Clean Air Techniek B.V.

User manual

English   Version 02
(valid for software V1.0 and higher)

Series MSC III
Biological Safety Cabinet Class III

Types:

 MSC III 1200

 MSC III 1500

 MSC III 1800

Offers protection for personnel, environment and product.

Before using the safety cabinet, please read this manual carefully. The required instructions have to be carried out first.

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Preface

Congratulations with your new Biological Safety Cabinet from Clean Air Techniek B.V.

This is the user manual of the MSC III Biological Safety Cabinet Class III. The cabinet meets all the latest requirements and the European standard that is necessary for Microbiological Safety Cabinets, the EN 12469:2000.

While developing the MSC III cabinet, we took the wishes and demands of our users into account. The primary function is safety for personnel, product and environment, but also ergonomics, design and ease of use are supplementary criteria. To comply with all these wishes and demands the MSC III has been designed and built. The MSC III is the most progressive safety cabinet currently available.

The EN 12469:2000 describes only the minimum requirements, which creates a base for the high demands Clean Air Techniek B.V. pursuits for its products. The MSC III is a high-quality product constructed with high-grade components and materials, with new techniques, such as:
- Microprocessor control with a LCD display for the interface with the user;
- Automatic up speeding fan (only with option booster fan) when there is increasing resistance in the filter the necessary airspeeds are maintained;
- User-friendly window construction with a hinge mechanism easy to operate.

Furthermore the MSC III is a service friendly installation, produced in the Netherlands.

We thank you for buying this cabinet and wish you good times working with our MSC III Biological Safety Cabinet Class III.

Clean Air Techniek B.V.

Version table

Ver. 02	22-07-08		AK/MP		Update for microprocessor controls
Version:	Date:	From serial number:	By:	Check:	Change:

TOC

1   Introduction

The biological safety workbench is a high-quality product, made of first class materials.

In the class III microbiological safety workbench the operator is separated from the work by gloves which are mechanically attached to the cabinet. Filtered air is continuously supplied and the escape of any airborne particulate contamination is prevented by exhaust and inlet filtration systems.

In this safety cabinet the inlet filter (HEPA & pre-filter) is positioned on the right hand side of the cabinet, providing a stream of sterile air into the cabinet thus avoiding any contamination of materials in the cabinet.

A transfer hatch is provided on the left hand side of the safety cabinet to allow instruments and materials to be passed into the cabinet without breaking the integrity of the unit.

All air that passes the cabinet is exhausted via a pre-filter which is mounted directly under the exhaust HEPA on top of the cabinet. After this the air is exhausted to the exhaust opening with duct connection.

As with every safety aspect, the intended safety also depends on the proper use and maintenance. It is outside the scope of this manual to give you complete instructions on the use of biological safety workbenches. Clean Air would like to answer any question from the users, and wherever possible, give the available information about experiences with the installations by others.

This installation has been designed in conformity with the international standards. The standard, by which this microbiological safety work benches has to function, is the EN12469:2000.

For information about maintenance services you can contact your supplier.

2 Safety

2.1 Use in conformity with regulations

Personnel that is not properly informed about the safety regulation and/or does not meet the requirements mentioned in *§2.3 Authorized persons*, is not allowed to use the cabinet.
Improper use of the cabinet is not allowed.

2.2 Modifications and changes to the installation

In order to operate the installation safely changes and/or alterations shall only be made by Clean Air Techniek B.V., or shall be made after consultation with and permission in writing from Clean Air Techniek. If modifications and changes are made on own initiative, without permission from Clean Air Techniek B.V., the parts of the installation concerned are no longer covered by the warranty. Clean Air Techniek B.V. cannot be held liable for the consequences of the modifications and the dangers, which might possibly occur as a result. The modifications mentioned here include the connection of the installation to an exhaust system.

2.3 Authorized persons

Operating the installation

The cabinet shall only be used by personnel which:
- is familiar with the content, regulations and warnings which are mentioned in this operating manual;
- is familiar with how to operate the cabinet;
- is familiar with the start up procedure, the stop procedure and knows how to react in case of emergency;
- is familiar with the regulations to keep the safety in all circumstances;
- is capable to end a disturbance.

Maintenance and repair general

Maintenance shall only be performed by professional service engineers, who are sufficiently trained to:
- Estimate and avoid the dangers of the installation;
- Estimate the consequences of their actions.

Maintenance and repair of the electrical installation

Professional, electro-technical service engineers, who are sufficiently trained, shall only perform maintenance when:
- They can estimate and avoid the dangers of the installation;
- They can estimate the consequences of their actions;
- They are sufficiently informed about the operation of the installation and the operation of the sub-systems.

2.4 General safety aspects

1. The installation shall never be used for any (micro-) biological or any other potentially dangerous work, unless it is switched on, the window and transfer hatch are closed and there is no alarm.

2. The window shall never be opened, while work is performed in the installation.

3. When it is necessary to transfer material in or out of the working area, it is recommended to close the internal and external doors of the transfer hatch as soon as possible. Never open two hatch doors at the same time.

4. When the installation is not used, the installation shall always be closed, to prevent that dust particles etc. from the room can get into the installation (or worse: material from the installation can get into the room).

5. Always try to limit the amount of equipment in the workspace. Each object in the workspace will disturb the pattern of the airflow and a large number of equipment may lead to serious disruptions.

6. Do not use a centrifuge in the workspace. Even a small centrifuge is large in comparison with the work surface and its presence may seriously disrupt the airflow. In addition, all centrifuges themselves create an airflow, which may fling particles out of the casing.
In this case, the protection of the product cannot be guaranteed.

7. When homogenizers are used in the installation, all reservoirs have to be secured by screw connections, so that a sudden emission of fluids or aerosols will be avoided. To protect the personnel, glass reservoirs are suitable for protection. High-speed homogenizers may cause air turbulence, as do centrifuges.

8. Always use a chair with the correct height. This enables the personnel to have a good view through the window.

9. It is important to keep the biological safety cabinet clean. Minor contaminations are not always immediately visible and could easily be forgotten. This increases the possibility that potentially infective material is left behind and may cause serious contamination of the interior of the installation or worse. Regularly clean the work area. In case of doubt consider disinfection or contact Clean Air Techniek B.V. about the possibilities.

10. When the installation has been disinfected, for instance with the FAS, formaldehyde solution may be left in the installation for some time after the blower has been switched on. This is the reason why the installation has to work for about 10 minutes to remove all of the formaldehyde gas. Formaldehyde may crystallize into paraformaldehyde, which may decompose very slowly into formaldehyde gas, with negative consequences for the next experiment. We therefore advise you to run the installation unused for about one day after the cleaning with formaldehyde solution.

11. Transport and installation of the cabinet is only allowed for authorized staff. Please contact the manufacturer or the seller of the products.

2.5 Explanation user safety symbols

	GENERAL DANGER You can harm yourself and others seriously if you do not follow the procedures carefully.
	DANGER FOR ELECTROCUTION
	BIOLOGICAL DANGER
	DANGER OF EXPLOSION
	DANGER BY INDUSTRIAL VEHICLE

3   Installation (& Transport)

3.1   Transport regulations

- Power and control cables have to be disconnected by a professional serviceman
- The installation has to be transported on a strong pallet.

> **Careful!!**
>
> **- Any transportation of the installation has to be done by means of a fork-lift truck or pallet truck (the installations (components) have to be placed on a pallet, preferably).**
> **- Make sure that the lift forks are placed under the installation at the centre.**
> **- Make sure that the installation does not slip off the lift forks during transport.**

- After each transport, the installation has to be tested and regulated again.

3.2   Setting up the installation

	GENERAL DANGER
⚠️	Be careful: high centre of gravity, crossover point. Never hinge the window, as long as the cabinet is not placed on the support frame

The cabinet must be installed in a safe way. Clean Air Techniek B.V. supplies an optional support frame, which is designed for this purpose.
When the cabinet is purchased without a support frame, it is advised to discuss the installation with the supplier.

3.3   Assembly-instruction

The cabinet has to be placed on the support frame recommended by the supplier. The assembly needs to be done as specified in instruction underneath.

Assembly support frame

Build the support frame (see also *Appendix I: Support frame MSC III on page 58* for an explaining drawing):

- Make sure that the legs of the support are equally supporting and that the installation is levelled (when the floor is not level, the legs have to be adjusted).

Placing the cabinet

⚠	**DANGER BY INDUSTRIAL VEHICLE** Be careful: Make sure the cabinet cannot slide from the forks.

- Place the cabinet right on the forks of a forklift truck or lifting platform (See Figure 1 Installation of the cabinet);
- Place the installation directly on the lift forks of the fork-lift truck or lifting platform. Make sure that the installation does not slip off the lift forks.
- Lift the cabinet up. Take away the wooden pallet.
- Now place the installation on the support.
- Assemble the installation to the support by means of the two bolts.
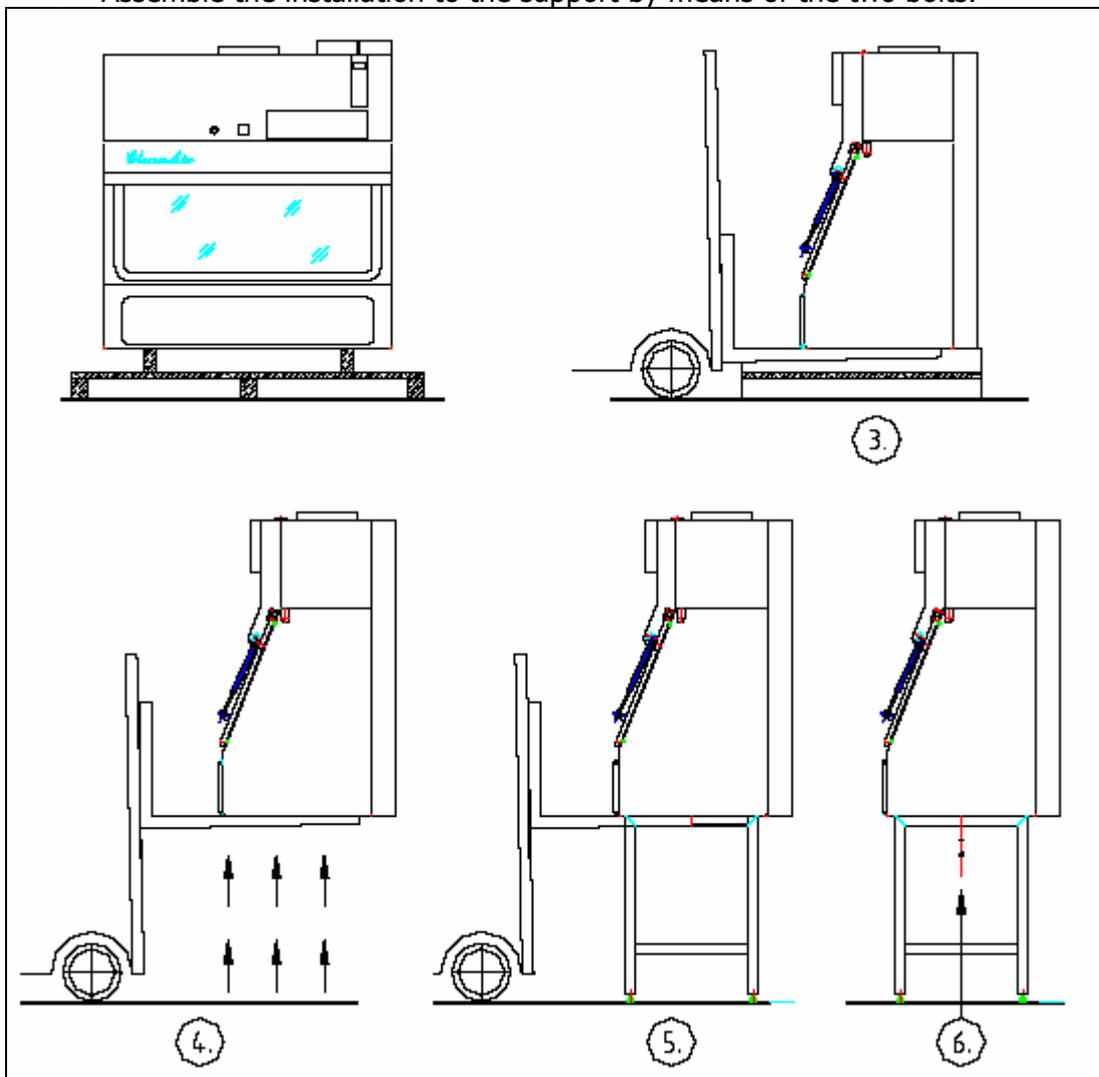
Figure 1 Installation of the cabinet

- Connect the wire to a grounded socket that is easy accessible (but be locked).
- Make the connection to the ducting for exhaustion.
- Remove the pre-filter cover from the right hand side of the cabinet.

> **ATTENTION!!**
> **Before the installation is put into operation, it has to be tested and regulated.**

3.4 Dismantling & Disposal

For dismantling and disposal follow the next instructions:
- *See § 8.1 Cleaning the installation on page 45;*
- See *§ 9.2 Replacement of the pre-filter on page 48*;
- *See Appendix II: Disinfection on page 59;*
- *See Appendix III: Replacement of the HEPA-filters on page 60;*
- Break the unit down into its component parts. You can re-cycle these components parts, dispose of them in accordance with local requirements.

For advice or information about dismantling or disposal please contact Clean Air Techniek B.V.

