FISON

Class II Biosafety Cabinet

FM-BSC-A201

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Index

1. Safety Measures

⚠	Under all conditions marked with ⚠, it is necessary to consult the document, to clarify the nature of potential risks and any countermeasures that must be taken.
	Actions or operations which are prohibited.
	Actions or operations that must be followed.

Ensure the input voltage is correct and stable. The rated load of the main power socket should be higher than the cabinet consumption. The plug must be well grounded.

To avoid air turbulence, the operator should slightly move his arms during the experiment. Hands should stay inside the working area for at least 1 minute before operating. To decrease the time of arms moving into and out of the working area, prepare all the necessary items inside the cabinet before starting the experiment.

Moving principles of different samples inside the cabinet: When two or more samples need to be moved, be sure that low-polluting samples move to high-polluting samples. The movement of items should also follow the principles of slow-moving.

Samples placed in parallel: Samples should be placed in the cabinet parallel to avoid cross-contamination between samples and blocking the back air grille.

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 the experiment.

The weight of items placed in the cabinet should be no more than 23kg/(25×25cm^2).

Avoid vibration: Avoid using vibration equipment (e.g. centrifuges, vortex oscillators, etc.) inside the cabinet. Vibration would cause lower cleanliness of the operating area and affect operator protection.

No flame: No flame is allowed inside the cabinet. Using fire will lead to airflow disorder and filter damage. If sterilization is required during the experiment, an infrared sterilizer is highly recommended.

The UV lamp can only be turned on when the front window is closed, and the fluorescent lamp is off. When the UV lamp working avoid looking straight.

ULPA filter life: With the usage time increasing, dust and bacteria accumulate inside the ULPA filter. Filter Resistance is getting bigger, when it reaches the maximum point, there will be audible and visual alarms. Replace the new ULPA filter, otherwise, it will affect the safety performance of the equipment. The used filter should be processed as medical waste.

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.

Front Grille is used for air intake and drain. Do not block it, otherwise it will affect airflow. An armrest is recommended to solve this problem and reduce the operator's wrist fatigue.

Long-term use of Microbiological Safety Cabinets will inevitably cause pollution (e.g. ULPA filters, corner cabinets, etc.). To sterilize thoroughly every 500 hours, a formalin (formaldehyde) fumigation sterilizer is recommended. After sterilization, neutralize formaldehyde gas with ammonium hydrogen carbonate. Ensure no sterilization gas escapes during the whole process.

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

In the transportation process should take appropriate protective measures according to the diagram on the surface of the package.

The ground bearing requirements: ground bearing capacity ≥450Kpa.

Allowable pressure of water socket: ≤0.8MPa. (Optional)

For experiments that produce waste liquid, please timely drain wastewater in the sump through the drain valve. If the liquid waste is harmful to the human body, according to the grade of pollution add the corresponding grade container, or connect to the corresponding grade drainpipes, and drain the waste into the experimental equipment to immediately dispose of it.

A person can operate a Microbiological Safety Cabinet only if he is qualified after training, during using a Microbiological Safety Cabinet if it is a harmful experiment, the operator must wear appropriate protective gloves, masks lab coats, etc., and avoid touching mouth, eyes, and face.

There is a risk of moving the parts. Relevant personnel can use this equipment after training. while the front window must be raised to 200mm and in this case person can operate in the cabinet. In this way, we can reduce harm out of front window trouble.

Serious declaration: We will take no responsibility for risks caused by improper operation and man-made damages.

1.1 Warning and reminder

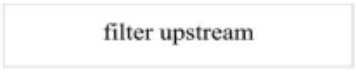
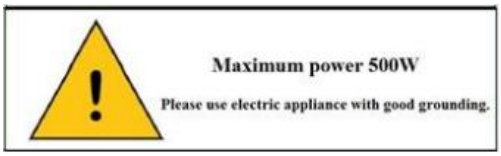
1.1.1 Front window operation port alarm

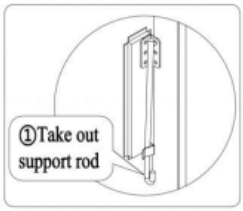
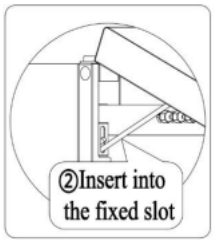
When the opening height of the front window of the safety cabinet exceeds or falls below the specified height of the front window operating port, the sound alarm will sound, the interlocking system will start, the opening height will be adjusted to the specified opening height, and the alarm sound and interlocking system will be automatically released (the height of the front window operating port is set to 200mm.

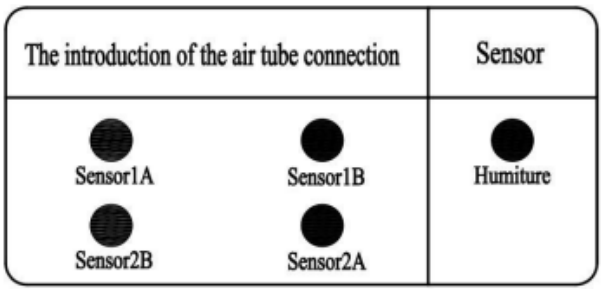
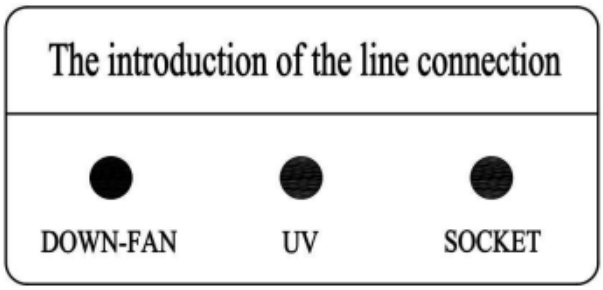
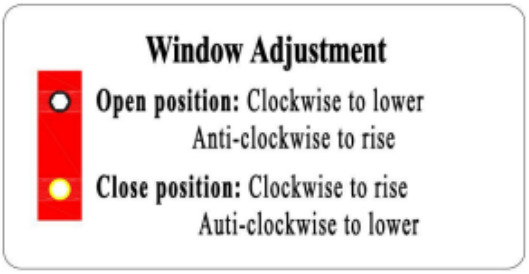
1.1.2 Filter pressure loss

Ensure the normal use of the safety cabinet, and the pressure difference of the filter in the safety cabinet shall not exceed 170Pa. When it exceeds 170Pa, an audible and visual alarm will be triggered.

