INSTRUCTION MANUAL

Mobile Airone 1000RS
Filtration Fume Cupboard

SAFELAB SYSTEMS
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Contents

FOREWORD

This manual has been prepared to give guidance and information to ensure optimum operation of the Mobile Airone 1000RS Filtration Fume Cupboard.

It is recommended that service and maintenance operations should only be undertaken by SAFELAB Service Engineers or their authorised agents.

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

SAFELAB SYSTEMS LTD.
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Website: - http://www.safelab.co.uk

NOTE:

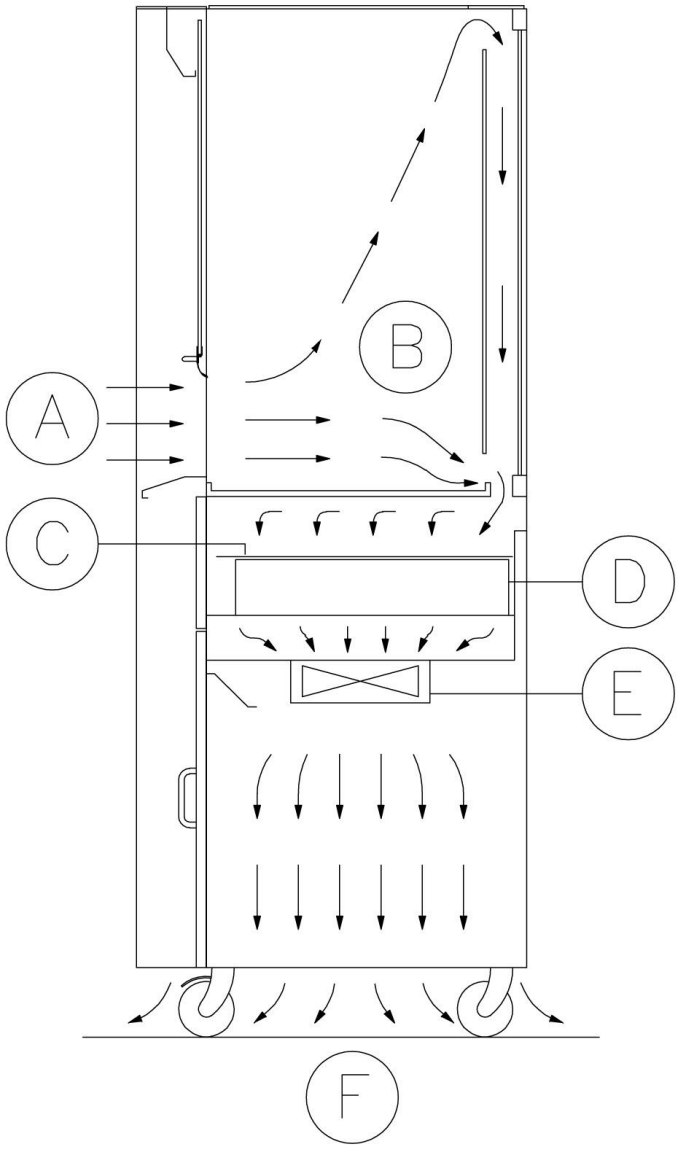
This Mobile Airone 1000RS Filtration Fume Cupboard requires annual service and inspection under the requirements of COSHH regulation 9 by a suitably qualified engineer.

PRINCIPLES OF OPERATION

Air is drawn into the cupboard at the working aperture **A** below the sliding sash at a velocity high enough to ensure entrainment of any fumes/odours given off by the processes carried out within the cupboard.

The fumes from within the cupboard are carried by the moving body of air through the cupboard **B** to the pre-filter **C** and main filter **D** to absorb vapours and other noxious fumes/odours before being expelled by the exhaust fan **E** as clean air **F**.

The fan **E**, which is mounted below the main filter exerts a negative pressure on the internal space within the cupboard **B**. This in turn pulls external air into the cabinet through the working aperture **A** and keeps a constant circulation of pre-filtered clean air passing through the cupboard whilst ensuring that noxious odours are trapped and adsorbed by the main filter.



INSTALLATION AND ASSEMBLY INSTRUCTIONS

Contents of Packaging (as standard):

- **Filtrete pre-filter.**
- **Main filter.**
- **Allen key**
- **Mains power lead**
- **Safety Log Book.**
- **Operational manual**
- **Quality Pass.**
- **Service and Maintenance Letter.**
- **Conformity certificates**
- **Warranty form.**

1. Remove outer packaging.

2. Remove filter housing cover panel with the allen key provided, to expose the main filter and pre-filter chamber. Remove the card mounted pre-filter from within the chamber.

3. Remove the main filter from the storage area at the base of the cupboard.
   Before lifting the main filter please note it weighs approx. 22kg and may require two people to safely handle it.
   Unpack the main filter and slide the filter, gasket side down, between the support guides in the filter chamber and ensure that it is pushed fully to the back. Tighten the two filter clamp knobs evenly.

4. Fill in the date on the filter identification label and stick it on the front of the filter ensuring it will be clearly visible through the window in the front of the filter housing cover panel.

