

Operation Manual



BCBS-502

Biological Safety Cabinet Class III

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

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01 Application Range

Class III Biosafety Cabinet is totally enclosed and gas-tight, it also can meet the requirement of operating Class I, II, III, IV pathogenic factor. It can be used in P3,P4 laboratory.

Work is performed with enclosed long-sleeved gloves that connected with Biosafety Cabinet. The cabinet is kept under negative pressure of at least 120 Pa. Supply air is filtered through high-quality filters before enter to the cabinet. Exhaust air is double-filtered through high-quality filters before enter to outdoor. Experimental article passes through the safety cabinet from two-door delivery box to ensure that it is not be contaminated. It is suitable for high-risk biological testing.

Class III Biosafety Cabinet are designed to protect the operator, the laboratory environment and work materials. It can avoid the operator to contact with potentially infectious aerosols and spills when operating pathogenic factor test materials. It is the necessary equipment in the laboratory in the search 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.

Working environment:

- (1) Only is suitable for indoor;
- (2) Ambient temperature: 15°C~35°C;
- (3) Relative Humidity: $\leq 75\%$;
- (4) Atmospheric pressure range: 70 kPa~106 kPa;
- (5) Power Supply: AC 220V $\pm 10\%$, 50Hz ± 1 Hz;

02 Technical Parameters

Production specification: BCBS-502	
External dimension	1340*850*2100mm
Internal work area	1240*650*650mm
Gloves quantity	2
Gloves type and dimension	Butyl rubber gloves, length : 800mm
Air cleanliness of work area:	
Main filter	Air supply filter: Efficiency 99.999% at 0.12 m m First exhaust filter: Efficiency 99.999% at 0.12 m m Second exhaust filter: Efficiency 99.999% at 0.12 m m
Pre-Filter	Polyester fiber, washable
Noise	Less than 65dBA
Illumination	Average illumination \geq 1000lux
Main structure	
Front window	Toughened explosion-proof glass, which can not cause negative effect by cleanliness and sterilization. Thickness is no less than 5 mm.
Work Zone	It's made up of type 304 stainless steel. Thickness is no less than 3mm. The exterior adopts good electrostatic painting.
Power supply	
Pass Box Size	Internal Size: 400*390*340mm
	External Size: 480*400*400mm
	Packing Size :1720×850×2100mm

03 Performance Index

The performance requirements of this product are as follows:

- **Air velocity**

The air velocity of the working area is no less than 0.05 m³/s. If withdrawing one glove, the air velocity of the glove hole is no less than 0.7m/s.

- **Leak-proof Cabinet**

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

- **Integrity of HEPA Filter**

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

Do not Scan and detect the HEPA filter, the leakage rate at any point should not be >0.005%.

- **Vibration amplitude**

The net vibration amplitude between frequency 10Hz and 10KHz is no more than 5µm (rms).

- **Noise**

The noise is no more than 63dB

- **Illumination**

The average illumination is no less than 650 lux, Each illuminance measured value is not less than 430lx.

- **Pressure Difference Display:**

The figure on the screen represents pressure loss of the filter, the precision error ≤5%. (78Pa means DW pressure difference of air supply filter)

- **The voltage**

increases to 1390V (AC) in 5s and keep for another 5s without breakdown.

- **Grounding resistance**

≤0.1Ω

04 Functions and Structures

I Product function and features:

