

# INSTRUCTION MANUAL

Code: 1000R, 1200R, 1500R, 1800R -115V

## AIRONE™ R (VAV) Range of Filtration Fume Cupboards



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## **FOREWORD**

This manual has been prepared to give guidance in the use of the following Recirculatory, Filtration Fume Cupboards:

Code:	Description.
1000R	AIRONE™ 1000-R (VAV) Filtration Fume Cupboards
1200R	AIRONE™ 1200-R (VAV) Filtration Fume Cupboards
1500R	AIRONE™ 1500-R (VAV) Filtration Fume Cupboards
1800R	AIRONE™ 1800-R (VAV) Filtration Fume Cupboards

This manual contains the information required to ensure optimum and free operation of the AIRONE™ R range of Filtration Fume Cupboards.

Service and maintenance operations should only be undertaken by SAFELAB Service Engineers or their authorised agents.

Details of Service Contracts, along with information on these and other products is available on request from:

**SAFELAB SYSTEMS LTD**  
**Airone Building**  
**8 Beaufighter Road**  
**Weston-Super-Mare**  
**BS24 8EE**

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## INDEX

<b>Page</b>	<b>Contents</b>
4 - 5	Principle of Operation
6 - 7	Specification
7 - 8 - 9	Installation and Assembly Instructions
10	Key Component Parts
11	Operating Instructions
12	Maintenance/Cleaning

### **Appendices**

13	I.	Fitting of the Main Carbon Filter.
14	II.	Pre-filter Replacement.
15 - 16	III.	Monitoring the Airone R. DIY Filter Monitoring.
16 - 17	IV.	Instructions for face velocity measurements. Airone R Examination Record.
18	V.	Instructions for Filter saturating testing.
19	VI.	Main Block Wiring Diagram.
20 - 21	VII.	Control System/Calibration Procedure.
22	VIII	Siting Locations for Airone R
23	XI.	E.C. Declaration of Conformity.

## **PRINCIPLE OF OPERATION**

### **(1) Recirculatory Mode of Operation (see diagram on following page)**

Air is drawn in through the front opening (1) at a velocity ensuring containment of any contaminants generated within the work area (2).

The operator can determine the required aperture by sliding the glass sash up to a maximum determined by the sash stop.

The contaminants from area (2) are drawn either upwards as in the case of lighter than air volatiles (4), or drawn across the worksurface to the secondary extract slot created by the back baffle, as in the case of heavier than air volatiles or particulates (3).

The combinations of extract slots (6) and (7) ensure that all contaminants entrained in the airflow are effectively transferred to the filter (5).

The filter(s) (5) combine large surface areas with a deep bed depth to ensure efficient filtration of contaminants. Clean filtered air is then drawn through the fan(s) (8) and after passing into the dispersal chamber (9) is exhausted via the louvres (10).

The relatively high pressure drop across the carbon filters ensures even flow through the filter and exceptionally uniform saturation.

