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RWD

CO_2 - инкубатор D180

Ведущий производитель доклинических исследований

Руководство по эксплуатации

Версия D

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Contents

1-Introduction

1.1 Overview

First of all, sincerely thanks for selecting the CO_2 Incubator manufactured by RWD.

Please read this user manual and all other auxiliary materials carefully before installing and using the product, it will be helpful for you to work better.

RWD has been always dedicated to improving the product function and the service quality, and will reserve the rights to revise the products itself and contents described in the instruction manual at any time without notice in advance.

If you find the practical situations about the supplied goods do not agree with the contents described in the manual, or have any questions or ideas about our products and service, welcome to contact us. For latest information, please visit our web site (http://www.rwdstco.com/) or contact us immediately.

The User Manual applies to CO_2 Incubator below:

- CO_2 Incubator—D180-P

1.2 Safety

Before operating the system, please read the "**2-System Safety**" section carefully to avoid damages to operators and the system during application.

If you have any question or suggestion regarding safety, please contact RWD for after-sales support.

This equipment should be operated and managed by trained professionals!

1.3 Comprehensive description

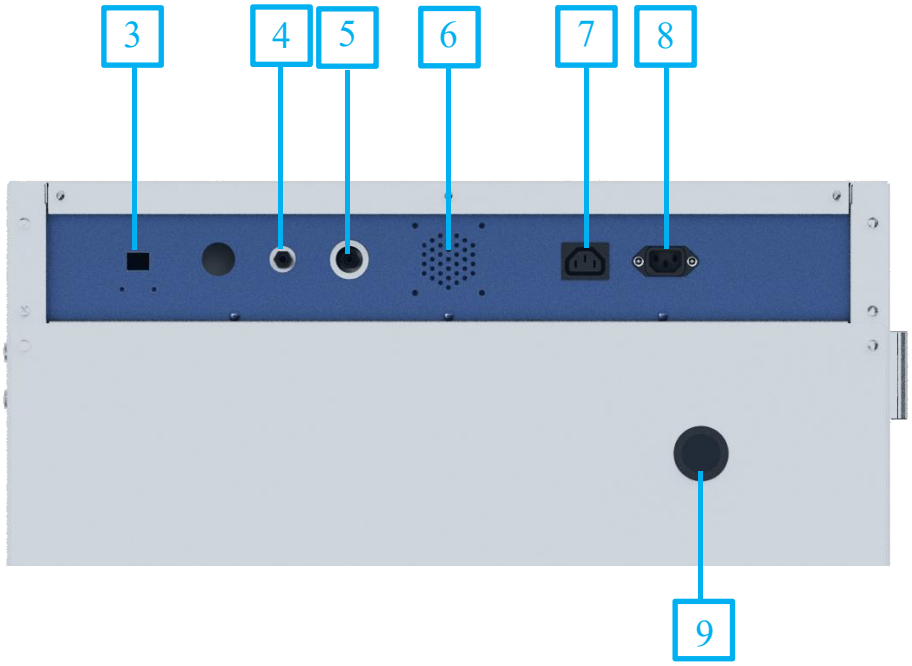
The CO_2 Incubator is an experiment box product designed, developed and produced by RWD, and also an advanced type of equipment for cell and tissue cell culture. The CO_2 Incubator ensures stable internal temperature, stable CO_2 level, constant PH, and constant saturated humidity by the precise control systems for temperature, CO_2 and humidity, that to make the normal growth of cells.

This product is commonly used in fields such as microbial culture, cytodynamics research, collection of mammalian cell secretions, carcinogenic or toxicological effects of various physical and chemical factors, antigen research and production, culture of hybridoma cells for antibody production, in vitro fertilization (IVF), stem cells, tissue engineering, and drug screening.

1.4 Product features

- Triple sterilization function. Continuous sterilization for 24 hours, professional HEPA filtration system, and irregular sterilization;
- Efficient, fast and easy high temperature sterilization ensures not only effective disinfection and sterilization, but also automatic running at night. The entire sterilization is less than 3 hours, and the total time is about 14 hours;
- Temperature homogeneity. Thermoelements are located on the outer wall of the incubator and is directly heated via six sides to ensure superior temperature uniformity and reduce the time of heating sterilization.
- The microprocessor control system is used to monitor the whole process of high temperature sterilization in real time, and also display the status information in different stages of high temperature sterilization in real time.

1.5 Product display and ports introduction



No.	**Component/interface name**	**Description**
1	Power switch	On/off
2	Control panel	Software operation
3	USB data interface	Export data information
4	CO_2 inlet	CO_2 cylinder connection port
5	CO_2 sampling port	CO_2 sampling within incubator
6	Cooling pan	Heat dissipation of equipment
7	220V Power outlet	Power outlet
8	220V Power inlet	Power inlet
9	Detection port filter assembly	The access for the lead of the detection device, etc

1.6 Equipment environmental requirements

The equipment operating environment is prepared according to the conditions listed below to ensure the operability and safety of the system.

Items	Description
Working environment	Temperature: 5°C - 40°C
	Humidity: 15%-95% (non-condensing)
	Air pressure: 103.4 kPa
Storage environment	Temperature: -20°C - 60°C
	Humidity: 10%-95% (non-condensing)
	Air pressure: 50kPa-106kPa
Operating voltage	1) 220V-240V VAC 50/60HZ, 5A 2) 100V-120V VAC 50/60HZ, 10A

1.7 Specification

Items	Description
Screen size	7-inch capacitive touch screen
External dimension: Length × width × height	67cm*64.7cm*97cm
Internal dimension: Length × width × height:	54.7cm*51cm*67.5cm
Capacity	~180L
Weight	~120kg
Heating method	Inner wall heating, air casing

1.8 Settable parameters

Items	Description
Temperature	10.0-50.0°C
CO_2 concentration	0.0-20.0%
Temperature alarm threshold	Upper limit: (T+0.1) - (T+5.0) Lower limit: (T-0.1) - (T-5.0)
CO_2 concentration alarm threshold	Lower limit: (C-0.1) - (C-5.0) Upper limit: (C+0.1) - (C+1.0)
Range of humidity alarm	0-100%
HEPA filter screen countdown	Adjustable range: 0 - 365 day(s)

1.9 Product list

Configuration	Items	Quantity	Description
Standard	Host	1	One CO_2 Incubator
Standard	Vertical plate of CO_2 Incubator (equipped with 6 button holes)	2	For supporting stainless steel shelves
Standard	Stainless steel shelves （horizontal shelves）	3	Carrier for culture dishes (up to 15 optional shelves, each with load bearing of 7kg)
Standard	horizontal shelves bracket	6	For support horizontal shelves
Standard	Inner cover assembly	1	For installing HEPA filter, air duct circulation
Standard	5.5 inch HEPA filter	1	Air filtering
Standard	Reservoir	1	Holding water to increase humidity
Standard	Stacking racks	4	For stacking and fixing of equipment
Standard	Detection port filter assembly	1	For air filtering
Standard	Ejector rob assembly	3	For supporting the vertical plate of CO_2 Incubator
Standard	Tube with 5M lengh	1	Connect cylinders to equipment
Standard	Triple-valve	2	For gas branch
Standard	Throughway Valve	2	Used for the same diameter pipeline switching
Standard	Hoop	10	For fixing the connection between the air pipe and the air valve

2-System safety

Please read the safety instructions carefully. For safety's sake, please be aware of the following:

- **Correct connection cables**
  Make sure all connection cables are safely and securely connected to the equipment.
- **Avoidance of all exposed electronic cables**
  Do not touch any electronics and wiring inside the equipment!
- **Shutdown due to suspected failure**
  In the case of equipment safety hazard or failure of normal operation, please contact the authorized technical support personnel.
- **Correct connection of equipment**
  Connect the equipment correctly to avoid operation difficulty or even disconnection of equipment due to incorrect connection.

2.1 Safety symbols

The following safety symbols and general marks may be used in the User Manual and on the equipment. If you have any question or suggestion regarding safety, please contact RWD for after-sales support. To prevent damages to the equipment and extend the service life of the equipment, please follow these instructions carefully.

- General safety warning.
Operate the device only in accordance with this user manual. Follow these general precautions during operation.

- High temperature warning.
Hot surfaces can burn unprotected skin or heat can damage materials.

- Risk of electric shock.
To avoid electric shock, the device must be properly connected to the protective ground wire.

- Waste treatment. Separate taking back of electrical and electronic instruments in countries of the European Union: this is applicable in countries of the European Union and other European countries with a separate collecting system for electronic waste. This product must be disposed of within the waste management regulations.

- Warning!
Parts and components that are susceptible to electrostatic discharge (ESD) are included

- Asphyxiation Hazard Warning.
High concentrations of CO_2 can displace oxygen and cause asphyxiation!

2.2 Safety instructions

- Plug in the power cord to prevent improper power contact.
- Pay attention to shockproof, waterproof, moisture proof, pressure proof and fireproof measures.
- During moving and handling equipment, pay attention to handling strength to prevent damages to equipment or falling of equipment;
- Be careful of broken glass.
- The CO_2 Incubator should be managed by specific personnel. It is strictly forbidden for untrained personnel to operate the equipment. Please use a reliable grounding device.
- The responsibility for equipment failure arising from any improper cleaning, maintenance and operation of the equipment should be borne by the user.
- If the equipment host is disassembled without the authorization of RWD, RWD will no longer fulfill its commitments for quality assurance and technical maintenance services to the equipment. For any technical problems please contact the authorized personnel or RWD for supports.

