreeze. However, when using ethylene glycol or Nybrine®, temperature distribution gets worse. In such a case, mix the appropriate quantity of water.

* To keep the balance of both liquids through tubes, set the appropriate water level for this unit and external open bath so that water won't overflow or water level will not lower when the unit is stopped. If this balance can not be kept, liquid may not flow in.

Product name	Closed cover
Code No.	112780



* Put both ends of the hose in the external open bath and fix these tightly.

- (4) Make sure that WATER-OUT nozzle is "Closed".
 - (5) Push O ring into closed cover and set it at the top of the circulation bath.
(Closed cover is not fixed on the cover yet).
- * If you can not set the cover easily, please apply water to O ring.

2. How to operate

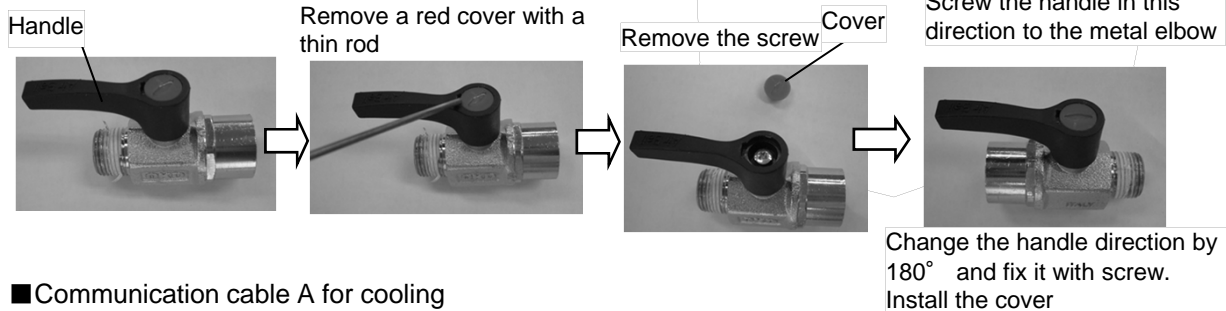
- (1) Turn on mains switch, power switch and press the [pump] key.
 - (2) Open WATER-OUT valve gradually.
 - When the water level in the circulation bath lowers and the bath internal is in vacuum state, closed cover can be attached tightly.
 - Liquid from external open bath starts circulating.
 - (3) Check the water level of the bath and adjust the circulation volume.
- * Do not crush the tube that connects to external WATER-OUT nozzle.
 - * In some cases, pressure in the bath or out of the bath is off balance, and liquid can not be suctioned from open bath. In such cases, close the valve for adjusting flow volume.
 - * After making sure the recovery of the liquid level of low temperature circulation bath, open the valve for adjusting flow volume gradually and adjust the volume.

5-4-2 Other options

When the discharge rate is insufficient, use the optional circulation metallic nozzle with a large diameter to reduce the piping resistance.

- (1) Remove the flow control valve from the main body and change the direction of handle. (Refer to the procedure to change the direction of handle of flow control valve described below.)
- (2) Wind the seal tape four to five turns around the threaded portion and screw in the 90° elbow (metal) (for both discharge and return sides).
- (3) Screw the flow control valve and metal nozzle to the discharge side and the metal nozzle to the return side. In either case, wrap the seal tape four to five turns to the threaded portion before screwing.

※ Procedure to change the direction of handle of the flow control valve



■ Communication cable A for cooling

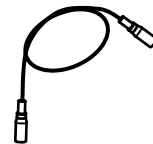
Type CC-2A (compatible with one CA type and one N1200 B type)

■ Branching box for communication cable for cooling

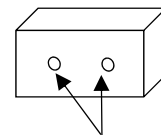
Type CC-BOX (compatible with one A type and one N1200 B)

The communication cable for connection and the cable relay box by connecting Type N-1200B and A-1116A for use in conjunction with the evaporator and cooling water circulator.

Communication cable A for cooling



Communication cable branch box for cooling



Connectors: Two in the front
: One in the backside

Interlock between B-1200B and CA-116A

N-1200B	Operation state of CA-116A type pump		
	CA temp. control	CA temp. control stopped	CA alarm ON
Operation state	Initial	Initial	Pump OFF
With power ON	Initial	Initial	Pump OFF
STOP→RUN	Pump ON	Pump ON	Pump OFF
RUN→STOP	Pump OFF	Pump OFF	Pump OFF
At N-1200 alarm	Pump OFF	Pump OFF	Pump OFF
With power OFF	Pump OFF	Pump OFF	Pump OFF

※ When the pump switch of CA-116A is operated, it turns ON/OFF the pump in preference to switch operation on CA.

