CO_2 Incubator

IPE610

(Air Jacket type)

First Edition

- Thank you for purchasing CO_2 incubator IPE610 produced by Yamato Scientific Co., Ltd.
- In order to use this equipment properly, please read this Instruction Manual and Warranty Card thoroughly before use. Keep them in safe place close to this equipment so that you can refer to them any time.

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

Yamato Scientific Co.,Ltd.

Table of contents

1.Safety precautions

Explanation of symbols

About pictograms

A variety of pictograms are indicated in this operating instruction and on products for safe operation. Possible results from improper operation ignoring them are 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 damages (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

Symbols list

Warnings

General warnings

Danger!: High voltage

Danger!: High temperature

Danger!: Driving part

Danger!: Hazard of explosion

Cautions

General cautions

Electrical shock!

Burning!

For water only

Poisonous material

Prohibitions

General prohibitions

No open flame

Do not disassemble

Do not touch

Compulsions

General compulsions

Connect ground wire

Horizontal installation

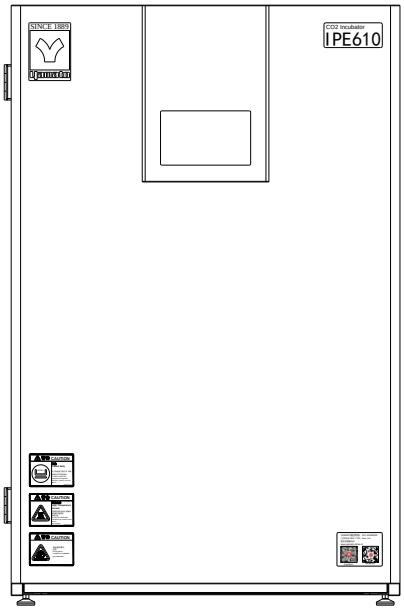
Pull out the power plug

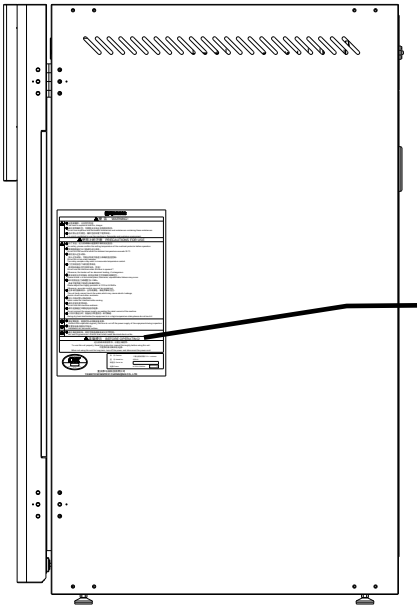
Periodical inspection

1. Safety precautions

Residual risk drawing

These drawings indicate positions of caution labels.





Product information label
1,3,7,10,15,26,27

※ Contact us if the caution labels are no more visible because nameplate is peeled off or texts are eliminated. We will send you a new nameplate. (for charge)

1. Safety precautions

Residual risk list

List of residual risks (Instructions for avoiding risks)

This list summarizes residual risks to avoid personal injuries or damages to properties during or related to the use of the product.

Be sure to fully understand or receive instructions on how to use, maintain and inspection of the product before starting operation.

	During or on carrying-in or installation			
№	Degree of risks	Details of risks	Protective measures to be implemented by the machine users	Relevant sections
1	Warning	Fire or electrical shock	1. Choose proper place for installation	Section 4.1
2	Caution	Injury	2. Use loading/unloading tools when moving and installing, and be sure to have more than 2 persons when moving by manpower.	Section 4.2
3	Caution	Injury	3. Install the equipment in a flat area.	Section 4.3
4	Caution	Injury	4. Implement safety measures when installing the equipment.	Section 4.4
5	Caution	Injury	5. Implement appropriate safety measures after installation.	Section 4.5
6	Warning	Explosion or fire	6. Never operate in a atmosphere where flammable or explosive gas is present.	Section 4.6
7	Warning	Fire or electrical shock	7. Do not operate in a place where there is liquid splashing.	Section 4.7
8	Warning	Fire or electrical shock	10. Connect the power supply to dedicated switchboard.	Section 4.10
9	Warning	Fire or electrical shock	11. Take care for handling of the power cord.	Section 4.11
10	Warning	Fire or electrical shock	12. Must connect grounding wire properly.	Section 4.12
11	Warning	Fire or electrical shock	13. Do not modify.	Section 4.13
12	Warning	Injury	14. When overlapping, be sure to use the stacking stand.	Section 4.14
13	Warning	Lack of oxygen/gas poisoning	15. Please install in a well-ventilated place.	Section 4.15
14	Warning	Lack of oxygen/gas poisoning	16. Please confirm the gas type.	Section 4.16
15	Warning	Lack of oxygen/gas poisoning	17. Please confirm CO2 gas pressure.	Section 4.17
16	Warning	Lack of oxygen/gas poisoning	18. When there is a CO2 gas leakage.	Section 4.18

Residual risk list

	During use			
№	Degree of risks	Details of risks	Protective measures to be implemented by the machine users	Relevant sections
17	Warning	Explosion or fire	2. The use of explosive and flammable substances is strictly prohibited.	Section 6.2
18	Warning	Poisoning, injury, death	3. The use of toxic substances and incubation for biosafety purpose are absolutely prohibited.	Section 6.3
19	Warning	Explosion or fire	5. Take extreme care not to exceed the heat-resistance temperature when a resin container is used.	Section 6.5
20	Warning	Fire	7. Do not place the samples on the bottom of the chamber.	Section 6.7
21	Caution	Burn or injury	8. Please use at proper temperature.	Section 6.8
22	Warning	Lack of oxygen/gas poisoning	9. Please install the silicone plugs and thread cap.	Section 6.9
23	Warning	Burn	14. Take special care when opening/closing the doors.	Section 6.14
24	Warning	Burn	15. Do not touch hot parts.	Section 6.15
25	Caution	Injury	16. Please do not sit on this equipment.	Section 6.16
26	Caution	Injury	17. Do not place any object on theequipment.	Section 6.17
27	Warning	Fire or electrical shock	18. Turn the power supply off when an abnormality occurs.	Section 6.18
28	Warning	Fire	19. When thundering, turn off the leakage protection switch.	Section 6.19
29	Warning	Fire or electrical shock	21. Please set the temperature of the independent overheat protector.	Section 6.21
30	Warning	Fire	22. Regularly inspect the ELB and independent overheat protector.	Section 6.22

	During inspection and maintenance			
№	Degree of risks	Details of risks	Protective measures to be implemented by the machine users	Relevant sections
31	Warning	Fire or electrical shock	During inspection and maintenance, be sure to unplug the power cord from the main power supply unless necessary.	Chapter 8
32	Warning	Burn	Perform this operation after the equipment returns to normal temperature.	Chapter 8
33	Warning	Fire or electrical shock	Do not disassemble the equipment.	Chapter 8

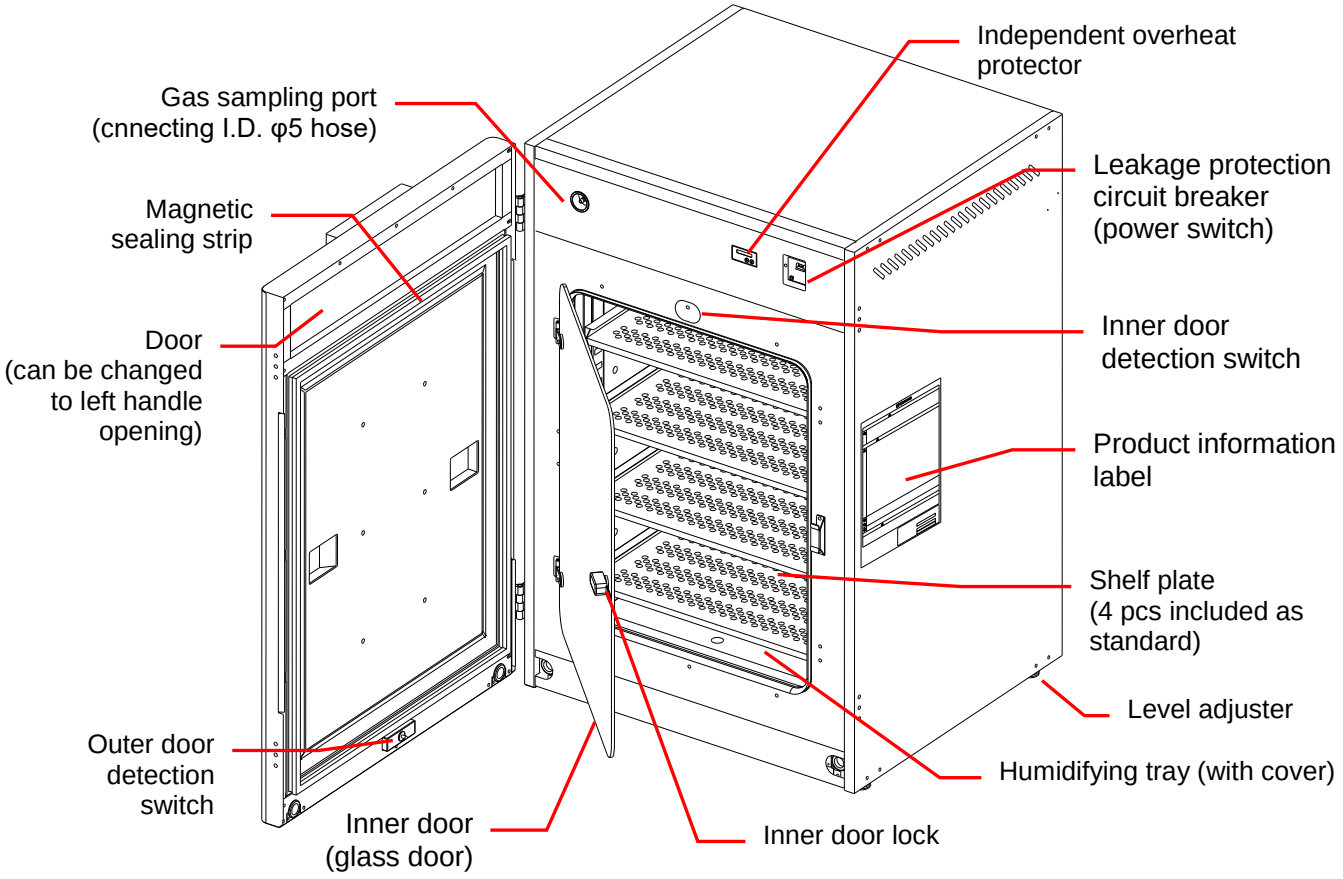
Residual risk list

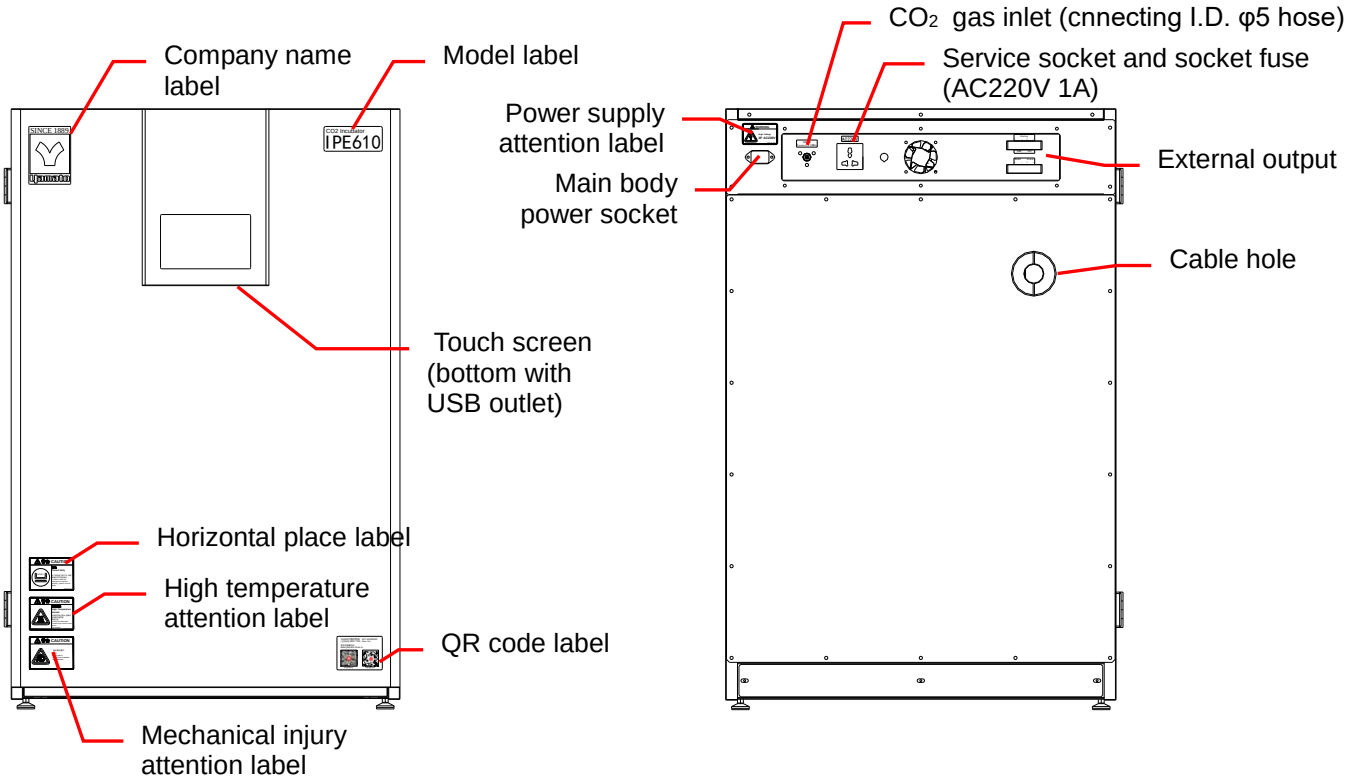
	When you are not going to use the unit for a long time or when discarding the unit			
№	Degree of risks	Details of risks	Protective measures to be implemented by the machine users	Relevant sections
34	Warning	Fire or electrical shock	Please cut off the power supply and unplug the power cord from the power supply.	Chapter 9
35	Caution	Injury, confined	Do not leave the unit where children may play around.	Chapter 9
36	Caution	Injury, confined	Please remove the handle and hinges so that the door cannot be locked.	Chapter 9

2. Names of parts and their functions

Main body

IPE610

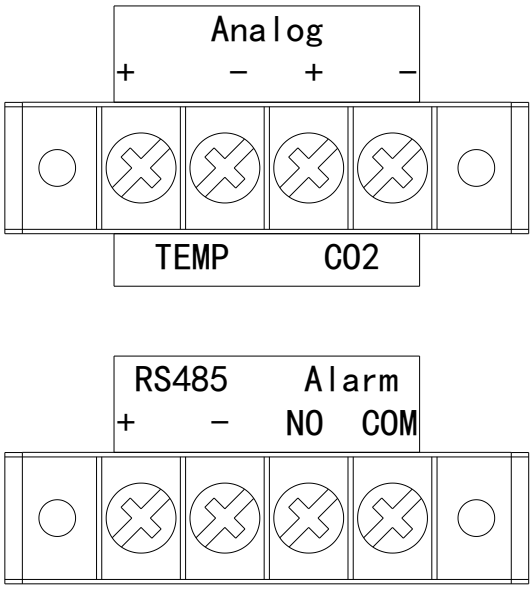




2. Names of parts and their functions

External output

Connection terminal
Connection: 4 terminal



Temperature output terminal
The function outputs the temperature displayed on the operation panel to the recorder.
＜Incubation mode＞
● 0～60℃: 4～20mA
＜Sterilization mode＞
● 0～200℃: 4～20mA

CO_2 output terminal
The function outputs the CO_2 gas concentration displayed on the operation panel to the recorder.
● 0～20％: 4～20mA

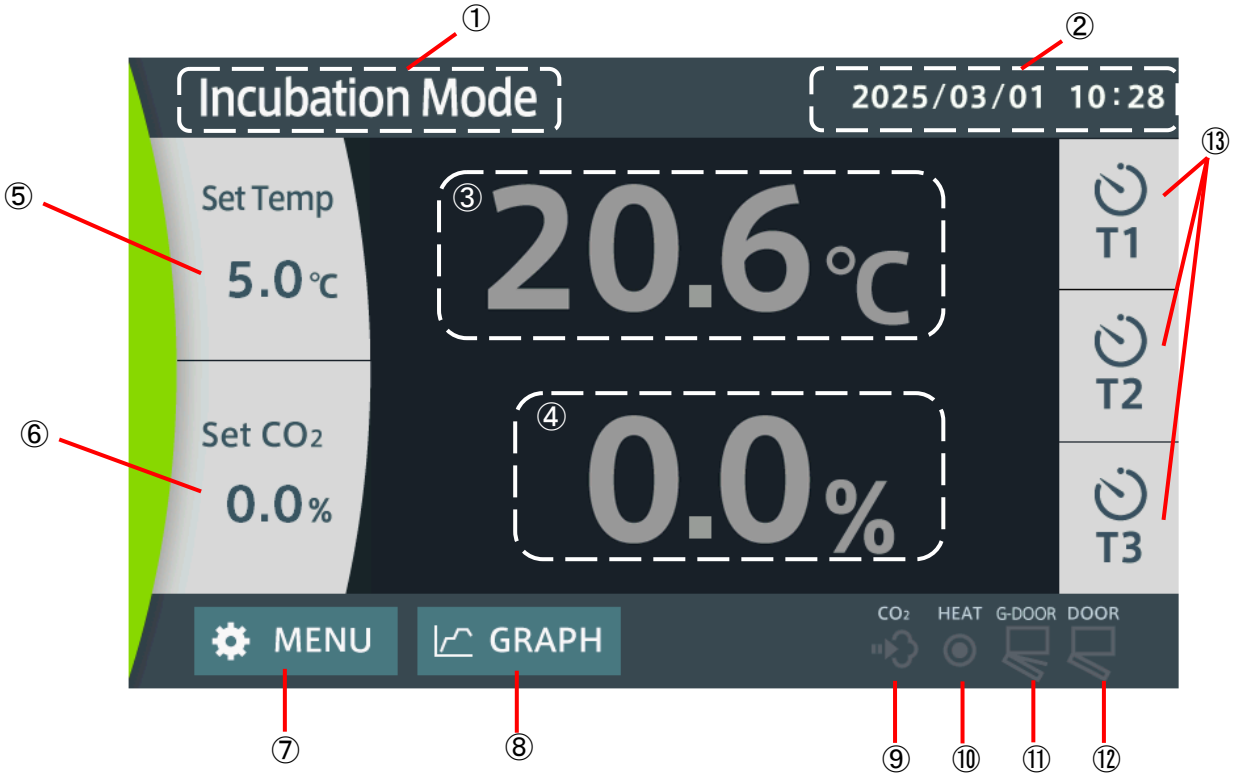
RS485 communication terminal
Connection terminals for communication.

Alarm output terminal
The function outputs the passive switching signal when any abnormalities listed on P.65～69 occurs.
●Normal: disconnected Abnormal: connected
●Contact capacity: AC240V 1A (resistance load)

2. Names of parts and their functions

Operation panel

Incubation screen

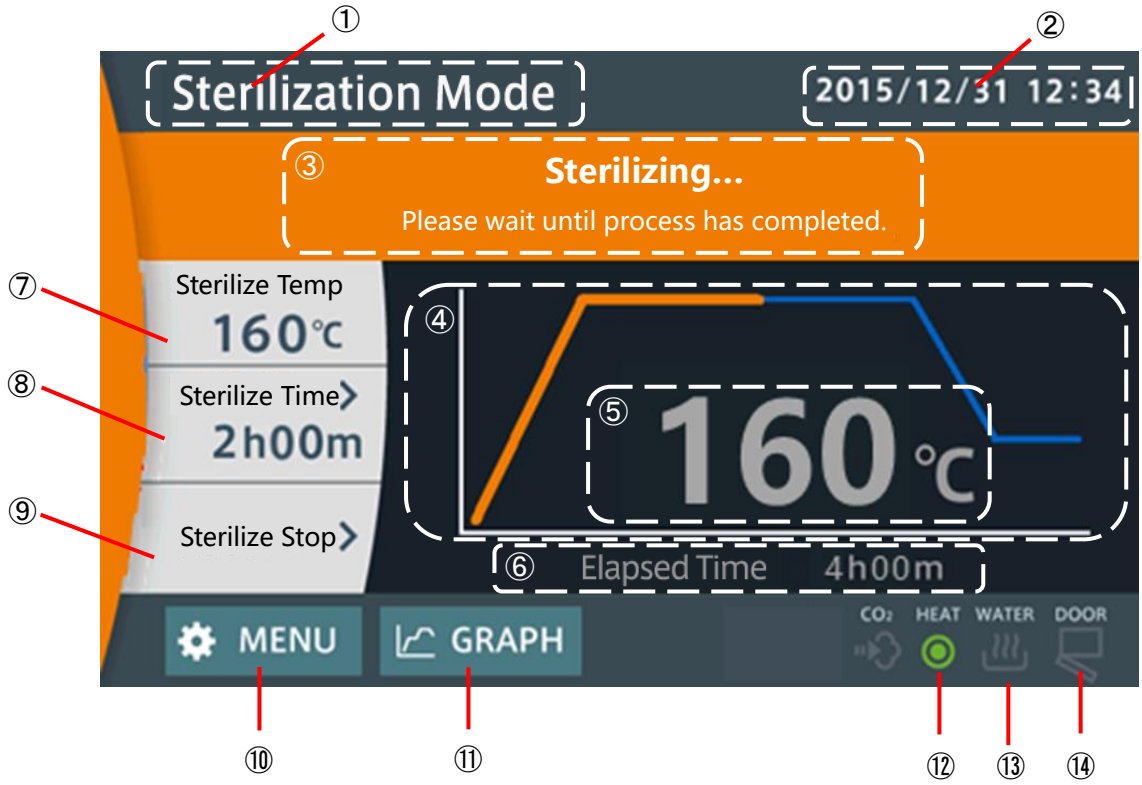


No.	Name	Operation/Action
①	Operation status display	Displays the operation status.
②	Date/Time display	Displays the present date and time.
③	Measured temperature display	Displays a measured temperature in the chamber. (Use in common with the temperature setting key)
④	Measured CO_2 concentration display	Displays a measured CO_2 concentration in the chamber. (Use in common with the CO_2 concentration setting key)
⑤	Temperature setting key	Chamber temperature setting key. (Displays the setting value)
⑥	CO_2 concentration setting key	Chamber CO_2 concentration setting key. (Displays the setting value)
⑦	Menu key	Displays the menu.
⑧	Graph key	Displays the operation history graphically.
⑨	CO_2 supply lamp	The lamp lights in “Green” while CO_2 gas is supplied.
⑩	Main heater lamp	The lamp lights in “Green” while the main heater is ON.
⑪	Inner door open lamp	The lamp lights in “Red” while the inner door is open. (Inner door is glass door)
⑫	Outer door open lamp	The lamp lights in “Red” while the outer door is open.
⑬	Timer key	Used to indicate that the set incubation time has elapsed. Enable time setting with T1～T3. Change in color to grey when not started, to green for startup and to orange for time-up. ※ These keys are not timers to stop the operation. ※ All timers stop when the sterilization mode begins.

2. Names of parts and their functions

Operation panel

Dry heat sterilization screen

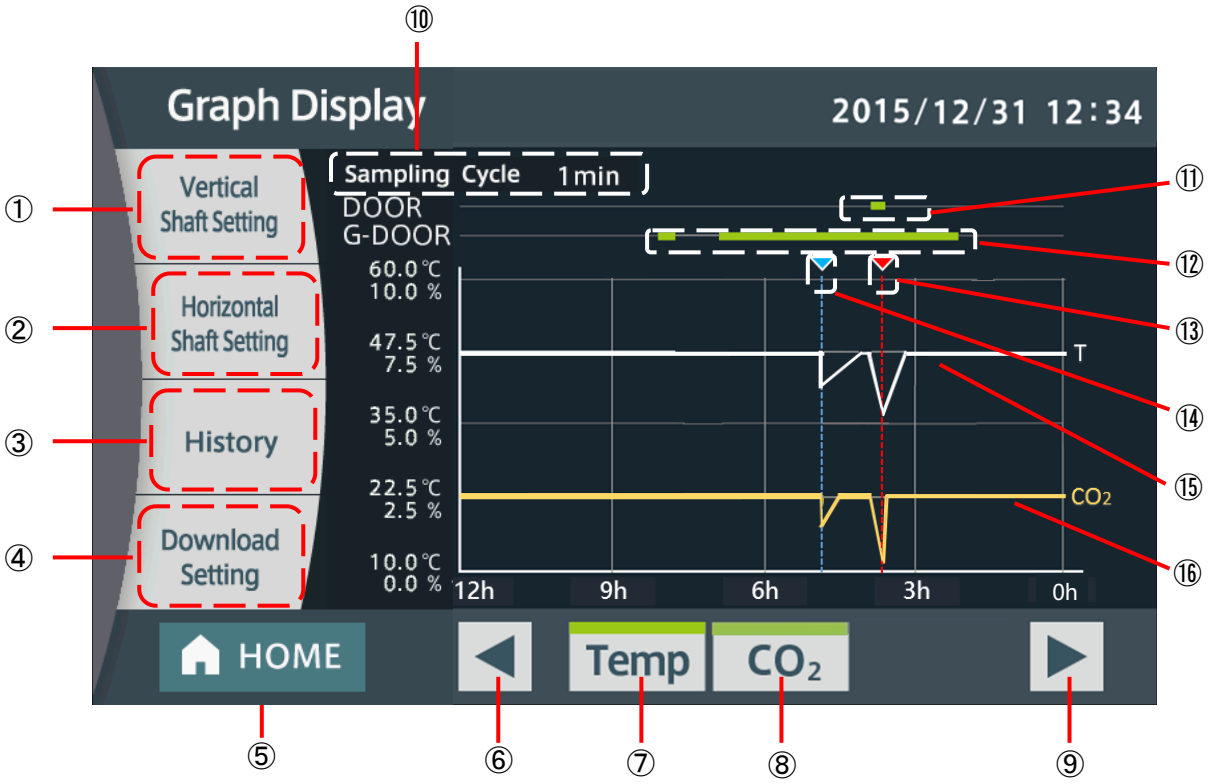


No.	Name	Operation/Action
①	Operation status display	Displays the operation status.
②	Date/Time display	Displays the present date and time.
③	Sterilization mode status display	Displays the current sterilization mode status.
④	Sterilization process display	Displays the progress status of sterilization mode.
⑤	Measured temperature display	Displays a measured temperature in the chamber.
⑥	Elapsed time display	Displays the time elapsed from start of sterilization.
⑦	Sterilization set temperature display	Displays the set sterilization temperature. (Set value 160℃ fixed)
⑧	Sterilization time setting key	Key to set the sterilization time (Set time displayed)
⑨	Sterilization canceling key	Key to cancel sterilization.
⑩	Menu key	Displays the menu.
⑪	Graph key	Displays the graph screen.
⑫	Main heater lamp	The lamp lights in “Green” while the main heater is ON.
⑬	Inner door open lamp	The lamp lights in “Red” while the inner door is open. (Inner door is glass door)
⑭	Outer door open lamp	The lamp lights in “Red” while the outer door is open.