5. Place the card mounted pre-filter on the top of the main filter with the tab facing outwards.

6. Replace the filter housing cover panel.

7. Following this procedure it is recommended that the filter monitoring procedure detailed in the Operational Safety Manual is performed. This ensures correct seating of the filter within the cabinet.

   Written records of filter monitoring are a legal requirement under COSHH.

8. Connect to the power supply and the cabinet is ready for commissioning.
   See **Calibration** instructions on page 12.

Services:

Provision has to be made for connecting the fume cupboard services, either via a docking station or plumbed in gas, water and waste. Also a tethering point is required.
Water coupling – 1/4” BSP male threaded outlet required.
Gas coupling – 1/8” BSP male threaded outlet required.
Waste - 38mm Vulcathene mechanical waste fitting (the fitting should be blanked of when not in use, with a type W24 blanking plug and W231 38mm nut.

SPECIFICATION

Definition:	The Airone 1000RS Mobile Filtration Fume Cupboard has been designed to comply with BS7989:2001 for filtration fume cupboards along with Building Bulletin 88 from the Department for Education and Employment and has been tested by CLEAPSS.
Application:	The unit gives maximum flexibility and can be manoeuvred between different locations. A counterweighted sliding front sash and clear laminated glass sides and rear provide 360° all round visibility making this ideal for demonstrations. Lowering the sash will reduce the airflow and therefore noise is reduced to a minimum benefiting demonstration.
Construction:	Aluminium extrusions and mild steel sheet, welded and painted in epoxy powder coat, Light Grey RAL-7035 and White RAL-9016. The fume enclosure is laminated safety glass. The top panel and rear baffle are clear acrylic. The suspended/counterweighted front sash is in laminated safety glass with an epoxy powder coated extruded aluminium handle. The work tray is white polypropylene as standard.
Sash Operation:	The vertical sliding laminated glass sash of the AIRONE 1000RS fume cupboard is suspended and counterweighted providing added advantages over fixed-sash or folding sash fume-hoods. E.g. the sliding laminated glass sash can be closed and this provides protection to operators. The vertical sash conforms to Paragraph 4.12 of the Building Bulletin # 88 of the DofEE (Rev. of Design Note # 29) and BS:7258 requirements in that the sash cannot fall if one of the suspending cable-cords is cut. Moving the vertical sash upwards and downwards causes the fan to speed up or slow down to give a constant face velocity, this is controlled by a micro switch.
Filter Housing:	The filter housing is located above the lower cabinet doors and contains the main filter and pre-filter.
Storage Area:	Located at the bottom of the unit and accessible by hinged doors with magnetic catches.
Low Airflow Light:	Red, gives a visual indication of a low airflow condition or when the pre-filter or main filter need changing. Located on the RH side cabinet aerofoil.
ON/OFF Switch:	Illuminated green, and located on the RH side cabinet aerofoil above the red low airflow light.
Supply:	230V 50Hz - 0.9 A (excluding electric socket load).
Performance:	The average inflow at the working aperture is 0.4 m/s. The minimum working aperture is 200mm high. The maximum working aperture is 365mm high.
Noise level:	59 dBA
Services:	Gas, water with remote valves with flexible connection hoses and waste with bottle trap and flexible drainpipe (unless specified otherwise)