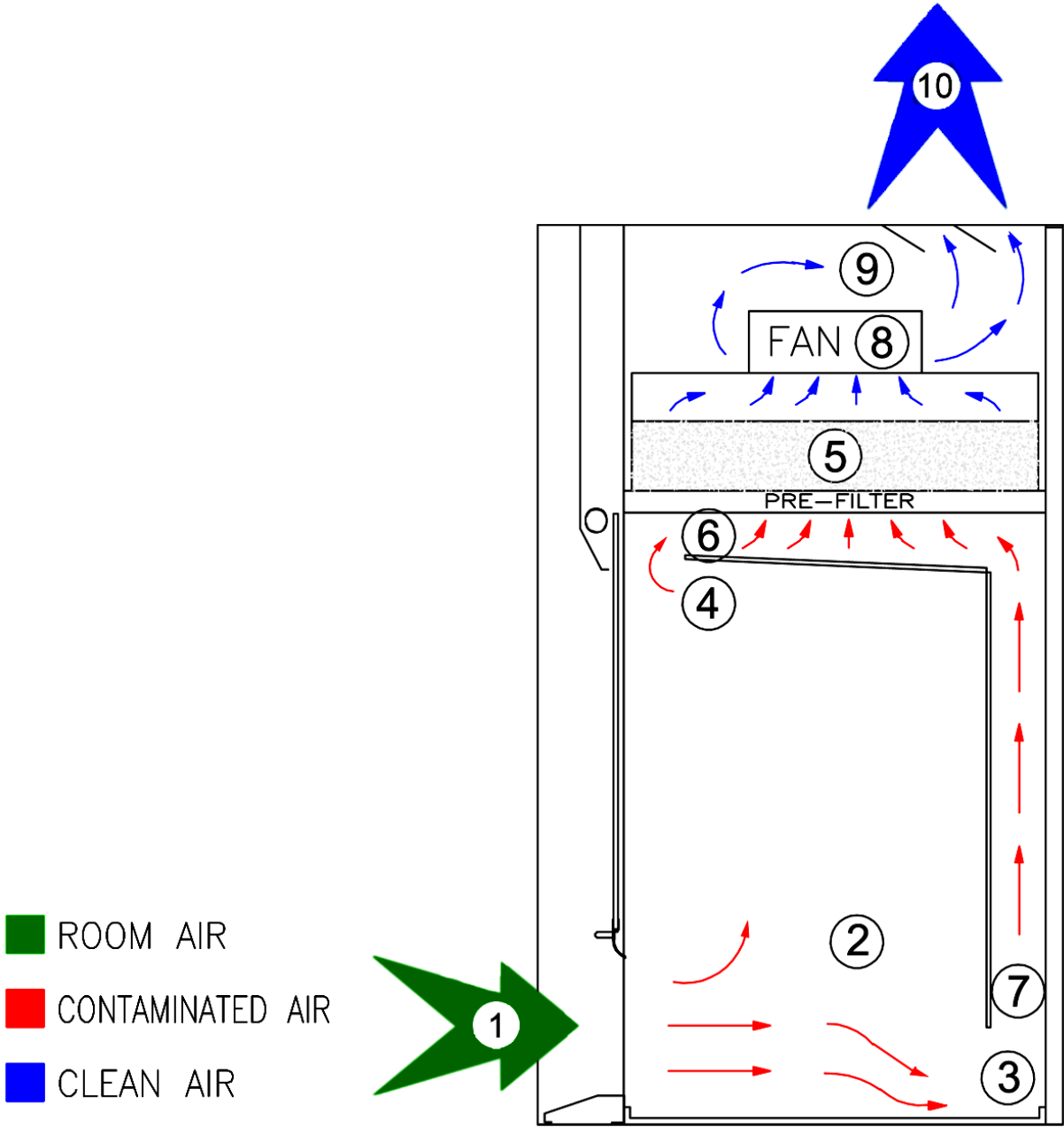
AIRONE™ R Filtration Fume Cupboards present a combination of advantages and unique features - ensuring the health and safety of operators by prevention of their exposure to concentrations of toxic chemical compounds providing protection to their environment - in line with British, European and US Federal Safety Standards.

Moving the vertical gliding safety glass upwards and downwards causes the fan to speed up or slow down to give a constant face velocity. To avoid the unit alarming unnecessarily, the sash should be moved slowly.

### **(2) Ducted - Vented Mode of Operation:**

Should venting to outside atmosphere be required after removal of contaminants by efficient filtration, the duct-work can be connected to the AIRONE Filtration Fume Cupboard via an optional duct adapter top box fitted with a 250 mm dia. duct outlet and internal transition adaptors fitted onto the fan(s). This Ducted Filtration Fume Cupboard will also protect personnel and the environment outside the building - contributing to the overall reduction of atmospheric pollution.

Airone R airflow:



- ROOM AIR
- CONTAMINATED AIR
- CLEAN AIR

## **SPECIFICATION**

**Definition:** AIRONE™ Work Stations are chemical Work Stations designed for the protection of operators from gaseous or particulates contaminants produced within the unit.

**Application:** Whenever the operator and the environment need to be protected from gaseous or particulate contaminants.

**Construction:** Manufactured from epoxy coated mild steel and aluminium extrusions. The transparent fume enclosure is constructed using laminated security glass.

**Worksurface:** Polypropylene worksurfaces are supplied as standard. A variety of worksurfaces are available which include Solid Grade Laminates, Stainless Steel and Cast Epoxy Resin.

**Prefilters:** Particle pre-filters with an efficiency of better than 97% for particles greater than 0.3 micron (DOP test).

