

INCUBADORA DE CO2 NAHITA - MODELO R50
NAHITA CO2 INCUBATOR – MODEL R50
INCUBATEUR CO2 NAHITA- MODÈLE R50

REF. - CODE - RÉF. JBB020

Nahita



Este manual es parte inseparable del aparato por lo que debe estar disponible a todos los usuarios del equipo. Le recomendamos leer atentamente el presente manual y seguir rigurosamente los procedimientos de uso para obtener las máximas prestaciones y una mayor duración del mismo.

This manual should be available for all users of these equipments. To get the best results and a higher duration of this equipment it is advisable to read carefully this manual and follow the processes of use.

Ce manuel est une partie indissociable de l'appareil et doit être mis à la disposition de tous les utilisateurs de l'équipement. Nous vous recommandons de lire attentivement ce manuel et de suivre scrupuleusement les procédures d'utilisation afin d'obtenir des performances maximales et une plus longue durée de vie de l'appareil.

LANGUAGES

Spanish	1-33
English	34-65
French	66-97

The Nahita CO₂ Incubator model R50 provides stable temperature, CO₂ concentration and saturated humidity to stimulate the growth environment of microorganisms, cells and tissues. It is often used in biological incubation, cell kinetics research, collection of mammalian cell secretions, studies of carcinogenic or toxicological effects of various physical and chemical factors, research and production of antigens, stem cells, tissue engineering, drug screening and other research fields.

Attention

This manual shows the product function, using method, attentions, etc. in detail, for your better understanding, convenient and safe using of this product, we advise you to read this manual carefully before your using.

Note: Not all the functions or parameters described in this manual are present in the Nahita CO₂ incubator model R50.

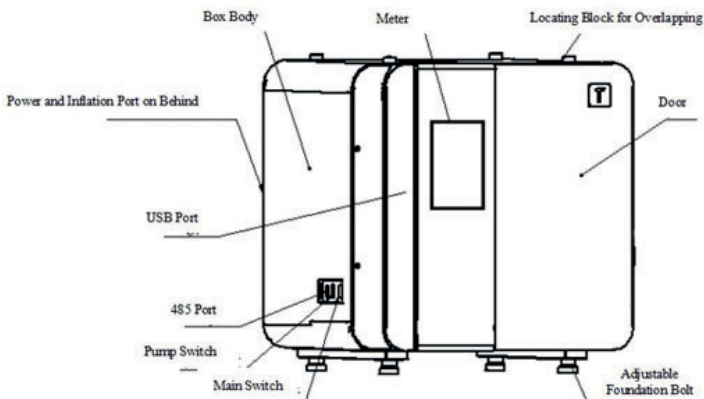
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1. SAFETY WARNINGS

- Do not put the equipment in a place where it is raining, wet or water splashed, otherwise it may cause electric leakage, short circuit, electric shock and other accidents.
- Do not insert the metal such as the iron nail or iron wire into any holes and gaps of the equipment, otherwise may cause the electric shock or injury because of the accidental contact between the above things and device parts.
- Do not disassemble, repair or modify the equipment by non-professional technical personnel, otherwise it may cause a fire or electric shock accident because of the improper operation.
- Do not damage the power plug or power cord, the power cord must be replaced if the power plug is loose, otherwise it may cause a fire or electric shock.
- Keep adequate ventilation for the equipment, the front panel, rear panel and side panels of the equipment shall have a clearance at least 20cm from the wall or other objects.
- The equipment shall be installed on the solid ground. If the ground is not solid enough or the installation field is not suitable, it may cause personal injury because of the equipment overturning.
- Be sure to disconnect the power supply before any repair or maintenance for the equipment, to prevent the electric shock or personal injury.
- If the equipment operation is abnormal, disconnect the power supply immediately to stop the equipment operation; it may cause an electric shock or fire because of the operation in abnormal condition.
- Remove the power plug before moving the equipment, the tilt angle in any direction shall be less than 45 degrees during the moving.
- Do not allow the non-professional personnel to disassemble the equipment without permission, the maintenance and accessories replacement should be carried out by the professional personnel.
- The internal parameter setting must be in charge of the qualified personnel, to prevent the function disorder of the controller program because of the setting operation without understanding.
- The external surface of the incubator shall not contact volatile chemicals such as gasoline and diluent. Keep internal and external surfaces clean, clean up sundries and stains frequently.
- The equipment shall be installed in the room with good ventilation. The narrow and small space may cause the CO₂ gas concentration to increase, and the CO₂ gas in high concentration is harmful to humans.

2. PRODUCT STRUCTURE AND FEATURES



- Human-computer interaction menu, microcomputer intelligent design. 7-inch color screen, touch screen controller.
- Six-side heating mode ensures the temperature uniformity.
- No condensation water control technology, even if the humidification tray produces high humidity, it will still not produce the condensation water on the top of the chamber, which provides the maximum protection for the cell and tissue incubation and avoiding the forming of the condensation danger. Ventilation without turbulent flow ensures a stable and uniform environment for cell incubation.
- Dry heat sterilization at 140□ simplifies the cleaning work and can effectively eliminate bacteria, mold, yeast, mycoplasma and other microorganisms on the internal surface of the chamber. All sensors are high temperature resistant components.
- Built-in humidifying, overall reservoir design, large evaporation area, fast humidity recovery, and no water overflow.
- The incubator is equipped with a fan to assist the air circulation, which can make the set environment of the inner recover quickly and be consistent. The forced convection is specially designed for making some key environmental conditions (temperature, gas and humidity) to distribute uniformly.
- The dividing panels and inner liner are made of copper alloy stainless steel, with antibacterial and antivirus function. The inner is with full arc design, it is convenient for cleaning and not easy to breed bacteria.
- Door control function, will intercept CO2 and stop the fan automatically when the door is open, saving energy and controlling the pollution overflow.
- Two-layer door design, the outer door has the heating function (avoid the condensation), the inner door made of bulletproof and toughened glass which is convenient for observing the samples in the experiment.
- Single beam and dual wave infrared CO2 sensor, it is the original imported high temperature resistant sensor, do not need to take it out during the sterilization, compatible with the high temperature sterilization.
- Has the function of alarm for temperature over limit and alarm for CO2 concentration over limit.
- Has the function of historical data exporting with USB stick.
- Built-in pump, it's convenient to drain the humidification water in the bottom of the chamber.

