



**Amerex Instruments, Inc.**

**HICLAVE**

**HG-SERIES AUTOCLAVES**

**(HG-50 and HG-80)**

**OPERATION MANUAL**

*Before using this Autoclave, please read this manual  
and follow all Safety Rules and Operating Instructions.*

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# Introduction

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- We would like to express our gratitude for your purchase of our autoclave. This manual covers the operation procedure and a simple maintenance method for the Autoclave HG-50 or HG-80 you now own. We hope that owing to your proper handling, the autoclave can demonstrate its full performance and that you will make regular use of it for a long time.
- For optional equipment ( Recorder,  Floating sensor,  Automatic water supply unit,  Printer), if any, read the attached instruction manuals for the options.
- Please check whether or not the product conforms to your order and confirm that it was not damaged during transportation. Should it be damaged or out of order, please contact our authorized distributor in your region.

- ① No part or all of this manual may be reproduced without our permission.
- ② The contents of this procedure are subject to change without prior notice.
- ③ Although we tried hard to make this manual error free, if you find any unclear descriptions, errors or omissions, kindly let us know.

# Read Carefully Before Using

- Determine the handling person responsible for this product.
- In this manual, the following headings are applied to items to which great attention should be given:

- **WARNING:** Precaution indicating an imminent dangerous situation which if not avoided may lead to death or serious injury.
- **CAUTION:** Precaution indicating a dangerous situation which if not avoided may lead to moderate or slight injury.
- **IMPORTANT:** Indicates items you are strongly advised to obey.
- △ **NOTE:** Items that will aid in proper operation of the equipment.

- **WARNING**

- Never use the autoclave to sterilize any of the following hazardous materials or substances with alkali content. Sterilization of such objects can cause explosion, corrosion of the working chamber or chamber piping, and deterioration of gaskets.

## List of Hazardous Materials

### ① Explosive substances

- Nitroglycol, nitroglycerin, nitrocellulose, and other explosive nitric esters.
- Trinitrobenzene, trinitrotoluene, picric acid, and other explosive nitro compounds.
- Peracetic acid, methyl ethyl ketone peroxide, benzoyl peroxide, and other organic peroxides.

### ② Ignitable substances

- Metallic lithium, potassium, sodium, yellow phosphorous, phosphorus sulfide, and red phosphorus.
- Celluloids, calcium carbide (carbide), lime phosphide, and magnesium powder
- Aluminum powder, magnesium powder, and metallic powders other than aluminum powder
- Sodium dithionite (or sodium hydrosulfite)

### ③ Oxidizing agents

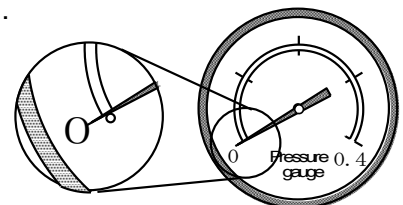
- Potassium chlorate, sodium chlorate, ammonium chlorate, and other chlorates
- Potassium perchlorate, sodium perchlorate, ammonium perchlorate, and other perchlorates.
- Potassium peroxide, sodium peroxide, barium peroxide, and other inorganic peroxides
- Potassium nitrate, sodium nitrate, ammonium nitrate, and other nitrates
- Sodium chlorite and other chlorites
- Calcium hypochlorite and other hypochlorites

### ④ Flammable substances

- Ethyl ether, gasoline, acetaldehyde, propylene oxide, carbon disulfide, and other substances whose flash points range from -30 to 0°C.
- Methanol, ethanol, xylene, benzyl acetate (or amyl acetate), and other substances whose flash points range from 0 to 30°C.
- Kerosene, gas oil, turpentine oil, isopentyl alcohol (or isoamyl alcohol), acetic acid, and other substances whose flash points range from 30 to 65°C.

### ⑤ Flammable gas (hydrogen, acetylene, ethylene, methane, ethane, propane, butane, and other substances that are gases at a temperature of 15°C under 1 atmospheric pressure.)

- When liquid with salt water and much salinity of salt agar etc. spills in the chamber, blowing, discharge water in the chamber and wipe up drop of water around the lid gasket beautifully. It causes the corrosion of the chamber and the piping when leaving just as it is.
- Check that the pressure is below "0 MPa" before opening the lid.
- Absolutely do not attempt to remodel or alter this product.



## - CAUTION

- Foreign matter (metals, liquid) may enter through the vent hole. Operating the equipment with such foreign matter inside may cause trouble with the equipment, fire or electric shock.
- Do not forcibly bend, twist, tie or extend the power cord. Do not place heavy objects on the cord. A damaged cord or exposed wire can cause fire or electric shock.
- Never connect the power cord to a power supply other than one of the rated voltage. Connection to such a power supply can cause fire or electric shock.
- If grounded socket is unavailable, ground the equipment using a separate ground wire before connecting the power cord to the power source.
- Connect the grounding cable correctly to the Type D or higher-grade grounding terminal. Never connect the grounding wire to gas pipes or water pipes.
- Close the lid after confirming that no foreign matter is adhering to the section contacting the lid gasket. Foreign matter in this section can cause vapor leak.
- When using a waste processing bag or other kind of bag and sterilizing, place the bag in the wire basket and then insert it into the chamber. Using the bag "as is" can cause excessive temperature, excessive pressure, boil dry, etc..
- Do not contact the mouth of the container which is placed in the chamber with the inner surface of the lid. If the mouth of the container is closed by the lid inner surface, gas or liquid will gush out of the container when opening the lid
- Be careful not to pinch your hands when closing the lid.
- Do not touch the lid or lid cover when opening or closing the lid.
- Do not put your face or hands close to the chamber when lifting the lid immediately after completion of the operation; steam will gush out of the chamber.
- The lid, chamber, gasket and panel are extremely hot after completion of the operation. Do not touch the equipment or you may get burned.
- Put on heat insulating gloves before removing a substance from the chamber. Do not put hands into the chamber until the steam has been vented.
- Some time is required for liquids to cool. Be sure to check that the temperature has dropped sufficiently before unloading a liquid from the chamber or burns can result.
- If the liquid surface which is placed in the chamber is covered with oil, etc, the liquid may gush out when taking out or carrying. Be sure to check that the temperature has dropped sufficiently before unloading the liquid from the chamber or it may cause burns.
- Do not unload the drain bottle or drain the chamber when the chamber is under pressure. Boiling water or steam may gush out and it may cause burns.
- Do not remove the drain bottle before water in the bottle has sufficiently cooled down.
- If any abnormality occurs (e.g. abnormal sounds, smells, smoke), immediately shut the main power off. After checking to see that the abnormal condition does not continue, call our authorized distributor in your region.
- If any abnormality in display occurs, turn the main power switch off then on again. If the problem continues, turn the main power switch off and call our authorized distributor in your region.

## - IMPORTANT

- Do not apply force to the lid that is open. Such force may damage the product.

# **How to Read this Manual**

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- This operation manual consists of the following sections covering the information required for proper operation of the Autoclave HG-50 or HG-80.

## **Chapter 1. What is the Autoclave HG-50, HG-80?**

This section describes the uses and features of the product and the names and functions of its parts.

## **Chapter 2. Installation**

This section explains where the equipment should be installed and how to install it. The product incorporates precision parts, so be sure to follow the instructions covered in this chapter.

## **Chapter 3. Operation Method**

This section illustrates how to change various set values, and describes operations before starting the equipment and after automatic operation. This section also covers the display and performance of the equipment during automatic operation.

## **Chapter 4. Maintenance and Service**

This section explains the methods for draining water from the drain bottle or chamber, cleaning the body of the equipment, and parts replacement.

## **Chapter 5. Specifications**

This section includes dimensions, power consumption and working range of the product. Refer to this section as is required.

## **Chapter 6. Troubleshooting**

This section covers troubleshooting procedures for the product. If you encounter a problem, read this section first.

## **Appendix**

This section contains information on the warranty and a glossary of terms that appear in the manual. Please refer to this section when necessary.

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# Chapter 1. What is the Autoclave HG-50, HG-80?

## 1. Product Uses

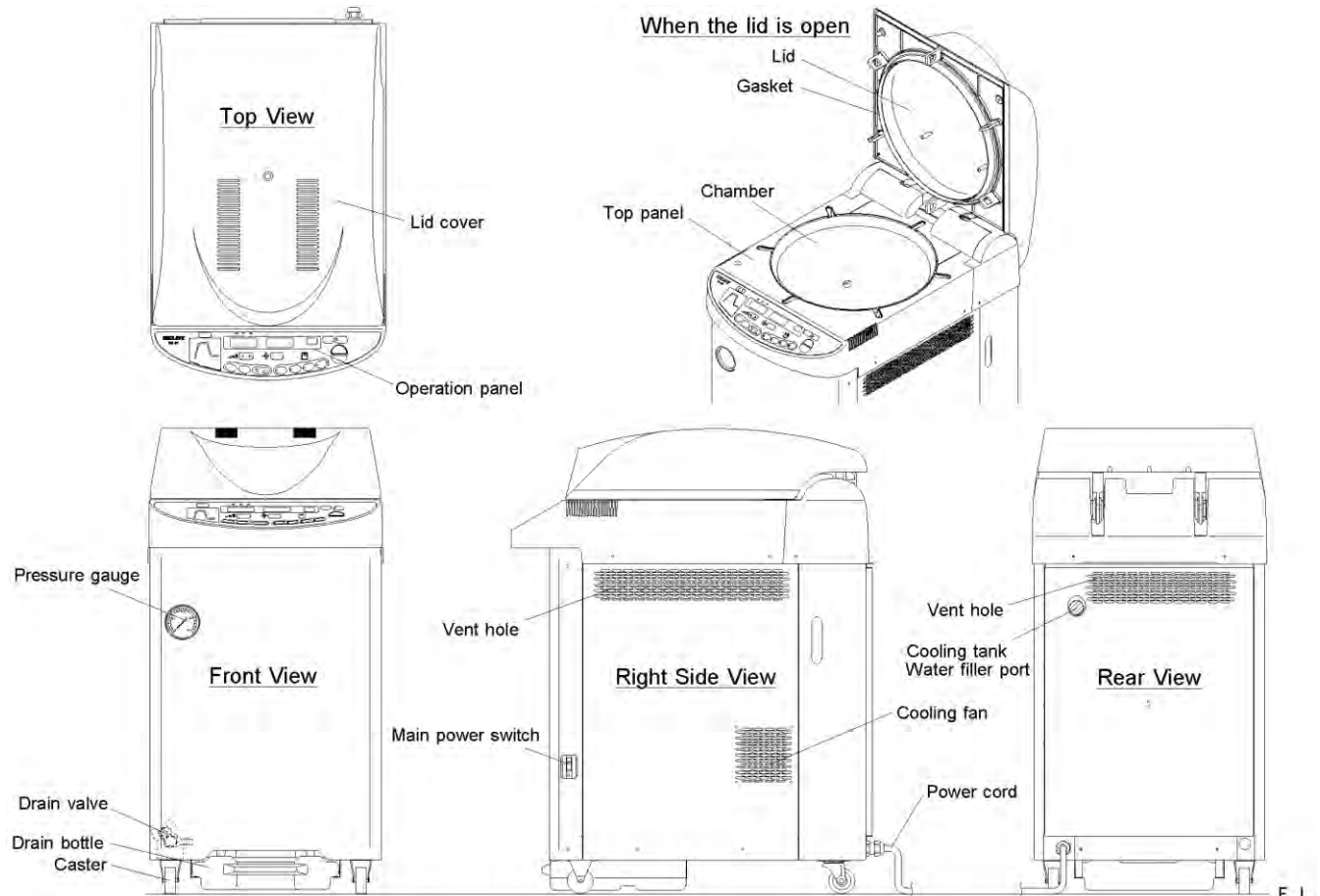
- The product is used to sterilize the load which can withstand high temperature and high pressure steam such as tools of glass, ceramic, metal or rubber, water, media, reagents and liquid medicines (Liquid, Agar, Solid modes) .
- The product is also used to liquefy media (Dissolution mode).