1000-R AIRONE™ Work Stations	Size 'RS' (690 x 490mm)	1 Pre-filter
1200-R AIRONE™ Work Stations	Size 'B' (600 x 450mm)	2 Pre-filters
1500-R AIRONE™ Work Stations	Size 'B' (600 x 450mm)	2 Pre-filters
1800-R AIRONE™ Work Stations	Size 'B' (600 x 450mm)	3 Pre-filters

**Main Filters:**

1000-R AIRONE™ Work Stations	Size 'RS' (690 x 490mm)	1 Filter
1200-R AIRONE™ Work Stations	Size 'B' (600 x 450mm)	2 Filters
1500-R AIRONE™ Work Stations	Size 'B' (600 x 450mm)	2 Filters
1800-R AIRONE™ Work Stations	Size 'B' (600 x 450mm)	3 Filters

Safelab Systems offer a wide variety of filter types for different applications, please consult your Operational Safety Log Book.

<b>Supply:</b>	1000-R AIRONE™	115V 60Hz - 5A
	1200-R AIRONE™	115V 60Hz - 5A
	1500-R AIRONE™	115V 60Hz - 5A
	1800-R AIRONE™	115V 60Hz - 8A

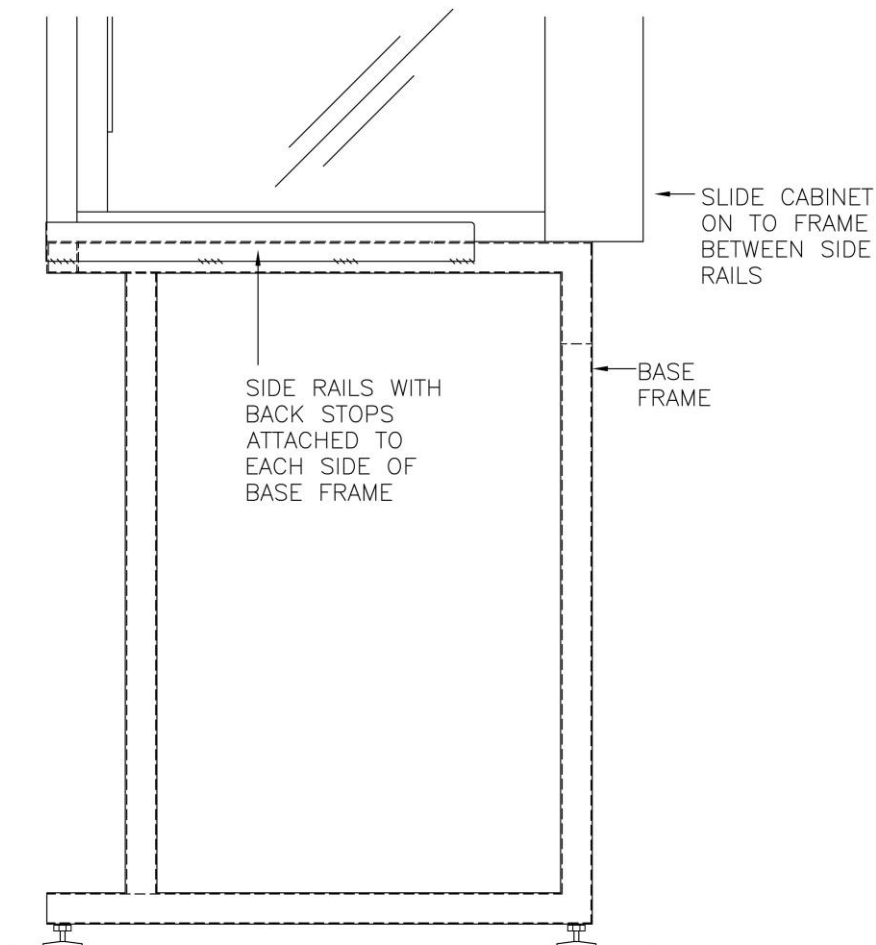
<b>Weight:</b>	1000-R AIRONE™	98 Kg } Excluding filter
	1200-R AIRONE™	126 Kg } Excluding filter
	1500-R AIRONE™	140 Kg } Excluding filter
	1800-R AIRONE™	180 Kg } Excluding filte

