Clean Air Techniek B.V.

User manual

English Version 5.0

Series CLF

Laminar crossflow-cabinet

Types:

CLF 475

CLF 575

CLF 675

Offers protection for product

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

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Preface

Clean Air provides a complete range Laminar Airflow Cabinets for handling of non-hazardous materials, which require a clean particle free environment. The cabinets offer the highest product protection. The horizontal airflow prevents contaminated outside air to enter the workstation's work area, ensuring product protection.

Its application is in the field of pharmaceutical industry, biotechnology, pharmacies, hospital and university laboratories as well as tissue culture and electronic laboratories.

The CLF 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; when there is increasing resistance in the filter the necessary airspeeds are maintained;
- Integrated drain on the backside of the working surface to prevent spilled liquids to leak in to the HEPA filter;
- White laminated wooden or stainless steel (304) working surface;
- All internal areas of the working space are in line with the effective HEPA filter area, to obtain a laminar flow;
- Side windows of safety glass for a good overview.

Furthermore the CLF is a service friendly cabinet, produced in The Netherlands.

We thank you for buying this cabinet and wish you good times working with this cabinet.

Clean Air Techniek B.V.

Version table

Vers. 5.0	**25-11-09**		**MPE**		**Document structure updated**
Version:	Date:	From serial number:	By:	Check:	Change:

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1 Introduction

1.1 CLF

The laminar crossflow-cabinet CLF has as purpose that the working surface is kept clear of particles by means of a clean laminar crossflow of air. By applying a HEPA-filter (High Efficiency Particulate Air) it is possible to work in this cabinet under conditions which are sterile, dust-free, or aseptic. The cabinet, therefore, offers a product protection.

Short description of the CLF

- At the top of the cabinet the inflow air is drawn through a pre-filter by a fan.
- This fan blows the air in the correct proportion to the crossflow HEPA-filter. Because the crossflow air passed through a HEPA-filter (High Efficiency Particulate Air), the working surface is free of particles.
- The airflow in the workspace is crosswards, thus preventing background air to flow into the class A workspace.
- The air flow leaves the cabinet by the work opening.

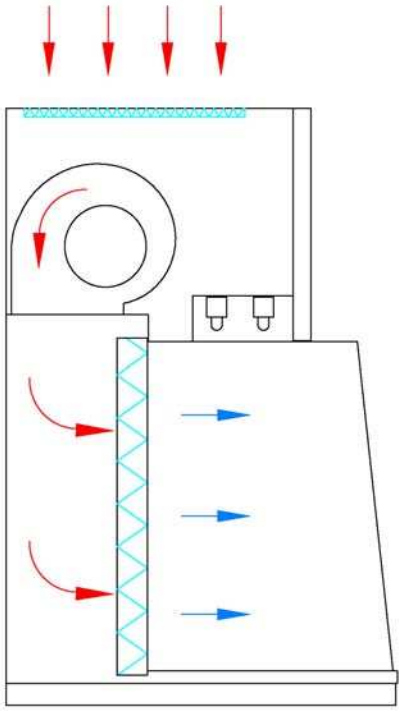


Figure 1: Sectional view CLF

2 Safety regulations

ATTENTION!
Before starting service with the cabinet always ask the responsible person if there is no danger for the service engineer, labor personnel, the laboratory and the surrounding of the cabinet.

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 *on page 7*, is not allowed to use the cabinet. Improper use of the cabinet is not allowed.

2.2 Modifications and changes to the cabinet

In order to operate the cabinet 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 B.V. If modifications and changes are made on own initiative, without permission from Clean Air Techniek B.V., the parts of the cabinet 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 cabinet to an exhaust system.

2.3 Authorized persons

Operating the cabinet

The cabinet shall only be used by personnel which:
- is familiar with the content, regulations and warnings which are mentioned in the user 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 repairs general

Maintenance shall only be performed by qualified service engineers, who are sufficiently trained by Clean Air Techniek B.V. to:
- Estimate and avoid the dangers of the cabinet;
- Estimate the consequences of their actions.
- Before starting maintenance to the cabinet (mechanical and/or electric) disconnect the power supply. Pay attention to rotating parts, after switching off the cabinet the fans will still rotate for a while.

Maintenance and repair of the electrical cabinet

Maintenance shall only be performed by professional electro-technical service engineers, who are sufficiently trained by Clean Air Techniek B.V. when:

- They can estimate and avoid the dangers of the cabinet;
- They can estimate the consequences of their actions;
- They are sufficiently informed about the operation of the cabinet and the operation of the sub-systems.

2.4 General safety aspects

1. The cabinet shall never be used unless the fan is switched into work mode and there is no alarm.

2. When the cabinet is not used, the cabinet should be switched in to power-save mode or closed/covered, to prevent that dust particles etc. from the room can get into the cabinet.

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

4. It's is important that the cabinets will be kept clean. Even the smallest contamination which is not visible will be easily forgotten. It is important to clean often the working area, especially the work top.

5. Be careful with flammable liquids such as alcohol. The airflow is in the direction of the person, so be very careful, or even better; prevent to use this kind of liquids.

6. The use of hand gloves and over sleeves is recommended.

7. Always use a chair with the correct height.

8. 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
	**HIGH VOLTAGE**
	**DANGER OF EXPLOSION**
	**DANGER BY INDUSTRIAL VEHICLE**

3 Cabinet

	**GENERAL DANGER** Be careful: high centre of gravity, crossover point.

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.

3.1 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 (Optional)

Build the support frame (see also

Appendix I: Support frame CLF on page 49 for an explaining drawing):
- Mount the support yokes (Pos. 5) to the reinforcement plate (Pos. 6);
- Mount the feet support (Pos. 7);
- Position the covers (Pos. 4) and adjusting feet (Pos. 3).

Placing the cabinet

- Place the cabinet right on the forks of a forklift truck or lifting platform;

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

- Move the cabinet to the correct height and position, perform this action as precise as possible above the support frame;
- The weight must be equally divided between the both forks and the cabinet must be horizontal levelled;
- The cabinet should be aligned with the support frame.
- Mount the cabinet to the support frame by means of the screws.
- Connect the powerplug to a grounded socket that is easy accessible.

In case of maintenance the cabinet must be completely free of voltage. This means that the connector in the socket must be easy to reach, otherwise a main-switch must be mounted between the cabinet and the power supply so that the cabinet can be cut off of the power-circuit.

3.2 Transport instructions

Before moving the cabinet make sure the power cable is disconnected of the power supply
The cabinet must be transported on a strong solid pallet.
After every transport the cabinet must be tested and calibrated.

	**GENERAL DANGER** Be careful: High center of gravity, crossover point.

3.3 Dismantling & Disposal

For dismantling and disposal follow the next instructions:
- See *§7.1 Cleaning the installation on page 41;*
- See *§8.2 Replacement of the pre-filter on page 42*;
- *See* Appendix II: Replacement of the HEPA-filters *on page 50;*
- 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

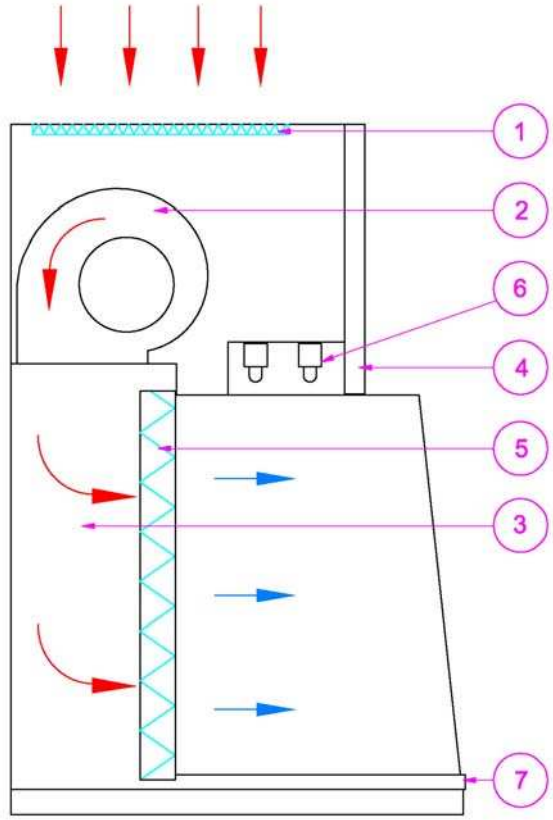


Figure 2 Sectional view CLF

Partlist:

1. Pre-filter
2. Fan
3. Plenum-construction
4. Front panel + control panel + I/O board
5. HEPA-filter
6. Lighting
7. Worktop

4.1 Type plate

On type plate (right upper side) there are instructions that are important for the connection of the cabinet.

4.2 Front panel

Behind the front panel (Figure 2, Pos 4) a number of electrical components are mounted.

- Operating panel / operating board
- Interface board, including fan control

To check one of these components, you need to open the front panel.

4.3 Worktop

The workroom contains a white laminated wooden or stainless steel (304) worktop (Figure 2, Pos 7).

4.4 Plenum-construction

The plenum-construction (Figure 2, Pos 3) equalizes the air trough the crossflow filter.

4.5 Crossflow filter

The crossflow HEPA-filter* (Figure 2, Pos 5) has a very high efficiency: Class H14 in accordance with EN1822. After assembling, each filter will be tested separately. Through the service panel on the back the crossflow filter can be reached.
*) **H**igh **E**fficiency **P**articulate **A**ir filter

4.6 Pre-filter

The pre-filter (Figure 2, Pos 1) is a filter in the class G3 accordance with EN779. Furthermore the pre-filter will enhance the life span of the HEPA-filter significantly.

4.7 Support frame (optional)

For a stable positioning of the cabinet we recommend the use of a support frame. For a good ergonomic work position the use foot support is present. In addition, it is recommended to use an in height adjustable, well disinfectable, chair to optimize the work position. See

Appendix I: Support frame CLF on page 49.

4.8 Main power connection

The main power connection is positioned on the top of the cabinet. The power cable length is maximum 3 meters and should always be accessible. See technical specifications for details.

4.9 Electronics

The electronics (Figure 2, Pos 4) consists of:

- Operational print; positioned in the top hood behind the front panel;
- Control print, positioned behind the front panel, including:
    - Fuse holders (see §9.2 on page 46 for fuse-numbers).
    - Fan control. The control is free adjustable in the range between 0% and 100%
    - An Air velocity compensating microprocessor regulates the fan speed to compensate for main power fluctuations and filter pollution.
    - Independent potential free output contact (interface board connector J6). See Interface board on page 54.
    - Main filter
    - Light ballast + starter for UV (Option)
    - Light ballast for FL-light

4.10 Operating panel

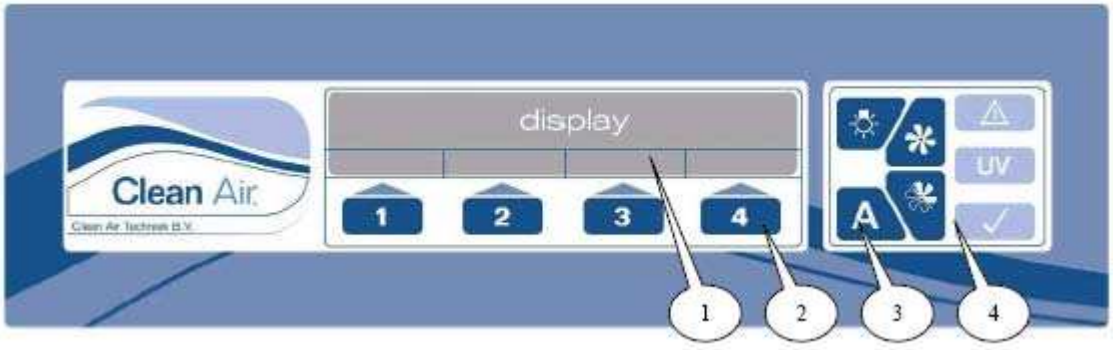


Figure 3: Operating panel

The operating panel (Figure 3, Figure 2, Pos 4) consist of:
1- Display;
2- Function keys (4x);
3- Fixed keys (4x);
4- Signals.

