

User's Manual

Protector® FilterMate Mobile Station™

Models 48700-00 and 48700-01

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Labconco Protector® FilterMate Mobile Station™, Manual #46897

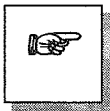
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CHAPTER 1

INTRODUCTION

Congratulations on your purchase of a Protector® FilterMate Mobile Station™. Labconco manufactures two models of the FilterMate Mobile Station™, one for 115V, 60 Hz operation and the other one for 230V, 50/60 Hz operation.

The Labconco Protector® FilterMate Mobile Station™ is an accessory for the Labconco Protector® Ventilation Stations. The FilterMate Mobile Station™ provides HEPA, carbon or HEPA/carbon filtration for the Ventilation Stations. When the FilterMate Mobile Station™ is connected to the Ventilation Station the enclosure conforms to ANSI/AIHA Z 9.5 – 1992, ETL and ETL-C, ASHRAE 110-95, and NFPA-45 (except carbon filters). In addition the 230V, 50/60 Hz model carries the CE mark. Filter Cells are sold separately

This manual covers both the 115V and 230V models.

The FilterMate Mobile Station™ provides the necessary CFM to an enclosure such as Labconco's Ventilation Station, Model Numbers 4862001, 4863001 and 4864001. When the FilterMate Mobile Station™ is connected to a 3' Ventilation Station, Model Number 4863001, and a carbon or carbon/HEPA filter combination is used in the FilterMate Mobile Station™ the Opening Reduction Kit, part number 4869000 is required. The 2' and 4' models do not require modifications. The Ventilation Station protects

the operator from specified vapors and/or particulates released during chemical or biological procedures performed within the enclosure. For biological work the FilterMate Mobile Station™ must be equipped with a HEPA filter, and is NOT to be used with biological hazardous materials. For volatile material the unit must be equipped with a carbon filter. As the air moves through the enclosure, vapors or particulates emitted within the enclosure are drawn through a rear baffle, where they are mixed with and diluted by room air.

This contaminated air is then drawn into the FilterMate Mobile Station™ where HEPA filters remove particulates and vapors are adsorbed in activated or impregnated carbon cells. It is recommended that the unit be allowed to operate at low speeds when particulates that are volatile or have volatiles adsorbed onto their surfaces to prevent material bleed off from the particulates into the air. Purified air is drawn from the filters, through the fan and returned to the room. Unlike laboratory fume hoods, which exhaust to the outside, the FilterMate Mobile Station™ does not exhaust tempered air from the room.

Each carbon filter cell has a working carbon portion (75%) and a back-up carbon portion (25%). The reserve portion gives the user ample time to complete work in process before changing the filters. This early warning system is accomplished by measuring the concentration of contaminants at a given level in the carbon bed by the use of gas sampling tubes. Sampling tubes are supplied with the acid, ammonia and formaldehyde filters. Sampling tubes for specific organic vapors can be obtained from your laboratory supply dealer. Impregnated carbon filters chemically treat contaminants, allowing purified air to be exhausted into the room. These impregnated filter cells are designed in the same manner as the organic vapor filter cell, each having a working portion and a reserve of impregnated carbon. The reserve allows time to change the filters when the working portion of carbon becomes exhausted. Gas sampling tubes also can be used to determine filter saturation with the impregnated carbon filters.

The HEPA filter can be installed before or after the carbon filters depending on the application. For non-hazardous biological applications the system is used with HEPA filters only or installed in combination with the carbon filter. Under normal operation, the HEPA filters are installed before the carbon filters. For clean room operation, the HEPA filters are installed after carbon filters.

The FilterMate Mobile Station™ when connected to the Protector® Ventilation Station allows the enclosure to be used for weighing light powders. The FilterMate's built-in speed control is capable of reducing the face velocity of the enclosure to 60 FPM, so that balances are not disturbed. An ON/OFF foot switch is provided to conveniently pause the air intake to reduce air currents when the final weight is taken.

Figure 1 shows the FilterMate Mobile Station™ connected to a 3' Ventilation Station with the provided clamps and connecting duct. Cabinet, work surface, and Protector Ventilation Station are not included.

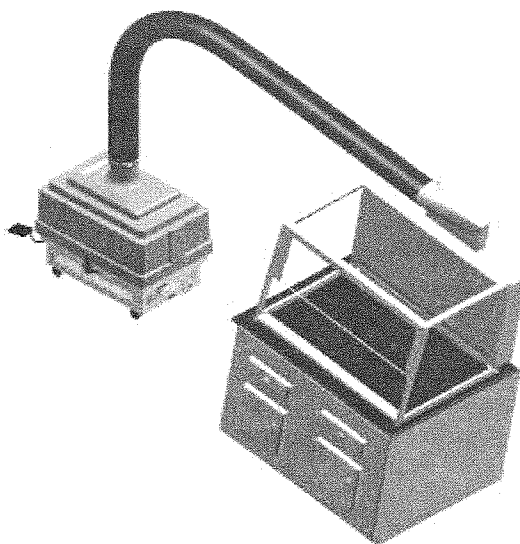


Figure 1

About This Manual

This manual is designed to help you learn how to install, use, and maintain your Protector FilterMate. Instructions for performing routine maintenance and making minor modifications to your Protector FilterMate are also included.

Chapter 1: Introduction provides a brief overview of the Protector FilterMate, explains the organization of the manual, and defines the typographical conventions used in the manual.

Chapter 2: Prerequisites explains what you need to do to prepare your site before you install your Protector FilterMate.

Chapter 3: Getting Started contains the information you need to properly unpack, inspect, install, and test your Protector FilterMate.

Chapter 4: Using Your Protector FilterMate discusses the basic operation of your Protector FilterMate.

Chapter 5: Maintaining Your Protector FilterMate explains how to perform routine maintenance on your Protector FilterMate.

Chapter 6: Modifying Your Protector FilterMate

Chapter 7: Troubleshooting contains a table of problems you may encounter while using your Protector FilterMate, including the probable causes of the problems, and suggested corrective actions.

Appendix A: Protector FilterMate Components and Replacement Parts contains labeled diagrams of all of the replacement parts and components for the Protector FilterMate.

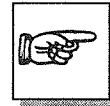
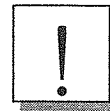
Appendix B: Protector FilterMate Specifications contain electrical specifications, environmental conditions, dimensions and wiring diagram.

Appendix C: Protector FilterMate Resources.

Typographical Conventions

Recognizing the following typographical conventions will help you understand and use this manual:

- Book, chapter, and section titles are shown in italic type (e.g., *Chapter 3: Getting Started*).
- Steps required to perform a task are presented in a numbered format.
- Comments located in the margins provide suggestions, reminders, and references.
- Critical information is presented in boldface type in paragraphs that are preceded by the exclamation icon. **Failure to comply with the information following an exclamation icon may result in injury to the user or permanent damage to your Protector FilterMate.**
- Important information is presented in capitalized type in paragraphs that are preceded by the pointer icon. **It is imperative that the information contained in these paragraphs be thoroughly read and understood by the user.**



Chapter 1: Introduction

CHAPTER 2

PREREQUISITES

Before you install your Protector FilterMate and Ventilation Station, you need to prepare your site for installation. Carefully examine the location where you intend to install your Protector FilterMate and Ventilation Station. You must be certain that the area is reasonably level and of solid construction. An electrical source must be located near the installation site.

Carefully read this chapter to learn:

- removal from carton.
- the electrical supply requirements.

Refer to *Appendix B: Protector FilterMate Specifications* for complete FilterMate electrical, dimensions, environmental conditions, specifications and requirements.

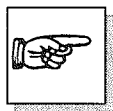
Electrical Requirements

The 115V Protector FilterMate requires 4 amps while the 230V models require 2 amps. 230V model is shipped without a plug. The customer must install the appropriate plug used in their installation.



CAUTION: This equipment must be grounded (earthed).

Ground Fault Interrupter



WHEN CONNECTING THE PROTECTOR FILTERMATE TO A GROUND FAULT INTERRUPTER CIRCUIT (GFIC), ENSURE THAT THE CIRCUIT IS RATED FOR 15-AMP LOAD AND IS FUNCTIONING CORRECTLY. CONNECTION OF THE FILTERING SYSTEM TO A LOWER CAPACITY OR DEFECTIVE GFIC MAY RESULT IN EXCESSIVE ACTIVATION OF THE GFIC, CUTTING POWER TO THE FILTERMATE WHILE IT IS OPERATING.

Location and Preparation

When the Protector FilterMate is connected to a Ventilation Station, the station should be located away from drafts, traffic patterns, doors, fans, ventilation registers, fume hoods, and any other air handling device that could disrupt its airflow patterns. All windows in the room adjacent to the Ventilation Station should be closed.