1. LCD Display

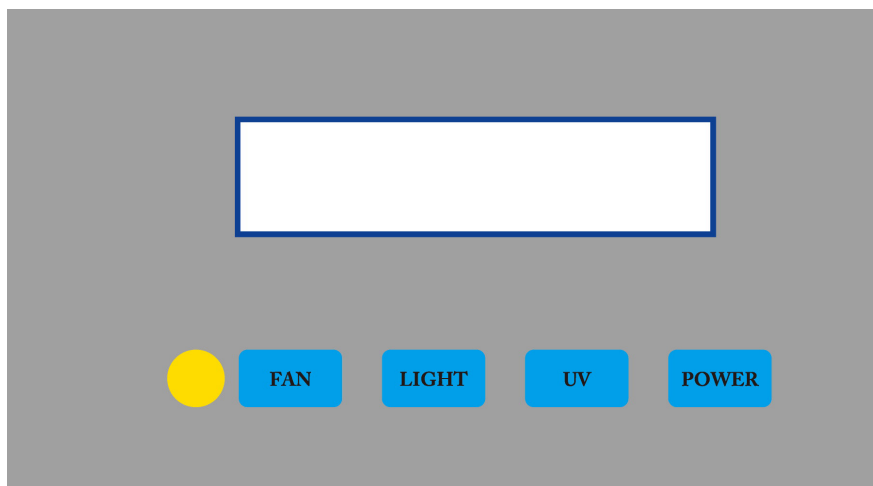
LCD Display is the output part for human-machine exchange. We can know the size of the LCD (latticed liquid crystal) screen is 128*64mm, white character and blue background. it is real-time

display to reflect the equipment working condition, such as effective working state of the filter, which is more intuitive.

2. Control panel

Four soft touch button: UV LIGHT FAN POWER

The yellow window is the remote control receiving window, which receives commands from the remote control.



The main operation of the device can be carried out by touching the soft touch button. In the case of remote control failure, the device can achieve the most basic functions through the role of the button.

POWER: main switch for controlling other function keys except reserving

LIGHT: control key for lamp. The lamp state and the indicated state on LCD changes from on to off or off to on once at every press on the key;

UV: control key for UV lamp. The UV lamp state and the indicated state on LCD changes from on to off or off to on once at every press on the key;

FAN: control key for the working state of fan. The working state and the indicated state on LCD changes once at every press on the key;

Spare UV : Press UV button for 3 seconds to open the spare UV lamp. You can press UV button for 3 seconds to close the spare UV lamp. When press the button, the power button won't work. It only works when changing the filter.

3. Warning

Digital pressure difference display, Digital airflow display, Electronic alarm system

Alarm situation is as following ;

1. Control panel display the pressure difference of the inlet filter and outlet filter

P1. negative pressure in work area

P2. inlet filter pressure

P3. first outlet filter pressure(middle filter pressure)

- P4. second outlet filter pressure
- 2. Filter does not work.
- 3. Negative pressure < 120Pa in work area

II. Introduction of the production structure

1. Air filter system (refer to the diagram 10: Air pattern)

The air filter system is the main part to protect the performance of the cabinet. It's made up of the one pre-filter, one air supply filter, two exhaust filters and the exhaust blower. The main function of the air filter system like follows: 1. Create clean air for the working area continuously. 2. Protecting the down air velocity 3. The cleanness of the working area. 4. Protecting the exhaust air is clean.

The performance of the HEPA filter is 99.999% at 0.3 microns particle. The air is to be filtered before entering into the working area. This could protect the samples from contamination. The vertical air flow design could prevent the contamination particle from depositing at the corner of the working area.

The exhaust air will go through two HEPA filters, this could protect the exhaust air is clean. So the class III biological safety cabinet could supply well protection to the operator, the samples and the circumstance.

The built-in pre-filter helps to prolong the service life of the main filters.

2. Structure characteristic

1) The glove is made up of butyl rubber, more wear resistance and anticorrosion. Each glove need to be strictly porosity testing. The design of the gloves is not only for the easy changing but also for the safety function.

2) The design of the cabinet agrees with the human body engineering. Its front glass window could decrease the light reflection. All this could increase the operator's comfortable.

3) The work area is made up of the 304 stainless steel, easy to clean. There is collecting tank under the worktop for the waste liquor. One drain valve under collecting tank and it's convenient for cleanliness.

4) Dual series of sewage valve design, more secure, easy to discharge the waste of internal operation.