4   Product description

1.   Type plate
2.   Body of the installation
3.   Main power-connection
4.   Hinged window with clamps
5.   Operating panel
6.   Light hood
7.   Socket outlet(s)
8.   Transfer hatch
9.   External door
10.   Internal door
11.   Glove
13.   Gasspring
14.   FL light
15.   Electronics print and motor regulation
16.   Inlet HEPA-filter
16.1   Inlet pre-filter
17   Disinfection cover
18.   Pre-filter
19.   Access hatch (front)
20.   Pre-filter grid
21.   Plenum construction
22.   Exhaust HEPA-filter
23.   Spindle
26.   Earth connection
27.   Glove port panel
28.   Connection flue gas generator/photometer
33.   UV-armature
39.   Pressure gauge
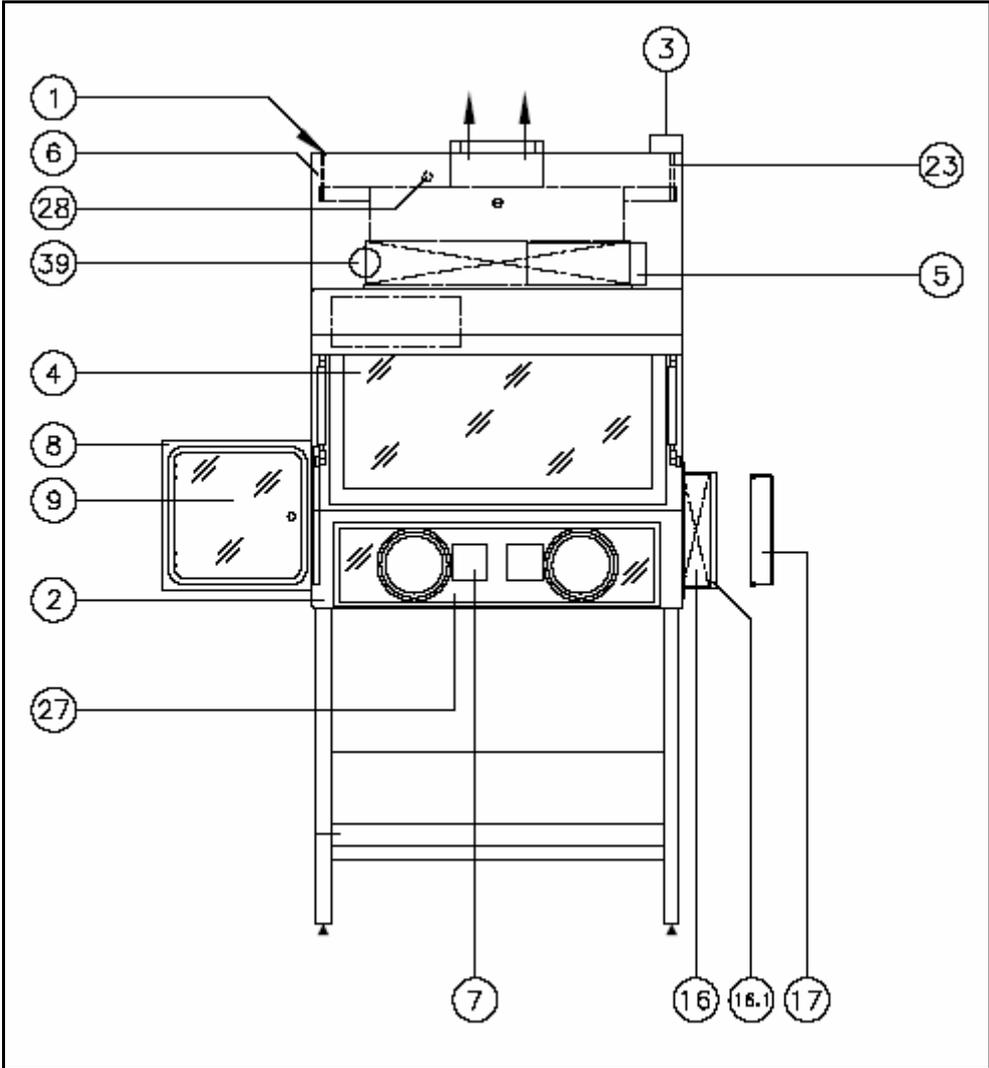
Figure 2 Front view of MSC III
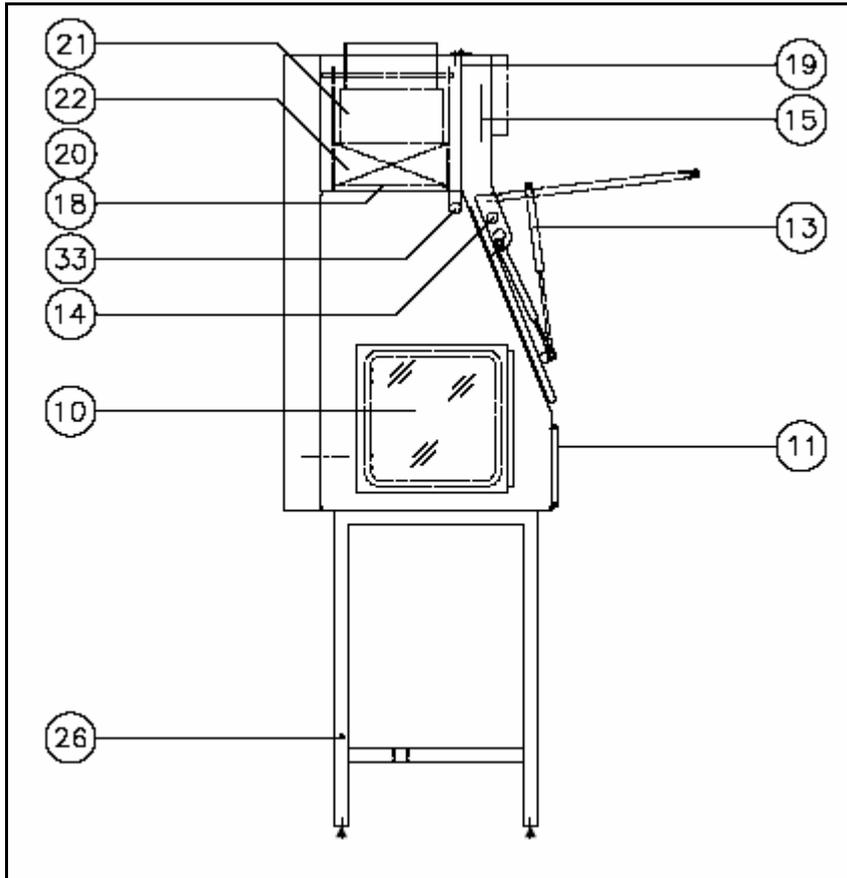
Figure 3 Side view MSC III

4.1 Type plate

The type plate (Pos. 1) mentions instructions that are important for the connection of the biological safety cabinet. See *Appendix VII:* Stickers *on page 68*.

4.2 Body of the installation

The body of the installation (Pos. 2) is made of epoxy-coated steel (optional stainless steel). The body is leak tight as per LI-C (table 1 and 4 of the EN 12469:2000-standard). The body has been tested according to the method described in annex of the EN 12469:2000-standard.
The light hood and support of coated steel.

4.3 Electrical connections

The main power connection is positioned on the top of the cabinet (Pos. 3, 3.1, 3.2). The cord length is maximum 3 meters and should always be accessible. See *§10.2 General specifications on page 54* for details*.*

4.4 Hinged window with clamps

The hinged window is a tightly closing (safety-) glass window inside an aluminium frame (Pos. 4 and 13). After opening the window, it <u>always</u> has to be closed with <u>all</u> the clamps. The window has been constructed as a hinged window for the purpose of cleaning it and for putting large objects into the installation. The window is kept in open position with the gas springs (position 13).

4.5 Operating panel

The operating panel makes sure that the biological safety workbench, in the case of power failure, maintains the last preset status of work mode.
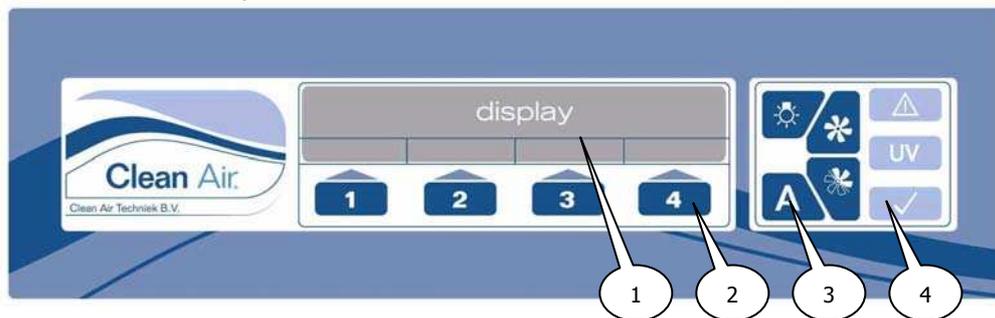
Figure 4 Operating panel

The operating panel (Pos 5 and Figure 4) consists of:
  1. Display;
  2. Function keys (4x);
  3. Fixed keys (4x);
  4. Signals.

4.6 Top hood with pressure gauge

In and behind the top hood a number of electrical components are assembled (position 6 and 39).
- FL lighting
- Operating panel / operating board
- Interface board, including engine control
- Pressure transmitter
- Pressure gauge
- Additional Option print.

If you wish to check one of these components, you need to hinge the top hood.
To check the interface board, the safety-cover has to be taken away (authorized service personnel only).

> **ATTENTION! OBSERVE PRECAUTIONS, ELECTROSTATIC SENSITIVE DEVICES!   THERE IS THE RISK OF A SHOCK AS LONG AS THE POWER PLUG HAS NOT BEEN DISCONNECTED.**

4.7 Socket outlet(s) (optional)

The sockets are assembled on the back wall of the working area.
They can be operated at the control panel. See *§10.2 General specifications on page 54* for electrical details. You have to consider the fact that after the biological safety workbench has been switched off, this function has to be activated each time, via the button on the operating panel.

4.8 Transfer hatch (position 8, 9, 10)

The transfer hatch (lxhxb=400 x 400 x 400 mm) is made of stainless steel, type 304 or epoxy coated steel. The internal and external doors are made of polycarbonate inside an aluminium frame.

4.9 Gloves and leak test cap (position 11, 12 and 27)

Underneath the window there is a separate polycarbonate panel inside an aluminium frame (position 27) with two (type MSC III 1200) or four (type MSC III 1500 and 1800) glove openings 170 mm diameter to fix the gloves to.

4.10 FL lights (position 14)

The Fluorescent-lighting (Pos 14) is assembled inside the top hood.
The hood can be tipped up and the FL-light can be removed.

ATTENTION! OBSERVE PRECAUTIONS, ELECTROSTATIC SENSITIVE DEVICES! THERE IS THE RISK OF A SHOCK AS LONG AS THE MAIN SWITCH HAS NOT BEEN SWITCHED OFF.

4.11 Electronics

The electronics (Pos. 15) consist of:
- Operational print; positioned in the top hood behind the operating panel;
- Control print, positioned under the top hood, behind the safety-cover, including:
  - Fuse holders (see *§10.2 General specifications on page 54* for fuse-numbers).
  - Fan control. The control is free adjustable in the range between 0% and 100%
  - Independent potential free output contact (interface board connector J6). See *Interface board on page 66.*
  - Mains filter
  - Light ballast+ starter for UV (Option)
  - Light ballast for FL-light
  - Option board (see *Appendix VI: Lay-out boards on page 66*)

4.12 *Filter systems*

Both the applied inlet filter (Pos. 16) and the exhaust filter (Pos. 22) are filters with a very high efficiency. Class H14 in accordance with EN1822. After assembling, each filter will be tested separately according to EN12469:2000, Annex D.
The exhaust HEPA-filter can be replaced via the front of the installation after opening the access hatch (Pos. 19).
Both inlet and exhaust filters are protected by pre filters (Pos. 16.1 and 18). The pre-filter will enhance the life span of the HEPA-filter significantly. During disinfection the inlet opening has to be covered with the disinfection cover (Pos. 17).

4.13 *Disinfection facilities (optional)*

FAS

In the back partition of the internal working area a electrical socket outlet (Pos. 7) is mounted which is to be used for the (portable-) disinfection unit FAS. The connections are under power as soon as the cabinet is in switched of. All other functions of the workbench are now disabled! For the disinfection procedure we refer to Appendix II: Disinfection on page 59.

VHP

VHP connections are mounted on the exhaust duct and on the disinfection cover.

4.14 *External booster fan (optional)*

A external booster fan can be mounted on top of the cabinet, so that the cabinet can work stand alone.

4.15 *Support frame (optional)*

For a stable positioning of the cabinet, we strongly recommend the use of the especially designed support frame from the supplier (Pos. 26).
This support frame includes an in steps adjustable feet support for a good ergonomically work position. As well, the feet support will increase the stability of the cabinet. In addition, it is recommended to use an in height adjustable, well disinfectable, chair to optimize the work position.

4.16 *Back side*

The back side can be used to get access to:
• Optional fittings;
• Sockets.

		GENERAL DANGER / BIOLOGICAL DANGER Cabinet must be disinfected before removing the back side components

4.17 Fan

The MSC III is not equipped with a fan. An external fan is controlled via I/O board.

4.18 Optional Fittings

Gas connection (Not available on the MSC III cabinets)

Bunsen burner lead-through set (Not available on the MSC III cabinets)

Vacuum connection

This connection is always assembled in combination with a vacuum tap, at the back of the work area. This outlet can be assembled by customer request in the bottom, left or right side panel or top of the installation.

UV light

The UV light is meant for disinfection of the working surface of the safety cabinet.

When the UV light switches on, the FL lighting switches off. The UV light may only be switched on when the window is closed (hatch doors have to be closed as well) or when the cabinet is in disinfection mode, this makes sure the user will not get in contact with UV-C radiation.

The UV switch-function [4] is only visible when the FL lights are switched of.

	DANGER FOR BURNING Avoid direct contact with UV-C radiation. This causes burns to the skin and eyes.
- DANGER - **UV-C** RADIATION PROTECT EYES AND SKIN UV-C	
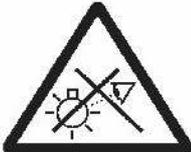
The UV light can be switched on and off on the display (see *§6.5 Control UV (optional) on page 25*). It is also possible to adjust the UV disinfection, for each day a certain disinfection period can be defined (see *§6.8 Set up 7 days clock UV on page 27*).

UV **Watch Out!**	Do not touch the UV-lamp with the hand and keep the lamp fat free; otherwise the lifetime will decrease. The UV-light must be cleaned with alcohol (70%) regularly (switch off the installation). *See §8.2 Cleaning the UV-light (optional) on page 46.*

When the UV is switched on, the UV hour counter counts the lighting period. UV-lamps have, depending on fabricate and type, a limit in effective running hours. Replace the lamp frequently.

Alternative Options

Please contact Clean Air Techniek B.V. for information about alternative options.

5   Control

5.1 Using the cabinet

Check if the information on the type plate is corresponding to the main power connection.
Connect the cabinet to the main connection by putting the plug into a grounded socket that is
easy accessible.

5.2 Cabinets positions

1		<u>Window</u> Open the window, Hinge the window, the top hood will open automatically.
2		<u>Hatch*</u> Close the inner hatch, Open the outer hatch, Load the hatch, Close the outer hatch.
2		<u>Hatch*</u> Close the outer hatch, Open the inner hatch, Load the hatch, Close the inner hatch.
3		<u>Disinfection:</u> Window and hatch are closed, inlet HEPA-Filter is closed.
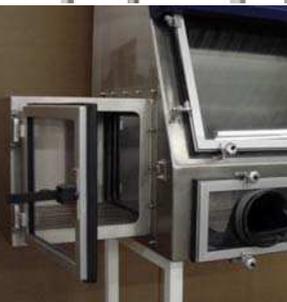
*) To transfer materials in and out the cabinet you have to use the transfer hatch. Never open two
hatch doors at the same time.

