# Laminar Flow Cabinet User Manual

(Apply to vertical model BKCB-V600)

### Preface

Thank you for buying the Laminar Flow Cabinet produced by our company.

In order for you to use this product properly and to prevent damage to persons, property and experimental products, please be sure to read and comply with the contents of the manual carefully. If you do not use the equipment in the way specified by the manufacturer and disassemble the equipment by yourself, the protection provided by the equipment lock may be damaged.

Only our after-sales service personnel and technicians authorized by us can install and repair this equipment, otherwise it may cause electric shock or fire.

Be sure to place the equipment firmly on a solid and flat surface. If the ground is not firm or the equipment placed in an inappropriate place, it will cause the equipment to fall over and cause injury to people.

Please use the AC  $220V \pm 10\%$  special power supply indicated on the nameplate of this equipment, otherwise it may cause fire or electric shock. If the use of voltage does not meet the requirements of the marked power supply, you need to add 3000W or more automatic voltage regulator that suitable for motor load.

Please use a grounded power outlet to prevent electric shock. If the power outlet is not grounded, be sure to have a professional technician install the grounding wire.

This equipment is for indoor use only, do not use it in the open air. If Laminar Flow Cabinet is wet by rain, it may cause leakage or electric shock.

Do not put the container with water on the Laminar Flow Cabinet. If the item falls, it may cause injury to people. And the run-off water can cause equipment leakage or electric shock.

Do not ground Laminar Flow Cabinet through gas pipes, power pipes, telephone lines or lightning rods. Such grounding may cause electric shock or other greater danger.

If the Laminar Flow Cabinet is not operating properly, stop using it and unplug it from the power source. Operating the equipment in an abnormal condition may cause other hazards such as equipment leakage.

When the Laminar Flow Cabinet is not used for a long time, unplug the power supply to prevent the power cord from causing electric shock, leakage and other dangers due to aging.

Do not store acid, alkali and other corrosive, flammable, explosive or volatile hazardous materials in the Laminar Flow Cabinet, or use combustible spray near the Laminar Flow Cabinet, which may easily cause equipment damage as well as casualties and property damage.

If you need to move the equipment after installation, you need to confirm with the manufacturer.

Dispose the replaced old filter as biological waste.

The top air outlet must not be blocked.

Our company reserves the right to change the design and user manual of the products, when they changes, the user will not be notified.

### Catalogue

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### **Chapter 1 Product Introduction**

### **1.1 Product Description**

There are strict requirements for the cleanliness of the air in the operating area including laboratories, electronic technology, aerospace, precision equipments and other fields at present. And clean air technology is also required in biological fields such as medicine and health, biopharmaceuticals, food, medical science experiments, sterile microorganisms, etc. Laminar Flow Cabinet is an ideal local air purification equipment to improve the clean working environment.

The cleanliness of the working area of this Laminar Flow Cabinet reaches ISO class 5, which can effectively improve the process conditions, ensure the accuracy of products and provide a sterile environment in the fields of scientific experiments and biological experiments.

### **1.2 Product Features**

### 1.2.1 Control of glass door

The front glass door and window are counterweight controlled, and the glass door and window can be stopped smoothly at any height position within the range, so that the glass door can also be controlled to take out the test products or equipments in the operation area when the power is out.

#### 1.2.2 Structure

(1) The cabinet adopts 1.2mm thick cold-rolled steel plate and electrostatic spraying on the surface, which enhances the structural strength and makes the whole equipment more stable and heavy.

(2) The work surface is made of stainless steel, which is beautiful and corrosion-resistant.

(3) The bracket is made of metal with electrostatic spraying on the surface.

(4) Control panel adopt touch switch to make the equipment appearance beautiful and easy to operate.

#### 1.2.3 UV sterilization

This Laminar Flow Cabinet using UV-C type 254nm wavelength UV sterilization, which can not only kill the active cells of microorganisms, but also kill strong heat-resistant budding spores and other mold spores, in addition that phage and viruses can quickly break under UV rays.

