

# ***OPERATING AND MAINTENANCE MANUAL***

## ***SafeFAST Classic A***



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## 1 GENERAL

Vertical laminar airflow benches with partial exhaust and protection barrier, the SafeFAST Classic cabinets, are designed to protect both the material to be manipulated from contamination and to protect the operator and the environment from microbial contamination hazards.

The dusted, filtered and sterile air passing through the main HEPA filter ensures optimum airflow laminarity on the work surface, thanks to its even perforation and the frontal air barrier. The system is designed to create a protective barrier and prevent exchanges between the internal, potentially biologically contaminated air, and the outside.

SafeFAST Classic cabinets are Class II Biohazard cabinets, according to the definitions now adopted by all the main international standards (example: EN 12469:2000). Suitable for the treatment of class CDC-2/3, DHSS-B2/B1 micro-organisms, group 1, 2, 3 decree no. 626 "Safety in the work environments" and wherever a product-personnel-environment cross-protection is required.

Especially suitable for applications such as:

- Manipulation of eziologic agents having a known pathogenicity on humans and animals.
- Presence of high concentrations of biologic materials.
- Presence of agents likely to cause genetic alterations or synergetic activities with other materials.
- Oncogenic viruses.
- Do not manipulate the products on the slotted part at the entry of the chamber, but in the middle of the work surface.

The performances of the cabinets are detailed in the TESTING CERTIFICATE below, in compliance with the requirements of:

- EN 12469: 2000

Furthermore SafeFAST Classic cabinets fulfil the armonized standards EN 61010-1 as well as EN 61326 according to the applicable European directives regarding the CE marking.

SafeFAST Classic cabinets comply with the above-mentioned standards ONLY if the instruments connected to the electrical socket positioned inside the work chamber are "CE" marked or in any case it meets the above mentioned standards aiming to avoid any electromagnetic interference.

All FASTER's cabinets are provided with high insertion loss filters.

Faster's cabinets can be supplied:

with supporting table. For stability reasons the instructions in the present manual must be followed, in particular please see paragraph 4B. (SYSTEM and PERFORMANCES CONTROLS) and paragraph 5 (LIMITATIONS).-

without supporting table. In that case the customer must put the cabinet on a table or a supporting surface suitable to assure its stability in all operating conditions, complying with all safety regulations presently in force.

**Faster s.r.l. cannot be held responsible for malfunctions, damage to people or property due to non-compliance, poor or no maintenance, or improper use of the cabinet.**

## 2 INSTALLATION

### 2.A INSTRUCTIONS AND CHECKS ON DELIVERY

Considering the critical nature of the use of the SafeFAST Classic cabinet and the need to keep it in optimum condition, installation is very important.

SafeFAST Classic Biohazard cabinets are positioned on a pallet, wrapped in an extensible film and contained in a package of multi-layer strapped cardboard.

After placing the cabinet in its site of use, opened the package and removed the extensible film, check that the equipment has not suffered any dents or scratches due to transport or improper handling of the package.

In case of any further transport, packing and storage by the user after the initial period of use (e.g.: change of laboratory or factory), contact the technical assistance service or the distributor for more accurate and precise instructions or for assistance by specialized technicians.

SafeFAST Classic Biohazard cabinets, with or without package, should be always located in a room sheltered from rain.

### 2.B INSTALLATION REQUIREMENTS

Install the cabinet away from drafts and heat sources (radiators, ventilators/convectors), to ensure proper functioning. For instance, in a small room ( $<30 \text{ m}^3$ ), if an exhaust duct is used to expel air outside the building, we recommend the installation of a grill in the room in order to provide an air supply equal at least to the quantity entering the front of the cabinet to create the protective barrier.

Install the cabinet in a well-ventilated room with a low degree of dust.

Place the cabinet away from doors and windows, which may cause malfunctions

Place the cabinet in places where there is little human traffic.

The door of the room should be in such a position relative to the cabinet as to prevent drafts.

Min. temperature            5 °C

Max. temperature:        40 °C

Max. humidity:            80% at 31°C, linear drop in relative humidity down to 50% relative humidity at 40°C.

Before connecting the cabinet to the mains power supply, check the necessary voltage and power indicated on the plate near the power cable. The room must be equipped with an earth connection and connections to the gas and/or vacuum networks, and an air exhaust duct must be installed outside the building.

The cabinet can be canalized only with remote motor-fan and thought thimble connection (optional). Alternatively it is possible the connection with the conditioning plant, but the air must not be recycled.

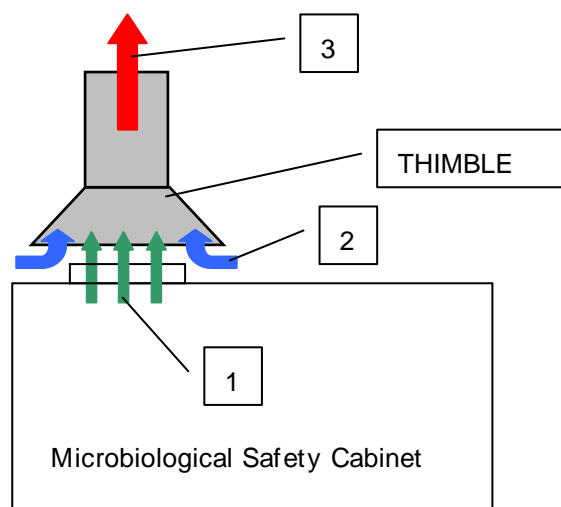
The exhaust system should be installed on the roof or on a wall or through a window. Otherwise, it can be connected to a chimney.

The distance between the cabinet and the exhaust system (if present) should be as short as possible.

### Thimble method example

#### LEGENDA:

1. Exhaust air from the cabinet.
2. Air from the environment.
3. Bleed Air (100÷200 m<sup>3</sup>/h more than the exhaust air flow rate from the cabinet) to a dedicated exhaust fan (in the electronic board a voltage free contact is available –see electrical diagram- to check when ventilation is ON).



For the connection to the gas and/or vacuum networks, read carefully chapter 2C.

The quantity of heat generated by the cabinet, if the air is not extracted outside the room, is the following for the eight models respectively:

SafeFAST Classic A 209	175 kcal/h
SafeFAST Classic A 212	240 kcal/h
SafeFAST Classic A 218	360 kcal/h

This heat value must be added to the heat generated by any instrument (eg. connected to internal socket or tap) used by the client in the work chamber.

**ATTENTION:** the installation must be done by technicians authorized by Faster S.r.l. or by the official distributor.

## 2.C ELECTRIC/GAS CONNECTIONS AND INSTALLATION OF THE WORK SURFACE

The electrical connection of the SafeFAST Classic A Biohazard cabinet is made by connecting the power cable located on the upper of the right side of the cabinet to a suitable power point (see technical table). When the cabinet is connected, the green light on the control panel switches on (see chapter 4E).

If stipulated by local legislation, insert upstream of the power line an automatic protection overload switch provided with a differential relay, with a rated switching amperage no greater than 30 mA.

Fluid taps are optional and may be installed in the holes on the right and left side glasses.

If an optional fuel gas tap has been ordered, a safety solenoid valve is supplied in the gas tap kit. The special plug of the solenoid valve must be connected to the proper socket.

For safety reasons the cabinet must be connected by qualified staff to the town gas mains through an approved conduit.

For the installation of the work surface, proceed as follows:

- remove the protective paper from the work surface leant against the back of the cabinet, taking care not to scratch its surface,
- clean the work surface with a damp cloth soaked in alcohol or soapy water or with a commonly available product designed for stainless steel,
- open the safety front window,
- place the work surface into the work chamber, let the back to slide on the chamber's supporting bases up to its back wall,
- close the safety front window.

## 2.D POSITIONING OF THE CABINET ON THE SUPPORTING TABLE

SafeFAST Classic A Microbiological Safety Cabinets can be supplied with the relevant supporting table, which they have to be fixed to.

After assembling the supporting table (see instructions at para. 15) put the supporting table on a flat not sloping floor and be sure that all the parts of the cabinet, that can be opened (control board panel and sash) are locked. Then position the cabinet on the table (See instructions at para. 16).



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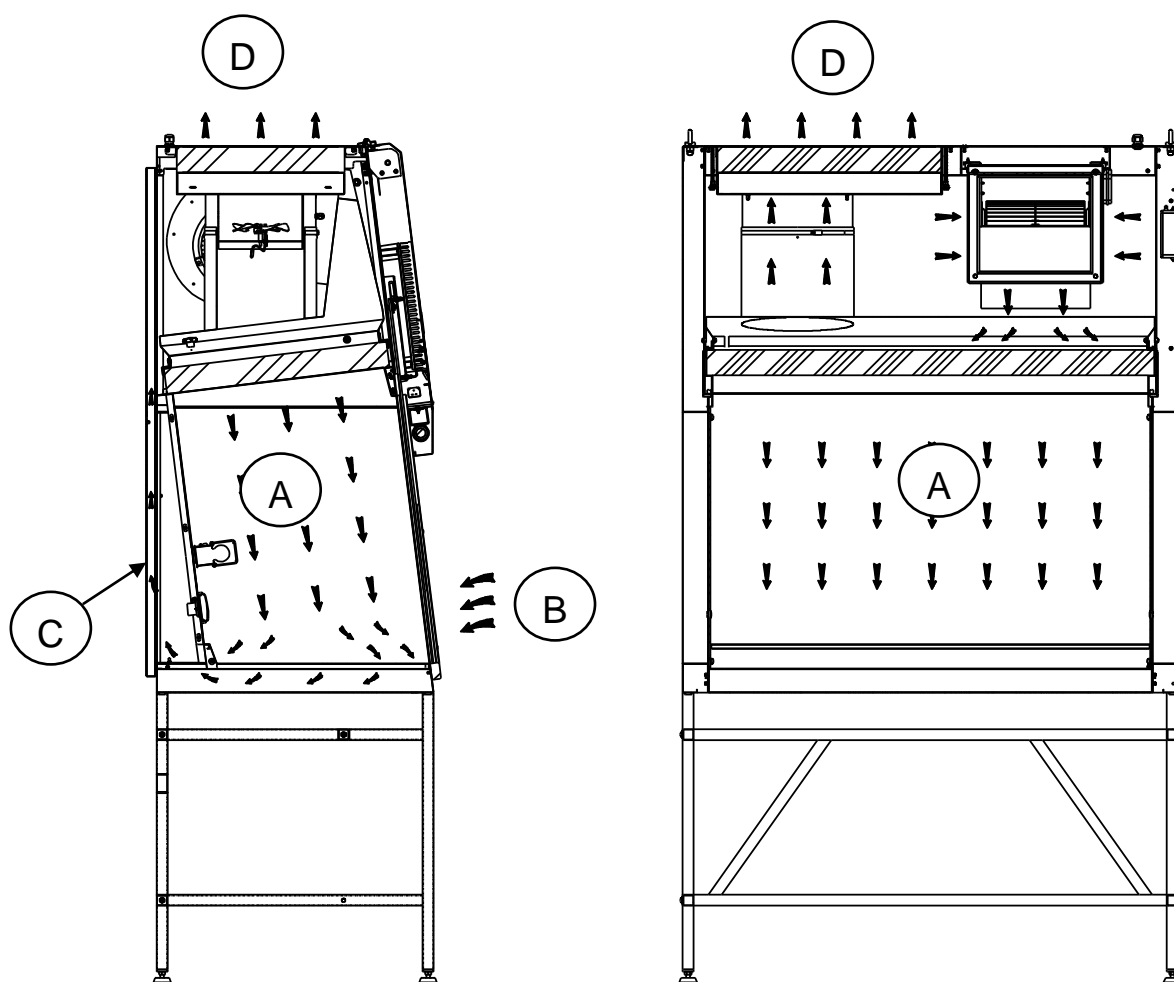
## Technical Features Table

Description	Unit	SafeFAST Classic A 209	SafeFAST Classic A 212	SafeFAST Classic A 218
Overall Dimensions (L x H x P)	mm	1045x1500x800	1350x1500x800	1960x1500x800
Usefull dimensions (L x H x P)	mm	887x740x580	1192x740x580	1802x740x580
Maximum front aperture	mm	440	440	440
Working aperture	mm	200	200	200
Weigh	Kg	155	175	240
Noise level	dB (A)	<53	<54	<56
Lighting level	Lux	>1000	>1000	>1000
Nitrogen, CO <sub>2</sub> , compressed air - maximum pressure	bar	4	4	4
Fuel gas- maximum pressure	mbar	20	20	20
Main voltage	V	230V AC 2P+T	230V AC 2P+T	230V AC 2P+T
Frequency	Hz	50	50	50
Power	W	900	1140	1460
Current	A	5,4	6,7	8,4
Electrical class		1	1	1
Protection level		IP20	IP20	IP20
Internal outlet (maximum current for all the sockets: 4A)		2P+T 230V 4A	2P+T 230V 4A	2P+T 230V 4A
Fluorescent lamps	W	1x30	1x36	1x58

### 3 OPERATION PRINCIPLES

The following are the working principles of the SafeFAST Classic A Biohazard cabinets.

The pressurized air pushed into the plenum of the main motor-fan passes through the absolute filter and then downwards, in a laminar flow, into the working chamber.(A). From here, through the perforated surface, having mixed with the external air (B) which enters the cabinet from the front opening, it is sucked into the intake up channel situated at the rear of the work chamber (C). Part of the air is exhausted (D) through the exhaust HEPA filter. This extracted air let air come in from the outside (front barrier) ensuring the protection of the operator/environment from hazardous material manipulated in the work area.





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## 4 OPERATION

### 4.A SCOPE

The vertical laminar airflow biosafety cabinet SafeFAST Classic A is manufactured in compliance with international standards for the protection of the material, the operator and the environment against biological hazards of Class II and is suitable for the manipulation of low- and middle- risk pathogenic agents (CDC-2/3, DHSS- B2/B1, NSF-1/2/3, D.L no. 626 group 1,2,3).

### 4.B SYSTEM AND PERFORMANCES CONTROLS

The SafeFAST Classic A cabinet are provided with an automatic regulation system to keep the airflow speed in the work chamber and the recycling air/extracted air constant even with the progressive clogging of the two HEPA filters up to the maximum pressure supported by the motor-fan.

The soft-touch control panel is microprocessor-controlled with a display showing all relevant data with regard to the operating functions, the different alarms and the error messages.

The perforated work surface creates optimal airflow laminarity at working level, while the front longitudinal slots create a protective air- barrier.

The vertically sliding safety glass sash is electrically operated. When the cabinet is running the work opening must be 200mm; any moving of the glass activates an audible and visual alarm, which cannot be silenced according to the EN 12469 standard.

When the cabinet is off the glass can be either opened up to the maximum opening or closed completely.

The front sash window can be closed and opened by pressing alternatively one of the two keys "arrow-up and arrow-down" [3-5] (see paragraph 4D)

**When the cabinet is on, any change of the work aperture invalidates the efficiency of the air barrier protecting the operator.**

Furthermore a safety device is installed, which stops the motor-fan automatically when the cabinet is on and the electrically operated sash window is completely closed.

