



Medical Air Technology
Containment & Services Ltd

BioMAT & TriMAT –2SF Class II
Microbiological Safety Cabinet
With
Manually Or **Motorised** Operated
Sliding & Sealing Front Screen

USER MANUAL



TriMAT- 2SF

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CABINET TYPES Covered By This Manual

This Manual relates to the following types of MAT Class II Safety Cabinets

- Recirculation Type
- Exhaust Type
- Thimble Type
- TriMAT Type
- AC Type (Active Compound)

The operation of the five cabinet types is basically the same, the differences are mainly relating to the method of discharging the exhaust air.

General Description

Your MAT BioMAT 2 Class II Microbiological Safety Cabinet has been designed to exceed the performance requirements of British Standard BS EN12469-2000. The cabinet carcass and all seals are maintained under negative pressure ensuring that air cannot leak out of the cabinet.

Class II Cabinets offer protection to the operator and environment from aerosols generated within the cabinet. High efficiency filters and an air curtain provide operator protection across the working aperture of the front screen. Protection of the products from external contamination is provided by the vertical unidirectional down-flow of sterile air in the working area.

To provide the operator with a more practical cabinet the BioMAT –2S incorporates a fully opening sliding and sealing front screen thus negating the need for a closure panel.

TYPE DESCRIPTIONS

Recirculation Type

The top module incorporates a fan and is designed to return the exhaust air back into the room after passing through two stages of hepa filtration.

Exhaust Type

The top module is designed for direct connection to a dedicated exhaust system that is capable of handling the pressure requirements of the cabinet and normally incorporates single hepa filtration together with a visual anti blow back damper.

Thimble Type

The top module incorporates a fan to cater for the cabinet pressure requirements and designed for connection to an open thimble or directly connected into a main exhaust system that is handling a number of cabinets. Double hepa filtration is normally used on open thimble, with single or double on the direct connected arrangement.

TriMAT Type

The TriMAT is a system developed by MAT to provide cabinet and room exhaust as a integrated top module incorporating fans to cater for the cabinet pressure requirements with two stages of hepa filtration. The upper section of the module includes a plenum where the filtered air from the cabinet and air drawn from the room through a grille along the front mixes. This combined air volume is then drawn through a further hepa filter (Cat 3 and 4 Labs) by the main exhaust system directly connected to the top of the module. If room filtration is not required an internal diffuser plate replaces the hepa filter.

AC Type (Active Compound)

The 'AC' type cabinet is a derivative of the all the above cabinets mainly for use with substances that are not biological i.e. carcinogenic and therefore cannot be killed by the usual fumigation methods. To prevent the cabinet internals becoming contaminated the first stage of hepa filtration is positioned in the base of the cabinet immediately below the removable work tray.

QUALITY ASSURANCE

Although fully tested before leaving our factory as part of the MAT Quality Assurance Programme, the specified performance will only be maintained if your BioMAT 2 is sited correctly and regularly service. MAT can only accept responsibility for correct functioning of your cabinet if: -

1. Safety Cabinet is correctly sited in the laboratory to avoid any adverse conditions within the room that may affect the level of operator protection.
2. It has been installed and commissioned by MAT trained personnel or approved agents.
3. Extension, modification, relocation, repairs or other maintenance is carried out by MAT personnel or persons authorized by MAT or, in the case of electrical work, by qualified electricians.
4. In the case of repair or maintenance, only replacement parts supplied or approved by MAT prior to fitting are used.
5. The electrical installation surrounding the unit and to which it is connected comply with the latest IEC regulations.
6. The unit is used and maintained in compliance with the instructions contained in this manual.

CE COMFORMITY

MAT declares that the equipment supplied conforms to the following CE directives—

Machinery

Electro Magnetic Compatibility

Low Voltage

YOUR MANUAL

This user manual has been prepared to provide basic operating instructions. It is only intended to supplement existing in-house procedures and codes of practice, and not to replace them. If further advice is required on the use or maintenance of this equipment, the staff of Medical Air Technology Ltd will be pleased to assist wherever possible.

MEDICAL AIR TECHNOLOGY LTD. IS ALWAYS PLEASED TO OFFER ADVICE
AND IN-HOUSE TRAINING IN THE USE OF
MICROBIOLOGICAL SAFETY CABINETS.

CABINET SITING

A copy of our Safety Matters Bulletin No. 2 (Located in Appendix C) on the correct siting of your Safety Cabinet is attached at the rear of this manual.

For further information refer to the current British Standard BS 5727:2005

MANUAL FRONT SCREEN QUICK START PROCEDURE

The following provides instructions to Start & Stop the Safety Cabinet

For the complete information on this procedure please refer to the 'Start Up & Shut Down Procedures'.

Start

- Plug cabinet fly lead into local 13 amp socket
- Turn key switch to the 'On' position. This will illuminate the following indicators which should show the noted colour on the Airflow Diagnostic display:
 - Power On - orange
 - Main Exhaust – green (Thimble & TriMAT) red (Recirculation & Exhaust)
 - Front Screen – green
 - Inflow – red
 - Downflow - red
 - Fumigation damper closed – orange (if fitted)

If the Main Exhaust LED is RED the Cabinet will not start and the alarm will activate. The alarm will also activate if the front frame is not closed.

- Open the front screen by releasing the 2 black clamps located at low level at each side of the front frame by turning through 180° ensuring that the clip is still hooked to the catch-plate. As the clamps are released the front screen will be moved forward away from the seal approximately 25mm by spring loaded pins, by and be retained by the side clamps. With the suction released the front screen may be raised to the standard working aperture of 200 mm; this is attained when the screen comes into contact with a stop.
- Once the working aperture height is reached the front frame and screen can be returned to the locked and sealed position, this is achieved by closing the black side clamps by turning through 180° firstly assuring that the clips are hooked to the catch-plate, to allow the front frame to be drawn into the closed position.
- On completion of the above the inflow display will stabilise within the green 'Safe Zone'. Provided all the indicators on the Diagnostic Airflow Diagram are showing green the cabinet is now safe to use.
- Switch on the interior lighting, using switch (B), this lighting will only work if the cabinet (A) switch is in the ON position.

