# Ware Drying Oven

## Model：DG400C/410C/440C/450C
## 800C/810C/840C/850C

- Second Edition -

- Thank you very much for purchasing this Yamato DG series Ware Drying Oven.
- Please read the “Operating Instructions” and “Warranty” before operating this unit to assure proper operation. After reading these documents, be sure to store them securely together with the “Warranty” at a handy place for future reference.

**⚠Warning!**

Before operating the unit, be sure to read carefully and fully understand important warnings in the operating instructions.

**Yamato Scientific Co.,Ltd.**

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# 1. Safety precautions

## Explanation of pictograms

### About pictograms

A variety of pictograms are indicated in this operating instruction and on products to assure safe operation. Possible results from improper operation ignoring them are classified as follows.
Be sure to fully understand the descriptions below before proceeding to the text.

| | |
|---|---|
| **Warning** | Indicates a situation which may result in death or serious injury (Note 1) |
| **Caution** | Indicates a situation which may result in minor injury (Note 2) and property damage (Note 3). |

(Note 1) Serious injury means a wound, an electrical shock, a bone fracture or intoxication that may leave after effects or require hospitalization or outpatient visits for a long time.
(Note 2) Minor injury means a wound or an electrical shock that does not require hospitalization or outpatient visits for a long time.
(Note 3) Property damage means damage to facilities, devices and buildings or other properties.

### Meanings of pictograms

This pictogram indicates a matter that encourages the user to adhere to warning (“caution” included).
Specific description of warning is indicated near this pictogram.

This pictogram indicates prohibitions
Specific prohibition is indicated near this pictogram.

This pictogram indicates matters that the user must perform.
Specific instruction is indicated near this pictogram.

# 1.Safety precautions

**List of symbols**

**Warning**

General warnings

Danger!:
High voltage

Danger!:
High temperature

Danger!:
Moving part

Danger!:Hazard of explosion

**Caution**

General cautions

Electrical shock!

Burning!

Caution for no liquid heating!

Caution for water leak!


For water only

Poisonous material

**Prohibitions**

General bans

Fire ban

Do not disassemble

Do not touch

**Compulsions**

General compulsions

Connect ground wire


Install levelly

Pull out the power plug

Regular inspection

# 1. Safety precautions

**Warning·Cautions**

## ⚠ Warning

**Never operate the unit in an atmosphere containing flammable or explosive gas**

Never operate the unit in an atmosphere containing flammable or explosive gas.
Otherwise, an explosion or a fire may result since the unit is not explosion-proof.
See section “Never operate the unit in an atmosphere containing flammable or explosive gas.
Otherwise, an explosion or a fire may result since the unit is not explosion-proof.”
See section “

13. List of dangerous materials” on page 53 about flammable or explosive gas.

**Be sure to connect the ground wire**

Be sure to connect the ground wire correctly. Otherwise, electrical leak may result and cause an electrical shock or a fire.

**Ban on operation when an abnormality occurs**

When a smoke or an unusual odor is seen or sensed, immediately turn the power switch on the main unit off and pull out the power cord (plug) from the power supply. A fire or an electrical shock may result.

**Never use electrical power cords bundled**

When these are used bundled, they might overheat causing a fire.

**Take care not to damage electrical power cords**

Avoid tightly bend, pull with a strong force or twist to prevent electrical power cords from damaging. A fire or an electrical shock may result.

**Never use an explosive or a flammable material with this unit**

Never use an explosive material, a flammable material or a material containing them. An explosion or an electrical shock may result.
See section “

13. List of dangerous materials” on page 53 about flammable or explosive gas.

**Never try to touch a hot part**

Some parts of the unit are hot during and immediately after operation. Take special care for possible burning.

**Never try to disassemble or alter the unit**

Some parts of the unit are hot during and immediately after operation. Take special care for possible burning.

## ⚠ Caution

**When a thunder is heard**

When a thunder is heard, turn the main power off immediately. A malfunction, fire or an electrical shock may result.

# 2. Before operating the unit

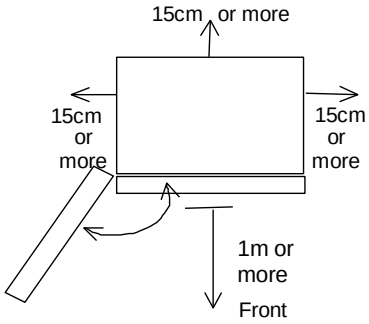
**Precautions when installing the unit**

## 1. Carefully select an installation site.

Take special care not to install the unit at a place described below:

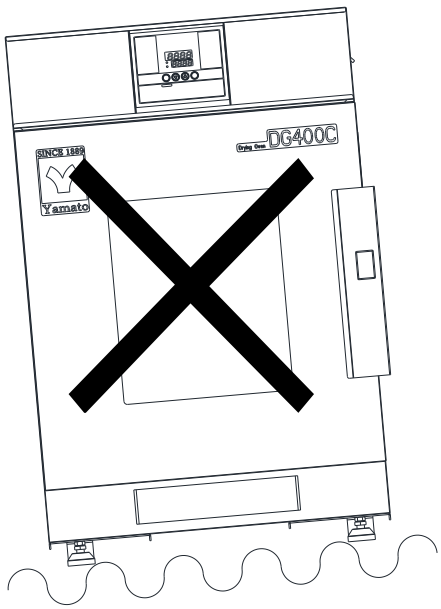
- On uneven or dirty floor
- Where combustible gas or corrosive gas exists
- Where the ambient temperature is 35°C or more
- Where temperature fluctuates widely
- Where dust or humidity is excessive
- Where subject to direct sunlight
- Where vibration is severe

Install this unit at a place with spaces shown below.




## 2. Install the unit on a level surface

Install the unit on a level surface, or else it may cause unexpected malfunctions like vibration, noise, etc.




## 3. Installation

The unit might fall down or move by an earthquake or an impact resulting a product damage.
We recommend to make safety measures when installing the unit at a busy place.
Take appropriate safety measures to prevent the unit from tripping over.

# 2. Before operating the unit

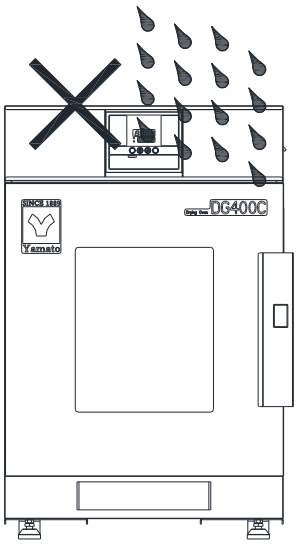


### 4. Ensure adequate ventilation

Do not operate if the vents at the side and back of product are blocked.
If blocked, it may cause the internal temperature rising and performance degradation of product, also result in accident, failure or fire.

### 5. Never operate the unit in a place containing liquid substance

Never operate the unit in a place containing liquid substance. Once liquid entering into the product, it may cause failure, electric shock or fire.

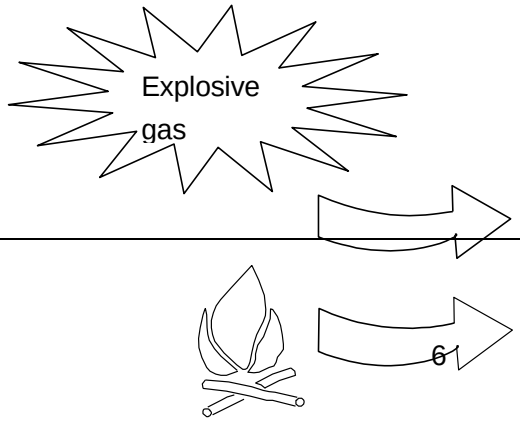


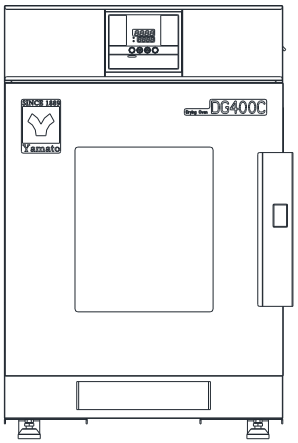

### 6. Never operate the unit in an atmosphere containing flammable or explosive gas

Never operate the unit in an atmosphere containing flammable or explosive gas.
Otherwise, an explosion or a fire may result since the unit is not explosion-proof.

See “

13. List of dangerous materials” on page 53 about flammable or explosive gas.




SINCE 1888
Yamato
DG400C

# 2. Before operating the unit



## 7. Use dedicated distribution board and outlet

Use a power distribution board or outlet that meets the electrical capacity of the unit.

| | | | | | | |
|---|---|---|---|---|---|---|
| Power capacity: | DG400C | AC115V | 9A | DG800C | AC115V | 12A |
| | DG440C | AC115V | 9A | DG840C | AC115V | 12A |
| | DG410C | AC220V | 5A | DG810C | AC220V | 6.5A |
| | DG450C | AC220V | 5A | DG850C | AC220V | 6.5A |

* When the unit does not start even when you turn the power ON, check if for low main voltage or if the unit is connected to the same power supply line as other devices and connect it to another line if necessary.
* Avoid connecting too many devices using a branching outlet or extending a wire, the temperature controlling function may degrade due to voltage drop.

Do not connect the unit to any parts or lines such as a gas pipe, a water pipe or a telephone line. Otherwise, an accident or a malfunction may result.

## 8. Handling of a power cord

Never use electrical power cords bundled. When these are used bundled, they might overheat causing a fire.

Do not convert, forcibly bend, twist or pull the power cord. Otherwise, a fire or an electrical shock may result.

Do not place the power cord under a desk or a chair, or sand between objects to avoid it from being damaged. Otherwise, a fire or an electrical shock may result.

Do not place the power cord close to a stove or other heat generating device. Sheath of the cord may burn and result in a fire or an electrical shock.

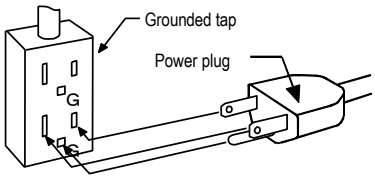
If the power cord should be damaged (exposure of core wire or disconnection), immediately turn the main unit off, pull out the power cord (plug) out of the power supply and ask your dealer to replace the cord. Otherwise, a fire or an electrical shock may result.

Connect the power cord to an appropriate wall outlet.

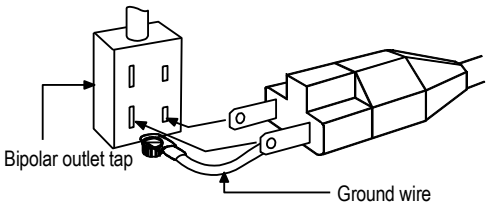
## 9. Be sure to connect the ground wire

- When there is no ground terminal available, class D grounding work is necessary and please consult your dealer or our nearest sales office.
- Be sure to connect the ground wire to the wall outlet securely.

We recommend use a ground type outlet




When a bipolar type outlet is used




Insert the ground adaptor included as an option, into a power plug confirming the polarity of the outlet. Connect the ground wire (green) of the ground adaptor to the ground terminal on the power supply equipment.

When there is no ground terminal.
In this case, class D grounding work is necessary and please consult your dealer or our nearest sales office.

Never connect the ground wire to gas pipe, water pipe, or telephone line. Otherwise, an accident or a malfunction may result.

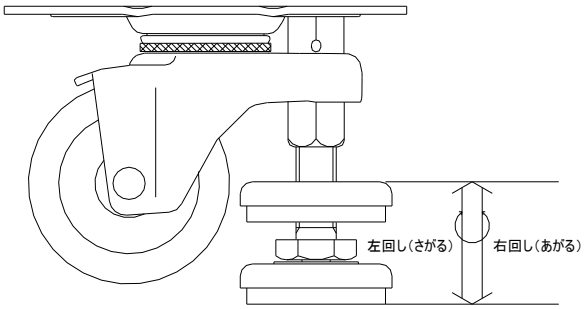
# 2. Before operating the unit

## Precautions when installing the unit

(1) Lift the foot of caster adjustor

Lift the feet of 4 caster adjustors as shown in the right figure, confirm the 4 casters can turn freely, and then move the unit.

※ If move to an uneven surface, it would give excessive impact to the casters and cause damage of casters. Please uplift the unit to move.

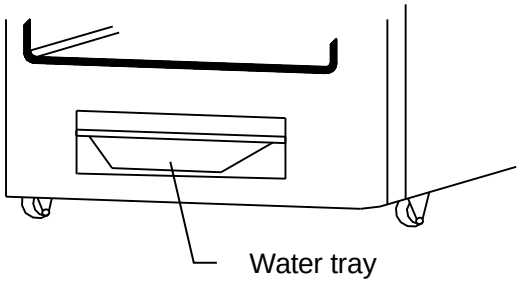



(2) Choose a proper installation place

Flat place (4 casters touch land totally), put down the feet of adjustors as check if the unit shakes or tilts.

(3) Set the water tray

Set the water tray for water containing when drying.



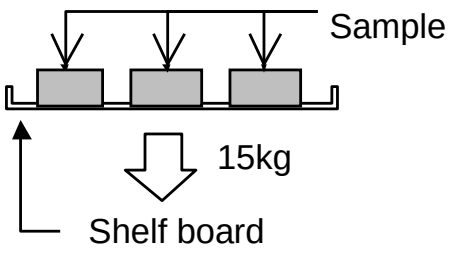

(4) Install shelf board

- Install the shelf rest brackets at left and right shelf supports at proper height.
- Slide the shelf board inward.

※Pay attention to the height of left and right shelf rest brackets.

- Confirm shelf board would not fall down and get loosening.