To optimize the visibility inside the work chamber, the cabinet is ergonomically angled sloping-fronted (abt. 7 degrees sloping as to the vertical)

### 4.C REMOTE SIGNALS (OPTIONAL)

The electronic control board can be improved adding the following optional features:

#### **Ventilation status (ON/OFF)**

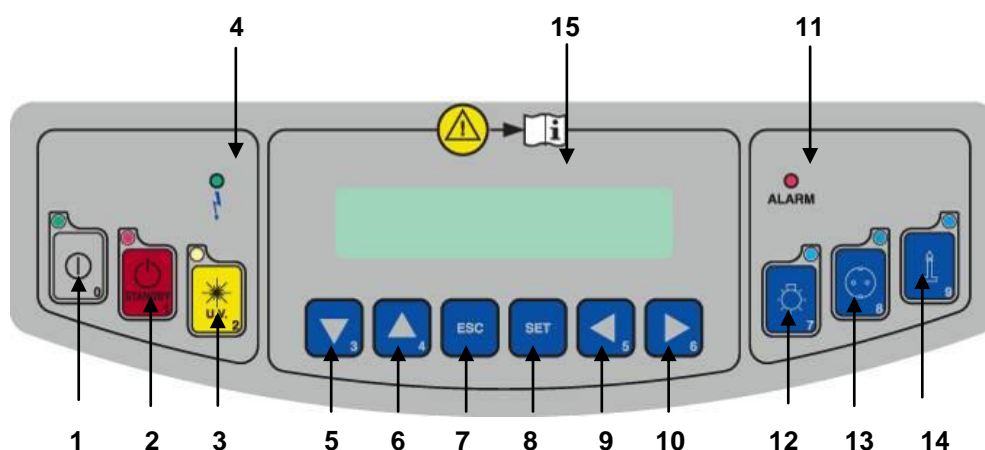
It is possible to obtain a 12 Vdc output to connect a led light or alternatively a Normally Open voltage free contact to be connected to an external circuit.

The signal starts when ventilation is turned ON and stops when ventilation is OFF.

## 4.D SYMBOLS OF CONTROL BOARD

List and description of all the symbols and controls of the control board :

List and description of all the symbols and controls of the control panel:



1

Position "0"

### MAIN SWITCH:

in the "0" position, the green light of the mains voltage is on (4); the LCD displays the model name. In this position the operator can activate only the fluorescent light (12), the U.V. lamp (3) and the power outlet (13) (with plug installed) and can activate the data stored in the microprocessor by pressing the "Right Arrows" key (9-10).

Position "I"

Press key "I" [1], insert the password using the small numbers in the right lower corner of the keys and press SET. Default password is 5 [9] – 4 [6]. When the password is typed in the green led of the switch lights up and the cabinet starts operating, the motor-blower is powered and first "CHECK PANEL" then "STAND-BY" appears on the display till the air flow reaches the pre-set value. In addition, an audible alarm will sound intermittently during this stand-by period, alerting the operator not to start working yet. When the audible alarm stops and the message "STAND-BY" disappears from the display, the cabinet is ready for use. The air velocity is displayed.

**NOTE:** In any case, it is advisable to wait 20-30 minutes before starting work.



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- 2 STAND BY (speed reduction)** By pushing the corresponding red key the password (the same to start the ventilation) is requested. Once confirmed the password the function is enabled. When it is enabled, the corresponding red LED lights up and, for single fan cabinets, the air speed is about 30% lower than their nominal speeds. The light and the gas electrovalve cannot be switched on. If they are on, they switch off automatically. If the PCB for the automatic regulation is installed following two messages appear alternatively:

**>>>ATTENTION<<<**

**DANGER**

and:

**REDUCED AIRFLOW**

**>>>DO NOT WORK<<<**

The "SPEED REDUCTION" function can be enabled only with the main switch in position "I". Only the power supply (13) can be operated.

**3 U.V. (optional)**

Yellow key to switch on UV. This supplies the U.V. lamp in "manual" mode; when enabled, the display shows "U.V. on". The U.V. lamp switches on only if the cabinet is off, the lighting of the cabinet is off and the front window is completely closed.

By pushing the relevant key you are requested to set the U.V working time. The timer resolution is 1 minute and the maximum time is 180 minutes (3 hours). The display will show the latest pre-set value, which can be changed using the "arrow" keys; when the time has been set, press the "SET" key to confirm. At this point the yellow LED lights up, the U.V. lamp is activated and the countdown starts. During the cycle the following message appears:

**U.V. TIMER**

**U.V. Timer (min) xxxx**

**4 LINE**

The green mains light switches on if the unit is connected to the mains and the line is live

**5-6UP/DOWN ARROWS**

Use the arrow keys to scroll the menu, to program changing parameters and to put in the password. Two passwords are programmed:

1) to start the cabinet and to enter the operator menu

2) to enter the main menu to change the data input (allowed only to authorized technical staff – service – because unsuitable interventions can cause troubles and incorrect operation of the cabinet. If installed with the up/down arrows it is possible move the sash window



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## 7 ESC

ESC key deletes the operation of data input and goes back to the starting condition.

When an alarm condition occurs, which is shown also by the message appearing on the LCD. By pushing "ESC" the alarm stops sounding. If the cause of the alarm is not resolved after 2 minutes the buzzer starts to sound again.

## 8 SET

SET key lets you enter the different functions or confirm the data input going back to the upper level.

## 9-10 LEFT/RIGHT ARROWS

Use the arrow keys to scroll the menu: if pressed the following data will appear on the display:

**U.V. Lamp Residual Lifetime:** Shows the operating time of the U.V.lamp pre-set by the user with the appropriate keys. The LCD will display (for example) "U.V. TIME=XXXX h". When such time is over, the message "U.V. LIFETIME OVER" will appear on the line below.

**1, 2, 3 Residual lifetime of filters :** it is the operation time of the filters installed in the cabinet that can be programmed by the user.

The LCD will display (for example) "RES. TIME FILTER 1=XXXX:XX h:min". When such time is over, the message "CHECK FILTER (i.e.) 1". will appear on the line below.

The filters installed in the cabinet follow the numbering listed below

TYPE of FILTER	NUMBER
MAIN HEPA	1
EXHAUST HEPA	2
ACTIVE CARBON	3

**LAF Power:** it is shown indirectly by the power supply voltage of the motor, expressed as percentage of max. load voltage displayed also in proportion by a bar.

The display shows the notice(es.): "MOT.LAF = XX % " (max.100%).

**Operating Time:** Shows the operating time of the cabinet from the moment when the main switch is positioned on "I"

The LCD will display (for example) "WORK TIME=XXXXXh". This value cannot be reset.

## 11 ALARM

When an alarm occurs the red LED lights up.

## 12 LIGHT

This switches on the fluorescent light; when enabled, the display shows "Light on". Switching on the fluorescent light automatically the U.V. lamp switches off.



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**13 SOCKET**

This supplies voltage; when enabled, if the PCB for the automatic regulation is installed the display shows "POWER ON". The global current for all the sockets installed on the cabinet is 4 Amps.

**14 GAS (optional)**

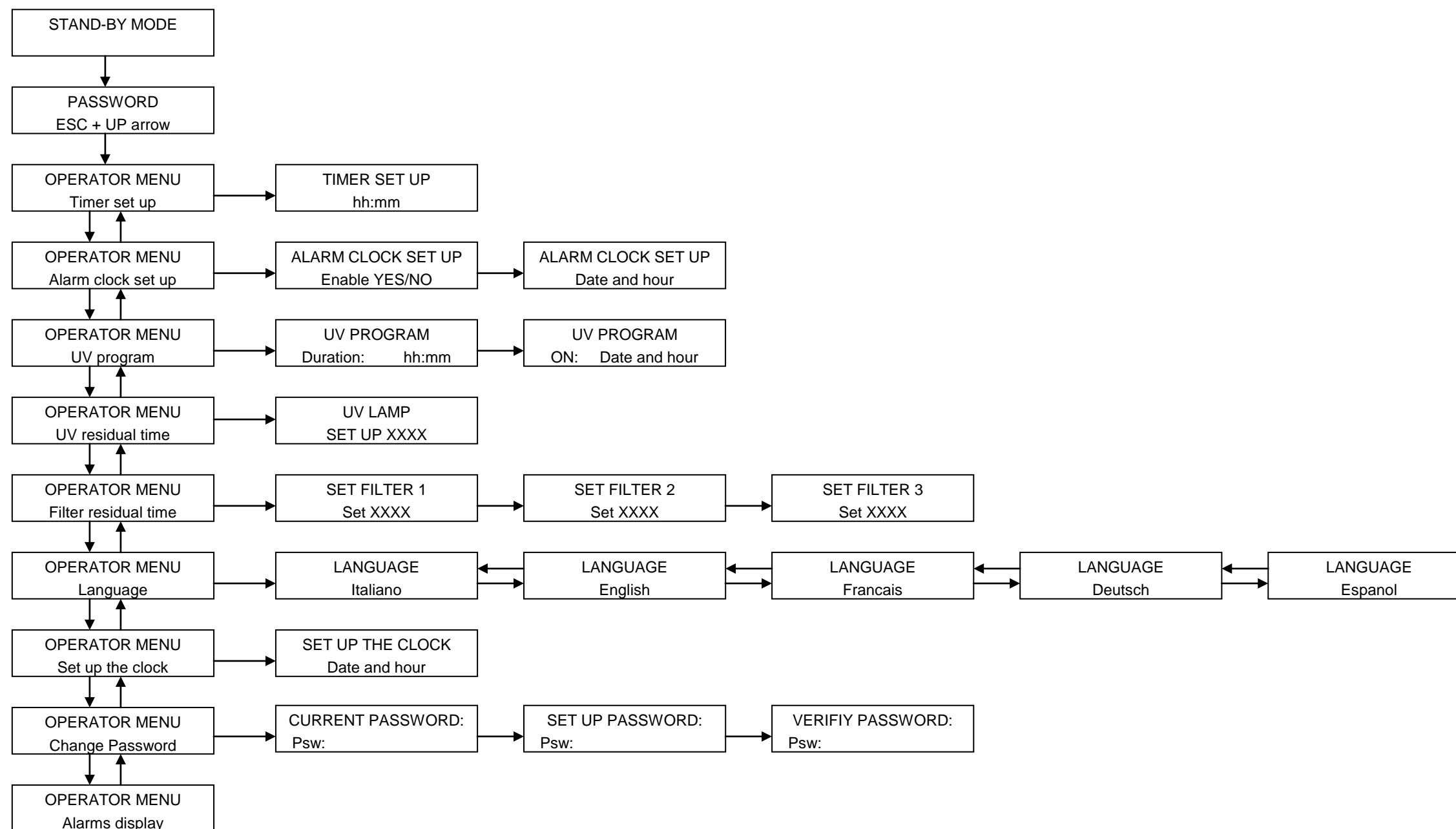
This activates the control for opening/closing the gas electrovalve; when enabled, if the PCB for the automatic regulation is installed the display shows "GAS ON". It operates only when the ventilation is running to prevent possible over-heating and risks of damaging the HEPA filter.

**15 DISPLAY**

Rearlight liquid crystal "LCD" display composed of 2 lines of 20 characters each showing the operating parameters and alarms.

#### 4.E OPERATOR MENU (OPTIONAL)

It's possible enter the operator menu, with the cabinet in stand-by mode and when the cabinet is switched on, by pressing at the same time the keys "ESC" (7) and "ARROW UP" (6).  
Entering the operator menu while the ventilation is running it's possible to set only the "ALARM CLOCK" and the "TIMER".





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#### **U.V. LAMP RESIDUAL LIFETIME:**

- use "UP/DOWN arrow" keys [5/6] to choice the desired menu
- select "U.V. LAMP RESIDUAL LIFETIME." and press "SET" [10] key; the display will show:

**U.V. LAMP RESIDUAL LIFETIME**  
**set XXXX**

- where XXXX shows the number of the hours set for lifetime of the U.V. lamp.
- Use the "up and down arrow" keys to adjust the hours parameter
- Then press the "SET" key [8] to confirm the data and/or go back to previous menu
- To conclude programming, press ESC" [7] key.

#### **FILTERS RESIDUAL LIFETIME:**

- use "UP/DOWN arrow" keys [5/6] to choice the desired menu
- select "FILTERS RESIDUAL LIFETIME." and press "SET" [8] key; the display will show:

**FILTER 1 RESIDUAL LIFETIME**  
**set XXXX**

where XXXX shows the number of the hours set for lifetime of the FILTER 1

- Use the "up and down arrow" keys to adjust the hours parameter
- Then press the "SET" key [8] to confirm the data and pass to filter 2 and so on up to filter 5 (as for relation between number and type of filter see table par. 4C)
- To conclude programming, press ESC" [7] key.

#### **LANGUAGE SELECTION**

- use "UP/DOWN arrow" keys [5/6] to choice the desired menu
- select "LANGUAGE" and press the "SET" key and the following message will be shown on the display:

**LANGUAGE**  
**English**

- With the "up and down arrow" keys select the desired language (Italian, English, French, German, Spanish).
- Press the "SET" key to confirm and exit the "LANGUAGE" menu.
- press "ESC" [7] key to go out.



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## SET UP THE CLOCK

- use "UP/DOWN arrow" keys [5/6] to choice the desired menu
- select "SET UP THE CLOCK." and press "SET" [8] key; the display will show:

### SET UP THE CLOCK

set XXXX

- Use the "left and right arrow" keys to select the desired parameter and set it using the "up and down arrow" keys
- Then press the "SET" key to confirm the data and/or go back to previous menu
- To conclude programming, press ESC" [7] key.

## PASSWORD CHANGE

- use "UP/DOWN arrow" keys [5/6] to choice the desired menu
- select "PASSWORD CHANGE" and press "SET" [8] key; the display will show:

CURRENT

PSW:

- digit the present Password then press "SET" key

SET UP PASSWORD

PSW:

- digit the new Password then press "SET" key

VERIFY PASSWORD

PSW:

- digit the password again and then press "SET" key to confirm the data and/or go back to previous menu
- To conclude programming, press ESC" [7] key.

## DISPLAY OF HISTORICAL FILES

- use "UP/DOWN arrow" keys [5/6] to choice the desired menu
- select "ALARMS DISPLAY " and press "SET" [8] key;
- use "UP/DOWN arrow" keys to scroll through the list of the possible troubles happened . The list is in chronological order and contains up to 64 voices
- To conclude programming, press ESC" [7] key.



