

EYELA

Low
Temperature
Circulator

Cool Ace

CA-2610
CA-2610 S

Instruction Manual



Important

This manual includes important information concerning the maintenance of the functionality of the product and safety use.

Please read carefully especially on
“Safety precautions” before use.

Please keep this instruction manual within easy reach of yourself whenever using the product.



Tokyo Rikakikai Co., Ltd.

Safety precaution

1. Signal word for warning

When using this product, mishandling and inflammable and combustible solution may cause unexpected personal injury or accident. Also, due to its function and characteristic, operation under high temperature may worsen the function and cause breakdown. However, if you have proper information before use, you can avoid almost all these troubles.

Therefore, this manual categorizes the level of importance and danger as below with alert mark and signal word. Please follow the instructions and use the product safely.

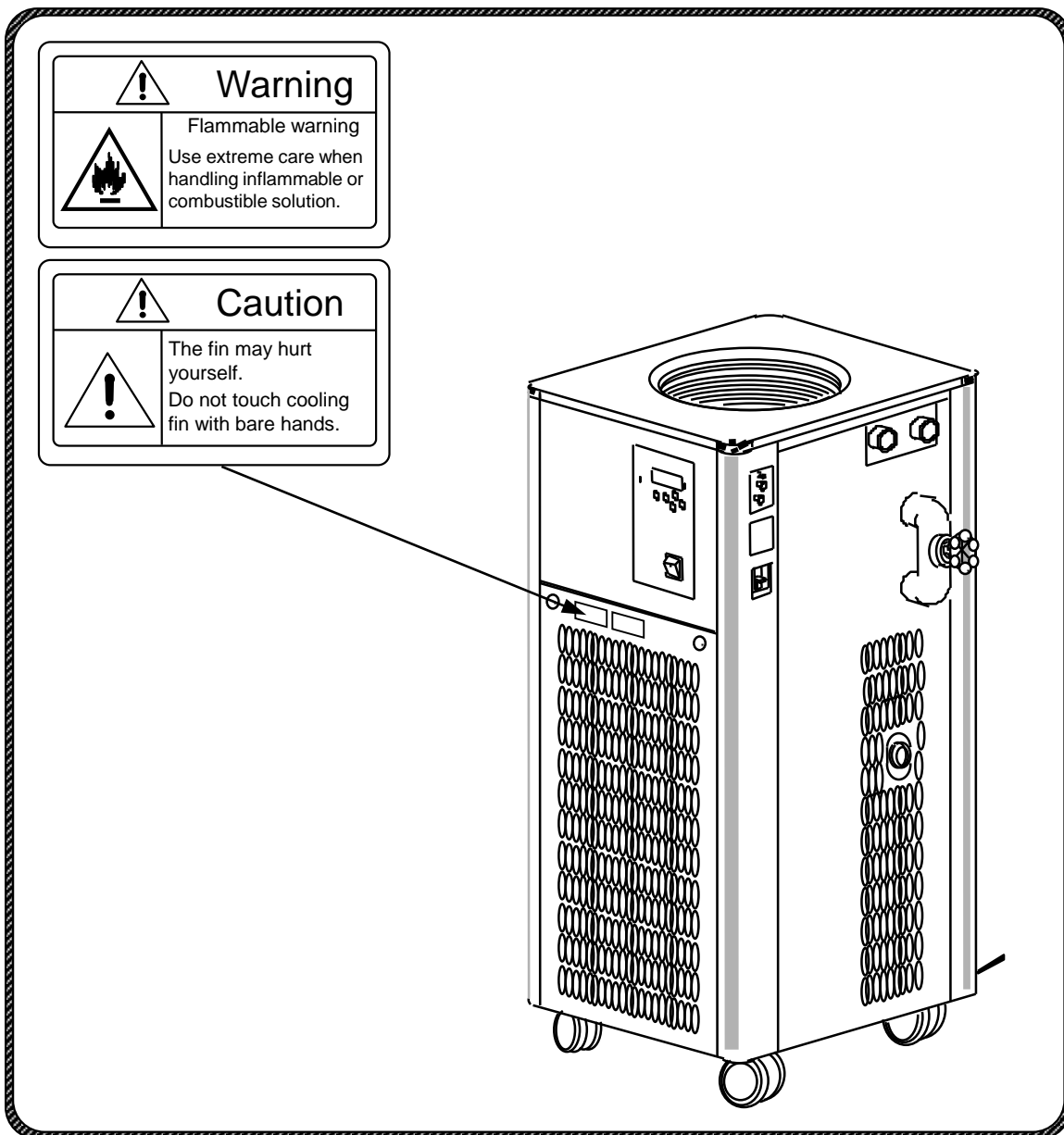
Alert mark Signal word	Definition
 WARNING	Mishandling the product may cause serious personal injury or loss of life.
 CAUTION	Mishandling the product may injure users or cause property damage.

Though we are trying to look into conceivable risk of using the product, it is very difficult for us to expect all of it. It means that all the instructions in this manual do not cover all the types of risks that may be caused by the product. However, if you follow the instructions, you surely can handle and operate the product safely. Please use extreme care when handling this product and try to prevent all the potential accidents and mechanical failures.

2. Warning display on the product

For high priority danger, warning label is attached on the machine body.
The position of the label is as below. Please read the instruction carefully
whenever you use the machine.

* If you have trouble reading warning label because of
damage, please change the label and attach the new one.
Please contact us if you require new label.



Thank you for choosing the product of **EYELA**

Introduction

This manual describes the procedure of setup, operation, troubleshooting, maintenance, check-up and disposal of Low Temperature Circulator [Cool Ace], CA-2610, 2610 S.

Please read this manual carefully before use.

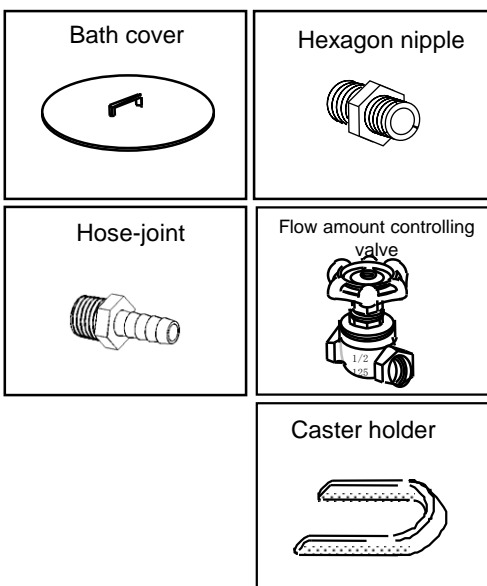
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Check-up list of packing

Please check the type and quantity of each part before setting up the instrument.

Contents		Qty
1	Main body	1
2	Bath cover	1
3	Hose-joint (R1/2 x External diameter 16)	2
4	Flow amount controlling valve (R1/2 x Rc1/2)	1
5	Hexagon nipple	1
6	Caster holder	4
7	Instruction manual	1
8	Warranty	1



1

For safety use

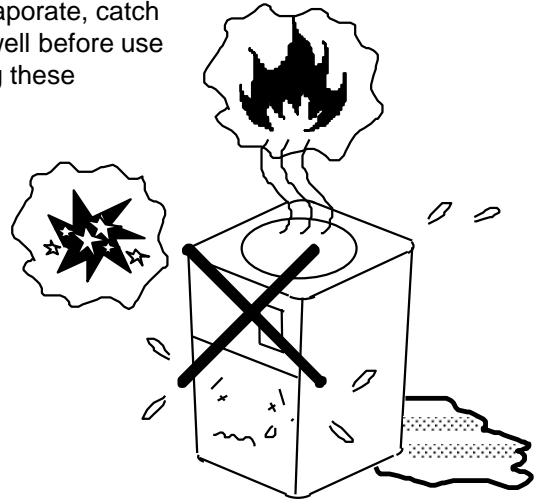
This product is not designed with explosion-proof construction.
Use care when handling the product.



WARNING

Use extreme caution when using
inflammable and combustible solution.

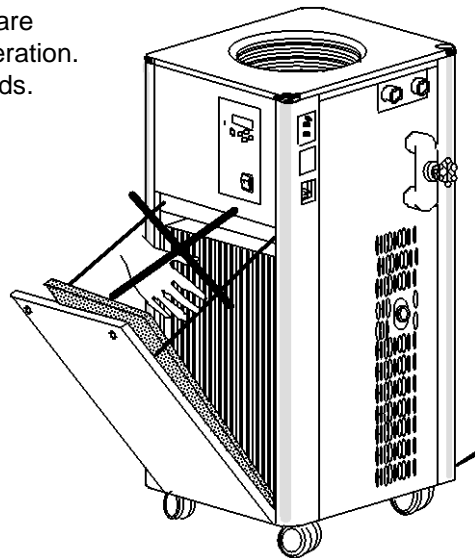
Leaving inflammable and combustible
solution out at room temperature or higher,
it (ethanol and etc.) may evaporate, catch
fire and explode. Ventilate well before use
and use care when handling these
solutions.



WARNING

Do not touch cooling fin with bare
hands.

Do not touch cooling fin with bare
hands during maintenance operation.
The edgy fin may cut your hands.



2

Outline of the product

2-1 Use application

**WARNING**

Do not remodel the product.

Make sure that it should not be used out of intended use.

Remodeling and improper use may cause electric shock or breakdown.

This is the cool water circulating machine to cool down the liquid in the bath with using cooling machine and circulate the liquid externally by circulating pump, and to cool down generating heat part of evaporator, reaction bath and other devices.

Circulation to open system can be performed when sealing up cover, which is one of the options, is used.

2-2 Specification

Product name		Cooling water circulating device (Cool Ace)	
Model		CA-2610	CA-2610 S
Circulation system		Suitable for seal-up circulation	
Range of available ambient temperature		5 to 35°C	
Features	Range of temperature control *1	-10 ~ 35°C	
	Accuracy of temperature control *2	±2.0°C (Water)	
	Cooling capacity *3	3000W at 20°C (liquid temperature)	
		2500W at 10°C (liquid temperature)	
	External circulation capacity *4	Maximum lifting range	9.5/13m (50/60Hz)
Maximum flow rate		23.5/27l/min (50/60Hz)	
Functions	Temperature control system	Caterpillar tube capacity exchanging control + Controlling turning on / off cooling machine	
	Setting Temp., display	Sheet key input · digital display, minimum digit 0.1°C	
	Safety device ad function	Electric leakage · excess current breaker, self-testing function for temperature controller, Sensor alarm, over load of cooling machine, high-pressure switch for cooling machine, timer for protecting cooling machine, circulating pump thermal protector	
	Included function	Controlling flow amount function Alarm out function *5 Output terminal for indicator External temperature sensor terminal	Controlling flow amount function Alarm output function *5 Output terminal for indicator External temperature sensor terminal Shutdown switch for emergency case Remote operation terminal
	Optional function	Function for detecting pressure abnormality of circulating water, Function for detecting flow amount decrease of circulating water	
Configuration	Temperature controller	Electronic digital setup · digital display	
	Temperature sensor	Thermistor	
	Cooling machine · cooling medium	Output: 1100W (Rotary) · R407C	
	Circulation pump	Magnet pump output 41/59W (50/60Hz) Maximum flow amount: 27/31l/min, Maximum lifting range 9.5/13m (50/60Hz)	
	Bath	Whole capacity Approx. 16.5t Actual capacity Approx. 14t Material SUS304	
	Cooling coil	Copper (Nickel plate)	
Spec.	External circulating nozzle	Nozzle, Returning nozzle diameter: Rc1/2	
	External measurement	450 (W) (bypass valve+10(W)) x 515 (D) x 1010 (H)	
	Measurement of bath	280 (diameter) x 270 (depth)	
	Rated supply	AC200V single phase 50/60Hz	
	Power source input	10A 2.0 kVA	
	Weight	Approx. 84 kg	

*1 The instrument does not incorporate heater.
Use antifreeze when using the heater at 5⁰C or less.

*2 Conditions

- Room temperature: 20⁰C • Water: 14 L
- Circulation amount: Maximum • Setting: 5 to 35⁰C
- Power source: AC200V 50/60Hz

• Heat load: Cooling capacity: smaller (approx. 90%)/ Cooling capacity: larger (approx. 110%)

• Cooling machine performs ON/OFF operation depending on use conditions (Room temperature, load, type of secondary refrigerant and the condition of stirring in the bath) and the temperature may be out of this range, because the cooling machine protection timer works.

• Cooling machine performs ON/OFF operation when preset temperature is from 4 to 10⁰C, and the temperature may be from ± 2 to $\pm 5^{\circ}\text{C}$ depending on use conditions (Room temperature, load, type of secondary refrigerant and the condition of stirring in the bath), because cooling machine protection timer works.

*3 Condition

- Room temperature: 20⁰C • Circulation flow: maximum • Power supply voltage: AC 200V 50Hz

• Cooling capacity is $\pm 10\%$ of indicated capacity.

• Cooling capacity varies depending on use condition such as room temperature, load, type of secondary refrigerant and the condition of stirring in the bath.

*4 Condition

- Water temperature: 20⁰C
- Power supply voltage: AC 200V 50/60Hz

• Circulation capacity is $\pm 10\%$ of indicated capacity.

• Circulation capacity varies depending on the type of secondary refrigerant and etc.

*5 Alarm output is contact output (a-contact).

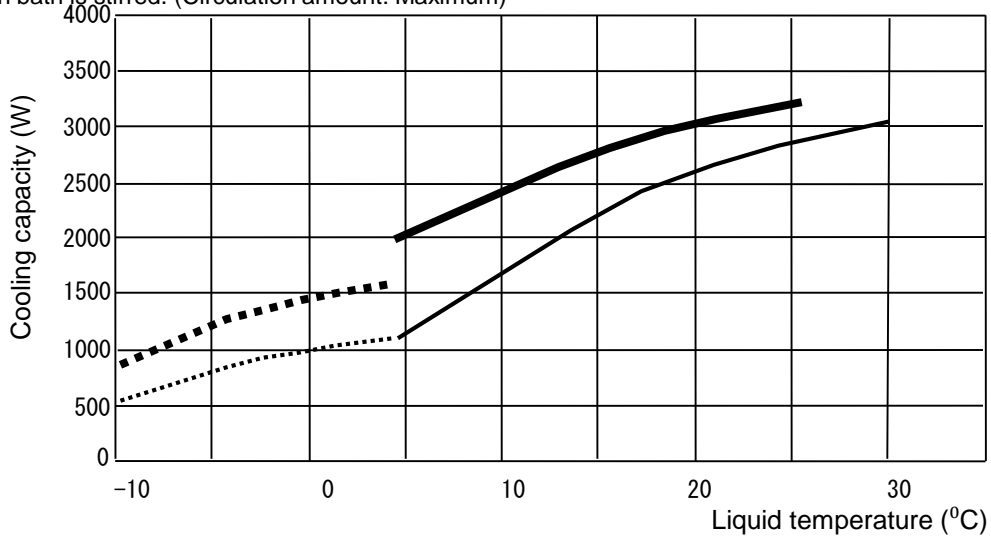
Contact capacity • AC 250V/DC 30V 3A Max.