2.3 Precautions for operation

- The CO_2 Incubator should be regularly cleaned and disinfected with disinfectant. Its stainless steel shelves can be removed for cleaning and disinfection to avoid failure of the experiment due to contamination by other microorganisms.
- If no CO_2 will be used for a long time, the CO_2 cylinder should be closed to prevent the CO_2 regulator from malfunctioning.
- The purity of used CO_2 must be 99.5%, or otherwise the sensitivity of CO_2 sensor will be reduced and the CO_2 filter will also be contaminated.
- The inner door of the incubator should be cleaned immediately if there is condensation water mist.
- The pressure value of CO_2 inlet should between 1- 1.5 atmospheres. (1Standard atmosphere =101.325kPa=1bar=14.5Psi）).
- If the CO_2 Incubator is overheated at 160°C, the internal temperature protector will cut off the heating power. In this case, it is necessary to restart the power supply after 8-12 hours of power-off.

3. Product assembly and structure

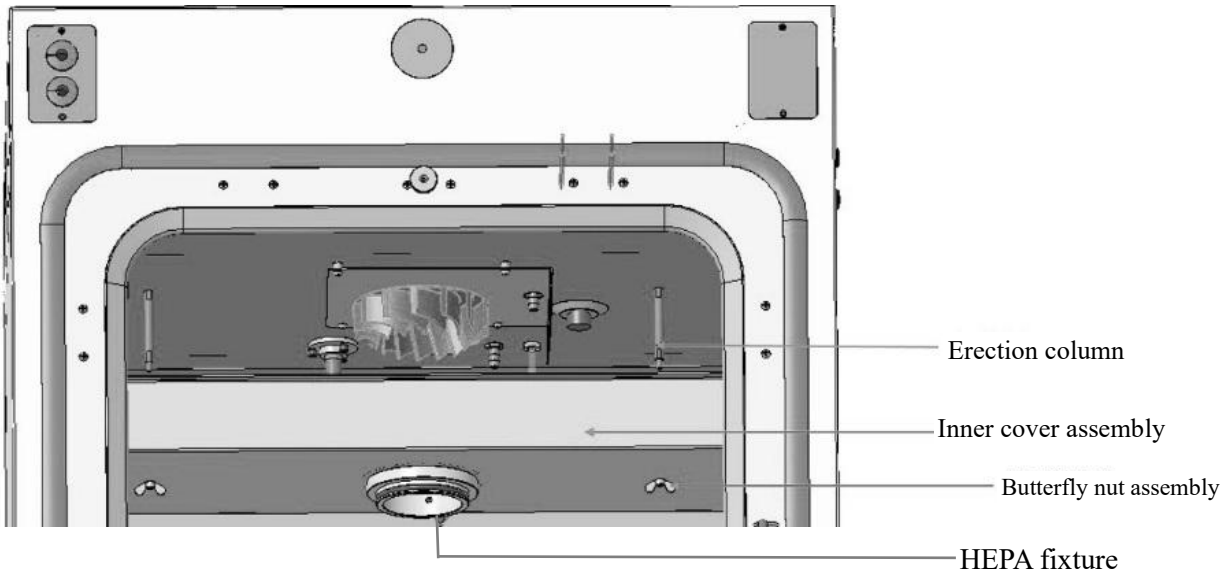
3.1 Incubator Installation

3.1.1 Precautions before Installation

1) A distance of at least 10cm should be reserved on each side of the incubator, including the back, so that the instrument can be easily connected the air supply device and the power supply.
2) The incubator weighs about 120kg, please choose a firm horizontal ground for placing, and ensure that the placing site is far away from the doors, Windows, heating devices and air conditioning pipes.
3) Please be sure to lift the incubator along both sides of the bottom seat of the incubator, do not lift it from the front and back.
4) Please first remove the plastic film used for package, and clean all the accessories and the inner surface of the incubator with appropriate laboratory disinfectant.

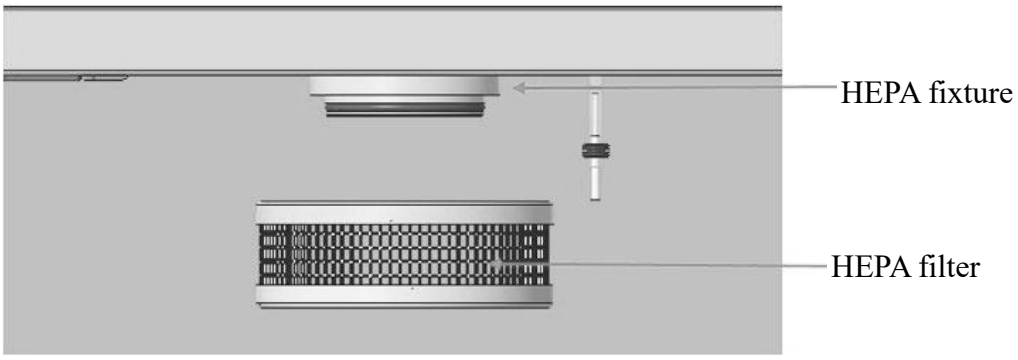
3.1.2 Install the inner cover assembly

Install the inner cover assembly on the erection column on the top of the inner container (note that the air duct direction of HEPA fixture needs to be facing inside), and lock the inner cover with the supplied butterfly nuts.



3.1.3 Install the HEPA filter

1) Remove the filter from the packing case.
2) Remove the plastic cover on the filter and be careful not to touch the filter medium.
3) Install the filter as shown below。

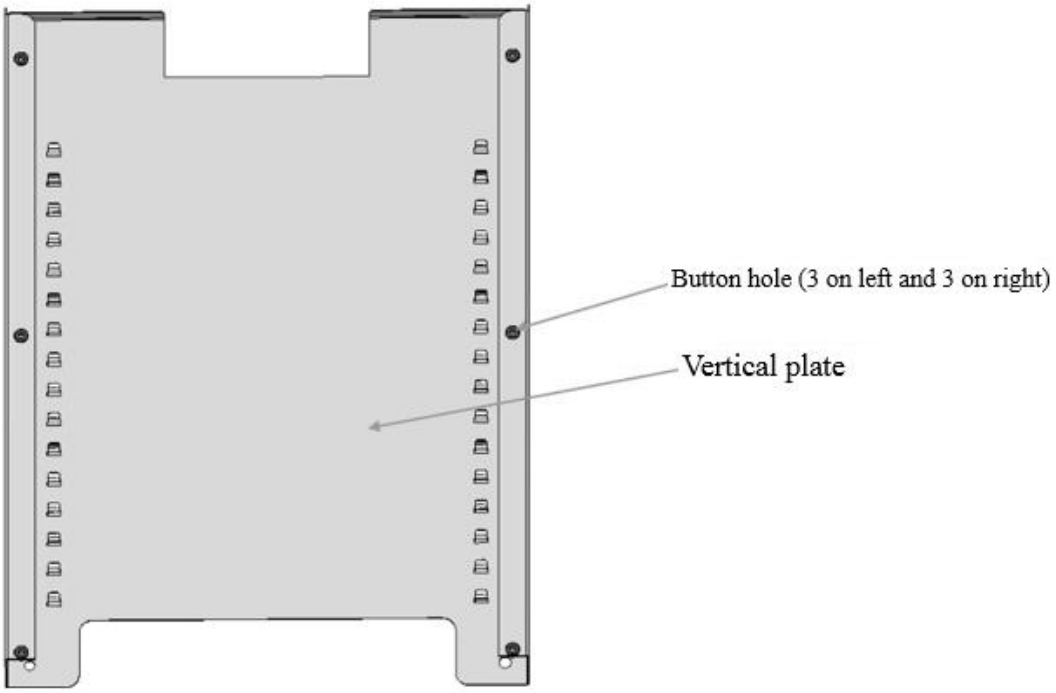


Caution: Handle filters with care, If not properly, the filter media may be damaged. To avoid damage to the incubator, do not operate the equipment without a HEPA filter installed.

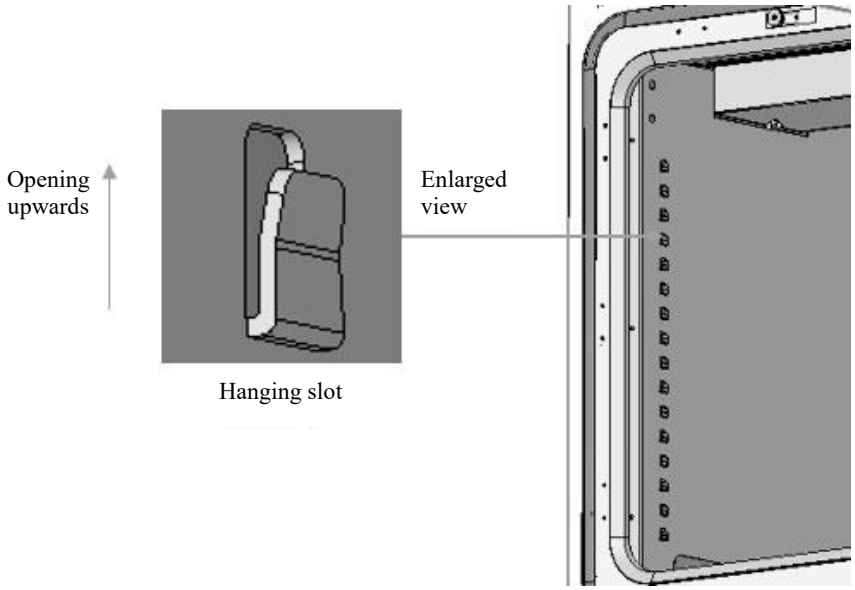
4) Make sure that one end of the 6*9 silicone tube in the incubator is well connected to the CO_2 sampling port, and the other end is connected to the air duct on the HEPA fixture. Shown as below