### **1.3 Technical Parameter**

Model Parameter	BKCB-V600
Dimension (W*D*H)	600*460*700
Work area size (W*D*H)	505*345*375

Air flow mode	Vertical	
Height of work table	45	
Front window	4.8mm	
ULPA	ULPA without partitions, with 99.995%, filtration efficiency for φ0.3μm particles	
Specification of ULPA	480*280*50	
Noise	≤65dB(A)	
Illumination	≥300 lx	
Vibration	≤5µm (rms)	
Temperature rise	≤8°C	
Display	LCD (Liquid Crystal Display)	
Splash-proof socket	The power of the equipment used does not exceed 500W	
Grounding resistance	<u>≤0.1Ω</u>	
Power supply	AC220V±10%, 50Hz±10%	
Working area	304 Brushed stainless steel	
Cabinet	Made of 1.2mm (1mm) cold-rolled steel plate and the surface is electrostatically sprayed	
UV Lamp appointed timing	UV lamp delayed 10s to open for the safety of the operator	
UV Lamp	15W	
LED lamp	4W	
Velocity of air flow	0.2-0.45m/s	
Safe height of front window opening	200mm	
Max height of front window opening	240mm	
Alarm for height of front window opening	Yes	
Safety	Colonies number≤0.5CFU/30min	

### **1.4 Mechanical Structure**



Figure 1 Mechanical structure

1	Side window glass	2	Front window glass	3	Switch
4	Cabinet	5	Power socket	6	Operation panel
7	Touch screen	8	LED lamp	9	UV lamp
10	Splash-proof socket				



#### Caution

- The power of the equipment used on the receptacle should not exceed 500W (rated voltage \* rated current 220V \* 2.3A).
- The splash-proof receptacle as splash-proof only when its front cover is lay down; the receptacle cannot be considered as splash-proof when the front cover is opened.

**Note:** IP44 is the socket degree of protection. According to IEC 60529: Protected the inside of the socket against foreign solid objects of  $1.0\text{mm}\Phi$  and greater from contacting the internal parts; protected the socket against splashing water from all directions from causing damage.

### **Chapter 2 Installation**



#### Caution

This Laminar Flow Cabinet needs to be installed by our trained and qualified engineers.

(1) Remove all packaging components.

(2) Inspect the external surface of the host for scratches, deformations or foreign objects.

(3) Carefully inventory accessories and information according to the packing list in the manual.

(4) Move the entire equipment to a position as close as possible to the final location and easy to install.



#### Caution

When handling the Laminar Flow Cabinet, it is strictly forbidden to place or disassemble it upside down.

### 2.1 Installation Environment

- (1) Indoor use.
- (2) Humidity range: ≤80%.
- (3) Power supply voltage: AC  $220V \pm 10\%$ .
- (4) Transient overvoltage: Facility category (overvoltage category) II.
- (5) Rated pollution level: Class 2.

### **2.2 Location Selection**

(1) Laminar Flow Cabinet should be installed in the clean laboratory or indoor away from the dust source and vibration source, not at the channel. If the laboratory has windows, it should always be in the closed state. Laminar Flow Cabinet should not be placed in the circulation air entrance, for fear that the air blow over the former operation area or blow to the ULPA.

(2) If space allows, there should be 30cm space behind and around the Laminar Flow Cabinet for cleaning, if not, there should be minimum 8cm per side and 3.8cm space at the back for cleaning. The Laminar Flow Cabinet power outlet can be closed to facilitate the maintenance of the Laminar Flow Cabinet, and there is no need to move the equipment to ensure electrical safety.

(3) The power socket of this equipment can be turned off to facilitate maintenance. Do not move the equipment to ensure the safety of electrical appliances. Do not put the equipment in the position where it is difficult to operate and disconnect the equipment.

### 2.3 Installation Steps

(1) Remove the packing material and check its hardware according to the packing list to make sure there is no damage during transportation after moving to the designated indoor

location.

(2) Unlock front door glass

Before pushing or pulling the front window glass, you need to use a Phillips screwdriver to loosen the fixing screws on both sides of the counterweight plate on the back of the equipment, so that the front window glass can be pushed or pulled smoothly, as shown in the figure below.



Figure 2 Unlock front door glass

(3) Place the whole equipment

The Laminar Flow Cabinet should be placed in a protected area of airflow to prevent the airflow from ventilation system, air conditioner, door, window and personnel movement that affect the Laminar Flow Cabinet.