2-3 Cooling capability curve (Reference)

Conditions

- AC200V 50Hz
- When bath is stirred. (Circulation amount: Maximum)

- Refrigerant : Water, Room temperature :20°C
- Refrigerant : Water, room temperature :35°C
- ⋯ Refrigerant : Ethanol, Room temperature :20°C
- ⋯ Refrigerant : Ethanol, room temperature :35°C



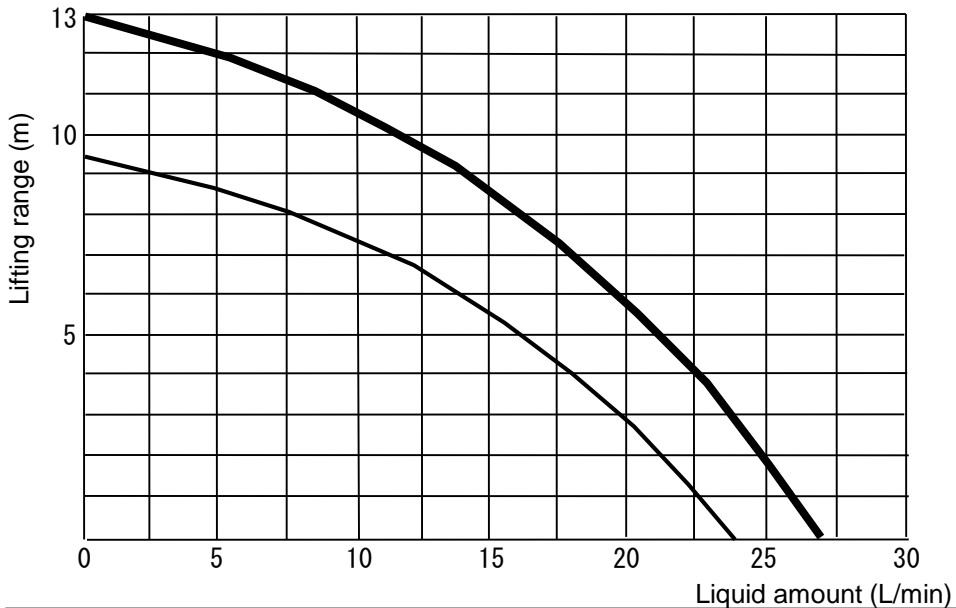
- * Cooling capability change starts when the measured temperature reaches at +4°C.
- * Cooling capability varies depending on use conditions such as room temperature, power supply voltage, type of secondary refrigerant, stirring in the bath and etc.

2-4 Circulation capability

Condition • AC200V 50/60Hz

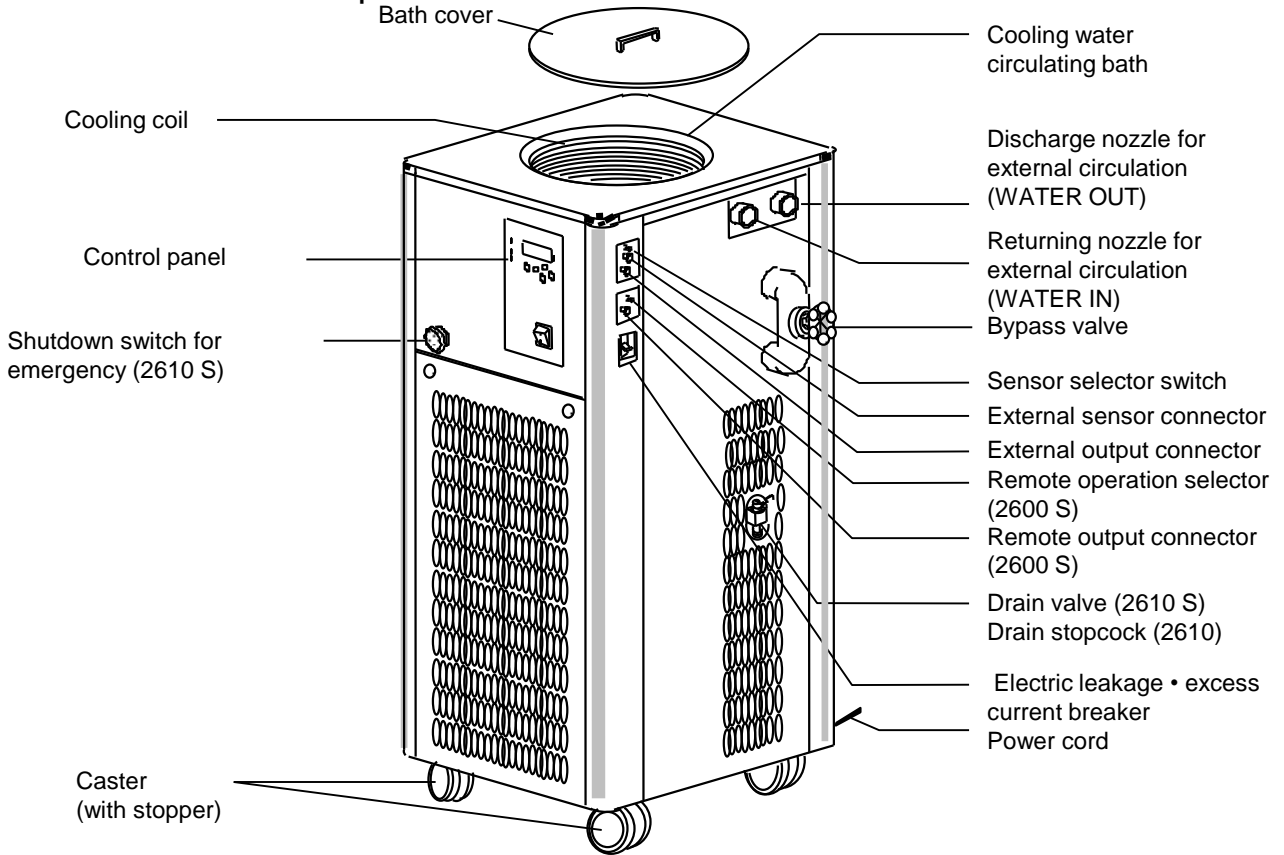
- Circulation liquid: Water Liquid temp.: 20°C

- 60Hz
- 50Hz



- * Circulation capability varies depending on the diameter of discharge nozzle, the condition of piping, the type of secondary refrigerant and etc. In case that the circulation is not sufficient, use high pressure pump HPP, which is one of the options.
- * When the circulation pump performs cutout operation, it may cause malfunction of the pump. For this reason, use bypass valve in order to circulate during operation.

2-5 Name of each part

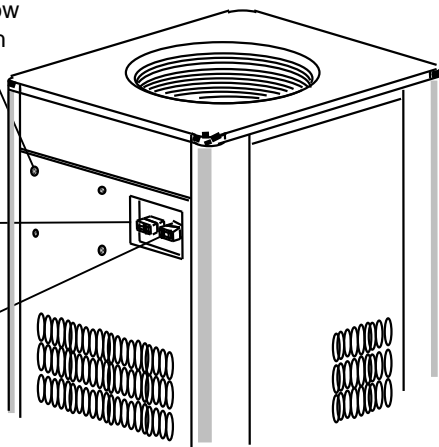


Back side

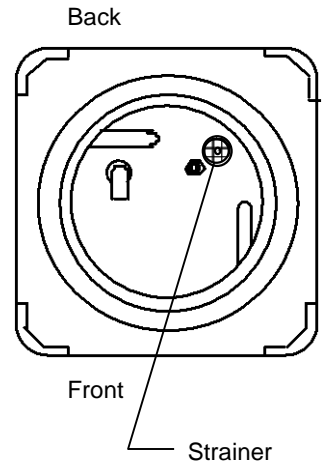
Screws for attaching flow amount/pressure switch (2 screws each)

Connector for flow amount switch

Connector for pressure switch



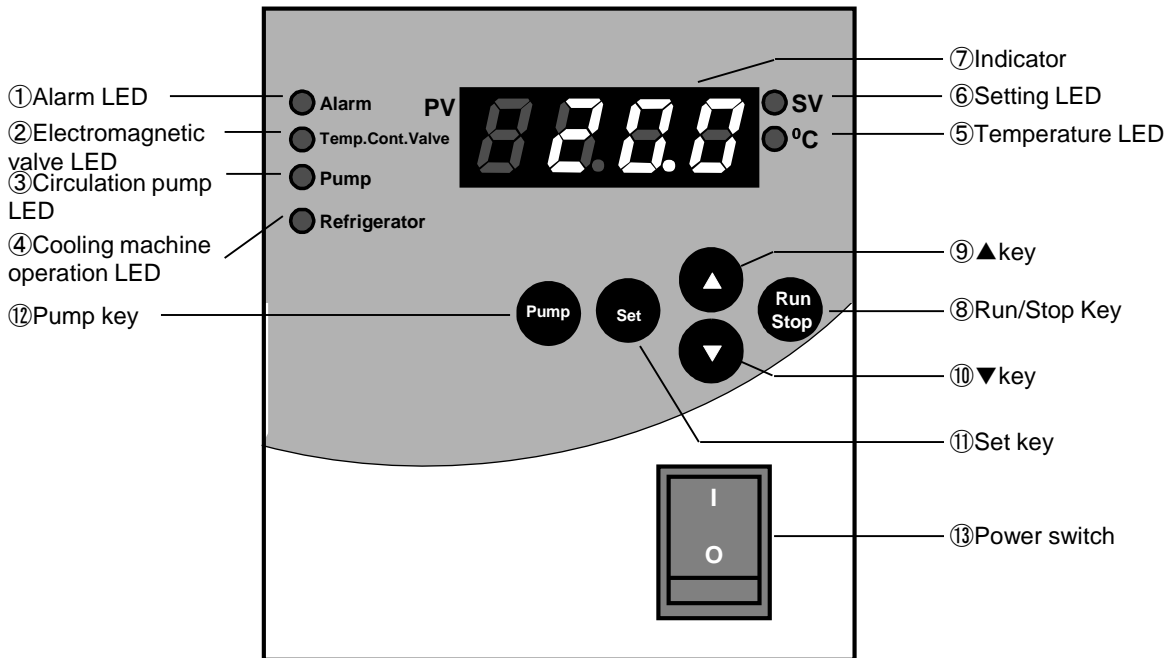
Over head view



3

Name and function of operating portion

3-1 Control panel



No.	Name	Function
①	Alarm LED	Lights up when outputting alarm.
②	Electromagnetic valve LED	Lights up when electromagnetic valve for changing capacity is turned on.
③	Circulation pump LED	Lights up when circulation pump is turned on.
④	Cooling machine operation LED	Lights up when cooling machine is turned on.
⑤	Temperature LED	Lights up when stopping or setting up control. Blinks during control.
⑥	Setting LED	Lights up when the actual temperature is preset one.
⑦	Indicator	Displays temperature, setup character and the description of alarm.
⑧	Run/Stop Key	Starts and stops control.
⑨	▲key	Available only for setup display. If you press the key, the value increases by 0.1. If you hold down the key, the value will be increased continuously. Holding down the key longer than 3 seconds can increase the value by 1.0. In case of control mode, the key changes displaying character.
⑩	▼key	Available only for setup display. If you press the key, the value decreases by 0.1. If you hold down the key, the value will be decreased continuously. Holding down the key longer than 3 seconds can decrease the value by 1.0. In case of control mode, the key changes displaying character.
⑪	Set key	Changes over measured value and preset value. Preset value can be re-set up with "▲ key" and "▼key". Cancels alarm display when displaying alarm and changes to normal display. If you hold down the key longer than 5 seconds, the key changes from normal operation mode to control mode (or from control mode to actual using mode).
⑫	Pump key	Turns ON/OFF circulation pump.
⑬	Power switch	Turns ON/OFF the power.

3-2 Safety · alarm function

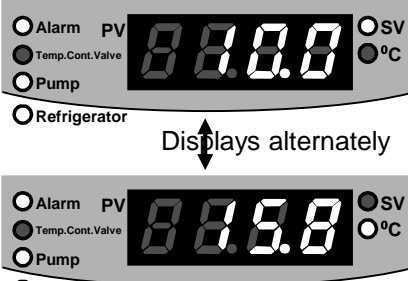
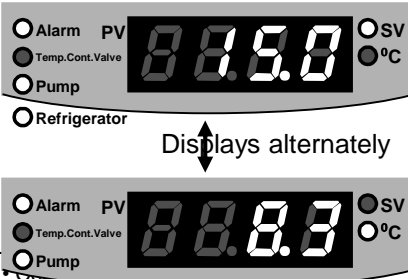
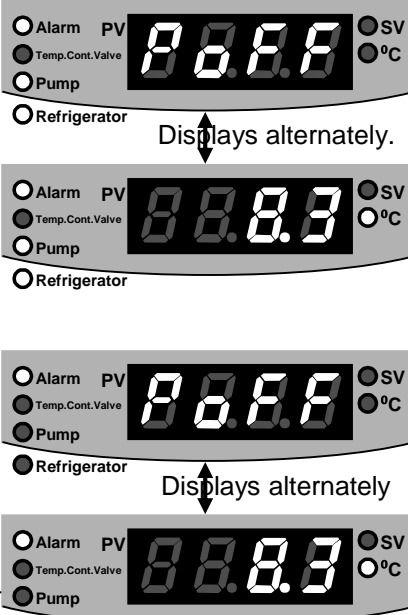
This product is equipped with safety f and alarm display function as below.



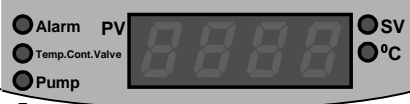
In case of trouble, please refer to "Troubleshooting" on page 32 and follow the appropriate procedure.

Safety functions


Safety device	Operation	Cause of the trouble
Electric leakage breaker	Turned off and cuts the power supply.	Electric leakage occurs. Or excess current flows.
High pressure switch of cooling machine	High pressure during the operation of cooling machine is abnormally high and the device lights up alarm lamp and stops the operation of cooling machine.	<ul style="list-style-type: none"> • Ambient temperature exceeds 35°C. • Heat load is heavier than cooling capacity and the temperature rises in the bath. • Dirt adheres on air filter. • Fan for cooling machine does not work.
Over load relay maintaining circuit of cooling machine.	<p>Due to over load (over heat)operation of cooling machine and etc., the device lights up alarm lamp and stops operation of cooling machine.</p> <p>When it returns to the condition, driving is automatically resumed.</p>	<ul style="list-style-type: none"> • Operating ambient temperature exceeds 35°C. • The switching of the power supply frequency is incorrect. • Power supply voltage exceeds 200 V ± 20 V range. • The refrigerator fans are not running. • Not cooled due to too heavy load. • Dust is attached to the air filter. • Incorrect use of temperature display correction
Circulation pump thermal protector	Circulation pump performs over heat operation and gets stopped. (Will be recovered automatically when it is cooled down.)	<p>Over load operation of circulation pump</p> <ul style="list-style-type: none"> • Viscosity of circulating liquid is high. • Sucks foreign substance. • Ambient temperature exceeds 35°C. • Piping resistance is strong. (Cutout of valve and etc.)
Temperature control self-testing function	Temperature controller does not work properly and lights up alarm lamp, and stops all the controls. Will be recovered automatically after sorting out the trouble.	<ul style="list-style-type: none"> • Temperature controller does not work properly because of noise and etc. • Ambient temperature exceeds 35°C.

