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# **BioSafety Cabinet**

## **11231BBC86**

### **Manual**

**Ningbo Hinotek Instrument Co.,Ltd**

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## **Preface**

Welcome to choose Biological Safety Cabinet. And we sincerely hope that our product can bring you best help. In order to make you understand more clearly about our Biological safety Cabinet, please read this manual carefully before starting to use.

It is very important for you to use our instrument correctly and safely.

Please put the manual in appropriate position in order to use it at random.

## **Application Range**

Biological Safety Cabinets are designed for personnel, product, and environmental protection. They are designed for avoiding infectious aerosol and splash when operators work with infectious material such as primary culture, bacterium and diagnostic samples. It is the necessary lab facility used in microbiology, biomedicine, gene recombine, animal experiment and biological goods, especially used in the environment of non-germ and non-dust where the operators should be protected to culture germ, such as health care, pharmacy and research.

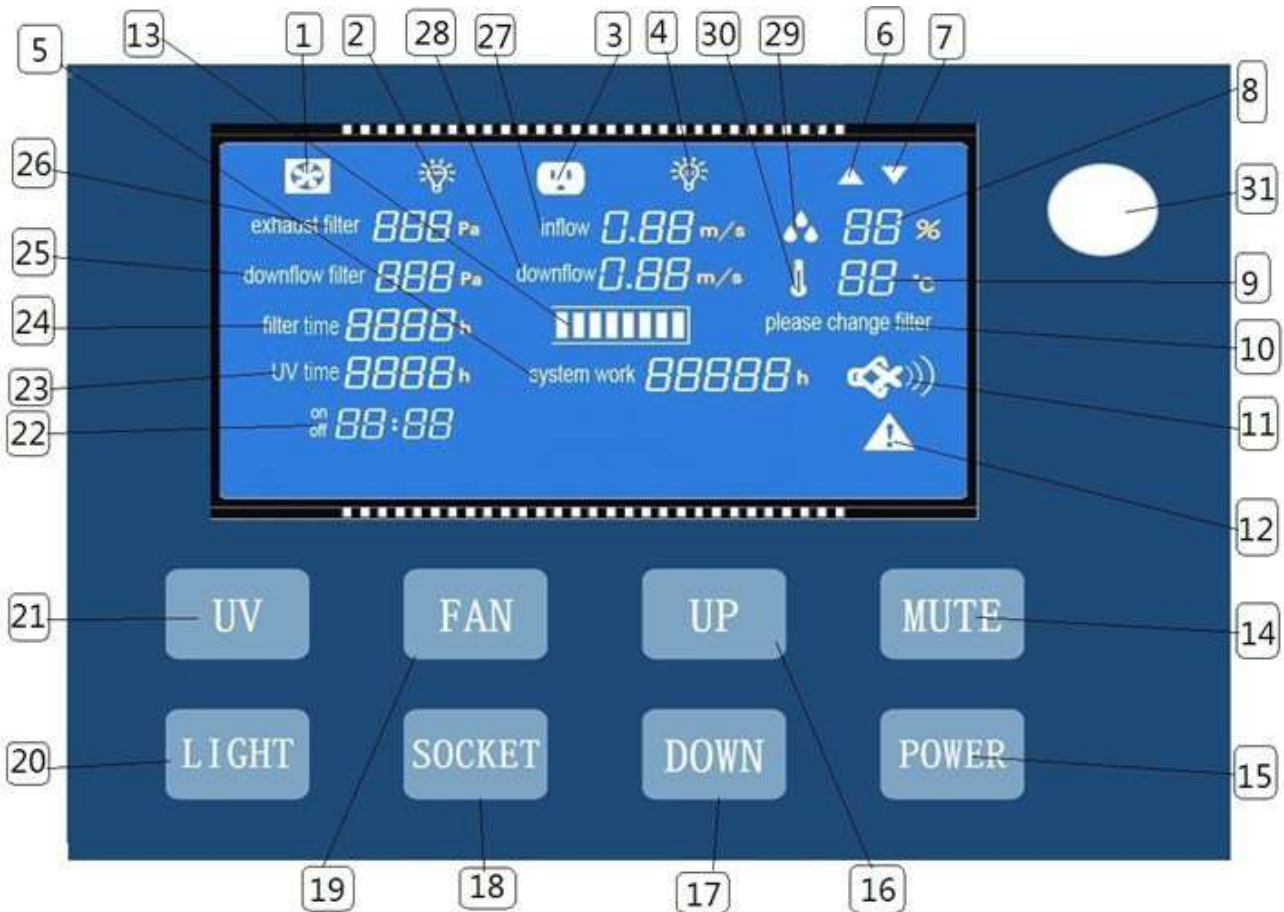
This Biological Safety Cabinet belongs to Class II Type A2 Biological Safety Cabinet. It is a negative pressure cabinet to protect personnel, product and environment. Inflow air can help the personnel and vertical down-flow air is filtrated by HEPA/ULPA to protect products. Contaminative air is filtrated by HEPA (ULPA) to protect environment. It must be connected with exhaust cover when it works with microbiological experiment of minim volatility toxic chemical and trace radionuclide.