Figure 3 Diagram of silicone strip position



#### Caution

(1) The cabinet should be installed in a large and spacious space that is adequate load-bearing place for horizontal stabilization.

(2) The silicone strip can prevent the front window glass bump damage during transportation. You can remove them after placing equipment.

### 2.4 Check after Installation

After powering up, check the following items according to the normal use process.

Test item	Normal condition
Power on and off	Connect the environmental power supply and the equipment is energized.
Fan operation	Click [Fan], fan works normally.
Front window glass up and down movement	The glass door slides smoothly up and down.
LED lamp	Click [LED lamp], the LED lamp is on.
Splash-proof socket	Click [Splash-proof socket], output power is AC 220V±10% tested by multimeter.

(1) This product is placed in laboratory sections or teaching laboratories.

(2) The installation location should be far away from dust and vibration sources.

(3) Be sure to plug the power supply into an outlet with a ground wire and ensure that the ground terminal is reliably grounded, and use a power supply with a leakage protection device.

(4) The interior and surroundings of the equipment must be carefully cleaned after installation using a vacuum cleaner or a tool that does not produce fibers.

(5) Test the average velocity of working area with an anemometer after installation and cleaning. The velocity meets the requirements of exceed 0.2m/s and less than 0.5m/s.



#### **Caution:**

If there is any problem please contact your local dealer for installation adjustment.

### Chapter 3 Use

### **3.1 Introduction to the Main Screen**



Figure 7 Main screen diagram

**Temperature/Humidity:** Real-time measurement and display of temperature and humidity in the operation area.

Air Flow Animation: When the equipment is running, display the air flow direction, the fan is closed, the animation stops.

**UV Lamp:** Control the switch of UV lamp.

Fan: Control the fan switch.

Power socket: Control the switch of splash-proof socket in the operation area.

Silence: Switch sound on and off. " $\times$ " is in front of the horn when the sound is off.

**Settings:** After clicking "Settings", it enters the settings interface, which allows you to set the following contents of the equipment: timing switch, fan settings, equipment life, standby settings.

Pressure: Real-time display of the pressure difference value before and after the filter.

Velocity: Real-time display of vertical airflow velocity magnitude.

Time: Real-time display of the current date and time.

**LED Lamp:** Control the open and close of LED lamp.

Splash-proof socket: Control the power on and off of splash-proof socket.

### **3.2 Settings Interface**



#### Figure 8 Settings diagram

Click "Settings" to enter the settings interface, in which you can set contents as shown in the figure.

#### 3.2.1 Timing switch

Click "Timing Switch" in the above figure to enter the timing switch interface, click "Time Input/Display Area" to input the value to be timed, and then you can switch the timing for the corresponding time.

Laminar Flow Cabinet				
	Timing Switch			
Time Input/	LED Lamp Timing	Fan Timing		
Display Area	open min	open min		
	close min	close min		
10 S. 1 S	UV Lamp Timing	Socket Timing		
	open min	open min		
	close min	close min		
- AL				

Figure 9 Timing switch diagram

#### 3.2.2 Standby settings

The standby time is the time when the screen is darkened and the equipment enters the screen protection state.

Click "Standby Settings" to enter the standby settings interface, click the number in the "Standby Time Display Area" to modify the standby time.



Figure 10 Standby settings diagram

### **3.3 Introduction to the use process**

(1) Before the experiment: Lower the front window to the bottom, click the UV lamp, turn on the UV lamp, disinfect for more than half an hour.

(2) You can manually lift the front window. When lift the front window to a suitable height, open the fan, you can start the experiment after running for half an hour.

(3) After the experiment, lower the front window to the bottom, click the UV lamp, turn on the UV lamp and disinfect for more than half an hour.

(4) After use, unplug the power supply and place it in suspension to avoid power contact with moisture and water to avoid leakage.



### Caution

(1) When disinfecting, people should leave the room to protect their eyes and skin from inadvertent exposure.

(2) The intensity of the UV lamp is tested regularly according to the manufacturer's specifications, and it is recommended that it be tested once a quarter. If it fails to pass, it need to be replaced.

