R04

EYELA

Magnetic Stirrer with a hot plate

RCH-1000

Instruction Manual

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

IMPORTANT **Be sure to read "Safety precautions" before use.**

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

Tokyo Rikakikai Co., Ltd.

FORWARD

Thank you very much for your kind patronage of EYELA.

Get to know your EYELA products, but before using, to be sure to read this manual well.

EYELA cannot be held responsible for the malfunctions resulting from the use of EYELA products other than as specified in this manual.

WARRANTY

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

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

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

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

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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.

Safety Precautions

1. Signal Words for Warnings

If you use this product with combustible or flammable solution, mishandling of it may cause unintended injury or accident.
In addition, due to the product's functions and characteristics, operation at high temperature may cause degradation of performance or troubles.
However, if you know such risks in advance, you can avoid most of accidents.

Therefore, important safety information on matters to be noted is defined as follows and indicated with the following alert symbols and signal words. Be sure to follow these instructions and use the product safely.

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 signs 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.

①

⚠ WARNING

Danger of a fire

Take extreme care for use of ignitable or flammable solution

②

⚠ CAUTION

Caution of burn

Do not attempt to touch the hot plate during and immediately after use.

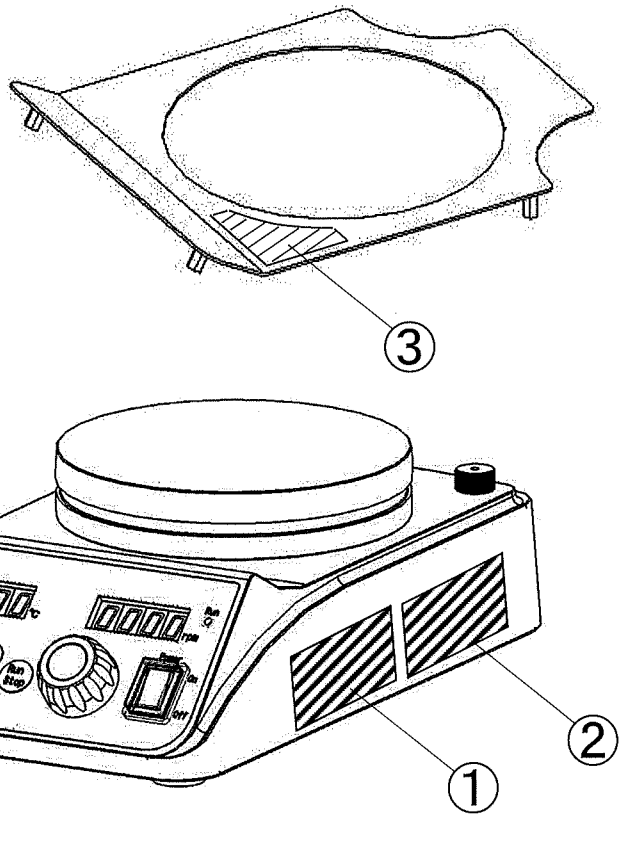
③

CAUTION

⚠

Caution to setting the rotation speed

When Aluminum Block(BBS series) Is used in the temperature at higher than 240 ℃, please set up the rotation speed, at less than 500rpm.



Thank you very much for purchasing EYELA products.

Introduction

This instruction manual explains installation, operation, troubleshooting, maintenance and inspection, and discarding procedures for the Magnetic Stirrer with a hot plate

Model RCH-1000

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

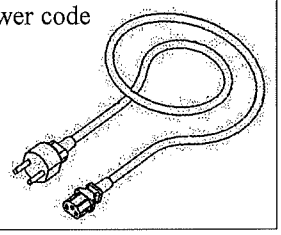
CONTENTS

Contents In Package

Be sure to confirm the kinds and quantities of parts before starting installation.

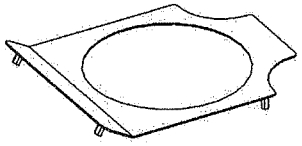
	Contents	Quantity
1	Main body	1
2	Power cord	1
3	Fuse (spare)	2(4A)
4	External temp. sensor	1
5	Heat insulation plate for BBS	1
6	Operation manual	1
7	Guarantee	1

2.Power code



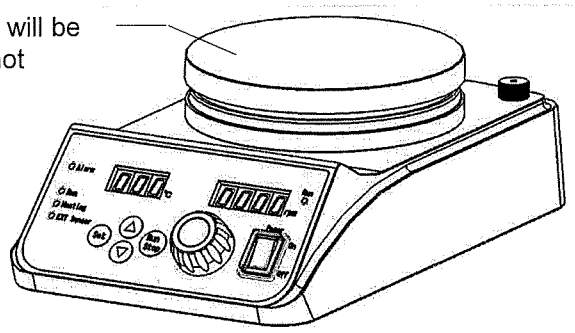
4. External temp. sensor

5. Heat insulation plate for BBS



1 For safe operations

This product is not explosion-proof. Be sure to take extreme care for safety during operation.

⚠WARNING	**Take extreme care for use of ignitable or flammable solutions** Ignitable or flammable solutions will evaporate when stirred and heated and may ignite and explode. When using, take utmost care. For example, use such liquid within the draft.
⚠ CAUTION	**Do not touch the hot plate during and immediately after use** Do not touch the hot plate during and immediately after use. The plate is hot and may cause burn. ●Portion that will be extremely hot 
⚠ CAUTION	**Pay attention to magnetism.** This product performs rotation and stirring by utilizing magnetism. When the product is brought too close to the electric machinery or the cardiac pacemaker, they may develop failure.
⚠CAUTION	**Take extreme care for the installation location.** Install the product on a flat, non-slippery, dry and stable place with sufficient spaces around the unit. Also select a place whose surface has been fire-proof finished.
⚠CAUTION	**Take care for the power cable and the lead wire of the external temperature sensor, which are susceptible to heat effects.** Take care not make the power cable and the lead wire of the external temperature sensor directly contact the hot plate.
⚠CAUTION	**Be sure to wear safety gears when using the product.** Be sure to wear safety gears against dangerous or harmful substances when operating the product. Improper or insufficient safety gears will cause an extremely dangerous situation when solution should splash, there are protruding parts that might hurt you, or a harmful or an flammable gas is generated.

2 Product overview

2-1 Application

⚠ WARNING

Never attempt to modify the product.
Operate the unit for the specified purpose only.

An electric shock or a malfunction may result if the product is modified or used for any purposes other than that specified.

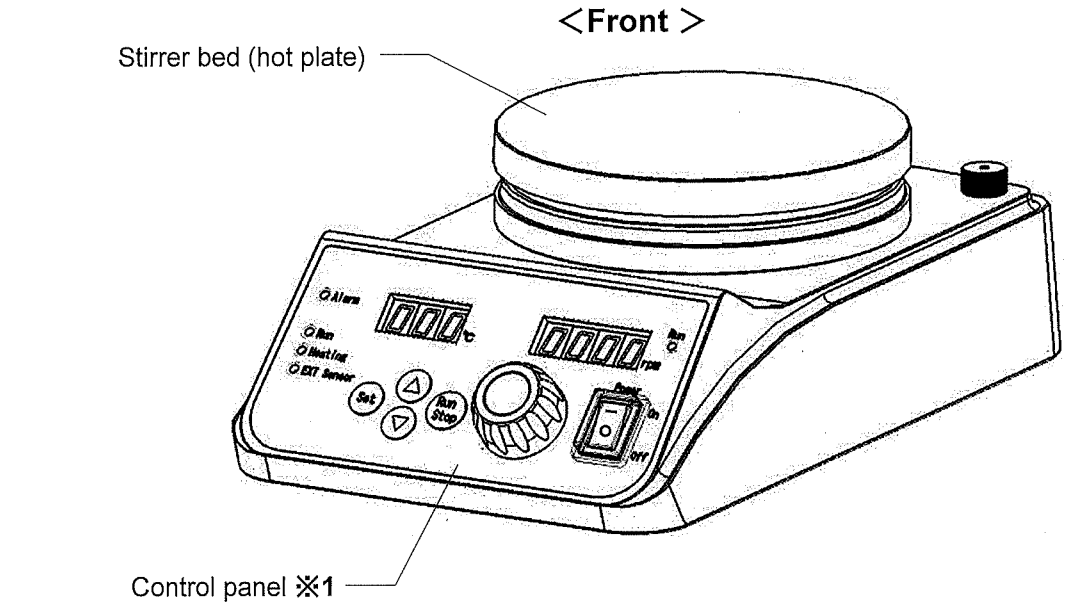
This product is a motor-driven magnetic stirrer with a heating function.
Applications the product is suited to include: laboratories for chemical or medical fields or clinical inspection rooms.
This unit is a magnetic stirrer to heat solution in a container placed on the heating plate. The motor-driven stirrer integrated in the unit and the stirrer in the container stir samples. Stirring strength will differ depending on the motor rpm as well as the size and the shape of the stirrer.