6   Starting up the cabinet
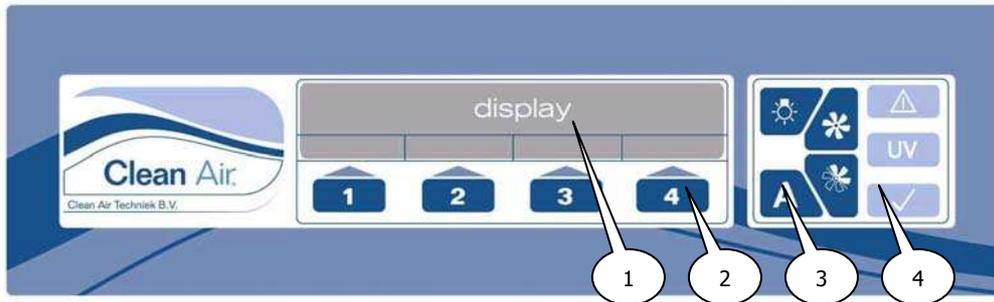
Figure 5 Display Interface

The operating panel (Figure 4 & Figure 5) consists of:
1. Display;
2. Function keys (4x);
3. Fixed keys (4x);
4. Signals.

Display:

The display has 4 lines, the lowest line gives the description of the function key underneath.
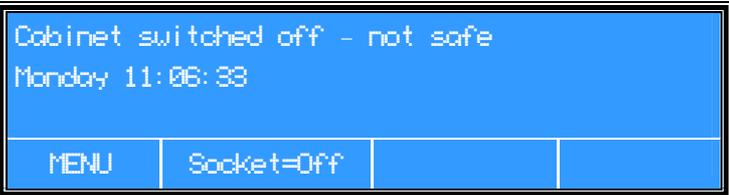
Fixed keys:

☼	Lighting ON/OFF
✳	Work mode fan ON/OFF
✳	Power save mode fan ON/OFF (is not available for MSC III –series)
A	Acknowledge / Enter

Function keys:

The function of keys 1, 2, 3 and 4 is variable. In the last line of the display the function is shown.

Signals:

⚠	Alarm: Confirmed alarm state Alarm, flashing (along with acoustic signal): Actual alarm
UV	UV: Indication UV-light switched on
✓	OK: Safe user mode

All equipment and, if possible, all materials required for working with a safety cabinet need to be placed into the installation before starting up the cabinet. Equipment or objects with a height up to +/- 300 mm can be placed in the working space by use of the hatch. In case of larger objects the window can be hinged (+/- 500 mm in height) . Be careful: keep the safety regulations in consideration.

> **ATTENTION!**
> **After opening the window, it <u>always</u> has to be closed with <u>all</u> the clamps.**
>
> **Otherwise there is the risk of any contamination getting in or out of the cabinet!**

6.1 Start the cabinet

1	Connect the power cable. The lighting of the display will light up.	Cabinet switched off – not safe Monday 11:06:33 <-250 Pa> MENU Socket=Off The alarm indicator light is red ⚠.
2	Close the window in the working position, close the clamps, close the doors of the hatch.	
3	If the cabinet is secured with a user code, this code has to be entered first. Confirm the code with button **A** . The default code is 0001.	• Enter actual user code. User code: 0000 (Enter code) A = Enter >> + - Esc The user code can be changed by the user, see *§ 6.10 Change the user code on page 40*.
4	Push button ✳ . To acknowledge this alarm, push button **A** .	The fan starts (only if booster fan is installed that is controlled by the option print). Cabinet is in start up mode. Starting to work mode – not safe Monday 11:06:33 <-250 Pa> MENU Socket=Off The alarm indicator light is red ⚠. There is an acoustic alarm.
5	Push button ☀ .	The light will switch on.
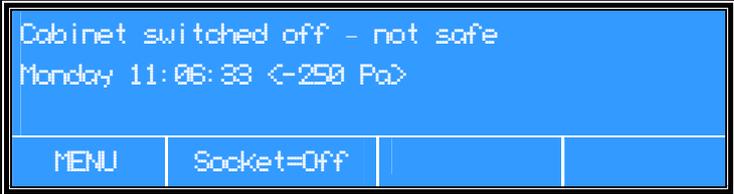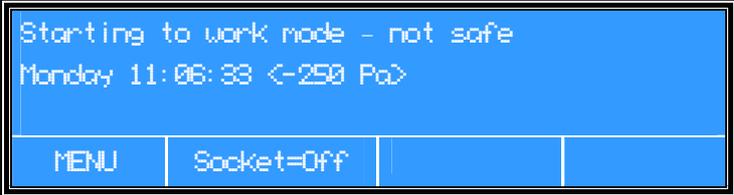
6	When the fan has reached the right airspeed and the pressure is OK, the alarm indicator will disappear. The following display will be shown.	Cabinet in work mode – safe Monday 11:06:33 <-250 Pa> MENU | Socket=Off | | However, the cabinet must operate for minimally 15 minutes more, before the cabinet is ready to work in.
7	If, after 10 minutes, the air speeds still are not right, the alarm will sound again. To see what is wrong: See § 6.9 on page 35 for more info about this menu.	Starting to work mode – not safe Monday 11:06:33 <-250 Pa> MENU | Socket=Off | | • Push button **1** (Menu). A => Hour counter information B => Status cabinet C => Settings A | B | C | Esc • Push button **2** (B). Information Status Cabinet A = Enter => | <= | | Esc • Push button **A**. Cabinet: Work mode Pressure work area: -233 < -200 Pa Flow rate work area: 0.53 m/s > 0.40 m/s => | <= | | Esc • Back to starting menu: button **4** (Esc).
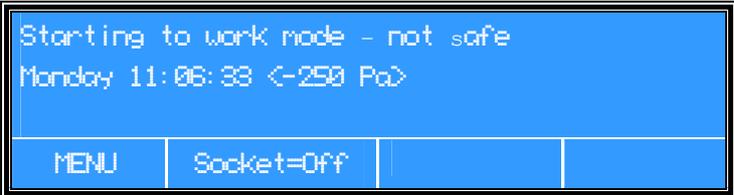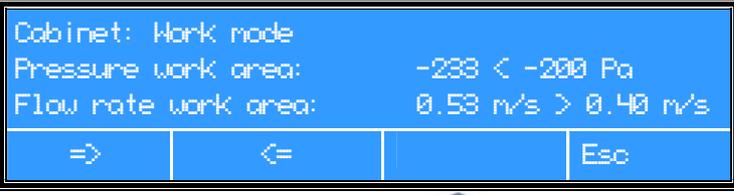
6.2 Locking functions cabinet

(Only when the locking function is activated)

1	The cabinet will lock its functions after being 5 minutes in work position.	When, within these 5 minutes, an arbitrary button is pushed (e.g. lighting) the timer starts counting again.
2	From this moment the fan-buttons are not available anymore. The user code has to be entered to make the functions available again.	Cabinet in work mode – Safe Monday 11:06:33 Cabinet is locked with pin code MENU | Socket=Off | | See *§6.10 Change the user code on page 40*

3	If the cabinet has to be locked immediately after entering the code; push button ![A] for 5 seconds.	After 3 seconds, two short beeps will be heard as an acknowledgement the cabinet has been locked.
4	To unlock the cabinet, the user code has to be entered again.	See *6.10 Change the user code on page 40.*

6.3 Power save mode (Not available for MSC III-series)

6.4 Turn off

1	Push button ![*] to turn off the cabinet.	The display will ask for the user code (only when the user code is activated).
2	Enter the user code and push button ![A].	Cabinet switched off - Not Safe Monday 11:06:33 <-150 Pa> MENU　　Socket=Off
		The fan will be switched off.
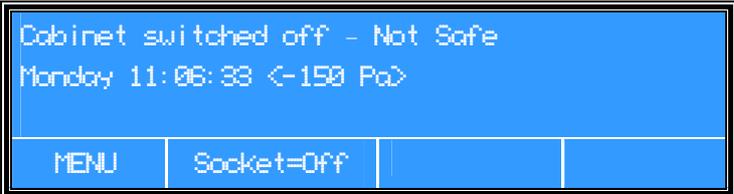
6.5 Control UV (optional)

The UV-function is only visible if this option is installed. The window has to be closed. In all other cases, the UV will be switched off and the function at the display is invisible.
UV may only be switched on with a closed window and hatch!
This prevents direct contact on the skin or eyes of the personnel.

Switching UV on:

1	The window and hatch must be closed with clamps. The cabinet must be switched off.	
2	The display shows "UV=Off". Push button ![4] (UV=Off). The UV will switch on.	Cabinet switched off - Not Safe Microbiological Safety Cabinet UV switched on MENU　　Socket=Off　　　　UV=On
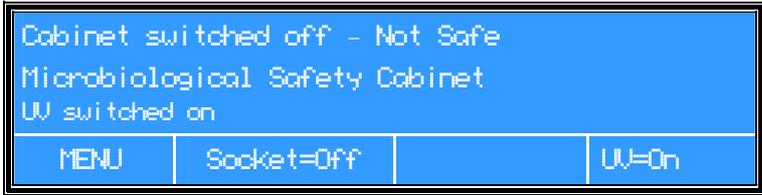
Switching UV off:

3	The display shows "UV=On". Push button **4** (UV=On). The UV will switch off.	Cabinet switched off – Not Safe Microbiological Safety Cabinet UV switched off MENU | Socket=Off | | UV=Off
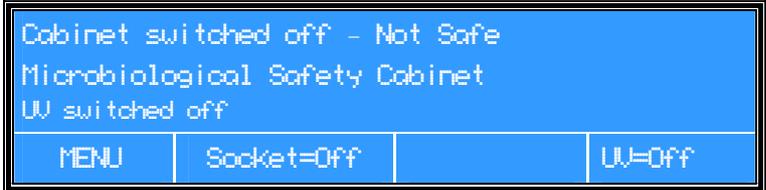
FL (Fluoresced lamp)-Lighting and UV cannot be switched on both at the same time. As a safety precaution, one of them will automatically switch off.

6.6 Control Gas supply (Not available on the MSC III cabinets)

6.7 Control sockets

The sockets can always be switched on and off. If the cabinet is switched off, the sockets are automatically switched off.
See technical specification (see *§10.2* General specifications *on page 54*) for maximum voltage and current (fuses).

Switching Socket on:

1	Cabinet is in work mode.	Cabinet in work mode – Safe Monday 11:06:33 MENU | Socket=Off | |
2	Push button **2** (Socket=Off). The display shows: Socket=On. Power of socket is switched on.	Cabinet in work mode – Safe Monday 11:06:33 Socket switched on MENU | Socket=On | |

Switching Socket off:

3	Push button **2** (Socket=On). The display shows: Socket=Off. Power of socket is switched off.	Cabinet in work mode – Safe Monday 11:06:33 Socket switched off MENU | Socket=Off | |

6.8 Menu functions

Hour counter information and reset (FL, UV, Timer):

1	Cabinet in work mode.	Cabinet in work mode - Safe Monday 11:06:33 MENU | Socket=Off | | • Push button **1** (Menu).
2		A => Hour counter information B => Status cabinet C => Settings A | B | C | Esc • Push button **1** (A).
3	Hour counter display shows.	Hour counter information A = Enter => | <= | | Esc
4	Push button **A**. Hour counter information shows.	Cabinet in use: 0:33 A: FL in use: 0:22 B: UV in use: 0:00 => | Reset A | Reset B | Esc *FL= Fluoresced lamp
	There are three different possibilities, see 5a, 5b and 5c.	
5a	Reset <u>all</u> timer and clock adjustments?	• Push button **1** (=>). Reset hour counter and clock => | | Reset | Esc • Push button **3** (Reset). • Push 2x button **4** (Esc) for starting menu.
5b	Reset FL counter?	• Push button **2** (reset A). • Push button **1** (Reset). • Push 2x button **4** (Esc) for starting menu.
5c	Reset UV counter?	• Push button **3** (reset B). • Push button **1** (Reset). • Push 2x button **4** (Esc) for starting menu.
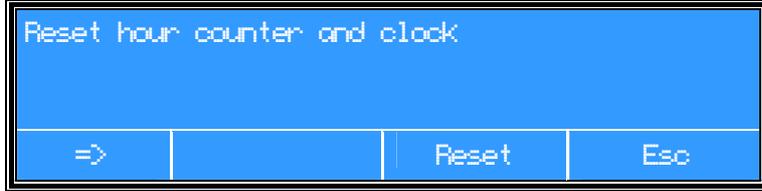
Set up 7 days clock UV

1	Cabinet in work mode. Push button ▲1 (Menu).	Cabinet in work mode - Safe Monday 11:06:33 MENU | Socket=Off | |
		A => Hour counter information B => Status cabinet C => Settings A | B | C | Esc
		• Push button ▲1 (A).
		Hour counter information A = Enter => | <= | | Esc
		• Push button ▲1 (=>).
		Set up for 7 days clock A = Enter => | <= | | Esc
		• Push button A.
	Set up for 7 days clock UV shows.	UV-Function: Disabled Timer | Clock | Disable | Esc

There are three ways to set the UV:
- 2a. Timer
- 2b. 7 days clock
- 2c. Disable

Timer

2a	The timer sets a period until the UV turns off.	• Push button ▲1 (Timer), to set up the timer. • Push button ▲3 (Change), to change the time. • The value can be changed by pushing button ▲1 (>>), ▲2 (+) or ▲3 (-). • Acknowledge the setting with button A. • Push 2x button ▲4 (Esc) for starting menu.

Clock (7 days clock)

2b	With the clock function, for each day of the week, you can set a variable period for the UV to be	• Push button ▲2 (Clock), to set up the 7 days clock.

	switched on. Keep in mind, you have to set the starting hour and starting minute for each day separately! For detailed information regarding programming this menu, *see §6.8 Set up 7 days clock UV on page 28* .	• Push button ▲3 (Change), to change starting time en ending time. • The value can be changed by pushing button ▲1 (>>), ▲2 (+) or ▲3 (-). • Acknowledge the setting with button A. • Push 2x button ▲4 (Esc) for starting menu. See also the Example on page 30.
	Disable	
2c	By pushing on "Disable" the UV can only be turned on and off manually. By pushing on button UV .	• Push button ▲3 (Disable), to set the UV manually. • Push 2x button ▲4 (Esc) for starting menu.

Please select not only a starting time, but also an ending time. Otherwise the UV will stay on until 0:00 h and only then turn off. See also the *Example on page 30.*

Example

Programming the 7 days clock UV will be given as an example.

Switch on the UV Tuesday evening 10 pm and switch off the UV Wednesday morning 6 am.

(See *§6.8 Hour counter information and reset (FL, UV,* Timer): *point 5a on page 27,* for deleting all Hour counter programmed information).