Air Exchanges – Accumulation of vapor contaminants from the exhaust of the Protector FilterMate can only occur when the Rate of Generation exceeds the Rate of Room Exhaust. For a saturated filter the following mathematical equation can be used:

Inlet Vapor Concentration (PPM) x Protector FilterMate Airflow in CFM < TWA (PPM) x Room Exhaust (CFM)

By equating both sides of the equation, the unknown will be the maximum allowed inlet concentration, not to exceed the TWA (Time Weighted Average) for the chemical.

Your Next Step

After you have determined that the location for your Protector FilterMate and Ventilation Station accommodates the installation and operational requirements, you are ready to unpack and install your Protector FilterMate and Ventilation Station. Proceed to *Chapter 3: Getting Started*.

Chapter 2: Prerequisites

CHAPTER 3

GETTING STARTED

Now that the site for your Protector FilterMate and Ventilation Station is properly prepared, you are ready to unpack, inspect, install, and test your Protector FilterMate. Read this chapter to learn how to:

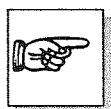
- unpack and move your Protector FilterMate and Ventilation Station. Refer to Ventilation Station Manual for instructions.
- set up your Protector FilterMate and Ventilation Station.
- install filter housing latches.
- connect duct and transition piece.
- install filters.
- connect the electrical supply source to your Protector FilterMate.
- set the face velocity.

Tools required are; flat bladed and Phillips screwdriver, drill and 1/8" drill bit. A small flat bladed screwdriver is required to adjust speed control. An anemometer is required to adjust the face velocity for the Ventilation Station.

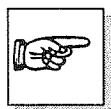
Unpacking Your Protector FilterMate

The United States Interstate Commerce Commission rules require that claims be filed with the delivery carrier within fifteen (15) days of delivery.

Carefully unpack your Protector FilterMate and inspect it for damage that may have occurred in transit. Refer to the Ventilation Station for unpacking instructions. If your Protector FilterMate is damaged, notify the delivery carrier immediately and retain the entire shipment intact for inspection by the carrier.



DO NOT RETURN GOODS WITHOUT THE PRIOR AUTHORIZATION OF LABCONCO. UNAUTHORIZED RETURNS WILL NOT BE ACCEPTED.



IF YOUR PROTECTOR FILTERMATE WAS DAMAGED IN TRANSIT, YOU MUST FILE A CLAIM DIRECTLY WITH THE FREIGHT CARRIER. LABCONCO CORPORATION AND ITS DEALERS ARE NOT RESPONSIBLE FOR SHIPPING DAMAGES.

Do not discard the carton or packing material for your FilterMate until you have checked all of the components, installed, and tested the FilterMate.

Protector FilterMate Components

As previously mentioned Labconco manufactures two models of FilterMate Systems. A 115V/60 Hz and a 230V/50/60 Hz. Your shipment will contain the following

Catalog #	Protector FilterMate Description
4870000	Protector FilterMate System 115V/60 Hz
or	
4870001	Protector FilterMate System 230V/50/60 Hz

Plus the Following:

Part #	Component Description
4868600	Duct Hose
1967000	Two (2) Clamps
4870300	Bracket/Latch Assembly
6924900	Syringe Kit
1337100	Power Cord (115 Volt only)
1334100	Power Cord (230 Volt only)
4869700	User's Manual

Setting Up Your Protector FilterMate

After you verify the Protector FilterMate components; move to the location where you want to install it. Then follow the steps listed below if connecting to a Ventilation Station.

- If a Protector Ventilation Station has been purchased, place it on a suitable work surface. There should be no gaps between the work surface and the bottom of the Ventilation Station.
- Locate the FilterMate on the floor within approximately 3' of the Ventilation Station. On the Ventilation Station remove three screws holding the top slot cover located in the center of the plenum and the two top screws holding the back cover. Insert the transition piece into the slot with the open end pointing towards the FilterMate.
- Drill 2-1/8" holes into the transition piece through the two existing holes where the two top screws were removed. Replace screws.
- Place black duct hose over the transition piece and clamp securely with one of the two hose clamps provided. Place the other

end over the inlet port of the FilterMate and clamp securely.

- The FilterMate can be positioned for easy foot switch operation. Refer to Figure 1 on page 3 for location of transition piece, hose clamps, and duct hose.
- Install the Bracket/Latch Assembly as shown in Figure 2. The Bracket/Latch and hardware is contained in a plastic bag that has been taped to the inside of the Plenum. For Bracket/Latch installation choose the set of holes that fits filter(s) you plan to use and attach with the screws and washers provided. The two holes located closest to the floor are used when a HEPA filter only is installed. The middle holes are for carbon filter only and the upper most holes are used when using a combination of carbon/HEPA filters.

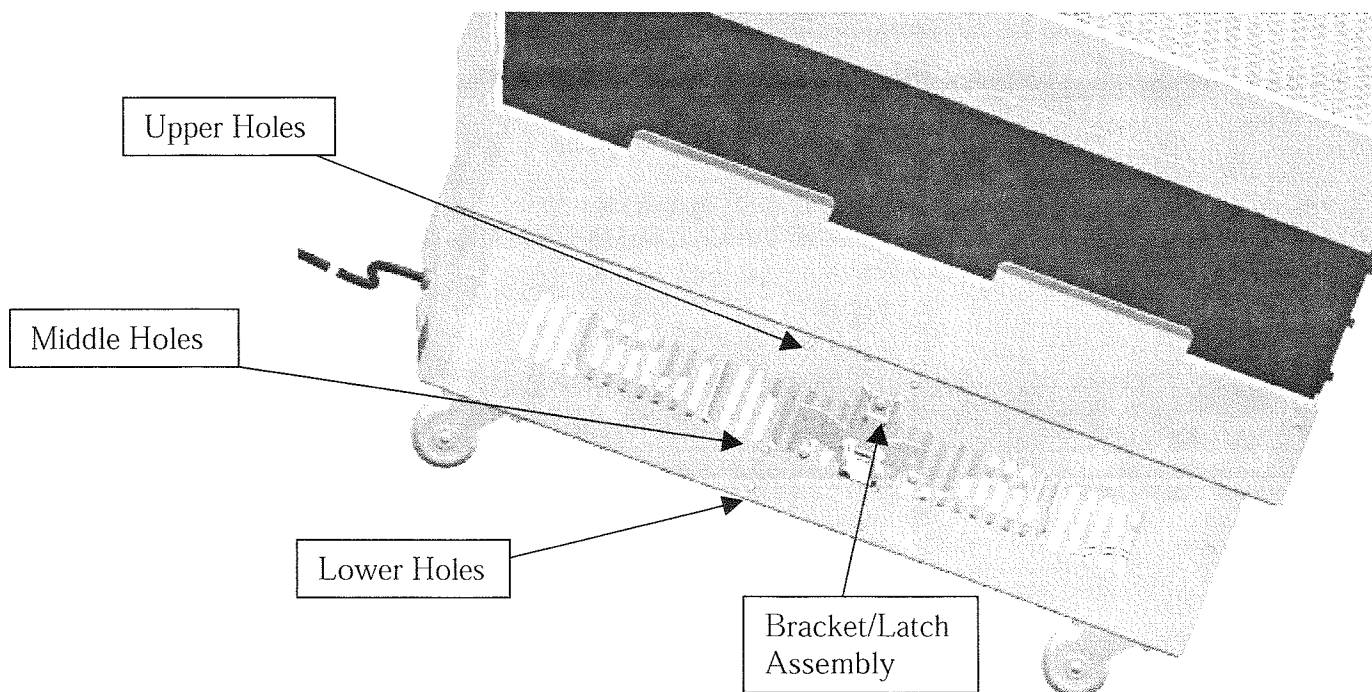
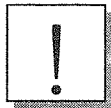


Figure 2

- If a 3' Ventilation Station is to be connected to a FilterMate containing a carbon or carbon/HEPA filter combination, the Opening Reduction Kit part number 4869000 must be installed on the Ventilation Station to achieve proper face velocity.

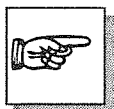
Installation of Color-Smart™ Filter Cells and HEPA Filters



Color-Smart Carbon Filter Cells and HEPA Filters are ordered and shipped separately. **DO NOT attempt to operate without proper filters.**

Begin installation by first removing filter housing.

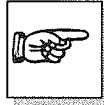
Install the correct filter for the application. Color-coding is given on each filter to match NIOSH Respirator recommendations.