3. TECHNICAL PARAMETERS

Model	R50
Reference	JBB020
Mode	Six-side Heating + Air Circulation + Gas Casing

Features	Temperature Range	Room Temperature+5°C ~60°C
	Temperature Resolution	0.1°C
	Temperature Fluctuation	±0.1 °C
	Temperature Distribution Accuracy	≤0.3°C (when the temperature is 37°C)
	CO2 Concentration Control Range	0-20%
	CO2 Concentration Fluctuation	±0.5%
	Humidity in chamber	≥90% (37°C)
Structure	Material Inside	SUS304Cu Mirror-surface Stainless Steel
	Material Outside	Cold Rolled Steel Plate, Chemical Resistance Coating on Surface
	Heat Insulation Material	Alumina Silicate Fibre
	Heater	Silicone Heating Patch
	CO2 Inlet	Diam. 6mm
	CO2 Filter	DUF
	Dividing Panels	SUS304Cu Mirror-surface Stainless Steel
Controller	Temperature Control Mode	Intelligent Fuzzy PID Control
	CO2 Concentration Control Mode	Intelligent Fuzzy PID Control
	Screen	7-Inch LCD Touch Screen
	Temperature Sensor	PT100
	CO2 Concentration Sensor	Imported Infrared Sensor
	Appointment Function	Once reached the appointment time, the system will enter the running state automatically
	Timing Function	Timing from Constant Temperature and Timing from Starting are optional
	Sterilization Function	140 °C Dry Heat Sterilization
	Running Mode	Constant Value Running Mode, Program Running Mode
	Historical Data	Review historical data and export historical data with USB stick
	Historical Curve	Review Historical Curve

Safety Device		Temperature Alarm, Concentration Alarm, Door Controller Alarm, Screen Lock, Power-off Protection
Specifications	Chamber Dimension (mm)	350*380*380
	Overall Dimension (mm)	660*610*685
	Internal Volumeb (L)	50
	Shelf Bearing Weight (kg)	15
	Max. Number of Shelves	7 (2 shelves supplied with the incubator)
	Space Between Shelves	40 mm
	Power supply	220VAC, 50/60 Hz.
	Net Weight (kg)	60

4. INSTALLATION INSTRUCTIONS

In order to ensure the normal running of the equipment and have the best performance, please install the equipment in a place that meets the following conditions:

Attention: The ambient temperature must be at least 5°C lower than the setting temperature.

- There is no direct sunlight or air conditioner which affects the ambient temperature in the room where the incubator is located.
- There should be enough space, clean air and adequate ventilation in the room.

Warning

If use this equipment in a narrow and closed space, may cause CO2 concentration in the air to increase and cause the harm to human body.

When the equipment uses CO2 control, need to ventilate the room frequently. The gas concentration in the closed space will increase gradually and the CO2 gas with high concentration is very dangerous to people. In addition, when CO2 is used, we should avoid to breath the air in the chamber directly when open the door.

- The installation place must be solid and flat.

Warning

Please install the equipment on the solid and flat ground or tabletop. If the installation surface is not solid, it may cause the personal injury because of the equipment overturning.

- Can not install in a place with combustible gas or corrosive gas.

Warning

If install the equipment in a place with combustible gas, it may cause explosion or fire. If install the equipment in a place with the corrosive gas which will corrode the equipment, it may cause the electric leakage or electric shock because of the corrosion.

- There should be no high humidity in the installation place.

Warning 

Can not use the equipment outdoor. If the equipment is splashed by rain, may cause electric leakage or electric shock.

- Adjust the equipment balance

Put the equipment on the solid and flat ground or tabletop, adjust the foundation bolt to make the equipment stable.

- Grounding

Must use power socket with the ground wire, to prevent the electric shock.

- Disinfection

Before the first operation of the equipment, the chamber should be cleaned and disinfected.

Warning 

1. Take out accessories in the incubator chamber.

2. Wash the chamber and accessories with diluted neutral detergent, then wash the residual detergent with the clean water.

3. Wash the chamber and accessories with alcohol to disinfect, then wipe them with the clean gauze. Put accessories into the chamber.

4. Add sterile distilled water to the humidifying tray, push it into the chamber carefully.

5. Can directly pour the sterile distilled water into the reservoir at the bottom of the chamber to humidify the chamber.

- Connect the CO2 gas cylinder

Warning 

Before connecting the gas cylinder, first, confirm the liquefied gas in the cylinder is CO2 gas with the purity more than 99.5%. Second, confirm the pressure value of the pressure reducer meets requirements, all tubes are connected correctly and firmly, without the falling off risk. **CO2 gas with high concentration is harmful to human body, may cause the suffocation or death.**

1. Install the pressure reducer to the gas cylinder, the primary rated pressure of the pressure reducer shall be 2.5MPaG (250kgf/cm²G, 3600psiG), the secondary rated pressure shall be 0.25MPaG (2.5kgf/cm²G, 37.5psiG).

2. Connect the pressure reducer and the equipment with the gas cylinder that has been checked and use the hose clamp to fasten the joint.

3. Open the pressure reducer on the gas cylinder, set the primary pressure to 5MPaG, adjust the secondary pressure to 0.03MPaG.

Warning 

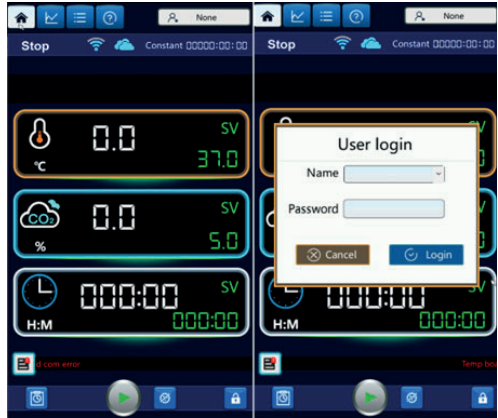
The secondary rated pressure can not be adjusted too high, otherwise: 1. May affect the gas control accuracy. 2. May cause the gas cylinder to fall off.

4. Check whether there is gas leakage at joints.

5. CONTROLLER OPERATION

1. Login Menu

When **User Permission Management** function is open, after the starting of the system, will enter **Login Menu**, click **Unlock** icon to do the user login.



Choose the suitable user to login, input the correct login password, click **login** icon to login.

There are three level permissions for the system:

First level permission: operator group, do regular operations, revise mode data;

Second level permission: Maintainer group, beside the operator group permission, also can enter **Parameter Setting** menu to revise parameters, can export historical data, operation logs and alarm records.

Third level permission: administrator, have all permissions.

Revise Password: when the user is login, click the login user on upper right corner of the monitoring menu, will prompt the box for revising password of the current user, so can do the password revising operation.













For login passwords and logout time of each user please see **Parameter Setting** - > **Other Parameter** - > **User Permission Management**, for details can check and revise login password, also can add and delete the lower level users.

2. Main menu









In **Main Menu**, the user can review or set common data and can perform routine operation.

2.1 Buttons

Button	Name	Instruction
	Run	Click to popup the subdialog box, to make the system into the run state
	Stop	Click to popup the subdialog box, to make the system into the stop state
	Home	Click to enter the Main Menu
	Curve	Click to enter the real-time curve menu
	Contents	Click to enter the contents menu
	Sterilization settings	In stopping state, click sterilization setting button, will enter the sterilization guiding menu
	Lighting	When the lighting function is open, click to open or close the lighting
	Appointment	When the appointment function is open, click to set the date and time
	Mute	When the peripheral alarm function is selected to open, click this button to open or close the peripheral ALM output.
	Mode edit	Click to quickly enter the mode edit menu.
	Alarm	When there is an alarm, the red alarm will be displayed on the upper right of this button; Click to enter the alarm record menu.
	Screen lock	When the user management permission function is open, click this button to enter or exit the user login; when the user management permission is closed, click this button to enter or exit the screen lock status.

