



PERCHLORIC ACID FUME HOOD

AD Series

User's Manual

Thank you for purchasing the Advancelab AD series fume hood. Please read this manual thoroughly to familiarize yourself with the many unique features and exciting innovations we have built into your new equipment.

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Warranty

Products Manufactured by Advancelab: Advancelab(S) Pte.Ltd., warrants products that it manufactures to be free from defects for a period of 12 months for parts, commencing from the date of shipment. Advancelab's sole responsibility is to repair or replace, at its option, any part of the product that proves defective or malfunctioning during this time limit. This warranty is void if the equipment is abused or modified by the customer, is operated outside Advancelab's operating instructions or specifications, or is used in any application other than that for which it is specified. This warranty does not include routine maintenance or service procedures, breakage, shipping damage, nor damage from misuse, intentional or unintentional abuse, neglect, natural disasters, or acts of God.

Freight Shortage or Damage: Upon receipt of any equipment from Advancelab, customer shall immediately unpack and inspect for damage or shortage. The customer shall not accept a damaged package or a short shipment until the carrier makes a "damage or shortage" notation on both the carrier's and customer's copy of the freight bill or delivery receipt. Service title passes when the shipment is loaded, so customer is responsible for filing and collecting a freight claim. Any replacement products must be ordered and paid for separately.

Generally, customers can improve the chance of collecting on a freight claim by following these procedures:

1. Formally requesting that the carrier inspect the shipment immediately upon suspecting damage or shortage to verify condition.
2. Notifying the carrier upon discovery of concealed damage and requesting an inspection within 15 days of receipt, both in person or phone and following up via mail.
3. Keeping the shipment as intact as possible, including retaining original packaging materials and keeping the product as close to the original receiving location as possible.
4. Holding salvage for disposition by the carrier.

All Claims: Advancelab (S) Pte.Ltd., expressly disclaims all other warranties, expressed or implied or implied by statute, including the warranties of merchantability or fitness for intended use. Advancelab is not responsible for consequential or incidental damages arising out of the purchase or use of the products supplied by Advancelab. Advancelab is not liable for damage to facilities, other equipment, products, property or personnel of others, or of their agents, suppliers, or affiliated parties, which is caused or alleged to have been caused by products supplied by Advancelab. In any event or series of events, Advancelab's total liability for any and all damages whatsoever is limited to the lesser of the actual damages or the original invoice cost of the items alleged to have caused the damage. The customer's sole and exclusive remedy for any cause of action whatsoever is repair or replacement of the non-conforming products or refund of the actual purchase price, at the sole option of Advancelab. All claims must be made in writing within 90 days of the date the product was shipped. Any claims not made within this time limit shall be deemed waived by the customer. Advancelab is not responsible for any additional costs of repair caused by poor packaging or in-shipment damage during return.

Warranty Returns: All warranty returns must be authorized in advance by Advancelab and approved by writing. Unless approved in advance for good reason, all returns must be in original condition, including all manuals, and must be packaged in original packaging materials. All returned goods are to be shipped to Advancelab, freight prepaid at customer's expense.

Introduction

1. Products Covered

Advancelab High Performance Laboratory Fume Hood				
Type	4 Feet	5 Feet	6 Feet	8 Feet
Perchloric Acid	AD04FH-PP-PCH	AD05FH-PP-PCH	AD06FH-PP-PCH	AD08FH-PP-PCH

2. Safety Warning

- Anyone working with, on or around this equipment should read this manual. Failure to read, understand and follow the instructions given in this documentation may result in damage to the unit, injury to operating personnel, and / or poor equipment performance.
- Any internal adjustment, modification or maintenance to this equipment must be undertaken by qualified service personnel.
- The use of any hazardous materials in this equipment must be monitored by an industrial hygienist, safety officer or some other suitable qualified individual.
- Before you process, you should thoroughly understand the installation procedures and take note of the environmental / electrical requirements.
- If the equipment is used in a manner not specified by this manual, the protection provided by this equipment may be impaired.

3. Limitation of Liability

The disposal and / or emission of substances used in connection with this equipment may be governed by various local regulations. Familiarization and compliance with any such regulations are the sole responsibility of the users. Advancelab's liability is limited with respect to user compliance with such regulations.

Declaration of Conformity



We, manufacturer : **Advancelab (S) Pte Ltd**
No. 52, Senang Crescent Singapore 416619
Tel: +65 6448 8255
Fax: +65 6448 9833

Declare under our sole responsibility that the product:

- **Category** : **Laboratory Fume Hood**
- **Brand** : **AD Series**
- **Model** : **AD04FH, AD05FH, AD06FH, AD08FH**

have been designed and manufactured to conform with the following standards, when installed and used in accordance to the operating and maintenance manual:

- **Electrical Equipment Safety Requirements** : **EN 61010 - 1 (2001)**
- **Low Voltage** : **EN 61010 - 1 (2010)**
- **EMC** : **EN 61326 - 2 (2006) Class B**
- **Performance** : **ASHRAE 110 - 1995**
European Union Standard EN 14175

This declaration is valid also as declaration of conformity to the following directives:

- **73/23/EEC** : **Directive on low voltage**
- **89/336/EEC** : **Directive on electromagnetic compatibility**
- **93/68/EEC** : **Directive on CE Marking**
- **98/37/EEC** : **Directive on machinery**

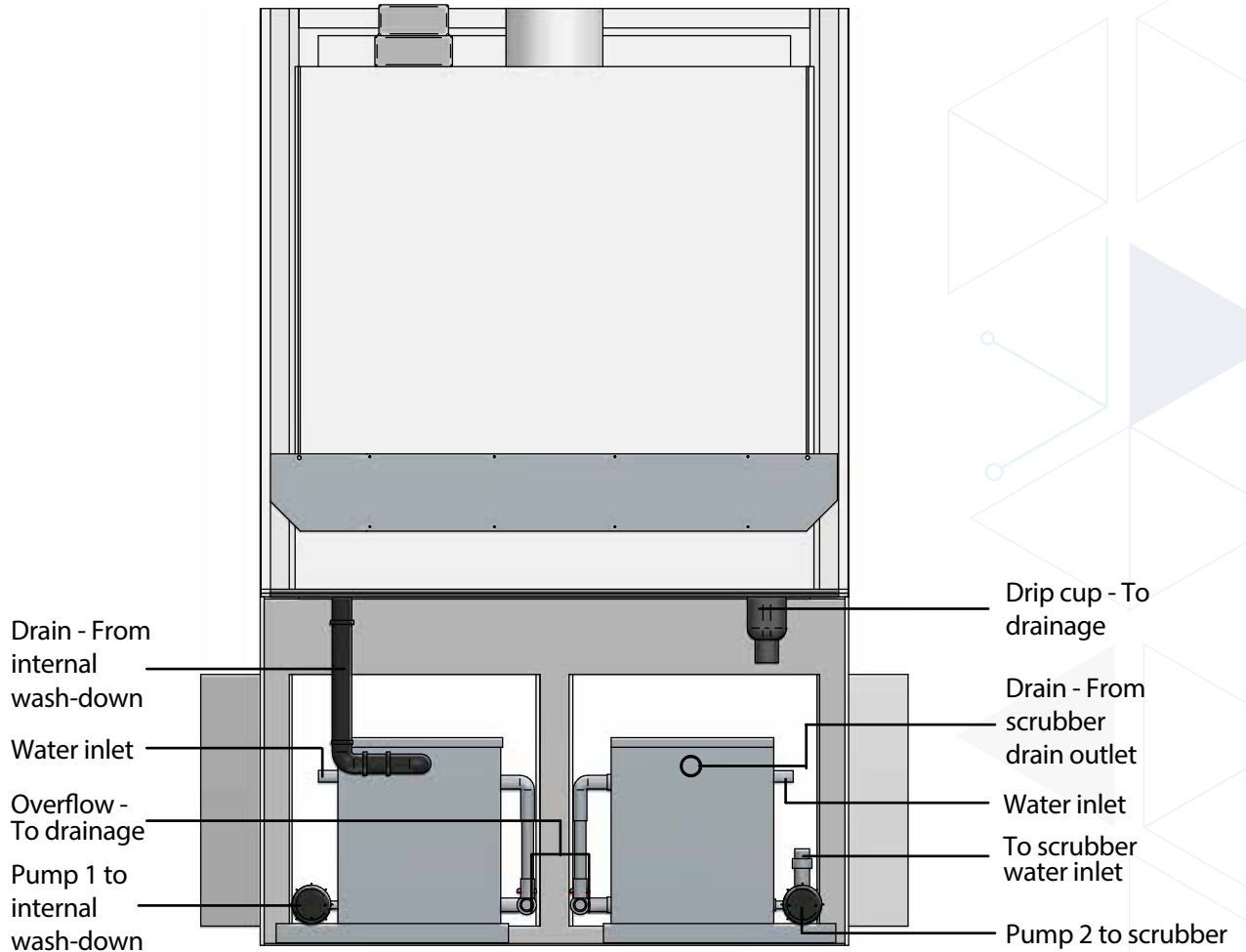
More information may be obtained from Advancelab's authorised distributors located within the EU and a list of these parties and their necessary contact information is available on request from Advancelab.



