

Monmouth
Circulaire

FILTRATION FUME CABINET

OPERATING AND MAINTENANCE MANUAL



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Warning

This system must be used in compliance with these instructions and any repairs or maintenance carried out by qualified personnel.

For parts or service information please contact Monmouth Scientific on:
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SECTION 1

DESCRIPTION OF THE CABINET

The Circulaire range of filtration fume cabinets are designed to provide operator and environmental protection. The cabinet provides an inflow of air >0.5m/sec through the working aperture to provide operator protection. The contaminated air is then passed through electrostatically charged pre-filters to remove particulate and then through Activated Carbon main filters to remove chemical contaminants before exhausting the air back to the laboratory. An additional carbon or HEPA exhaust safety filter may be fitted if required.

When installed correctly the cabinet complies fully with international standards including BS7989:2001 for filtration fume cupboards.

	<i>Circulaire 800</i>	<i>Circulaire 1100</i>	<i>Circulaire 1400</i>
External Dimensions	800mmWide 700mmDeep 1210mm High	1100mmWide 700mmDeep 1210mm High	1400mmWide 700mmDeep 1210mm High
Internal Dimensions	785mmWide 680mmDeep 840mm High	1085mmWide 680mmDeep 840mm High	1385mmWide 680mmDeep 840mm High

SECTION 2

INSTALLATION

- The cabinet should be sited in a draught free position
- The cabinet is recirculating and requires no connection to ductwork
- Open the front cover using the key provided and check that the main Carbon Filter/s are in place. If filters are not fitted see section 4 for instructions.
- Check the pre-filters are in place by rotating the small plastic catch located inside the enclosure, which will allow the pre-filter retaining frame to be lowered.
- Connect the cabinet to a 13A outlet socket
- Switch the cabinet on and the airflow and filter condition will be displayed on the LCD screen when the fan reaches normal speed

TESTING / COMMISSIONING

A test certificate will be supplied for conformity to CE marking, and electrical test.

The airflow should be checked using a vane anemometer and the results recorded. If the face velocity does not correlate with the value displayed on the LCD screen the cabinet will need to be re-calibrated, see section 5
The operation of the filter condition alarm should also be checked, see section 5.

THE CABINET MUST BE TESTED EVERY 14 MONTHS TO COMPLY WITH C.O.S.H.H REGULATIONS.