## 2. Product Features

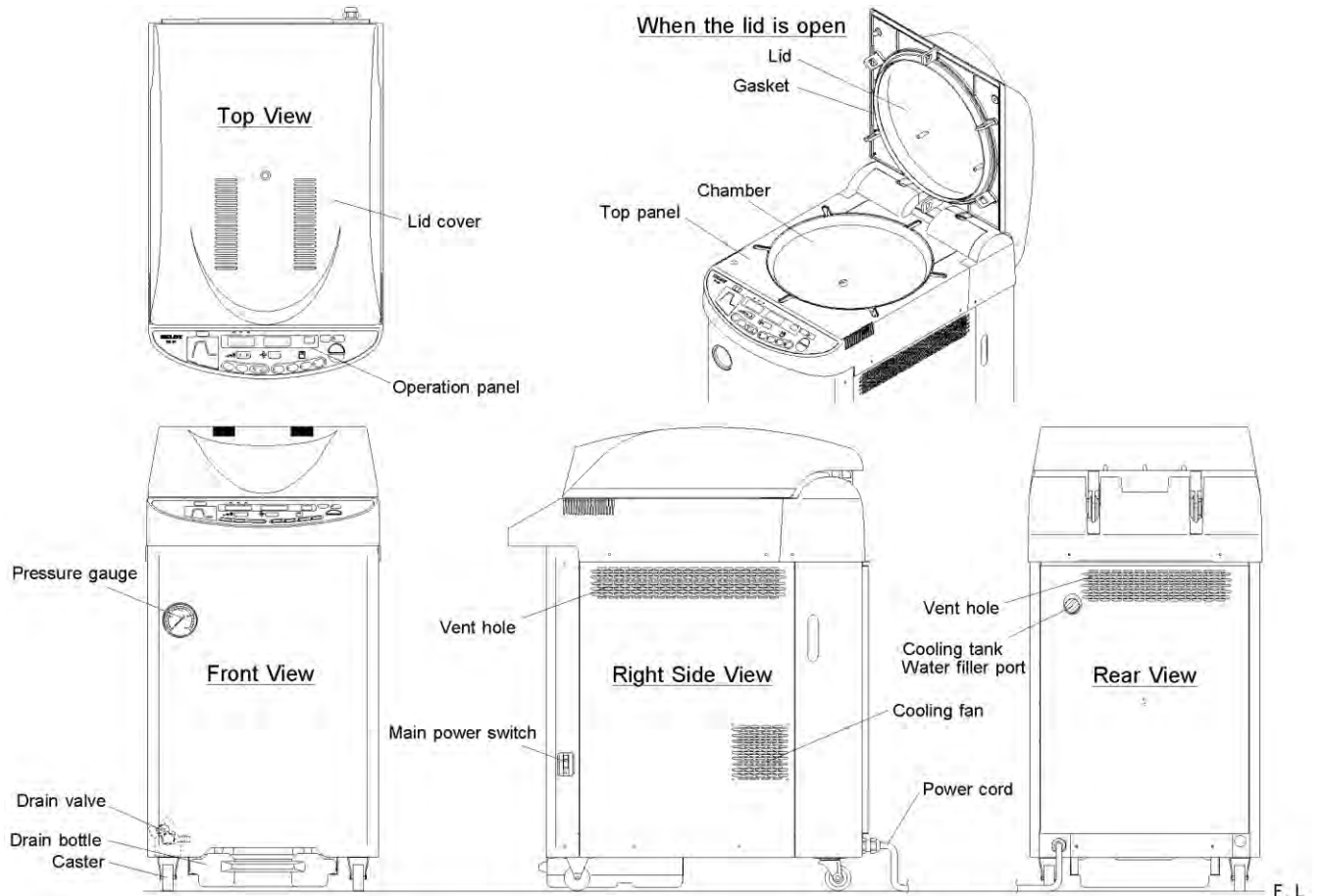
- In order to secure safety, the product is provided with a cover around the section that becomes hot during operation.
- The lid of the product is opened and closed automatically. So, it is not necessary to bring your hands near the upper part of the chamber to open or close the lid. It enhances the safety of the equipment.
- The agar cycle, which prevents solidification of sterilized media when they are not taken out immediately, and the dissolution mode, which dissolves solidified media, are provided.
- When the exhaust level (the opening ratio of the exhaust valve) is set, fine exhaust is conducted automatically after sterilization.
- Steam that comes out of the exhaust valve during air release and exhaust is cooled in the cooling tank to minimize the quantity of steam that is emitted into the room.
- This equipment can set the temperature, at which the load cannot be taken out, between 60°C and 97°C in each cycle and each program number for safety operation
- A reservation timer is provided to enable operation startup at any desired time within the range of 1 hour to 99 hours.

## 3. Names and Functions of Each Part

### ● HG-50 External View



● HG-80 External View





## ● Operation panel



- ① **Digital Display (Temperature)**  
The digital display indicates the preset sterilization temperature, etc. in the standby state, and it indicates the chamber temperature during operation.
- ② **Digital Display (Time and Pressure)**  
The digital display indicates the set time, reservation time, etc. in the standby state, and it indicates the pressure inside the chamber, time remaining until completion of sterilization, and time remaining until completion of warming during operation.
- ③ **Digital Display (Warming)**  
The digital display indicates the warming temperature, function number, etc. in the standby state, and it indicates the error when it is detected.
- ④ **Unit Display (Time, Press, Warm, and °C)**  
The unit corresponding to the current numeric value lights up.
- ⑤ **State Display (ST-BY, RUN, and COMP.)**  
The state display indicates the present state.
- ⑥ **Stage Display**  
All the stages included in the selected cycle light up, and the current operating stage flashes.
- ⑦ **Drain Bottle Display**  
The red lamp blinks when the drain bottle is full, and the green lamp illuminates when it is not full.
- ⑧ **POWER Switch**  
Used to turn on or off the power to the autoclave.
- ⑨ **LID CLOSE Switch**  
Used to close the lid.
- ⑩ **LID OPEN switch**  
Used to open the lid. When the lid is in the state to be opened, a green light comes on, and when the lid cannot be opened because the chamber is hot and highly pressurized, a red lamp lights up.
- ⑪ **Mode Switch**  
Used to select the mode and program number.
- ⑫ **FUNC. Switch**  
Used to change and confirm the setting of respective functions.
- ⑬ **SET switch**  
Used to change and confirm the set value.
- ⑭ **Set Value Increase/Decrease Switch (▲ ▼)**  
Used to increase or decrease the set value.
- ⑮ **Exhaust Level Switch (◀▶)**  
Used to change the exhaust level.
- ⑯ **FAN Cooling ON/OFF Switch**  
Used to change fan cooling ON/OFF setting.
- ⑰ **START Switch**  
Used to start operation.
- ⑱ **STOP Switch**  
Used to stop operation.
- ⑲ **PROGM Display**  
The display indicates the present program.

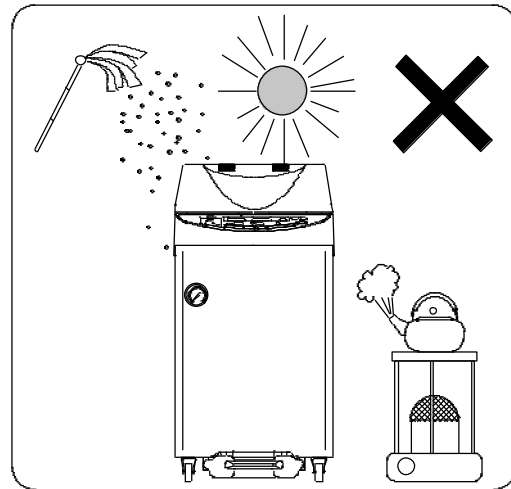
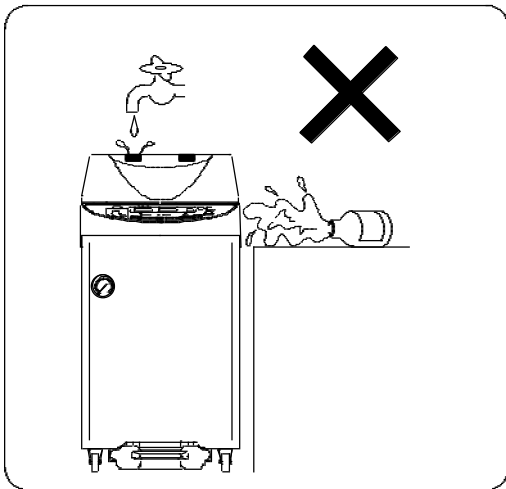
# Chapter 2. Installation

## - IMPORTANT

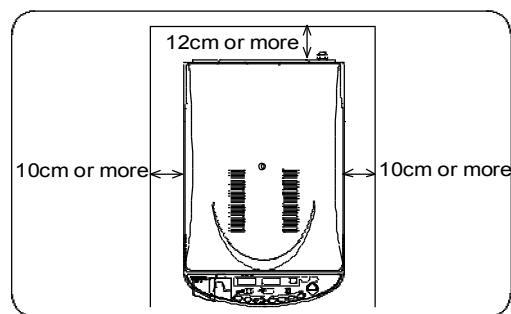
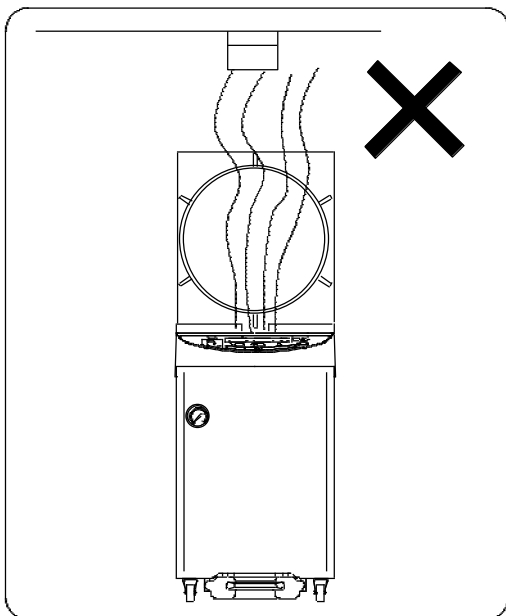
- If the equipment is installed in a place which is 800m or higher than sea level (i.e. under low pressure in mountainous areas), the settings must be changed. In this case, be sure to contact our authorized distributor in your region. Do not use the equipment before changing the specification.
- When relocating the product, close the lid so that it will not move, and then remove the drain bottle and power cord.

## 1. Installation instructions

- ① Avoid installing the equipment in a place where its body may be exposed to water or chemicals, or where corrosive and explosive gases may be produced nearby.
- ② Avoid installing the equipment in a place which is exposed to high humidity, direct sunlight or much dust.



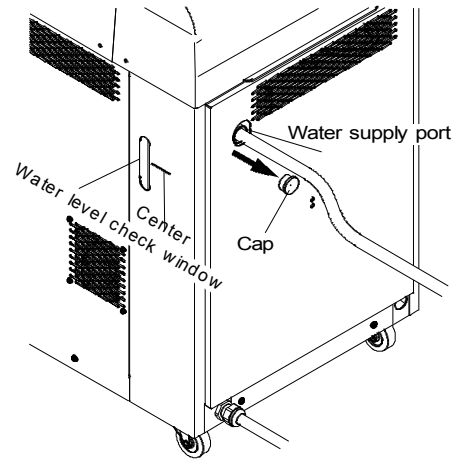
- ③ Avoid placing the equipment directly under a fire detector. If you open the lid immediately after completion of operation, steam comes out of the working chamber, and may activate the detector.
- ④ Arrange the equipment with a clearance of 10 cm or wider on the right side and 12 cm or wider on the rear side to prevent the vent hole from being blocked.



- ⑤ Avoid an installation place which is subject to impact or vibration.
- ⑥ Place the unit in a level, firm place which can withstand the load with 120 kg or above.
- ⑦ Avoid installing in a place which is subjected to a room temperature of  $5^{\circ}\text{C}$  or below or  $35^{\circ}\text{C}$  or above.
- ⑧ Avoid shining an ultraviolet [UV] lamp on resin parts due to cause change of color.

## 2. Installation Procedure

- ① Pour water into the cooling tank.
  - Remove the cap from the water supply port at the back of the unit, and pour water through the water supply port by using a hose, etc. up to the center of the level check window at the side of the unit.  
After water supply, return the cap back to the original position. (Hoses, etc. are not provided. Please prepare them by yourself.)
- ② Connect the power cord to the rated power supply.
  - Be sure to connect the grounding wire.



