

## 英文取説納付時の注意事項

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本書に含まれる以下の要素は、案件毎に修正が必要となる可能性があります。  
納付時には対象製品の仕様を確認の上、必要に応じて修正を加えてください。

1) P.6 “Choose a correct power distribution board or receptacle”中、電源供給方法についての表記。

<b>Electric capacity:</b>	IU400: 100V AC (Single phase), 13A
	IU800: 100V AC (Single phase), 14.5A

2) P. 57～ “Specification”中、電源仕様に関する表記。

Power supply (50/60Hz)	100V AC 13A	100V AC 14.5A
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3) P.58～ “Wiring Diagram”の結線図中、入力電源表記。

4) P.60～ “Replacement Parts Table”中、各種交換部品の電圧・電気容量に関する表記。

以上



## Stability Low Temperature Incubator

Model

# IU 400/800

## Instruction Manual

- Third Edition -

- Thank you for purchasing " Stability Low Temperature Incubator, IU Series" of Yamato Scientific Co., Ltd.
- To use this unit properly, read this "Instruction Manual" thoroughly before using this unit. Keep this instruction manual around this unit for referring at anytime.



**WARNING!**

Carefully read and thoroughly understand the important warning items described in this manual before using this unit.

**Yamato Scientific Co., LTD.**

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## Explanation


### MEANING OF ILLUSTRATED SYMBOLS


#### Illustrated Symbols

Various symbols are used in this safety manual in order to use the unit without danger of injury and damage of the unit. A list of problems caused by ignoring the warnings and improper handling is divided as shown below. Be sure that you understand the warnings and cautions in this manual before operating the unit.

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 **WARNING!** If the warning is ignored, there is the danger of a problem that may cause a serious accident or even fatality.

 **CAUTION!** If the caution is ignored, there is the danger of a problem that may cause injury/damage to property or the unit itself.

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#### Meaning of Symbols



This symbol indicates items that urge the warning (including the caution). A detailed warning message is shown adjacent to the symbol.



This symbol indicates items that are strictly prohibited. A detailed message is shown adjacent to the symbol with specific actions not to perform.



This symbol indicates items that should be always performed. A detailed message with instructions is shown adjacent to the symbol.

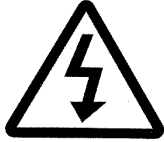
# Cautions in Using with Safety

## Table of Illustrated Symbols

### Warning



Warning,  
generally



Warning,  
high voltage



Warning,  
high temperature



Warning,  
drive train



Warning,  
explosive

### Caution



Caution,  
generally



Caution,  
electrical shock



Caution,  
scald



Caution,  
no road heating



Caution,  
not to drench



Caution,  
water only



Caution,  
deadly poison

### Prohibit



Prohibit,  
generally



Prohibit,  
inflammable



Prohibit,  
to disassemble



Prohibit,  
to touch

### Compulsion



Compulsion,  
generally



Compulsion,  
connect to the  
grounding  
terminal



Compulsion,  
install on a flat  
surface



Compulsion,  
disconnect the  
power plug



Compulsion,  
periodical  
inspection

## Cautions in Using with Safety

### Fundamental Matters of “WARNING!” and “CAUTION!”

#### **WARNING!**

##### **Do not use this unit in an area where there is flammable or explosive gas**

Never use this unit in an area where there is flammable or explosive gas. This unit is not explosion-proof. An arc may be generated when the power switch is turned on or off, and fire/explosion may result. (Refer to page61 “List of Dangerous Substances”.)

##### **Always ground this unit**

Always ground this unit on the power equipment side in order to avoid electrical shock due to a power surge.

##### **If a problem occurs**

If smoke or strange odor should come out of this unit for some reason, turn off the power key right away, and then turn off the circuit breaker and the main power. Immediately contact a service technician for inspection. If this procedure is not followed, fire or electrical shock may result. Never perform repair work yourself, since it is dangerous and not recommended.

##### **Do not use the power cord if it is bundled or tangled**

Do not use the power cord if it is bundled or tangled. If it is used in this manner, it can overheat and fire may be caused.

##### **Do not process, bend, wring, or stretch the power cord forcibly**

Do not process, bend, wring, or stretch the power cord forcibly. Fire or electrical shock may result.

##### **Substances that can not be used**

Never use explosive substances, flammable substances and substances that include explosive or flammable ingredients in this unit. Explosion or fire may occur.

##### **Do not disassemble or modify this unit**

Do not disassemble or modify this unit. Fire or electrical shock or failure may be caused.

##### **Do not touch high-temperature parts**

Some parts of this unit may become hot during and after an operation. It may cause burns.

#### **CAUTION!**

##### **During a thunder storm**

During a thunderstorm, turn off the power key immediately, then turn off the circuit breaker and the main power. If this procedure is not followed, fire or electrical shock may be caused.

## Requirements for Installation

### **WARNING!**

#### 1. Always ground this unit



- Connect the power plug to a receptacle with grounding connectors.



- Do not forget to ground this unit, to protect you and the unit from electrical shock in case of power surge. Choose a receptacle with grounding connectors as often as possible.
- Do not connect the grounding wire to a gas pipe, or by means of a lightning rod or telephone line. A fire or electrical shock will occur.

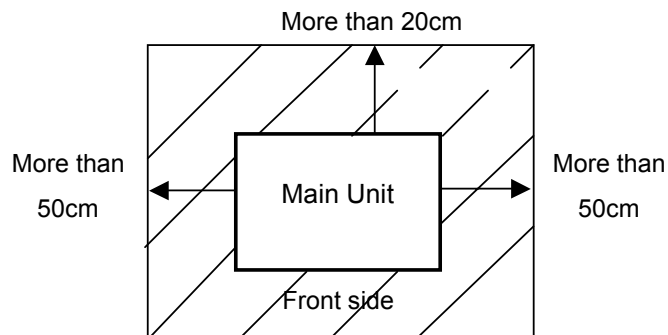
#### 2. Choose a proper place for installation



- Do not install this unit in a place where:
  - ◆ Rough or dirty surface.
  - ◆ Flammable gas or corrosive gas is generated.
  - ◆ Ambient temperature exceeds 35°C.
  - ◆ Ambient temperature fluctuates violently.
  - ◆ There is direct sunlight.
  - ◆ There is excessive humidity and dust.
  - ◆ There is a constant vibration.



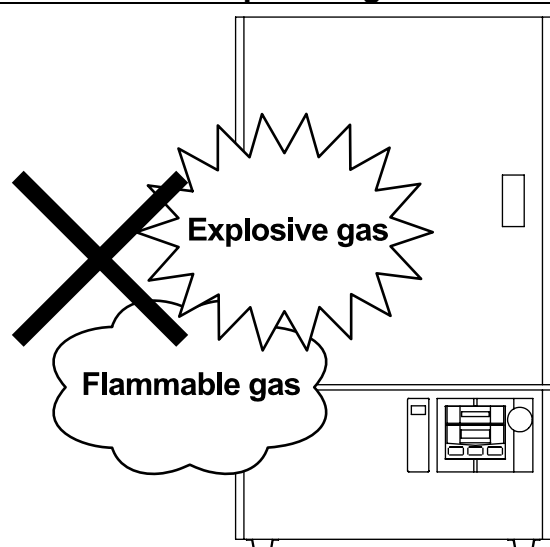
- Install this unit on a stable place with the space as shown below.



#### 3. Do not use this unit in an area where there is flammable or explosive gas



- Never use this unit in an area where there is flammable or explosive gas. This unit is not explosion-proof. An arc may be generated when the power switch is turned ON or OFF, and fire/explosion may result. (Refer to page 61 "List of Dangerous Substances".)

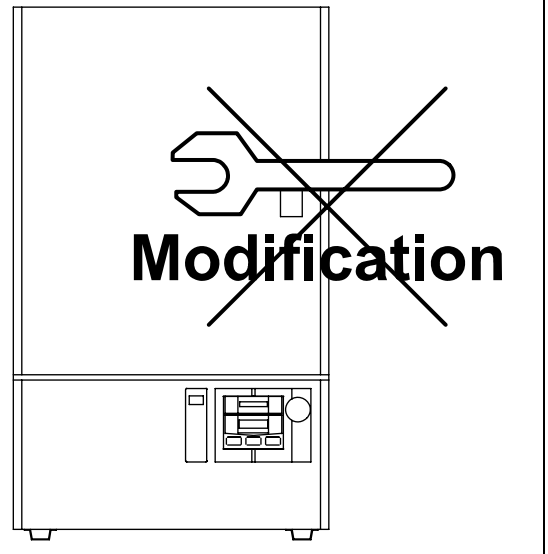


## Requirements for Installation

### 4. Do not modify



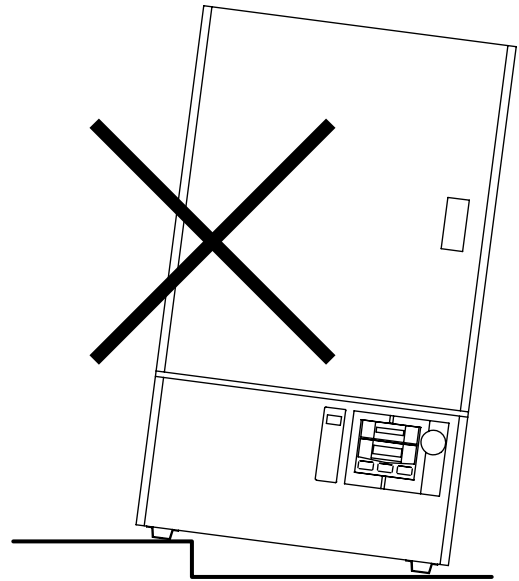
- Modification of this unit is strictly prohibited. This could cause a failure.



### 5. Installation on horizontal surface



- Set this unit to the flattest place. Setting this unit on rough or slope place could cause the vibration or noise, or cause the unexpected trouble or malfunction.





## Requirements for Installation

### **CAUTION!**

#### 6. Choose a correct power distribution board or receptacle



- Choose a correct power distribution board or receptacle that meets the unit's rated electric capacity.

**Electric capacity:** IU400: 100V AC (Single phase), 13A  
IU800: 100V AC (Single phase), 14.5A

**NOTE)**

There could be the case that the unit does not run even after turning ON the power. Inspect whether the voltage of the main power is lowered than the specified value, or whether other device(s) uses the same power line of this unit. If the phenomena might be found, change the power line of this unit to the other power line.

#### 7. Before/after installing



- It may cause injure to a person if this unit falls down or moves by the earthquake and the impact. etc.. To prevent, take measures that the unit cannot fall down, and not install to busy place.

#### 8. Handling of power code



- Do not entangle the power cord. This will cause overheating and possibly a fire.
- Do not bend or twist the power cord, or apply excessive tension to it. This may cause a fire and electrical shock.
- Do not lay the power cord under a desk or chair, and do not allow it to be pinched in order to prevent it from being damaged and to avoid a fire or electrical shock.
- Keep the power cord away from any heating equipment such as a room heater. The cord's insulation may melt and cause a fire or electrical shock.



- If the power cord becomes damaged (wiring exposed, breakage, etc.), immediately turn off the power at the rear of this unit and shut off the main supply power. Then contact your nearest dealer for replacement of the power cord. Leaving it may cause a fire or electrical shock.
- Connect the power plug to the outlet which is supplied appropriate power and voltage.

#### 9. Setting shelf



- Do not use other shelf than specified one. Failure to do so could cause the malfunction of the temperature control.

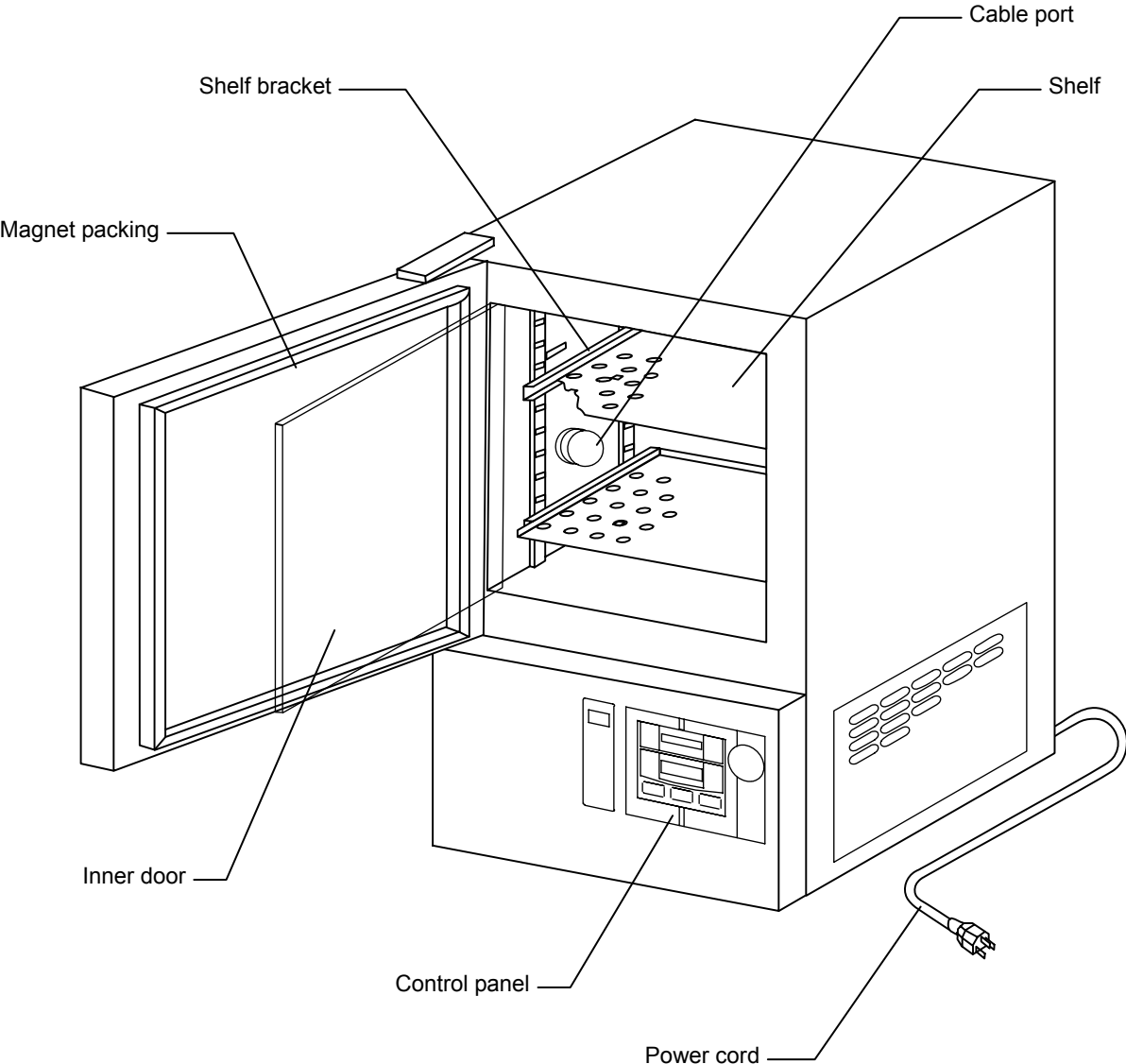


- Set the specific shelf plate(s) to the appropriate shelf pole, and use it (them).