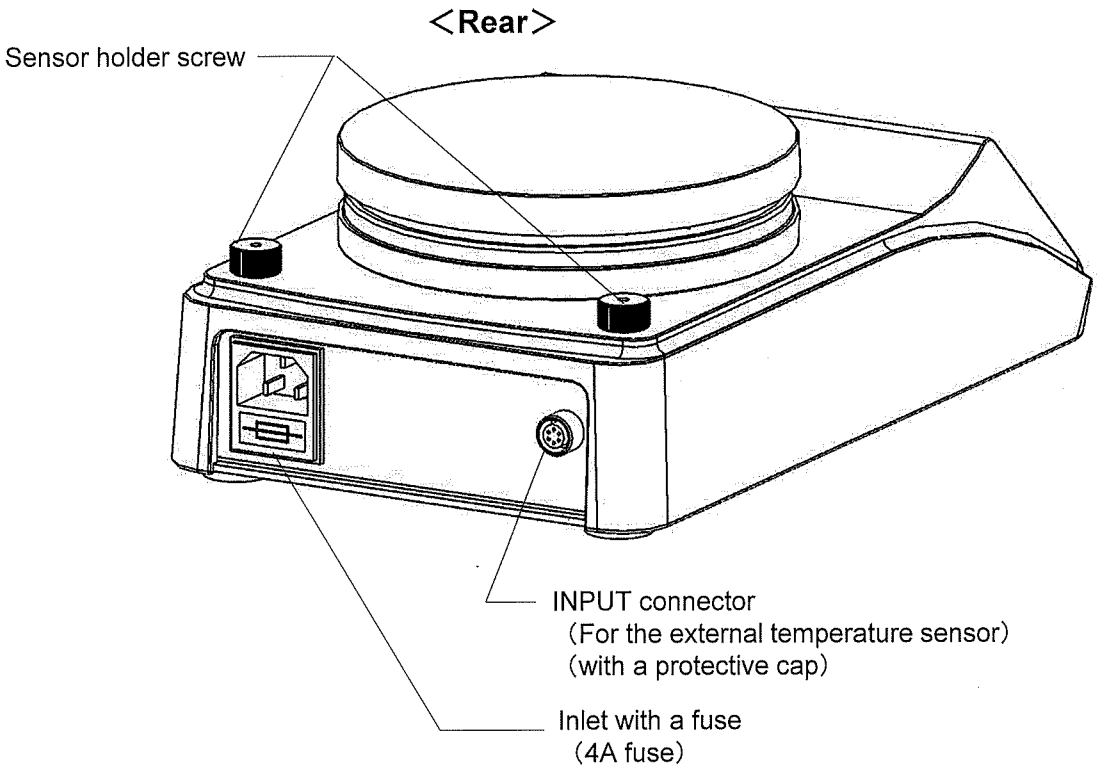
2-2 Specifications

Product name		Magnetic stirrer with a hot plate
Model		RCH-1000
Performance	Speed range (at no-load)	50～1500rpm
	Stirring capacity	20L (Water)
	Attainable temperature	Max.310℃(Plate surface)
Function	R.P.M. setting	Setting with a volume
	R.P.M. and temperature indication	Digital indication
	Temperature control	P.I.D control
	Temperature setting	Sheet key
	Safety function	Fuse, temperature fuse, self diagnostics function (upper temperature limiter)
Configuration	Motor	DC brushless motor Output:25W
	Magnet	Neodymium magnet
	Heater	600W
Standard	Body material	Aluminum die-cast, melamine resin bake finished
	Stirrer bed material	Aluminum die-cast, ceramic coated
	Stirrer bed size[mm]	φ135
Ambient temperature range		5～40℃
Overall dimensions [mm]		165W×275D×90H
Weight		About 3.0kg
Power input		2.9A, 630VA
Source voltage		AC220V 50/60Hz

※ Performances listed have ben measured at the conditions: room temperature of 20℃, rated source voltage, 50Hz and no-load.
※ Stirring capacity and the speed range differ depending on the shape and the material of the container or deterioration extent of the magnet and other conditions.
※ The withstand load of the stirrer bed is 25kg. Use the product below the withstand load.

2-3 Name of parts

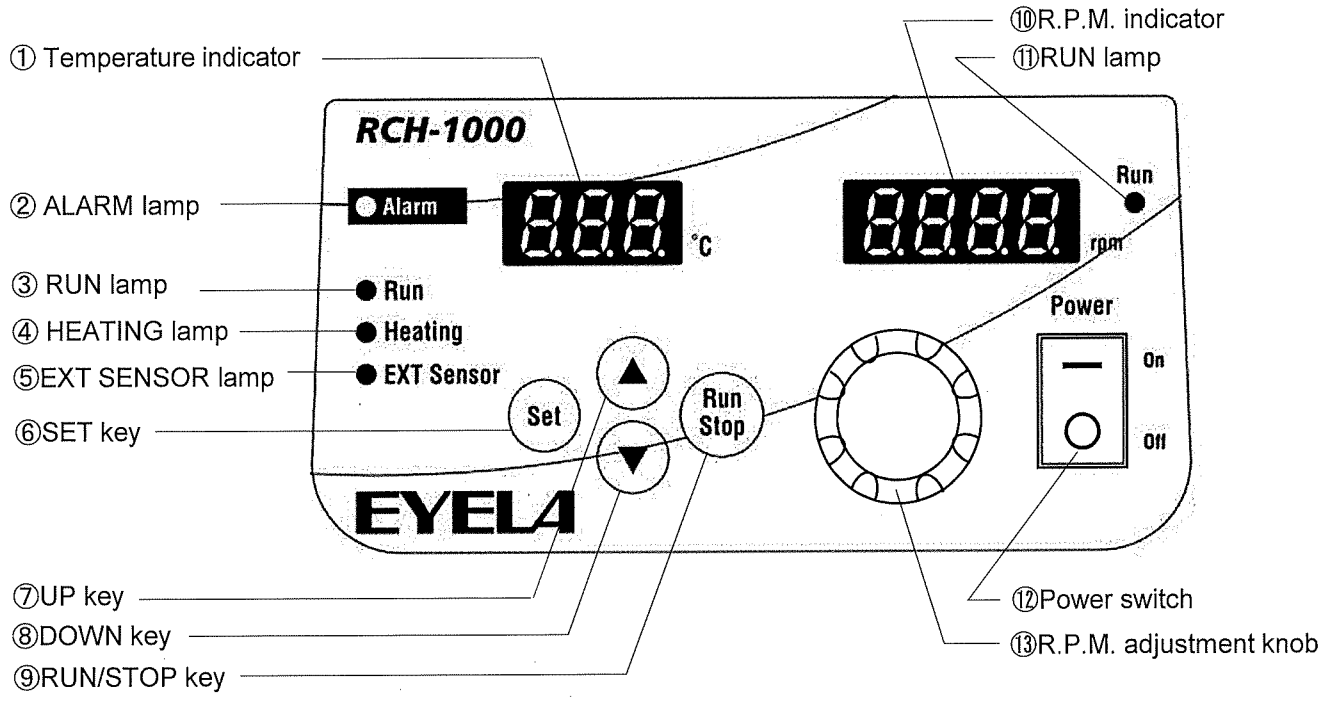




※1 Refer to "3-1 control panel" on P. 4 for details of the control panel.

