

THE BAKER COMPANY

“Creating immaculate atmospheres”

OPERATION AND MAINTENANCE MANUAL

BioChemGARD e3

**Class II, Type B2
Biosafety Cabinet**

**MODEL
BCG401 / BCG601**



This manual includes information for installation, operation, maintenance and spare parts. We recommend that it be kept near the cabinet for ready reference.

THE BAKER COMPANY

INTRODUCTION AND WELCOME

It is a pleasure to welcome you to the growing number of customers who own and operate Baker cabinets and glove boxes. As the inventors of the laminar flow biological safety cabinet and the leaders in the field, Baker people take special pride in providing a cabinet that is designed for maximum performance.

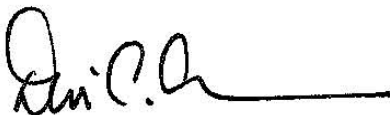
Your new BioChemGARD e3 cabinet includes many unique features which are included to give you superior performance, simpler maintenance and lower life cycle cost. The BioChemGARD e3 is a Class II, Type B2 biosafety cabinet that provides personnel, product and environmental protection. All exterior cabinet seals are under negative pressure. The BioChemGARD e3 is suitable for research and clinical diagnostic work involving tissue culturing of possibly infectious samples, IV drug preparations and other pharmaceuticals that could have adverse health effects on operators as well as other techniques requiring a contamination-free atmosphere.

In addition to the high quality you expect from all Baker equipment, this model has been ergonomically designed to provide the lab user with many exciting design features. The ergonomic design will help prevent repetitive motion injury, reduce fatigue and lab accidents and enhance productivity.

The adequacy of a cabinet for user safety should be determined on-site by an industrial hygienist, safety officer or other qualified person. Remember that you, the owner and user, are ultimately responsible and that you use your cabinet at your own risk.

We recommend that this manual, along with the factory test report, be kept near the cabinet for convenient reference by operators and qualified maintenance personnel. If you have any questions about the use or care of your new BioChemGARD e3 cabinet, please do not hesitate to contact our Customer Service Department at **800-992-2537** for assistance or e-mail us at bakerco@bakerco.com.

Sincerely,



*David Eagleson
President
The Baker Company, Inc.*

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Visit our website at www.bakerco.com

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I – FUNCTION OF THE BioChemGARD e3

BioChemGARD e3 Airflow

The BioChemGARD e3 meets the NSF Standard 49 classification for a Class II Type B2 biosafety cabinet. The BCG exhausts all inflow and downflow air to the atmosphere through an external building exhaust system directly connected to the top of the cabinet. Room air enters the front access opening of the cabinet at a minimum of 100FPM then enters the front work surface perforation. The cabinet supply blower draws room air in at the top rear of the cabinet and pushes it into the supply plenum and through the HEPA/ULPA supply filter. Most of the filtered down flow air passes through a diffuser, creating a unidirectional vertical flow in the work area, but some of the air is dumped down the back of the viewscreen creating a high velocity air curtain at the front access opening. The filtered down flow air in the work area splits at the work surface. Some of the air enters the rear work area perforation while most of the air enters the front work surface perforation. The air is pulled into the drain pan area, through the exhaust HEPA/ULPA filters, then up the rear exhaust plenums, and exits the cabinet to the facility exhaust system through a 12” exhaust collar at the top of the cabinet. [Reference Figure 1]

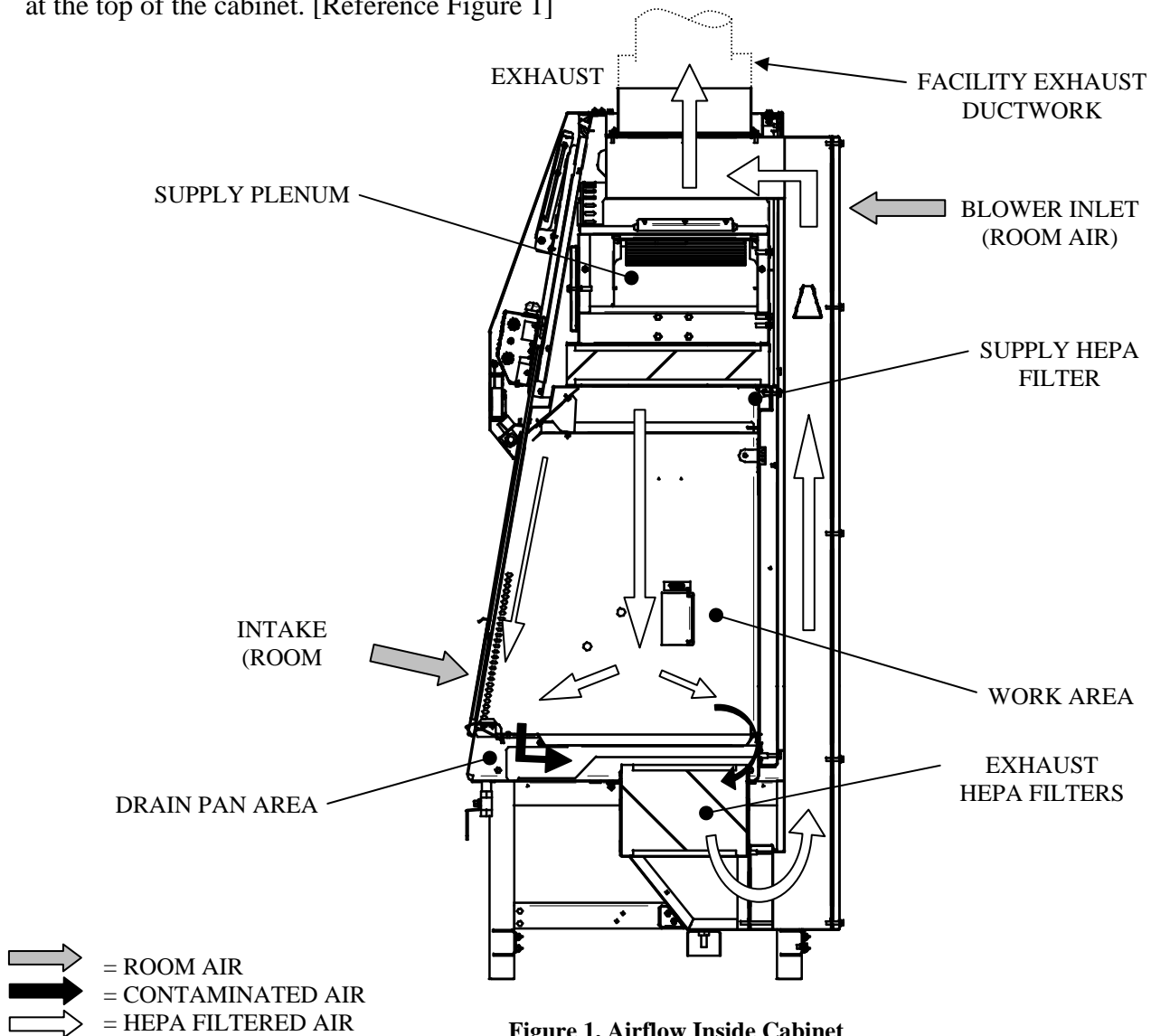


Figure 1, Airflow Inside Cabinet

Standard Features [Reference Figure 2]

- Meets NSF 49 standard for Class II, Type B2 biosafety cabinet.
- HEPA/ULPA filtration of air before it enters the work area.
- Exhaust HEPA/ULPA filters located under work surface for easy removal.
- Front accessibility to electrical components, lamp, blower, and filters.
- ReadySAFE™ operating mode to conserve energy
- Sliding view screen sloped 10 degrees for worker comfort.
- Removable work surface and supports for easy cleaning of the drain pan area.
- Supply filter diffuser/protector.
- Membrane switch control pad.
- GFCI protected duplex (2).
- Fluorescent lamp.
- Petcock on right hand wall.
- Padded armrest.
- Low flow exhaust monitor.
- Cable port – right side

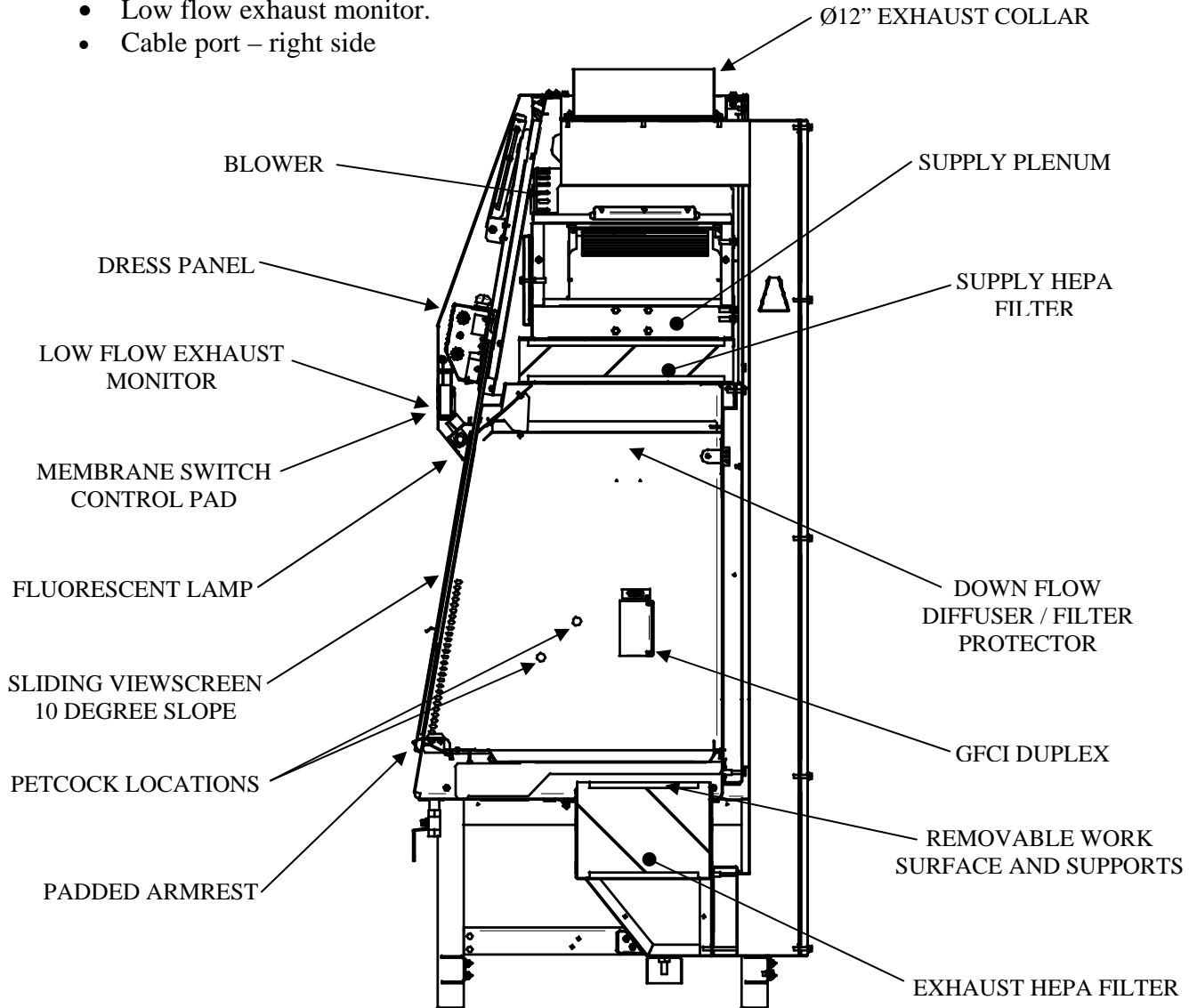


Figure 2, Cabinet Features

Design Details

Cabinet pressure plenums

The cabinet work area is surrounded by negative pressure and all external seals are under negative pressure. The supply plenum only contains room air at a positive pressure.

Motor/blower capacity, Cabinet Supply Blower

The motor/blower capacity of the cabinet is measured by the ability to provide a nearly constant volume of air as the filter resistance to airflow increases. Verification using a simulated supply filter-loading test has established that the BioChemGARD e3 cabinet is capable of automatically handling 420% increase in pressure drop across the filter without reducing total air delivery more than 10%. There is typically no need for manual speed control adjustments for increases in filter resistance. Minor blower speed adjustments may be required for air balancing purposes.

ReadySAFE™ operating mode

The ReadySAFE™ Mode is a feature that reduces the total airflow and energy consumption of the cabinet when it is not being used and the viewscreen is closed. Operation in the ReadySAFE™ mode maintains personnel, product and environmental protection. More detail on this feature can be found in **Section III, Proper Cabinet Use**.

Air balance adjustments

Air balance adjustments should only be made by a qualified technician. The facility exhaust system to the cabinet must be operating at a safe level of air flow for the cabinet supply blower to operate.

The cabinet downflow air is controlled by the setting of the cabinet motor/blower speed controller.

The cabinet intake air flow is controlled by the setting of the external exhaust air flow.

Cabinet HEPA/ULPA filters

The HEPA or ULPA biosafety cabinet filters used in this cabinet have been tested by the manufacturer for minimum particle collection efficiency under the latest version of IEST-RP-CC034. As part of the Baker Company's manufacturing process, each biosafety cabinet filter is integrity tested for leaks greater than 0.01% of the upstream aerosol concentration as stated in the latest version of IEST-RP-CC034.

Easy filter access

For convenience and ease of service, all filters are front accessible. The supply filter is located behind the dress panel in the front of the cabinet. The exhaust filters are located below the work surface. Only qualified technicians should replace filters.

One-piece interior wall construction

The interior side and rear work area walls are constructed from a single piece of 16-gauge stainless steel. It has smooth coved corners to help prevent buildup of contaminants and aid in cleanup.

Front access high velocity air slots

At the intersection of both sidewalls and front access opening there are high velocity air slots. The purpose of the slots is to capture any particulate traveling near the sidewalls and access opening.

All-metal plenums

The plenums are constructed entirely of either carbon or stainless steel in order to provide strength, durability, air-tightness and resistance to deterioration.

Removable recessed stainless steel work surface

The work surface is constructed of corrosion resistant 16-gauge type 304 stainless steel, with a satin finish that diminishes light reflection. It is recessed to retain spills and can be removed along with its supports to gain access to the drain pan and exhaust filters.

Drain pan

The drain pan is designed with smooth coved surfaces in all four bottom corners to facilitate cleaning and disinfection. Drainage is provided by a 1/2" diameter stainless steel ball valve located at the bottom of the drain pan.

Viewscreen

The cabinet's sliding viewscreen is 1/4" [6.35mm] safety plate glass. The viewscreen may be opened to 21" [533.4 mm] (without armrest) for placing of large items in the work area, and may be fully closed for system shutdown or UV light operation. **Note: the armrest must be properly re-installed prior to working in the cabinet.**

Work area lighting

The work area is illuminated by two external fluorescent lamps which provide a minimum of 100 foot-candles of light at the work surface.

Electronic ballast

The BioChemGARD e3 features solid-state electronic ballasts for the fluorescent and UV lights (optional). These ballasts increase reliability, efficiency, and service life with lower heat output.

UniPressure plenum

An all steel positive pressure plenum provides a more even clamping force on the HEPA/ULPA filter frame and helps deliver the down flow air more uniformly. The plenum can be easily elevated for quick filter changing.

Sponge armrest pad

The armrest pad is made out of EPDM sponge material and is resistant to most chemicals and UV exposure. It is held in place with a low tack adhesive so the pad can be easily removed for cleaning. It can also be autoclaved.

Ground fault circuit interrupter

The outlets on the cabinet are protected by a ground fault circuit interrupter (GFCI). The GFCI is designed to protect the operator from some electrical hazards. If the GFCI detects a hazardous condition, it will automatically cut off electricity to all the outlets. The button in the center of the GFCI outlet, typically the left hand outlet, will pop out. To reset the GFCI, correct the cause of the problem, and then

press the reset button on the GFCI.

Adjustable cabinet height

The channel stand has adjustable legs and leg levelers. The legs provide 6” [152.4mm] of height adjustment and the leg leveler provides an additional 2.5” [63.5mm] of height adjustment.

Cable ports

The standard configuration has a cable port located in the cabinet’s right side wall. This provides a way of introducing power and data cables or siphoning tubes into the work area of the cabinet without having to go through the front view screen access opening. An optional cable port may be added to the cabinet’s left side wall. Plugs are provided for use when the ports are not being used or the cabinet is being decontaminated.

UV light (Optional)

The optional ultraviolet (germicidal) lamp is permanently installed in the work area rear wall. See “Ultraviolet Germicidal Lamp” in **Section III, Proper Cabinet Use**.

Fume Hood Configuration (Optional)

The optional Fume Hood Configuration allows the use of the BioChemGARD e3 models to be used as a general purpose Fume Hood. For additional information regarding this option refer to the **Function and Description of the Fume Hood Option** in the Appendix of this manual

Specifications

Weight

The weight of the BioChemGARD e3, Model BCG401/BCG601 cabinet is 720/850 pounds with a shipping weight of 850/1020 pounds.

Electrical Specifications

All electrical wiring to the cabinet should comply with the National Electrical Code and any applicable local electrical codes at the site of installation.

A single 115V AC, 20A, 60Hz, single phase dedicated circuit is required to power this unit. This circuit shall provide the protective earth ground for the cabinet.

The cabinet is internally protected with a 250V, 20A circuit breaker.

Cabinet Ratings:

115V AC, 60Hz, single phase

Typical current less outlets for BCG401 0.6 Amps

Typical current less outlets for BCG601 0.8 Amps

The unit is furnished with one 14ft power cord with 20-amp plug, type NEMA 5-20P.

The power cord is the main disconnect device for the unit. The unit should be positioned in a manner that allows easy access to the power cord connection with the electrical utility.

The cabinet is provided with fluorescent lighting.

The cabinet is provided with two GFCI protected, 115V AC, duplex outlets. The outlet(s) on this circuit

are protected by a self-resetting circuit breaker. This breaker allows 7A total on all outlets.

The cabinet may be provided with an optional UV lamp.

The cabinet may be provided with an optional 24V DC power supply for low voltage options.

Environmental Conditions

The cabinet is designed for use in the following conditions:

- Indoors
- Altitudes up to 2000 meters
- Temperature range from 5°C to 40°C
- Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% at 40°C
- Main supply voltage 115V \pm 10% V AC
- Transient over voltage according to Installation Category (OVERVOLTAGE CATEGORIES) II per UL 61010-1, 2nd Edition
- Pollution Degree 2

Symbols and Terminology



Protective Earth: Any terminal intended for connection to external protective conductor for protection against electric shock in case of a fault.



General Caution: Refer to instruction manual for information regarding personnel and environment protection.

II - PREPARING THE BioChemGARD e3 FOR USE

Checking the Cabinet Upon Arrival

Upon receipt of a new BioChemGARD e3 cabinet, inspect the exterior of the crate, box and/or skid. If there is any visible damage, that fact should be noted on the receiving slip and immediately reported to the delivering carrier.

Remove the outer packing material and inspect the cabinet itself. If any concealed damage is found it should be reported to the delivery carrier. **A claim for restitution should be filed within 15 days.**

Due to the risk of mishandling by trucking companies, Baker has removed certain parts of the cabinet and has packed them separately. These items are listed on the packing slip, which accompanies the cabinet. Please check the packing slip carefully to be sure that all items have been located.

The Uses of a Biological Safety Cabinet

The BioChemGARD e3 has been designed to provide a work area which protects the experiment from the environment, and the environment and operator from the experiment. The laminar flow biological safety cabinet is designed for work with Biosafety Levels 1, 2 and 3 (low to moderate risk) agents as listed in The Center for Disease Control's "Biosafety in Microbiological and Biomedical Laboratories" (U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and National Institutes of Health, U.S. Government Printing Office, Washington, D.C. 20402). (HHS publication number CDC 93-8395).

Biosafety Level 4 or extremely high risk agents should never be used in this cabinet, except in conjunction with a one-piece positive pressure personnel suit ventilated by a life support system within a high containment facility. Please consult your safety professional for a proper risk assessment.