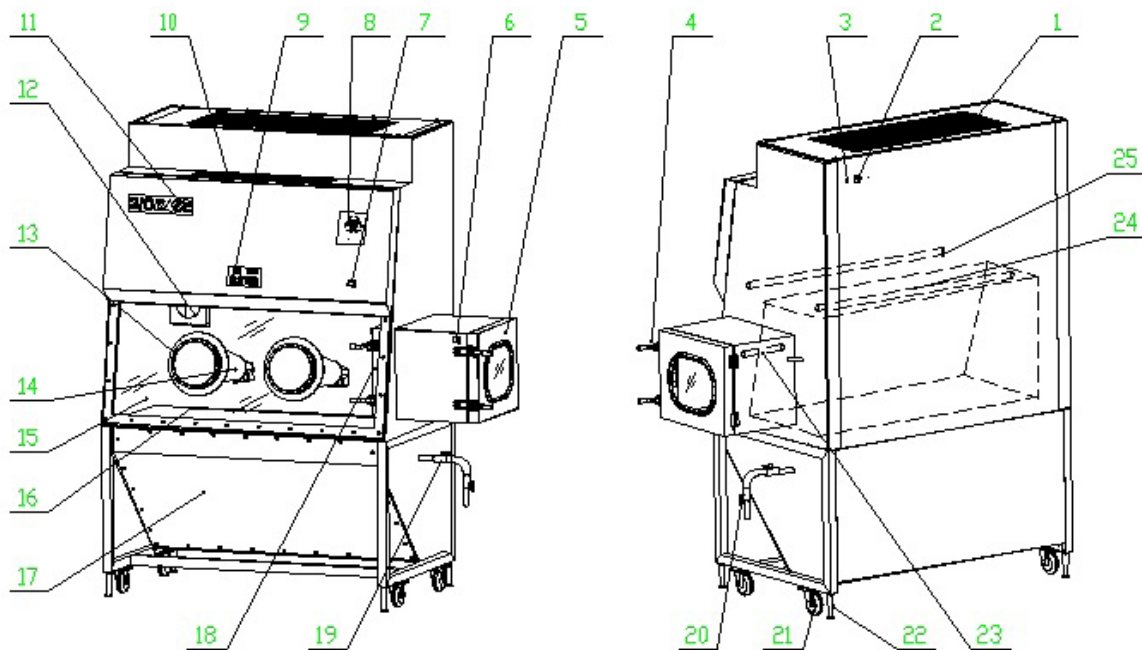
5) Built-in fluorescent lamp and UV lamp. The illumination intensity is fit for the sight. The location of the UV lamp is convenient for the sterilization of the work area.

6) It adopts imported blower. Lower noise, stable performance and high efficiency.

7) Perfect welding of the main body to protect the sealing performance and supply higher safety protection to the operator, sample and environment.

8) The pass box adopts interlock structure. There is UV lamp inside to protect the safety of the samples in the course of passing.

III. Diagram of the structure and the accessory



- | | | |
|-----------------------|--------------------------|--------------------------|
| 1. Exhaust air net | 2. Power Socket | 3. Power fuse |
| 4. Pass box handle | 5. Pass box door | 6. Pass box UV switch |
| 7. Total power switch | 8. Biohazard mark | 9. Control panel |
| 10. Pre-filter | 11. Company logo | 12. Pressure indicator |
| 13. Glove access | 14. Glove | 15. Front glass window |
| 16. Worktop | 17. The down front plate | 18. Pass box inside door |
| 19. First drain valve | 20. Second drain valve | 21. Foot Caster |
| 22. Foot stay bolt | 23. Pass box UV | 24. Working area UV |
| 25. Fluorescent lamp | | |

UV Lamp

UV Lamp located at the upper inside of the working area, to protect all the working area have complete sterilization.

Fluorescent light

Energy-saving Fluorescent lamp is used for lighting, to ensure the average lighting intensity could reach the standard requirement.


