



# Operation Manual



BCBS-307

## Biological Safety Cabinet Class II

Thank you for Choosing Biolab products. Please read the “Operating Instructions” and “Warranty” before operating this unit to assure proper operation.

## **Introduction**

Thank you very much for purchasing our biological safety cabinet! We sincerely hope that our products can provide the greatest help for your work.

Please read the “Operating Instructions” and “Warranty” before operating this unit to assure proper operation.

After reading these documents, be sure to store them securely together with the “Warranty” at a hand place for future reference.

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# 01 Unpacking, Installation and Debugging

Please firstly check if packing box is in good condition. If the packing box is damaged, please take photos.

## 1.1 Unpacking

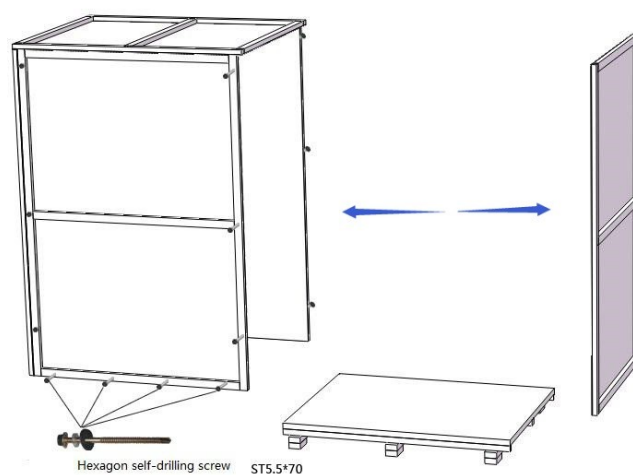
(Choose the proper unpacking method according to the actual situation)

Method 1: Use M8 Wrench to unpack



Picture 1

Method 2: Use Electric drill with hexagon dead M8 to unpack



Picture 2

## 1.2 Accessories Checking

Refer to the packing list and check the accessories.

### Packing list

Items	Quantity
Main Body	1unit
Power cord	1pc
Fuse (10A)	2pcs
Fuse (5A)	1pc

UV Lamp (T6 30W)	1pc
Remote control (including battery)	1pc
Keys	2pcs
User manual	1pc
Test report	1pc
Quality certification card	1pc
Big rubber gasket	1pc
Small rubber gasket	1pc
Motor control rod	1pc
Stainless steel internal screw ball valve	1pc
Stainless steel external screw tube	2pcs
PTFE tape	1pc

### 1.3 Installation conditions and using environment


To avoid disturbances of airflow caused by ventilation system, air conditioning, door, window, and personnel movement, biological safety cabinet should be placed in a protected zone of airflow, front aperture should not be directly facing windows and doors and stay away from the ventilation and air-conditioning vents. Tests show that if the velocity of other disruptive airflow over the suction airflow velocity of safety cabinet air inlet, indoor infectious gas will enter the work space of biological safety cabinet. So, it is very necessary to make the safety cabinet be in right position. The air exhaust from the top of the cabinet, the exhaust should not be limited while determining location. Biological safety cabinet should be in the downstream of air flow, at least 30mm distance must be keep for Each side of cabinet, so as to inspection and maintenance.

#### Working environment:

- (1)Only is suitable for indoor;
- (2)Ambient temperature: 15°C ~ 35°C;
- (3)Relative Humidity: ≤75%;
- (4) Atmospheric pressure range: 70 kPa ~ 106 kPa;
- (5)Electrical parameters: Consistent with the rated voltage of the biosafety cabinet (See 2.1.5 technical parameter performance index);
- (6)Power supply need to be grounded; (Judging method: testing the fire wire and the zero line of the power supply with multimeter, the fire wire to ground voltage should be grid voltage and the zero line to ground voltage should be 0, otherwise the power supply ground is bad).

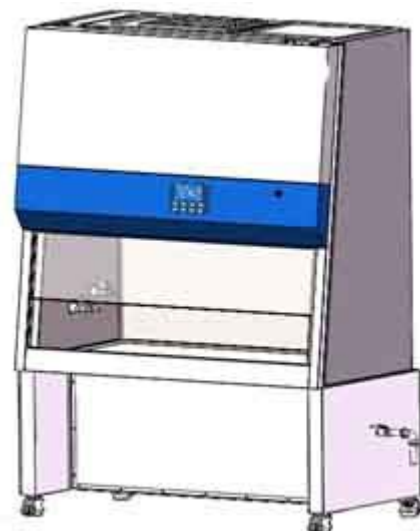
## 1.4 Installation

- a. Remove all the package materials;
- b. Inspect the surface of main body to make sure whether there is scratch, deformation or uncorrelated things;
- c. Move the whole device to the final installation location as close as possible where easy to install;

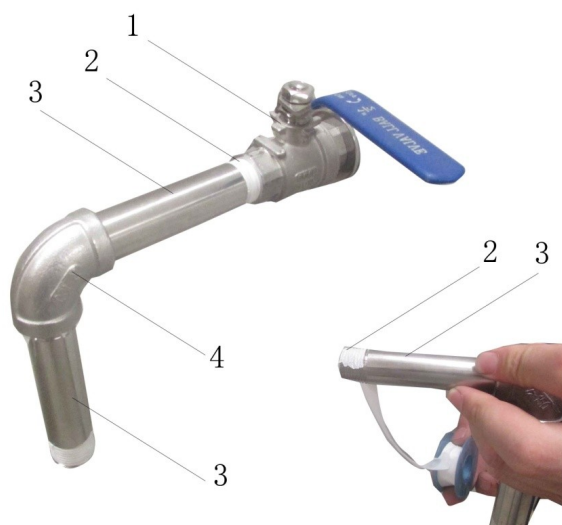
 The base stand will be packed at back of main body, please take it out before installation. DO NOT INVERT, DISASSEMBLE OR TITILE THE CABINET during transportation.

d. Install drain tube

Use PTFE tape to wrap some rounds on the screw of 2 stainless steel external screw tube (picture 4). Then connect the 2 stainless steel external screw tubes with Stainless steel 90° internal screwed conduit pipe in both sides. There is installed drain valve in the right of base stand, then connect the installed seepage tube with drain valve (picture 5) and use adjustable wrench firmly it.



Picture 3



Picture 4

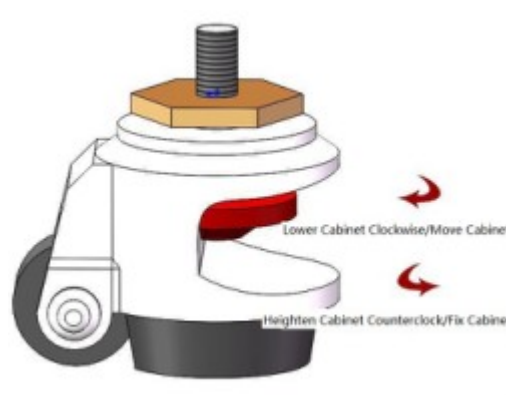
1. Drain valve

2. PTFE tape

3. Stainless steel external screw tube 4. Stainless steel 90° internal screwed conduit pipe

e. Installed picture, pls refer to Picture 4

f. Adjustment of Footmaster Caster



Picture 5

Clockwise rotate caster' red part to low down the base feet and the height of the cabinet. Low down all four casters can move the cabinet position.