## Specification continued

Dimensions (in millimetres): Width x Depth x Height

1000-R AIRONE™	External	1000 x 760 x 1300
1000-R AIRONE™	Internal	950 x 550 x 780
1200-R AIRONE™	External	1200 x 760 x 1300
1200-R AIRONE™	Internal	1150 x 550 x 780
1500-R AIRONE™	External	1500 x 760 x 1300
1500-R AIRONE™	Internal	1450 x 550 x 780
1800-R AIRONE™	External	1800 x 760 x 1300
1800-R AIRONE™	Internal	1750 x 550 x 780

## **INSTALLATION AND ASSEMBLY INSTRUCTIONS.**



**(Only applies if cabinet is mounted on stand)**

Contents of Packaging (as standard).

- AIRONE™ Filtration Fume Cupboard complete
- One envelope containing Prefilters (these may in some instances be fitted in the unit)
- One bag containing:-
  - Operational Safety Log Book.
  - Operational Manual.
  - Quality Control Certificate.
  - Mains Lead.
  - Allen Key.

Additional packages will include, if ordered, support stand, filters, ducting kits, etc.

Please note that for optimum performance it is advisable to site the AIRONE™ Filtration Fume Cupboards as directed in the Operational Safety Log Book (ref.: BS:7258).

Space for free air circulation must be provided around the AIRONE™ Filtration Fume Cupboard.

Place the AIRONE™ Filtration Fume Cupboard on the selected bench or stand.

#### Fitting the Filters

It is advisable to have another person available to assist

The following procedure should be followed:

- Ensure that power to the unit is switched off.
- Ensure that the front sash is at its lowest position.
- Unscrew the main front cover panel by removing the Allen screws to expose the main filter housing aluminium cover plate, ensuring that the lighting plug is disconnected. If possible have an assistant support the cover while this is done.
- Loosen screws and remove cover plate by sliding it up and out of the keyhole slots.
- The filter housing units each comprise of a combined motor and filter plenum chamber.
- Unpack the Main Activated Carbon or HEPA filters and slide them gasket side downward between the support guides for each main filter housing.