4.11 FL-lighting

The Fluorescent-Lighting (Figure 2, Pos 6) is mounted in the Light unit.

	**HIGH VOLTAGE**

4.12 Fan

The electric driven double suction fan (Figure 2, Pos 2) is maintenance-free.

4.13 Optional features

Gas connection

This connection is assembled together with a gas tap. Normally, both the inlet and outlet gas connections are hose connections, suitable for hoses with an inner diameter of 10 mm. All connections on the gas supply have to be done with a certified gas hose.
After the connection on the gas supply, the gas connections have to be tested on leakage by a certified installer.

Positions of the supply connection
- The connection, that is located inside the installation, is standard assembled on the worksurface inside the work space of the cabinet.
- The connection, that is located outside the installation, is standard assembled in the bottom of the installation.

Bunsen burner

Recommended to apply is the Fuego Bunsen burner, available at Clean Air Techniek B.V.

Positions of the supply connection
- The connection is standard through the workopening.

Vacuum/ O_2/ N_2 and compressed air connections

These connections are always assembled in combination with a tap.

Positions of the supply connection
- The connection, that is located inside the installation, is standard assembled in combination with a tap in the worksurface.
- The connection, that is located outside the installation, is standard assembled in the bottom of the installation.

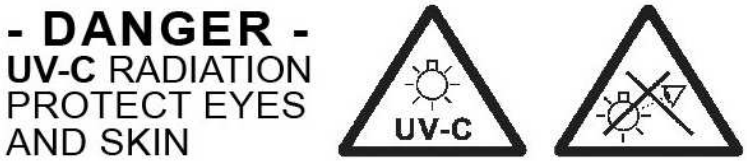
UV-Radiator

The UV radiator is meant for disinfecting the working surface of the cabinet.

When the UV-radiator is on, the TL lighting will be switched off. The UV radiator may only be switched on when the work space of the cabinet is entirely closed, this makes sure that the user will not get in contact with UV-C radiation. Block the front aperture (a special night door can be ordered for this purpose).

DANGER FOR BURNING

Avoid direct contact with UV-C radiation. This causes burns to the skin and eyes.



The UV light can be switched on and off on the display 4 (see §5.7 on page 22). It is also possible to adjust the UV disinfection, for each day a certain disinfection period can be defined (see §5.10 on page 24).

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 §7.2 on page 41.

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. For more info see Appendix XII: TUV Low Pressure Mercury Lamps (Optional) on page 65.

Sockets

The sockets are mounted in the working area.
They can be operated at the control panel. See "Technical specifications”on page 45 for electrical details.

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 Display interface

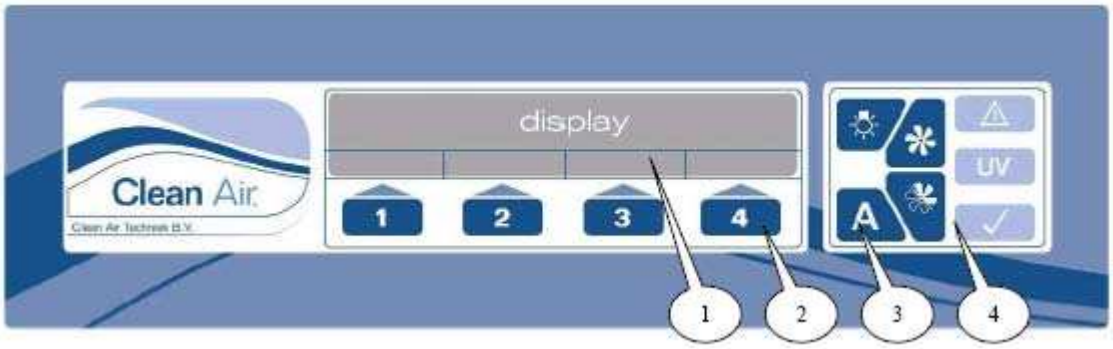


Figure 4 Display Interface

The operating panel (*Figure 3* and *Figure 4*) 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.

I	Cabinet switched off - not safe
II	Monday 11:06:33
III	
IV	MENU | Socket=Off | |

Fixed keys:

☼	Lighting ON/OFF
✻	Work mode fan ON/OFF
✻	Power save mode fan ON/OFF
A	Acknowledge / Enter

Function keys:

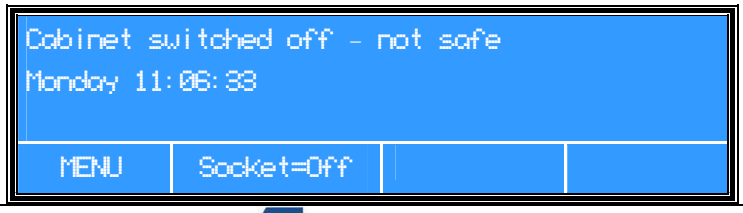
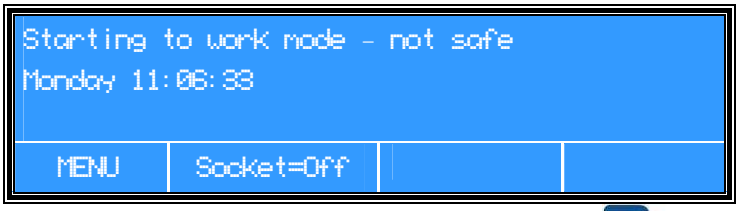
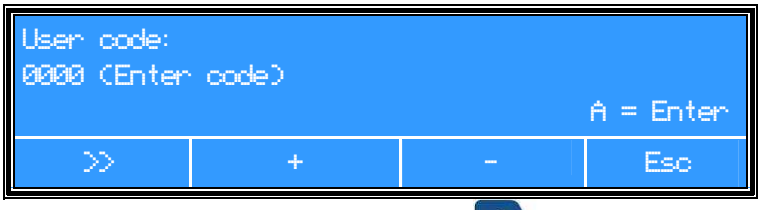
The function of keys 1, 2, 3 and 4 is variable. In the last line of the display the function is shown.

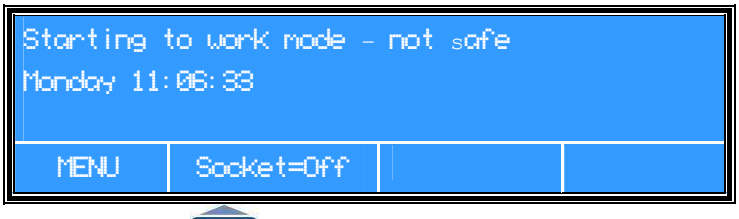
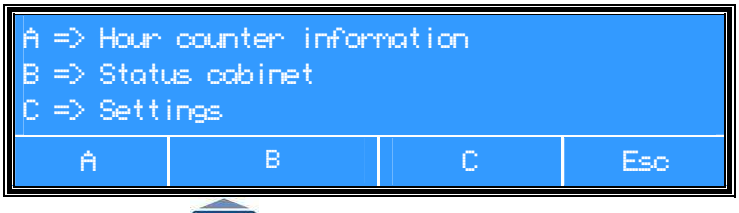
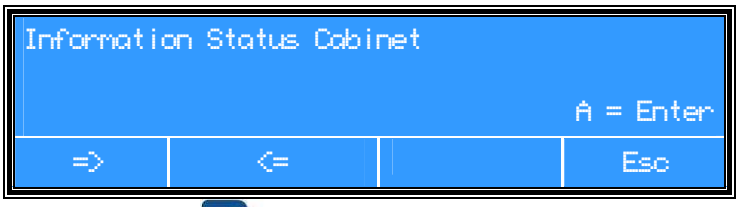
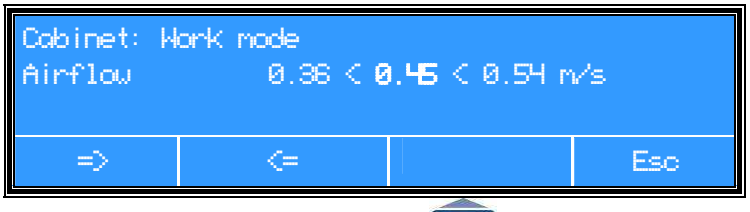
Signals:

⚠	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 the cabinet need to be placed into the installation before starting up the cabinet. High equipment or objects can be placed in the working space by sliding or hinging the window upwards. Be careful: keep the safety regulations in consideration.

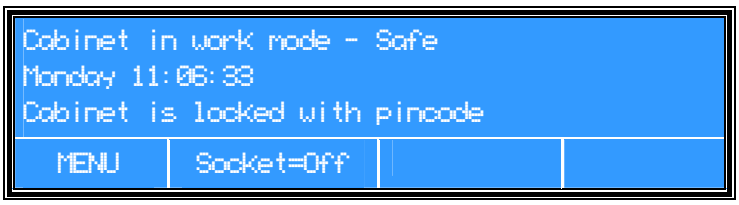
5.3 Starting up the cabinet

1	The lighting of the display will light up. The alarm indicator light is red ⚠.	• Connect the power cable. 
2	The fan starts. Cabinet is in start up mode. The alarm indicator light is red ⚠. There is an acoustic alarm.	• Push button ✻.  • To acknowledge this alarm, push button A.
3	If the cabinet is secured with a user code, this code has to be entered first. The default code is 0001. The user code can be changed by the user, see Appendix IX: User code on page 62.	• Enter actual user code.  • Confirm the code with button A.
4	The light will switch on.	• Push button ☼.
5	When the fan has reached the right airspeed, the alarm indicator will disappear. The following display will be shown.	 However, the cabinet must operate for minimally 15 minutes more, before the cabinet is ready to work with.

6	If the air speeds still are not right, the alarm will sound again. To see what is wrong: See § 5.11 on page 32 for more info about this menu.	 • Push button 1 (Menu).  • Push button 2 (B).  • Push button A.  • Back to starting menu: button 4 (Esc).

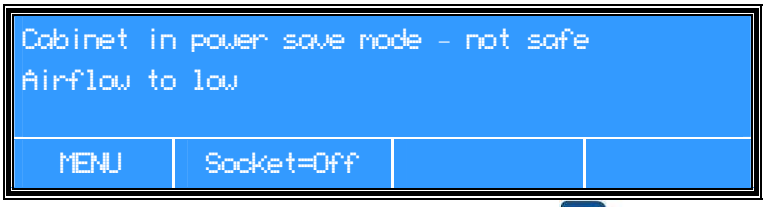
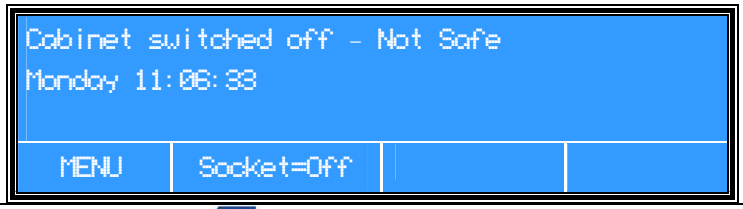
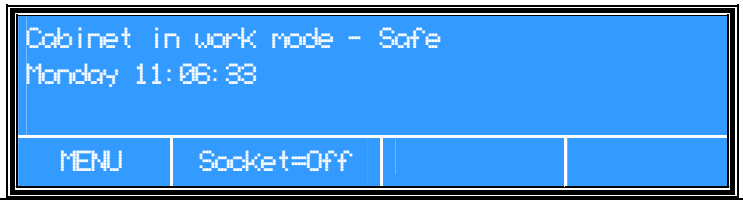
5.4 Locking functions cabinet

(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.	 See Appendix IX: User code on page 62.
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 Appendix IX: User code on page 62.

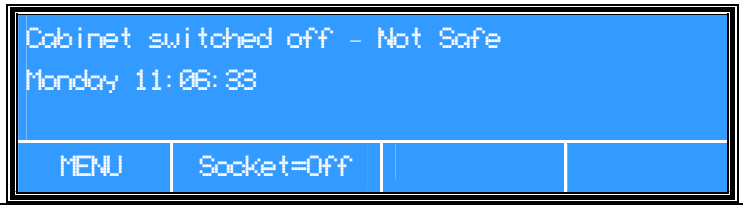
5.5 Power save mode

When not using the cabinet for a short period of time, put it in the power save mode. The fan will run at half speed to save energy (synonyms for power save mode are standby mode or night mode).