# Description and Function of Each Part

## Main Unit

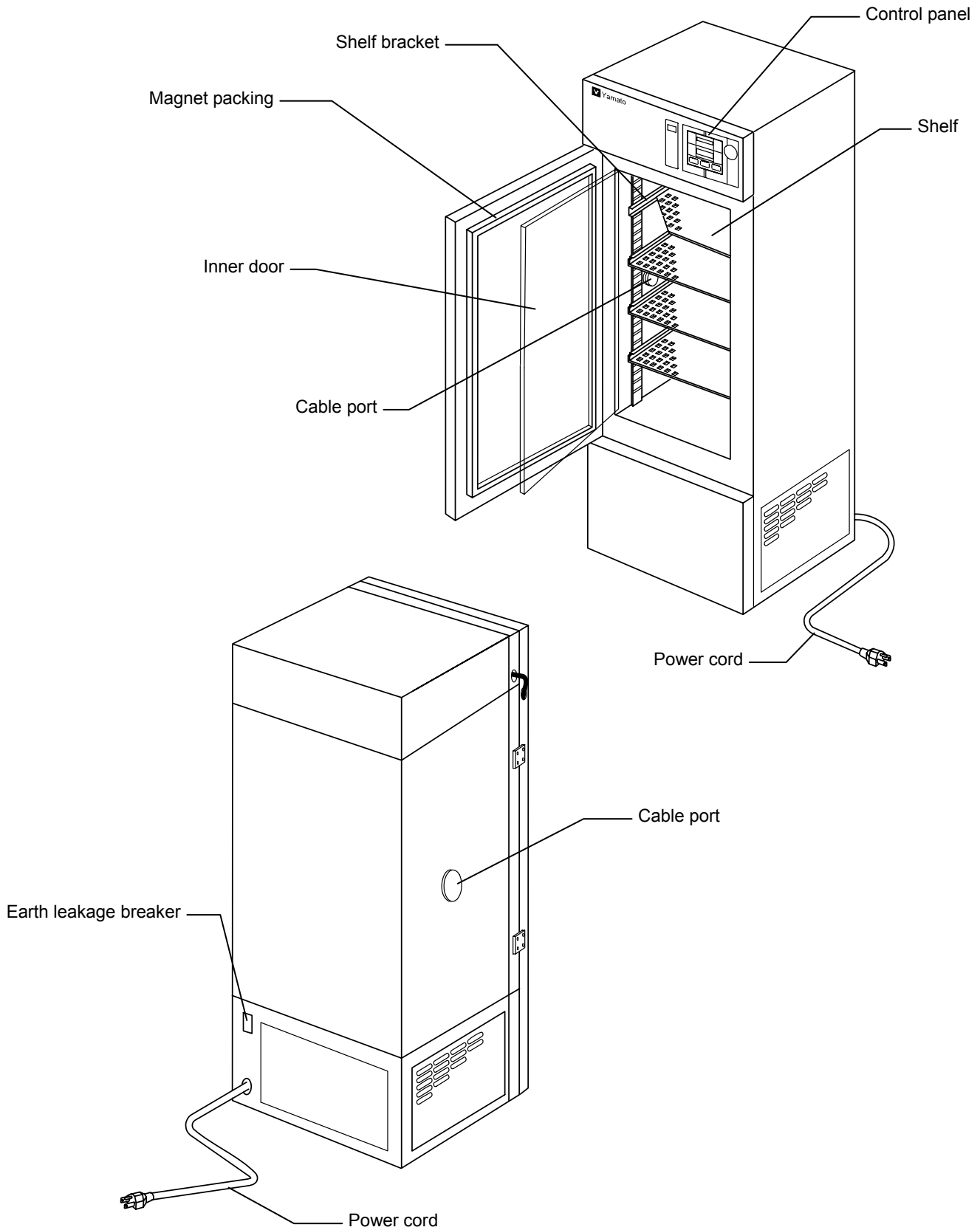
IU400



# Description and Function of Each Part

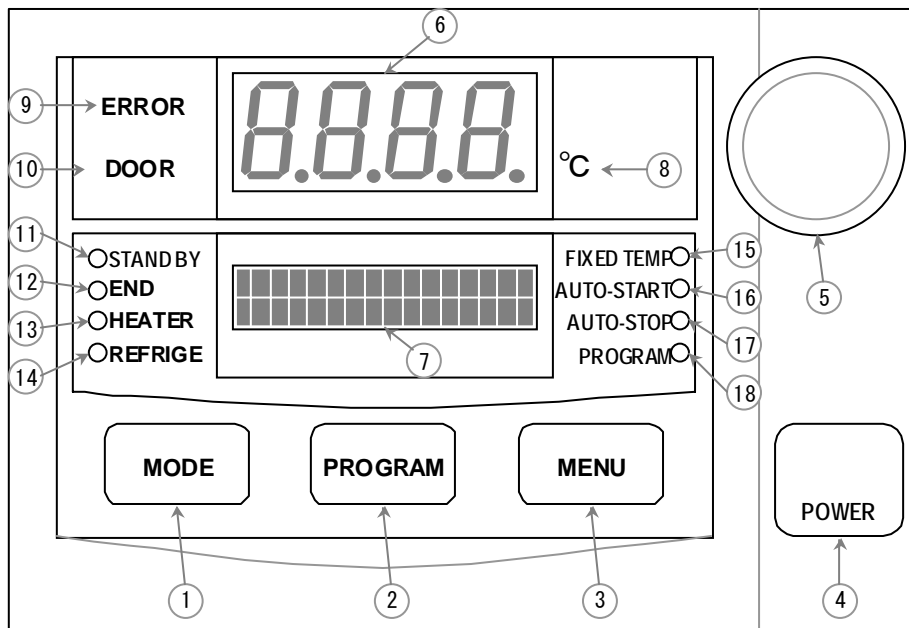
## Main Unit

IU800



# Description and Function of Each Part

## Control Panel



①	Mode Key	Starts/releases the function menu.
②	Program Key	Starts/releases the program menu.
③	Menu Key	Starts/releases the operation menu.
④	Power Key	Turns ON/OFF the power.
⑤	Jog Dial	Selects menu item and edit parameters.
⑥	Main Indicator	Indicates in-furnace temperature and error number.
⑦	Sub Indicator	Indicates various conditions of device with characters.
⑧	°C Lamp	Lights on while in-furnace temperature is indicated on the main indicator.
⑨	Error Lamp	Blinks when any trouble occurs.
⑩	Door Lamp	Lights on while the door is open.
⑪	Standby Lamp	Lights on while the device is in standby condition. Blinks while it is in startup wait state.
⑫	End Lamp	Blinks at autostop or end of the program operation.
⑬	Heater Lamp	Lights on while the heater is active.
⑭	Refrige Lamp	Lights on while the refrigerator is active. Blinks when the it is standby state.
⑮	Fixed Temp Lamp	Lights on during the fixed temperature operation. Blinks when selecting operation mode.
⑯	Auto Start Lamp	Lights on during the auto start operation. Blinks when selecting operation mode.
⑰	Auto Stop Lamp	Lights on during the auto stop operation. Blinks when selecting operation mode.
⑱	Program Lamp	Lights on during the program operation. Blinks when selecting operation mode.

## Preparation

### **WARNING!**

To prevent electric shock, be sure to connect the grounding wire of this unit to the grounding wire or terminal of the power source.

- Do not connect the grounding wire to a gas or water pipe.
- Never use a branched receptacle. It generates heat.
- Do not install this unit in a place where flammable gas or corrosive gas is generated.

### **CAUTION!**

Receptacle check:

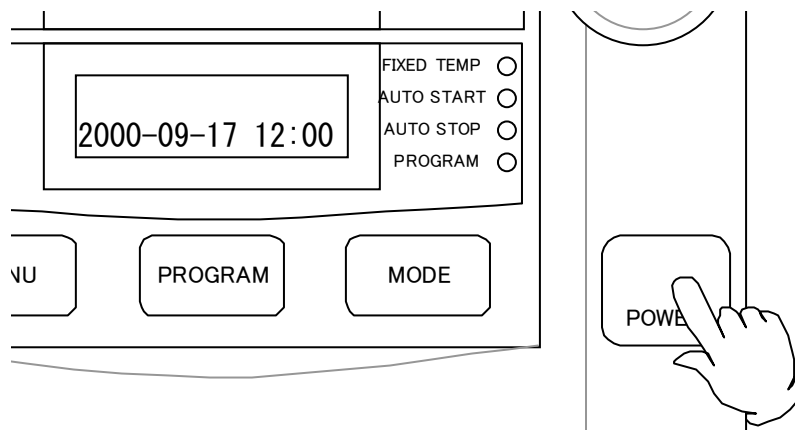
- Connect the power plug to appropriate receptacle.

Safety check:

- Check that the temperature of the independent overheating prevention device is set to 15°C higher than that of in-unit.

Electrical charge check:

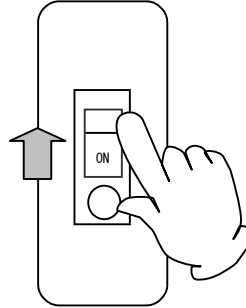
- In the following cases, the unit shall keep the current-carrying state for at least 25 hours with the breaker ON to charge the battery for data backup;
  - a) Installation of unit at delivery
  - b) When turning on the unit after the breaker has been OFF for long termThe power key on the control panel may set to "OFF".



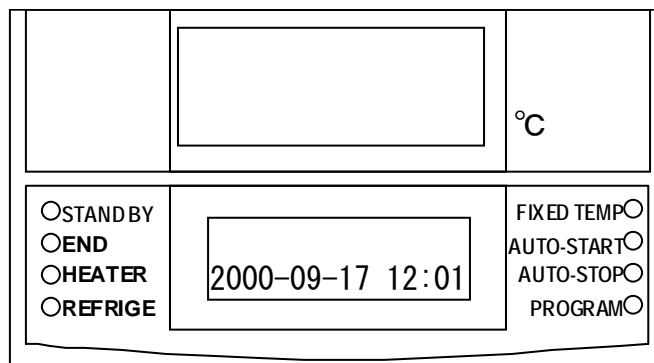
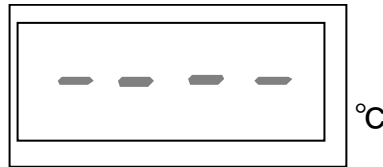
## Preparation

### Turn on earth leakage breaker

- Turn on the earth leakage breaker at the right side of this unit.



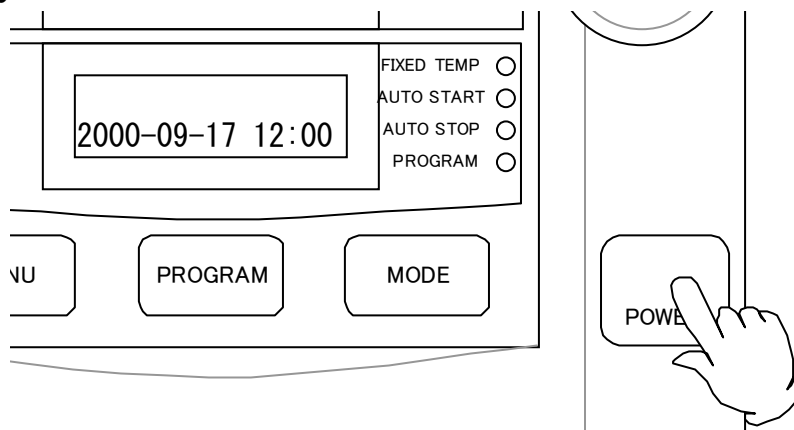
- The main indicator indicates “- - - -”, and after five seconds the sub indicator indicates the current date and time, e.g. “2000-09-17 12:01”.



#### NOTE)

The clock on device is not set at the factory shipment. Set the date and time referring to the instruction shown on Page 43 “Put clock right”.

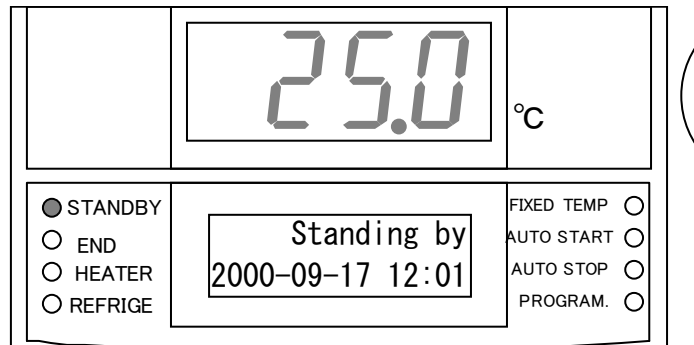
### Press power key



- Pressing the power key turns on the power with pip sound.

## Preparation

(Continued)



- The main indicator indicates the in-furnace temperature and the °C lamp lights on.
- The sub indicator displays “standing by” and the standby lamp lights on. This state is called the “standby state”.
- Pressing the power key again turns off the power.

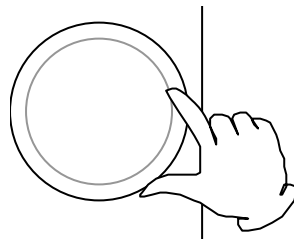
### NOTE)

The initial setting of the power source is set to OFF. Even the leakage breaker is turned to OFF or the main power supply is cut due to a power failure while using the unit, it stores the setting before the cutoff. This function is called “Momentary Stop Reset Function”. The refrigerator, however, starts operation after eight minutes after the cutoff.

## Setting with jog dial

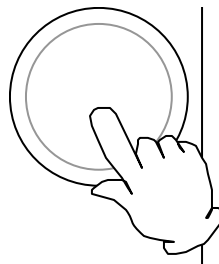
Jog dial is used to select the operation mode or to set temperature and clock.

### Turn jog dial



- Turning to clockwise: plus
- Turning to counterclockwise: minus

### Press jog dial



- Pressing the jog dial determines the setting and shows the next input window.

## Selecting operation mode

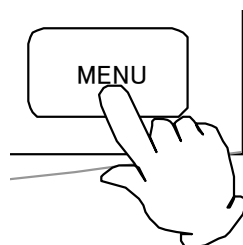
The following four operation modes are used.

No.	Operation mode	Function	Page
1	Fixed Temperature Operation	The device controls the constant temperature.	14
2	Auto Start Operation	The device starts operation at the specified time.	16
3	Auto Stop Operation	The device stops operation at the specified time.	19
4	Program Operation	The device starts programmed operation at the specified time.	22

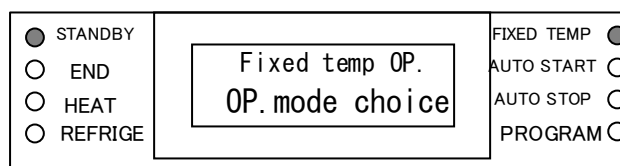
### Operation Selecting Method

**NOTE)** Make sure that the power is on.

- Press the menu key.



- The sub indicator indicates operation mode selection window.



- The operation mode on the sub indicator blinks and the corresponding lamp blinks. The indication can be changed in the order of "Fixed temperature operation" → "Auto start" → "Auto stop" → "program operation" by turning the jog dial to the right. The corresponding lamp also blinks.
- Press the menu key again to cancel the selection.
- The initial setting of operation mode is fixed temperature operation. In other cases, the unit automatically selects the operation mode previously carried out.

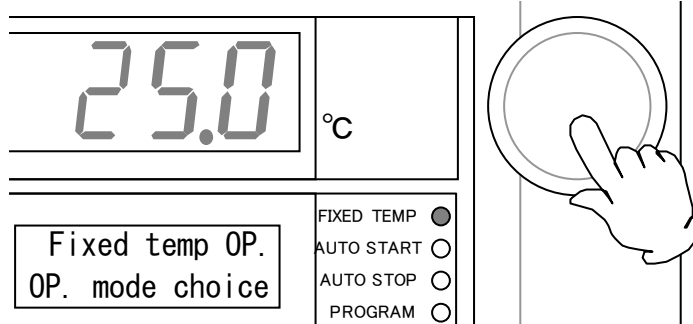
No.	Operation mode	Mode Lamp (blink)	Sub Indication (The hatching area is blinking.)
1	Fixed Temperature Operation	Fixed Temp Lamp	Fixed temp OP. OP. mode choice
2	Auto Start Operation	Auto Start Lamp	Auto-start OP. OP. mode choice
3	Auto Stop Operation	Auto Stop Lamp	Auto-stop OP. OP. mode choice
4	Program Operation	Program Lamp	Program OP. OP. mode choice



## Fixed Temperature Operation

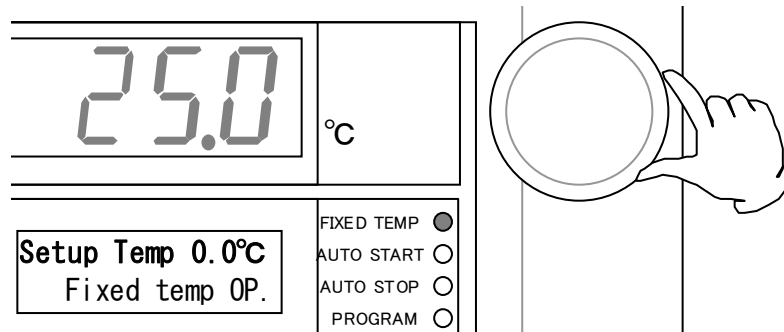
### Select operation mode

- Press the menu key. Turn the jog dial to indicate “Fixed temp OP.” on the sub indicator and then press the dial.