### **Chapter 4 Maintenance**

The operability and safety of this equipment can only be guaranteed if there are enough competent personnel and units for inspection, maintenance and repair.

### 4.1 Comprehensive Maintenance Cycle

Maintenance should be performed every week, every month, every year, every 1000 working hours and every restart.

### 4.2 Maintenance and Repair Methods

#### 4.2.1 Cleaning

Under normal circumstances, cleaning only requires a small amount of household or commercial dishwashing detergent, which will be dissolved in water and wiped directly to wipe off the surface of the equipment dirt.

(1) When the Laminar Flow Cabinet is used for the first time or long time out of use again. You should first use a dry cleaning towel to remove the floating dust on the surface, after several cleanings by towel wipe, to confirm the dust-free then use medical alcohol spray on medical gauze to disinfect the operating area, laminar flow plate and work surface, to wipe the comprehensive. Before use, turn on the UV lamp to disinfect, after 30 minutes, turn off the UV lamp and press the fan key, the fan will run.

(2) When the Laminar Flow Cabinet is used continuously.

After using the laboratory clean work table every day, first clear all the debris on the work surface, wipe it again with a dry and wet cleaning towel, and finally disinfect the operation area, laminar flow plate and work table surface with medical alcohol spray on medical gauze, wipe it comprehensively to prepare for use on the next day.



### Caution

You can only spray alcohol on the medical gauze with alcohol spray, do not spray alcohol on the laminar flow plate, because the laminar flow plate has a ULPA, which can not be subject to moisture.

#### 4.2.2 Regular maintenance

#### a. Daily or weekly cleaning in the process of use

Use medical alcohol to disinfect and clean the equipment.

Disinfect and clean the operation panel with medical alcohol.

Use flexible cleaning agent or glass-specific cleaning agent to clean the outer surface of the area and glass.

Check each function of the equipment according to the user manual.

#### b. Monthly cleaning

Surface cleaning.

Check functions of the equipment, disinfection of the interior of the equipment.

Record this maintenance process.

#### c. Annual maintenance

Check the firm station of steel wire ropes on the front window.

Check LED lamp tubes.

Conduct a thorough inspection of equipment's performance for the safety of it. The maintenance fee is paid by the user.



#### Caution

**a.** The power supply should be disconnected before performing routine maintenance;

b. Since the statistics of operating time will directly affect the judgment of maintenance needs, we suggest that a detailed record of operating time should be prepared for reference and inquiry when using this equipment;
c. The fan must be inspected and maintained on a regular basis.

**d.** Surface cleaning: In order to keep the cabinet clean, please clean it regularly (at least once a week is recommended), wipe it with a soft cloth soaked with flexible cleaner and then wrung out and wiped. Please do not spray any chemicals on the operation panel or other labels to prevent discoloration of the label film or unclear writing. Clean the outer surface of the cabinet and the glass with a flexible cleaner or a special cleaner for glass.

### **Chapter 5 Handling of Common Problems**

When there are doubts, suspicion of equipment failure in the process of use, you can first refer to the following content to troubleshoot.

Before diagnosing the problem, please make sure that the power supply is connected, the power cord is not obviously broken, the fuse is good, and the power lock is in the open state.

Fault	Position	Judgement basis	Solution	
	The equipment is equipped with an interlock program, when the UV lamp is turned on, it is normal to not be able to turn on the lighting, so make sure that the UV lamp is turned off.			
LED lamp light is not light up	Lamp tube	Check that the lamp tube is damage or not.	If it broken, replace lamp tube.	
or abnormal	Circuit	Check that the circuit is well connect or not.	If not, rewiring.	
	Control board	Excluding other damage possibilities.	Replace control board.	
	The equipment is equipped with an interlock program, when the glass door is opene the fan and the LED lamp is turned on, it is normal to not be able to turn on the UV lamp make sure that the glass door, the fan and the UV lamp are turned off.			
	Lamp holder	Check whether the lamp and the lamp holder are firmly connected.	If it broken, replace the lamp holder.	
UV lamp does not light up or	Lamp tube	Check that the lamp tube is damage or not.	If it broken, replace the lamp tube.	
abnormal	Ballast	Check that the ballast is damage or not.	If it broken, replace the lamp tube.	
	Circuit	Check that the circuit is well connect or not.	If not, rewiring.	
	Control board	Excluding other damage possibilities.	Replace the control board.	
	The equipment is equipped with an interlock program, when the UV lamp is turn is normal to not be able to turn on the fan, so make sure that the UV lamp is turne			
Fan is not work	Fan	Check that the fan is damage or not.	If broken, replace the fan.	
	Circuit	Check that the circuit is well connect or not.	If not, rewiring.	
Touch screen control is not sensitive	Circuit	Check that the circuit is well connect or not.	If not, rewiring.	
	Touch screen	Excluding other damage possibilities.	Replace the control board.	
Splash-proof socket is not	Fuse of splash- proof socket	Check that the fuse is intact or not.	If broken, replace the fuse.	