1	Cabinet in work mode. See*: Starting up the cabinet on page 22.*	Cabinet in work mode - Safe Monday 11:06:33 MENU | Socket=Off | | • Push button ▢1 (Menu).
	Set up for 7 days clock UV shows.	A => Hour counter information B => Status cabinet C => Settings A | B | C | Esc • Push button ▢1 (A). Hour counter information A = Enter => | <= | | Esc • Push button ▢1 (=>). Set up UV 7 days clock Function: Clock A = Enter => | <= | | Esc • Push button [A]. UV-Function: Disabled Timer | Clock | Disable | Esc

2	Set up the UV 7 days clock	• Push button **2** (Clock) for setting up the UV 7 days clock.
		Saturday UV on: 0:00 UV off: 0:00 Change Esc
		• Push button **3** (Change) for changing the start and end time.
		Saturday UV on: 00:00 UV off: 0:00 A = Enter >> + - Esc
		• The value can be changed by pushing button **1** (>>), **2** (+) or **3** (-).
3	Set up UV **starting time Tuesday evening 10 pm**.	• Saturday has to be changed into Tuesday, UV starting time at 10 pm and UV off at midnight. The display shows:
		Tuesday UV on: 22:00 UV off: 0:00 A = Enter >> + - Esc
		• Acknowledge the setting with button **A**.
		Hour counter information A = Enter => <= Esc
		• Push button **1** (=>), then button **A**, then button **2** (Clock) and then button **3** (Change).
	Set up UV switching of on **Wednesday morning 6 am**.	• Tuesday has to be changed into Wednesday, UV starting time at midnight and UV off at 6 am. The display shows:
		Wednesday UV on: 00:00 UV off: 6:00 A = Enter >> + - Esc
		• Acknowledge the setting with button **A**.

		Hour counter information A = Enter => | <= | | Esc
		• Push 2x button **4** (Esc) for starting menu.
4	Control of programmed UV Clock	• Push 3x button **1** (Menu).
		• Push button **A**.
		• Push button **2** (Clock), for checking the UV clock (day by day).
		Wednesday UV on: 0:00 UV off: 0:00 | | Change | Esc
		• Push button **3** (Change), to see what has been programmed.
		Wednesday UV on: 22:00 UV off: 0:00 A = Enter >> | + | - | Esc
		• The value can be checked by pushing button **1** (>>), **2** (+) or **3** (-).
		• Important! **Don't touch** **A**, only use 2x button **4** (Esc) to go back to the main menu.

Set up socket 7 days clock:

1	Cabinet in work mode. See: *Starting up the cabinet on page 22.*	**Cabinet in work mode – Safe** Monday 11:06:33 MENU | Socket=Off | |
		• Push button **1** (Menu).
		A => Hour counter information B => Status cabinet C => Settings A | B | C | Esc
		• Push button **1** (A).

	Set up display for socket 7 days clock shows.	Hour counter information A = Enter => <= Esc • Push 2x button **1** (=>). Set up socket 7 days clock Function: disabled A = Enter => <= Esc • Acknowledge the setting with button **A**. Socket function: Disabled Timer Clock Disable Esc

There are three ways to set the sockets:
- Timer
- 7 days clock
- Disable

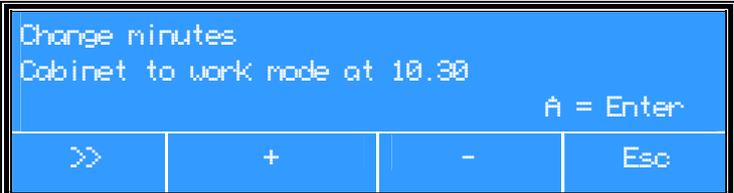|		
2	See *§6.8 Set up 7 days clock UV on page 28 and further.* See also the *Example for programming the UV-lamp on page 30.*	The timer function needs to be activated first, otherwise the sockets will not switch on.

Set up cabinet 7 days clock

With this menu it is possible to program an automatic switch action on of the cabinet. It is however not possible to switch off the cabinet itself automatically!

1	Cabinet in work mode. See*: Starting up the cabinet on page 22.*	Cabinet in work mode – Safe Monday 11:06:33 MENU Socket=Off • Push 5x button **1** (1x Menu, 1 x A and 3x =>), Setting cabinet 7 days clock Function: disabled A = Enter => <= Esc • Acknowledge the setting with button **A**,

		Tuesday Cabinet to work mode at 0.00 `Disable` `Change` `Esc`
2	Disable	• Push button **2** (Disable), to reset all previous settings.
3	Change days:	• Push button **3** (Change), to change the day. Tuesday Change day Cabinet to work mode at 0.00 A = Enter `>>` `+` `-` `Esc` • The value can be changed by pushing, **2** (+) or **3** (-).
4	Change hours:	• Push button **1** (>>) to change the time. Change hours Cabinet to work mode at 10.00 A = Enter `>>` `+` `-` `Esc` • The value can be changed by pushing button **2** (+) or **3** (-).
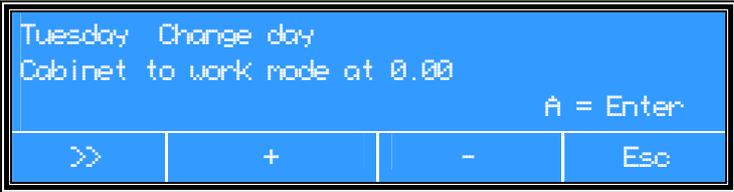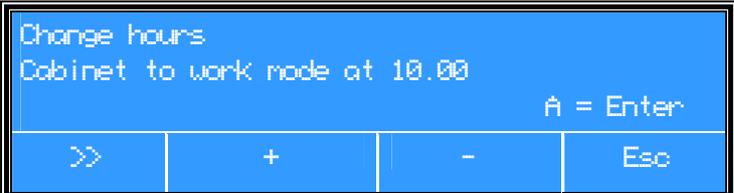
5	Change minutes:	Thursday
		Cabinet to work mode at 10.00
		
		`=>` `+` `-` `Esc`
		
		• Push button **1** (=>) again, to change the minutes.
		
		Change minutes
		Cabinet to work mode at 10.30
		A = Enter
		`>>` `+` `-` `Esc`
		
		• The value can be changed by pushing button **2** (+) or **3** (-).

6	Acknowledge the setting.	Acknowledge the setting with button **A**. Push 2x button **4** (Esc) for starting menu.

For more days / hours / minutes, walk again through the menu and confirm each time.
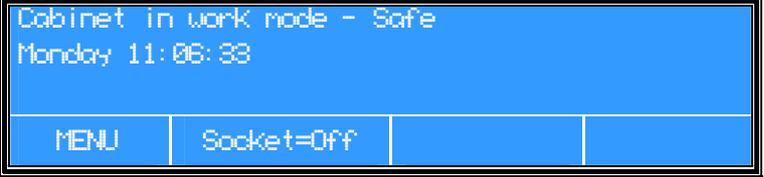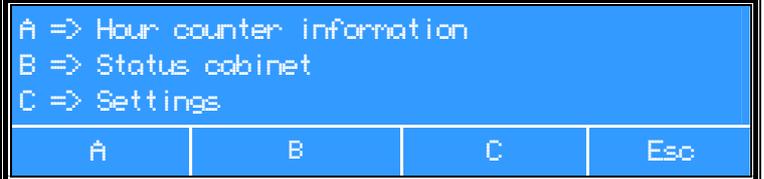
Set up actual time:

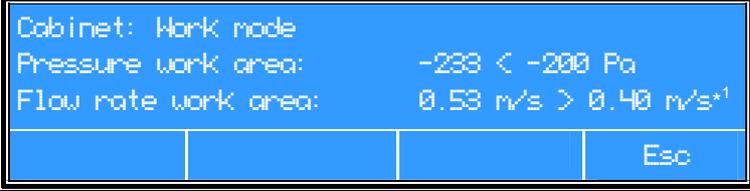|		
1	Cabinet in work mode. See: *Starting up the cabinet on page 22.*	Cabinet in work mode - Safe Monday 11:06:33 MENU Socket=Off

2	Set up actual time:
	
	Set up display the actual day shows.
		• Push 6x button ⬜**1** (1x Menu, 1 x A and 4x =>).
		
		Set up actual time
		Monday 11:06:33
		          A = Enter
		=> + - Esc
		
		• Acknowledge the setting with button **A**.
		
		Set up actual time change day
		Monday 11:06:33
		          A = Enter
		>> + - Esc
		
		• Push button ⬆**1** (=>).
		• The day can be changed by pushing button ⬆**2** (+) or ⬆**3** (-).

3	Change hours/min/sec: Set up display set up the actual time shows.	• Push button ⬜**1** (>>) again. • The hours/min/sec can be changed by pushing button ⬆**2** (+) or ⬆**3** (-).
4	Acknowledge the settings	• Acknowledge the setting with button **A**. • Push 2x button ⬜**4** (Esc) for starting menu.

Actual time appears when there are no more alarms.
In case of power failure, actual time is kept in memory for one month.

6.9 Information status cabinet

In this menu the settings of the cabinet can be checked to inform service personnel.

1	Cabinet in work mode. See: *Starting up the cabinet on page 22.*	Cabinet in work mode - Safe Monday 11:06:33 MENU Socket=Off • Push button ⬜**1** (Menu). A => Hour counter information B => Status cabinet C => Settings A B C Esc

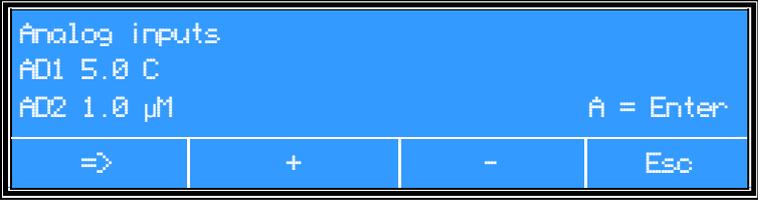|		
		Push button **2** (B).

2	Status Display:	Information status cabinet
		
		                   A = Enter
		
		  => <= Esc
		Status display shows

3	Status Information *[1]: Pres.: -233 < -200 Pa Flow. 0.53 m/s > 0.40 m/s (Example with colours)	• Push button **A**. Cabinet: Work mode Pressure work area: -233 < -200 Pa Flow rate work area: 0.53 m/s > 0.40 m/s*[1] Esc Status information cabinet shows (see example). • Left numbers are the actual air speeds (yellow); • Right numbers are the set up alarm borders (red).
4		• Push button **4** (Esc) for starting menu.

*[1]) This value is type specific. According to Annex K.4 airflow should not be less than 3 m^3/min for each cubic metre of the cabinet volume.

Information about the installed options

(The display only shows when the options are installed)

1	Cabinet in work mode.
	See: *Starting up the cabinet on page 22.*
		Cabinet in work mode - Safe
		Monday 11:06:33 <-250 Pa>
		
		  MENU Socket=Off
		
		• Push button **1** (Menu).
		
		A => Hour counter information
		B => Status cabinet
		C => Settings
		
		  A B C Esc
		• Push button **2** (B).

2	Information about the installed options is given (example):	Information status cabinet
		
		                   A = Enter
		
		  => <= Esc
		• Push button **1** (=>).

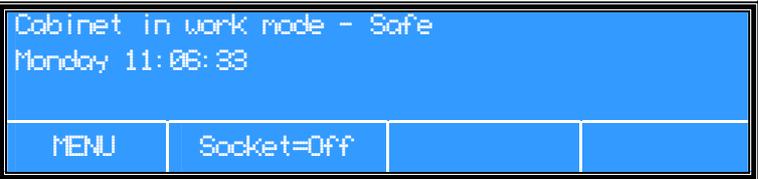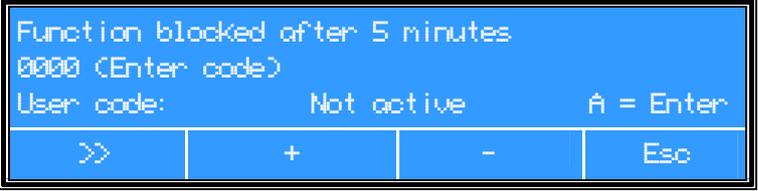|		
		Installed Options 1 Socket present, UV inst. 1 flow sens., 1 press. sens | => | <= | Option | Esc |
	From here there are 3 possibilities (examples): - 3a. Screen I - 3b. Screen II - 3c. Screen III	
3A	Options **Screen I** Starting up from Step 2	Installed Options 1 Socket present, UV inst. 1 flow sens., 1 press. sens | => | <= | Option | Esc | Installed options display shows. • Push button **3** (Option). Option Exhaust fan Relays #C2 | | | | Esc | For explanation codes see *Appendix VIII: Information installed options on page 69*. • Push 2x button **4** (Esc) for starting menu.
3B	Options **Screen II** Starting up from Step 2	Installed Options 1 Socket present, UV inst. 1 flow sens., 1 press. sens | => | <= | Option | Esc | Installed options display shows. • Push button **1** (=>). Installed Options Relays #A1 Relays #B1 | => | <= | | Esc | For explanation codes see *Appendix VIII: Information installed options on page 69*. • Push button **4** (Esc) for starting menu.
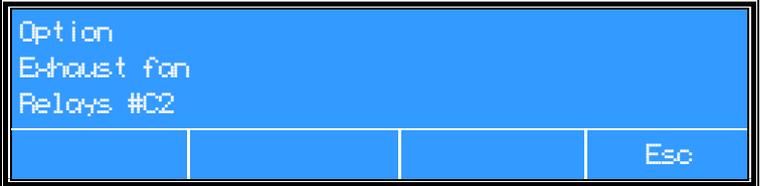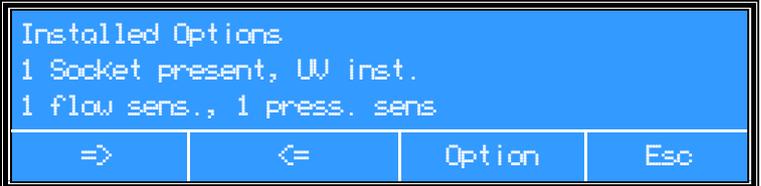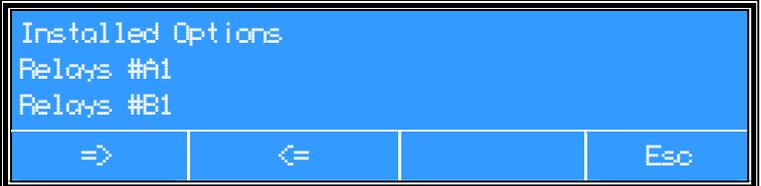
3C	Options **Screen III** (Display only appears when analogue options are installed) Starting up from Step 2	• Push 2x button **1** (=>).