### - CAUTION

- Do not forcibly bend, twist, tie, or extend the power cord. Do not place heavy objects on the cord. A damaged cord or exposed wire may cause fire or electric shock.
- Never connect the power cord to a power supply with a voltage other than the rated voltage. Connection to such a power supply may cause fire or electric shock.
- If not plugging the sterilizer into a grounded socket, ground the equipment separately before connecting it to the power source.
- Never ground to a gas pipe or vinyl chloride water service pipe.

- Connect the unit to the rated power source as specified below and ground the Green/Yellow earth wires.

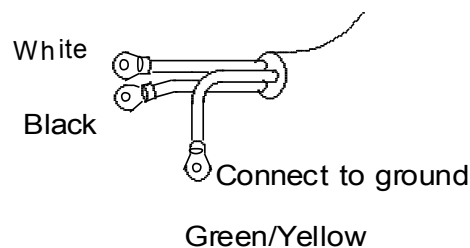
### HG-50 :

- AC220V /AC230V: 14 A or more, AC240V : 13 A or more.
- When the 2kw heater is used as option,  
AC110V: 19 A or more, AC120V: 17 A or more,  
AC220V: 10 A or more, AC230V/AC240V: 9 A or more

### HG-80 :

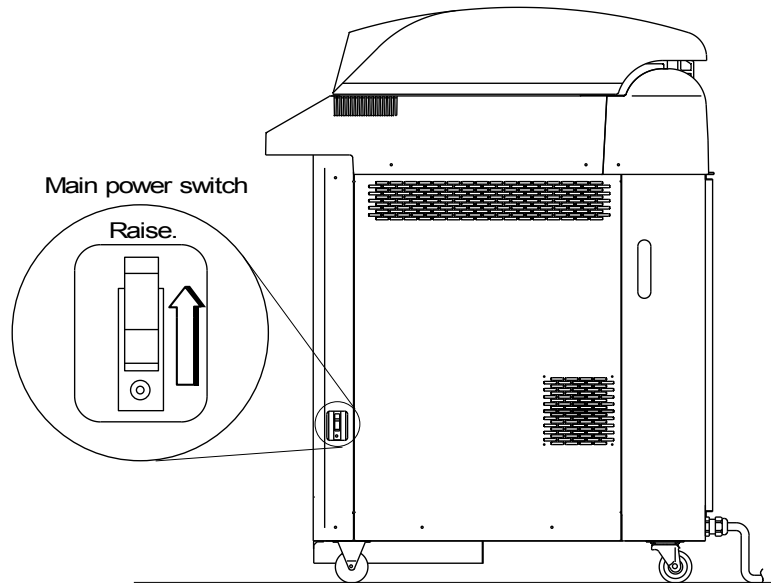
- AC220V: 17.3 A or more, AC230V: 16.6 A or more, AC240V: 15.9 A or more

### CONNECT TO RATED VOLTAGE



③ Turn ON the main power switch.

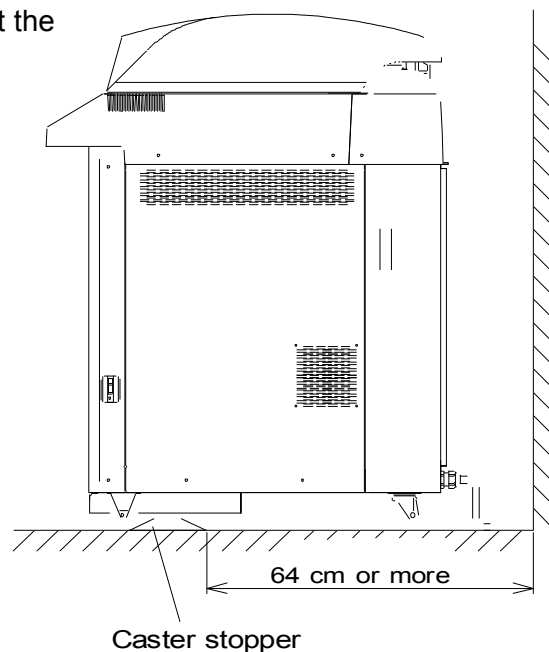
- Raise the lever of the main power switch in the right side of the unit.



④ Referring to “Chapter 3, Operation Procedure”, open the lid and take out the accessories. then, turn OFF the main power switch.

⑤ Put casters on the caster stoppers so that the unit will not move.

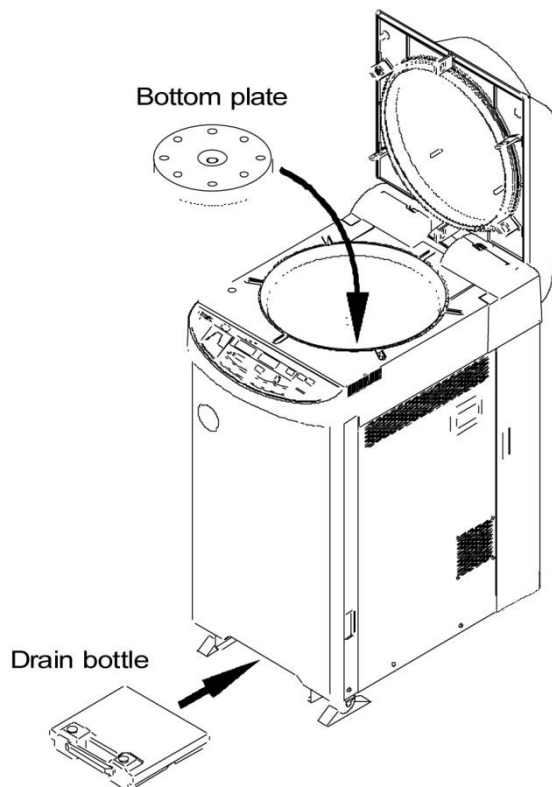
- Place two caster stoppers on a point which is distant from a wall 64cm or more, and push the unit so that the front casters will be put on the stoppers.
- Be sure to set the caster stoppers, otherwise the full water detecting function of the drain bottle may not be activated.



⑥ Place the bottom plate in the chamber.

⑦ Attach the drain bottle.

- Check that there is no foreign material or irregularity on the floor where the drain bottle is to be set. (Otherwise, the full water detecting function may not be activated.)

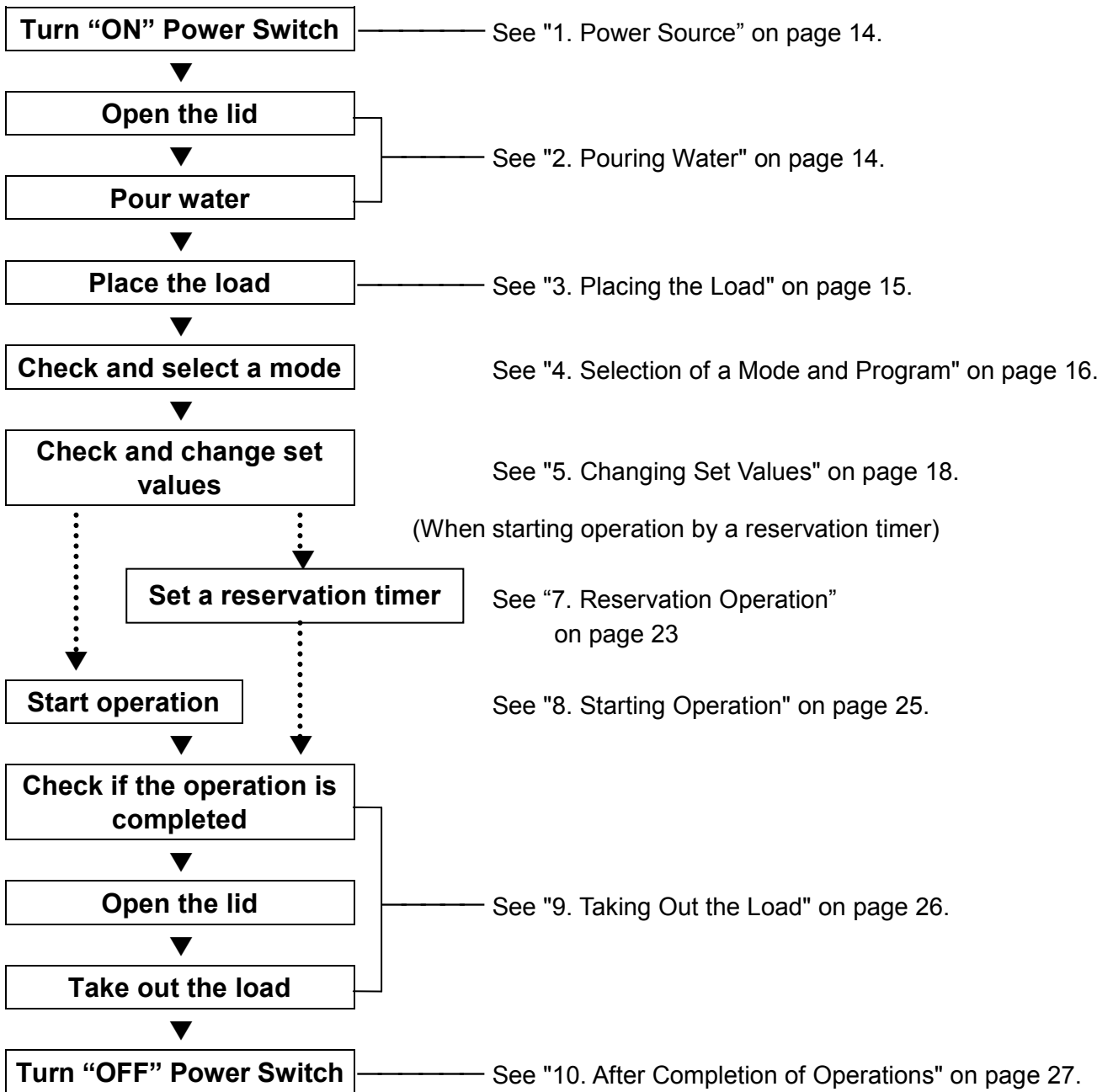


⑧ Turn ON the main power switch again.

# Chapter 3. Operation Procedure

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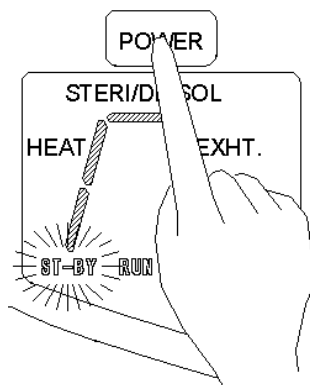
## Basic Operation Procedure



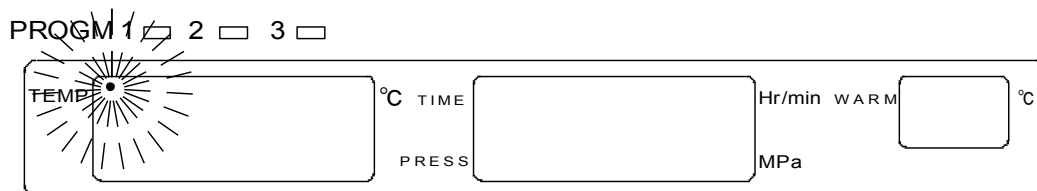
# 1. Power Source

① Press the "POWER" switch on the operation panel.

- The ST-BY light comes on, the preset value is displayed, and the unit enters the standby state.



- When none of the operation switches is touched for 10 minutes, the power saving function is activated, the display light goes out, and a dot blinks on the digital temperature screen. Press any switch other than the "LID OPEN" switch, and the unit returns to the standby state.



## △ NOTE

- When the power supply is interrupted or the main power switch is turned OFF, the temperature and time set for the previous operation will appear.

# 2. Pouring Water

## - IMPORTANT

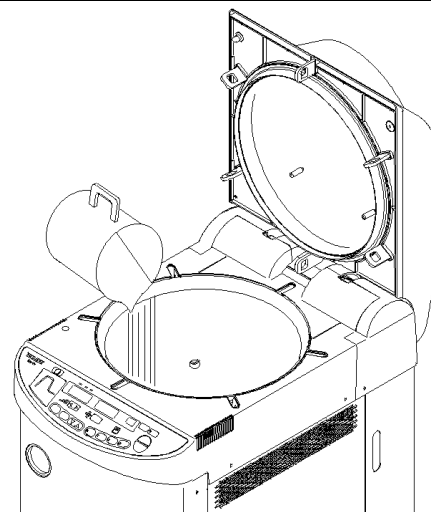
- When the sterilization time is extended or a large quantity of cloth is put in, pour a larger quantity of water than specified.