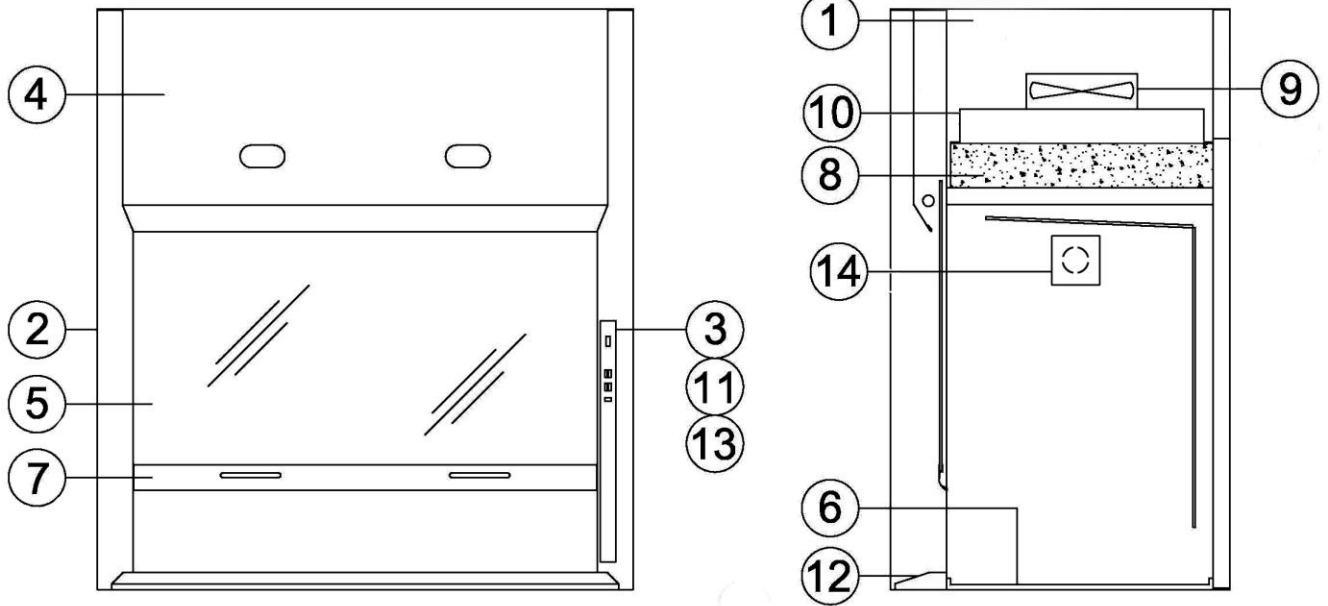


## **Good filter seating is essential for optimum performance.**

- When all filters are in place, tighten the clamping nuts firmly.
- One filter identification label will be supplied with the filter so that when the filter is installed it is visible through the viewing window.
- Replace both the front cover panels and retaining screws, ensuring the lighting plug is reconnected.
- Access to the pre-filters is made when the internal upper baffle is unfastened at the front and allowed to fold down. Access does not interrupt the seating of the main filters.
- Carefully unscrew the knurled nuts holding the internal baffle in position and allow it to fold down to expose the pre-filter carrying frames.
- Unfasten the knurled nut holding the lower pre-filter carriers and allow them to fold down.
- Beneath each main filter place a single FILTRETE particle pre-filter.
- Fold shut the pre-filter carriers and then the internal baffle.
- Amend the Operational Safety Log Book.
- Connect to the power supply and the AIRONE Filtration Fume Cupboard is ready for use.

**KEY TO COMPONENT PARTS.**

Part	Description
1.	Main Filter Housing and Exhaust Plenum.
2.	Aerofoils.
3.	Electrical Control Panel.
4.	Location of Front Panel.
5.	Sliding Front Sash.
6.	Work Surface.
7.	Aerodynamic Sash Handle.
8.	Filter Bank(s).
9.	Motor(s).
10.	Filter Clamping Plenum.
11.	VAV Control.
12.	Aerodynamic Lower Airfoil/Sill
13.	Main ON/OFF switch.
14.	Airflow Sensor



## **OPERATING INSTRUCTIONS.**

- Check voltage on data plate.
- Insert mains plug into power supply socket.
- Check filters fitted before operating.
- Turn the mains switch to the 'ON' position. Press "fan on" button on PCB. The fan motor(s) will run.
- The AIRONE Filtration Fume Cupboard should be run for a test period of one hour with the sash in the lowest position.
- Do not use physically or chemically incompatible substances within the working area or fume enclosure.
- Follow the filter instructions and recommendations as detailed in the Operational Safety Log Book.
- If the correct filters are not available - do not operate the AIRONE Filtration Fume Cupboard in the recirculatory mode.
- The remaining filter efficiency should be regularly checked as detailed in the Operational Safety Log Book. Filters should be replaced before the maximum breakthrough value in the Filter Test procedure is reached.
- Spare filters should be kept in stock to ensure that filters can be replaced in good time during regular monitoring or for emergency installations - should a spillage of volatile materials occur.
- Regular and careful cleaning of the work surface, back baffle and support channels is recommended to prevent a build up of contaminant substances.

Following these instructions will ensure protection for the operator, environment, and also prolong the life of the filters.

It is the responsibility of the operator to ensure correct use of the AIRONE Filtration Fume Cupboard at all times.

## **MAINTENANCE**

It is recommended that a service contract is taken out with SAFELAB SYSTEMS. Regular maintenance by our qualified personnel will save you time and money.

#### Replacement of Main Carbon or HEPA filters and Prefilters

The replacement frequency is dictated by the results of regular filter monitoring - see Operational Safety Log Book.

During the filter replacement procedure suitable protective clothing, facemask, gloves and safety glasses must be worn.

For further information see Appendix I and II.

#### **CLEANING.**

The construction materials used for the AIRONE Filtration Fume Cupboard are designed to give a long and problem free life. It is beneficial however to regularly clean and decontaminate the internal and external components.

- It is recommended that all AIRONE Filtration Fume Cupboards are left running during cleaning procedures and that suitable protective clothing, facemask, gloves, and safety glasses are worn.
- If required, the back / upper baffles can be removed for cleaning by carefully unscrewing the support screws. It is recommended that two people undertake this operation.
- Clean glass, acrylic, metalwork and worksurfaces with a mild detergent solution.
- After cleaning with mild detergent solution, wipe down all surfaces with a damp cloth.