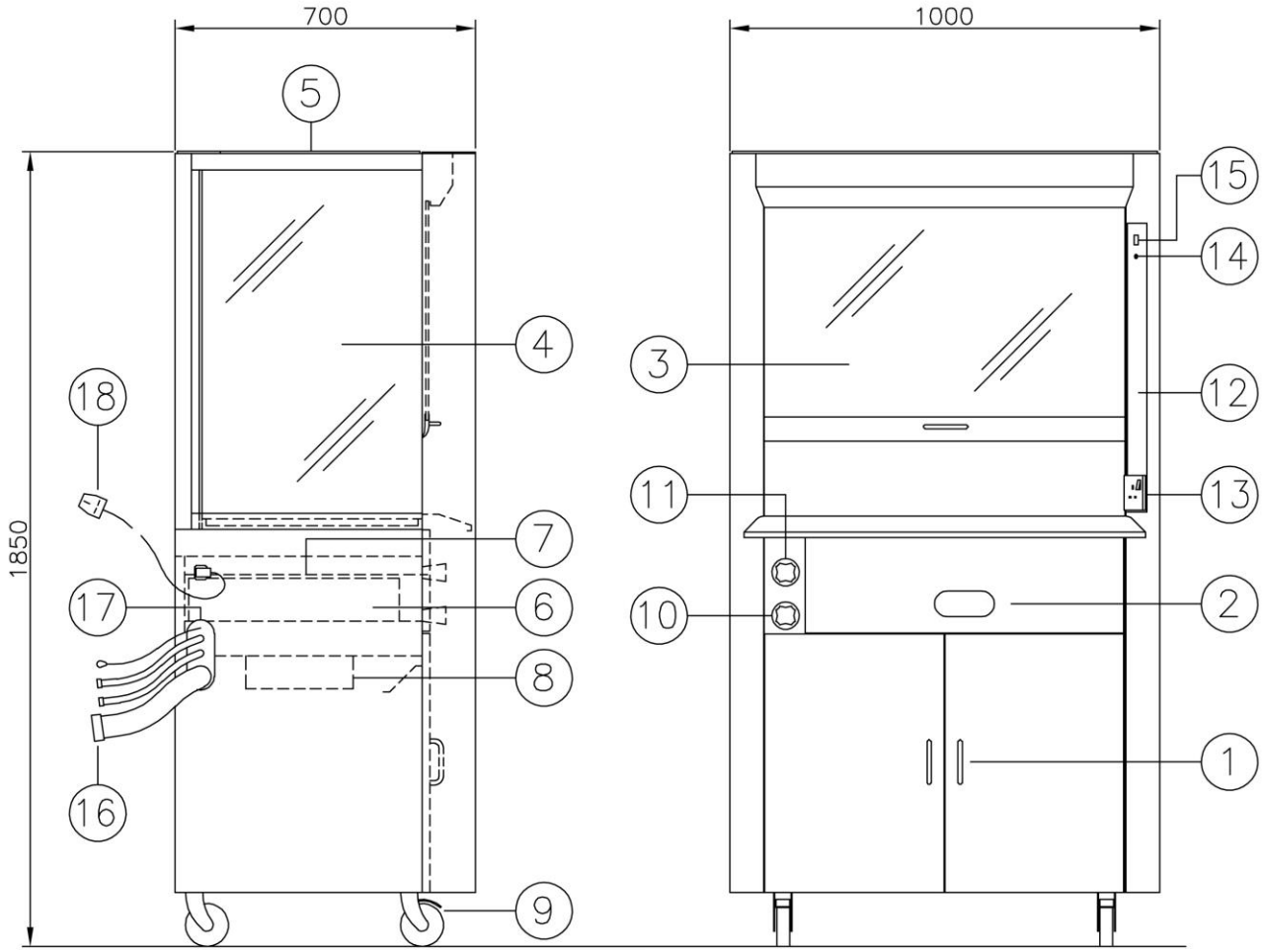
SPECIFICATION (CONTINUED)

Pre-filter: One piece cardboard framed blended synthetic fibre with polypropylene spun-bonded scrim – Safelab code: 101297 pack of 12 (the pre-filter will require replacing a minimum of every three months).

Main filter. CMS schools impregnated/activated carbon filter - Safelab code: 101094, Weight: 22 kg subject to humidity. See chemical list – page 8.

Dimensions:	External:	1000mm wide x 700mm deep x 1850mm high.
	Internal (Fume Hood Enclosure):	950mm wide x 500mm deep x 865mm high.
	Max. Sash Opening in Operation:	840mm wide x 365mm high.
	Max. Sash Opening for Loading:	840mm wide x 600mm high.
	Weight (packed):	125kgs (including carbon filter).

SPECIFICATION DIAGRAM



1) **Lower storage area.**
2) **Filter access panel/viewing window.**
3) **Vertical laminated glass sash.**
4) **Laminated glass side & rear windows.**
5) **Clear acrylic top panel.**
6) **Main filter.**
7) **Pre-filter.**
8) **Exhaust fan.**
9) **Castors (locking at front).**
10) **Gas valve (yellow).**
11) **Water valve (green).**
12) **Electrical access panel.**
13) **13A electric socket.**
14) **Low airflow warning light (red).**
15) **Illuminated ON/OFF switch (green).**
16) **Flexible service pipes and tether.**
17) **Services aperture (both sides).**
18) **Mains lead with moulded plug.**

CHEMICALS WHICH ARE SUITABLE FOR USE WITH THE SAFELAB CMS (EDUCATION) CARBON FILTER:

Inorganic

Aluminium Chloride and Bromide
Ammonia
Ammonia Chloride Bromine
Chlorine
Chromium (VI) Dichloride Dioxide
(Chromyl Chloride)
Hydrochloric Acid vapour
Hydrogen Chloride
Hydrogen Sulphide
Iodine
Iodine Chlorides
Lead fumes
Lead Bromide fumes
Mercury and its compounds
Nitric Acid vapour
Nitrogen Oxides (acidic)
Phosphine
Phosphorus (white)
Phosphorus Chlorides and Bromides
Phosphorus Oxides
Silicon Tetrachloride
Sulphur Dioxide
Thionyl Chloride
Tin (IV) Chloride
Titanium Tetrachloride
Zinc Chloride fumes

Organic

Acid Amides
Acid Anhydrides
Acid Chlorides
Alcohols
Aldehydes
Aliphatic Amines and their salts
Aliphatic Hydrocarbons
Aromatic Amines and their salts
Aromatic Hydrocarbons
Aromatic Nitro compounds
Carboxylic Acids
Esters
Ethers
Ketones
Nitriles
Organo Halogens
Phenols
Pyridine

Dusts etc

Dyes
Enzymes
Smoke

OPERATING INSTRUCTIONS

1. Position the Airone RS mobile fume cupboard where it is to be used and lock the front castors (see page 10 for a guide to positioning the fume cupboard).

2. Clip wire tether to anchor point before inserting mains plug into a13A electric socket .

3. Connect flexible gas, water and waste pipes to the plumbed in fittings or docking station ensuring that the gas and water fittings are securely pushed home and that the waste coupling is screwed on tightly. The services can be connected at either side of the cupboard (see photo at bottom of page).