① Press the "LID OPEN" switch.

- The lid will open automatically.

② Pour water until water rises through the center hole of the bottom plate.

- When there is no water at all, pour 3 liters of water for HG-50 and 3.5 liters for HG-80. Supply of water is also necessary for the dissolution cycle.



### 3. Placing the Load

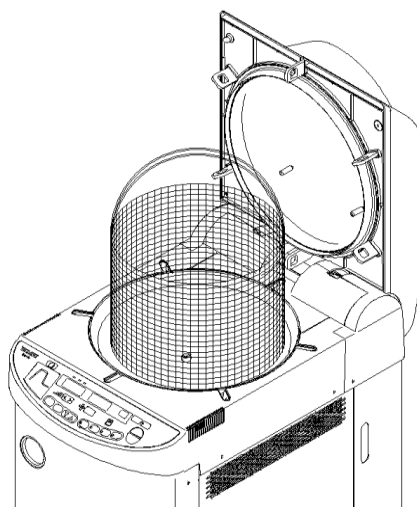
#### - CAUTION

- When using a waste processing bag or other kind of bag and sterilizing, place the bag in the wire basket and insert it into the chamber. Using the bag “as is” can cause excessive temperature, excessive pressure, boil-dry, etc.
- Do not contact the mouth of the container which is placed in the chamber with the inner surface of the lid. If the mouth of the container is closed by the lid inner surface, gas or liquid will gush out of the container when opening the lid.

#### - IMPORTANT

- Be sure to use the bottom plate.
- The mating surface of the chamber to the gasket is important for gas sealing. Exercise care so as not to damage the section by hitting it with loaded objects.
- Do not put in any object longer than the depth of the chamber stated in the specifications.

- ① Put the objects to be sterilized (dissolved material) in the chamber.



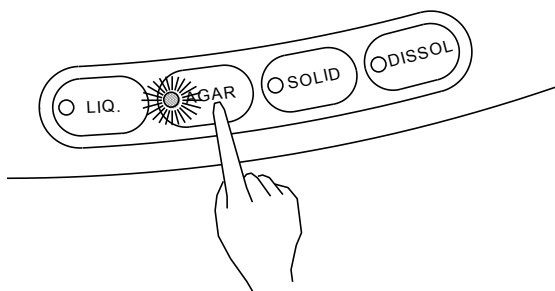
#### △ NOTE

- When sterilizing an empty deep container, lay the container on its side in the chamber so that it will be permeated with steam. An upright position may cause insufficient sterilization.
- If a waste disposal bag is used in sterilization, open the bag properly so that the bag is not in contact with the inside surface of the chamber. Insufficient sterilization may be caused if the bag is closed during sterilization. When the bag is opened excessively, steam is prevented from circulating in the chamber. This may also result in insufficient sterilization.
- Do not pile up the sterilization bucket in the chamber. When buckets are excessively piled, steam fails to penetrate to all points, resulting in incomplete sterilization.
- In sterilizing liquids such as medical solution and media, pay attention to the quantity of the liquid in relation to its container. For an Erlenmeyer flask, the amount of liquid should be approx. 3/4 of the capacity of the container; for a test tube, the appropriate quantity of chemical is approx. half of the capacity of the container. Too much chemical may result in overflow from the container during the temperature rising or cooling process.
- Use container caps that are loose fitting and allow the passage of air. Containers may break if venting is not possible.
- In the case of dissolution of agar media, its quantity should be 2 liters or less per container. Two liters or more of agar medium may not be completely dissolved.
- Use the DURHAM TEST TUBE (Sample tube) with 6mm caliber or more. At the DURHAM TEST TUBE (Sample tube) with less than 6 mm caliber, air bubble sometimes remains. Delaying of air release time may allow no air bubbles to be left. Change the air release time by referring to “6. Change of Function Setting-Air release time.”



## 4. Selection of a Mode and Program

- Select a mode according to the usage.

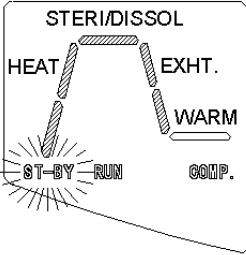
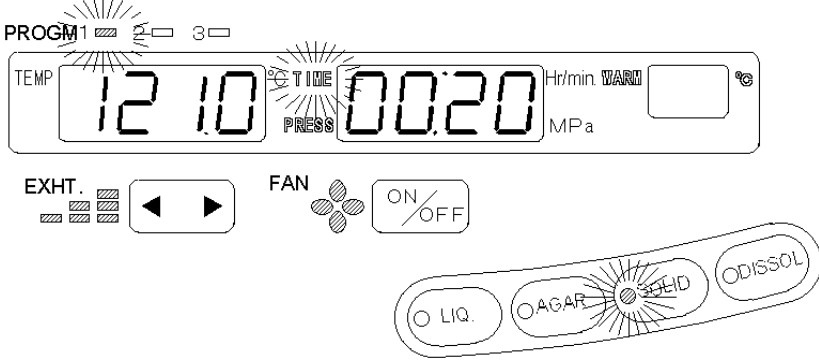
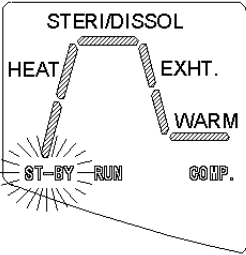
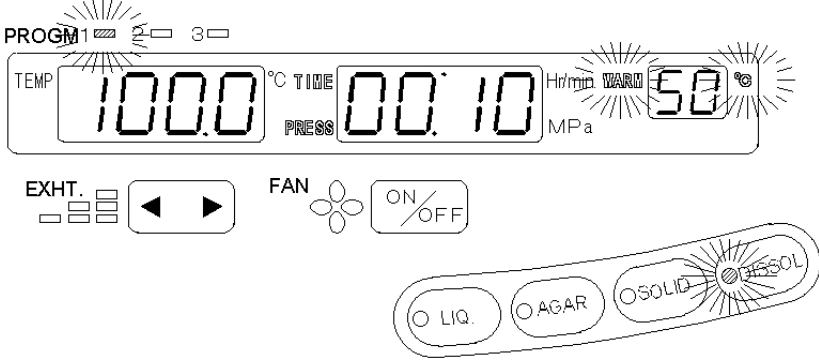


- ① Press the mode switch (LIQ, AGAR, SOLID, or DISSOL).

- Every time the switch is pressed, the current mode changes from Mode 1 to Mode 2, 3, 1, . . . in sequence repeatedly.

Mode	Application
Liquid	Sterilization of water, media, solid reagent, liquid reagent, liquid chemical, and other liquid that can withstand high-temperature high-pressure steam.
Agar	Sterilization of agar media (to be warmed so that it will not solidify after sterilization)
Solid	Sterilization of glass, ceramics, metal, rubber, and other solid equipment that can withstand high-temperature high-pressure steam and sudden decompression during exhaust
Dissolution	Dissolution of media

	Stage display	Initial set value (for all 3 programs)				
		Sterilizati on temp.	Sterilizati on time	Exhaust level	Fan cooling	Warm temp.
Liquid mode	HEAT → STERI → EXHT./COOL	121°C	20 min.	0	OFF	
Agar mode	HEAT → STERI → EXHT./ COOL → WARM	121°C	20 min.	0	OFF	50°C

Solid mode	Stage display	Initial set value (for all 3 programs)				
		Sterilizati on temp.	Sterilizati on time	Exhaust level	Fan cooling	Warm temp.
	HEAT → STERI → EXHT./COOL	121°C	20 min.	3 (fixed)	ON (fixed)	
						
Dissolution mode	Stage display	Initial set value (for all 3 programs)				
		Sterilizati on temp.	Sterilizati on time	Exhaust level	Fan cooling	Warm temp.
	HEAT → DISSOL → COOL → WARM	100°C	10 min.		OFF	50°C
						

## 5. Changing Set Values (Registration of the values by a user)

### △ NOTE

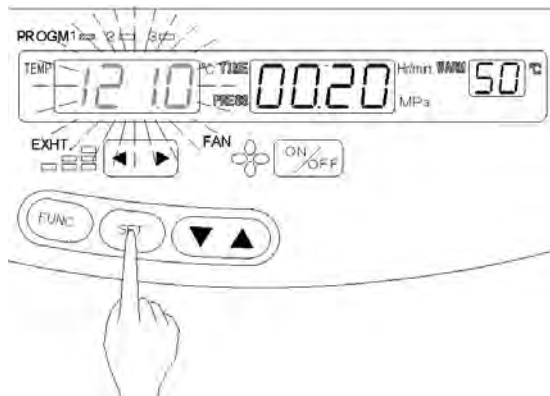
- When power supply is interrupted or the main power switch is turned OFF before starting the operation with the preset temperature and time, the preset values will return to the original values.

Select the mode for which the setting is to be changed, select the program number under which the set values are to be saved, and then change the setting as shown below.

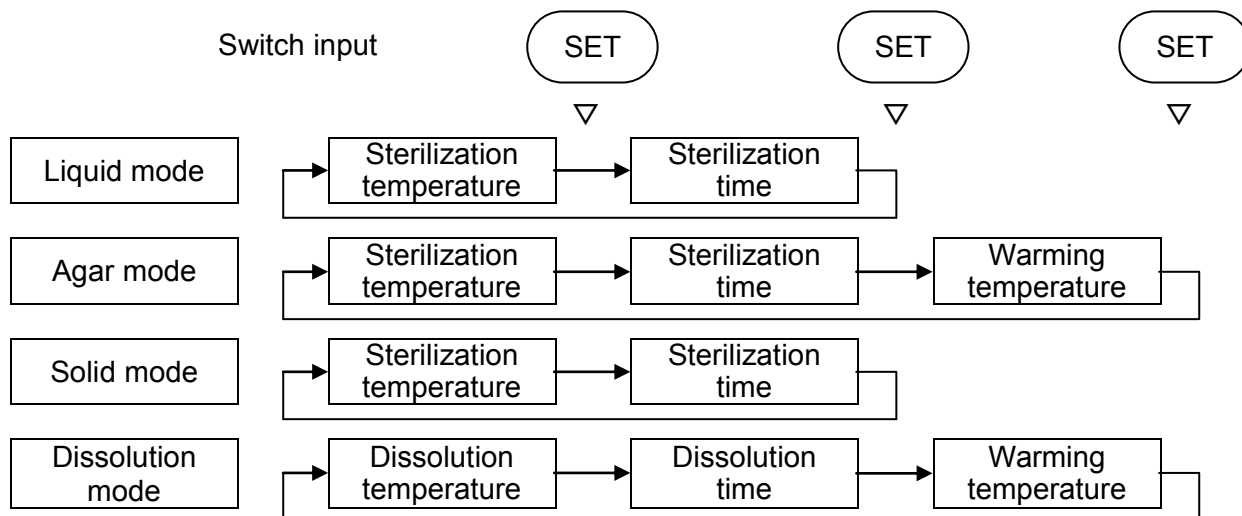
### ● Sterilization temperature, sterilization time, warming temperature, dissolution temperature, and dissolution time

The set values cannot be changed during operation.

- ① Press the "SET" switch.  
The set sterilization (dissolution) temperature display blinks, permitting setting change.
- ② When changing the setting other than the sterilization (dissolution) temperature, press the "SET" switch further and select the setting item to change.



- Every time the switch is pressed, the alterable setting items vary in sequence as shown below.



- ③ Press the set value increase/decrease switch (▲ ▼) to change the value.

- Every time the switch is pressed, the set value increases or decreases as follows;
  - Sterilization temperature : in 1°C increments within the range of 105°C to 135°C
  - Sterilization time : in 1 minute increments within the range of 1 min. to 5 hours
  - Dissolution temperature : in 1°C increments within the range of 60°C to 100°C
  - Dissolution time : in 1 minute increments within the range of 1 min. to 1 hour
  - Warming temperature : in 1°C increments within the range of 45°C to 60°C

- While the switch is kept pressed, the value increases ( decreases ) at the rate of 10 units, and it will return to the lower (upper) limit when the value exceeds the upper (lower) limit.