Counterclockwise rotate casters' red part can rise the base leg and height of cabinet. Raise all four casters can at same time can fix the cabinet. Adjust the four Foot -masters makes the cabinet stable.

g. Installation of Water and Gas Tap ( Optional )





Picture 6

1. Fastening Nut

2. Stainless Steel Water and Gas Taps

Take out fastening nuts, water and gas taps, installing as Picture 6.

### 1.5 Check after installation finished

Checking Items	Normal situation
Wind speed display	Inflow $0.53 \pm 0.025 \text{ m/s}$ , downflow $0.33 \pm 0.025 \text{ m/s}$
Pressure display	exhaust filter 80-120Pa, downflow filter 80-120Pa
Fan running	Normally
Fluorescent lamp	Lamp lights after pressing button
UV Lamp	Lamp lights after pressing button
Display screen buttons	All buttons can be used
Socket	Press the socket key, multimeter testing output supply voltage

## 02 User Instructions

### 2.1 Functions

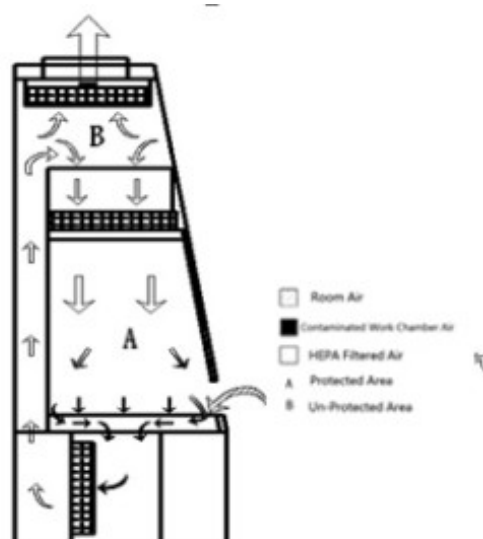
#### 2.1.1 Product Concept

This products belong to Class II A2 biological safety cabinet which fully meet the requirement of Pharmaceutical industry standard of the People's Republic of US standard ANSI/NSF49:2002, European standard EN12469:2000, biological safety cabinet is a kind of negative pressure filtration system for protecting operator, the laboratory environment and work materials, the front opening which air flow inward have protection function for operator, the filtered laminar flow generated by vertical HEPA can protect work materials, what's more, the polluted air flow become pure after processed by HEPA(ULPA) filter. As it has bag in and bag out filter, exhausted air will be much safe after twice processed so that protect environment. Operating air come back to operating area after twice processed, air purification effect is stronger and ensures the accuracy of experimental results. At the same time, the working life of HEPA filter is longer so that reduces the replacement frequency and cost. When it's used in microbiology experiment environment filled with volatile or toxic chemical and radionuclide, suitable exhaust hood in function have to be linked.

#### 2.1.2 Application Range

Biological Safety Cabinet is necessary equipment in the laboratory in the research of microbiology, biomedical, DNA recombinant, animal experiment, and biological products, especially in the occasion that operator need to adopt protective measure, such as medical and health, pharmacy, medical research. Our equipment provides a safety working environment which don't have bacterial and dust in the process of bacterial culture.

#### 2.1.3 Working theory/Air flow pattern and protected area



Picture 7

#### 2.1.4 Protected objects

Biological safety cabinets (BSCs) are designed to protect the operator, the laboratory environment and work materials from exposure to infectious aerosols and splashes that may be generated when manipulating materials containing infectious agents, such as primary cultures, stocks and diagnostic specimens.

#### 2.1.5 Technical Parameters and Performance Index

Parameters	Model BCBS-307
External Size(WxDxH)	1370mm×760mm×2100 mm
Working Zone Size(WxDxH)	1220mm×600mm×660 mm
Power Supply AC	220V±10% , 110V±10%
Frequency	50 Hz, 60Hz
Consumption	900W
Total Airflow Volume	460m <sup>3</sup> /h
Downflow Velocity	0.33±0.025m/s

Inflow Velocity	0.53±0.025m/s
UV Lamp Consumption	30W
Fluorescent lamp Consumption	40W×2 H Type
HEAP Filter	99.9995% ( Diameter: 0.12μm )
Noise	≤61dB ( A )

### Notes:

- (1) Electric consumption power including power which operation area needs to load (Loading no more than 500W)
- (2) Our company has right for changing the products, if we need to change and re-design, please forgive us for not notifying you.

### Performance Index

#### 1) Biological safety functions

Personnel protection, microbial colony count  $\leq 5\text{CFU}$ ;

Sample protection, microbial colony count  $\leq 5\text{CFU}$ ;

Cross contamination protection, microbial colony count  $\leq 2\text{CFU}$ .

#### 2) Leak-proof Cabinet

If cabinet pressurized to 500Pa, the pressure should be no less than 450 Pa after 30 min.

#### 3) Integrity of HEPA Filter

Scan and detect the HEPA filter, the leakage rate at any point should not be  $> 0.01\%$ .

#### 4) Vibration amplitude

The net vibration amplitude between frequency 10Hz and 10KHz is no more than  $5\mu\text{m}(\text{rms})$ .

#### 5) Illumination

The average illumination is no less than 650 lux, every measured illumination is no less than 430lux.

#### 6) Mechanical performance

Structure design is reasonable, high quality materials are adopted for the cabinet. It can resist shape global deformation caused by external force. The working surface will not occur permanent deformation when weight put reaching 23kg.

#### 7) Electrical properties

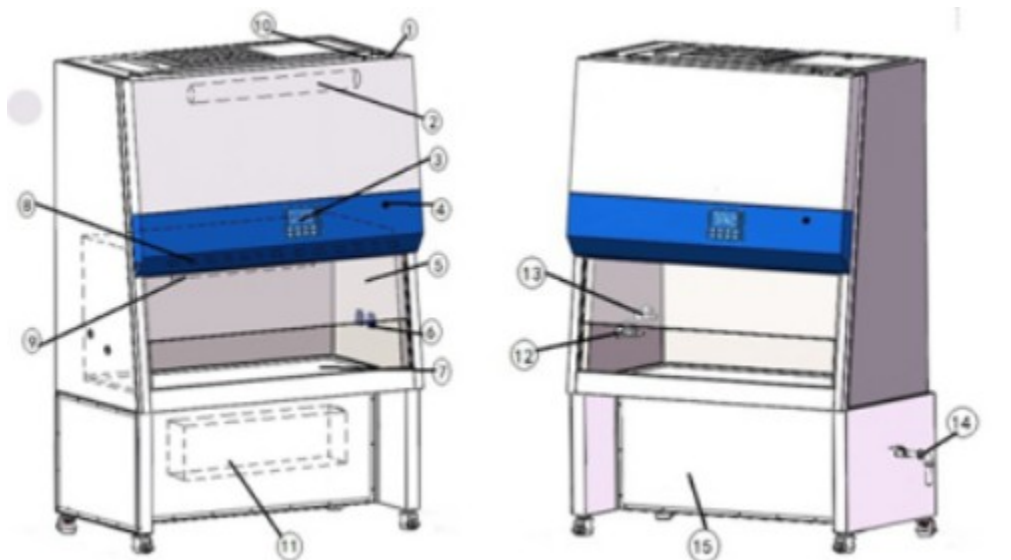
The voltage increases to 1390V (AC) in 5s and keep for another 5s without

breakdown.