3 Names and functions of the control assembly

3-1 Control panel



	Name	Function
①	Temperature indicator	This indicates the present temperature of the hot plate. Also indicates the set temperature in the set temperature change mode. Indicates an alarm when an abnormality occurs.
②	ALARM lamp	The lamp comes on when an alarm occurs.
③	RUN lamp	The lamp comes on when temperature adjustment is started.
④	HEATING lamp	The lamp stays on while power is supplied to the heater.
⑤	EXT SENSOR lamp	The lamp stays on during control with an external temperature sensor.
⑥	SET key	The key is used to switch between the temperature setting and the measurement modes or to select and determine a set item. Alarm display is cleared when certain types of alarms have occurred.
⑦	UP key	The set temperature increases by 1℃ each time the key is pressed. The set temperature increases by 10℃ when the key is kept pressed.
⑧	DOWN key	The set temperature decreases by 1℃ each time the key is pressed. The set temperature decreases by 10℃ when the key is kept pressed.
⑨	RUN/STOP key	The key is used to switch between start/stop of temperature adjustment.
⑩	R.P.M. indicator	The indicator indicates the set number of rotations. This also indicates an alarm when the R.P.M. alarm occurs.
⑪	RUN lamp	The lamp comes when the stirrer starts to rotate.
⑫	Power switch	The switch is used to switch power ON/OFF.
⑬	R.P.M. adjustment knob	Press this knob to switch rotation start/stop. Turn this knob to adjust the R.P.M. setting.

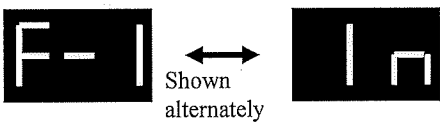
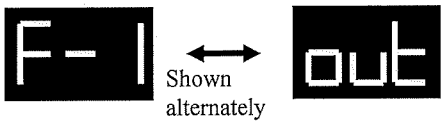
3-2 Safety, Alarm and Warning functions

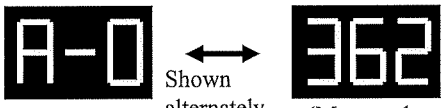
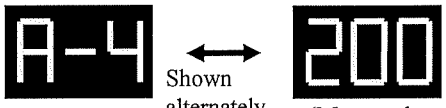
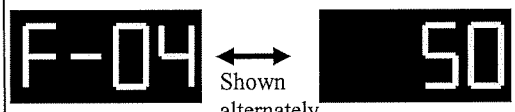
This product has the following safety functions.
When any abnormality occurs, take appropriate measures by referring to the section "Causes and solutions of troubles" on P.20 .

Safety function

Safety device	Operation	Causes of operation
Fuse	Power to the product is shut off when the fuse is blown.	• Overcurrent exceeding the rated value flew to the product.
Temperature fuse	Power to the product is shut off when the temperature fuse is blown.	• The product temperature rose excessively.
Self diagnostics function of the temperature controller	All control sessions will stop when the temperature controller has entered an abnormal state. Automatic recovery is attempted and the product recovers when the abnormal state is eliminated.	• The temperature controller is in an abnormal state due to noises.
Self diagnostics function of the temperature controller (Upper temperature limiter)	An alarm is indicated and all control sessions will stop.	• The temperature measured on the internal temperature sensor exceeded the temperature set on the upper temperature limiter. • It is valid during control of both of internal temperatures and external temperatures. Alarms will be indicated with the temperature on the internal temperature sensor even when external temperature control is active. • Setting range of the upper temperature limiter : 10～340℃ **※Set at 10℃ at the factory shipping.**

Alarm indication

Alarm name	Alarm indications and operations	Causes and solutions of alarms
Internal temperature sensor malfunction alarm Alarm symbol F-1 In Valid during internal/external temperature control	 Shown alternately  The alarm LED comes on and all control sessions will stop.	The internal temperature sensor is disconnected or short-circuited. Malfunction occurred to the control assembly. The alarm cannot be released until the malfunction is solved and the power is reset. Stop operation and contact your dealer or the nearest service center.
External temperature sensor malfunction alarm Alarm symbol F-1 Out Valid during external temperature control	 Shown alternately  The alarm LED comes on and all control sessions will stop.	The external temperature sensor is disconnected while the sensor is connected or the sensor is disconnected or short-circuited. Malfunction occurred to the control assembly. The alarm cannot be released until the malfunction is solved and the power is reset. Stop operation and contact your dealer or the nearest service center.
Measured temperature upper limit alarm Alarm symbol HHH Valid during internal/external temperature control	 Blinking  The alarm LED comes on and all control sessions will stop.	The temperature exceeded the measurable range of the internal/external temperature sensors. ※Measurement temperature range : 0~370℃ The alarm can be released with the "Set" key when the temperature has returned in the measurement range. If it is apparently different from the actual temperature, stop operation and contact your dealer or the nearest service center.
Measured temperature lower limit alarm Alarm symbol LLL Valid during internal/external temperature control	 Blinking  The alarm LED comes on and all control sessions will stop.	The temperature fell below the measurable range of the internal/external temperature sensors. ※Measurement temperature range : 0~370℃ The alarm can be released with the "Set" key when the temperature has returned in the measurement range. If it is apparently different from the actual temperature, stop operation and contact your dealer or the nearest service center

Alarm name	Alarm indications and operations	Causes and solutions of alarms
Upper temperature limiter Alarm symbol A-0 Valid during internal/external temperature control	 Shown alternately (Measured temperature) Alarm The alarm LED comes on and all control sessions will stop.	The temperature on the internal temperature sensor exceed the setting of the upper temperature limiter. ※Setting temperature range of the upper limiter : 10~340℃ The alarm can be released with the "Set" key when the temperature has returned in the measurement range. Even while an alarm is active, you can change the set temperature of the upper temperature limiter by keeping the "Set" key pressed longer.
Power outage recovery alarm Alarm symbol A-4 Valid during internal/external temperature control	 Shown alternately (Measured temperature) Alarm The alarm LED comes and control will continue or stop according to the selection for the power outage recovery function.	Power supply stopped tentatively during temperature control or rotation control and then recovered. When recovering power, control will be resumed or stopped according to the setting of the power outage recovery function. The alarm can be released with the "Set" key.
External temperature sensor wrong connection alarm Alarm symbol MIS Valid during internal temperature control	 Blinking The alarm LED comes on and all control sessions will stop. Alarm	An external temperature sensor was connected while internal temperature control is active. You can release by removing the external temperature sensor and pressing the "Set" key. ※Connect the external temperature sensor while the product power is OFF.
R.P.M. alarm Alarm symbol F-4 Valid during internal/external temperature control	 Shown alternately (Set number of rotations) Alarm The alarm LED comes on and all control sessions will stop.	The motor was overloaded. Malfunction occurred to the motor. Malfunction occurred to the control assembly. The alarm cannot be released until the malfunction is solved and the power is reset. Stop operation and contact your dealer or the nearest service center.
Watch dog	There is no specific alarm indicated and control will be reset.	The temperature controller is in an abnormal state due to noises. Move any noise sources near the product away. The environment temperature exceeds 35℃. Stop operation and wait until the environmental temperature has decreased before resuming operation. If the causes are unknown, stop operation and contact your dealer or the nearest service center.