2.2 Icons

Name	Icon	Name	Icon	Name	Icon
Fan		Door open		Heating	
CO2 gas inflation		O2 inflation		Lower water level	

2.3 Running State

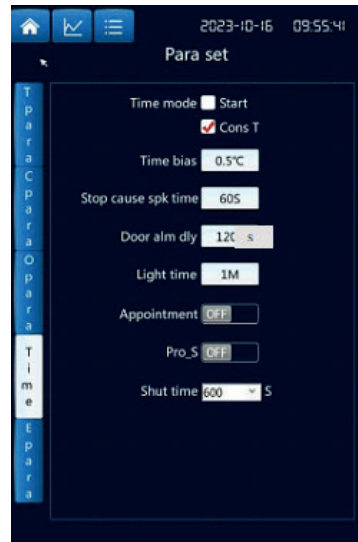
There are five running states on top of **Main Menu**, they are **Stop**, **Appointment**, **Run**, **Timing** and **Self Adjustment**.

2.3.1 Running

When click **Run** button to start the running, the system will enter **Running** state directly, now the system will do the judgement for **Timing Mode**.

The user can set **Timing Mode** in **Parameter Setting** - > **Time Parameter**, as shown in the following figure:

- Timing from running: the system will skip **Running** and enter **Timing** directly.
- Timing from constant temperature: when “setting temperature-timing deviation value from constant temperature \leq temperature measurement value \leq setting temperature + timing deviation value from constant temperature”, the system will enter **Timing** from **Running**.



2.3.2 Timing

When meet the condition for timing judgement, the system will enter **Timing** from **Running**, and the timing time starts to count, when meet the condition to stop running, the system will enter **Stopping**.

2.3.3 Stop Running

When the running timing is over, the system will shut all outputs and enter **Stopping**.

2.4 Sterilization Function



The user can select the sterilization mode from **System Setting- > Sterilization Parameter**, there are 3 sterilization modes: ultraviolet sterilization, high temperature sterilization (in model R50) and damp heat sterilization. Click sterilization icon from the monitoring menu to enter the sterilization guide menu, do relevant operations according to instructions on sterilization guide menu, and click Next.

High Temperature Sterilization Guide



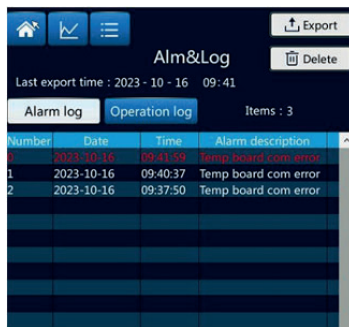
High Temperature Sterilization

There are 3 stages for the high temperature sterilization:

- 1) Heating stage: heating till to the temperature of the high temperature sterilization, when reach the temperature, enter to the disinfection stage.
- 2) Disinfection stage: Maintain the temperature of the high temperature sterilization, the time is the setting time.
- 3) Cooling stage: when the temperature drops to stopping temperature of high temperature sterilization, sterilization process is stopped.

2.5 Alarm Function

When there is an alarm in the system, the buzzer will ring, the alarm on the upper right of the alarm icon will be red, and the alarm relay is closed. Click to enter the alarm list menu to check the alarm contents, as shown in the picture. The red fonts in the alarm list are alarms still existing, while the white fonts are alarms that existed before but have disappeared now. If there are alarms now and the equipment is powered off and closed, once it is powered on again, the system will not make up the alarm stopping time for the previous alarm.



2.5.1 Buttons

No	Name	Instructions
1	Data export	When the U disk is connected, (if the user management permission is on, the level of the login user shall be above the maintainer group), you can click the data export button, which will prompt the dialog box for data exporting confirmation. Then click 'OK' to export the data.
2	Delete	If the user management permission is on, the level of the login user shall be administrator group, click the button for delete the alarm record.
3	Operation Log	Click to enter "Operate Log" menu.

2.5.2 Alarms Instructions

2.5.2.1 Temperature Alarm: There are three temperature alarms, including **Main Temperature Spillover**, **Upper Deviation of Main Temperature**, and **Lower Deviation of Main Temperature**, see details below:

Alarm Type	Instruction
Main Temperature Spillover	When there is an alarm for the main temperature sensor failure, the system will stop running, and the buzzer will ring (click any place on the menu for mute).
Upper Deviation of Main Temperature Alarm	When "Main Temperature Measurement Value > Main Temperature Setting Value + Over Temperature Alarm Deviation" , and the lasting time is longer than 'Temperature Alarm Delay', there is 'upper deviation of main temperature alarm', the buzzer will ring (click any place on the menu for mute), disconnect the heating relay of the main temperature.
Lower Deviation of Main Temperature Alarm	When "Under Temperature Alarm Deviation" is 0, there is no under temperature alarm for the main temperature. When "Main Temperature Measurement Value < Main Temperature Setting Value + Under Temperature Alarm Deviation" , and the lasting time is longer than 'Temperature Alarm Delay', there is 'lower deviation of main temperature alarm', the buzzer will ring (click any place on the menu for mute).

The user can set the value of **Over Temperature of Main Temperature Alarm Deviation and Under Temperature of Main Temperature Alarm Deviation in Parameter Setting -> Temperature Parameter.**

When the door is open, the system will not judge the upper deviation of the main temperature alarm and the lower deviation of the main temperature. When the door is closed, the system will proceed to judge the alarm.

2.5.2.2 Concentration Alarm: There are six concentration alarms, including **CO2 Spillover, CO2 Over Concentration Alarm, CO2 Under Concentration Alarm, O2 Spillover, O2 Over Concentration Alarm, and O2 Under Concentration Alarm.** See details below:

Alarm Type	Instruction
Spillover	When there is a concentration sensor failure, there is a concentration spillover alarm, the system will stop running, and the buzzer will ring (click any place on the menu for mute).
Over Concentration	When " Concentration Measurement Value > Concentration Setting Value + Over Concentration Alarm Deviation ", and the lasting time is longer than 'concentration alarm delay', there is an over concentration alarm, and the buzzer will ring (click any place on the menu for mute), disconnect the circuit for the gas inflation.
Under Concentration	When " Concentration Measurement Value < Concentration Setting Value - 0.50% ", start the timing. After 300 seconds, if " Concentration Measurement Value ≤ Previous Concentration Measurement Value + 0.20% ", then there is an under concentration alarm.

When the door is open, will not judge the over concentration alarm and under concentration alarm, when the door is closed, will proceed to judge the alarm.

2.5.2.3 Other Alarms

Alarm Type	Instruction
Door Open Alarm	When " Door Open Time > Door Open Alarm Delay " in running state is detected, there is a door open alarm.
Temperature Control Panel Communication Failure	When the communication between the computer and the display screen fails for 20 seconds, there is a display screen communication failure alarm.
CO2 Sensor Communication Failure	When CO2 sensor type is 485, if it cannot receive the correct reply from the sensor for 60 seconds, there is a CO2 sensor communication failure alarm.

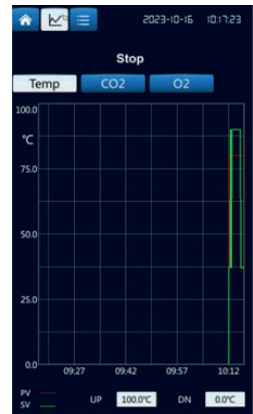
2.6 Operation Logs

The user can check the saved logs by touching the screen on **Operation Log**, the saved operation logs include: revision of temperature/CO2/ O2 setting value change/ user export/ delete alarm records/ operation logs / historical data/ start/ stop running/ start/ stop self adjusting/ start/ stop sterilization/ user login/ logout/ user add/ delete/ open/ close the door.