SECTION 3

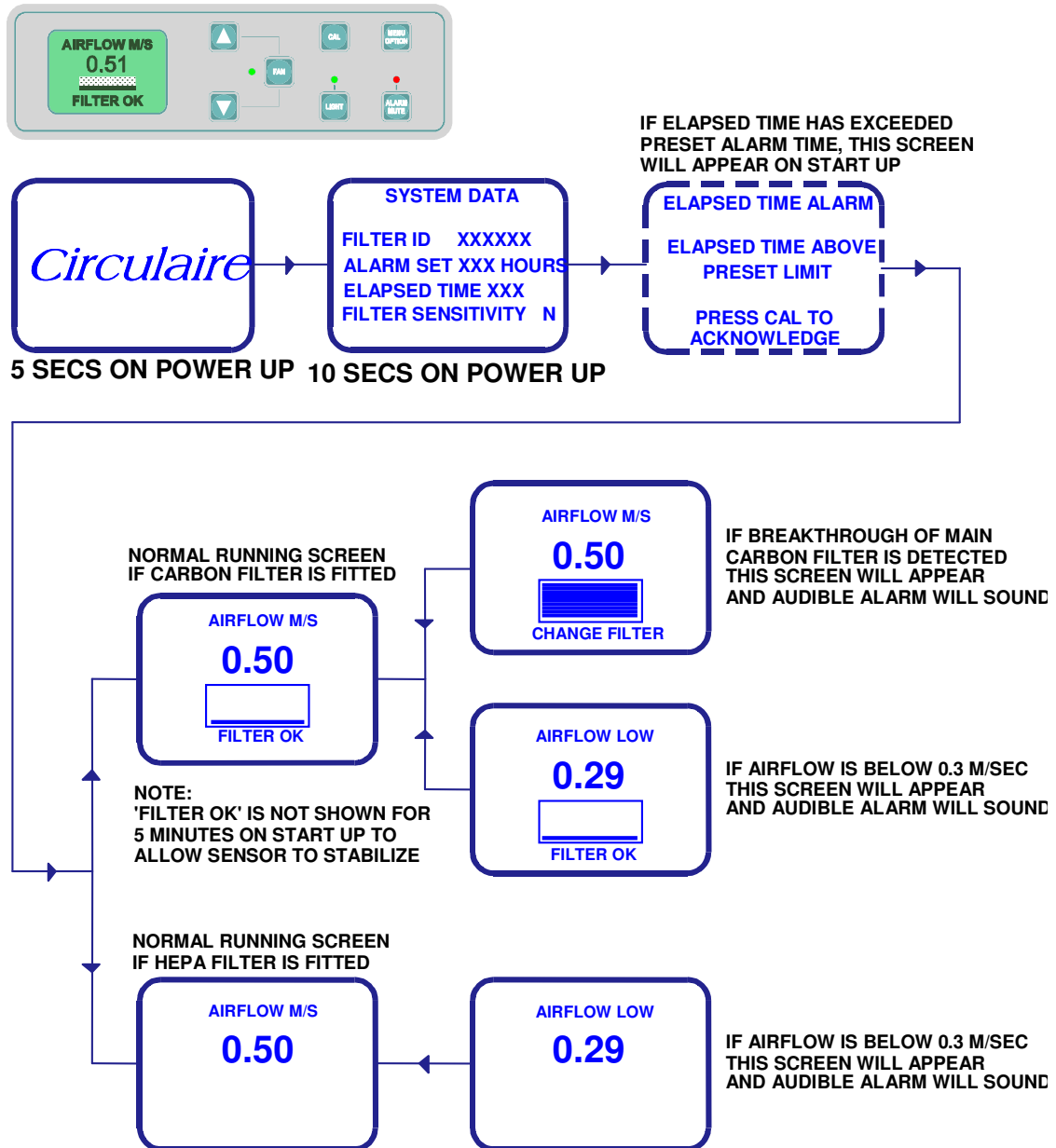
OPERATION

The cabinet is started by the illuminated rocker switch on the control panel. The fan/s will start up and the LCD display will indicate the current system data. During start up the low airflow alarm light will flash until the cabinet reaches correct operating speed. The face velocity and filter condition are continuously monitored and displayed on the LCD display

NOTE: site safety officer prior to starting work should approve Operating procedures.