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## **ALARM CLOCK**

- use "UP/DOWN arrow" keys [5/6] to choice the desired menu
- select "ALARM CLOCK" and press "SET" [8] key; the display will show:

### **Alarm clock set up**

#### **Set up XXXX**

- Use the "left and right arrow" keys to select the desired parameter and set it using the "up and down arrow" keys
- Then press the "SET" key to confirm the data and/or go back to previous menu
- Press "ESC" to abort the procedure
- When the set time is reached the buzzer start to ring and the display show this message

### **ALARM CLOCK**

#### **ALARM**

- Press the "ESC" key to silence the acoustic signal

## **TIMER SET UP**

- use "UP/DOWN arrow" keys [5/6] to choice the desired menu
- select "TIMER SET UP" and press "SET" [8] key; the display will show:

### **Timer set up**

#### **Set up XXXX**

- Use the "left and right arrow" keys to select the desired parameter and set it using the "up and down arrow" keys
- Then press the "SET" key to confirm the data and/or go back to previous menu
- Press "ESC" to abort the procedure
- At the end of the countdown the buzzer start to ring and the display will show this message:

### **TIMER**

#### **ALARM**

- Press the "ESC" key to silence the acoustic signal



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## **UV TIMER**

- use "UP/DOWN arrow" keys [5/6] to choice the desired menu
- select "UV TIMER" and press "SET" [8] key; the display will show:

### **UV TIMER**

**Duration XXXX**

- Use the "left and right arrow" keys to select the desired parameter and set it using the "up and down arrow" keys
- Then press the "SET" key to confirm the data
- The display shows:


### **UV TIMER**

**DATE XXXX**

- Use the "left and right arrow" keys to select the desired parameter and set it using the "up and down arrow" keys
- Then press the "SET" key to confirm the data and/or go back to previous menu

## 4.F DISPOSAL OF WASTES AND CONTAMINATED MATERIALS

### DISPOSAL OF ELECTRIC AND ELETTRONIC DEVICES (AEE)

	<p><b>INFORMATION FOR EUROPEAN UNION USER</b></p> <p>This symbol on the device means that when it needs to be disposed, it must be handled separately from urban waste.</p> <p>At the moment of the disposal, contact the dealer, to receive information about the collect and disposal in accordance with the laws in force in the country.</p>
<p>Appropriate disposal of this product will help to prevent potential negative effects on health and environment and to promotes re-use and / or recycling of materials of the equipment.</p> <p>The improper disposal of the product by holder involves the application of sanctions in accordance with the regulations in their own country.</p>	
<p><b>INFORMATION FOR USERS OUTSIDE THE EUROPEAN UNION</b></p> <p>This symbol is valid only in the European Union If you want to dispose this product, contact your local authorities or dealer and ask for the correct method of disposal.</p>	

**ATTENTION:** Before disposal, the cabinet where contaminants and pathogens have been manipulated, must be sterilized

The fluids of pathogenic material removed from the work surface and the liquid collection tank located under the table as well as from the HEPA absolute filters replaced during maintenance work are biologically toxic and harmful and must be submitted to special treatment. For more detailed information on such treatment, see the standards and regulations in force on the treatment and disposal of biologically toxic/harmful wastes.

All other materials, which the cabinet is made, are recyclable but cannot be disposed as local waste materials.

#### MATERIALS, WHICH THE CABINET IS MADE OF

PARTS OF THE CABINET	MATERIALS
External structure	Epoxy powder coated steel
Inside work chamber	AISI 304 stainless steel
Work surface	AISI 304 stainless steel
Motor-fans	Galvanized steel
Filters	Frame: aluminium alloy Filtration bed: glass fibre Protection grid: epoxy powder coated aluminium Gasket: polyurethane
Keyboard	Touch sensitive keyboard on the front panel
Glasses	Safety soda-calcic silicate sheet
Gaskets	EPDM
Wirings	Wires according to Rohs regulations, flame-proof cases in PVC
Cablepress	Body/nut in polyamide, inside part in EPDM

#### 4.G ERGONOMICS

This Microbiological safety cabinet has been designed and manufactured according to the general directions on the ergonomics provided for by the EN ISO 14738 standard.

Furthermore all maintenance operations are assured to be carried out in safety by merely following the instructions given in this manual at chapter 7.



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## 5 LIMITATIONS

### PRECAUTIONS for the correct use of the cabinet

Listed below are the most important guidelines to be followed and the main substances to be avoided to ensure the correct use of the SafeFAST Classic A cabinet:

NEVER USE chlorine-based substances (e.g. sodium hypochlorite) as they are corrosive for the metal structure of the cabinet, and in particular for stainless steel parts.

When the nature of the work carried out under the cabinet changes completely or following an accidental spilling of pathogenic material, STOP working and start again only after having cleaned and sterilized the cabinet,

DO NOT use ethanol as a sterilizing substance if a heat source is used under the cabinet,

DO NOT use cosmetic powders, nail polish, hairspray or cosmetics in general during work,

DO NOT eat, drink or smoke in the work zone,

AVOID substances that release explosive vapours.

In addition, when working with the cabinet, AVOID:

- the introduction of extraneous material
- the introduction of paper or cloth that might clog the holes of the work surface
- working in the part of the work surface near the front opening of the cabinet (longitudinally slotted zone)
- putting the hands or any object between the absolute filter and the sterile material
- working under the cabinet if the airflow has not yet been activated, i.e. when the display "STAND-BY" appears, indicating that the motor-fans are not yet on. After the cabinet is switched on, and if the work requires special sterile conditions, chemical sterilization of the work chamber must be carried out using a cloth soaked in bactericide. Then wait for 20-30 minutes for the bactericide to take effect.
- using in the work zone large-size bunsen burners, as the flame might damage the absolute filter located in the upper part of the working area
- manipulating pathogenic material not included in the categories indicated for Biohazard cabinets Class II according to EN-12469.

Before opening the front window be sure that the inside of the cabinet has been properly decontaminated; in fact this part can be potentially dangerous for the operator's hands as well as for the laboratory air, which comes directly into contact with, after opening the front window.

**ATTENTION: the U.V. radiations emitted by the germicidal U.V. lamp can cause erythemas and conjunctivitis. Avoid exposure of skin and eyes to direct radiation**



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## 6 OPERATING PROCEDURES

### 6.A PRELIMINARY CHECKS

Before carrying out any type of work, the following conditions should be verified:

- that the cabinet power cable is connected to a power point at a suitable voltage and frequency as per instructions shown on the label stuck near the electric cable
- that all alarm lights are off
- that the work area inside the cabinet is free from materials used during the previous session.
- that the cabinet has been sterilized in case of change in the nature of work to be carried out

### 6.B SWITCHING ON the SafeFAST Classic A cabinet

To start the cabinet, proceed as indicated below:

1. turn on the light by pushing the blue button [10] (If the UV lamp [2] is on, it switches off)
2. be sure that the sash window is in the work standard position (see para. 4B.)
3. press the main key I/O [1] (see chapter 4C.) and enter the password to switch on the cabinet. At first the display shows "CHECK PANEL" and the corresponding control leds of the keyboard light up. Then the message "STAND-BY" is displayed for about 40 seconds and the hour-counter starts operating
4. after 40 seconds of stand-by, the cabinet is ready for work. "STAND-BY" disappears from the screen and the LAF velocity are displayed
5. wait for 20-30 minutes before starting work
6. during this period of time, introduce into the internal work zone of the cabinet only the materials which are indispensable for the job at hand.

All movements made under the laminar air-flow cabinet should be parallel to the work surface, taking care to work in the middle of the table to avoid upstream contamination (for instance, when taking a sample from a bottle, hold the bottle gently but firmly with one hand, keeping it slightly inclined, and work with the other hand, so that the air that comes into contact with the hand does not directly contact the inside, but rather the outside of the bottle).

### 6.C SWITCHING OFF THE SafeFAST Classic A CABINET

**ATTENTION: Be careful that materials in the work area can be contaminated with pathogenic material. Behave accordingly.**

At the end of the work session, proceed as follows:

1. remove the material from the internal work chamber \*
2. clean the work surface and the inside walls of the chamber, as indicated in the "Cleaning Instructions" section (chapter 7A)
3. Let the laminar air-flow cabinet run for 20-30 minutes after the work is over (if no UV lamp is installed)
4. turn off the light by pushing the blue key [12]
5. press "I/O" [1] key switch and enter the password for switching off the cabinet (5 – 4 then press "SET").
6. slide the sash window completely down
7. In alternative to above point 6, if necessary, apply UV lamp (optional) on the back wall of the work chamber, plug it into the internal socket installed on the right-hand side of the work chamber, slide the sash window completely down and switch on the germicide lamp by pushing the "U.V." yellow key [3].



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## 7 MAINTENANCE

### 7.A INSTRUCTIONS FOR DAILY CLEANING OF BIOSAFETY CABINETS (by users)

Clean the outside of the SafeFAST Classic A cabinet, made of varnished iron-carbon sheet steel, using a damp cloth soaked in soapy water or some other commonly available products for varnished metal surfaces.

#### PROCEDURE:

- switch off the cabinet and disconnect the feeding cable;
- clean carefully all the varnished surfaces using a damp and squeezed cloth with soapy water or equivalent product.
- wipe all the surfaces using a soft cloth absolutely not abrasive.
- Clean/sterilize the internal work chamber with a bactericidal agent chosen according to the type of pathogenic micro-organism manipulated (e.g. hydrogen peroxide, ethyl alcohol, ethanol, phenolic compositions, aldehydes, quaternary ammonium salts, etc.).
- protect your hands wearing gloves if required by the bactericidal agent you are using
- spray the bactericidal agent on the side walls, the back wall and the work surface in a such uniform way to avoid leaving not sprinkled zones.
- do not spray the filtering upper zone to avoid damaging this part
- wipe carefully all the sprinkled zones using clean blotting paper. Be sure to remove any residual of the bactericidal agent.

If pathogenic material has been spilled during the work session, sterilize the work surface, then remove it using the small handles mounted on the sides. Sterilize the spilled materials contained in the collection basin located under the table and remove all spilled material by means of absorbent paper.

For thorough cleaning we suggest the use of a 70% ethanol solution or a solution of other bacteriostatic agents.

<b>WARNING:</b> <b>Never use solutions containing free chlorine (for instance, sodium hypochlorite), which cause corrosion to steel and stainless steel, resulting in irreparable damage to the cabinet structure.</b>
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## 7.B CLEANING OF GLASS

for the internal cleaning of the glass proceed as follows (see also para 14A) :

move the glass up in the position of maximum opening by pushing the proper button

to have complete access to the back of the sash window open the control board [1] turning the screws [2] with the proper key

clean the back of the sash window with suitable detergents

close the control board panel [1] and move completely down the sash window.

to have complete access to the front of the sash window open the control board panel [1]

clean the front of the sash window with suitable detergents

close the control board panel [1] closing the relevant screws [2].

**ATTENTION :** the inside of the sash window can be contaminated. It is operator's responsibility to decide if the sterilization is necessary before cleaning.

## 7.C INSTRUCTIONS FOR THE FUMIGATION/STERILIZATION OF BIOLOGIC SAFETY CABINETS

### **Procedure:**

For gas disinfection, formaldehyde is evaporated in the tightly sealed sample chamber. The quantity of the formaldehyde used depends on the sample chamber volume of the cabinet version to be disinfected (see Technical Data).

Per cubic meter of sample chamber volume, at least 5 g formaldehyde must be evaporated with 20 ml water (corresponds with 25 ml of a 20 % formaldehyde solution). The formaldehyde evaporates immediately when its boiling point is reached. The required reaction time is at least 6 hours.

After the required reaction time, the formaldehyde should be neutralized by evaporating a 25 % ammonium solution (10 ml per cubic meter of sample chamber volume).

### **Ambient conditions and accessories:**

The temperature at the cabinet location should be approx 21° C, the relative humidity should be between 60 and 85 %. To evaporate the solution, a heating device with a container is required.

### **NOTE – Disinfection procedure!**

**A disinfection with formaldehyde must be performed in accordance with the specifications of NSF 49/1992, Annex G. As this procedure has considerable risks, it must only be performed by specially trained and authorized service personnel!**



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If you use a FASTER formalin vaporizer follow this procedure:

1. after filling the two containers of the vaporizer according to the above-said instructions, the vaporizer can be connected to the power point inside the cabinet.
2. set the timer at 6 hours.
3. cover the cabinet completely with a polyethylene sheet which is to be carefully sealed at the bottom with adhesive tape (see enclosed picture 1); also the feeding cable of the cabinet must be sealed as shown in the enclosed picture 2.
4. start the sterilization cycle by pressing SET and STATUS key together, digit the password (3 times arrow up + ENTER). All the functions of the cabinet are deactivated except the power point. Now the fans start working for 30 secs. at intervals of 15 min. for totally 8 hours.  
  
CYCLE: abt. 1 hour of formaldehyde evaporation, 6 hours (time set with the timer) of fumigation process, 1 hour of reagent evaporation. Total time : 8 hours.
5. when the sterilization cycle is over, the message "END STERILIZATION" is displayed
6. to go out of the programme press SET and STATUS key together, digit the password (3 times arrow up + ENTER)
7. At this point, after wearing protective gloves, protective mask and clothing the polyethylene sheet can be removed and must be submitted to special waste disposal according to possible local regulations.
8. Aerate profusely the room in order to evacuate completely the residual gas and smell.

This fumigation operation is to be considered as a suggestion.



Picture 1



Picture 2.



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#### Post-fumigation cleaning

Having performed fumigation, the manipulation of the filters is safe: however, this manipulation should be carried out by technicians wearing protective gloves and clothing.

Before using the cabinet again any possible remains of the foregoing procedure of vaporization and relevant neutralization (which can show, for example, as white dust) must be removed from the work chamber.

**ATTENTION:** for cabinets that are not connected to the outside, but recycling the air in the environment, make sure that ambient concentration does not exceed  $2.5\text{mg/m}^3$ , as higher concentrations are harmful.

Faster S.r.l. refuses all responsibility for the performance of such sterilization procedures or of any possible consequences deriving from it, reminding that the full responsibility for the operation lies only and exclusively with the properly trained operator-user.

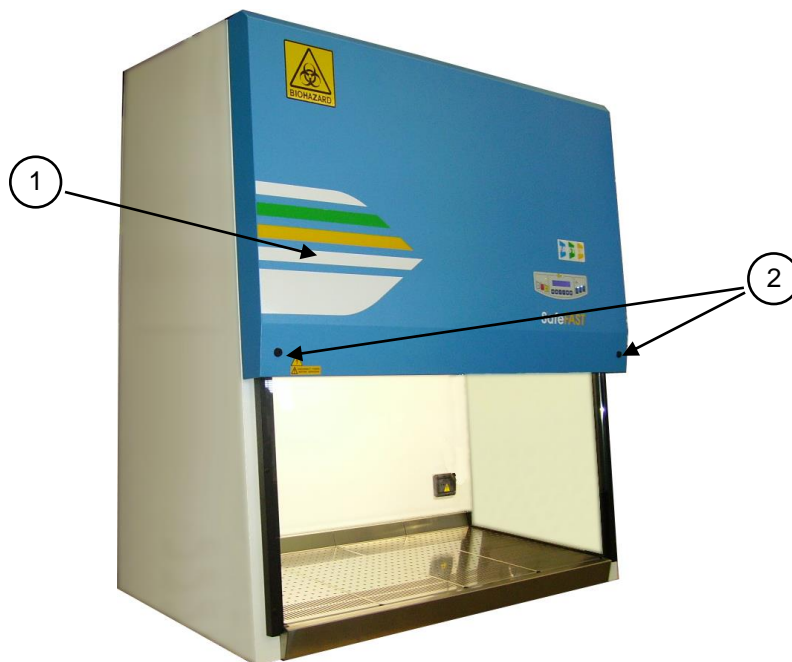
### 7.D REPLACEMENT OF HEPA FILTERS (by technical assistance personnel)

**ATTENTION:** before replacing HEPA filters, the cabinet must be decontaminated (see para. 7C.) and a sterilization certificate must be issued to the technicians before starting the operation. For the safety of the personnel and the environment, the use of relevant personal protection devices is recommended as well as the collection of the replaced HEPA filters in polyethylene bags.