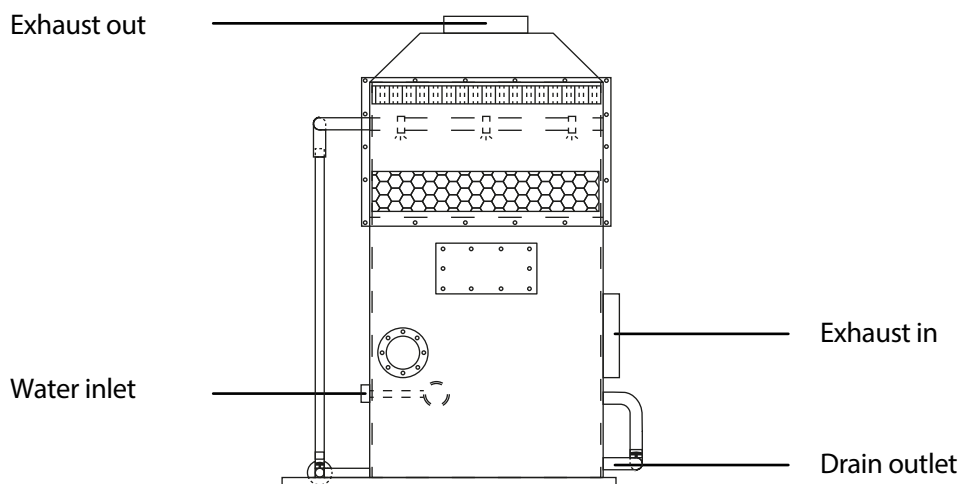
Zubin Menon
Managing Director



Installation Guide

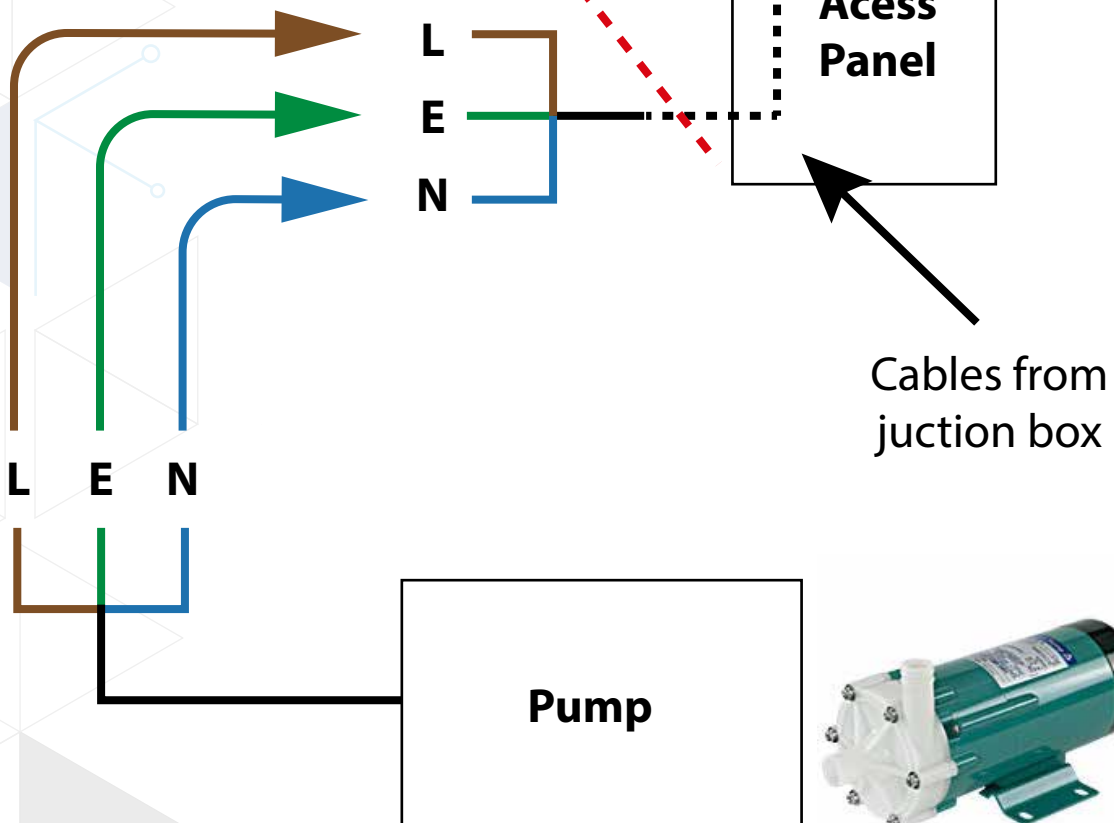


Scrubber Details



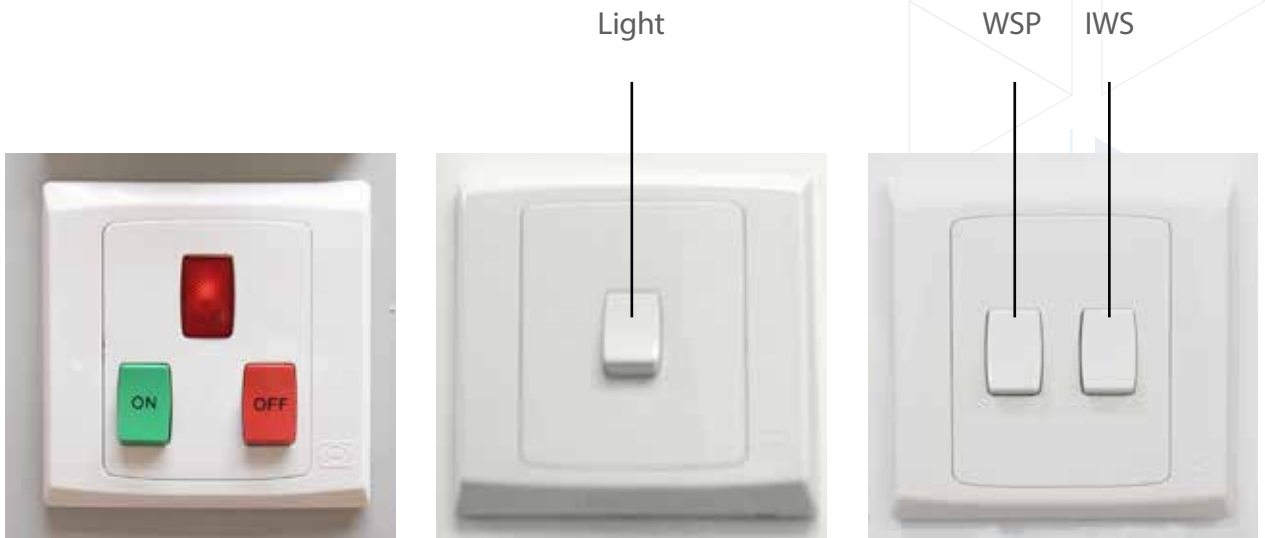
Installation Guide

Electrical Connections for Pump



Control System and Operation

1. Basic On/Off Control



Left side: Fan Switch

Right side: Light Switch, WSP Switch, IWS Switch

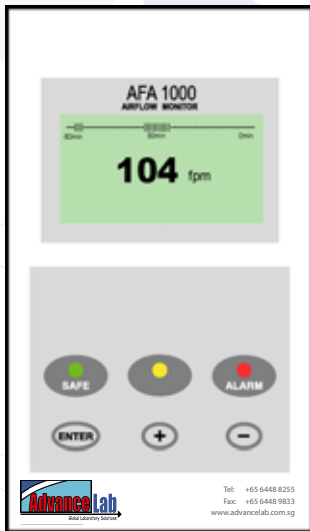
1. Fan Switch - Turns the external exhaust blower on and off (if connected).
2. Lamp Switch - Turns the fluorescent lamps on and off.
3. Wet Scrubber Pump (WSP) - Turns the wet scrubber pump on
4. Internal Wash-down System (IWS) - Turns the baffle wash down pump on.

2. General Fume Hood Operation

- Follow your laboratory procedure on the use of personal protective equipment and fume hood.
- Ensure the exhaust is operating before commencing work.
- Keep your head outside -the hood.
- Work as far into the hood as possible and with slow, deliberate movements, to minimize airflow disturbances.
- Work with the sash as fully lowered as possible, utilizing the sash as a natural barrier to accidents which may occur in the hood.
- If a combination sash is installed, do not open the vertical and horizontal sashes simultaneously.
- Do not use this hood as storage area. Items can block airflow and interfere with containment.