3.1.4 Install vertical plates and ejector rob assembly

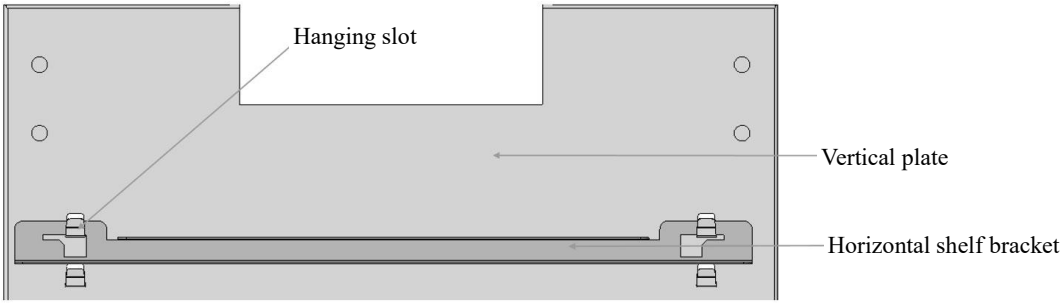
1) Attach the provided buttonholes to the flanges on the rear side of each vertical plate (each plate is provided with 6 button holes



2) Install two vertical plates with buttonholes into the CO_2 Incubator, and ensure that the hanging piece is toward the center of the chamber with the hanging slot facing up. The installation direction of vertical plates need not to be distinguished, any one of them can be installed on the opposite side by rotated. During the installation process, tilt vertical plates slightly so that they can be easily loaded, and then adjust them to the vertical position.

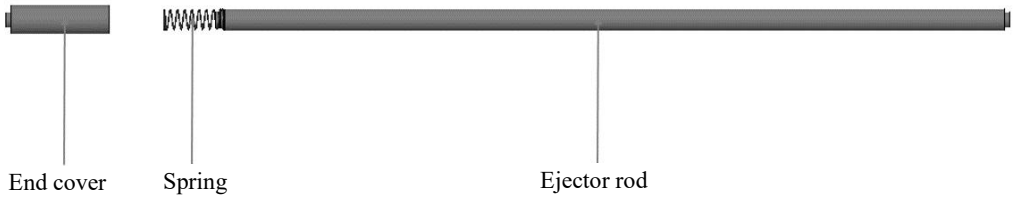


3) Install the vertical plates on the both sides, and then install the bracket for horizontal shelf. The rear hole of the horizontal shelf bracket is hung on the corresponding hanging piece of the vertical plate, and the position can be adjusted as needed. Pull the horizontal shelf bracket forward so that its front hole engages with the corresponding front hanging piece of the side vertical plate.



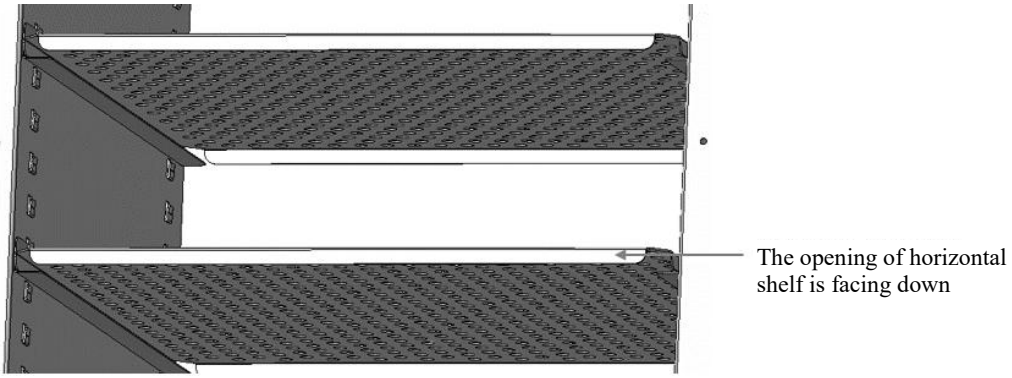
4) Ejector rob assembly. Find three ejector robs, springs and end covers from the accessory kit (2 pieces for the rear part of inner container and 1 piece for the upper front part of inner container). Insert spring ends from ridges into ejector robs and press the springs against the opposite side of the ejector robs. Spring will then be inserted into place after a cracking sound. Slide the end covers into ejector rods from above the springs. Insert one end of ejector rod into the corresponding hole of the vertical plate, and then the installation is completed.

Note: To install an ejector rod assembly, do not install the assembly to the lower edge of incubator near the reservoir, or otherwise the pan may not be easily replaced.

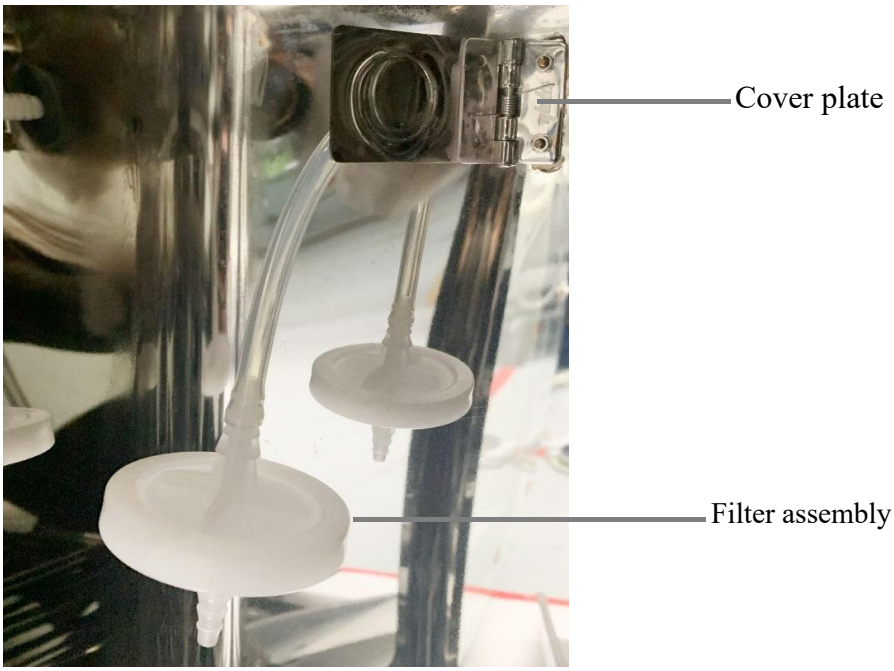


3.1.5 Install the horizontal shelve

Install the horizontal shelf into corresponding bracket for horizontal shelf as shown below.



3.1.6 Install the detection port filter assembly



1) Firstly find the detection port in the upper left corner of the incubator.
2) Take out the plug with the filter I.E. filter assembly.
3) Open the cover plate on the inside of the incubator to expose the opening and insert the filter assembly into it.

3.1.7 Adjust the equipment level

A bubble level can be placed on the horizontal shelf to check whether the equipment is flat. Please refer to the operation instruction of the bubble level for details.

3.1.8 Connect the device to the power supply

Note:

1) Connect the incubator to an exclusive grounded circuit to ensure that the circuit can load the operation of the equipment.
2) Plug the supplied power cord into the power socket on the back of the incubator, and then plug the other end into the earth dedicated circuit.

3.1.9 Filling of reservoir

Note: sterilized distilled water, desalted water or deionized water should be used when filling the reservoir. Purity of water should be within the resistance range of 50K to 1M Ohm/cm or the conductivity range of 20.0 to 1.0 uS/cm.

Water filling method:

1) The water level should not exceed 2/3 the height of the reservoir.
2) Please place the humidifying water tray in the center of the bottom of the incubator.
3) When high humidity is required, the reservoir can be placed close to the left side wall of the incubator. In addition, to close the sampling port can obtain the best humidity. However, this can also lead to condensation inside of incubator. To speed up the recovery of humidity after opening the door, please place another reservoir on the right.
4) Please check the water level regularly to ensure sufficient water and stable water level. At the same time, change water frequently to avoid using polluted water.

3.1.10 Connect to the CO_2 gas source

1) The series of incubator is limited to use CO_2 gas only. Gas purity is required to be 99.5% industrial grade.
2) Do not use the CO_2 tank with siphon. The tank should be fixed to the wall or other stabilizing device to prevent dumping. The outlet valve of the tank must be equipped with a CO_2 two-stage pressure regulator to ensure that the inlet pressure of the input for incubator is maintained at the level of 1.0bar to 1.5bar.