1.2 Label Description

Label	Description
	Biological hazard label
	Ground label (Protected Ground Earthing)
	Safe operation glass door height
	Filter scan label
	Sewage valve label, sewage valve biological hazard label, warning label
	Waterproof socket power total capacity
	Label of air tap

WATER	Faucet label
Please keep away from the front window when the glass door moves or fails Please clean the surface of stainless steel in time after the experiment	Front window warning film
	UV lamp warning label
	Electrical warning label
	Support rods remove a label
	Use instruction label for support rod
F10AL250V	10A power fuse label
Tubular Fuse For Socket F5AL250V	Operating area 5A socket fuse labels
Tubular Fuse For Blower F10AL250V	10A blower fuse label

	Marking of left internal wiring
	Marking of the right internal wiring
	Window adjustment label

1.3 Potential safety hazards and usage restrictions

Types of hazards	Potential hazards	Hazard impact	Cause analysis	Usage Restrictions
Performance hazards	Product pollution	Harm to product operators	1) The descending airflow velocity is too low. 2) The inflow is too high. 3) Failure of high-efficiency air supply. 4) Incomplete cleaning and disinfection. 5) Improper operation.	Use by professionals with experience in biological hazard prevention.
	Environment pollution	Biological hazard accidents	1) Failure of high-efficiency exhaust filter. 2) Improper operation.	Use by professionals with experience in biological hazard prevention.

	Operator infection	Personal safety accidents	1) Failure of high-efficiency exhaust filter. 2) The inflow wind speed is too low. 3) The descending wind speed is too high. 4) Improper operation.	Professional personnel with experience in biological hazard prevention should wear protective clothing when using it.
	Mechanical hazards to operators	Personal safety accidents	1) The front window glass door falls off. 2) Cabinet tilting.	Use by personnel with knowledge of mechanical operation safety.
Electrical hazards	Electric shock hazard	Personal safety accidents	1) The wire is damaged. 2) Poor grounding. 3) Caused by moisture and humidity.	Use by personnel with experience in electrical safety.
	Fire hazard	Personal safety accidents	1) Excessive load on the socket in the operation area. 2) Aging and short circuit of wires. 3) Improper operation.	Personnel with experience in electrical safety use and certain fire safety knowledge.

Accidents during use and corresponding measures:

Analysis of Unexpected Situations	**Possible hazards**	**Response measures**
Sudden power outage during use	Products, rooms, and operators may be contaminated	Immediately terminate the experiment, evacuate personnel, and reduce the possibility of personnel being infected. After the power supply is restored, it is necessary to enter with protective clothing and disinfect the room and equipment.
Supply fan malfunction during use	Products, rooms, and operators may be contaminated	Immediately terminate the experiment, completely close the front window operation port, turn on the ultraviolet lamp for disinfection, evacuate personnel, and reduce the possibility of personnel being infected. After disinfecting the room, wear protective

		clothing for subsequent inspection and sample processing.
Glass detachment or damage during use	Products, rooms, and operators may be contaminated	Quickly sealing samples that emit harmful gases to prevent contamination from spreading. Turn off the equipment and disinfect the room.
Emergencies in the work environment, such as fires, earthquakes, etc	Operator injury, equipment damage	Immediately terminate the experiment, completely close the front window operation port, and evacuate personnel. If time permits, cut off the power supply.

2. Introduction

Class II Biosafety Cabinet FM-BSC-A201 is a Class II type A2 safety level 2 enclosed cabinet unit with 70% of the ULPA filtered air recirculated through cabinet and 30% discharged through an exhaust ULPA filter to environment. Engineered specifically for laboratory operations that require user and product protection. Operates with a negative air pressure for personnel protection and HEPA filtered laminar airflow for product protection. The 30 W UV lamp with 253.7 nm emission serves purpose of attaining effective sterilization, also equipped with remote control functions, for convenient working operations. Suitable for work with microbiological research in absence of volatile or toxic chemicals and radionuclide.

3. Features

- Class II, A2 type of microbiological safety cabinet
- Facilitates personnel, product and environment protection
- Digital LCD display for easy monitoring of all parameters
- Ergonomically sized control panel improves user interface
- Airflow system: 70% air recirculation, 30% air exhaust
- Time reserve and power lock function
- ULPA filter life and UV life indicator
- Automatic air speed adjustable with filter block
- 304 grade stainless steel work table for operation surrounded by negative pressure
- Waterproof sockets positioned at side panels avails use of small devices in cabinet
- Reserved access for water and gas tap at cabinet side panel
- Emission of 253.7 nm from UV lamp for high efficient decontamination
- Motored front window for convenient, one hand operation
- Two-layer laminated toughened glass front window >5mm, anti UV layer
- Remote controlled operation realized at 6 m distance from cabinet, protecting feature to user in course of emergency
- Foot switch to adjust the height of the front window
- Audio and visual alarm (filter replacement, window over height, abnormal air flow velocity)