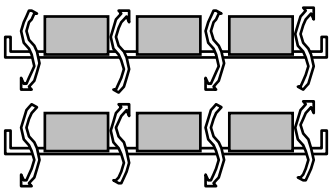
Withstand load of each shelf board is 15kg in uniform loading. Place the samples separately.



# 2. Before operating the unit

## Precautions when installing the unit

・Too many samples may influence proper temperature control. Be sure to use shelf boards and place samples apart each other so as to make free space of 30% or more to assure proper temperature accuracy.



Make at least 30% of space

(5) Never put samples at the bottom of inner chamber

- If directly put samples at the bottom of inner chamber and operate the unit, it may influence the temperature performance. It may cause not only corrosion, damage or rust of inner chamber, but also sample damage or fire.
- The sensor is set at the inner wall of chamber, do not make samples contact the walls.

Place the samples on the shelf boards.

(6) Pay attention not to use the following samples

①Samples containing flammable or explosive substances

This product is not explosion proof, never use the unit to dry samples containing flammable or explosive substances.

②Corrosive samples

Pay attention not to use corrosive samples. This product may be corroded by corrosive substances like strong acid, although it mostly made of stainless steel SUS304. Otherwise, the sealing strip may be corroded by organic solvent such as acid, alkali and oil.

(7) Open the vents when operating

The vents are set on the top of product. Usually, operate with the 2 vents opened. When operating, adjust the opening as per the moisture discharge of samples.

**High-temperature steam would erupt from the vents, it may cause burn injury, do not observe at the vents or touch them.**

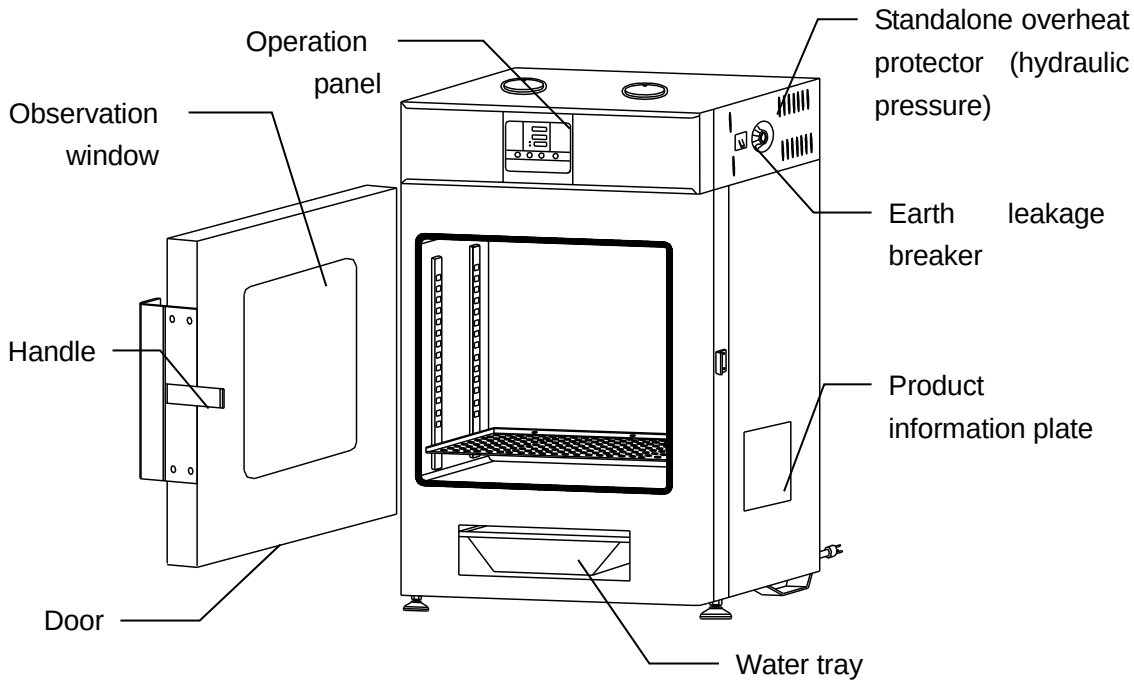
(8) Operate when door is fully closed

・Confirm that the locking mechanism at right side of door is totally locked, and then operate the unit.