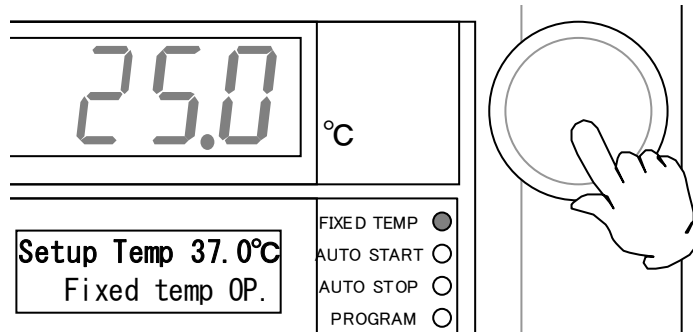
### Set temperature

- The screen displays the window to set temperature after the fixed temperature operation is determined.
- The sub indicator indicates “Setup Temp”. The numerical characters that indicate temperature blink. Indicate the desired temperature.



### Start operation

- Pressing the jog dial determines the set temperature and starts the operation.



- The heater lamp lights on and the blinking Fixed temp lamp lights on.
- At the fixed temperature operation, the heater repeats to turn on/off the power to keep the setting temperature. The heater lamp lights on while the heater is on. The refrige lamp lights on while the refrigerator is in operation. The blinking fixed temp lamp lights on.

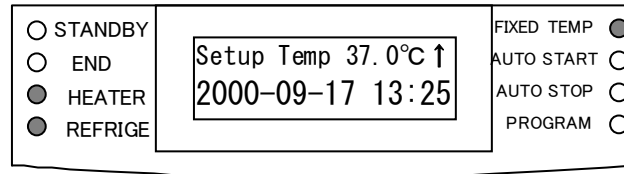
#### NOTE)

The refrigerator has to wait for at least eight minutes to restart. During waiting, it has been in the standby state. The lighting refrige lamp starts to blink.

## Fixed Temperature Operation

### Observe temperature during operation

- The main indicator indicates the in-furnace temperature.



- During the fixed temperature operation, the sub indicator displays the setting temperature and a blinking arrow that indicates the state of temperature control. The direction of arrow indicates the relation between the setting temperature and in-furnace temperature at the start of fixed temperature operation, as shown in bellow.

Setup Temp 37.0°C ↑  
2000-09-17 13:25

In case the setting temperature is higher than in-furnace temperature

Setup Temp 37.0°C ↓  
2000-09-17 13:25

In case the setting temperature is lower than in-furnace temperature

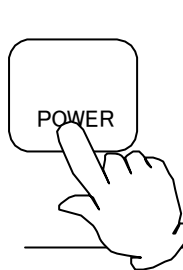
- The direction of arrow changes as shown in bellow when the in-furnace temperature is within the setting value  $\pm 2.5^{\circ}\text{C}$ .

Setup Temp 37.0°C →  
2000-09-17 13:25

When the in-furnace temperature reaches to the setting temperature

### Stop operation

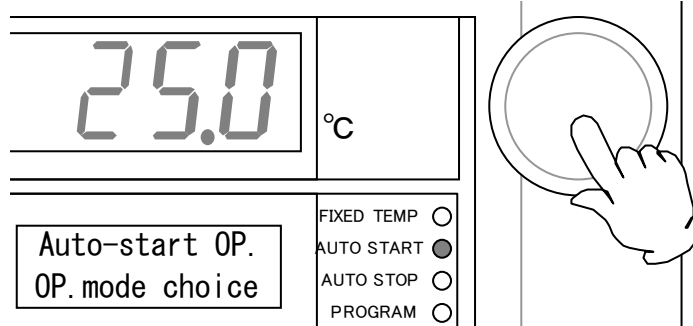
- Press the power key to stop the operation.



## Auto Start Operation

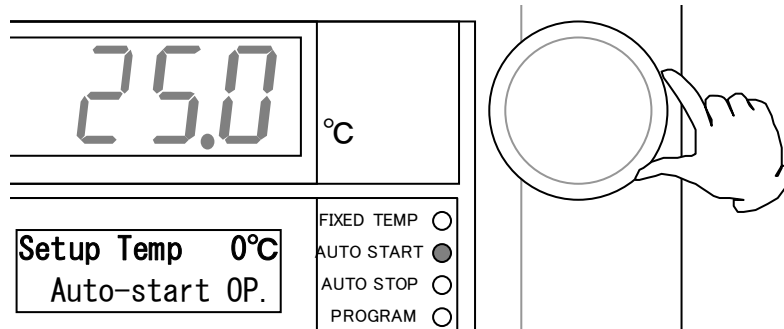
### Select operation mode

- Press the menu key. Turn the jog dial to display “Auto-start OP.” on the sub indicator, then press the dial.

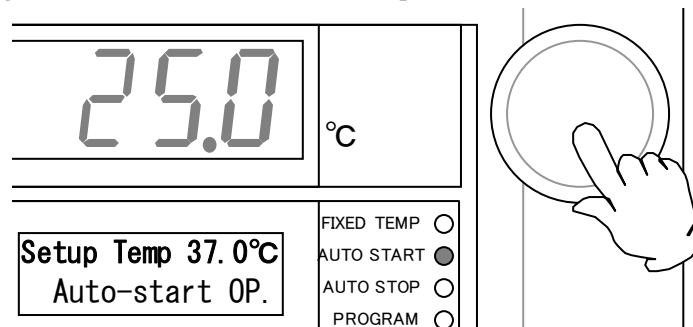


### Set temperature

- The screen displays the window to set temperature after the auto start is determined.
- The sub indicator indicates “Setup Temp”. The numerical characters that indicate temperature blink. Indicate the desired temperature.



- Press the jog dial to determine the set temperature.



## Auto Start Operation

### Set time

- The screen displays the window to set wait time to operate (period) or start time (the hour) after the set temperature is determined.  
When timer mode is set to "Time": wait time can be input.  
When timer mode is set to "Clock": start time can be input.

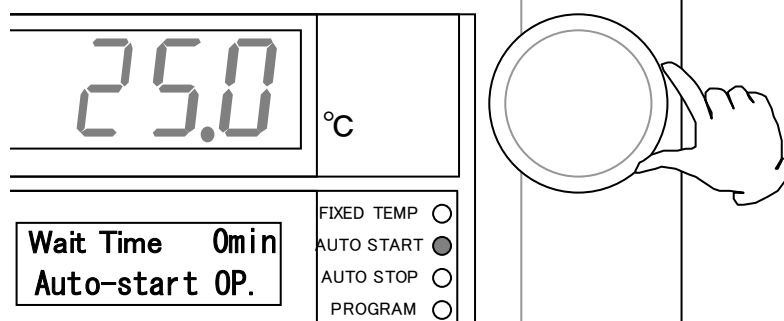
**NOTE)** The default setting is "Time". Refer to Page 38 "Select timer mode".

Wait time input window	<table border="1"> <tr> <td>Wait Time</td> <td>30min</td> </tr> <tr> <td colspan="2">Auto-start OP.</td> </tr> </table>	Wait Time	30min	Auto-start OP.	
Wait Time	30min				
Auto-start OP.					
Start time input window	<table border="1"> <tr> <td>Start Time</td> <td>13:00</td> </tr> <tr> <td colspan="2">Auto-start OP.</td> </tr> </table>	Start Time	13:00	Auto-start OP.	
Start Time	13:00				
Auto-start OP.					

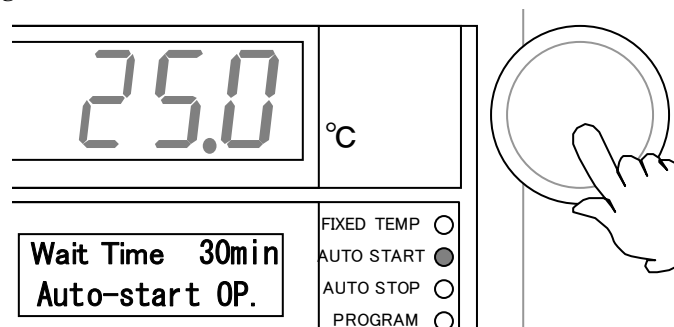
- For the input of startup wait time, the indication varies as shown below depending on the time range to be indicated.

Time Range	Indication
0minute to 59minutes	0min to 59min
1hour to 99hours59minutes	1h00m to 99h59m
100hours to 999hours	100hr to 999hr

- Turn the jog dial to set the desired time.

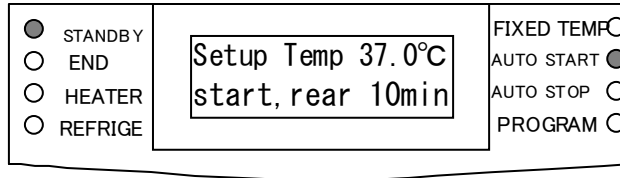


- Press the jog dial to determine the time set above.



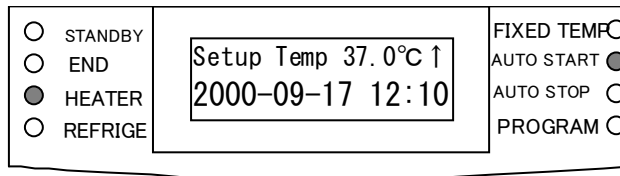
## Auto Start Operation

- After the wait time or start time is determined, the blinking auto start lamp lights on and the standby lamp blinks instead in startup wait state on auto start mode. The sub indicator shows the set temperature and remaining time.



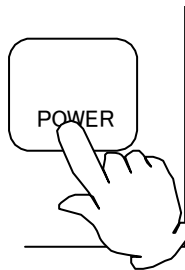
### Start operation

- The device starts fixed temperature operation when the remaining time shows "0". The standby lamp lights off when the operation is started. The sub indicator shows the same indication as in the fixed temperature operation.



### Stop operation

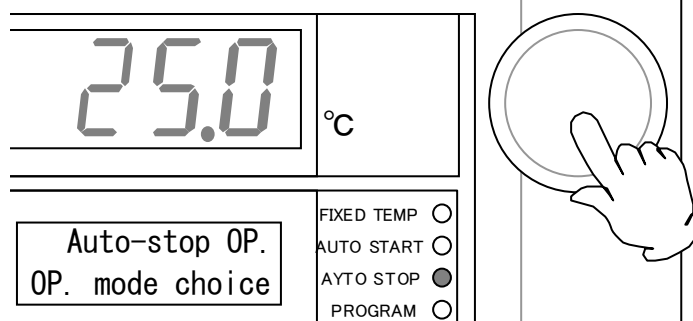
- Press the power key to stop the operation.



## Auto Stop Operation

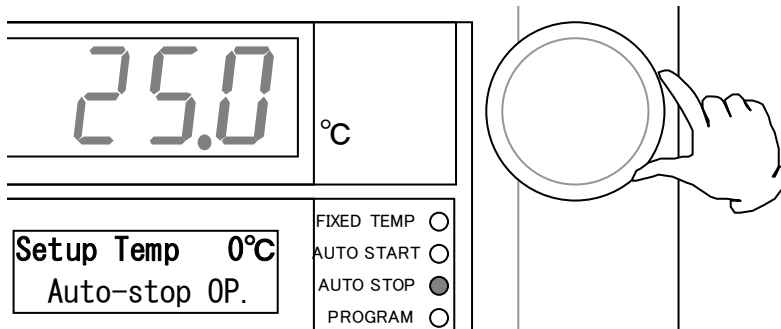
### Select operation mode

- Press the menu key. Turn the jog dial to indicate the “Auto-stop OP.” on the sub indicator, then press the dial.

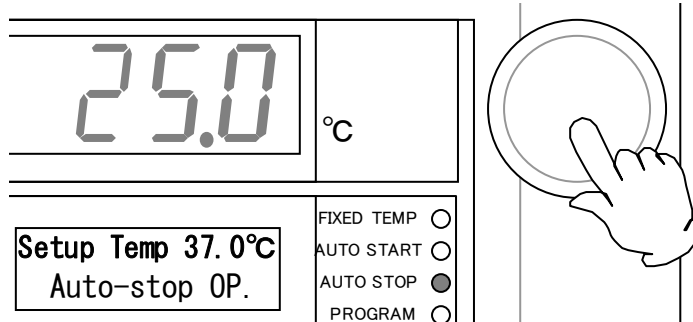


### Set temperature

- The screen displays the window to set temperature after the auto stop is determined.
- The sub indicator indicates “Setup Temp” and the numerical characters that indicate temperature blinks.



- Press the jog dial to determine the set temperature.



## Auto Stop Operation

### Set time

- The screen displays the window to set operation time or operation stop hour after the set temperature is determined.  
 When timer mode is set to "Time": operation time can be input.  
 When timer mode is set to "Clock": operation stop hour be input.

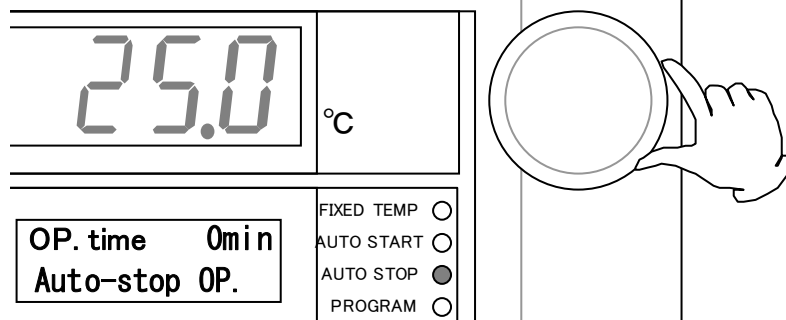
**NOTE)** The default setting is "Time". Refer to Page 38 "Select timer mode".

Operation time input window	<table border="1"> <tr> <td>Stop time</td> <td>30min</td> </tr> <tr> <td colspan="2">Auto-stop OP.</td> </tr> </table>	Stop time	30min	Auto-stop OP.	
Stop time	30min				
Auto-stop OP.					
Operation stop hour input window	<table border="1"> <tr> <td>Stop time</td> <td>13:00</td> </tr> <tr> <td colspan="2">Auto-stop OP.</td> </tr> </table>	Stop time	13:00	Auto-stop OP.	
Stop time	13:00				
Auto-stop OP.					

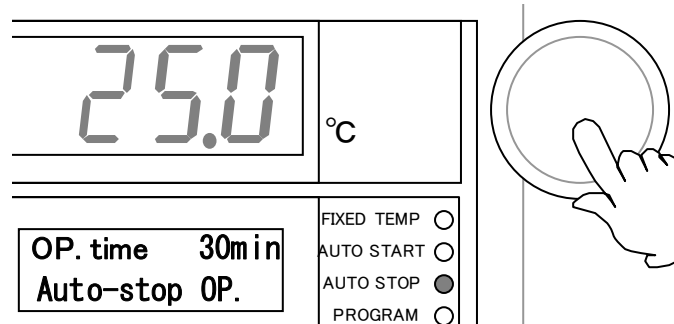
- For the input of operation time, the indication varies as shown below depending on the time range to be indicated.

Time Range	Indication
0minute to 59minutes	0min to 59min
1hour to 99hours59minutes	1h00m to 99h59m
100hours to 999hours	100hr to 999hr

- Turn the jog dial to set the desired time.



- Press the jog dial to determine the time set above.



## Auto Stop Operation

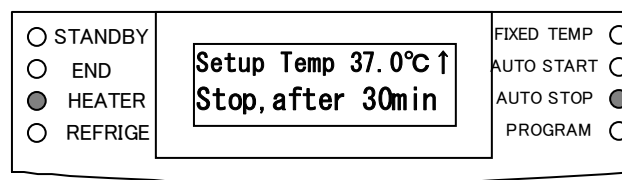
### Select "Wait Function"

- The screen changes to the window to select "Wait Function" after the time/hour is set.
- Turning on the function temporarily stops the countdown of timer if the in-furnace temperature is lower than set temperature by 3°C or more, or higher by 6°C or more.
- The function is available only when the timer mode is set to "Time". When it is set to "Clock", go to the next step.
- Turn the jog dial to select "ON" or "OFF" and then press it to determine.