Alarm function

Alarm name	Alarm display and operation	Reasons why alarm works
<p>Maximum temperature alarm</p>	<ul style="list-style-type: none"> • Continues to control • Buzzer beeps for 15 seconds. • Alarm display 	<p>Operation conditions Alarm works when the temperature in the chamber is higher than "Preset temp. + maximum preset temperature for alarm ." temporary. (Maximum preset temperature for alarm is at 10.0 °C at factory default.)</p> <p>Canceling alarm</p> <ul style="list-style-type: none"> • Alarm is canceled when measured temperature reaches within the range of "Preset temp. + Maximum preset temperature for alarm" temporary. • Alarm can be canceled by [Set] key. <p>* Maximum preset temperature for alarm can be changed. (Please refer to "How to operate maximum preset temperature for alarm" on page 19.)</p>
<p>Minimum temperature alarm</p>	<ul style="list-style-type: none"> • Continues to control. • Buzzer beeps for 15 seconds. • Alarm display 	<p>Operation condition Alarm works when the temperature in the chamber is lower than "Preset temp.-minimum preset temperature for alarm" temporary. (Minimum preset temperature for alarm is at 5.0 °C at factory default.)</p> <p>Canceling alarm</p> <ul style="list-style-type: none"> • Cancels alarm automatically when measured temperature is within the range of "Preset temp. – minimum preset temp. for alarm". • Alarm can be canceled by [Set] key. <p>* Minimum preset temperature for alarm can be changed. (Please refer to "How to operate minimum preset temperature for alarm" on page 20.)</p>
<p>Blackout alarm</p> <p>* 2610 S is not output.</p>	<p>depending on setting for power recovery.</p> <ul style="list-style-type: none"> • Display for continuing control <p>・制御継続時の表示</p> 	<p>Operation condition Alarm works when blackout occurs during control (power was cut off without stopping control).</p> <p>Canceling alarm Can be canceled by [Set] key.</p> <p>* Operation after power recovery can be changed. (Please refer to "How to set up power recovery" on page 21.)</p>

Alarm name	Alarm display and the description of operation	The reason why alarm works.
Alarm for cooling machine	<ul style="list-style-type: none"> Stops control and circulation pump. Buzzer beeps for 15 seconds. Alarm display. 	<p>Operation condition</p> <p>High pressure switch for cooling machine works Or the refrigerator circuit protector operated.</p> <p>Canceling alarm</p> <ul style="list-style-type: none"> Alarm can be canceled by [Set] key if high pressure switch is recovered.
Sensor alarm	<ul style="list-style-type: none"> Stops control and circulation pump. Buzzer beeps for 15 seconds. Alarm display 	<p>Operation condition</p> <ul style="list-style-type: none"> Internal sensor broken. Sensor selector switch is on "OUT" side when internal sensor controls. Or external sensor connector is disconnected. <p>Canceling alarm</p> <ul style="list-style-type: none"> Turn off the power switch once and cancel the alarm by [Set] key.
Watch dog	<ul style="list-style-type: none"> Reset microcomputer and try to restart the control. Stops control if microcomputer will not be back in normal status. Alarm display (undetermined) 	<p>Operation condition</p> <ul style="list-style-type: none"> Temperature controller does not work properly because of noise and etc. Ambient temperature exceeds 35°C. <p>Canceling alarm</p> <ul style="list-style-type: none"> Change environment and power source before operation.

Alarm function (Option)

Alarm name	Alarm display and the description of operation	The reason why alarm works.
Alarm for abnormal pressure of circulation water	<ul style="list-style-type: none"> Stops control and circulation pump. * The refrigerator will continue to control. Lights up alarm lamp of the main part of the switch. Buzzer beeps for 15 seconds. Alarm display 	<p>Operation condition</p> <p>Pressure of circulation water reaches at preset value of pressure switch.</p> <p>Canceling alarm</p> <ul style="list-style-type: none"> Turn off the power switch once and cancel the alarm by [Set] key.
Alarm for lowering flow amount of circulating water		<p>Operation condition</p> <p>Flow amount of circulation water reaches at the preset value of flow amount switch.</p> <p>Canceling alarm</p> <ul style="list-style-type: none"> Turn off power source switch once and cancel the alarm by [Set] key.

4-1 Setup environment

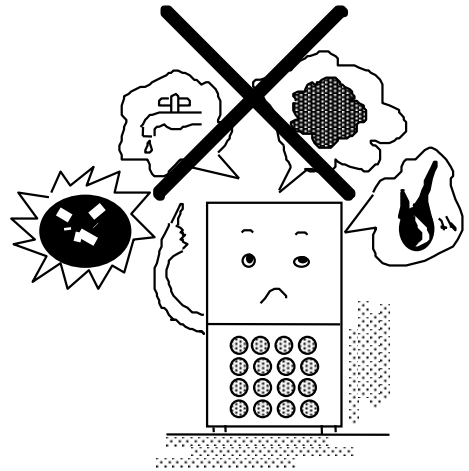
 CAUTION

Be careful of setup environment.
Especially, care should be taken on setup location, air conditioning and ventilation.

Due to the utilization of air-cooling system cooling machine, heat is exhausted from the unit. Use the product at the location where is with good ventilation and conditioning for preventing ambient temperature from rising high.

If the ambient temperature rises high, the operation efficiency will be worsened, which will lower the cooling capacity as well. Also, high temperature and high pressure operation of cooling machine may cause breakdown.

- No direct sunlight.
- Range of ambient temperature is from 5 to 35°C.
- Good ventilation and air-conditioning or the location which can be ventilated well.
- No inflammable solid, liquid and gas around the unit.
- No dew condensation
- Fewer humidity and dripping
- Fewer dust
- Even and stable
(Check the weight of the product during operation)
- Please use indoors.



4-2 Setup conditions

 CAUTION

Making enough space around the unit.

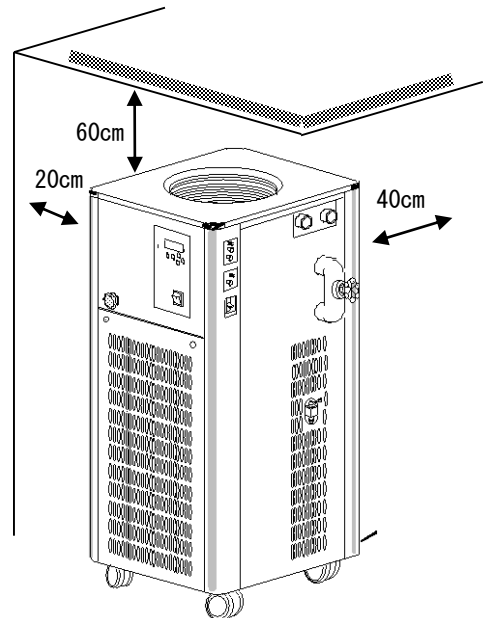
To maintain the function of the product, leave the space between the product and wall surface and ceiling plane. Space should be larger than the one shown on the right picture.

 CAUTION

Do not put anything on the top of the product.

 CAUTION

Heavy weight product -
Attention needs to be paid to carry.
CA-2610, 2610 S Approx. 84kg



* Keep enough piping space on the right side.
Do not block airflow orifice.

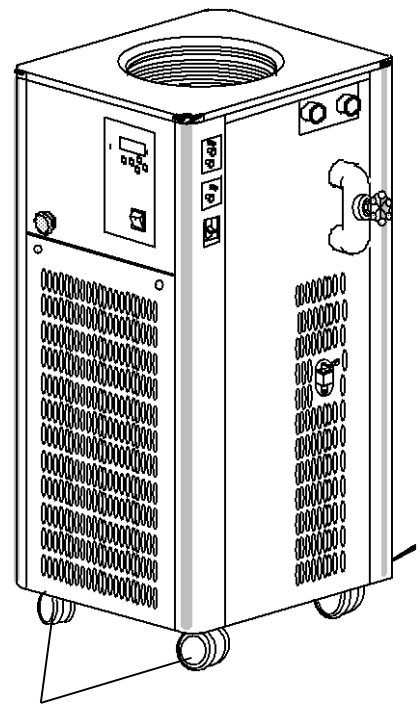
4-3 Setup

 **CAUTION**

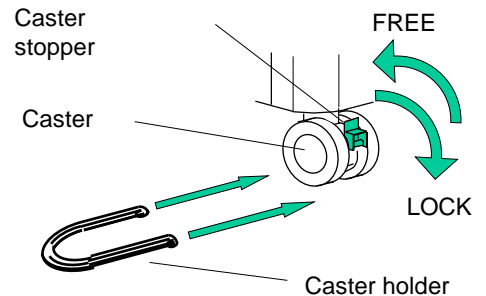
Do not tilt the main unit more than 15° .

Cooling machine is equipped with the main unit.
Do not lay the main unit down nor tilt more than 15° when carrying.

- 1) Cancel the lock of caster's stopper.
To cancel the lock, push up the lever of caster's stopper.
- 2) Move it to setup location.
* Moving the unit on uneven or bumpy place may damage the caster. Please carry it when going through these places.
- 3) Lock caster's stopper at setup location.
To lock the stopper, push up the lever of caster's stopper.
- 4) Slide attached caster holders (4 pcs) into the right beside of the body. Stop the rolling and circling of caster and fix with these holders.



Caster with stopper



4-4 Utility connection

WARNING

Check the voltage, phase and capacity of power source.

Wrong connection may cause fire or electric shock.

WARNING

Do not use branching socket and power strip..

Current excess may burn cable or cause fire.

WARNING

Connect earth cable properly.

Do not connect earth cable to gas pipe or water pipe for preventing electric shock.

WARNING

Connect earth cable correctly.

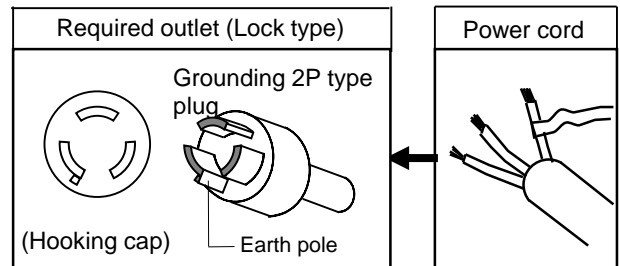
To prevent electric shock accidents, never connect the ground wire to the gas pipe or water pipe.

- (1) Check the voltage, phase and capacity of power source connecting to the product.
The power supply to connect the product is as shown on the right.

Product Model	Required power source	
	Voltage	Capacity
CA-2610,2610 S	AC 200V Single phase	15A

* If the power supply capacity is low during start-up and operation of the refrigerator, the power supply voltage drops, leading to start-up failure, overcurrent, etc.

- (2) Mains connector is not attached.
Direct wiring with distribution board or connect to lock-type outlet as shown on the picture.
In the absence of grounding, consult with an electrical work vendor and provide grounding based on the type D grounding work.



Power cord specification

Cable		Tip treatment	Cable cross section	Connection (Color)		
Length (approx.)	Thickness (Outer diameter)			L	N	E
CA-2610	3m	No plug (Peel off the tip only)	2.0mm ²	Black	White	Green
CA-2610S	10m					

5-1 Preparation for operation

**WARNING**

Use extreme care when using inflammable or combustible solution.

If inflammable or combustible solution (ethanol and etc.) is left higher than room temperature (or lower than room temperature for some solutions), it may evaporate, catch fire.

**CAUTION**

Use circulating liquid that does not affect the material of circulating route.

Material of circulating route of the unit is made of copper (coating), stainless, brass, Teflon, vinyl chloride, POM, silicon rubber, denatured PPO and ethylene-propylene rubber. Use circulation liquid that does not affect these materials.

1. Connecting to pipe and hose

(1) Screw hexagon nipple into the side of discharging cooling water (OUT).

(Hexagon nipple and hose joint are rolled up with tape.)

(2) Screw flow amount controlling valve into hexagon nipple.

(3) Connect hose joint to the socket on the returning cooling water side (IN) and flow amount controlling valve.

(4) Connect hose (internal diameter: 15mm) both on the returning cooling water side and discharging cooling water side. Fix the hose tightly with hose belt and etc. (Hose and hose belt are not included in the package)

* Use the hose that is made of the materials, which have appropriate pressure and heat-resistant for preventing it from being affected by solution.

* Operating in low temperature range will form frost on the piping block and worsen the cooling capacity depending on the length of the pipe. Protect the pipe with using the tape and etc. for the purpose of keeping the proper condition.

**WARNING**

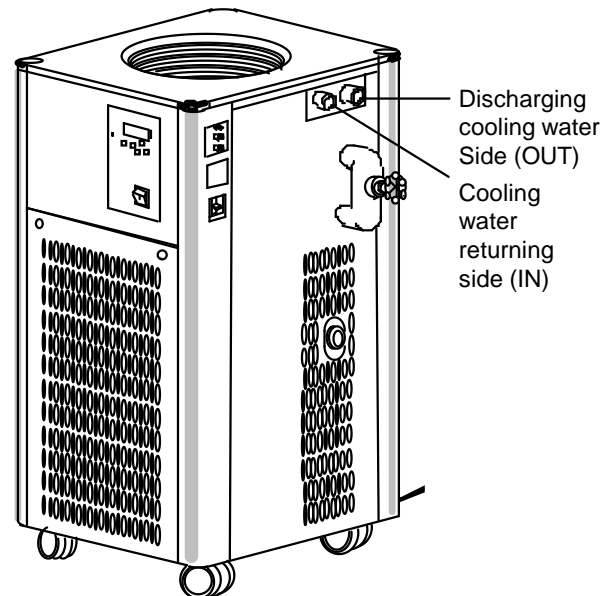
Do not shorten the piping diameter or extend the length of hose.

Do not use the hose joint of which its inner diameter is less than 9mm when the using hose joint differing from the attached one. Also, use hose with its minimum necessary length.

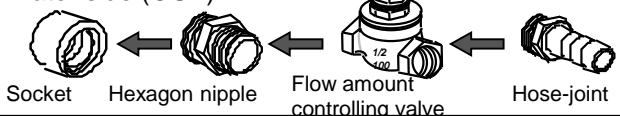
**CAUTION**

Do not use pure water.

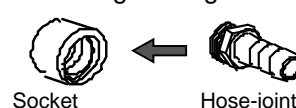
Please use tap water or softened tap water. Do not use ultrapure water or ion exchange water. It dissolves carbon dioxide in the air and turns into an acidic solution, making it easier to corrode metals in the circulation path. Failure of the cooling coil pinhole and circulation pump, etc. may cause trouble.



Discharging cooling water side (OUT)



Returning cooling water side (IN)



Using the unit as a low temperature bath

When using this unit as a low temperature bath, connect bypass hose to the nozzle of discharging cooling water side and returning cooling water side.

If you turn on circulation pump switch in this condition, bath will be stirred and cooling capacity will not be worsen.

Fix the hose with hose belt tightly.
(Hose and hose belt are not included.)

* Liquid will be flowed out from the returning side in case that the flow amount controlling valve is closed without connecting bypass hose.

2. Filling cooling water

(1) Check whether the drain stopcock is off from drain hose when using model 2610, and check whether the drain is "OPEN" when using model 2610 S.

(2) Pour water (approx. 14ℓ) into cooling water circulating bath until whole cooling coil is almost soaked.

* Use antifreeze liquid when using the bath lower than +5°C. However, do not use 100% of concentration of ethylene glycol or glycol -group refrigerant, because the viscosity gets higher in low temperature area and flow amount gets lesser, also the safety unit (refer to page 7) of circulating pump starts working. (Since the freezing temperature differs depending on concentration, check the temperature range of the antifreeze liquid.)

* When using water at the temperature approx. +5°C, it will be frozen on the pipe and worsen the cooling capacity.

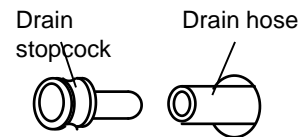
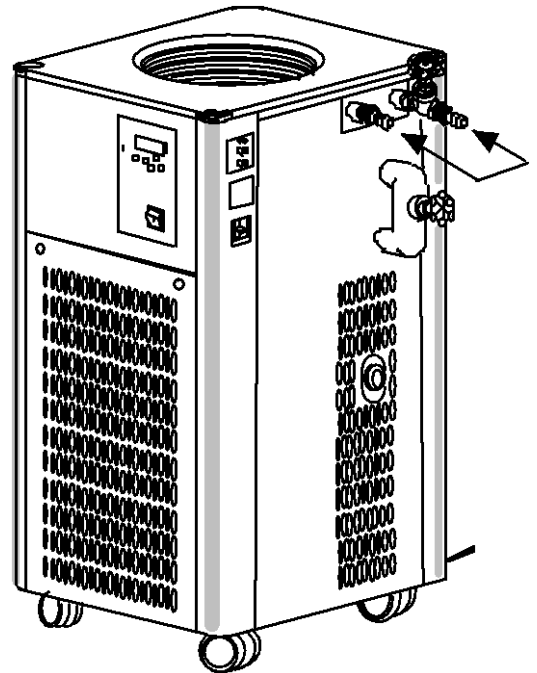
* Do not use the liquid that includes foreign substance. It may cause breakdown.