No.	Time	Content
1	2023-10-16 09:41:50	Administra login
2	2023-10-16 09:41:55	Device power on
3	2023-10-16 09:41:08	dministra USB export alarm
4	2023-10-16 09:41:02	dministra USB export operati
5	2023-10-16 09:40:46	Administra login
6	2023-10-16 09:40:33	Device power on
7	2023-10-16 09:38:00	Administra login
8	2023-10-16 09:37:46	Device power on
9	2023-10-16 09:35:30	Administra Delete alarm k
10	2023-10-16 09:35:05	Administra login
11	2023-10-16 09:35:00	Device power on
12	2023-10-16 09:33:52	dministra USB export alarm
13	2023-10-16 09:33:02	Administra login
14	2023-10-16 09:30:06	Administra logoff
15	2023-10-16 09:30:00	Administra login
16	2023-10-16 09:29:55	Administra logoff
17	2023-10-16 09:29:22	Administra login
18	2023-10-16 09:27:23	Administra logoff
19	2023-10-16 09:27:02	Administra login

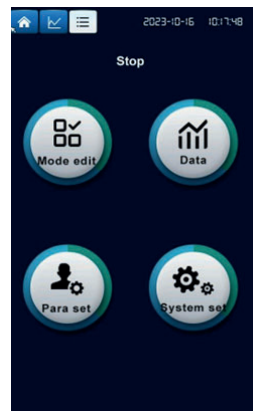
2.7 Real-time Curve

The user can click **Curve** in **Monitoring** menu to enter **Real - time Curve**, can review temperature and concentration curves for the last test one hour and can revise the upper and lower limit of the curve.



3. Contents Menu

The user can enter **Mode Edit**, **History Inquiry**, **Parameter Setting** and **System Setting** from the contents menu. Click the real time on upper right corner to enter the revising menu of the real time.



4. Mode Edit

There are two ways to enter the mode setting menu.

- 1 . Click the setting value in the monitoring menu to enter the mode setting menu quickly.
- 2 . Click “ Mode Edit” in **Contents** to enter the mode setting menu.

The system has two control modes: Fixed Value Mode and Program Mode. The user can set and edit cycles (0 ~ 30) , stages (1 - 5) , time (0 ~ 999 : 59) , temperature (decide the setting range according to “upper limit of t emperature setting” in **System Setting**.

- > **Temperature & Sterilization**) , CO 2 con centration (0 . 0 ~ 20 . 0 %) and O 2 concentration (0 . 0 ~ O2 Setting Break Point or O2 Setting break point ~ 99 . 9 %).

4.1 Fixed Value Mode

In fixed value mode, only set one control point for t he temperature and concentration. According to the t iming mode selection in **Parameter Setting - > Time Parameter**, and whether the time setting value is 0 or not, can achieve the following:

Time Setting Value	Timing Mode	Instruction
0	-	When the set time is 0, the equipment works continuously without stopping.
Not 0	Timing from Starting	The timer is activated from start-up, and operation stops when the set time elapses.
	Timing from Constant Temperature	The timer is activated once the temperature is constant. The operation stops when the set time has elapsed.

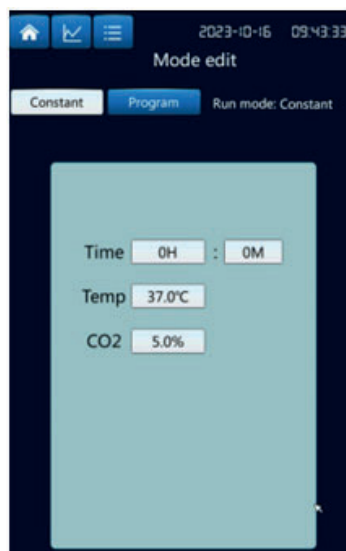
4.2 Program Mode

In Program Mode, you can set multiple control steps for temperature and concentration and define the control time for each step.

Time Setting Value	Timing Mode	Instruction
0	Timing from Running	No time is set for the step. The system will jump directly to the configured value of the next step. When it reaches the last step, it will return to the first step. Upon reaching the last step of the final cycle, the system will stop functioning.
	Timing from Constant Temperature	No time is set for the step. The system will jump directly to the configured value of the next step, but timing will only start once the temperature is kept constant. When it reaches the last step, it will return to the first step. Upon reaching the last step of the final cycle, the system will stop operation.

Time Setting Value	Timing Mode	Instruction
Not 0	Timing from Running	Once the time set for the step has elapsed, the system will move on to the next step. When it reaches the last step, it will return to the first step. Upon reaching the last step of the final cycle, the system will stop functioning.
	Timing from Constant Temperature	Once the set temperature for the step is constant, the timing will start. After the time set for the step has elapsed, the system will jump to the next step. When it reaches the last step, it will return to the first step. Upon reaching the last step of the final cycle, the system will stop working.

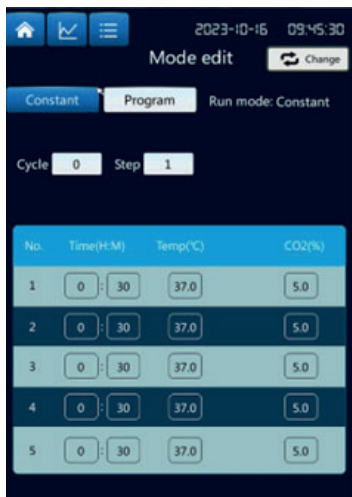
4.3 Operation Example



Fixed Value Mode

For example, to set the temperature to 37.0°C, CO₂ concentration to 5.0%, and run continuously without stopping, follow these steps: **Click Constant** in the **Mode Edit** menu to enter the setting menu.

No	Content	Instruction
1	Time Setting	Click the time textbox (Hour:Minute) and set to 0:0 to indicate continuous operation.
2	Temperature Setting	Click the temperature textbox and set to 37.0°C.
3	Concentration Setting	Click the CO ₂ concentration textbox and set to 5.0%.



Program Mode

For example: Set the program mode, when the temperature rises to 25.0, maintain for 1 hour and 30 minutes, control the concentration to 5.0%, then rises to 37.0°C and maintain for 1 hour, control the concentration to 10.0%, run one cycle, see the setting as below:

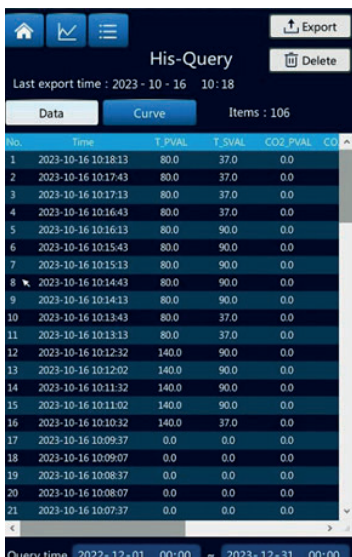
Step	Set Time	Set Temperature	Set Concentration
1	1:30 (1 hour and 30 minutes)	25,0 °C	5,0 %
2	1:00 (1 hour and 0 minutes)	37,0 °C	10,0 %

5. History Inquiry

5.1 Historical Data

5.1.1 Menu Instruction

The user can enter the **Data** menu to check the historical data saved by the touch screen. The saving interval time can be set. By clicking refresh, the user can view the latest data and the quantity of newly saved data.