- Do not let organic chemicals evaporate in the hood - use a proper waste bottle. Do not leave uncapped bottles of chemicals or waste in a hood.
- If performance is suspected, or an airflow alarm is triggered (if installed), terminate usage, close the sash completely, and cease work.
- Do not use perchloric acid in a fume hood unless it is specially designed for this purpose. Explosive perchlorate salts could accumulate in the exhaust system.
- Minimize external airflow disturbances, including foot traffic.
- Certify this hood annually to verify airflow velocity, smoke patterns and containment.
- Perform routine maintenance in accordance with the manufacturer's instructions.
- In case of spills, please refer to the laboratory procedure.

Microprocessor (Optional)

AFA 1000 FUME HOOD ALARMS



Model AFA 1000/1

- Digital display
- 3 Relay inputs
- 3 Relay outputs
- Com port

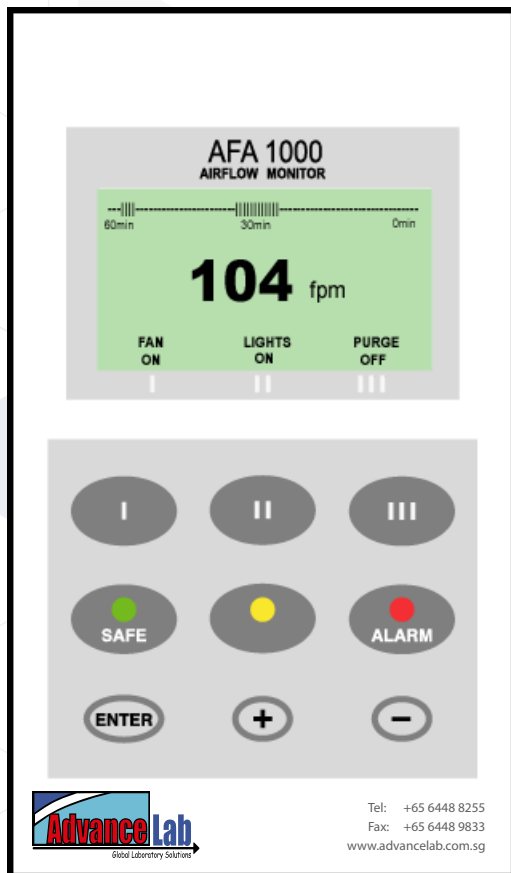
Used for alarm indication and monitoring on Fume Hoods



Model AFA 1000/2

- Digital display
- 3 Relay inputs
- 3 Relay outputs
- 3 Pushbuttons
- Com port

Used for alarm indication, monitoring and control on Fume Hoods



Velocity Bar Graph or Alarm Time Line

Velocity display fpm or m/sec

Control Pushbutton functions

Control Pushbuttons

LED indicators

Function and up/down buttons for Menu Configuration and Calibration.