1	Power save mode The fan runs at half speed. There is an acoustic alarm.	• Push button . When the cabinet is locked enter the user code.  • To acknowledge this alarm push button A.
2	Switch off procedure	• With the next push on the power save button the cabinet enters the switch off procedure. 
3	Work mode	• Push button . 

5.6 Turn off

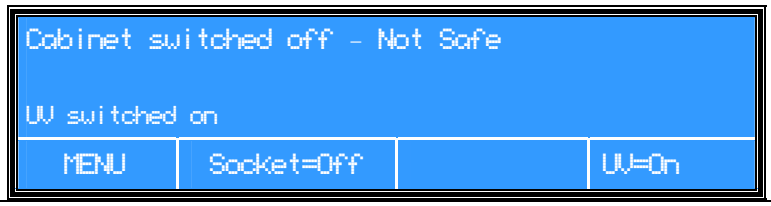
Remove all materials en accessories from the working area. Remove all spilled liquids and other parts in a responsible manner, according to the regulations.

1	The display will ask for the user code (only when the user code is activated).	• Push button to turn off the cabinet.
2	The fan will be switched off.	• Enter the user code and push button A. 

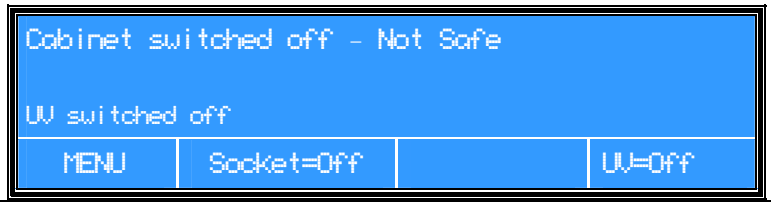
5.7 Control UV (optional)

The UV-function is only visible if this option is installed. If not installed the function at the display is invisible.
The UV-function may only be switched on with a completely closed workspace. See UV-Radiator on page 16)
This prevents direct contact on the skin or eyes of the personnel.

Switching UV on

1	Make sure that the entire workspace is closed. Cabinet must be switched off or in power safe mode. The display shows "UV=Off".	
2	The UV will switch on. The display shows "UV=On".	• Push button 4 (UV=Off). 

Switching UV off

3	The UV will switch off. The display shows "UV=Off".	• Push button 4 (UV=On). 

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.

5.8 Control sockets (Optional)

The sockets can always be switched on and off. If the cabinet is switched off, the sockets are automatically switched off. Also if the cabinet is switched from work mode into power save mode, the sockets are automatically switched off.
See technical specification (see *§9.2 General specifications on page 45*) for maximum voltage and current (fuses).

Switching socket on

1	Cabinet in work mode. See *§5.3 Starting up the cabinet on page 19.*	

2	The display shows: Socket=On. Power of socket is switched on.	• Push button 2 (Socket=Off). 

Switching socket off

3	The display shows: Socket=Off. Power of socket is switched off.	• Push button 2 (Socket=On). 

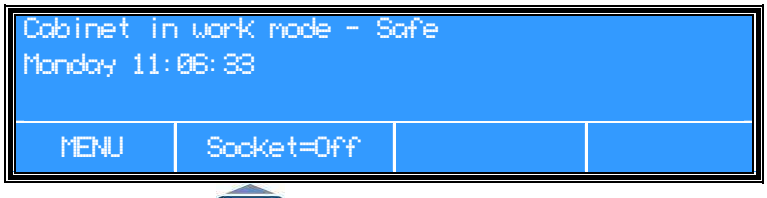
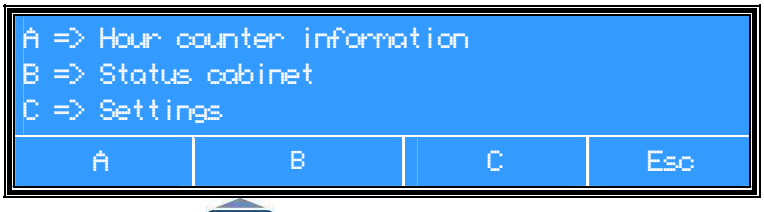
5.9 Menu functions

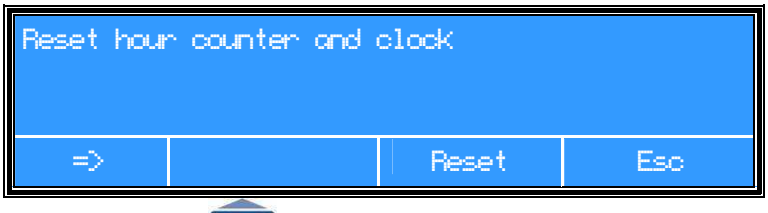
From the main menu you can go to: § 5.10 General information, § 5.11 Information about the status of the cabinet and § 5.12 information about the settings.

5.10 General Information

In general information more details are given about:
- Hour counter information and reset (FL, UV, Timer)
- Set up 7 days clock UV
- Set up socket 7 days clock
- Set up cabinet 7 days clock
- Set Actual time

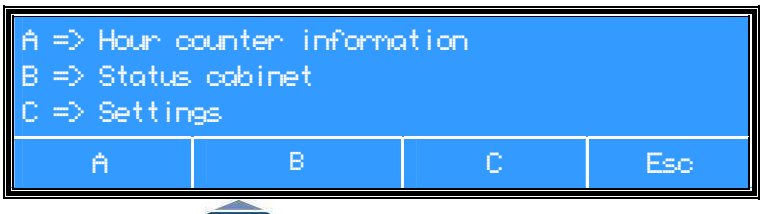
Hour counter information and reset (FL, UV, Timer)

1	Cabinet in work mode. See *§5.3 Starting up the cabinet on page 19.*	 • Push button 1 (Menu).
2		 • Push button 1 (A).

3	Hour counter display shows.	
4	Hour counter information shows.	• Push button A.  *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 (=>).  • 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. See *§5.3 Starting up the cabinet on page 19.*	 • Push button 1 (Menu).

	Set up for 7 days clock UV shows.	 • Push button 1 (A).  • Push button 1 (=>).  • Push button A. 

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 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	• Push button 2 (Clock), to set up the 7 days clock. • 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.

	§5.9 Set up 7 days clock UV on page 24 .	• Push 2x button 4 (Esc) for starting menu. See also the *Example on page 26*.

Disable

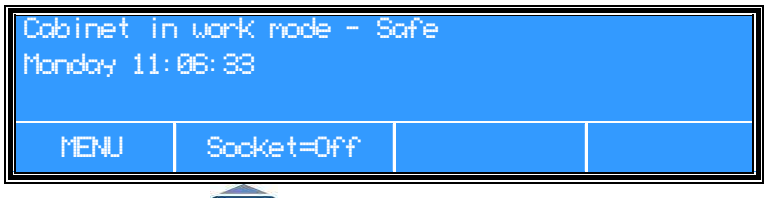
2c	By pushing on "Disable" the UV can only be turned on and off manually.	• Push button 3 (Disable), to set the UV manually. • Push 2x button 4 (Esc) for starting menu.

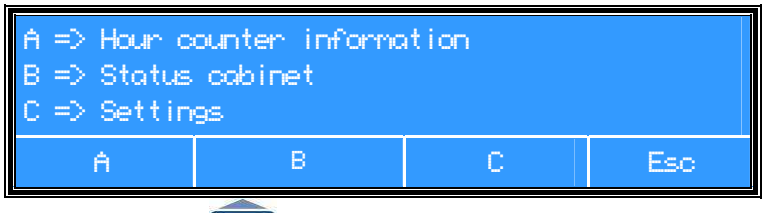
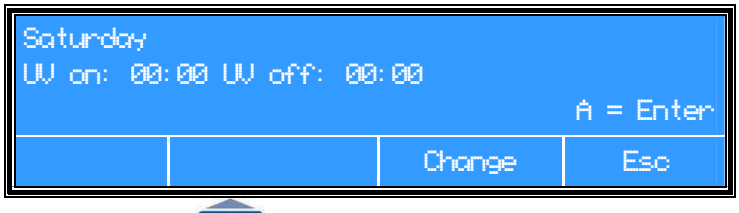
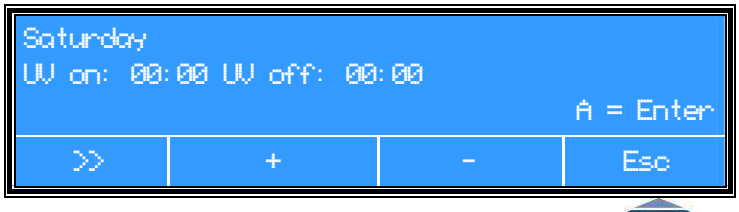
Please select not only a starting time, but also an ending time for every programmed day. Otherwise the UV will stay on until 00:00 h and only then turn off. See also the *Example on page 26.*

Example

Programming the 7 days clock UV will be given as an example.
Switch on the UV Tuesday evening 22.00 and switch off the UV Wednesday morning 06.00.

(See *§5.9 Hour counter information and reset (FL, UV,* Timer) *point 5a on page 23,* for deleting all Hour counter programmed information).

1	Cabinet in work mode. See *§5.3 Starting up the cabinet on page 19.*	 • Push button 1 (Menu).

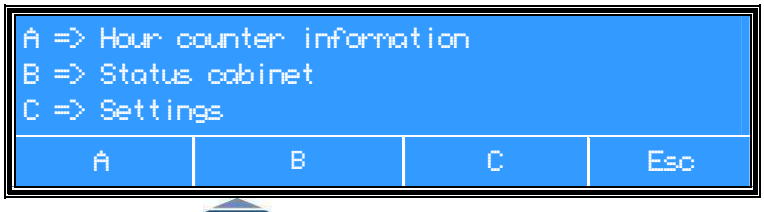
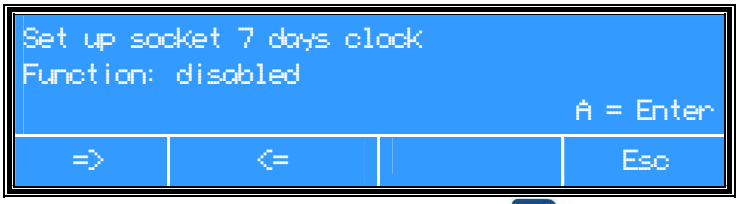
	Set up for 7 days clock UV shows.	 • Push button 1 (A).  • Push button 1 (=>).  • Push button A. 
2	Set up the UV 7 days clock	• Push button 2 (Clock) for setting up the UV 7 days clock.  • Push button 3 (Change) for changing the start and end time.  • The value can be changed by pushing button 1 (>>) , 2 (+) or 3 (-).
3	Set up UV **starting time Tuesday evening 22.00**. -Change start day, -Change start hour (22.00), -Change start min (22.00), -Change stop hour (00.00),	• Saturday has to be changed into Tuesday, UV starting time at 22.00 and UV off at midnight 00.00. The display shows:

	-Change stop min (00.00).	 • Acknowledge the setting with button A.
4	Set up UV switching off on **Wednesday morning 06.00**. -Change stop day, -Change start hour (00.00), -Change start min (00.00), -Change stop hour (06.00), -Change stop min (06.00).	 • Push button 1 (=>), then button A, then button 2 (Clock) and then button 3 (Change). • Tuesday has to be changed into Wednesday, UV starting time at midnight 00.00 and UV off at 06.00. • The display shows:  • Acknowledge the setting with button A.  • Push 2x button 4 (Esc) for starting menu.
5	Check of programmed UV Clock	• Push 3x button 1 (Menu). • Push button A. • Push button 2 (Clock), for checking the UV clock (day by day).  • Push button 3 (Change), to see what has been programmed. 

		•

		• The value can be checked by pushing button 1 (>>) change day. Every days program can be controlled by pushing 2 (+) or 3 (-). • Important! **Don't touch** A, only use 2x button 4 (Esc) to go back to the main menu.