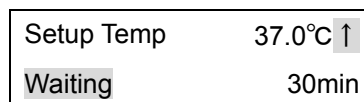


### Start operation

- The auto stop operation starts after the wait function is determined. Blinking auto stop lamp lights on and the sub indicator shows the set temperature and remaining time before operation stop.

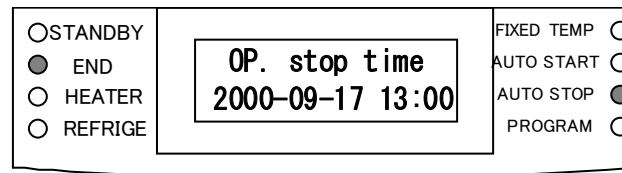


- If the wait function is set, the sub indicator indicates "Waiting" with blinking if the in-furnace temperature is lower than set temperature by 3°C or more, or higher by 6°C or more.



### Stop operation

- The device stops operation when the remaining time shows "0". The end lamp blinks when the operation is stopped. The sub indicator shows the operation end time.



### Cancel operation

- Press the power key to cancel the operation.

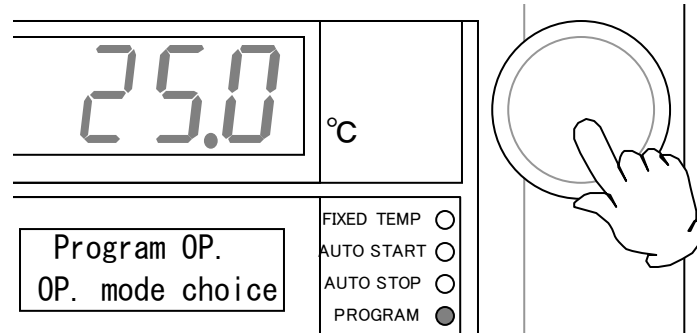


## Program Operation

Register the programs with the program menu before starting the program operation. Refer to the Page 27 “Create New Program” for the registration of programs.

### Select program mode

- Press the menu key. Turn the jog dial to indicate “Program OP.” on the sub indicator and then press the dial.

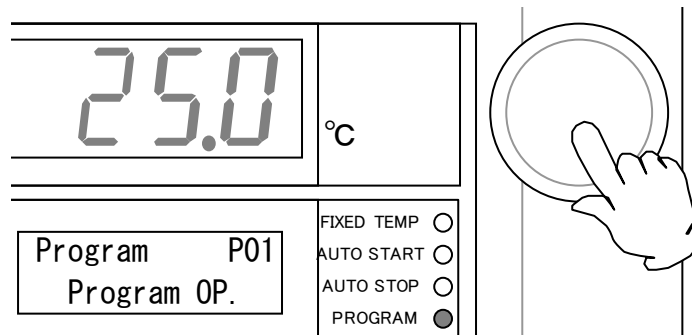


- If no program is set to the device, the buzzer sounds and the sub indicator indicates a message.
- In this case, register a program with “Create New Program” (refer to the Page 27) and try registration again.

A program isn't  
Registered

### Select program mode number

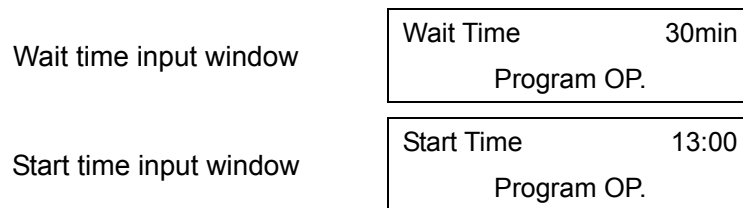
- Select the program number with the jog dial and then press it to determine.



## Program Operation

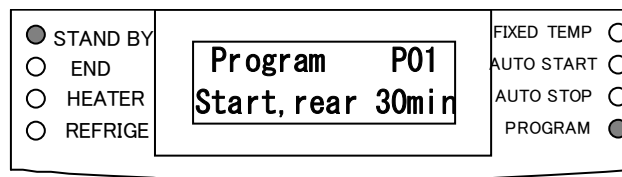
### Wait time / start time for operation

- The screen changes to the window to edit wait time (period)/start time (the hour) after the program is determined.  
When timer mode is set to "Time": wait time can be edited.  
When timer mode is set to "Clock": start time can be edited.
- NOTE)** The default setting is "Time". Refer to Page 38 "Select timer mode".
- Set the desired time by turning the jog dial.

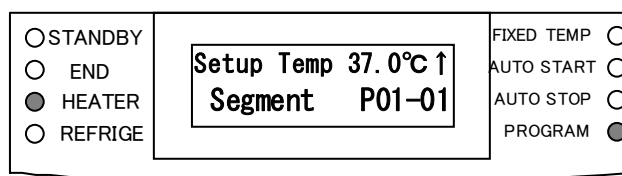


### Startup wait / startup

- The device is in the startup wait state of program operation mode after the wait time/ start time is determined. In this situation the blinking program lamp changes to lighting and the standby lamp blinks instead. The sub indicator shows the program number and remaining time to startup.



- The device starts operation when the remaining time shows "0". The standby lamp lights off when the operation is started. The sub indicator shows the segment number currently being executed and the set temperature.



## Program Operation

### Display during soak operation

- During the soak operation, the segment number and the remaining time of soak time are indicated alternately. In the case the device is in the waiting state, a message "Waiting" is indicated with blinking.

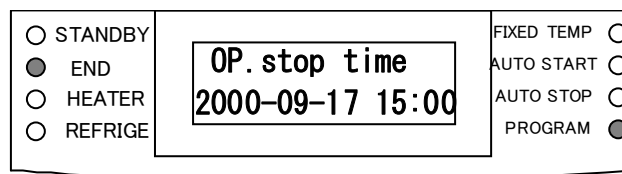
Segment number currently being executed	<table border="1"> <tr> <td>Setup Temp</td> <td>37.0°C ↑</td> </tr> <tr> <td>Segment</td> <td>P01-01</td> </tr> </table>	Setup Temp	37.0°C ↑	Segment	P01-01
Setup Temp	37.0°C ↑				
Segment	P01-01				
↓ ↑					
Remaining time of soak operation	<table border="1"> <tr> <td>Setup Temp</td> <td>37.0°C ↑</td> </tr> <tr> <td>Soak after</td> <td>30min</td> </tr> </table>	Setup Temp	37.0°C ↑	Soak after	30min
Setup Temp	37.0°C ↑				
Soak after	30min				
Waiting state	<table border="1"> <tr> <td>Setup Temp</td> <td>37.0°C ↑</td> </tr> <tr> <td>Waiting</td> <td>30min</td> </tr> </table>	Setup Temp	37.0°C ↑	Waiting	30min
Setup Temp	37.0°C ↑				
Waiting	30min				

- When a segment in repeating section is executed, the segment number and the remaining repeating time are indicated alternately.

Remaining repeating time	<table border="1"> <tr> <td>Setup Temp</td> <td>37.0°C ↑</td> </tr> <tr> <td>Rep. rest</td> <td>10</td> </tr> </table>	Setup Temp	37.0°C ↑	Rep. rest	10
Setup Temp	37.0°C ↑				
Rep. rest	10				

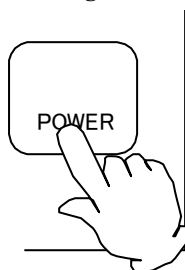
### Complete operation

- The end lamp blinks when the operation is completed. The sub indicator shows the operation end time.



### Stop operation

- Press the power key to release the waiting state or cancel the program operation.



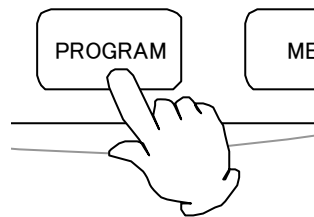
## Operating instructions for program menu

The program menu has the three functions listed below.

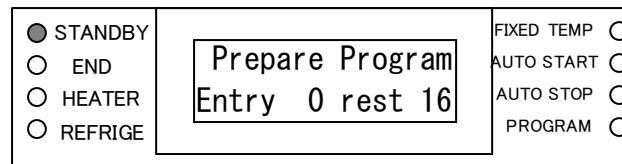
No.	Name	Function	Page
1	Prepare Program	Create a new program and register it.	27
2	Edit Program	Edits or checks the registered program.	28
3	Delete Program	Deletes the registered program.	35

### Select function of program menu

- Make sure that the power is turned on.
- Press the program key.



- The program menu is activated and the screen changes to the function selecting window.



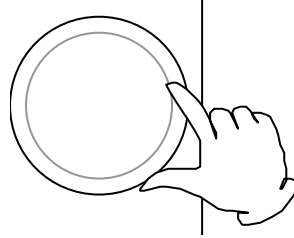
- The sub indicator indicates the number of programs already registered and the remaining number of segments. Also the function name currently selected is indicated with blinking.

Prepare Program	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p><b>Prepare Program</b></p> <p>Entry 0 rest 16</p> </div>
Edit Program	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p><b>Edit Program</b></p> <p>Entry 0 rest 16</p> </div>
Delete Program	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p><b>Delete Program</b></p> <p>Entry 0 rest 16</p> </div>

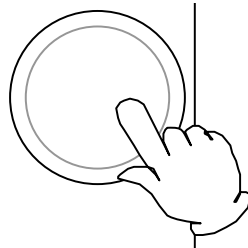
## Operating instructions for program menu

---

- Turn the jog dial to select the desired program menu.

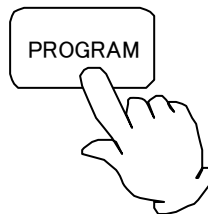


- Press the dial to determine menu.
- The screen changes to the menu input window.



### **Cancel operation**

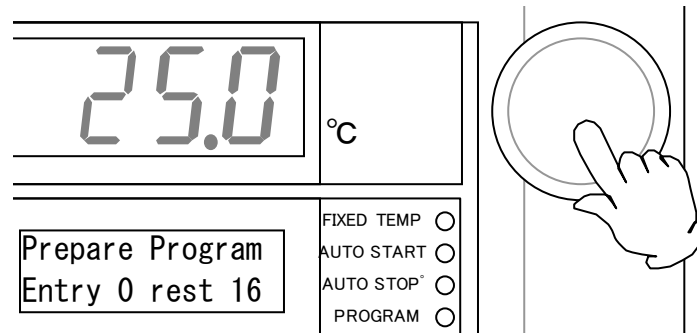
- Press the program key to cancel the program menu selected.



## Create New Program

### Select the “Prepare Program” menu

- Make sure that the remaining number of segment is not ‘0’. If not, delete one of the registered programs before creating a new program.
- Select the “Prepare Program” on the function selecting window in the program menu and then press the jog dial.

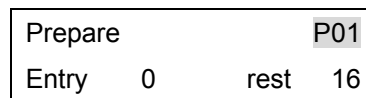


### Select program number

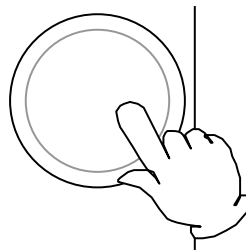
- The screen changes to the program number selecting window. The sub indicator indicates “Prepare” and the number in the screen, which shows the program number, blinks. Turn the jog dial to select the desired program number from P01 to P99.

**NOTE)** The program numbers already registered is not indicated here.

Program number  
selecting window



- Press the jog dial to determine the number selected above.

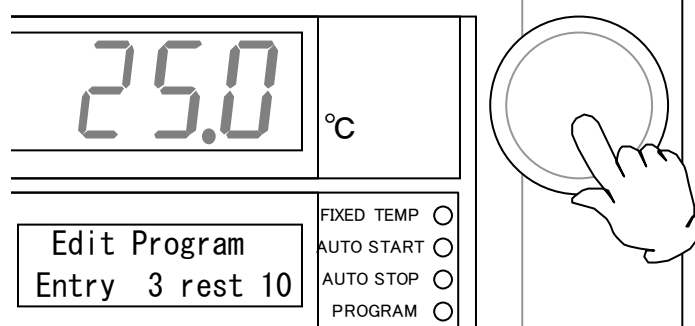


- The screen changes to the “Edit segment” window after the program number is determined. Go to Page 29 “Edit segment” to edit the segment.

## Edit Program

### Select "Edit Program" menu

- Make sure that any program(s) is (are) registered.



- Select the "Edit Program" on the function selecting window in the program menu and then press the jog dial.

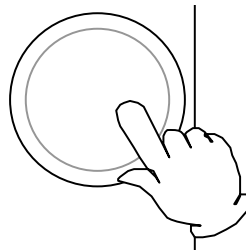
### Select program number

- The screen changes to the program number selection window. The sub indicator indicates "Editing" and the number in the screen, which shows the program number, blinks. Turn the jog dial to select the desired program number to be edited. The segment number the selected program uses and remaining numbers of segment are indicated at the bottom of sub indicator.

Program number  
selecting window

Editing	P01
Use 5	rest 10

- Press the jog dial to determine the number selected above.



- The screen changes to the "Edit segment" window after the program number is determined. Go to Page 29 "Edit segment" to edit the segment.

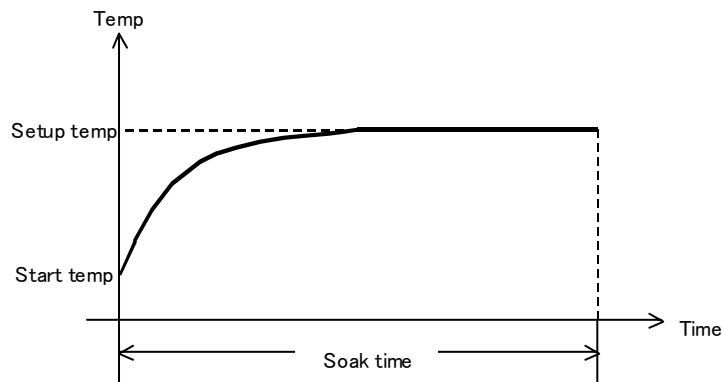
## Edit Program

### Edit segment

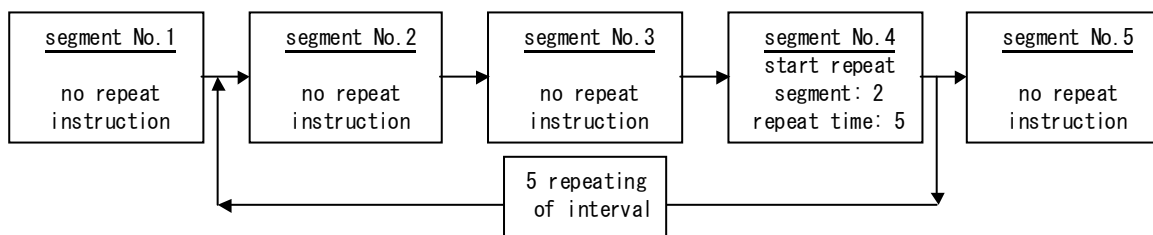
One segment has ten kinds of set item.

No.	Name	Setting range
1	Mode	Step, end
2	Set temperature	Within the range of set temperature for the device
3	Soak time	0 minute to 999 hours, hold
4	Wait function	OFF, ON
5	Repeat starting segment	None, registered segment number 1 to 16
6	Repeat time	1 to 999, infinite

The conception of a segment is shown in the figure below. The “Initial Temperature” means the in-furnace temperature when executing segment No. 1 just after the program operation is started, and also means the set temperature of segment executed last in the case other than mentioned above.



The conception of a repeat is shown in the figure below. The first execution of the repeat interval is not counted as a repeating time.





## Edit Program

### Select set item

The screen changes to the item selecting window after the program number is determined in the “Prepare Program” or “Edit Program”.