energized	Splash-proof	Check that the splash-proof socket	If damage, replace the splash-proof
	socket	is damage or not.	socket.
	Circuit	Check that the circuit is well connect or not.	If not, rewiring.
	Control board	Excluding other damage possibilities.	Replace control board.
The equipment	Power supply	Check that the power supply is well connect or not.	Reconnect the power supply.
	Power cord	Check that the power cord has obvious damage or not.	If it has, replace the power cord.
	Fuse	Whether fuse is good.	If damage, replace the fuse.
	Transformer	Whether transformer output is normal or not.	If not, replace the transformer.
	Control board	Excluding other damage possibilities.	Replace control board.



#### **Caution:**

**a.** The operation of the above electrical components must be carried out by a qualified electrician under safe conditions (cut off the power). And other parts are not allowed to disassemble, otherwise the consequences are borne by the user.

**b.** If there is other failure that is not in above list, or the operator can not immediately exclude, please immediately notify our company's

maintenance department. Please do not repair the equipment yourself for the sake of your safety.

**c.** The maintenance of this equipment should only be undertaken by trained and approved technicians.

**d.** If you need to order parts, you can inform our technical service department, and indicate us the model and number of the Laminar Flow Cabinet you have purchased please.

### **Chapter 6 Simple Parts Replacement**

Operation of all electrical components of the equipment must be carried out by a qualified electrician under safe conditions. When the equipment has malfunction and the operator can not immediately troubleshoot, please notify the maintenance personnel immediately. Please do not repair the equipment by yourself for your safety.

If you need to order parts, you can find our technical service department, inform us of the model and number of the Laminar Flow Cabinet you have purchased.

#### 6.1 Replace the Fuse

Socket fuse  $[\Phi 5*20(5A)]$  is located on the right side of Laminar Flow Cabinet. When you replace it, first turn off the power and unplug it, use a cross screwdriver to press and screw the fuse seat counterclockwise, take off the fuse in the fuse seat and replace it with a new fuse of same specification, then press and screw the fuse seat clockwise to replace it; fire line fuse  $[\Phi 5*20(10A)]$  is also located in the cabinet. The fuse  $[\Phi 5*20(10A)]$  is also located on the right side of the cabinet, use a screwdriver to remove the fuse and replace the fuse with a new one, then press it back.



Figure 11 Fuse replacement diagram

#### 6.2 Replace the UV Lamp

The product is equipped with life of UV lamp for a cumulative working time of 600 hours. We recommend that you regularly test the UV intensity in order to achieve good disinfection effect. You can use the UV intensity test card to confirm whether you need to replace the UV lamp or not. When replacing, first disconnect the power supply, then remove the lamp by screwing it 90°, take out a new UV lamp of same specification, put it on the lamp holder and screw 90° in the opposite direction.



Figure 12 UV lamp replacement diagram

### 6.3 Replace the LED Lamp

When LED lamp of the Laminar Flow Cabinet needs to be replaced, please disconnect the power supply. Then tilt the LED integrated bracket to remove, unplug the right side, replace the new LED bracket and then tilt the card into the slot.





Caution

(1) It is forbidden to wipe the lamp body with a wet cloth while cleaning in the powered state.

(2) Prohibit the replacement in the powered state.