2. Names of parts and their functions

Operation panel

Graph display screen



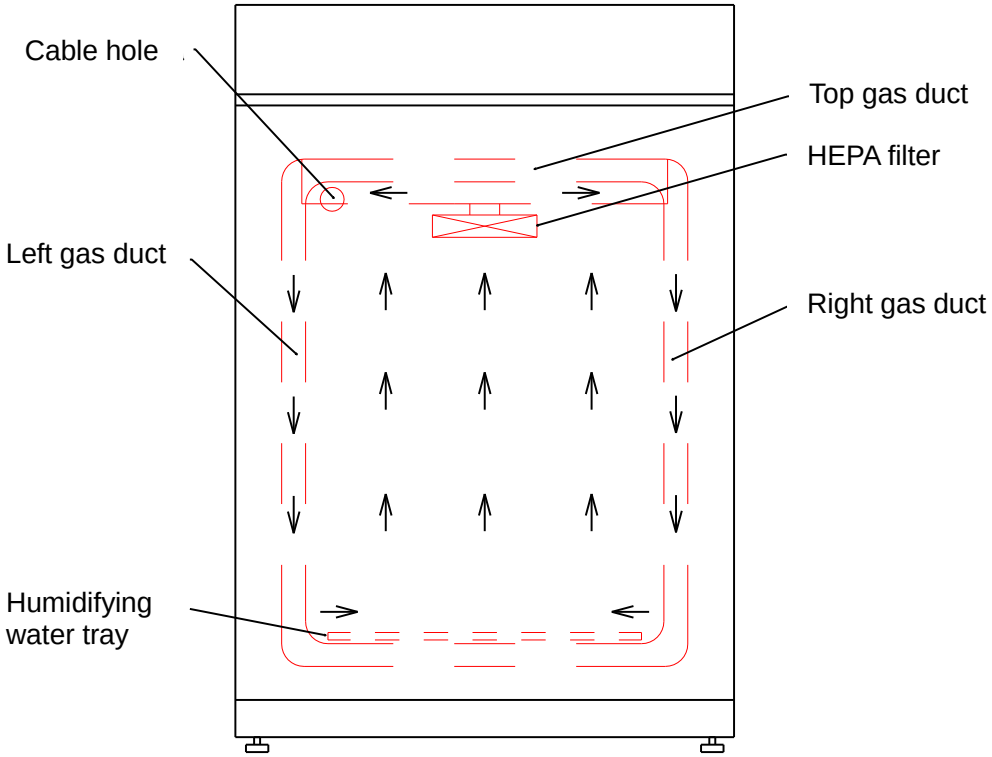
No.	Name	Operation/Action
①	Vertical shaft setting key	Displays a vertical shaft setting.
②	Horizontal shaft setting key	Displays a horizontal shaft setting
③	History key	Moves to the MENU display history page.
④	Download setting key	Displays download settings.
⑤	HOME key	Moves to the Incubation Mode screen.
⑥	Horizontal shaft left scroll key	Scrolls the Graph screen to the left by one page at a time. (Up to the last 30 days)
⑦	Temperature graph display key	Toggles ON/OFF of the temperature graph display.
⑧	CO_2 graph display key	Toggles ON/OFF of the CO_2 graph display.
⑨	Horizontal shaft right scroll key	Scrolls the Graph screen to the right by one page at a time.
⑩	Sampling cycle display	Displays a sampling cycle.
⑪	Outer door open/close display	Displays the open/close status of the outer door. Displays in “Green” while the door is open.
⑫	Inner door open/close display	Displays the open/close status of the inner door. (Inner door is glass door) Displays in “Green” while the door is open.
⑬	Abnormality/Alarm marker	Displays in “Red” when an abnormality or an alarm occurs.
⑭	Power OFF marker	Displays in “Blue” when power is shut OFF (power outage).
⑮	Temperature graph	Displays changes of the chamber temperature up to the present time.
⑯	CO_2 concentration graph	Displays changes of CO_2 concentration up to the present time.

※Graph during power OFF will not be displayed.

3. Overview of the unit

Overview and operation principle of the unit

In order to incubate cells under conditions that are as close as physiological conditions, it is necessary to keep temperature, humidity, and CO_2 gas concentration at a constant and stable status using the CO_2 incubator.
The operation principle of the product is described below.



Heating system

The CO_2 incubator IPE610 adopts an air jacket method, which offers even temperature distribution in the chamber and is less sensitive to the effects of external temperature. Control is performed by heating the chamber directly with the chamber outer wall heater. In addition, the door heater has automatic constant temperature function, so it can inhibit the condensation of water droplets in the chamber and the inner door (glass door).

Humidifying system

It is necessary to keep the humidity in the chamber to be greater than 90％rh to minimize changes in permeation pressure from vaporization of incubation liquid while preventing condensation in the chamber.
This unit carries out humidification by utilizing vaporization of water and is well able to maintain humidity of 90%rh or higher by sealing the unit and placing a humidifying water tray filled with water at the bottom in the chamber.
The structure of the natural evaporation method is simple, but pay attention to regularly add water to the humidifying water tray.

CO_2 gas concentration control method

The CO_2 gas environment aims to maintain pH value of the incubation item to a level needed for proliferation of cells. The ideal pH for incubation is 7.1～7.4 and it is necessary to supply CO_2 gas to control its concentration to maintain that pH value.
Usually the unit checks CO_2 gas concentration with the sensor in the chamber, opens the solenoid valve and supply CO_2 gas when the measured value is less than the setting value. Thus the gas concentration in the chamber is always adjusted to the specified value and the concentration will return to the setting value immediately even if the door is opened. This also consumes less CO_2 gas.
Non Dispersive Infra-Red (NDIR) system is used for setting CO_2 gas concentration in the chamber. This NDIR system is free from influences of temperature/humidity in the chamber during measurement of CO_2 gas concentration and enables the precise concentration control after the door is opened.

4. Before operation

Precautions when installing

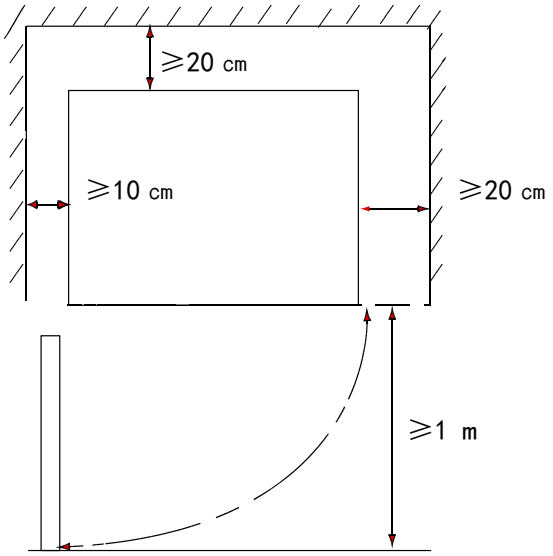
1. Choose proper place for installation

Do not install this Equipment in the place where:

- The location is rough, dirty or un-leveled.
- Flammable gas, explosive gas or corrosive gas will be generated.
- Ambient temperature will be more than 35℃ or less than 5℃.
- Difference from the set temperature is -5℃ or less
  (Example: When the set temperature is 37℃, avoid a place where the ambient temperature exceeds 32℃)
- Close to the air outlet of an air conditioner
- Ambient temperature will fluctuate.
- There is excessive humidity and dusty.
- There is direct sunlight.
- There is constant vibration.
- Outside the building.
- Power supply is instable.

Install the Equipment at the place with sufficient space as specified as below.

※ The right and left will be reversed for the left handle opening mode.



In order to prevent condensation in the chamber and the inner door, and obtain the stable control, install the equipment in a place where the ambient temperature is near normal temperature (23±5℃) and the air conditioner and fan cannot blow it.

2. Use loading/unloading tools when moving and installing, and be sure to have more than 2 persons when moving by manpower.

The weight of this equipment is about 110kg.
Use loading/unloading tools when moving and installing.
Be sure to have more than 2 persons when moving by manpower.

3. Install the equipment in a flat area.

Install the equipment in a flat area. If it is installed on rough and/or slope floor, vibration or noise will be occurred, and unexpected trouble and malfunction may occur.

4. Implement safety measures when installing the equipment.

Earthquakes or unexpected impacts may cause the unit to fall down or move and cause a personal injury. We recommend implementing safety measures such as installing the unit at a place with minimum human traffic.

5. Implement appropriate safety measures after installation.

Earthquakes or impacts may cause the unit to fall down or move and cause a personal injury. Implement appropriate measures against falling down for safety.

Precautions when installing

6. Never operate in a atmosphere where flammable or explosive gas is present.

Never operate this equipment in a atmosphere where flammable or explosive gas is present. This Equipment is not explosion-proof. Spark may be discharged by switching ON and OFF, and then it may cause fire or explosion.
Refer to P.85 “17. List of dangerous substances” for flammable and explosive gases.

7. Do not operate in a place where there is liquid splashing.

Do not operate this equipment in a place where there is liquid splashing. If the liquid enters the equipment, it may cause accident, malfunction, electric shock, fire, etc.

8. The equipment cannot be installed on the ground.

The equipment can not be installed on the ground, must be installed horizontally on the work table (surface), the height of the work table (surface) from the ground is not less than 200mm. Affected by sedimentation, bacteria, fungi and microorganisms are more likely to settle in the air near the ground, the equipment installation should be far from the ground and other dirty environment, and the installed work table (surface) should be smooth and easy to clean, to prevent the polluted air near the door getting into the inner chamber when the door is opened.

9. When connecting power cables, pay attention to the color of each core wire.

Before connecting the power cable, ensure that the protection switch on the power device is OFF.
Select a plug or terminal that meets the power capacity according to the connected power device.
(Refer to right table)

Core wire color	Indoor wiring
Black	Phase wire (live wire)
White	Neutral wire (zero wire)
Yellow green	Ground wire

10. Connect the power supply to dedicated switchboard.

Please use the appropriate switchboard and power socket meeting the power capacity.
Power capacity: Single phase 220V～50/60Hz 4.2A
(Protection switch overcurrent protection: 10A)

The operating voltage range is rated voltage ±10%, voltage range that guarantees the performance is rated voltage ±5%, the frequency is rated frequency ±1%.

※ There could be the case that the unit does not run even after turning ON the power. Inspect whether the voltage of the main power is lowered than the specified value, or whether other device(s) uses the same power line of this unit. Please take measures such as using a special power line for this unit.

Power cord · End treatment

Model	Power cord specification	Power side end treatment
IPE610	3 core 1.0mm^2 (※1)	M4 circular terminal block

※ The power cord length outside the unit is about 3m.

※1 Nominal cross-section area of the conductor.

4. Before operation

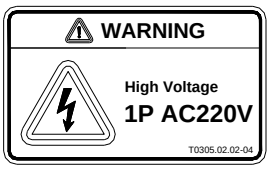
Precautions when installing

11. Take care for handling of the power cord.

·Do not entangle the power cord. This will cause overheating and possibly a fire.
·Do not bend or twist the power cord, or apply excessive tension to it. This may cause a fire and electrical shock.
·Do not connect too many wires to a multi-hole socket or extend wires using a cord reel. Otherwise, heat is generated or a fire may result. Also, the voltage may drop or temperature control performance may be degraded.
·Do not lay the power cord under a desk or chair, and do not allow it to be pinched in order to prevent it from being damaged and to avoid a fire or electrical shock.
·Keep the power cord away from any heating equipment such as a room heater. The cord's insulation may melt and cause a fire or electrical shock.
·If the power cord is damaged (core wire exposed, broken, etc.), immediately cut off the main power supply, turn off the main switch, and entrust the seller to replace the power cord. If left unchecked, it will lead to fire and electric shock accidents.
·Connect the power cord to a appropriate outlet.

12. Must connect grounding wire properly.

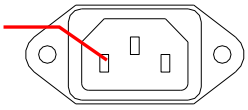
·Must connect grounding wire (green core wire of the power cord) properly to grounding line or terminal in order to avoid electrical shock due to electrical leakage.
·Do not connect the grounding wire to the gas pipe or water pipe. Otherwise, a fire may occur.
·Never connect grounding wire to telephone grounding line or to lightening conductor. Otherwise, a fire or electric shock may occur.
·Do not use the multi-hole socket because of the risk of heating.



This machine is equipped with a 10A power cord. Please insert the C13 plug on one end of the power cord into the power socket (C14) of the main body.

※ When connecting the power socket of main body, do not connect the power cord to the power supply. Ensure that the C13 plug of power cord is inserted to the bottom.

Power socket of main body (C14 socket)



Connect the power supply to the equipment. The grounding wire of the power supply must be correctly connected. The ground resistance of the grounding wire of the power supply must be 4Ω or less.

If there is no grounding wire, need to ground according to the technical standards of electrical equipment. Please ask a professional electrical installation company to carry on the installation.

13. Do not modify.

In order to avoid failure, it is absolutely prohibited for customer to modify the equipment.

14. When overlapping, be sure to use the stacking stand.

When overlapping the main body, please be sure to use the stacking stand (optional), and do not overlap if more than 2 sets.
In addition, the upper and lower sections must implement correct anti-falling countermeasures.

4. Before operation

Precautions when installing

15. Please install in a well-ventilated place.

- When CO_2 gas is used, CO_2 gas discharge will cause lack of oxygen and poisoning. Install the unit in a place with good ventilation and perform proper ventilation.
- If there are several medical CO_2 incubators in one room, the auxiliary ventilation device should also be equipped to speed up the air displacement in the environment that the medical CO_2 incubators are away from the vent.
- If the room is closed and cannot be ventilated, the CO_2 gas source must be set in another independent room, the setting of the gas source room shall be implemented according to relevant national standards, and then the pipeline shall be connected to the room where the equipment is located. The main valve must be set before the pipeline entering the room, and the room must be equipped with air circulation equipment. And set up CO_2 concentration monitoring device and alarm device in each CO_2 using point, when the CO_2 concentration of any indoor monitoring point is higher than 1000PPM, it should trigger the CO_2 concentration over-limit alarm, and give the sound and light warning.

16. Please confirm the gas type.

- When the gas is used incorrectly, it will lead to explosion and fire, or gas leakage resulting in poisoning, lack of oxygen and other accidents. When the equipment is connected to the CO_2 gas source, please make sure that the gas type is correct. The purity of the used CO_2 gas is $\geqslant$99.5% and it does not contain toxic and harmful components.
- When the equipment uses steel cylinder for gas supply, the CO_2 gas storage steel cylinder is prepared by the customer. The safe use of CO_2 gas storage steel cylinder should be carried out according to the relevant national standards.
- When the equipment uses the central gas supply, the safe use of the CO_2 central gas supply system should be carried out according to the relevant national standards.

17. Please confirm CO_2 gas pressure.

- When supplying CO_2 gas to the equipment, please choose a CO_2 gas reducing valve with stable quality, high resolution and stable pressure regulation. Please confirm that the output pressure (secondary pressure) of the reducing valve is 0.03MPa when the gas is not supplied to the equipment.
- When the pressure exceeds the specification, not only the performance of CO_2 concentration characteristics is degraded, but also lead to pipeline break, explosion, or poisoning and lack of oxygen caused by gas leakage.
- The pressure reducing valve cannot be changed after it is set.
- The CO_2 gas pressure reducing valve is not the standard configuration of the equipment, should be prepared by customer. Please choose a CO_2 gas reducing valve with stable quality, high resolution and stable pressure regulation.

18. When there is a CO_2 gas leakage.

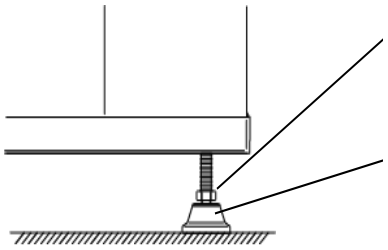
- In the process of equipment installation or use, when CO_2 gas leakage occurs, please immediately close the gas source or pipe main valve, open the doors and windows, ventilate and exhaust gas. Ask the personnel in the room to leave the room immediately! Wait for the CO_2 gas to dissipate completely before returning to the room.
- If the room is totally enclosed, the CO_2 gas leakage or CO_2 concentration over-limit alarm occur, ask the personnel in the room to leave the room immediately! Close the door! No one else is allowed in the room! And quickly close the CO_2 gas main valve outside the room! Call the security or fire department!

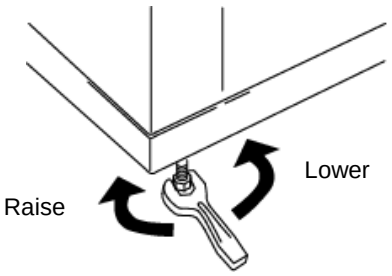
5. Installation procedures

Installation procedures

1. Level adjustment

1. Adjust the level so that the incubation container is maintained level to ensure the stable incubation environment.
2. Place a gradienter on a shelf plate in the unit and adjust the level adjuster. Adjust the height of two front adjusters and one right adjuster beforehand, and fine adjustment can be made smoothly.
3. Install the disinfected shelf plate in the chamber and place a gradienter on the plate for fine adjustment of level.
4. Please use the attached wrench to adjust the level adjuster, turn clockwise to higher and counterclockwise to lower.



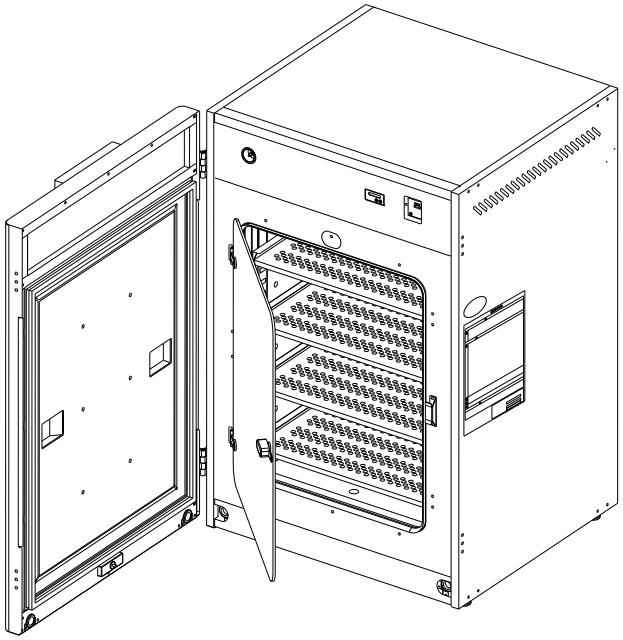


Wrench (attached)

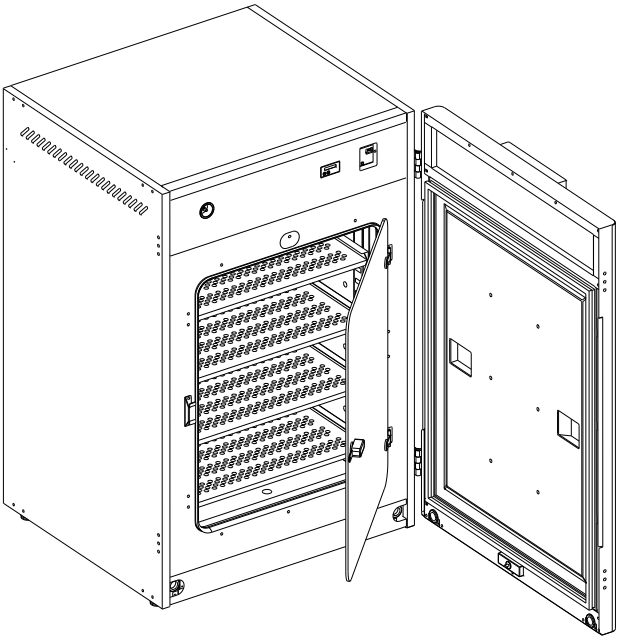
2. Change the opening hand of the door

The door of the unit can be changed between the right-opening and the left- opening depending on the use environment.
If need to change the direction of the door, please contact the sales store, our company's business office or customer service center.

Right opening (standard)

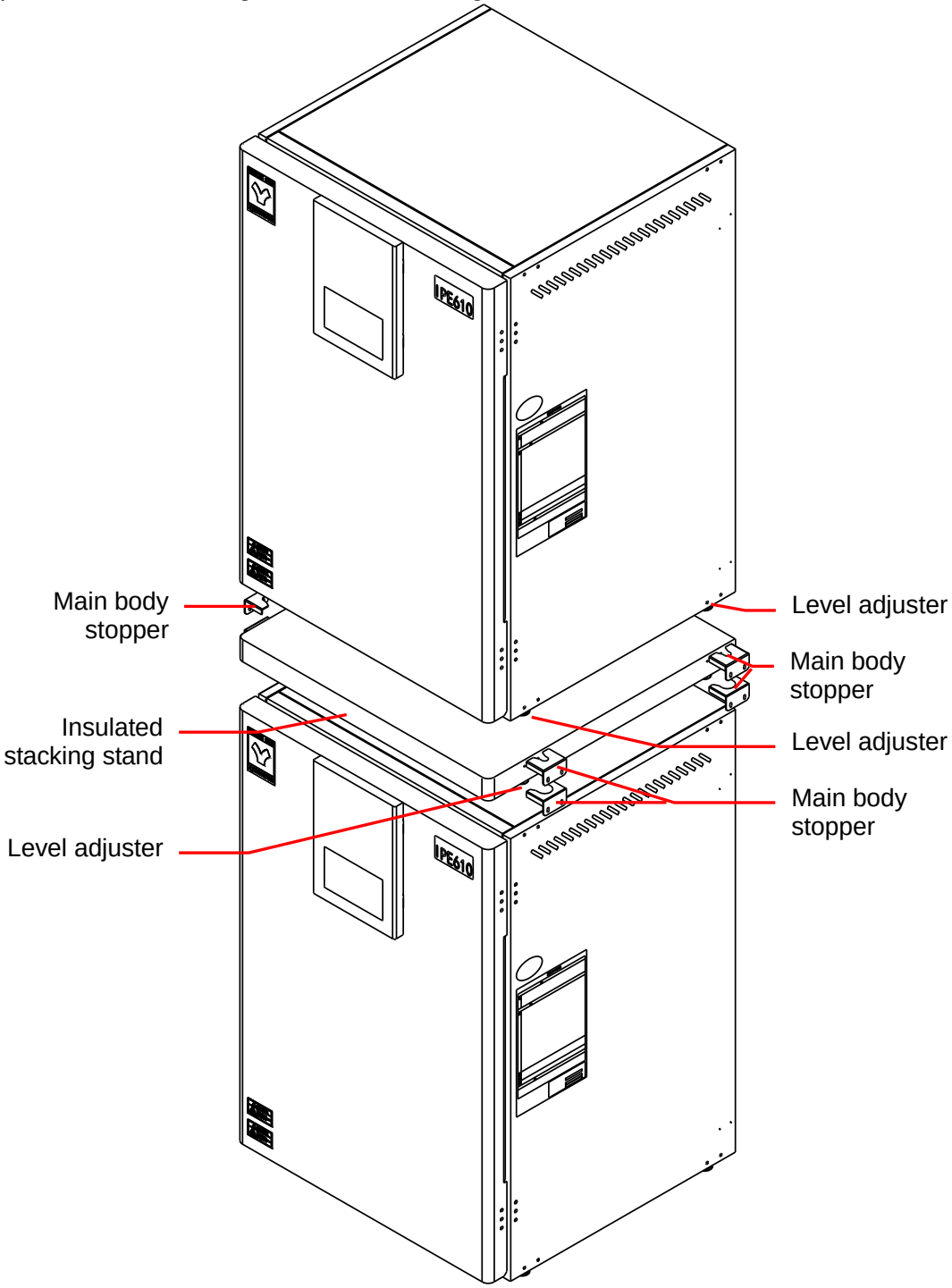


Left opening



3. Stacking the units (optional)

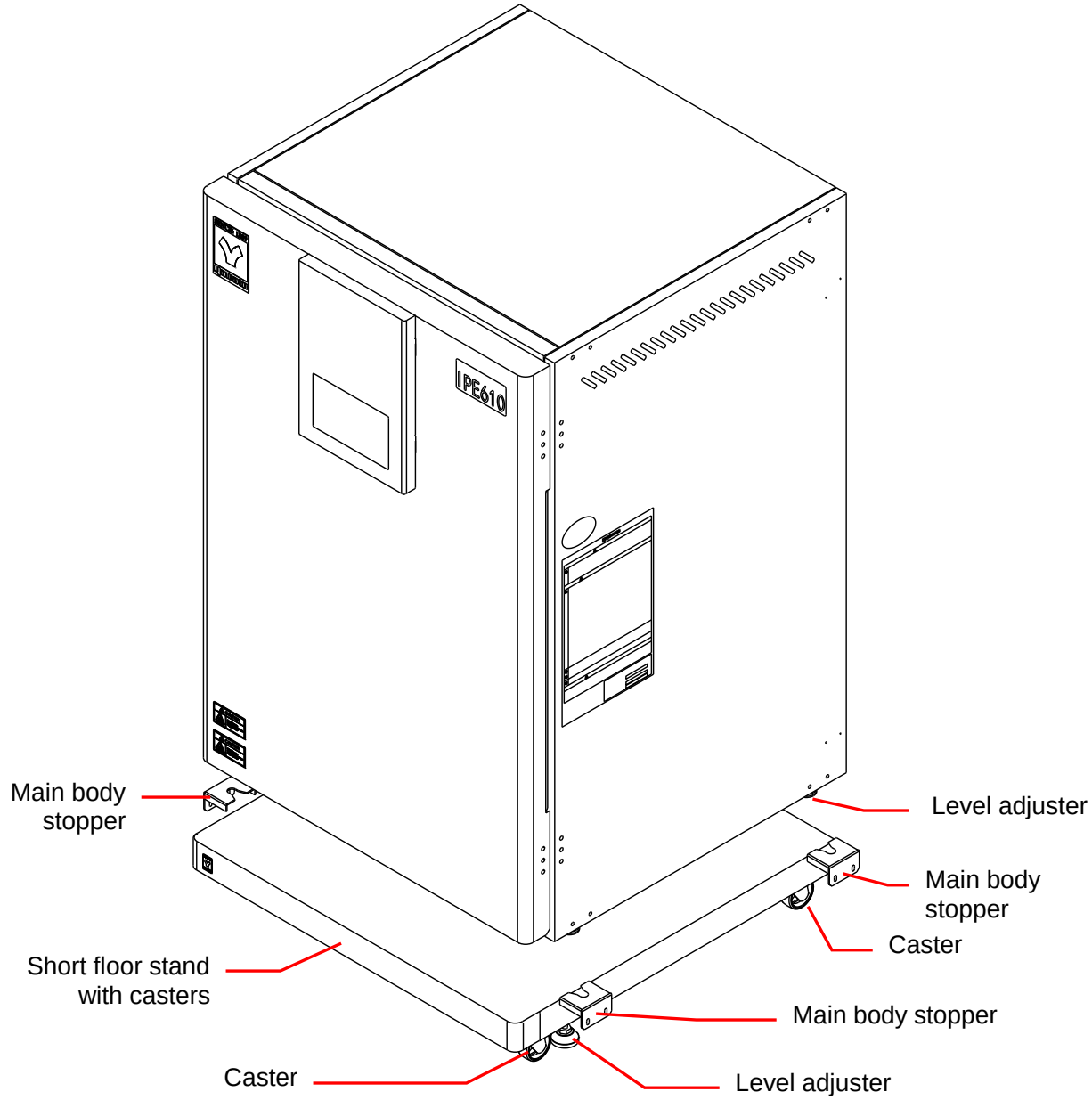
1. After installing the first equipment, please put insulated stacking stand. Refer to P.17 “1. Level adjustment” to adjust the levelness of the insulated stacking stand.
2. Please use the main body stoppers to secure the level adjuster of the insulated stacking stand.
3. Please place the second equipmrnt on the insulated stacking stand. Refer to P.17 “1. Level adjustment” to adjust the levelness of the equipment.
4. Please use the main body stoppers to secure the level adjusters of the second equipment.
5. Implement the anti-falling measures according to site conditions.