4. Specifications

Model No.	**FM-BSC-A201**
Type	Class II, A2 type
Filter Type	ULPA Filter
Filter Quantity	2 ULPA filters
Filter efficiency	ULPA Filter: 99.9995% efficiency at 0.12 μm
Inflow velocity	0.53 ± 0.025 m/s
Down flow velocity	0.33 ± 0.025 m/s
UV lamp	30 W ×1
UV Lamp emission	253.7 nm
Illuminating LED lamp	12 W ×2
Illumination	≥ 1000 Lux
Power consumption	760 W
Noise level	≤ 60 dB
Waterproof socket	500 W ×2
Front window	Two-layer laminated toughened glass, 5 mm
Work surface height	750 mm
Tested Opening	Safety height ≤ 200 mm
Max opening of front window	420 mm
Internal dimension (W×D×H)	940×600×660 mm
External dimension (W×D×H)	1100×750×2250 mm
Display	LCD display
Display parameter status	Exhaust filter and down flow filter pressure, filter and UV lamp working time, inflow and down flow velocity, filter life, humidity and temperature, system working time
Control system	Microprocessor
Airflow system	70% air recirculation, 30% air exhaust
Visual and audio alarm	Filter replacement, front window at unsafe height, abnormal air flow velocity
Water and gas tap	Reserved at side cabinet panel
Caster	Foootmaster caster
Clean Level	ISO 5 Class 100
Chamber Material (work table)	304 stainless steel
Chamber Material (body)	Cold-rolled steel with anti-bacteria powder coating
Power supply	220 V±10%, 50/60 Hz, 100 V±10%, 60 Hz
Packaging dimension with base stand (W×D×H)	1220×1000×1840 mm
Gross weight	243 kg

5. Applications

The Class II type A2 Biosafety Cabinet helps in protecting the user, the environment, and the experimental material in use. It is the most widely used type of cabinet in biomedical and microbiological laboratories.

6. Instrument Introduction

6.1 Product Structure

Figure-1

1) Footmaster Caster
2) Reserved holes for water and air faucets
3) LED Lamp
4) Nameplate
5) Operation Instruction
6) Doot motor
7) Waterproof socket fuse socket
8) Blower fuse tube socket
9) Power socket fuse
10) Power socket
11) Control panel
12) Power supply lock
13) UV lamp
14) Front window
15) Water-proof socket
16) Inflow grid

1) **Driving System of Front Window**
   The driving system consists of a tube motor, front window, hauling sash, and position switch.
2) **Air Filtration System**
   The Air Filtration System is the most important system of **FM-BSC-A201**. It consists of a blower, supply filter, and exhaust filter. The main function of an air filtration system is to continuously introduce clean air into the operating area, ensuring that the descending airflow velocity, cleanliness, and exhaust gas cleanliness in the operating area meet the standard requirements.
3) **UV Light**
   The UV lamp is inside the work area. So, UV lamps can well sterilize all spaces of the work area.
4) **LED Light**
   The **FM-BSC-A201** is equipped with an LED lamp. It can make sure average illumination inside a work area meets standard requirements

6.2 Sampling port

The sampling port reserved on the safety cabinet for testing the aerosol concentration upstream of the ULPA filter is located at the lower part of the worktable in the working area. The transparent tube marked with **"filter upstream"** is the sampling port for the aerosol concentration test the upstream of air supply filter and exhaust filter.

Figure-2

6.3 Power lock

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

6.4 Waterproof socket

Waterproof Sockets are located on the back side of the work area and can be controlled by the **SOCKET** button.

Note:

- Ensure the total load of sockets should be ≤ 500W.
- The waterproof socket can only be waterproof when its front cover is lowered, and the socket cannot be regarded as a waterproof socket when the front cover is opened.

6.5 Fuse

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

7. Installation

Instrument Installation

1) Remove all the package materials.
2) Inspect the surface of the main body to make sure whether there are scratches, deformation, or uncorrelated things.
3) Move the whole device to the final installation location.

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

4) The base stand assembly
   Referring to **Figure 3** assemble the base stand.

⚠ **Note:** The base mounting bolts are fixed to the base stand. When installing the base stand, except for the 4 bolts marked with a red circle in **Figure 3**, remove the other bolts and install them.

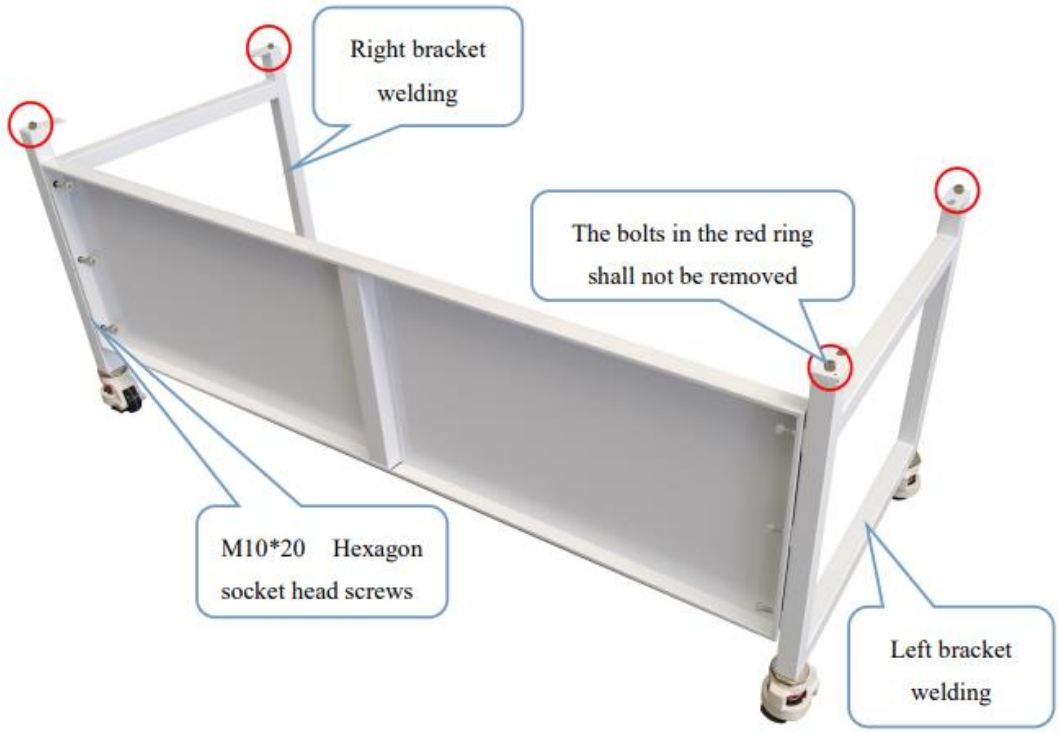


Figure-3

5) Connect the base stand and the main body
   For the connection between the cabinet and the base, it is recommended to use an elevator.