Grounding resistance  $\leq 0.1\Omega$

## 2.2 Product structure

### 2.2.1 Structural composition of BCBS-307



Picture 8

- 1.Power socket
- 2.Tube motor
- 3.Control panel
- 4.Key choice button
- 5.Front window
- 6.Water-proof socket
- 7.Working Area
- 8.Fluorescent Lamp
9. UV lamp
- 10.Fuse socket
- 11.Bag In and Bag Out filter
- 12.Water tap
- 13.Gas Tap
14. Drainage component
- 15.Base stand

### 1) Driving System of Front Window

Driving system consists of tube motor, front window, hauling sash and position switch.

### 2) Air Filtration System

Air Filtration System is the most important system of BSC. It consists of blower, supply filter and exhaust filter. The main function of Air Filtration System is transferring filtered air to work area, ensure the down flow velocity, and keep Class 100 cleanness of work area.

### 3) UV Light


UV lamp is inside work area. So UV lamp can well sterilize all space of work area. Emission of 253.7nm can ensure most efficient decontamination.

### 4) Fluorescent Light

The BSC is equipped with straight tube H type energy-saving fluorescent lamp. It can make sure average illumination inside work area which meets standard requirements.

### 5) Air pipe

Air pipe is the ventage of differential pressure sensor.


 The air pipe should not be blocked and please do not hang anything on the pipes, otherwise it will effect wind speed and pressure

### 6) Power lock

When the power cord is connected to main power, switch the key for power lock, then the equipment is powered on.

### 7) Water proof Socket

Waterproof Sockets are located on the right side of the work area, which can be controlled by SOCKET button.

 (1) Please make sure the total load of sockets should be  $\leq 500W$ ;  
(2) Only put the lid down can Waterproof Socket be waterproof, the socket can not be seen as waterproof when front lid open.

### 8) Fuse

The equipment is equipped with main power fuse, waterproof socket fuse and fan fuse. They are located near the power cord's outlet. Fuse label is corresponding to the relevant specifications.

### 9) LCD Display (Liquid Crystal Display)

Large LCD display indicates detailed key parameters, it is real-time display to reflect the equipment working condition, such as effective working state of the filter, which is more intuitive.



Picture 9

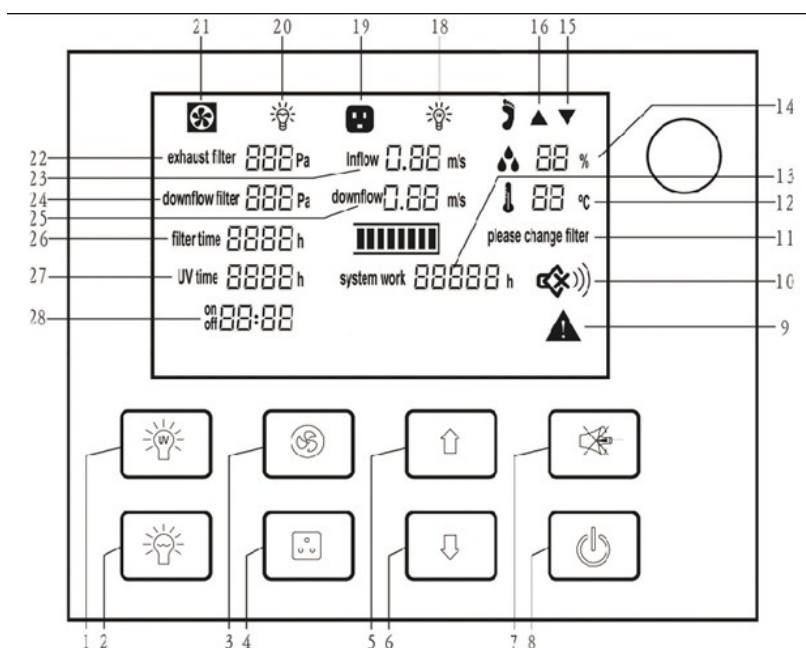
### 10) Control of Front Window

Front window is motorized, the soft touch-button on the panel could be controlled freely, the operator is no need to direct contact with front window. The motor is special reversible speed regulating motor that has the characteristics of big start torque and stable rotation.

### 11) Structure

- a) Biological Safety Cabinet's both sides and back area are negative pressure air channel. And the negative pressure keeps work area away from contamination.
- b) Cabinet body is built of 1.2mm cold-rolled steel with anti-powder coating. Strong and steady.
- c) Work area is fully made of stainless steel which looks beautiful and with corrosion resistance performance.
- d) Base stand is made of cold-rolled steel with anti-powder coating.
- e) Soft touch type control panel, easy to handle and beautiful appearance.

## 2.3 Control Panel



Picture 10

- |                            |  |
|----------------------------|--|
| 1. UV Lamp                 | 15. Glass Window Down Status             |
| 2. Fluorescent Lamp        | 16. Glass Window Up Status               |
| 3. Blower                  | 17. Foot Switch Status                   |
| 4. Socket                  | 18. UV Status                            |
| 5. Glass Window Up         | 19. Socket Status                        |
| 6. Glass Window Down       | 20. Fluorescent Lamp Status              |
| 7. Mute                    | 21. Blower Status                        |
| 8. Power                   | 22. Exhaust Filter Differential pressure |
| 9. Alarm Status            | 23. Inflow Velocity                      |
| 10. Mute Status            | 24. Supply Filter Differential pressure  |
| 11. Filter Changing Status | 25. <u>Downflow</u> Velocity             |
| 12. Temperature            | 26. Filter working time                  |
| 13. System Working Time    | 27. UV Lamp working time                 |
| 14. Humidity               | 28. Reservation timing                   |



## a) LCD Screen

The working status of the equipment and operation can be seen on the LCD screen.

## b) Soft touch button.

BSC's main functions could be executed by touch-buttons. User can operate the BSC either by pressing the buttons on control panel or using the remote control. There are totally 8 common button on control panel.



: The power button



: To control fluorescent lamp



: To control UV lamp.(It works only after front window fully closed.)



: To control blower working status. (It will not work when front window is fully closed.)



: To control socket power status.



: Press MUTE button to stop voice prompt



: Press UP button, glass window will raise.



: Press Down button, glass window will fall down.