CAUTIONS

- * **The use of any hazardous material in the cabinet requires that it be monitored by an industrial hygienist, safety officer or other qualified individual.**
- * **Explosive or flammable substances should never be used in the cabinet unless a qualified safety professional has evaluated the risk.**
- * **If hazardous biological work is to be performed, apply the enclosed biohazard decal. This is in accordance with OSHA regulations (volume 39, number 125, Part II).**
- * **If chemical, radiological or other non-microbiological hazards are present, be sure to employ appropriate protective measures. Call upon a suitably trained individual to monitor the operation.**

Location Within the Laboratory

Proper placement within the laboratory is essential. The ideal location for any biological safety cabinet is in a dead-end corner of the laboratory away from personnel traffic, vents, doors, windows and any other sources of disruptive air currents. Published research from The Baker Company and unpublished tests performed at the National Cancer Institute show that if a draft or other disruptive air current were to exceed the intake velocity of the cabinet, contamination can enter the work area or escape from it. If additional information is required, contact The Baker Company.

Installing the Cabinet

Installation of this cabinet should be carried out in accordance with appropriate OSHA regulations and those other regulatory agencies having jurisdiction.

To insure operator safety the cabinet must be installed and operated per the manufacturer's instructions.

1. Remove the strapping that holds the cabinet to the pallet.
2. Remove the cabinet from the skid with a forklift or other available equipment.
3. Move the cabinet into the laboratory room. Remove all tape, plastic wrap and other packaging materials on the cabinet.
4. The viewscreen counterweight is located in the rear right of the cabinet. Remove two ¼-20 hex head shipping screws that hold the viewscreen counterweight from moving. Verify that the viewscreen moves freely.
5. Change out shipping hardware with ¼-20 thumb screws provided. A drawing is provided showing the location of the shipping hardware on the cabinet.
6. The adjustable leg levelers for the stand are shipped with the unit in a small cardboard box.
7. Follow the stand adjustment instructions provided in the appendix of this manual to set the cabinet to the worksurface height desired.
8. Position the cabinet in its desired location within the laboratory room. Remove the front stand shipping brace. **Do not remove the rear stand bracing.**

Connecting the Exhaust for Ducting Outdoors

The BioChemGARD e3 cabinet operates with dedicated filtered exhaust ducted to the outdoors. Whenever possible, the cabinet exhaust should be connected to its own separate exhaust system. If it must be ducted into a ganged exhaust system, make sure that the system is not a recirculating one. The cabinet has a low Air Flow Alarm (AFM) that provides audible and visual indication if the cabinets exhaust volume drops to 20% below the exhaust setpoint. The building exhaust system should contain provisions to adjust the building system flow and pressure. The connection between the cabinet and the building exhaust duct is a 12" diameter Hard Exhaust Connection (HEC).

Exhaust Requirements

NSF Concurrent Balance Value

NSF/ANSI 49- 2010a

3.10 Concurrent Balance Value: This value is determined using the duct traverse measurement method as specified in ASHRAE Standard 111-2008, a minimum of 7.5 duct diameters downstream of a direct connected Biological Safety Cabinet (BSC). Prior to determining the concurrent balance value, it shall be confirmed that the cabinet is operating at its nominal set points for inflow and downflow velocity +/- 3fpm. The primary Direct Instrument Measurement (DIM) method shall be used for setting the inflow velocity. The accuracy of the DIM shall be better than or equal to +/- 3% and +/- 7CFM. The static pressure is also measured approximately two duct diameters from the cabinet exhaust connection. Appropriate filter load and tolerance values shall be added to the base static pressure value to accommodate filter loading: 0.3”W.G. shall be added for Type B1 cabinets and 0.7”W.G. shall be added for Type B2 cabinets. The resulting values may be used for design and balance exhaust/supply HVAC requirements.

8”[203MM] Access Opening Model	CBV Required Exhaust Volume CFM[L/SEC]	CBV Required Exhaust Duct Static Pressure “W.C. [PA]		
		8”[203MM] Diameter Duct	10”[254MM] Diameter Duct	12”[305MM] Diameter Duct
BCG401	664 CFM [313 L/SEC]	-1.9 “W.C. [-473 PA]	-1.7 “W.C. [-423 PA]	-1.6 “W.C. [-399 PA]
BCG601	993 CFM [469 L/SEC]	-2.3 “W.C. [-573 PA]	-1.8 “W.C. [-448 PA]	-1.7 “W.C. [-423 PA]

CBV=Concurrent Balance Value
 CFM= Cubic Feet per Minute
 L/SEC= Liters per Second
 PA= Pascal
 MM= Millimeter
 “W.C. = Inches of Water Column

Final Connections and Tests

1. The plumbing connection to the service petcocks must be made with great care because the effluent from a safety cabinet may be biologically hazardous. The facility safety officer should be consulted regarding these connections to assure they are properly connected and filtered if required. When present, petcocks are piped within the cabinet. The external connection uses 3/8” compression fitting at the rear, top or bottom of the cabinet outer sidewall seal panel. Qualified personnel with proper materials and technique should make connection to plant utilities per NFPA. **Flammable gas should not be piped into any cabinet.** However, if the risk is professionally evaluated and a decision is made to install a flammable gas petcock, then an emergency shut-off valve should be situated in an accessible location *outside* the cabinet.

2. A 20 amp power cord with a NEMA 5-20P plug is furnished with the cabinet. It should be plugged into a 115V AC, 60Hz, 20A dedicated utility outlet.
3. Thoroughly clean the interior of the cabinet. Locate the viewscreen at the correct opening height (8”).

NOTE: See Section III - PROPER CABINET USE “Operator Controls” for information regarding steps 4, 5, & 6 below.

4. Turn on the blower. The indicator light will illuminate and the running blower will make a soft audible sound.
NOTE: Building exhaust system airflow must be at a safe level for cabinet blower to operate.
5. Turn on the fluorescent light. The indicator light will illuminate along with the interior work area.
NOTE: The fluorescent light will not operate unless the blower switch is on. The fluorescent light will not operate when the viewscreen is closed.
6. If your cabinet has been purchased with the optional ultraviolet light (UV), lower the viewscreen to its fully closed position and turn the UV light on to make sure it is operational.
NOTE: The UV light option features an interlock that prohibits its operation unless the viewscreen is fully closed.
7. Although all units are carefully tested at the factory, it is advisable that certain other checks are made on-site by a qualified technician after installation. These include testing the filters for leaks and checking the air balance of the cabinet. A description of these tests can be found in **Section IV - ONSITE CHECKS AND MAINTENANCE PROCEDURES.**
8. It is recommended that all personnel who will be using the cabinet study this manual to learn how to use it effectively. For additional start up and use procedures, reference **Section III - PROPER CABINET USE.**

FOR MORE INFORMATION

For a complete listing of articles, papers and reports related to containment, clean air products and safety, contact The Baker Company for our complete bibliography or visit our website at www.bakerco.com.

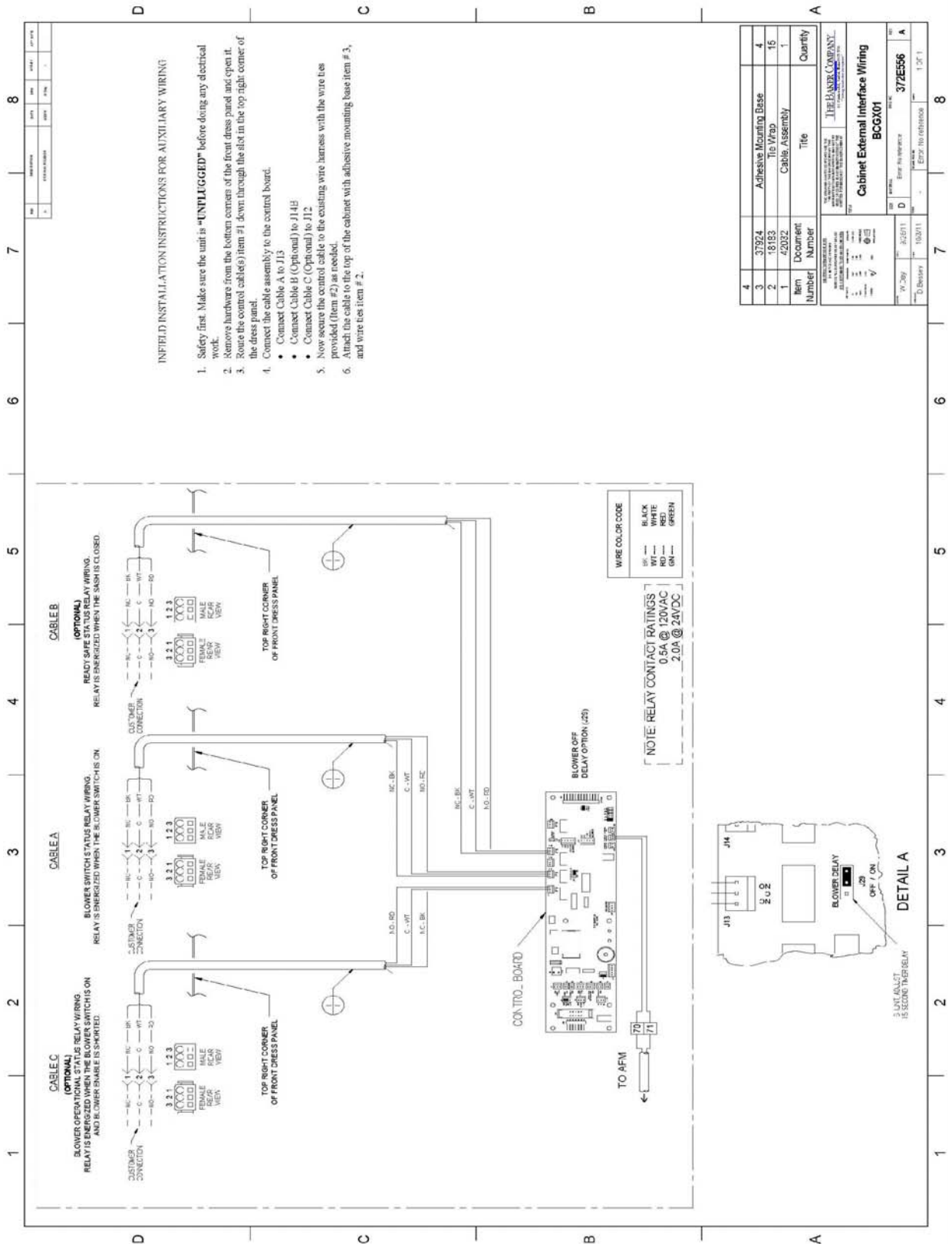
Auxiliary Wiring Options

All BCG401/BCG601 units will have the Auxiliary Blower Switch Status Wiring installed as a standard configuration. This package includes wiring that connects to the blower switch status relay. Refer to the General Arrangement Drawings for locations. This wiring allows the customer to connect the unit to an external system to monitor the switch status or to connect to a control circuit for an external blower or damper in their exhaust system.

When the customer wants to monitor additional conditions in the unit, they can order the optional ReadySAFE™ Status Relay Wiring and/or Blower Operational Status Relay Wiring. These connections allow the customer to connect to their external systems or control circuits.

The Auxiliary Wiring Options are detailed in Drawing 372E556.

Auxiliary Wiring Options



INFIELD INSTALLATION INSTRUCTIONS FOR AUXILIARY WIRING

1. Safety first. Make sure the unit is "UNPLUGGED" before doing any electrical work.
2. Remove hardware from the bottom corners of the front dress panel and open it.
3. Route the control cable(s) item #1 down through the slot in the top right corner of the dress panel.
4. Connect the cable assembly to the control board.
 - Connect Cable A to J13
 - Connect Cable B (Optional) to J14
 - Connect Cable C (Optional) to J12
5. Now secure the control cable to the existing wire harness with the wire ties provided (item #2) as needed.
6. Attach the cable to the top of the cabinet with adhesive mounting base item #3, and wire ties item #2.

Item Number	Document Title	Quantity
4		
3	37924 Adhesive Mounting Base	4
2	18183 Tie Wrap	15
1	42032 Cable Assembly	1
	Item Number	Title
	Quantity	Quantity

THE PAPER COMPANY 10000 W. 10TH AVE., SUITE 100 DENVER, CO 80231	
Part No. 372E556 Description Cabinet External Interface Wiring BCGX01	Rev. A Date 10/21/11 Drawn by 372E556 Checked by 10/21/11

III - PROPER CABINET USE

A biological safety cabinet is a valuable supplement to good sterile technique, but is not a replacement for it.

If the cabinet is not understood and operated correctly it will not provide an adequate protective barrier. To ensure operator safety the cabinet must be installed and operated per the manufacturer's instructions.

All activities that are to be performed in this cabinet should first be approved by a competent professional, such as an industrial hygienist or safety officer, to make sure that the cabinet is appropriate for the work it will be required to do. This person should monitor the cabinet and its operating personnel at regular intervals to ensure that it is being used correctly.

In order to keep the interior work area clean and free of particulates, all Baker biosafety cabinets are designed for continuous operation. If the blower is turned off, the work area will become contaminated with room air. Therefore it is recommended that the blower be left on at all times.

Operator Controls

The operator controls with indicators are arranged on the front dress panel of the cabinet. A number of switches are arranged in a single membrane switch assembly. [Reference Figure 2]

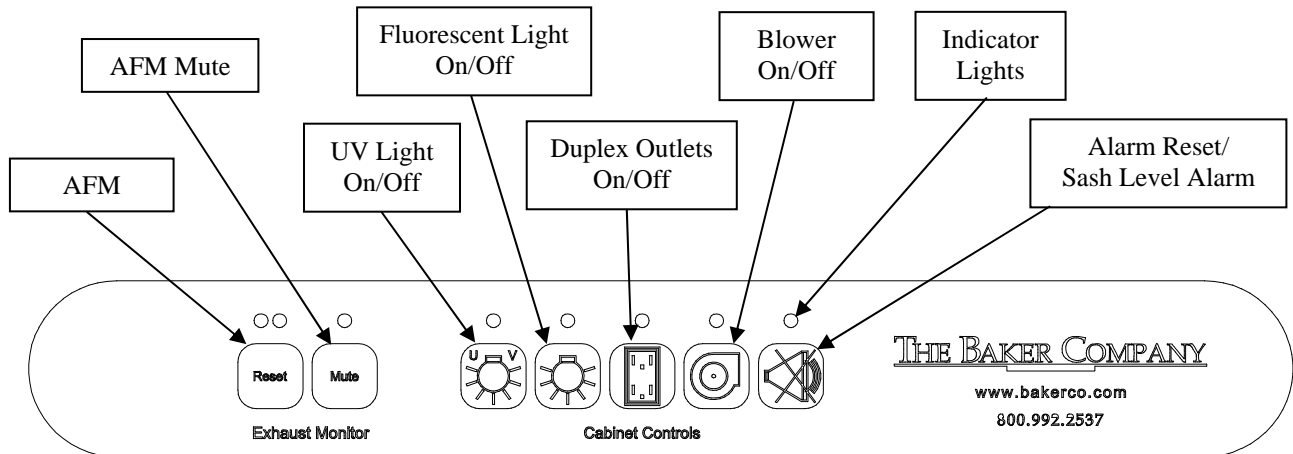


Figure 2, Operator Controls

- Ultraviolet (UV) Light On/Off [Optional] – This switch controls the UV light inside the work area if the UV light option is installed. **The viewscreen must be fully closed before the UV light will turn on.** A yellow indicator light located above the switch will illuminate when the switch is on. The UV light will automatically shut off if the viewscreen is opened.

- Fluorescent Light On/Off – This switch controls operation of the fluorescent light. A blue indicator light located above the switch will illuminate when the switch is on. **The cabinet blower must be on for the fluorescent light to operate. The fluorescent light will not operate when the viewscreen is closed.**
- Duplex Outlets On/Off – This switch controls the duplex outlets in the work area. A blue indicator light located above the switch will illuminate when the switch is on.
- Blower On/Off – This switch controls the power to the cabinet blower. A green indicator light located above the switch will illuminate when the switch is on.
- Alarm reset/Sash Level Alarm – For normal operation, the viewscreen must be placed at the allowable opening of 8". The sash alarm will be activated whenever the viewscreen is positioned at an unsafe level. To mute the audible alarm, press the alarm reset button. The indicator light located above the switch will continue to flash. After five minutes, if the alarm condition is not corrected, the alarm will sound again to remind you to reposition the viewscreen to its proper level. You may press the alarm reset switch again to mute the audible alarm for an additional five minutes.
- AFM Mute – This switch is for muting the AFM Audible Alarm when either a low exhaust flow condition exists during normal cabinet operation (viewscreen at 8 inch opening) or when there is a low exhaust condition in Ready Safe mode (viewscreen closed). The Mute time is set for 5 minutes. If the alarm condition is not corrected the Audible Alarm will reactivate at the end of the 5 minute mute time.
- AFM Reset – This switch is used to reset/acknowledge the AFM alarm conditions. When an alarm condition has occurred and has been corrected, the alarm indicators will be ON. Pressing the AFM Reset switch will turn the indicators OFF.

Alarm Conditions

Standard cabinets utilize the sash alarm; however three more alarms are also indicated. Below are brief descriptions of each of the alarm conditions that may be present on your cabinet. Additional information can be found by referencing the Troubleshooting Guide for Standard Board, *Dwg-503E505*, in the appendix of this manual.

The Sash Alarm occurs when the view screen is not at a safe operating position and alerts the user with a visual and audible alarm once per second. There is a 3 second delay before the alarm activates, to allow the end user time to move between safe operating positions. Pressing the mute button on the keypad will stop the audible alarm, however the visual alarm will continue until the view screen is placed at an appropriate level. If the sash position is not corrected, the audible alarm will return in five minutes.

The Power/processor Fault Alarm occurs when the system experiences a power outage or the microcontroller processor has a fault. This alarm can be enabled by placing a jumper on J22 of the control board. An indication of this fault is a visual and audible alarm of three 1 second alarms followed by a two second delay. This cycle is repeated until the alarm condition is cleared by pressing the mute key. Relay K4 will be inactive with LED 14 OFF when in alarm, and energized with LED 14 ON when no alarm is present.

The Double Proximity Sensor Fault alarm occurs when both Sash Position proximity sensors are activated simultaneously. This is a condition that should not be able to occur in normal operation. A visual and audible alarm four times per second indicates this fault condition. Below is a table which will help to determine which proximity switch is at fault:

SASH POSITION	LED 1 - ON	LED 2 - ON
CLOSED	FAULT	NORMAL
SAFE OPERATING POSITION	NORMAL	FAULT
FULLY OPEN	FAULT	FAULT

ReadySAFE™ Operation

The ReadySAFE™ Mode is a feature that reduces the total airflow and energy consumption of the cabinet when it is not being used. Operation of the cabinet in ReadySAFE™ Mode maintains personnel, product and environmental protection. The ReadySAFE™ Mode is activated when the viewscreen is in the fully closed position. While the ReadySAFE™ mode is active the blower speed will be reduced and the fluorescent lights automatically turn off. When the sash is returned to safe operating height the cabinet airflow will return to the original set point. The fluorescent light can then be turned on. In order for the ReadySAFE™ feature to be enabled there must be a jumper installed on J23 of the control board. Further reference to connections on the control board can be found in the Auxiliary Wiring Options section of this manual.

Air Flow Monitor Functions

AFM adjustment should only be performed by a qualified certification company or biological safety professional.

The Air Flow Monitor (AFM) is located behind the cabinet dress panel on the right side of the cabinet. The indicators and control pushbuttons are located on both the AFM instrument and on the cabinet operator controls located on the front of the cabinet dress panel. The AFM is a thermal air monitoring device. The air flow probe is located in the air plenum on the back of the cabinet and is accessible from the front of the cabinet by removing the motor/blower assembly.

The AFM is designed to monitor the air flow and provide audible and visual alarms in both normal operation and ReadySAFE™ operation. The instrument has the following indicators and controls: there are four LED indicators, a green Power indicator, a red Alarm indicator, a yellow ReadySAFE™ alarm indicator and a blue Mute indicator. There is an audible alarm. There are two pushbuttons, one to reset Alarm conditions, and one to Mute the audible alarm. There are two adjustment potentiometers, one for the normal operation alarm point and one for the ReadySAFE™ alarm point. The Alarm, ReadySAFE™, and Mute indicators as well as the Alarm reset and Mute pushbuttons are duplicated on the cabinet operator controls located on the front of the cabinet. The instrument also has two isolated Form C relay outputs to allow connection with other devices or systems. One relay is associated with the normal operation alarm, the other relay is associated with the ReadySAFE™ operation alarm.