2. Switch on at the mains socket and the green ON/OFF switch on the cupboard and allow it to run for approximately 5 minutes prior to use.

3. Always use appropriate PPE (personal protection equipment) when using the Airone RS Mobile Fume Cupboard.

4. When working in the cupboard try and ensure that the sliding sash is in its lowest position, and always lower the sash when the fume cupboard is not in use.

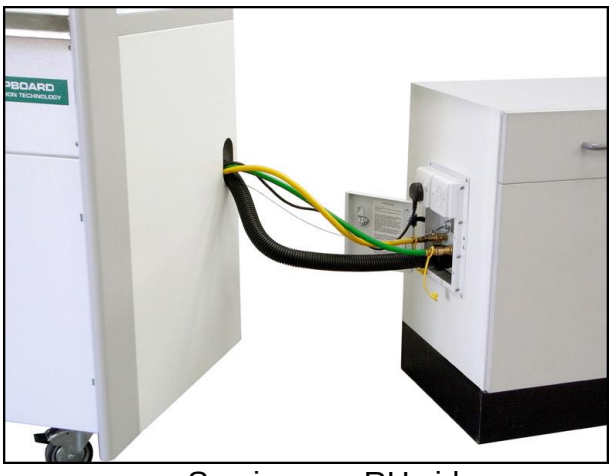
5. If using Bunsen burners, place them at least 20cm from the front sash, sides or rear baffle.

6. Before switching off the cabinet after use allow it to run for a further 5 to 10 minutes to make sure all hazardous vapours or gasses have cleared, and check that any bottle are capped or stoppered and no material has been left on the necks or pooled around the bases.
   Good housekeeping is essential to prolong carbon filter life.

7. After use, always run cold water through the waste system, and prior to disconnection, raise the flexible waste pipe to make sure there is no water trapped in the pipe.

8. Disconnect water, gas and waste hoses, then unclip the tether and return the fume cupboard to its storage location. If used with a docking station, always replace the cap on its waste fitting after use.

