LABDEX

Biological Safety Cabinet Class II

LX2OBSC2

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Index

1. Introduction

It is designed with three protection layer which is operator, sample and environment andit is floor mounted containment with 70% air circulation and 30% air exhaustion.Equipped with Large LCD display by which the user can check detailed status of the cabinet, such as inflow and down flow velocity, work area temperature and humidity, filter pressure, UV working time and filter working time, filter life indicator etc. It is mainly suitable for microbiological research in the absence of volatile or toxic chemicalsand radionuclide.

2. Features

- Motorized front window
- Pressure sensor for monitoring of condition of HEPA filters
- Interlock function
- Large LCD display
- Memory function in case of power-failure
- Single piece SS removable work tray

3. Specifications

Model No.	LX20BSC2
Internal dimension (W x D x H)	940 x 600 x 660 mm
External dimension (W x D x H)	1100 x 750 x 2200 mm
Tested opening	Safety height 200 mm
Max opening	480 mm
Inflow Velocity	0.53±0.025 m/s
Downflow Velocity	0.33±0.025 m/s
ULPA Filter	Two, 99.9995% efficient at 0.12μm, filter life indicator
Front Window	Motorized, Two-layer laminated toughenedglass ≥ 5mm. Anti UV
Noise	EN12469 ≤ 58 dB / NSF49 ≤ 61 Db
UV Lamp	30 W x 1
Emission	253.7 nanometres
Illuminating Lamp	12 W x 2
Illumination	≥1000Lux
Waterproof Sockets	Two, total load of two sockets: 500W
Display	LCD display, exhaust filter and downflow filter pressure, filter and UV lamp working time, inflow and downflow velocity, filter life, humidity and temperature, system working time, etc.
Control System	Microprocessor
Airflow System	70% air recirculation, 30% air exhaust
Visual and audio alarm	Filter replacement, window over height, abnormal air flow velocity
Work Material	304 stainless steel
Main Body	Cold-rolled steel with anti-bacteria powder coating
Work Surface Height	770 mm
Caster	Footmaster caster
Power Supply	AC220V±10%, 50/60Hz; 110V±10%, 60Hz
Power consumption	600 W
Package dimension (W x D x H)	1230 x 1060 x 1840 mm
Gross Weight	220kg

4. Applications

Used in laboratories in which the user can performs procedures with non-volatile,lightly volatile, radionuclide, chemical protection, etc.