There are no time delays programmed into the AFM control. The airflow probe may have an approximately 4 second delay responding to a large change in airflow. This is due to the thermal properties of the air flow sensor.

The function of the AFM LED indicators is as follows:

LED operation at Start Up:

When power is applied to the AFM the red Alarm LED, yellow ReadySAFE™ Alarm LED and blue Mute LED will be ON solid for approximately 20 to 30 seconds. This is an indication that the AFM is powered but is not monitoring the airflow alarm conditions. This time is essentially the time necessary for the thermal properties of the air flow probe to stabilize and provide an accurate reading.

Green Power LED:

This LED indicates that power is applied to the AFM. When power is first applied or if a power interruption has occurred this LED will flash. Pressing the Alarm Reset pushbutton with power applied changes the LED to solid ON operation.

Red Alarm LED:

This LED indicates the alarm condition when the cabinet is in its normal operating mode with the sash/viewscreen open. During normal operation this indicator is OFF. When an alarm condition exists, this indicator will flash at a fast rate. If the alarm condition clears before being acknowledged by pressing the Mute pushbutton, the indicator will change to solid ON. Pressing the Alarm Reset pushbutton once the alarm condition has cleared will change the indicator to its normal OFF condition.

Yellow ReadySAFE™ Alarm LED:

This LED indicates the alarm condition when the cabinet is in the ReadySAFE™ operating mode with the sash/viewscreen closed. During normal ReadySAFE™ operation this indicator is OFF. When an alarm condition exists, this indicator will flash at a fast rate. If the alarm condition clears before being acknowledged by pressing the Mute pushbutton, the indicator will change to solid ON. Pressing the Alarm Reset pushbutton once the alarm condition has cleared will change the indicator to its normal OFF condition.

Red and Yellow LEDs:

When an equipment problem exists, that is, a missing air flow probe or the remote display cable is disconnected, the Red and Yellow LEDs will alternately flash at a fast rate. When the equipment problem is corrected, both the Red and Yellow LEDs will be ON solid. Pressing the Alarm Reset pushbutton once the alarm condition is corrected will change the indicators to the normal OFF condition.

Blue Mute LED:

This LED indicates that the Audible Alarm has been muted. The Mute LED flashes at a fast rate while the Audible Alarm is muted.

The function of the Audible Alarm is as follows:

During normal operation the Audible Alarm is OFF. When an alarm condition exists in either the normal or ReadySAFE™ operating mode, or in the case of equipment issues, the Audible Alarm will ‘beep’ at a fast rate. If the alarm condition clears before being acknowledged by pressing the Mute pushbutton the Audible

Alarm will change to ‘beeping’ at a slower rate. Pressing the Mute pushbutton will silence the Audible Alarm for approximately 5 minutes

The function of the AFM Pushbuttons is as follows:

Alarm Reset pushbutton:

The Alarm Reset pushbutton is used to acknowledge a power interruption condition. Pressing the Alarm Reset pushbutton when the AFM is powered and the green LED is blinking will change the green LED to solid ON.

The Alarm Reset pushbutton is used to acknowledge or reset the indicated alarm condition of either the normal or ReadySAFE™ operation. If an alarm condition currently exists, pressing the Alarm Reset pushbutton will have no effect on the displayed alarm indications. If an alarm condition has existed, but is has cleared or has been corrected, pressing the Alarm Reset pushbutton will clear both visual and audible alarm indications.

Mute pushbutton:

The Mute pushbutton is used to silence the Audible Alarm when an alarm condition exists. When the Audible Alarm is ON, pressing the Mute pushbutton will silence the Audible Alarm for approximately five minutes. If the alarm condition continues to persist, the Audible Alarm will return. The Mute pushbutton can be used to repeatedly silence the Audible Alarm in five minute increments.

The function of the Alarm Setting Potentiometers is as follows:

When adjusting the alarm setpoints, first turn the Alarm Setting Potentiometers fully clockwise (CW).

In order to set an alarm setpoint the cabinet airflow must be set to an alarm condition. With the cabinet airflow at an alarm condition rotate the respective Alarm Setting Potentiometer counter clockwise (CCW) until the respective Alarm LED indicates an alarm condition. This will be close to the alarm setpoint. In the case of the normal operation alarm this will turn off the cabinet blower, so the airflow will change. Turn the Potentiometer very slightly CW. Return the airflow to the cabinet setpoint, then reduce the airflow gradually until the alarm condition occurs. If this is at the proper point no further adjustment is needed. This procedure may need to be repeated a few times to achieve the desired alarm setpoint.

For more detailed information on setting the alarm setpoints refer to the Factory Test Report that was shipped with the cabinet.

The function of the Alarm Relays is as follows:

The Alarm Relays are an isolated Form C (Normally Open [NO], Common [C], Normally Closed [NC]) relay. When power is applied the relays are not energized for approximately 20 seconds, indicating an alarm state. At that point they will respond to the conditions indicated by the measurement from the air probe and the AFM alarm circuitry. If an alarm condition exists the relays will not be energized. If no alarm condition exists the relays will be energized which changes the state of the relay (i.e. [NO] contact changes to closed [NC], etc).

The relay contact electrical specification is 1 Amp at 30V DC, and 0.5 Amp at 125V AC (resistive).

Programmable Delay Off Time Function

The following procedure can be used to program a Delay Off time for UV, outlets or fluorescent lights. There is no delay programmed when the unit is shipped from the factory.

NOTE - The device to be programmed should be in the OFF condition before you start programming.

15 minute increment programming:

1. Press and hold the pushbutton of the device you want to program.
2. In about 3 seconds you will hear a short 'beep'. This indicates that you have turned the device ON, are in the programming mode for the device and have programmed it to turn OFF in 15 minutes. Release the pushbutton.
3. Each subsequent press of the device pushbutton while in the programming mode will add 15 minutes to the Delay Off time. (i.e. pressing the pushbutton 3 additional times would set the delay to 60 minutes, 15 minutes initially plus 3 x 15 minutes additional delay times).
4. The device control will remain in the programming mode for about 4 seconds if the pushbutton is not pressed.
5. Once the programming mode for the device has ended the device can be turned OFF normally, if desired, by pressing the device pushbutton.
6. The programmed device will turn OFF automatically at the end of the Delay Time.
7. Each time a programmed device is turned off manually or automatically the programming is cleared and must be reentered, if desired.

1 hour increment programming:

1. Press and hold the pushbutton of the device you want to program.
2. In about 3 seconds you will hear a short 'beep'. Continue to hold the pushbutton. In about an additional 3 seconds you will hear a longer 'beep'. This indicates that you have turned the device ON, are in the programming mode for the device and have programmed it to turn OFF in 1 hour. Release the pushbutton.
3. Each subsequent press of the device pushbutton while in the programming mode will add 1 hour to the Delay Off time. (i.e. pressing the pushbutton 3 additional times would set the delay to 4 hours, 1 hour initially plus 3 x 1 hour additional delay times).
4. The device control will remain in the programming mode for about 4 seconds if the pushbutton is not pressed.
5. Once the programming mode for the device has ended the device can be turned OFF normally, if desired, by pressing the device pushbutton.
6. The programmed device will turn OFF automatically at the end of the Delay Time.
7. Each time a programmed device is turned off manually or automatically the programming is cleared and must be reentered, if desired.

Start-up Procedure

1. Make sure that the building exhaust system is operating properly and the cabinet AFM is not in alarm. If the cabinet has not been left running continuously, then turn on the cabinet blower. An indicator light located above the switch will illuminate when the switch is on. Listen for the soft sound of the cabinet blower running. If equipped with an optional magnehelic gauge, check the readings on it, it should have a pressure reading consistent with the last time the cabinet was on.

2. Turn on the fluorescent light. **NOTE: The Fluorescent Light will not operate unless the blower switch is on. The fluorescent light will not operate unless the viewscreen is opened.**
3. Check to determine that the drain valve is in the closed position or the drain coupling is capped.
4. If your cabinet has been purchased with the optional ultraviolet light (UV), lower the viewscreen to its fully closed position and turn the UV light on to make sure it is operational. **NOTE: The UV light option features a safety interlock that prohibits UV operation unless the viewscreen is fully closed.**
5. Wipe down the interior area of the cabinet with surface disinfectant. **NOTE: Some disinfectants, such as bleach or iodine, may corrode or stain the steel surfaces. Good practice is to thoroughly clean the surface afterward with a detergent and rinse with sterile water to prevent corrosion.**
6. Place all materials to be used for the next procedure inside the cabinet on the solid work surface. **Disinfect the exterior of these materials prior to placing them on the work surface.** Everything required (and nothing more) should be placed in the cabinet before beginning your work so that nothing passes in or out through the air barrier, until the procedure is completed. Implements should be arranged in the cabinet's work area in logical order so that clean and dirty materials are segregated, preferably on opposite sides of the work area. Blocking the front and rear perforated grilles must be avoided. If wipes or absorbent towels are used on the work surface, be sure to keep them away from the grilles.
7. After equipment is in place inside the cabinet, adjust the sliding viewscreen so it is open to the correct opening height (8"). An alarm will signal if the viewscreen is not at a safe level. This is important to maintain proper cabinet airflow.
8. Begin working in the cabinet only after it has run for at least three minutes with the viewscreen in the proper position.

Working in the Cabinet

- Hands and arms should be washed thoroughly with germicidal soap both before and after work in the cabinet. Operators are encouraged to wear long-sleeved gowns or lab coats with tight-fitting cuffs and sterile gloves. This minimizes the shedding of skin flora into the work area and protects hands and arms from contamination.
- Perform all work on the recessed area of the solid work surface. Work with a limited number of slow movements. Since all of the equipment needed should already be in the cabinet, it should not be necessary to move arms in and out through the air barrier.
- Because opening and closing doors in the laboratory causes air disturbance which might interfere with cabinet airflow, this kind of activity should be kept to a minimum while the cabinet is in use. Personnel should also avoid walking by the front of the cabinet while it is in use.
- Avoid using floor-type pipette discard canisters. It is important that used pipettes be discarded into a

tray or other suitable container inside the cabinet. This reduces the temptation to move in and out of the work area unnecessarily.

- Because of the restricted access, pipetting within the cabinet will require the use of pipetting aids.
- Use good aseptic technique. Procedures done with good technique and proper cabinet methods will not require the use of a flame. If, however, a safety officer approves the use of flame after evaluating the circumstances, then a burner with a pilot light such as the "Touch-O-Matic" should be used. Place it at the rear of the work area where the air turbulence caused by the flame will have the least possible effect. Flame disturbs the unidirectional airstream and also contributes to the heat load. If the cabinet blower is unintentionally turned off, the flame could also damage a filter.
- Tubing for a burner within the cabinet should be resistant to cracking or puncture. Material such as Tygon tubing is not acceptable for this use.
- **Never operate a cabinet while the viewscreen alarm indicator is on.** The operating position of the sash provides an 8" access opening. This restricted opening permits optimum operating conditions for the cabinet. Because operators will not all be the same height, it is suggested that the operator use a chair that may be adjusted for height.
- After a procedure has been completed, all equipment that has been in contact with the research agent should be enclosed, and the entire surface decontaminated. Trays of discarded pipettes and glassware should be covered. The cabinet should then be allowed to run for at least three minutes with no activity so that the airborne contaminants will be purged from the work area. Next, make sure that all equipment is removed from the cabinet.
- After all materials have been removed, culture apparatus, etc., decontamination of the interior surfaces should be repeated. Check the work area carefully for spilled or splashed nutrient that might support bacterial growth. **Never use the cabinet to store supplies or laboratory equipment.**
- It is recommended that the cabinet be left running continuously to ensure containment and cleanliness. If the user elects to turn the cabinet off at the end of a work session, the window should be closed completely. The sash alarm will be silenced when the window is in the fully closed position.

Reacting to Spills

Spills should be cleaned immediately to prevent cross contamination to the work and to avoid any damage to the stainless steel surfaces.

It is recommended that the researcher, in coordination with their consulting safety professional, have a written plan available in case of an accidental exposure or spill. The safety plan should include all of the emergency procedures to be followed in the event of an accident. All employees who use the cabinet should be familiar with the safety plan.

Cable Ports

The standard cabinet has a cable port located in the right sidewall. Cable ports in both the left and right sidewall is an available option. Cable ports provide a way of introducing power and data cables or siphoning tubes into the work area of the cabinet without having to go through the front viewscreen access opening. A plug is provided for each port, for when the port is not being used, or for when the cabinet is being decontaminated.

It is important not to overload the port with too many cables/tubing (a bundle approximately 1-1/8" in diameter maximum). Cables/tubing in the work area need to be held off the work surface using cable port clips provided. The clips are located along the interior rear work surface. They keep the cables/tubing from affecting the airflow in the work area, placing unwanted stress on the cable port gaskets, and interfering with the use of the work surface area. [Reference **Cable Port Illustration** in appendix]

Ultraviolet Germicidal Lamp (optional)

WARNING

- **UV light is hazardous, DO NOT defeat the interlock!**
- **Eyes and skin should not be exposed to direct ultraviolet light.**
- **Ultraviolet light should not be relied upon as the sole decontaminating agent. Additional surface disinfection should be performed both before and after every cabinet use.**
- **A biological safety cabinet acts as a supplement to good aseptic practices, not as a replacement.**

Decontamination

Whenever maintenance, service or repairs are needed in a contaminated area of your cabinet, the cabinet must first be decontaminated with an appropriate agent. The National Institute of Health, National Cancer Institute and the Centers for Disease Control have all recommended the use of formaldehyde gas for most microbiological agents. Its application requires individuals who are experienced in the decontamination of cabinets, since the gas itself is toxic.

A good reference for this procedure is the most current NSF/ANSI Standard 49-Annex G "Recommended Microbiological decontamination Procedures", NSF International, 789 North Dixboro Road, P.O. Box 130140, Ann Arbor, Michigan 48113-0140. NSF/ANSI 49 describes procedures for decontamination using either depolymerized paraformaldehyde or chlorine dioxide. Decontamination using alternative methods, such as vaporous hydrogen peroxide (VHP) should be thoroughly evaluated prior to use.

Have the proper safety equipment (gas masks, protective clothing, etc.) within easy reach for whatever gas you choose. In addition, you will want to be sure that the gas you are using will be effective against all of the biological agents within the cabinet. When you have decided which gas to use, post the antidote to it in a visible and nearby location. The volumes of the BCG401 & BCG601 cabinets are 52 and 80 cubic feet respectively. Provide the correct amount of decontaminating gas for this volume.

Carcinogens and other toxins present a unique chemical deactivation problem and the standard biological decontamination will not, of course, be effective against chemicals or other non-biological materials. With materials of this kind, consult a qualified safety professional.

Microbiological decontamination

WARNING
Only qualified technicians should perform this procedure.

Much of the information for microbiological decontamination was taken from NSF/ANSI 49, Annex G.

Space decontamination is mandatory when maintenance work, filter changes, and performance tests require access to any contaminated portion of the cabinet. All work surfaces and exposed surfaces should be decontaminated with a suitable surface disinfectant before certification tests are performed and before gaseous decontamination takes place. In addition, it may be desirable to perform gaseous decontamination of the entire cabinet before performing certification tests when the cabinet has been used with agents assigned to biosafety Level 2, and is recommended when the cabinet has been used with an agent assigned to biosafety Level 3. A qualified safety and risk assessment of cabinets potentially contaminated with biological agents should be performed by a biosafety officer or qualified safety professional. Appropriate decontamination (space and/or surface) should be performed before BSCs are moved to another location. Additionally, after spills and splashes of research agents, contaminated surfaces should be suitably decontaminated.

BSCs must be decontaminated prior to decommissioning and salvage, before physically moving the cabinet and whenever maintenance work or filter changes or performance tests require access to any contaminated portion of the cabinet.

Biological decontamination

Surface decontaminate accessible work area surfaces with either chlorine dioxide, hydrogen peroxide, or formaldehyde. Rinse work area surfaces with water and then wipe dry. Use formaldehyde gas or an acceptable alternative space decontamination procedure to decontaminate the HEPA/ULPA filters and cabinet interior spaces. Remove and discard all HEPA/ULPA filters and any pre-filters using approved methods. Rinse work area surfaces with water and wipe dry.

Chemical, radiological, oil, or heavy metal decontamination

Surface decontaminate accessible work area surfaces with an appropriate disinfectant and/or cleaning agent wipe down. Use formaldehyde gas or an acceptable alternative space decontamination procedure if biological agents may be present. Rinse work area surfaces with water and wipe dry. Remove and discard all HEPA/ULPA filters and any pre-filters using approved methods.

Decontamination procedure using paraformaldehyde

Caution
Only qualified technicians should perform this procedure.

All sources of hydrogen chloride must be removed from the cabinet before decontamination. Hydrogen chloride in the presence of formaldehyde, at ambient air conditions, will form the carcinogen Bis(chloromethyl)ether (BCME).

Important

When paraformaldehyde is used for gas decontamination, follow OSHA Regulations Code of Federal Regulations, Title 29, Formaldehyde-1910-1048, which addresses monitoring, posting of regulated areas, respirator selection, protection and fit testing, medical surveillance, hazard communication and training and recordkeeping.

1. While the cabinet and building exhaust are running, surface decontaminate the inside of the window and all other surfaces on the view screen assembly.
2. Turn off the cabinet blower but leave the building exhaust running.
3. Close the viewscreen. Use a $\frac{3}{8}$ " nut driver or wrench, to remove the $\frac{1}{4}$ -20 hex screws located on either side of the front dress panel.



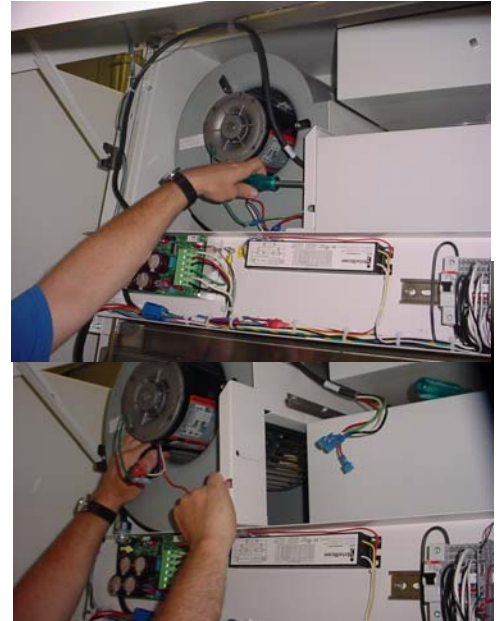
4. Once the hardware is removed, grasp the lower portion of the front dress panel and lift outwards, then up approximately 45 degrees. Lower the left and right hand panel rests into position.



5. Extend both panel rests to provide clearance for removal of the cabinet blower.



6. Remove the supply blower assembly. **Take note of wiring colors for proper reconnection.** Disconnect electrical wiring and remove (1) $\frac{1}{4}$ - 20 x $\frac{3}{8}$ " hex screw.
7. Slide supply blower assembly out towards the front and carefully remove from the cabinet.



8. If decontamination of the exhaust transition is not required then a seal plate is provided to cap the supply plenum. It is located on the front of the supply plenum. The (2) $\frac{1}{4}$ -20 hex screws holding it in place can be used to attach it over the opening in the supply plenum. (Skip steps 9 through 11)



9. To promote decontamination of the cabinet filters and exhaust transition requires a means to recirculate the exhaust airflow back into the cabinet. The Baker Company offers an optional Decon Loop Kit that can provide the necessary recirculation.
10. Install the decon loop blower assembly over the supply plenum opening.



11. While the building exhaust is running, remove the 4" diameter decon loop cover on the exhaust transition. It is located up above the supply plenum on the left side of the exhaust transition. Attach the 4" diameter flange coming off the decon loop blower hose.
12. Remove the front armrest assembly and place it in the work area for decontamination by lifting work surface using corner pull tabs. Roll armrest assembly inward to clear armrest locking tabs. Place armrest on work surface near front perforated grill.



13. Remove both the right and left hand lower sash tracks by removing the (2) 1/4-20 x 1/2" hex screws. The viewscreen is suspended from cables allowing it to be pulled down lower for ease sealing it to the front access opening.