※ There is no signal communication from CA-116A to N-1200B.

※ When two units of N-1200B are connected, circulation cannot be stopped unless these two units are stopped.

For interlock operation

- The refrigerator keeps operation even during stop of circulation. The use of antifreezing solution is recommended. (If water only is used, the area around the cooling coil is frozen.)
- Pressing the pump key while the circulation pump is stopped causes start of circulation.
- After completion of operation, be sure to turn OFF power supply for N-1200B and CA-116A.

■ Communication cable

For the operation method, refer to the operation manual of vacuum controller, Type NVC-3000.

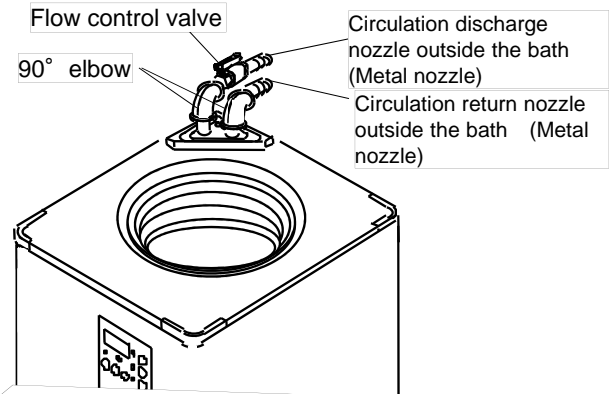
Communication cable			
Code №	269450	269460	269470
Model	COM-0.5M	COM-1M	COM-2M



Communication cable

■ Metal nozzle set

Model	Nozzle outside diameter (material)	Code 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



6

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
Residual current device can not be turned on.	Electric leakage hazard occurs.	Stop operation and contact your local dealer or closest customer service center.
	Excess current flows.	
No displays is shown on indicator when turning on Power switch.	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.
	Power is not supplied.	Turn on the breaker of distribution board.
	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.
	Power switch is impaired.	
	Temperature controller is impaired.	
Refrigeration unit does not work.	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.
	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 unit is not cooled down.	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.	
The unit is cooled down poorly.	Gas is leaking.	Stop operation and contact your local dealer or closest customer service center.
	Fan for refrigeration unit does not work.	
	Dirt adheres to the filter of refrigeration unit.	Clean the filter. (Refer to the section "Maintenance and checkup")
Cool water does not circulate.	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.
	Air is sucked in.	Remove drain stopcock and make sure that cool liquid flows, then attach the stopcock again. Turn on and off pump switch two or three times to release the air.

Trouble		Cause of trouble	Countermeasure
Cooling 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.
Circulation volume is small.		Replace the circulation nozzle with the other one that has smaller diameter.	Replace with the supplied nozzle that has larger diameter.
		Hose is crushed.	Stretch the hose.
		Pressure loss of circulation system is too much.	Reduce the pressure loss.
ALARM IS ACTIVATED	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.	<ul style="list-style-type: none"> •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. Please make the rating voltage 220V ± 10%
	Alarm for disconnection of temperature 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.
	Upper temperature limit alarm happens. •Alarm LED illuminates •" AOH" 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 •" AOL" 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.	<p>Press the [Set] key. Alarm can be canceled.</p> <p>Refer to the manual, P.19 and set up necessary functions.</p>
	<ul style="list-style-type: none"> •Temperature cannot be controlled. •Abnormal indication 	<ul style="list-style-type: none"> •Temperature controller is in abnormal status because of noise and etc. •Ambient temperature exceeds 35°C. 	<ul style="list-style-type: none"> •Change the installation site. •Set the room temperature at 35°C or lower. If that failure mode still remains, Stop operation and contact your local dealer or closest customer service center.
	Bath internals is frozen at +7°C or higher.	Poor circulation and bath is not stirred sufficiently because of pressure loss of piping and etc.	<ul style="list-style-type: none"> •Open the valve for adjusting discharge volume •Use antifreeze. •Using high-pressure pump is recommended.
Temperature controller is broken or refrigeration unit cannot be stopped.		Stop operation and contact your local dealer or closest customer service center.	