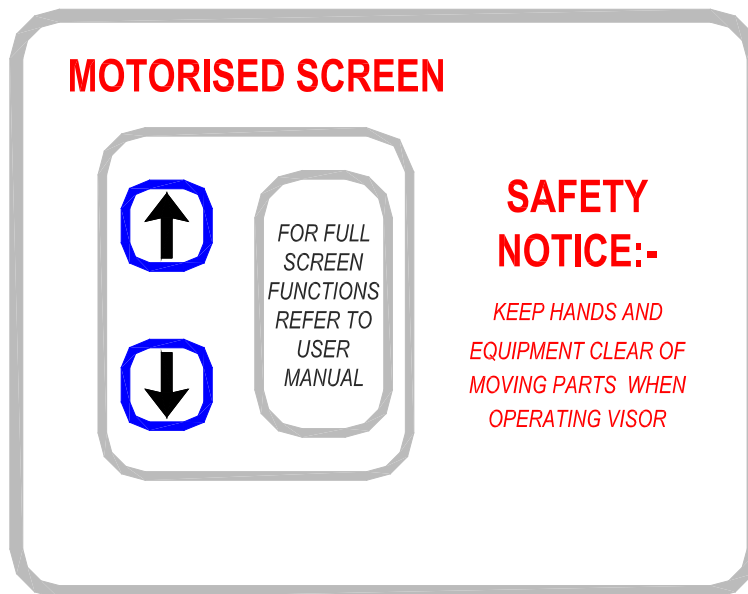
Stop

- The work area should be cleared of any apparatus and equipment and the cabinet left to run for a few minutes to clear any residual aerosols.
- Switch off the cabinet- using switch 'A', which will also switch off the lights
- Close the front screen by releasing the two black clamps located at low level at each side of the front frame by turning through 180° ensuring that the hook is retained by the catch-plate. The releasing of the clamps has allowed the front frame to move away from the seal aided by spring-loaded bolts. Slide the front screen to the bottom until it touches the rubber stops. Then lock the front frame into the sealed position; this is achieved by turning the black side clamps through 180°, firstly ensuring that the clips are hooked to the catch-plate.

MOTORISED FRONT SCREEN QUICK START PROCEDURE

The following provides instructions to Start & Stop the Safety Cabinet

For the complete information on this procedure please refer to the 'Start Up & Shut Down Procedures'.



Start

- Plug cabinet fly lead into local 13 amp socket
-
- Turn key switch to the 'On' position. This will illuminate the following indicators which should show the noted colour on the Airflow Diagnostic display:
 - Power On - orange
 - Main Exhaust – green (Thimble & TriMAT) red (Recirculation & Exhaust)
 - Front Screen – green
 - Inflow – red
 - Downflow - red
 - Fumigation damper closed – orange (if fitted)

If the Main Exhaust LED is RED the Cabinet will not start and the alarm will activate. The alarm will also activate if the front frame is not sealed

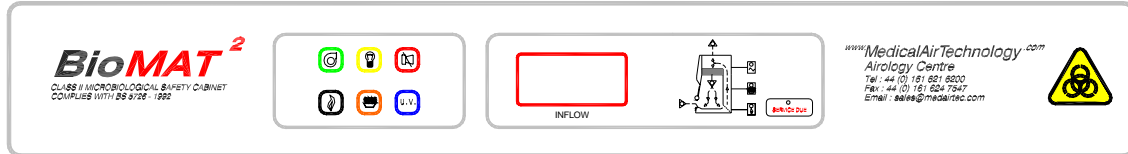
- Control of the front screen is achieved via the 'UP' & 'DOWN' buttons on the membrane Motorised screen panel to the right of the cabinet main control membrane.
- Open the front screen by pressing the 'UP' button ONCE. This will move the front frame forward sufficiently to release from the seal, followed by the glass screen rising to the 200mm high working aperture, once attained the front frame will pull back onto the seal. Following this swing the aerofoil into the working position.
- If on completion of the above the cabinet has not started, press the cabinet start button on the main membrane panel.
The cabinet will only start automatically after the initial start up when connected to a power supply or following electrical isolation.
- If it is necessary to open the front fully to allow loading of equipment the screen can be raised by pressing the 'UP' Button ONCE, this again will release the screen from the seal and raise the screen to its upper limit.
*During this period the cabinet remain in an alarm condition, until the screen is returned to the standard 200mm aperture.
Please note raising the screen above the normal height will negate the safe working of the cabinet and should be used to load the work area.*
- Once loading is complete press the 'DOWN' button to return the screen to the 200mm working aperture.
- Switch on the interior lighting, using switch (B), this lighting will only work if the cabinet (A) switch is in the ON position.

Stop

- The work area should be cleared of any apparatus and equipment and the cabinet left to run for a few minutes to clear any residual aerosols.
- Press the 'DOWN' button to lower the screen to the closed position. This will move the front frame forward sufficiently to release from the seal, followed by the glass screen being lowered to a position approximately 25mm from the bottom. *This is a safety feature to prevent fingers being trapped.* To close the screen fully it is necessary to keep the 'DOWN' button pressed until the screen has stopped moving and the frame has moved back onto the seal.

- Once the front frame as completion the sealing operation the cabinet fans will stop and if fitted the shut-off damper will close