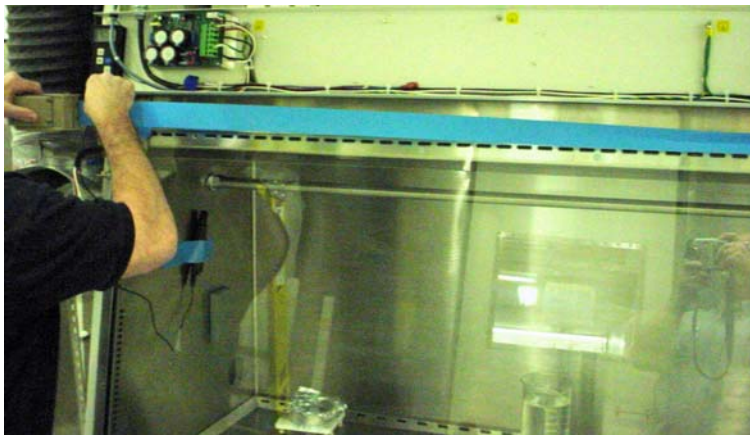
14. Turn off the building exhaust and seal off the building exhaust duct connection to the cabinet with an air tight damper.
15. Multiply the total volume of the cabinet (52 ft³ for BCG401 or 80 ft³ for BCG601) by 0.3 gram/ft³ (11 g/m³) of space to determine the amount of paraformaldehyde required to decontaminate the cabinet. You must consider the volume of the duct work between the air tight damper and the cabinet in the paraformaldehyde calculation. Also, the duct work must be gas tight.
16. Determine the stoichiometric amount of NH₄HCO₃ or alternative to neutralize the resulting formaldehyde gas with ammonia gas. The ammonium carbonate should be weighed out so that it is 10% greater than the weight of paraformaldehyde used for the decontamination to ensure completion of the reaction.
17. Prior to sealing up the cabinet make sure all gas or flammable petcocks are closed and pressure tight. Use a soap bubble solution to make sure there is no leakage. **NOTE: You are creating a confined space within the cabinet.**

18. Place a heating device, such as a commercially available electric frying pan or a remote formaldehyde generator/neutralizer, with the thermostat set at 450 to 475 °F (232 to 246 °C), on the work tray. The paraformaldehyde is spread evenly over the heating surface of the heating device. The heating device must have a grounded plug that should be plugged in to an outlet outside the cabinet. **NOTE: The auto-ignition temperature of paraformaldehyde is 572 °F (300 °C).**
19. Place an additional heating device on the work tray for the neutralizing agent. The neutralizing agent (NH₄HCO₃ or equivalent) should be separated from the air in the cabinet until needed. Below are two examples of how this separation could be achieved.

Example 1: The NH₄HCO₃ or equivalent alternative is spread evenly over the heating surface of the heating device. The top of the device is covered with aluminum foil in such a way as to prevent the NH₄HCO₃ or alternative from reacting with the formaldehyde during the decontamination. The aluminum foil can be placed to allow the escape of ammonia gas when heated, or provision can be made to remove the aluminum foil remotely at the start of the neutralization phase. The removal technique must not allow unsafe levels of formaldehyde to escape the cabinet.

Example 2: The cabinet is sealed using plastic with gloves as an integral part of the sheet of plastic. The NH₄HCO₃ or equivalent alternative is placed in a sealed container inside the cabinet. At the neutralization phase, the person performing the decontamination reaches into the cabinet without breaking the seal by using the gloves. The NH₄HCO₃ or equivalent alternative is removed from the sealed container and spread evenly over the heating surface of the heating device. The heating device is energized and the NH₄HCO₃ or equivalent alternative is heated and releases ammonia.

20. ***This step is recommended.*** Place spore strips inside the cabinet to confirm that the decontamination process has been successful.
21. Place a hot plate, a beaker of water and temperature and humidity indicators on the cabinet work surface. Do not connect electrical cords to the internal cabinet electric supply.
22. With the viewscreen fully closed, seal the front access opening with tape. Close all possible leak areas, such as the exit of electrical cords, around the sash and the junction of the tape and cabinet.



23. Determine the temperature and humidity inside the cabinet. The inside cabinet work space should be

at room temperature with 60% to 85% relative humidity. If relative humidity is low (Less than 60%) use the hot plate to heat the beaker of water until the desired temperature and humidity are achieved. Relative humidity above 85% will require extra cleanup which will be covered in step 30. **Note: Without the proper relative humidity the formaldehyde gas will not be effective. The mode of entry of formaldehyde into the living organisms is through the cell wall by the absorption of water.**

24. Prior to depolymerizing the formaldehyde, access to the area or room around the cabinet must be restricted in accordance with applicable federal and state regulation and prudent safety practice.

OSHA's Standard on Occupational Exposure to Formaldehyde requires that areas where the airborne concentration of formaldehyde exceeds the permissible exposure limits be established as a regulated area with signs and labels marking the area and access restricted to properly trained personnel. Applicable regulations must be reviewed and complied with.

25. Turn on the heating device containing the paraformaldehyde.
26. After 25% of the paraformaldehyde has depolymerized, turn on the decon loop blower (if installed) for 10 to 15 seconds. Repeat after 50%, 75% and 100% of the paraformaldehyde has depolymerized.
27. Allow the formaldehyde gas a minimum residence time of 12 hours, preferably overnight.
28. Turn on the heating device containing NH_4HCO_3 and the decon loop blower (if installed) and allow the two gases to circulate for at least one hour. Then vent the cabinet to the outside by opening the exhaust duct air tight damper.
29. Aseptically remove spore strip and place in Trypticase-soy broth and incubate for 7 days. No growth will verify the decontamination process.
30. When cleaning up, you may find residual paraformaldehyde (white powder) on the metal or glass surfaces. To remove this, use ammonia in warm water, wear gloves and wipe down the affected surfaces. The paraformaldehyde will dissolve in water and be neutralized by the ammonia.

Alternate decontamination methods

Prior to decontamination with an alternative method (such as vaporous hydrogen peroxide [VHP]), cycle parameters and validation of those parameters must be developed for each model and size of BSC. Material compatibility in terms of degradation and absorption of an alternative decontaminant are critical for maintaining cabinet integrity and the time required for decontamination, respectively. Alternate methods are required in certain instances, i.e., slow disease viruses. The decontamination method should be determined by consultation between user and certification agency. Automatic formaldehyde gas decontamination/neutralization may be used as a substitute to the formaldehyde procedure given below if the manufacturer's instructions have been followed. When using chlorine dioxide gas, similar precautions as used for formaldehyde should be followed. Similarly, automated chlorine dioxide gas systems are available which may be used if the manufacturer's instructions are followed.

Cleaning and Disinfecting Stainless Steel

Simple Cleaning

IMPORTANT

Do not use steel wool or steel pads when cleaning stainless steel.

Dirt deposits on stainless steel (dust, dirt and finger marks) can easily be removed. Frequently, warm water, with or without detergent, is sufficient. If this does not remove the deposits, mild, non-abrasive household cleaners can be used with warm water and bristle brushes, sponges or clean cloths.

Iron rust discoloration can be treated by rubbing the surface with a solution of 15% to 20% by volume of Nitric Acid and water and letting it stand for one to two minutes to loosen the rust.

Disinfection

The purpose of disinfection is to destroy particular organisms that could pose a potential hazard to humans or compromise the integrity of the experiment. It is important to use a suitable disinfectant in the concentration appropriate to the organism being killed. Standard disinfectants include: hypochloride (chlorine bleach), iodophor-detergent, ethanol, phenol and alcohol.

IMPORTANT

Rinsing in sterile hot water and wiping the surface completely dry should always follow disinfection and cleaning.

Disinfect the work surface before and after every procedure.

1. Disinfect surfaces of all equipment used.
2. Remove all items from the inside of the cabinet.
3. Place all items that may have come in contact with the agent(s), such as used pipettes, in a plastic bag or other suitable container.
4. Disinfect the entire inside surface of the cabinet.

For additional information on cleaning and disinfecting stainless steel, please refer to:

“Decontamination, Sterilization, Disinfection, and Antisepsis”, Vesley, Donald and Lauer, James L., *Laboratory Safety Principles and Practices, Second Edition*, 1995, Fleming, D.O., Richardson, J.H., Tulis, J.J. and Vesley, D., editors, ASM Press, Washington, D.C., pp. 219-237; and *Biosafety Reference Manual, Second Edition*, 1995, Heinsohn, P.A., Jacobs, R.R. and Concoby, B.A., editors, AIHA Publications, pp.101-110.

Using Ancillary Equipment

The rule to keep in mind is that the more equipment placed in the cabinet, the greater the air turbulence it causes. The turbulence resulting from equipment and materials can disrupt the designed airflow and reduce the effectiveness of the cabinet. When you use equipment which rotates, vibrates or heats be sure to place it at the rear of the work area if possible. This will help minimize the turbulence at the access opening.

About the HEPA/ULPA Filters

CAUTION

- **The HEPA/ULPA filter consists of continuous sheet of glass fibers pleated and mounted in a rigid frame. It is very delicate and the filter media should never be touched.**
- **HEPA/ULPA filters are not intended to filter gasses or vapors.**
- **Misuse of chemicals, Bunsen burners or a heavy dust load will shorten the filter's life.**

The Biosafety cabinet filters are one of the essential components of a clean air cabinet. It is the shield which stands between the product and the environment.

HEPA/ULPA filters consist of a continuous sheet of glass fibers pleated and mounted in a rigid frame. They are very delicate and the filter media should **never** be touched.

Proven efficiency in all HEPA filters used in Baker cabinets are 99.99% for particles 0.3 microns in diameter. The 0.3 micron particle is used as the basis for filter definition because theoretical studies have shown that filtration efficiency should be at a minimum for particles of this diameter, with efficiency increasing for particles either larger or smaller. Experiments with various viruses and microbial agents have proven the effectiveness of HEPA filters. Contact The Baker Company if more information is required.

Upon request an optional ULPA filter package can be made available when the cabinet is purchased. The proven efficiency of ULPA filters is 99.999% for particles 0.1 to 0.2 microns in size.

It is important to understand that HEPA/ULPA filters **are not** intended to filter gases or vapors and they **are not** 100% efficient on particulates.

The room and cabinet particulate levels along with the capacity of the building exhaust fan determines the life of a filter. Under most laboratory conditions, you should expect a long filter life. However, misuse or a heavy particulate load within the cabinet will shorten any filter's life.

Check the HEPA Filters Regularly (Recommended on an Annual Basis)

Over time, as the cabinet operates, the filters will collect particulate. When the cabinet can no longer maintain proper airflow balance due to the loading of the filters, they will need to be replaced. Only qualified technicians should check the cabinet filters to verify that they have not loaded with particulate to the extent that airflow balance is compromised.

If any filter has visible signs of damage or leaks it should be fixed or replaced immediately.

IV - ONSITE CHECKS AND MAINTENANCE PROCEDURES

It is recommended that the following checks be performed before initial use, after relocation and after each filter change. They should also be carried out at regular intervals, usually six months or one year, as specified by an industrial hygienist, safety officer or other qualified person. The tests described below meet recommended minimum requirements and only experienced technicians using proper procedures and instruments must perform them. Factory representatives can tell you about other tests, which you may consider desirable.

As reported earlier in this manual, each individual cabinet made by The Baker Company is carefully tested before it leaves the factory. A copy of the test report, found at the back of this manual, gives the factory test results for the BioChemGARD e3 cabinet delivered with this manual. Use it as a record of the original testing and as a guide to testing in the future. To gain many years of satisfactory service, please be sure that maintenance personnel come as close as possible to duplicating these original test figures.

The test procedures used should be identical to those done at The Baker Company so that achieving similar test results and comparison of data will be possible. Please correspond directly with The Baker Company to request detailed procedures for the particular cabinet model. Alternate testing procedures can be found in the NSF/ANSI Standard 49.

The Airflow Balance

WARNING
Only qualified technicians should perform this procedure.

The airflow balance, which is set at the factory, provides the cabinet with the proper air volume and velocity control to minimize leakage of airborne contamination either into or out of the work area.

In order to duplicate as closely as possible the airflow characteristics described in the original factory test report, please follow these steps:

1. Adjust the window to its designed opening height.
2. Perform down flow velocity test per NSF/ANSI 49. Specific details are on the cabinet instruction label and in the factory test report. **NOTE: The IV bar and UV light bulb need to be removed while performing down flow readings.**
3. Perform inflow velocity test per NSF/ANSI 49. Specific details are on the cabinet instruction label and in the factory test report.
4. Compare the results with those originally recorded at the factory.
5. Make adjustments to the building exhaust system as necessary. The cabinet blower speed control is set at the factory and automatically compensates for supply filter loading. Changing the building exhaust will change the cabinet exhaust/intake flow. Manual adjustment of the cabinet blower speed control is not typically required.

As the HEPA/ULPA filters load up with particulate, supply air will be maintained automatically, at least until the supply filter resistance increases 420%. When supply air eventually diminishes, it will be necessary to replace the supply HEPA/ULPA filter. The building exhaust system needs to be designed to deliver the exhaust flow at the required static pressure for a loaded exhaust filter condition. If, as the exhaust filters load, the building exhaust system is unable to deliver the airflow then the filters will need to be replaced. (See **Replacing the HEPA/ULPA Filters** later in this section).

Filter Leak & Smoke Testing

The filters in the cabinet were tested at the factory before shipment to ensure that the media, gasket, and frame were not exceeding NSF/ANSI Standard 49 allowable leak rates. Since filters may become damaged in transport, it is recommended that the filters be re-tested by a qualified technician before the cabinet is used. The filters should also be leak tested at prescribed intervals as specified by an industrial hygienist, safety officer or other qualified person. NSF/ANSI Standard 49 details the steps for performing the filter leak test.

Filter leak test procedure – Supply filter

The following test is conducted with reference to NSF/ANSI Standard 49, Section F.5 HEPA/ULPA Filter Leak Test.

WARNING

This procedure should only be performed by qualified technicians.

Before conducting the following procedure, verify that all work area surfaces of the BioChemGARD have been appropriately surface decontaminated.

1. Leave the cabinet blower and the exhaust system running. Ensure that the cabinet is operating within the airflow set point velocities stated on the cabinet data plate. Remember, if equipped with UV light or IV bar option, these must be removed prior to measuring downflow velocities.
2. Raise the cabinet viewscreen to its fully open position.



3. With an $1\frac{1}{32}$ " nut driver or wrench, loosen (2) #8-32 hex screws located on the downflow diffuser directly behind the viewscreen. **Do not remove the screws until the next step.**



4. Grasp the front edge of the supply diffuser with one hand while removing the loosened #8-32 hex screws. This will prevent the diffuser from falling into the work area.



5. Lower the front edge of the supply diffuser below the viewscreen sash and carefully remove it from the cabinet work area by pulling it down, forward and out. The back of the supply diffuser is located on pins that are welded to the back wall. Use caution not to damage the supply filter above the work area.



6. To access the top section of the cabinet, use a $\frac{3}{8}$ " nut driver or wrench to remove the $\frac{1}{4}$ " hex screws located on either side of the front dress panel.



7. Once the hardware is removed, grasp the lower portion

of the front dress panel and lift outwards, then up approximately 45 degrees. Lower the left and right hand panel rests into position.



8. Now that the front dress panel is supported exposing the motor blower assembly, place a tee fitting on the end of the aerosol generator hose and attach at the blower inlet as shown. This will be the location of the upstream aerosol introduction for supply filter testing.



9. There are two options available for determining the supply filter upstream aerosol concentration on the BioChemGARD;

Option 1: Measuring the upstream aerosol challenge.

Option 2: Calculating the upstream aerosol challenge.

Option 1: Measuring the Supply Filter Upstream Challenge

10. Remove the upstream challenge port fitting located directly on the top right side of the supply plenum as shown. Insert and tape over the upstream tubing attached to the aerosol photometer being used to hold in place. Space decontamination is not required for the removal of this fitting as this is a non-contaminated plenum on the BioChemGARD.



11. With the cabinet blower still operational, start the aerosol generator per manufacturer's instructions.



12. Using the photometer, measure the upstream aerosol challenge per manufacturer's instructions. **NOTE: NSF Standard 49 guidelines state a minimum upstream concentration of 10 micrograms per liter must be applied.**



13. Once the number of Laskin nozzles producing > 10 micrograms per liter of aerosol concentration is determined, set the 100% value on the photometer per manufacturer's instructions.
14. (Move ahead to Step 18 for filter scanning instructions)

Option 2: Calculating the Supply Filter Upstream Challenge

15. As stated in NSF/ANSI Standard 49 the upstream challenge aerosol concentration may be calculated using the following formula:

$$\frac{\text{Number of Laskin Nozzles} \times 13,500}{\text{CFM of challenged air}}$$

16. The following values can be used in the calculation for CFM of challenged air:

- BCG401= 396 CFM of challenged air (Supply Filter)
- BCG601= 585 CFM of challenged air (Supply Filter)

By using this formula, one Laskin nozzle will provide the following upstream concentration:

- BCG401= 34 micrograms per liter
- BCG601= 23 micrograms per liter

17. Once the number of Laskin nozzles producing ≥ 10 micro grams per liter of aerosol concentration is determined, set the internal reference of the photometer to the values determined from the calculation.
18. Scan the filter perimeter and filter media with the photometer probe no more than 1" away at a rate of no more than 2" per second. Refer to NSF/ANSI Standard 49 for verification of this information.
19. Any leak greater than .01% of the upstream aerosol concentration must be patched according to the limits stated in NSF/ANSI Standard 49 for biosafety cabinetry.



20. Once complete, remove the aerosol generator hose and re-install all parts to their original location.

Filter leak test procedure – Exhaust filters

The following test is conducted with reference to NSF/ANSI Standard 49, Section F.5 HEPA/ULPA Filter Leak Test.

WARNING

This procedure should only be performed by qualified technicians.

Before conducting the following procedure, verify that all work area surfaces of the BioChemGARD have been appropriately surface decontaminated.

1. Leave cabinet blower and the exhaust system running. Ensure that the cabinet is operating within the airflow set point velocities stated on the cabinet data plate.
2. Open the viewscreen.
3. Insert hooks on either side of the access opening suction slots at an elevation approximately equal to the 8" access opening.



4. Lift up the front of the work surface using the lift tabs provided and hang it on the hooks.



5. Using a $\frac{3}{8}$ " nut driver or wrench, remove the $\frac{1}{4}$ "-20 hex screws located on either side of the front dress panel.



6. Once the hardware is removed, grasp the lower portion of the front dress panel and lift outwards, then up approximately 45 degrees. Lower the left and right hand panel rests into position.



7. There is only one method used in determining the upstream aerosol concentration for the BioChemGARD exhaust filter.

Calculating the Exhaust Filter Upstream Challenge

The following formula will be used to calculate the exhaust filter upstream aerosol concentration:

$$\frac{\text{Number of Laskin Nozzles} \times 13,500}{\text{CFM of challenged air}}$$

8. The following values can be used in the calculation for CFM of challenged air.
 - BCG401= *664 CFM of challenged air (Exhaust Filters)
 - BCG601= *993 CFM of challenged air (Exhaust Filters)(* These values were measured by NSF International and represent the concurrent balance value [total exhaust volume])

By using this formula, one Laskin nozzle will provide the following upstream concentrations:

- BCG401= 20 micrograms per liter
 - BCG601= 14 micrograms per liter
9. Once the number of Laskin nozzles producing ≥ 10 micro grams per liter of aerosol concentration is determined, set the internal reference of the photometer to the values determined in Step 7 of this section above.

10. Remove the $\frac{3}{8}$ " exhaust port plug and insert the photometer sampling probe with rigid extension tubing into the exhaust downstream port.



11. Turn on the aerosol generator and apply aerosol to each filter under the work surface starting with the filter face. Slowly "paint" the filter media face and the perimeter of the filter gasket area to check for leaks. Continue painting each filter. Also apply aerosol to the rear section of each filter.



12. If a leak greater than .005% of the upstream concentration is detected, use the aerosol nozzle to pinpoint the location of the leak. **Surface decontaminate the work surface and remove it to allow better access for fixing the leak(s). Surface decontaminate the drain pan.**
13. Patch any visual tears or holes in the filter media per IEST-RP-CC034.3 guidelines. Gasket leaks can be sealed by applying pressure to the gasket sealing area. Repeat the probe test to verify that there are no leaks exceeding .005% of the upstream concentration.
14. Once complete and filter integrity has been verified, remove the aerosol generator hose and re-install all parts to their original location.