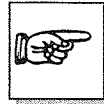
CAUTION SHOULD BE USED WHEN INSTALLING AND REMOVING FILTERS FROM THE UNIT. FILTER CELLS WEIGH APPROXIMATELY 40 LBS. (18.1 Kg.). INSTALLATION AND REMOVAL CAN BE BEST ACCOMPLISHED BY REMOVING THE FILTER HOUSING AND PLACING THE APPROPRIATE FILTER INTO THE FILTER COMPARTMENT. FILTERS ARE INSTALLED WITH THE GASKET SIDE DOWN. THE CARBON FILTER IS ALSO INSTALLED WITH THE SAMPLING PORT ON THE SIDE OF THE FILTERMATE THAT CONTAINS THE FOOT SWITCH.

When combination HEPA and carbon filters are required, install the HEPA above or below the carbon filters depending on the application. All filters are

installed with the gaskets facing down. Place one filter squarely on the other and make sure that all sides of both filters are even with each other. When installing the HEPA filter with the disposal kit catalog #6933202 follow instructions shipped with the filter.



DO NOT slide one filter on the gasket of the other filter. Refer to Figure 2.



IMPORTANT NOTE: INSTALL ALL FILTERS WITH THE GASKET DOWN. FAILURE TO DO SO WILL DECREASE THE PERFORMANCE OF THE SYSTEM AND CONTAINMENT MAY NOT BE ACHIEVED. CARBON FILTERS ARE INSTALLED GASKET DOWN AND THE SAMPLING PORT POINTS TOWARDS THE FOOT SWITCH.

Replacing the Filter



CAUTION: The carbon filter cells weigh approximately 40 pounds (18.1 Kg) each and may require 2 people for installation.

When handling the HEPA filter, use care not to allow hands to contact filter media. The glass micro filter pleats are extremely fragile. Any slight contact can puncture the pleats and destroy filtering capability.

Used HEPA and carbon filters should be treated as Hazardous Waste. Refer to disposal instructions included with each HEPA filter.

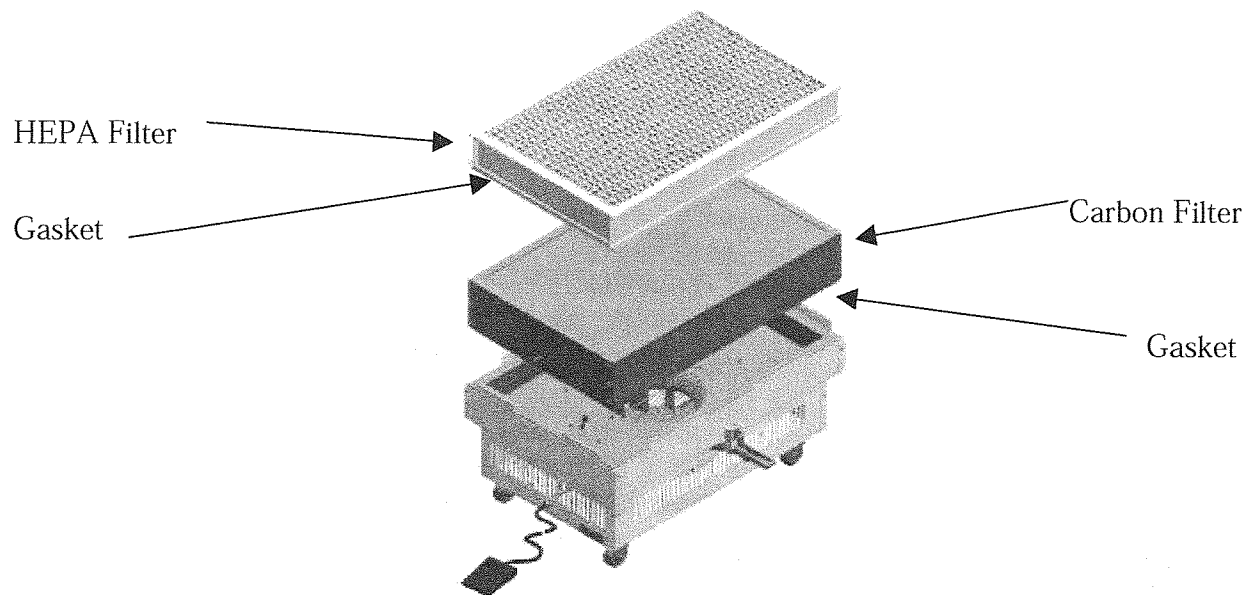


Figure 3

Carbon Filter	Color Code	Appropriate Use
Organic Vapor	Black	Organic compounds designated by NIOSH guidelines as acceptable for use with chemical cartridge type respirators. Concentrations in the enclosure's work area must not exceed the IDLH for the chemical and the exhaust from the enclosure must not exceed the TWA.
Ammonia and Amines	Bright Green	Ammonia, low molecular weight amines and other bases designated by NIOSH as acceptable for use with ammonia cartridge type respirators. Concentrations in the enclosure's work area must not exceed the IDLH for the chemical and the exhaust from the enclosure must not exceed the TWA.
Acid Gases	White	Acid gases designated by NIOSH as acceptable for use with acid gas cartridge type respirators. Concentrations in the enclosure's work area must not exceed the IDLH for the chemical and the exhaust from the enclosure must not exceed the TWA.
Formaldehyde (Formalin)	Drab Olive	Formaldehyde requires the use of an impregnated carbon for the treatment of formaldehyde. Concentrations in the enclosure's work area must not exceed the IDLH for the chemical and the exhaust from the enclosure must not exceed the TWA.
HEPA	Purple	HEPA filters are high-efficiency particulate air filters having a minimum particle removed efficiency of 99.9% for particles with a diameter of 0.3 micron or greater. Filters have expanded metal screen on upstream side for filter protection.

Speed Control Adjustment

Adjustment of the speed control is required to give the correct face velocity when the FilterMate is connected to a Protector Ventilation Station. The face velocity can be adjusted from 60 to 100 fpm. Containment of contaminants is assured at a setting within this range. Face velocity measurements are made using an anemometer. Face velocity measurements should be taken in accordance with the Industrial Ventilation 22nd Edition. An inexpensive anemometer can be obtained from your laboratory supply dealer. Locate the speed control adjustment shaft as shown in Figure 3. Using a small blade screwdriver, adjust the speed control to give the required face velocity. Weighing procedures usually require face velocities around 60 fpm. Working at the lowest face velocity appropriate for the application will give the quietest operation. The face velocity is increased by turning the speed control adjustment shaft clockwise to increase face velocity and counterclockwise to decreased face velocity.

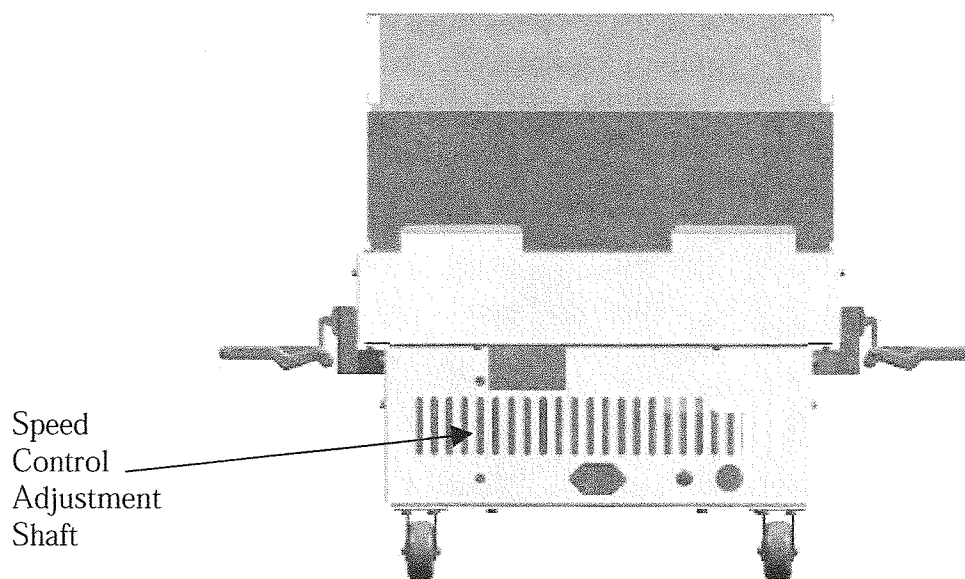


Figure 4

Prefilter Replacement

The FilterMate is shipped with a prefilter installed. Replace using Labconco part number 4868200. If an electrostatic prefilter is required for the removal of fine powders, mists, and aerosols replace the standard filter with Labconco part number 6912001. Replacement of the filter is accomplished by using a blade screwdriver to turn the retaining screws 1/4 turn. The filter retainer then can be removed and the prefilter replaced. Refer to Figure 4.



When using a HEPA filter in the FilterMate, the system can operate without a prefilter to prevent prefilter contamination. For longer HEPA filter life a prefilter is recommended. When using a HEPA filter with the disposal kit, a prefilter cannot be used.