4 Installation

4-1 Installation environment

⚠ WARNING

Do not install the product in a potentially hazardous location.

This products is not designed with explosion-proof structure. Using the unit in a potentially hazardous location may cause a fire.

⚠ WARNING

Handle deleterious or poisonous solvents in the draft chamber.

Note that mishandling of deleterious or poisonous solvents might cause an unexpected accident.

Select the installation site that meets the following conditions.

- Indoors
- No inflammable solid or liquid or gas around the unit.
- Ambient temperature must be from 5 to 40℃.
- No dew condensation
- Lesser humidity and no dripping on the unit.
- Lesser dust
- No direct sun light
- Well-ventilated
- Level, stable, and firm place
  (Confirm the weight of the product during operation.)

4-2 Installation conditions

⚠ CAUTION

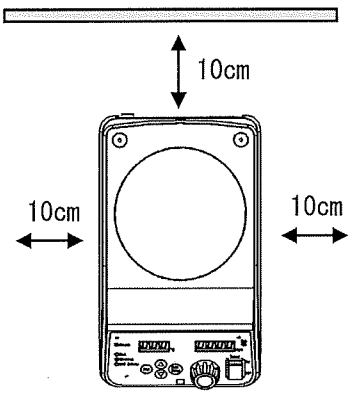
Avoid moving the unit during and for some time after operation.

Solution may cause burn if it spills over on your hand or other parts of the body.
It may spill over on the product and cause a malfunction.
Avoid moving the unit during and for some time after operation.

⚠ CAUTION

Assure some space around the unit.

To maintain the performance of the product, be sure to assure spaces shown in the diagram or larger between the product and the walls or the ceiling.



⚠ CAUTION

Do not tilt the body.

The unit has a motor inside.
Do not install the unit in a tilted position.

4-3. Connecting the utilities

⚠ WARNING

Confirm the voltage, phase, capacity, and the type of receptacle of power supply.

Wrong connection of power supply may cause fire or electric shock

⚠ WARNING

Do not use the branching socket or table tap.

It may cause burnout of burn out of cables or a fire from overcurrent.

⚠ WARNING

Never force the power cable to bend for use.

The cable may be damaged and contact with damaged portion may cause electric shock. Fire may occur.

⚠ WARNING

Be sure to connect the earth wire.

Failure to connect the earth wire may cause an electrical shock.

⚠ WARNING

Connect the earth wire correctly.

Never connect the earth wire to the gas pipe or water pipe to prevent electric shock.

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

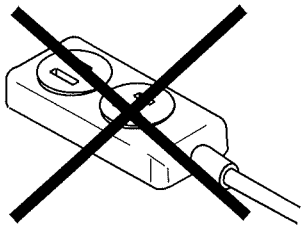
(2) Check the receptacle of installation place.
Prepare a receptacle g with earth

※ Do not connect the power plug in this stage.

※ Check that the sheath of the power cord is not damaged.
A damaged cord may cause an electrical shock.

※ Do not use a branching socket or a power strip for connection to the power supply.

Power supply for connection	
Voltage	Current
AC220V	10A



5 Operation

5-1 Preparation

⚠ WARNING

Take extreme care for use of flammable or combustible solutions.

Flammable or combustible solutions may vaporize and burn when they are left at a temperature of a room temperature or higher (at a lower temperature for some solutions). Be sure to assure proper ventilation and take extreme care when using such solutions.

※The unit is not of an anti-explosion structure.

⚠ CAUTION

Stop operation if you notice any abnormal conditions.

If you notice an abnormal condition, turn the power switch OFF and refer to "6.Causes of troubles and solutions" on P.20.

⚠ CAUTION

Do not place any large magnetic material.

The magnet may be attached toward the magnetic material, causing excessive load on the motor. This results in either motor damage or motor overheat, and the internal temperature may rise to damage the board.

⚠ WARNING

Do not wrap the hot plate and the body with aluminum foil.

Heat will accumulate inside and the internal temperature of the body may become extremely high.
Never operate the unit with the hot plate and the body wrapped.

⚠ CAUTION

Take extreme care for possible influences from magnetism.

This product has some magnetism and avoid using close to any devices that are susceptible to magnetism (magnetic data storage devices or a cardiac pacemaker).

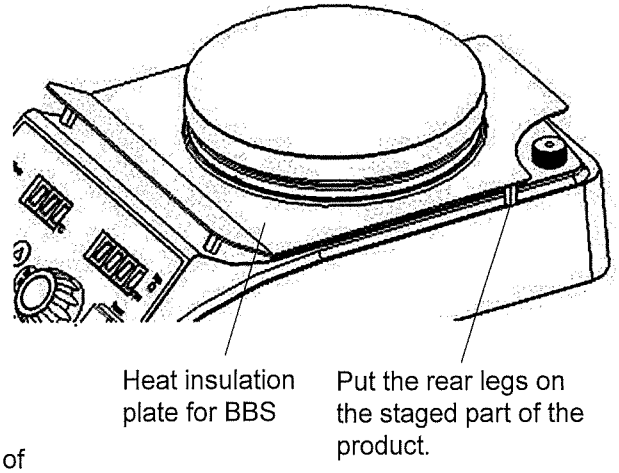
⚠ CAUTION

Take care for handling of the hot plate.

Placing a heavy container onto the hot plate roughly or applying a strong force in an oblique direction, the internal components of the plate may be damaged and the plate may be tilted.
Be sure to place a container gently from straight above.

5-1-1 Installing the heat insulation plate for BBS

1) First place the heat insulation plate for BBS on the body when you are going to use the optional aluminum block BBS type.

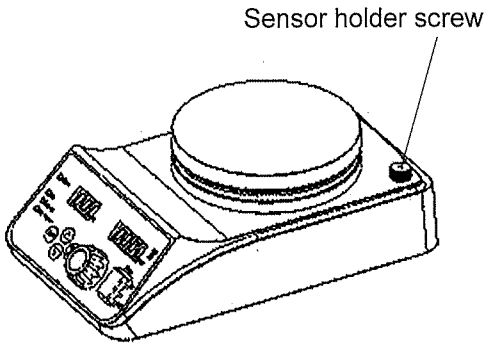


> ⚠ CAUTION
>
> **Be sure to use the heat insulation plate for BBS**
>
> Radiation heat from the aluminum block increase the internal temperature of the product and damage substrates or other components.
> Be sure to use the heat insulation plate for BBS.

※Refer to the operation manual for the BBS for details of the aluminum block BBS type.

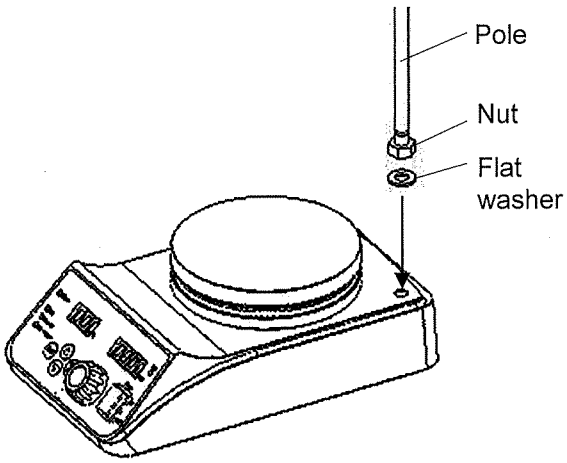
5-1-2 How to install the RCH pole

1) Loosen and remove the sensor holder screw.



2) Install the nut and the flat washer included to the threaded part of the pole, screw the threaded part of the pole into the body and then tighten the nut to fix the pole securely.

RCH pole (sold separately)
Code No.264790



5-1-3 Connecting the power supply

1)Make sure that the power switch of the product is OFF.