### **Working environment:**

- 1、 Only used in door;
- 2、 Environment temperature: 15°C ~ 35°C;
- 3、 Relative humidity: ≤75%;
- 4、 Pressure Range: 70kPa ~ 106kPa;
- 5、 Power supply: AC 20V±10%, 50Hz;
- 6、 Power: ≤1000W (without any other instruments)

## Features

### I High brightness Colored LCD display



### II Electro motion control of glass door

Front glass is electrically controlled. And it can be controlled by operation panel at random. So it is not necessary for operator to get touch with the glass door directly. Control motor of glass

door is special reversible timing motor. This motor has the feature of timing accuracy, big set-up moment and running stability.

### **III. Structure**

1. The left, right sides and backside walls of Biological Safety Cabinets are negative pressure enclosure design to prevent the leak of products.
2. 1.5mm thickness of Cold rolling steel duster is used on the cabinet body to increase the intensity of frame.
3. The surface of work zone and internal of the device is made of stainless steel to bear erode.
4. The control panel is touched-model switch to make more convenient operation and pretty appearance.

### **VI Caution and warning**

1. Numerical display of differential pressure
2. Electrical alarm system.

## **Performance Index**

All HEPA/ULPA filters shall be rated 99.999% efficient at 0.3 microns, the loss of practical work pressure is 80-170 Pa.

◆ **Biological Safety performance:**

Personnel safety: the microorganism germ falls  $\leq 5$ CFU/time

Product safety: the microorganism germ falls  $\leq 5$ CFU/time

Cross infection safety: the microorganism germ falls  $\leq 2$ CFU/time

◆ **Leak proof:**

Pressure ventilation system has no bubble under the soap bubble experiment on the condition that the inner pressure of cabinets is 500Pa.

◆ **Velocity:**

Average downflow velocity:  $> 0.30$ m/s

Average inflow velocity:  $> 0.50$ m/s

◆ **Clean Level:**

Conform to Germany standard of Medical field.

◆ **Vibration:**

The net displacement is no more than  $5\mu\text{m}$  (rms) when the frequency is from 10Hz to 10kHz

◆ **Noise:** No more than 67dB (A).

◆ **Lighting:** No less than 680 lux

◆ **UV timer:** after working for 30 minutes, the UV lamp auto-off

◆ **Pressure differential display:**

The number on the LCD display indicates pressure loss of filter. And its error of Pressure differential sensor is no more than 5%. When the velocity of the dowflow and inflow fluctuate more than 20% of normal value, the cabinet will alarm.

◆ Run-time of Fan:

The operator can view the run time of fan , 10 hours as one unit.

◆ Mechanism performance

Biological Safety cabinet is designed and structured to resist overturning or distortion caused by outside force, and deflexibility caused by overloading on the operation panel and tipping caused by overworking.

Biological Safety cabinet cannot be overturned when it is inclined by angle of 10°.

When 110kg lateral force separately loaded on backside and side of cabinet, the deformation displacement of will no more than 2mm.

When 110kg force is load on the front of the cabinet, the distance is less than 2mm between base and ground.

The core part of work surface can stand more 23 Kg pressure without permanent distortion.

◆ Resisting pressure: 1500V can not breakdown in one minute;

◆ Grounding resistance:  $\leq 0.1\Omega$ ;

◆ Power supply: AC 220V $\pm$ 10% , 50HZ;

◆ Normal high degree of the glass window: 200mm

◆ Total exhaust air: 250m<sup>3</sup> /h(exhaust)

Model	External Size (L*W*H) mm	Working zone size (L*W*H) mm	Power (W)	UV Lamp (W)
11231BBC86	700X650X1230	600X500X540	$\leq 1000$	20