The system is not to be used with biological hazards or other hazardous materials since there is no way to decontaminate the duct and filter housing.

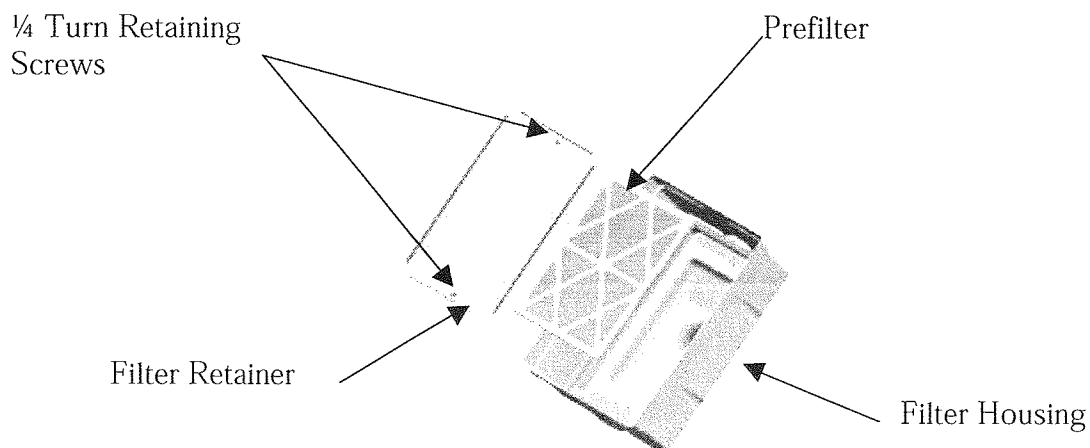


Figure 5

Your Next Step

The installation and setup of the Protector FilterMate is now complete. To learn about applications and appropriate uses of the FilterMate System proceed to *Chapter 4: Using Your Protector FilterMate*.

Chapter 3: Getting Started

CHAPTER 4

USING YOUR

PROTECTOR

FILTERMATE

Now that the installation of your FilterMate and Protector Ventilation Station is completed, you are ready to use your FilterMate. Read this chapter to learn about:

- Suitable Applications
- Definition of Terms
- Appropriate Chemicals
- Chemical Carcinogens
- Combination of Acids and Organics
- HEPA Filtered Systems
- Misapplication
- Operation

Suitable Applications

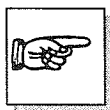
NIOSH (National Institute for Occupational Safety and Health, USA), has established guidelines for chemical cartridge and HEPA filtered respirators. Suitable applications for the Protector FilterMate are based on these guidelines. As with respirators, contaminants are adsorbed or treated by carbon and/or particulates filtered by the HEPA filter before air is returned to the breathing area. Biological hazardous materials or other hazardous solids are not to be used with the system

since there is no way to decontaminate the duct and filter housing.

Applications for the Protector FilterMate when attached to a Ventilation Station include:

- Release of low concentration of vapors effectively adsorbed or treated in carbon-based filters, or release of particulates for HEPA filter only and release of vapors and particulates for combination HEPA and carbon filters.
- Weighing of dust and powders using a HEPA filter.
- Treatment of specific chemicals that are carcinogens or suspected carcinogens. See section on carcinogens.
- Procedures that may have traditionally been done on the open bench (low levels).
- Odoriferous chemicals that are an unpleasant nuisance.

Other applications, not fitting the above guidelines, would be better suited in a ducted fume hood, biological safety cabinet or device that allows for exhausting to the outside. With all applications, the Protector FilterMate should be used in areas where only knowledgeable users have access to the enclosure.



REFERENCES TO NIOSH OR OSHA GUIDELINES AND REGULATIONS APPLY TO ANY WORK PLACE UNDER THE JURISDICTION OF THE U.S. DEPARTMENT OF LABOR. OTHER COUNTRIES OUTSIDE THE U.S. HAVE ESTABLISHED STANDARDS WHICH MAY DIFFER SLIGHTLY FROM THOSE USED AS GUIDELINES FOR THIS PRODUCT. IT IS THE USER'S RESPONSIBILITY TO BECOME AWARE

OF LOCAL REGULATIONS GOVERNING THE SAFE USE AND DISPOSAL OF CHEMICALS, CARBON AND HEPA FILTERS. KNOWLEDGE OF ESTABLISHED SAFE EXPOSURE LEVELS IS IMPERATIVE TO THE PROPER USE OF FILTERED ENCLOSURES.

Definition of Terms

NIOSH - National Institute for Occupational Safety and Health/Mine Safety and Health Administration. (U.S.A.)

TWA - Recommended Exposure Limits expressed as a Time Weighted Average. The exposure limit for that chemical for up to a 10 hour work day, 40 hours a week.

Odor Threshold - The value in parts per million for which one might expect to smell a chemical's presence in the air. This value is very subjective and detection will vary with the sensitivity of one's nose. The period of time until the odor threshold is reached in the exhaust stream can be estimated from Labconco's exclusive computerized filter modeling program. Contact Labconco on filter life for specific applications.

Saturation Level or Time - There is a limit to the amount of chemical that can be adsorbed by activated carbon, or neutralized by chemically treated carbon. Once the capacity of the carbon is reached, it is considered to be saturated and will adsorb (or neutralize) no further material; the outlet concentration of the chemical will equal the inlet concentration from that point until the filter is replaced. (Note that the capacity of activated carbon is not a constant, but varies with the inlet concentration). Labconco Technical specialists can determine with the computerized carbon-modeling program the estimated time to saturation for a particular chemical free of charge. When using a HEPA filter alone or in combination with a carbon filter

the speed control will need to be increased to allow for HEPA filter loading. Measure Ventilation Station face velocity with an anemometer.

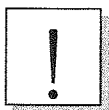
IDLH (Immediately Dangerous to Life and Health).

An atmosphere that poses an immediate hazard to life or produces immediate irreversible health effects.

IDLH concentrations should not be approached in the Ventilation Station.

Appropriate Chemicals

Below is a general set of rules to determine appropriateness of chemical usage.



Selected organic chemicals considered to be occupational carcinogens by NIOSH can be used in the Protector FilterMate under rigid restrictions. See separate discussion on carcinogens for special instructions.

Organics must have time weighted exposure limits (TWA) of 1 PPM or greater.

Chemicals must have a detectable odor at concentrations below the TWA for the chemical.

Chemicals must be designated by NIOSH guidelines as acceptable for use with chemical cartridge type respirators (the exception is formaldehyde). Chemicals not listed by NIOSH in the Pocket Guide must be approved by Labconco's Technical Specialist (or Engineering).

Inlet concentration must never exceed the IDLH (Immediately Dangerous to Life and Health) concentrations.

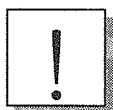
Chemicals having a recommendation by NIOSH of at least "Escape GMFOV" (Gas Mask Full-Face Respirator).

When evaporating a mixture of chemicals the chemical having the lowest TWA will be used to determine if the mixture meets the guidelines.

Call a Labconco Product Specialist at 1-800-821-5525 for assistance in chemical appropriateness.

Use of Chemical Carcinogens in the Protector FilterMate

Selected carcinogens may be used safely in the Protector FilterMate under the following restrictions.



The use of a vented hood is always the preferred method when working with carcinogens. The FilterMate should only be used as a last resort when vented hoods are not an option.

The potential carcinogens are listed in the NIOSH Pocket Guide to Chemical Hazards as "Ca.". Each potential carcinogen must have a TWA of 1 or greater, have minimum respirator recommendation of Escape GMFOV, and an odor threshold significantly lower than the TWA for the chemical.

The inlet concentration or the evaporation rate of the chemical must never exceed the TWA for the chemical.

The Protector FilterMate Chemical Guide chart provides estimated saturation times up to the TWA concentration for the Chemical.

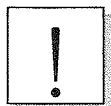
In addition to the above, all other guidelines for chemical use in the Protector FilterMate apply.

Combination of Acids and Organics

When applications require the filtration of both acids and organics, please note these facts.

The Acid Filter Cell, 6910301, has the ability to effectively treat acid fumes as well as low levels of organic vapors. The organics must follow the guidelines stated earlier. The Acid Filter capacity for organics is approximately one-third to one-half the capacity of the Organic Filter Cell. For a combination of Acid and Organics, order the Acid Filter and estimate the life to be 1/3 the time as for organics.