2)Connect the power cord included with product.

※Do not connect any cords other than the power cord included.

5-2 Setting the upper temperature limiter

(1) About the upper temperature limiter

When the set temperature for the internal temperature sensor exceeds the measured temperature on the upper temperature limiter, an alarm is indicated and all control sessions will stop.

※This is valid during both of internal temperature and external temperature control sessions.

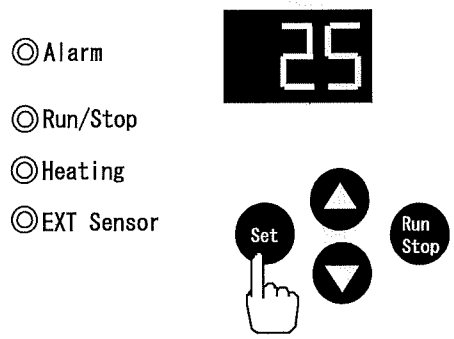
※The temperature for the upper temperature limiter is set at 10℃ at factory shipping for safety.
With this setting, the "A-0" upper temperature limit alarm will be triggered on the initial power ON and you need to change the setting for the upper temperature limiter according to the specific operating conditions.

(2) Setting the upper temperature limiter

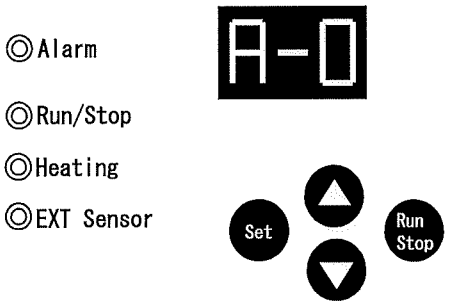
※Set the temperature for the upper temperature limiter higher than the temperature control setting.

※We recommend setting the upper temperature limiter to 330℃ or higher since the internal temperature sensor may exceed 300℃ during temperature control even if the liquid temperature is 100℃ or below during control of the external temperature.

1) Keep the "Set" key pressed longer.

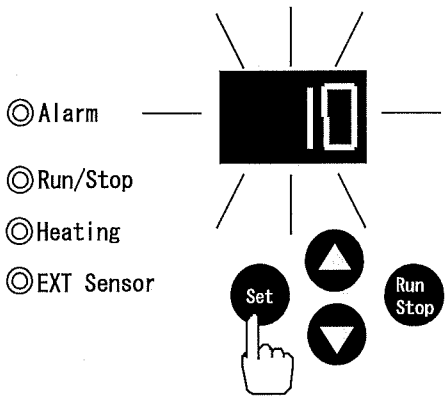


2) Release the finger off the key when the indication on the temperature display changes to "A-0".



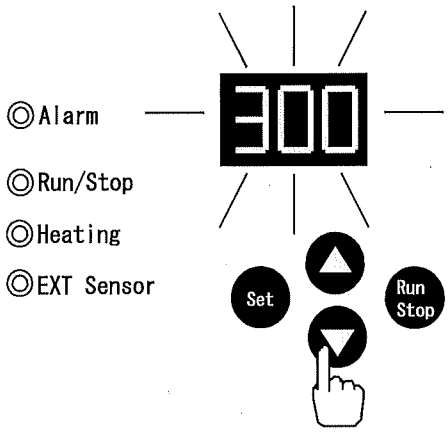
3) Press the "Set" key while "A-0" is indicated.
The indication on the indicator changes to the set temperature (flashing) of the upper temperature limiter and setting of a temperature is enabled.

※ The set temperature is that of the last session.
It is set at 10℃ at factory shipping.



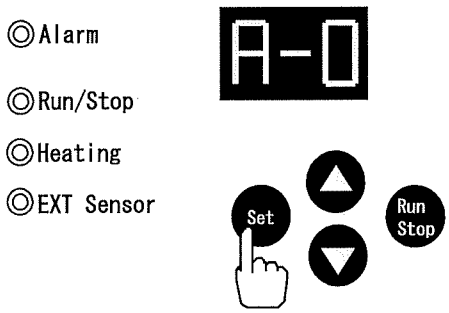
4) Press the "▲" and "▼" keys to enter a temperature you want to set.

※ Each press of the "▲" and "▼" keys changes the temperature by 1℃. Keeping them pressed will continuously change the temperature.



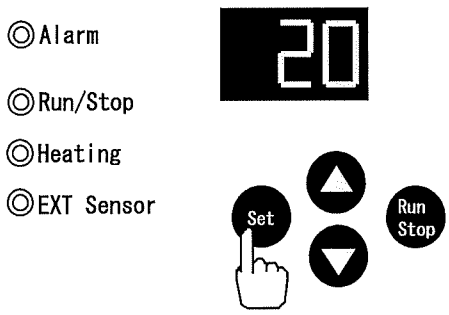
5) Press the "Set" key.
The set temperature (flashing) indicated is determined and the indication will change to "A-0".

※ The indication will return to the measured temperature indication and the settings will be cancelled if 30 seconds have passed without any key operations during temperature setting.



6) Keep the "Set" key pressed longer.
The indication on the indicator will return from "A-0" to the measured temperature.

7) Release the finger off the "Set" key.



5-3 Setting a temperature control method

(1) The products support two temperature control methods below. Make setting according to the control method you want to use.

1) Internal temperature control : The sensor integrated in the product body controls the temperature.
2) External temperature control : The external temperature sensor included with the product is used to control the temperature by installing it directly to the unit to control.
The internal temperature sensor keeps measuring the temperature for indicating possible alarms even during external temperature control.

Control method	Temperature measurement	Ext. temperature sensor	Upper temperature limiter	EXT Sensor LED
Internal temperature control	Internal sensor	Not connected	Valid	Off
External temperature control	External sensor	Connected	Valid	On

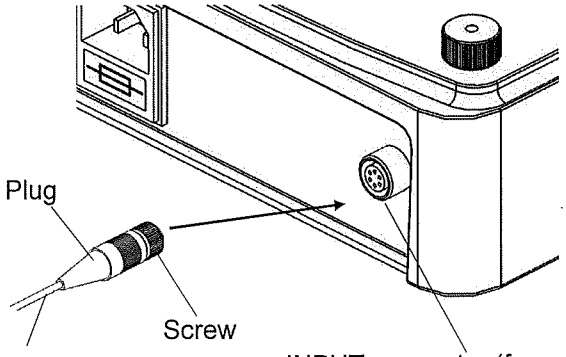
(2) How to switch temperature control methods
Temperature control methods will be recognized automatically when the external temperature sensor is connected.

※ Switch temperature control methods while the power to the product is OFF. Installing or removing the external temperature sensor while the product power is ON will trigger an alarm.

1)Internal temperature control
- Turn the product power ON when the external temperature sensor is not connected.
- Make sure that the "EXT Sensor" LED on the control panel is off.

2)External temperature control
- Remove the protective cap of the INPUT connector on the rear of the product and turn power ON with the external temperature sensor connected.

※Tighten the screw of the external temperature sensor securely and make sure that it will not come off.



- Make sure that the "EXT Sensor" LED on the control panel is on.

※During control with the external temperature sensor, the set temperature may not be attained depending on the device to control.

※After connecting the external temperature sensor, do not hold its plug and turn forcibly. The screw may be loosened and cause a disconnection.

⚠ CAUTION

Take care for handling of the external temperature sensor.

Insert the tip of the external temperature sensor into the specimen (water bath or aluminum block) for at least 20mm.
Also be sure to connect to the INPUT connector on the rear of the product.

⚠ CAUTION

Withstand temperature of the lead wire sheath of the external temperature sensor is 200℃.

