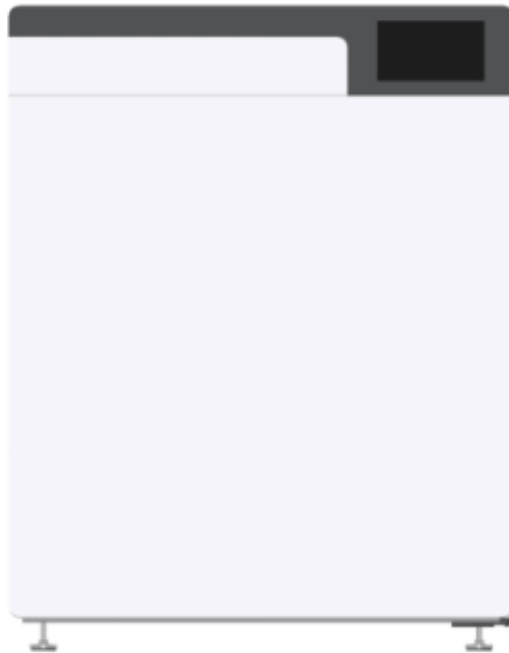


ARA CO₂ INCUBATOR

ARA P series

P170



ARA

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1. Safety Considerations

1-1. General Precautions



The following User Manual describes product functions, usage procedures and safety precautions during use. Read this instruction manual thoroughly before use.

1. Locate the instrument on a flat and leveled location.
2. Do not move the instrument during use.
3. Check the voltage before connecting power to avoid damaging the instrument due to incorrect voltage.
4. Before connecting the power, check the rated voltage.
5. Only use accessories and components provided or approved by Hanil.
6. Only insert designated container or sample do not insert anything else.
7. Avoid using the instrument in a flammable or radioactive environment.
8. Do not insert volatile or flammable substance inside the instrument.
9. For CO₂ supply, it is recommended to use gas regulator endorsed by Hanil at below 0.9 kgf/cm³ (13PSI). Connect the gas supply correctly to avoid CO₂ leakage or exceeding permitted CO₂ concentration range.
10. If unusual odor or smoke occurs, immediately disconnect the main power and contact Hanil Technical Support Team.
11. Do not remain the door open for a prolonged period during use.
12. Do not rest other objects on top of or next to the instrument.
13. Avoid using organic solvent and instead use neutral detergent for cleaning.
14. Always disconnect the power supply prior to cleaning.
15. Remove water from humidity pan and unplug the power cord when the instrument is to remain unused for an extended period.
16. All repairs and internal maintenance must be performed by qualified service personnel from Hanil.
17. Thoroughly remove any contamination when requesting repair or maintenance.
18. Do not use multiple instruments simultaneously when plugged to multi-outlets.
19. Do not touch instrument or power plug with wet hands.
20. Do not apply excessive force to the instrument.
21. Contact Hanil regarding instrument repair.