Fuse

The cabinet has a main power fuse, which lies at the back top of the cabinet, beside the outlet of the

power cord. (Refer to the diagram 6)


Drain

Drain lies at the inside corner of collecting tank.

 Please avoid to blocking the drain when putting aside stuff

Butyl glove

The glove is made up of butyl rubber, more wear resistance and anticorrosion. Each glove need to be strictly porosity testing. The design of the gloves is not only for the easy changing but also for the safety function.

 Please check the glove before experiment. Avoid it scratched by sharp object during the usage.

05 Installation and Usage

I. Installation


The installation of this safety cabinet is should be handled by authorized engineer.

1. Location.

Both the air intake and the exhaust outlet are on the top of the cabinet. It should prevent anything block or limit them. It could also avoid the cabinet airflow from effecting by any other airflow which caused by the ventilation system, air condition, windows etc. If possible, all sides of the cabinet have better retain 300mm spare space which could make the inspection conveniently.

2. The pre-treatment before installation

- 1) Inspecting the package carefully to see whether it is damaged.
 - 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 the door of destination.
4. Dismantle the package and carry it to the installation site.


 Clear the cabinet after un-packing, as any fragment may cause damage to the blower and the HEPA filter.

5. Install, check and training

Install, check and training are completed by post sales engineer.

6. Training

After the installation is finished, the after-service engineer should make training about how to operation. The careful reading is required before usage.

 Those who are trained can be able to operate this equipment.

II Usage

1. Connecting the Power, AC 220V, 50Hz


2. Open the main power key, the display screen will light and blink for 3 times, meanwhile the cabinet alarm 3 times.

3. The cabinet will do self-test at beginning of connecting power, to test whether its safety and all functions are in proper state. If the air supply filter and the exhaust filter could not reach the requirement, the cabinet will have visual and audible alarm to warn the operator to change the filter.

4. After self-test, the cabinet will go to standby mode to wait for the operators' commands.

5. When the operator presses the "Power" button of the control panel, the screen will display the pressure difference of the cabinet.

6. Only after the operator press the "power" button, the other functions could work, such as the "Light", "UV", "Fan", "Transfer key", "Socket", "Up", "Down" and "Timing". But the function of "Reserve" must be pressed before pressing the power key.

 The intensity of UV light should be tested according to the manufacturer's requirement. We suggest do this test once a quarter and change it timely if it does not pass the test.

7. Turn on the fan for 30 minutes, it could reach normal, then the operator could start to do the experiment.

8. Usage of the remote control. Please refer to figure 2, function and structure Introduction of the remote control.

9. After finishing the experiment, sterilize the cabinet for more than 30 minutes, then turning off power.

06 Preventive Maintenance

1. Cut off power before maintenance
2. The statistics of the working time will affect the maintenance frequency, so we suggest the operator prepare a detailed record of the operation hour for reference
3. Exhaust bellow and exhaust pipe should take regular check and maintenance
 - I. Total preventive maintenance period

One year or 1000 hours

II. Recommended maintenance and service methods

1. Surface Cleaning

- 1) Stainless Steel part:
 - a) Non-work area:

Usually, clean the cabinet surface with soft cloth soaked in the condensed soap water at first. Then make it clean by another soft cloth soaked in the clean warm water. Finally, clean it by dry cloth.

b) Work area: for the polluted work surface and drain, it should be sterilization first. Then clean it with medicinal alcohol



The detergent should not cause damage to the 304 stainless steel

- 2) Coating part: It could use any home-use detergent to clean it at first. Then dry it with soft cloth.
- #### 2. Daily and weekly cleanliness after experiment.
- 1) Clean and sterilize the working area.
 - 2) Clean and sterilize the control panel.
 - 3) Clean the exterior surface and glass of cabinet with soft detergent or glass-specific detergent.
 - 4) Testing all functions according to the instruction book.
 - 5) Check the glove carefully, change it if find any damage.
 - 6) Keep report.
- #### 3. Monthly Cleaning
- 1) Clean the whole exterior surface with detergent.
 - 2) Use 70% alcohol and 1:100 diluted home bleaching agent (0.05% sodium hypochlorite) to clean the work surface, interior sides (not include diffuse board of air supply filter) and window inside. After that, clean it again by sterile water to remove the remaining chlorine.
 - 3) Check all regular functions.