(3) Check whether discharging amount controlling valve is "CLOSE".

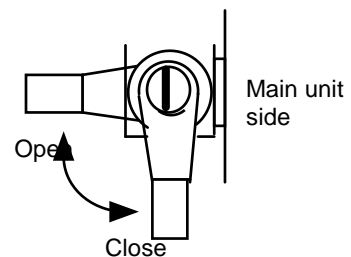
(4) Put bath cover on the main unit depending on use condition.

3. Connecting mains connector

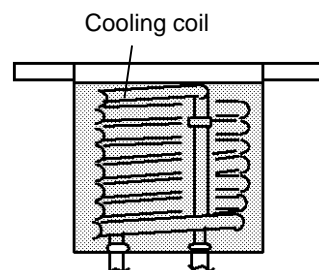
Plug mains connector into the outlet after checking the power switch is OFF. When not using the power plug, connect directly to the main power supply.



Drain stopcock for 2610




Drain valve for 2610 S



Water level of cooling water circulating bath

5-2 How to operate

Turn on electric leakage, excess current and power switch. Measured temperature of the cooling circulation bath will be indicated after the initial display (5 seconds) (Measurement mode).

* Product-specific alphabets and numeric values are displayed in “”.

1. Setting up temperature

Preset temperature can be changed even when the machine gets controlled or stops.

1) Setting up temperature (Setting mode)

Press [Set] key. Indicator changes to display (blinking) temperature and your desired temperature can be set.

• “Setting up LED (SV)” lights up.

* Temperature is set as the value you preset last time. Factory default value is 10.0°C.

2) Changing preset temp.

Input your desired temperature with [▲] and [▼] key.

* Every press of [▲] and [▼] key increases/decreases by 0.1°C. If you hold down the key, the value will be changed continuously, and if you hold down the key for longer than 3 seconds, the value will be changed by 1.0°C.




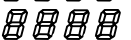

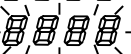
3) Confirming preset temperature

[Press [Set] key. Displayed temperature (blinking) is confirmed and indicator changes to show measured temperature display.

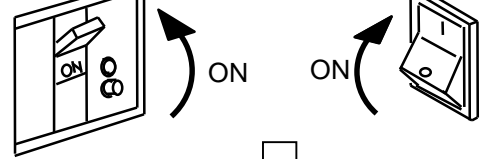
• “Setting LED (SV)” lights off.

* If no key operation is done for more than 1 minute during setting temperature, the indicator changes to show measured temperature display. In this case, please follow the same procedure again from 1) to reset.

* LED status

 , “” Lights off
 , “” Lights up
 , “” Blinks

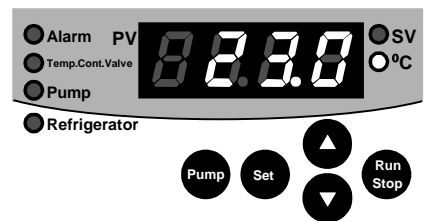
Electric leakage • excess current breaker Power switch



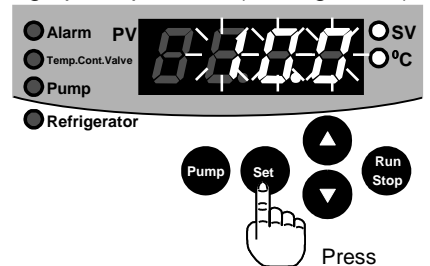
Initial display



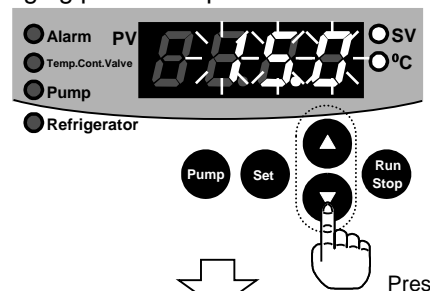
After showing initial display for 5 seconds, measured temp. will be displayed.



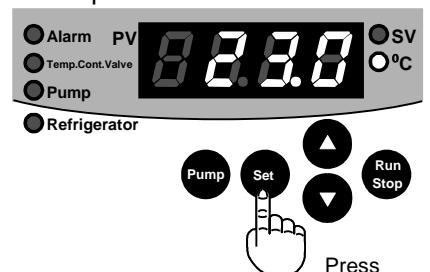
1) Setting up temperature (Setting mode)



2) Changing preset temp.



3) Confirming and deciding preset temperature



2. Starting operation

1) Starting temperature control

Press [Run/Stop] key. Temperature control will be started.

- "Temperature LED (°C)" blinks.
- "Electromagnetic valve LED (Temp.Cont.Valve)" lights up when electromagnetic valve for controlling temperature is turned on.
- Cooling machine is turned on when the temperature reaches at preset temperature +0.5°C. "Cooling machine LED (Refrigerator)" lights up when the cooling machine is ON. The machine is turned off when measured temperature is approx. -1.5°C lower than preset temperature, and "Cooling machine LED (Refrigerator)" lights off.

* Protection timer for cooling machine works for 180 seconds. The cooling machine does not re-start up for 180 seconds after the machine gets stopped temporarily.

*** At the time of starting the cooling machine and adjusting the temperature, the operation sound of the solenoid valve for switching the cooling capacity is "clicked", but it is not abnormal.**

2) Operating circulating pump

Press [Pump] key. Circulating pump starts working. Gradually open the flow control valve when the pump is activated to begin circulation to the outside.

- "Pump LED (Pump)" lights up.

* Circulating pump does not operate simultaneously with [Run/Stop] key.

3) Open bypass valve so that the bath can be stirred. Please open the bypass valve enough to stir inside the tank.

4) Adjustment of flow adjustment valve

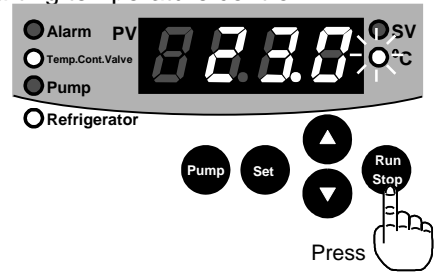
Open valve for controlling flow amount little by inches. It starts circulating externally. Make sure that there's no leak at the connecting part of the hose.

* If circulating pump operates without closing bypass valve and valve for controlling flow amount, the pump may be broken down. Also, in case that the circulation system may be blocked off, set bypass valve "OPEN" to perform stirring in the bath and control the valve for controlling flow amount for avoiding trouble.

* When supplying water to circulation system, the water level of cooling water circulating bath is lowered. In case that the cooling coil is exposed, fill the cooling water.

* When using water, it may be frozen over cooling coil depending on preset temperature if stirring was not performed in the bath properly. In this case, set more amount for circulation of bypass valve. Use antifreeze if freezing amount is huge.

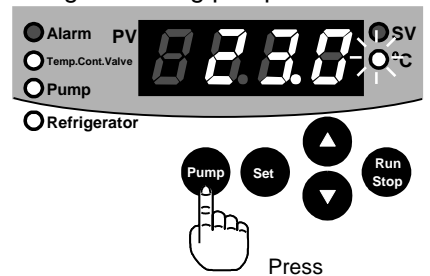
1) Starting temperature control.



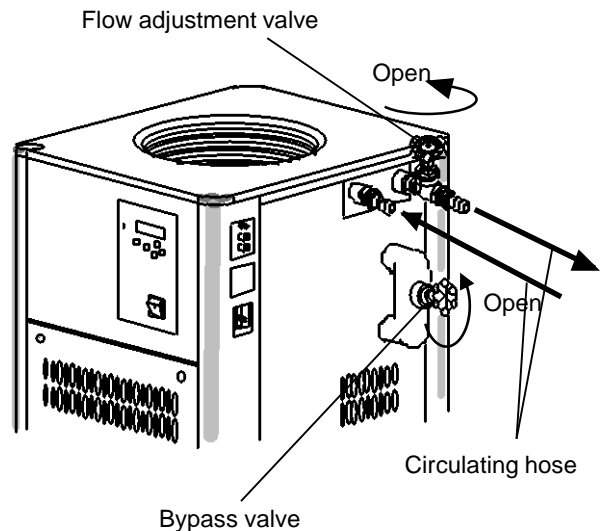
Cooling machine protection timer function

Once the cooling machine stops, it will not operate for about 180 seconds from stop even if the measured temperature is higher than the set temperature by about 0.5 °C.

2) Operating circulating pump



3) Adjustment of flow adjustment valve



3. Stopping operation

1) Stopping temperature control operation

Press [Run/Stop] key. Operation gets stopped.

- Blinking 「Temp.LED (°C)」 turns to light up.
- Solenoid valve LED (Temperature control valve) goes out.

“Cooling machine LED (Refrigerator)” goes out.

2) Stopping circulating pump

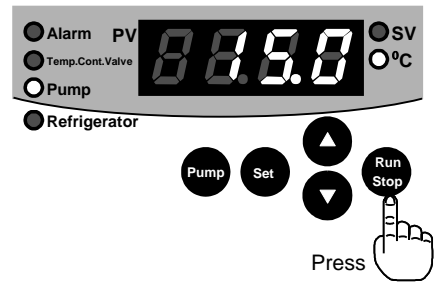
“Pump LED (Pump)” lights off.

*If you would like to stop operation, turn off power switch after stopping operation. Turing off the power without stopping operation will occur blackout alarm at the next operation. (only for 2610)

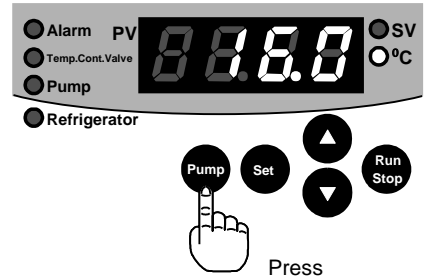
* If you do not use the instrument for a long time, turn off power switch, electric leakage and excess current breaker. Moreover, unplug the mains connector.

* Drain water tank, piping and circulation pump.

1) Stopping operation



2) Stopping circulating pump



5-3 How to operate control mode



Caution

Temperature indication correction should be performed within the range of -5.0°C to 5.0°C . The setting can be done in the range of -20.0°C to 20.0°C , but do not set it beyond -5.0 degrees C \sim 5.0 aspect C. If you use beyond the range of use, it may cause refrigerator stoppage, refrigerator alarm (**oHt**) to occur, unexpected accident depending on usage conditions etc.

1. How to compensate displaying temperature

This function compensates the displayed temperature when the temperature measured by thermometer differs from the value of the indicator.
 * Do not use this function by setting up the value beyond the range of available temperature, which may cause breakdown.

Setting up compensating displayed temperature

1) Change to control mode

Hold down [Set] key longer than 5 seconds. Then, the display changes to control mode and displays "S.S.S.S" before changing to compensating displayed temperature mode.

• "Temp.LED ($^{\circ}\text{C}$)" lights off.

2) Change to temperature compensating mode

Press [Set] key.

Indicator displays (blinks) the temperature compensated by the function of compensating displayed temperature.

* Compensating temperature (blinking) is set up as the value you used last time. Factory default value is 0°C .

3) Change the compensated temperature

Press [\blacktriangle] and [\blacktriangledown] key to input compensating temperature.

Every press of [\blacktriangle] and [\blacktriangledown] key increases/decreases the value by 0.1°C . If you hold down the key, the value will be changed continuously.

4) Confirm the compensated temperature (Change to alarm mode for maximum temperature)

Press [Set] key. Displaying (blinking) compensated temperature is confirmed and decided. Then, "S.S.S.S" will be displayed on the indicator and the display will change to alarm mode for maximum temperature.

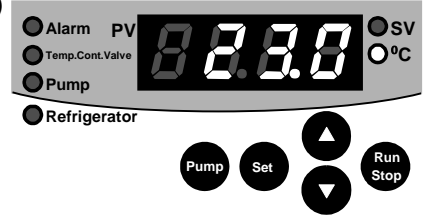
* Compensated temperature is not available until you press [Set] key.

* When changing other control mode

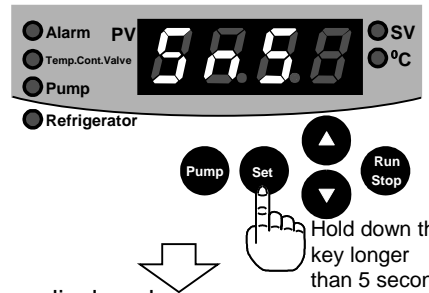
Set the mode by pressing [\blacktriangle] and [\blacktriangledown]. * When you do not need to change other control mode, hold down [Set] key longer than 5 seconds. Indicator returns to "measured temperature" display.

* No key operation for more than 1 minute during setting up will return to the display of measured temperature. In this case, please reset up from the operation 1).

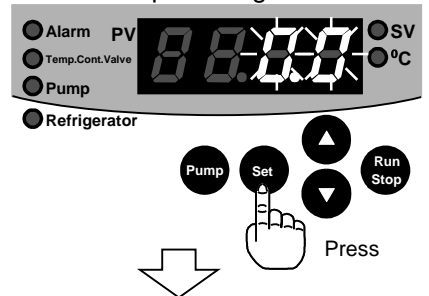
Measured temperature display (Measurement mode)



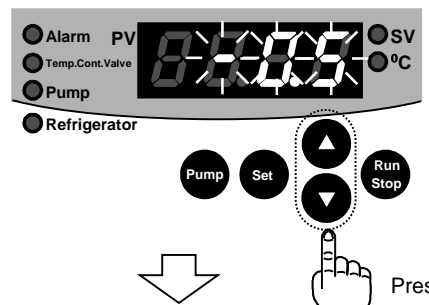
1) Change to control mode



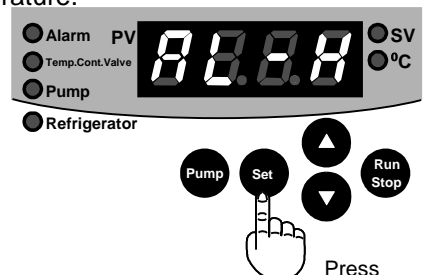
2) Set up displayed temperature compensating mode



3) Set up compensated temp.



4) Confirm and decide compensated temp. Change to alarm mode for maximum temperature.



2. How to operate alarm for maximum temperature

Detecting temperature of alarm for maximum temperature can be changed.

* Since alarm for maximum temperature tends to occur, do not set up the temperature within the range of 5.0°C.

Setting up alarm for maximum temperature

1) Change to control mode

Hold down [Set] key for more than 5 seconds. The display changes to control mode and "5.5.5" shown on indicator, and then display will be compensating displayed temperature mode.

• 「Temp. LED (°C)」 lights off.

2) Change to alarm mode for maximum temperature

Press [▲] key and display alarm mode for maximum temperature "8.8.8"

3) Set up alarm mode for maximum temp

Press [Set] key.

Indicator changes to display (blink) preset temperature for alarm for maximum temperature.

* Preset temperature (blinking) was set up as the value you used last time. Factory default value is 5.0°C.

4) Change of the preset temperature of the upper limit temperature alarm Press [▲] and [▼] key to input temperature.

Every one press of [▲] and [▼] key increases /decreases 0.1°C. If you hold down the key, the value will be changed continuously.