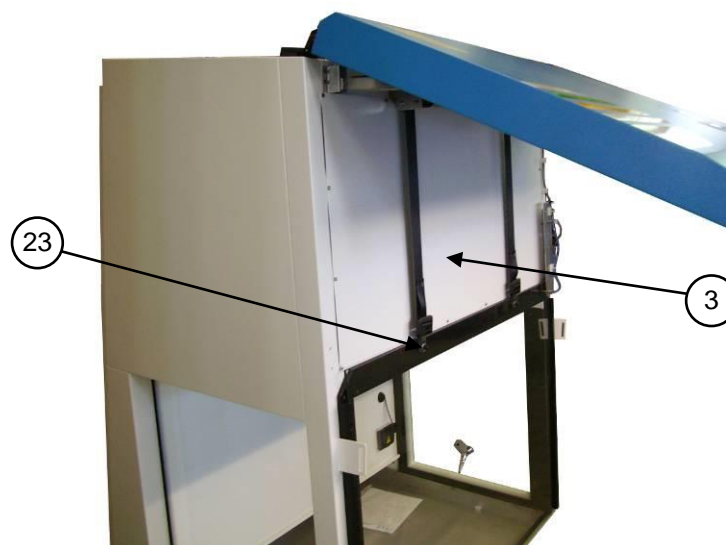
**Replacement of main/exhaust HEPA filter** (see para-13A. "Diagram for maintenance operations")

## LAF Filter

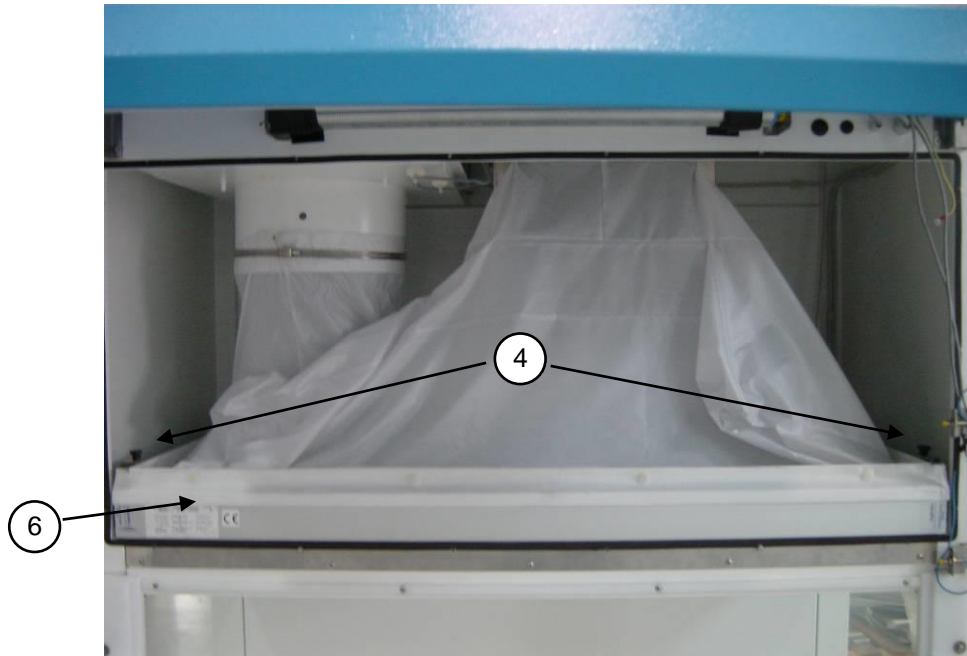
1. Open the front sash window completely by pressing the “arrow-up” button
2. Switch off the cabinet and disconnect it from the mains
3. Open the control board [1] turning the locks [2] with the proper key.



4. Unscrew the screws [23] that fasten the glass belts to the glass
5. Remove the internal panel [3] unscrewing the relevant fastening screws.



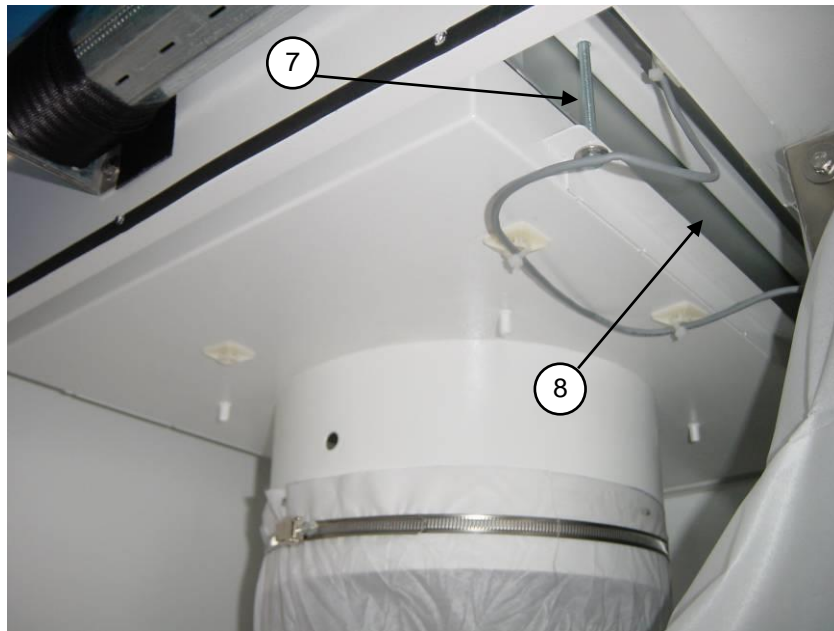
6. Rotate the threaded bars [4] to release the HEPA filter [6].



7. Remove the HEPA filter wearing PPD and put it in a hermetically sealed polythene bag.
8. Place the additional gasket (if it is not already present) on the filter shoulder frame opposite the shoulder gasket of filter (already present).
9. Install the new HEPA filter.
10. Lock the HEPA filter [6] by means of the threaded locking bars [4]

## Exhaust Filter

11. Rotate the fastening threaded bars [7] to lift down the plenum group [8] and to release the HEPA filter.



12. Proceed as indicated in above 6, 7 and 8 points.
13. Lock the HEPA filter by rotating the fastening threaded bars [7].
14. Re-close the internal panel [3] with the special fastening screws.
15. Re-close the control board [1] with care and lock it with the closures [2].
16. Proceed with the necessary control-calibration procedures of the laminar air-flow cabinet.

**ATTENTION:** Gaskets should be of the closed-cell type and have no interstices in the joining points. Gaskets of EPDM, neoprene, hypalon, etc. may be replaced by CAF-type non-adhesive silicone.

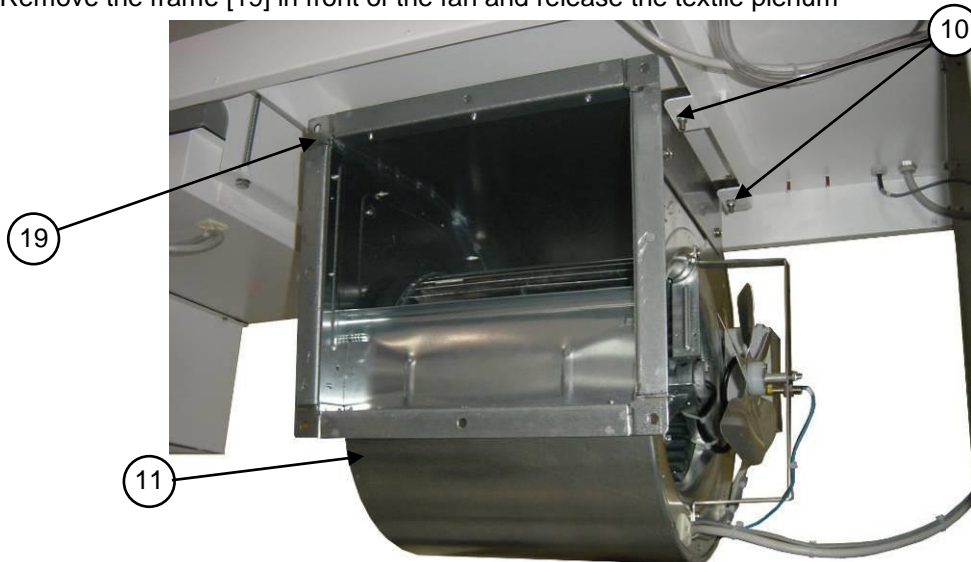
**ATTENTION:** the two main/exhaust HEPA filters should be replaced at the same time. Having replaced the filters, proceed with the calibration of the motor-fan speed. Carry out a check with a particle counter and possibly a D.O.P. test. For these operations, contact your local distributor.

## 7.E REPLACEMENT OF MOTOR-FANS (by technical assistance personnel)

**ATTENTION:** before replacing the motor-fans, the cabinet must be decontaminated and a sterilization certificate must be issued to the technicians before starting the operation (see par. 7D). For the safety of the personnel and the environment, the use of PVC gloves is recommended as well as the collection of the replaced materials in polyethylene bags.

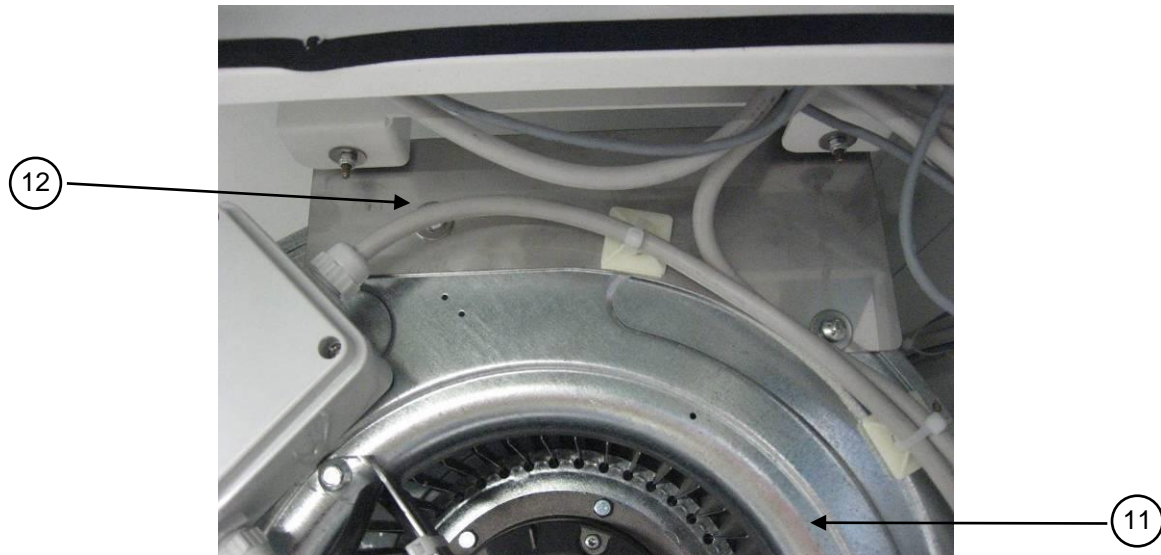
### Replacement of main motor-fan.

1. Proceed as indicated in sub-section "Replacement of HEPA filters", from 1 to 3 points.
2. Remove the frame [19] in front of the fan and release the textile plenum



3. Disconnect electrical connectors from terminal board in the plastic box.
4. Unscrew fastening screws [10] of the main motor-fan [11] and relevant stirrups

Remove the main motor-fan [11] including the side stirrup [12].



5. Position the new motor-fan after and the relevant stirrup.
6. Fasten the motor-fan with the relevant screws and reconnect electrical connectors.
7. Proceed as indicated in the sub section "Replacement of HEPA filters", from 13 to 15 points.

## **7.F REPLACEMENT OF FLUORESCENT LAMPS (by technical assistance personnel)**

Lift down completely the front sash window

Disconnect the mains power.

Open the front control panel [1] unscrewing the fastening locks [2],

Replace the lamps [16]

Close the front control panel [1] with the fastening locks [2].

## **7.G REPLACEMENT OF U.V. GERMICIDE LAMP (by technical assistance personnel)**

Disconnect the electrical connections of the lamps from the outlet. Remove the protection grid of the lamp and replace the germicide bulb. Fasten the protection grid and connect the electric connections again.

**IMPORTANT:** during the installation of the new U.V. lamp, pay attention not to leave fingerprints on the lamp which will block the UV effect.