- ④ If the switch is left untouched for 5 seconds, the display will return from blinking to steady state, and the setting is completed.

**△ NOTE**

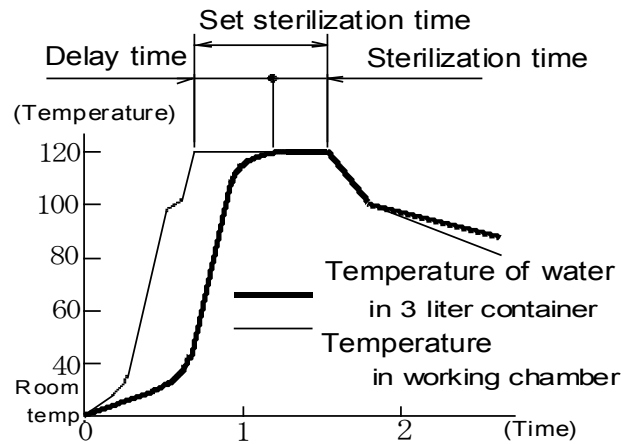
- For sterilization of liquid, set a sterilization time longer than usual by taking delay time into account and by referring to the table below.

**Ex. :** When there is 3 liters of water in a flask, it takes nearly 30 minutes (delay time) for temperature of water in the container to reach a set sterilization temperature after temperature in the chamber reaches the set value. You should set a sterilization time 30 minutes longer than usual to cope with this delay time.

$$\begin{aligned} &\text{Set sterilization time (50 minutes)} \\ &= \text{Delay time (30 minutes)} + \text{Sterilization time (20 minutes)} \end{aligned}$$

Reference Values of Delay Time (per Flask)

Liquid Volume	Delay Time
3 liters	30 minutes
2 liters	25 minutes
1 liter	20 minutes
500 cc	15 minutes



Delay Time Reference Data

- When a dressing drum is used, it takes several hours for the temperature in waste disposal bag to reach the set temperature after the temperature in the chamber (displayed temperature) reaches the set temperature (delay time).

If there is approx. 300 ~ 500 milliliters of water in the waste disposal bag, steam is generated in the bag and drives the air out. This will significantly reduce the delay time at the time of temperature rise. Refer to the table below and take this delay time into account when setting the sterilization time.

The delay time will be shortened when a perforated dressing drum is used.

Reference Values for delay time in Bag

Water in Bag	Delay time
Not poured	206 minutes
Poured	48 minutes

Case: A large number of  $\phi 15 \times 100$  test tubes placed in a waste disposal bag.

- For dissolution of coagulated agar medium, set an appropriate dissolution temperature and time, referring to the table below.

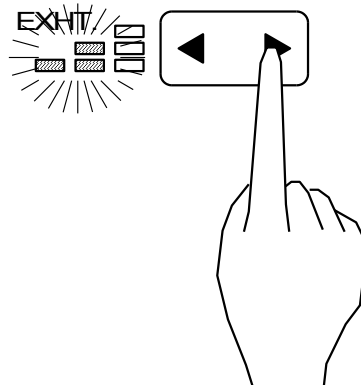
Reference Values (per Flask)

Quantity of Liquid	Dissolution Temperature	Dissolution Time
2 liters	100°C	60 minutes
1 liter		45 minutes
500 cc		25 minutes

## ● Exhaust level

The exhaust level can be changed from level 0 to level 3 in the liquid and agar modes. It can be changed also during operation.

- ① Press the ► switch to increase the exhaust level, and press the ◀ switch to decrease the level.



### △ NOTE

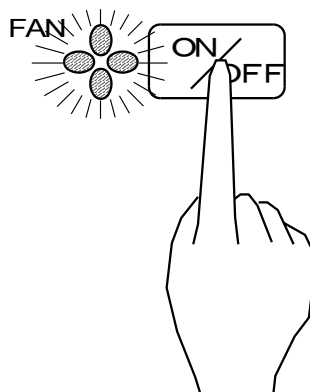
- Rapid exhaust after sterilization of liquid may cause the liquid to spill. Set a lower exhaust level for fine exhaust, or set the level 0 (natural cooling).
- Continuous operation at the exhaust level of 3 may cause steam to come out of the exhaust port of the drain bottle. In that case, lower the exhaust level, except for the solid cycle, and turn ON the fan cooling function.

## ● Fan cooling ON/OFF

Except the solid mode, fan cooling ON/OFF can be changed. It can be changed also during operation.

- ① Press the "Fan cooling ON/OFF" switch.

- The fan rotates after sterilization when the fan indicator is lighting.



## 6. Changing Function Setting

### △ NOTE

- When power supply is interrupted or the main power switch is turned OFF before starting the operation with the preset temperature and time, the preset values will return to the original values.

Select the mode for which the setting is to be changed, select the program number under which the set values are to be saved, and then change the setting as shown below.

### ● Air release time

The initial setting for air release time is as follows.

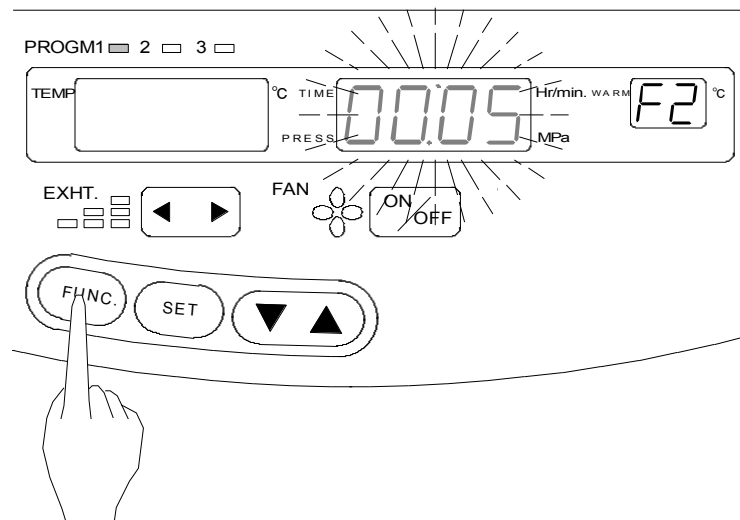
**HG-50** : 5 minutes after detecting 97°C (4 minutes, when 2kw heater is used as option)

**HG-80** : 8 minutes after detecting 97°C

If air bubbles remain in a Durham tube and the like of less than 6 mm in inner diameter, extension of the air release time may eliminate remaining air bubbles. Extension of the air release time may eliminate remaining air bubbles also when a large quantity of cloth is put in the chamber. The time can be set for each mode and program number. The set value cannot be changed during operation.

#### ① Press the "FUNC." switch two times in the standby state.

- "F2" will appear on the digital display, and the air release set time display will blink, entering the changeable state.



#### ② Press the set value increase/decrease switch (▲ ▼) to change the value.

- Every time the switch is pressed, the time increases (decreases) in one minute increments within the following range.

HG-50: within the range of 5 to 10 min.

(within the range of 3 to 9 min., when the 2kw heater is used as option)

HG-80: within the range of 8 to 16 min.

- When the set value exceeds the upper (lower) limit, it will return to the lower (upper) limit.

#### ③ If the switch is left untouched for 5 seconds, the display will return to the standby state, and completing the setting.

## ● Lid lock temperature

The temperature that prevents the load from being taken out for safety can be set for each mode and each program number. The initial setting of the lid lock is 80°C for the liquid, agar, and dissolution modes, while it is 97°C for the solid mode.

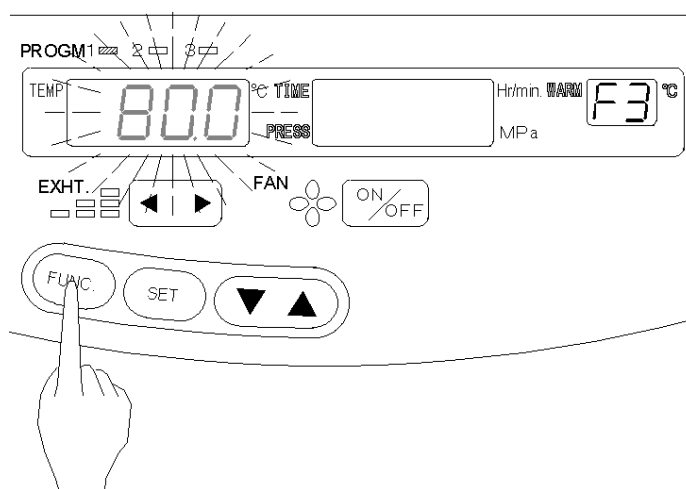
The set value cannot be changed during operation.

### - CAUTION

- The center temperature of liquid will take much time to drop. Take the delay in temperature drop into sufficient consideration when setting the lid lock temperature in order to avoid an accidental scald.

#### ① Press the "FUNC." switch three times in the standby state.

- "F3" will appear on the digital display, and the lid lock set temperature display will blink, entering the changeable state.



#### ② Press the set value increase/decrease switch (▲ ▼) to change the value.

- Every time the switch is pressed, the temperature increases (decreases) in 1°C increments within the following range.

HG-50 : within the range of 60°C to 97°C

HG-80 : within the range of 60°C to 95°C for liquid, agar and dissolution modes  
within the range of 60°C to 97°C for solid mode.

- While the switch is kept pressed, the set value increases(decreases) in 10°C increments and if the value exceeds the upper (lower) limit, it will return to the lower (upper) limit.

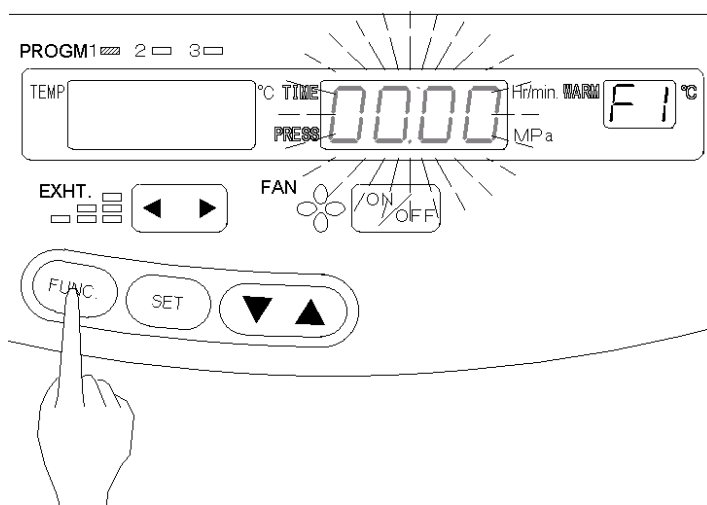
#### ③ If the switch is left untouched for 5 seconds, the display will return to the standby state, and completing the setting .

## 7. Programmable Auto-start

- When the set time passes, operation is started automatically.

### ① Press the "FUNC." switch once in the standby state.

- "F1" will appear on the digital display, and the reservation time display will blink, entering the alterable state.
- If the switch is left untouched for 5 seconds during programmable auto-start setting, the reservation is cancelled, returning to the standby state.



### ② Press the set value increase/decrease switch (▲ ▼) to change the value.

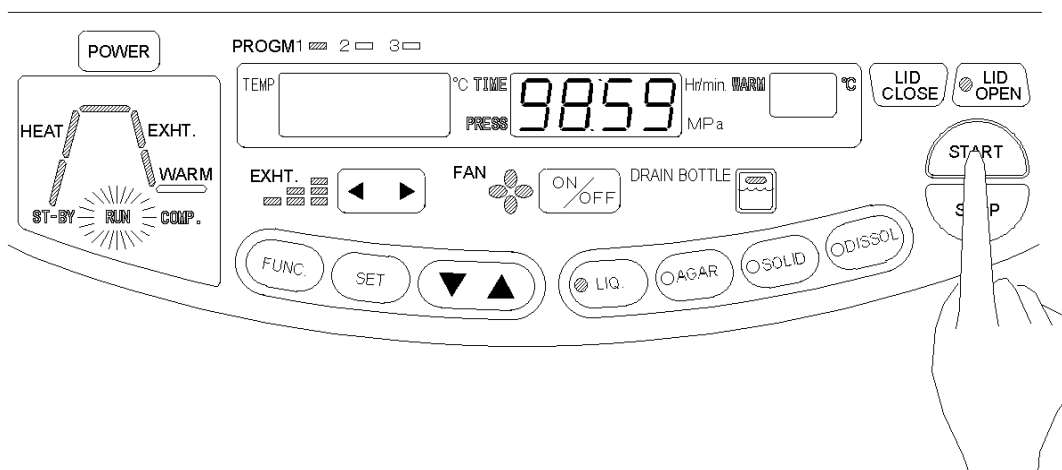
- Every time the switch is pressed, the time increases (decreases) in one hour increments within the range of 1 hour to 99 hours.
- While the switch is kept pressed, the value will increase (decrease) in 10 hours increments, and when the set value exceeds the upper (lower) limit, it will return to the lower (upper) limit.