Refer to **Figure 4** to connect the base stand and the main body.

Figure-4

Align the mounting holes on the bottom of the cabinet with the mounting bolts, and the cabinet slowly descending the mounting base.
Take out the M10×20 Hexagon socket head screws, Flat washer 10, and Spring washer 10 from the accessory box, and fasten tightly according to **Figure 4.**

6) **Installation of Drain valve**

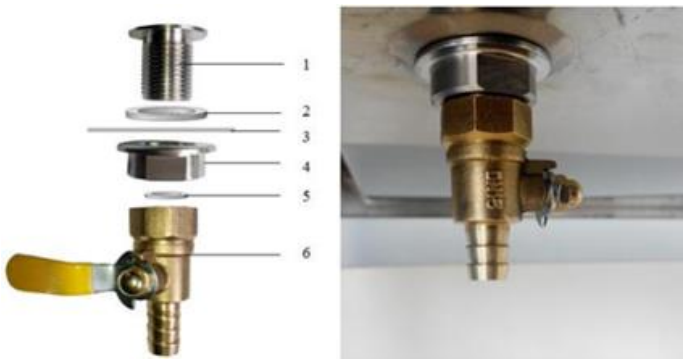


Figure-5

(1) Drain valve connect
(2) Shim (Inner diameter × Outer diameter × thickness Φ20 × Φ28 × 2mm)
(3) Safety cabinet bottom installation holes
(4) Ball coupling fastening nut
(5) Rubber gasket (Inner diameter × outer diameter × thickness Φ13 × Φ19 × 2mm)
(6) Drain valve

7) **Whole machine placement**
Biosafety cabinets should be placed in a protected area with airflow to prevent the impact of airflow from ventilation systems, air conditioning, doors, windows, and personnel movement on the cabinet. Tests have shown that if other interfering airflow exceeds the suction airflow velocity at the inlet of the safety cabinet, indoor infectious gases will enter the working area of the biological safety cabinet. So, it is necessary to place the safety cabinet correctly and keep it in the correct position. Attention should also be paid to the relationship between the exhaust of the safety cabinet and the indoor ventilation airflow or exhaust ducts. The exhaust of the safety cabinet is discharged from above the cabinet. When placing the safety cabinet, its exhaust should be avoided from being restricted, and the distance between the top exhaust port and the ceiling should not be less than 80mm. The biosafety cabinet should be located downstream in the direction of airflow, and at least 300mm of space must be reserved on each side of the cabinet for inspection.

8) **Adjustment of Footmaster Caster**

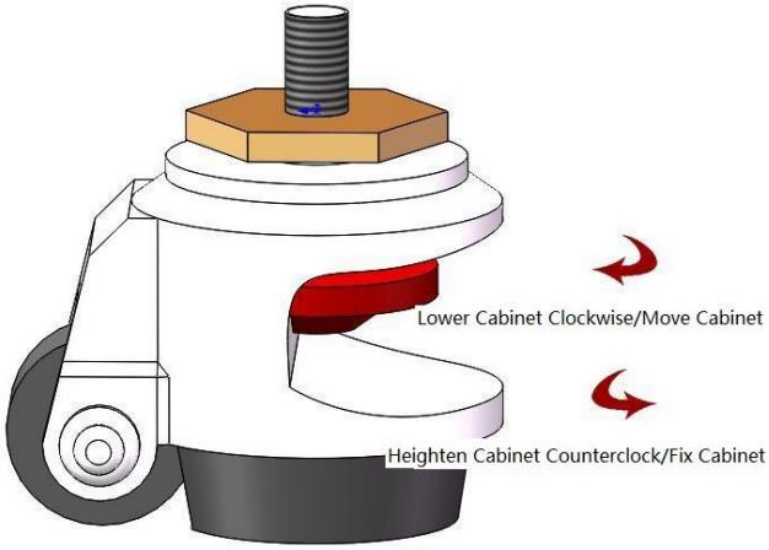


Figure-6

Clockwise rotate the caster' red part to lower the base feet and the height of the cabinet. Low down all four casters can move the cabinet position. Counterclockwise rotation casters' red part can raise the base leg and height of the cabinet. Raise all four casters can at the same time fix the cabinet. Adjust the four-foot -masters to make the cabinet stable.