1-2. Pictograph

General Danger



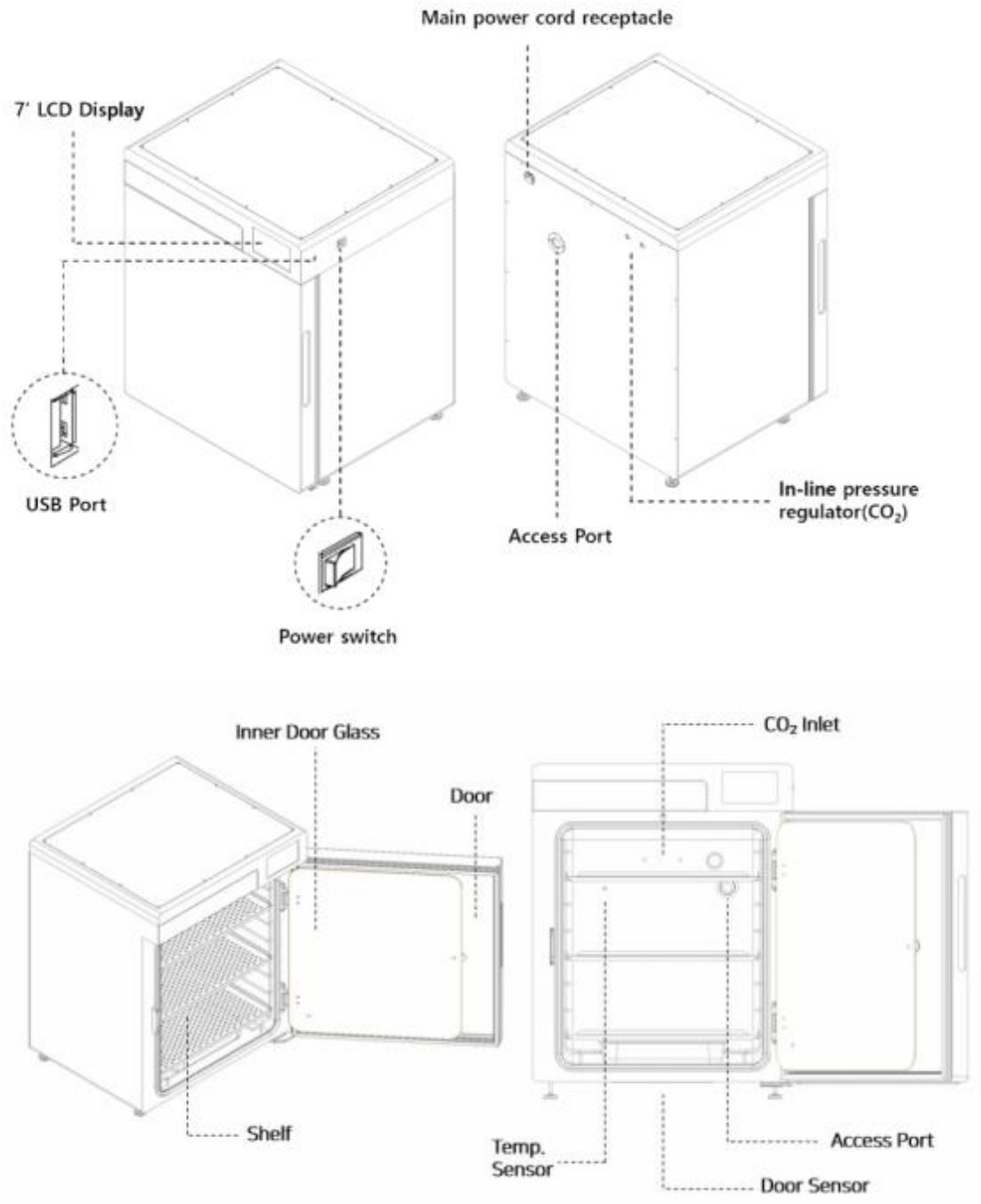
Potential electrical hazards

1-3. Electrical Precautions

1. Only use power cable provided with the product.
2. Plug the power cable to a grounded outlet.
 - To check whether the outlet is grounded, contact a professional electrician or Hanil Technical Support Team.
3. Install the instrument in a way that prevents the power cable from being stepped.
4. Do not rest any objects on top of the power cable.
5. If the following cases occur, turn off the instrument immediately, unplug the power cable from the outlet and contact Hanil Technical Support Team.
 - The instrument makes unusual noise or odor
 - The power cable is worn out or damaged.
 - Spilled liquid on the instrument
 - Water entered the instrument
 - Parts of the instrument is damaged

2. Product Description

2-1. Exterior Description



2-2. Product Components



- When the product arrives, check if there exists any damage to the package.
- If there is damage on the package, contact the vendor immediately.
- Contacts are located on the bottom of the user manual and the label on the product exterior.

1. After purchase, open the packing box and confirm that everything under the component list is present.

Components List

Quantity	Content
1	Main Unit
1	User Manual
1	AC Power Adapter (180mm)
1	Humidity Pan
2	Shelf Channels (Left, Right)
3	Shelves
3	CO ₂ Supply Pipe

2-3. Technical Specification


Type	Content
Model Name	ARA P170
Instrument Dimension (WxDxH)	726 x 651 x 935mm
Chamber Dimension (WxDxH)	560 x 470 x 650 mm
Shelf Dimension (WxDxH)	536 x 461 x 25 mm
Weight	96 kg
Interior Volume	170L
Cabinet Material	Stainless Steel
Inner Door Material	Tempered Glass
Shelf Material	Stainless Steel
LCD Size (Resolution)	7 inch (WVGA, 800 x 480)
Heating Method	Directing Heating
Humidifying Method	Pan Evaporation
Temperature Control	Microprocessor PID Controlled 7-Channel Temperature Sensor (PT100) (Resolution: 0.1°C)
CO ₂ Concentration Control	Microprocessor PID Controlled Non-Dispersive Infrared

	Sensor (Resolution: 0.1%)
Configuration Display	Digital Display
In-Chamber Air Circulation	Fan-less Passive Ventilation
Alarm	Temperature, CO ₂ Concentration
CO ₂ Supply Tube Outer Diameter	12 mm
CO ₂ Supply Pressure	0.9 (Less Than 13 PSI)
CO ₂ Fill Inner Diameter	8 mm
Sterilization	Dry Sterilization (120C)
Accessories	AC Power Code (1), Humidity Pan (1), Shelves (3), Shelf Channels (2), CO ₂ Supply Pipe (3m)
Electrical Specification	220 V (50/60)
Max Power Consumption	1.1 kW
Temperature Control Range	Room Temperature +5~50 °C
Temperature Stability	±0.2°C (@ 37°C)
Temperature Uniformity	±0.3°C
Temperature Recovery Time	Within 10 minutes (recovery to 37°C after opening the inner door for 30 seconds)
CO ₂ Control Range	0~20%
CO ₂ Stability	±0.1% (at 5% set concentration)
CO ₂ Uniformity	±0.1%
CO ₂ Recovery Time	Within 10 minutes (recovery to 5% after opening the inner door for 30 seconds)
Humidity Range in Chamber	95%
Usable Ambient Temperature	14~32°C
Usable Relative Humidity	~80%
Maximum Shelf Capacity	15 kg
Appropriate Shelf Capacity Ratio	~50%


3. Product Installation

3-1. Caution during Installation

- Improper installation can cause malfunction during use.
- Contact Hanil Technical Support Team when the instruments need to be moved and reinstalled.