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## 7.H SPARE PARTS LIST

CODE	DESCRIPTION	SafeFAST Classic A		
		209	212	218
V20 000004000	230V gas electro-valve	1	1	1
V20 000004010	Electro-valve connector	1	1	1
V20 000032020	AVE Plate IP-44	1	1	1
V20 000034000	UNEL socket	1	1	1
V20 000006030	30 W/84 fluorescent lamp	1	-	-
V20 000006040	36 W/84 fluorescent lamp	-	1	-
V20 000006050	58 W/84 fluorescent lamp	-	-	1
V20 000051300	1x30W lampholder	1	-	-
V20 000051360	1x36W lampholder	-	1	-
V20 000051380	1x58W lampholder	-	-	1
V20 000006900	Line Filter	1	1	1
V30 000000010	Shielded Proximity Namur AEG 8/2	2	2	2
V30 000000090	Proximity Namur AEG 8/2	1	1	1
V30 000005200	SafeFAST Classic A keyboard	1	1	1
V30 000008100	MicroP "CPULAF" card	1	1	1
V30 000008000	"PWLAF" power card	1	1	1
V30 000007200	Glass motor control board	1	1	1
V40 000007000	Front glass motor	1	1	1
V50 000001400	DDM 9/7, 300W C/F main motor-fan IP-55	1	-	-
V50 000000200	DDM 9/9, 300W C/F main motor-fan IP-55	-	1	-
V50 000000420	DDM 10/10, 550W C/F main motor-fan	-	-	1
V50 000000900	Exh. sensor fan diam. 154	1	1	1
V50 000100220	HEPA filter 457 x 457 x 69mm (exhaust)	1	-	-
V50 000100230	HEPA filter, 457 x 610 x 69mm (exhaust)	-	1	-
V50 000100250	HEPA filter, 457 x 915 x 69mm (exhaust)	-	-	1
V50 000090350	Main HEPA filter, 915 x 610 x 69mm	1	-	-
V50 000090360	Main HEPA filter, 1220 x 610 x 69mm	-	1	-
V50 000090380	Main HEPA filter, 1830 x 610 x 69mm	-	-	1
K60011430800	Left-hand side glass	1	1	1
K60011431400	Right-hand side glass	1	1	1
K60011130900	Frontal glass SafeFAST Classic A 209	1	-	-
K60011430900	Frontal glass SafeFAST Classic A 212	-	1	-
K60012030900	Frontal glass SafeFAST Classic A 218	-	-	1
V20 000006070	U.V. lamp 15W	1	1	-
V20 000006080	U.V. lamp 30W	-	-	1



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## 8 MONITORING SYSTEM

ALARM OR ERROR MESSAGE	DESCRIPTION
Airflow Alarm	Airflow speed in the work chamber under minimum threshold value
	Insufficient air suction from the front aperture, thus air speed in the exhaust channel under minimum threshold value
LAF Triac Failure	Too fast and uncontrollable main motor-fan (LAF)
No encoder input	No input signal from the fan anemometer
Max LAF Alarm	Airflow speed in the work chamber over maximum threshold value
Close front panel	The front window is not closed correctly
UV Lifetime over	Residual lifetime of the UV lamp expired
Sensors failures	Failure to one of the sensors. Press "MUTE" key and the correspondent sensor is displayed
BLACK-OUT	Warning of black-out when the cabinet is working Press "MUTE" to stop the alarm
HEPA Filters Check	Possible clogging of absolute (HEPA) filters
Position the window	The sash window is not in the correct position
F1 (2, 3) lifetime over	Filter 1 (2, 3,) residual lifetime is over
ATTENTION DANGER Reduced airflow. DO NOT WORK	Warning to pay attention when the speed reduction is activated (only for keyboards with "SPEED REDUCTION" key)

## 9 TROUBLESHOOTING - Probable causes of malfunctions

PROBLEM	CAUSE	REMEDY
Cabinet does not work	<ul style="list-style-type: none"> <li>– the electricity supply has been cut off at the mains</li> <li>– Electronic board out of order</li> <li>– Blown fuse(s)</li> </ul>	<ul style="list-style-type: none"> <li>– check the voltage input to the cabinet</li> <li>– Replace PCB</li> <li>– Replace fuses</li> </ul>
Alarm: “HEPA filters check”	HEPA filter clogged	Replace HEPA filter
Alarm: “Airflow alarm”	Exhaust duct clogged	Check the exhaust duct
	HEPA filters clogged	Replace HEPA filters.
	The main motor-fan does not work	Check the terminal voltage of the power card of the main motor-fan  Check F7 fuse on the power card  Replace the power card  Replace the microprocessor card
“Black-out ” Alarm <b>(probable exchange of air between the work chamber and the outside and possible contamination of the environment)</b>	Blackout	Check the feeding cable, the connection plug/socket, the power supply line  Press “ESC” [7] key to silence the alarm
Alarm “Sensors failure”	Failure of sensor XX	Replace XX sensor.
Alarm: “No encoder input”	No signal from flow sensor	Replace the sensor



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## 10 TRANSPORT, PACKING and STORAGE INSTRUCTIONS

**ATTENTION: Disconnect the power and sterilize the unit before performing any of the following operations**

The following instructions are essential if the end user needs to transport, pack or store a cabinet after a period of routine use (e.g. laboratory/plant relocation):

- Disconnect tubes for gas/vacuum
- If the cabinet exhausts to the outside of the building or is connected to the intake channel of the air treatment system, remove the connection tube from the cabinet to the outside or cabinet to the air treatment system. Be careful not to damage or cover with dust (or any other material) the exhaust filter of the cabinet
- Remove the work surface and cover it with a protective film
- Close the cabinet front opening

If the cabinet is to be moved from one laboratory to another within the same building:

- on a table with wheels: it is sufficient to put the cabinet on the table; do not place it on one side or on the back panel.
- by a forklift: put the cabinet on a pallet to ensure good stability and to protect the basin under the cabinet and the front window against damage in transit

Take care not to damage protruding parts (e.g.: gas/vacuum taps, exhaust duct) when passing through doors/windows

If the cabinet is to be kept temporarily unused at final destination, cover the cabinet itself with a protective film (pluriball or expansible film) taking care to protect also the exhaust filter, especially from dust

We recommend extreme caution in long-distance moving carried out by forwarding agents (e.g. change of address): we suggest that you use the original packaging supplied by the manufacturer with the cabinet.

Packaging characteristics:

Wooden pallets of the following dimensions:

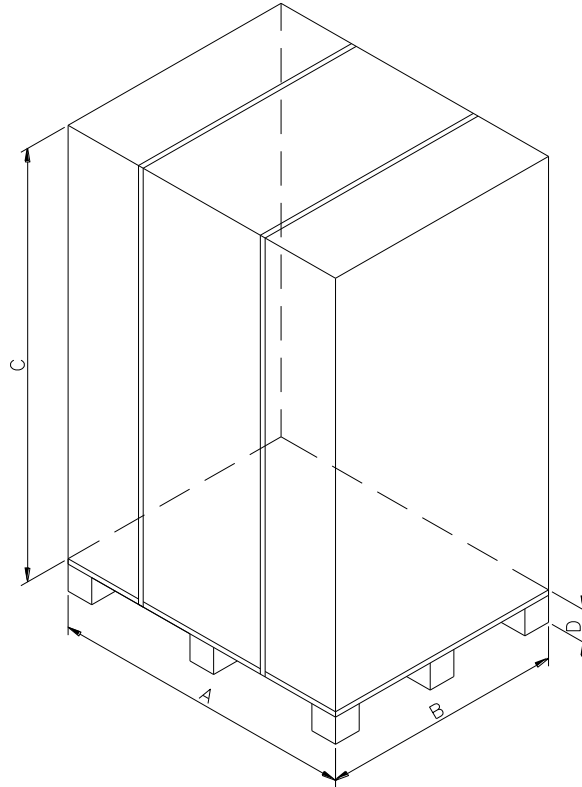
SafeFAST Classic A 209:	113 x 90 x 12 cm.
SafeFAST Classic A 212:	145 x 90 x 12 cm
SafeFAST Classic A 218	205 x 90 x 12 cm

Cardboard base to be laid on the pallet of the following dimensions:

SafeFAST Classic A 209:	110 x 87 x 1 cm. (sp.)
SafeFAST Classic A 212:	142 x 87 x 1 cm. (sp.)
SafeFAST Classic A 218:	202 x 87 x 1 cm. (sp.)

Pluriball to wrap and protect the cabinet from dust

Cardboard outer package of the following dimension:



<b>Cabinet model</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
SafeFAST Classic A 209	1130	900	1600	120
SafeFAST Classic A 212	1450	900	1600	120
SafeFAST Classic A 218	2050	900	1600	120

#### Steel straps and clips

During transport take care to maintain the package in a vertical position (i.e. the pallet at the bottom)

The cabinet (with or without the package) must be kept in a place with the following environmental conditions:

- Min. temperature: 0°C
- Max. temperature: 60°C
- Max. humidity: 95%



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## **11 ADDITIONAL INFORMATION**

### **11.A GUARANTEE**

The guarantee for SafeFAST Classic A Biohazard vertical laminar air-flow cabinets is 24 months from date of invoice.

In addition to those cases specifically indicated in Chapter 5 relating to improper use of the cabinet, the guarantee offered by Faster S.r.l., also excludes certain improper uses described in the instruction manual, of which the most important are listed again below :

installation in a place which does not conform to the manufacturer's recommendations

wrong power voltage

poor earthing

use of chlorine or its derivatives, incompatible with stainless steel, for cleaning the cabinet,

tampering or changes made by the client

tampering with the cabinet using any type of tool

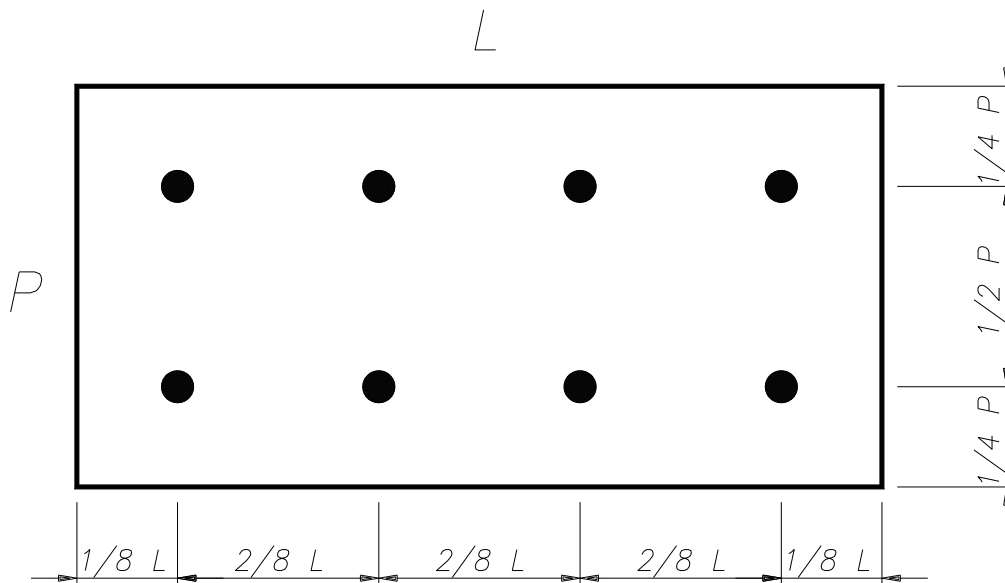
improper connection between the electrical outlet and the power cable, wrong connection between the gas cock or electro-valve and gas mains

### **11.B ADDRESS FOR TECHNICAL ASSISTANCE** (for the distributor)

## 12 TESTS PERFORMED ACCORDING TO EN 12469 STANDARD

### 12.A MEASUREMENT OF LAMINAR AIRFLOW VELOCITY

The LAF velocity is measured at 10 cm. over the bottom of the front window. The standard provides for the reading in at least 8 points:



In our tests the readings are taken in 12 points as above-diagrammed. Each one of the 12 readings lasts at least 1 minute. The velocity is measured with a hot-wire thermoanemometer with the following features:

<b>Measure-Range</b>	0÷2 m/s
<b>Precision</b> (of the device including the probe)	+/- 0.05 m/s +/- 5%
<b>Working temperature</b>	from – 20 to + 70°C.
<b>Resolution</b>	m/s

The average velocity is obtained by the following formula:

$$\text{Average velocity} = (V_1 + V_2 + \dots + V_n) / n$$

n = number of readings points

V<sub>1</sub>, V<sub>2</sub>,.....V<sub>n</sub> = velocities measured in the various points.

The average velocity must be within the range of 0,25 und 0,5 m/sec

Ensure that no single measurement differs from the average of all the measurements by +/- 20 %.



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## 12.B MEASUREMENT OF THE EXHAUST AIR VELOCITY

Measure the average velocity on the exhaust HEPA filter by means of an anemometer with the following features :

<b>Precision</b>	+/- 0.2 m/s +/- 5%
<b>Working temperature</b>	from - 20 to + 70°C.
<b>Resolution</b>	m/s

Being careful to set the device properly.

Report the reading of the average exhaust velocity (V) in the "Test Report" showing also the other data requested i.e. the section (in m<sup>2</sup>) of the exhaust duct (S1) and the section (in m<sup>2</sup>) of the working aperture of the cabinet (S2).

Now the air barrier velocity (VI) is given by the following formula:

$$VI = (V \times S_1) / S_2$$

Also this value must be reported in the "Test Report".

The air barrier velocity must be  $\geq 0.4$  m/s

## 12.C MEASUREMENT OF THE NOISE LEVEL

For a correct testing the background noise in the laboratory with the cabinet off should not exceed 55 dBA.

The microphone of the phonometer must be placed at 1 m from the centre of the working aperture of the cabinet between the glass and the work surface or 1m from any part of the cabinet.

The sound pressure level must not be over 65 dBA.

The measure taken must be reported in then "Test report".

## 12.D MEASUREMENT OF LIGHTING

Take the measure with a luxmeter placed inside the work chamber in the middle of the work surface.

Consider at least 4 readings points where the two side points should be 150mm away from the side walls and the middle points will be spaced max. 300mm apart, if possible. Then calculate the average value, which should be at least 750 lux.

Register the average value of the lighting in the "Test report".

## 12.E MEASUREMENT OF VIBRATION

Take the measures with a vibration analyser, which is to be placed as follows according to the models:

- SafeFAST Classic A 209 in the middle of the central section of the work surface
- SafeFAST Classic A 212 //218 : in the middle of the two central sections of the work surface

The test must be performed firstly when the cabinet is off and then when the cabinet is working.



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The difference of the taken values is the real datum of the cabinet vibration. This value should not exceed 0.005 mm RMS

Record the data in the "Test Report"

## **12.F CONTROL OF ALARMS**

### **ALARM FOR MISFUNCTIONING OF MAIN MOTOR-FAN (LAF)**

This alarm can be simulated by disconnecting the feeding cables of the main motor-fan. When the cabinet is switched on and the "stand-by" period is over, check that the red light of the relevant alarm and the visual and sound (buzzer) signals start.

### **ALARM FOR REDUCTION OF THE EXHAUST DUCT CAPACITY**

To verify this alarm, clog the exhaust duct gradually at the end of stand-by period and check that the red light of the relevant alarm and the visual and sound (buzzer) signals start. Furthermore check that when the clogged duct is cleared, the alarm stops.

### **ALARM FOR CHANGING THE STANDARD OPENING OF THE SASH WINDOW OF THE CABINET**

To verify this alarm it is enough you move the front sash window from its standard work position by pressing the relevant keys and check that the red light of the relevant alarm and the visual and sound (buzzer) signals start. Re-position the sash window in its standard work position and check that the alarm stops.

### **ALARM FOR REDUCTION OF LAMINAR AIRFLOW VELOCITY IN THE WORK CHAMBER**

During the normal working of the cabinet, cover the work surface almost completely with a PVC or cardboard sheet and check that the relevant red light switches on. When the correct operating conditions of the laminar airflow are restored, the alarm will stop.

### **OTHER ALARMS**

With the help of FASTER's technicians also the alarms for LAF and protection barrier velocity below the minimum threshold or over the maximum threshold can be checked



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## **12.G DEHS TEST FOR MAIN AND EXHAUST HEPA FILTER**

### **OBJECT AND PRINCIPLE OF THE TEST:**

Check of the integrity of the HEPA filters through an analysis of the filtering system, able to find out possible small leaks and/or defects altering the efficiency of the filters and at the same time to test leaks around gaskets.

The HEPA filter system fitted to the cabinet is tested for leakage by subjecting it to an aerosol on the upstream side and measuring passage of the aerosol to the downstream side

### **INSTRUMENTS TO BE USED FOR TESTING :**

1. Aerosol generator
2. Photometer

### **REAGENTS:**

Liquid aerosol agent composed of Emery 3004 or equivalent in concentration of 60 microg./l.

Suitable measures must be taken to prevent or reduce the operator's exposure to aerosol.

### **TEST PROCEDURE:**

The photometer must be used at a threshold sensitivity specific to the test aerosol of 0.0001 micro-g/l and capable of measuring aerosol concentrations up to about 80 micro-g./l.