③ Press the "START" switch.

- **CAUTION**

- Be careful not to pinch hands when closing the lid.
  - Do not touch the lid or lid cover when opening/closing the lid.
  - Check that there is no foreign material on the mating face of the gasket before starting the operation. Such a foreign material will cause steam leakage.
- Press the "START" switch within 5 seconds after last pressing of the set value increase/decrease switch.
- The lid will close automatically, the remaining time of the reservation timer will be shown on the digital display, and "RUN" will light up.
- When operation will not begin even if the "START" switch is pressed, check to see if the drain bottle is full of water. If it is full, refer to "1. Draining the Drain Bottle" on page 31. Operation will not begin either when the lid has not been opened or closed completely. Press the "LID OPEN" switch, and press the "START" switch again after the lid has opened completely.



**How to confirm the reservation time during operation of the reservation timer**

- Press the "FUNC." switch to confirm the reservation time during operation of the reservation timer. The set time will be displayed for 5 seconds. The set time cannot be changed.
- The reservation hour is reset to 0 hour after the reservation time is over.

**△ NOTE**

- The reservation time is valid only for one operation.

## 8. Starting an Operation



① Press the "START" switch.

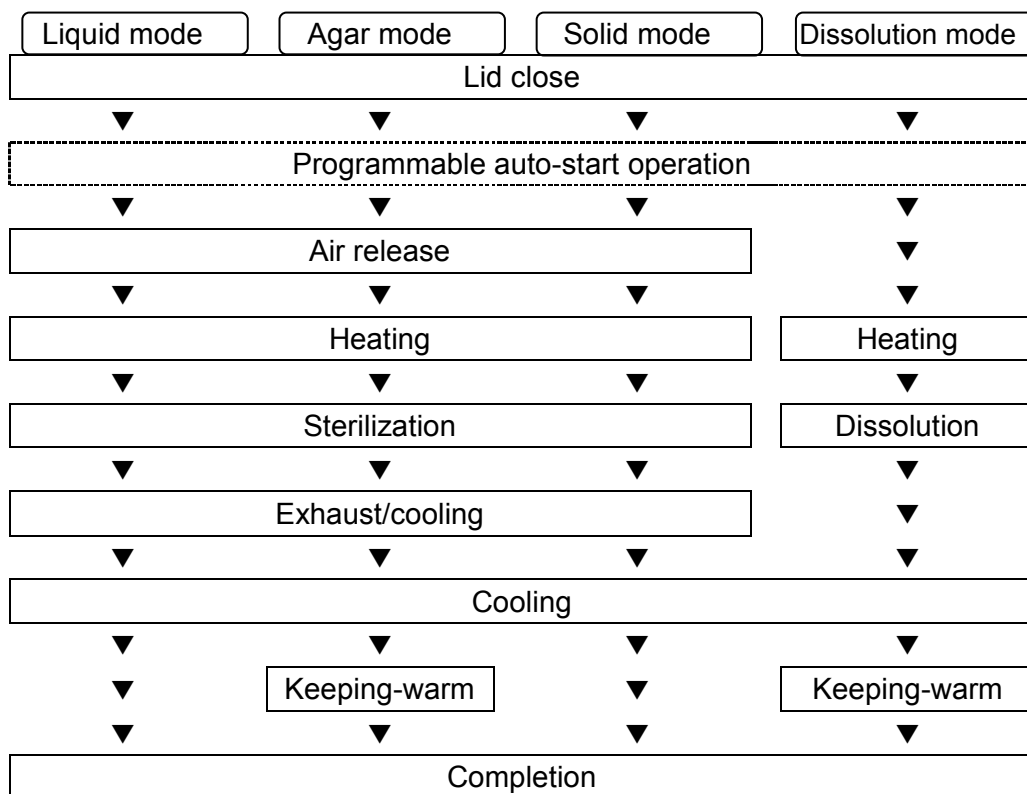
- The lid will close automatically, the **RUN** display will light up, and the stage shown below will begin automatically according to the selected cycle. Refer to "13. Operation of each stage" on page 27 for the details of the operation of each stage.
- When operation will not begin even if the "START" switch is pressed, check to see if the drain bottle is full of water. If it is full, refer to "1. Draining the Drain Bottle" on page 31. Operation will not begin either when the lid has not been opened or closed completely. Press the "LID OPEN" switch, and press the "START" switch again after the lid has opened completely.

### - CAUTION

- When closing the lid, be careful so that a hand will not be caught in the lid.
- Do not touch the lid or lid cover when opening/closing the lid.
- Check that there is no foreign material on the mating face of the gasket before starting the operation. Such a foreign material will cause steam leakage.

### - IMPORTANT

- Do not apply force to the lid that is open. Such force may damage the product.



### △ NOTE

- When the lid is closed while the temperature inside the chamber is still high, the air in the chamber leaking through the gasket will make a hissing sound, which is not failure. Continue operation.

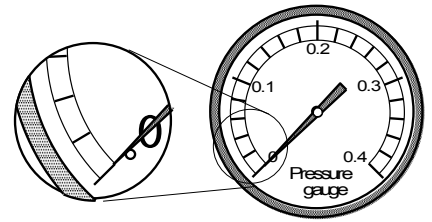
### How to confirm the setting during operation

- To confirm the set temperature and time during operation, press the "SET" switch. While the switch is being pressed, the set value is displayed. The set value cannot be changed.

## 9. Taking Out the Load

### - WARNING

- When salt water, salt media, and other liquid with a high concentration of salt boil over inside the chamber, drain water from the chamber and wipe the area around the gasket cleanly, otherwise the chamber and piping will be corroded, causing explosion.
- Open the lid after confirming that the pressure in the chamber has dropped to "0 MPa" .



### - CAUTION

- Keep the face and hands away from the chamber when lifting the lid after operations are completed; steam will gush out of the opening of the chamber.
- After operation is over, the lid, chamber, packing and panel are hot. To protect yourself from burns, do not touch with bare hands.
- It takes a lot of time for the liquid to cool. Be sure to check that the temperature has dropped sufficiently before unloading the liquid from the chamber, or you may get burned.
- If the liquid surface which is placed in the chamber is covered with oil, etc, the liquid may gush out when taking out or carrying. Be sure to check that the temperature has dropped sufficiently before unloading the liquid from the chamber or it may cause burns.
- Put on heat insulation gloves before taking objects out of the chamber. Do not put your hands into the chamber until the steam has been vented.

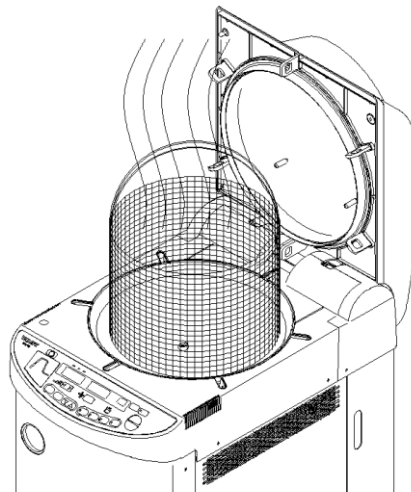
① Press the "LID OPEN" switch.

- When the display is red, the lid cannot be opened.

② Take out the load.

③ Press the "LID CLOSE" switch.

- When the temperature inside the chamber is high, the cooling fan will run until the temperature drops enough to unlock the lid safely. The air leaking from the chamber will make a hissing sound, which is not failure. Continue operation. Lid will not be closed just in case the lid is not opened completely.
- Press "LID OPEN" switch and press the "LID CLOSE" switch again after the Lid has been opened completely.



## 10. At the End of Operation

- ① Turn off the POWER switch after the completion of each routine operation.

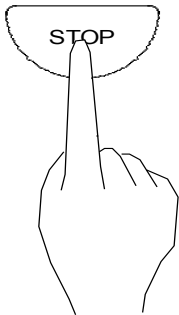
### - IMPORTANT

- *To prevent clogging of the piping and also rusting & staining of the heater, change the water of the chamber, once a day. Without drainage of water of the chamber, if filling in the gaps and continuing to run, in case the sterilized substances is like sodium chloride, acidity or alkalinity, a part of such a substance dissolve into the pouring water and then the chamber, heater and heater cover may be corrosive.*

### △ NOTE

- The temperature and time set for the previous operation are saved even if the power supply is interrupted or the main power switch is turned OFF.

## 11. To Interrupt an Operation



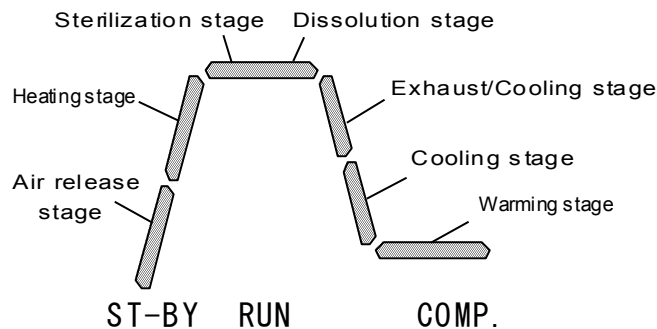
- ① Press the "STOP" switch.

- The automatic cycle is interrupted, and the unit enters the standby state (the state before operation).
- Refer to "9. Taking Out the Load" when taking out the loaded objects. (The lid will not open until the temperature inside the chamber drops below the lid lock temperature and the pressure drops to 0 MPa.)

## 12. If Power Supply is Cut Off during Operation

- If power supply is shut off before completing the operation due to power failure etc, operation is interrupted and the power switch is in the off state when power supply comes back. When the POWER switch is pressed and the equipment becomes standby state, □□ is displayed in the digital display window and an electronic alarm sounds to notify it that the operation was not completed due to the power failure. This power failure notice is stored in memory and it continues to notify even if the ON /OFF operation of the POWER switch is repeated. When the STOP switch is pressed during the power failure notice, the display turns to the standby state (the state before operation startup). Redo the operation once again. A power failure is reported also when the power supply is shut off during operation by pressing the POWER switch .

## 13. Operation of Each Stage



### ■ Lid closing stage ..... Common to all modes

- The chamber temperature and pressure are shown on the digital display, and the lid closes automatically.
- When temperature inside the chamber is high, the cooling fan runs until the temperature drops, permitting safe lid locking.

■ **Programmable auto-start operation** ... Common to all modes  
(when the programmable auto-start operation is used)

- The remaining time in the reservation timer is shown on the digital display.

■ **Air release stage** ..... Liquid mode, agar mode, and solid mode

- The illuminated air release section on the stage display changes to blinking, and the temperature and pressure inside the chamber begin to be shown on the digital display.
- Air releasing will continue until the preset air release time passes after the temperature inside the chamber reaches 97°C.

■ **Heating stage** ..... Liquid mode, agar mode, and solid mode

- The illuminated heating section of the stage display changes to blinking.
- Temperature continues to rise until the exhaust valve closes and the temperature (pressure) reaches the preset sterilization temperature (pressure).

■ **Heating stage** ..... Dissolution mode

- The illuminated air release section on the stage display changes to blinking, and the temperature and pressure inside the chamber begin to be shown on the digital display.
- The temperature continues to rise until it reaches the preset dissolution temperature.

■ **Sterilization stage** ..... Liquid mode, agar mode, and solid mode

- The sterilization section of the stage display changes to blinking from steady state, and the sterilization set time appears on the digital display simultaneously with start-up of the sterilization timer.
- The temperature (pressure) is kept constant during the preset sterilization time.
- When the temperature inside the chamber decreases by "0.1°C" or more from the set value because of an error, the overcool mark on the digital display lights up, and the sterilization timer stops operation. Operation is resumed when the temperature reaches the setup temperature again.