<b>Mode</b>	Mode ▶ 30min P01-01 rest 10
<b>Set temperature</b>	Setup temp ▶ 37.0°C P01-01 rest 10
<b>Soak time</b>	Soak time ▶ 30min P01-01 rest 10
<b>Wait mode</b>	Wait ▶ OFF P01-01 rest 10
<b>Repeat start segment</b>	Rep. start ▶ S01 P01-01 rest 10
<b>Repeat count</b>	Rep.count ▶ 9999 P01-01 rest 10
<b>Segment addition</b>	Append seg. P01-01 rest 10
<b>Program end</b>	Program End P01-01 rest 10

### NOTE)

The program number and segment number under edition, and remaining number of segment are displayed at the bottom of sub indicator. Turning the jog dial shows the details for all segments registered. The two items, “Segment Addition” and “Program End” are shown after the detail for the last segment number is displayed.

## Edit Program

Some set items are not indicated depending on the condition as shown in the list below, which means that the items are invalid in that condition.

Item	Indication
Mode	Always indicated.
Set Temperature	Not indicated when the mode is in "End".
Soak Time	Not indicated when the mode is in "End".
Wait Function	Not indicated when the mode is in "End" or soak time is in "Hold".
Repeat Starting Segment	Not indicated when the mode is in "End" or soak time is in "Hold". Not indicated when it is between the repeat intervals specified with the other segments.
Repeat Time	Not indicated when the repeat starting segment is not indicated or in "None".
Segment Addition	Not indicated when the mode is in "End" or soak time is in "Hold".

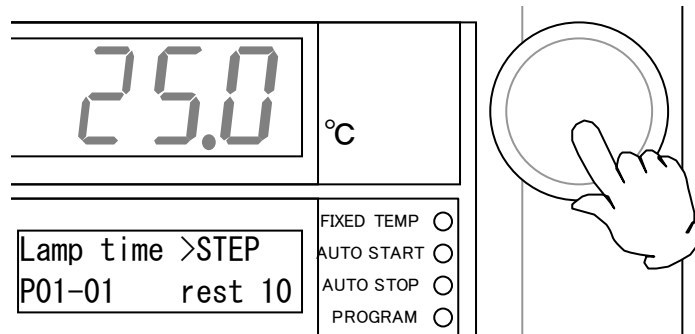
**NOTE)**

The content of program under operation is impossible to be changed. The "▶" (cursor) does not appear on the item selecting window. Only checking the program is available during operation.

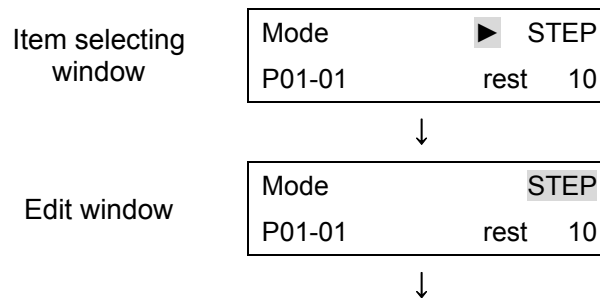
## Edit Program

### Edit segment

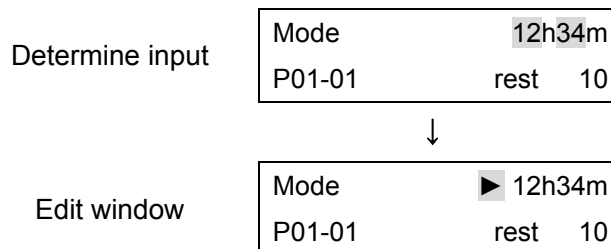
The segment is edited to the program number determined in Page 28 “Select program number”.



- Select the set item and press the jog dial. The blinking "▶" (cursor) disappears and the set value starts to blink.

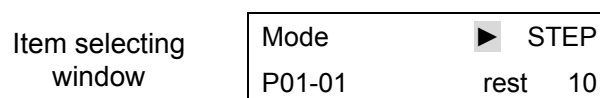


- Turn the jog dial to indicate the desired set item then press it to determine the value and go back to the item selecting.



### Cancel setting

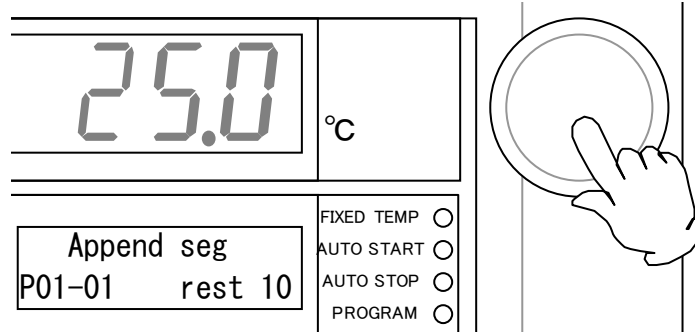
- Press the program key to cancel the setting. The input value is cancelled and the screen goes back to the item selecting window.



## Edit Program

### Add segment

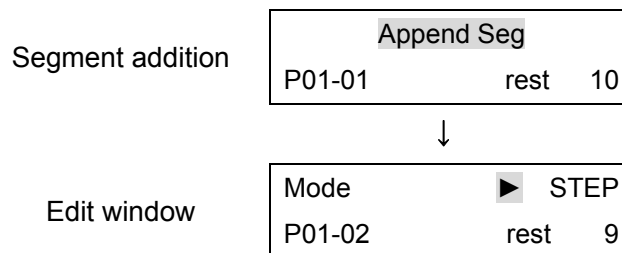
- Select the "Append seg" on the item selecting window and then press the jog dial.



#### NOTE)

The "Append seg" is not indicated in the following conditions; the ramp time for the last segment number is in "end", the soak time is in "hold", the repeat time is in "limitless", the key lock mode is in "on", or the program under edition is being executed.

- One segment number is added and one remaining number of segment decreases. The screen goes back to the item selecting and the ramp time corresponding to the added segment number is indicated.



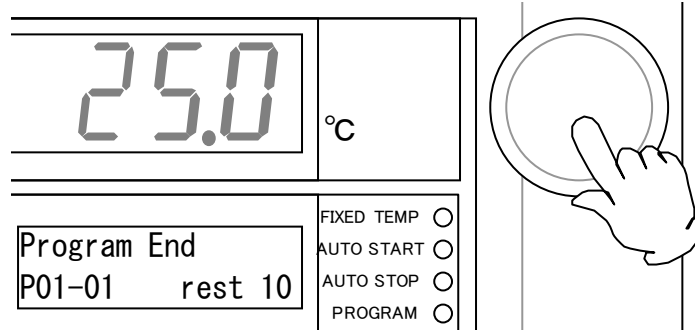
- The initial settings of newly added segment are listed below. The settings of first segment when creating new program are the same as them.

Item	Initial value	Note
Mode	step	
Set Temperature	0.0°C	
Soak Time	hold	
Wait Function	OFF	Not available because the soak time is in "hold".
Repeat Starting Segment	none	Not available because the soak time is in "hold".
Repeat Time	infinite	Not available because the repeat starting segment is not available.

## Edit Program

### End program edition

- Select the “Program End” on the items selecting window and then press the jog dial.



**NOTE)** Pressing the program key on the item selecting window is also possible.

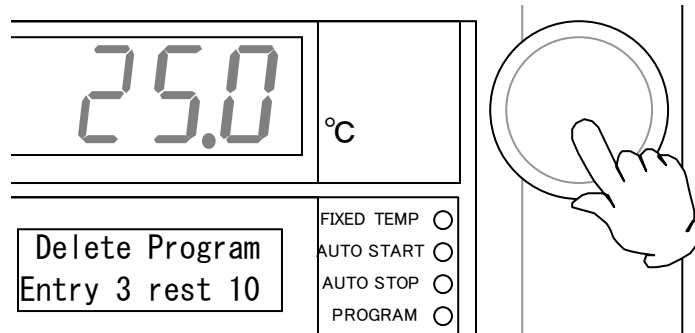
## Delete Program

**NOTE)**

- Make sure that any program(s) is (are) registered.
- Deleting the program under operation is impossible.

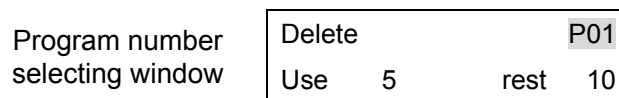
**Select “Delete Program”**

- Select the “Delete Program” on the function selecting window in the program menu and then press the jog dial.



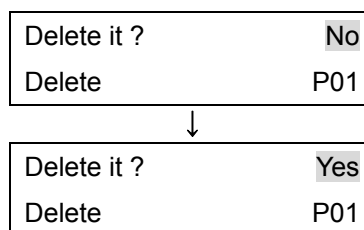
**Select program number**

- The screen changes to the program number selecting window. Turn the jog dial to select the desired program number to be deleted, then press it.



**Check the number and select “Yes”**

- The screen changes to the window to check the program number. Make sure that the correct program number to be deleted is indicated and then press “Yes”.



**NOTE)** Press the “No” or program key to cancel the deletion.

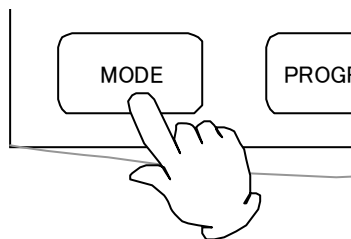
## Function menu

The function menu has the seven functions listed below. (\*: Optional function)

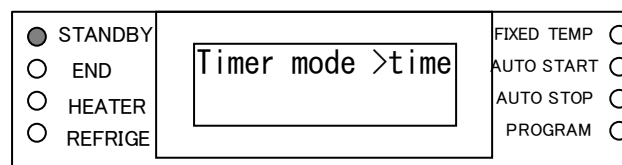
No.	Name	Function	Page
1	Timer Mode	Sets the timer mode	38
2	Key Lock Mode	Sets the key lock mode.	39
3	Buzzer Mode	Sets the buzzer mode.	40
4	Calibration Offset	Sets the calibration offset temperature.	41
5	Total Operating Hours	Indicates the total operating hours.	42
6	Date/Time	Sets the date and time.	43
7	Defrosting Operation Mode	Start/stop of defrosting operation mode on the refrigerator	45
8	Cycle Defrosting Operation Time	Setting of cycle defrosting operation time on the refrigerator	46
9	Communication Lock out Mode (*)	Sets the communication lock out mode.	47

### Select item from function menu

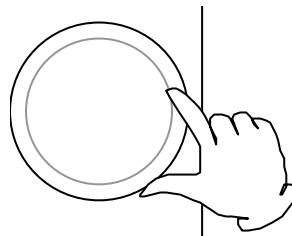
- Make sure that the power is on.
- Press the mode key.



- The function menu is activated and the item selection window appears.



- Turning the jog dial indicates the mode.



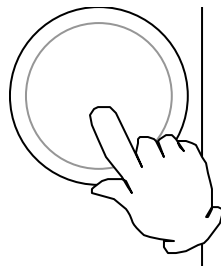
## Function menu

### Select function

- Turn the jog dial to select the item indicated on the sub indicator.

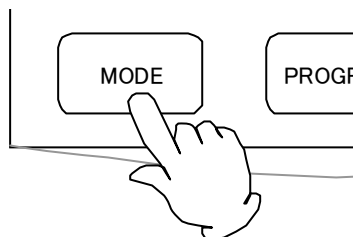
<b>Timer mode</b>	Timer mode ▶time
<b>Key lock mode</b>	Key lock mode ▶OFF
<b>Buzzer mode</b>	Buzzer mode ▶ON
<b>Calibration offset</b>	Calibrate ▶±0.0°C
<b>Total operating hours</b>	Acc. time 49999hr
<b>Date/Time</b>	Date ▶2000-12-31 Time 23:59
<b>Defrosting operation mode</b>	Defrost ▶OFF
<b>Cycle defrosting operation time</b>	Cycle ▶10min-ON Freezer 23h50-OFF
<b>Communication lock out mode</b>	Comm. Lockout ▶OFF

- Press the jog dial to select the function with the mode indicated.



### Cancel function setting

- Press the mode key again to cancel the item selection.





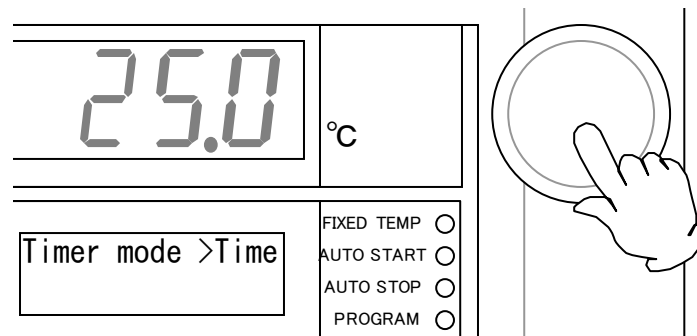
## Function menu

### Select timer mode

**NOTE)**

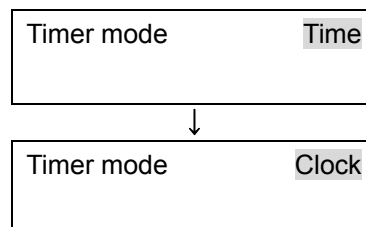
The content of timer mode currently being executed cannot be changed at the startup wait state on auto start mode and on program operation mode, and at under operation state on auto stop mode.

- Indicate the “Timer mode” on the item selection window in function menu and then press the jog dial.



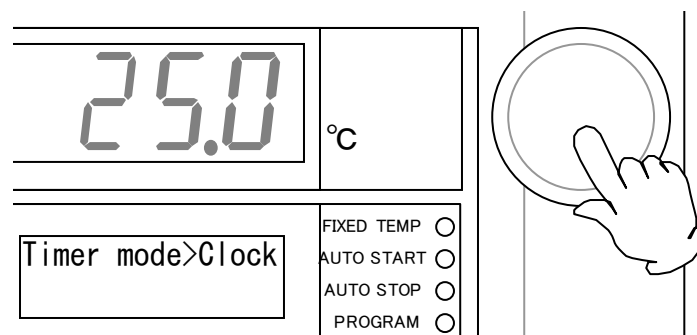
### Select “Time” / “Clock”

- The “▶” (cursor) disappears and the current mode blinks. Turn the jog dial to indicate “time” or “Clock”.



### Determine mode

- Press the jog dial.

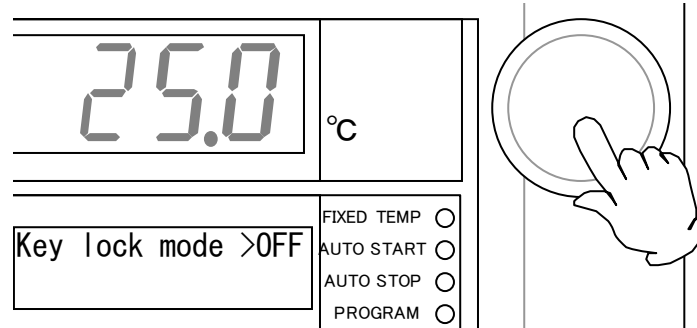


- The timer mode is determined and the screen goes back to the item selection window in function menu.

## Function menu

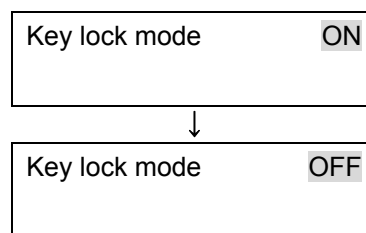
### Select key lock mode

- Indicate the “Key Lock mode” on the item selection window in function menu and then press the jog dial.



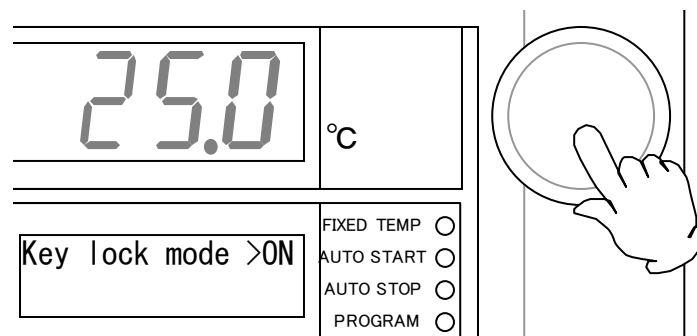
### Select “ON” / “OFF”

- The “▶” (cursor) disappears and the current mode blinks. Turn the jog dial to indicate “ON” or “OFF”.