8. Operations

8.1 Control Panel

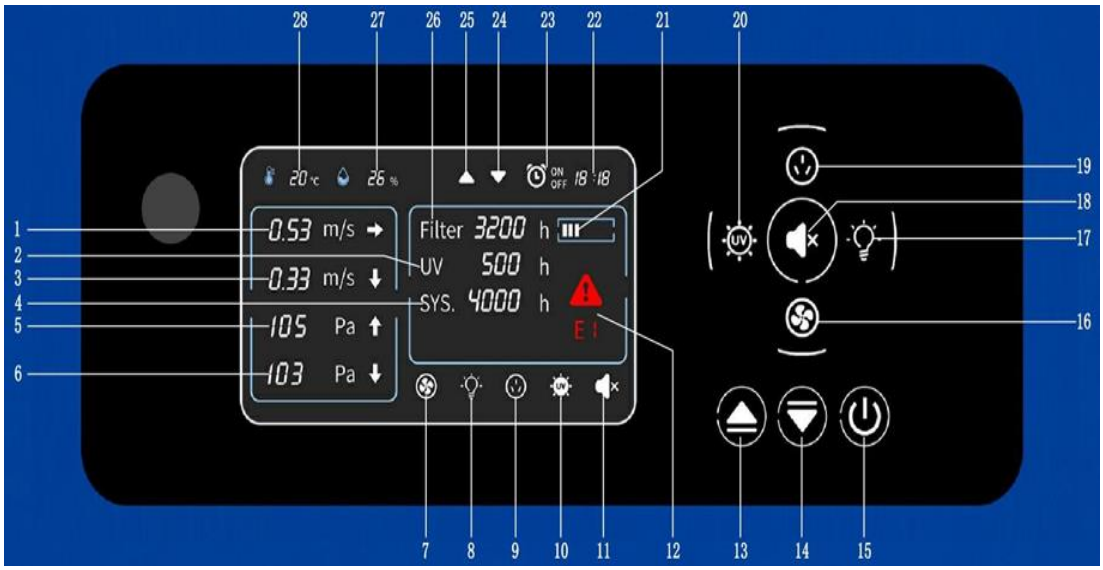


Figure-7

1) Inflow velocity
2) UV Lamp Working Time
3) Down-flow velocity
4) System Working Time
5) Exhaust Filter Differential Pressure
6) Supply Filter Differential Pressure
7) Fan Status
8) LED Lamp Status
9) Socket Status
10) UV Lamp Status
11) Mute Status
12) Alarm Status
13) Glass Window Up
14) Glass Window Down
15) Power
16) Fan
17) LED Lamp
18) Mute
19) Socket
20) UV Lamp
21) Filter working time barcode
22) System time/Reservation Timing Display
23) Timing function
24) Glass Window Down Status
25) Glass window Up status
26) Filter Working Time
27) Humidity
28) Temperature

LCD display screen (Liquid Crystal Display) places liquid crystals between two parallel pieces of glass, with many small vertical and horizontal wires in between. The rod-shaped crystal molecules are controlled to change direction by whether they are electrified or not, and the light is refracted to produce a picture. It has low power consumption and no electromagnetic radiation, as shown in **Figure 7.**
The LCD display technology adopted reflects the working status of the instrument and equipment in real-time, such as the effective working status of the filter. This gives the operator a more intuitive feeling.

1) **LCD Screen**
   The working status of the equipment and operation can be seen on the LCD screen.
2) **Soft touch button**
   FM-BSC-A201 main functions could be executed by touch buttons. Users can operate the BSC either by pressing the buttons on the control panel or using the remote control. There are a total of 8 common buttons on the control panel.

	Power button	Master switch for controlling other function buttons.
	LED lamp button	Control button for LED lamp. Each time you press it, the state of the LED lamp and the indication state on the LCD will change once, that is, from on to off, or from off to on.
	UV lamp button	Control button for a UV lamp. Each time you press it, the state of the UV lamp and the indication state on the LCD will change once, that is from on to off, or from off to on. (This button will be valid only when the glass door is completely closed)
	Fan control button	Control button for fan working state. Each time you press it, the working state of the fan and the indication state on the LCD will change once. (This button does not work when the glass door is closed)
	Socket button	The control button for the power on/off state of the socket. Each time you press it, the power on/off state and the indication state on the LCD will change once.
	Mute button	When this button is pressed, the mute function is activated.
	Glassdoor up button	Press the up button, the glass door will keep rising, and stop when it is 200mm away from the work table. Press the UP button again until it reaches the highest point of travel, the glass door will stop moving.
	Glassdoor down button	Press the down button, the glass door will keep falling and stop when it is 200 mm away from the table panel. Press the button again, the glass door will shut down and stop moving.

You can also complete the time adjustment and one-key timing function of the UV lamp through the combination of buttons:

Combination button	Time adjustment	After powering on, in the standby (Black screen) State, first press the Mute button 5 seconds, and the clock adjustment state will be entered. At the beginning, the minute bit will flash, then adjust the minute bit to the current time by pressing the up button and down button. The press the mute button 5 seconds to save.
	One button timing function of the UV lamp	1. When the device is running, close the fan, LED lamp, and glass door, long press the UV lamp for 3s, after the interface displays the off countdown, then start the one-button timing sterilization function; At the end of the timing, the UV lamp will automatically be turned off and returned to the standby mode. (The default ex-factory setting sterilization time of the safety cabinet is 30 min) 2. **Change the UV timing time:** In the standby (black screen) state, long press the UV button for 3s to enter the timing setting, press the mute button to switch between the minute bit and hour bit, then press the up button and down button to adjust the time. After the timing setting, long press the UV button to save.

8.2 Operation Instruction

1) Connect the AC power supply and recommend users to use a regulated power supply.
2) Turn on the power lock and put the device in standby mode after powering on, waiting for the operator to input and execute through the button.
3) After pressing the power button, the following function keys can be activated: LED lighting, disinfection, fan, noise reduction, socket, and electric door lifting.

⚠ The disinfection function cannot be selected when the glass door is opened or when other keys are pressed.

4) Before use, lower the bottom edge of the glass door to the bottom, turn on the UV light, and disinfect for more than 10 minutes.

Note:

- When disinfecting, people should leave the room to protect their eyes and skin and avoid injury caused by accidental exposure.
- The intensity of the ultraviolet lamp tube should be regularly tested according to the manufacturer's specifications, and it is recommended to do so once every quarter. If it fails, it should be replaced.

5) When in use, lift the bottom edge of the glass door to a height of 200mm above the operating table, turn on the fan, and run for 10 minutes before conducting the cabinet experiment normally.

To ensure the safety of the operation, place the experimental supplies in the safety cabinet in advance and keep the bottom edge of the glass door 200mm higher than the tabletop during the experimental operation.

6) After use, lower the bottom edge of the glass door to the bottom, turn on the UV light, disinfect for more than half an hour, and then turn off the device.

9. 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 cutting off the power, to avoid electric shock.

9.1 Preparations before maintenance

Soap, hot water or warm water, a soft cotton cloth, a dry cloth or towel, medical alcohol or other disinfectants, abrasive household cleaners, and sterile water.

9.2 Clean the Cabinet surface

9.2.1 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.

9.2.2 Clean the external surface and front window

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

9.2.3 Overall maintenance period

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

9.3 Maintenance methods

9.3.1 Daily or weekly maintenance

1) Disinfect and clean the operating area.
2) Clean the external surface and front window around the operating area.
3) Check the various functions of equipment.
4) Record this maintenance result.