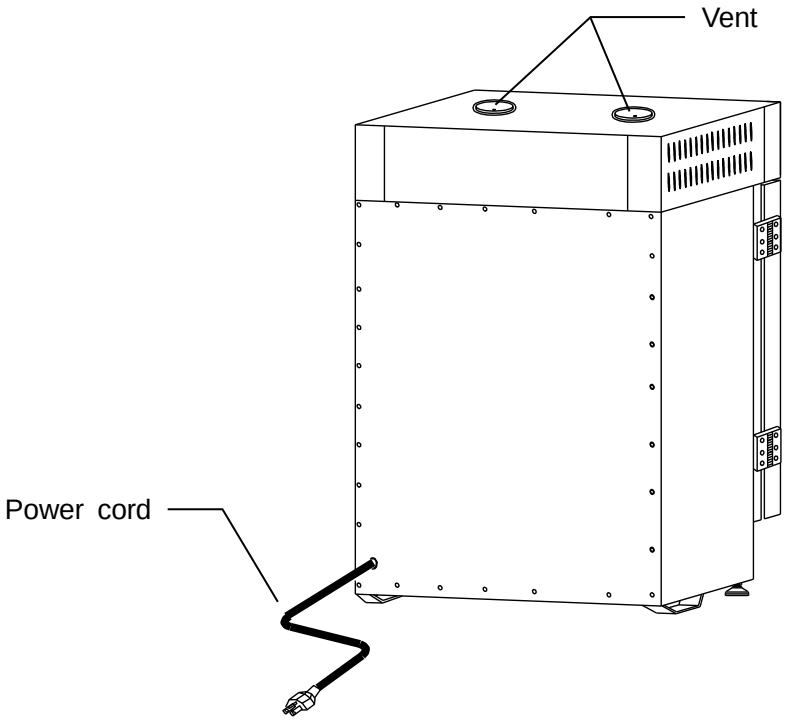
# 3. Names and functions of parts

**Main body**

**DG400C/410C front**



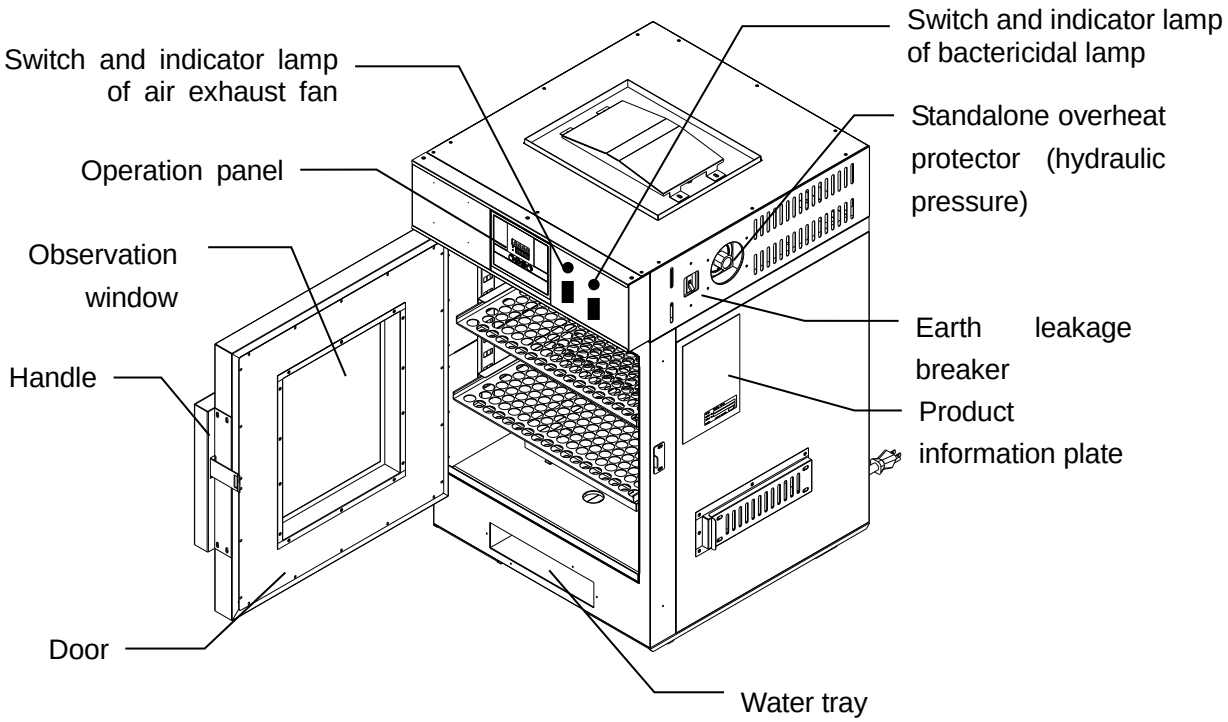

**DG400C/410C Back**



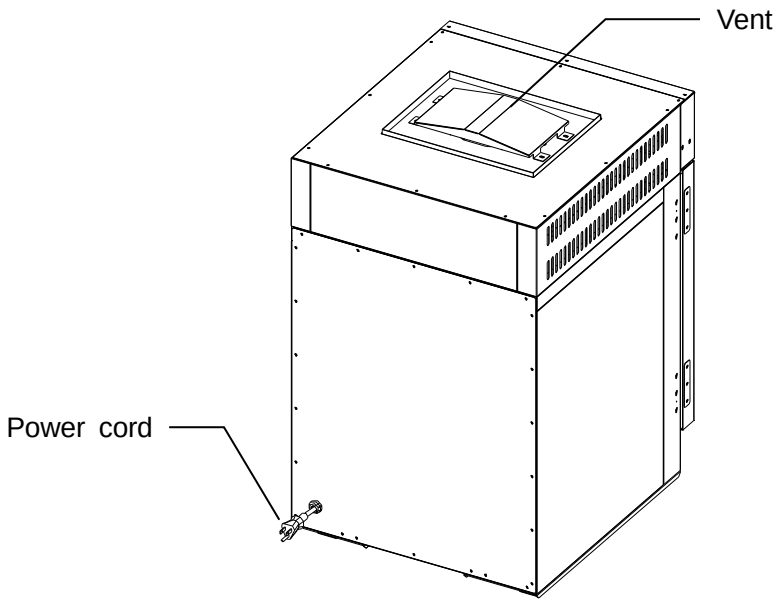
# 3. Names and functions of parts

**Main body**

### DG440C/450C front



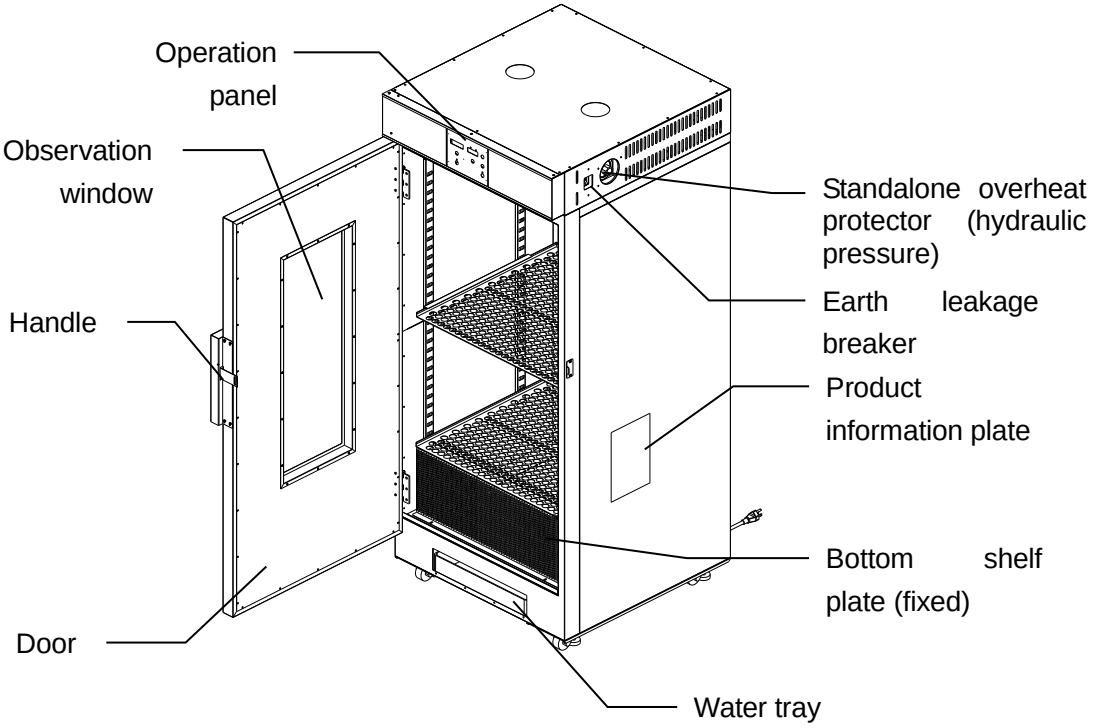

### DG440C/450C Back



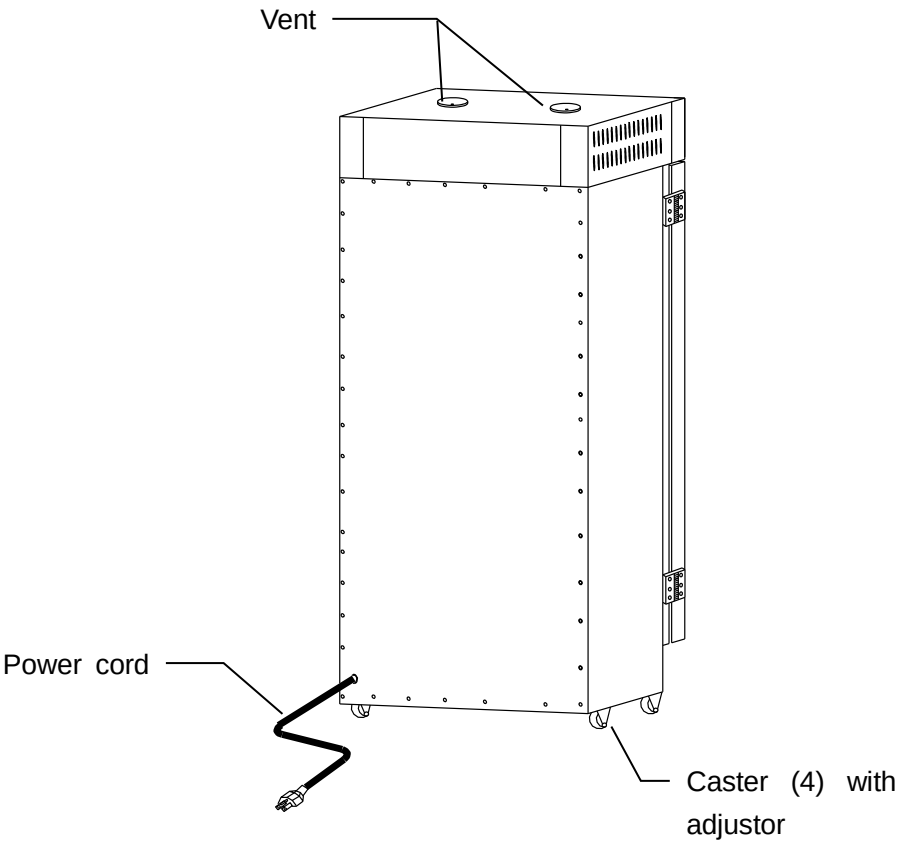
# 3. Names and functions of parts

**Main body**

**DG800C/810C front**



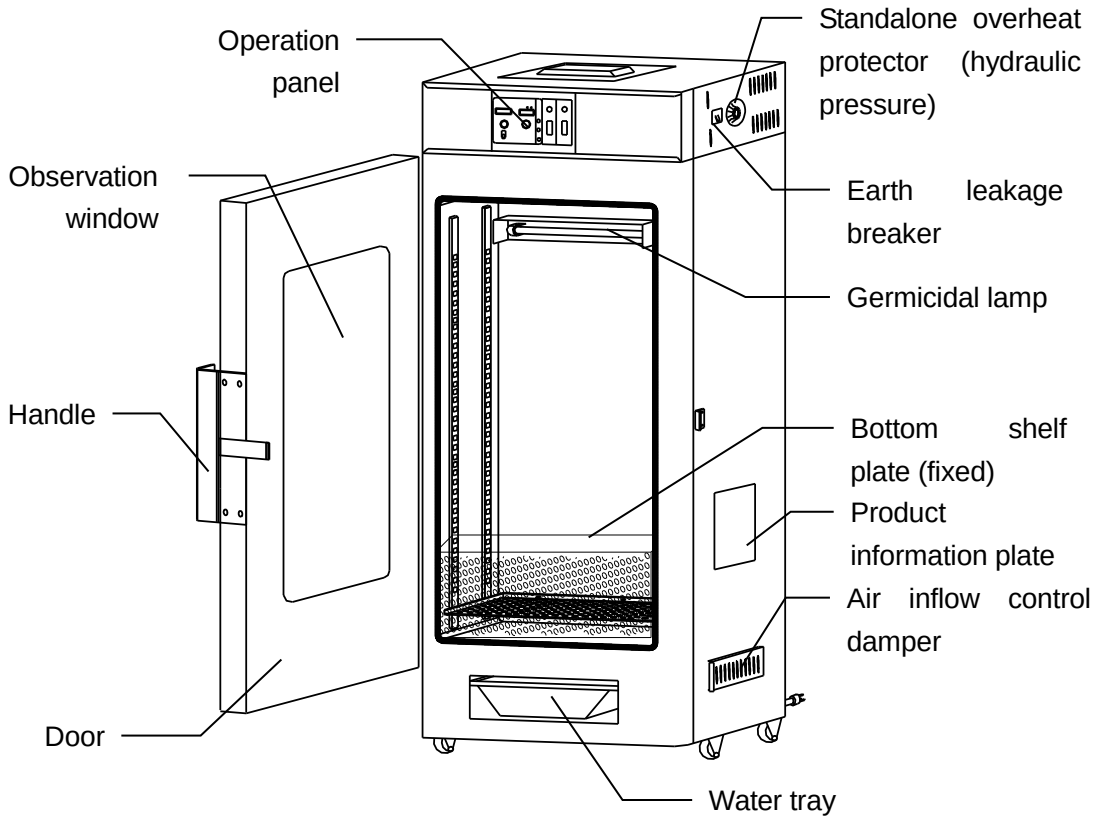

**DG800C/810C back**



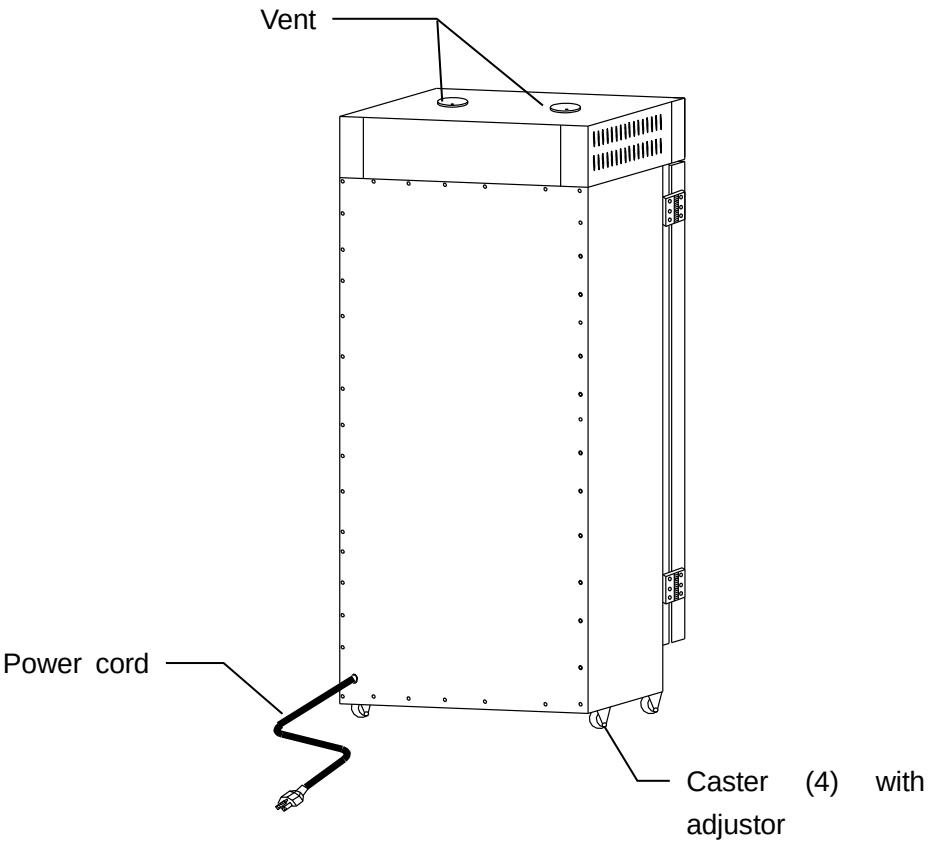
# 3. Names and functions of parts

**Main body**

**DG840C/850C front**

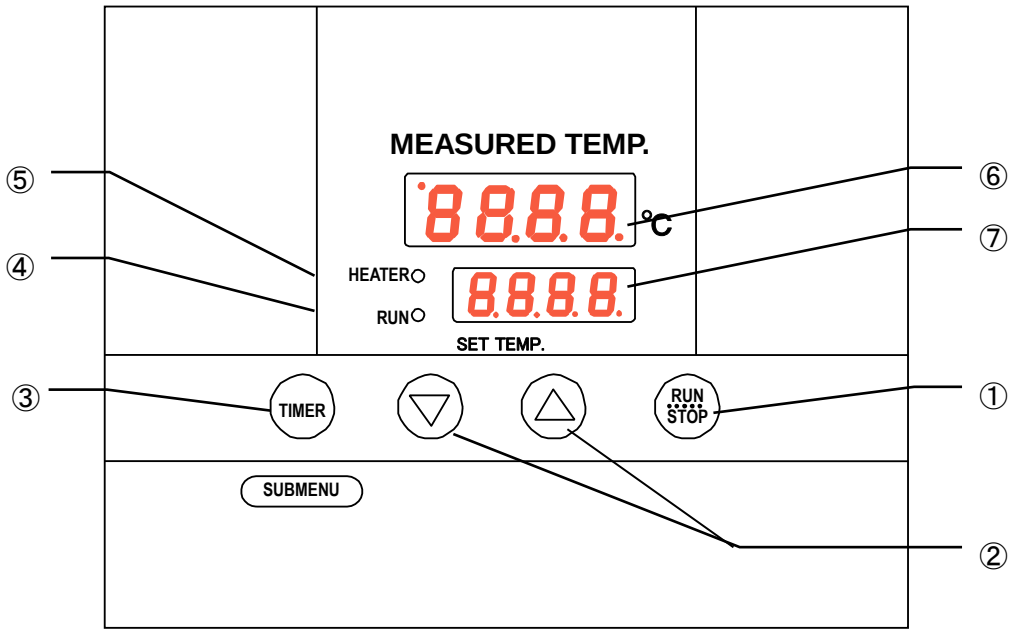



**DG840C/850C back**



# 3. Names and functions of parts

## Operation panel

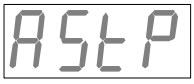
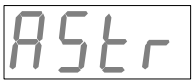
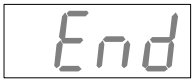



| No. | Name | Operation/action |
|---|---|---|
| ① | RUN/STOP key | Used for starting/stoping operation. |
| ② | ▼▲ keys | Used for selecting settings. |
| ③ | TIMER key | Key for selecting timer operation settings.<br>Quick auto stop operation, auto stop operation or auto start operation can be selected. |
| | SUB MENU key<br>(Long press of the Timer key) | Key for setting calibration offset temperature, the key lock function or the power outage compensation function. |
| ④ | RUN lamp | Illuminates during fixed temperature operation and blinks during timer operation. |
| ⑤ | HEATER lamp | Illuminates while heater power is on. |
| ⑥ | Measured temperature screen | Displays measured temperature in the bath · set characters · alarm information. |
| ⑦ | Set temperature screen | Displays a set temperature, timer settings and timer remaining time. |

# 3. Names and functions of parts

## Explanation of characters

Characters on the controller are explained in this section.

| Characters | Identifier | Name | Application |
|---|---|---|---|
|  | AStP | Auto stop setting | Used for setting auto stop operation. |
|  | AStr | Auto start setting | Used for setting auto start operation. |
|  | End | Time up | Displayed when timer operation has ended.<br>See pages 22 and 24. |
|  | cAL | Calibration offset setting | Used for inputting a calibration offset temperature<br>See section “Using the calibration offset function” on page 28. |
|  | Lock | Key lock of settings | Key locks settings to prevent their alteration<br>See section “Using the lock function” on page 29. |
|  | Pon | Power outage compen-sation setting | Selects operations after recovery from power outage.<br>See section “Using the power outage compensation function” on page 30. |

*See the section “Operation mode·function setting keys and characters” on page 19 for characters of operation modes and functions.