	Install the instrument on a firm level surface.
	During installation, maintain a 15cm clearance behind the instrument and 10cm ventilation space on each side of the unit.
	Plug the AC power cord attached to the back of the instrument into a grounded socket.
	Do not place flammable or explosive substance next to the instrument.
	Avoid installing in an environment containing flammable or corrosive gas.
	Avoid installing in a crowded, hot and humid environment or in front of a cooling and heating system to prevent contamination due to airborne microorganism. Installing in a cleanroom is recommended for the most effective culturing condition.
	Do not install the instrument in a humid or wet location to avoid short circuits or electrical injury.

3-2. Caution prior to Use

	Use in an environment with ambient temperature between 14°C and 30°C and relative humidity below 80%. Using the instrument outside of permissible environment can cause malfunction or condensation within chamber.
	Avoid frequently opening and close inner and outer door. Doing so extends the period that the instrument stays below set temperature and CO ₂ concentration.
	Do not insert excessive number of culture dish. Doing so can disturb air circulation and increase temperature. Using up to 50% of the shelf surface is recommended.
	Pre-run the instrument for 1~2 hours before cell culture.
	Do not pull the power plug during use.
	Secure the accessories after checking interior condition, shelf and humidity pan location.

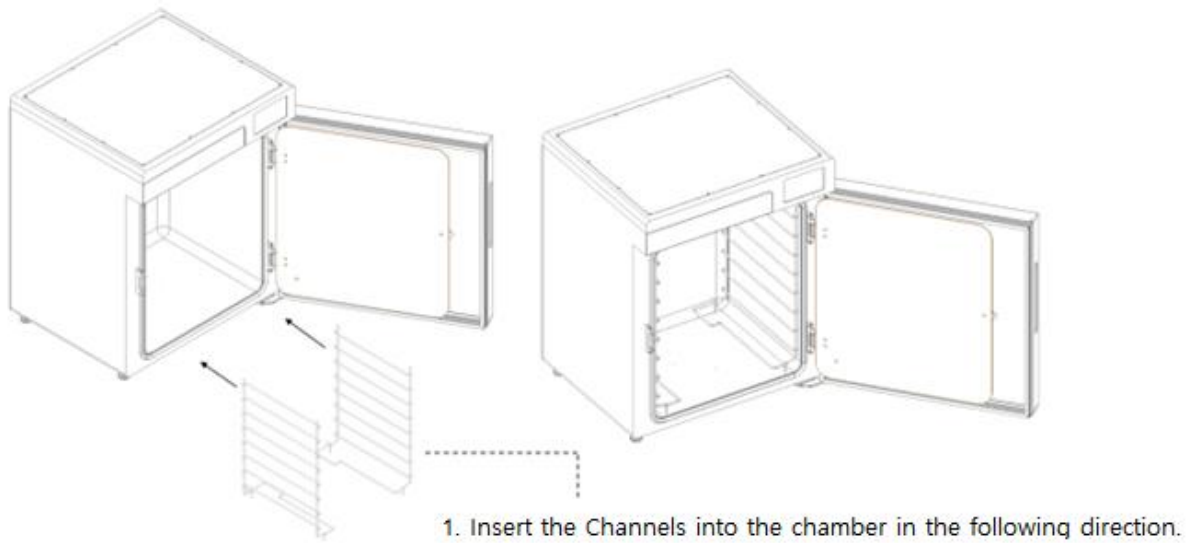
3-3. Preliminary Cleaning

Sterilize and disinfect the chamber and the accessories prior to first use.

	Clean all components with neutral detergent and rinse with distilled water.
	Clean the chamber and its components with clean and soft cloth soaked with 70% ethanol
	Do not use corrosive agents such as sodium chlorate or halogen solutions.
	Do not use cleaning tools with rough surface to avoid scratching the instrument surface.