5. Instrument Introduction

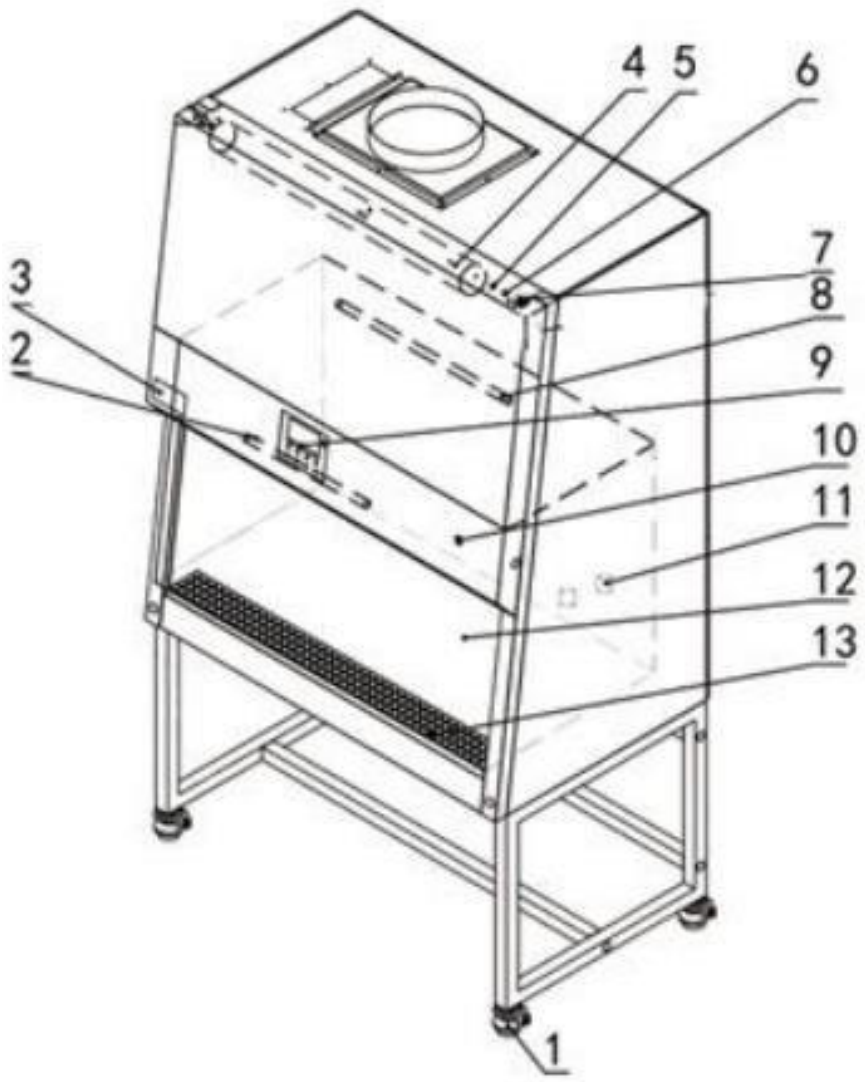

Figure 1

1. Footmaster Caster
2. LED Lamp
3. Nameplate
4. Tube motor
5. Fuse socket
6. General power fuse socket
7. Power Socket
8. UV lamp
9. Control panel
10. Power supply lock
11. Water-proof socket
12. Front window
13. Inflow grid

5.1 Brief Introduction

1) Driving System of Front Window

The driving system consists of a tube motor, front window, hauling sash, and positionswitch.

2) Air Filtration System

The Air Filtration System is the most important system of BSC. It consists of a blower, supply filter, and exhaust filter. The function of the Air Filtration System is to transfer filtered air to the work area, ensure the downflow velocity, and keep class 100 cleanness of the work area.

3) UV Light

The UV lamp is inside the work area. So UV lamps can well sterilize all space in the workarea.

4) LED Light

The BSC is equipped with an LED lamp. It can make sure the average illumination inside the work area meets standard requirements.

5) Air pipe

The air pipe is the ventage of the differential pressure sensor.

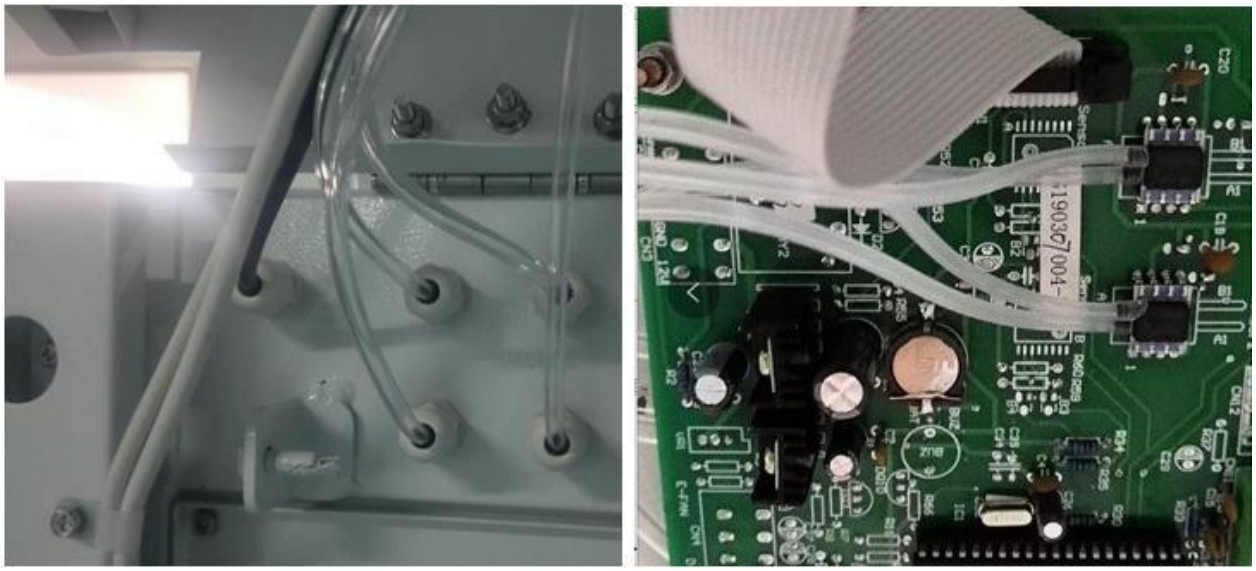

Figure-2

The air pipe should not be blocked and kindly do not hang anythingon the pipes, otherwise it will affect wind speed and pressure.