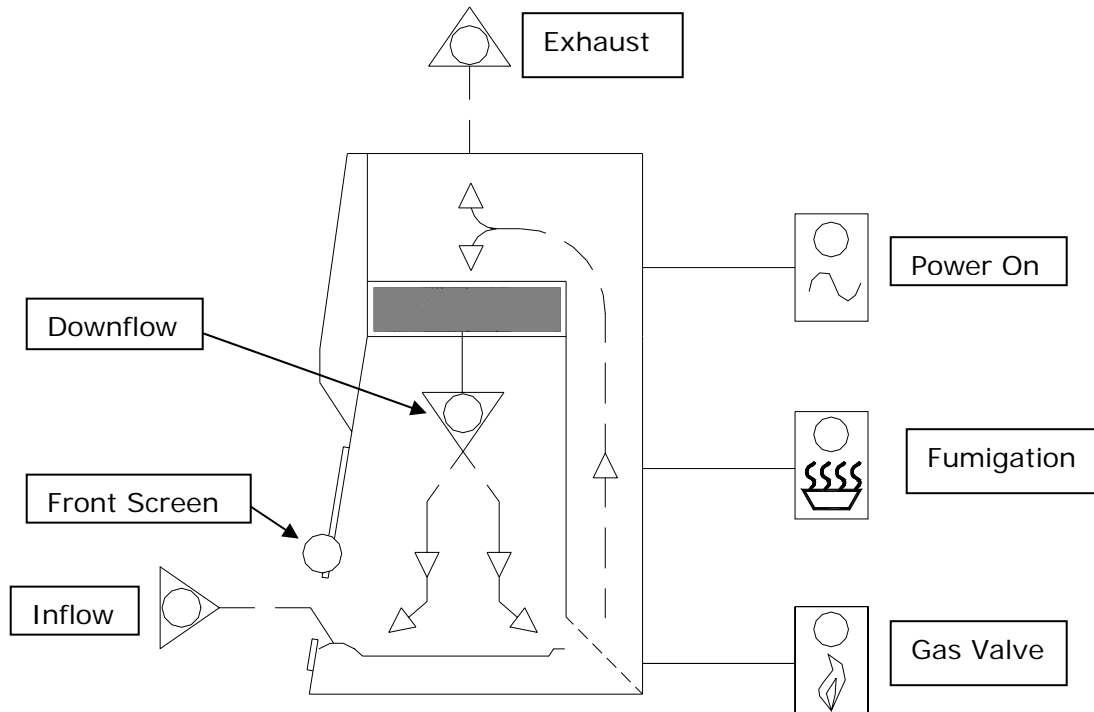
CONTROL PANEL



DESCRIPTION	LEGEND	COLOUR	FUNCTION
A - Cabinet		Green	Controlling power supply to fans and all control circuits.
B – Lights		Yellow	Controlling power to lights. Will only work if switch 'A' is in 'ON' position.
C – Gas Valve (Optional)		Black	To activate solenoid Gas Valve. Will only function if cabinet is in safe working condition.
D – Alarm Mute		Red	To mute audible alarm other than front screen alarm. Fault indication on diagram will remain illuminated.
E – Fumigate		Orange	To activate fumigate sequence. Will only operate when cabinet is switched off.
F – U.V. Lights (Optional)		Blue	To activate power to U.V. Lights. Will only operate when cabinet and lights are switched OFF.

AIRFLOW DIAGNOSTIC DIAGRAM

The Airflow Diagnostic Diagram is diagrammatic and does not fully illustrate the airflows and filter arrangement of the cabinet



MANUAL FRONT SCREEN START UP PROCEDURE

The following notes are for guidance where local laboratory instructions do not exist or are inappropriate. They should complement, not replace, existing codes of practice issued by Laboratory Safety Officers.

With Front Screen Closed

- Ensure power supply to the cabinet is switched on, as evidenced by the green 'power on' lamp on the control panel being illuminated. The key switch on the front of the cabinet must be turned to the "On" position.

Also illuminated will be the left hand red LEDs on the Airflow Display

- Start the Cabinet by pressing the green switch 'A' on the fascia panel, firstly ensuring that the main exhaust indicator on the airflow diagnostic diagram is illuminated green – this will initially energise the exhaust fan.

If the main exhaust LED is illuminated RED this indicates that the main exhaust is not in operation and the cabinet will not start.

- Open the front screen by releasing the 2 black clamps located at low level at each side of the front frame by turning through 180° ensuring that the clip is still hooked to the catch-plate. As the clamps are released the front screen will be moved forward approximately 25mm away from the seal by spring loaded pins and be retained by the side clamps. With the suction released the front screen may be raised to the standard working aperture of 200mm; this is attained when the screen comes into contact with a stop.

As soon as the suction is broken, air will be drawn into the cabinet around the seal, allowing the airflow meter to rise and when the green operating zone is reached the down-flow fans will start.

During this period the airflow and front frame open alarms will be activated until the green 'safe zone' is reached however the front frame alarm will still be active but may be muted if required by pressing switch 'D' on the fascia panel

- Once the working aperture height is reached the front frame and screen can be returned to the locked and sealed position, this is achieved by closing the black side clamps by turning through 180° firstly assuring that the clips are hooked to the catch-plate, to allow the front frame to be drawn into the closed position.

When the front frame is closed satisfactorily the alarm will cease.

- On completion of the above the display will stabilise within the green 'Safe Zone'. Provided all the indicators on the Diagnostic Airflow Diagram are showing green the cabinet is now safe to use.

NOTE 1: If the cabinet is fitted with a motorised shut off damper controlled by the cabinet, it may take up to 2 minutes for the cabinet to stabilize as the damper opens.

NOTE 2: During the operation of the cabinet the illuminated LEDs on the display may drift within the safe green zone, this is usually an indication of a fluctuation in the mains electrical supply and should not compromise the safe working conditions within your safety cabinet. Should the drift be significant in that the display strays to the outside of the safe working zone, the alarms will be automatically activated.

- Switch on the interior lighting, using switch (B), this lighting will only work if the cabinet (A) switch is in the ON position.

With Front Screen Open

- Ensure power supply to the cabinet is switched on, as evidenced by the green 'power on' lamp on the control panel being illuminated. The key switch on the front of the cabinet must be turned to the "On" position.
- Press the green switch 'A' on the fascia panel – this will energise the exhaust fan and allow the inflow display to rise into the green zone, when reached the down-flow fans will start.
- On completion of the above the display on the airflow gauge will stabilise within the green 'Safe Zone'. Provided all the indicators on the Diagnostic Airflow Diagram are showing green the cabinet is now safe to use.

NOTE 1: If the cabinet is fitted with a motorised shut off damper controlled by the cabinet, it may take up to 2 minutes for the cabinet to stabilize as the damper opens.

NOTE 2: During the operation of the cabinet the illuminated LEDs on the display may drift within the safe green zone, this is usually an indication of a fluctuation in the mains electrical supply and should not compromise the safe working conditions within your safety cabinet. Should the drift be significant in that the display strays to the outside of the safe working zone, the alarms will be automatically activated

- Switch on the interior lighting, using switch (B), this lighting will only work if the cabinet (A) switch is in the ON position.