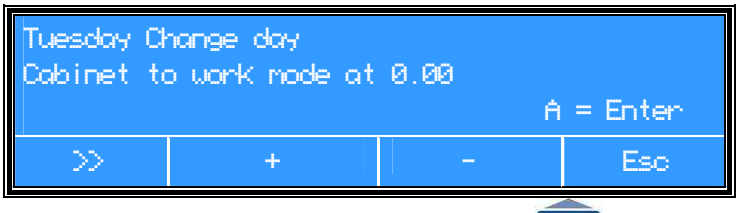
Set up socket 7 days clock

1	Cabinet in work mode. See *§5.3 Starting up the cabinet on page 19.* Set up display for socket 7 days clock shows.	 • Push button 1 (Menu).  • Push button 1 (A).  • Push 2x button 1 (=>).  • Acknowledge the setting with button A. 

	There are three ways to set the sockets: - Timer - 7 days clock - Disable	
2	See *§5.9 Set up 7 days clock UV on page 24 and further.* See also the *Example for programming the UV-lamp on page 26.*	The timer function needs to be activated first, otherwise the sockets will not switch on.

Set up cabinet 7 days clock

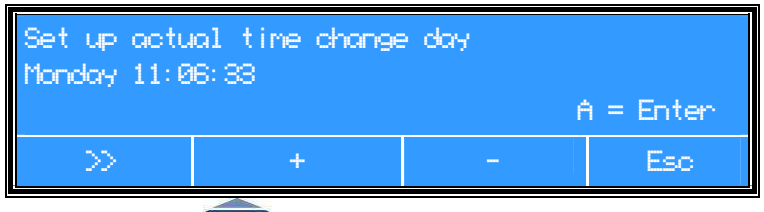
With this menu it is possible to program an automatic switch action on of the cabinet. It is however not possible to switch off the cabinet itself automatically!

1	Cabinet in work mode. See *§5.3 Starting up the cabinet on page 19.*	 • Push 5x button 1 (1x Menu, 1 x A and 3x =>),  • Acknowledge the setting with button A. 
2	Disable	• Push button 2 (Disable), to reset all previous settings.
3	Change days:	• Push button 3 (Change), to change the day.  • The value can be changed by pushing, 2 (+) or 3 (-).
4	Change hours:	• Push button 1 (>>) to change the time.

		 • The value can be changed by pushing button 2 (+) or 3 (-).
5	Change minutes:	 • Push button 1 (=>) again, to change the minutes.  • 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 *§5.3 Starting up the cabinet on page 19.*	
2	Set up actual time: Set up display the actual day shows.	• Push 6x button 1 (1x Menu, 1 x A and 4x =>).  • Acknowledge the setting with button A.  • Push button 1 (=>).

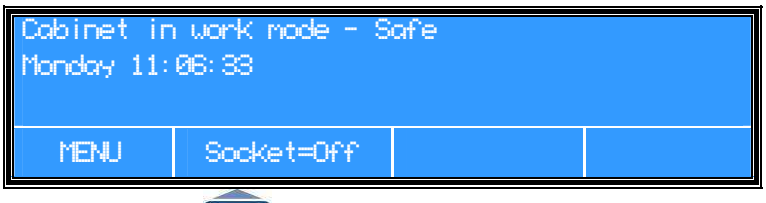
		• The day can be changed by pushing button 2 (+) or 3 (-).
3	Change hours/min/sec: Set up display set up the actual time shows.	• Push button 1 (>>) again. • The hours/min/sec can be changed by pushing button 2 (+) or 3 (-).
4	Acknowledge the settings	• Acknowledge the setting with button A. • Push 2x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

5.11 Information status cabinet

In this menu the settings of the cabinet can be checked to inform service personnel.
In information status more details are given about:

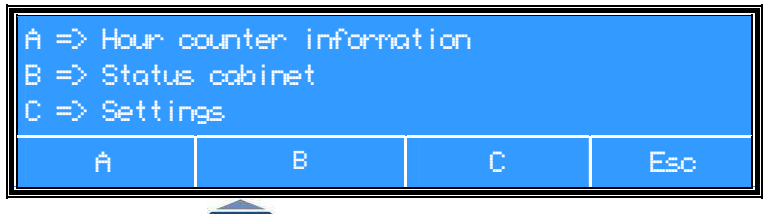
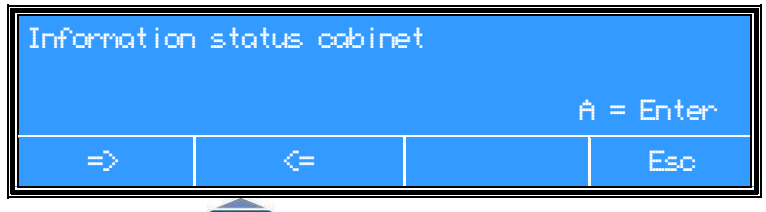
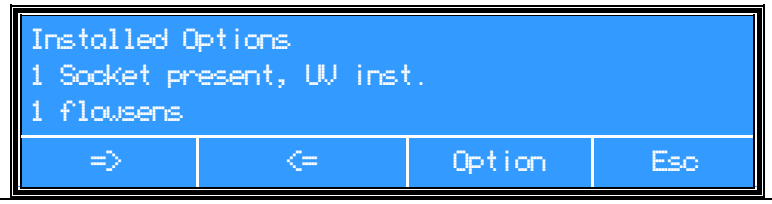
- Actual velocities, alarm setting and fan settings
- Information about the installed options (Sockets, UV)
- Information about Options relays
- Information about Analog inputs (only visible when option is activated)

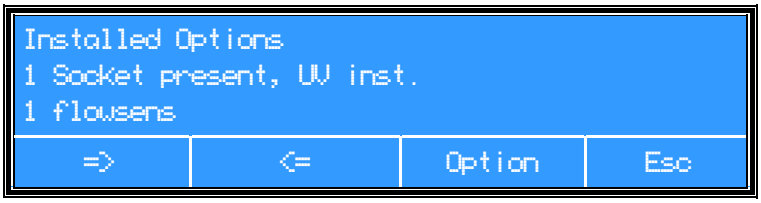
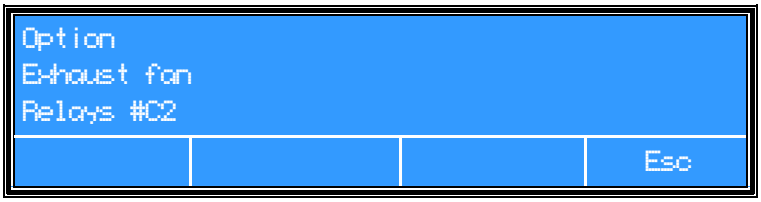
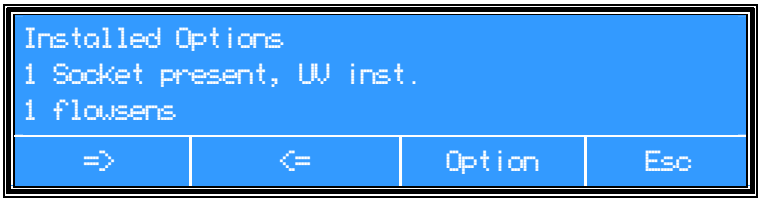
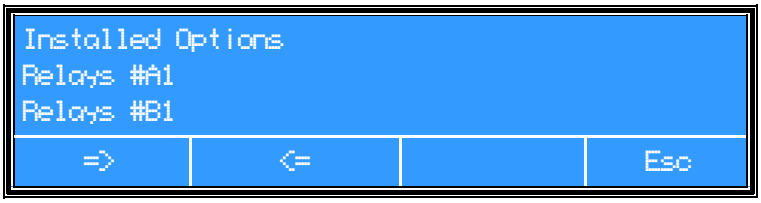
1	Cabinet in work mode. See *§5.3 Starting up the cabinet on page 19.*	 • Push button 1 (Menu).  • Push button 2 (B).
2	Status Display:	 Status display shows
3	Status Information :  Example with colours)	• Push button A. 

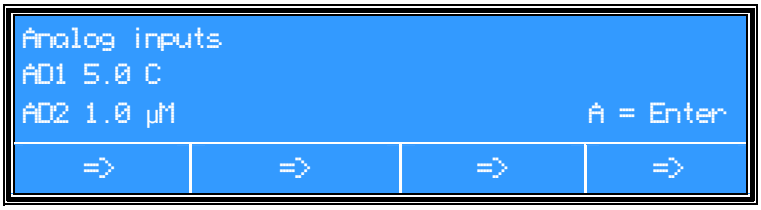
		Status information cabinet shows (see example). • Middle numbers are the actual air speeds (yellow); • Left and right numbers are the set up alarm borders (red).
4	Information fan shows	• Push button 1 (=>).  The seven-digit number in the upper right corner is only meant for service aims. • Push button 4 (Esc) for starting menu.

Information about the installed options

(The display only shows when the options are installed)

1	Cabinet in work mode. See *§5.3 Starting up the cabinet on page 19.*	 • Push button 1 (Menu).  • Push button 2 (B).
2	Information about the installed options is given (example):	 • Push button 1 (=>). 
	From here there are 3 possibilities (examples): - 3a. Screen I - 3b. Screen II - 3c. Screen III	

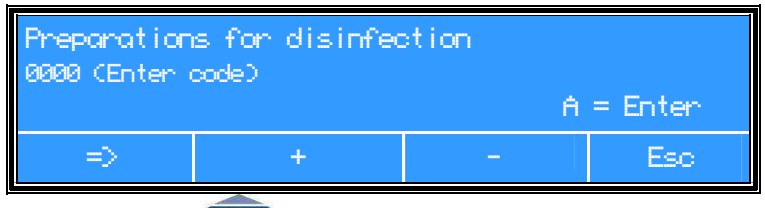
3a	Options **Screen I** Starting up from Step 2	 Installed options display shows. • Push button 3 (Option).  For explanation codes see *Appendix VIII: Information installed* options *on page 52* . • Push 2x button 4 (Esc) for starting menu.
3b	Options **Screen II** Starting up from Step 2	 Installed options display shows. • Push button 1 (=>).  • For explanation codes see *Appendix VIII: Information installed options on page 52.* • 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 (=>).  For explanation codes see *Appendix VIII: Information installed options on page 58.* • Push button 4 (Esc) for starting menu.

5.12 Settings

In settings more details are given about:
- Preparations for disinfection
- Activating the user code
- Factory adjustments
- Testing of alarms
- Change the user code
- Change language

Disinfection (Not applicable for this type of cabinet)

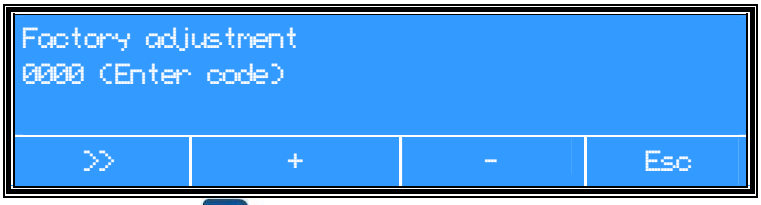
1	Cabinet in work mode. See *§5.3 Starting up the cabinet on page 19.*	 • Switch off the cabinet with button ✱. • Push button 1 (Menu).  • Push button 3 (C). • Push button A.
2		 • Push button 4 (Esc) to leave the disinfection.

Activating the user code

See *Appendix IX: User code on page 61*.

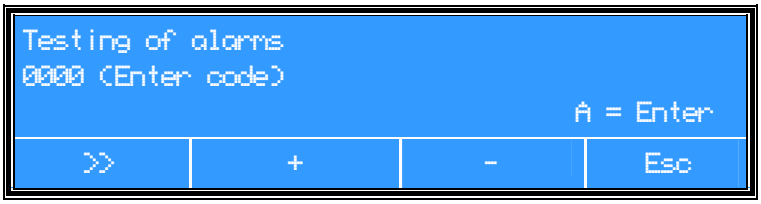
Factory adjustments

1	Cabinet in work mode. See *§5.3 Starting up the cabinet on page 19.*	
2	Factory adjustments:	• Push button 1 (Menu). • Push button 3 (C). • Push 2x button 1 (=>).