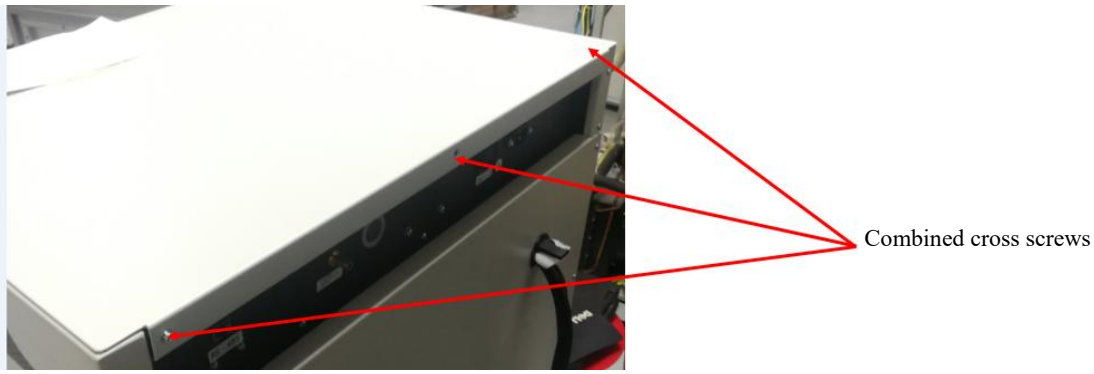
Caution: high concentration of CO_2 gas can cause suffocation! The recommended standard for indoor CO_2 levels is less than 1,000 parts per million. Please take care to keep the room ventilated. If you need to work in a confined environment, it is recommended to monitor the concentration level of carbon dioxide gas to prevent gas build-up leading to excessive concentration. If the

indoor CO_2 concentration reaches 5000 PPM, personnel should not be exposed to this environment for more than 8 hours.

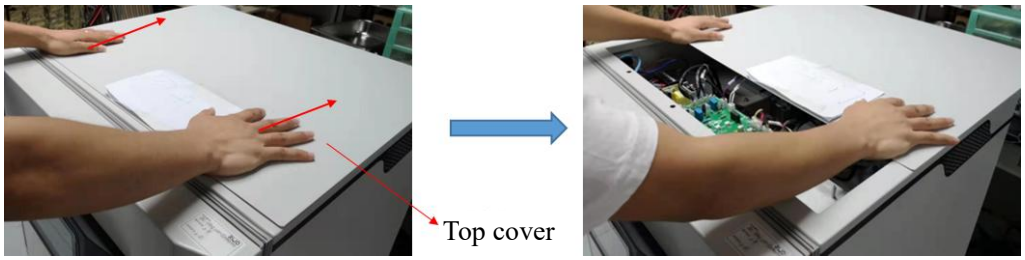
3.1.11 Switch the direction of the door

The direction of inside and outside doors can be changed according to your need. The following steps describe how to change the room door from left to right rotation:

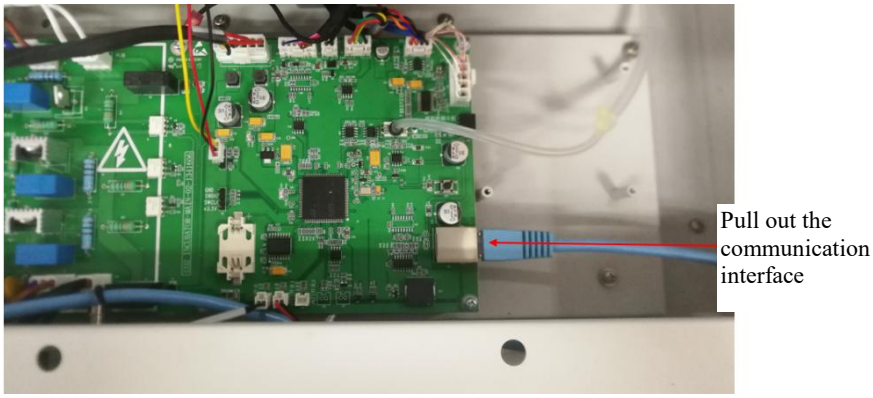
1) Disconnect the power supply and ensure that the dead equipment is operated as below (important).
2) Find 3 set screws at the back of the top cover and use a cross screwdriver to remove them, and then retain these screws.



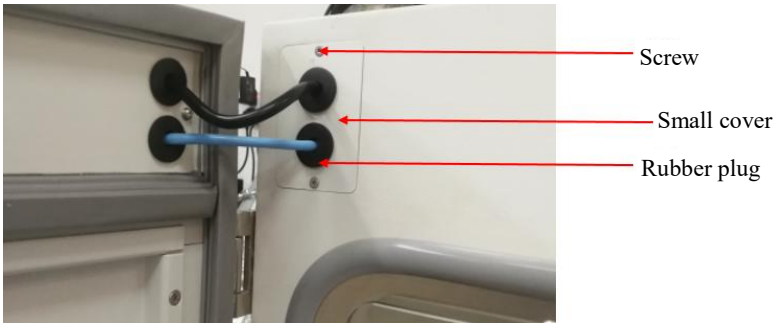
3) Push the top cover back from the front side and remove the cover.



4) Pull out the communication interface and front door heating film terminal at the positions shown below.



5) Use a cross screwdriver to remove the screws on the small cover and take out the wire plug and wire.



6) Use a screwdriver to remove 3 screws on the cover and change the outlet hole to the left side.

7) Use a screwdriver to remove 8 nuts on one side, remove the hinge and fasten these nuts and hinge securely on another direction.
8) Use screws to secure the wire cover, small cover and top cover to their original positions.

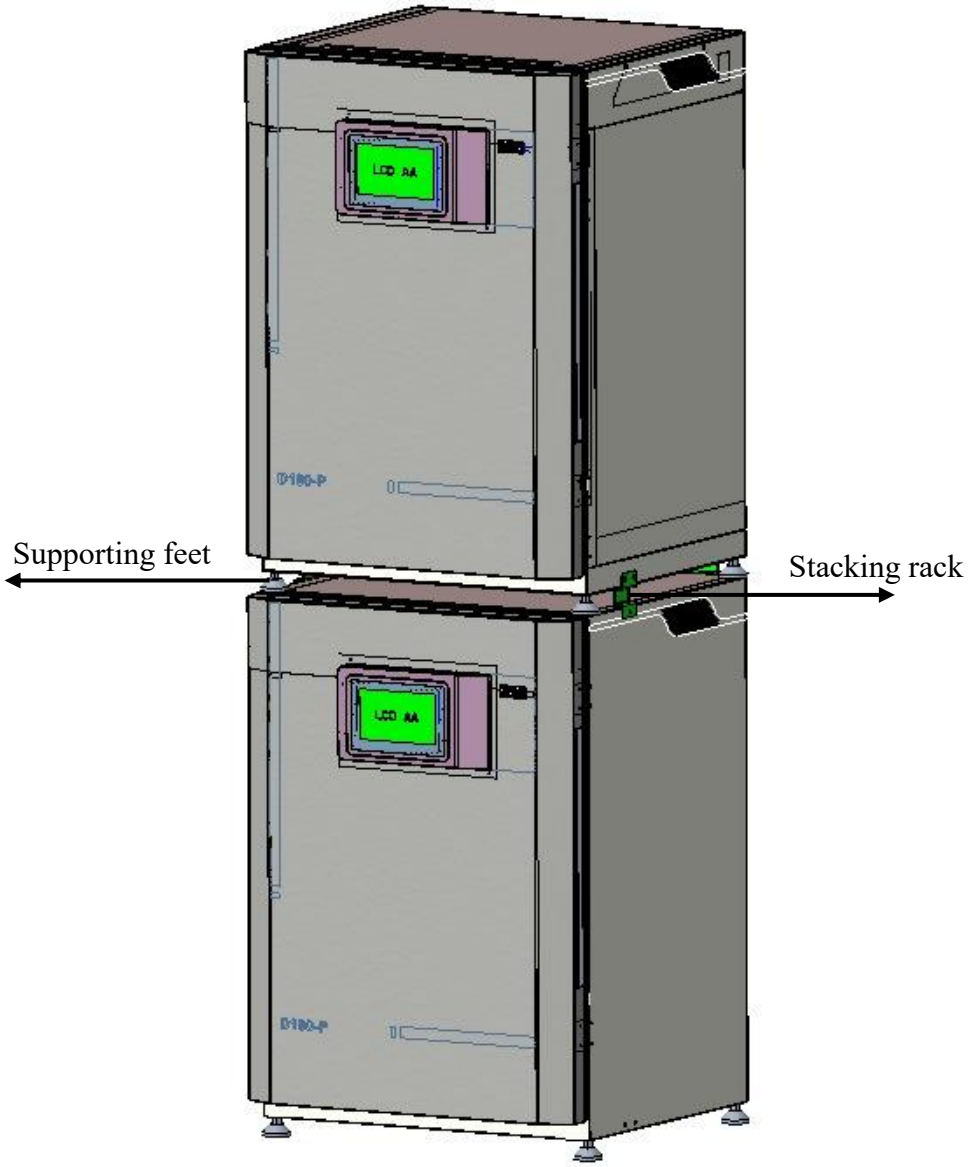
3.1.12 Incubator Stacking

Note: The weight of the incubator is about 120kg. Please work with more than two people to lift the instrument. Be sure to lift the incubator along both sides of the base. Incubator should be stacked against the wall. Turn off the power and disconnect the power cord when stacking the incubator. When the incubator is stacked, do not open the two outer doors of the incubator at the same time.

Four stacking racks are included in the accessory kit for each incubator

1) Stack two incubators and tighten the four supporting feet of the incubator located above in order to ensure the stacking balance.
2) Use a cross screwdriver to remove the four fixing screws on the lower left and lower right of the incubator above.
3) Remove the two fixing screws on the top left and top right of the incubator below.
4) Remove the fixing screws on the left and right sides of the back of the top cover.
5) Finally, the left and right and the rear sides of the two incubators were connected and fixed respectively with the cross screw and stacking racks of M5*12 in the incubator accessory package.