6) Power lock

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

7) Waterproof Socket

Waterproof Sockets are located on the right side of the work area and can becontrolled by the SOCKET button.

- Kindly make sure 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.

8) LCD Display (Liquid Crystal)

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

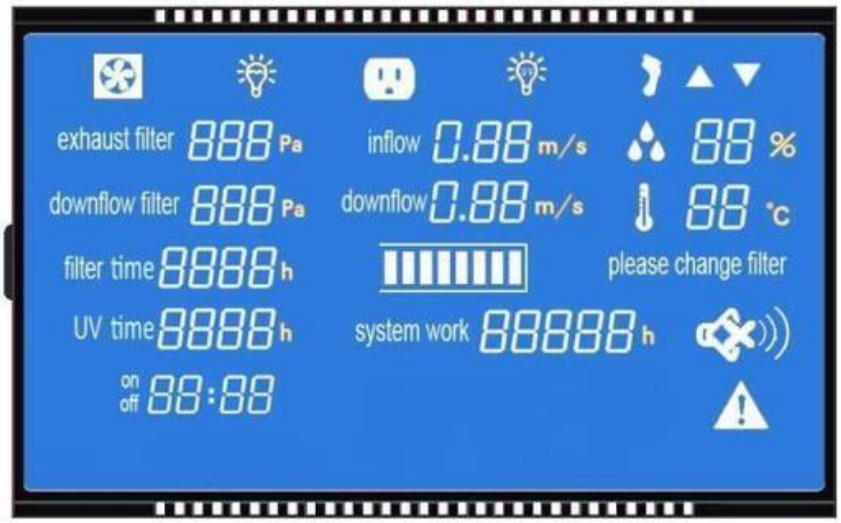

Figure-3

9) Control of the Front Window

The front window is motorized. It could be controlled by a control panel. A glass door control motor for a dedicated reversible speed motor, the motor has a large starting torque, smooth rotation, and so on.

10) Structure

- The Biological Safety Cabinet's both sides and back area are negatively pressure air channels.
- Make double isolation by air curtain and cabinet between the working area and the external environment the working area is surrounded by negative pressure to avoid any leakage.

- The cabinet body is built of 1.2mm cold-rolled steel with anti-powder coating. Strong and steady.
- The work area is fully made of 304 stainless steel which looks beautiful and with corrosion resistance performance.
- The base stand is made of cold-rolled steel with anti-powder coating.
- Soft touch type control panel, easy to handle, and beautiful appearance.

5.2 Control Panel

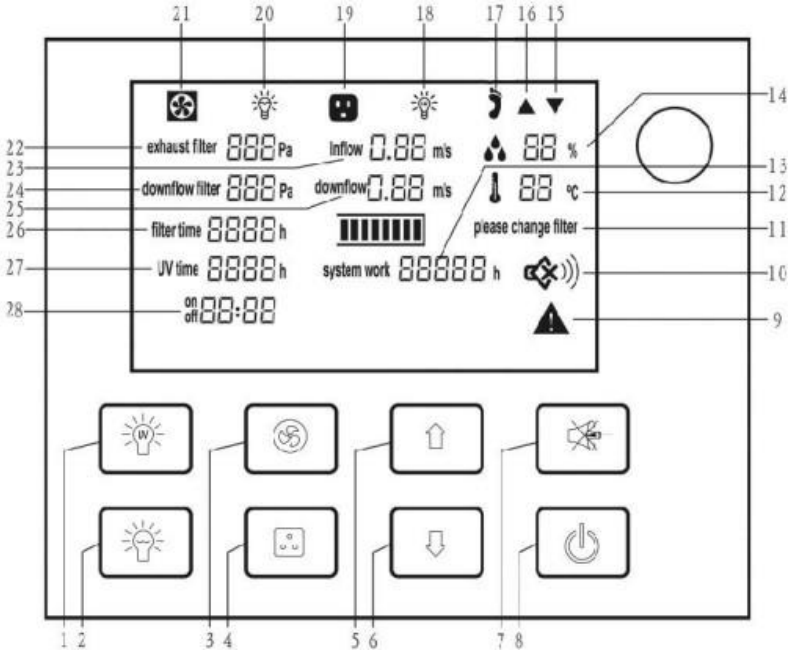

Figure-4

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

1) LCD Screen

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

2) Soft touch buttons

Main functions could be executed by touch buttons. Users can operate the BSC either by pressing thebuttons on the control panel or using the remote control. There are a total of 8 common buttons on the controlpanel.

 The power button is the main switch to control other functional keys.

 To control the LED lamp.