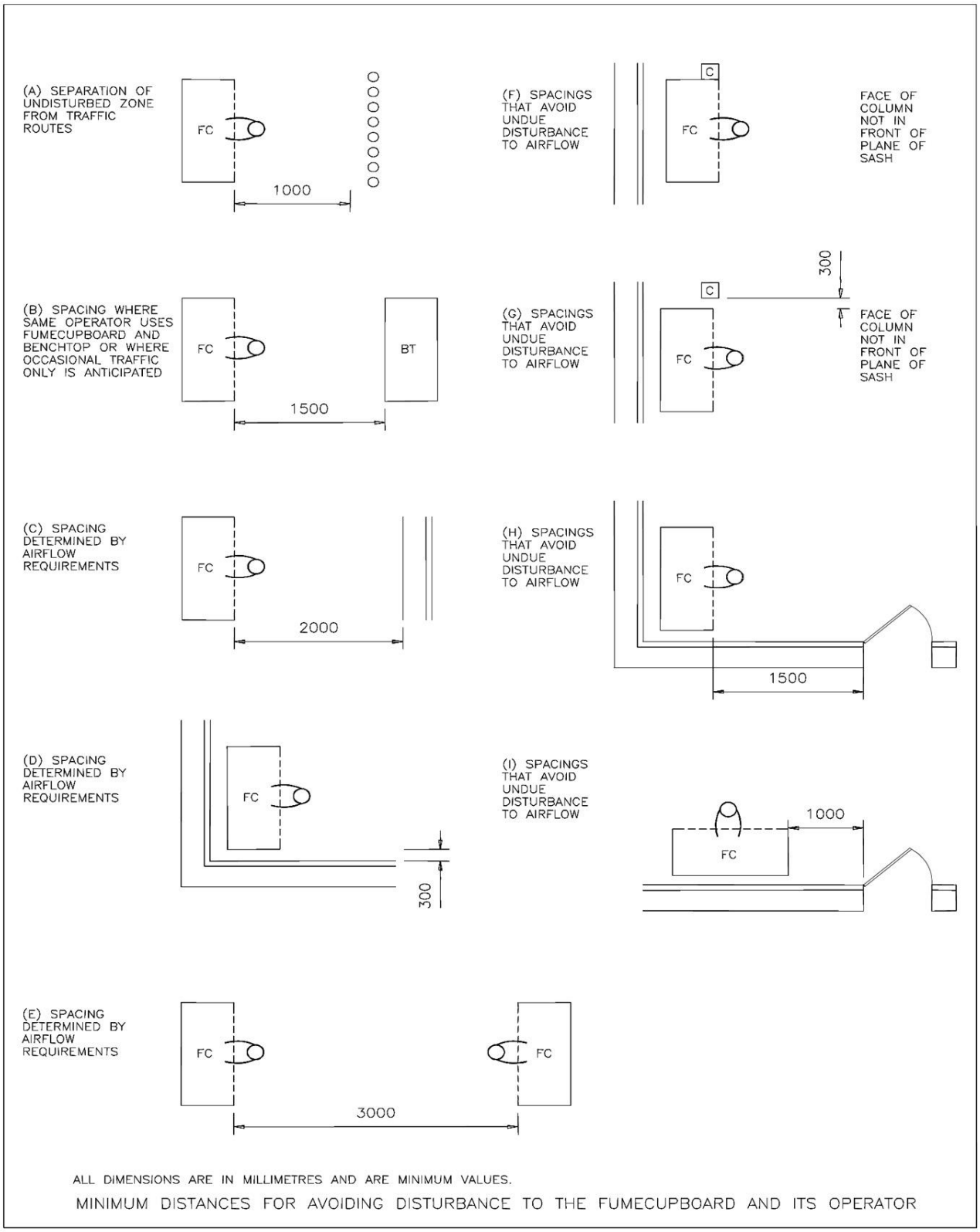
Services on LH side



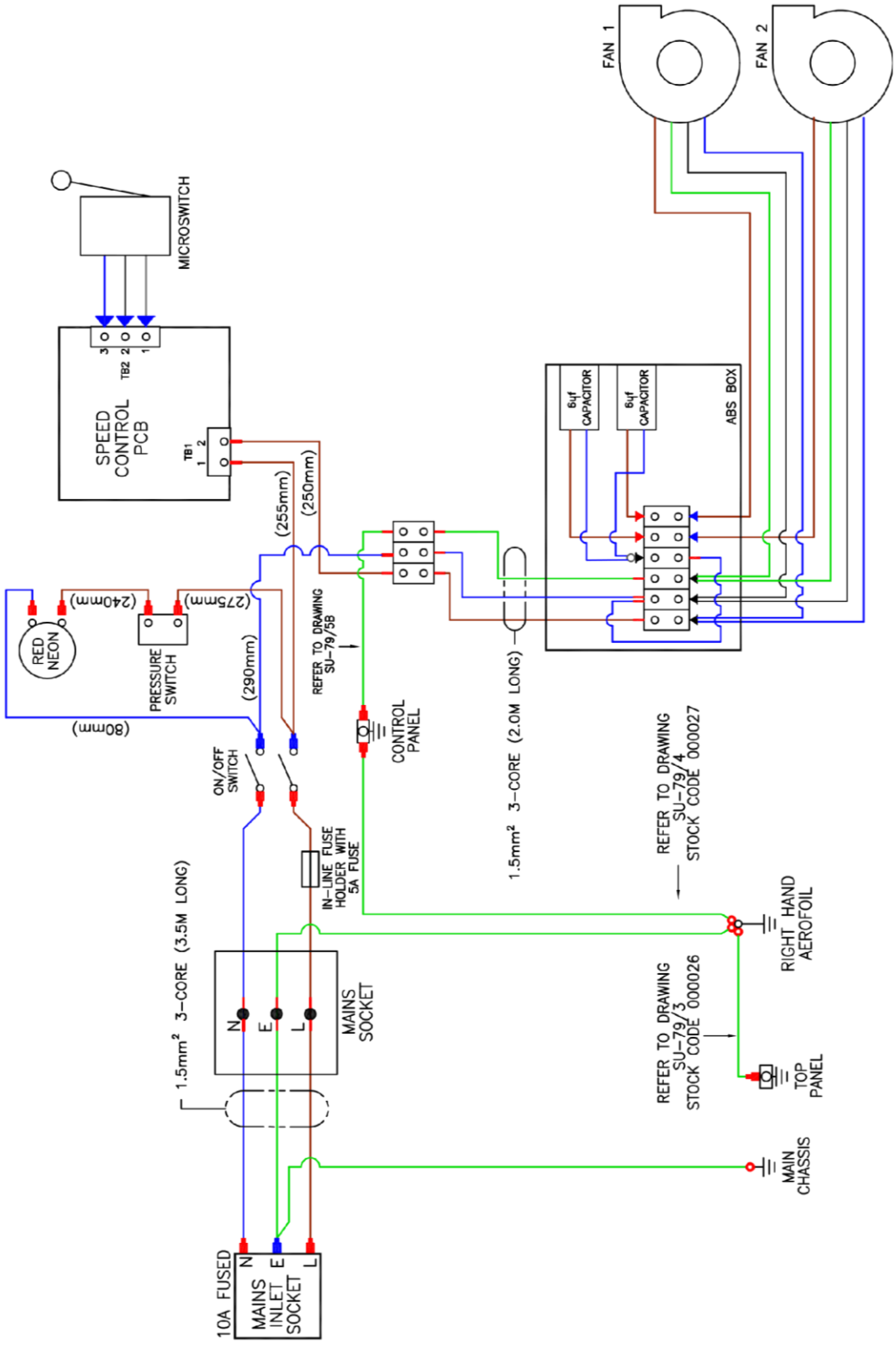
Services on RH side

OPERATING INSTRUCTIONS (CONTINUED)