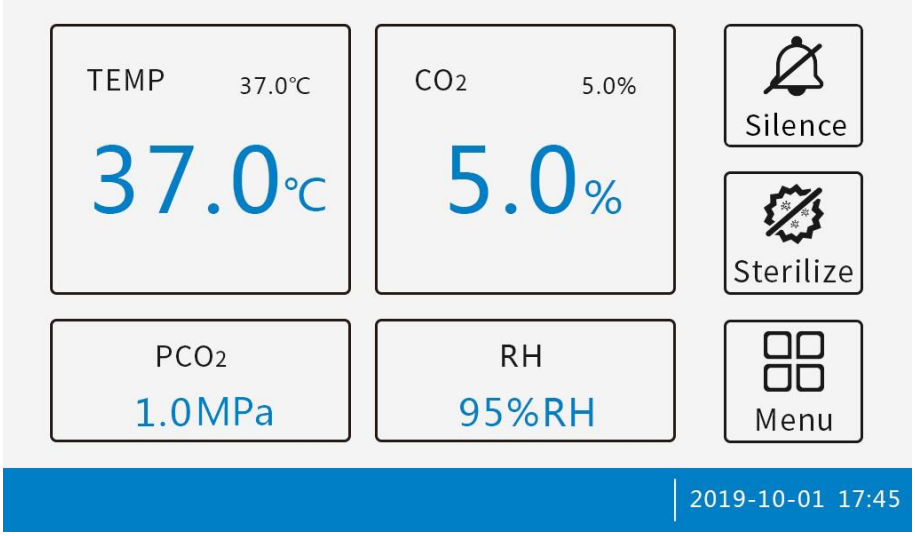
The completed sketch map is as follows.



4-Operation Instruction

4.1 Initial start

The incubator will be started up only while it was well installed with the power and gas supply properly connected, and the reservoir filled with water. Press power switch to start the equipment and enter the main interface as shown below.

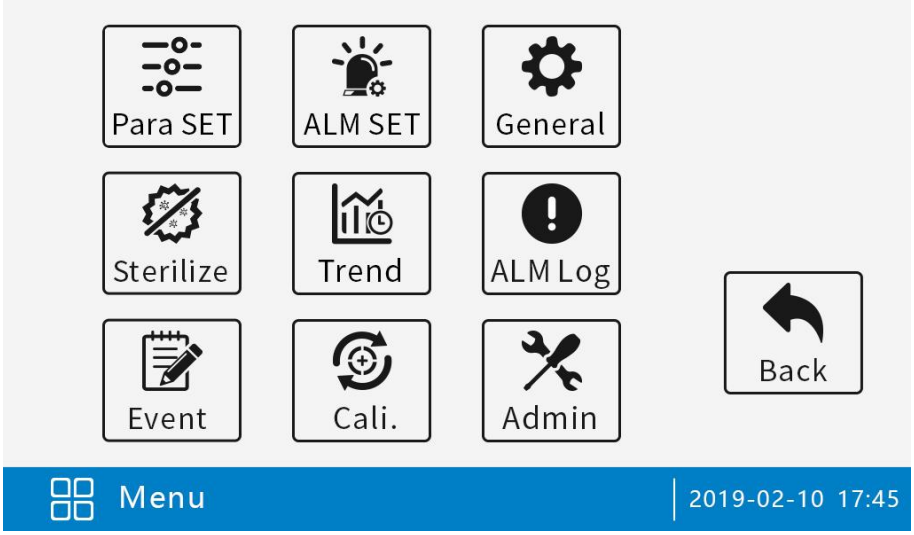


The parameter display area on main interface includes: TEMP (temperature), CO_2 (CO_2 concentration), PCO_2 (CO_2 pressure), and RH (relative humidity);

Functional area include keys of [Silence], [Sterilize] and [Menu].

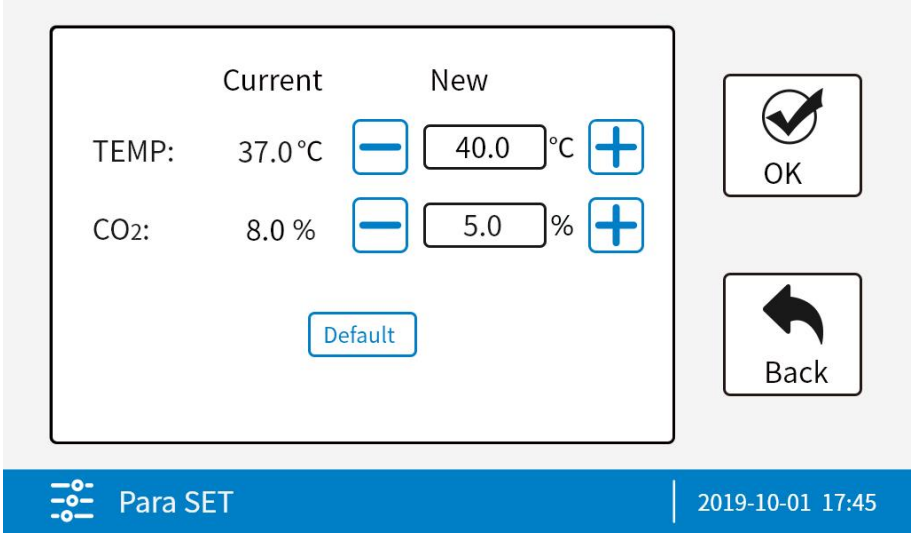
4.2 Menu

Click the [Menu] to the interface below. It mainly includes Para SET, Alarm Set, General, Sterilize, Trend, Alarm Log, Event, Calibration, Admin and so on.



4.3 Temperature and CO_2 concentration settings

Click the [Para SET] on the [Menu] to enter the parameter set interface, or click the "TEMP" or "CO_2" area of the main interface to quickly enter the same interface



[Para SET] interface supports the adjustment of temperature and CO_2 concentration:

a) The operating temperature range of incubator is: 10°C - 50°C; and at least 5°C above ambient temperature;
   The factory default temperature is 37°C;

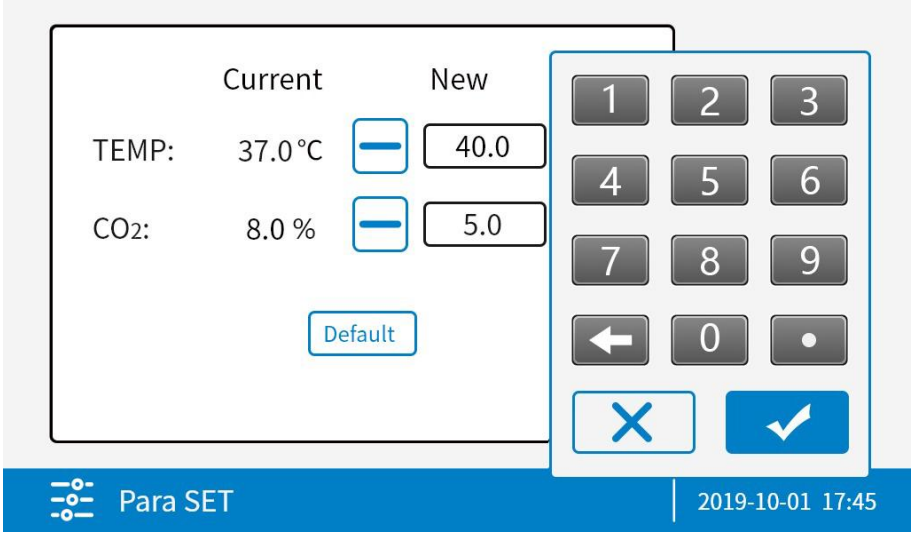
b) The CO_2 setting range of incubator is: 0.0% - 20.0%;
   The factory default CO_2 concentration is 0.0%;

Click the "Default" key to restore to the factory set.

The temperature and CO_2 concentration can be set in two ways:

a) Click the "+/-" key to increase or decrease the value;

b) Click the [New] edit box to input the target value and confirm by selecting "√" on the pop-up numeric keypad.

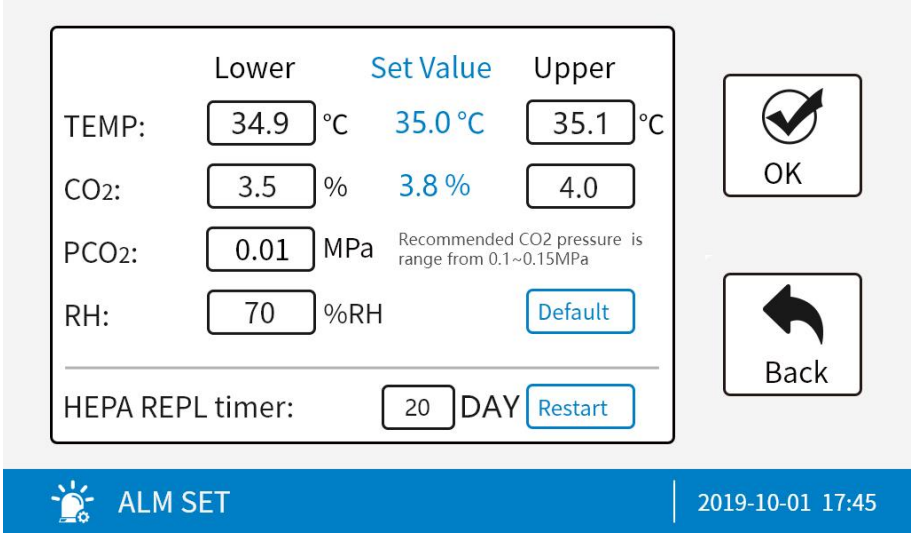


Note: when the display value of temperature and CO_2 concentration reaches the target

set value, please wait for at least 2 hours and proceed to the next step after stabilization.