# 4. Operating procedures

## List of operation modes and functions

Operation modes of the unit are as shown below:

| № | Name | Description | Page |
|---|---|---|---|
| 1 | Fixed temperature operation | Turning the ELB on to enter the operation setting mode.<br>Proceed to temperature setting that uses ▼▲ keys.<br>Pressing the RUN/STOP key longer to start operation, and pressing the RUN/STOP key longer again to stop operation. | P.21 |
| 2 | Quick auto stop operation | Used when you want to "stop fixed temperature operation being performed automatically in several hours.<br>Press the TIMER key during fixed temperature operation to display "AStP."<br>Set a duration before stop with the ▼▲ keys.<br>Pressing the RUN/STOP key starts quick auto stop operation and activates the timer in the middle of it to automatically stop it after the set period of time. | P.22 |
| 3 | Auto stop operation | Used when you want to "set automatic stop for fixed temperature operation when making settings for it."<br>Press the TIMER key to display "AStP."<br>Set a duration before stop with the ▼▲ keys.<br>Pressing the RUN/STOP key starts auto stop operation. | P.24 |
| 4 | Auto start operation | Used when you want to "start operation automatically after several hours" after power is turned on.<br>Press the TIMER key to display "AStr."<br>Set a duration before stop with the ▼▲ keys.<br>Pressing the RUN/STOP key starts auto start operation. | P.26 |
| * Operation mode cannot be changed while the unit is in operation. First stop operation before changing the mode. | | | |

# 4. Operating procedures

## List of operation modes and functions

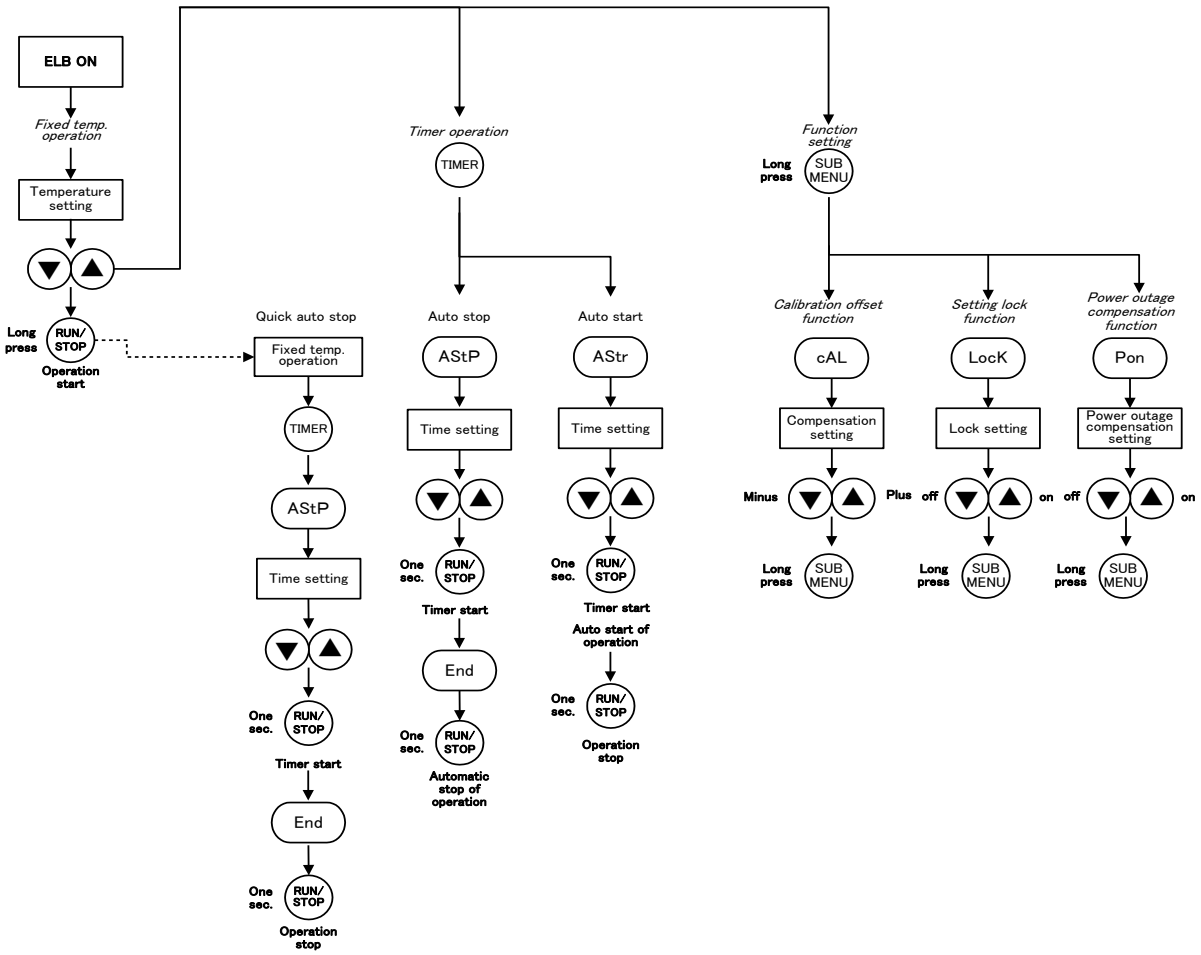
Functions of the unit are as shown below:

| № | Name | Description | Page |
|---|---|---|---|
| 1 | Overheat prevention function | Automatic overheat prevention function:<br>This function is linked to the unit set temperature and has been set to so that it is automatically activated (returned automatically) at a temperature 12℃ higher than the set temperature in the bath.<br>Standalone overheat prevention device:<br>When the temperature in the bath reaches the set temperature of the overheat prevention device, its heater circuit trips to shut off controller operation.<br>The temperature can be set with the manual dial on the hydraulic overheat prevention device installed at the right side of the unit. | P.20 |
| 2 | Calibration Offset function | Calibration offset function compensates any differences between the target temperature in the bath and the control temperature of the controller (sensor temperature.)<br>The function can compensate to either plus or minus side for the whole temperature band of the unit.<br>This compensation can be set with the SUB MENU keys. | P.28 |
| 3 | Setting lock function | This function locks the set operation status.<br>The lock can be set or released with the SUB MENU key. | P.29 |
| 4 | Power outage compensation function | This function returns the main unit operation to the resume status after recovery from power outage, or keeps the current stop status.<br>This compensation can be set with the SUB MENU keys. | P.30 |

# 4. Operating procedures

## Operation mode·function setting keys and characters

Key operations and characters in the diagram below are used for operation mode and function settings.



# 4. Operating procedures

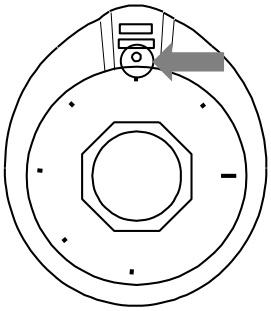
## Operating procedures (settings for overheat prevention device)

As a safety measure for preventing overheat, a hydraulic overheat prevention device (manual return) is installed.

### Temperature setting range and functions

The temperature setting range for the standalone overheat prevention device is “50℃～120℃.”
When the temperature in the bath keeps rising beyond the controller set temperature and reaches the set temperature of the overheat prevention device, the heater circuit trips and the controller operation is shut off.
When the overheat prevention device is activated, it will not be released until the ELB is turned on.

### How to set temperature



Set the temperature scale to the arrow

**Setting the overheat prevention temperature**

- Set the temperature scale on the hydraulic overheat prevention device installed on the right side of the unit to the arrow in the diagram shown left.
- Turn the ELB to “OFF” and wait for a while without opening the door.
- After a while, turn the ELB“ON.” (Turn the ELB“ON”.)

### ⚠ Caution

① Set temperature as “set temperature +20℃” as a rough standard and add 5℃ to the setting if the device functions improperly.

② The temperature setting range for the standalone overheat prevention device is “50℃～120℃.” Be sure to set the overheat prevention activation temperature correctly otherwise the device may not start, the overheat prevention device is activated before temperature in the bath increases completely, or a fire or other unexpected accidents may result.
**The temperature is set at 120℃ on shipping from the factory.**

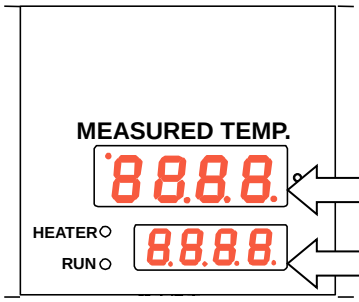
③ If the temperature set of standalone overheat protector is at room temperature or below, open the door at this time, the standalone overheat protector may work.

④ The overheat prevention device has been designed to prevent overheating of devices not to protect samples. The device does not prevent accidents caused from use of explosive or flammable substances.

# 4. Operating procedures

## Operating procedures (fixed temperature operation)

### How to start fixed temperature operation

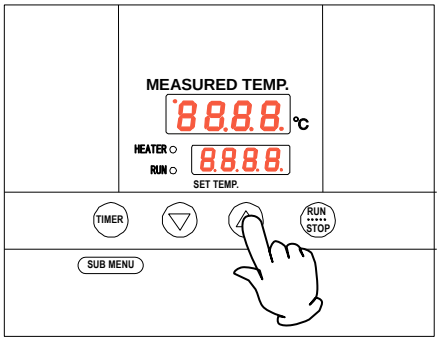



**1.Turn the ELB ON. (Turn the ELB to "ON.")**

When the ELB is turned ON, the intial values will be displayed for about four seconds, then the initial screen will appear and the current bath temperature and the previous set temperature are displayed on each of the indicators.

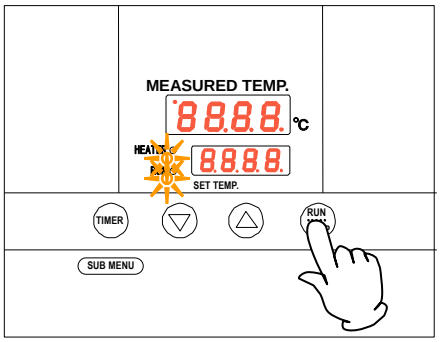
Measured temperature screen: Displays the current bath temperature

Set temperature screen: Displays the previous set temperature




**2. Setting the temperature**

Set a temperature using the ▼▲ keys.




**3. Starting operation**

Press the RUN/STOP key longer.

Fixed value operation will start and the RUN lamp and the HEATER lamp come on.

**4. Stopping operation**

Press the RUN/STOP key longer.

Operation stops, the RUN lamp goes off and the screen switches to the initial setting screen.

### When you want to correct setting errors or change settings

When you want to change settings, press the ▼▲ keys on the current screen to enter the setting mode where you can change settings. Blink stops three seconds after three seconds after change and setting is completed.

**Caution**

① When you want to lower the set temperature during fixed temperature operation, note that it takes some time to reach the reset temperature since the unit has no cooling capacity.

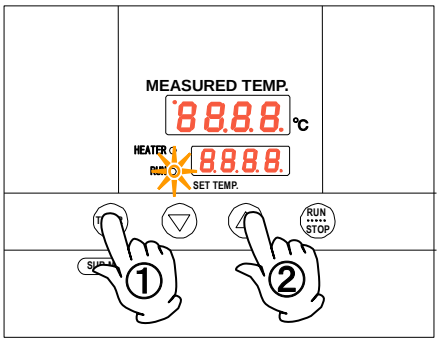
② Immediately after operation has been stopped, the temperature in the bath is around the set temperature. Operation stop refers only to machine stop and time needed for decreasing the emperature in the bath is not considered.

# 4. Operating procedures

## Operating procedures (quick auto stop operation)

Used when you want to “stop fixed temperature operation being performed automatically in several hours. Quick auto stop operation is a function to enable auto stop timer setting during operation.

### Procedures for quick auto stop operation



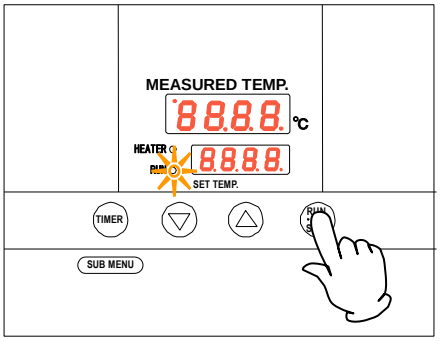

**1. Setting time period before stop during fixed temperature operation**

① Make sure that the RUN lamp is illuminated to indicate the unit is in operation.
Press the TIMER key.
Characters AStP  are indicated on the measured temperature screen to indicate the auto stop operation mode and set duration blinks on the set temperature screen.

② Set a duration you want using the ▼▲ keys.

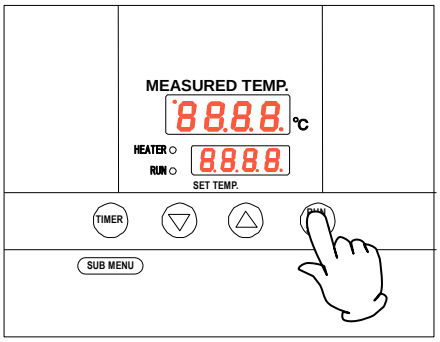
### About the timer function

The maximum time that can be set for the timer is 999 hours 50 minutes.
Up to 99 hours 59 minutes, time can be set in minutes.
One hundred hours and over are set only in 10 minutes.
Keep the ▼▲ keys pressed to continuously change set time and you can quickly reach the time you want. Press the ▼▲ keys once at a time for fine adjustment.




**2. Starting timer operation**

When the time you want is set, press the RUN/STOP key while the set temperature screen is blinking.
The RUN lamp blinks and timer operation is started.
Timer starts counting when the temperature in the bath reaches the set temperature.
Once timer counting is started, the set temperature screen changes to the remaining time display.




**3.Stopping and ending timer operation**

Operation stops automatically when the set temperature has elapsed.
Characters End  blink on the set temperature screen to indicate operation has ended.
Press the RUN/STOP key for approx. one second to end the timer operation mode. The screen switches to the initial setting screen.

# 4. Operating procedures

## Operating procedures (quick auto stop operation)

### When you want to correct set temperature or set time, or change settings

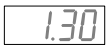
When you want to change settings, press the ▼▲ keys on the current screen to enter the setting mode where you can change settings. Blinking stops three seconds after three seconds after change and setting is completed. Note, however, that temperature changes after timer activation are counted also while temperature is changing.

When you want to change settings before timer activation, press the TIMER key on the current screen to enter the setting mode where you can change settings. Enter a time duration from when the set temperature is reached to the time the device shall be stopped.

When you want to change settings after timer activation, press the TIMER key on the current screen to enter the setting mode where you can change settings. Note, however, you need to set a time calculated by adding the time already passed to the time to be added.

After change has been made, press the RUN/STOP key to complete the process.

When you want to stop quick auto stop operation in the middle of it, press the RUN/STOP key long once to stop device control once, then make settings again in the appropriate mode.

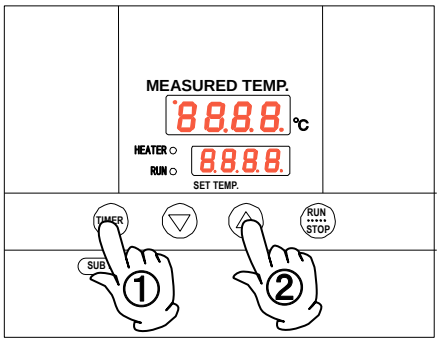
In terms of the remaining time display  a blinking dot indicates count down and an illuminating dot indicates a wait status (while temperature is increasing or decreasing to the set temperature) during which the timer has stopped counting.