		Analog inputs AD1 5.0 C AD2 1.0 µM A = Enter
		=> | + | - | Esc

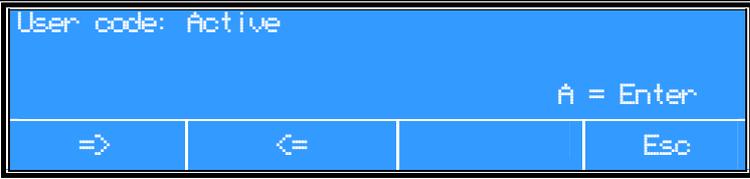For explanation codes see *Appendix VIII: Information installed options on page 69.*

- Push button **4** (Esc) for starting menu.
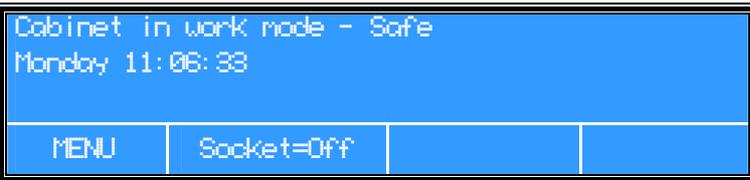
6.10 Settings

Activating the user code

The function "User code Active/not active" makes it possible to block the control of the installation. To change this state the valid user code has to be entered. The new state (active or not active) is valid after a period of 5 minutes (after touching the last button). The pre installed valid user code is 0001. In case of emergency there is a special code to break the unknown or forgotten user code. In that case enter code 2882 and the original pre installed code, 0001, is valid again.
Also see *Change the user code on page 40.*

1	Cabinet in work mode. See*: Starting up the cabinet on page 22.*	Cabinet in work mode - Safe Monday 11:06:33 MENU | Socket=Off | | • Push button **1** (Menu). • Push button **3** (C). • Push button **1** (=>). User code: not active A = Enter => | <= | | Esc User code mode appears. • Push button **A**. Function blocked after 5 minutes 0000 (Enter code) User code: Not active A = Enter >> | + | - | Esc The information for the user code shows. The user code can be activated or deactivated. • Enter the user code using button **1** (>>), **2** (+) and **3** (-). • Push button **A**.

1		User code: Active A = Enter => <= Esc • Push button [4] (Esc) for starting menu.

Factory adjustments

1	Cabinet in work mode. See: *Starting up the cabinet on page 22.*	Cabinet in work mode - Safe Monday 11:06:33 MENU Socket=Off
2	Factory adjustments:	• Push button [1] (Menu). • Push button [3] (C). • Push 2x button [1] (=>). • Push button [A]. • Enter the code for "Factory adjustment" (authorized personnel only). Factory adjustment 0000 (Enter code) >> + - Esc Factory adjustment display shows. Factory settings can be changed here (authorized personnel only). See service manual for more information. • Push button [A]. • Push button [4] (Esc) for starting menu.

System

For service purposes only!

1	Cabinet in work mode. See*: Starting up the cabinet on page 22.*	Cabinet in work mode - Safe Monday 11:06:33 <-250 Pa> MENU Socket=Off
2	Testing of alarms display shows:	• Push button **1** and **3** (C). • Push 3x button **1**. • Push button **A**. System 0000 (Enter code) A = Enter >> + - Esc • Enter service code.
3	For service purposes only!	In this menu down loading and up loading of data can be arranged.

Change the user code

1	Cabinet in work mode. See*: Starting up the cabinet on page 22.*	Cabinet in work mode - Safe Monday 11:06:33 MENU Socket=Off
2	Change the user code	• Push button **1** (Menu) and **3** (C). • Push 4x button **1** (=>). • Push button **A**. User code: 0000 (Enter code) A = Enter >> + - Esc • Enter actual user code. • Push button **A**. Input user code: New code: 0000 Old code: 0001 A = Enter >> + - Esc • Enter the new valid user code. • Push button **A**.
	The pre installed valid user code is 0001. In case of emergency there is a special code to break the unknown or forgotten user code. In that case enter code 2882 and the original pre installed code, 0001, is valid again.	

Change language:

To change the language, first close the window, switch off the cabinet and all functions. Then the language can be changed and confirmed. As confirmation the 3 LED's (right) light up for 1 second and 2 short beeps will sound. The cabinet will be switched on automatically.

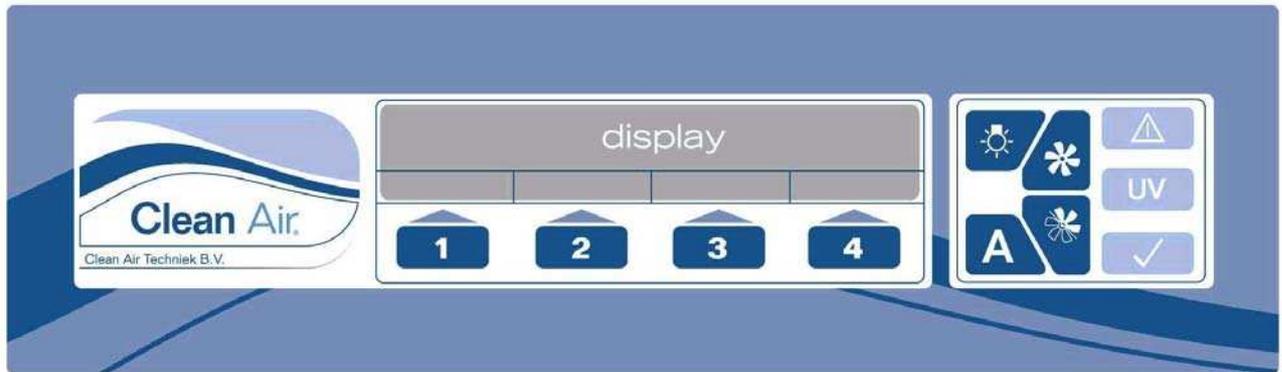|		
1	Cabinet in work mode. See: *Starting up the cabinet on page 22.*	Cabinet in work mode - Safe Monday 11:06:33 MENU Socket=Off

2	Change the language	• Push button 1 (Menu).
		• Push button 3 (C).
		• Push 5x button 1 (=>).
		• Push button A.
		
		Conditions: The fan has to be switched off (push ✳) and sockets and FL-light must be switched off.
		
		Taal Language Sprache
		Engels English Englisch
		                              A = Enter
		              Change Esc
		
		• Push button 3 (Change) to change the language.
		• Push button A.

3	Starting up	The cabinet switches on automatically
4	Stop	• Push button ✳ to switch off the cabinet.

7   Alarms

Figure 6 Operating panel

When there is an alarm situation the alarm indicator flashes red ⚠ and there is an acoustic signal. The safe working conditions are no longer granted.

Push button 🅐 for giving an acknowledgement that the user has seen the alarm. Only at the start up mode, the acoustic signal will mute. The alarm indicator will (always) keep on burning. Before acknowledging the alarm, the user code must be entered (only when the user code is activated).
An acknowledged alarm (with button A) shall be repeated every 7 minutes, as long as the alarm situation continues.
The buzzer has a SPL, sound pressure level, of at least 10 dB (A)* more than the sound pressure of the working cabinet. See *Appendix IX: Required specifications on page 70.*

⚠	**GENERAL DANGER** Make sure that there are no alarm situations during the use of the cabinet. Never work with a cabinet with activated alarm signals.

The different types of alarm signals will be discussed in the following chapter.

7.1   Flow alarm

If one of the following alarms occurs and no apparent cause can be found, the service department has to be contacted. They will ask for the status of the cabinet, which helps to find possible causes (see *§6.9 Information status cabinet on page 35*).

<u>Flow too low</u>

Flow too low

Figure 7

Person protection is not guaranteed.
The air speed of sterile air into the working area through the inlet filter opening is too low, there is a risk that the workspace will be contaminated.
According to Annex K.4 airflow should not be less than 3 m^3/min for each cubic metre of the cabinet volume.

7.2   Pressure alarm

<u>Pressure too high</u>

Pressure too high

Figure 8

Person protection is not guaranteed.
According to Annex K.4 pressure should be at a <u>negative</u> pressure of at least 200 Pa (compared to the environment).
If there is an unacceptable deviation, there will be an alarm.

7.3   Other alarms

Other alarms are:

<u>Communication error</u>
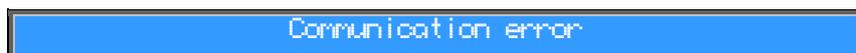
Communication error

Figure 9

Contact your service organization.

Procedure in case of alarms:

	Check if the window is closed with all the clamps and check if the hatch is closed.	When the installation is back into the work mode the alarm will not mute immediately. The cabinet needs time to get the correct airflow and pressure.
	In case the alarm is still present: **Stop working,** Switch of the blower, position the cover for the inlet HEPA filter (See Figure 2 pos. 17 on page 14) disinfect the installation, if necessary, and notify the service department to look for the cause	If there is any doubt whether disinfecting the installation is necessary, please consult your biological safety official
	Read the alarms from the display. Contact your service organization.	Cabinet in work mode – Not Safe Monday 11:06:33 MENU Socket=Off Working with the cabinet is not possible anymore. On no account, the installation may be used before a serviceman has remedied the defect

8   Cleaning

8.1 Cleaning the installation

The installation has to be cleaned regularly. Preferably, each time after the installation has been used. Diluted disinfectants may be used. In most cases, hot water with a cleaning agent, or the use of a maximally 70% alcohol solution, will be sufficient.

Chlorine containing cleaning agent is not recommended, because even small concentrations chlorine has an oxidizing effect on the material of the installation.

It is important to clean the worktop,. A 1% solution of Natriumdodecylsulfat * (SDS-solution CAS-no. 151-21-3) in demineralised water could be applied for cleaning.

Remove the waste and place it in an appropriate container.

*) Literature:
> See Mallinckrodt J.T. Baker data sheet: SDS is MSDS number No S3670
> Mallinckrodt Baker Inc. 222 Red School Lane Phillipsburg, NJ 08865

⚠	**BIOLOGICAL DANGER** Never clean an used installation without precaution (for instance disinfection)

Procedure for cleaning the cabinet

- Switch off the installation (See *procedure 6.4 on page 25*);
- Put on gloves;
- Clean the surface with the SDS-solution on a tissue (Natriumdodecylsulfat solution);
- Repeat this action with a new tissue;
- Clean the surface with a moist cloth;
- Repeat this action;
- Dry the surface with a paper tissue.

Cleaning the worktop

⚠	**BIOLOGICAL DANGER** Never clean an used installation without precaution (for instance disinfection)

- Clean the top side of the worktop (see *§8.1 Procedure for cleaning the cabinet on page 45*);

<u>Cleaning the inside of the window</u>

	BIOLOGICAL DANGER Never clean an used installation without precaution (for instance disinfection)

Check if this procedure can be done safely. It is advised to disinfect the installation first (see *Appendix II: Disinfection on page 59*).

Procedure for cleaning and to disinfect the window with liquid:
- Put on gloves;
- Switch off the installation (See *procedure 6.4 on page 25*);
- Hinge the window open;
- Clean (and if necessary Disinfect) the window;
- Clean (and if necessary Disinfect) the rubber seal;
- Smear the seal thin with Vaseline;
- Hinge the window.

Please note: the clean ability of the MSC III biological safety cabinet is at least conform Class CI-B (EN 12469:2000-table 2: Clean ability performance).

8.2 Cleaning the UV-light (optional)

	BIOLOGICAL DANGER Never clean an used installation without precaution (for instance disinfection)
	DANGER FOR ELECTROCUTION

The UV-light must be cleaned regularly with alcohol (70%). Put on gloves and switch of the cabinet and let the UV-light cool down before cleaning. After cleaning the UV-light tube must be dried before using it.

9 Small maintenance and service

<table>
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<td>⚠</td>
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BIOLOGICAL DANGER

BE CAREFUL!!
- Before starting service with the cabinet always ask the responsible person if the cabinet is decontaminated so that when testing the HEPA-filters there is not any danger for the service engineer, labour personnel, the laboratory and the surroundings of the cabinet. If necessary disinfect the installation; for more information see *Appendix II: Disinfection on page 59*.

</td>
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</table>

9.1 Periodic maintenance

A periodic maintenance has to take place regularly. To a certain extent, this depends on the frequency of use of the cabinet. Contact your service organization for advice.

- Validate the system on safety;
- Check for correct functioning of the electrical system;
- Check for correct functioning of assembled auxiliary machines;
- Check and, if necessary, test the external blower in the ducting;
- Check the HEPA-filter for efficiency and leakage;
- Check the installation and the exhaust system for leakage;
- Verification and calibration of the mounted air speed sensor and pressure transmitter;
- Measure the airflow through each open glove port should be checked (> 0,7 m/s);
- Measure the airflow through the inlet filter (> 3 m^3/min for each m^3 cabinet volume);
- Measure the pressure in the cabinet (<-200 Pa)
- Check and adjust the alarm system.

A copy of the normal service scheme is available at Clean Air Techniek, please contact us for special arrangements.

9.2 Replacement of the pre-filter

All this takes place with the cabinet switched on, so that an under pressure in the biological safety workbench is maintained; this is an extra safety precaution.

Since these activities do not take much time, it will not create problems to the HEPA-filter when it sucks air without pre-filtration for a short time. The advantages of this simply outweigh the disadvantages.

In general, Clean Air Techniek, as the manufacturer, is not in favour of the user replacing the filters himself. This is a specialist job at which mistakes are easily made. Special tools and PVC bags that can be sealed for discharge are needed for the job.

Exhaust pre-filter

The installation is disinfected first and then switched on. Wear gloves, open the window,

Supplies needed:

- Two plastic bags (minimum measurement 75x50 [cm] with closure);
- Tape;
- Two pair of gloves;
- Possible disposing requirements;
- New pre-filter (measurements of the pre-filter are necessary when ordering a new one, the measurements are printed on the type plate (see Figure 2 *on page 14 and Appendix VII:* Stickers *on page 68*).

Procedure:

- Switch on the installation;
- Make sure that there are no alarms when starting up;
- Put on the gloves and keep an extra pair ready for use;
- Fold the edge of the plastic bag ±10 cm;

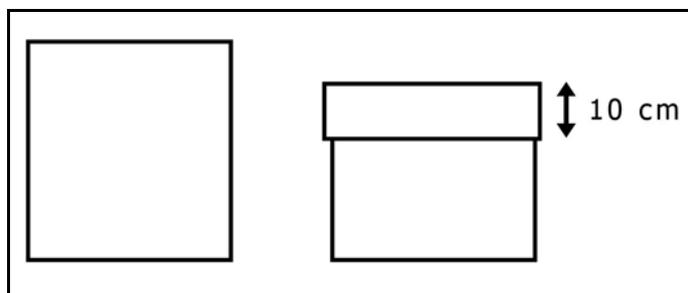*Figure 10 Folding the edge of the bag ±10 cm*

- Open the window;
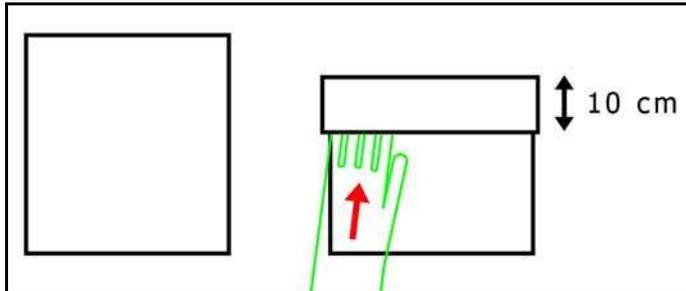- Place the opening of the plastic bag inside the workspace with your left hand;

*Figure 11 Positioning the left hand in the plastic bag*

- remove the pre-filter grid (position 20 of Figure 3 on page15);
- Pull the pre-filter from its frame with your right hand;
- Roll the filter up (still with your right hand);
- Put the filter into the plastic bag;
- Fold back the edge of the plastic bag, not touching the inner side of the plastic bag;
- Press the air out of the bag;
- Seal the plastic bag airtight;
- Place a new pre-filter in the frame;
- Place the frame in position;
- Put back the pre-filter grid into position;
- Dispose the gloves and the pre-filter in the correct way, in a second plastic bag that is already at hand (transport package).
- Put on new gloves;
- Seal the plastic bag airtight;
- Close the window;
- Remove the plastic bag and place it in an appropriate container;
- Remove the gloves and put them in the appropriate container.