3-4. Installing the Shelf Channels

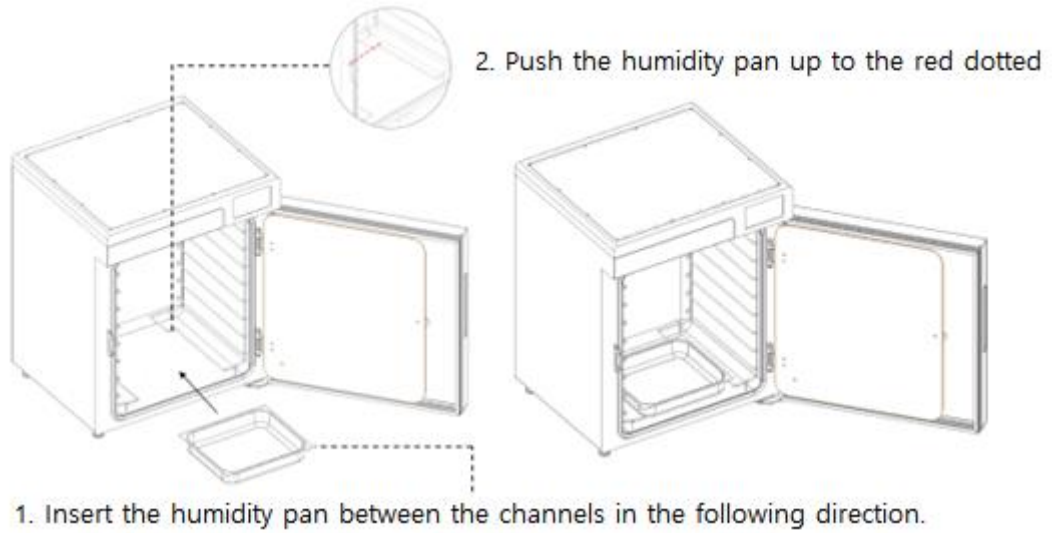
Follow the instruction below when reinstalling shelves support due to cleaning.



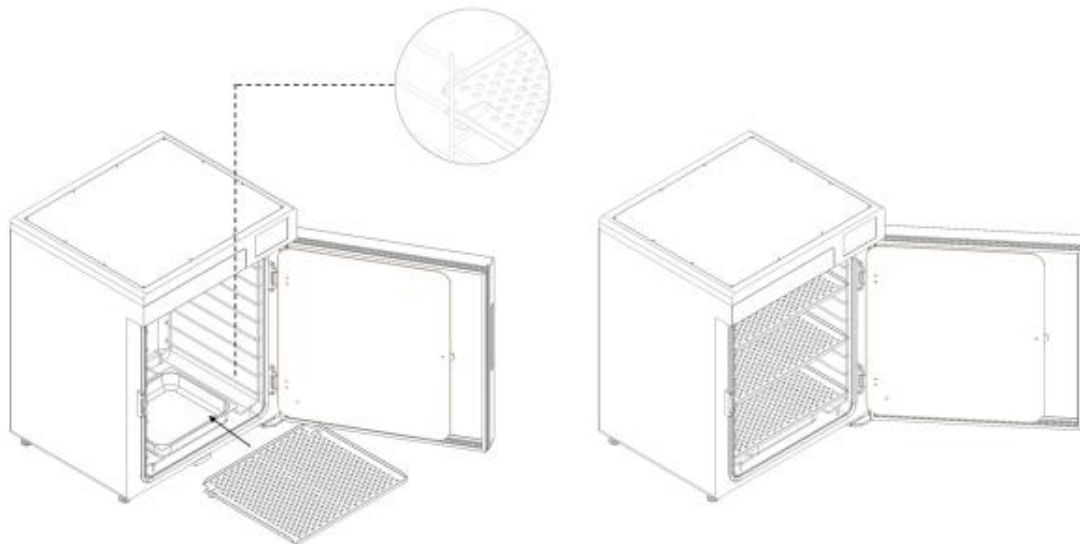
3-5. Installing the Humidity Pan



Only use sterilized distilled water. Do not use ionize water to prevent corroding the humidity pan



3-6. Installing the Shelves

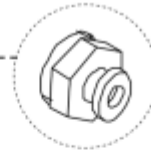


1. Place the latch attached to the bottom of the shelf below the shelf Channels and push the shelves into the chamber.

3-7. Connecting the CO₂ Gas Supply



Close the CO₂ tank valve when connecting or disconnecting CO₂ supply tube.



12mm connector

[CO₂ Connect] Push and secure tube with outer radius 12mm into the inlet located on the back of the instrument.

[CO₂ Disconnect] Push connector entrance and pull the tube to disconnect.

3-8. Connecting Power



Make sure that the power source match the electrical specification on this instrument (220V, 50/60 Hz).

[Turning On]

1. Connect the AC power cord to the power socket located on the rear left of the instrument. Then, connect the power plug into the power outlet.
2. Click the [I] from the [I/O] of the power switch, located at top right of the instrument, to turn on.