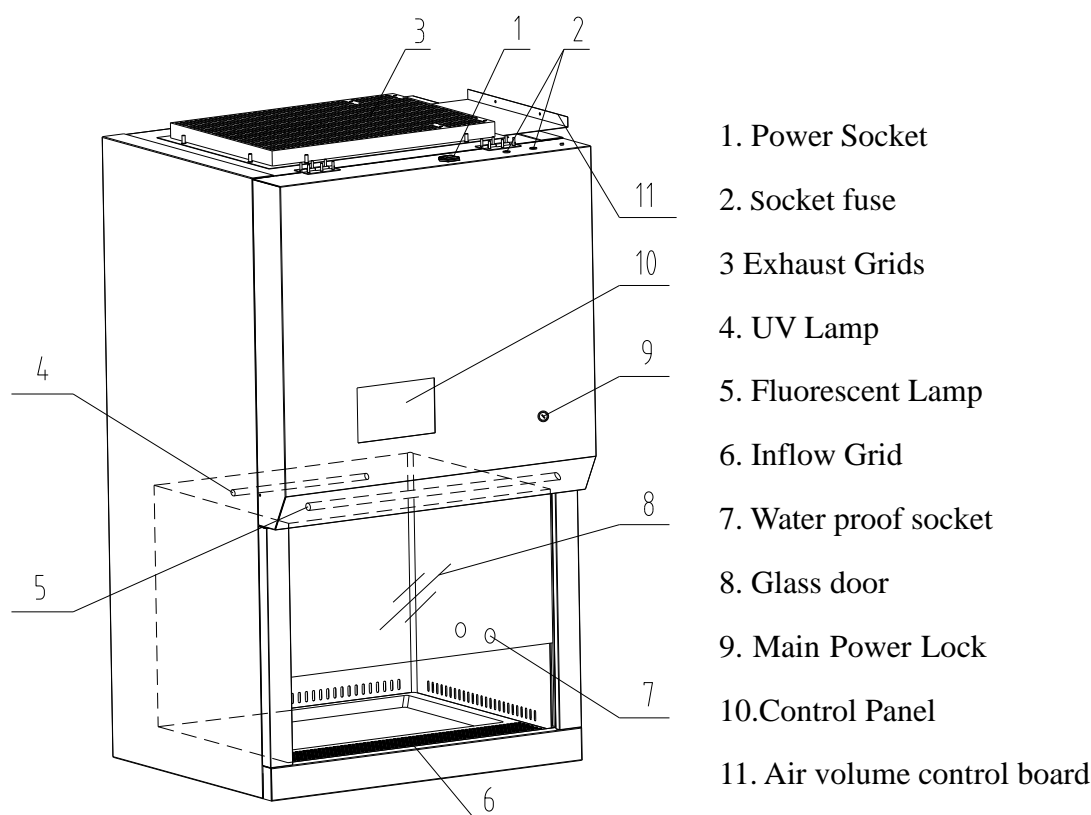
## **Function and Structure**

### **I、 Air filtering system (to see airflow figure and protection area)**

Air filtering system is the uppermost system to ensure equipment functions. It consists of air supply fan, air supply filter and exhaust air filter.

The main function of air filtering system is pushing clean air into workroom continuously, the vertical clean air speed in work room is  $0.37\text{m/s} \pm 0.015$  to ensure that the clean level can meet the filed standard. The exhaust air is purified, meanwhile, environmental protection.

### **II Product structure and main parts**



★ **Front glass door driving system**

Front glass door driving system consists of door-motor, front glass door, traction structure, limit switch etc.

★ **UV Light power**

UV Lamp is specially used to sterilize, lies inside the working zone fixed at stainless steel top-inside, so that this could ensure the maximum lighting working zone.

UV Lamp has the timing function, after sterilizing for 30 minutes; the UV lamp will be power off.

★ **light source**

Lighting source ensures a certain degree of illumination. Light source consists two pipe-type energy-saving fluorescent lamps, outside the area; the average degree inside the working zone should be no less than 680Lux. Avoiding the negative effect towards airflow etc.



★ **Control board**

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1. Fan working status display</li> <li>2. Light working status display</li> <li>3 Socket working status display</li> <li>4. Uv lamp working status display</li> <li>5. Pedal switch working status display</li> <li>6. Glass windows up status display</li> <li>7. Glass windows down status display</li> <li>8. Humidity display</li> <li>9 .Temperature Display</li> <li>10. Please replace filter</li> <li>11. Mute status display</li> </ul> | <ul style="list-style-type: none"> <li>12. Alarm status display</li> <li>13. Filter life bar code display</li> <li>14. Mute button</li> <li>15. Power control button</li> <li>16. Glass window move-up (UP)</li> <li>17. Glass window move-down (DOWN)</li> <li>18 .SOCKET</li> </ul> |
|---|---|