	Factory adjustment display shows. Factory settings can be changed here (authorized personnel only). See service manual for more information. (Version: X.X =version of Display board, I/0: VX.XX= version of IO board, OPT: VX.X = version option board)	• Push button A. • Enter the code for "Factory adjustment" (authorized personnel only).  • Push button A.  • Push button 4 (Esc) for starting menu.

Testing of alarms

For service purposes only! More information given in Appendix VI: Alarm-test procedure*on page* 55*.*

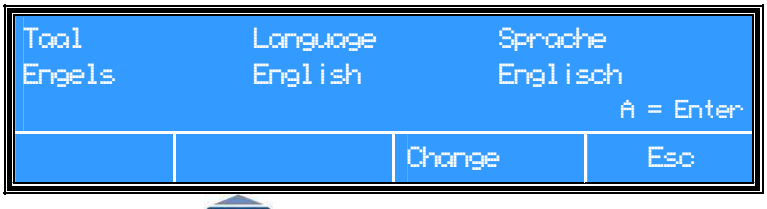
1	Cabinet in work mode. See *§5.3 Starting up the cabinet on page 19.*	
2	Testing of alarms display shows:	• Push button 1 and 3 (C). • Push 3x button 1. • Push button A.  • Enter service code.
3	For service purposes only!	The various values of the fan and velocities are shown on the display. In case of interference, inform you service organization.

Change the user code

See *Appendix IX: User code on page 61.*

Change language

To change the language, switch off the cabinet and switch off 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 *§5.3 Starting up the cabinet on page 19.*	
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.  • Push button 3 (Change) to change the language. • Push button A.

6 Alarms

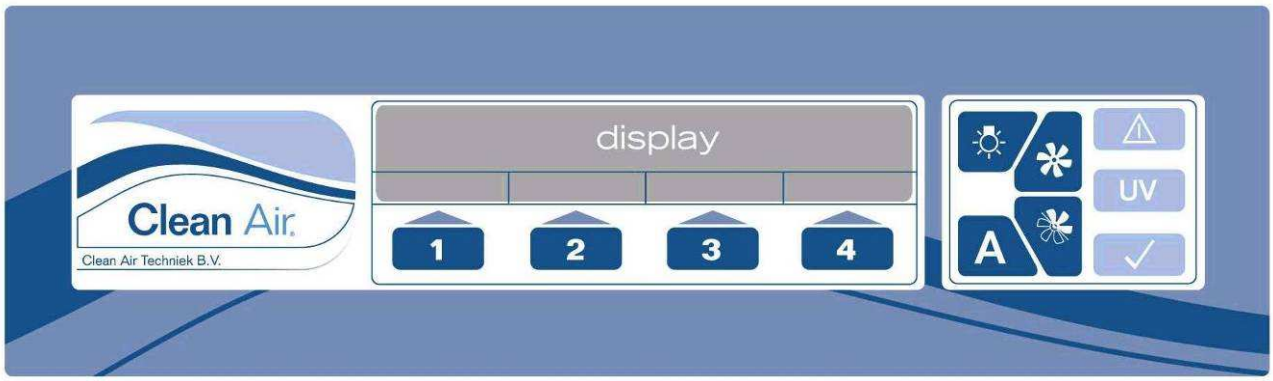


Figure 5 Operating panel

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 A for giving an acknowledgement that the user has seen the alarm. 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 X: Required specifications* on page *63.*

	**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.

6.1 Flow alarms

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 *§5.11 Information status cabinet on page 32*).

Flow too low

Figure 6

Product protecting crossflow is too low.

Product protection becomes less, there is a chance that aerosols from the outside go into the working area.

Flow too high

Figure 7

Product protecting crossflow is too high.
Product protection stays intact.

6.2 Other alarms

Other alarms are:

Fan failure

Figure 8

Most likely the fuse is broken. Replace it with a new one. If the alarm is still there, contact your service organization.
To reset this alarm you must disconnect the power plug from the main voltage.

Communication error

Figure 9

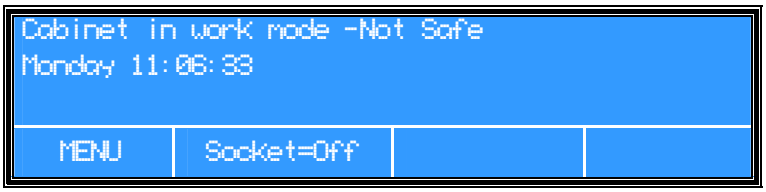
Contact your service organization.

		Overview possible alarms	
	No alarm	Flow too low	Flow too high
Product protection:	Yes	No	Yes

Table 1: Alarm situations in work position

Procedure in case of alarms

	In case the alarm is still present: Stop working, and push button  or the standard operation procedure has to be followed.	The cabinet goes into the saving position.

	Read the alarms from the display. Contact your service organization.	 Working with the cabinet is not possible anymore.

7 Cleaning

Only the responsible safety officer (safety officer or the responsible examiner) can decide if this procedure is valid or not. Additional standard operation procedures can be necessary.

7.1 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 will be sufficient.
Chlorine containing cleaning agent is not recommended, because even small concentrations chlorine may result in an oxidizing effect on the material of the installation.
It is important to clean the worktop (see *§ 4.3 on page 13)* regularly. 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

Procedure for cleaning the installation

Never clean a used installation without precaution (for instance disinfection)

- Switch the installation in the working mode (see *§5.3 Starting up the cabinet on page 19)*;
- Put on gloves;
- Clean the surface with the cleaning-solution on a tissue ;
- Repeat this action with a new tissue;
- Clean the surface with a moist cloth;
- Repeat this action;
- Dry the surface with a paper tissue.

7.2 Cleaning the UV-light (optional)

Never clean a 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.

8 Small maintenance and testing

BE CAREFUL!!
Before starting service with the cabinet a written declaration "that the cabinet is decontaminated" must be present. The responsible person (laboratory supervisor) will decide if the cabinet has to be decontaminated so that when servicing the installation and the HEPA-filters there is no danger for the service engineer, labour personnel, the laboratory and the surroundings of the cabinet.

8.1 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.
Guideline for testing and maintenance given Clean Air Techniek B.V. is every 12 months at least.

- Validate the system on safety;
- Check for correct functioning of the electrical system;
- Check the HEPA filter for efficiency and leakage;
- Verification/calibration of the assembled air speed sensor(s);
- Check and adjust the alarm system.

8.2 Replacement of the pre-filter

(See 4.6 Pre-filter *on page* 13)

Supplies needed:

- Plastic bag (minimum measurement 75x50 [cm] with closure);
- Two pair of gloves;
- Tape.

Procedure:

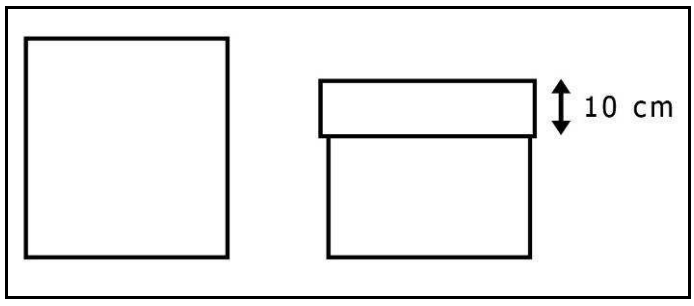
- Switch off the installation;
- Put on the gloves;
- Fold the edge of the plastic bag ±10 cm;
- 

Figure 10 Folding the edge of the bag ±10 cm

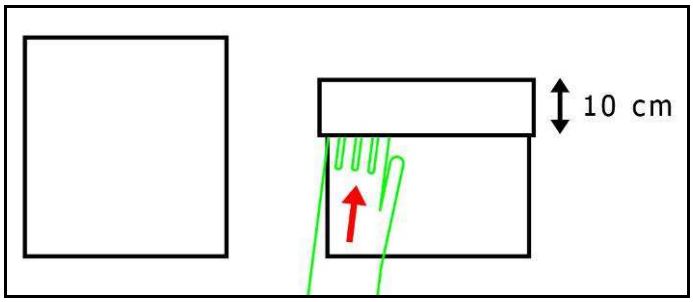


Figure 11 Positioning the left hand in the plastic bag

- Pull the pre-filter towel 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;
- Remove the plastic bag and place it in an appropriate container;
- Put on new gloves;
- Place a new pre-filter towel;
- Remove the gloves and put them in the appropriate container.

8.3 Replacing the fluorescent-light (FL light)

When an FL light needs to be changed, switch off the power of the installation. The upper front panel needs to be opened. Unscrew the nuts of the coverplate.The transparent light plate needs to be removed in to the workarea. Replace the FL tube for a new one (see *Figure 12)*. Reposition all parts on the installation.

	**DANGER FOR ELECTROCUTION**

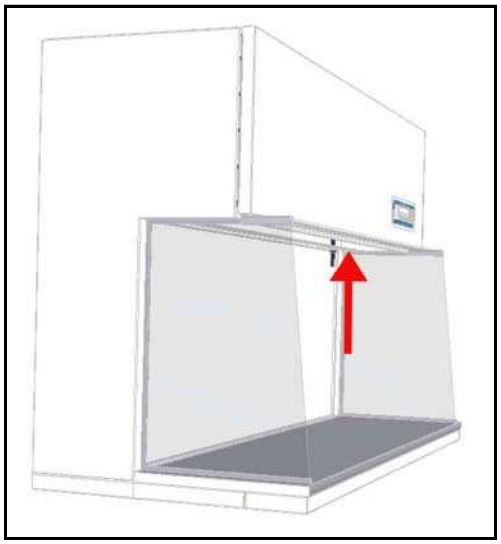


Figure 12 Position of the FL-tube

8.4 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 *page 12* and *page 57*);
- Version number of the software used in the cabinet.

Software Version

1	Cabinet in work mode. See *§5.3 Starting up the cabinet on page 19.*	
2	Software version:	• Push button 1 (Menu). • Push button 3 (C). • Push 2x button 1 (=>). 

8.5 Service contract

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

8.6 Testing

Recommended tests for first installation or after changing the HEPA filters are:

- Velocity tests (see Appendix IV Measuring method air velocities *on page 53);*
- Filter Integrity tests (see Appendix III: Efficiency test of the HEPA-filters *on page* 52*);*
- Alarm tests (see Appendix VI: Alarm-test procedure *on page* 55*).*

Recommended tests after installing with a regular interval are:

- Velocity tests (see Appendix IV Measuring method air velocities *on page 53);*
- Filter Integrity tests (see Appendix III: Efficiency test of the HEPA-filters *on page* 52*);*
- Alarm tests (see Appendix VI: Alarm-test procedure *on page* 55*).*

9 Technical specifications

9.1 Physical surrounding

Transport physics		**CLF 475**	**CLF 575**	**CLF 675**
Surrounding temperature	[°C]	-25 tot 55	-25 tot 55	-25 tot 55
Surrounding temperature (max 24 [h])	[°C]	-25 tot 75	-25 tot 75	-25 tot 75
Humidity	[%]	20 tot 90	20 tot 90	20 tot 90

In use physics		**CLF 475**	**CLF 575**	**CLF 675**
Surrounding temperature	[°C]	15 tot 30	15 tot 30	15 tot 30
Humidity (not condensed)	[%]	30 tot 80	30 tot 80	30 tot 80

9.2 General specifications

Dimensions		**CLF 475**	**CLF 575**	**CLF 675**
Front aperture (lxh)	[mm]	1190 x 730	1495 x 730	1800 x 730
Outer meas. (without support frame (lxhxd)	[mm]	1290 x 1350 x 890	1595 x 1350 x 890	1900 x 1350 x 890
Height including. Support frame 810 [mm]	[mm]	2082	2082	2082
Interior dimensions (lxhxd)	[mm]	1190 x 730 x 580	1495 x 730 x 580	1805 x 730 x 580
Working area (lxd)	[mm]	1190 x 540	1495 x 540	1800 x 540
Mass	[kg]	225	270	325

Filter		**CLF 475**	**CLF 575**	**CLF 675**
Pre-filter (EN 779)	[mm]	G3	G3	G3
Crossflow filter	[mm]	HEPA 12P7	HEPA 15P7	HEPA 18P7

Performance		**CLF 475**	**CLF 575**	**CLF 675**
Sound level (according to ISO 11201)	[dB A]	<58	<58	<54
Average crossflow speed (in work mode)	[m/s]	0,45 ±0,05 *[1]	0,45 ±0,05 *[1]	0,45 ±0,05 *[1]
Average crossflow speed (in standby mode)	[m/s]	0,20 ± 0,05	0,20 ± 0,05	0,20 ± 0,05
Airflow (work mode) +/-10%	[m^3/h]	1400	1800	2150

*[1] As where no individual measurement should differ more than 20% from the mean. All measurements must in between 0,36 m/s and 0,54 m/s.