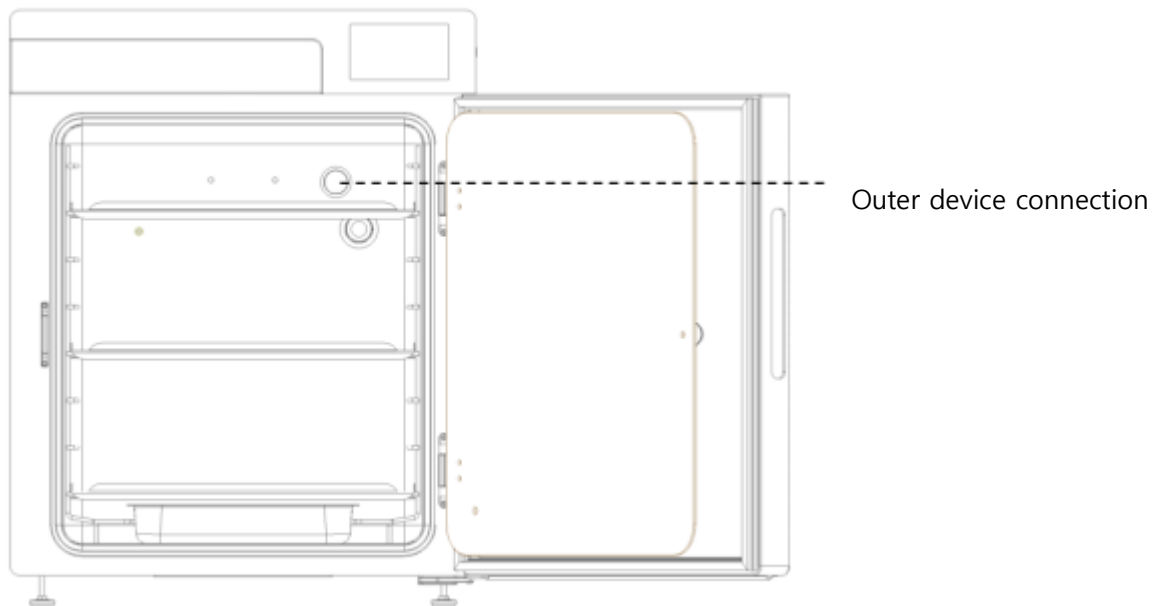
[Turning Off]

1. Press the [I] from the power switch to turn off.

3-9. Connecting External Device Port

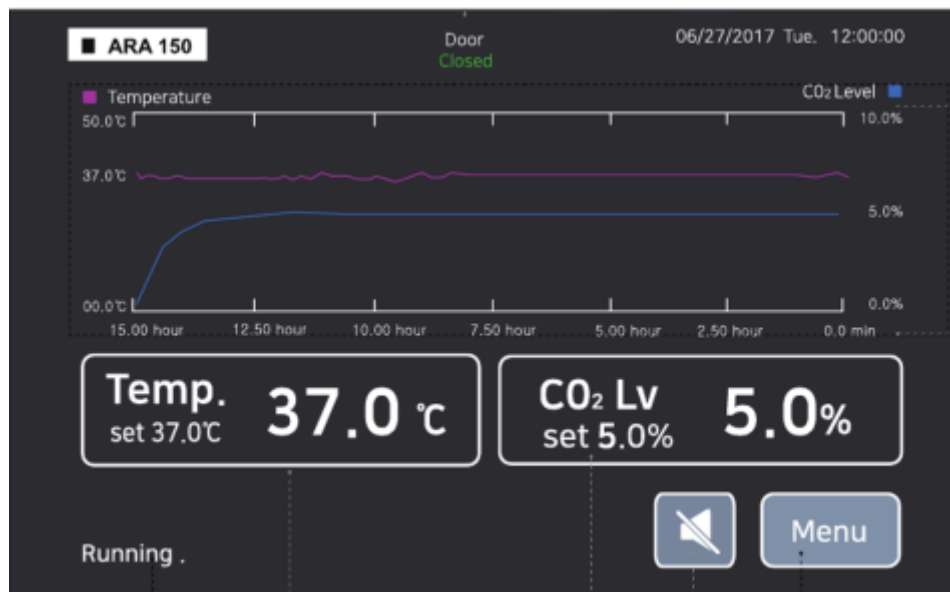
Use the external device port to install external devices such as additional sensors or connect cables to and from the chamber.

Please enclose port with silicon cap after connection. Opening the port can cause micro-condensation around the port.



4. Usage Instruction

4-1. Display



Door Indicator: Displays outer door status

Graph Indicator: Displays Set Temperature, Current Temperature, Set CO₂ Concentration, and Current Co₂ Concentration in real time.

Status Indicator: Displays current operation status and error message

Temperature Indicator: Displays Set and Current Temperature. Touch "Temp." to set temperature.

CO₂ Indicator: Displays Set and Current CO₂ Concentration. Touch "CO₂ Lv" to set CO₂ Concentration.

Alarm Indicator: Turn alarm sound ON/OFF

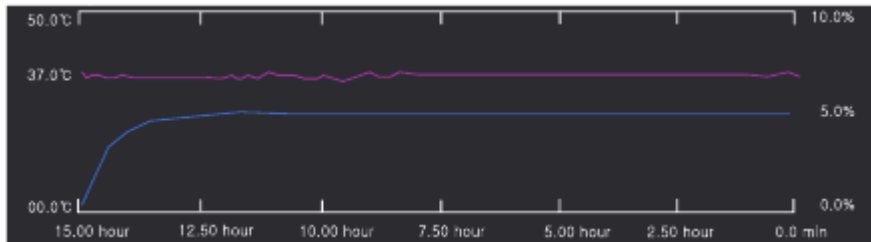
Menu: Displays Operation Log, Date/Time Setting and Sterilization function.