7 Maintenance · checkup

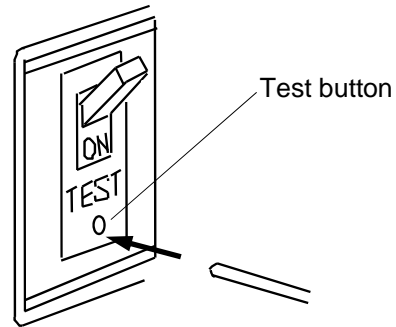
7-1 Operation test for residual current device



CAUTION

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.

7-2 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.



CAUTION

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.

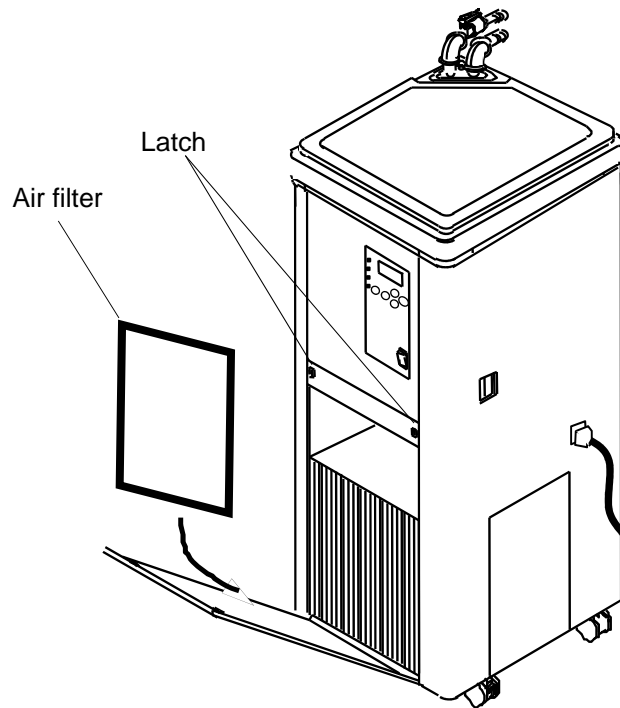
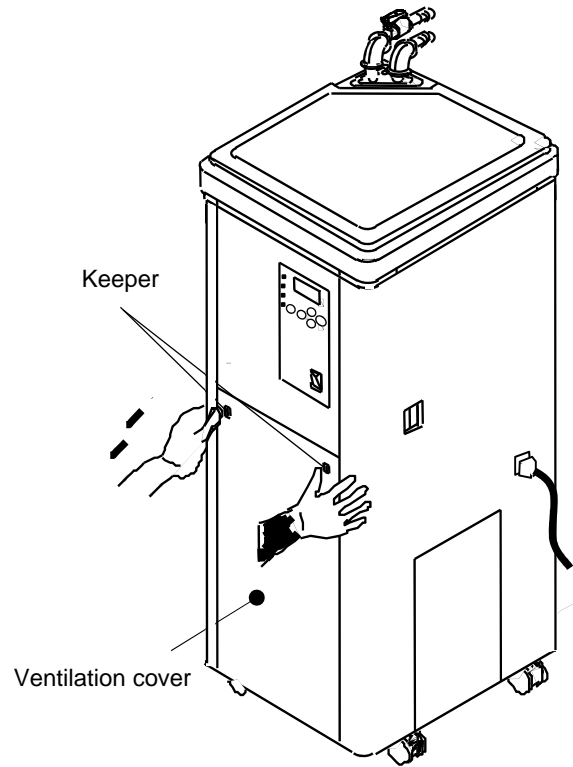
Condition of the filter differs depending on the environment and operating time, however, check and clean the filter regularly.

- (1) Turn off residual current device and power switch and unplug the mains connector from outlet.
- (2) Pressing the keeper (black) of ventilation cover with hands can unlock the latch and open the cover. Take the filter out.

- (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) Set the filter in the cover again and close the cover. Pressing the keeper (black) of the cover with both hands simultaneously. Latches are locked.