- |  |   |
|--|---|
| <b>19. Fan control button</b>                      | <b>26. Exhaust filter differential pressure</b> |
| <b>20 .Light (LIGHT)</b>                           | <b>27. Inflow wind speed display</b>            |
| <b>21. Sterilization button(UV)</b>                | <b>28. Downflow wind speed display</b>          |
| <b>22. Install timer status display</b>            | <b>29. Humidity display icon</b>                |
| <b>23. Uv lamp working time display</b>            | <b>30. Temperature display icon</b>             |
| <b>24. Filters working time display</b>            | <b>31. Remote control receiving window</b>      |
| <b>25. Supply air filter differential pressure</b> | <b>32. Working time display</b>                 |
| <b>25. Downflow filter differential pressure</b>   |   |

(1) LCD display window

The output part of Human-equipment exchange, which we can understand the state of equipment and performance.

(2) Remote-control receive window

This window receive the order from remote control

(3) Press button lightly

The key point of Human-equipment exchange is to operate the equipment through light-touch. When Remote control is out of work, this equipment can achieve the basically functions by the button.

Power Button: POWER, in addition to reservation, in control of the other switch;

Light button: LIGHT, is the key to control the lamp lighting. Press every time, the state of LCD and the lamp correspondingly change. That is, the light turn on to off or turns off to on.

Sterilization Button: UV, the ultraviolet lamp controls switch. The state of LCD and the lamp correspondingly change. That is, the light turn on to off or turns off to on. The key acts only when the glass window closed.

Fan Control Button: WM, in control of the fan working condition. Press every time, the state of LCD and the lamp correspondingly change. The button cannot act when the glass window closed.

Socket: SOCKET, is the control button of socket working situation. Every time you press it, on / off situation and the relevant indication situation on LCD display will change.

Glass Window up Button: UP, press up button sustaining, the glass window rises .To height of 200mm or releasing the button, the glass window immediately stops. Press again and the glass window rises again.

Glass Window down Button: DOWN. Keep pressing the down button, the glass window will go down until 200mm to the bottom or you release the button. The glass window will continue going down when you press the button again.

Mute button: MUTE. The alarm will stop when you press this button, and will continue if you press again.

There are 8 usually-used buttons on the operational board. Reservation and timing function should be operated by the remote control. Button existed on both operational board and the remote control has the same function.

## ★ **Remote Control**

It is inconvenient for the users to operate from a distance. In order to solve this problem, the biological safety cabinets are equipped with remote control. The remote control is with small volume (thickness 7mm) and light weight (only 18g) and could flexibly control all the functions of the cabinet within the range of before the cabinets 6m, 30°. The users could carry around for operation. The remote control adopts Japan NEC special chips for remote control which are featured with better anti-jamming performance, longer control distance and better control precision. (Check picture 2)

Functions of the remote control:



1. Power (Power)
  2. Subscribe (Sub)
  3. Fix time (Install Timer)
  4. Confirm (Confirm)
  5. Cancel (Cancel)
  6. Turn up (+)
  7. Turn down (-)
  8. Fan (Fan)
  9. Sterilize (Uv)
  10. Light (Light)
  11. Socket (Socket)
  12. Mute (Mute)
  13. Move the glass window up (Up)
- Move the glass window down (Down)

图 2

### **Main power Lock**

When power circuit is connected with electricity and the Power Lock is open, the device starts to work and the fan work in low speed.

### **★ Water-proof socket**

There are two Water proof sockets in the working space on the right side that can supply power to the working interior, the user through the waterproof **socket** control the power on-off.

- 1) Equipment power on the Socket does not exceed 500W;
- 2) only put the front cover of the water-proof socket down can prevent water, when the front cover was opened, the outlet can not be regarded as water-proof socket.

### **★Fuse tube**

One F10A  $\phi 5 \times 20$  mm is the power fuse for live wire of this device; One F10A  $\phi 5 \times 20$  mm is the power fuse for neutral wire of this device; the other one F5A  $\phi 5 \times 20$  mm is the fuse of waterproof socket; they lie in the top side of the board surface, there is a clear identification tag on all the fuse tubes.