Inlet pre-filter

The installation is disinfected first and then switched on. Wear gloves, remove the pre-filter (position 16.1 of Figure 2 on page 14) put the pre-filter in a plastic bag. Place a new pre-filter and dispose the gloves and the pre-filter in the correct way.

9.3 Replacing the Fluorescent-light (FL light)

When an FL light (see Figure 3 Side view MSC III *on page 15*) needs to be changed, the top hood can be lifted. Switch off the power of the installation. Replace the FL tube by a new one. Close the top hood.

	DANGER FOR ELECTROCUTION
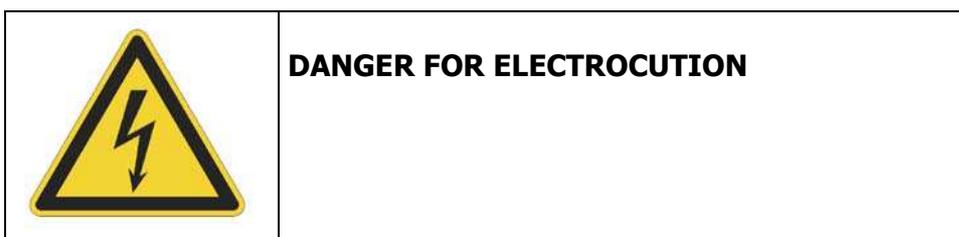
9.4 Procedure for replacement of rubber gloves

Replacement of the gloves.

Cabinet has to be switched in work mode without alarms.

Materials needed

- New pair of rubber (neoprene or latex) gloves with roll end. (Neoprene gloves are most resistant to UV and disinfection or chemicals, latex gloves are more comfortable to work with but less resistant to UV and chemicals. As an alternative, gloves made of Hypalon, are also available for special custom made solutions).

Figure 12 Rubber glove with roll end
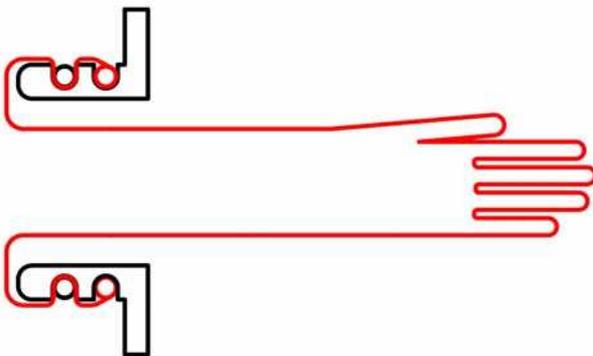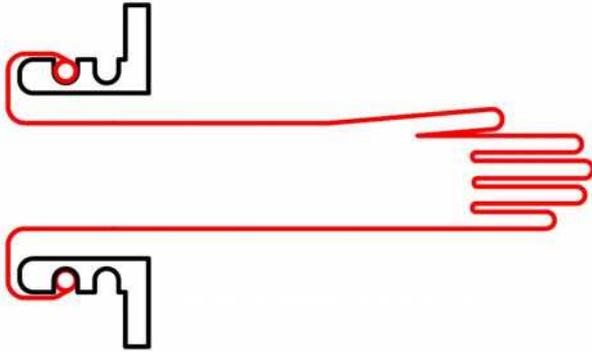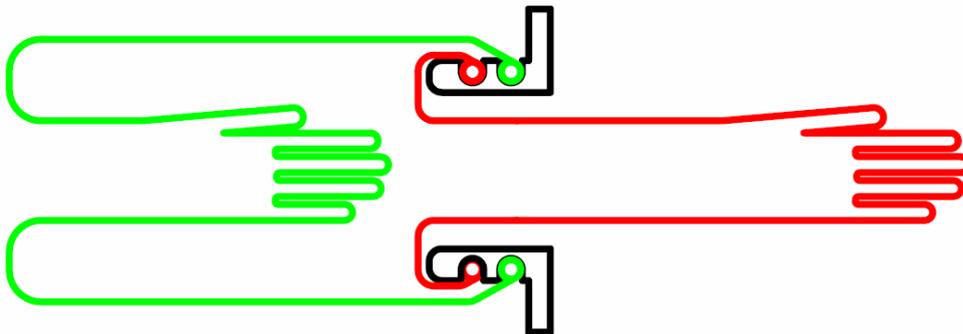
Procedure

Step 1

Figure 13 Old glove's position

The roll end of the old glove is positioned in the second groove of the glove port panel, The O-ring is located in the first groove of the glove port panel.
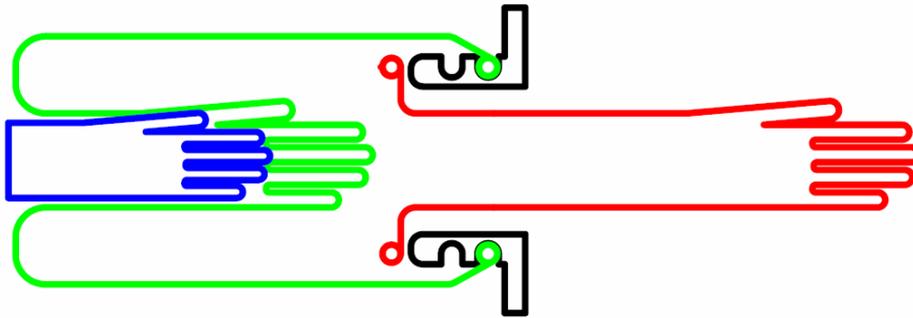
Step 2

Figure 14 Repositioning the old glove

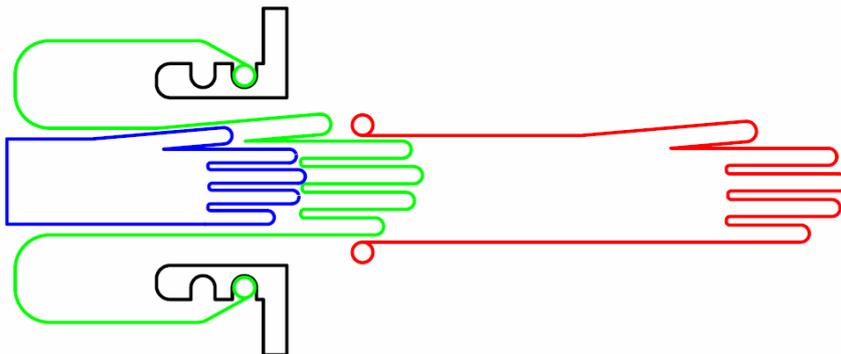Remove the O-ring from the first groove , reposition the old glove from the second groove towards the first grove.

Step 3

Figure 15 Place the new glove.

Mount the new glove in the second groove, with the roll end inside out.

Step 4

Figure 16 Remove the old glove

Put a hand in the new glove, remove the old glove out of the first groove.

Step 5

Figure 17 Push the old glove

Push the old glove in to the work area of the cabinet.
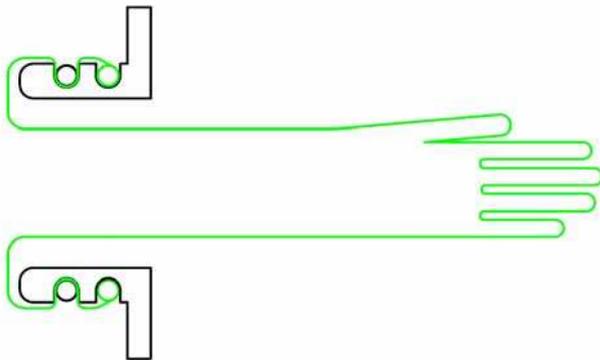Turn the glove inside-out.

Step 6

Figure 18 Place the O-ring

Position the O-ring on the first groove.

Step 7

Remove the gloves and put them in the appropriate container (according to the local regulations).

9.5 Service contact

For advice or any technical questions please contact your service organisation. Please refer to the following items:
- Type, Class, Project number and Serial number mentioned on the type plate
  (for the position of the type plate see position 1 of Figure 2 on page 14 and page 68);
- Version number of the software used in the safety cabinet.

Software Version:

1	Cabinet in work mode. See*: Starting up the cabinet on page 22.*	Cabinet in work mode - Safe Monday 11:06:33 MENU Socket=Off
2	Software version:	• Push button 1 (Menu). • Push button 3 (C). • Push 2x button 1 (=>). Factory Adjustments Version: X.X xxxx I/O: VXXX OPT: VX.X >> + - Esc

9.6 Service Contract

For information and orders concerning service or service contracts please contact Clean Air B.V.

10 Technical specifications

10.1 Physical surrounding

Transport physics		MSC III 1200	MSC III 1500	MSC III 1800
Surrounding temperature	[°C]	From -25 up to 55	From -25 up to 55	From -25 up to 55
Surrounding temperature (max. 24 h)	[°C]	From -25 up to 75	From -25 up to 75	From -25 up to 75
Humidity	[%]	20 - 90	20 - 90	20 - 90

In use physics		MSC III 1200	MSC III 1500	MSC III 1800
Surrounding temperature	[°C]	15 – 30	15 – 30	15 – 30
Humidity	[%]	30 - 80	30 - 80	30 - 80

10.2 General specifications

Dimensions Work space		MSC III 1200	MSC III 1500	MSC III 1800
Window opening (hxl)	[mm]	520x1030	520x1330	520x1630
Outer meas. without support frame (lxdxh)	[mm]	1757x791x1240	2057x791x1240	2357x791x1240
Height with support frame for work height 800 [mm]	[mm]	2139	2139	2139
Interior dimensions (lxdxh)	[mm]	1194x614x870	1494x614x870	1794x614x870
Interior volume	[m³]	0,55	0,69	0,83
Dimensions gloves	[mm]	2x Ø 170	4x Ø 170	4x Ø 170

Dimensions Hatch		MSC III 1200	MSC III 1500	MSC III 1800
Hatch opening (hxl)	[mm]	325x325	325x325	325x325
Outer meas. (lxdxh)	[mm]	404x404x404	404x404x404	404x404x404
Interior dimensions Hatch (lxdxh)	[mm]	400x400x400	400x400x400	400x400x400

Filter

		MSC III 1200	MSC III 1500	MSC III 1800
Pre filter inflow	[mm]	G3 (EN 779) 360x360	G3 (EN 779) 360x360	G3 (EN 779) 360x360
Inflow	[mm]	Astrocell II ULPA 3P3 A99C9S3M3 305X305X69 mm U15 acc. EN 1822	Astrocell II ULPA 3P3 A99C9S3M3 305X305X69 mm U15 acc. EN 1822	Astrocell II ULPA 3P3 A99C9S3M3 305X305X69 mm U15 acc. EN 1822
Pre filter exhaust	[mm]	G3 (EN 779) 905x295	G3 (EN 779) 1210x295	G3 (EN 779) 1515x295
Exhaust	[mm]	Astrocell II HEPA 9P3 A99C9S2R3 915x305x117 mm H14 acc. EN 1822	Astrocell II HEPA 12P3 A99C9S2R3 1220X305X117 mm H14 acc. EN 1822	Astrocell II HEPA 15P3 A99C9S2R3 1525X305X117 mm H14 acc. EN 1822

Performance

		MSC III 1200	MSC III 1500	MSC III 1800
Sound level (according to ISO 11201)	[dB A]	N.A	N.A	N.A
Mass (without frame)	[kg]	200	250	300
Average inflow speed through inlet filter	[m/s]	0,93	0,93	0,93
Exhaust air (work mode)	[m³/h]	300 +/- 25	300 +/- 25	300 +/- 25
Exhaust connection	[mm]	Ø 250	Ø 250	Ø 250
Window		8 mm laminated glass (2 layers)	8 mm laminated glass (2 layers)	8 mm laminated glass (2 layers)
Hatch		Poly Carbonate	Poly Carbonate	Poly Carbonate

Electrics

		MSC III 1200	MSC III 1500	MSC III 1800
Power connection	[V] [Hz]	230 50	230 50	230 50
Needed main fuse box security	[A]	10	10	10
J6: Alarm, potential free contact	[V] [A]	Max. 48 Max. 1	Max. 48 Max. 1	Max. 48 Max. 1
Electrical insulation		Class 1	Class 1	Class 1
Electrical safety IEC 61000-4-11 Installation cat.		Class A II	Class A II	Class A II
Power sockets	$U_{max.}$[V] I_{max} [A] $P_{max.}$[W]	230 3,15 725	230 3,15 725	230 3,15 725
Power dissipation in work mode (with light switched on) excl. maximum power socket excl. fan power	J/s (W) $I_{nom.}$ [A]	72 0,3	72 0,3	116 0,5
Power dissipation in work mode (with light switched on) incl. maximum power socket excl. fan power	J/s (W) $I_{nom.}$ [A]	797 3,5	797 3,5	841 3,6

Lighting		**MSC III 1200**	**MSC III 1500**	**MSC III 1800**
TL-High output		2x	2x	2x
Colour		White – Nr.840	White – Nr.840	White – Nr.840
Diameter	[mm]	Ø26	Ø26	Ø26
Length	[mm]	970	970	1500
Power	[W]	2x 36	2x 36	2x 58
Intensity (mean)	[Lux]	980	980	1250

Fuses I/O Board		**MSC III 1200**	**MSC III 1500**	**MSC III 1800**
F1: PCB; 24 [V]	[A] T	0,5	0,5	0,5
F2: Option	[A] T	3,15	3,15	3,15
F3: Lighting	[A] T	0,5	0,5	0,5
F4: UV	[A] T	0,5	0,5	0,5
F6: Socket 1	[A] T	3,15	3,15	3,15
F7: Fan	[A] T	8	8	8
F8: PCB	[A] T	1,6	1,6	1,6
F9: PCB	[A] T	1,6	1,6	1,6

Fuses Option Board		**MSC III 1200**	**MSC III 1500**	**MSC III 1800**
F1: Optional fan	[A] T	Max. 8	Max. 8	Max. 8
F2: Optional	[A] T	Max. 8	Max. 8	Max. 8
F3: Charge current	[A] T	1	1	1

Options:

UV		**MSC III 1200**	**MSC III 1500**	**MSC III 1800**
Type		UV-C	UV-C	UV-C
Power	[W]	30	30	30
Length UV-wave	[nm]	253	253	253
Diameter	[mm]	Ø 28	Ø 28	Ø 28
Length	[mm]	908,8	908,8	908,8

See also *Appendix IX: Required specifications on page 70* and *Appendix X: Part list critical components on page 71*.