5.1.2 Buttons

No	Content	Instruction
1	Export	When the USB stick is connected, click the data export button. A dialog box for data export confirmation will pop up. Then click "YES" to export the data.
2	Delete	Click to pop up the dialog box for data delete confirmation.
3	Curve	Click to enter Historical Curve .
4	Time Setting	Click the corresponding text box to set the starting and stopping time for historical data to be checked.
5	Data Record Interval	Click to set the interval for data recording.

Note: Do not exceed 100000 pcs when export the data, or will cause the export failure, it will take 1 minute/ 5000 pcs for exporting PDF format, and will take 5 seconds /10 000 pcs for exporting CSV format.

5.2. Historical Curve

5.2.1 Menu Instruction

The historical curve includes temperature curve, CO2 curve and O2 curve, the user can check curves and the correspondence between curves and historical data by magnify, minimize, move left, move right and so operations.



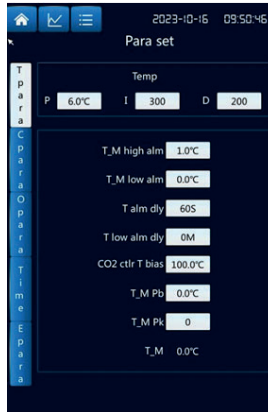
5.2.2 Buttons

No	Content	Instruction
1	X axis operation	Do move left, move right, magnify, minimize operations for time axis.
2	Y axis operation	Do move left, move right, magnify, minimize operations for measurement axis.
3	Upper and Lower Limit of Measurement axis	Set upper and lower limit of measurement axis.
4	Select curve	Select temperature, CO2, or O2 curve.
5	Print preview	When the print function is open, click the print icon to enter print preview menu.

6. Parameters Setting

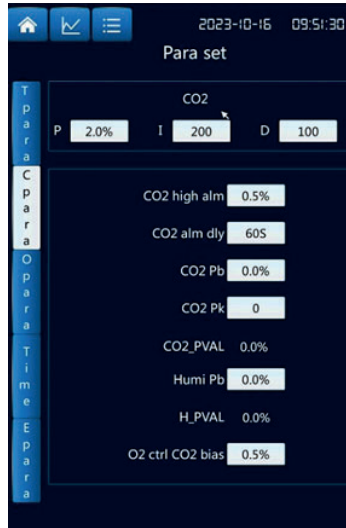
With the administrator and tester permission (or password 3), can enter **Parameter Setting** from **Contents** menu.

6.1 Temperature Parameters



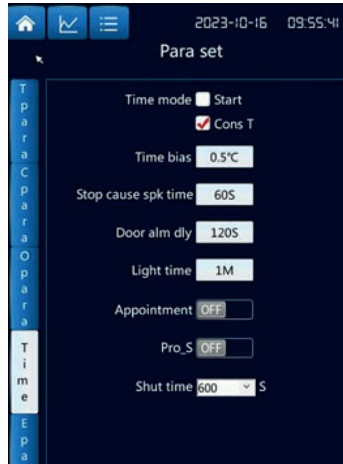
Name	Function	Initial Value (Setting Range)
Proportion P	Time proportion adjustment for main temperature	(0 . 1 - 4 0 . 0 °C) 6 . 0
Integral I	Integral adjustment for main temperature	(1- 2 0 0 0 s) 3 0 0
Differential D	Differential adjustment for main temperature	(0- 1 0 0 0 s) 2 0 0
Over Temperature Alarm Deviation (ALH)	Main temperature upper deviation alarm. When main temperature measurement value > setting temperature + ALH, and lasting 'temperature alarm delay' time, there is an alarm, the buzzer will ring, the system will cut off the heating.	(0- 4 0 . 0 °C) 1 . 0 °C
Under Temperature Alarm Deviation (ALL)	Main temperature lower deviation alarm. When main temperature measurement value < setting temperature + ALL, and lasting 'temperature alarm delay' time, there is an alarm, the buzzer will ring. There is no under temperature alarm function when this parameter is 0.	(- 4 0 . 0 - 0 °C) 0 . 0 °C
Temperature Alarm Delay	Main temperature upper/lower deviation alarm, door temperature upper deviation alarm keep lasting this time then there is an alarm.	(0- 9999 seg) 6 0
Lower Temperature Alarm Delay	When the equipment is starting and running this time, if the current main temperature measurement value < setting temperature + ALL, there is a main temperature lower deviation alarm. There is no this function when this parameter is 0.	(0- 1000 Min) 0
CO2 Inflation Control Temperature Deviation	After starting, when main temperature measurement value ≥ main temperature setting value - CO2 control temperature deviation, start to control CO2.	(0- 1 0 0 . 0 °C) 1 0 0 . 0 °C
Main Temp. Deviation Correction	Normally it is used to correct the error in low-temperature measurement. Deviation value = (Main Temperature) Actual Temperature Value - (Main Temp.) Measurement Value	(- 5 0 . 0 - 5 0 . 0 °C) 0 . 0 °C
Main Temp. Slope Correction	Normally it is used to correct the error in high-temp. measurement. Slope = 1000 * (Actual Temp. - Main Temp. Measurement Value) / Main Temp. Measurement Value	(- 9 9 9 - 9 9 9) 0

6.2 CO2 Parameters



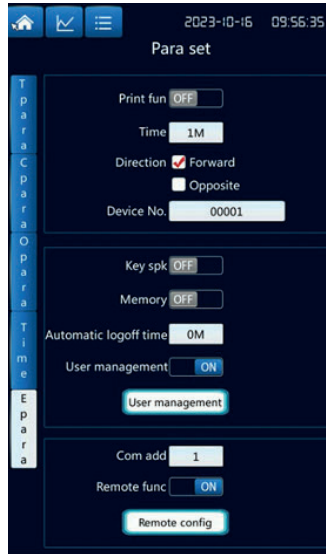
Name	Function	Initial Value (Setting Range)
Proportion P	CO2 Time proportion adjustment	(0 . 1 - 4 0 . 0 %) 2 . 0
Integral I	CO2 Integral adjustment	(1- 2 0 0 0 s) 2 0 0
Differential D	CO2 Differential adjustment	(0- 1 0 0 0 s) 1 0 0
CO2 Over Concentration Alarm Deviation (ALH)	CO2 over concentration alarm. When CO2 measurement value > CO2 setting value + ALH, and lasting "CO2 Alarm Delay" time, there is an over concentration alarm, and the buzzer will ring.	(0- 5 . 0 %) 0 . 5 %
CO2 Alarm Delay	CO2 over concentration alarm keeps lasting this time, then there is an alarm.	(0- 9 9 9 9 seg) 6 0
CO2 Deviation Correction	Normally used to correct the error in low concentration measurement. Deviation value = (CO2) Actual Value - (CO2) Current Measurement Value	(- 5 . 0 - 5 . 0 %) 0 . 0 %
CO2 Slope Correction	Normally used to correct the error in high concentration measurement. Slope value = $1000 \times (\text{Actual CO2} - \text{CO2 Measurement Value}) / \text{CO2 Measurement Value}$	(- 9 9 9 - 9 9 9) 0
Humidity Deviation Correction	Correction Value = Actual Humidity Value - Current Humidity Measurement Value	(- 2 0 . 0 - 2 0 . 0 %) 0 . 0
O2 Control Deviation	After starting, when CO2 measurement value \geq CO2 setting value - O2 control CO2 deviation, start to control CO2.	(0 . 0 - 2 0 . 0 %) 0 . 5