 To control UV lamps. (It works only after the front window, LED lamp, and blower fan arefully closed).

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

 To control socket power status.

 Press the MUTE button to stop the voice prompt.

 Press the UP button, glass window will raise.

 Press the Down button, glass window will fall.

These are 8 common buttons on the control panels.

3) Clock Adjustment

- Turn the power key, so the machine is in standby state.
- Press the light button, and then press the power button for 5 seconds. Then users see the state of the clockadjustment after a buzzer alarm.
- Firstly, the minute position is flashing, press UP and DOWN to adjust to the present time.
- Then press the MUTE button switch to the position and adjust to the present time.
- After that, press the light buttonfirst, and press the power button for about 5 seconds. Data will be saved after a buzzer alarm.

5.3 Remote Control and Footswitch

1) Remote control

- It is inconvenient for the users to operate from a distance.
- A small & light remote control is flexible enough to be used to control all the functions of the cabinet in a distance ≤6m, 30° range.
- The operator can evencarry it with them during the experiment for convenience.
- This remote control adopts a specific chip that features good anti-jamming performance, longercontrol distance, and high control precision.

Figure-5

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)
6 Socket (SOCKET)
7 Mute (MUTE)
8 Front window up (UP)
9 Front window down (DOWN)

1) Reservation Time (SUB)

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

2) Timer (INSTALL TIMER)

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

3) Application of Reservation Time

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

9.2 The use of the foot switch

Press the left red switch by foot, the front window goes up, press the right black switch, front window goes down.

Figure-6

6. Installation

6.1 Unpacking

1. **Method 1 Necessary tools for unpacking:** Electric drill with hexagon dead M8

Figure-7

2. **Method 2 Use M8 Wrench to unpack**

Figure-8

3. Rapid unpacking diagram (Picture 3). Disassemble the screws shown in the below picture, then movethe wooden pieces to the right and left.

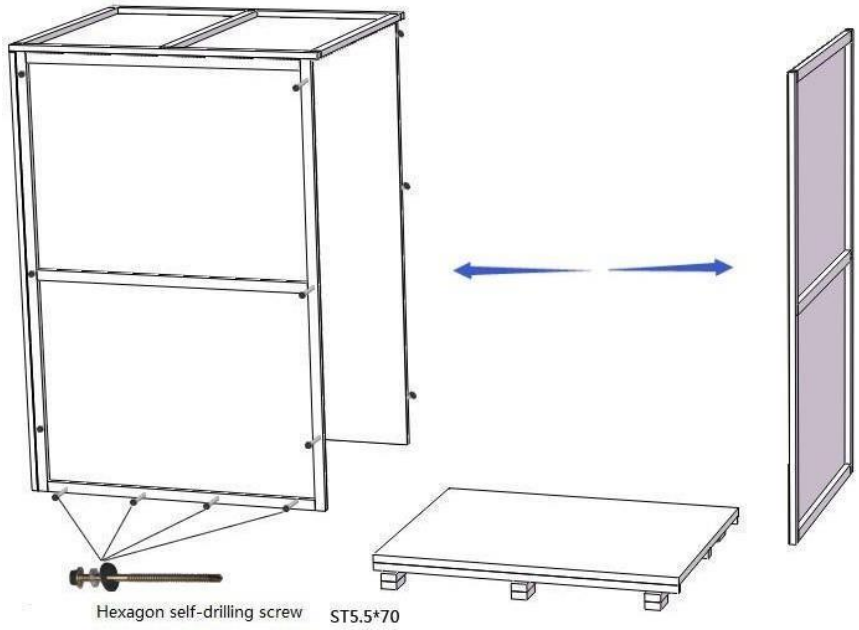

Figure-9

6.2 Installation conditions and environment

To avoid disturbances to the safety cabinet and its operator, follow the following guidelines, while determining a suitable location for the cabinet:

- The distance from the plane of the aperture to any circulation space should be at least 1000 mm,to preserve a zone undisturbed by anyone other than the operator.
- Biological safety cabinets should be placed in a position where there should be no opposing wall(or other obstruction likely to affect the airflow) within 2000 mm of the front aperture.
- Safety cabinets should not be installed in positions where they are likely to be affected by otheritems or equipment. In particular, the distance to the aperture of an opposing safety cabinet, fume cupboard, or the edge of a local exhaust ventilation outlet should not be less than 3000 mm.
- Any room air supply diffuser should not be within 1500 mm of the front aperture.
- Doorways should not be within 1500 mm of the aperture or 1000 mm of the side of the safety cabinet.
- The position of a safety cabinet should satisfy the spatial requirements (e.g. vision, lighting, andconvenience of access) of the operator and personnel working nearby. When a cabinet is installedon a benchtop, the leading edge should be flush with or slightly overhanging the edge of the benchtop.