The test must be performed as follows:

- Operate the cabinet with airflow velocity as per specs.
- Place the aerosol generator in such a way that the aerosol produced is immediately caught by the barrier airflow and then recycled into the intake channel
- Switch the generator on and adjust the photometer to give a reading of 100% when sampling this concentration
- Ensure that the threshold of reading sensitivity of the photometer is 0.0001 microg./l.
- Using a sampling probe attached to the photometer scan the main and exhaust filter faces, seals and construction joints, moving the sampling probe at not more than 30 mm/s
- Check the values read by the photometer constantly, in order to detect possible leakage.
- Acceptance criteria: downstream reading must be less or equal to 0.01%



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## 12.H INSTRUCTIONS FOR THE CLEANING TEST OF BIOLOGICAL SAFETY CABINETS

**ATTENTION:** Before carrying out the cleaning test wear the suitable rubber gloves to avoid direct contact with parts potentially contaminated.

The first step of the test is to pour some drops of milk inside the work chamber on several points included those more difficult because near the edges and corners.

Then the whole work chamber must be cleaned and brushed carefully, at first by using a lukewarm solution of water and soap (for the cleaning use a sponge and in the most critical points a brush) and then, after wiping the whole chamber, isopropyl alcohol.

The check that all contaminants have been removed can be performed by means of a microbiological test called IGIENTEST HACCP 100, which is able to find out the presence of residual proteins and sugar, or equivalent

### Method:

1. Add a drop of B Reagent (included in the test kit) in a test tube already containing A reagent
2. Shake the test tube gently: the solution will become green. Move the test tube into its support inside the kit
3. (N.B.: do not close the test tube with the thumb because the contact with the skin could distort the result. Use the cap)
4. Take a pad, being careful not to touch the end. The pad must be used only once: its re-use gives wrong results. If the surface to be tested is dry, add one or two drops of the hydrating solution included in the kit. Do not use water to wet the pad
5. Pressing firmly, rub the pad on the surface which is to be tested repeatedly. Do not touch the end of the pad in fibre in order not to distort the results
6. Move the pad into the test tube previously prepared. The pad must be well soaked in the solution. Wait 10 minutes for the reaction.
7. After about 10 minutes the reaction generates the colour, which is to be interpreted according to the following table:

Level 1	Level 2	Level 3	Level 4
Green colour	Grey colour	Violet colour	Dark Violet colour
0 micro-g proteins on the surface	100 micro-g proteins on the surface	300 micro-g proteins on the surface	1000 micro-g proteins on the surface
<b>Judgment</b>	<b>Judgment</b>	<b>Judgment</b>	<b>Judgment</b>
good	At the limit	unsatisfactory	unsatisfactory



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## 12.1 EVALUATION OF PROTECTION FACTORS

The test shown here below can be performed when installing the cabinet.

The operator protection factor (Apf) is defined as the ratio of exposure of airborne contamination generated on the open bench to the exposure resulting from the same dispersal within the cabinet under test.

The expression for the protection factor becomes:

$$(N \times V) / (10^4 \times n)$$

where:

N = number of particles liberated

n = the number recovered at a sampling rate of V (dm<sup>3</sup>/min)

The value of n is determined from an examination of the developed and dried filter membrane,

For a biological safety cabinet, which is to pass the containment test, the total number of spots of potassium iodide on the membrane can be easily counted by examining each filter with x 10 magnifier at disposal

The N value (number of generated spots of potassium iodide) is calculated by the expression

$$N = 3.1 \times 10^7 \times M$$

where

M = quantity of potassium iodide expressed in ml dispersed by the aerosol generator (20 ml)

This expression incorporates the constant derived from droplet size, flowrate and velocity of disk rotation.

The sampling flowrate V is 100 dm<sup>3</sup>/min when the vacuum on the air sampler is 8" of water column (200 mm of H<sub>2</sub>O)

Required tests: at least 5 consecutive tests must be performed, each of one must give a protection factor not less than 10<sup>5</sup> estimated for each sampling.

### BACKGROUND TEST

Before performing the test on Biological Safety cabinets make sure that the environment is not contaminated by Potassium iodide.

Proceed in performing the tests in the same way as in the measurement of the protection factor.

A count of more than 5 spots in one of the two membranes during a 10 min test should be regarded as unsatisfactory



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## **KI-DISCUSS – TEST PROCEDURE**

Pour 20 ml potassium iodide solvent into the mist generator.

Be careful that the needle valve is closed.

The suction fan is to be activated 30 seconds before the generator.

When the green light on the control panel is on (which shows that the disc runs at the correct speed) open the needle valve from 1/10 to 1/12 turn anticlockwise allowing then the solution to feed on to the centre of the spinning disc through the silicone rubber pipe and the hypodermic pipe.

The solution passing through the pipe as well as the mist generated by the spinning disc are visible.

The correct dimension of the particles is produced by the spinning disc when the quantity of potassium iodide flow varies from 1 to 2 ml/min. It is important to check this change of flow measuring the time taken to empty the container. This control ensures that the hypodermic pipe is not partially clogged.

When the test is over, a small quantity of solution usually remains in the hypodermic pipe, which is responsible for the clogging of the pipe when it is filled in again and the needle valve opened. For this reason it is advisable to squash the silicone pipe near the hypodermic pipe once or twice in order to clean it and allow a constant flow. The cycle during which the potassium iodide solution flows on the spinning disc should be over in abt. 15 min.

Turn the disc motor off but continue to run the fan for a further 5 min to recover any dispersed particle.

When the suction fan has completely stopped, incline the air samplers vertically, remove the cover of a sampler, unscrew the brass cone and remove the filter membrane.

Place the membrane in the petri dish containing the palladium chloride solution, with the surface that has been exposed to the airflow facing upwards.

Note the sampler from which the membrane was removed.

Within 30 s to 45 s the membrane will become saturated with palladium chloride and any potassium iodide particles will become visible as brown spots. Remove the membrane and immerse in distilled water for 3 s to 4s and then place it on a clean filter paper to dry.

The membrane must be kept in the suitable container waiting for the test.

Repeat this procedure with the filter membrane from the other air sampler. Replace cover over the petri dish.

Be careful that the tweezers used for placing the membrane in the palladium chloride solution are not used for loading the air samplers.



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## EXAMINATION OF THE FILTER MEMBRANES

Examine each filter membrane with x 10 magnifier and count the number of brown spots on the filter membrane

If the number exceeds 50/100 it will be necessary to use a graticule with the magnifier and to count the spots within a square or a convenient circle and to use an appropriate multiplication factor as per following table:

<b>GRATICULE CIRCLE (diameter)</b>	<b>Y FACTOR</b>
2,5 mm	77
2,0 mm	121
1,0 mm	483
0,9 mm	597
0,8 mm	756
0,7 mm	988
0,5 mm	1.935

## SQUARE ON THE GRATICULE

1 cm <sup>2</sup>	3,8
Quadrato più piccolo	1.520

These factors take into account the percentage of the total surface of the membrane area on which the particles can deposit.

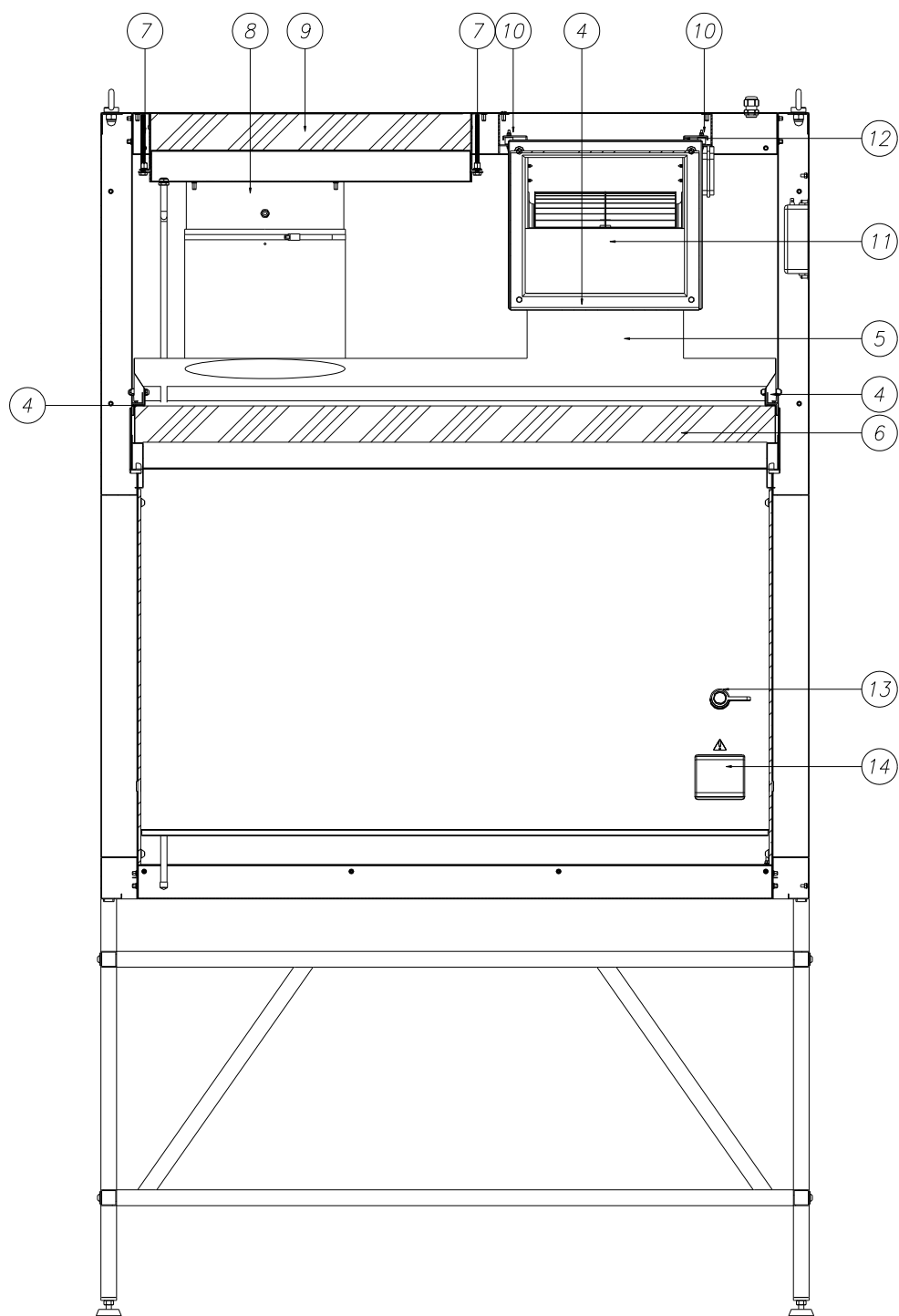


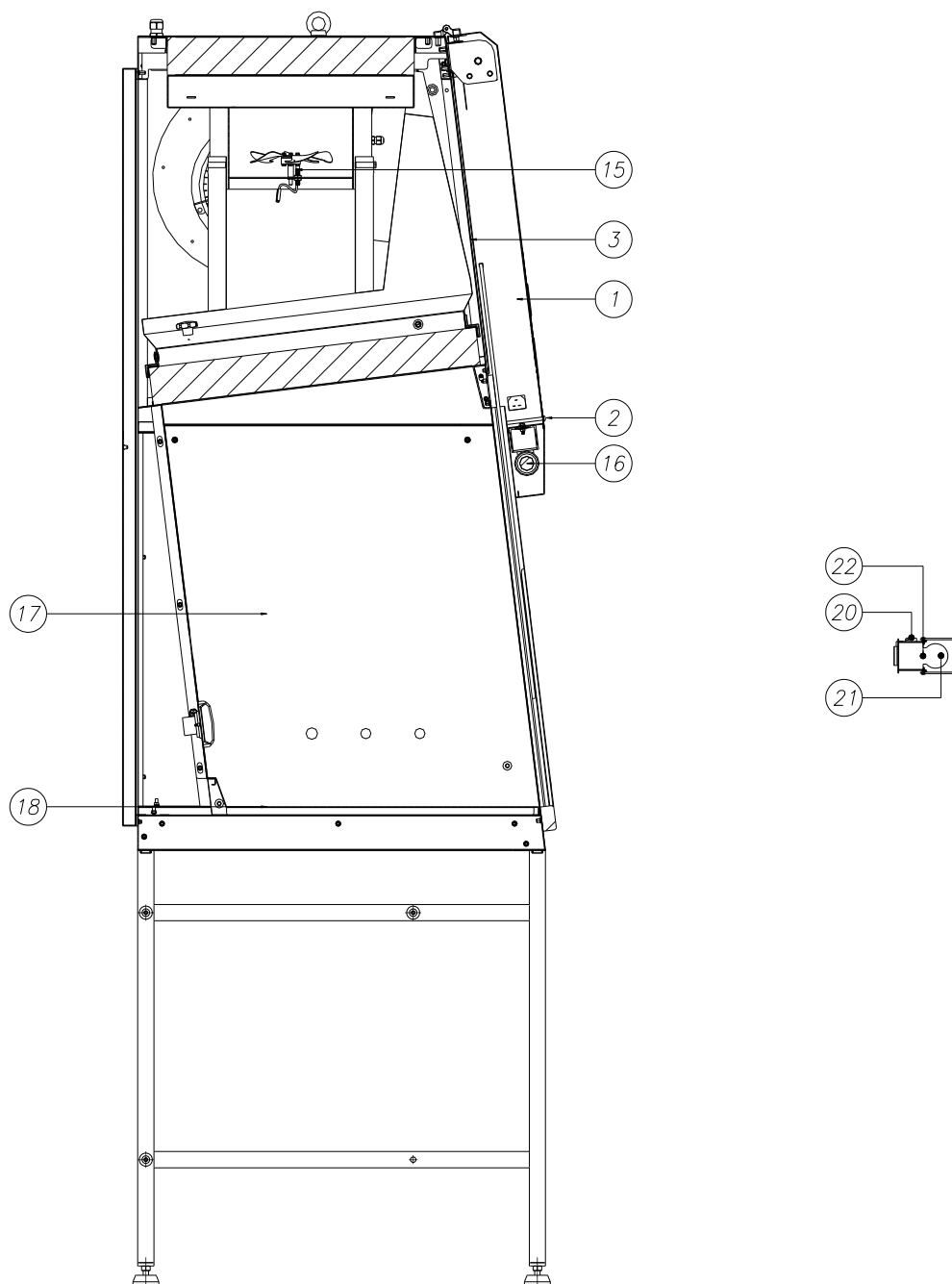
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## 13 DRAWINGS AND DIAGRAMS