Electrics		**CLF 475**	**CLF 575**	**CLF 675**
Power connection	[V] [Hz]	230 +/- 5% 50	230 +/- 5% 50	230 +/- 5% 50
Needed main fuse box security	[A]	16	16	16
J6: Alarm, potential free contact	[V]	Max. 48	Max. 48	Max. 48
	[A]	Max. 1	Max. 1	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]	230 3,15	230 3,15	230 3,15
	$P_{max.}$[W]	725	725	725
Power consumption in standby mode (with light switched off) excl. maximum power socket	P [J/s,W] I [A]	373 1,62	460 2,0	465 2,02
Power consumption in work mode (with light switched on) excl. maximum power socket	P_{nom} [J/s,W] $I_{nom.}$ [A]	708 3,08	805 3,5	1000 4,35
Power consumption in work mode (with light switched on) incl. maximum power socket	P_{nom} [J/s,W] $I_{nom.}$ [A]	1433 6,23	1530 6,6	1725 7,5
Power consumption in max mode fan (with light switched on) excl. maximum power socket	P_{max} [J/s,W] $I_{max.}$[A]	980 4,26	1383 6,0	1427 6,2
Power consumption in max mode fan (with light switched on) incl. maximum power socket	P_{max} [J/s,W] $I_{max.}$[A]	1705 7,41	2108 9,16	2152 9,35

Lighting		**CLF 475**	**CLF 575**	**CLF 675**
TL-High output		2x	2x	2x
Color		white	white	white
Diameter	[mm]	Ø26	Ø26	Ø26
Length	[mm]	892	1198	1500
Power	[W]	30	36	58
Intensity (mean)	[Lux]	> 900	> 900	> 900

Fuses I/O board		**CLF 475**	**CLF 575**	**CLF 675**
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	1,6	1,6	1,6
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

Options:

UV		**CLF 475**	**CLF 575**	**CLF 675**
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]	892	892	892

Bunsen burner		**CLF 475**	**CLF 575**	**CLF 675**
Voltage	[V] DC	9	9	9
Power	[W]	2	2	2

See also Appendix X: Required specifications *on page* 63 and Appendix XI: Recommended spare parts list *on page* 64.

10 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 programmed	UV option has to be programmed please contact your service organization
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
Cabinet is locked	User code must be entered	Enter the user code (or de-activate the user code see § 5.12 Change the user code on page 36)

Appendix I: Support frame CLF

For every type of cabinet from CLF-series a specific support frame is available.

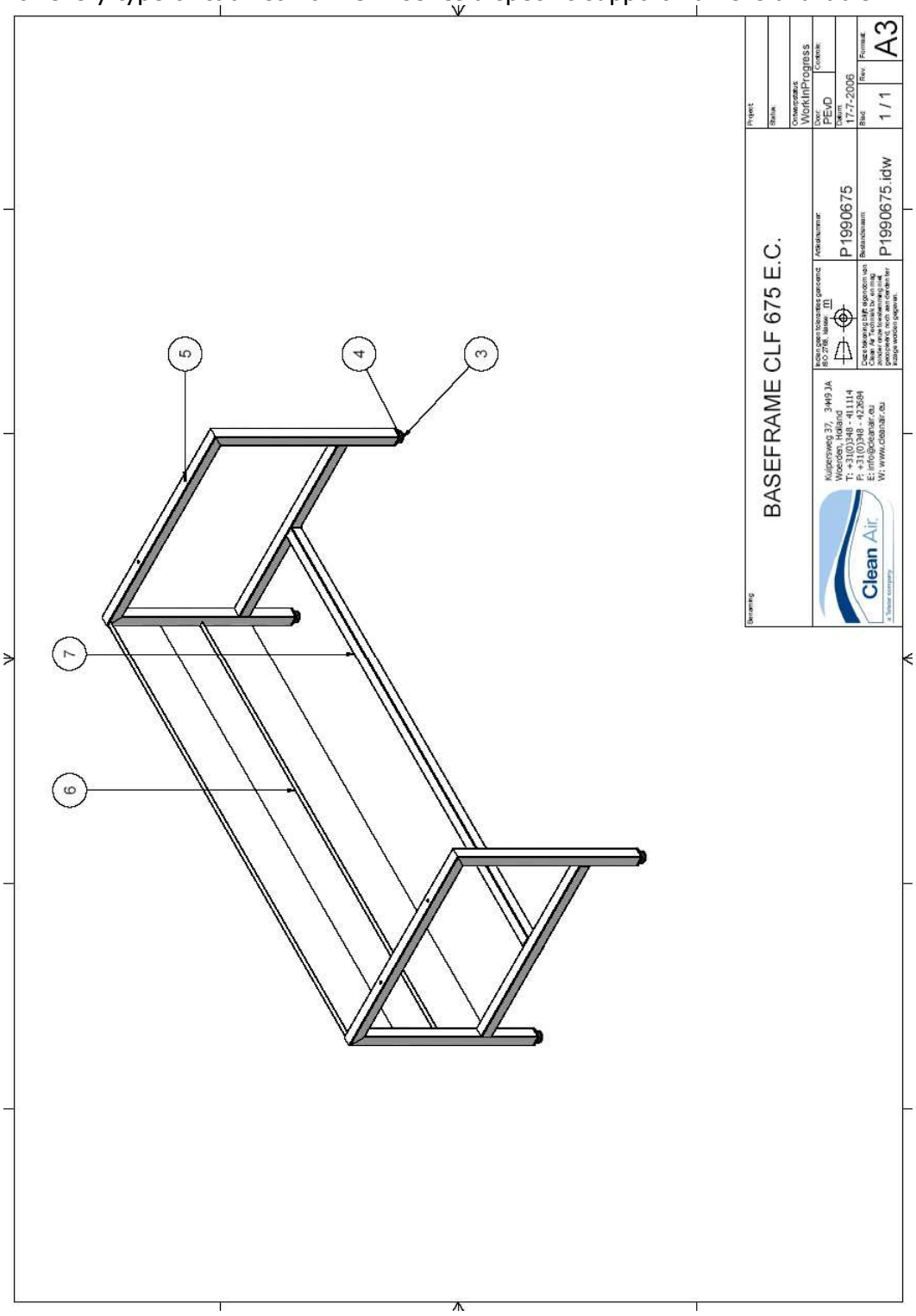


Figure 13 Example of a support frame

Appendix II: Replacement of the HEPA-filters

BE CAREFUL!!
Before starting service with the cabinet a written declaration "that the cabinet is decontaminated" must be present. The responsible person (laboratory supervisor) will decide if the cabinet has to be decontaminated so that when servicing the installation and the HEPA-filters there is no danger for the service engineer, labour personnel, the laboratory and the surroundings of the cabinet.

Clean Air Techniek B.V. strongly recommends special trained technicians to carry out filter exchange. Certified service organizations are recommended. At all times keep to the written procedures in this manual!

1. When does a HEPA filter need to be replaced?

Under normal circumstances the serviceable life time of a HEPA filter is several years (mostly between 5 and 10 years). The filter should be replaced whenever the air velocity and/or the filter Integrity are no longer in compliance with the required specifications. The cabinet has a microprocessor that is automatically regulating the fan speed to compensate for main power fluctuations and filter pollution.

2. replacing the HEPA-filter

Make sure that the cabinet has been properly decontaminated so as to ensure that no danger exists for the service engineer, the laboratory personnel and the environment.
If the customer has a special procedure for the disposal of contaminated material, then this should be followed. In case the service engineer does not think that this is sufficient, then proper precautions should be made in consultation with the person responsible for the cabinet.
If there is no special procedure it is best to wear at least gloves and the protective clothing normally worn during work with the cabinet. It is also advised to have a breathe protection e.g. with a semi-facial mask with HEPA filters.

Supplies needed:

- Plastic bag with closure (minimum measurement depends on the volume of the HEPA filter);
- Two pair of gloves;
- Semi-facial mask with HEPA filters;
- Tools (knife, spanner or socket wrench, Alien key);
- Tape;
- Chemical disposal container or chemical disposal procedure.

Removing the old HEPA filter

- Switch off the cabinet and pull out the power plug;
- Put on the gloves and keep an extra pair ready for use;
- Put on your breathe protection e.g. with a semi-facial mask with HEPA filters;
- Remove the lower back panel;
- Loosen the bolts of the pressure construction;
- Take HEPA-filter out of the cabinet into a plastic back;
- Remove the HEPA-filter conform the regulations;
- Loosen the bolts of the pressure construction;

- Take the HEPA filter out of the cabinet and put it into an appropriate plastic bag;
- Seal the plastic bag airtight;
- Remove the gloves and put them in the appropriate container.

Position the new HEPA filter

- Unpack the new filter, check specifications and register the serial number and specifications;
- Filter certificate has to be stored on a safe place;
- Put Vaseline on the seal of the HEPA filter (both sides);
- Position the HEPA filter (take care for possible damage of the sealings!);
- Place the new HEPA-filter;
- Put the cabinet together in the reverse way as described above;
- Put of your gloves and put these in an appropriate bag;
- Do an efficiency test according to the procedure described in Appendix III.

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.

Appendix III: Efficiency test of the HEPA-filters

ATTENTION!
Before starting service with the cabinet always ask the responsible person if there is no danger for the service engineer, labor personnel, the laboratory and the surrounding of the cabinet.

Clean Air Techniek B.V. strongly recommends special trained technicians to carry out filter tests. Certified service organizations are recommended. At all times keep to the written procedures in this manual!

Requirements

Efficiency test by means of a particle counter

The HEPA-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 HEPA-filter must have an efficiency of 99,99%. A local measured value must be ≤ 0,01%. When a HEPA-filter does not meet the EN1822, it is allowed to repair it. The surface of the reparation must not be more that 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 II: Replacement of the HEPA-filters on page 50.

Test aerosol

In a CLF cabinet, test aerosol can be added on the fan suction side after removing the pre-filter on top of the cabinet (do not remove the metal grid under prefilter to prevent contact with the rotating fan and electronic components). Switch on the installation.

	**GENERAL DANGER** You can harm yourself and others seriously if you do not follow the procedures carefully
	**HIGH VOLTAGE**

The 100% measure point (upstream concentration) of the crossflow HEPA-filter is positioned on the top of the crossflow plenum. The HEPA filter can be scanned on the downstream side (in the workarea).

Appendix IV Measuring method air velocities

Requirements

The measurement of air velocities in the cabinet is performed according to manufacturer specifications as described in chapter 9 on page 45.

Air velocities crossflow

- Switch on the cabinet;
- Measure the airspeeds in a rectangular grid with a distance between each measurement point of no greater than 300 x 300 mm. The rectangular grid must be 150 mm away from each side that encloses the filter.
- Measure with an anemometer in a verticall plane at 150 mm from the HEPA filter
- This measurement must be done for at least one minute on each position.