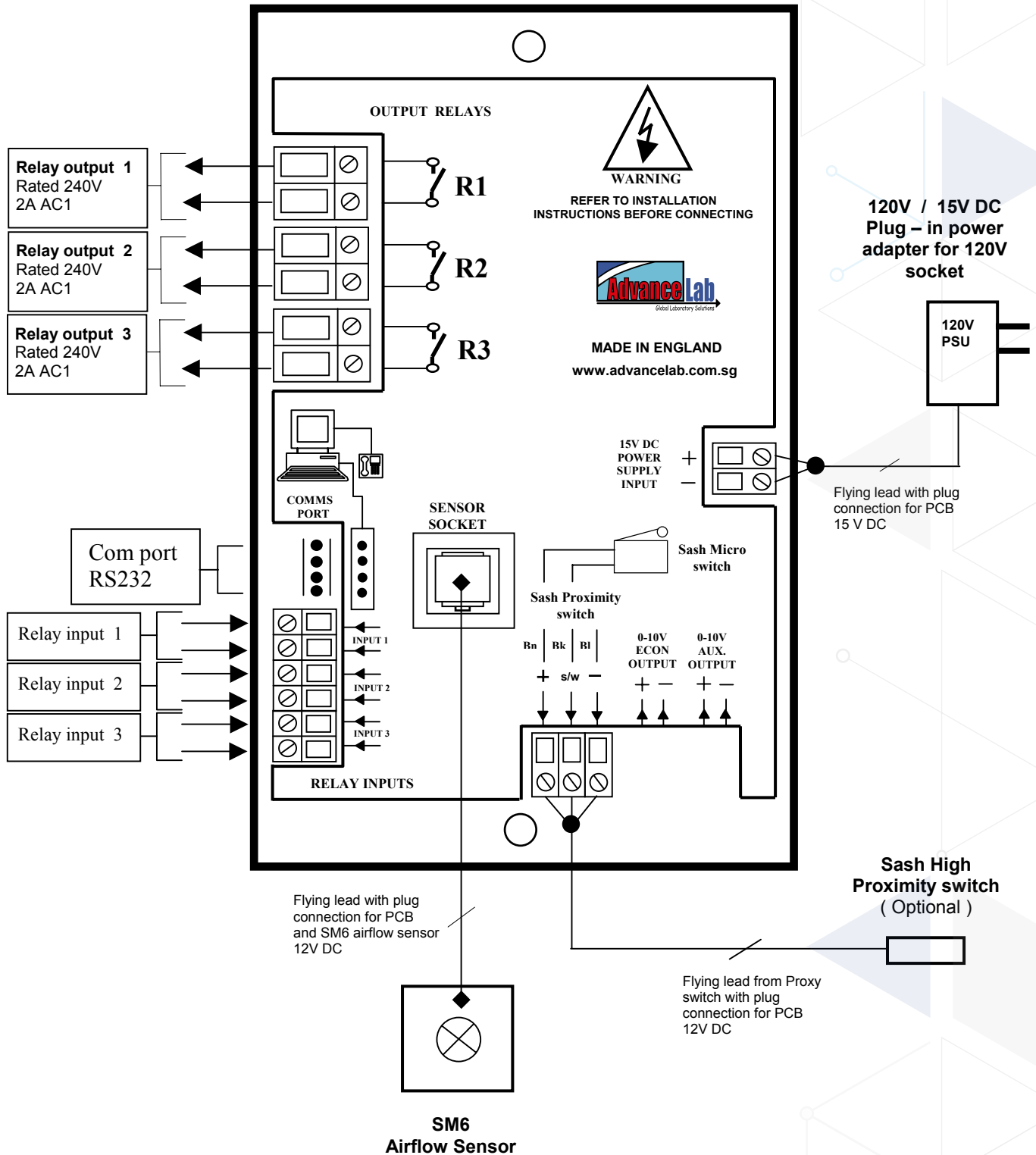
ENTER - also used as Mute button for audible alarm

Note:- Access to the Calibration and Configuration menus Configuration menu is password protected and is factory set. To access and/or change the password, contact the supplier for the Engineers Password and enter the Password in the Main Menu or alternatively use a Laptop connected to the Com port and the Upload/Download software provided.

Microprocessor (Optional)

AFA 1000 FUME HOOD ALARMS

Connection details :-



1. General Description

All systems comprise of the following components:-

- 1 - SM6 Airflow Sensor
- 1 - AFA 1000 Alarm unit
- 1 - AC power supply

If the sash Alarm System option is included there will also be a sash micro switch or proximity switch.

Operator Features - the alarm has the following operator features:-

Digital Display

The digital display is a back-lit, full graphic unit with a visual display of approx 56 x 27 mm.

The display operates through the software allowing the generation of figures, wording and icons.

The display shows the fume cupboard face velocity in m/sec or fpm when enabled or the alternative with no velocity reading but showing AIR FAIL / AIR SAFE as continuous display.

All of the above are configurable via the alarm key pad.

An 'event time line' segmented into 20 x 3 minute segments will scroll across the display (when enabled). This takes the form of a graphical 'blip' that will progress from from the right hand side to the left hand side - representing events that have occurred during the past hour. On the standard alarm this will be limited to airflow alarms but other alarms are available.

Using the diagnostics software and an associated computer via the com port on the alarm the event data can be transferred to a data logger.

The alternative to the event time line is a dynamic 'bar graph' representing the face velocity.

The display shows a Horn icon (with line through it) when the audible alarm is in the Muted condition

Sash High -

will be displayed when the Sash alarm is enabled and the sash is raised above the max safe working opening.

Ext Alarm -

This display will alternate on/off with the velocity reading.

will be displayed when external alarm input is activated (when enabled).

This display will alternate on/off with the velocity reading.

Air Fail -

will be displayed if the airflow is less than the low air alarm point.

High Air -

This display will alternate on/off with the velocity reading.

will be displayed if the airflow is more than the High air alarm point.

Set-back -

This display will alternate on/off with the velocity reading.

will be displayed if the night set-back function is activated (when enabled)

Disabled -

This display will alternate on/off with the velocity reading.

will be displayed if the alarm disable function is activated (when enabled)

This display will alternate on/off with the velocity reading

LED Indicators - the alarm unit has three LED indicators:-

Red - Alarm

Amber - Caution

Green - Safe

Audible Alarm Sounder - the alarm has an audible alarm sounder with local or remote Mute facility

Enter - the alarm has an Enter button - this is multi-functional as follows:-

Press Enter momentarily when alarm is sounding to mute the alarm

Press Enter for 5 secs will gain access to Calibration and Configuration menu (both menus password protected)

+ / - - the alarm has + / - buttons that can be used scroll through the calibration and configuration menu or to select options or values

External Connections - the alarm unit will have the following connection points:-

Input 1 -

volt free relay input configurable for normally closed or normally open relays

This input can be configured as:-

- Alarm disable
- Night set-back
- External alarm
- Sash High
- High / Low

Input 2 -

volt free relay input configurable for normally closed or normally open relays

This input can be configured:-

- Alarm disable
- Night set-back
- External alarm
- Sash High
- High / Low

Input 3 -

volt free relay input configurable for normally closed or normally open relays

This input can be configured as:-

- Alarm disable
- Night set-back
- External alarm
- Sash High
- High / Low

Com Port -	to enable connection to Laptop or PC for full diagnostics, logging or setting up and for communications to building computer system (BMS)
Power Supply -	low voltage DC power supply
Airflow Sensor -	connection socket for the face velocity airflow sensor

The following Pushbutton controls apply to the AFA 1000 / 2 only:-

Pushbutton 1 -	This button can be configured to act as a Fan stop / start button for the fume cupboard extract fan
Pushbutton 2 -	This button can be configured to act as a Lights ON / OFF for the fume cupboard or Pump stop / start button for a fume cupboard scrubber pump. (Can be interlocked with Pushbutton 1)
Pushbutton 3 -	This button can be configured to act as a Panic button or a Purge button
Fan ON / OFF -	will be displayed if the Fan button is operated (when enabled)
Light ON / OFF -	will be displayed if the Lights button is operated (when enabled)
Pump ON / OFF -	will be displayed if the Pump button is operated (when enabled)
UV Lights ON / OFF -	will be displayed if the UV Lights button is operated (when enabled)
Purge ON / OFF -	will be displayed if the Purge button is operated (when enabled)

2. Alarm Configuration / Calibration

The alarm can be configured via a Laptop or PC using a variety of 'set up' programs each designed for a particular application with a combination of input, output and push buttons. This configuration can be changed via the alarm key pad using the manu system if required or re-configured by re-connection of the laptop or PC.

This allows the fume hood manufacturer to stock standard units and configure the alarms to suit the application.