**Clock Adjustment:**

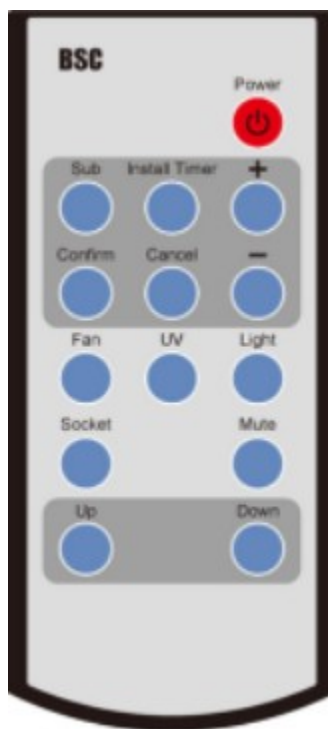
Turn the power key, so machine is in standby state.

Press the light button, and then press the power button for 5 seconds. Then you see the state of clock adjustment after a buzzer alarm.

Firstly, minute position is flashing, press UP and DOWN to adjust to present time. Then press the MUTE button switching to hour position and adjust to present time. After that, press the light button first, and press the power button for about 5 seconds. Data will be saved after a buzzer alarm.

## 2.4 Remote Control

It is inconvenient for the users to operate from a distance. Small & light remote control is flexibly to be used to control all the functions of the cabinet in a distance  $\leq 6\text{m}$ ,  $30^\circ$  range. The operator can even carry it with themselves during experiment for convenience. This remote control adopt specific chip which is featured with good anti-jamming performance, longer control distance and high control precision.



Picture 11

### Buttons of Remote Control:

1. Power (POWER)
2. Reservation Time (SUB)
3. Timer (INSTALL TIMER)
4. Confirm (CONFIRM)
5. Cancel (CANCEL)
6. Turn up (+)
7. Turn down (-)
8. Fan (FAN)
9. UV (UV)
10. Illumination (LIGHT)

11. Socket (SOCKET)
12. Mute (MUTE)
13. Front window up (UP)
14. Front window down (DOWN)

### **A. Reservation Time (SUB)**

- a. Connect power, open power lock, and press the reservation timing button (SUB);
- b. Adjust the time (minutes) by “+” or “-” button. Press the confirmation button (CONFIRM) to confirm; and then adjust other minutes and hours position data in the same way;
- c. After the time is confirmed, the corresponding display lamp lights by selecting the function buttons (such as UV);
- d. Press the POWER button again, the reservation function starts. Reserved time starts count down. The corresponding setting function starts when the time counts down to zero.

### **B. Timer (INSTALL TIMER)**

- a. Connect power, open power lock, press button (POWER), the corresponding display lamp lights by selecting the function buttons (such as UV);
- b. Press button (INSTALL TIMER), adjust the time (minutes) by “+” or “-” button. Press button (CONFIRM) to confirm; and then adjust other minutes and hours position data in the same way;
- c. After the time is confirmed, the Timer function starts. When the time counts down to zero, all the functions will be off, the cabinet will be in standby mode.

### **C. Application of Reservation Time**

Biological safety cabinet is equipped with special UV lamp. When turning on or turning off the cabinet, sterilization time of UV lamp should be at least 30 minutes. In order to save the waiting time of turning on or turning off the cabinet, we develop reservation time function. It realizes function of automatic turning on or turning off the cabinet after the sterilization finished. Reservation time setting range is from 0 to 99 hours and 59 minutes. This function helps operators to save time and improve efficiency.

## 2.5 Instructions for Operation

### 2.5.1 Normal Operation Notice

- (1) Make sure input voltage is correct and stable. The rated load of main power socket should be higher than cabinet consumption. Plug must be well grounded.
- (2) In order to avoid air turbulence of the front opening , the operator should vertically slightly move his arms during experiment. Hands and arms should stay inside the working area at least 1 minute before operating. In order to decrease the times of arms moving into and out of the working area, prepare all the necessary items inside the cabinet before starting experiment;
- (3) Moving principles of different samples inside cabinet: When two or more samples need to be moved, be sure that low-polluting samples move to high-polluting samples. Movement of items should also follow the principles of slow-moving.
- (4) Samples placed in parallel: Samples should be placed in the cabinet parallel to avoid cross-contamination between samples and blocking back air grille.
- (5) In order to avoid samples being sucked into the negative passage or the blower, do not place soft and slight samples (for example: soft tissue) on the surface during experiment;
- (6) The weight of items placed in the cabinet should be no more than 23Kg/25×25cm<sup>2</sup>;
- (7) Avoid vibration: avoid using vibration equipment ( e.g. centrifuges, vortex oscillator, etc.) inside the cabinet. Vibration would cause lower cleanliness of operating area and affect operator protection.
- (8) No flame: No flame is allowed inside the cabinet. Using of fire will lead to airflow disorder, and filter damage. If sterilization is required during the experiment, infrared sterilizer is highly recommended.
- (9) HEPA filter life: With the usage time increasing, dust and bacteria accumulate inside HEPA filter. Filter Resistance is getting bigger, when it reaches the maximum point, there will be audible and visual alarm. Please timely contact with the service department of our company to replace new HEPA filter, otherwise it will affect the safety performance of the equipment. The used filter should be processed as medical waste.

(10) There is a negative passage surrounding the work area, which is sealed strictly in the factory. The operator is not allowed to remove or loose screws of those parts. If necessary, please contact service personal.

(11) Front Grille is used for air intake and drain. Do not block it, otherwise it will affect airflow. Armrest is recommended to solve this problem and reducing the operator's wrist fatigue.

(12) Long-term use of biological safety cabinets will inevitably cause pollution (e.g. HEPA filters, corner cabinets, etc.). In order to sterilize thoroughly every 500 hours, formalin (formaldehyde) fumigation sterilizer is recommended. After sterilization, neutralize formaldehyde gas with ammonium hydrogen carbonate. Make sure no sterilization gas escapes during the whole process.

(13) The maximum storage period is one year. If the period is more than one year, performance test should be done.



**Serious declaration: we will take no responsibility for risks caused by improper operation and man-made damages!**

### 2.5.2 Normal Operation Process

a. Connect the same power reply, as required of equipment

b. Open the power lock, LCD display lights up and alarm rings at the same time, then the machine enters to standby status. Waiting for the operator to input button to use it.

c. Press POWER button, then the following functions are available: Fluorescent lamp, UV lamp, Fan, Mute, Sockets, Front window up and down, Reservation timing



**When front window is closed and fluorescent light is off, then press the UV button to select the sterilization function.**

d. Before doing experiment, please sterilize the cabinet for more than 30 minutes by UV lamp.



**(1) For safety of eyes and skin, people should leave room during the UV sterilization.**

**(2) UV lamp intensity should be tested regularly. If there is no test conditions, it should be replace when the UV timer on the display indicate the working time reaches to 1000 hours.**

e. Please move the front window at 200mm height from the work table, turn on the fan, make sure the experiment should be started after fan working for at least half an hour.



**For operating safety, please put testing materials inside the cabinet in advance, and keep the front window at 200mm height from the work table during operation.**

After finishing the experiment, please move the front window down to the bottom, and make sure to sterilize the cabinet by UV lamp for 30 minutes before turning off the cabinet.

## 2.6 Daily maintenance

Because the operating time will directly affect the judgment of maintenance needs, we recommend the user keep a detailed record of operating time for reference.