# 4. Operating procedures

## Operating procedures (auto stop operation)

This mode automatically stops fixed temperature operation after a certain time from its start set with the timer.

### Procedures for auto stop operation



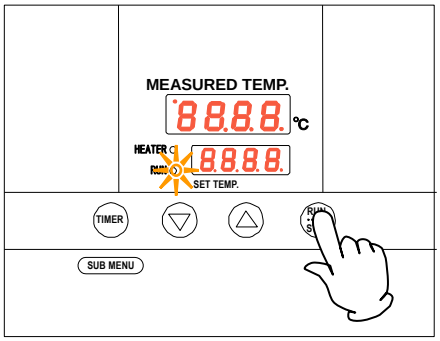

**1. Setting a stop time**

① After confirming the temperature you want is set, Press the TIMER key to display characters AStP AStP on the measured temperature screen that indicate auto stop operation.
The set time is displayed on the set temperature screen.

② Set a time you want using the ▼▲ keys.
Pressing the▼▲ keys makes the set time blink. The time is determined when blinking stops.

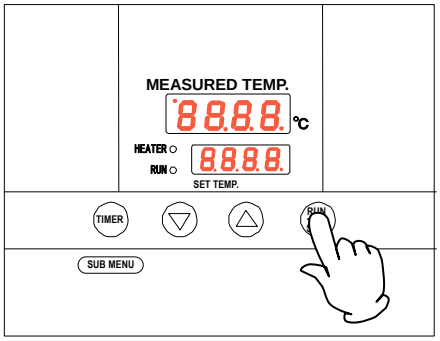
### About the timer function

The maximum time that can be set for the timer is 999 hours 50 minutes.
Up to 99 hours 59 minutes, time can be set in minutes.
One hundred hours and over are set only in 10 minutes.
Keep the ▼▲ keys pressed to continuously change set time and you can quickly reach the time you want. Press the ▼▲ keys once at a time for fine adjustment.




**2. Starting timer operation**

When the time you want is set, press the RUN/STOP key for about one second while characters AStP AStP that indicate auto stop operation are displayed on the measured temperature screen and the set time on the set temperature screen.
The RUN lamp blinks and timer operation is started.
Timer starts counting when the temperature in the bath reaches the set temperature.
Once timer counting is started, the set temperature screen changes to the remaining time display.




**3. Stopping and ending timer operation**

Operation stops automatically when the set temperature has elapsed.
Characters End End blink on the set temperature screen to indicate operation has ended.
Press the RUN/STOP key for approx. one second to end the timer operation mode. The screen switches to the initial setting screen.

# 4. Operating procedures



### When you want to correct set temperature or set time, or change settings

When you want to change settings, press the ▼▲ keys on the current screen to enter the setting mode where you can change settings. Blinking stops three seconds after three seconds after change and setting is completed. Note, however, that temperature changes after timer activation are counted also while temperature is changing.

When you want to change settings before timer activation, press the TIMER key on the current screen to enter the setting mode where you can change settings. Enter a time duration from when the set temperature is reached to the time the device shall be stopped.

When you want to change settings after timer activation, press the TIMER key on the current screen to enter the setting mode where you can change settings. Note, however, you need to set a time calculated by adding the time already passed to the time to be added.

After change has been made, press the RUN/STOP key to complete the process.

Auto stop operation is not available together with auto start operation.

When you want to stop auto stop operation in the middle of it, press the RUN/STOP key long once to stop device control once, then make settings again in the appropriate mode.

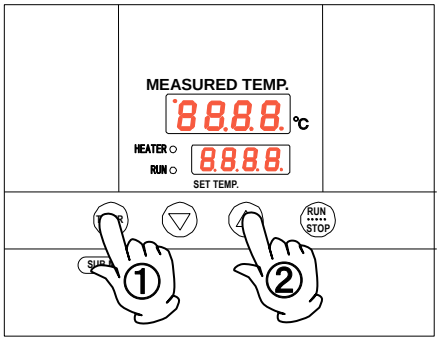
In terms of the remaining time display  a blinking dot indicates count down and an illuminating dot indicates a wait status (while temperature is increasing or decreasing to the set temperature) during which the timer has stopped counting.

# 4. Operating procedures

## Operating procedures (auto start operation)

This mode automatically starts fixed value operation after a certain time from its start set with the timer.
However, operation does not stop automatically but needs to be stopped manually.

### Procedures for auto start operation



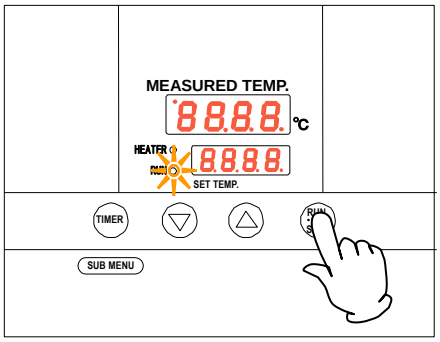

**1. Setting an operation start time**

① After confirming the temperature you want is set, Press the TIMER key to display characters AStr on the measured temperature screen that indicate auto start operation.
The set time is displayed blinking on the set temperature screen.

② Set a time you want using the ▼▲ keys.
Pressing the▼▲ keys makes the set time blink. The time is determined when blinking stops.

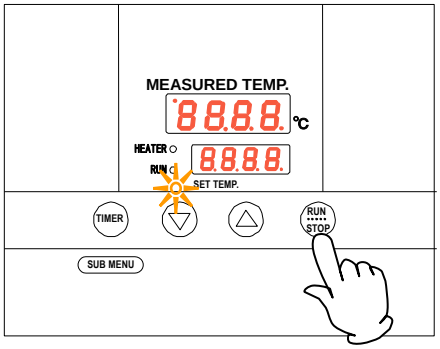
### About the timer function

The maximum time that can be set for the timer is 999 hours 50 minutes.
Up to 99 hours 59 minutes, time can be set in minutes.
One hundred hours and over are set only in 10 minutes.
Keep the ▼▲ keys pressed to continuously change set time and you can quickly reach the time you want. Press the ▼▲ keys once at a time for fine adjustment.




**2. Starting timer operation**

When the time you want is set, press the RUN/STOP key for about one second while characters AStr that indicate auto start operation are displayed on the measured temperature screen and the set time on the set temperature screen.
Timer starts counting when the RUN/STOP key is pressed and RUN lamp blinks.
Display on the measured temperature screen switches from set time display to remaining time display.




**3.Stopping and ending timer operation**

Operation automatically starts at the set time and the RUN lamp comes on.
To stop operation, press the RUN/STOP key for approx. one second to end the timer operation mode. The screen switches to the initial setting screen.

# 4. Operating procedures



**When you want to correct set temperature or set time, or change settings**

When you want to change the set temperature during timer counting, press the ▼▲ keys during that status to switch the set temperature screen to the set temperature input mode, which blinks to enable change of the set temperature with the ▼▲ keys.

When you want to change the set time during timer counting, press the TIMER key during that status to switch the set temperature screen to the set time input mode, which blinks to enable change of the set time with the ▼▲ keys.

In either case, the set temperature screen will stop blinking after a while and switch to the timer count mode and the change made is determined. Note, however, when you change the set time you need to set a time calculated by adding the time already passed to the time to be added.

When operation has started after the auto start time, you cannot change the set time.

When you want to stop auto start operation in the middle of it, press the RUN/STOP key long to stop device control once, then make settings again in the appropriate mode.

In terms of the remaining time display  a blinking dot indicates count down and an illuminating dot indicates a wait status (while temperature is increasing or decreasing to the set temperature) during which the timer has stopped counting.

# 4. Operating procedures

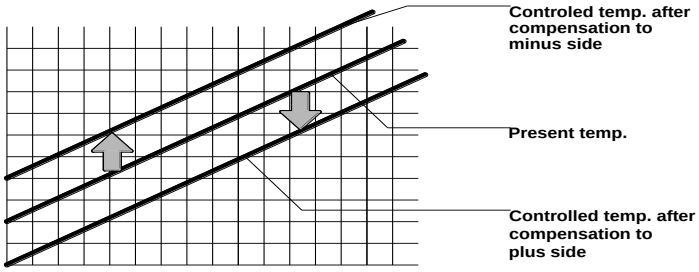
## Useful functions (calibration offset function)

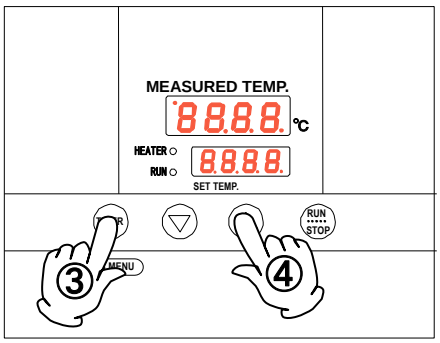
### Using the calibration offset function

Calibration offset function compensates any differences between the target temperature in the bath and the control temperature of the controller (sensor temperature.) The function can compensate in parallel to either plus or minus side for the whole temperature band of the unit.

The lock can be set or released with the SUB MENU keys.

**The temperature is set at "0" on shipping from the factory.**




① Start operation at the target set temperature and confirm the temperature in the bath with a temperature recorder after temperature has stabilized.

② Confirm the difference between the set temperature and that in the bath.

③ Press the TIMER key (SUB MENU key) long to enter the sub menu mode.
Press the TIMER key (SUB MENU key) several times to select the characters cAL cAL that indicates the calibration offset function.

④ Enter the difference between the set temperature and the temperature in the bath using the ▼▲ keys and press the TIMER key (SUB MENU key) long to exit the sub menu mode. (When you want to set the key lock function, proceed to character selection process for the key lock function without pressing the TIMER key (SUB MENU key) long.)

* You can set either of + or – side for the offset compensation temperature.
When compensation is set for the – side, the measured temperature display decreases by the compensation temperature while the temperature in the bath increases by the same amount.
When compensation is set for the + side, the measured temperature display increases by the compensation temperature while the temperature in the bath decreases by the same amount.

* Since too large a compensation value may result in larger difference between the actual and indicated temperatures and may present a danger, consult our nearest sales office before entering a large compensation value.

* The device has, in addition to the calibration offset function, the two-point compensation function that adjusts offset for the lower temperature range and higher temperature range, for which adjustment temperatures have been input on shipping from the factory.

* Consult the nearest sales office before attempting validation work for the temperature adjusting device.

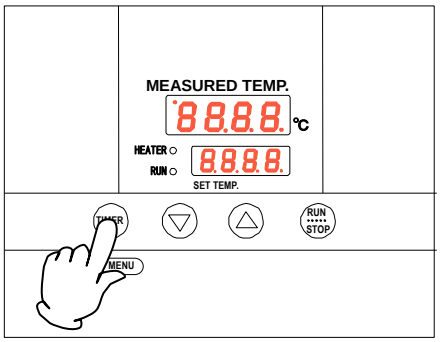
# 4. Operating procedures

## Useful function (setting lock function)

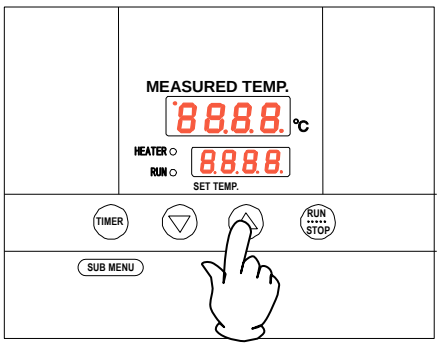
### Using the lock function

This function locks the set operation status.

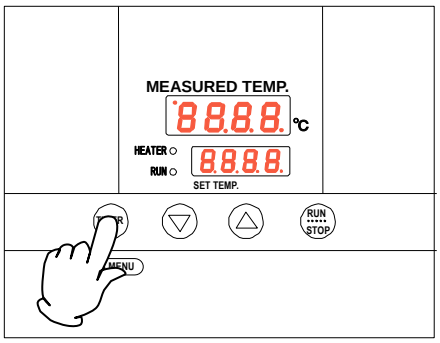
**The temperature is set at “off” on shipping from the factory.**




① Press the TIMER key (SUB MENU key) long to enter the sub menu mode.
Press the TIMER key (SUB MENU key) several times to select the characters Lock that indicate the setting lock function.




③ “Off” is displayed on the set temperature screen. To lock settings, change to “on” using the ▲ key.
Press the TIMER key (SUB MENU key) long to exit the sub menu mode.




(3) To release lock, press the TIMER key (SUB MENU key) long again and select the characters Lock that indicate setting lock using the ▼▲ keys.
Lock is released when “off” is selected using the ▼ key.

* When the lock function is “on”, keys other than the RUN/STOP key and the TIMER key (SUB MENU key) are locked.

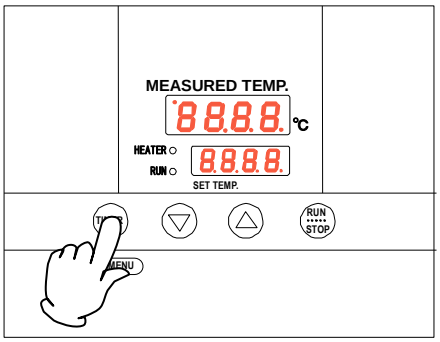
# 4. Operating procedures

## Useful function (power outage compensation function)

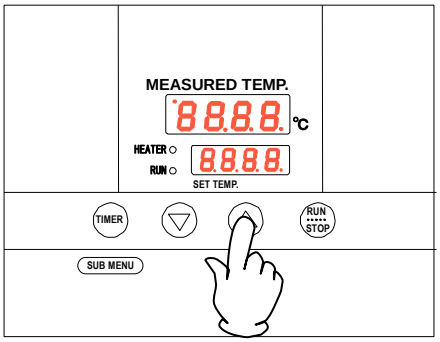
### Using the power outage compensation function

The power outage compensation function returns the main unit operation to the resume status after recovery from power outage, or keeps the current stop status.