## Spare Part List

<b>Spare part name</b>	<b>NO.</b>
External power wires	100011
Fuse tube 10A	100012
Fuse tube 5A	100013
Fluorescent lamp	100014
UV lamp tube	100016
Waterproof socket	100018
Air supply fan	200002
Exhaust filter	300001
Supply filter	300002
Micro-computer control board	200003
LCD display board	200004
Glass door control motor	200006
Travel switch	100019
Display board film	400001
Safety cabinet logo	400002
Warning Clause Label	400003
Cabinet body	500001
Glass door	300003



## **Installation and usage**

### **I. Installation**

#### **1. Location.**

The biological safety cabinet should be placed on the airflow protection area. It could prevent the cabinet airflow from effecting by any other airflow made by the ventilation system, air condition, door, windows and the person movement. The test show that if the interrupting airflow exceeds the inflow of the biological safety cabinet, the infection air of the room will enter into the working zone. So the installation point is very important. The relation between the exhaust air and the ventilation system or exhaust pipe should also be noticed. The cabinet exhaust from the top, so it should prevent something blocking the air outlet. If possible, all sides have better retain 300mm spare space which could make the inspection conveniently.

#### **2. The pretreatment before installation**

- 1) Inspecting the package carefully to see whether it have been broken.
- 2) If transportation on cold weather, the cabinet should be placed on the heating received area for 24 hours before installation.
- 3) Before unpacking, the cabinet should be moved near from the installation point

#### **3. Move to Destination door.**

#### **4. Dissembling package and movement.**

#### **The cabinet could not inversion on transportation**

#### **5. Clean inside package material and all fragment.**

- 1) Check whether the relative data and accessories are completely packaged according to product packing list.
- 2) Check the possible damage within and without cabinet during transportation and the hardware loose condition. If possible check the HEPA filter and front board bolt.

3) Move away the protected package from the top of exhaust filter.

Any fragment may cause damage to the blower and the HEPA filter.

## 6. Check and Adjustment

## 7. Training

After installation, please tell operator the basic function, operate step and notice etc.

## II Operation Instruction

1. Connecting the Power, AC 110V, 60Hz

2. Open the power lock, the LCD display will be bright. At the same time, the cabinet will say :  
welcome to use our Biological Safety Cabinets.

3. The cabinet will do self-test when it has power: check the safety and the performance.  
Normally required height of window opened is 200mm. When the front window above the  
required height, the cabinet will alarm, the mark on the LCD display will blink. Adjust  
the height and it will be ok.

4. After self-testing, the cabinet will stand by. The operator could operate the cabinet by control  
panel or remote control.

5. When you press the “Power” button, the follow function could work: the “Light”, “UV”,  
“Blower”, “mute”, “Socket”, “Up”, “Down” and “Timing”. “reserve ” must be operate before  
pressing button of power.



When the front window up or any other button work, the UV could not action

6. Before you work, close the front window and turn on the UV light to sterilization for more than  
half an hour.



1) While sterilizing, everybody should leave the room to protect the eyes and skin.

2) According to the manufacture’s standard, the intensity of the UV should be test regularly. We  
suggest one time per quarter, if not up to the standard, it should be changed.

7. The operator could do experiment after the blower working for half an hour.

8. The use the remote control follow the introduction of functions and structure (remote control)
9. After experiment, close the front window and turn on the UV light to sterilize for half an hour.  
Then turn off the power.



## Maintenance

### ★Maintenance

#### ※ Cycle of comprehensive service

Have a service every year or every 1000 work hours

- △ 1. Please cut off the power before servicing
2. The statistics of working time will affect the service frequency, we advice that a detailed report of operation hour should be available to reference and inquire.
3. Exhaust bellows and exhaust pipe should be taken regular test and maintenance (for B2 type).

#### ※Recommended service methods

##### 1. Surface Cleaning

Usually, clean the cabinet surface with soft detergent.

##### 2. Daily and weekly cleanliness

- 1) Clean and sterilize the working zone.
- 2) Clean and sterilize the control panel.
- 3) Clean the exterior surface and front window with Soft detergent.
- 4) Testing all functions according to instruction book.
- 5) Keep report.

##### 3. Monthly Cleaning

- 1) Clean the whole exterior surface with detergent.
- 2) Sterilize the interior surface. The filter frame is not included
- 3) Check all functions in the regular use.
- 4) Keep report.

#### 4. Annual Service

Make a comprehensive service to the cabinet, checking the safety carefully.

- 1) Checking the driving device of the front panel to see its elasticity
- 2) Checking the UV lamp and fluorescent lamp
- 3) Keep report.

### ★Repair

#### **1. The preparation work before repairing.**

Make sure the equipment connect to the ground well in order to secure the safety during work. Check whether there are any cable disconnect, short circuit or damage, if any mentioned condition occurred, solve the problem first.