**When doing maintenance, please pay attention to cut off the power, so as to avoid electric shock!**

### 2.6.1 Preparations before maintenance

Soap, hot water or warm water, a soft cotton cloth, dry cloth or towel, medical alcohol or other disinfectants, 100 dilution of household bleach, abrasive household cleaners, sterile water

### 2.6.2 Clean the cabinet surface

#### 1) Clean the operating area surface

Wipe the entire surface with a soft cotton cloth or towel soaked with concentrated liquid soap, then wipe up the soap with another cotton cloth or towel soaked with clean hot or warm water, and then wipe the surface with a dry cotton cloth or towel rapidly.

For the contaminated or dirty work surface or sump., use 70% medical alcohol or other disinfectant to wipe.



**Disinfectants used for wiping should not damage 304 stainless steel.**

## **2) Clean the external surface and front window.**

Use soft cotton cloth or towel to wipe the surface with non-abrasive household cleanser.

### **2.6.3 Overall maintenance period**

We suggest comprehensive maintenance period is one year or 1000 working hours.

### **2.6.4 Maintenance methods**

#### **1) Daily or weekly maintenance**

- a. Sterilize and clean the operating area
- b. Clean the external surface and front window.
- c. Check the various functions of equipment
- d. Record this maintenance result

#### **2) Monthly maintenance**

- a. Clean the external surface and front window.
- b. Wipe the working table, inner wall surface of operating area (excluding the wind distributing grid of operating area) and the inner surface of glass door with 70% medical alcohol or household bleach diluted 1:100 (i.e, 0.05% sodium hypochlorite). Then wipe again with sterile water in order to eliminate the rest chlorine.
- c. Check the various functions of equipment
- d. Record this maintenance result

#### **3) Annual maintenance**

- a. Check the two conveyor belts of front window drive unit, and ensure that their tightness is coincident.
- b. Check the UV lamp and fluorescent lamps.
- c. Apply for testing the overall performance of cabinet on an annual basis to ensure the performance safety. User is responsible for testing costs.
- d. Record this maintenance result.

### **2.6.5 Storage conditions**

Safety cabinet should be stored in a relative humidity no more than 75%, the temperature is below 40°C, in the warehouse with good ventilation performance, no acid, no alkali and no other corrosive gases, storage period shall not exceed

one year, safety cabinet for more than a year needs to be unpacked and checked. Only the tested and qualified safety cabinet can be sold.

### 2.6.6 Methods and procedures for disinfection

Disinfection is necessary when any contaminated part of the biosafety cabinet is needed for routine maintenance, replacement filters, and performance testing, etc. Before doing certification test and gas sterilization, all internal working surface and the exposed outer surface should be disinfected with a suitable disinfectant. Before doing certification test, use Biological safety level 2 designated reagent, disinfection of the entire safety cabinet in a gaseous form. When the safety cabinet has been used, it is recommended to use the biological safety level 3 designated reagent disinfection. Disinfection is necessary when there is a potential danger of contamination by biological factors. In addition, reagent for overflow and spill after the experiment, the contaminated surface should be properly disinfected. When the most time need gas sterilization, the below procedure use the depolymerization of paraformaldehyde as disinfectant. Before use other alternative methods disinfection, the cycle parameters of each type and size of the safe cabinet and the validity of these parameters must be given; The compatibility of materials is related to the degradation and absorption of alternative detergents, which is a key factor in maintaining the integrity of the safety cabinet and the time required for disinfection. Some situations require these alternatives, for example: slow down the disease virus. The disinfection method is determined by the user and the certification body. When doing gas sterilization with paraformaldehyde, point out the specified area, the gas mask selected, protection facilities, corresponding test, medical monitoring, hazard communication and training, Records retention and so on. following below steps:



Before sterilization, all hydrogen chloride must be removed from the safety cabinet. When formaldehyde exists, — in the case of ambient air, hydrogen chloride will form Carcinogen two chloromethyl ether (BCME).

a. Multiply the high, wide, deep, calculate the total volume of the safety cabinet;

b. the total volume of the safety cabinet multiplied by 11g / m<sup>3</sup> to determine the quality of the required paraformaldehyde. The amount of ammonium bicarbonate or its substitute is determined by chemical measurement, and provide ammonia and formaldehyde for the neutralization reaction. Weight ammonium bicarbonate more than 10% of the quality, to ensure complete reaction;

c. If the safety cabinet has an exhaust pipe, the pipe must be airtight. The tightness can be achieved at the end of the pipeline, or if there is a control valve near the safety cabinet, airtight achieved at control valve. If the exhaust pipe is



longer than 3m, it is necessary to increase the amount of paraformaldehyde to compensate for the increased volume. If the exhaust of the safety cabinet is recycled into the exhaust system of the building, disconnect the safety cabinet from the building system (use plastic film and plastic tape);

d. if the exhaust of the safety cabinet is released into the room, sealed with a plastic exhaust;

e. In order to emergent eliminate formaldehyde, disinfection and removal the formaldehyde after neutralization, can be placed hose in the vicinity of the safety cabinet, the hose must be connected with the chemical smoke hood or other suitable for the discharge of toxic gases;

f. Place the heating device such as electric heating pan commercially available, or formaldehyde generator / neutralizer on the work table. The temperature is set to 232°C to 246°C, paraformaldehyde is evenly sprayed on the heating surface of the heating device;



**The self ignition temperature of oligomeric formaldehyde is**

**300°C**

g. Place the heating device of the neutralizer on the worktable. The neutralizer (ammonium bicarbonate or equivalent) should be isolated from the air in the safety cabinet before use. Here are two examples of how to achieve air isolation:

Example 1: Ammonium bicarbonate or substitute is evenly sprayed on the heating surface of the heating device, and covered with aluminum foil to prevent the reaction of ammonia bicarbonate or its substitutes in the process of disinfection with formaldehyde. The placement of aluminum foil should be able to make the ammonia escape during heating, or be prepared to remove aluminum foil at the beginning of the neutralization phase. The dangerous situation of formaldehyde leaking from safety cabinet should not happen when remove the aluminum foil;

Example 2: The safety cabinet is sealed with plastic film which as a whole with gloves. Bicarbonate of ammonia or equivalent substitute is sealed in a container of the safety cabinet. During the neutralization phase, the person who is disinfected enters the safe cabinet through the glove without breaking the seal system. The ammonia bicarbonate or equivalent substitute is removed from the sealed container and evenly distributed on the heating surface of the heating device, and the heating device is energized, then the ammonium bicarbonate or substitute is heated to release ammonia gas;

h. Place heating plate, beaker of water and temperature hygrometer on the safety cabinet table, do not connect wires in the internal power supply of the safety cabinet;