9.3.2 Monthly maintenance

1) Clean the external surface and front window.
2) Wipe the working table, inner wall surface of the operating area (excluding the wind-distributing grid of the operating area), and the inner surface of the glass door with 70％ medical alcohol.
3) Check the various functions of equipment.
4) Record this maintenance result.

9.3.3 Annual Maintenance

1) Check the two conveyor belts of the front window drive unit and ensure their tightness coincides.
2) Check the UV lamps and LED lamps.
3) Apply for testing the overall performance of the cabinet annually to ensure performance safety. The user is responsible for testing costs.
4) Record this maintenance result.

9.4 Storage and transportation

9.4.1 Storage conditions

Safety cabinet should be stored in a relative humidity of no more than 75%, with a temperature below 40℃, in a warehouse with good ventilation performance, no acid, no alkali, and no other corrosive gases, the storage period shall not exceed one year, safety cabinet for more than a year needs to unpack and checked.

9.4.2 Transportation

During the safety cabinet's transportation, corresponding measures should be taken following the requirements shown on the outer surface of the packaging box.

9.5 Methods and Procedures for Disinfection

Disinfection is necessary when any contaminated part of the biosafety Cabinet is needed for routine maintenance, replacement filters, performance testing, etc. Before doing the certification test and gas sterilization, all internal working surfaces and the exposed outer surface should be disinfected with a suitable disinfectant. What is more, using Class II biosafety level designated medicament to sterilize the cabinet with gases is required. Class III biosafety level designated medicament is recommended after the use of the cabinet. The cabinet, under the risk of being polluted by the biological factor, should be sterilized before sliding position.

The polluted working surface caused by overflowed and spilled reagents also should be sterilized. Most of the cases that need gas sterilization use depolymerized triformol as the disinfector as noted below, the period parameters the validity of each model, and the size of the cabinet are required to be listed before changing the sterilization method. The relevance of the material has connections with the absorption and degeneration of spare decontaminants, which is the key factor in keeping the cabinet integrated and the sterilization time. There need those alternative sterilization way in some cases, such as slow disease viruses. The sterilization method is used against the consult between the end user and the certification authority. Point out the given area, gas mask, safeguard procedures, corresponding test, medical monitoring, conveying danger and training, record and reserve, etc... and follow these steps.

⚠ Before sterilization, all the hydrogen chloride should be moved away from the cabinet. This will result in the carcinogenic substance BCME when it meets with formaldehyde under the ambient air.

1) Figure out the total volume by multiplying the height, width, and depth.
2) The required weight of the triformol will be worked out through the total volume multiply 11g/m^3, figuring out the weight of ammonium bicarbonate or its alternative by chemometry.

3) It must be bubble-tight if there are exhaust pipe with the biosafety Cabinet, which can be realized at the end of the pipe or sealing at the control valve if there is a valve near the cabinet, it needs more triformol to compensate for the added volume if the length of exhaust pipe is more than 3 meters. If the exhaust recirculation of the cabinet connects with the exhaust system of the construction, interrupting the connection system of the biosafety Cabinet with construction and sealing (by using plastic film and plastic strips)
4) Sealing by plastic film as the waste gas is exhausted into the room from the biosafety Cabinet.
5) To urgently eliminate formaldehyde, sterilize and eliminate formaldehyde after neutralizing, put a tube near the biosafety Cabinet in advance which is required to connect with a chemical smoke hood or other exhaust devices that are suitable for releasing the harmful gas.
6) Put the heater, such as an electric-heating frying pan which can be bought from the market, a formaldehyde generator, or neutralizer on the working table. Set up the temperature at 232℃-246℃, the triformol is spraying over the surface of the heater devices equably.

 The autoignition temperature is paraformaldehyde at 300℃.

7) The neutralizer with the heating device is placed on the workbench. Neutralizers (Ammonium bicarbonate or equivalent) should be isolated from the air in the cabinet before use. The following two examples illustrate how to achieve air separation.

Example 1:

Ammonium bicarbonate or substitute is uniformly sprayed on the heated surface of the heating device and covered with aluminum foil to prevent the carbonic acid hydrogen ammonia or its substitute in disinfection reaction with formaldehyde. The aluminum foil should be placed so that ammonia can be released during heating or ready to remove aluminum foil at the beginning of the neutralization phase. Removal of aluminum foil is not allowed when the formaldehyde leaks out of the safety cabinet.

Example 2:

The safety cabinet with the gloves for a whole plastic film sealing. Ammonium bicarbonate or equivalent substitutes are placed in a container in a safety cabinet. During the neutralization phase, the disinfected personnel into the safety cabinet through the gloves do not break the sealing system. The ammonium bicarbonate or equivalent substitutes are removed from the sealed container and uniformly sprinkled on the heating surface of the heating device, then the heating device is energized, and the ammonium bicarbonate or the substitute is heated to release the ammonia.

- Putting the heating plate, water beaker, and hygrothermograph on the worktable, do not connect the wires to the power supply in the cabinet.
- Sealing the front operating window with thick plastic film and plastic strips. Seal all the areas where possible to leak. Such as the wire outlet, the surrounding of the front operating window, and the joint between the plastic film and biosafety Cabinet.
- Measure the temperature and humidity inner the cabinet.
- The humidity is at 60%-85% when the temperature is above 21℃, heating the water in the beak up to the expected temperature and humidity.