※ **When placing two layers, it is necessary to implement correct anti-falling measures on both the upper and lower layers.**

4. Installing on the short floor stand with casters (optional)

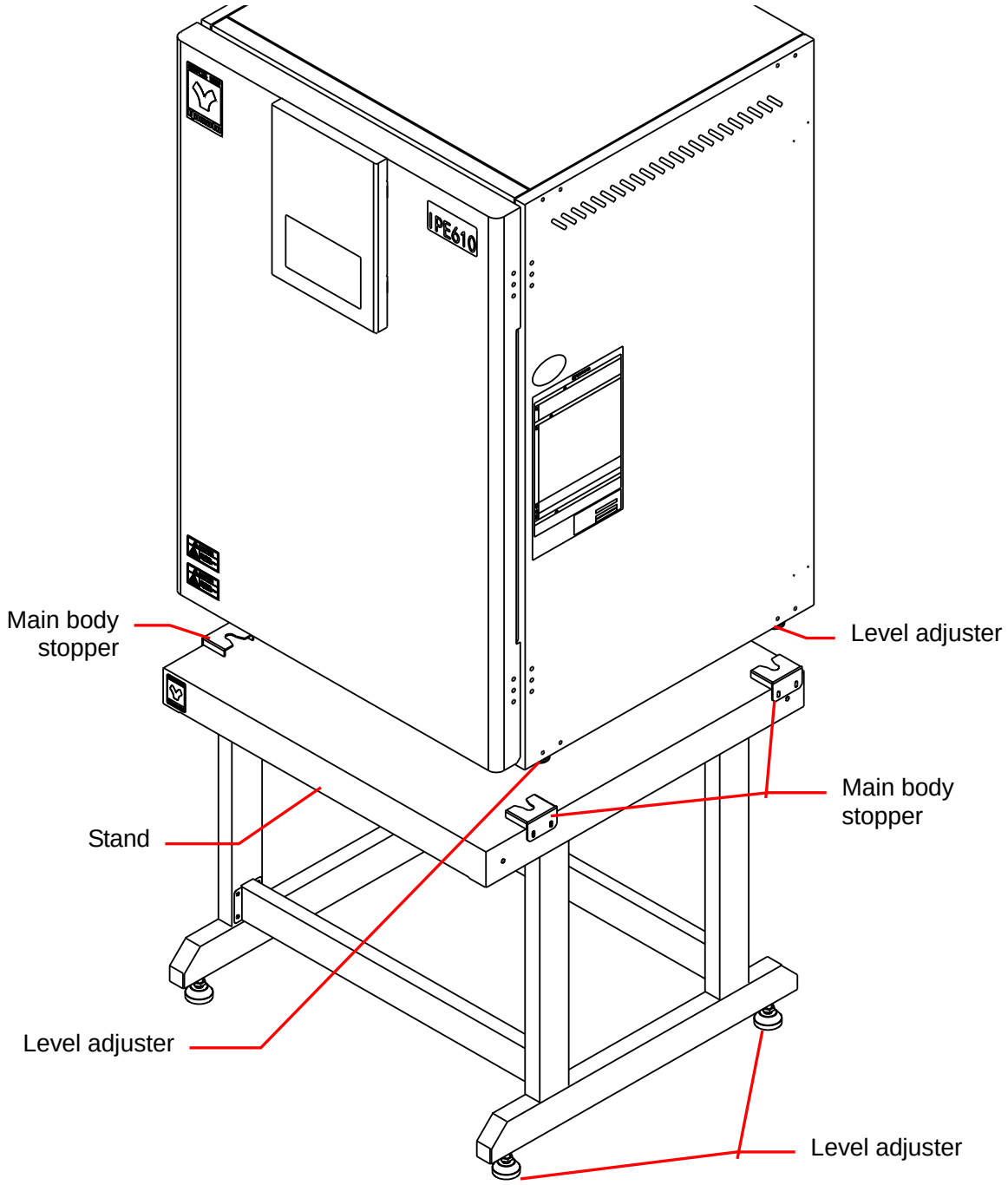
1. Place the unit on the assembled short floor stand with casters. (Refer to the operation manual for optional parts)
2. Hook the notches of the main body stoppers over the level adjusters of the unit and then secure by tightening screws on the side.
3. Refer to P.17 “1. Level adjustment” to adjust the levelness.



※ **Short floor stand allows stacking. However, when placing two layers, use a insulated stacking stand (optional), and it is necessary to implement correct anti-falling measures on both the upper and lower layers.**

5. Installing on the stand (optional)

1. Place the unit on the assembled stand. (Refer to the operation manual for optional parts)
2. Hook the notches of the main body stoppers over the level adjusters of the unit and then secure by tightening screws on the side.
3. Refer to P.17 “1. Level adjustment” to adjust the levelness.



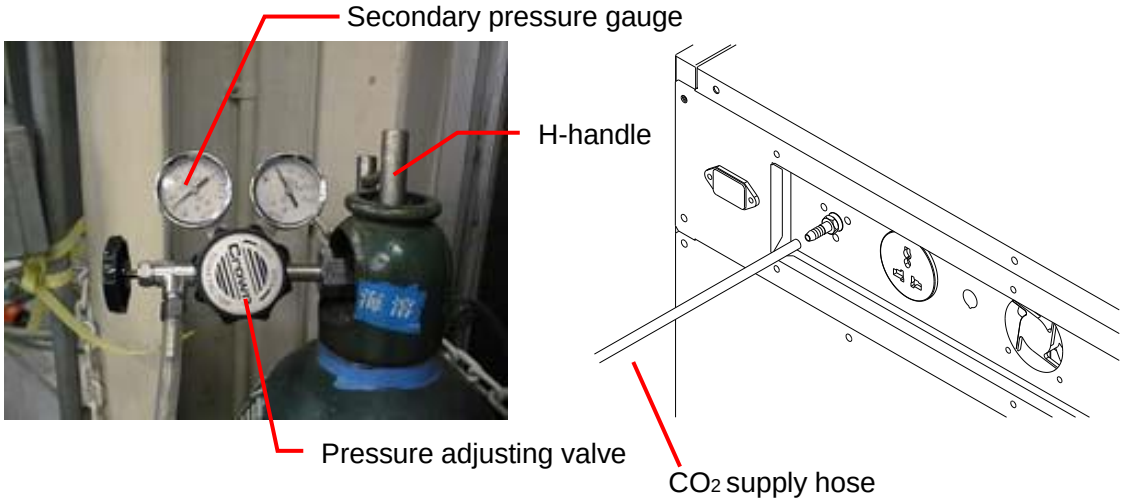
※ Note that 2-layer stacking is not allowed when using this stand.

6. Connecting the CO_2 supply hose

1. The purity of the used CO_2 gas source is ⩾99.5% and it does not contain toxic and harmful components. Do not use other gas sources.
2. Open/close the green CO_2 gas cylinder valve instantaneously through the H handle, and remove the dusts attached to the regulator connection part.
3. Check the sealing strip of the regulator at the dust-removed CO_2 gas cylinder connection part, and install the pressure reducing valve using a wrench (adjustable wrench) (see photo). (The primary pressure of an unused CO_2 gas cylinder is about 5.9±0.5MPa). Here take the steel cylinder gas supply as an example, when using the CO_2 central gas supply system, still need to install the pressure reducing valve.

   ※ Please choose a CO_2 gas reducing valve with stable quality, high resolution and stable pressure regulation.

   ※ When using the steel cylinder for gas supply, the CO_2 gas storage steel cylinder is prepared by the customer. The relevant usage specifications should be carried out according to the relevant national standards.
4. Connect the attached CO_2 supply hose to the regulator and the CO_2 supply port of the main unit. If the CO_2 supply hose is long, cut it to an appropriate length.
5. Secure the CO_2 supply hose with the attached hose clamp.
6. Check for gas leakage at the hose connection by following the steps below.
   A) Turn the pressure adjusting valve fully to the left and close it to prevent damages to the regulator.
   B) Turn the flow adjusting valve fully to the left to open the valve.
   C) Open the valve of gas cylinder by about 1/2 through the H-handle and inject the gas. Slowly turn the pressure adjusting valve clockwise to raise pressure and when the secondary pressure reaches in the range of 0.02～0.03MPa, apply some soapy water to the hose connection and check if there is gas leakage.
7. Use a pressure adjusting valve whose specified secondary pressure range is 0～0.2MPa.



※ The CO_2 reducing valve is optional.

5. Installation procedures

Preparation before use

1. Sterilization before use/periodic sterilization

Before installing the parts into the chamber, the inner surface of the chamber and all parts need to be sterilized. When the contamination is not severe, it is generally sterilized in the following procedures.

(1) Sterilization (when operating dry heat sterilization)

1. Please refer to “2. Cleaning and Drying” on P.61 “Daily inspection/maintenance” to clean and dry the inner chamber and parts.
2. Operate the dry heat sterilization. Refer to P.40 “Dry heat sterilization”.

⚠ Caution: If operate the dry heat sterilization with leaving contaminants in the chamber or on the door, such contaminants may firmly adhered and may not be removed. Be sure to carry out cleaning before starting the dry heat sterilization.

⚠ Caution: When the humidifying tray is left with water or the chamber is left with samples, it is absolutely prohibited to operate the dry heat sterilization. It will lead to sample damage, equipment failure and so on.

(2) Disinfection (when not operating dry heat sterilization)

1. Please refer to “2. Cleaning and Drying” on P.61 “Daily inspection/maintenance” to clean the inner chamber and parts, no need to dry.
2. Then wipe each part with 75% medical disinfection alcohol or carry on spray treatment twice, each time for 3 minutes.

⚠ Caution: The filter paper of the HEPA filter should not be stained with any liquid, otherwise it will damage the HEPA filter.

3. After disinfection, wipe the metal and glass surfaces of parts with new sterilized gauzes, reverse the disassembly procedures, and install all the parts of the inner chamber.

Please follow the table below to check whether each part has been disinfected. When installing parts after disinfection, please also disinfect hands.
Refer to P.23-28 "2. Disassembly method of chamber parts-6. Installation of shelf plate" for disassembly and installation methods of chamber parts.

Items to check	Check mark	Items to check	Check mark
All the walls of the chamber (side, back, bottom, top)		Fan blade	
Glass door (two sides)		Motor shaft	
Sealing strips of glass door and outer door		Left and right blanking plates, hanging strip	
Baffle glass, top gas duct		Humidifying water tray (with cover)	
Cable hole silicone plug, gas sampling port threaded cap		Shelf rest fittings and shelf plates	
Temperature sensor		CO_2 gas supply port nozzle	

※Refer to P.7 Internal chamber diagram

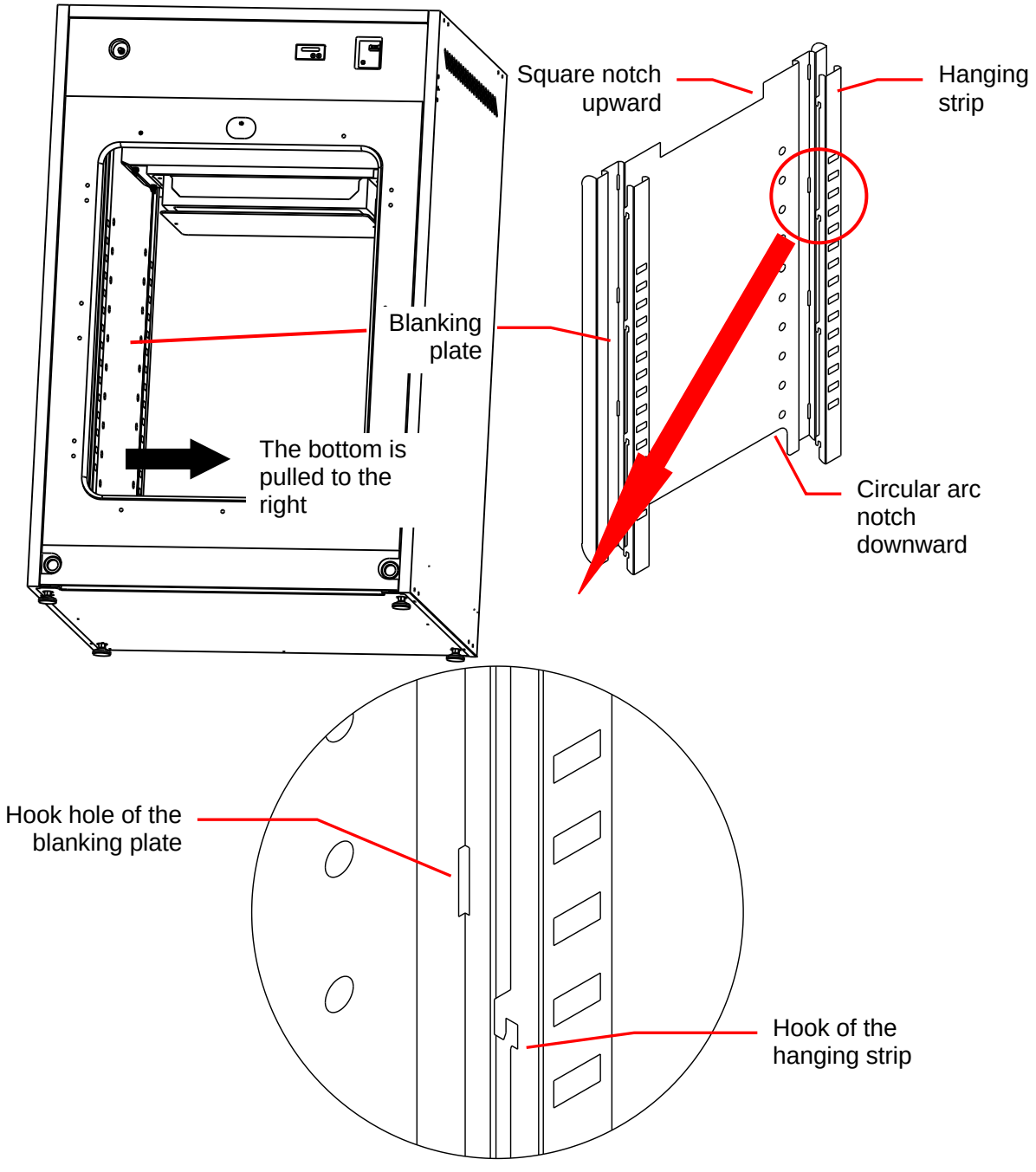
⚠ Caution:
When cleaning, drying, and disinfecting, be sure to cut off the power supply of the unit. After operation, wait until the chamber is fully dry before next operation.

5. Installation procedures

Preparation before use

2. Disassembly method of chamber parts

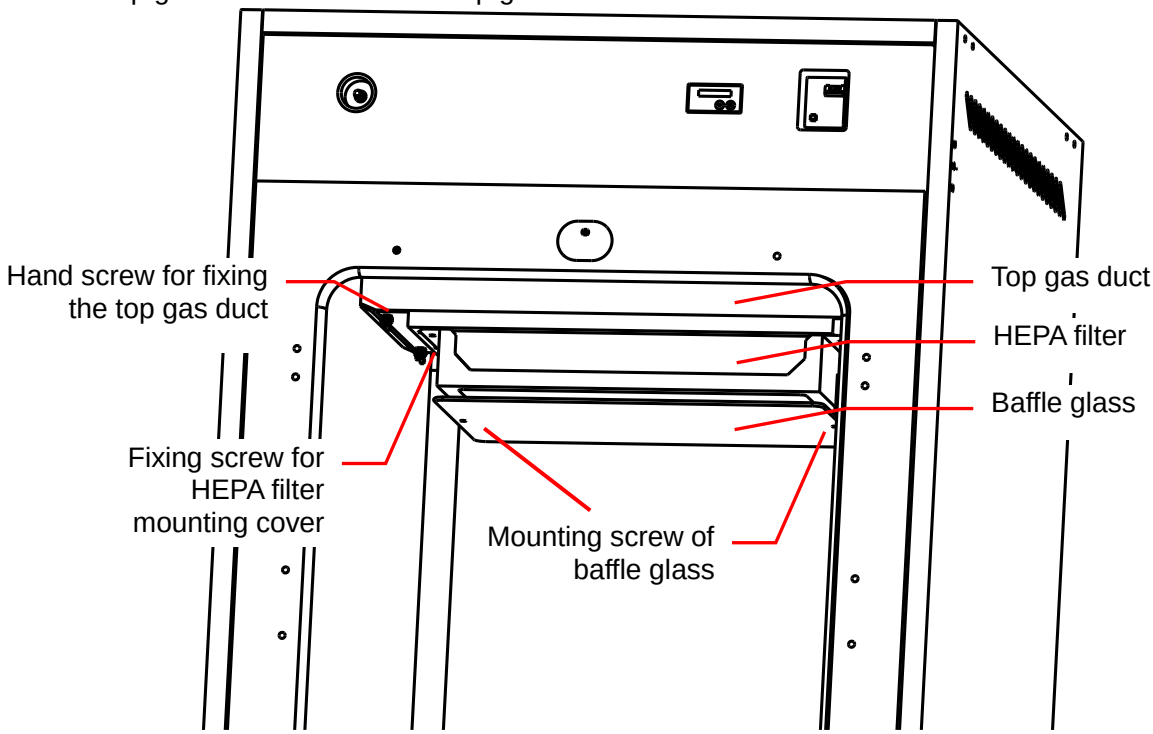
1. Open the outer door and inner door.
2. Take out the shelf palte in the chamber, and then take out the shelf rest fittings. Remove the humidifying water tray and its cover.
3. Since the left and right blanking plates are symmetrical and easy to disassemble structures, when need to remove the left blanking plate, the top of the left blanking plate is kept to the left, the bottom is pulled to the right, and then it can be removed from the door after tilting. Also, when need to remove the right blanking plate, the top of the right blanking plate is kept to the right, the bottom is pulled to the left, and then it can be removed from the door after tilting.
4. Push the hanging strip on the blanking plate upward to take out the hanging strip. During installation, place the hooks of the hanging strip into the hook holes of the blanking plate, and then press the hanging strip downward to complete the installation.



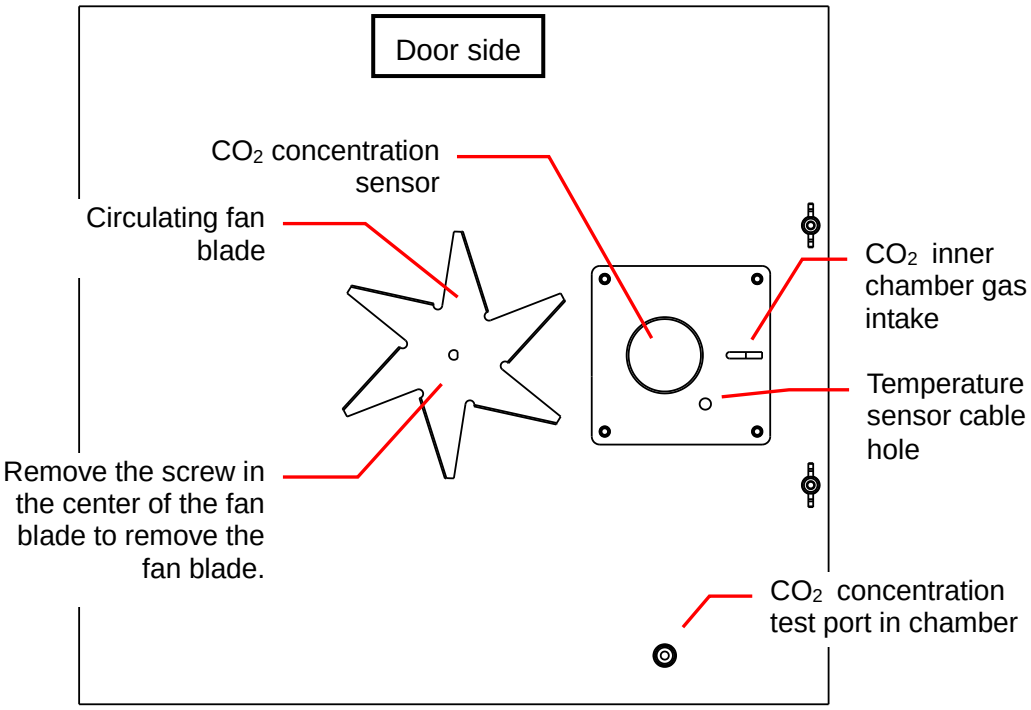
5. Installation procedures

Preparation before use

5. Remove the 2 mounting screws (1 on the left and 1 on the right) of the baffle glass to take out the baffle glass.
6. Remove the 6 mounting screws of the HEPA filter mounting cover (3 on the left and 3 on the right) to take out the HEPA filter.
7. After removing the temperature sensor, remove the 4 screws (2 on the left and 2 on the right) of the top gas duct to take out the top gas duct.



8. After the gas duct is disassembled, the distribution of top components is shown in the figure below.



3. The use of cable hole

1) When using the cable hole

When leading the sensor wire or pipe into the chamber, plug the hole with silicone plugs from outside and inside of the chamber to ensure that there is no gap.

When the sensor wire or pipe is thick, make a cut in the plugs with knife and put the wire or the pipe in the cut.

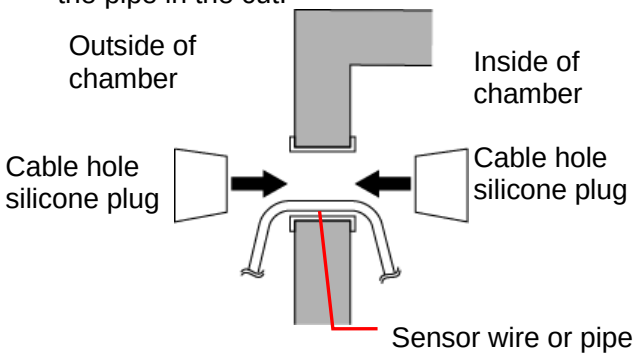


Figure 15. Installation diagram when using the cable hole

1) When not using the cable hole

When not using the cable hole, fully plug the hole from outside and inside with silicone plugs

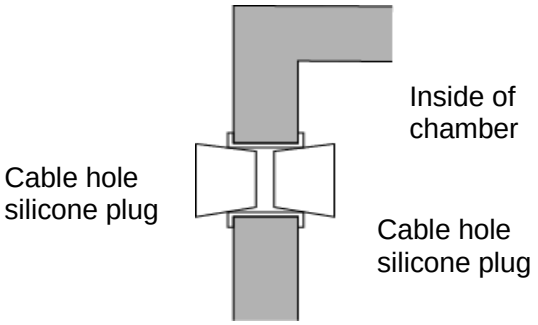


Figure 16. Installation diagram when not using the cable hole

⚠ Caution: If the cable hole silicone plug is loose and cannot seal the hole, it will lead to CO_2 gas leakage, increased CO_2 consumption, condensation, temperature instability in the chamber, external air pollution, etc. Make sure the silicone plug is tight.

⚠ **Warning: CO_2 leakage will lead to an increase in environmental CO_2 concentration, and high CO_2 concentration will cause harm to the human health, even suffocation or death.**

⚠ Warning: Do not open the cable hole. When the cable hole silicone plug is damaged and cannot seal, it is forbidden to use the incubator. Please purchase the same parts from our company or our designated service provider for replacement.

4. The use of gas sampling port

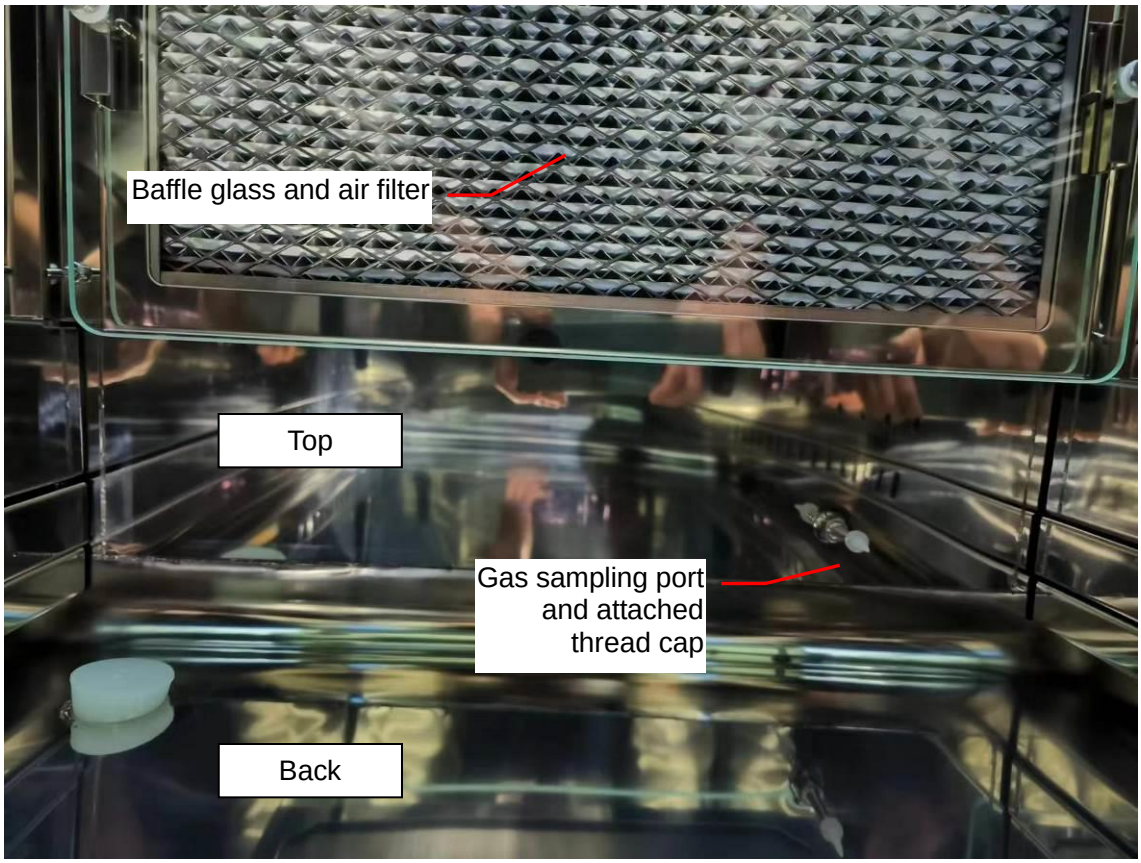
1) When using the gas sampling port

During gas sampling and checking, use the pump type CO_2 concentration checking instrument, and connect the suction inlet of pump to the gas sampling port.

Connect one end of the attached test hose to the sampling port at the top of the chamber, and set the other end at the geometric center of the chamber.

2) When not using the gas sampling port

When not using the gas sampling port, please plug it with the attached thread cap to make it airtight.



Thread cap mounting diagram when not using the gas sampling port (top view)

⚠ Caution: If the gas sampling port thread cap is loose and cannot seal the port, it will lead to CO_2 gas leakage, increased CO_2 consumption, condensation, temperature instability in the chamber, external air pollution, etc. Make sure the thread cap is tight.

⚠ **Warning: CO_2 leakage will lead to an increase in environmental CO_2 concentration, and high CO_2 concentration will cause harm to the human health, even suffocation or death.**

⚠ Warning: Do not open the gas sampling port. When the gas sampling port thread cap is damaged and cannot seal, it is forbidden to use the incubator. Please purchase the same parts from our company or our designated service provider for replacement.

5. Installation procedures

Preparation before use

5. Installation and pouring of humidifying water tray

When running the incubation, be sure to pour the humidifying water tray with sterile water. The water evaporates naturally to maintain the humidity required for incubation. Please note that there must be a certain amount of water in the humidifying water tray.

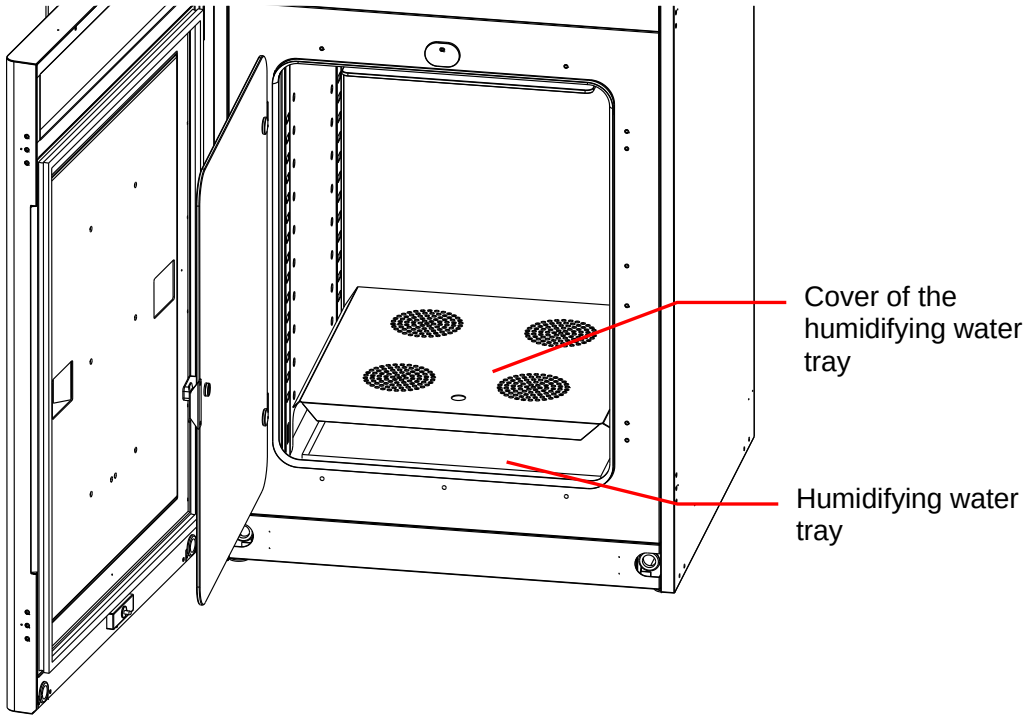
⚠ Warning: Absolutely prohibit to use tap water, due to the influence of chloride ions, it will cause rust in the inner chamber.

⚠ Caution: Do not use other water, the bacteria in the water will multiply in the incubator and pollute the environment in the incubator.

1) Place the attached humidifying water tray on the bottom of the inner chamber. The humidifying water tray must be located in the middle of the bottom.

2) Pour the sterile water into the humidifying water tray. Visually estimate the water amount is poured to 1/2. (Approx. 2L)

3) Close the cover of the humidifying water tray. It must cover the humidifying water tray completely.



⚠ Caution: During water pouring, when the water falls outside the humidifying water tray, wipe it with degreasing cotton gauze.

