



**FILTRATION FUME CABINET
MODELS CT800, CT1100, CT1400 & CT1800
OPERATING AND MAINTENANCE MANUAL**



ISSUE B

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Warning

This cabinet 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 Benchvent.

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.

	T800	T1100	T1400	T1800
External Dimensions	800mmWide 700mmDeep 1210mm High	1100mmWide 700mmDeep 1210mm High	1400mmWide 700mmDeep 1210mm High	1800mmWide 700mmDeep 1210mm High
Internal Dimensions	785mmWide 680mmDeep 840mm High	1085mmWide 680mmDeep 840mm High	1385mmWide 680mmDeep 840mm High	1785mmWide 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
- Lift up the front cover and remove the inner filter access cover using the key provided and check that the main Carbon Filter/s are in place and the identification tags are connected. 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

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.

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

GENERAL OPERATION

The main on/off switch is located on the right hand side near the top of the cabinet. When first turned on the LCD control panel will be displayed providing operator instructions for cabinet use. The cabinet can be put into standby mode by pressing the  key. When in standby mode the fan, lights and control system are turned off. Normal operation can be resumed by touching the screen. An ECO mode can be activated (see page 11) which turns off the lights and reduces the fan speed if no activity is seen inside the cabinet for a time period set in the supervisor settings (see page 11). Normal operation is resumed by touching the screen. If the cabinet is not to be used for several days the cabinet can be turned off at the main on/off switch if preferred.

CONTROL SYSTEM


The cabinet is controlled and monitored by a microprocessor with an LCD touch screen. The touch screen provides the operator with general information about the cabinet and displays the current face velocity and filter condition. Control of light level, fan speed and other operating settings are all accessed via a menu system.

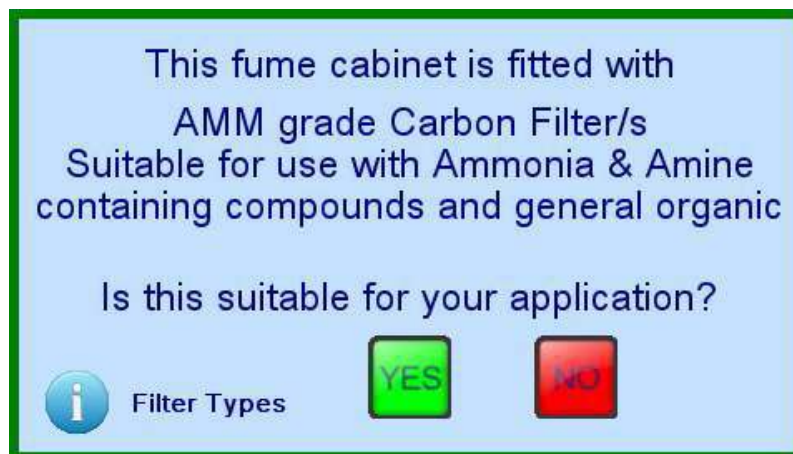
The control system is factory set to maintain the following parameters:

Normal face velocity:	0.50m/sec.
Low fan speed:	0.35m/sec.
Low airflow alarm:	0.30m/sec.

These settings can be changed by a Benchvent engineer. Please contact Benchvent for further advice.

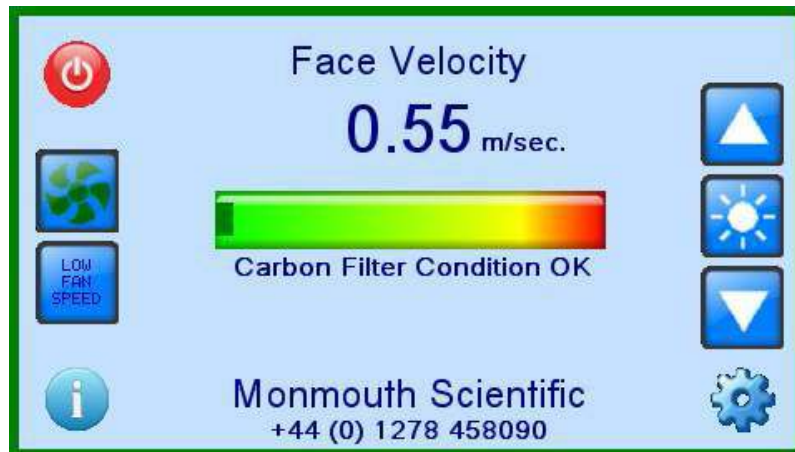
START-UP

When first turned on the screen below is displayed providing information about the filters fitted to the cabinet. **It is vitally important that the correct filters are fitted to suit the work being carried out.** Basic filter information can be displayed by pressing the  key. Please contact Benchvent for further advice on filter types.