Airflow smoke pattern test

It is recommended that a qualified technician verify the direction of airflow within your cabinet before the cabinet is used. The direction of airflow should also be verified at prescribed intervals as specified by an industrial hygienist, safety officer or other qualified person. NSF/ANSI Standard 49 details the steps for performing the airflow smoke pattern test in their Standard 49.

Electrical safety tests

Since electrical components may become damaged in transport, it is recommended that a qualified technician retest them before the cabinet is used.

Note: While performing the electrical safety tests, ensure that the connections with the test leads are solid, as poor connections will increase the resistance reading. Also, ensure that the exposed metal being touched is solidly connected to the cabinet frame. Gasketed panels may not provide a reliable measurement.

The electrical leakage, ground circuit resistance and polarity were tested at the factory before shipment to ensure that there is no risk of electrical shock present in your cabinet. Electrical safety tests should also be performed at prescribed intervals as specified by an industrial hygienist, safety officer or other qualified person. See the cabinet test report for recorded values of the tests performed.

Maintenance Notes

Cleaning the Work Area

Spills that fall through the perforated grills can be removed through the drain valve after proper decontamination.

To wash the drain pan under the work surface, lift the work surface up, surface decontaminate and remove the work surface and work surface supports. This provides unobstructed access to the drain pan for easy cleaning. Remember that this area must be assumed to have contamination, so use caution in doing this task. Make sure the drain valve is closed when cleaning of the drain pan is completed.

Ultraviolet Germicidal Lamp (optional)

UV germicidal lamps lose their effectiveness over time and should be replaced when their intensity at the work surface drops below 40 microwatts per square centimeter at a wavelength of 253.5×10^{-9} meters.

If the cabinet has a germicidal lamp, measure its intensity frequently. Take the measurement at the geometric center of the work surface with an ultraviolet light meter. The visual appearance does not indicate UV effectiveness

Replacing the HEPA/ULPA Filters

WARNING

Only qualified technicians should perform this procedure. Decontaminate the cabinet before changing the filters.

During routine cabinet certification, it may be determined that it is necessary to replace the HEPA/ULPA filters. This replacement would be required if proper airflow balance could not be achieved due to filter loading or if the filter is damaged beyond repair.

HEPA/ULPA filters are very easily damaged. Great care must be taken when handling the filters to avoid damage to the filter media and gasket surfaces. The filters should be inspected carefully before and after installation.

A chemically contaminated filter must be handled with caution. Clothing and/or breathing apparatus should be used to protect personnel as necessary to reduce exposure to any hazards. Once removed, filters should immediately be disposed of in accordance with good safety practices and environmental regulations.

After filter replacement has been completed, the cabinet and the room should be cleaned and decontaminated in a manner consistent with the nature of the hazardous material. This includes proper disposal of all cleaning materials, along with the protective gear and clothing.

Supply Filter Replacement Procedure

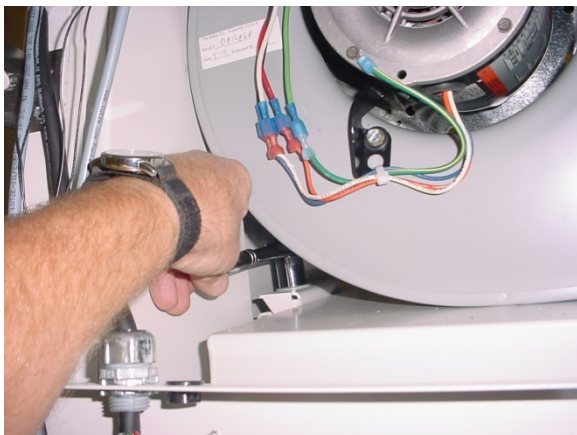
WARNING

Prior to starting the supply filter replacement procedure, a risk assessment should be completed to determine the potential of biological and chemical hazards present. If necessary a space decontamination or appropriate chemical wipe down procedure may be required.

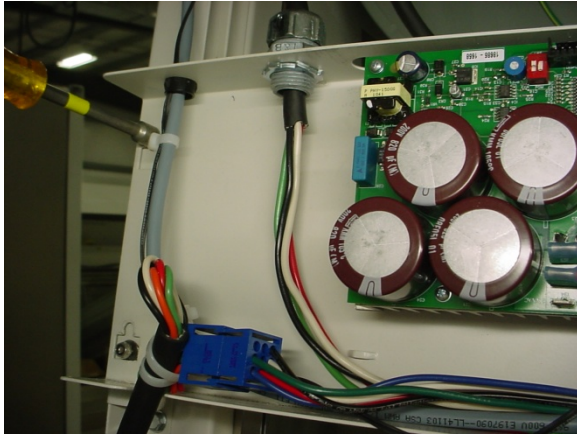
1. Surface decontaminate all interior surfaces in the cabinet work area.
2. Disconnect the cabinet power cord from the wall receptacle.
3. Using a $\frac{3}{8}$ " nut driver or wrench, remove the $\frac{1}{4}$ "-20 hex screws located on both sides of the front dress panel.
4. Once the hardware is removed, grasp the lower portion of the front dress panel and lift outwards, then up to approximately 45 degrees. Lower the left and right hand panel rests into position.



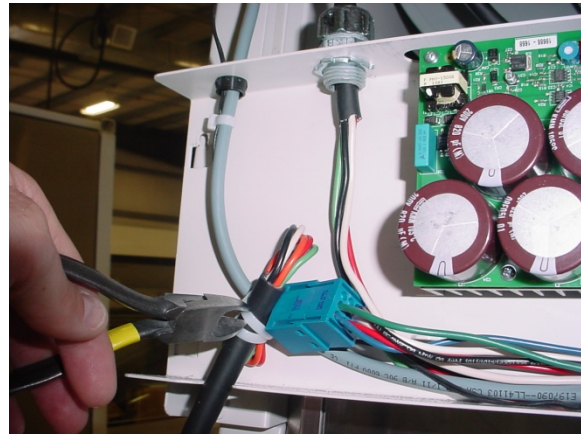
5. Close the cabinet viewscreen in preparation of the supply filter removal.
6. Loosen the (2) $\frac{1}{2}$ " hex head bolts located on either side of the supply filter plenum, alternating two or three revolutions at a time. This will raise the supply plenum evenly to provide supply filter access.



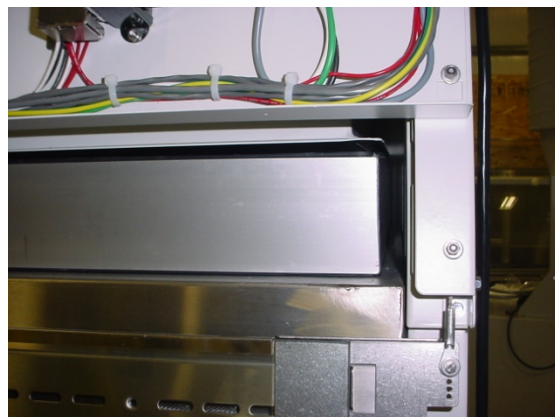
- Using a 5/16" nut driver or wrench, loosen the 2 locknuts located on both sides of the electrical mounting board. Removal of these 4 locknuts is not required.



- Snip the cable tie from the motor blower wiring and disconnect the blue connector.



- Remove the electrical mounting board assembly and move it up, locating the lower keyhole slot on the upper stud location allowing clearance for supply filter removal.



10. **NOTE: The glass fiber media of the filter is very delicate and care must be taken not to damage it.**
11. Grasp the supply filter by the frame only and carefully remove from the biosafety cabinet. The used filter should be marked appropriately and disposed of safely in accordance with environmental regulations.



12. **Note: Make sure that the airflow direction arrow on the new supply filter is pointing down.**
Slide the new supply filter all the way in until it stops against the rear filter stop. Be careful not to contact the filter media with your fingers. Align the filter frame, left to right, so it is positioned directly under the supply plenum.
13. Tighten the (2) ½” hex head bolts, alternating two or three revolutions at a time until the filter gasket is compressed approximately 1/8”.
14. Reassemble the cabinet following the instructions above in reverse order.
15. Reconnect the power.

ExchangeSAFE™ Exhaust Filter Replacement Procedure

WARNING

Before conducting the ExchangeSAFE™ Procedure, a risk assessment should be performed by a laboratory safety officer or qualified technician to verify the proper Personal Protective Equipment (PPE) and decontamination method(s) required for the hazards. Based on the risk assessment, procedural changes or additions may be required. In cases where hazards cannot be reduced by decontamination the use of gowning and a Powered Air Purifying Respirator (PAPR) is recommended.

A full review of the ExchangeSAFE™ Procedure is recommended before performing a filter exchange.

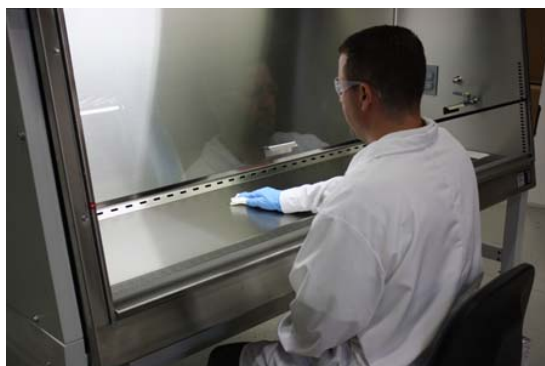
Required Materials: ExchangeSAFE™ Kit for BCG401 [Kit#372G002]
ExchangeSAFE™ Kit for BCG601 [Kit#373G002]

Each kit includes filter removal components, replacement exhaust filters and gasket sealing materials for servicing one cabinet.

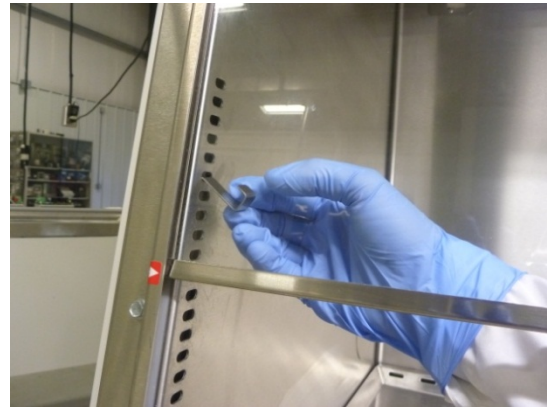
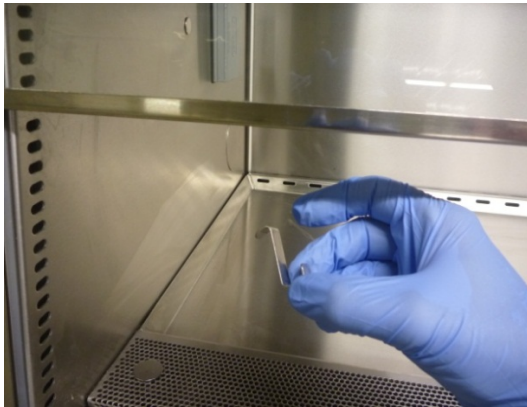
Description of Parts in kit [Part Number]	BCG401	BCG601
	Quantity of Parts	
ExchangeSAFE™, Bag-Out Cap Assembly [42119]	2	3
Filter Cover, Perforated [372P275]	2	3
Exhaust HEPA Filter [42061]	2	3
Filter Gasket Material [42105]	1 roll	1 roll
Adhesive Tape [42106]	1 roll	1 roll

SECTION I: Preparation for filter removal

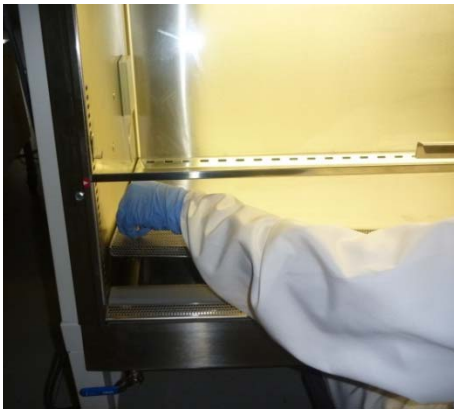
1. Remove all items from the cabinet work area.
2. Ensure that the building exhaust system remains operational and the BCG supply fan is turned off.
3. The viewscreen must remain at the 8" (203 mm) sash opening height during this procedure
4. Surface decontaminate all exposed surfaces of the BioChemGARD work area, i.e., interior sidewalls, top of work surface, armrest, back of the viewscreen.



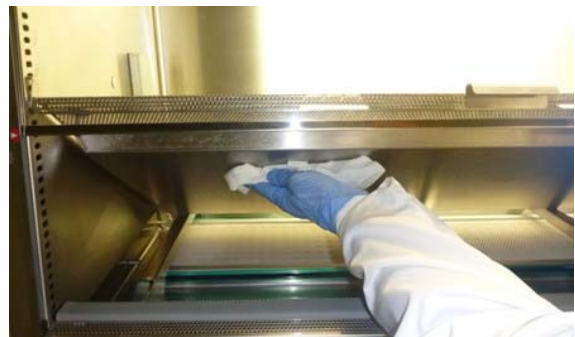
5. Install two work surface hooks, provided with the kit, into the sidewall suction slots on both sides of the cabinet as shown. [Use the 6th slot down from the top approximately]



6. Using the built in lifting tabs, raise the front of the work surface and rest it on the hooks previously installed in Step 4. This will allow access to clean the underside of the work surface.



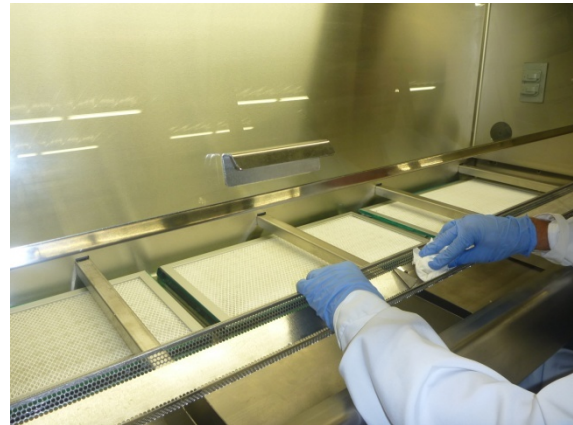
7. Surface decontaminate the underside of the work surface to prepare for removal in Step 7.



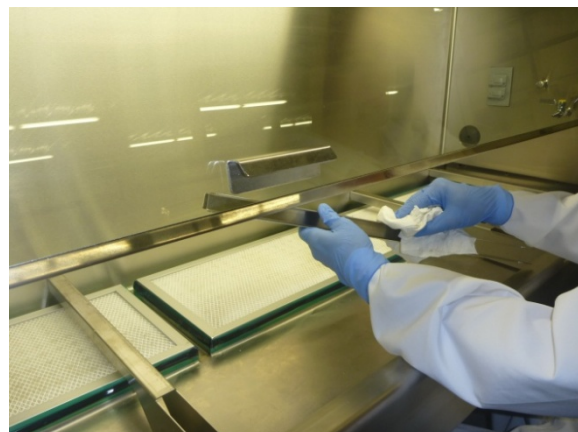
8. Finish cleaning the work surface by

disconnecting it from the hooks and partially removing it from the cabinet. Approximately half of the work surface should be extended out of the cabinet opening. Rest it on the padded armrest and clean the rear portion as shown. Once decontaminated, carefully remove it and set aside.

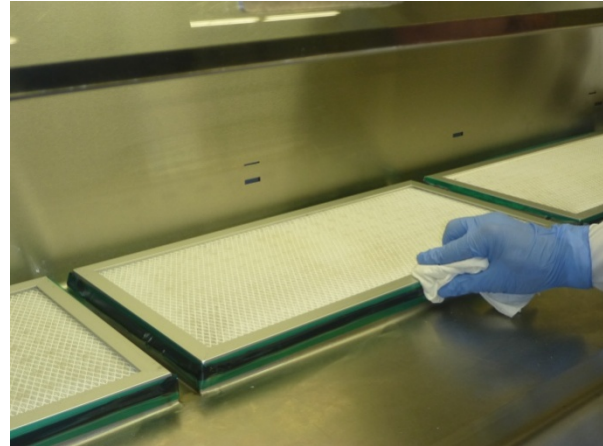
9. Surface decontaminate the top and underside of the armrest, remove, and set aside.



10. Disconnect the work surface supports from their connection to the work area back wall, lift and surface decontaminate. Remove them from the cabinet.



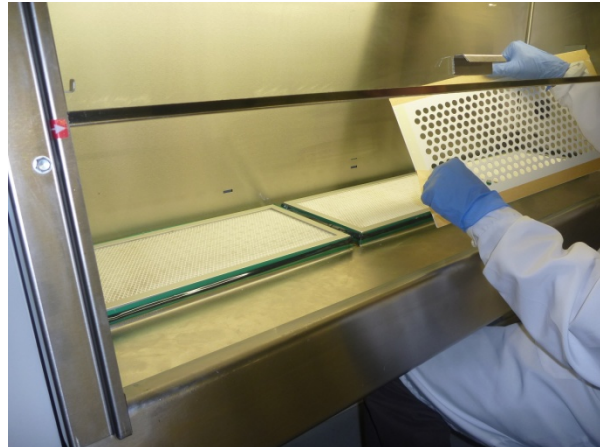
11. Surface decontaminate the well of the drain pan along with the top of each filter face. The drain pan surfaces between and behind the filters will be surface decontaminated later.



SECTION II: Capping and removal of filters

12. Find and remove one painted metal perforation cap from the exhaust filter kit. Remove the adhesive backing material from the perimeter of the perforated cap and place it in the drain pan area for bagging and disposal later..

CAUTION: Do not touch the exposed adhesive as its high adhesion characteristics may damage the personal protective equipment (PPE)

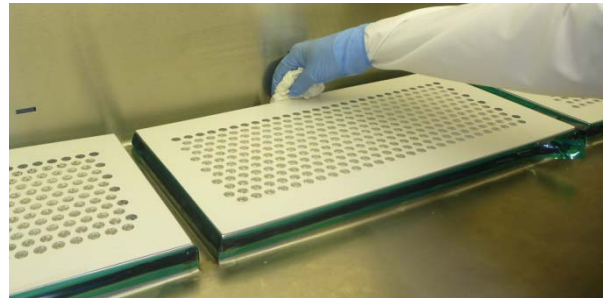


13. Align the painted metal perforation cap with the top of the filter. Ensure the adhesive side is facing down and press firmly into place around the perimeter of the filter.

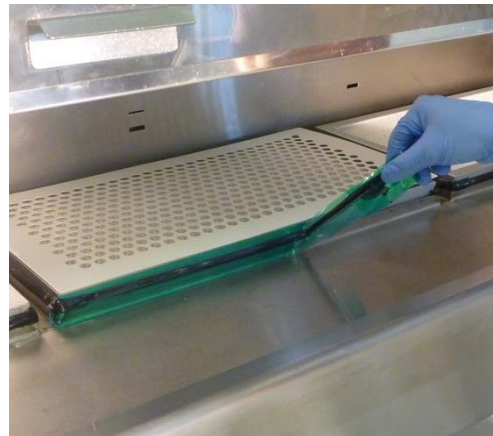
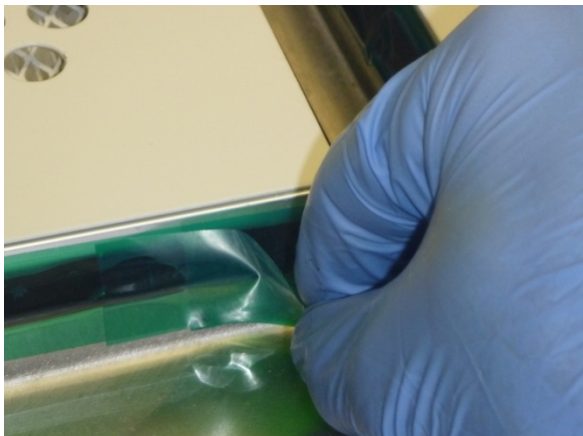


14. Repeat steps 11 and 12 until all filters are capped.

15. Once all filters have been capped, surface decontaminate the drain pan area behind and between the filters. Pay specific attention to cleaning the exposed tape surface as well.