5) Confirmation of the upper limit temperature alarm (Change to lower limit temperature alarm)

Press [Set] key. Displayed (blinking) preset temperature is confirmed and decided.

"8.8.8" will be shown on indicator and the display will change to alarm mode for minimum temperature.

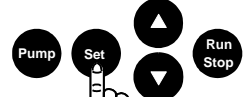
• Changed preset temperature will not be available until you press [Set] key.

* When you would like to change to other control mode, change and select the mode by pressing [▲] and [▼] key.

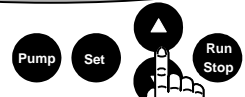
* When you do not need to change to other control mode, press [Set] key for more than 5 seconds. Indicator will show "measured temperature" again.

* The display will be back to "measured temperature" if no key operation is done for more than a minute during setting up. In this case, please follow the procedure from 1) to reset.

1) Change to control mode.



2) Change to alarm mode for maximum temperature



Hold down [Set] key for longer than 5 seconds

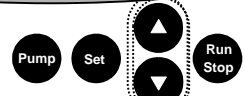
Press once

3) Set up alarm mode for maximum temp.



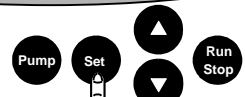
Press

4) Change of the preset temperature of the upper limit temperature alarm



Press

5) Confirm and decide the temperature for alarm. Change to alarm mode for minimum temp.



Press

3. How to operate alarm for minimum temperature

Detecting temperature of minimum temperature for alarm can be changed.

* Since alarm for minimum temperature tends to occur, please do not set the temperature within the range of 5.0°C.

Setting up alarm for minimum temperature

1) Change to control mode

Press [Set] key for more than 5 seconds. The display will change to control mode. "SAS" will be shown on indicator and the display will change to compensating displayed temperature mode.

• "Temp. LED (°C)" lights off.

2) Change to alarm mode for minimum temp. Press [▲] key twice and display alarm for minimum temperature "88.88".

3) Set up alarm mode for minimum temperature

Press [Set] key.

Indicator changes to display (blink) preset temperature of alarm for minimum temperature.

* Preset temperature (blinking) is set as the value you used last time. Factory default value is 5.0°C

4) Change the preset temperature of the alarm for minimum temp.

Every one press of [▲] and [▼] key increases/decreases by 0.1°C. If you hold down the key, the value will be changed continuously.

5) Confirmation of the alarm for minimum temperature (Change to recovery setup after blackout)

Press [Set] key. Displayed (blinking) temperature is confirmed and decided. "88.88" will be displayed on indicator and the display will change to setting up recovery mode for blackout.

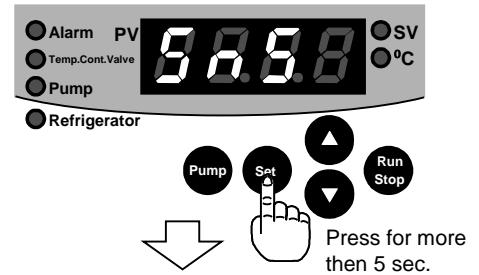
* Changed temperature will not be available until you press [Set] key.

* When you would like to change to other control mode, press [▲] and [▼] and select the mode.

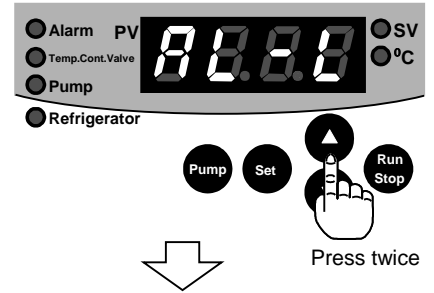
* When you do not need to change to other control mode, press [Set] key for more than 5 seconds. Indicator will show "Measured temperature" once again.

* The display will be back to "Measured temperature" if no key operation is done for more than 1 minute during setting up. In this case, please follow the procedure from 1) to re-start.

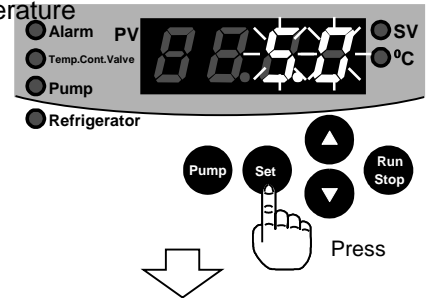
1) Change to control mode



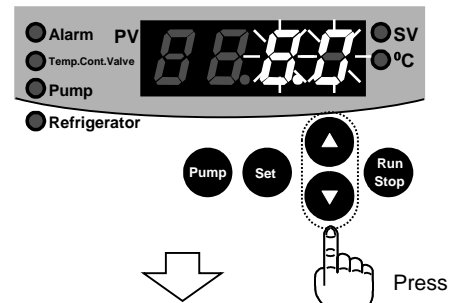
2) Change to alarm mode for minimum temp.



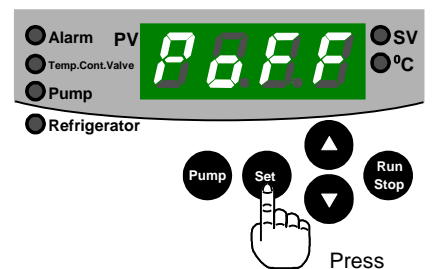
3) Set up alarm mode for minimum temperature



4) Set up temperature for alarm



5) Confirming and decide the temperature for alarm. Change to setup mode for recovery after blackout.



*** 2610 S type cannot be set for recovery after blackout.**

4. How to operate recovery setup after blackout

In case of blackout (including the case of turning off power switch without stopping control), the operation after the recovery of the unit can be selected.

Setup for recovery from blackout

1) Change to control mode.

The mode will change to control mode and "58.58" will be shown on indicator. Then, the mode will change to compensating displayed temperature mode.

- "Temp.LED (°C)" lights off.

2) Change to recovery setup for blackout.

Press [▼] key and display recovery from blackout mode "88.88".

3) Set up recovery mode for blackout

Press [Set] key.

Indicator changes to display (blink) setup character to set up recovery from blackout.

* Setup character (blinking) was set up as the value you used last time. Factory default character is "8888".

4) Change recovery setup for blackout

Press [▲] and [▼] key and select setup character.

* Setup character changes as follow.

"8888" : Continues controlling (Pump operation also continues working)

[▲] ↓ [▼]

"8888" : Stops control (Stops pump operation)

[▲] ↓ [▼]

"8888" : Continues controlling. (the same operation for "8888")

5) Press [Set] key. Setup character (blinking) is decided and "58.58" will be shown on indicator and the display will change to compensating displayed temperature mode.

* Setup character will not be available until you press [Set] key.

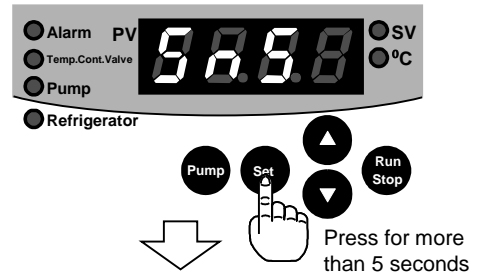
* When you would like to change to other control mode, press [▲] and [▼] key to select a mode.

* When you do not need to change to other mode, press [Set] key for longer than 5 seconds.

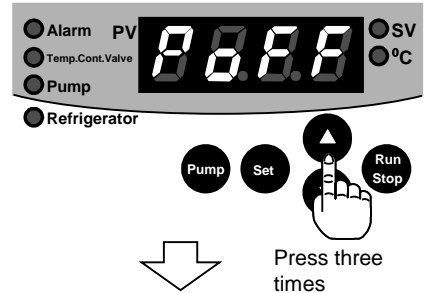
Indicator will display "measured temperature" again.

* The display will be back to "measured temperature" if no operation has been done for more than a minute. In this case, please follow the procedure from 1) to re-set.

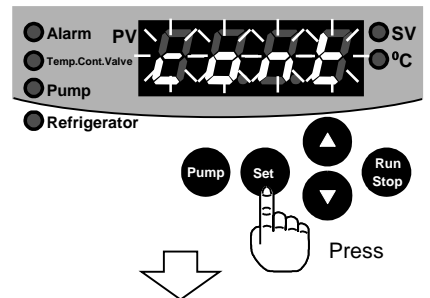
1) Change to control mode.



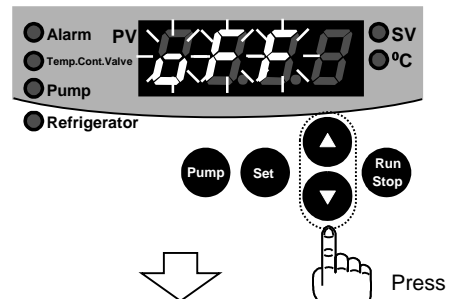
2) Change to recovery setup for blackout.



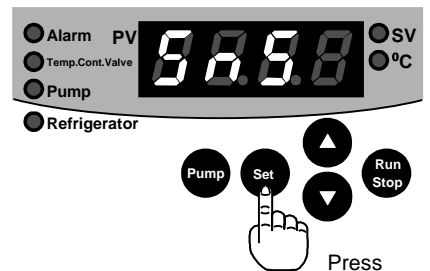
3) Set up recovery mode for blackout.



4) Change recovery setup for blackout



5) Confirm and decide recovery setup for blackout. Change to compensating displayed temperature mode.



6-1 Sealing up cover (Circulation to open system)

With "Sealing up cover", which is one of the options, circulation to open system can be performed.

* Hose joint, which is attached to sealing up cover, is not used in this unit.

(1) Set up sealing up cover into circulation bath and turn on electric leakage / excess current breaker, power switch, Run/Stop key and pump key switch.

(2) Open discharge flow amount controlling valve by inches.

- When water level lowers down in the circulation bath and the space is evacuated, sealing up cover will be fixed.
- Liquid circulates from external open bath.

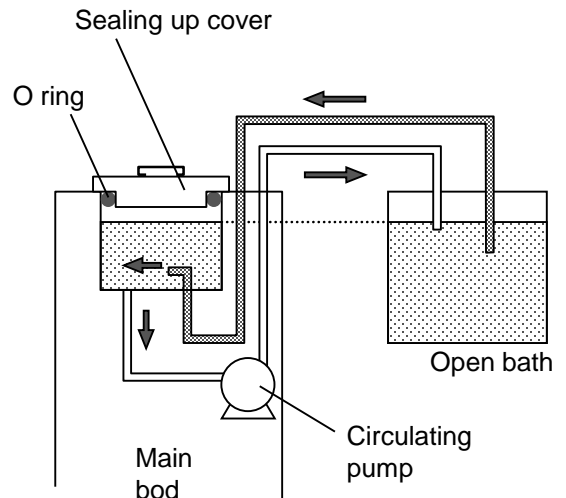
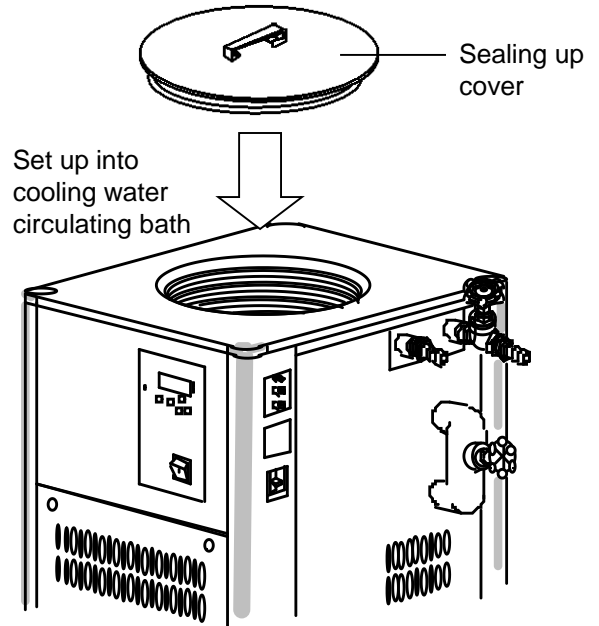
(3) Control the circulation amount while checking the water level of external open bath.

* Control the height of water level of main unit and external open bath for preventing the liquid from overflowing or the water level from lowering down when the instrument gets stopped. Liquid may not return when the status is imbalance.

* Put both ends of hose into external open bath and fix it tightly.

* Circulation can not be performed when the open bath is pressurized even slightly. or depressurized.

Product name	Sealing up cover
Cat. No.	112780



6-2 High pressure pump Model HPP

With using "High pressure pump Model HPP", which is one of the options, circulation to circulation system that has huge pressure loss can be performed. Specific base is required when attaching with pump. For more detail, please refer to its instruction manual.

It cannot be used with optional flow switch (P.27), pressure switch (P.24), remote control lead wire (P.31).

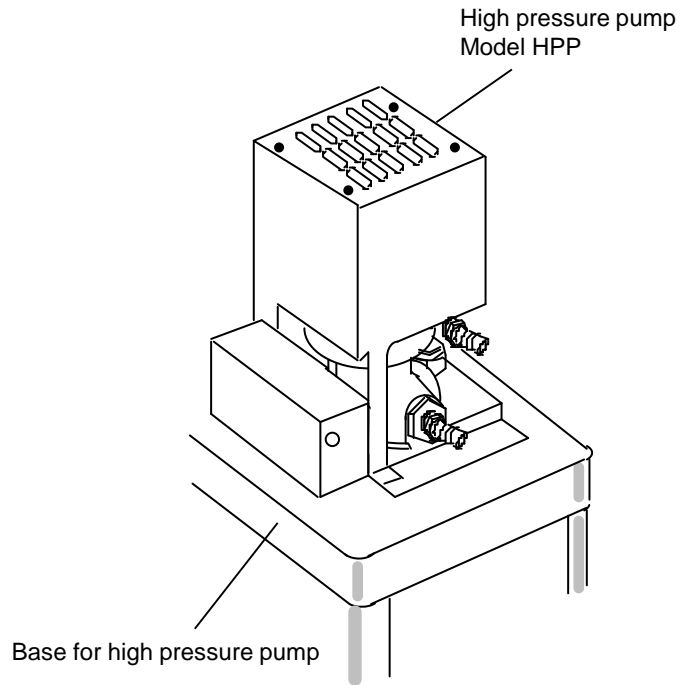
■ High pressure pump Model HPP

Model	Material	Voltage	Cat.No.
HPP-1100	SUS	AC100V	158750
HPP-2100	SUS	AC200V 3-phase	158770

■ Base for high pressure pump

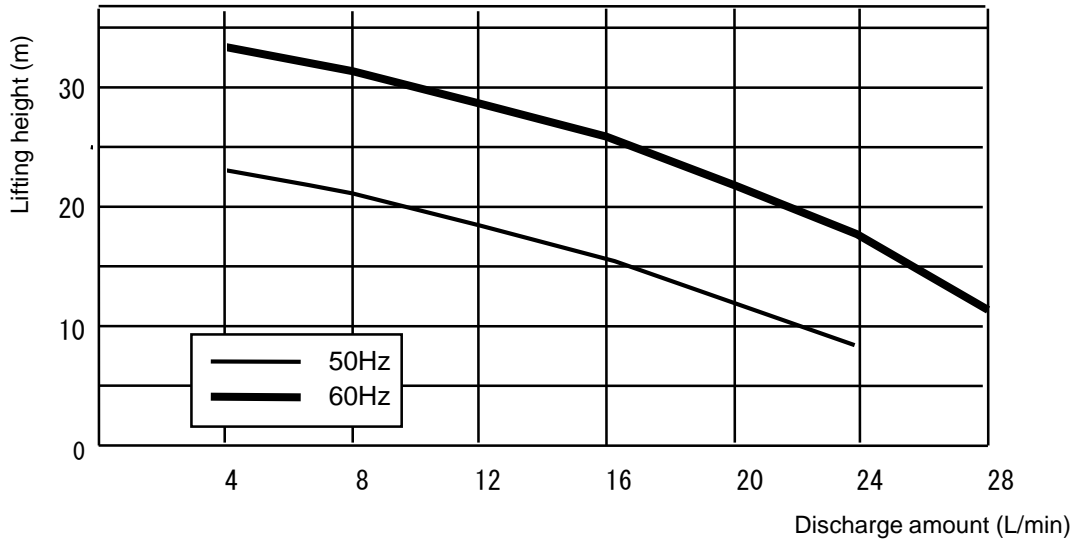
Model	Cat. No.
CA-6	199440

External diameter of the product gets approx. 317mm higher when setting high pressure pump.