11   Trouble shooting

Fault	Cause	Remedy
No power on socket of the cabinet	Socket is not activated	Activate socket on display push on **2**
	Fuse is broken	Replace the fuse
UV button is not visible on display	UV equipment is not installed	x
	Option UV is not installed	UV option has to be programmed please contact your service organization
	Alarms are activated	Get back to safe work mode
FL-light is not working	Contacts of the FL are not locking in the power connections	Turn the FL-light slightly
	UV light is on	Switch of the UV light
MSC is locked	User code must be entered	Enter the user code (or de-activate the user code see Activating the user code on page 38)

Appendix I: Support frame MSC III

Figure 19 Support frame MSC III (1800)

Appendix II: Disinfection

Disinfecting the installation

The installation has to be disinfected regularly; especially before the visit of a serviceman or after use of the installation at which the risk of microbiological contamination is high.

The most efficient way is to use formaldehyde solution for the decontamination in accordance with the methods mentioned in "Appendix A of the Code of Practice for Prevention of Inspection in Clinical Laboratories and Postmortem Rooms (the Howie code of practice)".

For the disinfection procedure we refer to the manual for the Formalin vaporiser model type FAS2000 (portable unit), delivered by Clean Air Techniek. It is customary to have the formaldehyde gas disinfect the installation during the night.

During disinfection the inlet opening has to be covered with the disinfection cover (Pos. 17 of Figure 2).

Be careful with disinfectants that contain chloride concentrations. When in doubt, please consult our sales department.

Appendix III: Replacement of the HEPA-filters

Under normal circumstances, the life span of a HEPA-filter comprises several years. However, it will become clogged up gradually, until there is no longer a proper flow-through and the filter has to be replaced.

<table>
<tr>
<td></td>
<td>

BIOLOGICAL DANGER

BE CAREFUL!!
Before starting service with the cabinet always ask the responsible person if the cabinet is decontaminated so that when servicing the installation and the HEPA-filters there is not any danger for the service engineer, labour personnel, the laboratory and the surroundings of the cabinet. If necessary disinfect the installation; for more information see *Appendix II: Disinfection on page 59*.
</td>
</tr>
</table>

The valid procedures for the disposal of possible contaminated material must always be followed. When the service engineer thinks this is not enough this will be discussed with the responsible person so that enough precautions can be made.

Clean Air Techniek B.V. strongly recommends specially trained technicians to carry out filter exchange. Certified service organizations are recommended. At all times keep to the service and maintenance procedures from Clean Air Techniek B.V.

Replacement of the HEPA-filters

Under normal circumstances, the life span of HEPA-filters comprises several years. However it will become clogged up gradually, until there is no longer a proper flow-through and the filter has to be replaced.
For the exhaust HEPA filter the following applies:
- The cabinet should have a negative pressure of at least 200 Pa.
- The inflow air velocity at the centre of one open glove port should be at least 0,7 m/s.
- HEPA filter efficiency measured with a photometer and DOP or EMERY 3004 as test, should be ≥ 99,997%.

For the inlet HEPA filter the following applies:
- The velocity through the inlet filter should not be less than 3 m^3/min for each m^3 cabinet volume, with a negative pressure in the cabinet of at least 200 Pa.
- HEPA filter efficiency measured with a photometer and DOP or EMERY 3004 as test aerosol, should be ≥ 99,997%.

Exhaust HEPA-filter

To have access to the main exhaust filter, the filter hatch on the front (position 19 of Figure 3 on page 15) has to be opened. The filter can be taken out after detaching the pressure bars, the plenum construction (position 21 of Figure 3 on page 15) can be lifted with the spindles (position 23 of Figure 2 on page 14). Then the filter has to be packed in a plastic bag for burning. Dispose the filters according to local guidelines or customer regulations. After this, a new HEPA-filter can be installed.

Inlet HEPA-filter

To change the inlet HEPA-filter first remove the (inlet-) pre-filter. The bolts which are visible then have to be removed. Now you can replace the HEPA-filter and put the bolts back in place.

Before the installation is used again, the new filter has to be tested for density and efficiency by means of a Emery or D.O.P. test procedure. Now the installation is ready for use.

Appendix IV: Efficiency test of the HEPA-filters

Requirements

According to the norm EN 12469:2000 HEPA-filters must meet a few requirements.

Efficiency test by means of a particle counter

The inlet filter and the exhaust filter must have an efficiency of 99,995% MPPS*. A local measured value can be a factor 10 higher, ≤ 0.05%.
*) Most Penetrating Particle Size

Efficiency test with a photometer

The inlet filter and the exhaust filter must have an efficiency of 99,99%. Any locally measured value must be ≤ 0.01%.

When a HEPA-filter does not meet the EN 12469:2000, it is allowed to repair it. However the surface of the reparation must not be more than 5% of the total surface of the HEPA-filter.

When this does not have sufficient effect the HEPA-filter must be replaced as described in *Appendix III: Replacement of the HEPA-filters on page 60*.

Test aerosol

Inlet HEPA filter

With an MSC III cabinet, test aerosol is added upstream of the inlet HEPA-filter (*Figure 20* Pos A). It is recommended to use a smoke channel to achieve an equal concentration over the entire filter surface. The 100% measure point upstream concentration for the inlet filter is measured upstream of the inlet filter.
The Inlet HEPA filter can be scanned downstream (*Figure 20* Pos B).

Exhaust HEPA filter

With an MSC III cabinet, test aerosol is added upstream of the exhaust HEPA-filter (*Figure 20* Pos A) using a test-aerosol generator that is positioned inside the (closed) cabinet.
The Inlet HEPA filter can be scanned (*Figure 20* Pos B).
Using the same adjustments of the test-aerosol generator, as used testing the inlet HEPA filter, a 100% upstream concentration is achieved.
The exhaust filter can be scanned downstream using the single measurement point ((*Figure 20* Pos C). When the bolt is removed, the measure probe (hose) can be stuck through the hole in the service panel, into the downflow plenum (*Figure 20* Pos C).
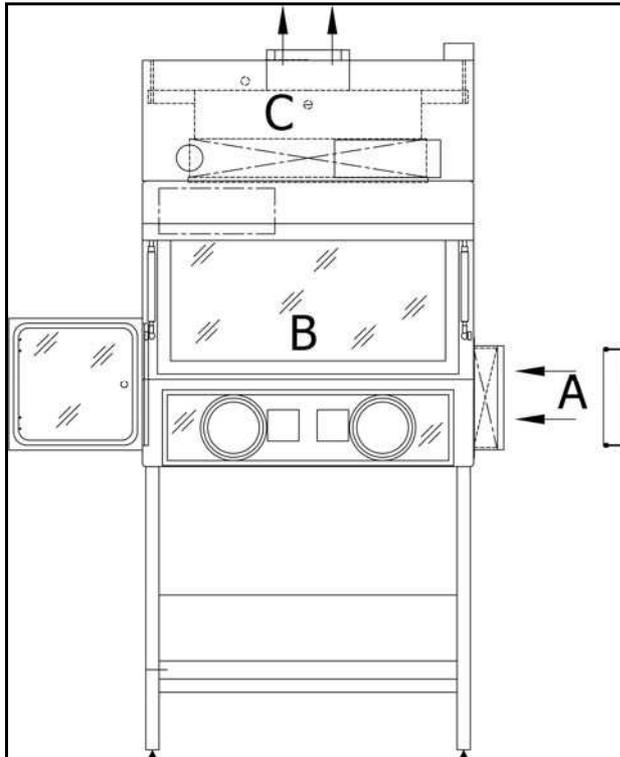
Figure 20 Front view MSC III

Figure 21 single measure point downstream exhaust HEPA filter

Appendix V: Measuring methods

The measurement of air velocities and pressure difference is done according to the EN 12469:2000.
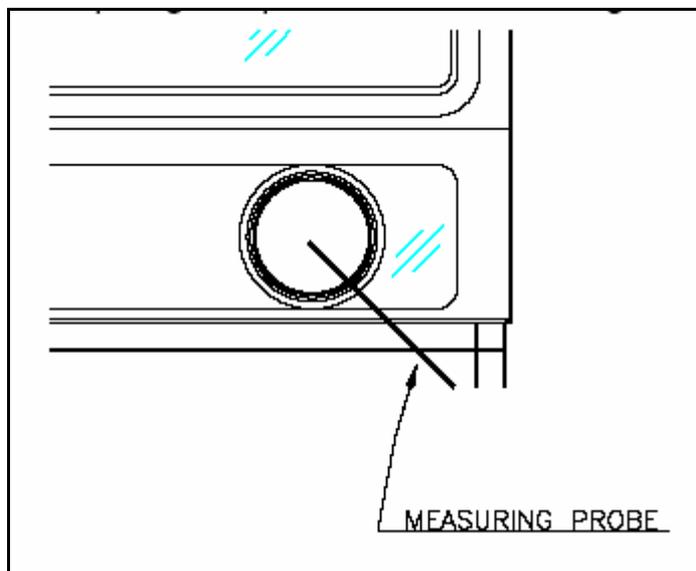
Air velocities glove port

Air velocities should be determined by means of a hot-wire anemometer.

<u>Criteria</u>

According to the EN12469:2000 the cabinet should have a negative pressure of at least 200 Pa and the inflow air velocity at the centre of one open glove port should be at least 0,7 m/s.

<u>Measuring points</u>

Figure 22 Measure point inflow air velocities MSC III glove port

The safety cabinet should be switched on in the work mode with no alarms.
Measure the air velocity at the centre of one open glove port as indicated in Figure 22.

Air velocities inlet HEPA filter

Air velocities should be determined by means of a hot-wire anemometer.

<u>Criteria</u>

According to the EN12469:2000 the airflow through the inlet filter should be should not be less than 3 m^3/min for each m^3 cabinet volume.

Measuring points

Figure 23 Measuring the inlet velocity of the MSC III

	1	2
A	+	+
B	+	+

Table 1

The safety cabinet should be switched on in the work mode with no alarms.
Measure the air velocity as indicated in Figure 23 and record the velocity as indicated in Table 1 .

Pressure measurement in the cabinet

Measuring point for pressure difference

The safety cabinet should be switched on in the work mode with no alarms.
In order to measure the pressure of the cabinet, disconnect the hose of the pressure gauge of the cabinet. (Figure 2, Pos 39 on page 14). Connect it to a calibrated manometer.

Adjusting the cabinet

Since this cabinet is connected directly to an external exhaust system you can only change the inflow velocity or pressure, by means of this external system.
So in order to adjust the cabinet, the speed of the external fan should be increased or decreased. Ask the responsible person to adjust this external fan.
Keep in mind that if you change the speed of the external fan, the pressure of the room is changing also.
The inflow air velocity and pressure of the cabinet must be in the range as described in Appendix V: Measuring methods.
It is recommended to use the values as measured in the test report of Clean Air B.V. of this specific MSC III.
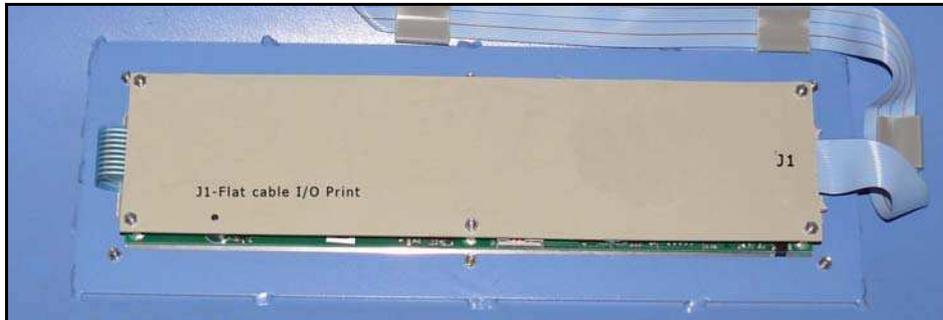
Appendix VI: Lay-out boards

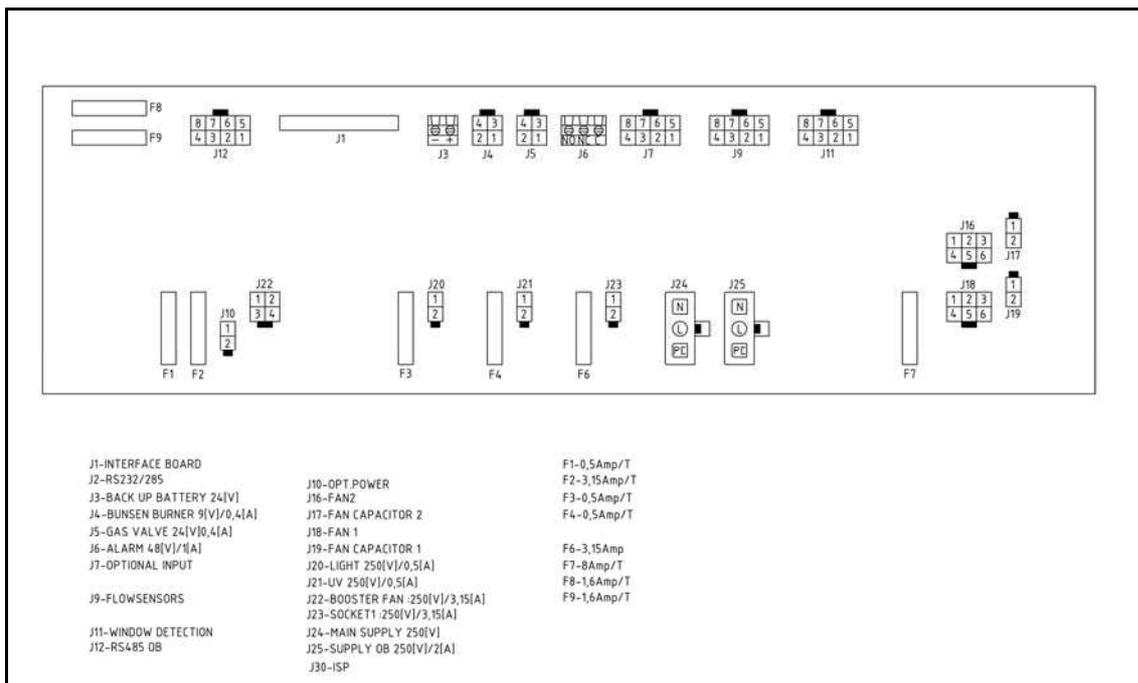Interface board

Figure 24 Interface board

Control board
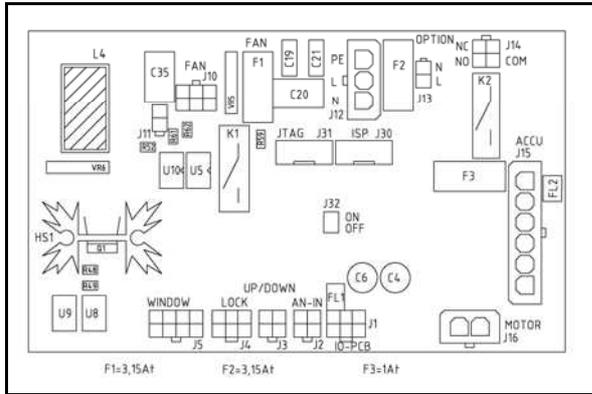

Figure 25 Control board E010001 rev E

Option board

Figure 26 Option board

Appendix VII: Stickers

Safety sign	Text	Location
	Biohazard	warning placed on the outer side of the light hood. Biohazard sticker is positioned on the cabinet. The sticker has to positioned in sight of the operator.
	Type plate + CE logo	Placed on outer frame
	Inflow HEPA filter registration	Above the Inflow Filter
	Exhaust HEPA filter registration	Behind the light hood at the I/O print
	Earth symbol	On several locations
	Warning electroshock	On several locations
	Sticker I/O Board	Behind the top hood
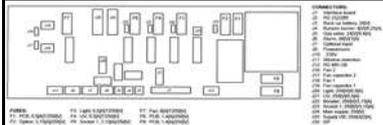
Appendix VIII: Information installed options