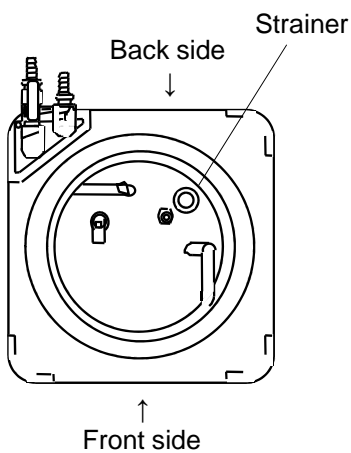


※ Do not press the cover downward when opening the cover.

2. Cleaning strainer

Clean the strainer regularly.
Before cleaning, drain the water from the bath.

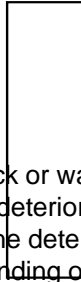
Top surface



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.

-






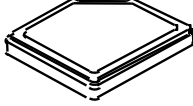
4. Checking pipe

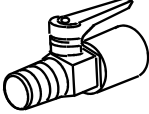
Check whether the pipe has slack or water leak, and also make sure that hose is not deteriorated before and after use. The progress of the deterioration for the circulation hose differs depending on the use condition, however, check the hose regularly and replace it with new one if needed.




8

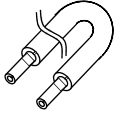


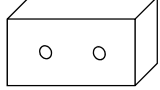
Consumption parts/Optional accessories


CA-1116A

① Filter (New) 			② Drain stopcock 			③ Waste plug 			④ Bath cover 		
Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty
251010	CA-1115	1	148850	CA,NCB	1	216590	CA-1310	1	188320	CA-1112	1

⑤ Ball valve 			⑥			⑦			⑧		
Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty
247190	3/8 × 3/8	1									

⑨ Metal nozzle set 			⑩ Circulation nozzle A 			⑪ Silicon hose 			⑫		
Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty
See the table below		2 each	See the table below		1	112720	I.D. φ9	5m			
						144170	I.D. φ12	5m			

⑬ Insulated hose set 			⑭ Closed cover 			⑮ Communication cable A for cooling 			⑯ Branch box for communication cable A for cooling 		
Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty	Cat.No.	Norm	Q'ty
See the table below		1	112780	-	1	252200	CC-2M	1	252210	CC-BOX	1

⑰ Communication cable 		
Cat.No.	Norm	Q'ty
269450	COM-0.5M	1
269460	COM-1M	1
269470	COM-2M	1

■ 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

■ ⑩ 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

■ ⑬ Cold insulation hose set

Length	Cat.No.			
	1m	2m	5m	
I.D.	φ9	112690	112700	174420
	φ12	113280	143330	174440
	φ15	113290	143340	174460

The insulated hose is made from chloroprene and is one of consumables. Since deterioration and ageing of the hose differ depending on the use conditions. Check the hose and replace it as required.

9 Disposal of the product

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

Main components and disposal instructions

Component	Specification	Total weight	Dimensions	Method for disposing
Main unit of low temperature circulator	CA-1116A	Approx. 43kg	354(W) × 384(D) × 851(H)m	Contact waste disposer
	Refrigerating Freon gas to be charged in the refrigerator	—	—	For disposing Freon 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)
		Corner of front top	Acrylonitrile -Butadiene -Styrene (ABS)
		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)	Stainless(SUS316L)
		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		Styrene foam
	Electrical part	Basal plate condenser, relay	Glass epoxy resin, steel, copper
		Switch, residual current device	Polyester resin, steel, copper
		Power cord, wires , Inlet	Vinyl, soft copper,Nylon(PA6)
		Fan for refrigeration unit	Aluminum (Al)
		Insulation film , Nylon clamp	Polyethylene terephthalate (PET) , Polyamide (PA66)
		Motor	Zinc alloy (ZDC) , brass
	Bath cover		Acrylonitrile -Butadiene -Styrene (ABS)
	Nozzle's tray		elastomer
	Circulating	Valve , Nozzle, Elbow	Brass _PTFE _ABS_ Steel , 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.



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EYELA is a coined word from EYE and LA from laboratory and signifies our commitment to the future of science.

TOKYO RIKAKIKAI CO.,LTD

TN Koishikawa Bldg.6F,1-15-17
Koishikawa,Bunkyo-ku,Tokyo
112 - 0002 Japan
Phone: 81 / 3 – 6757 – 3378
Fax : 81 / 3 – 3868 – 6571
E-mail: info.eyela@eyela.co.jp
<http://www.eyelaworld.com>

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