#### **2. Common faults and trouble shooting**

- 1) screen does not work

Check whether the power supply was connected, power input is suitable, protective tube has been broken.

- 2) UV light does not work

Change the UV lamp

- 3) florescent light does not work

Change the florescent light



- 1. All operations above must be done by qualified electrician under safety condition (cut power supply). Not allowed to dismantle any other parts of the machine, otherwise the**

**users should be responsible for all the consequences.**

- 2. When the equipment has any fault which not be mentioned above, and the operator cannot solve the problem, please ask our repair department. For safety reason, do not repair by yourself.**
- 3. The repairing job shall only be done by the persons trained or authorized by HINOTEK.**
- 4. To order the part ask our technology department with the notice of the model and type of the part you want to buy.**

## **NOTES**

1. Before connecting to AC power supply, make sure the power have stable and same voltage as the cabinet, the rated load is no less than required. The cabinet uses ground type plug, this plug have 3 wires which only matches 3 wire power sockets, it is a safety device. If the plug cannot be inserted in the socket, change the socket to match the plug.
2. Move Slowly: in order to prevent circuit condition from being effected, operators should keep the airflow complete when moving arms inside the cabinet, the arms should move vertically and slowly. The arms should stay in the cabinet for 1 minute to let the air flows above the surface of arms before any experiment. All materials involved in the experiment should been put in the cabinet before experiment as much as possible to reduce the times that arms pass through the window.
3. The principle of material moving: if any two or more items need to be moved, must obey the rule that only move lower polluted materials to higher polluted area, in order to avoid the pollution in wide area caused by highly polluted material. Meanwhile the movement of any material must be slow.
4. Horizontal position of materials: in order to prevent materials from cross contamination, all materials should be put in a straight line horizontally, to avoid cross contamination during the reverse air flow.
5. During the using of equipment, do not put soft and small materials (e.g. tissue) on the

- surface, to avoid being sucked into suction ventilator or block the pipe.
6. The maximum weight of material inside the cabinet should no more than 23kg/25×25cm<sup>2</sup>;
  7. To avoid shaking: do not use shaking devices (e.g. centrifuge, shaking mixer) as much as possible, because the shaking devices may shake off the particulates in the filter which may reduce the cleanliness class inside the working zone. Meanwhile, operators would be polluted if the front panel failed to balance;
  8. Forbidden fire: Any open flame is forbidden in the cabinet! The open flame may disturb the air flow and damage the filter. If the high temperature sterilizing is required during the experiment, we strongly recommend use infrared ray sterilizer.
  9. HEPA filter and its use life: for the filter's age increases, dust and germs gathering in the filter, that will lead to high pressure of HEPA filter. Contact us to change the HEPA filter when the air pressure alarm, otherwise it will decrease the safety class of the cabinet. The old filter should be disposed as biohazard waste.
  10. The air blow and the steel plate underneath is the cabinet cover, the door at the back is wind tube baffle. The wind tube had strict air tightness treatment at the factory to keep its leaking tightness. Operators should not loose or remove the screws, for special request, contact our after sale department for repairing.
  11. The barrier close to front window on the table is designed for air intake and discharging pollution as well, a discharging port is under the table; during the use of cabinet, do not block the grizzly screen, otherwise it may disturb the air flow. Armrest is recommended to solve this problem and extend the tired period of operator's arms.
  12. Cross contamination may occur when cabinet was used for long time (HEPA filter, cabinet angle), in order to reduce the pollution of biological safety cabinet, we recommend sterilize the cabinet every 500 hours by formalin sterilizer, then use fumigation sterilizer to clean inside of the cabinet. During the sterilizing, keep the sterilizing air inside the cabinet and avoid leaking out of the cabinet.
  13. The storage period of cabinet is one year, or time exceed cabinet should be open to

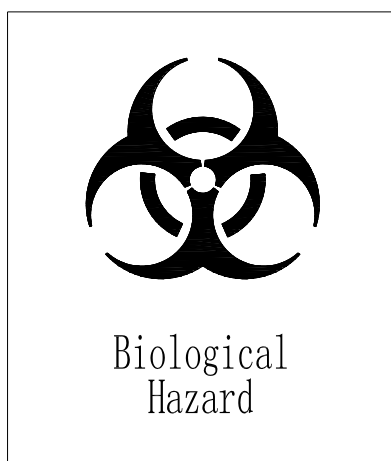
examined by our technician to qualify the safety.