Flow amount curve

- Condition: water temperature: 20°C



6-3 Pressure switch

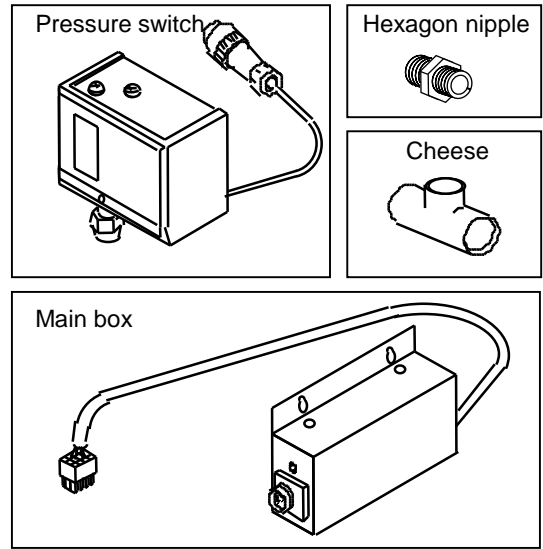
It stops all the control of the unit when pressure of cooling circulating water is higher than preset value.

Cannot be used with optional high pressure pump (HPP type - P.23). When used in combination, the CA-2610 (S) type stops control when the pressure switch is activated, but the HPP type continues to control.

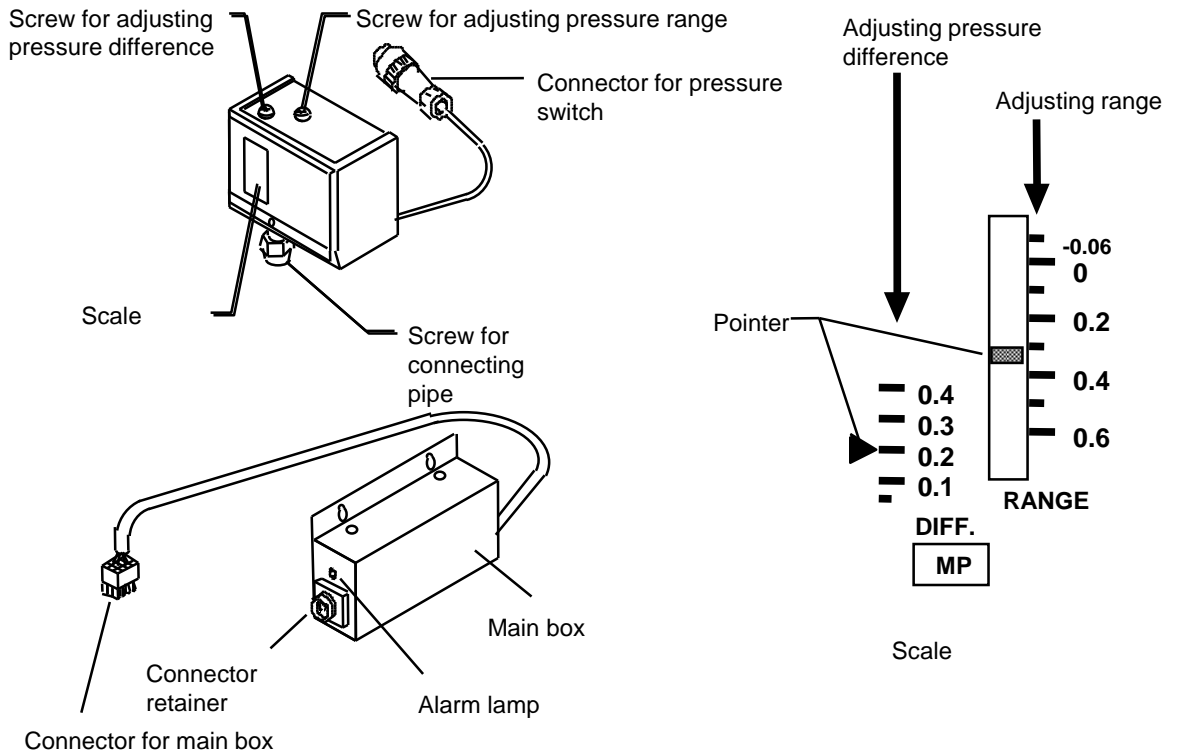
Model	Cat. No.
CA-PS4	199420

Check the type and quantity of the parts before setting up.

Contents of the package		Qty
1	Pressure switch	1
2	Main box	1
3	Hexagon nipple	1
4	Cheese	1



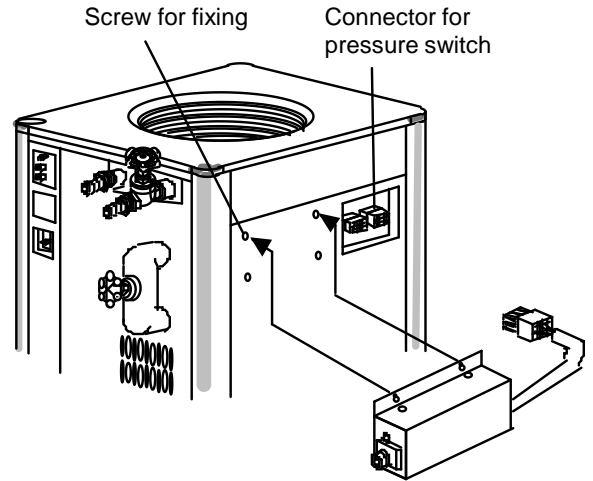
● Name of each part



● How to set up main box

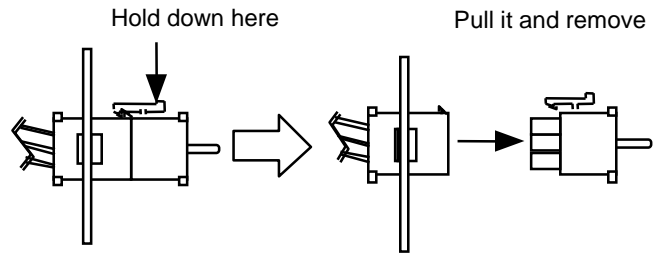
1) With cross-blade screw driver, loosen two screws (the ones of first row or second row) on the back of upper part of the unit.

2) Get the screw through the port of the main box and lower the main box to fix it with screws.



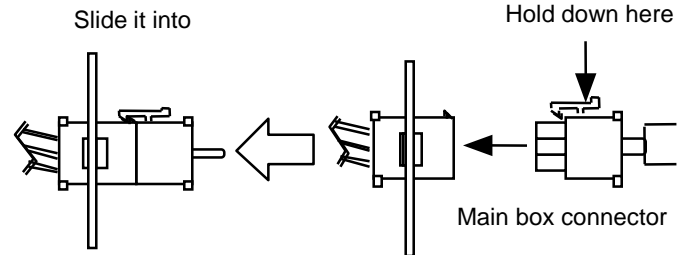
3) Slide connector connecting to main body side toward the arrow head direction and remove it.

* Connector for pressure switch and for flow amount switch are available. Right one on the back is for pressure switch. Do not remove the one for flow amount switch.



4) Remove main box connector with sliding it toward the direction of arrow head.

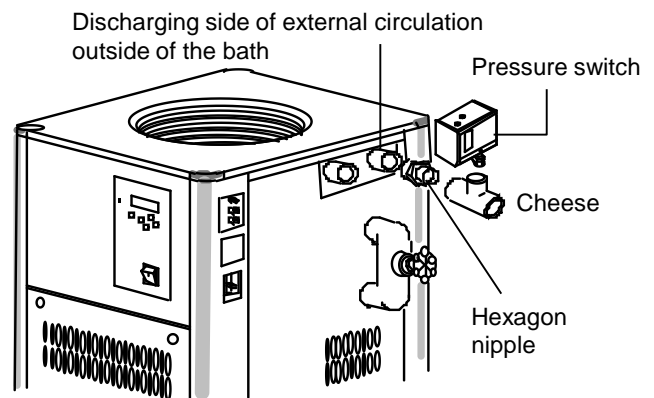
* Push and fix the connector until it catches the tab. If the connector is not fixed tightly, alarm may occur when operating.



● Setting up pressure switch

1) Screw hexagon nipple, cheese and pressure switch tightly into "WATER OUT" of discharging side of external circulation outside of the bath.

* Roll tape around screw connecting part for preventing water leak.

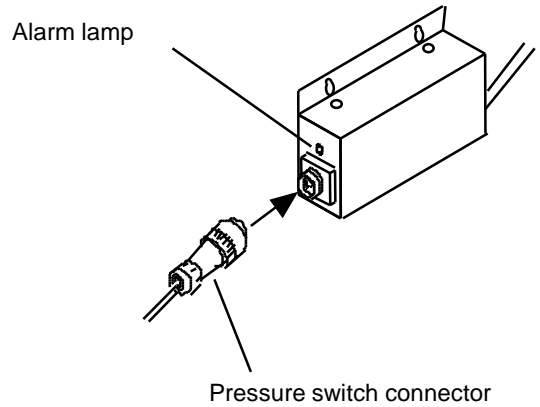


●Connecting pressure switch connector

Connect pressure switch connector to connector holder of main box until you hear click sound.

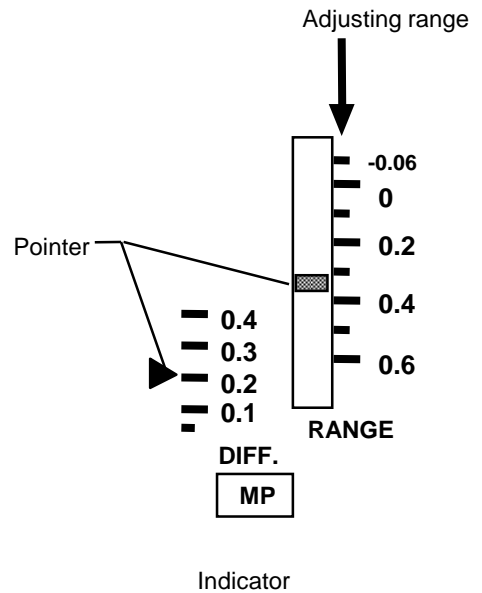
* Alarm lamp lights up if the connection is wrong, and the unit can not be started up.

* In case that the pressure switch connector will be influenced by external stress caused by pipe connection, attach some protection parts on the indicator.



●Changing the maximum value of pressure

With range adjusting screw (RANGE), set up the maximum pressure. Turning range adjusting screw clockwise can lower the preset pressure and turning it counter clockwise can rise the pressure.



6-4 Flow amount switch

It stops all the controls of the unit when the flow amount of cooling circulating water is less than preset value.

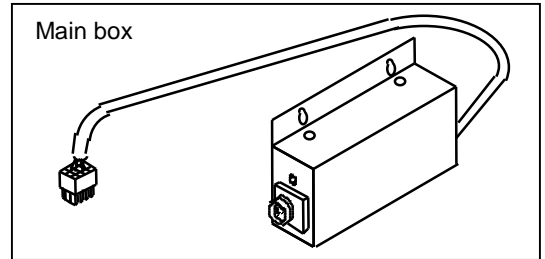
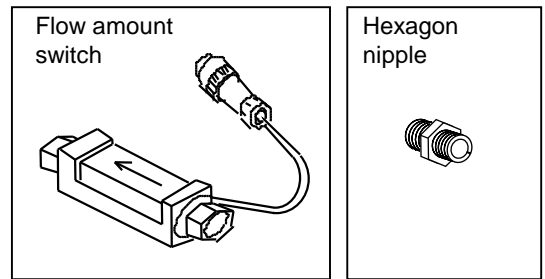
Cannot be used with optional high pressure pump (HPP type - P.23).

When used in combination, the CA-2610 (S) type stops control when the flow switch is operated, but the HPP type continues to control.

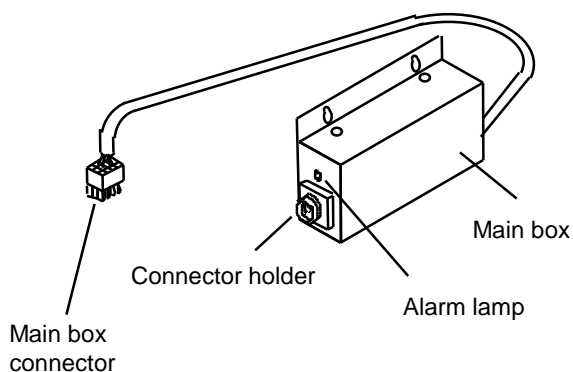
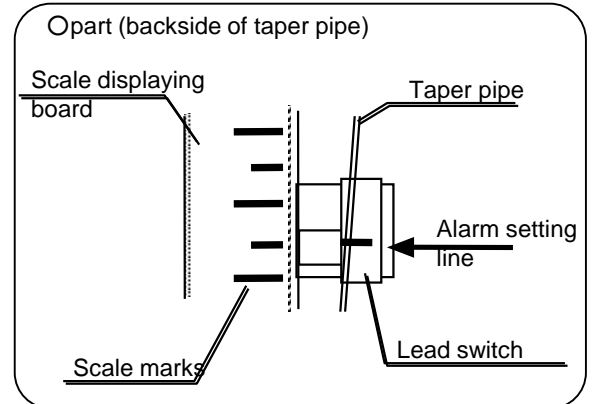
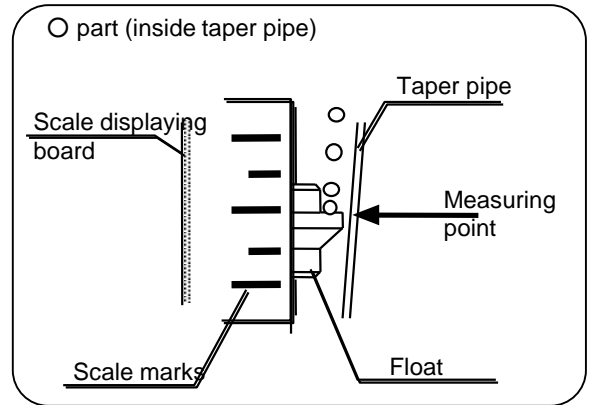
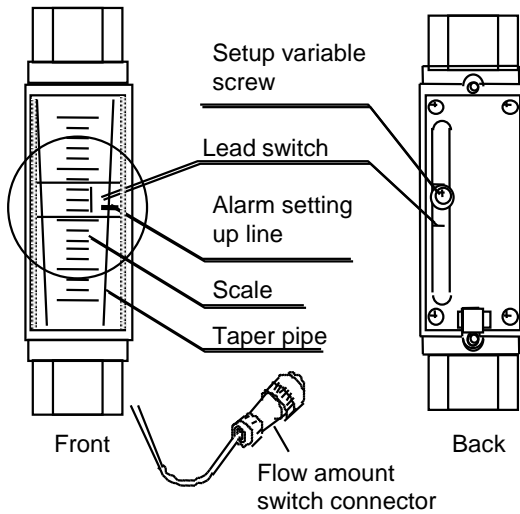
Model	Cat. No.
CA-FS2	199430

Check the type and quantity of parts before setting up.