4.4 Alarm settings

Click the "ALM SET" on the [Menu] to enter the interface as below, or click the "PCO_2 /RH" area on the main interface to quickly enter the alarm settings interface;



Items	Description
Temperature alarm threshold	Upper limit: (T+0.1) - (T+5.0) Lower limit: (T-0.1) - (T-5.0)
CO_2 concentration alarm threshold	Upper limit: (C+0.1) - (C+1.0) Lower limit: (C-0.1) - (C-1.0)
The setting range of CO_2 pressure	0.00-0.06Mpa （Recommended value of CO_2 pressure is 0.1~0.15Mpa）
The setting range of humidity alarm	0-100% RH
HEPA filter screen countdown	0 - 365 days

Note: The upper/lower alarm limit of temperature and CO_2 concentration must be adjusted based on current target set value i.e. [Set Value] (e.g. the [Set Value] is 35°C, then the default upper limit of alarm is 35.5°C, and the adjustable range is 35.1°C to 40.0°C).

4.5 High temperature sterilization

The sterilization lasts for around 14 hours, of which 2-4 hours for heating, 2 hours for sterilization, and 6-8 hours for cooling;

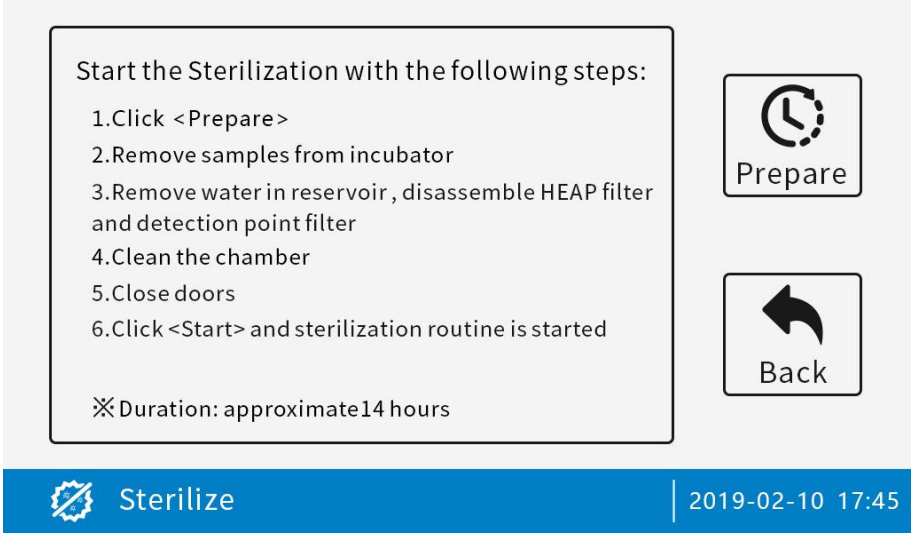
Note

- Please first clean the incubator, wipe the visible leakage traces, remove the odor, internal stains, etc. ;

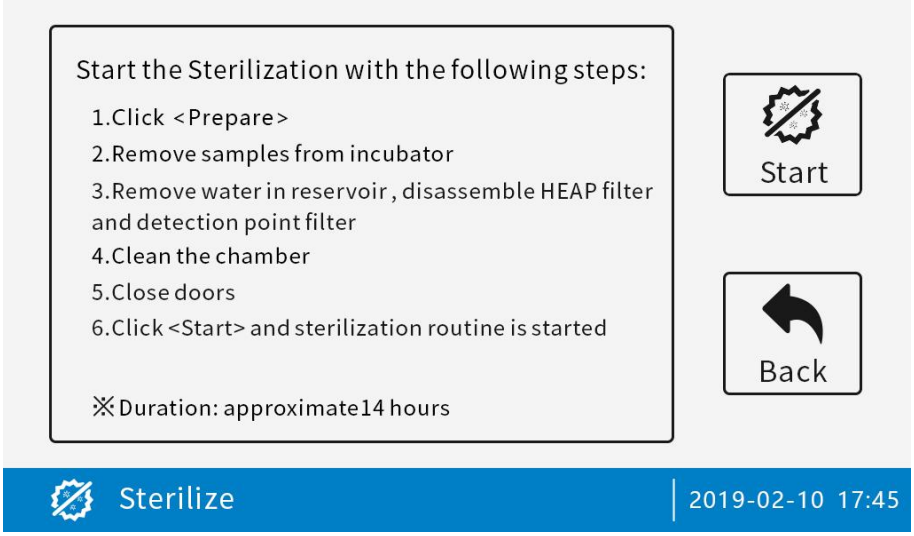
- Remove the HEPA filter and the air filter before sterilization (see section 5.6 for pictures);
- There may be odor during the sterilization, which is a normal phenomenon;
- The sterilization does not apply to other projects or instruments;
- During the sterilization, the high temperature of chamber will melt the specimens, utensils, etc. Therefore, all specimens in the chamber should be removed in advance (reservoirs can also be sterilized by high temperature).

Please start the sterilization as following steps:

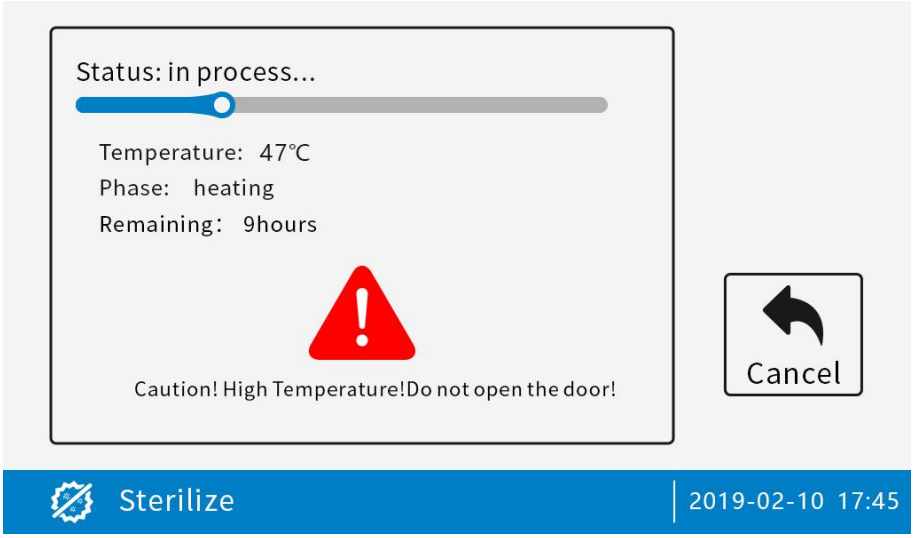
1) Click the [Sterilize] key on the main interface or [Menu] interface to enter the following interface:



2) Click the [Prepare] key, it changes to [Start], then follow the prompts in the picture to start the sterilization.



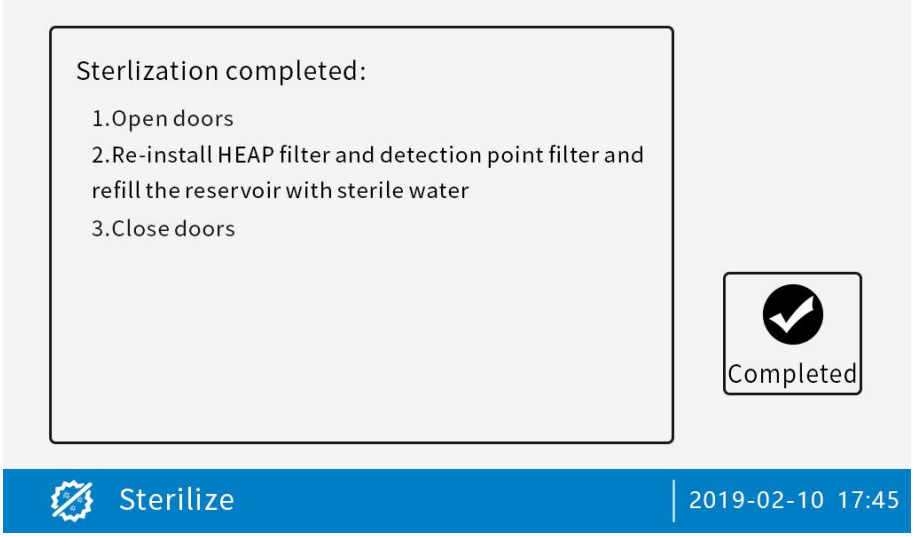
3) The following page will be displayed during sterilization



Note: Some materials may discolor during the sterilization, which is a normal phenomenon.

Warning: The inner surface of the incubator will be heated to 140°C during the sterilization. During this process, to contact with anywhere of the outside surface of incubator may result in burns.

4) Please follow the following instructions on the interface after sterilization.