4-2. Status Indicators

[Temperature]

Shows change in temperature over time in a purple graph.

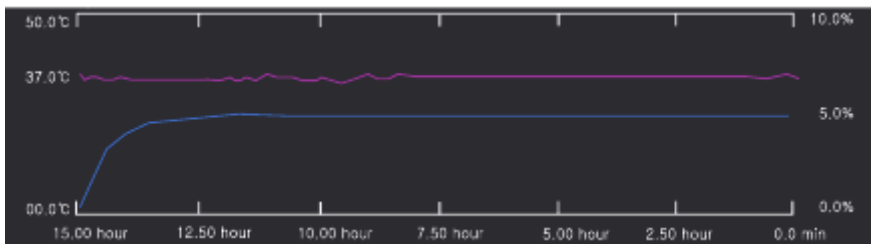
> Temperature Display Range: 0~50°C



[CO₂ Concentration]

Shows change in CO₂ concentration over time in a blue graph.

> CO₂ Concentration Display Range: 0~20%



[All View – Cumulative Temperature/Concentration]

Press "Graph Indicator" and "All View" to view change in temperature and CO₂ concentration over 240-hour period.



[Export – Data Export]

Press "Graph Indicator" and "Export" to save temperature and CO₂ concentration data in the past 240 hours into an USB.



[Clear – Delete Data]

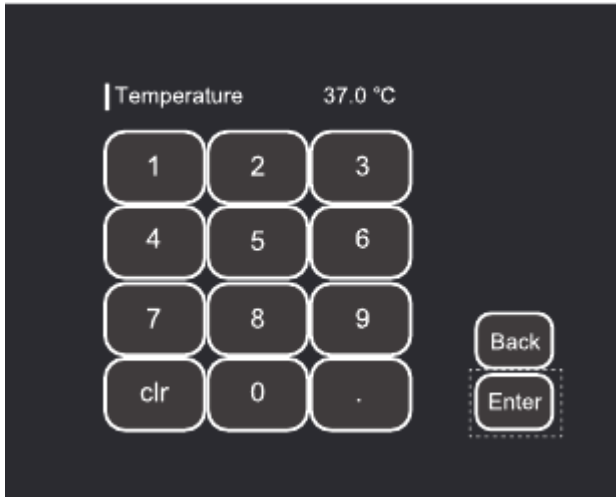
Press "Graph Indicator" and "Clear" to delete and reset the collected data in the past 240 hours.



4-3. Temperature Configuration

1. Press "Temp." form the main screen.

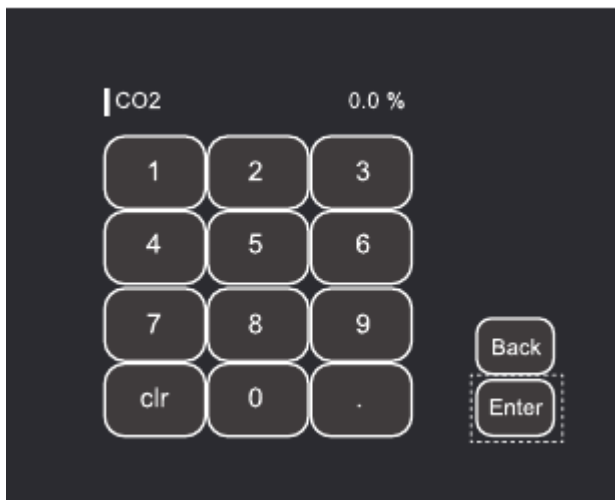




2. Input the desired temperature and press "Enter". Set temperature has range of 0~50°C. When input temperature exceeds the maximum set temperature, 50°C, temperature is set to 50°C.

4-4. CO₂ Concentration Configuration

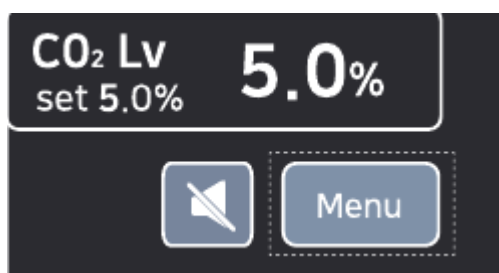
1. Press "CO₂ LV" from the main screen.



2. Input the desired CO₂ concentration and press "Enter". Set concentration has range of 0~20%. When input concentration exceeds the maximum set value, 20%, concentration is set to 20%.