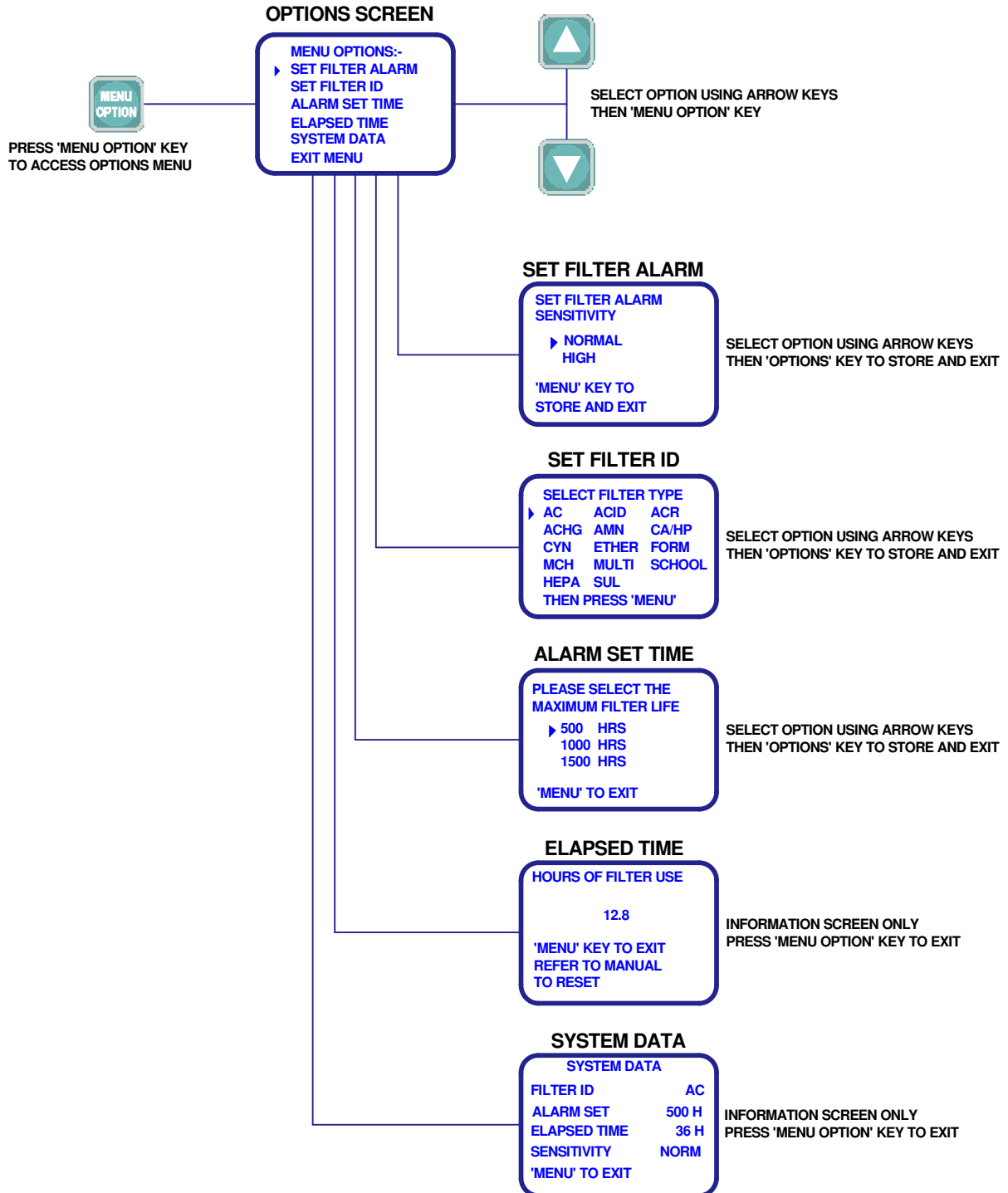
START UP SEQUENCE

During start up the following sequence of screens appear on the LCD display:



MENU OPTIONS

The system parameters may be set and / or viewed by pressing the 'MENU OPTION' key on the control panel.



SET FILTER ALARM SENSITIVITY

The sensitivity of the hydrocarbon sensor may be set to 2 levels. Select high for substances with low O.E.L.s such as Formalin or Glutaraldehyde.

SET FILTER ID

When a new filter is fitted the correct filter type should be selected from the menu. This information is displayed for 10 seconds at start up and also on the System Data screen.

ALARM SET TIME

An elapsed time alarm may be set to 500, 1000 or 1500 hours to alert the operator when this limit is reached.

ELAPSED TIME

The time elapsed since a new filter was fitted or the alarm reset. This information is displayed for 10 seconds at start up and also on the System Data screen. To reset the alarm select the Elapsed Time screen and press "ALARM MUTE" key.

SYSTEM DATA

This is an information screen and is displayed for 10 seconds at start up.

SECTION 4

FILTERS

Filters concentrate dust, pollutants etc. and care must be taken when changing filters.

IMPORTANT: Personal Protective Equipment must be worn when changing filters including gloves and particulate face mask.

PRE-FILTERS - CHANGING

This may be carried out with the cabinet running to provide additional protection to the operator.

- Rotate the small plastic catch inside the enclosure which will allow the pre-filter retaining frame to be lowered and the filter replaced.

MAIN CARBON FILTERS - CHANGING

Check filters to be fitted are the correct grade for intended use. Contact Monmouth Scientific for information if required.

- The cabinet should be turned off whilst changing the main Carbon Filters.
- Open the front panel with the key provided.
- Rotate each filter clamp handle 180° to raise filters.
- Slide filters out and seal in a marked bag for disposal.
- Fit new filters ensuring they are pushed fully in before rotating filter clamp handles to clamp the filter in place.
- Close and lock the front panel.
- Set the 'filter ID' - Turn cabinet on and press the "MENU OPTION" key. Select "SET FILTER ID" and use arrow keys to select grade of filter fitted. Press "MENU OPTION" key to store and exit.
- Reset the 'Elapsed Time' - select the Elapsed Time screen and press "ALARM MUTE" key.
- Cabinet is now ready for use.