## **Appendix I.**

### **Fitting or Replacing the Main Carbon Filter**

- Switch off the cabinet and disconnect power supply
- Reduce the sash to its lowest opening.
- Unscrew the main front cover panel by removing the Allen screws to expose the main filter housing aluminium cover plate, ensuring that the lighting plug is disconnected. If possible have an assistant support the cover while this is done.
- Loosen screws and remove cover plate by sliding it up and out of the keyhole slots.
- Carefully unpack the new Activated Carbon or HEPA filters
- Remove the old carbon or HEPA filters and immediately place them into the plastic bags - seal and tape them for secure disposal.
- Place the replacement filters as required into the filter location.
- Ensure that the knurled nuts are securing the filters are fastened securely.

#### **Good filter seating is essential for optimum performance.**

- Replace the both the front cover panels and tighten down the screws with a 3mm Allen Key, ensuring the light plug is reconnected.
- Following filter replacement it is recommended that the filter monitoring procedure detailed in the Operational Safety Manual is performed. This ensures correct seating and that satisfactory workstation performance has been verified.
- **Written records of filter monitoring are a legal requirement under COSHH.**

## **Appendix II.**

### **Pre-filter Replacement**

- Access to the pre-filters is made when the internal upper baffle is unfastened at the front and allowed to fold down. Access does not interrupt the seating of the main filters.
- Carefully unscrew the knurled nuts holding the internal baffle in position and allow it to fold down to expose the pre-filter carriers.
- Unfasten the knurled nuts holding the lower pre-filter carriers and allow them to fold down partially.
- Carefully remove the old pre-filters.
- Seal the old pre-filters into a polythene bag for disposal.
- Beneath each main filter place a fresh single FILTRETE particle pre-filter ensuring that all the holes are covered.
- Fold shut the pre-filter carriers and then the internal baffle.
- Amend the Operational Safety Log Book with details of the replacement filter fitted.

## **Appendix III.**

### **Monitoring the Airone R Range**

This fume cupboard is a 'portable appliance', powered by mains electricity and it complies with EN-BS-61010. The correct fuse must be fitted to the mains plug and this and other parts of the electrical system should be examined frequently for obvious damage. There should be regular formal inspections including earth bonding and insulation testing. Only suitably trained electricians should carry out this testing. Live electrical components could be exposed.

The minimum requirement to comply with COSHH Regulations is that the face velocities and filter efficiencies must be yearly monitored (at least once every 14 months) and a written record kept of the results. There are tables printed on back-pages of the Operational Safety Log-Book suitable for keeping these records.

SAFELAB SYSTEMS recommend that a simple air-sampling test be carried out once a week at eye-and-mouth level and/or at the outflow port of the AIRONE Fume Cupboard - utilising an appropriate GASTEC Chemical Detector Tube - recording any result in the Operational Safety Log-Book.

It is also recommended that the prefilter be replaced at least once every 6 months. The 6 months span represents a more suitable period between filter-monitoring checks.

SAFELAB SYSTEMS offer Service Contracts for regular filter-monitoring and servicing of all AIRONE Filtration Fume Cupboards. Please phone our Service Department for details.

### **Do-It-Yourself Filter Monitoring Checks:**

Equipment Required:

Airflow Meter:

A rotating vane anemometer with a vane diameter between 60 to 100mm., with the facility to average readings over a period of 10 seconds. Safelab Systems supply a suitable rotating vane anemometer: Order Code - SRVANE.

Unidirectional Hot Wire Anemometers are also available with the facility of averaging readings.

## **GASTEC Volumetric Gas-Detection kit:**

The GASTEC gas-detection kit consists of a disposable tube used with a volumetric detector handpump that draws a measured volume of air through the tube. The length of colour change in the tube indicates the concentration of the gas tested. Safelab Systems can supply a suitable model:

GASTEC Volumetric Detector Pump. *Order code - SRV604*

N.B.: Additional packs of disposable tubes will be required.

Examples:

1 pack of 10 Formalin Tubes. *Order code SRV602*

Refer to Operational Safety Log-Book and Chemical Listing for correct selection from over 500 different GASTEC chemical detector tubes available for measuring ppm concentration levels of over 800 compounds in gaseous phase.