4-5. History

1. Press "Menu" from the main screen.



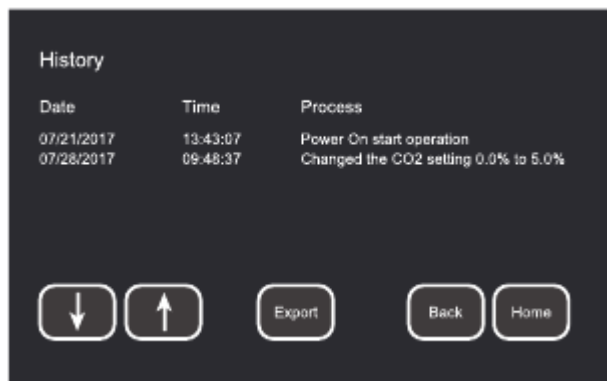
2. Select "History view"



3. The following screen displays the operation log in a chronological order.

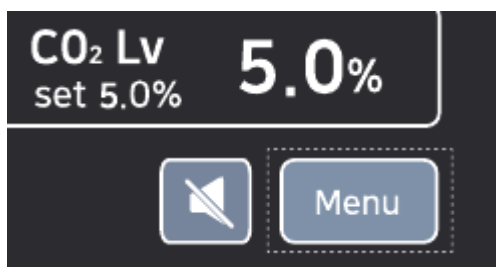
Press "Export" to save log into USB

> Log saves up to 40 lines regardless of time.



4-6. Time Configuration

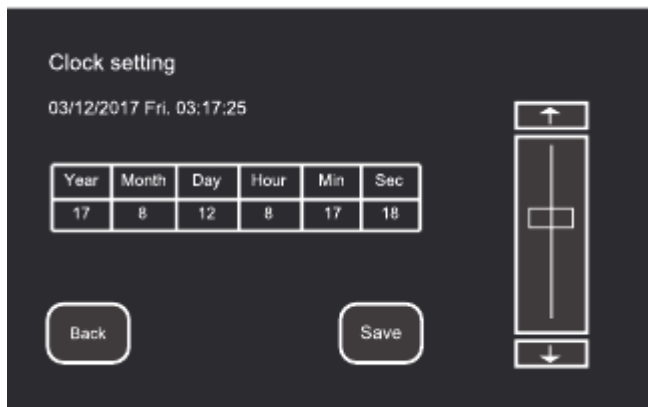
1. Press "Menu" form the main screen.



2. Select "Clock Setting"

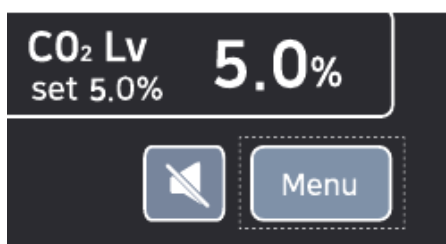


3. Configure each part of time under Year/Month/Day/Hour/Min/Sec by dragging scroll bars up and down. Press "Save" to finalize the configuration.

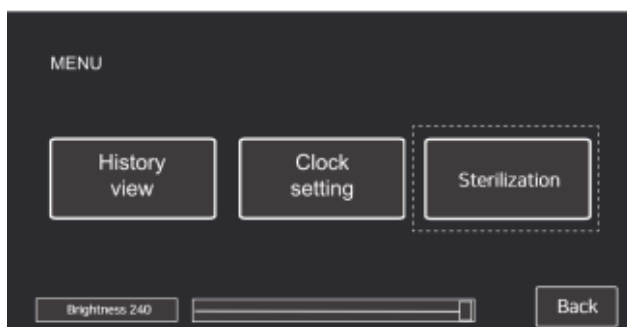


4-7. Sterilization

1. Press "Menu" from the main screen.



2. Select "Sterilization"



3. Screen displays current Chamber temperature. Press "Start" to open "Sterilization" page.

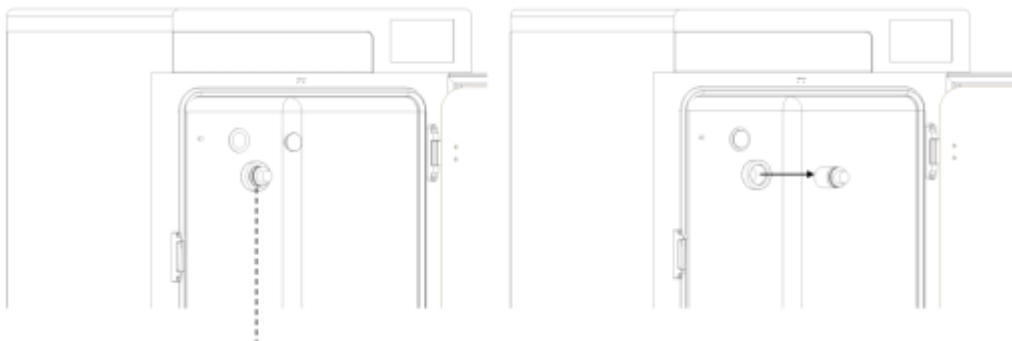
Sterilization is set at 120°C for 4 hours.

Press "Yes" when Sterilization confirmation window opens to start Sterilization.



- Before Sterilization, remove CO₂ Sensor and clean the Chamber.
- Start Sterilization only after removing liquid (sample, water etc.) from the Chamber.
- Refer to the following page to remove CO₂ Sensor.