GUIDE TO POSITIONING LOCATIONS FOR THE AIRONE RS MOBILE FUME CUPBOARD



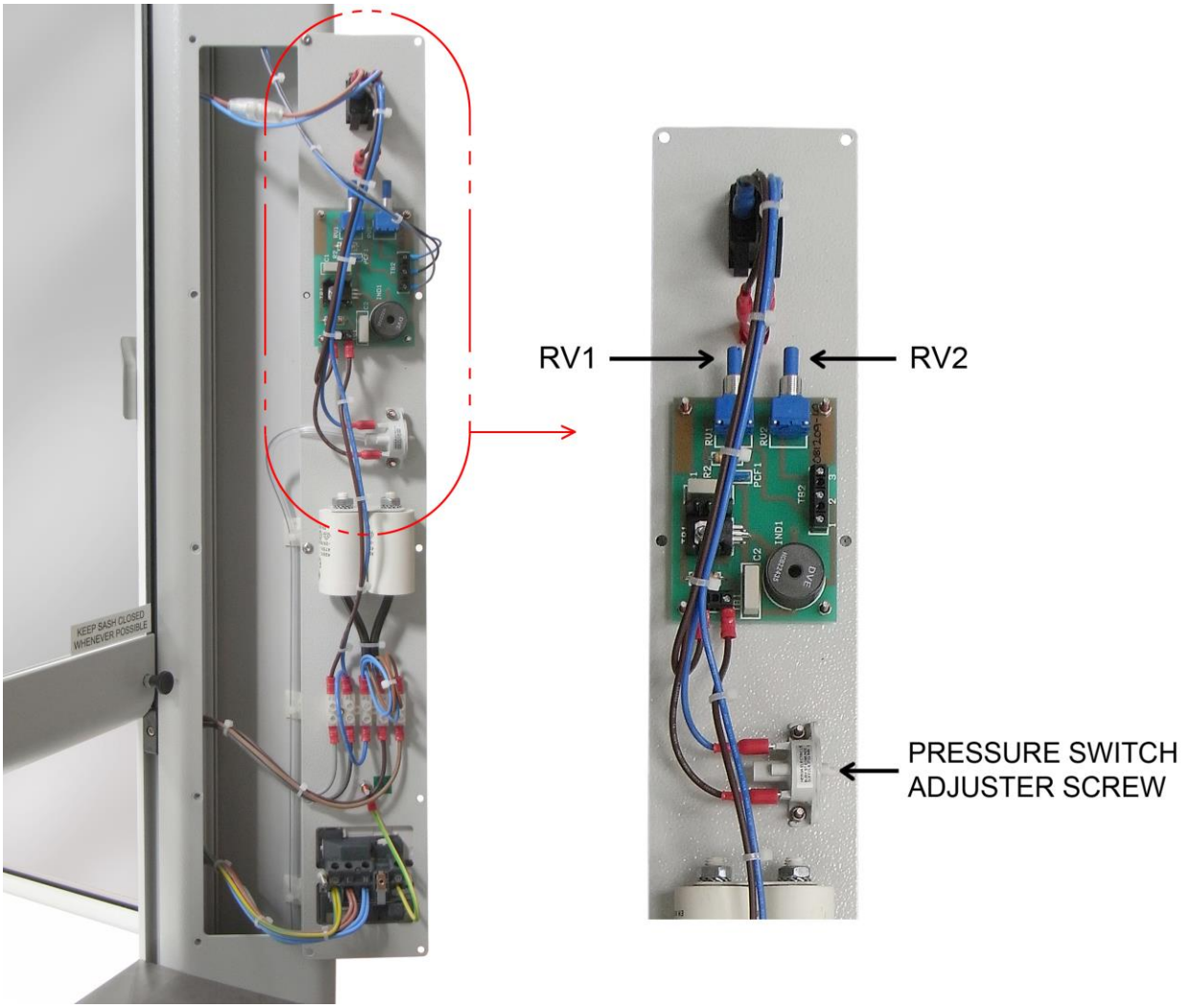
WIRING DIAGRAM



CALIBRATION

(SHOULD ONLY BE UNDERTAKEN BY A SUITABLY QUALIFIED PERSON)

1. Remove the ten screws retaining the electrical panel on the RH aerofoil extrusion, and withdraw the panel (panel may be attached as shown in photo during calibration.



ELECTRICAL PANEL

2. Switch on unit, and position the sash so that the top edge is just below the micro switch (located on top RH side of the unit behind the upper front fascia panel).

3. Using a calibrated vane anemometer with a diameter of 100mm, adjust RV1 on the speed control PCB until an average airflow of 0.4m/s is achieved at the sash opening.

4 Raise the sash to its highest working position (upper sash stop), and adjust RV2 on the speed control board to achieve an average inflow of 0.4m/s at the sash opening.

5. Lower sash to just below trigger point of micro switch and block approximately 90% of the rear air duct at the back of the work tray.

6. Adjust the pressure switch adjuster screw so that the red warning light just starts to flicker.

7. Switch off the unit and replace the control panel.

MAINTAINANCE AND PERFORMANCE MONITORING:

This fume cupboard is a 'portable appliance', powered by mains electricity and it complies with EN-BS-61010. The correct fuse (10A) must be fitted to the mains plug and this and other exposed parts of the electrical system should be examined frequently for obvious damage. There should be regular formal inspections including earth bonding and insulation testing.