- i. Seal the front door of the safety cabinet with thick plastic film and plastic tape. Cover all areas that may be leaking, such as the outlet of the electric wire, the front window and the joint of the plastic film and the safety cabinet;
- j. Measure the temperature and humidity in the safety cabinet;
- k. The temperature above 21°C, humidity should be reach 60% ~ 85%. Heating the water in the beaker with heating board to reaches the desired temperature and humidity ;
- l. Before depolymerization of formaldehyde, Strictly restricted to the area or room around the safety cabinet in accordance with the provisions of the relevant regulations and safety measures . Occupational safety and health regulations relating to occupational exposure to formaldehyde require formaldehyde to be used as a control area in areas where the concentration of formaldehyde in the air exceeds the permissible exposure limits, the area should be marked with signs and symbols, only the appropriate training personnel to enter .Must review and comply with current regulations;
- m. Insert the wire of the heating device into the socket outside of the safety cabinet;
- n. After 25%Place the heating device of the neutralizer on the worktable. The neutralizer (ammonium bicarbonate or equivalent) should be isolated from the air in the safety cabinet before use. Here are two examples of how to achieve air isolation:  
  
Example 1: Ammonium bicarbonate or substitute is evenly sprayed on the heating surface of the heating device, and covered with aluminum foil to prevent the reaction of ammonia bicarbonate or its substitutes in the process of disinfection with formaldehyde. The placement of aluminum foil should be able to make the ammonia escape during heating, or be prepared to remove aluminum foil at the beginning of the neutralization phase. The dangerous situation of formaldehyde leaking from safety cabinet should not happen when remove the aluminum foil;  
  
Example 2: The safety cabinet is sealed with plastic film which as a whole with gloves. Bicarbonate of ammonia or equivalent substitute is sealed in a container of the safety cabinet. During the neutralization phase, the person who is disinfected enters the safe cabinet through the glove without breaking the seal system. The ammonia bicarbonate or equivalent substitute is removed from the sealed container and evenly distributed on the heating surface of the heating device, and the heating device is energized, then the ammonium bicarbonate or substitute is heated to release ammonia gas;
- a. Place heating plate、 beaker of water and temperature hygrometer on the safety cabinet table, do not connect wires in the internal power supply of the

safety cabinet;

- b. Seal the front door of the safety cabinet with thick plastic film and plastic tape. Cover all areas that may be leaking, such as the outlet of the electric wire, the front window and the joint of the plastic film and the safety cabinet;
- c. Measure the temperature and humidity in the safety cabinet;
- d. The temperature above 21°C, humidity should be reach 60% ~ 85%. Heating the water in the beaker with heating board to reaches the desired temperature and humidity ;
- e. Before depolymerization of formaldehyde, Strictly restricted to the area or room around the safety cabinet in accordance with the provisions of the relevant regulations and safety measures . Occupational safety and health regulations relating to occupational exposure to formaldehyde require formaldehyde to be used as a control area in areas where the concentration of formaldehyde in the air exceeds the permissible exposure limits, the area should be marked with signs and symbols, only the appropriate training personnel to enter .Must review and comply with current regulations;
- f. Insert the wire of the heating device into the socket outside of the safety cabinet;
- g. After 25% of the formaldehyde was depolymerized, open the safe cabinet fan 10 s ~ 15s . After Paraformaldehyde depolymerization of 50%, 75% and 100% repeating the above steps. If the safety cabinet fan does not work, use the auxiliary fan or fan to promote the circulation of the air in the safety cabinet, or extend the disinfection time, More than the following steps suggested by p;
- h. Disconnection heating plate and heating device power supply of paraformaldehyde;
- i. Keep the safety cabinet at least 6h, preferably overnight;
- j. According to step g preparing for neutralizing agent, energized heating device containing ammonium bicarbonate and safety cabinet fan to escape the ammonium bicarbonate. Same with the operation of paraformaldehyde, After 25% of the formaldehyde was depolymerized, open the safe cabinet fan 10 s ~ 15s, if the safety cabinet fan does not work, use the auxiliary fan or fan to promote the circulation of the air in the safety cabinet, Or extended neutral time to at least 6 h;
- k. After keep the safety cabinet at least 1 h, opening the sealing film;

If evacuated the neutralized formaldehyde with a hose, uncover the plastic mulch of the safety cabinet vent, connect hose to vent and seal, if the hose work normally, the plastic cover the front window of the safety cabinet will be inhaled,

the plastic cover of the front window is cut out one or two small openings(approximately 15cm\*15cm), the fresh air enter the safety cabinet, the neutralized formaldehyde exhaust from the pipe of the safety cabinet vent. of the formaldehyde was depolymerized, open the safe cabinet fan 10 s ~ 15s . After Paraformaldehyde depolymerization of 50%, 75% and 100% repeating the above steps. If the safety cabinet fan does not work, use the auxiliary fan or fan to promote the circulation of the air in the safety cabinet, or extend the disinfection time, More than the following steps suggested by p;

o. Disconnection heating plate and heating device power supply of paraformaldehyde;

p. Keep the safety cabinet at least 6h, preferably overnight;

q. According to step g preparing for neutralizing agent, energized heating device containing ammonium bicarbonate and safety cabinet fan to escape the ammonium bicarbonate. Same with the operation of paraformaldehyde, After 25% of the formaldehyde was depolymerized, open the safe cabinet fan 10 s ~ 15s, if the safety cabinet fan does not work, use the auxiliary fan or fan to promote the circulation of the air in the safety cabinet, Or extended neutral time to at least 6 h;

r. After keep the safety cabinet at least 1 h, opening the sealing film;

s. If evacuated the neutralized formaldehyde with a hose, uncover the plastic mulch of the safety cabinet vent, connect hose to vent and seal, if the hose work normally, the plastic cover the front window of the safety cabinet will be inhaled, the plastic cover of the front window is cut out one or two small openings(approximately 15cm\*15cm), the fresh air enter the safety cabinet, the neutralized formaldehyde exhaust from the pipe of the safety cabinet vent.