**DECLARATION: we declare that we are not responsible for any risk or damage caused by irregular operation.**

## Labels Explain

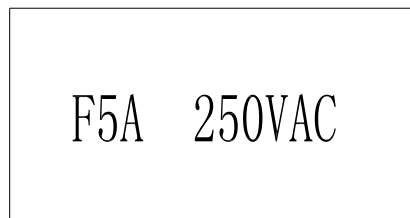
1. At the top of cabinet

2. Biohazard sign: Biological Hazard, top-left of cabinet.

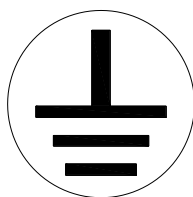


3. Protective tube label: main power protective tube label F10A 250VAC, zero wire fuse plug F10A 250VAC, tube like wire tube plug of air blower F5A 250VAC locates at the bottom of

their protective tube.

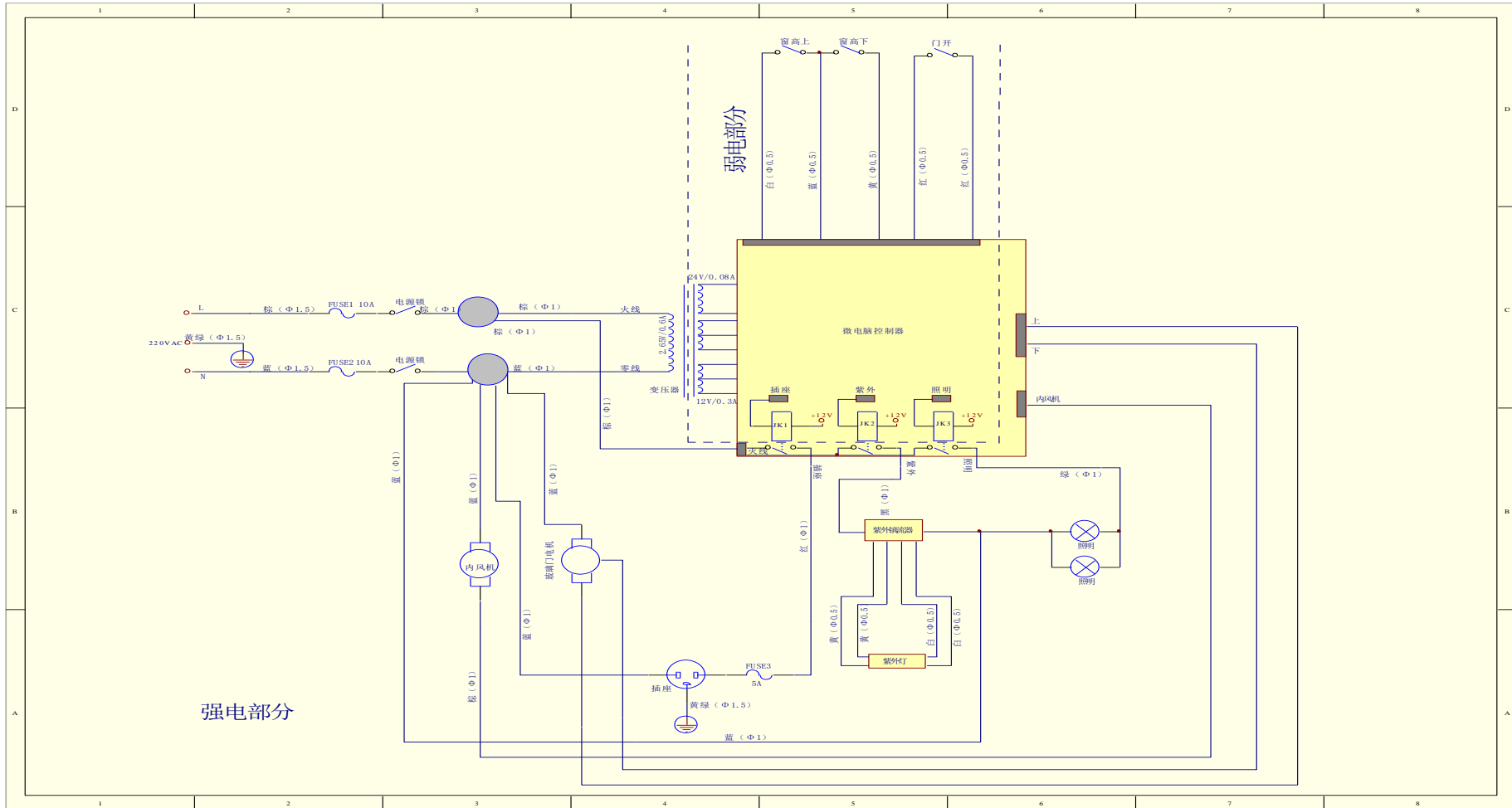