Your Airone 1000 RS Mobile Fume Cupboard should have an annual service by a suitably qualified person, to maintain it's good condidtion and reduce the possibility of hazard to the operator.
We recommend that a service programme be arranged with Safelab Systems ltd**.**

Regular maintenance by our qualified personnel will ensure safe running of your equipment and also ensure that you meet your requirements under COSHH regulation 9.

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

Refer to page 14 for face velocity and filter checking procedures.

It is also recommended that the pre-filter be replaced a minimum of once every 3 months.

Safelab Systems offer Service Contracts for regular filter-monitoring and servicing of all AIRONE Filtration Fume Cupboards. Please phone our Service Department for details. Tel. No. 01934 421342

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 (available from Safelab Systems). Record result in the Operational Safety Log-Book.

Information for users for Easy Do-It-Yourself filter-monitoring checks:

Equipment Needed:

A calibrated vane anemometer with a diameter of 100mm and the facility to average readings over a period of 10 seconds.
Unidirectional Hot-wire Anemometers are also available with the facility of averaging readings.

Refer to Building Bulletin # 88 of the DfEE (rev. of Design Note #29)

GASTEC Volumetric Gas-Detection kit consisting of a disposable tube used with a volumetric detector hand pump 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 supply a suitable model:

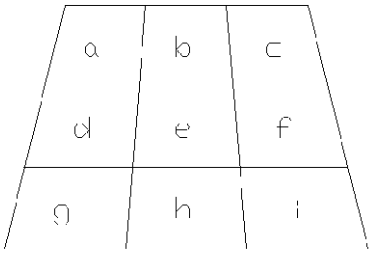
GASTEC Volumetric Detector Pump (Safelab code SRV604).
Additionally packs of disposable tubes will be required.

Pack of 10 Sulphur Dioxide Tubes, 1 pack of 10 Trichloroethene. Tubes.
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.

MAINTAINANCE AND PERFORMANCE MONITORING (CONTINUED):

INSTRUCTIONS FOR FACE VELOCITY MEASUREMENTS
(Record results on record form - page 15)

PROCEDURE:



Imagine the face of the fume cupboard divided into nine cells.

Stand as far as practicable from the fume cupboard with the sensing head in the plane of the sash and take airflow readings at approximately the centres of each of the nine cells.

Record for each cell the approximate average reading over a period of at least ten seconds, applying any corrections from the air flow meter calibration chart.

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

CALCULATION:

Minimum face velocity -

Record which of a, b,c,d,e,f,g,h,i, is the smallest, i.e.: the minimum face velocity.

If it is below 0.3 m/s then containment factors are impaired and the cause will have to be found and remedied.

VARIATION:

Check for variation as follows :

- Add together the values a,b,c,d,e,f,g,h,i and divide by 9 to get the average.
- Find the biggest and smallest of a,b,c,d,e,f,g,h,i.
- The upper percentage variation is the biggest minus the average, divided by the average and multiplied by 100.

The lower percentage variation is the average minus the smallest, divided by the average and multiplied by 100. Each of these should be below 30%, if not, then the Airone 1000RS has been parked in an unsuitable site and will have to be moved. (see page 10 for siting guidance.)

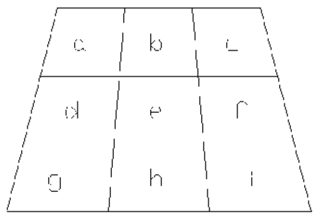
MAINTAINANCE AND PERFORMANCE MONITORING (CONTINUED):

AIRONE 1000RS EXAMINATION RECORD:

Site:..
....

Location of Airone 1000RS:
....
....…………………………………………

Air flow meter: ....
used



Date Of Check	Readings in each of the cells as above.									Average (m/s)	Drop > 10% from Before	Do filters PASS Check	Is Fume flow Inward	Any deterioration or damage observed. Fail if face velocity < 0 . 3 m / s	Initials of Tester
	a	b	c	d	e	f	g	h	i						

If a drop of 10% is found then the cause of the problem should be cleared. (Check Prefilters.)
If the minimum face velocity is below 0.3 m / s then airflow in the fume cupboard is inadequate.

MAINTAINANCE AND PERFORMANCE MONITORING (CONTINUED):

INSTRUCTIONS FOR FILTER SATURATION TESTING.

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 our Operational Safety Log-Book for further information.

CLEANING

The materials used to construct the Airone 1000RS Mobile Fume Cupboard have been selected to give maximum durability and a long life. It is beneficial however to regularly clean and decontaminate the internal and external surfaces.

It is recommended that the cabinet is switched on during any cleaning procedure and that suitable protective clothing (face-mask, gloves and safety glasses) is worn.

All surfaces should be cleaned with a mild detergent solution then finished off with a damp cloth and wiped dry.