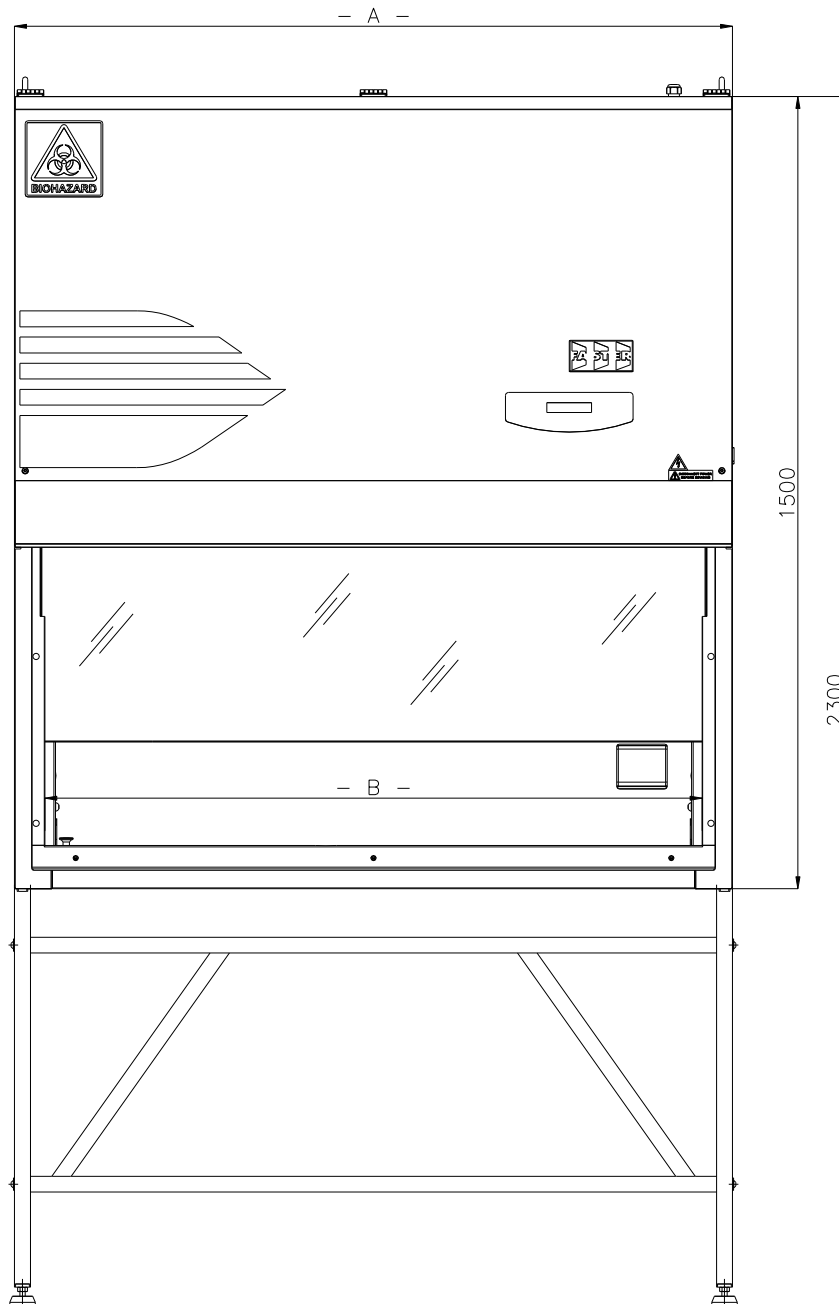
LEGENDA	
Ref.	DESCRIPTION
1	Control board panel
2	Control panel locks
3	Internal panel
4	LAF plenum tie-rod
5	LAF plenum
6	Main HEPA filter
7	Threaded bars
8	EXHAUST plenum
9	EXHAUST HEPA filter
10	Screws fixing Main motor-fan
11	Main motor-fan
12	Stirrup main motor fan
13	UV lamp socket
14	UV lamp socket
15	Main anemometer fan
16	Lamps
17	Work chamber
18	Work surface
19	Frame
20	UV lamp carter
21	UV lamp
22	UV lamp holder

### 13.A DIAGRAM FOR MAINTENANCE OPERATIONS



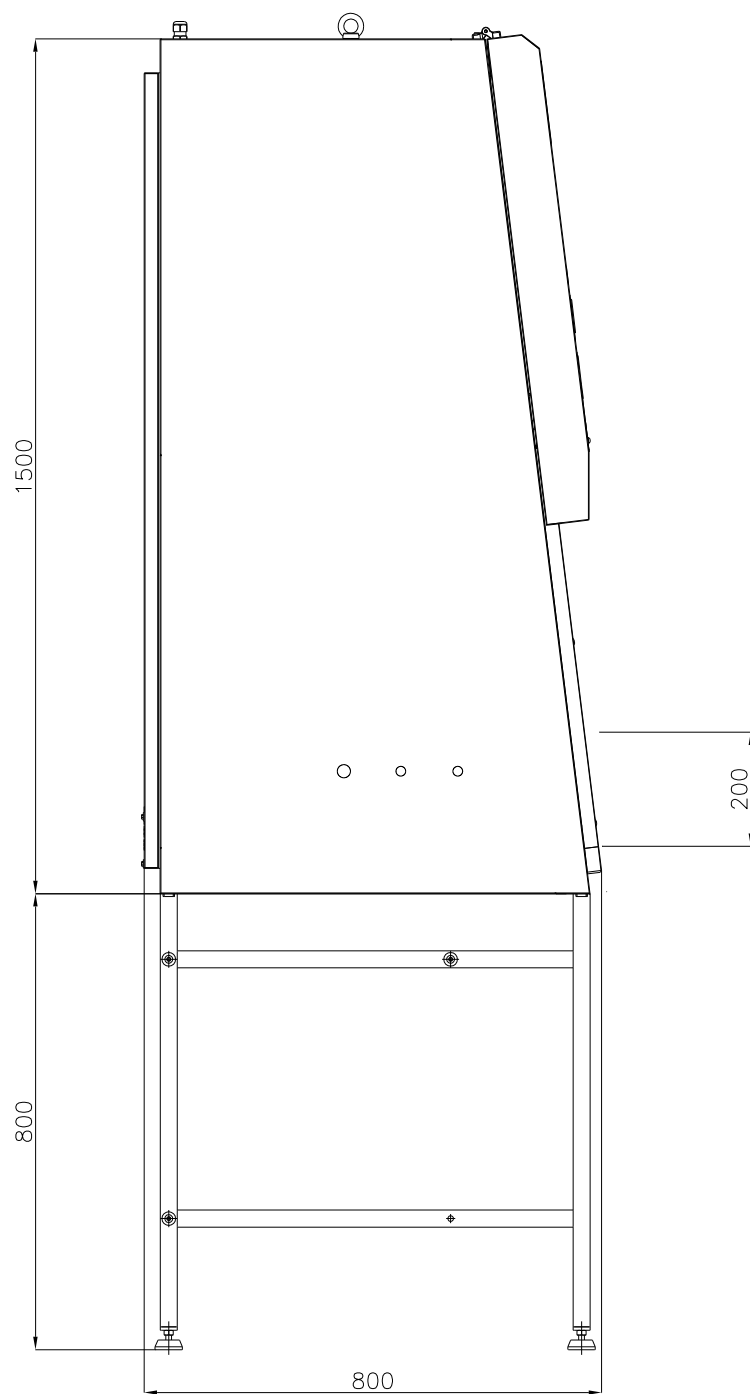


### 13.B FRONTAL DIAGRAM



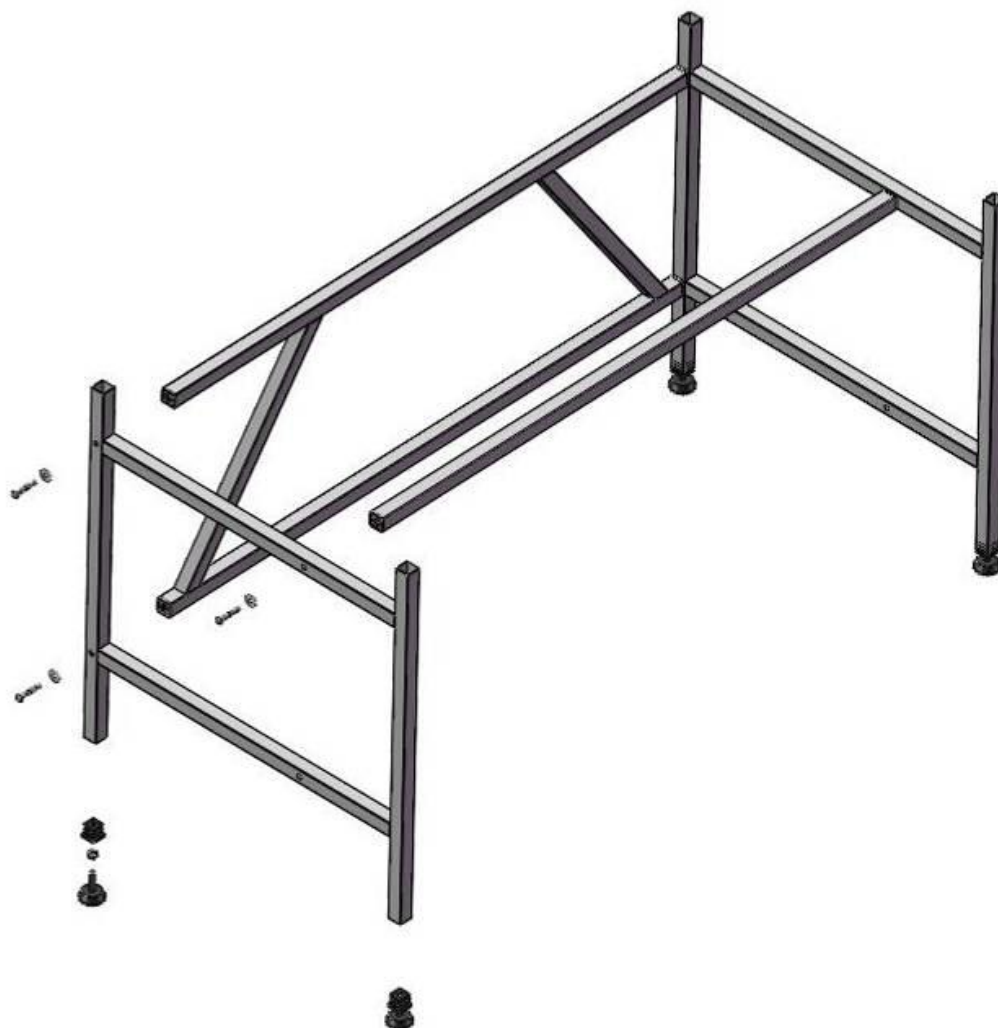
SafeFAST Classic A	A	B
209	1045	899
212	1350	1194
218	1960	1804

### 13.C SIDE DIAGRAM



## 14 ASSEMBLY of SUPPORT TABLE

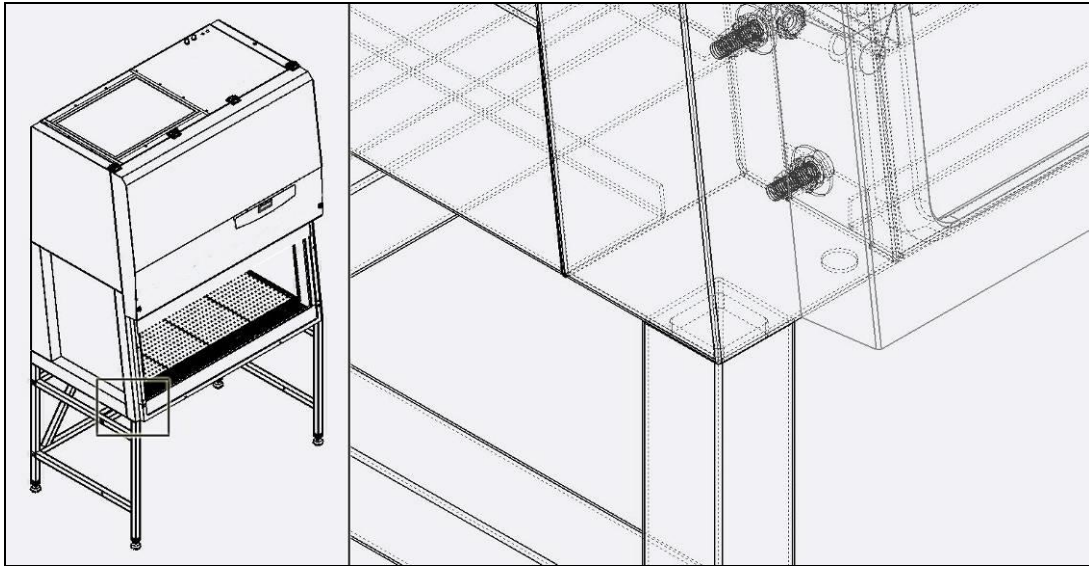
The supporting stand is supplied not assembled, with, the kit of screws and the feet.



## 15 ASSEMBLY OF THE CABINET ON THE SUPPORTING STAND

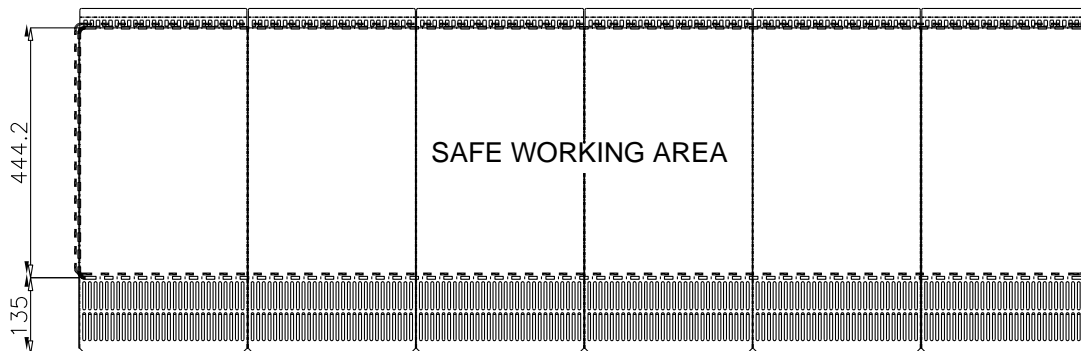
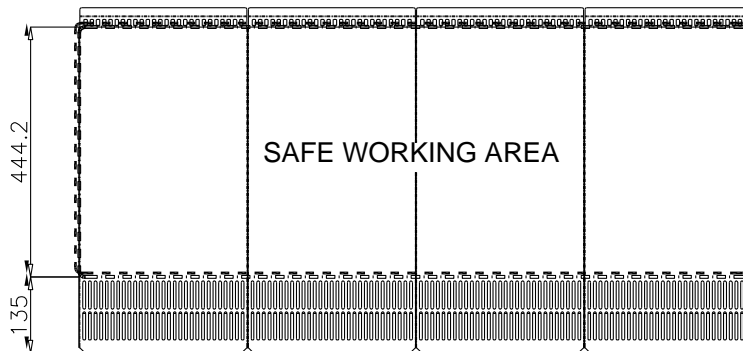
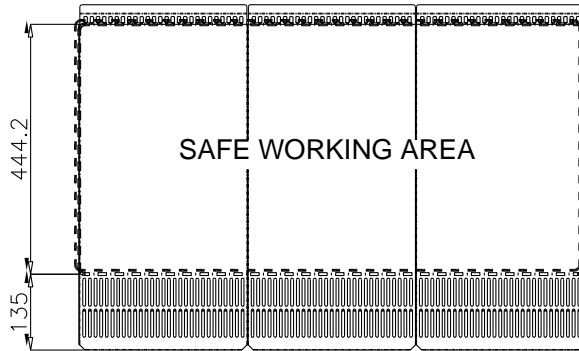
When the stand has been assembled the cabinet can be installed following this procedure :