MANUAL FRONT SCREEN SHUT DOWN PROCEDURE

With Front Screen To Be Closed

- The work area should be cleared of any apparatus and equipment and the cabinet left to run for a few minutes to clear any residual aerosols.
- Switch off the cabinet- using switch 'A'. This will also switch off the lights
- Close the front screen by releasing the two black clamps located at low level at each side of the front frame by turning through 180° ensuring that the hook is retained by the catch-plate. The releasing of the clamps has allowed the front frame to move away from the seal aided by spring-loaded bolts. Slide the front screen to the bottom until it touches the rubber stops. Then lock the front frame into the sealed position; this is achieved by turning the black side clamps through 180°, firstly ensuring that the clips are hooked to the catch plate.

With Front Screen To Remain Open

- The work area should be cleared of any apparatus and equipment and the cabinet left to run for a few minutes to clear any residual aerosols.
- Switch off the cabinet- using switch 'A'. Which will also switch off the lights

TriMAT Operation

The TriMAT principle allows the cabinet to continue in operation should the main exhaust fail whilst the cabinet is switched on, this to allow time to close up any work in progress or continue working if allowed by the laboratory protocols. When the main exhaust is not in use the air from the cabinet is returned to the room after passing through two stages of hepa filtration.

Once the cabinet has been switched off and the main exhaust is not in operation the cabinet CANNOT be started until the main exhaust has been restored.

MOTORIZED FRONT SCREEN START UP PROCEDURE

The following notes are for guidance where local laboratory instructions do not exist or are inappropriate. They should complement, not replace, existing codes of practice issued by Laboratory Safety Officers.

With Front Screen Closed

- Ensure power supply to the cabinet is switched on, as evidenced by the green 'power on' lamp on the control panel being illuminated. The key switch on the front of the cabinet must be turned to the "On" position.

Also illuminated will be the left hand red LEDs on the Airflow Display

- Start the Cabinet by pressing the front screen 'UP' button ONCE on the fascia panel, firstly ensuring that the main exhaust indicator on the airflow diagnostic diagram is illuminated either green or red this being dependant on the type of cabinet green for Thimble & TriMAT with red for Recirculation & Exhaust.

This will move the front frame forward sufficiently to release from the seal, followed by the glass screen rising to the 200mm high working aperture, once attained the front frame will pull back onto the seal. Following this swing the aerofoil into the working position.

If the main exhaust LED is illuminated RED on Thimble & TriMAT type cabinets this indicates that the main exhaust is not in operation and the cabinet will not start.

- If on completion of the above the cabinet has not started, press the cabinet start button on the main fascia panel.

The cabinet will only start automatically at the initial start up when firstly connected to the power supply of following any electrical isolation i.e. power cut.

- On completion of the above the display will stabilise within the green 'Safe Zone'. Provided all the indicators on the Diagnostic Airflow Diagram are showing green the cabinet is now safe to use.

NOTE 1: If the cabinet is fitted with a motorised shut off damper controlled by the cabinet, it may take up to 2 minutes for the cabinet to stabilise as the damper opens.

NOTE 2: During the operation of the cabinet the illuminated LEDs on the display may drift within the safe green zone, this is usually an indication of a fluctuation in the mains electrical supply and should not compromise the safe working conditions within your safety cabinet. Should the drift be significant in that the display strays to the outside of the safe working zone, the alarms will be automatically activated.

- Switch on the interior lighting, using switch (B), this lighting will only work if the cabinet (A) switch is in the ON position.

MOTORISED FRONT SCREEN SHUT DOWN PROCEDURE

- The work area should be cleared of any apparatus and equipment and the cabinet left to run for a few minutes to clear any residual aerosols.
- Press the 'DOWN' button to lower the screen to the closed position.

This will move the front frame forward sufficiently to release from the seal, followed by the glass screen being lowered to a position approximately 50mm from the bottom. This is a safety feature to prevent fingers being tapped. To close the screen fully it is necessary to keep the 'DOWN' button pressed until the screen as stopped moving and the frame as moved back onto the seal.

- Once the front frame has completed the sealing operation the cabinet fans will stop and if fitted the shut-off damper will close
- The internal lights will be switched off automatically

The TriMAT principle allows the cabinet to continue in operation should the main exhaust fail whilst the cabinet is switched on, this to allow time to close up any work in progress or continue working if allowed by the laboratory protocols. When the main exhaust is not in use the air from the cabinet is returned to the room after passing through two stages of hepa filtration.

Once the cabinet has been switched off and the main exhaust is not in operation the cabinet CANNOT be started until the main exhaust has been restored.

MANUAL

SLIDING FRONT SCREEN OPERATION

The cabinet is fitted with a sliding toughened glass front screen, which has the ability to seal the cabinet whilst fumigating without the need for an independent closure panel.

Opening To The Standard 200 mm Working Aperture

- Release the black clamps located at low level at each side of the front frame by turning anti-clockwise through 180° ensuring that the clip is still hooked to the catch-plate. This will allow the front frame to move forward by approximately 25 mm and clear of the seal, this is aided by spring-loaded pins pushing the frame forward.
- Raise the front screen by gripping the handles and moving the screen upwards until the stop at 200 mm is reached.
- Relocate the front frame by turning the side black side clamps clockwise through 180° firstly ensuring the clips are still hooked to the catch-plates, to draw the screen onto the seal.
- Providing all the indicators on the 'Diagnostic Airflow Diagram' are showing green and the 'Inflow Meter' display is in the green the cabinet should be ready for use

Whilst the front frame is released and the screen is in the lowered position alarms will be activated. Once the frame is returned to the closed position and the aperture set at 200 mm the alarms will cease.

Opening To Allow Cleaning Of Screen Inner Surface (Always consult the Laboratory Safety Officer before carrying out this procedure)

- Release the black side clamps by turning anti-clockwise through 180° then swing the hooks clear of the catch-plates by applying slight pressure to the front screen.

- Hold handles and swing out the front screen which is hinged at the top of the cabinet to an angle of approximately 30° until the two support arms have located into their holding position
Note: Please keep fingers away from glass screen runners whilst raising the front frame, as the glass screen tends to rise due to the changing position of the counter balance arrangement.
- Before commencing to clean the screen or enter the cabinet work area ENSURE that the support arms are fully located on the pins
- To close the front frame it is preferred that this operation is carried out by two people, one at each side by holding the front frame with one hand to ease the frame forward to allow the support arms to be raised slightly by the other hand to clear the locating pin then to lower the front frame to allow the black side clamps to be attached and rotated to form the seal.