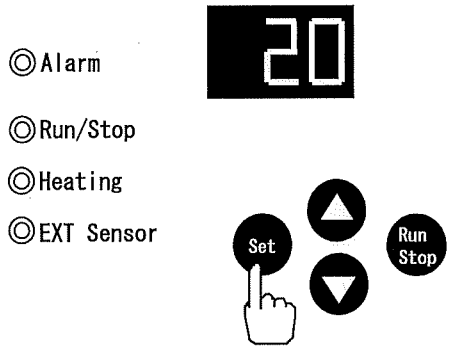
Withstand temperature of the lead wire sheath of the external temperature sensor is 200℃.
Take care not to come into contact with the hot plate or a container installed.

5-4 Temperature setting

※ The setting is common for internal temperature control and external temperature control.
The setting can be changed during temperature control as well as temperature control is stopped.

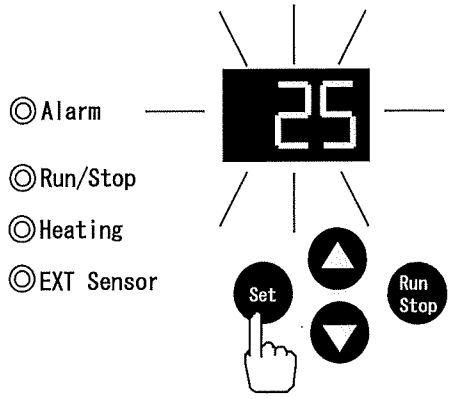
※ Set the temperature at a temperature higher than the environmental temperature of the product by at least 30℃.

1) Press the "Set" key.



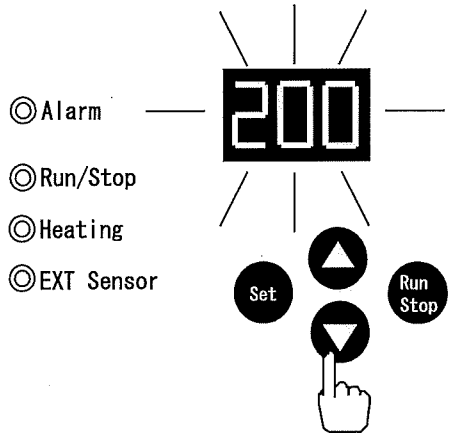
2) The indication on the indicator changes to the set temperature (flashing) and setting of a temperature is enabled.

※ It is set at 25℃ at the time of factory shipping.



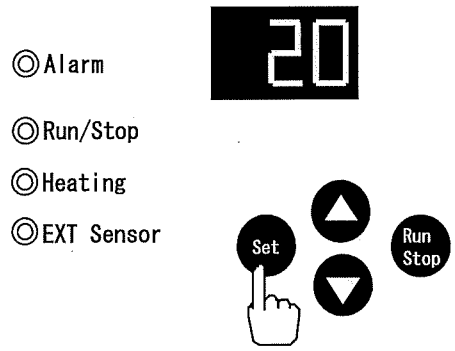
3) Press the "▲" and "▼" keys to enter a temperature you want to set.

※ Each press of the "▲" and "▼" keys changes the temperature by 1℃. Keeping them pressed will continuously change the temperature.



4) Press the "Set" key.
The set temperature (flashing) indicated is determined and the indication will change to "measured temperature".

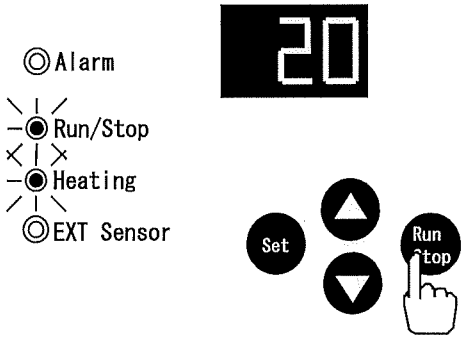
※ The indication will return to the measured temperature indication and the settings will be cancelled if 30 seconds have passed without any key operations during temperature setting.



5-5 Starting/Stopping temperature control

※ This operation is common for internal temperature control and external temperature control.

1) Starting temperature control
- Press the "Run/Stop" key.
- The "Run/Stop" LED comes on and control starts.
- The "Heating" LED flashes depending on the heater output.



⚠ CAUTION

Do not touch the hot plate.

The hot plate is hot during temperature control, immediately after temperature control or use of the product.
Wait and make sure that the hot plate has sufficiently cooled down before attempting to touch it. In particular during external temperature control, the hot plate surface may be 1300℃ or higher even when the liquid temperature is 100℃or less.

⚠ CAUTION

Because of the product characteristics, the top surface of the product or the hot plate may become hot up to about 50℃ when the room temperature is high because the motor rotation generates an eddy current.

⚠ CAUTION

Do not connect the external temperature sensor during internal temperature control.

All control sessions will stop and the external temperature sensor wrong connection alarm is indicated.
Connect the external temperature sensor while power is OFF.

⚠ CAUTION

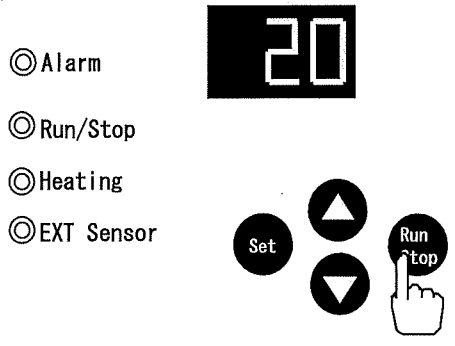
Do not remove the external temperature sensor during external temperature control.

All control session will stop and the external temperature sensor malfunction alarm is indicated.
Remove the external temperature sensor while power is OFF.

※ The heat insulation material inside the hot plate may burn and be discolored depending on set temperatures, which will not adversely affect the performance in any way.

※ The silicone water repellant in the heat insulation material may evaporate and generate steam or odor depending on set temperatures, which does not indicate a abnormality of the product.
Such symptom will not repeat once it occurred.

2) Stopping temperature control
- Press the "Run/Stop" key.
- The "Run/Stop" LED goes off and control stops.
- The "Heating "LED goes off.



5-6 Starting/Stopping rotation control

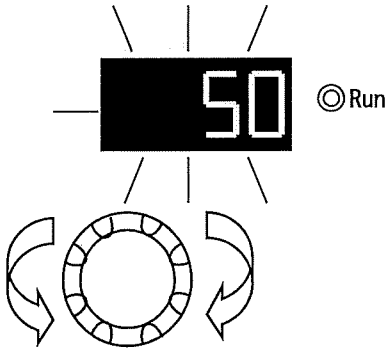
※ This operation is for internal temperature control and external temperature control.
The setting can be changed during any session of temperature control, temperature control stop, rotation or rotation is stopped.
Note that rotation will stop when the temperature control alarm is triggered.

※ The stirrer may lose synchronism at a higher rotation.
Set a rotation while monitoring the operation of the stirrer.

※ At a higher rotation, the hot plate will be hot from eddy current and results in an error in temperature adjustment precision at a lower temperature range. We recommend 500r.p.m. or lower speed at about 100°C or lower set temperature.

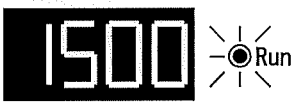
※ When the rotation abnormality alarm is triggered, the rotation control stops and temperature control stop as well.

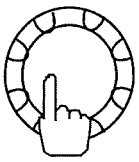
1) How to set
- Turning the encoder clockwise increases the number of rotations.
- Turning the encoder anticlockwise decreases the number of rotations.



※ Indication flashes during setting of a number of rotations.
After a while, the state will change from flashing to lit.

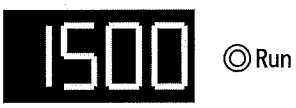
2) Starting rotation
- Press the encoder.
- The "Run" LED comes on and rotation starts.
- While the number of rotations indicator is flashing, adjustment to the set number of rotations is in progress. The state changes from flashing to lit when the actual number of rotation matches the set number of rotations.