Screen III Analogue inputs (only if installed)

```
Analog inputs
AD1 5.0 C
AD2 1.0 µM                          A = Enter
        =>           <=                    Esc
```
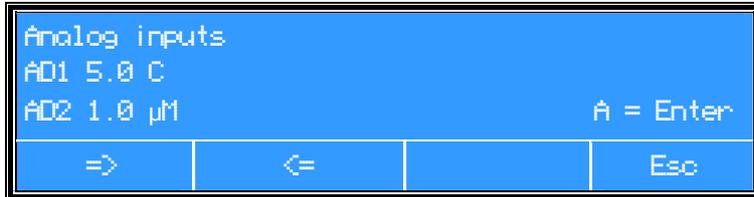
Figure 27 Example of screen III

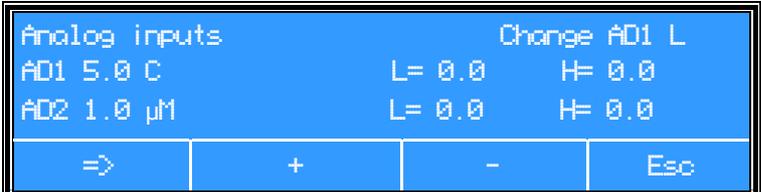Analogue inputs can be used to program alarm settings for e.g.:
- temperature (°C) of working surface;
- temperature (°C) of work area;
- particle counters (ppm);
- relative humidity (%);
- pressure (Pa in plenum).

If alarm limits are exceeded, an alarm will sound as short beeps with intervals.

To install alarm limits, start from the menu as described in *§6.9 *1) This value is* type specific. According to Annex K.4 airflow should not be less than 3 m3/min for each cubic metre of the cabinet volume.

Information about the installed options *on page 36*.

(The display only shows when the options are installed):

	Starting from screen III	
1		``` Analog inputs AD1 5.0 C AD2 1.0 µM A = Enter => <= Esc ``` • Push button **A**.
2	**Settings for High and Low Alarm**	``` Analog inputs Change AD1 L AD1 5.0 C L= 0.0 H= 0.0 AD2 1.0 µM L= 0.0 H= 0.0 => + - Esc ``` • Push button **1** (=>), • Choose the required limits (L=Low, H=High) for AD1 and AD2 using button **2** (+) and **3** (–) • Push button **4** (Esc) to confirm the settings and to go back to the starting menu.

An alarm can be transferred, depending on the code:
- #B5, through relay K3;
- #C5, through relay K2 (option print).

Appendix IX: Required specifications

Overview of the required specifications according to EN 12469:2000.

	Requirement (shortened)	**According to:**
Lighting	At least 750 [lux] at work surface	EN 12469 Annex A.2
Sound level	<65 [dB(A)] when background level is <55 [dB(A)]	EN 12469 Annex A.3
Sound level Buzzer	Exceed 10 [dB(A)] more than installation sound pressure	EN 12469 Annex A.3
Vibration	<0,005 [mm] RMS at centre workspace, Between 20 and 20000 [Hz]	EN 12469 Annex A.4
Stability	Conform to EN 292-1and 292-1	EN 12469 Annex A.5
Materials, general	The material likely to be in contact with micro organisms should be uniformly corrosion resistant, non-flammable and non-absorbing	EN 12469 Annex A.6
Materials, general	Materials and sealants for joints should be durable and resistant to cleaning and disinfection agents and resistant to general use of MSCs.	EN 12469 Annex A.6
Materials, general	Manufacturers should ensure that the materials of construction will not be damaged by fumigation with formaldehyde	EN 12469 Annex A.6
Glass and front windows	Laminated safety glass or UV-resistant safety plastics	EN 12469 Annex A.7
Glass and front windows	Conform to EN 292-1 and EN 292-2	EN 12469 Annex A.7
Electrical safety	Conform to EN 61010-1	EN 12469 Annex A.8
No Gas supply (optional) safety	Fittings for flammable gas should not be provided in class III cabinets	EN 12469 Annex A.9
Ergonomics	Maintenance can be carried out safely on the cabinet after installation	EN 12469 Annex A.10
Ergonomics	Considered according to prEN ISO 14738:1997	EN 12469 Annex A.10
Temperature	Air temperature in work space <8° above ambient laboratory temperature	EN 12469 Annex A.11
Leakage of carcass	≤ 10% loss of test overpressure of 500 Pa in the whole enclosed system after 30 min.	EN 12469 table 4
Glove ports and gloves	It should be possible to replace gloves from the outside of the cabinet in such way that the old gloves can be pushed inside the cabinet and new ones fitted whilst the fan is still running.	EN 12469 Annex A.12
Aerosol challenge method	Particle counter: <0,05% Aerosol photometer: <0,01%	EN 12469 Annex D
Volumetric airflow rate		EN 12469 Annex G
Design and airflow velocities		EN 12469 Annex H

Appendix X: Part list critical components

Component	Type specific	Art. no.	Supplier	Type
Inflow HEPA Filter	MSC III 1200	1000323	AAF	Astrocell II ULPA 3P3 A99C9S3M3 305X305X69 mm U15 acc. EN 1822
Exhaust HEPA Filter	MSC III 1200	1000931	AAF	Astrocell II HEPA 9P3 A99C9S2R3 915x305x117 mm H14 acc. EN 1822
Pre filter	MSC III 1200	1050001		KF250 C15-350 G3 (EN 779)
Gas spring	MSC III 1200	2700644	Easylift Winco	A1N1-50-200-485/400N
FL-lighting	MSC III 1200	1440016	Osram	Lumilux L36W/21-01
Ballast	MSC III 1200	1240002	Osram	VSA 40 W Optima
Inflow HEPA Filter	MSC III 1500	1000323	AAF	Astrocell II ULPA 3P3 A99C9S3M3 305X305X69 mm U15 acc. EN 1822
Exhaust HEPA Filter	MSC III 1500	1001203	AAF	Astrocell II HEPA 12P3 A99C9S2R3 1220X305X117 mm H14 acc. EN 1822
Pre filter	MSC III 1500	1050001		KF250 C15-350 G3 (EN 779)
Gas spring	MSC III 1500	2700644	Easylift Winco	A1N1-50-200-485/400N
FL-lighting	MSC III 1500	1440016	Osram	Lumilux L36W/21-01
Ballast	MSC III 1500	1240002	Osram	VSA 40 W Optima
Inflow HEPA Filter	MSC III 1800	1000323	AAF	Astrocell II ULPA 3P3 A99C9S3M3 305X305X69 mm U15 acc. EN 1822
Exhaust HEPA Filter	MSC III 1800	1001513	AAF	Astrocell II HEPA 15P3 A99C9S2R3 305x1525X117 mm H14 acc. EN 1822
Pre filter	MSC III 1800	1050001		KF250 C15-350 G3 (EN 779)
Gas spring	MSC III 1800	2700644	Easylift Winco	A1N1-50-200-485/400N
FL-lighting	MSC III 1800	1440017	Osram	Lumilux L58W/21-01
Ballast	MSC III 1800	1240002	Osram	VSA 40 W Optima
Gloves	All types	1130002		Port: 136 mm Shape: R/L Telescopic Length: 750 mm Material: Neoprene Size: 8 Thickness: 6/10
Mini Helic Manometer 0-500 Pa	All types	1430021	Mini Helic	0-500 Pa
Huba pressure meter	All types	1330073	Huba	694 300PA 0/10V
Air velocity-sensor exhaust	All types	1330010	Kriwan	0,2-10 m/s
Booster Fan (Optional)	All types	3000010	Rosenberg	RS250L
FL-holder	All types	1440110	BJB	BJB G13
UV-lighting	All types	1440008	Philips	UV tube 30 W
Starter (for UV only)	All types	2040001	Philips	PH starter S10, 220-240V, 4-65W
PCB-material	All types	-	Duraver	FR-4, according to UL94
Socket	All types	Misc.	e.g. Mennekes Schuko	-
Optional:				
Vacuum tap	-	2800048	Broen	1770
CO_2 tap	-	2800005	Broen	1735

Articles mentioned above can be ordered at the service organization Particle Measurement & Validation B.V.

Particle Measurement & Validation B.V.		Phone:	+31 (0)348 423661
Kuipersweg 37		Fax:	+31 (0)348 422684
3449 JA Woerden		E-mail:	info@pmvbv.nl
The Netherlands		Internet:	www.pmvbv.nl

Appendix XI: TUV Low Pressure Mercury Lamps

Special fluorescent lamps

Disinfection

Philips TUV disinfection lamps are low-pressure mercury-vapour discharge lamps consisting of a tubular glass envelope, emitting short-wave ultraviolet radiation with a radiation peak at 253.7 nm (UV-C) for germicidal action. The glass filters out the 185 nm ozone-forming line. A protective coating on the inside limits the depreciation of the useful UV-C radiation output (Longlife lamps). PL-S have a specially adapted starter providing almost instant starting characteristics already built into the lamp base. Note The UV-C radiation output of these lamps is indicated by the following warning signs
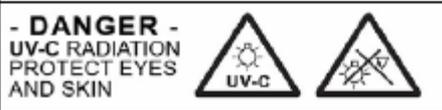
Applications
Philips TUV lamps are used for killing or inactivating bacteria, viruses and other primitive organisms. Typical application examples include air, water and surface disinfection in hospitals, bacteriological research and pharmaceutical institutions, and food processing industries, such as dairies, breweries and bakeries. They are also used for the disinfection of drinking water, waste water, swimming pools, air conditioning systems, cold storage rooms, packing material, etc. Finally, they are applied in a variety of photochemical processes.

Note: Radiation of these lamps is harmful to eyes and skin. Installations with these lamps are to be screened off completely.

- **DANGER** -
UV-C RADIATION
PROTECT EYES
AND SKIN

Dimensions in mm

Type	Cap/ base	Lamp voltage V	Lamp current A	UV-C radiation W	Useful life h	Depreciation 5000 hrs %	Nett weight g
TUV							
TUV 4W	G5	29	0.17	0.7	5000	30	16
TUV 6W	G5	42	0.16	1.5	8000	25	22
TUV 8W	G5	56	0.15	2.1	8000	20	29
TUV 11W	G5	37	0.33	2.1	8000	25	22
TUV 16W	G5	46	0.35	3.4	8000	20	29
TUV 10W	G13	45	0.23	2.5	8000	10	62
TUV 15W	G13	51	0.34	4.6	8000	12	75
TUV 25W	G13	46	0.60	7.0	8000	12	75
TUV 30W	G13	100	0.37	11.2	8000	12	140
TUV 36W	G13	103	0.44	14.6	8000	12	186
TUV 55W	HO	G13	83	0.77	16.5	8000	12	140
TUV 75W	HO	G13	108	0.84	25.5	8000	12	140
TUV 115W	VHO	G13	92	1.50	37.7	5000	12	290
TUV 115W	-R VHO	G13	92	1.50	31.0	5000	15	293
TUV PL-S							
TUV 5W	PL-S	G23	34	0.18	1.0	8000	15	30
TUV 9W	PL-S	G23	60	0.17	2.4	8000	15	41
TUV 11W	PL-S	G23	89	0.16	3.6	8000	15	58
TUV PL-L							
TUV 18W	PL-L	2G11	60	0.37	5.5	8000	15	66
TUV 36W	PL-L	2G11	105	0.44	12.0	8000	15	114
TUV 55W HF	PL-L	2G11	103	0.54	17.0	8000	15	145
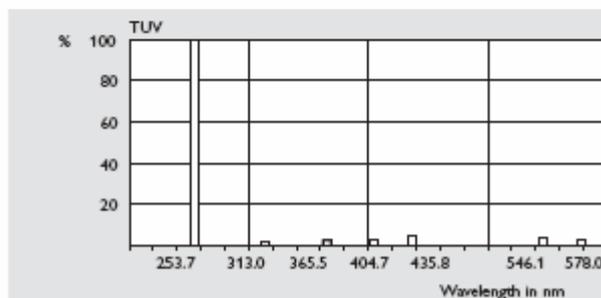
Spectral power distribution

Maintenance: relation between UV-C output and burning time
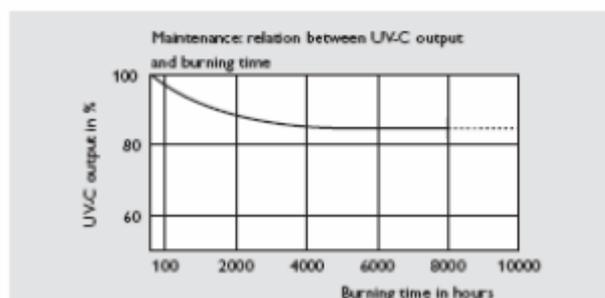
Appendix XII: Statement of the agreement for machines

Manufacturer: Clean Air Techniek B.V.

Address: Kuipersweg 37
                     3449 JA Woerden
                     The Netherlands
Phone: +31 (0) 348 41 11 14
Fax: +31 (0) 348 42 26 84
E-mail: exportinfo@cleanairbv.nl
Internet: www.cleanairbv.com

Hereby declares that:

Type: _____
Project number: _____
Serial number: _____

is in compliance with the following directives:
• Machine Directive (98/37/EC);
• Low Voltage Directive (2006/95/EC);
• Electromagnetic Compatibility Directive (2004/108/EC).

And declares furthermore that the following national technical standards and specifications are used:
• NEN-EN 12469 (2000) Performance criteria for microbiological safety cabinets;
• NEN-EN 1822 High efficiency particulate air filters.

Signature:

                     ....

Name: ....

Quality controller
By order of the production controller

Woerden, date   ....

Appendix XIV: Memo

Index

Distributed By

Lab Unlimited
CARL STUART GROUP

Web: www.labunlimited.com
Email: info@labunlimited.com