Safety Precautions



NOTICE: The following safety precautions must be strictly followed. Refer to Application Section and Chemicals Appropriate for Use for additional safety information

- Ensure that the FilterMate is connected to an electrical service in accordance with local and national electrical codes. Failure to do so may create a fire or electrical hazard. Do not remove or service any electrical components without first disconnecting the Protector FilterMate from electrical service.
- Use of an open flame must be avoided with the Protector FilterMate. Open flames may disrupt the airflow patterns in the Ventilation Station and cause a fire hazard with volatile solvents.
- Change the prefilters every 3 months or more frequently if dusty conditions exist. Failure to do so will reduce the performance

of the unit and possibly cause loss of contaminant containment. Change the HEPA filter when the face velocity falls below acceptable limits. In applications where contaminants of the HEPA prefilter is of concern or the use of the HEPA filter with the disposable filter cover liner and plastic bag. The system is operated without a Prefilter.

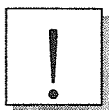
- The Filter Cells used in this unit are heavy and require care when installing and removing. Refer to Installation Instructions in this manual for proper handling of Filter Cells.
- Exhausted carbon filters and HEPA filters are to be disposed of as hazardous waste. The user is responsible for recording the chemicals adsorbed or removed by the filters and disposing of the cells properly. HEPA filters are supplied with a cover and disposal bag or a disposable filter cover liner and bag.
- Use in areas where only trained users have access to the enclosure. Any new users must be trained and should also read this Instruction Manual.
- Do not use the Protector FilterMate in a poorly ventilated area. If the Protector FilterMate is to be used in a confined space, make sure the space is well ventilated and the concentration of toxic contaminants cannot accumulate greater than the TWA.
- Proper operation of the enclosure depends largely upon the enclosure location and the operator's work habits. The Protector Ventilation Station should be located away from traffic patterns, doors, fans, ventilation registers, fume hoods, and any other air handling device that could disrupt its airflow patterns. Consult *Chapter 2: Prerequisites*

and *Chapter 3: Getting Started* sections of this manual for further details.

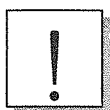
- The warning properties (i.e., odor, taste) of the volatile organic compounds or other material being used in the enclosure must be adequate to provide an early indication that the Filter Cell may be saturated.
- Highly toxic vapors, unknown reaction, hazardous particulate, biological hazards or processes generating high levels of contaminants are not intended for use in the Protector Ventilation Station.
- Color-Smart Filter Cells are color coded to match NIOSH respirator types. Only chemicals which can be safely adsorbed/treated with the specific carbon based filters installed or removed by HEPA filters are appropriate for use in this enclosure.
- Use the smallest possible quantity of chemical(s) within the enclosure and never exceed the amount which can be effectively adsorbed by the Filter Cell before breakthrough.
- Adjust face velocity to fall between 60 and 100 FPM.
- Leave the blower on for at least one minute after work in the enclosure has been completed.
- If a chemical is spilled on the work surface **DO NOT** switch off the blower until all traces of the chemical has been removed.
- Make sure carbon based Filter Cells or HEPA filters are installed prior to each use.

- If the blower fails during use, chemical processes should cease and the area should be vacated and ventilated before replacing the blower.
- Always refer to the NIOSH Pocket Guide to Chemical Hazards before proceeding. For additional help with filter and chemical selection contact Labconco at 1-800-821-5525 or 1-816-333-8811.

HEPA FilterMate Equipped with HEPA Filter



The Protector Ventilation Station when attached to a FilterMate provides personnel and environmental protection from particulate matter. Because room air is drawn over the work surface during operation, this enclosure should not be used for operations requiring sample protection from environmental contamination and should not be used with biological hazards since the filter housing and ductwork cannot be decontaminated.



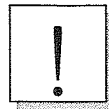
HEPA filters are only effective for entrapment of particulate matter. Manipulations, which generate gases or vapors, i.e., toxic chemicals or radionuclides, require the use of a HEPA and carbon filter in combination. The surface of the HEPA filters are fragile and should not be touched. Care must be taken to avoid puncturing the HEPA filter during installation or normal operation. If you suspect that a HEPA filter has been damaged DO NOT use the enclosure; contact a local certification agency or Labconco.

The HEPA filter in the Enclosure will gradually accumulate airborne particulate matter from the room and from work performed in the Ventilation Station. The rate of accumulation will depend upon the cleanliness of the room air, the amount of time the Ventilation Station is operating, and the nature of work being done. With normal usage, the HEPA filters will last two to five years before requiring replacement.

Each HEPA filter is provided with a cardboard cover and plastic bag or a disposable filter cover liner and plastic bag to aid in the proper disposal of the HEPA filter. Refer to the disposal instruction provided with each HEPA filter.



The FilterMate with HEPA filters is not intended or designed for the use of biological hazardous materials.



Misapplications that could result in a hazardous situation

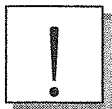
There is one scenario where the Protector FilterMate misapplication would be a part of a hazardous condition. This scenario could also be true with the use of a HEPA filter that has collected particulates that have volatile materials adsorbed onto the particles. If the user continues to operate the system with any of the following conditions present a potentially hazardous condition will exist:

1. The inlet concentration is greater than the TWA.
2. The filter becomes saturated.

3. The ventilation of the room is insufficient to dilute the exhaust of the Protector FilterMate to below the TWA for the chemical.

When the inlet concentration is greater than the TWA, extra measures must be taken to monitor the number of room air exchanges.

Operating the Protector FilterMate



Make sure the application is appropriate for the Protector FilterMate. If in doubt, call Labconco at 1-800-821-5525 between the hours of 7:00 A.M. and 6:00 P.M. Central Standard Time.

Your FilterMate is now ready for operation. Simply start the system by pressing the ON/OFF foot switch.

CHAPTER 5

MAINTAINING YOUR

PROTECTOR

FILTERMATE

Monitoring and changing the filters is the primary maintenance required.

Under normal operation, your Protector FilterMate requires little routine maintenance. The following maintenance schedule is recommended:

Monthly (or more often as required)

Test filter condition on carbon filtered models using a gas detector tube at intervals of 20% of the total estimated time. The exception to the 20% recommendation is formaldehyde or any carcinogen or suspected carcinogen. These hazardous chemicals must be checked at least every 10% of the total estimated time. Gas detector tubes for the specific chemicals that are being used in the enclosure can be obtained from your laboratory supply dealer.

Check face velocity on HEPA filtered models. Change HEPA filter when face velocity of the Ventilation

Station drops below 90 feet per minute, and the speed control is full open.

Replace carbon filters when chemical breakthrough is indicated by odor, time, detector tube, or for some chemicals, analytical instrumentation.
See "Filter" section of this manual.

Quarterly

Change the prefilters every 3 months or more frequently if dusty conditions exist.

Refer to Filter installation section for the replacement of carbon and HEPA filters.

Prefilters

The roughing prefilter installed in your Protector FilterMate should be replaced every 3 months or more frequently if the unit is operated in dusty conditions. Optional electrostatic prefilter can be ordered to replace the roughing filter for the removal of aerosols, mists and fine particles. See "Accessories" section of manual. In some applications, when the prefilter becomes contaminated the system can be operated with it removed.

Color-Smart™ Filter Cells

Color-Smart Filter Cells are engineered to the National Institute for Occupational Safety and Health (NIOSH) guidelines for respirators as defined in the NIOSH Pocket Guide to Chemical Hazards. A free copy can be requested by calling NIOSH at (202)-783-3238. Carbon-based and HEPA filters are color coded in the same fashion as respirator cartridge filter types for at-a-glance recognition from the front of the enclosure.



Filters are installed as, one carbon, one carbon and one HEPA, or one HEPA. Do not install 2 HEPA filters or 2 Carbon Filters at one time.

Always replace both filter cells at the same time.

Filter Cells for organic vapors are filled with activated carbon with the very highest adsorption capacity. This adsorption capacity varies with each chemical and should be determined before use. Contact Labconco for information. Gases and vapors passing through activated carbon are attracted and held to the surface of the carbon. Impregnated Carbon Filter Cells are required for acid gases, bases, formaldehyde, ammonia and low molecular weight amines. A chemical reaction and/or adsorption occurs in impregnated carbon. Unlike mechanical filters, carbon filters **DO NOT** become more efficient with use. Their chemical reaction and/or adsorption capacity is limited. When one detects any taste, odor or irritation, contaminant generation should be halted and the filter checked for saturation. The contaminated area should be vacated and ventilated before changing the carbon filters.

Any re-circulating carbon filtering and/or HEPA device such as the Protector FilterMate will significantly reduce, but not completely eliminate, contaminants released into the room. When working with materials that are highly toxic or working on unknown reactions a vented laboratory hood is the preferred method.

Determination of When to Replace Filters (Non HEPA Filtered):

The filters **MUST** be replaced when any one of the following three conditions are met:

1. The concentration of the chemical in the sampling well is equal to or greater than the TWA. (The positioning of the sampling well provides the user an additional 1" thickness of carbon filter after this point before the outlet concentration reaches the TWA).