6.3 Working environment

- It is only suitable for indoor.
- **Ambient temperature:** 15℃ to 35℃.
- **Relative Humidity:** ≤75%.
- **Atmospheric pressure range:** 70 kPa～106 kPa.
- **Electrical parameters:** Consistent with the rated voltage of the biosafety cabinet.
- The power supply needs to be grounded; (Judging method: testing the firewire and the zero line of the power supply with a multimeter, the firewire to ground voltage should be grid voltage and thezero line to ground voltage should be 0, otherwise the power supply ground is bad).
- Test the voltage stability before using, if the voltage is unstable, use the voltage regulator, otherwise the control panel and transformer may be easily damaged.

6.4 Process of Installation

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

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

1) The base stand assembly

Referring to the picture, assemble the base stand.

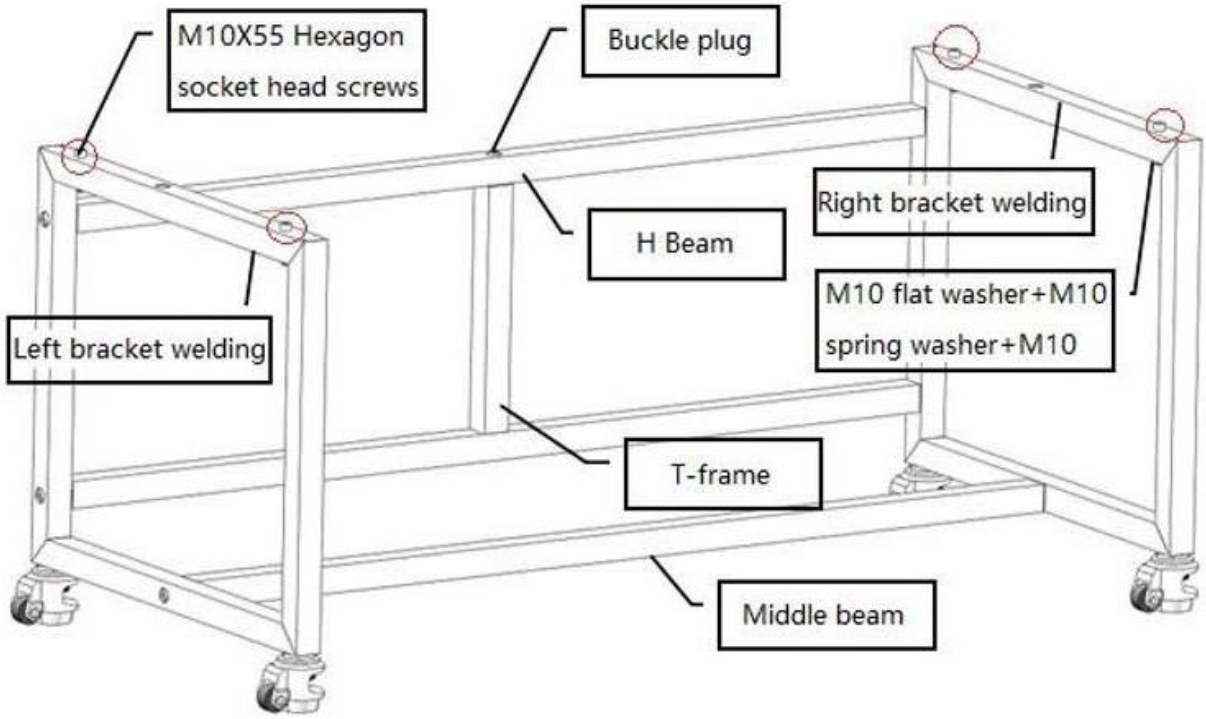

Figure-10

Remove the M10×55 hexagon socket head screws, buckle plug, M10 stainless steel flat washer, M10 stainless steel spring washer, and M10 stainless steel cap nuts, referring to the picture in assembled base,firmly fastening requirements.

2) Connect the base stand and the main body

Align the mounting holes on the bottom of the cabinet with the mounting bolts, and the cabinet slowlydescends the mounting base.