If the procedures carried out inside the cabinet are always the same this screen can be bypassed in the Supervisor Settings (see page11)

When the filter type has been accepted the normal running screen below is displayed.



FACE VELOCITY

The microprocessor controls the fan speed to compensate for filter blockage and other changes in airflow. The face velocity is continuously monitored and displayed. The value will fluctuate slightly during normal operation, this is normal and is an indication that the fan is under microprocessor control. If preferred the units displayed can be changed to ft/min. in the Supervisor Settings (see page 11)

CARBON FILTER CONDITION

The cabinet is fitted with a hydrocarbon sensor which monitors the airflow after it has passed through the main filter/s. The filter condition is displayed on the bar graph indicator in the middle of the display. If filter breakthrough is detected the green line will progress to the right and warning messages will be displayed. If the main filter fitted to the cabinet is a HEPA filter the bar graph will not be displayed.

CONTROL BUTTONS



Light On / Off



Reduce Brightness



Increase Brightness



Fan On



Fan Off



Low Fan Speed - Reduces fan speed to 0.35m/sec. for use when weighing



Settings - access to settings menu




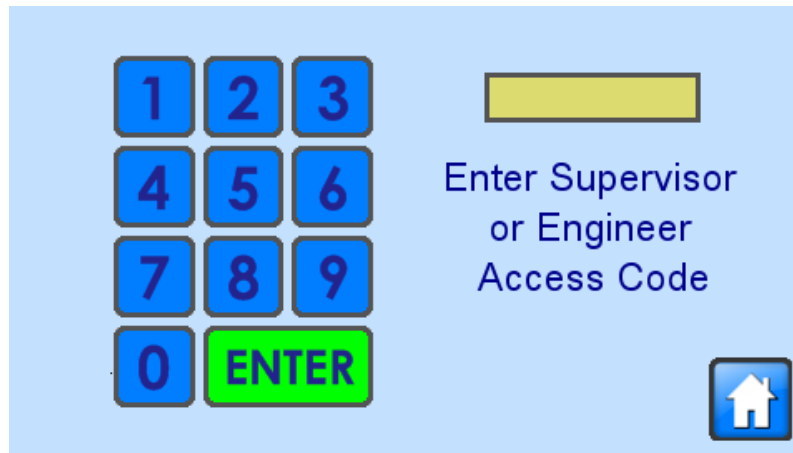
Information - Cabinet and filter information



Standby - Puts cabinet into standby


SETTINGS

Pressing the  key on the main screen enters the Set-Up menu access screen.



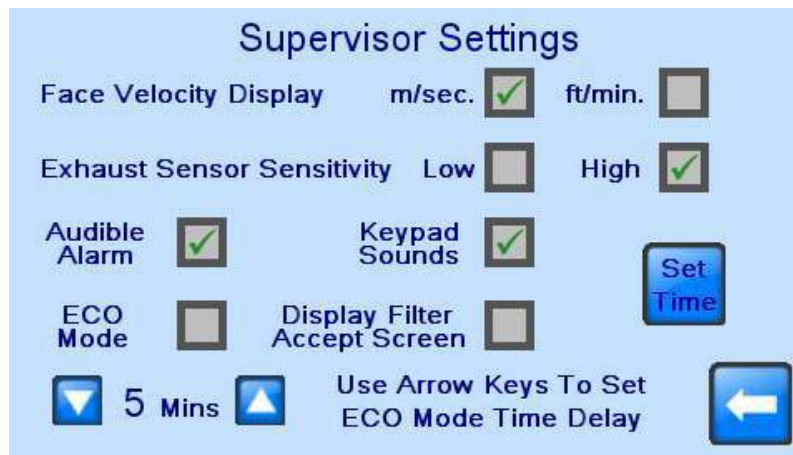
The supervisor access code is supplied with the cabinet and allows access to change operating preferences.

The engineer access code is reserved for service engineers to carry out maintenance procedures.

The  key returns to the normal display screen.

SUPERVISOR SETTINGS

When the correct Supervisor code is entered the screen below is displayed.



Face Velocity Display - select preferred velocity units.

Exhaust Sensor Sensitivity - Changes the sensitivity of the carbon filter sensor to enable detection of less volatile chemicals.