MAIN HEPA FILTERS - CHANGING

- Carry out safety hazard assessment for safe changing
- Follow the procedure for changing Carbon Filters taking extra care with operator protection. (a dropped filter can release particulate).
- Dispose of filter as hazardous waste.

EXHAUST FILTER – CHANGING (IF FITTED)

- The exhaust filter/s are mounted on top of the cabinet.
- Remove the top fixing frame by unscrewing the fixing bolts.
- Place used filters in a polythene bag and seal. Label bag with disposal instructions.
- Apply silicone grease to new filter seals and place in position. Replace frame and bolt down evenly.
- If the cabinet is used with toxic particulates and a HEPA exhaust filter fitted the filter should be checked using DOP equipment.

FILTER SELECTION

It is most important that filters fitted are correct for the particular application. A guide to filter selection is as follows:

Gaseous fumes – Activated Carbon filters. Different grades are available to improve efficiency and extend filter life.

Particulates – HEPA filters. Circulaire HEPA filters are 99.997% efficient for particulates greater than 0.3 microns. For maximum protection against penetration the safety exhaust HEPA filter should be selected. The exhaust filter has seals under negative pressure to eliminate possible filter bypass. The main filter can either be HEPA or activated carbon.

Activated Carbon Filters

Standard activated carbon is suitable for a wide range of pollutants including hydrocarbons. Activated carbon can be impregnated with chemicals to neutralise types of chemicals and there is a list on the following page to indicate the types available.

The given weight is approximate to standard activated carbon. Impregnated carbons have higher densities and will increase filter weight.

Filter Type	Application	Typical Chemicals
HEPA	Particulates	Asbestos / powders
ACTIVATED CARBON – A/C	Hydrocarbons	Alcohols, Hydrocarbons, General use
ACID	Acid gasses	So ₂ , HCL, H ₂ So ₄
FORM	Aldehydes	Formalin Glutaraldehyde
SUL	Sulphur compounds	H ₂ S, mercaptans
AMM	Ammonia	NH ₃ , NH ₄
ETHER	Ethers	
SCHOOLS	Educational, Animal odours	SO ₂ , H ₂ SO ₄ , BR ₂ , H ₂ S, NH ₃ , CCL ₄ , hydrocarbons

- All grades of activated carbon have general use capability for hydrocarbons.
- Other grades are available for applications not listed above.
- Filters can be manufactured in layers suitable for more than one application.

To determine correct filter type please contact Monmouth Scientific with details of application, volumes, concentrations, temperatures etc.

Exhaust Filters

The cabinet may be fitted with a safety exhaust filter if required to provide an additional level of safety / capacity if required.

Cabinets used for toxic particulates must be fitted with a HEPA exhaust filter. (The main filter may be Carbon or HEPA.)

MAXIMISING FILTER LIFE

- Handle minimum volumes of chemicals
- Minimise surface area of exposed chemicals to reduce evaporation rates
- Cover containers as far as practical
- Do not boil off large volumes of chemicals
- Minimise use of heat
- Acids should be at room temperature and covered as far as practical

CARBON FILTER EFFICIENCIES

Typical filter efficiencies are >99% and this efficiency is maintained for most of the filter life. Filters should be changed when efficiency has reduced to below 90%.

ABSORPTION CAPACITIES

Circulaire cabinets have very large filter capacities, with a typical value of >30% for hydrocarbons. The cabinets have the following nominal absorption capacities:

Model	Carbon Weight	Hydrocarbon capacity at 30% absorption
Circulaire 800	1 X 16Kg	4.8Kg
Circulaire 1100	2 X 14Kg	8.4Kg
Circulaire 1400	2 X 16Kg	9.6Kg

Impregnated filters have different densities and filter capacities. Contact Monmouth Scientific for absorption capacities for different applications.