4) Check the glove carefully, change it if find any damage.

5) Keep report.

4. Annual Service

Make a comprehensive maintenance to the cabinet, especially checking the safety functions carefully.

1) Checking the gloves, UV lamp and fluorescent lamp

2) Checking all the functions of the cabinet to protect it's safety.

3) Keep record.

Repair

1. The preparation work before repairing.

Make sure whether the cabinet have been had well earth connection. It's important to secure the safety during the regular and repair work. Check whether there are any cable disconnect, short circuit, if any mentioned malfunction occurred, solve the problem first.

2. Simple trouble shooting

No.	Malfunction	Check position	Solve measurement
1	Lamp does not work	Electrical resource	Assure the electricity is connected well and the fuse tube is good
		Lamp holder	Tighten the light holder
		Light tube	change the light tube
2	Lamp shining or turning red	Light tube	Change the light tube
3	Soft press button does not work well	Control Panel	Assure the power is connected, fuse tube is good
			Assure the buttons is not destroyed
			Assure the wire is connected well
4	No electricity	Fuse tube	If fuse tube is broken, change a new one
		Power supply	The power supply is not connected

Notes:

- 1.All maintenance above must be done by qualified electrician under safety condition (cut off power).
- 2.When the malfunction of the cabinet is not agrees with any one above, and the operator cannot solve it immediately, please contact our repair department timely. For safety reason, do not repair it by yourself.
- 3.The repairing job shall only be done by the engineers authorized by Biolab.
- 4.If any accessories need to be purchased, please record the registration number of the accessories and contact out sales department.

07 Notes

- 1.Before connecting to AC power supply, make sure the power is stable and the same voltage with the cabinet requirement, the rated load power outlet of the power socket is no less than requirement. This 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 samples moving: if any two or more samples need to be moved, in order to avoid the pollution in wide area caused by highly polluted material. The sample moving must obey the rule that only move lower polluted samples to higher polluted one. 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 and avoid block back reverse air grid and influence normal wind road at the same time.
- 5.During the usage of cabinet, do not put soft and small materials (e.g. tissue) on the surface, to avoid being inhaled into the negative hole or the blower..
6. The maximum weight of material inside the cabinet should no more than 23kg/ 25×25cm²;
- 7.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 which may reduce the cleanliness class inside the working zone.
- 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: With the extension of the filter life, 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 fan and the steel plate underneath is the plenum cover, 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 air grille close to the front window on the worktop is designed for air intake. When do experiment, do not block it. There is access for the pollution liquid under the worktop, it connected with two exhaust tap at the cabinet exterior. Please do not block the pollution liquid access

12.Cross contamination may occur when cabinet is used for long time (HEPA filter, cabinet angle etc), 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, avoid the sterilized air from leaking out of the cabinet.




13.The storage period of cabinet is one year. If exceed one year, the cabinet should be examined by our technician to confirm its safety.

14.The inside and outside door of the pass box are mechanical interlocks, please don't failure the interlock functions intended and open the two doors together.