Audible Alarm - Turns off the audible low airflow alarm.

Keypad Sounds - Turns off the audible key beeps.

ECO Mode - turns off the lights and reduces the fan speed if no activity is seen inside the cabinet for a time period set by using the arrow keys at the bottom of the screen. Normal operation will be resumed when operator touches the screen.


Display Acceptance Screen - Turns on / off the Filter type acceptance screen at start up.

Set Time - displays a time / date setup screen





Pressing the  key returns to the previous screen.

INFORMATION SCREEN


Pressing the  key on the main screen will display the information screen below.



Service information is reset by a Benchvent engineer during a service visit. When a service becomes due a warning screen will be displayed momentarily on start-up during the proceeding month.

Pressing the  key will display the screen below providing information on the type of filters fitted. The  key will return to the previous screen.



Pressing the  key again will display information on the types of filter available.

Available Filter Types.

AC:	General organic / inorganic solvents etc.
ACID:	Acidic compounds and general organics.
ACR:	Alkali compounds and general organics
AMM:	Ammonia & Amine containing compounds and general organics
CYN:	Cyanide compounds and general organics
ETHER:	Ether compounds and general organics
FORM:	Aldehydes and general organics
SUL:	Sulphur compounds and general organics
MCH:	A blend of up to 4 of the above carbon types
ED:	Tri-Layered for use in schools (organic, acid & alkali)
HEPA:	Removal of particulate



SECTION 4

FILTERS

Genuine Benchvent Filters are fitted with an electronic tag which transmits filter type, part number etc. to the control system automatically on start-up. Filters from alternative suppliers may be used but the efficiency and capacity cannot be guaranteed. The control system will detect non genuine filters and display a warning on start-up.

IMPORTANT: Filters concentrate dust, pollutants etc. and care must be taken when changing them. Personal Protective Equipment must be worn 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 Benchvent for information if required.

- The cabinet should be turned off whilst changing the main Carbon Filters.
- Lift up the front panel and remove the inner filter access cover with the key provided.
- Disconnect the wire from the electronic filter tag(s).
- 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.
- Re-connect the wire to the electronic filter tag(s).
- Re fit the inner filter access cover.
- Close the front panel.
- Cabinet is now ready for use and the updated filter information will be displayed on the general information screen.

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.
- Disconnect the wire from the electronic filter tag(s) and remove the filter(s)
- 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.
- Re-connect the wire to the electronic filter tag(s).
- 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 Benchvent 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
CT800	1 X 16Kg	4.8Kg
CT1100	2 X 14Kg	8.4Kg
CT1400	2 X 16Kg	9.6Kg
CT1800	2 X 16Kg + 1 X 14Kg	18Kg

Impregnated filters have different densities and filter capacities. Contact Benchvent 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. **Always replace fuses with the correct type and rating.**

LIGHTING

The high efficiency, low voltage LED light tubes are fitted to the inside of the front cover. They should provide many years of service without requiring replacement. Spare tubes are available from Benchvent and have the following part numbers:

CT800 - GS-01514
CT1100 - GS-01539
CT1400 - GS-01540
CT1800 - GS-01540

Care should be taken to ensure the tubes are fitted in the correct orientation with the red+ marking on the tube aligning with red mark on the fitting.

CHECKING THE LOW AIRFLOW ALARM

The low airflow alarm will be activated if the face velocity drops below 0.35m/sec. To check the function of the alarm follow the procedure below:

- 1) With the cabinet running measure the face velocity using a rotating vane anemometer. The average reading should be $0.55\text{m/s} \pm 0.02$
- 2) Using paper or similar material progressively block the air inlet grille/s as evenly as possible inside the cabinet to simulate a blocked filter.
- 3) The fan will automatically speed up to try and compensate for the loss in airflow, however as the filters are increasingly blocked a point will be reached where the fan has no more capacity and the airflow will begin to drop.
- 4) Monitor the face velocity to check that the alarm is activated at around 0.3m/sec.
- 5) Remove paper to allow the cabinet to return to a normal running condition.

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. After 5 minutes 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, the bar graph indicator will indicate an alarm condition 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) The bar graph indicator will drop to indicate a safe condition and the cabinet is safe to use.
- 8) If no response is observed from the challenge test, or the cabinet does not recover to a safe condition after the test the main carbon filters may need to be replaced or the system may need to be re-calibrated. Contact Benchvent for further advice.

For parts or service information please contact Benchvent.

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