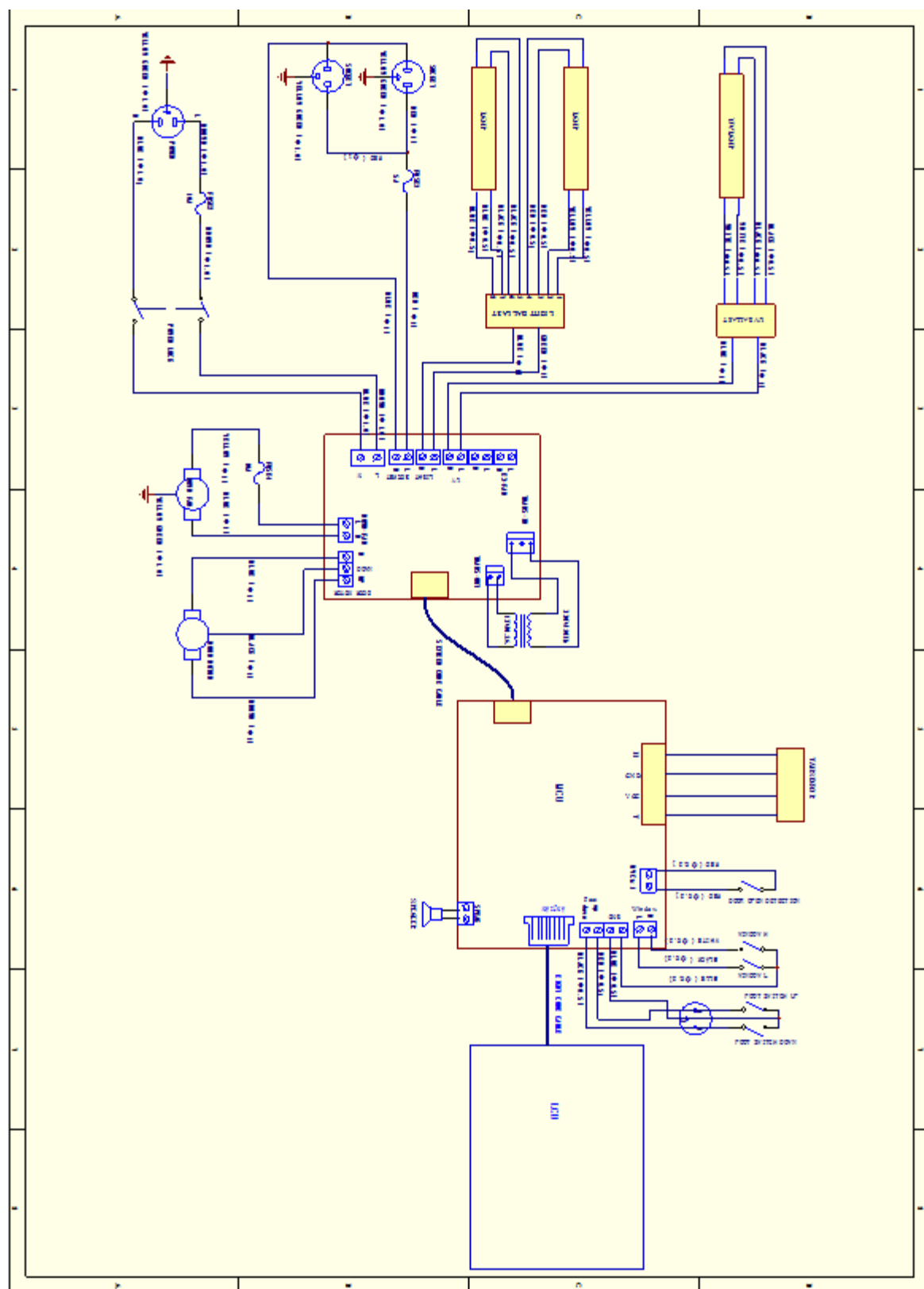


Other methods can be used to eliminate formaldehyde, as long as the method can be used to safely and effectively eliminate formaldehyde gas.

## 2.8 Replacement parts list

Number	Name	Specification
AAB01	Fuse	10A
AAB02	Fuse	5A
AAB03	Lamp holder T8	LG13-01A
AAB04	UV Lamp	T6 30W
AAB05	LED fluorescent Lamp	16W
AAB06	UV lamp ballast	1*TL8-30W
AAB07	Upper filter (Exhaust filter)	700*390*50mm
AAB08	Lower filter (Supply filter)	1215*470*69mm
AAB09	Bottom filter(Bag In and Bag Our filter)	1090*400*80mm
AAB10	Fan	DZAE9/9-4
AAB11	Control panel	LCD control board (strong circuit board, weak circuit board, display screen)
AAB12	Remote control (with battery)	
AAB13	Key selection button	YJ139(LA38、LA39)
AAB14	Glass	1305*730*6.38mm

## 2.9 Wiring diagram



# 03 Trouble Shooting and Labels

## 3.1 Common faults & solution

### 3.1.1 Warning and reminder

Digital display of pressure difference, digital velocity display, audible and visual alarm system

#### 1) Over safety height alarm for front window

There will be audio and visual alarm when front window is lifting over safety height. Same time LCD display will twinkle exclamation mark. Then just adjust the height of the front window.(Front window height setting value is 200mm).

#### 2) HEPA filter pressure difference alarm

There will be audio and visual alarm if pressure of air supply filter or exhaust filter can't meet present value, at the same time LCD display will twinkle exclamation mark. Remind the operator to replace the filter immediately to protect the operator's safety.


#### 3) Velocity fluctuation alarm

There will be audio and visual alarm if the inflow velocity and down flow velocity below 20% of the standard value, namely, inflow velocity below 0.42m/s, down flow velocity below 0.26m/s, at the same time LCD display will twinkle exclamation mark to remind the operator pay attention.

### 3.1.2 Trouble shooting

Please confirm whether the power is connected or not, whether the power cord is obvious damaged or not, whether the fuse is good or not, and whether the power locks are in the open state or not before the fault diagnosis.

Faults	Check parts	Measures
Fluorescent lamp doesn't work	Lamp holder	Tube and lamp holder is connected securely
	Circuit	Check circuit
	fluorescent tube	Change it

	Ballast	 Change it
	Control panel	Change it
UV lamp doesn't work	Front window, fluorescent lamp and blower	Check the front window, fluorescent lamp and the blower is open or not.
	Lamp holder	Tube and lamp holder is connected securely.
	Circuit	Check circuit
	UV lamp	Change it
	Micro Switch	Check if Micro Switch is broken
	Control panel	Change it
Button doesn't work	Control panel	Make sure the power connects well and the fuse is well
		Check if the button is broken
		Make sure the connecting wire is connected well
		Change control panel
Blower doesn't work	Front window	Front window is open or not, blower works only when the front window is open
	Micro Switch	Check if Micro Switch is broken or works fine
	Blower	If blower is broken, change it
	Circuit	Check circuit
	Control panel	Change it
No electricity in socket	Socket fuse	Check if socket fuse is broken
	Socket	Check if socket is broken
	Circuit	Check circuit
	Control panel	Change it
Pressure or air speed displayed	Gas circuit	Check whether gas circuit has dropped, is broken, or jammed



incorrectly	Control panel	Change it
Front window doesn't work	Circuit	Check circuit
	Motor of front window	Check front window motor
	Transmission part	Check transmission connection and lead rail
	Control panel	change it
Foot switch doesn't work	Circuit	Check circuit
	Control panel	Change it
Remote control doesn't work	Remote control	Check if the Remote control is broken or not, and if there's electric in the battery
	Connection cable	Check whether main control panel and display board is connected well.
	Control panel	Change it
No electricity in equipment	Power supply	Check power supply connects well
	Power wire	Check whether power wire has obvious damage
	Fuse	Check if the fuse is good
	Power key	Check if power key is open, is broken or not
	Transformer	Check whether the transformer works normally
	Control panel	Change it
Display doesn't work	Connection cable	Check whether the connection cable is connected well
	Display screen	Check whether the display screen is well
	Control panel	Change it
No alarm	Micro switch	Check whether the micro switch is good, and it works normally or not.
	Circuit	Check whether connection circuit of micro switch is good.
	Control panel	Change it



## NOTES

(1) The above electrical parts must be operated by a qualified electrician in safety conditions (cutting off power supply). The other parts are not allowed to remove; otherwise the user should take responsibility by them;

(2) When failures are not occur, and the operator can't solve, please notify our maintenance department immediately. For your safety, please do not maintain equipment by yourself;

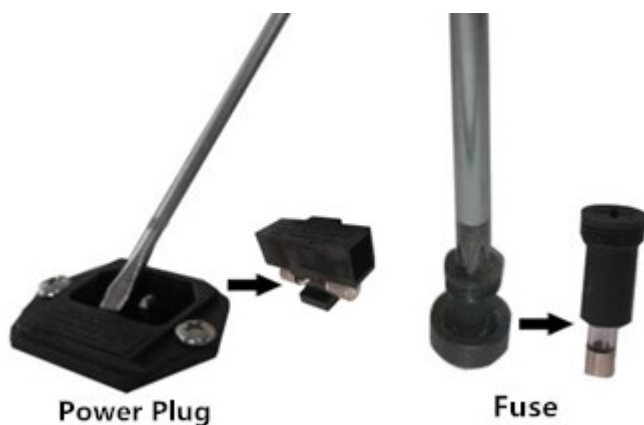
(3) The maintenance of this equipment is undertaken by trained and recognized technicians;

(4) If you need to order parts, contact the agent or our technical service department, and please indicate the model and serial number of the cabinet purchased.