SECTION 5

MAINTENANCE

The cabinet should be isolated from the electricity supply before carrying out any maintenance procedures.

FUSES


The main fuses are located in the mains inlet socket on the top of the cabinet. Remove the mains lead and withdraw the fuses using a small screwdriver. Fuses for the fan and light are located on the power supply PCB inside the electrical enclosure on the inside of the front cover. Remove the cover screws to access the fuse holders. **Always replace fuses with the correct type and rating.**




LIGHTING

The fluorescent light is fitted to the inside of the front cover panel. Open the front panel with the key provided to gain access to the fluorescent tube. The starter is located inside the fitting.

CALIBRATION OF AIRFLOW AND HYDROCARBON MONITORS











This requires the use of a calibrated Ø100mm rotating vane anemometer and should be carried out by a trained service engineer.

- 1) Place the head of the anemometer in the centre of the aperture supported by a laboratory stand.
- 2) To enter calibration mode press and hold the  key whilst switching on the cabinet. Release the button when 2 audio beeps are heard.
- 3) Three calibration choices will appear on the screen:-
 1. FULL
 2. FILTER SAT
 3. MIN SPEED

Select using the   keys and confirm with the  key





- 4) The cabinet should now be left running for 15 minutes to stabilize the sensors.

Full Calibration

- 1) Select "FULL" using the   keys and confirm with the  key.
- 2) Set the face velocity to 0.5m/sec. on the vane anemometer using the fan   Keys.
- 3) When the anemometer reading has stabilised at approximately 0.5m/sec press the  key to store data.
- 4) The screen will now display airflow in m/sec.
- 5) When display airflow has stabilised, use   keys to match airflow display to anemometer reading. When stable press  to store data. An audio beep will sound twice and alarm LED will flash for 6 seconds to store data. Screen will change back to calibration menu.
- 6) To complete the calibration procedure press  to return to normal operation.








Filter saturation Alarm

This must be carried out with carbon filters in good condition. The cabinet should be left running for a minimum of 15 minutes prior to carrying out the calibration procedure to allow the sensor to stabilise. The sensor is an electro-chemical device and may require re-calibration after initial use.

- 1) Select "FILTER SAT" using the   keys.
- 2) Press  to start procedure.
- 3) The calibration process is automatic and Red / Green LED's will flash alternately while the sensor is being calibrated. The system will return to the main calibration screen at the end of the procedure.
- 4) To complete the calibration procedure press  to return to normal operation.

Min. Speed

The minimum operating speed of the fans is set using the following procedure:

- 1) Select "MIN SPEED" using the   keys.
- 2) Press  to start the procedure.
- 3) Set the face velocity to 0.35m/sec. on the vane anemometer using the   keys.
- 4) When the face velocity has stabilised to approximately 0.35m/sec. press the  key to save the settings. The system will return to the main calibration screen at the end of the procedure.
- 5) To complete the calibration procedure press  to return to normal operation.

Checking the carbon filter condition alarm

- 1) Turn the cabinet off, open the front cover and release the filter clamp to provide a filter bypass.
- 2) Close the cover and turn the cabinet on.
- 3) The filter condition alarm is inhibited for 5 minutes during start up to allow the sensor to stabilise and the words "FILTER OK" will not be displayed on the LCD screen. After 5 minutes when this message appears, proceed to step 4.
- 4) Pour a small amount of Isopropyl Alcohol onto a piece of tissue paper inside the cabinet.
- 5) The hydrocarbon sensor should sense the presence of the fumes and activate the audible alarm.
- 6) Turn the cabinet off, re-clamp the filter and run the cabinet to contain any fumes still being released.
- 7) If no response is observed from the challenge test, the system may need to be re-calibrated, see "CALIBRATION OF AIRFLOW AND HYDROCARBON MONITORS"

SECTION 6

SERVICING

An annual service is recommended and testing is mandatory under C.O.S.H.H regulations and will include the following points:

- Check / replace pre-filter
- Check and record face velocity readings
- Check airflow monitor and re-calibrate if necessary
- Check operation of hydrocarbon sensor
- Check condition of glazing, hinges etc.
- Inspect electrical components, lighting, cables etc.
- Issue test report and airflow certificate.

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