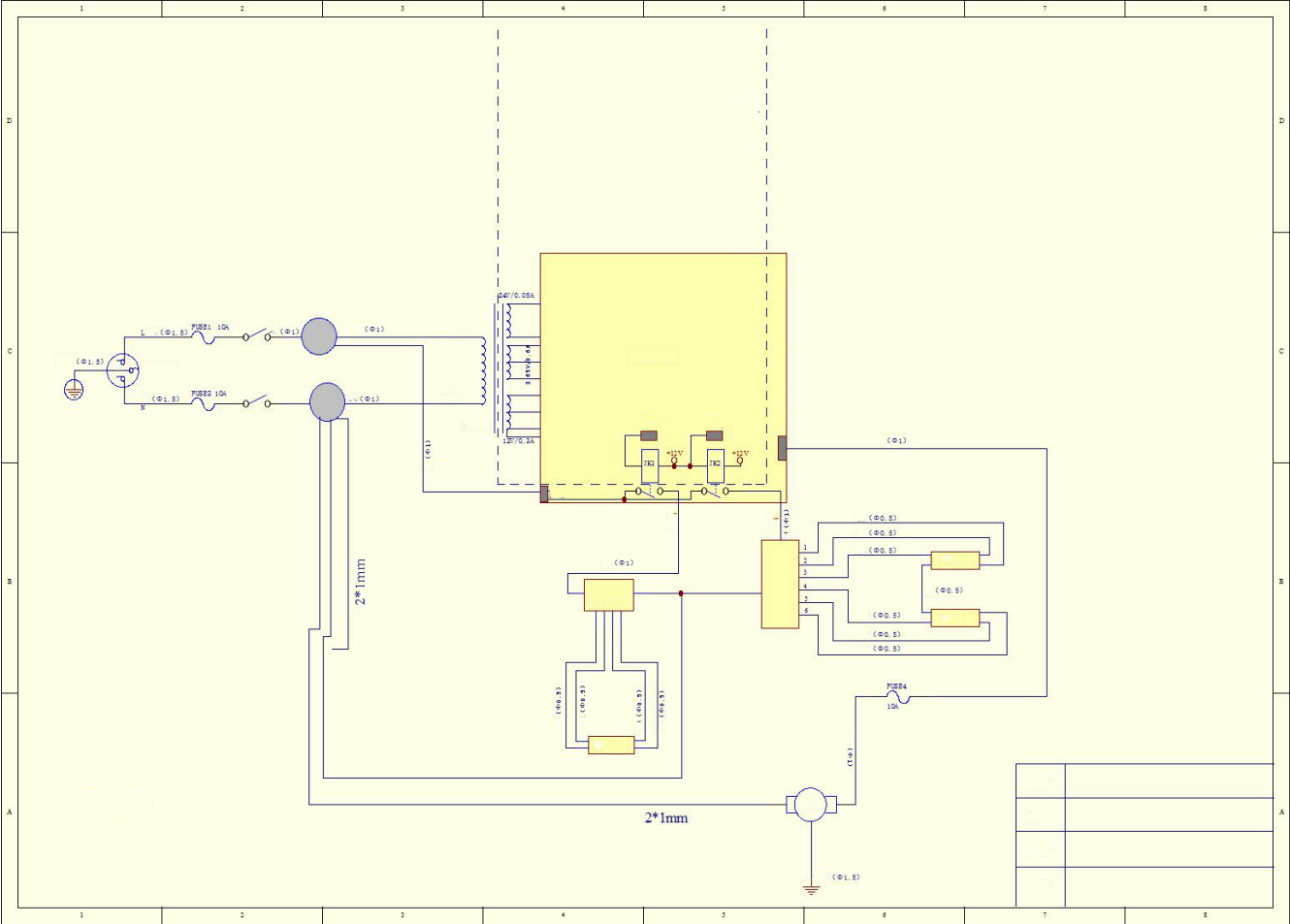
15.The gloves are made of butyl rubber. It pass strict leak proof test before out of the factory. In order to avoid the pollution leakage, please do not use sharp items scratch the gloves.