**The function is set at “on” on shipping from the factory.**




① Press the TIMER key (SUB MENU key) long to enter the sub menu mode.
Press the TIMER key (SUB MENU key) several times to select the characters Pon that indicate the power outage compensation function.

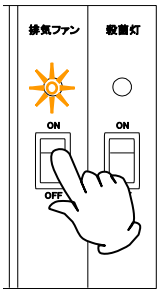



② “On” is displayed on the set temperature screen. The device keeps stop status after recovery from power outage when this setting is set to “off” using the ▼ key.
Press the TIMER key (SUB MENU key) long to exit the sub menu mode.

# 4. Operating procedures

## Air exhaust fan (only for DG450C/850C)

① Use the regulating damper of air inflow at lower right to manually regulate. Loosen the fixed screws of regulating damper, it's total open if slide inward and total close if slide outward.
**It's total close at factory setting.**




② When use the air exhaust fan, please turn its switch ON. The indicator lamp of air exhaust fan lights up, and the exhaust fan activates.
When not use, please turn off the regulating damper of air inflow, switch OFF.
(※ the air exhaust fan is controlled through ON/OFF of standalone switch)

③ When not use the air exhaust fan, please turn its switch OFF. The indicator lamp of air exhaust fan goes out, and the exhaust fan stops.

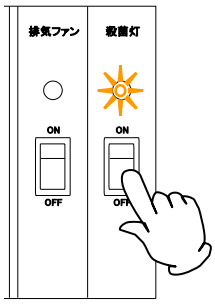
## ⚠ Warning

※ The exhaust vent of unit would emit high-temperature vapor, keep your head and hands away.

※ There is too much moisture contained in the gas exhausted by the unit, do not put goods easily affected with damp near the unit.

# 4. Operating procedures

## Bactericidal lamp (only for DG450C/850C)




① When use the bactericidal lamp, close the door and then turn the switch of bactericidal lamp ON.
The ultraviolet light (253.7nm nearby) irradiates in the chamber.
For safety, if door opens, even the switch is ON, the bactericidal lamp would goes out.

② When not use the bactericidal lamp, please turn its switch OFF. The indicator lamp of sterilization goes out, and bactericidal lamp goes out.

### ⚠ Caution

※ The bactericidal lamp is controlled through ON/OFF of standalone switch.

※ Do not use materials of easily fading, degrading and damage, like plastic container, cloth, wallpaper and so on.
If irradiated by ultraviolet light, these materials would fade, degrade and damage.

※ Do not use plant or use unit near plant. The ultraviolet light would make leaves wither and influence the growth of plant.

※ Carefully clean the indicator lamp and reflect sheet. The sterilizing effect would sharply decline if they're dirty.

※ Please replace the indicator lamp once it reaches the service life. If the indicator lamp lights up beyond its service life, the output of ultraviolet light would weaken and the initial sterilizing effect cannot be achieved. Its service life is 4000hrs (about 6 months) with continuous lighting.

※ If use bactericidal lamp to work by necessity, to prevent exposure of skin and eyes, please wear protective mask and gloves for ultraviolet light.

### ⚠ Warning

※ When the indicator lamp lighting up, never directly or indirectly use your eyes to look, and never have the reflected light enter your eyes, which may cause eye ache or influence the eyesight.

※ Do not have the ultraviolet light radiation (sterilizing ray) directly or indirectly contact your skin, which may cause skin inflammation.

※ When install, disassemble or clean the unit, please cut off the power, or else it may cause eye ache, eyesight decline, skin inflammation, etc.

# 5. Cautions on handling

## ⚠ Warning

### 1. About handling of flammable or combustible solution

The unit is not explosion proof. Take special care for handling samples on which explosive substances, combustible substances or substances containing them. Flammable or combustible solution will evaporate when left at a room temperature (or at a lower temperature for some types of solutions) and may be ignited and explode from switches, lights and other ignitable sources. Be sure to assure sufficient ventilation when using these materials.

See section “

13. List of dangerous materials” on page 53.

### 2. Ban on use/countermeasures when an error occurs

If smoke is emerges on the unit or an odd odor is felt, immediately turn the ELB on the main unit off, turn the power supply off and contact your dealer or a Yamato sales office for inspection. Otherwise, a fire or an electrical shock may result. The user shall never attempt to repair the unit to avoid any possible dangers.

### 3. Ensure adequate ventilation

Do not operate if the vents at the side and back of product are blocked.
If blocked, it may cause the internal temperature rising and performance degradation of product, also result in accident, failure or fire.

### 4. Do not be splashed by liquid

Do not make liquid enter into the product, especially from the vents at the side and back of product. If liquid enters into product, stop operation. It may cause accident, failure or fire.

### 5. Do not drop metal object in the chamber

Do not drop metal object in the chamber such as clip, staple and screw.
If metal object drops in the chamber, stop operation. It may cause accident, failure or fire.

### 6. Do not open…

Do not open the fixed control panel, cover, etc., and do not operate if opened.
It may cause accident, failure or fire.

### 7. Do not operate without water tray

Do not operate without water tray.
It may cause accident or failure.

### 8. Do not modify the product

Please do not modify the product as per customer's requirement, it may cause accident, failure or fire.

# 5. Cautions on handling

## ⚠ Caution

### 1. Do not step on the unit

Do not step on the unit. Otherwise, the unit may topple over or be damaged resulting a personal injury or a malfunction.

### 2. Do not put or drop an object on the unit

Do not put or drop an object on the unit. Since the unit contains high precision devices, vibrations or shock may cause a malfunction.

### 3. When a thunder is heard

When a thunder is heard, turn the ELB on the main unit off then turn the main power off immediately. Otherwise, a lightning strike may result and cause a fire.

### 4. During night and not to be operated for a long period of time

During the night and when you want to stop the unit for a longer period of time, turn the ELB to "off" and pull out the power cord from the power supply.

### 5. About recovery from power outage

When the power is applied again after the unit has stopped due to power outage, the unit will automatically return to the status immediately before the power outage and resumes operation. Turn the ELB off if you do not want to resume operation by automatic recovery.

### 6. Always operate the unit at a correct ambient temperature

Operational temperature range is RT＋5℃～70℃。
Never try to operate the unit outside the operating temperature range.

### 7. When open/close door

·When open/close door, pay attention to the open/close range (space), do not have hand and face approach it, it may hurt hand and face.

·After operation, do not open the door to quickly cool down the samples. Because the heat from chamber may cause deformation of control panel, controller failure and so on.

## 8. Do not operate the unit with the door open

⚠ When the unit is operated with the door open, it cannot control temperature normally, and the heater may overheat result in a possible danger. Be sure to operate the unit with the door closed.

# 5. Cautions on handling

⚠ **Caution**

### 9. Set of shelf board and sample

⚠ Please correctly set shelf board and sample as per Page 7 Install shelf board. If not, it may cause the product cannot reach its performance and result in accident and failure.

### 10. Do not operate items not recorded at Instruction Manual

⃠ Do not operate items not recorded at Instruction Manual, it may result in unpredictable accident.

# 6. Maintenance procedures

## Daily inspection/maintenance

Be sure to perform daily inspection and maintenance to assure reliable operation of the unit.

### ⚠ Warning

- Be sure to pull out the power cord unless necessary before trying to do inspection and maintenance works.
- Start these works after the device has returned to the normal temperature.
- Never try to disassemble the unit.

### ⚠ Caution

- Wipe off any dirt with a tightly wrung soft cloth. Never try to clean the unit with benzene, thinner or scouring powder, or rub with a scrubbing brush. Deformation, degradation or discoloration may result.

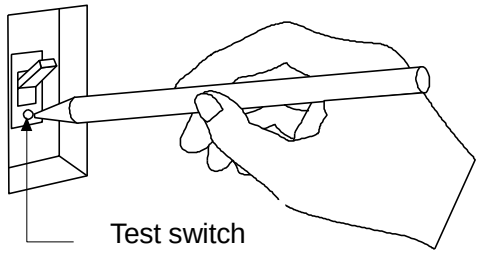
**Every month**

Please inspect the ELB performance.

Power on to test

Firstly, turn ELB on

Then, use a tip (like ball pen tip) to press the test switch of ELB. If ELB breaks off, it's normal.




**Maintenance of inner chamber**

Please stop operation, turn off the ELB, and pull out the power cord from distribution board or outlet.

Confirm the temperature in the chamber, and take out the shelf boards and shelf supports.

The inner chamber, shelf boards and shelf rest brackets are made of stainless steel SUS304, and the inner door uses toughened glass. Please use alcohol and cleaning cloth to wipe, and then use dry cloth to wipe.

Pay attention not to use acid or alkali lotion, oil, organic solvent, etc., it may cause corrosion and damage.

**There are some sharp protrusions in the chamber, at the shelf boards and shelf supports. Do not get hurt. Especially for novice working, please wear gloves.**

# 6. Maintenance procedures



## Drainage of water tray

According to ware moisture and current weather condition, the water collections of water tray are different.

The water accumulation before operation and after operation, take out the tray during operation to drain water.

After draining, put the water tray back.

## Maintenance of air suction filter ( only for DG450C DG850C)

- Please turn the ELB 「OFF」.
- Hold the handle of suction filter at the lower right and pull it out. (its temperature might be very high after operation, pay attention not to be scalded)

- Use dust collector to clean the filter screen and revert its installation. (operate the unit with the suction filter being installed)

# 6. Maintenance procedures



## Replacement of germicidal lamp (DG450C DG850C)

※It's suggested that the germicidal lamp is replaced by YAMATO serviceman

・Please turn the ELB 「OFF」.
Make sure the power of germicidal lamp is「OFF」.
・Use M4 cross screwdriver to screw out the screws at left and right sides of germicidal lamp, and disassemble the protective cover of germicidal lamp (do not lose the screws).

・Hold the lamp and rotate it by 90°.

・Take out the lamp along the gaps of both ends of lamp holder.
・After replacement, revert the installation as per reverse order.

**There are sharp bulges in the chamber, at the shelf plate or shelf rest, pay attention not to be injured. It's dangerous to work bare-handed, please wear gloves.**

# 7. When the unit is not to be used for a long time or when disposing

## When the unit is not to be used for a long time or when disposing

| ⚠ Caution | ⚠ Warning |
|---|---|
| When the unit is not going to be used for a long time<br>● Turn the ELB to off and pull out the power cord. | When disposing the unit<br>● Do not leave the unit in the area where children may have access.<br>● Be sure to remove handles before disposing the unit to prevent the doors from locking.<br>● In general, dispose the unit as a bulky waste. |

## Notes about disposition

Always pay attention to the preservation of the global environment.

・We highly recommend taking the unit apart as far as possible for separation or recycling to contribute to the preservation of the global environment. Major components and materials for the unit are as follows:

| Names of major components | Major materials |
|---|---|
| **Major mechanism part components** | |
| Enclosure | Steel plate　SPCC （powder coating） |
| Internal bath | Stainless steel |
| Heat insulator | Rock wool |
| Door packing | Silicon rubber foam |
| Nameplates | Polyethylene (PET) resin film |
| **Major electric parts** | |
| Heater | Iron-chrome heater |
| Boards | Glass fiber and other composite parts |
| Power cord, wire material and others | Synthetic rubber sheathed and resin sheathed wires |

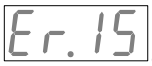
# 8. Troubleshooting

## Safety device and error codes

The unit has the self diagnostic function with a controller and a separate safety device.
Table below shows possible causes and measures when the safety device is triggered.

[Error codes]

When a functional or mechanical abnormality occurs, an error code will be displayed on the control panel. When an abnormality occurs, confirm the error code and immediately stop operation.

| Safety device | Symptom | Possible causes and measures |
|---|---|---|
| Sensor error |  appears | ● Error in the temperature input circuit<br>● Disconnection or other errors in the temperature sensor.<br>● Measured temperature is outside the displayable range<br>Contact our service department. |
| Memory error |  appears | ● Memory setting error<br>Contact our service department. |
| Measured temperature error | －－－－<br>－－－－ appears | ● When the upper limit alarm of the temperature alarm function is triggered.<br>Contact our service department. |

# 8. Troubleshooting

## When a malfunction is suspected

If any of the symptoms below occurs

| Symptom | Check |
|---|---|
| Turning the ELB to on will not activate the unit. | ● If the power cord is connected to the power supply securely.<br>● If power outage is not occurring.<br>● If the standalone overheat prevention device is working. |
| Temperature does not rise. | ● If the set temperature is below that in the device.<br>● If the power supply voltage has declined.<br>● If the ambient temperature is not low.<br>● If cooling load for inside the bath is not too large. |
| Temperature fluctuates during operation. | ● If the set temperature is appropriate.<br>● If the power supply voltage has declined.<br>● If ambient temperature fluctuates widely.<br>● If cooling load for inside the bath is not too large. |
| Displayed temperature differs from the measurement. | ● If the calibration offset setting is not other than “0”. Set it to “0.” Confirm settings in “Useful functions (calibration offset function)” in page 28. |

If power outage occurs

When the power is applied again after the unit has stopped due to power outage, the unit will automatically return to the status immediately before the power outage and resumes operation.
Turn the ELB off if you do not want to resume operation by automatic recovery.

◆If the symptom does not match any of the above, immediately turn the ELB on the main unit off, pull out the power cord from the power supply and contact your dealer or one of our sales offices.