16. When the tape is “clean”, locate the sealing release tab, (a segment of tape doubled over), and slowly pull the tape away from the perimeter of the filter. As this is being done the black gasket material should pull away with the tape. Continue until all the tape and gasket is removed from each filter.



17. Locate and remove one plastic non-perforated cap with attached plastic bag from the exhaust filter kit. Remove the adhesive backing material from the perimeter of the cap assembly and place in the drain pan area for bagging and disposal later.

CAUTION: Do not touch the exposed adhesive as its high adhesion characteristics may damage the personal protective equipment (PPE).



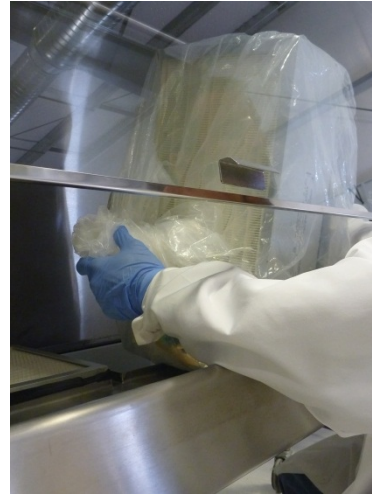
18. Align the cap assembly, adhesive side down, on the filter you are removing. This cap assembly will be installed directly over and in connection with the perforated cover previously installed.



19. Carefully lift the filter out of the cavity and place in the drain pan area on one end as shown below.



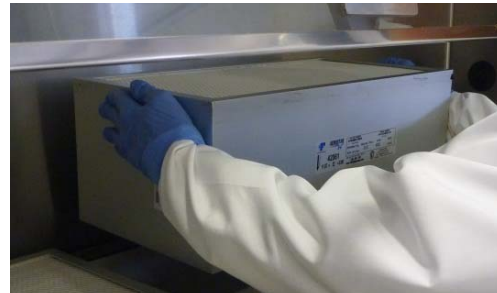
20. Unfasten the plastic bag and unroll it around the filter. Rotate the filter using the cap handles and finish unrolling the bag around the filter. Place all used materials such as wipes, removed gasket and tape into the bag and seal it closed using zip ties provided.



21. Remove the bagged filter from the cabinet and place it in a disposal container appropriate for the waste classification.
22. Repeat steps 17 through 21 for the remaining filters.

SECTION III: Installation of new filters

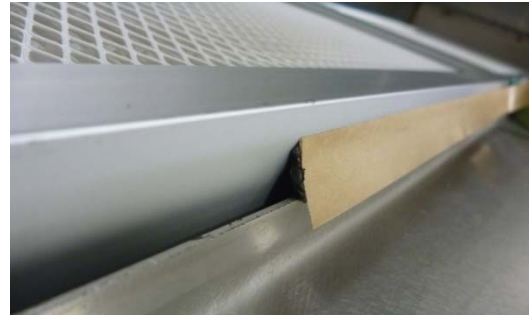
23. Wipe down the drain pan, again paying particular attention to the perimeter of the filter cavities.
24. Lift the new filter into the cabinet with the filter media protective screen facing up. Align it over the filter cavity and carefully lower it into place.



NOTE: Use caution not to touch the exposed media on the bottom of the filter.

25. Center the filter in the cavity so that the gap is the same on all sides.

26. Using the roll of black gasket material provided, apply gasket material into the gap around the entire filter perimeter paying close attention to contact both the aluminum filter frame and drain pan knife edge as shown. Leave the gasket backing material on while applying the gasket so that it may be easily applied to the filter cavity perimeter. Overlap the ends of the gasket approximately $\frac{1}{4}$ to $\frac{1}{2}$ ". **NOTE: Press the gasket in place around the entire perimeter before removing the backing material.**

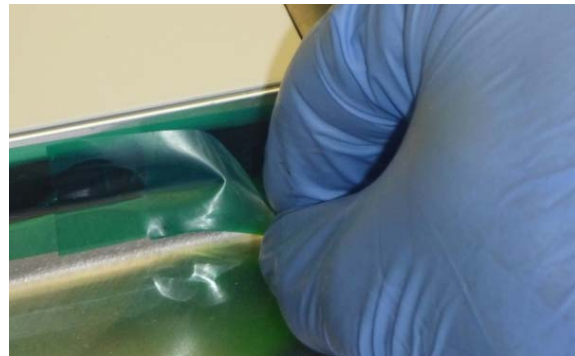
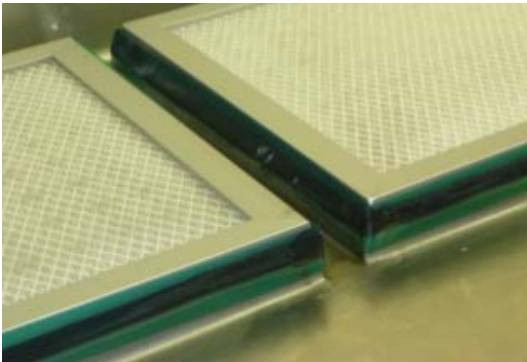


27. Inspect for any visible gaps around the filter. Use a mirror to check the rear side of the filter.



28. If there are any visible gaps or openings between the filter and the drain pan knife edge that cannot be filled by pressing the black gasket into place, cut and apply additional short strips of black gasket where required.. When applying pressure to the gasket material, use a piece of backing paper to prevent gloves from sticking to the gasket.

29. Repeat steps 24 through 28 for the remaining filters.
30. Perform a HEPA/ULPA Filter Leak Test to ensure that there are no leaks present. See the Filter leak test procedure in Section IV of this manual. If leaks are detected in the gasket seal area apply pressure to the location and repeat leak test. If needed, additional gasket strips can be applied to the leaking area.
31. When all exhaust filters and gasket areas are free of leaks, apply adhesive tape over the gasket area making sure not to cover the top of the filter frame. This will impede on the capping process for future filter replacements as shown. The tape provides a cleanable surface on the drain pan and filter frame for wipe down procedures.



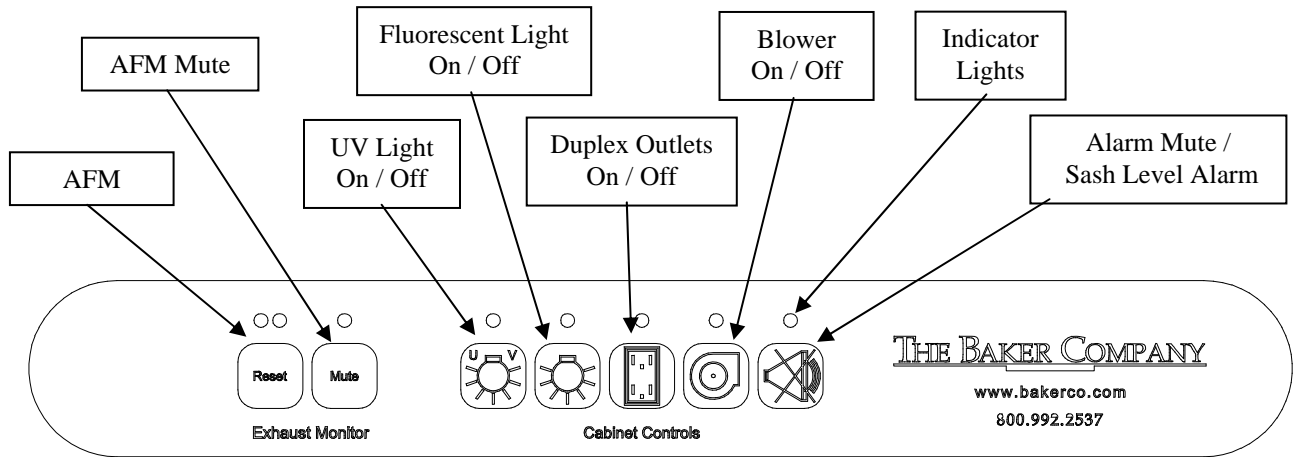
IMPORTANT: Leave a pull tab of doubled cover tape on the end of the tape as shown for ease of filter replacement in the future. The tape shall only cover the vertical surfaces of the drain pan and filter frame. Do not apply tape on top of the filter frames as this will impede on future filter replacement.

32. Replace all cabinet work area components into the BioChemGARD. The ExchangeSAFE™ procedure is now complete.

Troubleshooting

Here are some suggestions based on our experience with the use and misuse of biological safety cabinets.

The following diagram will be used as reference in this troubleshooting section.



If there is no down flow air within the work area-

1. Make sure the cabinet is plugged in and the blower switch is turned on. The green indicator above the button should be lighted.
2. Check the airflow monitor indicator located directly above the button labeled RESET. If flashing “RED” and audible alarm are present, check all airflow monitor cables first for proper connection, then verify that the required exhaust flow and static pressure have been met. All Class II Type B2 cabinets must be equipped with a supply fan interlock that shuts the fan off when the building exhaust flow is below the required setting. Refer servicing to qualified cabinet certifier.

If the Fluorescent Light doesn't work-

1. As an additional safety feature for your BioChemGARD, the fluorescent light cannot be turned on when the blower switch is turned off. Verify that the blower switch is on (indicated by green LED) before pressing the fluorescent light switch. The fluorescent light will not operate with the viewscreen in the closed position and the ReadySAFE™ mode is active. The blue LED above the switch will be on when the fluorescent light is on.
2. If fluorescent light is still inoperative, open the front dress panel and check that the bulb is properly installed in the lamp sockets. **WARNING! Risk of electrical shock! Disconnect power supply before opening or refer servicing to qualified service personnel.** Replacement of the fluorescent bulb may be required.
3. Have a qualified electrician check the wiring to ensure that proper voltage is supplied to the ballast.
4. If none of the above corrects the problem, the fluorescent ballast may need to be replaced.

When the Viewscreen Sash Alarm is sounding-

NOTE: The indicator above the alarm-reset button will flash.

1. Make sure the viewscreen sash is at the correct position indicated by the red and white arrows located

on either side of the biosafety cabinet. The audible and visual alarm should be silent when the window is at this proper design opening or placed in the fully closed position. When activated, the audible alarm can be silenced for five minutes by pressing the Alarm-Mute button. However, the visual alarm indicator will continue to flash. After five minutes, the alarm will sound again. You may press the Alarm-Mute button again or return the sash to its proper operational height.

2. If the viewscreen sash alarm is still activated when in the proper location, open the electrical panel and check to see if the proximity sensor cables are connected. **WARNING! Risk of electrical shock! Disconnect power supply before opening or refer servicing to qualified service personnel.**
3. Check to see if the viewscreen proximity sensor is properly aligned and is sensing the top leading edge of the viewscreen. (Stainless steel channel must be in place on top edge of viewscreen)

If one (or both) of the electrical outlets does not function-

1. Make sure the outlet switch is in the on position. The blue indicator above the button should be lighted.
2. Check the reset button on the ground fault circuit interrupter (GFCI) outlet located on the left hand sidewall of the cabinet. If the GFCI has tripped, a red LED on the outlet will indicate this condition. Press the reset button to reset outlet. The outlets are also protected by a self-resetting thermal circuit breaker. A qualified electrician or cabinet certifier, using the wiring diagram in the appendix of this manual, can check this breaker and all other connections/components in the circuit.

If the Ultraviolet (UV) light doesn't work-

1. Make sure the viewscreen is completely closed. The fluorescent light should turn off automatically.
2. The yellow indicator above the switch should be on.
3. Check for proper installation of the UV bulb in the lamp sockets.
4. Inspect the UV bulb; replace if necessary.
5. Have a qualified electrician check the wiring to ensure that proper voltage is supplied to the ballast.
6. If none of the above corrects the problem, the UV ballast may need replacing.

When a smoke test indicates that there is air flowing from the interior of your cabinet into the surrounding room-

1. Cabinet shall be certified by an experienced cabinet certifier at least annually to verify cabinet performance.
2. Make sure that the building exhaust is operating at the required static pressure and exhaust flow stated in this manual or the cabinet data plate. The cabinet airflow monitor alarm should indicate a low airflow condition if the flow is not at a safe level.
3. Check to see if anything is blocking part of the work surface front or rear perforation. Also check under the work surface to see if anything is blocking the exhaust filters.
4. Verify that cabinet down flow is within specification.
5. Check for room cross drafts caused by vents, open windows, and high traffic through doorways. Eliminate the source of the cross draft as this could cause airflow to escape from the cabinet work area.
6. The exhaust filter may be loaded with particulate if the cabinet has been in service for some time.

Decontaminate the cabinet and replace the filters.

When there is uneven fan operation, or noise from the motor/blower assembly-

WARNING! Risk of electrical shock! Disconnect power supply before opening front dress panel or refer servicing to qualified service personnel.

1. Open the front dress panel and inspect the motor/blower assembly for obstructions, loose or broken mounting hardware. Remove, tighten or replace as required.
2. Check the speed controller for proper input power and contact The Baker Company technical support group for assistance.

Main Circuit Board Troubleshooting

A troubleshooting guide for the control board is provided at the end of the appendix section.

V – DISASSEMBLY INSTRUCTIONS

IMPORTANT

Only qualified technicians should perform this procedure.

1. Unplug cabinet from power source. Lower viewscreen.
2. Removal of the front dress panel:
 - A. Remove (2) $\frac{1}{4}$ -20 x $\frac{1}{2}$ “ lower front panel attaching screws and locking safety clips on top of cabinet. Pull the bottom edge of the vertical dress panel out away from the cabinet. Hinge the dress panel standoff down and lower the vertical panel on them.
 - B. **Label** and unplug all wiring from the AFM alarm system box, light assembly and electrical mounting board. Remove wired from mounting clip on front dress panel
 - C. Lower front panel. Remove the (2) dress panel locking clips on top of cabinet held with (4) #8-32 cap nuts and washers. Firmly grip the bottom edge of the vertical dress panel with both hands and slide the panel upward lifting it off the cabinet. This should be done with two people.
3. Removal of the electrical mounting board:
 - A. Unclip the input power cord assembly on the top right of the cabinet that goes up from the electrical mounting board.
 - B. Disconnect blue plug on the left side letting it hang down.
 - C. **Mark** and unplug motor power cord, at the motor, and release wiring cables from the vertical sash track.
 - D. Loosen the (4) $\frac{5}{16}$ ” locking cap nuts and carefully lift the electrical mounting board, with all the power cord assemblies attached, off the cabinet. Store in a safe place.
4. Removal of sliding viewscreen:
 - A. Lift the viewscreen up to its maximum height.
 - B. Place #8-32 x 1” long screw in tapped hole at top of sash track brackets under each viewscreen cable tab. Leave the screws out approximately $\frac{3}{8}$ ” to $\frac{1}{2}$ ”. This will support the viewscreen while the cables are being disconnected.
 - C. Remove the #8-32 x $\frac{1}{2}$ “hex screw that holds the cables to the viewscreen cable tab.
For reassembly note which hole they were in.
 - D. Remove both the right and left hand lower sash tracks by removing (2) $\frac{1}{4}$ -20 by $\frac{1}{2}$ ” hex screws. Carefully lift the viewscreen up and off of the cabinet. This should be done with two people.
5. Remove work surface, armrest assembly and work surface supports.
6. Removal of the blower:
 - A. Remove (1) $\frac{1}{4}$ - 20 x $\frac{1}{2}$ ” hex screw attaching blower mounting plate to supply plenum.
 - B. Remove the blower by sliding it outward toward you.
7. Removal of the supply filter and plenum assembly
 - A. Loosen the (2) $\frac{1}{2}$ - 13 x 3” supply plenum clamping bolts to raise the supply plenum off the supply filter. Slide the supply filter to the front and remove it. Continue to loosen plenum clamping bolts then remove plenum by sliding it out the front.
8. Removal of right or left side center section panels.
 - A. Remove right and left side filler panels located at bottom of side panel by removing (2) #8-32 thumb screws.
 - B. Loosen and remove side wall outer plumbing, brass bulkhead nut and star washer located at

- bottom of panels. These are standard on right side, optional on left side. **If installed remove optional cable port plug assemblies.**
- C. Remove side panels by removing (5) ¼-20 x 2-1/2” hex screws with seal washers. **Do not lose or damage seal washers on bulkhead plumbing fitting.** Pull panel out at the top first and slide it downward off the bulkhead plumbing fitting. For left side panel disconnect electrical wiring to work area outlets and optional UV light.
9. Removal of right and left side top section panel:
- A. Remove (4) ¼-20 x 3/8” hex screws, without seal washers, and lift panels off. These are not sealing panels and, if needed, will give access to supply plenum clamping assembly bolts.
10. Removal of rear exhaust duct assembly:
- A. Disconnect cabinet from the exhaust system.
- B. Unbolt cabinet exhaust connection transition assembly from rear exhaust duct by removing (BCG401 qty-7 / BCG601 qty-11) ¼-20 x 3/4” hex screws with seal washers and lift it off the top of the cabinet. **Do not lose or damage seal washers.**
- C. Remove (2) 45 degree angle supports located on the rear of base stand attached with (4) each ¼-20 hardware.
- D. Remove (8) ¼-20 hex screws (with seal washers) attaching exhaust duct assembly to cabinet. **Note the different length of screws used [(4) 2” long on top flange and (4) 3” long on bottom flange].** Slide out the bottom section of the duct first to clear base frame then lower it after clearing the supply plenum. **Do not lose or damage seal washers.**
11. Remove the base stand assembly:
- A. Remove rear exhaust duct assembly per section 10 above.
- B. Remove right and left side filler panels located at bottom of side panel by removing (2) #8-32 x 3/8” screws.
- C. Remove work surface, armrest and work surface supports.
- D. Follow the procedure for replacing exhaust HEPA/ULPA filter and remove the filters.
Caution: protect the filters from damage.
- E. Remove the (BCG401 qty-1 / BCG601 qty-3) ¼-20 hex nut attaching the front of the exhaust plenum to bottom of the drain pan.
- F. Remove stand front cross support by removing (4) ¼-20 x 1” hex screws (two on each end).
- G. Lower and remove the exhaust plenum assembly by loosening (2) ½-13 x 4” bolts to clear drain pan stud(s) and pull it out forward.
CAUTION: at this point a fork lift or blocking should be placed under the cabinet to elevate and stabilize it.
- H. Remove the rear lower cross member by removing (4) ¼-20 cap nuts.
- I. Remove the right and left stand sides by removing (6) ¼-20 x ¾” hex screws.
NOTE: when reassembling stand side to cabinet, apply lue Loctite to ¾” hex screws.
12. Remove the sash counter weight assembly:
- A. Unbolt protective cover by removing (2) ¼-20 x 3/8” hex screws and (1) #8-32 cap nut.
- B. Detach sash cables from weight box by removing (1) 1/4-20 x 1-1/2” bolt with locking nut.
- C. Unbolt bottom end of one of the counter weight guide tracks by removing (2) ¼-20 x 3/8” hex screws and separate the tracks to remove weight box.
CAUTION: weight box weight, depending on size of cabinet, is 31 or 46 lbs.
- D. Continue to remove counter weight tracks and pulley assembly by unbolting the remaining (4) ¼-20 x 3/8” hex screws.
13. Remove supply air screen and top plenum, as an assembly, from cabinet center section:
- A. Remove (3) ¼-20 x 3/8” hex screws and (1) #8-32 hex cap nut with flat washer holding

- supply air screen, then remove screen.
- B. Remove (8) $\frac{1}{4}$ -20 x $\frac{3}{8}$ " hex screws, 4 per side, that attach plenum assembly to the center section.

NOTE: when reassembling, apply blue Loctite to (8) $\frac{1}{4}$ -20 x $\frac{3}{8}$ " hex screws.

Use these instructions in reverse order to reassemble the cabinet.

To install HEPA/ULPA filters see **Replacing the HEPA/ULPA Filters**.