Appendix V: Lay-out boards

Interface board

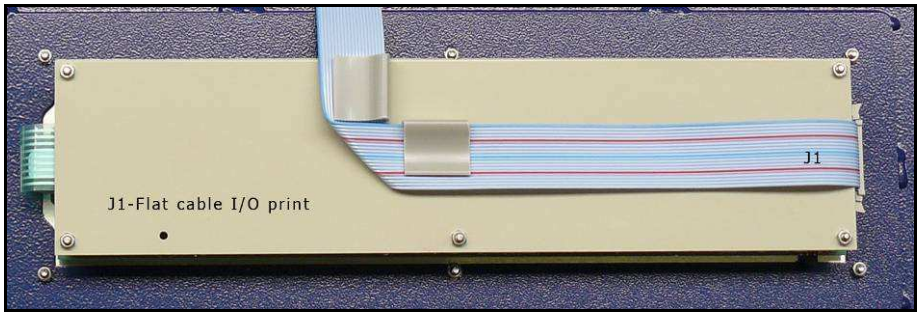


Figure 14 Interface board

Control board

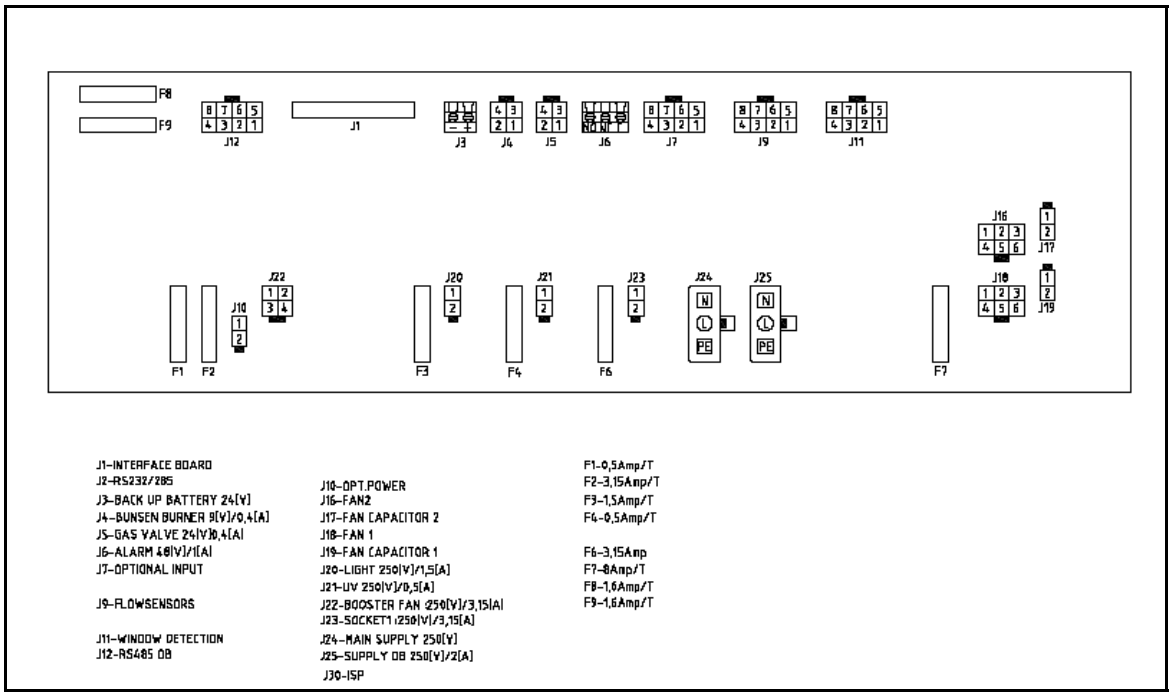
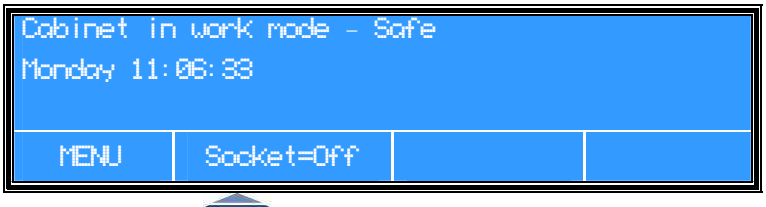
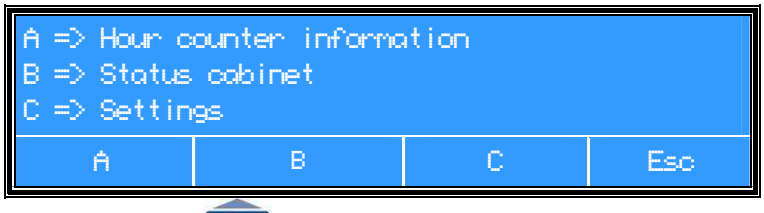
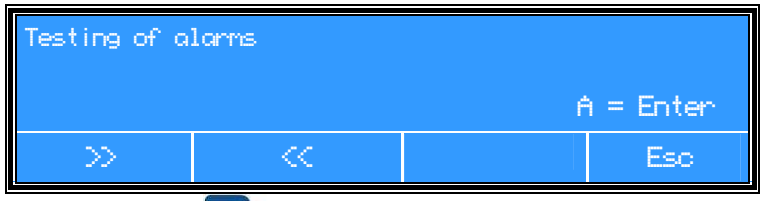
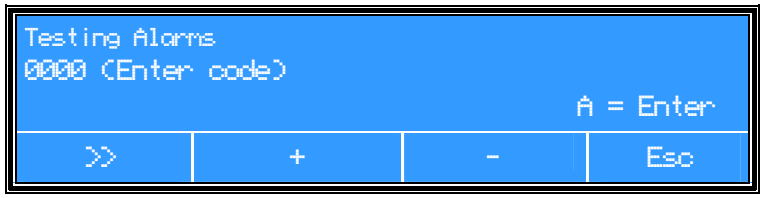


Figure 15 Control board E010001 rev F

Appendix VI: Alarm-test procedure

(Authorized personnel only)
To test the alarm limits, the automatic fan control must be overruled, so the fan power can be set by hand. The entire state of the cabinet will stay unchanged, except for the fan-power. The required test-code is 7733.
In this state, each 30 second, two short audible signals will be heard, to be remembered at the initial unsafe mode. After 30 minutes after the last button is touched, the fan returns to its work mode.

Alarm-test procedure

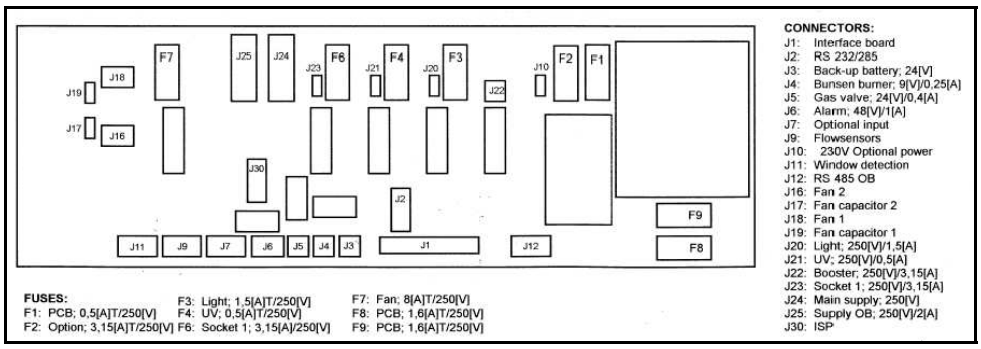
1	Cabinet in work mode. See *§ 5.3 Starting up the cabinet* on page *19.*	 • Push button 1 (Menu).  • Push button 3 (C) .
2	Alarm test	• Push 3x button 1 (>>).  • Push button A.  • Enter the test code: 7733. • Push button A.
3	Alarm test settings (NM = Normal mode, PS = Power save mode, DF = Data of cross Flow, IF = Inflow, (not applicable) CV = Current value)	 • Push button 2 (+) or 3 (-) in order to adjust the fan speed. Value CV will change.

Middle numbers are the actual values from the airspeed indicators, which are changeable with the use of the buttons 2 (+) and 3 (-).
First and last values are the set up alarm borders (for example: Data of Crossflow DF: lowest level is 0.36 m/s, highest level is 0.54 m/s and the actual value for crossflow velocity is 0.45 m/s).
The fan speed is shown in tenths of percents (0 = min. and 1000 = max.).

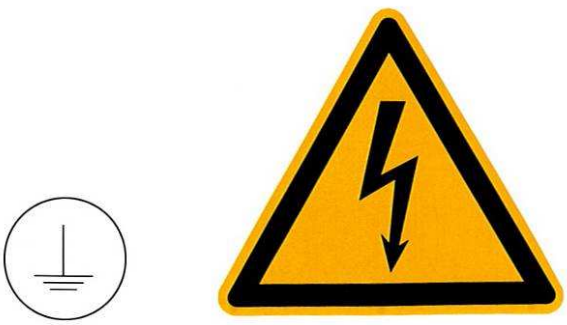
Appendix VII: Stickers

1) Sticker cabinet type. This sticker can be found on the outside on top of the cabinet. For an example of the sticker, see the picture underneath.

2) Sticker I/O board.



3) Electro



Appendix VIII: Information installed options

Installed options microprocessor

This chapter describes the codes from § 5.11 Information about the installed options on page 33. Menu B from the microprocessor.

- Start up in "Menu-Display",
- Push button 1 (Menu),
- Push button 2 (B),
- Push button 1 (=>) for screen I,
- Push button 1 (=>) for screen II,
- Push button 1 (=>) for screen III.

Screen I Installed options – Option

Figure 16 Example of screen I

Explanation of the codes from the menu:
- #E0: no electrical window;
- #E1: electrical window; no functionality for fan; (only available for EF/S series)
- #E2: work mode, if cabinet is switched on;
- #C3 = relay K2 on option print;

Screen II Installed options – relays

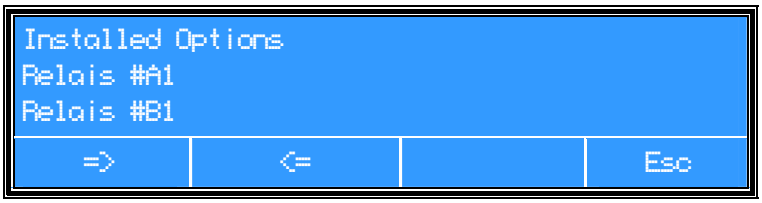


Figure 17 Example of screen II

Overview functions of relay K8, #A1-A12

Alarm #A1 - #A12 relay switching K8, on output J5 at the IO print:
Set up from #A1 until #A12:

A1 Relay ON = A & (HD * LD * HI * LI) DEFAULT
A2 Relay ON = A & (HD * LD * HI * LI * R)
A3 Relay ON = W & (HD * LD * HI * LI)
A4 Relay ON = W & (HD * LD * HI * LI * R)
A5 Relay ON = W & (HD * LD)
A6 Relay ON = A & (HD * LD)
A7 Relay OFF = A & (HD * LD * HI * LI)
A8 Relay OFF = A & (HD * LD * HI * LI * R)
A9 Relay OFF = W & (HD * LD * HI * LI)
A10 Relay OFF = W & (HD * LD * HI * LI * R)
A11 Relay OFF = W & (HD * LD)
A12 Relay OFF = A & (HD * LD)

Explanation codes used above:
W = Working mode, S = Save mode, A = Cabinet on and spare mode, HD = High down/crossflow alarm, LD = Low down/crossflow alarm, HI = High inflow alarm, LI = Low inflow alarm, R = Window alarm, & = AND function, = OR function.

Functions are factory adjustments and cannot be changed by the user.

Overview functions of relay K3, #B1-B5

Alarm #B1 - #B5 relay switching K3, on output J22 at the IO print:

- #B1: the K3 relay is activated if the main fan is switched on (working mode / saving mode);
- #B2: the K3 relay is activated if the main fan is on half speed mode (saving mode);
- #B3: the K3 relay is activated if the main fan is in the working mode;
- #B4: the K3 relay is activated if the option Disinfection in the menu is chosen;
- #B5: the K3 relay is activated if there is an alarm from the analogue inputs.

Overview functions of relay K2, #C1-C5

Alarm #C1 - #C5 relay switching K2, on output J14 at the Option print:

- #C1: the K2 relay is activated if the main fan is switched on (working mode/ saving mode);
- #C2: the K2 relay is activated if the main fan is on half speed mode (saving mode);
- #C3: the K2 relay is activated if the main fan is in the working mode;
- #C4: the K2 relay is activated if in the menu is chosen for the option Disinfection;
- #C5: the K2 relay is activated if there is an alarm from the analogue inputs.