This configuration of the various functions and the calibration of the alarm face velocity display is menu driven. Access to the menu will be via password (4 digit number) and will be two level. The first level will be for calibration of the unit and second level will be for 'engineers' to set up the conguration of the alarm.

**Note:- If you enter the Calibration or Configure Menu by accident:-
press the + & - buttons at the same time to escape back to the Main Menu**

The menus and sub-menus are in 'plain language' and incorporate brief instructions where appropriate.
See menu operation document

3. Start up

When unit is powered up the following sequence of events occure:-

1. The 12V DC power is applied to the airflow sensor and a delay on timer (30sec) is initiated
2. The alarm then performs a self test on the display and all indicators etc (approx 5 sec)
3. The display show a 'Welcom note' - with the fume cupboard manufacturer company name (if configured) for the rest of the initial 30 sec delay time
During this time the airflow sensor is stabilising
4. During the whole of the 30 sec period all alarms and relay outputs are inhibited.
5. At the end of 30 sec delay the unit performs one of two options:-
 - a. If the alarm colibration has been previously completed - the unit goes to normal operating mode (Run)
 - b. If the unit has not been calibrated the unit displays
'Unit requires Set up - press Enter to access Set up menu'
The set up menu allows calibration or configuration via the password protection

During the set-up all alarms and output relays are inhibited.

4. Events / actions

Safe airflow

- Meter reading above warning level (e.g. >90fpm)
- Green LED on

Warning airflow

- Meter reads between warning level and air fail level (e.g. > 80fpm and < 90fpm)
- Amber LED on

Low airflow

- Meter reads below alarm level for longer than the warning to low air delay time
- AIR FAIL toggles on / off with display
- Red LED on (Flashing)
- Audible alarm sounds - can be muted via Enter pushbutton
- Low air relay operates (if cfigured)

Reset: - when airflow rises 4fpm above Low air level for longer than the low air to warning air delay time the Low air alarm resets automatically

High airflow

If configured:-

- High Air toggles on / off with display
- Audible alarm sounds - can be muted via Enter pushbutton

Sash High

- When the input configured as Sash High is activated
- Amber LED on
- Sash High - toggles on / off with velocity display
- Audible can be muted via Enter pushbutton - this silences the alarm and initiates a repeat timer (if configured). After the delay time the alarm re-sounds (and can be re-muted). During this time the Amber LED flashes on / off.
- Sash High relay operates (if configured)

Reset when Sash lowered to safe position and input de-activated.

High / Low

- When input configured as High/Low is activated
- Display Icon shows High or Low
- High / Low relay operates (if configured)

This function is designed for two speed fan operation or two position damper operation switched via a micro or proximity switch activated at a given position on the sash.

Night set-back

- When input configured as Night set-back is activated
- Night set-back icon is displayed
- Red LED on (Flashing)
- Reduced Low air alarm (if configured)
- Audible alarm muted
- Mute icon shown on display

External alarm

- When input configured as External alarm is activated
- Red LED on (Flashing) - (if configured)
- External alarm toggles on / off with display - (if configured)
- Audible alarm sounds - can be muted via Enter pushbutton
- External alarm relay operates (if configured)

Alarm disable

- When input configured as Alarm disable is activated
- Alarm disabled is displayed
- Red LED on (Flashing)
- Audible alarm muted
- Mute icon shown on display

5. Quick Start Installation

Follow the instructions below for installing and commissioning the unit:-

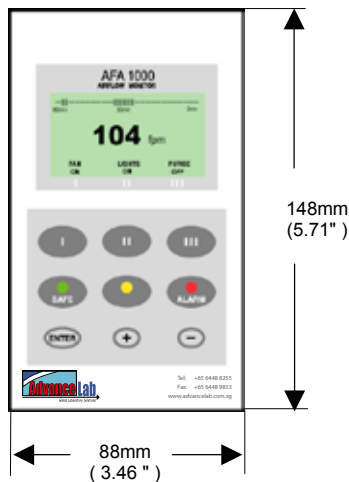
1. Fit the alarm to the Fume Hood using the cut-out details provided with the unit. - see page 13
2. Fit the airflow sensor to the Fume Hood using the cut out and installation details provided. - see page 13 & 14
3. Connect the 'telephone style' airflow sensor plug-in cable to the sensor and the back of the alarm unit.
- see typical connection diagram on page 14
4. Plug in the power adapter to a Mains AC power socket and connect the flying lead to the alarm unit.
- see typical connection diagram on page 14
5. Power up the unit and wait at least 30 secs while the sensor temperature stabilises.
6. If the unit has not been calibrated the unit will display 'Requires setup' - press ENTER to continue and in the Main Menu use +/- buttons on the alarm facia select 'SETUP' and then press the ENTER button.
7. In the Setup Menu select 'CALIBRATION' and press the ENTER button.
8. At this stage you will be requested to enter the PASSWORD. Use the +/- button to select the individual digits in turn and then press ENTER.
If the password is correct the unit will go to the calibration mode. If the password is not correct you will be requested to try again
- on the third wrong password entry the calibration menu will lock out for 10 mins.
9. When in the calibration mode follow the instructions on the display screen to carry out the calibration of the unit.
See 'Calibration Notes' below for hints on successful calibration. When the calibration is complete the unit will return to the Main Menu.
10. Use the +/- buttons on the alarm facia select 'RUN' and then press the ENTER button.

The unit will now function and display the measured Fume Hood face velocity

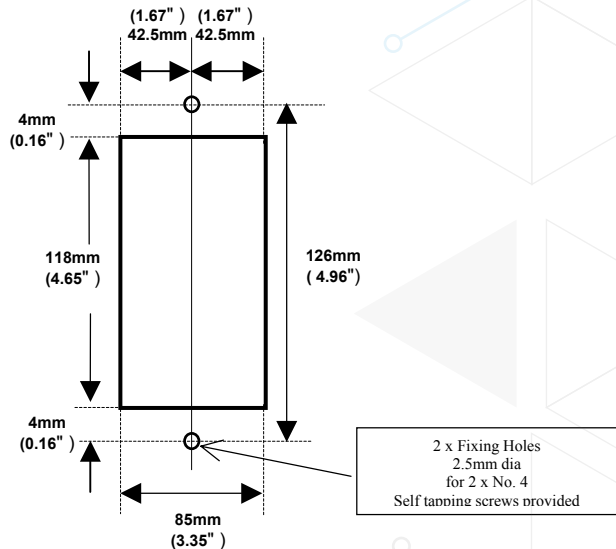
6. Calibration Notes:-

1. When using a standard Fume Hoods with Vertical Sliding sashes open the sash to the normal max safe working height for the Low Air sample
2. For the Higher Air sample close the sash to approx 50% of the opening used for the Lower Air sample. If the Higher air sample value is too close to the Lower Air sample the alarm will detect this and ask you to repeat with a higher value. To do this close the sash a little more and repeat the sample. Avoid closing the sash below 100mm.
3. The face velocity readings on the open sash may vary at different points on the measuring grid by up to 20fpm. This is quite acceptable in terms of the fume cupboard performance so long as no individual point is below the designated Low Air alarm point. The figure entered on the calibration point can be taken as the average value of all the measuring grid readings or could be taken as the individual lowest point on grid. For most fume cupboards this low point is on the bottom row in the centre and is a convenient position to measure and for future reference when checking the alarm during annual maintenance.
4. Take time when measuring the face velocities for the calibration procedure to allow for the velocities across the open sash to stabilise. If the velocities are changing or are turbulent during the sampling period the alarm will detect this and ask you to repeat the sample.
5. When using a Fume Hood with Horizontal Sliding sashes open the sashes to the normal max safe working opening for the Low Air sample.
6. When calibrating or re-calibrating the alarm it is important to ensure that the 'Vent kit' is connected to the SM6 sensor on the fume hood. If the vent kit is not connected the sensor will not 'see' a change in the airflow during the calibration procedure and when switched to Run condition the display will show a fixed reading that will not change when the fume cupboard velocity changes. This only applies during the calibration mode. If in normal running after successful calibration the vent kit becomes disconnected the air flow across the sensor will fall and the alarm will go into the AIR FAIL condition.