### 3.1.3 Simple accessories replacement

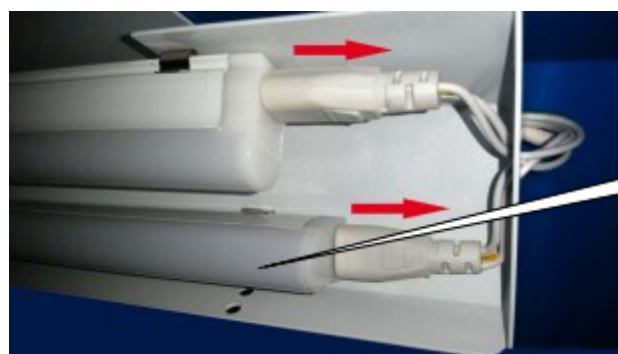
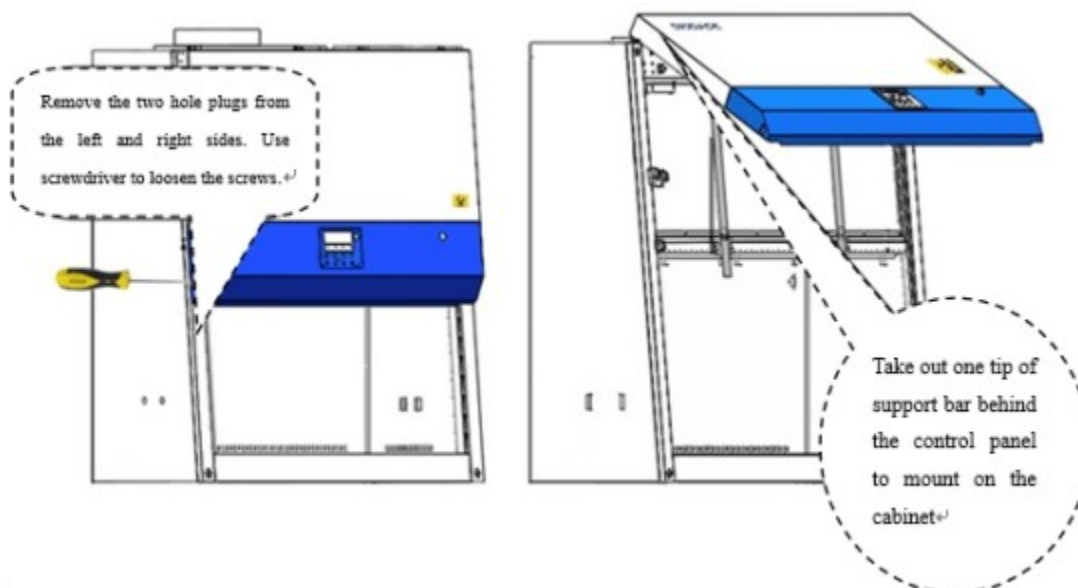
#### 1) Replace the fuse

Socket, fan fuse are located in the top operation panel. When replace them, turn off the power and disconnect plug, use a Phillips screwdriver counterclockwise pressing screwed fuse holder, remove the fuse out and replace a new fuse, and then clockwise pressing screwed fuse holder; FireWire fuse is located in the side of the cabinet operation panel, take out of the fuse holder using a slotted screwdriver and replace with a new fuse, and then press it back.



#### 2) Replace fluorescent light

When replacing lights, make sure that the power is off, open the operation panel like shown in Picture 15, use the control panel support frame (fixed in the inside position of the control panel as shown), then remove the lamp holder as the direction of arrow refer to Picture 16, replace the lamp tube in same specification and then insert the lamp holder in reverse direction.



Fluorescent light tube

## 2) Replace UV lamp

UV lamp should be replaced regularly according to the frequency of use, when using UV lamps reach to the time of 600 hours, we recommend to replace the lamp. When replacing, first make sure the power is off, and then screw the bulb 90 ° and take it off, then take the correspondence type of lamp, and put it to the lamp holder and screw 90 ° in reverse direction. After replacing the UV lamp, it needs to keep pressing the button of UV for about five seconds when the machine stays standby.



### 3.2 Label Description

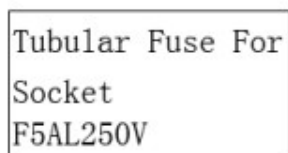
#### 1 ) Biological hazard label



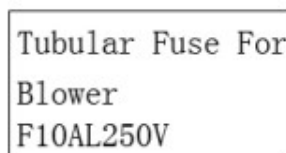
#### 2 ) Fuse label



a



b



c

Note:

- a. 10A power fuse label
- b. Operating area 5A socket fuse labels
- c. 10A blower fuse label

3 ) Ground label



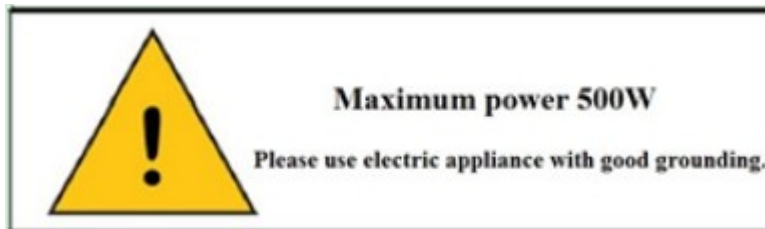
4 ) Glass door super elevation warning label



5 ) UV lamp alarm label



6 ) Load requirements label



7 ) Exhaust filter upstream label

**exhaust filter upstream**

8 ) Exhaust filter upstream label

**downflow filter upstream**

## 04 Warranty

- 1) Warranty is 12 months from EX-factory date (excluding consumable accessories, UV and Fluorescent lamp, fuse).
- 2) We will take no responsibility for risks caused by improper operation and man-made damages.
- 3) After the expiration of warranty, our company is also responsible for repairs, but the corresponding maintenance cost should be charged.
- 4) Life time of biosafety cabinet is 8 years from production date on the label.
- 5) We can provide equipment drawings and necessary technical data for maintenance companies or personnel trained by our company.

**Warranty declaration: One-year Warranty, Life-long Maintenance**



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