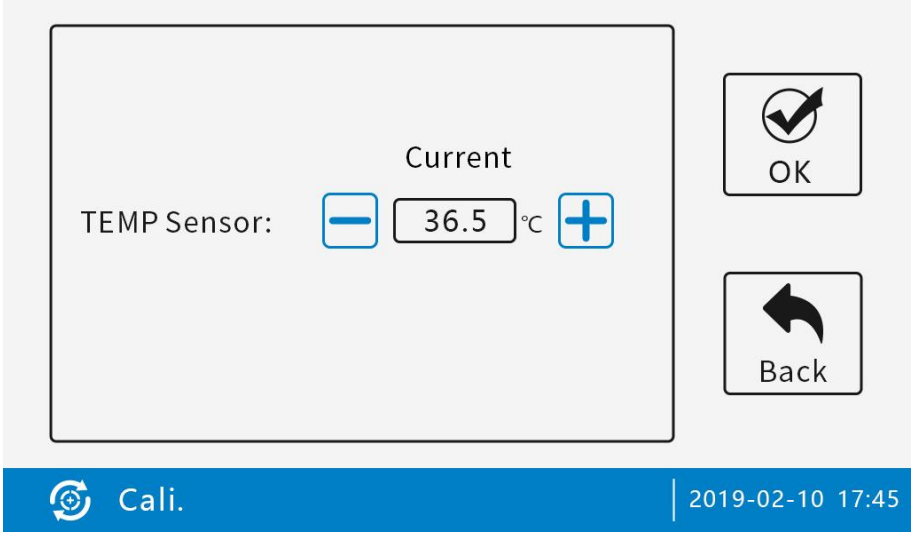


4.6 Sensor calibration

Sensors can be calibrated periodically as needed. The frequency of calibration depends on usage, environment conditions and accuracy requirements.

A good laboratory specifications require at least one calibration of sensors each year for the equipment.

Click [Cali.] on the [Menu] interface to enter the following interface:

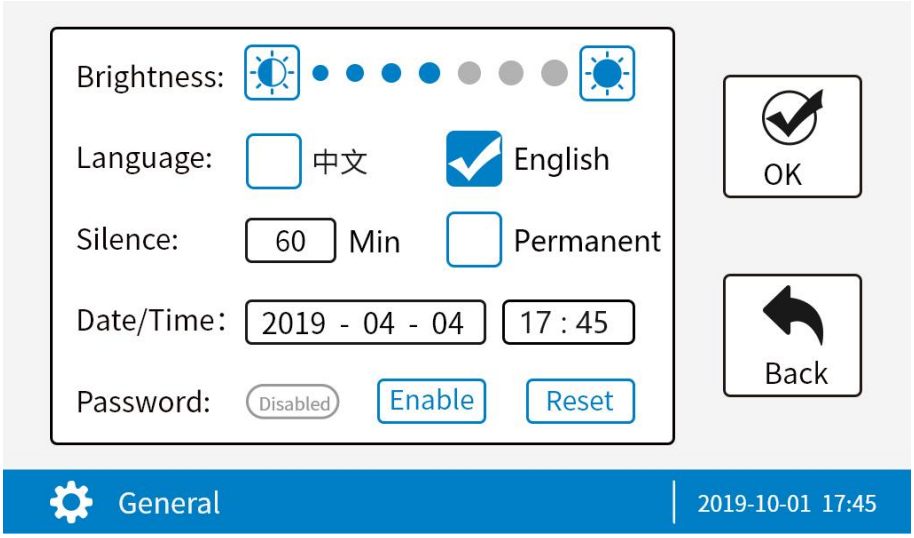


◆ **External auxiliary calibration of temperature sensor**

The chamber temperature must be stable before calibration. Place the prepared temperature calibration instrument in the center of the incubator chamber. The instrument should be within the airflow, rather than being against the shelf. After the calibrated temperature value is stabilized, the measured value of the calibration instrument should be input to the [Current Value] of the temperature sensor by the "+/-" button or the numeric keypad.

4.7 General

Screen brightness, system language, silence duration, system day/time and password can be set on the [General] interface.



Silence duration setting range: 2-999min. If "Permanent" is ticked, which means that the mute duration is unlimited after clicks the button 

on the main interface.

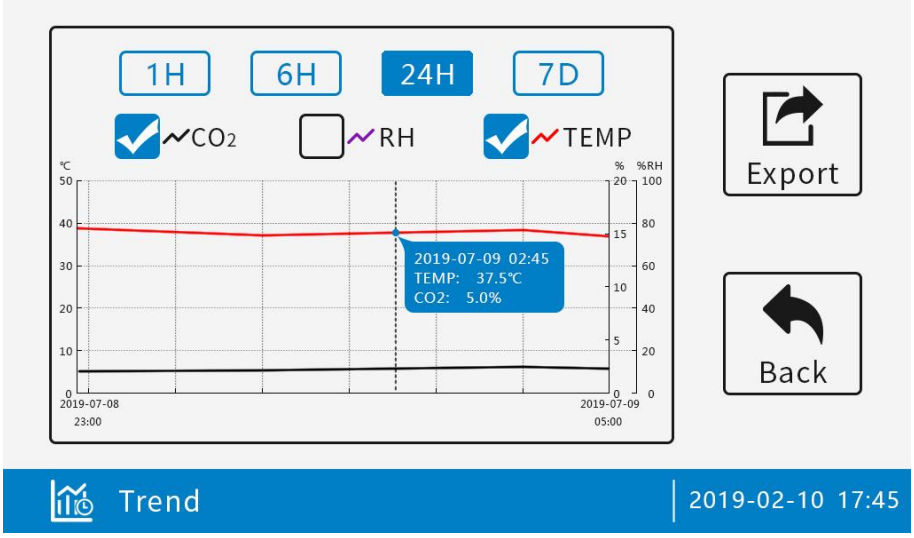
The password setting is as follows:

- In the factory settings, the password function is off by default;
- The system default password is 0000;
- After the password is enabled, the password need to be input during the operation of [Para SET] and [ALM SET] interfaces and so on to prevent the misoperation;
- Click the “Enable” to get a pop-up window such as the following left figure; correctly enter the password to Enable/Disabled the system password;
- Click the [Reset] to get the right figure, password could be reset in this window.

4.8 Other operations

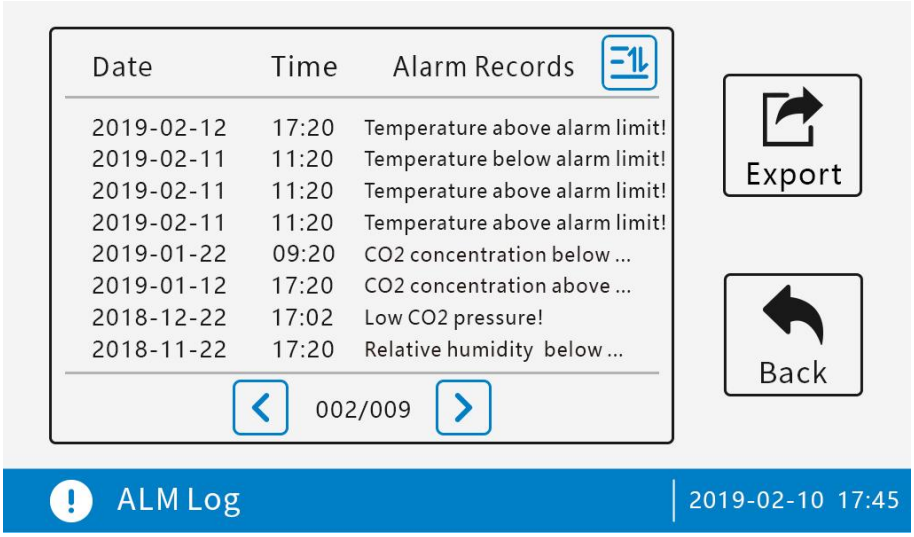
Trend

The changing curve of CO_2 concentration, relative humidity and temperature at different time span can be viewed in this interface; click [Export] to export historical data according to the prompts.



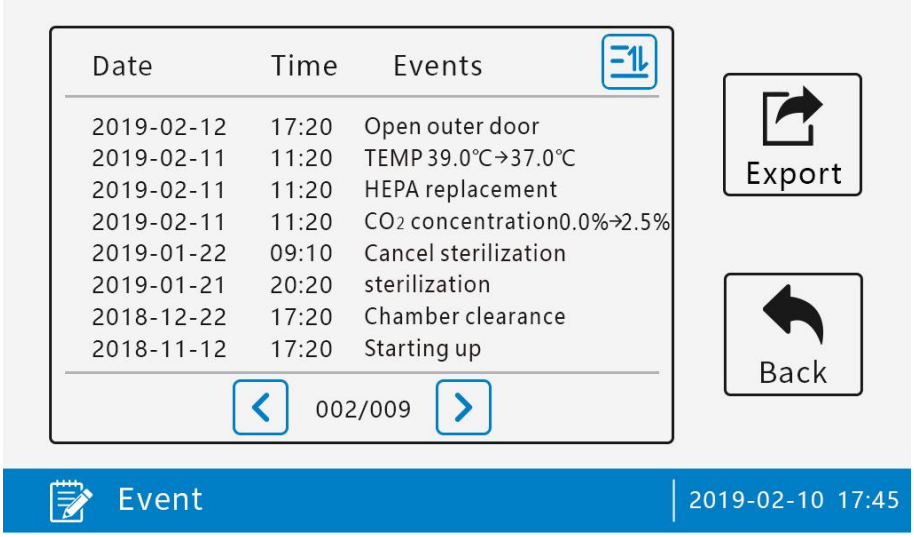
ALM Log

The alarm record interface is shown as below, export the alarm record by clicking [Export];



Event

The operation log interface is shown as below, export the operation log by clicking [Export].