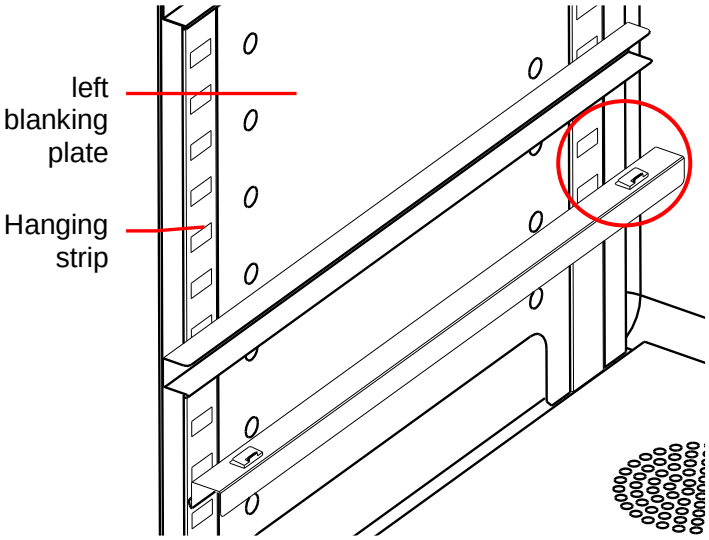
⚠ Caution: In order to maintain the stable operation of the incubator and maintain the hygiene in the chamber, replenish the water in the humidifying water tray once every week, and replace the water in the humidifying water tray once every two weeks.

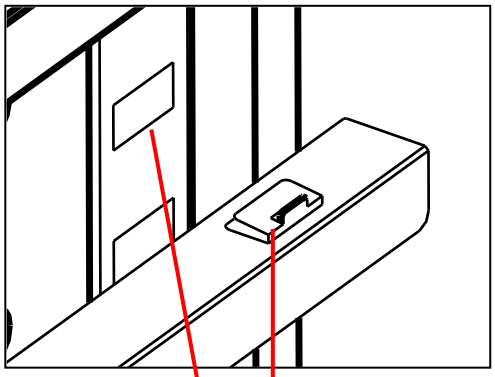
5. Installation procedures

Preparation before use

6. Installation of shelf plate

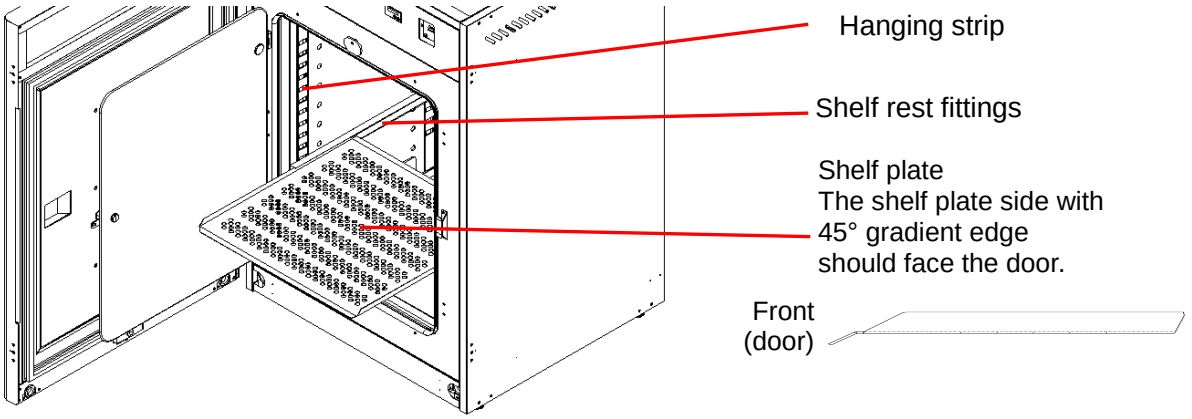
Please install the shelf rest fittings to the hanging strips of the left and right blanking plates in the chamber.



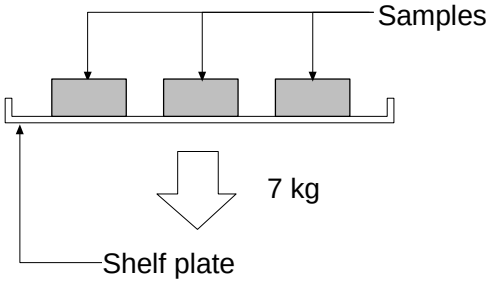


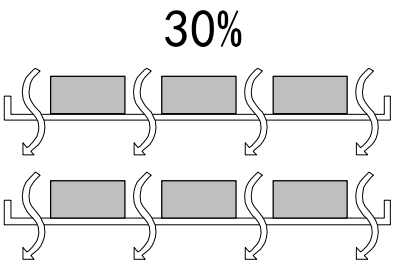
Insert the hooks of the shelf rest fittings into the mounting holes of the hanging strip

Please install the shelf plate to the shelf rest fittings in the chamber. The shelf plate side with 45° gradient edge should face the operator, and then put into the chamber. The shelf plate side with 45° gradient edge cannot be pushed into the shelf rest fittings, otherwise the shelf plate will tilt.



The standard shelf bearing capacity is evenly distributed 7kg. Please place the samples dispersedly. If put too many samples, normal temperature control will not be possible. In order to ensure the temperature accuracy, please leave more than 30% of the shelf space for placing the samples.





6. Handling precautions

Warning and caution

1. Unauthorized personnel are strictly prohibited from operating the equipment.

Unauthorized personnel are strictly prohibited from operating the equipment.
All the operators of the equipemnt can operate this equipment only after receiving regular training on equipment operation and maintenance and obtaining operation qualification certificate. The training content must include the emergency procedures for the release of toxic, hazardous, flammable, explosive or pathogenic substances into the environment. After the training is completed, keep training records and proofs of understanding the training content.

2. The use of explosive and flammable substances is strictly prohibited.

It is absolutely prohibited to use explosive and flammable substances, and articles containing these substances in the equipment. It may lead to explosion or fire. Refer to P.85 “17. List of dangerous substances”.

3. The use of toxic substances and incubation for biosafety purpose are absolutely prohibited.

It is absolutely prohibited to use toxic samples or samples that will produce toxic gases in the equipment. It may lead to accidents.
This product is not designed for biosafety purpose. The incubation for biosafety purpose is absolutely prohibited.

4. Do not use corrosive samples.

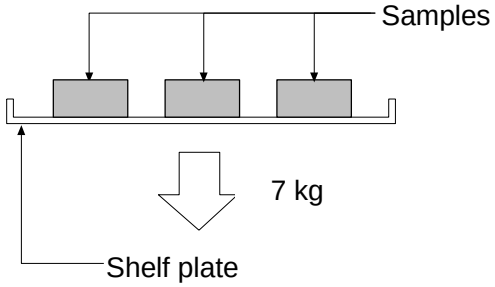
Although the inner chamber is made of stainless steel, it will be corroded by strong acid and son on. In addition, the sealing strip is silicone rubber and PVC rubber, will be corroded by acid, alkali, oil, halogen element solvent.

5. Take extreme care not to exceed the heat-resistance temperature when a resin container is used.

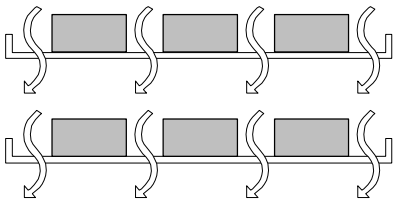
First confirm the heat-resistance temperature before using a resin container. Using such a container beyond its heat-resistance temperature will melt resin and a fire or an explosion may result.

6. Pay special attention to the placement of the samples.

The standard shelf bearing capacity is evenly distributed 7kg. Please place the samples dispersedly.



If put too many samples, normal temperature control will not be possible. In order to ensure the temperature accuracy, please leave more than 30% of the shelf space for placing the samples.



6. Handling precautions

Warning and caution

7. Do not place the samples on the bottom of the chamber.

When using this equipment, if the samples are directly placed on the bottom of the inner chamber, it will cause unstable temperature, no temperature rise and son on, and the performance of the equipment can not be achieved. Therefore, it is absolutely prohibited to place the samples on the bottom surface. Please place the samples on the attached shelf plate and install the shelf plate on the shelf rest fittings in the chamber. Also, do not contact the chamber wall directly.

8. Please use at proper temperature.

- Temperature control range is RT +5℃～60℃.
- Never use the equipment at a temperature outside the temperature control range. Using outside the operating temperature range may lead to a malfunction or an accident.
- In order to prevent condensation in the chamber and the inner door and obtain a stable control, when installing the equipment, try to choose a place where the surrounding temperature is near the normal temperature (23±5℃) and the equipment is not exposed to the wind from the air conditioning system.

9. Please install the silicone plugs and thread cap.

Make sure to well install the silicone plugs at the cable hole. Make sure to well install the thread cap at the gas sampling port in the chamber. Otherwise, it will lead to CO_2 gas leakage, condensation and external air pollution. **CO_2 leakage will lead to an increase in environmental CO_2 concentration, and high CO_2 concentration will cause harm to the human health, even suffocation or death.** Refer to P.25 “3. The use of cable hole”.

10. Keep incubating containers clean.

Keep containers or shelf plates putting in or taking out the equipment clean to prevent proliferation of bacteria.

11. Replace the humidifying water periodically.

Replace the humidifying water at least every two weeks. It is recommended to prepare the humidifying water by adding chemical like preservative into distilled or sterilized water to prevent water contamination.

12. Take care for possible degradation of performance when using the cable hole.

When inserting the inspecting sensor or probe into the cable hole, close the cover of cable hole as far as possible and seal it with heat-resistant sealing materials so that there is no gap. If sealing is insufficient, the temperature characteristics, CO_2 concentration characteristics, etc. will be reduced.

13. Be sure to close the inner door.

Be sure to close the inner door before closing the outer door. Note that sufficient performance will not be assured even if the outer door is closed unless the inner door is completely closed.

14. Take special care when opening/closing the doors.

Do not put your hands or face closer to the operating range (space) of the door when opening or closing it. The door may hit your hands or face, and may result in burn or personal injury.

15. Do not touch hot parts.

During operation and immediately after operation, some parts of the equipment (back plate of outer door, inner door surroundings) will be in a high temperature state, be careful of burns.

6. Handling precautions

Warning and caution

16. Please do not sit on this equipment.

Please do not sit on this equipment. Collapse, damage may lead to injuries and other accidents.

17. Do not place any object on theequipment.

Do not place any object on the equipment. It may fall and cause a personal injury.

18. Turn the power supply off when an abnormality occurs.

In case of unexplained smoke, odor, etc., please immediately cut off the mian body power supply, and then turn off the main power supply, and entrust the sales store or our company's business office, customer service center for spot inspection. If left unchecked, it may lead to fire or electric shock accidents. Customer repairing is very dangerous, which is absolutely prohibited.

19. When thundering, turn off the leakage protection switch.

When thundering, cut off the main body power supply and turn off the main power supply immediately. If left unchecked, lightning strikes may lead to fire or other accidents.

20. About recovery from power outage

The equipment stopped during operation because of a power failure or other causes, when power recovers, the equipment will automatically return to the state before the failure and resume operation. If the automatic recovery is malfunctioning, cut off the power supply.

21. Please set the temperature of the independent overheat protector.

For safety, be sure to set the independent overheat protector. In addition, the temperature setting of the independent overheat protector is more than +10°C higher than set value of the temperature regulator.
For operating procedures and other precautions, refer to P.32 “Independent overheat protector”.

22. Regularly inspect the ELB and independent overheat protector.

ELB and independent overheat protector are very important safety devices. Be sure to check regularly.
For inspection procedures, refer to P.62 “Inspect the ON and OFF functions of Earth Leakage Breaker (ELB).” and “Check the activation of independent overheat protector.”.

23. Be sure to read the instruction manual before using this equipment.

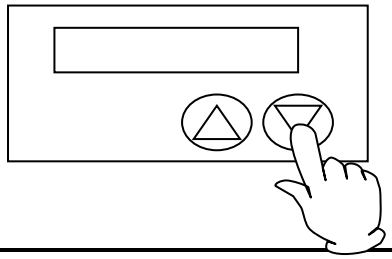
Please read the instruction manual of the equipment before using.

7. Operating method

Setting of independent overheat protector

Temperature setting of independent overheat protector

※ Set temperature with ▼▲ keys on its panel.



Independent overheat protector

The safety device in order to prevent temperature overheat, besides the automatic overheat protection function of the controller (automatic reset), there is also independent overheat protector (manual reset) which has a different circuit with the controller, composed of other sensors, dual safety countermeasures.

- Temperature setting range and function

Temperature setting range: 0～180℃

Input method: Press the ▼▲ keys to set to the desired value

Function: The heater output breaks off when a measured temperature exceeds the set temperature of the independent overheat protector. This function is enabled while the ELB is ON. When the independent overheat protector activates, the temperature displayer displays “Independent overheat protector error” and the buzzer sounds.

- Operating method

① Normally, set the temperature 10℃ or more than the set temperature of the unit. Note that the independent overheat protector is intended to prevent abnormal overheat during failure of the unit and not to protect the sample.

② When the independent overheat protector is set to the value lower than the chamber temperature and the unit is running with this setting temperature, causing the independent overheat protector activates wrongly, please correct the setting value and turn ON power supply again (cut off power supply for more than 5 seconds).

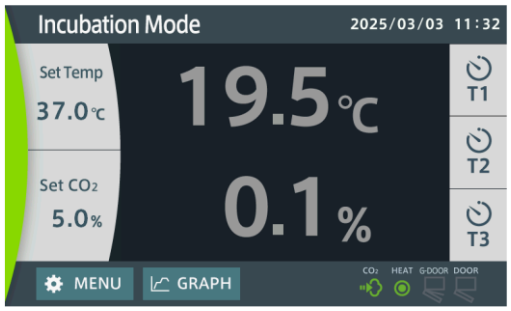
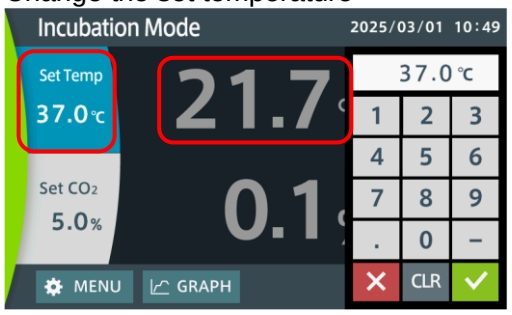
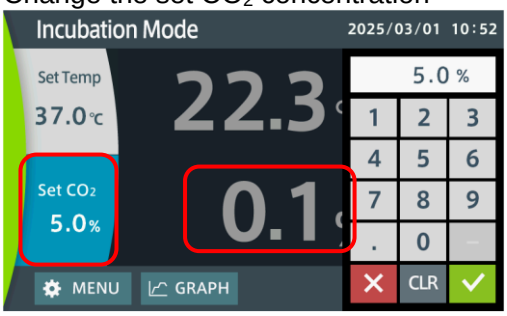
③ To check activation of the independent overheat protector at the desired temperature, stabilize the inner chamber operation at the desired temperature and lower the set value of the independent overheat protector gradually. (About 5 seconds is necessary for activation of this device. Wait for 5 seconds for confirmation. The chamber temperature may be inconsistent with the set value of the independent overheat protector.）

- Precautions

Cleaning work on the setting device or around it might cause the setting to change. Be sure to check that the temperature is set at the appropriate value before starting operation.

7. Operating method

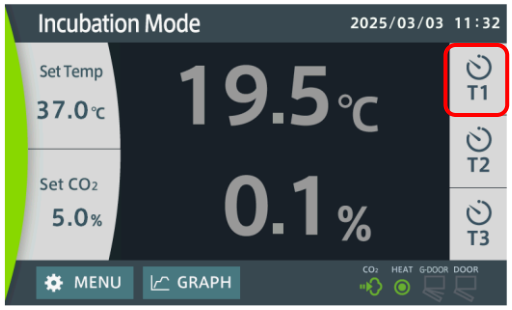
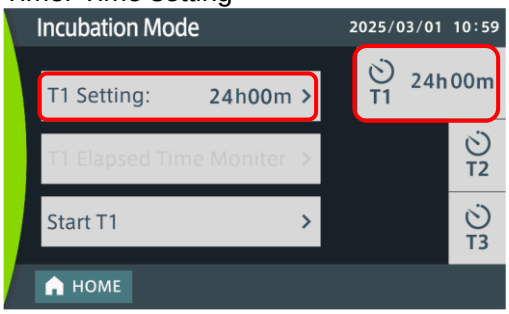
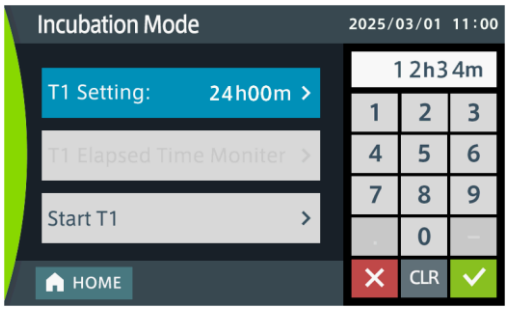
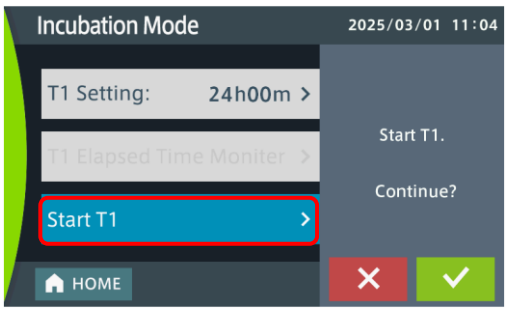
Incubation Operation

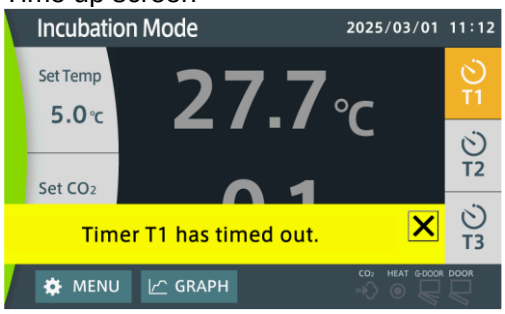
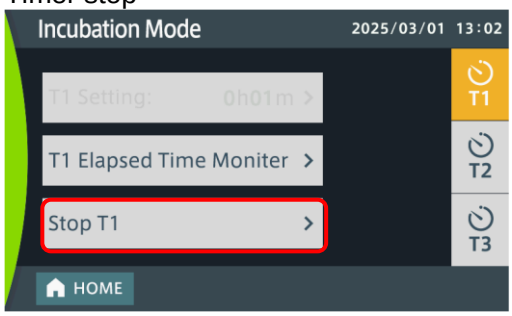
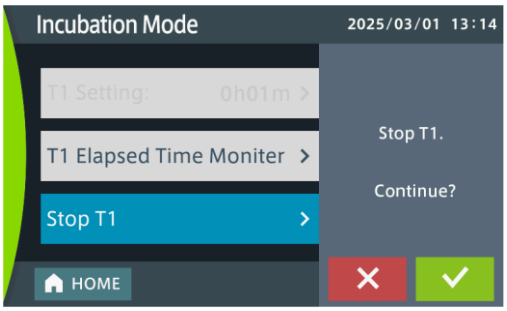
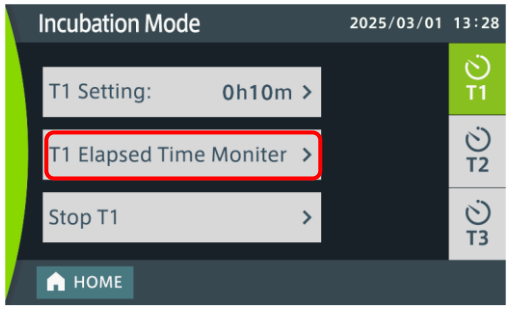
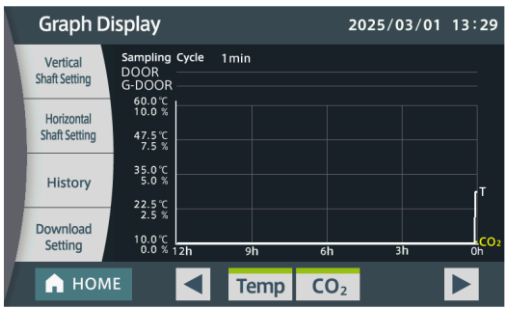
1	Turn power on 	Please open the door and turn on the power switch at the top of the inner chamber.
2	Incubation Mode screen 	When the incubation screen appears, the operation begins automatically. ※ While the CO_2 sensor is warming up, “- -.-%” is indicated in the measured concentration column. Warming-up generally takes 1 minute which might take several hours depending on condensation status. When CO2 concentration is widely different from 0% in the atmospheric condition, carry out “CO2 Concentration 0 Adjust Function” on P.49.
3	Change the set temperature 	① Touch the “Set Temp” key or the “Measured Temp” display will display ten keyboard in the right. ② Enter a temperature you want to set. Setting range: 5.0℃～60.0℃。 ③ When setting is complete, press the ✓ key to confirm. ※ When you want to reenter a value, press the CLR key or to cancel changes, press the ✕ key to return to the value before editing.
4	Change the set CO_2 concentration 	① Touch the “Set CO_2” key or the “Measured CO_2 Concentration” display will display ten keyboard in the right for entering numeric values. ② Enter the CO_2 concentration value you want. Setting range: 0.0%～20.0%。 ③ When CO_2 concentration setting is complete, press the ✓ key to confirm. ※ When you want to reenter a value, press the CLR key or to cancel changes, press the ✕ key to return to the value before editing.

Timer function

Time up can be notified by setting and activating the timer.

※ The timer is not for stopping operation.　※ All timers are stopped when sterilization is operating.

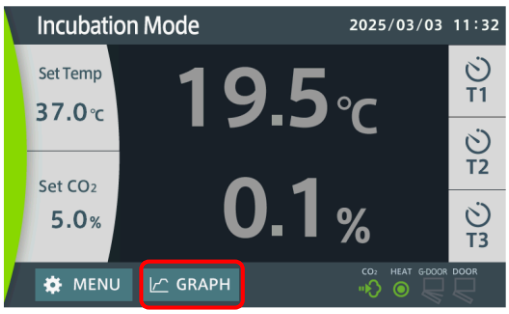
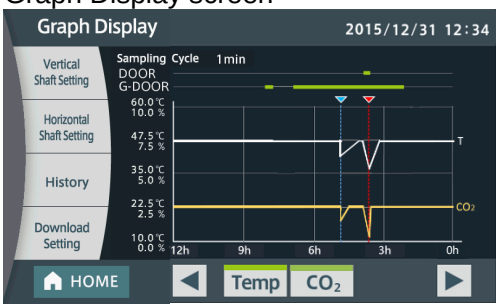
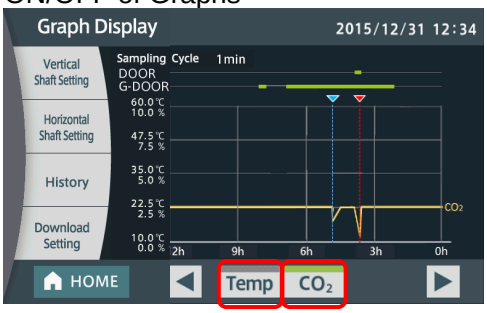
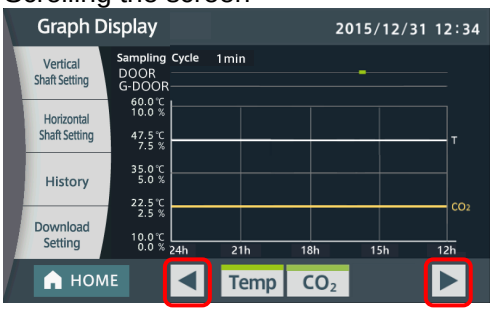
1	Timer check 	① Touching the Timer key will change it into “Timer Check” key. Timer key　Timer Check key   Touching the Timer Check key will return to the “Timer” key.
2	Timer Time setting  	① Touching the “Timer Check” key longer will display the Timer setting screen. ② Touching the “T1 (T2, T3) setting” key displays the ten keyboard for entering numeric values in the right space. ③ Touch a timer setting you want. ④ When setting is complete, press the ✓ key to confirm. ※ When you want to reenter a value, press the CLR key or to cancel changes, press the ✕ key to return to the value before editing. ※ Time setting ranges are 00h00m～99h59m and 100h～9999h. (Setting 100h or longer is in the unit of h (hour). Value entered in m (minute) will be invalid and rejected (00).) ※ Timer confirmation key does not display the unit m (minute) when the time is 100h or longer (but its counting is carried out).
3	Timer Start 	① Touching the “Start T1 (T2, T3)” key will display the Start Check screen in the right. ② Touch the ✓ key in the lower right. The timer starts counting (The timer key changes to green) ※ Touch the ✕ key to cancel timer start. ※ While the timer is active, the remaining timer time will be displayed on the Timer Check key. ※ Touch the HOME key will switch to the RUN screen.

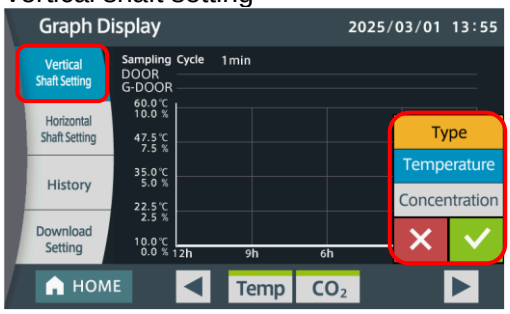
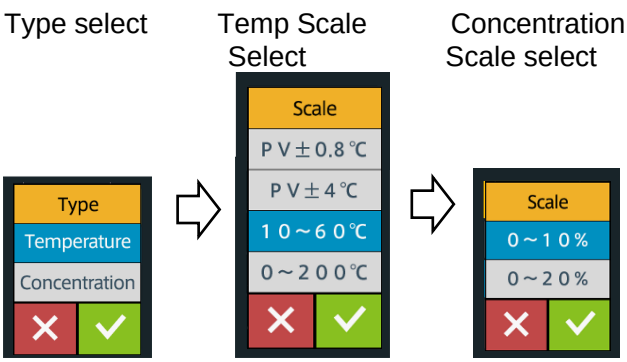
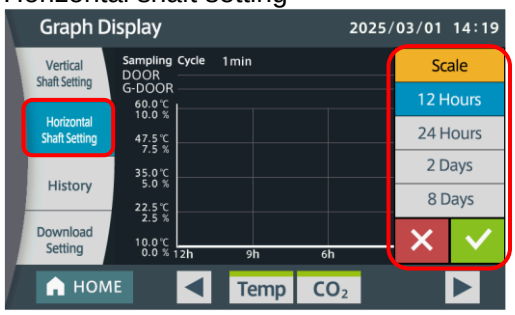
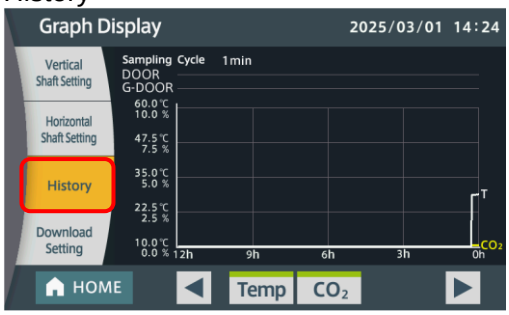
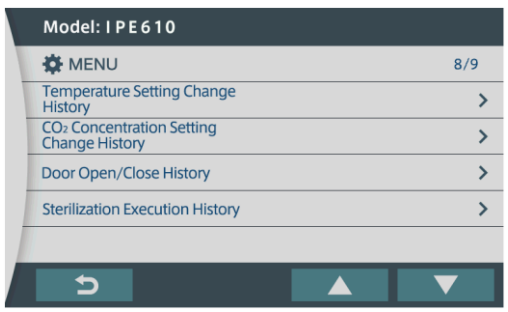
4	Time up screen 	① After elapse of the timer set time (time up), the time-up is notified and the timer key changes to orange. ※ After time-up, elapsed time since timer activation will be displayed on the Timer check key.
5	Timer stop  	① Touch “Stop T1 (T2, T3)” in the timer set screen. ② The stop screen appears on the right side. ③ Touch the ✓ key at the lower right of the screen to stop the timer. ※ Touch the ✕ key to cancel. ※ With the timer stops, the timer key changes gray. ※ Touch the HOME key will switch to the RUN screen.
6	Trend monitor screen  	① Touch the “T1 (T2, T3) elapsed time monitor” on the timer set screen. ② Displays the trend graph of the elapsed time part of the timer (up to 30 days). ※ Key cannot be operated when the timer is not started. ※ The trend graph screen changes to the timer setting screen when the HOME key is Pressed.