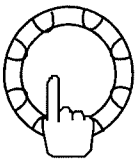




※ The indicator of the number of rotations indicates the set number of rotations irrespective of the product is in control or in control stop state.

3) Stopping rotation
- Press the encoder.
- The "Run" LED goes off and rotations stops.

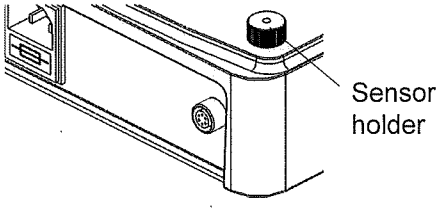




Procedures after operation

Turn the switch OFF and remove the power plug out of the outlet when you are not going to use the product for an extended period of time.

It is convenient to insert the external temperature sensor into the sensor holder while it is not used
Do not insert any object into the holder other than the sensor.



5-7 Setting the power outage recovery function.

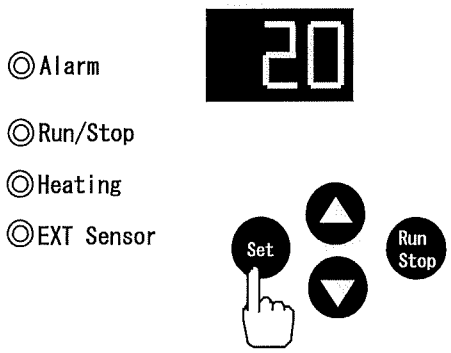
You can set operations on recovery from power outage that occurred during control.
(Power supply to the product is turned OFF and then ON during control.)

※ The power outage recovery function is ON (enabled) at the time of factory shipping.

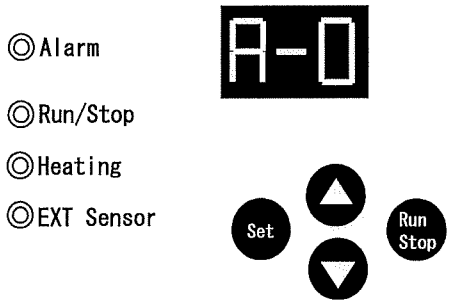
※ This function is common for the internal temperature control and the external temperature control. You can change the setting irrespective of the product is in temperature control, temperature control stop, rotating or in control stop state.

	A-4 setting	Alarm indication	Operation
Valid	ON	A-4	Control continues with the state before power outage
Invalid	OFF	A-4	All control session stop

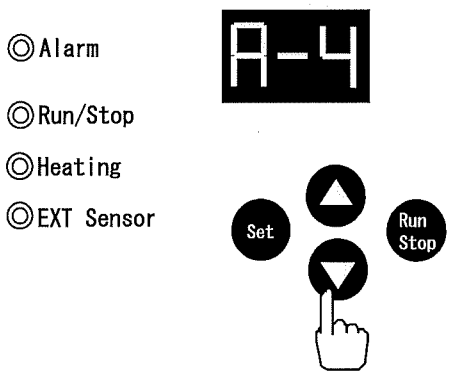
1) Keep the "Set" key pressed longer.



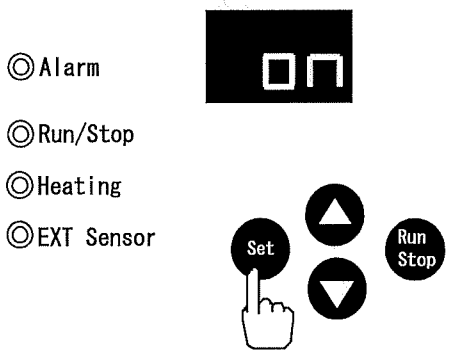
2) Release the finger off the key when the indication on the temperature display changes to "A-0".



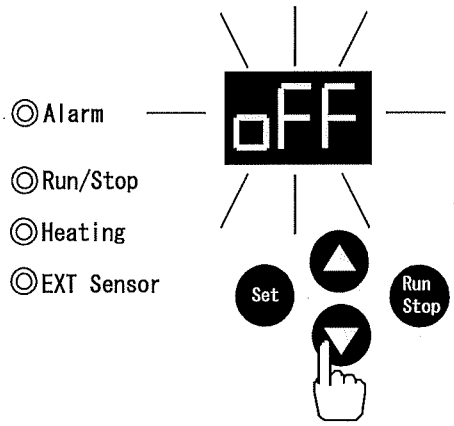
3) Press the ▲" or the "▼" key to indicate "A-4" in the temperature indicator.



4) Press the "Set" key.

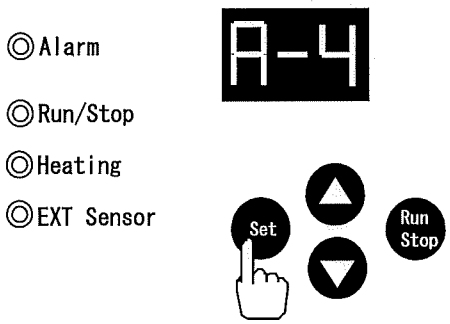


5) Press the "▲" or the "▼" key to select "ON" or "OFF".



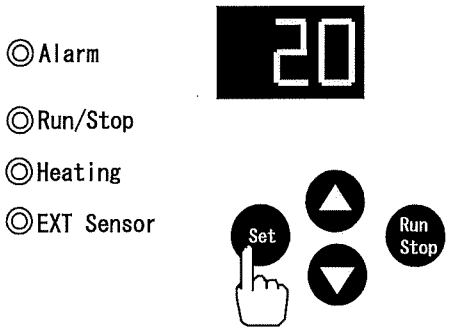
6) Press the "Set" key.
and the indication will change to "A-4".

※ The indication will return to the measured temperature indication and the settings will be cancelled if 30 seconds have passed without any key operations during temperature setting.



6) Keep the "Set" key pressed longer.
The indication on the indicator will return from "A-4" to the measured temperature.

7) Release the finger off the "Set" key.



6 Trouble shooting

For any trouble not described in the table below. contact the nearest service center.

Symptom	Causes	Solutions
The power switch has been turned on but nothing appears on the indicator.	Fuse has blown.	Replace the fuse.
	The power plug has come off of the outlet or the product. Or is not inserted completely.	Turn the power switch OFF, securely insert the power plug into the outlet and then turn the power switch ON.
	The power switch has a malfunction.	Immediately stop operation and contact your dealer or the nearest service center.
	The control substrate has a malfunction.	
	The temperature fuse has blown.	
Temperature control is not possible. Temperature does not reach the set temperature.	The set temperature is different.	Check the set temperature. Set the temperature higher at least 30℃ than the environmental temperature.
	The environmental temperature is high.	Check the environmental temperature. Operating environmental temperature range : 5～40℃
	The upper temperature limiter has activated.	Check the set temperature of the upper temperature limiter. Set the temperature for the upper temperature limiter higher than the temperature control setting. If the limiter activates again, immediately stop operation and contact your dealer or the nearest service center.
	The temperature sensor has a malfunction.	Immediately stop operation and contact your dealer or the nearest service center. ※If the internal temperature is defective, proper control will be impossible even during external temperature control.
	The control substrate has a malfunction.	Immediately stop operation and contact your dealer or the nearest service center.
	The heater is disconnected.	
	The connector for the external temperature sensor is damaged.	
	The external temperature sensor is not inserted in the specimen (water bath or aluminum block) properly.	Insert the external temperature sensor properly during external temperature control.
	Load on the specimen (water bath or aluminum block) is too large.	Reduce load.
	The set number of rotations is too high.	The hot plate may be overheated from eddy current and cause some error in temperature control. In such a case, reduce the number of rotations.