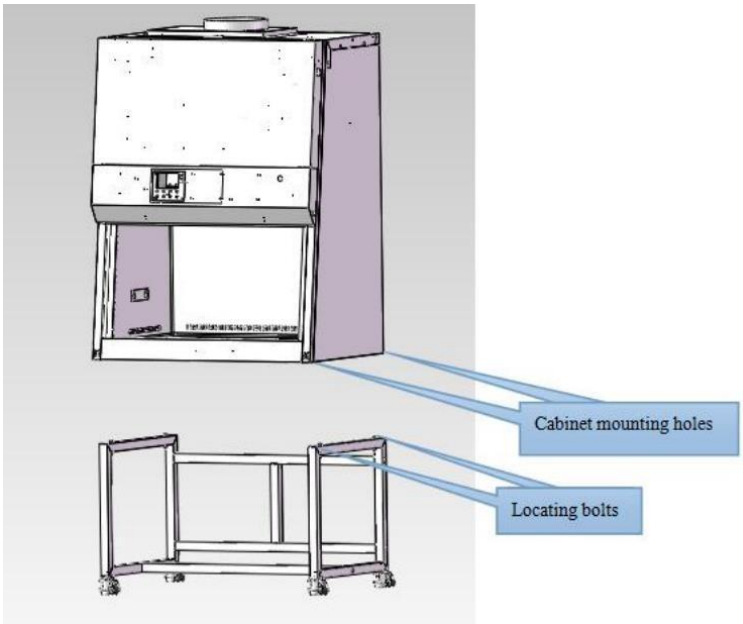

Figure-11

Figure-12

3) Installation of Drain valve

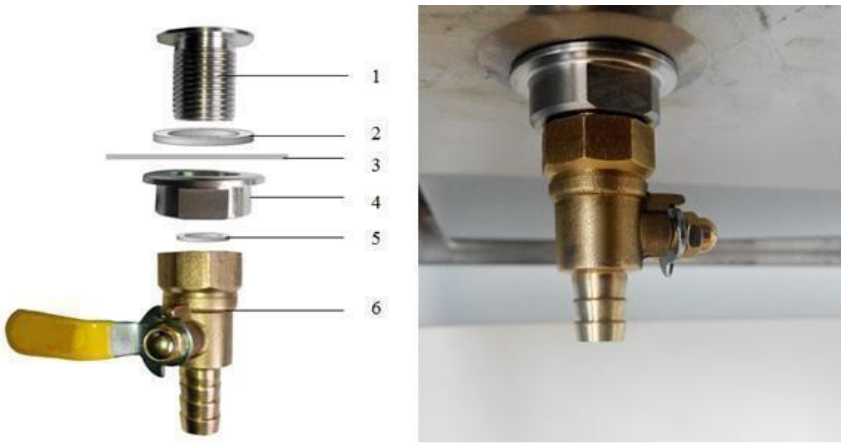

Figure-13

- Drain valve connect
- Shim (Inner diameter× outer diameter× thicknessΦ20× Φ28× 2mm)
- Safety cabinet bottom installation holes
- Ball coupling fastening nut
- Rubber gasket (Inner diameter × outer diameter × thicknessΦ13×Φ19×2mm)

Drain valve

Take out the drain valve coupling, shim, Ball nut, Rubber gasket, and Drain valve, assemblingfrom up to down as Picture 7 illustrated.

4) Adjustment of Footmaster Caster

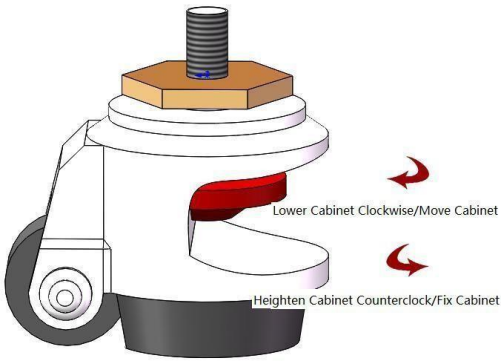

Figure-14

Clockwise rotate the caster' red part to lower the base feet and the height of the cabinet. Low downall four casters can move to the cabinet position. Counterclockwise rotation casters' red part can raise the base leg and height of the cabinet. Raising all four casters can at the same time fix the cabinet. Adjusting the four Foot -masters makes the cabinet stable.

5) Foot Switch

Install the Foot Switch as Picture. Its socket is at the left top, connect the plug.