7. Operating method

Trend graph display function

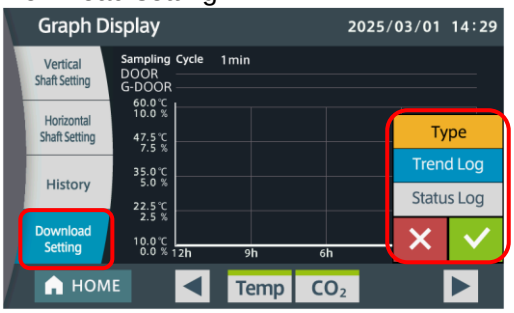
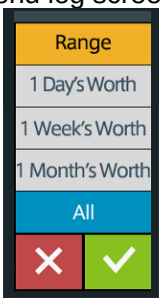
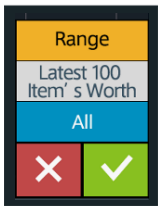
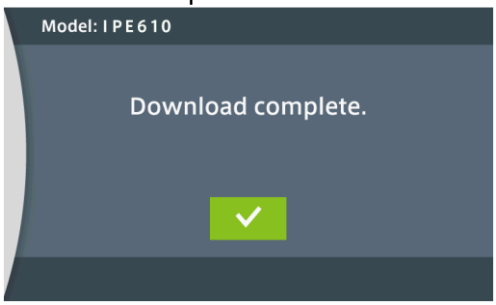
The operation state in the past can be confirmed with the trend graph.

1	Incubation Mode screen 	Touch the “GRAPH” key.
2	Graph Display screen 	The Trend Graph Display screen will appear. ※ Touching the “HOME” key will switch to the Incubation Mode screen.
3	ON/OFF of Graphs 	Touching the “Temp” key turns the Temp Graph display ON/OFF. Touching the “CO2” key turns CO2 concentration graph display ON/OFF.
4	Scrolling the screen 	Touching the ◀ ▶ key scrolls the graph screen to right or left by one page at a time. ※ You can scroll screens for up to 30 days ago.

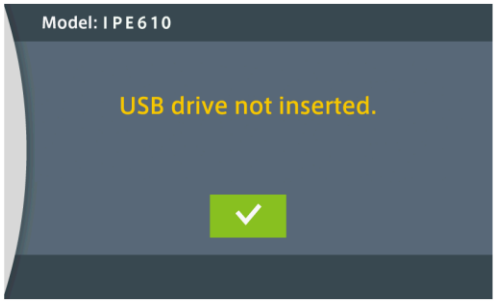
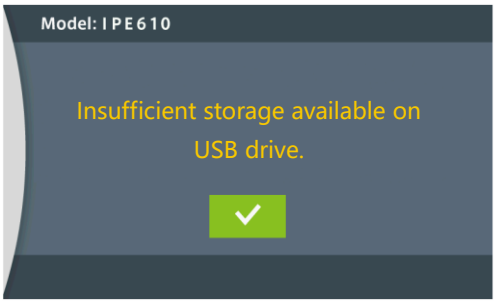
5	Vertical shaft setting 	① Touch the “Vertical Shaft Setting” key. ② Type select screen is displayed. ③ Touch "temperature" key, and then touch the key to display the Scale screen. (PV: measured temperature) ④ Touch "concentration" key, and then touch the key to display the Scale screen. 
6	Horizontal shaft setting 	① Touch the “Horizontal Shaft Setting” key. ② The Scale screen will appear for selecting a time scale. ③ Touch the scale you want, and then touch the key to change the horizontal shaft scale.
7	History  	① Touch the “History” key. ② You will move to the history display on the MENU screen. ※ For history display on the MENU screen, refer to P.55 “History”.

Download function

You can download the past operating status data in a USB drive.

1	Download setting  ・Download of Trend log (CSV file) Output of temperature and CO_2 concentration log data ・Download of status log (CSV file) Change history of temperature and CO_2 concentration setting, history of supplying the humidifying water, door open/close history, error history, power ON/OFF history data	① Please insert the USB drive into the USB port at the bottom of the operation panel. ② Touch the “Download Setting” key. ③ The Download Type Select screen appears. Select the desired range. Trend log screen  Status log screen 
2	Download check screen 	① Touching the ✓ key displays the Download check screen. ② Touch ✓. ※ Use a USB drive whose port is USB2.0 and memory capacity 32GB or less.
3	Download complete screen 	Download is complete when a screen shown in the left appears. Touch ✓. ※ Note that Trend log and status log will not downloaded at the same time.

When the messages below are shown during download

 Insert the USB drive into the USB port at the bottom of the operation panel.	 Insufficient storage available in the USB drive. Use a new USB drive.

7. Operating method

Download format

Data will be downloaded in a USB drive in the following conditions.

・File format is CSV.

・Up to 100 pieces of status log will be output per item.

Folder name		File name	Range	Description
Trend log	Trend	Year_Date_Time_day.csv	1 day's worth	Measured temp/measured CO_2 concentration
		Year_Date_Time_week.csv	1 week's worth	Measured temp/measured CO_2 concentration
		Year_Date_Time_month.csv	1 month's worth	Measured temp/measured CO_2 concentration
		Year_Date_Time_all.csv	All	Measured temp/measured CO_2 concentration
Status log	Status	Year_Date_Time_new.csv	Latest 100 items' worth	Status log of latest 100 items of all status items
		Year_Date_Time_st_temp.csv	All	Change temp setting
		Year_Date_Time_st_co2.csv	All	Change CO_2 concentration setting
		Year_Date_Time_st_err_on.csv	All	Error/Warning occurred
		Year_Date_Time_st_err_off.csv	All	Error/Warning released
		Year_Date_Time_st_pw_on.csv	All	Power ON
		Year_Date_Time_st_pw_off.csv	All	Power OFF
		Year_Date_Time_st_door.csv	All	Door open/close
		Year_Date_Time_st_water.csv	All	Check humidifying water supply
		Year_Date_Time_st_sterilization.csv	All	Sterilization

7. Operating method

Dry heat sterilization

Before incubation, perform the dry heat sterilization to sterilize the inner chamber.
From the start of sterilization operation, it takes about 11 hours for the inner chamber to return to normal temperature.
After the sterilization time has passed, when the chamber temperature drops to the set incubation temperature or below 40℃, the sterilization process ends, and switch to temperature retain operation at the set incubation temperature.

During sterilization (160℃), when the door is opened and power supply is turned OFF, the alarm sounds and the sterilization stops.

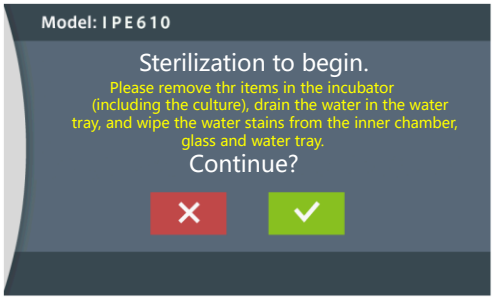
(Danger)

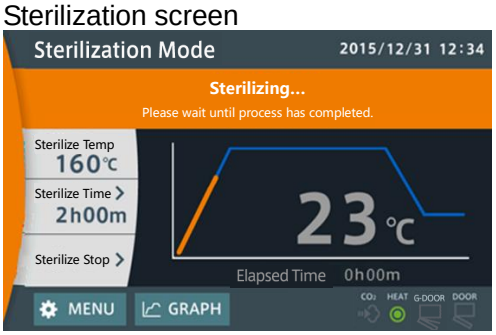
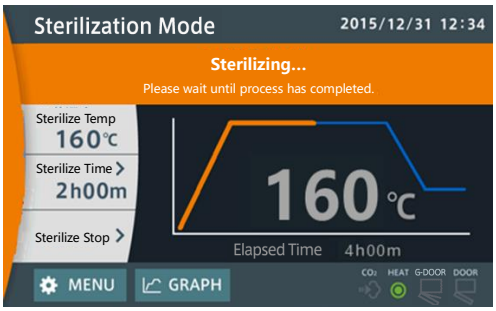
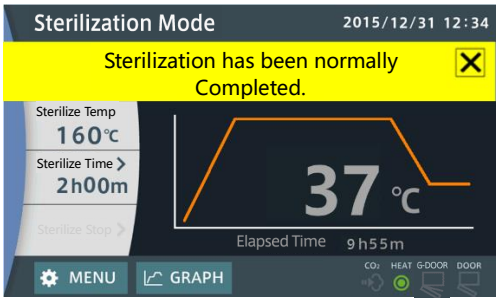
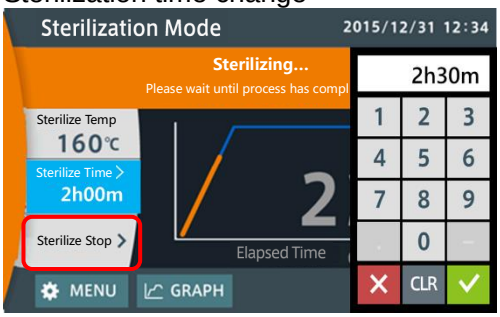
- **During dry heat sterilization, especially the top surface of the equipment and the door upper part are in a high temperature, do not touch them.**
  Otherwise, the user may suffer burn.
- **During dry heat sterilization, never open the outer and inner doors.**
  The inner chamer is in a high temperature and the user may suffer burn.
- **Never attempt dry heat sterilization while leaving sample or humidifying water in the chamber.**
  Otherwise, the sample may be damaged and the unit may malfunction.

(Caution)

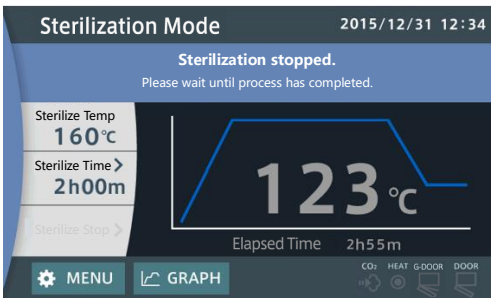
- **During dry heat sterilization, do not put any objects other than the shelf plate, humidifying tray.**
  Otherwise, the temperature may not rise to 160℃, making correct dry heat sterilization impossible and the unit may malfunction.

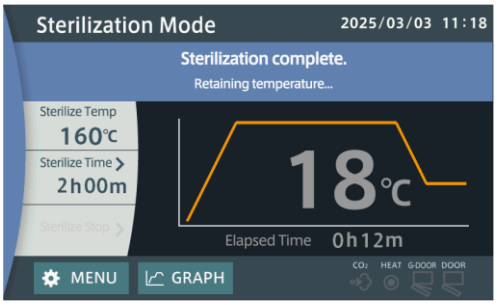
- **Before the dry heat sterilization, please drain all the water from the humidifying tray, and wipe it clean with a cloth after cleaning.**
  If the humidifying tray has water residue, it may not be able to perform normal sterilization.
- **Confirm that the chamber temperature has lowered, open the outer door.**
  If the chamber temperature is high, the user may suffer burn.

1	MENU screen  Sterilization start confirmation screen  	① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 5 of MENU, display “Sterilization start". ② Touch “Sterilization Start”. ③ The sterilization start confirmation screen appears. ④ Touch ✓ to confirm. ⑤ Move to the sterilization screen and start sterilization.

2	Sterilization screen    	When the screen as shown in the left appears, sterilization starts automatically. At the sterilization temperature (160℃), the sterilization temperature is maintained during the sterilization period (2 hours in the left figure). After reaching the sterilization time at the sterilization temperature, the temperature in the chamber drops. When reaching the incubation set temperature or 40℃, whichever is higher, the sterilization process is over, and switch to temperature retain operation at the incubation set temperature. When sterilization is over without any trouble, “Sterilization has been normally completed” appears. ※ For sterilization again, repeat the sterilization start procedure from the Menu screen. ※ For incubation, start the incubation start procedure from the Menu screen.。 ※ During sterilization (160℃), when the door is opened and power supply is turned OFF, the sterilization stops.
3	Sterilization time change  	① Touching the “Sterilization Time” key causes the numerical input key pad to appear on the right side. ② Enter the desired sterilization time. Setting range: 2h00m～3h00m ③ When time setting is complete, press the key to confirm. ※ When you want to reenter a value, press the CLR key or to cancel changes, press the key to return to the value before editing.

4 Sterilization stop





① Touch the “Sterilization Stop” key, the sterilization stop confirmation screen appears on the right.

② Touch the ✓ key to confirm.
③ The sterilization stops and the temperature in the chamber drops.

④ When reaching the incubation set temperature or 40℃, whichever is higher, the sterilization process is over, and switch to temperature retain operation at the incubation set temperature.

※ For sterilization again, repeat the sterilization start procedure from the Menu screen.

※ For incubation, start the incubation start procedure from the Menu screen.

7. Operating method

MENU list

Following setting can be made in the menu.

Item	Description	Page
Language	You can change the display panel language. (Japanese/Chinese)	P.45
Date	You can change calendar settings.	P.45
Time	You can change time settings.	P.45
Security setting	Parameter settings related to temperature and CO2 concentration can be protected with a password.	P.46
Touch Key Tone setting	You can set ON/OFF for touch key tone.	P.46
Change Password	You can change the password.	P.47
LCD Brightness Setting	You can change the LCD brightness.	P.47
Display Energy Saver Setting	You can minimize the LCD brightness automatically when any operations are not made on the display for a certain period of time.	P.48
Display Settings	In operation screen, display only the chamber temperature and CO2 concentration when any operations are not made on the display for a certain period of time to make the display more visible.	P.48
CO2 Concentration 0 Adjust Function	When the CO2 concentration in the chamber is 0.0% and the CO2 display deviates from 0.0%, the operation is performed.	P.49
Frame Heater Control Settings	Door frame heater control amount can be changed. If there is condensation water drops on the glass of inner door, change the control amount of the door heater. If no condensation water drops are found on the glass of inner door, but only found near the sealing strip of the inner door in the inner chamber, change the control amount of the door frame heater.	P.49
Trend Sampling Cycle Settings	You can change the sampling cycle for the Graph screen. (Trend data before change will be deleted when the sampling cycle is changed.)	P.50
Sterilization Start	Starts operation for sterilization	P.51
Incubation Start	Starts operation for incubation after sterilization	P.51
Incubation Temperature Calibration	Correct the chamber temperature during incubation	P.52
Door Temperature Setting Calibration	Door heater control amount can be changed. If there is condensation water drops on the glass of inner door, change the control amount of the door heater.	P.52
Accumulated Power-On Time	Displays the accumulated power-on time.	P.53
Accumulated Incubate Mode Time	Displays the accumulated incubation time	P.53
Accumulated Sterilization Time	Displays the accumulated sterilization time	P.53
Total Number of Sterilization Cycles	Displays the accumulated number of sterilizations	P.54
Total Door Open/Close Repetitions	Displays the accumulated number of door open/close	P.54
Software information	Displays information about the control software.	P.54

MENU list

History	You can display the following items. ・Temp setting change history ・CO2 concentration setting change history ・Door open/close history ・Sterilization history ・Error/warning history ・Error/warning cancellation history ・Power ON/OFF history	P.55
HEPA	The HEPA filter replacement period can be reset. Perform this operation when the HEPA filter is replaced. If the accumulated running time exceeds 8000 hours, the HEPA filter replacement notification is displayed.	P.56

7. Operating method

Language

MENU screen

① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 1 of MENU, display “Language".

② Touch “Language”.

③ Select a language you want to set.

※ Following languages are available.

English・Chinese

④ Touch the ✓ key to confirm.

Date

MENU screen

① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 1 of MENU, display “Date”.

② Touch “Date”.

③ Enter numeric values on the ten keyboard.

④ Touch the ✓ key to confirm.

Time

MENU screen

① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 1 of MENU, display “Time”.

② Touch “Time”.

③ Enter numeric values on the ten keyboard.

※ Enter the time in the 24-hour form.

④ Touch the ✓ key to confirm.

7. Operating method

Security setting

MENU screen

① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 1 of MENU, display “Security setting”.

② Touch “Authority level”.

③ Enter a password.

※ The initial setting is “111”.

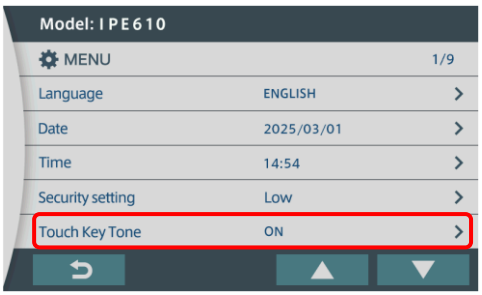
④ Select high/low.

⑤ Touch the ✓ key to confirm.

※ When the authority level is set high, parameter settings related to incubation temperature and CO2 concentration can be locked with a password.

Touch Key Tone setting

MENU screen



① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 1 of MENU, display “Touch Key Tone”.

② Touch “Touch Key Tone”.

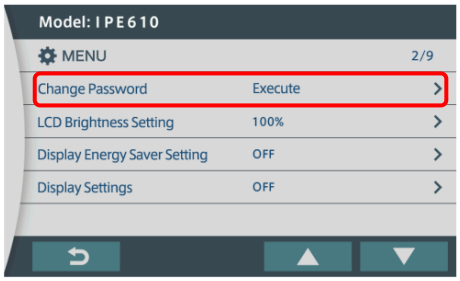
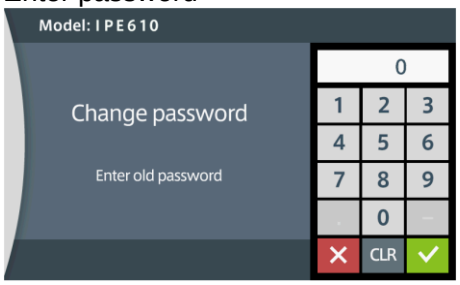
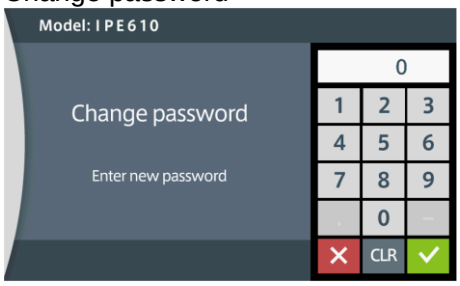
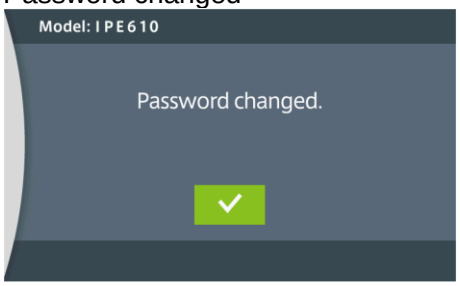
③ Select ON/OFF

④ Touch the ✓ key to confirm.

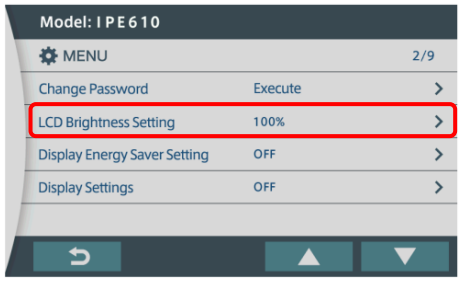
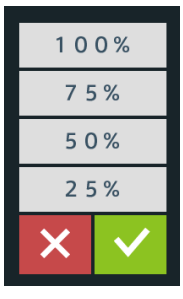
※ Set the Touch Key Tone OFF, the key touch sound is turned OFF. (Abnormal sound and alarm are not turned OFF)

7. Operating method

Change Password

1	MENU screen 	Change the password of Authority level. ① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 2 of MENU, display “Change Password”. ② Touch “Change Password”.
2	Enter password 	③ Enter the present password on the ten keyboard. ※ The initial setting is “111”. ④ Touch the ✓ key.
3	Change password 	⑤ Enter a new password on the ten keyboard. ⑥Touch the ✓ key. ※ The password must be a 3-digit number (000～999).
4	Password changed 	⑦ When Password changed screen appears, touch the ✓ key. ⑧ Password has been changed when the screen shown in the left appears. Touch the ✓ key.

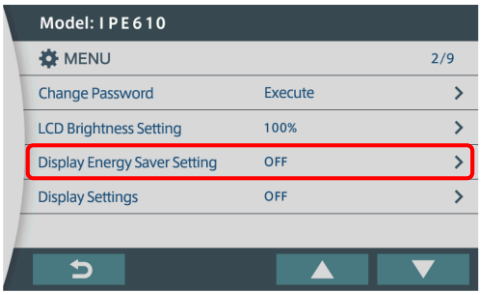
LCD Brightness Setting

MENU screen 	① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 2 of MENU, display “LCD Brightness Setting”. ② Touch “LCD Brightness Setting”. ③ Select a brightness. ※ Brightness settings are as below. ・100％・75％・50％・25％ ④ Touch the ✓ key to confirm.	

7. Operating method

Display Energy Saver Setting

MENU screen



① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 2 of MENU, display “Display Energy Saver Setting”.

② Touch “Display Energy Saver Setting”.

③ Enter a time before the energy saver activating (minutes) on the ten keyboard.

④ Touch the ✓ key to confirm.

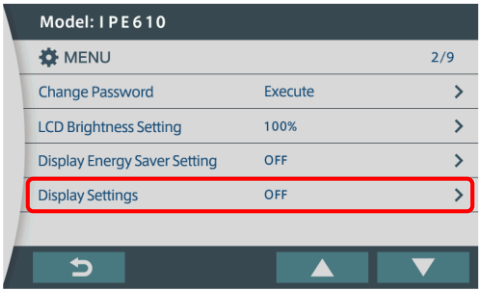
※ The setting range is 0～60 (min).
(0 means that the function is OFF)

※ When the set time elapses without doing any panel operation, the panel brightness will decrease.

※ Touch the panel to return to the normal brightness.

Display Settings

MENU screen



① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 2 of MENU, display “Display Settings”.

② Touch “Display Settings”.

③ Enter a time before the Display settings activating (minutes) on the ten keyboard.

④ Touch the ✓ key to confirm.

※ The setting range is 0～60 (min).
(0 means that the function is OFF)

Simple screen display

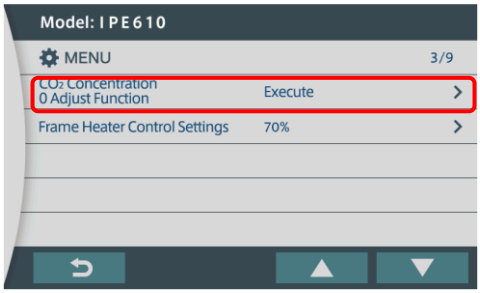
Eg. The Display Settings is 10 minutes.
The screen will switch to the simple screen display when the set time (10 minutes) elapses without doing any panel operations on the operation screen.

You can return to the original screen by touching the panel.

7. Operating method

CO_2 Concentration 0 Adjust Function

MENU screen



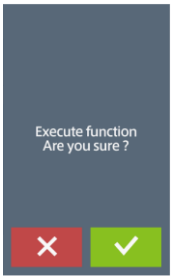
※ Set the CO_2 concentration in the chamber to 0%, open the door and well ventilate the chamber before operation.

① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 3 of MENU, display “CO_2 Concentration 0 Adjust Function”.

② Touch “CO_2 Concentration 0 Adjust Function”.

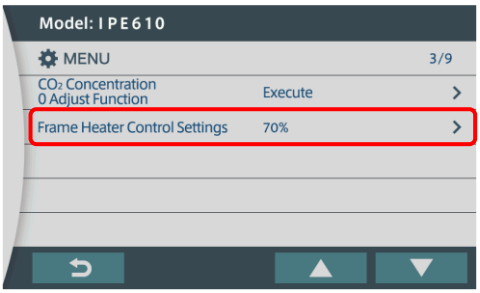
③ Touch the ✓ key to execute the function.

※ No compensation will be made when the measured CO_2 concentration exceeds ±0.5%.



Frame Heater Control Settings

MENU screen



① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 3 of MENU, display “Frame Heater Control Settings”.

② Touch “Frame Heater Control Settings”, pops up the password input key pad.

③ Enter the password, the value input key pad will pop up.

④ Please enter the heater output control amount through the numeric key.

※ The initial set value is 70%.

⑤ Touch the ✓ key to confirm the heater control amount.

※ Using when there are condensation droplets on the stainless steel door frame of the inner chamber, increasing the output of the door frame heater can reduce or eliminate condensation droplets. Please increase by 5% each time.

※ The parameter has been set at the factory, generally no need to modify, too large heat output may destroy the temperature uniformity in the chamber. Please adjust carefully.

Trend Sampling Cycle Settings

MENU screen

Sampling cycle	Recording period
2min	Approx. 360 days
1min	Approx. 180 days
30sec	Approx. 90 days
10sec	Approx. 30 days

The trend log data (measured temperature and measured CO_2 concentration) are recorded for each cycle set with the sampling cycle setting.

① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 4 of MENU, display “Trend Sampling Cycle Settings”.

② Touch “Trend Sampling Cycle Settings”.

③ Select a cycle.

※ Available cycles are as below.

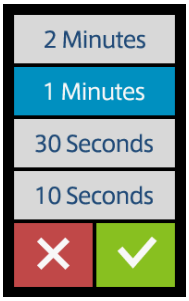
・10sec・30sec・1min・2min

④ Touch the key to confirm.

※ Trend data before change will be deleted when the sampling cycle is changed.

※ Trend log during power failure is not recorded.

※ When the acquired data exceeds the record range, older recorded data are deleted sequentially one by one.

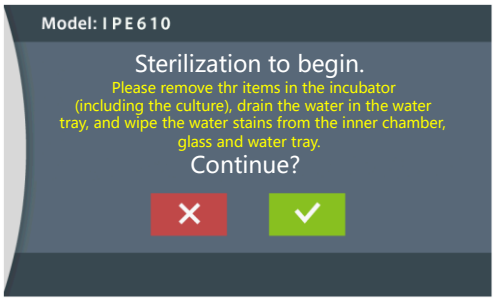


7. Operating method

Sterilization Start

MENU screen

Sterilization start confirmation screen



① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 5 of MENU, display “Sterilization Start”.

② Touch “Sterilization Start”.

③ The sterilization start confirmation screen appears.

④ Touch the ✓ key to confirm.

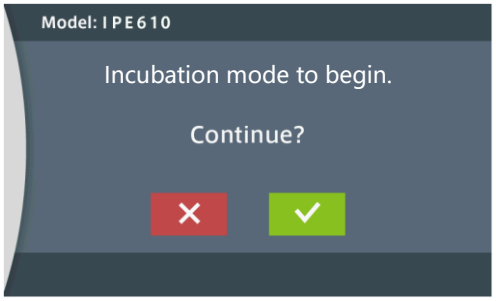
⑤ Move to the sterilization screen and start sterilization.

※ For details of sterilization, refer to P.40 “Dry heat sterilization”.

Incubation Start

MENU screen

Incubation start confirmation screen



① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 5 of MENU, display “Incubation Start”.

② Touch “Incubation Start”.

③ Touch the ✓ key to confirm.

④ Move to the incubation screen and start incubation.

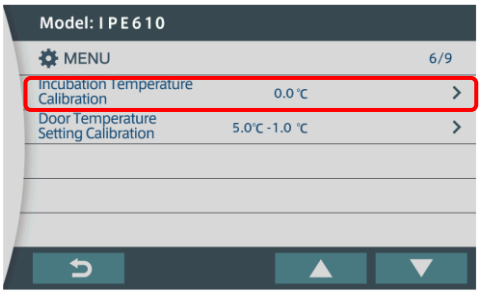
※ The incubation key is not operative till sterilization is over.

For details of incubation, refer to P.33 “Incubation Operation”.

7. Operating method

Incubation Temperature Calibration

MENU screen



① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 6 of MENU, display “Incubation Temperature Calibration”.

② Touch “Incubation Temperature Calibration”.

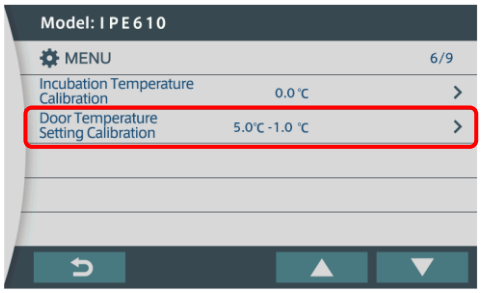
③ Enter a compensation temperature with the ten keypad.

④ Touch the ✓ key to confirm.

Eg. 1) Enter “-0.5” when the chamber temperature is lower by 0.5℃.
Eg. 2) Enter “1.0” when the chamber temperature is higher by 1.0℃.