2. The Protector FilterMate outlet (exhaust) concentration approaches the inlet concentration, indicating filter saturation.
3. The odor in the work area becomes intolerable or the concentration of the chemical in the work area is greater than the TWA.

There are four means of determining when its time to change the filters (not shown in the order of preference).

Odor - A person's sensitivity to odor, tolerance of odor and their comfort level under odoriferous conditions vary with the individual. While odor is an indicator that chemicals are passing through the filter, several points need to be understood:

- Odor within the room is not necessarily an indication of saturation or hazardous exposure concentrations.
- Odor can be used as a prompt to sample the chemical concentration in the sampling well.
- Organic chemicals approved for use in the Protector FilterMate have odors that are detectable before reaching the time weighted exposure limits.

Detection Tubes - Color change indicators can be used to measure the concentration of the chemical at the 3" level of the carbon bed (or in the exhaust if desired). A kit including syringe pump and tubing is included with each Protector FilterMate. Labconco Customer Service Representatives are supplied with detector tube catalog numbers, as well as telephone numbers to direct you to where to purchase these items.

A starter kit of detector tubes for the measurement of ammonia, acid gases, and formaldehyde is provided with the respective filters. For Organic Filter Cells, chemical specific detector tubes should be purchased when installing fresh filters. Each kit contains

instructions on how many strokes of the syringe are required to obtain the stated sensitivity. The sampling syringe is connected to the sampling port by first removing one of the large plugs on front of the filter housing by prying off with the blade of a screw driver. Connect the syringe as shown in Figure 6, page 40 while the system is running pull the air through the tube with the syringe. Each stroke of the syringe represents a 100-ml sample and corresponds to the number of strokes necessary to give the indicated color changes. Due to the wide variety of organics and varying TWA's, it is recommended that specific detector tubes be purchased directly from Sensidyne, Draeger or your laboratory supply dealer. The vast majority of detector tubes available start measuring at the TWA. When a user observes a color change in the tube, they should replace the filter immediately. If no detector tube for your specific chemical is available, other means of detection must be used.

Time - For applications that have very consistent inlet concentrations and operating time, "Time" can be used to anticipate saturation or TWA levels based on prior experience. However, this does not replace the need for sampling. Detector tubes, or analytical instrumentation should **always** be used to determine concentrations in the filter well. It is recommended that the filters be checked with detector tubes or other means at intervals of 20% of the total estimated filter life. The exception to the 20% recommendation is formaldehyde and any carcinogen or suspected carcinogen. These more hazardous chemicals must be checked at least every 10% of the total estimated time.

Analytical Instrumentation - This is the most accurate means of measuring concentrations of any chemical. It is the method of choice when no detector tubes are available or the tubes are not sensitive enough to measure at the TWA concentration for the chemical. This method is also to be used to determine saturation when the chemical concentration is below the measurement range of detector tubes.

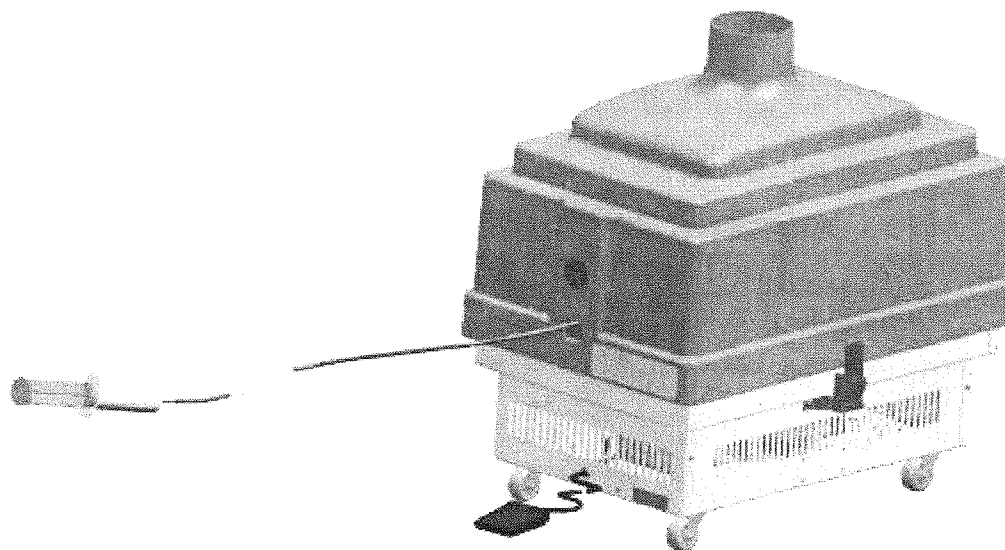


Figure 6

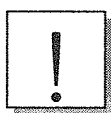
Determination of when to Replace Filters on HEPA Filtered Models:

The HEPA filters in the FilterMate gradually accumulate airborne particulate matter from the room. The rate of accumulation will depend upon the cleanliness of the room air, the amount of time the Enclosure is operating, and the nature of work being done in the Enclosure. In typical installations and usage, the HEPA filters will last two to five years before requiring replacement. Replace HEPA filters when face velocity drops below 90 feet per minute, and the speed control is adjusted full open. HEPA filters do not require prefilters and prefilters may be removed for these applications if contamination of prefilters is a concern. Prefilters are recommended for long HEPA filter life. Two types of protection for HEPA filters are

available. Catalog number 6933201 is provided with a cardboard cover to cover the up stream side of the filter before insertion into a plastic bag for appropriate disposal. Catalog number 6933202 comes with a disposable filter cover liner and plastic bag for appropriate disposal.

Prefilter Replacement

- Refer to Prefilter Installation Figure 5, Page 20.



If prefilters contain contaminated materials treat as hazardous waste.

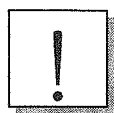
Filter Cell Replacement

- Refer to Installation, Figure 3, Page 17.

Motorized Impeller Replacement

The motorized impeller must be replaced as a complete unit. When the motorized impeller is replaced, the capacitor should also be replaced.

1. Unplug unit from the electrical outlet.
2. Remove filter housing and filters.
3. Remove the bottom cover by removing the screws holding the bottom cover in place.
4. Remove 4 screws in the motor bracket that holds the motorized impeller, Item 9, Figure 8 Page 50.



**WARNING: High-speed blower.
Never operate impeller with housing off.**

5. Disconnect all wires leading to the motor. Be sure to connect wires on the new motor in the same positions as old motor was wired. Refer to wiring diagram located on the motor bracket.

6. Remove motorized impeller from the bracket by removing the four nuts and washers holding the motor to the bracket.
7. Replace the capacitor with a new one of equal voltage and capacity.
8. Reassemble the new motorized impeller by reversing the assembly steps.

Speed Control Replacement

1. Remove the screws holding the bottom cover.
2. Remove the two screws holding the speed control using a Phillips screwdriver. Refer to exploded view of system on Figure 8, Page 50.
3. Disconnect all wires leading to the speed control. Connect wires on new speed control in the same position as the old speed control.
4. Reassemble to the system in the same position and with the same screws that were removed earlier.

CHAPTER 6

MODIFYING YOUR PROTECTOR FILTERMATE

It is necessary to install the Opening Reduction Kit Part Number 4869000 on 3' Protector Ventilation Stations when carbon or carbon/HEPA filters are used to assure a face velocity of 100 fpm. Maximum face velocity without the reduction kit is 90 fpm for a carbon filter installed in FilterMate and 75 PPM when both HEPA and carbon are installed. The 2' Protector Ventilation Station does not require an Opening Reduction Kit. The 4' Protector Ventilation Station is for HEPA filter only. Following is a table showing the requirements.

Model Number	Protector Ventilation Station	Filter	Face Velocity (fpm)	Opening Reduction Kit (P/N 486900) Required
4862001	2'	Carbon	60-100	No
		HEPA	60-100	No
		Carbon/HEPA	60-100	No
4863001	3'	Carbon	60-100	Yes
		HEPA	60-100	No
		Carbon/HEPA	60-100	Yes
4864001	4'	Carbon	Not Available	--
		HEPA	60-100	No
		Carbon/HEPA	Not Available	--

CHAPTER 7

TROUBLESHOOTING

YOUR PROTECTOR

FILTERMATE

Refer to the following if your Protector FilterMate fails to operate properly. If the suggested corrective actions do not solve your problem, contact Labconco for additional assistance.

PROBLEM	CAUSE	CORRECTIVE ACTION
Blower won't turn on	Unit not plugged into outlet	Plug the Protector FilterMate into appropriate electrical service
	Circuit breaker(s) or Ground Fault Interrupter	Reset circuit breaker
	Blower wiring is disconnected	Inspect blower wiring
	Blower switch is defective	Replace foot switch assembly – P/N 4867200
	Motorized impeller is defective	Replace motorized impeller P/N 6933600 – 115V, 60 Hz or P/N 6933700 – 230V, 50/60 Hz
Low face velocity or poor containment of contaminants	Sash not closed for Ventilation Station	Close sash to the lowest position
	Prefilters clogged	Replace Prefilters
	HEPA Filter clogged	Replace HEPA filters
	Opening Reduction Kit not installed on 3' Ventilation Station when Carbon or Carbon/HEPA filter is used.	