- The digital timer shows the remaining time during the sterilization stage. Press the "SET" switch to confirm the preset time. While the switch is being pressed, the set value is displayed. The set value cannot be changed.

△ **NOTE**

- In sterilization of petri dishes or empty containers, the air remaining in the container expands and may increase the pressure extraordinarily within the chamber. If the pressure in the chamber exceeds the saturated steam pressure, the automatic exhaust valve opens and discharges the air in the chamber into the drain bottle.
- The chamber temperature is kept slightly higher so that it will not drop below the sterilization set temperature.

■ **Dissolution stage** ..... Dissolution mode

- The illuminated dissolution section of the stage display changes to blinking, and the dissolution set time appears on the digital display simultaneously with actuation of the dissolution timer.
- The digital timer shows the remaining time during the dissolution stage. Press the "SET" switch to confirm the preset time. While the switch is being pressed, the set value is displayed. The set value cannot be changed.

■ **Exhaust/cooling stage** ..... Liquid mode, agar mode, and solid mode

- The illuminated exhaust section of the stage display changes to blinking, and the pressure inside the chamber appears on the digital display.
- The exhaust valve opens up to the preset exhaust level, and the fan begins to run when the fan cooling is set in the ON position.
- The liquid mode and agar mode permit the change of exhaust level and fan cooling ON/OFF even during the exhaust/cooling stage.

△ **NOTE**

- Rapid exhaust after sterilization of liquid may cause the liquid to spill. Set a lower exhaust level for fine exhaust, or set the level 0 (natural cooling).

- When the pressure in the chamber drops below 0.01 MPa and the temperature in the chamber below 99.9°C, the operation proceeds to the next cooling stage.

■ **Cooling stage** ..... Common to all modes

- The illuminated cooling section of the stage display changes to blinking, and the exhaust valve opens fully.
- The fan runs when the fan cooling is set in the ON position. The fan cooling ON/OFF can be changed in any stage except the solid mode.
- The liquid mode and solid mode shift to the next stage when the temperature inside the chamber drops below the lid lock temperature. The fan continues to run until the temperature drops to the level 10°C lower than the lid lock temperature.
- The agar mode and dissolution mode permit lid opening/closing when the temperature inside the chamber drops below the lid lock temperature. When the temperature inside the chamber drops lower than the warming set temperature, the fan stops, shifting to the next warming stage.

■ **Warming stage** ..... Mode 1 and 4

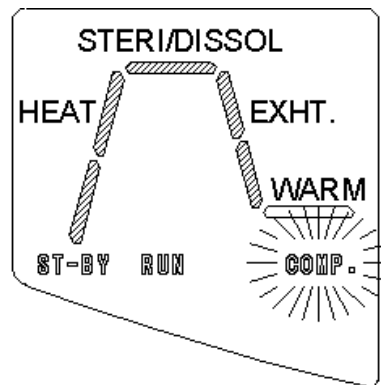
- The illuminated warming section of the stage display changes to blinking.
- The electronic alarm (beep beep beep) notifies the warming start.
- When 24 hours (fixed) passes, the operation shifts to the next completion process.

△ **NOTE**

- After warming time is over (24 hr), the chamber will not be heated. The temperature inside the chamber will drop to the room temperature, and the agar media, etc. will solidify.
- Refer to "9. Taking Out the Load" on page 26 when taking out the loaded objects during warming stage.

■ **Completion** ..... Common to all modes

- When all stages of the respective mode are completed, an electronic alarm (peep, peep, peep...) will be given three times, and the COMP. display lights up, notifying that all stages have completed.



- When the respective switches remain untouched for 10 minutes, the power saving function is activated, the light in the display section goes out, and the dot blinks on the temperature digital display. Press any switch except the "LID OPEN" switch, and the unit returns to the completion state.



# Chapter 4. Maintenance and Service

## - CAUTION

- Do not maintain or repair the unit during operation.
- Maintain or repair the unit when it is sufficiently cool.

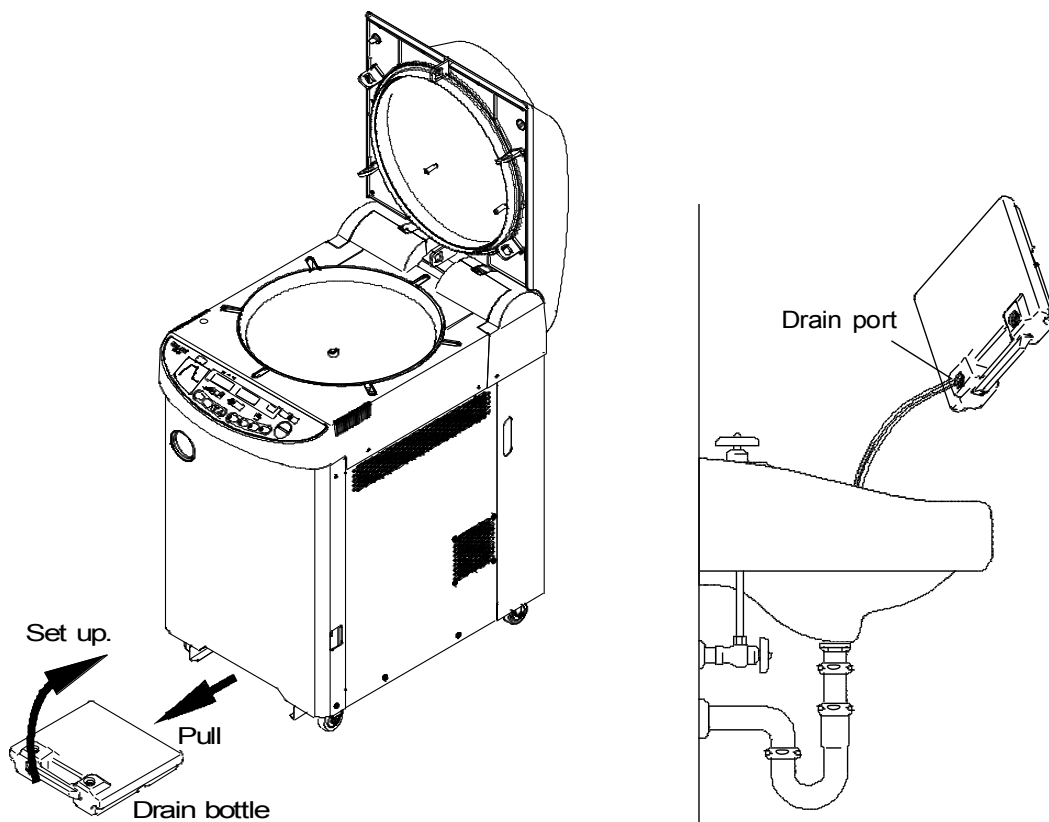
## 1. Draining the Drain Bottle

- The water level in the drain bottle increases as the operation time elapses. When it is full of water, the drain bottle display blinks in red, making an electronic alarm sound (peep).

## - CAUTION

- Remove the drain bottle when the water inside the bottle is cool sufficiently in the standby state.

- ① Slowly pull out the drain bottle from the unit.
  - Water may spill from the drain port when the bottle is pulled rapidly.
- ② Set up the drain bottle slowly.
  - Set it up slowly so that the water will not spill.
- ③ Drain water from the bottle through the drain port.

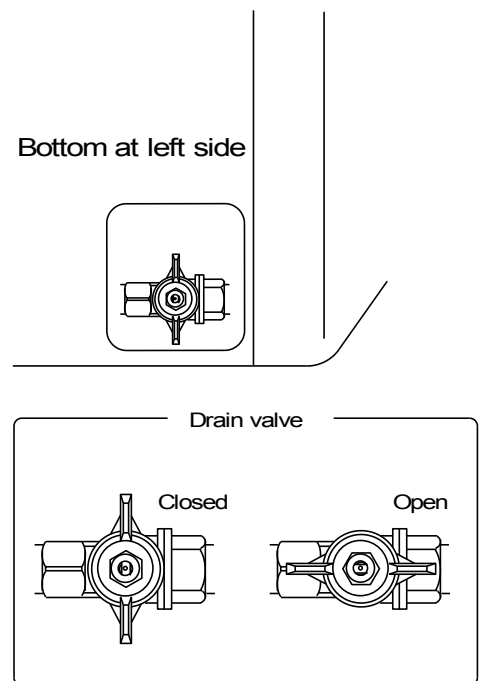




## 2. Draining the Chamber

### - CAUTION

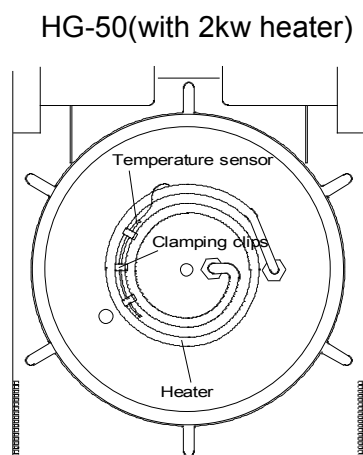
- When pressure is remaining in the chamber, do not remove the drain bottle or drain the chamber, otherwise hot water and steam may gush out, causing a scald.
- When the unit is not to be used for a long time, be sure to drain the chamber to prevent pipe clogging. Confirm that the inside of the chamber has cooled sufficiently before draining the chamber.
  - ① Open the drain valve at the bottom of the left side of the unit, and the water in the chamber will be poured into the drain bottle.
  - ② When the drain bottle is full of water, the drain bottle display blinks in red, and an electronic alarm sounds (peep). Close the drain valve, and drain the bottle.
  - ③ Repeat the operation several times until the water inside the chamber disappears.
  - Close the drain valve completely.



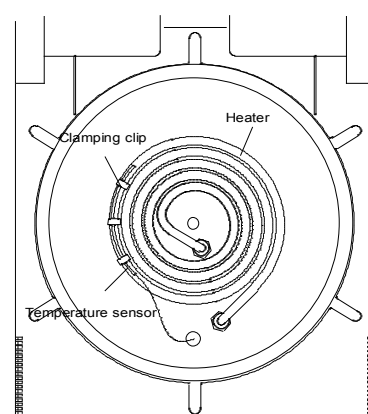
## 3. Cleaning inside the Chamber

### - CAUTION

- The heater at the bottom of the chamber is provided with a temperature sensor. Exercise care so that you will not have your finger cut by the edge during cleaning.
  - ① Take out the bottom plate, and check the chamber bottom and heater surface for dirt. Clean them with a soft brush and the like after draining.
  - ② When the temperature sensor is off the clamping clips, attach the temperature sensor correctly to the clamping clips.



HG-50 with 3kw heater & HG-80



## 4. Cleaning Body

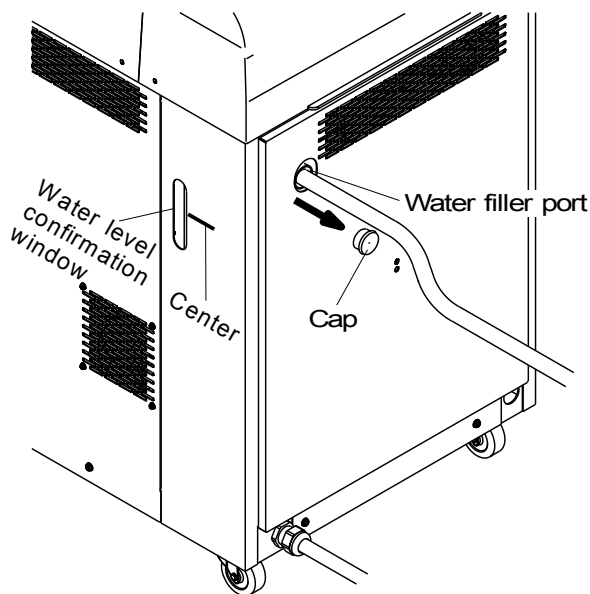
### - IMPORTANT

- Do not use benzine or thinner to clean the body. Also make sure that the volatile substances such as insecticides do not come into contact with the body as these substances may deteriorate the body or strip its paint.

- ① Gently wipe stains from the body with a soft cloth. To remove stubborn stains, wring a cloth moistened with neutral detergent diluted with water, and wipe off the stains with it. Wipe off any moisture with a dry cloth.