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

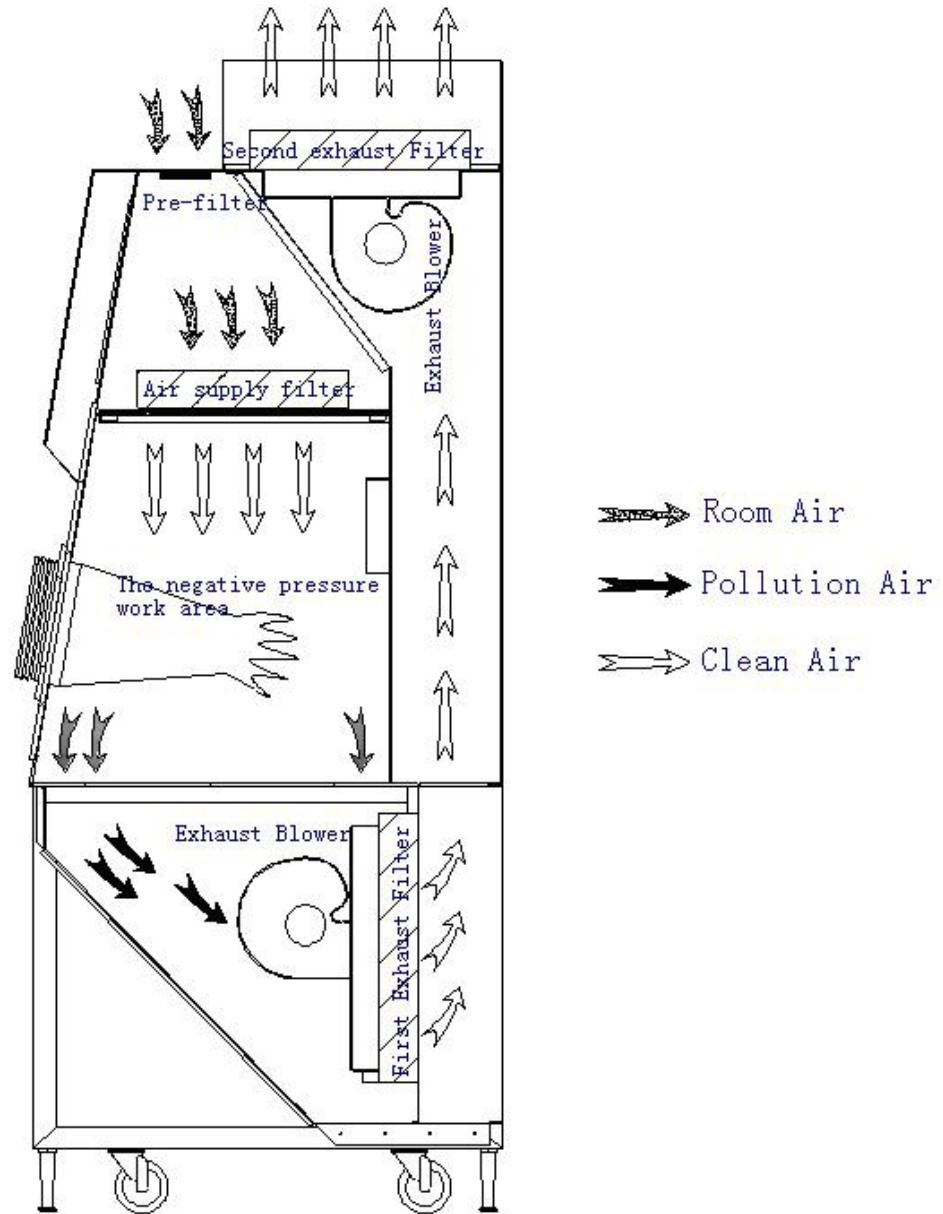
08 Label Description

1. Biohazard sign	
2. Fuse label	F10AL250V
3. Grounding wire label	
4. Certificate: stochastic attachment	 <p style="text-align: center;">Certification</p> <p>Model: _____</p> <p>Number: _____</p> <p>Inspector: _____</p> <p>Date: _____</p>

09 Circuit Diagram



10 Airflow pattern and protection area



11 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) We can provide equipment drawings and necessary technical data for maintenance.



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