# 9. After sales service and warranty



## When requesting a repair

If any trouble occurs, immediately stop operation, turn the ELB off, pull out the power plug and contact your dealer or our sales office.

Information necessary for requesting a repair

- ◆Model name of the product
- ◆Serial number
- ◆Date (y/m/d) of purchase

Confirm on the warranty card or the nameplate installed on the unit.
See section “Main body” on page 11.

- ◆Description of trouble （as in detail as possible）

Be sure to indicate the warranty card to our service representative.

## Warranty card (attached separately)

- Warranty card is given by your dealer or one of our sales offices and please fill in your dealer, date of purchase and other information and store securely.
- Warranty period is one full year from the date of purchase. Repair service for free is available according to the conditions written on the warranty card.
- For repairs after the warranty period consult your dealer or one of our sales offices. Paid repair service is available on your request when the product’s functionality can be maintained by repair.

## Minimum holding period of repair parts

The minimum holding period of repair parts for this product is seven years after end of production.
Repair parts here refer to parts necessary for maintaining performance of the product.

# 10. Specifications

| Name | | Ware Drying Oven | | | |
|---|---|---|---|---|---|
| Model | | DG400C | DG440C | DG800C | DG840C |
| System | | Natural convection | Natural convection Forced circulation air exhaust | Natural convection | Natural convection Forced circulation air exhaust |
| Temperature control range | | RT+5℃～70℃ | | | |
| Structure | Interior material | Stainless steel SUS304 | | | |
| | Observation window | 250×300mm toughened glass×1 | | 250×700mm toughened glass×1 | |
| | Heater | Iron-chrome heater 1.0KW | | Iron-chrome heater 1.34KW | |
| | Air exhaust fan | —— | Moisture-proof axial flow fan | —— | Moisture-proof axial flow fan |
| | Bactericidal lamp | —— | Moisture-proof fluorescent tube 8W | —— | Moisture-proof fluorescent tube 15W |
| Control | Control system | PID control of heater output with a micro-computer | | | |
| | Setting system | Digital setting using up/down keys | | | |
| | Operation mode | Fixed temperature operation, quick auto stop operation<br>Auto stop operation, auto start operation | | | |
| | Sensor | K thermocouple | | | |
| | Auxiliary functions | Lock function, power outage compensation function, calibration offset function | | | |
| Safety device | Controller Self-diagnosis function | Temperature sensor error, display error, temperature input circuit error, measured temperature error | | | |
| | Protection device | ELB, hydraulic pressure standalone overheat prevention device | | | |
| Spec. | Inner dimension (mm) (w×d×h) | 450×450×450 | | 620×600×1195 | |
| | Outer dimension (mm) (w×d×h) | 504×562×788 | 504×562×820 | 674×711×1586 | 674×711×1618 |
| | Shelf board step, load capacity | 10 steps 15kg/pc. | | 29steps 15kg/pc. | |
| | Shelf support pitch | 30mm | | | |
| | Internal capacity | 92L | | 445L | |
| | Weight | Approx. 45kg | Approx. 48kg | Approx. 78kg | Approx. 83kg |
| | Power supply (i50/60Hz) | AC115V 9A | AC115V 9A | AC115V 12A | AC115V 12A |
| Accessories | | DG400C/DG440C shelf plate -2pcs, DG800C/840C shelf plate -4pcs, Instruction Manual, Warranty Card | | | |

*DG400C/800C performance: value at power AC115V, DG450C/850C performance: value at power AC220V

*Operating environmental temperature range for this device is 5℃～35℃.

# 10. Specifications

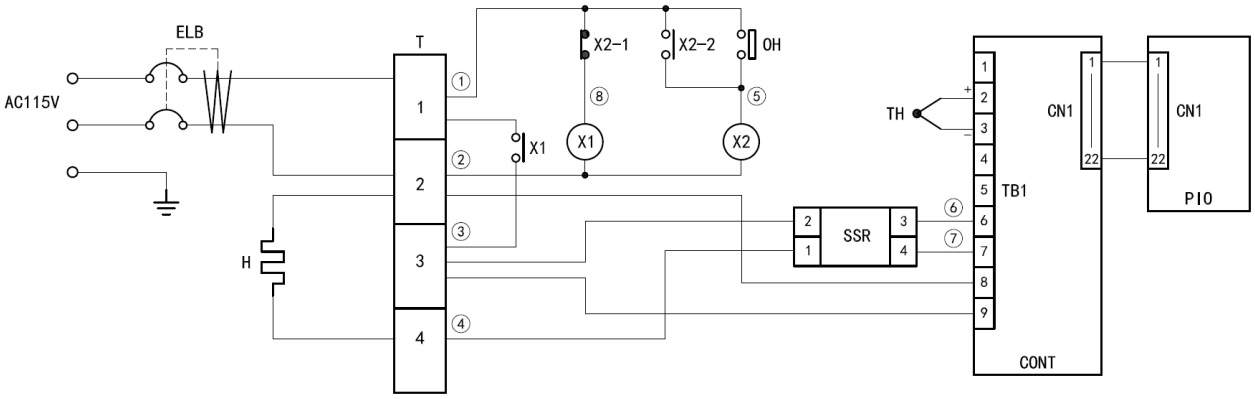
| Name | | Ware Drying Oven | | | |
|---|---|---|---|---|---|
| Model | | DG410C | DG450C | DG810C | DG850C |
| System | | Natural convection | Natural convection Forced circulation air exhaust | Natural convection | Natural convection Forced circulation air exhaust |
| Temperature control range | | RT+5℃～70℃ | | | |
| Structure | Interior material | Stainless steel SUS304 | | | |
| | Observation window | 250×300mm toughened glass×1 | | 250×700mm toughened glass×1 | |
| | Heater | Iron-chrome heater 1.0KW | | Iron-chrome heater 1.34KW | |
| | Air exhaust fan | —— | Moisture-proof axial flow fan | —— | Moisture-proof axial flow fan |
| | Bactericidal lamp | —— | Moisture-proof fluorescent tube 8W | —— | Moisture-proof fluorescent tube 15W |
| Control | Control system | PID control of heater output with a micro-computer | | | |
| | Setting system | Digital setting using up/down keys | | | |
| | Operation mode | Fixed temperature operation, quick auto stop operation<br>Auto stop operation, auto start operation | | | |
| | Sensor | K thermocouple | | | |
| | Auxiliary functions | Lock function, power outage compensation function, calibration offset function | | | |
| Safety device | Controller Self-diagnosis function | Temperature sensor error, display error, temperature input circuit error, measured temperature error | | | |
| | Protection device | ELB, hydraulic pressure standalone overheat prevention device | | | |
| Spec. | Inner dimension (mm) (w×d×h) | 450×450×450 | | 620×600×1195 | |
| | Outer dimension (mm) (w×d×h) | 504×562×788 | 504×562×820 | 674×711×1586 | 674×711×1618 |
| | Shelf board step, load capacity | 10 steps 15kg/pc. | | 29steps 15kg/pc. | |
| | Shelf support pitch | 30mm | | | |
| | Internal capacity | 92L | | 445L | |
| | Weight | Approx. 45kg | Approx. 48kg | Approx. 78kg | Approx. 83kg |
| | Power supply (i50/60Hz) | AC220V 5A | AC220V 5A | AC220V 6.5A | AC220V 6.5A |
| Accessories | | DG410C/DG450C shelf plate -2pcs, DG810C/850C shelf plate -4pcs, Instruction Manual, Warranty Card | | | |

*DG410C/450C/810C/850C performance: value at power AC220V.

*Operating environmental temperature range for this device is 5℃～35℃

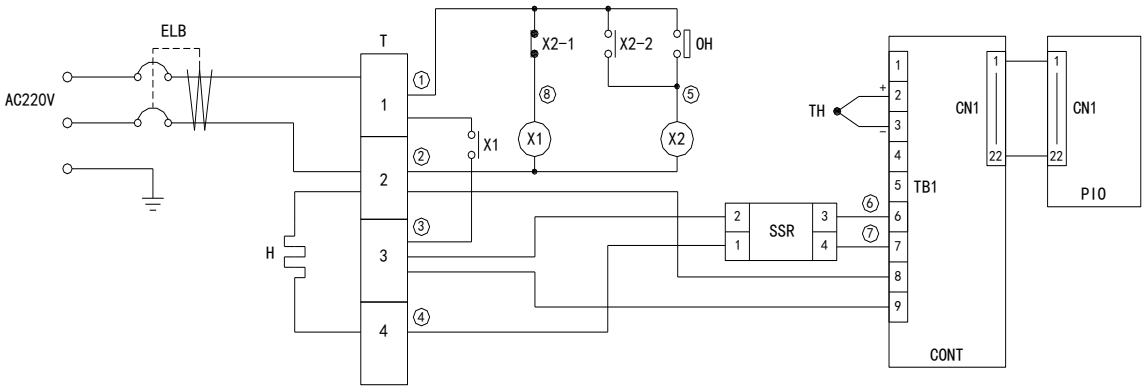
# 11. Wiring diagram

## DG400C/800C




| Symbol | Part name | Symbol | Part name |
|---|---|---|---|
| ELB | Circuit breaker | OH | Thermostat |
| H | Heater | TH | Temperature sensor (K-thermocouple) |
| T | Terminal block | CONT | Planar board |
| SSR | SSR | PIO | Display circuit board |
| X1, X2 | Relay | | |

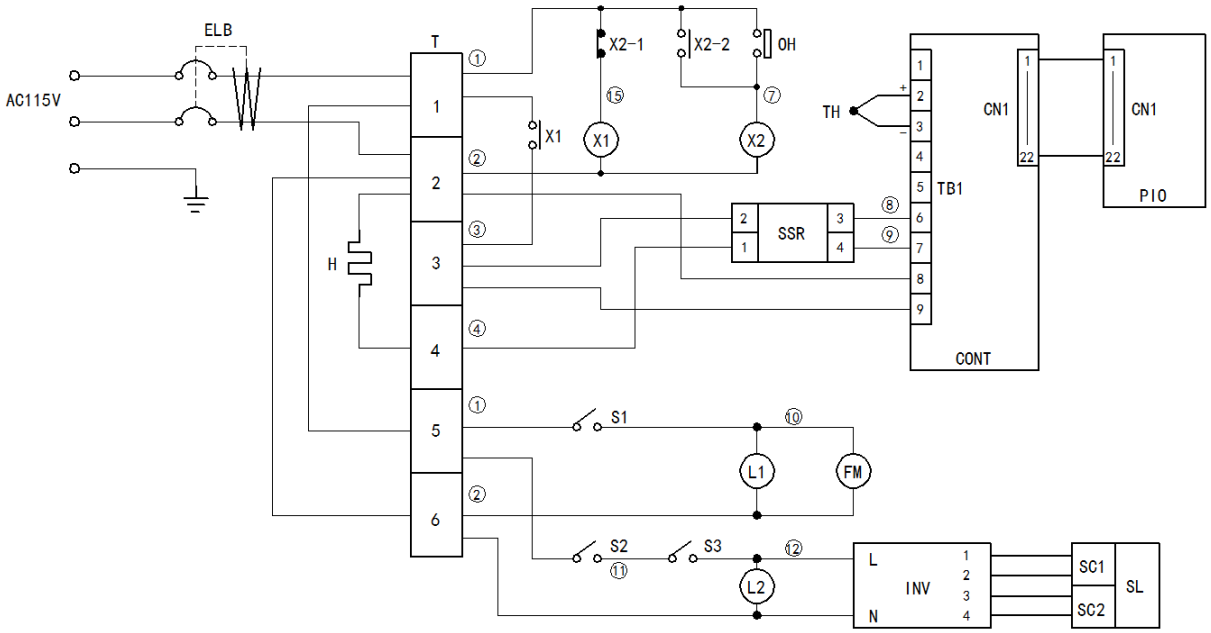
## DG410C/810C




| Symbol | Part name | Symbol | Part name |
|---|---|---|---|
| ELB | Circuit breaker | OH | Thermostat |
| H | Heater | TH | Temperature sensor (K-thermocouple) |
| T | Terminal block | CONT | Planar board |
| SSR | SSR | PIO | Display circuit board |
| X1, X2 | Relay | | |