7. Dimensions

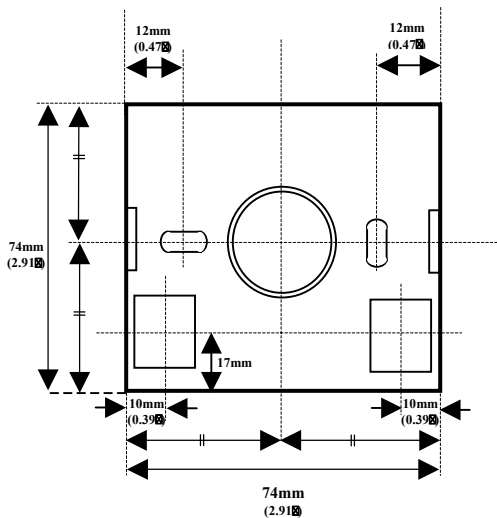


Alarm Panel Dimensions

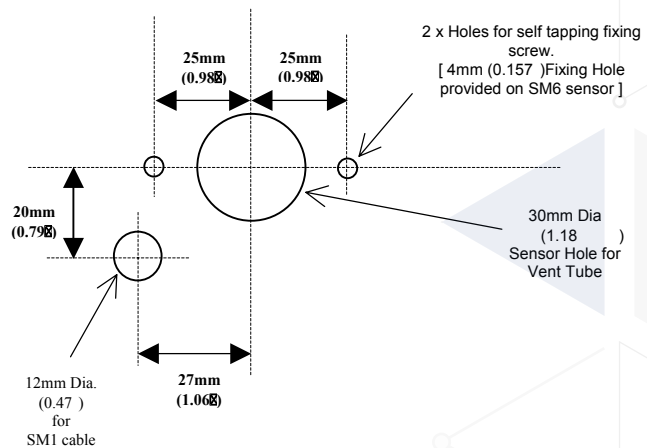


Panel Cutout Dimensions

118mm x 85mm (4.65" x 3.35")

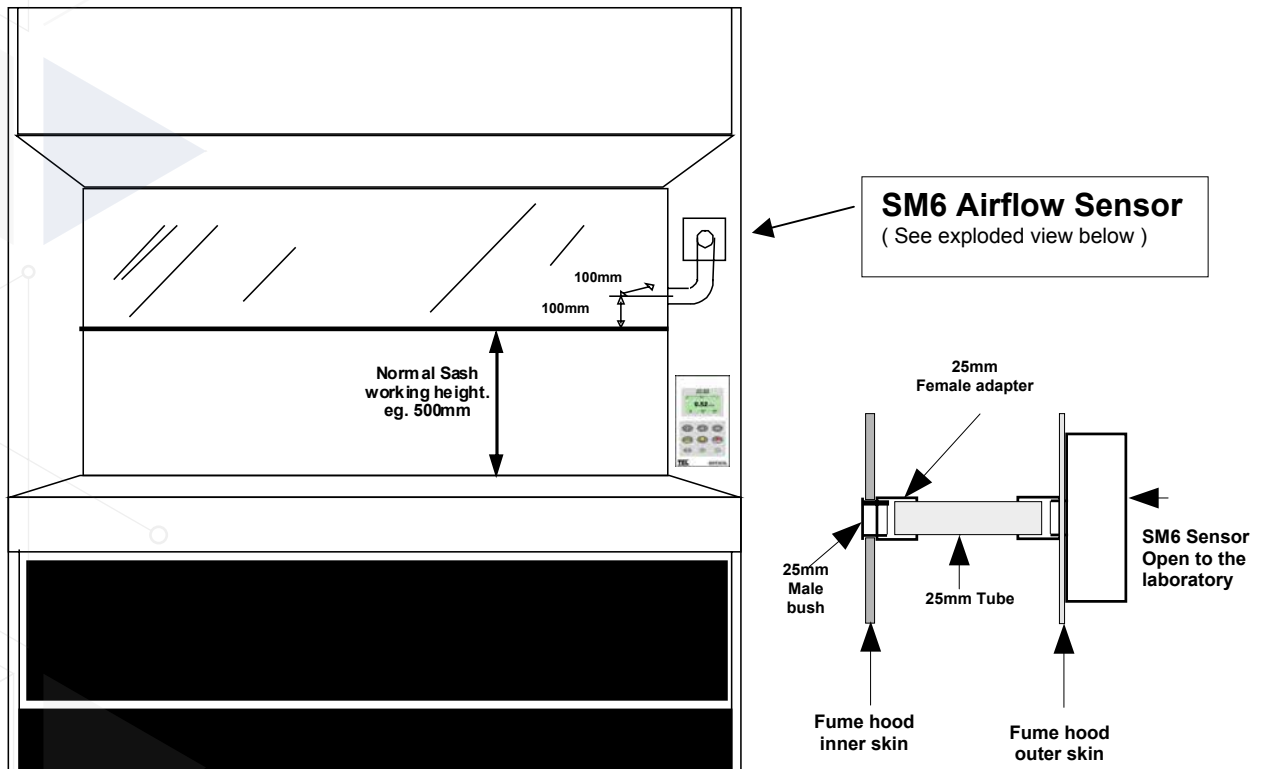


SM6 Sensor Dimensions
(Rear view)



SM6 Sensor Panel Cutout Dimensions
(Front view)

8. SM6 Airflow Sensor Installation



It is very important to position the SM6 airflow sensor in the correct position to give long term stable reading of the face velocity. Please read the INSTALLATION NOTES below and if in doubt contact us for further advice.