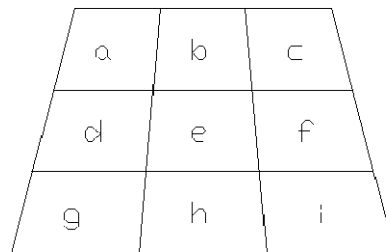
## **Appendix IV.**

Instructions for face velocity measurements.  
(Record results on record form - page 21)

### **Procedure: Check once per month**

Divide the face of the fume cupboard into nine cells.

Place the anemometer in the plane of the sash and take airflow readings at approximately at the centre of each of the nine cells.



Record for each cell the approximate average reading over a period of at least ten seconds.

Look at the table and repeat any reading which seems to be very different from the general average. Record the average of this and the previous reading.

### **Calculation:**

Minimum face velocity -

If the minimum face velocity is below 0.3 m/s then containment factors are impaired and the fault will need to be detected and rectified.





## **Appendix V.**

### **Instructions for Filter Saturation Testing.**

Several filters can be fitted into the AIRONE R Filtration Fume Cupboards:

(1) The 'Filtrete' pre-filter is the thin white layer which will filter out dust, smoke and mists. It is located at the top of the working area. As the prefilter becomes clogged from dust, aerosols and particles accumulating on its surface the face velocity of the air gradually decreases. Prefilter replacement will be required more frequently than that of the main filter. Replace prefilters at least once every 6 months.

(2) The 'Main Filter' options are:

- (a) 1200, 1500 & 1800 units: Size 'B' - 15 kg in weight - 600mm x 450mm x 100 mm.  
1000 unit: Size 'RS' - 19 kg in weight - 690mm x 490mm x 100 mm. Safelab Systems activated/impregnated carbon filter for absorbing hazardous gases and vapours.
- (b) 1200, 1500 & 1800 units: Size 'B' HEPA Filter.  
1000 unit: Size 'B' HEPA Filter. (H-13 Grade) for removal of particulates to submicron level - efficiency 99.995 % for particles down to 0.3 micron in diameter.

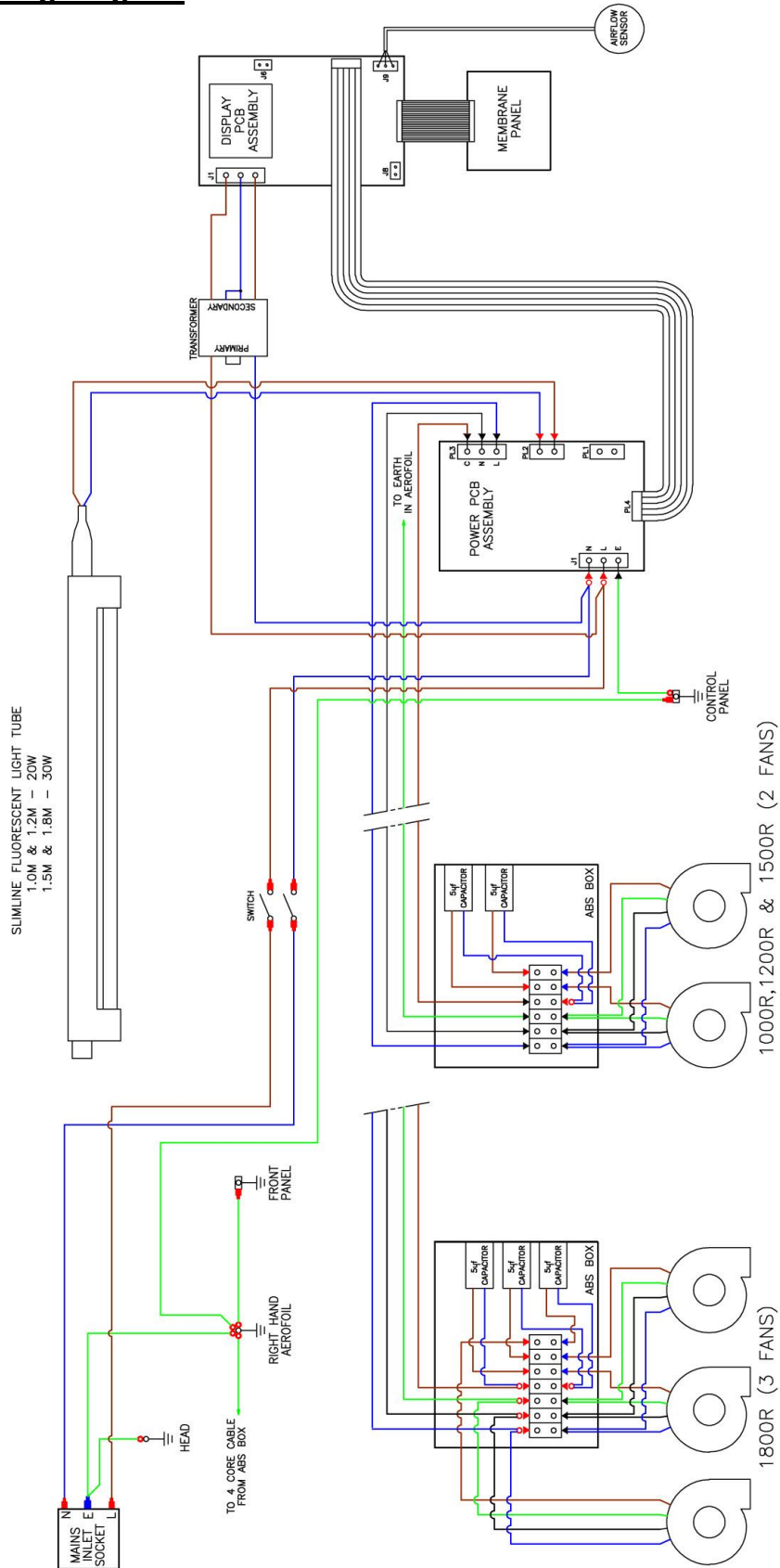
Regular filter-checks and monitoring - once a week is recommended - to test quality of the air breathed in by operators and filtration efficiency. Filter-challenge tests can be carried out during routine Service and Maintenance procedures once every 6 months - as described in the Operational Safety Log-Book.