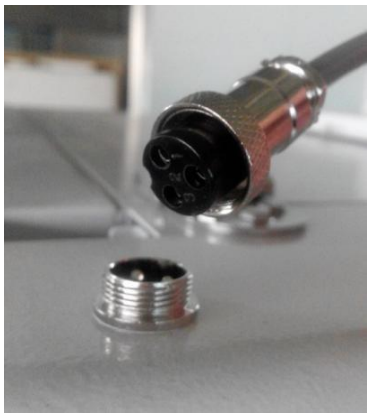

Figure-15

6) Installation of Water and Gas Tap (Optional)

- Fastening Nut.
- Stainless Steel Water and Gas Taps.
- Take out fastening nuts, water, and gas taps, installing.

Figure-16

7. Operations

7.1 Instructions for Operations

1) Normal Operation Notice

- Make sure the input voltage is correct and stable. The rated load of the main power socket shouldbe 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 slightsamples (for example soft tissue) on the surface during the experiment.
- The weight of items placed in the cabinet should be no more than 23 kg/25×25cm2.
- **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.
- **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 biological safety cabinets will inevitably cause pollution (e.g. ULPA filters, cornercabinets, etc.). To sterilize thoroughly every 500 hours, a 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. The maximum storage period is one year. If the period is more than one year, a performance test should be done.

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

2) Operation Process

- Connect the same power reply, as required for equipment
- Open the power lock, the LCD lights up and the alarm rings at the same time, then the machineenters standby status. Waiting for the operator to input the button to use it.
- Press the POWER button, then the following functions are available: LED lamp. UV lamp, Fan, Mute, Sockets, Front window up and down, Reservation timing.

⚠ **When the front window is open or another button is pressed, the UV lamp cannot work.**

- Before experimenting, kindly sterilize the cabinet for more than 30 minutes with a UV lamp (the front window must be closed).

For the safety of eyes and skin, people should leave the room during the UV sterilization.
UV lamp intensity should be tested regularly. If there are no test conditions, it shouldbe replaced, recommended once for three months.

- Kindly move the front window at 200mm height from the worktable, turn on the fan, and make sure the experiment is started after the fan working for at least half an hour.

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

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

7.2 Functions

1) Product Concept

This product belongs to the Class II A2 biological safety cabinet which fully meets the requirements of US standard ANSI/NSF49:2002 and European standard EN12469:2000, a biological safety cabinet is a kind of negative pressure filtration system for protecting the operator, the laboratory environment, and work materials, the front opening which airflow inward has a protection function for an operator, the filtered laminar flow generated by vertical ULPA (ULPA) FILTER. When it's used in a microbiology experiment environment filled with volatile or toxic chemicals and radionuclides, a suitable exhausthood function must be linked.

2) Working theory/ Airflow pattern and protected area

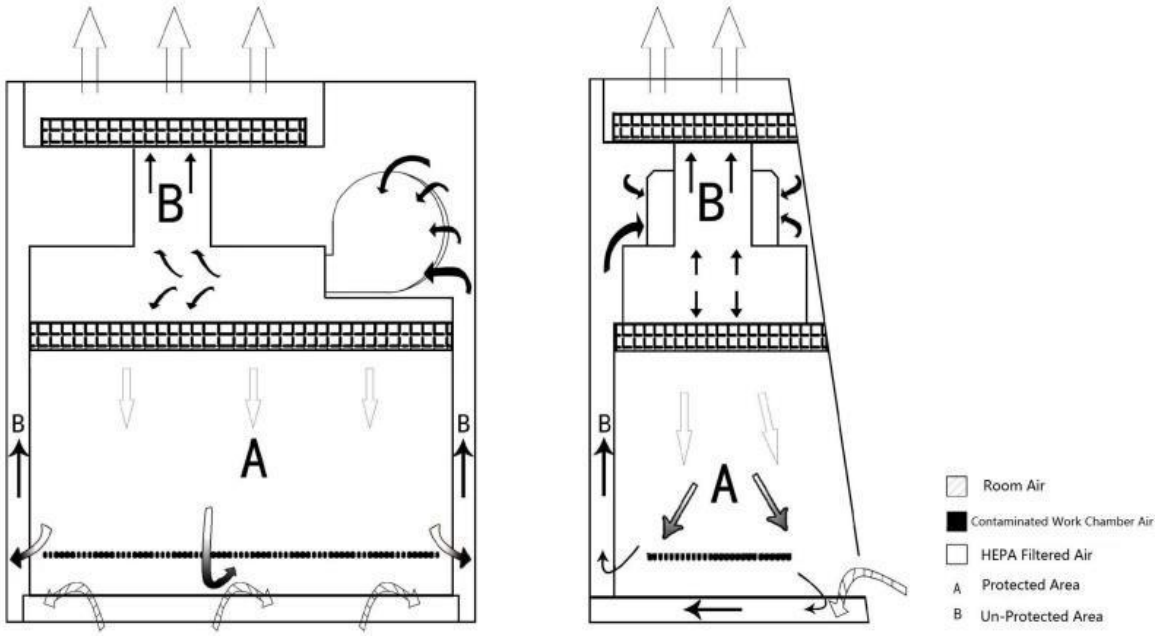

Figure-17

3) Protected objects

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

Notes: Electric consumption power including power which operation area needs to load (loading nomore than 500W.)