#### 4. Grounding wire sign

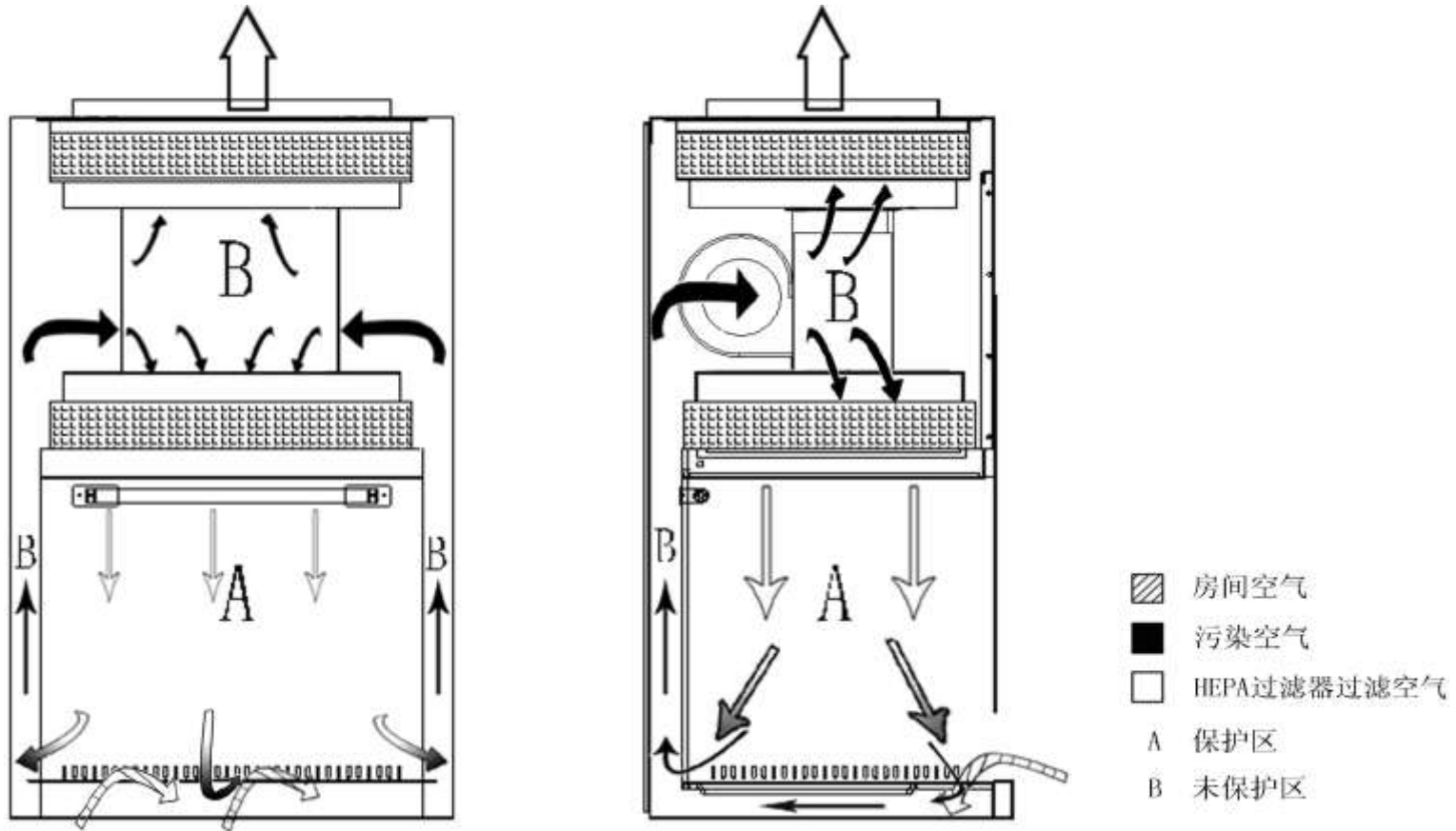




**Circuit Chart**



### Air Flow Chart and Protection area



## **GUARANTEE**

- Twelve months guarantee from the date of purchase.
- Any damage to the cabinet or accessories caused by the incorrectly operation will not get a free service even in the guarantee period.
- Service will be charged overdue the guarantee period.
- Provide the drawings of facility and partly required technical data to the maintenance unit and personal that trained and approved by HINOTEK