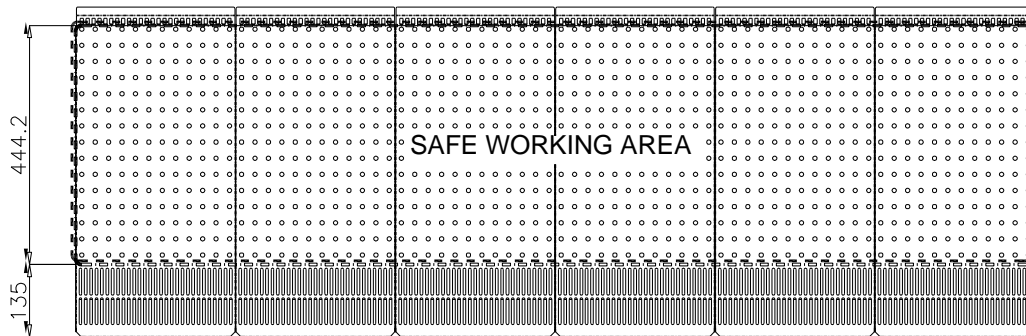
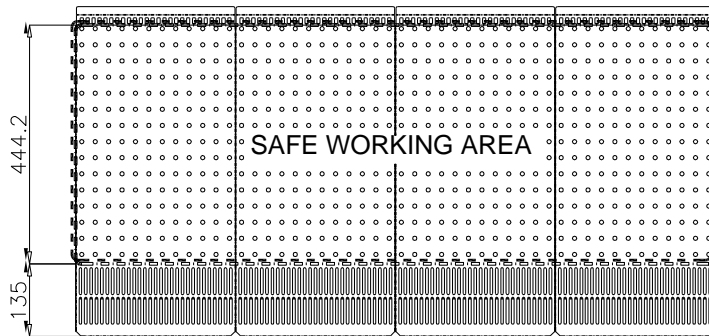
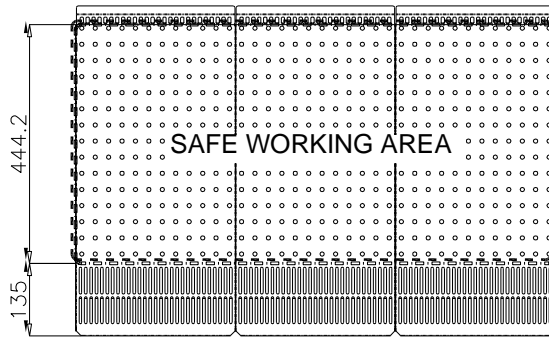
- Check the correct levelling of the stand and in case adjust the height of the feet [3]
- Check the tightening of all the screws and the firmness of the stand
- Lift the cabinet with suitable equipment (for example a forklift) complying with the safety rules (the weight of the cabinet is shown in the “table of technical features” para. 9) and put it on the stand
- Put the cabinet on the stand , taking good care to fit together the jutting feet of the cabinet and the cavities of the stand



- The two eyebolts positioned on the top of the cabinet can be used to lift the cabinet

## 16 SAFE WORKING AREA DIAGRAM





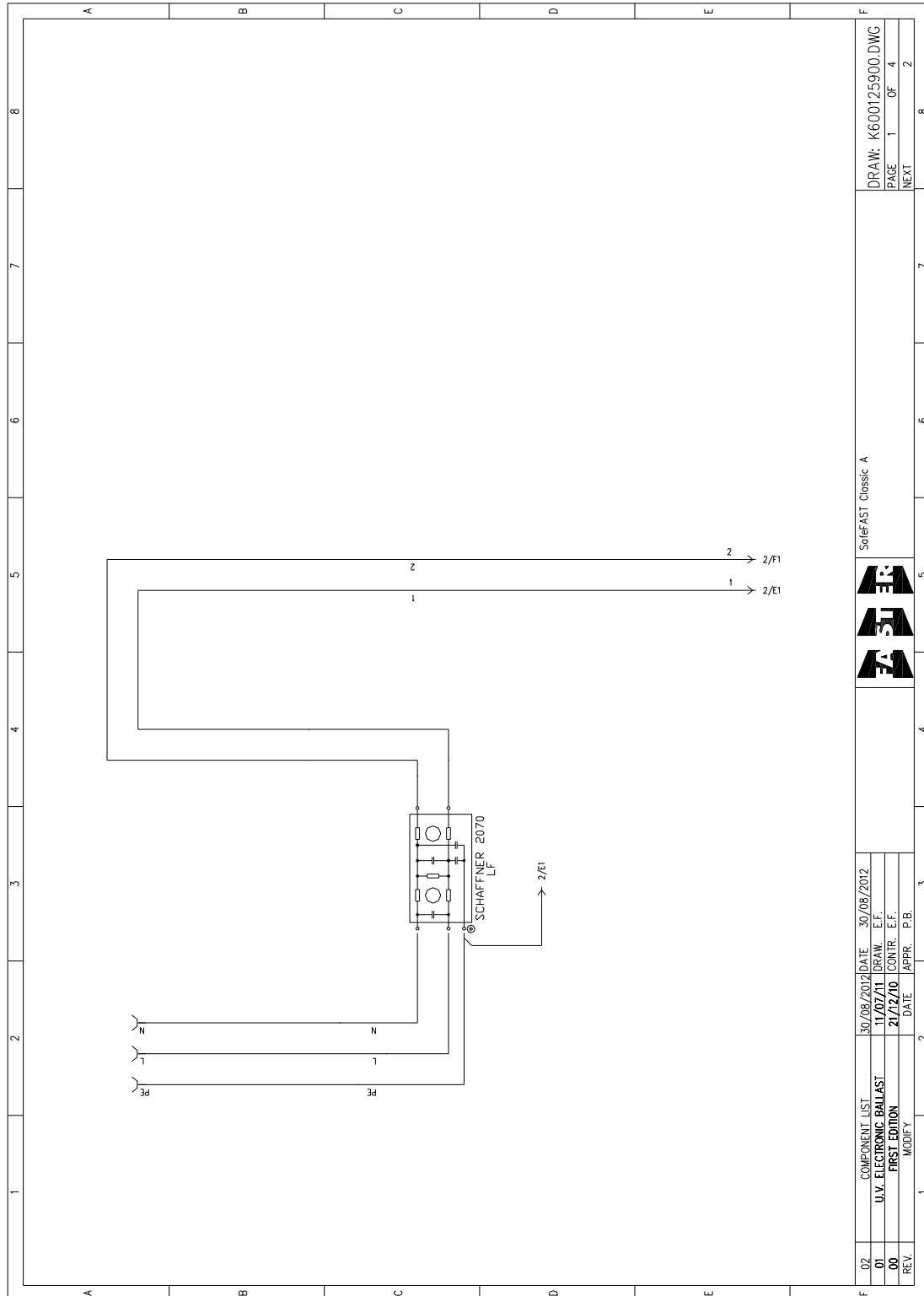


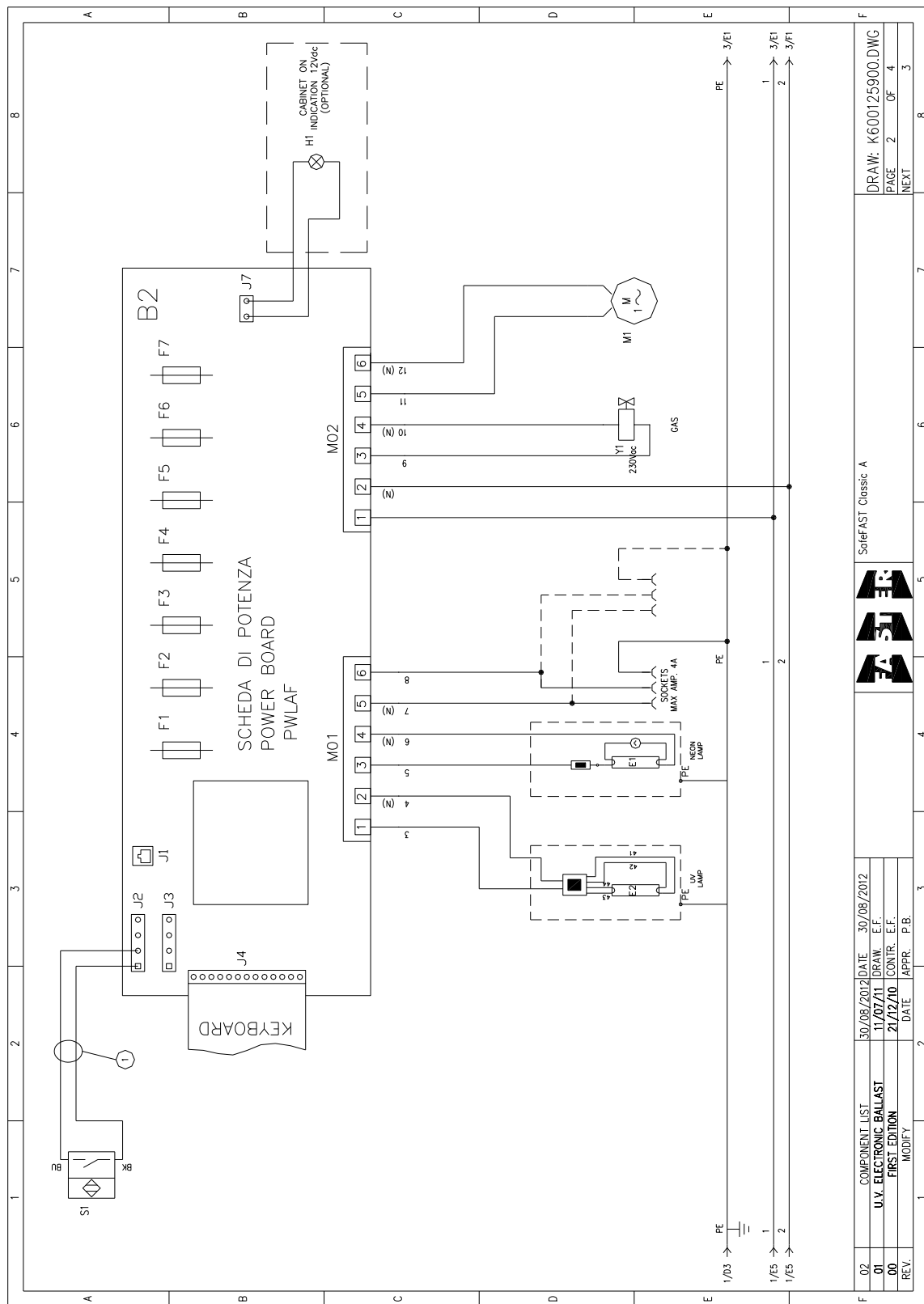
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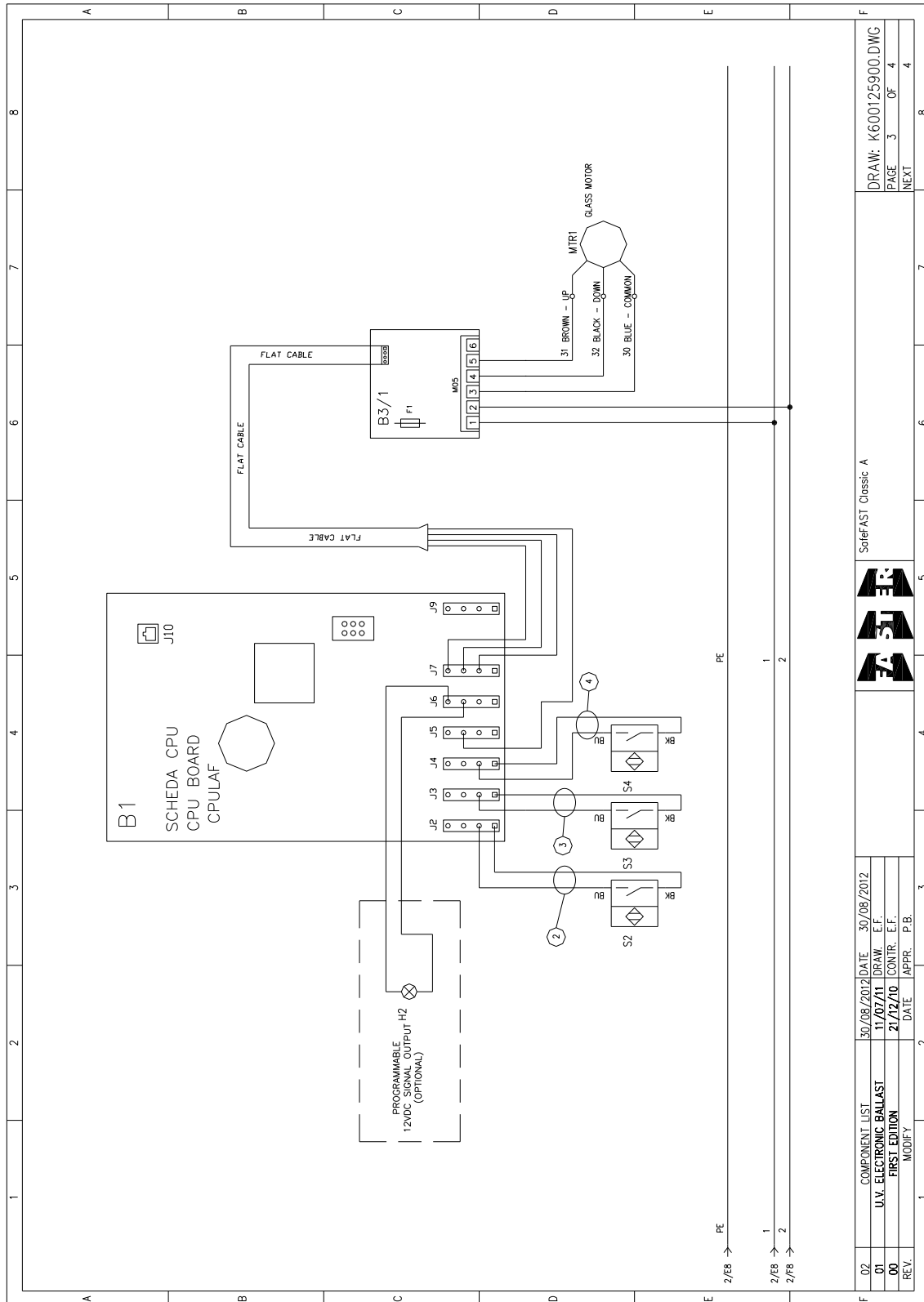
## 17 Sensors list

PLUG	Software name	Description
J4-CPULAF	S0	Air flow sensor
J3- CPULAF	S1	Window sensor
J2- CPULAF	S2	
J3-PWLAF	S3	Magnetic sensor for U.V.
J2- PWLAF	S4	Proximity switch for U.V.

## 18 WIRING DIAGRAM







[illegible]