8. Maintenance

Due to 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, Kindly pay attention to cutting off the power, to avoid electricshock.**

8.1 Preparations before maintenance

Soap, hot water or warm water, a soft cotton cloth, dry cloth or towel, medical alcohol or otherdisinfectants, 100 dilutions of household bleach, abrasive household cleaners, and sterile water.

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

8.3 Overall Maintenance Period

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

8.4 Maintenance Methods

1) Daily or weekly maintenance

- Disinfect and clean the operating area.
- Clean the external surface and front window around the operating area.
- Check the various functions of equipment.
- Record this maintenance result.

2) Monthly Maintenance

- Clean the external surface and front window.
- Wipe the working table, the 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 or household bleach diluted 1:100 (i.e., 0.05% sodium hypochlorite). Then wipe again with sterile water to eliminate the rest of the chlorine.
- Check the various functions of equipment.
- Record this maintenance result.

3) Annual Maintenance

- Check the two conveyor belts of the front window drive unit and ensure that their tightness is coincident.
- Check the UV lamps and LED lamps.
- Apply to test the overall performance of the cabinet on an annual basis to ensure performance safety. The user is responsible for testing costs.
- Record this maintenance result.

8.5 Storage conditions

Safety cabinet should be stored in a relative humidity of no more than 75%, 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. Only the tested and qualified safety cabinet can be sold.

Note:

- 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.
- When failures do not occur, and the operator can't solve them, kindly notify your maintenance department immediately. For your safety, kindly do not maintain the equipment by yourself.
- The maintenance of this equipment is undertaken by trained and recognized technicians.

9. Troubleshooting

Common Faults & Solutions

9.1 Warning and reminder

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

1) Over safety height alarm for the front window

There will be audio and visual alarms when the front window is lifting over safety height. At the same time, the LCD will twinkle the exclamation mark. Then just adjust the height ofthe front window. (Front window height setting value is 200mm).

2) ULPA filter pressure difference alarm

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

3) Velocity fluctuation alarm

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

9.2 Troubleshooting

Kindly confirm whether the power is connected or not, whether the power cord is damagedor not, whether the fuse is good or not, and whether the power locks are in an open state ornot before the fault diagnosis.

Faults	Check parts	Measures
The LED lamp doesn't work.	Circuit.	Check circuit.
	LED tube.	Change it.
	Control panel.	Change it.
The UV lamp doesn't work.	Front window, LED lamp, and blower.	Check whether the front window, LEDlamp, and blower are open or not.
	Lamp holder.	The tube and lamp holder are connected securely.
	Circuit.	Check circuit.
	UV lamp.	Change it.
	Micro Switch.	Check if the Micro Switch is broken.
	Control panel.	Change it.
The 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 it is connected well.
		Change control panel.
The bowler doesn't	Front window.	Whether the front window is open or not,

work.		the blowerworks 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, change it.
	Circuit.	Check circuit.
	Control panel.	Change it.
No electricity in the socket.	Socket fuse.	Check if the socket fuse is broken.
	Socket.	Check if the socket is broken.
	Control panel.	Change it
Pressure or airspeed is displayed incorrectly.	Gas circuit.	Check whether the gas circuit has dropped.
	Control panel.	Change it.
The front window doesn’t work.	Circuit	Check circuit.
	The motor of the front window.	Check the front window motor.
	Transmission part.	Check transmission connection and lead rail.
	Control panel.	Change it.
The footswitch 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.
	Connection cable.	Check whether the main control panel and display.
	Control panel.	Change it.
No electricityin the equipment.	Power supply.	Check power supply connects well.
	Power wire.	Check whetherobvious.
	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.
	Control panel.	Change it.
The display doesn’t work.	Connection winding.	Connection winding displacement.
	Display screen.	Display screen.
	Control panel.	Control panel.
No alarm.	Micro switch.	Check whether the micro switch is good, andit.
	Circuit.	Check whether the connection circuit of the micro.
	Control panel.	Change it.

10. Circuit Diagram