Door Temperature Setting Calibration

MENU screen



① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 6 of MENU, display “Door Temperature Setting Calibration”.

② Touch “Door Temperature Setting Calibration”.

③ Enter a compensation value with the ten keypad.

④ Touch the ✓ key to confirm the compensation value.

The temperature setting value of the door is the same as that of the main unit without orrection.
When condensation in the chamber becomes severe, enter a compensation value in accordance with the example below.

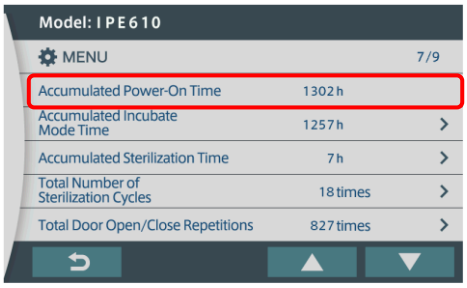
Adjustment point

- When condensation forms on the glass door: Correct the door temperature compensation value by +0.2℃ each time.
- When condensation forms on the rear wall of the chamber: Correct the door temperature compensation value by -0.2℃ each time.

7. Operating method

Accumulated Power-On Time

MENU screen



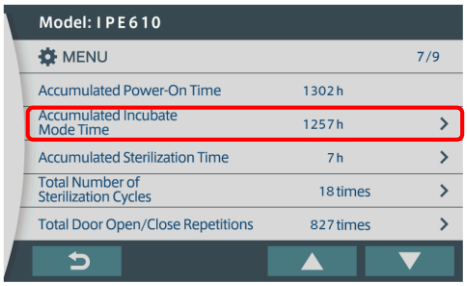
① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 7 of MENU, display “Accumulated Power-On Time”.

② “Accumulated Power-On Time” appears on the right.

※ “Accumulated Power-On Time” cannot be reset.

Accumulated Incubate Mode Time

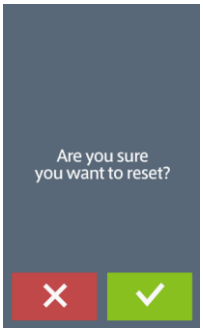
MENU screen



① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 7 of MENU, display “Accumulated Incubate Mode Time”.

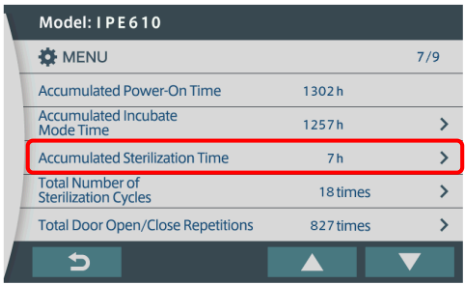
② “Accumulated Incubate Mode Time” appears on the right.

③ To reset the accumulated incubation time, touch “Accumulated Incubate Mode Time” and touch ✓.



Accumulated Sterilization Time

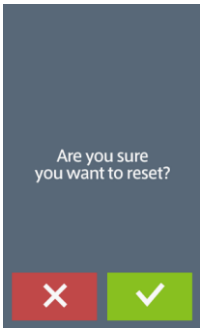
MENU screen



① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 7 of MENU, display “Accumulated Sterilization Time”.

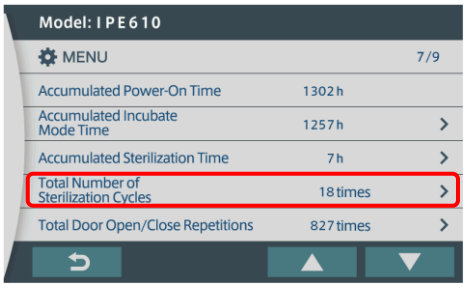
② “Accumulated Sterilization Time” appears on the right.

③ To reset the accumulated sterilization time, touch “Accumulated Sterilization Time” and touch ✓.



Total Number of Sterilization Cycles

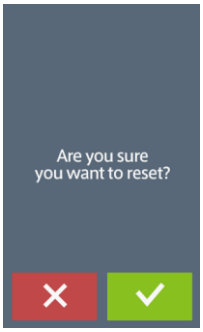
MENU screen



① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 7 of MENU, display “Total Number of Sterilization Cycles”.

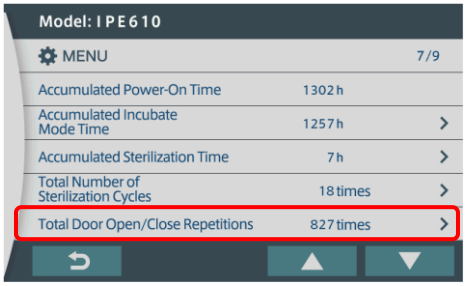
② “Total Number of Sterilization Cycles” appears on the right.

③ To reset the total number of sterilization cycles, touch “Total Number of Sterilization Cycles” and touch ✓.



Total Door Open/Close Repetitions

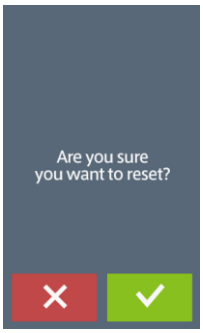
MENU screen



① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 7 of MENU, display “Total Door Open/Close Repetitions”.

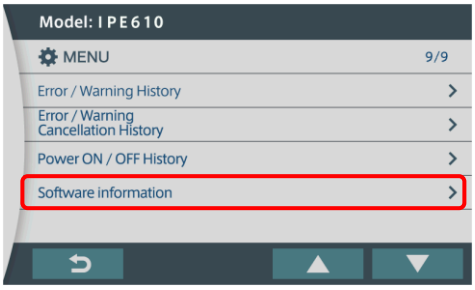
② “Total Door Open/Close Repetitions” appears.

③ To reset the number of door open/close times, touch “Total door open/close repetitions” and touch ✓.



Software information

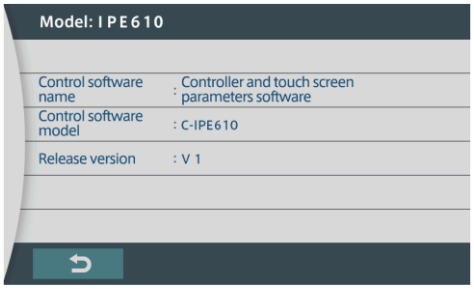
MENU screen



① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 9 of MENU, display “Software information”.

② Touch “Software information” to enter the software information screen.

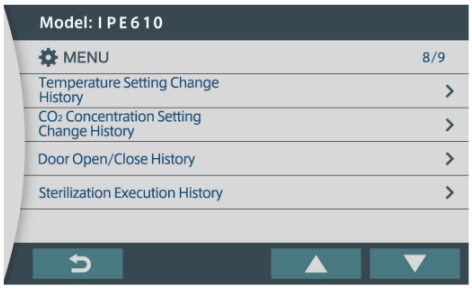
Software information screen

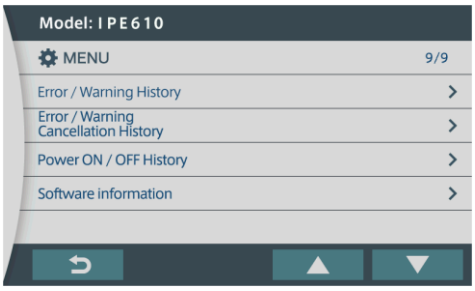


※ The software information screen displays the information of the control software name, control software model and current software release version.

History

MENU screen





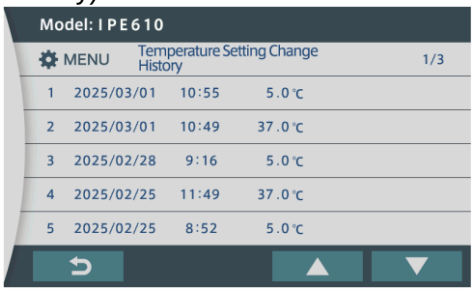
① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 9 of MENU, display the history items.

② Following histories can be displayed.

- Temperature Setting Change History
- CO_2 Concentration Setting Change History
- Door Open/Close History
- Sterilization Execution History
- Error/Warning History
- Error/Warning Cancellation History
- Power ON/OFF History

※ You can download using a USB drive.

Example of history screen (Temperature Setting Change History)



Displays the date and content of 20 history items in the latest chronological order. (Up to 100 items for the Door Open/Close History)

7. Operating method

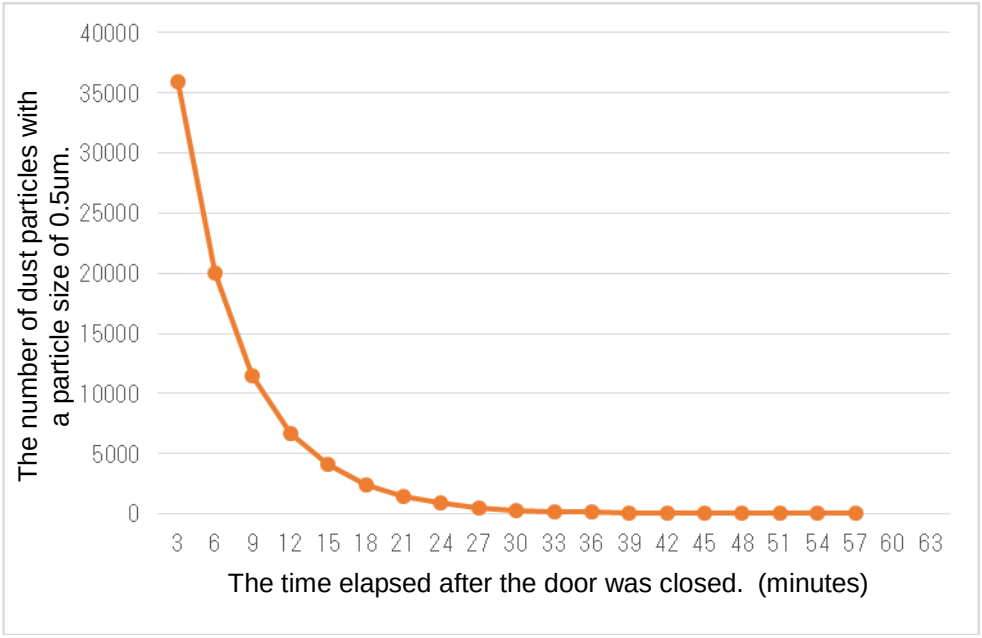
HEPA filter replacement and time reset

Action

After the inner door is closed, the circulating fan runs, and the HEPA filter removes dust and bacteria in the chamber.

There is a temporary drop in temperature after the door is opened/closed.

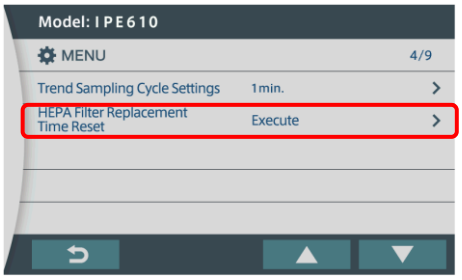
(Reference data) 1CF 0.5μm dust reduction chart after the inner door is closed for 60 minutes (test in 10,000 cleanliness environment)



Filter replacement method

When reaching the filter replacement time (operating for 8000 hours), the main unit operation panel displays a notification "Replace HEPA filter". When the notification appears or filter is blocked or damaged, refer to P.23 "2. Disassembly method of chamber parts" to replace the filter.

MENU screen

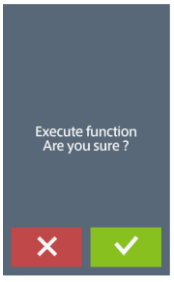


After replacing the HEPA filter, reset the timer and restart the timing for the next replacement cycle.

① Touch the “MENU” key in the incubation screen and use the ▲▼ keys to select to Page 4 of MENU, display “HEPA Filter Replacement Time Reset”.

② Touch “HEPA Filter Replacement Time Reset”. The function execution screen appears.

③ Touch ✓ to execute.

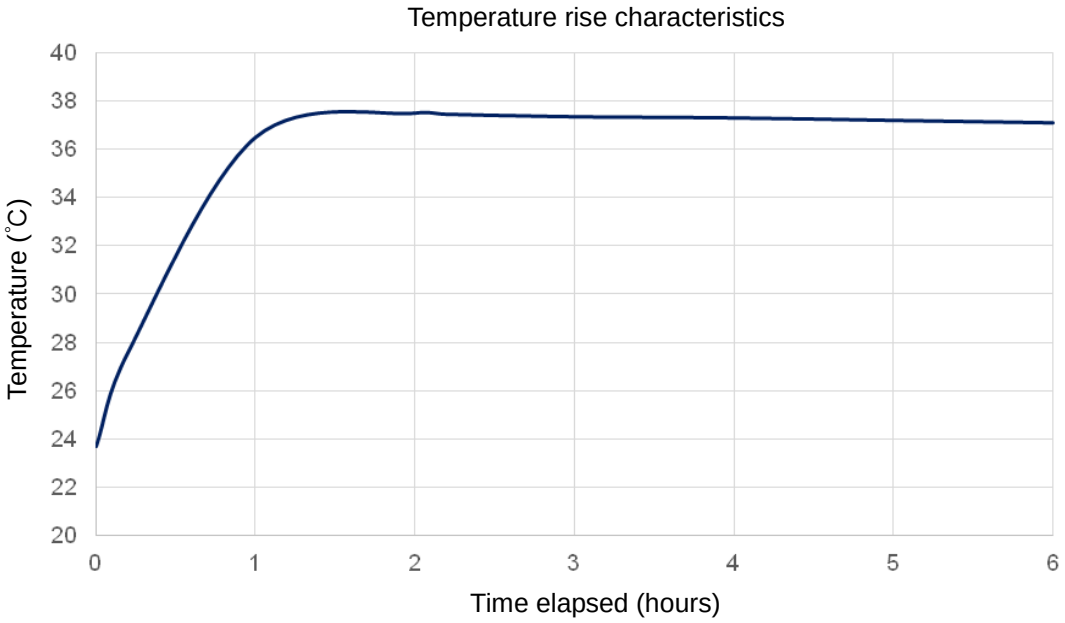


Replacement parts list

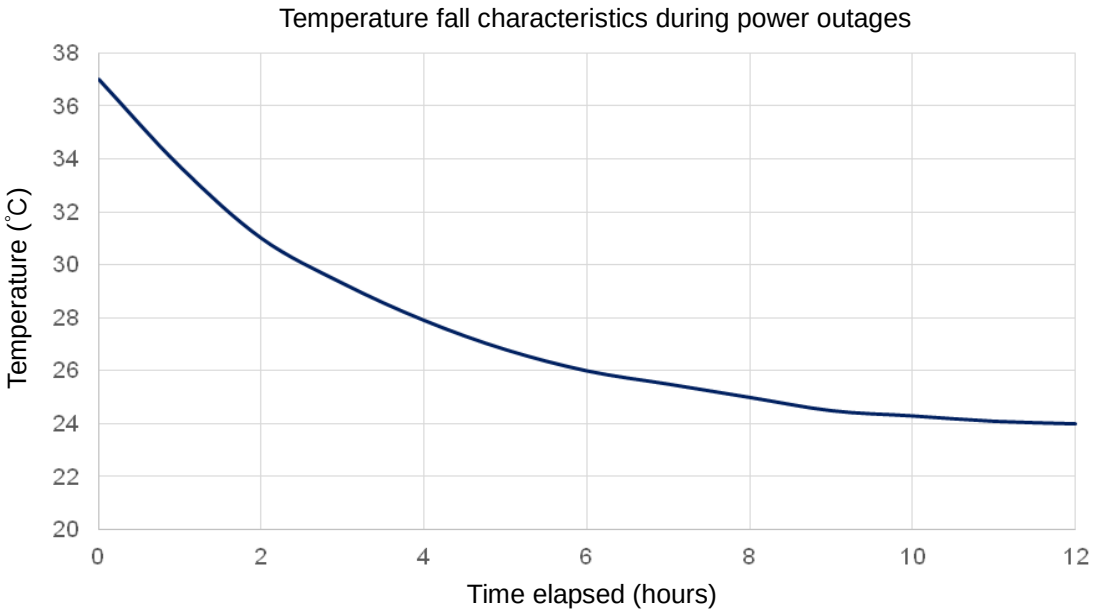
No.	Part name	Code №	Specification	Manufacturer
1	Filter	H051002023	IPE610_01_02-09	Yamato Scientific
2	Baffle glass	H051002022	IPE610_01_02-12	Yamato Scientific

7. Operating method

Temperature rise characteristics (Reference data)



Temperature fall characteristics during power outage (Reference data)



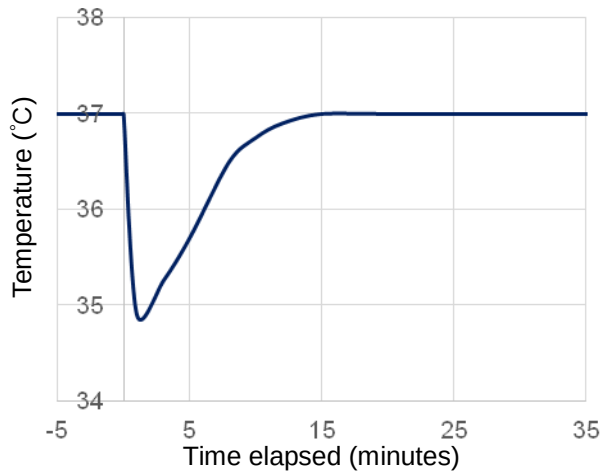
<Conditions>

- Set temperature: 37℃
- CO_2 gas concentration: 5％
- Power supply AC220V　50Hz
- Environmental temperature: 22℃
- Environmental humidity: 65％RH
- No samples

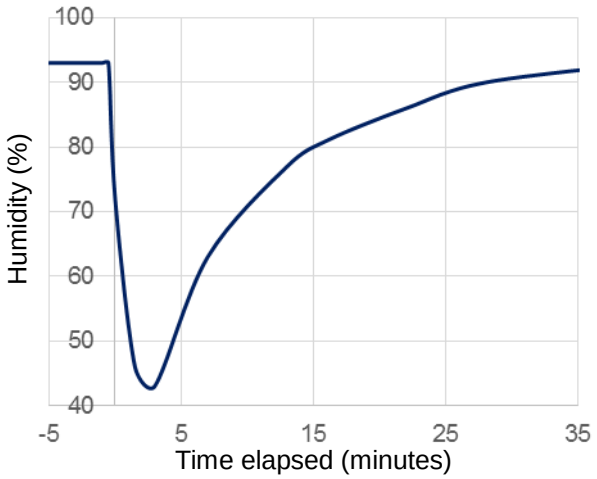
7. Operating method

Recovery after door open characteristics (Reference data)

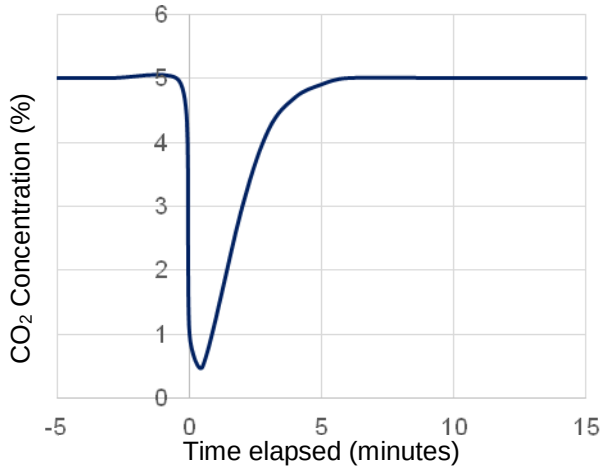
Temperature recovery characteristics



Humidity recovery characteristics



CO_2 recovery characteristics

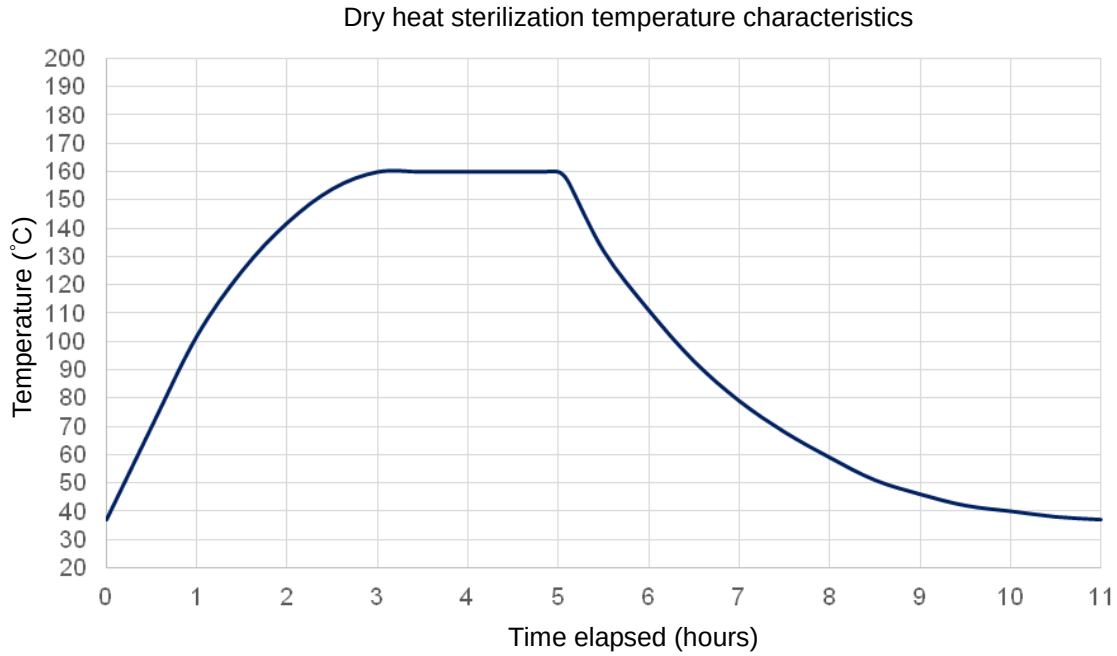


<Conditions>

- Set temperature: 37℃
- CO_2 gas concentration: 5％
- Power supply AC220V　50Hz
- Environmental temperature: 22℃
- Environmental humidity: 65％RH
- No samples
- Recovery characteristics when the door is opened for 30 seconds and then closed. (Door open/close angle: 90°)

7. Operating method

Dry heat sterilization temperature characteristics (reference data)



<Conditions>

- Sterilization temperature・temperature holding time: 160℃　2 hours
- Power supply AC220V　50Hz
- Environmental temperature: 22℃
- Environmental humidity: 65％RH
- No samples

8. Maintenance method

Daily inspection/maintenance

⚠ Warning

- During inspection and maintenance, be sure to unplug the power cord from the main power supply unless necessary.
- Perform this operation after the equipment returns to normal temperature.
- Do not disassemble the equipment.

⚠ Caution

- Please wipe the dirt with a soft cloth. Do not use gasoline, banana oil, cleaning powder and so on, do not brush. It will cause deformation, metamorphism, discolor, etc.

Daily inspection

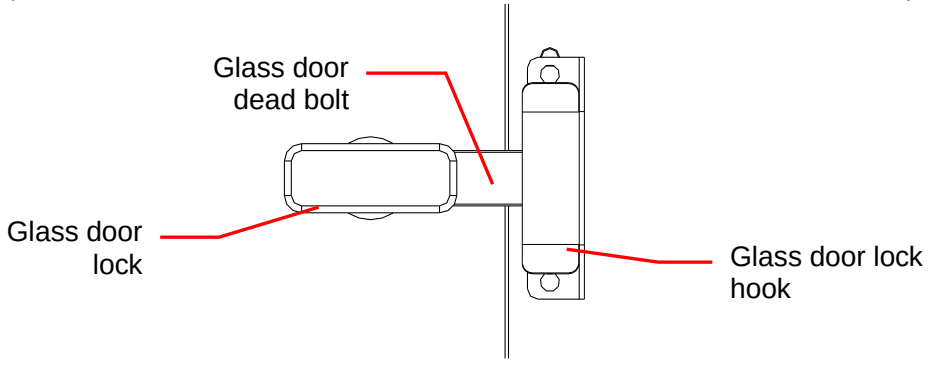
Before use and after cleaning and disinfection, first check if the glass door and the glass door sealing strip are intact. There should be no damage, stains and foreign objects attached. Glass door hinges and locks are not loose or deformed. The glass door lock should not shake when rotating.

⚠ Caution: If the glass door sealing strip is damaged, the glass is broken, the glass door hinges or locks are loose or deformed, or there are foreign objects attached to the glass or sealing strip, resulting in the glass door cannot be sealed after closing, it will lead to CO_2 gas leakage, increased CO_2 consumption, condensation, temperature instability in the chamber, external air pollution, etc. Please clean and inspect the glass door and the glass door sealing strip regularly.

⚠ Warning: CO_2 leakage will lead to an increase in environmental CO_2 concentration, and high CO_2 concentration will cause harm to the human health, even suffocation or death.

⚠ Warning: Do not use the incubator when the glass door or glass door sealing strip is broken, and the glass door hinges and locks are loose or deformed, resulting in failure to seal. Please contact us or our designated service provider for maintenance.

When closing the glass door, please hold the glass door lock and slowly close the glass door. When the glass door is attached to the glass door sealing strip, push it forward, and rotate the glass door lock at the same time, when the dead bolt is rotated to the middle of the inside of the lock hook, it's in place.



⚠ Caution: The good locking state of the glass door is the dead bolt is in the middle of the lock hook, that is, the glass door lock and the dead bolt are in a horizontal position. When closing the glass door, please be sure to lock the glass door lock. If the glass door lock and dead bolt deviate from the horizontal position, the glass door may not be locked properly, and there is a gap between the glass and the sealing strip, which can not be sealed.

8. Maintenance method

Daily inspection/maintenance

In order to facilitate customer to carry out daily maintenance, the operation procedures of stop operation, disinfection methods, dry heat sterilization are summarized. For more accurate incubation, be sure to read it carefully before using the equipment.

1. Stop operation

   To stop the operation of this equipment, follow the steps below. Particularly, be sure to dry the inner chamber.

   A) Please turn OFF the ELB.
   B) Please close the main valve of the CO_2 gas cylinder.
   C) Clean and dry all accessories. Please refer to "2. Cleaning and Drying" on this page.

2. Cleaning and Drying

   A) Please turn OFF the ELB.
   B) Refer to P.23-28 "2. Disassembly method of chamber parts-6. Installation of shelf plate" for disassembly of chamber parts.
   C) Wet the sterilized gauze with purified water, wipe and clean the metal frame of the HEPA filter, the stainless steel surface of the inner chamber and both sides of the glass door.

      ⚠ Caution: The filter paper of the HEPA filter should not be stained with any liquid, otherwise it will damage the HEPA filter.
   D) Clean the disassembled metal parts (excluding HEPA filters) by using purified water at 15-30°C, following the steps of washing, rinsing and final rinsing. Please use weakly acidic, weakly alkaline, neutral medical cleaning agent.

      ⚠ Caution: Absolutely prohibit to use tap water and chlorine-containing cleaning agent, due to the influence of chloride ions, it will cause rust in the inner chamber.

      ⚠ Caution: When condensation leads to mildew and other serious dirt, or dry stains, it should be soaked with medical cleaning agent, and then scrub or wash.
   E) Wipe the metal and glass surfaces of inner chamber and parts with sterilized gauzes, reverse the disassembly procedures, and install all the parts of the inner chamber.

      ⚠ Caution: If dry heat sterilization is required later, please open the door, leave the inner chamber and the parts separately for more than 2 hours, and then reverse the disassembly procedures to install all the parts of the inner chamber.
   F) If the equipment is out of use, leave the door open for more than 24 hours in order to dry the chamber thoroughly.

3. Disinfection

   When used for the first time or after a period of time without use, if not use dry heat sterilization, it is recommended to wash, dry and disinfect before incubation operation.
   Refer to P.22 “(2) Disinfection” of “1. Sterilization before use/periodic sterilization”.

   ⚠ Caution: Please cut off the power supply when cleaning, drying and disinfecting. Otherwise, electric leakage may occur, resulting in a life-threatening electric shock.

4. Dry heat sterilization

   When used for the first time or after a period of time without use, it is recommended to wash, dry and sterilize before incubation operation.
   Refer to P.22 “(1) Sterilization” of “1. Sterilization before use/periodic sterilization”.

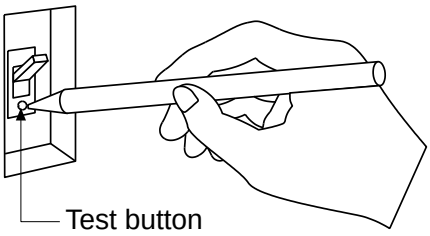
   ⚠ Caution: Please cut off the power supply when cleaning and drying, till the chamber is fully dry before starting, and then implement dry heat sterilization. Otherwise, electric leakage may occur, resulting in a life-threatening electric shock.