Opening Screen To Maximum To Aid Equipment Loading (Always consult the Laboratory Safety Officer before carrying out this procedure.)

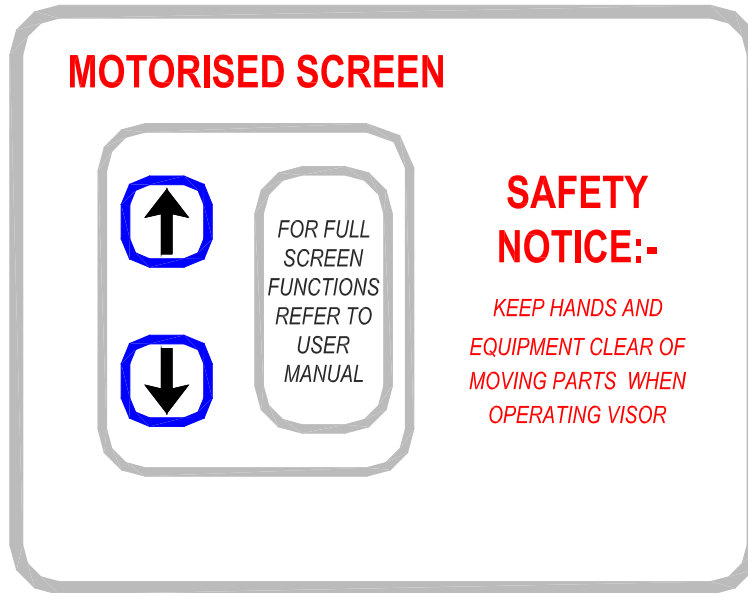
- Release the black side clamps by turning anti-clockwise through 180° then swing the hooks clear of the catch-plates by applying slight pressure to the front screen.
- Hold handles and slightly swing out the front screen, which is hinged at the top of the cabinet to allow the screen to clear the standard aperture stop, and then raise the screen to its maximum. Once in the fully open position the front should be locked in the closed position by re engaging the hooks for the side clamps into the catch-plates then rotating the handle anticlockwise through 180°.

Whilst the front screen is in the open position the alarm will be activated, if required this can be muted.

MOTORIZED SLIDING FRONT SCREEN OPERATION

The cabinet is fitted with a sliding toughened glass front screen, which has the ability to seal the cabinet whilst fumigating without the need for an independent closure panel.

The motorised front screen is operated by the up and down buttons on the 'Motorised Screen' membrane as illustrated below



NOTE: During any operation of the front screen an audible and visible alarms will operate.
If required the audible alarm can be muted by pressing red alarm mute button (D) on the control fascia.

a) Opening and Closing To The Standard 200 mm Working Aperture

- Press the 'UP' button

This will move the front frame slightly forward to release the seal; the glass screen will then be raised automatically to the standard working height of 200mm. Once reached the front frame will be pulled back onto the seal.

This will also start the cabinet, except on the initial start-up following connection to or failure of the electrical supply when it will be necessary to press the cabinet 'On/Off' button (A) once the front screen as reached the working height of 200mm.

- Push aerofoil into position.
- To close press the 'DOWN' button
This will move the front frame slightly forward to release the seal: the glass screen will then be lowered and stop approximately 25mm from the base to prevent fingers etc being trapped.
- To fully close press and retained pressed 'DOWN' button until the front frame has been fully closed.

*When fully closed the cabinet fans will stop and any damper motor to closed
As the screen closes the aerofoil is moved clear*

**b) Opening And Closing To Allow Cleaning Of Screen Inner Surface
(Always consult the Laboratory Safety Officer before carrying out
this procedure)**

*Note: This operation can only be actioned if the front screen is in the fully
closed position*

- Press both the 'UP' and 'DOWN' buttons simultaneously and keep pressed until the front frame begins to move forward then release the buttons.
- Once the front frame as stopped moving and cleared the seals, press and remain pressing the 'UP' button which will allow the complete front frame to swing upwards until it reaches the maximum opening then release the button.
If the button is released before reaching the limit the front frame will stop at that position
- To close press and remain pressing the 'Down' button until the front frame as reached the fully closed position.

**c) Opening And Closing Screen To The Maximum To Aid Equipment
Loading (Always consult the Laboratory Safety Officer before
carrying out this procedure.)**

- Firstly open the front screen to the 200mm working height as detailed above
- Press 'UP' button again will automatically raise the glass screen to its maximum opening by moving the front frame forward, raising the screen to upper limit.
During this period the cabinet remain in an alarm condition, until the screen is returned to the standard 200mm aperture.
- To close press the 'DOWN' button
This will close the glass screen to the standard 200mm position
- If it is required to close the screen fully refer to a) above

NOTES:

- At any time during the operation of the front screen (even when it is moving automatically), pressing either the UP or DOWN buttons will stop the screen movement. The movement can be resumed by pressing either button again.
- Across the front aperture of the cabinet at low level are photoelectric safety beams (one on inside and one just above the aerofoil. If at anytime a beam

is broken the screen will stop moving. The screen will not re commence its operation until the required directional button is pressed.

INFLOW AIR GAUGE

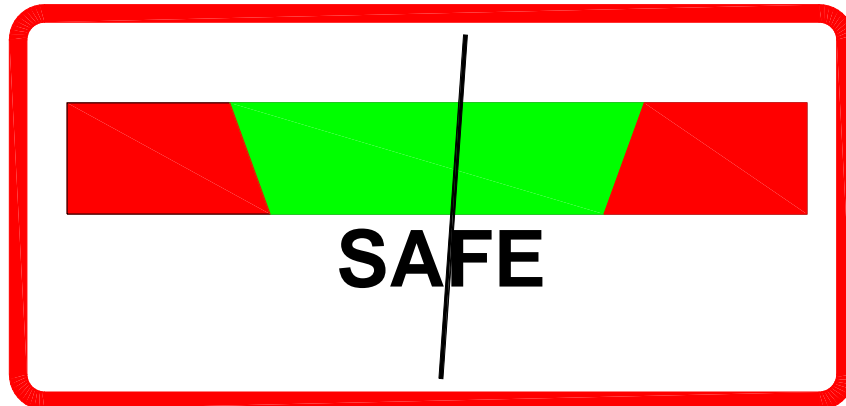
Whilst the cabinet is switched on and the exhaust system is running, the volume of air flowing into the cabinet is continuously monitored on the gauge positioned centrally on the control membrane.