Screen III Analogue inputs (only if installed)

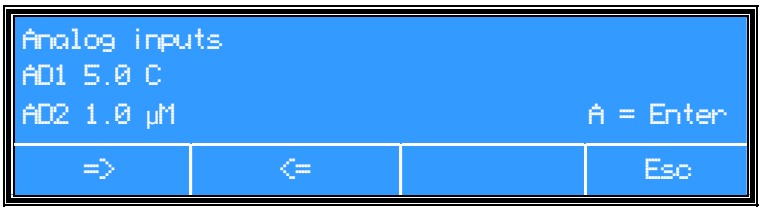
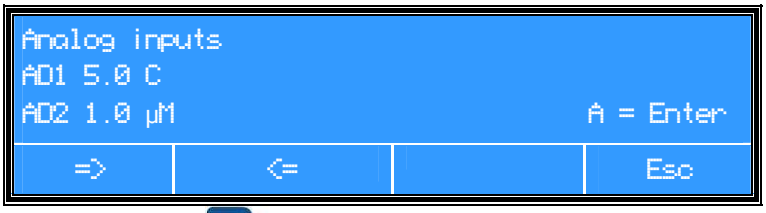
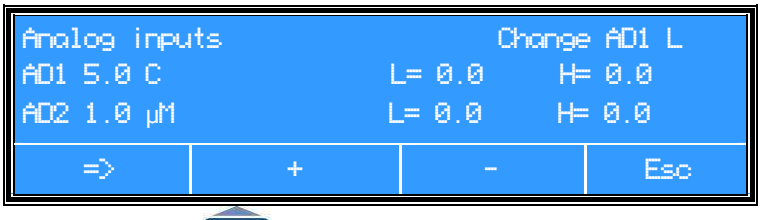


Figure 18 Example of screen III

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 § 5.11 Information status cabinet on page 32.
(The display only shows when the options are installed):

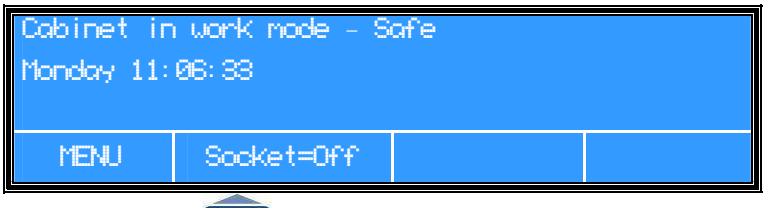
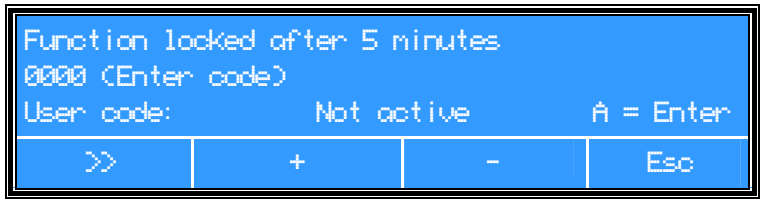
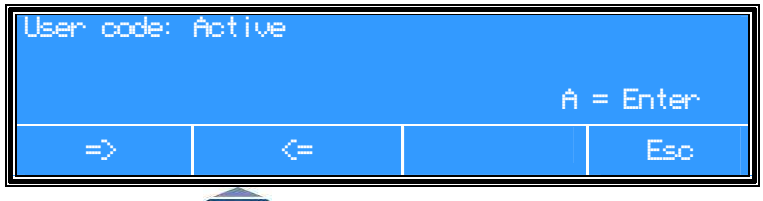
1	Starting from screen III	 • Push button A.
2	Settings for High and Low Alarm	 • Push button 1 (=>). • Choose the required limits (L=Low, H=High) for AD1 and AD2 using button 2 (+) and 3 (–). • Push button 4 (Esc) to confirm the settings and to go back to the starting menu.

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

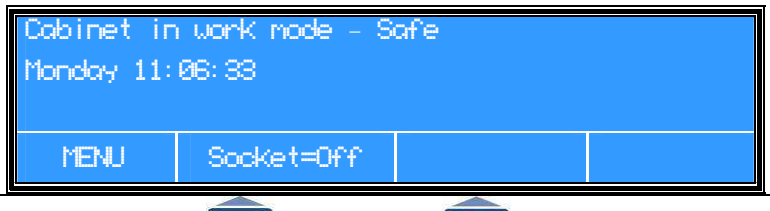
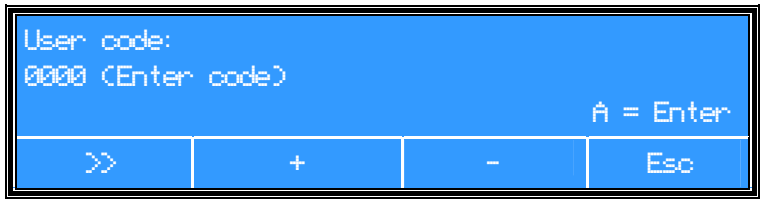
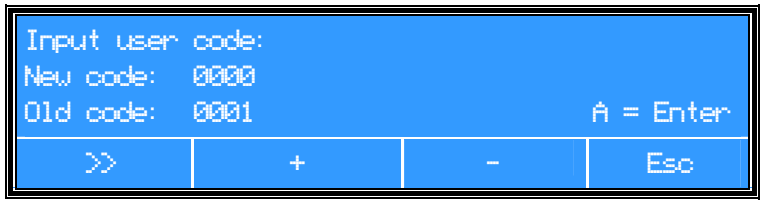
Appendix IX: User code

Activating the user code

The function "User code Active/not active" makes it possible to lock 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.

1	Cabinet in work mode. See *§ 5.3 Starting up the cabinet* on page *19.*	 • Push button 1 (Menu). • Push button 3 (C). • Push button 1 (=>).  User code mode appears. • Push button A.  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.  • Push button 4 (Esc) for starting menu.

Changing the user code

1	Cabinet in work mode. See *§ 5.3 Starting up the cabinet* on page *19.*	
2	Change the user code	• Push button 1 (Menu) and 3 (C). • Push 4x button 1 (=>). • Push button A.  • Enter actual user code. • Push button A.  • 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.		

Appendix X: Required specifications

Overview of the required specifications

Specifications	**Requirement** (shortened)	**According to:**
Lighting	Average value at least 540 lux at locations on side to side center line of work surface	IEST-RP-CC-002.3:2009
Sound level	<65 [dB(A)] when background level is <55 [dB(A)] according to ISO11201.	ISO 11201
Sound level Buzzer	Exceed 10 [dB(A)] more than installation sound pressure	Manufacturer specifications
Stability	Conform to EN 61010-1:2002-08 and EN 12100-1:2003 and 12100-2:2003	EN 61010, EN 12100-1:2003 and 12100-2:2003
Materials, general	The material likely to be in contact with micro organisms should be uniformly corrosion resistant, non-flammable and non-absorbing	Manufacturer specifications
Materials, general	Materials and sealants for joints should be durable and resistant to cleaning and disinfection agents and resistant to general use of cabinet.	Manufacturer specifications
Side walls	Safety glass or UV-resistant safety plastics	Manufacturer specifications
Side walls	Conform to EN 12100-1:2003 and 12100-2:2003	EN 12100-1:2003 and 12100-2:2003
Electrical safety	Conform to EN 61010	EN 61010
Gas supply (optional) safety	Conform to EN 12100-1:2003 and 12100-2:2003	EN 12100-1:2003 and 12100-2:2003
Ergonomics	Maintenance can be carried out safely on the cabinet after installation	Manufacturer specifications
Ergonomics	Considered according to prEN ISO 14738:1997	to prEN ISO 14738:1997
Filter efficiency test / Aerosol challenge method	Particle counter: <0,05% Aerosol photometer: <0,01%	IEST-RP-CC-002.3:2009 ISO 14644-3:2005
Workspace classifcation	Maximum permitted number of particles / m^3 at rest : 0,5 µm = 3520, 5,0 µm =20	ISO 14644-1:1999 / GMP Annex 1, March 2009
Design and airflow velocities	V_{avg} 0,45 +/- 0,05 m/s in work mode as where no individual measurement should differ more than 20% from the mean. All measurements must in between 0,36 m/s and 0,54 m/s.	Manufacturer specifications GMP Annex 1, March 2009

Appendix XI: Recommended spare parts list

Component	Type specific	Art. no.
Crossflow HEPA filter	CLF 475	1001207
Pre-filter	CLF 475	
Fan	CLF 475	3000002
FL-lighting	CLF 475	1440003
FL-Holder	CLF 475	1460003
Crossflow HEPA filter	CLF 575	1001507
Pre-filter	CLF 575	
Fan	CLF 575	3000033
FL-lighting	CLF 575	1440003
FL-Holder	CLF 575	1460002
Crossflow HEPA filter	CLF 675	1001807
Pre-filter	CLF 675	
Fan	CLF 675	3000033
FL-lighting	CLF 675	1440001
FL-Holder	CLF 675	1460001

Component	Type specific	Art. no.
Air velocity-sensor crossflow	All	1330023
Starter FL	All	2040001
Mains filter	All	6400010
Optional:	All	
Gas-/vacuum tap	All	2800002/2800004
Bunsenburner	All	Misc.
UV-tube	All	1440008
UV holder	All	2030003
UV starter	All	2040001
Ballast UV	All	1240003
Nightdoor (for UV protection)	CLF 475	S402001
Nightdoor (for UV protection)	CLF 575	S404001
Nightdoor (for UV protection)	CLF 675	S403001

Articles mentioned above can be ordered at the service organization Particle Measurement & Validation b.v.

Particle Measurement & Validation b.v.
Kuipersweg 37
3449 JA Woerden
The Netherlands

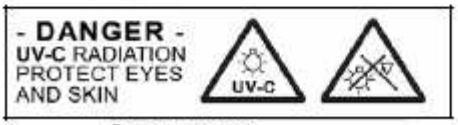
Phone: +31 (0) 348 423661
Fax: +31 (0) 348 422684
E-mail: info@pmvbv.nl
Internet: www.pmvbv.nl

Appendix XII: TUV Low Pressure Mercury Lamps (Optional)

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

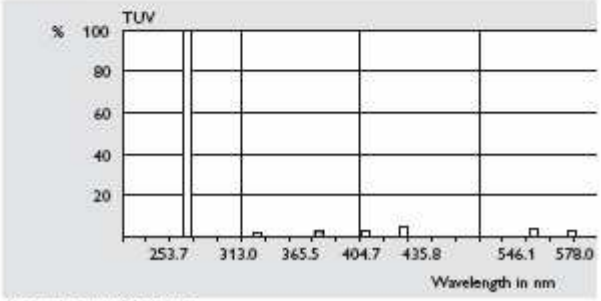


Applications
Philips TUV lamps are used for killing or inactivating bacteria, viruses and other primitive organisms. Typical application examples include air, water and surface disinfection in hospitals, bacteriological research and pharmaceutical institutions, and food processing industries, such as 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.

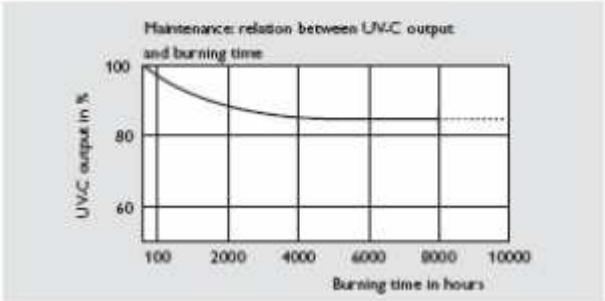
Note: Radiation of these lamps is harmful to eyes and skin. Installations with these lamps are to be screened off completely.

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



Appendix XIII: Statement of the agreement for machines

Manufacturer: Clean Air Techniek B.V.

Address: Kuipersweg 37
3449 JA Woerden
The Netherlands
Phone: +31 (0) 348 411114
Fax: +31 (0) 348 422684
E-mail: info@cleanair.eu
Internet: www.cleanair.eu

Hereby declares that:

Type: _____
Project number: _____
Serial number: _____

is in compliance with the following directives:
- Machine Directive (2006/42/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 1822 High efficiency particulate air filters;
- ISO 14644;
- GMP Annex 1.

Signature:

.....

Name: .....

Quality controller
By order of the production controller

Woerden, date .....

Appendix XIV: Memo

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