FILTER REPLACEMENT

DURING THE PRE-FILTER AND MAIN FILTER REPLACEMENT PROCEDURE, SUITABLE PROTECTIVE CLOTHING (FACE-MASK, GLOVES AND SAFETY GLASSES) MUST BE WORN

PRE-FILTER REPLACEMENT

(SAFELAB RECOMMENDS THAT THE PRE-FILTER IS REPLACED EVERY THREE MONTHS)

1. Switch off the cabinet and disconnect it from the mains electricity supply.

2. Remove the filter access panel (item 2 in page 7) to expose the filter enclosure.

3. Withdraw the pre-filter from the top of the main filter. Seal the old pre-filter into a polythene bag for disposal.

5. Carefully slide the new pre-filter in to place above the main filter with the tab facing outwards.

6. Replace the filter access panel.

MAIN FILTER REPLACEMENT

(SAFELAB RECOMMENDS THAT THE MAIN FILTER IS REPLACED EVERY FIVE YEARS DEPENDING ON USE AND APPLICATION)

1. Switch off the cabinet and disconnect it from the mains electricity supply.

2. Remove the filter access panel (item 2 in page 7) to expose the filter enclosure.

3. Remove the pre-filter from the top of the main filter, and unscrew the filter clamping knobs on each side of the filter.

4. Check that the new or replacement Safelab carbon filter is correctly selected (consult Safelab Ltd by phone, fax or e-mail for assistance).

5. Unpack the Main filter and prepare suitable equipment for its safe handling. Place the filter gasket side upwards on a clean flat surface (Retain the packaging for disposing of the old filter).

6. **Before removing the main filter please note it weighs approx. 22kg and may require two people to safely remove it from the housing.**
   Firmly grip each side of the main filter, pull up to break seal, and withdraw it from the filter housing.

7. With the gasket side downwards, slide the new filter into place between the guides in the main filter housing ensuring that it's located fully to the back stop and evenly retighten the two knurled knobs to clamp the filter in position, and fit a new pre-filter. Good filter seating is essential for effective filtration.

8. Fill in the date on the filter identification label and stick it on the front of the filter ensuring it will be clearly visible through the window in the front of the filter access panel.

9. Replace the filter access panel.

10. Reconnect to the mains electricity supply and switch on the cabinet.

11. Enter details of main filter change in the Safety Log Book.

12. Following this procedure it is recommended that the filter monitoring procedure detailed in the Operational Safety Manual is performed. This ensures correct seating of the filter within the cabinet.
    Written records of filter monitoring are a legal requirement under COSHH.

SPARE-PARTS

Main filter:	Part No. 101094
Pre-filters:	Part No. 101297 (pack of 12)
Mains lead:	Part No. 050201
Water hose (to supply):	Part No. 170600
Water hose (valve to outlet):	Part No. 170603
Gas hose (to supply):	Part No. 170601
Gas hose (valve to outlet):	Part No. 180604
Flexible waste pipe:	Part No. 170500
Fan (2 fitted)	Part No. 060250
On/Off switch	Part No. 050245
Red neon light	Part No. 050643
Sash cord kit	Part No. 000013
Micro switch	Part No. 050246
13A electric socket	Part No. 050310
Dual speed control PCB	Part No. 040300

TROUBLESHOOTING

1. What if I can smell the vapours or gases being used in the procedure?

   Filters have a high efficiency but, because the nose is very sensitive, the residual gases passing through the filter may sometimes be smelt, even though their level is not hazardous. If the gases are causing distress, the operation should be finished and the degree of filter saturation monitored.

2. What if I can smell the vapours or gases being used in the procedure, but I have checked the filter performance and it is satisfactory ?

   Check siting of the cabinet to ensure that nothing is being allowed to escape out through the sash. Fume containment is easily impaired by draughts from windows, doors or fan heaters and air vents.

3. What if there is a release that the filters of the Airone 1000RS cannot contain?

   If the initial chemical hazard analysis or risk assessment (under COSHH) has been carried out correctly resulting in correct selection of appropriate types of carbon filters followed by weekly air sampling and filter monitoring checks this is unlikely to occur. In case it does happen, due to accidental release of gas or vapour or an unexpected spillage, then leave the fan running and evacuate the area. Subject to the hazard assessment and local considerations, it may be that personnel with breathing apparatus would have to return to open windows and ensure that all hazardous vapours or gases had been dispersed.

   It is recommended that a replacement carbon filter is kept available at short notice for such an event.

WARNING:

If a spill exceeds the capabilities of the Airone 1000RS, it is likely to exceed the capabilities of carbon filtration face masks. This means that only an air or oxygen cylinder based breathing apparatus could provide adequate protection.

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CE

E.C. DECLARATION OF CONFORMITY

Safelab Systems Ltd

hereby certify that the

Airone 1000RS
Filtration Fume Cupboard

Conforms to the requirements of the
Low Voltage Directive #73/23/EEC and the
Electromagnetic Compatibility Directives # 89/336/EEC and #92/31/EEC

Complying with the conformity criteria of European Standards:

EN 61010-1: 1993 safety requirements for electrical equipment for measurement, control and laboratory use Part 1 : General requirements
EN 50081-1, EN 50082-1 : Emission Limits to Reference Standards:
EN 60555-2 & 3, EN 55022/B, EN 55014

Signed: .....

Roger Guess, Manager Director
Safelab Systems Ltd

Dated: 1st November 2015

The single source for the complete clean air solution

Registered No: 5336826 England and Wales
Registered Office: Airone Building, 8 Beaufighter Road, Weston-Super-Mare BS24 8EE

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