6.3 Time Parameters



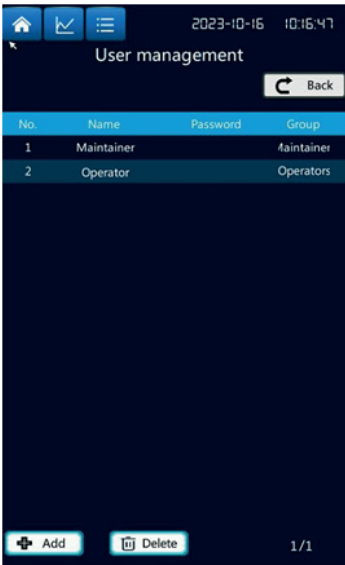
Name	Function	Initial Value (Setting Range)
Timing Mode	Timing from Starting: The system can directly jump to timing state from the run state. Timing from Constant Temperature: When the system is in the run state and when "Main Temperature Setting Value - Timing from Constant Temperature Deviation \leq Main Temperature Measurement Value \leq Main Temperature Setting Value + Timing from Constant Temperature Deviation," the system can enter the timing state.	Constant Temperature Timing
Timing from Constant Temperature Deviation	If the difference between the temperature measurement value and the setting value is within this parameter, the system will enter "Timing" from "Running" state and start the timing.	(0- 5 . 0 °C) 0 . 5
Prompt Time for End	When the running ends, the buzzer will ring to remind the user. "0" means the buzzer will not stop automatically and must be stopped manually.	(0- 9999 sec) 60
Door Alarm Delay	If the door remains open for this duration, a door open delay alarm will activate, and the buzzer will ring. Note: No door control alarm when set to 0.	(0- 9999 sec) 120
Lighting Time	When the lighting is turned on, the lighting time is reset automatically. (Can be enabled/disabled in system settings.) Note: "0" means the light must be turned off manually.	(0- 9 9 9 min) 1
Appointment Function	Enable or disable the appointment function.	Closed
Screen Protect Function	Enable or disable the screen protection function.	Closed
Close Backlight Time	When the screen protect function is enabled and there is no operation on the touch screen for this duration, the backlight will turn off.	600 sec

6.4 Other Parameters



Name	Function	Initial Value (Setting Range)
Print Function	OFF: The print function is disabled. ON: The print function is enabled.	OFF
Print Interval	Prints one measurement data entry at each interval. Prints the table header and current date when printing starts for the first time or when the date changes.	(1 ~ 9 9 9 min) 1
Print Direction	Select the print direction of the data.	Forward
Equipment No.	The identification number of this equipment.	-
Power Down Memory	OFF: The system starts in OFF state. ON: If the system was not OFF before power down, it resumes the previous running state when restarted.	OFF
Buzzer for Touch	Whether the buzzer rings when touching the screen.	ON
Automatic Logout Time	If no operation is performed on the touchscreen within this time, the user will be logged out. Note: Will not log out automatically when set to 0.	(0 ~ 9 9 9 min) 0
User Permission Management Function	Enable or disable user permission management.	OFF
User Permission Management	If the user permission management function is enabled, click to enter the user permission management menu.	-
Correspondence Address	The communication address for this equipment.	(1 ~ 2 5 5) 1
Remote Function	Enable or disable the remote function.	OFF
Remote Configuration	Click to enter the remote configuration menu.	-

6.5 User Permission Management

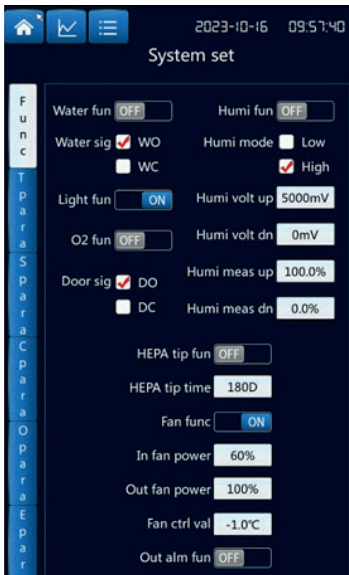


On the user permission management menu, the user can add, delete and revise password for the next level user.

7. System Setting

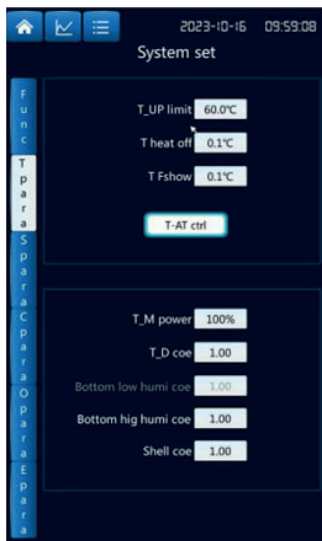
Under the administrator group permission (or password 9) , can enter **System Setting** from **Contents Menu**.

7.1 Function Selection

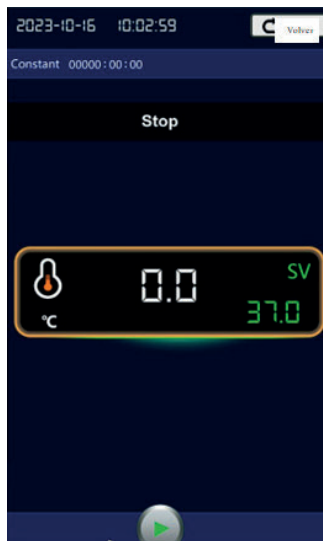


Name	Function	Initial Value (Setting Range)
Water Level Function	OFF: No low water level detection. ON: Low water level detection enabled.	OFF
Water Level Signal	Select the water level signal.	Low level
Lighting Function	Enable or disable the lighting function.	OFF
O2 Function	Enable or disable the O2 function.	OFF
Door Control Signal	Select door open/closed signal.	Door open
Humidity Function	If open humidity measurement function.	OFF
Humidity Mode	Humidity mode is low humidity or high humidity.	High humidity
Humidity Voltage Upper Limit	The humidity sensor output the maximum value of the voltage signal.	(Humidity Voltage Lower Limit ~ 5000 mV) 5000 mV
Humidity Voltage Lower Limit	The humidity sensor output the minimum value of the voltage signal.	(0 mV ~ Humidity Voltage Upper Limit) 0 mV
Humidity Measurement Upper Limit	The maximum value measured by the humidity sensor.	(Humidity Measurement Lower Limit ~ 100.0%) 100.0%
Humidity Measurement Lower Limit	The minimum value measured by the humidity sensor.	(0.0% ~ Humidity Measurement Upper Limit) 0.0%
HEPA Reminding Function	When not replace HEPA in continuously HEPA prompt interval time, and HEPA Reminding function is open, will remind the user 'it's time to replace HEPA' on monitoring menu.	OFF
HEPA Reminding Interval		(10~ 1000 days) 180
Fan Function	If have fan function	ON
In Deviation Fan Power	When temperature measurement value < tem- perature setting value + fan control deviation value, the fan output power is beyond deviation fan power, or is in deviation fan power.	(30~ 100 %) 60
Out Deviation Fan Power		(30~ 100 %) 100
Fan Control Deviation Value		(-20.0- 0.0 °C) - 1.0
Peripheral Alarm Function Selection	When this function is open, the monitoring menu will display if to set to output the mute button for the peripheral ALM.	OFF