8. Maintenance method

Daily inspection/maintenance

Monthly inspection

- Inspect the ON and OFF functions of Earth Leakage Breaker (ELB).
  Connect the power cord and test it when it is powered on.
  - ・First switch the power supply to [OFF] state.
  - ・Then switch to [ON] state, use the tip of the ballpoint pen, etc. to press the test button of the ELB, if the ELB is cut off, it is normal.



- Check the activation of independent overheat protector.
  - ・After the chamber has stabilized at the appropriate set temperature, set the activating temperature of the independent overheat protector to a value several degrees (5°C) lower than this temperature.
  - ・Under normal circumstances, after a few seconds the heater loop is disconnected, at the same time, the operation panel displays [Independent overheat protector error], and the alarm buzzer sounds.

※ In addition, before long-term continuous operation and unmanned operation during night time, please be sure to implement the activation confirmation of the above ELB and independent overheat protector.

Durability of the inner door sealing strip

When the door is opened/closed 10 times a day, the durability of the inner door sealing strip is about 3 years. When it deforms or cracks, the inner door can not be sealed, please replace. Please entrust Yamato Scientific for replacement.

Durability of the CO_2 sensor

The durability of CO_2 sensor is about 10 years. If the accuracy cannot be maintained by correction, replace it. Please entrust Yamato Scientific for replacement.

8. Maintenance method

Regular inspection

In order to facilitate customer to carry out daily maintenance, the regular inspection items in use are summarized. For more accurate incubation, be sure to read this carefully before using the equipment.

Regular inspection in use

Items	Frequency	Reference page
Supplying water to the humidifying tray	Once a week	P.27
Replacement of humidifying water	Once every 2 weeks (target)	P.27
Inspect the ELB	Once a month	P.62
CO_2 gas cylinder replacement (30kg) [When using steel cylinder for gas supply]	Once every 3~6 months (target) (When the primary pressure of the CO_2 pressure regulator begins to drop, replace immediately)	P.21
CO_2 concentration 0 adjust	Once every 3~6 months	P.49
CO_2 sensor calibration	Once a year (adjust immediately if accuracy cannot be met)	Please entrust Yamato Scientific
Temperature calibration	Once a year	

Regular maintenance

Parts	Interval				
	Annual inspection	Monthly inspection	Weekly inspection	Replace as needed	Replace every 8000 hours of operation
ELB (power switch)		●		●	
Cable hole silicone plug		●		●	
Gas sampling port thread cap		●		●	
Glass door			●	●	
Glass door sealing strip			●	●	
Outer door sealing strip	●			●	
Overheat protector	●			●	
CO_2 gas source filter				●	●
HEPA filter				●	●
CO_2 supply pipe		●		●	
CO_2 sensor	●			●	

※ If the above parts need to be replaced, please contact Yamato Scientific Chongqing or our designated service provider. Any individual or unit please do not attempt to repair the equipment or replace any parts, otherwise it may cause damage to the equipment or accidents, for which our company does not assume any responsibility.

9. Long storage and scrap

When not using the equipment for a long time / when scrapping

⚠ Caution	⚠ Warning
When not using the equipment for a long time ● Please cut off the power supply and unplug the power cord from the power supply.	**Scrap this equipment.** ● Do not leave the unit where children may play around. ● Please remove the handle and hinges so that the door cannot be locked. ● Please disinfect the inner chamber before scrapping. ● In general, please dispose as large garbage.

Matters to consider when scrapping the equipment

Always pay attention to the protection of the global environment.

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

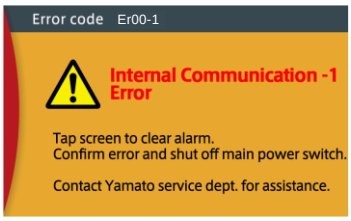
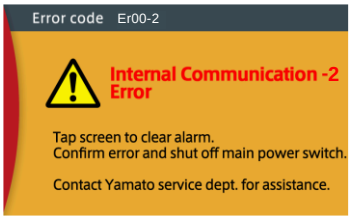
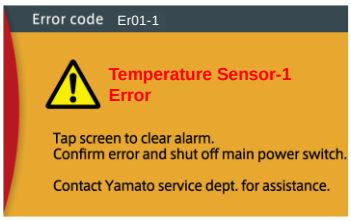
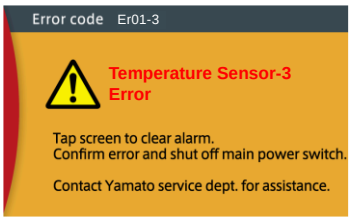
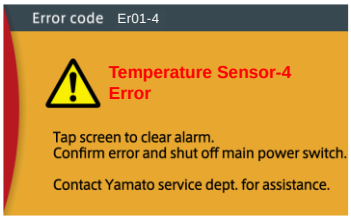
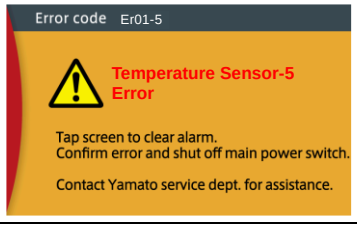
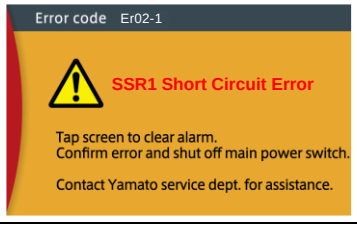
Names of major components	Major materials
Major components of the main unit	
Exterior	Cold rolled steel plate with chemical resistant coating
Inner chamber, tray	Stainless steel plate
Shelf plate	Stainless steel plate
Inner door	Glass
Sealing strip (door, inner door)	silicone gel
Fan	ABS resin
Hoses	silicone gel
Heat insulation material	Glass wool
Label	Polyethylene (PET) resin film
Major components of the electric system	
Switches and relays	Resin, copper and other composite material
Operation panel	Glass, glass fiber and other composite materials
Board	Glass fiber and other composite materials
Heater	Silicone gel, aluminium
Power cord	Synthetic rubber sheath, copper, nickel and other composite materials
Wiring materials	Glass fiber, flame-retardant vinyl resin, copper, nickel and other composite materials
Sensor (Pt&K double, PT sensor)	Stainless steel SUS304, others

10. Troubleshooting

Error indications and solutions

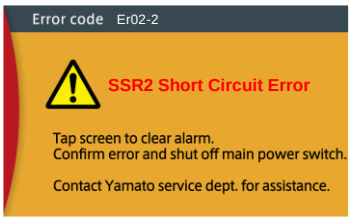
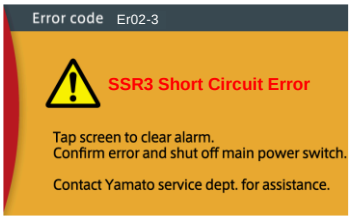
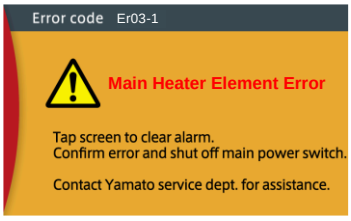
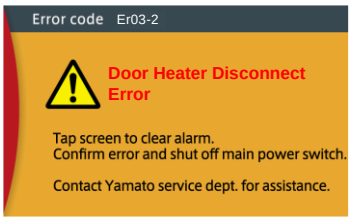
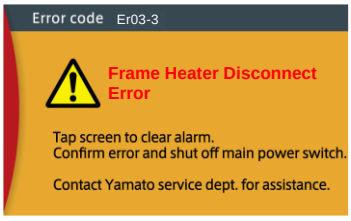
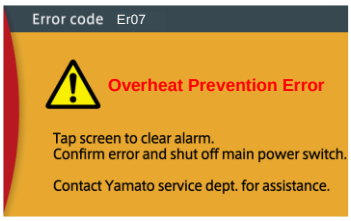
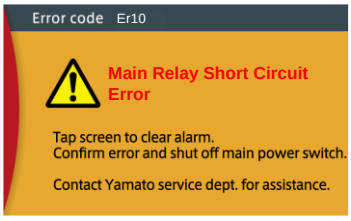
When an error occurs, the buzzer sounds and the operation panel will display “Error No.” and “Error name”.
Operating conditions are as follows depending on the error name.

- Error name is “Error”: Operation other than error items continues.
- Error name is “Warning”: Operation continues as in the normal status.

Error No.	Error name	Display	Solution
Er00-1	Internal communication 1 error		Communication error between the touch panel and the control board. Call for service if the error is not cancelled even if power is restarted.
Er00-2	Internal communication 2 error		Communication error between the CO_2 sensor and the control board. Call for service if the error is not cancelled even if power is restarted.
Er01-1	Temperature sensor 1 error		The chamber temperature sensor is disconnected or short-circuit. Call for service if the error is not cancelled even if power is restarted.
Er01-3	Temperature sensor 3 error		The door temperature sensor is disconnected or short-circuit. Call for service if the error is not cancelled even if power is restarted.
r01-4	Temperature sensor 4 error		The humidifying water sensor is disconnected. Call for service if the error is not cancelled even if power is restarted.
Er01-5	Temperature sensor 5 error		The frame temperature sensor is disconnected or short-circuit. Call for service if the error is not cancelled even if power is restarted.
Er02-1	SSR1 short circuit error		The main heater (air jacket) SSR is defective.Call for service if the error is not cancelled even if power is restarted.

10. Troubleshooting

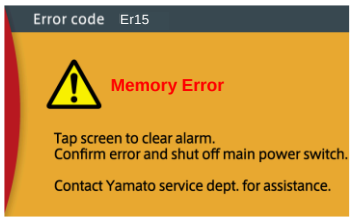
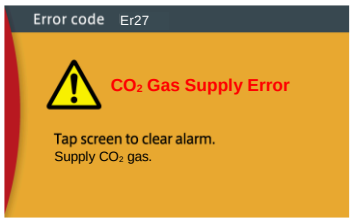
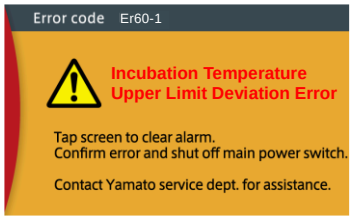
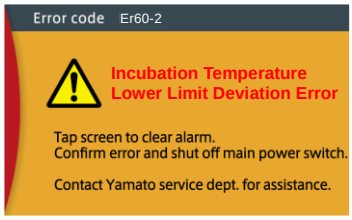
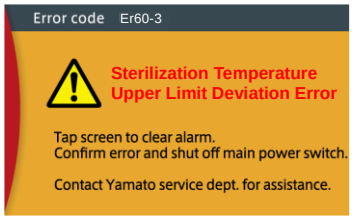
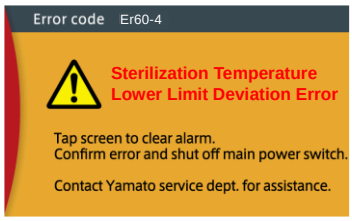
Error indications and solutions

Error No.	Error name	Display	Solution
Er02-2	SSR2 short circuit error		The door heater SSR is defective. Call for service if the error is not cancelled even if power is restarted.
Er02-3	SSR3 short circuit error		The door frame heater SSR is defective. Call for service if the error is not cancelled even if power is restarted.
Er03-1	Main heater disconnect error		Main heater circuit is disconnected. Call for service if the error is not cancelled even if power is restarted.
Er03-2	Door heater disconnect error		Door heater circuit is disconnected. Call for service if the error is not cancelled even if power is restarted.
Er03-3	Frame heater disconnect error		Frame heater circuit is disconnected. Call for service if the error is not cancelled even if power is restarted.
Er07	Independent overheat prevention error		The chamber temperature exceeds the set temperature of the independent overheat protector. Check the set temperature of the independent overheat protector. (Refer to P.32).
Er10	Main relay short circuit error		Main relay is disconnected. Call for service if the error is not cancelled even if power is restarted.

※ When more than one errors occur, they will be displayed in turn.

10. Troubleshooting

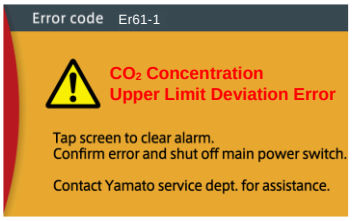
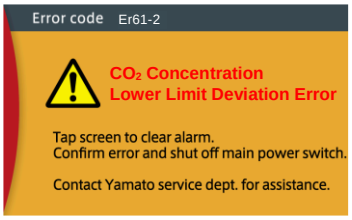
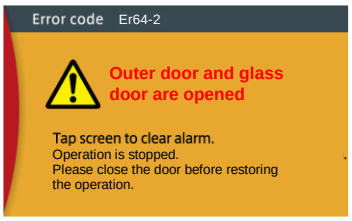
Error indications and solutions

Error No.	Error name	Display	Solution
Er15	Memory error		Malfunction occurs to the controller. Call for service if the error is not cancelled even if power is restarted.
Er27	CO_2 gas supply error		Check the supply pressure and the remaining amount of the CO_2 gas cylinder and supply CO_2 gas. (Refer to P. 21)
Er60-1	Incubation temperature upper limit deviation error		This error occurs when the chamber temperature stabilized at the set temperature and then remained at a temperature +2℃ higher than the set temperature for 15 minutes or more. Call for service if the error is not cancelled even if power is restarted.
Er60-2	Incubation temperature lower limit deviation error		This error occurs when the chamber temperature stabilized at the set temperature and then remained at a temperature -2℃ lower than the set temperature for 15 minutes or more. Call for service if the error is not cancelled even if power is restarted.
Er60-3	Sterilization temperature upper limit deviation error		This error occurs when the chamber temperature stabilized at the set temperature and then remained at a temperature +5℃ higher than the set temperature for 15 minutes or more. Call for service if the error is not cancelled even if power is restarted.
Er60-4	Sterilization temperature lower limit deviation error		This error occurs when the chamber temperature stabilized at the set temperature and then remained at a temperature -3℃ lower than the set temperature for 15 minutes or more. Call for service if the error is not cancelled even if power is restarted.

※ When more than one errors occur, they will be displayed in turn.

10. Troubleshooting

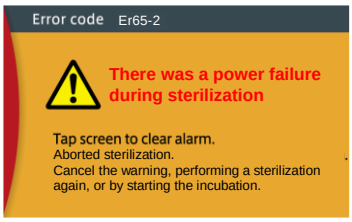
Error indications and solutions

Error No.	Error name	Display	Solution
Er61-1	CO_2 concentration upper limit deviation error		This error occurs when CO_2 concentration stabilized at the set concentration and then remained at a concentration 1% higher than the set concentration for 15 minutes or more. Call for service if the error is not cancelled even if power is restarted.
Er61-2	CO_2 concentration lower limit deviation error		This error occurs when CO_2 concentration stabilized at the set concentration and then remained at a concentration 1% lower than the set concentration for 15 minutes or more. Call for service if the error is not cancelled even if power is restarted.
Er64-1	Warning: Outer door opens		The outer door is opened. Please close the outer door.
Er64-2	Warning: Outer door and glass door open		Outer door and glass door are opened. The operation stops. Please close the doors.
Er64-3	Warning: Glass door opens		The glass door is opened. Please close the glass door.
Er65-1	Door open alarm during sterilization		This error occurs when the door is opened at the sterilization temperature (160℃). Repeat sterilization or proceed to incubation.

※ When more than one errors occur, they will be displayed in turn.

10. Troubleshooting

Error indications and solutions

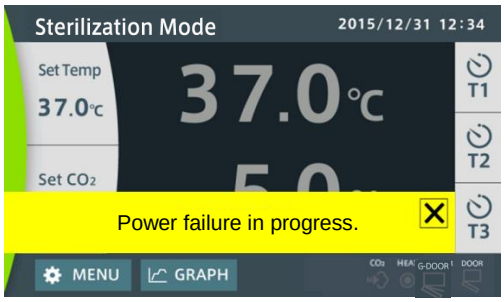
Error No.	Error name	Display	Solution
Er65-2	Power failure alarm during sterilization		This error occurs when power supply is cut off during sterilization at the terilization temperature (160℃). Repeat sterilization or proceed to incubation.

※ When more than one errors occur, they will be displayed in turn.

10. Troubleshooting

Error indications and solutions

List of notices



←Notices will be indicated at the position in the left figure.

Symptom	Indications	Solutions
Door open	Door ajar.	Close the door.
The sterilization operation ends normally	Sterilization has been normally completed.	Notifies that sterilization has been completed without trouble.
Recovery from power outage (Including normal ELB ON)	Power failure in progress.	Please confirm whether the equipment and samples are abnormal.
T1 time up	Timer T1 has timed out.	Please stop the timer. (Refer to P.34 "Timer function")
T2 time up	Timer T2 has timed out.	Please stop the timer. (Refer to P.34 "Timer function")
T3 time up	Timer T3 has timed out.	Please stop the timer. (Refer to P.34 "Timer function")
HEPA filter replacement timing ※	Replace HEPA filter.	Replace the HEPA filter. (After replacement of the HEPA filter, execute HEPA filter replacement timing reset from the MENU screen)

※ Displayed when an option is set.

・Eliminate the notice by touching the × mark. Any notices except for “Power failure recovery” notice will appear again after a certain period of time. (The notice will be cancelled when the cause is eliminated)

Solutions
● When an error occurs and needs a service, record the error code, immediately transfer the samples to another equipment and turn the ELB off. ● If an error occurs, need to replace the parts or inspect the equipment. Please contact YAMATO SCIENTIFIC CO., LTD. with hotline (+81-3-5548-7122). Also, when contacting, be sure to tell the error code.

10. Troubleshooting

Fault diagnosis

Symptom	Causes	Solution
The unit will not operate even if the ELB is turned ON.	●User's power supply is defective. ●ELB is defective.	●AC220V±10％ ●Replace
Temperature will not rise.	●Too many samples are loaded. ●Heater disconnection ●SSR is defective. ●Operation panel is defective.	●Samples shall be 70％ or less to the shelf plate area. ●Replace ●Replace ●Replace
Temperature setting does not match the indication.	●Does not reach a stable state ●Door/Frame heater control amount is large. ●Temperature controller is defective.	●Wait until stabilize ●Lower the setting ●Replace
Temperature in the chamber is unstable or high.	●Too many samples are loaded. ●Environmental temperature change is wide. ●Door/Frame heater control amount is large. ●Fan in chamber is defective. ●Temperature controller is defective.	●Samples shall be 70％ or less to the shelf plate area. ●Adjust environmental temperature. ●Lower the setting ●Replace ●Replace
CO_2 concentration will not rise at all	●CO_2 gas cylinder gas pressure is insufficient. ●Solenoid valve is defective. ●Air filter is clogged. ●CO_2 concentration controller is defective.	●Replace the gas cylinder ●Replace ●Replace ●Replace
CO_2 concentration setting does not match the indication.	●Does not reach a stable state. ●CO_2 gas cylinder secondary pressure adjustment is incorrect. ●CO_2 concentration controller is defective. ●Filter is clogged. ●CO_2 sensor filter is clogged.	●Wait until stabilize ●Replace ●Replace ●Replace ●Replace
CO_2 concentration rise is slow or unstable.	●CO_2 gas cylinder secondary pressure is insufficient. ●Inner door sealing strip is defective. ●Cable hole is not plugged. ●Air filter is clogged. ●CO_2 concentration controller is defective. ●Fan in chamber is defective. ●CO_2 sensor filter is clogged.	●Adjust ●Replace ●Set a silicone plug. ●Replace ●Replace ●Replace ●Replace
Humidity will not rise	●Humidifying water is insufficient. ●Temperature is unstable. ●Cable hole is not plugged. ●Door open/close is too frequent. ●Door/Frame heater control amount is large. ●Temperature controller is defective.	●Add water. ●Wait until stabilize ●Set a silicone plug. ●Reduce the number of open/close. ●Lower the setting ●Replace
Condensation occurs on the glass door (inner door)	●Door heater control amount is low. ●Temperature controller is defective. ●Door heater disconnection	●Increase the heater control amount ●Replace ●Replace

10. Troubleshooting

Fault diagnosis

Chamber temperature is ¯ ¯ .¯℃	●Temperature sensor is defective.	●Replace
Chamber temperature is ¯ ¯ .¯℃	●Temperature sensor is defective.	●Replace
CO_2 concentration is ¯ ¯ .¯℃	●CO_2 sensor is defective. ●Solenoid valve is defective.	●Replace ●Replace
CO_2 concentration is ¯ ¯ .¯℃	●CO_2 sensor is defective. ●Wrong 0 adjustment	●Replace ●Redo 0 adjustment.
CO_2 concentration is ¯ ¯ .¯℃	●During warming-up ●CO_2 sensor is defective.	●Standby ●Replace

11. After sales service and warranty

When requesting a repair

When requesting a repair

If any trouble occurs, immediately stop operation, turn the power switch 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
- ●Description of trouble (as in detail as possible)
- ●Samples in use (whether it's toxic, pathogenic)

See the warranty card or the nameplate installed on the unit.

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

Minimum holding period of repair parts

The minimum holding period of repair parts for this equipment is 7 years after end of production. Repair parts here refer to parts necessary for maintaining performance of the equipment.

12. Specifications

Model			IPE610	
Operating temperature range			18-30℃ (for indoor use only)	
Operating altitude height			Used below altitude 2000 meters	
Operating ambient humidity			≤80%RH	
Function			Incubate the biological cells, tissues and bacteria	
System	Heat		Air jacket	
	Humidify		Water evaporates naturally through humidifying tray	
	CO_2 concentration control		CO_2 sensor detection control	
	Stir		Weak wind circulation through electric fan	
Performance ※1	Operating temperature range		RT+5.0℃～60.0℃ (operate at 37℃, RT is less than 30℃)	
	Operating humidity range		More than 90％RH	
	CO_2 concentration control range		0.0 (at atmospheric pressure)～20.0％	
	Temperature fluctuation (CO_2 concentration 0.0%)		±0.3℃ (at37.0℃)	±0.5℃ (not 37.0℃)
	Temperature uniformity (CO_2 concentration 0.0%)		±0.5℃ (at37.0℃)	±1.0℃ (not 37.0℃)
	CO_2 concentration display error (at37℃)		±0.2％	
	CO_2 concentration control error (at37℃)		±0.5% (at5.0%)	±1.0% (not 5.0%)
	Dry heat sterilization operation		160℃ Hold for 2 hours	
Structure	Exterior		Cold rolled steel plate with chemical resistant coating	
	Inner chamber		Stainless steel plate	
	Inner door		Tempered glass	
	Heat insulation material		Glass wool	
	Fan motor		Shaded pole motor	
	Heater	Air jacket	Aluminum foil t3 heater 470W	
		Auxiliary	Heating wire 20W	
		Door	Aluminum foil heater 300W	
		Frame	Heating wire 90W	
	Sensor	Temperature control/indication	Platinum temperature measurement resistor Pt100Ω	
		Individual overheat protector	K Thermocouple	
	Cable hole		I.D.φ32mm (back of main body)	
	Legs		Level adjuster (adjuster)	
	CO_2 sensor		NDIR (New single light source · dual wavelength system)	
Controller	Temperature controller		7” color LCD, resistive touch panel	
	Temperature control system		PID control	
	Additional function		Temperature output terminal, CO_2 concentration output terminal, external alarm output terminal, various history display, trend graph, USB data output	
Safety function			Self diagnosis (temperature sensor error, heater disconnection, SSR short circuit, main relay malfunction, Door open alarm, temperature upper/lower limit error, CO2 concentration upper/lower limit error), independent overheat protector, ELD with overcurrent detection function	

12. Specifications

Model		IPE610
Standard	Internal dimension ※2	W485×D540×H640mm
	External dimension ※2	W600×D664(765)×H880mm
	Internal capacity ※2	Approx. 185L
	Effective internal capacity	Approx. 129L
	Withstand load of shelf plate	7kg/pc
	Shelf rest steps	12 steps
	Rated voltage	220V～ 50/60Hz
	Rated current	4.2A (ELB capacity 10A)
	Weight (kg)	Net weight: 142kg
Accessories		Shelf plate 4pcs, shelf rest 8pcs, humidifying tray 1pc (including cover), CO_2 supply hose φ7×φ10×2m, sampling tube φ5×φ7×0.7m, hose clamp 2pcs, cable hole silicone plug 2pcs, 250V 2A fuse tube 1pc, gas sampling port thread cap 1pc, power cord 1pc, instruction manual, warranty card

※1 Performances have been measured at power 220V～ 50Hz, RT 22℃±3℃, humidity 60％RH±20％ and no-load.

The operating environmental temperature range of the unit is 18℃～30℃.

※2 Protrusions are excluded.

13. Optional parts

List of optional parts

Item name	Product code	Remarks	Set contents
Standard shelf plate		Used when you want to add samples in the inner chamber. Same with the attached shelf plate.	Standard shelf plate 1pc
Standard humidifying tray		Same with the attached humidifying tray.	
Stacking stand		When placed in 2-layer way, the fixed fittings will be used.	
Insulation stacking stand		When placed in 2-layer way, the fixed fittings will be used. This enables dry heat sterilization in the lower layer and incubation in the upper layer simultaneously in the 2-layer stacking condition. Used for 2-layer stacking.	Fixed fitting 4pcs Fixed screw 8pcs
Low floor stand with caster		Low floor stand. Easy to move with casters. Used for 2-layer stacking.	Stand 1pc Fixed fitting of main body 4pcs Fixed screw 8pcs
Stand		Stand used for assembling and fixing for one unit.	Stand 1pc Fixed fitting of main body 4pcs Fixed screw 30pcs
Antirust agent for humidifying tray		Add to humidifying tray to inhibit microbial reproduction	
External communication adapter		RS485 to USB converter	
Pressure reducing valve assembly		Used for CO_2 gas supply system. When there is CO2 gas supply system, used when the outlet pressure of the gas supply system is below 0.03MPa.	Precision pressure reducing valve 1
Pressure reducing valve assembly		Used for CO_2 gas cylinder. When using CO2 gas cylinder, used when there is no pressure reducing valve on the gas cylinder	Pressure reducing valve; 1 Precision pressure reducing valve 1
CO_2 switching valve assembly		When the CO_2 gas cylinder is empty, it automatically switches to the reserve cylinder.	

※1 Please inform in advance when placing an order for the main body.

Combination for 2-layer stacking is as follows.

Lower layer	Upper layer	Applicable option
IPE610	IPE610	Insulation stacking stand ×1
BNA610	IPE610	Main body stopper ×4 or Insulation stacking stand ×1

※1 Please inform in advance when placing an order for the main body.