Optimum operator protection is achieved when the central column of the gauge is illuminated green, if one of the columns on either side of centre the cabinet is illuminated the cabinet is still safe to use.

In the event of any of the red columns being illuminated and/or if the audible alarm is sounding the following action should be taken, work should stop and the following checks be carried out.

- Check the closure panel (night door) has been removed.
- The inflow and exhaust indicators are illuminated green.
- On the *recirculation model only* the discharge grille on the top has not been obstructed.

If all the above are correct and the display is still indicating red – Contact The MAT Service Department.



CLEANING PROCEDURE

Regular cleaning is important to prevent the build-up of dirt and hence potentially infectious material. Routine swabbing of work surfaces with 70% v/v IMS (ethanol) or IPA (Isopropyl Alcohol) is recommended.

For cleaning the work surfaces, swabbing with a mild detergent in warm water is very effective. Phenolic or Cresolic disinfectants should be avoided as they may stain the white surfaces with a brownish colour. Hypochlorites will cause rust spots on the stainless steel work tray. If they are used, any spillage should be quickly

rinsed with clean water and mopped up with an absorbent tissue. Most of the quaternary ammonium compounds and the Glutaraldehyde based surface disinfectants are suitable.

To facilitate cleaning of the work zone and the interior, the front screen may be raised to its upper limit or alternatively the front frame can be opened to gain access to the work area and rear of the glass screen. *See the sections relating to the operation of the manual and motorised front screens for the operating instructions.* It is good practice to clean the inside of the viewing screen to ensure adequate visibility of the working zone.

Always consult the Laboratory Safety Officer before carrying out this procedure.

ULTRAVIOLET RADIATION

Cabinets may be fitted with short wavelength Ultraviolet (U.V.) tubes emitting 254 nanometres.

WARNING

CARE SHOULD BE EXERCISED IN THE USE OF U.V. RADIATION

U.V. Radiation can cause burns to unprotected skin and it is very important not to look at the illuminated tube with the naked eye.

As a safety feature the U. V. tubes are interlinked with the cabinet lights to prevent them being lit when the cabinet is being used.

APPLICATIONS

Many bacteria are quite resistant to U. V. Radiation, and may require prolonged exposure for sterilization. Dry and/or protein covered organisms may be protected against U.V. and may be only slightly affected if at all. However, moist, vegetative cells without too much protein covering are killed with reasonable effectiveness following a 3-4 hours exposure.

LIFE SPAN

Typical efficiencies for the 253.7 nm tubes are

100% at 50 hours
90% at 200hours
80% at 1000Hours

FUMIGATION

When handling hazardous materials the air space inside the cabinet should be decontaminated regularly and always before servicing and following any spillages. Fumigation by formaldehyde gas is the recommended decontamination procedure for biological hazards.

To facilitate the fumigation a sequence has been incorporated in the cabinet controls.

A convenient way of generating sufficient formaldehyde is to boil off Formalin (40% formaldehyde BP or equivalent) together with an equal amount of water in a suitable vessel such as the vaporizer available from MAT.

The current British Standard recommends that the quantity of Formalin required is 60ml formaldehyde plus 60ml water per cubic metre of cabinet volume (BS.EN 12469:2000). From knowledge gained from end users and large users of safety cabinets this quantity is considered well in excess of the quantity required to achieve a '100% kill' and a number of users now internally publish their own recommendations

Alternative Method

Due to the Health & Safety problems associated with formaldehyde an alternative method using Hydrogen-Peroxide is currently being used, however this method was originally developed to sterilise clean rooms and at present work is in progress by various parties to ensure this process provides adequate 'kill' to allow a 'Permit to Work' being issued when internal work such as filter changing is required on the cabinet.

FUMIGATION PROCEDURE Using Formaldehyde

- Switch off the cabinet by pressing the green button 'A' on the control panel.
- If the cabinet is a recirculation type, fit the optional fumigation adaptor kit to the discharge grille situated on the top panel, right hand rear corner, ensuring that the damper is fully closed
- Fill the vaporiser with the correct amount of formalin (**See following page for quantities**) and screw on the aluminium cap – finger tight, having checked the gasket in the cap is undamaged. If the vaporiser is free standing, place in cabinet, fill with formalin as above, plug into socket and switch on.
- Close the sliding front screen by releasing by rotating clockwise through 180° the 2 black clamps located at low level on the sides of the front frame ensuring that the hook is still retained by the catch-plate. As the clamps are released spring loaded pins will push the front frame and screen away from the seal to allow the screen to be closed. When closed re-lock the side clamps by rotating anti-clockwise through 180°.
- Press the 'orange FUM' button and the red 'FUM' indicator will be illuminated on the diagnostic display. **N.B** Once the 'FUM' button has been activated DO NOT SWITCH CABINET ON until the cycle has been completed.

When the 'FUM' button has been pressed, this will inhibit all other button functions.

Pressing the 'FUM' button has set a sequence into operation, activating a built in programme allowing the cabinet to disperse formaldehyde throughout the cabinet. On completion of this 60 minute cycle the indicator remains illuminated to show the cabinet is still in a state of decontamination.

- The cabinet should be left in this condition preferably overnight, but for a minimum of 6 hours.
- Following decontamination the cabinet should be purged of all residual formaldehyde gas.

If the cabinet is a recirculation type, the flexible hose from the fumigation adaptor should be positioned to discharge safely to the atmosphere, (for example, through a ducted fume cupboard or ceiling extract connection, then open the damper).

First press the 'FUM' button to disengage the fumigation cycle then following confirmation that the main exhaust is running indicated by the top indicator on the Diagnostic Diagram showing green, switch on the cabinet, if satisfactory release the side clamps with the hooks retained in the catch-plate, then pull forward on screen handles to break the suction seal following which the inflow display will rise into the green zone. When this has

stabilised the front screen can be raised to the standard aperture of 200 mm to improve air throughput to clear the formaldehyde.