### Determine mode

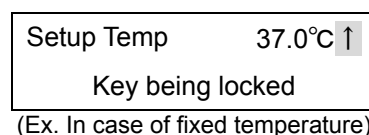
- Press the jog dial.



- The key lock mode is determined and the screen goes back to the item selection window in function menu.

### NOTE)

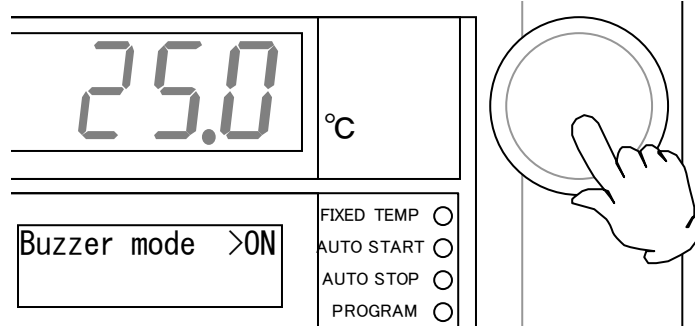
Turning the key lock mode to “ON” inhibits changing the contents of program and setting details of function menus. The sub indicator displays “Key being locked”.



## Function menu

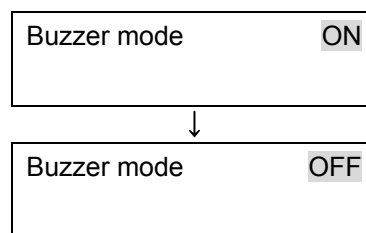
### Select buzzer mode

- Indicate the “Buzzer mode” on the item selection window in function menu and then press the jog dial.



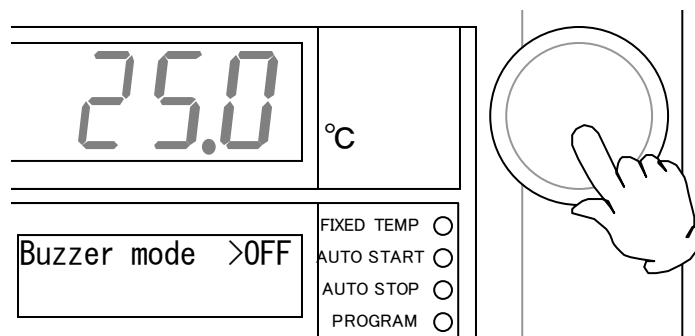
### Select “ON” / “OFF”

- The “▶” (cursor) disappears and the current mode blinks. Turn the jog dial to indicate “ON” or “OFF”.



### Determine mode

- Press the jog dial.



- The buzzer mode is determined and the screen goes back to the item selection window in function menu.

#### NOTE)

Turning the buzzer mode to “OFF” inhibits the sound of warning buzzer at an abnormal state, auto-stop, and operation end buzzer in program operation.

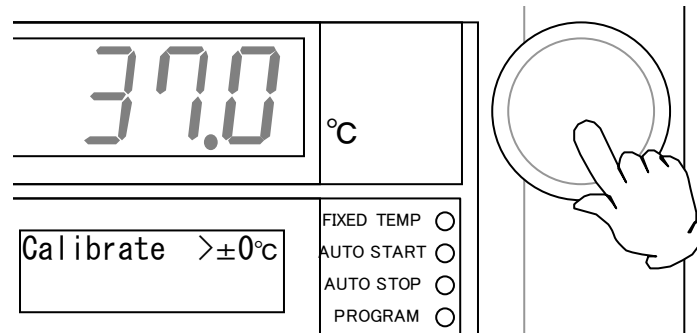
## Function menu

### Select calibration offset mode

**NOTE)**

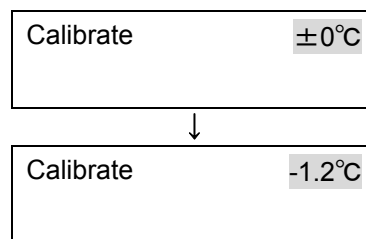
To know about the calibration offset, refer to the Page 48 “Calibration Offset Function”.

- Indicate the “Calibrate” on the item selection window in function menu and then press the jog dial.



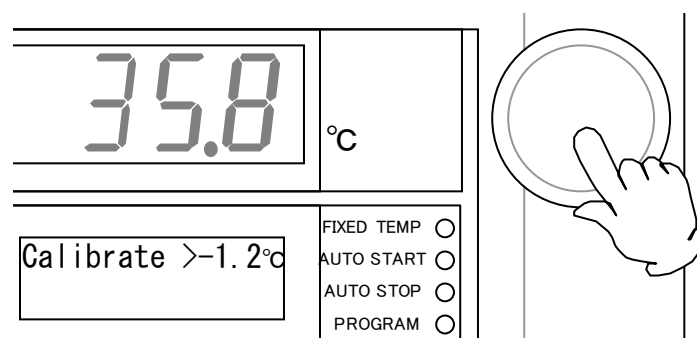
### Input offset temperature

- The “▶” (cursor) disappears and the current offset temperature blinks. Turn the jog dial to indicate desired temperature.



### Determine mode

- Press the jog dial.



- The calibration offset temperature is determined and the screen goes back to the item selection window in function menu.

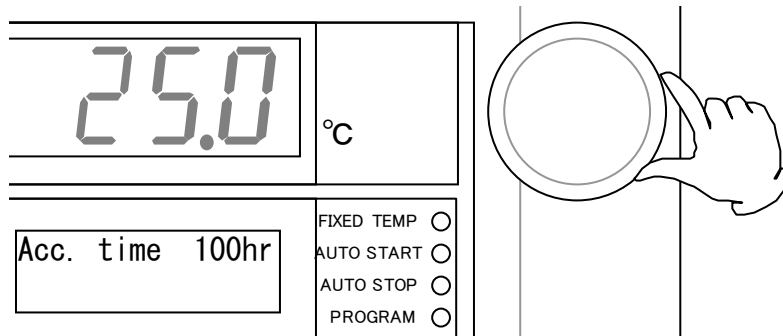
## Function menu

### Select "Acc. Time"

**NOTE)**

The "Acc. Time" is a function to check the total operating hour of device. The content cannot be changed.

- Turn the jog dial on the item selection window to indicate the "Acc. Time".



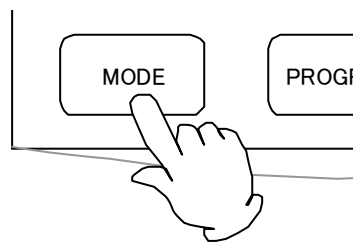
- The total operating hour from the factory shipment to the current time is indicated.



**NOTE)**

The total operating hour means the total lapsed time when the power of device is not off. Standby state, startup wait state, and operation end state are included in it.

- Press the mode key to cancel the function menu when the check is completed.



## Function menu

### Put clock right

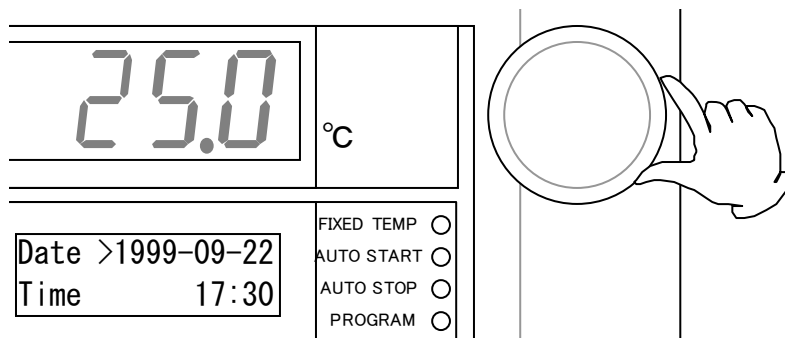
**NOTE)**

The time indicated on the clock is not correct at factory shipment. Before operating this unit, put the clock right.

**NOTE)**

When the timer mode is set to “Clock”, the setting of clock cannot be changed at the startup wait state on auto start mode and on program operation mode, and at under operation state on auto stop mode. Press the power key to stop the operation and reset the clock.

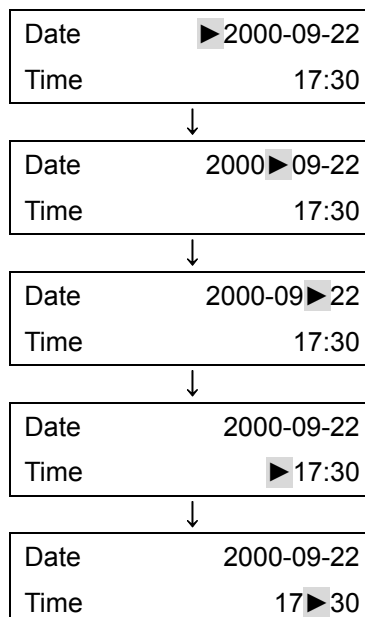
- Turn the jog dial on the item selection window in function menu to indicate the “Date” and “Time”.



- The window indicates the current date and time.



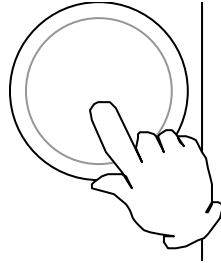
- Turning the jog dial moves the “▶” (cursor) on the window in the order of “Year”, “Month”, “Date”, “Hour” and “Minute”.



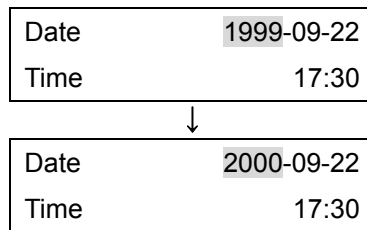
## Function menu

(continued)

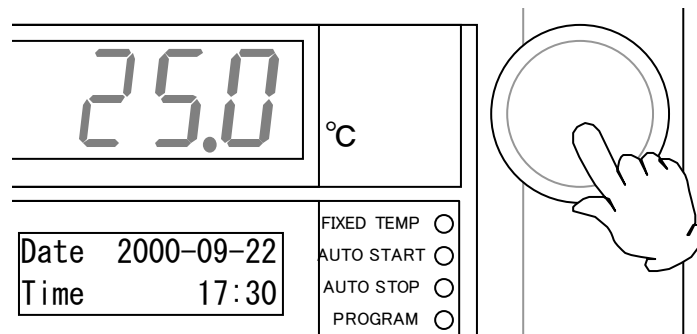
- Select the desired item and press the jog dial.



- The “▶” (cursor) disappears and the current set value blinks. Turn the jog dial to change the value.



**Press the jog dial.**



- The setting is determined and the window goes back to the item selection window in function menu.

## Function menu

### Select defrosting operation mode

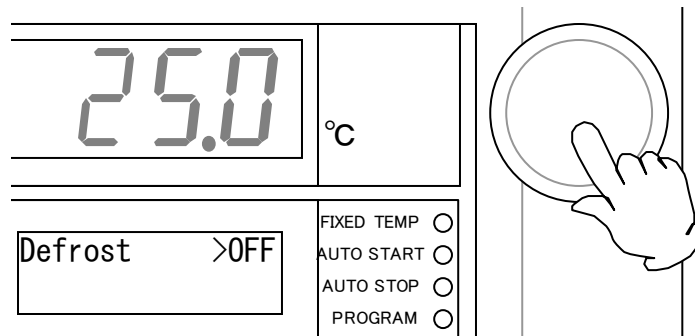
**NOTE)**

The details of defrosting operation mode are impossible to be changed during the remote operation (optional). Cancel the remote operation state to change them.

**NOTE)**

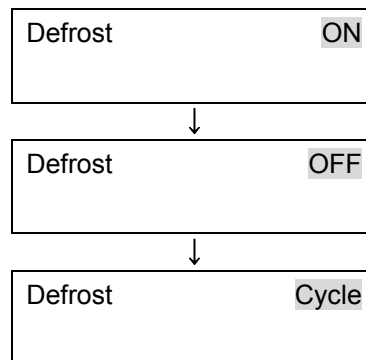
Carry out the defrosting operation when frost on the heat exchanger can be seen from the inspection window at the bottom surface of unit.

- Indicate the “Defrost mode” on the item selection window in function menu and then press the jog dial.



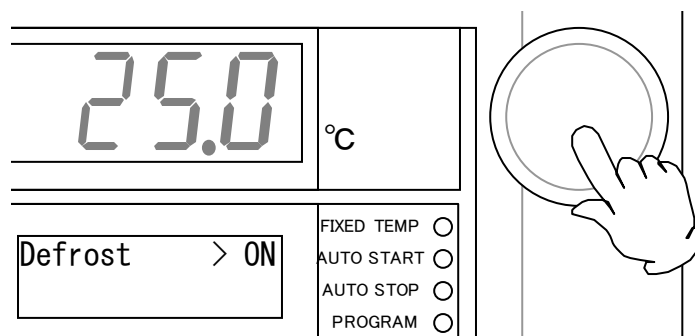
### Select “ON” / “OFF” / “Cycle”

- The “▶” (cursor) disappears and the current mode blinks. Turn the jog dial to indicate “ON”, “OFF”, or “Cycle”.



### Determine mode

- Press the jog dial.



- The defrost mode is determined and the screen goes back to the item selection window in function menu.



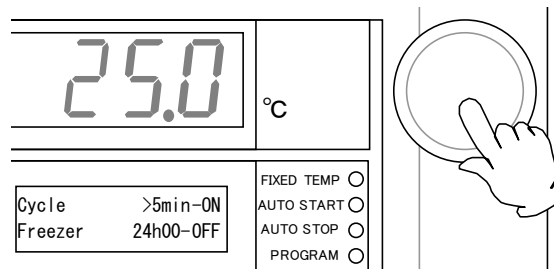
## Function menu

### Select cycle defrosting operation time

**NOTE)**

The details of cycle defrosting operation time are impossible to be changed during the remote operation (optional). Cancel the remote operation state to change them.

- Indicate the “Cycle” and “Defrost” on the item selection window in function menu and then press the jog dial.

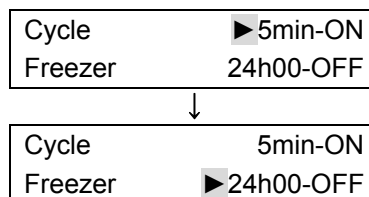


- The ON/OFF time in the current cycle defrosting operation is displayed.



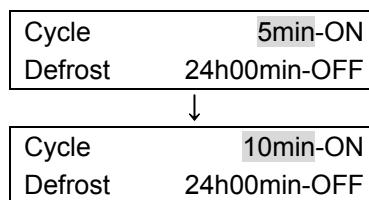
### Select the setting item

- Turning the jog dial moves the “▶” (cursor) on the window in the order of ON time, OFF time. Select the desired item and press the jog dial.



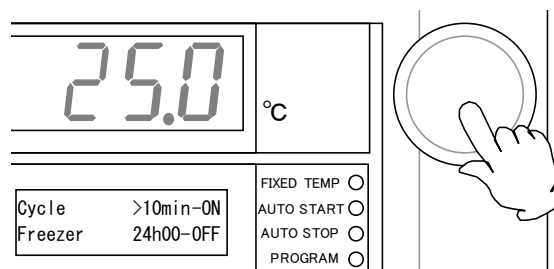
### Edit the setting value

- The “▶” (cursor) disappears and the current value blinks. Turn the jog dial to change the value.



### Determine mode

- Press the jog dial.

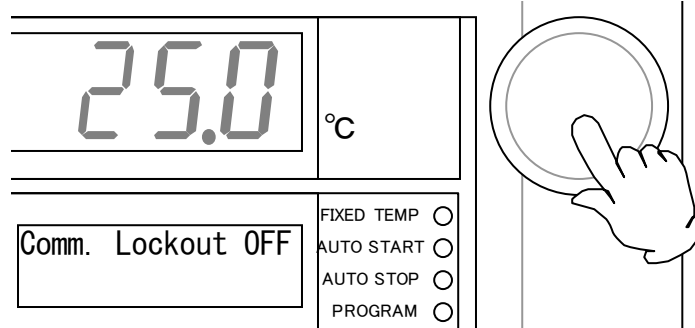


- The defrosting operation time is determined and the screen goes back to the item selection window in function menu.