Contents of packing		Qty
1	Flow amount switch	1
2	Main box	1
3	Hexagon nipple	1



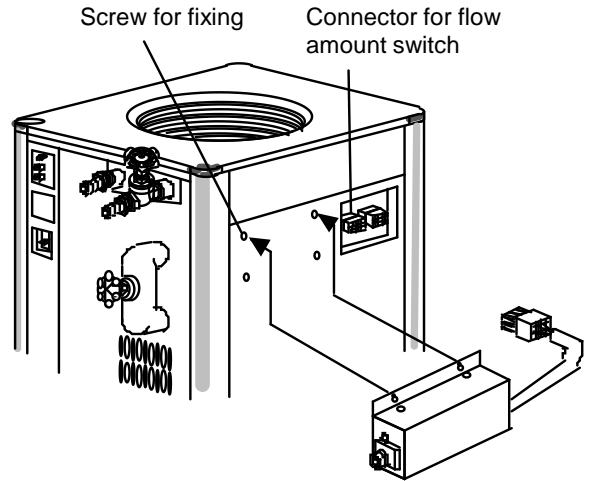
●Name of each part



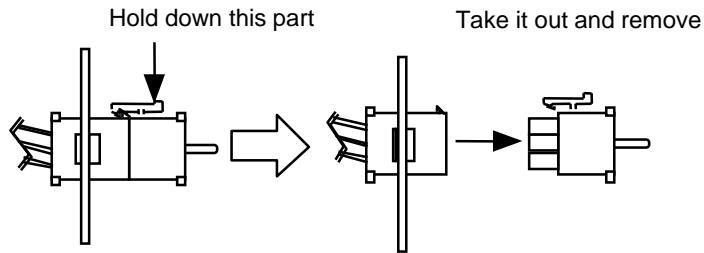
●How to set up main box

1) With cross-blade screw driver, loosen two screws (first row or second row) on the upper part of the backside of the unit.

2) Get the screw through port of main box. Then, lower the main box and fix with screws tightly.

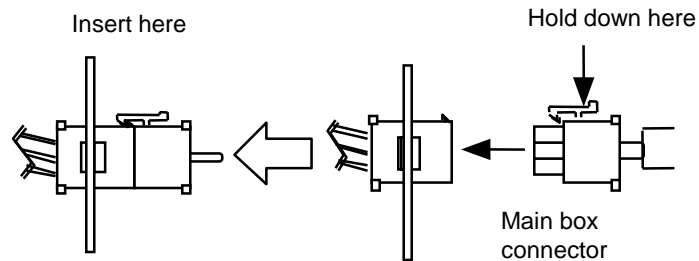


3) Slide the connector connecting to main body side toward the direction of arrow head and remove it.
 * Connector for pressure switch and flow amount switch are available. Left side on the back is the connector for flow amount switch. Do not pull out the connector on the right side, which is for pressure switch.



3) Slide main box connector towards the direction of arrow head and remove it.

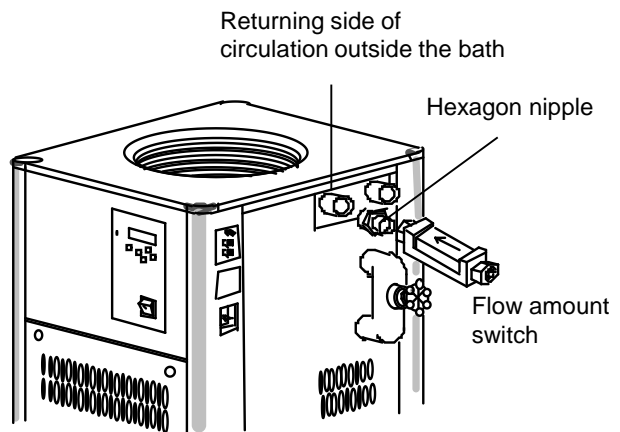
* Insert the connector tightly until it catches with the tab. If the connection is loose, alarm may occur in the operation condition.



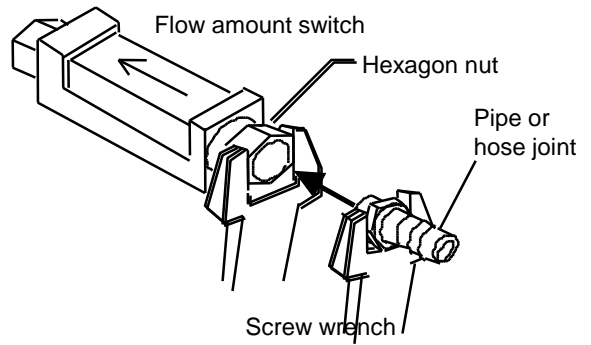
●Attaching flow amount switch

1) Screw hexagon nipple, cheese and pressure switch into "WATER IN" of returning side of circulation outside of the bath.

* Roll tape around connecting screw for preventing water leak.



* Pipe and hose on the side of flow amount switch IN must be held up in other location. When the load and the force on pipe and hose burden the flow amount switch directly, the switch may be broken down or damaged.

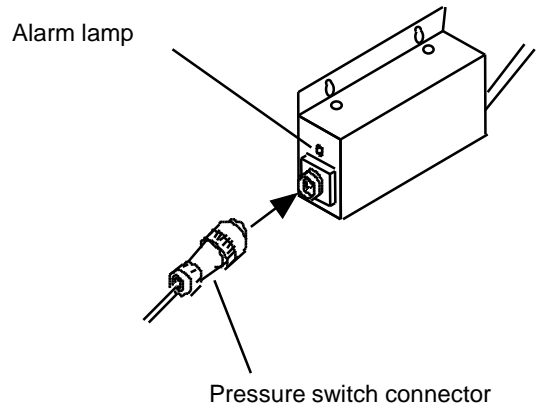


●Connecting flow amount switch connector

Connect the connector attaching with flow amount switch to connector holder of main box. Insert connector tightly until you hear click.

* If the connection is wrong, alarm lamp lights up and the unit can not be started up again.

* In case that the unit tends to have external stress caused by piping connection, put some protection parts on the indicator.

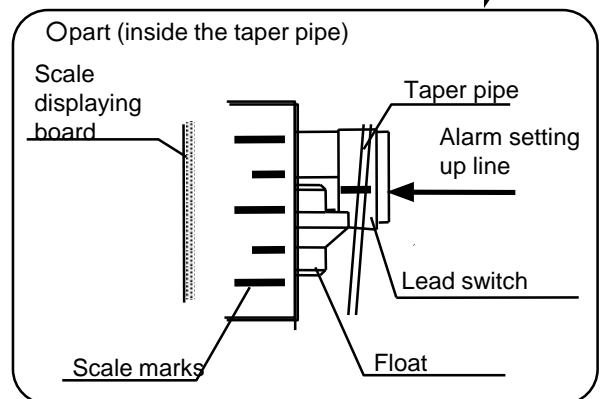
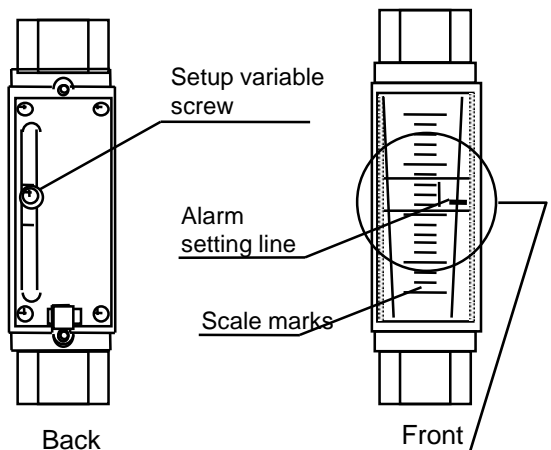


●Changing minimum value of flow amount

Preset value can be changed by loosening setup variable screw on the back of flow amount switch and sliding the position of lead switch. Set the setting line of lead switch on the desired mark and tighten setup variable screw.

《Notice》

- Setup must be within the range of 20%~90% of full scale. Beyond this range, alarm contact point may not work properly (see right figure).
- For about 30 seconds after circulating pump starts working, alarm from flow amount switch onto main unit will be canceled (suspended state). Alarm does not occur for about 30 seconds after circulating pump starts working even though the flow amount is less than preset value. After about 30 seconds, alarm lamp of control panel lights up for the first time and stops all the controls when the flow amount is less than preset temperature.



6-5 External sensor and outputting lead wire

WARNING

Fix external sensor firmly.

If external sensor is off from external circulating bath, it can not detect temperature and cause abnormal heating that boils with no water depending on preset temperature, or the bath will be supercooled.

● External temperature sensor

With using external temperature sensor, the temperature of external circulating point can be changed directly.

Model	Cat. No.
STP-300	196730

1) When using external temperature sensor, connect the sensor tightly to external sensor connector as shown on the figure.

2) When turning sensor selector switch to "OUT" side, external temperature starts temperature controlling for circulating liquid and etc.

- * Fix the external connector firmly so that it will not be disconnected during operation.
- * Turn off the power switch when attaching and removing the sensor for preventing electric shock and malfunction.
- * When not using external temperature sensor, remove from the unit.

● External output and lead wire

With output lead wire, measured temperature can be output as recorder output. Also, when the safety function (alarm and etc.) works, it can be output as no-electric pressure contact points (a contact point).

As for each recorder output and alarm output signal, please refer to the right figure.

Model	CAT. No.
ROL-100	114230

When using recorder output and alarm output, connect output lead wire to external output connector tightly as shown on the picture.

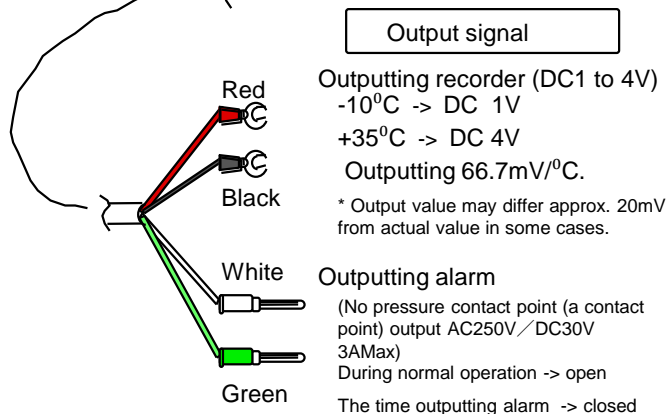
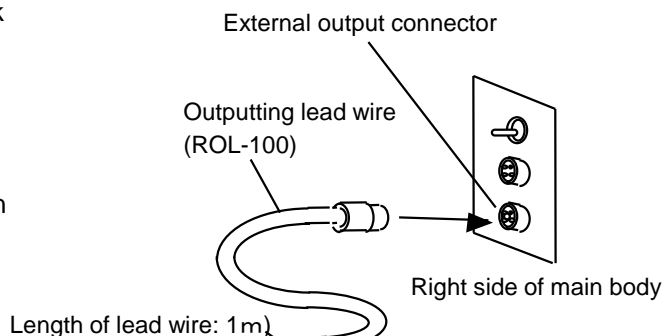
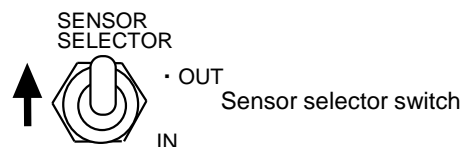
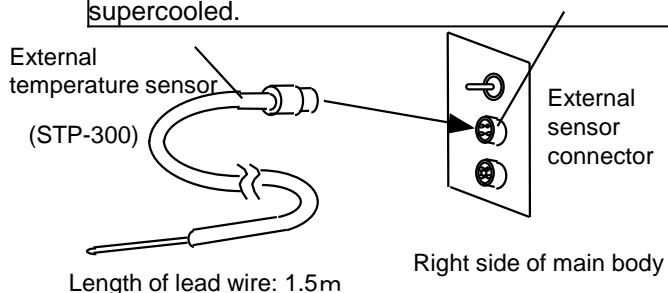
* Turn off the power switch when attaching and removing the wire for preventing electric shock and malfunction.

* When not using the lead wire, remove the wire from the unit.

WARNING

Before using external sensor, check whether external circulating valve is open or closed.

If external sensor will be used with closing the external circulating valve, temperature control for external circulating bath will not be able to perform, which causes abnormal heating and boils with no water in the bath depending on preset temperature, or the bath will be supercooled.



6-6 Lead wire for remote operation

WARNING

Connect lead wire for remote operation to no-electric pressure contact point. Operate the lead wire at no-electric pressure contact point (rated supply: more than AC250V,0.2mA).AC200V is supplied from main unit side.

● Lead wire for remote operation

With lead wire for remote operation, electric pressure, temperature control and pump can be operated externally. Cannot be used with optional high pressure pump (HPP type · P.23).

Model	Cat. No.
RC-110	234340

1) When using lead wire for remote operation, stop controlling, operating pump and turn off the power switch of the unit. Then, connect the lead wire for remote operation tightly.

2) When turning remote operation selector "ON", power supply, temperature control and pump control can be turned ON and OFF externally. In this case, turn on the temperature control of main unit and turn off the pump switch.

* Connect lead wire for remote operation tightly so that it will not be disconnected during operation.

* Turn the power off when attaching and removing the wire for preventing the electric shock and breakdown.

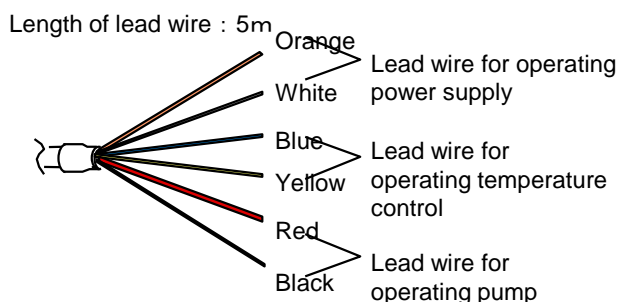
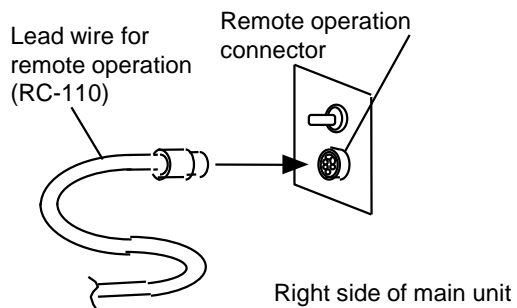
Usage restrictions and safety precautions for remote control.

- When performing remote operation for power supply, alarm for blackout is output by ON/OFF operation. Set up the recovery from blackout as "cont" or "on".
- OFF time of temperature control must be longer than 2 minutes when performing remote operation for temperature control. Without setting OFF time, cooling machine may have malfunction (As for remote operation, the accuracy of temperature is -2 minutes for OFF timer of cooling machine and approx. $\pm 3^{\circ}\text{C}$ for 2300W load.)
- Each alarm can be detected by external alarm output(refer to P.30).
- **When operating from the outside by remote control, the LED display on the control panel and control action do not match.**

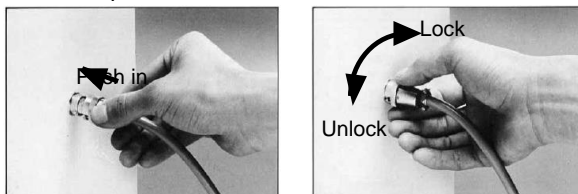
WARNING

Stop controlling, operating pump and turn off the power before connecting lead wire for remote control.

Connecting connector with leaving the power on, it may cause electric shock or leakage because of voltage supply on terminal part.