Chapter 7: Troubleshooting Your Protector FilterMate

APPENDIX A

PROTECTOR

FILTERMATE

COMPONENTS AND

REPLACEMENT

PARTS

The components that are available for your Protector FilterMate are listed on the following page. The parts shown are the most commonly requested. If other parts are required, please contact Product Service.

Appendix A: Protector FilterMate Components and Replacement Parts

Item	Qty.	Catalog #	Description
1	1	4868300	Cover, Filter Housing
2	2	1936900	Plug, Pry Out
3	1	4868500	Gasket, Filter Housing
4	1	4868200	Prefilter, Roughing, 14" x 20" x 1"
5	1	4867600	Retainer Prefilter
6	2	6917900	Stud, Oval, Slotted
7	1	6933201	Filter, HEPA w/cardboard protective cover and plastic bag for filter disposal – must be ordered separately
7A	1	6933202	Filter, HEPA w/disposable filter cover liner and plastic bag for filter disposal – must be ordered separately
7B	1	6910201	Filter Cell, Ammonia – must be ordered separately
7C	1	6910301	Filter Cell, Acid Gases – must be ordered separately
7D	1	6910401	Filter Cell, Organic Vapors – must be ordered separately
7E	1	6910501	Filter Cell, Formaldehyde – must be ordered separately
8	1	4867200	Foot Switch Assembly
9	1	6933600	Motorized Impeller Terminated (115V only)
9A	1	6933700	Motorized Impeller Terminated (230V only)
10	4	1941000	Caster, Swivel – 2 inch
11	1	6933500	Capacitor, Terminated – 25 MFD (115V only)
11A	1	6933501	Capacitor, Terminated – 6 MFD (230V only)
12	1	3704400	Speed Control Assembly (115V only)
12A	1	3704401	Speed Control Assembly (230V only)
13	1	1327209	Circuit Breaker, 40 Amp (115V only)
13A	2	1327205	Circuit Breaker, 20 Amp (230V only)
14	1	1333800	Power Inlet 115V
14A	1	1338100	Power Inlet 230V
15	-	-	Sampling Port
16	1	4872100	Indicator Lamp 115V
16A	1	4872200	Indicator Lamp 230V
17	2	4870300	Latch Assembly
Not Shown	1	6924900	Syringe Kit
Not Shown	1	1337100	Power Cord (115V only)
Not Shown	1	1334100	Power Cord (230V only)
Not Shown	1	4869700	Manual
Not shown	1	6925700	Detector Tubes, Ammonia – Pkg. of 3
Not Shown	1	6925800	Detector Tubes, Acid – Pkg. of 3
Not Shown	1	6926000	Detector Tubes, Formaldehyde – Pkg. of 3
Not Shown	2	1967000	Clamp, Hose
Not shown	1	6912001	Filter, Electrostatic (Optional)
Not shown	1	4869000	3' Ventilation Station Opening Reduction Kit
Not Shown	8'	4868600	Hose Duct

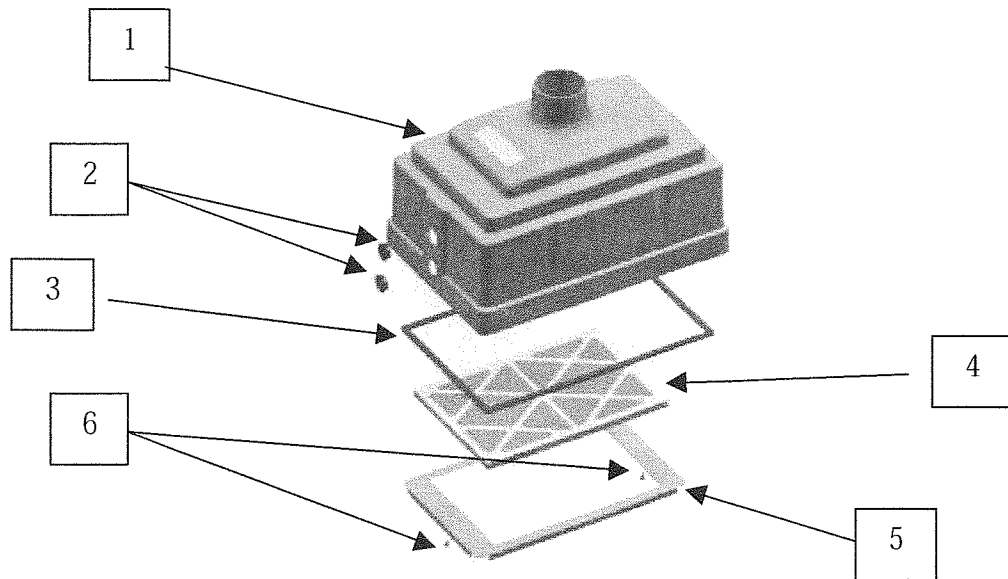


Figure 7

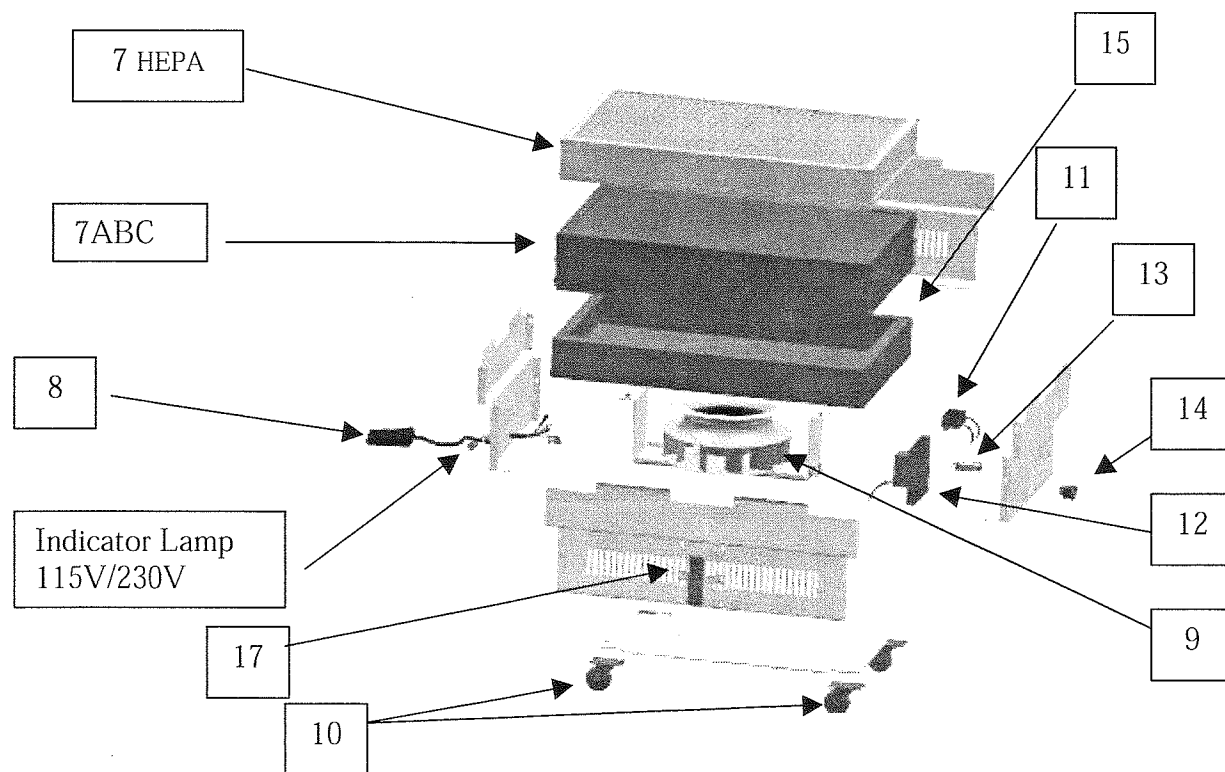


Figure 8

APPENDIX B

PROTECTOR

FILTERMATE

SPECIFICATIONS

This Appendix contains technical information about the Protector FilterMate including specifications, environmental operating conditions, wiring diagrams, dimensions, and evaporation rates.

Electrical Specifications

- Protector FilterMate, (Model 4870000): 4 Amps, 115V, 60 Hz.
- Protector FilterMate, (Model 4870001): 2 Amps, 230V, 50/60 Hz.