Symptom	Causes	Solutions
Temperature control is not possible. The set temperature is not attained.	Stirring is not made.	The specimen is not stirred and temperature distribution may be uneven, in which case stirring shall be conducted.
	Air from an air conditioner hits directly making the product cooler.	Keep the product out of air from an air conditioner.
	Discharge speed in the draft chamber is high making the product cooler.	Lower the discharge speed in the draft chamber.
	Source voltage is low.	Use a reliable power supply outlet
Internal temperature control and external temperature control cannot be switched.	The external temperature sensor has a malfunction.	Immediately stop operation and contact your dealer or the nearest service center.
	The control substrate has a malfunction.	
Rotation will not start. Rotation is unstable. The stirrer loses synchronism.	Number of rotations is not set.	Check the set number of rotations.
	The stirrer is not inserted in the specimen.	Insert the stirrer.
	The stirrer magnetism is low.	Replace the stirrer
	Liquid specimen amount is too large or viscosity is too high.	Reduce amount or check the viscosity.
	The number of rotations is too high.	Lower the number of rotations.
	The motor has a malfunction.	Immediately stop operation and contact your dealer or the nearest service center.
	The control substrate has a malfunction.	
	A strong stirrer other than the optional is used and the motor is under excessive load.	Use the optional stirrer.

7 Maintenance · Inspection

7-1 Cleaning and care of the product

⚠ WARNING

Never attempt to disassemble the product.

The unit contains parts with high voltage applied or may become hot, and disassembly may cause an electrical shock or an injury.

⚠ CAUTION

Use a correct method and items for cleaning or caring the product.

When cleaning or maintaining the product, never splash water to the exterior or the inside directly, do not put any foreign materials and never use the cleanser,thinner, oil, kerosene, acid, and equivalent. Otherwise, the user may suffer electric shock or damage to the product.

1. Turn the power switch OFF and remove the plug out of the outlet before maintenance.
2. Use a tightly wrung soft cloth for cleaning. Use a mild detergent for stubborn dirt and wipe off any remaining solution.

⚠ HOT SURFACE

Do not touch the hot plate during and immediately after use.

The hot plate is hot during and immediate after temperature control.
Wait until you have confirmed that the hot plate has sufficiently cooled down.

⚠ CAUTION

Do not cool the hot down rapidly.

Cooling the heated hot plate rapidly may cause a heater disconnection.

⚠ CAUTION

Remove dust frequently from the receptacle.

If the device is used while being connected to the receptacle for a long time, dust may accumulate in a gap between the receptacle and power plug. The device may fail and may be ignited. (Tracking phenomenon)

7-2 How to replace the fuse

If the fuse has blown, replace it with a new one.

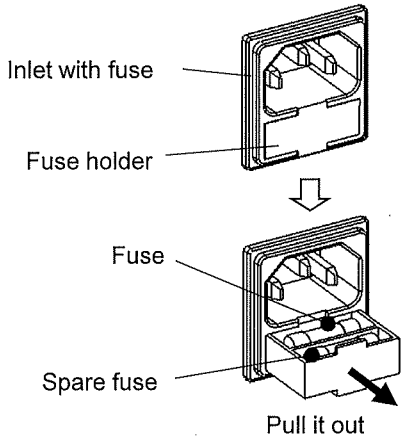
1) Turn OFF the power switch and pull out the power cord from the inlet with fuse.

2) Hold the fuse holder between the tips of your fingers and pull it out.
The fuse that is set on the back side is the used fuse and the set that is set on the front side is the spare fuse.

3) Pull out the spare fuse on the front side and replace it with the fuse on the back side.

※Be sure to use the specified fuse.
If you use other fuse, the meltdown is not caused when the overcurrent flows and it may cause an accident such as fire.

※If a meltdown is soon caused again after the replace -ment of fuses, stop using the product immediately and contact the dealer you purchased the product from/or your nearest service center.



Code No.	Name
148380	Fuse 4A

8 Disposal of the product

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

Main components and disposal instructions

Component	Weight	External dimensions[mm]	Method for disposing
Main unit	Approx3.0kg	165W×275D×90H	Request the disposal operator for disposal.

※We ask you to discard packing materials after classifying them by material types.

Materials of major components

Component	Principal parts	Principal component parts	Major materials
Main body	Casing assembly	Casing	Aluminum die-cast (ADC-12)
		Spacer	Stainless steel(SUS304), brass (C3604) Polyacetal resin
		Rubber leg	Elastomer styrene, polyamide 6
		Rotation adjusting knob	PET-GF15%
		Sensor holder	Polyacetal resin
		Sheet metal	Stainless steel(NSSC180)
	Stirrer bed	Hot plate	Aluminum die-cast (ADC-12)
		Hot plate support	PPS-GF40%
		Heat insulation material	Silica aero gel Glass fiber non-woven cloth, water repellent (silicon)
		Heat insulation material collar	Glass fiber, silicate binder
	Heat insulation plate for BBS	Sheet metal	Stainless steel(SUS304)
		Spacer	PPS
	Stirring assembly		Neodymium(Nd), iron(SS-41)
	Electric components	Substrate	Epoxy glass resin, copper
		Motor	Stainless steel, aluminum, copper wire
		Heater	Mica, copper wire
		Internal temperature sensor	Stainless steel, copper wire
		Power switch	Polyester resin, PVC
		Power cord, internal wiring	PVC, copper wire
External temperature sensor			Stainless steel, silicone, FEP, copper wire, zinc, polyacetal resin

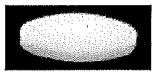
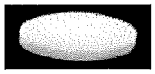
※When disposing of the product, please segregate components according to the materials in the table above.

9 After-sale Services

1. If the product does not operate well, check according to the chapter of "Troubleshooting" to determine whether it is failure or not.
2. If the trouble cannot be solved, contact the store where you bought this product or nearest Service Center listed on this manual for repair.
3. We repair the product free of charge during the warranty period according to the warranty provisions.
4. After the warranty period, we repair the product with charge upon your request.

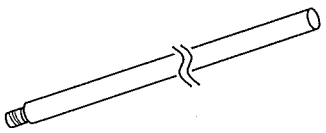
10 Consumables・Spare Parts

■High performance stirrer

Product name	Model	O.D. × length[mm]	Qty	Code No.
Teflon® stirrer 	TSB-30	8 × 30	5	123830
	TSB-40	8 × 40	5	123840
Teflon® stirrer (Football type) 	TFS-15	6 × 15	5	200280
	TFS-20	10 × 20	5	200290
	TFS-25	10 × 25	5	200300
	TFS-30	15 × 30	5	200310
	TFS-35	15 × 35	5	200320
Teflon ® high performance stirrer (Football type) 	TFX-15	6 × 15	1	200390
	TFX-21	10 × 20	1	240320
	TFX-25	10 × 25	1	200410
	TFX-30	15 × 30	1	200420
	TFX-35	15 × 35	1	200430
	TFX-40	20 × 40	1	200440
Teflon ® stirrer (disc type)	ST-10L	Φ9 × 6H	1	182100

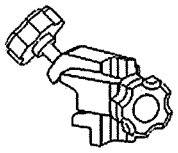
■Optional parts

①Pole for RCH



Code No.	Pole size [mm]
264790	Φ10 × 465

②ZC clamp

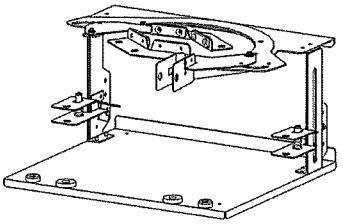


Code No.	Model	Clamp diameter [mm]
124560	ZC	φ22(MAX)

③Temperature sensor for RCH-1000

Code No.	265680

④Container fall preventive device



Code No.	264720

⑤Fuse 4A

Code No.	148380

※Refer to the operation manual for the model BBS for details of the aluminum block BBS.