### **Chapter 7 Caution**

### 7.1 Storage Conditions

The Laminar Flow Cabinet should be stored in the warehouse with relative humidity not more than 75%, temperature less than 40°C, good ventilation, no acid, alkali and other corrosive gases. The storage cycle should not exceed one year. If it stored for more than one year, the open-package inspection is needed and only passed the inspection can it enter the circulation field.

### 7.2 Transportation Conditions

The Laminar Flow Cabinet should be transported in full accordance with the requirements shown on the outer surface of the packing area. The user should check the integrity of the packing area carefully when receiving the Laminar Flow Cabinet with packing area sent by the logistics company. If the packing area has damage, extrusion and other phenomena, please refuse to sign, and contact with our company in time.



Caution

Please contact with us in time when the Laminar Flow Cabinet that has been installed and used is relocated and moved again.

### 7.3 Caution

(1) Before connecting the AC power supply, you need to ensure that the voltage of the power supply is consistent with input voltage and it is stable, and ensure that the rated load of the power socket is not less than the requirements. The Laminar Flow Cabinet adopts grounding plug, which has the third leg that could only match with grounding type power socket, so it is a safety equipment. If the plug can not be inserted into the socket, you should ask an electrician to install a grounding type power socket. Be sure to confirm good grounding when using.

(2) During the using process of the equipment, do not put soft, fine items (for example: soft tissue paper) on the countertop, avoid sucking them into the negative pressure duct and fan by the inlet, which can affect the operation of the equipment.

(3) The maximum weight of items placed in the cabinet should not exceed  $23 \text{kg}/25 \times 25 \text{cm}^2$ .

(4) Avoid vibration: Avoid the use of vibrating equipments (such as centrifuges, vortex oscillators, etc.) in the cabinet, because vibration will make the particulate matter accumulated on the filter membrane shake off, resulting in the reduction of cleanliness inside the operating area. At the same time, if there is former operating surface balance failure, it will also cause Laminar Flow Cabinet contaminate to the operator.

(5) Open flame is prohibited: The use of open flame is prohibited in the Laminar Flow Cabinet. The use of open flame will lead to flocculation of airflow in the operating area, and will damage the filter. During the process of experiments that requiring high temperature sterilization, it is highly recommended to use infrared sterilizer.

(6) ULPA has service life. With the extension of the use period, dust and bacteria

accumulation in the filter will lead to the increase of pressure loss of ULPA. When the increase of the velocity can not meet the requirements, you must promptly contact our service department to replace the ULPA, otherwise it will affect the safety of the equipment. Replaced filter should be disposed according to the medical waste.

(7) The fan and its lower side steel plate is the static pressure area cover, these air ducts are strictly sealed when leave factory and needed to maintain their tightness. The operator should not loosen or remove the screws of these parts. If there is a special need, it must be handled by our service personnel.

(8) The storage period of the equipment is one year. When it exceed the storage period, it must be opened and inspected once by the company's technical personnel, only qualified can it be used.



#### Caution

Solemnly declare: If the equipment is not used in accordance with the methods prescribed by the company, it may damage the protection provided by the equipment, and the company should not be responsible for the risks caused by the operation that not in accordance with the provisions!

## **Chapter 8 Label Description**

F10AL250V	10A Fuse Label
Tubular Fuse For Socket F5AL250V	5A Tubular Fuse for Socket Label
Tublar Fuse For Blower F10AL250V	10A Tubular Fuse for Blower Label
	Grounding Label
	Over-height Warning Label for Front Window
Please keep away from the front window if the glass door has problem	Warning Film for Front Window
Curion Net (V lang-weeking energiet	UV Lamp Warning Label
Maximum power 500W Please use electric appliance with good grounding.	Load Requirement Label
filter upstream	Filter Upstream Label

### **Chapter 9 Warranty Commitment**

**9.1** The warranty period of the purchased product and maintenance contents are subject to the sales contract.

**9.2** In the warranty period of the equipment, if the user improper use caused by failure or damage, the company does not assume warranty obligations.

**9.3** Out of the warranty period, the company is also responsible for maintenance, but charged the corresponding maintenance fees.

9.4 Equipment use period is 8 years, production date see product label.

**9.5** The company trains and approves the maintenance unit and maintenance personnel to provide drawings and some necessary technical data of the equipment.





The specifications of power cord and the connection power cord should meet the relevant standards.