- Before depolymerizing the formaldehyde, strictly restrict entry to the area around the biosafety Cabinet or room in accordance with related regulations and safety measures.
- Connect the wire of the heater with the socket outside the cabinet.
- 25% formaldehyde is depolymerized open the safety cabinet fan 10 s ~ l 5 s. after the para-formaldehyde is depolymerized by 50%, 75%, and 100%, repeating the above steps. If the safety cabinet fan does not work, use auxiliary fans to promote air circulation in the cabinet, or prolong the disinfection time overstep P.
- Disconnect the power supply of the heating plate and heater for the use of triformol
- Keep the biosafety Cabinet isolation at least 6 hours, it is better to leave it for a night.
- Prepare the neutralizer, power off the heating device and the fan of the biosafety Cabinet until the ammonium bicarbonate is wiped away, the operation of triformol is also the same, after the decomposition of 20% ammonium bicarbonate, open the fan for 10s – 15s, using an assisted fan or electric fan to promote the air circulation inner biosafety Cabinet or prolong the neutralization time for at least 6 h if the fan of the biosafety Cabinet does not work.
- Keep the biosafety Cabinet isolation at least 1 hour before opening the sealing membrane.
- If exhausting the formaldehyde caused by neutralization via tube, tear out the plastic cover in the exhaust pipe, connect it with the tube, and seal. The plastic cover in the front of the biosafety Cabinet will be sucked in and cut one or two openings to make fresh air into the cabinet if the tube works well, then the formaldehyde is exhausted via the tube.

10. Troubleshooting

Kindly confirm whether the power is connected or not, whether the power cord is obviously 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
The LED lamp doesn't work	Circuit	Check the circuit
	LED tube	Replace it
	Control panel	Replace it
UV lamp doesn't work	Front window, LED lamp, and blower	Check whether the front window, LED lamp, and blower are open or not.
	Lamp holder	The tube and lamp holder are connected securely.
	Circuit	Check the circuit
	UV lamp	Replace it
	Micro Switch	Check if the Micro Switch is broken
	Control panel	Replace it
The button doesn't work	Control panel	Ensure the power connects well and the fuse is well
		Check if the button is broken
		Ensure the connecting wire is connected well
		Replace the control panel
The blower doesn't work	Front window	The front window is open or not, blower works only when the front window is open
	Micro Switch	Check if the Micro Switch is broken or works fine
	Blower	If the blower is broken, replace it
	Circuit	Check the circuit
	Control panel	Replace it
No electricity in the socket	Socket fuse	Check if the socket fuse is broken
	Socket	Check if the socket is broken
	Circuit	Check the circuit
	Control panel	Replace it
Pressure or air speed displayed incorrectly	Gas circuit	Check whether the gas circuit has dropped, is broken, or jammed
	Control panel	Replace it
The front window doesn't work	Circuit	Check the circuit
	The motor of the front window	Check the front window motor
	Transmission part	Check transmission connection and lead rail
	Control panel	Replace it
	Circuit	Check the circuit

The footswitch doesn't work	Control panel	Replace it
Remote control doesn't work	Remote control	Check if the Remote control is broken or not, and if there's electricity in the battery
	Connection cable	Check whether the main control panel and display board are connected well.
	Control panel	Replace it
No electricity in the equipment	Power supply	Check power supply connects well
	Power wire	Check whether the power wire has obvious damage
	Fuse	Check if the fuse is good
	Power key	Check if the power key is open, broken, or not
	Transformer	Check whether the transformer works normally
	Control panel	Replace it
The display doesn't work	Connection winding displacement	Connection winding displacement
	Display screen	Check the display screen
	Control panel	Check the control panel
No alarm	Micro switch	Check whether the micro switch is good, and whether it works normally or not.
	Control panel	Replace it

Notes:

- The above electrical parts must be operated by a qualified electrician in safety conditions (cutting off the power supply). The other parts are not allowed to be removed; otherwise, the user should take responsibility for them.
- For your safety, do not maintain equipment by yourself.
- The maintenance of this equipment is undertaken by trained and recognized technicians.

11. Accessories

Standard Accessories

Accessories no	Accessories name
1.	LED lamp 2 pcs
2.	UV lamp
3.	Base stand
4.	Remote control
5.	Footswitch
6.	Drain valve
7.	2 Waterproof sockets

Optional Accessories

Accessories No.	Name
1	Water Tap
2	Gas Tap

12. Replacement

12.1 Replace LED lamp

When replacing the LED lamp, make sure that the power is off, open the operation panel, and use the control panel support frame (fixed in the inside position of the control panel). Then pull out the lead of the lamp tube in the direction indicated by the arrow **(Figure 9)**, take down the lamp tube, and then take out the lamp tube of the corresponding model to install it.