Appendix

Replacement Parts List

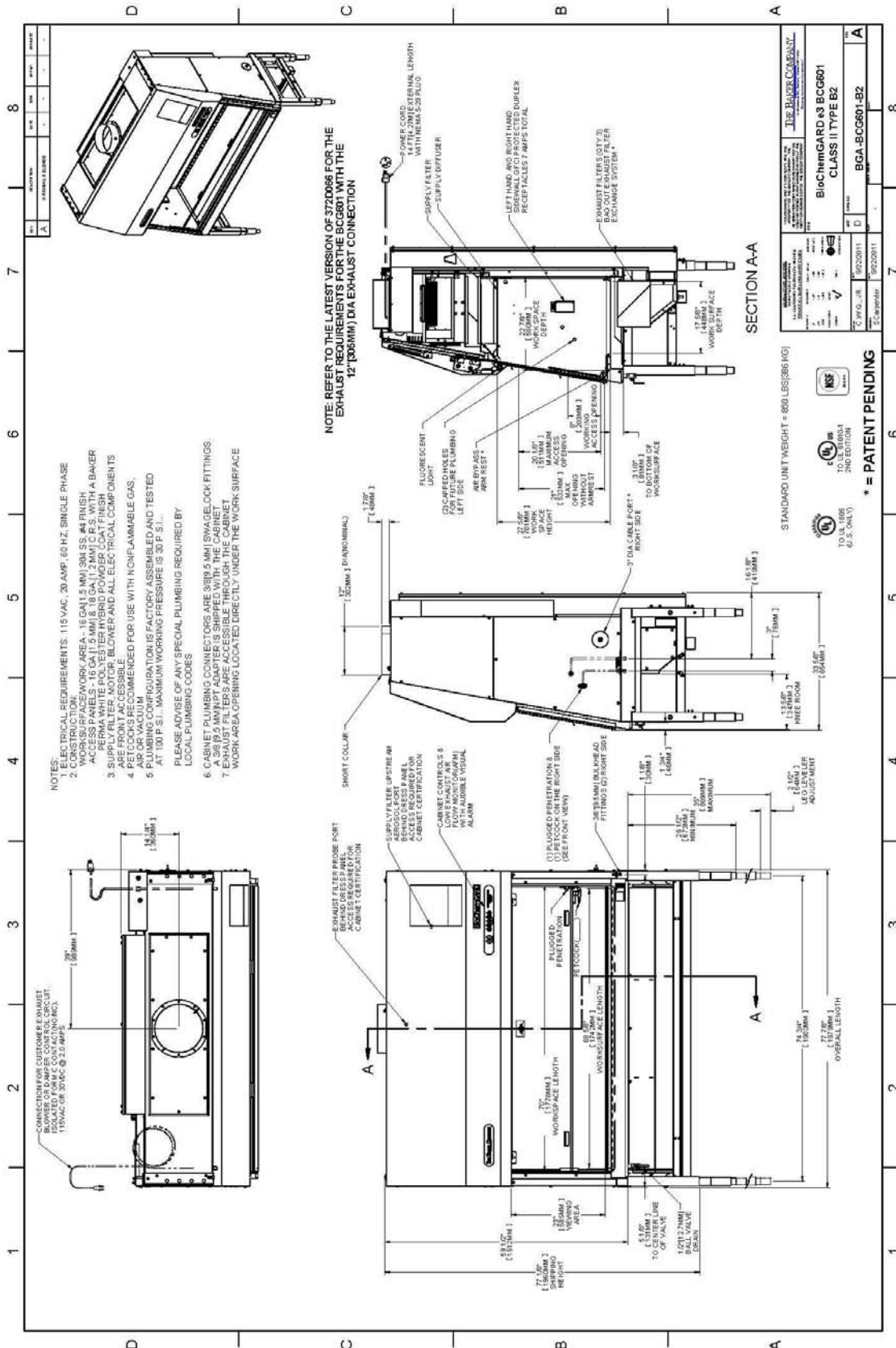
Baker Part Number

Electrical Items	BCG401	BCG601
Fluorescent lamp	41386	41383
Ultraviolet lamp	18024	18025
Fluorescent lamp holders	41438/41439	41438/41439
Ultraviolet lamp holders – plunger end / fixed end	20281 / 20283	20281 / 20283
Fluorescent ballast	39391	41384
Ultraviolet ballast	40899	40899
Circuit breaker [outlets]	34332	34332
Motor Drive, 3 Phase	41988	42171
Transformer	34327	34327
Relay, solid state	1855167	1855167
Terminal block assembly	42017	42017
Proximity switch – Fixed wire	40647	40647
Control Board w/AFM Passthrough	42048	42048
(Option) Hi-End- Controller Board	40184	40184
(Option) Hi-End- Touch Screen Interface	40250	40250
(Option) Hi-End- Power Supply	41639	41639
Label, Touchpad, SW, Overlay	42067	42067
Airflow monitor, AFM	42096	42096
Airflow monitor, Low Range Probe	41935	41935
Ground fault interrupter outlet with indicator light	34921	34921
Motor, Baldor	41388	41388

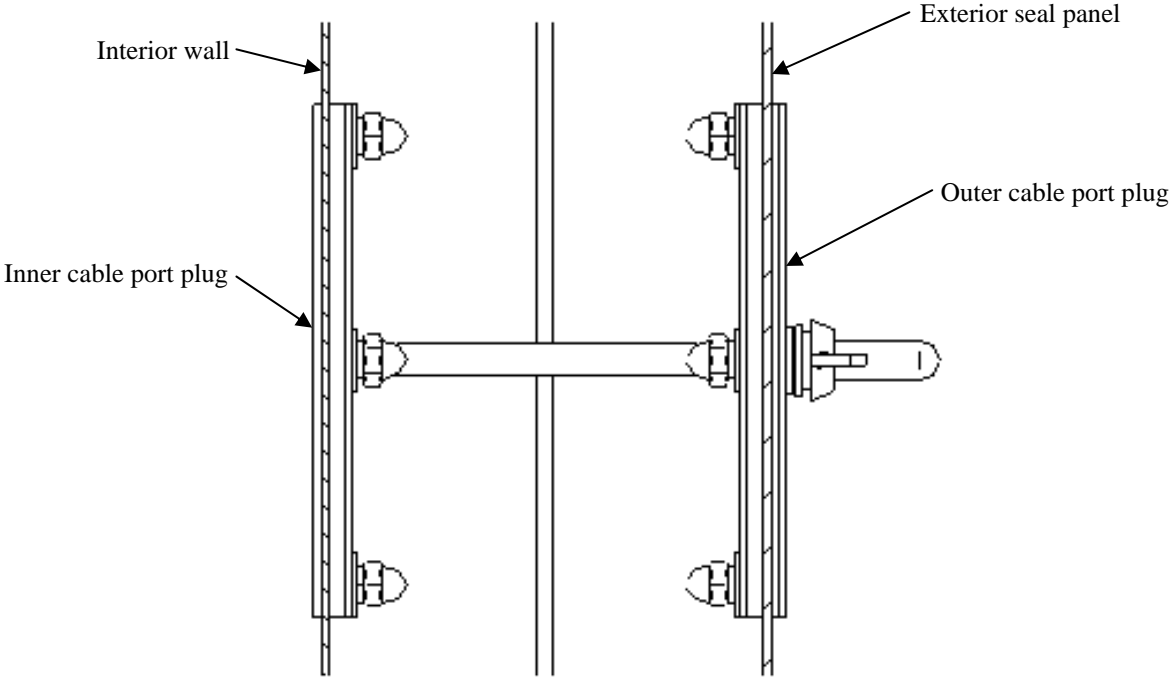
Baker Part Number

Mechanical Items	BCG401	BCG601
Supply HEPA filter	41978 (18"x48"x3.54")	42005 (18"x72"x3.54")
Exhaust HEPA filters	42061 Qty – 2 (11.15"x22.08"x8")	42061 Qty - 3 (11.15"x22.08"x8")
Blower	11418	11418
Armrest pad	41547	41549
Work surface	372X103	373X102
Work surface support	372P112	372P112
Down flow diffuser	372P114	373P104
View screen Assembly	372A305	373A302
View screen track, right hand	355A305	355A305
View screen track, left hand	355A304	355A304
Cable, right side, view screen	41989	41989
Cable, left side, view screen	41990	42019
Pulley, 2"OD	19249	19249

BCG601 (Base unit)



Cable Port Illustration



Interior View



Exterior View

[Cable port plug not shown]

Function and Description of the Fume Hood Option

The BioChemGARD e3 can be provided with an option that allows it to be used as a general purpose Fume Hood. To provide this additional versatility the cabinet was designed, constructed and tested to comply with the UL61010-1, Second Edition and UL1805 standards.

The basic construction and features of the BioChemGARD e3 are covered in the body of this Operation Manual. Before using this cabinet as a Fume Hood, a thorough understanding of the function of this cabinet is required.

The BioChemGARD e3 has been investigated for fire and electrical safety and mechanical risk of injury. UL1805, in particular, applies to laboratory hoods and cabinets intended to provide an enclosed work area with exhaust for containment and removal of vapors, mists, gases, and particulate matter from the work area. To comply with this standard, tests are conducted for minimal air flow capability.

NOTE: The Fume Hood Option is not designed to function as a perchloric acid, radioisotope or any other type of special purpose hood.

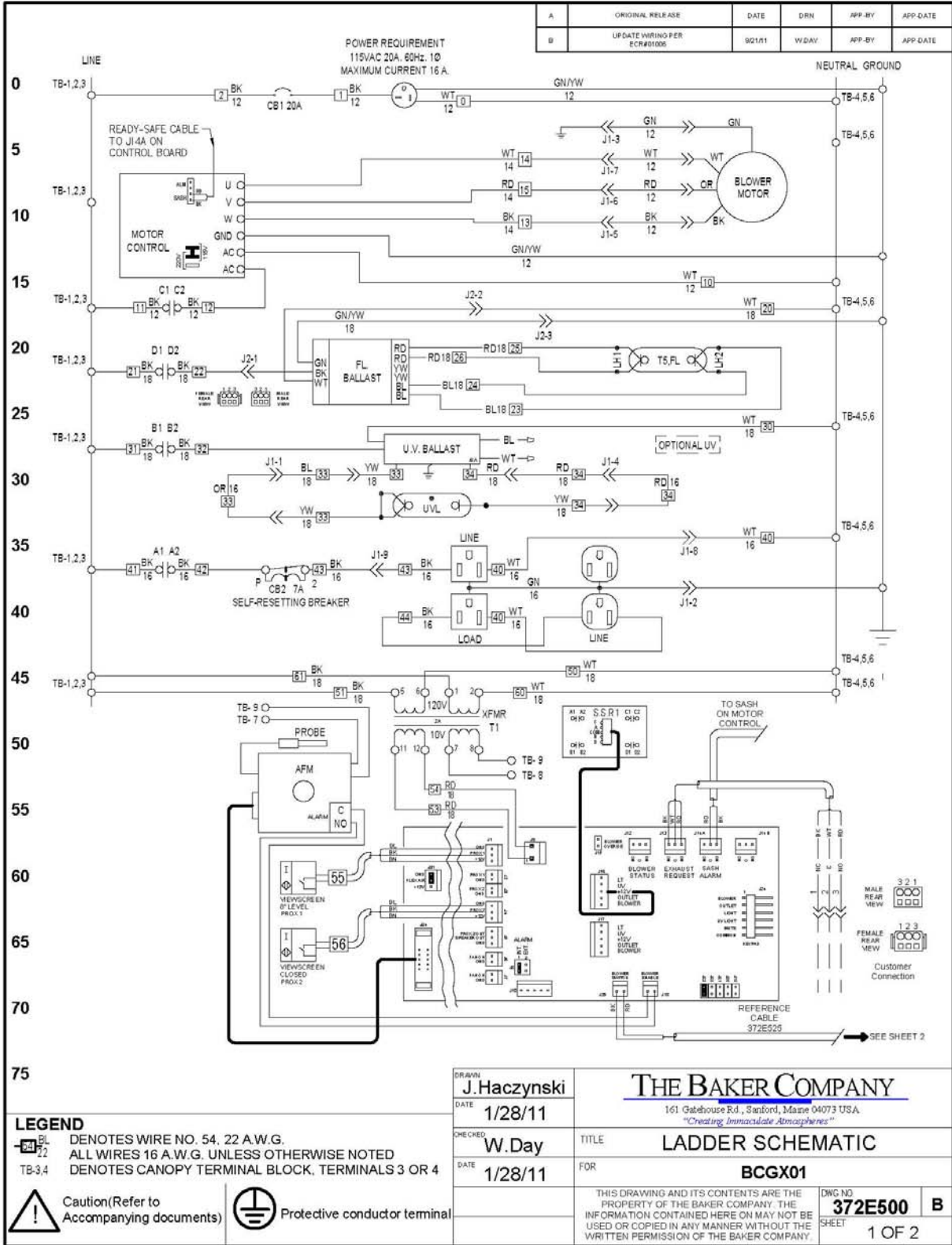
The BioChemGARD e3 has been tested in accordance with ANSI/ASHRAE 110-1995. This standard specifies a quantitative test procedure for evaluation of Laboratory Fume Hoods. Test data confirms that this cabinet meets the requirements of this standard.

The BioChemGARD e3 is designed to be used with a reliable dedicated exhaust system that is appropriate for the application. Any application considered should be defined and approved by a qualified safety professional at the facility, with specific consideration of the materials and methods to be used.

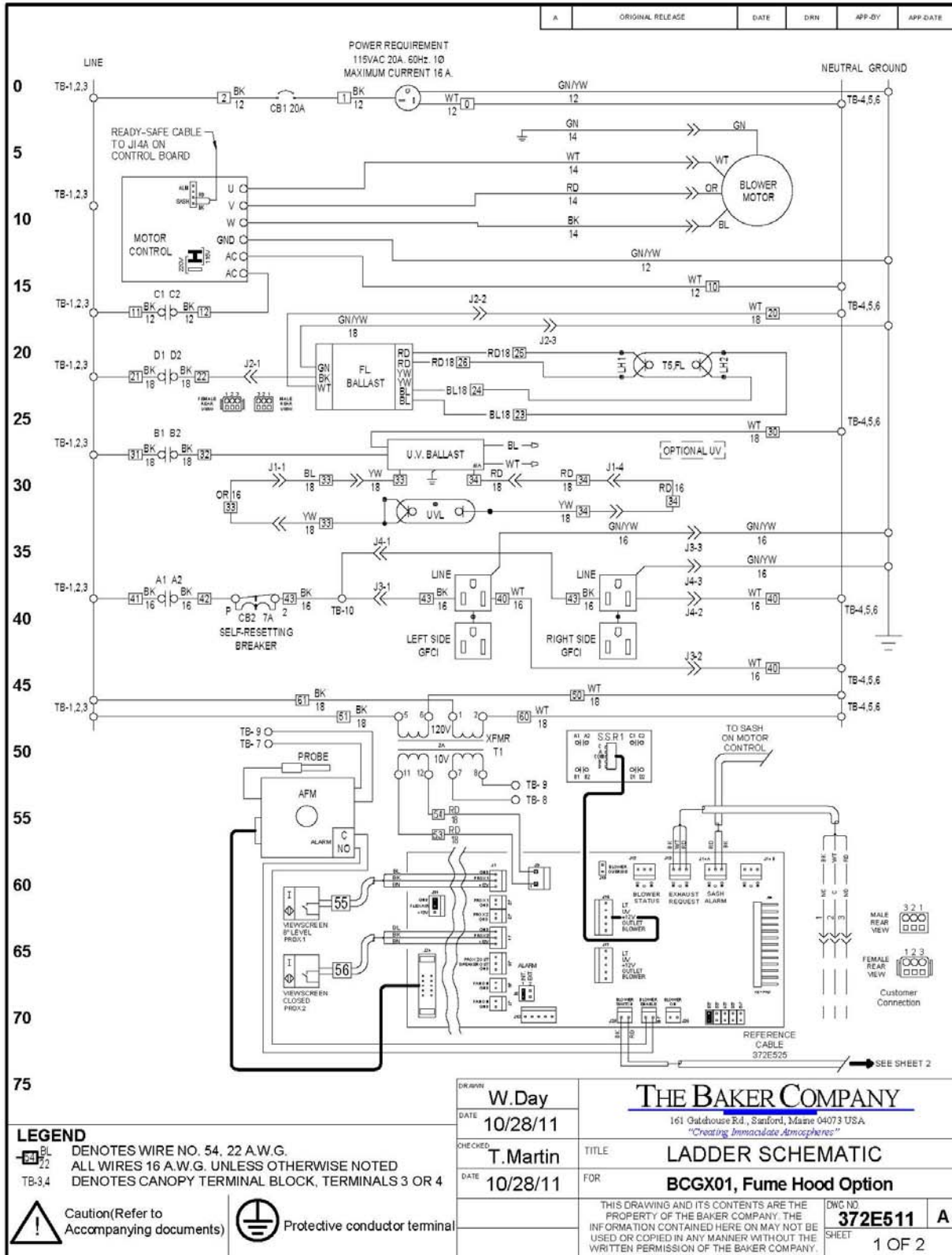
To accommodate the special requirements of Fume Hood applications, the electrical accessory outlets have been moved outside of the work area. The outlets are relocated under the cabinet, on the front of the exhaust plenum, facing toward the user. There are two GFCI duplex outlets, one to the left and one to the right. The outlet circuit is rated at 7 Amps total for both outlets. These outlets are provided with drip proof covers.

The service fixtures are also installed differently. The standard Fume Hood option provides one color-coded service fixture and a remote control valve located on the right hand side of the cabinet. A total of four (4) service fixtures, two (2) per side, can be provided.