7.2 Temperature Parameters



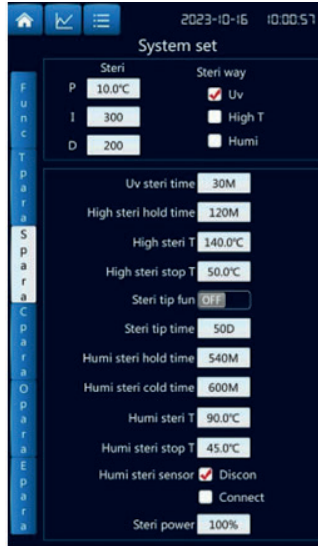
(Temperature Parameters)



(Self Adjustment Menu)

Name	Function	Initial Value (Setting Range)
Temperature Setting Upper Limit	The maximum value of the temperature setting range.	(0- 100.0°C) 60.0
Heating Shutoff Deviation	When Temperature Measurement Value \geq Temperature Setting Value + Heating Shutoff Deviation, shut off the heating output.	(-5.0- 5.0°C) 0.1
Temperature Insensitive Area	The insensitive area for the main temperature and door temperature.	(0.0- 5.0°C) 0.1
Temperature Self Adjustment	In stopping or appointment state, can click to enter self-adjustment menu.	-
Main Temperature Power	The main temperature power during running.	(0- 100 %) 100
Door Body Output Factor	Door body power during running = main temperature power * door body output factor.	(0.00- 9.99) 1.00
Bottom Low Humidity Factor	In low humidity mode, the bottom power during running = main temperature power * low humidity factor.	(0.00- 9.99) 1.00
Bottom High Humidity Factor	In high humidity mode, the bottom power during running = main temperature power * high humidity factor.	(0.00- 9.99) 1.00
Cabinet Opening Output Factor	Cabinet opening power during running = main temperature power * cabinet opening output factor.	(0.00- 9.99) 1.00

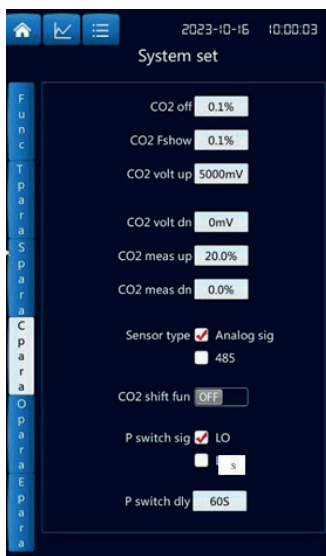
7.3 Sterilization Parameters



Name	Function	Initial Value (Setting Range)
Sterilization Proportion P	Time proportion adjustment for sterilization	(0.1- 50.0) 10.0
Sterilization Integral I	Integral adjustment for sterilization	(1- 2000 seg) 300
Sterilization Differential D	Differential adjustment for sterilization	(0- 1000 seg) 200
Sterilization Mode	Sterilization modes: Ultraviolet Sterilization, High Temperature Sterilization, Damp Heat Sterilization	High Temperature Sterilization
Ultraviolet Sterilization Time	The setting time for ultraviolet sterilization	(1~ 999 Min) 30
High Temperature Sterilization Time	The setting time for high-temperature sterilization	(1~ 999 Min) 120
High Temperature Sterilization Temperature	The sterilization temperature setting value when the sterilization mode is high temperature sterilization	(high T°C sterilization stopping T°C ~ 200.0°C) 140.0
High Temperature Sterilization Stopping Temperature	The setting value for the sterilization stopping temperature when the sterilization mode is high temperature sterilization	(0.0°C ~ High T°C Sterilization T°C) 50.0
Sterilization Reminding Time	When not sterilizing continuously, sterilization reminding interval time, and sterilization reminding function is open, it will remind the user 'it's time to sterilize reminder time' on monitoring menu.	OFF
Sterilization Interval Reminding		(10~ 1000 days) 50

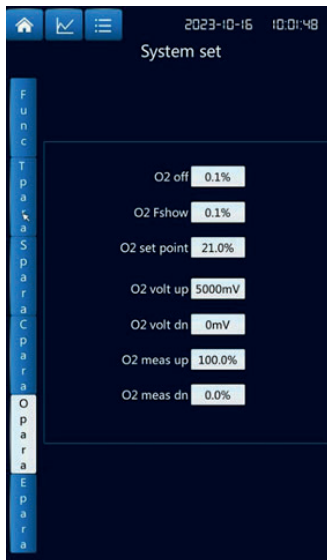
Name	Function	Initial Value (Setting Range)
Damp Heat Sterilization Disinfect Time	The setting lasting time for the damp heat sterilization	(1~ 3000 Min) 540
Damp Heat Sterilization Condense Time	The setting condense time for the damp heat sterilization	(1~ 3000 Min) 600
Damp Heat Sterilization Temperature	The setting value for the sterilization temperature when the sterilization mode is damp heat sterilization	(Damp Heat Sterilization Stopping Temperature ~ 150.0°C) 90.0
Damp Heat Sterilization Stopping Temperature	The setting value for the sterilization stopping temperature when the sterilization mode is damp heat sterilization	(0.0°C ~ Damp Heat Sterilization Temperature) 45.0
Damp Heat Sterilization Sensor	In damp heat sterilization state, the power state for the concentration and humidity	Disconnected
Sterilization Power	The output power for high-temperature sterilization and damp heat sterilization	(0- 100 %) 100

7.4 CO2 Parameters



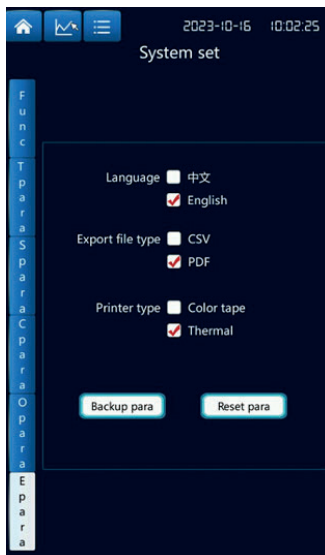
Name	Function	Initial Value (Setting Range)
CO2 Shut off Deviation	When "CO2 measurement value \geq CO2 setting value + CO2 shut off deviation", shut off the output of CO2 inflation relay.	(- 5.0- 5.0 %) 0.1 %
CO2 Insensitive Area	The insensitive area of CO2 measurement value	(0.0- 5.0 %) 0.1
CO2 Voltage Upper Limit	The maximum value of voltage signal output by CO2 sensor	(CO2 Voltage Lower Limit ~ 5000 mV) 5000
CO2 Voltage Lower Limit	The minimum value of voltage signal output by CO2 sensor	(0 mV ~ CO2 Voltage Upper Limit) 0
CO2 Measurement Upper Limit	The maximum value measured by CO2 sensor	(CO2 Measurement Lower Limit ~ 100.0%) 20.0
CO2 Measurement Lower Limit	The minimum value measured by CO2 sensor	(0.0% ~ CO2 Measurement Upper Limit) 0.0
Sensor Type	Type of sensor used	Infrared CO2 sensor
CO2 Cylinder Exchange Function	If detect CO2 pressure switch to judge if to exchange CO2 cylinder or not.	OFF
Pressure Switch Signal	Pressure switch signal selection	Gas Short Disconnected
Pressure Switch Delay	Will exchange the gas in inflation cylinder automatically when continuously detect the pressure switch is not connected for this time.	(10~ 999 seg) 60