Figure-8

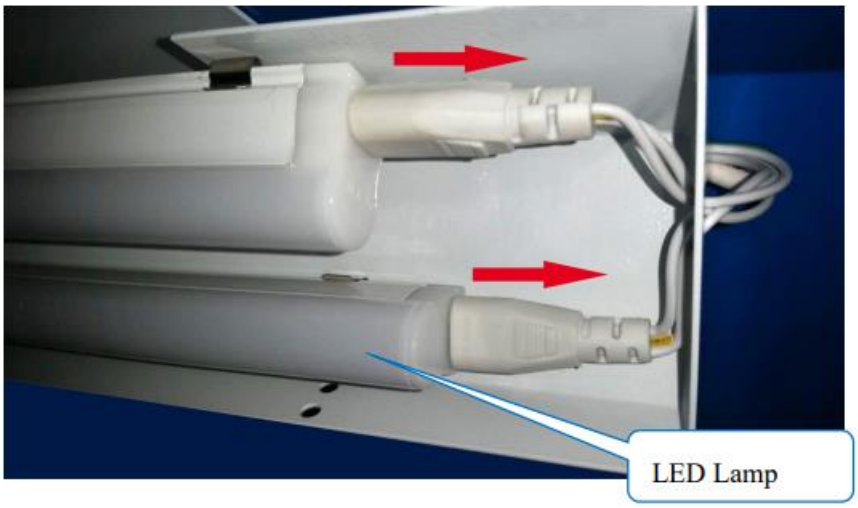


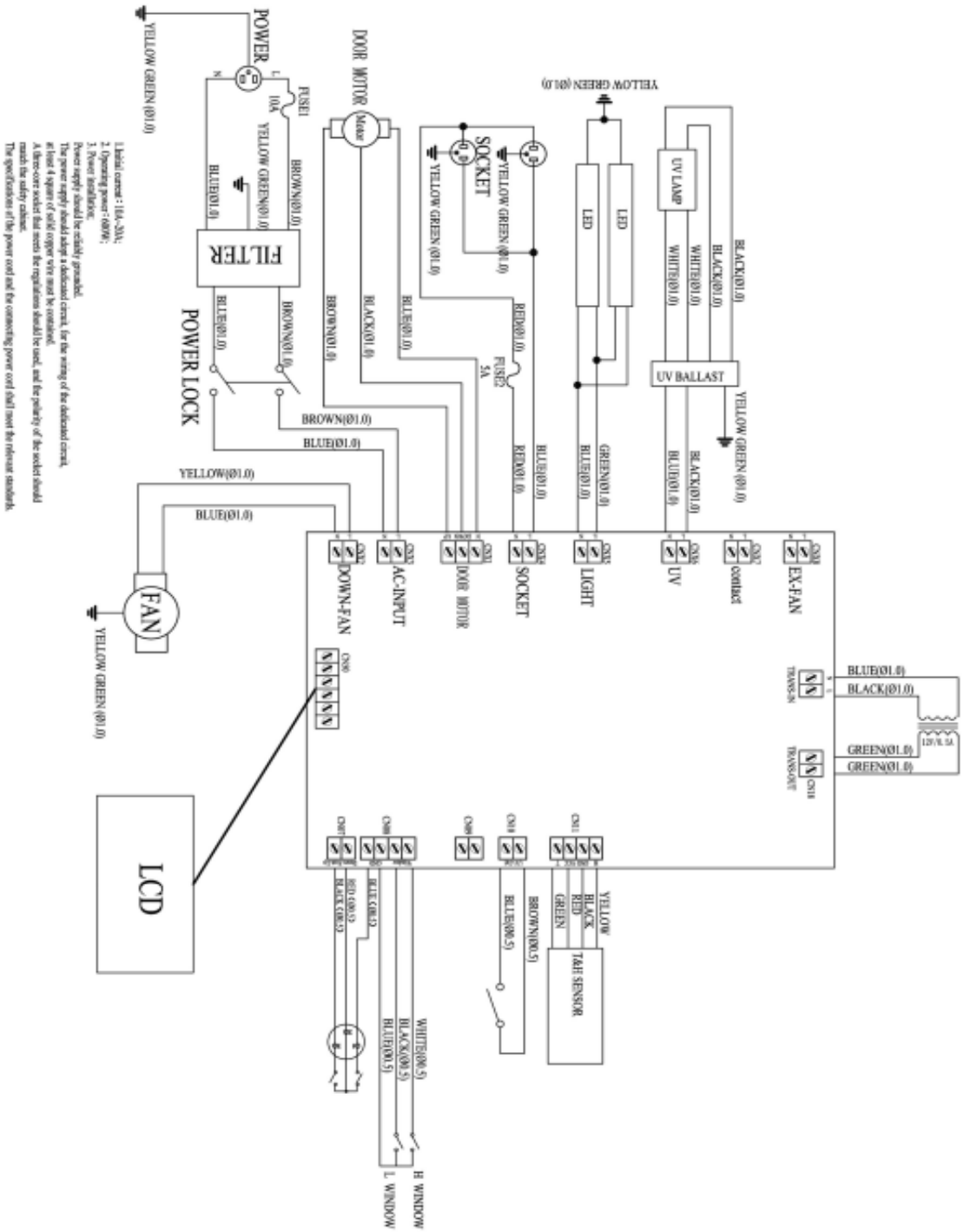
Figure-9

12.2 Replace the UV lamp

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

Figure-10

13. Circuit Diagram



14. Appendix

Airflow Mode Diagram and Protective Area

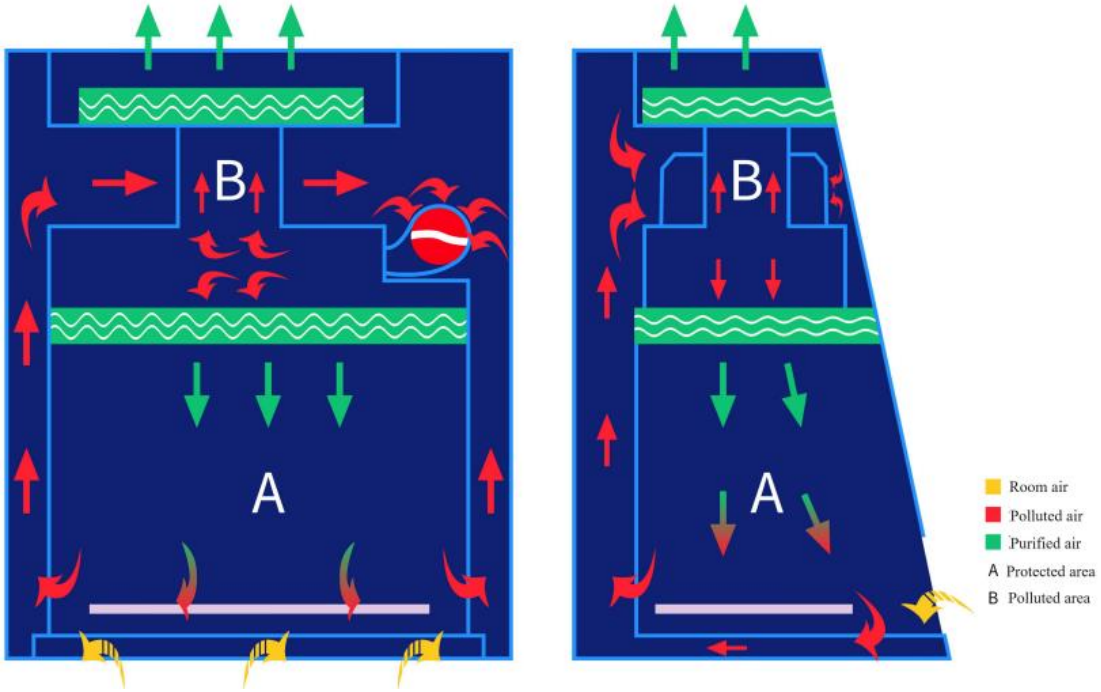


Figure-11