Ladder Schematic: BCGX01

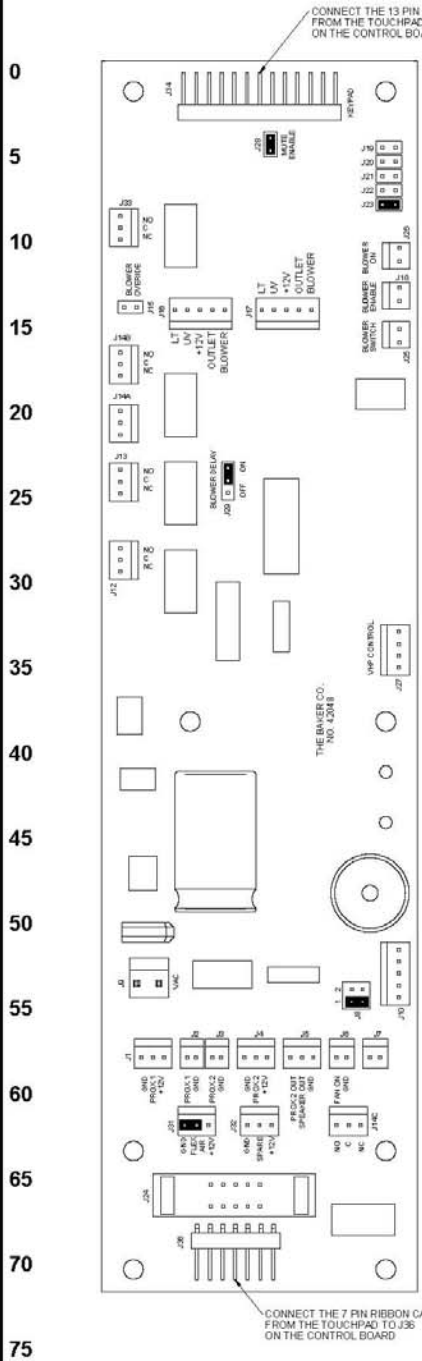


Ladder Schematic: BCGX01, Fume Hood Option



DRAWN	W. Day	THE BAKER COMPANY 161 Galdrouse Rd., Sanford, Maine 04073 USA <i>"Creating Immaculate Atmospheres"</i>	
DATE	10/28/11		
CHECKED	T. Martin	TITLE	LADDER SCHEMATIC
DATE	10/28/11	FOR	BCGX01, Fume Hood Option
<p>LEGEND</p> <p> BL DENOTES WIRE NO. 54, 22 A.W.G.</p> <p> 22 ALL WIRES 16 A.W.G. UNLESS OTHERWISE NOTED</p> <p>TB.3,4 DENOTES CANOPY TERMINAL BLOCK, TERMINALS 3 OR 4</p>		<p>THIS DRAWING AND ITS CONTENTS ARE THE PROPERTY OF THE BAKER COMPANY. THE INFORMATION CONTAINED HERE ON MAY NOT BE USED OR COPIED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF THE BAKER COMPANY.</p>	
<p> Caution(Refer to Accompanying documents)</p> <p> Protective conductor terminal</p>		DWG NO	372E511 A
		SHEET	1 OF 2

A	ORIGINAL RELEASE	DATE	DRN	APP-BY	APP-DATE
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Jumper / Wiring Combinations:

- 1- **Ready Safe Operation** : Jumper on J23, connector on J14A (NO & C) to SASH on motor controller
- 2- **Flex Air not installed** : Jumper J31 as shown
- 3- **Blower/Light Interlock Override** : Adding Jumper to J20 removes safety feature
- 4- **Power/Processor Fault**: Jumper J22 to enable fault alarm
- 5- **Blower OFF Delay**: Jumper J29 OFF for no Blower off delay, Jumper J29 ON for 15 second Blower off delay.
- 6- **AFM**: Plug in 2 wire AFM cable to J18

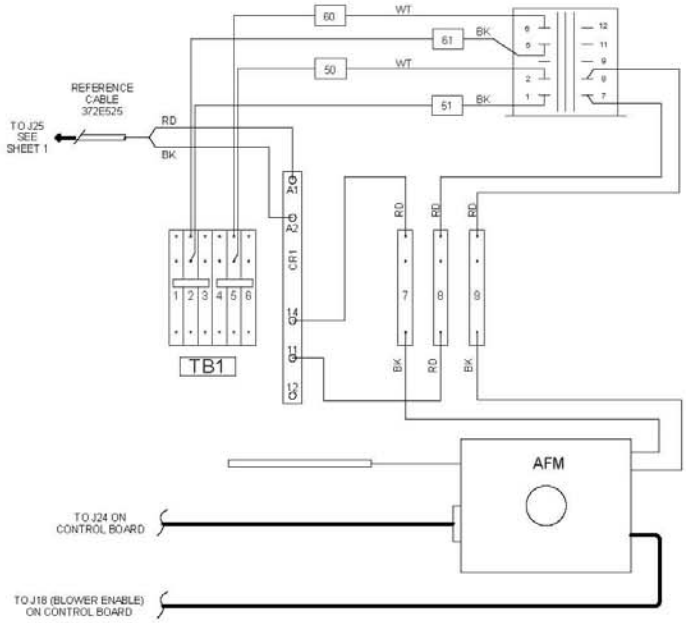
If you are in need of a manual for your cabinet they are available online at:

<http://www.bakerco.com/resources/manuals.php>

OR

Call Customer Service at The Baker Company

1-(800)-992-2537



LEGEND

BL DENOTES WIRE NO. 54, 22 A.W.G.
 22 ALL WIRES 16 A.W.G. UNLESS OTHERWISE NOTED
 TB-3,4 DENOTES CANOPY TERMINAL BLOCK, TERMINALS 3 OR 4

Caution(Refer to Accompanying documents)

Protective conductor terminal

DRAWN	W.Day	THE BAKER COMPANY 161 Gatehouse Rd., Sanford, Maine 04073 USA <i>"Creating Immaculate Atmospheres"</i>		
DATE	10/28/11			
CHECKED	T.Martin	TITLE LADDER SCHEMATIC		
DATE	10/28/11	FOR BCGX01, Fume Hood Option		
THIS DRAWING AND ITS CONTENTS ARE THE PROPERTY OF THE BAKER COMPANY. THE INFORMATION CONTAINED HERE ON MAY NOT BE USED OR COPIED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF THE BAKER COMPANY.		DWG NO	372E511	A
		SHEET	2 OF 2	

Stand Leg Extension Procedure

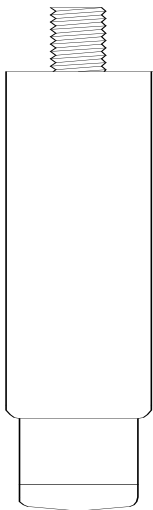
The cabinet is shipped with the legs bolted in the shipping position and has two work surface height settings per option:

Stand Option	Work surface Elevation
Adjustable leg leveler	29 ⁵ / ₈ " [752mm] to 32 ¹ / ₈ " [816mm] and 35 ⁵ / ₈ " [905mm] to 38 ¹ / ₈ " [968mm]
Caster	29 ³ / ₄ " [756mm] and 32 ¹ / ₂ " [826mm]

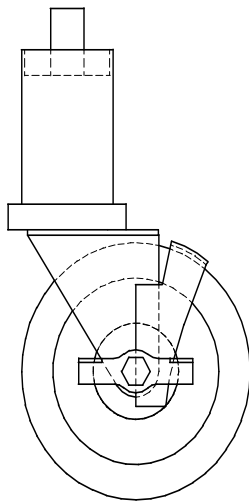
NOTE: castor stand option has four modified leg assemblies and two 45° stand supports (Not shown).

Remove the following parts from the hardware box shipped with the cabinet. Check the quantities with the parts list below.

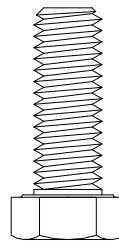
Item Number	Part Description	Quantity
1	Adjustable leg leveler (or caster, if applicable)	4
2	Hex head bolt, ³ / ₈ "-16 x 1" long	8
3	Lock Washer, ³ / ₈ "	8
4	Flat Washer, ³ / ₈ "	8



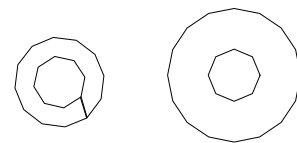
Adjustable leg leveler



Caster



Hex head bolt



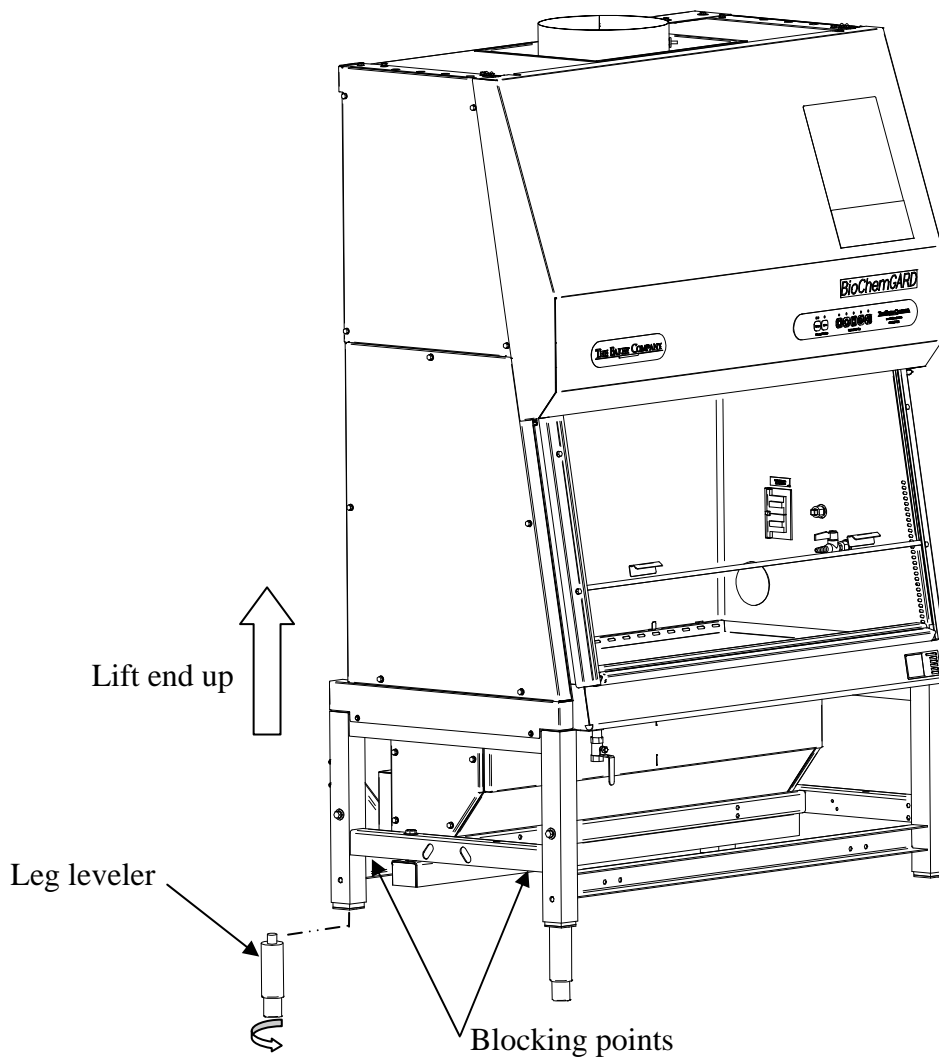
Lock & flat washer

Getting the cabinet off the pallet

1. To protect the floor finish, use a moving blanket. Carefully slide the cabinet off the pallet onto the moving blanket.
2. Slide the cabinet into its destination room before going further with the assembly/installation.

Installing the adjustable leg leveler or caster option

3. Lift one end of the cabinet/stand assembly up a minimum of 7" [178mm] and block in position. **See illustration below.**
4. Screw in two of the adjustable leg levelers or castors (Item# 1). Screw in by hand as tight as you can then remove the blocking.



Only the adjustable leg leveler is shown for clarity

- Repeat steps 3 & 4 on the other end of the cabinet.

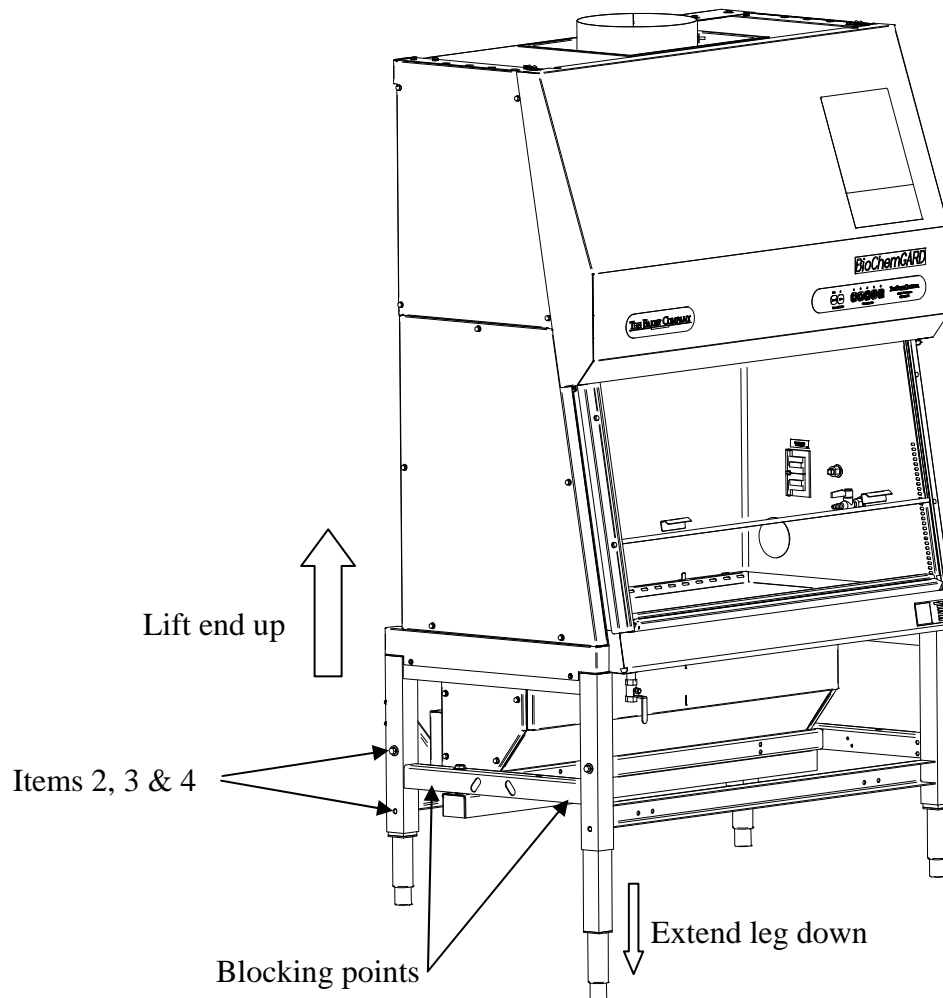
IMPORTANT

If the caster option is provided be sure to chock the previously installed casters [to prevent cabinet movement] before repeating steps 3 & 4.

Raising the unit to 29 5/8" [752mm] work surface height: adjustable leg leveler option

Raising the unit to 32 1/2" [826mm] work surface height: caster option

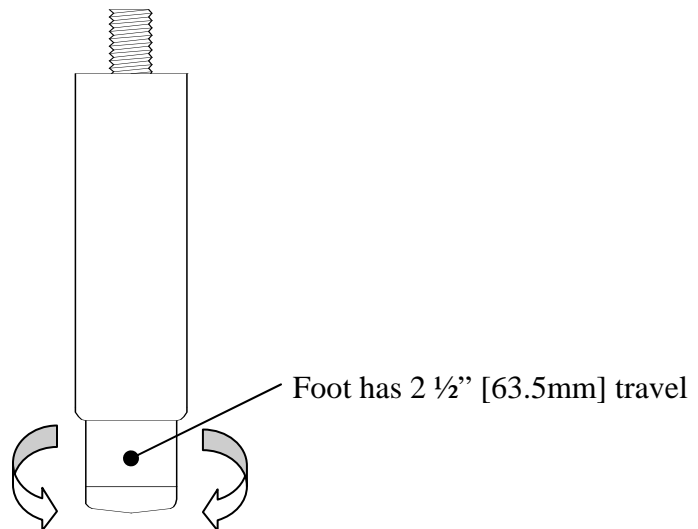
- Lift one end of the cabinet up a minimum of 5" [127mm] and block in position.
- Unscrew the bolts (one per leg) that hold the legs in the shipping position.
- Slide the leg out of the stand 2.5" [63.5mm] (2.75" [69.8mm] for castor option). Holes will be exposed at both bolt locations.



9. Bolt the leg in position with items 2, 3, and 4. (two bolts per leg).
10. Repeat steps 7 through 9 for the other leg then remove the blocking.
11. Repeat steps 6 through 10 for the other end of the cabinet.

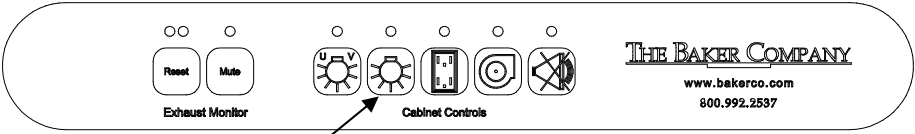
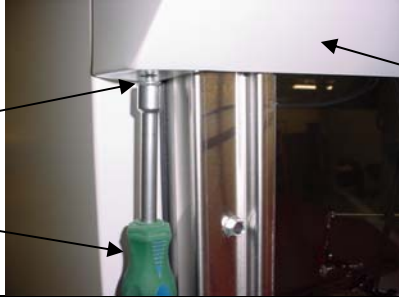

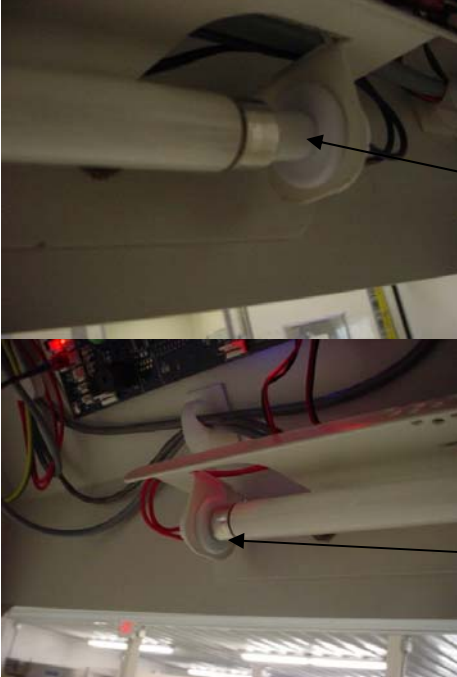
Raising the unit to the 38 1/8" [968mm] work surface height: adjustable leg leveler option

12. Lift one end of the cabinet up a minimum of 7" [178mm] and block in position.
13. Unscrew the bolts (two per leg) that hold the legs in the current work surface height position.
14. Slide the leg out of the stand 6" [152.4mm]. Holes will be exposed at both bolt locations.
15. Bolt the leg in position with items 2, 3, and 4. (two bolts per leg).
16. Repeat steps 14 through 16 for the other leg then remove the blocking.
17. Repeat steps 13 through 17 for the other end of the cabinet.



Rotate foot for fine adjustment to aid in leveling of cabinet

Replacing Fluorescent Lamp

<p>1. Turn off the fluorescent lamp by depressing the light on/off switch located on the right side of the light canopy.</p>	 <p>Reset Mute Exhaust Monitor</p> <p>Fluorescent Light on/off</p> <p>Cabinet Controls</p> <p>THE BAKER COMPANY www.bakerco.com 800.992.2537</p>
<p>2. Using a 3/8" nut driver or wrench, remove the 1/4" hex fasteners located on either side of the front dress panel.</p>	 <p>1/4" Fastener</p> <p>Nut driver</p> <p>Dress panel</p>
<p>3. Once the hardware is removed, grasp the lower portion of the front dress panel and lift outwards, then up approximately 45 degrees. At this point the left and right hand panel rests can be lowered into position.</p>	
<p>4. Using both hands, grasp the lamp carefully near each end. Slide the lamp sideways into the plunger socket until the other end of the lamp comes out of the fixed socket. Swing the lamp toward you and remove. Properly dispose of lamp.</p>	 <p>Plunger socket Left side of cabinet panel</p> <p>Fixed socket</p>
<p>5. Install new lamp by following step# 4 in reverse order.</p>	

6. Hinge dress panel up, pivot left and right panel rests back toward cabinet and lower dress panel. Press the light on/off switch to verify that the lamp is working. **NOTE: the cabinet blower must be on in order for the light to function.**

7. Reinstall 1/4" hex fasteners on front dress panel.

Ultraviolet Lamp Replacement

UV germicidal lamps lose their effectiveness over time and should be replaced when the intensity at the work surface drops below 40 microwatts per square centimeter at a wavelength of 253.5×10^{-9} meters.

IMPORTANT

Before replacing a UV germicidal lamp it might be necessary to check with an industrial hygienist, safety officer or other qualified person in the lab to make sure that there is nothing stored in the cabinet that could potentially be a hazard to you or could be contaminated by room air.

1. Raise the viewscreen to its maximum open position. The audible alarm should activate and the indicator on the light canopy will flash.
2. Using both hands, grasp the UV lamp carefully near each end and move it approximately 13mm [$\frac{1}{2}$ "] to the right side of the cabinet until the UV lamp is released from the lamp socket on the left side. Carefully remove lamp from cabinet and dispose of it properly.
3. Install new lamp by following step 2 in reverse order. Making sure that the lamp is held securely in place.
4. Lower the viewscreen to full closed and turn on the UV light momentarily to verify that it comes on. Immediately turn the UV off again.
5. Raise the viewscreen to the proper sash opening height. This will cancel the audible alarm and flashing indicator light.

NOTICE – OSHA Federal Regulation

The following is an excerpt from the OSHA Federal Register Page 22240 and Figure J-9.

*Biological hazard signs. The biological hazard warning shall be used to signify the actual or potential presence of a biohazard and to identify equipment, containers, rooms, materials, experimental animals or combinations thereof, which contains, or are contaminated with, viable hazardous agents. For the purpose of this subparagraph the term "biological hazard" or "biohazard" shall include only those infectious agents presenting a risk or potential risk to the well-being of man.

We have enclosed a sign featuring the Biohazard Symbol.

We recommend that you attach this sign to the unit in a prominent location if you plan to perform any work in the hood with agents that present a risk or potential risk to the well-being of man.

Warranty

The Baker Company, Inc., expressly represents and warrants all goods (a) to be as specified (and described) in The Baker Company catalogues and literature, and (b) to be free under normal use, service and testing (all as described in The Baker Company, Inc., catalogues and literature) from defects in material and workmanship from a period of thirty-six months from the invoice date.

The exclusive remedy for any breach or violation of this warranty is as follows: The Baker Company, Inc., will F.O.B. Sanford, Maine, furnish without charge repairs to or replacement parts or equipment which proved defective in material or workmanship. No claim may be made for any incidental or consequential damages.

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