## Function menu

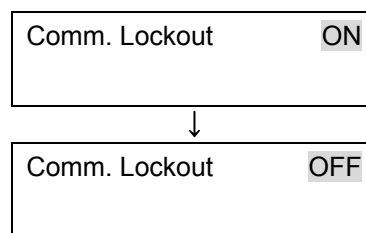
### Select communication lockout mode

- Indicate the “Comm. Lockout” on the item selection window in function menu and then press the jog dial.



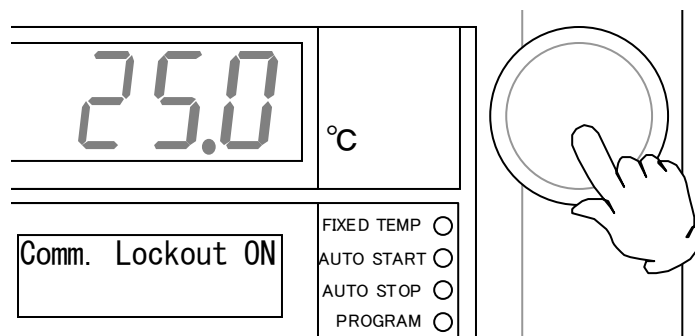
### Select “ON” / “OFF”

- The “▶” (cursor) disappears and the current mode blinks. Turn the jog dial to indicate “ON” or “OFF”.



### Determine mode

- Press the jog dial.



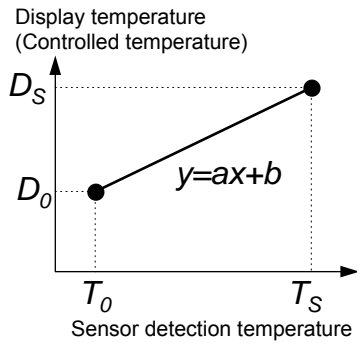
- The communication lockout mode is determined and the screen goes back to the item selection window in function menu.

#### NOTE)

Turning the communication lock out mode to “ON” inhibits executing remote operation initiating command. In case the unit is in the remote operation, it goes to the “standby” state.

## Calibration Offset Function

### Description



**Fig. 1**

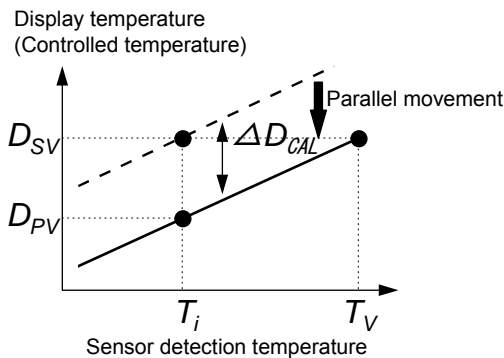
In the controller, the relationship between the temperature  $T$  detected by the sensor and the display temperature of the control panel  $D$  is expressed by the equation of the line which passes the two points  $(T_0, D_0)$  and  $(T_S, D_S)$  shown in **Fig.1**.

Here,  $T_0$  is the sensor detecting temperature when the furnace central temperature becomes the zero adjusting temperature (normally room temperature is adopted)  $D_0$  at the time of no load,  $T_S$  is the sensor detecting temperature when the furnace central temperature becomes the span adjustment temperature (normally working maximum temperature is adopted)  $D_S$  at the time of no load in the same way.

As it is clear from the facts above, conforming of the furnace central temperature and the display temperature is guaranteed

only when there is no load and at two points shown above. In other words, it is possible for a temperature measured at a point in the furnace does not conform to the display temperature of the control panel at a voluntary temperature without load.

This is the function to move the line which passes above two points to the Y axis direction in parallel (increase or decrease y intercept of the line). The parallel movement amount including a sign is defined as the calibration offset. This function can conform the display temperature of the control panel to the measurement temperature of a voluntary point in the furnace at a voluntary temperature.



**Fig.2**

In **Fig.2**,  $D_{SV}$  is a display temperature of the control panel under the condition that the temperature in the furnace is constant for a set temperature. It is natural to say that this value is equal to the target set temperature.  $D_{PV}$  is a measurement temperature of a voluntary point in the furnace under this condition. The difference between  $D_{PV}$  and  $D_{SV}$  including the sign is defined as the calibration offset. Therefore offset is shown as below.

$$\Delta D_{CAL} = D_{PV} - D_{SV} \quad \text{Equation 1}$$

In **Fig. 2**,  $\Delta D_{CAL}$  becomes the negative value since the target set temperature  $D_{SV}$  is larger than the actually measured temperature  $D_{PV}$ . In order to conform the display temperature to the actually measured temperature, let the controller to recognize that the temperature in the furnace differs from the target set temperature by  $\Delta D_{CAL}$ .

### NOTE)

The setting tolerance of calibration offset is  $\pm 3^\circ\text{C}$ . The offset value at factory shipment is  $0^\circ\text{C}$ .

### <Example>

The fixed temperature operation with a target set temperature of  $37.0^\circ\text{C}$  is started. After plenty time has passed from the time the indication on control panel has reached to  $37.0^\circ\text{C}$ , the temperature of a certain point in the furnace is measured with a thermometer. The result is  $35.8^\circ\text{C}$ . The indication on the panel is to be equal to the measured temperature ( $35.8^\circ\text{C}$ ) with the calibration offset function.

In this case the calibration offset  $\Delta D_b$  is expressed with (“measured temperature” — “indicated temperature”) by **Equation 1**.

Therefore,  $\Delta D_b : 35.8^\circ\text{C} - 37.0^\circ\text{C} = -1.2^\circ\text{C}$

## Independent overheating prevention device

There are two safety devices in this unit: the auto-overheating preventive function of the controller (automatic recovery) and the independent overheating prevention device (manual recovery). Circuits and sensors that are independent from the controller configure them. These safety devices for the temperature overheating prevention protect the instrument in a fail-safe method.

### Setting the Temperature Range and Function

<b>Setting Temperature Range:</b>	10 to 399°C
<b>Input Method:</b>	Three integer digital switch. Turn the dial of each column and set the desired value. The first integer as the left can only be from 0 to 3 for the hundred columns.
<b>Function:</b>	Heater output is cut off when the measured temperature gets higher than the set temperature of the independent overheating prevention device. The function is active when the earth leakage breaker is ON. When the independent overheating prevention device is activated, <b>Er.07</b> blinks on the main indicator with the <b>ERROR</b> lamp blinks.

### Activation/Setting Method

- Usually, set the temperature 15°C higher than the set temperature of the controller.
- To set the optimum setting temperature to protect the samples, the temperature should be set as follows;
  - a) Sufficiently higher than the ambient temperature.
  - b) At least 15°C higher than the maximum temperature of temperature pattern to be operated
- When the independent overheating prevention device is activated improperly by the next reasons, changing the setting of the device lower than the internal temperature, or by continuing operation when the setting of the device is too low, turn off the earth leakage breaker to reset the main unit and perform the setting again. If it is activated by another reason, refer to the Page 54 “In the Event of Failure...”.

## CAUTION!

### Precautions


- Only 0 to 3 can be set for the column of hundreds of the digital switch by the stop mechanism; however, if forced to change it to a value higher than 3, it will damage the unit.
- Set temperature can change by touching the dial when cleaning. Always confirm that the set temperature is correct after cleaning or before operation.

## Openness of the door


When the door on the unit is opened during operation, the door lamp lights on while the unit continues to operate. If the door remains open for more than five minutes, the warning buzzer sounds to inform the openness. Do not open the door for long time to keep the temperature in the unit constant.

## **WARNING!**

### **If a problem occurs**



-  If smoke or strange odor should come out of this unit for some reason, turn off the power key right away, and then turn off the circuit breaker and the main power. Immediately contact a service technician for inspection. If this procedure is not followed, fire or electrical shock may result. Never perform repair work yourself, since it is dangerous and not recommended.

### **Substances that cannot be used**


-  Never use explosive substances, flammable substances and substances that include explosive or flammable ingredients in this unit. Explosion or fire may occur. (Refer to page61 "List of Dangerous Substances")

## **CAUTION!**


### **Setting sample**

-  Do not put sample more than 5kg on the shelf provided. When you use some samples, keep space between each of them.
-  Temperature control may lose accuracy if many samples are set. Set sample making room more than 30% of the shelf in order to keep accuracy of temperature.


### **Treatment of Sample**

-  When large amount or large heat load of the sample requires to be treated, it takes longer time than usual. Check the appropriate amount as required, and set the sample. Also, when the heating sample (note that it is limited to deal only the sample with no explosion, ignition, and flammability) requires to be treated, the temperature is not stable. Be careful to this non-stable temperature.


### **Do not step on this unit**

-  Do not step on this unit. It will cause injury if this unit fall down or break.


### **Do not put anything on this unit**

-  Do not put anything on this unit. It will cause injury if fall.


### **During a thunder storm**

-  During a thunderstorm, turn off the power key immediately, then turn off the circuit breaker and the main power. If this procedure is not followed, fire or electrical shock may be caused.

### **Independent overheating prevention device**


-  Always use the independent overheating prevention device for safety. Set the temperature 20°C more than setting point of the controller.

### **Use under proper temperature range**


-  Operational temperature range of this unit is 0 to 60°C. Setting the temperature out of that cause a trouble or malfunction.

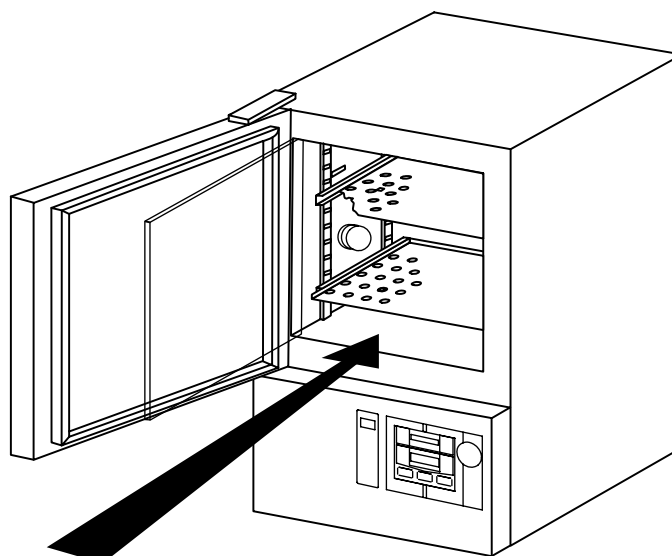
## **CAUTION!**

### Operation method

-  Operate this unit with the method specified by this operation manual. If operated in ways other than specified in this operation manual, any failure or accident could be caused. If operated in ways other than specified in this operation manual, the product is not guaranteed.


### Do not put sample on the internal base

-  If sample is put directly on the base, device performance will be disturbed. Furthermore, internal temperature will abnormally rise and it will cause trouble. Never put sample on the base. Fix the shelf on the metal fittings then set sample on it.




**SAMPLES X**


### Do not use corrosive sample

-  Stainless steel SUS304 is used for the circulation air path. However, it may be corroded by strong acid etc.. Care must be taken, vinyl chloride rubber and silicon rubber of packing may be corroded by some kind of solvent, ex alkaline, oil, halogen etc.


### When you open and close the door

-  When you open and close the door, be careful not to be hit your hands or face. It may cause injury.

### When using the cable hole...

-  When inserting the sensor or probe into the cable hole for measurement, close the hole cap as possible, and seal it with a packing or sealing material so that no clearance exits between the hole and cap. If not, the performance degradation, such as degradation of temperature characteristics, may result in.

### Return after power failure

-  When power is supplied after a power failure, the device automatically starts operation again with the same state as just before the power failure. It is danger that the device starts unattached operation after a power failure. We recommend for you to turn off the switch of this unit if a power failure occurs during operation.

## Daily Inspection and Maintenance

### **WARNING!**

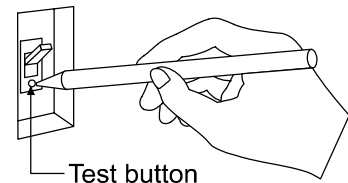
- Disconnect the power cable from the power source when doing an inspection or maintenance unless needed.
- Perform the daily inspection and maintenance after returning the temperature of this unit to the normal one.
- Do not disassemble this unit.

### **CAUTION!**

- Use a well-drained soft cloth to wipe dirt on this unit. Do not use benzene, thinner or cleanser for wiping. Do not scrub this unit. Deformation, deterioration or color change may result in.

### Monthly maintenance

- Check the earth leakage breaker function.
  1. Connect the power cord.
  2. Turn the breaker on.
  3. Push the red test switch by a ballpoint pen etc.
  4. If there is no problem, the earth leakage breaker will be turned off.



- Check the movement of overheating prevention device.

Perform the fixed temperature operation of device with certain preset temperature. Then set the operation temperature of overheating prevention device to the value approximately 5°C lower than the preset temperature of device.

In normal condition, the heater circuit is closed after a few seconds and the "Error" lamp starts to blink. The main indicator displays "Er07" and the sub indicator displays the detail of error and its corrective action. The warning buzzer sounds when its function is set to "ON".
- ❖ Be sure to check the movement of earth leakage breaker malfunction and overheating prevention device mentioned above before a long-term continuous operation or unmanned night operation.

For any questions, contact the dealer who you purchased this unit from, or the nearest sales division in our company.

### When not using this unit for long term / When disposing

#### **CAUTION!**

##### **When not using this unit for long term...**

- Turn off the power and disconnect the power cord.

#### **WARNING!**

##### **When disposing...**

- Keep out of reach of children.
- Remove the gripper and hinge to prevent the door lock.
- Treat as large trash.



## Error Display

When an error occurs, the buzzer sounds and the ERROR lamp blinks. The main indicator indicates the error number and the sub indicator indicates the detail of error and its corrective actions.

Error No.	Error Name	Main indicator	Sub indicator
Er00	Communication error	Er.00	Communication Er Ex a connection
Er.01	Temperature sensor error	Er.01	Sensor Error Calls a service
Er.02	TRIAC short-circuit	Er.02	SSR Error Calls a service
Er.03	Heater disconnection	Er.03	Heat Error Calls a service
Er.07	Independent overheating protection device is activated.	Er.07	Overheat Error Calls a service
Er.08	Timer element error	Er.08	Controller Er Calls a service
Er.10	Main relay error	Er.10	Main relay Er Calls a service
Er.13	Refrigerator error	Er.13	Refrigerator Er Calls a service
Er.14	RAM error	Er.14	Controller Er Calls a service
Er.15	EEP ROM error	Er.15	Controller Er Calls a service

## Troubleshooting

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### Before call us...

Condition	Check the following.
The sub indicator does not indicate current date and time when the earth leakage breaker is turned on.	<ul style="list-style-type: none"><li>• Power plug is not connected to the receptacle correctly.</li><li>• Power failure.</li></ul>
Temperature fluctuates during the operation.	<ul style="list-style-type: none"><li>• Too much samples.</li><li>• The change of ambient temperature is remarkable.</li></ul>
Temperature does not reach the desired one.	<ul style="list-style-type: none"><li>• Too much samples.</li></ul>

### When an error occurs...

- In case these error code mentioned above is displayed, recode the error code and shut off the power immediately.
- In case “Er14” is displayed, once turn off a circuit breaker. Then, after more than 30seconds, turn on the breaker again. In case “Er14”is still displayed even after the breaker is turned on, then contact us.

### When power failure occurs...

- When power is supplied after a power failure, the device automatically starts operation again with the same state as just before the power failure. It is danger that the device starts unattached operation after a power failure.
- We recommend for you to turn off the switch of device if a power failure occurs during operation.

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**In the case if the error other than listed above occurred, turn off the power switch and primary power source immediately. Contact the shop of your purchase or nearest Yamato Scientific Service Office.**

### In Case of Request for Repair

If the failure occurs, stop the operation, turn OFF the power switch, and unplug the power plug. Please contact the sales agency that this unit was purchased, or the Yamato Scientific's sales office.

#### < Check following items before contact >

- ◆ Model Name of Product
  - ◆ Production Number
  - ◆ Purchase Date
  - ◆ About Trouble (in detail as possible)
- } See the production plate attached to this unit.