If the main exhaust indicator shows RED the cabinet will not start and the damper will remain closed.

- Within the first few minutes the majority of the formaldehyde being exhausted from the cabinet will be removed. However due the fact that formaldehyde adheres to the surfaces of the cabinet and within the media of the hepa filters we consider that it is advisable that the cabinet is run for between 4 and 6 hours before work re-commences.

With recirculation type cabinets, the fumigation adaptor should be removed prior to any work being carried out.

- Any poly-formaldehyde residue in the vaporiser may be removed by heating with water containing a little mild detergent at neutral pH.

Other methods of generating formaldehyde and other methods of cabinet decontamination can be employed and the Laboratory Safety Officer should be consulted on their use. Medical Air Technology Limited will be pleased to advise if they are able, but a detailed knowledge of every technique cannot be guaranteed.

FORMALIN QUANTITIES

The recommended quantities stated in BS EN12469: Page 40 Annex J, Part 2 are 60ml formaldehyde solution mixed with 60ml distilled water per cubic meter of cabinet volume.

However this quantity is now considered in excess of that required to achieve a satisfactory kill.

We have therefore produced the following Table based on quantities employed by users of large numbers of Safety Cabinets.

The quantities shown below are exact amounts calculated from the different sizes of MAT Class 2 Safety Cabinets.

If you still consider that the quantities recommended in the British Standard are to be used, you may find on completion of the sterilization cycle that high quantities of fluids containing formaldehyde are present in the cabinet.

Cabinet Size	Formaldehyde
1200mm BioMAT Class 2 Safety Cabinet	20ml Formaldehyde @40% + 20ml of distilled water
1500mm BioMAT Class 2 Safety Cabinet	25ml Formaldehyde @40% + 25ml of distilled water
1800mm BioMAT Class 2 Safety Cabinet	30ml Formaldehyde @40% + 30ml of distilled water

ALTERNATIVE METHOD FUMIGATION PROCEDURE Using Hydrogen-Peroxide

- Switch off the cabinet by pressing the green button 'A' on the control panel.
- Close the sliding front screen by rotating clockwise through 180° the 2 black clamps located at low level on the sides of the front frame ensuring that the hook is still retained by the catch-plate. As the clamps are released spring loaded pins will push the front frame and screen away from the seal to allow the screen to be closed. When closed re-lock the side clamps by rotating anti-clockwise through 180°.
- Connect VHP Generator hoses to connections on the cabinet body and top module
- Prepare the VHP Generator for sterilization.
- Press the blue 'VHP' button and the red 'VHP' indicator will be illuminated on the diagnostic panel. N.B. Once the 'VHP' button has been activated DO NOT SWITCH CABINET ON UNTIL THE CYCLE HAS BEEN COMPLETED.

When the 'VHP' button has been pressed, this will inhibit all other button functions

Pressing the 'VHP' button instructs the down-flow fans to run continuously whilst the sterilization is in progress; this to ensure the hydrogen peroxide is fully circulated around the cabinet.

- Following decontamination the cabinet can be returned to operational mode. First press the 'VHP' button to disengage the fumigation cycle and disconnect the VHP Generator. Then following confirmation that the main exhaust is running indicated by the top indicator on the Diagnostic Diagram showing green, switch on the cabinet. If satisfactory release the side clamps with the

hooks retained in the catch plate, then pull forward on screen handles to break the suction seal following which the inflow display will rise into the green zone. When this is stabilised the front screen can be raised to the standard aperture of 200 mm.

GENERAL NOTES

1. Do not store equipment inside the Microbiological Safety Cabinet. The amount of equipment should be kept to a minimum to reduce the disruption to the airflow patterns within the cabinet.
2. A Bunsen burner should not be used inside the cabinet. If the work necessitates, a low profile touch burner or Kampf burner may be used, although the convection currents above any gas burner can seriously reduce the effectiveness of the cabinet.
3. Great care should be taken to prevent litter such as disposable gloves or tissues from being sucked through the airways at the rear of the work area. These can lodge and reduce the airflow through the cabinet. It is good practice to clean underneath the work tray regularly. ***Always consult the Laboratory Safety Officer before carrying out this procedure.***
4. The failsafe solenoid operated gas valve will only allow gas to flow when the cabinet is switched on and there is a satisfactory airflow. Any interruption in the power supply, or failure of air supply necessitates manual resetting of the valve by depressing the switch on the control panel marked 'gas valve'.
5. As an additional safety feature the fluorescent tubes will only work when the switch marked 'lights' has been depressed and the cabinet fans are running. If U.V lights are fitted they can only be used instead of the fluorescent lights, i.e. both types of light cannot be on at the same time.

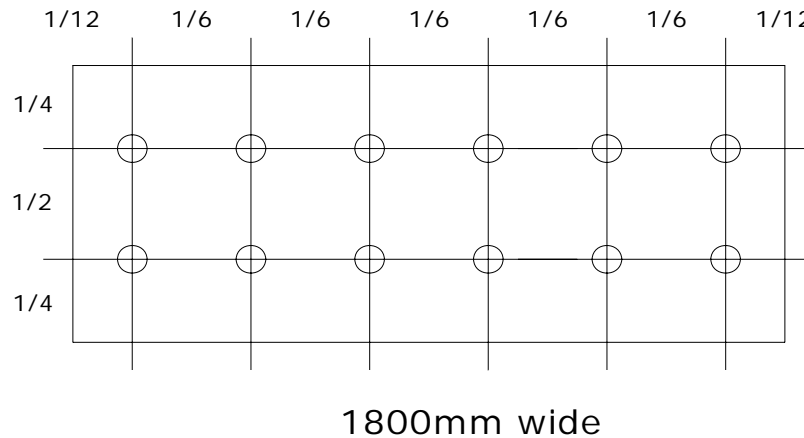
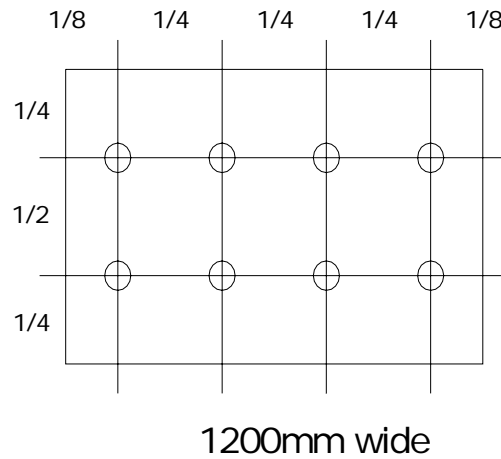
We recommend cabinet users to consult their own laboratory safety booklets. Other publications available include:

Science Reviews Ltd, Occupational Hygiene Monograph No.9
British Standard BSEN 12469-2000
Australian Standard AS2567
American National Sanitation Foundation Standard No. 49

Also, the latest guidelines issued by the UK Advisory Committee on Dangerous Pathogens. These documents contain much useful information on the performance, installation, testing, use and limitations of Microbiological Safety Cabinets.

AIRFLOW MEASUREMENTS

It is recommended that the downward airflow be checked regularly, i.e. weekly or monthly according to cabinet usage. A rotating vane type anemometer with a head diameter of about 100mm is considered satisfactory. On 1200 wide cabinets, take at least 8 readings, namely four along a line one quarter of the depth of the working space forward of the rear wall, and four along a line the same distance behind the front window on an horizontal plane 100mm above the top edge of the working aperture. Anemometer positions for the 1200mm & 1800mm sizes of cabinets are illustrated below. The results should be recorded to monitor cabinet performance over time.



UNIDIRECTIONAL DOWNFLOW AIR

MAT Class II Safety Cabinets are designed to operate within the 0.25 to 0.5 m/s velocity stated in the current BS EN 12469:2000.

However to provide an economically operating cabinet the average down-flow velocity is normally set between 0.3 and 0.35 m/s measured at a horizontal plane 100 mm above the top edge of the working aperture.

If the average velocity is above or below this but within the British Standard the cabinet will operate satisfactory provided all the other operating parameters are correct and validated.

This pre-set velocity can only vary if

- (a) the soiling of the down flow filter occurs
- (b) should there be a fan failure.

It is recommended that the down-flow velocity be checked on a regular basis as detailed under the Airflow Measurements section and the results recorded to monitor cabinet performance over time.

CONTROL PANEL

WARNING

Ensure cabinet is isolated from mains electricity supply before opening panel

CONTROLS

The control system is mounted on the rear of the hinged front panel and is accessed by removing the two screws located at the lower edge of the panel end plates, once removed the panel can be raised and supported by the side struts which are locked by raising the panel to the limit of the struts when a 'click' is heard and then lowered until the weight is supported.

Lowering the front panel is achieved by raising the panel to limit of the struts to release the lock then lowering the panel.

To avoid accidental contact with the electrical circuits removable acrylic covers are fitted over the rear of the controls.

ELECTRICAL PROTECTION

Fuses mounted on the circuit board protect the electrical circuits of the cabinet.

ALARM CIRCUITS

Four alarm circuits are incorporated.

1. INFLOW

Sensed by a accurate pressure sensor mounted on the control panel back plate connected by tubing to the sensing points, this will sense low airflow caused by fan failure or filter soiling, and transmit the signal to the 'inflow' meter on the front panel and alarm circuit.

2. DOWNFLOW

Sensed by a pressure switch connected by tubing to the down flow module capable of sensing air failure should there be a fan failure.

3. FRONT FRAME

Sensed by a micro-switch fitted in the side module behind the left hand lower corner of front frame.

4. FRONT SCREEN

Two alarms are fitted these are sensed by micro switches detecting the position of the front screen by the position of the counter balance weight as follows: -

- a. Sensing when the screen is fully closed
- b. Sensing when the screen is above the standard 200 mm working aperture.

Note:

It is important to ensure that the pressure tubing is not damaged or split where it is connected to the pressure sensor or switch. The pressure sensor or switch, in the event of inadequate airflow in either part of the system, will cause the alarm circuit to be activated with a flashing red indicator on the diagnostic diagram and an intermittent audible alarm tone. The audible alarm tone can be silenced by depressing the 'alarm mute' button 'D' on the control panel after which the red light will remain continuously lit until the correct airflow is reinstated or the cabinet is switched off.

FAN SPEED CONTROL

The speed of the inflow (exhaust) and down-flow fans can be adjusted to obtain the optimum cabinet operation. HOWEVER THIS SHOULD NORMALLY ONLY BE CARRIED OUT BY A SKILLED SERVICE ENGINEER. AN INCORRECT SET-UP CAN PRODUCE AN UN-SAFE CABINET

In the unlikely event it becomes necessary to adjust the fan airflows the two speed control units that regulate the electrical supply to the down-flow and inflow fan(s) are positioned on the control panel located on the rear of the front hinged panel see 'Controls' for method of access.

SERVICE AND SPARES

When Contacting our Service Care or Spares Departments to arrange servicing or purchase spares please have the Cabinet Types and Serial Nos. available to enable the correct information to be provided.

Contact Telephone and Fax Numbers

Inland:

Tel: 0161 621 6200
Fax: 0161 624 7547

Overseas:

Tel: 0044 161 621 6200
Fax: 0044 161 624 7547

APPENDIX A

Service Schedule

MAT SERVICE SCHEDULE
MAT Class II Microbiological Safety Cabinets

Schedule of work included in service agreement

1	D.O.P. Test on main filter(s) and seals
2	Change main filters as necessary (Supply and fitting subject to additional charge)
3	Check airflow systems in accordance with methods dictated by relevant British Standards
4	Check and adjust airflow gauge as necessary
5	Check and adjust electrical and electronic controls as related to the airflow system
6	Check and adjust operation of exhaust system as necessary
7	Clean windows, inspect cabinet case and ducting if fitted
8	Optional operator and product protection tests
9	Prepare service report

Above work to be carried out twice each service year
Operator protection factor test carried out once per year unless instructed otherwise

SERVICE CARE DEPARTMENT

Telephone Contact: 0161 621 6200

FAX: 0161 624 7547

APPENDIX B

Drawings and Wiring Diagrams

APPENDIX D

Special Options Fitted To Cabinet