13. Optional parts

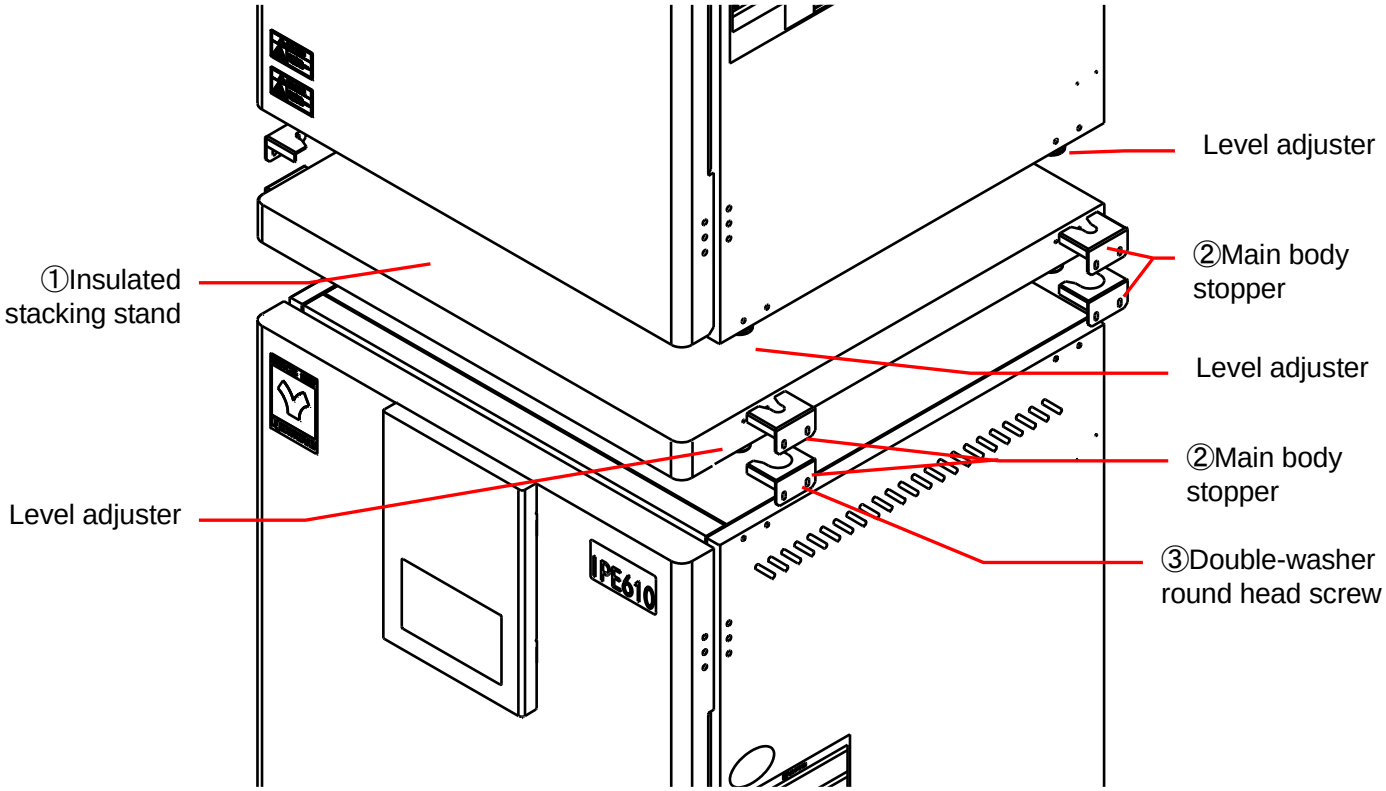
Insulated stacking stand

List of packing parts

No.	Part name	Qty.
①	Insulated stacking stand	1
②	Main body stopper	8
③	Double-washer round head screw (M4×8)	16

Installation method

(1) For safety, please pull out the power plug and take out the samples in the equipment.
(2) Remove the resin screws (4 positions) installed on the top of the equipment below.
(3) Please put insulated stacking stand and install with the installation fittings.
(4) Please place the equipment to be installed on the stacking stand.
(5) Use a gradienter to find the levelness of the equipment placed on the stand.
(6) Please align the screw holes and install the main body stoppers according to the figure below.
(7) For safety, please be sure to take anti-falling measures, using steel wires fixed to the anti-falling fittings at the back of main body.



When placing two layers, it is necessary to implement correct anti-falling measures on both the upper and lower layers.

13. Optional parts

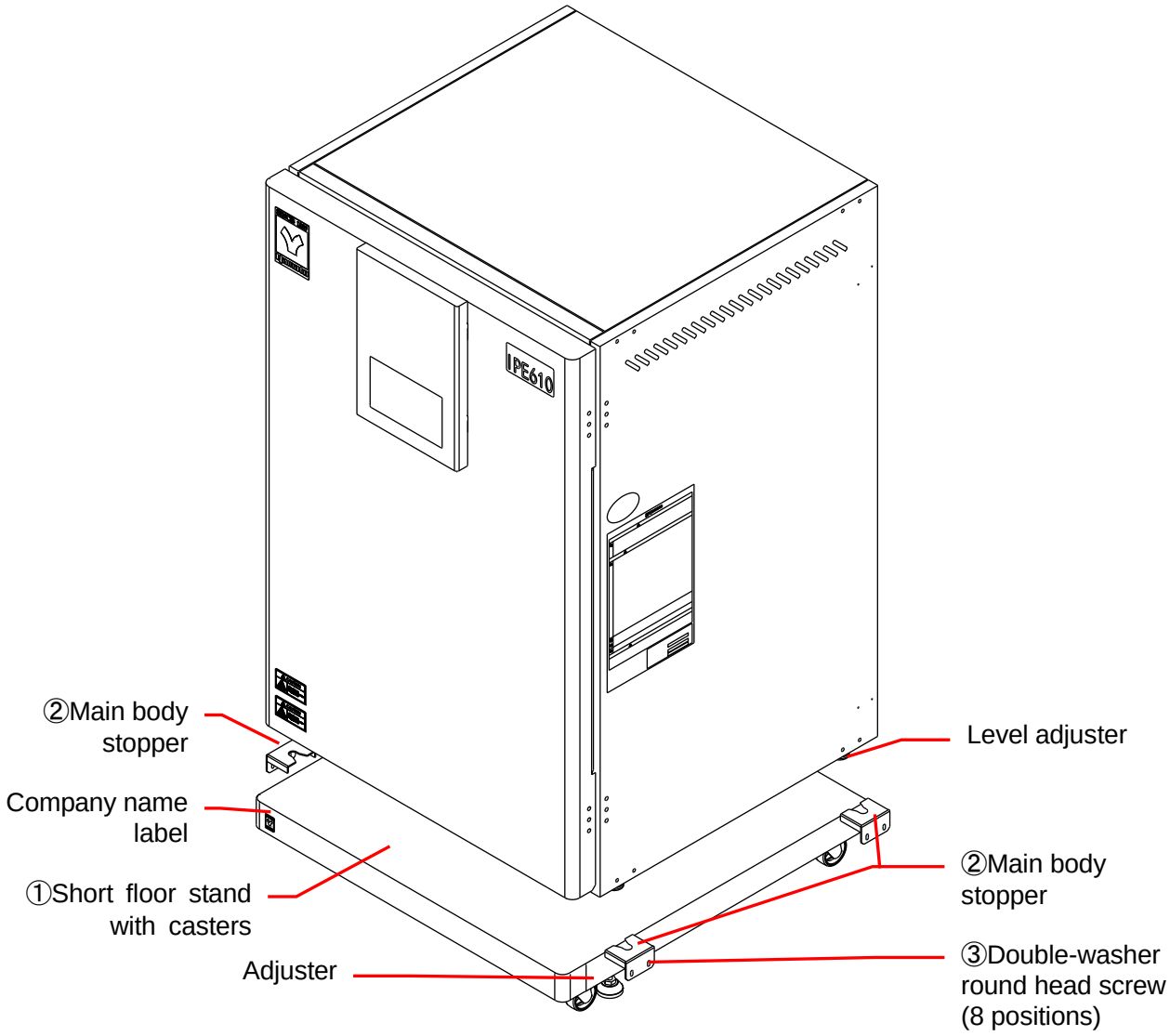
Short floor stand with casters

List of packing parts

No.	Part name	Qty.
①	Short floor stand with casters	1
②	Main body stopper	4
③	Double-washer round head screw (M4×8)	8

Installation method

(1) For safety, please pull out the power plug and take out the samples in the equipment.
(2) Please pay attention to the direction of the stand and place the equipment on the stand.
※ The side with the company name label is the front side.
(3) Align the screw holes and fix the feet of the main body with ②Main body stopper and ③ Double-washer round head screw.
(4) Please fix the stand adjuster to the bottom and use a gradienter to find out the levelness.
(5) Please use a gradienter to find the levelness of the main body.
(6) When placing two layers, it is necessary to implement correct anti-falling measures.



13. Optional parts

Stand

List of packing parts

No.	Part name	Qty.	No.	Part name	Qty.
①	Leg	1	⑤	Main body stopper	4
②	Connecting pipe	1	⑥	Double-washer round head screw (M4×10)	24
③	Stand top plate	1	⑦	M4X8 cross round head screws	6
④	Universal adjusting foot	1			

Stand assembly method

Please refer to the figure below, use and ⑥Double-washer round head screw and ⑦Cross round head screws to assemble correctly.

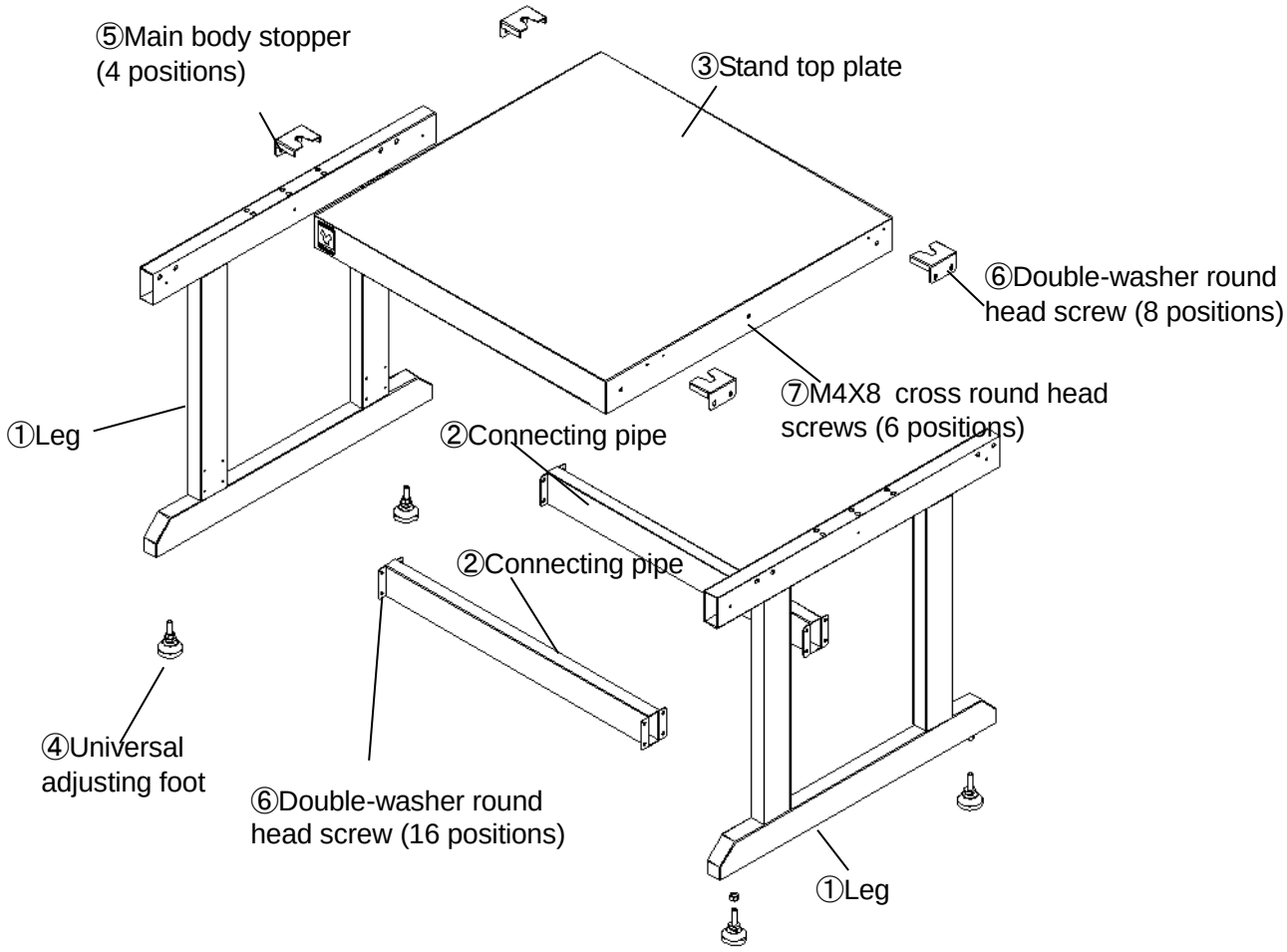
※ During assembly, ensure that the screws are temporarily fixed, and then fixed in place after the whole assembly.

(1) Use ⑥Double-washer round head screw to fix the ①Leg and ②Connecting pipe in place.

(2) Use ⑦Round head screw to fix the ③Stand top plate to ①Leg.

(3) Use ⑥Double-washer round head screw to fix the ⑤Main body stopper to ③Stand top plate.

※ The side with the company name label is the front side.



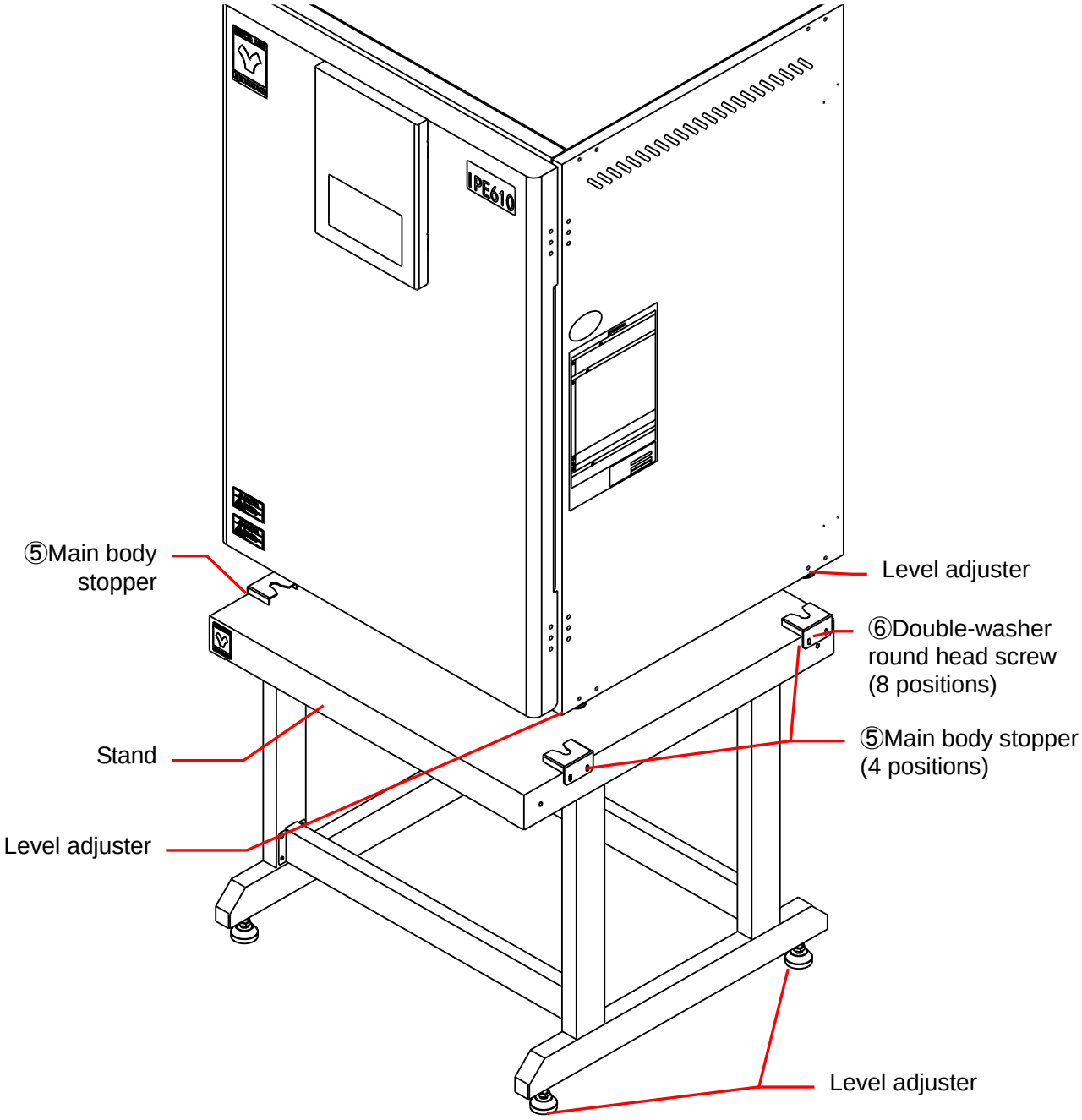
13. Optional parts

Stand

Connection of CO_2 incubator and stand

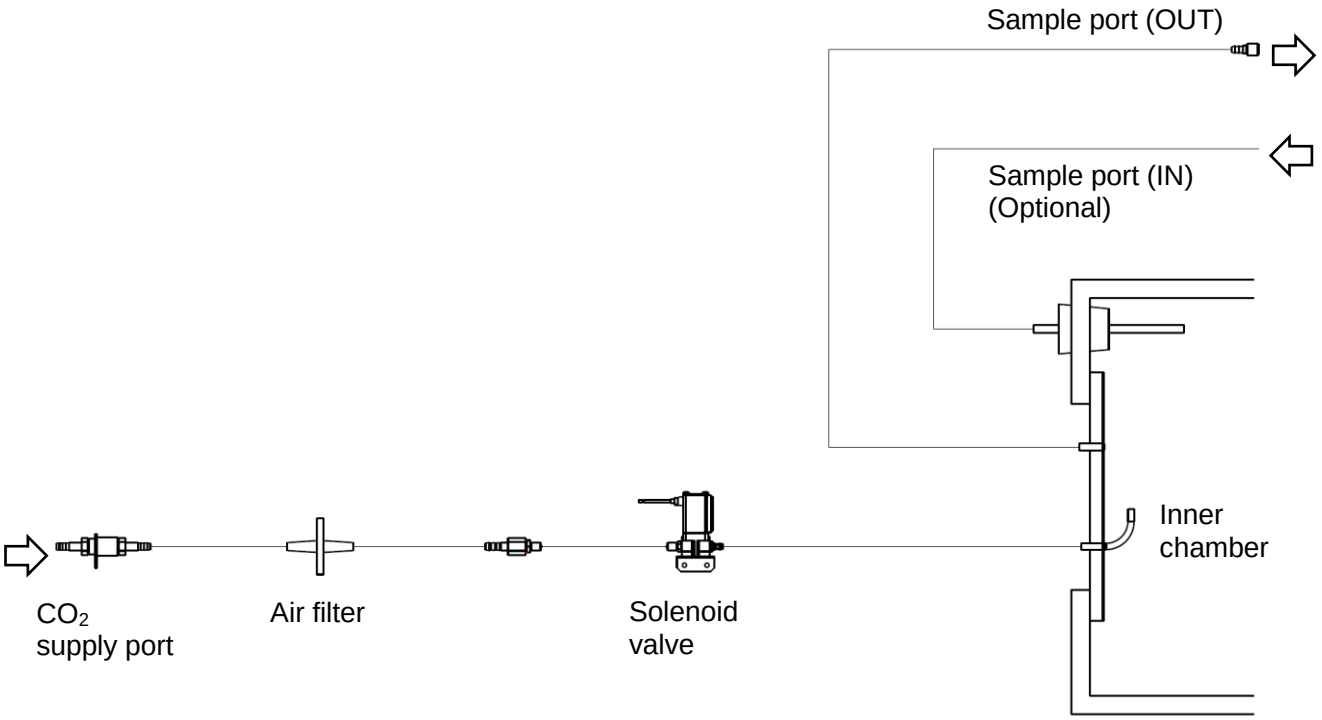
(1) For safety, please pull out the power plug and take out the samples in the equipment.
(2) Please pay attention to the direction of the stand and place the equipment on the stand.
(3) Please adjust the level adjuster screws of the stand, and use a gradienter to find out the levelness.
(4) Please use a gradienter to find the levelness of the main body.
(5) Align the screw holes and fix the legs of the main body with ⑤Main body stopper and ⑥ Double-washer round head screw.

※ Please note: When using this stand, the equipment cannot be placed in 2-layer way.



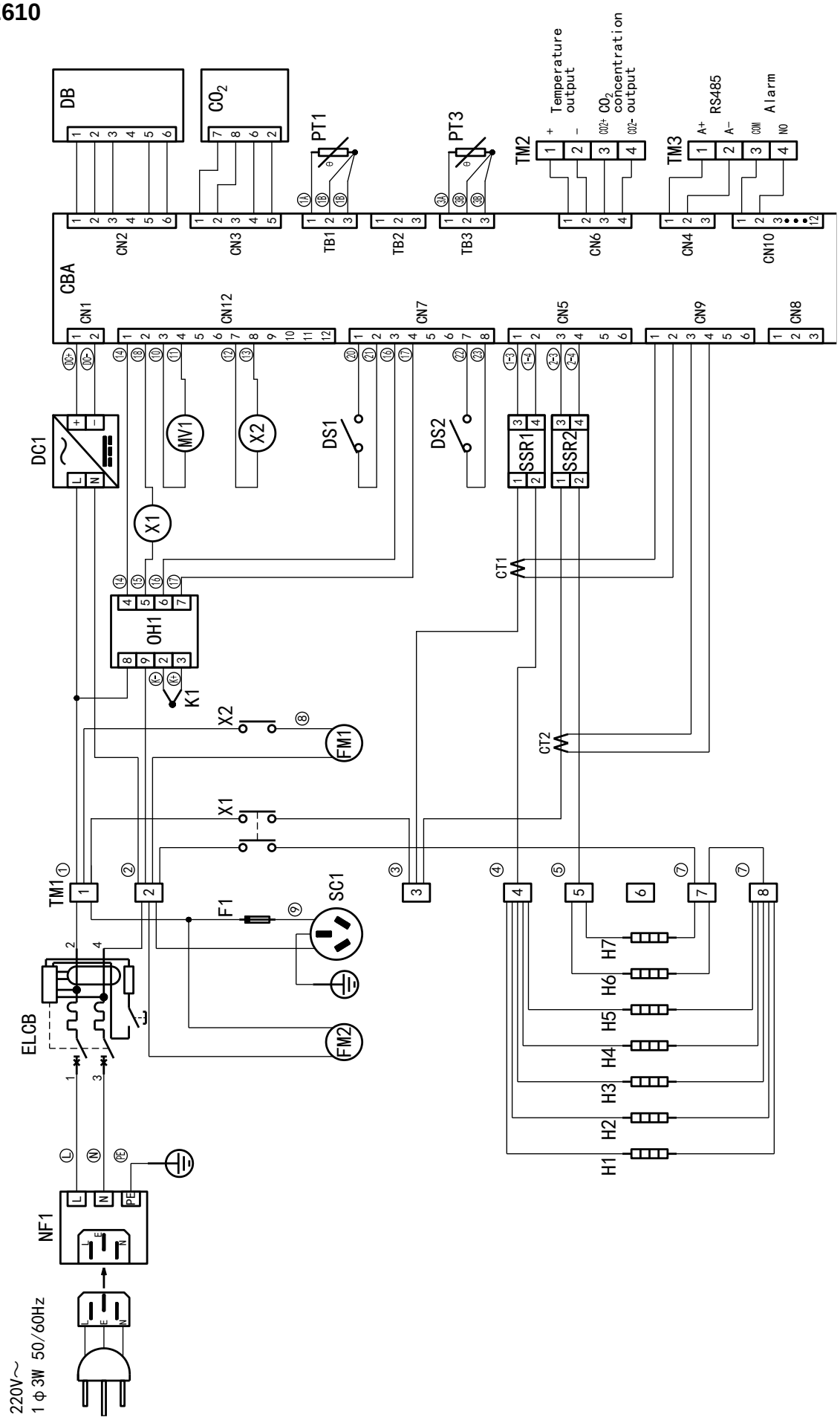
14. Piping diagram

IPE610



15. Wiring diagram

IPE610



15. Wiring diagram

IPE610

Part symbols in the wiring diagram

Symbol	Name	Symbol	Name
NF1	Power filter	X1	Heat master relay
ELCB	Leakage protection circuit breaker (30mA)	X2	Circulating fan start relay
TM1	Wiring terminal block	FM1	Circulating fan
TM2	Output terminal block	FM2	Cooling fan
TM3	RS485 output terminal block	F1	Fuse (250V 2A)
DC1	Switching power supply	SC1	Service socket
CBA	Control board	SSR1	Main heating solid state relay
DB	Display and operation touch screen	SSR2	Door heating solid state relay
CO_2	CO_2 sensor	CT1，2	Current transformer
DS1	Outer door detection switch	H1	Bottom heater
DS2	Inner door detection switch	H2	Left side heater
PT1	Chamber temperature sensor (Pt100)	H3	Right side heater
PT3	Door temperature sensor (Pt100)	H4	Back side heater
K1	Overheat protection sensor (K)	H5	Test port heater (auxiliary)
OH1	Independent overheat protector	H6	Door heater
MV1	CO_2 intake solenoid valve	H7	Door frame heater (auxiliary)

16. List of replacement parts

Symbol	Part name	Code №	Specification	Manufacturer
1	Filter	H051002023	IPE610_01_02-09	Yamato Scientific
2	Baffle glass	H051002022	IPE610_01_02-12	Yamato Scientific
3	Turbine fan	A011603028	J238-112-1153	Yamato Scientific
4	Motor gasket	A081902074	XUE21-007	Yamato Scientific
5	Silicone plug	A070202028	29*37*30	Yamato Scientific
6	Thread cap	A082002013	M6*13	Yamato Scientific
7	Intake pipe (CO_2 supply)	A080807116	φ7*φ10, transparent PVC 2m	Yamato Scientific
8	Clamp (for CO_2 intake pipe)	A080912033	φ6-φ12	Yamato Scientific
9	Sampling tube	A080807113	φ5*φ7 0.7m	Yamato Scientific

17. List of dangerous substances

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

Explosive substance	Explosive substance	①Nitroglycol, glycerine trinitrate, cellulose nitrate and other explosive nitrate esters
		②Trinitrobenzen, trinitrotoluene, picric acid and other explosive nitro compounds
		③Acetyl 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	①Potassium chlorate, sodium chlorate, ammonium chlorate, and other chlorates
		②Potassium perchlorate, sodium perchlorate, ammonium perchlorate, and other perchlorates
		③Potassium peroxide, sodium peroxide, barium peroxide, and other inorganic peroxides
		④Potassium nitrate, sodium nitrate, ammonium nitrate, and other nitrates
		⑤Sodium chlorite and other chlorites
		⑥Calcium hypochlorite and other hypochlorites
	Flammable substances	①Ethyl ether, gasoline, acetaldehyde, propylene chloride, carbon disulfide, and other substances with ignition point at a degree 30 or more degrees below zero.
		②n-hexane, ethylene oxide, acetone, benzene, methyl ethyl ketone and other substances with ignition point between 30 degrees below zero and less than zero.
		③Methanol, ethanol, xylene, pentyl acetate, (a.k.a.amyl acetate) and other substances with ignition point between zero and less than 30 degrees.
		④Kerosene, 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 gases combustible at 15 degrees at one air pressure.

18. 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.	Judge ment

№	Item	Implementation method	TOC No. Reference page of the operating instruction manual	Judge ment
Specifications				
1	Accessories	Confirm quantity according to accessories column	12. Specifications P.74	
2	Installation	·Visual check of environmental conditions Caution: Take care for environment	4. Before use ·Installation P.13	
		·Securing a space		
		·Installing the adjusters ·Connecting the CO_2 gas cylinder ·Sterilization・disinfection in the chamber ·Installing the shelf plate ·Installing the humidifying tray	4. Before use P.13 5. Installation procedures ～28	
Operation related matters				
1	Power source voltage	·Use multimeter to detect the voltage at the user side (socket, etc.) ·Measurement of voltage during operation (within standard) Note: When installing plugs and protective switches, please use items that meet specifications	4. Before use ·About the power supply P.14 ·Be sure to connect the ground wire… P.15 12. Specification ・Specifications - Power supply P.74	
2	Starting operation	·Starting operation	5. Installation procedures P.17 7. Operating procedures ·Operating procedures P.32～59	

18. Standard installation manual

№	Item	Implementation method	TOC No. Reference page of the operating instruction manual	Judgement
Description				
1	Operational descriptions	Explain operations of each component according to the operational instructions	7. Operating procedures ·Operating procedures P.32～59 1. Safety precautions P.1～5 17. List of dangerous substances P.85	
2	Error codes Maintenance and inspection	Explain the customer about error codes and procedures for release according to the operational instructions Explain operations of each component according to the operational instructions	10. Troubleshooting ～11. After sales service and warranty P.65～73	
3	Completion of installation Entries	・ Fill in the installation date and the installation mgr. on the nameplate of the main unit ・Fill in necessary information to the warranty card and hand it over to the customer ・Explanation of the route for after-sales service	8. Maintenance procedures ·Daily inspection/ maintenance P.60～63	
4	Operational descriptions	Explain operations of each component according to the operational instructions	11. After sales service and warranty P.73	

Limited liability

Be sure to use this Equipment strictly following the handling and operating instructions in this Instruction Manual.
Yamato Scientific assumes no responsibility for accident or malfunction caused by inappropriate operation of this Equipment in any way not specified in this Instruction Manual.
Never attempt to perform matters prohibited in this Instruction Manual.
Otherwise, unexpected accident may result.

Notice

●Descriptions in this Instruction Manual are subject to change without notice.
●Our company will replace this Instruction Manual with missing page or paging disorder.

Instruction Manual
CO_2 Incubator
Model IPE610
First edition Mar. 5, 2025
Revised on

YAMATO SCIENTIFIC CO., LTD.
Harumi Triton Square Y-36F, 1-8-11 Harumi,
Chuo-ku, Tokyo 104-6136, Japan
Tel : +81-3-5548-7122
Fax : +81-3-5548-0132
https://www.yamato-scientific.com/