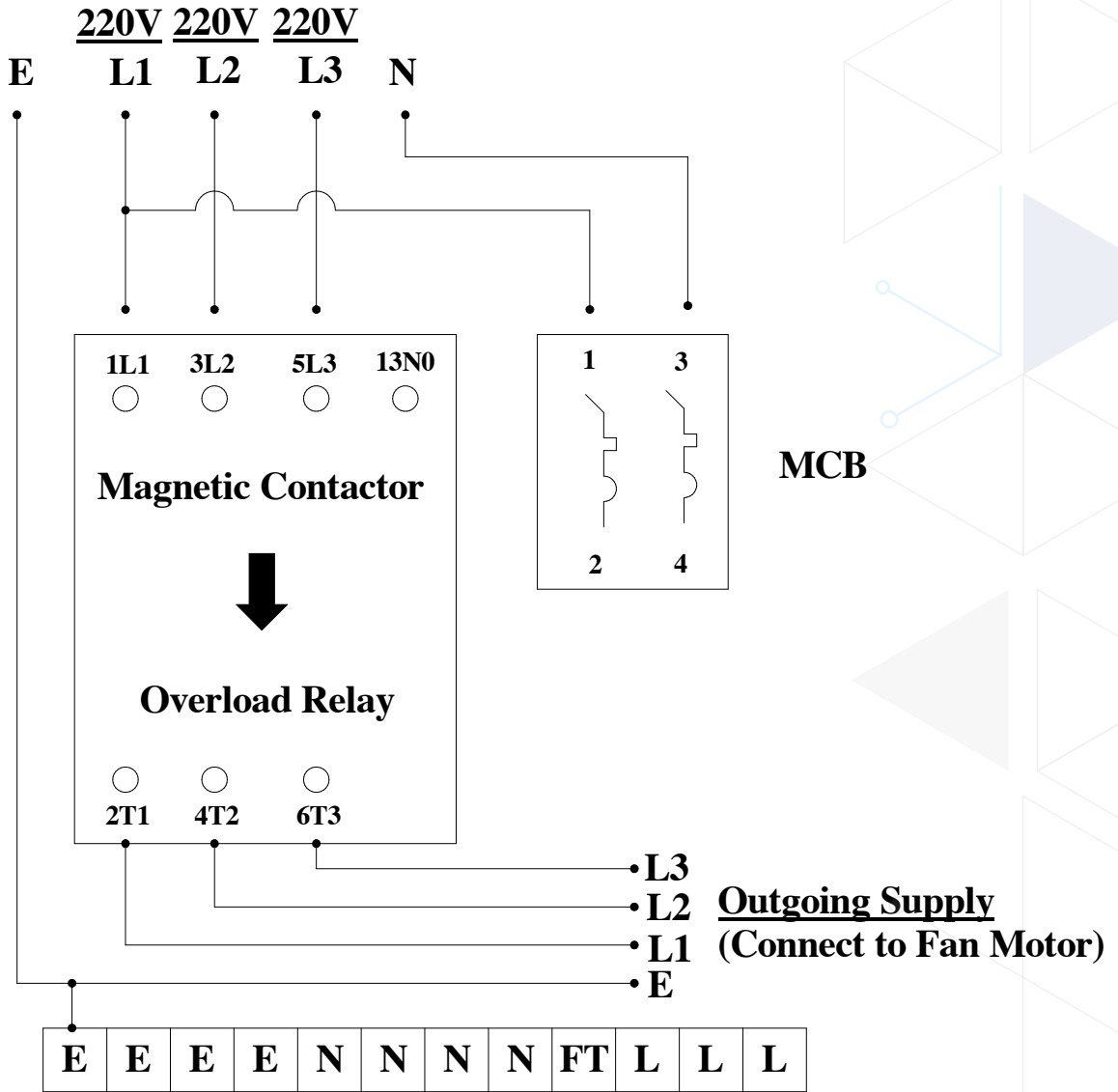
INSTALLATION NOTES:-

1. The SM6 sensor must be positioned where it can "see" the room pressure of the laboratory. The back connection spigot of the sensor is designed to accept a 25mm OD tube which should be connected to the inner chamber of the fume hood. (This tube and fittings is known as the "vent kit")
2. If possible mount the sensor on the the front of the fume hood and use a short length of tube. Tube lengths of more than 1 metre or smaller diameter will restrict the airflow through the sensor. This will lead to too much sensitivity being required to calibrate the unit which can lead to some instability of the reading or incorrect readings at low velocities.
3. For fume hoods with a single skin side wall or a double skin with a small gap between them it may not be possible to achieve the ideal sensing position using a flexible tube.
With a single skin side wall it is possible to fix the sensor on the outside of the fume cupboard and connect directly to the inner chamber in the ideal position. This method can only be used for up to two fume cupboards when they are positioned side by side (using the two outer walls). An slternative method is to mount the sensor on the fume hood and connect using a short flexible tube to a rigid wall tube attached to the inner side wall. The open end of this rigid wall tube should be positioned in the 'ideal position' ie. 100mm back from the sash and 100mm higher than the normal sash opening.
Fume hoods with a high internal height can present a difficulty because the tube length to reach the ideal position may be longer than 1 metre. In this case it is better to use a tube no longer than 1 metre which may result in a sensing position higher than the ideal.
4. The sensor should not be mounted in a position were it is subject to draughts from the laboratory air input or ventilation system.

NOTE:- ALTERNATIVE IN-LINE SENSOR AVAILABLE TYPE SM6 FOR FUME HOODS WITH INTERNAL ACCESS PANEL ON SIDE WALL

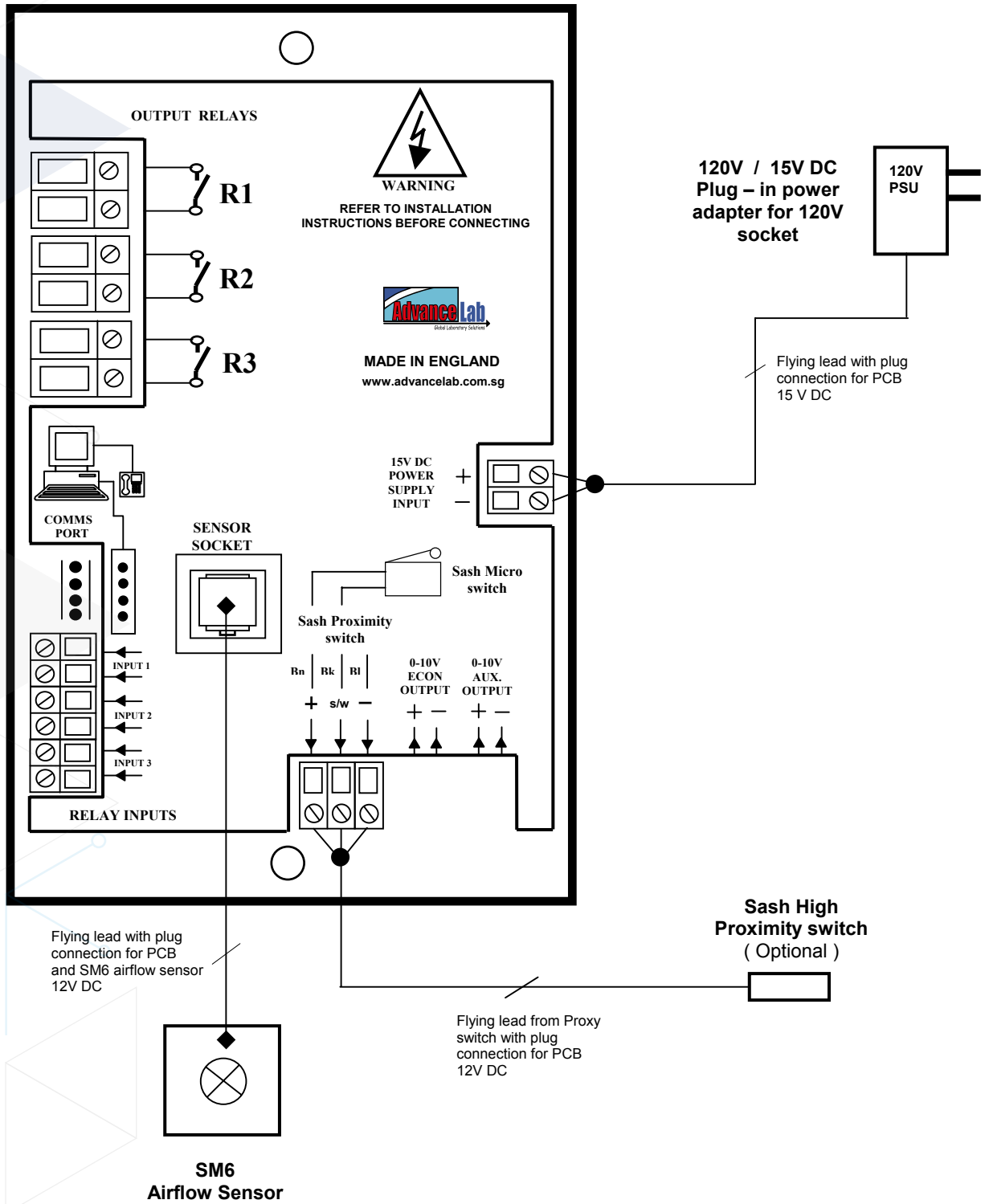
9. Main Circuit Diagram

Supply In
(20Amp 3 Phase Isolater Mount At Fume Hood Location) - Within 1m Distance