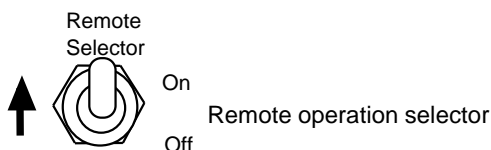


Remote operation connector detachment



The connector has a lock function.

- Match the connector protrusion with the groove and rotate the indentation ring. (Removal is the reverse procedure.)




7

Troubleshooting

For the trouble that is not mentioned below, please consult your local dealer or closest customer service center.

Trouble	Cause of trouble	Solution
Electric leakage breaker is turned off even though trying to turn it on.	Electric leakage occurs.	Stop the operation immediately and contact your local dealer or closest customer center.
	Excess current flows.	
No display is shown on indicator even though power switch is turned on.	Mains connector is unplugged from outlet or not plugged properly.	Turn off electric leakage breaker and power switch. Then, plug the mains connector into outlet.
	Power source is not supplied.	Turn on the breaker of distribution board.
	Electric leakage breaker is not turned on.	Turn on electric leakage breaker.
	Electric leakage breaker has been broken down.	Stop the operation immediately and contact your local dealer or closest customer center
	Power switch has glitch.	
	Temperature controller has glitch.	
Cooling machine does not work properly.	Protection timer for cooling machine works.	Once the cooling machine is turned off, it can not be turned on for 150 seconds in any conditions.
	High pressure switch of cooling machine or over load relay maintaining circuit works.	As the load for cooling machine is too heavy, reduce it.
		Set room temperature at 35°C or less if the ambient temperature is high
	Cooling machine is broken down.	Stop the operation immediately and contact your local dealer or closest customer center.
Water level is lowered down and cooling coil is exposed, and over load operation is performed.	Fill the circulating liquid into cooling circulation bath.	
The unit can not be cooled down.	Preset temperature is not correct.	Check the preset temperature and the value of compensating temperature display.
	Cooling machine does not work.	Stop the operation immediately and contact your local dealer or closest customer center.
	Fan for cooling machine does not work.	
	Gas is leaking.	
Gas is leaking.		
The unit is cooled down poorly.	Fan for cooling machine does not work.	Stop the operation immediately and contact your local dealer or closest customer center.
	Electromagnetic valve for selecting capability has malfunction.	
	Filter of cooling machine adheres dirt.	
I hear a noise when starting the refrigerator. The refrigerator overload relay works.	<ul style="list-style-type: none"> Power supply voltage exceeds 200 V ± 20 V. 	<ul style="list-style-type: none"> Appropriate power supply voltage.

Trouble	Cause of trouble	Solution
Cooling water does not circulate.	Valve for controlling discharge amount is closed.	Open the valve for controlling discharge amount.
	Strainer of cooling water circulating bath adheres dirt.	Remove dirt.
	Thermal protector of circulating pump does not work.	When using cooling liquid that has high viscosity, water it down or use the liquid that has lesser lower viscosity.
Circulating amount is fewer.	Using circulating nozzle that has smaller diameter intentionally.	Replace with circulating nozzle that is included with the unit.
	Hose is crushed.	Fix the hose properly.
	Pressure loss of circulation system is too much.	Using high pressure pump (HPP), which is one of the options, is recommended.
Bath will be frozen if the preset temperature is higher than +5°C.	Circulation is fewer because of pressure loss and etc. Also, the bath can not be stirred sufficiently.	<ul style="list-style-type: none"> • Open valve for controlling discharge amount. • Use antifreeze. • Using high pressure pump, which is one of the options, is recommended.
	Temperature controller has glitch or cooling machine does not stop.	Stop the operation immediately and contact your local dealer or closest customer center.
Sensor alarm occurs. "SESS"	Sensor selector points at "OUT" side when internal sensor of the unit controls. (or sensor selector points at "IN" side when external sensor controls.)	Set the selector at the appropriate side.
	Temperature sensor has been come down.	Stop the operation immediately and contact your local dealer or closest customer center.
Alarm for blackout occurs. "B0EE" * 2600 S is not output.	Blackout has occurs during control. Turned off the power switch without stopping control.	Cut off the power after stopping control. Cancel alarm by pressing [Set] key.
Alarm for cooling machine occurs. "BBEB"	Fan for condenser stops and pressure switch for cooling machine works.	Stop the operation immediately and contact your local dealer or closest customer center.

Trouble	Cause of trouble	Solution
Alarm for maximum temperature occurs.	Bath was stirred poorly.	Open the discharge flow adjustment valve.
	Cooling machine is cooled poorly.	Check the situation, cause and solution for cooling machine related descriptions on the previous page.
Alarm for minimum alarm occurs.	Bath is stirred poorly.	Open the discharge flow adjustment valve.
Level alarm occurs. “  ” * Valid only when flow switch/pressure switch is installed	Flow amount switch, which is one of the options, or pressure switch worked.	Check the pipe system. (Scale clogs in the internal part of piping or the diameter of pipe is too small, which cause huge pressure loss.)
Control stops without outputting alarm.	Temperature controller does not work properly because of noise and etc.	Change power source. However, if the alarm still occurs, stop the operation immediately and contact your local dealer or closest customer service center.

Cooling machine alarms may be caused by complex differences such as usage conditions. It is effective to secure the space around the equipment and change the usage conditions (room temperature, power supply, etc.). If temperature display correction is used, return the temperature display correction to 0°C.

8

Maintenance and check-up

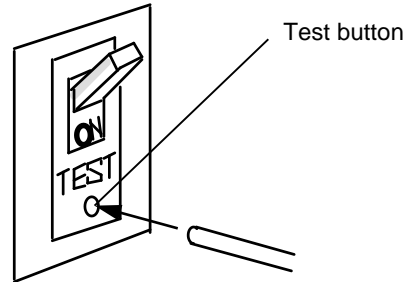
8-1 Operation test of electric leakage breaker

CAUTION

Conduct a operation test for electric leakage breaker.

Using electric leakage breaker in bad status may cause electric shock.
Conduct a operation test per month.

Plug mains connector and turn on the power of the breaker, and push test button with thin stick.
The status is normal if the breaker operates and turned OFF.



8-2 Cleaning and caring the product.

WARNING

Do not take down the product.

A part of the internal part of the unit is under electric pressure and subject to have high temperature. Therefore, breaking down the unit may cause electric shock or injure yourself.

CAUTION

Use appropriate product for cleaning

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

Do not touch cooling fin with bare hands.

Do not touch cooling fin with bare hands during maintenance operation. Edgy fin may cut your hands.

CAUTION

Unplug mains connector when cleaning and caring the product.

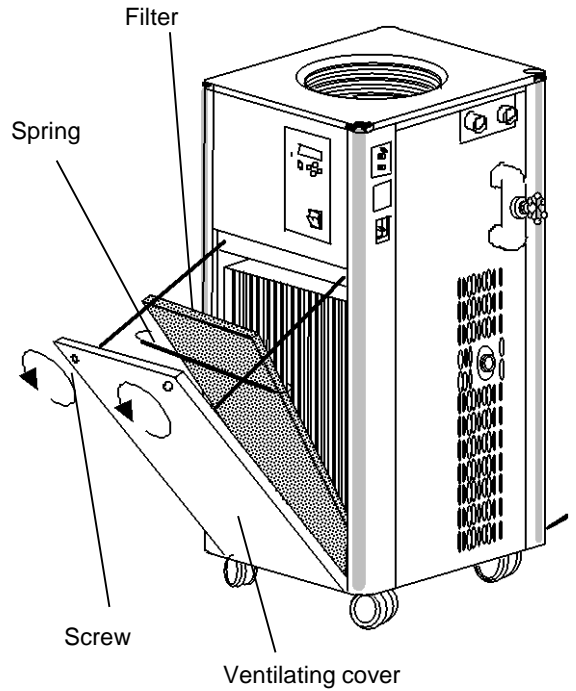
Turn off power switch, electric leakage breaker and unplug mains connector from outlet when cleaning and caring the product. Without doing these, it may cause electric shock or damage the product.

1. Cleaning air filter

Clogged filter worsens the cooling capacity. Also, it may cause glitch on the cooling machine. The condition of the filter varies depending on environment and operating time, however, please check and clean the filter regularly.

1) Turn off electric leakage breaker and power switch. Unplug the mains connector from outlet.

- 2) Turn two screws (black) on ventilating cover left to open the ventilating cover. Remove the spring fixing filter and take the filter out.
- 3) After removing the dirt by tapping the filter, wash it. (Use mild detergent if it has greasy dirt.)
- 4) Dry well after finishing washing the filter. (Do not use dryer for preventing the filter from being melted.)
- 5) After cleaning, set the filter on ventilating cover and fix the upper part with springs, and close the cover. Turn two screws (black) on ventilating cover right to fix each other.
- 6) Please set the cleaned filter in the ventilation cover, fix with the spring on the upper side and close the cover. Turn the two veneering screws (black) of the ventilating cover to the right side and tighten the ventilating cover to fix.

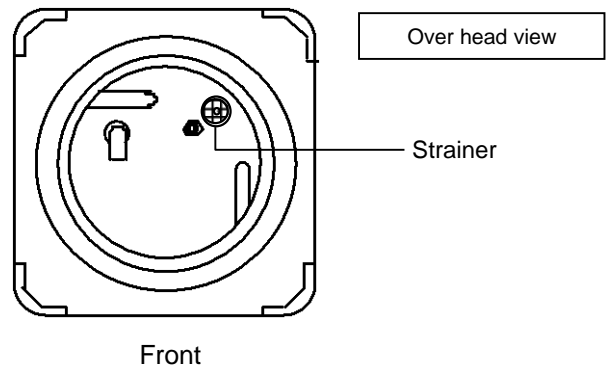


2. Cleaning strainer
 Clean the strainer regularly.
 Drain the water from circulating bath.

3. Cleaning the product
 For cleaning the main body, use soft cloth after screwing water tightly. Use mild detergent to remove greasy dirt and wipe it off after using the detergent.

4. Checking up pipe
 Check the piping system whether it has any leak or slacken or deteriorated part before and after use. Deterioration and obsolescence of the hose and etc. vary depending on use conditions. Please check regularly and replace the parts if needed.

5. Changing circulating water
 Change circulating water regularly (once/month). when you do not use the unit, please drain the water from bath. Corruption of standing water generates scale and mold and cause clogged drain, eroded pipe and rust.



9

Disposal of the product

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

Main components and disposal instructions.

Specification	Component	Total weight	External measurement	Disposal instruction
CA-2610 CA-2610 S	Main unit	Approx. 84kg	450(W) × 515(D) × 1010(H) mm	Please contact waster disposer.
	Refrigerant included in cooling machine Freon gas R407C	The amount of Freon gas is stated in the production number of the main body. *1	_____	For disposing Freon gas R407C, please ask waster disposer.

Note) Please dispose packing materials by separating each type of material.



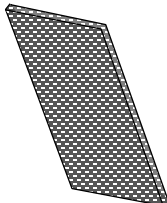

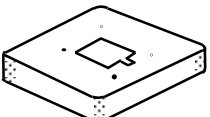
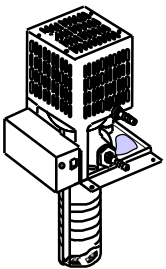
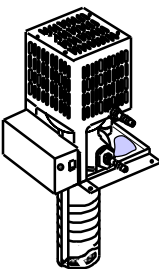
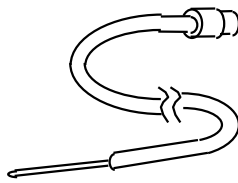
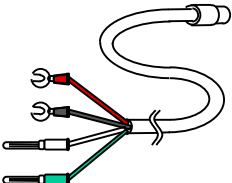
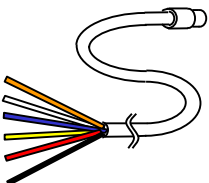
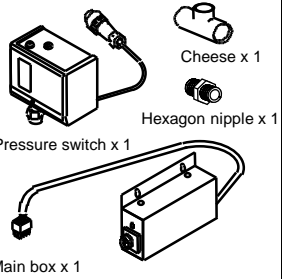
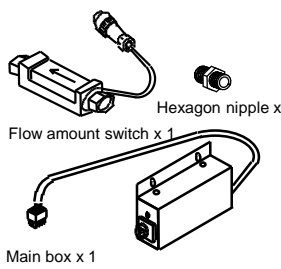
*1 The product number is affixed to the front side of the main body side (ground fault / overcurrent breaker installation side).

1. When the machine does not work properly, please check and see whether it breaks down or not by referring to pages of "Troubleshooting".
2. If you are sure that it breaks down, please contact your local dealer or customer service center mentioned on the manual.
3. Repair work during guarantee period will be proceeded based on service warranty.
4. Repair work after the guarantee period will be available with charge if requested.

Terms of warranty

- 1 The warranty period of your purchased product is 12 months from the date of purchase.
- 2 The product having any defect that occurs within the warranty period despite your normal operating condition will be repaired for free or replaced.
- 3 This warranty refers to the warranty of this product alone and does not include all damage (operating losses, miscellaneous expenses, etc.) induced by the malfunction or defect of the product.
- 4 The terms of this warranty are effective only in Japan.
If you indirectly export the purchased product to a foreign country, application of the terms herein will be excluded with issuance of non-applicability judging paper of material subject to the export restrictions at which time all responsibilities belong to the exporting party.
- 5 In the following cases the product will be repaired for value even within the warranty period.
 - A) If you fail to return the customer card or make a user registration in our HP within one month of your purchase.
 - B) If you do not present the warranty or your user registration does not exist when you make a repair request.
 - C) If the warranty does not bear the name/seal of the distributor and the date of purchase.
 - D) Malfunction or damage arising out of handling in violation of the precautions described in the Instruction Manual and labeling on the main body of the product, or relocation of the installation place after purchase, and drop, impact, etc. during use.
 - E) Malfunction or damage arising out of wrong use or unjustifiable remodeling or repair.
 - F) Malfunction or damage arising out of abnormality due to external factors such as fire, earthquake, wind and flood damage, salt pollution, lightening strike, other act of God or power used, etc.
 - G) Performance deterioration or malfunction due to corrosion of consumable parts, replacement of consumable parts.
- 6 The warranty may be different depending on the product item.
(The period of keeping functional parts for repair will be 5 years, in principle, after production of the product is discontinued)
- 7 The product warranty of an overseas marketed product by our overseas sales function shall be defined separately.

Optional Parts List

① Hose-joint 			② Flow amount controlling valve 			③ Filter 			④ Sealing up cover 		
Code No.	Standard	Qty.	Code No.	Standard	Qty.	Code No.	Standard	Length	Code No.	Standard	Qty.
169990	1/2 x φ16	1	161330	R1/2, RC1/2	1	201640	TA-55135	1	112780	—	1
⑤ Base for high pressure pump 			⑥ High pressure pump 			⑦ High pressure pump 			⑧ External temperature sensor 		
Code No.	Standard	Qty.	Code No.	Standard	Qty.	Code No.	Standard	Qty.	Code No.	Standard	Qty.
199440	CA-6	1	158750	HPP-1100	1	158770	HPP-2100	1	196730	STP-300	1
⑨ Output lead wire 			⑩ Lead wire for remote operation 			⑪ Pressure switch  Cheese x 1 Hexagon nipple x 1 Pressure switch x 1 Main box x 1			⑫ Flow amount switch  Hexagon nipple x 1 Flow amount switch x 1 Main box x 1		
Code No.	Standard	Qty.	Code No.	Standard	Qty.	Code No.	Standard	Qty.	Code No.	Standard	Qty.
114230	ROL-100	1	234340	RC-110	1	199420	CA-PS4	1Set	199430	CA-FS2	1Set