7.5 O2 Parameters



Name	Function	Initial Value (Setting Range)
O2 Shut off Deviation	When "O2 measurement value \geq O2 setting value + O2 shut off deviation", shut off the output of O2 inflation relay.	(- 5.0- 5.0 %) 0.1
O2 Insensitive Area	The insensitive area of O2 measurement value	(0.0- 5.0 %) 0.1
O2 Concentration Break point	When O2 mode is high concentration, O2 setting value range is O2 concentration break point \sim 99.9%; when O2 mode is low concentration, O2 setting value range is 0.0% \sim O2 concentration break point.	(0.0- 99.9 %) 21.0
O2 Voltage Upper Limit	The maximum value of voltage signal output by O2 sensor	(O2 Voltage Lower Limit \sim 10000 mV) 10000
O2 Voltage Lower Limit	The minimum value of voltage signal output by O2 sensor	(0 mV \sim O2 Voltage Upper Limit) 0
O2 Measurement Upper Limit	The maximum value measured by O2 sensor	(O2 Measurement Lower Limit \sim 100.0%) 100.0
O2 Measurement Lower Limit	The minimum value measured by O2 sensor	(0.0% \sim O2 Measurement Upper Limit) 0.0

7.6 Other Parameters



Name	Function	Initial Value (Setting Range)
Language	Display in Chinese or English	English
Export File Format	The format for exporting file is CSV or PDF	CSV
Printer Model	Select the model of connected micro printer	Ribbon Printer
Save Factory Default	Save factory default value	
Restore Factory Default	Restore factory default value	

6. COMMON FAILURE SHOOTING

Failure	Reason	Resolution
No power	The plug is not inserted properly or the cord is damaged	Insert the plug again or replace the power cord
	The fuse is damaged	Replace the fuse
The temperature in box does not rise	The setting temperature is low	Adjust the setting temperature
	The heater is failure or the cord joint is falling	Repair the heater and check the circuit
	Temperature control meter is failure	Repair or replace the temperature control meter
	The temperature sensor is failure	Replace the temperature sensor
	Alarm when open the door	Check whether the door is closed or not, check the door control switch is damaged or not
The CO2 concentration in box does not rise	The valve of the gas cylinder is not open	Open the valve of the gas cylinder
	The valve of the pressure reducer is not open	Adjust the valve of the pressure reducer
	The gas tube is blocked	Check the gas tube
	The gas control solenoid valve is in short circuit or damaged	Check the gas control solenoid valve
	CO2 sensor is damaged	Replace the CO2 sensor
	Alarm when open the door	Check whether the door is closed or not, check the door control switch is damaged or not
Large deviation between the setting value and measurement value for the temperature or CO2 concentration	The sensor is damaged	Replace the sensor
	The meter deviation correction is not proper	Adjust the meter deviation correction value
Large fluctuation for temperature or CO2 concentration	PID parameter is not correct	Adjust PID parameter
	The ambient temperature does not meet the standard	Adjust the ambient temperature

7. DAILY MAINTENANCE

If the equipment is running, please turn it off, disconnect the power supply, close the valve of CO₂ gas cylinder, and then do the maintenance work.

Note: When using a cleaning method not recommended by the manufacturer, the user must consult the supplier whether the cleaning method to be used will damage the equipment or not. Use the appropriate disinfectant. You must use sterile water to clean all articles and surfaces thoroughly and then dry them in the air.

Alcohol (even 70% alcohol solution) is volatile and flammable, should be used in the area with good ventilation and no trace of fire. For parts cleaned with alcohol, please do not put them near the fire or other dangerous articles. Do not spray any flammable solution to CO₂ sensor. Do not use strong alkaline or corrosive detergent. The stainless steel can resist corrosion, but it can not prevent corrosion completely. Do not use sodium hypochlorite (bleach) solution, because it can cause the chamber to rust.

7.1 Cleaning the Internal Surface of Incubator

1. Remove the CO₂ sensor, humidifying tray and other articles that need to be taken out.
2. Connect the draining hose to the bottom of the box, put the water outlet hose to the water container, hold the water inlet hose to the condensation water in the workroom, turn on the water pump, drain the residual condensation water.
3. Use the disinfectant or mild detergent to wipe and clean the internal of incubator.
4. After cleaning, spray a solution with 70% alcohol (or more) or use alcohol cotton to wipe and then dry in the air (please pay attention to the safety when spraying alcohol).

7.2 Cleaning the External Surface of Incubator

Dissolve a mild detergent in water, use a wet sponge or a soft and cloth dipped with detergent to clean the external surface of incubator, and then wipe and dry it with a soft cloth.

7.3 Cleaning the Glass Door

You can use the same disinfectant to clean the internal surfaces of the incubator and to clean the glass door of incubator. After the cleaning, remember to wash with sterile distilled water to remove the residual disinfectant. Then wipe and dry the glass door with the soft cloth.

Some attentions for cleaning and maintaining the glass door of incubator: the water will leach alkaline substances (Sodium, Na). Water evaporation will cause the alkaline to concentrate and cause the white pollution or turbidity on the glass surface. The corrosion process will be accelerated if use the chemical detergent with high pH and heating (high temperature sterilization). So, after cleaning, you must wash and dry the glass door.

Repairing the corroded glass is an extremely complex task. In most cases, the corroded glass must be replaced.

7.4 Cleaning the Humidifying Tray

Use the soap water or normal lab disinfectant to clean the humidifying tray. Use sterile water to wash, and spray 70% alcohol (or more). The humidifying tray can support the high temperature sterilization.

7.5 Sterilization

High Temperature Sterilization

- You need to clean the incubator in advance. Erase all visible leakage traces in order to remove the odor, internal stains, traces from drying material and so on.
- Maybe there is a peculiar smell in the high temperature sterilization process. It's a normal phenomenon.
- High temperature sterilization is not suitable for other experiments and instruments in the laboratory.
- During the sterilization, the high temperature in the incubator will melt samples, instruments, utensils and other articles in the chamber.
- There are 3 stages for the high temperature sterilization:
 - 1) Heating stage: heating to the temperature of high temperature sterilization, enters the disinfection stage once reaches the temperature.
 - 2) Disinfection stage: maintains the temperature of high temperature sterilization during the set time, enters the cooling stage once the set time has elapsed.
 - 3) Cooling stage: when the temperature drops to 50 .0°C, the whole sterilization process is completed.

8. ATTENTION DURING INCUBATION

1. Do not let the air from the air conditioning system blows the incubator or door directly, because it will promote the condensation process or cause pollution.
2. When put cultures in the chamber, you should keep enough space between each utensil/bottle with cultures to ensure the air circulation. The improper spacing will cause the uneven for the temperature distribution and CO₂ concentration in the chamber.
3. Do not place acidic or alkaline materials, and do not place materials that can produce corrosive gases in the chamber. These materials may cause problems such as discoloration or corrosion and then cause failure.
4. Close the inner door completely and then close the outer door. If the inner door is not closed completely, even if the outer door is closed, the incubator still can not reach its best performance.
5. Close the door gently. Too much force will cause the culture medium to be splashed out, the door is not closed completely, or the gasket is damaged.
6. After the high temperature sterilization, be careful when opening the door because the inside of the outer door will be very hot.