### Minimum Retention Period of Performance Parts for Repair

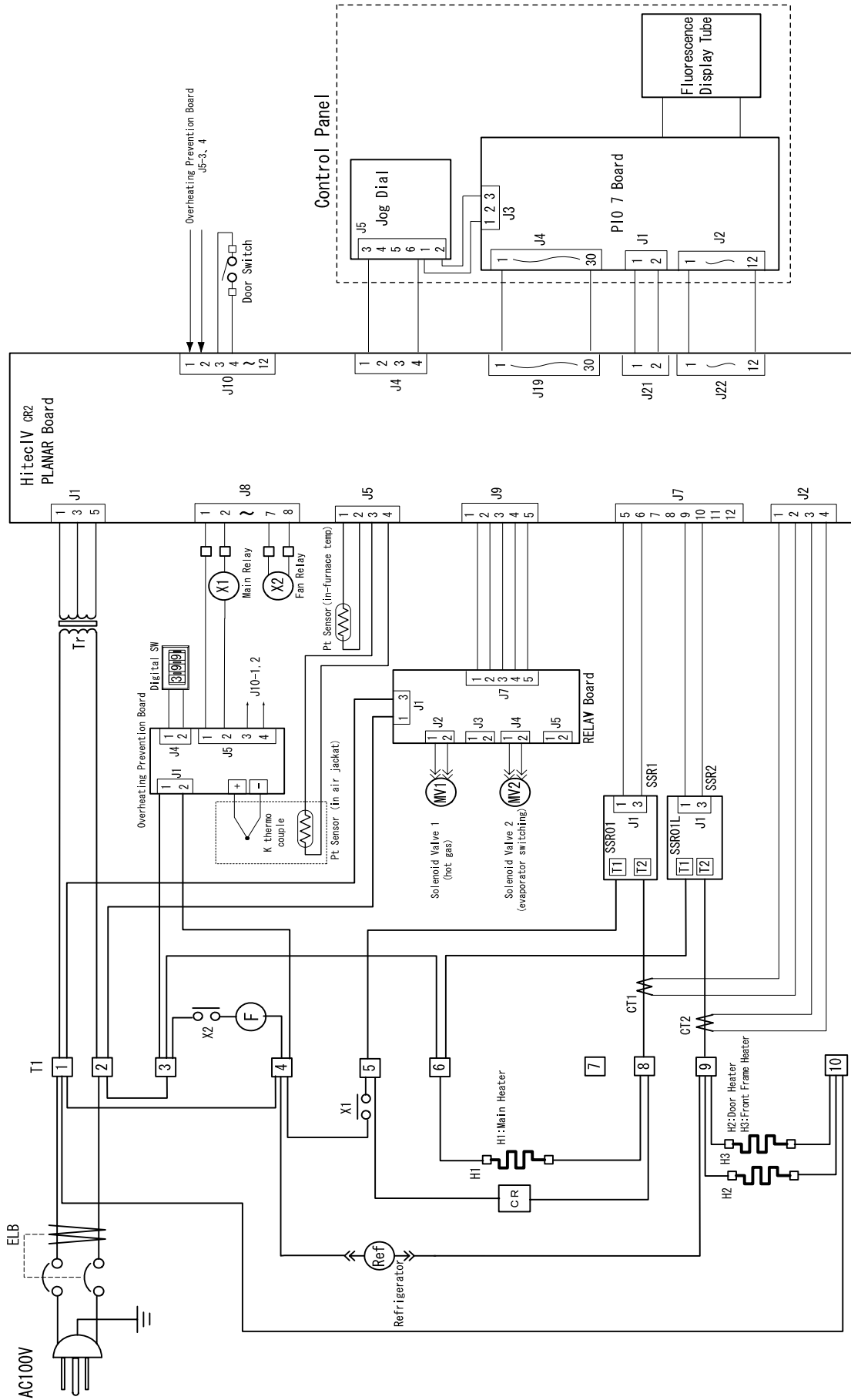
The minimum retention period of performance parts for repair of this unit is 7 years after discontinuance of this unit.

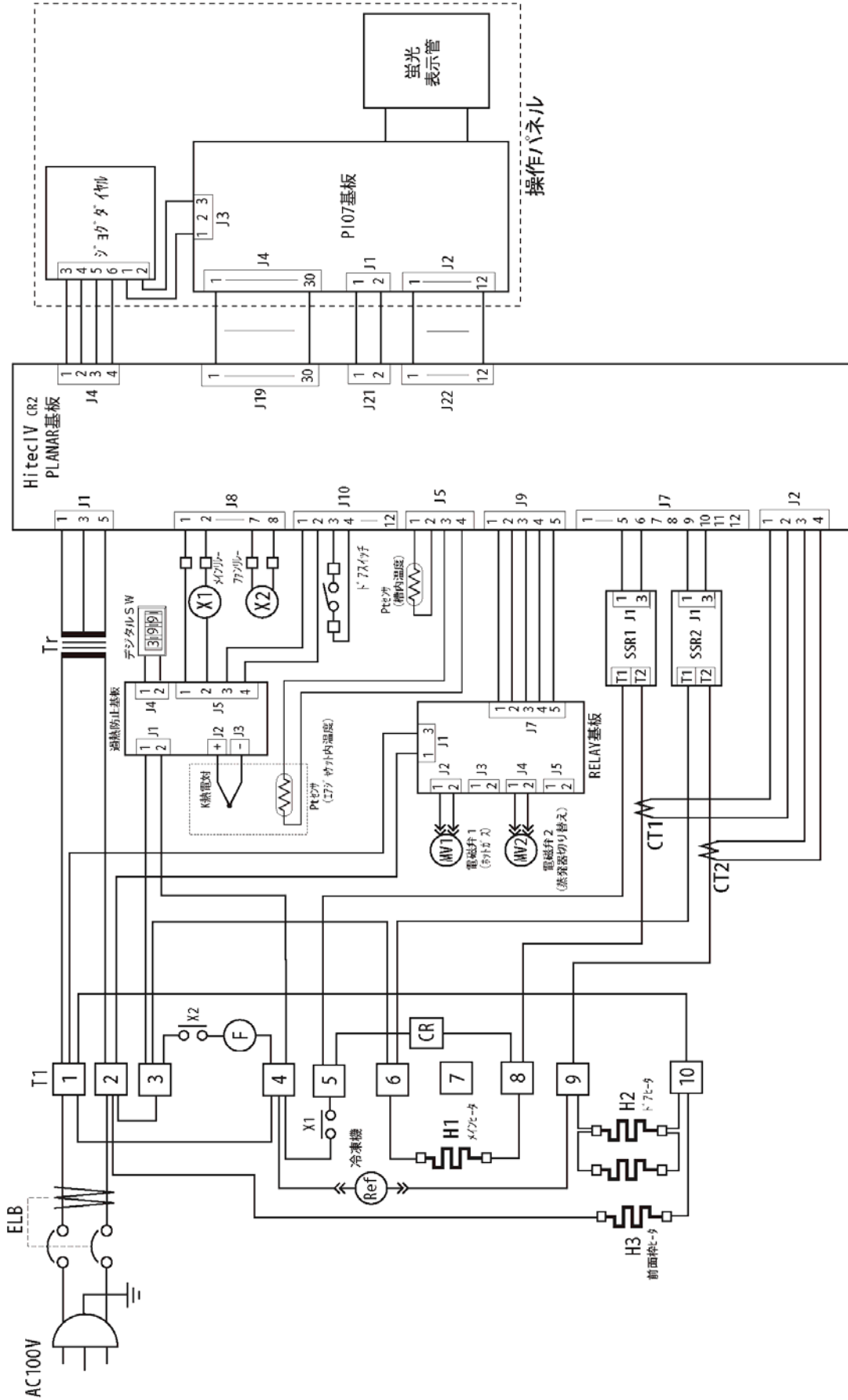
The "performance part for repair" is the part that is required to maintain this unit.

Model		IU400	IU800
Performance	Operating temperature range	0 to 60°C	
	Temperature stability	Within $\pm 0.3^{\circ}\text{C}$ under the temperature fluctuation 5 to 35°C (set temp: 37°C)	
	Temperature adjustment accuracy (*1)	$\pm 0.2^{\circ}\text{C}$ (set temp.:37°C)	
	Temperature distribution accuracy (*1)	$\pm 1^{\circ}\text{C}$ (set temp.:37°C)	
Function/Configuration	Jacket system	Air jacket	
	Temperature control system	PID control by microcomputer	
	Temperature/time setting system	Digital setting by jog dial	
	Temperature display system	Digital display by green LED	
	Other indication	Liquid crystal display of function information	
	Timer indication range	1 minute to 99 hours 59 minutes, and 100 hours to 999 hours	
	Functions for Operation	Fixed temperature operation, Auto start operation, Auto stop operation, Program operation	
	Additional function	Timer, Clock, Total operating hours counter (max. of 49999h), Calibration offset	
	Safety device	Self-diagnostic functions (Sensor error, Heater disconnection, Triac short circuit, Automatic overheating prevention, Refrigerator error), Key lock function, Door switch, Independent overheating prevention device, Earth leakage breaker	
	Sensor	Pt100 $\Omega$ $\times$ 2 (for the inside of bath and air jacket), K thermocouple (for independent overheating prevention)	
	Heater	Iron chrome wire heater/Door heater	
	Nominal capacity of heater	0.85/0.04 KW	0.85/0.1 KW
	Fan motor	Cross flow fan	
	Cable port	Internal diameter $\phi$ 32mm (the left side of unit)	
	Refrigerator	Air-cooled method refrigerator (cooling medium: R134a)	
	Inner door	Hard grass (5mm)	
Standard	Operating ambient temperature range	5 to 35°C	
	Operating ambient humidity	65%RH $\pm$ 20%	
	Internal dimensions (*2) (W×D×H mm, approx.)	450 × 480 × 450	600 × 530 × 1000
	External dimensions (*2) (W×D×H mm, approx.)	590 × 600 × 1000	740 × 650 × 1880
	Internal capacity	Approx. 100L	Approx. 300L
	Withstand load of shelf	15kg/piece	
	Number of layer for shelf bracket	11	29
	Shelf bracket pitch	30mm	
	Power supply (50/60Hz)	100V AC 13A	100V AC 14.5A
	Weight	Approx. 90kg	Approx. 155kg
Attachement	Instruction Manual, Warranty Shelf(IU400:3pcs. (bracket: 6), IU800: 5pcs. (bracket: 10))		
Optional accessories	Temperature output terminal, Time-up output terminal, External alarm terminal, External communication adapter, Internal temperature of bath measuring sensor, Startup state selecting function, Frame (only for IU400), Shelf		

\*1: The value under the condition of the ambient temperature of 23°C $\pm$ 5°C, the humidity of 65% $\pm$ 20%, and without load.

\*2: The projection is not included.





# Replacement Parts Table

## IU400

Symbol	Part Name	Code No.	Specification
CT1,2	Current detection cell	2-17-001-0002	CTL-6-S-400
ELB	Earth leakage breaker	2-06-005-0010	BJS153
F	Cross flow fan	2-15-027-0001	FM5035AAB
H1	Heater	IU400-40050	850W
H2	Cord heater	IN600-40080	
PIO	PIO7 board	1-24-000-0084	
CR2	PLANAR board	1-24-000-0066	Hitec CR2
	Independent overheating prevention device	1-27-001-0093	
SSR1,2	SSR	LT00028423	SSR-01
Tr	Transformer	2-18-000-0040	
SW	Digital switch	2-01-010-0005	Digi-switch for type4 OH
X1,2	Relay	2-05-000-0013	AJR6010
T1	Terminal block	2-07-023-0007	TS0056-10-10P
Ref	Refrigerator	3-01-006-0002	CAH17YE
MV1,2	Solenoid valve	3-02-012-0001	NEV-202D × FA1
Pt · K	Air jacket sensor	1-16-001-0053	Pt100 Ω/K
Pt	Internal sensor	1-16-001-0054	Pt100 Ω
CR	CR absorber	2-30-002-0001	2S1201 250W
LS	Door switch	2-02-001-0008	AGX106(1a)

## IU800

Symbol	Part Name	Code No.	Specification
CT1,2	Current detection cell	2-17-001-0002	CTL-6-S-400
ELB	Earth leakage breaker	2-06-005-0010	BJS153
F	Cross flow fan	4-35-000-0027	FV6035AAB
H1	Heater	IU400-40050	850W
H2	Cord heater	IN600-40080	
PIO	PIO7 board	1-24-000-0084	
CR2	PLANAR board	1-24-000-0066	Hitec CR2
	Independent overheating prevention device	1-27-001-0093	
SSR1,2	SSR	LT00028423	SSR-01
Tr	Transformer	2-18-000-0040	
SW	Digital switch	2-01-010-0005	Digi-switch for type4 OH
X1,2	Relay	2-05-000-0013	AJR6010
T1	Terminal block	2-07-023-0007	TS0056-10-10P
Ref	Refrigerator	3-01-006-0001	CAH33YE
MV1	Solenoid valve	3-02-012-0001	NEV-202D × FA1
Pt · K	Air jacket sensor	1-16-001-0053	Pt100 Ω/K
Pt	Internal sensor	1-16-001-0054	Pt100 Ω
CR	CR absorber	2-30-002-0001	2S1201 250W
LS	Door switch	2-02-001-0008	AGX106(1a)

## List of Dangerous Substances



Never use explosive substances, flammable substances and substances that include explosive or flammable ingredients in this unit.

### EXPLOSIVE

<b>EXPLOSIVE:</b>	Ethylene glycol dinitrate (nitro glycol), Glycerin trinitrate (nitroglycerine), Cellulose nitrate (nitrocellulose), and other explosive nitrate esters
	Trinitrobenzene, Trinitrotoluene, Trinitrophenol (picric acid), and other explosive nitro compounds
	Acetyl hidroperoxide (peracetic acid), Methyl ethyl ketone peroxide, Benzyl peroxide, and other organic peroxides

### FLAMMABLE

<b>IGNITING:</b>	Lithium (metal), Potassium (metal), Sodium (metal), Yellow phosphorus, Phosphorus sulfide, Red phosphorus, Celluloid compounds, Calcium carbide, Lime phosphate, Magnesium (powder), Aluminum (powder), Powder of metals other than magnesium and aluminum, Sodium hydrosulfite
<b>OXIDIZING:</b>	Potassium chlorate, Sodium chlorate, Ammonium chlorate, and other chlorate
	Potassium perchlorate, Sodium perchlorate, Ammonium perchlorate, and other perchlorate
	Potassium peroxide, Sodium peroxide, Barium peroxide, and other inorganic peroxide
	Potassium nitrate, Sodium nitrate, Ammonium nitrate, and other nitrate
	Sodium chlorite and other chlorites
	Calcium hypochlorite and other hypochlorites
<b>INFLAMMABLE LIQUID:</b>	Ethyl ether, Gasoline, Acetaldehyde, Propylene chloride, Carbon disulfide, and other flammable substances having a flash point of lower than -30°C
	Normal hexane, ethylene oxide, acetone, benzene, methyl ethyl ketone, and other flammable substances having a flash point of -30°C or higher but lower than 0°C
	Methanol, Ethanol, Xylene, Pentyl acetate (amyl acetate), and other flammable substances having a flash point of 0°C or higher but lower than 30°C
	Kerosene, Light oil (gas oil), Oil of turpentine, Isopentyl alcohol (isoamyl alcohol), Acetic acid, and other flammable substances having a flash point of 30°C or higher but lower than 65°C
<b>FLAMMABLE GAS:</b>	Hydrogen, Acetylene, Ethylene, Methane, Propane, Butane, and other flammable substances which assume a gaseous state at 15°C and 1 atm

(Source: Appendix Table 1 of Article 6 of the Industrial Safety and Health Order in Japan)



## Responsibility

Please follow the instructions in this document when using this unit. Yamato Scientific has no responsibility for the accidents or breakdown of device if it is used with a failure to comply. Never conduct what this document forbids. Unexpected accidents or breakdown may result in.

## Note

- ◆ The contents of this document may be changed in future without notice.
- ◆ Any books with missing pages or disorderly binding may be replaced.

Instruction Manual for  
**Stability Low Temperature Incubator**  
**Model IU400/800**

Third Edition Oct. 1, 2009

Revised Mar.2,2012

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