Environmental Conditions

- Indoor use only.
- Maximum altitude: 6562 feet (2000 meters).
- Ambient temperature range: 41° to 104° (5° to 40°C).
- Maximum relative humidity: 80% for temperatures up to 88°F (31°C), decreasing linearly to 50% relative humidity at 104°F (40°C).
- Main supply voltage fluctuations not to exceed $\pm 10\%$ of the nominal voltage.
- Transient overvoltages according to Installation Categories II (overvoltage categories per IEC 1010). Temporary voltage spikes on the AC input line that may be as high as 1500V for 115V models and 2500V for 230V models are allowed.

Appendix B: Protector FilterMate Specifications

- Used in an environment of Pollution degrees 2 (i.e., where normally only non-conductive atmospheres are present). Occasionally, however, a temporary conductivity caused by condensation must be expected, in accordance with IEC 664.

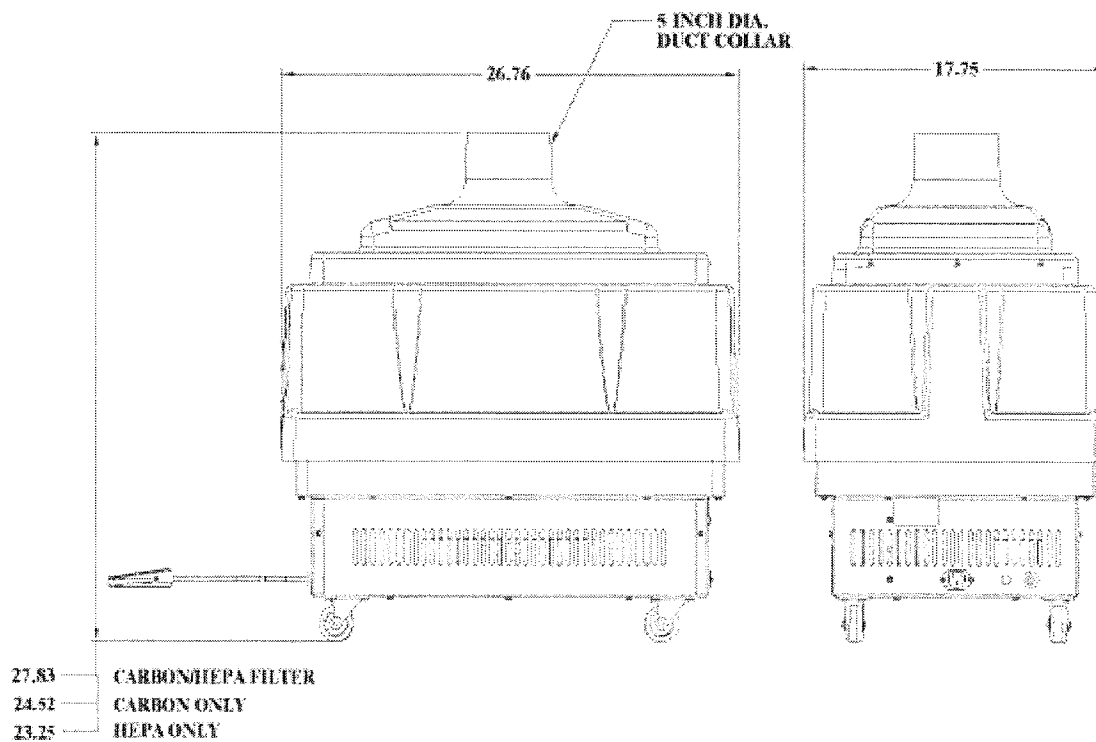
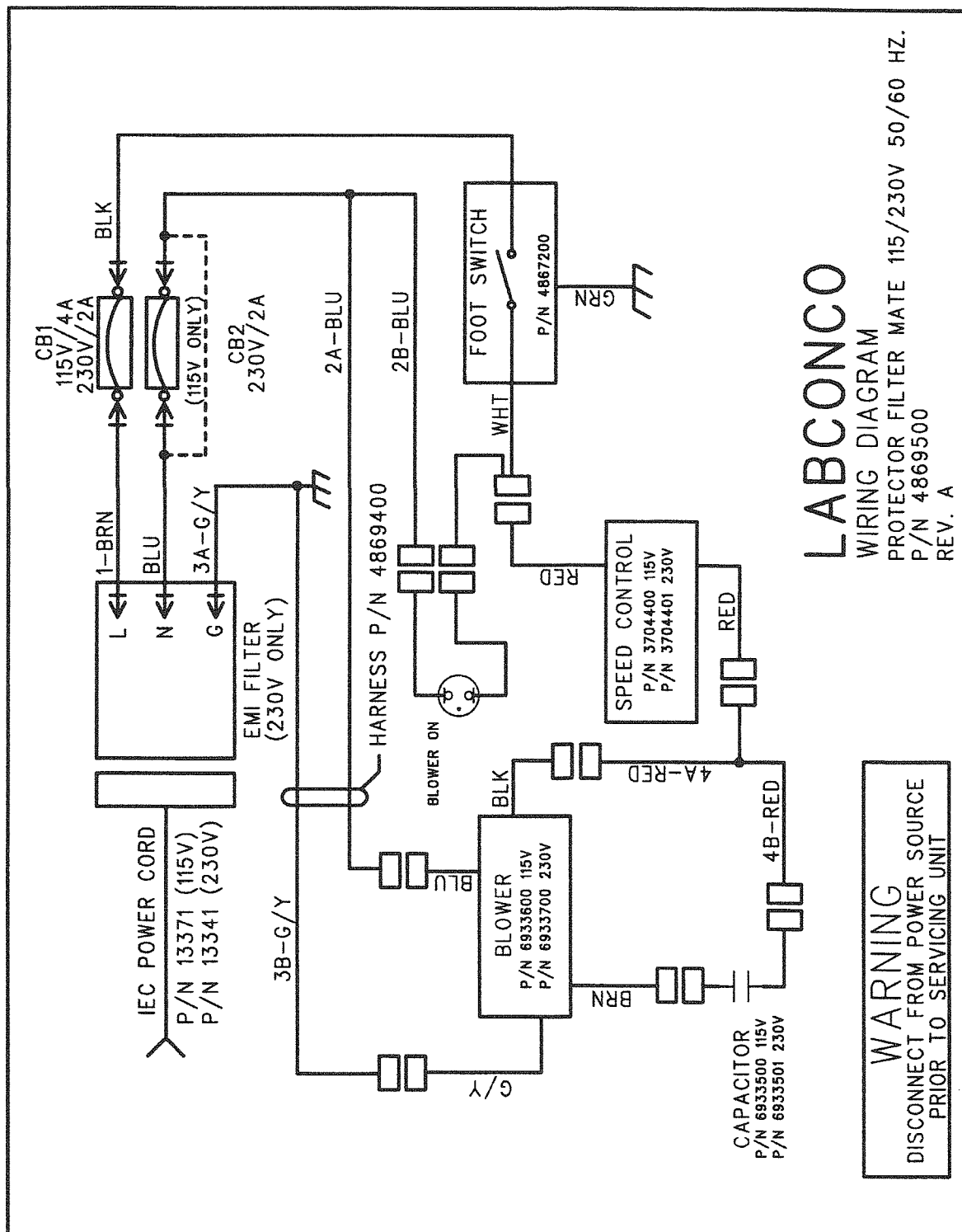


Figure 9

Wiring Diagram -115V Models/230V Models – P/N 4869400



Appendix B: Protector FilterMate Specifications

APPENDIX C

PROTECTOR

FILTERMATE

RESOURCES

The following resources are for you to refer to for your Protector FilterMate.

Pocket Guide to Chemical Hazards
National Institute for Occupational Safety and Health
(NIOSH)
(202) 783-3238

National Draeger, Inc.
101 Technology Drive
P.O. Box 120
Pittsburgh, PA 15230
(414) 787-8383

Sensidyne
16333 Bay Vista Drive
Clearwater, FL 34620
(800) 451-9444

Declaration of Conformity

Application Council Directive(s): 73/23/EEC, 89/336/EEC

Standard(s) to which conformity is declared: EN60950, EN55022, EN50082-1

Manufacturer's Name: Labconco Corporation

Manufacturer's Address: 8811 Prospect Avenue
Kansas City, MO 64132 USA

Importer's Name: See Shipping/Customs Documents*

Importer's Address: See Shipping/Customs Documents for your equipment

Type of Equipment: Laboratory Equipment -Safety Enclosure

Model No.: Protector® FilterMate™

4870000

4870001

Serial No.: Various - See Individual Declaration

Year of Manufacture: 1999 and Subsequent

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).

Place:

(Signature)

Date:

(Full Name)

(Position)

***An individual version of this declaration is included with your shipping/customs documentation.**