# 11. Wiring diagram

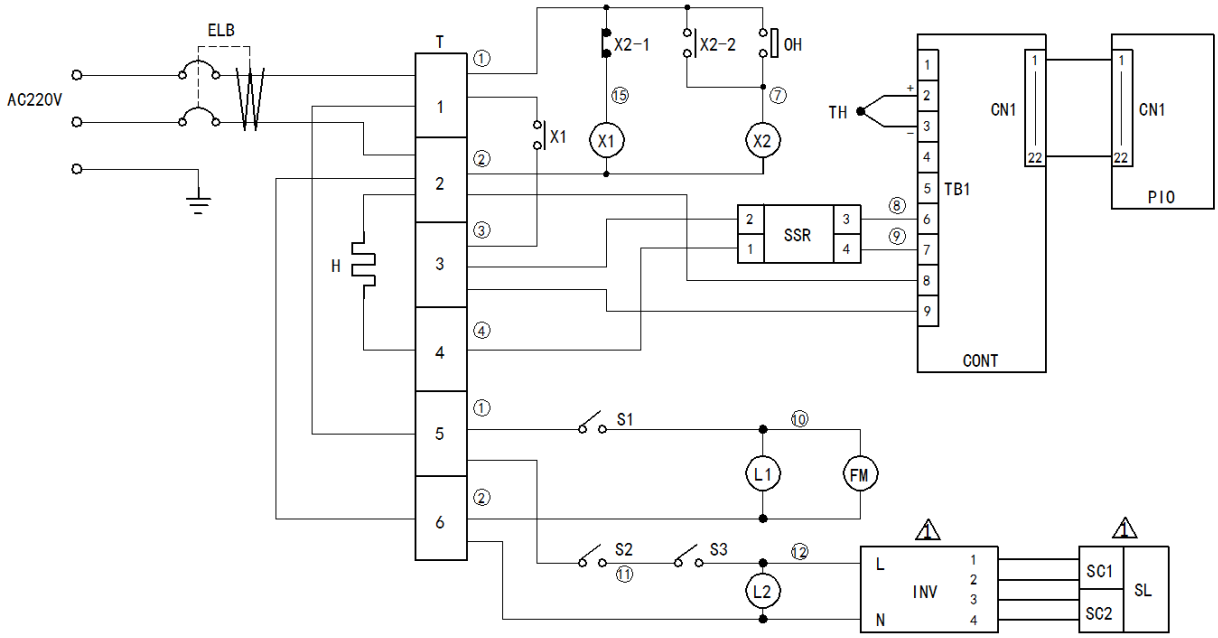
## DG440C/840C




| Symbol | Part name | Symbol | Part name |
|---|---|---|---|
| ELB | Circuit breaker | X1,X2 | Relay |
| H | Heater | L1 | Indicator lamp of air exhaust fan |
| T | Terminal block | L2 | Indicator lamp of sterilization |
| SSR | SSR | S1 | Fan motor switch |
| OH | Thermostat | FM | Air exhaust fan |
| TH | Temperature sensor (K-thermocouple) | S2 | Door switch |
| CONT | Planar board | S3 | Bactericidal lamp switch |
| PIO | Display circuit board | SL | Bactericidal lamp |
| INV | Ballast | | |

# 11. Wiring diagram

## DG450C/850C




| Symbol | Part name | Symbol | Part name |
|---|---|---|---|
| ELB | Circuit breaker | X1,X2 | Relay |
| H | Heater | L1 | Indicator lamp of air exhaust fan |
| T | Terminal block | L2 | Indicator lamp of sterilization |
| SSR | SSR | S1 | Fan motor switch |
| OH | Thermostat | FM | Air exhaust fan |
| TH | Temperature sensor (K-thermocouple) | S2 | Door switch |
| CONT | Planar board | S3 | Bactericidal lamp switch |
| PIO | Display circuit board | SL | Bactericidal lamp |
| INV | Ballast | | |

# 12. List of replacement parts

**Common parts**

| Symbol | Part name | Code No. | Specifications | Manufacturer |
|---|---|---|---|---|
| TH | Temperature sensor | H010101001 | T0304.01-08 Φ3.2*55*2000 | Yamato |
| CONT | Planar board | B011401002 | CN40B-Y | Yamato |
| PIO | Display circuit board | B011402002 | CN40B-Y | Yamato |
| - | Tough card | B011299001 | 15P 300mm | Yamato |
| SSR | SSR | A011006023 | KS15/D-38Z25-L | Yamato |
| OH | Thermostat | B020103002 | 55．13225．070 | Yamato |

**DG400C**

| Symbol | Part name | Code No. | Specifications | Manufacturer |
|---|---|---|---|---|
| - | Power cord | A011209001 | 3*2.0sq 3m | Yamato |
| ELB | Circuit breaker | A010410004 | BV-DN IP+N 16A 30mA | Yamato |
| X1 | Relay | A011002001 | HF116F-2/110AL1HSTFW | Yamato |
| X2 | Relay | A011002005 | HF13F/A1002Z1D | Yamato |
| H | Heater | H020601010 | DG400A_01_04-14(115V,1000W) | Yamato |

**DG800C**

| Symbol | Part name | Code No. | Specifications | Manufacturer |
|---|---|---|---|---|
| - | Power cord | A011209001 | 3*2.0sq 3m | Yamato |
| ELB | Circuit breaker | A010410004 | BV-DN IP+N 16A 30mA | Yamato |
| X1 | Relay | A011002001 | HF116F-2/110AL1HSTFW | Yamato |
| X2 | Relay | A011002005 | HF13F/A1002Z1D | Yamato |
| H | Heater | H020601011 | DG800C.01.02-06(115V,1340W) | Yamato |

# 12. List of replacement parts

**DG410C**

| Symbol | Part name | Code No. | Specifications | Manufacturer |
|---|---|---|---|---|
| - | Power cord | A011209001 | 3x2.0sq | Yamato |
| ELB | Circuit breaker | A010410003 | BV-DN 1P+N 6A 30mA | Yamato |
| X1 | Relay | A011002002 | HF116F-2/220AL1HSTFW | Yamato |
| X2 | Relay | A011002007 | HF13F/A2202Z1D | Yamato |
| H | Heater | H020601004 | DG410C_01_04-14(220V 1000W) | Yamato |

**DG810C**

| Symbol | Part name | Code No. | Specifications | Manufacturer |
|---|---|---|---|---|
| - | Power cord | A011209001 | 3x2.0sq | Yamato |
| ELB | Circuit breaker | A010410007 | BV-DN IP+N 10A 30mA | Yamato |
| X1 | Relay | A011002002 | HF116F-2/220AL1HSTFW | Yamato |
| X2 | Relay | A011002007 | HF13F/A2202Z1D | Yamato |
| H | Heater | H020601005 | DG810C.01.02-06(220V,1340W) | Yamato |

# 12. List of replacement parts

**DG440C/840C**

| Symbol | Part name | Code No. | Specifications | Manufacturer |
|---|---|---|---|---|
| - | Power cord | A011209001 | 3*2.0sq 3m | Yamato |
| ELB | Circuit breaker | A010410004 | BV-DN IP+N 16A 30mA | Yamato |
| X1 | Relay | A011002001 | HF116F-2/110AL1HSTFW | Yamato |
| X2 | Relay | A011002005 | HF13F/A1002Z1D | Yamato |
| S1 | Fan motor switch | B011501002 | DS-850S-F2-10 | Yamato |
| FM | Air exhaust fan | B080104002 | R87F-A1A16H-WR | Yamato |
| S2 | Door switch | A011505004 | Z-15GQ22-B | Yamato |
| S3 | Bactericidal lamp switch | B011501002 | DS-850S-F2-10 | Yamato |
| L1, L2 | Indicator lamp of air exhaust fan | A011102072 | AC110V G | Yamato |

**DG440C**

| Symbol | Part name | Code No. | Specifications | Manufacturer |
|---|---|---|---|---|
| H | Heater | H020601010 | DG400A_01_04-14(115V,1000W) | Yamato |
| SL | TUV Lamp | A081702037 | TUV 8W | Yamato |
| INV | UV Ballast (110V) | A010799009 | RW12-180-10A | Yamato |
| SC | T5 Lamp feet | A011399020 | T5 Lamp feet | Yamato |

**DG840C**

| Symbol | Part name | Code No. | Specifications | Manufacturer |
|---|---|---|---|---|
| H | Heater | H020601011 | DG800C.01.02-06(115V,1340W) | Yamato |
| SL | TUV Lamp | A081702033 | TUV 15W | Yamato |
| INV | UV Ballast (110V) | A010799004 | RW12-425-18A | Yamato |
| SC | T8 Lamp feet | A011399019 | T8 Lamp feet | Yamato |

# 12. List of replacement parts

**DG450C/850C**

| Symbol | Part name | Code No. | Specifications | Manufacturer |
|---|---|---|---|---|
| - | Power cord | A011209001 | 3*2.0sq 3m | Yamato |
| X1 | Relay | A011002002 | HF116F-2/220AL1HSTFW | Yamato |
| X2 | Relay | A011002007 | HF13F/A2202Z1D | Yamato |
| S2 | Door switch | A011505004 | Z-15GQ22-B | Yamato |
| FM | Air exhaust fan | A080104037 | KA1238XA2(IP55)BMT(L) | Yamato |
| L1，L2 | Indicator lamp of air exhaust fan | A011102073 | AC220V G | Yamato |

**DG450C**

| Symbol | Part name | Code No. | Specifications | Manufacturer |
|---|---|---|---|---|
| ELB | Circuit breaker | A010410003 | BV-DN 1P+N 6A 30mA | Yamato |
| S1，S3 | Switch | A011501003 | MR-6-210-C5L-BGAA-220 | Yamato |
| H | Heater | H020601004 | DG410C_01_04-14 | Yamato |
| SL | TUV Lamp | A081702037 | TUV 8W | Yamato |
| INV | UV Ballast (220V) | A010799008 | RW12-180-10 | Yamato |
| SC | T5 Lamp feet | A011399020 | T5 Lamp feet | Yamato |

**DG850C**

| Symbol | Part name | Code No. | Specifications | Manufacturer |
|---|---|---|---|---|
| ELB | Circuit breaker | A010410007 | BV-DN IP+N 10A 30mA | Yamato |
| S1，S3 | Switch | B011501002 | DS-850S-F2-10 | Yamato |
| H | Heater | H020601005 | DG810C.01.02-06 | Yamato |
| SL | TUV Lamp | A081702033 | TUV 15W | Yamato |
| INV | UV Ballast (220V) | A010799003 | RW12-425-18 | Yamato |
| SC | T8 Lamp feet | A011399019 | T8 Lamp feet | Yamato |

# 13. List of dangerous materials

Never use an explosive substance a flammable substance or a substance containing them for this device.

| | | |
|---|---|---|
| Explosive substance | Explosive substance | ① Nitroglycol, glycerine trinitrate, cellulose nitrate and other explosive nitrate esters |
| | | ② Trinitrobenzen, trinitrotoluenem, picric acid and other explosive nitro compounds |
| | | ③ Acetyl hydroperoxide, methyl ethyl ketone peroxide, benzoyl peroxide and other organic peroxides |
| Flammable substances | Explosive substances | Metal “lithium”, metal “potassium”, metal “natrium”, yellow phosphorus, phosphorus sulfide, red phosphorus, celluloids, calcium carbide (a.k.a, carbide), lime phosphide, magnesium powder, aluminum powder, metal powder other than magnesium and aluminum powder, sodium dithionous acid (a.k.a., hydrosulphite) |
| | Oxidizing substances | ① Potassium chlorate, sodium chlorate, ammonium chlorate, and other chlorates |
| | | ② Potassium perchlorate, sodium perchlorate, ammonium perchlorate, and other perchlorates |
| | | ③ Potassium perchlorate, sodium perchlorate, ammonium perchlorate, and other inorganic perchlorates |
| | | ④ Potassium nitrate, sodium nitrate, ammonium nitrate, and other nitrates |
| | | ⑤ Sodium chlorite and other chlorites |
| | | ⑥ Calcium hypochlorite and other hypochlorites |
| | Flammable substances | ① Ethyl ether, gasoline, acetaldehyde, propylene chloride, carbon disulfide, and other substances with ignition point at a degree 30 or more degrees below zero. |
| | | ② n-hexane, ethylene oxide, acetone, benzene, methyl ethyl ketone and other substances with ignition point between 30 degrees below zero and less than zero. |
| | | ③ Methanol, ethanol, xylene, pentyl acetate, (a.k.a.amyl acetate) and other substances with ignition point between zero and less than 30 degrees. |
| | | ④ Kerosene, light oil, terebinth oil, isopenthyl alcohol (a.k.a. isoamyl alcohol), acetic acid and other substances with ignition point between 30 degrees and less than 65 degrees. |
| | Combustible gas | Hydrogen, acetylene, ethylene, methane, ethane, propane, butane and other Substance which is a flammable gas at 15 degrees, one air pressure. |

# 14. Standard installation manual

* Install the product according to the following: (Confirm separately for optional items or special specifications)

| Model | Serial number | Date | Installation mgr. (company name) | Installation mgr. | Judg ment |
|---|---|---|---|---|---|
| | | | | | |

| № | Item | Implementation method | TOC No. Reference page of the operating instruction manual | Judg ment |
|---|---|---|---|---|
| Specifications | | | | |
| 1 | Included items | Check for number of staffs against the included item field | 10. Specifications field P.44 | |
| 2 | Installation | ・ Visual check of environmental conditions<br>Caution: Take care for environment | 2. Before operating the unit<br>・On the installation site P.5 | |
| | | ・ Securing a space | | |
| Operation-related matters | | | | |
| 1 | Source voltage | ・Measure the user side voltage (outlet) with a tester<br>・Measure voltage during operation (shall meet the standard)<br>Caution: Always use a plug that meets the specification for attaching to the ELB. | 2. Before operating the unit P.5<br>・Be sure to connect the ground wire. P.8<br>・Power supply is ….<br>10.Specifications P.44<br>・Specification-power supply | |
| 2 | Operation start | ・Starts operation<br>Performs fixed value operation, auto stop operation or auto start operation | 2. Before operating the unit P.4～10<br>・Installation procedures… P.17～30<br>4. Operating procedures | |
| Description | | | | |
| 1 | Operational descriptions | Explain operations of each compo-nent according to the operational instructions | 4. Operating procedures P.17～30<br>・Operating procedures P.1～～50<br>1. Safety precautions ～ 13.List of dangerous materials | |
| 2 | Error codes | Explain the customer about error codes and procedures for release according to the operational instructions | 8. Troubleshooting P.41<br>～ 9. After sales service and warranty 43 | |
| 3 | Maintenance and inspection | Explain operations of each component according to the operational instructions | 6. Maintenance procedures<br>・Daily inspection/ maintenance P.36 | |
| 4 | Completion of installation Entries | ・Fill in the installation date and the installation mgr. on the nameplate of the main unit<br>・Fill in necessary information to the warranty card and hand it over to the customer<br>・ Explanation of the route for after-sales service | 9. After sales service and warranty P.43 | |

## 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
Ware Drying Oven

Model DG400C/410C/440C/450C/800C/810C/840C/850C

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