The recommended procedure for testing the efficiency of the system requires a GASTEC Volumetric Detector Pump and Gastec Chemical Detector Tubes. Test the quality of air by sampling at eye and mouth level at regular intervals - once a week - with Gastec tubes calibrated for the particular compound in concentrations below its respective OEL (Occupational Exposure Limit) MEL (Maximum Exposure Limit) or OES (Occupational Exposure Standard (or MAK in Germany and/or TLV in the USA).

Please refer to the Chemical Listing, Adsorption Index and Gastec Detection Guide published in our Operational Safety Log-Book.

# Appendix VI.

## Main Block Wiring Diagram



**Appendix VII.**

**Control System**



## CALIBRATION PROCEDURE

- 1) Hold in "CAL" whilst applying mains power to the unit.
- 2) Release the "CAL" when two audio beeps are observed.
- 3) After a second audio beep is observed a "SET FAN SPEED" prompt message in a box will appear on the LCD display.
- 4) The system must now be left for a **minimum of 15 minutes** to allow the Figaro sensor to reach operating temperature (**if fitted**).
- 5) Using a calibrated handheld anemometer set the face velocity airflow to the required level using the "FAN UP" & "FAN DOWN" switches to alter the fan speed.
- 6) When the required face velocity has been set and allowed to stabilise press the "CAL" switch again, an airflow display in M/sec will appear on the LCD.
- 7) After the airflow reading has stabilised, use the "FAN UP" & "FAN DOWN" switches to set the displayed airflow to match the calibrated handheld anemometer.
- 8) When the desired reading is observed press the "CAL" switch once, the audio will beep twice, the fan & alarm LED will alternate on and off for approximately six seconds during which time the airflow and saturation alarm settings are being stored.
- 9) The display will then return to the main run screen.

NB The airflow may alter from the target set point for a short period before stabilising, to avoid this switch the power off and on again.

- 10) The saturation alarm function is disabled for 5 minutes from initial power up. During this period no text is displayed. When enabled, **FILTER OK** is displayed. If no gas sensor is fitted, no text is displayed after the 5 minute warm up period.
- 11) If the system detects a saturation condition of the filter, the **FILTER OK** text changes to **FILTER SATURATED**, the alarm text flashes every second and an audio alarm sounds. This can be muted using the alarm mute switch on the membrane panel.

## Appendix VIII.

### Siting Locations for Airone R Range.

Figure 16.