4.9 Alarm and prompt message

Prompts	Possible cause	Solution
The outer door is open for too long!	Opening time of outside door > 2min;	1) Close the outside door of the equipment.
Please close the inner door!	Opening time of inside door > 2min;	1) Close the inside door of the equipment.
Temperature below alarm limit!	Actual temperature of inner cavity < the lower limit of set temperature alarm threshold;	1) Adjust the lower alarm limit; 2) Check whether the ambient temperature is too low; 3) Contact the after-sales staff.
Temperature above alarm limit!	Actual temperature of inner cavity > the upper limit of set temperature alarm threshold	1) Adjust the upper alarm limit; 2) Check whether the ambient temperature is too high; 3) Contact the after-sales staff.
CO_2 concentration below alarm limit!	CO_2 concentration < lower limit of concentration alarm threshold **(Note: if CO_2 concentration was set to 0.0%, the alarm can be blocked)**	1）Check whether the air pressure valve of cylinder is abnormal; 2）Adjust the preset pressure of cylinder to 1.0-1.5bar; 3）Check whether the air supply line is abnormal.
CO_2 concentration above alarm limit!	CO_2 concentration > upper limit of concentration alarm threshold	1）Check whether the air pressure valve of cylinder is abnormal; 2）Adjust the preset pressure of cylinder to 1.0-1.5bar.
Low CO_2 pressure!	CO_2 pressure is lower than 0.06MPa;	1）Check whether the air pressure valve of cylinder is abnormal; 2）Replace the cylinder and adjust the preset pressure of cylinder to 0.1-0.15MPa; 3）Check whether the air supply line is abnormal.
Relative humidity below alarm limit!	The current humidity is lower than the lower limit of humidity alarm;	1) Fill the reservoir with water.
Humidity sensor error!	MCU have no communication with humidity sensor	1) Contact the after-sales staff;
001 Voltage error, please restart the device or contact the after-sales personnel!	Abnormal voltage	1) Restart equipment; 2) Contact the after-sales staff;

002 CO_2 sensor disconnected, please restart the device or contact the after-sales personnel!	CO_2 sensor is not connected	1) Restart equipment; 2) Contact the after-sales staff;
003 CO_2 sensor error, please restart the device or contact the after-sales personnel!	CO_2 sensor is abnormal	1) Restart equipment; 2) Contact the after-sales staff;
004 Temperature sensor error, please contact the after-sales personnel!	Temperature sensor is abnormal	1) Contact the after-sales staff;
005 Communication error, please contact the after-sales personnel!	Communication between display panel and control panel failed	1) Contact the after-sales staff;
006 Motor error, please check if anything stuck in HEPA filter or contact after-sales personnel!	Motor fault	1) motor plugging, check whether there is any foreign matter in the installation position of HEPA, or contact after-sales service; 2) 2) motor damage, or contact after-sales service;

5-Maintenance

5.1 Preventive maintenance list

Items	Daily	Weekly	Monthly	3-6 months	Annually
Check the air pressure of the CO_2 cylinder.	✓				
Check the hinges and sealing gaskets of doors.					✓
Check whether the water level in the reservoir is between 1/3 and 2/3 from the top		✓			
Confirm and record CO_2, humidity and temperature calibration values					✓
Disinfect the inner surface of incubator				✓	
Replace the Detection port filter assembly					✓
Replace the CO_2 filter					✓
Replace HEPA				✓	

Note: Power must be turned off and the power cord disconnected before cleaning and maintenance.

Note: Please use appropriate disinfectants for cleaning, do not use strong alkaline or corrosive disinfectants, do not use sodium hypochlorite (bleach) solution. Rinse with sterile distilled water after cleaning to make sure there is no residual disinfectant. No matter what concentration of alcohol solution is used when cleaning and disinfecting equipment, ensure good ventilation and no open flame. For parts cleaned with alcohol, do not place them near open fires or other hazardous materials. The temperature of the

CO_2 sensor can reach about 150℃ during the running. Please clean the sensor after it is fully cooled.

5.2 Clean the inside of incubator

1) Remove the horizontal shelf, Detection port filter assembly, HEPA filter and connection lines, and vertical plates.
2) Wash the horizontal shelves and lines with disinfectants, and rinse them with sterile water. Shelves and pipes can also be autoclaved.
3) Clean the inside of the incubator from top to bottom with disinfectant, both sides of the inner door also need to be washed, and then rinse away the residual disinfectant with sterile water. Spray 70% alcohol after rinsing completely.
4) Install the vertical plates, Detection port filter assembly, shelves and so on, and spray them with 70% alcohol.

5.3 Clean Cabinet Exterior

Dissolve a mild detergent in water and wash the outside of incubator with a wet sponge or a soft and dried cloth. Dry them with a soft cloth.

5.4 Clean the inner door (glass door)

The inner door can be also cleaned with the disinfectant the same as that used for cleaning the incubator chamber. After cleaning, be sure to wash with sterile distilled water to remove residual disinfectant, and then dry the inner door with a soft cloth.

5.5 Clean the reservoir

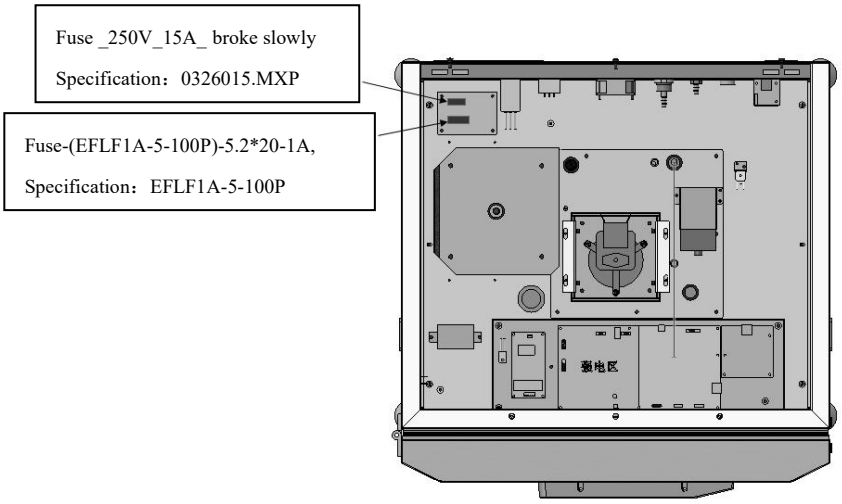
Clean the reservoir with soapy water and regular laboratory disinfectants. Rinse them with sterile water and spray them with 70% alcohol. Reservoirs can also be sterilized by high temperature.

5.6 HEPA filter maintenance

The reminder period of HEPA filter replacement can be set according to your needs, and the range is from 0 to 365 days. See Section *4.4-Alarm Settings*.
When the air filter can be seen to turn dirty, please replace them in time.

5.7 Replace the fuse

1) Turn off the incubator power switch and unplug the power cord.
2) Remove the three screws from the back of the top cover with a cross screwdriver and push back the cover.
3) Remove the fuse and replace it as shown below。
4) Install the top cover by following the dismantling procedure.



6-Troubleshooting

This section introduces the commonly encountered failures during operation of the equipment, possible causes of failure, and countermeasures.

Failures	**Possible cause**	**Troubleshooting methods**
No temperature rise	1) System alarm has occurred but not restarted 2) Internal components are damaged	1) Restarted 2) Contact after-sales staff of RWD
temperature abnomal	1) Abnormal damage of components	1) Contact after-sales staff of RWD
CO_2 Concentration anomaly	1) The valve is damaged. 2) Pressure of input CO_2 is excessively low	1）Contact after-sales staff of RWD. 2）Adjust valve pressure to 1.0-1.5bar
Zero deviation of CO_2 Concentration	1) Damaged valve or residual CO_2 gas 2) CO_2 Sensor zero deviation	1）Close the main valve of CO_2 cylinder, open the incubator door, and observe the CO_2 display value after around 3 minutes. 2）Contact after-sales staff for CO_2 sensor calibration
Loud noise	1) The wind blade of the fan motor falls off 2) Fan motor shaft off-center 3) Fan motor shaft, wind blade or turbine are stuck by a foreign matter	1) Contact after-sales staff of RWD for checking or to replace the motor
The equipment can't be powered on	1) fuse blew 2) internal components are damaged	1) Replace the fuse according to the manual 2) Contact after-sales staff of RWD
Humidity abnormal	1) Humidity sensor zero deviation 2) Humidity sensor is damaged	1) Calibrate humidity sensor 2) Contact after-sales staff of RWD
Display abnormal	1) Abnormal communication of the display screen 2) The display screen is damaged	1) Restarted 2) Contact after-sales staff of RWD

7-Warranty

The centrifuge is covered by a 12-month quality guarantee. Repair and maintenance within one year can be carried out by an authorized RWD dealer, whose contacts are listed on page 32.

Контактная информация сервисных центров

Сервисный центр Диаэм в Москве:
Адрес: 129345, г. Москва, ул. Магаданская, д.7, стр.3
Тел.: +7 (495) 745-05-08 (многоканальный)
E-mail: service@dia-m.ru
www.dia-m.ru

Сервисный центр Диаэм в Новосибирске:
Адрес: 630090, Новосибирск, Академгородок, пр. Ак. Лаврентьева, 6/1, офис 100А
Тел.: +7 (495) 745-05-08 (многоканальный)
E-mail: service@dia-m.ru
www.dia-m.ru

Сервисный центр Диаэм в Казани:
Адрес: 420111, Казань, ул. Профсоюзная, д.40-42, пом. № 8
Тел.: +7 (495) 745-05-08 (многоканальный)
E-mail: service@dia-m.ru
www.dia-m.ru

Сервисный центр Диаэм в Санкт-Петербурге:
Адрес: 197022, Санкт-Петербург, ул. Профессора Попова, д. 23, лит. Д, офис 614 (БЦ «Гайот»)
Тел.: +7 (495) 745-05-08 (многоканальный)
E-mail: service@dia-m.ru
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