* CO₂ Sensor Removal



Pull the CO₂ Sensor according to the diagram to remove.

4. Once Sterilization starts, the chamber reaches up to 120°C.

After reaching 120°C, a message saying "Maintaining chamber at 120°C" appears and remains for 4 hours.

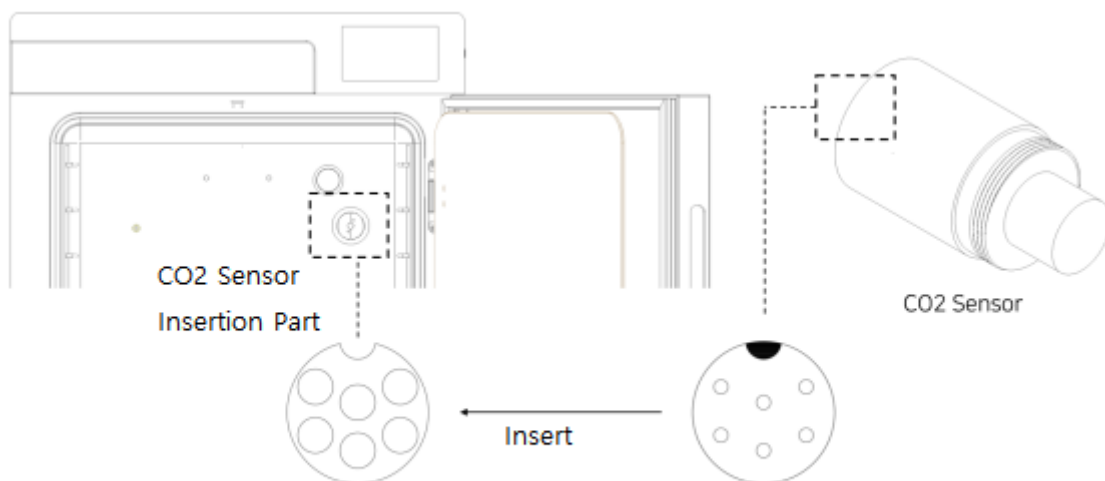


5. After 4 hours of process, a message saying "Cooling down to set temp" appears and returns to set temperature before Sterilization. After returning to set temperature, "Complete the sterilization" message appears and Sterilization will be over.

Press "Home" to return to main screen.



*CO₂ Sensor Insertion



Insert the CO₂ Sensor according to the insertion port depicted in the diagram.

5. Maintenance

5-1. Interior



- Shut down the power before cleaning chamber and exterior.
- Remove the humidity pan when cleaning inside the chamber.
- When cleaning the chamber, avoid exposing CO₂ sensor to water.

1. If the chamber interior is contaminated, shut down the power and wipe out moisture with a dry, soft and clean cloth.
2. When cleaning the chamber interior, apply 70% ethanol to a soft and clean cloth to wipe the chamber and remove moisture with a dry cloth.
3. Do not use chemical reagents such as benzene or paint thinners to prevent damage.

5-2. Exterior

1. Beware of scratches during cleaning or moving.
2. When cleaning the product surface, use a soft clothed applied with neutral detergent to wipe and use a dry cloth to remove moisture.

6. Troubleshooting

6-1. Before Contacting Us

If the instrument malfunctions, first refer to the following checklist

Symptom	Checklist
Power is not turning on.	Make sure that the power cord is connected by checking the power plug.
	Check if the power switch is turned ON.
The chamber temperature is not or takes too long reaching the set value.	Check that the set value matches the desired temperature at the main screen.
	Check that the set temperature is higher than ambient temperature by at least 5°C.
	Check that the inner door is closed.
	Check that the outer door is closed.
	Check if there are devices releasing electromagnetic radiation.
The chamber humidity is low.	Check the distilled water level in the humidity pan.
	If the water level is low, fill 1/2 or 2/3 of the humidity pan with sterilized distilled water.
The CO ₂ usage is abnormally high.	Opening the inner door frequently can cause increase in CO ₂ consumption.
	Check that silicone rubber seal on the inner door is closed completely.
	Check that the CO ₂ tube is connected properly, without punctures.
	Check that the external device port is closed completely.
The CO ₂ concentration is not or takes too long reaching the set value.	Check that the set value matches the desired CO ₂ concentration at the main screen.
	Check that the CO ₂ tank has sufficient level of CO ₂ .
	Check that the CO ₂ tube is connected properly, without punctures.
	If there is an issue with the HEPA filter attached to the CO ₂ tube, contact Hanil Technical Support Team as it can block CO ₂ flow.

6-2. Error Message

If the following Error Message appears, contact Hanil Technical Support Team with the Serial Number at the side of the instrument. Contact for Technical Support Team is at the bottom of the manual.

Error Message	Symptom
E4	Heating wire reached abnormal temperature (more than 50°C).
ES1~ES7	Temperature sensor connection or function is defective.