## 5. Water Supply to Cooling Tank

- When the water level in the cooling tank is below the water level confirmation window, supply water to the cooling tank using a hose, etc. When the water level is low, steam will come out of the drain tank during exhaust.
- ① Remove the cap from the water filling port of the cooling tank at the back of the unit, and supply water up to the center of the water level confirmation window at the side of the unit through the water filling port.



# Chapter 5. Specifications

Model	HG-50	HG-80
Outer dimensions	455W × 890H × 691D mm	455W × 1030H × 691D mm
Chamber size	364 Dia. × 482 D mm (Effective volume: 50.2 liter)	364 Dia. × 730 D mm (Effective volume: 76 liter)
Rated power	AC220 V ±10%; Φ1; 50/60 Hz; 14 A or more AC230 V ±10%; Φ1; 50/60 Hz; 14 A or more AC240 V ±10%; Φ1; 50/60 Hz; 13 A or more	AC220 V ±10%; Φ1; 50/60 Hz; 17.3 A or more AC230 V ±10%; Φ1; 50/60 Hz; 16.6 A or more AC240 V ±10%; Φ1; 50/60 Hz; 15.9 A or more
Temp./humidity conditions	5-35°C, 10-85%RH (Dew concentration not allowed.)	
Power consumption	3.0kW	3.8kW
Weight	62 kg	73kg
Type of pressure vessel	Small pressure vessel	
Material of chamber	Stainless steel (SUS304)	
Sterilization temperature setting range	105-135°C variable	
Sterilization timer	1-300 min. (5 hr)/remaining time display method	
Dissolution temperature setting range	60-100°C variable	
Dissolution timer	1-60 min. (1 hr)/remaining time display method	
Warming temperature setting range	40-60°C variable	
Exhaust level	4 steps variable	
Fan cooling	ON/OFF	
Air release time	5 - 10 min. variable	8-16 min. variable
Lid lock temperature	60-97°C variable	Liquid, Agar, Dissolution modes: 60-95°C variable, Solid mode:60-97°C variable
Programmable auto-start	1-99 hr later/ start time setting method	
Max. operating pressure	0.26MPa	
Thermometer	Digital display: 5.0-137.9°C	
Pressure gauge	Digital display: 0-0.3 MPa/ Analog display: 0-0.4 MPa	
Safety alarm unit	Pressure safety valve, Earth leakage and Over current breaker, Boil-dry protection device, Error display (Boil-dry, Temperature sensor disconnection, Overheating, Overcooling, Abnormal pressure, Abnormal state of the lid, exhaust valve or heater)	
Supplied Accessories	Drain Bottle (1 pc) Bottom Plate (1 pc) Operation Manual (1 copy) Caster Stopper (2 pcs)	Drain Bottle (1 pc) Bottom Plate (1 pc) Operation Manual (1 copy) Caster Stopper (2 pcs)

For HG-50 with 2kW heater as option, the specifications are as follows.

Other specifications are the same as the HG-50 standard model.

Rated power supply	AC110 V ±10%; single-phase; 50/60 Hz; 19 A or more AC120 V ±10%; single-phase; 50/60 Hz; 17 A or more AC220 V ±10%; single-phase; 50/60 Hz; 10 A or more AC230 V ±10%; single-phase; 50/60 Hz; 9 A or more AC240 V ±10%; single-phase; 50/60 Hz; 9 A or more
Air release time	3 - 9 min. variable

# Chapter 6. Troubleshooting

## 1. Error Detection (Alarms)

- Should any malfunction occur in the autoclave, the error detection circuit will be triggered to assure safety. Once the circuit is activated, an error number appears on the digital display and the electronic alarm sounds, indicating the problem. To stop the alarm sound, press the STOP switch. If an alarm occurs, check the error number and turn off the power switch.

Error Number	Problem	Remedy
<b>E 1</b> (Lack-of-water alarm)	• Lack-of-water	• Check to see that the pressure is at 0 MPa and then open the lid. After the heater has been cooled, pour in a sufficient quantity of water, and repeat operations from the beginning.
	• Piping is clogged by a bag such as the waste disposal bag.	• Whenever a bag, such as a waste disposal bag, is used for sterilization, put it in the wire mesh basket and place the basket in the working chamber.
<b>E 2</b> (Temperature sensor wire breakage alarm)	• Temperature in the working chamber falls below the freezing point.	• Adjust room temperature at the installation site to 5 ~ 35°C.
	• Disconnection of temperature sensor for control.	• Contact our authorized distributor in your region.
<b>E 3</b> (Over-temperature alarm)	<ul style="list-style-type: none"> <li>• Temperature in the working chamber exceeded the upper limit of the working temperature range by +3°C or more.</li> <li>• A temperature +5°C or more above the set temperature continued for 10 seconds during sterilization.</li> <li>• A temperature +10°C or more above the set temperature continued for 15 minutes during warming.</li> </ul>	
<b>E 4</b> (Over-cool alarm)	• A temperature of 102°C or less continued for 10 seconds during sterilization.	
<b>E 5</b> (Over-pressure alarm)	• When saturated steam pressure under the set temperature exceeded +0.025MPa or above for more than 15 seconds.	
	• When pressure of 0.01MPa or more is detected in the state that the lid opens.	• Whenever a bag, such as a waste disposal bag, is used for sterilization, put it in the wire mesh basket and place the basket in the working chamber.
	• Piping is clogged by a bag such as the waste disposal bag.	
<b>E 6</b> (Lid trouble alarm)	• The lid does not close within 30 minutes after start of operation.	• Check to see if any foreign substance is caught.
	• When the lid opens during operation	• Contact our authorized distributor in your region.
	• Defects of the lid switch	
<b>E 7</b> (Automatic exhaust valve trouble alarm)	• The automatic exhaust valve continued closing for 10 seconds.	
<b>E 9</b> (Sterilization heater trouble alarm)	• Temperature in the working chamber has not reached a set sterilization temperature after 5 hours has elapsed from operation start-up.	• Reduce the quantity of objects to be sterilized and repeat operations from the beginning. If this error reoccurs after all measures have been taken, contact our authorized distributor in your region.
<b>E □</b> (Power failure)	• When power supply is shut off during operation	• Redo the operation from the beginning.

Error Number	Problem	Remedy
<b>E L</b> (Lid lock trouble alarm)	<ul style="list-style-type: none"> <li>• The sliders for locking the lid are not inserted at the right position.</li> <li>• The detection of locking turn off during operation.</li> </ul>	<ul style="list-style-type: none"> <li>• Contact our authorized distributor in your region.</li> </ul>

## 2. Early Troubleshooting

Symptom	Cause	Remedy
Display remains off after power is turned on.	<ul style="list-style-type: none"> <li>● Check the plug and outlet first.</li> <li>① The plug is not properly inserted or is insufficiently tightened.</li> <li>② Disconnection in the power cord.</li> <li>③ Defect in the DISPLAY.</li> <li>④ The main power switch is "OFF."</li> </ul>	<ul style="list-style-type: none"> <li>① Properly insert the plug and retighten any loose parts.</li> <li>②③ Contact our authorized distributor in your region.</li> <li>④ Turn "ON" the main power switch.</li> </ul>
No air exhausted from the working chamber.	<ul style="list-style-type: none"> <li>① Defective automatic exhaust valve.</li> </ul>	<ul style="list-style-type: none"> <li>① Contact our authorized distributor in your region.</li> </ul>
Pressure gauge reading remains low.	<ul style="list-style-type: none"> <li>① Defective safety valve.</li> <li>② Defective pressure gauge.</li> <li>③ Disconnection in the heater.</li> <li>④ Defective automatic exhaust valve.</li> <li>⑤ Steam leakage.</li> </ul>	<ul style="list-style-type: none"> <li>①-④ Replace the defective part (Contact our authorized distributor in your region).</li> <li>⑤ For steam leakage from piping, retighten or seal the joints.</li> </ul>
Steam leakage from lid gasket	<ul style="list-style-type: none"> <li>① Deterioration of lid gasket</li> <li>② Improperly installed lid gasket.</li> <li>③ Foreign matter under the gasket.</li> </ul>	<ul style="list-style-type: none"> <li>① Replace the lid gasket.</li> <li>② Press on the gasket to remove any unevenness.</li> <li>③ Remove the foreign matter.</li> </ul>
Water leakage from the bottom of the body.	<ul style="list-style-type: none"> <li>① Deterioration of the heater seal packing due to boil-dry or other problem.</li> <li>② The drain valve open.</li> </ul>	<ul style="list-style-type: none"> <li>① Contact our authorized distributor in your region.</li> <li>② Close the valve.</li> </ul>
The lid will not open.	<ul style="list-style-type: none"> <li>① The lid open display is red.</li> <li>② Power is not supplied.</li> </ul>	<ul style="list-style-type: none"> <li>① Wait until the lid open display changes to green.</li> <li>② Press the "POWER" switch to turn on the power.</li> </ul>
The lid will not close.	<ul style="list-style-type: none"> <li>① The lid is not open completely.</li> </ul>	<ul style="list-style-type: none"> <li>① Press the "LID OPEN" switch to completely open the lid, and then press the "LID CLOSE" switch.</li> </ul>
Displayed temperature exceeds set temperature and exhaust is repeated frequently during the sterilization stage.	<ul style="list-style-type: none"> <li>① Defect in the heater circuit.</li> </ul>	<ul style="list-style-type: none"> <li>① Contact our authorized distributor in your region.</li> </ul>

● This table of early troubleshooting describes the causes and remedies of simple problems. If you are unable to fix or repair the problem, contact our authorized distributor in your region and provide the following information. (Please show the warranty to our service staff visiting your place.)

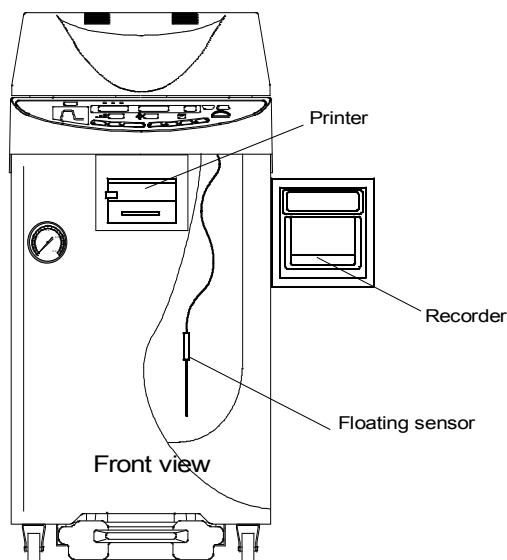
- ① Model and serial number of the autoclave.
- ② Defective point(s) and symptom(s) (error number if applicable).
- ③ Number of days of operation (date of purchase).
- ④ Operating conditions (including substances being sterilized).

# Appendix

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## 1. Glossary

- Autoclave (High pressure steam sterilizer)  
Equipment to sterilize with saturated steam the instrument and gauze for medical treatment and surgical operations and media used in laboratories under a pressure higher than atmospheric pressure.
- Type D grounding work  
Grounding work that ensures the grounding resistance of less than  $100\Omega$ , using a soft copper wire of 1.6 mm or more in diameter or any other wire equivalent to or better than the said copper wire.
- Exhaust level  
The degree at which the exhaust valve opens.
- Recorder  
Equipment for recording the temperature inside the chamber (loaded objects)  
(See drawing below.)
- Floating sensor  
Detects the temperature of the objects to be sterilized and starts operation of the sterilization timer.  
(See drawing below.)
- Printer  
Equipment for recording the temperature and pressure inside the chamber (loaded objects)  
(See drawing below.)



## SPARE PARTS FOR HG-SERIES AUTOCLAVES

<u>Catalog No.</u>	<u>Description</u>
ATA-HGLG	Lid gasket for HG-50/80
ATA-50H	Heater for HG-50 (specify 120V or 220V)
ATA-80H	Heater for HG-80
ATA-HVEGO	Low water sensor and thermostat for HG autoclaves
ATA-HVESV	Solenoid valve for HG-50
ATA-ROM	EPRM including extractor for HG-50
ATA-HVSSR	Solid state relay for HG autoclaves
ATA-HVTS	Temperature sensor for HG autoclaves

**If you need technical support, have any concerns or questions, or would like to place an order for spare parts, please contact:**



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