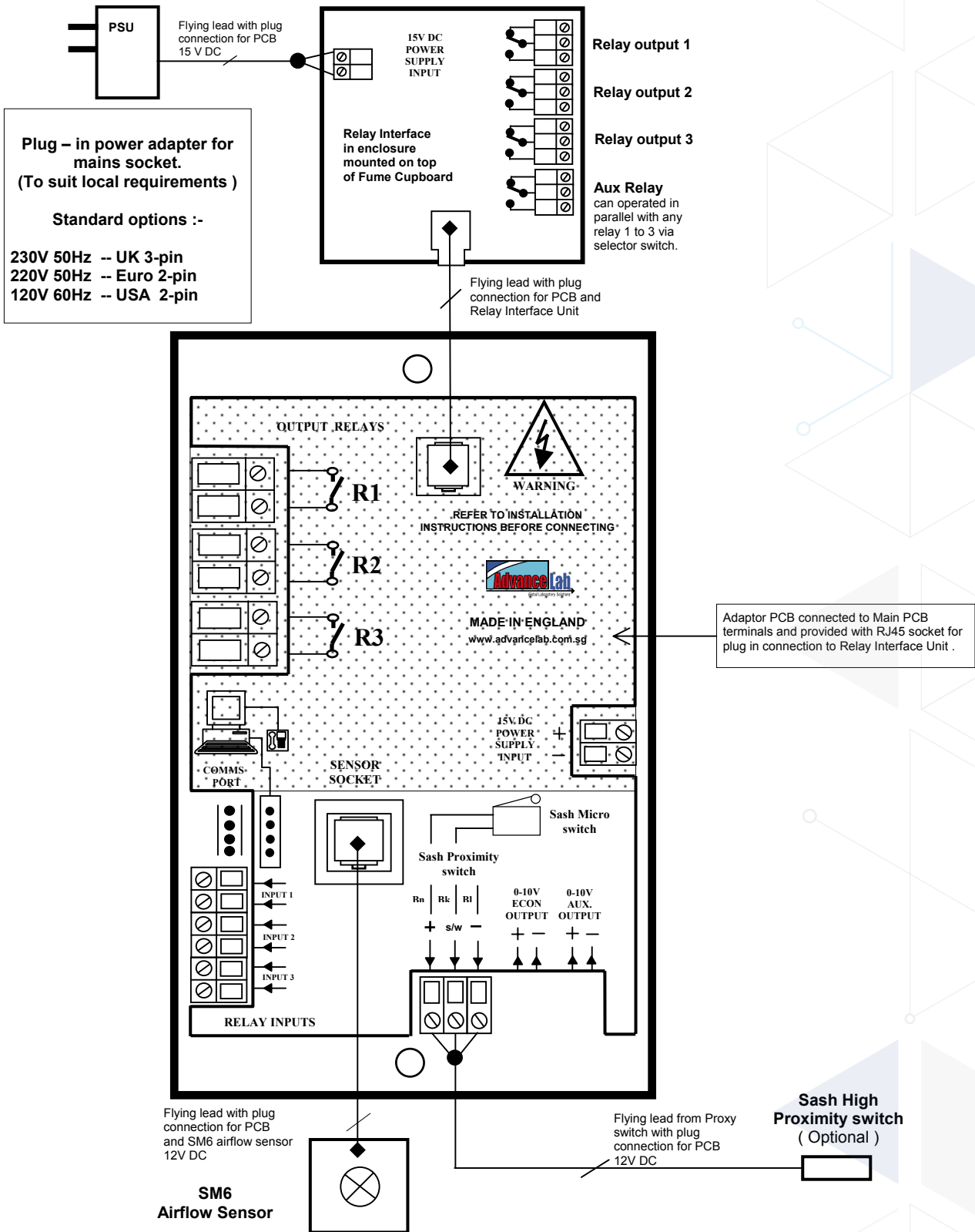
Circuit Diagram- (Junction Box On Top The Fume Hood)

10. Typical Wiring Diagram (Alarm only)



11. Typical Wiring Diagram with Optional Relay Interface Unit

Optional Relay Interface Unit in ABS enclosure mounted on top of fume Cupboard to allow up to 3 external cable connections to be terminated.
 Rated at 240V 5A



Service and Maintenance

Scheduled Maintenance

Proper and timely maintenance is crucial for trouble free functioning of any device and your Advancelab fume hood is no exception to this rule. We strongly recommend that you follow the maintenance schedule suggested hereunder in order to obtain performance from your Advancelab fume hood.

No.	Description of Task to Perform	Maintenance to be carried out every			
		Week	Month	Quarter	1 Year
1	Clean the interior work surface and walls	√			
2	Clean the sash and all glass surfaces	√			
3	Check airflow patterns using a source of visible smoke	√			
4	Inspect the controls of the services of the fume hood		√		
5	Clean the exterior surface of the fume hood		√		
6	Clean for any blockages at the fume hood		√		
7	Determine the face velocity and ensure that the fume hood is operating properly		√		
8	Inspect the fume hood for any physical abnormalities or malfunction			√	
9	Check the sash for proper operation			√	
10	Change the florescent lamps				√
11	Re-certification				√

Cleaning the fume hood

- Clean the work surface and walls with appropriate disinfectant agent and soap water afterward
- Clean the sash window using an appropriate disinfectant agent and glass cleaner afterward
- Use a damp cloth to clean the exterior surface of the fume hood, particularly on the front and top in order to remove dust that has accumulated there
- Use clean water to finish the cleaning and wash away any residue of disinfectant agent, soap water and glass cleaner
- For removing stubborn stains or spots on the stainless steel surface, make use of MEK (Methyl-Ethyl-Ketone). In such cases, make sure that you wash the steel surface immediately afterwards with clean water and some liquid detergent.
- Use a polyurethane cloth or sponge for washing. Regularly cleaning the stainless steel surface can help you retain the attractive factory finish.
- Ensure that there's no blockage in and behind the baffle.

Check the hood's functionality

- Check the hood's mechanical functionality; eg: sash window - lubricate if necessary
- Check the hood's electrical functionality; eg: fluorescent lamp - replace if necessary
- Check the hood for any defect, repair immediately
- Check the hood's airflow pattern and face velocity to ensure that the hood is functioning properly

Re-certification

All fume hoods must be re-certified annually by a certified engineer.



Indonesia

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